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data recovery circuits,” Vijayaraghavan discloses “two devices” with “transmitter (TX) circuit and a receiver (RX) circuit.” Exs. B-3, B-4, B-7, B-8 (claim 6[j]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to re-modulate the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 6[j]). Indeed, re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of

any of the above recited references to include wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 6[k]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Carter, Vijayaraghavan, CMIS, and TI DS110DF111 where they disclose wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters, with the embodiments of at least Lugthart 431, TI DS125DF410, Chung, Cornelius, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11 As specific examples, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses that “the TX equalizer circuitry may be configured to compensate for channel loss” and “may perform pre-emphasis” and that “equalization-related settings are obtained,” including “UC TX preset coefficient data,” TI DS110DF111 discloses “output de-emphasis compensates for the

lossy transmission medium at the output” and that it “cannot determine independently the appropriate output voltage or de-emphasis setting, so the user is responsible for configuring these parameters. They can be set of reach channel independently,” CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-7, B-8, B-5, B-11 (claim 6[k]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 6[k]). Indeed, wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters), yielding a predictable result (greater data processing

capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “cable-dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include cable-dependent equalization parameters employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach cable-dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters. *See, e.g.*, Exs. B-3 – B-9, B-11

(claim 7). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Carter, Vijayaraghavan, Cornelius, CMIS where they disclose cable-dependent equalization parameters employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters, with the embodiments of at least Lugthart 431, TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11 As specific examples, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-8, B-7, B-4, B-11 (claim 7). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that cable-dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound

data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 7). Indeed, cable-dependent equalization parameters employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (cable-dependent equalization parameters are employed), according to its established function (for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters are adaptively updated,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include said cable-

dependent equalization parameters are adaptively updated in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach said cable-dependent equalization parameters are adaptively updated. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 8). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Carter, Vijayaraghavan, Cornelius, CMIS where they disclose said cable-dependent equalization parameters are adaptively updated, with the embodiments of at least Lugthart 431, TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-4, B-7, B-8, B-11 (claim 8). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters are adaptively updated. *See, e.g.*, Exs.

B-3 – B-9, B-11 (claim 8). Indeed, that said cable-dependent equalization parameters are adaptively updated is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (said cable-dependent equalization parameters are adaptively updated), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable. *See, e.g.*, Exs. B-3 – B-

9, B-11 (claim 9). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, Vijayaraghavan, Cornelius, CMIS where they disclose said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable, with the embodiments of at least TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses a “start-up phase to determine the channel parameters such as, for example, loss, noise, dispersion, non-linearity, etc.,” Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-3, B-4, B-7, B-8, B-11 (claim 9). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining

said cable-dependent equalization parameters during manufacturer-testing of the network cable. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 9). Indeed, that said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first inbound data stream has a per-lane symbol rate in excess of 50 GBd,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 10). For example, a POSITA would have been motivated to

incorporate the embodiments of at least each of Lugthart 431, Carter, TI DS125DF410, and Musah where they disclose that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd, with the embodiments of at least TI DS110DF111, CMIS, Chung, Vijayaraghavan, Cornelius, Rianni, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses “speeds of between about 480 Mbits/s/ and about 10Gbit/s,” Carter discloses “speeds faster than 10 gigabits per second (G) and in particular 40 G and 100G,” TI DS125DF410 discloses “Data Rates from 9.8 to 12.5 Gbps,” and Musah discloses “data rate of up to 32 Gb/s per lane.” Exs. B-3, B-8, B-6, B-11 (claim 10). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd. *See, e.g.,* Exs. B-3 – B-9, B-11 (claim 10). Indeed, that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first inbound data stream has a per-lane symbol rate in excess of 50 GBd), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second

transceiver to the first transceiver,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[a]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, Cornelius, and Vijayaraghavan, where they disclose connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver, with the embodiments of at least TI DS110DF111, TI DS125DF410, CMIS, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses “cable configurations” including “conducting lines 111” that “can include metal (e.g., copper) conductors,” Carter discloses a “first device” coupled to “an electrical cable or optical cable,”

Cornelius discloses an “active cable” including “two active plugs 500 and 505, one on each end of cable 507,” and Vijayaraghavan discloses a “bi-directional lane which is configured to communicate data between two communication devices” and “may use two pairs of differential lines to communicate data in both directions at the same time.” Exs. B-4, B-7, B-8 (claim 11[a]). Additionally, Lugthart 431 discloses a “first transceiver assembly 105a includes a host side that is electrically connected to the first electronic device 101a and a line side that is electrically connected to a first end of the conductive lines 111” as well as “the second transceiver assembly 105b includes a host side that is electrically connected to the second electronic device 101b and a line side that is electrically connected to a second end of the conductive lines 111,” Carter discloses a “converter device 10 that is configured to connect to a first device 12 and a second device 14” that “converts traffic data” and comprises a first connector that is configured to connect to (or to be coupled to) a connector 16 within the first device 12,” Vijayaraghavan discloses “two devices” with “transmitter (TX) circuit and a receiver (RX) circuit.” Exs. B-3, B-4, B-7, B-8 (claim 11[a]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to connect a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[a]). Indeed, connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver is but one of a finite number of known, predictable solutions to achieve greater data

processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively), according to its established function (to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach packaging the first transceiver into a first connector configured

to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[b]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, and Vijayaraghavan, where they disclose packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device, with the embodiments of at least TI DS110DF111, TI DS125DF410, Cornelius, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses a “first transceiver assembly 105a includes a host side that is electrically connected to the first electronic device 101a and a line side that is electrically connected to a first end of the conductive lines 111” as well as “the second transceiver assembly 105b includes a host side that is electrically connected to the second electronic device 101b and a line side that is electrically connected to a second end of the conductive lines 111,” Carter discloses a “converter device 10 that is configured to connect to a first device 12 and a second device 14” that “converts traffic data” and comprises a first connector that is configured to connect to (or to be coupled to) a connector 16 within the first device 12,” Vijayaraghavan discloses “two devices” with “transmitter (TX) circuit and a receiver (RX) circuit.” Exs. B-3, B-7, B-8 (claim 11[b]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to package the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical

output signal from the first transceiver to the network interface port of the first host device. *See, e.g.,* Exs. B-3 – B-9, B-11 (claim 11[b]). Indeed, packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (packaging the first transceiver into a first connector), according to its established function (configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include packaging the second transceiver into a second connector

configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[c]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, and Vijayaraghavan, where they disclose packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device, with the embodiments of at least TI DS110DF111, TI DS125DF410, Cornelius, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses a “first transceiver assembly 105a includes a host side that is electrically connected to the first electronic device 101a and a line side that is electrically connected to a first end of the conductive lines 111” as well as “the second transceiver assembly 105b includes a host side that is electrically connected to the second electronic device 101b and a line side that is electrically connected to a second end of the conductive lines 111,” Carter discloses a “converter device 10 that is configured to connect to a first device 12 and a second device 14” that “converts traffic data” and comprises a first connector that is configured to connect to (or to be coupled to) a connector 16 within the

first device 12,” Vijayaraghavan discloses “two devices” with “transmitter (TX) circuit and a receiver (RX) circuit.” Exs. B-3, B-7, B-8 (claim 11[c]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to package the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[c]). Indeed, packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (packaging the second transceiver into a second connector), according to its established function (configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers being configured to perform clock and data recovery on

the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TIDS110DF111, TIDS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach that the first and second transceivers being configured to perform clock and data

recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[d]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, Cornelius, CMIS, TI DS110DF111, and Vijayaraghavan, where they disclose that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals, with the embodiments of at least TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng, and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses a “the transceiver 10 includes a first transmit path equalizer 11a, a second transmit path equalizer 11b, a first transmit path clock and data recovery (CDR) circuit 12a, a second transmit path CDR circuit 12b, a transmit path digital signal processor

(DSP) 13, a transmit path DAC 14, a receive path equalizer 21, a receive path CDR circuit 22, a receive path DSP 23, a first receive path DAC 24a, and a second receive path DAC 24b,” Carter discloses a “converter device 10 converts traffic data between the first form factor pluggable standard and the second form factor pluggable standard in a variety of data transport modes to enable connectivity between the first device and a plurality of different types of second devices,” Cornelius discloses a device containing “clock and data recovery circuits,” Vijayaraghavan discloses “two devices” with “transmitter (TX) circuit and a receiver (RX) circuit.” Exs. B-3, B-4, B-5, B-7, B-8, B-11 (claim 11[d]). Additionally, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses that “the TX equalizer circuitry may be configured to compensate for channel loss” and “may perform pre-emphasis” and that “equalization-related settings are obtained,” including “UC TX preset coefficient data,” TI DS110DF111 discloses “output de-emphasis compensates for the lossy transmission medium at the output” and that it “cannot determine independently the appropriate output voltage or de-emphasis setting, so the user is responsible for configuring these parameters. They can be set of reach channel independently,” CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-11 (claim 11[d]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-

modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 11[d]). Indeed, that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-

modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 12). For example,

a POSITA would have been motivated to incorporate the embodiments of at least each of Carter, Vijayaraghavan, Cornelius, CMIS where they disclose that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals, with the embodiments of at least Lugthart 431, TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-4, B-7, B-8, B-11 (claim 12). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 12). Indeed, that

the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 13). For example,

a POSITA would have been motivated to incorporate the embodiments of at least each of Carter, Vijayaraghavan, Cornelius, CMIS where they disclose that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation, with the embodiments of at least Lugthart 431, TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-4, B-7, B-8, B-11 (claim 13). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 13). Indeed, that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in

cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters,” a person of ordinary skill in the art would have been motivated to combine Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Kobayashi, Zheng, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart 431, TI DS110DF111, TI DS125DF410, CMIS, Carter, Chung, Vijayaraghavan, Cornelius, Musah, Rianni, Zheng, each of which teach that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters. *See, e.g.*, Exs. B-3 – B-9, B-11 (claim 14). For example, a POSITA would have been motivated to incorporate the embodiments

of at least each of Lugthart 431, Carter, Vijayaraghavan, Cornelius, CMIS where they disclose that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters, with the embodiments of at least TI DS110DF111, TI DS125DF410, Chung, Musah, Rianni, Kobayashi, Zheng and/or any combinations therein. *See* Exs. B-3 – B-9, B-11. As specific examples, Lugthart 431 discloses a “start-up phase to determine the channel parameters such as, for example, loss, noise, dispersion, non-linearity, etc.,” Carter discloses that “the controller 130 retrieves from non-volatile memory 144 (FIG. 3), specific transmit emphasis parameters, and at 242, supplies those transmit emphasis parameters to the signal processor,” Vijayaraghavan discloses a TX equalizer circuitry “configured to compensate for channel loss” and “perform pre-emphasis” with “DC preset data” “obtained from firmware at the UC by the equalization controller,” Cornelius discloses that “the clock and data recovery circuits may employ equalizer circuits, buffers, emphasis, and de-emphasis circuits” and that “operational parameters” “may be configured” to “allow cables to adapt to new hosts and devices as the cable is used in various system applications,” and CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Exs. B-3, B-4, B-7, B-8, B-11 (claim 14). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-

dependent equalization parameters. *See, e.g.*, Exs. B-3 – B-9, B-11 – B-9, B-11 (claim 14). Indeed, that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

Similarly, a POSITA would have been motivated to combine the SMP9 Cable in view of the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson.

To the extent that it is determined that any of these references do not disclose or render obvious “each of the first and second connectors including a respective transceiver that performs clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that each of the first and

second connectors including a respective transceiver that performs clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream, in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 1[c]). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Lugthart 431, Carter, Cornelius, and Vijayaraghavan, where they disclose first and second connectors including a respective transceiver that performs clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream, with the embodiments of at least CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, and/or any combinations therein. *See* Ex. B-11 (claim 1[c]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to use first and second connectors including a respective transceiver that performs clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream. *See, e.g.*, Exs. B-10 – B-11 (claim 1[c]). Indeed, using first and second connectors including a respective transceiver that performs clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. It would thus require nothing more than the application of a known solution (each of the first and second connectors including a respective transceiver), according to its

established function (for performing clock and data recovery on the electrical input signal to extract and re-modulate the inbound data stream for transit via the electrical conductors as a respective electrical transit signal conveying a transit data stream), yielding a predictable result (the communication of electrical transit signals between a first device and a second device). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 1[d]). For example, a POSITA would have been motivated to incorporate the embodiments of the SMP9 Cable, where it discloses the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable, with the embodiments of at least CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson and/or any combinations therein. *See* Exs. B-10 – B-11. A POSITA would have been motivated to make such combinations with a reasonable

expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable. *See, e.g.*, Exs. B-10 – B-11 (claim 1[d]). Indeed, the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. It would thus require nothing more than the application of a known solution (the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal), according to its established function (to extract and re-modulate the transit data stream as the outbound data stream from the cable), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the respective transceivers each employing fixed, cable-independent, equalization parameters for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references

to include the respective transceivers each employing fixed, cable-independent, equalization parameters for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 1[e]). For example, a POSITA would have been motivated to incorporate the embodiments of the SMP9 Cable where it discloses disclose the respective transceivers each employing fixed, cable-independent, equalization parameters for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal, with the embodiments of at least CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson and/or any combinations therein. *See* Exs. B-10 – B-11. As specific examples, CMIS discloses a “module control state” where “all memory map register locations shall be set to their power-on defaults” and control field such as “Tx Adaptive Input Eq Enable,” “TX Adaptive Input Eq Recall,” “Rx Output Eq control, pre-cursor,” and “RX Output Eq control, post-cursor.” Ex. B-11 (claim 1[e]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the respective transceivers each employing fixed, cable-independent, equalization parameters for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal. *See, e.g.*, Exs. B-10 – B-11 (claim 1[e]). Indeed, the respective transceivers each employing fixed, cable-independent, equalization parameters for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. It would thus require nothing more

than the application of a known solution (the respective transceivers each employing fixed, cable-independent, equalization parameters), according to its established function (for each of: the remodulation of the transit data stream as the outbound data stream, and the clock and data recovery performed on the electrical input signal), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the respective transceivers each employ cable-dependent equalization parameters for at least one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the respective transceivers each employ cable-dependent equalization parameters for at least one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 2). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the respective transceivers each employ cable-dependent equalization parameters for at least one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal. *See, e.g.*, Exs. B-10 – B-11 (claim 2). Indeed, that the respective

transceivers each employ cable-dependent equalization parameters for at least one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (employing cable-dependent equalization parameters), according to its established function (for at least one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters adapt during usage of the Ethernet cable,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that said cable-dependent equalization parameters adapt during usage of the Ethernet cable in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 3). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters adapt during usage of the Ethernet cable. *See, e.g.*, Exs. B-10 – B-11 (claim 3). Indeed, that said cable-dependent equalization parameters adapt during

usage of the Ethernet cable is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (adapting cable-dependent equalization parameters), according to its established function (during the usage of the Ethernet cable), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters are fixed during normal usage of the Ethernet cable, and wherein said cable-dependent equalization parameters are determined during manufacturing-testing of the Ethernet cable,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that said cable-dependent equalization parameters are fixed during normal usage of the Ethernet cable, and wherein said cable-dependent equalization parameters are determined during manufacturing-testing of the Ethernet cable in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 4). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters are fixed during normal usage of the Ethernet cable, and wherein said cable-dependent equalization parameters are determined during manufacturing-testing of the Ethernet cable. *See, e.g.*, Exs. B-10 – B-11 (claim 4). Indeed, that said cable-

dependent equalization parameters are fixed during normal usage of the Ethernet cable, and wherein said cable-dependent equalization parameters are determined during manufacturing-testing of the Ethernet cable is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (determining equalization parameters during manufacturing-testing of the Ethernet cable), according to its established function (to fix cable-dependent equalization parameters during normal usage of the Ethernet cable), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of 50 GBd,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of 50 GBd in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 5). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of 50 GBd. *See, e.g.*, Exs. B-10 – B-11 (claim 5). Indeed, that the inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of

50 GBd is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of 50 GBd), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “receiving with the first connector a first electrical input signal conveying a first inbound data stream from a first host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include receiving with the first connector a first electrical input signal conveying a first inbound data stream from a first host device in view of the teachings of at least the knowledge of a POSITA *See, e.g.*, Exs. B-10 – B-11 (claim 6[a]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art receiving with the first connector a first electrical input signal conveying a first inbound data stream from a first host device. *See, e.g.*, Exs. B-10 – B-11 (claim 6[a]). Indeed, receiving with the first connector a first electrical input signal conveying a first inbound data stream from a first host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of

a known solution according to its established function (receiving with the first connector a first electrical input signal conveying a first inbound data stream from a first host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “performing clock and data recovery on the first electrical input signal with a first transceiver in the first connector to extract the first inbound data stream,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include performing clock and data recovery on the first electrical input signal with a first transceiver in the first connector to extract the first inbound data stream in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[b]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art performing clock and data recovery on the first electrical input signal with a first transceiver in the first connector to extract the first inbound data stream. *See, e.g.*, Exs. B-10 – B-11 (claim 6[b]). Indeed, performing clock and data recovery on the first electrical input signal with a first transceiver in the first connector to extract the first inbound data stream is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (performing

clock and data recovery on the first electrical input signal with a first transceiver in the first connector to extract the first inbound data stream), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “re-modulating the first inbound data stream as a first transit data stream conveyed by a first electrical transit signal over a first of the conductor pairs,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include re-modulating the first inbound data stream as a first transit data stream conveyed by a first electrical transit signal over a first of the conductor pairs in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[c]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to re-modulate the first inbound data stream as a first transit data stream conveyed by a first electrical transit signal over a first of the conductor pairs. *See, e.g.*, Exs. B-10 – B-11 (claim 6[c]). Indeed, re-modulating the first inbound data stream as a first transit data stream conveyed by a first electrical transit signal over a first of the conductor pairs is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (re-modulating the first inbound data stream

as a first transit data stream conveyed by a first electrical transit signal over a first of the conductor pairs), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “receiving with the second connector a second electrical input signal conveying a second inbound data stream from a second host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include receiving with the second connector a second electrical input signal conveying a second inbound data stream from a second host device in view of the teachings of at least the knowledge of a POSITA. *See, e.g.,* Exs. B-10 – B-11 (claim 6[d]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to receive with the second connector a second electrical input signal conveying a second inbound data stream from a second host device. *See, e.g.,* Exs. B-10 – B-11 (claim 6[d]). Indeed, receiving with the second connector a second electrical input signal conveying a second inbound data stream from a second host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (receiving with the second connector a second electrical input signal conveying a second inbound data stream from a second host device), yielding a predictable result (greater data processing

capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “performing clock and data recovery on the second electrical input signal with a second transceiver in the second connector to extract the second inbound data stream,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include performing clock and data recovery on the second electrical input signal with a second transceiver in the second connector to extract the second inbound data stream in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[e]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to perform clock and data recovery on the second electrical input signal with a second transceiver in the second connector to extract the second inbound data stream. *See, e.g.*, Exs. B-10 – B-11 (claim 6[e]). Indeed, performing clock and data recovery on the second electrical input signal with a second transceiver in the second connector to extract the second inbound data stream is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (performing clock and data recovery on the second electrical input signal with a second transceiver in the second connector to extract the

second inbound data stream), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “re-modulating the second inbound data stream as a second transit data stream conveyed by a second electrical transit signal over a second of the conductor pairs,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include re-modulating the second inbound data stream as a second transit data stream conveyed by a second electrical transit signal over a second of the conductor pairs in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[f]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to re-modulate the second inbound data stream as a second transit data stream conveyed by a second electrical transit signal over a second of the conductor pairs. *See, e.g.*, Exs. B-10 – B-11 (claim 6[f]). Indeed, re-modulating the second inbound data stream as a second transit data stream conveyed by a second electrical transit signal over a second of the conductor pairs is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (re-modulating the second inbound data stream as a second transit data stream conveyed by a second electrical

transit signal over a second of the conductor pairs), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “performing clock and data recovery on the first electrical transit signal with the second transceiver to extract the first transit data stream,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include performing clock and data recovery on the first electrical transit signal with the second transceiver to extract the first transit data stream in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[g]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to perform clock and data recovery on the first electrical transit signal with the second transceiver to extract the first transit data stream. *See, e.g.*, Exs. B-10 – B-11 (claim 6[g]). Indeed, performing clock and data recovery on the first electrical transit signal with the second transceiver to extract the first transit data stream is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (performing clock and data recovery on the first electrical transit signal with the second transceiver), according to its established function (to extract the first transit data stream), yielding a predictable result (greater

data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “re-modulating the first transit data stream as a second outbound data stream conveyed by a second electrical output signal to the second host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include re-modulating the first transit data stream as a second outbound data stream conveyed by a second electrical output signal to the second host device in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[h]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to re-modulate the first transit data stream as a second outbound data stream conveyed by a second electrical output signal to the second host device. *See, e.g.*, Exs. B-10 – B-11 (claim 6[h]). Indeed, re-modulating the first transit data stream as a second outbound data stream conveyed by a second electrical output signal to the second host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (re-modulating the first transit data stream as a second outbound data stream conveyed by a second electrical output signal to the second host device), yielding a predictable result (greater data processing capabilities and efficiency).

Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “performing clock and data recovery on the second electrical transit signal with the first transceiver to extract the second transit data stream,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include performing clock and data recovery on the second electrical transit signal with the first transceiver to extract the second transit data stream in view of the teachings of at least the knowledge of a POSITA. *See, e.g.,* Exs. B-10 – B-11 (claim 6[i]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to perform clock and data recovery on the second electrical transit signal with the first transceiver to extract the second transit data stream. *See, e.g.,* Exs. B-10 – B-11 (claim 6[i]). Indeed, performing clock and data recovery on the second electrical transit signal with the first transceiver to extract the second transit data stream is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (performing clock and data recovery on the second electrical transit signal with the first transceiver), according to its established function (to extract the second transit data stream), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art

would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[j]). A POSITA would have been motivated with a reasonable expectation of success to make such combinations to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to re-modulate the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device. *See, e.g.*, Exs. B-10 – B-11 (claim 6[j]). Indeed, re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (re-modulating the second transit data stream as a first outbound data stream conveyed by a first electrical output signal to the first host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of

ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 6[k]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters. *See, e.g.*, Exs. B-10 – B-11 (claim 6[k]). Indeed, wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said

performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (wherein said re-modulating the first transit data stream, said re-modulating the second transit data stream, said performing clock and data recovery on the first electrical input signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization [sic] parameters), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “cable-dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include cable-dependent equalization parameters employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed,

cable-independent, equalization parameters in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 7). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that cable-dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters. *See, e.g.*, Exs. B-10 – B-11 (claim 7). Indeed, cable-dependent equalization parameters employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (cable-dependent equalization parameters are employed), according to its established function (for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing [sic] clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters are adaptively updated,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include said cable-dependent equalization parameters are adaptively updated in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 8). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters are adaptively updated. *See, e.g.*, Exs. B-10 – B-11 (claim 8). Indeed, that said cable-dependent equalization parameters are adaptively updated is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (said cable-dependent equalization parameters are adaptively updated), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable,” a person of ordinary skill in the art would have

been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 9). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable. *See, e.g.*, Exs. B-10 – B-11 (claim 9). Indeed, that said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (said cable-dependent equalization parameters are fixed during normal usage, and wherein the method further comprises: determining said cable-dependent equalization parameters during manufacturer-testing of the network cable), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first inbound data stream has a per-lane symbol rate in excess of 50 GBd,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 10). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd. *See, e.g.*, Exs. B-10 – B-11 (claim 10). Indeed, that the first inbound data stream has a per-lane symbol rate in excess of 50 GBd is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first inbound data stream has a per-lane symbol rate in excess of 50 GBd), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second

transceiver to the first transceiver,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 11[a]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to connect a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver. *See, e.g.*, Exs. B-10 – B-11 (claim 11[a]). Indeed, connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively, to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second transceiver to the first transceiver is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (connecting a first end and a second end of a set of conductor pairs to a first transceiver and a second transceiver, respectively), according to its established function (to transport a first electrical transit signal from the first transceiver to the second transceiver and a second electrical transit signal from the second

transceiver to the first transceiver), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 11[b]). *See, e.g.*, Exs. B-10 – B-11 (claim 11[b]). Indeed, packaging the first transceiver into a first connector configured to couple a first electrical input signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (packaging the first transceiver into a first connector), according to its established function (configured to couple a first electrical input

signal from a network interface port of a first host device to the first transceiver and a first electrical output signal from the first transceiver to the network interface port of the first host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 11[c]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art to package the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device. *See, e.g.*, Exs. B-10

– B-11 (claim 11[c]). Indeed, packaging the second transceiver into a second connector configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution (packaging the second transceiver into a second connector), according to its established function (configured to couple a second electrical input signal from a network interface port of a second host device to the second transceiver and a second electrical output signal from the second transceiver to the network interface port of the second host device), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re- modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals,” a person of ordinary skill in the art would have been motivated to

combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 11[d]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals. *See,*

*e.g.*, Exs. B-10 – B-11 (claim 11[d]). Indeed, that the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers being configured to perform clock and data recovery on the first and second electrical input signal to extract and re-modulate the first and second inbound data streams respectively as the first and second electrical transit signals conveying first and second transit data streams, configured to perform clock and data recovery on the second and first electrical transit signals to extract and re-modulate the second and first transit data streams as first and second outbound data streams conveyed by the first and second electrical output signals from the cable, and each configured to employ fixed, cable-independent, equalization parameters for clock and data recovery on the respective electrical input signals and for generating the respective electrical output signals), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 12). *See, e.g.*, Exs. B-10 – B-11 (claim 12). Indeed, that the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to employ cable-dependent equalization parameters for generating the first and second electrical transit signals and for clock and data recovery on the second and first electrical transit signals), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 13). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater data processing capabilities and efficiency in cable applications. It was also already well-known in the art that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation. *See, e.g.*, Exs. B-10 – B-11 (claim 13). Indeed, that the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to adapt the cable-dependent equalization parameters during operation), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose or render obvious “the first and second transceivers are each configured to use preset cable-dependent

equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable with CMIS, Chung, Musah, Rianni, Kobayashi, Zheng, Aronson, or a combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exs. B-10 – B-11 (claim 14). Indeed, that the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters is but one of a finite number of known, predictable solutions to achieve greater data processing capabilities and efficiency in cable applications. Using such techniques would thus require nothing more than the application of a known solution according to its established function (the first and second transceivers are each configured to use preset cable-dependent equalization parameters during operation, and wherein the method further comprises: testing an assembled cable to determine the cable-dependent equalization parameters), yielding a predictable result (greater data processing capabilities and efficiency). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

Complainant has yet to indicate a belief that any of the prior art references do not supply any of the claim limitations. Respondents’ motivations to combine the prior art to supply other

limitations may be amended or supplemented in view of Complainant's contentions regarding the missing limitations in the prior art references.

### **Secondary Considerations**

Respondents are not aware of any secondary-considerations evidence demonstrating non-obviousness of the Asserted Claims of the '252 Patent. Complainants have not produced any documents related to secondary considerations, nor have Complainants identified any such secondary considerations, let alone demonstrated a nexus between any such considerations and the alleged inventions of the Asserted Claims of the '252 Patent.

As discussed in Appendix B, the prior art references confirm that the Asserted Claims of the '252 Patent would have been obvious to a POSITA before the earliest possible priority date. Respondents reserve the right to supplement or modify these factors to address any evidence or arguments later identified by Complainants.

### **Invalidity Grounds Under 35 U.S.C. § 112**

. Subject to Respondents' reservation of rights above, Respondents identify their grounds of invalidity for the '252 Patent based on lack of enablement, written description, and indefiniteness pursuant to 35 U.S.C. §§ 112(a) and (b) below. The terms recited below are invalid based on lack of enablement, written description, and indefiniteness pursuant to 35 U.S.C. §§ 112(a) and (b) under any scope of the claim terms. If, however, an overbroad construction is applied, at least under the overbroad constructions that Complainants appear to be applying to the Asserted Claims of the '252 Patent, which go beyond (and are not adequately described or enabled by) the purported inventions allegedly disclosed in the '252 Patent, the claims are invalid for that additional reason. Specifically, to the extent that Complainants assert that the Asserted Claims of the '252 Patent are so broad as to cover the Respondents' respective Accused Products and alleged

domestic industry products, or to the extent that they may eventually be construed so broadly, such an interpretation or construction would render the Asserted Claims of the '252 Patent invalid for failure to meet the requirements of 35 U.S.C. § 112. A more detailed discussion of Respondents' written description, enablement, and indefiniteness defenses will be set forth in Respondents' expert report(s) on invalidity.

**Lack of Written Description and/or Enablement**

The '252 Patent does not provide sufficient written description to establish that the applicants were in possession of the alleged inventions recited in certain of the Asserted Claims at the time the '252 Patent was filed. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus.

The specification of the '252 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the Asserted Claims without undue experimentation. To the extent the following limitations are definite, the application that became the '252 Patent fails to sufficiently describe or enable them as required:

Term	Relevant Claim(s)	Basis
“fixed, cable-independent, equalization parameters”	1, 6, 11	The specification of the '252 Patent provides that “the host-facing transmitter and receiver set 210 employ fixed equalization parameters that are cable-independent, i.e., they are not customized on a cable-by-cable basis.” The '252 does not otherwise provide any detail regarding the “cable-independent equalization

Term	Relevant Claim(s)	Basis
		<p>parameters” nor does it provide any examples of such parameters.</p> <p>Accordingly the '252 Patent does not contain sufficient written description to allow a person of ordinary skill in the art to recognize that the inventors were in possession of the claimed invention nor does it enable a person of ordinary skill in the art to make and use the invention without undue experimentation.</p>
<p>“wherein cable dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters”</p>	<p>7-10</p>	<p>The '252 Patent does disclose and does not provide sufficient information to allow a POSITA to make and use a device wherein both “cable dependent equalization parameters” and “fixed, cable-independent, equalization parameters” are employed for the same process.</p> <p>The '252 Patent does not disclose a device wherein both “cable dependent equalization parameters” and “fixed, cable-independent, equalization parameters.” The disclosures in the d'252 Patent are thus insufficient to allow a POSITA to recognize that the inventors were in possession of the claimed invention.</p>
<p>“have a per-lane symbol rate in excess of 50 GBd.”</p>	<p>5, 10</p>	<p>The '252 Patent does not disclose and does not provide sufficient information to allow a POSITA to make and use a device with “per-lane symbol rate in excess of 50 GBd.” The specification discusses only “26.5625 GBd” per lane.</p>

Term	Relevant Claim(s)	Basis
		The '252 Patent does not disclose a per-lane symbol rate in excess of 50 GBd, and only describes 26.5625 GBd. This disclosure is insufficient to allow a POSITA to recognize that the inventors were in possession of the claimed invention.

**Indefiniteness**

Certain of the Asserted Claims are invalid because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite for failing to particularly point out and distinctly claim the subject matter the applicants regard as their invention.

The following limitations recited in the Asserted Claims are indefinite in whole, in part or in combination:

Term	Relevant Claim(s)	Basis
“fixed, cable-independent, equalization parameters”	1, 6, 11	<p>The specification of the '252 Patent provides that “the host-facing transmitter and receiver set 210 employ fixed equalization parameters that are cable-independent, i.e., they are not customized on a cable-by-cable basis.” The '252 does not otherwise provide any detail regarding the “cable-independent equalization parameters” nor does it provide any examples of such parameters.</p> <p>Accordingly the '252 Patent fails to inform, with reasonable certainty, a person of ordinary skill in the art of the scope of the invention.</p>

Term	Relevant Claim(s)	Basis
<p>“re-modulating the first inbound data stream,” “re-modulating the second inbound data stream,” “re-modulating the first transit data stream,” “re-modulating the second transit data stream”</p>	<p>6, 7</p>	<p>The claims, read in light of the specification and prosecution history, fail to inform, with reasonable certainty, what the term “re-modulating” means. The term “re-modulating” is used in the specification in multiple contexts.</p> <p>For example, the specification states that “receiver 400 receives an analog electrical signal (CH_IN) and supplies it to an optional low noise amplifier.” <i>See</i> 252 Patent at 6:62-63. The Specification continues to state that, after passing through a CTLE and FFE, a “decision feedback equalizer (DFE) 404 operates on the filtered signal to correct for trailing ISI an detect each transmitted channel bit or symbol, thereby producing a demodulated digital data stream.” <i>See</i> 252 Patent at 7:3-7. Thereafter, the specification further states that the “symbols or data blocks are placed on the digital receive bus (RXD) for remodulation and transmission by a transmitter to the remote end of the channel.” 252 Patent at 7:14-16.</p> <p>In other contexts, however, the 252 Patent discusses modulation with respect to the type of modulation scheme employed (e.g., PAM4 or NRZ). <i>See</i> 252 Patent at 8:38-56. The 252 Patent specifically contemplates that the “[t]hough not explicitly shown here, the host-facing transmitter and receiver sets 910 may include “gearbox” functions that convert 1 lane of PAM4 symbols into 2</p>

Term	Relevant Claim(s)	Basis
		<p>lanes of NRZ symbols, and vice versa.” 252 Patent at 8:64-67.</p> <p>Given the inconsistent use of the term in the specification and the lack of guidance in the claims, the claims of the 252 patent are indefinite, as they fail to provide reasonable certainty as to the meaning of the term “re-modulating.”</p>
<p>“3. The active Ethernet cable of claim 2, wherein said cable-dependent equalization parameters adapt during usage of the Ethernet cable.”</p>	<p>3</p>	<p>Claim 3 is an apparatus claim that is directed to “The active Ethernet cable of claim 2.” The additional limitations of this claim, however, require the steps of “said cable-dependent equalization parameters <i>adapt during usage</i> of the Ethernet cable.”</p> <p>The inclusion of this step within an apparatus claim renders the claim indefinite as it does not provide a POSITA with reasonable certainty as to when infringement would occur. <i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i>, 05-1009 (Fed. Cir. Nov. 21, 2005).</p>
<p>“4. The active Ethernet cable of claim 2, wherein said cable-dependent equalization parameters are fixed during normal usage of the Ethernet cable, and wherein said cable-dependent equalization parameters are determined during manufacturing-testing of the Ethernet cable.”</p>	<p>4</p>	<p>Claim 4 is an apparatus claim that is directed to “The active Ethernet cable of claim 2.” The additional limitations of this claim, however, require the additional steps of “said cable-dependent equalization parameters are fixed during normal usage” and that the “cable-dependent equalization parameters [be] determined during manufacturing-testing.”</p> <p>The inclusion of these steps within an apparatus claim renders the claim indefinite as it does not</p>

Term	Relevant Claim(s)	Basis
		provide a POSITA with reasonable certainty as to when infringement would occur. <i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i> , 05-1009 (Fed. Cir. Nov. 21, 2005).
“wherein cable dependent equalization parameters are employed for at least one of: re-modulating the first inbound data stream, re-modulating the second inbound data stream, said performing clock and data recovery on the first electrical transit signal, and said performing clock and data recovery on the second electrical input signal, each employ fixed, cable-independent, equalization parameters”	7–10	The claims, read in light of the specification and prosecution history, fail to inform, with reasonable certainty, how the cables can simultaneously use, for the same process, both cable dependent equalization parameters and cable-independent equalization parameters.
“each of the first and second connectors being adapted to fit into an Ethernet port of a corresponding host device”	1–5	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty as to what an “Ethernet port” is.
<p>“a respective transceiver that performs clock and data recovery . conveying a transit data stream”</p> <p>“the respective transceiver for each of the first and second connectors performing clock and data recovery on the respective electrical transit signal to extract and re-modulate the transit data stream as the outbound data stream from the cable”</p> <p>“the respective transceivers each employing”</p>	1	<p>The claim recites structural components in combination with method steps (e.g., “performing clock and data recovery,” “conveying a transit data stream,” and “employing.”). <i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i>, 05-1009 (Fed. Cir. Nov. 21, 2005).</p> <p>The inclusion of these steps within an apparatus claim renders the claim indefinite as it does not provide a POSITA with reasonable certainty as to when infringement would occur.</p>
“wherein the respective transceivers each employ cable-dependent equalization parameters for at least	2	The claim recites structural components in combination with method steps (e.g., “employ”).

Term	Relevant Claim(s)	Basis
one of: the remodulation of the inbound data stream for transit, and the clock and data recovery performed on the electrical transit signal.”		<p><i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i>, 05-1009 (Fed. Cir. Nov. 21, 2005).</p> <p>The inclusion of these steps within an apparatus claim renders the claim indefinite as it does not provide a POSITA with reasonable certainty as to when infringement would occur.</p>
“wherein the <i>inbound data stream and the outbound data stream each have a per-lane symbol rate in excess of 50 GBd.</i> ”	5	<p>The claim recites structural components in combination with method steps. <i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i>, 05-1009 (Fed. Cir. Nov. 21, 2005).</p> <p>The inclusion of these steps within an apparatus claim renders the claim indefinite as it does not provide a POSITA with reasonable certainty as to when infringement would occur.</p>

### Inequitable Conduct

Discovery is ongoing regarding the enforceability of the '252 Patent. To date, Complainants have refused to disclose any prior art known to Complainants, those involved in prosecution, or known to the inventors, outside of what is identified in the prosecution history and what was disclosed to it by third parties in litigation.

In view of Complainants' continued obstruction to relevant discovery, Respondents reserve the right to amend or supplement these contentions as discovery progresses including in response to, among other things, information learned in fact and/or expert discovery including identification of additional prior art, Complainants' positions on priority, infringement, claim construction, and/or invalidity, the Court's rulings, including on claim construction, changes in the Respondents'

respective Accused Products, and in the event Complainants are permitted to revise infringement or domestic industry theories.

### **Improper Inventorship**

Complainants have yet to provide discovery concerning each named inventor's participation, involvement, and contribution to the conception and reduction to practice of the alleged invention, including the dates of such participation, involvement, and contribution to the conception and reduction to practice on an element-by-element basis. *See, e.g.*, Respondents' Common Interrogatory No. 27. Respondents reserve their rights to contend, based on further discovery, that the Asserted Claims of the '252 Patent are invalid and/or unenforceable due to misjoinder of one or more inventors, nonjoinder of one or more inventors, or derivation of the claimed inventions from another.

## **6. THE '111 PATENT**

### **Priority Date**

Complainants have yet to satisfy their burden of proving that any of the Asserted Claims of the '111 Patent are entitled to a priority date prior to the filing date of its application, August 27, 2019. Because Complainants have not shown that United States Provisional Patent Application No. 62/723,701 ("701 Provisional Application") provides written description support for the Asserted Claims, Complainants are not entitled to the priority date of August 28, 2018, the filing date of that application. Additionally, because Complainants have not shown that any of the Asserted Claims of the '111 Patent were conceived or reduced to practice, actually or constructively, prior to the filing date of the '111 Patent, none of the Asserted Claims of the '111 Patent are entitled to a date of invention that is earlier than the filing date, August 27, 2019.

Respondents reserve the right to supplement and amend its Initial Contentions should Complainants subsequently identify alleged support for its claimed priority date.

**Subject Matter Eligibility Grounds Under 35 U.S.C. § 101**

As shown in Exhibits C-1 through C-12, each of the limitations of the Asserted Claims of the '111 Patent, individually and in combination with the other elements of each claim, were well understood, routine, and conventional in the industry at the time. Exhibits C-1 through C-12 cite a number of prior art references as evidence of the description of the industry at the relevant time and how the various claim elements were well understood, routine, and conventional (alone and in combination). The prior art references referred to are exemplary only.

The information provided in prior art references and cited herein and in Appendices should not be deemed an admission regarding the scope of any claims or the proper construction of those claims or any terms contained therein. Respondents claim construction disclosures will be provided according to the procedural schedule. Nothing contained in these Initial Contentions should be understood or deemed to be an express or implied admission or contention with respect to the absence of factual disputes relating to patent ineligibility, the absence of a need for construction of any terms in an Asserted Claim, any proper construction of any terms in an Asserted Claim, or alleged infringement of that claim. There is no claim construction issue or factual issue that precludes the Administrative Law Judge finding that the claims of the Asserted Patents are patent-ineligible.

Respondents also reserve the right to rely upon expert testimony as evidence of the description of the industry at the relevant time and how the various claim elements were well understood, routine, and conventional (alone and in combination). Respondents also further

incorporate by reference the discussion below providing the exemplary legal and factual bases supporting its Section § 101 contentions. *See infra* at Section 6.2.2.

Furthermore, to the extent the listed prior art discloses and describes particular products that were publicly known and/or in public use, in addition to each publication itself serving to demonstrate that the Asserted Claims of the '111 Patent were well understood, routine, and conventional at the time of filing, the various products described in the publications also serve to demonstrate that the Asserted Claims of the '111 Patent were well understood, routine, and conventional at the time of filing.

Respondents also reserve the right to rely upon foreign counterparts of the references identified in these Initial Contentions, U.S. counterparts of foreign patents and foreign patent applications identified in these Initial Contentions, U.S. and foreign patents and patent applications corresponding to articles and publications identified in these Initial Contentions, issued patents corresponding to published patent applications identified in these Initial Contentions, published patent applications corresponding to issued patents identified in these Initial Contentions, and any systems, products, or prior inventions related to any of the references identified in these Initial Contentions.

As discussed below, the limitations of the Asserted Claims of the '111 Patent recite cables comprised of generic and conventional hardware components, such as registers, transceivers, pluggable transceiver modules, and chip-to-module communications links, and the components therein are used in their known and expected manner. The transceivers can also comprise software-based functions implemented by firmware stored in the memory and/or the microcontrollers, and the software-based functions are generic and conventional as well (*e.g.*, storing data (*e.g.*, coefficients) to/from memory).

## Identification of Asserted Claims That Are Ineligible Under § 101

'111 Patent Claim	Exception to Eligibility	Factual and Legal Basis	Representative Claim <sup>7</sup>
1	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
2	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
3	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
4	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
5	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
6	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
7	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
8	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1

7 Claims 8, 11 and 16 are substantially equivalent in scope to claim 1, therefore claim 1 can be used as representative of claims 8, 11, and 16 for purposes of these Contentions. Claims 2–7, 9–10, 12–14, and 17–19 have additional limitations that do nothing to make these claims valid under Section 101 and therefore claim 1 can be used as representative of all Asserted Claims for purposes of these Contentions. *See, e.g., Content Extraction*, 776 F.3d at 1349 (affirming that a specific claim is “representative, because all the claims are ‘substantially similar and linked to the same abstract idea’”). Moreover, as discussed below, each of the Asserted Claims of the ’111 Patent fails to satisfy Section 101 irrespective of whether claim 1 is representative.

9	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
10	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
11	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
12	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
13	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
14	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
15	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
16	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
17	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
18	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1
19	Abstract Idea	Respondents incorporate by reference the below discussion concerning 35 U.S.C. § 101.	1

## **Factual and Legal Basis for Subject Matter Ineligibility**

### ***Alice* Step One: The Asserted Claims Are Directed to The Abstract Idea of Transferring and Converting Data**

#### **Representative Independent Claim 1**

Representative claim 1 of the '111 Patent recites as follows:

1. A SerDes communications method that comprises, in a transceiver:

- [c] selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model;
- [c] updating the initial pre-equalizer coefficient values during a training phase; and
- [c] using the updated pre-equalizer coefficient values to convey a transmit data stream.

'111 Patent, claim 1.

The plain language of claim 1 establishes that it is directed to a patent-ineligible concept, namely the abstract idea of retrieving data from a register, updating data during a training phase, and using the updated data. Claim 1 does not specify any non-conventional ways of retrieving data, updating data, using the data, or conveying data. In addition, claim 1 does not provide any new algorithms or methods or techniques for accomplishing these tasks. In effect, claim 1 claims a computer-implemented method of converting and conveying data, and the Federal Circuit has “consistently held that similar claims reciting the collection, transfer, and publishing of data are directed to an abstract idea.” *Cellspin Soft, Inc. v. Fitbit, Inc.*, 927 F.3d 1306, 1315 (Fed. Cir. 2019) (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); *In re TLI Commc’ns. Patent Litig.*, 823 F.3d 607, 610–12 (Fed. Cir. 2016)). See also *Adaptive Streaming Inc. v. Netflix, Inc.*, 836 F.App’x 900, 903 (Fed. Cir. 2020) (“We have held that the ideas of encoding and decoding image data and of converting formats, including when data is received

from one medium and sent along through another, are by themselves abstract ideas, and accordingly conclude that claims focused on those general ideas governing basic communication practices, not on any more specific purported advance in implementation, were directed to abstract ideas.”); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1344 (Fed. Cir. 2019) (“We have recognized that ‘information as such is an intangible’ and that collecting, analyzing, and displaying that information, without more, is an abstract idea”) (cleaned up).

Claim 1 appears to require the functional result of “convey[ing],” data, but fails to do so in a non-abstract way as it does not sufficiently describe how to achieve these results in a non-abstract way. *See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns., LLC*, 847 F.3d 1329, 1338–39 (Fed. Cir. 2017) (holding that “claim 1 manipulates data but fails to do so in a non-abstract way,” because “[t]he claim requires the functional result of ‘converting,’ ‘routing,’ ‘controlling,’ ‘monitoring,’ and ‘accumulating records,’ but does not sufficiently describe how to achieve these results in a non-abstract way.”); *RecogniCorp LLC v. Nintendo Co., Ltd.*, 855 F.3d 1322, 1326–27 (Fed. Cir. 2017) (“standard encoding and decoding” is “an abstract concept long utilized to transmit information,” and “[a] process that started with data, added an algorithm, and ended with a new form of data was directed to an abstract idea”); *Adaptive Stream Inc. v. Netflix, Inc.*, 836 F.App’x 900, 903 (Fed. Cir. 2020) (“We have held that the ideas of encoding and decoding image data and of converting formats, including when data is received from one medium and sent along through another, are by themselves abstract ideas.”); *Entropic Commc’ns., LLC v. DISH Network Corp.*, 767 F.Supp.3d 1043, 1058 (C.D. Cal. 2025) (“Sending and receiving data, even in the context of a communication network, is abstract.”). Claim 1 is only directed to the aspirational end-result that, somehow, conversion and pre-equalization occurs. *See also TriDim Innovations LLC v. Amazon.com, Inc.*, 207 F.Supp.3d 1073, 1080 (N.D. Cal. 2016) (“Much like the

unpatentable subject matter in TLI Communications, the claims in question here are defined only in terms of their functions . . .”) (citing *In re TLI*, 823 F.3d at 613); *Affinity Labs of Tex., LLC v. Amazon.com, Inc.*, 838 F.3d 1266, 1269–70 (Fed. Cir. 2016) (“The purely functional nature of the claim confirms that it is directed to an abstract idea . . .”); *Elec. Power Grp.*, 830 F.3d at 1354 (ineligible claims provided no “particular . . . inventive technology for performing those functions”).

Hardware for performing data retrieval, updating, and use was generic at least as of the ’111 Patent’s August 28, 2018 filing date, *see, e.g.*, C-1 – C-12, and no specific type of data retrieval and use hardware are recited in these elements. These elements are abstract because they describe a generic devices (a transceiver) configured to perform an abstract process (data retrieval and use) without specifying sufficiently concrete or inventive technological improvements; and there are no specific, non-generic components or configurations recited therein that improve technology or solve a technical problem in a novel way. As of the August 28, 2018 filing date of the ’111 Patent, active cables were in common usage. *See, e.g.*, C-1 – C-12.

Although Respondents believe that independent claim 1 of the ’111 Patent is representative of all Asserted Claims of the ’111 patent (all asserted claims recite the same abstract idea with immaterial and conventional variations), out of an abundance of caution, Respondents will discuss the remaining asserted independent and dependent claims here.

## **Dependent Claim 2**

Dependent claim 2 of the ’111 Patent recites as follows:

2. The method of claim 1, wherein at least some of the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics.

’111 Patent, claim 2.

The additional limitations recited in dependent claim 2 merely add the requirement that the channel models are for C2M channels with different insertion loss and package loss characteristics. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 2 only recites abstract ideas, as the additional limitations of claim 2 are neither in isolation nor combined render claim 2 patent eligible.

### **Dependent Claim 3**

Dependent claim 3 of the '111 Patent recites as follows:

3. The method of claim 1, wherein at least some of the different channel models presume different types of receiver equalization.

'111 Patent, claim 3.

The additional limitations recited in dependent claim 3 merely add the requirement that at least some of the different channel models presume different types of receiver equalization. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 3 only recites abstract ideas, as the additional limitations of claim 3 are neither in isolation nor combined render claim 3 patent eligible.

### **Dependent Claim 4**

Dependent claim 4 of the '111 Patent recites as follows:

4. The method of claim 1, wherein said selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers.

'111 Patent, claim 4.

The additional limitations recited in dependent claim 4 merely adds the requirement that selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 4 only recites abstract ideas, as the additional limitations of claim 4 are neither in isolation nor combined render claim 4 patent eligible.

### **Dependent Claim 5**

Dependent claim 5 of the '111 Patent recites as follows:

5. The method of claim 4, wherein the performance characteristic is an error signal energy.  
'111 Patent, claim 5.

The additional limitations recited in dependent claim 5 merely add the requirement that the performance characteristic is an error signal energy. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 5 only recites abstract ideas, as the additional limitations of claim 5 are neither in isolation nor combined render claim 5 patent eligible.

### **Dependent Claim 6**

Dependent claim 6 of the '111 Patent recites as follows:

The method of claim 4, wherein the performance characteristic is a bit error rate.  
'111 Patent, claim 6.

The additional limitations recited in dependent claim 6 merely add the requirement that the performance characteristic is a bit error rate. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 6 only recites abstract ideas, as the additional limitations of claim 6 are neither in isolation nor combined render claim 6 patent eligible.

### **Dependent Claim 7**

Dependent claim 7 of the '111 Patent recites as follows:

The method of claim 4, further comprising updating the selected register with the updated pre-equalizer coefficient values.

'111 Patent, claim 7.

The additional limitations recited in dependent claim 7 merely add updating the selected register with the updated pre-equalizer coefficient values. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 7 only recites abstract ideas, as the additional limitations of claim 7 are neither in isolation nor combined render claim 7 patent eligible.

### **Independent Claim 8**

Independent claim 8 recites as follows:

8. A chip-to-module communications link that comprises a port connector coupling a port transceiver to a pluggable module transceiver, the pluggable module transceiver including:

[c] one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to the port transceiver; and

- [c] a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model,
- [c] the controller using one of the registers to set initial coefficient values for the one or more transmit filters.

'111 Patent, claim 8.

Like claim 1, the plain language of claim 8 establishes that it is directed to a patent-ineligible concept, namely the abstract idea of abstract idea of storing data, retrieving data, and using the data.

Hardware for performing data storage, retrieval, and use was generic at least as of the '111 Patent's August 28, 2018 filing date, *see, e.g.*, C-1 – C-12, and no specific type of data retrieval and use hardware are recited in these elements. These elements are abstract because they describe a generic devices (a transceiver) configured to perform an abstract process (data retrieval and use) without specifying sufficiently concrete or inventive technological improvements; and there are no specific, non-generic components or configurations recited therein that improve technology or solve a technical problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, active cables were in common usage. *See, e.g.*, C-1 – C-12.

### **Dependent Claim 9**

Dependent claim 9 of the '111 Patent recites as follows:

9. The communications link of claim 8, wherein at least some of the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics.

'111 Patent, claim 9.

The additional limitations recited in dependent claim 9 merely add the requirement that the channel models are for C2M channels with different insertion loss and package loss characteristics. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date

of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 9 only recites abstract ideas, as the additional limitations of claim 9 are neither in isolation nor combined render claim 9 patent eligible.

### **Dependent Claim 10**

Dependent claim 10 of the '111 Patent recites as follows:

10. The communications link of claim 8, wherein at least some of the different channel models presume different types of receiver equalization.

'111 Patent, claim 10.

The additional limitations recited in dependent claim 10 merely add the requirement that at least some of the different channel models presume different types of receiver equalization. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 10 only recites abstract ideas, as the additional limitations of claim 10 are neither in isolation nor combined render claim 10 patent eligible.

### **Independent Claim 11**

Independent claim 11 recites as follows:

11. A chip-to-module communications link that comprises a port connector coupling a port transceiver to a pluggable module transceiver, the pluggable module transceiver including:

- [c] one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to the port transceiver; and
- [c] a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values for which the port transceiver determines a performance characteristic,
- [c] the controller using one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters.

'111 Patent, claim 11.

Like claims 1 and 8, the plain language of claim 11 establishes that it is directed to a patent-ineligible concept, namely the abstract idea of abstract idea of storing data, retrieving data, and using the data.

Hardware for performing data storage, retrieval, and use was generic at least as of the '111 Patent's August 28, 2018 filing date, *see, e.g.*, C-1 – C-12, and no specific type of data retrieval and use hardware are recited in these elements. These elements are abstract because they describe a generic devices (a transceiver) configured to perform an abstract process (data retrieval and use) without specifying sufficiently concrete or inventive technological improvements; and there are no specific, non-generic components or configurations recited therein that improve technology or solve a technical problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, active cables were in common usage. *See, e.g.*, C-1 – C-12.

### **Dependent Claim 12**

Dependent claim 12 of the '111 Patent recites as follows:

12. The communications link of claim 11, wherein the performance characteristic is an error signal energy.

'111 Patent, claim 12.

The additional limitations recited in dependent claim 12 merely add the requirement that the performance characteristic is an error signal energy. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 12 only recites abstract ideas, as the additional limitations of claim 12 are neither in isolation nor combined render claim 12 patent eligible.

### **Dependent Claim 13**

Dependent claim 13 of the '111 Patent recites as follows:

13. The communications link of claim 11, wherein the performance characteristic is a bit error rate.

'111 Patent, claim 13.

The additional limitations recited in dependent claim 13 merely add the requirement that the performance characteristic is a bit error rate. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 13 only recites abstract ideas, as the additional limitations of claim 13 are neither in isolation nor combined render claim 13 patent eligible.

### **Dependent Claim 14**

Dependent claim 14 of the '111 Patent recites as follows:

14. The communications link of claim 11, wherein the port transceiver generates updates for the coefficient values of the one or more transmit filters.

'111 Patent, claim 14.

The additional limitations recited in dependent claim 14 merely add the requirement that the port transceiver generates updates for the coefficient values of the one or more transmit filters. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 14 only recites abstract ideas, as the additional limitations of claim 14 are neither in isolation nor combined render claim 14 patent eligible.

## **Dependent Claim 15**

Dependent claim 15 of the '111 Patent recites as follows:

15. The communications link of claim 14, wherein the controller saves updated coefficient values in one of the registers.

'111 Patent, claim 15.

The additional limitations recited in dependent claim 15 merely add the requirement that the controller saves updated coefficient values in one of the registers. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional and well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 15 only recites abstract ideas, as the additional limitations of claim 15 are neither in isolation nor combined render claim 15 patent eligible.

## **Independent Claim 16**

Independent claim 16 of the '111 Patent recites as follows:

16. A pluggable module transceiver including:

- [c] one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to a port transceiver; and
- [c] a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model,
- [c] the controller using one of the registers to set initial coefficient values for the one or more transmit filters.

'111 Patent, claim 16.

Like claims 1, 8, and 11, the plain language of claim 16 establishes that it is directed to a patent-ineligible concept, namely the abstract idea of abstract idea of storing data, retrieving data, and using the data.

Hardware for performing data storage, retrieval, and use was generic at least as of the '111 Patent's August 28, 2018 filing date, *see, e.g.*, C-1 – C-12, and no specific type of data retrieval and use hardware are recited in these elements. These elements are abstract because they describe a generic devices (a transceiver) configured to perform an abstract process (data retrieval and use) without specifying sufficiently concrete or inventive technological improvements; and there are no specific, non-generic components or configurations recited therein that improve technology or solve a technical problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, active cables were in common usage. *See, e.g.*, C-1 – C-12.

### **Dependent Claim 17**

Dependent claim 17 of the '111 Patent recites as follows:

17. The pluggable module transceiver of claim 16, wherein the port transceiver determines a performance characteristic for each register.

'111 Patent, claim 17.

The additional limitations recited in dependent claim 17 merely add the requirement that the port transceiver determine a performance characteristic for each register. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 17 only recites abstract ideas, as the additional limitations of claim 17 are neither in isolation nor combined render claim 17 patent eligible.

### **Dependent Claim 18**

Dependent claim 18 of the '111 Patent recites as follows:

18. The pluggable module transceiver of claim 17, wherein the performance characteristic is an error signal energy.

'111 Patent, claim 18.

The additional limitations recited in dependent claim 18 merely add the requirement that the performance characteristic is an error signal energy. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 18 only recites abstract ideas, as the additional limitations of claim 18 are neither in isolation nor combined render claim 18 patent eligible.

### **Dependent Claim 19**

Dependent claim 19 of the '111 Patent recites as follows:

19. The pluggable module transceiver of claim 17, wherein the performance characteristic is a bit error rate.

'111 Patent, claim 19.

The additional limitations recited in dependent claim 19 merely add the requirement that the performance characteristic is a bit error rate. These elements do not disclose any improved function of a computer or other technology, nor do they solve a specific technological problem in a novel way. As of the August 28, 2018 filing date of the '111 Patent, these were conventional well-known techniques. *See, e.g.*, C-1 – C-12. In sum, claim 19 only recites abstract ideas, as the additional limitations of claim 19 are neither in isolation nor combined render claim 19 patent eligible.

### ***Alice Step Two: The Asserted Claims Contain No “Inventive Concept” Sufficient to Render Them Patent Eligible***

As noted above, the second step of a Section 101 analysis under *Alice* requires the consideration of each claim element “both individually and ‘as an ordered combination’ to

determine” whether there are additional elements present in the claim that ‘transform the nature of the claim’ into a patent-eligible application.” *Alice*, 573 U.S. at 217 (quotation omitted).

The Asserted Claims of the ’111 Patent merely invoke well-understood, routine, and conventional software methods and techniques to achieve the multiple abstract ideas interspersed throughout the Asserted Claims. The claims are directed to storing data in registers, retrieving the data from the registers, and using the data, which is well-known to one of ordinary skill in the art. *See, e.g.*, C-1 – C-12. As the Federal Circuit has held, “claims are not saved from abstraction merely because they recite components more specific than a generic computer.” *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1286 (Fed. Cir. 2018). As discussed in detail in the preceding Section, the Asserted Claims of the ’111 Patent lack any of the inventive hallmarks found in other patents found to be patent eligible.

As noted earlier, the Asserted Claims of the ’111 Patent provide no technological solution to the purported problems but instead simply disclose the abstract idea of storing, retrieving, and using data, which moreover would have been well-known to one of ordinary skill in the art. As noted at the beginning of this section, the second step of a Section 101 analysis under *Alice* requires the consideration of the claim elements “as an ordered combination” to determine whether there are additional elements present in the claim that “transform the nature of the claim” into a patent-eligible application.” *Alice*, 134 S. Ct. at 2347 (quotation omitted). However, the method claims’ order of claim elements transfer the claim into patent-eligible material. The order of the claim elements does not disclose any software and/or hardware technological advancement.

## All of the Asserted Claims Are Substantially Similar—Represented by Claim 1—for Purposes of Section 101 Analysis

All the Asserted Claims of the '111 Patent are directed to patent-ineligible abstract ideas. Where claims are “substantially similar and linked to the same abstract idea,” courts may look to representative claims in a Section 101 analysis. *Content Extraction and Trans. v. Wells Fargo Bank*, 776 F.3d 1343, 1349 (Fed. Cir. 2014). Here, claim 1 of the '111 Patent is representative of all Asserted Claims of the '111 Patent, as the remaining claims recite the same abstract idea with immaterial and conventional variations.

Asserted independent claims 1, 8, 11, and 16 recite nearly the same subject matter with only minor variations for purposes of Section 101 analysis. As discussed above, claim 1 is directed to the abstract idea of retrieving, updating, and using data. Claims 8, 11, and 16 recite the same subject matter written as apparatus claims.

The asserted dependent claims add additional limitations, but those additional limitations do not impart patent eligibility. Instead, the dependent claims add further variations on abstract ideas that are not technological advancements. *See, e.g., Universal Secure Registry LLC v. Apple Inc.*, 10 F.4th 1342, 1357 (Fed. Cir. 2021).

As noted previously, dependent claims 2-7, 9-10, 12-15, and 17-19 recite conventional and well-known subject matter, (*see, e.g.,* C-1 – C-12) and do not contain an inventive concept that would suffice to transform the abstract subject matter into an eligible application of the abstract idea.

Notably, there are no specific instructions or limitations in the specification concerning how these claim limitations must be carried out, other than a description of the idea, non-specific examples of how the idea may be carried out, and the instructions to apply it to the conventional

technological environment. *See Alice*, 573 U.S. at 220–21. Thus, as with claim 1, none of the asserted dependent claims provide particular requirements as to how the claimed steps are to be performed, nor do they recite anything other than conventional components that are used in conventional ways.

Accordingly, claim 1 of the '111 Patent is representative for purposes of the Section 101 analysis, and any differences amongst claims 2–19 are insubstantial with respect to eligibility, as each of the claims in the '111 Patent are drawn to the same abstract idea of storing, updating, retrieving, and using data using generic components and configurations. *Alice*, 573 U.S. at 225; *see also Content Extraction*, 776 F.3d at 1348.

**Invalidity Grounds Under 35 U.S.C. §§ 102 and 103**

Respondents attach, as Appendix C to its Initial Contentions, claim charts showing examples of how the cited references anticipate and/or render obvious the Asserted Claims of the '111 Patent under at least AIA 35 U.S.C. §§ 102 and 103 either expressly or inherently as understood by a person having ordinary skill in the art or based on Complainants’ apparent interpretation of the claims.

<b>Ex.</b>	<b>Patent No. or Title (Primary Inventor/Author)</b>	<b>Date of Issue/ Publication</b>	<b>Filing Date</b>
C-1	U.S. Patent No. 10,148,414 (“Lugthart ’414”)	October 19, 2017 (Published)	June 30, 2017
C-2	U.S. Patent Publication No. 2017/0302431 (Lugthart ’431)	Oct. 19, 2017 (Published)	Apr. 21, 2014
C-3	U.S. Patent No. 11,032,111 (Ran)	July 14, 2020 (Published)	Aug. 24, 2018
C-4	U.S. Patent Publication No. 2010/0158538 (Mazzini)	June 24, 2019 (Published)	Dec. 19, 2008
C-5	U.S. Patent Publication No. 2013/0073749 (Tremblay)	Mar. 21, 2013 (Published)	Feb. 22, 2011
C-6	U.S. Patent No. 6,466,626 (Cecchi)	Oct. 15, 2002 (Published)	Feb. 23, 1999
C-7, C-12	U.S. Patent No. 9,768,985 (Ciacci)	Sept. 19, 2017 (Published)	Jan. 1, 2016

<b>Ex.</b>	<b>Patent No. or Title (Primary Inventor/Author)</b>	<b>Date of Issue/ Publication</b>	<b>Filing Date</b>
C-8, C-12	U.S. Patent Publication No. 2003/0058959 (Rafie)	March 27, 2003 (Published)	Sept. 25, 2001
C-9	Amphenol SMP9 Active Electric Cable Product (SMP9 Cable)	N/A	N/A
C-10	Stratix V Product (Stratix)	Published no later than November 2012 and 2016	N/A
C-11	High Speed Serdes Devices and Applications (Stauffer)	Published no later than 2008	N/A
C-12	U.S. Patent No. 11,095,271 (Kang)	Dec. 12, 2019 (Published)	Dec. 19, 2018
C-12	InfiniBand™ Architecture Specification Volume 2 Release 1.4 (Infiniband)	Nov. 16, 2016 (Published)	N/A
C-12	U.S. Patent No. 8,516,238 (Cornelius)	Jan. 5, 2012 (Published)	June 30, 2011
C-12	U.S. Patent Publication No. 2005/0232336 (Balakrishnan)	Oct. 20, 2005 (Published)	Apr. 19, 2005
C-12	WIPO Patent No. 13155160 (Fox)	Oct. 17, 2013 (Published)	Apr. 10, 2013
C-12	U.S. Patent Publication No. 2014/0281067 (Das Sharma)	Sept. 18, 2014 (Published)	Mar. 15, 2013
C-12	U.S. Patent No. 7,239,665 (Mezer)	May 26, 2005 (Published)	Nov. 24, 2003
C-12	PCI Express Base Specification Revision 3.1a (PCIe 3,1a)	Nov. 7, 2015 (Published)	N/A
C-12	Texas Instruments – DS125DF410 Low-Power Multi-Rate Quad Channel Retimer (TI DS125DF410)	Published no later than February 2018	N/A
C-12	Texas Instruments – DS110DF111 Low-Power, Multirate, 2-Channel Retimer (TI DS110DF111)	Published no later than June 2015	N/A

The attached claim charts identify specific examples of disclosures that teach or suggest a given claim limitation. These identifications should be understood to be exemplary; the charts do not necessarily indicate every location within a particular prior art reference where a claim

limitation may be disclosed or suggested. Respondents and their expert witnesses may rely on other portions of the prior art.

To the extent Complainants contend that any reference identified above does not anticipate the Asserted Claims, it would have been obvious over that primary reference alone or to combine or modify the primary references with concepts from other prior art, such as the other references identified and as explained herein and in Exhibits C-01 – C-12.

In particular, for each limitation of the Asserted Claims that Complainants contend is not met by a particular reference, Respondents contend that the limitation (and claim as a whole) is obvious based on a combination of that particular reference with (1) any other reference disclosing the limitation, (2) any admitted prior art, as explained in the background of each patent or discussed in the file history, (3) any other reference identified in Exhibits C-01 – C-12, as disclosing that limitation, and/or (4) the knowledge of a person of ordinary skill in the art and/or any of the references and concepts discussed herein regarding the relevant background and state of the art. Respondents' obviousness grounds for each dependent claim incorporate the obviousness grounds for the claims from which the dependent claim depends in addition to any obviousness grounds identified in the charts for the dependent claim. To the extent that individual Exhibits C-01 – C-12 include specific combination of prior art, Respondents' contentions are not limited only to those particular combinations, as such combinations are merely exemplary and are meant to be inclusive of the combinations expressed herein and in the other Appendices to these contentions.

The suggested obviousness combinations discussed herein are not to be construed to suggest that any reference included in the combinations is not anticipatory. Further, to the extent that Complainants contend that any of the anticipatory prior art fails to disclose one or more limitations of the Asserted Claims, Defendants reserve the right to identify other prior art

references that, when combined with the anticipatory prior art, would render the claims obvious despite an allegedly missing limitation. Defendants will further specify the motivations to combine the prior art, including through reliance on expert testimony, at the appropriate later stage of this Investigation.

In addition to the combinations of Exhibits C-01 – C-12, at least the following exemplary combinations would have been obvious to a POSITA:

- Lugthart '414, Das Sharma, & Mezer
- Lugthart '431 in view of Tremblay, or Kang, or Ran, or Mazzini, or Infiniband, Cornelius, Fox, Mezer, Balakrishnan, or Das Sharma, or a combination thereof;
- Ran in view of Lugthart '431, Tremblay, or Kang, or Infiniband, Cornelius, Fox, Mezer, Balakrishnan, or Das Sharma, or a combination thereof;
- Tremblay in view of Kang, or Ran, or Mazzini, or Infiniband, Cornelius, Fox, Mezer, Balakrishnan, or Das Sharma, or a combination thereof;
- Mazzini in view of Kang, or Tremblay, Ran, or a combination thereof;
- Cecchi in view of Tremblay, or Kang, or Ran, or Mazzini, or Infiniband, or a combination thereof;
- Stratix V Product in view of Lugthart '414, Das Sharma, Mezer, or a combination thereof;
- Stauffer in view of Lugthart '414, Das Sharma, Mezer, or a combination thereof;
- Rafie in view of Lugthart '431/'414, or Tremblay, or Kang, or Infiniband, or Ran, or Cecchi, or Mazzini, or Tremblay, or Cornelius, or Fox, or Mezer, or Balakrishnan, or Das Sharma, or Ciacci, or a combination thereof;

- Ciacci in view of Lugthart '431/'414, or Tremblay, or Kang, or Infiniband, or Ran, or Cecchi, or Mazzini, or Tremblay, or Cornelius, or Fox, or Mezer, or Balakrishnan, or Das Sharma, or Rafie, or a combination thereof.

For each specified combination, Respondents rely on the references herein, as well as the knowledge of a person of ordinary skill in the art, including that which will be discussed through expert discovery. Although Respondents provide exemplary disclosures and motivations to combine below, Respondents will present expert opinion in accordance with the procedural schedule. Respondents reserve the right to supplement or modify the anticipation and obviousness grounds in response to, for example, Complainants' positions regarding the scope and meaning of the Asserted Claims taken in this Investigation, before the PTAB, or during prosecution of pending matters related to the Asserted Patents, claim construction determinations made in this Investigation or other proceedings involving the Asserted Patents, updates or changes to Complainants' infringement and/or technical domestic industry positions, and materials later obtained during discovery, including from Complainants or in response to any third party subpoenas.

Respondents reserve the right to rely on the prior art references identified in connection with any of the other Asserted Patents in connection with the '111 Patent. In addition, Respondents hereby cite the following additional references as being relevant to the subject matter claimed in the '111 Patent. Respondents are producing concurrently herewith a number of such references that are relevant to the validity of the Asserted Patents, the state of the art, and as evidencing a motivation to combine various references. Respondents reserve the right to rely on one or more of the references produced concurrently herewith as anticipatory references under 35 U.S.C. § 102, as further evidence of obviousness under 35 U.S.C. § 103 (including as evidence of motivation to

combine or reasonable expectation of success), as background references demonstrating the state of the art, as a limitation upon the doctrine of equivalents, or for any other purpose. Based on further investigation and discovery, based on positions that Complainants may take regarding the scope of the Asserted Claims, and/or based on the Court's claim construction (once issued), Respondents reserve the right to revise these contentions and to rely on these references to prove the invalidity of the '111 Patent in a manner consistent with this ALJ's Ground Rules.

- United States Patent No. 5,854,921
- United States Patent No. 6,680,681
- United States Patent No. 7,308,058
- United States Patent No. 7,664,171
- United States Patent No. 8,477,835
- United States Patent No. 8,787,430
- United States Patent No. 9,088,336
- United States Patent No. 9,118,512
- United States Patent No. 9,137,063
- United States Patent No. 9,152,257
- United States Patent No. 9,495,245
- United States Patent No. 9,754,605
- United States Patent No. 9,806,812
- United States Patent No. 10,736,201
- United States Patent Publication No. 2010/0232493
- United States Patent Publication No. 2013/0223506
- United States Patent Publication No. 2015/0189092
- PCT Publication No. 2016/203205

- Optical Internetworking Forum, “OIF Next Generation Interconnect Framework,” OIF-FD-Client-400G/1T-01.0 (2013)
- Optical Internetworking Forum Implementation Agreement, “Common Electrical I/O (CEI) - Electrical and Jitter Interoperability agreements for 6G+ bps, 11G+ bps, 25G+ bps I/O and 56G+ bps,” OIF-CEI-04.0 (Dec. 29, 2017)
- Insertion loss, package, loss, dissipation, Oxford – A Dictionary of Electronics and Electrical Engineering (5th ed. 2018)
- Insertion loss, Newton’s Telecom Dictionary (31st ed. 2018)
- IEEE Std. 802.3bs-2017 “IEEE Standard for Ethernet: Amendment 10: Media Access Control Parameters, Physical Layers, and Management Parameters for 200 Gb/s and 400 Gb/s Operation” (2017)
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section One
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section Two
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section Three
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section Four
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section Five
- IEEE Standard for Ethernet, IEEE 802.3 (2015) Section Six

**Level of Ordinary Skill in the Art**

To assess the level of ordinary skill of a POSITA, the following factors can be considered: (i) the type of problems encountered in the art; (ii) the prior solutions to those problems; (iii) the rapidity at which innovations are made; (iv) the sophistication of the technology; and (v) the level of education of active workers in the relevant field.

Based on the foregoing, Respondents contend that a POSITA for the ’111 Patent as of August 27, 2019 (as well as August 28, 2019) would have had a Bachelor of Science in electrical or computer engineering with at least three years of experience in high-speed digital communication systems. A higher level of education may substitute for less experience.

## **Obviousness and Motivation to Combine**

Motivations to combine with a reasonable expectation of success, as well as the general state of the art, may be found in a variety of places including in the references defined above, and the specification of the '111 Patent. For example, each piece of prior art relates to the design and/or structure and/or function of active cable devices. A person of ordinary skill in the art at the time of the alleged invention would have been motivated to combine any one piece of identified prior art with any other identified piece of prior art with a reasonable expectation of success. For at least this reason, it would have been obvious to a person of skill in the art at the time of the alleged invention of the Asserted Claims to combine the various references cited herein so as to practice the Asserted Claims and there was a motivation in the art to make such a combination with a reasonable expectation of success.

Motivations to combine various prior art references with a reasonable expectation of success are present in the references themselves, the common knowledge of one of ordinary skill in the art, the prior art as a whole, or the nature of the problems allegedly addressed by the '111 Patent. Further reasons to combine the references identified in these charts with a reasonable expectation of success include the nature of the problem being solved, the express, implied, and/or inherent teachings of the prior art, the knowledge of persons of ordinary skill in the art, the fact that the prior art is generally directed towards methods and systems for the design and/or structure and/or function of active cable devices that such combinations would have yielded predictable results, and the fact that such combinations would have represented known alternatives to a person of ordinary skill in the art.

In *KSR International Co. v. Teleflex, Inc.*, the United States Supreme Court held that, among other things, “[t]he combination of familiar elements according to known methods is likely

to be obvious when it does no more than yield predictable results.” 550 U.S. 398, 416 (2007); *see also id.* at 401 (“[A] court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.”). In particular, a patent is obvious where “the content of the prior art, the scope of the patent claim, and the level of ordinary skill are not in material dispute, and the obviousness of the claim is apparent in light of these factors.” *Id.* at 427. The Supreme Court explained that “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *Id.* at 401.

Moreover, the Supreme Court recognized that market pressures will motivate a person of ordinary skill to survey known art for solutions to problems. *Id.* at 402 (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp.”). When a person of ordinary skill uses an identified, predictable solution to solve a problem, “it is likely the product not of innovation but of ordinary skill and common sense.” *Id.* at 402-03.

In addition, when a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. *Id.* at 417. If a person of ordinary skill can implement a predictable variation, § 103 bars its patentability. *Id.* The rationale to combine or modify prior art references is significantly stronger when references seek to solve similar problems, come from the same field, and correspond well with one another. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023).

The references share commonalities in terms of their general subject matter as well as the types of equipment, products, systems, and/or methods used. Further, the prior art references explicitly or implicitly reference other prior art references, share common authors or inventors, were published in the same journals, were compiled by a common author of a compilation or reference book, were presented at the same conferences, and/or were developed at common companies, schools, or organizations which would motivate one of skill in the art to combine them. Additionally, the references, and any products, devices, or processes described in the references, existed and/or were invented in the same time period providing further motivation for combination with a reasonable expectation of success.

These disclosures are provided without prejudice to any arguments or objections concerning the relevance of motivation to combine in connection with any invalidity contentions. Respondents reserve the right to further specify the motivations to combine the prior art in response to positions that Complainants may take later in this Investigation and as discovery proceeds. Respondents may rely on any and all portions of the prior art, other documents, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the claims invalid as obvious. Moreover, Respondents reserve the right to rely on later identified sources of information, including but not limited to witness testimony and other discovery, to establish the state of the art in the relevant time frame pertaining to the '111 Patent.

One or more combinations of the prior art references identified in Exhibits C-1 through C-12 would have been obvious because these references would have been combined with a reasonable expectation of success using a simple substitution of one known, equivalent element for another to obtain predictable results and/or a teaching, suggestion, or motivation in the prior

art generally. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. Further, the combinations of the prior art references identified in Exhibits C-1 through C-12 would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

All of the Asserted Claims are directed to the use of registers storing equalization coefficients. Such technology was widely known before the alleged priority date of the '111 Patent, as evidenced by the references in Exhibits C-1 through C-12. *See, e.g.*, Exs. C-1 (Lugthart '414); C-2 (Lugthart '431); C-3 (Ran); C-4 (Mazzini); C-5 (Tremblay); C-6 (Cecchi); C-7 (Ciacci); C-8 (Rafie); C-9 (SMP9 Cable); C-10 (Stratix); C-11 (Stauffer); C-12 (Secondary References).

The prior art references provide motivations to combine with a reasonable expectation of success because they describe the field of the Asserted Patents, teach improvements, explain desired features, and even expressly state that one of skill in the art would be able to apply their teachings to related systems or methods.

In accordance with these advances, the prior art could have been combined according to methods known to those of ordinary skill within the field of the Asserted Patents to yield predictable results. The substitution of one element in an active cable device could have been predictably achieved by one of ordinary skill at the time of the alleged invention. One of ordinary skill in the art would have been aware of these various applications, including the structure and timing methodologies and techniques, and would have been able to select appropriate attributes of one for inclusion in another. Those of ordinary skill in the art could have employed known techniques to improve similar prior art devices in the same way as claimed in the '111 Patent.

Additional motivations to combine specific references are discussed below.

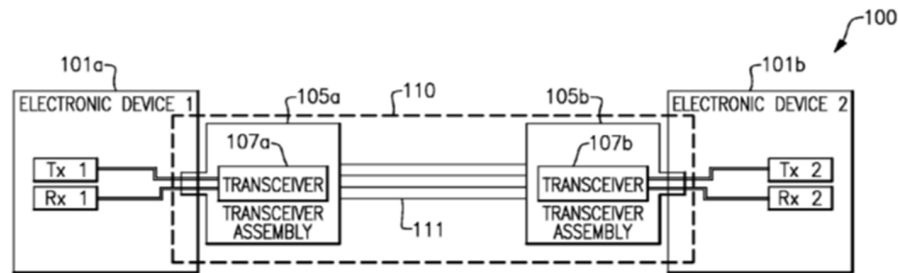
#### **6.1.1.1. Exemplary Motivations to Combine for the '111 Patent**

A person of ordinary skill in the art would have been motivated to combine any of the references described in Exhibits C-01 – C-12, or any reference disclosed above, with a reasonable expectation of success to perform the teachings of using a controller to adjust registers containing equalizer coefficients. The '111 patent recognizes that active cables containing certain data processing functionality were well known in the art prior to the priority date of the '111 patent. *See* '111 patent at 1:19-35.

For example, a person of ordinary skill in the art would have been motivated to combine U.S. Patent No. 10,148,414 B1 (“Lugthart '414”) with U.S. Patent Publication No. 2014/0281067 (“Das Sharma”) and United States Patent No. 7,239,665 (“Mezer”) with a reasonable expectation of success to render obvious claims 1–19 of the '111 Patent.

U.S. Patent No. Lugthart '414 was filed on June 30, 2017, was published October 19, 2017, and claims domestic priority to at least U.S. Patent Application No. 14,581,979 filed on December 23, 2014. Lugthart '414 qualifies as prior art under 35 U.S.C. § 102(a)(1)(AIA) and 35 U.S.C. § 102(a)(2)(AIA).

Lugthart '414 discloses an “active cable” that “includes... first and second transceiver assemblies 105a, 105b positioned at either end of... conductive lines 111.” *See* Lugthart '414 at 14:32-37, Fig. 2A (below).



**FIG. 2A**

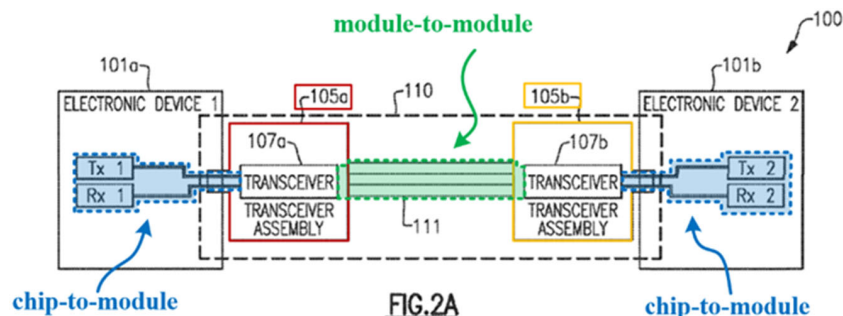
The electronic components of an active cable improve signal quality. *See, e.g.*, Lugthart '414 at 14:32-34. The transceiver assemblies 105a, 105b include transceivers 107a, 107b, respectively. *See id.* at 14:50-56, Fig. 2A. Each transceiver assembly has a “host side” electrically connected to a host (termed an “electronic device”) and a “line side” electrically connected to one end of the cable’s conductive lines 111. *See id.* at 14:36-45, Fig. 2A (annotated detail below).



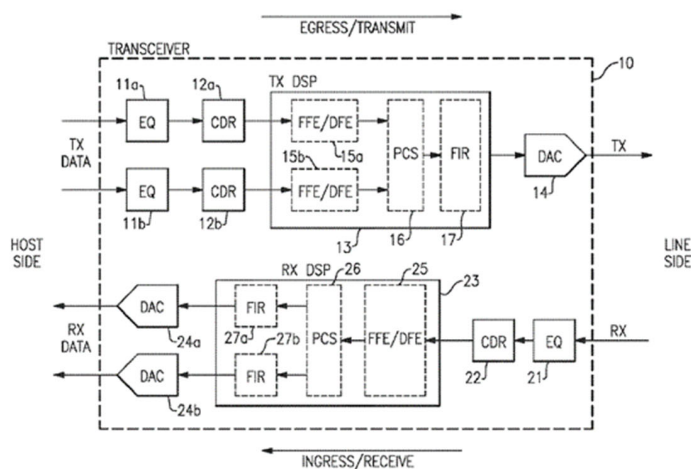
Each transceiver assembly’s input port comprises a connector, such as an industry standard SFP or QSFP connector, that “is configured to mechanically and electrically connect, e.g., in a releasable fashion, to a corresponding port or other interface on the respective electronic device 101a, 101b, and an output port that is connected to the cable.” *See id.* at 15:49-59, Figs. 2A, 17A, 17B, 18.

The transceivers 107a/107b of Lugthart '414 can perform pre-equalization (which Lugthart '414 calls pre-emphasis) on signals transmitted over the cable's conductive lines 111, as well as on signals transmitted to electronic devices 101a/101b. *See, e.g., id.* at 23:67-24:2, 29:25-30.

Figure 1A's transceiver 10 illustrates one embodiment of Figure 2A's pluggable module transceiver 107a/107b. *See, e.g., id.* at 14:50-56.



**FIG. 2A**



**FIG. 1A**

Transceiver 10's "EGRESS/TRANSMIT" path through DSP 13 performs digital signal processing, including retiming, on the multi-lane TX DATA signal before transmitting the TX signal over conductive lines 111. *See, e.g., id.* at 16:4-10, 21:42-49, Figs. 1A, 2A. The finite impulse response (FIR) filter 17 is a transmit filter that performs pre-emphasis on the re-timed TX signal transmitted over conductive lines 111. *See, e.g., id.* at 16:17-22, 29:25-30.

Lugthart '414 configures FIR filters using “tap coefficients,” and the filters “perform emphasis on the signal to compensate for channel losses.” *See id.* at 22:19-23, 23:64-24:7. “Pre-emphasis” and “pre-equalization” were used interchangeably in the art. *See, e.g.*, U.S. Patent No. 8,787,430 at 2:39-41 (describing a “technique for combating ISI [inter-symbol interference]... known as ‘pre-emphasis’, or pre-equalization”); *see also* U.S. Patent No. 9,806,812 at 7:54-55; U.S. Patent No. 9,137,063 at 3:24-27; U.S. Patent No. 9,152,257 at 5:4-8. The purpose of pre-equalization is to compensate for anticipated channel distortion on a transmitted signal.

On the “INGRESS/RECEIVE” path, the DSP 23 performs digital signal processing on signal RX received from the cable before that signal is transmitted to the host (electronic device 101a/101b in Figure 2A). *See, e.g.*, Lugthart '414 at 8:30-36, 9:42-55, Fig. 1A. The DSP 23 includes FIR filters 27a/27b. *See, e.g., id.* at 9:42-50. The DSP 23 uses these FIR filters for “adaptive and configurable signal conditioning features such as... output pre-emphasis” on the signal transmitted to the host. *See, e.g., id.* at 9:56-59, 29:25-30. In one exemplary embodiment, Lugthart '414 describes a five-tap FIR 17 and 27a/27b. *See, e.g., id.* at 22:19-23.

U.S. Patent Publication No. 2014/0281067 (“Das Sharma”) was filed on March 15, 2013, and published on September 18, 2014. Das Sharma qualifies as prior art under at least 35 U.S.C. § 102(a)(1)(AIA) and 35 U.S.C. § 102(a)(2)(AIA).

Das Sharma discloses adaptive pre-equalization to fine-tune pre-equalization coefficients. *See, e.g.*, Das Sharma at [0075], [0080]. Das Sharma stores pre-equalization coefficients in registers on the transmitter side. *See id.* at [0078], [0106]. Das Sharma uses these adaptive pre-equalization techniques for PCI Express applications, a widely practiced SerDes method and one of the protocols that Lugthart '414 explicitly supports. *See id.* at [0038], [0069]; *see also* Lugthart '414 at 16:38-43.

More specifically, Das Sharma describes “a link training and equalization procedure” in which “a set of coefficients” is “applied to [the] transmission logic” of the transceiver. Das Sharma at [0066]. The set of coefficients is “applied to a finite impulse response (FIR) filter” in transmission logic of the transceiver to apply pre-emphasis before signal transmission. Das Sharma at [0079]. Das Sharma explains that “a lower bit error rate may be achieved in a channel of a communications link... when an optimized set of coefficients are applied to” the transceiver’s “transmission logic.” *See id.* at [0089].

Das Sharma stores “a set of default coefficients located within registers of the transmitter” that “may be applied to the transmission... logic.” *See, e.g.*, Das Sharma at [0078], [0106]. Das Sharma refers to each register storing coefficient data as a “coefficient register table.” *See id.* at [0078]. During operation, the default coefficients (also referred to as “pre-sets”) “are requested from the configuration registers” and applied to the transmitter’s pre-emphasis filter. *See id.* at [0086]-[0088], [0136], [0155].

United States Patent No. 7,239,665 (“Mezer”) was filed on November 24, 2003, and published on May 26, 2005. Mezer qualifies as prior art under at least 35 U.S.C. § 102(a)(1)(AIA) and 35 U.S.C. § 102(a)(2)(AIA).

Mezer discloses an equalization process that uses “a set of coefficients” that Mezer calls “equalizer characteristic[s].” *See, e.g.*, Mezer at 3:64-4:7, 7:4-15 (“equalizer characteristic’ shall be understood to include a set of coefficients such as a set of filter coefficients”). “[V]arious types of channels may be tested in advance to determine suitable FFE [Feed-Forward Equalizer] characteristics therefor, and when it is determined to which one of the channel types the computer system is coupled, the suitable FFE characteristic for that type of channel may be selected.” *See id.* at 6:53-57; *see also* 3:33-4:42 (describing the process for pre-computing the various sets of

coefficients). An ordinarily skilled artisan would have understood that Mezer teaches that different initial “set[s] of coefficients” can be “pre-computed” for different types of channels and those different sets of coefficients can be “stored in [a] storage unit.” *See id.* at 4:4-15.

“Selection of a pre-computed equalizer characteristic based on a channel characteristic may be performed with respect to virtually any communication channel that has an impulse response that varies with a physical characteristic,” including a C2M channel. *See id.* at 6:62-7:3.

Lugthart '414 describes training phases. *See, e.g.,* Lugthart '414 at 47:55-60. During training, signals are transmitted over the communication channel and “parameters” are “adjusted,” including “operating parameters for the equalizers.” *See, e.g.,* Lugthart '414 at 48:65-49:12. An ordinarily skilled artisan understood that this describes adaptive equalization. While Lugthart '414 is not explicit about which of the equalizers has its parameters “adjusted” during training, an ordinarily skilled artisan understood that Lugthart '414 describes adjusting the equalization parameters for any, or all, of Lugthart '414's equalizers, including FIR filters 27a/27b of RX DSP 23 in Lugthart '414's transceiver assembly that performs pre-equalization on signals transmitted to the host transceiver as discussed *supra* §VI.A. *See, e.g.,* Lugthart '414 at 23:26-28, 23:64-24:2, 48:65-49:12.

To the extent Lugthart '414 is read to not expressly disclose using adaptive pre-equalization to adjust pre-equalization coefficients for FIR filters 27a/27b of RX DSP 23 in Lugthart '414's transceiver assembly, Das Sharma would have motivated an ordinarily skilled artisan to have implemented Lugthart '414 in that manner. Das Sharma teaches adaptive pre-equalization used in the same type of PCI Express protocol that Lugthart '414 describes. *See, e.g.,* Das Sharma at [0038], [0069]; *see also* Lugthart '414 at 16:40-43. Das Sharma stores an initial set of pre-equalization coefficients in registers of the transceiver on the transmitter side (Das Sharma at

[0078], [0106]) and performs an adaptive pre-equalization process that optimizes the pre-equalization coefficients during a training process to “achieve communication... with minimal data loss.” *See, e.g.*, Das Sharma at [0075].

Lugthart '414 Figure 2A shows that Lugthart '414 specifically contemplates the using conductive lines 111 to connect transceiver assemblies 107a and 107b. An ordinarily skilled artisan would have known that Lugthart '414's cable assembly 110 in Figure 2A would be assembled during the manufacturing process. As such, the characteristics of the channel formed by conductive lines 111 connecting transceiver assemblies 107a and 107b would be largely determined during the manufacturing process, while surrounding factors such as the interference from other proximate conductors, transceiver electrical noise, or changes in cable electrical conductivity from, e.g., temperature or humidity variations, would perturb the channel characteristics.

An ordinarily skilled artisan knew that storing default pre-equalization parameter values determined during the manufacturing process was convenient and even essential for certain operating environments that made adaptation impractical. Storing default values also improves the cable assembly's boot-up speed as the pre-equalization adjusts incrementally from the default values, e.g., the training sequence, and need only account for deviations incurred during actual cable assembly use. *Id.*

If Lugthart '414 is not understood as describing an adaptive pre-equalization process, then an ordinarily skilled artisan had multiple reasons to modify Lugthart '414 to make Lugthart '414's pre-equalization process adaptive and to store the initial set of pre-equalization coefficients in a set of registers with a reasonable expectation of success.

First, Das Sharma expressly teaches the benefits of using an adaptive pre-equalization process that optimizes the pre-equalization coefficients to the particular channel, thereby achieving

communication “with minimal data loss.” *See, e.g.*, Das Sharma at [0075]. An ordinarily skilled artisan understood that an adaptive pre-equalization process, like Das Sharma’s, enables optimizing coefficients for the current characteristics of a particular channel, thereby compensating for changes in the operating environment (*e.g.*, temperature) that may alter the channel impairments (*e.g.*, distortion) affecting transmitted signals. United States Patent No. 8,477,835 at 3:51-64 (pre-equalization coefficients “can be adapted periodically during system operation to account for changes in the system environment that may impact performance”). Das Sharma also expressly teaches storing initial pre-equalization coefficients in a set of registers. *See, e.g.*, Das Sharma at [0078], [0106]. An ordinarily skilled artisan would have used Das Sharma’s teachings to make Lugthart ’414’s pre-equalization process adaptive and to store an initial set of pre-equalization coefficients in a set of registers, which are specific memory locations that the processor(s) performing the pre-equalization can access quickly and conveniently.

Second, adaptive pre-equalization’s benefits for improving data transmission performance were well-known. *See, e.g.*, Das Sharma at [0075], [0089] (optimizing the initial pre-equalizer coefficients based on channel conditions yields “a lower bit error rate” and thus “increase[d] data transmission performance within [the] communication system[.]”); United States Patent No. 9,806,812 at 10:40-11:2; United States Patent No. 8,477,835 at 5:34-39; United States Patent No. 6,680,681 at 2:20-28.

Similarly, on-chip registers were a well-known storage medium that an ordinarily skilled artisan understood were desirable for storing coefficients in a digital signal processor (DSP) because values can be retrieved from registers more quickly than from other types of storage, which may require the specific address locations for access (as opposed to the names typically associated with the registers, to which the software programs can point), thereby increasing the

speed and flexibility of DSP operations. *See, e.g.*, United States Patent No. 9,495,245 at 5:13-22 (registers permit “parallel and... immediate[.]” access and allow “data to be accessed, processed, and transferred more efficiently”); United States Patent No. 5,854,921 at 1:41-52, 2:8-34 (operations by a processor on data stored in “registers... within the microprocessor” requires fewer clock cycles than operations on data stored in off-chip memory like DRAM).

An ordinarily skilled artisan would have been motivated to store Mezer’s pre-computed sets of coefficients in a coefficient register table as taught by Das Sharma, to reduce the size, cost, and complexity of implementing Mezer’s “lookup table.” *See, e.g.*, United States Patent No. 6,680,681 at 1:38-41 (the “size, cost and complexity” of storing equalizer coefficients in a “lookup table” in memory may be “unacceptable”), 2:46-49 (addressing these concerns by storing equalizer coefficients in a “register array”); *see also* Mezer at 5:13-18; Das Sharma at [0075], [0078], [0106].

These well-known benefits of an adaptive pre-equalization process and storing coefficients in registers would have motivated an ordinarily skilled artisan to make Lugthart ’414’s pre-equalization process adaptive and to store an initial set of pre-equalization coefficients in registers with a reasonable expectation of success.

Third, making Lugthart ’414’s pre-equalization process adaptive and storing an initial set of pre-equalization coefficients in a set of registers meets multiple rationales that are indicative of obviousness. *KSR v. Teleflex*, 550 U.S. 398, 417-421 (2007). This combination is a “mere application of a known technique [adaptive pre-equalization using initial coefficients stored in registers as taught by Das Sharma] to a piece of prior art [Lugthart ’414] ready for the improvement” because Lugthart ’414’s system was ready for the improved error rate reduction achieved by Das Sharma’s adaptive pre-equalization. *Id.*, 417.

This also combines known elements (Lugthart '414's pluggable module transceiver that performs pre-equalization and Das Sharma's adaptive pre-equalization that uses initial coefficients stored in registers) to perform their same known functions to yield predictable results. *KSR*, 550 U.S. at 417 (“When a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.”) (cleaned up); *see also Intel v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380-1381 (Fed. Cir. 2023) (“There is a motivation to combine when a known technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the prior art elements according to their established functions.”) (cleaned up); *Intel v. Qualcomm*, 21 F.4th 784, 799–800 (Fed. Cir. 2021) (applying “known-technique” rationale).

An ordinarily skilled artisan would have reasonably expected success in making Lugthart '414's pre-equalization process adaptive and storing an initial set of pre-equalization coefficients in a set of registers as taught by Das Sharma. Adaptive pre-equalization was well-known. *See, e.g.*, Das Sharma at [0081]; *see also* United States Patent No. 7,664,171 at 1:62-2:40. Based on these teachings in the art, an ordinarily skilled artisan understood how to use training signals to perform adaptive pre-equalization and to update an initial set of pre-equalization coefficients. *See, e.g.*, Das Sharma at [0081]; *see also* United States Patent No. 7,664,171 at 1:62-2:40. An ordinarily skilled artisan further knew how to store initial and updated pre-equalization coefficients in registers because Das Sharma taught this (Das Sharma at [0075]-[0078]) and registers were a well-known storage medium for storing data in a digital signal processor like Lugthart '414's RX DSP 23. *See, e.g.*, United States Patent No. 9,495,245 at 5:13-22; United States Patent No. 5,854,921 at 2:8-34.

As another example, claims 1-19 are invalid under 35 U.S.C. § 103 (AIA) over the combination of Lugthart '414 in view of Das Sharma, and in further view of Mezer.

To the extent Lugthart '414 and Das Sharma do not disclose storing different initial pre-equalization coefficient values for different channel models, that was taught by Mezer.

Mezer's equalization process uses "coefficients" that Mezer also calls "equalizer characteristics." *See, e.g.*, Mezer at 3:64-4:7, 7:11-15. Mezer teaches that "various types of channels may be tested in advance to determine suitable FFE [Feed-Forward *Equalizer*] characteristics therefor, and when it is determined to which one of the channel types the computer system is coupled, the suitable FFE characteristic for that type of channel may be selected." *See, e.g.*, Mezer at 6:53-57; *see also id.* 3:33-4:42 (describing process for pre-computing the various sets of coefficients). An ordinarily skilled artisan understood that a "feed-forward equalizer" was a type of equalizer that, like pre-equalization, improved communication by compensating for channel distortion, and thus the "equalizer characteristics" (coefficients) in Mezer are analogous to coefficients used in an adaptive pre-equalization process. *See, e.g.*, United States Patent No. 8,787,430 at 17:4-14. Thus, Mezer teaches that different initial "set[s] of coefficients" can be "pre-computed" for different channel types and "stored in [a] storage unit." *See, e.g.*, Mezer at 4:4-7.

An ordinarily skilled artisan understood that Mezer's teachings were applicable to the pre-equalization process performed by Lugthart '414 (as modified by Das Sharma in the manner described above). Mezer teaches that "[s]election of a pre-computed equalizer characteristic based on a channel characteristic may be performed with respect to virtually any communication channel that has an impulse response that varies with a physical characteristic" and is explicit that this includes Ethernet channels. *See, e.g.*, Mezer at 6:62-7:3. An ordinarily skilled artisan understood that Lugthart '414's *chip-to-module communications link* between the pluggable module

transceiver and the host transceiver is a “communication channel that has an impulse response that varies with a physical characteristic” as described by Mezer, because Lugthart ’414’s C2M link distorts transmitted signals in ways that vary with the physical characteristics of the channel as discussed above.

Mezer’s equalizer is on the receiver side of the communication channel rather than the transmitter side as in Lugthart ’414 and Das Sharma, so Mezer’s equalization is not pre-equalization as in Lugthart ’414 and Das Sharma. *See, e.g.*, Mezer at 5:25-28; *see also* Lugthart ’414 at 23:26-28, 23:64-02, 48:65-49:19; Das Sharma at [0078], [0081], FIG. 5. However, an ordinarily skilled artisan understood that the below-discussed benefits Mezer describes of storing different initial equalization coefficients for different channel types (improved efficiency and/or using less hardware) apply equally to pre-equalization performed on the transmitter side. *See, e.g.*, Mezer at 5:40-55. Indeed, applying the same type of “lookup table” approach for initial pre-equalizer coefficients on the transmitter side was known. United States Patent No. 9,118,512 at 12:34-55, 13:56-59 (“a measurement of a channel condition... may be used to index a lookup table and obtain... coefficient[s]” for a transmitter-side pre-equalizer); United States Patent No. 10,736,201 at 10:13-52 (initial pre-equalizer coefficients “can be pre-determined and stored in a memory of the driving circuitry,” for example “in a look-up table”); United States Patent No. 8,477,835 at 9:67-10:2 (“a simple mapping table, which can be realized through a table-lookup ROM, RAM, or through firmware, can provide the means to set TX equalizer coefficients”); Das Sharma at [0078], [0106].

Thus, an ordinarily skilled artisan understood that Mezer’s teachings apply directly to Lugthart ’414’s pre-equalization process (as modified by Das Sharma as described *above*).

An ordinarily skilled artisan had multiple reasons to modify the above-discussed combination based on Lugthart '414 and Das Sharma to store, in Das Sharma's registers, different pre-computed pre-equalization coefficients for different channel models with a reasonable expectation of success.

First, Mezer expressly teaches the benefits of using different pre-stored pre-computed pre-equalization coefficients for different channel types with different channel characteristics. *See, e.g.*, Mezer at Abstract, 5:40-56. If the adaptive equalizer does not customize the initial coefficients to the channel type, "convergence of the adaptive equalizer may be slower than desirable." *See, e.g.*, Mezer T 1:16-18. Mezer explains that its use of different pre-computed coefficients for different channel types can be used in an adaptive equalization process that uses "conventional principles" like in Lugthart '414 and Das Sharma, but "because of the relatively high degree of equalization provided by the pre-computed FFE block 48, the adaptive FFE 52 may converge more rapidly, and/or may require less hardware (e.g., fewer gates) than would be the case" if initial equalization coefficients were used that were not pre-computed for the specific channel type. *See, e.g.*, Mezer at 5:40-55; *id.*, 2:21-23 (FFE means "feed forward equalizer").

Thus, Mezer expressly teaches that using different sets of stored coefficients for different channel types can advantageously provide a more efficient adaptive training process that "converges more rapidly" to coefficients that yield an acceptable error rate and/or can use less hardware. *See, e.g.*, Mezer at 5:40-55. One exemplary Mezer channel characteristic is the length of a cable used in the channel, because different cable lengths can distort the signal transmitted through the channel differently. *See, e.g.*, Mezer at 3:32-4:22. An ordinarily skilled artisan understood that Mezer's techniques are applicable to other variable channel characteristics, such as different PCB trace lengths between the host transceiver and the pluggable module connector.

*See, e.g.*, Mezer at 6:50-53 (“selection of one of a number of stored pre-computed equalizer characteristics may be performed on the basis of a channel characteristic other than cable length”), 6:62-7:3 (Mezer’s techniques “may be performed with respect to virtually any communication channel that has an impulse response that varies with a physical characteristic”).

Thus, an ordinarily skilled artisan understood that channel characteristics can vary widely, so that the designers of the chips with SerDes typically characterize multiple different channel models and store the corresponding pre-equalization parameters as potential initial values for the adaptation process. Mezer’s express teachings would have motivated an ordinarily skilled artisan to modify Lugthart ’414 and Das Sharma to store different pre-computed pre-equalization coefficients for different channel models as initial coefficients for use in the adaptive pre-equalization process used by Lugthart ’414 as modified by Das Sharma with a reasonable expectation of success. An ordinarily skilled artisan would have stored the pre-computed initial pre-equalization coefficients in a set of registers in the same way Das Sharma describes for storing initial pre-equalization coefficients. Das Sharma at [0078].

Second, it was well-known that using initial pre-equalization coefficients that accurately estimate the impact of the channel “shorten[s] the training time” for the pre-equalizer, leading to less costly down time for training. *See, e.g.*, Mezer at 5:40-55 (the adaptive training process converges more rapidly); *see also* United States Patent No. 7,664,171 at 10:30-33, 2:33-40 (“if the initial coefficient value of equalizer is estimated accurately enough, the equalizer will nearly enter into the convergence state before training”), 2:33-40 (describing a “pre-loading technique of equalizer coefficient[s], which first writes a group of initial coefficient value pre-calculated (estimated) into the coefficient register of equalizer before the equalizer starts training process”), 10:47-11:7 (“the effect of equalizer coefficient pre-load of the present invention is much better

than the prior art.”); United States Patent No. 9,118,512 at 12:34-55, 13:56-59; United States Patent No. 10,736,201 at 10:13-52; United States Patent No. 8,477,835 at 9:67-10:3; Das Sharma at [0078], [0082], [0106]; Mezer at 6:27-42.

It was also well-known that active cable systems like Lugthart '414's could be plugged into different types of electronic devices 101a/101b with different types of communication links between the pluggable module connector and the host transceiver (Lugthart '414 Fig. 2A) and that the C2M link between the pluggable module's transceiver and the host device's transceiver could vary for different electronic devices and distort the signal differently. *See, e.g.*, Lugthart '414 at 6:25-48.

Thus, an ordinarily skilled artisan would have understood that storing different initial equalization coefficients, for different types of electronic devices that might be used with the cable, would increase the likelihood of selecting, for a particular device, initial coefficients that accurately estimated the C2M channel's impact on the signal, thus desirably yielding an efficient training process.

Third, modifying the pluggable module transceiver of Lugthart '414 in view of Das Sharma discussed above to store different initial sets of pre-equalization coefficients for different channel models meets multiple rationales indicative of obviousness. *KSR*, 550 U.S. at 417-421. Modifying the pluggable module transceiver of Lugthart '414 in view of Das Sharma to use different pre-equalization coefficients for different C2M channel models is a “mere application of a known technique [using different initial coefficients for different channel types as taught by Mezer] to a piece of prior art [Lugthart '414 as modified by Das Sharma] ready for the improvement” because the pluggable module transceiver of Lugthart '414 in view of Das Sharma was ready for the

improvement of a more efficient pre-equalization training process that results from having different initial coefficients for different channel types. *Id.*, 417.

This combination is also nothing more than combining known elements (Lugthart '414's pluggable module transceiver that performs pre-equalization, Das Sharma's adaptive pre-equalization that uses initial coefficients stored in registers, and Mezer's different initial equalization coefficients for different channel types) to perform their same known functions to yield predictable results. *KSR*, 550 U.S. at 417; *PACT XPP*, 61 F.4th at 1380-81 (discussing known technique improving similar devices in same way).

An ordinarily skilled artisan also would have reasonably expected success in further modifying Lugthart '414 and Das Sharma to store different initial pre-equalization coefficients for different channel types as taught by Mezer. *See, e.g.*, Mezer at Abstract, 5:40-56. Mezer teaches that initial equalization coefficients for different channel types can be computed and stored in advance. *See, e.g.*, Mezer at 3:34-4:22.

At least two techniques were known for how the transceiver of the combination based on Lugthart, Das Sharma, and Mezer would determine which set of initial coefficients to use when the cable is plugged into a new host device.

First, Mezer teaches that the pre-computed equalizer characteristics may be selected based on cable length or "on the basis of a channel characteristic other than cable length." *See, e.g.*, Mezer at 6:27-28, 6:50-57. "Selection of a pre-computed equalizer characteristic based on a channel characteristic may be performed with respect to virtually any communication channel that has an impulse response that varies with a physical characteristic." *See, e.g.*, Mezer at 6:62-7:3. "[W]hen it is determined to which one of the channel types the computer system is coupled, the suitable FFE characteristic for that type of channel may be selected." *See, e.g.*, Mezer at 6:50-57.

Lugthart '414 teaches a “startup-phase” when its active cable is installed between two electronic devices. *See, e.g.*, Lugthart '414 at 47:65-48:7, Fig. 2A. In the start-up phase, a “basic channel test may be performed... to determine the channel parameters such as, for example, loss, noise, dispersion, non-linearity, etc.” *See, e.g.*, Lugthart '414 at 48:20-23. To the extent Lugthart '414 suggests that this “channel test” tests the channel between the host transceivers in the electronic devices 101a/101b, an ordinarily skilled artisan understood that pluggable module transceivers 107a/107b could have been easily adapted to each perform a channel test for the channel shown in red below between the pluggable module transceiver and its respective host transceiver in the electronic device 101a/101b into which the pluggable module transceiver’s assembly is releasably plugged. This would have been well-within the POSA’s capabilities as it would have simply involved implementing Lugthart '414’s known “basic channel test” capability in the pluggable module transceiver because Lugthart '414’s host transceiver already had this “basic channel test” functionality. *See, e.g.*, Lugthart '414 at 48:20-23.

An ordinarily skilled artisan understood that Lugthart '414’s “basic channel test” that “determine[s] the channel parameters” like “loss, noise, dispersion, non-linearity, etc.” was a desirable way to select among Mezer’s different sets of initial pre-equalization coefficients for different channel types. *See, e.g.*, Lugthart '414 at 48:20-23; Mezer at 6:50-7:3. During Das Sharma’s adaptive equalization process, equalization coefficients are adjusted to compensate for these types of “channel parameters” like loss and noise. *See, e.g.*, Das Sharma at [0066], [0075]-[0077], [0087]-[0089]. An ordinarily skilled artisan understood that these same channel parameters used to adapt pre-equalization coefficients to yield suitably low error in the received signal were desirable parameters to use to select an initial set of pre-equalization coefficients that best compensates for the channel’s impact on the signal to make the training process “converge more

rapidly, and/or... require less hardware.” *See, e.g.*, Mezer at 5:40-55, 6:27-33, 6:50-57; Das Sharma at [0081] (describing generating new coefficient values during the adaptive equalization process based on a measured bit error rate for the channel).

Second, an alternative way to select from among the sets of pre-computed pre-equalization coefficients in the combination based on Lugthart, Das Sharma, and Mezer was to send a known test signal using each set, determine which set produced a received signal that most closely matched the known test signal, and select the set of coefficients that produced that closest matching signal. *See, e.g.*, Mezer at 6:53-57 (selecting set of coefficients when channel type is determined); Das Sharma at [0081] (iteratively cycling through multiple sets of coefficients during the adaptive equalization process and determining a bit error rate for each one). This was well-within the ordinarily skilled artisan’s capabilities. It simply involves the pluggable module transceiver sending a known test signal using each set of coefficients, the port transceiver determining which received test signal most closely matches the known test signal using the same error evaluation techniques known for use in adaptive equalization (Das Sharma at [0081]), selecting the register with the coefficients that yielded the test signal with lowest error, and the pluggable module transceiver using the set of coefficients selected by the port transceiver.

Whether the pluggable module transceiver or the port transceiver selects the register with the best performing coefficients was an ordinarily skilled artisan’s design choice, as backchannel communication between the transceivers meant either transceiver could make the selection. *KSR*, 550 U.S. at 421 (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”).

It was well-known to use backchannel communication between transceivers on opposite ends of a communications channel to implement equalization. *E.g.*, United States Patent Publication No. 2004/0071203 at [0070]; IEEE Std. 802.3-2015, “IEEE Standard for Ethernet: Section 5” at 473 (802.3-215, Clause 72, “§72.6.10.2.3 Coefficient update field: The coefficient update field carries correction information from the local receiver to the link partner transmit equalizer.”). The receiving host transceiver could use a backchannel communication technique to provide error information on each test signal to the transmitting pluggable module transceiver, which could use that error information to select the register with the coefficients that produced the lowest error. Alternatively, the receiving port transceiver could evaluate the error data and select the register with the coefficients that produced the lowest error and communicate that selection to the pluggable module transceiver using backchannel communication.

Thus, an ordinarily skilled artisan would have had a reasonable expectation of success in implementing Lugthart '414's active cable to perform adaptive pre-equalization, store in Das Sharma's registers different initial pre-equalization coefficients for different channel types as taught by Mezer, and select from among those different coefficients the set best suited to the channel in which the cable is installed because this involved simply using known techniques and was well within an ordinarily skilled artisan's skill.

Similarly, a POSITA would have been motivated to combine Ran in view of either Lugthart '431, or Tremblay, or Kang, or Infiniband, or a combination thereof; Tremblay in view of either Kang, or Ran, or Mazzini, or Infiniband, or a combination thereof; Mazzini in view of either Kang, or Tremblay, Ran, or a combination thereof; or Cecchi in view of Tremblay, or Kang, or Ran, or Mazzini, or Infiniband, or a combination thereof.

To the extent that it is determined that any of these references do not disclose “selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Rafie, Ciacci, Balakrishnan, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such selection of registers to specify pre-equalization coefficient values in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, TI DS125DF410, or TIDS110DF111, each of which teach selecting registers to specify pre-equalization coefficient values. *See, e.g.*, Exhibits C-2–C-6, C-12 (claim 1[a]). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Kang, Cornelius, Infiniband, Ran, Balakrishnan, and Cecchi where they disclose the use of multiple registers with equalization coefficients corresponding to different channel models, with the embodiments of at least Lugthart ’431, Tremblay, Mazzini, Rafie, Ciacci, Balakrishnan, TI DS125DF410, TIDS110DF111, and/or any combinations therein. *See* Exs. C-3, C-6, C-12. As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors, each of which a POSITA would have had reason to implement in at least Lugthart ’431, Tremblay, and /or Mazzini. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. Balakrishnan discloses

storing “gain coefficients of the digital pre-equalizer” in a register. Balakrishnan ¶ 27. It was also well-known in the art to store coefficients in registers and that using multiple registers was an option. *See, e.g.*, Exhibits C-3, C-6, C-12 (claim 1[a]). Indeed, using multiple registers with coefficient values is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of selecting from multiple registers corresponding to different channel models would thus require nothing more than the application of a known solution (incorporating multiple registers that correspond to different channel models), according to its established function (selecting between the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “updating the initial pre-equalizer coefficient values during a training phase,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such updating via a training phase in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, TI DS125DF410, or TIDS110DF111, each of which teach updating coefficient values. *See, e.g.*, Exhibits C-2–C-6, C-12 (claim 1[b]). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Ran, Mazzini, and Tremblay where they disclose the use of updating via training with the embodiments of at least Lugthart ’431, Kang, Cecchi, Infiniband, Cornelius and/or any combinations therein. *See Exs. C-3 – C-5.*

As specific examples, Mazzini describes a training phase with respect to at least Figure 4, Ran discloses a training phase with respect to at least Figures 3A, 3B, and 3D, and Tremblay describes an adaptive process. *Id.* A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that you could use a training phase to update coefficients in the manner considered. *See, e.g., id.* (claim 1[b]). Indeed, using a training phase to update coefficients is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of training would thus require nothing more than the application of a known solution (incorporating a training phase), according to its established function (updating coefficient values), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “using the updated pre-equalizer coefficient values to convey a transmit data stream,” (claim 1[c]) a person of ordinary skill in the art would have been motivated to combine any of these references with a reasonable expectation of success for the same reasons discussed related to the prior limitations related to Claim 1 of the ’111 patent. A POSITA would have understood that any selection of multiple registers or updating that occurs would ultimately be used to transmit the updated coefficient values to convey a data stream.

To the extent that it is determined that any of these references do not disclose that “the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics,” a person of ordinary skill in the art would have been motivated to

combine Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Balakrishnan, Das Sharma, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models with different insertion loss and package loss characteristics in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Balakrishnan, Das Sharma, TI DS125DF410, or TIDS110DF111 each of which teach models with differing channel characteristics. *See, e.g.*, Exhibits C-2–C-6, C-12 (claims 2, 9). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Cecchi, Kang, Cornelius, Balakrishnan, Das Sharma, TI DS125DF410, or TIDS110DF111 where they disclose the varying models having variations in channel characteristics with the embodiments of at least Lugthart '431, Tremblay, Ran, Mazzini, or Infiniband. *See* Exs. C-6, C-12. As a specific example, Cecchi discloses a plurality of registers with differing characteristics, Balakrishnan discloses frequency shaping, and Das Sharma discloses channel losses. *Id.* A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations of insertion loss and package loss characteristics. *See, e.g., id.* (claim 1[a]). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art

would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “at least some of the different channel models presume different types of receiver equalization,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Ciacci, Rafie, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, or Infiniband, each of which teach models with differing channel characteristics. *See, e.g.*, Exhibits C-2–C-6, C-12 (claims 3, 10). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Cecchi, Kang, Cornelius, and Infiniband where they disclose the varying models having different types of receiver equalization with the embodiments of at least Lugthart ’431, Tremblay, Ran, Mazzini, Ciacci, Rafie, TI DS125DF410, or TIDS110DF111. *See* Exs. C-6, C-12. As a specific example, Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors. Ex. C-6. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations in different types of receiver equalization. *See, e.g.*, Exhibits C-6, C-12 (claims 3, 10). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization

using these different models would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Rafie, Ciacci, Fox, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Fox, TI DS125DF410, or TIDS110DF111, each of which teach determining a performance characteristic. *See, e.g.*, Exhibits C-2–C-6, C-12 (claim 4). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Mazzini, Tremblay, Ran, Cecchi, Kang, Cornelius, and Ran where they disclose the varying models having different types of receiver equalization with the embodiments of at least Lugthart ’431, Tremblay, Ran, Mazzini, or Infiniband. *See* Exs. C-3–C-5. As specific examples, Mazzini describes a training phase with respect to at least Figure 4, Ran discloses a training phase with respect to at least Figures 3A, 3B, and 3D, and Tremblay describes an adaptive process, each of which includes using initial pre-equalizer coefficients. *See id.* Fox teaches “utilize ongoing CMTS receiver measurements, such as bit error rates, modulation

error rates, and power measurements, to continually recalculate and optimize various CMTS receiver parameters in each channel's profile.” Fox at 11:26-31, *see also id.* at 10:6-8. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that the initial pre-equalize coefficients could be used to determine characteristics of registers. *See, e.g., id.* (claim 4). Indeed, using the initial coefficients to determine register characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these initial coefficient values to determine varying register characteristics would thus require nothing more than the application of a known solution (using initial values), according to its established function (measuring different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “the performance characteristic is an error signal energy,” a person of ordinary skill in the art would have been motivated to combine Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Fox, Mezer, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance characteristic that is an error signal energy in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Fox, Mezer, TI DS125DF410, or TIDS110DF111, each of which teaches the performance characteristic relating to errors. *See, e.g.,* Exhibits C-2–C-6, C-12 (claims 5, 12, 18). For example, a POSITA would have

been motivated to incorporate the embodiments of at least each of Cecchi, Cornelius, Fox, Mezer, TI DS125DF410, or TIDS110DF111, where they disclose the varying models having a performance characteristic that is an error signal energy with the embodiments of at least Lugthart '431, Tremblay, Ran, Mazzini, or Infiniband *See* Exs. C-6, C-12 (claims 5, 12, 18). As a specific example, Cecchi discloses measuring error rate, Cornelius discloses measuring transmission errors, Fox discloses bit error rates, and Mezer discloses error signals. *Id.* A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that error signal energy could be used as a performance characteristic. *See, e.g., id.* (claims 5, 12, 18). Indeed, using an error signal energy as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using an error signal energy as a performance characteristic thus requires nothing more than the application of a known solution (using an error signal energy as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “a performance characteristic is a bit error rate,” a person of ordinary skill in the art would have been motivated to combine Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Fox, Mezer, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance characteristic that is a bit error rate in view

of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, Fox, Mezer, TI DS125DF410, or TIDS110DF111, each of which teaches the performance characteristic relating to errors. *See, e.g.*, Exhibits C-2–C-6, C-12 (claims 6, 13, 19). For example, a POSITA would have been motivated to incorporate the embodiments of at least each of Cecchi, Cornelius, Fox, Mezer, TI DS125DF410, and TIDS110DF111 where they disclose the varying models having a performance characteristic that is a bit error rate with the embodiments of at least Lugthart '431, Tremblay, Ran, Mazzini, or Infiniband. *See Exs. C-6, C-12 (claims 6, 13, 19)*. As a specific example, Cecchi discloses measuring error rate, Cornelius discloses measuring transmission errors, Fox discloses bit error rates, and Mezer discloses error signals. *Id.* A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that bit error rates could be used as a performance characteristic. *See, e.g., id.* (claims 6, 13, 19). Indeed, using a bit error rate as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using a bit error rate as a performance characteristic thus requires nothing more than the application of a known solution (using a bit error rate as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “updating the selected register with the updated pre-equalizer coefficient values,” a person of ordinary skill in the art would have been motivated to combine Lugthart '431, Tremblay, Kang, Ran, Mazzini,

Cecchi, Infiniband, Cornelius, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, TI DS125DF410, and TIDS110DF111, each of which teach determining a performance characteristic. *See, e.g.*, Exhibits C-2–C-6, C-12 (claims 7, 14, 15). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Mazzini, Tremblay, Ran, Cecchi, Kang, Cornelius, Ran, TI DS125DF410, and TIDS110DF111 where they disclose the varying models updating the selected register with updated pre-equalizer coefficients with the embodiments of at least Lugthart '431, Tremblay, Ran, Mazzini, or Infiniband. *See* Exs. C-3–C-5 (claims 7, 14, 15). As specific examples, Mazzini describes a training phase with respect to at least Figure 4, Ran discloses a training phase with respect to at least Figures 3A, 3B, and 3D, and Tremblay describes an adaptive process, each of which includes using initial pre-equalizer coefficients. *See id.* A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that training would require updating the coefficient values. *See, e.g., id.* (claims 7, 14, 15). Indeed, updating coefficient values is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using this updating would thus require nothing more than the application of a known solution (updating coefficient values), according to its established function (a training sequence), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the

art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to the port transceiver,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such transmit filters to pre-equalize streams being transmitted in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, TI DS125DF410, or TIDS110DF111, each of which teach transmit filters. *See, e.g.,* Exhibits C-2–C-6, C-12 (claims 8[a], 11[a], 16[a]). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Kang, Cornelius, Infiniband, Ran, Cecchi, TI DS125DF410, and TIDS110DF111 where they disclose the use of multiple registers with equalization coefficients corresponding to different channel models, with the embodiments of at least Lugthart ’431, Tremblay, Mazzini, and/or any combinations therein. *See* Exs. C-6, C-12. As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors, each of which a POSITA would have had reason to implement in at least Lugthart ’431, Tremblay, and /or Mazzini. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known

in the art to use transmit filters on a data stream. *See, e.g.*, Exhibits C-6, C-12 (claims 8[a], 11[a], 16[a]). Indeed, using a transmit filters on a data stream is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of transmit filters on a data stream would thus require nothing more than the application of a known solution (transmit filters on a data stream), according to its established function (apply the transmit filters), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model, the controller using one of the registers to set initial coefficient values for the one or more transmit filters.,” a person of ordinary skill in the art would have been motivated to combine Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, TI DS125DF410, TIDS110DF111, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such multiple registers each of which contain initial coefficient values corresponding to different channel models in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lugthart ’431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, TI DS125DF410, or TIDS110DF111, each of which teach transmit filters. *See, e.g.*, Exhibits C-2–C-6, C-12 (claims 8[b], 11[b], 11[c], 16[b]). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Kang, Cornelius, Infiniband, Ran, Cecchi, TI DS125DF410, and TIDS110DF111 where they disclose the use of multiple registers with equalization coefficients corresponding to different channel models, with the

embodiments of at least Lugthart '431, Tremblay, Mazzini, and/or any combinations therein. *See* Exs. C-6, C-12. As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors, each of which a POSITA would have had reason to implement in at least Lugthart '431, Tremblay, and /or Mazzini. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art to use multiple registers each of which contain initial coefficient values corresponding to different channel models. *See, e.g.*, Exhibits C-6, C-12 (claims 8[b], 11[b], 11[c], 16[b]). Indeed, using multiple registers each of which contain initial coefficient values corresponding to different channel models is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of multiple registers each of which contain initial coefficient values corresponding to different channel models would thus require nothing more than the application of a known solution (multiple registers each of which contain initial coefficient values corresponding to different channel models), according to its established function (selecting on of the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

Similarly, a POSITA would have been motivated to combine the Stratix V Product in view of either Lugthart '414, Das Sharma, Mezer, or a combination thereof, and Stauffer in view of

Lugthart '414, Das Sharma, Mezer, or a combination thereof, with a reasonable expectation of success.

To the extent that it is determined that any of these references do not disclose “selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such selection of registers to specify pre-equalization coefficient values in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, each of which teach selecting registers to specify pre-equalization coefficient values. *See, e.g.*, Exhibits C-10-C-11, C-12 (claim 1[a]). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art to store coefficients in registers and that using multiple registers was an option. *See, e.g.*, Exhibits C-10, C-11, C-12 (claim 1[a]). Indeed, using multiple registers with coefficient values is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of selecting from multiple registers corresponding to different channel models would thus require nothing more than the application of a known solution (incorporating multiple registers that correspond to different channel models), according to its established function (selecting between the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “updating the initial pre-equalizer coefficient values during a training phase,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such updating via a training phase in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, each of which teach updating coefficient values. *See, e.g.*, Exhibits C-10-C-11, C-12 (claim 1[b]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that you could use a training phase to update coefficients in the manner considered. *See, e.g., id.* (claim 1[b]). Indeed, using a training phase to update coefficients is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of training would thus require nothing more than the application of a known solution (incorporating a training phase), according to its established function (updating coefficient values), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “using the updated pre-equalizer coefficient values to convey a transmit data stream,” (claim 1[c]) a person of ordinary skill in the art would have been motivated to combine any of these references for the same reasons discussed related to the prior limitations related to Claim 1 of the ’111 patent. A

POSITA would have understood that any selection of multiple registers or updating that occurs would ultimately be used to transmit the updated coefficient values to convey a data stream.

To the extent that it is determined that any of these references do not disclose that “the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Meze or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models with different insertion loss and package loss characteristics in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, each of which teach models with differing channel characteristics. *See, e.g.,* Exhibits C-10-C-11, C-12 (claims 2, 9). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations of insertion loss and package loss characteristics. *See, e.g., id.* (claim 1[a]). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “at least some of the different channel models presume different types of receiver equalization,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, each of which teach models with differing channel characteristics. *See, e.g.*, Exhibits C-10-C-11, C-12 (claims 3, 10). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations in different types of receiver equalization. *See, e.g.*, Exhibits C-6, C-12 (claims 3, 10). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers,” a person of ordinary skill in the art would have been motivated

to combine the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, each of which teach determining a performance characteristic. *See, e.g.,* Exhibits C-10-C-11, C-12 (claim 4). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that the initial pre-equalize coefficients could be used to determine characteristics of registers. *See, e.g., id.* (claim 4). Indeed, using the initial coefficients to determine register characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these initial coefficient values to determine varying register characteristics would thus require nothing more than the application of a known solution (using initial values), according to its established function (measuring different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “the performance characteristic is an error signal energy,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance

characteristic that is an error signal energy in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer each of which teaches the performance characteristic relating to errors. *See, e.g.*, Exhibits C-10-C-11, C-12 (claims 5, 12, 18). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that error signal energy could be used as a performance characteristic. *See, e.g., id.* (claims 5, 12, 18). Indeed, using an error signal energy as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using an error signal energy as a performance characteristic thus requires nothing more than the application of a known solution (using an error signal energy as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “a performance characteristic is a bit error rate,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance characteristic that is a bit error rate in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer each of which teaches the performance characteristic relating to errors. *See, e.g.*, Exhibits C-10-C-11, C-12

(claims 6, 13, 19). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that bit error rates could be used as a performance characteristic. *See, e.g., id.* (claims 6, 13, 19). Indeed, using a bit error rate as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using a bit error rate as a performance characteristic thus requires nothing more than the application of a known solution (using a bit error rate as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “updating the selected register with the updated pre-equalizer coefficient values,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, each of which teach determining a performance characteristic. *See, e.g.,* Exhibits C-10-C-11, C-12 (claims 7, 14, 15). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that training would require updating the coefficient values. *See, e.g., id.* (claims 7, 14, 15). Indeed, updating coefficient values

is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using this updating would thus require nothing more than the application of a known solution (updating coefficient values), according to its established function (a training sequence), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to the port transceiver,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such transmit filters to pre-equalize streams being transmitted in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart '414, Das Sharma, or Mezer, each of which teach transmit filters. *See, e.g.*, Exhibits C-10-C-11, C-12 (claims 8[a], 11[a], 16[a]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art to use transmit filters on a data stream. *See, e.g.*, Exhibits C-6, C-12 (claims 8[a], 11[a], 16[a]). Indeed, using a transmit filters on a data stream is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of transmit filters on a data stream would thus require nothing more than the application of a known solution (transmit filters on a data stream), according to its established function (apply the transmit filters), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the

art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model, the controller using one of the registers to set initial coefficient values for the one or more transmit filters,” a person of ordinary skill in the art would have been motivated to combine the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, or any combination thereof with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such multiple registers each of which contain initial coefficient values corresponding to different channel models in view of the teachings of at least the knowledge of a POSITA and/or one or more of the Stratix V Product, Stauffer, Lugthart ’414, Das Sharma, or Mezer, each of which teach transmit filters. *See, e.g.*, Exhibits C-10-C-11, C-12 (claims 8[b], 11[b], 11[c], 16[b]). A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art to use multiple registers each of which contain initial coefficient values corresponding to different channel models. *See, e.g.*, Exhibits C-6, C-12 (claims 8[b], 11[b], 11[c], 16[b]). Indeed, using multiple registers each of which contain initial coefficient values corresponding to different channel models is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of multiple registers each of which contain initial coefficient values corresponding to different channel models would thus require nothing more than the application of a known solution (multiple registers each of which contain initial coefficient values corresponding to different channel models), according to its established function (selecting

on of the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so. Similarly, a POSITA would have been motivated to combine Rafie or Ciacci in view of either Balakrishnan or Fox or a combination thereof, and, for any claim that Credo asserts requires a cable, a pluggable module, or SerDes communications or similar feature, in further view of Lugthart (any of 414/434/993), Ran, Cecchi, or Mazzini. These references are in the same field of invention and have compatible and complementary teachings.

It would have been obvious to apply the adaptive pre-equalization techniques taught by Rafie or Ciacci (Exs. C-6 and C-7) to wireline communication in a cable, such as those taught by Lugthart (Exs. C-1, C-2, C-12), Ran (Ex. C-3), Cecchi (Ex. C-6), Mazzini (Ex. C-4). Both wireless and wireline systems suffer from channel impairments that degrade signal quality. Wireless systems are susceptible to multipath fading, interference, and frequency-selective attenuation. Wireline systems (e.g., coaxial or twisted pair cables) suffer from inter-symbol interference (ISI), attenuation, and reflections, particularly at higher frequencies or over longer distances. A POSITA would recognize that pre-equalization—where the transmitter compensates for expected channel impairments—can mitigate these effects in both domains. Given the known limitations of cable infrastructure—such as frequency-dependent loss, reflections due to impedance mismatches, and signal degradation over long distances—a POSITA would be motivated to implement any known solution that improves signal integrity and throughput, including those used in wireless communication. Implementing pre-equalization techniques in active cables would thus require nothing more than the application of a known solution (pre-equalization), according to its established function (improving transmission performance), yielding a predictable result (pre-

equalization in a wired cable). It is also the of known technique (pre-equalization) to improve similar devices (wireless and active cables) in the same way. It is also applying a known technique to a known device (active cables) ready for improvement to yield predictable results. Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that Rafie or Ciacci do not disclose that “the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics,” a person of ordinary skill in the art would have been motivated to combine Rafie or Ciacci with Balakrishnan, Cecchi, or Kang with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models with different insertion loss and package loss characteristics in view of the teachings of at least the knowledge of a POSITA and/or one or more of Lutghart '431, Tremblay, Kang, Ran, Mazzini, Cecchi, Infiniband, Cornelius, or Balakrishnan, each of which teach updating coefficient values. See, e.g., Exhibits C-1, C-2, C-3, C-4, C-6, C-12] (claims 2, 9). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Balakrishnan, Cecchi, or Kang where they disclose the varying models having variations in channel characteristics with the embodiments of at least Rafie or Ciacci. See Exs. C-12. A POSITA would have been motivated to make such combinations with a reasonable expectation of success to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations of insertion loss and package loss characteristics. See Exs. C-12 (claim 1[a]). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models

would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that Rafie does not disclose “updating the selected register with the updated pre-equalizer coefficient values,” a person of ordinary skill in the art would have been motivated to combine Rafie in further view of Ciacci or Balakrishnan with a reasonable expectation of success. Ciacci discloses “For instance, the transmitter device can be configured to select a first path to adaptively initialize the coefficients before data is transmitted and a second path to continuously adjust the coefficients while data is being transmitted. More particularly, the processing control logic 102 can be configured to select the presence transition equalization path 114 when there are presence change events for the RF carrier signal (e.g., events corresponding to when the RF carrier signal transitions between being present and being absent on the antenna 106). Once data is being transmitted, with pre-equalization using the coefficients generated by path 114, the processing control logic 102 can select the adaptive feedback equalization path 112, which can include logic circuitry that is configured to continuously adjust the coefficients based upon feedback received from the antenna relative to the updated coefficients.” Ciacci at 4:39-54. Balakrishnan discloses “Once frequency response of front-end components has been characterized, this information can be stored in the digital base band on a configuration register (CFR), and thereby used to specify gain coefficients of the digital pre-equalizer. Balakrishnan, ¶ 27. A POSITA would have understood it was beneficial to store the

updated coefficients in the proper register, which is the purpose of said register, especially in light of the teachings of Ciacci and Balakrishnan.

To the extent that it is determined that Ciacci does not disclose bi-directional communication, a person of ordinary skill in the art would have found it obvious to modify Ciacci to allow communications in two directions.

Similarly, a POSITA would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or a combination thereof, with a reasonable expectation of success.

To the extent that it is determined that any of these references do not disclose “selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such selection of registers to specify pre-equalization coefficient values in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claim 1[a]). For example, a POSITA would have been motivated to incorporate the embodiments at least each of Kang, Cornelius, Ran, Balakrishnan, and Cecchi where they disclose the use of multiple registers with equalization coefficients corresponding to different channel models. *See Exs. C-3, C-9, C-12.* As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate

for various factors. A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. Balakrishnan discloses storing “gain coefficients of the digital pre-equalizer” in a register. Balakrishnan ¶ 27. It was also well-known in the art to store coefficients in registers and that using multiple registers was an option. *See, e.g.*, Exhibit C-12 (claim 1[a]). Indeed, using multiple registers with coefficient values is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of selecting from multiple registers corresponding to different channel models would thus require nothing more than the application of a known solution (incorporating multiple registers that correspond to different channel models), according to its established function (selecting between the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “updating the initial pre-equalizer coefficient values during a training phase,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such updating via a training phase in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claim 1[b]). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that you could use a training phase to update coefficients in the manner considered. *See, e.g., id.* (claim 1[b]). Indeed, using a training phase to

update coefficients is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of training would thus require nothing more than the application of a known solution (incorporating a training phase), according to its established function (updating coefficient values), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “using the updated pre-equalizer coefficient values to convey a transmit data stream,” (claim 1[c]) a person of ordinary skill in the art would have been motivated to combine any of these references for the same reasons discussed related to the prior limitations related to Claim 1 of the ’111 patent. A POSITA would have understood that any selection of multiple registers or updating that occurs would ultimately be used to transmit the updated coefficient values to convey a data stream.

To the extent that it is determined that any of these references do not disclose that “the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models with different insertion loss and package loss characteristics in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claims 2, 9). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel

models would account for variations of insertion loss and package loss characteristics. *See, e.g., id.* (claim 1[a]). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models would thus require nothing more than the application of a known solution (using multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “at least some of the different channel models presume different types of receiver equalization,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA. *See, e.g.,* Exhibits C-3, C-9, C-12 (claims 3, 10). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that variations in channel models would account for variations in different types of receiver equalization. *See, e.g.,* Exhibits C-3, C-9, C-12 (claims 3, 10). Indeed, using different models to account for different characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these different models would thus require nothing more than the application of a known solution (using

multiple models), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claim 4). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that the initial pre-equalize coefficients could be used to determine characteristics of registers. *See, e.g., id.* (claim 4). Indeed, using the initial coefficients to determine register characteristics is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using these initial coefficient values to determine varying register characteristics would thus require nothing more than the application of a known solution (using initial values), according to its established function (measuring different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “the performance characteristic is an error signal energy,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance characteristic that is an error signal energy in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claims 5, 12, 18). F. As a specific example, Cecchi discloses measuring error rate, Cornelius discloses measuring transmission errors, and Mezer discloses error signals. *Id.* A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that error signal energy could be used as a performance characteristic. *See, e.g., id.* (claims 5, 12, 18). Indeed, using an error signal energy as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using an error signal energy as a performance characteristic thus requires nothing more than the application of a known solution (using an error signal energy as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “a performance characteristic is a bit error rate,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson,

Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include a performance characteristic that is a bit error rate in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claims 6, 13, 19). As a specific example, Cecchi discloses measuring error rate, Cornelius discloses measuring transmission errors, and Mezer discloses error signals. *Id.* A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that bit error rates could be used as a performance characteristic. *See, e.g., id.* (claims 6, 13, 19). Indeed, using a bit error rate as a performance characteristics but one of a finite number of known, predictable solutions to measuring performance. Implementing pre-equalization using a bit error rate as a performance characteristic thus requires nothing more than the application of a known solution (using a bit error rate as a performance characteristic), according to its established function (accounting for different channel characteristics), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose that “updating the selected register with the updated pre-equalizer coefficient values,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include the use of differing channel models that presume different types of receiver equalization in view of the teachings of at least the knowledge of a POSITA. *See,*

*e.g.*, Exhibits C-3, C-9, C-12 (claims 7, 14, 15). A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art that training would require updating the coefficient values. *See, e.g., id.* (claims 7, 14, 15). Indeed, updating coefficient values is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization using this updating would thus require nothing more than the application of a known solution (updating coefficient values), according to its established function (a training sequence), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “one or more transmit filters to each pre-equalize a corresponding serial symbol stream being transmitted to the port transceiver,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such transmit filters to pre-equalize streams being transmitted in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claims 8[a], 11[a], 16[a]). As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors. A POSITA would have been motivated to make such combinations to achieve greater adaptability in cable applications. It

was also well-known in the art to use transmit filters on a data stream. *See, e.g.*, Exhibits C-3, C-12 (claims 8[a], 11[a], 16[a]). Indeed, using a transmit filters on a data stream is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of transmit filters on a data stream would thus require nothing more than the application of a known solution (transmit filters on a data stream), according to its established function (apply the transmit filters), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent that it is determined that any of these references do not disclose “a controller having multiple registers, each of the multiple registers containing a set of initial coefficient values corresponding to a different channel model, the controller using one of the registers to set initial coefficient values for the one or more transmit filters.,” a person of ordinary skill in the art would have been motivated to combine the SMP9 Cable in view of Ran, Kang, Das Sharma, Mezer, Aronson, Cecchi, Cornelius, Balakrishnan, or any combination thereof, with a reasonable expectation of success. It would have been obvious to modify the teachings of any of the above recited references to include such multiple registers each of which contain initial coefficient values corresponding to different channel models in view of the teachings of at least the knowledge of a POSITA. *See, e.g.*, Exhibits C-3, C-9, C-12 (claims 8[b], 11[b], 11[c], 16[b]). As specific examples, Kang discloses “a plurality of registers,” Cornelius discloses configuring “operational parameters, modes, and other aspects,” Ran discloses multiple registers for a “Chip-to-Module (C2M) device,” and Cecchi discloses different registers that correspond to different length cables with different pre-emphasis coefficients to compensate for various factors. A POSITA would have

been motivated to make such combinations to achieve greater adaptability in cable applications. It was also well-known in the art to use multiple registers each of which contain initial coefficient values corresponding to different channel models. *See, e.g.*, Exhibits C-3, C-12 (claims 8[b], 11[b], 11[c], 16[b]). Indeed, using multiple registers each of which contain initial coefficient values corresponding to different channel models is but one of a finite number of known, predictable solutions to implement adaptability in pre-equalization. Implementing pre-equalization making use of multiple registers each of which contain initial coefficient values corresponding to different channel models would thus require nothing more than the application of a known solution (multiple registers each of which contain initial coefficient values corresponding to different channel models), according to its established function (selecting one of the multiple registers), yielding a predictable result (adaptability in pre-equalization). Therefore, a person of ordinary skill in the art would have been motivated to make such contemplated combinations and would have had a reasonable expectation of success in doing so.

To the extent any of the preambles are deemed to be limiting, a POSITA would have likewise been motivated to combine any of the above references for the above-mentioned reasons.

Complainant has yet to indicate a belief that any of the prior art references do not supply any of the claim limitations. Respondents' motivations to combine the prior art to supply other limitations may be amended or supplemented in view of Complainant's contentions regarding the missing limitations in the prior art references.

### **Secondary Considerations**

Respondents are not aware of any secondary-considerations evidence demonstrating non-obviousness of the Asserted Claims of the '111 Patent. Complainants have not produced any documents related to secondary considerations, nor have Complainants identified any such

secondary considerations, let alone demonstrated a nexus between any such considerations and the alleged inventions of the Asserted Claims of the '111 Patent.

As discussed in Appendix C, the prior art references confirm that the Asserted Claims of the '111 Patent would have been obvious to a POSITA before the earliest possible priority date. Respondents reserve the right to supplement or modify these factors to address any evidence or arguments later identified by Complainants.

### **Invalidity Grounds Under 35 U.S.C. § 112**

. Subject to Respondents' reservation of rights above, Respondents identify their grounds of invalidity for the '111 Patent based on lack of enablement, written description, and indefiniteness pursuant to 35 U.S.C. §§ 112(a) and (b) below. The terms recited below are invalid based on lack of enablement, written description, and indefiniteness pursuant to 35 U.S.C. §§ 112(a) and (b) under any scope of the claim terms. If, however, an overbroad construction is applied, at least under the overbroad constructions that Complainants appear to be applying to the Asserted Claims of the '111 Patent, which go beyond (and are not adequately described or enabled by) the purported inventions allegedly disclosed in the '252 Patent, the claims are invalid for that additional reason. Specifically, to the extent that Complainants assert that the Asserted Claims of the '111 Patent are so broad as to cover the Respondents' respective Accused Products and alleged domestic industry products, or to the extent that they may eventually be construed so broadly, such an interpretation or construction would render the Asserted Claims of the '111 Patent invalid for failure to meet the requirements of 35 U.S.C. § 112. A more detailed discussion of Respondents' written description, enablement, and indefiniteness defenses will be set forth in Respondents' expert report(s) on invalidity.

**Lack of Written Description and/or Enablement**

The '111 Patent does not provide sufficient written description to establish that the applicants were in possession of the alleged inventions recited in certain of the Asserted Claims at the time the '111 Patent was filed. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* One of ordinary skill in the art would not have understood that the inventors were in possession of the full scope of the claimed apparatus.

The specification of the '111 Patent also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the Asserted Claims without undue experimentation. To the extent the following limitations are definite, the application that became the '111 Patent fails to sufficiently describe or enable them as required:

Term	Relevant Claim(s)	Basis
“wherein at least some of the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics”	2, 9	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device “wherein at least some of the different channel models are for chip-to-module (C2M) channels with different insertion loss and package loss characteristics.”
“wherein said selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers”	4–7	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device “wherein said selecting includes using the initial pre-equalizer coefficient values to determine a performance characteristic for each of the multiple registers.”
“wherein the port transceiver generates updates for the coefficient values of the one or more transmit filters”	14–15	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device “wherein the port transceiver

<b>Term</b>	<b>Relevant Claim(s)</b>	<b>Basis</b>
		generates updates for the coefficient values of the one or more transmit filters.”
“wherein the port transceiver determines a performance characteristic for each register”	17–19	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device “wherein the port transceiver determines a performance characteristic for each register.”
“a set of initial coefficient values for which the port transceiver determines a performance characteristic”	4, 11, 16	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device with “multiple registers containing a set of initial coefficient values for which the port transceiver determines a performance characteristic”
“wherein the performance characteristic is an error signal energy”	5, 12, 18	The patent does not disclose and has insufficient disclosure to allow a POSITA to make and use a device “wherein the performance characteristic is an error signal energy”

### **Indefiniteness**

Certain of the Asserted Claims are invalid because they fail to inform those skilled in the art about the scope of the invention with reasonable certainty and are indefinite for failing to particularly point out and distinctly claim the subject matter the applicants regard as their invention.

The following limitations recited in the Asserted Claims are indefinite in whole, in part or in combination:

<b>Term</b>	<b>Relevant Claim(s)</b>	<b>Basis</b>
“wherein at least some of the different channel models are for chip-to-module (C2M) channels	2, 9	The meaning of this term—read in light of the specification and prosecution history—cannot be

Term	Relevant Claim(s)	Basis
with different insertion loss and package loss characteristics”		determined with reasonable certainty because it is not clear what insertion loss and package loss characteristics are.
“wherein at least some of the different channel models presume different types of receiver equalization”	3, 10	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty because it is not clear what it means to “presume different types of receiver equalization.”
“using the initial pre-equalizer coefficient values to determine a performance characteristic” / “a set of initial coefficient values for which the port transceiver determines a performance characteristic” / “determines a performance characteristic for each register”	4, 11, 16	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty because it is not clear what a “performance characteristic” of a “coefficient value” or “register” means or what using “initial pre-equalizer coefficient values to determine a performance characteristic” means.
“different channel model”	1, 8, 16	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty with regard to the scope of “different channel model.”
“updating the initial pre-equalizer coefficient values during a training phase” / “wherein the port transceiver generates updates for the coefficient values of the one or more transmit filters”	1, 14	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty what it means to “update” “initial pre-equalizer coefficient values.”
“training phase”	1	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty as to the distinction

Term	Relevant Claim(s)	Basis
		between a training phase and a non-training phase.
“wherein the performance characteristic is an error signal energy”	5, 12, 18	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty as to the meaning of an error signal energy.
“convey a data stream”	1	The meaning of this term—read in light of the specification and prosecution history—cannot be determined with reasonable certainty because it is not clear what it means to “convey” a data stream.
<p>“the controller using one of the registers to set initial coefficient values for the one or more transmit filters”</p> <p>“the controller using one of the registers selected by the port transceiver to specify the initial coefficient values for the one or more transmit filters”</p>	8, 11, 16	<p>The claim recites structural components in combination with method steps (e.g., “using one of the registers to set”). <i>IPXL Holdings, L.L.C. v. Amazon.com, Inc.</i>, 05-1009 (Fed. Cir. Nov. 21, 2005).</p> <p>The inclusion of these steps within an apparatus claim renders the claim indefinite as it does not provide a POSITA with reasonable certainty as to when infringement would occur.</p>

### Inequitable Conduct

Discovery is ongoing regarding the enforceability of the ’111 Patent. To date, Complainants have refused to disclose any prior art known to Complainants, those involved in prosecution, or known to the inventors, outside of what is identified in the prosecution history and what was disclosed to it by third parties in litigation.

In view of Complainants' continued obstruction to relevant discovery, Respondents reserve the right to amend or supplement these contentions as discovery progresses including in response to, among other things, information learned in fact and/or expert discovery including identification of additional prior art, Complainants' positions on priority, infringement, claim construction, and/or invalidity, the Court's rulings, including on claim construction, changes in the Respondents' respective Accused Products, and in the event Complainants are permitted to revise infringement or domestic industry theories.

### **Improper Inventorship**

Complainants have yet to provide discovery concerning each named inventor's participation, involvement, and contribution to the conception and reduction to practice of the alleged invention, including the dates of such participation, involvement, and contribution to the conception and reduction to practice on an element-by-element basis. *See, e.g.*, Respondents' Common Interrogatory No. 27. Respondents reserve their rights to contend, based on further discovery, that the Asserted Claims of the '111 Patent are invalid and/or unenforceable due to misjoinder of one or more inventors, nonjoinder of one or more inventors, or derivation of the claimed inventions from another.

\* \* \*

## 7. CONCLUSION

For the reasons discussed above, and those revealed through further discovery, the Asserted Claims of the Asserted Patents are invalid.

Respondents expect to have experts provide relevant analysis. Respondents' contentions are without prejudice to Respondents' experts' analysis and opinions, which will be disclosed in accordance with the deadlines set forth in the Procedural Schedule in this Investigation (Order No. 7). Once those reports are served, they shall be deemed incorporated by reference herein.

Respondents reserve the right to supplement, amend, and/or revise its contentions in accordance with the Ground Rules (Order No. 2), the Procedural Schedule in this Investigation (Order No. 6), pursuant to 19 C.F.R. § 210.27(f), in response to any supplements, amendments, modifications, or clarifications of Complainants' validity contentions, in response to a decision on claim construction, based on Respondents' further investigation, or as may be warranted in light of ongoing discovery.

Date: June 26, 2025

Respectfully submitted,

*/s/ Adam D. Swain*

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**CERTAIN ACTIVE ELECTRICAL CABLES  
AND COMPONENTS THEREOF**

**Inv. No. 337-TA-1446**

**CERTIFICATE OF SERVICE**

I hereby certify that on June 26, 2025, copies of the foregoing served upon the following as indicated:

<p>Steve Shahida, Esq. Office of Unfair Import Investigations <b>U.S. INTERNATIONAL TRADE COMMISSION</b> 500 E Street, S.W. Washington, D.C. 20436 <a href="mailto:Khashayar.Shahida@usitc.gov">Khashayar.Shahida@usitc.gov</a></p>	<p><input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Via Courier (UPS) <input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Via Email</p>
<p><b><u>COUNSEL FOR COMPLAINANTS CREDO SEMICONDUCTOR INC., AND CREDO TECHNOLOGY GROUP LTD.</u></b></p> <p>Richard A. Sterba <b>FISH &amp; RICHARDSON P.C.</b> 1000 Maine Ave., SW Washington, DC 20024 <a href="mailto:FRServiceCredoITCOffense@fr.com">FRServiceCredoITCOffense@fr.com</a></p>	<p><input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Via Courier (UPS) <input type="checkbox"/> Via Hand Delivery <input checked="" type="checkbox"/> Via Email</p>
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