

**AMENDED
EXHIBIT 34**

Exhibit 34 – Claim Chart Showing Amphenol’s Infringement of U.S. Patent 10,877,233 (“’233 Patent”)

The following chart is based on information known to date. Credo reserves the right to amend and update this chart as additional information is obtained and analyzed. The exemplary claim mappings below rely on images and data from Amphenol and its suppliers’ public-facing materials. The following chart is representative of Amphenol’s infringement by its unlawful importation into the United States, sale for importation into the United States, and/or sale within the United States after importation of all the Accused Amphenol Products.

As outlined in the below claim chart, the Accused Amphenol Products infringe, either literally or under the doctrine of equivalents, at least Claims 1, 8, and 15 of the ’233 patent.

| <u>’233 Patent</u> | <u>Accused Amphenol Products</u> |
|--------------------------------|---|
| <u>Claim 1</u> | |
| [1pre] A cable that comprises: | The Accused Amphenol Products comprise a cable. See, e.g.: |

Claim 1

OSFP (Octal Small Form Factor Pluggable) Copper Cable Assemblies

200G / 400G / 800G / 1.6T SOLUTIONS

Amphenol is leading the industry in OSFP cable development. Our Electronics Products 'Product of the Year' award-winning OSFP (Octal Small Form Factor Pluggable) cable assemblies are compatible with 25G/lane channel NRZ up to 224G/lane channel PAM4 signaling protocols that allow the cables to deliver aggregate bandwidths of 200G, 400G, 800G, and 1.6T per cable assembly. Available in both Passive and Active variants.

- Comprehensive system integrated interconnect design for copper or optical based cable solutions
- Addresses current and future market desired bandwidth port capability requirements
- Optimized heat dissipative and airflow features to maximize the heat dissipative properties of the system
- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4 / 224G PAM4
- Cable sizes: 25AWG – 32AWG
- 112G Passive cable lengths up to 2 meters
- 112G Active cable lengths up to 4 meters
- 224G Passive cable lengths up to 1 meter

Ex. 46, *Amphenol OSFP Copper Cable Assemblies Datasheet.*



Claim 1

QSFP DD Cable Assemblies

200G / 400G / 800G SOLUTIONS

Amphenol’s QSFP DD (Double Density) copper cable assemblies double the number of channels from 4 to 8 lanes when compared to the existing QSFP cabling systems, enabling more bandwidth within the same mechanical envelope. Compatible with 25G/Lane NRZ up to 112G/Lane PAM4 signaling protocols that allow cables to deliver aggregate bandwidths of 200G, 400G, and 800G per cable assembly. Available in both Passive and Active variants.

- Addresses current and future market desired bandwidth port capability requirements
- Backwards mate compatible with QSFP receptacles
- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4
- Cable sizes: 25AWG – 32AWG
- 112G Passive cable lengths up to 2 meters
- 112G Active cable lengths up to 4 meters
- Ultra-low-power Active Electrical Cable featuring Smart CDR SoC up to 3 meters at only 4.5W per side



Ex. 79, *Amphenol QSFP DD Cable Assemblies Datasheet*.

[1a] a first data recovery and re-modulation (DRR) device that exchanges inbound and outbound multi-lane data streams with a first host interface port via a first end connector plug;

The Accused Amphenol Products comprise a first data recovery and re-modulation (DRR) device that exchanges inbound and outbound multi-lane data streams with a first host interface port via a first end connector plug.

For example, the first DRR device is a first digital signal processor (“DSP”) at one end of the active cable.

See, e.g.:

Claim 1

OSFP (Octal Small Form Factor Pluggable) Copper Cable Assemblies

200G / 400G / 800G / 1.6T SOLUTIONS

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- Addresses current and future market desired bandwidth port capability requirements
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- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4 / 224G PAM4
- Cable sizes: 25AWG - 32AWG
- 112G Passive cable lengths up to 2 meters
- 112G Active cable lengths up to 4 meters
- 224G Passive cable lengths up to 1 meter



















Ex. 46, *Amphenol OSFP Copper Cable Assemblies Datasheet.*

'233 Patent

Accused Amphenol Products

Claim 1

| <input type="checkbox"/> PART NUMBER | DESCRIPTION | PRODUCT DRAWING | 3D MODEL (STP) | STATUS | DISTRIBUTOR STOCK CHECK |
|--------------------------------------|--|---|----------------|--------|-------------------------|
| <input type="checkbox"/> NJJJN8-0004 |  OSFP Cable Assembly, DSP Active, 32AWG, 4M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN8-0007 |  OSFP Cable Assembly, DSP Active, 32AWG, 1.5M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN8-0008 |  OSFP Cable Assembly, DSP Active, 32AWG, 2.5M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN8-0009 |  OSFP Cable Assembly, DSP Active, 32AWG, 3.5M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN80001 |  OSFP Cable Assembly, DSP Active, 32AWG, 1M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN80002 |  OSFP Cable Assembly, DSP Active, 32AWG, 2M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN80003 |  OSFP Cable Assembly, DSP Active, 32AWG, 3M, 112G / Lane, Flex Sleeve |  | | Active | |
| <input type="checkbox"/> NJJJN80010 |  OSFP Cable Assembly, DSP Active, 32AWG, 4.5M, 112G / Lane, Flex Sleeve |  | | Active | |

Ex. 47, Amphenol OSFP Cable Assemblies Webpage (annotated).

Claim 1

QSFP DD Cable Assemblies

200G / 400G / 800G SOLUTIONS

Amphenol's QSFP DD (Double Density) copper cable assemblies double the number of channels from 4 to 8 lanes when compared to the existing QSFP cabling systems, enabling more bandwidth within the same mechanical envelope. Compatible with 25G/Lane NRZ up to 112G/Lane PAM4 signaling protocols that allow cables to deliver aggregate bandwidths of 200G, 400G, and 800G per cable assembly. Available in both Passive and Active variants.

- Addresses current and future market desired bandwidth port capability requirements
- Backwards mate compatible with QSFP receptacles
- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4
- Cable sizes: 25AWG – 32AWG
- 112G Passive cable lengths up to 2 meters
- 112G Active cable lengths up to 4 meters
- Ultra-low-power Active Electrical Cable featuring Smart CDR SoC up to 3 meters at only 4.5W per side



Ex. 79, *Amphenol QSFP DD Cable Assemblies Datasheet*.

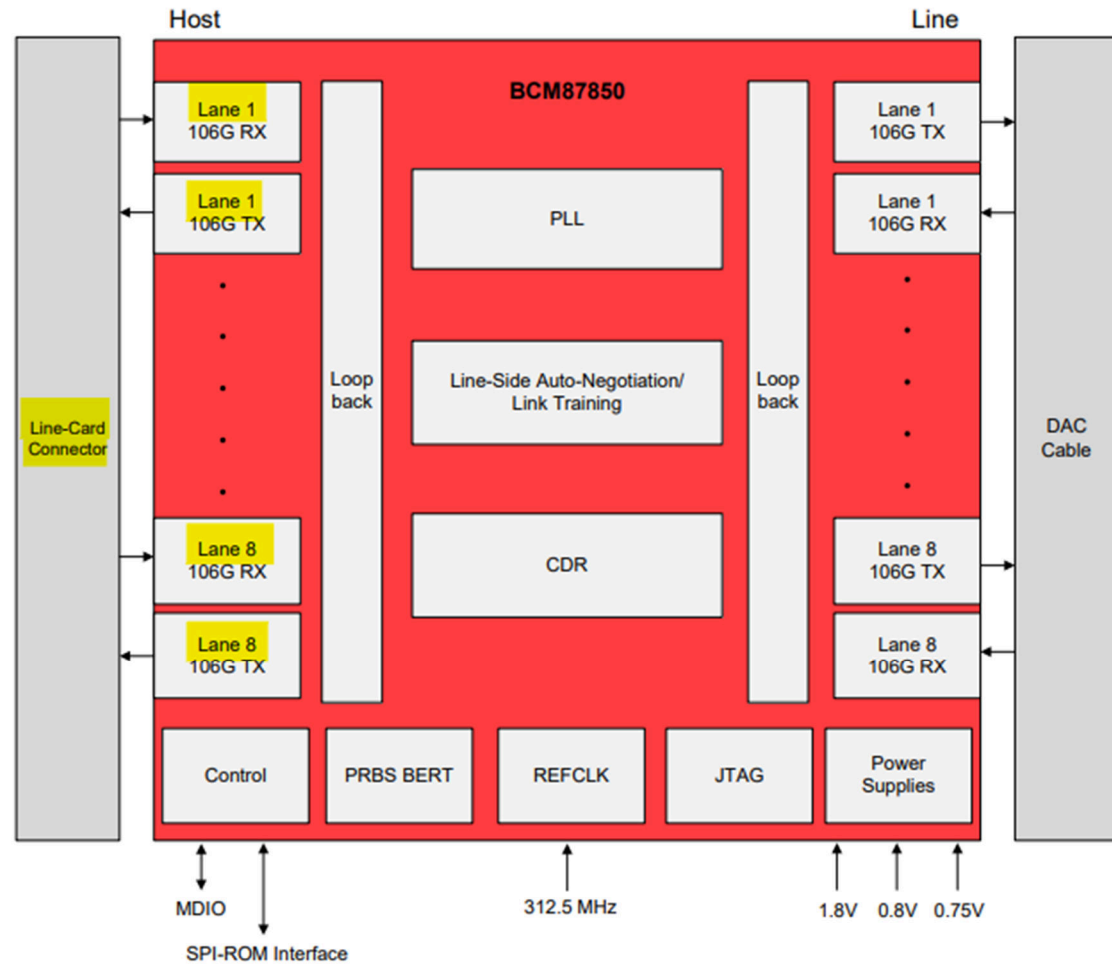
For example, the DSPs in the Accused Products are manufactured by Broadcom and others. The first DSP in the Accused Amphenol Products is a retimer that exchanges inbound and outbound multi-lane data streams with a first host interface port via a first end connector plug.

See, e.g.:


- Amphenol will highlight OAI expansion version 1.0, featuring Broadcom's 1.6T (2x800G), 5nm retimer PHY, ExaMAX2® 112G backplane connector, OSFP 112 I/O connector and Mini Cool Edge, Expo Hall, Booth A8.

| '233 Patent | Accused Amphenol Products |
|-----------------------|--|
| <p>Claim 1</p> | <p>Ex. 48, <i>Broadcom 2022 OCP Global Summit Press Release</i></p> <p>Key components used for validation include (1) Broadcom's BCM85361 1.6Tbps retimer/crossbar and Amphenol's ExaMAX2 112Gb/s high-speed backplane connector system.</p> <ul style="list-style-type: none"> • Broadcom's BCM85361 is a 16 lane, 112G SerDes retimer with support for long-reach backplanes with ~45dB of insertion loss and passive DAC cables up to 3 meters. The retimer supports Ethernet rates up to 2 x 800 GbE for scale-out and can also be configured as a flexible crossbar for scale-up requirements. BCM85361 is designed in the advanced 5nm process node, delivering low power to meet the challenges of increasing energy consumption in data centers. • Amphenol's ExaMAX2 connector system delivers industry leading SI performance needed to support OAI applications. The Vertical Header (VH) P/N: 10167063c and Right-Angle Receptacle (RAR) P/N:10167059c are configured as 4x16 and provide the connectivity to support both scale-out and switch implementations of the Expansion Card. The innovative beam-on-beam mating interface of the ExaMAX2 solution demonstrates a resonance-free Insertion Loss profile thru 60GHz and superb Return Loss performance. <p>Ex. 49, <i>Broadcom B-Connected Blog Post</i>.</p> <p>Overview</p> <p>The Broadcom® BCM87850 is a single-chip, eight-lane, ultra-low power, ultra-low latency PHY that integrates retimer and equalizer to support active cable applications. The BCM87850 is capable of equalizing 22 dB of loss on both the client-side and line-side interfaces. Each lane is capable of multiple data rates, including 106.25 Gb/s.</p> <p>The on-chip clock synthesis is performed by a low-cost 312.5-MHz reference clock through high-frequency, low jitter phase-locked loops (PLLs).</p> <p>The BCM87850 is fabricated in low-power 7-nm CMOS technology and is available in a 12 mm × 12 mm, 0.5-mm pitch, 485-ball BGA, RoHS-compliant package.</p> <p>Ex. 50, <i>Broadcom BCM87850 Product Brief</i> (annotated).</p> |

Claim 1



Ex. 50, Broadcom BCM87850 Product Brief (annotated).

| '233 Patent | Accused Amphenol Products |
|--|--|
| Claim 1 | |
| <p>[1b] a second DRR device that exchanges inbound and outbound multi-lane data streams with a second host interface port via a second end connector plug; and</p> | <p>The Accused Amphenol Products comprise a second DRR device that exchanges inbound and outbound multi-lane data streams with a second host interface port via a second end connector plug.</p> <p>For example, the second DRR device is a second DSP retimer at the other end of the cable. As shown below, each end of the cable has a symmetrical connector containing a DSP.</p> <p>See, e.g.:</p>  <p>Ex. 46, <i>Amphenol OSFP Copper Cable Assemblies Datasheet</i>.</p> |

'233 Patent

Accused Amphenol Products

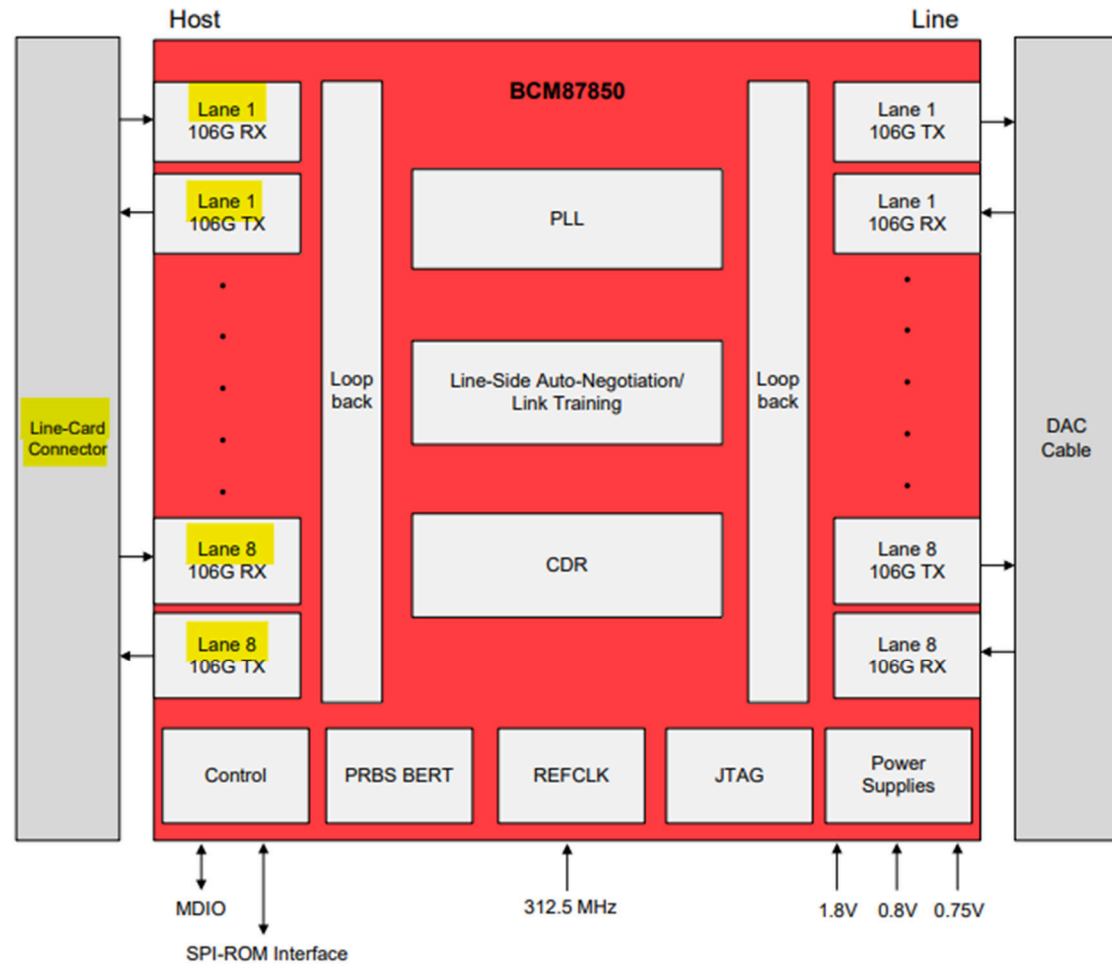
Claim 1



Ex. 79, Amphenol QSFP DD Cable Assemblies Datasheet.

The second DSP exchanges inbound and outbound multi-lane data streams with a second host interface port via a second end connector plug:

Claim 1



Ex. 50, Broadcom BCM87850 Product Brief (annotated).

See also [1pre] and [1a] above.

| '233 Patent | Accused Amphenol Products |
|---|--|
| <p><u>Claim 1</u></p> <p>[1c] electrical conductors connecting the first and second DRR devices to convey electrical transit signals therebetween,</p> | <p>The Accused Amphenol Products comprise electrical conductors connecting the first and second DRR devices to convey electrical transit signals therebetween.</p> <p>For example, the electrical conductors are dual-axial, differential-pair copper wires (one per lane) that connect the first and second DSPs to convey electrical transit signals therebetween.</p> <p>See, e.g.:</p> <ul style="list-style-type: none"> ▪ Assembled with industry leading twin-axial SKEWCLEAR® 8-pair or 16-pair wire <p>Ex. 46, <i>Amphenol OSFP Copper Cable Assemblies Datasheet</i>.</p> <ul style="list-style-type: none"> ▪ Assembled with industry leading twin-axial SKEWCLEAR® 8-pair or 16-pair wire <p>Ex. 79, <i>Amphenol QSFP DD Cable Assemblies Datasheet</i>.</p> |

Claim 1

OSFP (Octal Small Form Factor Pluggable) Copper Cable Assemblies

200G / 400G / 800G / 1.6T SOLUTIONS

Amphenol is leading the industry in OSFP cable development. Our Electronics Products 'Product of the Year' award-winning OSFP (Octal Small Form Factor Pluggable) cable assemblies are compatible with 25G/lane channel NRZ up to 224G/lane channel PAM4 signaling protocols that allow the cables to deliver aggregate bandwidths of 200G, 400G, 800G, and 1.6T per cable assembly. Available in both Passive and Active variants.

- Comprehensive system integrated interconnect design for copper or optical based cable solutions
- Addresses current and future market desired bandwidth port capability requirements
- Optimized heat dissipative and airflow features to maximize the heat dissipative properties of the system
- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4 / 224G PAM4
- Cable sizes: 25AWG – 32AWG
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- 112G Active cable lengths up to 4 meters
- 224G Passive cable lengths up to 1 meter



Ex. 46, *Amphenol OSFP Copper Cable Assemblies Datasheet.*

Claim 1

QSFP DD Cable Assemblies

200G / 400G / 800G SOLUTIONS

Amphenol's QSFP DD (Double Density) copper cable assemblies double the number of channels from 4 to 8 lanes when compared to the existing QSFP cabling systems, enabling more bandwidth within the same mechanical envelope. Compatible with 25G/Lane NRZ up to 112G/Lane PAM4 signaling protocols that allow cables to deliver aggregate bandwidths of 200G, 400G, and 800G per cable assembly. Available in both Passive and Active variants.

- Addresses current and future market desired bandwidth port capability requirements
- Backwards mate compatible with QSFP receptacles
- Data Rate: 25G NRZ / 56G PAM4 / 112G PAM4
- Cable sizes: 25AWG – 32AWG
- 112G Passive cable lengths up to 2 meters
- 112G Active cable lengths up to 4 meters
- Ultra-low-power Active Electrical Cable featuring Smart CDR SoC up to 3 meters at only 4.5W per side



Ex. 79, Amphenol QSFP DD Cable Assemblies Datasheet.

[1d] the first DRR device converting between said electrical transit signals and said inbound and outbound multi-lane data streams for the first host interface port, and

The first DRR device in the Accused Amphenol Products converts between said electrical transit signals and said inbound and outbound multi-lane data streams for the first host interface port.

For example, the first DSP receives electrical transit signals from the cable and converts them (via the retimer) into multi-lane data streams that are sent to the host. The first DSP also receives multi-lane data streams from the host and converts them (via the retimer) into electrical transit signals that are sent to the cable.

| '233 Patent | Accused Amphenol Products |
|--|--|
| Claim 1 | |
| | <p>See, e.g.:</p> <p>Overview</p> <p>The Broadcom® BCM87850 is a single-chip, eight-lane, ultra-low power, ultra-low latency PHY that integrates retimer and equalizer to support active cable applications. The BCM87850 is capable of equalizing 22 dB of loss on both the client-side and line-side interfaces. Each lane is capable of multiple data rates, including 106.25 Gb/s.</p> <p>The on-chip clock synthesis is performed by a low-cost 312.5-MHz reference clock through high-frequency, low jitter phase-locked loops (PLLs).</p> <p>The BCM87850 is fabricated in low-power 7-nm CMOS technology and is available in a 12 mm × 12 mm, 0.5-mm pitch, 485-ball BGA, RoHS-compliant package.</p> <p><i>Ex. 50, Broadcom BCM87850 Product Brief (annotated).</i></p> |
| <p>[1e] the second DRR device converting between said electrical transit signals and said inbound and outbound multi-lane data streams for the second host interface port,</p> | <p>The second DRR device in the Accused Amphenol Products converts between said electrical transit signals and said inbound and outbound multi-lane data streams for the second host interface port.</p> <p>For example, the second DSP at the other end of the cable also converts between said electrical transit signals and said inbound and outbound multi-lane data streams for the first host interface port via the retimer.</p> |

| ’233 Patent | Accused Amphenol Products |
|--|--|
| Claim 1 | |
| | <p>Overview</p> <p>The Broadcom® BCM87850 is a single-chip, eight-lane, ultra-low power, ultra-low latency PHY that integrates retimer and equalizer to support active cable applications. The BCM87850 is capable of equalizing 22 dB of loss on both the client-side and line-side interfaces. Each lane is capable of multiple data rates, including 106.25 Gb/s.</p> <p>The on-chip clock synthesis is performed by a low-cost 312.5-MHz reference clock through high-frequency, low jitter phase-locked loops (PLLs).</p> <p>The BCM87850 is fabricated in low-power 7-nm CMOS technology and is available in a 12 mm × 12 mm, 0.5-mm pitch, 485-ball BGA, RoHS-compliant package.</p> <p>Ex. 50, <i>Broadcom BCM87850 Product Brief</i> (annotated).</p> <p><i>See also 1[b] and 1[d] above.</i></p> |
| <p>[1f] the first and second DRR devices providing pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories.</p> | <p>The first and second DRR devices in the Accused Amphenol Products provide pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories.</p> <p>For example, the first and second DSPs provide different levels of pre-equalization corresponding to “short” and “long” modes used for 112G-per-lane chip-to-module (C2M) transmission, per the IEEE 802.3ck standard. On information and belief, the transmit filter coefficient values used for short-channel and long-channel pre-equalization are stored in nonvolatile memories so they are available for C2M communications when the cable is connected to the host.</p> <p>See, e.g.:</p> |

| '233 Patent | Accused Amphenol Products |
|----------------|--|
| Claim 1 | <p data-bbox="709 289 1104 315">120G.3.2.1 Module output modes</p> <p data-bbox="709 350 1780 464">The module output shall support two modes: short and long. The means of controlling the module output mode is implementation dependent. For each output mode, the module shall meet the requirements for eye height (min) and VEC (max) in Table 120G-3 for both near-end and far-end measurements (see 120G.3.2.2.1).</p> <p data-bbox="693 500 1402 526">Ex. 52, <i>IEEE 802.3ck Specification</i> at 7275 (annotated).</p> <p data-bbox="693 574 1829 639">The datasheet for the exemplary Accused Amphenol Products notes that they support the IEEE 802.3ck standard: ¹</p> <p data-bbox="699 691 919 717">SPECIFICATIONS</p> <ul data-bbox="716 743 1293 1084" style="list-style-type: none"> • Refer to the latest revision specification of the OSFP octal small form factor pluggable module • Applicable IEEE specifications • IEEE802.3by • IEEE802.3bj • IEEE802.3cd • IEEE802.3ck • The InfiniBand™ architecture specification and annexes <p data-bbox="693 1097 1640 1123">Ex. 46, <i>Amphenol OSFP Copper Cable Assemblies Datasheet</i> (annotated).</p> |

¹ The Accused Amphenol Products that use a QSFP form factor likewise comply with the IEEE 802.3ck standard. See Ex. 77, QSFP-DD Specification at 34; Ex. 78, *QSFP112 Specification* at 10.

| '233 Patent | Accused Amphenol Products |
|----------------|---|
| Claim 1 | <p>SPECIFICATIONS</p> <ul style="list-style-type: none"> ▪ Refer to the latest revision of the QSFP-DD hardware specification for QSFP double density 8X pluggable transceiver ▪ Applicable IEEE specifications <ul style="list-style-type: none"> ▪ IEEE802.3by ▪ IEEE802.3bj ▪ IEEE802.3cd ▪ IEEE802.3ck ▪ The InfiniBand™ architecture specification and annexes <p>Ex. 79, <i>Amphenol QSFP DD Cable Assemblies Datasheet</i> (annotated).</p> <p>The datasheet also notes that a nonvolatile memory (an EEPROM) is integrated into the cable assembly:</p> <ul style="list-style-type: none"> ▪ EEPROM in cable assembly <p>Ex. 46, <i>Amphenol OSFP Copper Cable Assemblies Datasheet</i>.</p> <ul style="list-style-type: none"> ▪ EEPROM in cable assembly <p>Ex. 79, <i>Amphenol QSFP DD Cable Assemblies Datasheet</i>.</p> |

| '233 Patent | Accused Amphenol Products |
|--|---|
| Claim 8 | |
| [8pre] A cable manufacturing method that comprises: | The Accused Amphenol Products are produced using a cable manufacturing method. <i>See [1pre] above.</i> |
| [8a] connecting a first connector plug to a first data recovery and re-modulation (DRR) device that exchanges multi-lane data streams with a first host interface port via the first connector plug; | The Accused Amphenol Products are produced using a cable manufacturing method, including connecting a first connector plug in the Accused Amphenol Products to a first data recovery and re-modulation (DRR) device that exchanges multi-lane data streams with a first host interface port via the first connector plug. <i>See [1a] above.</i> |
| [8b] connecting a second connector plug to a second DRR device that exchanges multi-lane data streams with a second host interface port via the second connector plug; | The Accused Amphenol Products are produced using a cable manufacturing method, including connecting a second connector plug in the Accused Amphenol Products to a second DRR device that exchanges multi-lane data streams with a second host interface port via the second connector plug. <i>See [1b] above.</i> |
| [8c] connecting electrical conductors to the first and second DRR devices to convey electrical transit signals therebetween, | The Accused Amphenol Products are produced using a cable manufacturing method, including connecting electrical conductors in the Accused Amphenol Products to the first and second DRR devices to convey electrical transit signals therebetween. <i>See [1c] above.</i> |
| [8d] the first DRR device converting between said electrical transit signals and said multi-lane data streams for the first host interface port, and | The Accused Amphenol Products are produced using a cable manufacturing method, wherein the first DRR device in the Accused Amphenol Products converts between said electrical transit signals and said multi-lane data streams for the first host interface port. <i>See [1d] above.</i> |
| [8e] the second DRR device converting between said electrical transit signals and said multi-lane data streams for the second host interface port, | The Accused Amphenol Products are produced using a cable manufacturing method, wherein the second DRR device in the Accused Amphenol Products converts between said electrical transit signals and said multi-lane data streams for the second host interface port. <i>See [1e] above.</i> |

| '233 Patent | Accused Amphenol Products |
|--|---|
| Claim 8 | |
| <p>[8f] the first and second DRR devices providing pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories.</p> | <p>The Accused Amphenol Products are produced using a cable manufacturing method, wherein the first and second DRR devices in the Accused Amphenol Products provide pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories.</p> <p><i>See [1f] above.</i></p> |

| '233 Patent | Accused Amphenol Products |
|--|---|
| Claim 15 | |
| [15pre] A communications method that comprises: | Amphenol performs a communication method. <i>See</i> [1pre] above. |
| [15a] inserting a first end connector plug of a cable into a first host interface port, the first end connector plug being connected to a first data recovery and re-modulation (DRR) device that converts a multi-lane data stream from the first host interface port into electrical transit signals conveyed by electrical conductors to a second DRR device connected to a second end connector plug of the cable; and | Amphenol inserts a first end connector plug of a cable into a first host interface port, the first end connector plug being connected to a first data recovery and re-modulation (DRR) device that converts a multi-lane data stream from the first host interface port into electrical transit signals conveyed by electrical conductors to a second DRR device connected to a second end connector plug of the cable. <i>See</i> [1a], [1c], [1d] above. |
| [15b] inserting the second end connector plug of the cable into a second host interface port, the second DRR device converting a multi-lane data stream from the second host interface port into electrical transit signals conveyed by electrical conductors to the first DRR device, | Amphenol inserts the second end connector plug of the cable into a second host interface port, the second DRR device converting a multi-lane data stream from the second host interface port into electrical transit signals conveyed by electrical conductors to the first DRR device. <i>See</i> [1b], [1c], [1e] above. |
| [15c] the first and second DRR devices providing pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories. | The first and second DRR devices of the Accused Amphenol Products provide pre-equalization of the electrical transit signals using transmit filter coefficient values stored in nonvolatile memories. <i>See</i> [1f] above. |

