

**UNITED STATES INTERNATIONAL TRADE COMMISSION  
WASHINGTON, D.C.**

**Before the Honorable Doris Johnson Hines  
Administrative Law Judge**

**In the Matter of**

**CERTAIN VIDEO GAME CONSOLES,  
ROUTERS, GATEWAYS AND  
COMPONENTS THEREOF**

**Inv. No. 337-TA-1445**

**EXHIBIT 1**

**RESPONDENTS SONY INTERACTIVE ENTERTAINMENT INC., SONY  
INTERACTIVE ENTERTAINMENT LLC, VANTIVA SA, AND VANTIVA USA LLC's  
DISCLOSURE OF INITIAL INVALIDITY CONTENTIONS**

## **EXHIBITS AND ATTACHMENTS**

<b>Exhibits A1 – A15</b>	Invalidity Claim Charts for Primary References for '272 Patent
<b>Exhibits B1 – B15</b>	Invalidity Claim Charts for Primary References for '927 Patent
<b>Exhibits C1 – C23</b>	Invalidity Claim Charts for Primary References for '134 Patent
<b>Exhibits D1 – D23</b>	Invalidity Claim Charts for Primary References for '776 Patent
<b>Attachment A</b>	Subject-Matter Eligibility Contentions for '272 Patent
<b>Attachment B</b>	Subject-Matter Eligibility Contentions for '927 Patent
<b>Attachment C</b>	Subject-Matter Eligibility Contentions for '134 Patent
<b>Attachment D</b>	Subject-Matter Eligibility Contentions for '776 Patent

Pursuant to Order No. 9 and the deadline for private parties to provide initial responses to contention interrogatories on burden, Respondents Sony Interactive Entertainment Inc., Sony Interactive Entertainment LLC, Vantiva SA, and Vantiva USA, LLC (collectively, “Respondents”) hereby provide these Invalidity Contentions (“Invalidity Contentions”) and Subject-Matter Ineligibility Contentions (“Ineligibility Contentions”) to Complainant AX Wireless LLC (“Complainant” or “AXW”).

## **I. INTRODUCTORY STATEMENT**

These Invalidity and Ineligibility Contentions are based on Respondents’ current knowledge and understanding of U.S. Patent Nos. 10,917,272 (“’272 Patent”); 11,646,927 (“’927 Patent”); 11,777,776 (“’776 Patent”); and 12,063,134 (“’134 Patent”) (collectively, “the Asserted Patents”) and the prior art, along with Respondents’ understanding of Complainant’s infringement allegations and apparent claim interpretations based on those allegations, as set forth in Complainant’s Complaint and exhibits thereto, as well as Complainant’s List of Proposed Claim Constructions, served on Jun 13, 2025. The contentions set forth below are initial contentions as required by Order No. 9. Respondents reserve the right to revise or supplement these contentions in light of party and third-party discovery, AXW’s infringement contentions, any claim construction order issued by the ALJ, review and analysis by expert witnesses, and further investigation and discovery regarding the defenses asserted by Respondents. For example, Respondents expressly reserve the right to amend these contentions after review of AXW’s infringement contentions, after review of AXW’s validity contentions, after issuance of a claim construction order, should AXW provide any information that it failed to provide in its disclosures, if AXW amends its disclosures in any way, or otherwise as permitted in advance of the scheduled cut-off date for supplementing contention interrogatories. Further, because discovery is ongoing and the exchange of final burden contention interrogatory responses is not until August 15,

2025, Respondents reserve the right to revise, amend, and/or supplement the information provided herein, including identifying other bases of invalidity based on the identified and charted references, and also charting, and relying on additional references. Further, Respondents reserve the right to revise their ultimate contentions concerning the invalidity of the Asserted Claims, which may change depending upon further and ongoing investigation, the construction of the Asserted Claims and/or positions that AXW or expert witnesses may take concerning claim construction, infringement, and/or invalidity issues. Respondents further reserve the right to amend their contentions in view of improperly held discovery, including regarding AXW's failure to produce documents from prior litigation(s) including the Asserted Patents or patents related to the Asserted Patents.

These Invalidity and Ineligibility Contentions should not be construed to waive any objections to the Complaint or as an admission that the infringement allegations contained therein were adequate or that Complainant's apparent claim interpretations are correct, have merit, or should be adopted. Respondents expressly reserve the right to amend these contentions based on Complainant's forthcoming responses to Respondents' interrogatories on infringement or when Complainant specifies its theories with greater clarity. Additionally, and as further explained below, where these Invalidity Contentions disclose that a prior art reference meets a claim limitation, such position may be based on Complainant's apparent claim interpretations; Respondents do not necessarily agree that such interpretations are correct, have merit, or should be adopted.

Respondents' investigation of the Asserted Patents, their file histories, and the prior art is ongoing, and Respondents expressly reserve the right to supplement these Invalidity and Ineligibility Contentions based on further discovery and in a manner consistent with Order No. 9 and the applicable Ground Rules for this investigation, or otherwise in accordance with any order or direction of this Commission or agreement of the parties. Respondents' ongoing investigation includes, but is

not limited to, serving subpoenas on prior artists and inventors regarding prior art, seeking additional information related to the references and prior art systems disclosed in these Invalidity and Ineligibility Contentions, seeking additional information regarding Complainant's infringement theories and the products and services accused of infringement, seeking information regarding any prior sales and/or uses by the original assignees of the Asserted Patents, and seeking expert testimony. Respondents also reserve the right to rely on any prior art identified or disclosed by non-parties to this action that are involved in a suit or action involving one or more of the Asserted Patents, as well as any prior art produced or disclosed during the course of this litigation. Additionally, Respondents have not yet had the benefit of taking the depositions of the named inventors or those that worked with the named inventors, or of the named inventors, authors, and entities listed on any references or systems identified in these Invalidity Contentions.

## **II. ASSERTED PATENTS AND CLAIMS**

Complainant asserts the following claims from the Asserted Patents (collectively, "the Asserted Claims"):

<b>Asserted Patent</b>	<b>Asserted Claims</b>
'272 Patent	1, 11
'927 Patent	1, 2
'776 Patent	1-6
'134 Patent	1-7

Complainant appears to allege a priority date of August 21, 2009, for all of the Asserted Patents based on the filing of provisional application SN 61/235,909. Reference to any "asserted priority date" should not be construed to mean that Respondents agree that the Asserted Patents are in

fact entitled to such priority date(s).<sup>1</sup>

Respondents understand that Complainant is not asserting an invention date, or conception, reduction to practice, design, and/or development of the claimed invention, prior to the asserted priority dates identified above. To the extent Complainant later alleges that any such inventive activities occurred prior to the priority dates identified above, Respondents reserve the right to object to such belated changes in position and/or to supplement these Invalidity Contentions to address any such contention, including by identifying and/or charting additional prior art that may become relevant in view of such assertion. Likewise, to the extent Complainant successfully establishes an invention date before any of the prior-art references relied on by Respondents, then those references serve as evidence of secondary considerations of obviousness, particularly, contemporaneous invention by others. To the extent Complainant alleges that any prior art relied on in these Invalidity Contentions does not actually qualify as prior art to the Asserted Patent, Respondents reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier critical date for the challenged prior art and/or a later priority date and/or date of invention for a particular Asserted Claim). Respondents also reserve the right to rely on additional documents, information, and evidence to demonstrate public availability or public availability by a certain date of a prior art reference or to rebut any efforts by Complainant to allege any reference was not publicly available or publicly available by a certain date or otherwise available as prior art.

For purposes of these contentions, Respondents address those claims specifically asserted by Complainant. Respondents reserve the right to amend or supplement this disclosure as necessary in

---

<sup>1</sup> Respondents contend that the Asserted Patents are not entitled to the priority date of the provisional application SN 61/235,909 at least because the provisional application does not meet 35 U.S.C. § 112 requirements for any of the Asserted Claims. For example, the provisional application suffers from the same deficiencies of the '272 Specification as explained in the "Invalidity Under 35 U.S.C. § 112" section as well as additional deficiencies.

view of any changes or amendments made, for any reason, to Complainant's infringement theories, infringement contentions, or Asserted Claims, including to Complainant's asserted priority and/or invention date(s).

### **III. CLAIM CONSTRUCTION**

To the extent these Invalidity Contentions rely on or otherwise embody particular constructions of terms or phrases in the Asserted Claims, Respondents are not conceding that any such constructions are proper. For purposes of these Invalidity Contentions, Respondents may adopt alternative claim construction positions. In particular, portions of these Invalidity Contentions, including the claim charts attached as Exhibits and Attachments, may be based on the underlying claim constructions and/or interpretations in Complainant's complaint and accompanying exhibits, or in its List of Proposed Claim Constructions. To the extent such constructions and/or interpretations are understood by Respondents. Respondents do not concede that any such constructions or interpretations by Complainant are proper or correct, and expressly reserve the right to contest any such constructions.

Throughout the attached Exhibits and Attachments, Respondents provide examples of where references disclose subject matter recited in preambles, without regard to whether the preambles are properly considered to be limitations of the Asserted Claims. Respondents reserve the right to argue, at the appropriate stage of this case, that the preambles are or are not limitations. Further, the fact that Respondents provide examples of any limitation does not mean that Respondents believe that the limitation is defined, is supported by a written description in the specification, is enabled, or otherwise comports with the requirements of the patent statute, including, but not limited to, 35 U.S.C. § 112.

Nothing disclosed herein is an admission or acknowledgement that any of Respondents' products or services infringes any of the Asserted Claims. Respondents reserve the right to

supplement, modify, or otherwise amend these Invalidity Contentions, including based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in connection with the claim construction process.

#### **IV. PERSON HAVING ORDINARY SKILL IN THE ART**

A POSITA at the time of the purported invention would have had at least a master's degree in electrical engineering or similar discipline, and/or two to three years of experience working or conducting research in the field of wireless communication protocols, or an equivalent combination of education and experience.

#### **V. IDENTIFICATION OF PRIOR ART<sup>23</sup>**

In this section Respondents identify the prior art references that anticipate and/or render obvious the Asserted Claims of the Asserted Patents. The referenced patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f) and (g).<sup>4</sup> Whether a prior art reference anticipates or renders obvious the Asserted Claims may depend upon claim construction.

##### **A. Prior Art for '272 Patent**

###### **1. Prior Art Patent Publications for '272 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the prior art patent publications set forth in the appendices attached hereto. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin,

---

<sup>2</sup> Respondents also hereby identify any systems or products that embody the technology described in any patent or publication identified in these Invalidity Contentions. Respondents reserve the right to rely on any documents or other evidence regarding any such systems.

<sup>3</sup> Additionally, Respondents identify and incorporate by reference all prior art references identified during the prosecution history of the asserted patents, including any reference cited on the face of the asserted patents, any references disclosed by the applicants during prosecution in information disclosure statements, and any references identified or cited by the examiner as part of any office action relating to the asserted patents or to the applications which ultimately lead to the issuance of the asserted patents. Respondents further incorporate by reference the prior art and arguments made in *inter partes* review and other post-grant challenges to the Asserted Patents and patents related to the Asserted Patents, including Respondents' own filed and forthcoming *inter partes* review petitions.

<sup>4</sup> Unless otherwise indicated, all citations are to the pre-AIA provisions of Title 35 of the U.S. Code.

and dates of publication and/or issue are included on the face of those documents. Such prior art patents include, but are not limited to:

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 8,675,754 titled “Hybrid modulation schemes used in data communication” to Yonge et al. (“Yonge”)	March 18, 2014	August 19, 2010
U.S. 7,903,755 titled “Method and apparatus for preamble training with shortened long training field in a multiple antenna communication system” to Mujtaba (“Mujtaba”)	March 8, 2011	August 6, 2007
US2016/0255178 titled “Method of detecting packet bandwidth in a wireless OFDM network with multiple overlapped frequency bands” to Kim (“Kim 2016”)	September 1, 2016	May 6, 2016
US2016/0056991 titled “Method and apparatus for generating a PHY data unit” to Zhang et al. (“Zhang ’991”)	February 25, 2016	November 2, 2015
WO2006/119159A2 titled “Transmission of signalling information in an ofdm communication system” to De Courville et al. (“DeCourville 159”)	November 9, 2006	May 1, 2006
U.S. 7,856,068 titled “Nested preamble for multi input multi output orthogonal frequency division multiplexing” to Tung et al. (“Tung 068”)	December 21, 2010	June 6, 2006
U.S. 7,280,621 titled “Preamble detector method and device for OFDM systems” to Murphy. (“Murphy 621”)	October 9, 2007	March 31, 2003
US2007/0115802 titled “Transmitting and receiving systems for increasing service	May 24, 2007	December 8, 2006

Patent No.	Date of Issue/Publication	Filing Date
coverage in orthogonal frequency division multiplexing wireless local area network, and method thereof” to Yu et al. (“Yu 802”)		
US2006/0182017 titled “Method and system for compromise greenfield preambles for 802.11n” to Hansen et al. (“Hansen 017”)	August 17, 2006	June 9, 2005
US2005/0243774 titled “Repetition coding for a wireless system” to Choi et al. (“Choi 774”)	November 3, 2005	September 17, 2003

Respondents reserve the right to supplement these references as they learn in the course of discovery of other prior art patent publications that would anticipate and/or render the Asserted Claims obvious.

Respondents hereby incorporate by reference all prior art patent publications previously identified by Respondents in its Response to the Complaint, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

## 2. Prior Art Non-Patent Publications for ’272 Patent

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works set forth in the appendices attached hereto. These publications constitute prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby discloses as prior art publications all references disclosed below in Section V, such as articles, books, or other similar publications. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that

would anticipate and/or render the Asserted Claims obvious.

Such prior art non-patent publications include, but are not limited to:

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
“ITU-T Recommendation G.9960 - Draft generation home Networking transceivers” (“the G.9960 Draft”) Alone or in Combination with “G.hn: Extended PHY frame header,” ITU-T SGJ 5/Q4 09XC-119 by Sid Schrum at Intellon Corporation (“Schrum”), “G.hn: Using Two Symbols for the Header of a PHY frame on Coax” ITU-T SGJ 5/Q4 09XC-119 by Boaz Kol at CoperGate (“Kol”), and/or “G.hn: 09CC-R12 HomePlug AV interoperability updates” ITU-T 09CC-062R1 by Les Brown at Infineon Technologies USA (“Brown”) (collectively “G.hn refs”)	Sid Schrum; Boaz Kol; Les Brown	At least as early as early as January 13, 2006
IEEE 802.11 Wireless LANs TGn Sync Proposal Technical Specification (“2005 802.11n TGn Sync Specification”)	Document No. IEEE 802.11-04/0889r6	May 18, 2005
TGn Sync Proposal (“TGnSync 2004”)	Document No. IEEE 802.11-04/888r0	August 13, 2004
PHY Updates to TGn Sync Proposal (“2005 TGn Sync PHY Updates”)	Document No. IEEE 802.11-05/418r0	May 16, 2005
TGn Sync Complete Proposal (“2005 TGn Sync Proposal”)	Document No. IEEE 802.11-04/888r9	March 4, 2005
WWiSE Proposal: High Throughput Extension to the 802.11 Standard (“WWiSE 2005”)	Document No. IEEE 802.11-05/0149r5	March 18, 2005

Respondents hereby incorporate by reference all prior art non-patent publications previously identified by Respondents in its Responses to the Complaint and Notice of Investigation, all patent

publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

### **3. Prior Art Systems and/or Knowledge**

Certain systems were known, publicly used, sold, or offered for sale prior to the Asserted Patents' priority date. For example, as early as August 2009, software defined radio products existed that could be used to implement the functionality described in the Asserted Patents. GNU Radio and Ettus Research's Universal Software Radio Peripheral are examples of such systems. Other 802.11 testbeds for wireless research existed universities such as the University of California, Los Angeles had developed 802.11 testbed products such as UCLA's METEOR, described in IEEE 802.11-03/806r0. The software and firmware techniques, methods, and/or algorithms described in the Prior Art Patents and Publications identified above could have been practiced or implemented on these systems, and doing so would be within the knowledge and ability of a person of ordinary skill in the art. Indeed, prototyping and testing wireless techniques in this manner was well-known in the art as of the earliest priority date claimed by Complainant.

Because Respondents has not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or further investigation.

### **4. Derivation Under 35 U.S.C. § 102(f)**

Other than copies of the Asserted Patents and their file histories, Complainant has not produced any documents regarding the alleged invention, conception, or reduction to practice of the Asserted Claims. To the extent discovery reveals that AX Wireless; any related subsidiaries or entities; either of the named inventors of the Asserted Patents, Mr. Marcos Tzannes and/or Mr. Joon Bae Kim; Applied Transform and/or or any other entities affiliated with either of the named inventors

improperly derived the alleged inventions or any part of the alleged inventions pursuant to pre-AIA U.S.C. § 102(f) from another person or entity, Respondents reserve the right to amend their invalidity contentions with the name(s) of the person(s) or entities from whom and the circumstances under which the alleged inventions or any part(s) of the alleged inventions were derived. 35 U.S.C. § 102(f) states that “[a] person shall be entitled to a patent unless ... he did not himself invent the subject matter sought to be patented.” To succeed on an improper derivation claim, a patent challenger may show: (1) prior conception by another, and (2) communication of that conception to a named inventor. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1576 (Fed. Cir. 1997). For example, Respondents intend to seek discovery on the development and conception of IEEE’s drafts and proposals for various 802.11 standards, including the 802.11ax standard, as well as any communications and participation of the named inventors and/or the above-referenced affiliated entities in relevant standard setting bodies such as the IEEE and/or the Wi-Fi Alliance.

**B. Prior Art for '927 Patent**

**1. Prior Art Patents for '927 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the prior art patent publications set forth in the appendices attached hereto. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Such prior art patents include, but are not limited to:

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 8,675,754 titled “Hybrid modulation schemes used in data communication” to Yonge et al. (“Yonge”)	March 18, 2014	August 19, 2010

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 7,903,755 titled “Method and apparatus for preamble training with shortened long training field in a multiple antenna communication system” to Mujtaba (“Mujtaba”)	March 8, 2011	August 6, 2007
US2016/0255178 titled “Method of detecting packet bandwidth in a wireless OFDM network with multiple overlapped frequency bands” to Kim (“Kim 2016”)	September 1, 2016	May 6, 2016
US2016/0056991 titled “Method and apparatus for generating a PHY data unit” to Zhang et al. (“Zhang ’991”)	February 25, 2016	November 2, 2015
WO2006/119159A2 titled “Transmission of signalling information in an ofdm communication system” to De Courville et al. (“DeCourville 159”)	November 9, 2006	May 1, 2006
U.S. 7,856,068 titled “Nested preamble for multi input multi output orthogonal frequency division multiplexing” to Tung et al. (“Tung 068”)	December 21, 2010	June 6, 2026
U.S. 7,280,621 titled “Preamble detector method and device for OFDM systems” to Murphy. (“Murphy 621”)	October 9, 2007	March 31, 2003
US2007/0115802 titled “Transmitting and receiving systems for increasing service coverage in orthogonal frequency division multiplexing wireless local area network, and method	May 24, 2007	December 8, 2006

Patent No.	Date of Issue/Publication	Filing Date
thereof” to Yu et al. (“Yu 802”)		
US2006/0182017 titled “Method and system for compromise greenfield preambles for 802.11n” to Hansen et al. (“Hansen 017”)	August 17, 2006	June 9, 2005
US2005/0243774 titled “Repetition coding for a wireless system” to Choi et al. (“Choi 774”)	November 3, 2005	September 17, 2003

Respondents reserve the right to supplement these references as they learn in the course of discovery of other prior art patent publications that would anticipate and/or render the Asserted Claims obvious.

Respondents hereby incorporate by reference all prior art patent publications previously identified by Respondents in its Response to the Complaint, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

## 2. Prior Art Publications for '927 Patent

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works set forth in the appendices attached hereto. These publications constitute prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby discloses as prior art publications all references disclosed below in Section V,

such as articles, books, or other similar publications. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the Asserted Claims obvious.

Such prior art non-patent publications include, but are not limited to:

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
“ITU-T Recommendation G.9960 - Draft generation home Networking transceivers” (“the G.9960 Draft”) Alone or in Combination with “G.hn: Extended PHY frame header,” ITU-T SGJ 5/Q4 09XC-119 by Sid Schrum at Intellon Corporation (“Schrum”), “G.hn: Using Two Symbols for the Header of a PHY frame on Coax” ITU-T SGJ 5/Q4 09XC-119 by Boaz Kol at CoperGate (“Kol”), and/or “G.hn: 09CC-R12 HomePlug AV interoperability updates” ITU-T 09CC-062R1 by Les Brown at Infineon Technologies USA (“Brown”) (collectively “G.hn refs”)	Sid Schrum; Boaz Kol; Les Brown	At least as early as early as January 13, 2006
IEEE P802.11 Wireless LANs Joint Proposal: High throughput extension to the 802.11 Standard: PHY (“2006 802.11n Joint PHY Proposal”)	Document No. IEEE 802.11-05/1102r4	January 13, 2006
IEEE 802.11 Wireless LANs TGn Sync Proposal Technical Specification (“2005 802.11n TGn Sync Specification”)	Document No. IEEE 802.11-04/0889r6	May 18, 2005
TGn Sync Proposal (“TGnSync 2004”)	Document No. IEEE 802.11-04/888r0	August 13, 2004

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
PHY Updates to TGn Sync Proposal (“2005 TGn Sync PHY Updates”)	Document No. IEEE 802.11-05/418r0	May 16, 2005
TGn Sync Complete Proposal (“2005 TGn Sync Proposal”)	Document No. IEEE 802.11-04/888r9	March 4, 2005
WWiSE Proposal: High Throughput Extension to the 802.11 Standard (“WWiSE 2005”)	Document No. IEEE 802.11-05/0149r5	March 18, 2005

Respondents hereby incorporate by reference all prior art non-patent publications previously identified by Respondents in its Responses to the Complaint and Notice of Investigation, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

### **3. Prior Art Systems and/or Knowledge**

Certain systems were known, publicly used, sold, or offered for sale prior to the Asserted Patents’ priority date. For example, as early as August 2009, software defined radio products existed that could be used to implement the functionality described in the Asserted Patents. GNU Radio and Ettus Research’s Universal Software Radio Peripheral are examples of such systems. Other 802.11 testbeds for wireless research existed universities such as the University of California, Los Angeles had developed 802.11 testbed products such as UCLA’s METEOR, described in IEEE 802.11-03/0806r0. The software and firmware techniques, methods, and/or algorithms described in the Prior Art Patents and Publications identified above could have been practiced or implemented on these systems, and doing so would be within the knowledge and ability of a person of ordinary skill in the art. Indeed, prototyping and testing wireless techniques in this manner was well-known in the art as of the earliest priority date claimed by Complainant.

Because Respondents has not yet completed discovery in this case, Respondents reserve the

right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or further investigation.

#### **4. Derivation Under 35 U.S.C. § 102(f)**

Other than copies of the Asserted Patents and their file histories, Complainant has not produced any documents regarding the alleged invention, conception, or reduction to practice of the Asserted Claims. To the extent discovery reveals that AX Wireless; any related subsidiaries or entities; either of the named inventors of the Asserted Patents, Mr. Marcos Tzannes and/or Mr. Joon Bae Kim; Applied Transform and/or or any other entities affiliated with either of the named inventors improperly derived the alleged inventions or any part of the alleged inventions pursuant to pre-AIA U.S.C. § 102(f) from another person or entity, Respondents reserve the right to amend their invalidity contentions with the name(s) of the person(s) or entities from whom and the circumstances under which the alleged inventions or any part(s) of the alleged inventions were derived. 35 U.S.C. § 102(f) states that “[a] person shall be entitled to a patent unless ... he did not himself invent the subject matter sought to be patented.” To succeed on an improper derivation claim, a patent challenger may show: (1) prior conception by another, and (2) communication of that conception to a named inventor. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1576 (Fed. Cir. 1997). For example, Respondents intend to seek discovery on the development and conception of IEEE’s drafts and proposals for various 802.11 standards, including the 802.11ax standard, as well as any communications and participation of the named inventors and/or the above-referenced affiliated entities in relevant standard setting bodies such as the IEEE and/or the Wi-Fi Alliance.

#### **C. Prior Art for ’776 Patent**

##### **1. Prior Art Patents for ’776 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103

based on the prior art patent publications set forth in the appendices attached hereto. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Such prior art patents include, but are not limited to:

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 10,637,706 titled “Transmission method and transmission apparatus for packet format detection” to Huang et al. (“Huang”)	April 28, 2020	March 22, 2018
U.S. 10,122,563 titled “Orthogonal Frequency Division Multiplex Data Unit Generation and Decoding” to Sun et al. (“Sun”)	November 6, 2018	June 17, 2016
U.S. 8,276,054 titled “Wireless communication system, wireless communication apparatus, wireless communication method, and computer program to Morioka et al. (“Morioka”).	September 25, 2012	May 8, 2008
JP 2005/223388 titled “Wireless communication apparatus and program” to Nakagawa et al. (“Nakagawa”).	August 18, 2005	February 3, 2004
U.S. 2006/0050705 titled “Distinguishing between protocol packets in a wireless communication system” to Kim. (“Kim”).	March 9, 2006	August 5, 2005

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 8,018,975 titled “Method and system for performing synchronization in OFDM systems” to Ma et al. (“Ma ’975”)	September 13, 2011	October 2, 2006
U.S. 7,903,755 titled “Method and apparatus for preamble training with shortened long training field in a multiple antenna communication system” to Mujtaba (“Mujtaba”)	March 8, 2011	August 6, 2007
U.S. 2005/0141407 titled “Multiple-antenna communication systems and methods for communicating in wireless local area networks that include single-antenna communication devices” to Sandhu (“Sandhu”).	June 30, 2005	December 30, 2003
U.S. 7,599,332 titled “Modified preamble structure for IEEE 802.11a extensions to allow for coexistence and interoperability between 802.11a devices and higher data rate, MIMO or otherwise extended devices” to Zelst et al. (“Zelst”)	October 6, 2009	May 27, 2005
U.S. 7,961,696 titled “Preambles in OFDMA system” to Ma et al. (“Ma ’696”)	July 23, 2007	June 14, 2011
U.S. 8,675,754 titled “Hybrid modulation schemes used in data communication” to Yonge et al. (“Yonge”)	March 18, 2014	August 19, 2010

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 2010/0054223 titled “Physical Layer Data Unit Format” to Zhang et al. (Zhang ’223 App)	August 26, 2009	March 4, 2010
WO2006/119159A2 titled “Transmission of signalling information in an ofdm communication system” to De Courville et al. (“DeCourville 159”)	November 9, 2006	May 1, 2006
U.S. 7,856,068 titled “Nested preamble for multi input multi output orthogonal frequency division multiplexing” to Tung et al. (“Tung 068”)	December 21, 2010	June 6, 2026
U.S. 7,280,621 titled “Preamble detector method and device for OFDM systems” to Murphy. (“Murphy 621”)	October 9, 2007	March 31, 2003
US2007/0115802 titled “Transmitting and receiving systems for increasing service coverage in orthogonal frequency division multiplexing wireless local area network, and method thereof” to Yu et al. (“Yu 802”)	May 24, 2007	December 8, 2006
US2006/0182017 titled “Method and system for compromise greenfield preambles for 802.11n” to Hansen et al. (“Hansen 017”)	August 17, 2006	June 9, 2005

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
US2005/0243774 titled “Repetition coding for a wireless system” to Choi et al. (“Choi 774”)	November 3, 2005	September 17, 2003
U.S. Patent Application Publication No. 2010/0260159 to Zhang et al. (“Zhang ’159”)	October 14, 2010	April 10, 2012

Respondents reserve the right to supplement these references as they learn in the course of discovery of other prior art patent publications that would anticipate and/or render the Asserted Claims obvious.

Respondents hereby incorporate by reference all prior art patent publications previously identified by Respondents in its Response to the Complaint, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

**2. Prior Art Publications for ’776 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works set forth in the appendices attached hereto. These publications constitute prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby discloses as prior art publications all references disclosed below in Section V, such as articles, books, or other similar publications. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the Asserted Claims obvious.

Such prior art non-patent publications include, but are not limited to:

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
40/20 MHz Interoperability for Robust, High Performance and Compatible 802.11n Systems (“40/20 MHz Interoperability for 802.11n Systems”)	Document No. IEEE 802.11- 05/1102r4	January 13, 2006
IEEE 802.11 Wireless LANs TGn Sync Proposal Technical Specification (“2005 802.11n TGn Sync Specification”)	Document No. IEEE 802.11- 04/0889r6	May 18, 2005
TGn Sync Proposal (“TGnSync 2004”)	Document No. IEEE 802.11- 04/888r0	August 13, 2004
PHY Updates to TGn Sync Proposal (“2005 TGn Sync PHY Updates”)	Document No. IEEE 802.11- 05/418r0	May 16, 2005
TGn Sync Complete Proposal (“2005 TGn Sync Proposal”)	Document No. IEEE 802.11- 04/888r9	March 4, 2005
WWiSE Proposal: High Throughput Extension to the 802.11 Standard (“WWiSE 2005”)	Document No. IEEE 802.11- 05/418r0	May 16, 2005
IEEE 802.11ax Standard (“Wi-Fi 6 Standard”)	Document No. IEEE 802.11- 04/888r9	February 26, 2021

Respondents hereby incorporate by reference all prior art non-patent publications previously identified by Respondents in its Responses to the Complaint and Notice of Investigation, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

### **3. Prior Art Systems and/or Knowledge**

Certain systems were known, publicly used, sold, or offered for sale prior to the Asserted Patents' priority date. For example, as early as August 2009, software defined radio products existed that could be used to implement the functionality described in the Asserted Patents. GNU Radio and Ettus Research's Universal Software Radio Peripheral are examples of such systems. Other 802.11 testbeds for wireless research existed universities such as the University of California, Los Angeles had developed 802.11 testbed products such as UCLA's METEOR, described in IEEE 802.11-03/806r0. The software and firmware techniques, methods, and/or algorithms described in the Prior Art Patents and Publications identified above could have been practiced or implemented on these systems, and doing so would be within the knowledge and ability of a person of ordinary skill in the art. Indeed, prototyping and testing wireless techniques in this manner was well-known in the art as of the earliest priority date claimed by Complainant.

Because Respondents has not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or further investigation.

### **4. Derivation Under 35 U.S.C. § 102(f)**

Other than copies of the Asserted Patents and their file histories, Complainant has not produced any documents regarding the alleged invention, conception, or reduction to practice of the Asserted Claims. To the extent discovery reveals that AX Wireless; any related subsidiaries or entities; either of the named inventors of the Asserted Patents, Mr. Marcos Tzannes and/or Mr. Joon Bae Kim; Applied Transform and/or or any other entities affiliated with either of the named inventors improperly derived the alleged inventions or any part of the alleged inventions pursuant to pre-AIA U.S.C. § 102(f) from another person or entity, Respondents reserve the right to amend their invalidity

contentions with the name(s) of the person(s) or entities from whom and the circumstances under which the alleged inventions or any part(s) of the alleged inventions were derived. 35 U.S.C. § 102(f) states that “[a] person shall be entitled to a patent unless ... he did not himself invent the subject matter sought to be patented.” To succeed on an improper derivation claim, a patent challenger may show: (1) prior conception by another, and (2) communication of that conception to a named inventor. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1576 (Fed. Cir. 1997). For example, Respondents intend to seek discovery on the development and conception of IEEE’s drafts and proposals for various 802.11 standards, including the 802.11ax standard, as well as any communications and participation of the named inventors and/or the above-referenced affiliated entities in relevant standard setting bodies such as the IEEE and/or the Wi-Fi Alliance.

**D. Prior Art for '134 Patent**

**1. Prior Art Patents for '134 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the prior art patent publications set forth in the appendices attached hereto. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. Such prior art patents include, but are not limited to:

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 10,637,706 titled “Transmission method and transmission apparatus for packet format detection” to Huang et al. (“Huang”)	April 28, 2020	March 22, 2018
U.S. 10,122,563 titled “Orthogonal Frequency Division Multiplex Data Unit Generation and Decoding” to Sun et al. (“Sun”)	November 6, 2018	June 17, 2016

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 8,276,054 titled “Wireless communication system, wireless communication apparatus, wireless communication method, and computer program to Morioka et al. (“Morioka”).	September 25, 2012	May 8, 2008
JP 2005/223388 titled “Wireless communication apparatus and program” to Nakagawa et al. (“Nakagawa”).	August 18, 2005	February 3, 2004
U.S. 2006/0050705 titled “Distinguishing between protocol packets in a wireless communication system” to Kim. (“Kim”).	March 9, 2006	August 5, 2005
U.S. 8,018,975 titled “Method and system for performing synchronization in OFDM systems” to Ma et al. (“Ma ’975”)	September 13, 2011	October 2, 2006
U.S. 7,903,755 titled “Method and apparatus for preamble training with shortened long training field in a multiple antenna communication system” to Mujtaba (“Mujtaba”)	March 8, 2011	August 6, 2007
U.S. 2005/0141407 titled “Multiple-antenna communication systems and methods for communicating in wireless local area networks that include single-antenna communication devices” to Sandhu (“Sandhu”).	June 30, 2005	December 30, 2003

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 7,599,332 titled “Modified preamble structure for IEEE 802.11a extensions to allow for coexistence and interoperability between 802.11a devices and higher data rate, MIMO or otherwise extended devices” to Zelst et al. (“Zelst”)	October 6, 2009	May 27, 2005
U.S. 7,961,696 titled “Preambles in OFDMA system” to Ma et al. (“Ma ’696”)	July 23, 2007	June 14, 2011
U.S. 8,675,754 titled “Hybrid modulation schemes used in data communication” to Yonge et al. (“Yonge”)	March 18, 2014	August 19, 2010
U.S. 2010/0054223 titled “Physical Layer Data Unit Format” to Zhang et al. (Zhang ’223)	August 26, 2009	March 4, 2010
WO2006/119159A2 titled “Transmission of signalling information in an ofdm communication system” to De Courville et al. (“DeCourville 159”)	November 9, 2006	May 1, 2006
U.S. 7,856,068 titled “Nested preamble for multi input multi output orthogonal frequency division multiplexing” to Tung et al. (“Tung 068”)	December 21, 2010	June 6, 2026

<b>Patent No.</b>	<b>Date of Issue/Publication</b>	<b>Filing Date</b>
U.S. 7,280,621 titled “Preamble detector method and device for OFDM systems” to Murphy. (“Murphy 621”)	October 9, 2007	March 31, 2003
US2007/0115802 titled “Transmitting and receiving systems for increasing service coverage in orthogonal frequency division multiplexing wireless local area network, and method thereof” to Yu et al. (“Yu 802”)	May 24, 2007	December 8, 2006
US2006/0182017 titled “Method and system for compromise greenfield preambles for 802.11n” to Hansen et al. (“Hansen 017”)	August 17, 2006	June 9, 2005
US2005/0243774 titled “Repetition coding for a wireless system” to Choi et al. (“Choi 774”)	November 3, 2005	September 17, 2003
U.S. Patent Application Publication No. 2010/0260159 to Hongyuan Zhang. (“Zhang ’159”).	October 14, 2010	April 12, 2010

Respondents reserve the right to supplement these references as they learn in the course of discovery of other prior art patent publications that would anticipate and/or render the Asserted Claims obvious.

Respondents hereby incorporate by reference all prior art patent publications previously identified by Respondents in its Response to the Complaint, all patent publications identified on the

face of the Asserted Patents, and any additional patent publications identified herein.

**2. Prior Art Publications for '134 Patent**

Respondents contend that the Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works set forth in the appendices attached hereto. These publications constitute prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, Respondents hereby disclose as prior art publications all references disclosed below in Section V, such as articles, books, or other similar publications. Respondents reserve the right to supplement this list as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and/or render the Asserted Claims obvious.

Such prior art non-patent publications include, but are not limited to:

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
40/20 MHz Interoperability for Robust, High Performance and Compatible 802.11n Systems (“40/20 MHz Interoperability for 802.11n Systems”)	Document No. IEEE 802.11-05/1102r4	January 13, 2006
IEEE 802.11 Wireless LANs TGn Sync Proposal Technical Specification (“2005 802.11n TGn Sync Specification”)	Document No. IEEE 802.11-04/0889r6	May 18, 2005
TGn Sync Proposal (“TGnSync 2004”)	Document No. IEEE 802.11-04/888r0	August 13, 2004
PHY Updates to TGn Sync Proposal (“2005 TGn Sync PHY Updates”)	Document No. IEEE 802.11-05/418r0	May 16, 2005
TGn Sync Complete Proposal (“2005 TGn Sync Proposal”)	Document No. IEEE 802.11-04/888r9	March 4, 2005
WWiSE Proposal: High Throughput Extension to the 802.11 Standard (“WWiSE 2005”)	Document No. IEEE 802.11-05/418r0	May 16, 2005

<b>Publication</b>	<b>Author</b>	<b>Publication Date</b>
IEEE 802.11ax Standard ("Wi-Fi 6 Standard")	Document No. IEEE 802.11- 04/888r9	February 26, 2021

Respondents hereby incorporate by reference all prior art non-patent publications previously identified by Respondents in its Responses to the Complaint and Notice of Investigation, all patent publications identified on the face of the Asserted Patents, and any additional patent publications identified herein.

### **3. Prior Art Systems and/or Knowledge**

Certain systems were known, publicly used, sold, or offered for sale prior to the Asserted Patents' priority date. For example, as early as August 2009, software defined radio products existed that could be used to implement the functionality described in the Asserted Patents. GNU Radio and Ettus Research's Universal Software Radio Peripheral are examples of such systems. Other 802.11 testbeds for wireless research existed universities such as the University of California, Los Angeles had developed 802.11 testbed products such as UCLA's METEOR, described in IEEE 802.11-03/806r0. The software and firmware techniques, methods, and/or algorithms described in the Prior Art Patents and Publications identified above could have been practiced or implemented on these systems, and doing so would be within the knowledge and ability of a person of ordinary skill in the art. Indeed, prototyping and testing wireless techniques in this manner was well-known in the art as of the earliest priority date claimed by Complainant.

Because Respondents has not yet completed discovery in this case, Respondents reserve the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or further investigation.

### **4. Derivation Under 35 U.S.C. § 102(f)**

Other than copies of the Asserted Patents and their file histories, Complainant has not produced any

documents regarding the alleged invention, conception, or reduction to practice of the Asserted Claims. To the extent discovery reveals that AX Wireless; any related subsidiaries or entities; either of the named inventors of the Asserted Patents, Mr. Marcos Tzannes and/or Mr. Joon Bae Kim; Applied Transform and/or or any other entities affiliated with either of the named inventors improperly derived the alleged inventions or any part of the alleged inventions pursuant to pre-AIA U.S.C. § 102(f) from another person or entity, Respondents reserve the right to amend their invalidity contentions with the name(s) of the person(s) or entities from whom and the circumstances under which the alleged inventions or any part(s) of the alleged inventions were derived. 35 U.S.C. § 102(f) states that “[a] person shall be entitled to a patent unless ... he did not himself invent the subject matter sought to be patented.” To succeed on an improper derivation claim, a patent challenger may show: (1) prior conception by another, and (2) communication of that conception to a named inventor. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1576 (Fed. Cir. 1997). For example, Respondents intend to seek discovery on the development and conception of IEEE’s drafts and proposals for various 802.11 standards, including the 802.11ax standard, as well as any communications and participation of the named inventors and/or the above-referenced affiliated entities in relevant standard setting bodies such as the IEEE and/or the Wi-Fi Alliance.

## **VI. STATE OF THE ART, ANTICIPATION, AND OBVIOUSNESS**

The references identified above, as further described in the Exhibits, each disclose, either expressly or inherently, every element of the Asserted Claims of the identified Asserted Patent, thereby anticipating those claims and/or rendering obvious such Asserted Claims (including in combination with the knowledge of a person of ordinary skill in the art). To the extent Complainant contends that any reference does not anticipate or render obvious the Asserted Claims as set forth above, it would have been obvious to combine or modify that reference with concepts from other prior art, as explained throughout these Invalidity Contentions. In particular, for each limitation of the Asserted Claims that Complainant contends 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 primary reference disclosing that limitation, (2) the references identified in Section V below, (3) any statements made in the intrinsic record of such Asserted Patent, and/or (4) the knowledge of one of ordinary skill in the art (as explained in additional detail below).

Respondents do not yet have the benefit of Complainant's positions regarding the prior art in the current litigation, including what element(s), if any, Complainant contends are not disclosed by each prior art reference, whether Complainant contends that a reference is not in fact prior art, and whether Complainant contends that a person of ordinary skill in the art would not be motivated to combine specific references. Respondents reserve the right to supplement these obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) in view of such positions and/or as discovery in the case, including expert discovery, progresses.

The information discussed in the prior art raised in these Invalidity Contentions forms part of the background knowledge of a person of ordinary skill in the art at the time each of the Asserted Patents was filed and would have been used in determining whether and how to combine references to achieve the claimed invention(s), as discussed herein.<sup>5</sup> Indeed, the existence, nature, and content of each prior art reference, including the prior art references cited here, provide further evidence regarding the knowledge of a person of ordinary skill in the art at the relevant time. Respondents expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in these Invalidity Contentions, including to demonstrate that a particular claim element was known at the time of the Asserted Patents to a person of ordinary skill in the art, to show that the differences between a claimed invention and a prior art reference would have been

---

<sup>5</sup> See *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that “the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious”).

obvious to a person of ordinary skill in the art, and to establish that a person of ordinary skill in the art would have been motivated to combine teachings of one or more references to achieve a claimed invention.

**A. Anticipation**

Single items of prior art that anticipate the Asserted Claims are cited and described in the claim charts attached hereto with the above-referenced Appendices; each of which describes anticipation of one or more claims of the Asserted Patents by a primary reference. These claim charts provide citations to portions of the included references, illustrating how the prior art explicitly discloses every element of the Asserted Claims.

**1. '272 Patent and '927 Patent**

As set forth below, and as illustrated in the claim charts attached as A1-A15; and B1-15 the Asserted Claims of the '272 Patent and '927 Patent are invalid under 35 U.S.C. § 102 as anticipated at least as in view of the references and systems the tables below:

<b>Chart (Appx.)</b>	<b>Prior Art Reference</b>
A9/B9	Hansen 017
A13/B13	WWiSE 2005
A12/B12	2005 TGn Sync Proposal
A10/B10	Choi 774
A8/B8	Yu 802
A11/B11	2006 802.11n Joint PHY Proposal
A5/B5	DeCourville 159
A3/B3	Kim

## 2. '776 Patent and '134 Patent

As set forth below, and as illustrated in the claim charts attached as C1-C23; and D1-D23 the Asserted Claims of the '776 Patent and '134 Patent are invalid under 35 U.S.C. § 102 as anticipated in view of the references and systems in the tables below:

<b>Chart (Appx.)</b>	<b>Prior Art Reference</b>
C17/D17	Hansen 017
C22/D22	WWiSE 2005
C21/D21	2005 TGn Sync Proposal
C18/D18	Choi 774
C16/D16	Yu 802
C20/D20	2006 802.11n Joint PHY Proposal
C13/D13	DeCourville 159
C19/D19	Zhang '159
C1/D1	Huang
C5/D5	Kim

### **B. Obviousness**

In addition to the discussion above, the Asserted Claims are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. Items of prior art that render obvious the Asserted Claims are cited and described in the claim charts attached hereto as A1-A15; B1-B15; C1-C23; D1-D23. The identification of certain combinations of prior art does not exclude other combinations and is without prejudice to Respondents' right to rely on additional specific combinations as well as to detail and explain such combinations.

Indeed, much of the art identified in these contentions reflects common knowledge and the state of the art prior to the filing or asserted priority dates of the Asserted Patents. As such, the obviousness combinations in these contentions are intended to be exemplary. There are many possible combinations of the disclosed prior art, and the inclusion of certain exemplary combinations does not exclude other combinations.

Citations to particular excerpts from the prior art are likewise exemplary and not exhaustive of the evidentiary support for the invalidity of the Asserted Patents contained in and/or concerning a particular piece of prior art. Respondents may rely on uncited portions of the prior art references, other documents or operational systems, the “Background of the Invention” and other relevant portions of the Asserted Patents, the prosecution histories of the Asserted Patents (including all cited references), and forthcoming fact and expert testimony to provide context to aid in understanding the prior art reference and/or the cited portions of the references. Where Respondents cite to a particular figure in a reference, the citation encompasses the caption and description of the figure and any text relating to or discussing the figure. Likewise, where Respondents cite text referring to a figure, the citation includes the figure as well.

Moreover, and as discussed below, in addition to the information contained elsewhere in these contentions, Respondents have identified additional motivations and reasons to combine the various references cited herein. In particular, multiple teachings, suggestions, and/or reasons to modify any of the references and/or to combine any two or more of the references in A1-A15; B1-B15; C1-C23; D1-D23 come from many sources, including the prior art (specific and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obvious to try, the nature of the problem faced, and/or knowledge possessed by one of ordinary skill. 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 or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the claimed combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry, and the desire to improve features and performance, would motivate the addition of features to systems as they become available, become less expensive, become more commonly used, provide better performance, reduce costs, or predictably achieve other clearly desirable results.

### **1. Obviousness Grounds**

Respondents contend that, at least under AXW's actual and/or apparent application of the claims, the references and systems in the exemplary tables below, whether alone or in combination with each other and/or the references identified herein, render the Asserted Claims obvious under 35 U.S.C. § 103, as set forth in the charts attached as A1-A15; B1-B15; C1-C23; D1-D23. In particular, each prior art reference or system may be combined with (1) information known to persons skilled in the art at the time of the alleged invention; (2) any other anticipatory prior art references or systems; and (3) any of the additional prior art identified below or in the prosecution of the Asserted Patents and related applications.

As set forth below, and as illustrated in the claim charts attached as A1-A15; B1-B15; C1-

C23; D1-D23; the Asserted Claims are invalid under 35 U.S.C. § 103 as obvious in view of the references and systems in the tables below, whether alone or in combination with each other.

<b><u>'272 and '927 Patents</u></b>	
<b>Chart (Appx.)</b>	<b>Exemplary Prior Art Combination(s)</b>
A9/B9 (Hansen 017)	<ul style="list-style-type: none"> <li>• Hansen 017 + Knowledge of a POSITA</li> <li>• Hansen 017 + Knowledge of a POSITA + WWiSE 2005</li> <li>• Hansen 017 + Knowledge of a POSITA + WWiSE 2005 + Choi 774</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> </ul>
A13/B13 (WWiSE 2005)	<ul style="list-style-type: none"> <li>• WWiSE 2005 + Knowledge of a POSITA</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> </ul>
A12/B12/ (2005 TGn Sync Proposal)	<ul style="list-style-type: none"> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + WWiSE 2005</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + WWiSE 2005 + Choi 774</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + DeCourville 159</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> </ul>
A10/B10 (Choi 774)	<ul style="list-style-type: none"> <li>• Choi 774 + Knowledge of a POSITA</li> <li>• Choi 774 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> </ul>
A8/B8 (Yu 802)	<ul style="list-style-type: none"> <li>• Yu 802 + Knowledge of a POSITA</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Yu 802 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + 2006 802.11n Joint PHY Proposal</li> </ul>
A11/B11 (2006 802.11n Joint PHY)	<ul style="list-style-type: none"> <li>• Yu 802 + Knowledge of a POSITA</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Yu 802 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> </ul>

Proposal)	Yu 802 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Hansen 017
A5/B5 (DeCourville 159)	<ul style="list-style-type: none"> <li>• DeCourville 159 + Knowledge of a POSITA</li> <li>• DeCourville 159 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• DeCourville 159 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> </ul> DeCourville 159 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Hansen 017
A3/B3 Kim	<ul style="list-style-type: none"> <li>• Kim + Knowledge of a POSITA</li> <li>• Kim + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Kim + Knowledge of a POSITA + Huang</li> <li>• Kim + Knowledge of a POSITA + Huang + 2006 802.11n Joint PHY Proposal</li> <li>• Kim + Knowledge of a POSITA + Huang + Zhang '159</li> <li>• Kim + Knowledge of a POSITA + DeCourville 159</li> </ul>

<b><u>'776 and '134 Patents</u></b>	
<b>Chart (Appx.)</b>	<b>Exemplary Prior Art Combination(s)</b>
C17/D17 (Hansen 017)	<ul style="list-style-type: none"> <li>• Hansen 017 + Knowledge of a POSITA</li> <li>• Hansen 017 + Knowledge of a POSITA + WWiSE 2005</li> <li>• Hansen 017 + Knowledge of a POSITA + WWiSE 2005 + Choi 774</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• Hansen 017 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> <li>• Hansen 017 + Knowledge of a POSITA + WWiSE 2005 + Murphy 621</li> </ul>
C22/D22 (WWiSE 2005)	<ul style="list-style-type: none"> <li>• WWiSE 2005 + Knowledge of a POSITA</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> <li>• WWiSE 2005 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159 + Murphy 621</li> </ul>
C21/D21 (2005 T Gn Sync Proposal)	<ul style="list-style-type: none"> <li>• 2005 T Gn Sync Proposal + Knowledge of a POSITA</li> <li>• 2005 T Gn Sync Proposal + Knowledge of a POSITA + WWiSE 2005</li> <li>• 2005 T Gn Sync Proposal + Knowledge of a POSITA + WWiSE 2005 + Choi 774</li> </ul>

	<ul style="list-style-type: none"> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Choi 774</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159</li> <li>• 2005 TGn Sync Proposal + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + DeCourville 159 + Murphy 621</li> </ul>
C18/C18 (Choi 774)	<ul style="list-style-type: none"> <li>• Choi 774 + Knowledge of a POSITA</li> <li>• Choi 774 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• Choi 774 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Murphy 621</li> </ul>
C16/D16 (Yu 802)	<ul style="list-style-type: none"> <li>• Yu 802 + Knowledge of a POSITA</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Yu 802 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + 2006 802.11n Joint PHY Proposal</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + 2006 802.11n Joint PHY Proposal + Murphy 621</li> </ul>
C20/D20 (2006 802.11n Joint PHY Proposal)	<ul style="list-style-type: none"> <li>• Yu 802 + Knowledge of a POSITA</li> <li>• Yu 802 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Yu 802 + Knowledge of a POSITA + 2005 TGn Sync Proposal</li> <li>• Yu 802 + Knowledge of a POSITA + 2005 TGn Sync Proposal + Hansen 017</li> <li>• Yu 802 + Knowledge of a POSITA + 2005 TGn Sync Proposal + Hansen 017 + Murphy 621</li> </ul>
C13/D13 (DeCourville 159)	<ul style="list-style-type: none"> <li>• DeCourville 159 + Knowledge of a POSITA</li> <li>• DeCourville 159 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• DeCourville 159 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal</li> <li>• DeCourville 159 + Knowledge of a POSITA + 2006 802.11n Joint PHY Proposal + Hansen 017</li> <li>• DeCourville 159 + Knowledge of a POSITA + Murphy 621</li> </ul>
C19/D19 Zhang '159	<ul style="list-style-type: none"> <li>• Zhang '159 + Knowledge of a POSITA</li> <li>• Zhang '159 + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Zhang '159 + Knowledge of a POSITA + Huang</li> <li>• Zhang '159 + Knowledge of a POSITA + Huang + 2006 802.11n Joint PHY Proposal</li> <li>• Zhang '159 + Knowledge of a POSITA + Huang + Kim</li> <li>• Zhang '159 + Knowledge of a POSITA + DeCourville 159</li> </ul>
C1/D1 Huang	<ul style="list-style-type: none"> <li>• Huang + Knowledge of a POSITA</li> <li>• Huang + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> </ul>

	<ul style="list-style-type: none"> <li>• Huang + Knowledge of a POSITA + Zhang '159</li> <li>• Huang + Knowledge of a POSITA + Zhang '159 + 2006 802.11n Joint PHY Proposal</li> <li>• Huang + Knowledge of a POSITA + Zhang '159 + Kim</li> <li>• Huang + Knowledge of a POSITA + DeCourville 159</li> </ul>
C5/D5 Kim	<ul style="list-style-type: none"> <li>• Kim + Knowledge of a POSITA</li> <li>• Kim + Knowledge of a POSITA + Hansen 017 + WWiSE 2005</li> <li>• Kim + Knowledge of a POSITA + Huang</li> <li>• Kim + Knowledge of a POSITA + Huang + 2006 802.11n Joint PHY Proposal</li> <li>• Kim + Knowledge of a POSITA + Huang + Zhang '159</li> <li>• Kim + Knowledge of a POSITA + DeCourville 159</li> </ul>

## 2. State of the Art

As of the alleged Priority Date (August 21, 2009), a POSITA would have knowledge of many concepts relevant to technologies described in the Asserted Patents. Respondents describe herein exemplary concepts and knowledge known to POSITAs as of the time of the claimed invention of the Asserted Patents, however Respondents reserve the right to rely on any further information describing the state of the art as of the Priority Date, including any of the information disclosed in the prior art references described herein and in charts A1-A15; B1-B15; C1-C23; and D1-D23. Indeed, as noted above, the references discussed in the claim charts may disclose the elements of the Asserted Claims explicitly and/or inherently, and/or they may be relied upon to show the state of the art in the relevant timeframe.

Wired and wireless communication standards development was well underway at the time of the Asserted Patents' alleged invention. The first iteration of 802.11 was adopted in 1997, and the 802.11a and 802.11g amendments were adopted in 1999 and 2003, respectively. The first meeting of "TGn" the 802.11 Task Group developing next iteration of the standard, 802.11n, occurred in Singapore. *See* IEEE 802.11-03/0724r0 ("TGn September 2003 Agenda"). Because the Wi-Fi standard had been in development for ten years before the alleged invention, the concepts described in

the Asserted Patents were present in the prior art. For example, “headers,” “header fields” made up of “bits,” “OFDM,” “OFDM symbols,” OFDM symbol generators, transmitters and receivers, and encoders and demodulators were all present in the prior art. *See*, e.g., 2005 802.11n TGn Sync Specification at 100:14–101:5 (describing two-symbol “extended” header field); WWiSE 2005 at 69:8–31 (explaining that “[I]n the extended communication range configuration (ER), SIG-N is composed of two consecutive MIMO-OFDM symbols.”); Tung 068 at 4:45–55; Murphy 621 at 1:17–31; Choi 774 at [0013].

So too were other aspects of the Asserted Patents known in the prior art. For example, the Asserted Patents describe that, in the alleged invention, “headers” of a communication frame are repeated in various configurations. ’272 Patent, 5:56–6:2. However, repetition of header fields was well known as of the time of the invention. For example, in 2005, the IEEE 802.11n TGn working group was presented with proposals for repeated headers from the TGn Sync and WWiSE industry groups during development of the IEEE 802.11n standard. *See*, e.g., 2005 802.11n TGn Sync Specification at 100:14–101:5 (describing two-symbol “extended” header field); WWiSE 2005 at 69:8–31 (explaining that “[I]n the extended communication range configuration (ER), SIG-N is composed of two consecutive MIMO-OFDM symbols.”). Further, it was known that repeating a field improved reliability. *E.g.*, DeCourville 159 at 24:3–8.

The use of OFDM symbols, including multiple symbols for a given field or for parts of a given field, was also well known at the time of the alleged invention. Indeed, 802.11n working documents frequently refer to transmission using OFDM symbols. *E.g.*, 2005 802.11n TGn Sync Specification at 100:14–101:5 (describing two-symbol “extended” header field); WWiSE 2005 at 69:8–31 (explaining that “[I]n the extended communication range configuration (ER), SIG-N is composed of two consecutive MIMO-OFDM symbols.”); DeCourville 159 at 24:3–8; Tung 068 at 4:45–55; Murphy

621 at 1:17–31; Choi 774 at [0013].

The Asserted Patents also refer, in their claims, to “ordering” of header field bits and of OFDM symbols. *E.g.*, ’272 Patent, cl. 1 (“wherein the second set of header bits of the second header field transmitted using the second OFDM symbol are transmitted in a different order than the first set of header bits of the second header field transmitted using the first OFDM symbol”); ’927 Patent, cl. 1 (“wherein the second set of header bits of the second header field to be transmitted is configured in a different order than the first set of header bits of the second header field to be transmitted, and the fourth set of header bits of the second header field to be transmitted is configured in a different order than the third set of header bits of the second header field to be transmitted”); ’134 Patent, cl. 1 (“the second header field is a repetition of the first header field and is carried by the second OFDM symbol in a same order as the first header field carried by the first OFDM symbol.”). But these “ordering” concepts were also well known. For example, WWiSE 2005 describes frequency permutation that would result in the “different order” described by the claims of the ’272 and ’927 Patents. *E.g.*, WWiSE 2005 at 69. Similarly, the ’134 Patent’s “same order” is also found in the art before its alleged invention. *E.g.*, Yu 802 (describing repeated signal fields).

Further, the ’776 Patent’s claim 1 describes “distinguish[ing] the second packet format from the first packet format by detecting, from the received wireless packet, the second header field which repeats the first header field.” ’776 Patent, cl. 1. While the Asserted Patents do not explain how this detection is implemented, prior art references make clear that to the extent that what is claimed is using the presence of an additional header field, or the fact that the header field is a repetition of a previous header field, to distinguish the packet type was well known in the art at the time of the alleged invention. *E.g.*, Yu 802 at [0106]–[0108].

### **C. Motivations to Combine**

Respondents believe that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts; there was a reason to make each combination, each combination of art would have produced no unexpected results, and each combination at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 414–18 (2007) (rejecting the Federal Circuit’s “rigid” application of the teaching, suggestion, or motivation to combine test instead espousing an “expansive and flexible” approach). As the Supreme Court has held, a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton” and “in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like a pieces of a puzzle.” *Id.* at 420–21.

Nevertheless, in addition to the information contained elsewhere in these contentions, Respondents identify exemplary combinations, motivations, and reasons to combine the cited art. Multiple teachings, suggestions, and/or reasons to modify any of the references and/or to combine any two or more of the references come from many sources, including the prior art (specific and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obvious to try, the nature of the problem faced, and/or knowledge possessed by one of ordinary skill in the art.<sup>6</sup> In addition, the patentee admits in the intrinsic record, including the specification and prosecution history of the Asserted Patents, that many of the claimed features were conventional and known in the art.

In general, a claimed invention is unpatentable if the differences between it and the prior art “are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a); *Graham v. John Deere Co.*, 383

---

<sup>6</sup> Respondents reserve the right to present qualified expert testimony on any or all of these items.

U.S. 1, 13–14 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: “(1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the art at the time of invention; and (4) objective evidence of nonobviousness.” *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 877 (Fed. Cir. 1993).

*KSR International Co. v. Teleflex Inc., et al.*, 550 U.S. 398 (2007) (“KSR”), reaffirmed *Graham*, holding that a claimed invention can be obvious even if there is no teaching, suggestion, or motivation for combining the prior art to produce that invention. In determining whether a claim is obvious, “[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *Id.* at 418. In determining whether a claim is obvious, “a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* When prior art elements are combined according to known methods to yield predictable results, the claimed invention is obvious. *Id.* at 417. In addition, “[o]ne of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims.” *Id.* at 419–20. “Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420.

Any suggested obviousness combinations set forth herein are in the alternative to Respondents’ anticipation contentions and are not to be construed to suggest that any reference

included in any combination is not anticipatory in its own right or is not the basis for a single-reference obviousness defense. In particular, Respondents are currently unaware of the extent, if any, to which Complainant will contend that certain limitations of the Asserted Claims are not disclosed in the art identified by Respondents as anticipatory. To the extent an issue arises with respect to any such claim limitation, Respondents reserve the right to identify other references and combinations, which may make obvious the allegedly missing limitation in the disclosed system or method.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362–64 (Fed. Cir. 2001). In view of the Supreme Court’s *KSR* decision, the PTO issued, and updated, a set of Examination Guidelines. *See* Examination Guidelines for Determining Obviousness Under 35 U.S.C. § 103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc.*, 72 Fed. Reg. 57526 (October 10, 2007); Examination Guidelines Update: Development in the Obviousness Inquiry After *KSR v. Teleflex*, 75 Fed. Reg. 53643-60 (September 2010); *see also* MPEP § 2141 (<https://www.uspto.gov/web/offices/pac/mpep/s2141.html>) (accessed July 6, 2022). These Guidelines summarized the *KSR* decision and subsequent case law, as well as identified various rationales for finding a claim obvious, including those based on other precedents. Those rationales include:

- (1) Combining prior art elements according to known methods to yield predictable results;
- (2) Simple substitution of one known element for another to obtain predictable results;
- (3) Use of known technique to improve similar devices (methods, or products) in the same way;
- (4) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (5) “Obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

- (6) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; and
- (7) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Respondents contend that one or more of these rationales apply in considering the obviousness of the Asserted Claims of the Asserted Patents.

To the extent that prior art identified by Respondents as anticipatory are found not to anticipate the Asserted Claims: (1) the prior art establishes that the claimed subject matter was obvious to a person of ordinary skill in the art at the time of the alleged invention; (2) the claims are nevertheless unpatentable because the Asserted Claims contain nothing that goes beyond “ordinary innovation”; (3) no Asserted Claim goes beyond combining known elements to achieve predictable results (particularly in the predictable art(s) of the Asserted Patent) or does more than choose between clear alternatives known to those of skill in the art; and/or (4) the prior art renders the Asserted Claims obvious either alone or in combination with each other or one or more of the other references identified in these Invalidity Contentions.

Motivation to make the proposed combinations of prior art references and knowledge of one skilled in the art generally exists within the references themselves as well as within the knowledge of one skilled in the art in the relevant time frame.

### **1. Exemplary Combinations and Motivations for Making Combinations of Prior Art**

As explained above, Respondents contend that a person of ordinary skill in the art would have been motivated to combine any of the primary references in these Invalidity Contentions with (1) any other primary reference, (2) the references identified in Section V below, (3) any statements made in

the intrinsic record of the Asserted Patents, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Respondents provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

The illustrative combinations described above render the asserted claims of the Asserted Patents invalid as obvious under 35 U.S.C. § 103. Respondents' contention that these combinations render these claims obvious under 35 U.S.C. § 103 are in no way an admission or suggestion that any reference or system/product does not independently anticipate the asserted claims under 35 U.S.C. § 102. Nor does the inclusion of the exemplary combinations below exclude other combinations of prior art. To the extent that any prior art reference or system/product described in these contentions is found not to disclose a limitation of these claims, it would have been obvious to a person of ordinary skill in the art to combine that reference or system/product with any other reference or system/product described in these contentions to meet the limitation, and such persons would have been motivated to do so. Respondents incorporate by reference any statements and reasons set forth by the Examiner during prosecution of the Asserted Patents and related patent applications as to why it would have been obvious to modify or combine references or systems/products to achieve the limitations of these claims. As discussed above, the below list is a non-exhaustive subset of combinations. Respondents reserve the right to use any reference or system/product described in these contentions in combination with any other reference or system/product described in these contentions. A person of ordinary skill in the art at the time of the alleged invention also would have had a reasonable expectation of success in implementing the combinations.

**2. Exemplary Combinations for Claims 1 and 11 of the '272 Patent and Claims 1 and 2 of the '927 Patent.**

A clear motivation existed in the art at the time of the purported inventions to combine

references related to the use of multiple and/or repeated header bits in OFDM-based data packet communications systems, such as Yonge, Maltsev, Mujtaba, Zhang '159, Kim 2016, Takahashi, Batra, Kao, Zhang '991, DeCourville 159, Zu 802, Hansen 017, Choi 774, 2005 802.11n TGn Sync Specification, TGnSync 2004, 2005 TGn Sync Proposal, and WWiSE 2005 to address any problems that the asserted '272 and '927 Patents sought to solve. For example, the '272 Patent “relates to communications systems.” '272 patent at 1:32-33. The '272 Patent acknowledges that prior art “[c]onventional multi-user communications system[s] use frame-based (or packet-based) transmission to communication [sic] between two or more users over a shared channel based on Orthogonal Frequency Division Multiplexing (OFDM)” and that “[a]n example of such a system includes IEEE 802.11 (Wireless LAN), IEEE 802.16 (WiMAX), and ITU G.9960 (G.hn).” *Id.* at 1:40-49. The '272 Patent’s further description of prior art explains the understanding at the time that, in a data packet, “[t]he header contains important control information for the receiver to decode the payload properly, and also provides information about the packet length for virtual carrier sensing. Hence, it is essential to decode the header reliably.” For example, “[i]n G.9960, which . . . should be familiar to those skilled in the art, the header containing PHYH bits (header information block) is carried over one or two OFDM symbols ( $D=1$  or  $2$ ), and within each symbol, multiple header information blocks are repeated over the entire frequency band.” *Id.* at 1:55-64. In addition, the references relate to similar subject matter in the same technical field as the asserted patents. For example, like the asserted patents, TGn Sync Proposal 2005, TGnSync 2004, and WWiSE 2005 disclose use of repeated header bits in OFDM- based data packet communication systems. *See, e.g.*, TGn Sync Proposal 2005 at 70-76, 83-94; TGnSync 2004 at slides 12-20; WWiSE 2005 at 58-60, 67-69.

A POSITA would have been motivated, with a reasonable expectation of success, to also look to other references that teach standard improvement techniques in data packet header structures such

as those disclosed by the 2006 802.11n Joint PHY Proposal, Mujtaba, Younge, and/or the common knowledge of the POSITA, or other prior art identified above. For example, Mujtaba “relates generally to multiple antenna wireless communication systems, and more particularly, to preamble training techniques for a multiple antenna communication system,” and is in response to a need for “a method and system for performing channel estimation and training in a MIMO-OFDM system that is compatible with current IEEE 802.11a/g standard (SISO) systems.” Mujtaba at 1:15-18, 2:22-28. Mujtaba discloses that a “header format includes a preamble having at least one legacy long training field and an extended portion having at least N additional long training fields on each of the N transmit antennas, wherein one or more of said at least N additional long training fields are comprised of only one OFDM symbol. The extended portion optionally comprises one or more repeated OFDM symbols for frequency offset estimation.” *Id.* at 2:35-43. As another example, TGnSync 2004 discloses multi-part, repeating header fields, as well as the use of two channels with overlapping bandwidths. TGnSync 2004 at slides 16-20, 23-26. As additional motivations to combine, many references were authored/invented by the same individuals, distributed to the same people, and/or intended for the same standard specification(s). Therefore, a POSITA would have been motivated, with a reasonable expectation of success, to improve data packet header designs as disclosed in, for example, WWiSE 2005, TGn Sync Proposal 2005, TGnSync 2004 and/or the 2006 802.11n Joint PHY Proposal by utilizing references that teach standard improvement techniques in data packet header designs including Mujtaba, Younge, TGnSync 2004, and/or the common knowledge of the POSITA, or other prior art identified above.

A POSITA would be further motivated to combine the above-described references and Hansen 017, WWiSE 2005, 2005 TGn Sync Proposal, Choi 774, Yu 802, 2006 802.11n Joint PHY Proposal, or DeCourville 159 because each of these references seeks to improve efficiency and

reliability and arises from the development of the 802.11n standard before it was finalized in 2009. *E.g.*, Hansen 017 at Abstract (“Aspects of the invention described herein may enable a greenfield access mode in IEEE 802.11n WLAN systems”); WWiSE 2005 at 1 (“WWiSE Proposal: High throughput extension to the 802.11 Standard”); 2005 TGn Sync Proposal at 1 (“This document presents the technical specification for the MAC and the PHY layer of the TGn Sync proposal to IEEE 802.11 TGn”); Choi 774 at [0002] (“The IEEE 802.11a/g standard specifies a robust data encoding scheme that includes error correction. However, for extended range communication, a more robust data transmission scheme at reduced data rates is required.”); Yu 802 at [0006] (“IEEE 802.11a/b/g are standards for the wireless LAN system.”); 2006 802.11n Joint PHY Proposal at 1 (“Joint Proposal: High throughput extension to the 802.11 Standard: PHY”); DeCourville 159 at 2:9–11 (“Furthermore, in order to improve efficiency and to achieve the high data rates, IEEE 802.11n is planned to introduce a number of advanced techniques.”). Further, each of Hansen 017, WWiSE 2005, and Choi 774 each sought to improve the PHY layer of the 802.11 Standard. *E.g.*, Hansen 017 at [0059]; WWiSE 2005 at 13; Choi 774 at [0002].

Further, there are close ties between the people who developed these references. All, or almost all, were members of the IEEE and actively working to develop the 802.11n standard. For example, Chris Hansen, inventor of Hansen 017, was an author of the WWiSE Proposal, as was Marc de Courville, inventor of DeCourville 159. WWiSE 2005 at 2. Won-Joon Choi, inventor of Choi 774, was an author of TGn Sync. TGn Sync at 2. The Joint Proposal was a merger of the TGn and WWiSE proposals, and lists as an author Heejung Yu, the inventor of Yu 802, and Marc de Courville, inventor of DeCourville 159. Given the relatedness of these references and their field of art, a POSITA would find it obvious to combine these references with a reasonable chance of success.

### 3. Exemplary Combinations for Claims 1-6 of the '776 Patent and Claims 1-7 of the '134 Patent

A clear motivation existed in the art at the time of inventions to combine references related to the use of header-based repetition in OFDM-based data packet communication systems, such as U.S. Patent No. 10,637,706 (Huang), U.S. Patent No. 10,122,563 (Sun), and/or 40/20 MHz Interoperability for Robust, High Performance and Compatible 802.11n Systems, Document No. IEEE 802.11-04/0772r0 (July 2004) (“40/20 MHz Interoperability for 802.11n Systems”) to address any problems that the asserted patents sought to solve. For example, the '776 patent relates to “multiple header information blocks are repeated over the frequency band.” '776 patent at 2:1-2. The '776 Patent acknowledges that prior art “[c]onventional multi-user communications system[s] use frame-based (or packet-based) transmission to communication [sic] between two or more users over a shared channel based on Orthogonal Frequency Division Multiplexing (OFDM)” and that “[a]n example of such a system includes IEEE 802.11 (Wireless LAN), IEEE 802.16 (WiMAX), and ITU G.9960 (G.hn).” *Id.* at 1:45-54. The '776 Patent’s description of prior art explains the understanding at the time that, in a data packet, “[t]he header contains important control information for the receiver to decode the payload properly, and also provides information about the packet length for virtual carrier sensing. Hence, it is essential to decode the header reliably.” For example, “[i]n G.9960, which...should be familiar to those skilled in the art, the header containing PHY<sub>H</sub> bits (header information block) is carried over one or two OFDM symbols (D=1 or 2), and within each symbol, multiple header information blocks are repeated over the entire frequency band.” *Id.* at 1:62-2:2. In addition, the references relate to the same or substantially similar subject matter in the same technical field as the asserted patents. For example, like the asserted patents, Huang relates to a “transmission method and transmission apparatus that allows a receiver to receive and decode packets in an efficient fashion

when the receiver can receive packets in different formats.” Huang at 1:56-59. Similarly, Sun discloses “[a]t least some of the OFDM symbols of the OFDM data unit are decoded according to a first communication protocol indicated by the determination of whether the candidate signal field corresponds to the repetition of the legacy signal field.” Sun at Abstract.

A POSITA would have been motivated, with a reasonable expectation of success, to also look to other references that teach decoding repeated transmission packet headers in different formats, such as those disclosed by U.S. Patent Nos. 8,276,054 (Morioka), JP2005223388A (Nakagawa), U.S. Patent No. 8,675,754 (Yonge), U.S. Patent No. 7,903,755 (Mujtaba), U.S. Patent Application Publication No. 2010/0260159 to Zhang et al. (“Zhang ’159”); and/or the common knowledge of a POSITA. For example, Morioka relates to a “wireless communication system including a first communication station configured to operate according to a first communication protocol; and a second communication station capable of operating according to both the first communication protocol and a second communication protocol.” Morioka at 4:16-22. Morioka further discloses “[w]hen the second communication station transmits a packet according to the second communication protocol, at least a first signal field compliant with the first communication protocol and a second signal field compliant with the second communication protocol are attached to a header of the packet, the first signal field including a parity bit.” *Id.* at 5:28-34. As another example, Nakagawa discloses “a wireless communication device and a program according to the present invention include a header transmission number detection unit that detects repeated transmission number information of a header, and header transmission number information detected by the header transmission number detection unit.” Nakagawa at ¶ [0010]. Yonge discloses a “method for transmitting information between stations in a network, the method comprising: modulating main information on portions of a signal according to a first level of a hierarchical modulation scheme associated with a constellation; and modulating

auxiliary information on portions of a signal according to a second level of the hierarchical modulation scheme associated with a sub-constellation of the constellation; wherein the signal includes multiple copies of the auxiliary information with each copy being modulated on a respective portion of the signal.” Yonge at 5:13-23. Mujtaba discloses a “header format [that] includes a legacy preamble having at least one legacy long training field and an extended portion having at least N additional long training fields on each of the N transmit antennas, wherein one or more of the at least N additional long training fields are comprised of only one Orthogonal Frequency Division Multiplexing (OFDM) symbol.” Mujtaba at Abstract. Other references similarly disclose relevant subject matter. As additional motivations to combine, many references were author/invented by the same individuals, distributed to the same people, and/or intended for the same standard specification(s). Therefore, a POSITA would have been motivated, with a reasonable expectation of success, to improve data packet header designs disclosed in, for example, Morioka, Nakagawa, Yonge, Mujtaba, and/or the common knowledge of the POSITA.

A POSITA would be further motivated to combine the above-described references and Hansen 017, WWiSE 2005, 2005 TGn Sync Proposal, Choi 774, Yu 802, 2006 802.11n Joint PHY Proposal, DeCourville 159, or Murphy 621 because each of these references seeks to improve efficiency and reliability and arises from the development of the 802.11n standard before it was finalized in 2009. *E.g.*, Hansen 017 at Abstract (“Aspects of the invention described herein may enable a greenfield access mode in IEEE 802.11n WLAN systems”); WWiSE 2005 at 1 (“WWiSE Proposal: High throughput extension to the 802.11 Standard”); 2005 TGn Sync Proposal at 1 (“This document presents the technical specification for the MAC and the PHY layer of the TGn Sync proposal to IEEE 802.11 TGn”); Choi 774 at [0002] (“The IEEE 802.11a/g standard specifies a robust data encoding scheme that includes error correction. However, for extended range

communication, a more robust data transmission scheme at reduced data rates is required.”); Yu 802 at [0006] (“IEEE 802.11a/b/g are standards for the wireless LAN system.”); 2006 802.11n Joint PHY Proposal at 1 (“Joint Proposal: High throughput extension to the 802.11 Standard: PHY”); DeCourville 159 at 2:9–11 (“Furthermore, in order to improve efficiency and to achieve the high data rates, IEEE 802.11n is planned to introduce a number of advanced techniques.”); Murphy 621 at 1:29–31. Further, each of Hansen 017, WWiSE 2005, and Choi 774 each sought to improve the PHY layer of the 802.11 Standard. *E.g.*, Hansen 017 at [0059]; WWiSE 2005 at 13; Choi 774 at [0002].

Further, there are close ties between the people who developed these references. All, or almost all, were members of the IEEE and actively working to develop the 802.11n standard. For example, the WWiSE 2005 Proposal lists Chris Hansen, inventor of Hansen 017, and Marc de Courville, inventor of DeCourville 159, as authors. WWiSE 2005 at 2. TGn Sync lists Won-Joon Choi, inventor of Choi 774, and Aon Mujtaba, inventor of Mujtaba, as authors. TGn Sync at 2–5. The Joint Proposal was a merger of the TGn and WWiSE proposals, and lists as authors Heejung Yu, the inventor of Yu 802, Marc de Courville, inventor of DeCourville 159, Aon Mujtaba, inventor of Mujtaba, and Anuj Batra, inventor of Batra. Given the relatedness of these references and their field of art, a POSITA would find it obvious to combine these references with a reasonable chance of success.

## **B. Secondary Considerations**

A patentee bears the burden of production with respect to evidence of secondary considerations of non-obviousness. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018). As of the date of these Invalidity Contentions, Complainant has not identified any secondary considerations of non-obviousness. Respondents reserve all rights to respond to any secondary considerations of non-obviousness raised by Complainant, including by updating, modifying, and/or

adding to these Invalidity Contentions. Respondents are not aware of any unexpected results (none is mentioned in the Asserted Patents or their file history), long felt need, commercial success (or any nexus to any allegedly successful commercial embodiment), or awards for the Asserted Patents. Indeed, as shown in these Invalidity Contentions, dozens of other companies and individuals described, built, and/or patented the exact same concepts in the Asserted Patents before Complainant ever did—often many years before. Even where others’ inventions occurred at approximately the same time as the alleged invention in the Asserted Patents, such simultaneous invention further demonstrates the obviousness of the Asserted Patents.

Respondents contend that there are no secondary considerations of non-obviousness evidencing the validity of any of the Asserted Claims. Secondary considerations of non-obviousness, or objective indicia of non-obviousness, “can include copying, long felt but unsolved need, failure of others, commercial success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing industry respect for the invention, awards or other industry praise for the invention, and skepticism of skilled artisans before the invention.” *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 711 F.3d 1348, 1368 (Fed. Cir. 2013). “A nexus between the merits of the claimed invention and evidence of secondary considerations is required in order for the evidence to be given substantial weight in an obviousness decision.” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 668 (Fed. Cir. 2000). Moreover, even if a nexus exists, secondary considerations of non-obviousness “simply cannot overcome [a] strong prima facie showing of obviousness.” *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1368 (Fed. Cir. 2008). X1 has not established the existence of any objective indicia of non-obviousness or secondary considerations. Respondents reserve the right to supplement its contentions to respond to any such evidence should AXW be permitted to raise them in the future.

AXW has not identified any evidence of copying of the purported inventions of the Asserted Claims. Similarly, AXW has provided no evidence of any failure of others to realize any purported inventions of the Asserted Claims, any evidence of any long felt but unsolved need solved by the purported inventions of the Asserted Claims, or any evidence of unexpected properties of, or unexpected results created by, the purported inventions of the Asserted Claims.

AXW has also has not identified any evidence that the purported inventions of the Asserted Claims have enjoyed any commercial success. *Id.* To the extent that AXW claims that sales of any accused products constitute commercial success, AXW has not identified any evidence of any nexus between the claimed invention and such alleged commercial success. Moreover, any commercial success of the accused products may be due to factors other than the merits of the claims, including non-patented features or functionalities, marketing efforts, or other financial or economic incentives related to the sale or distribution of the accused products. AXW also has not provided evidence of unexpected results or unexpected properties in the purported inventions of the Asserted Claims. *Id.* If any commercial success is due to any of the concepts discussed in the Asserted Patents, those concepts are also present in the prior art, as described above, and thus do not support any commercial success that is relevant to the question of obviousness. *See Tokai Corp. v. Easton Enters, Inc.*, 632 F.3d 1358, 1369–70 (Fed. Cir. 2011) (“If commercial success is due to an element in the prior art, no nexus exists.”); *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (“Where the offered secondary consideration actually results from something other than what is both claimed and novel in the claim, there is no nexus to the merits of the claimed invention.”); *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006) (“[I]f the feature that creates the commercial success was known in the prior art, the success is not pertinent.”).

AXW has not identified any evidence of industry respect for the purported inventions of the

Asserted Claims, and also no evidence of any awards or other industry praise for any purported inventions of the Asserted Claims. *Id.* AXW has not identified any evidence of any skepticism of skilled artisans prior to purported inventions of the Asserted Claims; to the contrary, the prior art identified herein establishes not only a lack of skepticism but an appreciation that the purported inventions of the Asserted Claims were known to those of skill in the art. AXW has not identified any evidence of any failed attempts by others to resolve any of the alleged problems that were allegedly solved by any of the alleged inventions claimed in the Asserted Patents. *Id.* AXW has not identified any evidence of any teaching away from any of the alleged inventions claimed in the Asserted Patents. *Id.* Rather, and as discussed above, there are multiple references anticipating and/or rendering obvious the alleged inventions. AXW has not identified any evidence of any long-felt but unresolved need for the alleged inventions claimed in the Asserted Patents. As described above, the Asserted Claims are anticipated and/or rendered obvious by multiple prior art references. To the extent there was ever a need for any of the alleged inventions, they were well known to those in the art, including in connection with connectivity in wireless communications systems.

If AXW identifies any additional secondary considerations of non-obviousness, Respondents thus reserve the right to amend and/or supplement its contentions.

## **VII. CLAIM CHARTS**

The attached claim charts (Exhibits A1–D23 and Attachments A–D) are based, in whole or in part, on Complainant’s asserted theories of infringement in this case, to the extent discernible from Complainant’s Complaint. As an initial matter, all portions of each prior art reference cited in each of the attached claim charts are relied upon to support the disclosure of each patent claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where

a particular claim term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to text refers to the text itself, as well as the accompanying figures or drawings that accompany the text. Respondents reserve the right to rely on additional, or different, portions of the prior art references, other publications and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Respondents reserve the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Respondents also reserve the right to rely on the testimony of the authors, named inventors, or anyone else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

#### **VIII. INVALIDITY UNDER 35 U.S.C. § 112**

Respondents provide the following grounds for invalidity under 35 U.S.C. § 112. Respondents' investigation of the Asserted Patents is ongoing, and Respondents reserve the right to amend or supplement these disclosures based on further investigation and in a manner consistent with the Ground Rules for this Investigation or further Orders of this Court, or otherwise in accordance with any order or direction of this Court or agreement of the parties. Further, Complainant's infringement theories fail to provide sufficient detail to fully understand its proposed application of the Asserted Claims, and Respondents reserve the right to assert additional grounds for invalidity under 35 U.S.C. § 112 in response to Complainant's claim interpretations. Respondents also reserve the right to supplement, modify, or otherwise amend these grounds for invalidity under 35 U.S.C. § 112 based on the Court's claim construction rulings or opinions or the parties' positions or

arguments taken in connection with the claim construction process.

The specifications of the Asserted Patents do not provide adequate written description to support the scope of the claims asserted by Complainant in furtherance of its infringement theories or any reasonably understood scope of the claims. Title 35 U.S.C. § 112<sup>7</sup> paragraph 1 requires a specification to contain “a written description of the invention.” To fulfill the written description requirement, the specification “must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (citation omitted). To satisfy the written description requirement, “the applicant must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention,’ and demonstrate that by disclosure in the specification of the patent.” *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)). The Asserted Patents do not meet that requirement for the reasons described in the below chart, which Respondents reserve the right to amend.

As one non-limiting example, the specification of the Asserted Patents discloses in general terms the concept of repeating headers in wired communications, a concept the specification admits was well known in the prior art. “The possibility of carrying more than PHY H bits in the header (H=1 or 2) is also under discussion as disclosed in the “G.hn: PHY-Frame Header Extension” article and in ‘G.hn: Extended PHY Frame Header,’ ITU-T 5G15/Q4 09XC-119, July 2009.” ’272 Patent, 2:9-13. The Asserted Patents also state that “[t]he repetition scheme expands similarly with larger values of  $D_{MAX}$  and  $H_{MAX}$ . An exemplary aspect focuses on dealing with different values of D, with different

---

<sup>7</sup> Because the Asserted Claims are alleged to have a priority date before September 16, 2012, Respondents apply pre-AIA 35 U.S.C. § 112.

values of H *capable of being supported in a straightforward way as discussed in the paper G.hn: PHY-Frame Header Extension.* ’272 Patent, 2:46-50 (emphasis added). The specification of the Asserted Patents does not provide any written description support demonstrating that the Patentee possessed any particular configuration of headers in any particular communication system, let alone the specific configuration identified in the claims. The specification does not recite the meaning of the claim terms “packet type,” “header field,” “part,” “wireless packet,” “packet of a [first/second] type,” or “packet format,” nor do the Asserted Patents provide any written description that would permit a person of ordinary skill in the art to understand how these terms are to be used in the Asserted Claims. Because the specification references only the general understanding that headers can be repeated in wireless packets, Patentee’s theory appears to be that it has provided a written description for any configuration of packet headers in any format, so long as the packet headers contain a repeated portion. The Asserted Patents lack the written description for the scope of the claims that AX Wireless now asserts.

Additionally, the Asserted Patents do not enable the claim scopes contained in Complainant’s Complaint. § 112 paragraph 1 requires a specification to describe “the manner and process of making and using [the invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains ... to make and use the [invention].” The enablement requirement is separate from and in addition to the written description requirement. *Ariad*, 598 F.3d at 1344. This “requirement is satisfied when one skilled in the art, after reading the specification, could practice the claimed invention without undue experimentation.” *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1244 (Fed. Cir. 2003) (citation omitted); see *Wyeth & Cordis Corp. v. Abbott Labs.*, 720 F.3d 1380, 1385–86 (Fed. Cir. 2013). The Asserted Patents do not meet that requirement for the reasons described in the below chart, which Respondents reserve the right to amend. As explained above, the

specification of the Assert Patents contain only a general reference to the concept of repeating headers in a packet, and does not enable the specific configurations of repeated header fields in the claims of the Asserted Patents.

Certain of the Asserted Claims are invalid for failing to comply with the definiteness requirement of § 112. Respondents note that their charting of a prior art reference for a claim or limitation that Respondents contend is invalid for lack of definiteness in no way represents an admission or concession that the scope of the claim or limitation is definite or ascertainable. § 112 paragraph 2 requires that a patent claim “particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention.” Claim terms that fail to inform those skilled in the art “with reasonable certainty . . . about the scope of the invention” fail the definiteness requirement of Section 112 paragraph 2. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

A non-exhaustive exemplary list of claims and claim limitations that are invalid under § 112 is below. Respondents reserve the right to amend this list and may identify additional or different terms that are invalid under § 112 in accordance with the schedule in this case for identifying terms for construction, and based on the claim scope and infringement theories apparent from Complainant’s responses to the Respondents’ discovery requests seeking the Complainant’s contentions.

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>“a first packet type comprising a first header field, wherein the first header field comprises two parts, a first part comprising a first set of header bits of the first header field and a second part comprising a second set of header bits of the first header field, wherein the first set of header bits of the first header field is different than the second set of header bits of the first header field” ’272 Patent, Claim 1</p> <p>“a second packet type comprising a second header field, wherein the second header field comprises four parts, a first part comprising a first set of header bits of the second header field, a second part comprising a second set of header bits of the second header field, a third part comprising a third set of header bits of the second header field and a fourth part comprising a fourth set of header bits of the second header field,”</p> <p>“wherein the first set of header bits of the second header field is the same as the second set of header bits of the second header field, wherein the third set of header bits of the second header field is the same as the fourth set of header bits of the second header field;”</p> <p>“wherein the second set of header bits of the second header field transmitted using the second OFDM symbol are transmitted in a different order than the first set of header bits of the second header field transmitted using the first OFDM symbol,”</p> <p>“wherein the fourth set of header bits of the second header field transmitted using the fourth OFDM symbol are transmitted in a different order than the third set of header bits of the second header field transmitted using the third OFDM symbol;”</p> <p>’272 Patent, Claim 1</p> <p>“a first packet type comprising a first header field, wherein the first header field comprises two parts, a first part comprising a first set of header bits of the first header field and a second part comprising a second set of header bits of the first header field, wherein the first set of header bits of the first header field is different than the second set of header bits of the first header field;”</p>	<p>Lacks enablement and written description under § 112 ¶ 1. The specification of the Asserted Patents does not teach or disclose how to determine specific “packet types.” The Asserted Patents also do not teach or disclose how to identify any “header fields” or “parts” of “header field” components of a specific “packet type.”</p> <p>Further, the Asserted Patents provide no teaching or disclosure of any order of “header bits” within a packet, “header field” or “part” of a “header field,” nor do the Patents teach how to identify when header bits are “the same” or transmitted “in a different order” from any other header bits in a particular packet, header field, or “part” of a header field.</p>

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>“a second packet type comprising a second header field, wherein the second header field comprises four parts, a first part comprising a first set of header bits of the second header field, a second part comprising a second set of header bits of the second header field, a third part comprising a third set of header bits of the second header field and a fourth part comprising a fourth set of header bits of the second header field,”</p> <p>“wherein the first set of header bits of the second header field is the same as the second set of header bits of the second header field, wherein the third set of header bits of the second header field is the same as the fourth set of header bits of the second header field; and”</p> <p>“wherein the second set of header bits of the second header field received using the second OFDM symbol are received in a different order than the first set of header bits of the second header field received using the first OFDM symbol, and”</p> <p>“wherein the fourth set of header bits of the second header field received using the fourth OFDM symbol are received in a different order than the third set of header bits of the second header field received using the third OFDM symbol.”</p> <p>'272 Patent, Claim 11</p>	

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>“generate a packet of a first type comprising a first header field, wherein the first header field comprises two parts, a first part comprising a first set of header bits of the first header field and a second part comprising a second set of header bits of the first header field, wherein information contained in the first set of header bits of the first header field is different than information contained in the second set of header bits of the first header field;”</p> <p>“generate a packet of a second type comprising a second header field, wherein the second header field comprises four parts, a first part comprising a first set of header bits of the second header field, a second part comprising a second set of header bits of the second header field, a third part comprising a third set of header bits of the second header field and a fourth part comprising a fourth set of header bits of the second header field,”</p> <p>“wherein information contained in the first set of header bits of the second header field is the same as information contained in the second set of header bits of the second header field, and information contained in the third set of header bits of the second header field is the same as information contained in the fourth set of header bits of the second header field,”</p> <p>“wherein the second set of header bits of the second header field to be transmitted is configured in a different order than the first set of header bits of the second header field to be transmitted, and the fourth set of header bits of the second header field to be transmitted is configured in a different order than the third set of header bits of the second header field to be transmitted;”</p> <p>’927 Patent, Claim 1</p>	<p>Lacks enablement and written description under § 112 ¶ 1. The specification of the Asserted Patents does not teach or disclose how to determine specific “packet types.” The Asserted Patents also do not teach or disclose how to identify any “header fields” or “parts” of “header field” components of a specific “packet type.”</p> <p>Further, the Asserted Patents provide no teaching or disclosure of any order of “header bits” within a packet, “header field” or “part” of a “header field,” nor do the Patents teach how to identify when header bits are “the same” or transmitted “in a different order” from any other header bits in a particular packet, header field, or “part” of a header field.</p>

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>“formats of the wireless packet including a first packet format and a second packet format, the first packet format comprising a first header field”</p> <p>“the second packet format comprising both the first header field carried by the first OFDM symbol and a second header field carried by a second OFDM symbol which follows the first OFDM symbol, and the second header field being a repetition of the first header field,”</p> <p>“wherein the transceiver distinguishes the second packet format from the first packet format by detecting, from the received wireless packet, the second header field which repeats the first header field.”</p> <p>’776 Patent, Claim 1</p> <p>“The wireless communication device of claim 1, wherein the first packet format and the second packet format are used in a same network.”</p> <p>’776 Patent, Claim 2</p> <p>The wireless communication device of claim 1, wherein the transceiver determines the received wireless packet as the second packet format when the second header field is detected from the wireless packet.</p> <p>’776 Patent, Claim 3</p> <p>The wireless communication device of claim 1, wherein the transceiver determines the received wireless packet as the first packet format when the second header field is not detected from the wireless packet.</p> <p>’776 Patent, Claim 4</p> <p>The wireless communication device of claim 1, wherein the first and second header fields contain information for decoding the wireless packet.</p> <p>’776 Patent, Claim 5</p>	<p>Lacks enablement and written description under § 112 ¶ 1. The specification of the Asserted Patents does not teach or disclose how to determine specific “wireless packets” or “packet formats.” The Asserted Patents also do not teach or disclose how to identify any “header field” sub-components of a specific “wireless packet” or “packet format.”</p> <p>Further, the Asserted Patents provide no teaching or disclosure of how to identify repetition of any “header fields,” or how the “transceiver” “detect[s], from the received wireless packet, the second header field which repeats the first header field.”</p>

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>“The wireless communication device of claim 1, wherein the first and second header fields contain information related to a length of the wireless packet.”</p> <p>'776 Patent, Claim 6</p>	
<p>“formats of the wireless packet include a first packet format and a second packet format, the first packet format comprises a first header field,”</p> <p>“the second packet format comprises both the first header field carried by the first OFDM symbol and a second header field carried by a second OFDM symbol which follows the first OFDM symbol,”</p> <p>“wherein the second header field is a repetition of the first header field and is carried by the second OFDM symbol in a same order as the first header field carried by the first OFDM symbol, and”</p> <p>“wherein the transceiver is configured to transmit the wireless packet in a format determined among the first packet format and the second packet format.”</p>	<p>Lacks enablement and written description under § 112 ¶ 1. The specification of the Asserted Patents does not teach or disclose how to determine specific “wireless packets” or “packet formats.” The Asserted Patents also do not teach or disclose how to identify any “header field” sub-components of a specific “wireless packet” or “packet format.”</p> <p>Further, the Asserted Patents provide no teaching or disclosure of how to identify repetition of any “header fields,” or how the “transceiver”</p>

Claim Term	Exemplary reason for invalidity under 35 § 112
<p>'134 Patent, Claim 1.</p> <p>“The wireless communication device of claim 1, wherein the transceiver is configured to use the first packet format and the second packet format in a same network.”</p> <p>'134 Patent, Claim 2</p> <p>The wireless communication device of claim 1, wherein when the wireless packet is transmitted in the first packet format, the transceiver is configured to transmit the first header field without transmitting the second header field which repeats the first header field.</p> <p>'134 Patent, Claim 3</p> <p>The wireless communication device of claim 1, wherein when the wireless packet is transmitted in the second packet format, the transceiver is configured to transmit both the first header field and the second header field which repeats the first header field.</p> <p>'134 Patent, Claim 4</p> <p>The wireless communication device of claim 1, wherein the first and second header fields contain information for decoding the wireless packet.</p> <p>'134 Patent, Claim 5</p> <p>The wireless communication device of claim 1, wherein the first and second header fields contain information related to a length of the wireless packet.</p> <p>'134 Patent, Claim 6</p>	<p>“determine[s] among the first packet format and the second packet format.”</p>
<p>“transceiver is configured to transmit the wireless packet in a format determined among the first packet format and the second packet format”</p> <p>'134 Patent: Claim 1</p>	<p>Indefinite under § 112 ¶ 2</p>

Claim Term	Exemplary reason for invalidity under 35 § 112
“carried by the second OFDM symbol in a same order as”  ’134 Patent: Claim 1	Indefinite under § 112 ¶ 2
“selectively applied”  as in “the repetition is selectively applied to one or more header fields included in the header, based on whether the wireless packet is the first packet format or the second packet format, while not being applied to the payload”  ’134 Patent: Claim 7	Indefinite under § 112 ¶ 2

In addition to the above, each of the asserted claims is invalid for lack of enablement and lack of written description under § 112 ¶ 1 for failure to require the communication of a “D” value. Each of the examples in the patents requires the communication of a “D” value. Yet, there is no such requirement in the claims. *Centocor Ortho Biotech, Inc. v. Abbott Labs.*, 636 F.3d 1341, 1353 (Fed. Cir. 2011) (reversing judgment and holding patent invalid because claims “overreach the scope of [the patents’] contribution to the field of art as described in the patent specification”); *Atlantic Research Marketing Systems, Inc. v. Troy*, 659 F.3d 1345 (Fed. Cir. 2011) (finding a patent invalid because the claims did not include essential elements from the specification).

Respondents will provide additional analysis regarding its contentions regarding 35 U.S.C. § 112 in accordance with the schedule in this case and the Court’s Ground Rules.

If written description support has not been found for a claim of the Asserted Patents, such claim is not entitled to a priority date earlier than the date on which the claim was first presented. For example, claims 1 and 11 of the ’272 Patent are not entitled to a priority date earlier than February 3, 2020, the date on which such claims were first presented, because the specification of the ’272 Patent does not support formatting packets with four or more fields utilizing an alternating pattern of

repeated header bits.

Further, claims 1-6 of the '776 and claims 1-7 of the '134 Patent are not entitled to a priority date before September 9, 2021<sup>8</sup>, when claims directed to detecting duplicate header fields to distinguish between different packet formats were first presented, because the '776 Patent and '134 Patents failed to describe those limitations.

In the event that the Court finds that the asserted claims are invalid for lack of written description and the priority date for the '776 and '134 Patents is found to be September 9, 2021, then the prior art references in the following claim charts may be considered as prior art:

**Exhibit C2 & D2** (Invalidity Chart (Sun)) **Exhibit C1 & D1** (Invalidity Chart (Huang)). In addition, the accused products themselves would invalidate the Asserted Patents, as the 802.11AX Wireless standard is prior art to the Asserted Patents.

## **IX. PATENT INELIGIBILITY UNDER 35 U.S.C. § 101**

Each of the Asserted Patents fail to meet the requirements of 35 U.S.C. § 101—namely the Asserted Claims of the Asserted Patents are directed to an abstract idea and are, therefore, not patentable subject matter. The Attachments A–D contain detailed explanations to support patent ineligibility. Furthermore, the Asserted Claims of the Asserted Patents recite well-understood, routine, and conventional activity within the fields of the Asserted Patents. *See generally Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017) (“To determine whether the exception applies, the Supreme Court has set forth a two-step inquiry. Specifically, a court must determine: (1) whether the claim is directed to a patent-ineligible concept, i.e., a law of nature, a natural phenomenon, or an abstract idea; and if so, (2) whether the elements of the claim, considered

---

<sup>8</sup> This date is the filing date of United States Patent, 11,212,146, the claims of which are directed to “detecting duplicate header fields to distinguish between different packet formats.”

both individually and as an ordered combination, add enough to transform the nature of the claim into a patent eligible application.”<sup>9</sup> For *Mayo/Alice* Step 1, the Federal Circuit has identified “two inquiries of significance” when determining whether computer-related claims are directed towards eligible subject matter at Step 1: “[1] whether the focus of the claimed advance is on a solution to a problem specifically arising in the realm of computer networks or computers; and [2] whether the claim is properly characterized as identifying a specific improvement in computer capabilities or network functionality . . . .” *TecSec, Inc. v. Adobe Inc.*, 978 F.3d 1278, 1293 (Fed. Cir. 2020) (internal citations and quotations omitted).

In conducting the *Mayo/Alice* two-step analysis, a representative claim may be used for claims that are “substantially similar and linked to the same abstract idea.” *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat’l Ass’n*, 776 F.3d 1343, 1348 (Fed. Cir. 2014); *Smart Sys. Innovations, LLC v. Chicago Transit Auth.*, 873 F.3d 1364, 1368 n.7 (Fed. Cir. 2017) (concluding that claims “should rise or fall together” when they “contain only minor differences in terminology but require performance of the same basic process”) (internal quotation omitted). Likewise, the Asserted Claims of the Asserted Patents are similarly linked to the same abstract idea and therefore are equally ineligible under § 101.

“Once the defendant has made a prima facie case the burden shifts to the Complainant to identify limitations that are present in the asserted claims but that are not represented by the allegedly representative claim.” *Id.* at 1031-32. Further, “the representativeness inquiry must be ‘directly tethered to the claim language.’” *Id.* at 1030-31 (quoting *Solutran, Inc. v. Elavon, Inc.*, 931 F.3d 1161, 1168 (Fed. Cir. 2019)).

---

<sup>9</sup> As further discovery occurs, Respondents’ patent eligibility theories may develop further. Respondents reserve the right to amend these theories before trial.

Respondents set forth its positions regarding subject matter eligibility for each of the Asserted Patents in Attachments A-D.

