IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

CRYSTAL CLEAR CODEC, LLC,	§	
	§	
Plaintiff,	§	
	§	**Case No. 6:21-cv-375**
v.	§	
	§	**Jury Trial Demanded**
LG ELECTRONICS, INC., AND LG ELECTRONICS U.S.A., INC.,	§	
	§	
Defendants.	§	
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	§	
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	§	

CRYSTAL CLEAR CODEC, LLC'S
COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Crystal Clear Codec, LLC ("Crystal Clear Codec" or "Plaintiff") hereby submits this Complaint for patent infringement against Defendants LG Electronics, Inc. ("LGE") and LG Electronics U.S.A., Inc. ("LGUSA") (collectively "LG" or "Defendants") and states as follows:

THE PARTIES

1. Crystal Clear Codec, LLC is a Texas limited liability company, having a principal place of business at 2323 S. Shepherd, 14th Floor, Houston, Texas 77019.

2. On information and belief, Defendant LGE is a Korean corporation with a principal place of business at LG Twin Towers, 128 Yeoui-daero, Yeongdungpo-gu, Seoul, Republic of Korea. On information and belief, LGE is the entity that manufactures the LG-branded products sold in the United States, including mobile communication devices such as the accused products in this case. On information and belief, in addition to making the products, LGE is responsible for

research and development, product design, and sourcing of components. Defendant LGE is a parent corporation of Defendant LGUSA.

3. On information and belief, Defendant LGUSA is a wholly-owned subsidiary of LGE and is a company incorporated under the laws of Delaware with regular and established places of business in Texas at, for example, 4030 W Barker Ln., Ste 510, Austin, TX 78759 and 9420 Research Blvd, Austin, Texas 78759. On information and belief, Defendant LGUSA is registered to do business in the State of Texas since at least April 3, 1984 and may be served for process at its registered agent for service of process at United States Corporation Company, 211 E. 7th Street, suite 620, Austin, Texas 78701. On information and belief, LGUSA imports, distributes, offers for sale, and sells certain LG-branded wireless mobile communication devices in the United States for consumer use, including the accused products in this case.

4. On information and belief on August 1, 2018, LG Electronics Mobilecomm U.S.A., Inc. ("LGEM") merged into LGUSA, its former parent company, thereby making LGUSA the successor in interest of LGEM. On information and belief, prior to that merger, LGEM imported, distributed, offered for sale, and sold certain LG-branded wireless mobile communication devices in the United States for consumer use, including the accused products in this case. On information and belief, LGUSA imports, distributes, offers for sale, and sells certain LG-branded wireless mobile communication devices in the United States for consumer use, including the accused products in this case. On information and belief, LGUSA has assumed all of the rights and obligations of LGEM, including with respect to any damages for patent infringement that took place before the merger.

JURISDICTION AND VENUE

5. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a) because this action arises under the patent laws of the United States, Title 35 of the United States Code, 35 U.S.C. §§ 101 *et seq.*

6. LG is in the business of supplying mobile devices, such as smartphones and tablets, in the United States.

7. LG has solicited business in the State of Texas, transacted business within the State of Texas and attempted to derive financial benefit from residents of the State of Texas, including benefits directly related to the instant patent infringement cause of action set forth herein.

8. LG has made, used, sold, offered for sale, and/or imported mobile phones and/or has placed such phones into the stream of commerce, which phones have been offered for sale, sold, and/or used in the State of Texas and this judicial district.

9. At the time of filing of this Complaint, LG's mobile phones are available for purchase by consumers in Texas, including within this judicial district.

10. On information and belief, LG has made, used, sold, offered for sale, and/or imported wireless mobile communication devices that are alleged herein to infringe one or more of the patents set forth herein, and/or has placed such devices into the stream of commerce, which devices have been made, offered for sale, sold, and/or used in the State of Texas and within this judicial district.

11. LG sells products in this judicial district that are accused of infringement in this Complaint.

12. LG is subject to personal jurisdiction in Texas and in this judicial district.

13. LG is subject to personal jurisdiction under the provisions of the Texas Long Arm Statute, TX CIV. PRAC. & REM CODE § 17.041 et seq., by virtue of the fact that, upon information and belief, LG has availed itself of the privilege of conducting and soliciting business within this State on a continuous and systematic basis, including engaging in at least some of the infringing activities in this State, as well as by others acting as LG's agents and/or representatives, such that it would be reasonable for this Court to exercise jurisdiction consistent with principles underlying the U.S. Constitution, and the exercise of jurisdiction by this Court would not offend traditional notions of fair play and substantial justice.

14. On information and belief, LG has also established minimum contacts with this judicial district and regularly transacts and does business within this district, including advertising, promoting and selling products over the internet, through intermediaries, representatives and/or agents located within this judicial district, that infringe Plaintiff's patents, which products are then sold and/or shipped directly to citizens residing within this State and in this judicial district. On further information and belief, LG has purposefully directed activities at citizens of this State including those located within this judicial district.

15. On information and belief, LG has purposefully and voluntarily placed its products into the stream of commerce with the expectation that they will be purchased and used by customers located in the State of Texas and the Western District of Texas. On information and belief, LG's customers in the Western District of Texas have purchased and used and continue to purchase and use LG's products.

16. Venue as to LGE, a foreign corporation, is proper in this judicial district under 28 U.S.C. §§1391 and 1400(b).

17. Venue as to LGUSA is proper in this judicial district under 28 U.S.C. §§1391 and 1400(b) at least because it has committed acts of infringement in this judicial district, has a regular and established place of business in this judicial district, and its registered agent is in this judicial district.

INTRODUCTION

18. The Enhanced Voice Services ("EVS") codec was designed to meet the demands of packet-switched mobile communications networks and was developed and standardized under the lead of the 3GPP Codec Working Group, 3GPP TSG SA WG4. The EVS codec, among other features, enables vastly improved voice quality, network capacity and advanced features for voice services, for example, over Long Term Evolution ("LTE" or "4G") networks.

19. The EVS codec is a speech and/or audio coding standard defined by the EVS Standard and is embodied in 3GPP standards documents known as technical specifications ("TS"). The 26 series of technical specifications cover various aspects of the EVS codec, including at least 26.441, 26.442, 26.443, 26.444, 26.445, 26.446, 26.447, 26.448, 26.449, 26.450, 26.451, 26.114 and 26.952 (collectively the "EVS Standard").

20. In March 2010, the Third Generation Partnership Project ("3GPP") completed a study item on use-cases for EVS over the Evolved Packet System of LTE. This study led to the development of the EVS codec which was completed in 3Q2014.

21. The EVS codec is designed for high quality and efficient coding of speech, music and mixed content.

22. The EVS codec employs cutting-edge technology to significantly enhance the communication quality, efficiency, and versatility of 3GPP mobile communication systems. The EVS codec is rapidly replacing the Adaptive Multirate Wideband ("AMR-WB") codec as the

leading standard for speech and audio coding on wireless networks. Among the many benefits over AMR-WB, EVS provides full-HD voice audio quality, higher efficiency and versatility, and increased reliability to consumers.

23. From a quality perspective, the EVS codec provides this unrivalled quality for not only clean speech but noisy speech and music/audio across the entire bit rate range. This, combined with better capacity and excellent robustness to frame erasures, makes the EVS codec supremely adapted to mobile applications.

24. The delivery of unprecedented quality for speech, background music (when appropriate), and mixed content through the EVS codec is the result of a number of technical advantages and improvements over AMR-WB. For example, where AMR-WB was limited to wideband, the EVS codec allows audio signals to be encoded in narrowband ("NB"), wideband ("WB"), super wideband ("SWB"), or fullband ("FB"). The EVS codec also allows the use of variable bit rates across a wide range of bit rates from 5.6 kb/s to 128 kb/s, allowing service providers to optimize network capacity and call quality as desired for their service; improves compression efficiency at all operational rates; provides the capability to switch bit rates at every 20-ms frame allowing the codec to easily adapt to changes in channel capacity; incorporates unique concealment techniques to minimize the impact of packet loss caused by adverse conditions in the transmission channel; includes a system for Jitter Buffer Management ("JBM"); and uses different coding strategies depending on the characteristics of the signals to be transmitted.

25. Through these and other technical advantages, EVS (sometimes referred to commercially as "Enhanced HD Voice," "Ultra HD Voice," or "HD Voice+") provides a high efficiency and versatile solution to audio and speech encoding. Consumers therefore enjoy, for

example: better sounding, clearer calls; smoother conferencing; and a "being-there" quality of experience.

26. In 2016, T-Mobile became the first wireless carrier in the United States to upgrade its network to support EVS, touting EVS as "a true next-gen voice technology that delivers some incredibly cool benefits to our customers," including "improv[ing] voice call reliability in areas of weaker signal" and "even higher-fidelity calls."[1] The 3GPP "anticipate[s] that enhanced voice services based on the new EVS codec will become the dominant voice service in 3GPP LTE networks."[2]

27. U.S. Patent Nos. 8,063,809; 9,161,038; 9,361,904; 10,032,460; 10,614,817; and 10,339,945 (collectively, "Patents-in-Suit") were issued as part of the development of the new and improved methods and systems that were ultimately adopted as the EVS Standard. The Patents-in-Suit are generally drawn to the EVS codec.

28. The technology of the Patents-in-Suit is important to the EVS codec and is necessary for LG's consumers to enjoy Enhanced HD Voice, Ultra HD Voice, or HD Voice+ services when using LG's mobile devices. The Patents-in-Suit disclose technologies that provide significant benefits to LG consumers including better sounding, clearer calls and smoother conferencing, when compared to older technologies operating at the same bit rate.

29. Crystal Clear Codec is the current assignee of the Patents-in-Suit.

LG'S DIRECT INFRINGEMENT

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[1] Neville Ray, *Patent-Pending: T-Mobile's Next Network Upgrade with Enhanced Voice Services*, T-Mobile (Apr. 5, 2016), https://www.t-mobile.com/news/blog/volte-enhanced-voice-services

[2] 3GPP TR 26.952 V16.1.0 (2019-06).

30. LG has directly infringed and continues to directly infringe the Patents-in-Suit by, for example, making, using, offering to sell, selling, and/or importing into the United States without authority, products, equipment, software, and/or services that practice one or more claims of each of the Patents-in-Suit, including without limitation LG's mobile devices, and other devices with EVS codec capabilities compliant with the EVS Standard.

31. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30,

MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

32. Each of the LG EVS Products includes hardware and software that implements the EVS codec, which is defined by the EVS Standard. For example, certain LG EVS Products are identified by a Global Mobile Suppliers Association Report as supporting the EVS codec.[3] In addition, hardware and/or software components comprising the LG EVS Products are publicly identified as supporting the EVS codec and/or Enhanced HD Voice, Ultra HD Voice, or HD Voice+ services.

33. The Patents-in-Suit are essential to the EVS Standard.

34. The EVS codec in the LG EVS Products complies with the EVS Standard.

35. Because LG's EVS Products include hardware and/or software components supporting the EVS codec compliant with the EVS Standard, LG necessarily infringes the Patents-in-Suit.

LG'S INDIRECT INFRINGEMENT

36. LG indirectly infringes the Patents-in-Suit.

37. LG induces direct infringement of the Patents-in-Suit by customers, importers, sellers, resellers, and/or end users of LG EVS Products.

[3] Global mobile Suppliers Association, Enhanced Voice Services (EVS): Market Update (May 2019) attached as Ex. A.

38. At the very latest, LG had actual knowledge of the Patents-in-Suit and of its infringement of the same as of the date of this Complaint.

39. LG knows that the use of LG's mobile devices, and other devices with EVS codec capabilities compliant with the EVS Standard, to make a voice call using the EVS codec, constitutes infringement of the Patents-in-Suit.

40. On information and belief, LG advertises the infringing products and services, publishes specifications and promotional literature encouraging customers to operate the accused products and services, creates and/or distributes user manuals for the accused products and services that provide instruction and/or encourage infringing use, and offers support and/or technical assistance to its customers that provide instructions on and/or encourage infringing use.

41. LG encourages and facilitates its customers to infringe the Patents-in-Suit by, for example, instructing customers that purchase the LG EVS Products that such devices have voice calling capability, and by providing various indicators within those devices of the same.

42. For instance, LG provides its customers with a user guide for each of the LG EVS Products.[4] The user guide includes instructions on how to make a phone call.[5] Using an LG EVS Product to make a phone call on an EVS-supported wireless carrier network (e.g., T-Mobile network) results in infringement of the Patents-in-Suit.

43. End users of LG EVS Products, pursuant to LG's instructions, indicators, and advertisements, thus each directly infringe the Patents-in-Suit.

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[4] *See, e.g.,* LG V30+ User Guide, *available at* https://www.lg.com/us/support/products/documents/LG-US998U_USC_EN_UG_Web_V1.0_170925.pdf

[5] *See id.* at pp. 82-85.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 8,063,809

44. On November 22, 2011, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 8,063,809 ("the '809 Patent"), entitled "Transient Signal Encoding Method and Device, Decoding Method and Device, and Processing System."

45. Crystal Clear Codec is the owner of the '809 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

46. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24

LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

47. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the '809 Patent.

48. Upon information and belief, LG has infringed directly and continues to infringe directly the '809 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States ("LG EVS Products").

49. For example, the LG EVS Products practice and/or are capable of practicing representative claim 10 of U.S. Patent No. 8,063,809.

50. Claim 10 of the '809 Patent discloses a transient signal encoding device, comprising a reference sub-frame obtaining module, configured to obtain a reference sub-frame where a maximal time envelope having a maximal amplitude value is located from time envelopes of all sub-frames of an input transient signal; a first amplitude value adjusting module, configured to adjust an amplitude value of the time envelope of each sub-frame before the reference sub-frame in such a way that a first difference is greater than a preset first threshold, wherein the first difference is a difference between the amplitude value of the time envelope of each sub-frame before the reference sub-frame and the amplitude value of the maximal time envelope; and a bitstream writing module, configured to write the adjusted time envelope into a bitstream.

51. Each of the LG EVS Products includes the EVS codec, which comprises the transient signal encoding device of representative Claim 10 of the '809 Patent.

52. The EVS codec in the LG EVS Products includes a reference sub-frame obtaining module, configured to obtain a reference sub-frame where a maximal time envelope having a maximal amplitude value is located from time envelopes of all sub-frames of an input transient signal. [*See, e.g.,* 3GPP TS 26.445/ETSI TS 126.445[6] (hereinafter TS 26.445) at section 5.2.6.2.1.6].

53. The EVS codec in the LG EVS Products includes a first amplitude value adjusting module, configured to adjust an amplitude value of the time envelope of each sub-frame before the reference sub-frame in such a way that a first difference is greater than a preset first threshold, wherein the first difference is a difference between the amplitude value of the time envelope of each subframe before the reference sub-frame and the amplitude value of the maximal time envelope. [*See, e.g.,* TS 26.445, at section 5.2.6.2.1.6].

54. The EVS codec in the LG EVS Products includes a bitstream writing module, configured to write the adjusted time envelope into a bitstream. [*See, e.g.,* TS 26.445, at sections 5.2.6.2.1.6, 5.2.6.2.1.7].

55. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the '809 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or

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[6] Available, for example, at https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=1467

more claims of the '809 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the '809 Patent. LG advertises and promotes its LG EVS Products on its website.[7] LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '809 Patent.

56. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '809 Patent by Defendants has damaged and will continue to damage Plaintiff.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 9,161,038

57. On October 13, 2015, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 9,161,038 ("the '038 Patent"), entitled "Method and Device for Encoding A High Frequency Signal, And Method and Device for Decoding a High Frequency Signal."

58. Crystal Clear Codec is the owner of the '038 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

59. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG

[7] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

60. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘038 Patent.

61. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘038 Patent. The infringing acts include, but are not limited to, the manufacture, use,

sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States ("LG EVS Products").

62. For example, the LG EVS Products practice and/or are capable of practicing representative claim 10 of U.S. Patent No. 9,161,038.

63. Claim 10 of the '038 Patent discloses a device for decoding a high frequency signal, the device comprising: a decoding unit, configured to obtain signal class information and frequency information of a high frequency signal of a current frame by decoding; an obtaining unit, configured to obtain a high frequency excitation spectrum of the current frame; a normalization unit, configured to determine normalization length according to the signal class of the high frequency signal of the current frame obtained by the decoding unit and low frequency signal information, and obtain a normalized high frequency excitation spectrum by normalizing the high frequency excitation spectrum obtained by the obtaining unit according to the normalization length; a high frequency spectrum obtaining unit, configured to modify the normalized high frequency excitation spectrum obtained by the normalization unit by using the frequency information obtained by the decoding unit, and obtain a high frequency spectrum; and an output processing unit, configured to obtain an output signal by using the high frequency spectrum of the current frame obtained by the high frequency spectrum obtaining unit, and output the output signal.

64. Each of the LG EVS Products includes the EVS codec, which includes a device for decoding a high frequency signal of representative Claim 10 of the '038 Patent. [*See, e.g.,* TS 26.445, at section 5.2.6.2]

65. The EVS codec in the LG EVS Products includes a decoding unit, configured to obtain signal class information and frequency information of a high frequency signal of a current frame by decoding. [*See, e.g.,* TS 26.445, at sections 5.2.6.2.1.3, 6.1.5.2.1.1, 6.1.5.2.1.2].

66. The EVS codec in the LG EVS Products includes an obtaining unit, configured to obtain a high frequency excitation spectrum of the current frame. [*See, e.g.,* TS 26.445, at sections 5.2.6.2.1.5, 6.1.5.2.1.4, 6.1.5.2.1.5].

67. The EVS codec in the LG EVS Products includes a normalization unit, configured to determine normalization length according to the signal class of the high frequency signal of the current frame obtained by the decoding unit and low frequency signal information. [*See, e.g.,* TS 26.445, at section 6.1.5.2.1.6].

68. The EVS codec in the LG EVS Products includes a normalization unit, configured to obtain a normalized high frequency excitation spectrum by normalizing the high frequency excitation spectrum obtained by the obtaining unit according to the normalization length. [*See, e.g.,* TS 26.445, at section 6.1.5.2.1.6].

69. The EVS codec in the LG EVS Products includes a high frequency spectrum obtaining unit, configured to modify the normalized high frequency excitation spectrum obtained by the normalization unit by using the frequency information obtained by the decoding unit, and obtain a high frequency spectrum. [*See, e.g.,* TS 26.445, at section 6.1.5.2.1.6].

70. The EVS codec in the LG EVS Products includes an output processing unit, configured to obtain an output signal by using the high frequency spectrum of the current frame obtained by the high frequency spectrum obtaining unit, and output the output signal. [*See, e.g.,* TS 26.445, at sections 6.1.5.2, 6.1.5.2.1.7].

71. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the '038 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the '038 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the '038 Patent. LG advertises and promotes its LG EVS Products on its website.[8] LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '038 Patent.

72. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '038 Patent by Defendants has damaged and will continue to damage Plaintiff.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 9,361,904

73. On June 7, 2016, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 9,361,904 ("the '904 Patent"), entitled "Method for Predicting Bandwidth Extension Frequency Band Signal, and Decoding Device."

74. Crystal Clear Codec is the owner of the '904 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

[8] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

75. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

76. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the '904 Patent.

77. Upon information and belief, LG has infringed directly and continues to infringe directly the '904 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States ("LG EVS Products").

78. For example, the LG EVS Products practice and/or are capable of practicing representative claim 11 of U.S. Patent No. 9,361,904.

79. Claim 11 of the '904 Patent discloses a decoding device for predicting a bandwidth extension frequency band signal of an audio signal, comprising: a processor configured to: demultiplex a received bitstream; decode the demultiplexed bitstream to obtain a frequency domain signal; determine whether a highest frequency bin, to which a bit is allocated, of the frequency domain signal is less than a preset start frequency bin of a bandwidth extension frequency band; predict an excitation signal of the bandwidth extension frequency band according to an excitation signal within a predetermined frequency band range of the frequency domain signal and the preset start frequency bin of the bandwidth extension frequency band when the highest frequency bin to which at least one bit is allocated is less than the preset start frequency bin of the bandwidth extension frequency band; make n copies of the excitation signal within the predetermined frequency band range of the frequency domain signal; use the n copies of the excitation signal as an excitation signal between the preset start frequency bin of the bandwidth extension frequency band and a highest frequency bin of the bandwidth extension frequency band, wherein n is greater than 0, and wherein n is equal to a ratio of a quantity of frequency bins between the preset start frequency bin of the bandwidth extension frequency band and the highest frequency

bin of the bandwidth extension frequency band to a quantity of frequency bins within the predetermined frequency band range of the frequency domain signal; predict the excitation signal of the bandwidth extension frequency band according to the excitation signal within the predetermined frequency band range of the frequency domain signal, the preset start frequency bin of the bandwidth extension frequency band, and the highest frequency bin to which a bit is allocated when the highest frequency bin to which a bit is allocated is greater than or equal to the preset start frequency bin of the bandwidth extension frequency band; predict a bandwidth extension frequency band signal according to the predicted excitation signal of the bandwidth extension frequency band and a frequency envelope of the bandwidth extension frequency band; and reconstruct the audio signal based on the bandwidth extension frequency band signal.

80. Each of the LG EVS Products includes the EVS codec, which includes a decoding device for predicting a bandwidth extension frequency band signal of an audio signal. [*See, e.g.,* TS 26.445, at section 5.3.1].

81. Each of the LG EVS Products includes a processor which implements and/or is capable of implementing the EVS codec. [*See, e.g.,* TS 26.445, at sections 4.4.2, 6.2]

82. In each of the LG EVS Products the processor is configured to demultiplex a received bitstream. [*See, e.g.,* TS 26.445, at section 6.2.3.2].

83. In each of the LG EVS Products the processor is configured to decode the demultiplexed bitstream to obtain a frequency domain signal. [*See, e.g.,* TS 26.445, at section 6.2.3.2.3.1, 6.2.3.2.1.1, 6.2.3.2.1.2].

84. In each of the LG EVS Products the processor is configured to determine whether a highest frequency bin, to which a bit is allocated, of the frequency domain signal is less than a

preset start frequency bin of a bandwidth extension frequency band. [*See, e.g.,* TS 26.445, at section 6.2.3.2.3.2].

85. In each of the LG EVS Products the processor is configured to predict an excitation signal of the bandwidth extension frequency band according to an excitation signal within a predetermined frequency band range of the frequency domain signal and the preset start frequency bin of the bandwidth extension frequency band when the highest frequency bin to which at least one bit is allocated is less than the preset start frequency bin of the bandwidth extension frequency band. [*See, e.g.,* TS 26.445, at section 6.2.3.2.3.2.3].

86. In each of the LG EVS Products the processor is configured to make n copies of the excitation signal within the predetermined frequency band range of the frequency domain signal. [*See, e.g.,* TS 26.445, at sections 6.2.3.2.3.2, 6.2.3.2.3.2.3].

87. In each of the LG EVS Products the processor is configured to use the n copies of the excitation signal as an excitation signal between the preset start frequency bin of the bandwidth extension frequency band and a highest frequency bin of the bandwidth extension frequency band, wherein n is greater than 0, and wherein n is equal to a ratio of a quantity of frequency bins between the preset start frequency bin of the bandwidth extension frequency band and the highest frequency bin of the bandwidth extension frequency band to a quantity of frequency bins within the predetermined frequency band range of the frequency domain signal. [*See, e.g.,* TS 26.445, at section 6.2.3.2.3.2.3].

88. In each of the LG EVS Products the processor is configured to predict the excitation signal of the bandwidth extension frequency band according to the excitation signal within the predetermined frequency band range of the frequency domain signal, the preset start frequency bin of the bandwidth extension frequency band, and the highest frequency bin to which a bit is

allocated when the highest frequency bin to which a bit is allocated is greater than or equal to the preset start frequency bin of the bandwidth extension frequency band. [*See, e.g.,* TS 26.445, at section 6.2.3.2.3.2.3].

89. In each of the LG EVS Products the processor is configured to predict a bandwidth extension frequency band signal according to the predicted excitation signal of the bandwidth extension frequency band and a frequency envelope of the bandwidth extension frequency band. [*See, e.g.,* TS 26.445, at sections 6.2.3.2.1.3.2.3, 6.2.3.2.1.3.2.4, 6.2.3.2.3.2, 6.2.3.2.3.2.1, 6.2.3.2.3.2.2, 6.2.3.2.3.2.3, 6.2.3.2.3.2.4].

90. In each of the LG EVS Products the processor is configured to reconstruct the audio signal based on the bandwidth extension frequency band signal. [*See, e.g.,* TS 26.445, at section 6.2.4.1].

91. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the '904 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the '904 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the '904 Patent. LG advertises and promotes its LG EVS Products on its website.[9] LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '904 Patent.

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[9] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

92. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '904 Patent by Defendants has damaged and will continue to damage Plaintiff.

COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 10,032,460

93. On July 24, 2018, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 10,032,460 ("the '460 Patent"), entitled "Frequency Envelope Vector Quantization Method and Apparatus."

94. Crystal Clear Codec is the owner of the '460 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

95. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression

Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

96. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘460 Patent.

97. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘460 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States (“LG EVS Products”).

98. For example, the LG EVS Products practice and/or are capable of practicing representative claim 5 of U.S. Patent No. 10,032,460.

99. Claim 5 of the ‘460 Patent discloses an audio signal encoding apparatus, comprising a processor and a memory storing program codes, wherein the program codes, when executed by the processor, cause the apparatus to perform a process that comprises: obtaining N frequency envelopes of a frame of an audio signal, wherein N is an even integer; organizing the N frequency envelopes into N1 groups, wherein each group comprises two frequency envelopes, and N=2xN1; quantizing a first group of frequency envelopes to obtain a first vector by using a codebook,

wherein the codebook has 2^B code words and each code word corresponds to a vector, and B is a positive integer greater than or equal to 2; determining if a code word corresponding to the first vector is in a first half of the codebook or in a second half of the codebook; and if the code word corresponding to the first vector is in the first half of the codebook, quantizing a second group of frequency envelopes by using the first half of the codebook, or if the code word corresponding to the first vector is in the second half of the codebook, quantizing a second group of frequency envelopes by using the second half of the codebook.

100. Each of the LG EVS Products includes the EVS codec program code which includes an audio signal encoder.

101. Each of the LG EVS Products includes an audio signal encoding apparatus comprising a memory storing program codes (e.g., the EVS codec) and a processor.

102. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises obtaining N frequency envelopes of a frame of an audio signal, wherein N is an even integer. [*See, e.g.,* TS 26.445, at sections 5.2.6.3, 5.2.6.3.2].

103. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises organizing the N frequency envelopes into N1 groups, wherein each group comprises two frequency envelopes, and N=2×N1. [*See, e.g.,* TS 26.445, at sections 5.2.6.3, 5.2.6.3.2].

104. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises quantizing a first group of frequency envelopes to obtain a first vector by using a codebook, wherein the codebook has

2^B code words and each code word corresponds to a vector, and B is a positive integer greater than or equal to 2. [*See, e.g.,* TS 26.445, at section 5.2.6.3.2].

105. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises determining if a code word corresponding to the first vector is in a first half of the codebook or in a second half of the codebook. [*See, e.g.,* TS 26.445, at section 5.2.6.3.2].

106. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises quantizing a second group of frequency envelopes by using the first half of the codebook if the code word corresponding to the first vector is in the first half of the codebook. [*See, e.g.,* TS 26.445, at section 5.2.6.3.2].

107. In the LG EVS products, the program code, when executed by the processor, causes the audio signal encoding apparatus to perform a process that comprises quantizing a second group of frequency envelopes by using the second half of the codebook if the code word corresponding to the first vector is in the second half of the codebook. [*See, e.g.,* TS 26.445, at section 5.2.6.3.2].

108. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the '460 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the '460 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the '460 Patent. LG advertises and promotes its LG EVS Products on its website.[10] LG provides, makes, uses, licenses, sells, and

[10] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '460 Patent.

109. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '460 Patent by Defendants has damaged and will continue to damage Plaintiff.

COUNT V: INFRINGEMENT OF U.S. PATENT NO. 10,614,817

110. On April 7, 2020, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 10,614,817 ("the '817 Patent"), entitled "Recovering High Frequency Band Signal of a Lost Frame in Media Bitstream According to Gain Gradient."

111. Crystal Clear Codec is the owner of the '817 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

112. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE,

LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3 plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

113. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘817 Patent.

114. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘817 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States (“LG EVS Products”).

115. For example, the LG EVS Products practice and/or are capable of practicing representative claim 13 of U.S. Patent No. 10,614,817.

116. Claim 13 of the ‘817 Patent discloses a decoder, comprising: a memory storing program codes; and a processor coupled to the memory, the program codes causing the processor to be configured to: obtain a synthesized high frequency band signal of a current lost frame; obtain

recovery information related to the current lost frame, wherein the recovery information comprises a coding mode of a previous frame and a frame class of a last frame received before the current lost frame; determine a global gain gradient of the current lost frame according to the recovery information; determine a global gain of the current lost frame according to the global gain gradient and a global gain of each frame in previous M frames of the current lost frame, wherein M is a positive integer; determine a subframe gain of the current lost frame; and adjust the synthesized high frequency band signal of the current lost frame according to the global gain of the current lost frame and the subframe gain of the current lost frame to obtain a high frequency band signal of the current lost frame.

117. Each of the LG EVS Products includes a decoder.

118. In each of the LG EVS Products, the decoder comprises a memory storing program codes (e.g., the EVS codec); and a processor coupled to the memory.

119. In the LG EVS products, the program code causes the processor to be configured to obtain a synthesized high frequency band signal of a current lost frame. [*See, e.g.,* 3GPP TS 26.447/ETSI TS 126.447[11] (hereinafter TS 26.447), at section 5.3.2.1.1].

120. In the LG EVS products, the program code causes the processor to be configured to obtain recovery information related to the current lost frame, wherein the recovery information comprises a coding mode of a previous frame and a frame class of a last frame received before the current lost frame. [*See, e.g.,* TS 26.447, at sections 5.1.1, 5.3.2.1].

[11] Available, for example, at https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=1469

121. In the LG EVS products, the program code causes the processor to be configured to determine a global gain gradient of the current lost frame according to the recovery information. [*See, e.g.,* TS 26.447, at section 5.3.2.1.1.3].

122. In the LG EVS products, the program code causes the processor to be configured to determine a global gain of the current lost frame according to the global gain gradient and a global gain of each frame in previous M frames of the current lost frame, wherein M is a positive integer. [*See, e.g.,* TS 26.447, at sections 5.3.2.1.1, 5.3.2.1.1.3].

123. In the LG EVS products, the program code causes the processor to be configured to determine a subframe gain of the current lost frame. [*See, e.g.,* TS 26.447, at section 5.3.2.1.1].

124. In the LG EVS products, the program code causes the processor to be configured to adjust the synthesized high frequency band signal of the current lost frame according to the global gain of the current lost frame and the subframe gain of the current lost frame to obtain a high frequency band signal of the current lost frame. [*See, e.g.,* TS 26.447, at section 5.3.2.1.1].

125. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the '817 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the '817 Patent, all to the injury of Plaintiff. In the case of such infringement, the users of the LG EVS Products are the direct infringers of the '817 Patent. LG advertises and promotes its LG EVS Products on its website.[12] LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in

[12] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '817 Patent.

126. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '817 Patent by Defendants has damaged and will continue to damage Plaintiff.

COUNT VI: INFRINGEMENT OF U.S. PATENT NO. 10,339,945

127. On July 2, 2019, the United States Patent and Trademark Office ("USPTO") duly and legally issued United States Patent No. 10,339,945 ("the '945 Patent"), entitled "Coding/Decoding Method, Apparatus, and System for Audio Signal."

128. Crystal Clear Codec is the owner of the '945 Patent. As such, LG's infringement described below has injured, and continues to injure, Crystal Clear Codec.

129. LG EVS Products include any LG product that contains the EVS codec, including at least the LG Ultra HD Voice (or HD Voice+) capable products manufactured, used, imported, offered for sale, and/or sold in the United States including, but not limited to, the following phones: LG G5, LG G6, LG G6+, LG G7 Fit, LG G7 ThinQ, LG G8 ThinQ, LG G8X ThinQ, LG K8, LG K8S, LG K8X, LG K8+, LG K20, LG K20 plus, LG K22, LG K30, LG K31, LG K51, LG Q6, LG Q6+, LG Q70, LG V20, LG V30, LG V30+, LG V30S ThinQ, LG V35 ThinQ, LG V40 ThinQ, LG V50 ThinQ 5G, LG V60 ThinQ 5G, LG V60 ThinQ 5G Dual Screen, LG Arena 2, LG Aristo, LG Aristo 2, LG Aristo 2 Plus, LG Aristo 3, LG Aristo 3 Plus, LG Aristo 4 Plus, LG Aristo 5, LG Escape Plus, LG Fiesta LTE, LG Fiesta 2 LTE, LG Fortune 2, LG Fortune 3, LG Grace LTE, LG Harmony, LG Journey LTE, LG Neon Plus, LG Phoenix 4, LG Phoenix 5, LG Premier Pro LTE, LG Prime 2, LG Rebel 4 LTE, LG Risio 3, LG Risio 4, LG Stylo 2 Plus, LG Stylo 3, LG Stylo 3

plus, LG Stylo 3 LTE, LG Stylo 4, LG Stylo 4 Plus, LG Stylo 6, LG Tribute Dynasty, LG Tribute Empire, LG Tribute Monarch, LG Tribute Royal, LG X Charge, LG X Venture, LG Xpression Plus, LG Zone 4; the following tablets: LG G Pad F2 8.0, LG G Pad X II 8.0 PLUS T-Mobile, LG G Pad 5, and any other LG products that contain the EVS codec including, but not limited to, products containing the Qualcomm Snapdragon X12 LTE Modem, the Qualcomm Snapdragon X16 LTE Modem, the Qualcomm Snapdragon X20 LTE Modem, the Qualcomm Snapdragon X24 LTE Modem, or MediaTek 4G LTE modems (used for example, in MediaTek Helio X30, MT6595, MT8785, MediaTek Helio P23, MediaTek Helio X27, MediaTek Helio X25, MediaTek Helio X23, MediaTek Helio X20, MediaTek Helio X10, MediaTek Helio P60, MediaTek Helio P30, MediaTek Helio P23, MediaTek Helio P22, MediaTek Helio A22, MT6573, MT6752, MT6750, MT6739, MT6738, MT6737T, MT6737, MT6735, MT6732, MT6595, MT6592).

130. On information and belief, these products are among the larger range of LG EVS Products, each of which practices and/or is capable of practicing the ‘945 Patent.

131. Upon information and belief, LG has infringed directly and continues to infringe directly the ‘945 Patent. The infringing acts include, but are not limited to, the manufacture, use, sale, importation, and/or offer for sale of products containing the EVS codec and/or practicing the EVS Standard in the United States (“LG EVS Products”).

132. For example, the LG EVS Products practice and/or are capable of practicing representative claim 11 of U.S. Patent No. 10,339,945.

133. Claim 11 of the ‘945 Patent discloses a coding apparatus, comprising: a processor is configured to execute computer instructions stored in memory, wherein, when the processor executes the computer instructions, to processor operates to: code a low frequency band signal of an input audio signal received in a communications interface to obtain one or more characteristic

factors of the input audio signal; perform coding and prediction on a high frequency band signal of the input audio signal to obtain a first full band signal; perform de-emphasis processing on the first full band signal, wherein a de-emphasis parameter of the de-emphasis processing is determined according to the one or more characteristic factors; and calculate a first energy of the first full band signal that has undergone de-emphasis processing; perform band-pass filtering on the input audio signal to obtain a second full band signal; calculate a second energy of the second full band signal; calculate an energy ratio between the second energy and the first energy; send a bitstream resulting from coding the input audio signal via the communications interface, wherein the bitstream comprises the energy ratio.

134. Each of the LG EVS Products includes a coding apparatus comprising a processor configured to execute computer instructions (e.g., EVS codec) stored in memory. [*See, e.g.,* TS 26.445, at section 4.4.1].

135. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to code a low frequency band signal of an input audio signal received in a communications interface to obtain one or more characteristic factors of the input audio signal. [*See, e.g.,* TS 26.445, at sections 5.2, 5.2.3, 5.2.3.1.4.1, 5.2.3.1.5, 5.2.3.1.7].

136. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to perform coding and prediction on a high frequency band signal of the input audio signal to obtain a first full band signal. [*See, e.g.,* TS 26.445, at sections 5.2.6.1.2, 5.2.6.1.17].

137. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to perform de-emphasis processing on the first full band signal,

wherein a de-emphasis parameter of the de-emphasis processing is determined according to the one or more characteristic factors. [*See, e.g.,* TS 26.445, at sections 5.2.3.1.5.1, 5.2.6.1.17].

138. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to calculate a first energy of the first full band signal that has undergone de-emphasis processing. [*See, e.g.,* TS 26.445, at section 5.2.6.1.17].

139. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to perform band-pass filtering on the input audio signal to obtain a second full band signal. [*See, e.g.,* TS 26.445, at section 5.2.6.1.17].

140. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to calculate a second energy of the second full band signal. [*See, e.g.,* TS 26.445, at section 5.2.6.1.17].

141. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to calculate an energy ratio between the second energy and the first energy. [*See, e.g.,* TS 26.445, at section 5.2.6.1.17].

142. In each of the LG EVS Products when the processor executes the computer instructions, the processor operates to send a bitstream resulting from coding the input audio signal via the communications interface, wherein the bitstream comprises the energy ratio. [*See, e.g.,* TS 26.445, at section 5.2.6.1.17].

143. In addition to its direct infringement, LG is now indirectly infringing by way of inducing infringement the infringement of the claims of the ‘945 Patent in the State of Texas, in this judicial district, and elsewhere within the United States by, among other things, making, using, licensing, selling, offering for sale, or importing infringing LG EVS Products, covered by one or more claims of the ‘945 Patent, all to the injury of Plaintiff. In the case of such infringement, the

users of the LG EVS Products are the direct infringers of the '945 Patent. LG advertises and promotes its LG EVS Products on its website.[13] LG provides, makes, uses, licenses, sells, and offers its LG EVS Products for sale with the specific intent that its customers use those phones in an infringing manner. LG sells or offers to sell its LG EVS Products for use in practicing the processes patented by the '945 Patent.

144. The acts of infringement by Defendants have caused damage to Plaintiff, and Plaintiff is entitled to recover from Defendants the damages sustained by Plaintiff as a result of Defendants' wrongful acts in an amount subject to proof at trial. The infringement of the '945 Patent by Defendants has damaged and will continue to damage Plaintiff.

JURY DEMAND

145. Crystal Clear Codec, LLC hereby demands a trial by jury on all issues.

[13] *See, e.g.*, http://www.lg.com/us/cell-phones/all-cell-phones .

PRAYER FOR RELIEF

WHEREFORE, Crystal Clear Codec, LLC requests entry of judgment in its favor and against Defendants as follows:

a. A declaration that Defendants have infringed and are infringing, directly or indirectly, one or more claims of the Patents-in-Suit, either literally or under the doctrine of equivalents;

b. An award of damages pursuant to 35 U.S.C. § 284 adequate to compensate Crystal Clear Codec for LG's infringement of the Patents-in-Suit in an amount according to proof at trial (together with prejudgment and post-judgment interest), but not less than a reasonable royalty; and

c. An award of costs and expenses pursuant to 35 U.S.C. § 284 or as otherwise permitted by law; and

d. Such other and further relief, whether legal, equitable, or otherwise, to which Crystal Clear Codec may be entitled or which this Court may order.

Dated: April 19, 2021

Respectfully submitted,

/s/ Demetrios Anaipakos

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