FCC RF EXPOSURE EVALUATION REPORT

Product Name:	IP Phone
Trade Mark:	GRANDSTREAM
Model No.:	GRP2612W
Report Number:	200326019RFC-3
Test Standards:	FCC 47 CFR Part 1 Subpart I
FCC ID:	YZZGRP2612WV2
Test Result:	PASS
Date of Issue:	April 27, 2020

Prepared for:

Grandstream Networks,Inc.
126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
16/F, Block A, Building 6, Baoneng Science and Technology Park,
Qingxiang Road No.1, Longhua New District, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by: _____ Henry Lu, Team Leader

Reviewed by: _____ Kevin Liang, Assistant Manager

Approved by: _____ Billy Li, Technical Director

Date: April 27, 2020

Version

Version No.	Date	Description
V1.0	April 27, 2020	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Grandstream Networks,Inc.
Address of Applicant:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA
Manufacturer:	Grandstream Networks,Inc.
Address of Manufacturer:	126 Brookline Ave., 3rd Floor Boston, MA 02215, USA

1.2 EUT INFORMATION

Product Name:	IP Phone		
Model No.:	GRP2612W		
Trade Mark:	GRANDSTREAM		
DUT Stage:	Production Unit		
EUT Supports Function:	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
Sample Received Date:	March 27, 2020		
Sample Tested Date:	March 27, 2020 to April 20, 2020		

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For 2.4 GHz ISM Band of Wi-Fi	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2462 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11
Channel Separation:	5 MHz
Antenna Type:	PCB Antenna
Antenna Gain:	3.0dBi
Maximum Peak Power:	IEEE 802.11b: 21.64 dBm IEEE 802.11g: 24.13 dBm IEEE 802.11n-HT20: 23.95 dBm

For 5 GHz U-NII Bands of Wi-Fi	
Frequency Bands:	5150 MHz to 5250 MHz (U-NII-1)
	5250 MHz to 5350 MHz (U-NII-2A)
	5470 MHz to 5725 MHz (U-NII-2C)
	5 725 MHz to 5 850 MHz (U-NII-3)
Frequency Ranges:	5180 MHz to 5240 MHz
	5260 MHz to 5320 MHz

	5500 MHz to 5700 MHz				
	5 745 MHz to 5 825 MHz				
Support Standards:	IEEE 802.11ac				
TPC Function:	Not Support				
DFS Operational mode:	Slave without radar Interference detection function				
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)				
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz				
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz				
	IEEE 802.11ac-VHT80: 80 MHz				
Data Rate:	IEEE 802.11a: Up to 54 Mbps				
	IEEE 802.11n-HT20: Up to MCS7				
	IEEE 802.11n-HT40: Up to MCS7				
	IEEE 802.11ac-VHT20: Up to MCS8				
	IEEE 802.11ac-VHT40: Up to MCS9				
	IEEE 802.11ac-VHT80: Up to MCS9				
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20 5 for IEEE 802.11n-HT40/ac-VHT40 2 for IEEE 802.11ac-VHT80				
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80				
Antenna Type:	PCB Antenna				
Antenna Gain:	5150 MHz to 5250 MHz	3.5 dBi			
	5250 MHz to 5350 MHz	3.5 dBi			
	5470 MHz to 5725 MHz	3.5 dBi			
	5725 MHz to 5850 MHz	3.5 dBi			
Maximum conducted output power (dBm):		**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a:	16.51	16.06	13.36	15.72
	IEEE 802.11n-HT20:	16.04	15.65	14.71	15.29
	IEEE 802.11n-HT40:	14.26	13.71	13.02	15.36
	IEEE 802.11ac-VHT20	15.95	15.77	14.71	15.39
	IEEE 802.11ac-VHT40	14.28	13.75	13.06	15.54
	IEEE 802.11ac-VHT80:	13.19	12.83	11.77	14.97

1.4 OTHER INFORMATION

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz

Test channels for 5 GHz U-NII Bands of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Channel 36	Channel 44	Channel 48
		5180 MHz	5220 MHz	5240 MHz
	5250 MHz to 5350 MHz	Channel 52	Channel 60	Channel 64
		5260 MHz	5300 MHz	5320 MHz
	5470 MHz to 5725 MHz	Channel 100	Channel 116	Channel 140
		5500 MHz	5580 MHz	5700 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 161
		5745 MHz	5785 MHz	5805 MHz
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5250 MHz to 5350 MHz	Channel 54	--	Channel 62
		5270 MHz	--	5310 MHz
	5470 MHz to 5725 MHz	Channel 102	Channel 110	Channel 134
		5510 MHz	5550 MHz	5670 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
IEEE 802.11ac-HT80	5150 MHz to 5250 MHz	--	Channel 42	--
		--	5210 MHz	--
	5250 MHz to 5350 MHz	--	Channel 58	--
		--	5290 MHz	--
	5470 MHz to 5725 MHz	Channel 106	--	Channel 122
		5530 MHz	--	5610 MHz
	5725 MHz to 5850 MHz	--	Channel 155	--
		--	5775 MHz	--

1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 1 Subpart I

All test items have been performed and recorded as per the above standards

1.6 TEST LOCATION

All tests were performed at:

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. MPE EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 MPE COMPLIANCE REQUIREMENT

3.2.1 Limits

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density.

3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3.3 MPE CALCULATION METHOD

S = PG/4πR^2= EIRP/4πR^2
S = power density (in appropriate units, e.g., mw/cm2)
P = power input to the antenna (in appropriate units, e.g., mw)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.
R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

3.4 MPE CALCULATION RESULTS

Note: *For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.*

3.4.1 For WLAN

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n and
operating at 5150 MHz to 5250 MHz for IEEE802.11a/n/ac and
operating at 5250 MHz to 5350 MHz for IEEE802.11a/n/ac and
operating at 5470 MHz to 5725 MHz for IEEE802.11a/n/ac and
operating at 5725 MHz to 5850 MHz for IEEE802.11a/n/ac.

3.4.1.1 Antenna Type:

PCB Antenna

3.4.1.2 Antenna Gain:

2412MHz to 2462 MHz: 3.0dBi
5150 MHz to 5250 MHz: 3.5 dBi
5250 MHz to 5350 MHz: 3.5 dBi
5470 MHz to 5725 MHz: 3.5 dBi
5725 MHz to 5850 MHz: 3.5 dBi

3.4.1.3 Results for WLAN

Operating Mode		Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
		(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm^2)	
OSIS	IEEE 802.11b	2412	21	1	3	25	316.2278	1	0.0629
		2437	21	1	3	25	316.2278	1	0.0629
		2462	21	1	3	25	316.2278	1	0.0629
	IEEE 802.11g	2412	24	1	3	28	630.9573	1	0.1255
		2437	24	1	3	28	630.9573	1	0.1255
		2462	24	1	3	28	630.9573	1	0.1255
	IEEE 802.11n-HT20	2412	23	1	3	27	501.1872	1	0.0997
		2437	23	1	3	27	501.1872	1	0.0997
		2462	23	1	3	27	501.1872	1	0.0997
	IEEE 802.11a	5180	16	1	3.5	20.5	112.2018	1	0.0223
		5220	16	1	3.5	20.5	112.2018	1	0.0223
		5240	16	1	3.5	20.5	112.2018	1	0.0223
		5260	16	1	3.5	20.5	112.2018	1	0.0223
		5300	16	1	3.5	20.5	112.2018	1	0.0223
		5320	16	1	3.5	20.5	112.2018	1	0.0223
		5500	13	1	3.5	17.5	56.2341	1	0.0112
		5580	13	1	3.5	17.5	56.2341	1	0.0112
		5700	13	1	3.5	17.5	56.2341	1	0.0112
		5745	15	1	3.5	19.5	89.1251	1	0.0177
		5785	15	1	3.5	19.5	89.1251	1	0.0177
		5825	15	1	3.5	19.5	89.1251	1	0.0177
	IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5180	16	1	3.5	20.5	112.2018	1	0.0223
		5220	16	1	3.5	20.5	112.2018	1	0.0223
		5240	16	1	3.5	20.5	112.2018	1	0.0223
		5260	16	1	3.5	20.5	112.2018	1	0.0223
		5300	16	1	3.5	20.5	112.2018	1	0.0223

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm^2)	
	5320	15	1	3.5	19.5	89.1251	1	0.0177
	5500	15	1	3.5	19.5	89.1251	1	0.0177
	5580	15	1	3.5	19.5	89.1251	1	0.0177
	5700	15	1	3.5	19.5	89.1251	1	0.0177
	5745	16	1	3.5	20.5	112.2018	1	0.0223
	5785	15	1	3.5	19.5	89.1251	1	0.0177
	5825	15	1	3.5	19.5	89.1251	1	0.0177
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5190	14	1	3.5	18.5	70.7946	1	0.0141
	5230	14	1	3.5	18.5	70.7946	1	0.0141
	5270	14	1	3.5	18.5	70.7946	1	0.0141
	5310	14	1	3.5	18.5	70.7946	1	0.0141
	5510	13	1	3.5	17.5	56.2341	1	0.0112
	5550	13	1	3.5	17.5	56.2341	1	0.0112
	5670	13	1	3.5	17.5	56.2341	1	0.0112
	5755	15	1	3.5	19.5	89.1251	1	0.0177
	5795	15	1	3.5	19.5	89.1251	1	0.0177
IEEE 802.11ac-VHT80	5210	13	1	3.5	17.5	56.2341	1	0.0112
	5290	12	1	3.5	16.5	44.6684	1	0.0089
	5530	12	1	3.5	16.5	44.6684	1	0.0089
	5610	12	1	3.5	16.5	44.6684	1	0.0089
	5775	14	1	3.5	18.5	70.7946	1	0.0141

APPENDIX 1 PHOTOS OF TEST SETUP

N/A

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

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