



Certificate #4312.01

RF EXPOSURE EVALUATION REPORT

Product Name: IP Phone
Trade Mark: GRANDSTREAM
Model No.: GRP2602W
HVIN: GRP2602WV2
Report Number: 2401158930RFC-3
Test Standards: FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 6
FCC ID: YZZGRP2602WV2
IC: 11964A-GRP2602WV2
Test Result: PASS
Date of Issue: June 24, 2024

Prepared for:

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

Prepared by:

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UTTR-RF-RSS102-V1.1

Version

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V1.0	June 24, 2024	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.:	GRP2602W		
HVIN:	GRP2602WV2		
Trade Mark:	GRANDSTREAM		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n/ax	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac/ax
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac/ax
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac/ax
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac/ax
Sample Received Date:	January 15, 2024		

Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

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/g/n-HT20/n-HT40/ax-HE20/ax-HE40
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) IEEE 802.11n-HT40: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax: OFDM/ OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, 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 IEEE 802.11n-HT40: Up to MCS7 IEEE 802.11ax-HE20/ HE40: Up to MCS11
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20/ax-HE20: 11 IEEE 802.11n-HT40/ax-HE40: 9
Channel Separation:	5 MHz
Antenna Type:	PCB Antenna
Antenna Gain: (Provided by the customer)	2.0 dBi
Maximum Peak Power:	IEEE 802.11b: 18.00 dBm IEEE 802.11g: 27.16 dBm IEEE 802.11n-HT20: 26.41 dBm

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	IEEE 802.11n-HT40: 26.70 dBm IEEE 802.11ax-HE20: 26.68 dBm IEEE 802.11ax-HE40: 25.61 dBm
Maximum e.i.r.p	IEEE 802.11b: 20.00 dBm IEEE 802.11g: 29.16 dBm IEEE 802.11n-HT20: 28.41 dBm IEEE 802.11n-HT40: 28.70 dBm IEEE 802.11ax-HE20: 28.68 dBm IEEE 802.11ax-HE40: 27.61 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 5720 MHz 5745 MHz to 5825 MHz
Support Standards:	IEEE 802.11a/n/ac/ax
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) IEEE 802.11ax: OFDM/OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20: 20 MHz IEEE 802.11n-HT40/ac-VHT40/ax-HE40: 40 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 802.11ax-HE20/HE40: Up to MCS11
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40 5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40 5470 MHz to 5725 MHz: 12 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 6 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40 5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20/ax-HE20 2 for IEEE 802.11n-HT40/ac-VHT40/ax-HE40
Antenna Type:	PCB Antenna
Antenna Gain: (Provided by the customer)	5150 MHz to 5250 MHz: 4.5 dBi 5250 MHz to 5350 MHz: 4.5 dBi

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	5470 MHz to 5725 MHz: 4.5 dBi				
	5725 MHz to 5850 MHz: 4.5 dBi				
Maximum conducted output power (dBm):		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	14.83	14.78	15.67	15.35
	IEEE 802.11n-HT20:	14.82	14.82	15.14	15.40
	IEEE 802.11n-HT40:	14.48	14.61	15.55	15.47
	IEEE 802.11ac-VHT20	14.85	14.85	15.14	15.49
	IEEE 802.11ac-VHT40	14.39	14.55	15.38	15.33
	IEEE 802.11ax-HE20	14.79	14.83	15.17	15.48
	IEEE 802.11ax-HE40	14.39	14.54	15.40	15.32
Maximum EIRP (dBm):		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	19.33	19.28	20.17	19.85
	IEEE 802.11n-HT20:	19.32	19.32	19.64	19.90
	IEEE 802.11n-HT40:	18.98	19.11	20.05	19.97
	IEEE 802.11ac-VHT20	19.35	19.35	19.64	19.99
	IEEE 802.11ac-VHT40	18.89	19.05	19.88	19.83
	IEEE 802.11ax-HE20	19.29	19.33	19.67	19.98
	IEEE 802.11ax-HE40	18.89	19.04	19.90	19.82

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 IEEE 802.11ax-HE20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT40 IEEE 802.11ax-HE40	2422 MHz to 2452 MHz	Channel 3	Channel 7	Channel 9
		2422 MHz	2437 MHz	2452 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)	Straddle band
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20 IEEE 802.11ax-HE20	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	Channel 144
		5500 MHz	5580 MHz	5700 MHz	5720 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165	--
		5745 MHz	5785 MHz	5825 MHz	--
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40 IEEE 802.11ax-HE40	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	Channel 142
		5510 MHz	5550 MHz	5670 MHz	5710 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159	--
		5755 MHz	--	5795 MHz	--
	--	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
RSS-102 Issue 6

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

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 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	RSS-102 Issue 6	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	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

3.2.1.1 FCC 47 CFR Part 1 Subpart I

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.

3.2.1.2 RSS-102 Issue 6

According to RSS-102 Issue 6, field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1 W (adjusted for tune-up tolerance)
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz
- at or above 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 5 W (adjusted for tune-up tolerance)

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the EIRP was derived.

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

FCC 47 CFR Part 1 Subpart I

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

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 = 20cm, 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/ax and
operating at 5250 MHz to 5350 MHz for IEEE802.11a/n/ac/ax and
operating at 5470 MHz to 5725 MHz for IEEE802.11a/n/ac/ax and
operating at 5725 MHz to 5850 MHz for IEEE802.11a/n/ac/ax.

3.4.1.1 Antenna Type:

PCB Antenna

3.4.1.2 Antenna Gain:

2412MHz to 2462 MHz: 2.0 dBi

5150 MHz to 5250 MHz: 4.5 dBi

5250 MHz to 5350 MHz: 4.5 dBi

5470 MHz to 5725 MHz: 4.5 dBi

5725 MHz to 5850 MHz: 4.5 dBi

3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode		Freq.	Declared maximum conducted 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)	
SSO	IEEE 802.11b	2412-2462	18	1	2.0	21	125.8925	1	0.0250
	IEEE 802.11g	2412-2462	27	1	2.0	30	1000.0000	1	0.1989
	IEEE 802.11n-HT20	2412-2462	26	1	2.0	29	794.3282	1	0.1580
	IEEE 802.11n-HT40	2422-2452	26	1	2.0	29	794.3282	1	0.1580
	IEEE 802.11ax-HE20	2412-2462	26	1	2.0	29	794.3282	1	0.1580
	IEEE 802.11ax-HE40	2422-2452	25	1	2.0	28	630.9573	1	0.1255
	IEEE 802.11a	5180-5240	14	1	4.5	19.5	89.1251	1	0.0177
		5260-5320	14	1	4.5	19.5	89.1251	1	0.0177
		5500-5600	15	1	4.5	20.5	112.2018	1	0.0223
		5700-5720	15	1	4.5	20.5	112.2018	1	0.0223
		5745-5825	15	1	4.5	20.5	112.2018	1	0.0223
	IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5180-5240	14	1	4.5	19.5	89.1251	1	0.0177
		5260-5320	14	1	4.5	19.5	89.1251	1	0.0177
		5500-5600	14	1	4.5	19.5	89.1251	1	0.0177
		5700-5720	15	1	4.5	20.5	112.2018	1	0.0223
		5745-5825	15	1	4.5	20.5	112.2018	1	0.0223
	IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5190-5230	14	1	4.5	19.5	89.1251	1	0.0177
		5270-5310	14	1	4.5	19.5	89.1251	1	0.0177
		5510-5590	13	1	4.5	18.5	70.7946	1	0.0141
		5670-5710	15	1	4.5	20.5	112.2018	1	0.0223
		5755-5795	15	1	4.5	20.5	112.2018	1	0.0223

3.4.1.4 Results for RSS-102 Issue 6

Operating Mode		Freq.	Declared maximum conducted output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Declare Limit
		(MHz)	(dBm)		(dBi)	(dBm)	(W)	(W)
SSO	IEEE 802.11b	2412-2462	18	1	2.0	21	0.1259	2.6840
	IEEE 802.11g	2412-2462	27	1	2.0	30	1.0000	2.6840
	IEEE 802.11n-HT20	2412-2462	26	1	2.0	29	0.7943	2.6840
	IEEE 802.11n-HT40	2422-2452	26	1	2.0	29	0.7943	2.6916
	IEEE 802.11ax-HE20	2412-2462	26	1	2.0	29	0.7943	2.6840
	IEEE 802.11ax-HE40	2422-2452	25	1	2.0	28	0.6310	2.6916
	IEEE 802.11a	5180-5240	14	1	4.5	19.5	0.0891	4.5253
		5260-5320	14	1	4.5	19.5	0.0891	4.5729
		5500-5600	15	1	4.5	20.5	0.1122	4.7145
		5700-5720	15	1	4.5	20.5	0.1122	4.8310
		5745-5825	15	1	4.5	20.5	0.1122	4.8570
	IEEE 802.11n-HT20 IEEE 802.11ac-VHT20 IEEE 802.11ax-HE20	5180-5240	14	1	4.5	19.5	0.0891	4.5253
		5260-5320	14	1	4.5	19.5	0.0891	4.5729
		5500-5600	14	1	4.5	19.5	0.0891	4.7145
		5700-5720	15	1	4.5	20.5	0.1122	4.8310
		5745-5825	15	1	4.5	20.5	0.1122	4.8570
	IEEE 802.11n-HT40 IEEE 802.11ac-VHT40 IEEE 802.11ax-HE40	5190-5230	14	1	4.5	19.5	0.0891	4.5312
		5270-5310	14	1	4.5	19.5	0.0891	4.5789
		5510-5590	13	1	4.5	18.5	0.0708	4.7204
		5670-5710	15	1	4.5	20.5	0.1122	4.8136
		5755-5795	15	1	4.5	20.5	0.1122	4.8743

3.4.2 Simultaneous Multi-band Transmission MPE Analysis

3.4.4.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_WLAN + 5G_WLAN	Not Support

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 ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
