



Certificate #4312.01

RF EXPOSURE EVALUATION REPORT

Product Name: SIP/Multicast Talk-Back Speaker
Trade Mark: GRANDSTREAM
Model No. / HVIN: GSC3516
Report Number: 220720530RFC-5
Test Standards: FCC 47 CFR Part 1 Subpart I
RSS-102 Issue 5
FCC ID: YZZGSC3516
IC: 11964A-GSC3516
Test Result: PASS
Date of Issue: August 29, 2022

Prepared for:

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

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
**Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and
technology park, Longhua district, Shenzhen, China**

TEL: +86-755-2823 0888**FAX: +86-755-2823 0886**

Prepared by:

Kieron Luo

Project Engineer

Reviewed by:

Henry Lu

Team Leader

Approved by:



Assistant Manager

Date:

August 29, 2022

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

Version

Version No.	Date	Description
V1.0	August 29, 2022	Original

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com<http://www.uttlab.com>UTTR-RF-RSS102-V1.1

CONTENTS

1. GENERAL INFORMATION	4
1.1 CLIENT INFORMATION	4
1.2 EUT INFORMATION	4
1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD	4
1.4 OTHER INFORMATION.....	7
1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	8
1.6 DEVIATION FROM STANDARDS	8
1.7 ABNORMALITIES FROM STANDARD CONDITIONS.....	8
1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER	8
2. EQUIPMENT LIST	8
3. MPE EVALUATION	9
3.1 REFERENCE DOCUMENTS FOR EVALUATION	9
3.2 MPE COMPLIANCE REQUIREMENT	9
3.2.1 LIMITS	9
3.2.2 TEST PROCEDURE	10
3.3 MPE CALCULATION METHOD	10
3.4 MPE CALCULATION RESULTS	10
3.4.1 FOR WLAN	10
3.4.2 FOR BT	14
3.4.3 SIMULTANEOUS MULTI-BAND TRANSMISSION MPE ANALYSIS.....	15
APPENDIX 1 PHOTOS OF TEST SETUP	16
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS	16

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:	SIP/Multicast Talk-Back Speaker		
Model No. / HVIN:	GSC3516		
Trade Mark:	GRANDSTREAM		
DUT Stage:	Identical Prototype		
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth V4.2	
	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:	July 19, 2022		

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 BT_LE	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth LE
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Antenna Type:	Dipole Antenna
Antenna Gain: (Provided by the customer)	5.0 dBi
Maximum Peak Power:	6.76 dBm

For BT_EDR	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth BR + EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Channel Separation:	1 MHz
Antenna Type:	Dipole Antenna
Antenna Gain: (Provided by the customer)	5.0 dBi

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

Maximum Peak Power:	10.82 dBm
----------------------------	-----------

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, IEEE 802.11n-HT40
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)
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
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11n-HT40: 7
Channel Separation:	5 MHz
Antenna Type:	Dipole Antenna
Antenna Gain: (Provided by the customer)	5.0 dBi
Maximum EIRP (dBm):	IEEE 802.11b: 26.66 dBm IEEE 802.11g: 28.27 dBm IEEE 802.11n-HT20: 25.92 dBm IEEE 802.11n-HT40: 26.41 dBm
Maximum conducted output power:	IEEE 802.11b: 21.66 dBm IEEE 802.11g: 23.27 dBm IEEE 802.11n-HT20: 20.92 dBm IEEE 802.11n-HT40: 21.41 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)
	5725 MHz to 5850 MHz (U-NII-3)
Frequency Ranges:	5180 MHz to 5240 MHz
	5260 MHz to 5320 MHz
	5500 MHz to 5700 MHz
	5745 MHz to 5825 MHz
Support Standards:	IEEE 802.11a/n/ac
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

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

	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 802.11ac-VHT80				
	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 802.11ac-VHT80				
	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:	Dipole Antenna				
Antenna Gain: (Provided by the customer)	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:	14.21	14.00	15.64	15.17
	IEEE 802.11n-HT20:	14.35	14.17	15.30	15.00
	IEEE 802.11n-HT40:	14.35	14.05	14.94	14.87
	IEEE 802.11ac-VHT20	14.33	14.18	15.43	14.97
	IEEE 802.11ac-VHT40	14.30	13.78	14.80	14.72
	IEEE 802.11ac-VHT80:	13.38	13.28	14.29	14.25
Maximum EIRP (dBm):		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	17.71	17.50	19.14	18.67
	IEEE 802.11n-HT20:	17.85	17.67	18.80	18.50
	IEEE 802.11n-HT40:	17.85	17.55	18.44	18.37
	IEEE 802.11ac-VHT20	17.83	17.68	18.93	18.47
	IEEE 802.11ac-VHT40	17.80	17.28	18.30	18.22
	IEEE 802.11ac-VHT80:	16.88	16.78	17.79	17.75

1.4 OTHER INFORMATION

Test channels for BT_LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

Test channels for BT_EDR				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 39	Channel 78
$\pi/4$ DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
8DPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
IEEE 802.11b	2412 MHz to 2462 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 1	Channel 6	Channel 11
IEEE 802.11g	2412 MHz to 2462 MHz	2412 MHz	2437 MHz	2462 MHz
		Channel 1	Channel 6	Channel 11
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	2412 MHz	2437 MHz	2462 MHz
		Channel 1	Channel 6	Channel 11
IEEE 802.11n-HT40	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		
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 36	Channel 44	Channel 48
	5250 MHz to 5350 MHz	5180 MHz	5220 MHz	5240 MHz
		Channel 52	Channel 60	Channel 64
	5470 MHz to 5725 MHz	5260 MHz	5300 MHz	5320 MHz
		Channel 100	Channel 116	Channel 140
	5725 MHz to 5850 MHz	5500 MHz	5580 MHz	5700 MHz
		Channel 149	Channel 157	Channel 165
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	5745 MHz	5785 MHz	5825 MHz
		Channel 38	--	Channel 46
	5250 MHz to 5350 MHz	5190 MHz	--	5230 MHz
		Channel 54	--	Channel 62
	5470 MHz to 5725 MHz	5270 MHz	--	5310 MHz
		Channel 102	Channel 110	Channel 134
		5510 MHz	5550 MHz	5670 MHz

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

IEEE 802.11ac-VHT80	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
	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	--	--
		5530 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
RSS-102 Issue 5

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 5	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 5

According to RSS-102 Issue 5, 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.

According to RSS-102 Issue 5, 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.

RF 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, except when the device operates as follows:

- below 20 MHz⁶ and the source-based, time-averaged maximum e.i.r.p. 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 e.i.r.p. 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 e.i.r.p. 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 e.i.r.p. 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 e.i.r.p. 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 e.i.r.p. 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 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:

Dipole Antenna

3.4.1.2 Antenna Gain:

2412MHz to 2462 MHz: 5.0 dBi

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

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 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	MP E Limit	MPE Value
		(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm²)	
SISO	IEEE 802.11b	2412	21	1	3.5	25.5	354.8134	1	0.0706
		2437	21	1	3.5	25.5	354.8134	1	0.0706
		2462	21	1	3.5	25.5	354.8134	1	0.0706
	IEEE 802.11g	2412	23	1	3.5	27.5	562.3413	1	0.1119
		2437	23	1	3.5	27.5	562.3413	1	0.1119
		2462	23	1	3.5	27.5	562.3413	1	0.1119
	IEEE 802.11n-HT20	2412	20	1	3.5	24.5	281.8383	1	0.0561
		2437	20	1	3.5	24.5	281.8383	1	0.0561
		2462	20	1	3.5	24.5	281.8383	1	0.0561
	IEEE 802.11n-HT40	2422	21	1	3.5	25.5	354.8134	1	0.0706
		2437	21	1	3.5	25.5	354.8134	1	0.0706
		2452	21	1	3.5	25.5	354.8134	1	0.0706
	IEEE 802.11a	5180	14	1	3.5	18.5	70.7946	1	0.0141
		5220	14	1	3.5	18.5	70.7946	1	0.0141
		5240	14	1	3.5	18.5	70.7946	1	0.0141
		5260	14	1	3.5	18.5	70.7946	1	0.0141
		5300	14	1	3.5	18.5	70.7946	1	0.0141
		5320	14	1	3.5	18.5	70.7946	1	0.0141
		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	14	1.5	3.5	19.0	79.4328	1	0.0158
		5785	14	1.5	3.5	19.0	79.4328	1	0.0158
		5825	14	1.5	3.5	19.0	79.4328	1	0.0158
	IEEE 802.11n-HT20	5180	14	1	3.5	18.5	70.7946	1	0.0141
		5220	14	1	3.5	18.5	70.7946	1	0.0141
		5240	14	1	3.5	18.5	70.7946	1	0.0141
		5260	14	1	3.5	18.5	70.7946	1	0.0141
		5300	14	1	3.5	18.5	70.7946	1	0.0141
		5320	14	1	3.5	18.5	70.7946	1	0.0141
		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	14	1.5	3.5	19.0	79.4328	1	0.0158
		5785	14	1.5	3.5	19.0	79.4328	1	0.0158
		5825	14	1.5	3.5	19.0	79.4328	1	0.0158

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

IEEE 802.11ac-VHT20	5180	14	1	3.5	18.5	70.7946	1	0.0141
	5220	14	1	3.5	18.5	70.7946	1	0.0141
	5240	14	1	3.5	18.5	70.7946	1	0.0141
	5260	14	1	3.5	18.5	70.7946	1	0.0141
	5300	14	1	3.5	18.5	70.7946	1	0.0141
	5320	14	1	3.5	18.5	70.7946	1	0.0141
	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	14	1	3.5	18.5	70.7946	1	0.0141
	5785	14	1	3.5	18.5	70.7946	1	0.0141
	5825	14	1	3.5	18.5	70.7946	1	0.0141
IEEE 802.11n-HT40	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	14	1	3.5	18.5	70.7946	1	0.0141
	5550	14	1	3.5	18.5	70.7946	1	0.0141
	5670	14	1	3.5	18.5	70.7946	1	0.0141
	5755	14	1	3.5	18.5	70.7946	1	0.0141
	5795	14	1	3.5	18.5	70.7946	1	0.0141
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	14	1	3.5	18.5	70.7946	1	0.0141
	5550	14	1	3.5	18.5	70.7946	1	0.0141
	5670	14	1	3.5	18.5	70.7946	1	0.0141
	5755	14	1	3.5	18.5	70.7946	1	0.0141
	5795	14	1	3.5	18.5	70.7946	1	0.0141
IEEE 802.11ac-VHT80	5210	14	1	3.5	18.5	70.7946	1	0.0141
	5290	14	1	3.5	18.5	70.7946	1	0.0141
	5530	14	1	3.5	18.5	70.7946	1	0.0141
	5775	14	1	3.5	18.5	70.7946	1	0.0141

3.4.1.4 Results for RSS-102 Issue 5

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)
SISO	IEEE 802.11b	2412	21	1	3.5	25.5	0.3548	2.6840
		2437	21	1	3.5	25.5	0.3548	2.7030
		2462	21	1	3.5	25.5	0.3548	2.7219
	IEEE 802.11g	2412	23	1	3.5	27.5	0.5623	2.6840
		2437	23	1	3.5	27.5	0.5623	2.7030
		2462	23	1	3.5	27.5	0.5623	2.7219
	IEEE 802.11n-HT20	2412	20	1	3.5	24.5	0.2818	2.6840
		2437	20	1	3.5	24.5	0.2818	2.7030
		2462	20	1	3.5	24.5	0.2818	2.7219
IEEE 802.11n-HT40	2422	21	1	3.5	25.5	0.3548	2.6916	
	2437	21	1	3.5	25.5	0.3548	2.7030	
	2452	21	1	3.5	25.5	0.3548	2.7144	

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

UTTR-RF-RSS102-V1.1

OSIS	IEEE 802.11a	5180	14	1	3.5	18.5	0.0708	4.5253
		5220	14	1	3.5	18.5	0.0708	4.5491
		5240	14	1	3.5	18.5	0.0708	4.5610
		5260	14	1	3.5	18.5	0.0708	4.5729
		5300	14	1	3.5	18.5	0.0708	4.5966
		5320	14	1	3.5	18.5	0.0708	4.6085
		5500	15	1	3.5	19.5	0.0891	4.7145
		5580	15	1	3.5	19.5	0.0891	4.7613
		5700	15	1	3.5	19.5	0.0891	4.8310
		5745	14	1.5	3.5	19.0	0.0794	4.8570
		5785	14	1.5	3.5	19.0	0.0794	4.8801
		5825	14	1.5	3.5	19.0	0.0794	4.9031
	IEEE 802.11n-HT20	5180	14	1	3.5	18.5	0.0708	4.5253
		5220	14	1	3.5	18.5	0.0708	4.5491
		5240	14	1	3.5	18.5	0.0708	4.5610
		5260	14	1	3.5	18.5	0.0708	4.5729
		5300	14	1	3.5	18.5	0.0708	4.5966
		5320	14	1	3.5	18.5	0.0708	4.6085
		5500	15	1	3.5	19.5	0.0891	4.7145
		5580	15	1	3.5	19.5	0.0891	4.7613
		5700	15	1	3.5	19.5	0.0891	4.8310
		5745	14	1.5	3.5	19.0	0.0794	4.8570
		5785	14	1.5	3.5	19.0	0.0794	4.8801
		5825	14	1.5	3.5	19.0	0.0794	4.9031
	IEEE 802.11ac-VHT20	5180	14	1	3.5	18.5	0.0708	4.5312
		5220	14	1	3.5	18.5	0.0708	4.5551
		5240	14	1	3.5	18.5	0.0708	4.5789
		5260	14	1	3.5	18.5	0.0708	4.6026
		5300	14	1	3.5	18.5	0.0708	4.7204
		5320	14	1	3.5	18.5	0.0708	4.7437
		5500	15	1	3.5	19.5	0.0891	4.8136
		5580	15	1	3.5	19.5	0.0891	4.8628
		5700	15	1	3.5	19.5	0.0891	4.8859
		5745	14	1	3.5	18.5	0.0708	4.5253
		5785	14	1	3.5	18.5	0.0708	4.5491
		5825	14	1	3.5	18.5	0.0708	4.5610
	IEEE 802.11n-HT40	5190	14	1	3.5	18.5	0.0708	4.5729
		5230	14	1	3.5	18.5	0.0708	4.5966
		5270	14	1	3.5	18.5	0.0708	4.6085
		5310	14	1	3.5	18.5	0.0708	4.7145
		5510	14	1	3.5	18.5	0.0708	4.7613
		5550	14	1	3.5	18.5	0.0708	4.8310
		5670	14	1	3.5	18.5	0.0708	4.8570
		5755	14	1	3.5	18.5	0.0708	4.8801
	IEEE 802.11ac-VHT40	5795	14	1	3.5	18.5	0.0708	4.9031
		5190	14	1	3.5	18.5	0.0708	4.5312
		5230	14	1	3.5	18.5	0.0708	4.5551
		5270	14	1	3.5	18.5	0.0708	4.5789
		5310	14	1	3.5	18.5	0.0708	4.6026
		5510	14	1	3.5	18.5	0.0708	4.7204
		5550	14	1	3.5	18.5	0.0708	4.7437
		5670	14	1	3.5	18.5	0.0708	4.8136
		5755	14	1	3.5	18.5	0.0708	4.8628
		5795	14	1	3.5	18.5	0.0708	4.8859

OSIS	IEEE 802.11ac-VHT80	5210	14	1	3.5	18.5	0.0708	4.5432
		5290	14	1	3.5	18.5	0.0708	4.5907
		5530	14	1	3.5	18.5	0.0708	4.7321
		5775	14	1	3.5	18.5	0.0708	4.8743

3.4.2 For BT

For BT_LE function, operating at 2402MHz to 2480 MHz for GFSK and

For BT_EDR function, operating at 2402MHz to 2480 MHz for GFSK, $\pi/4$ DQPSK, 8DPSK

3.4.2.1 Antenna Type:

Dipole Antenna

3.4.2.2 Antenna Gain:

2402MHz to 2480 MHz: 5.0 dBi

3.4.2.3 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)	(dBm)	(dBm)	(dBm)	(mW)	(mW /cm ²)	
LE	2402-2480	6	1	5.0	12.0	15.8489	1	0.0032
EDR	2402-2480	10	1	5.0	16.0	39.8107	1	0.0079

3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(W)	(W)
LE	2402-2480	6	1	5.0	12.0	0.0158	2.6764
EDR	2402-2480	10	1	5.0	16.0	0.0398	2.6764

3.4.3 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 + BT	Support
2	5G_WLAN + BT	Support
3	2.4G _WLAN + 5G_WLAN	Not Support

3.4.4.1 Results for transmit simultaneously

FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value			Limits
		WLAN (mw/cm ²)	BT (mw/cm ²)	Transmit simultaneously	
1	2.4G _WLAN + BT	0.1119	0.0079	0.1198	1
2	5G_WLAN + BT	0.0177	0.0079	0.0256	1

Note:
According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:
Transmit simultaneously MPE = Σ of MPE ratios
MPE ratios = Field strengths or power density / MPE limit at the test frequency

RSS-102 Issue 5

No.	Configurations	Maximum MPE Value					Limits
		WLAN		BT		Transmit simultaneously	
		W	(w/m ²)	W	(w/m ²)		
1	2.4G _WLAN + BT	0.5623	1.1187	0.0398	0.0792	0.4464	1
2	5G_WLAN + BT	0.0891	0.1773	0.0398	0.0792	0.0672	1

Note:

According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Σ of MPE ratios

MPE ratios = Field strengths or power density / MPE limit at the test frequency

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.
