

TEST REPORT

Product Name : Bubble Gum True Wireless Air

Brand Mark : iLuv

Model No. : BBGTWSAIR
BBGTWSAIRBK, BBGTWSAIRBL,
BBGTWSAIRGD, BBGTWSAIRMG,
BBGTWSAIRRD, BBGTWSAIRRG,
BBGTWSAIRSG, BBGTWSAIRWH,

Extension Model : BBGTWSAIRKCBK, BBGTWSAIRKCBL,
BBGTWSAIRKCRG, BBGTWSAIRKCWH,
TB100, TB100BK, TB100BL, TB100CR, TB100GN,
TB100MG, TB100MT, TB100PBL, TB100PU,
TB100RG, TB100SG, TB100WH

FCC ID : ATL-TB100

Report Number : BLA-EMC-202012-A1001

Date of Sample Receipt : 2020/12/1

Date of Test : 2020/12/1 to 2020/12/14

Date of Issue : 2020/12/17

Test Standard : 47 CFR Part 15, Subpart C 15.247

Test Result : Pass

Prepared for:

iLuv Creative Technology

2 Harbor Park Drive, Port Washington, NY11050, USA

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

**Building C, No. 107, Shihuan Road, Shiyuan Sub-District, Baoan District,
Shenzhen, Guangdong Province, China**

TEL: +86-755-23059481



Compiled by:

Jozu

Review by:

Sweet. Liang

Approved by:

Jamen Li

Date:

2020/12/17



REPORT REVISE RECORD

Version No.	Date	Description
00	2020/12/17	Original

TABLE OF CONTENTS

1	TEST SUMMARY	6
2	GENERAL INFORMATION	7
3	GENERAL DESCRIPTION OF E.U.T.	7
4	TEST ENVIRONMENT	8
5	TEST MODE	8
6	MEASUREMENT UNCERTAINTY	8
7	DESCRIPTION OF SUPPORT UNIT.....	9
8	LABORATORY LOCATION.....	9
9	TEST INSTRUMENTS LIST	10
	ANTENNA REQUIREMENT.....	14
	CONCLUSION.....	14
	CONDUCTED BAND EDGES MEASUREMENT	15
	LIMITS.....	15
	BLOCK DIAGRAM OF TEST SETUP.....	15
	TEST DATA	16
	DWELL TIME.....	17
	LIMITS.....	17
	BLOCK DIAGRAM OF TEST SETUP.....	17
	TEST DATA	18
	HOPPING CHANNEL NUMBER.....	19
	LIMITS.....	19
	BLOCK DIAGRAM OF TEST SETUP.....	19
	TEST DATA	19
	CARRIER FREQUENCIES SEPARATION	20
	LIMITS.....	20
	BLOCK DIAGRAM OF TEST SETUP.....	20
	TEST DATA	20
	20DB BANDWIDTH	21
	BLOCK DIAGRAM OF TEST SETUP.....	21

TEST DATA	21
CONDUCTED PEAK OUTPUT POWER	22
LIMITS.....	22
BLOCK DIAGRAM OF TEST SETUP	22
TEST DATA	23
CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	24
LIMITS.....	24
BLOCK DIAGRAM OF TEST SETUP	24
PROCEDURE	24
TEST DATA	26
RADIATED SPURIOUS EMISSIONS	28
LIMITS.....	28
BLOCK DIAGRAM OF TEST SETUP	29
PROCEDURE	29
TEST DATA	31
RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	39
LIMITS.....	39
BLOCK DIAGRAM OF TEST SETUP	40
PROCEDURE	40
TEST DATA	42
CONDUCTED SPURIOUS EMISSIONS.....	46
LIMITS.....	46
BLOCK DIAGRAM OF TEST SETUP	46
TEST DATA	47
10 APPENDIX.....	48
10.1 APPENDIXA: 20DBEMISSION BANDWIDTH	48
<i>Test Result</i>	48
<i>Test Graphs</i>	49
10.2 APPENDIXC: MAXIMUM CONDUCTED OUTPUT POWER	51
<i>Test Result</i>	51
<i>Test Graphs</i>	52
10.3 APPENDIXD: CARRIER FREQUENCY SEPARATION.....	55
<i>Test Result</i>	55

Test Graphs	56
10.4 APPENDIXE: TIME OF OCCUPANCY	57
Test Result	57
Test Graphs	58
10.5 APPENDIXF: NUMBER OF HOPPING CHANNELS	60
Test Result	60
Test Graphs	61
10.6 APPENDIXG: BAND EDGE MEASUREMENTS	62
Test Result	62
Test Graphs	63
10.7 APPENDIXH: CONDUCTED SPURIOUS EMISSION	66
Test Result	66
Test Graphs	67
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	73
APPENDIX B: PHOTOGRAPHS OF EUT	75

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass

2 GENERAL INFORMATION

Applicant	iLuv Creative Technology
Address	2 Harbor Park Drive, Port Washington, NY11050, USA
Manufacturer	Shenzhen Swetz Sound Technology Co., Limited
Address	No.18, Xiantian Road, Xinsheng Community, Longgang Street, Longgang District, Shenzhen
Factory	Shenzhen Swetz Sound Technology Co., Limited
Address	No.18, Xiantian Road, Xinsheng Community, Longgang Street, Longgang District, Shenzhen
Product Name	Bubble Gum True Wireless Air
Test Model No.	BBGTWSAIR

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V01
Software Version	V1.01
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK, pi/4DQPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Internal Antenna
Antenna Gain:	1.0dBi(Provided by the customer)

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	DC3.7V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (hopping and non hopping mode all have been tested, non hopping mode is worse case for RE)
Remark: Full battery is used during all test except ac conducted emission, DH1,DH3, DH5 all have been tested, during the test, GFSK, Pi/4QPSK modulation were all pre-scanned Only worst mode would be recorded in this report.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A
AC Adapter	HTC	TC P300	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyao Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Conducted Band Edges Measurement					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Dwell Time					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Hopping Channel Number					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Carrier Frequencies Separation					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due

Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of 20dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Peak Output Power

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	6/10/2018	6/9/2021
Receiver	R&S	ESPI3	101082	4/20/2020	4/19/2021

LISN	R&S	ENV216	3560.6550.15	7/1/2020	6/30/2021
LISN	AT	AT166-2	AKK1806000003	12/17/2019	12/16/2020
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

Test Equipment Of Radiated Spurious Emissions

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2018	7/13/2021
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2018	7/13/2021
Amplifier	SKET	PA-000318G-45	N/A	7/1/2020	6/30/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Radiated Emissions which fall in the restricted bands

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021

broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2018	7/13/2021
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2018	7/13/2021
Amplifier	SKET	PA-000318G-45	N/A	7/1/2020	6/30/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Conducted Spurious Emissions

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

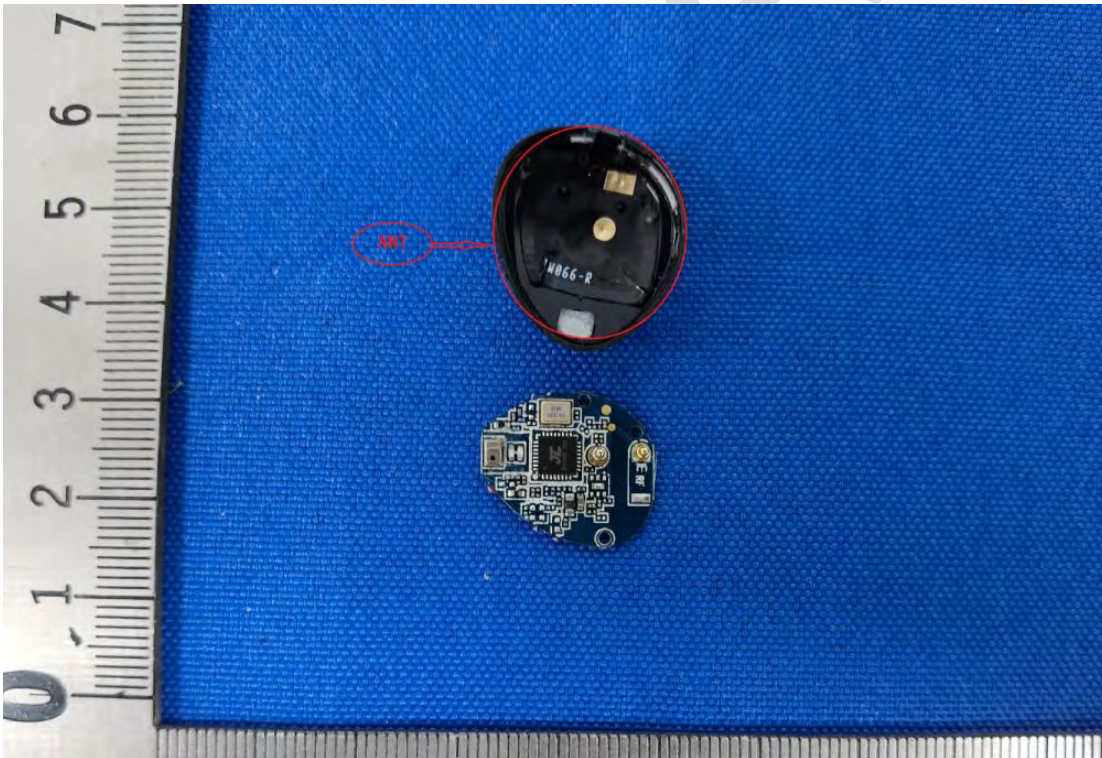
CONCLUSION

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.0dBi.



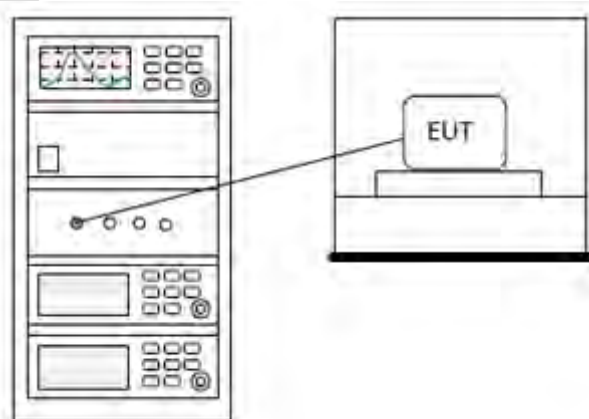
CONDUCTED BAND EDGES MEASUREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
---------------	--

BLOCK DIAGRAM OF TEST SETUP



TEST DATA**Pass: Please Refer To Appendix: Appendix1 For Details**

BlueAsia

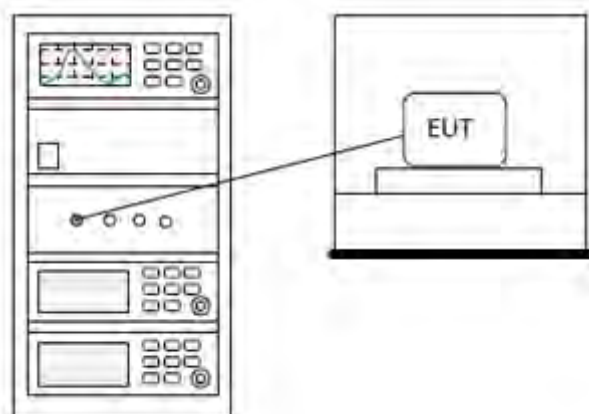
DWELL TIME

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

BLOCK DIAGRAM OF TEST SETUP



TEST DATA**Pass: Please Refer To Appendix: Appendix1 For Details**

BlueAsia

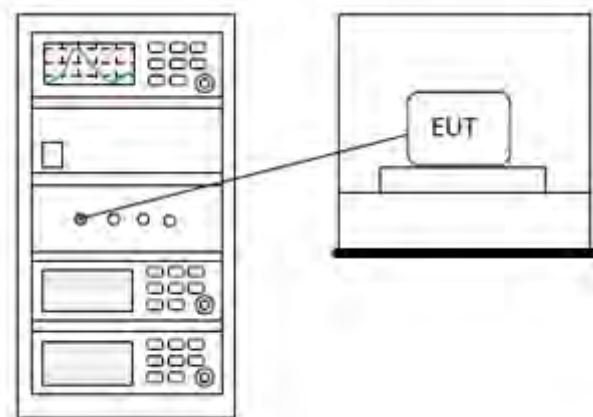
HOPPING CHANNEL NUMBER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.3
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

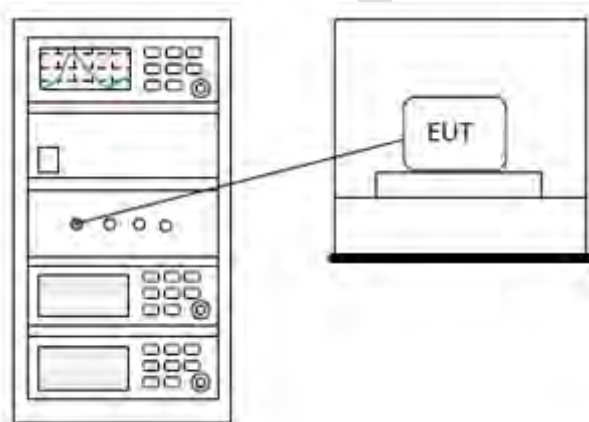
CARRIER FREQUENCIES SEPARATION

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W
---------------	--

BLOCK DIAGRAM OF TEST SETUP



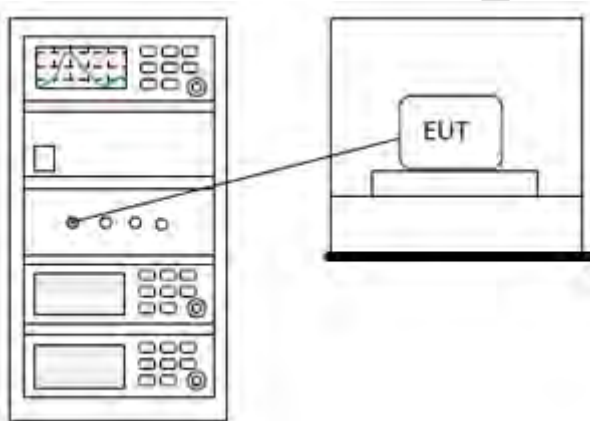
TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.7
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

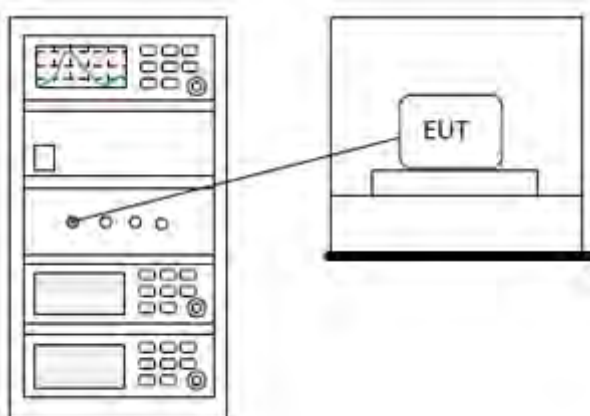
CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq \text{hopping channels} < 50$
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

BLOCK DIAGRAM OF TEST SETUP



TEST DATA**Pass: Please Refer To Appendix: Appendix1 For Details**

BlueAsia

CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

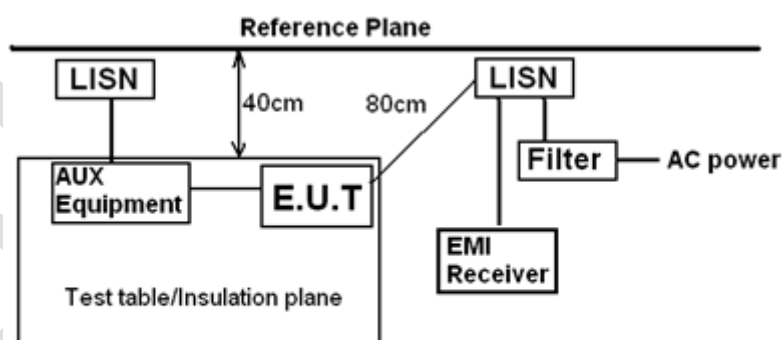
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

BLOCK DIAGRAM OF TEST SETUP



Remark
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

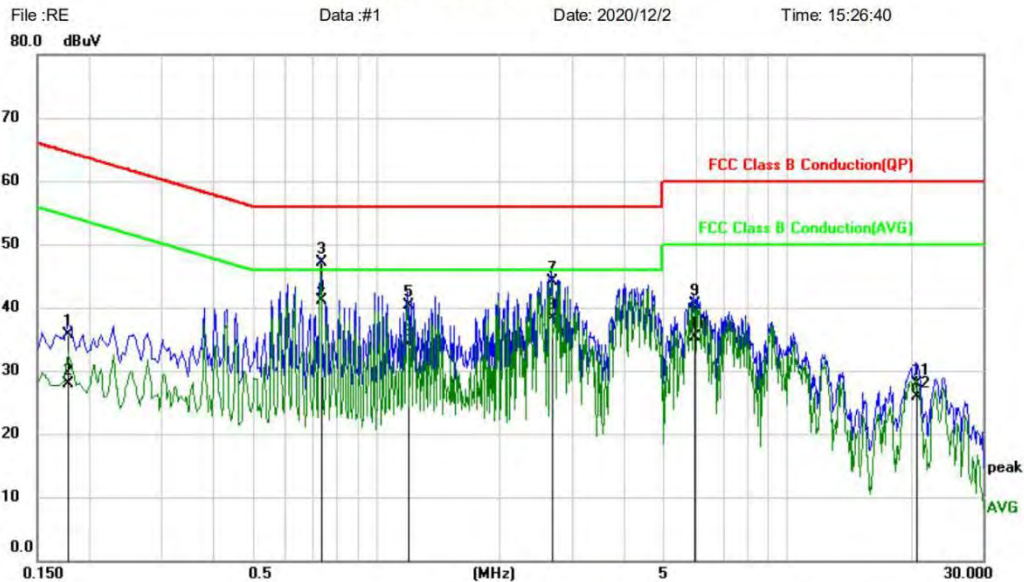
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: $LISN = Read\ Level + Cable\ Loss + LISN\ Factor$

TEST DATA

[Test Mode: TX]; [Line: Line]

Conducted Emission Measurement



Site: Phase: **L1** Temperature:
Limit: FCC Class B Conduction(QP) Power: AC 120V 60Hz Humidity: %
EUT: Bubble Gum True Wireless Air
M/N: BBGTWSAIRBK
Mode: working mode
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1780	25.84	9.82	35.66	64.58	-28.92	QP	
2		0.1780	18.15	9.82	27.97	54.58	-26.61	AVG	
3		0.7340	37.59	9.60	47.19	56.00	-8.81	QP	
4	*	0.7340	31.41	9.60	41.01	46.00	-4.99	AVG	
5		1.1940	30.55	9.70	40.25	56.00	-15.75	QP	
6		1.1940	24.47	9.70	34.17	46.00	-11.83	AVG	
7		2.6660	34.42	9.72	44.14	56.00	-11.86	QP	
8		2.6660	28.52	9.72	38.24	46.00	-7.76	AVG	
9		5.9420	30.79	9.75	40.54	60.00	-19.46	QP	
10		5.9420	25.53	9.75	35.28	50.00	-14.72	AVG	
11		20.6180	18.15	9.83	27.98	60.00	-32.02	QP	
12		20.6180	16.02	9.83	25.85	50.00	-24.15	AVG	

*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[TestMode: TX]; [Line: Neutral]

Conducted Emission Measurement



Site: Limit: FCC Class B Conduction(QP) EUT: Bubble Gum True Wireless Air M/N: BBGTWSAIRBK Mode: working mode Note:

Phase: **N** Temperature: Power: AC 120V 60Hz Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2020	25.61	9.82	35.43	63.53	-28.10	QP	
2		0.2020	17.74	9.82	27.56	53.53	-25.97	AVG	
3		0.7380	34.94	9.65	44.59	56.00	-11.41	QP	
4	*	0.7380	28.02	9.65	37.67	46.00	-8.33	AVG	
5		2.7180	29.57	9.76	39.33	56.00	-16.67	QP	
6		2.7180	21.61	9.76	31.37	46.00	-14.63	AVG	
7		4.6460	26.81	9.78	36.59	56.00	-19.41	QP	
8		4.6460	17.92	9.78	27.70	46.00	-18.30	AVG	
9		10.3340	18.92	9.83	28.75	60.00	-31.25	QP	
10		10.3340	12.51	9.83	22.34	50.00	-27.66	AVG	
11		20.8700	18.08	9.87	27.95	60.00	-32.05	QP	
12		20.8700	14.85	9.87	24.72	50.00	-25.28	AVG	

*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

RADIATED SPURIOUS EMISSIONS

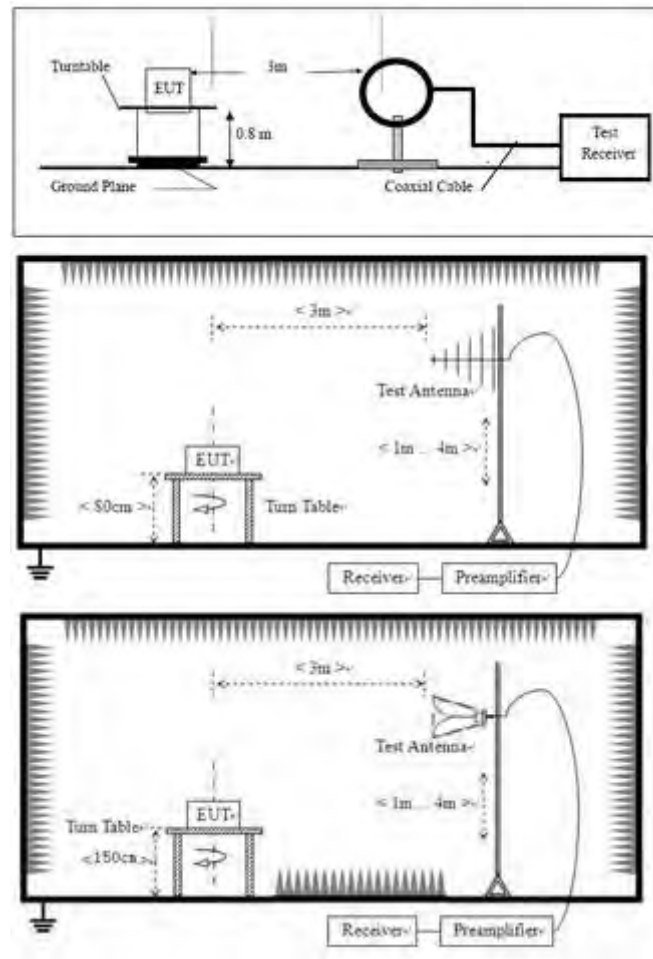
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX mode (SE) below 1G; TX mode (SE) Above 1G;
Test Mode (Final Test)	TX mode (SE) below 1G; TX mode (SE) Above 1G;
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

BLOCK DIAGRAM OF TEST SETUP



PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

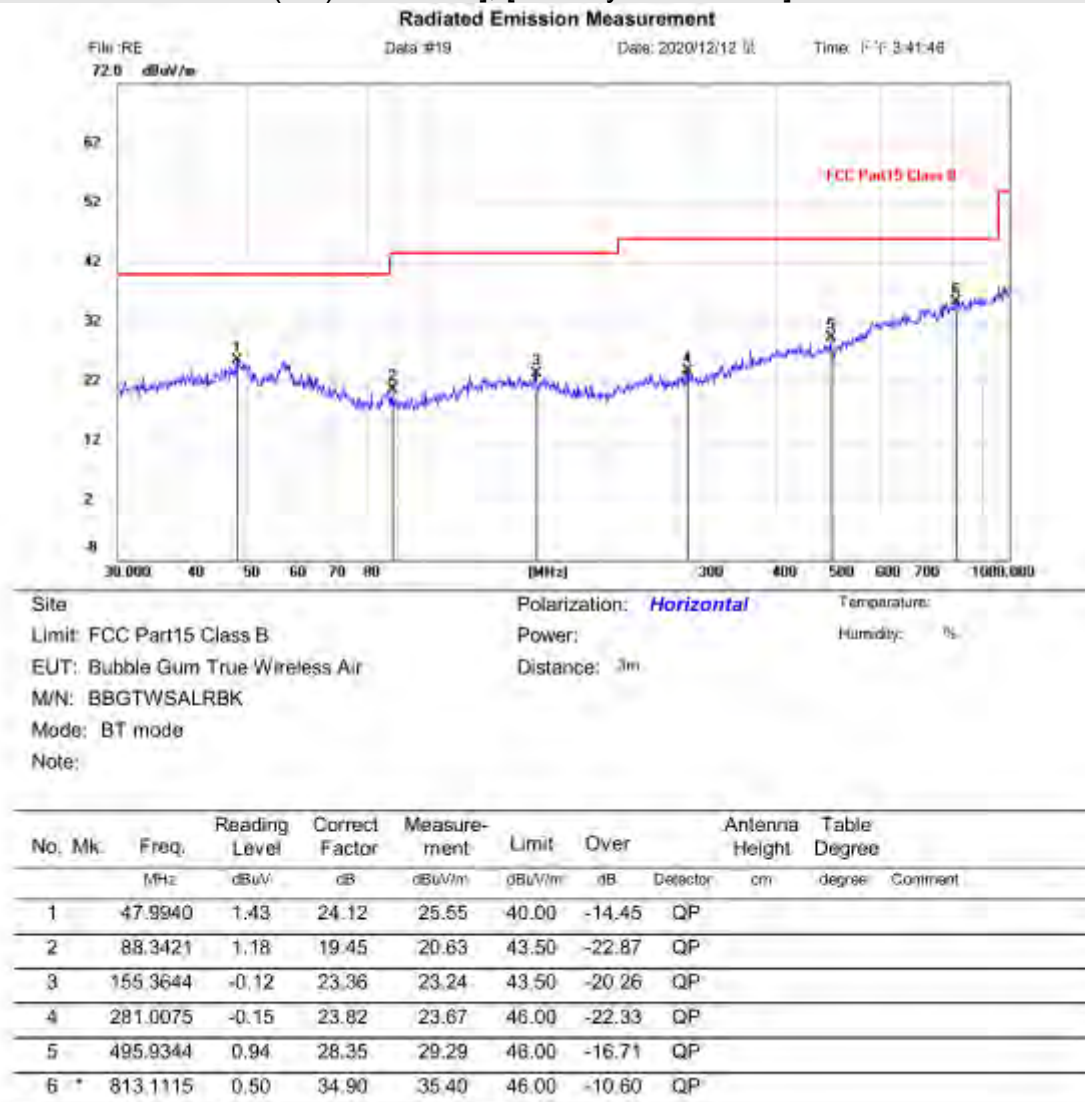
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

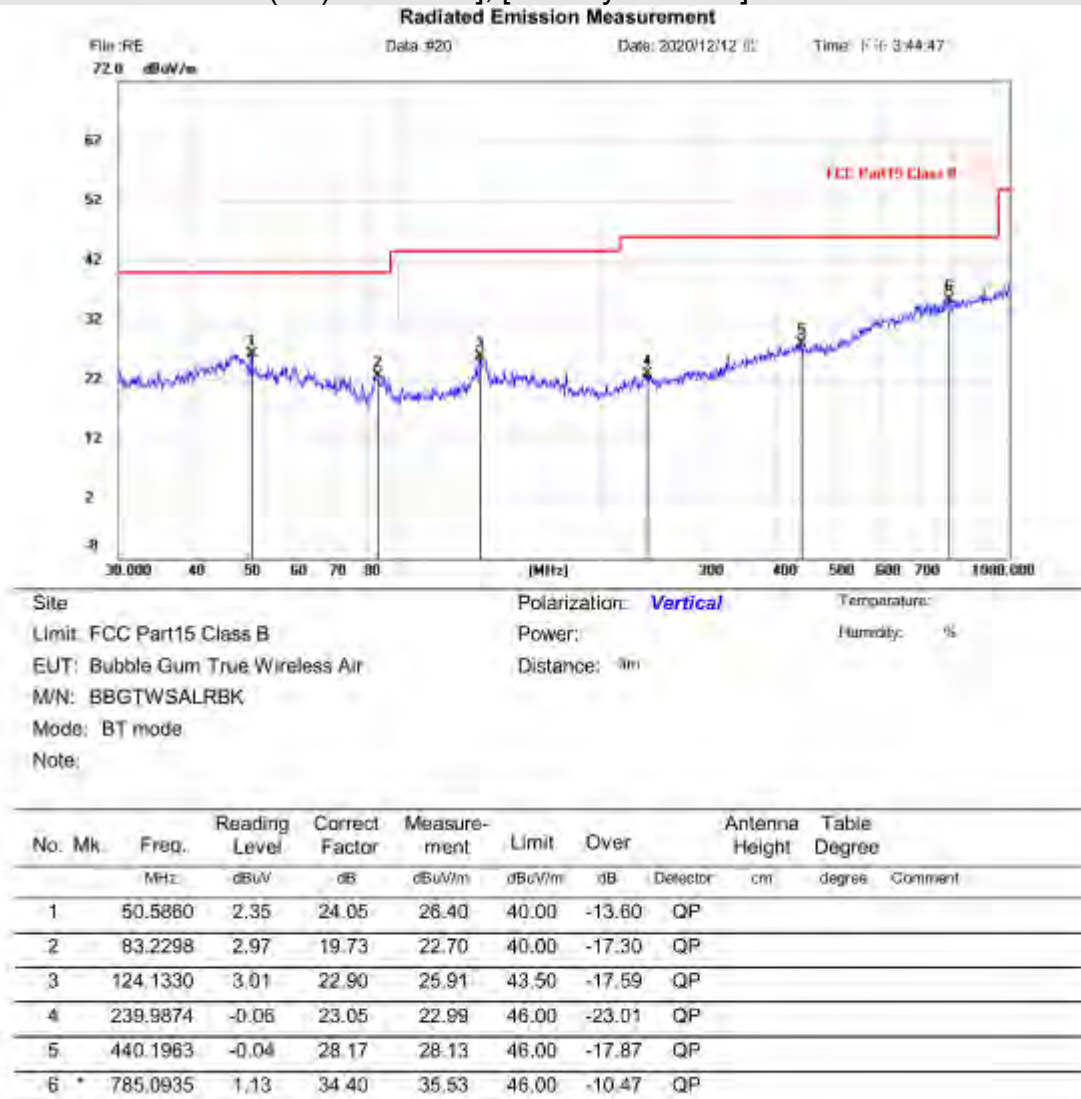
TEST DATA

[Test Mode: TX mode (SE) below 1G]; [Polarity: Horizontal]



Test Result: Pass

[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]



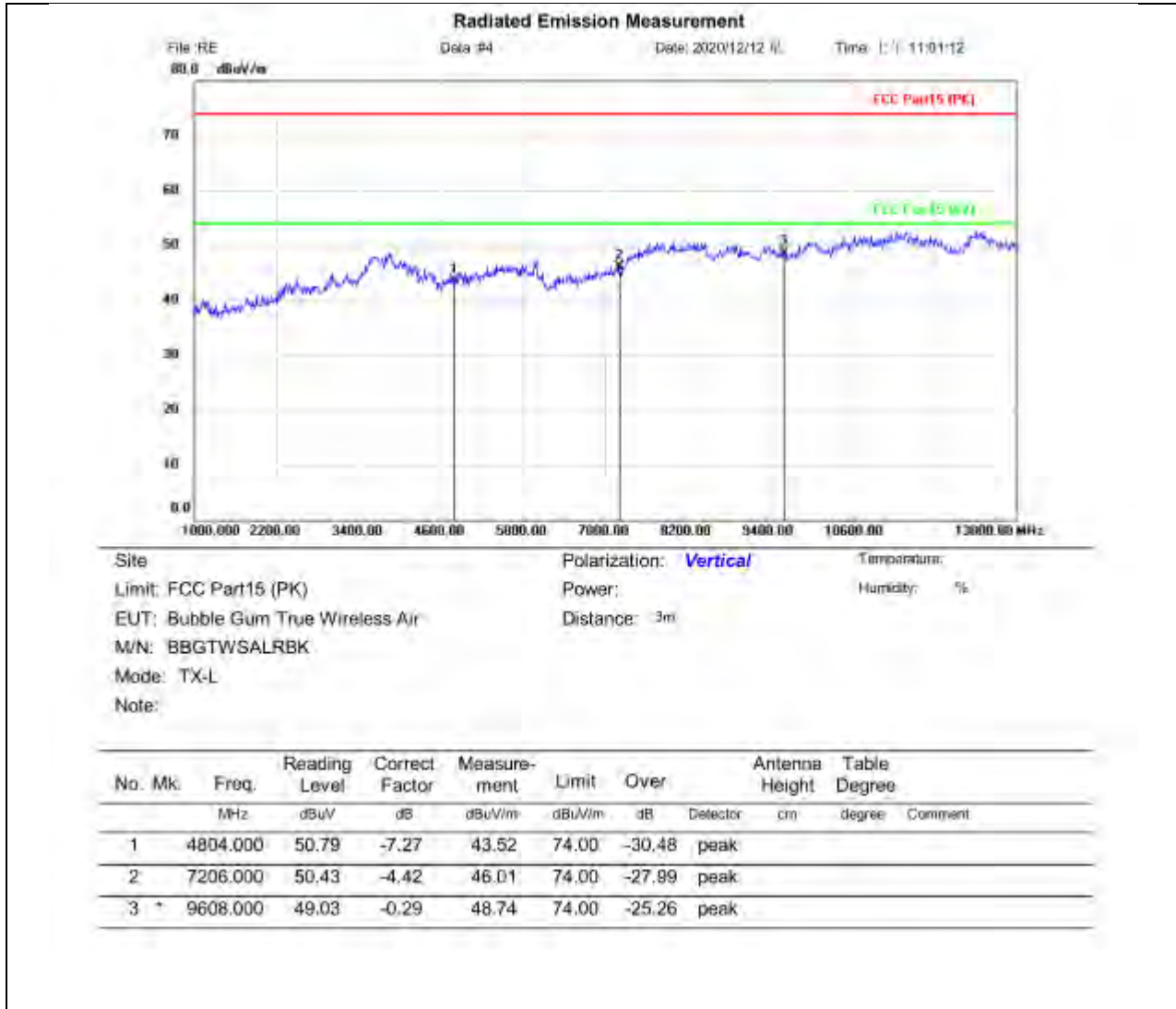
Test Result: Pass

[TestMode: TX]

Remark: During the test, pre-scan the GFSK, Pi/4QPSK modulation, and found the Pi/4QPSK modulation which it is worse case.

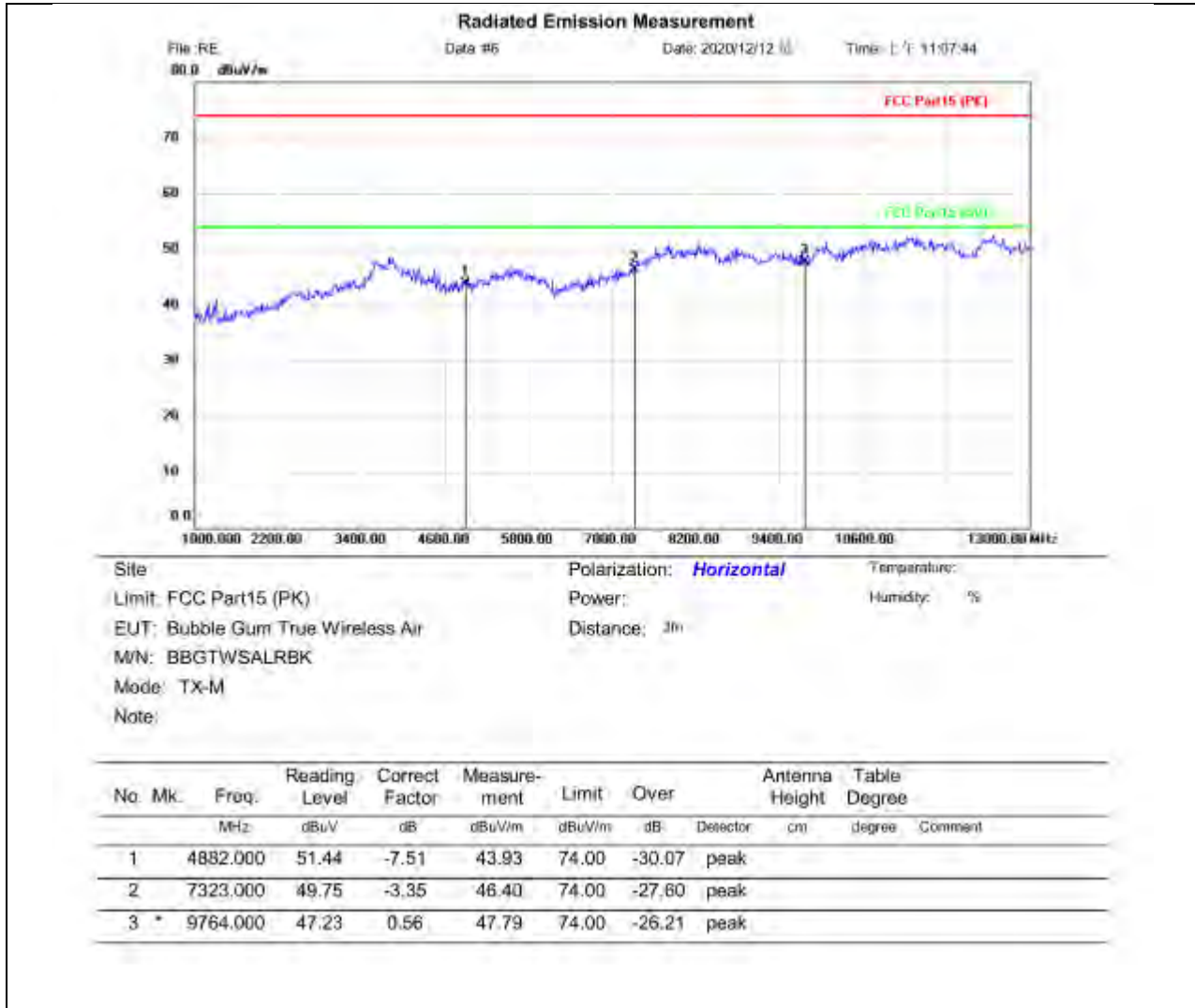
Test channel:lowest





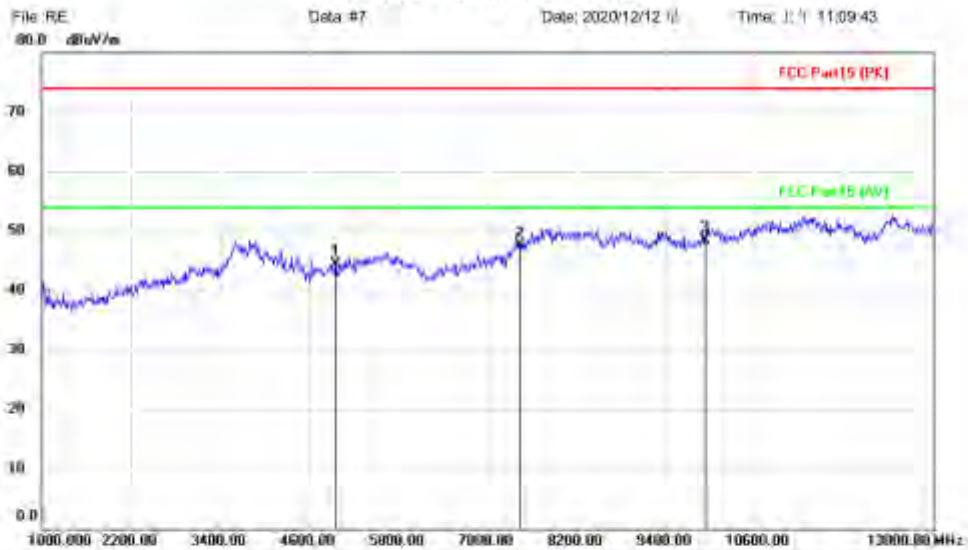
Test channel: Middle





Test channel: Highest

Radiated Emission Measurement



Site: Limit: FCC Part 15 (PK) EUT: Bubble Gum True Wireless Air M/N: BBGTWSALRBK Mode: TX-H Note:

Polarization: **Horizontal** Power: Distance: 3m Temperature: Humidity: %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		4960.000	51.57	-6.99	44.58	74.00	-29.42	peak			
2		7440.000	50.01	-2.43	47.58	74.00	-26.42	peak			
3	*	9920.000	46.80	1.63	48.43	74.00	-25.57	peak			



RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

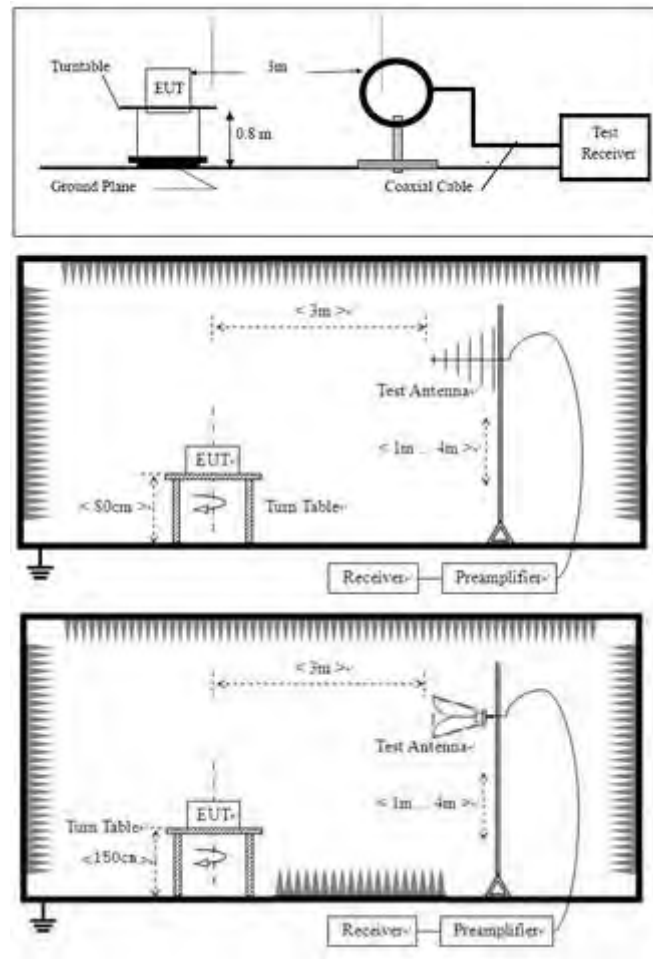
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

BLOCK DIAGRAM OF TEST SETUP



PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

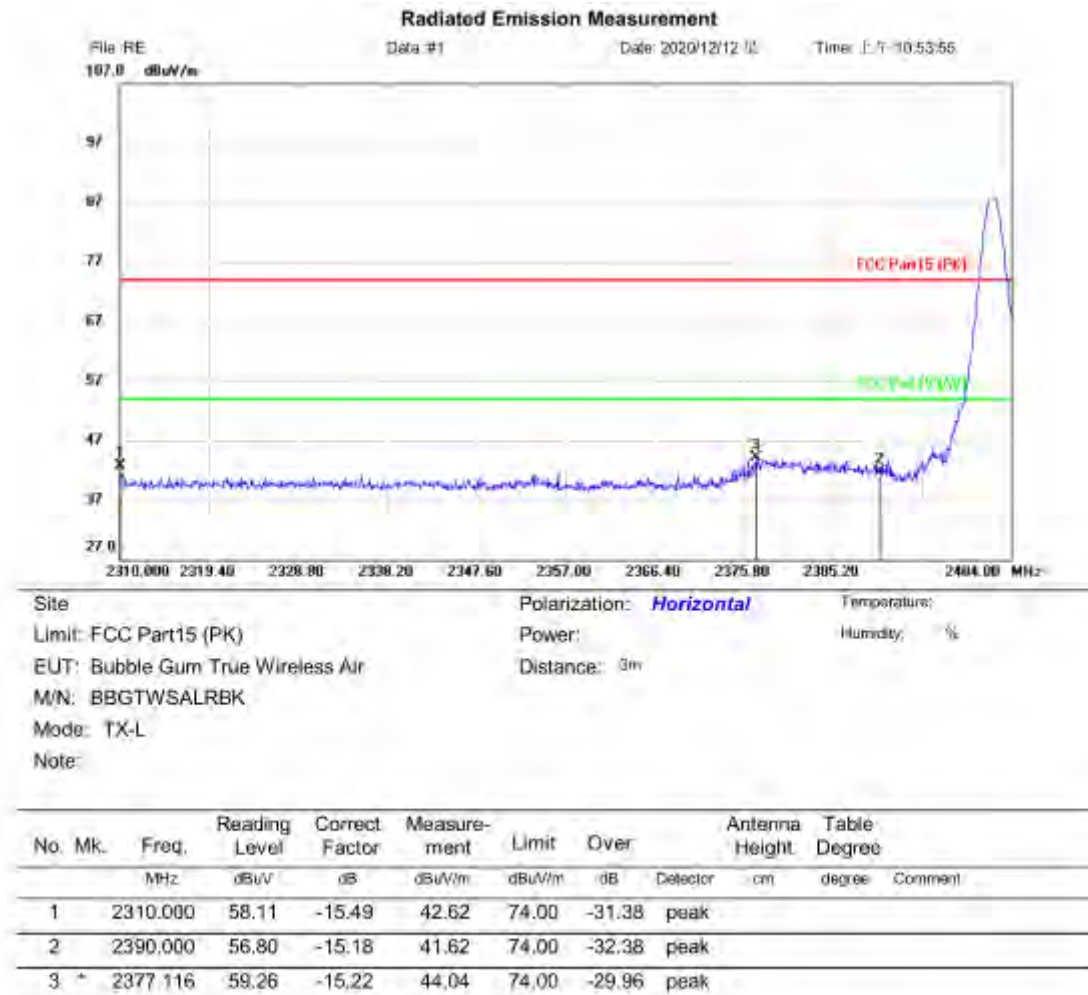
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

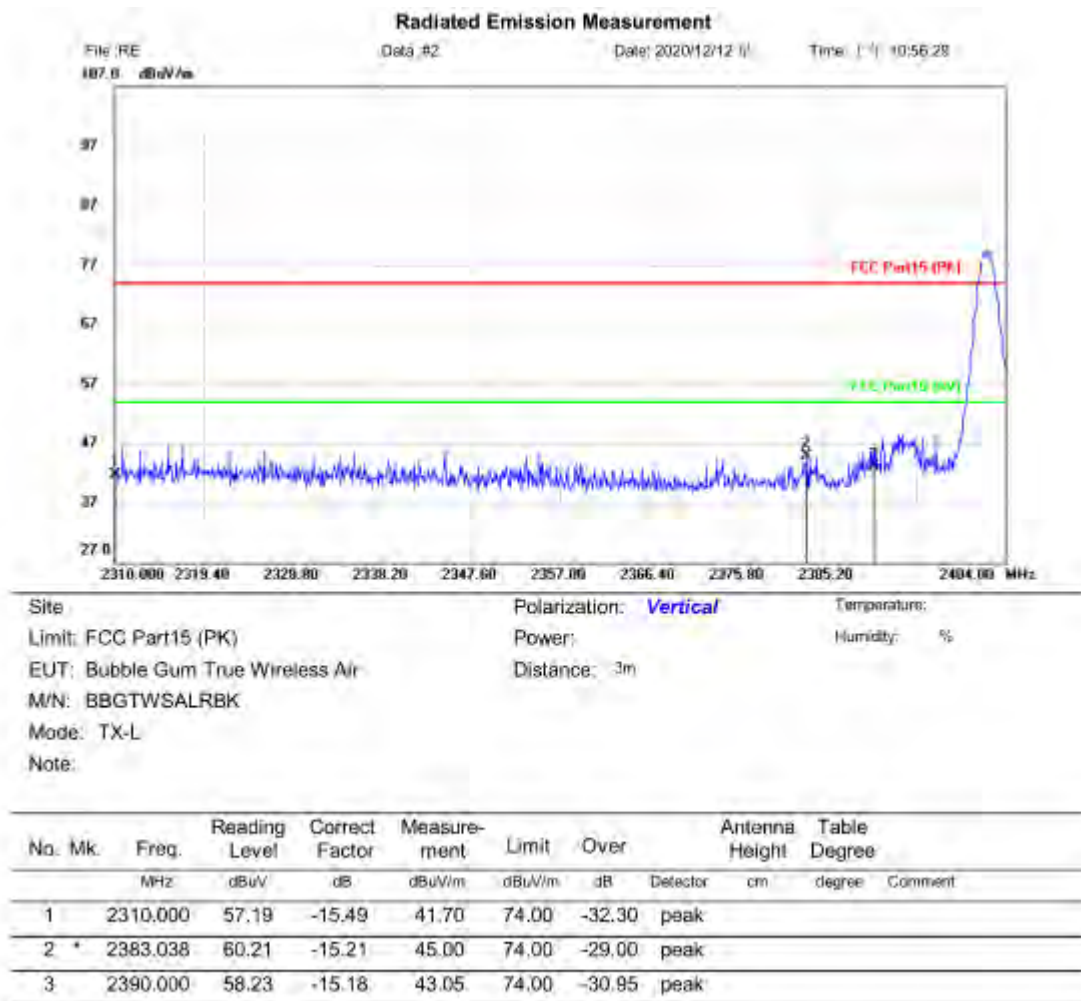
BlueAsia

TEST DATA

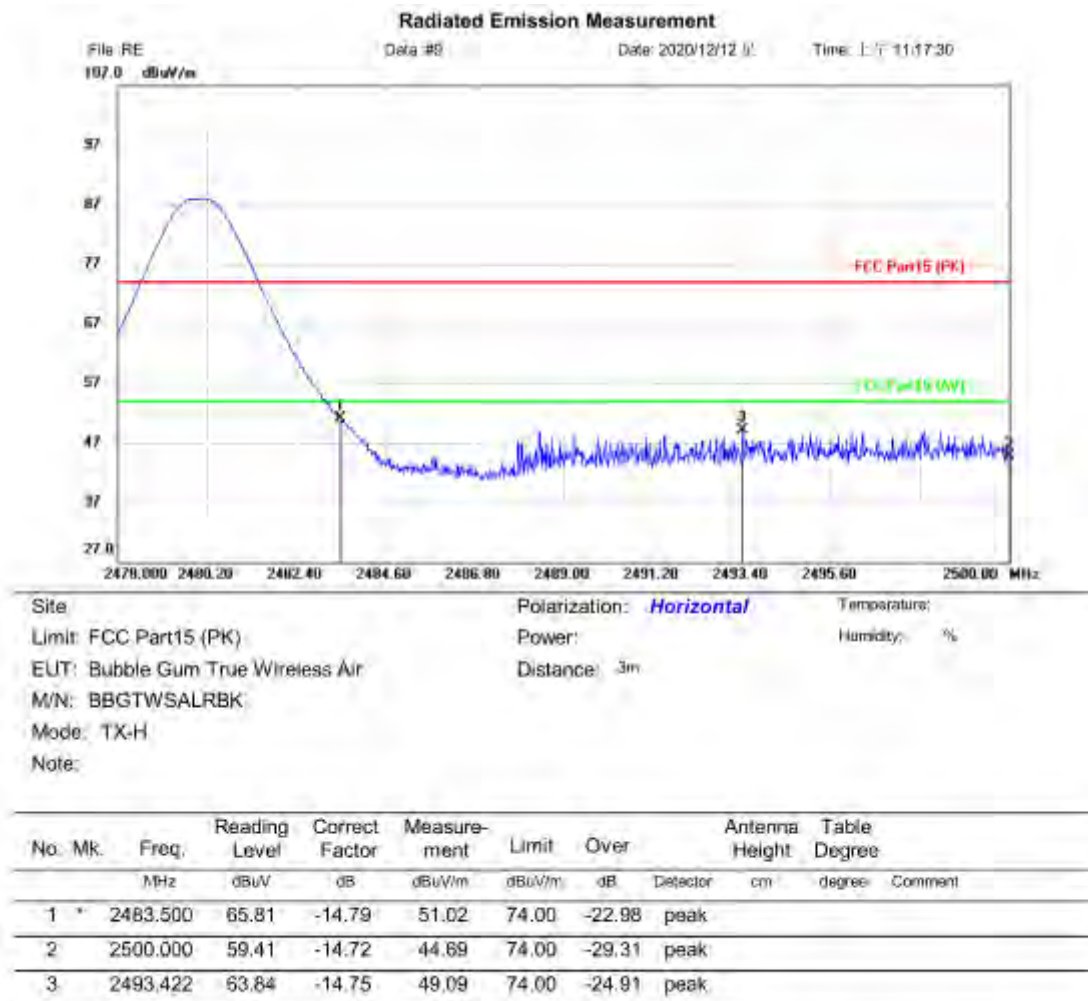
Remark: During the test, pre-scan the GFSK, Pi/4QPSK modulation, and found the Pi/4QPSK modulation which it is worse case.

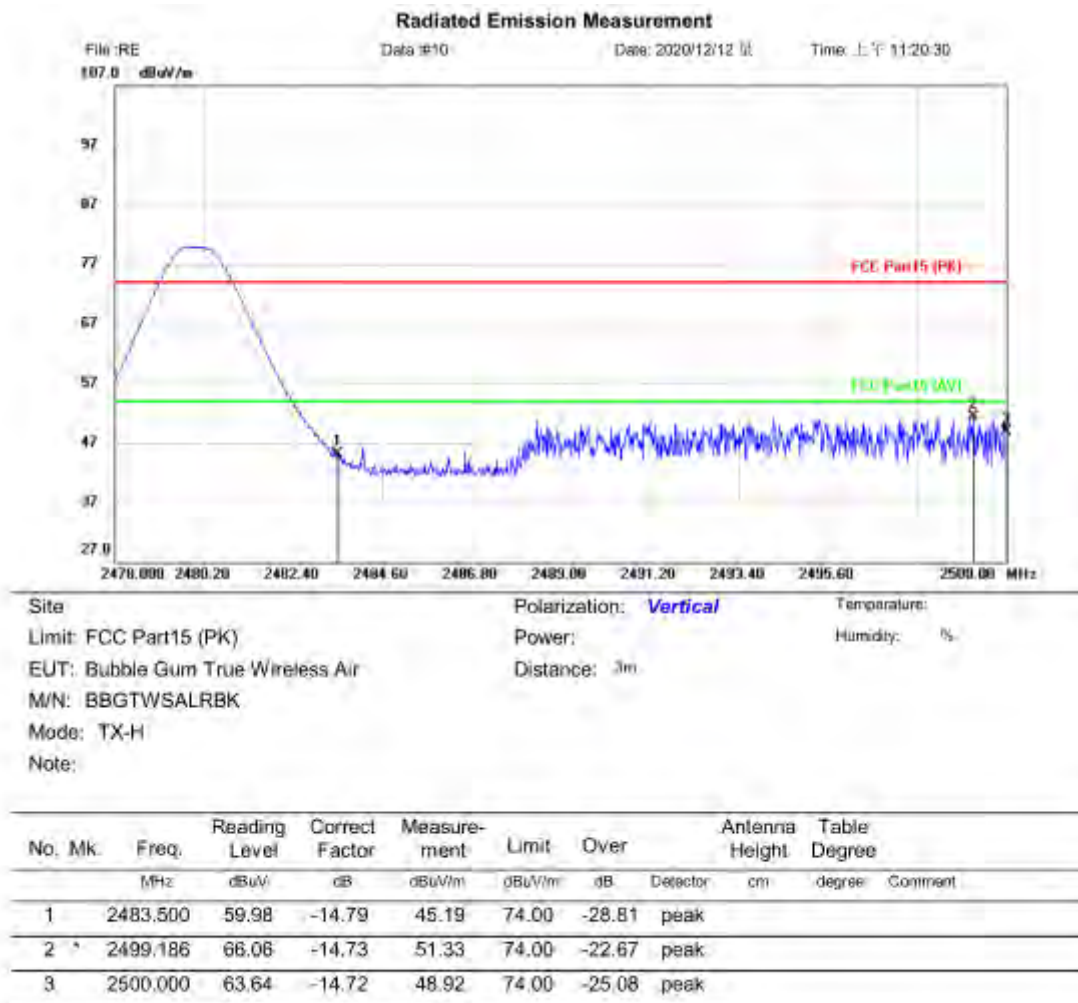
Lowest channel





Highest channel





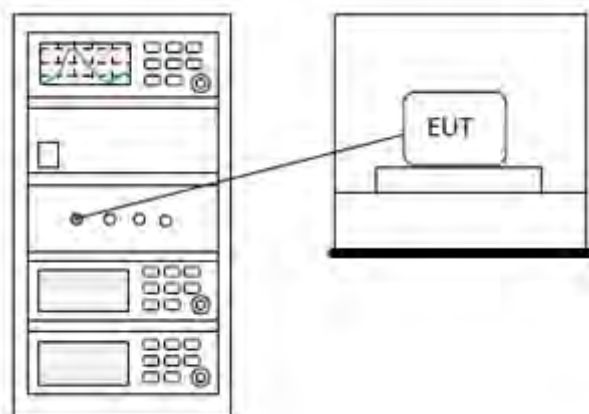
CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
---------------	--

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia

10 APPENDIX

Appendix1

10.1 APPENDIX A: 20DB EMISSION BANDWIDTH

Test Result

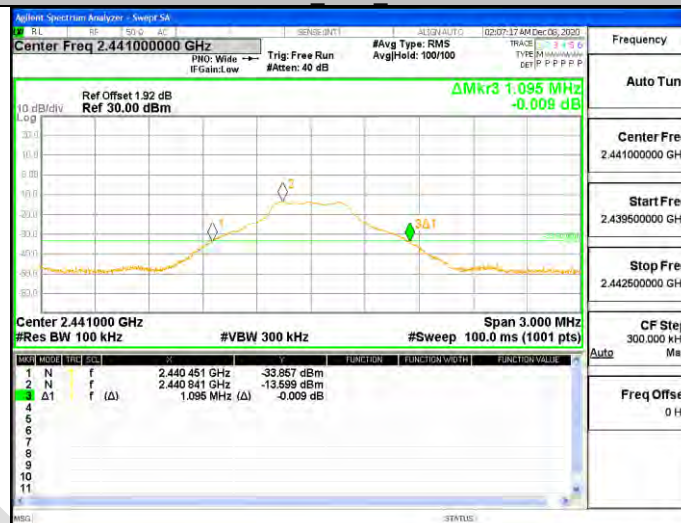
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	1.095	2401.448	2402.543	---	PASS
		2441	1.095	2440.451	2441.546	---	PASS
		2480	1.095	2479.448	2480.543	---	PASS
2DH1	Ant1	2402	1.383	2401.304	2402.687	---	PASS
		2441	1.377	2440.301	2441.678	---	PASS
		2480	1.383	2479.298	2480.681	---	PASS

Test Graphs

DH1 Ant1 2402



DH1 Ant1 2441



DH1 Ant1 2480



2DH1 Ant1 2402

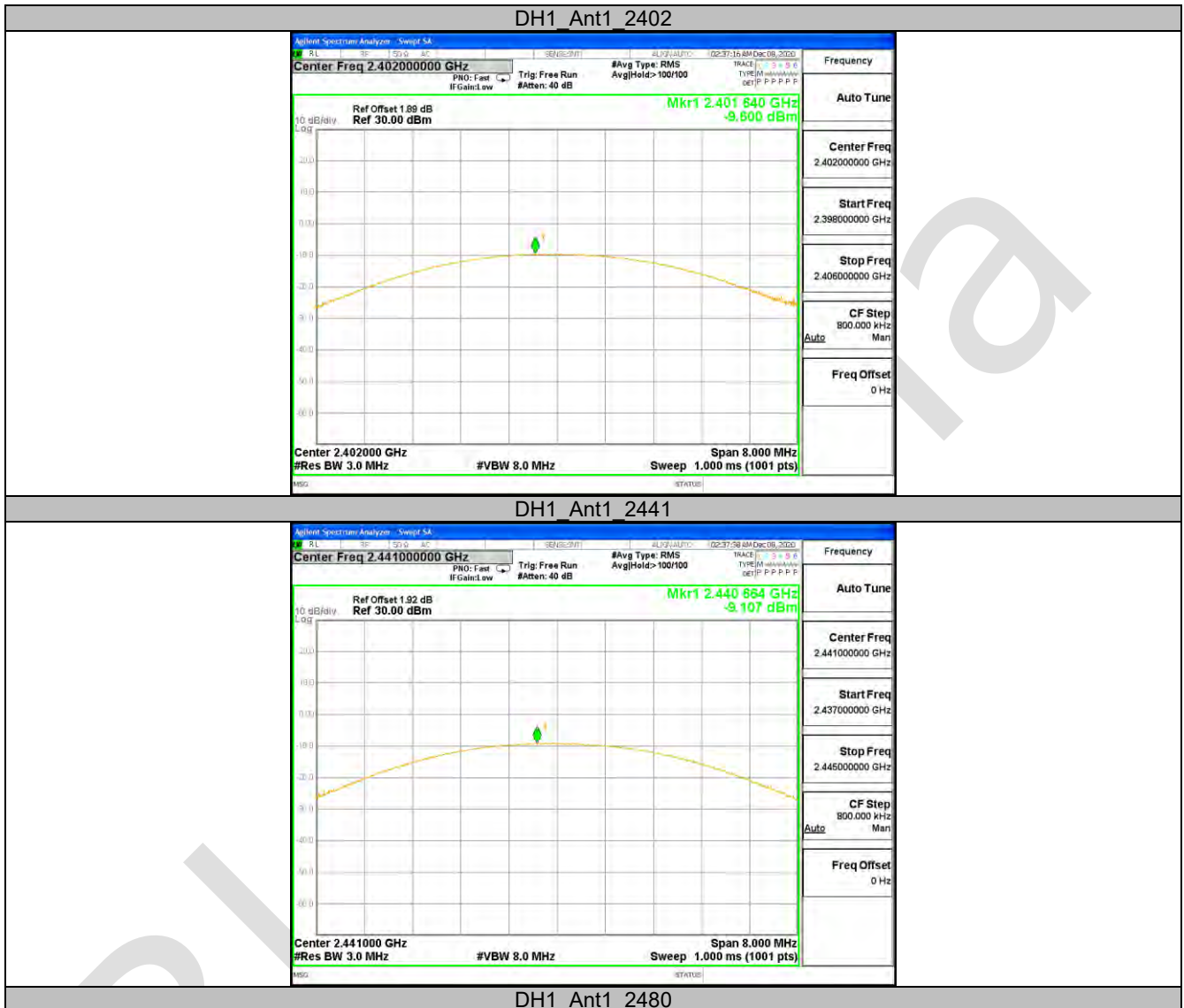


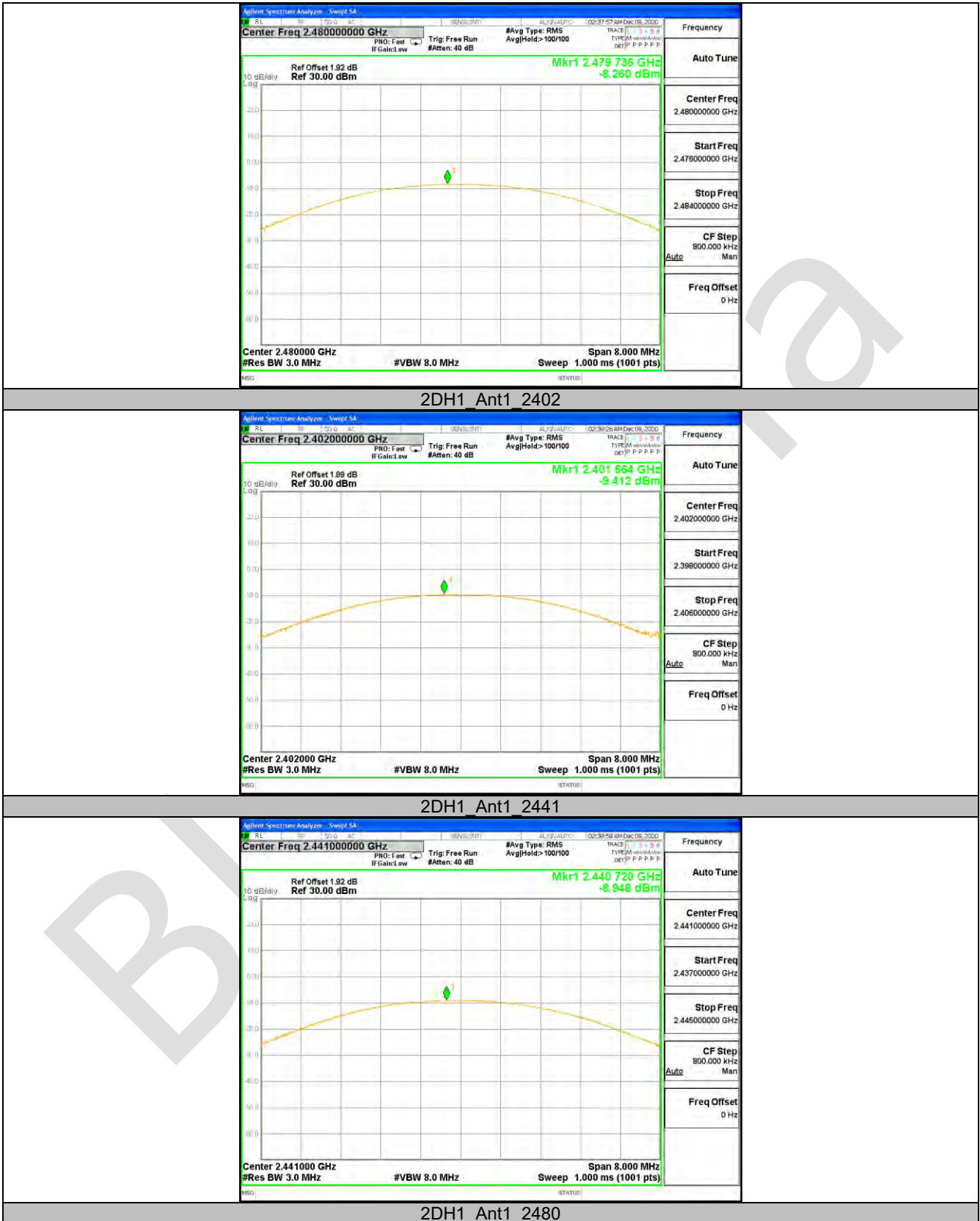
10.2 APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER

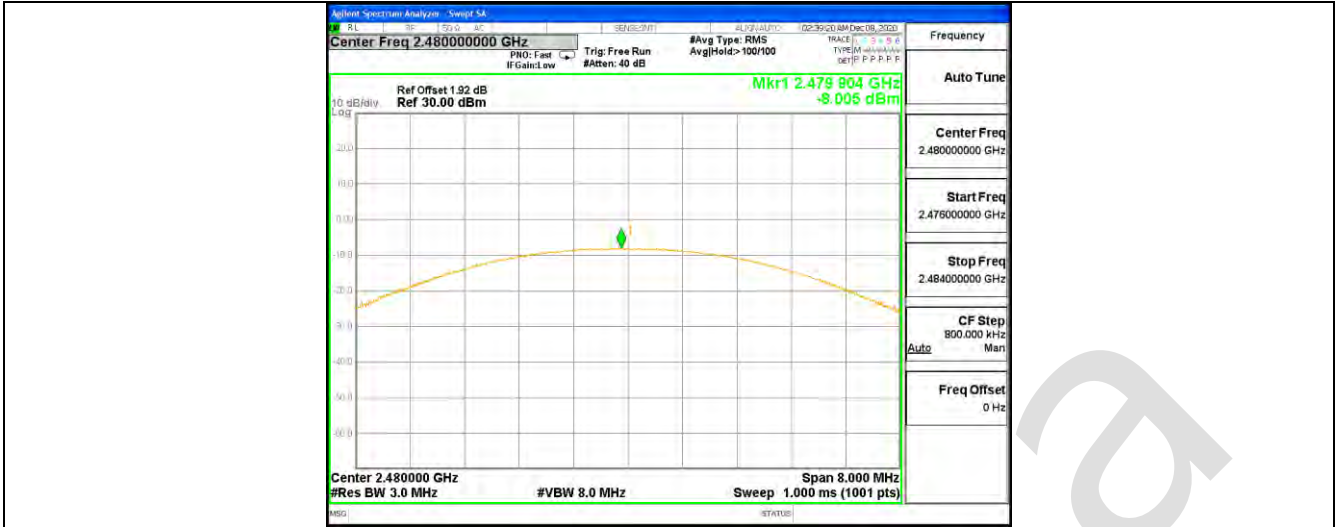
Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH1	Ant1	2402	-9.6	<=20.97	PASS
		2441	-9.11	<=20.97	PASS
		2480	-8.26	<=20.97	PASS
2DH1	Ant1	2402	-9.41	<=20.97	PASS
		2441	-8.95	<=20.97	PASS
		2480	-8.01	<=20.97	PASS

Test Graphs







10.3 APPENDIX D: CARRIER FREQUENCY SEPARATION**Test Result**

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop	0.962	≥ 0.730	PASS
2DH1	Ant1	Hop	0.996	≥ 0.922	PASS

Test Graphs



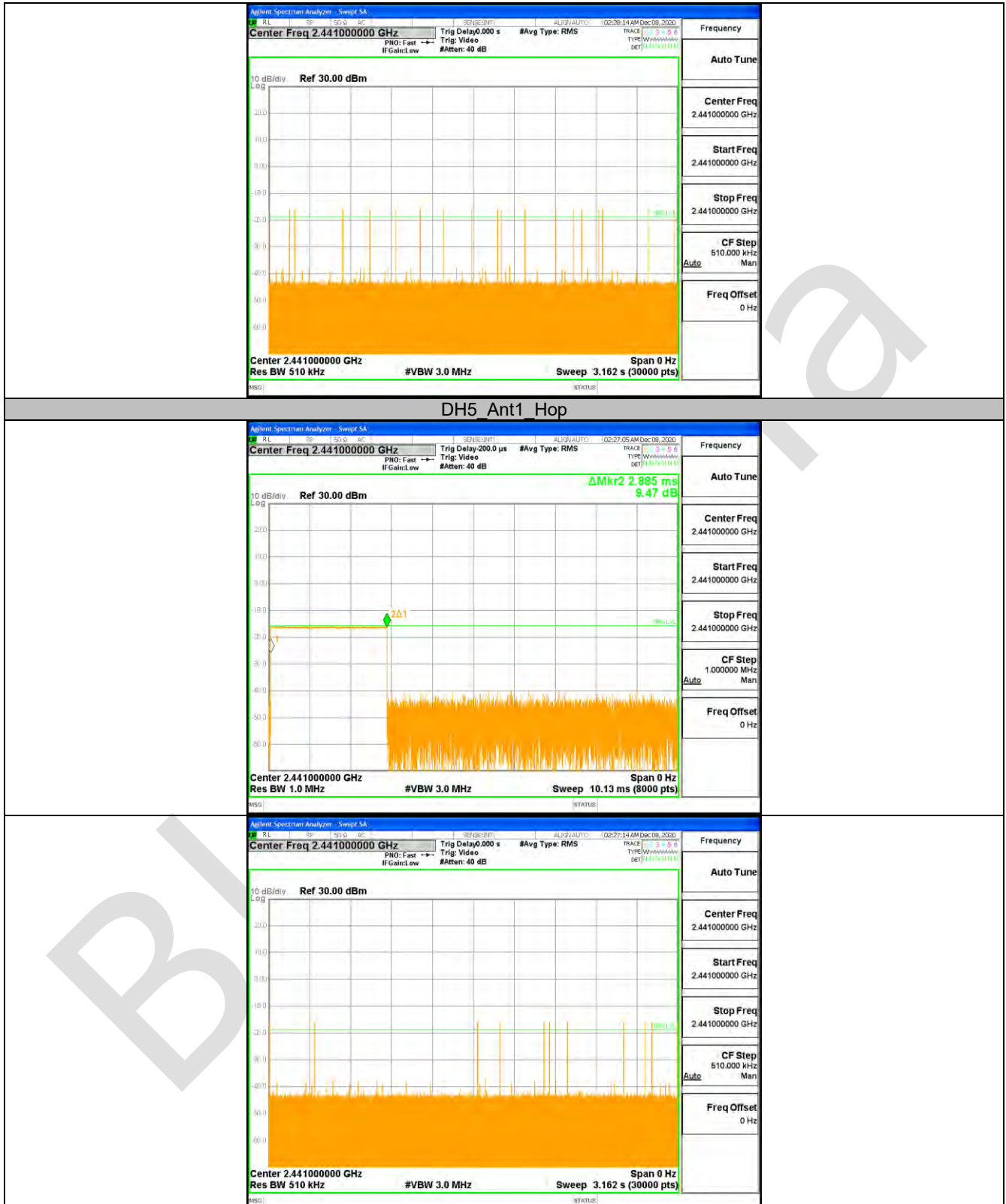
10.4 APPENDIXE: TIME OF OCCUPANCY

Test Result

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.38	320	0.121	≤ 0.4	PASS
DH3	Ant1	Hop	1.64	190	0.311	≤ 0.4	PASS
DH5	Ant1	Hop	2.89	110	0.317	≤ 0.4	PASS

Test Graphs





10.5 APPENDIXF: NUMBER OF HOPPING CHANNELS**Test Result**

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH1	Ant1	Hop	79	≥ 15	PASS
2DH1	Ant1	Hop	79	≥ 15	PASS

Test Graphs



10.6 APPENDIX G: BAND EDGE MEASUREMENTS

Test Result

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	-14.56	-56.14	<=-34.56	PASS
		High	2480	-13.38	-55.25	<=-33.38	PASS
		Low	Hop_2402	-14.80	-56.38	-34.8	PASS
		High	Hop_2480	-13.70	-54.9	-33.7	PASS
2DH1	Ant1	Low	2402	-14.64	-56.07	<=-34.64	PASS
		High	2480	-13.32	-55.89	<=-33.32	PASS
		Low	Hop_2402	-15.19	-56.31	-35.19	PASS
		High	Hop_2480	-9.90	-54.43	-29.9	PASS

Test Graphs







10.7 APPENDIXH: CONDUCTED SPURIOUS EMISSION

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	-14.74	-14.74	---	PASS
			30~1000	30~1000	-47.196	<=-34.739	PASS
			1000~26500	1000~26500	-54.222	<=-34.739	PASS
		2441	Reference	-13.78	-13.78	---	PASS
			30~1000	30~1000	-47.659	<=-33.777	PASS
			1000~26500	1000~26500	-53.222	<=-33.777	PASS
		2480	Reference	-13.38	-13.38	---	PASS
			30~1000	30~1000	-47.959	<=-33.381	PASS
			1000~26500	1000~26500	-51.455	<=-33.381	PASS
2DH1	Ant1	2402	Reference	-14.69	-14.69	---	PASS
			30~1000	30~1000	-49.784	<=-34.685	PASS
			1000~26500	1000~26500	-53.205	<=-34.685	PASS
		2441	Reference	-14.42	-14.42	---	PASS
			30~1000	30~1000	-50.777	<=-34.419	PASS
			1000~26500	1000~26500	-53.464	<=-34.419	PASS
		2480	Reference	-13.34	-13.34	---	PASS
			30~1000	30~1000	-49.414	<=-33.344	PASS
			1000~26500	1000~26500	-54.215	<=-33.344	PASS

Test Graphs

