TEST REPORT

Product Name	:	True Wireless Earphone
Brand Mark	:	RFTECH
Model No.	:	TWS09RP, TWS09J, TWS09A, TWS09RP-W, T9,T9J, T9R,T9A, Naztech Freedom+, 14622, 14623, TREBLAB xFit, BS52
FCC ID	:	2AQKL-T9
Report Number	:	BLA-EMC-202009-A2501
Date of Sample Receipt	:	2020/9/4
Date of Test	:	2020/9/4 to 2020/9/19
Date of Issue	:	2020/9/19
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

Shenzhen U-IoT Smart Technology Co.Ltd

4F, Building 4, Baokun Industry Estate, Dalang Street, Longhua District, Shenzhen,China.

Prepared by:

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

IOT Test Centre of BlueAsia

No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen,China

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Compiled by: Jozu.

Review by: Sweet.Liang

Approved by:

Date: 2020/9/19

REPORT REVISE RECORD

Version No.	Date	Description
00	2020/9/19	Original

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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
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
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

2 GENERAL INFORMATION

Applicant	Shenzhen U-IoT Smart Technology Co.Ltd
Address	4F, Building 4, Baokun Industry Estate, Dalang Street, Longhua District, Shenzhen,China.
Manufacturer	Shenzhen RF Technology Co., Ltd.
Address	4F, Building 4, Baokun Industry Estate, Dalang Street, Longhua District, Shenzhen,PRC
Factory	Shenzhen RF Technology Co., Ltd.
Address	4F, Building 4, Baokun Industry Estate, Dalang Street, Longhua District, Shenzhen,PRC
Product Name	True Wireless Earphone
Test Model No.	T9

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V2
Software Version	N/A

Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK, p/4DQPSK, 8DPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Chip Antenna
Antenna Gain:	4.75dBi(Provided by the customer)

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	3.7Vdc

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, 8-DPSK modulation were all pre-scanned only worse case is reported.*	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission	±4.34dB
Radiated Emission	±4.24dB
Radiated Emission	±4.68dB
AC Power Line Conducted Emission	±3.45dB

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Radiated Emission (1GHz ~ 18GHz)	±4.44 dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A
AC Adapter	UGREEN	CD112	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
IOT Test Centre of BlueAsia
No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen,China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
Tests were sub-contracted:
Radiation test is conducted by Global United Technology Services Co., Ltd.
No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102
FCC —Registration No.: 381383
Job No.: GTS202009000067

9 TEST INSTRUMENTS LIST

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

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

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

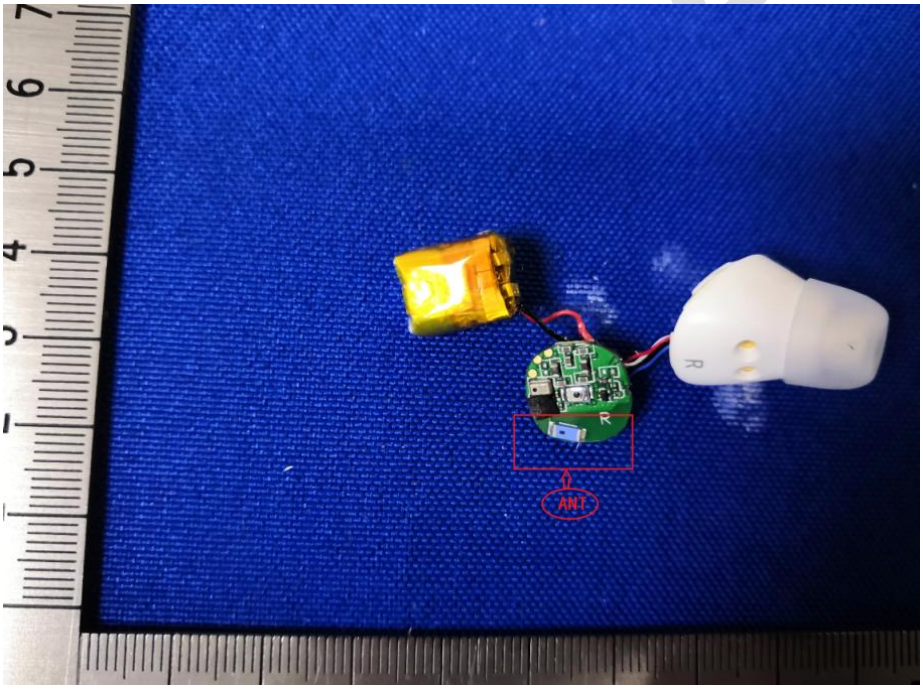
ANTENNA REQUIREMENT

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 a 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 4.75dBi.



RADIATED SPURIOUS EMISSIONS

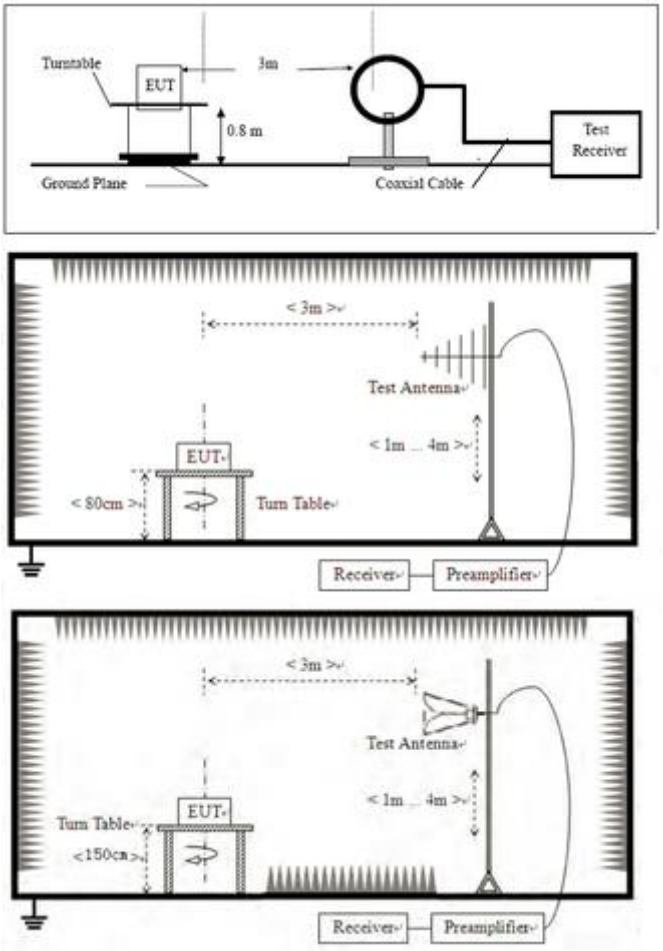
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX mode (SE) below 1G; TX mode (SE) above1G
Test Mode (Final Test)	TX mode (SE) below 1G; TX mode (SE) above1G
Tester	Jozu
Temperature	24℃
Humidity	53%

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

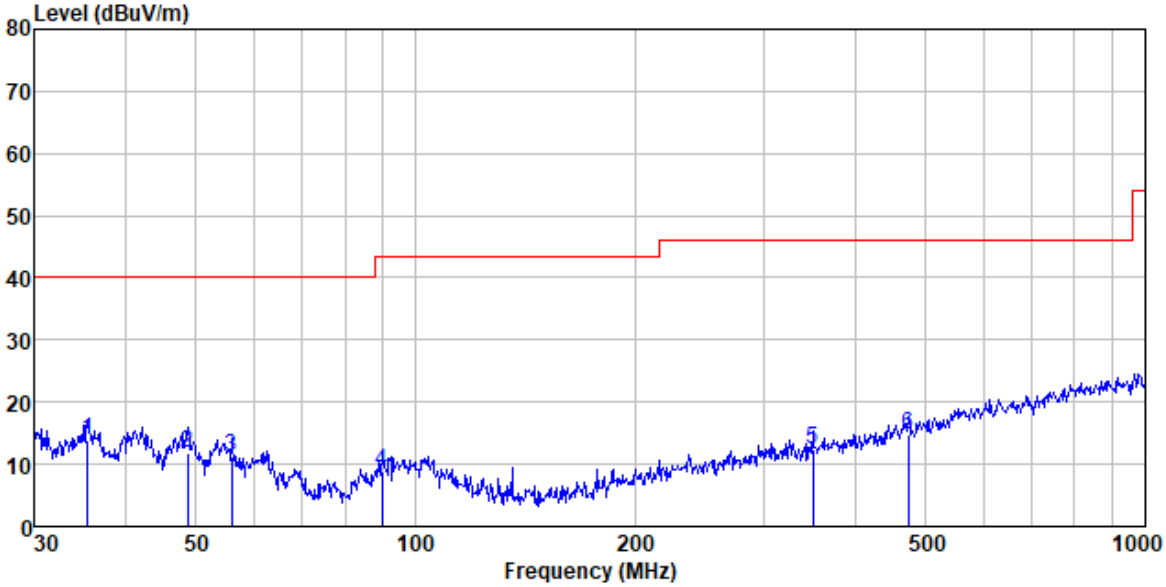
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. 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.
d. 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.
e. 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.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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 ¨C Preamplifier Factor
3) Scan from 9kHz to 25GHz, the disturbance above 18GHz 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.
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

[TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]
Power:AC120V/60Hz

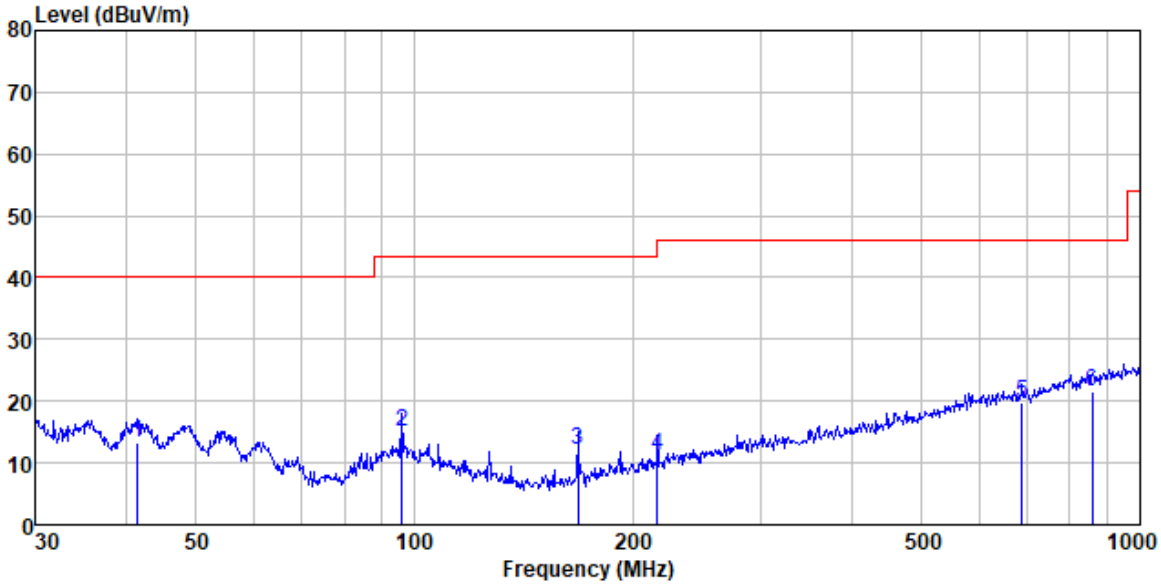


Condition : FCC PART15 CLASS B 3m HORIZONTAL
Job.No : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

	Freq	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	35.499	37.16	11.42	35.39	0.61	13.80	40.00	-26.20	QP
2	48.672	34.97	12.29	36.12	0.76	11.90	40.00	-28.10	QP
3	56.001	34.95	11.68	36.27	0.83	11.19	40.00	-28.81	QP
4	89.905	33.75	10.57	36.64	1.11	8.79	43.50	-34.71	QP
5	350.477	32.81	14.53	37.47	2.62	12.49	46.00	-33.51	QP
6	473.835	32.11	16.81	37.51	3.20	14.61	46.00	-31.39	QP

Test Result: Pass

[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]
Power:AC120V/60Hz



Condition : FCC PART15 CLASS B 3m VERTICAL
Job.No : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

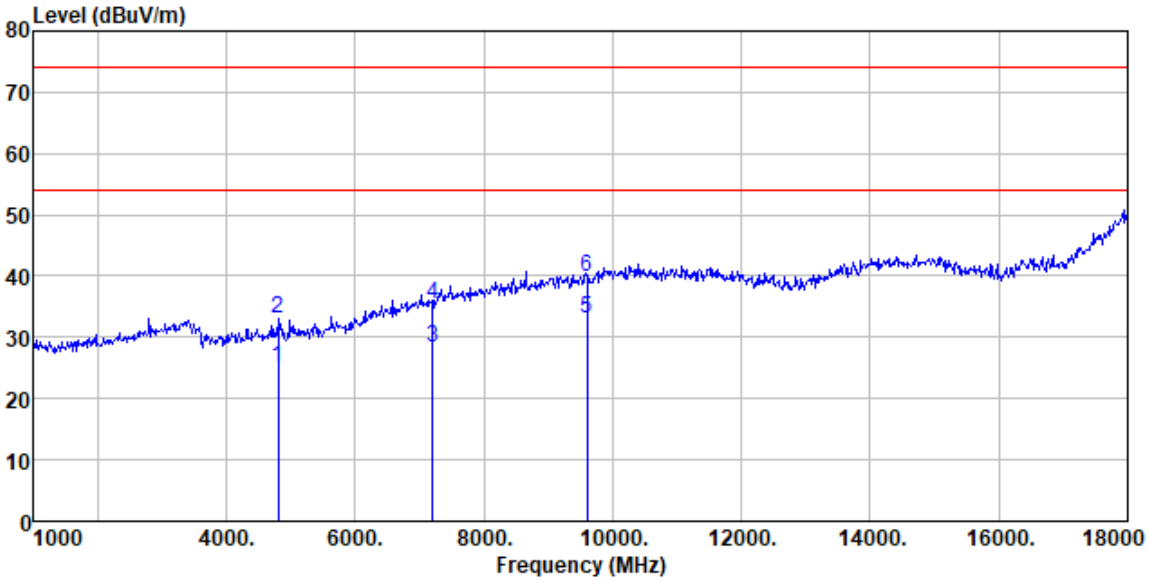
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	41.567	36.01	12.22	35.75	0.68	13.16	40.00	-26.84	QP
2	96.099	38.80	11.65	36.69	1.16	14.92	43.50	-28.58	QP
3	167.824	39.06	8.46	37.18	1.67	12.01	43.50	-31.49	QP
4	216.024	35.74	11.02	37.35	1.93	11.34	46.00	-34.66	QP
5	687.151	33.63	19.59	37.62	4.05	19.65	46.00	-26.35	QP
6	860.035	32.60	21.95	37.61	4.69	21.63	46.00	-24.37	QP

Test Result: Pass

[TestMode: *8-DPSK*]

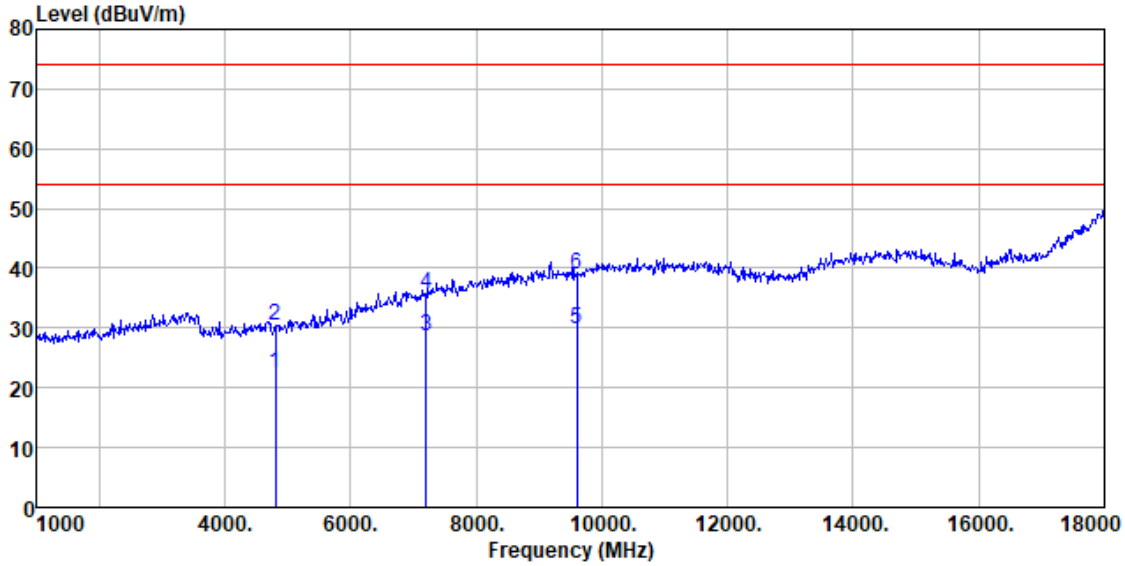
Remark: During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the 8-DPSK modulation which it is worse case.

Test channel:lowest



Condition : FCC PART 15 (PK) 3m VERTICAL
Job No. : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

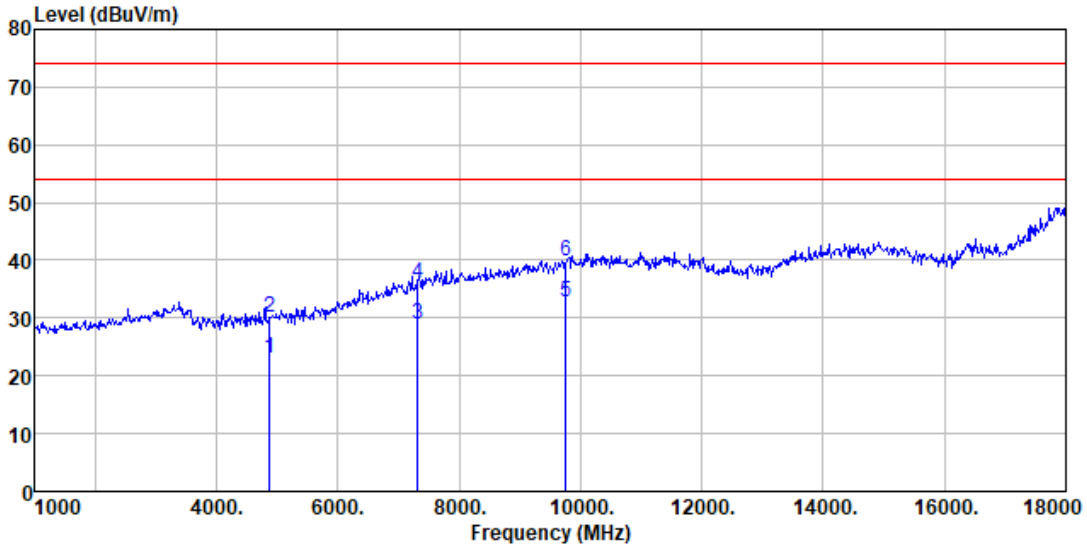
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4804.000	26.86	31.35	37.73	4.61	25.09	54.00	-28.91	Average
2	4804.000	34.87	31.35	37.73	4.61	33.10	74.00	-40.90	Peak
3	7206.000	21.67	35.89	35.63	6.48	28.41	54.00	-25.59	Average
4	7206.000	28.68	35.89	35.63	6.48	35.42	74.00	-38.58	Peak
5	9608.000	22.20	37.74	34.94	7.97	32.97	54.00	-21.03	Average
6	9608.000	29.21	37.74	34.94	7.97	39.98	74.00	-34.02	Peak



Condition : FCC PART 15 (PK) 3m HORIZONTAL
Job No. : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

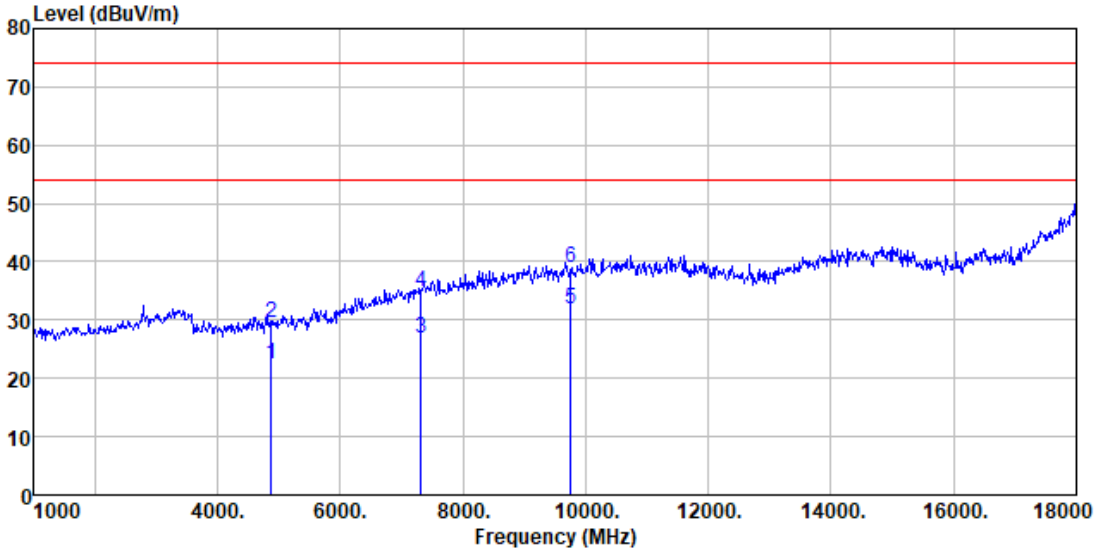
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4804.000	24.18	31.35	37.73	4.61	22.41	54.00	-31.59	Average
2	4804.000	32.20	31.35	37.73	4.61	30.43	74.00	-43.57	Peak
3	7206.000	21.87	35.89	35.63	6.48	28.61	54.00	-25.39	Average
4	7206.000	28.89	35.89	35.63	6.48	35.63	74.00	-38.37	Peak
5	9608.000	19.17	37.74	34.94	7.97	29.94	54.00	-24.06	Average
6	9608.000	28.19	37.74	34.94	7.97	38.96	74.00	-35.04	Peak

Test channel:Middle



Condition : FCC PART 15 (PK) 3m HORIZONTAL
Job No. : GTS202009000067
Test Mode : TX 2441MHz
Test Engineer: Hans
Remark :

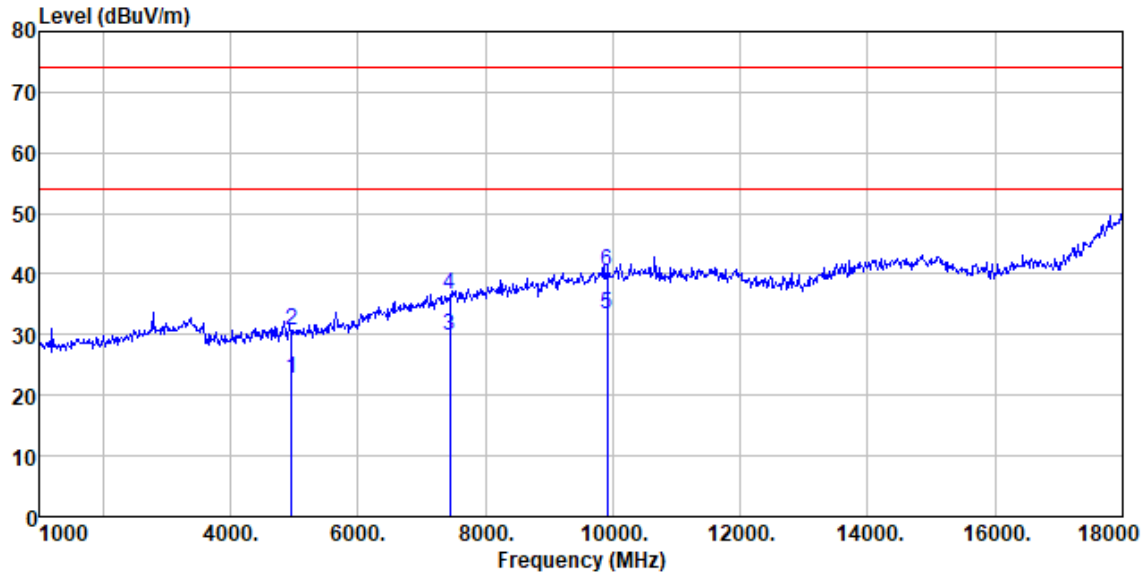
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4882.000	24.62	31.49	37.76	4.69	23.04	54.00	-30.96	Average
2	4882.000	31.62	31.49	37.76	4.69	30.04	74.00	-43.96	Peak
3	7323.000	21.71	36.18	35.60	6.63	28.92	54.00	-25.08	Average
4	7323.000	28.70	36.18	35.60	6.63	35.91	74.00	-38.09	Peak
5	9764.000	21.71	38.08	35.03	8.03	32.79	54.00	-21.21	Average
6	9764.000	28.73	38.08	35.03	8.03	39.81	74.00	-34.19	Peak



Condition : FCC PART 15 (PK) 3m VERTICAL
Job No. : GTS202009000067
Test Mode : TX 2441MHz
Test Engineer: Hans
Remark :

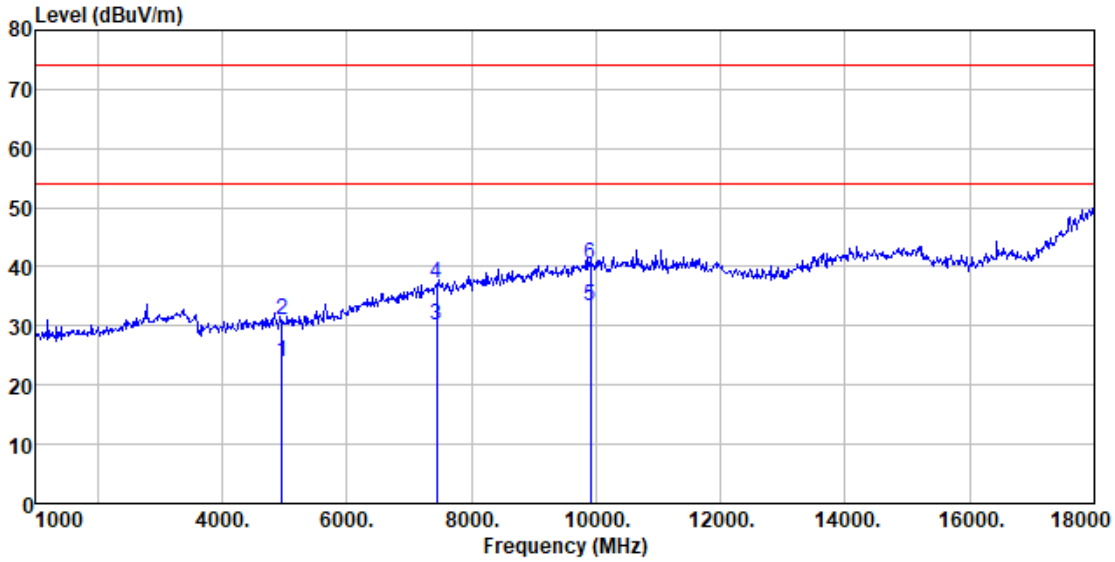
	Freq	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4882.000	24.08	31.49	37.76	4.69	22.50	54.00	-31.50	Average
2	4882.000	31.09	31.49	37.76	4.69	29.51	74.00	-44.49	Peak
3	7323.000	19.71	36.18	35.60	6.63	26.92	54.00	-27.08	Average
4	7323.000	27.74	36.18	35.60	6.63	34.95	74.00	-39.05	Peak
5	9764.000	20.82	38.08	35.03	8.03	31.90	54.00	-22.10	Average
6	9764.000	27.81	38.08	35.03	8.03	38.89	74.00	-35.11	Peak

Test channel:Highest



Condition : FCC PART 15 (PK) 3m VERTICAL
Job No. : GTS202009000067
Test Mode : TX 2480MHz
Test Engineer: Hans
Remark :

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4960.000	24.04	31.63	37.78	4.79	22.68	54.00	-31.32	Average
2	4960.000	32.06	31.63	37.78	4.79	30.70	74.00	-43.30	Peak
3	7440.000	22.03	36.46	35.56	6.77	29.70	54.00	-24.30	Average
4	7440.000	29.03	36.46	35.56	6.77	36.70	74.00	-37.30	Peak
5	9920.000	22.07	38.42	35.14	8.09	33.44	54.00	-20.56	Average
6	9920.000	29.09	38.42	35.14	8.09	40.46	74.00	-33.54	Peak



Condition : FCC PART 15 (PK) 3m HORIZONTAL
Job No. : GTS202009000067
Test Mode : TX 2480MHz
Test Engineer: Hans
Remark :

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4960.000	25.23	31.63	37.78	4.79	23.87	54.00	-30.13	Average
2	4960.000	32.23	31.63	37.78	4.79	30.87	74.00	-43.13	Peak
3	7440.000	22.57	36.46	35.56	6.77	30.24	54.00	-23.76	Average
4	7440.000	29.59	36.46	35.56	6.77	37.26	74.00	-36.74	Peak
5	9920.000	22.09	38.42	35.14	8.09	33.46	54.00	-20.54	Average
6	9920.000	29.09	38.42	35.14	8.09	40.46	74.00	-33.54	Peak

Test Result: Pass

RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

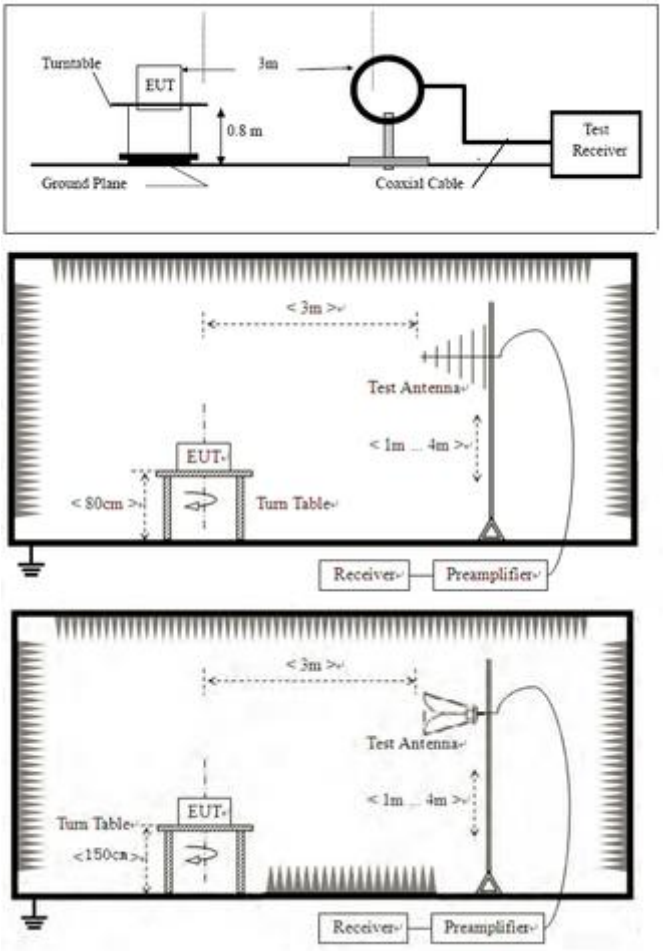
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	23℃
Humidity	51%

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

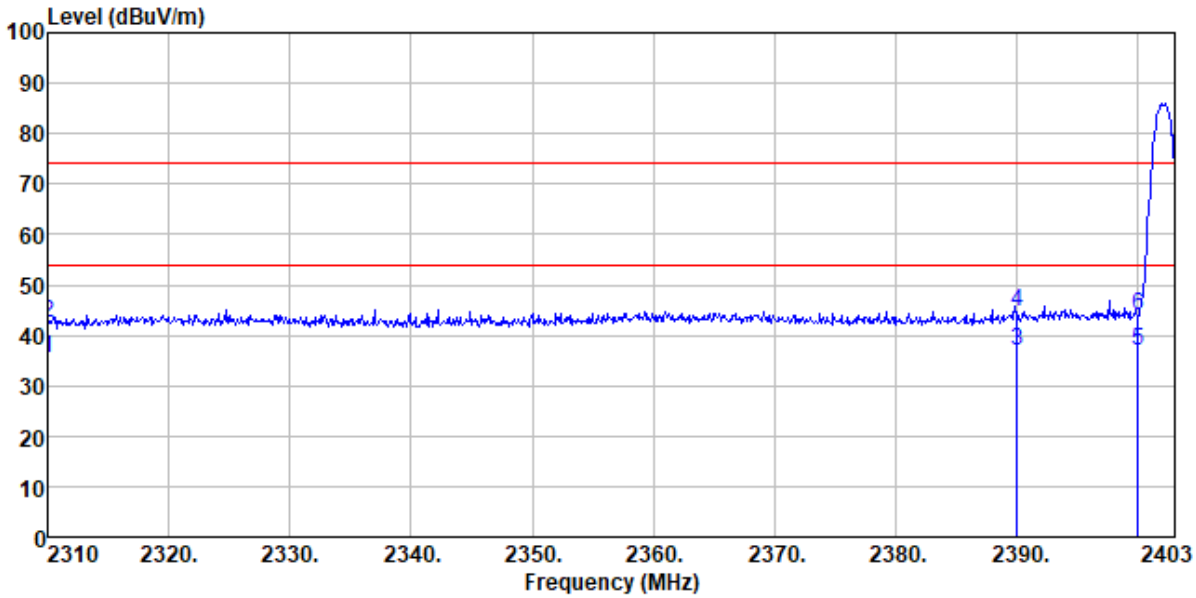
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. 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.
d. 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.
e. 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.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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: Level= Read Level+ Cable Loss+ Antenna Factor- 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.

TEST DATA

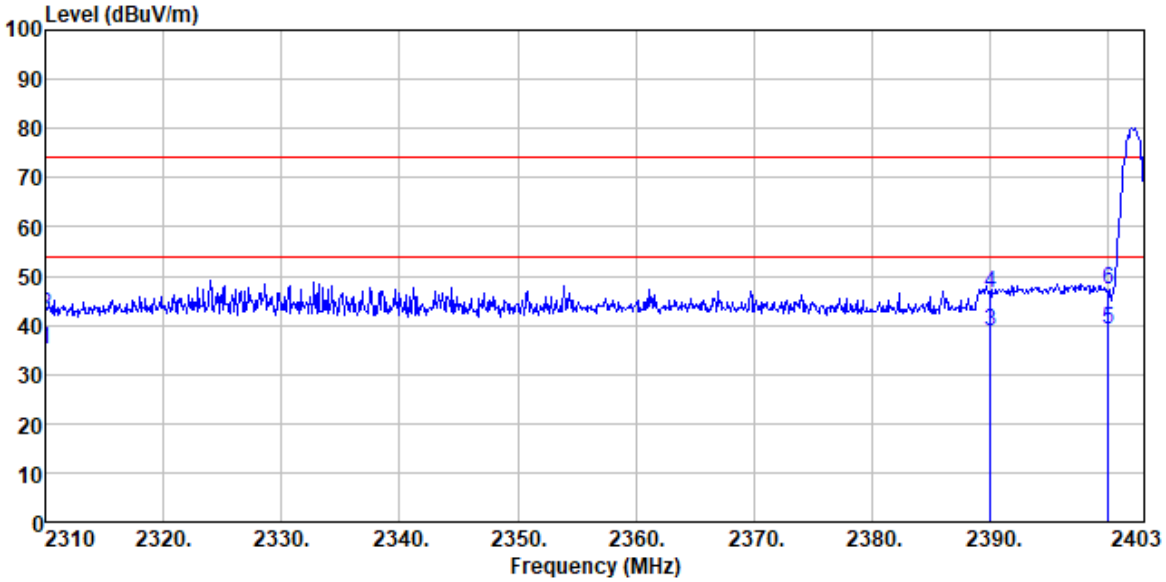
Remark: During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the 8-DPSK modulation which it is worse case.

Lowest channel



Condition : FCC PART 15 (PK) 3m HORIZONTAL
Job No. : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

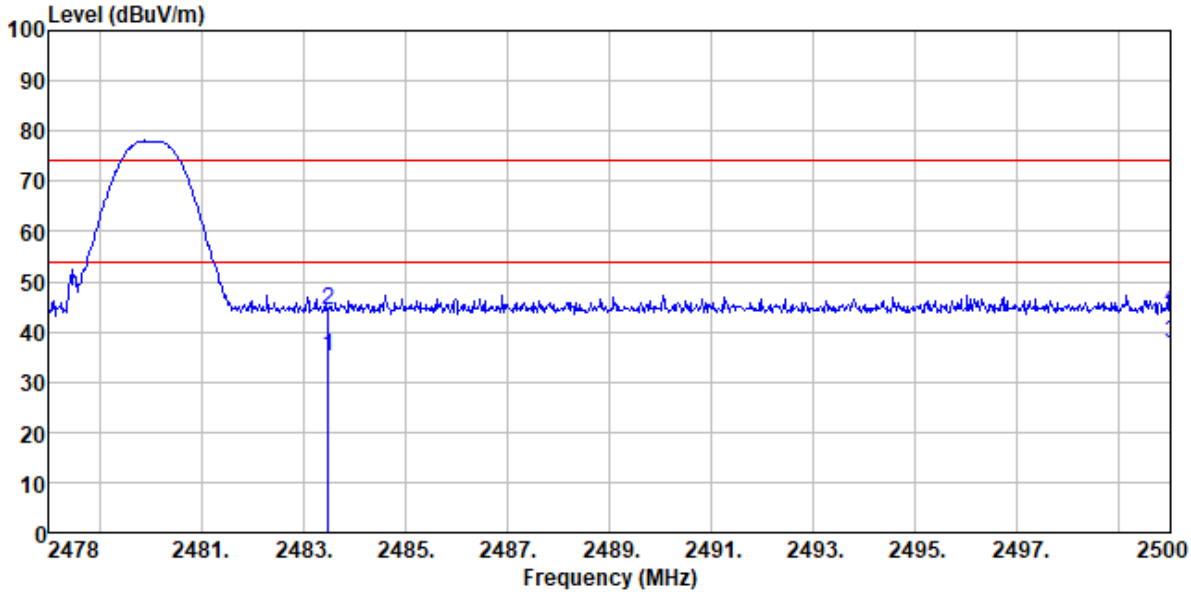
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	36.06	27.14	30.43	2.81	35.58	54.00	-18.42	Average
2	2310.000	43.06	27.14	30.43	2.81	42.58	74.00	-31.42	Peak
3	2390.000	36.75	27.37	30.24	2.91	36.79	54.00	-17.21	Average
4	2390.000	44.76	27.37	30.24	2.91	44.80	74.00	-29.20	Peak
5	2400.000	36.88	27.41	30.26	2.91	36.94	54.00	-17.06	Average
6	2400.000	43.89	27.41	30.26	2.91	43.95	74.00	-30.05	Peak



Condition : FCC PART 15 (PK) 3m VERTICAL
Job No. : GTS202009000067
Test Mode : TX 2402MHz
Test Engineer: Hans
Remark :

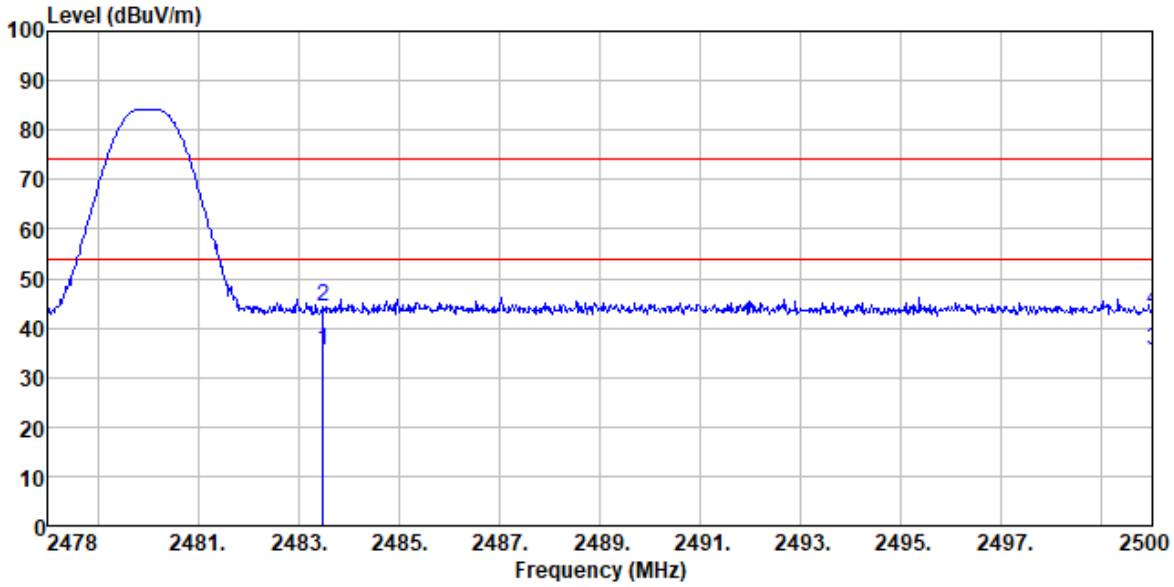
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	35.50	27.14	30.43	2.81	35.02	54.00	-18.98	Average
2	2310.000	42.50	27.14	30.43	2.81	42.02	74.00	-31.98	Peak
3	2390.000	38.57	27.37	30.24	2.91	38.61	54.00	-15.39	Average
4	2390.000	46.58	27.37	30.24	2.91	46.62	74.00	-27.38	Peak
5	2400.000	39.05	27.41	30.26	2.91	39.11	54.00	-14.89	Average
6	2400.000	47.04	27.41	30.26	2.91	47.10	74.00	-26.90	Peak

Highest channel



Condition : FCC PART 15 (PK) 3m VERTICAL
Job No. : GTS202009000067
Test Mode : TX 2480MHz
Test Engineer: Hans
Remark :

	Freq	ReadLevel	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	34.61	27.66	30.12	2.99	35.14	54.00	-18.86	Average
2	2483.500	43.61	27.66	30.12	2.99	44.14	74.00	-29.86	Peak
3	2500.000	37.20	27.70	30.13	3.01	37.78	54.00	-16.22	Average
4	2500.000	44.19	27.70	30.13	3.01	44.77	74.00	-29.23	Peak



Condition : FCC PART 15 (PK) 3m HORIZONTAL
Job No. : GTS202009000067
Test Mode : TX 2480MHz
Test Engineer: Hans
Remark :

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	34.72	27.66	30.12	2.99	35.25	54.00	-18.75	Average
2	2483.500	43.72	27.66	30.12	2.99	44.25	74.00	-29.75	Peak
3	2500.000	34.87	27.70	30.13	3.01	35.45	54.00	-18.55	Average
4	2500.000	42.89	27.70	30.13	3.01	43.47	74.00	-30.53	Peak

Test Result: Pass

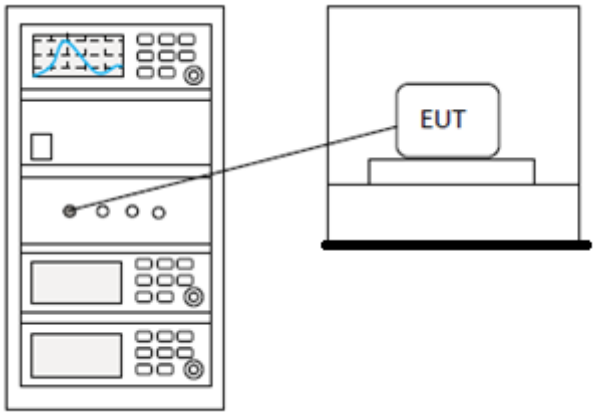
CONDUCTED SPURIOUS EMISSIONS

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℃
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

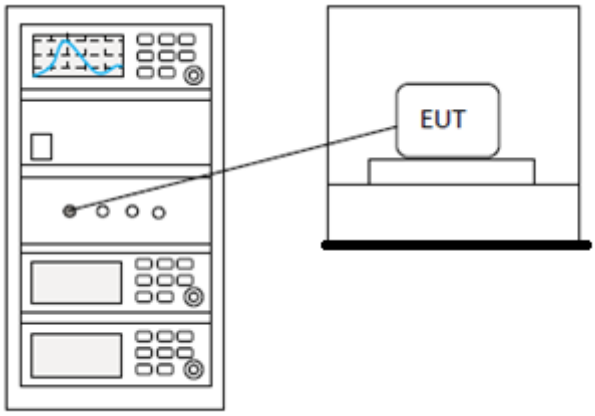
CONDUCTED BAND EDGES MEASUREMENT

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℃
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

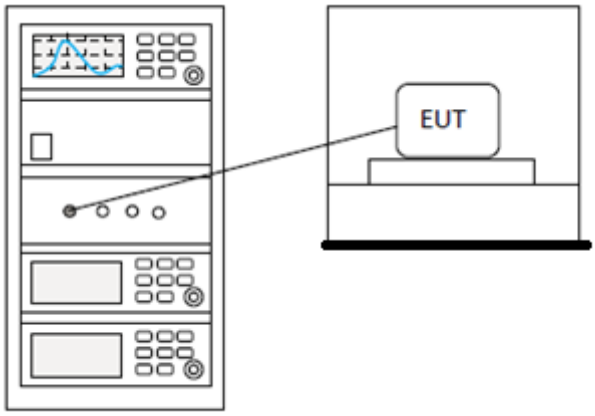
DWELL TIME

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

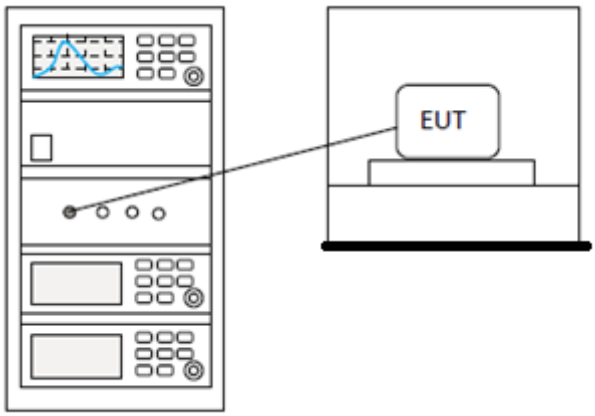
HOPPING CHANNEL NUMBER

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

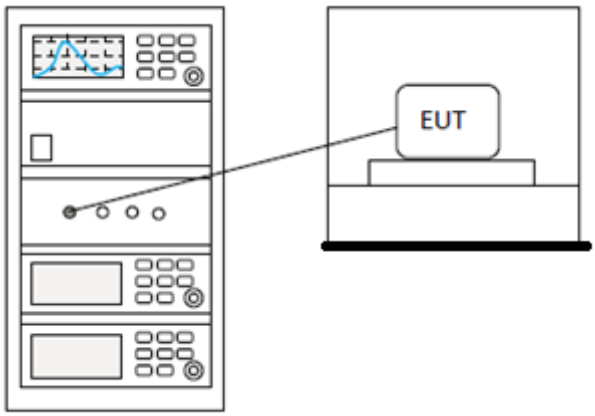
CARRIER FREQUENCIES SEPARATION

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℃
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



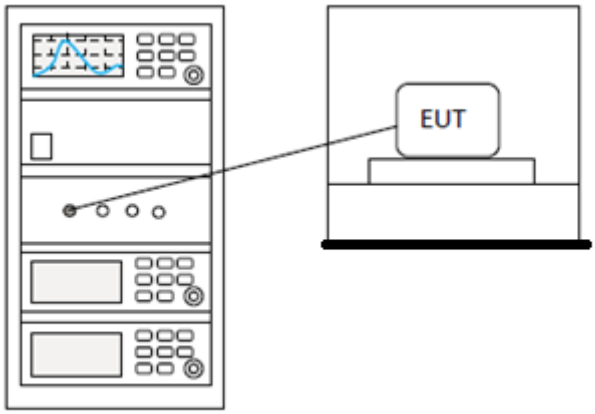
TEST DATA

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

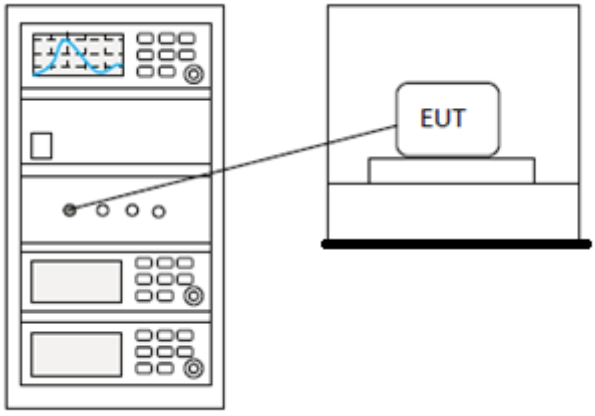
CONDUCTED PEAK OUTPUT POWER

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℃
Humidity	60%

LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ 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

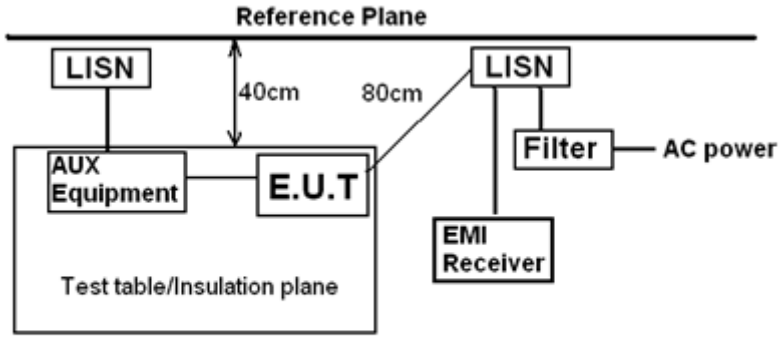
CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

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℃
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 Impedence Stabilization Network
Test table height=0.8m

PROCEDURE

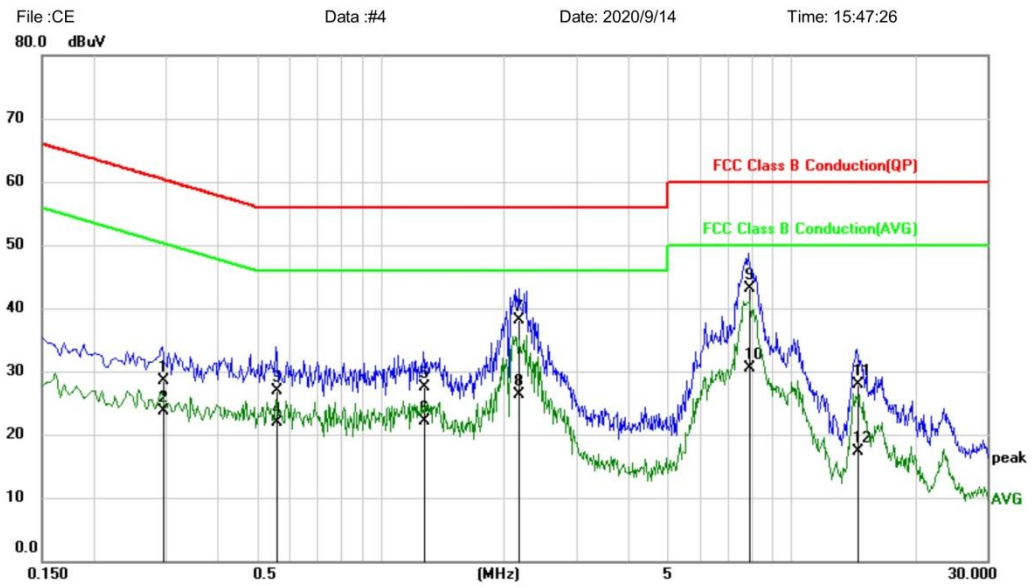
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50?H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a 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

[TestMode: TX]; [Line: Line] AC 120V 60Hz

Conducted Emission Measurement



Site
Limit: FCC Class B Conduction(QP)
EUT: Ture Wireless Earphone
M/N: TWS09
Mode: BT mode
Note:

Phase: *L1*
Power:

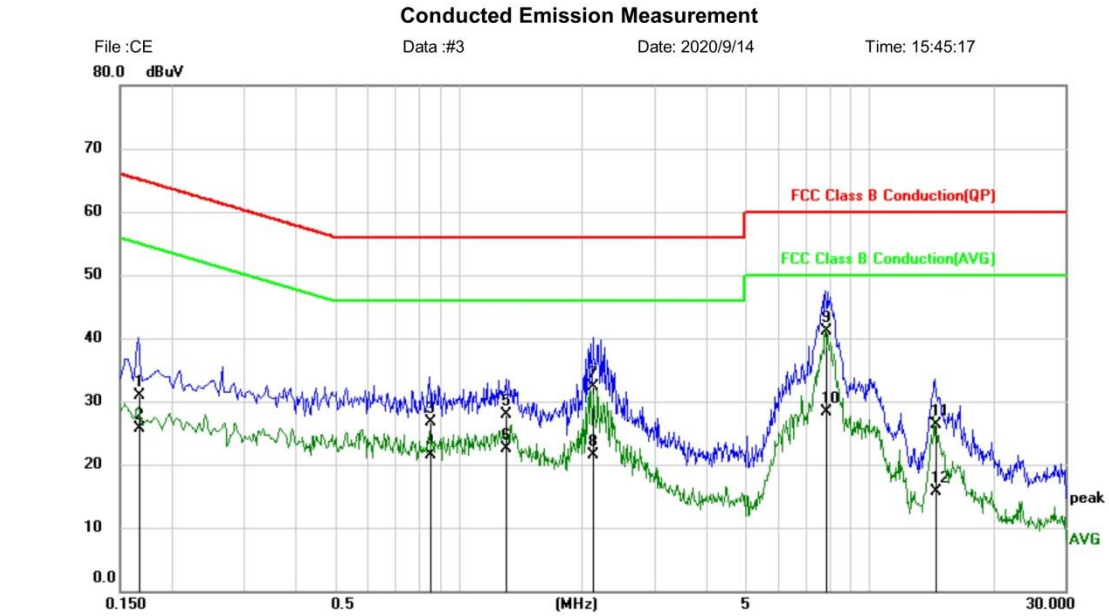
Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2940	18.71	9.79	28.50	60.41	-31.91	QP	
2		0.2940	13.86	9.79	23.65	50.41	-26.76	AVG	
3		0.5580	17.22	9.74	26.96	56.00	-29.04	QP	
4		0.5580	12.14	9.74	21.88	46.00	-24.12	AVG	
5		1.2740	17.63	9.82	27.45	56.00	-28.55	QP	
6		1.2740	12.24	9.82	22.06	46.00	-23.94	AVG	
7		2.1740	28.21	9.82	38.03	56.00	-17.97	QP	
8		2.1740	16.39	9.82	26.21	46.00	-19.79	AVG	
9	*	7.8580	33.27	9.87	43.14	60.00	-16.86	QP	
10		7.8580	20.60	9.87	30.47	50.00	-19.53	AVG	
11		14.4740	17.95	9.97	27.92	60.00	-32.08	QP	
12		14.4740	7.35	9.97	17.32	50.00	-32.68	AVG	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX]; [Line: Neutral] AC 120V 60Hz



Site Phase: N Temperature: 26

Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %

EUT: Ture Wireless Earphone

M/N: TWS09

Mode: BT mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1660	21.10	9.87	30.97	65.16	-34.19	QP	
2		0.1660	15.92	9.87	25.79	55.16	-29.37	AVG	
3		0.8500	16.92	9.75	26.67	56.00	-29.33	QP	
4		0.8500	11.66	9.75	21.41	46.00	-24.59	AVG	
5		1.3060	18.02	9.83	27.85	56.00	-28.15	QP	
6		1.3060	12.64	9.83	22.47	46.00	-23.53	AVG	
7		2.1300	22.45	9.86	32.31	56.00	-23.69	QP	
8		2.1300	11.73	9.86	21.59	46.00	-24.41	AVG	
9	*	7.8180	31.17	9.86	41.03	60.00	-18.97	QP	
10		7.8180	18.46	9.86	28.32	50.00	-21.68	AVG	
11		14.4980	16.30	10.01	26.31	60.00	-33.69	QP	
12		14.4980	5.74	10.01	15.75	50.00	-34.25	AVG	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass