FCC Part 15C&RSS-247 Test Report
FCC ID: 2AUVN-TGLBCHHPS
IC:29648-TGLBCHHPS

Applicant:	HERMES SELLIER
Address:	24 rue du Fg Saint-Honore 75008 Paris FRANCE
Manufacturer:	CC LAB
Address:	269 Chemin Mentaberrikoborda 64480 Ustaritz FRANCE
EUT:	Active Speaker
Trade Mark:	HERMÈS , LA BOITE CONCEPT
Model Number:	TG-LBC-HH PS(Music Box ; TO/GO)
Date of Receipt:	Aug. 20, 2022
Test Date:	Aug. 22, 2022 - Oct. 20, 2022
Date of Report:	Oct. 25, 2022
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.407 RSS-247 Issue 2: February 2017 RSS-GEN, Issue 5: March 2019 ANSI C63.10:2013
Test Result:	Pass
Report Number:	DL-20221104018E-3

Prepared (Test Engineer):	Pxing Huang
Reviewer (Supervisor):	Jack Bu
Approved (Manager):	Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart C RSS-247 Issue 2: February 2017			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203 RSS-Gen 8.3	Antenna requirement	PASS	
FCC part 15.207 RSS-Gen 8.8	AC Power Line Conducted Emission	PASS	
FCC part 15.407 (a) RSS-247 Section 6.2.4.1	Conducted Peak Output Power	PASS	
FCC part 15.407 (e) RSS-247 Section 6.4	6dB Bandwidth& 99% OCB	PASS	
FCC part 15.407 (a) RSS-247 Section 6.2.4.1	Power Spectral Density	PASS	
FCC part 15.407(b) RSS-247 Section 6.2.4.2 RSS-Gen 8.10	Conducted Bandedge	PASS	
FCC part 15.407(b)/15.209 RSS-247 Section 3.3 RSS-Gen 8.9	Radiated Emission and Restricted Bands	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen DL Testing Technology Co., Ltd.
Add. : 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

FCC Test Firm Registration Number: 854456
Designation Number: CN1307
ISED Registration number: 27485
IC Registered No.:CN0118

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**,providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.56dB
2	RF power,conducted	±0.42dB
3	Spurious emissions,conducted	±2.76dB
4	All emissions,radiated(<1G)	±3.65dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Active Speaker
Model No.:	TG-LBC-HH PS(Music Box ; TO/GO)
Sample ID:	DL-20221101018E-1#
HVIN:	TG-LBC-HH PS(Music Box ; TO/GO)
Serial No.:	N/A
Model Difference	N/A
Operation Frequency:	5727MHz~5804MHz
Channel numbers:	16
Channel separation:	2MHz
Modulation technology:	GFSK
Antenna Type:	Chip Antenna
Antenna gain:	2dBi
Power supply:	DC14.8V from battery and wireless charging
Power:	30W

Note:

1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.The EUT's all information provided by client.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	5727	07	5756	13	5793
02	5730	08	5760	14	5797
03	5734	09	5771	15	5801
04	5738	10	5776	16	5804
05	5749	11	5779		
06	5753	12	5782		

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

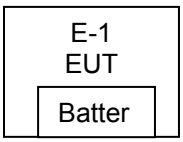
Pretest Mode	Description	
Mode 1	CH01	GFSK
Mode 2	CH09	
Mode 3	CH16	
Mode 4	Link Mode	
For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	CH01	GFSK
Mode 2	CH09	
Mode 3	CH16	
Mode 4	Link Mode	

Note:

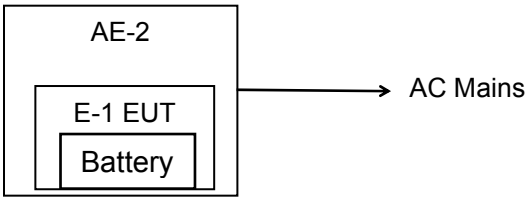
(1) The measurements are performed at the highest, middle, lowest available channels.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	Active Speaker	TG-LBC-HH PS(Music Box ; TO/GO)	N/A	EUT
AE-2	Active Speaker	TG-LBC-HH DS(Music Box ; TO/GO)	N/A	AE
AE	Notebook	B40-80	MP07F6JD	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the end product.

Test software Version	Test program: Switch the high, medium and low emission signals by touching the switch.		
Frequency	5727 MHz	5771MHz	5804 MHz
Power Setting of Softwave	5	5	5

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 20db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 06, 2021	Nov. 05, 2022
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 06, 2021	Nov. 05, 2022
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 06, 2021	Nov. 05, 2022
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 06, 2021	Nov. 05, 2022
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 06, 2021	Nov. 05, 2022
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 06, 2021	Nov. 05, 2022
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 06, 2021	Nov. 05, 2022
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 06, 2021	Nov. 05, 2022
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 06, 2021	Nov. 05, 2022
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 06, 2021	Nov. 05, 2022
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 06, 2021	Nov. 05, 2022
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 06, 2021	Nov. 05, 2022
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 06, 2021	Nov. 05, 2022
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 06, 2021	Nov. 05, 2022
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 06, 2021	Nov. 05, 2022
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 06, 2021	Nov. 05, 2022

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Nov. 25, 2019	Nov. 24, 2022
2	EMI Receiver	R&S	ESR	101421	Nov. 06, 2021	Nov. 05, 2022
3	LISN	R&S	ENV216	102417	Nov. 06, 2021	Nov. 05, 2022
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 06, 2021	Nov. 05, 2022

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

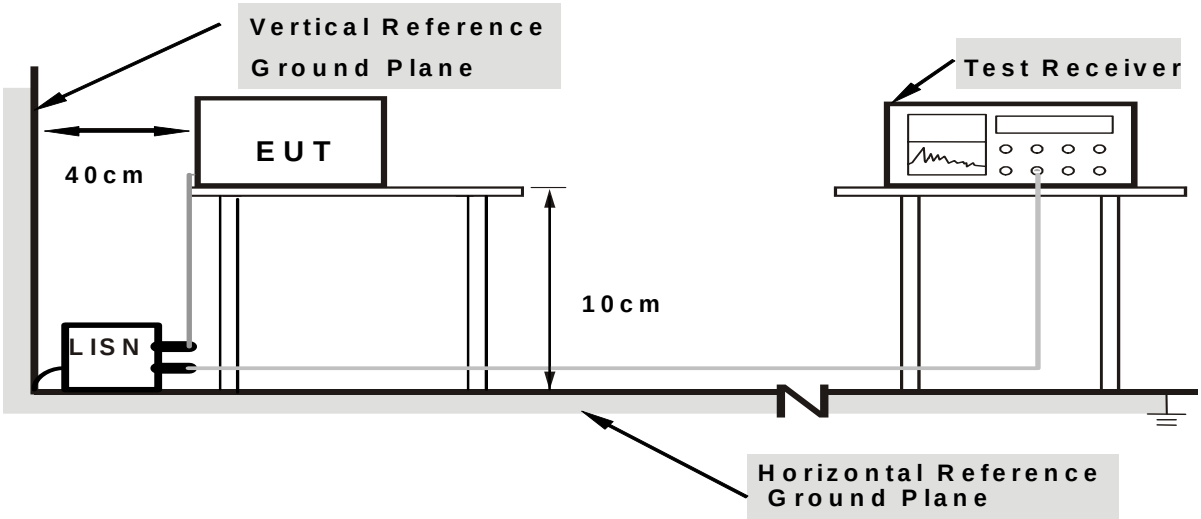
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

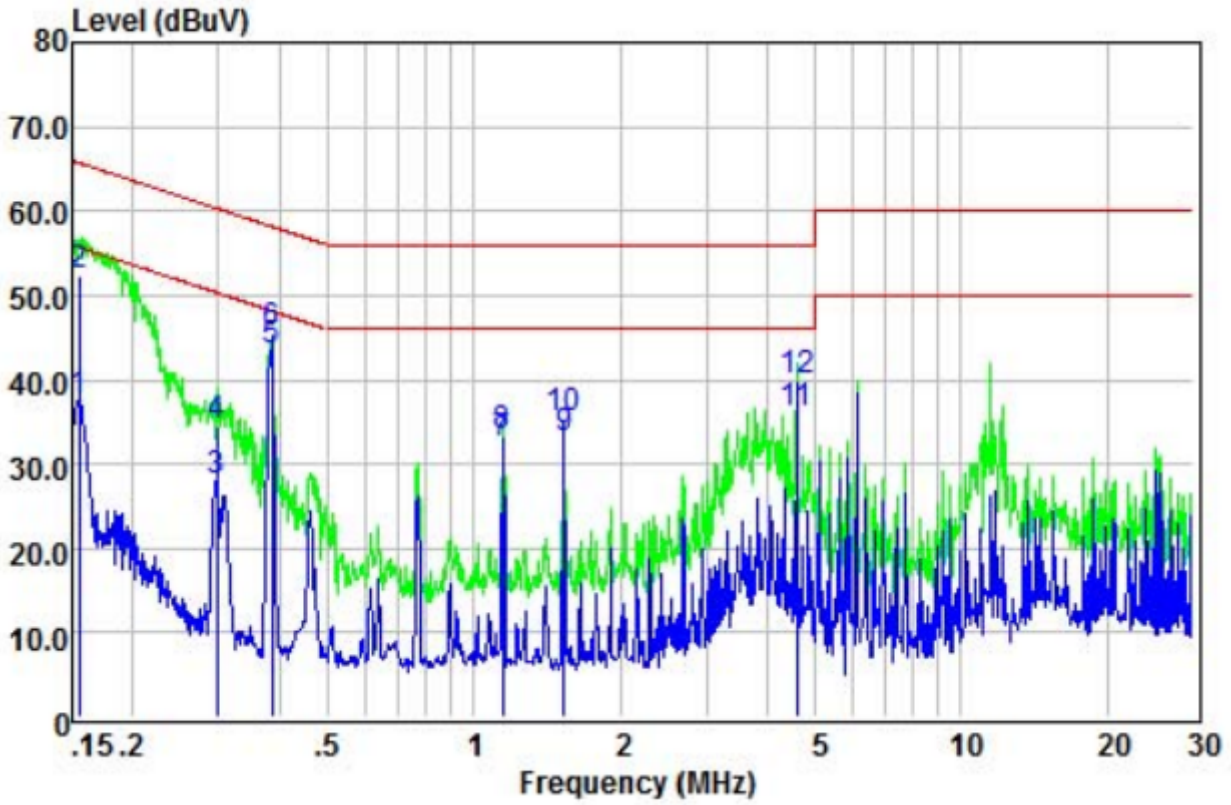
3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4

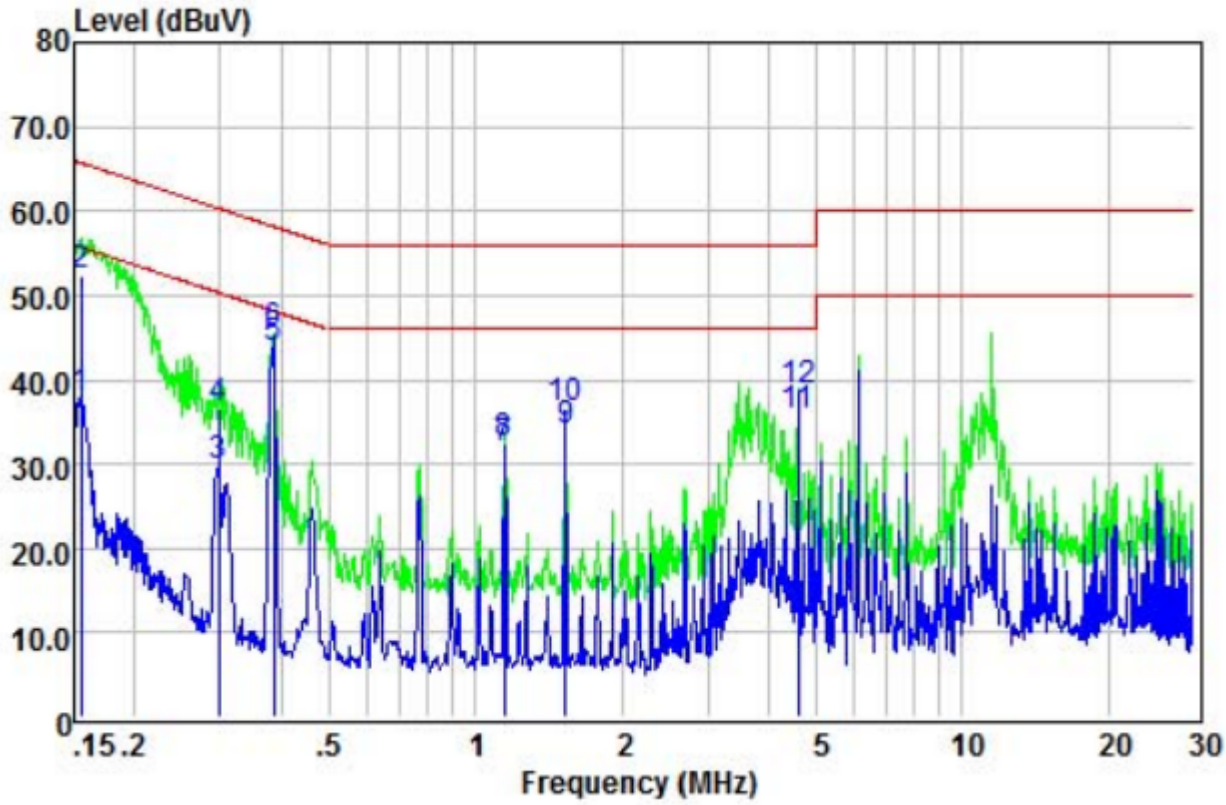


Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.15	27.90	9.63	0.05	37.58	55.74	-18.16	Average
2	0.15	42.68	9.63	0.05	52.36	65.74	-13.38	QP
3	0.30	18.30	9.62	0.05	27.97	50.32	-22.35	Average
4	0.30	24.96	9.62	0.05	34.63	60.32	-25.69	QP
5	0.39	33.85	9.66	0.05	43.56	48.17	-4.61	Average
6	0.39	35.79	9.66	0.05	45.50	58.17	-12.67	QP
7	1.15	22.72	9.61	0.06	32.39	46.00	-13.61	Average
8	1.15	23.49	9.61	0.06	33.16	56.00	-22.84	QP
9	1.54	23.48	9.60	0.06	33.14	46.00	-12.86	Average
10	1.54	25.70	9.60	0.06	35.36	56.00	-20.64	QP
11	4.60	26.39	9.58	0.06	36.03	46.00	-9.97	Average
12	4.60	30.32	9.58	0.06	39.96	56.00	-16.04	QP

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.15	28.19	9.60	0.05	37.84	55.74	-17.90	Average
2	0.15	42.55	9.60	0.05	52.20	65.74	-13.54	QP
3	0.30	20.21	9.55	0.05	29.81	50.32	-20.51	Average
4	0.30	26.96	9.55	0.05	36.56	60.32	-23.76	QP
5	0.39	33.93	9.61	0.05	43.59	48.17	-4.58	Average
6	0.39	35.84	9.61	0.05	45.50	58.17	-12.67	QP
7	1.15	22.20	9.62	0.06	31.88	46.00	-14.12	Average
8	1.15	22.88	9.62	0.06	32.56	56.00	-23.44	QP
9	1.54	24.25	9.59	0.06	33.90	46.00	-12.10	Average
10	1.54	26.95	9.59	0.06	36.60	56.00	-19.40	QP
11	4.60	25.91	9.66	0.06	35.63	46.00	-10.37	Average
12	4.60	28.82	9.66	0.06	38.54	56.00	-17.46	QP

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Field Strength (micorvolts/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
216-230	180	3
230~960	200	3
Above 960	500	3

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. 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.
d. 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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. 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.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

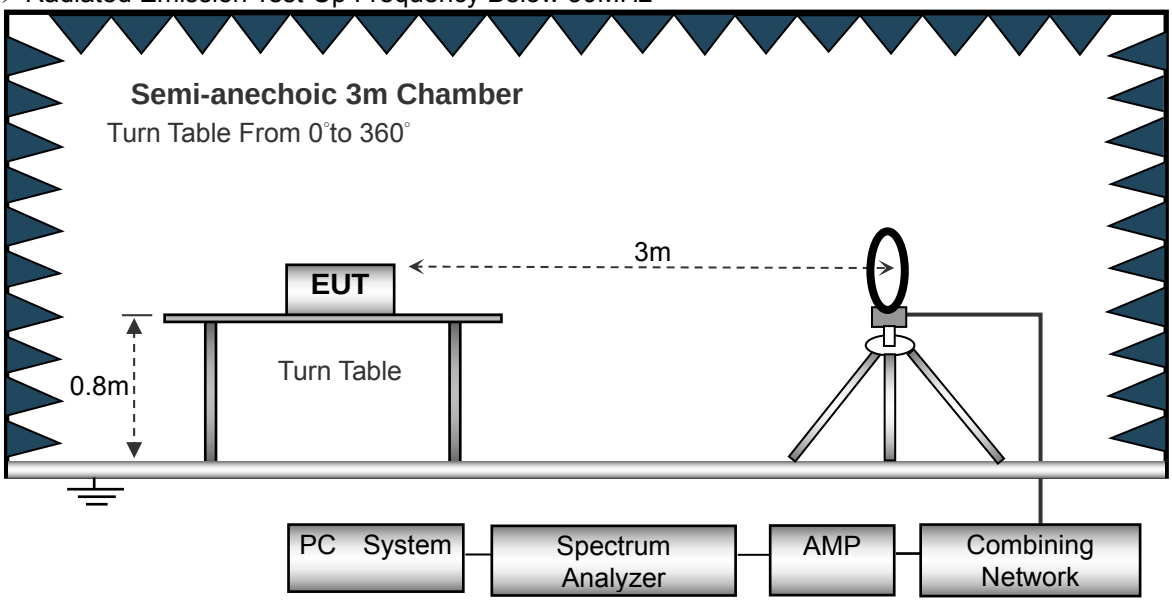
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

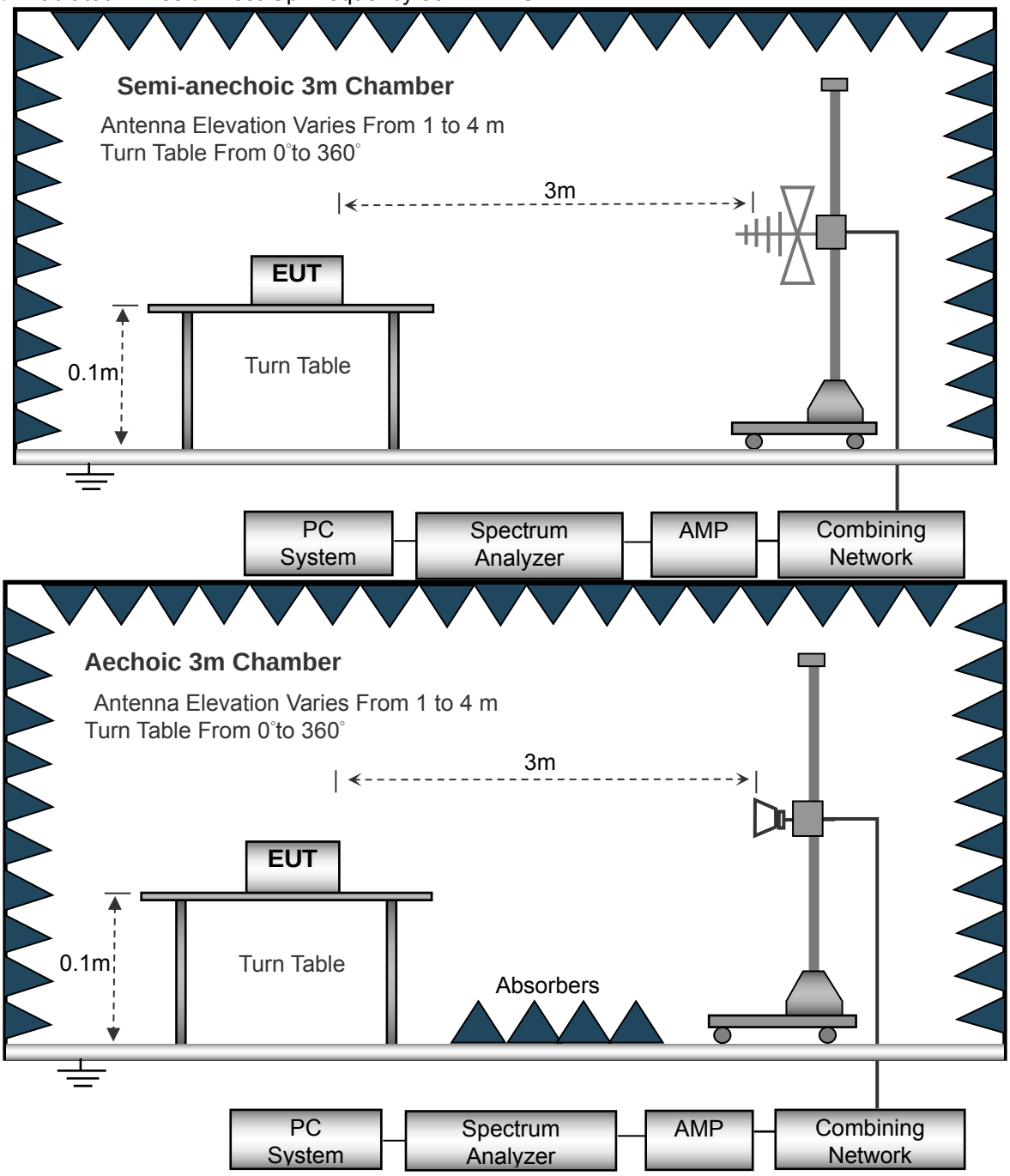
No deviation

3.2.4 TEST SETUP

（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz

3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Mode 4	Polarization :	--

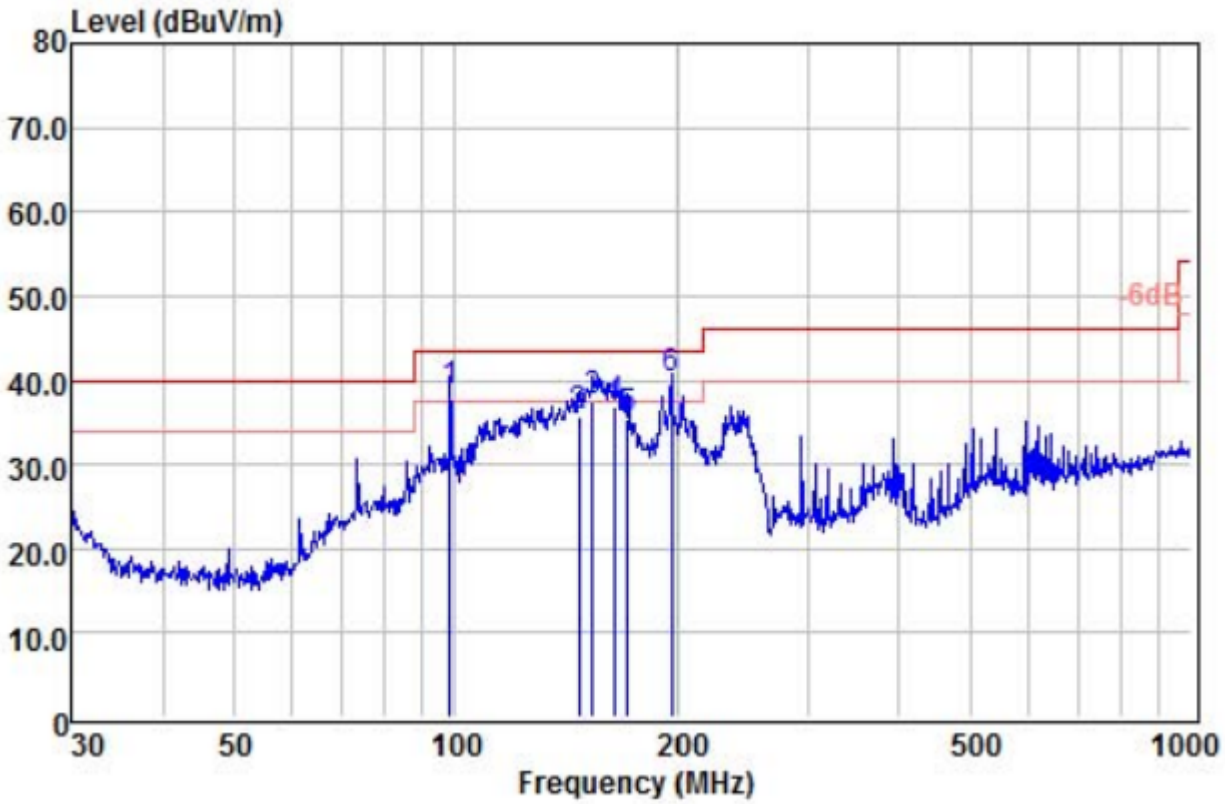
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 14.8V from battery		
Test Mode :	Mode 4		



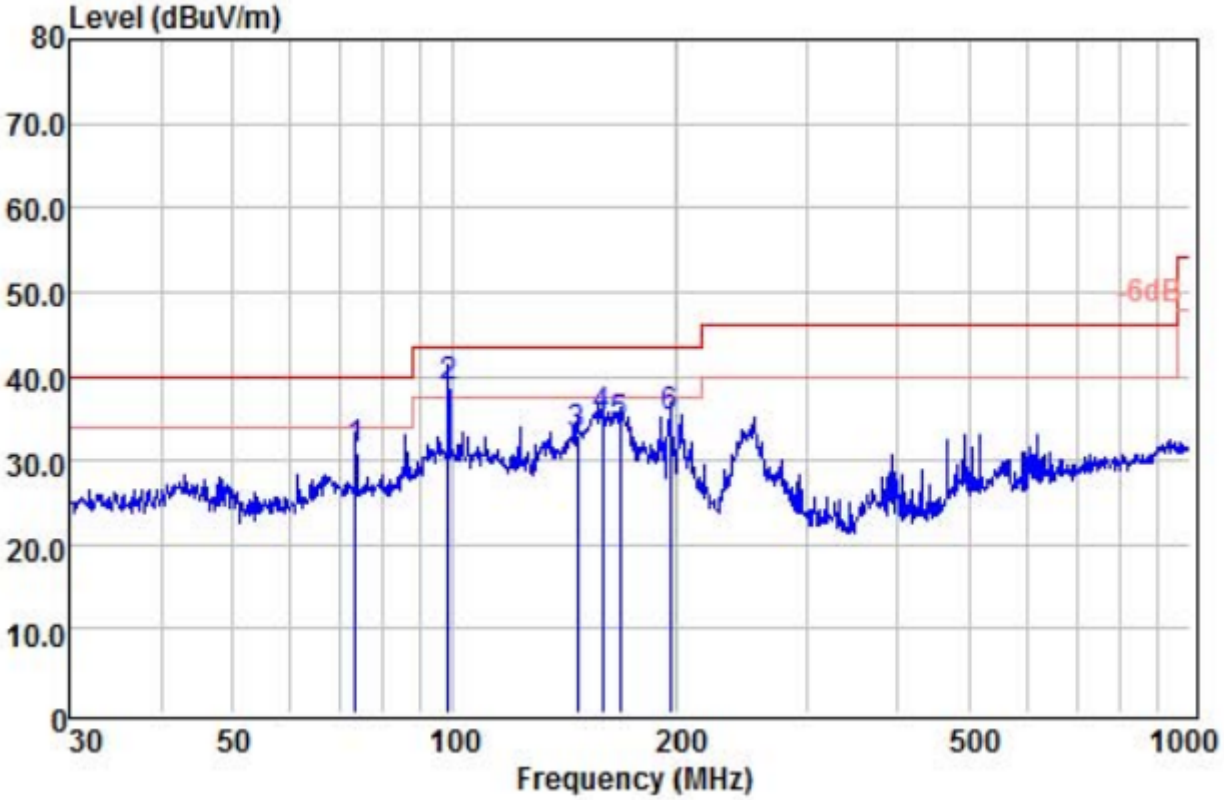
	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1 !	98.14	28.12	9.60	0.82	38.54	43.50	-4.96	QP
2	147.40	26.09	8.70	0.85	35.64	43.50	-7.86	QP
3	153.74	27.48	9.00	0.86	37.34	43.50	-6.16	QP
4	164.91	26.47	9.65	0.86	36.98	43.50	-6.52	QP
5	171.39	24.38	10.10	0.87	35.35	43.50	-8.15	QP
6 !	196.51	28.29	11.00	0.88	40.17	43.50	-3.33	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 14.8V from battery		
Test Mode :	Mode 4		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	73.62	22.78	7.68	0.84	31.30	40.00	-8.70	QP
2 !	98.14	28.43	9.51	0.82	38.76	43.50	-4.74	QP
3	147.40	23.45	8.84	0.85	33.14	43.50	-10.36	QP
4	159.23	25.20	9.18	0.86	35.24	43.50	-8.26	QP
5	168.41	23.33	9.96	0.87	34.16	43.50	-9.34	QP
6	196.51	23.44	10.69	0.88	35.01	43.50	-8.49	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

3.2.8 TEST RESULTS (1GHZ~25GHZ)

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5727									
V	11454.00	56.33	30.55	5.77	24.66	56.21	68.20	-11.99	PK
V	11454.00	45.69	30.55	5.77	24.66	45.57	54.00	-8.43	AV
V	17181.00	54.31	30.33	6.32	24.55	54.85	68.20	-13.35	PK
V	17181.00	44.06	30.33	6.32	24.55	44.6	54.00	-9.4	AV
V	22908.00	51.36	30.85	7.45	24.69	52.65	68.20	-15.55	PK
H	11454.00	56.47	30.55	5.77	24.66	56.35	68.20	-11.85	PK
H	11454.00	46.32	30.55	5.77	24.66	46.2	54.00	-7.8	AV
H	17181.00	54.82	30.33	6.32	24.55	55.36	68.20	-12.84	PK
H	17181.00	44.09	30.33	6.32	24.55	44.63	54.00	-9.37	AV
H	22908.00	51.53	30.85	7.45	24.69	52.82	68.20	-15.38	PK
operation frequency:5771									
V	11542.00	56.32	30.55	5.77	24.66	56.2	68.20	-12	PK
V	11542.00	45.88	30.55	5.77	24.66	45.76	54.00	-8.24	AV
V	17313.00	54.85	30.33	6.32	24.55	55.39	68.20	-12.81	PK
V	17313.00	44.39	30.33	6.32	24.55	44.93	54.00	-9.07	AV
V	23084.00	52.06	30.85	7.45	24.69	53.35	68.20	-14.85	PK
H	11542.00	56.13	30.55	5.77	24.66	56.01	68.20	-12.19	PK
H	11542.00	45.78	30.55	5.77	24.66	45.66	54.00	-8.34	AV
H	17313.00	55.93	30.33	6.32	24.55	56.47	68.20	-11.73	PK
H	17313.00	45.21	30.33	6.32	24.55	45.75	54.00	-8.25	AV
H	23084.00	52.63	30.85	7.45	24.69	53.92	68.20	-14.28	PK
operation frequency:5804									
V	11608.00	57.33	30.55	5.77	24.66	57.21	68.20	-10.99	PK
V	11608.00	46.51	30.55	5.77	24.66	46.39	54.00	-7.61	AV
V	17412.00	56.31	30.33	6.32	24.55	56.85	68.20	-11.35	PK
V	17412.00	45.63	30.33	6.32	24.55	46.17	54.00	-7.83	AV
V	23216.00	52.11	30.85	7.45	24.69	53.4	68.20	-14.8	PK
H	11608.00	56.83	30.55	5.77	24.66	56.71	68.20	-11.49	PK
H	11608.00	45.08	30.55	5.77	24.66	44.96	54.00	-9.04	AV
H	17412.00	55.34	30.33	6.32	24.55	55.88	68.20	-12.32	PK
H	17412.00	44.63	30.33	6.32	24.55	45.17	54.00	-8.83	AV
H	23216.00	52.03	30.85	7.45	24.69	53.32	68.20	-14.88	PK

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205, RSS-Gen 8.9, RSS-Gen 8.10

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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.

g. Test the EUT in the lowest channel,the Highest channel

Note:

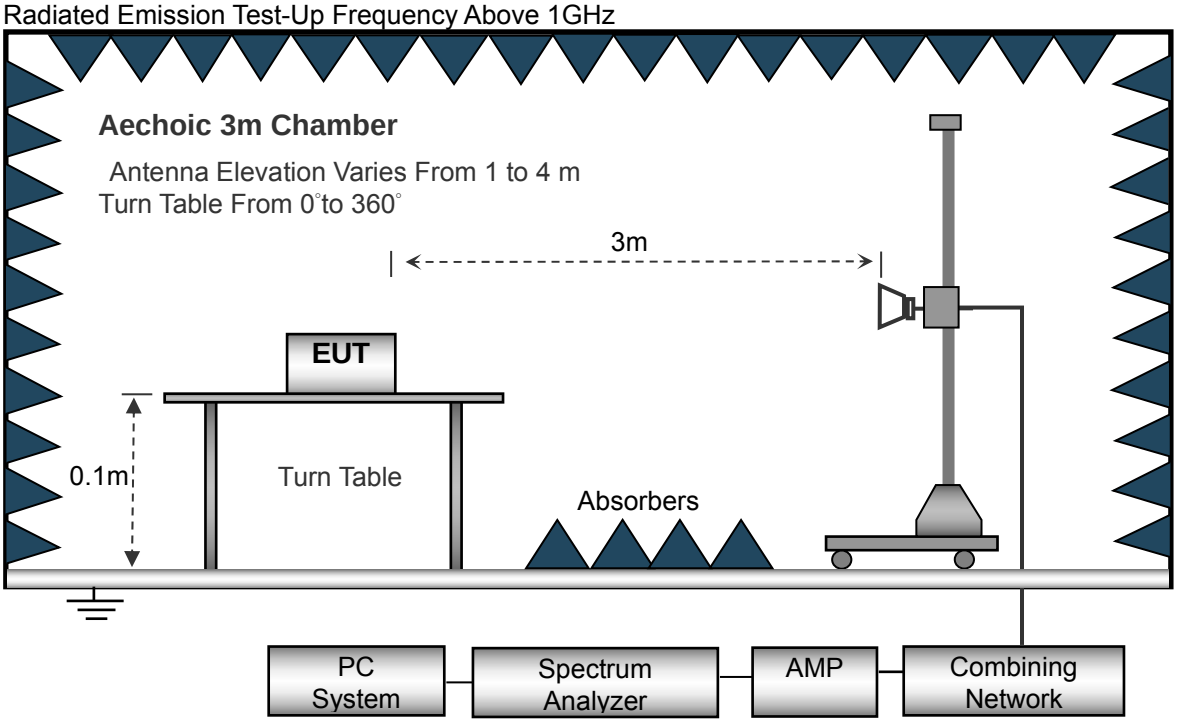
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULT

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
V	5727.00	55.36	30.21	4.83	23.97	53.95	68.2	-14.25	PK
V	5727.00	44.92	30.21	4.83	23.97	43.51	54	-10.49	AV
V	5804.00	56.06	30.22	4.85	23.98	54.67	68.2	-13.53	PK
V	5804.00	45.93	30.22	4.85	23.98	44.54	54	-9.46	AV
H	5727.00	56.31	30.21	4.83	23.97	54.9	68.2	-13.3	PK
H	5727.00	45.87	30.21	4.83	23.97	44.46	54	-9.54	AV
H	5804.00	55.32	30.22	4.85	23.98	53.93	68.2	-14.27	PK
H	5804.00	45.16	30.22	4.85	23.98	43.77	54	-10.23	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
   Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

4.POWER SPECTRAL DENSITY TEST

Test Requirement:	FCC Part15 C Section 15.407 (e)&RSS-247 Section 6.2.4.1
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and RSS-Gen

4.1.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.407) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407 (e)	Power Spectral Density	30dBm/500kHz	5725-5850	PASS

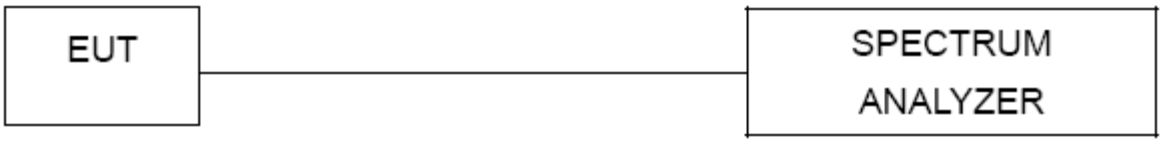
4.1.2 TEST PROCEDURE

Methods refer to FCC KDB 789033
a) Set RBW ≥ 1/T, where T is defined in II.B.I.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (＜500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW(＜1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

4.1.3DEVIATION FROM STANDARD

No deviation.

4.1.4TEST SETUP



4.1.5 EUT OPERATION CONDITIONS

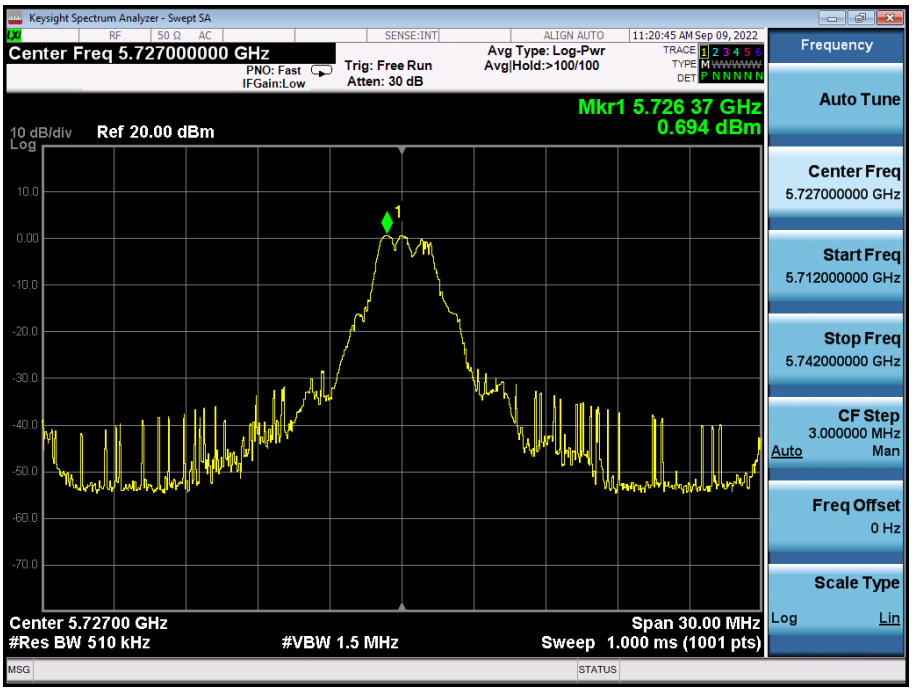
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.6 TEST RESULTS

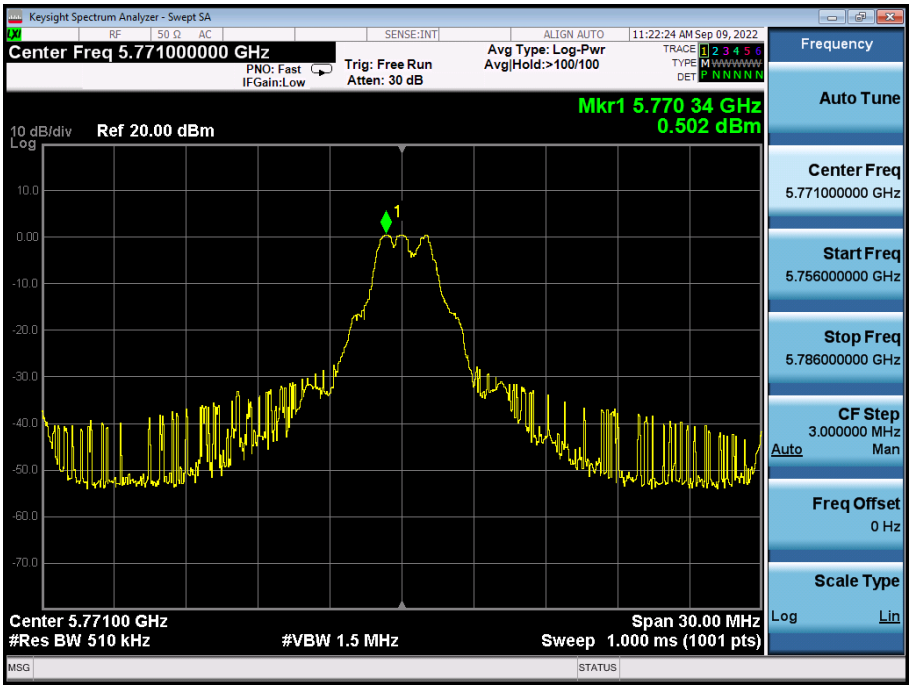
Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	GFSK	Test Voltage ：	DC 14.8V from battery

Frequency	Power Spectral Density (dBm/500kHZ)	Limit (dBm/500kHz)	Result
5727 MHz	0.694	30.00	PASS
5771 MHz	0.502	30.00	PASS
5804 MHz	-0.764	30.00	PASS

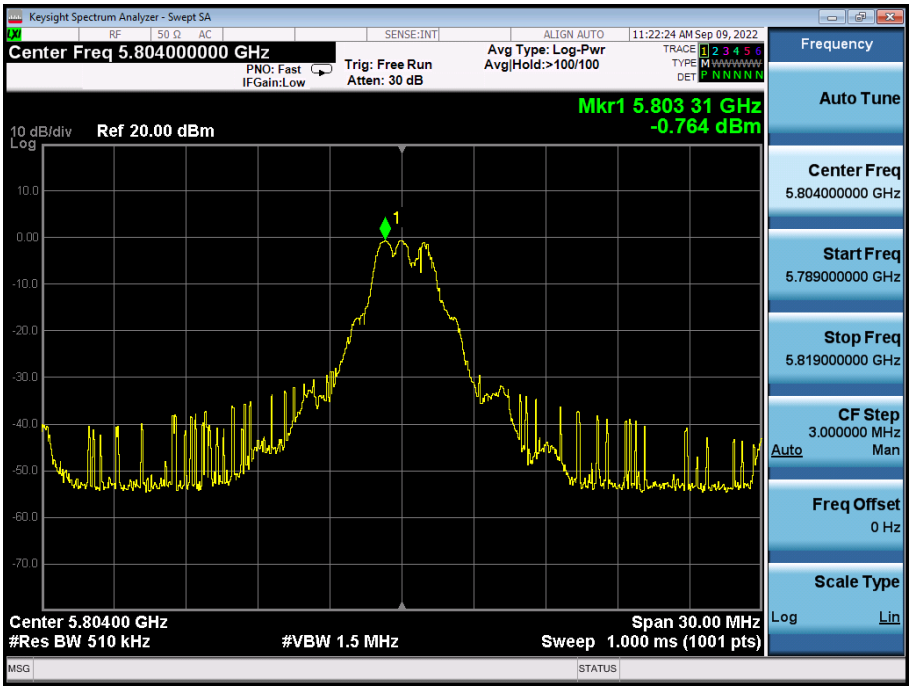
CH01



CH09


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.771000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
11:22:24 AM Sep 09, 2022
Mkr1 5.770 34 GHz
0.502 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 5.77100 GHz
#Res BW 510 kHz
#VBW 1.5 MHz
Span 30.00 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.771000000 GHz
Start Freq
5.756000000 GHz
Stop Freq
5.786000000 GHz
CF Step
3.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

CH16


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.804000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
11:22:24 AM Sep 09, 2022
Mkr1 5.803 31 GHz
-0.764 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 5.80400 GHz
#Res BW 510 kHz
#VBW 1.5 MHz
Span 30.00 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.804000000 GHz
Start Freq
5.789000000 GHz
Stop Freq
5.819000000 GHz
CF Step
3.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

5. CHANNEL BANDWIDTH

5.1.1 APPLIED PROCEDURES / LIMIT

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth. The 26 dB bandwidth is used to determine the conducted power limits. The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

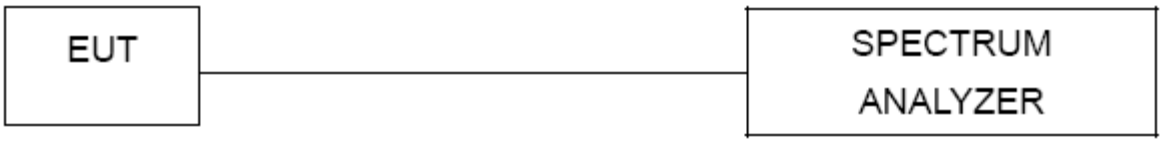
5.1.2 TEST PROCEDURE

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP



5.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

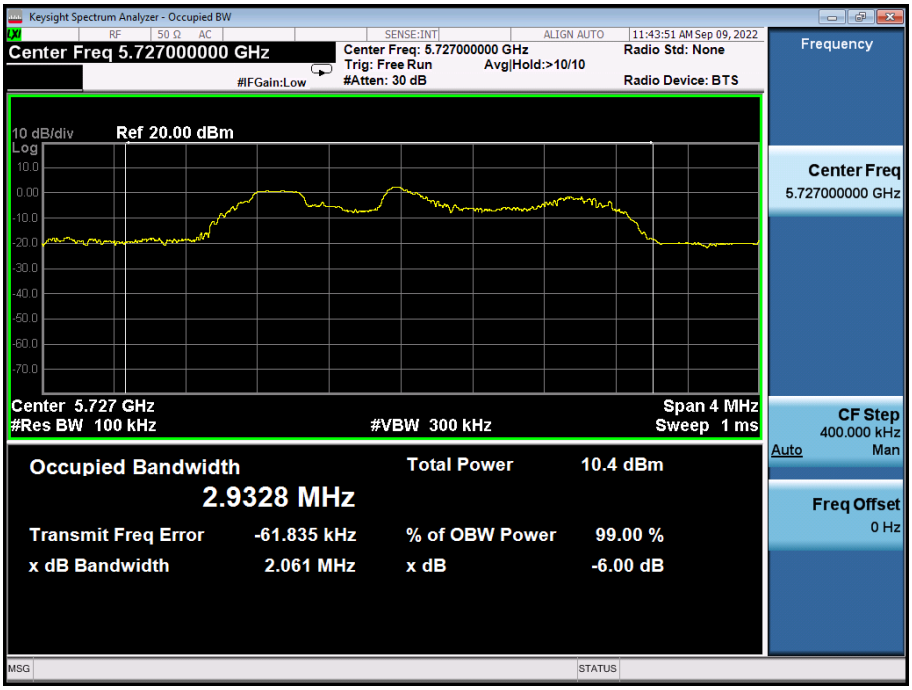
5.1.6 TEST RESULTS

Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	GFSK	Test Voltage ：	DC 14.8V from battery

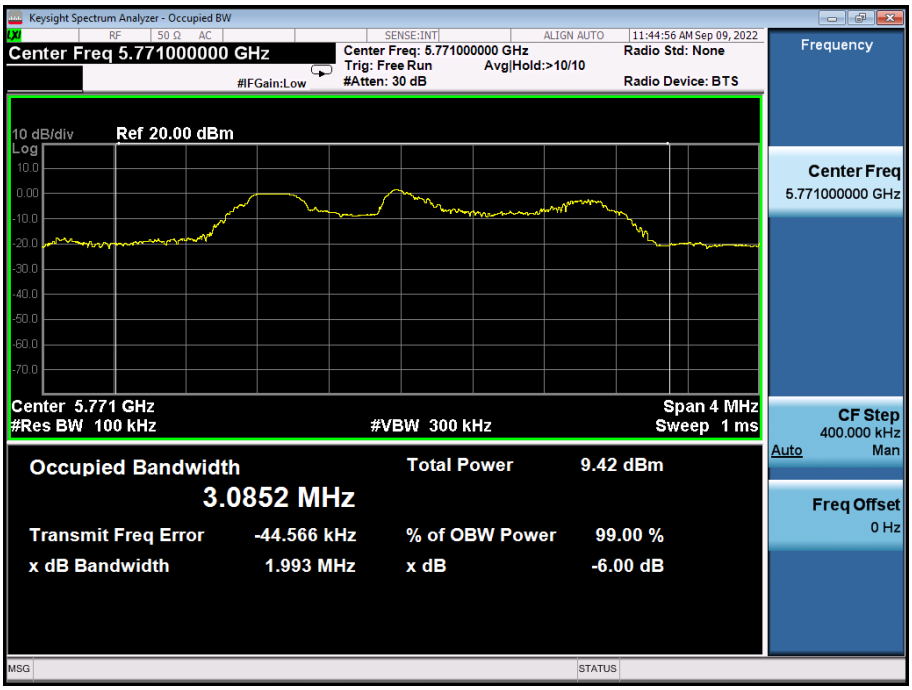
Test channel	6dB Bandwidth (MHz)	99% Occupied bandwidth(MHz)	Limit(KHz)	Result
Lowest	2.061	2.554	>500	Pass
Middle	1.993	2.732		
Highest	2.064	2.821		

6dB Bandwidth

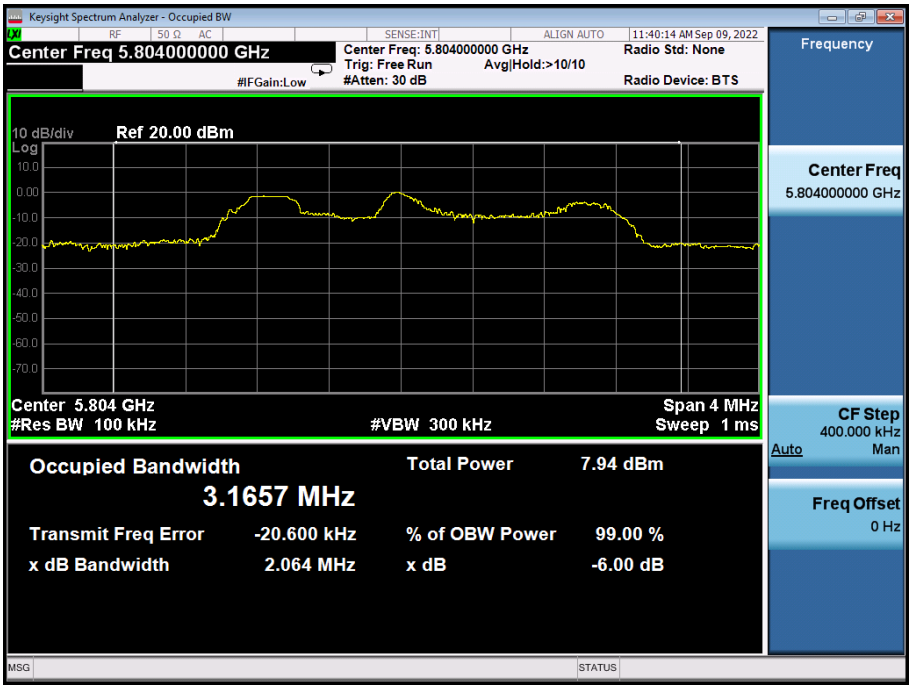
CH01



CH09

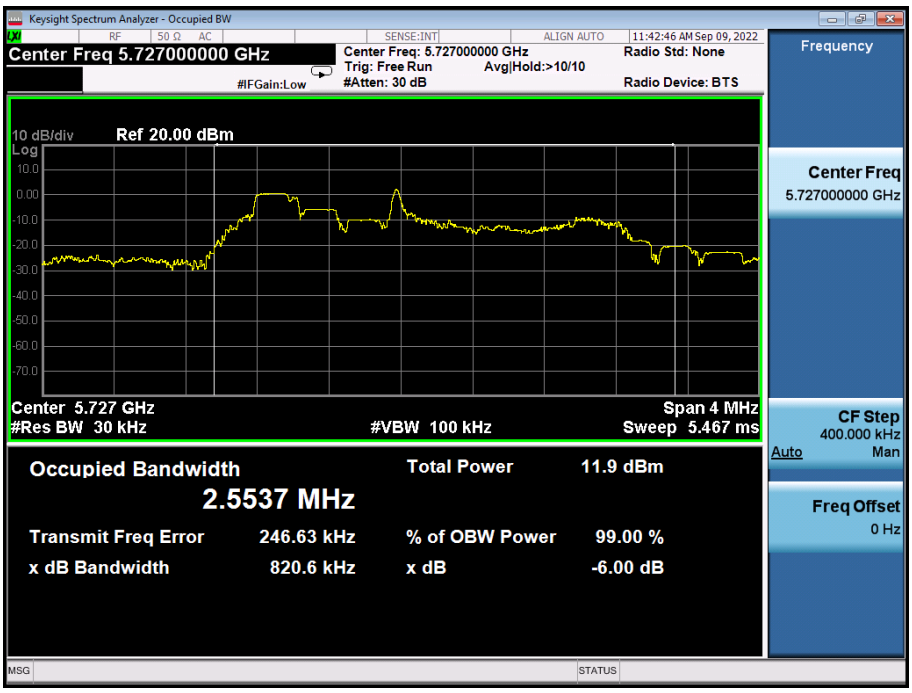

Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
11:44:56 AM Sep 09, 2022
Center Freq 5.771000000 GHz
#IFGain:Low
Center Freq: 5.771000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 5.771 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4 MHz
Sweep 1 ms
Center Freq
5.771000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
3.0852 MHz
Total Power 9.42 dBm
Transmit Freq Error -44.566 kHz
% of OBW Power 99.00 %
x dB Bandwidth 1.993 MHz
x dB -6.00 dB
MSG
STATUS

CH16

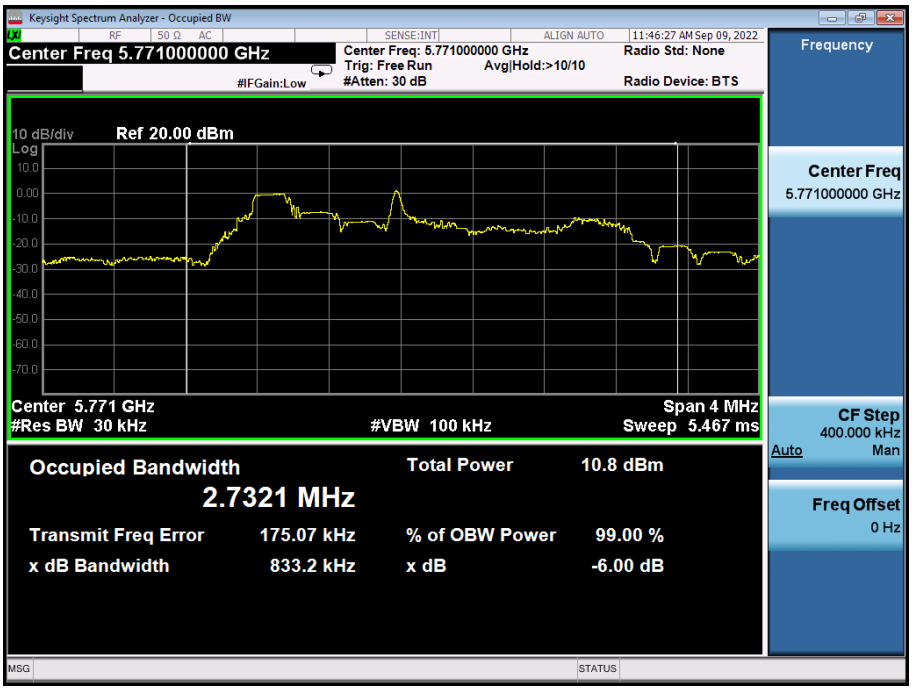

Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
11:40:14 AM Sep 09, 2022
Center Freq 5.804000000 GHz
#IFGain:Low
Center Freq: 5.804000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 5.804 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4 MHz
Sweep 1 ms
Center Freq
5.804000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
3.1657 MHz
Total Power 7.94 dBm
Transmit Freq Error -20.600 kHz
% of OBW Power 99.00 %
x dB Bandwidth 2.064 MHz
x dB -6.00 dB
MSG
STATUS

99% Bandwidth

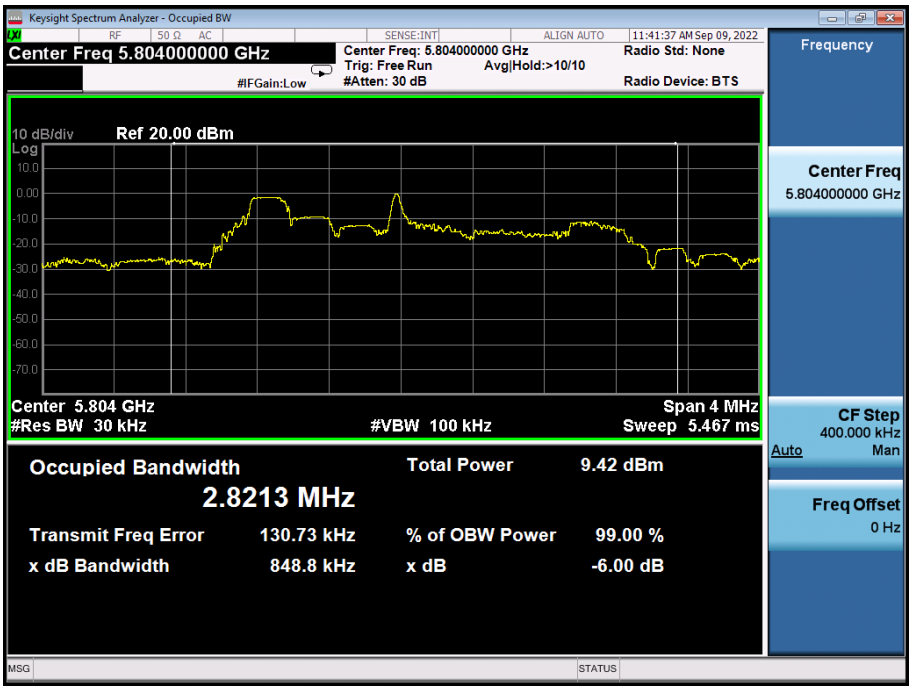
CH01



CH09



CH16


Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
11:41:37 AM Sep 09, 2022
Center Freq 5.804000000 GHz
#IFGain:Low
Center Freq: 5.804000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 5.804 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 4 MHz
Sweep 5.467 ms
Center Freq
5.804000000 GHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
2.8213 MHz
Total Power 9.42 dBm
Transmit Freq Error 130.73 kHz
% of OBW Power 99.00 %
x dB Bandwidth 848.8 kHz
x dB -6.00 dB
MSG
STATUS

6.PEAK OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.407(a)&RSS-247 Section 6.2.4.1
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and RSS-Gen

6.1.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.407) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(a)	Peak Output Power	1 watt or 30dBm	5725-5850	PASS

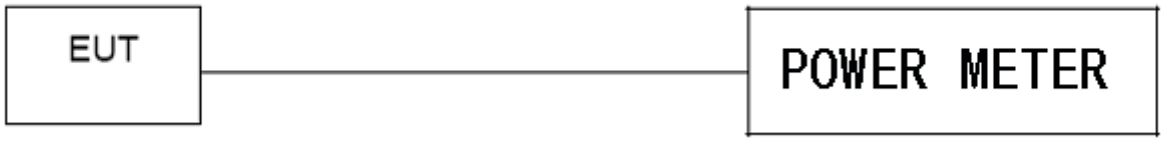
6.1.2 TEST PROCEDURE

a. The EUT was directly connected to the Power meter.

6.1.3 DEVIATION FROM STANDARD

No deviation.

6.1.4 TEST SETUP



6.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.6 TEST RESULTS

Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	GFSK	Test Voltage ：	DC 14.8V from battery

Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
Lowest	2.126	30.00	Pass
Middle	1.027		
Highest	0.356		

7. CONDUCTED BAND EDGE

7.1.1 APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 20dB.

FCC: For the band 5725-5825 MHz, All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

7.1.2 TEST PROCEDURE

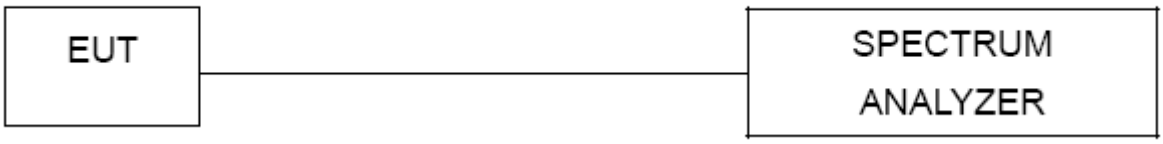
Using the following spectrum analyzer setting:

A) Set the RBW = 1MHz.
B) Set the VBW = 3MHz.
C) Sweep time = auto couple.
D) Detector function = peak.
E) Trace mode = max hold.
F) Allow trace to fully stabilize.

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP

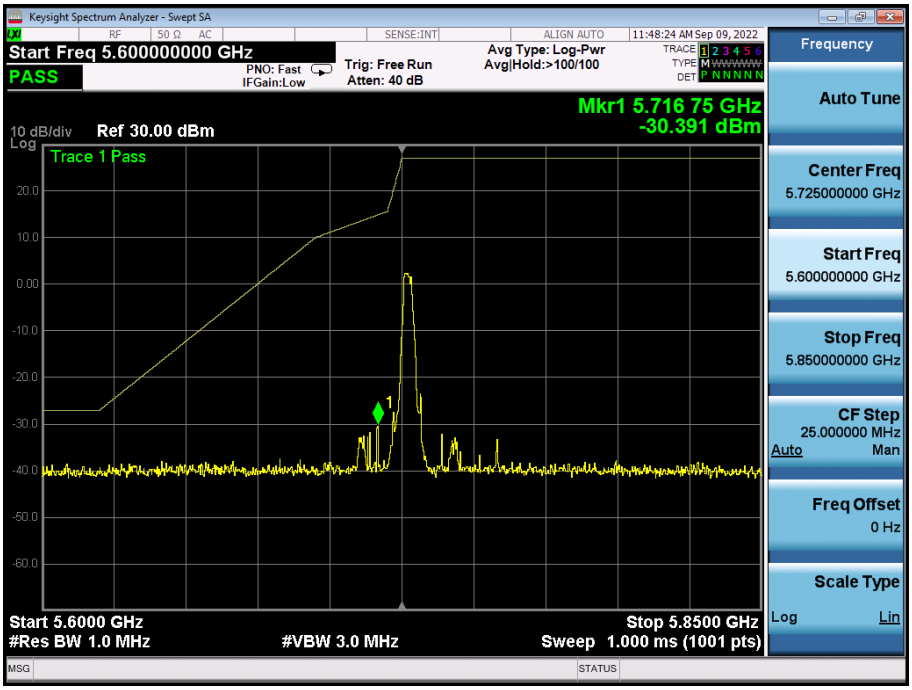


7.1.5 EUT OPERATION CONDITIONS

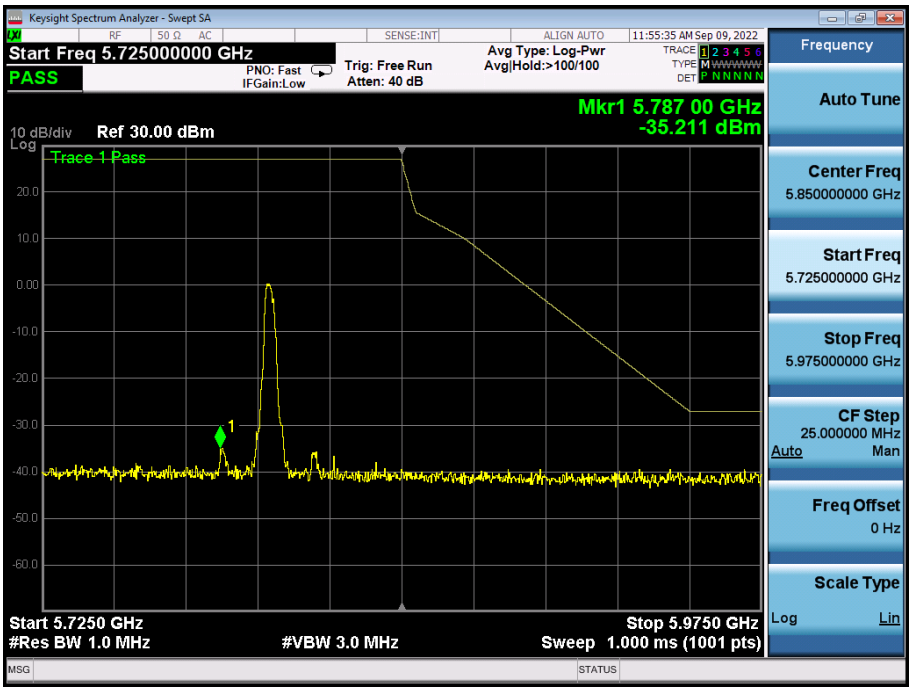
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.6 TEST RESULTS

5727MHz



5804MHz



8. ANTENNA REQUIREMENT

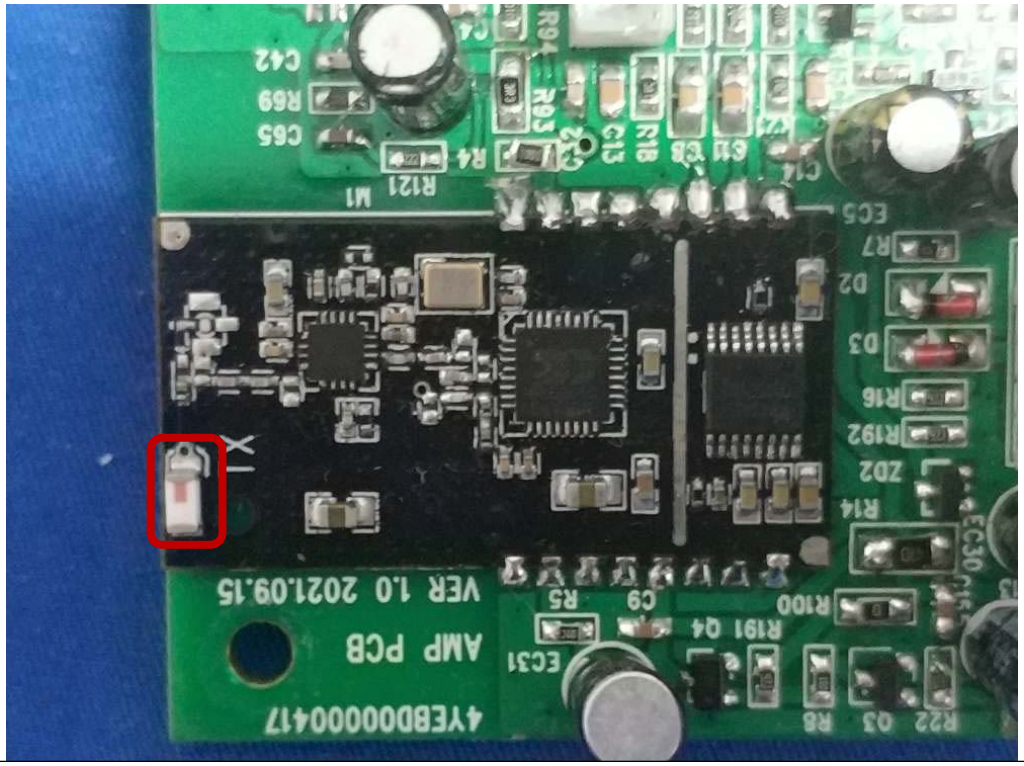
Standard requirement:	FCC part 15.203&RSS-Gen 8.3

For intentional device, according to FCC 47 CFR Section 15.203, 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.

For RSS-Gen Section 8.3: A transmitter can only be sold or operated with antennas with which it was approved. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power

EUT Antenna:

The antennas are Chip antenna, the best case gain of the antennas are 2dBi.



9. TEST SEUUP PHOTO

Reference to the appendix I for details.

10. EUT PHOTO

Reference to the appendix II for details.

※※※※※ **END OF REPORT** ※※※※※