

FCC TEST REPORT

FCC ID:2AQ6V-KPSOUNDBAR2

IC:24314-KPSOUNDBAR2

Report Number..... : ZKT-211019L5488E-3

Date of Test..... Aug. 10, 2021 to Oct. 19, 2021

Date of issue..... : Oct. 22, 2021

Total number of pages..... 38

Test Result : PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : TOTEM ACOUSTIQUE INC.

Address : 9165, Champ d'Eau, St. Leonard, Quebec, H1P3M3, Canada

Manufacturer's name : TOTEM ACOUSTIQUE INC.

Address : 9165, Champ d'Eau, St. Leonard, Quebec, H1P3M3, Canada

Test specification:

Standard..... : 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 procedure..... : /

Non-standard test method : N/A

Test Report Form No..... : TRF-EL-111_V0

Test Report Form(s) Originator..... : ZKT Testing

Master TRF : Dated: 2021-10-22

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Soundbar

Trademark : Totem

Model/Type reference..... : KIN Play Sound Bar- II

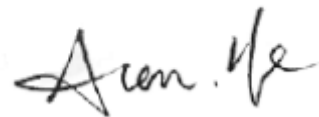
Ratings..... : 100-240V~ 50/60Hz

Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China**

Tested by (name + signature).....: Alen He



Reviewer (name + signature).....: Joe Liu



Approved (name + signature).....: Lake Xie



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1.VERSION

Report No.	Version	Description	Approved
ZKT-211019L5488E-3	Rev.01	Initial issue of report	Oct. 22, 2021

2.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	
15.407 (g) RSS-Gen Section 8.11	Frequency Stability	PASS	

NOTE:

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

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

Test lab CAB identifier:CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, 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	$\pm 1.38\text{dB}$
2	RF power conducted	$\pm 0.16\text{dB}$
3	Spurious emissions conducted	$\pm 0.21\text{dB}$
4	All emissions radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Soundbar
Test Model No.:	Totem
Sample ID:	ZKT211019L5488E-1#
HVIN:	KIN Play Sound Bar- II
Model Different.:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Sample(s) Status:	Engineer sample
Operation Frequency:	5727MHz~5804MHz
Channel Numbers:	16
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Chip Antenna
Antenna gain:	2dBi
Power supply:	100-240V~ 50/60Hz

Operation Frequency each of channel			
Channel	Frequency	Channel	Frequency
1	5727MHz	9	5771MHz
2	5730MHz	10	5776MHz
3	5734MHz	11	5779MHz
4	5738MHz	12	5782MHz
5	5749MHz	13	5793MHz
6	5753MHz	14	5797MHz
7	5756MHz	15	5801MHz
8	5760MHz	16	5804MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	5727MHz
The middle channel	5771MHz
The Highest channel	5804MHz

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	Switch the high, medium and low emission signals by touching the switch.
Power level setup	<7dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious



3.4 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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Soundbar	Totem	KIN Play Sound Bar-II	N/A	EUT
AE-1	Notebook	lenovo	B40-80	MP07F6JD	AE
Item	Shielded Type	Ferrite Core	Length	Note	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation & RF Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Previous calibration	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY4510957 2	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
3	Test Receiver (9kHz-7GHz)	R&S	ESC17	101169	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
4	Bilog Antenna (30MHz-1400M Hz)	Schwarzbeck	VULB9168	00877	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
5	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120 D	1541	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
8	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519 B	014	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30M Hz	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1G Hz	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40G Hz	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
13	CMW500 Test	R&S	CMW500	106504	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
14	ESG Signal Generator	Agilent	E4421B	GB4005120 3	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
15	Signal Generator	Agilent	N5182A	MY4742021 5	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
16	Power Meter	Anritsu	ML2495A	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
17	D.C. Power Supply	LongWei	TPR-6405 D	\	\	\	\
18	Software	Audix	E3	6.101223a	\	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Previous calibration	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
2	LISN	CYBERTEK	EM5040A	E185040014 9	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
3	Test Cable	N/A	C01	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
4	Test Cable	N/A	C02	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2020	Sep. 21, 2021	Sep. 20, 2022
7	Software	Audix	E3	6.101223a	\	\	\

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207&RSS-Gen 8.8
Test Method:	ANSI C63.10:2013 and RSS-Gen
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quas-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) *Decreases with the logarithm of the frequency.

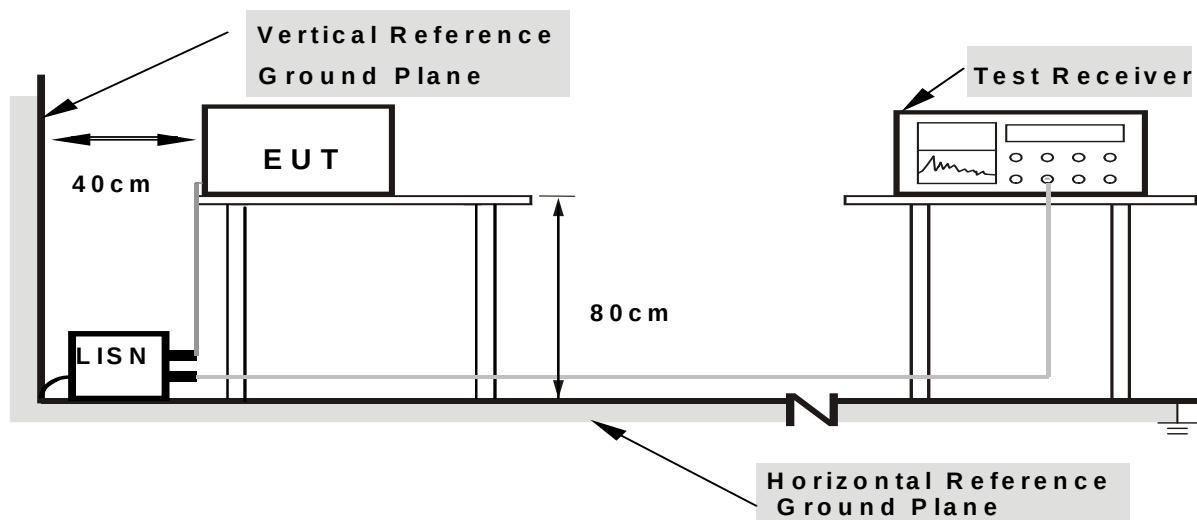
4.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 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 cm from other units and other metal planes

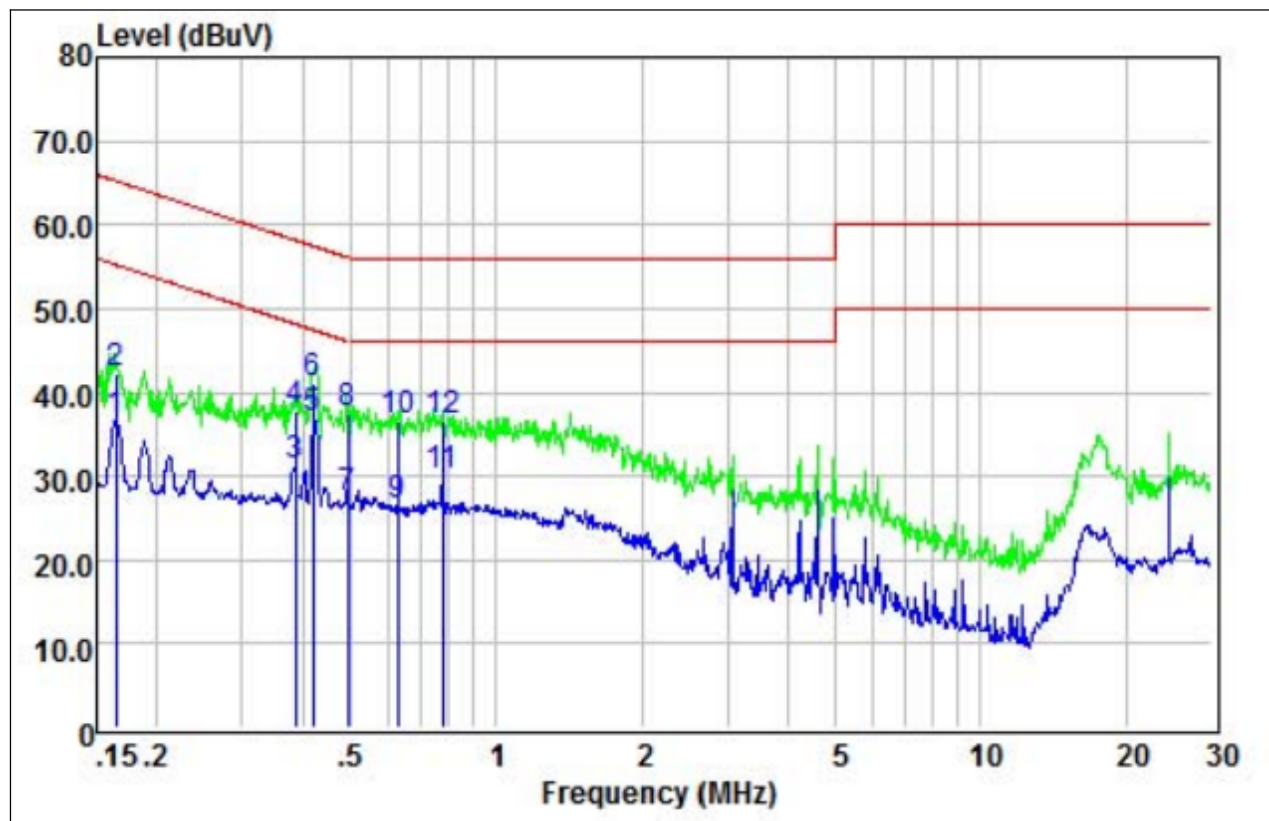
4.1.5 EUT OPERATING CONDITIONS

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.

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

4.1.6 TEST RESULTS

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test model :	KIN Play Sound Bar- II

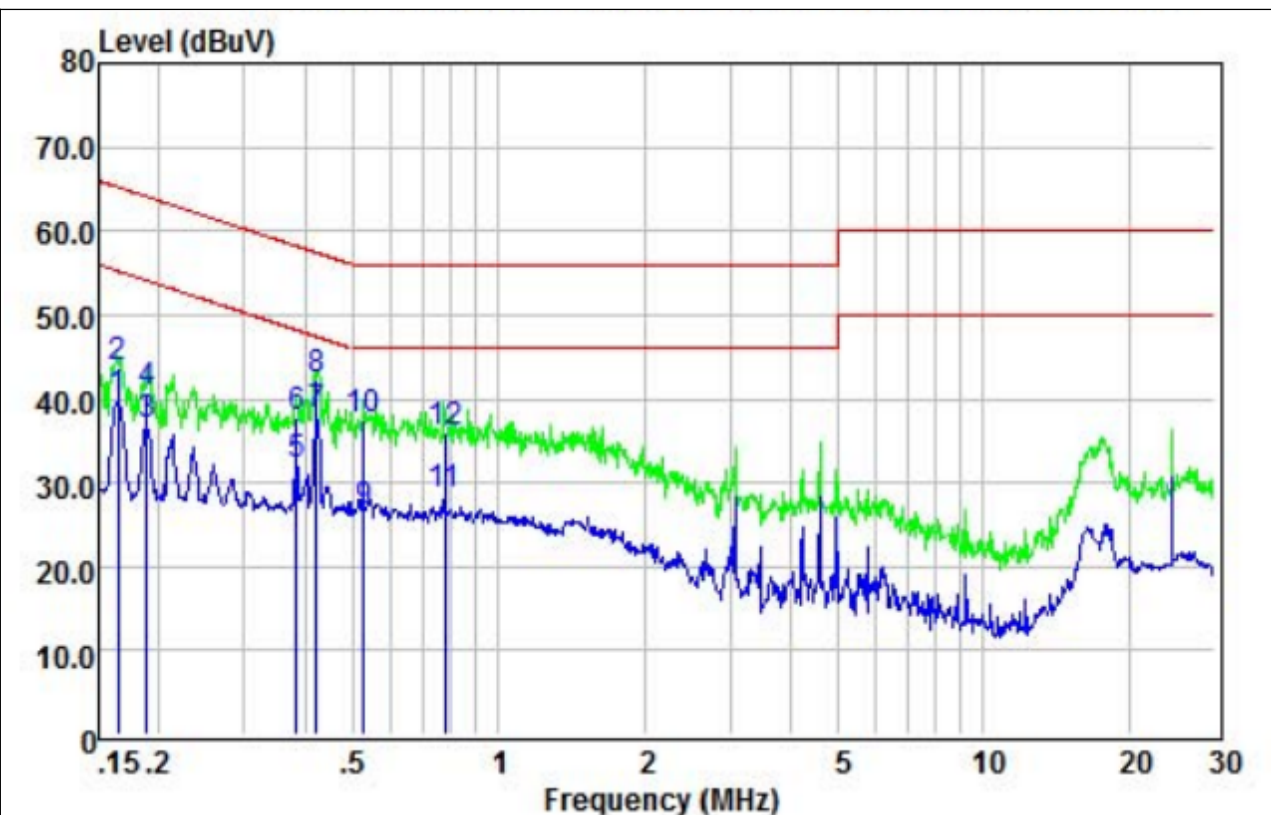


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.16	26.95	9.63	0.05	36.63	55.25	-18.62	Average
2	0.16	32.44	9.63	0.05	42.12	65.25	-23.13	QP
3	0.39	21.63	9.66	0.05	31.34	48.17	-16.83	Average
4	0.39	28.11	9.66	0.05	37.82	58.17	-20.35	QP
5	0.42	27.31	9.67	0.05	37.03	47.46	-10.43	Average
6	0.42	31.33	9.67	0.05	41.05	57.46	-16.41	QP
7	0.49	17.60	9.69	0.05	27.34	46.10	-18.76	Average
8	0.49	27.75	9.69	0.05	37.49	56.10	-18.61	QP
9	0.63	16.64	9.66	0.05	26.35	46.00	-19.65	Average
10	0.63	27.00	9.66	0.05	36.71	56.00	-19.29	QP
11	0.78	20.27	9.63	0.05	29.95	46.00	-16.05	Average
12	0.78	26.95	9.63	0.05	36.63	56.00	-19.37	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test model :	KIN Play Sound Bar- II



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.16	30.34	9.58	0.05	39.97	55.25	-15.28	Average
2	0.16	33.99	9.58	0.05	43.62	65.25	-21.63	QP
3	0.19	27.27	9.54	0.05	36.86	54.11	-17.25	Average
4	0.19	31.26	9.54	0.05	40.85	64.11	-23.26	QP
5	0.38	22.42	9.61	0.05	32.08	48.21	-16.13	Average
6	0.38	28.02	9.61	0.05	37.68	58.21	-20.53	QP
7	0.42	28.32	9.62	0.05	37.99	47.42	-9.43	Average
8	0.42	32.48	9.62	0.05	42.15	57.42	-15.27	QP
9	0.53	16.78	9.63	0.05	26.46	46.00	-19.54	Average
10	0.53	27.80	9.63	0.05	37.48	56.00	-18.52	QP
11	0.78	18.99	9.63	0.05	28.67	46.00	-17.33	Average
12	0.78	26.28	9.63	0.05	35.96	56.00	-20.04	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC part 15.407(b)/15.209 RSS-247 Section 3.3/RSS-Gen 8.9				
Test Method:	ANSI C63.10:2013 and RSS-Gen				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
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	1/T	Average

4.2.1 RADIATED EMISSION LIMITS

Frequencies (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
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT

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).

4.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

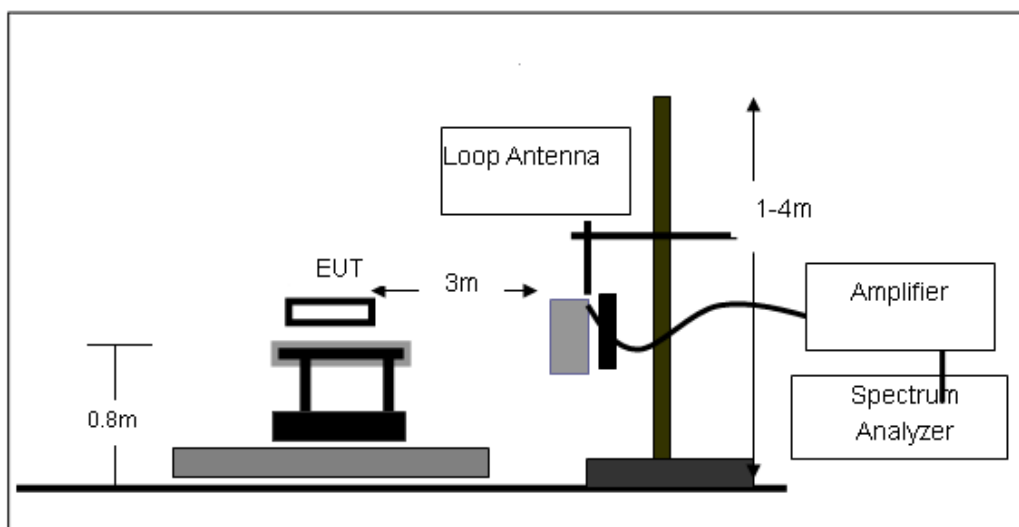
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

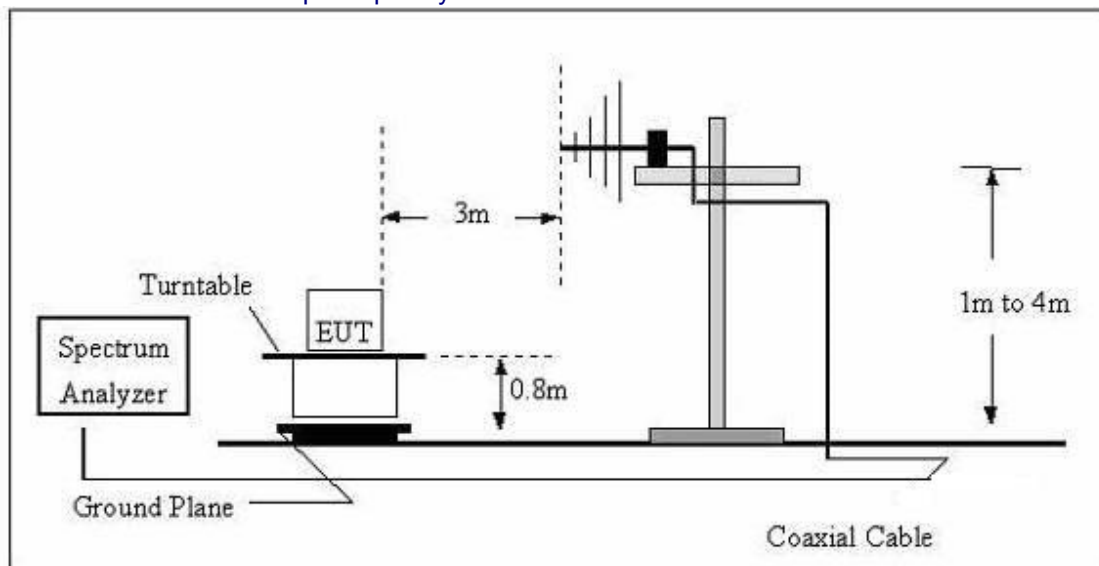
No deviation

4.2.4 TEST SETUP

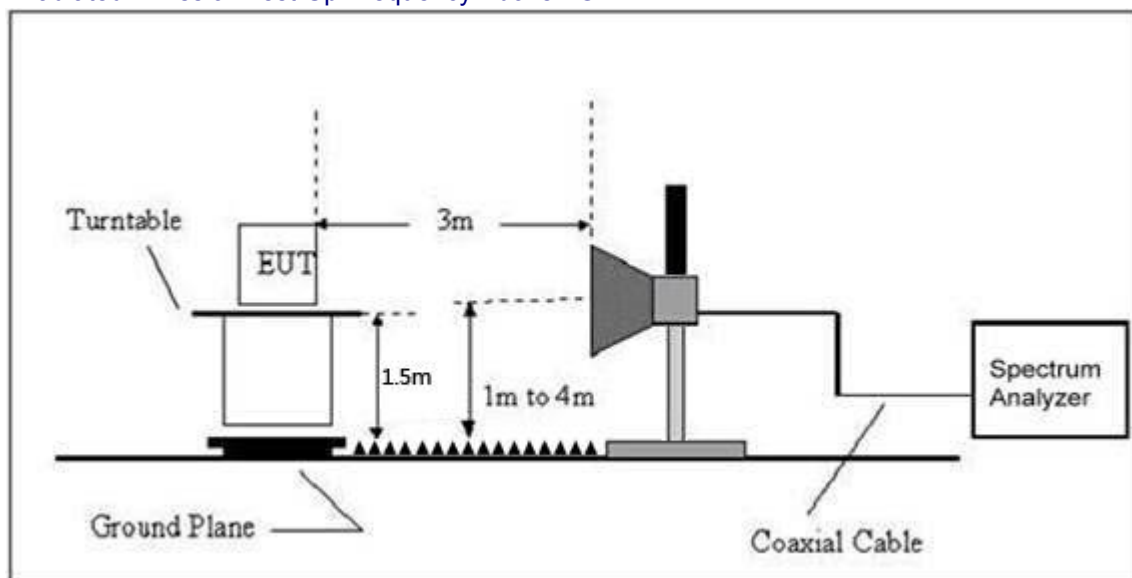
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



4.2.5 EUT OPERATING CONDITIONS

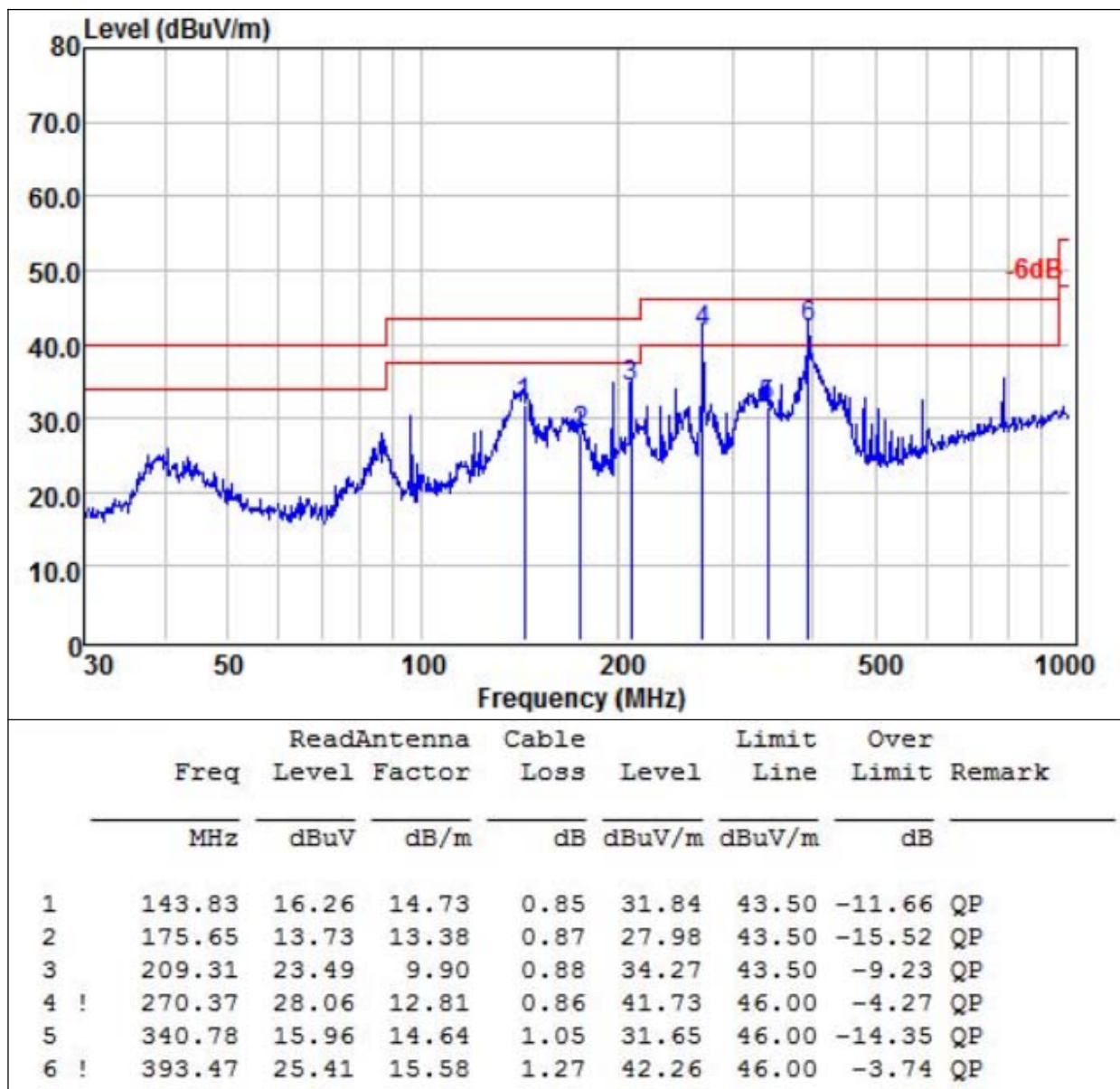
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

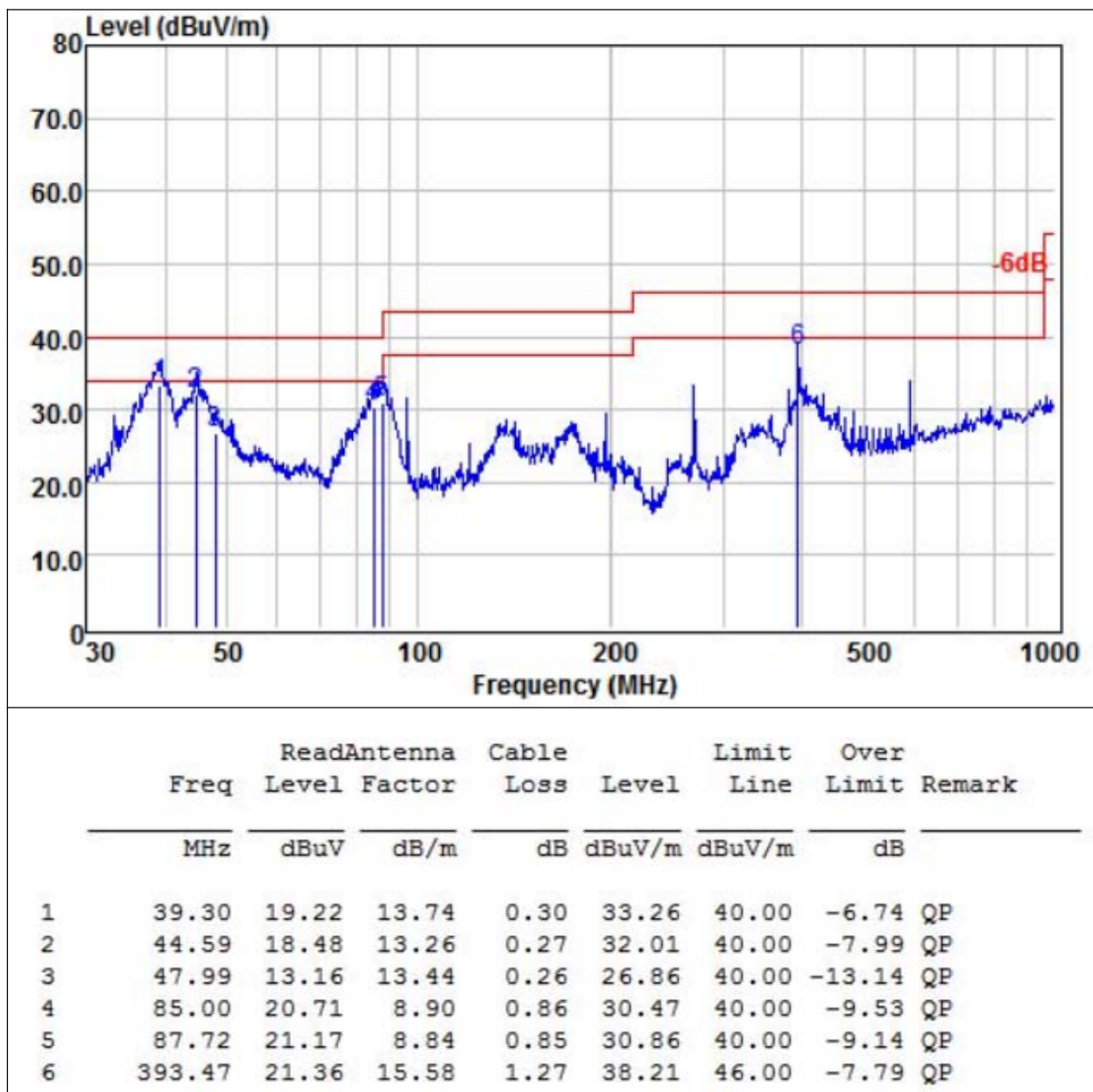
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz	Test model :	KIN Play Sound Bar- II
Test Mode:	Transmitting mode of GFSK 5727MHz		



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz	Test model :	KIN Play Sound Bar- II
Test Mode:	Transmitting mode of GFSK 5727MHz		



Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.

1GHz~40GHz

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:5727MHz									
V	11454	55.64	30.55	5.77	24.66	55.52	68.20	-12.68	Pk
V	11454	43.47	30.55	5.77	24.66	43.35	54.00	-10.65	AV
V	17181	54.63	30.33	6.32	24.55	55.17	68.20	-13.03	Pk
V	17181	42.61	30.33	6.32	24.55	43.15	54.00	-10.85	AV
V	22908	53.61	30.85	7.45	24.69	54.9	68.20	-13.3	Pk
V	22908	41.52	30.85	7.45	24.69	42.81	54.00	-11.19	AV
V	28635	52.18	31.02	8.99	25.57	55.72	68.20	-12.48	Pk
V	28635	41.23	31.02	8.99	25.57	44.77	54.00	-9.23	AV
H	11454	56.33	30.55	5.77	24.66	56.21	68.20	-11.99	Pk
H	11454	44.85	30.55	5.77	24.66	44.73	54.00	-9.27	AV
H	17181	55.29	30.33	6.32	24.55	55.83	68.20	-12.37	Pk
H	17181	43.26	30.33	6.32	24.55	43.8	54.00	-10.2	AV
H	22908	54.29	30.85	7.45	24.69	55.58	68.20	-12.62	Pk
H	22908	42.69	30.85	7.45	24.69	43.98	54.00	-10.02	AV
H	28635	53.61	31.02	8.99	25.57	57.15	68.20	-11.05	Pk
H	28635	42.17	31.02	8.99	25.57	45.71	54.00	-8.29	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:5771MHz									
V	11542	55.63	30.55	5.77	24.66	55.51	68.20	-12.69	Pk
V	11542	44.16	30.55	5.77	24.66	44.04	54.00	-9.96	AV
V	17313	54.82	30.33	6.32	24.55	55.36	68.20	-12.84	Pk
V	17313	43.86	30.33	6.32	24.55	44.4	54.00	-9.6	AV
V	23084	54.16	30.85	7.45	24.69	55.45	68.20	-12.75	Pk
V	23084	42.18	30.85	7.45	24.69	43.47	54.00	-10.53	AV
V	28855	53.69	31.02	8.99	25.57	57.23	68.20	-10.97	Pk
V	28855	41.63	31.02	8.99	25.57	45.17	54.00	-8.83	AV
H	11542	56.84	30.55	5.77	24.66	56.72	68.20	-11.48	Pk
H	11542	45.16	30.55	5.77	24.66	45.04	54.00	-8.96	AV
H	17313	54.27	30.33	6.32	24.55	54.81	68.20	-13.39	Pk
H	17313	44.36	30.33	6.32	24.55	44.9	54.00	-9.1	AV
H	23084	53.72	30.85	7.45	24.69	55.01	68.20	-13.19	Pk
H	23084	43.16	30.85	7.45	24.69	44.45	54.00	-9.55	AV
H	28855	53.04	31.02	8.99	25.57	56.58	68.20	-11.62	Pk
H	28855	42.15	31.02	8.99	25.57	45.69	54.00	-8.31	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:5804MHz									
V	11608	55.63	30.55	5.77	24.66	55.51	68.20	-12.69	Pk
V	11608	44.85	30.55	5.77	24.66	44.73	54.00	-9.27	AV
V	17412	54.63	30.33	6.32	24.55	55.17	68.20	-13.03	Pk
V	17412	43.59	30.33	6.32	24.55	44.13	54.00	-9.87	AV
V	23216	53.62	30.85	7.45	24.69	54.91	68.20	-13.29	Pk
V	23216	42.18	30.85	7.45	24.69	43.47	54.00	-10.53	AV
V	29020	52.39	31.02	8.99	25.57	55.93	68.20	-12.27	Pk
V	29020	41.22	31.02	8.99	25.57	44.76	54.00	-9.24	AV
H	11608	55.27	30.55	5.77	24.66	55.15	68.20	-13.05	Pk
H	11608	45.16	30.55	5.77	24.66	45.04	54.00	-8.96	AV
H	17412	54.82	30.33	6.32	24.55	55.36	68.20	-12.84	Pk
H	17412	44.63	30.33	6.32	24.55	45.17	54.00	-8.83	AV
H	23216	54.13	30.85	7.45	24.69	55.42	68.20	-12.78	Pk
H	23216	43.26	30.85	7.45	24.69	44.55	54.00	-9.45	AV
H	29020	53.29	31.02	8.99	25.57	56.83	68.20	-11.37	Pk
H	29020	42.15	31.02	8.99	25.57	45.69	54.00	-8.31	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.

5. RADIATED BAND EMISSION MEASUREMENT

5.1 TEST REQUIREMENT:

Test Requirement:	FCC Part15 C Section 15.209 and 15.205&RSS-Gen 8.9				
Test Method:	ANSI C63.10: 2013 and RSS-Gen				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above	Peak	1MHz	3MHz	Peak
	1GHz	Average	1MHz	1/T	Average

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).

5.2 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:

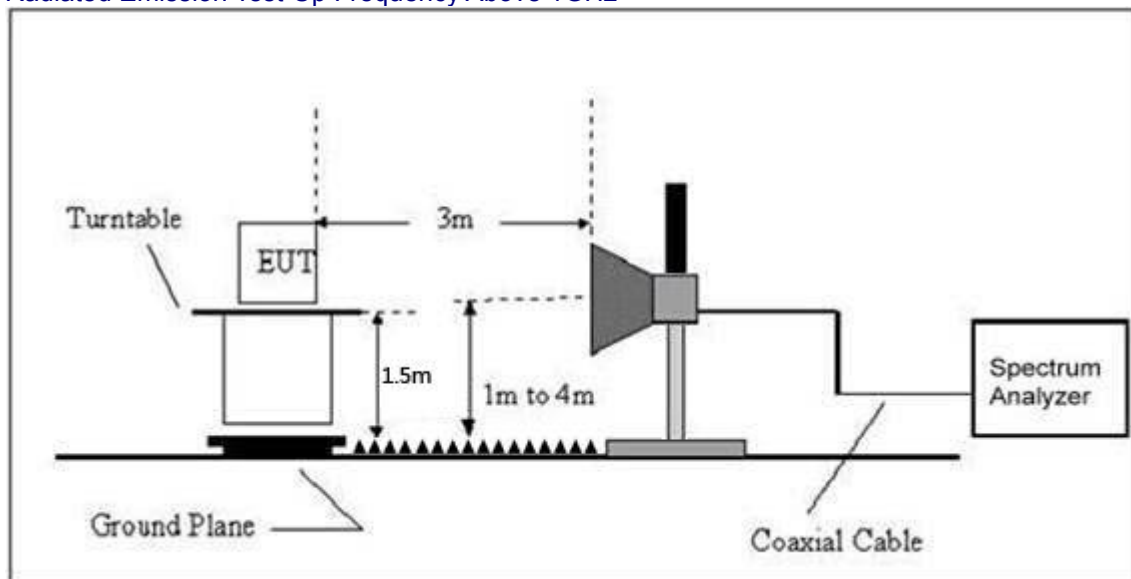
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.3 DEVIATION FROM TEST STANDARD

No deviation

5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



5.5 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.

5.6 TEST RESULT

Horizontal

Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
5727	55.36	30.21	4.83	23.97	53.95	68.20	-14.25	PK
5727	45.36	30.21	4.83	23.97	43.95	54.00	-10.05	AV
5804	54.26	30.22	4.85	23.98	52.87	68.20	-15.33	PK
5804	43.16	30.22	4.85	23.98	41.77	54.00	-12.23	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

Vertical

Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
5727	56.12	30.21	4.83	23.97	54.71	68.20	-13.49	PK
5727	45.32	30.21	4.83	23.97	43.91	54.00	-10.09	AV
5804	54.17	30.22	4.85	23.98	52.78	68.20	-15.42	PK
5804	43.82	30.22	4.85	23.98	42.43	54.00	-11.57	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

6. POWER SPECTRAL DENSITY TEST

6.1 APPLIED PROCEDURES / LIMIT

RSS-247 Section 6.2.4.1				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407	Power Spectral Density	8dBm/3kHz	5725-5850	PASS

6.2 TEST PROCEDURE

Methods refer to FCC KDB 789033

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) The result is the PPSD.
- 4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



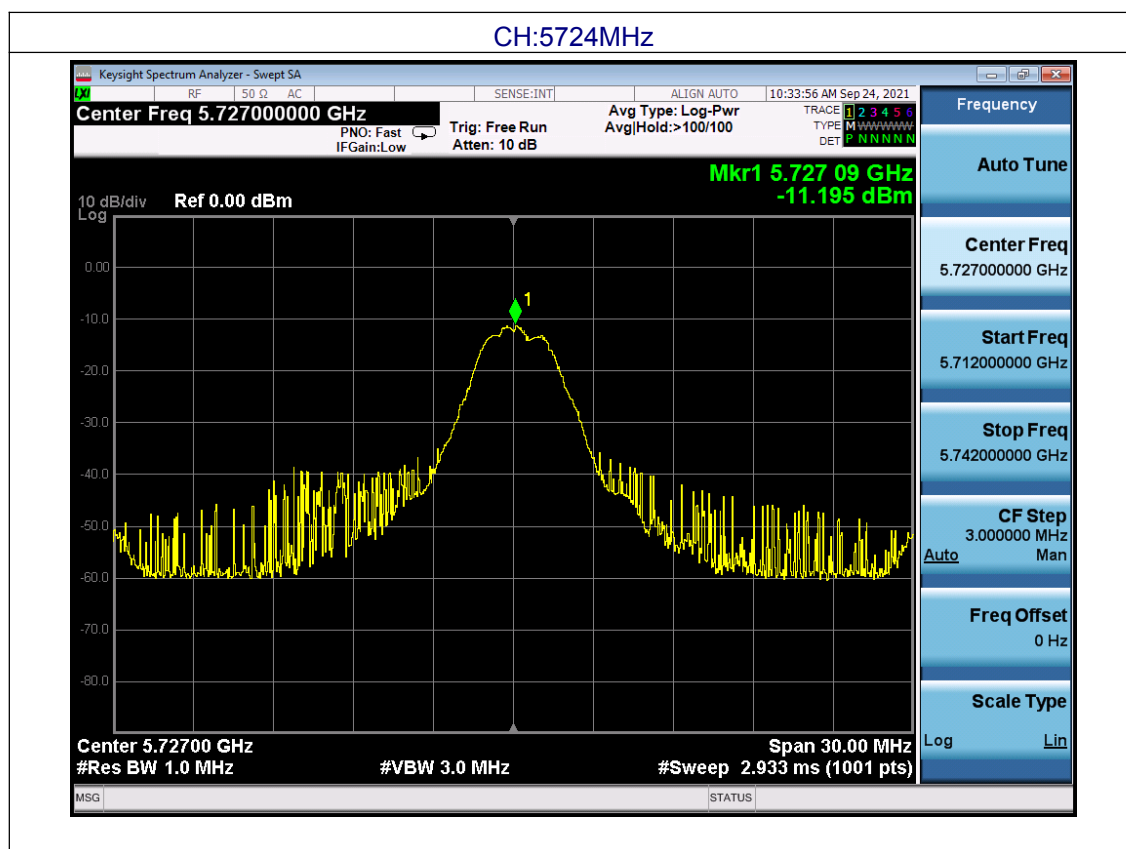
6.5 EUT OPERATION CONDITIONS

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.

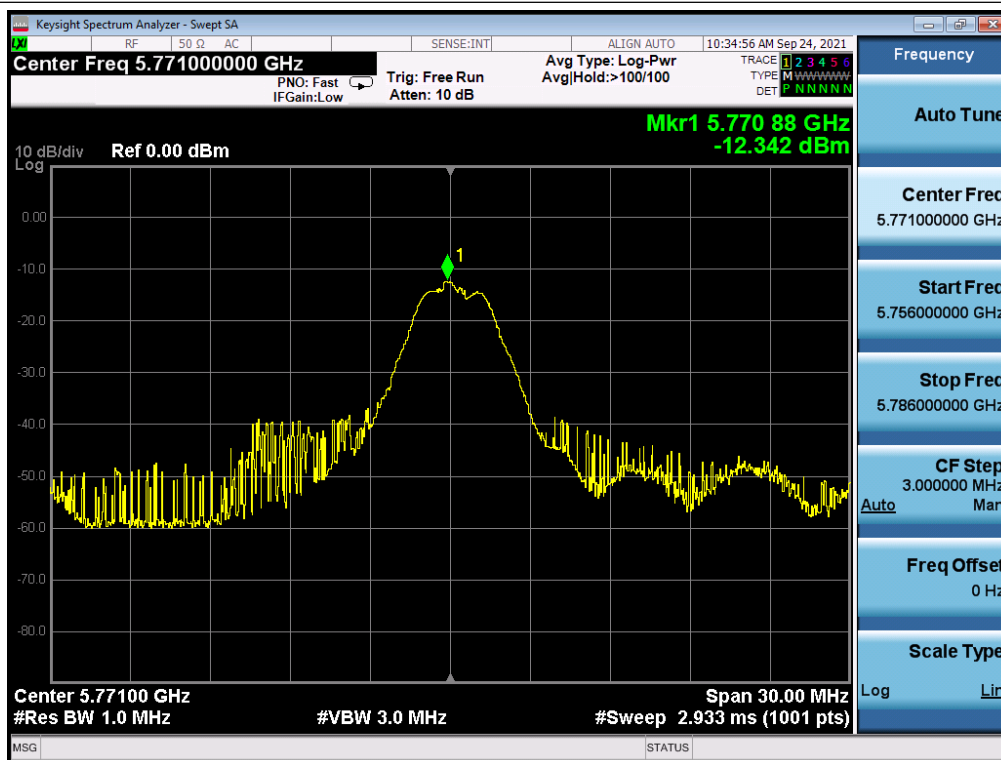
6.6 TEST RESULTS

Temperature :	26°C	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC 120V/60Hz

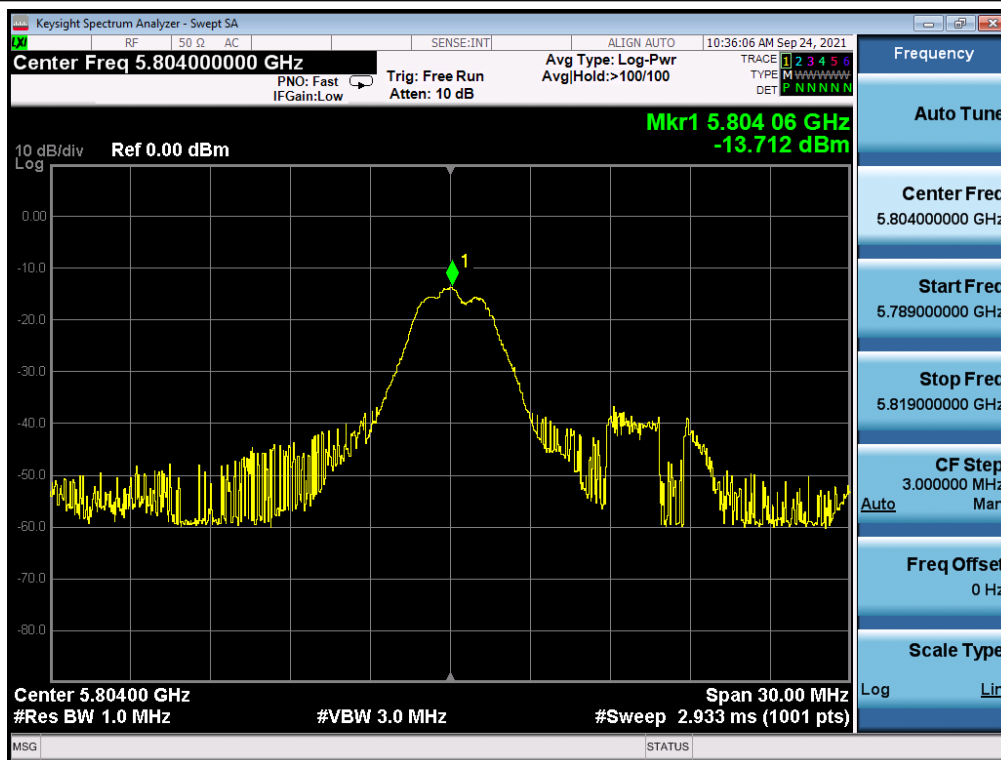
Frequency	Power Spectral Density(dBm)	Limit (dBm)	Result
5727 MHz	-11.195	30.00	PASS
5771 MHz	-12.342	30.00	PASS
5804 MHz	-13.712	30.00	PASS



CH:5771MHz



CH:5804MHz



7. CHANNEL BANDWIDTH

7.1 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

7.2 TEST PROCEDURE

1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



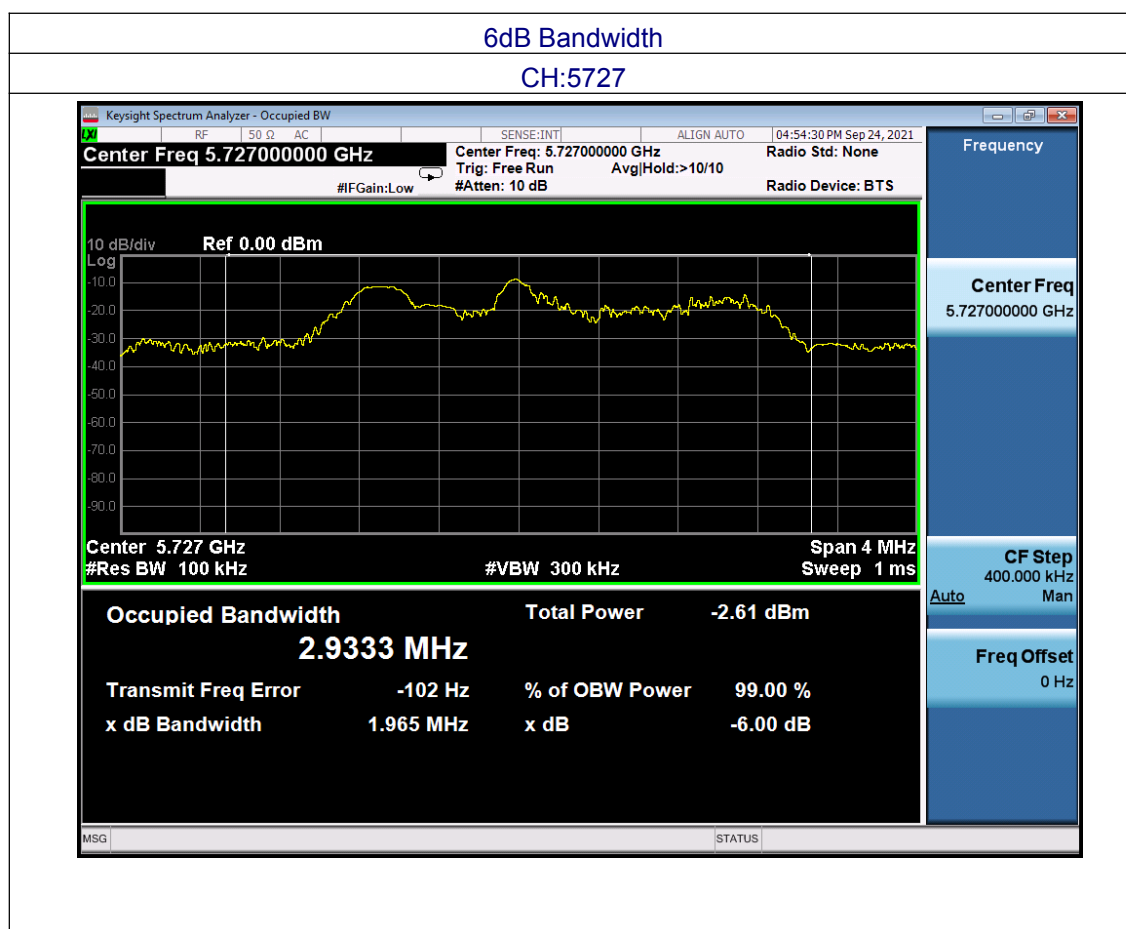
7.5 EUT OPERATION CONDITIONS

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.

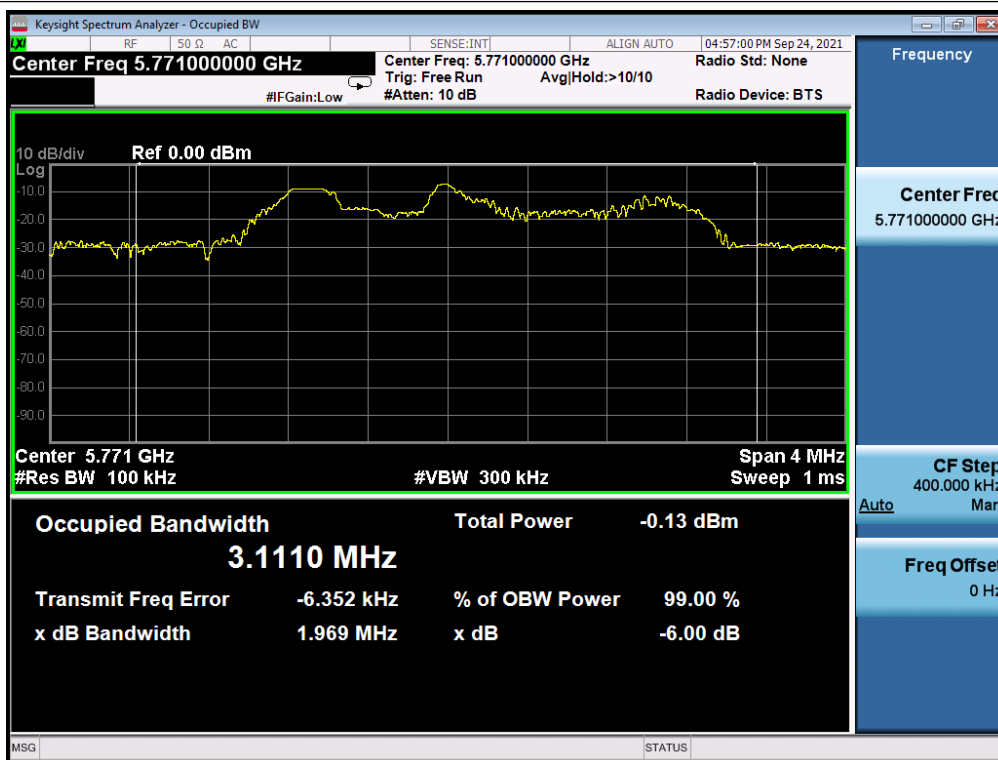
7.6 TEST RESULTS

Temperature :	26°C	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC 120V/60Hz

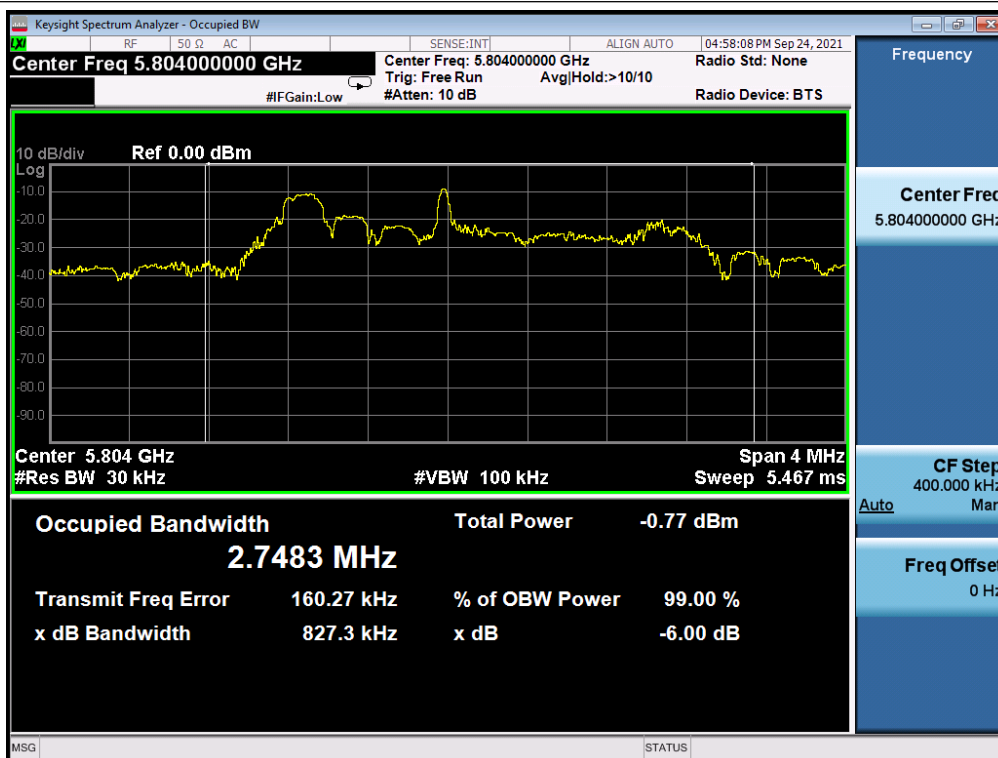
Test channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit(KHz)	Result
Lowest	1.965	2.554	>500	Pass
Middle	1.969	2.678		
Highest	2.001	2.748		



CH:5771

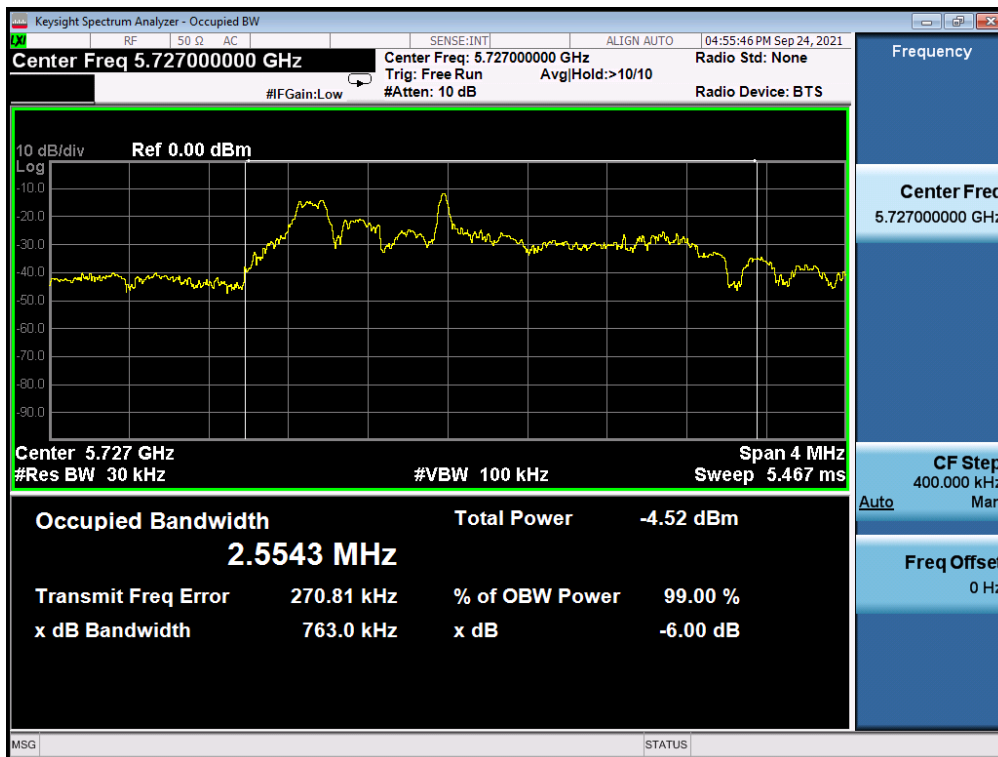


CH:5804

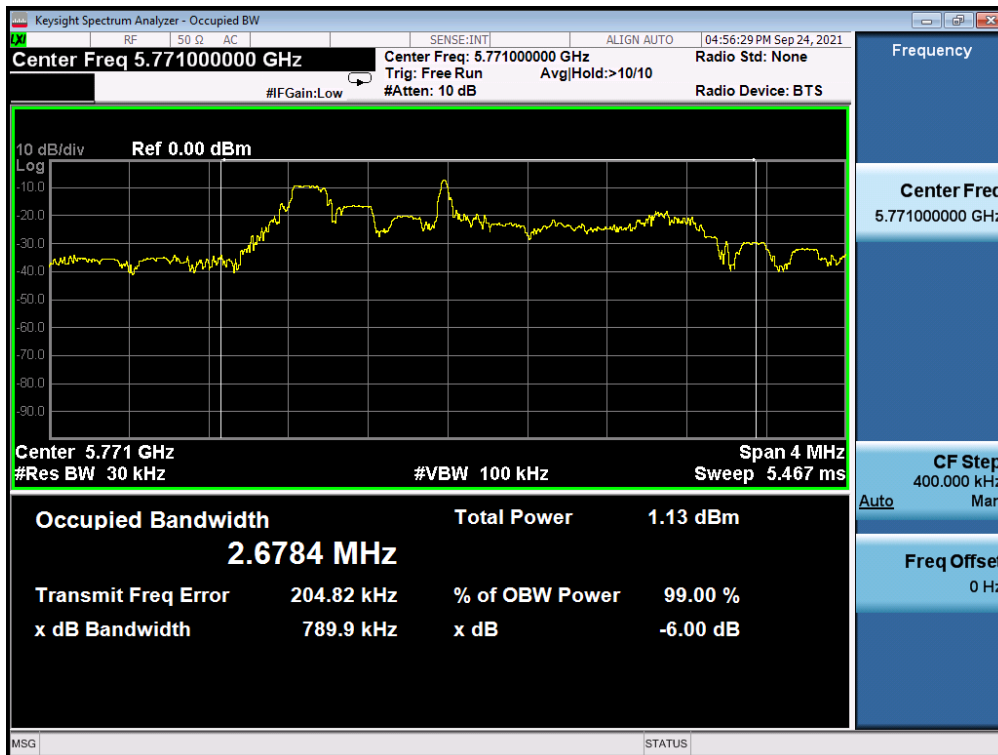


99% Bandwidth

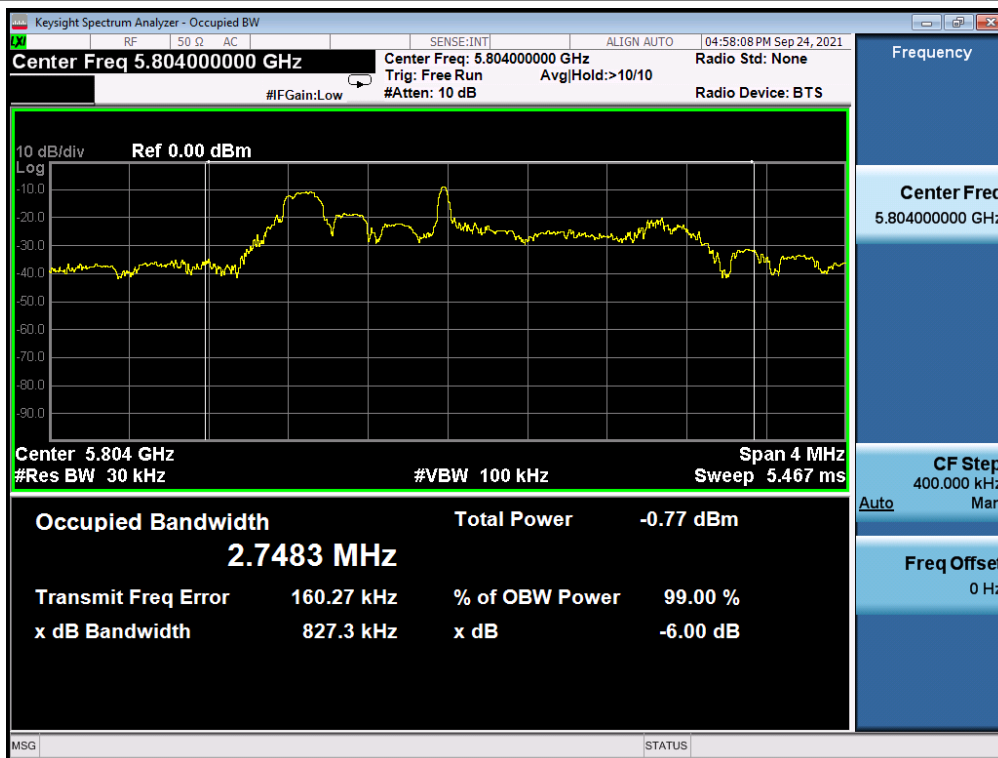
CH:5727



CH:5771



CH:5804



8. PEAK OUTPUT POWER TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC part 15.407 (a) RSS-247 Section 6.2.4.1				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407 (a)	Peak Output Power	1 watt or 30dBm	5725-5850	PASS

8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 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.

8.6 TEST RESULTS

Temperature :	26°C	Relative Humidity :	54%
Test Mode :	GFSK	Test Voltage :	AC 120V/60Hz

Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
Lowest	-2.233	30.00	Pass
Middle	-2.861		
Highest	-3.868		

9. CONDUCTED BAND EDGE

9.1 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.

9.2 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.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



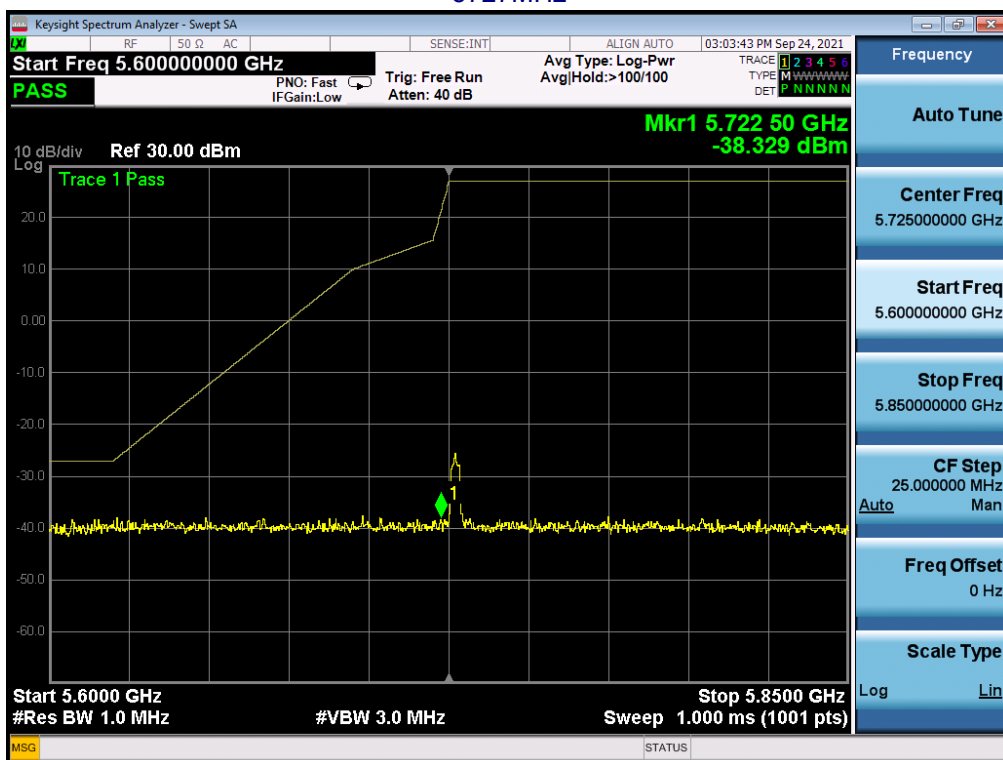
9.5 EUT OPERATION CONDITIONS

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.

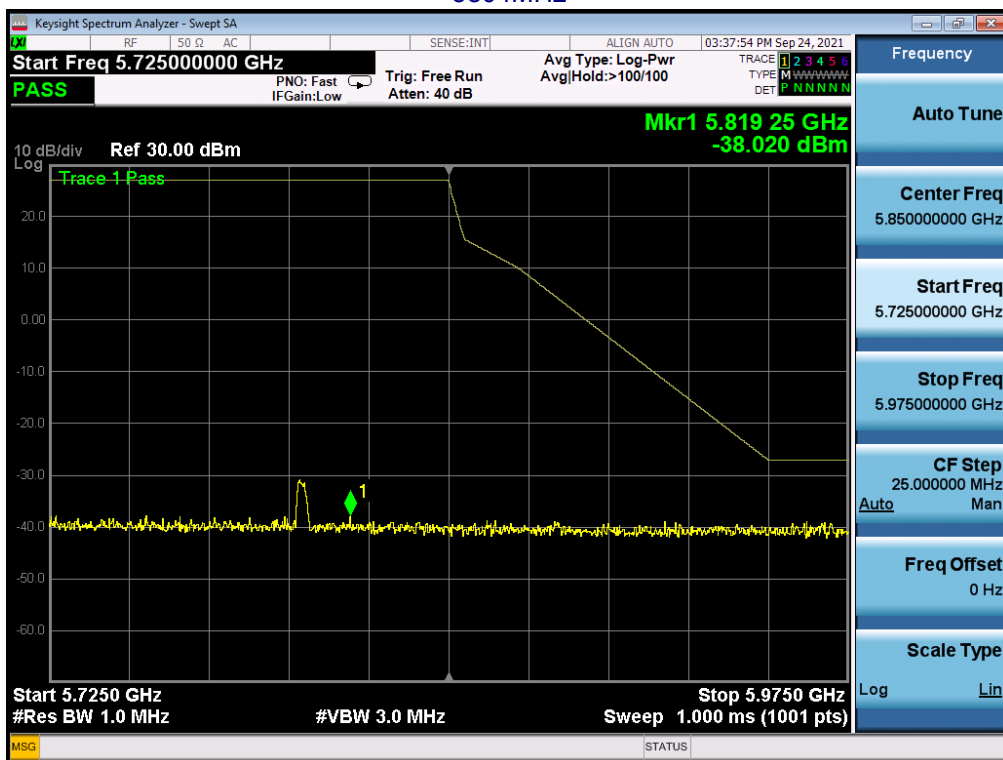
9.6 TEST RESULTS

PASS

5727MHz



5804MHz



10.FREQUENCY STABILITY

10.1 TEST LIMIT

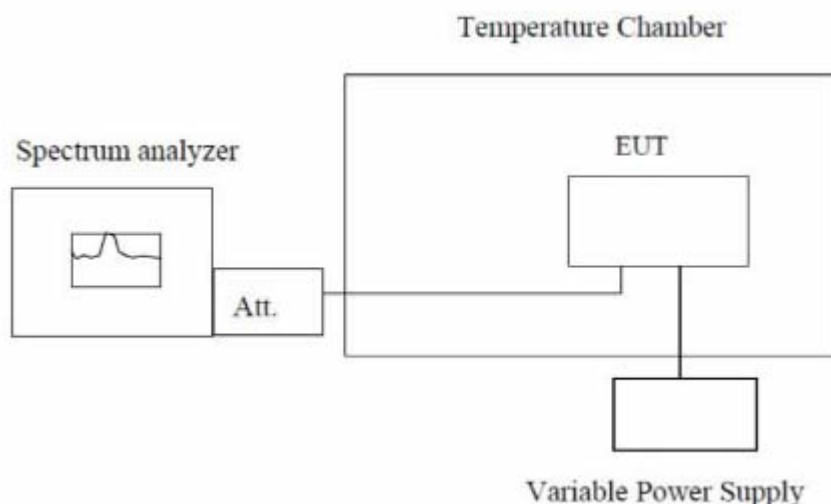
For 15.407(g): Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

For RSS-Gen Section 8.11: If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

10.2 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11 specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$

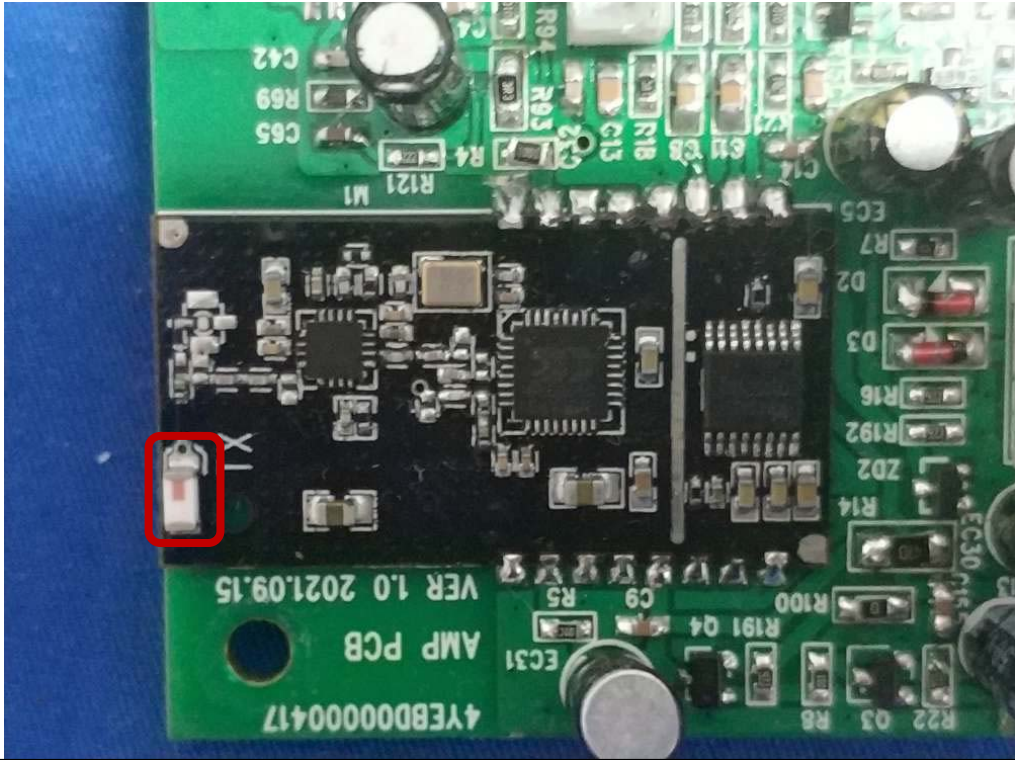
10.3 TEST SETUP



10.4 TEST RESULT

PASS

11.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.	
	

12. TEST SETUP PHOTO

Reference to the appendix I for details.

13. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

***** END OF REPORT *****