



FCC RADIO TEST REPORT

Applicant : Guangzhou Shirui Electronics Co.,Ltd.
Address : 192 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District, Guangzhou,Guangdong,China
Equipment : Smart pen
Model No. : SP20, SP20A, SP20B , SP20C, SP20D
Trade Name : seewo
FCC ID : 2AFG6-SP20

I HEREBY CERTIFY THAT :

The sample was received on Jul. 11, 2019 and the testing was carried out on Aug. 03, 2019 at CerpPASS Technology (SuZhou) Co., Ltd. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology (Suzhou) Co., Ltd., the test report shall not be reproduced except in full.

Approved by:


Miro Chueh
EMC/RF Manager

Laboratory Accreditation:

CerpPASS Technology Corporation Test Laboratory

TAF LAB Code: 1439

CerpPASS Technology (SuZhou) Co., Ltd.

A2LA LAB Code: 4981.01



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1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4: 2014

FCC Rules and Regulations Part 15 Subpart C §15.249

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209	. Radiated Emission	Pass
15.215	. 20dB Bandwidth Measurement	Pass
15.249	. Band Edges Measurement Data	Pass



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Equipment	Smart pen
Model No.	SP20, SP20A, SP20B , SP20C, SP20D
Model Discrepancy	The models are identical except for model name for marketing purpose.
Modulation Type	GFSK
Frequency Range	2402MHz -2480MHz
Channel Number	40 Channels
Power Rating	TX:DC 3.7V by battery (350mAh) RX: DC 5V

2.2 Carrier Frequency of Channels

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
*01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	*2440	30	2460	*40	2480

Note: Channels remarked * are selected to perform test.

2.3 Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The complete test system included EUT for the RF test.
- Switch the frequency points by up and down keys to press the circular key for long to keep transmitting
- The EUT had been tested under operating condition
EUT staying in continuous transmitting mode was programmed.
Channel Low (2402MHz), Channel Mid (2440MHz) and Channel High (2480MHz) were chosen for full testing.



2.4 Description of Test System

No	Device	Manufacturer	Model No.	Description
1	Notebook	SONY	PCG-71811P	R33021

Use Cable:

No.	Cable	Quantity	Description
A	USB Cable	1	0.15m Non Shielding



2.5 General Information of Test

<input type="checkbox"/>	Test Site	CerpPASS Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	TAF	1439
	FCC	TW1079, TW1061
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
<input checked="" type="checkbox"/>	Test Site	CerpPASS Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	CNAS	L5515
	FCC	CN1243
	A2LA	4981.01
	IC	7290A-1, 7290A-2
VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz	



3. Test Equipment and Ancillaries Used for Tests

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Receiver	R&S	ESCI3	100563	2019.06.21	2020.06.20
LISN	Schwarzbeck	NSLK 8127	8127-920	2018.09.25	2019.09.24
Pulse Limiter	R&S	ESH3-Z2	100529	2019.03.11	2020.03.10
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Bilog Antenna	Sunol	JB1	A072414-2 -2	2019.07.13	2020.07.13
EMI Receiver	R&S	ESCI3	101183	2019.06.28	2020.06.27
EMI Receiver	R&S	ESCI7	100968	2019.07.28	2020.07.27
Preamplifier	EM Electronics corp.	EM330	60618	2019.03.11	2020.03.10
Horn Antenna	Schwarzbeck	BBHA9120 D	9120D-619	2019.07.13	2020.07.13
Horn Antenna	Schwarzbeck	BBHA9170	9170-348	2019.06.23	2020.06.22
Spectrum Analyzer	R&S	FSP40	100324	2019.07.13	2020.07.12
Preamplifier	EMCI	EMCI 030-00-3230	SN016723	2019.03.11	2020.03.10
Preamplifier	EM Electronics corp.	EM01G18G	SN060714	2019.03.23	2020.03.22
Spectrum Analyzer	KEYSIGHT	N9010A	MY53400169	2018.08.25	2019.08.24
Software	E3	AUDIX	Version: 8.14.806b	N/A	N/A



4. Antenna Requirements

4.1 Standard Applicable

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.

4.2 Antenna Construction and Directional Gain

No.	Antenna Type	Antenna Gain
1	Built-in	2.03dBi



5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

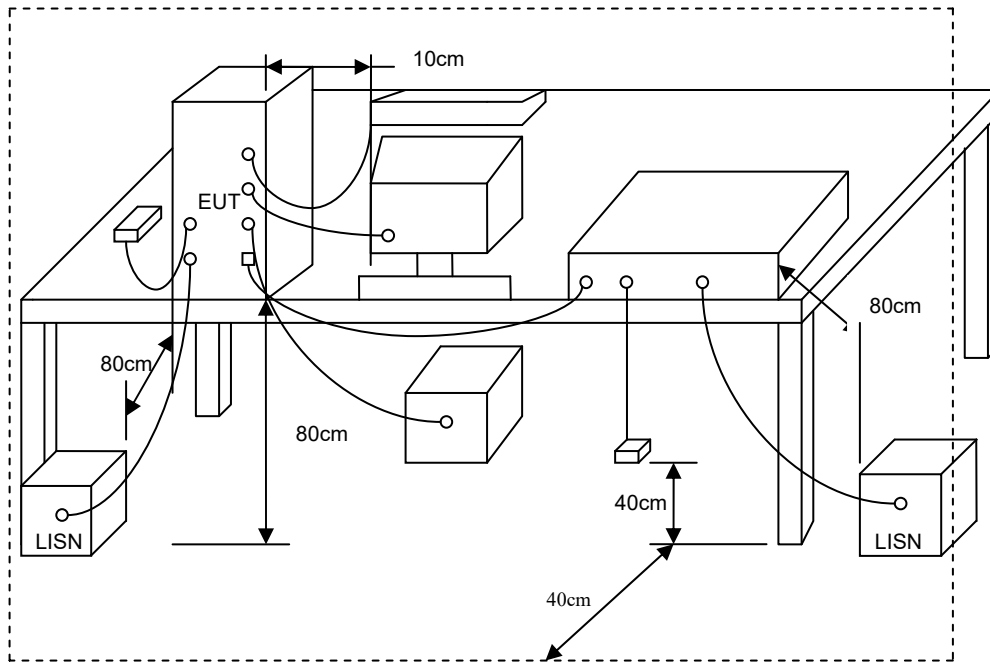
*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



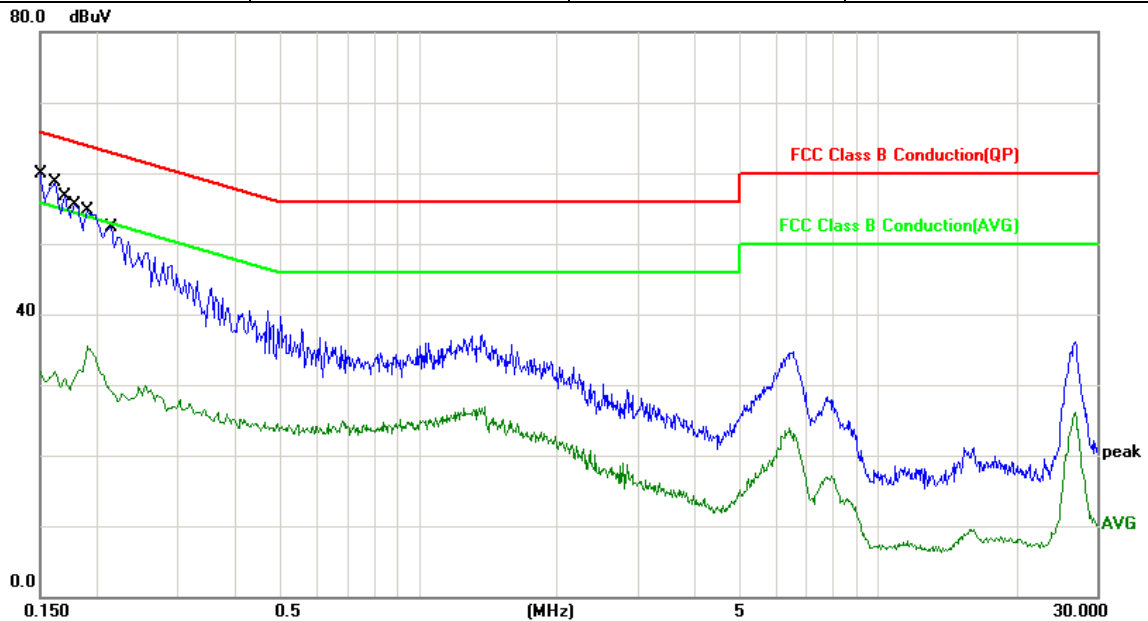
5.3 Typical Test Setup





5.4 Test Result and Data

Test Mode :	Normal Link		
AC Power :	AC 120V/60Hz	Phase:	LINE
Temperature :	26°C	Humidity:	60%
Pressure(mbar) :	1002	Date:	2019-07-31

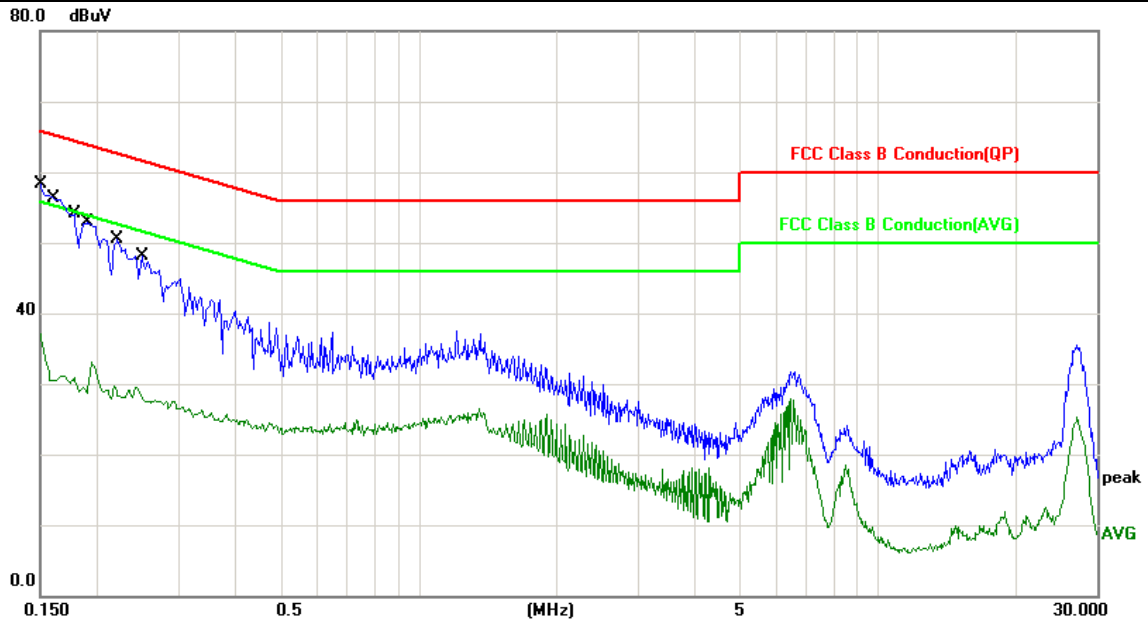


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.06	41.83	51.89	65.99	-14.10	QP
2	0.1500	10.06	21.64	31.70	55.99	-24.29	AVG
3	0.1620	10.06	40.18	50.24	65.36	-15.12	QP
4	0.1620	10.06	20.59	30.65	55.36	-24.71	AVG
5	0.1700	10.06	39.15	49.21	64.96	-15.75	QP
6	0.1700	10.06	20.28	30.34	54.96	-24.62	AVG
7	0.1780	10.06	38.33	48.39	64.57	-16.18	QP
8	0.1780	10.06	20.07	30.13	54.57	-24.44	AVG
9	0.1900	10.06	37.19	47.25	64.03	-16.78	QP
10	0.1900	10.06	23.80	33.86	54.03	-20.17	AVG
11	0.2140	10.05	34.58	44.63	63.04	-18.41	QP
12	0.2140	10.05	19.43	29.48	53.04	-23.56	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Normal Link		
AC Power :	AC 120V/60Hz	Phase:	NEUTRAL
Temperature :	26°C	Humidity:	60%
Pressure(mbar) :	1002	Date:	2019-07-31



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	10.06	40.19	50.25	65.99	-15.74	QP
2	0.1500	10.06	25.08	35.14	55.99	-20.85	AVG
3	0.1624	10.06	37.92	47.98	65.34	-17.36	QP
4	0.1624	10.06	20.26	30.32	55.34	-25.02	AVG
5	0.1787	10.06	36.00	46.06	64.54	-18.48	QP
6	0.1787	10.06	19.38	29.44	54.54	-25.10	AVG
7	0.1900	10.06	35.24	45.30	64.03	-18.73	QP
8	0.1900	10.06	20.68	30.74	54.03	-23.29	AVG
9	0.2220	10.05	31.51	41.56	62.74	-21.18	QP
10	0.2220	10.05	18.21	28.26	52.74	-24.48	AVG
11	0.2500	10.03	29.40	39.43	61.75	-22.32	QP
12	0.2500	10.03	18.11	28.14	51.75	-23.61	AVG

Note: Measurement Level = Reading Level + Correct Factor



6. Test of Spurious Emission (Radiated)

6.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2014. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions for unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated ($\mu\text{V} / \text{M}$)	Radiated (dB $\mu\text{V} / \text{M}$)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

Frequency (MHz)	Distance Meters	Radiated (dB $\mu\text{V} / \text{M}$)
30-230	10	30
230-1000	10	37

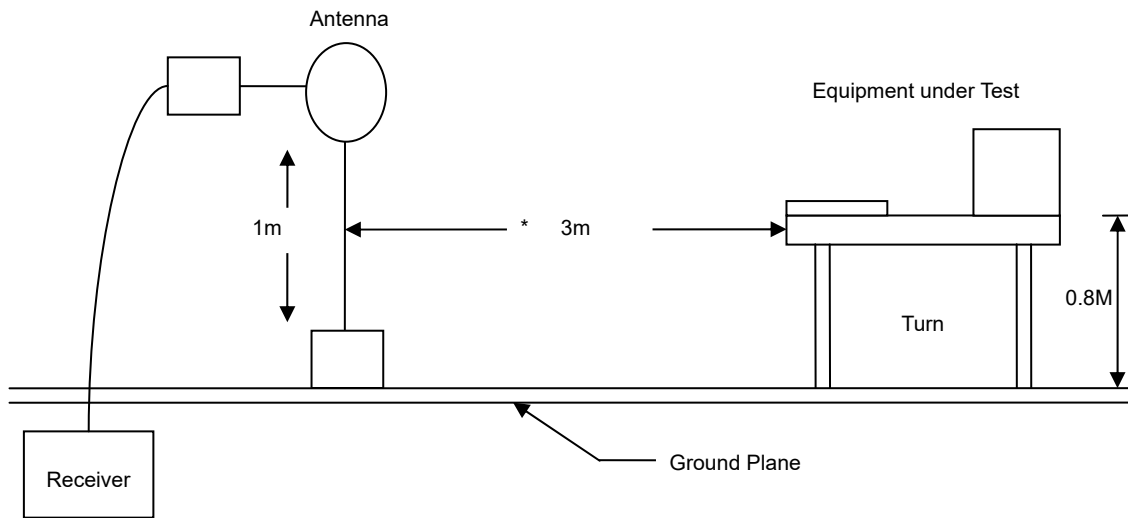
6.2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

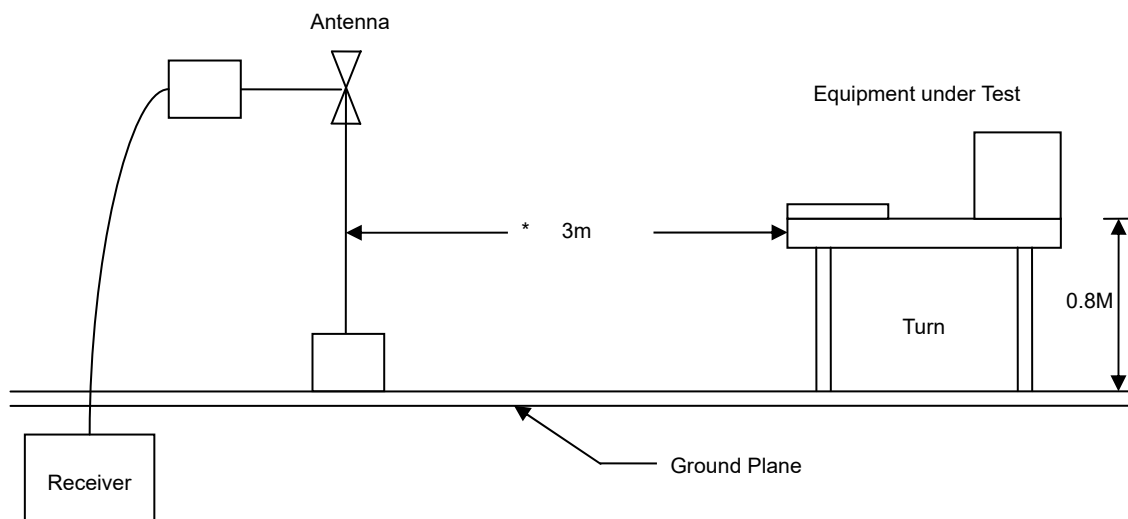


6.3 Typical Test Setup

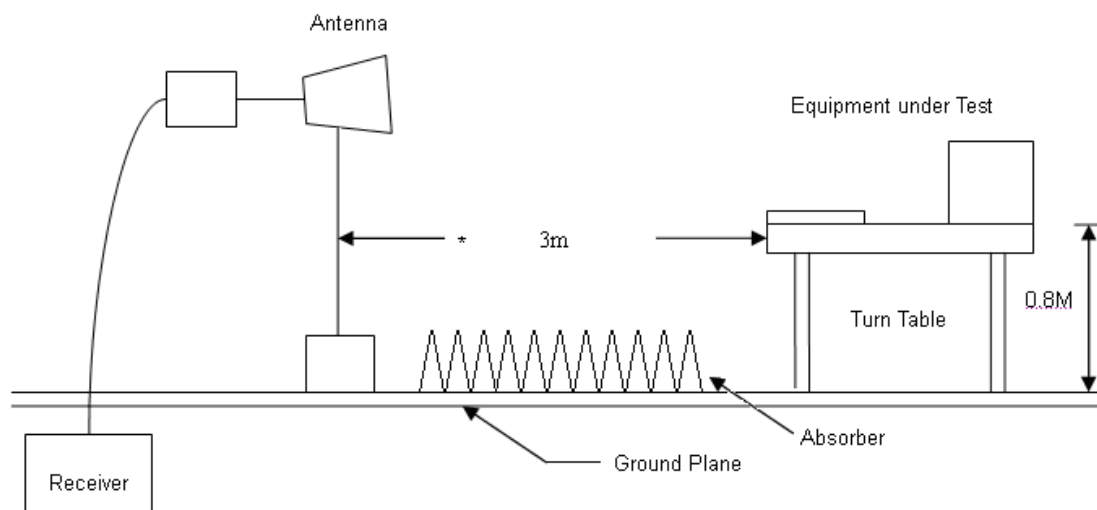
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup





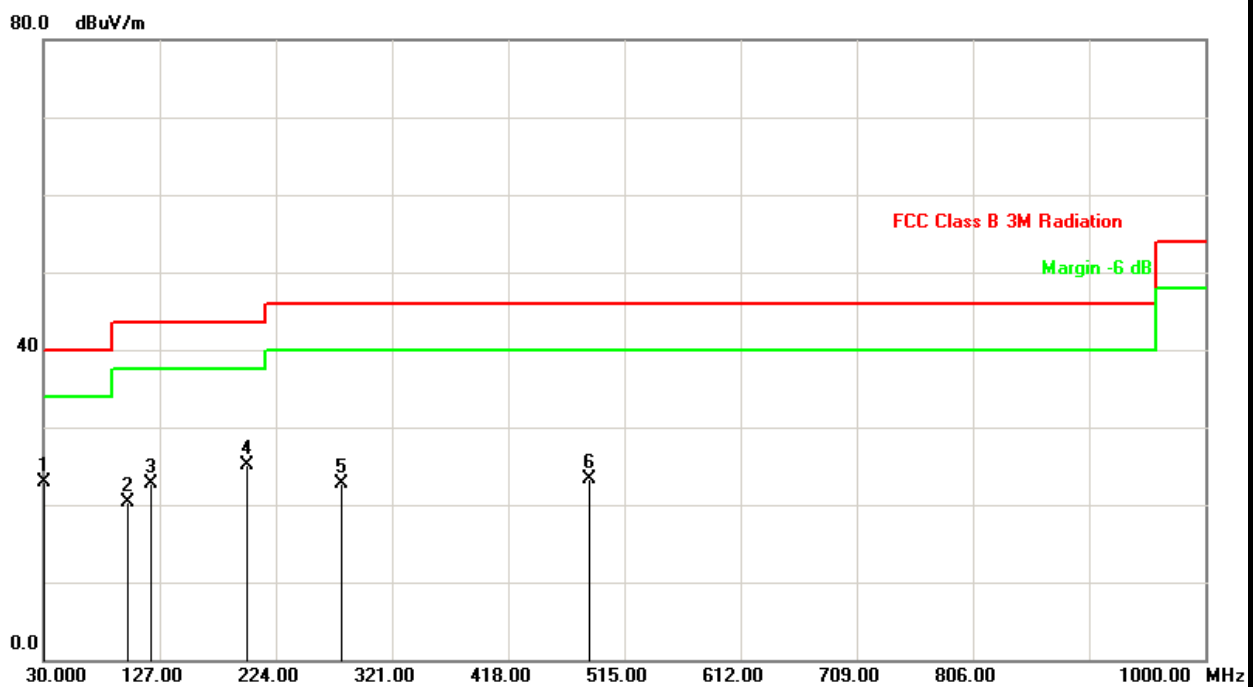
6.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz-30MHz spurious emission is under limit 20dB more.

6.5 Test Result and Data (30MHz ~ 1GHz)

Power	DC 3.7V	Pol/Phase	HORIZONTAL
Test Mode	TX-2402MHz	Temperature	25 °C
Test date	Jul. 31, 2019	Humidity	55 %

Note : Level = Reading + Factor
 Margin = Level – Limit
 Factor = Antenna Factor + Cable Loss – Amplifier Factor
 Only worse case is reported

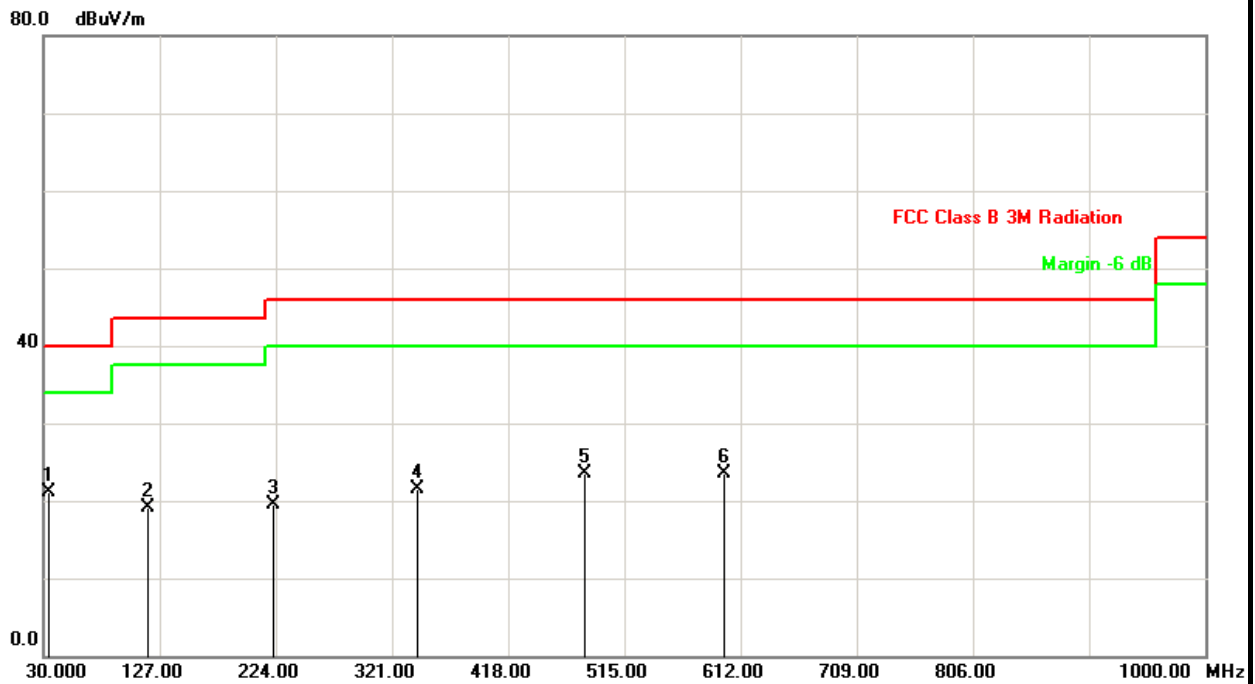


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.0000	-5.62	28.47	22.85	40.00	-17.15	peak	100	78
2	100.8100	-11.74	32.08	20.34	43.50	-23.16	peak	200	106
3	120.2099	-10.36	33.03	22.67	43.50	-20.83	peak	100	57
4	199.7500	-9.80	34.87	25.07	43.50	-18.43	peak	300	120
5	279.2900	-6.26	29.04	22.78	46.00	-23.22	peak	200	351
6	485.8999	-2.26	25.53	23.27	46.00	-22.73	peak	100	69



Power	DC 3.7V	Pol/Phase	VERTICAL
Test Mode	TX-2402MHz	Temperature	25 °C
Test date	Jul. 31, 2019	Humidity	55 %

Note : Level = Reading + Factor
 Margin = Level – Limit
 Factor = Antenna Factor + Cable Loss – Amplifier Factor
 Only worse case is reported



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	33.8800	-7.99	29.07	21.08	40.00	-18.92	peak	100	302
2	117.2999	-10.37	29.38	19.01	43.50	-24.49	peak	100	15
3	222.0600	-7.62	27.17	19.55	46.00	-26.45	peak	100	118
4	342.3399	-5.85	27.28	21.43	46.00	-24.57	peak	100	79
5	482.0199	-2.03	25.62	23.59	46.00	-22.41	peak	100	246
6	598.4199	-2.05	25.63	23.58	46.00	-22.42	peak	100	57

**6.6 Test Result and Data (1GHz ~ 25GHz)**

Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	TX-2402MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

Frequency (MHz)	AntPol. H/V	Correct Factor (dB)	Reading level (dBuV)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector mode (PK/QP)
4541.667	H	0.74	41.98	42.72	74.00	-31.28	peak
4804.000	H	1.23	41.25	42.48	74.00	-31.52	peak
4966.667	H	1.54	40.53	42.07	74.00	-31.93	peak
6213.333	H	3.35	41.02	44.37	74.00	-29.63	peak
6751.667	H	4.28	40.40	44.68	74.00	-29.32	peak
7206.000	H	5.88	48.17	54.05	74.00	-19.95	peak
7206.000	H	5.88	42.74	48.62	54.00	-5.38	AVG
3918.333	V	-2.17	45.00	42.83	74.00	-31.17	peak
4428.333	V	0.29	42.66	42.95	74.00	-31.05	peak
4804.000	V	1.23	42.80	44.03	74.00	-29.97	peak
5845.000	V	2.88	41.76	44.64	74.00	-29.36	peak
6411.667	V	3.42	41.59	45.01	74.00	-28.99	peak
7206.000	V	5.88	49.81	55.69	74.00	-18.31	peak
7206.000	V	5.88	44.46	50.34	54.00	-3.66	AVG

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	: TX-2440MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

Frequency (MHz)	AntPol. H/V	Correct Factor (dB)	Reading level (dBuV)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector mode (PK/QP)
4145.000	H	-1.15	44.27	43.12	74.00	-30.88	peak
4880.000	H	1.37	39.62	40.99	74.00	-33.01	peak
5335.000	H	1.88	40.91	42.79	74.00	-31.21	peak
6128.333	H	3.31	42.26	45.57	74.00	-28.43	peak
6581.667	H	3.72	41.51	45.23	74.00	-28.77	peak
7320.000	H	6.33	47.79	54.12	74.00	-19.88	peak
7320.000	H	6.33	42.46	48.79	54.00	-5.21	AVG
3861.667	V	-2.36	43.31	40.95	74.00	-33.05	peak
4880.000	V	1.37	40.14	41.51	74.00	-32.49	peak
5505.000	V	2.03	39.71	41.74	74.00	-32.26	peak
6185.000	V	3.33	40.21	43.54	74.00	-30.46	peak
6865.000	V	4.64	40.16	44.80	74.00	-29.20	peak
7320.000	V	6.33	49.41	55.74	74.00	-18.26	peak
7320.000	V	6.33	44.04	50.37	54.00	-3.63	AVG

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	: TX-2480MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

Frequency (MHz)	AntPol. H/V	Correct Factor (dB)	Reading level (dBuV)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector mode (PK/QP)
3125.000	H	-5.57	45.85	40.28	74.00	-33.72	peak
4541.667	H	0.74	42.48	43.22	74.00	-30.78	peak
4960.000	H	1.52	41.55	43.07	74.00	-30.93	peak
6440.000	H	3.44	40.91	44.35	74.00	-29.65	peak
7006.667	H	5.11	41.20	46.31	74.00	-27.69	peak
7440.000	H	6.80	47.04	53.84	74.00	-20.16	peak
7440.000	H	6.80	41.23	48.03	54.00	-5.97	AVG
4145.000	V	-1.15	42.76	41.61	74.00	-32.39	peak
4960.000	V	1.52	41.81	43.33	74.00	-30.67	peak
5930.000	V	3.09	42.11	45.20	74.00	-28.80	peak
6440.000	V	3.44	41.50	44.94	74.00	-29.06	peak
7120.000	V	5.55	41.95	47.50	74.00	-26.50	peak
7440.000	V	6.80	48.98	55.78	74.00	-18.22	peak
7440.000	V	6.80	43.87	50.67	54.00	-3.33	AVG

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



7. 20dB Bandwidth Measurement Data

7.1 Test Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.2 Test Procedure

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100KHz.
- c. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.3 Test Setup Layout



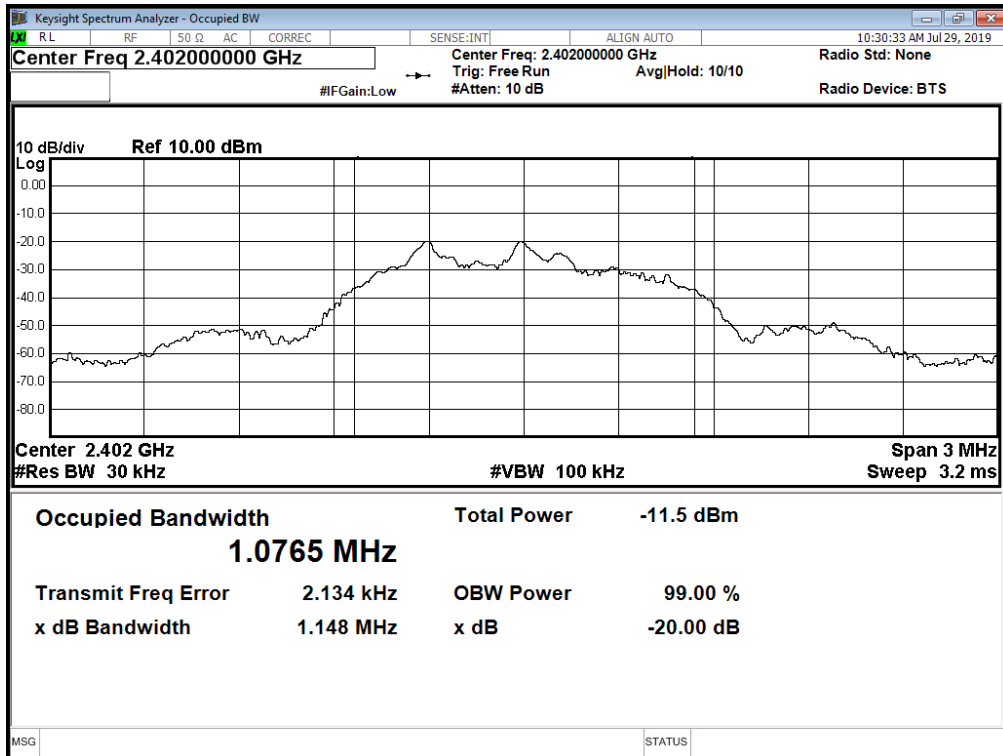
7.4 Test Result and Data

Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	: TX-Mode	Humidity	: 54 %
Test date	: Jul. 29, 2019		

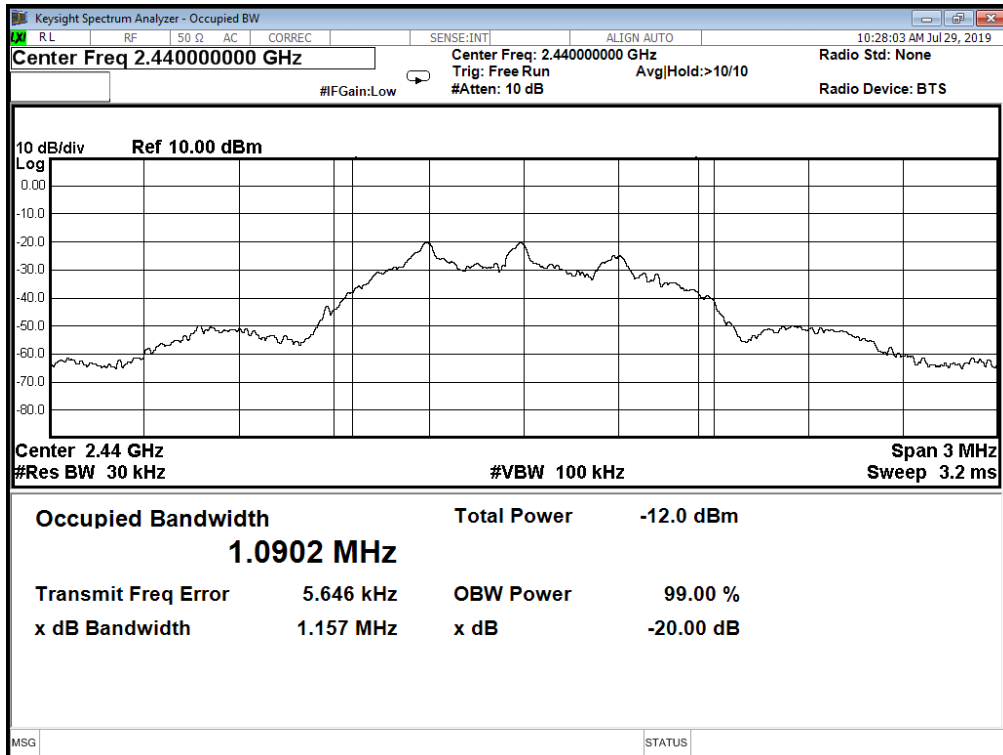
Channel	Frequency (MHz)	20dB Bandwidth (KHz)
Low	2402	1148.00
Mid	2440	1157.00
High	2480	1149.00



Channel: Low

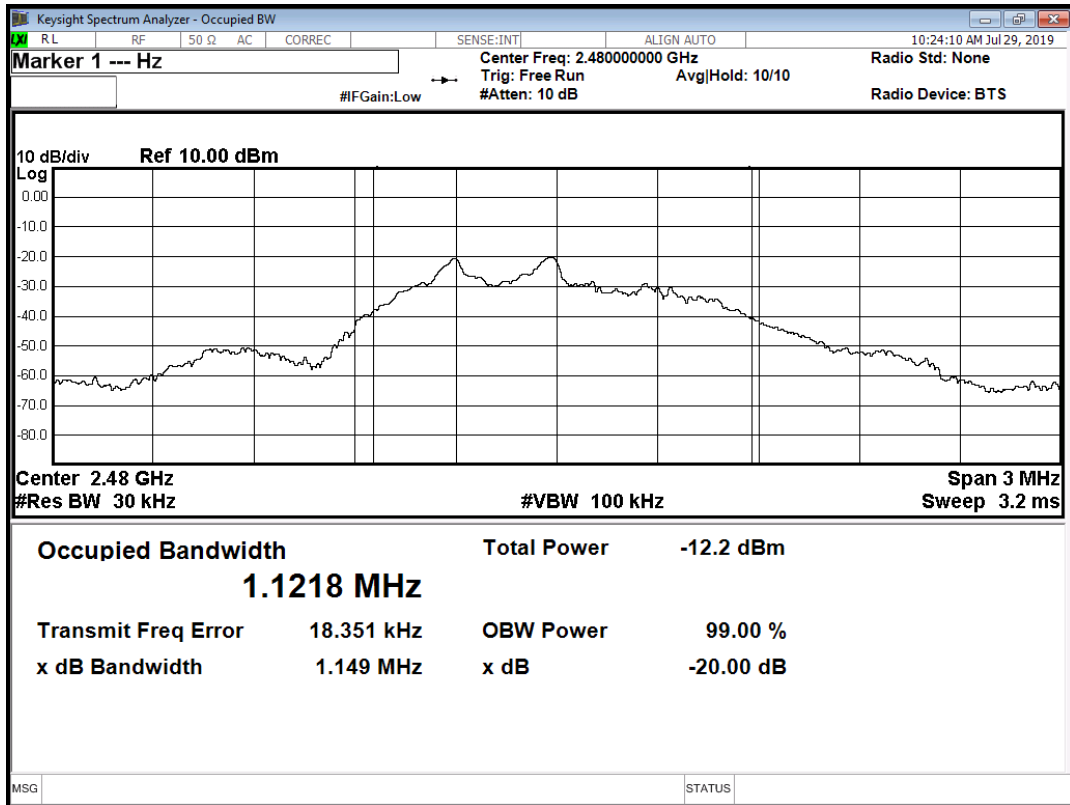


Channel: Mid





Channel: High





8. Band Edges Measurement

8.1 Test Limit

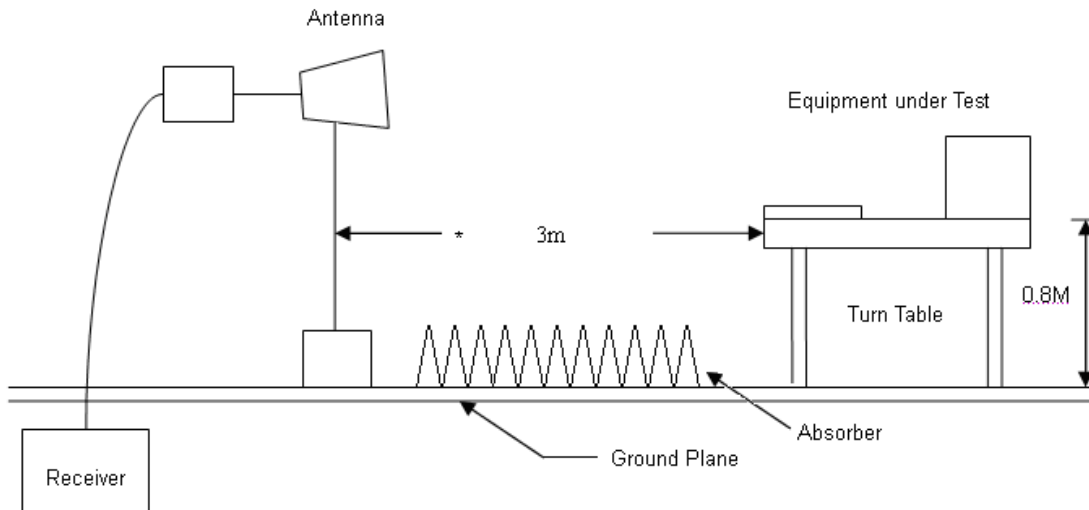
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

8.2 Test Procedure

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz.
- The band edges was measured and recorded.

8.3 Test Setup Layout

Above 1GHz Test Setup



**8.4 Restrict band emission Measurement Data**

Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	: TX-2402MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-10.05	62.18	52.13	74.00	-21.87	peak
2	2390.000	-10.05	45.83	35.78	54.00	-18.22	AVG
3	2400.000	-10.01	78.13	68.12	74.00	-5.88	peak
4	2400.000	-10.01	60.38	50.37	54.00	-3.63	AVG
5	*2402.000	-10.00	98.75	88.75	114.00	-25.25	peak
6	*2402.000	-10.00	93.34	83.34	94.00	-10.66	AVG

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-10.05	57.28	47.23	74.00	-26.77	peak
2	2390.000	-10.05	43.19	33.14	54.00	-20.86	AVG
3	2400.000	-10.01	73.77	63.76	74.00	-10.24	peak
4	2400.000	-10.01	55.37	45.36	54.00	-8.64	AVG
5	*2401.800	-10.00	92.56	82.56	114.00	-31.44	peak
6	*2401.800	-10.00	86.81	76.81	94.00	-17.19	AVG

- Note:
1. Level = Reading + Factor
 2. Margin = Level – Limit
 3. Factor = Antenna Factor + Cable Loss – Amplifier Factor
 4. “*”: Fundamental frequency



Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	TX-2440MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	*2440.867	-9.83	95.33	85.50	114.00	-28.50	peak
2	*2440.867	-9.83	90.50	80.67	94.00	-13.33	AVG

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	*2439.717	-9.84	88.64	78.80	114.00	-35.20	peak
2	*2439.717	-9.84	83.48	73.64	94.00	-20.36	AVG

- Note:
1. Level = Reading + Factor
 2. Margin = Level – Limit
 3. Factor = Antenna Factor + Cable Loss – Amplifier Factor
 4. “*”: Fundamental frequency



Power	: DC 3.7V	Temperature	: 24 °C
Test Mode	: TX-2480MHz	Humidity	: 54 %
Test date	: Jul. 31, 2019	Atmospheric Pressure	: 1010 hpa

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*1	2479.750	-9.67	95.79	86.12	114.00	-27.88	PEAK
*2	2479.750	-9.67	90.90	81.23	94.00	-12.77	AVG
3	2483.500	-9.65	66.32	56.67	74.00	-17.33	PEAK
4	2483.500	-9.65	50.33	40.68	54.00	-13.32	AVG

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
*1	2479.750	-9.67	90.15	80.48	114.00	-33.52	PEAK
*2	2479.750	-9.67	85.30	75.63	94.00	-18.37	AVG
3	2483.500	-9.65	62.38	52.73	74.00	-21.27	PEAK
4	2483.500	-9.65	45.32	35.67	54.00	-18.33	AVG

- Note:
1. Level = Reading + Factor
 2. Margin = Level – Limit
 3. Factor = Antenna Factor + Cable Loss – Amplifier Factor
 4. “*”: Fundamental frequency



9. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

9.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.