



CTC Laboratories, Inc.

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TEST REPORT

Report No.	CTC20230081E01
FCC ID	2AWAE-G13
Applicant	Shenzhen Chitado Technology Co., Ltd
Address	501, Zhuyuan Factory, No. 1301-26, Sightseeing Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen, China
Manufacturer	Shenzhen Chitado Technology Co., Ltd
Address	501, Zhuyuan Factory, No. 1301-26, Sightseeing Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen, China
Product Name	Electric Hoverboard
Trade Mark	/
Model/Type reference	G13
Listed Model(s)	G11, G2, G5, T580, T581, F1, G-F1, Y1, Y1S, Y1pro
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of receipt of test sample....	July 21, 2023
Date of testing	July 21~26, 2023
Date of issue	July 26, 2023
Result	PASS

Compiled by:	
(Printed name+signature)	Zoe Xie
	
Supervised by:	
(Printed name+signature)	Miller Ma
	
Approved by:	
(Printed name+signature)	Walter Chen
	
Testing Laboratory Name	CTC Laboratories, Inc.
Address	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Date of issue	Description
01	July 26, 2023	Original



1.3. Test Description

FCC Part 15 Subpart C (15.247)			
Test Item	Standard Section	Result	Test Engineer
	FCC		
Antenna Requirement	15.203	Pass	Alicia Liu
Conducted Emission	15.207	Pass	Eva Feng
Conducted Band Edge and Spurious Emissions	15.247(d)	Pass	Alicia Liu
Radiated Band Edge and Spurious Emissions	15.205&15.209&15.247(d)	Pass	Alicia Liu
6dB Bandwidth	15.247(a)(2)	Pass	Alicia Liu
Conducted Max Output Power	15.247(b)(3)	Pass	Alicia Liu
Power Spectral Density	15.247(e)	Pass	Alicia Liu
Transmitter Radiated Spurious	15.209&15.247(d)	Pass	Alicia Liu

Note: The measurement uncertainty is not included in the test result.



1.4. Test Facility

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the test measurement capability for CTC Laboratories, Inc.



Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.08 dB	(1)
Radiated Emissions 30~1000MHz	4.51 dB	(1)
Radiated Emissions 1~18GHz	5.84 dB	(1)
Radiated Emissions 18~40GHz	6.12 dB	(1)
Occupied Bandwidth	-----	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Chitado Technology Co., Ltd
Address:	501,ZhuyuanFactory,No.1301-26,Sightseeing Road,Xinlan Community, Guanlan Street, Longhua District, Shenzhen, China
Manufacturer:	Shenzhen Chitado Technology Co., Ltd
Address:	501,ZhuyuanFactory,No.1301-26,Sightseeing Road,Xinlan Community, Guanlan Street, Longhua District, Shenzhen, China

2.2. General Description of EUT

Product Name:	Electric Hoverboard
Trade Mark:	/
Model/Type reference:	G13
Listed Model(s):	G11, G2, G5, T580, T581, F1, G-F1, Y1, Y1S, Y1pro
Power supply:	Nominal Voltage: 37VDC Max. Charging voltage:42VDC
Adapter model:	
Hardware version:	/
Software version:	/
Serial number:	S01
BLE	
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB antenna
Antenna gain:	0.0766dBi



2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
/	/	/	/
/	/	/	/
/	/	/	/

Cable Information			
Name	Shielded Type	Ferrite Core	Length
/	/	/	/
/	/	/	/

Test Software Information			
Name	Versions	Power Level	/
FCC_assist	1.0.3.a	Index	/



2.4. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
00	2402
01	2404
:	:
18	2438
19	2440
20	2442
:	:
38	2478
39	2480

Note: The display in grey were the channel selected for testing.

Test mode

For RF test items:
The engineering test program was provided and enabled to make EUT continuous transmit(100% duty cycle).
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.



2.5. Measurement Instruments List

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 23, 2023
2	Spectrum Analyzer	Rohde & Schwarz	FUV40-N	101331	Mar. 15, 2024
3	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 23, 2023
4	Signal Generator	Agilent	E8257D	MY46521908	Dec. 23, 2023
5	Power Sensor	Agilent	U2021XA	MY5365004	Mar. 15, 2024
6	Power Sensor	Agilent	U2021XA	MY5365006	Mar. 15, 2024
7	High and low temperature box	ESPEC	MT3035	N/A	Mar. 24, 2024
8	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	102414	Dec. 23, 2022
9	300328 v2.2.2 test system	TONSCEND	v2.6	/	/

Radiated emission(3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Jan. 12, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 23, 2023
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 23, 2023
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 15, 2024
5	Pre-Amplifier	SONOMA	310	186194	Dec. 23, 2023
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 23, 2023
7	Test Receiver	R&S	ESCI7	100967	Dec. 23, 2023

Radiated emission(3m chamber 3)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-759	Nov. 09, 2023
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 23, 2023
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 23, 2023
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 23, 2023
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 23, 2023
6	Loop Antenna	ZHINAN	ZN30900A	/	Dec. 25, 2023

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101112	Dec. 23, 2023
2	LISN	R&S	ENV216	101113	Dec. 23, 2023
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 23, 2023

Note:1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.

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For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : yz.cnca.cn

3. TEST ITEM AND RESULTS

3.1. Conducted Emission

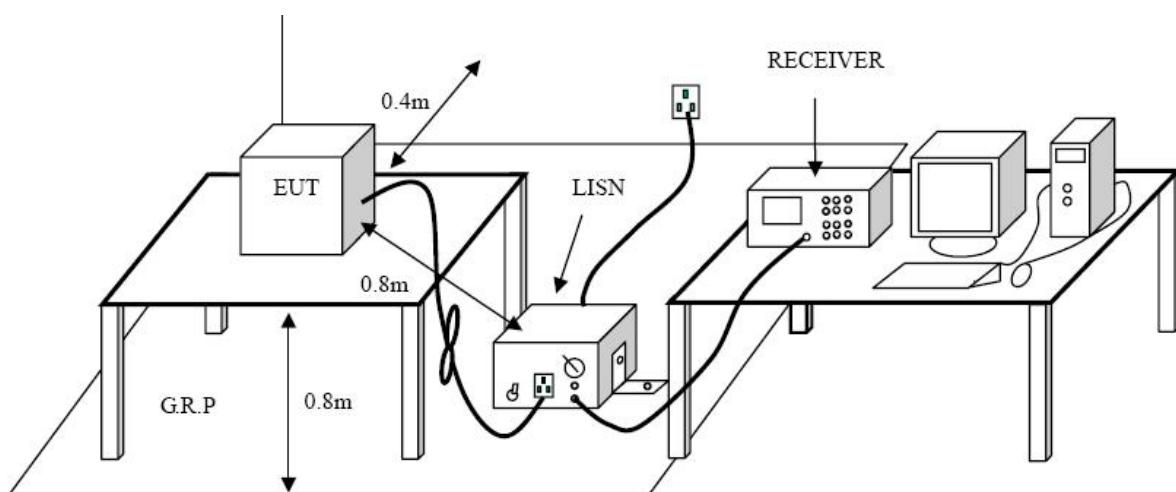
Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS - Gen 8.8

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

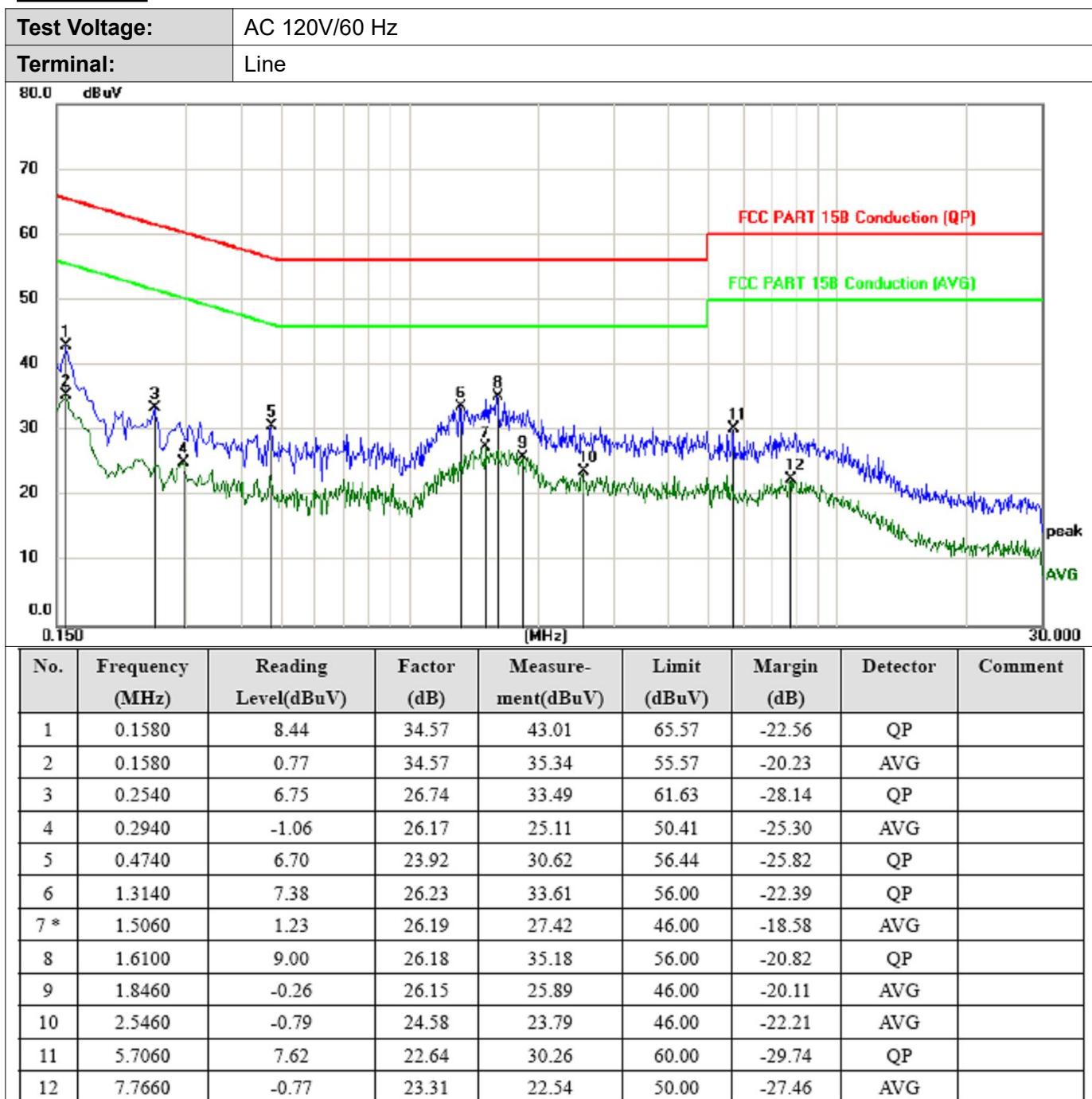


Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

Test Mode:

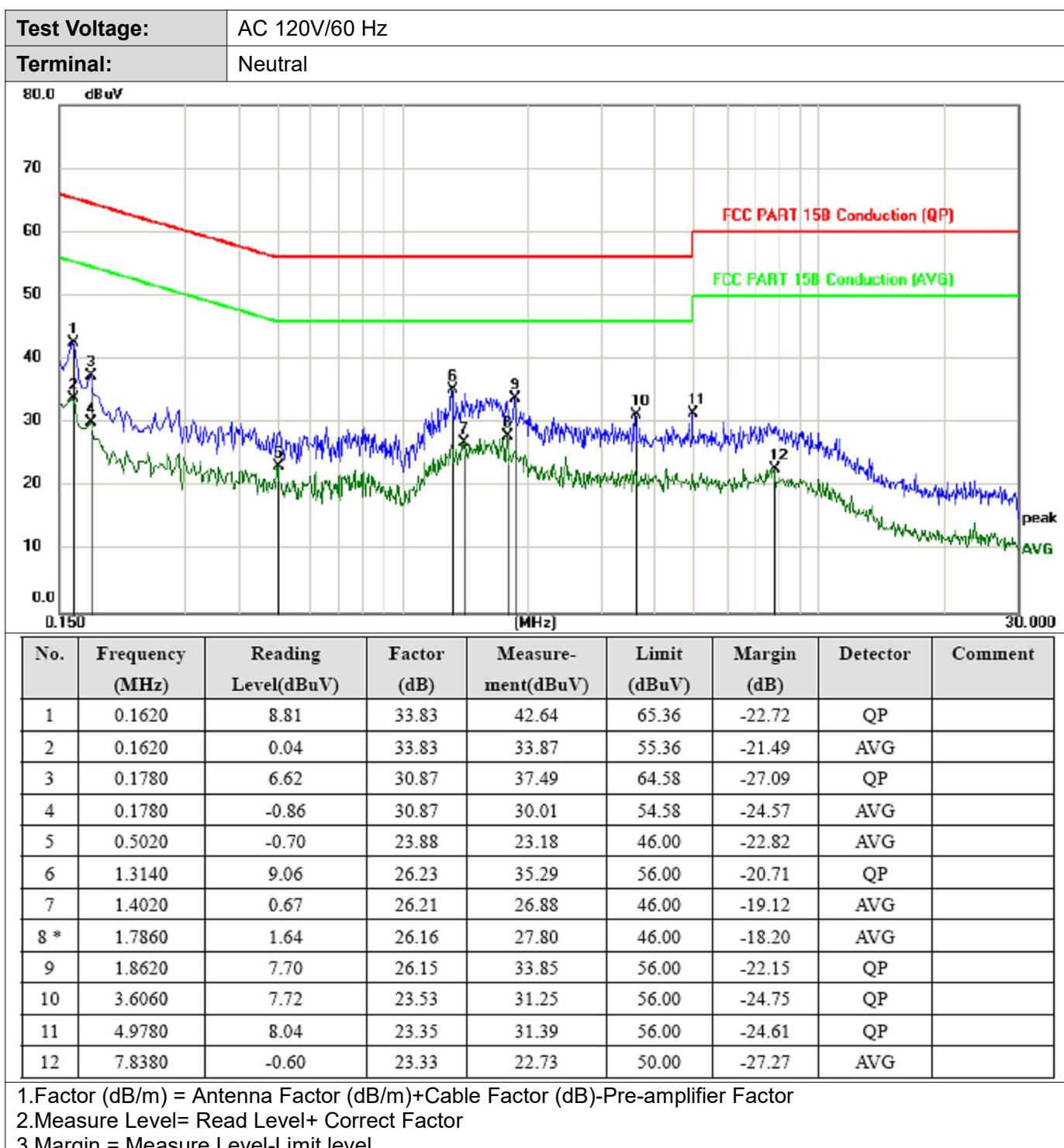
Please refer to the clause 2.4.

Test Results


1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2. Measure Level= Read Level+ Correct Factor

3. Margin = Measure Level-Limit level



3.2. Radiated Emission

Limit

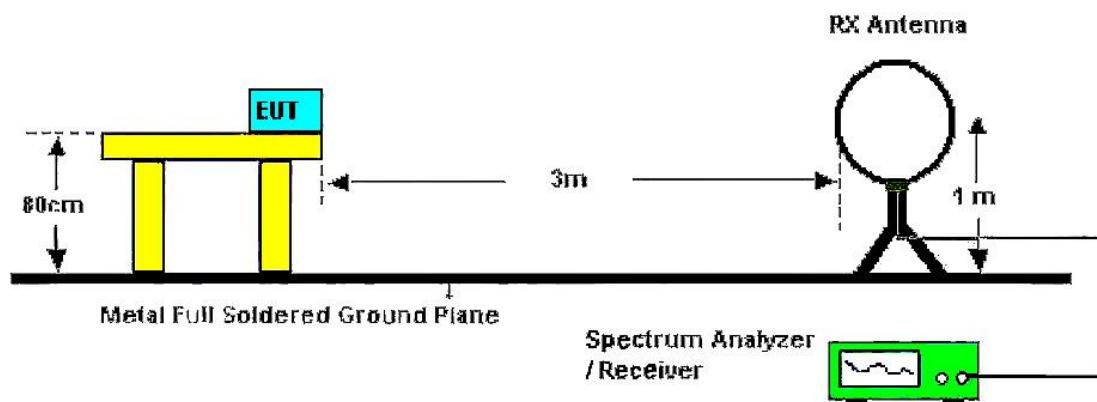
FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9

Frequency	Limit (dB _u V/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

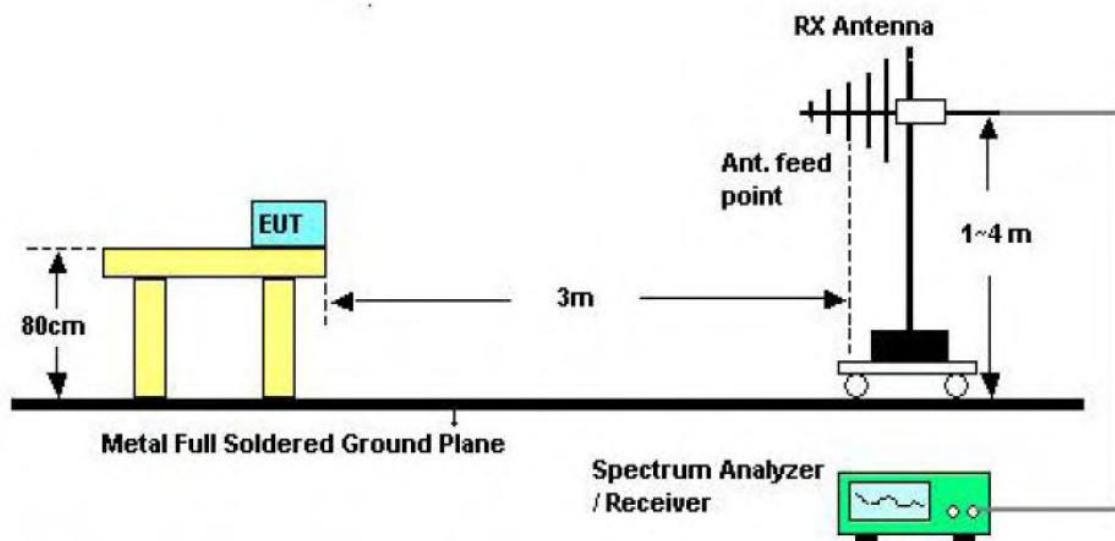
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dB_uV/m)=20log Emission Level (uV/m).

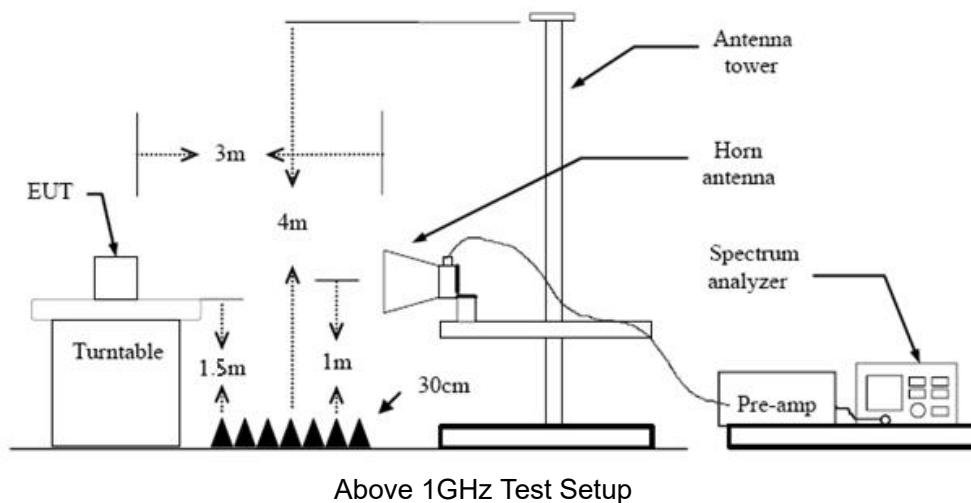
Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
 4. 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 turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
 5. Set to the maximum power setting and enable the EUT transmit continuously.
 6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW \geq 1/T Peak detector for Average value.
- Note 1: For the 1/T& Duty Cycle please refer to clause 3.8 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz-1GHz

Ant. Pol.	Horizontal							
Test Mode:	TX BLE Mode 2402MHz							
Remark:	Only worse case is reported							
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	30.3173	44.75	-11.72	33.03	40.00	6.97	QP
2		38.8879	47.50	-16.86	30.64	40.00	9.36	QP
3		39.2991	46.73	-17.11	29.62	40.00	10.38	QP
4		59.6493	46.28	-16.36	29.92	40.00	10.08	QP
5		136.4598	57.70	-25.00	32.70	43.50	10.80	QP
6		231.7179	58.68	-21.25	37.43	46.00	8.57	QP

Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Measure Level= Read Level+ Correct Factor
3. Over = Limit -Measure Level

Ant. Pol.	Vertical																																																																							
Test Mode:	TX BLE Mode 2402MHz																																																																							
Remark:	Only worse case is reported																																																																							
80.0 dBuV/m																																																																								
<table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq.</th> <th>Reading Level</th> <th>Correct Factor</th> <th>Measure-ment</th> <th>Limit</th> <th>Over</th> </tr> <tr> <th></th> <th></th> <th>MHz</th> <th>dBuV</th> <th>dB</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>Detector</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>30.2111</td> <td>48.56</td> <td>-11.66</td> <td>36.90</td> <td>40.00</td> <td>3.10</td> <td>QP</td> </tr> <tr> <td>2</td> <td></td> <td>39.0245</td> <td>53.74</td> <td>-16.94</td> <td>36.80</td> <td>40.00</td> <td>3.20</td> <td>QP</td> </tr> <tr> <td>3</td> <td></td> <td>49.1865</td> <td>44.75</td> <td>-14.40</td> <td>30.35</td> <td>40.00</td> <td>9.65</td> <td>QP</td> </tr> <tr> <td>4</td> <td></td> <td>55.2207</td> <td>48.99</td> <td>-15.24</td> <td>33.75</td> <td>40.00</td> <td>6.25</td> <td>QP</td> </tr> <tr> <td>5</td> <td></td> <td>122.8340</td> <td>63.83</td> <td>-23.95</td> <td>39.88</td> <td>43.50</td> <td>3.62</td> <td>QP</td> </tr> <tr> <td>6</td> <td></td> <td>135.0319</td> <td>60.41</td> <td>-25.12</td> <td>35.29</td> <td>43.50</td> <td>8.21</td> <td>QP</td> </tr> </tbody> </table>		No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	1	*	30.2111	48.56	-11.66	36.90	40.00	3.10	QP	2		39.0245	53.74	-16.94	36.80	40.00	3.20	QP	3		49.1865	44.75	-14.40	30.35	40.00	9.65	QP	4		55.2207	48.99	-15.24	33.75	40.00	6.25	QP	5		122.8340	63.83	-23.95	39.88	43.50	3.62	QP	6		135.0319	60.41	-25.12	35.29	43.50	8.21	QP
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Above 1GHz

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar	Detector
Low Channel-2402MHz							
4804	58.36	-4.86	53.5	74	-20.5	H	PK
4804	43.09	-4.86	38.23	54	-15.77	H	AV
7206	54.5	1.6	56.1	74	-17.9	H	PK
7206	40.05	1.6	41.65	54	-12.35	H	AV
4804	61.19	-4.86	56.33	74	-17.67	V	PK
4804	41.09	-4.86	36.23	54	-17.77	V	AV
7206	52.14	1.6	53.74	74	-20.26	V	PK
7206	40.29	1.6	41.89	54	-12.11	V	AV
Middle Channel-2440MHz							
4880	58.21	-4.87	53.34	74	-20.66	H	PK
4880	41.33	-4.87	36.46	54	-17.54	H	AV
7320	52.38	1.51	53.89	74	-20.11	H	PK
7320	38.35	1.51	39.86	54	-14.14	H	AV
4880	58.3	-4.87	53.43	74	-20.57	V	PK
4880	41.5	-4.87	36.63	54	-17.37	V	AV
7320	55.49	1.51	57	74	-17	V	PK
7320	38.06	1.51	39.57	54	-14.43	V	AV
High Channel-2480MHz							
4960	58.72	-4.26	54.46	74	-19.54	H	PK
4960	41.62	-4.26	37.36	54	-16.64	H	AV
7440	53.21	1.69	54.9	74	-19.1	H	PK
7440	37.69	1.69	39.38	54	-14.62	H	AV
4960	57.09	-4.26	52.83	74	-21.17	V	PK
4960	41.66	-4.26	37.4	54	-16.6	V	AV
7440	52.39	1.69	54.08	74	-19.92	V	PK
7440	38.49	1.69	40.18	54	-13.82	V	AV

Remarks:

1. Correct (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2. Measure Level= Read Level+ Correct Factor
3. Margin = Measure Level-Limit
4. Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3h Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

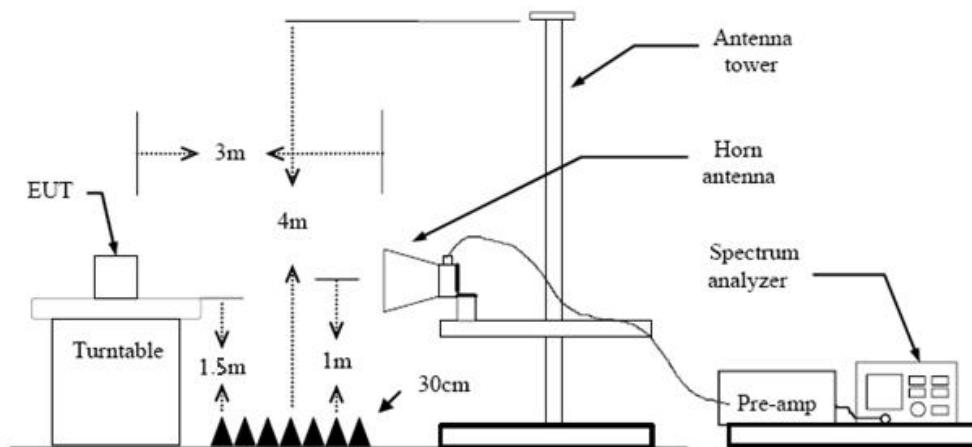
3.3. Band Edge Emissions (Radiated)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)/ RSS 247 5.5:

Restricted Frequency Band (MHz)	(dBuV/m)(at 3m)	
	Peak	Average
2310 ~ 2390	74	54
2483.5 ~ 2500	74	54

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

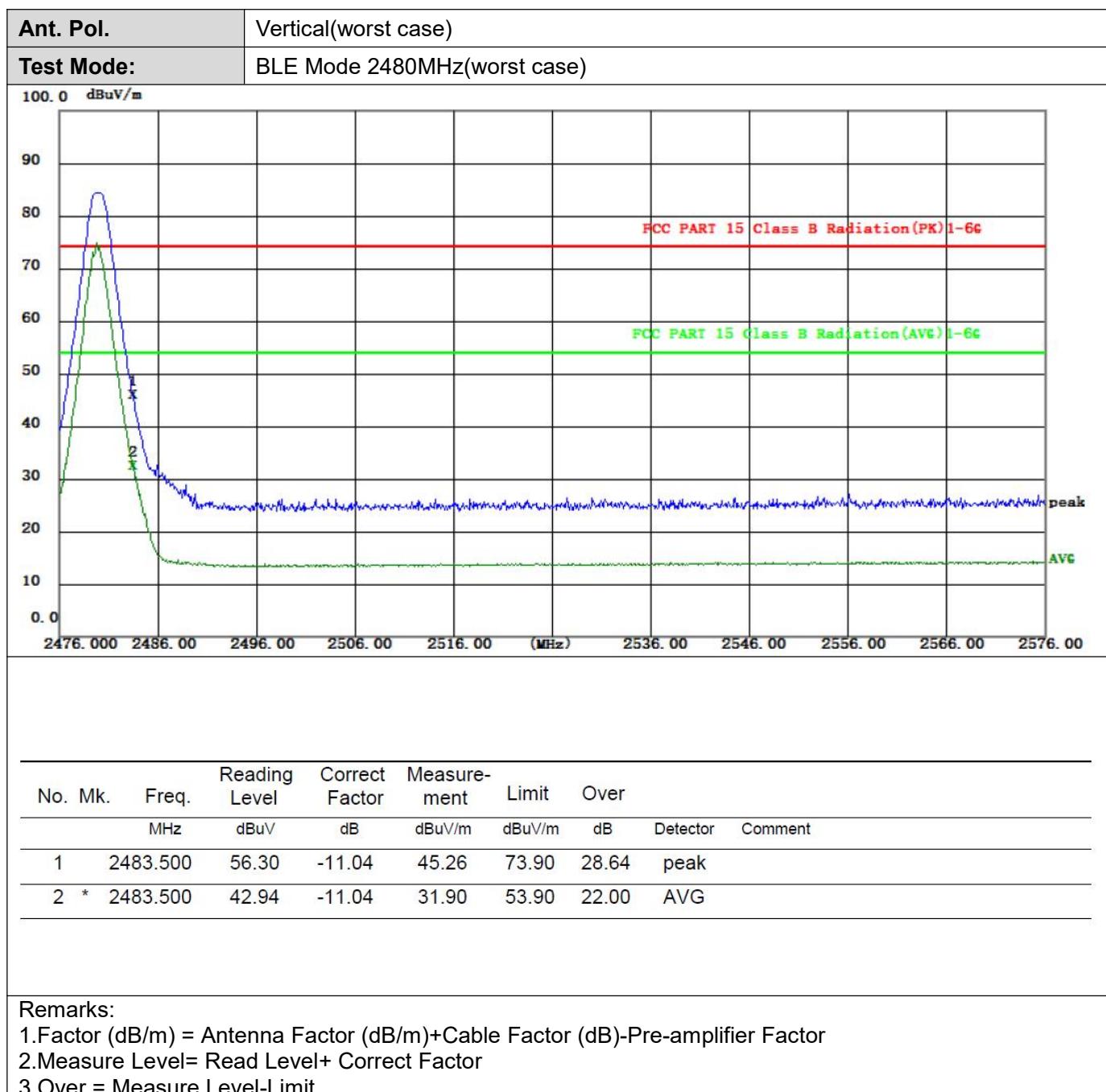
Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.8 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Results

Ant. Pol.	Vertical (worst case)													
Test Mode:	BLE Mode 2402MHz													
100.0 dBuV/m														
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over							
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector						
1		2310.000	34.91	-11.50	23.41	73.90	50.49	peak						
2		2390.000	35.26	-11.28	23.98	73.90	49.92	peak						
3		2310.160	24.10	-11.50	12.60	53.90	41.30	AVG						
4	*	2390.032	24.05	-11.28	12.77	53.90	41.13	AVG						
Remarks:														
1. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor														
2. Measure Level= Read Level+ Correct Factor														
3. Over = Measure Level-Limit														

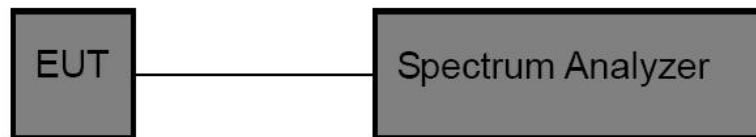


3.4. Band edge and Spurious Emissions (Conducted)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d): 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.

Test Configuration



Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
RBW = 100 kHz, VBW \geq RBW, scan up through 10th harmonic.
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

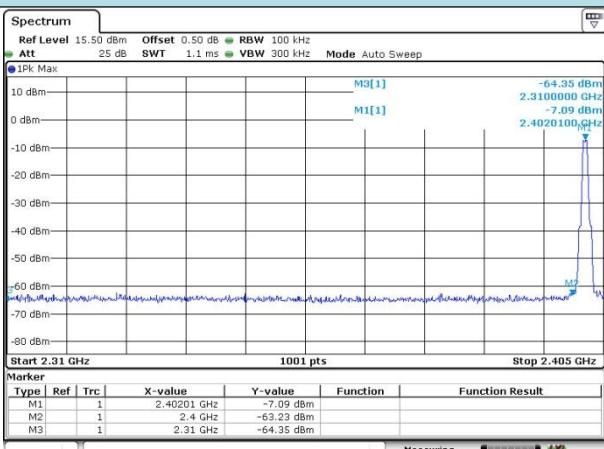
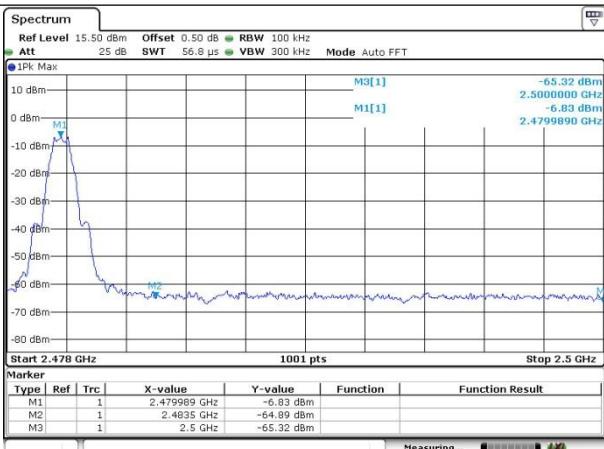
Test Mode

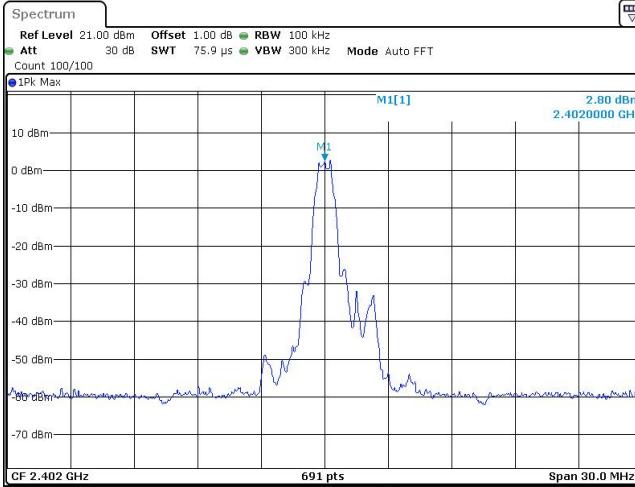
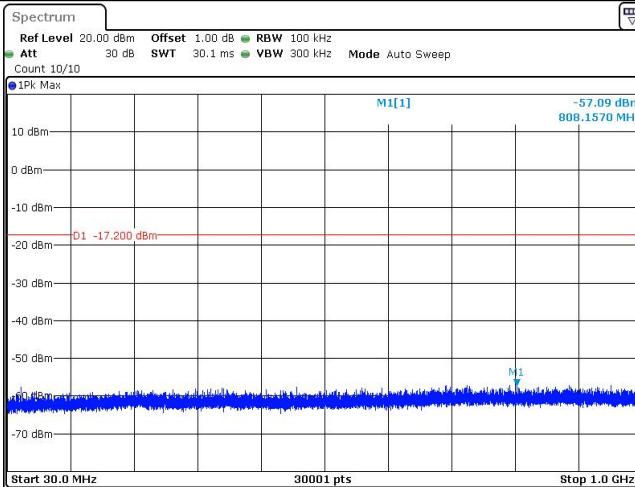
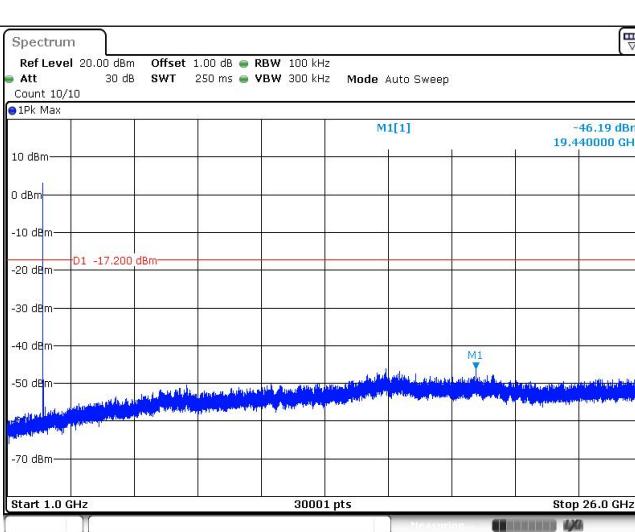
Please refer to the clause 2.4.

Test Results

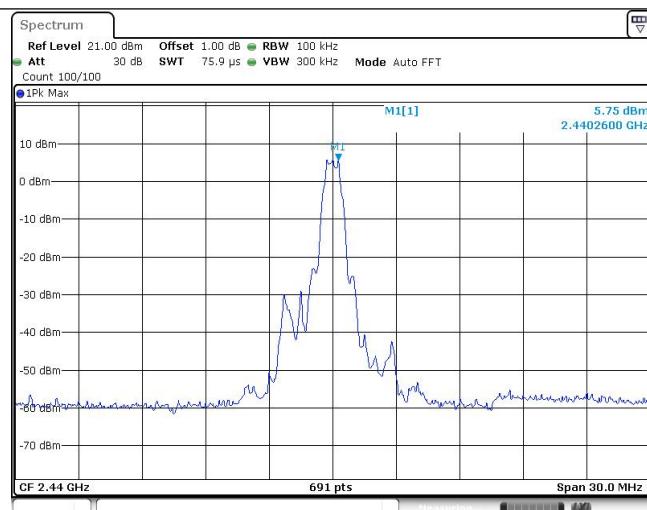
(1) Band edge Conducted Test



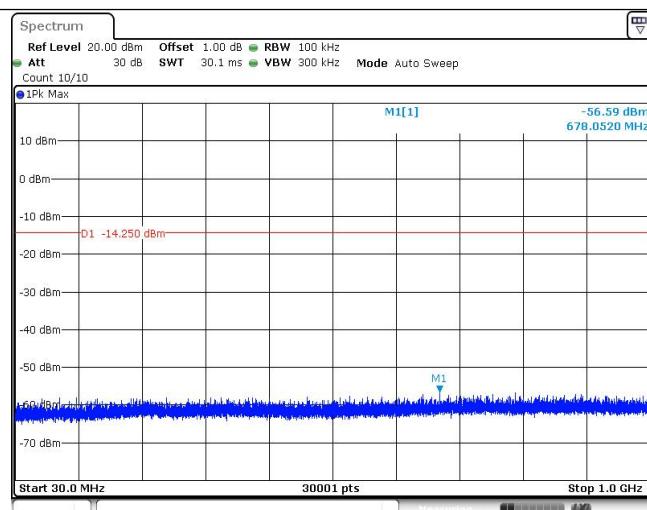
Test Item:	Band edge																												
CH00	 <p>Spectrum</p> <p>Ref Level 15.50 dBm Offset 0.50 dB RBW 100 kHz Att 25 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep</p> <p>1Pk Max</p> <p>10 dBm M3[1] -64.35 dBm 0 dBm M1[1] 2.3100000 GHz -10 dBm -7.09 dBm -20 dBm 2.4020100 GHz -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm</p> <p>Start 2.31 GHz 1001 pts Stop 2.405 GHz</p> <p>Marker</p> <table border="1"><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td></td><td>2.40201 GHz</td><td>-7.09 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-63.23 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.35 dBm</td><td></td><td></td></tr></tbody></table> <p>Measuring...</p>	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.40201 GHz	-7.09 dBm			M2	1		2.4 GHz	-63.23 dBm			M3	1		2.31 GHz	-64.35 dBm		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																							
M1	1		2.40201 GHz	-7.09 dBm																									
M2	1		2.4 GHz	-63.23 dBm																									
M3	1		2.31 GHz	-64.35 dBm																									
CH39	 <p>Spectrum</p> <p>Ref Level 15.50 dBm Offset 0.50 dB RBW 100 kHz Att 25 dB SWT 56.8 μs VBW 300 kHz Mode Auto FFT</p> <p>1Pk Max</p> <p>10 dBm M3[1] -65.32 dBm 0 dBm M1[1] 2.5000000 GHz -10 dBm -6.83 dBm -20 dBm 2.4799990 GHz -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm</p> <p>Start 2.478 GHz 1001 pts Stop 2.5 GHz</p> <p>Marker</p> <table border="1"><thead><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr></thead><tbody><tr><td>M1</td><td>1</td><td></td><td>2.479989 GHz</td><td>-6.83 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-64.89 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-65.32 dBm</td><td></td><td></td></tr></tbody></table> <p>Measuring...</p>	Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.479989 GHz	-6.83 dBm			M2	1		2.4835 GHz	-64.89 dBm			M3	1		2.5 GHz	-65.32 dBm		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																							
M1	1		2.479989 GHz	-6.83 dBm																									
M2	1		2.4835 GHz	-64.89 dBm																									
M3	1		2.5 GHz	-65.32 dBm																									

Test Item:	SE
CH00 Reference level	
CH00 30MHz~1000MHz	
CH00 1GHz~26GHz	

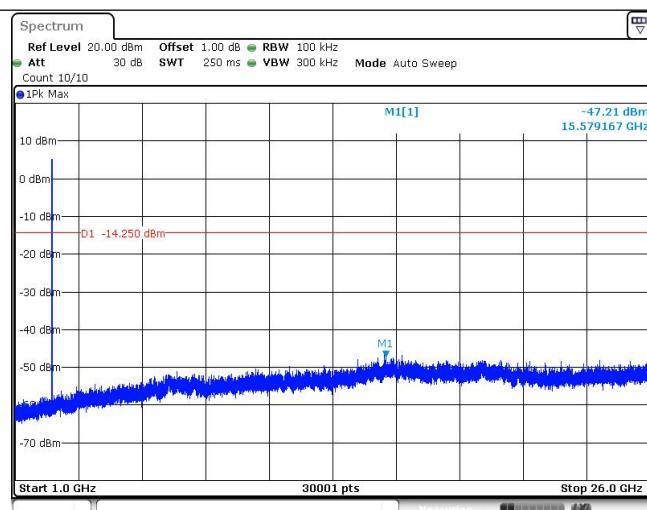
CH19
Reference level



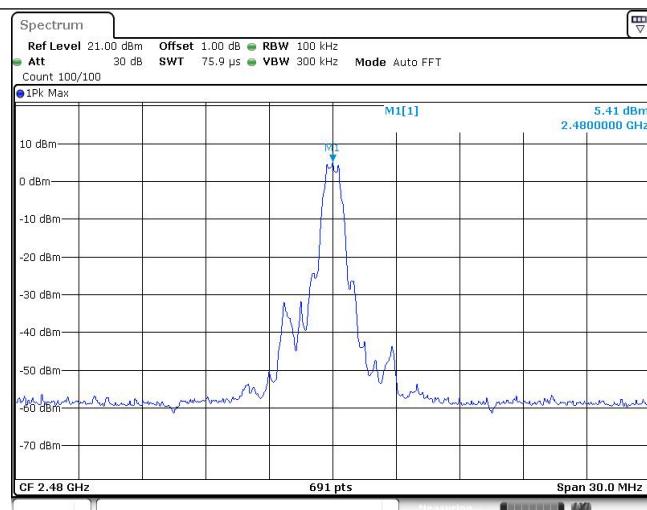
CH19
30MHz~1000MHz



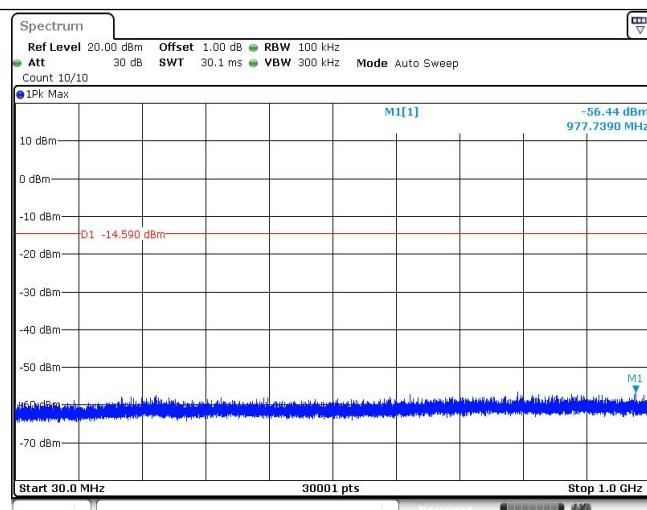
CH19
1GHz~26GHz



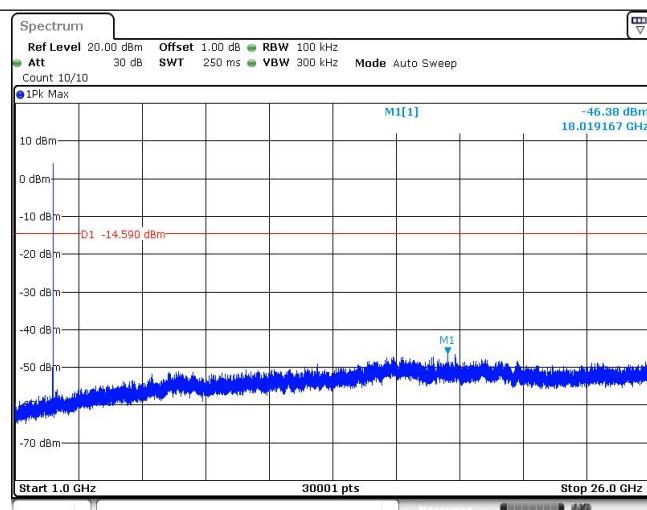
CH39
Reference level



CH39
30MHz~1000MHz



CH39
1GHz~26GHz





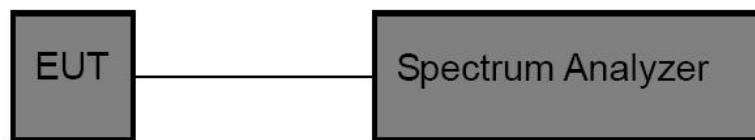
3.5. DTS Bandwidth

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2)/ RSS-247 5.2 a:

Test Item	Limit	Frequency Range(MHz)
DTS Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

Test Configuration



Test Procedure

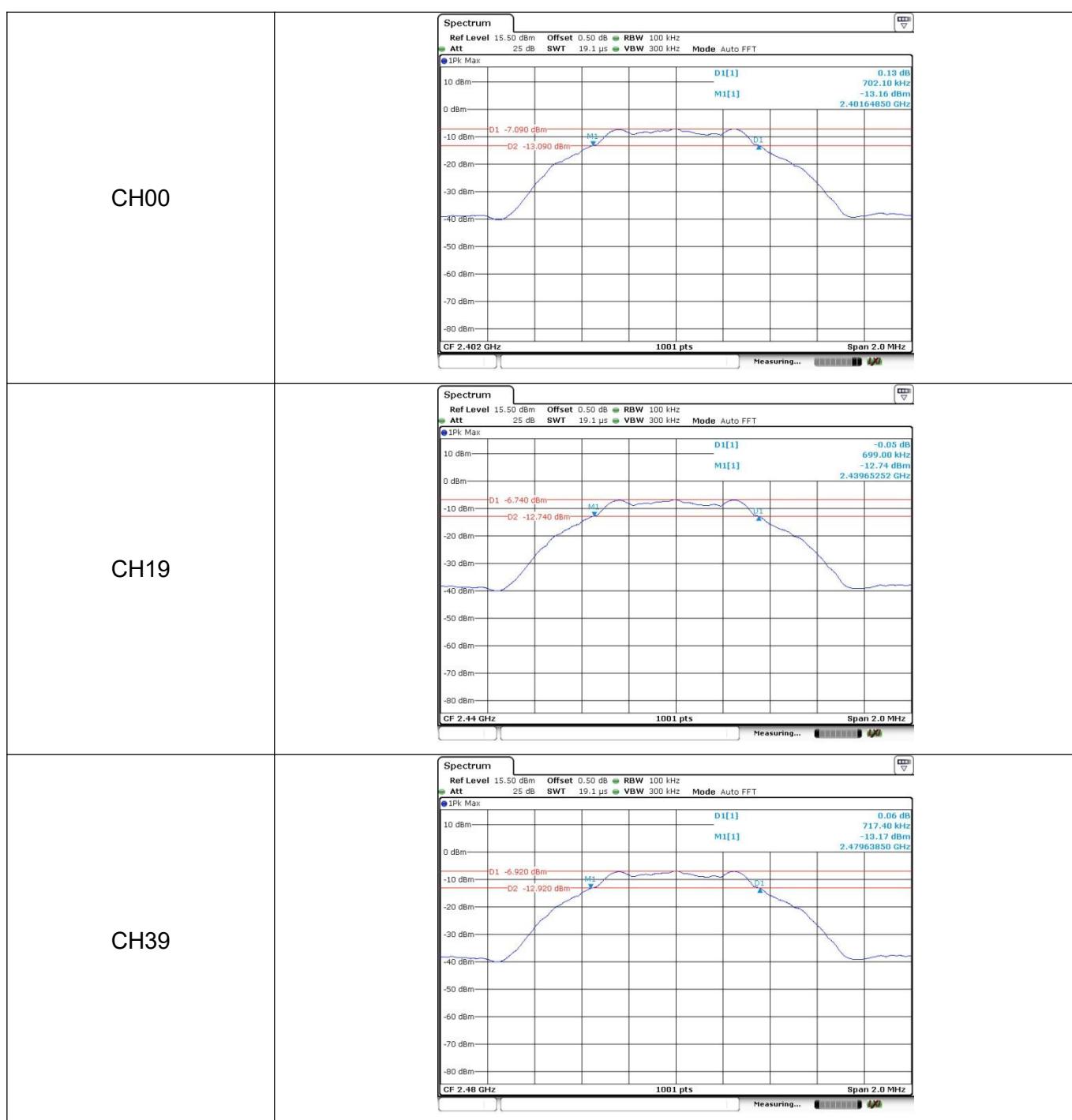
5. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
6. DTS Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.OCB Spectrum Setting:
 - (1) Set RBW = 1% ~ 5% occupied bandwidth.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

Test Mode

Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	DTS BW[MHz]	Limit[MHz]	Verdict
BLE	2402	0.7021	>=0.5	PASS
	2440	0.699	>=0.5	PASS
	2480	0.7174	>=0.5	PASS



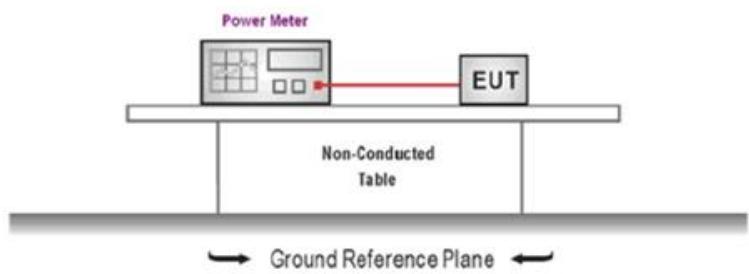
3.6. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3)/ RSS-247 5.4 d:

Section	Test Item	Limit	Frequency Range(MHz)
CFR 47 FCC 15.247(b)(3)	Maximum conducted output power	1 Watt or 30dBm	2400~2483.5
ISED RSS-247 5.4 d	EIRP	4 Watt or 36dBm	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was tested according to ANSI C63.10: 2013 and KDB 558074 D01 for compliance to FCC 47 CFR 15.247 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
4. Record the measurement data.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm]	Limit[dBm]	Verdict
BLE	2402	0.41	<=30	PASS
	2440	0.48	<=30	PASS
	2480	0.44	<=30	PASS

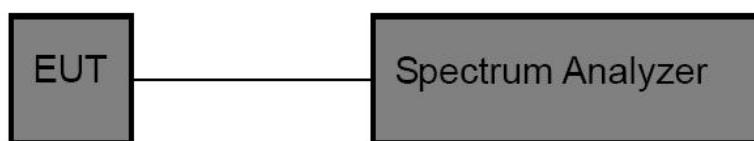
3.7. Power Spectral Density

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e)/ RSS-247 5.2 b:

Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:
Set analyzer center frequency to DTS channel center frequency.
Set the span to 1.5 times the DTS bandwidth.
Set the RBW to: 3 kHz
Set the VBW to: 10 kHz
Detector: peak
Sweep time: auto
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

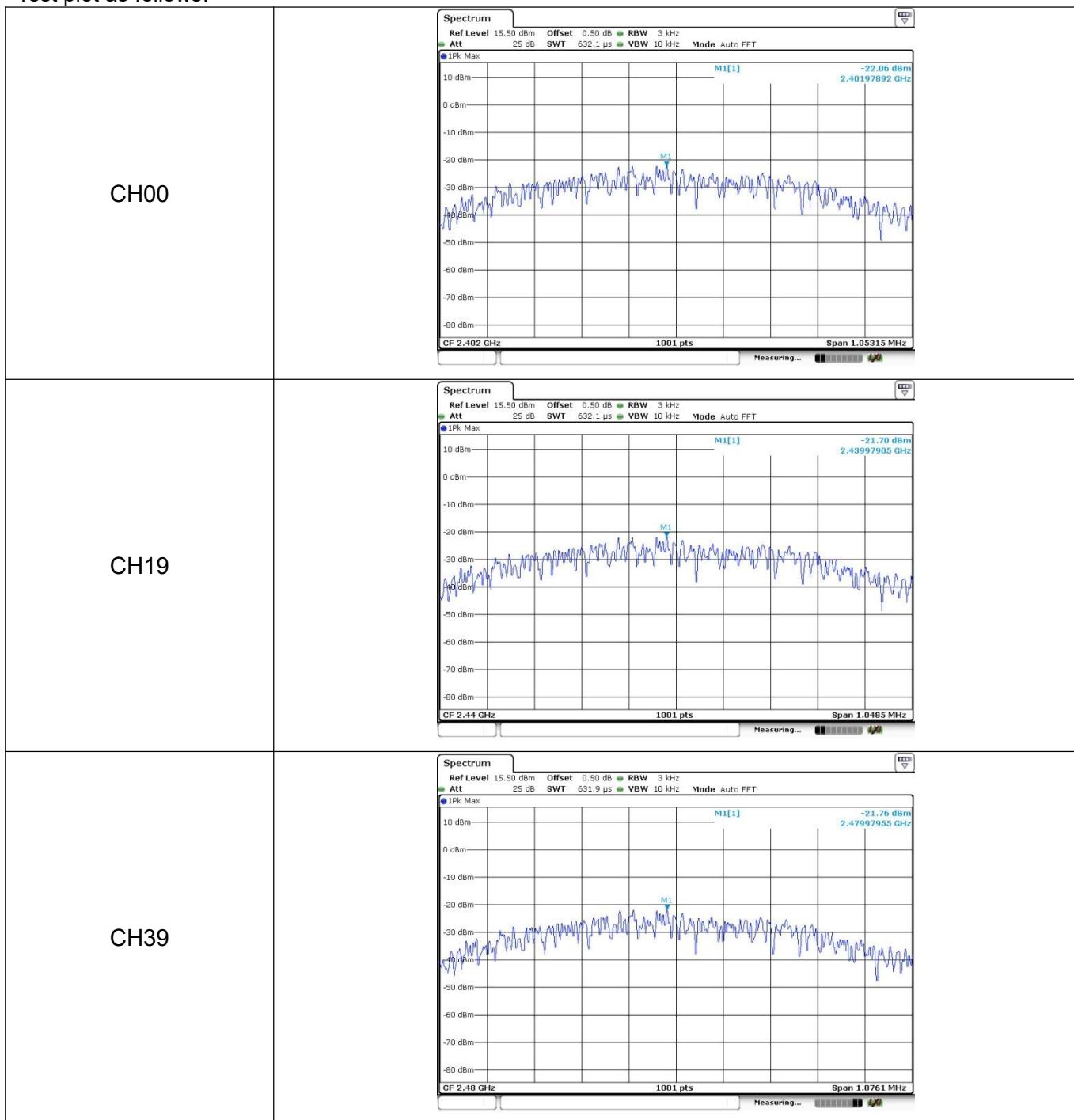
Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE	2402	-22.06	<=8	PASS
	2440	-21.70	<=8	PASS
	2480	-21.76	<=8	PASS

Test plot as follows:





3.8. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

This product has a PCB antenna, fulfill the requirement of this section.

*****THE END*****