Test Report

Under

FCC Part15 Subpart C

Report Reference No. .....:	EA1511026F 01001
Engineer by (name + signature) .....:	Kelly Wu
Approved by (name + signature) .....:	Joe Long
Date of issue.....:	2015-12-23
Testing Laboratory.....:	DongGuan Anci Electronic Technology Co., Ltd
Address.....:	No. A222, Building A, Shifu Hardware Plaza, Changan Town, Dongguan City, Guangdong Pr., China. FCC Registered Test Site Number: 721657

Product name ……:	Intelligent E-scooter
Model No. ……:	S1
FCC ID ……:	2AGOLS1
Applicant's name ……:	ShenZhen Cham Battery Technology Co., Ltd.
Address ……:	Room 03, 8F, Fangda Building, South District, Nanshan High-tech District, 518057 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Manufacturer ……:	ShenZhen Cham Battery Technology Co., Ltd.
Address ……:	Room 03, 8F, Fangda Building, South District, Nanshan High-tech District, 518057 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product	Intelligent E-scooter
Brand Name	POWEROCKS
Model No.	S1
Working Voltage	DC 25.2V
Frequency Range	2402- 2480 MHz
Channel Number	40
Channel Separation	2MHz
Type of Modulation	GFSK
Data Rate	1Mbps
Antenna Type	Printed Antenna
Peak Antenna Gain	-0.61dBi

1.2. Mode of Operation

Test Mode
Mode 1: Transmitter-GFSK 1Mbps

Note:

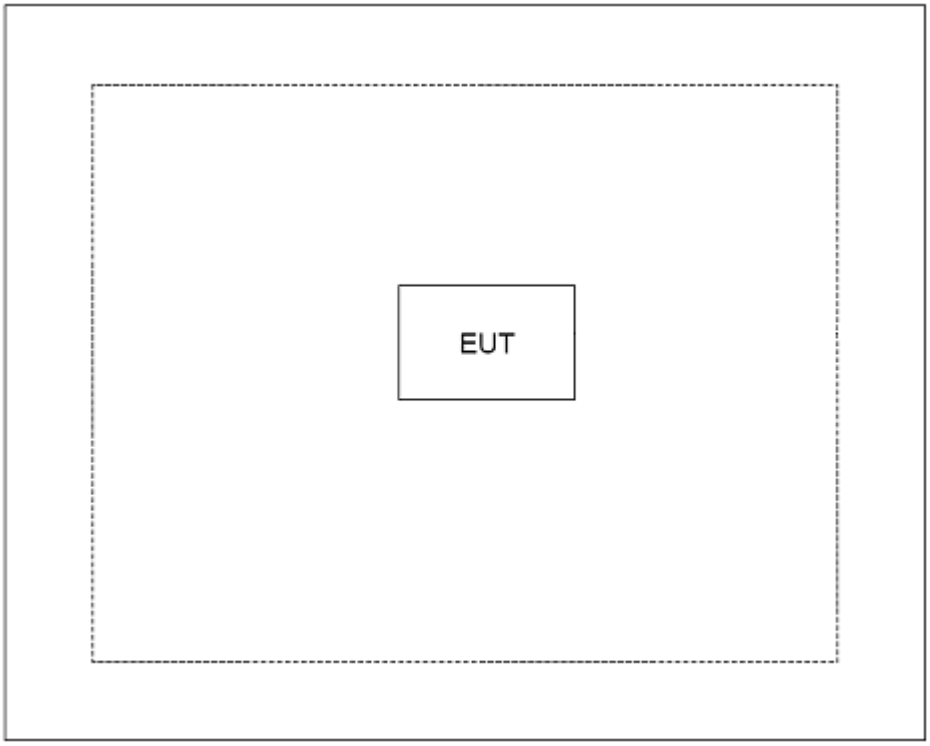
1. The device described above was tested by Dong Guan Anci Electronic Technology Co., Ltd. to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Dong Guan Anci Electronic Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the above official standards.
2. This report applies to the above sample only and shall not be reproduced in part without written approval of Dong Guan Anci Electronic Technology Co., Ltd

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	N/A	N/A	N/A	N/A	N/A

1.4. Configuration of Tested System

Connection Diagram


Signal Cable Type		Signal cable Description
A	N/A	N/A

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run the software “Bluetool”, then select test mode and channel to test

2. Technical Test

2.1. Summary of Test Result

Performed Test Item	Normative References	Test Result
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: Section 15.207	Pass
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: Section 15.209	Pass
6dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(a)(2);	Pass
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(b)(3)	Pass
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(e)	Pass
Band-edge Compliance of RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(d)	Pass
Spurious RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 15.247(d)	Pass

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

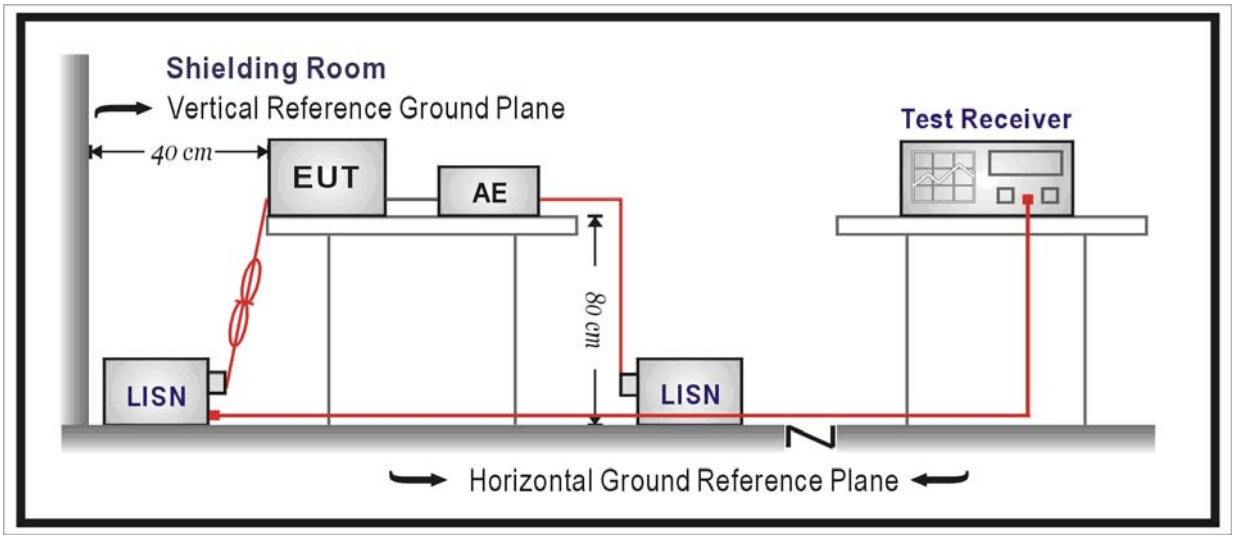
3. Conducted Emission

3.1. Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-669	2016-07-18
Pulse Limiter	ROHDE&SCHWARZ	ESH3-Z2	101661	2016-07-18
Test Cable	N/A	C01	N/A	2016-07-18
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101358	2016-07-18

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

3.4. Test Procedure

According to FCC ANSI C63.4: 2009 & ANSI C63.10: 2009

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. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /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)

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.

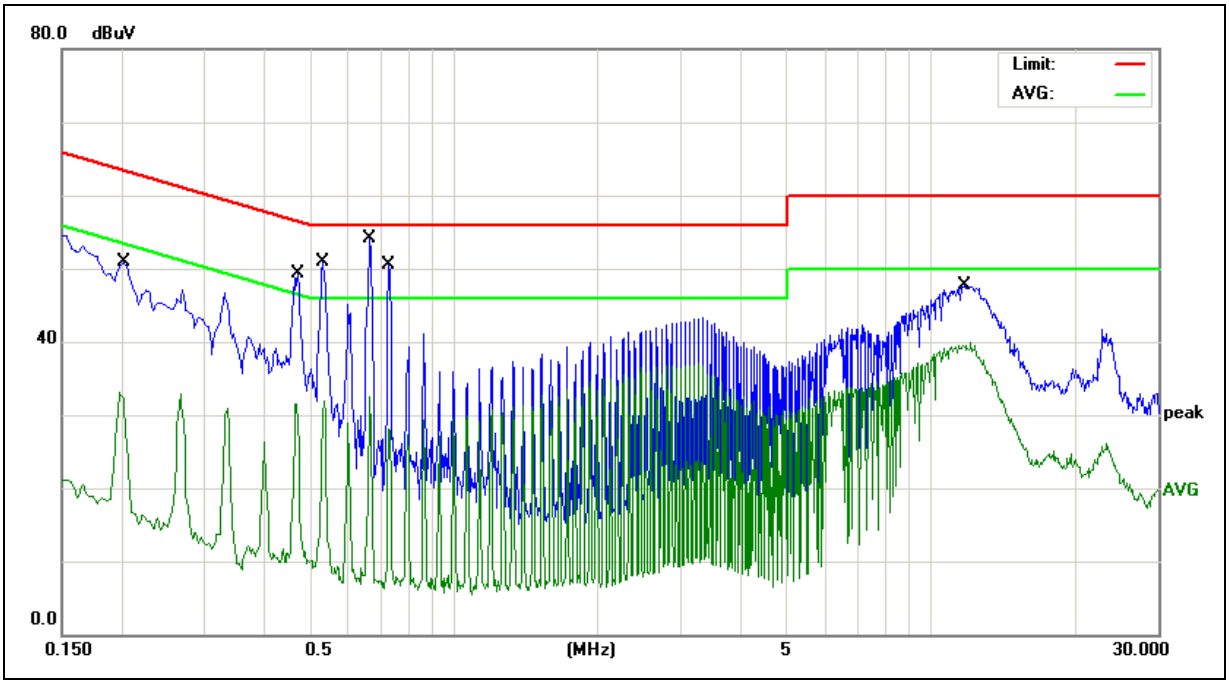
The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Uncertainty

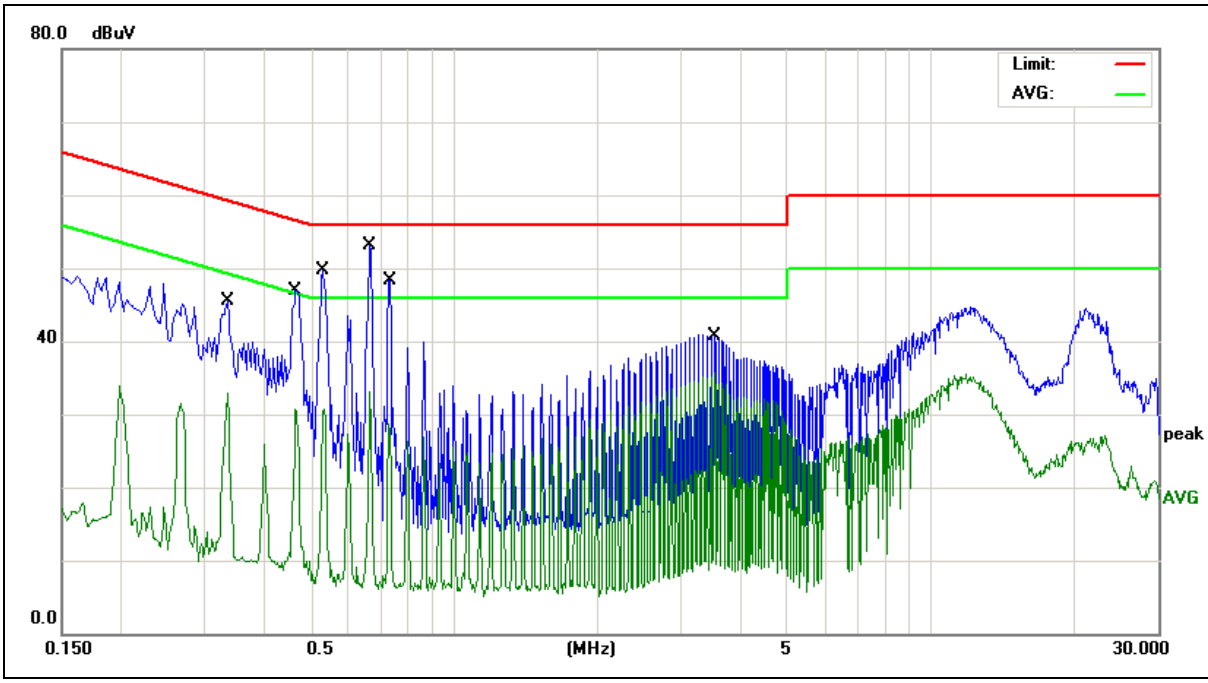
The measurement uncertainty is defined as ± 2.01 dB

3.6. Test Result



Site:	**843**	**Phase:N**	**Temperature(C):26(C)**
Limit:	**FCC Fart 15 B Conduction (QP)**		**Humidity(%):60%**
EUT:	**Intelligent E-scooter**	**Test Time:**	**2015-11-25 18:01:13**
M/N.:	**S1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Mode 1**	**Test Engineer:**	**Jason**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.2020	34.70	10.12	44.82	63.52	-18.70	QP	
2	0.2020	20.91	10.12	31.03	53.52	-22.49	AVG	
3	0.4700	34.07	10.12	44.19	56.51	-12.32	QP	
4	0.4700	17.36	10.12	27.48	46.51	-19.03	AVG	
5	0.5299	37.09	10.12	47.21	56.00	-8.79	QP	
6	0.5299	20.92	10.12	31.04	46.00	-14.96	AVG	
7 *	0.6660	42.19	10.14	52.33	56.00	-3.67	QP	
8	0.6660	23.02	10.14	33.16	46.00	-12.84	AVG	
9	0.7300	39.18	10.14	49.32	56.00	-6.68	QP	
10	0.7300	19.35	10.14	29.49	46.00	-16.51	AVG	
11	11.7700	32.66	10.29	42.95	60.00	-17.05	QP	
12	11.7700	28.70	10.29	38.99	50.00	-11.01	AVG	



Site:	**843**	**Phase:L1**	**Temperature(C):26(C)**
Limit:	**FCC Fart 15 B Conduction (QP)**		**Humidity(%):60%**
EUT:	**Intelligent E-scooter**	**Test Time:**	**2015-11-25 17:58:57**
M/N.:	**S1**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**Mode 1**	**Test Engineer:**	**Jason**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.3339	32.34	10.12	42.46	59.35	-16.89	QP	
2	0.3339	21.02	10.12	31.14	49.35	-18.21	AVG	
3	0.4660	33.97	10.12	44.09	56.58	-12.49	QP	
4	0.4660	20.73	10.12	30.85	46.58	-15.73	AVG	
5	0.5299	36.17	10.12	46.29	56.00	-9.71	QP	
6	0.5299	20.11	10.12	30.23	46.00	-15.77	AVG	
7 *	0.6660	41.72	10.14	51.86	56.00	-4.14	QP	
8	0.6660	23.05	10.14	33.19	46.00	-12.81	AVG	
9	0.7340	35.04	10.14	45.18	56.00	-10.82	QP	
10	0.7340	17.69	10.14	27.83	46.00	-18.17	AVG	
11	3.5260	29.35	10.14	39.49	56.00	-16.51	QP	
12	3.5260	25.42	10.14	35.56	46.00	-10.44	AVG	

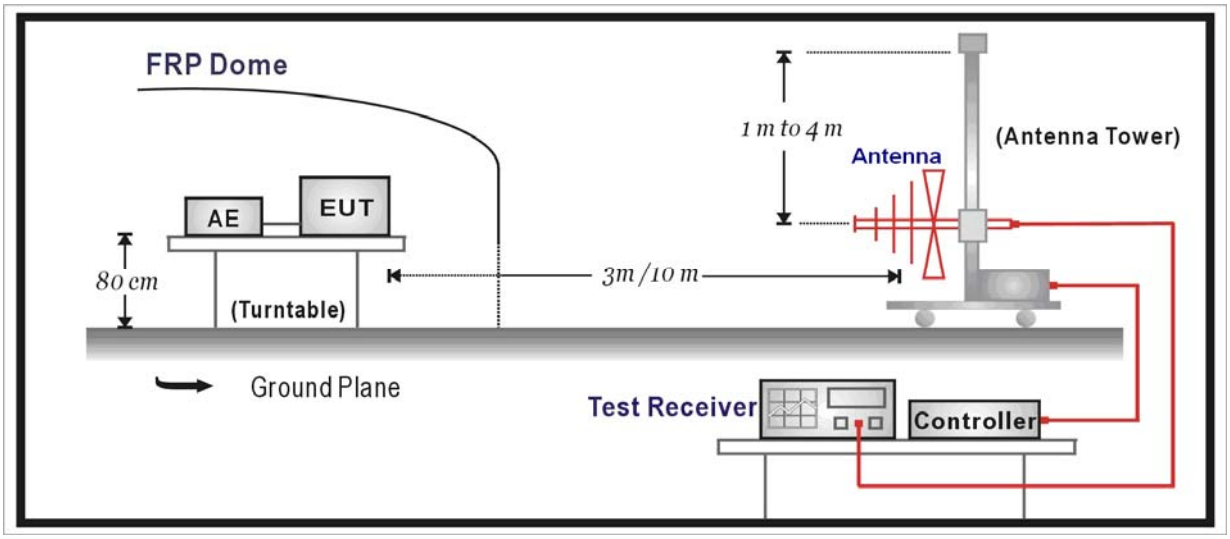
4. Radiated Emission

4.1. Test Equipment

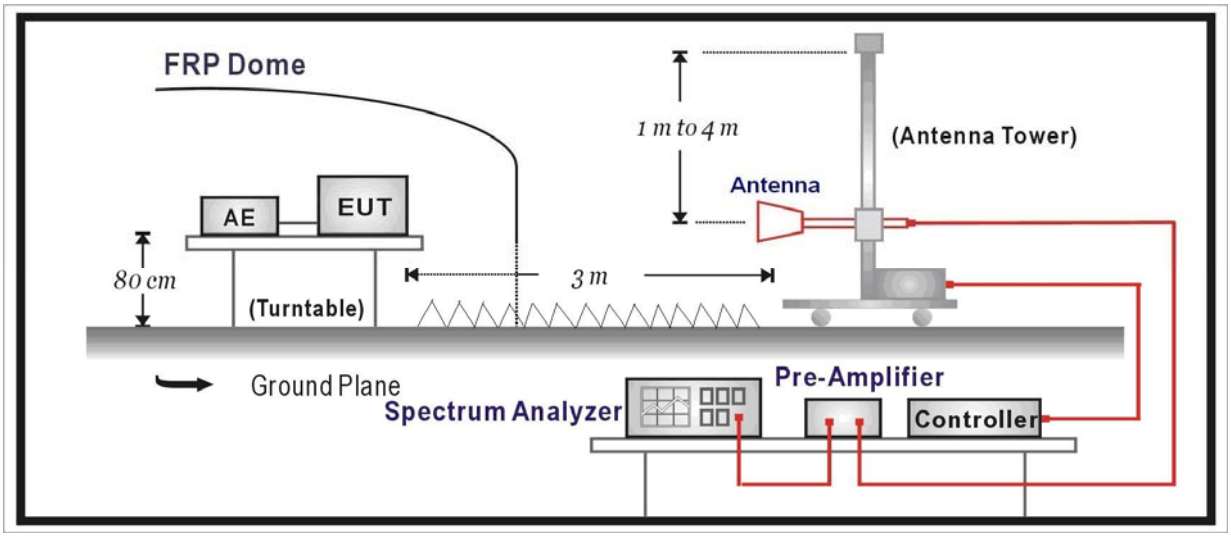
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Log-Bicon Antenna	SCHWARZBECK MESS	VULB 9163	9163-588	2016-07-18
Test Cable	N/A	10M_OS01	N/A	2016-07-18
Test Cable	N/A	C01-1/-2	N/A	2016-07-18
Pre-Amplifier	HP	8447D	N/A	2016-07-17
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17
Test Receiver	ROHDE&SCHWARZ	ESVD	832497/002	2016-07-18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2016-07-18

4.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

According to ANSI C63.10: 2009

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

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 C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor – Preamplifier Gain

Test Mode : Mode 1

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Lowest	H	539.3	3.9	19.3	23.2	46	-22.8	QP
	V	644.0	1.4	19.5	20.9	46	-25.1	QP
	H	3122.5	43.8	-5.1	38.7	54(Note1)	-15.3	PK
	H	4808.0	47.7	-1.9	45.8	54(Note1)	-8.2	PK
	V	7206.0	40.4	3.5	43.9	54(Note1)	-10.1	PK
	H	24000.0	31.4	18.8	50.2	54(Note1)	-3.8	PK
Middle	V	553.3	2.6	19.6	22.2	46	-23.8	QP
	V	648.4	2.3	19.5	21.8	46	-24.2	QP
	V	3122.5	43.7	-5.1	38.6	54(Note1)	-15.4	PK
	H	4888.5	48.4	-1.6	46.8	54(Note1)	-7.2	PK
	H	7323.0	41.4	3.7	45.1	54(Note1)	-8.9	PK
	H	24000.0	31.4	18.8	50.2	54(Note1)	-3.8	PK
Highest	V	525.2	4.3	18.8	23.1	46	-22.9	QP
	H	744.9	1.4	20.2	21.6	46	-24.4	QP
	H	3122.5	43.6	-5.1	38.5	54(Note1)	-15.5	PK
	H	4961.0	48.5	-1.4	47.1	54(Note1)	-6.9	PK
	V	7440.0	42.4	3.6	46.0	54(Note1)	-8.0	PK
	H	24000.0	31.4	18.8	50.2	54(Note1)	-3.8	PK

Note 1: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

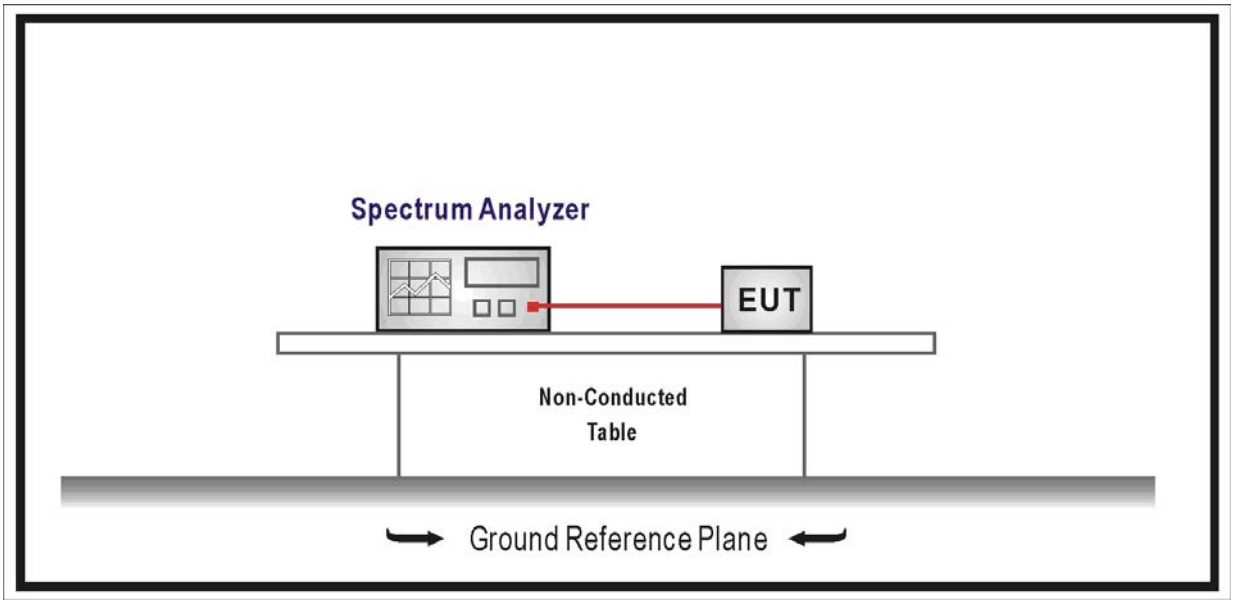
5. 6dB Bandwidth

5.1 Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date Due
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2 Test Setup



5.3 Limit

- For frequency hopping systems operating in 2400-2483.5 MHz band, no limitation.
- For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

5.4 Test Procedure

According to ANSI C63.10: 2009

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 6dB bandwidth, centered on a hopping channel

RBW ≧ 1% of the 6dB bandwidth

VBW ≧ RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.

Use the marker-to-peak function to set the marker to the peak of the emission..

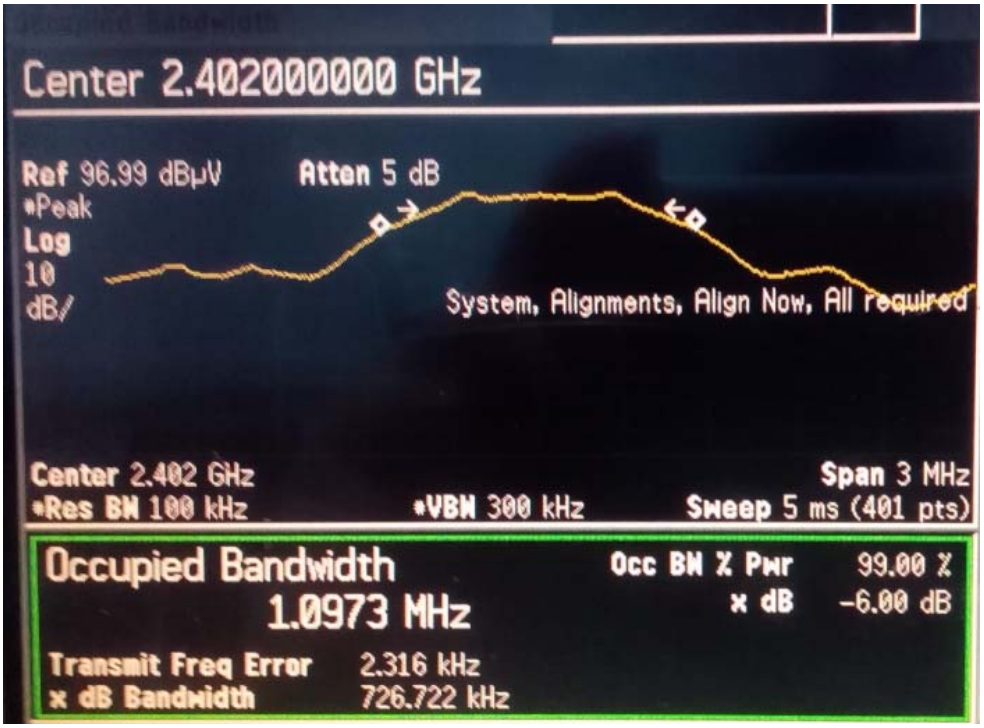
5.5 Uncertainty

The measurement uncertainty is defined as ± 1 kHz

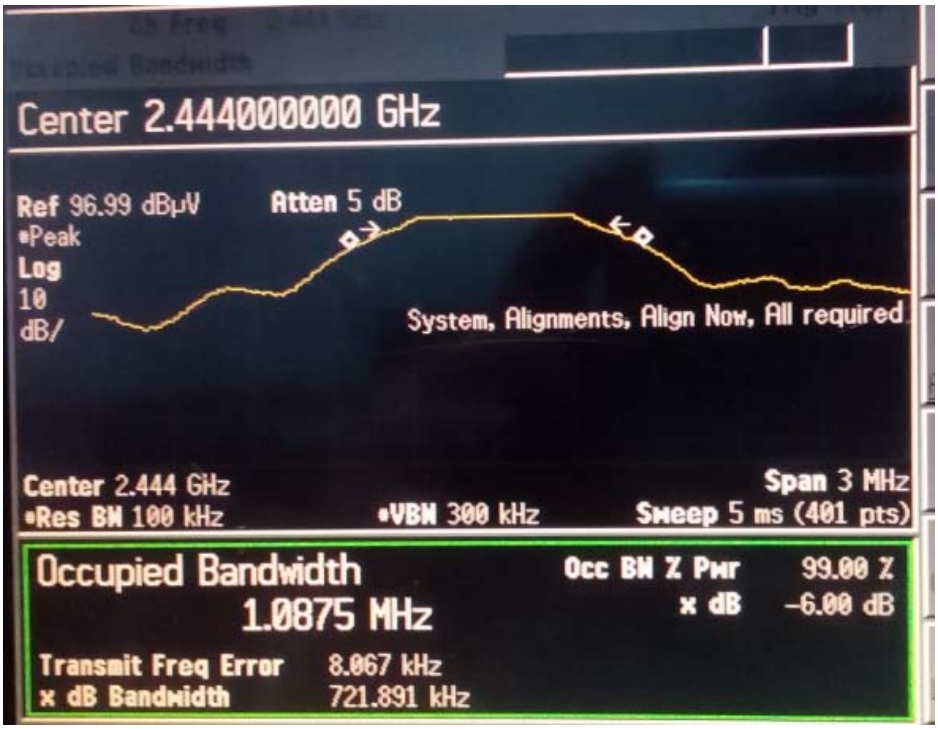
5.6 Test Result

Channel No.	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
Lowest channel	2402	726.7	>500
Middle channel	2444	721.9	>500
Highest channel	2480	724.8	>500

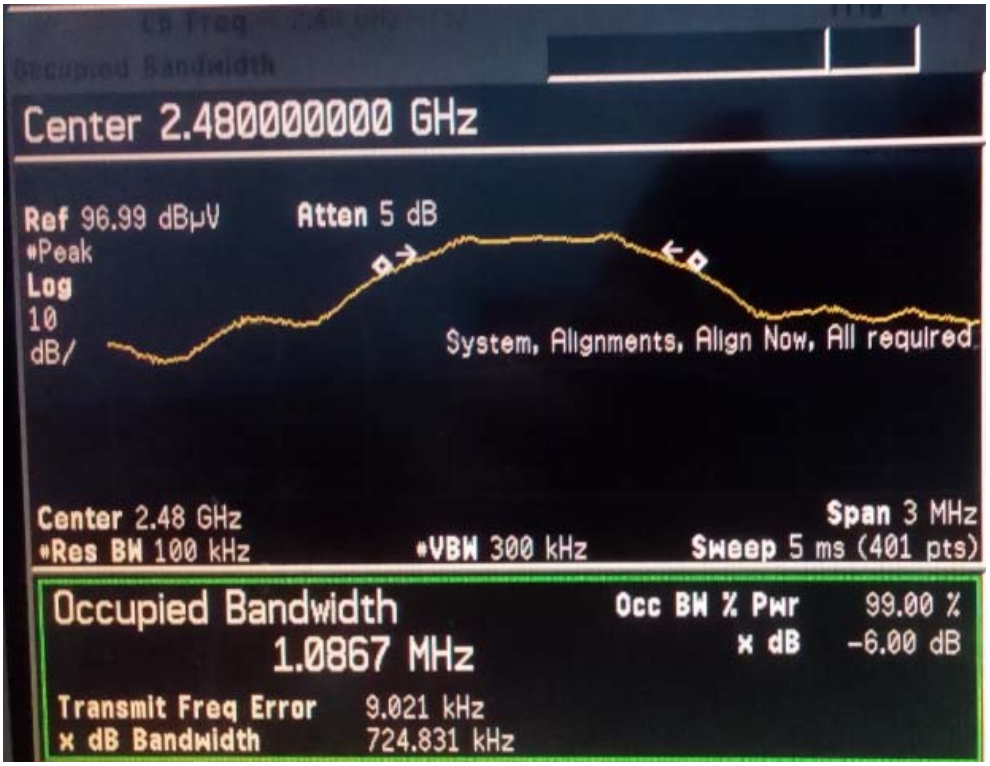
Lowest channel 2402MHz



Middle channel 2440MHz



Highest channel 2480MHz



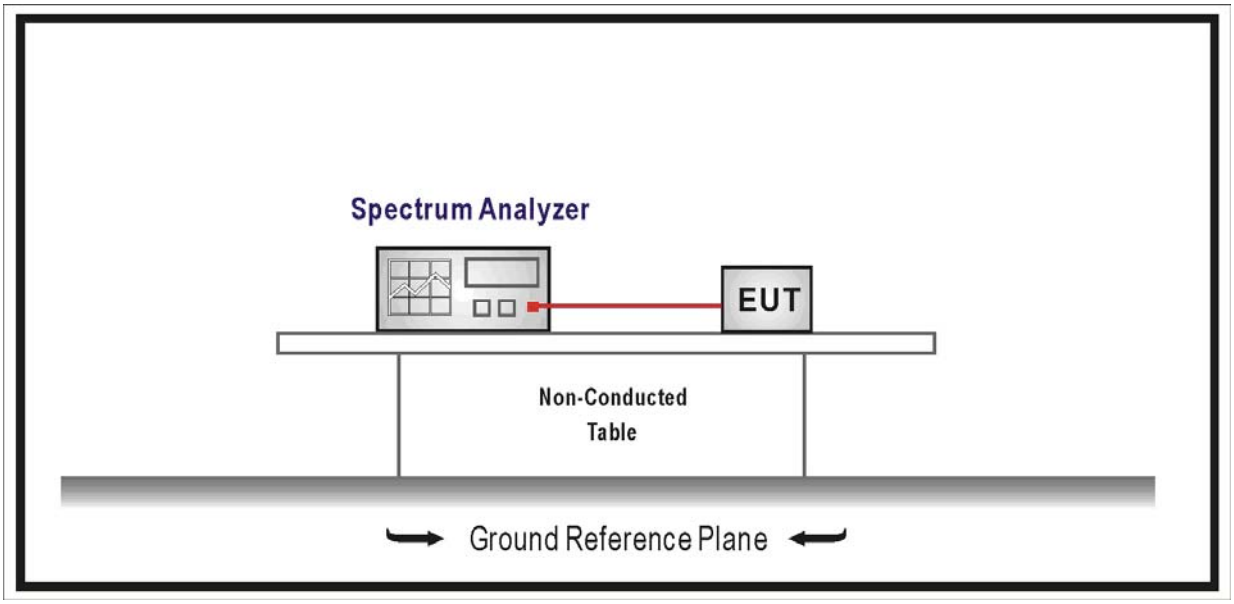
6. Peak Output Power

6.1. Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date Due
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

6.2. Test Setup



6.3. Limit

- For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt

6.4. Test Procedure

According to ANSI C63.10: 2009

Use the following spectrum analyzer settings:

Span ≧ 3 x RBW

RBW ≧ DTS bandwidth

VBW ≧ 3 x RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

6.5. Uncertainty

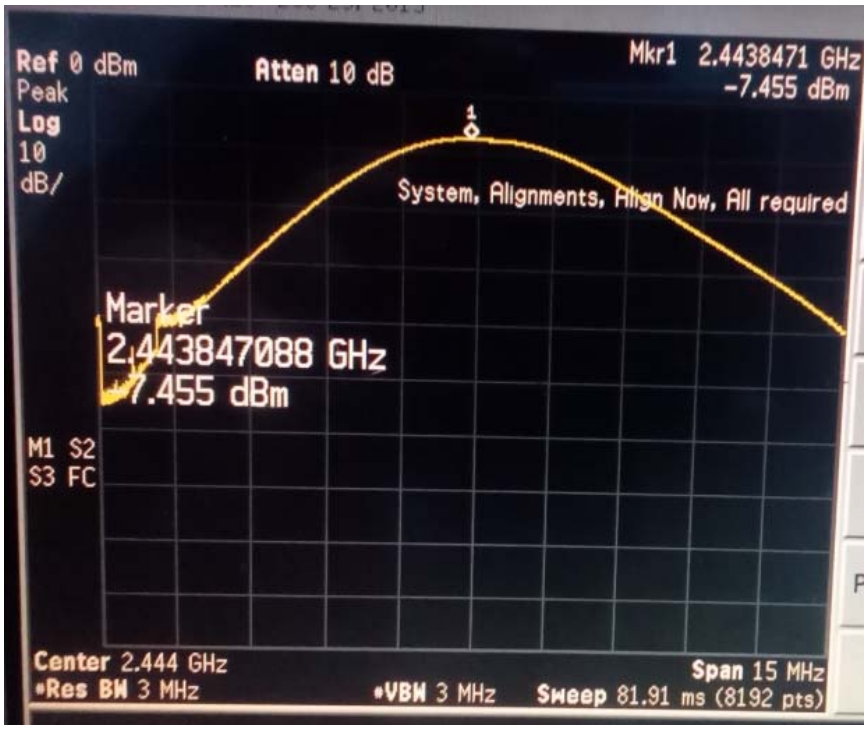
The measurement uncertainty is defined as ± 1.0 dB

6.6. Test Result

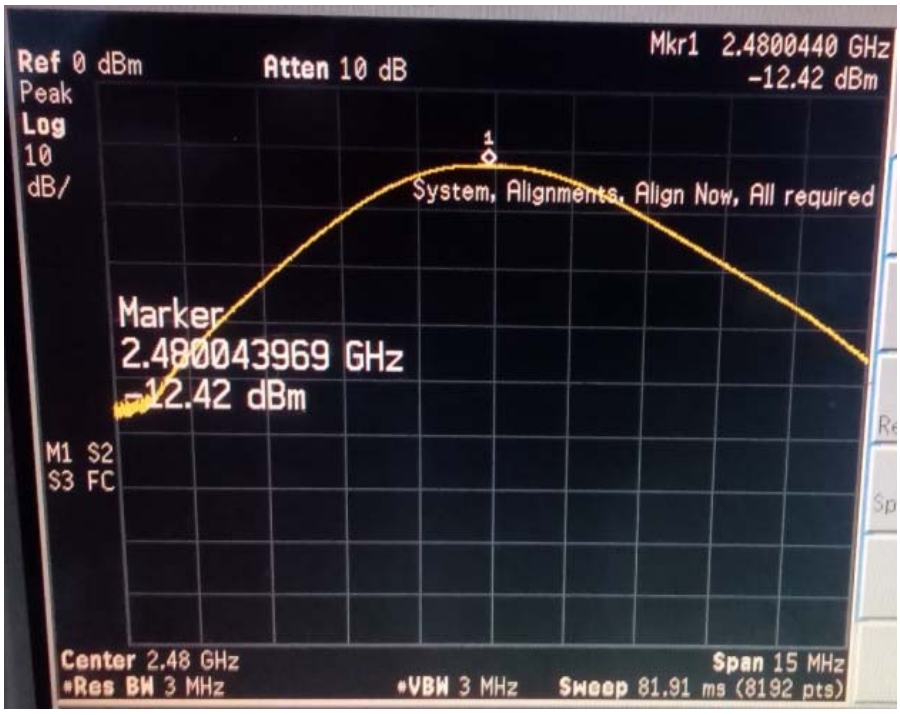
Channel No.	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest channel	2402	-10.26	30.00	Pass
Middle channel	2444	-7.46	30.00	Pass
Highest channel	2480	-12.42	30.00	Pass

Lowest channel 2402MHz

Middle channel 2444MHz



Highest channel 2480MHz



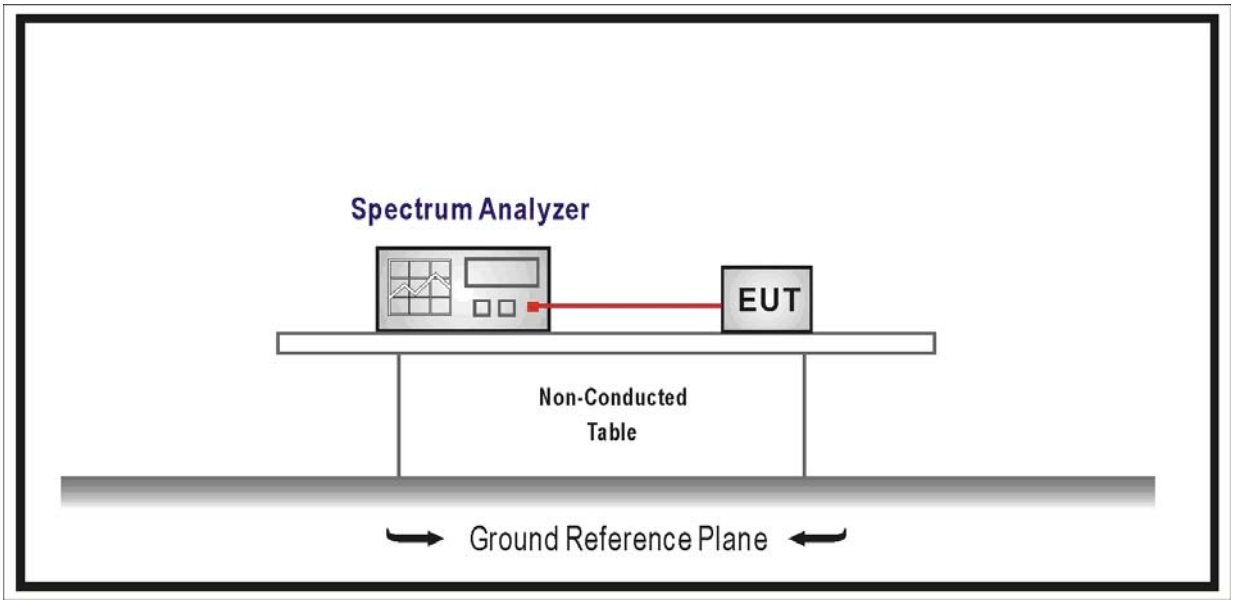
7. Power Spectral Density

7.1. Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date Due
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

- For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

7.4. Test Procedure

According to ANSI C63.10: 2009

Use the following spectrum analyzer settings:

Span ≧ 1.5MHz

RBW ≧ 3KHz

VBW ≧ 10KHz

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

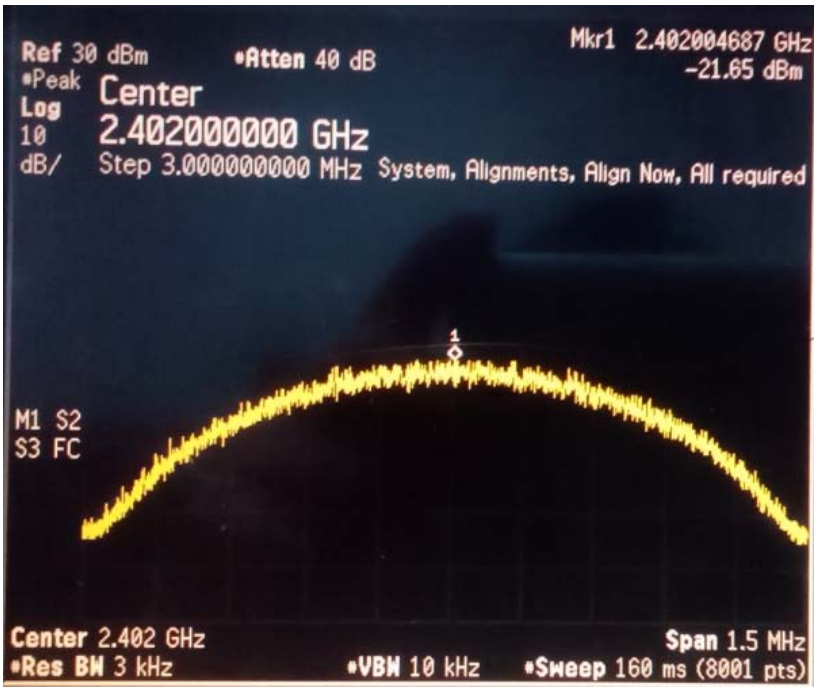
7.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

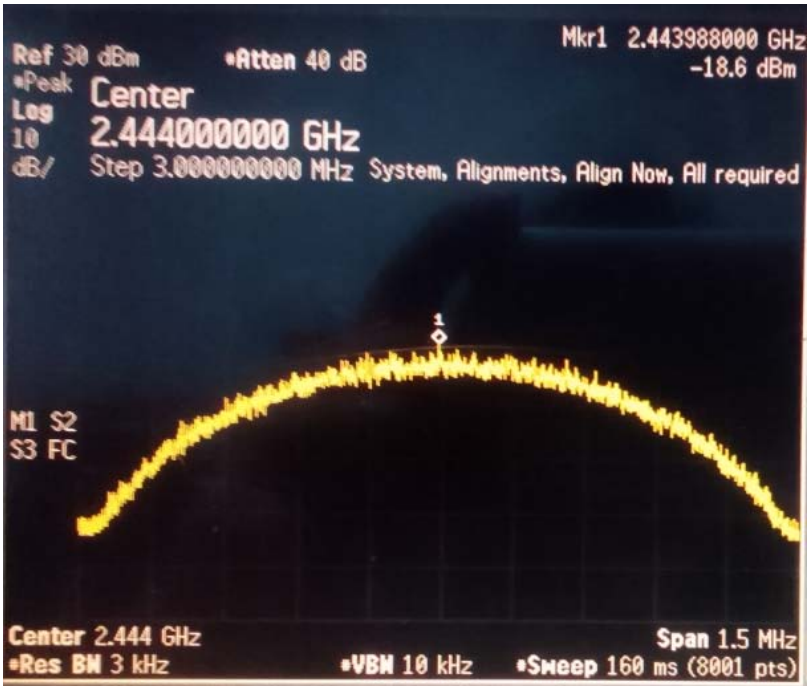
7.6. Test Result

Channel No.	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
Lowest channel	2402	-21.65	8.0	Pass
Middle channel	2444	-18.60	8.0	Pass
Highest channel	2480	-22.11	8.0	Pass

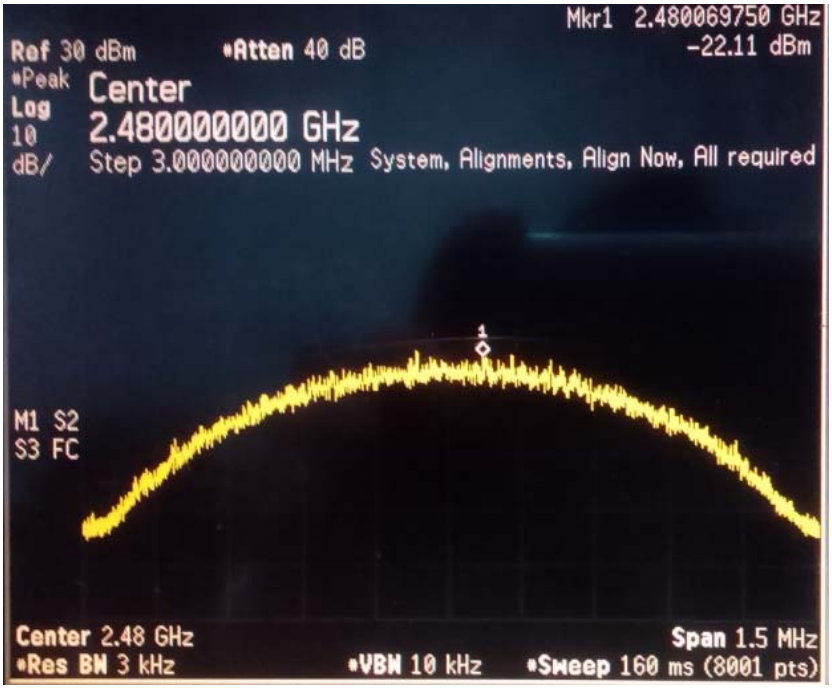
Lowest channel 2402MHz



Middle channel 2444MHz



Highest channel 2480MHz



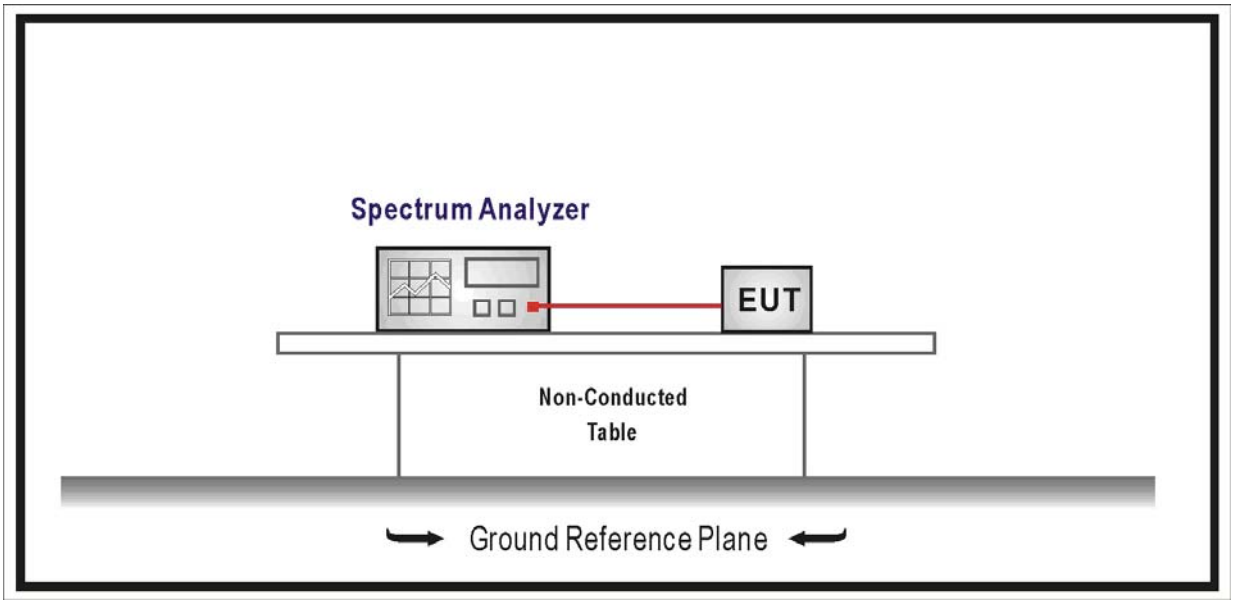
8. Band-edge Compliance of RF Conducted Emissions

8.1. Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date Due
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. 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 FCC part 15, must be designed to ensure that 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.
- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz

bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

8.4. Test Procedure

According to ANSI C63.10: 2009

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.

RBW ≧ 1% of the span

VBW ≧ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge.

Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

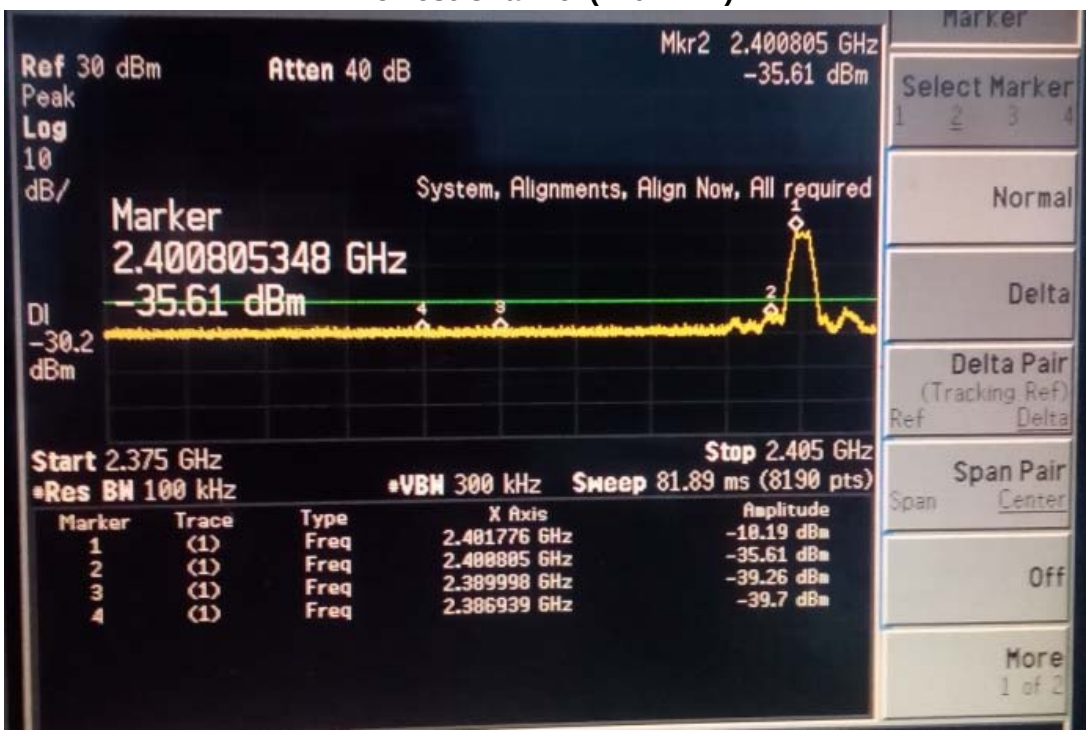
Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

8.5. Uncertainty

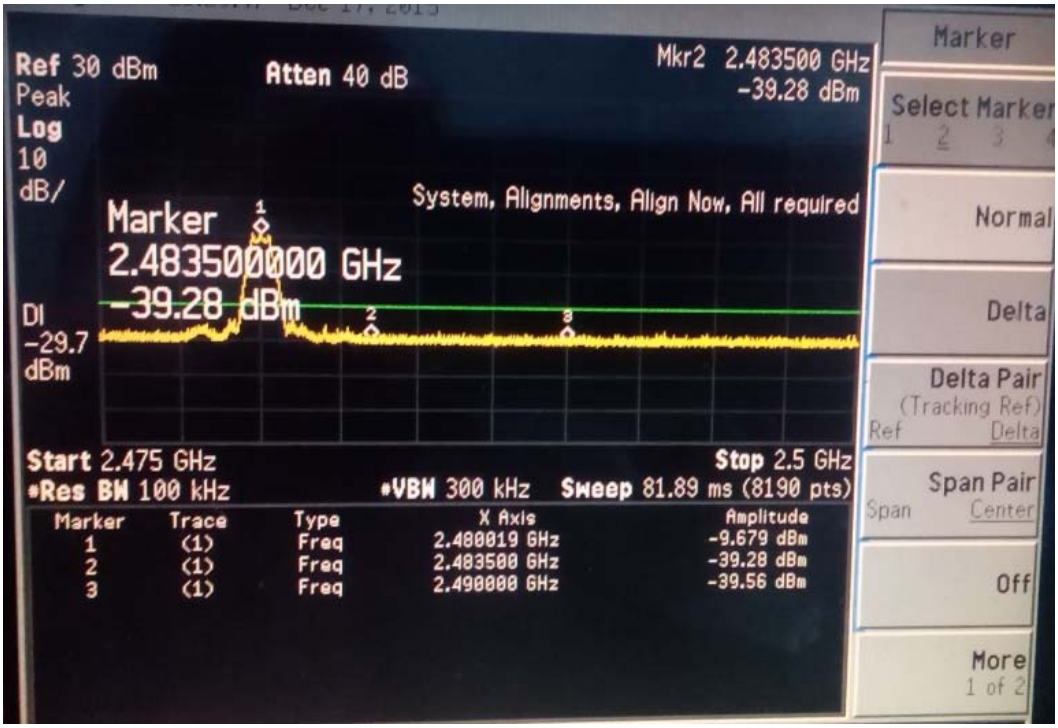
The measurement uncertainty is defined as ± 1.0 dB

8.6. Test Result

Lowest Channel (2402MHz)



Highest Channel (2480MHz)



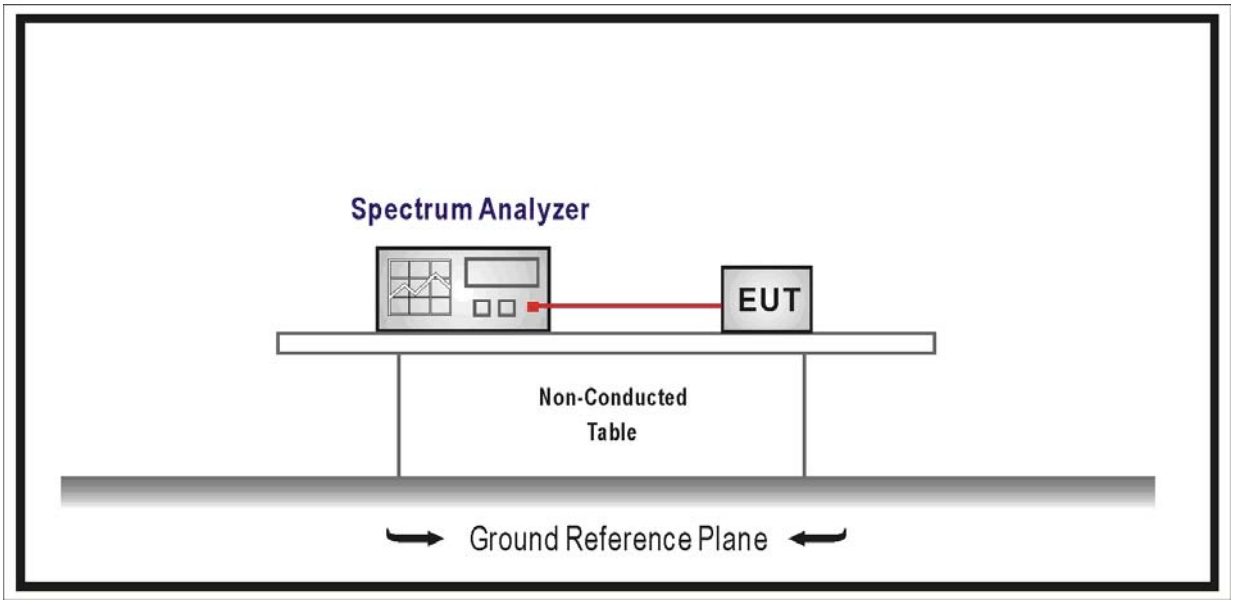
9. Spurious RF Conducted Emissions

9.1. Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date Due
Spectrum Analyzer	Agilent	E4407B	N/A	2016-07-17

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted 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, the attenuation required under this

paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

9.4. Test Procedure

According to ANSI C63.10: 2009

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10^{th} harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW ≧ RBW

Sweep = auto

Detector function = peak

Trace = max hold

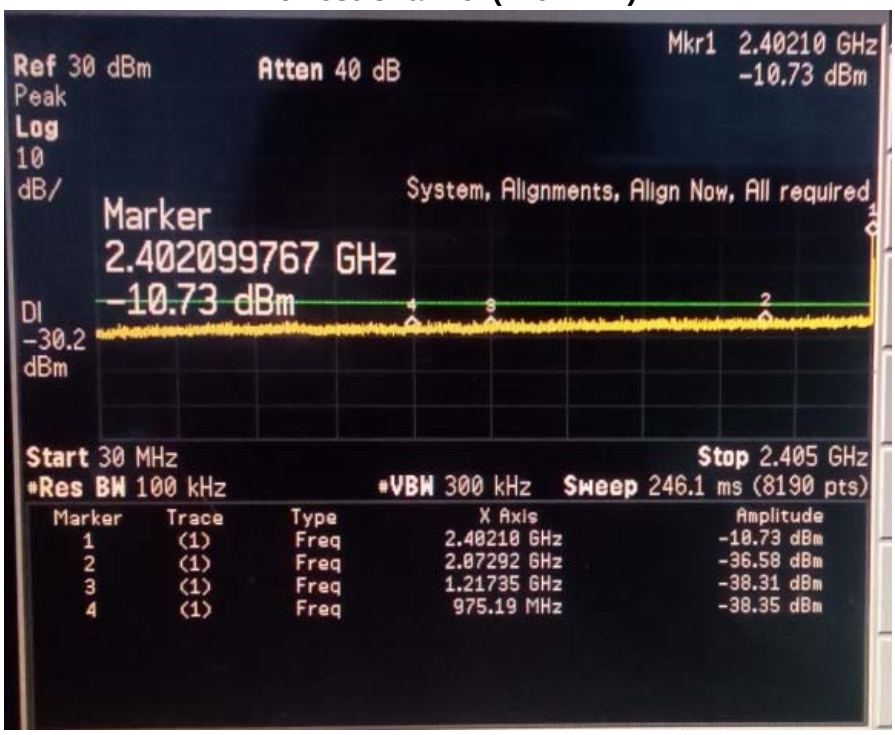
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

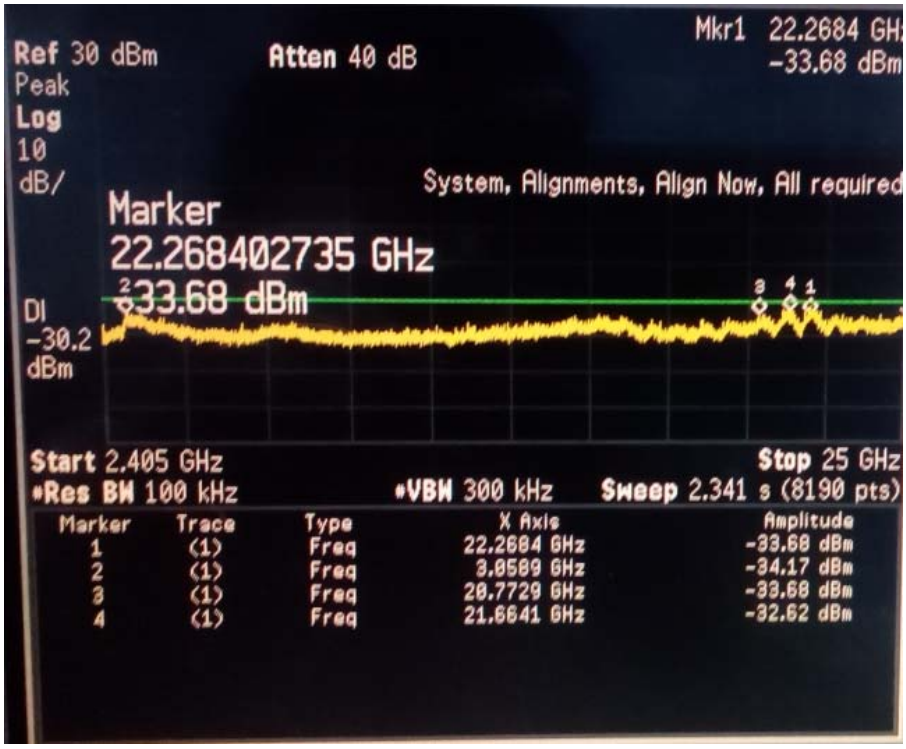
9.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

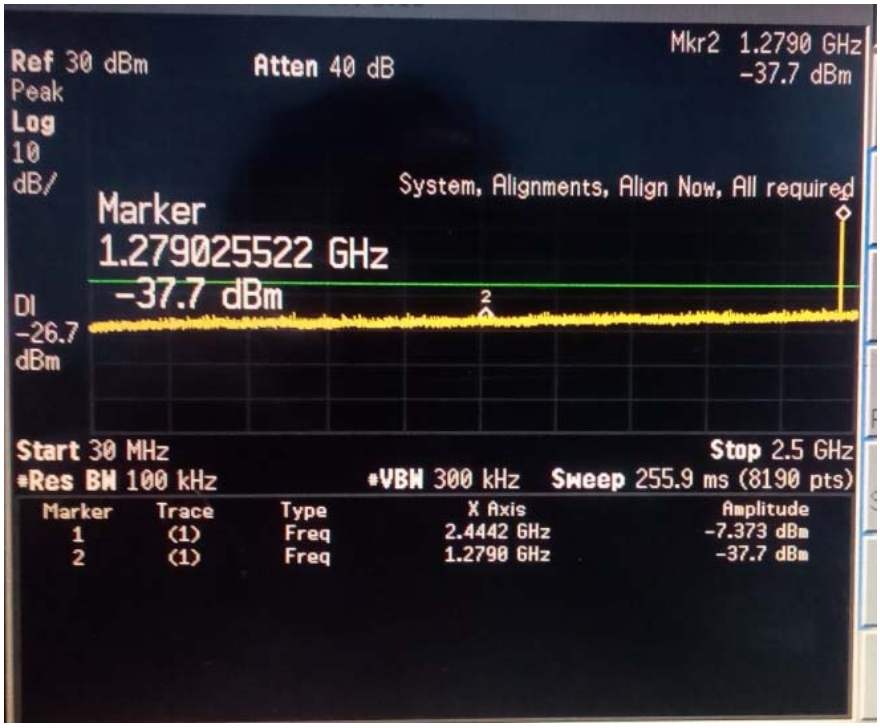
9.6. Test Result

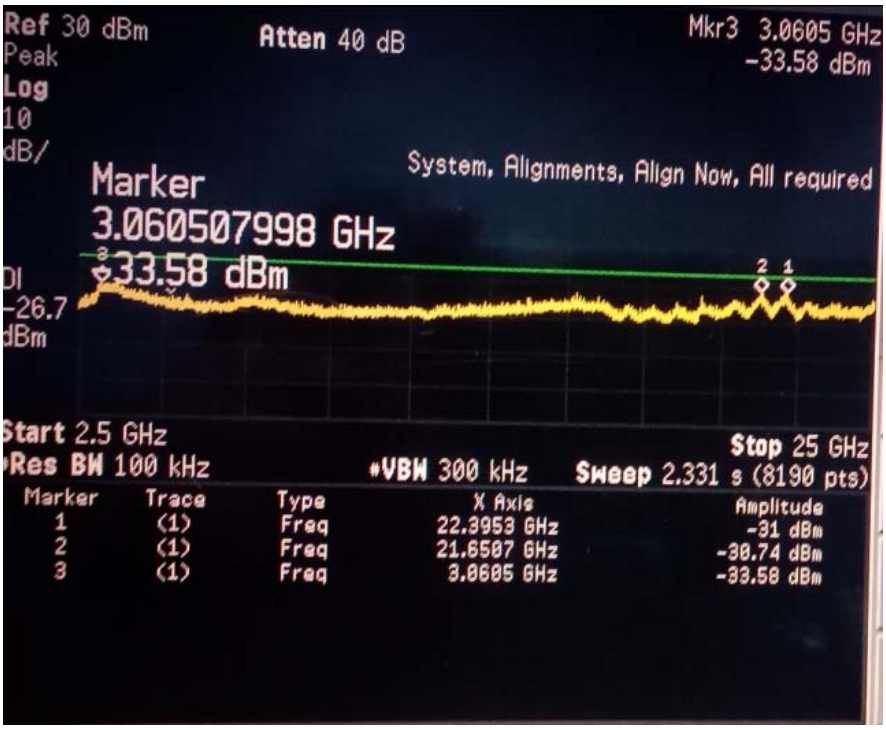
Lowest Channel (2402MHz)



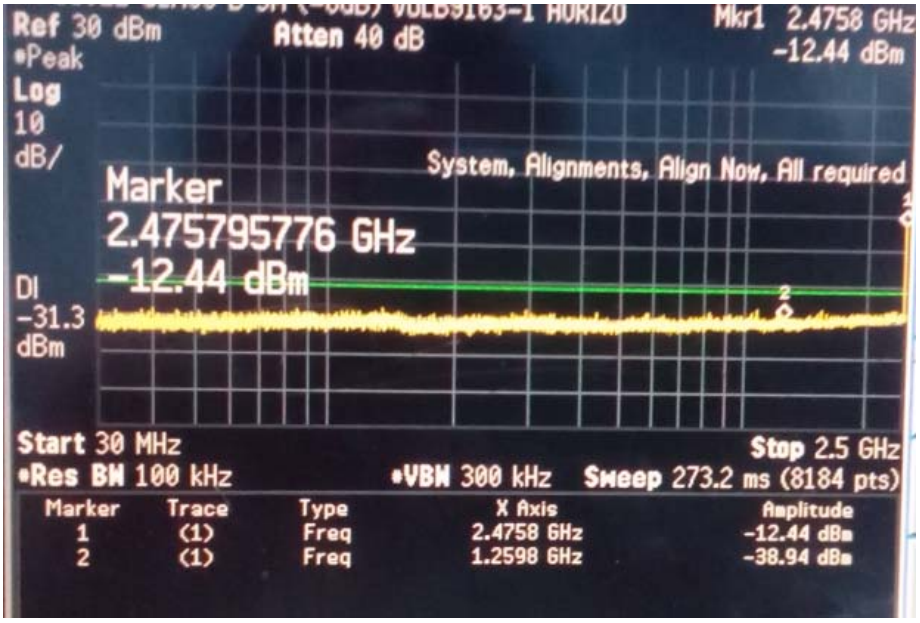


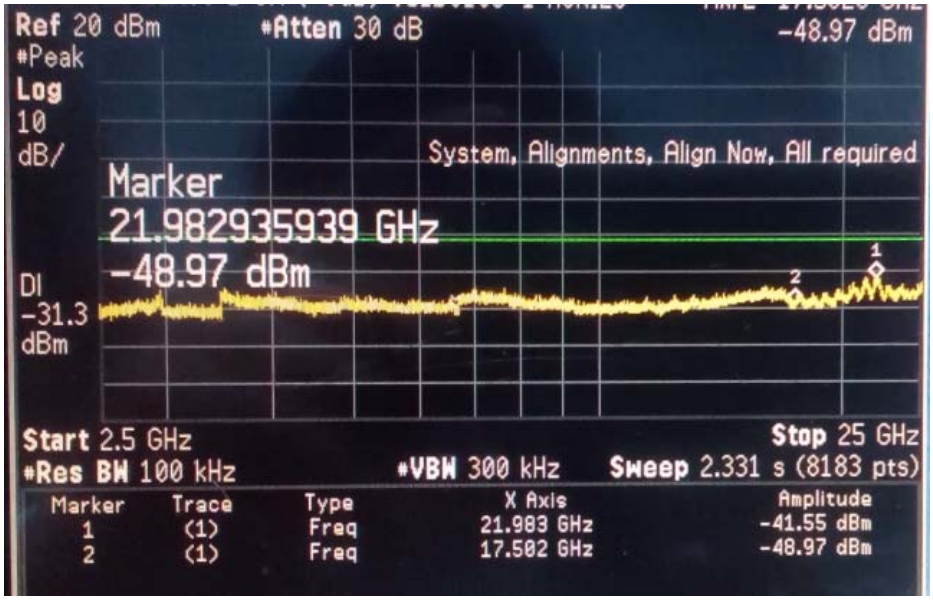
Middle Channel (2444MHz)





Highest Channel (2480MHz)





10. Antenna requirement

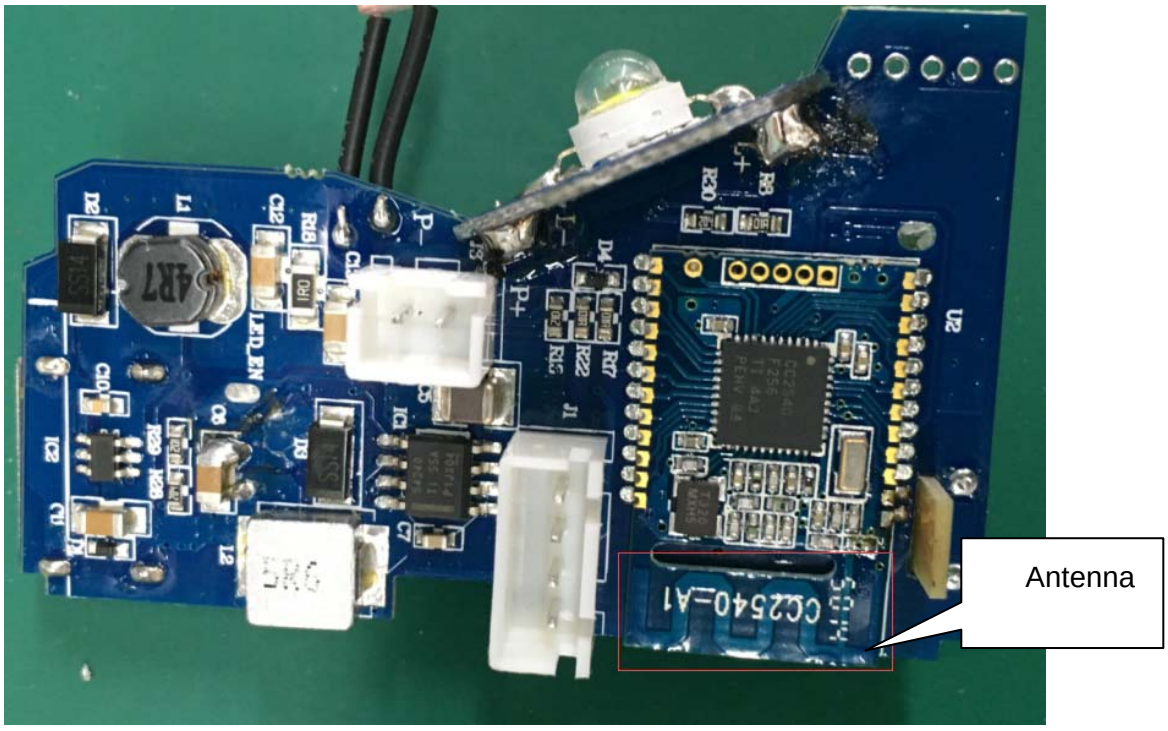
10.1 15.203 requirements:

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 an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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.

10.2 EUT Antenna

The Bluetooth antenna is an internal antenna which permanently attach, and the best case gain of the antenna is -0.61dBi

Antenna location:



Remark: For Test setup photo, appearance photo, internal photo, please refer appendix.