FCC Radio Test Report

FCC ID: 2AC23-WT39M2011T

FCC 47 CFR Part 15 Subpart C
RSS 247 Issue 1:2015

Product： WIFI+BT Module

Trade Name： GSD

Model Number： WT39M2011T

Firmware Version Identification Number (FVIN): 1.0

Issued for

Hui Zhou Gaoshengda Technology Co.,LTD

NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

Issued by

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TEST RESULT CERTIFICATION

Product	:	WIFI+BT Module
Applicant	:	Hui Zhou Gaoshengda Technology Co.,LTD
Address	:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Manufacturer	:	Hui Zhou Gaoshengda Technology Co.,LTD
Address	:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Model No.	:	WT39M2011T
Standards	:	FCC Part 15 Subpart C (15.247) RSS 247 Issue 1: 2015
Test Method	:	ANSI C63.10: 2014 KDB 558074 D01 DTS Meas Guidance v03r05

The above equipment has been tested by Shenzhen ATL Testing Technology Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test.....:

Date of receipt of test item 2016-10-24

Date(s) of performance of test ..... 2016-10-24 to 2016-11-28

Test Result.....: Pass

Testing by	:	Sifeifei	Date	:	2016-11-28
		(Si feifei)			
Check by	:	Xie Lingling	Date	:	2016-11-29
		(Xie Lingling)			
Approved by	:	Xu Peng	Date	:	2016-12-06
		(Xu Peng)			

Table of Contents **Page**

Table of Contents **Page**

1. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part 15 Subpart C (15.247)/RSS 247 Issue 1: 2015				
Standard Section		Test Item	Judgment	Remark
FCC	IC			
15.207	RSS Gen	AC Power Conducted Emission	PASS	
15.247(d)	RSS 247 Section 5.5	Antenna Conducted Spurious Emissions	PASS	
15.247(b)(3)	RSS 247 Section 5.4(4)	Output Power	PASS	
15.247(a)(2)	RSS 247 Section 5.2(1)	6dB RF Bandwidth	PASS	
15.247(e)	RSS 247 Section 5.2(2)	Power Spectral Density	PASS	
15.209/ 15.205	RSS 247 Section 5.5 RSS Gen	Transmitter Radiated Emissions	PASS	
15.203	/	Antenna Requirement	PASS	

NOTE:

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

(2)The test results of this report relate only to the tested sample(s) identified in this report.

1.1 TEST FACILITY

Shenzhen ATL Testing Technology Co., Ltd.
Add. : F/4, Building 10, Dayuan Industrial Zone, Xili Town, Nanshan District, Shenzhen, China

1.2 MEASUREMENT UNCERTAINTY

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

A. Conducted Emission :

The measurement uncertainty is evaluated as ± 3.2 dB.

B. Radiated Measurement :

The measurement uncertainty is evaluated as ± 3.7 dB.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	WIFI+BT Module
Model Name	WT39M2011T
Additional Model Number(s)	N/A
Model Difference	N/A
Frequency Range	2402~2480 MHz
Modulation Type	Bluetooth BLE: GFSK
Data Rate	Up to 3Mbps
RF Output Power	GFSK: 1.63 dBm
Antenna Type	FPC Antenna (Max. Gain: 3.96 dBi)
Power Source	DC Powered by host system.
Power Rating	DC 5V from USB interference.
Remark	More details EUT technical specifications, please refer to the User's Manual.

Note:

(1) This Test Report is FCC Part 15 Subpart C, 15.247 for Bluetooth BLE. And the Test procedure follows the FCC KDB 558074 D01 DTS Meas Guidance v03r05.

(2) More information about the Wifi, please refer to other test report.

(3) Transmitting mode with antennas

Mode	TX Antenna (s)
BLE	1

2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	BLE TX(GFSK) Mode

For Conducted Test	
Final Test Mode	Description
Mode 1	BLE TX(GFSK) Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	BLE TX(GFSK) Mode

Note:

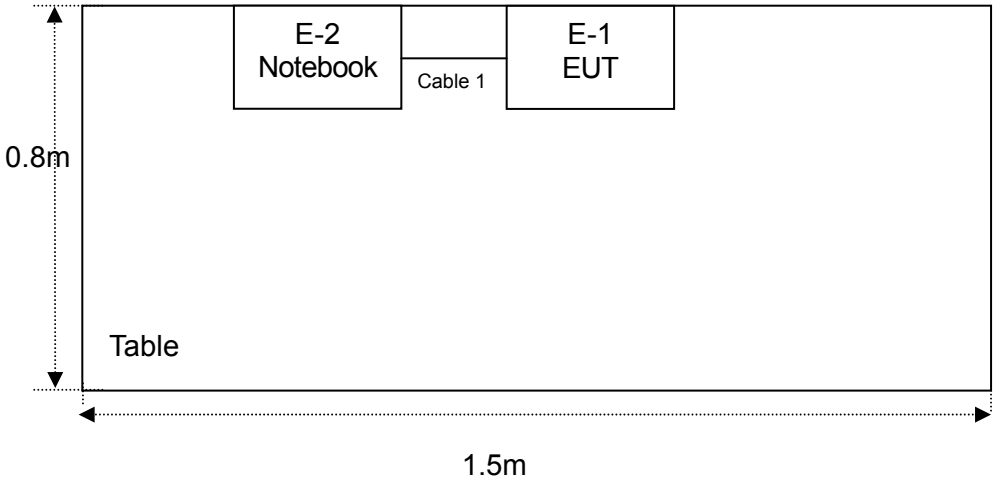
(1) Software used to control the EUT for staying in continuous transmitting mode was programmed. After verification, all tests were carried out with the worst case test modes as shown below.

(2) Bluetooth BLE Mode:
Channel (2402/2440/2480MHz) with GFSK modulation were chosen for full testing.

(3) By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

2.3 DESCRIPTION OF TEST SETUP

Radiated Emission



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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	WIFI+BT Module	GSD	WT39M2011T	N/A	EUT
E-2	Notebook	LENOVO	P405	DOC	

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	15cm	

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) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.5 EUT Exercise Software

Power Parameters for Testing			
Test Software Version	**Media Tek BT Tool.exe**		
Mode	**Frequency/ Parameters**		
BLE	**2402 MHz**	**2442 MHz**	**2480 MHz**
	DEF	**DEF**	**DEF**

3. CONDUCTED EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT (Frequency Range 150KHz-30MHz)

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

Note:

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

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

The following table is the setting of the receiver

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

3.2 TEST PROCEDURE

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

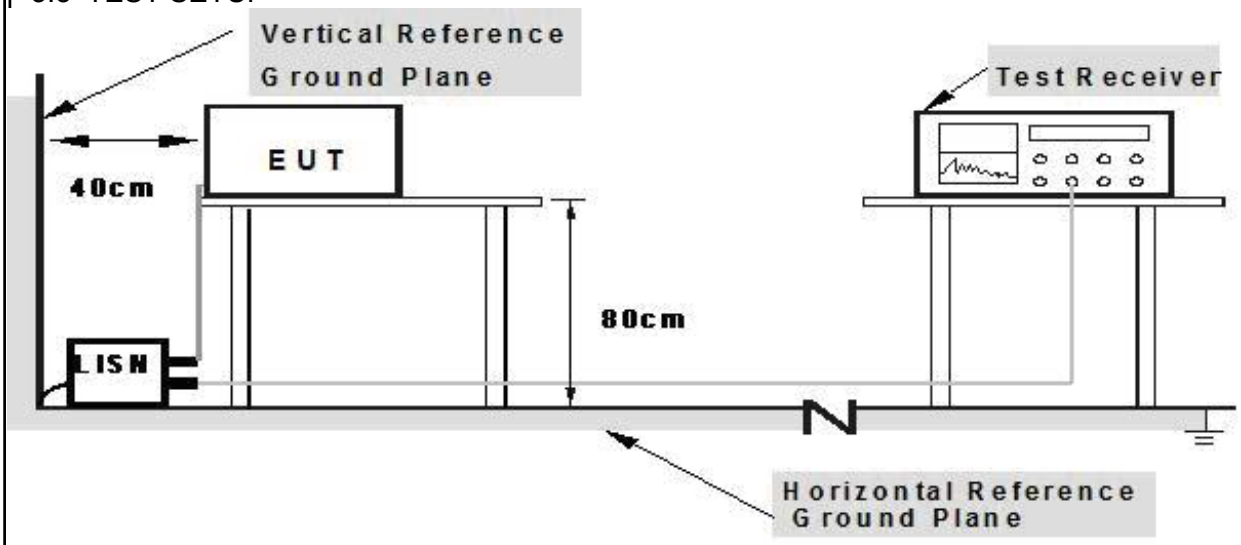
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

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

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

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

3.3 TEST SETUP



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

3.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
LISN	R&S	NSLK81	8126466	Jul. 04. 2016	Jul. 03. 2017	1 year
LISN	R&S	NSLK81	8126487	Dec. 23, 2015	Dec. 22, 2016	1 year
50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 04. 2016	Jul. 03. 2017	1 year
Test Cable	N/A	C01	N/A	Jul. 04. 2016	Jul. 03. 2017	1 year
Test Cable	N/A	C02	N/A	Jul. 04. 2016	Jul. 03. 2017	1 year
Test Cable	N/A	C03	N/A	Jul. 04. 2016	Jul. 03. 2017	1 year
EMI Test Receiver	R&S	ESCI	1166.595	Jul. 04. 2016	Jul. 03. 2017	1 year
Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 04. 2016	Jul. 03. 2017	1 year

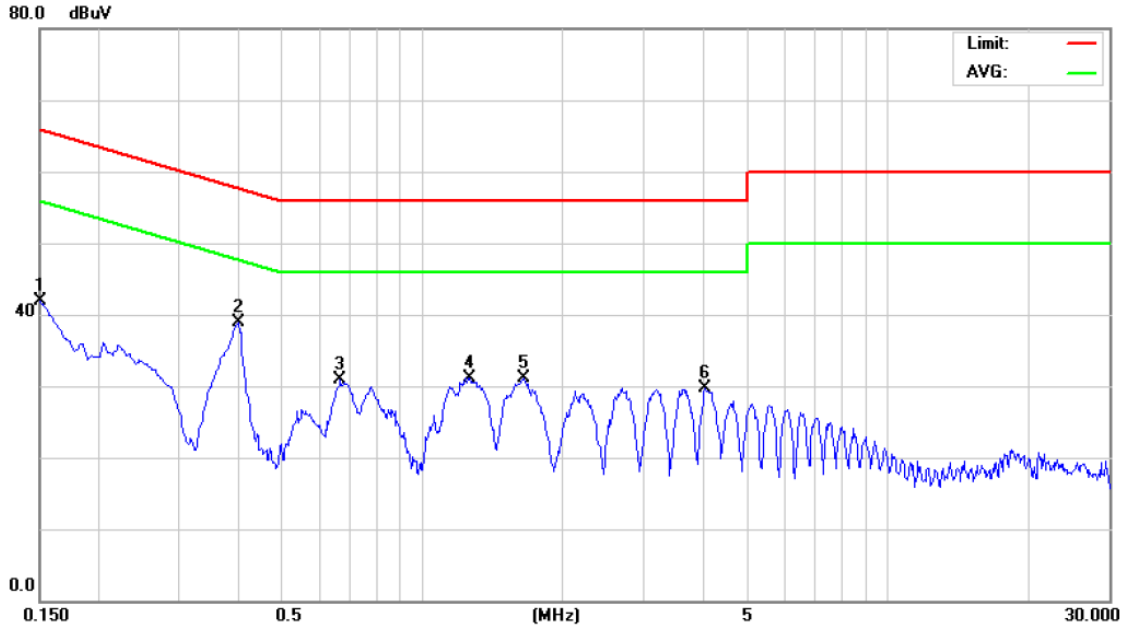
3.5 EUT OPERATING CONDITIONS

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

3.6 TEST RESULTS

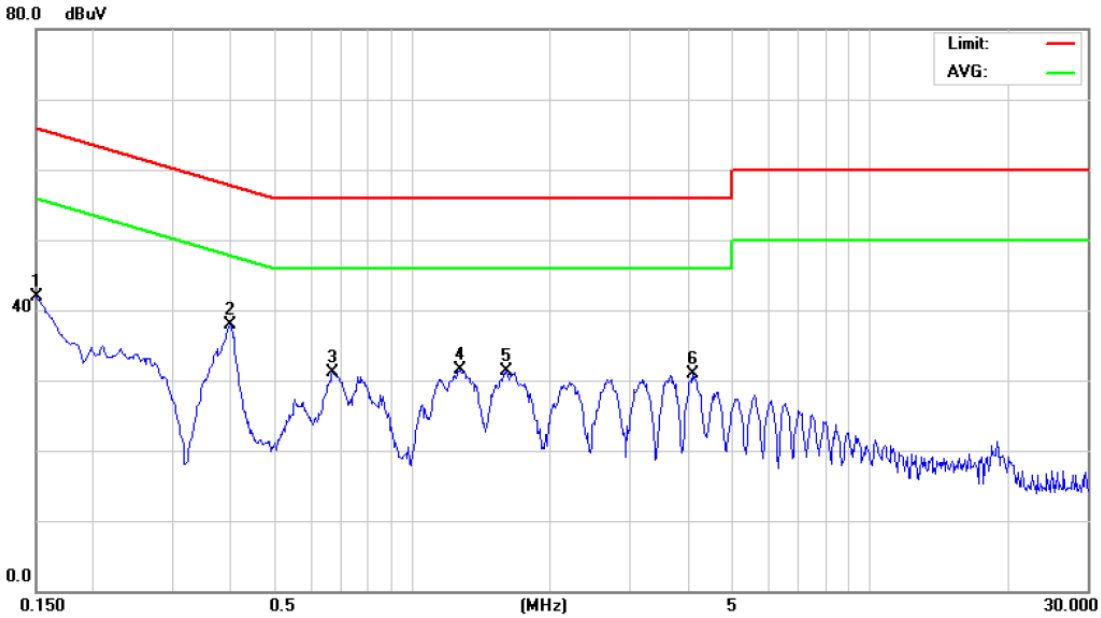
EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Terminal:	Line
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	120V/ 60Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	31.91	9.92	41.83	66.00	-24.17	peak
2	*	0.4020	28.81	10.02	38.83	57.81	-18.98	peak
3		0.6660	20.88	10.10	30.98	56.00	-25.02	peak
4		1.2660	21.08	10.06	31.14	56.00	-24.86	peak
5		1.6580	21.01	10.06	31.07	56.00	-24.93	peak
6		4.0660	19.72	9.99	29.71	56.00	-26.29	peak



EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Terminal:	Neutral
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	120V/ 60Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	31.69	10.12	41.81	66.00	-24.19	peak	
2	*	0.3980	27.79	10.05	37.84	57.90	-20.06	peak	
3		0.6700	21.02	10.02	31.04	56.00	-24.96	peak	
4		1.2700	21.32	10.13	31.45	56.00	-24.55	peak	
5		1.6060	21.15	10.10	31.25	56.00	-24.75	peak	
6		4.0940	20.84	10.06	30.90	56.00	-25.10	peak	



4. RADIATED EMISSION MEASUREMENT

4.1 RADIATED EMISSION LIMIT (Frequency Range 9KHz-1000MHz)

20 dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and RSS-210 Section 2.2&A8.5, then the 15.209(a) and RSS-General limit in the table below has to be followed.

FREQUENCY (MHz)	Field Strength (uV/m at 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

RADIATED EMISSION LIMITS (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m)(at 3 M)		Class B (dBuV/m)(at 3 M)	
	Peak	Average		Peak
Above 1000	80	60	74	54

Note:

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

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

(2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

The following table is the setting of the receiver

Receiver Parameter	Setting
Attenuation	Auto
Start Frequency~ Stop Frequency	9kHz~150kHz/ RB 200Hz for QP
Start Frequency~ Stop Frequency	150kHz~30MHz/ RB 9kHz for QP
Start Frequency~ Stop Frequency	30MHz~1000MHz/ RB120kHz for QP

The following table is the setting of the spectrum

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10^{th} carrier harmonic
RB/ VB (emission in restricted band)	1MHz/ 3 MHz for Peak, 1MHz/ 10Hz for Average

4.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

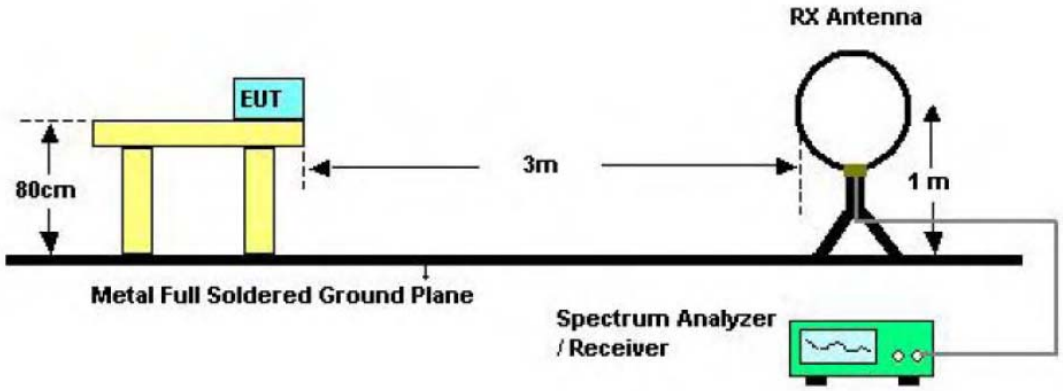
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The height of the equipment or of the substitution antenna shall be 1.5 m; 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.
d. 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, above 1G Average detector mode will be instead.
e. 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.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

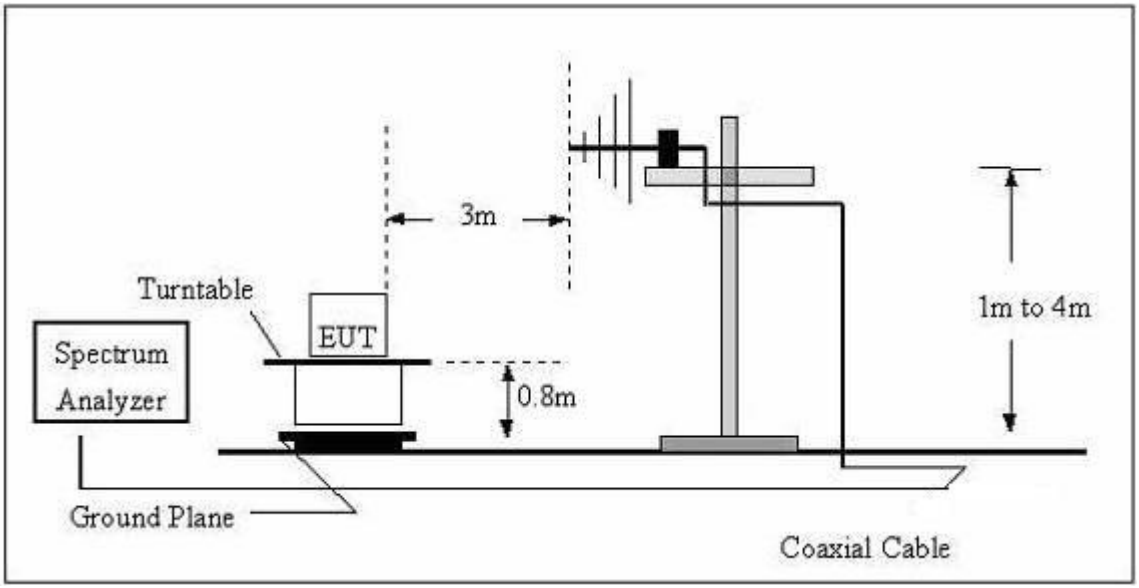
Note:
Both horizontal and vertical antenna polarities were tested.
And performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

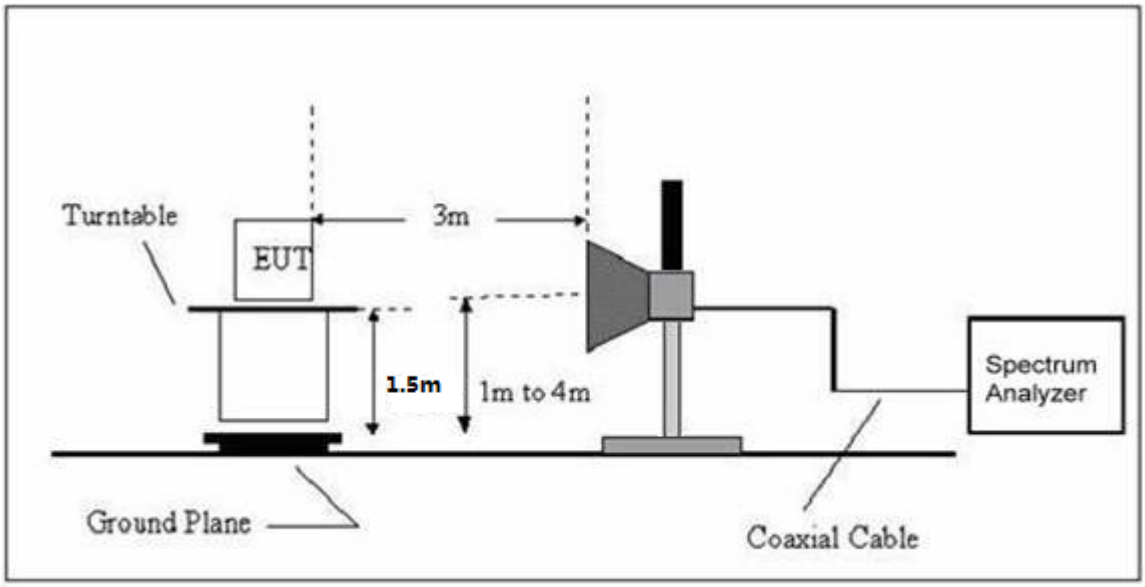
(A) Radiated Emission Test Set-Up Frequency Below 30MHz



(B) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



4.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Broadband Antenna	R&S	VULB 9168	VULB 9168-456	Jul. 04. 2016	Jul. 03. 2017	1 year
Test Cable	N/A	R-01	N/A	Dec. 23, 2015	Dec. 22, 2016	1 year
Test Cable	N/A	R-02	N/A	Dec. 23, 2015	Dec. 22, 2016	1 year
EMI Test Receiver	R&S	ESCI	101324	Jul. 04. 2016	Jul. 03. 2017	1 year
Antenna Mast	EM	SC100_1	N/A	N/A	N/A	N/A
Turn Table	EM	SC100	060531	N/A	N/A	N/A
50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 04. 2016	Jul. 03. 2017	1 year
Spectrum Analyzer	R&S	FSP40	100154	Jul. 04. 2016	Jul. 03. 2017	1 year
Horn Antenna	R&S	HF906	10029	Jul. 04. 2016	Jul. 03. 2017	1 year
Amplifier	EM	EM-30180	060538	Jul. 04. 2016	Jul. 03. 2017	1 year

4.5 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.

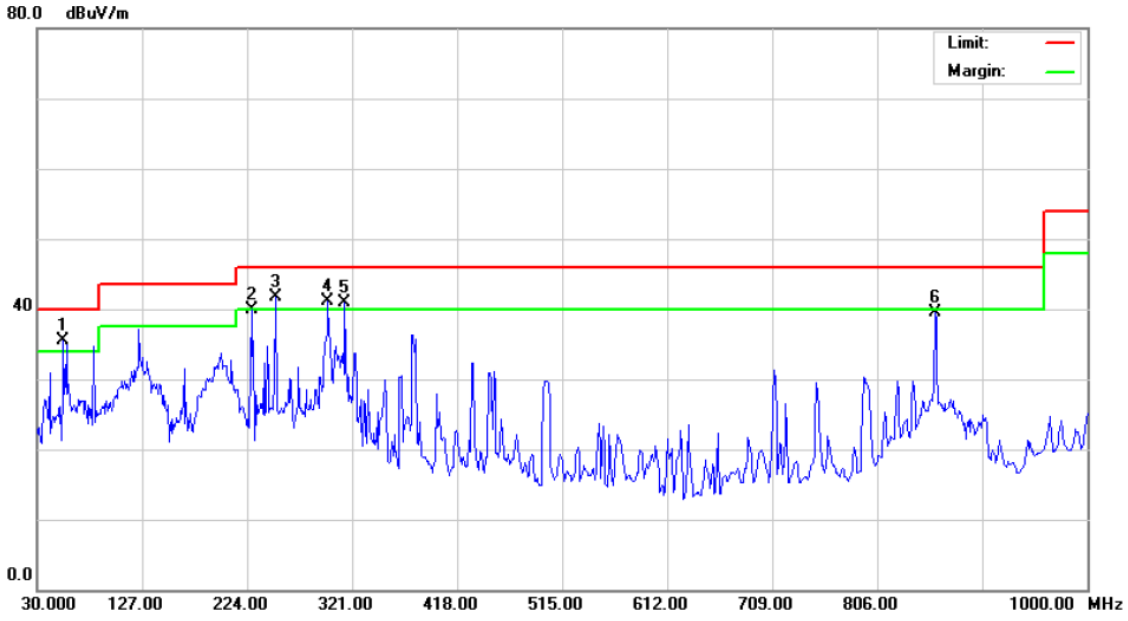
4.6 TEST RESULTS

4.6.1 TEST RESULTS (Bellow 1GHz)

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Horizontal
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	!	54.8348	56.31	-20.90	35.41	40.00	-4.59	peak
2		228.4901	58.63	-18.78	39.85	46.00	-6.15	peak
3	*	250.3010	60.19	-18.40	41.79	46.00	-4.21	peak
4	!	299.3158	57.84	-16.73	41.11	46.00	-4.89	peak
5	!	314.3765	57.38	-16.57	40.81	46.00	-5.19	peak
6		860.0352	50.63	-11.19	39.44	46.00	-6.56	peak

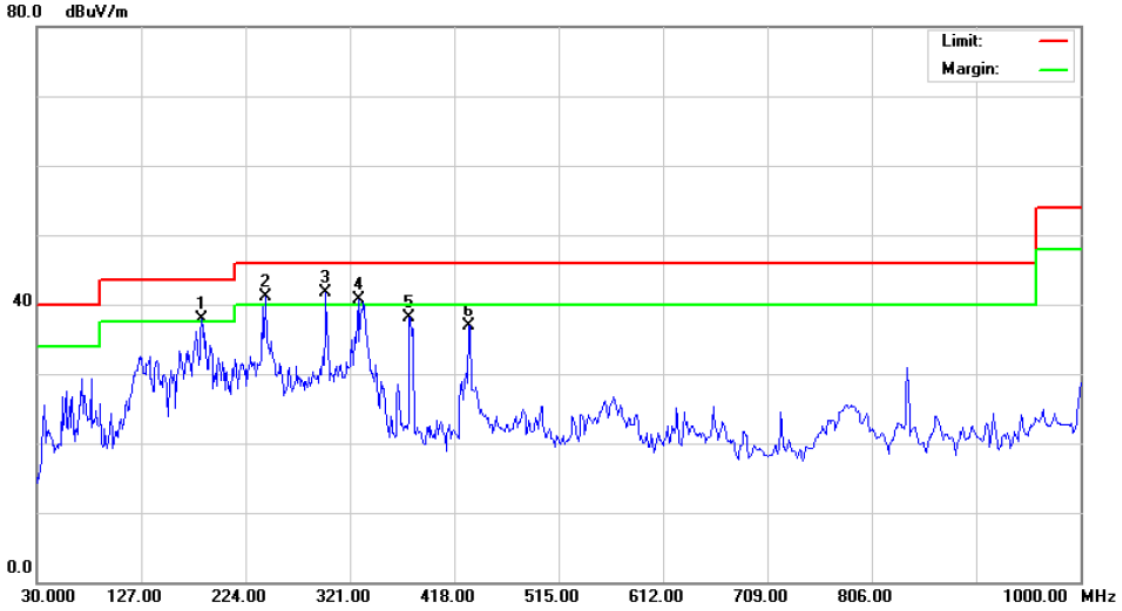
Remark:
Factor = Antenna Factor + Cable Loss.



EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Vertical
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	!	183.8440	56.83	-19.00	37.83	43.50	-5.67	peak
2	!	243.3771	59.72	-18.56	41.16	46.00	-4.84	peak
3	*	299.3158	58.43	-16.73	41.70	46.00	-4.30	peak
4	!	329.0390	57.04	-16.39	40.65	46.00	-5.35	peak
5		377.2590	54.09	-15.92	38.17	46.00	-7.83	peak
6		432.5457	52.28	-15.28	37.00	46.00	-9.00	peak

Remark:
Factor = Antenna Factor + Cable Loss.



4.6.2 TEST RESULTS (Above 1GHz)

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Horizontal
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	46.79	0.77	47.56	74.00	-26.44	peak	
2		2390.000	36.01	0.77	36.78	54.00	-17.22	AVG	
3	*	2402.010	97.06	0.82	97.88	54.00	43.88	AVG	FUNDAMENTAL FREQUENCY
4	X	2402.100	98.21	0.82	99.03	74.00	25.03	peak	FUNDAMENTAL FREQUENCY

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4804.021	33.31	13.44	46.75	54.00	-7.25	AVG	
2		4804.100	40.64	13.44	54.08	74.00	-19.92	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Vertical
Test Mode：	BLE TX Mode (2402MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	46.20	0.77	46.97	74.00	-27.03	peak	
2		2390.000	35.83	0.77	36.60	54.00	-17.40	AVG	
3	*	2402.010	94.34	0.82	95.16	54.00	41.16	AVG	FUNDAMENTAL FREQUENCY
4	X	2402.100	95.81	0.82	96.63	74.00	22.63	peak	FUNDAMENTAL FREQUENCY

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4804.034	30.95	13.44	44.39	54.00	-9.61	AVG	
2		4804.112	39.34	13.44	52.78	74.00	-21.22	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Horizontal
Test Mode：	BLE TX Mode (2442MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4884.063	32.88	13.92	46.80	54.00	-7.20	AVG	
2		4884.085	40.25	13.92	54.17	74.00	-19.83	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Vertical
Test Mode：	BLE TX Mode (2442MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4884.056	30.65	13.92	44.57	54.00	-9.43	AVG	
2		4884.089	39.16	13.92	53.08	74.00	-20.92	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Horizontal
Test Mode：	BLE TX Mode (2480MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2479.800	95.74	1.15	96.89	54.00	42.89	AVG	FUNDAMENTAL FREQUENCY
2	X	2479.980	97.60	1.15	98.75	74.00	24.75	peak	FUNDAMENTAL FREQUENCY
3		2483.500	59.61	1.17	60.78	74.00	-13.22	peak	
4		2483.500	49.29	1.17	50.46	54.00	-3.54	AVG	

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4960.065	32.51	14.36	46.87	54.00	-7.13	AVG	
2		4960.102	39.96	14.36	54.32	74.00	-19.68	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

EUT：	WIFI+BT Module	Model Name. ：	WT39M2011T
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Ant. Pol.:	Vertical
Test Mode：	BLE TX Mode (2480MHz)		
Test Voltage ：	DC 5V		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2480.000	95.74	1.15	96.89	74.00	22.89	peak	FUNDAMENTAL FREQUENCY
2	*	2480.000	94.20	1.15	95.35	54.00	41.35	AVG	FUNDAMENTAL FREQUENCY
3		2483.500	57.61	1.17	58.78	74.00	-15.22	peak	
4		2483.500	46.91	1.17	48.08	74.00	-25.92	peak	

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4960.059	29.81	14.36	44.17	54.00	-9.83	AVG	
2		4960.087	38.62	14.36	52.98	74.00	-21.02	peak	

Remark:
Factor = Antenna Factor + Cable Loss.

5. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

5.1 LIMITS

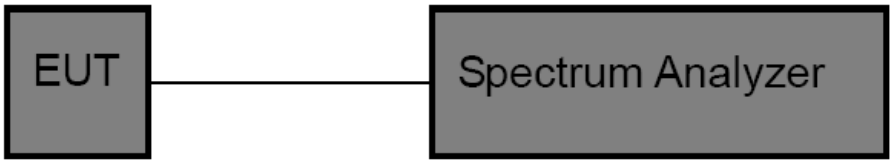
FCC Part 15.247, subpart C/ RSS 247 Section 5.4(4)	
Frequency Range (MHz)	2400~2483.5
Limits	30

5.2 TEST PROCEDURE

The measurement is according to section 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance v03r02.

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

5.3 TEST SETUP



5.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 04. 2016	Jul. 03. 2017	1 year

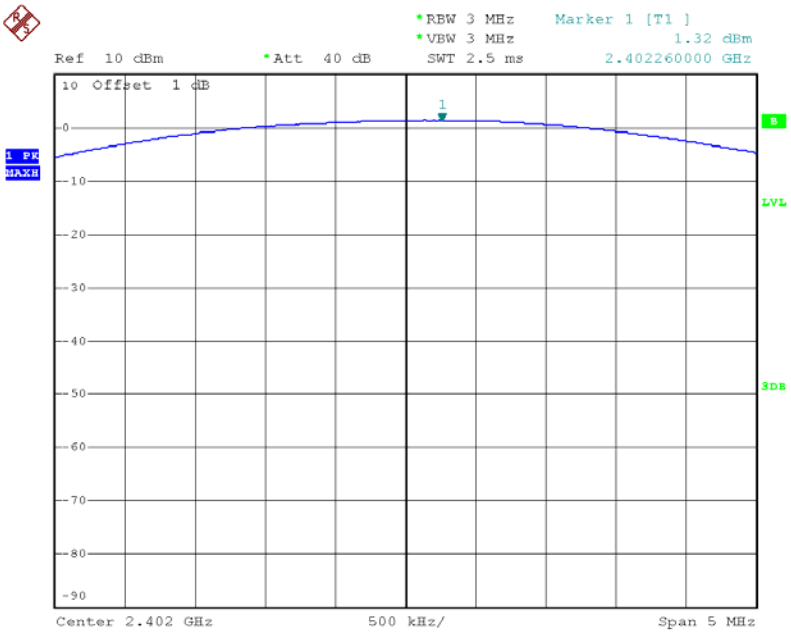
5.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

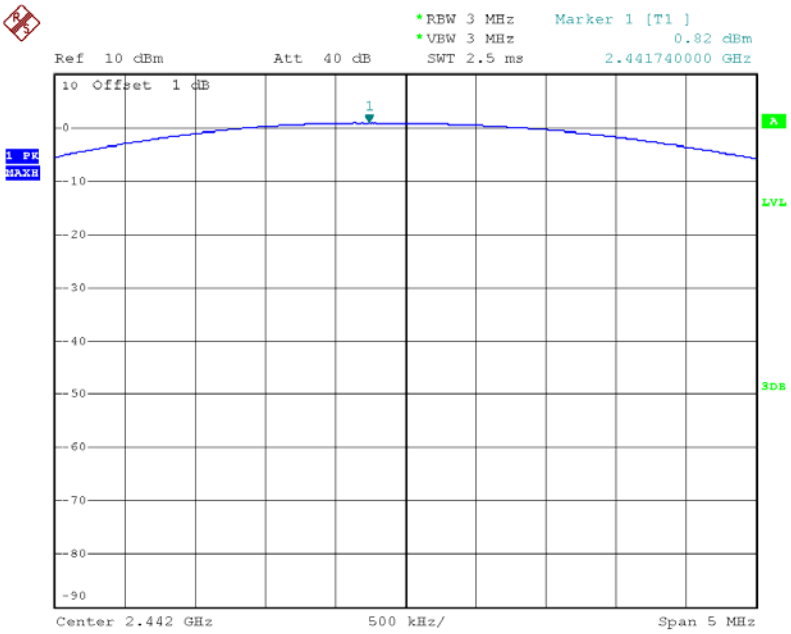
5.6 TEST RESULTS

Bluetooth BLE Mode			
GFSK			
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)
01	2402 MHz	1.32	30
19	2440 MHz	0.82	
40	2480 MHz	1.60	

BLE Mode 2402 MHz

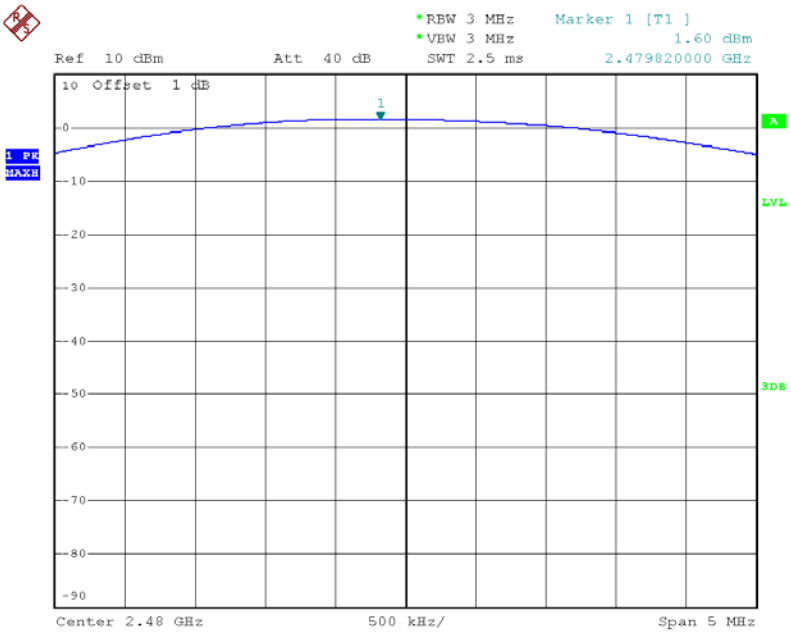


BLE Mode 2442 MHz



Date: 12.NOV.2016 18:29:36

BLE Mode 2480 MHz



Date: 12.NOV.2016 18:29:15

6. OCCUPIED BANDWIDTH MEASUREMENT

6.1 LIMITS

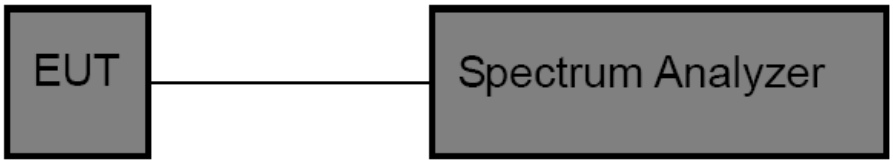
FCC Part 15.247, subpart C/ RSS 247 Section 5.2(1)	
Frequency Range (MHz)	2400~2483.5
Limits	6 dB Bandwidth>500 KHz

6.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Spectrum Parameters	Setting
Attenuation	Auto
Span	>6 dB Bandwidth
RBW	100 kHz
VBW	≥3RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3 TEST SETUP



6.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 04. 2016	Jul. 03. 2017	1 year

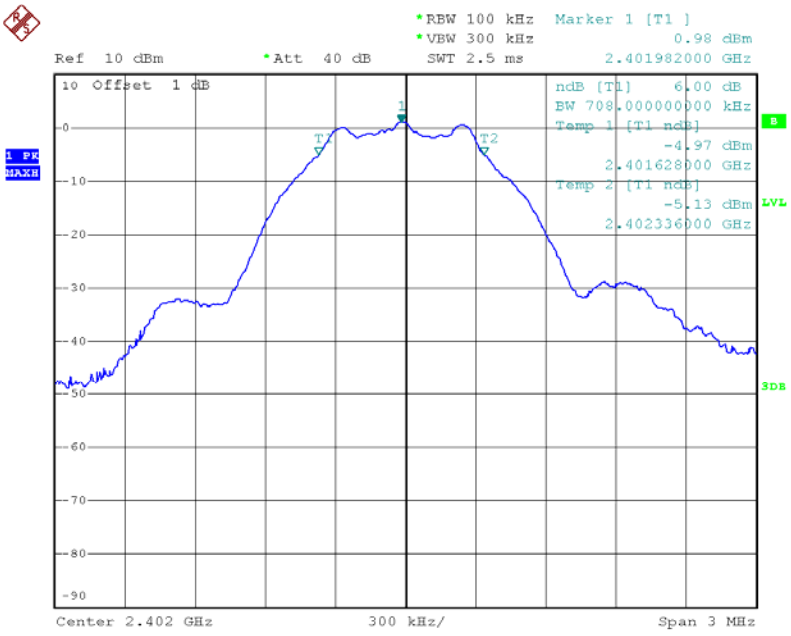
6.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

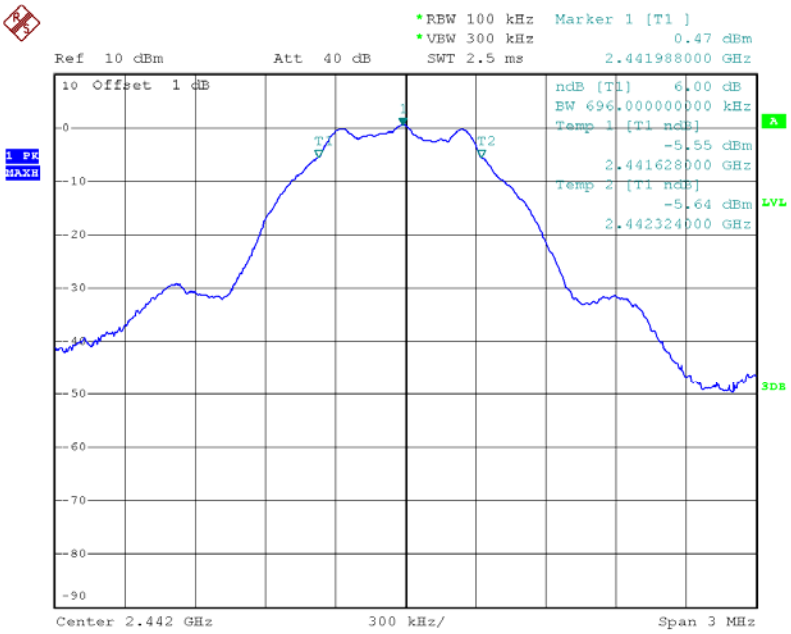
6.6 TEST RESULTS

Bluetooth BLE Mode			
Frequency (MHz)	**6dB Bandwidth (kHz)**	**99% OBW (MHz)**	**Limit**
2402	708.00	N/A	>=500 kHz
2440	696.00	N/A	
2480	696.00	N/A	

BLE Mode 2402 MHz

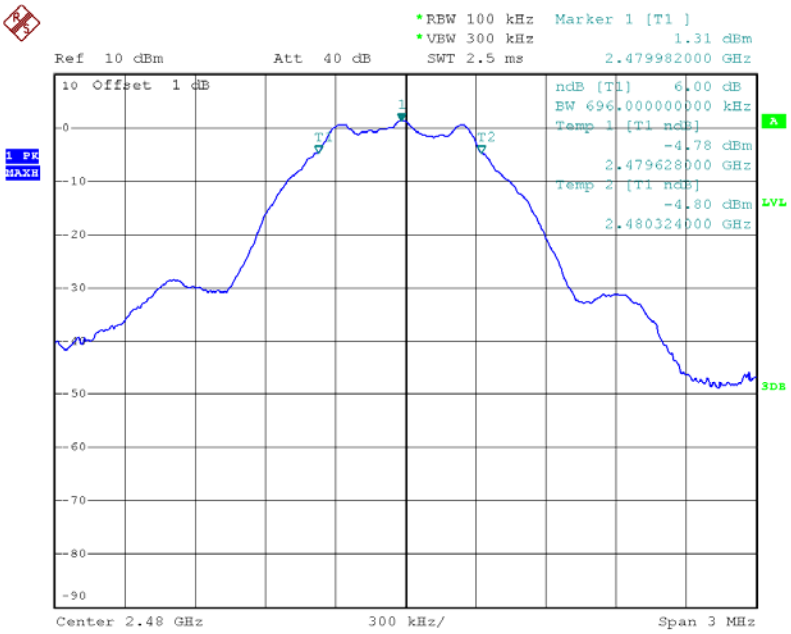


BLE Mode 2442 MHz



Date: 12.NOV.2016 18:30:45

BLE Mode 2480 MHz



Date: 12.NOV.2016 18:31:58

7. POWER SPECTRAL DENSITY

7.1 LIMITS

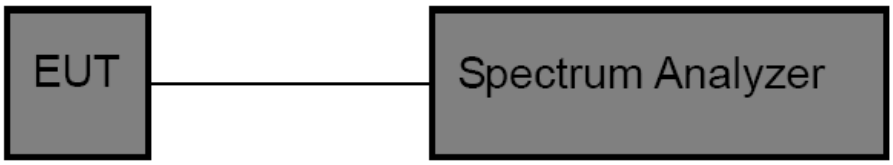
FCC Part 15.247, Subpart C/ RSS 247 Section 5.2(2)	
Frequency Range (MHz)	2400~2483.5
99% Occupied Bandwidth	8 dBm in any 3 kHz

7.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Spectrum Parameters	Setting
Attenuation	Auto
Span	Set the span to 1.5 times the DTS channel bandwidth
RBW	3 kHz
VBW	≥3RBW
Detector	Reak
Trace	Max Hold
Sweep Time	Auto

7.3 TEST SETUP



7.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 04. 2016	Jul. 03. 2017	1 year

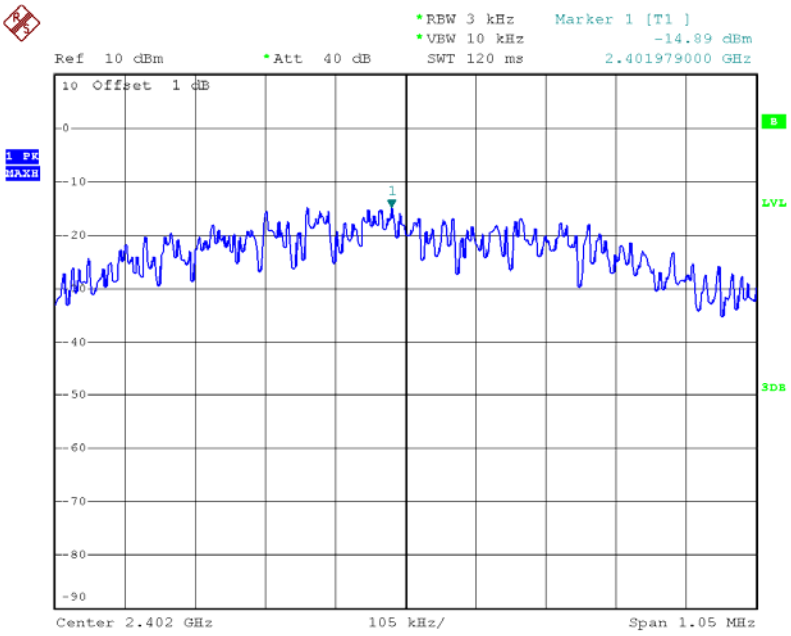
7.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

7.6 TEST RESULTS

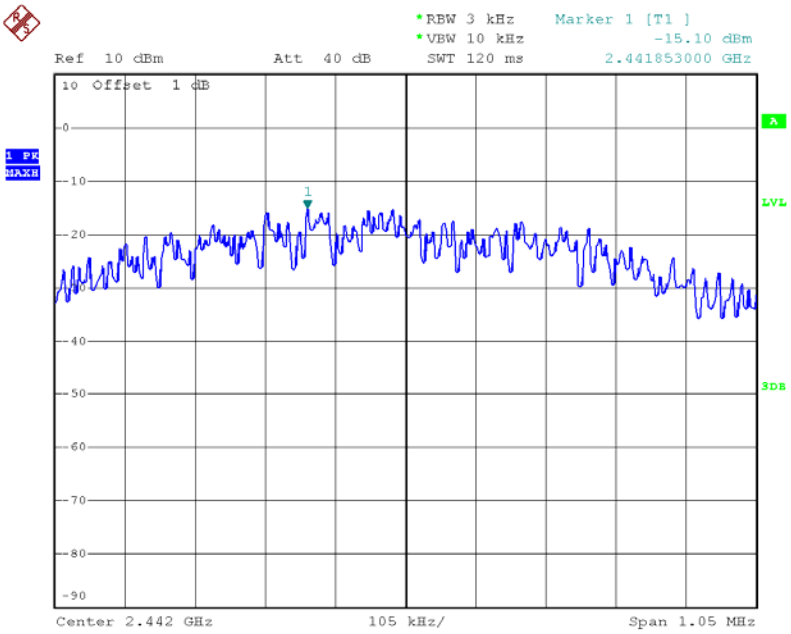
Bluetooth BLE Mode			
Frequency (MHz)	**Power Density (3 kHz/dBm)**	**Limit (dBm/3KHz)**	**Result**
2402	**-14.89**	**8**	**Pass**
2440	**-15.10**		
2480	**-14.39**		

BLE Mode 2402 MHz



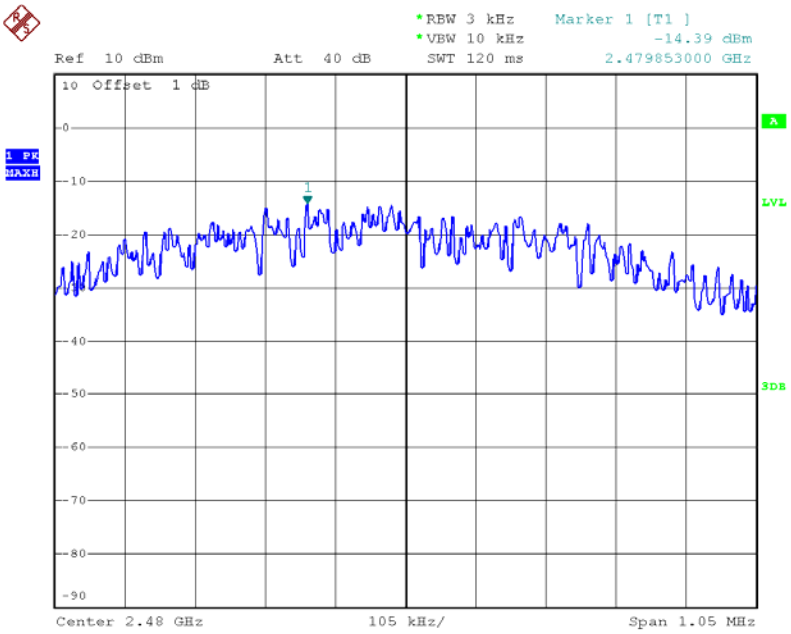
Date: 12.NOV.2016 18:41:32

BLE Mode 2442 MHz



Date: 12.NOV.2016 18:33:18

BLE Mode 2480 MHz



Date: 12.NOV.2016 18:32:54

8. ANTENNA CONDUCTED SPURIOUS EMISSION

8.1 LIMITS

FCC Part 15.247, Subpart C/ RSS 247 Section 5.5	
Frequency Range (MHz)	2400~2483.5
Limit	In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the desired power, based on either an RF conducted measurement, provide the transmitter demonstrates compliance with the peak conducted power limits.

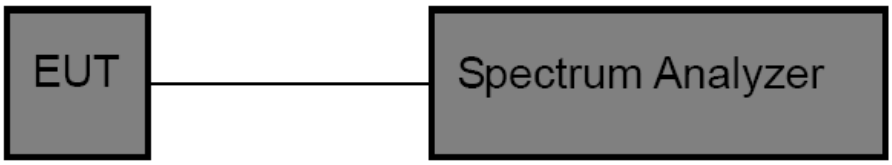
8.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

a. Set frequency range to capture low band-edge from 2310 MHz up to 2390 MHz, and for up band-edge from 2483.5 MHz up to 2500 MHz
b. For low band-edge set the equipment transmit at the lowest channel, and for up band-edge set the equipment transmit at the highest channel
c. Set the VBW≥3 RBW (100kHz/ 300kHz) for conducted measurement
d. For radiated measurements the RBW set to 1 MHz, and the VBW set to 1 MHz for peak measurements and 10 Hz for average measurement

8.3 TEST SETUP

Conducted Emission Test Setup



8.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 04. 2016	Jul. 03. 2017	1 year

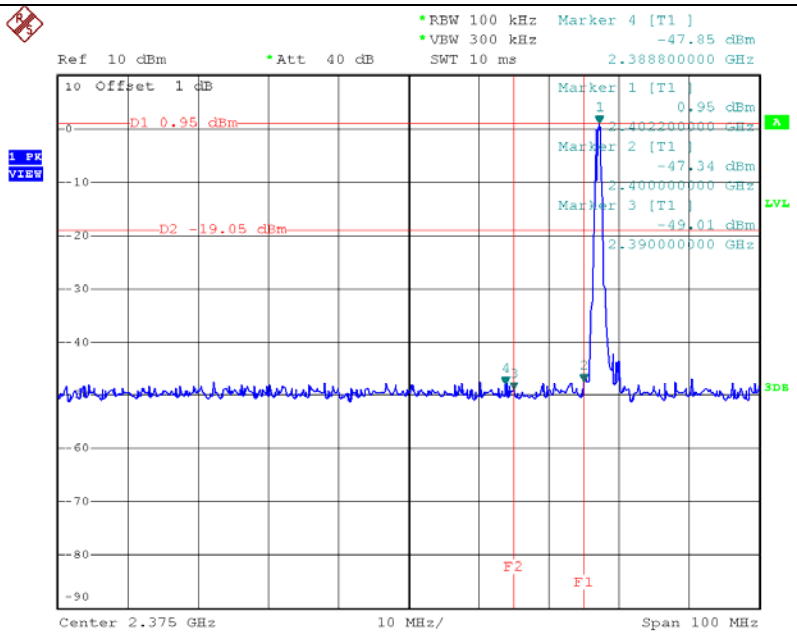
8.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

8.6 TEST RESULTS

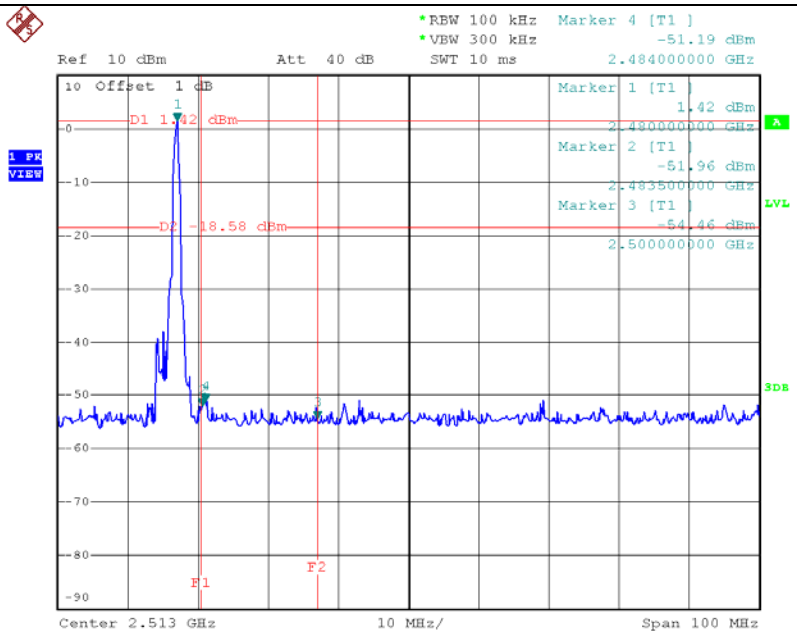
Only showed the worst mode data of ANT 0 transmitting.

BLE Mode Low CH



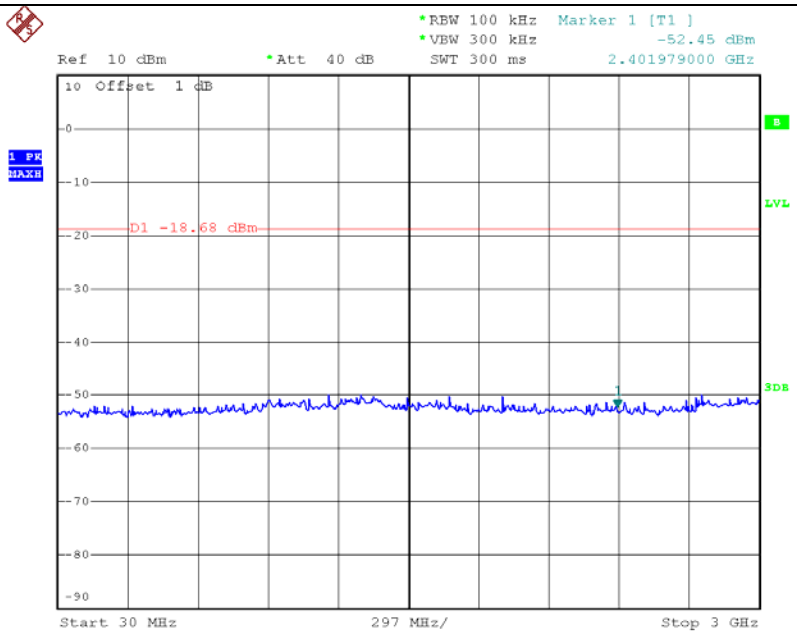
Date: 12.NOV.2016 18:39:57

BLE Mode High CH



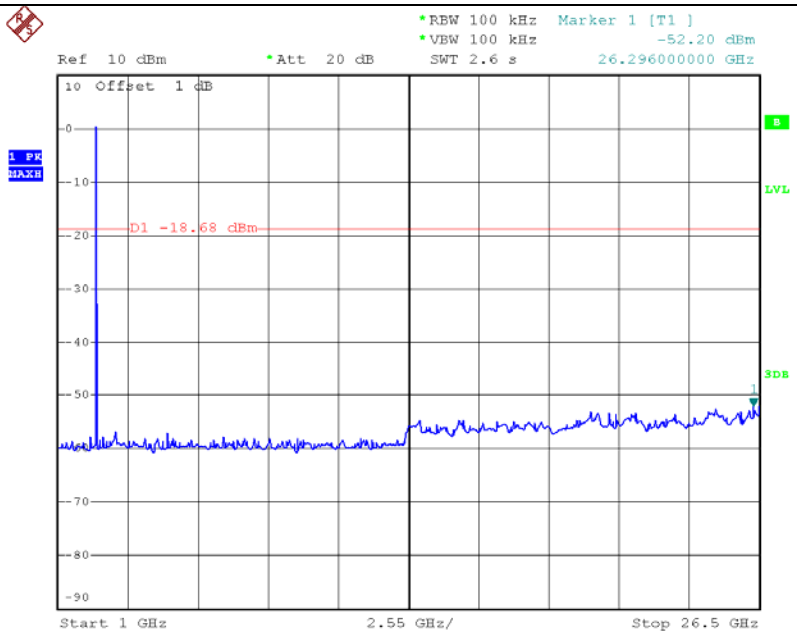
Date: 12.NOV.2016 18:34:51

BLE Mode 2402 MHz Below 1 GHz



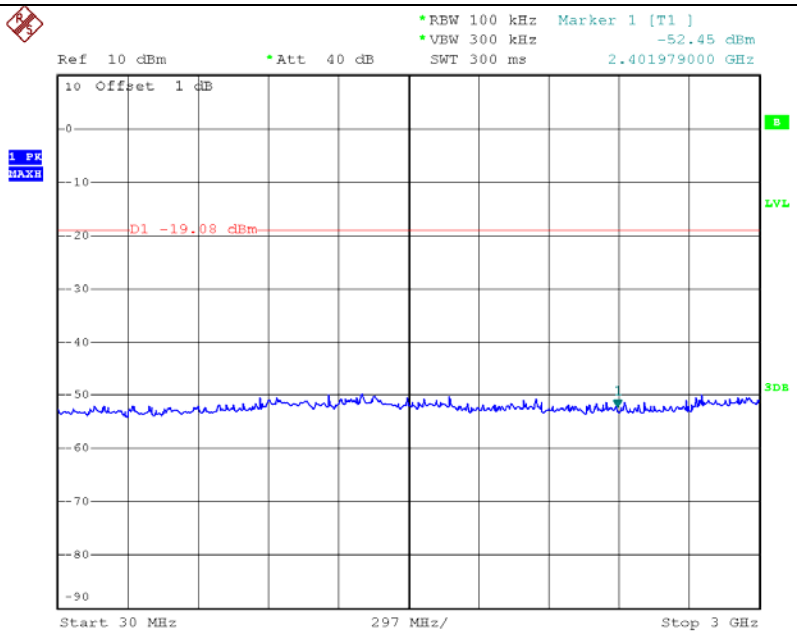
Date: 12.NOV.2016 18:44:58

BLE Mode 2402 MHz Above 1 GHz



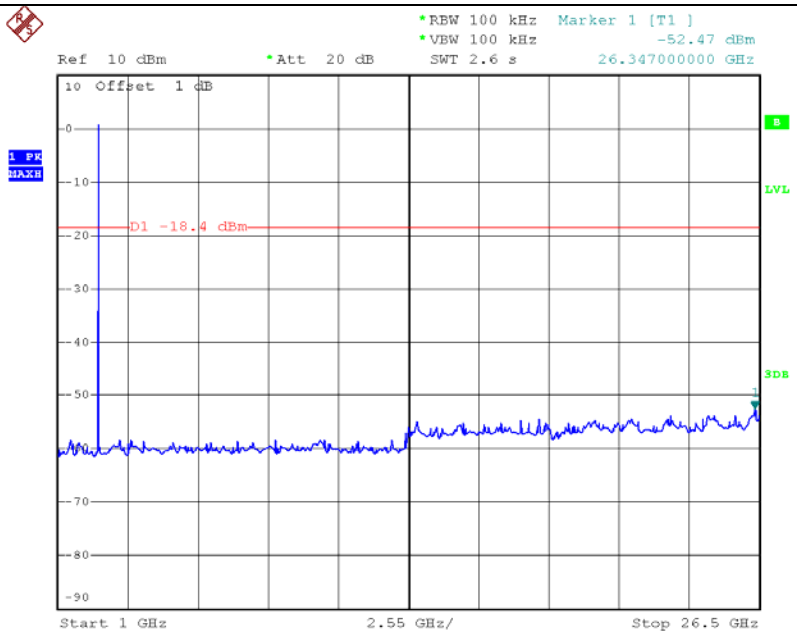
Date: 12.NOV.2016 19:30:29

BLE Mode 2442 MHz Below 1 GHz



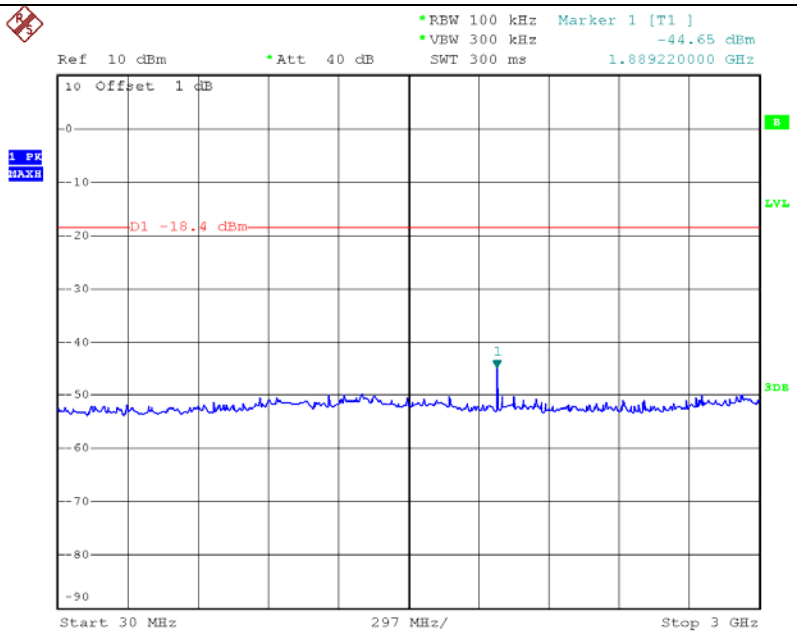
Date: 12.NOV.2016 18:45:24

BLE Mode 2442 MHz Above 1 GHz



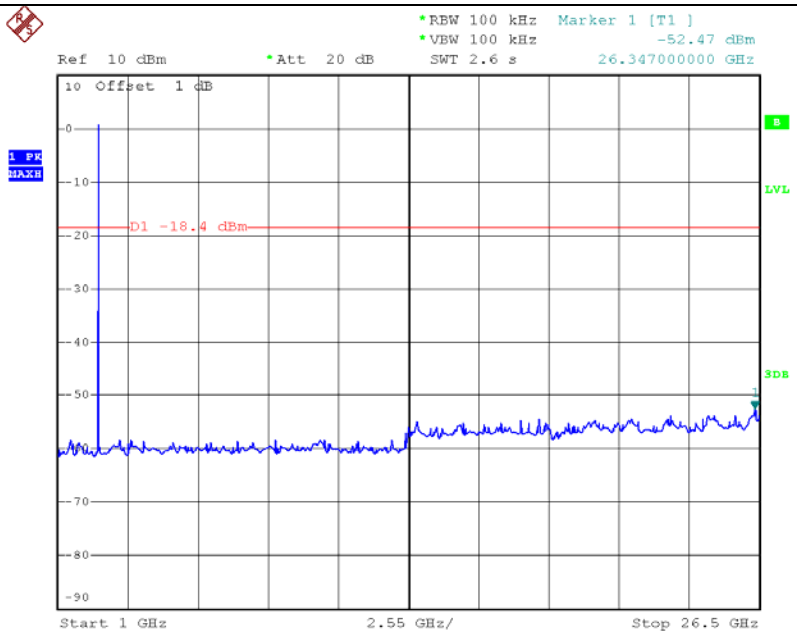
Date: 12.NOV.2016 19:40:43

BLE Mode 2480 MHz Below 1 GHz



Date: 12.NOV.2016 18:45:43

BLE Mode 2480 MHz Above 1 GHz



Date: 12.NOV.2016 19:40:43

9. ANTENNA REQUIREMENT

9.1 REQUIREMENT

Antenna Requirement (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 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.
Antenna Requirement (15.247)	If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2 ANTENNA CONNECTOR CONSTRUCTION

The EUT antenna is a FPC Antenna. And the maximum gain of this antenna is 3.96 dBi. It complies with the standard requirement.