

# TEST REPORT

**Reference No.**..... : WTS16S0756109E  
**FCC ID** ..... : WUI-LM55931  
**Applicant**..... : Winplus Co., Ltd.  
**Address**..... : Suites 6-11, 7th Floor, Corporation Park, 11 On La, Shatin, Hong Kong.  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product Name**..... : Bluetooth Module  
**Model No.**..... : WMD410A01SR6A0  
**Standards**..... : FCC CFR47 Part 15 Section 15.247:2015  
**Date of Receipt sample** .... : Jul. 18, 2016  
**Date of Test** ..... : Jul. 19 – Aug. 10, 2016  
**Date of Issue**..... : Aug. 12, 2016  
**Test Result**..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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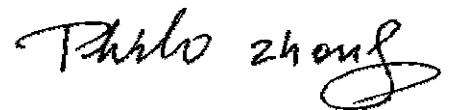
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Tested by:



Zero Zhou / Tested Engineer

Approved by:



Philo Zhong / Manager

## 2 Contents

	<b>Page</b>
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 CONTENTS .....</b>	<b>2</b>
<b>3 REVISION HISTORY .....</b>	<b>4</b>
<b>4 GENERAL INFORMATION.....</b>	<b>5</b>
4.1 GENERAL DESCRIPTION OF E.U.T. ....	5
4.2 DETAILS OF E.U.T. ....	5
4.3 CHANNEL LIST.....	5
4.4 TEST MODE.....	5
4.5 TEST FACILITY.....	6
<b>5 EQUIPMENT USED DURING TEST .....</b>	<b>7</b>
5.1 EQUIPMENTS LIST .....	7
5.2 MEASUREMENT UNCERTAINTY .....	8
5.3 TEST EQUIPMENT CALIBRATION .....	8
<b>6 TEST SUMMARY .....</b>	<b>9</b>
<b>7 CONDUCTED EMISSION .....</b>	<b>10</b>
7.1 E.U.T. OPERATION .....	10
7.2 EUT SETUP.....	10
7.3 MEASUREMENT DESCRIPTION .....	10
7.4 CONDUCTED EMISSION TEST RESULT .....	11
<b>8 RADIATED EMISSIONS.....</b>	<b>13</b>
8.1 EUT OPERATION.....	13
8.2 TEST SETUP .....	14
8.3 SPECTRUM ANALYZER SETUP .....	15
8.4 TEST PROCEDURE .....	16
8.5 SUMMARY OF TEST RESULTS .....	17
<b>9 BAND EDGE MEASUREMENT .....</b>	<b>20</b>
9.1 TEST PRODUCE.....	20
9.2 TEST RESULT .....	21
<b>10 BANDWIDTH MEASUREMENT.....</b>	<b>22</b>
10.1 TEST PROCEDURE.....	22
10.2 TEST RESULT .....	22
<b>11 MAXIMUM PEAK OUTPUT POWER .....</b>	<b>24</b>
11.1 TEST PROCEDURE.....	24
11.2 TEST RESULT .....	24
<b>12 POWER SPECTRAL DENSITY .....</b>	<b>26</b>
12.1 TEST PROCEDURE.....	26
12.2 TEST RESULT .....	26
<b>13 ANTENNA REQUIREMENT .....</b>	<b>28</b>
<b>14 RF EXPOSURE.....</b>	<b>29</b>
14.1 REQUIREMENTS.....	29
14.2 THE PROCEDURES / LIMIT.....	29
14.3 MPE CALCULATION METHOD .....	30
<b>15 PHOTOGRAPHS –MODEL WMD410A01SR6A0 WITH HOST TEST SETUP PHOTOS.....</b>	<b>31</b>
15.1 CONDUCTED EMISSION AT TEST SITE 2#.....	31
15.2 RADIATED EMISSION .....	31

<b>16</b>	<b>PHOTOGRAPHS - CONSTRUCTIONAL DETAILS .....</b>	<b>35</b>
16.1	PHOTOGRAPHS -HOST EXTERNAL PHOTOS .....	35
16.2	PHOTOGRAPHS-HOST INTERNAL PHOTOS .....	36
16.3	PHOTOGRAPHS-MODEL WMD410A01SR6A0 PHOTOS.....	37

### 3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S0756109E	Jul. 18, 2016	Jul. 19 – Aug. 10, 2016	Aug. 12, 2016	original	-	Valid

## 4 General Information

### 4.1 General Description of E.U.T.

Product Name:	Bluetooth Module
Model No.:	WMD410A01SR6A0
Model Difference:	N/A
Host Name:	Smart LED Light Strip
Host Brand:	Winplus
Host Model No.:	LM55931
Operation Frequency:	2402MHz ~ 2480MHz, separated by 2MHz,40 channels in total
The lowest oscillator:	32.768KHz
Type of modulation:	GFSK(BLE only)

### 4.2 Details of E.U.T.

Technical Data:	2.0-3.6VDC
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### 4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

### 4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests Carried Out Under FCC part 15.247

Test mode	Low channel	Middle channel	High channel
Transmitting	2402MHz	2440MHz	2480MHz

Table 2 Tests Carried Out Under FCC part 15.207&15.209

Test Item	Test Mode
Conducted Emissions	Communication
Radiated Emissions	Communication

#### 4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, October. 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. 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 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. 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 328995, December 3, 2014.

## 5 Equipment Used during Test

### 5.1 Equipments List

<b>Conducted Emissions at Mains Terminals Disturbance Voltage(1#)</b>						
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Calibration Date</b>	<b>Calibration Due Date</b>
1	EMI Test Receiver	R&S	ESCI	100947	Sep.14, 2015	Sep.13, 2016
2	LISN	R&S	ENV216	100115	Sep.14, 2015	Sep.13, 2016
3	Cable	Top	TYPE16(3.5M)	-	Sep.14, 2015	Sep.13, 2016
<b>Conducted Emissions at Mains Terminals Disturbance Voltage(2#)</b>						
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Calibration Date</b>	<b>Calibration Due Date</b>
1	EMI Test Receiver	R&S	ESCI	101155	Sep.14, 2015	Sep.13, 2016
2	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.14, 2015	Sep.13, 2016
3	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.14, 2015	Sep.13, 2016
4	Cable	Laplace	RF300	-	Sep.14, 2015	Sep.13, 2016
<b>3m Semi-anechoic Chamber for Radiation(1#)</b>						
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Calibration Date</b>	<b>Calibration Due Date</b>
1	Spectrum Analyzer	R&S	FSP	100091	Apr. 08, 2016	Apr. 07, 2017
2	Amplifier	Agilent	8447D	2944A10178	Jan. 13, 2016	Jan. 12, 2017
3	Active Loop Antenna	Beijing Dazhi	ZN30900A	0703	Oct, 17, 2015	Oct, 16, 2016
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr. 09, 2016	Apr. 08, 2017
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep. 14, 2015	Sep. 13, 2016
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr. 09, 2016	Apr. 08, 2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G26	2004	Apr. 13, 2016	Apr. 12, 2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr. 13, 2016	Apr. 12, 2017
9	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr. 13, 2016	Apr. 12, 2017
<b>3m Semi-anechoic Chamber for Radiation(2#)</b>						
<b>Item</b>	<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Calibration Date</b>	<b>Calibration Due Date</b>
1	Test Receiver	R&S	ESCI	101296	Apr. 13, 2016	Apr. 12, 2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr. 09, 2016	Apr. 09, 2017
3	Amplifier	ANRITSU	MH648A	M43381	Apr. 13, 2016	Apr. 12, 2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr. 13, 2016	Apr. 12, 2017

## 5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	$\pm 1.0$ dB
RF Power Density	$\pm 2.2$ dB
Radiated Spurious Emissions test	$\pm 5.03$ dB (Bilog antenna 30M~1000MHz)
	$\pm 4.74$ dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	$\pm 3.64$ dB (AC mains 150KHz~30MHz)

## 5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.



## 6 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

## 7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013&ANSI C63.4:2014
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB $\mu$ V between 0.15MHz & 0.5MHz 56 dB $\mu$ V between 0.5MHz & 5MHz 60 dB $\mu$ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

### 7.1 E.U.T. Operation

Operating Environment :

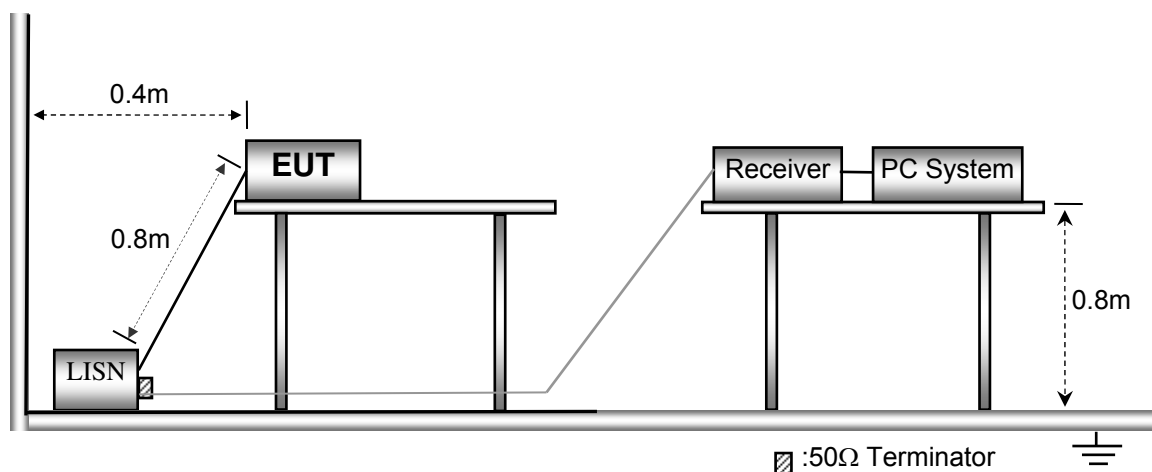
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

### 7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.

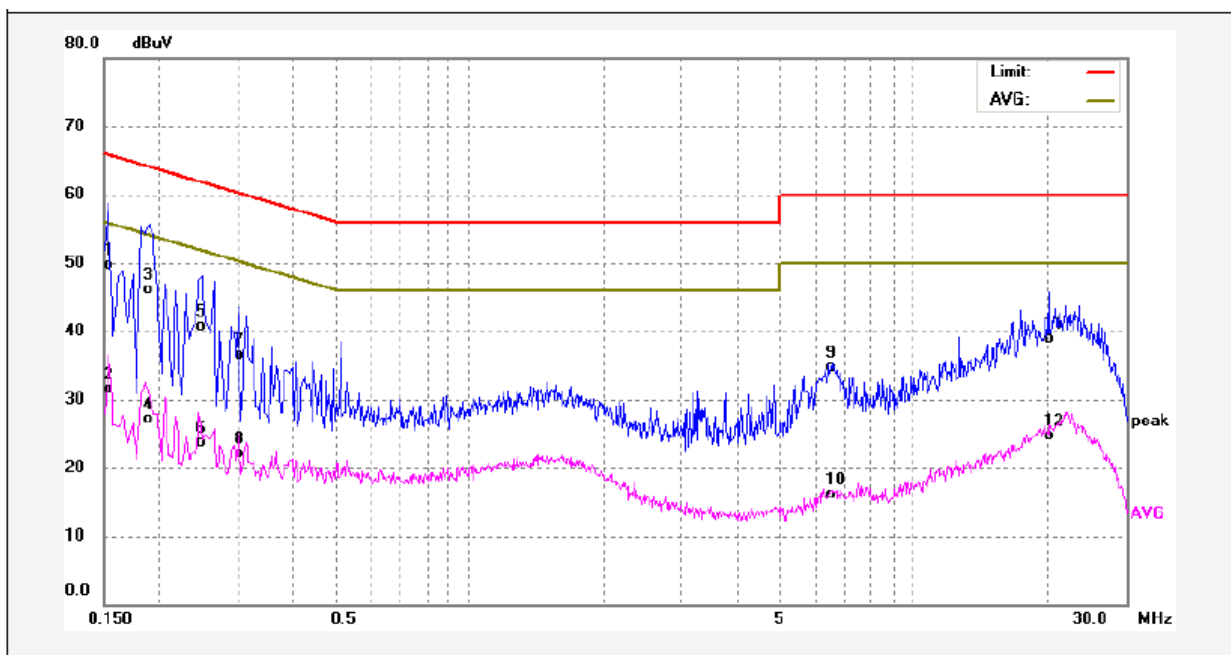


### 7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

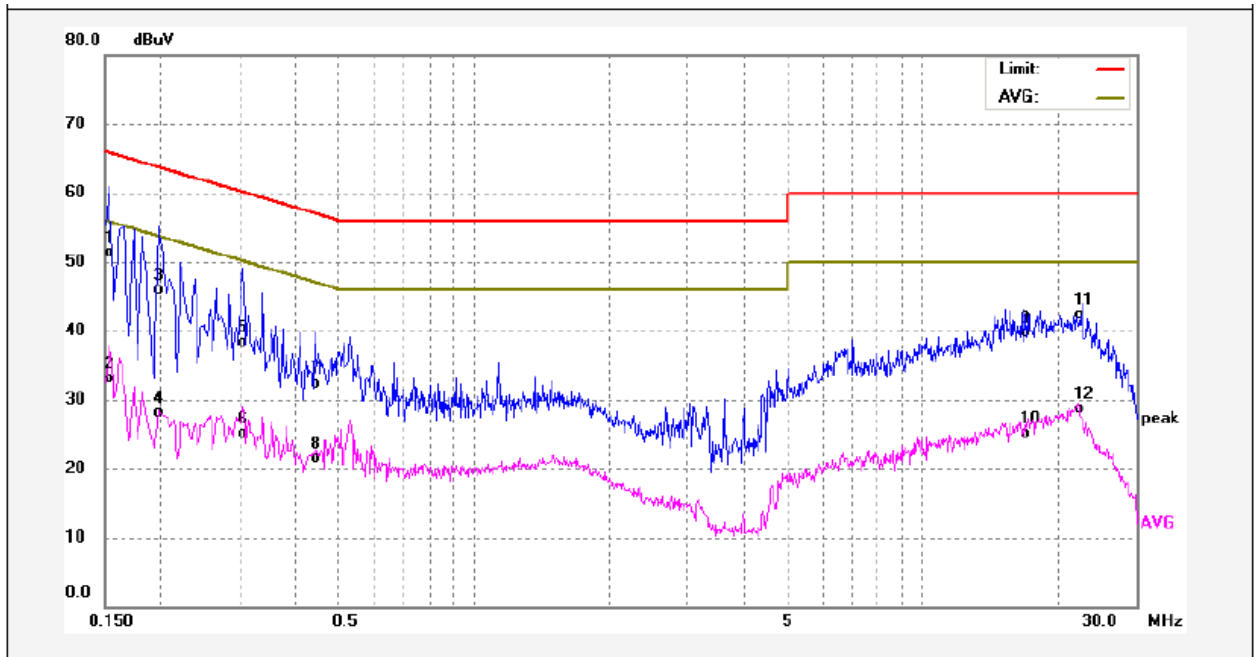
### 7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	39.45	10.29	49.74	65.78	-16.04	QP	
2	0.1539	21.13	10.29	31.42	55.78	-24.36	AVG	
3	0.1900	35.77	10.27	46.04	64.03	-17.99	QP	
4	0.1900	16.74	10.27	27.01	54.03	-27.02	AVG	
5	0.2500	30.47	10.26	40.73	61.75	-21.02	QP	
6	0.2500	13.51	10.26	23.77	51.75	-27.98	AVG	
7	0.3020	26.14	10.28	36.42	60.19	-23.77	QP	
8	0.3020	11.80	10.28	22.08	50.19	-28.11	AVG	
9	6.5620	24.04	10.62	34.66	60.00	-25.34	QP	
10	6.5620	5.57	10.62	16.19	50.00	-33.81	AVG	
11	20.0700	27.87	11.06	38.93	60.00	-21.07	QP	
12	20.0700	13.63	11.06	24.69	50.00	-25.31	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1539	41.09	10.29	51.38	65.78	-14.40	QP	
2	0.1539	22.80	10.29	33.09	55.78	-22.69	AVG	
3	0.1980	35.56	10.26	45.82	63.69	-17.87	QP	
4	0.1980	17.81	10.26	28.07	53.69	-25.62	AVG	
5	0.3060	28.11	10.28	38.39	60.08	-21.69	QP	
6	0.3060	14.84	10.28	25.12	50.08	-24.96	AVG	
7	0.4420	21.96	10.26	32.22	57.02	-24.80	QP	
8	0.4420	11.20	10.26	21.46	47.02	-25.56	AVG	
9	16.8140	28.63	10.98	39.61	60.00	-20.39	QP	
10	16.8140	14.20	10.98	25.18	50.00	-24.82	AVG	
11	22.6860	31.11	11.14	42.25	60.00	-17.75	QP	
12	22.6860	17.50	11.14	28.64	50.00	-21.36	AVG	

## 8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013&ANSI C63.4:2014

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log <sup>(2400/F(kHz))</sup> + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log <sup>(24000/F(kHz))</sup> + 40
1.705 ~ 30	30	30	100 * 30	20log <sup>(30)</sup> + 40
30 ~ 88	100	3	100	20log <sup>(100)</sup>
88 ~ 216	150	3	150	20log <sup>(150)</sup>
216 ~ 960	200	3	200	20log <sup>(200)</sup>
Above 960	500	3	500	20log <sup>(500)</sup>

### 8.1 EUT Operation

Operating Environment:

Temperature: 25.5 °C

Humidity: 51 % RH

Atmospheric Pressure: 1016 mbar

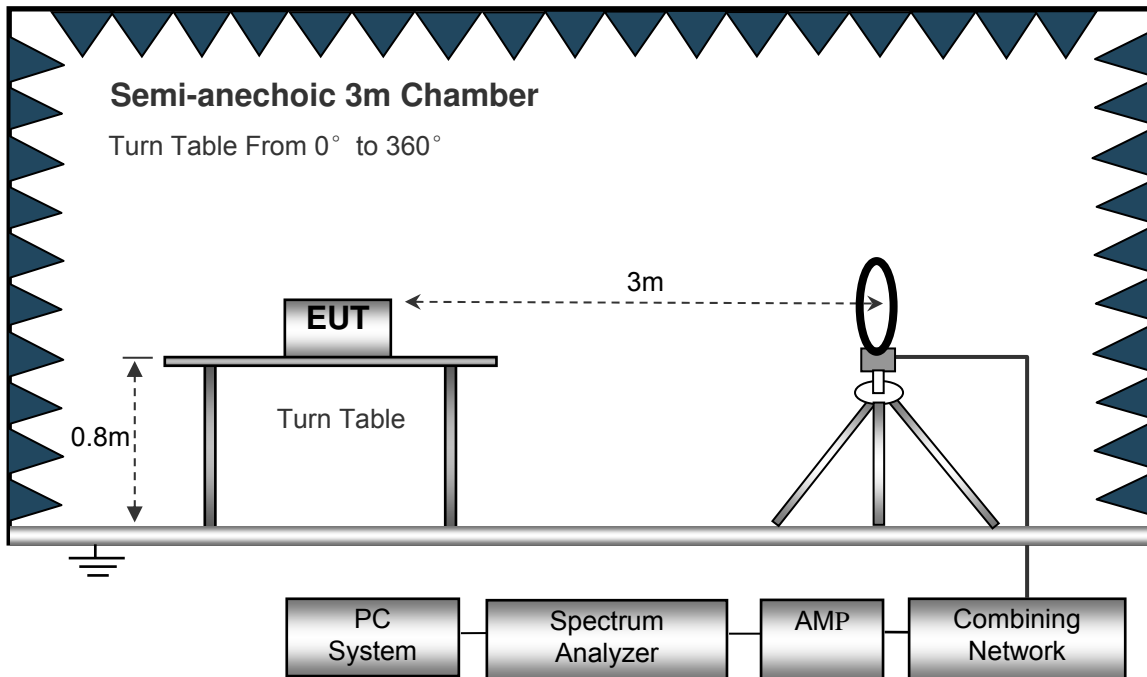
EUT Operation:

The test was performed in transmitting mode, the test data were shown in the report.

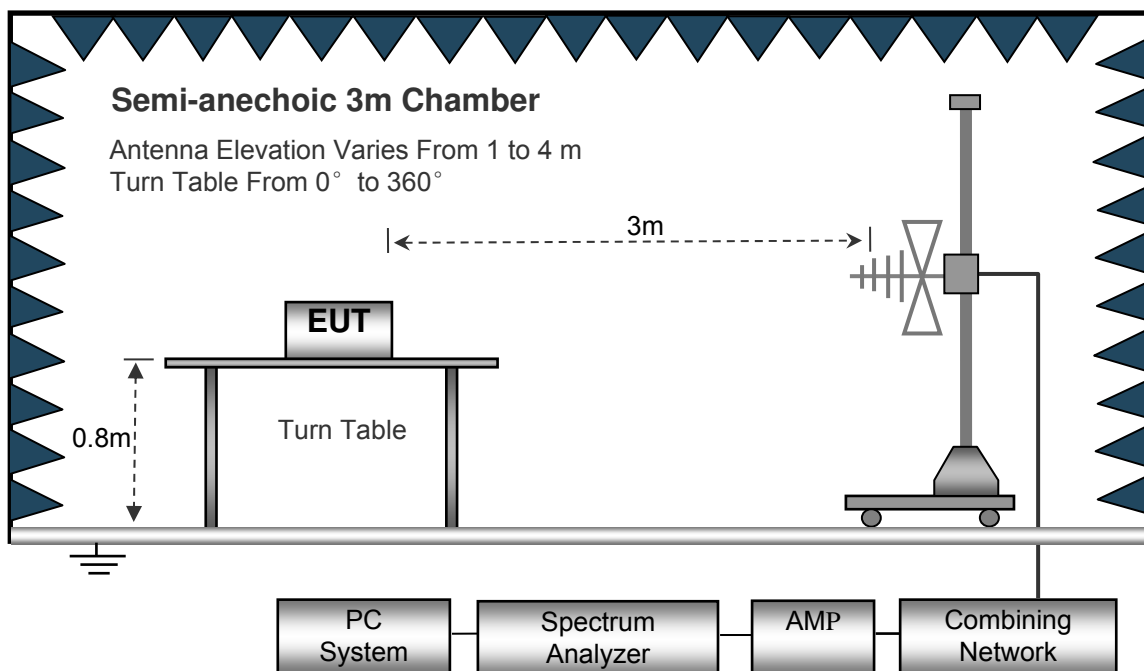
### 8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.

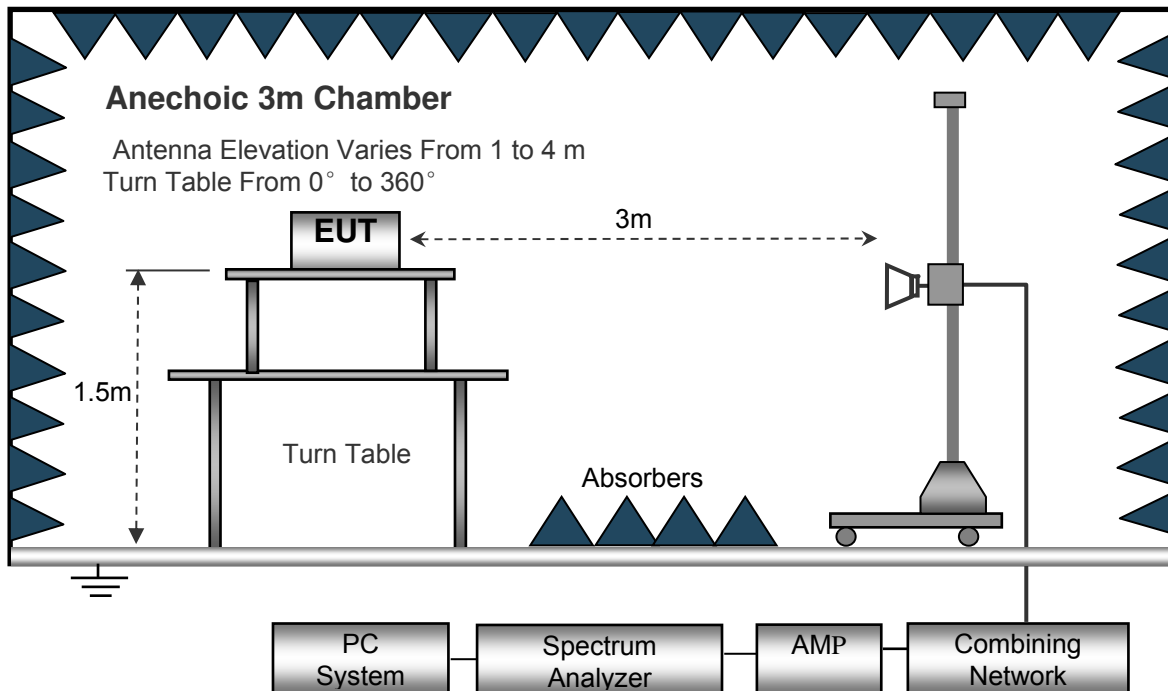
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto  
 IF Bandwidth..... 10kHz  
 Video Bandwidth..... 10kHz  
 Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 100kHz  
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto  
 Detector ..... PK  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 3MHz  
 Detector ..... Ave.  
 Resolution Bandwidth..... 1MHz  
 Video Bandwidth..... 10Hz

#### 8.4 Test Procedure

1. The EUT is placed on a turntable, which is above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. New battery was used during test.



## 8.5 Summary of Test Results

### Test Frequency: 32.768KHz~30MHz

The measurements were more than 20 dB below the limit and not reported

### Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK(BLE) Low Channel									
309.36	21.97	QP	263	1.7	H	10.21	32.18	46.00	-13.82
309.36	19.48	QP	1	1.8	V	10.21	29.69	46.00	-16.31
4804.00	52.05	PK	360	1.5	V	-1.06	50.99	74.00	-23.01
4804.00	43.43	Ave	360	1.5	V	-1.06	42.37	54.00	-11.63
7206.00	53.82	PK	74	1.5	H	1.39	55.21	74.00	-18.79
7206.00	43.33	Ave	74	1.5	H	1.39	44.72	54.00	-9.28
2317.48	45.35	PK	142	1.8	V	-13.06	32.29	74.00	-41.71
2317.48	37.66	Ave	142	1.8	V	-13.06	24.60	54.00	-29.40
2356.35	44.82	PK	226	1.2	H	-13.32	31.50	74.00	-42.50
2356.35	36.96	Ave	226	1.2	H	-13.32	23.64	54.00	-30.36
2493.90	42.39	PK	262	1.7	V	-12.98	29.41	74.00	-44.59
2493.90	37.72	Ave	262	1.7	V	-12.98	24.74	54.00	-29.26

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK(BLE) Middle Channel									
309.36	21.50	QP	332	1.1	H	10.21	31.71	46.00	-14.29
309.36	20.99	QP	111	1.7	V	10.21	31.20	46.00	-14.80
4880.00	53.72	PK	223	2.0	V	-0.59	53.13	74.00	-20.87
4880.00	40.40	Ave	223	2.0	V	-0.59	39.81	54.00	-14.19
7320.00	52.09	PK	315	1.4	H	2.25	54.34	74.00	-19.66
7320.00	44.45	Ave	315	1.4	H	2.25	46.70	54.00	-7.30
2332.83	46.36	PK	13	1.1	V	-13.21	33.15	74.00	-40.85
2332.83	39.89	Ave	13	1.1	V	-13.21	26.68	54.00	-27.32
2374.56	44.67	PK	96	1.8	H	-13.05	31.62	74.00	-42.38
2374.56	37.79	Ave	96	1.8	H	-13.05	24.74	54.00	-29.26
2486.01	42.13	PK	228	1.2	V	-13.10	29.03	74.00	-44.97
2486.01	36.89	Ave	228	1.2	V	-13.10	23.79	54.00	-30.21

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK(BLE) High Channel									
309.36	20.64	QP	236	1.4	H	10.21	30.85	46.00	-15.15
309.36	18.40	QP	65	1.0	V	10.21	28.61	46.00	-17.39
4960.00	52.33	PK	219	1.5	V	-0.25	52.08	74.00	-21.92
4960.00	41.41	Ave	219	1.5	V	-0.25	41.16	54.00	-12.84
7440.00	53.71	PK	97	1.5	H	2.81	56.52	74.00	-17.48
7440.00	43.61	Ave	97	1.5	H	2.81	46.42	54.00	-7.58
2326.97	45.15	PK	208	1.2	V	-13.20	31.95	74.00	-42.05
2326.97	39.18	Ave	208	1.2	V	-13.20	25.98	54.00	-28.02
2389.00	42.69	PK	270	2.0	H	-13.15	29.54	74.00	-44.46
2389.00	36.98	Ave	270	2.0	H	-13.15	23.83	54.00	-30.17
2491.88	42.89	PK	204	1.7	V	-13.05	29.84	74.00	-44.16
2491.88	38.05	Ave	204	1.7	V	-13.05	25.00	54.00	-29.00

**Test Frequency: 18GHz~25GHz**

The measurements were more than 20 dB below the limit and not reported

## 9 Band Edge Measurement

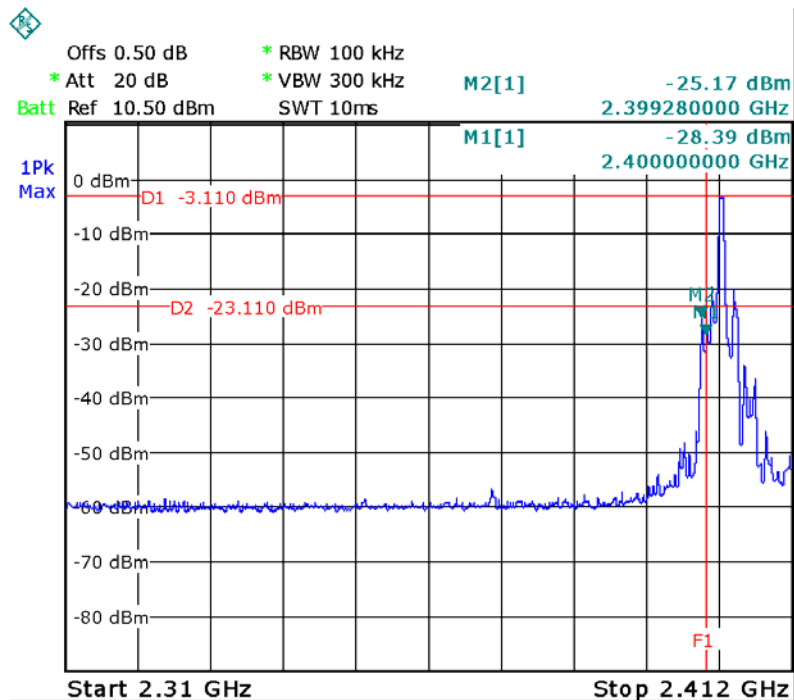
Test Requirement:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) and 15.205(c).
Test Method:	KDB558074 D01 DTS Meas Guidance v03r05
Test Limit:	Regulation 15.247 (d), 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 power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Test Mode:	Transmitting

### 9.1 Test Procedure

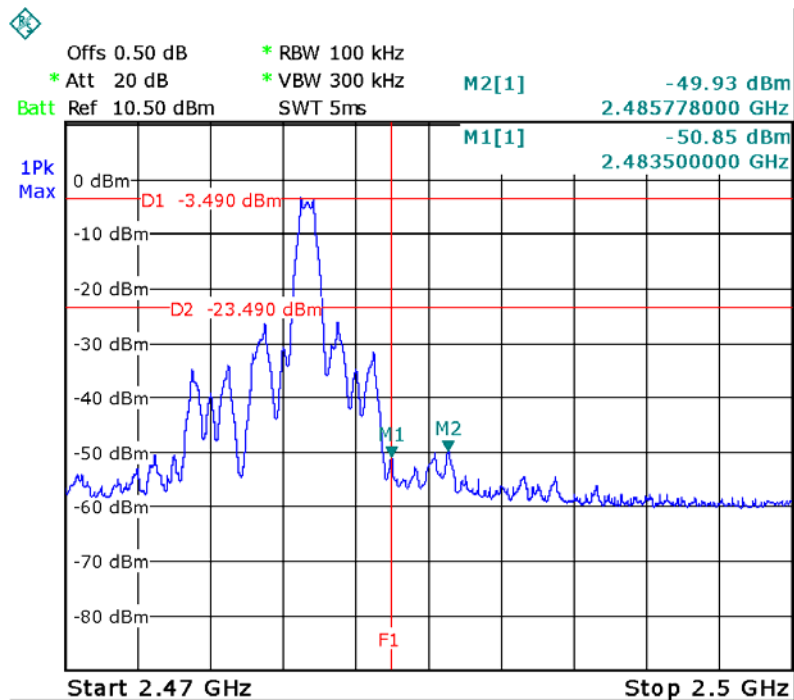
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto  
Detector function = peak, Trace = max hold
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### 9.2 Test Result

Band edge-left side



Band edge-right side



### 10 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247  
 Test Method: KDB558074 D01 DTS Meas Guidance v03r05

#### 10.1 Test Procedure

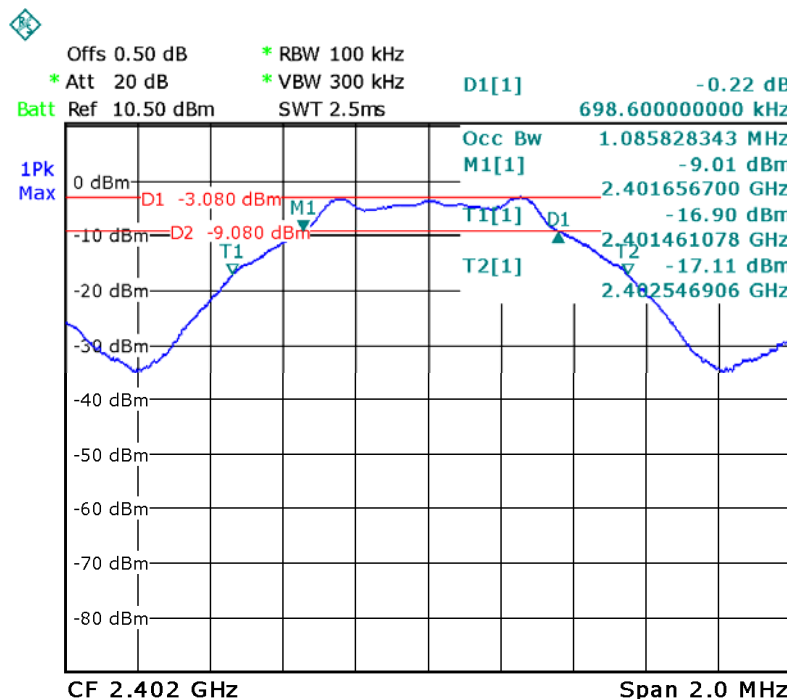
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

#### 10.2 Test Result

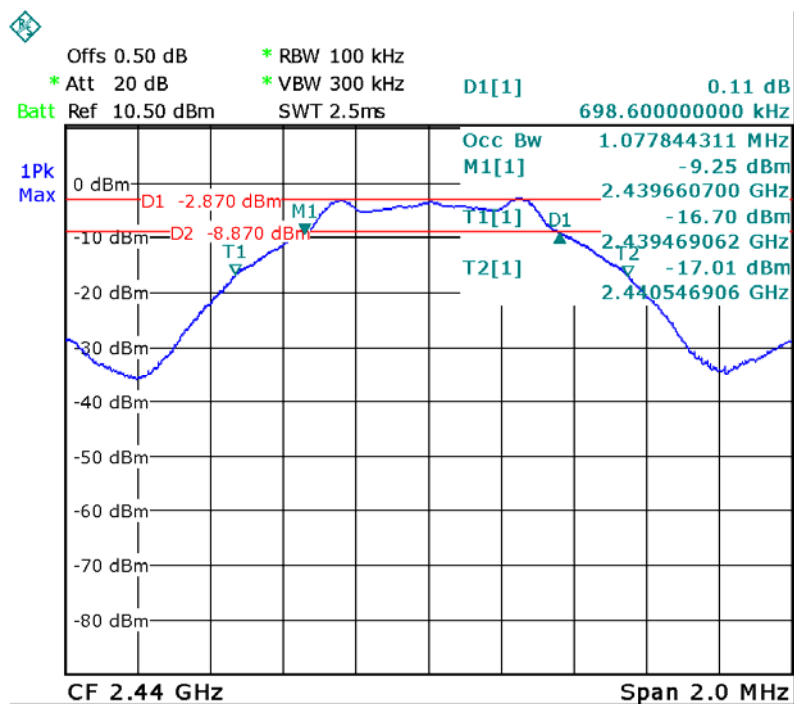
Operation mode	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low channel	0.699	1.086
Middle channel	0.697	1.078
High channel	0.695	1.074

Test result plot as follows:

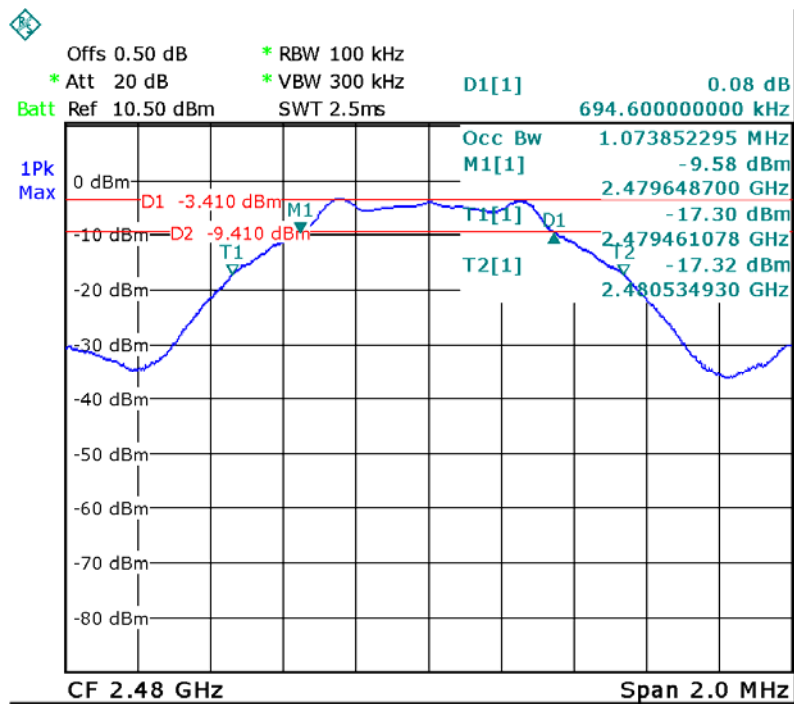
Mode: Low channel



Mode: Middle channel



Mode: High channel



## 11 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247  
 Test Method: KDB558074 D01 DTS Meas Guidance v03r05

### 11.1 Test Procedure

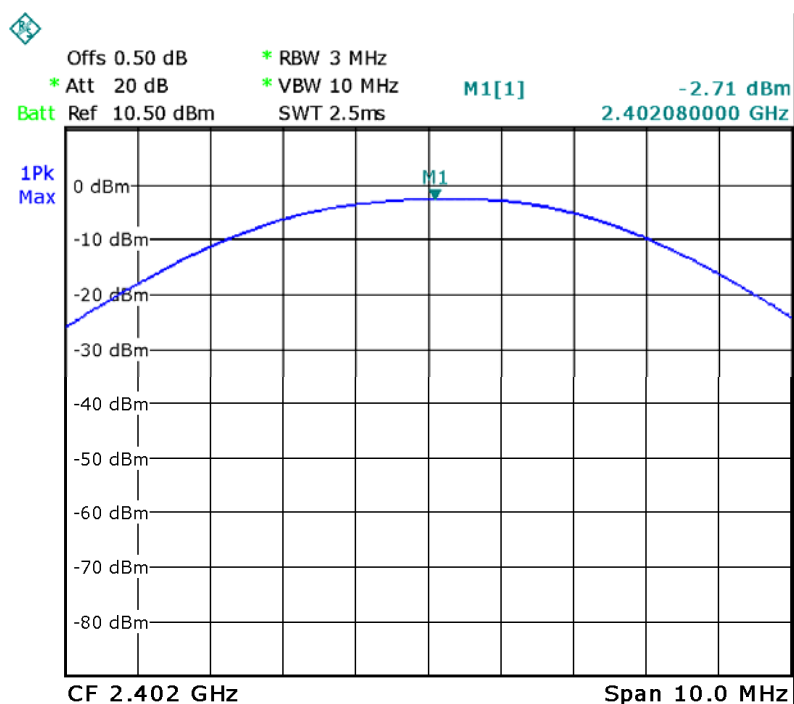
KDB558074 D01 DTS Meas Guidance v03r05

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 10MHz. VBW = 10MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

### 11.2 Test Result

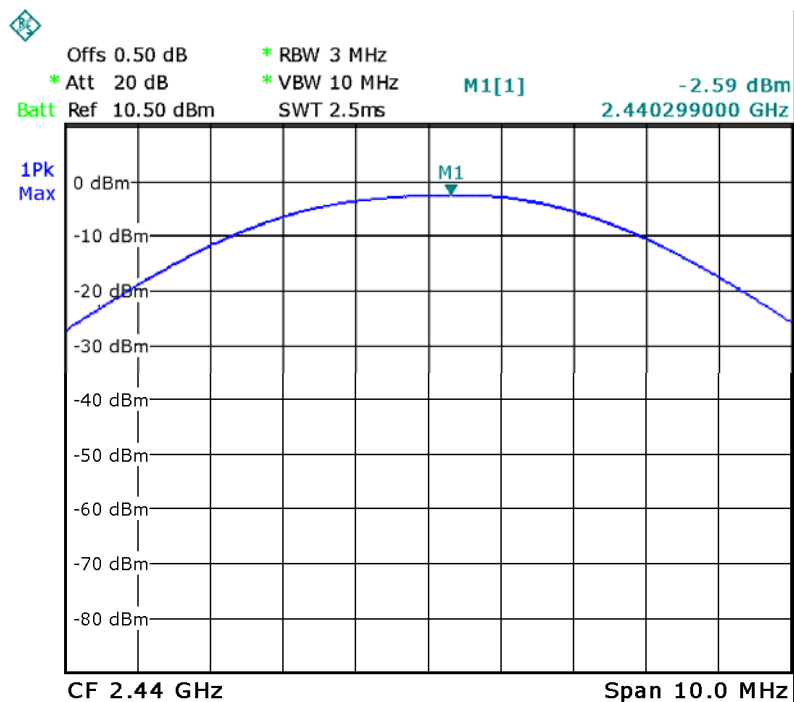
Maximum Peak Output Power (dBm)		
Low channel	Middle channel	High channel
-2.71	-2.59	-3.13
Limit		
1W/30dBm		

Test mode: Low channel

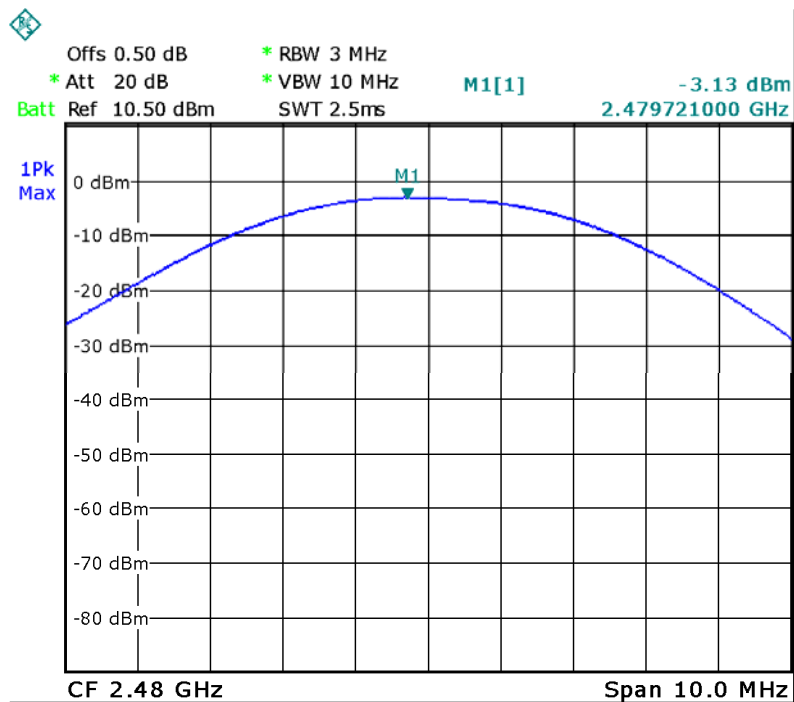




Test mode :Middle channel



Test mode: High channel



## 12 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

### 12.1 Test Procedure

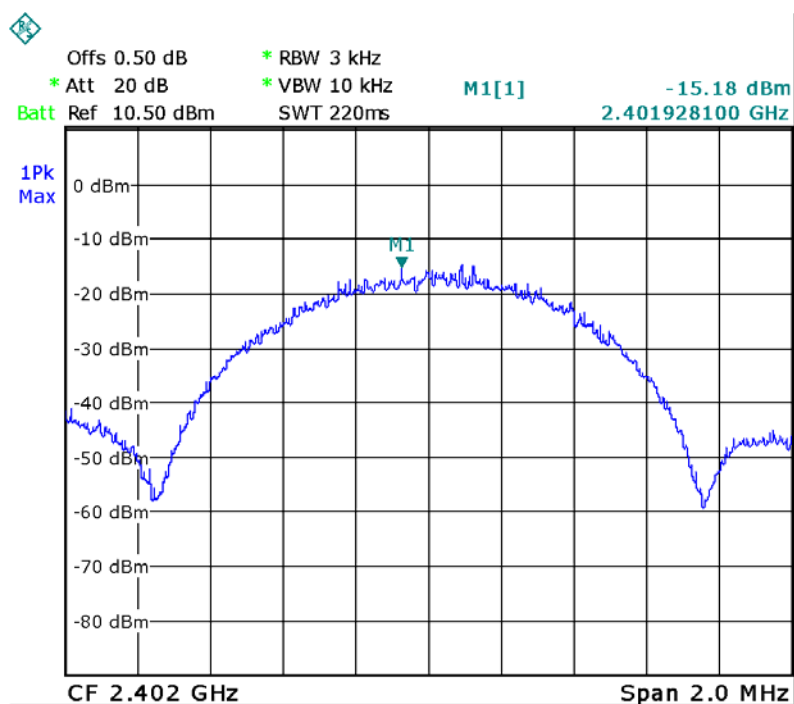
KDB558074 D01 DTS Meas Guidance v03r05

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section  
Submit this plot.

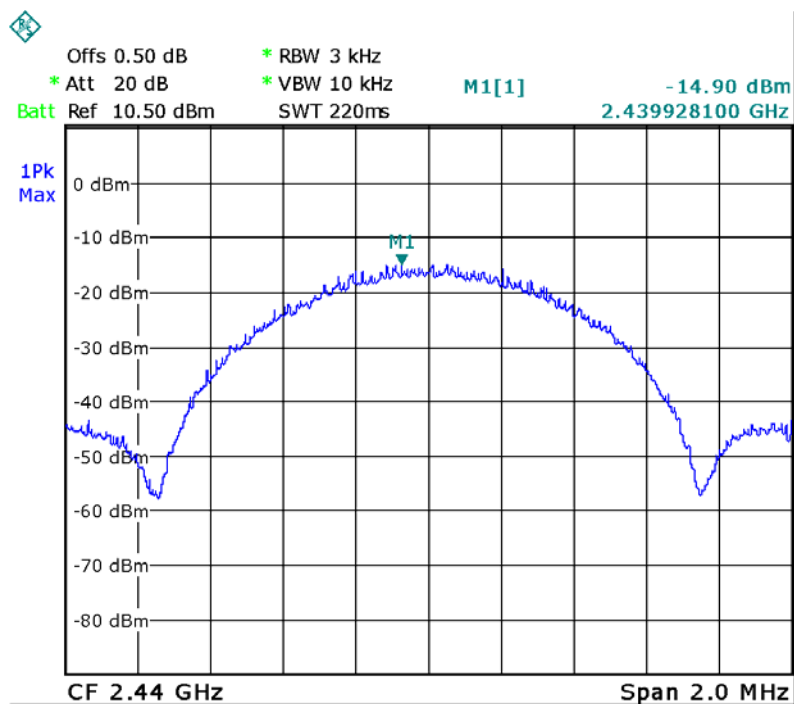
### 12.2 Test Result

Power Spectral Density		
Low channel	Middle channel	High channel
-15.18	-14.90	-15.48
Limit		
8dBm per 3kHz		

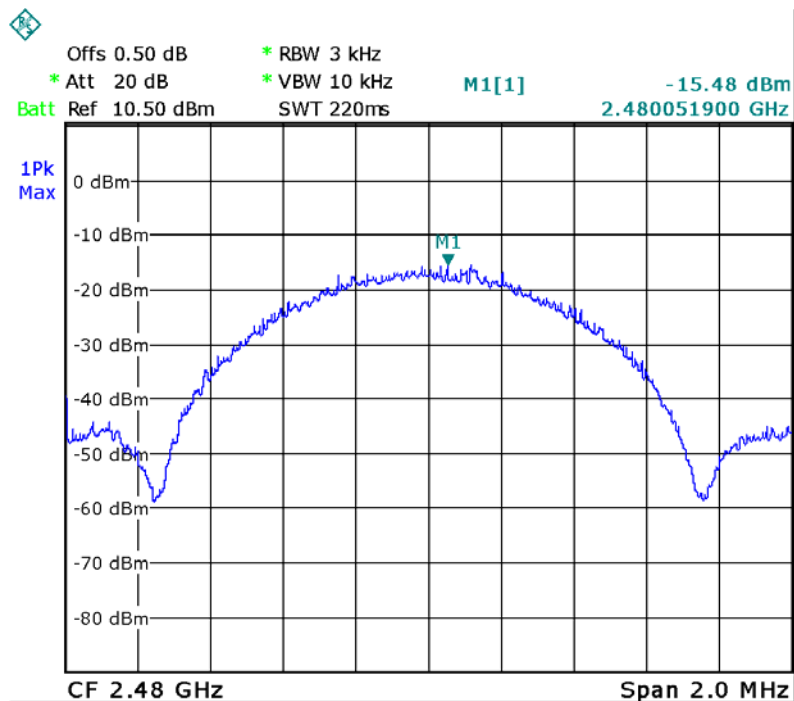
Test mode: Low channel



Test mode: Middle channel



Test mode: High channel



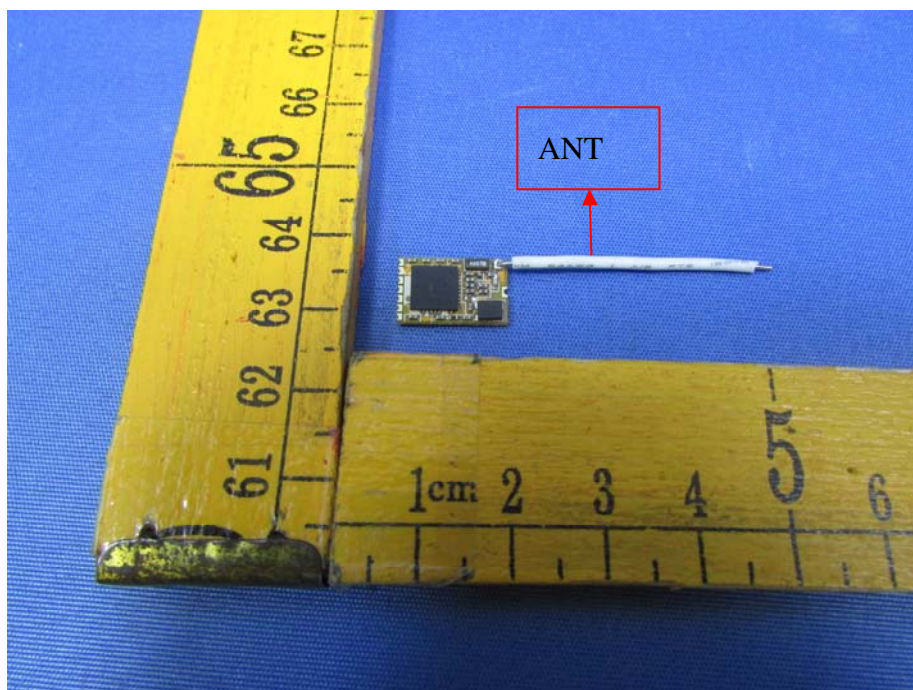
### 13 Antenna Requirement

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT has one wire antenna, the gain is 1.66dBi. meets the requirements of FCC 15.203.



## 14 RF Exposure

Test Requirement: FCC Part 1.1307  
 Test Mode: FCC Part 2.1091  
 KDB 447498 D01 General RF Exposure Guidance v06

### 14.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

### 14.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 14.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = output power to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm <sup>2</sup> )	Limit of Power Density (mW/cm <sup>2</sup> )
1.66	1.466	-2.59	0.551	0.000161	1

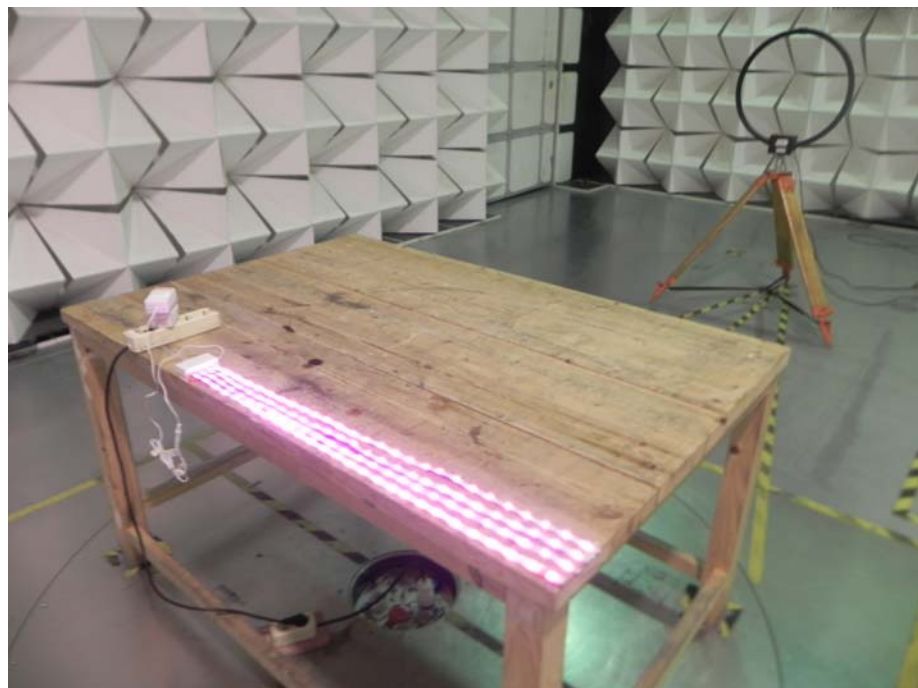
## 15 Photographs –Model WMD410A01SR6A0 with Host Test Setup Photos

### 15.1 Conducted Emission at test site 2#



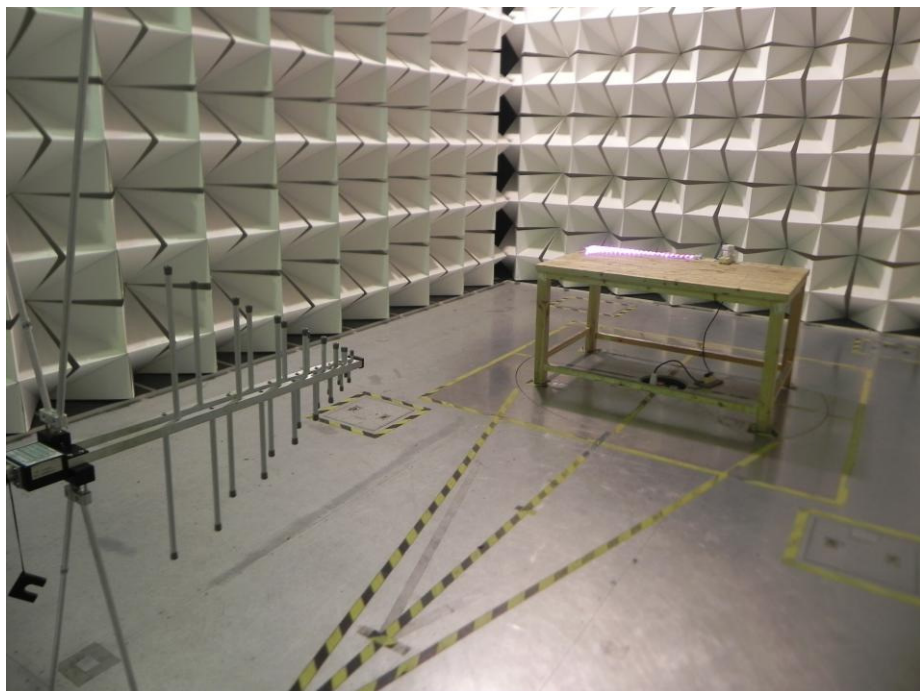
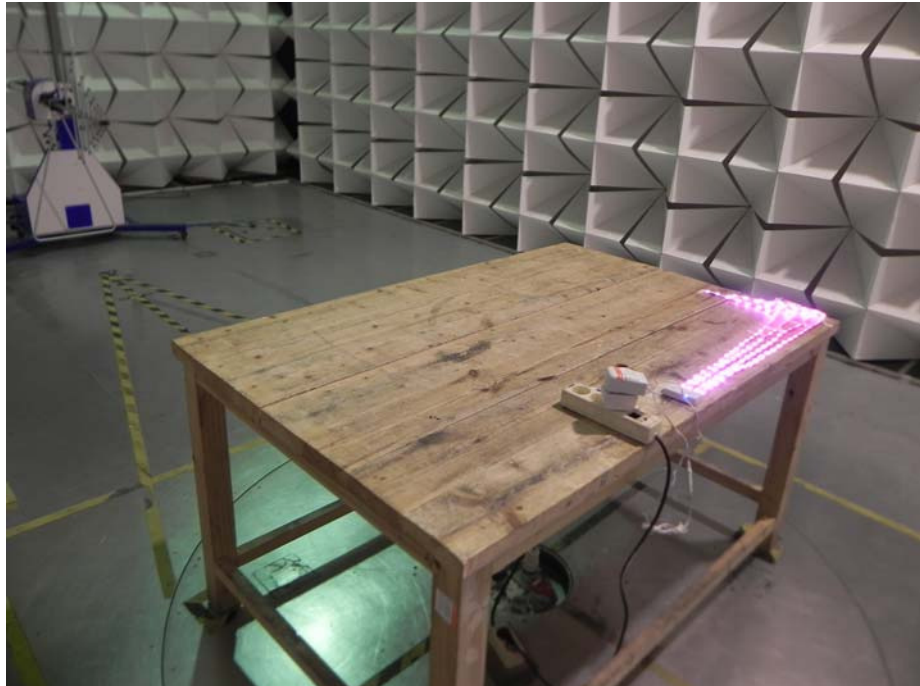
### 15.2 Radiated Emission

Test frequency from 32.768KHz to 30MHz Test Site 2#





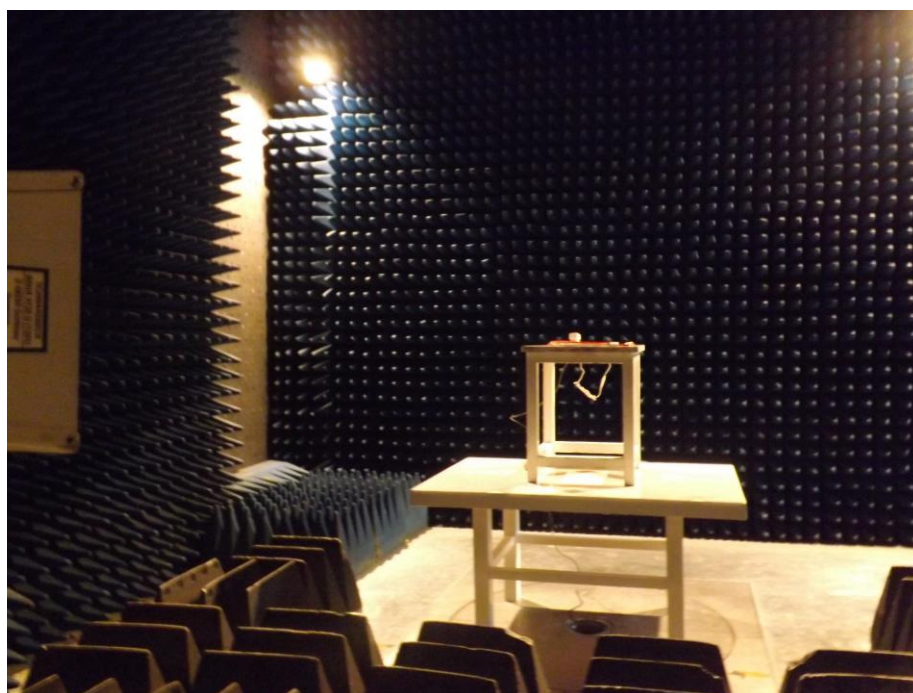
Test frequency from 30MHz to 1GHz Test Site 2#



Test frequency 1GHz to 25GHz Test Site 1#





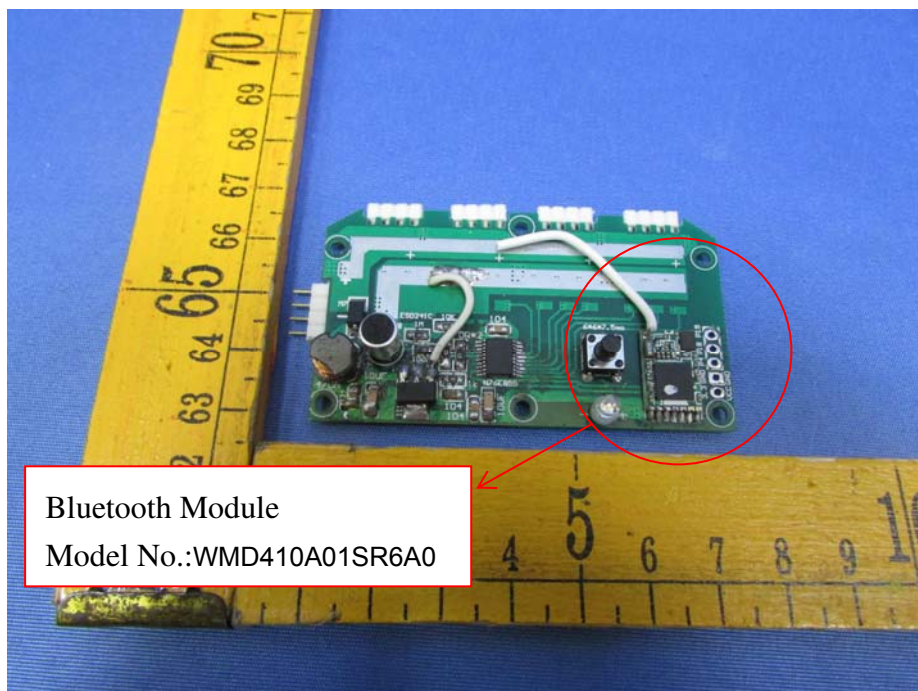


## 16 Photographs - Constructional Details

### 16.1 Photographs -Host External Photos

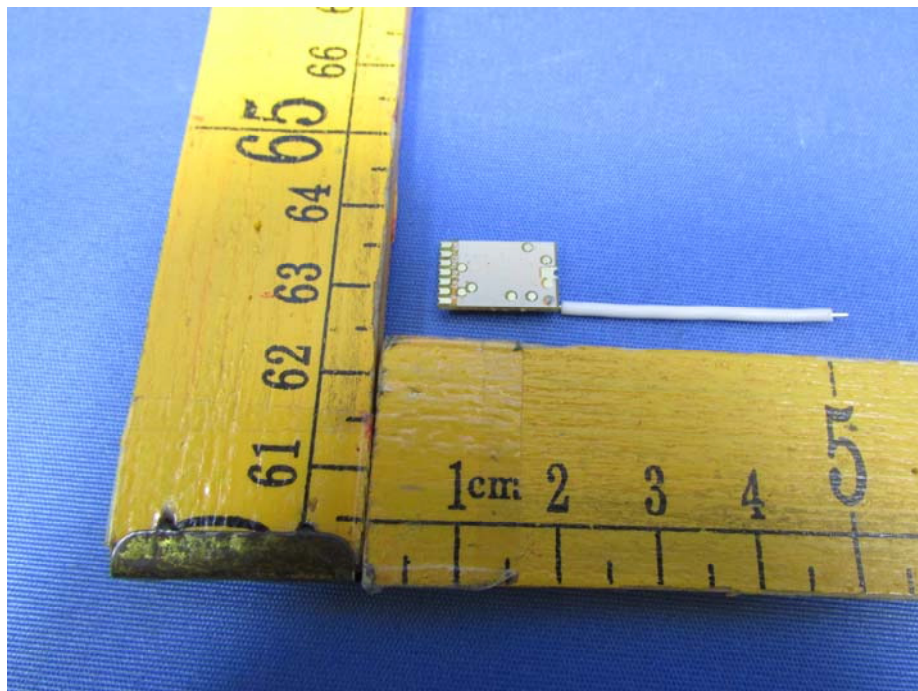
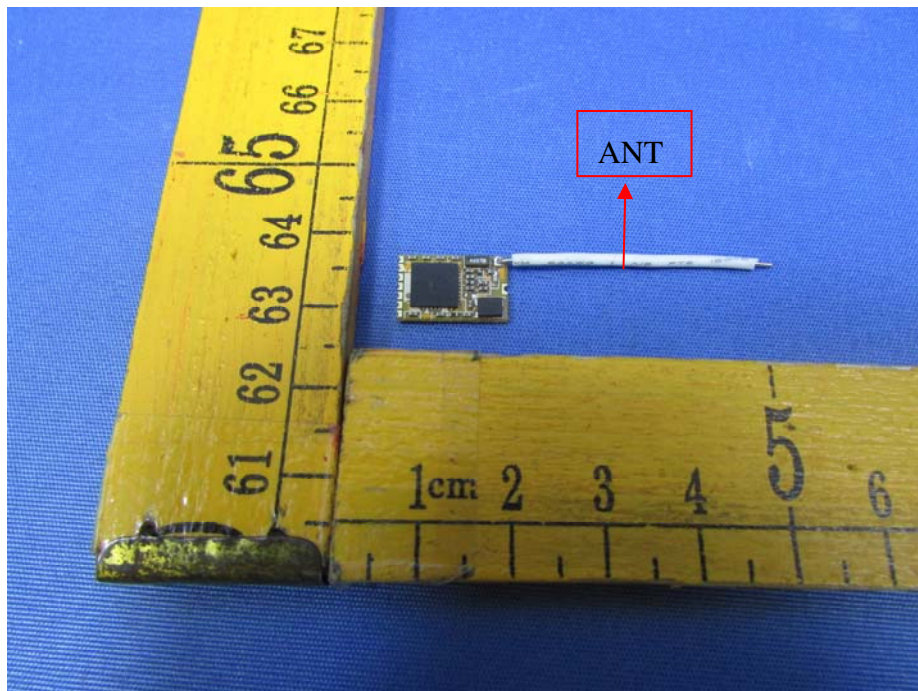


## 16.2 Photographs-Host Internal Photos





### 16.3 Photographs-Model WMD410A01SR6A0 Photos



====End of Report====