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# FCC Test Report

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Report No.: AGC01680170802FE04

**FCC ID** : 2AKHJ-MD156  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Bluetooth+2.4G Mouse  
**BRAND NAME** : N/A  
**MODEL NAME** : MD156  
**CLIENT** : Shenzhen Hangshi Technology Co., Ltd.  
**DATE OF ISSUE** : July 09, 2017  
**STANDARD(S)** : FCC Part 15 Rules  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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### Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 09, 2017	Valid	Original Report

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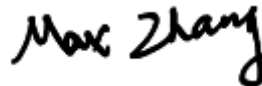
## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Shenzhen Hangshi Technology Co., Ltd.
<b>Address</b>	Hangshi Technology Park, Democracy West Industry Area, Shajing Town, Bao'an District, Shenzhen, China.
<b>Manufacturer</b>	Shenzhen Hangshi Technology Co., Ltd.
<b>Address</b>	Hangshi Technology Park, Democracy West Industry Area, Shajing Town, Bao'an District, Shenzhen, China.
<b>Product Designation</b>	Bluetooth+2.4G Mouse
<b>Brand Name</b>	N/A
<b>Test Model</b>	MD156
<b>Date of test</b>	July 08, 2017 to July 09, 2017
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

Tested by



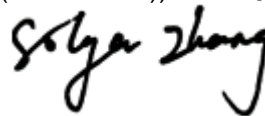
Max Zhang(Zhang Yi) July 09, 2017

Reviewed by



Bart Xie(Xie Xiaobin) July 09, 2017

Approved by



Solger Zhang(Zhang Hongyi)  
Authorized Officer July 09, 2017

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

<b>Operation Frequency</b>	2.402 GHz to 2.480GHz
<b>Maximum field strength</b>	91.98dBuV/m(AV)@3m
<b>Bluetooth Version</b>	V3.0
<b>Modulation</b>	GFSK, Pi/4 DQPSK, 8DPSK
<b>Number of channels</b>	79 For BR/EDR
<b>Antenna Gain</b>	A1
<b>Antenna Designation</b>	V1.0
<b>Hardware Version</b>	Integrated Antenna (Met 15.203 Antenna requirement)
<b>Software Version</b>	0dBi
<b>Power Supply</b>	DC 3V by battery

Note: The 2.4GHz module and BT module can not transmit simultaneously.

**2.2. TABLE OF CARRIER FREQUENCY**

BR/EDR channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

### 3. MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.18\text{dB}$
2	All emissions, radiated	$\pm 3.91\text{dB}$
3	Temperature	$\pm 0.5^\circ\text{C}$
4	Humidity	$\pm 2\%$

### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel $\pi/4$ -DQPSK
5	Middle channel $\pi/4$ -DQPSK
6	High channel $\pi/4$ -DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	BT Link

Note:

- All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.
- For Radiated Emission, 3axis were chosen for testing for each applicable mode.

## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure :



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Bluetooth+2.4G Mouse	MD156	2AKHJ-MD156	EUT

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249&15.209	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	N/A



## 6. TEST FACILITY

<b>Site</b>	Dongguan Precise Testing Service Co., Ltd.
<b>Location</b>	Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
<b>FCC Registration No.</b>	371540
<b>Description</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014.

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2017	July 3, 2018
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2017	July 3, 2018
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2017	July 3, 2018
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2017	July 3, 2018
3m Anechoic Chamber	CHENGYU	966	PTS-001	July 4, 2017	July 3, 2018
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2017	June 5, 2018
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2017	June 5, 2018
Power Sensor	Agilent	U2021XA	MY55050474	June 6, 2017	June 5, 2018
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 11, 2016	July 10, 2017
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 6, 2017	June 5, 2018

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2017	July 3, 2018
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2017	July 7, 2018
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2017	July 7, 2018
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2017	July 3, 2018
Shielded Room	CHENGYU	843	PTS-002	June 6, 2017	June 5, 2018

## 7. RADIATED EMISSION

### 7.1 TEST LIMIT

#### Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

#### Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		$\mu$ V/m	dB( $\mu$ V)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB( $\mu$ V)/m (Peak) 54.0 dB( $\mu$ V)/m (Average)	

Remark: (1) Emission level dB $\mu$  V = 20 log Emission level  $\mu$  V/m  
(2) The smaller limit shall apply at the cross point between two frequency bands.  
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

## 7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use minimum resolution bandwidth of 1 MHz. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

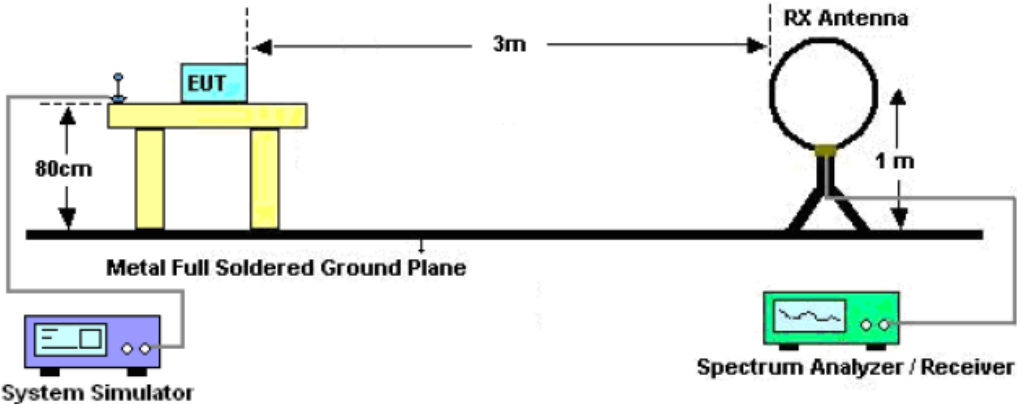
The following table is the setting of spectrum analyzer and receiver.

<b>Spectrum Parameter</b>	<b>Setting</b>
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz RBW 1.5MHz/ VBW 5MHz for Peak, RBW 1.5MHz/10Hz for Average

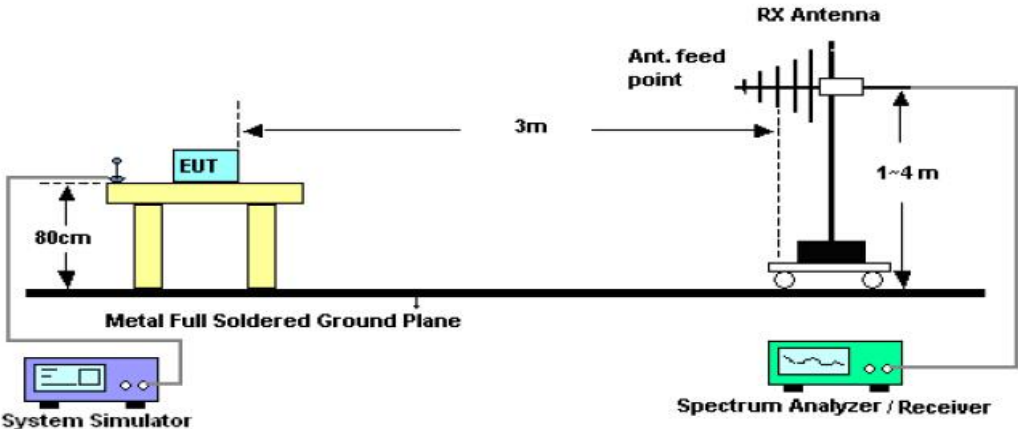
<b>Receiver Parameter</b>	<b>Setting</b>
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

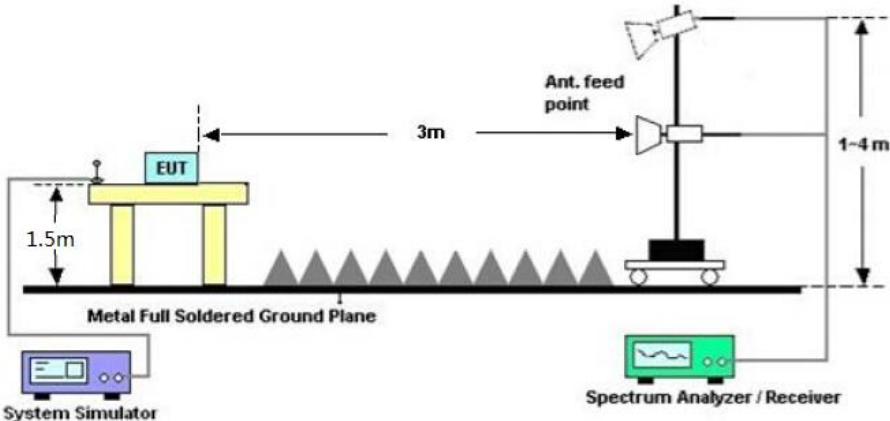
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



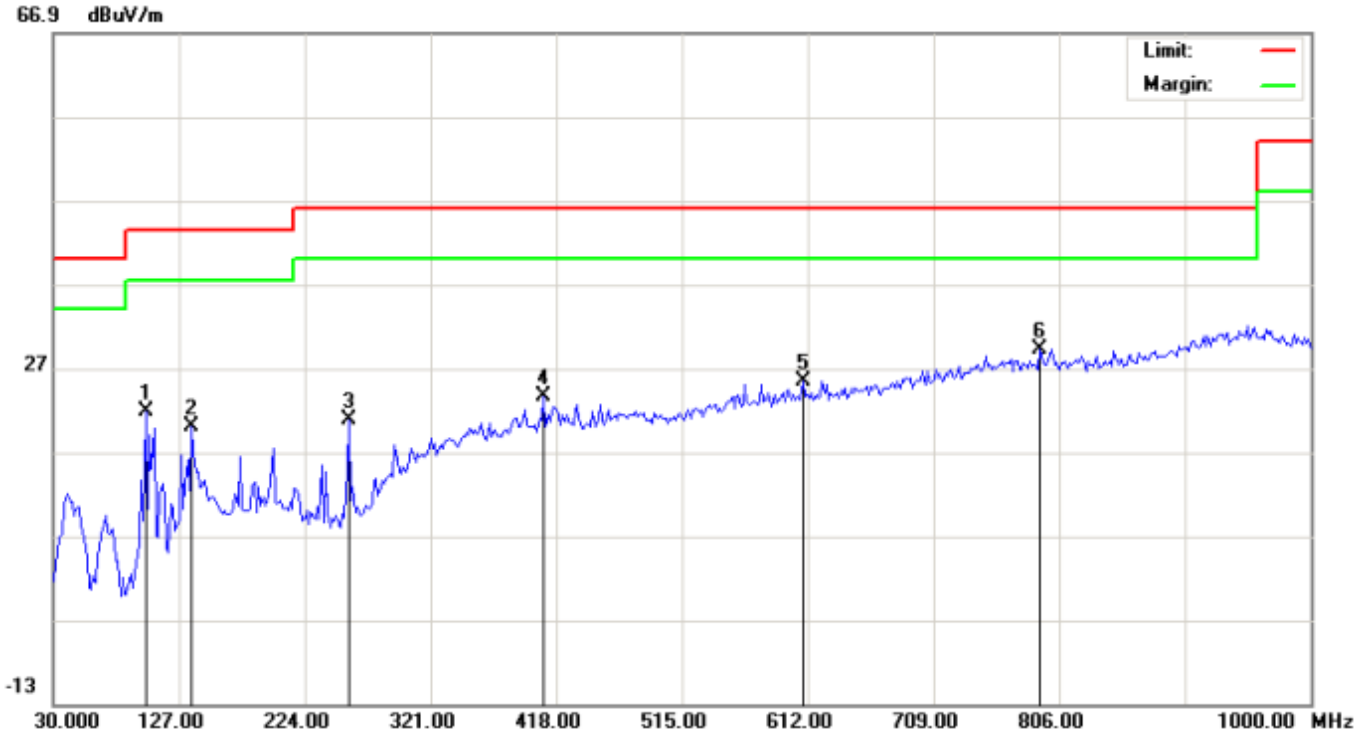
**7.4. TEST RESULT**

**RADIATED EMISSION BELOW 30MHZ**

No emission found between lowest internal used/generated frequencies to 30MHz.

**RADIATED EMISSION 30MHz- 1GHZ**

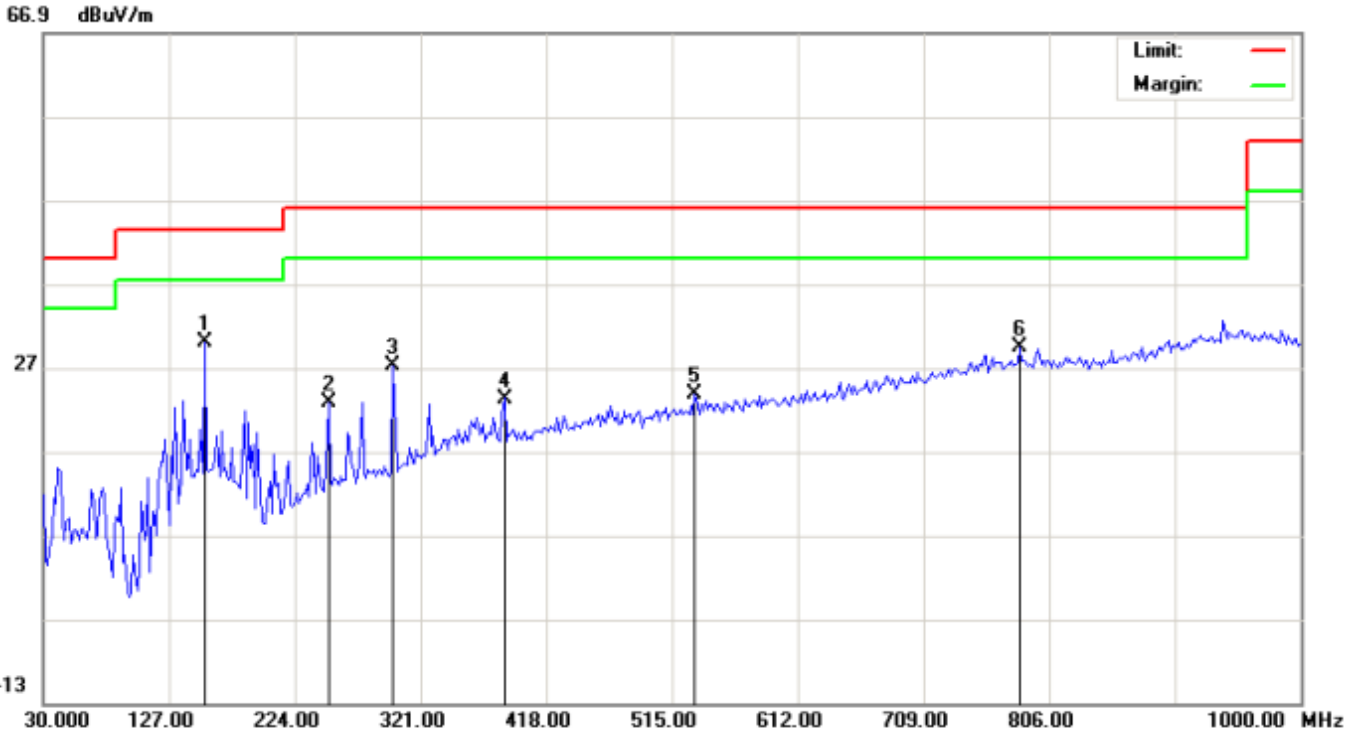
EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Horizontal



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		101.1333	11.66	10.22	21.88	43.50	-21.62	peak			
2		136.7000	6.36	13.66	20.02	43.50	-23.48	peak			
3		257.9500	12.58	8.25	20.83	46.00	-25.17	peak			
4		408.3000	4.20	19.32	23.52	46.00	-22.48	peak			
5		608.7667	1.66	23.75	25.41	46.00	-20.59	peak			
6	*	791.4500	2.04	27.20	29.24	46.00	-16.76	peak			

**RESULT: PASS**

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	154.4833	14.71	15.29	30.00	43.50	-13.50	peak			
2		249.8667	9.01	13.89	22.90	46.00	-23.10	peak			
3		299.9833	11.78	15.41	27.19	46.00	-18.81	peak			
4		385.6667	4.32	18.98	23.30	46.00	-22.70	peak			
5		532.7833	1.75	22.02	23.77	46.00	-22.23	peak			
6		783.3667	2.37	27.09	29.46	46.00	-16.54	peak			

**RESULT: PASS**

**Note:**

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

**FIELD STRENGTH OF FUNDAMENTAL**

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	GFSK	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
2402.138	105.46	-9.37	96.09	114	-17.91	peak
2402.138	100.23	-9.37	90.86	94	-3.14	AVG
2441.031	105.64	-9.63	96.01	114	-17.99	peak
2441.031	100.36	-9.63	90.73	94	-3.27	AVG
2480.163	105.14	-9.61	95.53	114	-18.47	peak
2480.163	100.47	-9.61	90.86	94	-3.14	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	GFSK	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
2402.364	104.89	-9.37	95.52	114	-18.48	peak
2402.364	101.35	-9.37	91.98	94	-2.02	AVG
2441.069	105.29	-9.63	95.66	114	-18.34	peak
2441.069	100.85	-9.63	91.22	94	-2.78	AVG
2480.236	106.23	-9.61	96.62	114	-17.38	peak
2480.236	101.48	-9.61	91.87	94	-2.13	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	$\pi$ /4-DQPSK	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
2402.198	105.33	-9.37	95.96	114	-18.04	peak
2402.198	100.27	-9.37	90.9	94	-3.1	AVG
2441.067	105.49	-9.63	95.86	114	-18.14	peak
2441.067	100.42	-9.63	90.79	94	-3.21	AVG
2480.125	105.24	-9.61	95.63	114	-18.37	peak
2480.125	100.32	-9.61	90.71	94	-3.29	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	$\pi$ /4-DQPSK	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Value Type
2402.010	104.38	-9.37	95.01	114	-18.99	peak
2402.010	101.21	-9.37	91.84	94	-2.16	AVG
2441.072	105.74	-9.63	96.11	114	-17.89	peak
2441.072	100.33	-9.63	90.7	94	-3.3	AVG
2480.155	105.31	-9.61	95.7	114	-18.3	peak
2480.155	100.42	-9.61	90.81	94	-3.19	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	8DPSK	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
2402.291	105.34	-9.37	95.97	114	-18.03	peak
2402.291	100.16	-9.37	90.79	94	-3.21	AVG
2441.034	105.23	-9.63	95.6	114	-18.4	peak
2441.034	100.68	-9.63	91.05	94	-2.95	AVG
2480.177	105.08	-9.61	95.47	114	-18.53	peak
2480.177	100.42	-9.61	90.81	94	-3.19	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Modulation :	8DPSK	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
2402.066	104.13	-9.37	94.76	114	-19.24	peak
2402.066	100.58	-9.37	91.21	94	-2.79	AVG
2441.123	105.64	-9.63	96.01	114	-17.99	peak
2441.123	100.29	-9.63	90.66	94	-3.34	AVG
2480.214	106.24	-9.61	96.63	114	-17.37	peak
2480.214	101.47	-9.61	91.86	94	-2.14	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RADIATED EMISSION ABOVE 1GHZ**

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.276	44.32	3.74	48.06	74	-25.94	peak
4804.276	36.51	3.74	40.25	54	-13.75	AVG
7206.414	38.45	8.14	46.59	74	-27.41	peak
7206.414	34.62	8.14	42.76	54	-11.24	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.728	44.16	3.74	47.9	74	-26.1	peak
4804.728	37.28	3.74	41.02	54	-12.98	AVG
7207.092	38.69	8.14	46.83	74	-27.17	peak
7207.092	36.33	8.14	44.47	54	-9.53	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 2	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4882.134	43.69	3.76	47.45	74	-26.55	peak
4882.134	36.84	3.76	40.6	54	-13.4	AVG
7323.201	38.42	8.17	46.59	74	-27.41	peak
7323.201	35.27	8.17	43.44	54	-10.56	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 2	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4882.144	44.69	3.76	48.45	74	-25.55	peak
4882.144	37.84	3.76	41.6	54	-12.4	AVG
7323.216	38.26	8.17	46.43	74	-27.57	peak
7323.216	35.51	8.17	43.68	54	-10.32	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 3	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.354	43.65	3.83	47.48	74	-26.52	peak
4960.354	39.18	3.83	43.01	54	-10.99	AVG
7440.531	37.52	8.21	45.73	74	-28.27	peak
7440.531	36.84	8.21	45.05	54	-8.95	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 3	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.428	42.86	3.83	46.69	74	-27.31	peak
4960.428	39.15	3.83	42.98	54	-11.02	AVG
7440.642	37.54	8.21	45.75	74	-28.25	peak
7440.642	35.26	8.21	43.47	54	-10.53	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

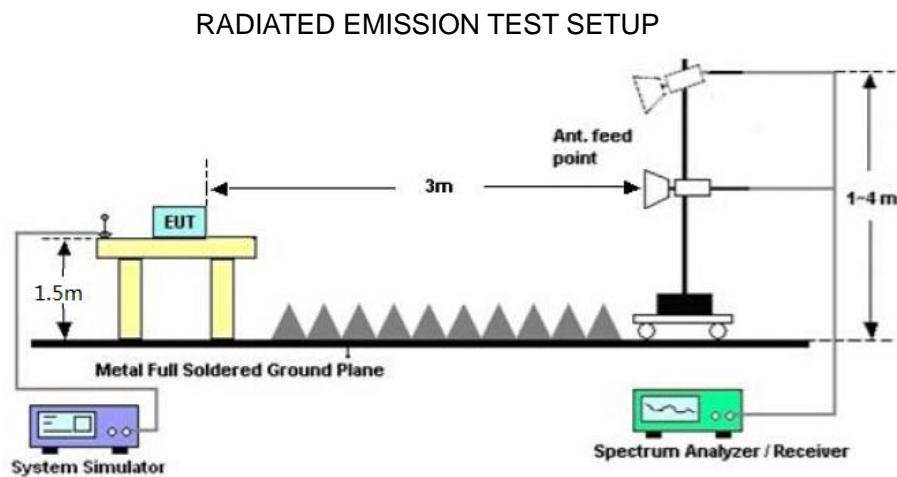
**Note:** Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.  
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.  
The “Factor” value can be calculated automatically by software of measurement system.  
The GFSK modulation was the worst case and only the data of worst recorded in this report.

## 8. BAND EDGE EMISSION

### 8.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO
3. Other procedures refer to clause 7.2.

### 8.2 TEST SETUP



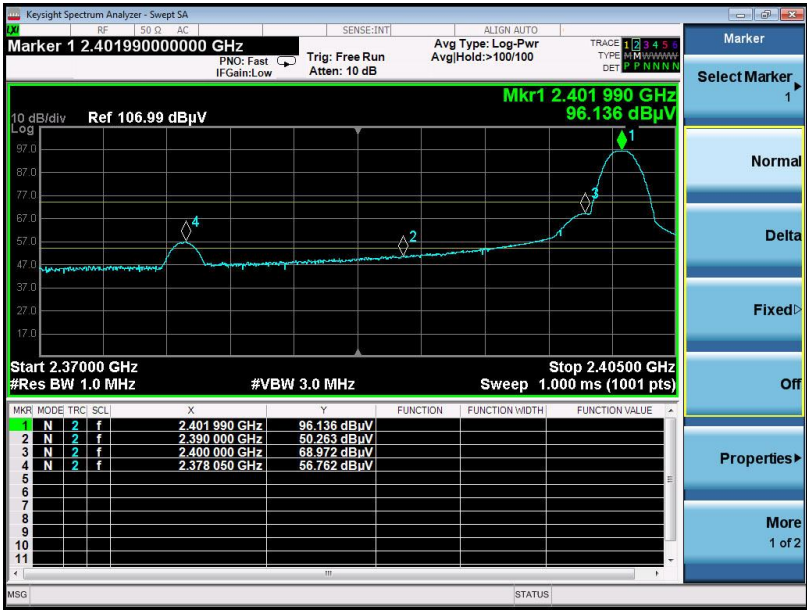
### 8.3 RADIATED TEST RESULT

**Note:**

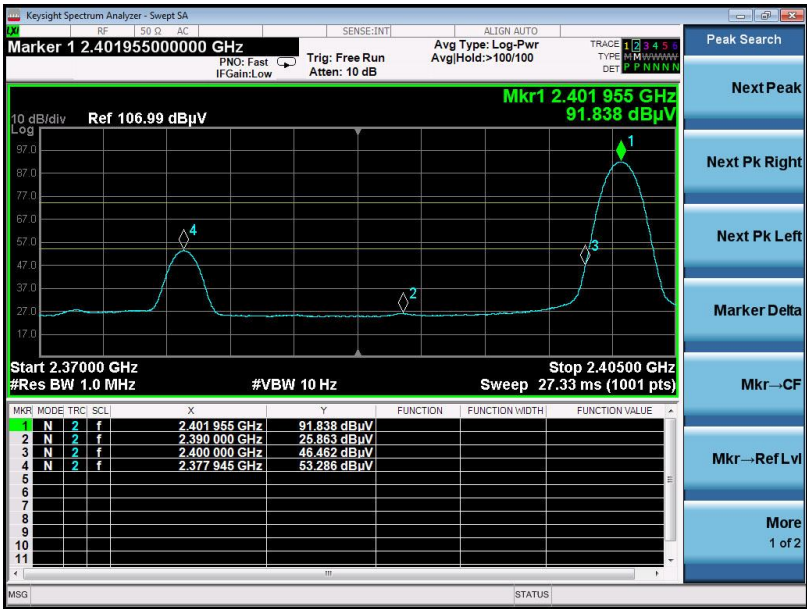
1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.

EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Horizontal

PK Value



AV Value

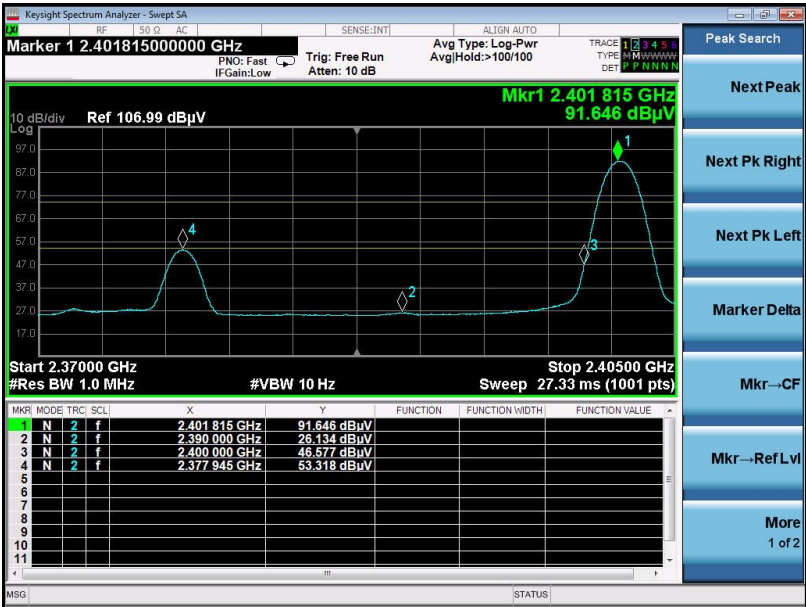


EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 1	Polarization :	Vertical

PK Value



AV Value

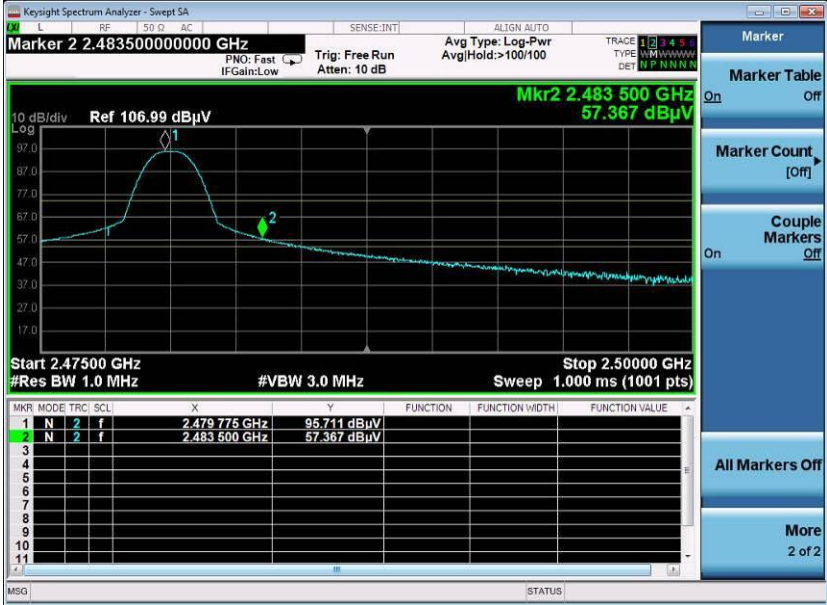






EUT :	Bluetooth+2.4G Mouse	Model Name. :	MD156
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC3.0V
Test Mode :	Mode 3	Polarization :	Vertical

PK Value



AV Value



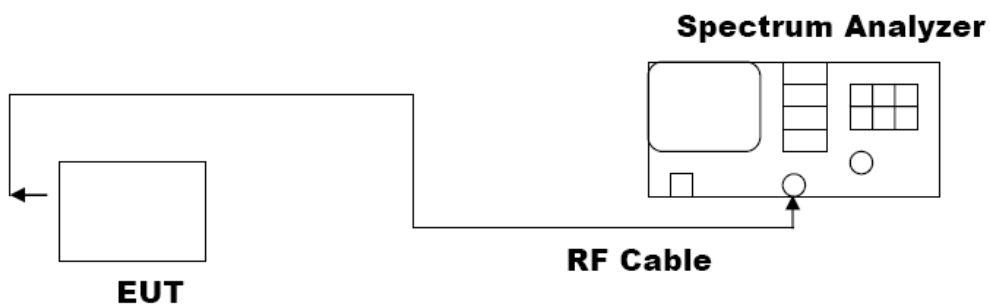
Note: The GFSK modulation was the worst case and only the data of worst recorded in this report.

## 9. 20DB BANDWIDTH

### 9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 30 KHz, VBW  $\geq 3 \times$  RBW.
4. Set SPA Trace 1 Max hold, then View.

### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

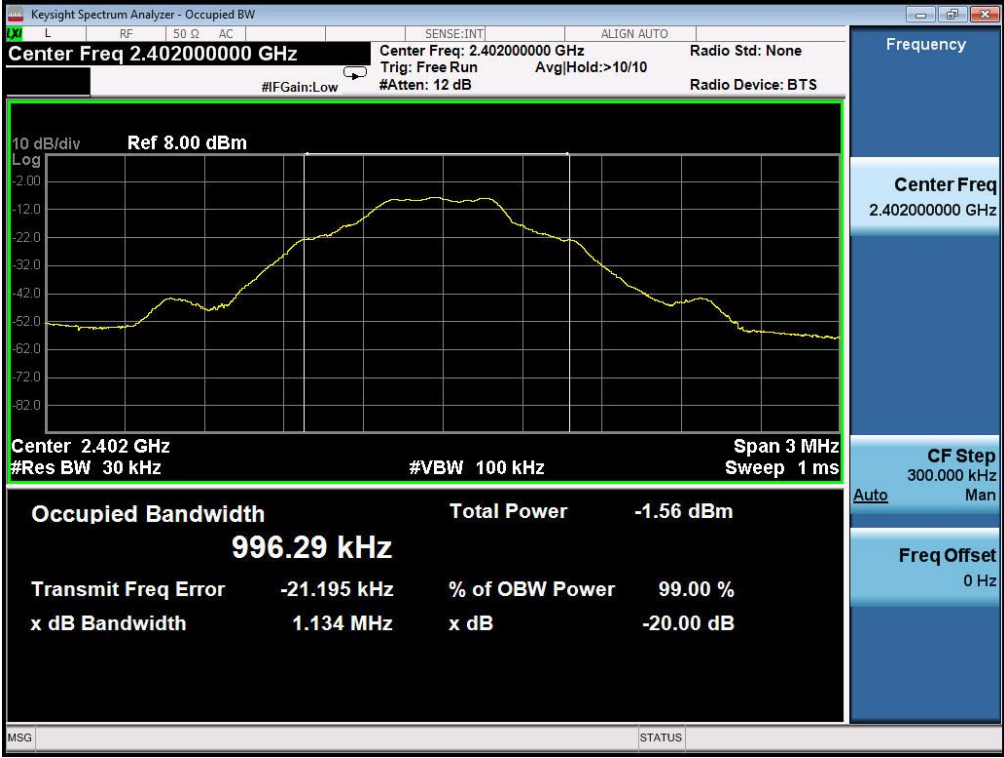


9.3. MEASUREMENT RESULTS

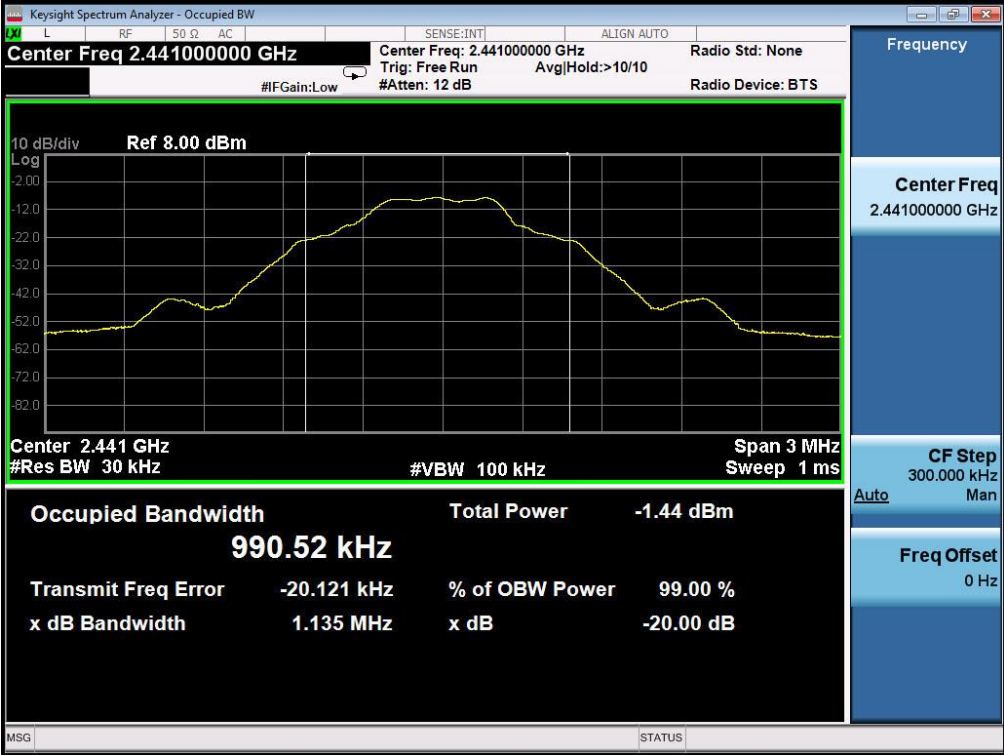
TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK for BR/EDR

Test Data (MHz)		Criteria
Low Channel	1.134	PASS
Middle Channel	1.135	PASS
High Channel	1.134	PASS

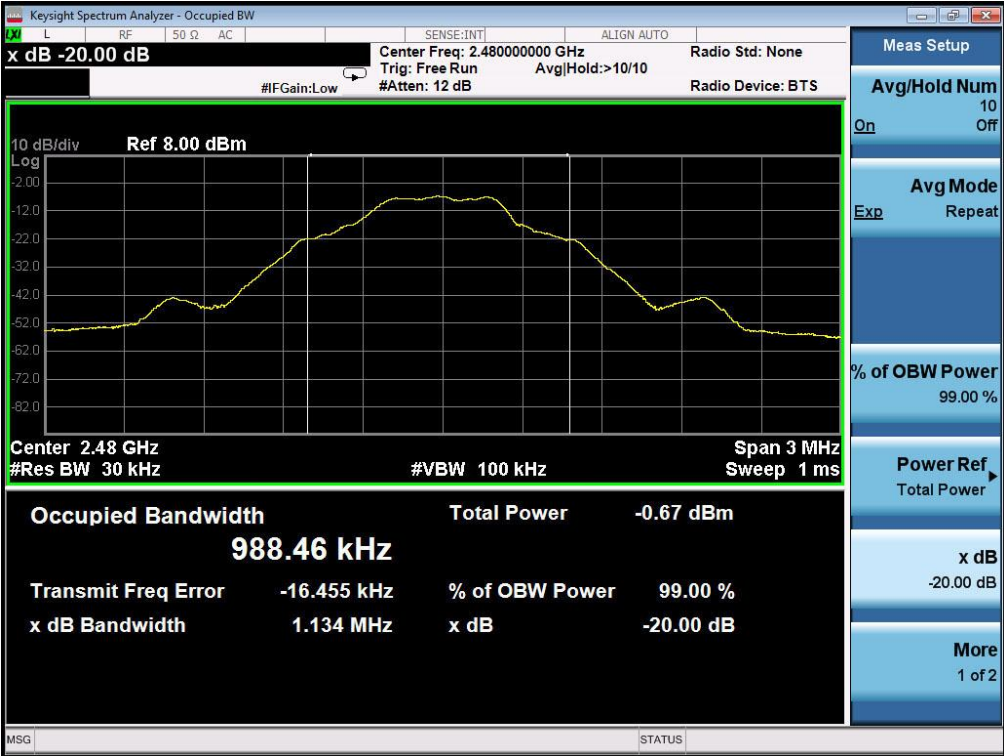
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



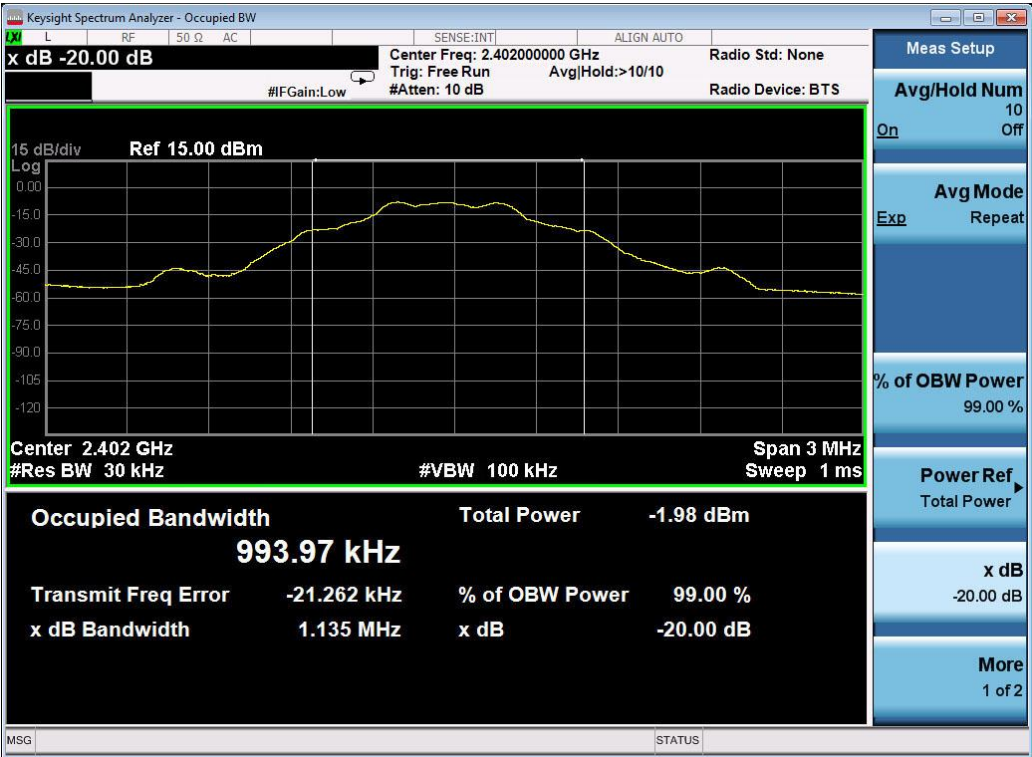
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



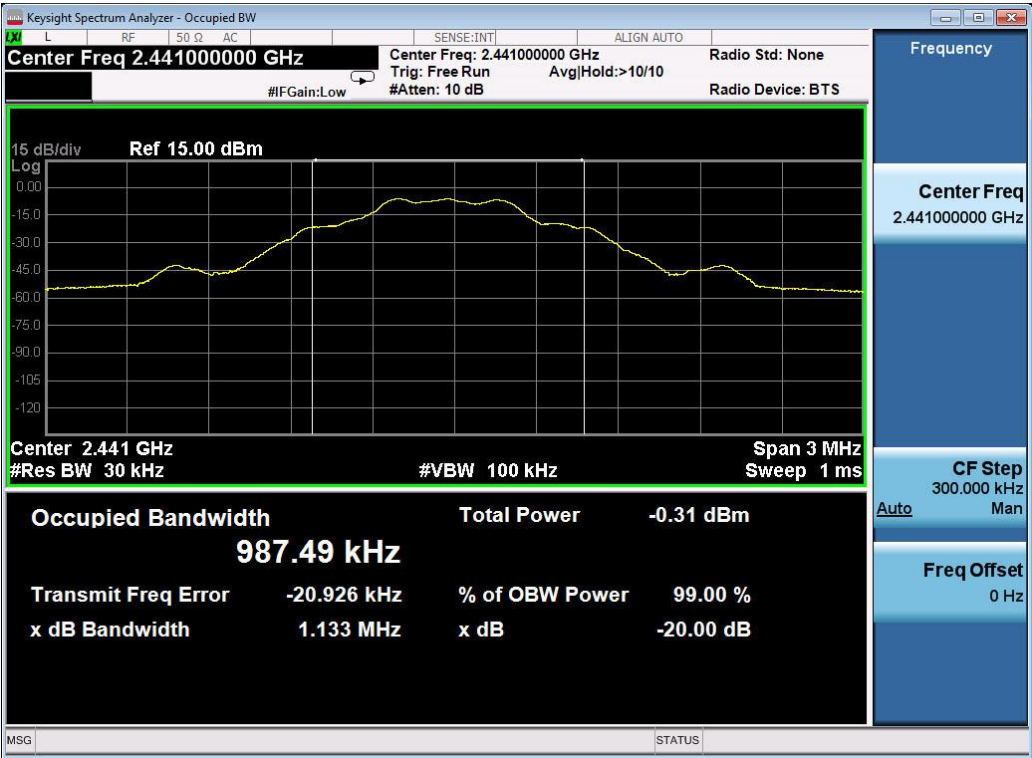
<b>TEST ITEM</b>	20DB BANDWIDTH
<b>TEST MODULATION</b>	$\pi$ /4-DQPSK for BR/EDR

Test Data (MHz)		Criteria
Low Channel	1.135	PASS
Middle Channel	1.133	PASS
High Channel	1.131	PASS

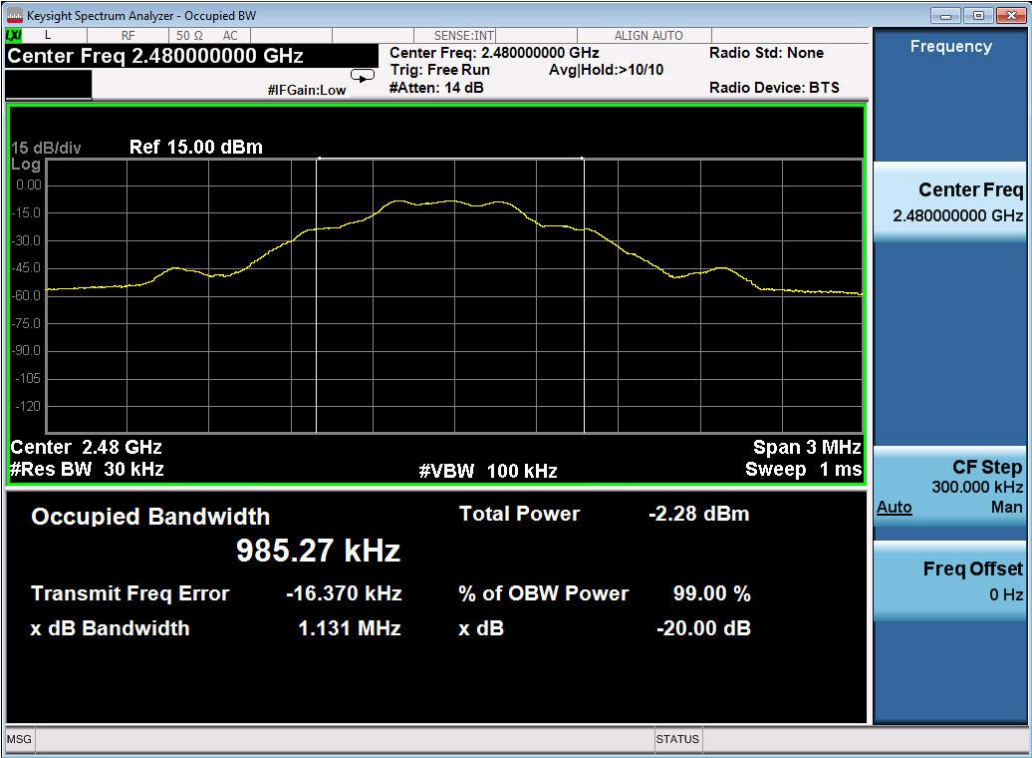
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



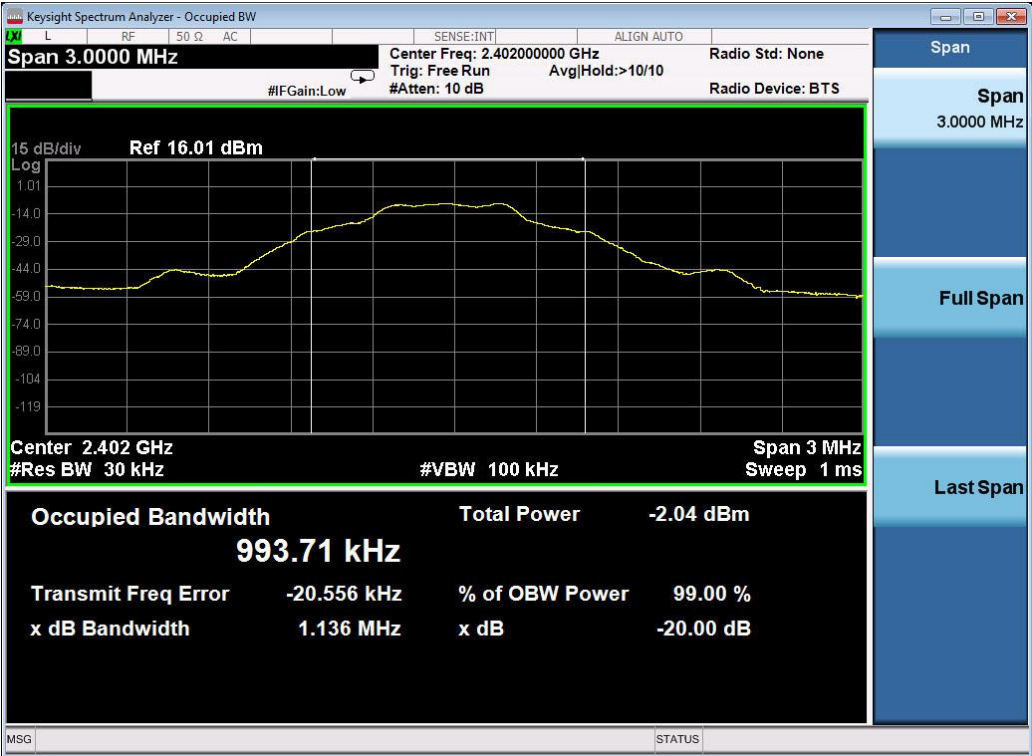
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



<b>TEST ITEM</b>	20DB BANDWIDTH
<b>TEST MODULATION</b>	8DPSK for BR/EDR

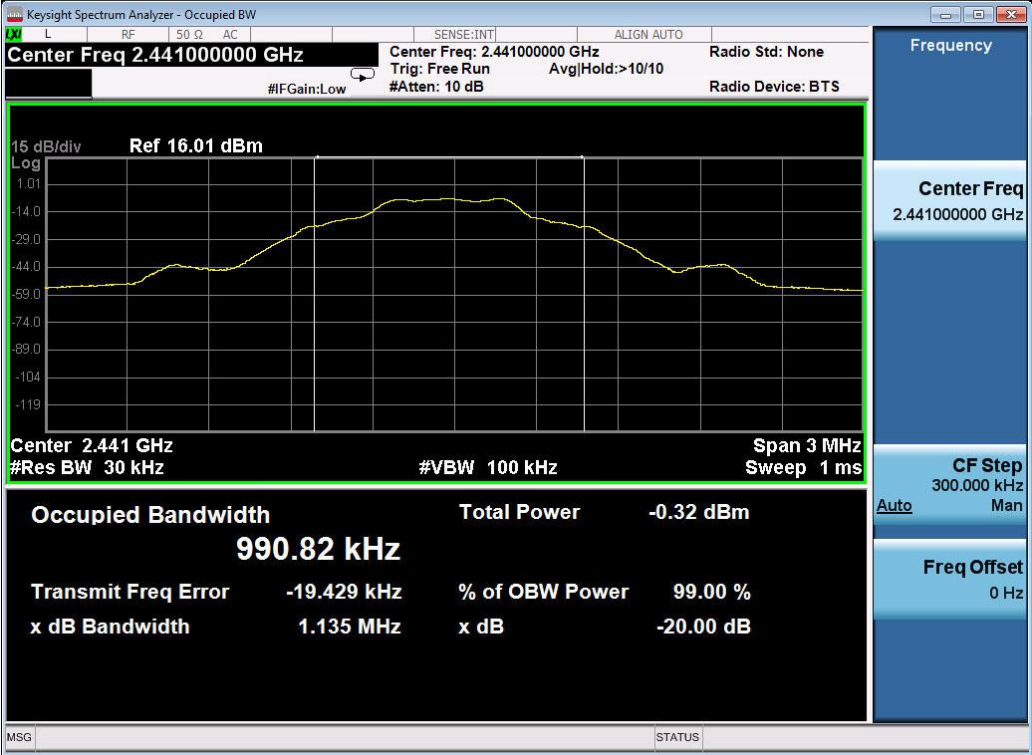
Test Data (MHz)		Criteria
Low Channel	1.136	PASS
Middle Channel	1.135	PASS
High Channel	1.129	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

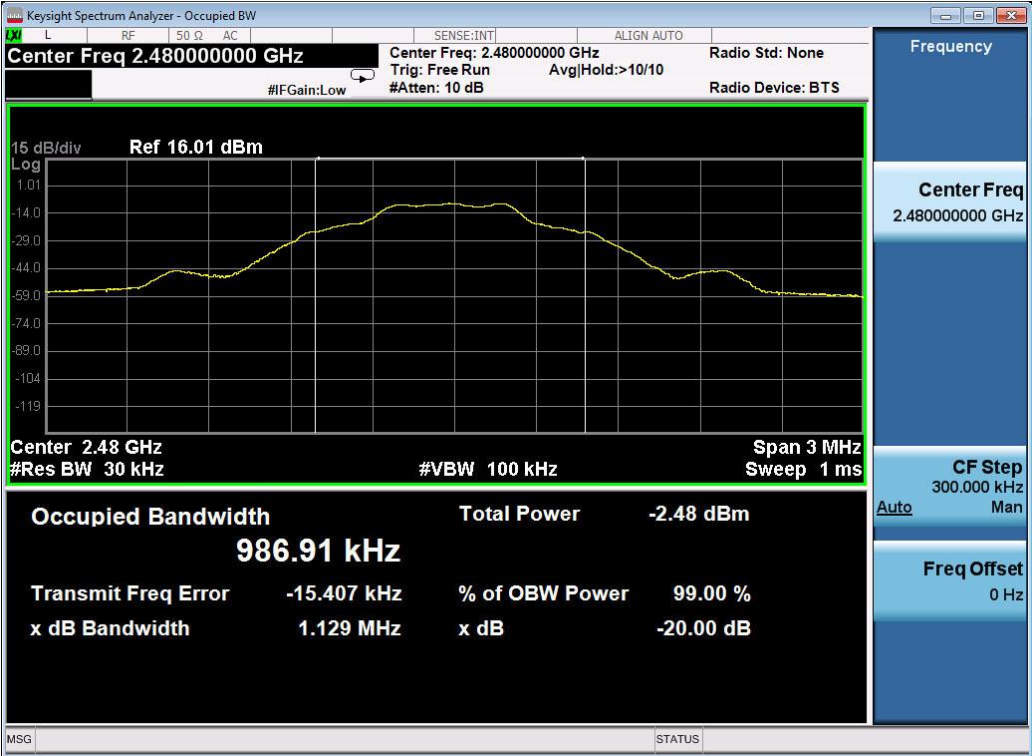




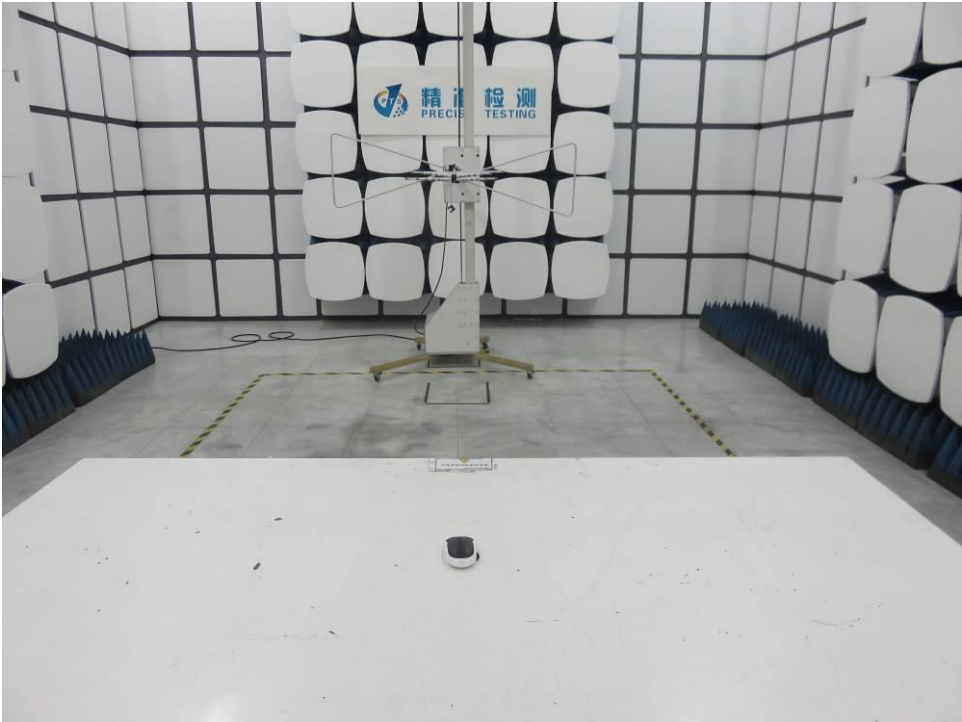
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



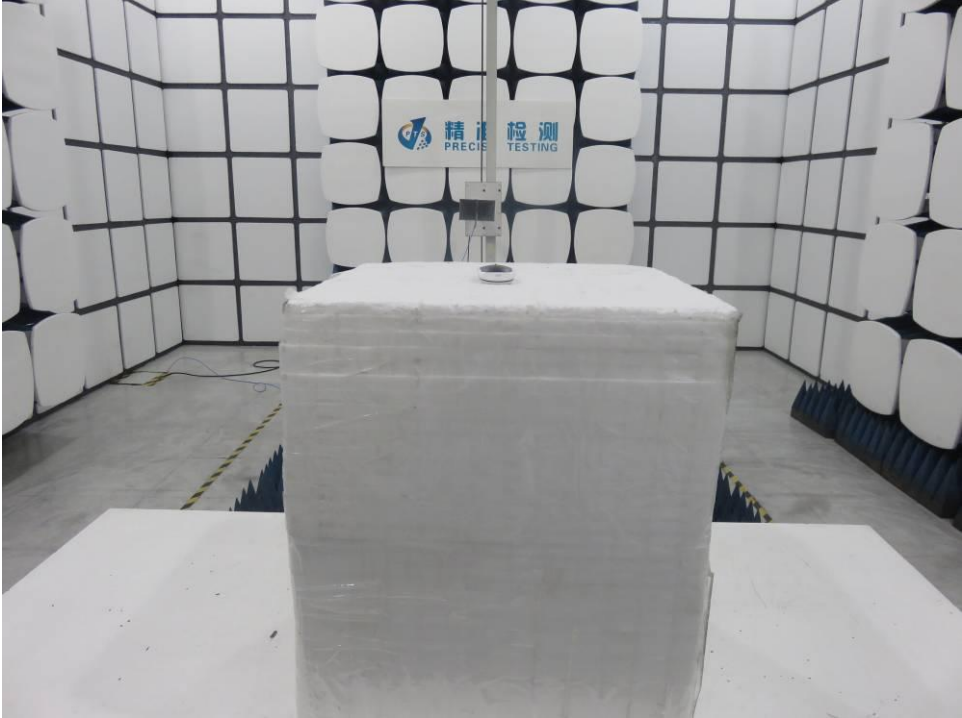
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



**APPENDIX A: PHOTOGRAPHS OF TEST SETUP**  
**FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ**



**FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ**



**APPENDIX B: PHOTOGRAPHS OF EUT**

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



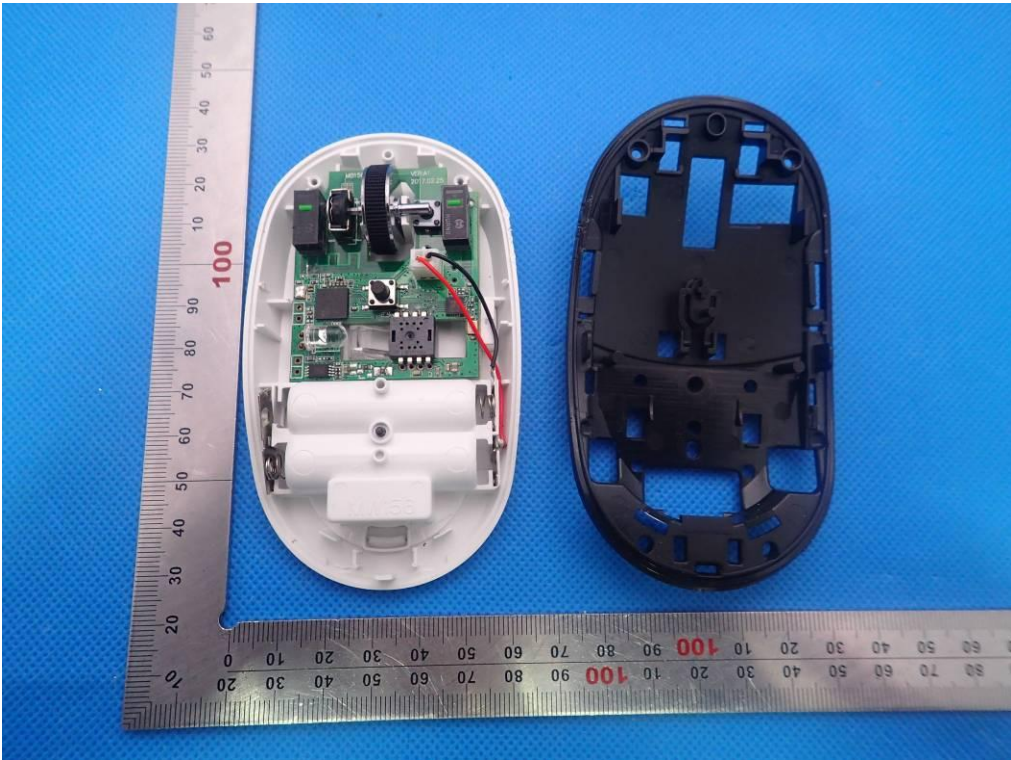
LEFT VIEW OF EUT



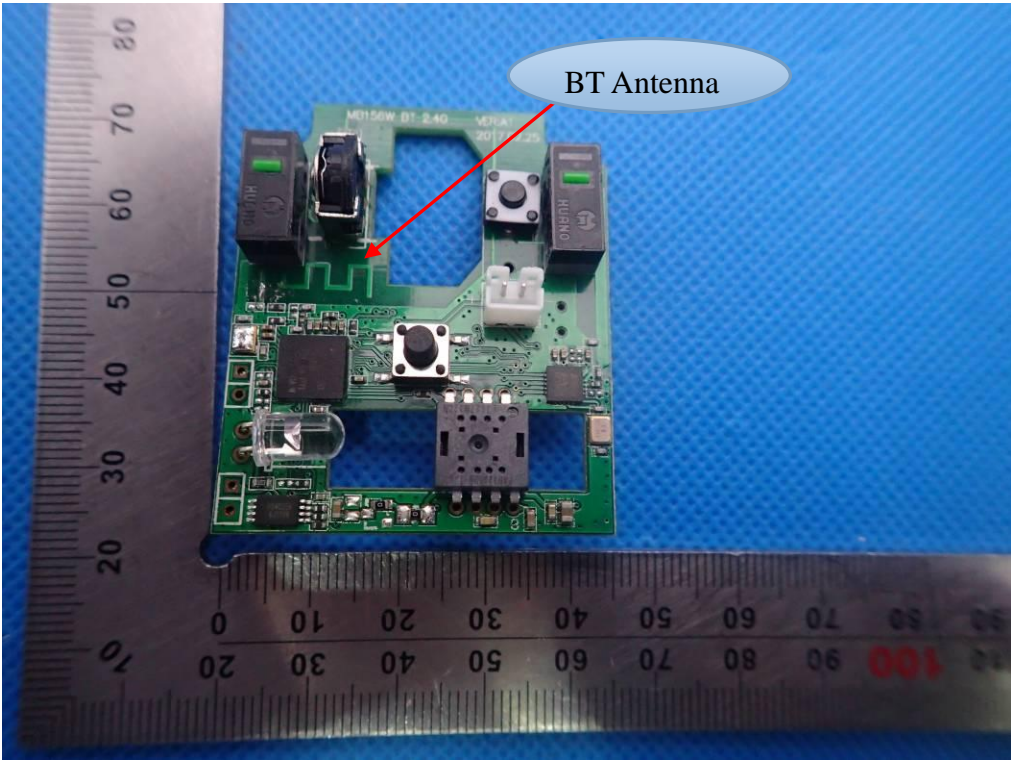
RIGHT VIEW OF EUT



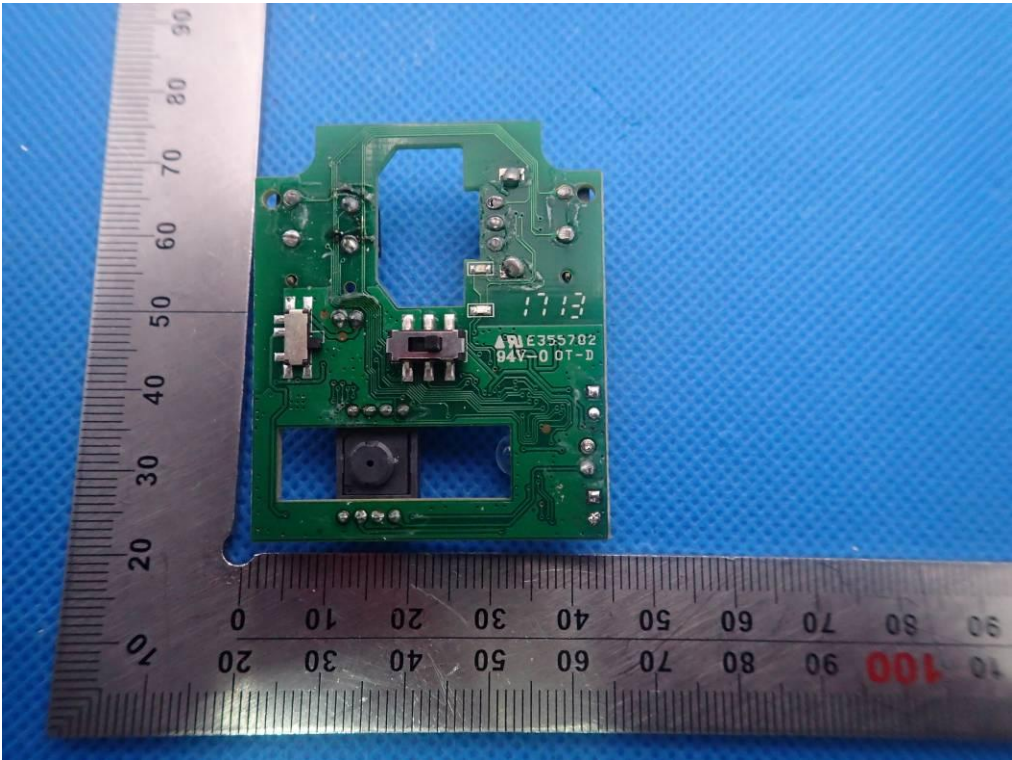
OPEN VIEW OF EUT-1



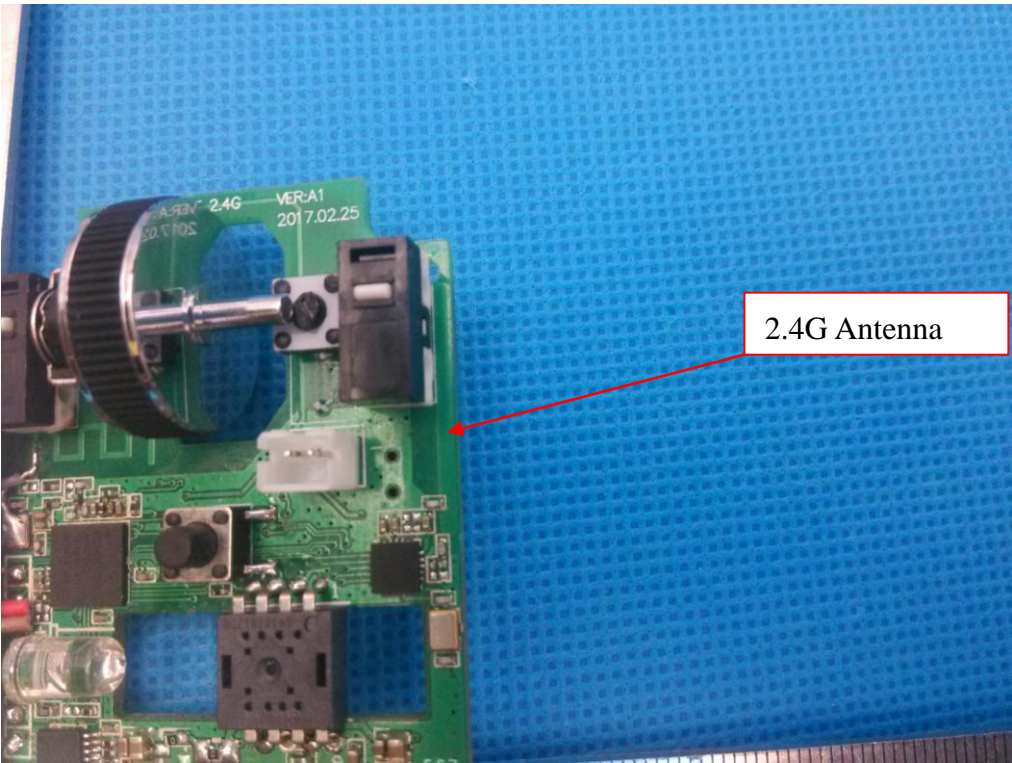
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



----END OF REPORT----