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# FCC Test Report

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Report No.: AGC04096150402FE03

**FCC ID** : 2AEDMSC-25  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Bluetooth speaker  
**BRAND NAME** : ESOTICA  
**MODEL NAME** : SC-25  
**CLIENT** : Shenzhen Caijiaxin Technology Co., Ltd.  
**DATE OF ISSUE** : Apr.25,2015  
**STANDARD(S)**  
**TEST PROCEDURE(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	/	Apr.25,2015	Valid	Original Report

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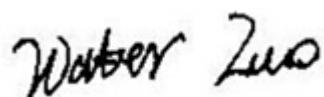
## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Shenzhen Caijiaxin Technology Co., Ltd.
<b>Address</b>	The Negative First Floor to the Right, Jinyu City, No .592, Bulong Road, Sakata Street, Longgang District, Shenzhen
<b>Manufacturer</b>	Shenzhen Caijiaxin Technology Co., Ltd.
<b>Address</b>	The Negative First Floor to the Right, Jinyu City, No .592,Bulong Road, Sakata Street, Longgang District, Shenzhen
<b>Product Designation</b>	Bluetooth speaker
<b>Brand Name</b>	ESOTICA
<b>Test Model</b>	SC-25
<b>Date of test</b>	Apr.22,2015 to Apr.24,2015
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Report Template</b>	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Compliance Certification Service(Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) 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.

Prepared By



Water Zuo Apr.25,2015

Checked By



Forrest Lei Apr.25,2015

Authorized By



Solger Zhang Apr.25,2015

## 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>RF Output Power</b>	2.62dBm(Max)
<b>Bluetooth Version</b>	V4.0
<b>Modulation</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK
<b>Number of channels</b>	79 for traditional BT 40 for BLE
<b>Hardware Version</b>	V1.0
<b>Software Version</b>	V1.0
<b>Antenna Designation</b>	PCB Antenna (Met 15.203 Antenna requirement)
<b>Antenna Gain</b>	0dBi
<b>Power Supply</b>	DC 3.7V by battery for speaker, DC12V/2.0A by adapter for Cushion
Note: The USB port only used for charging and can't be used to transfer data with PC.	

### 2.2. TABLE OF CARRIER FREQUENCYS

Traditional Bluetooth 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

BLE Channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2404MHZ
	:	:
	38	2478 MHZ
	39	2480 MHZ

### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , 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 % .

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	Normal operation (BT)

Note:

1. 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.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

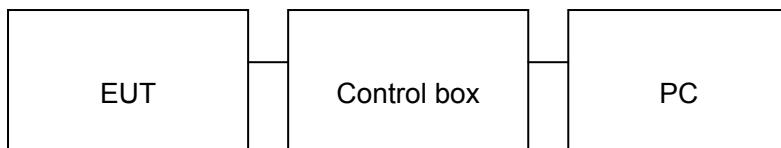
## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Bluetooth speaker	ESOTICA	SC-25	EUT
2	PC	Dell	INSPIRON	A.E
3	Control box	N/A	N/A	A.E

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.207	Conduction Emission	Compliant

## 6. TEST FACILITY

<b>Site</b>	Compliance Certification Service(Shenzhen) Inc.
<b>Location</b>	No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan Ian Town, Baoan Distr
<b>FCC Registration No.</b>	441872
<b>Description</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

## 7 ALL TEST EQUIPMENT LIST

### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.27	2015.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.06	2015.06.06
Horn Antenna	R&S	9120D	152265	2014.10.27	2015.10.26
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21
Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07
Power Meter	Anritsu	ML2495A	1204003	2014.10.25	2015.10.24
Power Sensor	Anritsu	MA2411B	100309	2014.10.25	2015.10.24

### Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	102086	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.06	2015.06.06
Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.06	2015.06.06
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26

## 8. RADIATED EMISSION

### 8.1 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.

## 8.2. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 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 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
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.

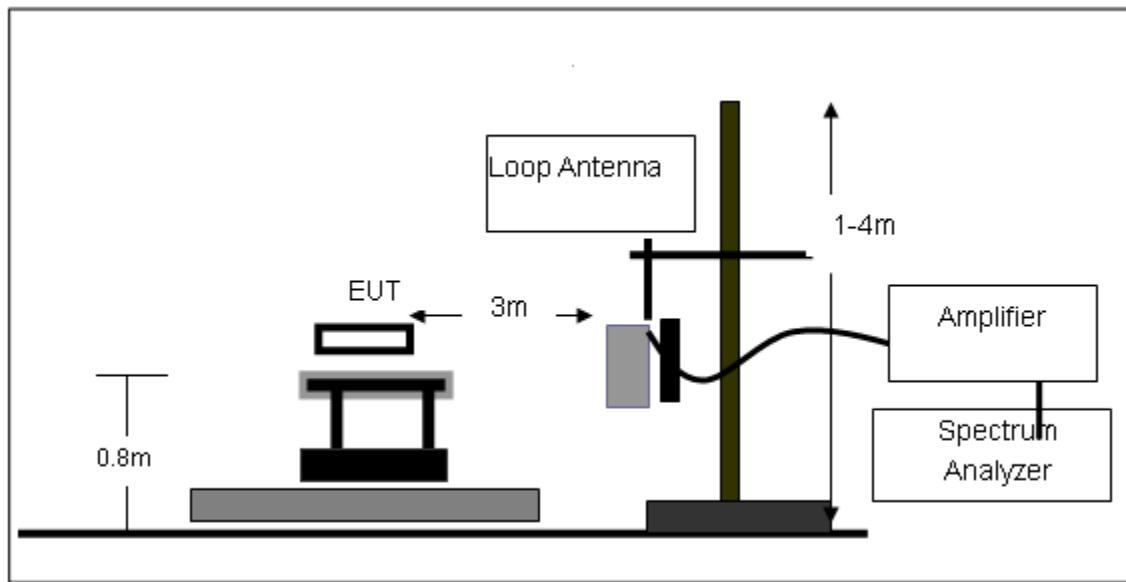
The following table is the setting of spectrum analyzer and receiver.

<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 1MHz/1MHz for Peak, 1MHz/10Hz for Average

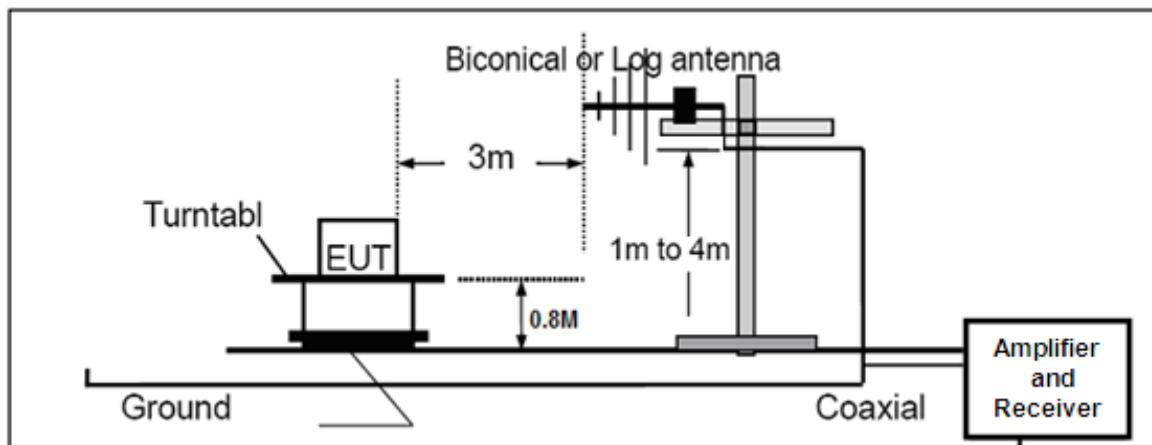
<b>Receiver Parameter</b>	<b>Setting</b>
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

### 8.3. TEST SETUP

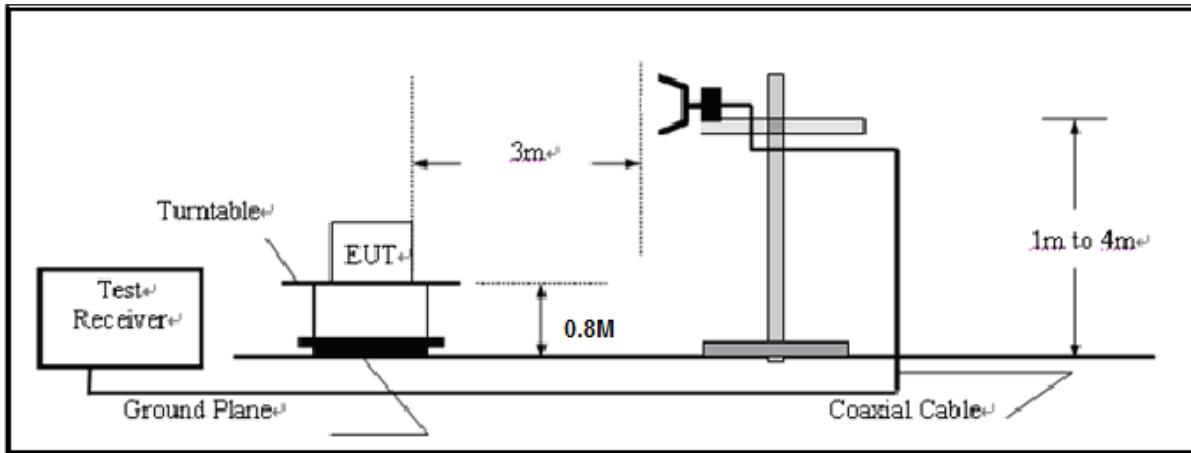
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



#### 8.4. TEST RESULT(Worst modulation:GFSK)

#### FOR TRADITIONAL BLUETOOTH

#### RADIATED EMISSION BELOW 30MHZ

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

#### RADIATED EMISSION BELOW 1GHZ

#### RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL



Site: site #1  
Limit: FCC Class B 3M Radiation  
EUT: Bluetooth Speaker  
M/N: SC-25  
Mode: Low Channel TX  
Note:

Polarization: **Horizontal**

Temperature: 26

Power:

Humidity: 60 %

Distance: 3m

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1	*	52.6333	24.71	11.22	35.93	40.00	-4.07	peak			
2		114.0667	18.50	11.45	29.95	43.50	-13.55	peak			
3		199.7500	21.80	11.99	33.79	43.50	-9.71	peak			
4		299.9833	9.71	15.41	25.12	46.00	-20.88	peak			
5		416.3833	13.06	19.57	32.63	46.00	-13.37	peak			
6		434.1667	12.22	20.11	32.33	46.00	-13.67	peak			

**RESULT: PASS**

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1 Polarization: *Vertical* Temperature: 26  
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Low Channel TX  
 Note:

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	*	38.0833	30.65	6.39	37.04	40.00	-2.96	peak			
2		127.0000	20.74	9.78	30.52	43.50	-12.98	peak			
3		201.3667	23.13	9.13	32.26	43.50	-11.24	peak			
4		416.3833	7.51	19.57	27.08	46.00	-18.92	peak			
5		487.5167	7.83	21.00	28.83	46.00	-17.17	peak			
6		770.4333	4.06	26.91	30.97	46.00	-15.03	peak			

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.  
 2. The "Factor" value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: site #1 Polarization: **Horizontal** Temperature: 26  
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Middle Channel TX  
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1	*	54.2500	25.15	11.20	36.35	40.00	-3.65	peak			
2		217.5333	21.51	12.67	34.18	46.00	-11.82	peak			
3		451.9500	13.37	20.61	33.98	46.00	-12.02	peak			
4		734.8667	3.30	26.19	29.49	46.00	-16.51	peak			
5		867.4333	1.30	27.76	29.06	46.00	-16.94	peak			

**RESULT: PASS**

## RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1	Polarization: <i>Vertical</i>	Temperature: 26
Limit: FCC Class B 3M Radiation	Power:	Humidity: 60 %
EUT: Bluetooth Speaker	Distance: 3m	
M/N: SC-25		
Mode: Middle Channel TX		
Note:		

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	*	38.0833	30.65	6.39	37.04	40.00	-2.96	peak			
2		127.0000	20.74	9.78	30.52	43.50	-12.98	peak			
3		201.3667	23.13	9.13	32.26	43.50	-11.24	peak			
4		416.3833	7.51	19.57	27.08	46.00	-18.92	peak			
5		487.5167	7.83	21.00	28.83	46.00	-17.17	peak			
6		770.4333	4.06	26.91	30.97	46.00	-15.03	peak			

## RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

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

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: site #1 Polarization: *Horizontal* Temperature: 26  
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: High Channel TX  
 Note:

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	*	55.8667	25.18	11.19	36.37	40.00	-3.63	peak			
2		217.5333	20.01	12.67	32.68	46.00	-13.32	peak			
3		340.4000	9.49	18.10	27.59	46.00	-18.41	peak			
4		416.3833	15.06	19.57	34.63	46.00	-11.37	peak			
5		772.0500	2.60	26.93	29.53	46.00	-16.47	peak			
6		903.0000	1.10	28.69	29.79	46.00	-16.21	peak			

**RESULT: PASS**

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1  
 Limit: FCC Class B 3M Radiation  
 EUT: Bluetooth Speaker  
 M/N: SC-25  
 Mode: High Channel TX  
 Note:

Polarization: **Vertical**  
 Power:  
 Distance: 3m

Temperature: 26  
 Humidity: 60 %

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	*	39.7000	27.42	8.51	35.93	40.00	-4.07	peak			
2		127.0000	21.24	9.78	31.02	43.50	-12.48	peak			
3		180.3500	20.60	13.98	34.58	43.50	-8.92	peak			
4		443.8667	10.62	20.40	31.02	46.00	-14.98	peak			
5		506.9167	9.69	21.32	31.01	46.00	-14.99	peak			
6		822.1667	1.79	27.32	29.11	46.00	-16.89	peak			

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

FOR BLE

### RADIATED EMISSION BELOW 30MHZ

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

### RADIATED EMISSION BELOW 1GHZ

#### RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-25

Mode: Low Channel TX

Note:

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	*	55.8667	25.18	11.19	36.37	40.00	-3.63	peak			
2		114.0665	20.00	11.45	31.45	43.50	-12.05	peak			
3		194.9000	21.91	11.76	33.67	43.50	-9.83	peak			
4		460.0332	12.88	20.70	33.58	46.00	-12.42	peak			
5		608.7667	3.52	23.75	27.27	46.00	-18.73	peak			
6		822.1666	2.50	27.32	29.82	46.00	-16.18	peak			

**RESULT: PASS**

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1 Polarization: **Vertical** Temperature: 26  
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Low Channel TX  
 Note:

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	*	36.4667	31.59	4.27	35.86	40.00	-4.14	peak			
2		127.0000	21.24	9.78	31.02	43.50	-12.48	peak			
3		180.3498	21.60	13.98	35.58	43.50	-7.92	peak			
4		443.8666	12.12	20.40	32.52	46.00	-13.48	peak			
5		487.5167	9.84	20.99	30.83	46.00	-15.17	peak			
6		770.4333	2.06	26.91	28.97	46.00	-17.03	peak			

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL

66.9 dBuV/m



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-25

Mode: Middle Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	54.2500	25.15	11.20	36.35	40.00	-3.65	peak			
2		191.6665	20.30	11.61	31.91	43.50	-11.59	peak			
3		217.5330	18.01	12.67	30.68	46.00	-15.32	peak			
4		432.5500	14.78	20.06	34.84	46.00	-11.16	peak			
5		595.8333	1.73	23.63	25.36	46.00	-20.64	peak			
6		822.1666	0.50	27.32	27.82	46.00	-18.18	peak			

**RESULT: PASS**

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1 Polarization: **Vertical** Temperature: 26  
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Middle Channel TX  
 Note:

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	*	36.4667	31.59	4.27	35.86	40.00	-4.14	peak			
2		199.7500	26.33	9.06	35.39	43.50	-8.11	peak			
3		435.7832	12.32	20.16	32.48	46.00	-13.52	peak			
4		529.5498	8.37	21.93	30.30	46.00	-15.70	peak			
5		846.4166	3.34	27.31	30.65	46.00	-15.35	peak			
6		898.1499	0.65	28.56	29.21	46.00	-16.79	peak			

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: site #1  
Limit: FCC Class B 3M Radiation  
EUT: Bluetooth Speaker  
M/N: SC-25  
Mode: High Channel TX  
Note:

Polarization: **Horizontal** Temperature: 26  
Power: Humidity: 60 %  
Distance: 3m

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dB			Height	Degree	
1	*	52.6332	25.71	11.22	36.93	40.00	-3.07	peak			
2		199.7500	20.80	11.99	32.79	43.50	-10.71	peak			
3		299.9832	14.21	15.41	29.62	46.00	-16.38	peak			
4		440.6333	14.28	20.31	34.59	46.00	-11.41	peak			
5		608.7667	5.52	23.75	29.27	46.00	-16.73	peak			
6		814.0833	4.18	27.32	31.50	46.00	-14.50	peak			

**RESULT: PASS**

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1  
Limit: FCC Class B 3M Radiation  
EUT: Bluetooth Speaker  
M/N: SC-25  
Mode: High Channel TX  
Note:

Polarization: Vertical  
Power:  
Distance: 3m  
Temperature: 26  
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dB			cm	degree	
1	*	38.0833	30.15	6.39	36.54	40.00	-3.46	peak			
2		198.1331	23.92	9.47	33.39	43.50	-10.11	peak			
3		443.8666	11.62	20.40	32.02	46.00	-13.98	peak			
4		479.4331	11.97	20.91	32.88	46.00	-13.12	peak			
5		700.9166	3.92	25.22	29.14	46.00	-16.86	peak			
6		822.1666	1.29	27.32	28.61	46.00	-17.39	peak			

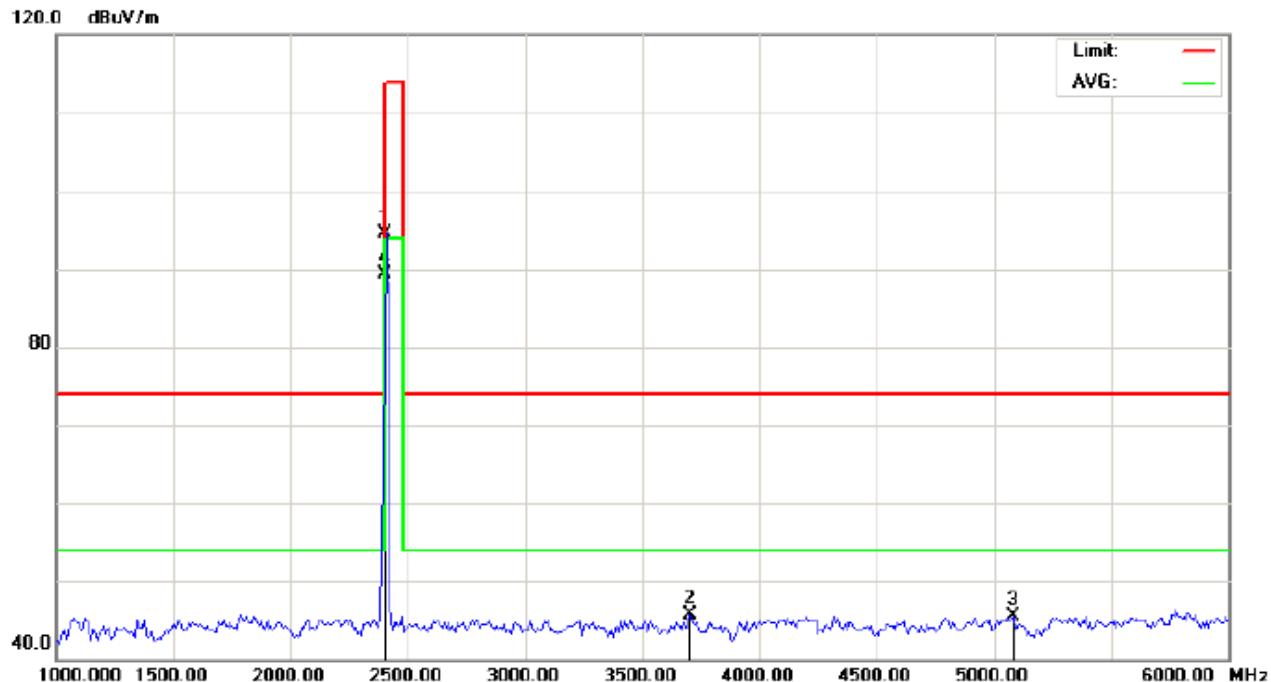
**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

## **RADIATED EMISSION ABOVE 1GHZ FOR TRADITIONAL BLUETOOTH**

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-LOW CHANNEL-HORIZONTAL

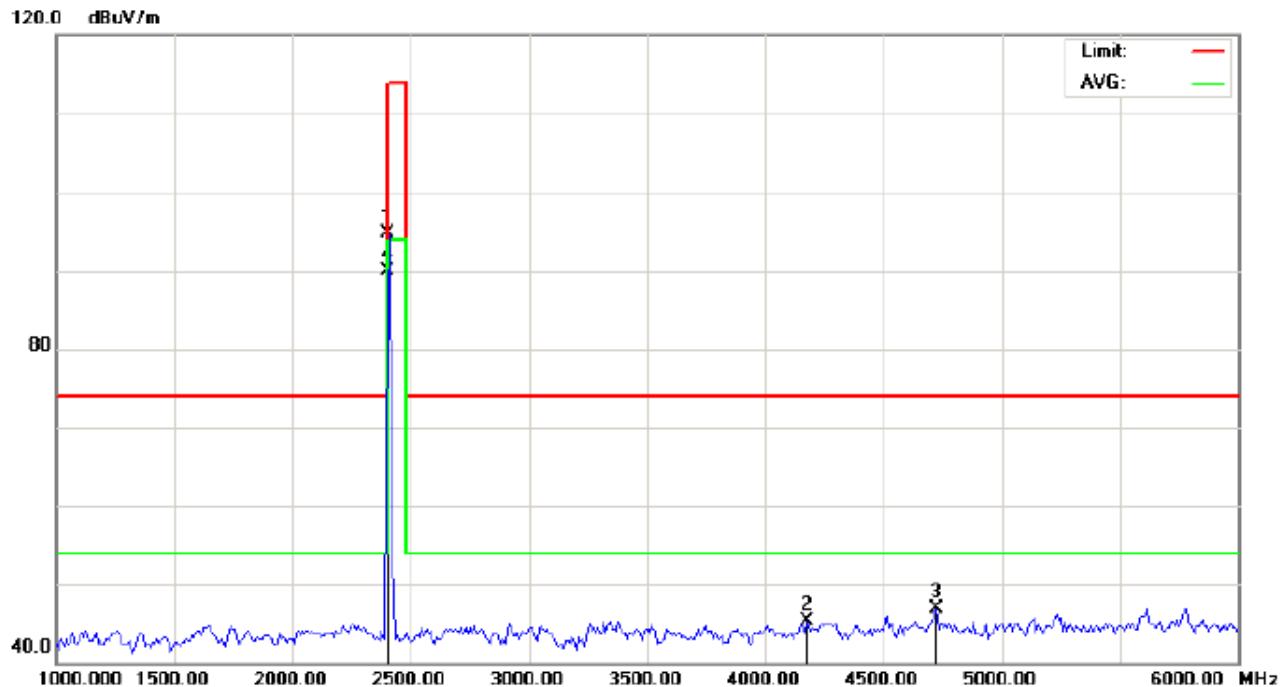


Site: site #1 Polarization: **Horizontal** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: Low Channel TX  
Note:

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		2402.000	104.17	-9.68	94.49	114.00	-19.51	peak			
2		3700.000	52.44	-6.66	45.78	74.00	-28.22	peak			
3		5083.333	47.27	-1.80	45.47	74.00	-28.53	peak			
4	*	2402.000	98.94	-9.68	89.26	94.00	-4.74	AVG	100	210	

## RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHZ)-LOW CHANNEL- VERTICAL

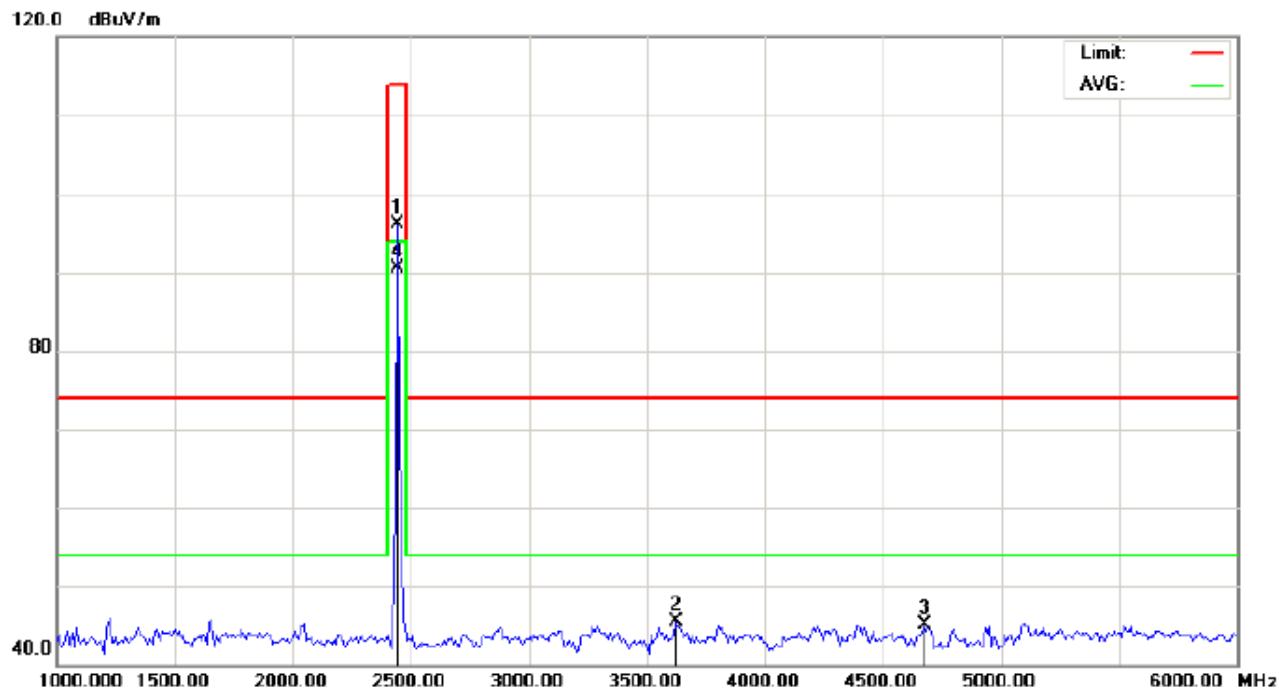


Site: site #1 Polarization: *Vertical* Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Low Channel TX  
 Note:

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		2402.000	104.29	-9.68	94.61	114.00	-19.39	peak			
2		4175.000	49.49	-4.21	45.28	74.00	-28.72	peak			
3		4725.000	49.37	-2.52	46.85	74.00	-27.15	peak			
4	*	2402.000	99.65	-9.68	89.97	94.00	-4.03	AVG	100	210	

**RESULT: PASS**

RADIATED EMISSION TEST- (ABOVE 1GHZ)-MIDDLE CHANNEL-HORIZONTAL

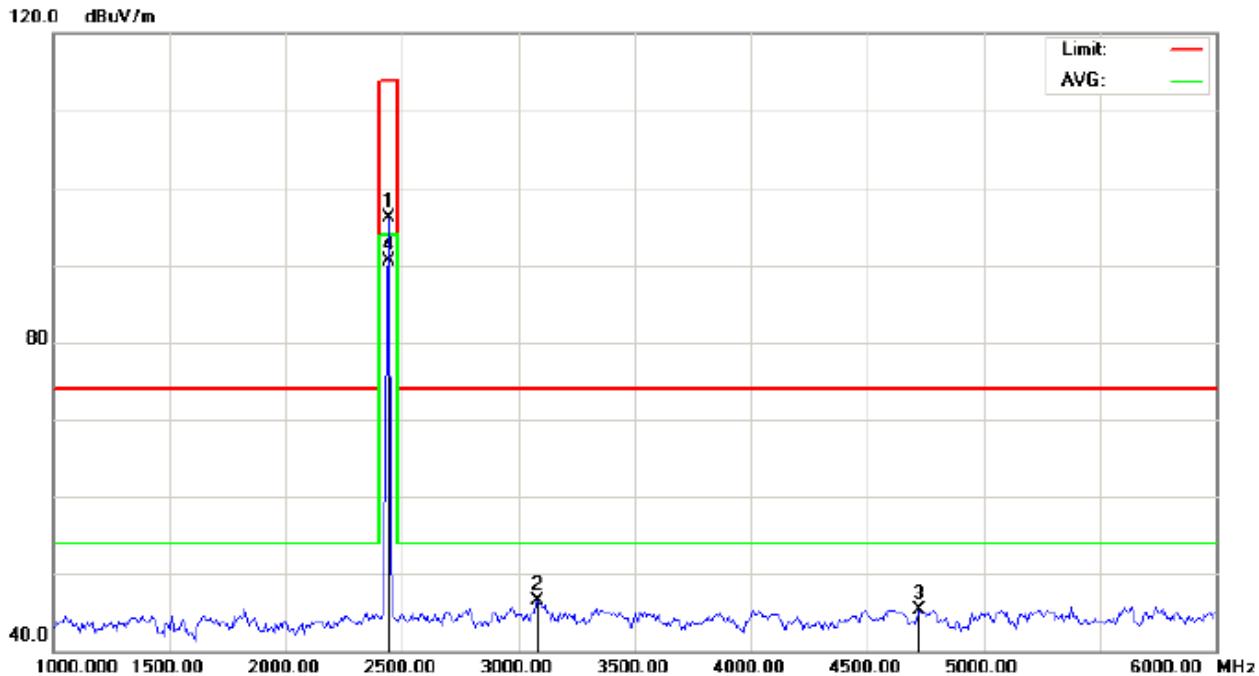


Site: site #1 Polarization: *Horizontal* Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Middle Channel TX  
 Note:

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		2441.000	105.79	-9.63	96.16	114.00	-17.84	peak			
2		3625.000	52.70	-7.12	45.58	74.00	-28.42	peak			
3		4675.000	47.85	-2.65	45.20	74.00	-28.80	peak			
4	*	2441.000	100.16	-9.63	90.53	94.00	-3.47	AVG	100	113	

**RESULT: PASS**

RADIATED EMISSION TEST- (ABOVE 1GHZ)-MIDDLE CHANNEL- VERTICAL

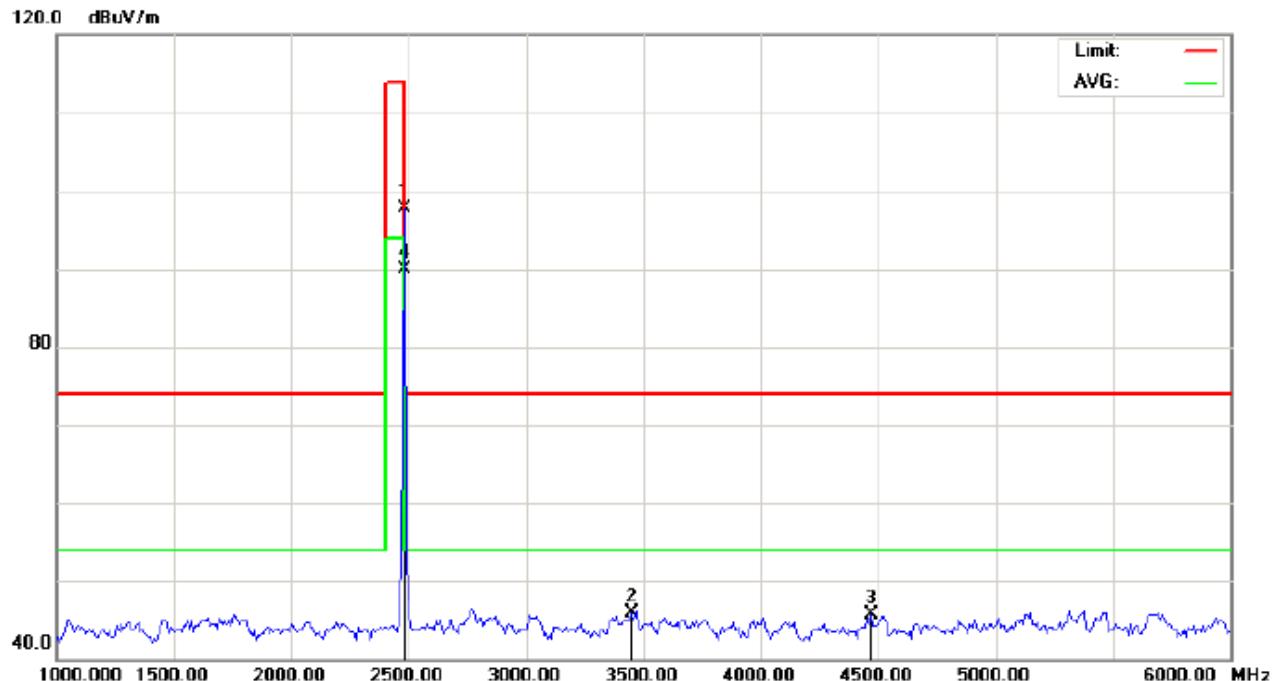


Site: site #1 Polarization: **Vertical** Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance: 3m  
 M/N: SC-25  
 Mode: Middle Channel TX  
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
1		2441.000	105.78	-9.63	96.15	114.00	-17.85	peak			
2		3083.333	54.70	-8.28	46.42	74.00	-27.58	peak			
3		4725.000	47.88	-2.52	45.36	74.00	-28.64	peak			
4	*	2441.000	100.18	-9.63	90.55	94.00	-3.45	AVG	100	108	

**RESULT: PASS**

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-HIGH CHANNEL-HORIZONTAL

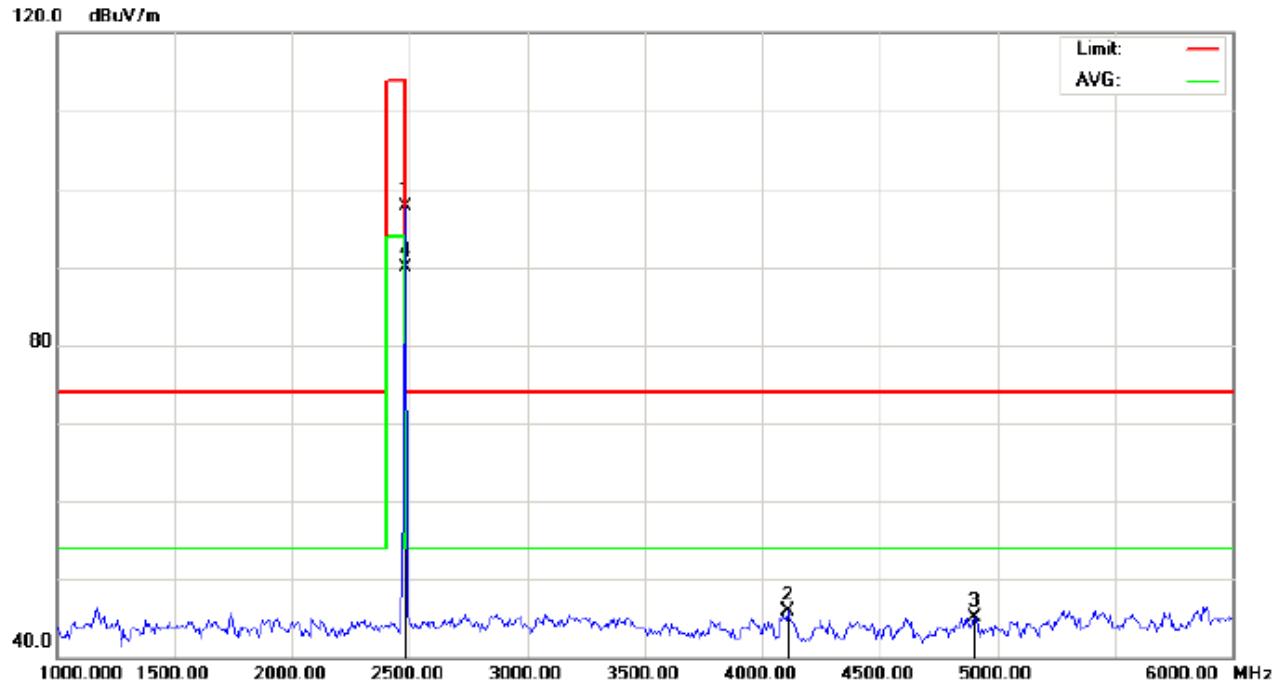


Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: High Channel TX  
Note:

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		2480.000	107.37	-9.59	97.78	114.00	-16.22	peak			
2		3450.000	53.94	-7.94	46.00	74.00	-28.00	peak			
3		4466.667	49.00	-3.22	45.78	74.00	-28.22	peak			
4	*	2480.000	99.41	-9.59	89.82	94.00	-4.18	AVG	100	311	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-HIGH CHANNEL- VERTICAL



Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: High Channel TX  
Note:

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		2480.000	107.28	-9.59	97.69	114.00	-16.31	peak			
2		4108.333	50.41	-4.44	45.97	74.00	-28.03	peak			
3		4900.000	47.18	-2.06	45.12	74.00	-28.88	peak			
4	*	2480.000	99.59	-9.59	90.00	94.00	-4.00	AVG	100	317	

## RESULT: PASS

**Note:** 6~25GHz at least have 20dB margin. 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.

**Field strength of the fundamental signal**

**Peak value**

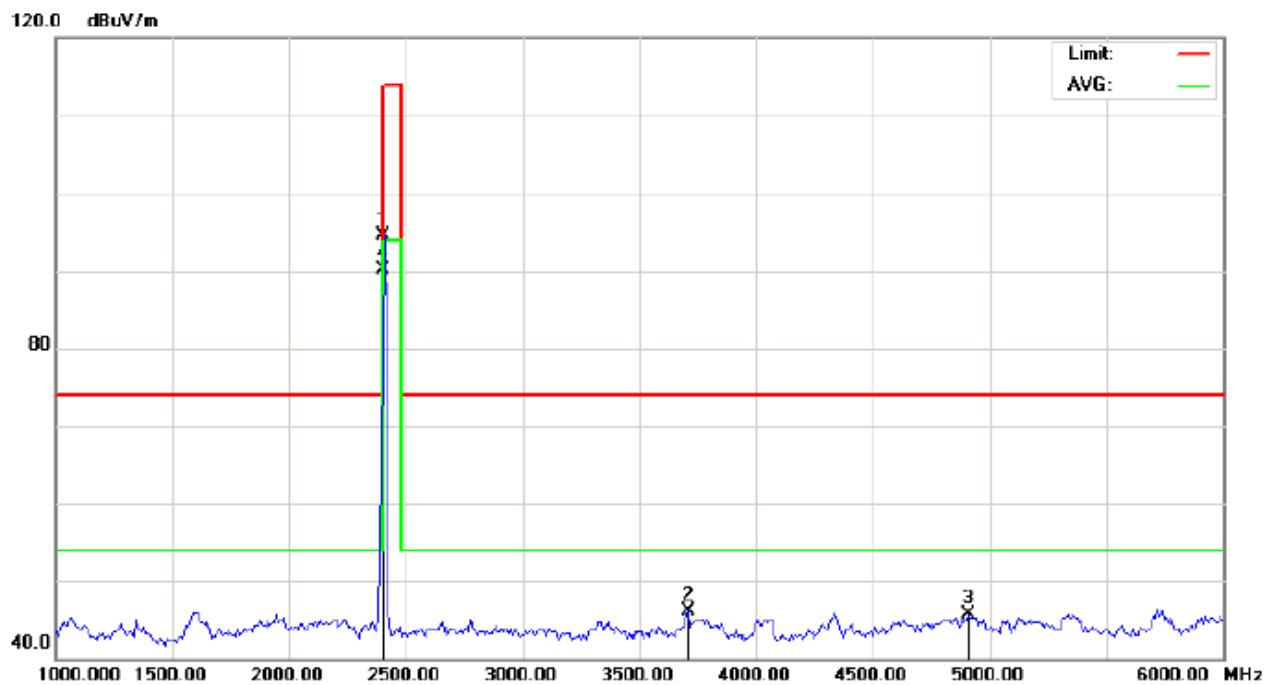
Frequency (MHz)	Reading Level (dBuv)	Factor (dB/m)	Measurement (dBuv/m)	Limit (dBuv/m)	Over (dB)	Antenna Polarization
2402	104.17	-9.68	94.49	114	-19.51	Horizontal
2402	104.29	-9.68	94.61	114	-19.39	Vertical
2441	105.79	-9.63	96.16	114	-17.84	Horizontal
2441	105.78	-9.63	96.15	114	-17.85	Vertical
2480	107.37	-9.59	97.78	114	-16.22	Horizontal
2480	107.28	-9.59	97.69	114	-16.31	Vertical

**Average value**

Frequency (MHz)	Reading Level (dBuv)	Factor (dB/m)	Measurement (dBuv/m)	Limit (dBuv/m)	Over (dB)	Antenna Polarization
2402	98.94	-9.68	89.26	94	-4.74	Horizontal
2402	99.65	-9.68	89.97	94	-4.03	Vertical
2441	100.16	-9.63	90.53	94	-3.47	Horizontal
2441	100.18	-9.63	90.55	94	-3.45	Vertical
2480	99.41	-9.59	89.82	94	-4.18	Horizontal
2480	99.59	-9.59	90.00	94	-4.00	Vertical

## FOR BLE

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-LOW CHANNEL-HORIZONTAL

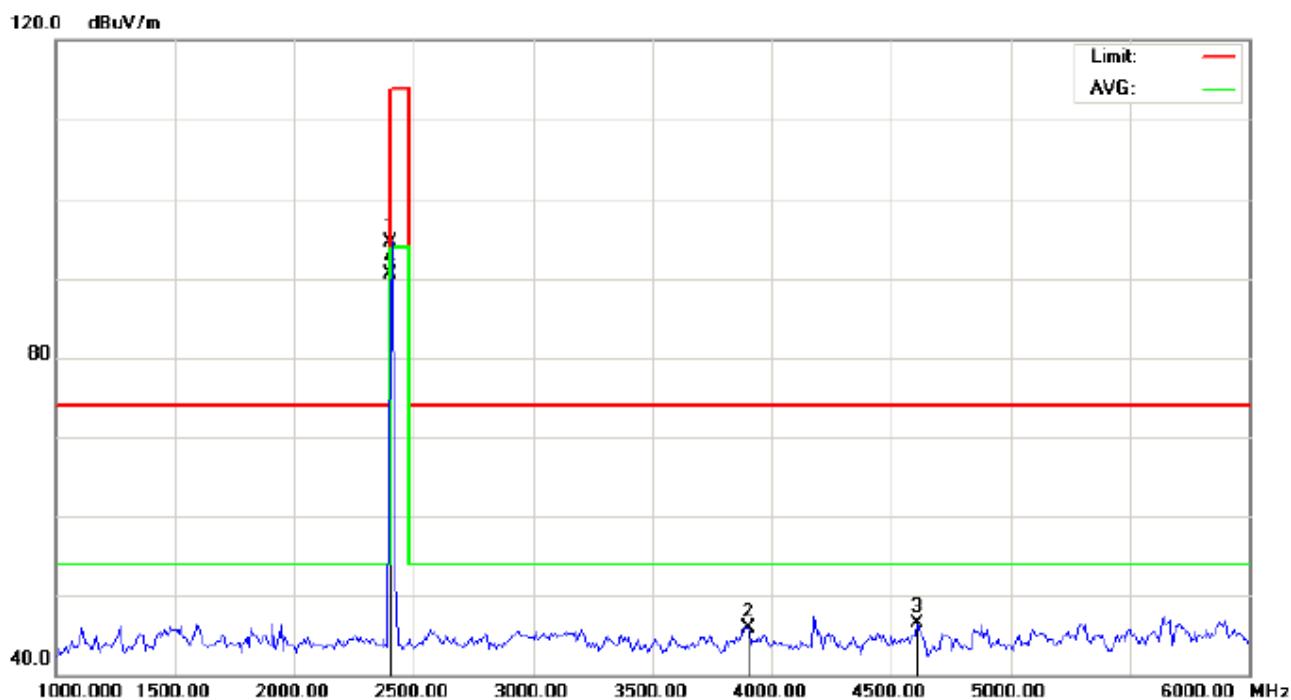


Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: Low Channel TX  
Note:

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		2402.000	104.17	-9.68	94.49	114.00	-19.51	peak			
2		3708.333	52.65	-6.61	46.04	74.00	-27.96	peak			
3		4908.333	47.76	-2.04	45.72	74.00	-28.28	peak			
4	*	2402.000	99.86	-9.68	90.18	94.00	-3.82	AVG	100	139	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-LOW CHANNEL- VERTICAL

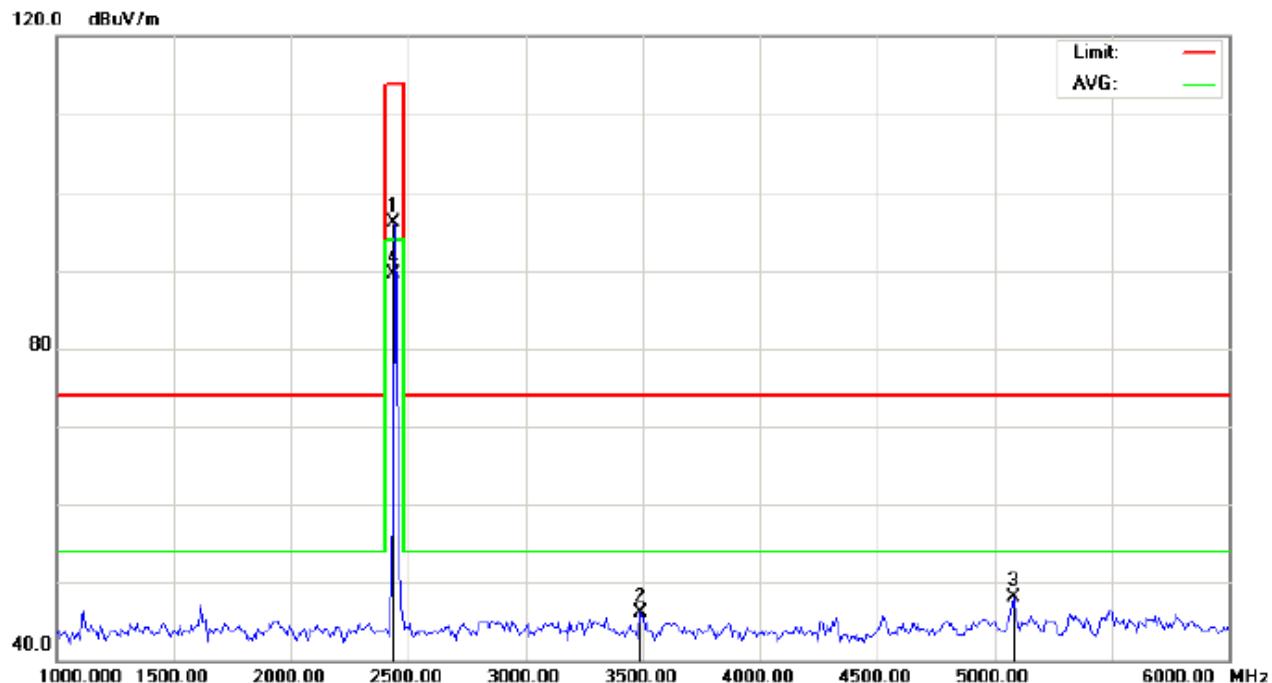


Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: Low Channel TX  
Note:

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		2402.000	104.25	-9.68	94.57	114.00	-19.43	peak			
2		3900.000	51.32	-5.43	45.89	74.00	-28.11	peak			
3		4608.333	49.24	-2.83	46.41	74.00	-27.59	peak			
4	*	2402.000	100.21	-9.68	90.53	94.00	-3.47	AVG	100	135	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-MIDDLE CHANNEL-HORIZONTAL

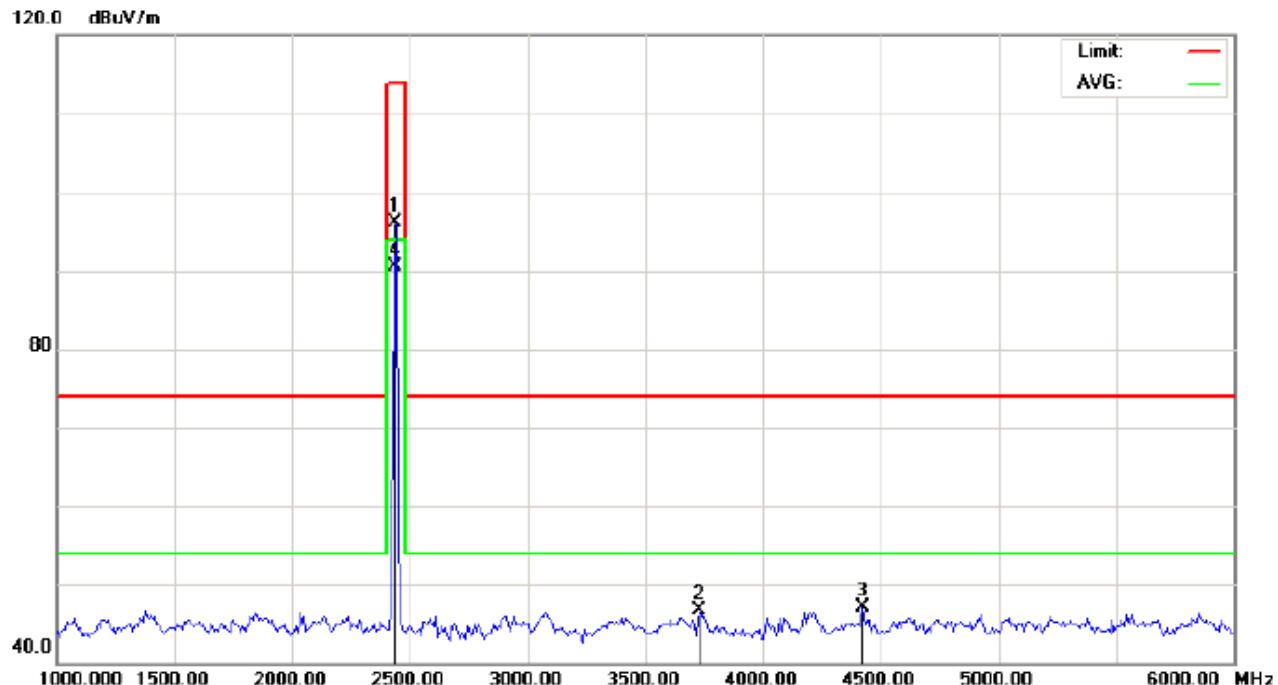


Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: Middle Channel TX  
Note:

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		2440.000	105.77	-9.64	96.13	114.00	-17.87	peak			
2		3491.667	54.03	-7.90	46.13	74.00	-27.87	peak			
3		5083.333	49.96	-1.80	48.16	74.00	-25.84	peak			
4	*	2440.000	99.18	-9.64	89.54	94.00	-4.46	AVG	100	219	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-MIDDLE CHANNEL- VERTICAL

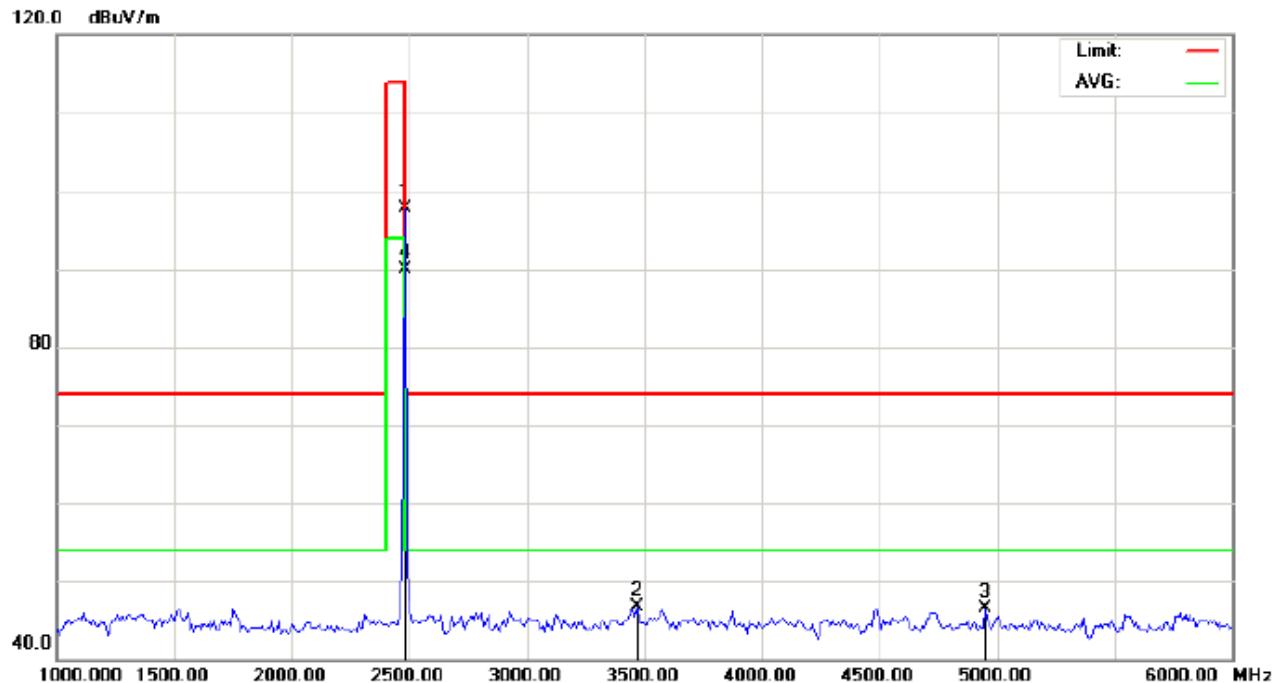


Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: Middle Channel TX  
Note:

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		2440.000	105.69	-9.64	96.05	114.00	-17.95	peak			
2		3733.333	53.23	-6.45	46.78	74.00	-27.22	peak			
3		4425.000	50.37	-3.36	47.01	74.00	-26.99	peak			
4	*	2440.000	100.17	-9.64	90.53	94.00	-3.47	AVG	100	213	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-HIGH CHANNEL-HORIZONTAL

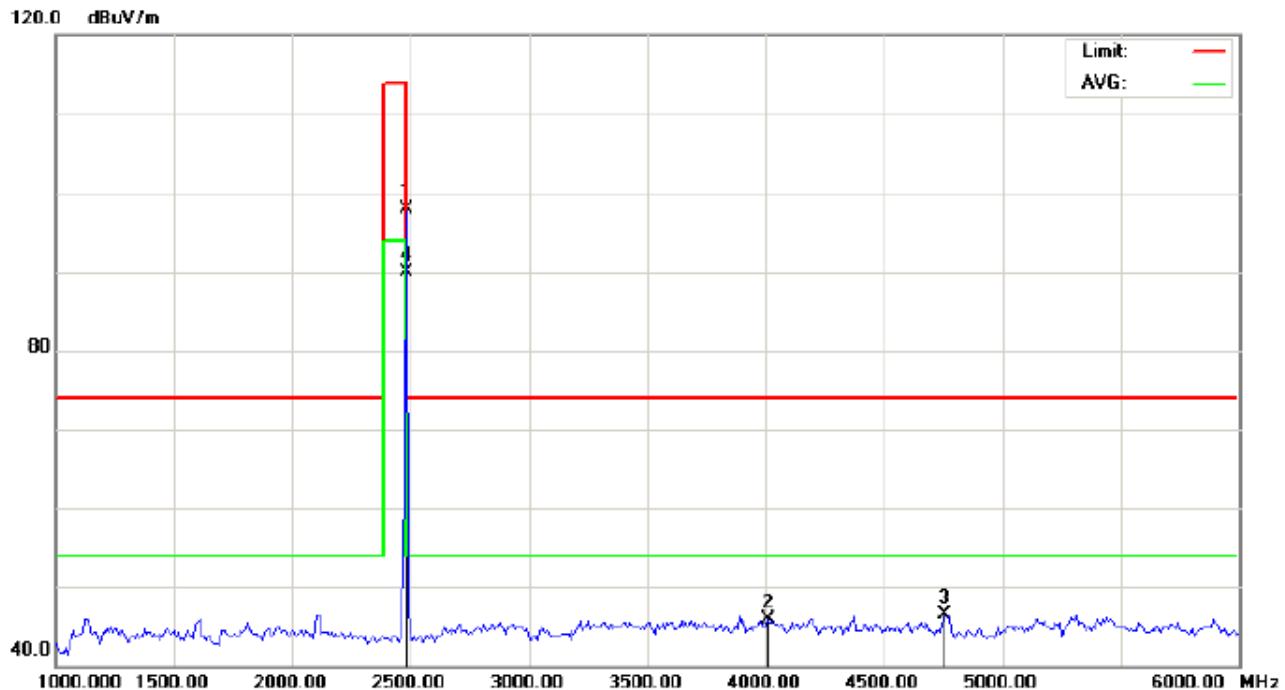


Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: High Channel TX  
Note:

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		2480.000	107.32	-9.59	97.73	114.00	-16.27	peak			
2		3466.667	54.55	-7.92	46.63	74.00	-27.37	peak			
3		4950.000	48.38	-1.93	46.45	74.00	-27.55	peak			
4	*	2480.000	99.46	-9.59	89.87	94.00	-4.13	AVG	100	182	

## RESULT: PASS

## RADIATED EMISSION TEST- (ABOVE 1GHZ)-HIGH CHANNEL- VERTICAL



Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance: 3m  
M/N: SC-25  
Mode: High Channel TX  
Note:

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		2480.000	107.42	-9.59	97.83	114.00	-16.17	peak			
2		4008.333	50.65	-4.78	45.87	74.00	-28.13	peak			
3		4758.333	48.89	-2.43	46.46	74.00	-27.54	peak			
4	*	2480.000	99.58	-9.59	89.99	94.00	-4.01	AVG	100	157	

## RESULT: PASS

**Note:** 6~25GHz at least have 20dB margin. 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.

**Field strength of the fundamental signal**

**Peak value**

Frequency (MHz)	Reading Level (dBuv)	Factor (dB/m)	Measurement (dBuv/m)	Limit (dBuv/m)	Over (dB)	Antenna Polarization
2402	104.17	-9.68	94.49	114	-19.51	Horizontal
2402	104.25	-9.68	94.57	114	-19.43	Vertical
2440	105.77	-9.64	96.13	114	-17.87	Horizontal
2440	105.69	-9.64	96.05	114	-17.95	Vertical
2480	107.32	-9.59	97.73	114	-16.27	Horizontal
2480	107.42	-9.59	97.83	114	-16.17	Vertical

**Average value**

Frequency (MHz)	Reading Level (dBuv)	Factor (dB/m)	Measurement (dBuv/m)	Limit (dBuv/m)	Over (dB)	Antenna Polarization
2402	99.86	-9.68	90.18	94	-3.82	Horizontal
2402	100.21	-9.68	90.53	94	-3.47	Vertical
2440	99.18	-9.64	89.54	94	-4.46	Horizontal
2440	100.17	-9.64	90.53	94	-3.47	Vertical
2480	99.46	-9.59	89.87	94	-4.13	Horizontal
2480	99.58	-9.59	89.99	94	-4.01	Vertical

## 9. BAND EDGE EMISSION

### 9.1. MEASUREMENT PROCEDURE

1 The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

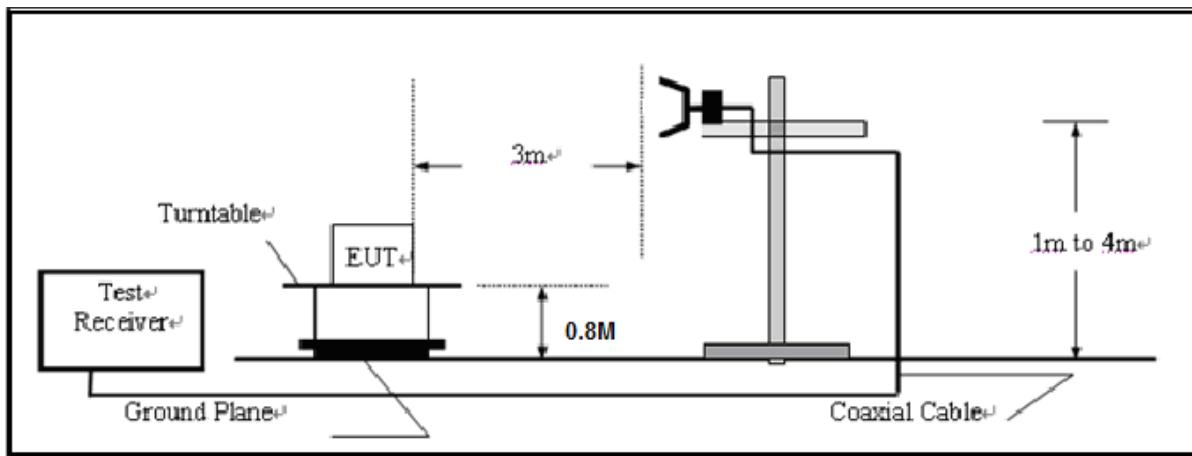
2 Max hold the trace of the step 1, and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.

3 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

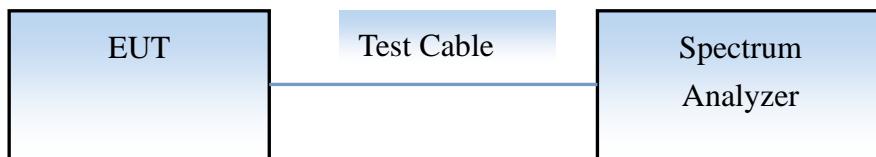
(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO

### 9.2 TEST SETUP

RADIATED EMISSION TEST SETUP



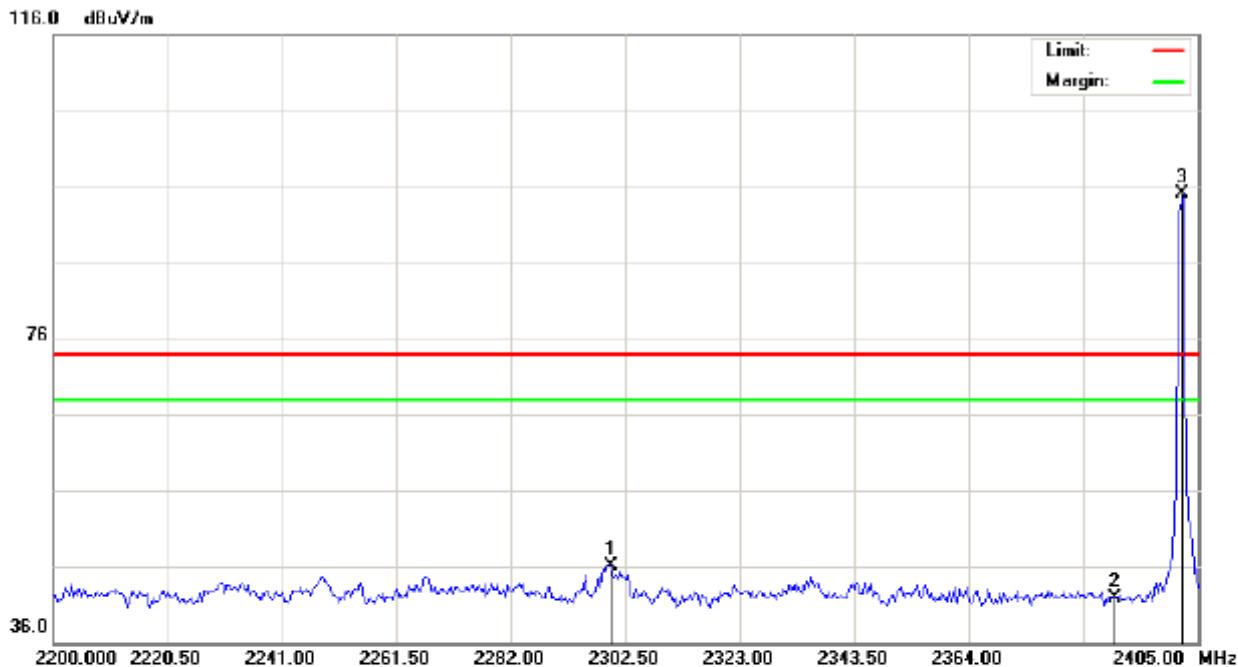
CONDUCTED TEST SETUP



### 9.3 RADIATED TEST RESULT(Worst modulation:GFSK)

#### FOR TRADITIONAL BLEUTOOTH

TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



Site: site #1 Polarization: *Horizontal* Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %

EUT: Bluetooth Speaker Distance:

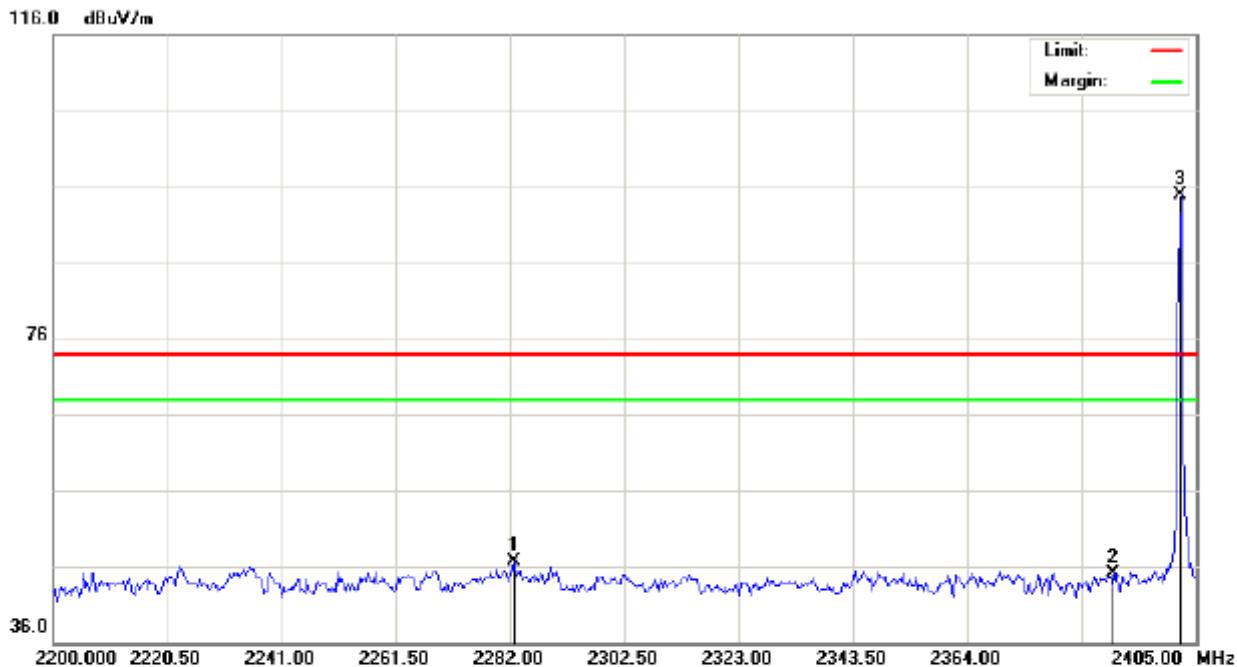
M/N: SC-25

Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna	Table	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		Height	Degree	
								cm	degree		
1		2299.767	35.91	10.21	46.12	74.00	-27.88	peak			
2		2390.000	31.50	10.31	41.81	74.00	-32.19	peak			
3	*	2402.000	84.72	10.32	95.04	74.00	21.04	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

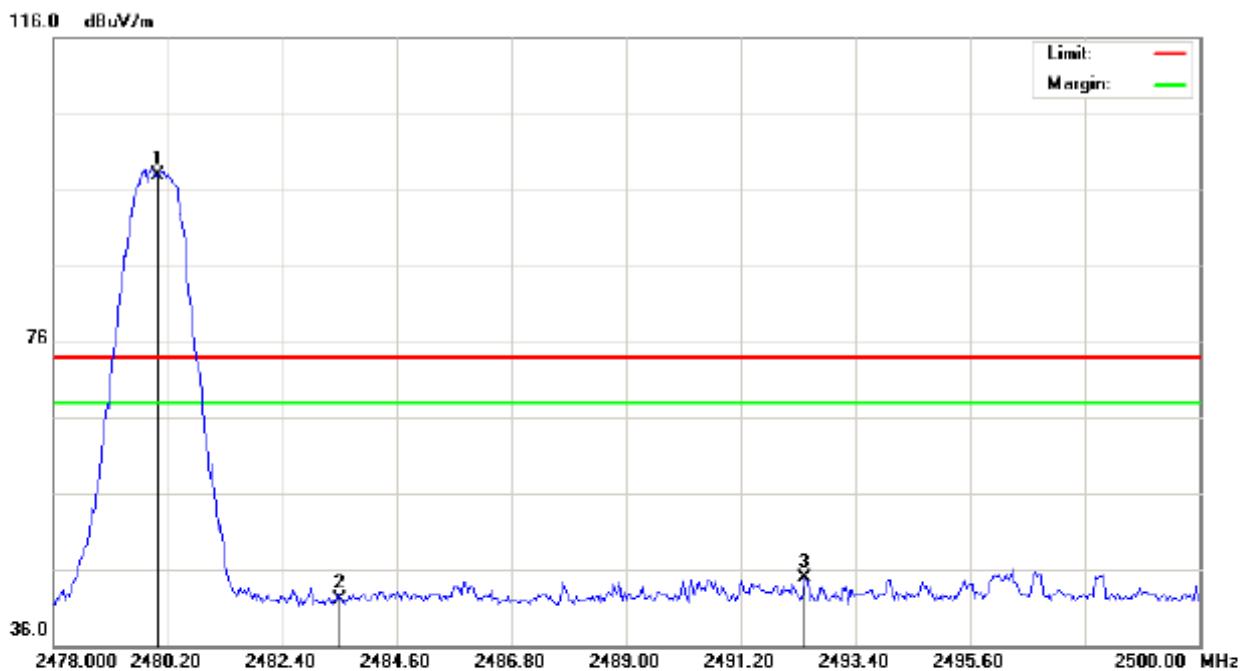



---

Site: site #1      Polarization: *Vertical*      Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)      Power:      Humidity: 60 %  
 EUT: Bluetooth Speaker      Distance:  
 M/N: SC-25  
 Mode: Low Channel TX  
 Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB				
1		2282.683	36.54	10.19	46.73	74.00	-27.27	peak			
2		2390.000	34.71	10.31	45.02	74.00	-28.98	peak			
3	*	2402.000	84.59	10.32	94.91	74.00	20.91	peak			

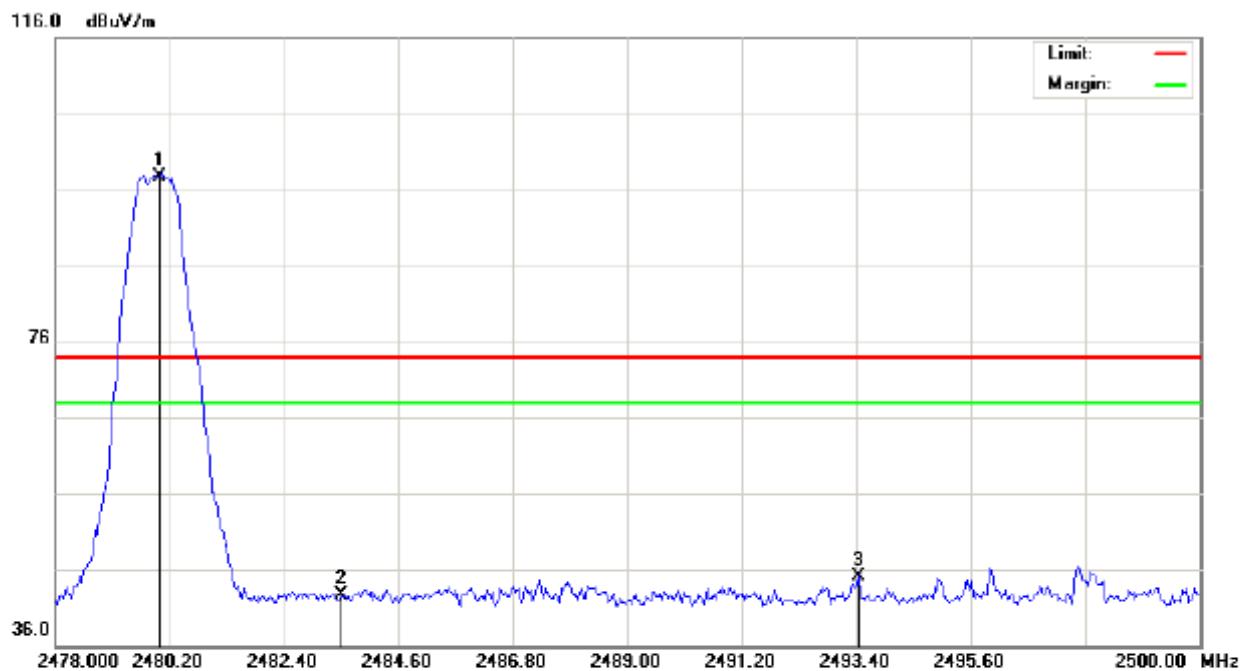
TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal



Site: site #1 Polarization: *Horizontal* Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance:  
 M/N: SC-25  
 Mode: High Channel TX  
 Note:

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	*	2480.000	87.55	10.41	97.96	74.00	23.96	peak			
2		2483.500	31.69	10.41	42.10	74.00	-31.90	peak			
3		2492.410	34.44	10.42	44.86	74.00	-29.14	peak			

## TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical



Site: site #1 Polarization: **Vertical** Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance:  
M/N: SC-25  
Mode: High Channel TX  
Note:

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	*	2480.000	87.32	10.41	97.73	74.00	23.73	peak			
2		2483.500	32.26	10.41	42.67	74.00	-31.33	peak			
3		2493.437	34.78	10.42	45.20	74.00	-28.80	peak			

## RESULT: PASS

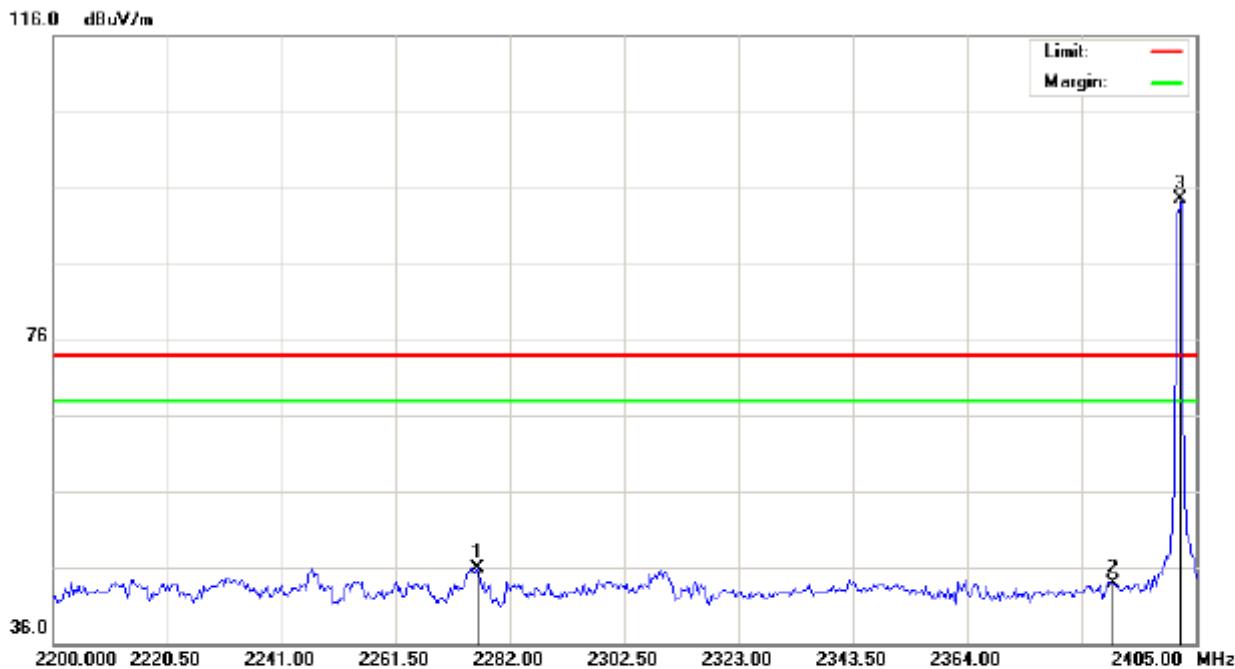
**Note:** The other modes radiation emission have enough 20dB margin.

Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

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

## FOR BLE

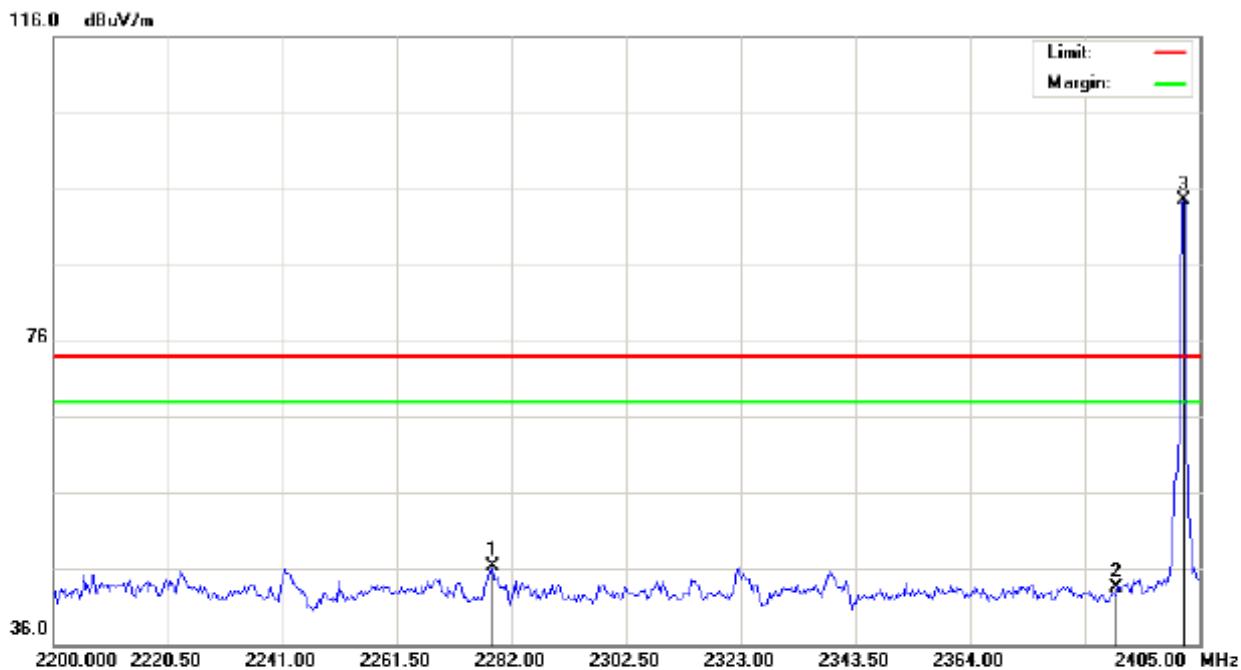
## TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance:  
M/N: SC-25  
Mode: Low Channel TX  
Note:

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		2276.192	35.78	10.18	45.96	74.00	-28.04	peak			
2		2390.000	33.50	10.31	43.81	74.00	-30.19	peak			
3	*	2402.000	84.20	10.32	94.52	74.00	20.52	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

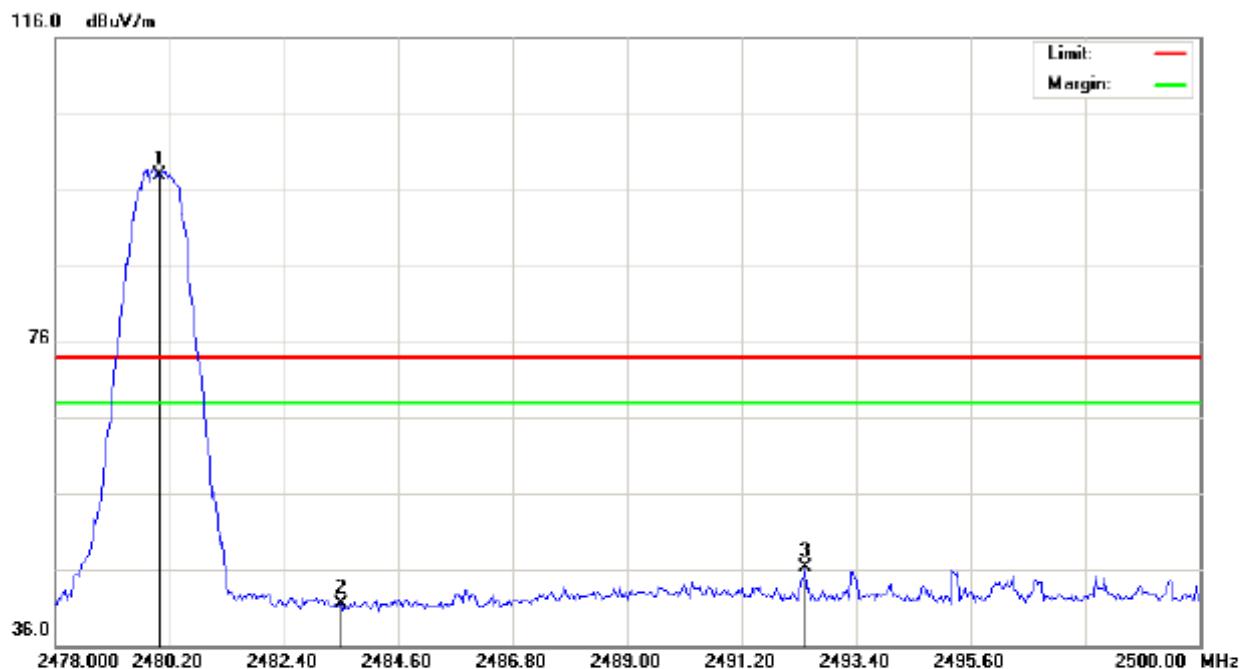



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Site: site #1      Polarization: **Vertical**      Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)      Power:      Humidity: 60 %  
 EUT: Bluetooth Speaker      Distance:  
 M/N: SC-25  
 Mode: Low Channel TX  
 Note:

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		2278.583	36.18	10.19	46.37	74.00	-27.63	peak			
2		2390.000	33.21	10.31	43.52	74.00	-30.48	peak			
3	*	2402.000	84.11	10.32	94.43	74.00	20.43	peak			

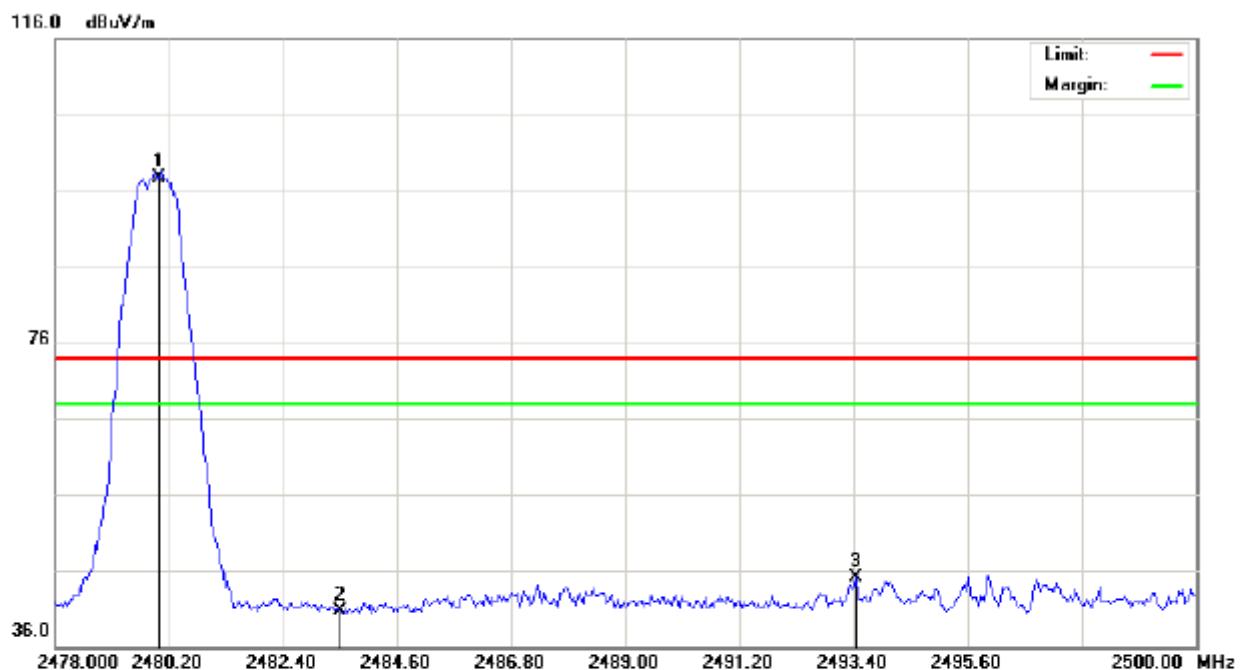
TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal



Site: site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %  
EUT: Bluetooth Speaker Distance:  
M/N: SC-25  
Mode: High Channel TX  
Note:

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	*	2480.000	87.55	10.41	97.96	74.00	23.96	peak			
2		2483.500	31.19	10.41	41.60	74.00	-32.40	peak			
3		2492.410	35.94	10.42	46.36	74.00	-27.64	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical



Site: site #1 Polarization: **Vertical** Temperature: 26  
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %  
 EUT: Bluetooth Speaker Distance:  
 M/N: SC-25  
 Mode: High Channel TX  
 Note:

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	*	2480.000	87.32	10.41	97.73	74.00	23.73	peak			
2		2483.500	30.26	10.41	40.67	74.00	-33.33	peak			
3		2493.437	34.78	10.42	45.20	74.00	-28.80	peak			

**RESULT: PASS**

**Note:** The other modes radiation emission have enough 20dB margin.

Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

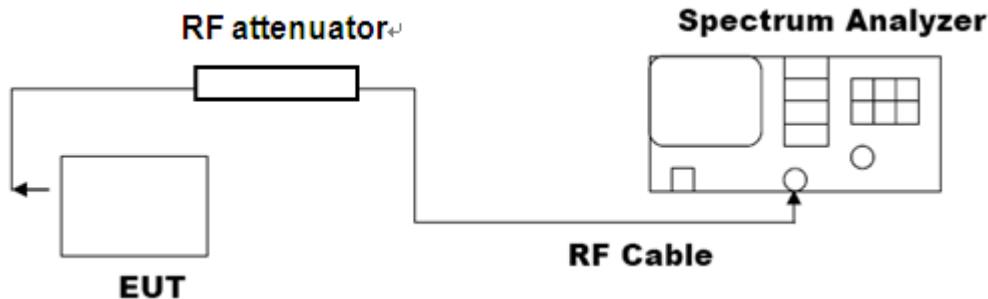
The "Factor" value can be calculated automatically by software of measurement system.

## 10. 20DB BANDWIDTH

### 10.1. 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 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel  
 $RBW \geq 1\%$  of the 20 dB bandwidth,  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

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

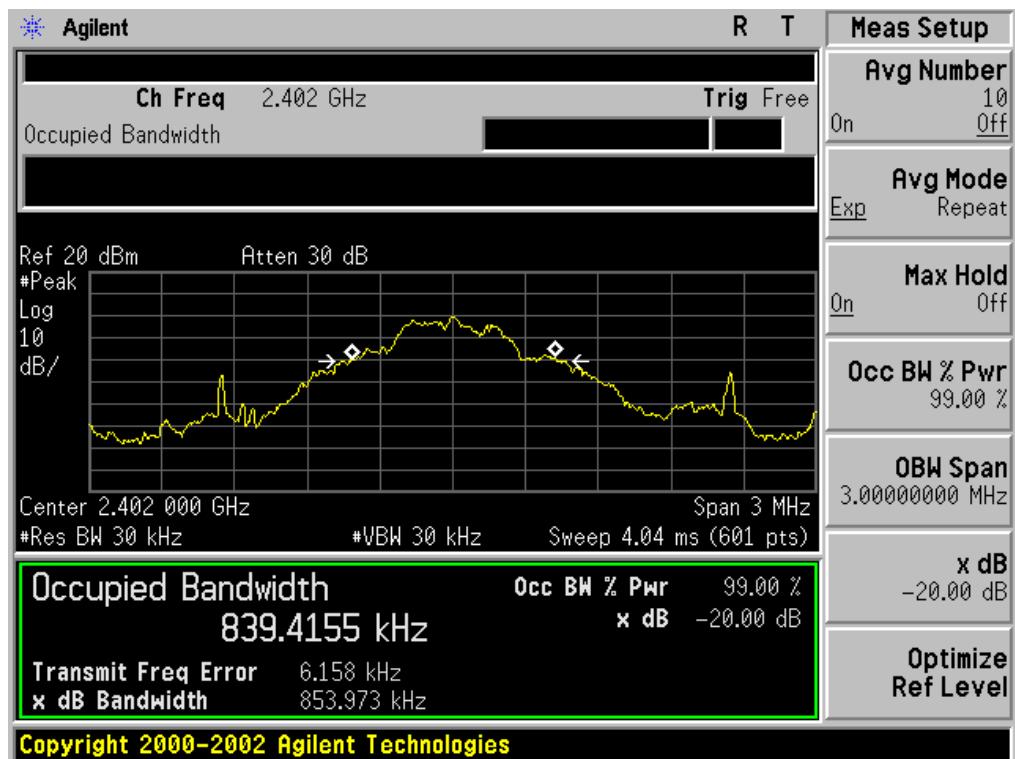


### 10.3. LIMITS AND MEASUREMENT RESULTS

#### FOR TRADITIONAL BLUETOOTH

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
N/A	Low Channel	0.854	PASS
	Middle Channel	0.859	PASS
	High Channel	0.781	PASS

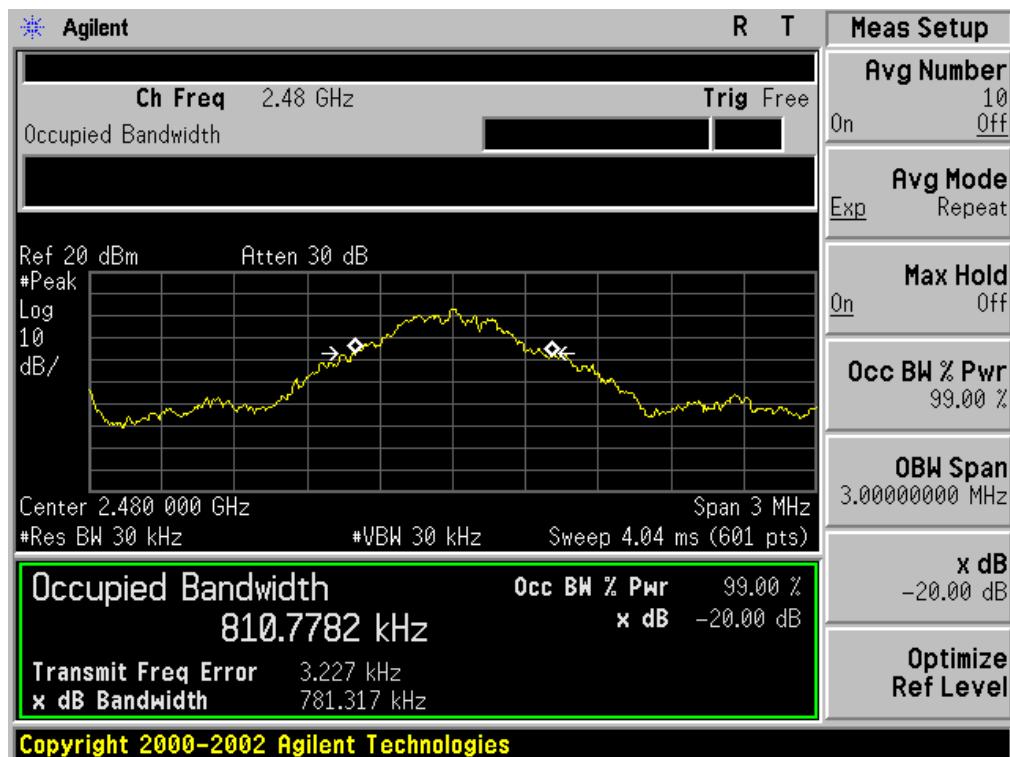
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



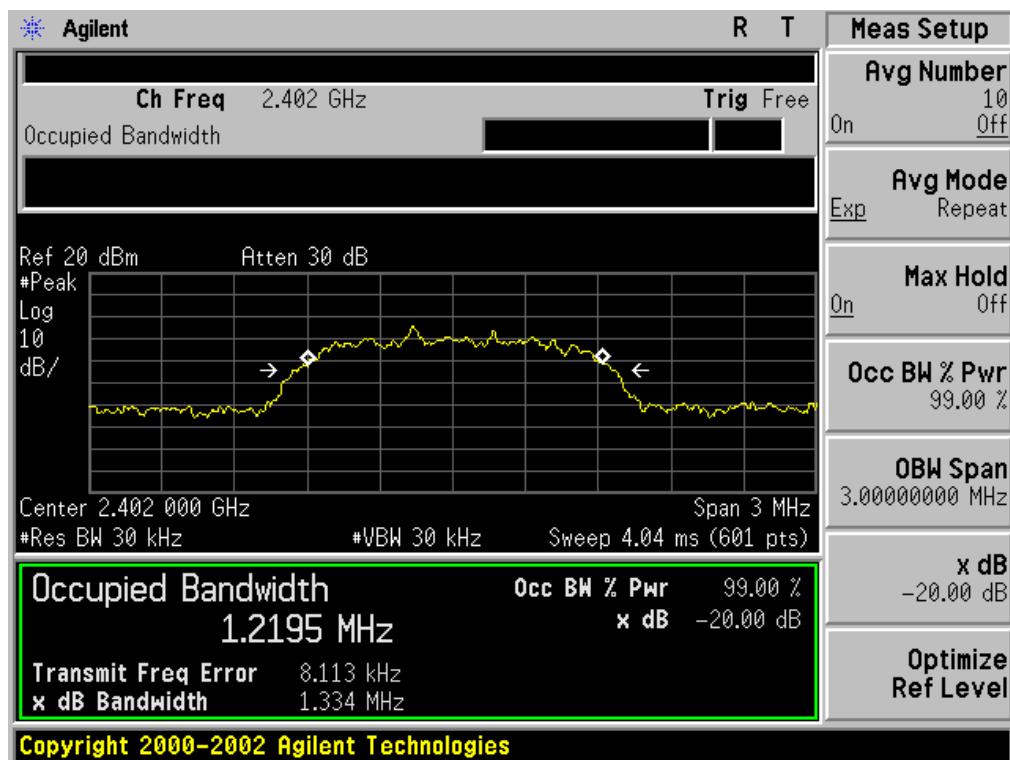
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



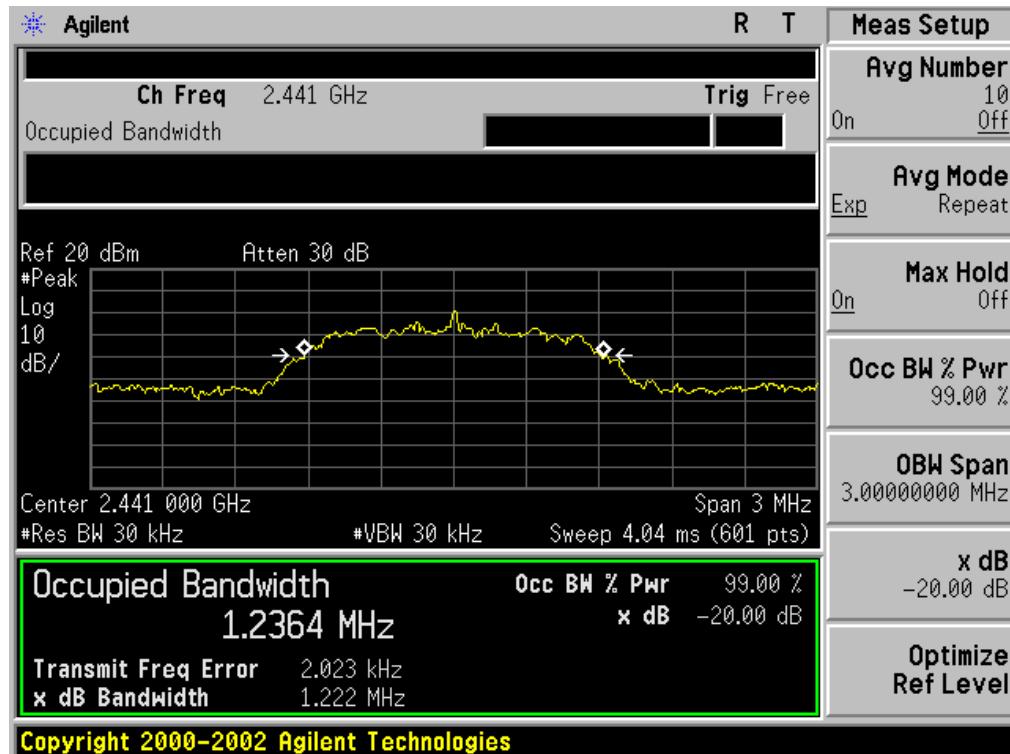
**BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT**

Applicable Limits	Measurement Result	
	Test Data (MHz)	Criteria
N/A	Low Channel	1.334
	Middle Channel	1.222
	High Channel	1.219

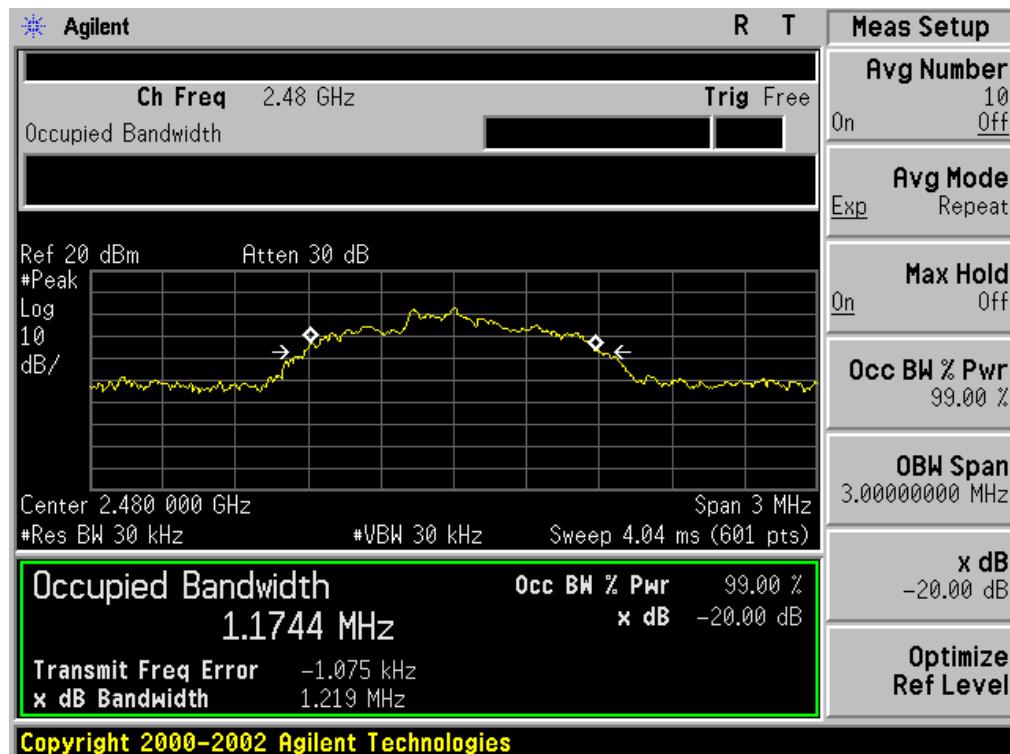
**TEST PLOT OF BANDWIDTH FOR LOW CHANNEL**



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



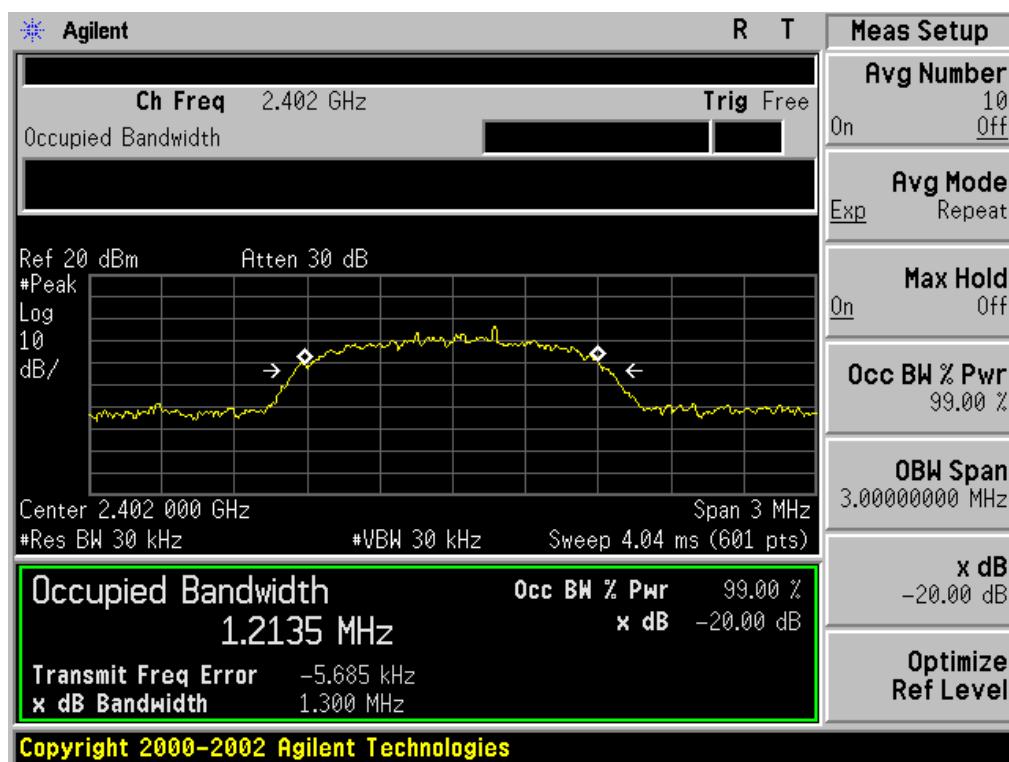
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



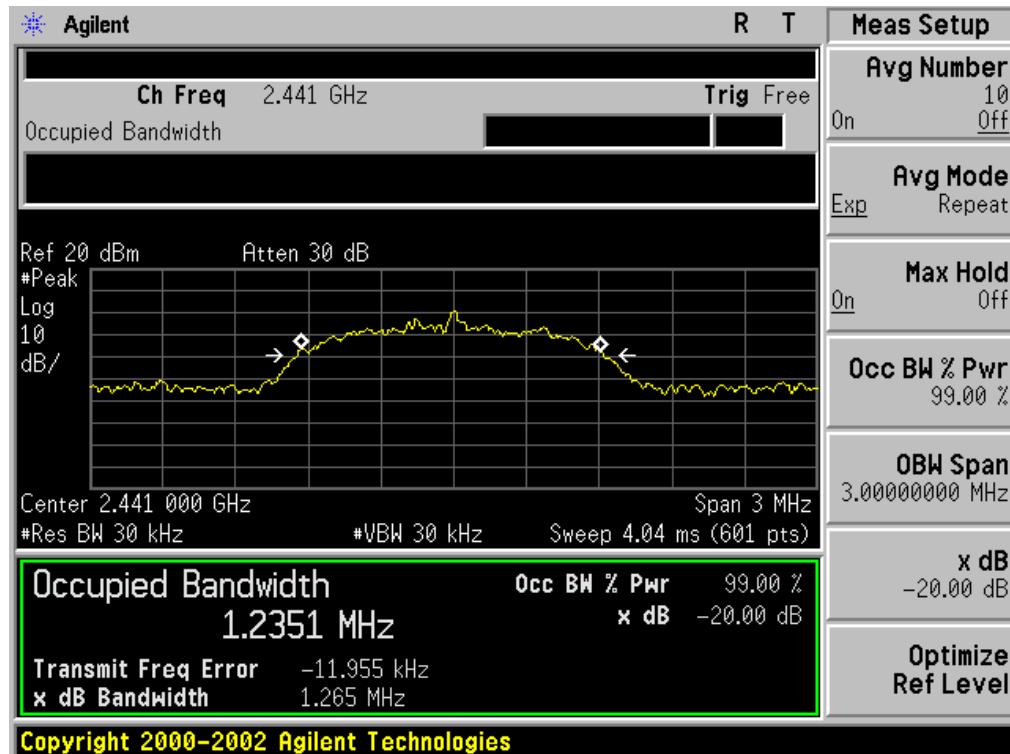
**BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT**

Applicable Limits	Measurement Result	
	Test Data (MHz)	Criteria
N/A	Low Channel	1.300
	Middle Channel	1.265
	High Channel	1.272

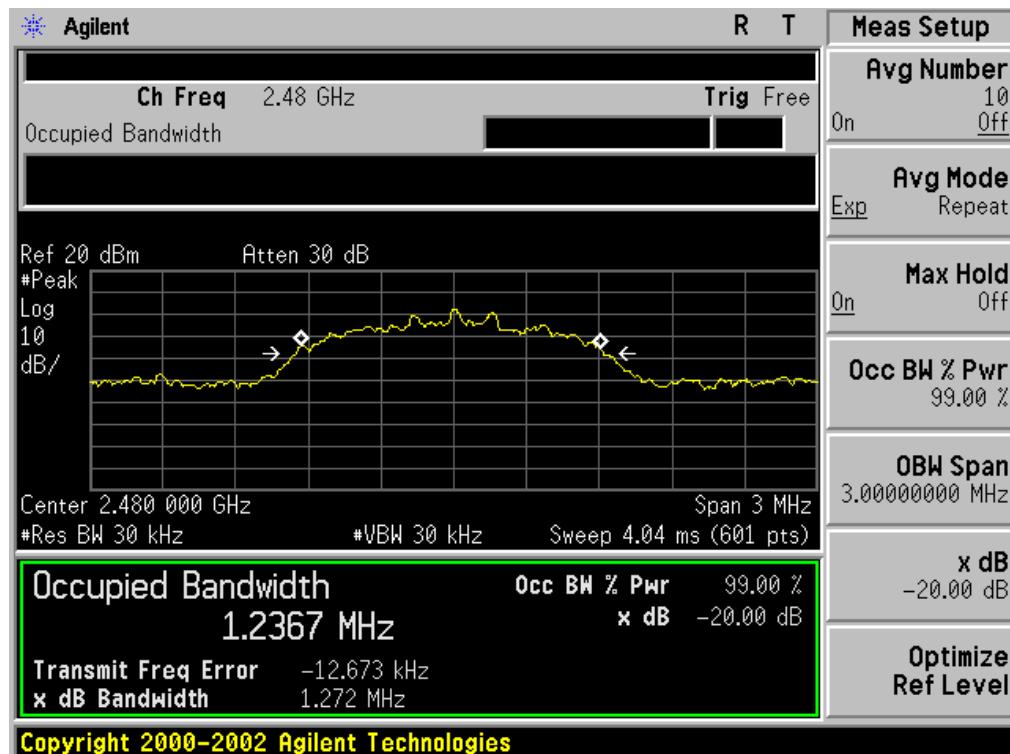
**TEST PLOT OF BANDWIDTH FOR LOW CHANNEL**



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



FOR BLE

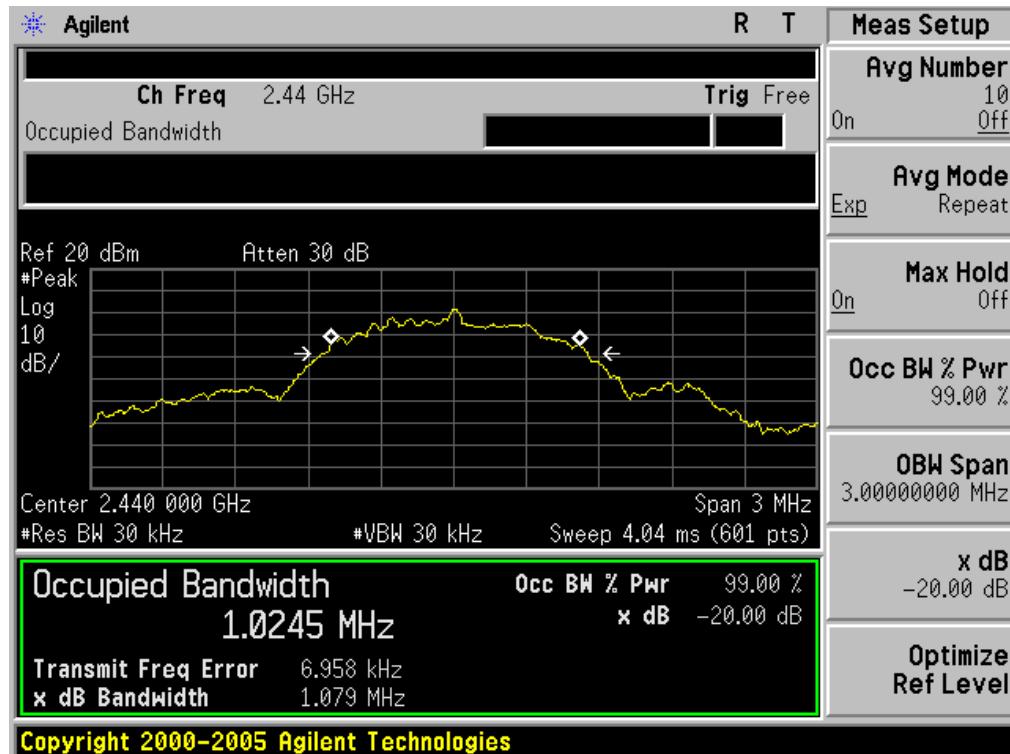
BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT

Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
N/A	Low Channel	1.089	PASS
	Middle Channel	1.079	PASS
	High Channel	1.083	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



## 11. FCC LINE CONDUCTED EMISSION TEST

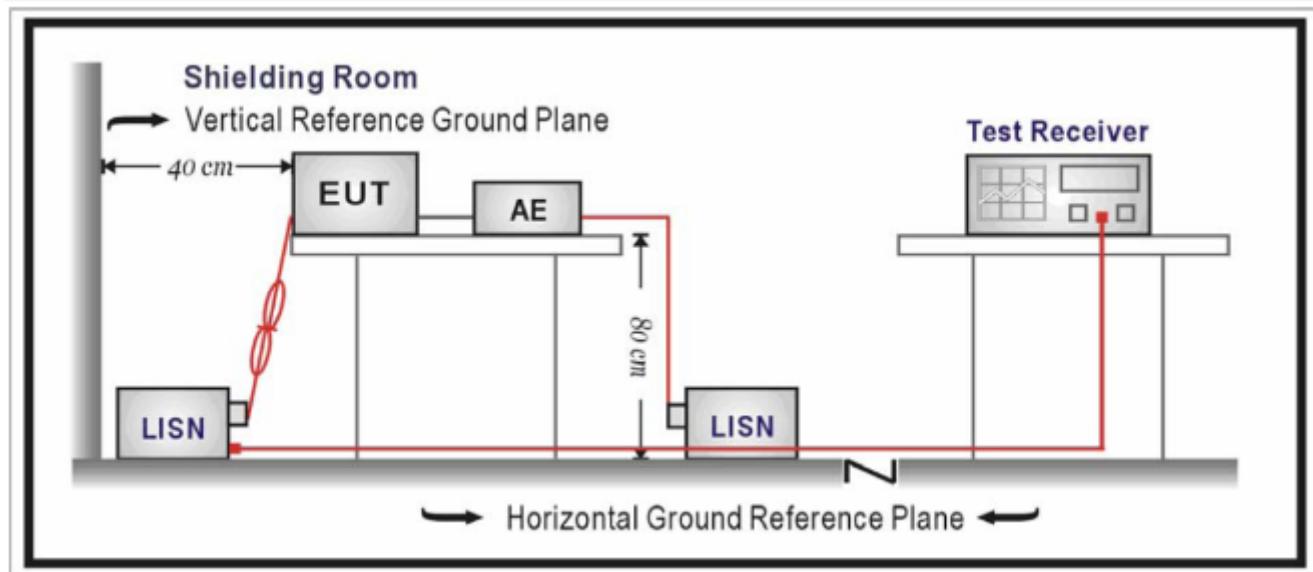
### 11.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. ( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 11.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



### **11.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST**

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

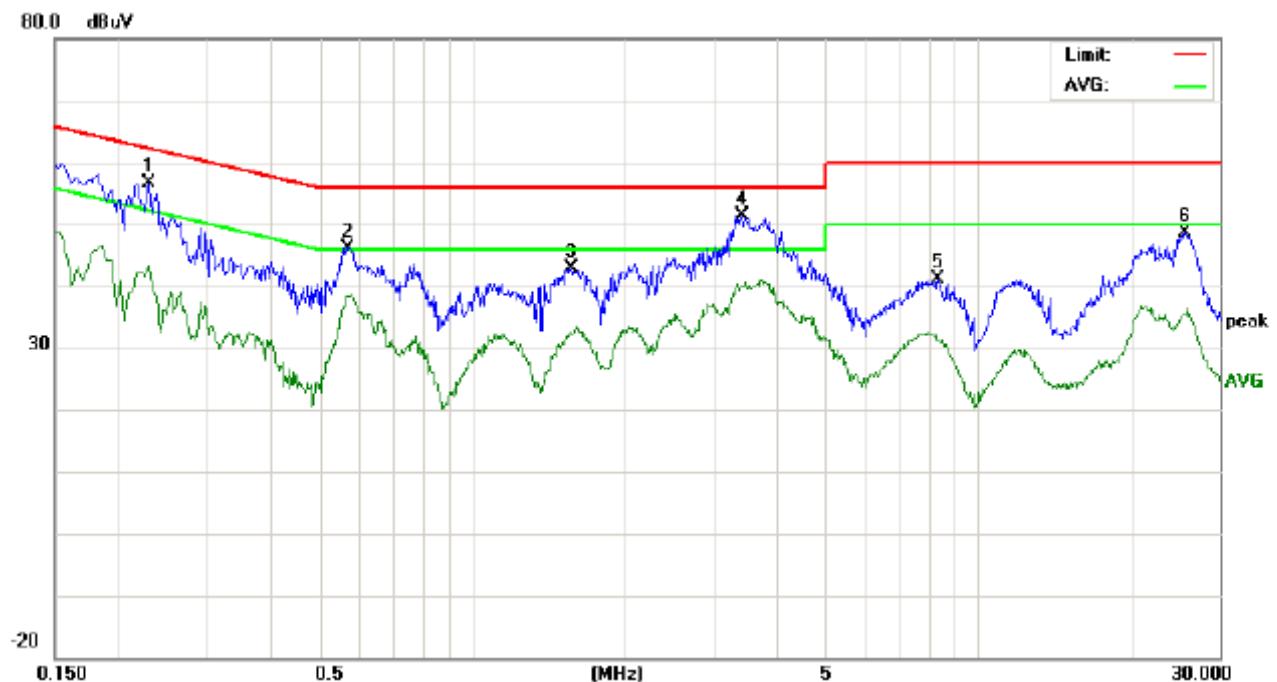
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### **11.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST**

- EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

**11.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST  
FOR TRADITIONAL BLUETOOTH**

Line Conducted Emission Test Line 1-L

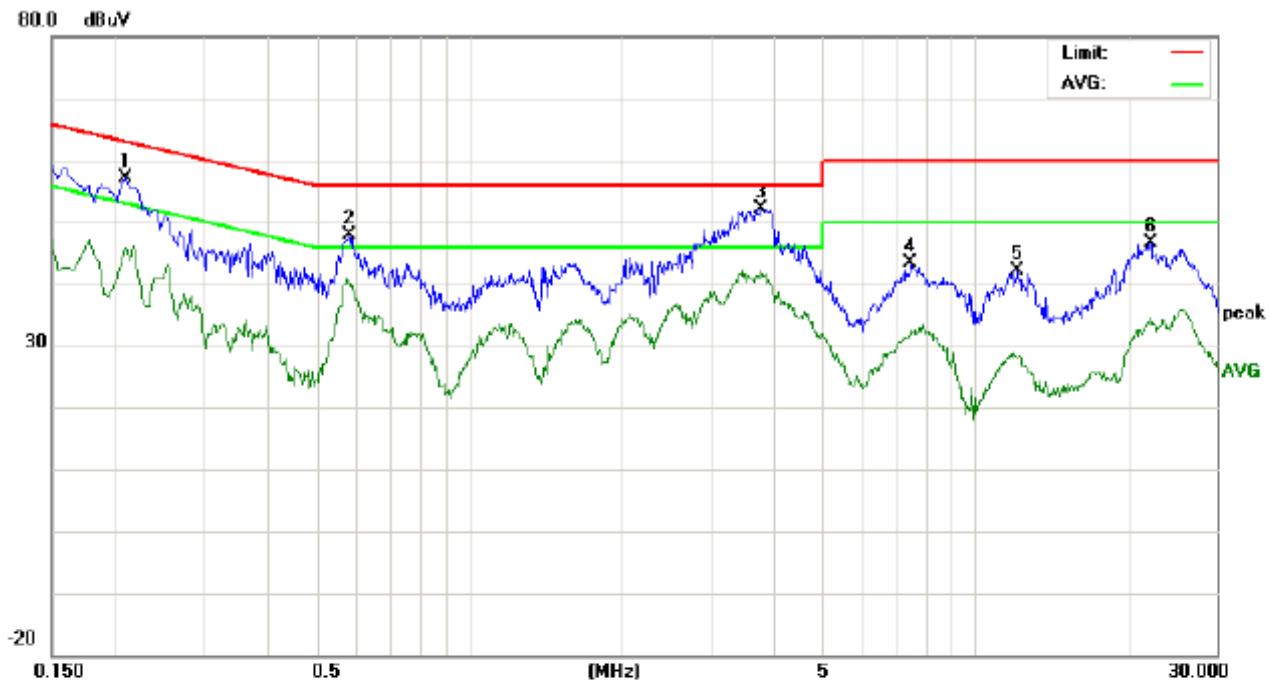



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Site: Conduction Phase: **L1** Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %  
 EUT: Bluetooth Speaker  
 M/N: SC-25  
 Mode: Normal Operation  
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2300	46.45		33.21	10.25	56.70		43.46	62.45	52.45	-5.75	-8.99	P	
2	0.5700	35.86		27.97	10.34	46.20		38.31	56.00	46.00	-9.80	-7.69	P	
3	1.5700	32.41		21.81	10.36	42.77		32.17	56.00	46.00	-13.23	-13.83	P	
4	3.4220	40.97		29.59	10.52	51.49		40.11	56.00	46.00	-4.51	-5.89	P	
5	8.3539	30.81		20.86	10.34	41.15		31.20	60.00	50.00	-18.85	-18.80	P	
6	25.7220	38.53		25.41	10.11	48.64		35.52	60.00	50.00	-11.36	-14.48	P	

Line Conducted Emission Test Line 2-N

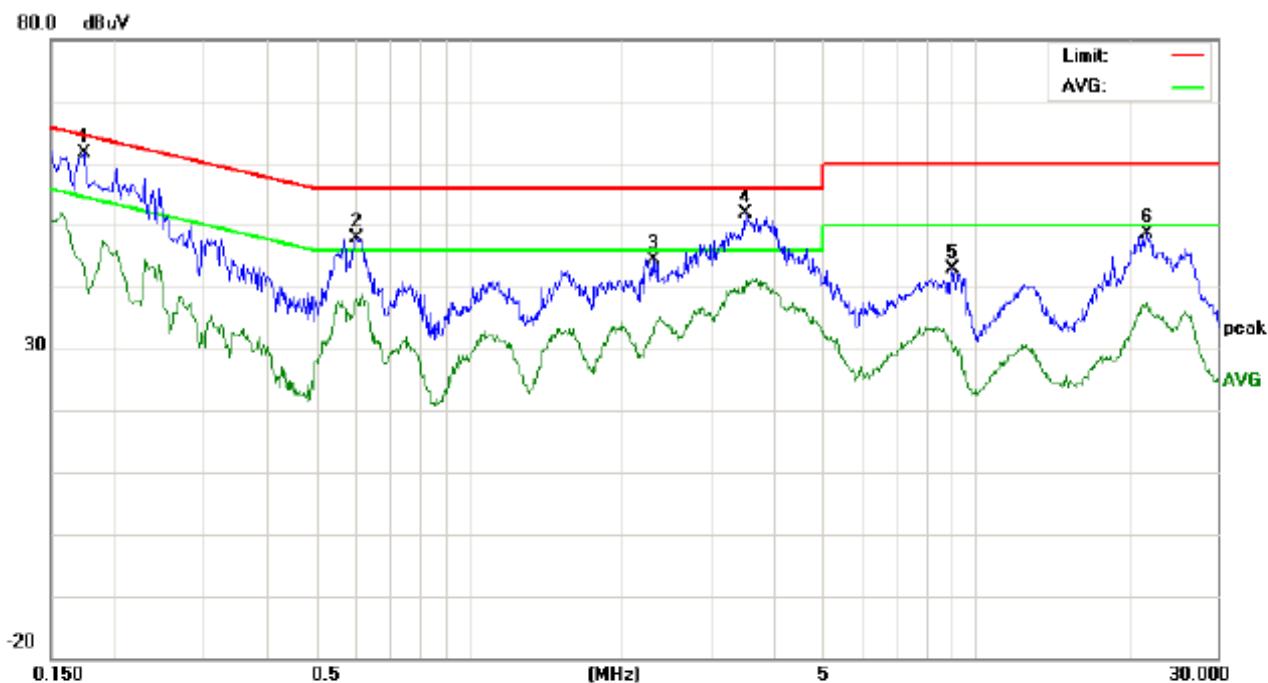


Site: Conduction Phase: **N** Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %  
 EUT: Bluetooth Speaker  
 M/N: SC-25  
 Mode: Normal Operation  
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2100	46.84		35.69	10.23	57.07		45.92	63.20	53.20	-6.13	-7.28	P	
2	0.5820	37.63		29.85	10.33	47.96		40.18	56.00	46.00	-8.04	-5.82	P	
3	3.7900	41.70		31.65	10.46	52.16		42.11	56.00	46.00	-3.84	-3.89	P	
4	7.4859	32.93		22.17	10.33	43.26		32.50	60.00	50.00	-16.74	-17.50	P	
5	12.1779	31.91		17.98	10.14	42.05		28.12	60.00	50.00	-17.95	-21.88	P	
6	22.2580	36.44		24.59	10.12	46.56		34.71	60.00	50.00	-13.44	-15.29	P	

**FOR BLE**

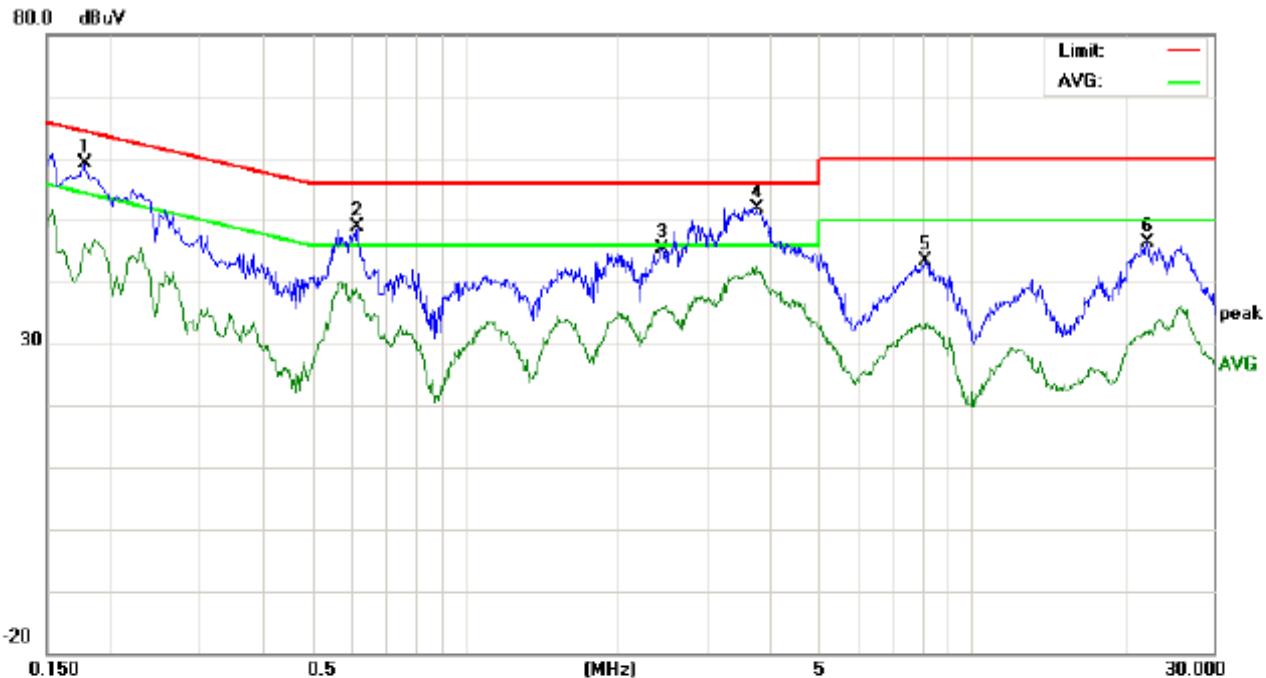
Line Conducted Emission Test Line 1-L



Site: Conduction Phase: L1 Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %  
 EUT: Bluetooth Speaker  
 M/N: SC-25  
 Mode: Normal Operation  
 Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		dB	Peak	QP	AVG	QP	AVG	QP	AVG	
1	0.1740	51.37		33.30	10.19	61.56		43.49	64.76	54.76	-3.20	-11.27	P	
2	0.6020	37.46		27.79	10.31	47.77		38.10	56.00	46.00	-8.23	-7.90	P	
3	2.3179	34.11		22.33	10.35	44.46		32.68	56.00	46.00	-11.54	-13.32	P	
4	3.5260	41.27		30.56	10.51	51.78		41.07	56.00	46.00	-4.22	-4.93	P	
5	9.0379	32.56		20.56	10.22	42.78		30.78	60.00	50.00	-17.22	-19.22	P	
6	21.7700	38.57		27.35	10.12	48.69		37.47	60.00	50.00	-11.31	-12.53	P	

Line Conducted Emission Test Line 2-N



Site: Conduction Phase: **N** Temperature: 26

Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %

EUT: Bluetooth Speaker

M/N: SC-25

Mode: Normal Operation

Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	Avg		Peak	QP	Avg	QP	Avg	QP	Avg		
1	0.1780	48.98		35.86	10.19	59.17		46.05	64.57	54.57	-5.40	-8.52	P	
2	0.6140	38.45		27.90	10.32	48.77		38.22	56.00	46.00	-7.23	-7.78	P	
3	2.4539	35.07		25.50	10.41	45.48		35.91	56.00	46.00	-10.52	-10.09	P	
4	3.7740	41.48		31.78	10.47	51.95		42.25	56.00	46.00	-4.05	-3.75	P	
5	8.1379	33.03		22.53	10.35	43.38		32.88	60.00	50.00	-16.62	-17.12	P	
6	22.2420	36.15		21.85	10.12	46.27		31.97	60.00	50.00	-13.73	-18.03	P	

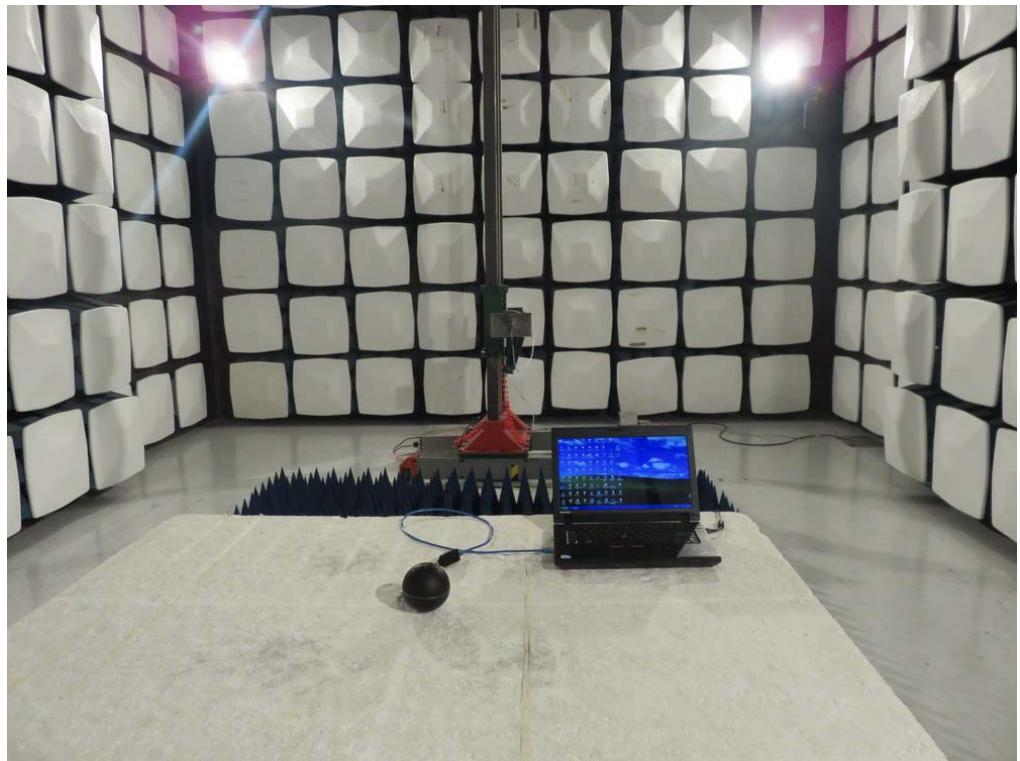
## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP



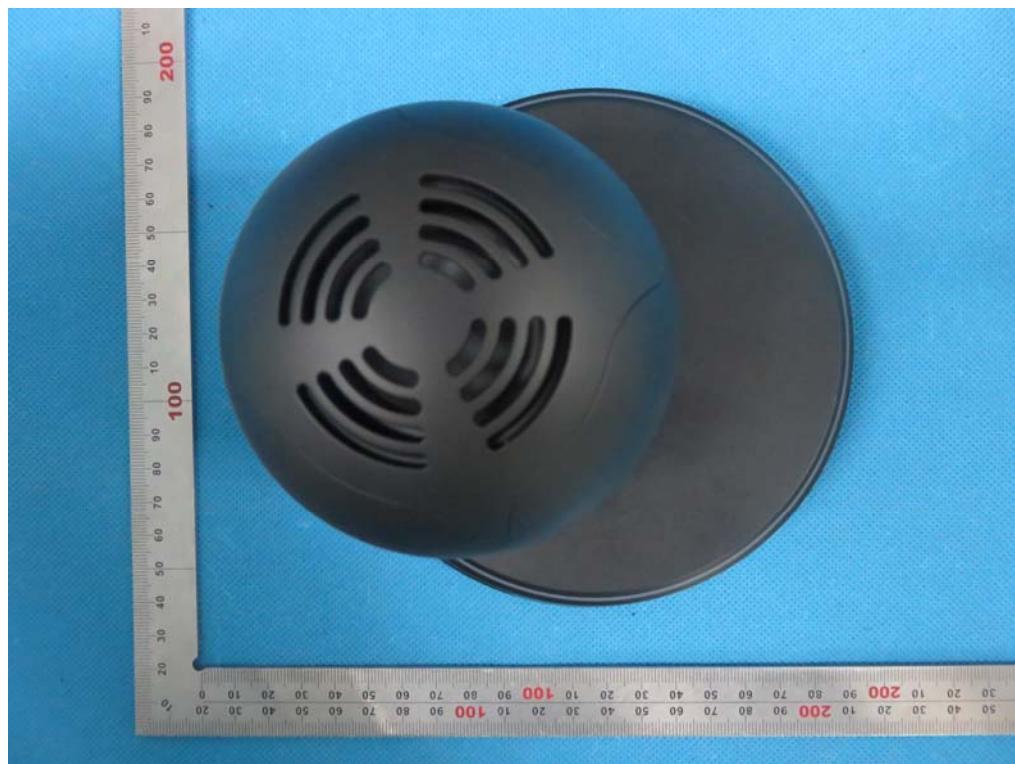


## APPENDIX B: PHOTOGRAPHS OF EUT

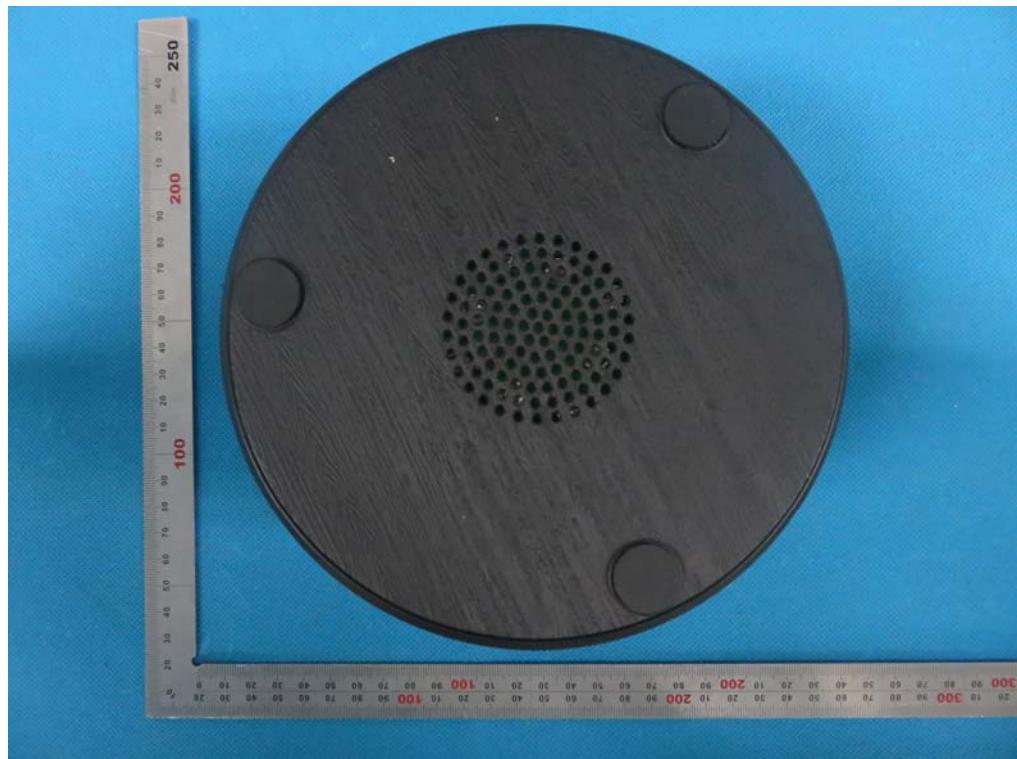
### TOTAL VIEW OF EUT



TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



LEFT VIEW OF EUT



RIGHT VIEW OF EUT



VIEW OF EUT (USB)



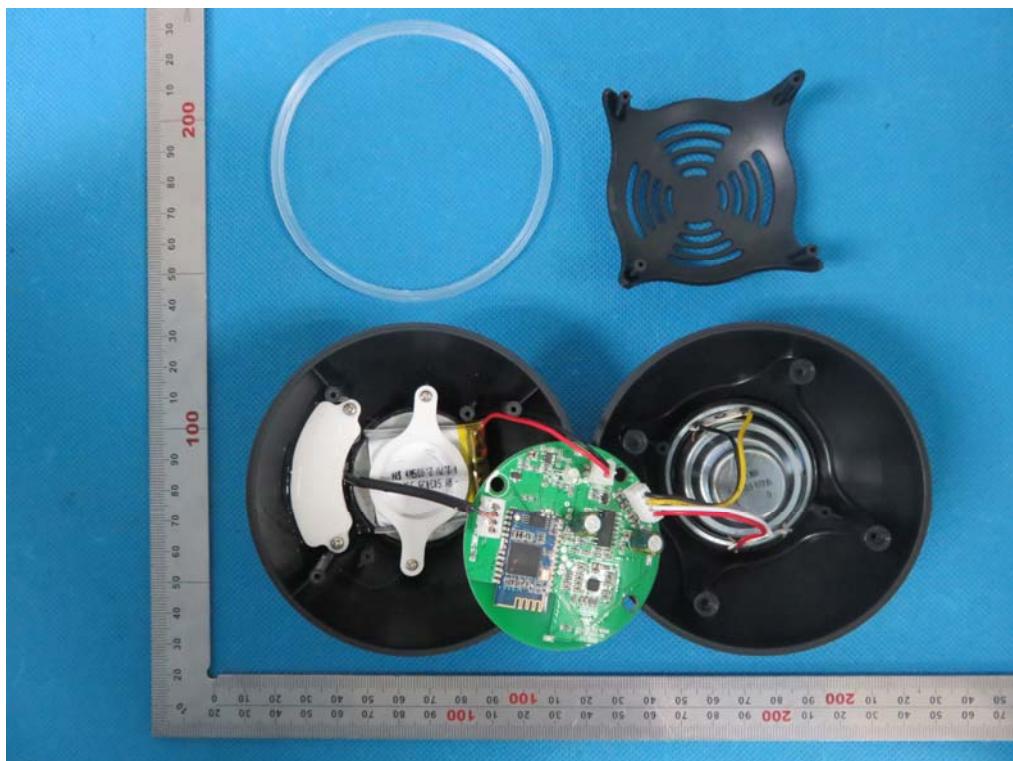
VIEW OF EUT (AUX)



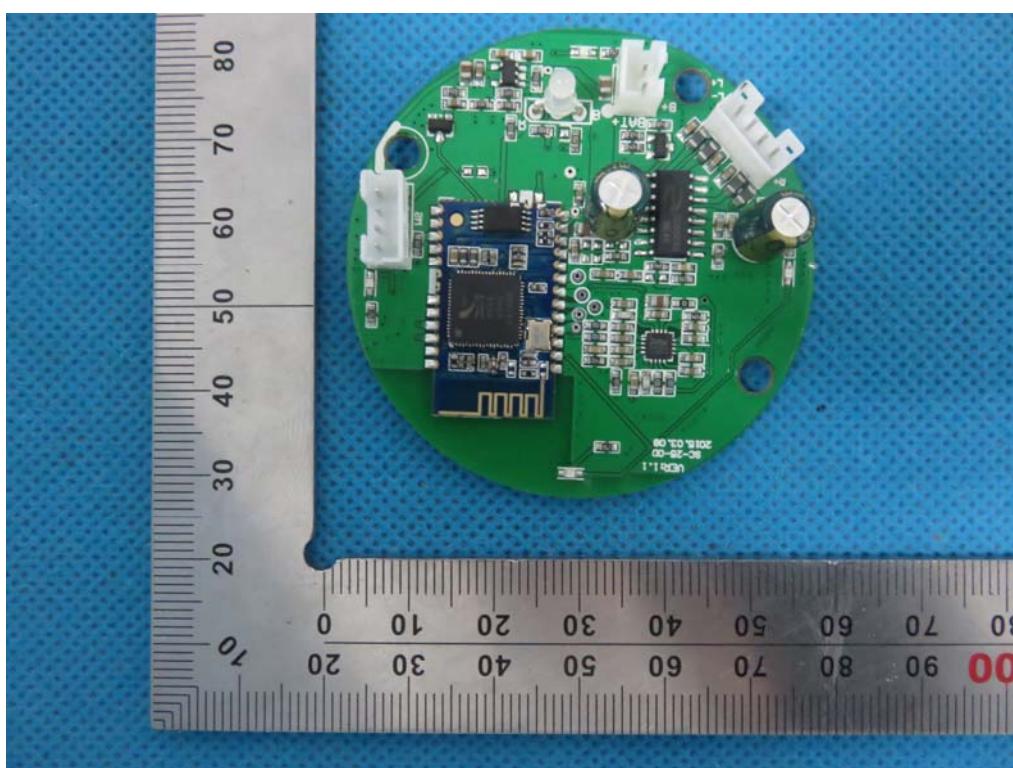
ADAPTOR OF EUT



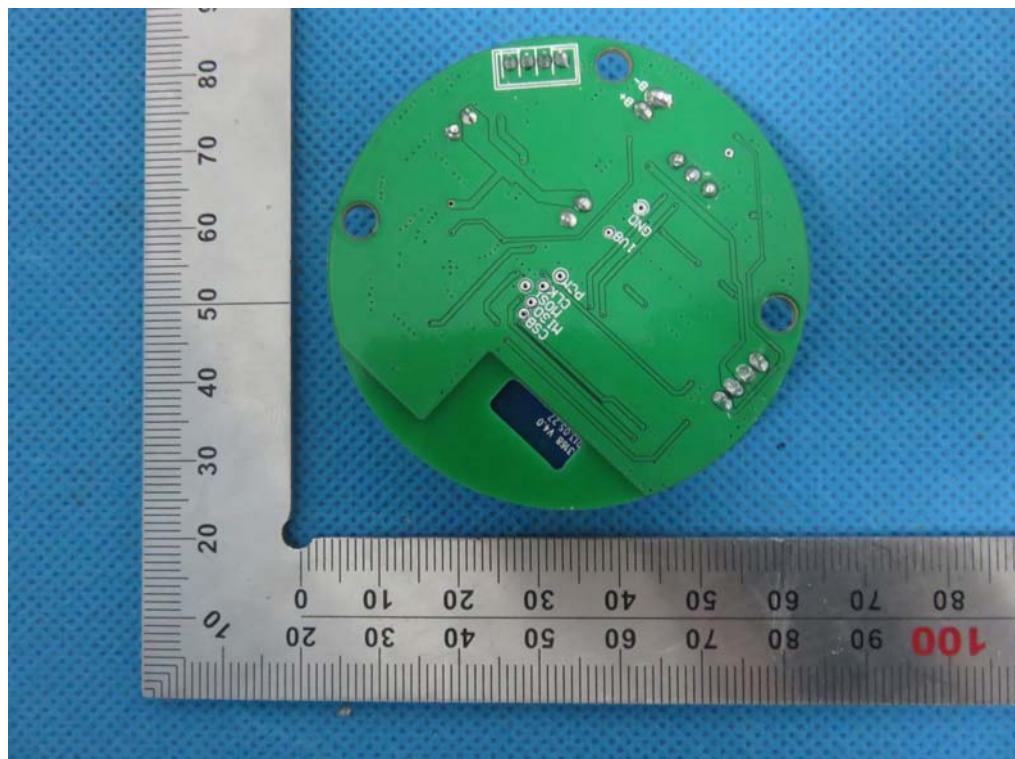
OPEN VIEW OF EUT



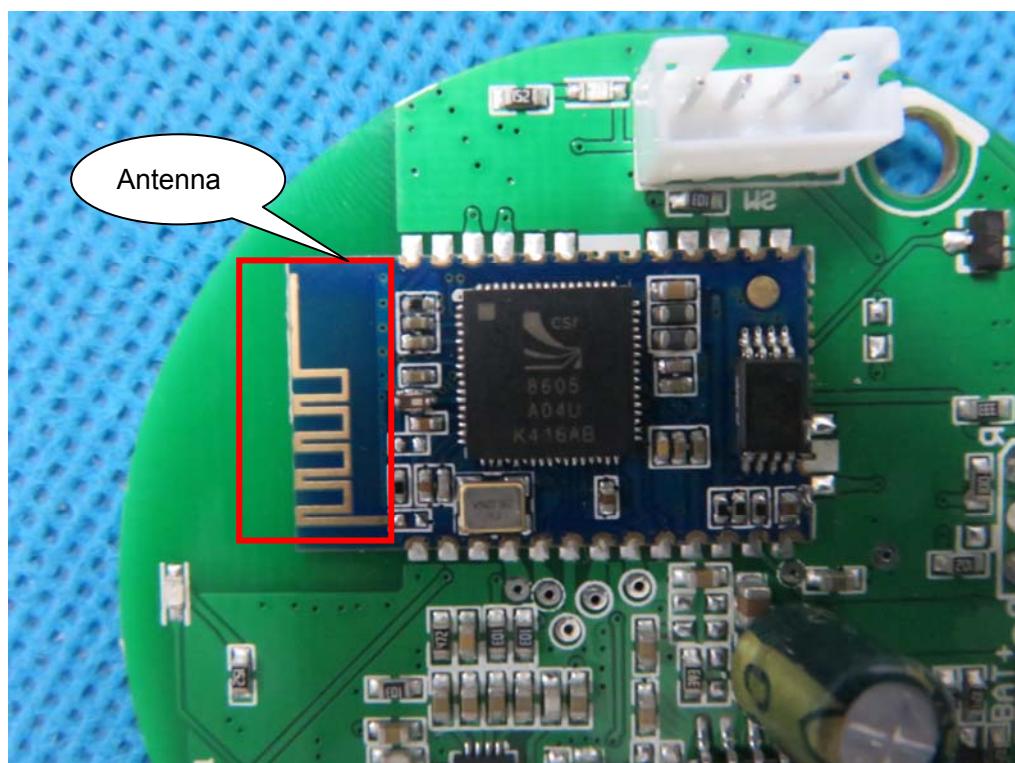
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



----END OF REPORT----