

# Test Report

## FCC Part15 Subpart C

Product Name : Bluetooth USB Dongle  
Model No. : BT600  
FCC ID : AL8-BT600  
IC : 457A-BT600

Applicant : Plantronics, Inc.

Address : 345 Encinal Street, Santa Cruz, CA95060 USA

Date of Receipt : Dec. 17, 2014  
Test Date : Dec. 17, 2014~ Dec. 31, 2014  
Issued Date : Jan. 07, 2015  
Report No. : 14C0468R-RF-US-P06V02  
Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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**History of This Test Report**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
14C0468R-RF-US-P06V02	V1.0	Initial Issued Report	Jan. 07, 2015

**1. General Information**

**1.1. EUT Description**

Product Name	Bluetooth USB Dongle
Brand Name	Plantronics
Model No.	BT600
Working Voltage	DC 5V
Bluetooth Specification	3.0HS + Version 4.0
Frequency Range	2402- 2480 MHz
Channel Number	V3.0+HS: 79 V4.0: 40
Channel Separation	V3.0+HS: 1MHz V4.0: 2MHz
Type of Modulation	V3.0+HS: GFSK, Pi/4 DQPSK, 8DPSK V4.0: GFSK
Data Rate	V3.0+HS: 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK) V4.0: 1Mbps(GFSK)
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Bluetooth Working Frequency of Each Channel: (For V3.0+HS)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

Bluetooth Working Frequency of Each Channel: (For V4.0)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	2480 MHz



**Bluetooth Antenna List**

Antenna	Manufacturer	Model No.	Peak Gain
Monopole Antenna	Goertek	MILA antenna	-4.12dBi for 2.4GHz

**1.2. Mode of Operation**

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit-1Mbps(GFSK_BLE)

Note:

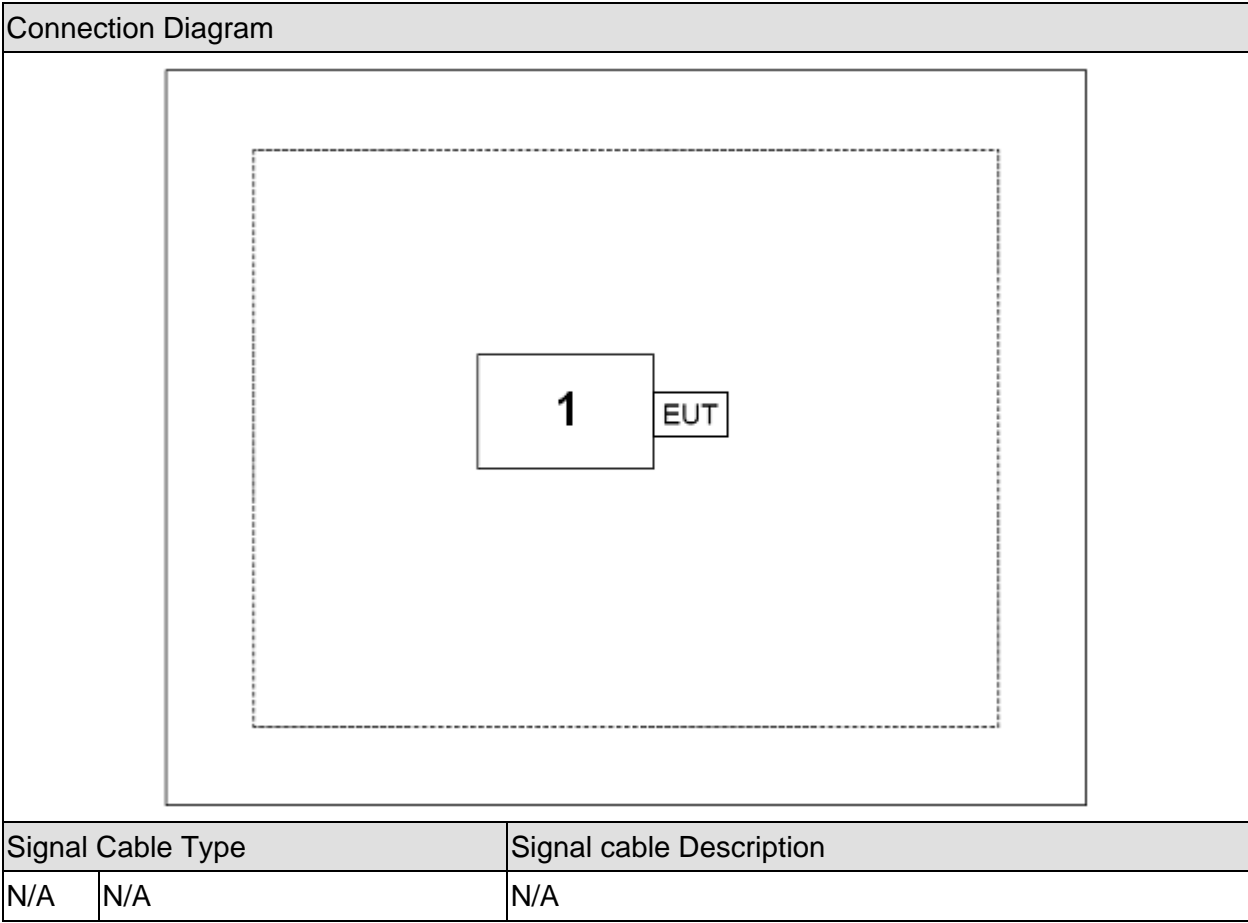
1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
3. This Bluetooth product can support Bluetooth 3.0 and 4.0, this report only indicate 4.0 test data. For Bluetooth 3.0 refer to report 14C0468R-RF-US-P06V01.

**1.3. Tested System Details**

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook	Asus	N80V	8BN0AS226971468	N/A

1.4. Configuration of Tested System



## 1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run the RF test software "Blue Test 3", and set the test mode and channel, then press OK to start continue receive.

**2. Technical Test**

**2.1. Summary of Test Result**

- No deviations from the test standards
- Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.209	Yes	No
RF Antenna Conducted Spurious	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2014 15.247(d)	Yes	No
Operation Frequency Range of 20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2014 15.215(c)	Yes	No
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.247(a)(2)	Yes	No
Power Output	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.247(b)(3)	Yes	No
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: 2014 Section 15.247(e)	Yes	No

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS-Gen Issue 4 November 2014 Section 8.8	Yes	No
Radiated Emission	RSS-210 Issue 8 December 2010 Section 2.7 Table 2 and Table 3	Yes	No
RF Antenna Conducted Spurious	RSS-210 Issue 8 December 2010 Section A8.5	Yes	No
Radiated Emission Band Edge	RSS-210 Issue 8 December 2010 Section A8.5	Yes	No
Occupied Bandwidth	RSS-Gen Issue 4 November 2014 Section 6.6 RSS-210 Issue 8 December 2010 Section A8.2(1)	Yes	No
Power Output	RSS-210 Issue 8 December 2010 Section A8.4(4)	Yes	No
Power Spectral Density	RSS-210 Issue 8 December 2010 Section A8.2(2)	Yes	No

**2.2. Test Environment**

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



### 3. Conducted Emission

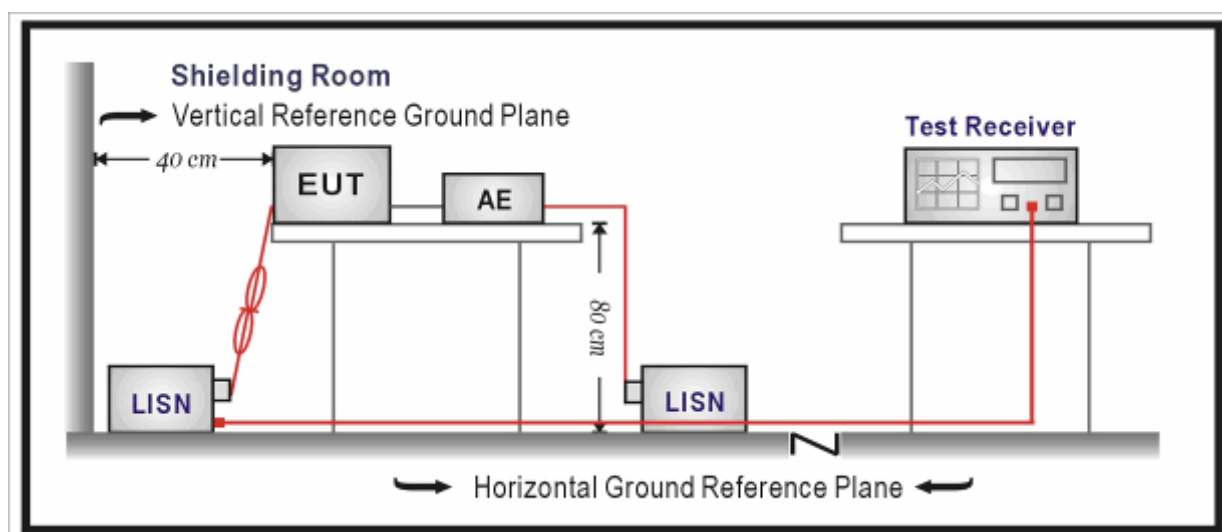
#### 3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2015.03.30
Two-Line V-Network	R&S	ENV216	100043	2015.03.30
Two-Line V-Network	R&S	ENV216	100044	2015.09.16
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2015.03.01
50ohm Termination	SHX	TF2	07081401	2015.09.16
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2016.01.08

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

#### 3.2. Test Setup



**3.3. Limit**

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

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

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

**3.4. Test Procedure**

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

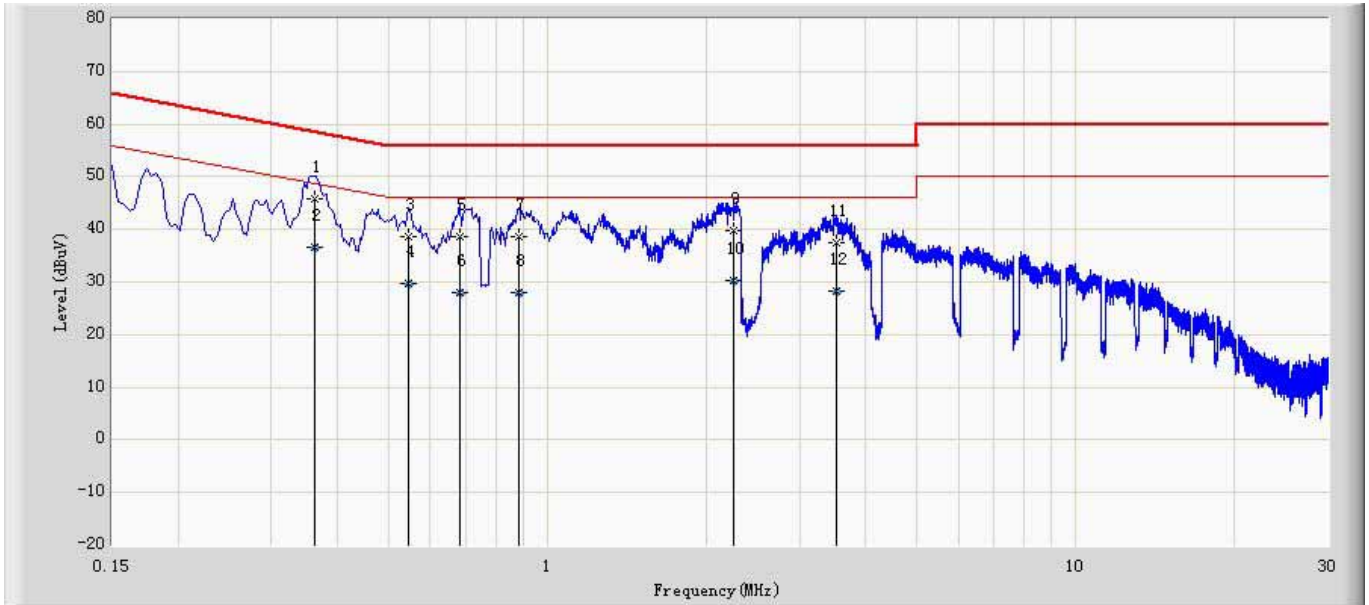
The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

**3.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 2.02$  dB

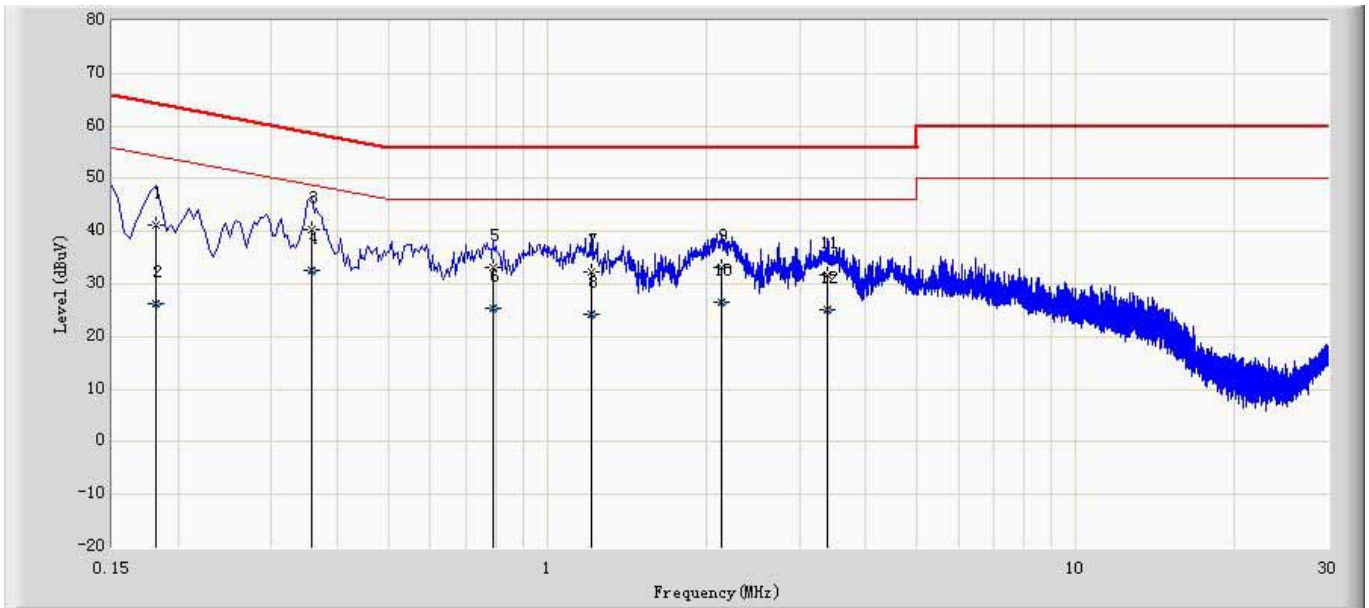
### 3.6. Test Result

Site: TR1	Time: 2014/12/28 - 18:42
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: Bluetooth USB Dongle	Power: AC 120V/60Hz
Note: Mode: Transmit at channel 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.362	45.933	36.051	-12.750	58.682	9.882	QP
2	*	0.362	36.571	26.689	-12.111	48.682	9.882	AV
3		0.546	38.622	28.728	-17.378	56.000	9.894	QP
4		0.546	29.848	19.954	-16.152	46.000	9.894	AV
5		0.682	38.478	28.631	-17.522	56.000	9.846	QP
6		0.682	28.082	18.236	-17.918	46.000	9.846	AV
7		0.882	38.487	28.666	-17.513	56.000	9.821	QP
8		0.882	27.904	18.084	-18.096	46.000	9.821	AV
9		2.258	39.747	29.956	-16.253	56.000	9.791	QP
10		2.258	30.210	20.419	-15.790	46.000	9.791	AV
11		3.518	37.580	27.755	-18.420	56.000	9.825	QP
12		3.518	28.249	18.424	-17.751	46.000	9.825	AV

Site: TR1	Time: 2014/12/28 - 18:46
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: Bluetooth USB Dongle	Power: AC 120V/60Hz
Note: Mode: Transmit at channel 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.182	41.339	31.395	-23.055	64.394	9.944	QP
2		0.182	26.204	16.260	-28.190	54.394	9.944	AV
3		0.358	40.309	30.330	-18.466	58.775	9.979	QP
4	*	0.358	32.641	22.663	-16.133	48.775	9.979	AV
5		0.790	33.028	23.104	-22.972	56.000	9.925	QP
6		0.790	25.458	15.534	-20.542	46.000	9.925	AV
7		1.210	32.205	22.188	-23.795	56.000	10.017	QP
8		1.210	24.308	14.291	-21.692	46.000	10.017	AV
9		2.142	33.161	23.207	-22.839	56.000	9.954	QP
10		2.142	26.658	16.704	-19.342	46.000	9.954	AV
11		3.390	31.854	21.832	-24.146	56.000	10.022	QP
12		3.390	25.160	15.138	-20.840	46.000	10.022	AV

Note: All the low ,middle and high channels of all different modes are investigated, and only report the worst case.

**4. Radiated Emission**

**4.1. Test Equipment**

Radiated Emission / AC-2

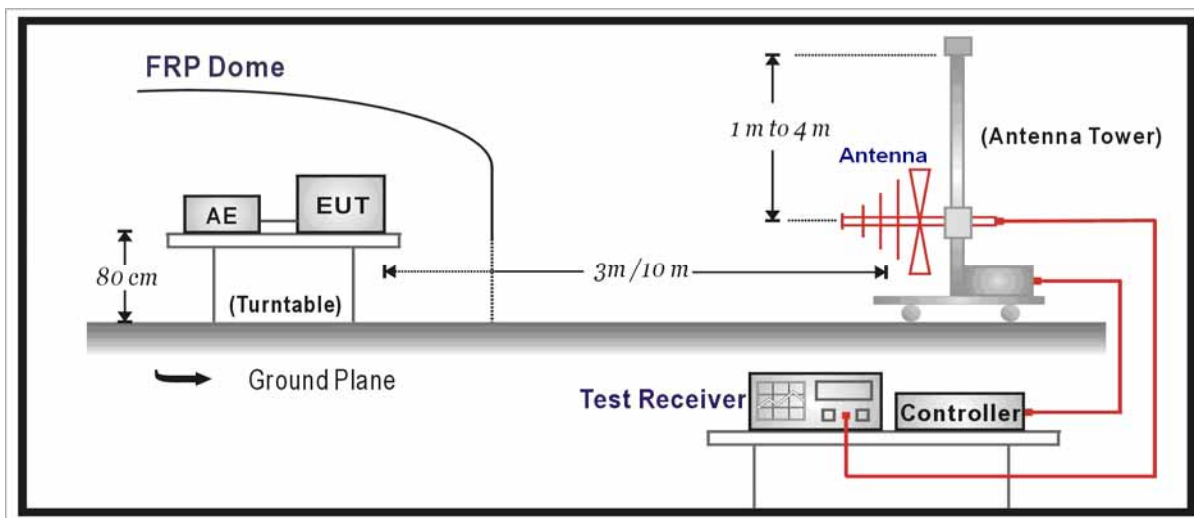
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2015.03.28
Loop Antenna	R&S	HFH2-Z2	833799/003	2015.11.25
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2015.10.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2015.03.01
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2016.01.08

Radiated Emission / AC-5

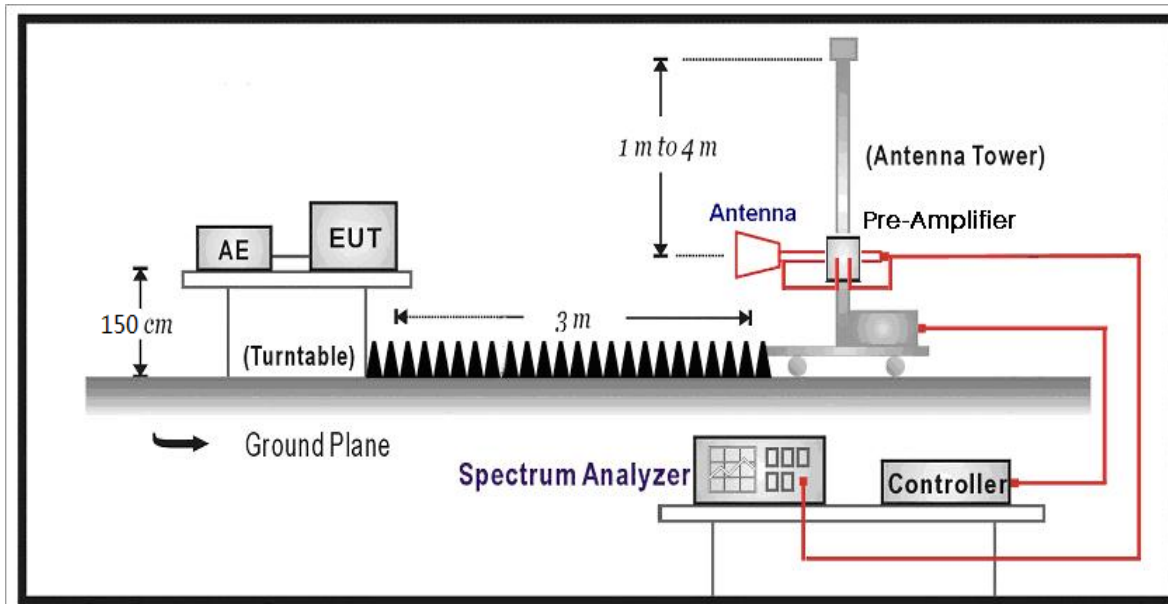
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2015.05.12
Preamplifier	Miteq	NSP1800-25	1364185	2015.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2015.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2015.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2015.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2016.04.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2015.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2015.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2015.03.01
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2016.01.08

4.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



**4.3. Limit**

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

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

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

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

**4.4. Test Procedure**

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

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

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

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

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

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

**4.5. Uncertainty**

The measurement uncertainty above 1G is defined as ± 3.9 dB  
 below 1G is defined as ± 3.8 dB

**4.6. Test Result**

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

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

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

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

Mode 1: Transmitter-1Mbps(GFSK\_BLE)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4799.5	38.6	9.6	48.2	54(Note2)	-5.8	PK
	V	4808.0	45.2	9.7	54.9	74	-19.1	PK
	V	4804.0	33.2	9.7	42.9	54	-11.1	AV
	H	7206.0	35.1	11.9	47.0	54(Note2)	-7.0	PK
	V	7206.0	34.4	11.9	46.3	54(Note2)	-7.7	PK
	H	9608.0	31.6	13.9	45.5	54(Note2)	-8.5	PK
	V	9608.0	31.8	13.9	45.7	54(Note2)	-8.3	PK
19	H	4876.0	37.9	10.2	48.1	54(Note2)	-5.9	PK
	V	4884.5	40.4	10.2	50.6	54(Note2)	-3.4	PK
	H	7320.0	34.2	12.0	46.2	54(Note2)	-7.8	PK
	V	7320.0	34.3	12.0	46.3	54(Note2)	-7.7	PK
	H	9760.0	32.2	14.1	46.3	54(Note2)	-7.7	PK
	V	4876.0	37.9	10.2	48.1	54(Note2)	-5.9	PK
39	H	4961.0	39.6	10.5	50.1	54(Note2)	-3.9	PK
	V	4961.0	40.4	10.5	50.9	54(Note2)	-3.1	PK
	H	7440.0	32.9	12.1	45.0	54(Note2)	-9.0	PK
	V	7440.0	33.6	12.1	45.7	54(Note2)	-8.3	PK
	H	9920.0	33.1	14.3	47.4	54(Note2)	-6.6	PK
	V	9920.0	32.1	14.3	46.4	54(Note2)	-7.6	PK

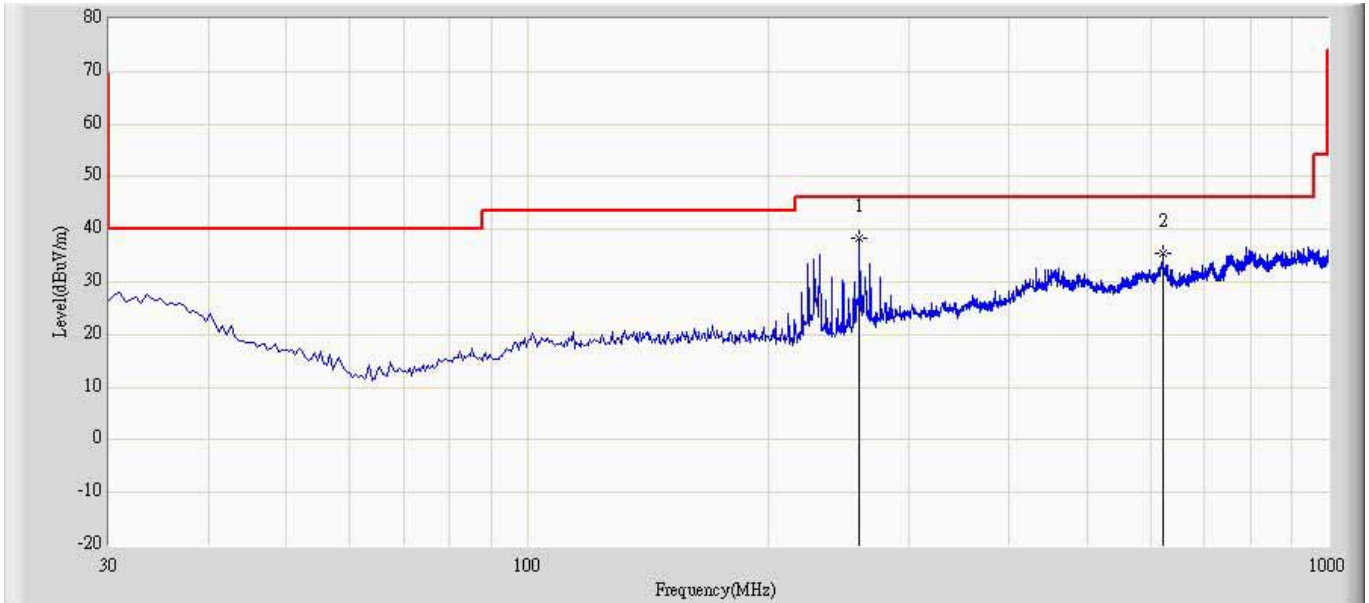
Note 1: The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

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



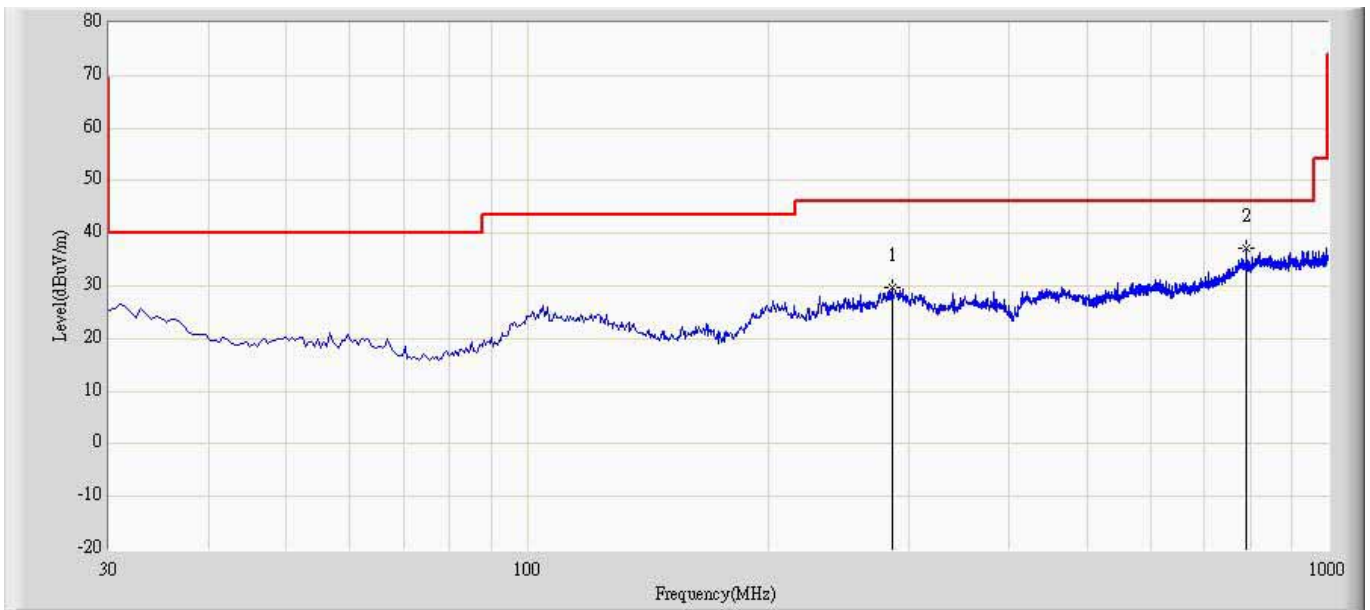
## The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2014/12/28 - 09:48
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_10M(30-1000M)20130511	Polarity: Horizontal
EUT: Dongle	Power: AC 120V/60Hz
Note: Mode: Transmit at channel 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	259.890	38.314	17.878	-7.686	46.000	20.436	QP
2		621.700	35.489	2.977	-10.511	46.000	32.512	QP

Site: AC2	Time: 2014/12/28 - 09:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_10M(30-1000M)20130511	Polarity: Vertical
EUT: Dongle	Power: AC 120V/60Hz
Note: Mode: Transmit at channel 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		285.110	29.810	2.964	-16.190	46.000	26.846	QP
2	*	791.450	37.153	4.657	-8.847	46.000	32.496	QP

## 5. RF Antenna Conducted Spurious

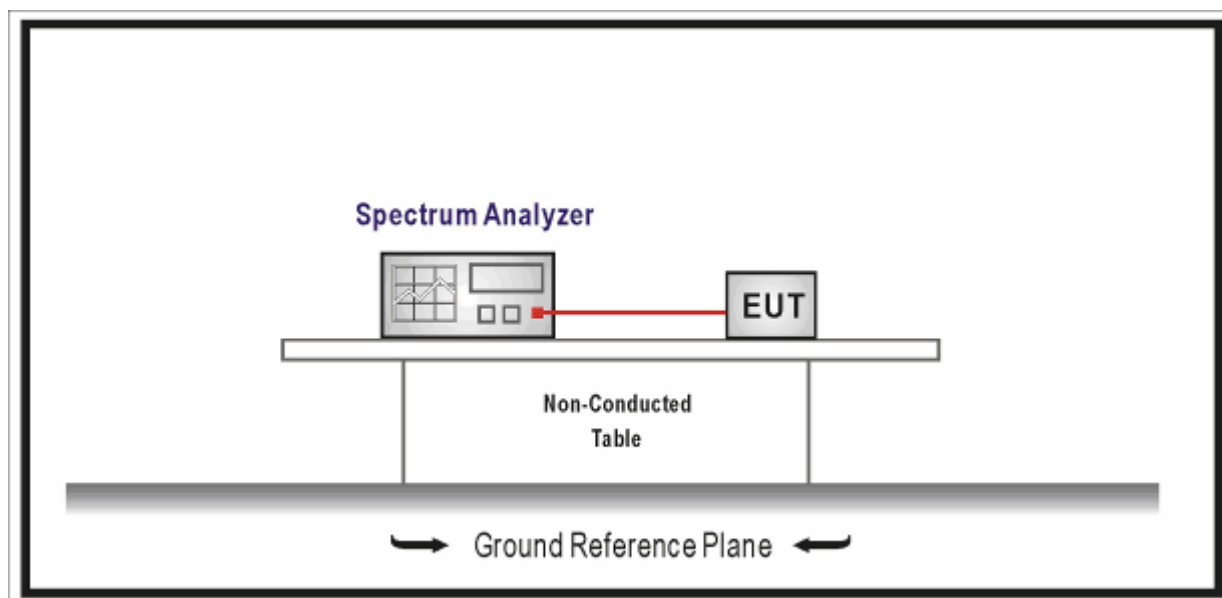
### 5.1. Test Equipment

RF Antenna Conducted Spurious / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2015.05.12
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2015.04.09

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

### 5.2. Test Setup



### 5.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

**5.4. Test Procedure**

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

**5.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 1.27$  dB

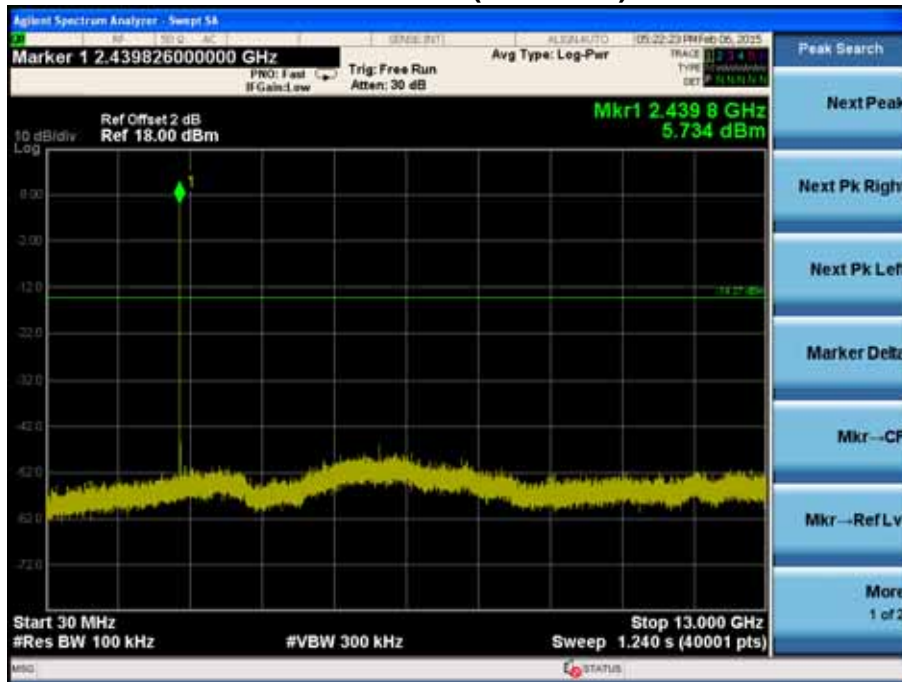
5.6. Test Result

Product	:	Bluetooth USB Dongle
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit-1Mbps(GFSK_BLE)

Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)-1



**6. Radiated Emission Band Edge**

**6.1. Test Equipment**

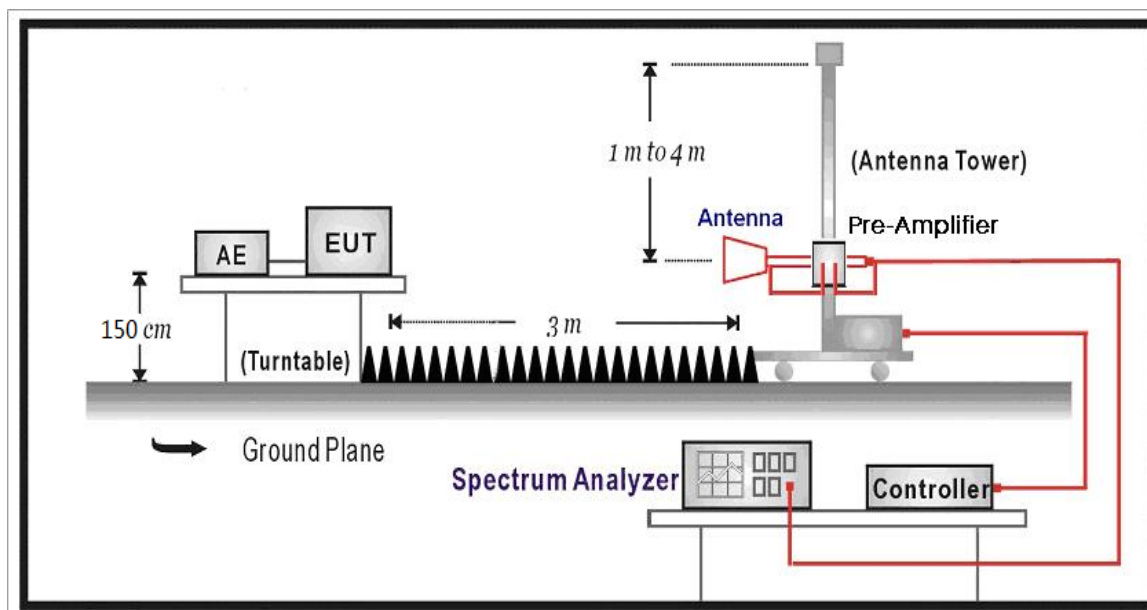
Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MY49100159	2015.03.30
Preamplifier	Miteq	NSP1800-25	1364185	2015.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2015.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2015.10.15
DRG Horn	ETS-Lindgren	3117	00123988	2015.01.07
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2015.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2015.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2015.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2015.08.07
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2016.01.08

Note 1: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.



## 6.2. Test Setup



## 6.3. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

## 6.4. Test Procedure

Since the EUT can be set to transmit continuously (Duty cycle >98%), use KDB 558074 Section 11.13.3.3 to perform band edge test for average value.

If the EUT can be configured or modified to transmit continuously ( $D \geq 98\%$ ), then the average emission levels within 2 MHz of the authorized band edge may be measured using the following method (with EUT transmitting continuously):

- a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).
- b) Set span to 2 MHz.
- c) RBW = 100 kHz.
- d) VBW  $\geq [3 \times \text{RBW}]$ .
- e) Detector = RMS (power averaging), if  $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$ .
- f) Averaging type = power (i.e., rms).
  - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
  - 2) Some instruments require linear display mode to use linear voltage averaging. Log or

dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

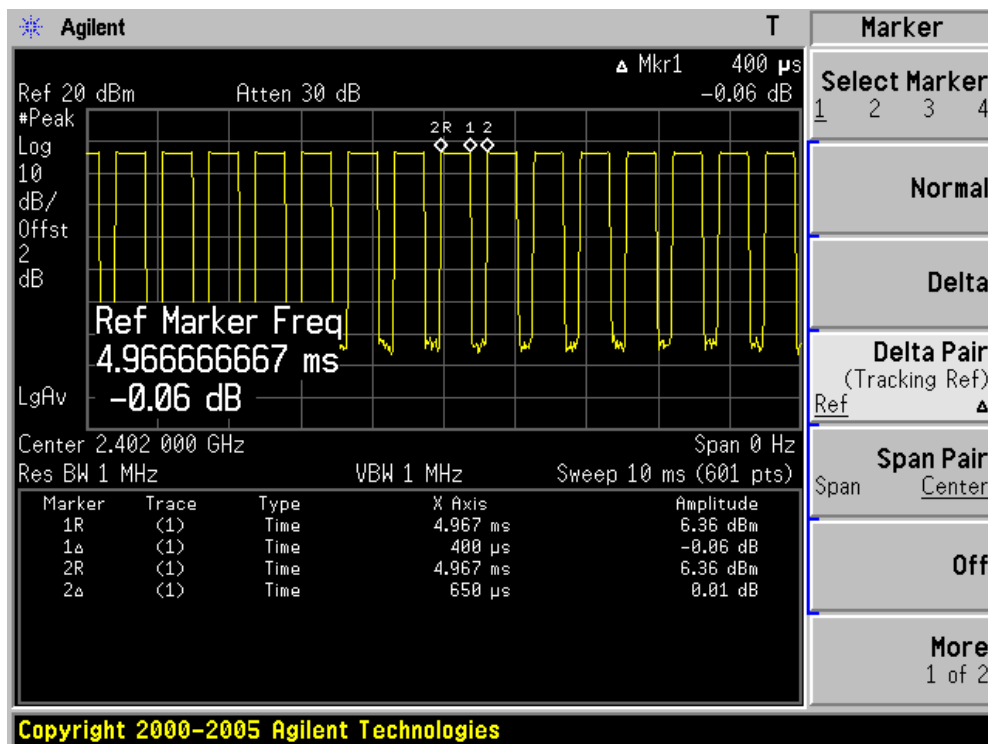
i) Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission)  $\pm$  0.5 MHz.

If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission  $\pm$  0.5 MHz.

Since the EUT can be set to transmit continuously (Duty cycle <98%), use ANSI C63.10 Section 11.12.2.5 to perform band edge test for average value.

PK:RBW=1MHz,VBW=3MHz

AV: RBW=1MHz,VBW= 1/Ton(KHz)=1/0.4=2.5KHz

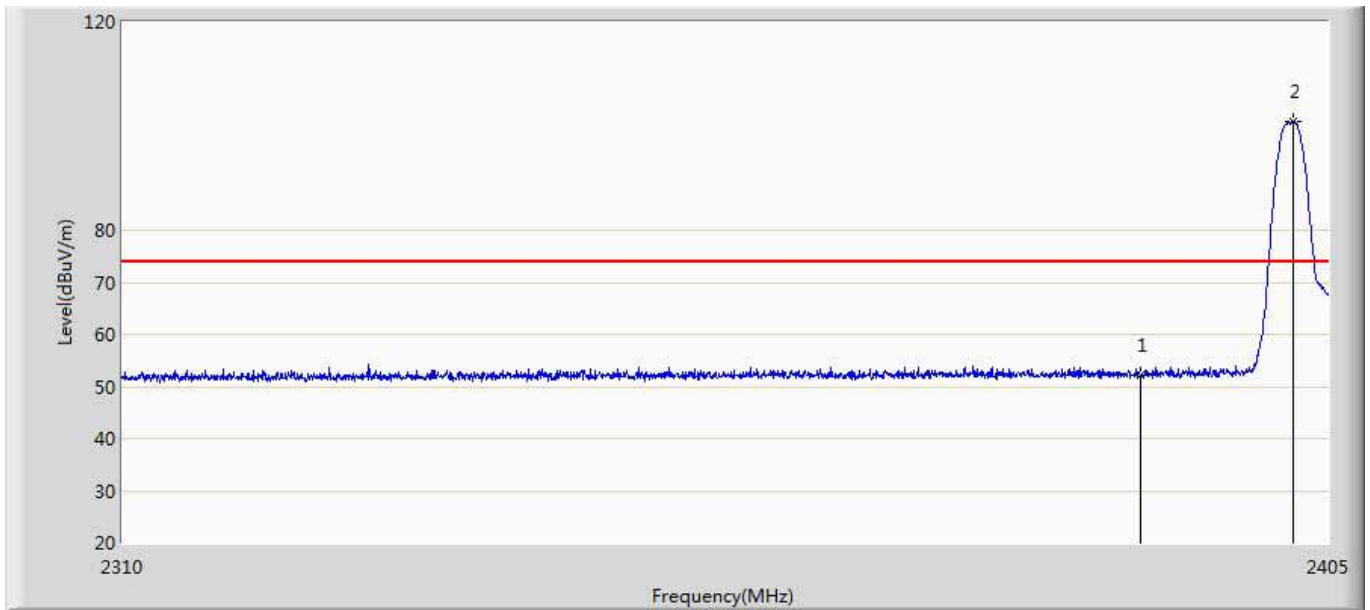


## 6.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm$  3.9 dB

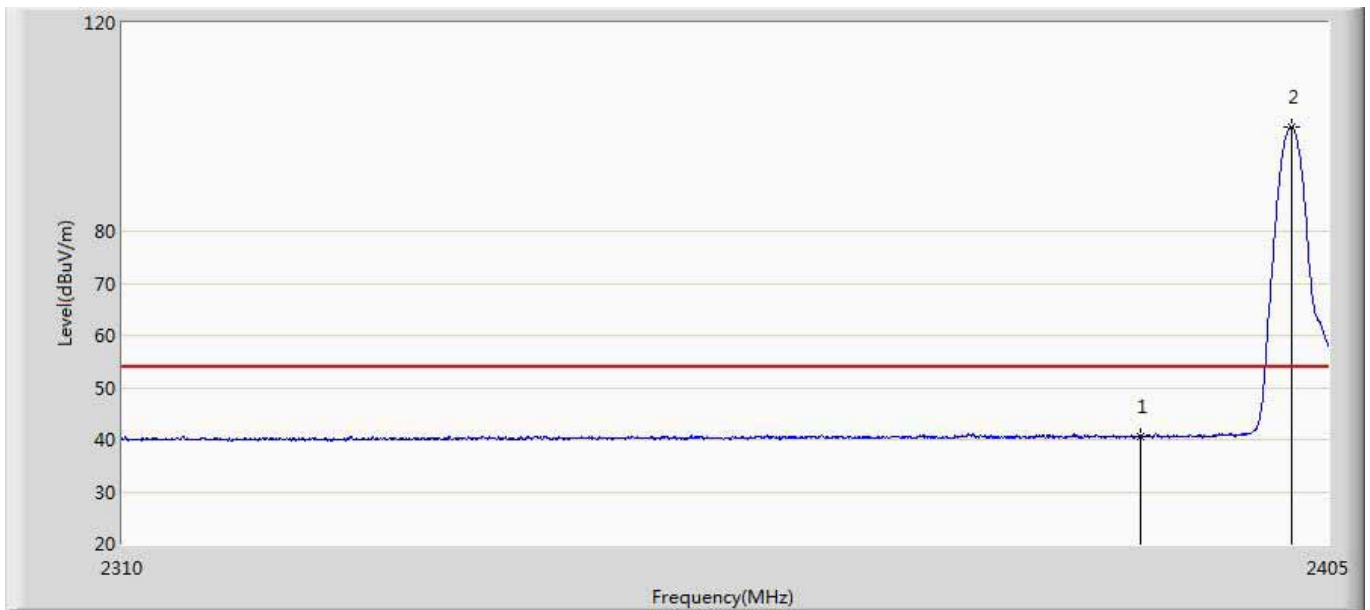
6.6. Test Result

Site: AC5	Time: 2015/02/09 - 11:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: 2402	



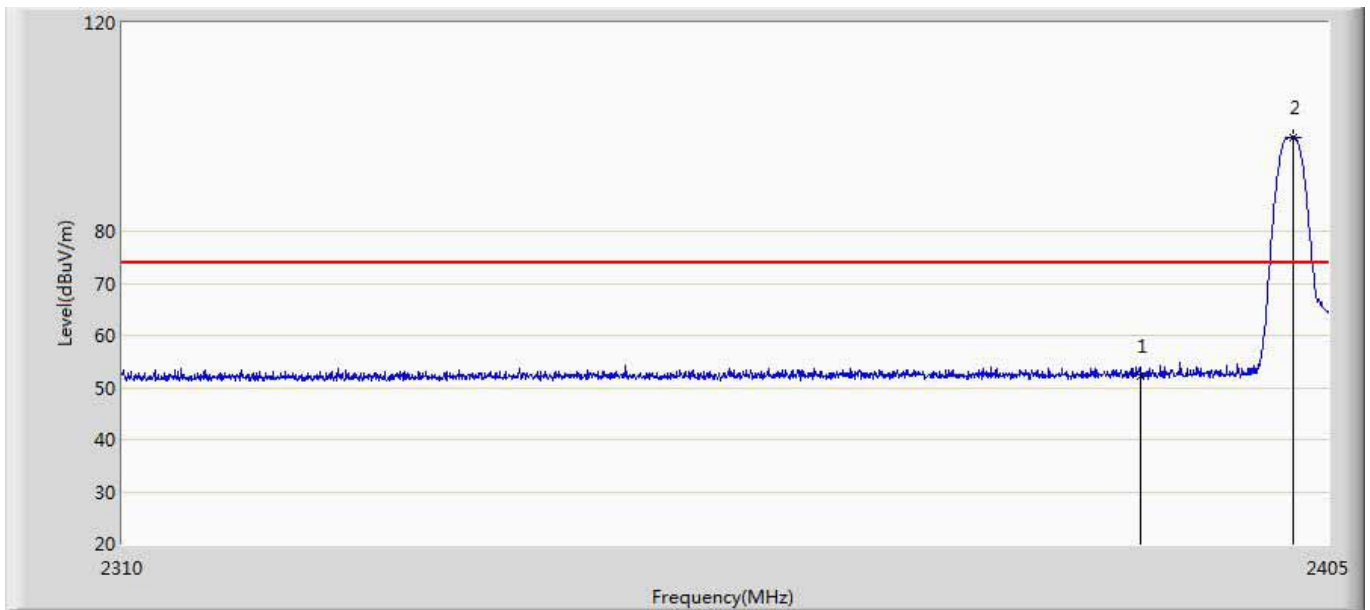
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	52.189	14.496	-21.811	74.000	37.693	PK
2	*	2402.198	100.858	63.105	26.858	74.000	37.753	PK

Site: AC5	Time: 2015/02/09 - 11:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2402 by BLE	



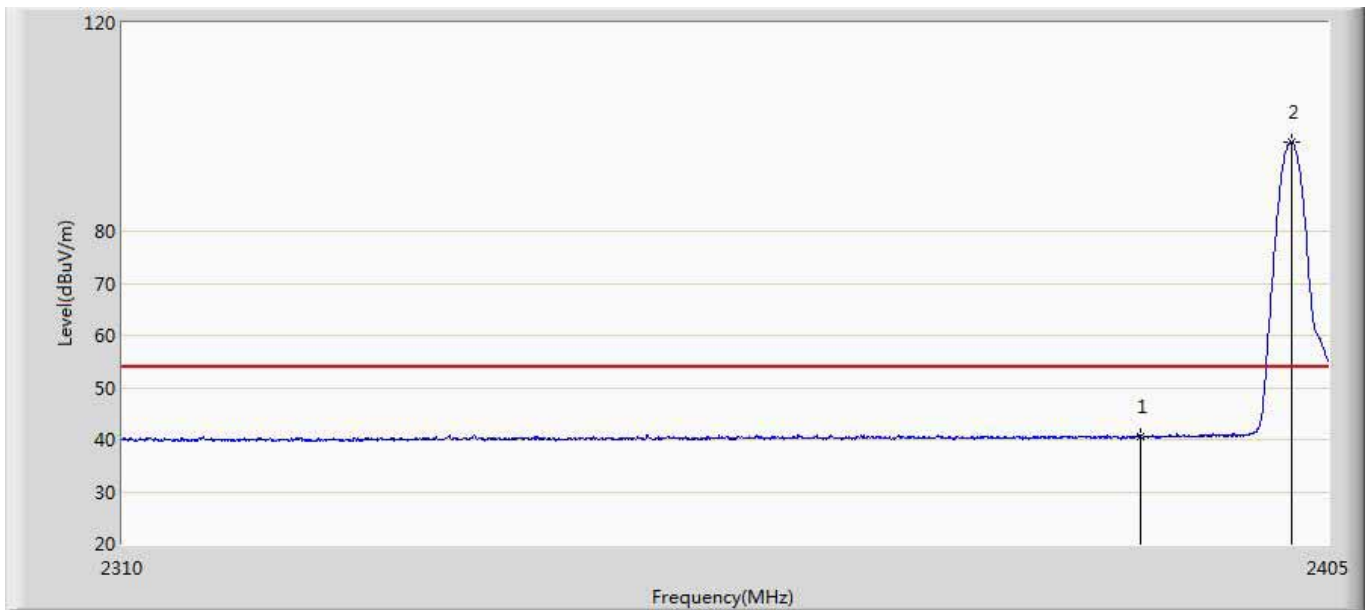
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	40.608	2.915	-13.392	54.000	37.693	AV
2	*	2402.055	100.053	62.301	46.053	54.000	37.752	AV

Site: AC5	Time: 2015/02/09 - 11:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2402 by BLE	



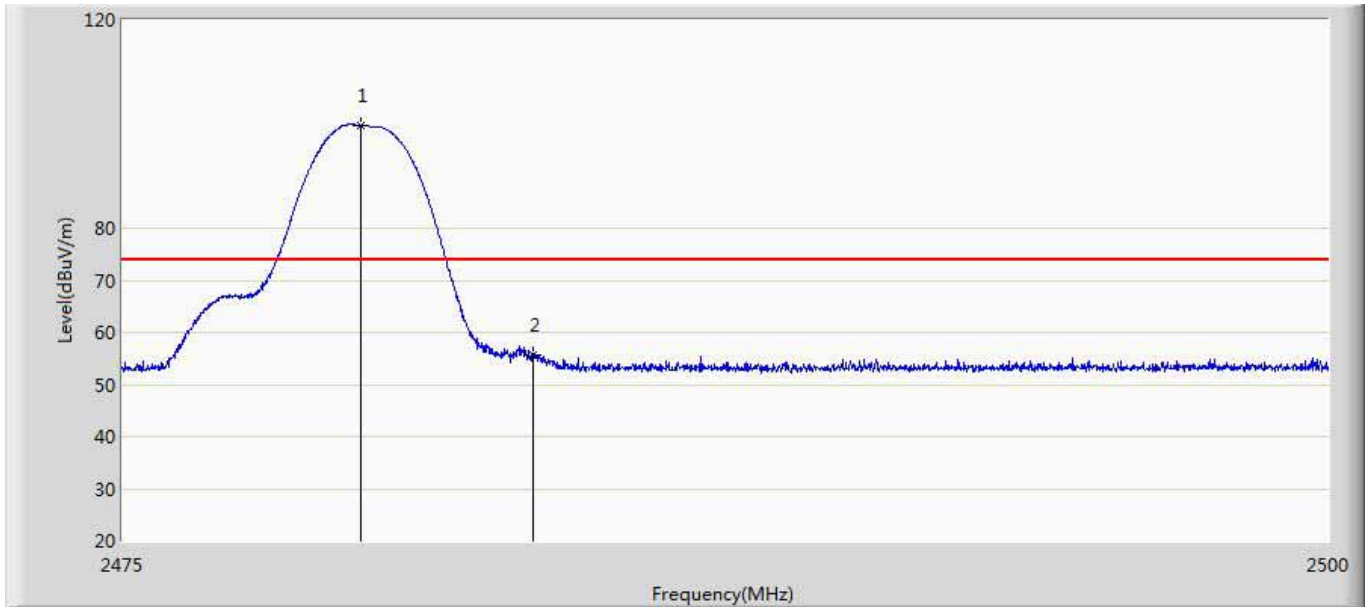
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	52.092	14.399	-21.908	74.000	37.693	PK
2	*	2402.150	98.115	60.362	24.115	74.000	37.753	PK

Site: AC5	Time: 2015/02/09 - 11:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2402 by BLE	



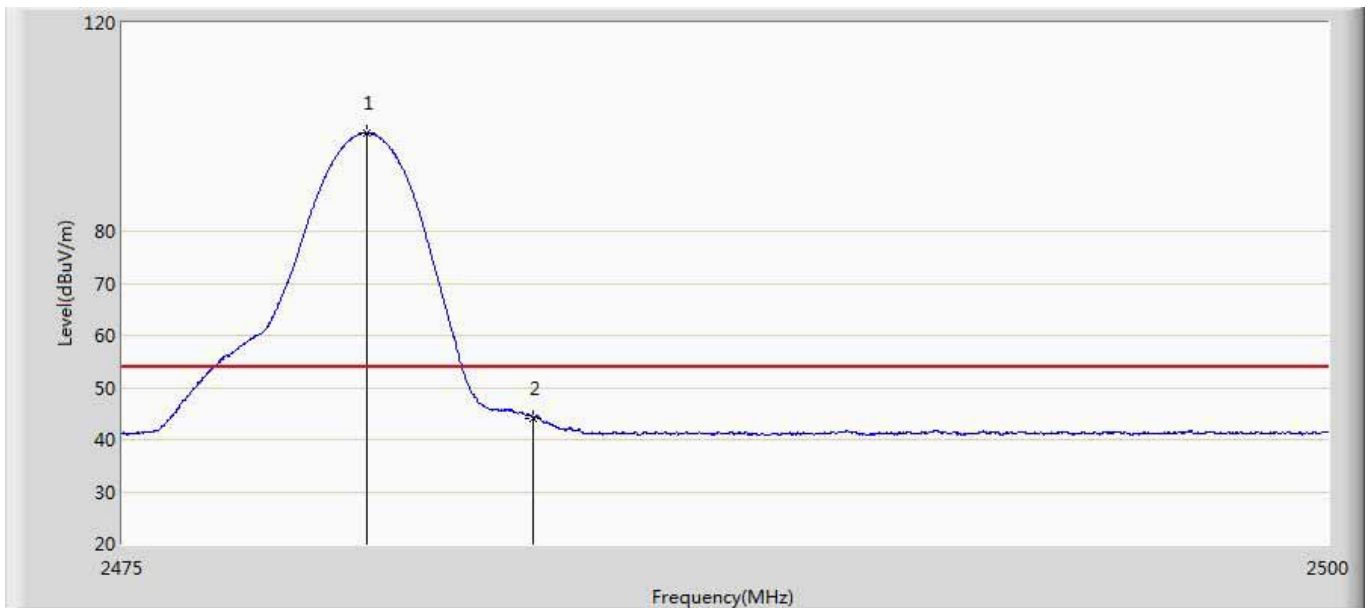
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	40.715	3.022	-13.285	54.000	37.693	AV
2	*	2402.055	97.213	59.461	43.213	54.000	37.752	AV

Site: AC5	Time: 2015/02/09 - 11:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2480 by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.937	99.698	61.564	25.698	74.000	38.133	PK
2		2483.500	55.637	17.486	-18.363	74.000	38.150	PK

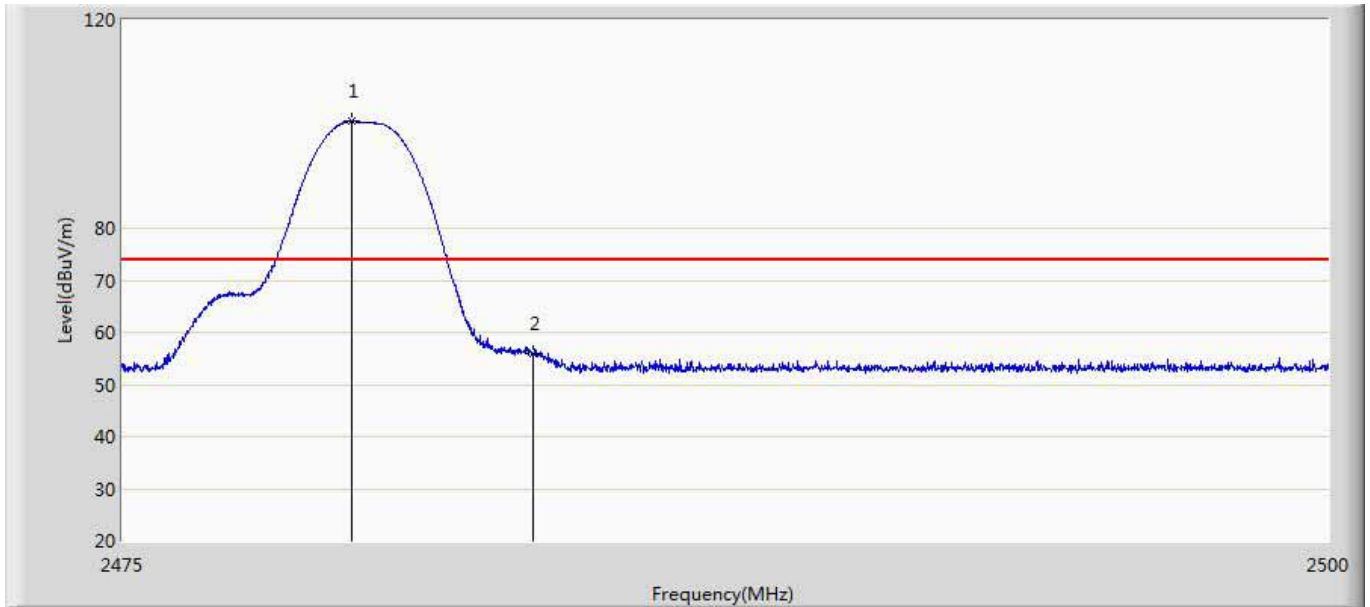
Site: AC5	Time: 2015/02/09 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2480 by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.050	98.805	60.671	44.805	54.000	38.134	AV
2		2483.500	44.146	5.995	-9.854	54.000	38.150	AV

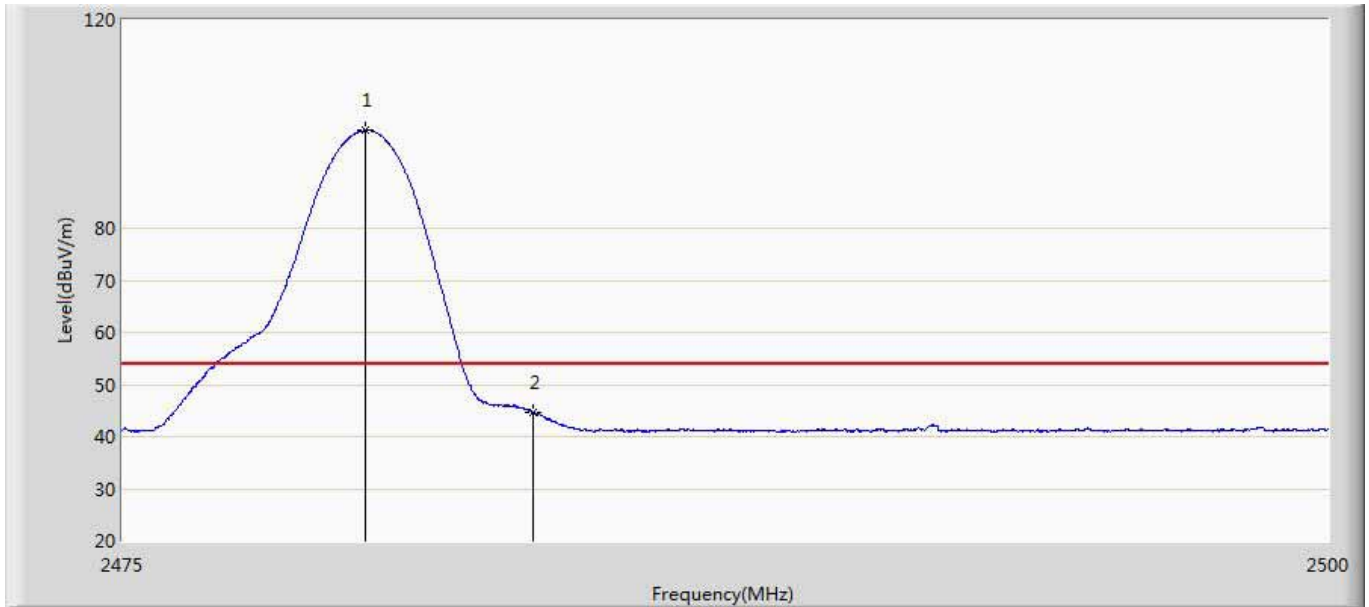


Site: AC5	Time: 2015/02/09 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2480 by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.738	100.531	62.398	26.531	74.000	38.133	PK
2		2483.500	55.953	17.802	-18.047	74.000	38.150	PK

Site: AC5	Time: 2015/02/09 - 12:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH USB DONGLE	Power: AC 120V/60Hz
Note: Mode1: Transmitter at ch2480 by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.012	98.757	60.623	44.757	54.000	38.134	AV
2		2483.500	44.616	6.465	-9.384	54.000	38.150	AV

## 7. Operation Frequency Range of 20dB Bandwidth

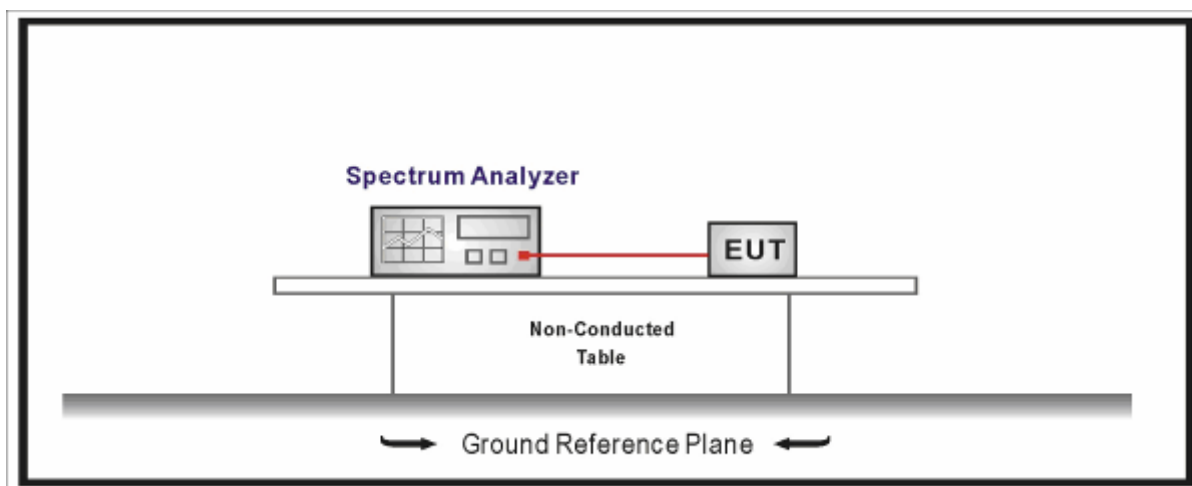
### 7.1. Test Equipment

Operation Frequency Range of 20dB Bandwidth / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.05
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2015.04.09

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

### 7.2. Test Setup



### 7.3. Limit

20 dB bandwidth of the emission is contained within the operation frequency band.

### 7.4. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

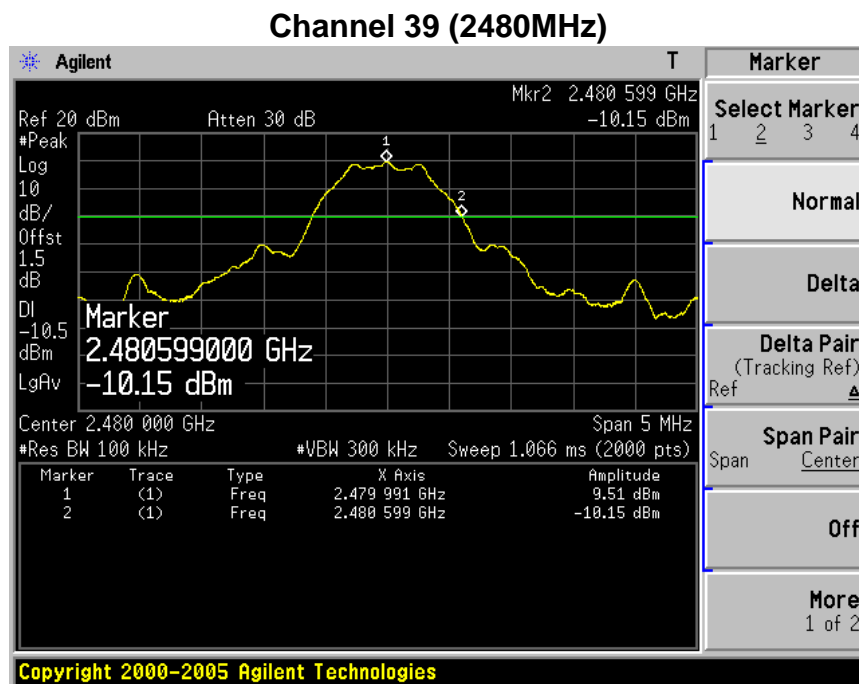
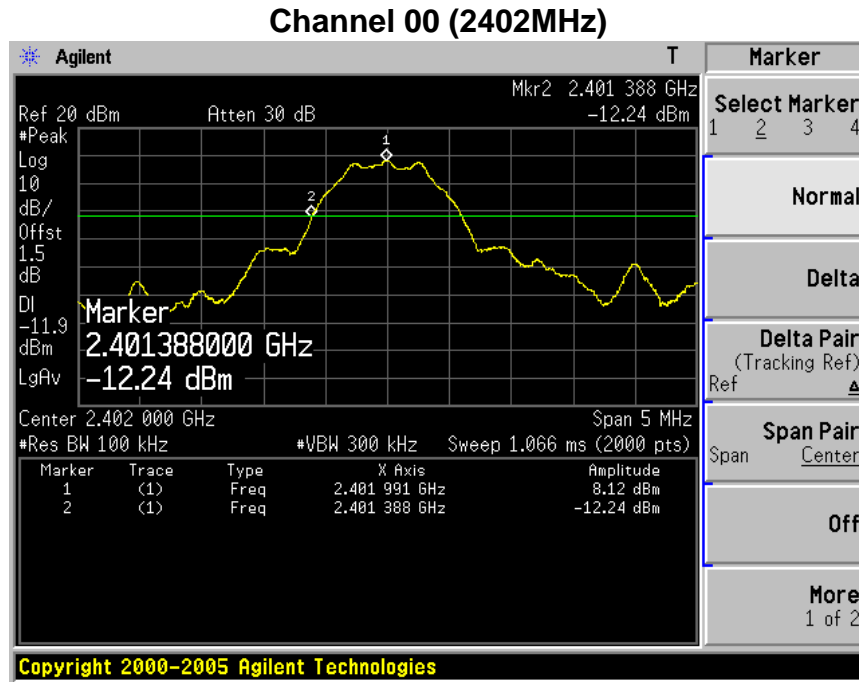
Set RBW = 100 kHz, Span greater than RBW.

### 7.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1$  kHz

7.6. Test Result

Product	:	Bluetooth USB Dongle
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit-1Mbps(GFSK_BLE)



## 8. 6dB Bandwidth and Occupied Bandwidth

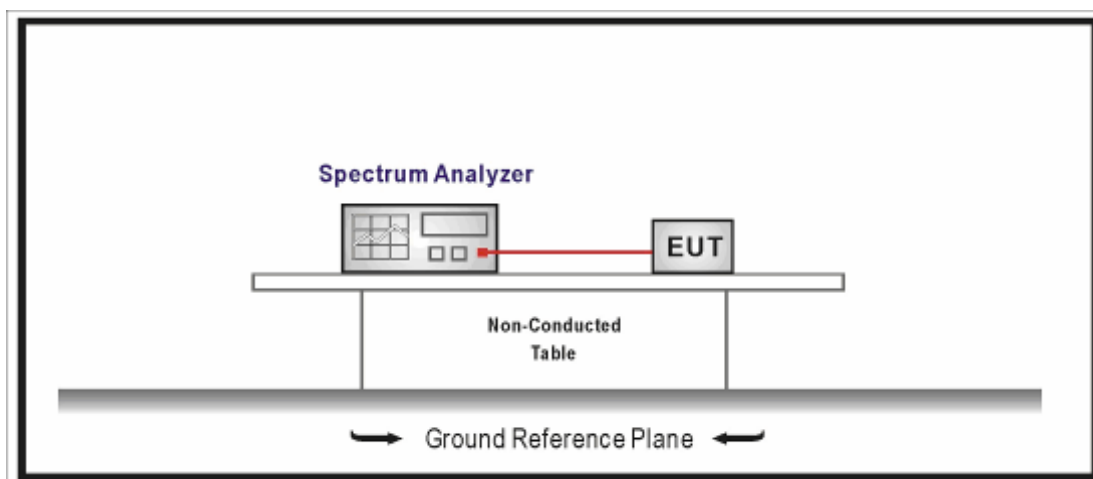
### 8.1. Test Equipment

Occupied Bandwidth / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.05
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2015.04.09

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

### 8.2. Test Setup



### 8.3. Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

### 8.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2014; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The 6dB bandwidth test is using KDB 558074 Section 8.1 option 1 method.

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies

associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### **8.5. Uncertainty**

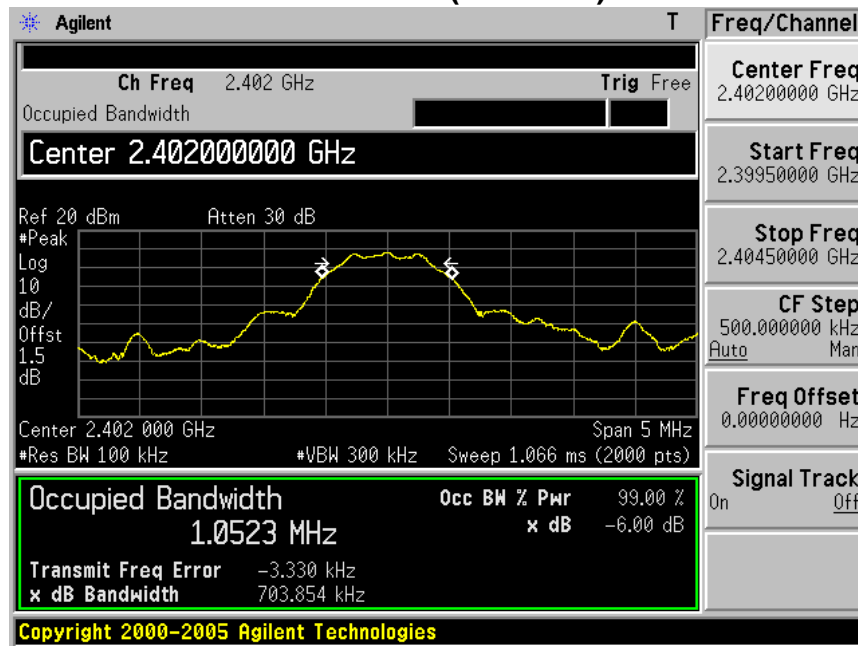
The measurement uncertainty is defined as  $\pm 1$  kHz

## 8.6. Test Result

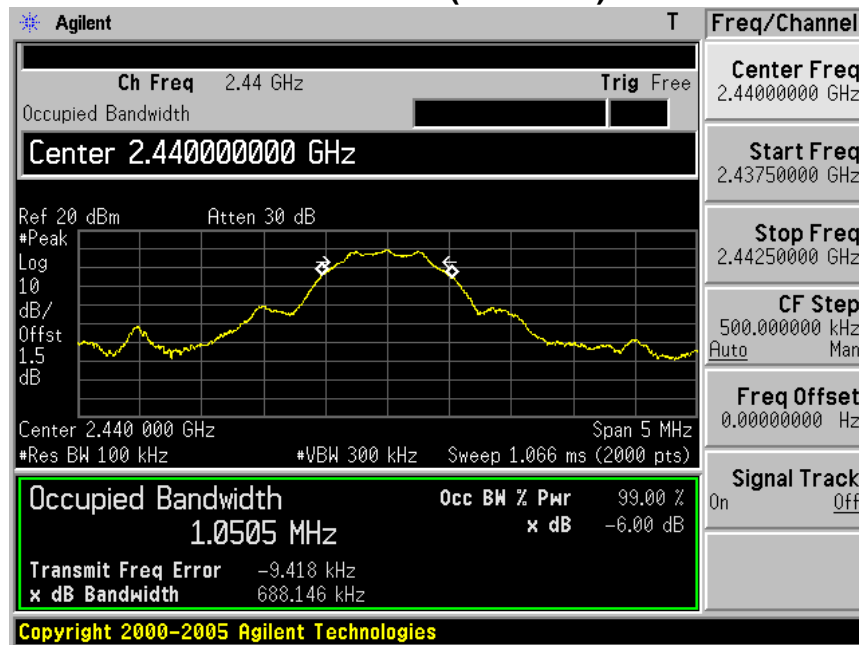
Product	:	Bluetooth USB Dongle
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit-1Mbps(GFSK_BLE)

Channel No.	Frequency (MHz)	6dB Bandwidth (kHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
00	2402	703.854	1052.3	>500	Pass
19	2440	688.164	1050.5	>500	Pass
39	2480	705.384	1052.1	>500	Pass

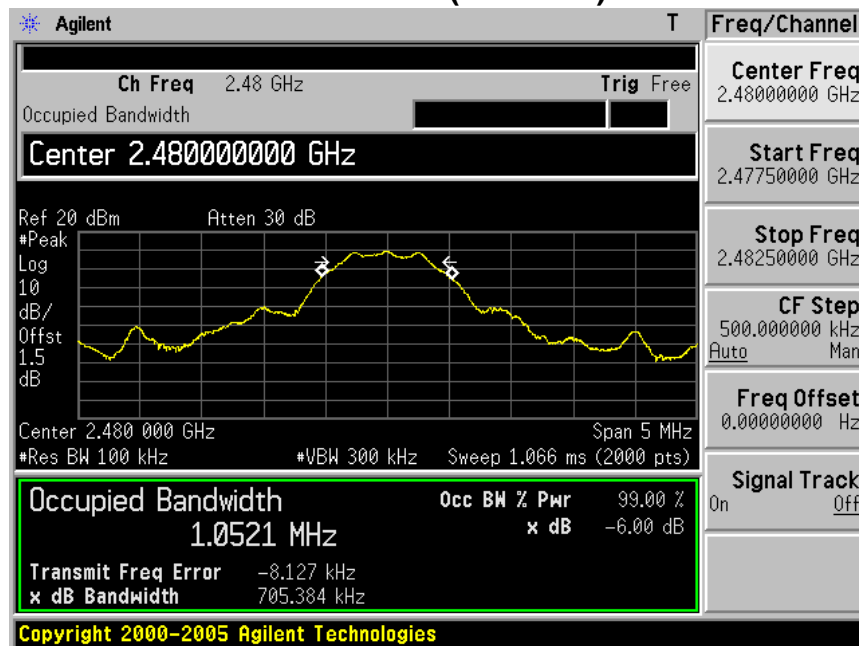
### Channel 00 (2402MHz)



### Channel 19 (2440MHz)



### Channel 39 (2480MHz)





## 9. Power Output

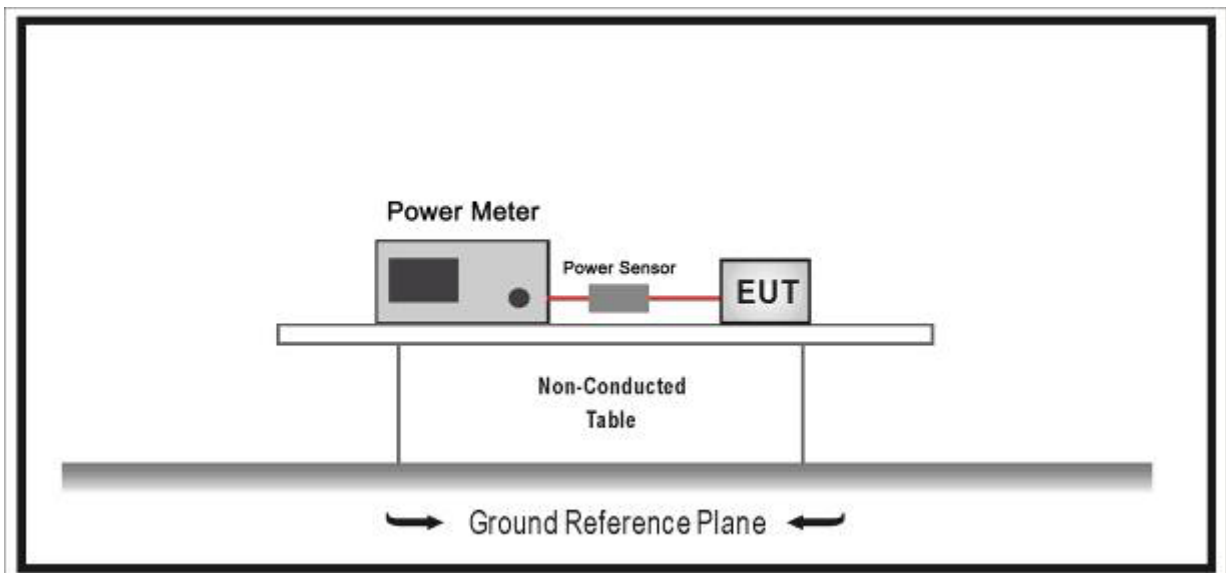
### 9.1. Test Equipment

Power Output / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2015.10.29
Power Sensor	Anritsu	MA2411B	0846014	2015.10.29
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2015.04.09

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

### 9.2. Test Setup



### 9.3. Limit

The maximum peak power shall be less 1 Watt (30dBm).

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

### 9.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 D01 DTS Meas Guidance v03r02 section 9.1.2 PKPM1 Peak power meter method.

1. Power meter and sensor's minimum video bandwidth is 50MHz, larger than EUT's bandwidth;

Fast responding diode sensors respond immediately to changes in power level to reduce total test time.

2. Use peak detector to test.

## 9.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1.27$  dB

**9.6. Test Result**

Product	:	Bluetooth USB Dongle
Test Item	:	Power Output
Test Site	:	TR8
Test Mode	:	Mode 1: Transmit-1Mbps(GFSK_BLE)

Channel No.	Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
00	2402	7.39	30.00	Pass
19	2440	8.23	30.00	Pass
39	2480	8.93	30.00	Pass

## 10. Power Spectral Density

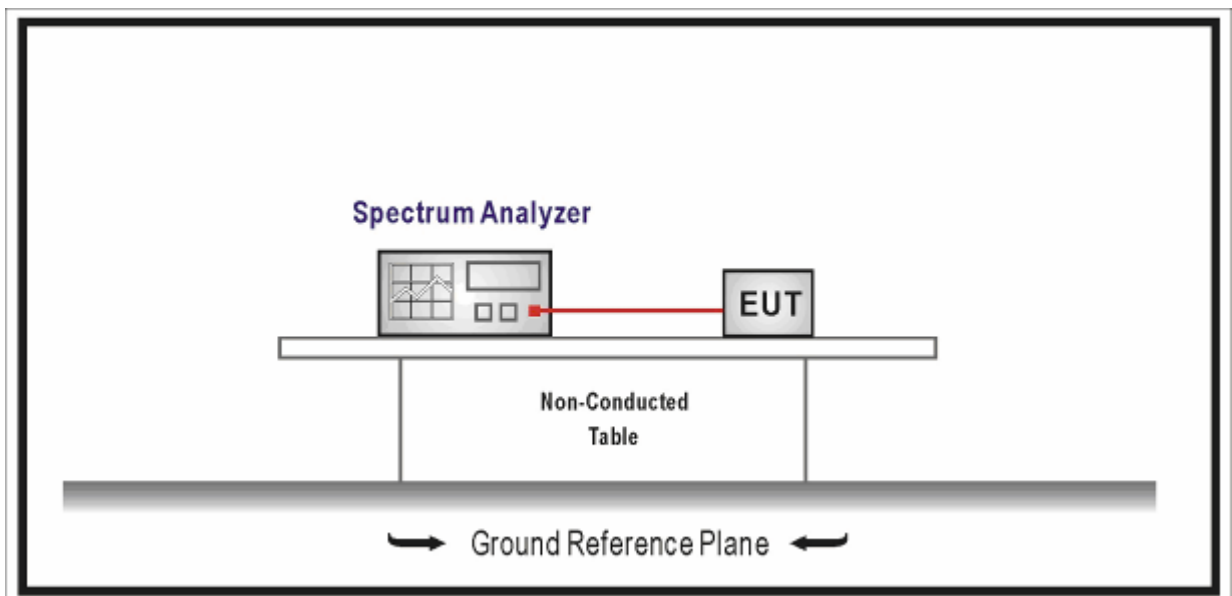
### 10.1. Test Equipment

Power Spectral Density / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2016.01.05
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2015.04.09

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

### 10.2. Test Setup



### 10.3. Limit

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

### 10.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ . (Actually we use 3kHz RBW)

- d) Set the VBW  $\geq 3 \times$  RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the band.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

## 10.5. Uncertainty

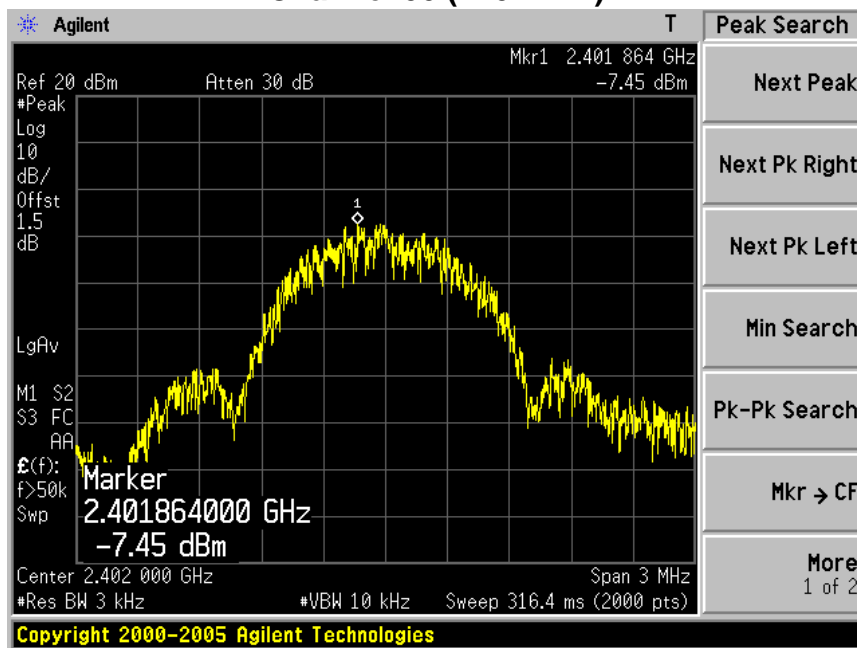
The measurement uncertainty is defined as  $\pm 1.27$  dB

10.6. Test Result

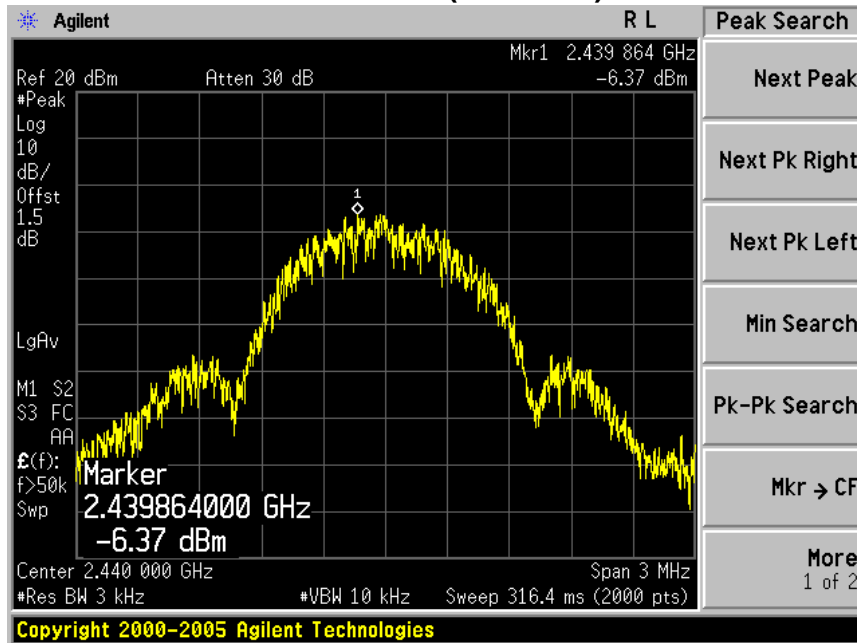
Product	:	Bluetooth USB Dongle
Test Item	:	Power Spectral Density
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmit-1Mbps(GFSK_BLE)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm)	Limit (dBm)	Result
00	2402	-7.45	8	Pass
19	2440	-6.37	8	Pass
39	2480	-5.96	8	Pass

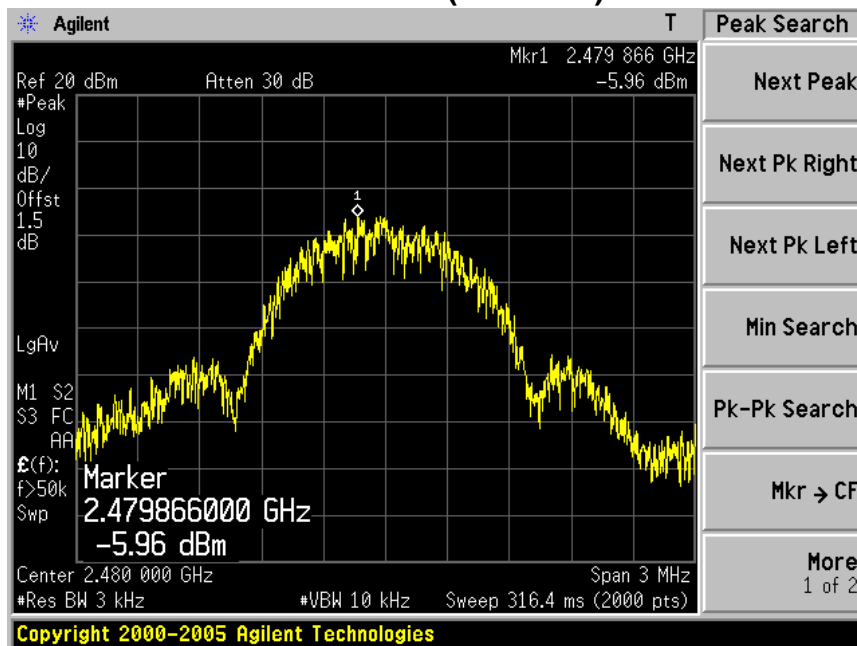
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



The End