MEASUREMENT REPORT
of
Bluetooth speaker

Applicant	**:**	TopSeed Technology Corp.
EUT	**:**	Bluetooth speaker
FCC ID	**:**	PTITSJC-BT02
Model	**:**	TSJC-BT02

Tested by :

Training Research Co., Ltd.

TEL : 886-2-26935155 FAX : 886-2-26934440

No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C.

CERTIFICATION

We here by verify that:

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (2003) as a reference. All test were conducted by ***Training Research Co., Ltd.***, *No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C.* Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart C Section 15.247.

Applicant	**:**	TopSeed Technology Corp.
Applicant address	**:**	9F-3, No. 16, Jain Ba Rd., Chung Ho City, Taipei Hsien, Taiwan 235, R.O.C.
FCC ID	**:**	PTITSJC-BT02
Report No.	**:**	AA515100096
Test Date	**:**	November 24, 2010

Prepared by: Jack Tsai *Jack Tsai*

Approved by: Frank Tsai *Frank Tsai*

Conditions of issue :

(1) ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***

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Ⅰ. GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of applicant in support that the certification in accordance with Part 2 Subpart J and Part 15 Subpart A and C of the Commission's Rules and Regulations.

1.2 Description of EUT

FCC ID	**:**	PTITSJC-BT02
Product Name	**:**	Bluetooth speaker
Model	**:**	TSJC-BT02
Frequency Range	**:**	2402MHz to 2480MHz
Support Channel	**:**	79 Channels
Channel Spacing	**:**	1MHz
Modulation Skill	**:**	GFSK
Power Type	**:**	Powered by battery
Other	**:**	Mini USB port for battery recharged

1.3 Test method

1 Powered by battery and Mini USB port for battery recharged.

2 The notebook PC and test fixture is connected by USB and parallel cables, and then test fixture connected with EUT setting test mode.

3 The Notebook PC and test fixture is moving when test mode set finish. The software provided by the manufacturer, the test is performed under the specific conditions.

4 Set different channel (CH1/CH40/CH79) and making EUT to the mode of continuous transmission.

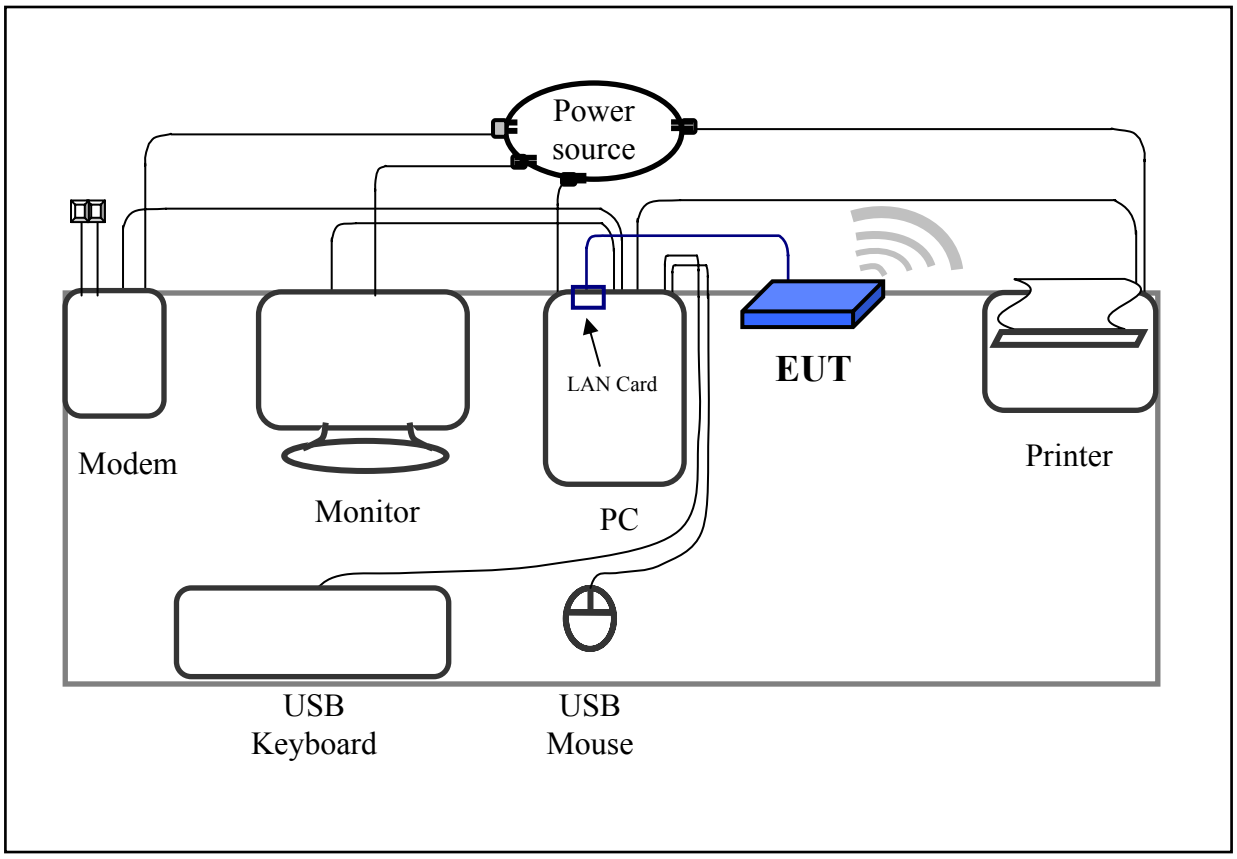
1.4 Description of Support Equipment

Notebook	**:**	**DELL**
Model No.	:	JX285 (PP26L)
Serial No.	:	410362204
FCC ID	:	Doc Approved
BSMI	:	R33002
Test fixture	**:**	**TopSeed Technology Corp.**
Model No.	:	USB and parallel
Power type	:	By Notebook PC
Data cable	:	Shielded, 1.2m length, without ferrite core
PC	**:**	**HP**
Model No.	:	Pavilion t1000, P8574A
Serial No.	:	TWL3320051, TW21920435
FCC ID	:	N/A, Doc (Declaration of Confirmation) Approved
BSMI	:	R33001, 3902H097
Power type	:	100 ~ 127VAC/200 ~ 240VAC, 6A/3A, 50 ~ 60Hz, Switching
Power cord	:	Non-shielded, 1.80m length, Plastic hood, No ferrite core
Monitor	**:**	**HP 15' Color Monitor, HP pavilion mx70, ViewSonic**
Model No.	:	D2827A, P1283A, VCDTS21366
Serial No.	:	KR91379759, TWTBQ00397, KP74620621
FCC ID	:	C5F7NFCMC1518X, DoC Approved, GSS17019
BSMI	:	3872B039, 4872A167, 3862A401
Power type	:	100 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord	:	Shielded, 1.83m length, No ferrite core
Data cable	:	Shielded, 1.46m length, with two ferrite cores
USB Keyboard	**:**	**Logitech**
Model No.	:	Y-BP62a
Serial No.	:	820-000255
FCC ID	:	DoC Approved
BSMI	:	T51160
Power type	:	By PC
Data cable	:	Shielded, 1.33m length, Plastic hood, without ferrite core

USB Mouse	**:**	**Logitech**
Model No.	:	M-U0003
Serial No.	:	810-001851
FCC ID	:	DoC Approved
BSMI	:	T41126
Power type	:	By PC
Power cord	:	Shielded, 1.81m length, Plastic hood, No ferrite core
Printer	**:**	**EPSON; HP**
Model No.	:	B241A, C2642A
Serial No.	:	FAPY155090, SG69A196GV
FCC ID	:	None (DoC Approved), B94C2642X
BSMI	:	R33126, None
Power type	:	Switching adaptor
Power cord	:	Non-shielded, 173cm length, No ferrite core (between adaptor and AC source) Non-shielded, 180cm length, with ferrite core (between printer and adaptor)
Data cable	:	Shielded, 1.70m length, No ferrite core
Fax/Modem	**:**	**Aceex**
Model No.	:	DM-1414
Serial No.	:	9010582
FCC ID	:	IFAXDM1414
Power type	:	110 VAC / 50 ~ 60 Hz, Switching
Power Cord	:	Non-shielded, 1.90m length, Plastic hoods, and no ferrite bead
Data Cable	:	RS-232→Shielded, 1.30m length, Metal hoods , No bead RJ11x2→Non-shielded, 7’ length, Plastic hoods, No bead

1.5 Configuration of System Under Test

1.5.1 Radiated and Conducted emissions of test setup for EUT (USB for charging)



Connections of Equipment

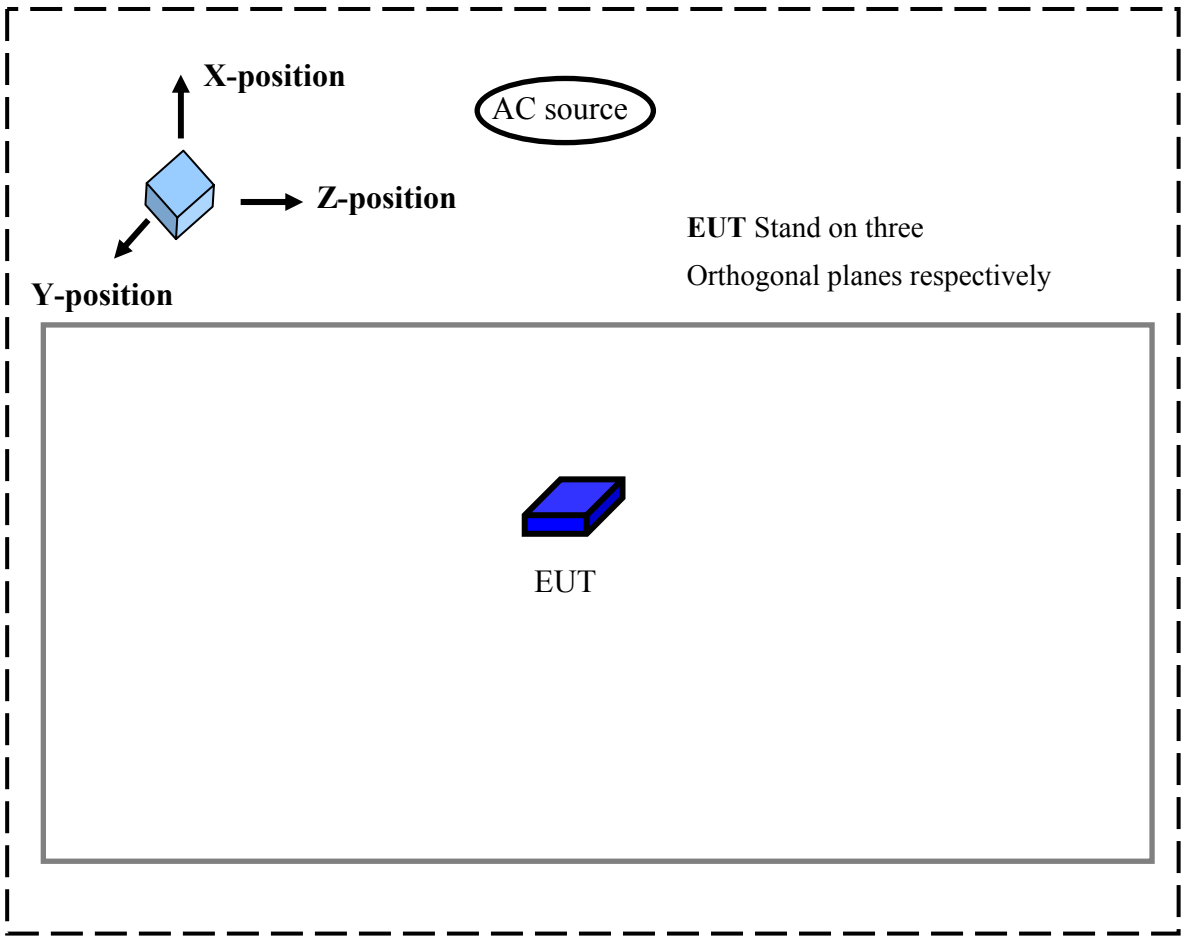
PC: *USB Port --- EUT for charging only

EUT: *Mini USB Port ---82 cm length, Shielded, without ferrite core

The tests below are carried with the EUT transmitter set at high power in TDD mode. The EUT is forced to select of output power level and channel number by parallel and USB interface of NB.

The setting up procedure was recorded in 1.3 test method.

1.5.2 Radiated of test setup for EUT (Only EUT)



Radiated emissions: The radiated emissions data presents represent the worst case of three orthogonal with EUT.

1.6 Verify the Frequency (MHz) and Channel

CH	0	1	2	3	4	5	6	7	8	9
0		2402	2403	2404	2405	2406	2407	2408	2409	2410
1	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420
2	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430
3	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440
4	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450
5	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460
6	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470
7	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480

Note:

1. This is for confirming that all frequencies are in 2.402GHz to 2.480GHz.
2. Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz.
   (The locations of these frequencies one near the top, one near the middle and one near the bottom.)
3. After test, the EUT operating frequencies are in 2.402GHz to 2.480GHz. So all the items as followed in testing report are need to test these three frequencies:
   Top: Channel – 01; Middle: Channel – 40; Bottom: Channel – 79.

1.7 Test Procedure

All measurements contained in this report were performed mainly according to the techniques described in ANSI C63.4 (2003) and the pre-setup was written on 1.3 test method, the detail setup was written on each test item.

1.8 Location of the Test Site

The radiated emissions measurements required by the rules were performed on the **three-meter**, **Anechoic Chamber (FCC Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F, No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in a anechoic chamber also located at Training Research Co., Ltd.

No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

1.9 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests were chosen as that which produced the highest emission levels. However, only those conditions, which the EUT was considered likely to encounter in normal use were investigated.

There is a test condition apply in this test item, the test procedure description as <1.3 test method>. Three channels were tested, one in the top (CH1), one in the middle (CH40) and the other in bottom (CH79).

II. Section 15.203: Antenna requirement

The EUT has an integrated antenna permanently attached on the PCB, which inside the housing. In addition, there is no external antenna or connector employed. The antenna requirement stated in Sect.15.203 is inapplicable to this EUT.

III. Section 15.207: Power Line Conducted Emissions for AC Powered Units

3.1 Test Condition & Setup

The power line conducted emission measurements were performed in an semi-anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak and average detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150KHz to 30MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.3

There is a test condition apply in this test item, the test procedure description as <1.3 test method>. Three channels were tested, one in the top (CH Lowest), one in the middle (CH Middle) and the other in bottom (CH Highest).

3.2 List of Test Instruments

Calibration Date

Instrument Name	Model	Brand	Serial No.	Next time
EMI Receiver	8546A	HP	3520A00242	03/12/11
RF Filter Section	85460A	HP	3448A00217	03/12/11
LISN (EUT)	3816/2	EMCO	00042976	01/26/11
LISN (Support E.)	3816/2	EMCO	00042989	01/15/11
Pre-amplifier	15542 ZFL-500	Mini – Circuits	0 0117	10/06/11
6dB Attenuator	MCL BW-S6W2	Mini – Circuits	9915 – Conducted	10/06/11
10dB Attenuator	A5542 VAT010	Mini – Circuits	0215 – Conducted	10/06/11
Coaxial Cable (2.0 meter)	A30A30-0058-50FS-2M	Jyebao	SMA-08	10/06/11
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	Jyebao	SMA-09	10/06/11
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-01	10/06/11
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-02	10/06/11
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	10/06/11

3.3 Test Result of Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions on the LIVE and NETURAL conductors of the EUT power cord. Show as follows.

Test Conditions: Temperature : 25 °C Humidity : 73 % RH

Test mode: Charging mode

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	153.000	51.55	---	---	65.91	55.91	-4.36
	222.000	47.70	---	---	63.94	53.94	-6.24
	558.000	39.14	---	---	56.00	46.00	-6.86
	668.000	42.46	---	---	56.00	46.00	-3.54
	774.000	40.25	---	---	56.00	46.00	-5.75
	16830.000	41.68	---	---	60.00	50.00	-8.32
Line 2	156.495	57.27	47.54	12.91	65.86	55.86	-18.32
	558.000	39.52	---	---	56.00	46.00	-6.48
	669.575	43.61	42.39	38.62	56.00	46.00	-7.38
	774.000	41.48	---	---	56.00	46.00	-4.52
	867.000	40.12	---	---	56.00	46.00	-5.88
	16230.000	41.21	---	---	60.00	50.00	-8.79

NOTE:

(1)Margin = Peak Amplitude – Limit, *The reading amplitudes are all under limit.*

(2)A "+" sign in the margin column means the emission is OVER the Class B Limit and "–" sign of means UNDER the Class B limit

Test mode: Channel Lowest

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	154.545	56.58	47.94	12.74	65.94	55.94	-18.00
	222.000	49.20	---	---	63.94	53.94	-4.74
	668.000	40.80	---	---	56.00	46.00	-5.20
	781.000	39.96	---	---	56.00	46.00	-6.04
	1566.000	39.53	---	---	56.00	46.00	-6.47
	5890.000	43.51	---	---	60.00	50.00	-6.49
Line 2	156.680	59.78	50.00	9.52	65.83	55.60	-15.83
	226.000	46.35	---	---	63.83	53.83	-7.48
	668.000	40.54	---	---	56.00	46.00	-5.46
	781.000	38.34	---	---	56.00	46.00	-7.66
	1566.000	39.53	---	---	56.00	46.00	-6.47
	5890.000	43.63	---	---	60.00	50.00	-6.37

Test mode: Channel Middle

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	154.725	56.84	48.81	11.38	65.94	55.83	-17.13
	158.000	52.38	---	---	65.77	55.77	-3.39
	222.000	47.98	---	---	63.94	53.94	-5.96
	668.000	40.89	---	---	56.00	46.00	-5.11
	781.000	40.65	---	---	56.00	46.00	-5.35
	1566.000	39.51	---	---	56.00	46.00	-6.49
Line 2	156.000	59.90	50.10	4.84	65.86	55.86	-15.76
	668.000	41.17	---	---	56.00	46.00	-4.83
	781.000	40.28	---	---	56.00	46.00	-5.72
	1113.000	39.51	---	---	56.00	46.00	-6.49
	5460.000	43.52	---	---	60.00	50.00	-6.48
	6000.000	43.94	---	---	60.00	50.00	-6.06

Test mode: Channel Highest

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	156.950	56.95	48.00	4.51	65.83	55.83	-17.83
	185.000	51.52	---	---	65.00	55.00	-3.48
	212.000	48.86	---	---	64.23	54.23	-5.37
	668.000	41.10	---	---	56.00	46.00	-4.90
	781.000	40.39	---	---	56.00	46.00	-5.61
	1566.000	40.29	---	---	56.00	46.00	-5.71
Line 2	156.590	60.13	50.39	-59.53	65.83	55.83	-15.44
	160.450	61.63	49.48	-59.54	65.63	55.63	-16.15
	668.000	41.03	---	---	56.00	46.00	-4.97
	781.000	39.61	---	---	56.00	46.00	-6.39
	1550.000	39.90	---	---	56.00	46.00	-6.10
	5510.000	43.05	---	---	60.00	50.00	-6.95

IV. Section 15.247 (a): Technical description of the EUT

Based on the Section 2.1, *Frequency Hopping Spectrum System* is a spread spectrum system in which the carrier has been modulated by a *high speed spreading code* and an *information data stream* with its *known hopping algorithm* and *avoidance method.* The high speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal. In the *operational description* demonstrates the operation principles of the base-band processor employed by the EUT, shows that which is a complete FHSS base-band processor and meets the definition of the *Frequency Hopping Spectrum System.*

V. Section 15.247(a)(1): Carrier Frequency Separation

5.1 Test Condition

The EUT must have its hopping function enabled. Use the following spectrum analyzer setting

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) bandwidth (RBW) ≧ 1% of the span

Video (or Average) Bandwidth (VBW) ≧ RBW

Sweep = Auto

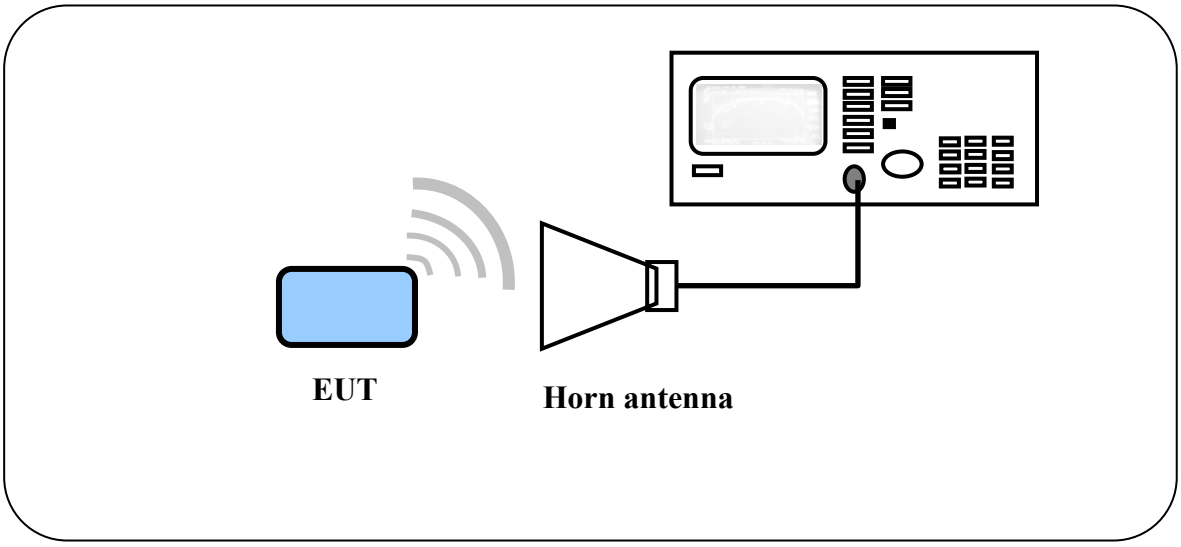
Detector Function = peak

Trace = max hold

Setting up procedure is written on 1.3 test method.

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channel. The limit is specified in one of the subparagraphs of this section. Submit this plot.

5.2 Test Instruments Configuration



Test Configuration of carrier frequency separation

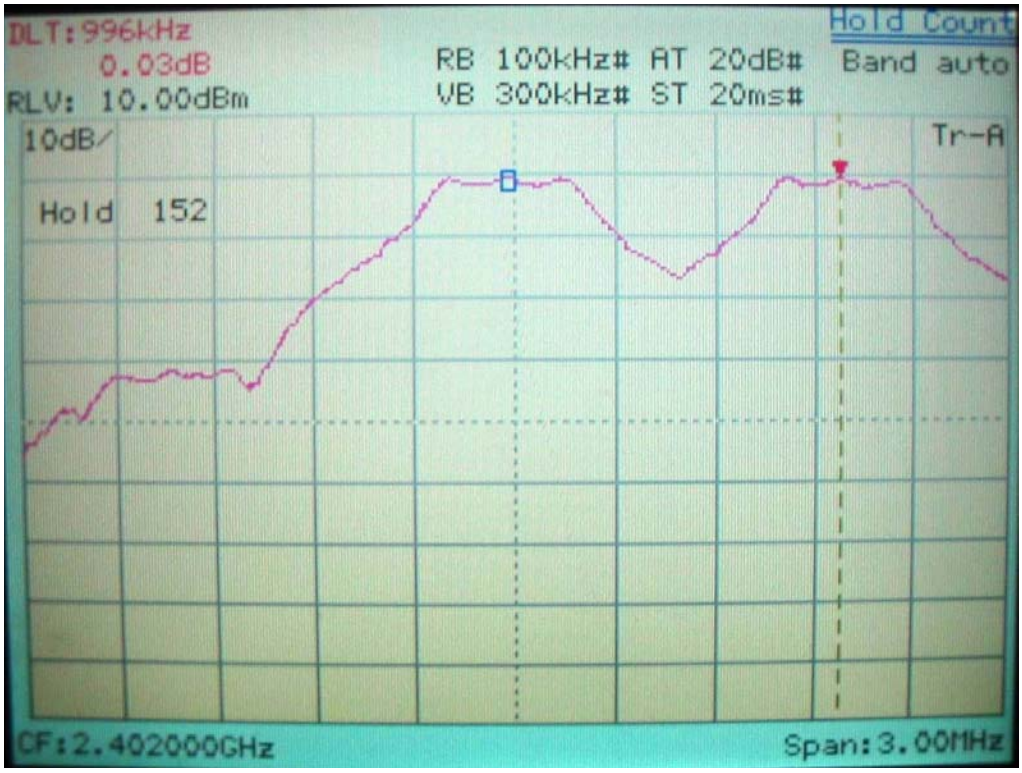
5.3 List of Test Instruments

				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11
Horn Antenna	3115	EMCO	9104-3668	01/20/11

5.4 Test Results

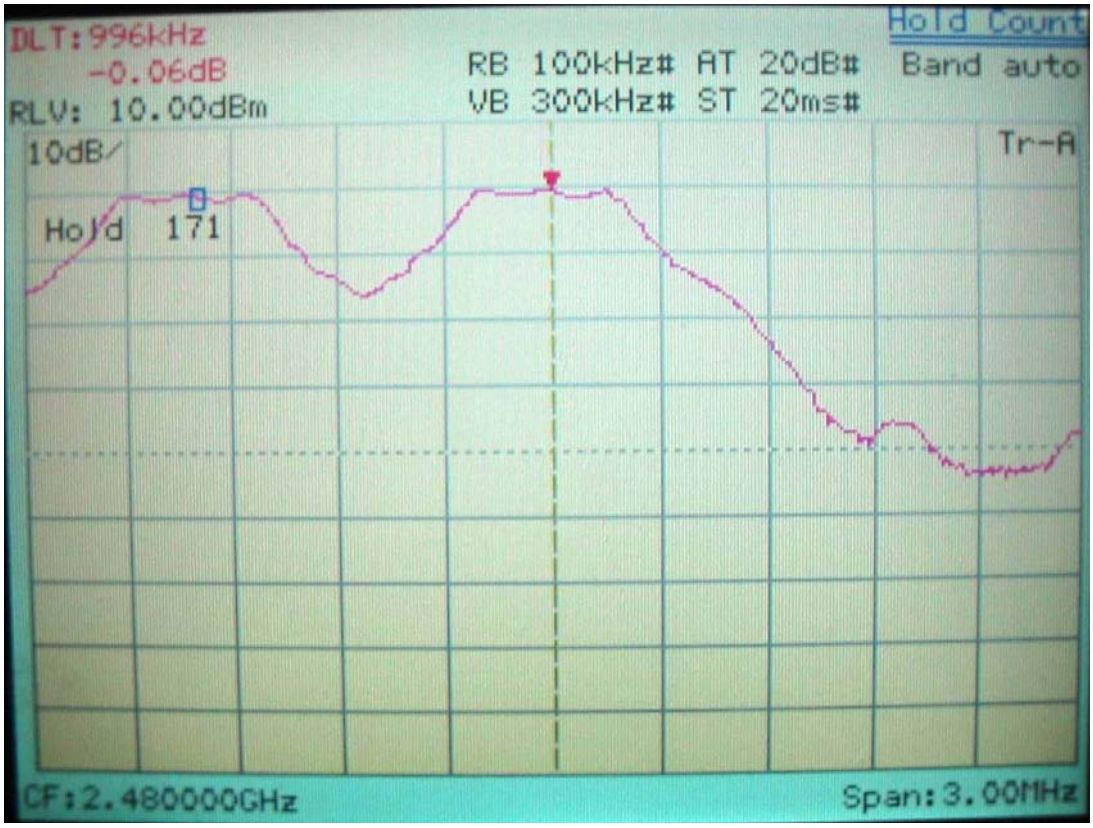
Channel	Bluetooth
01	996 kHz
40	990 kHz
79	996 kHz

Carrier Frequency Separation for CH01



Carrier Frequency Separation for CH40

Carrier Frequency Separation for CH79



VI. Section 15.247(a)(1)(ii) Number of Hopping Frequencies

6.1 Test Condition

The EUT must have its Hopping function enabled. Use the following spectrum analyzer setting:

Span = the frequency band of operation

RBW ≧ 1% of the span

VBW ≧ RBW

Sweep = auto

Detector function = peak

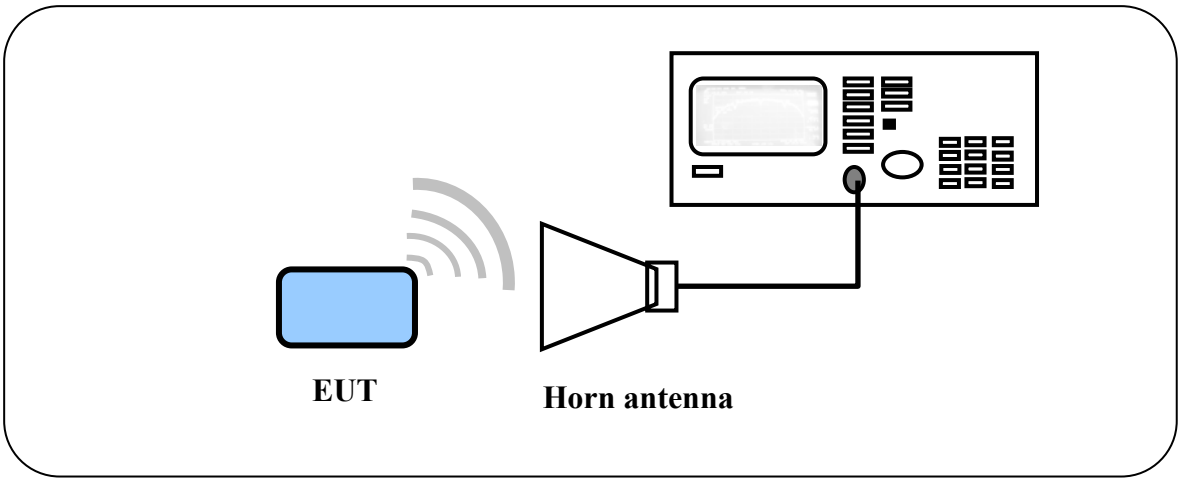
Trace = max hold

Allow the trace to stabilize. It may prove necessary to break the span up to sections. In order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this section.

6.2 List of Test Instruments

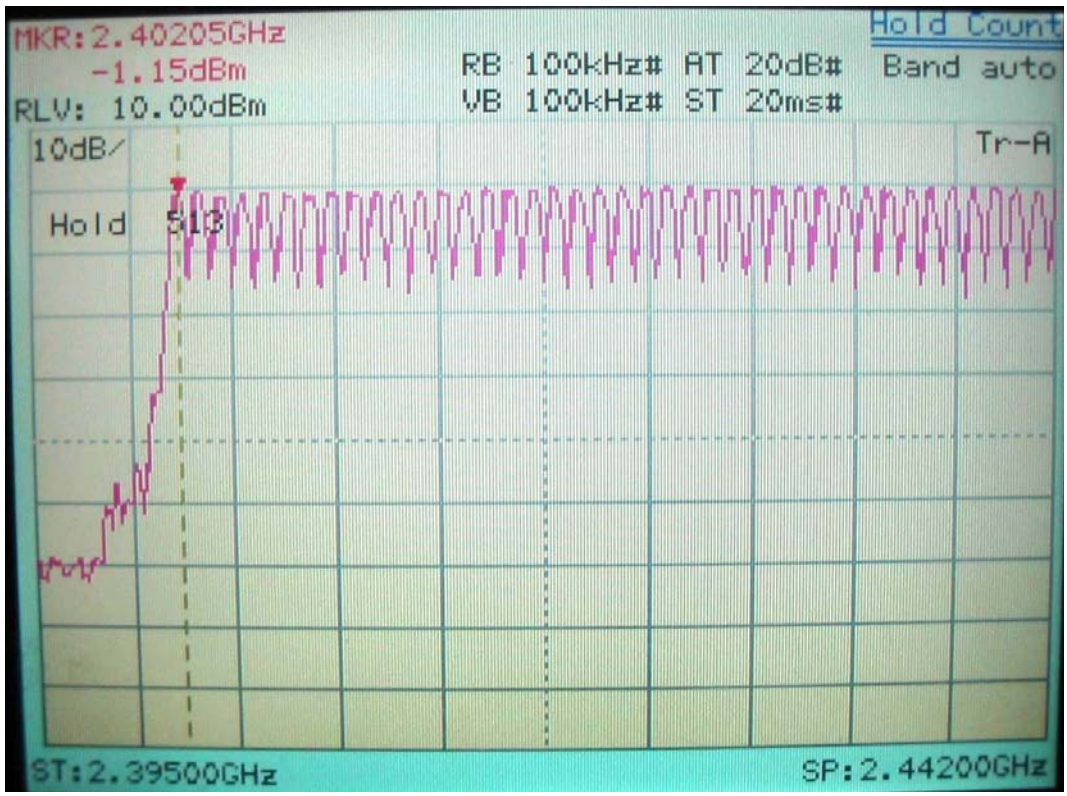
				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11
Horn Antenna	3115	EMCO	9104-3668	01/20/11

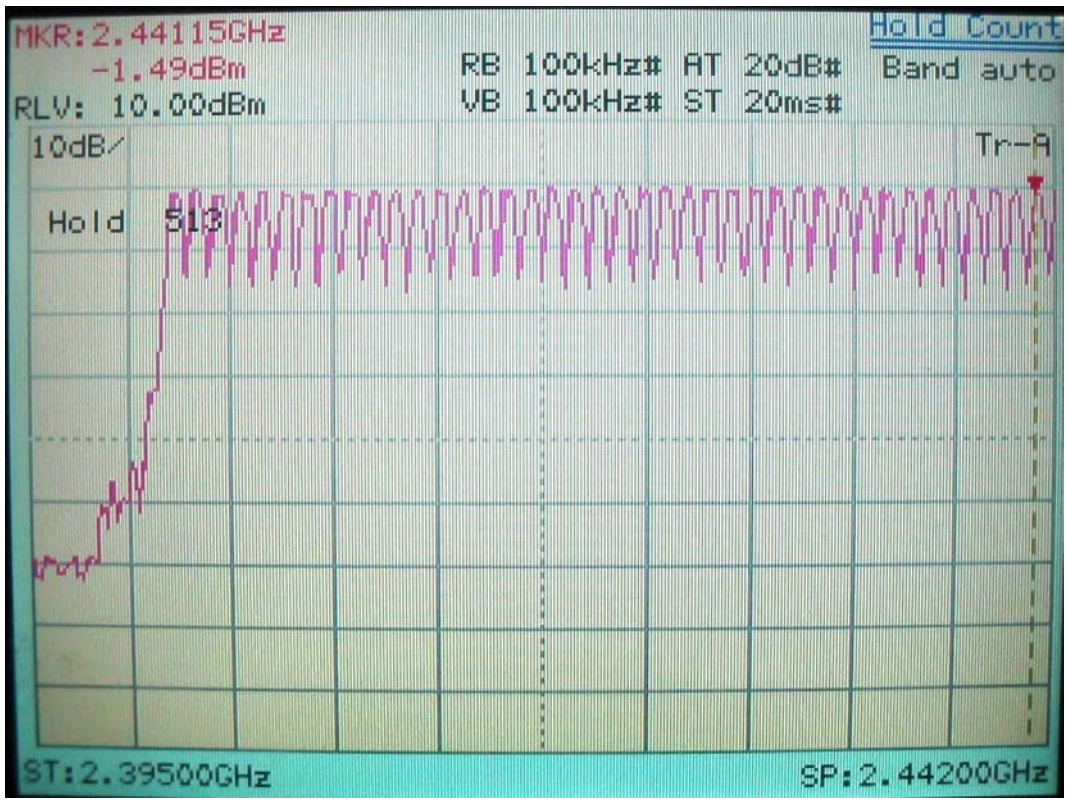
6.3 Test Instruments Configuration

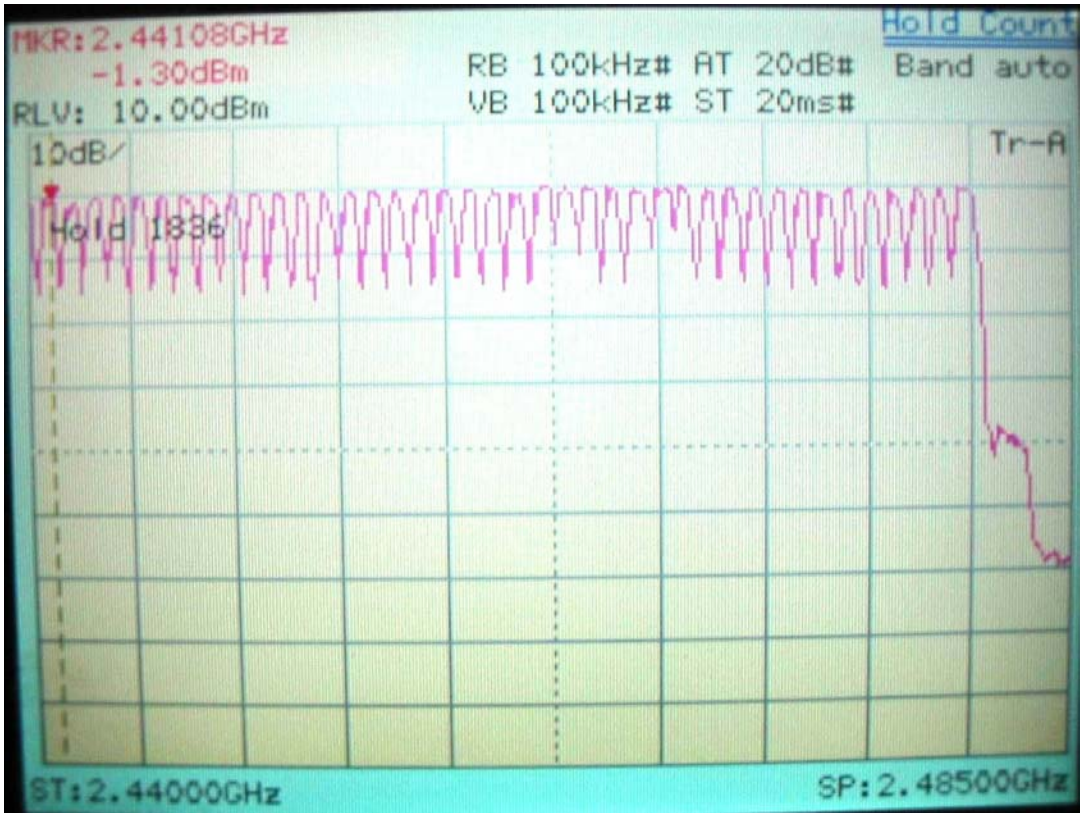


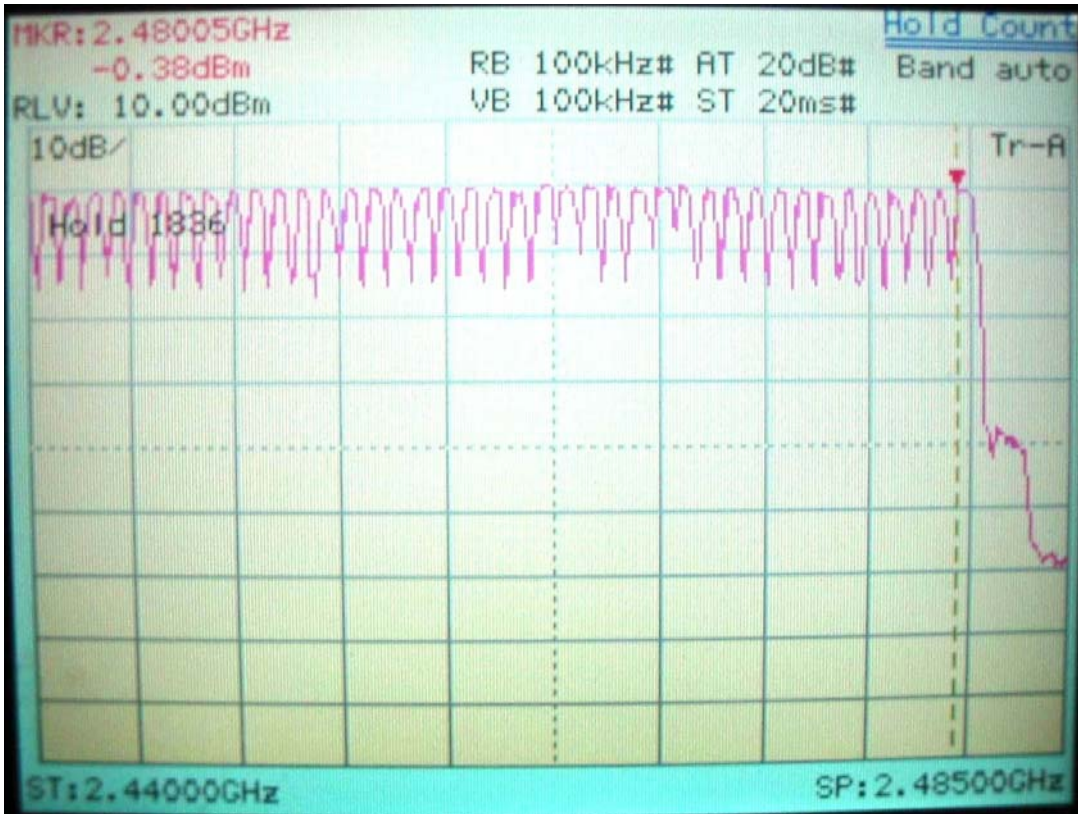
Test Configuration for number of hopping frequencies

6.4 Test Results






MKR:2.44108GHz
-1.30dBm
RLV: 10.00dBm
RB 100kHz# AT 20dB#
VB 100kHz# ST 20ms#
Hold Count
Band auto
10dB/
Tr-A
Hold 1886
ST:2.44000GHz
SP:2.48500GHz


MKR:2.48005GHz
-0.38dBm
RLV: 10.00dBm
RB 100kHz# AT 20dB#
VB 100kHz# ST 20ms#
Hold Count
Band auto
10dB/
Tr-A
Hold 1886
ST:2.44000GHz
SP:2.48500GHz

VII. Section 15.247(a)(1)(ii) Time of Occupancy (Dwell Time)

7.1 Test Condition

The EUT must have its hopping function enabled. Use the following spectrum analyzer setting:

Span = zero span, centered on a hopping channel

RBW = 1M

VBW ≧ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

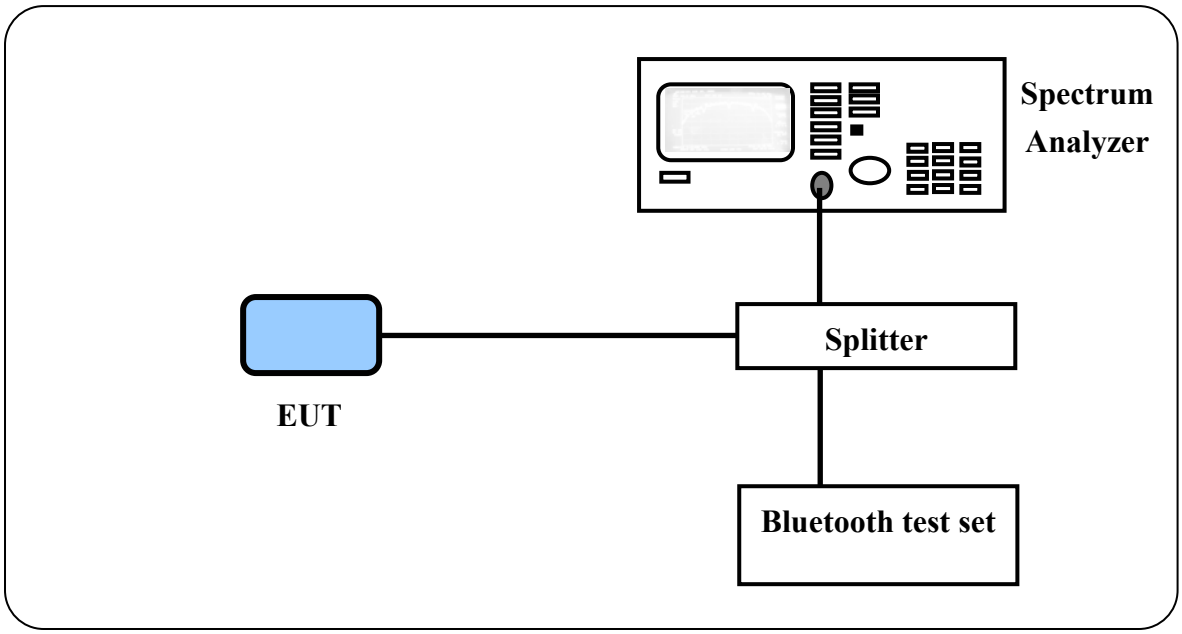
Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this section. Submit this plot(s). An oscilloscope may be used instead of a spectrum analyzer.

7.2 List of Test Instruments

				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11
Bluetooth Test Set	MT8852A	ANRITSU	6k00001241	N/A
RF Splitter	ZFSC-2-2500	MINI-CIRCUITS	SF863200403	N/A

7.3 Test Instruments Configuration



Note:

1. Running Bluetooth test set for Test mode.
2. Spectrum Analyzer record test results.

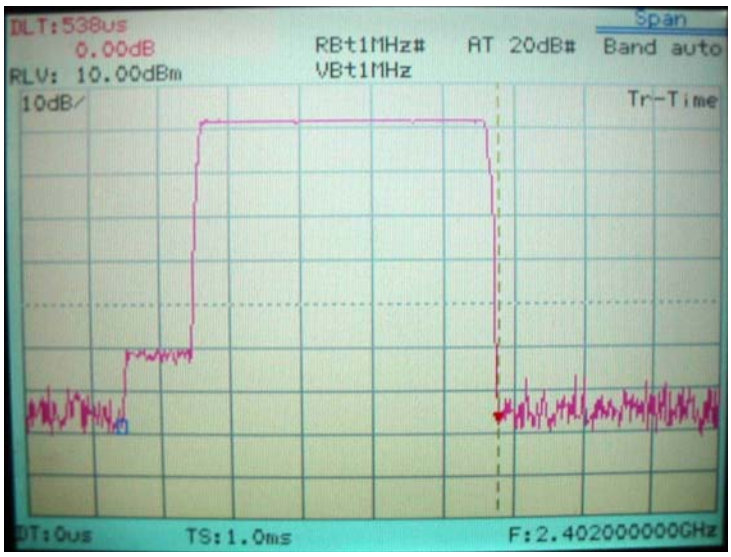
7.4 Test Results

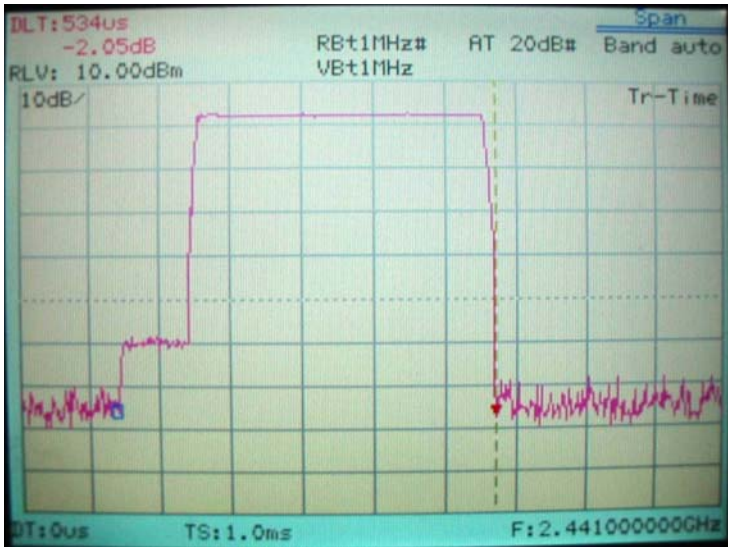
CH	DH1-Packet (ms)	DH3-Packet (ms)	DH5-Packet (ms)
01	0.538x31.6x10.12 = 172.05	1.792x31.6x5.06 = 286.53	3.08x31.6x3.37 = 328.00
40	0.534x31.6x10.12 = 170.77	1.796x31.6x5.06 = 287.17	3.08x31.6x3.37 = 328.00
79	0.534x31.6x10.12 = 170.77	1.796x31.6x5.06 = 287.17	3.07x31.6x3.37 = 326.93

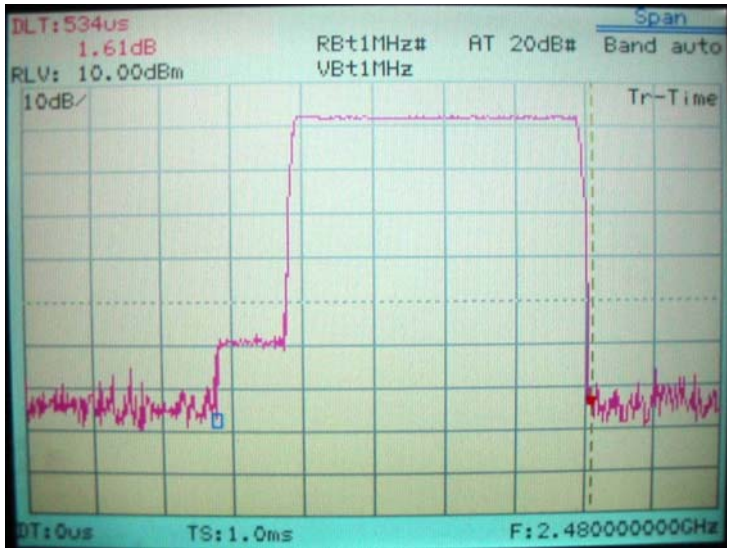
備註：1. 0.4 x 79 = 31.6 s

2. DH1: $1600 \div 79 \div 2 = 10.12$ ms
3. DH3: $1600 \div 79 \div 4 = 5.06$ ms
4. DH5: $1600 \div 79 \div 6 = 3.37$ ms
5. Show as following page.

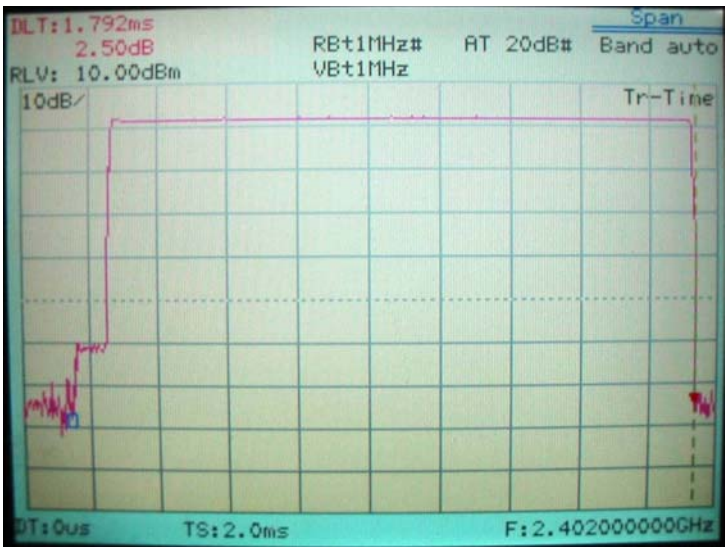
DH1-Packet：

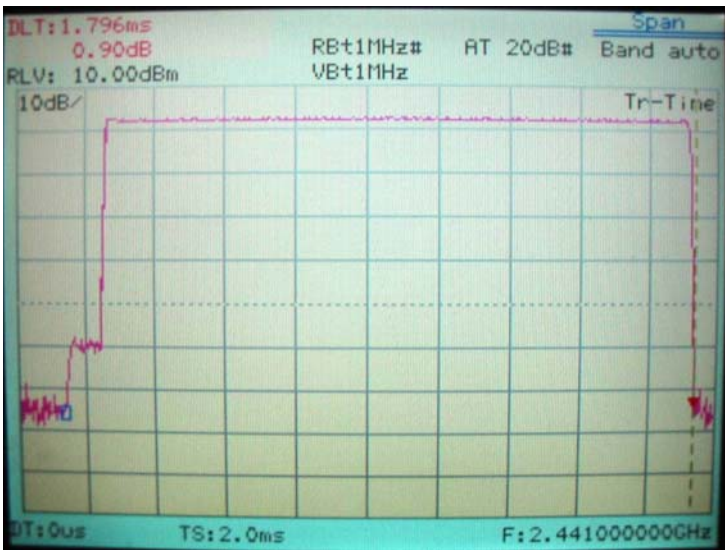

DLT:538us
0.00dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:1.0ms
F:2.402000000GHz


DLT:534us
-2.05dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:1.0ms
F:2.441000000GHz


DLT:534us
1.61dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:1.0ms
F:2.480000000GHz

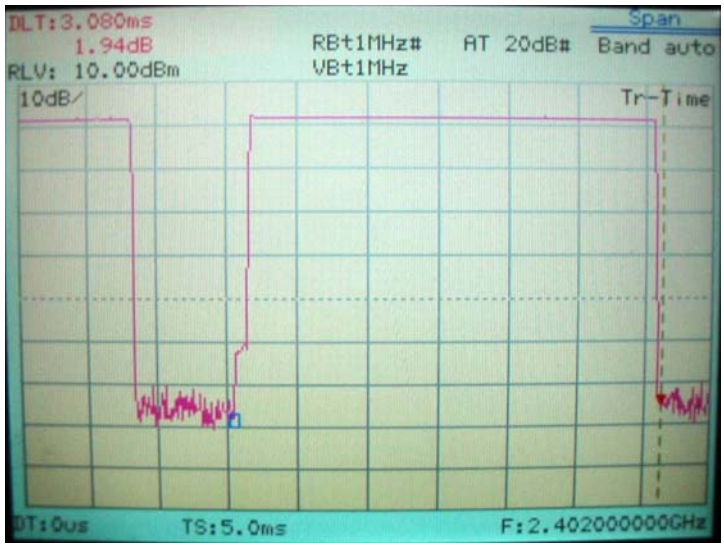
DH3-Packet：

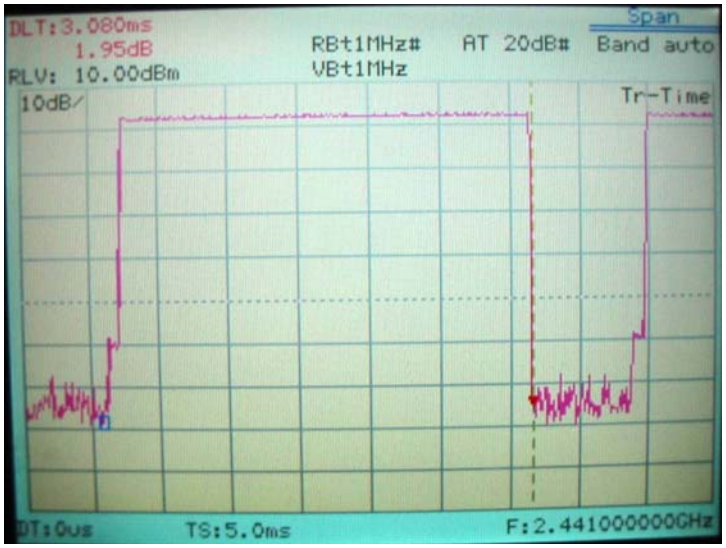

DLT:1.792ms
2.50dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:2.0ms
F:2.402000000GHz

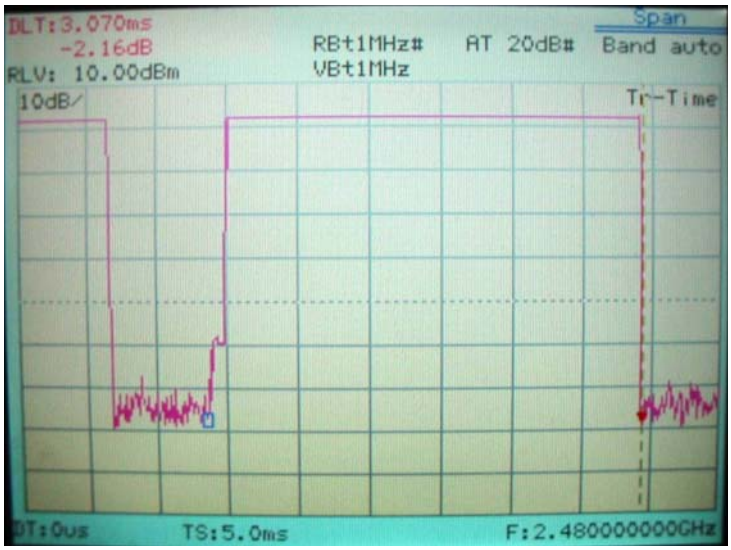

DLT:1.796ms
0.90dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:2.0ms
F:2.441000000GHz


DLT:1.796ms
2.29dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:2.0ms
F:2.480000000GHz

DH5-Packet：


DLT:3.080ms
1.94dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:5.0ms
F:2.402000000GHz


DLT:3.080ms
1.95dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:5.0ms
F:2.441000000GHz


DLT:3.070ms
-2.16dB
RLV: 10.00dBm
RBt1MHz#
VBt1MHz
AT 20dB#
Span
Band auto
10dB/
Tr-Time
DT:0us
TS:5.0ms
F:2.480000000GHz

VIII. Section 15.247(a)(1)(ii) 20dB Bandwidth

8.1 Test Condition

Use the following spectrum analyzer setting:

Span = the frequency band of operation

RBW ≧ 1% of the emission bandwidth

VBW ≧ RBW

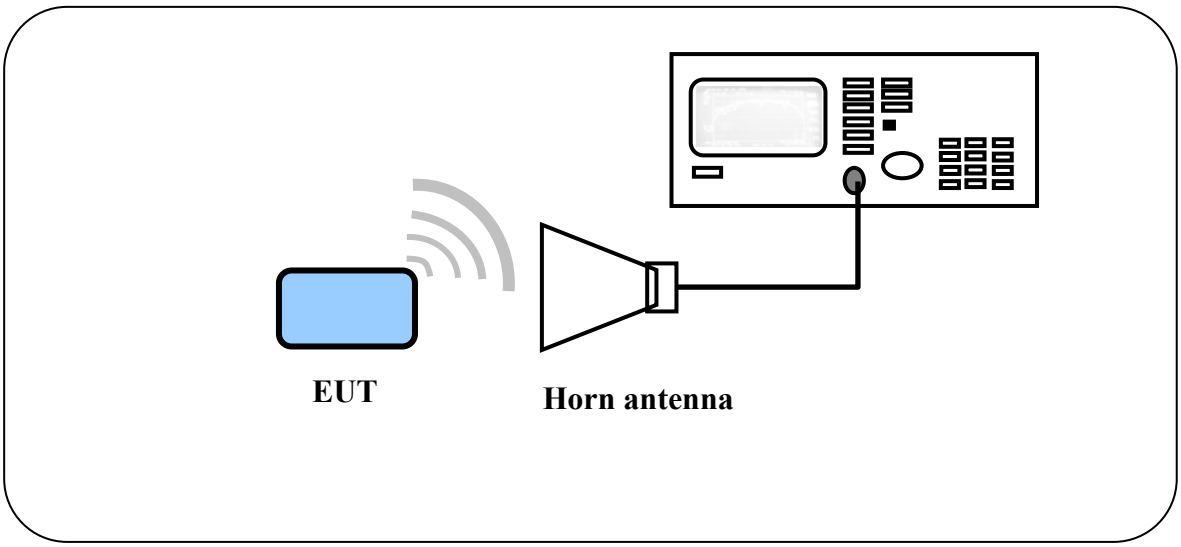
Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this section. Submit this plot(s).

8.2 Test Instruments Configuration



Test Configuration of Bandwidth for Frequency Hopping Spread Spectrum System

8.3 List of Test Instruments

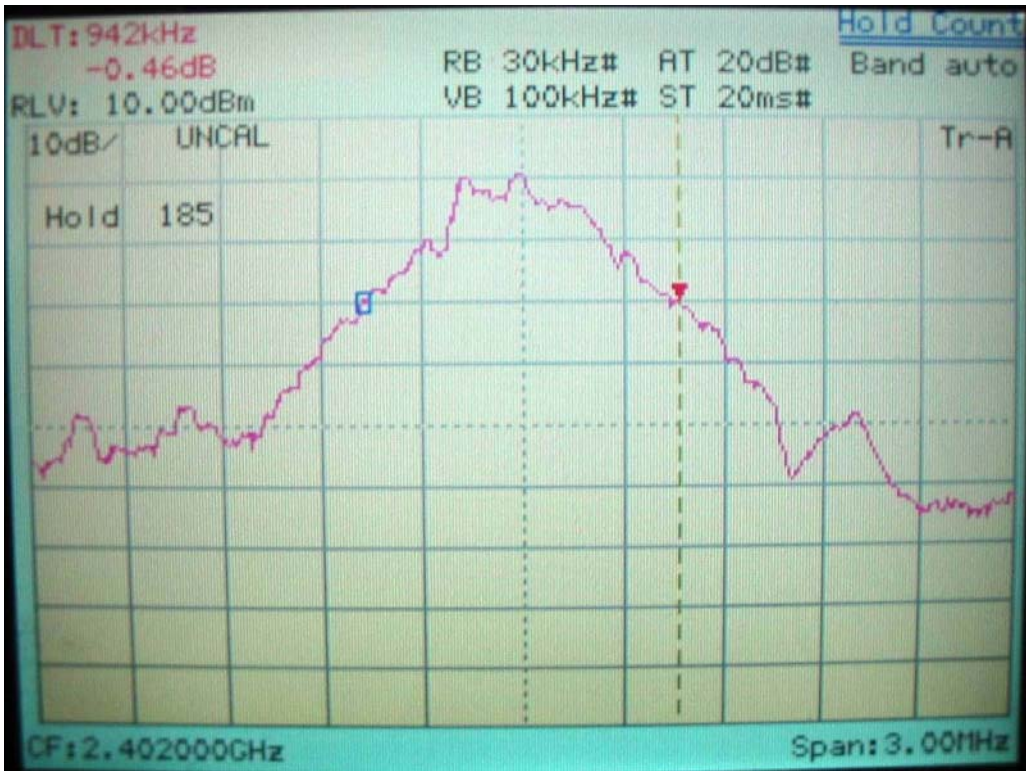
				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11
Horn Antenna	3115	EMCO	9104-3668	01/20/11

8.4 Test Results

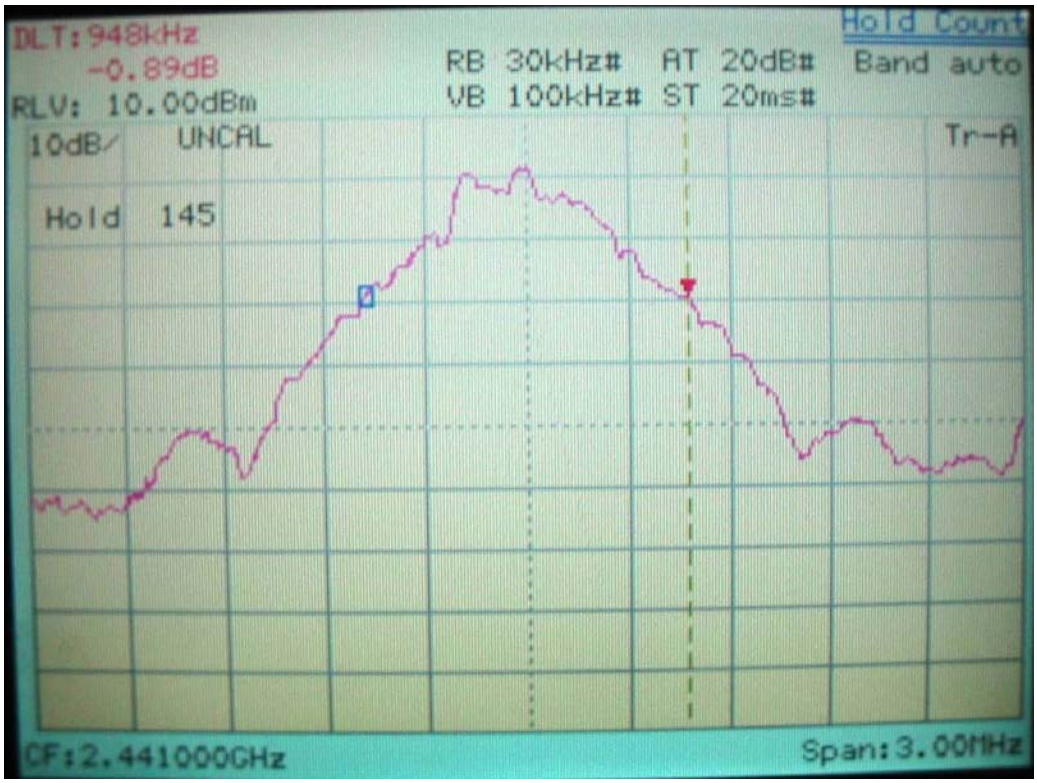
Channel	Bluetooth
01	942 kHz
40	948 kHz
79	954 kHz

Note:
The data in the above table are summarizing the following attachment spectrum analyzer.

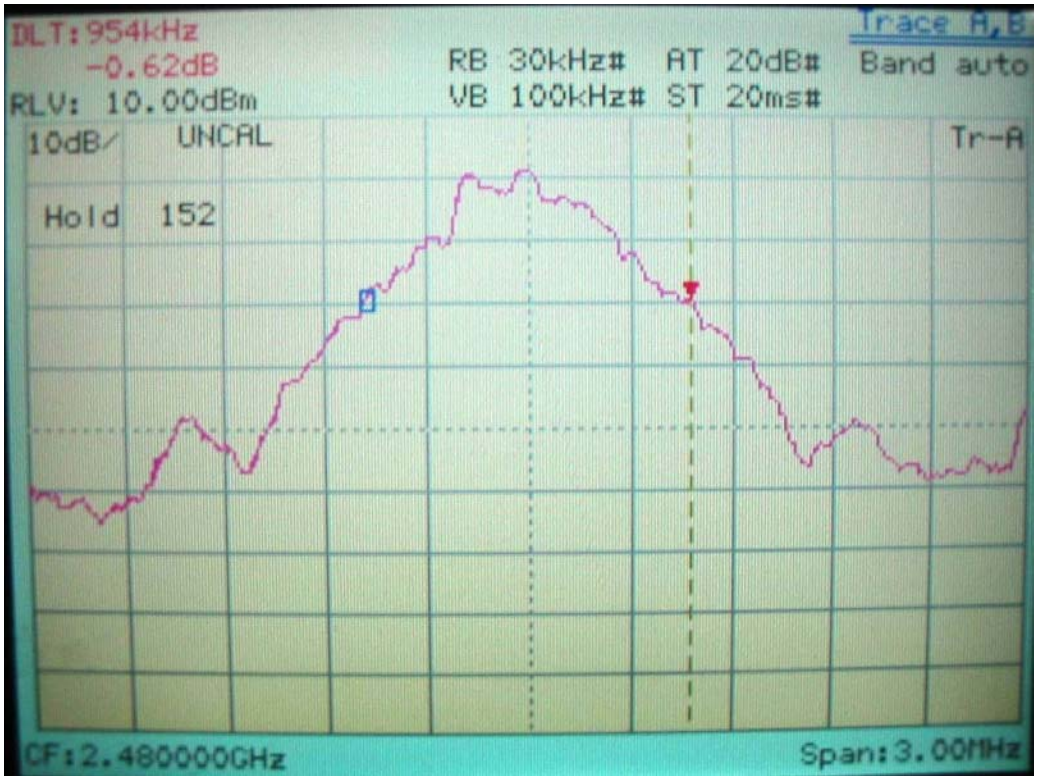
Bandwidth of Channel 1:



Bandwidth of Channel 40:

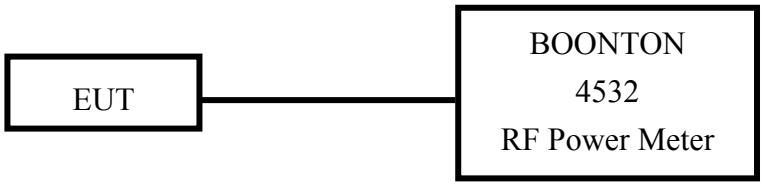


Bandwidth of Channel 79:



IX. Section 15.247(b) Peak Output Power

9.1 Test Condition & Setup



1. The output of the transmitter is connected to the BOONTON RF Power Meter.
2. The calibration is performed before every test. The values of the output power of the EUT will shown in the dBm directly are the transmitter output peak power. Recording as follows.

9.2 List of Test Instruments

Calibration Date

Instrument Name	Model No.	Brand	Serial No.	Next time
RF Power Meter	4532	BOONTON	117501	09/06/11
Peak Power Sensor	57340	BOONTON	2696	04/26/11

9.3 Test Result

Formula:

RF output power of EUT + |Cable loss| = Output peak power

Channel	RF Output	Cable Loss	Output Peak Power	
	dBm	dBm	dBm	mW
CH01	5.768	1.5	7.27	5.333
CH40	6.340	1.5	7.84	6.081
CH79	6.239	1.5	7.74	5.942

X. Section 15.247(c) Band-edge Compliance

10.1 Test Condition

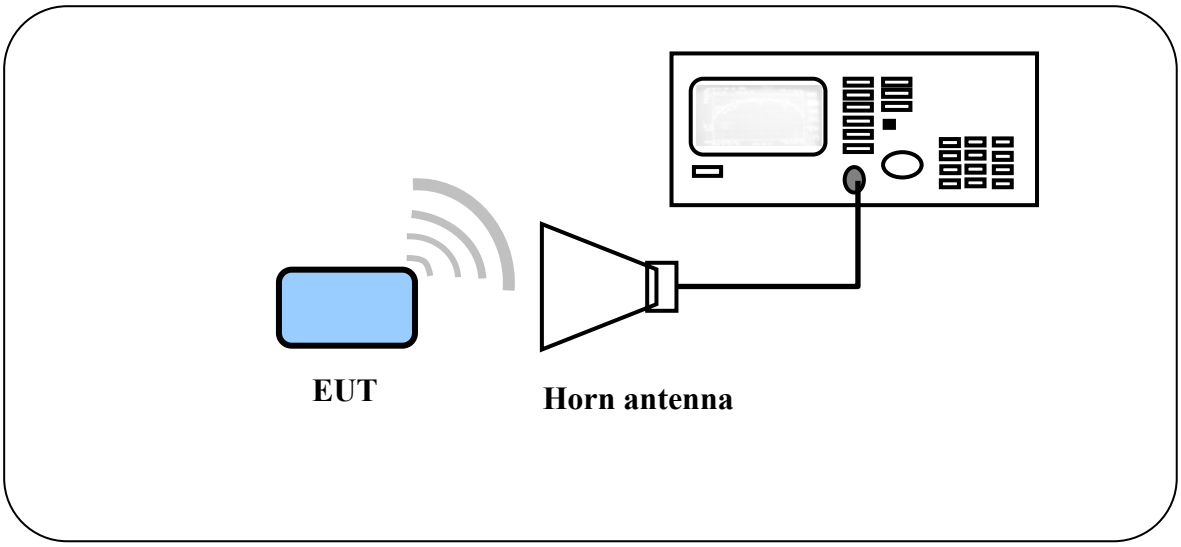
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either *at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified id §15.209(a)*,

We perform this section by the *radiated manner*, the RBW is set to 100kHz and VBW>RBW. We'd made the observation *up to 10th harmonics and the criterion is all the harmonic/spurious emissions must be 20dB below the highest emission level measured.* If the emissions fall in the restricted bands stated in the Part15.205(a) must also *comply with the radiated emission limits specified in Part15.209(a). (Peak mode: RBW=VBW=1MHz, Average mode: RBW=1MHz; VBW=10Hz)*

10.2 List of Test Instruments

				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11
Spectrum Analyzer	8564E	HP	3720A00840	03/03/11
Microwave Preamplifier	84125C	HP	US36433002	10/19/11
Horn Antenna	3115	EMCO	9104-3668	01/20/11

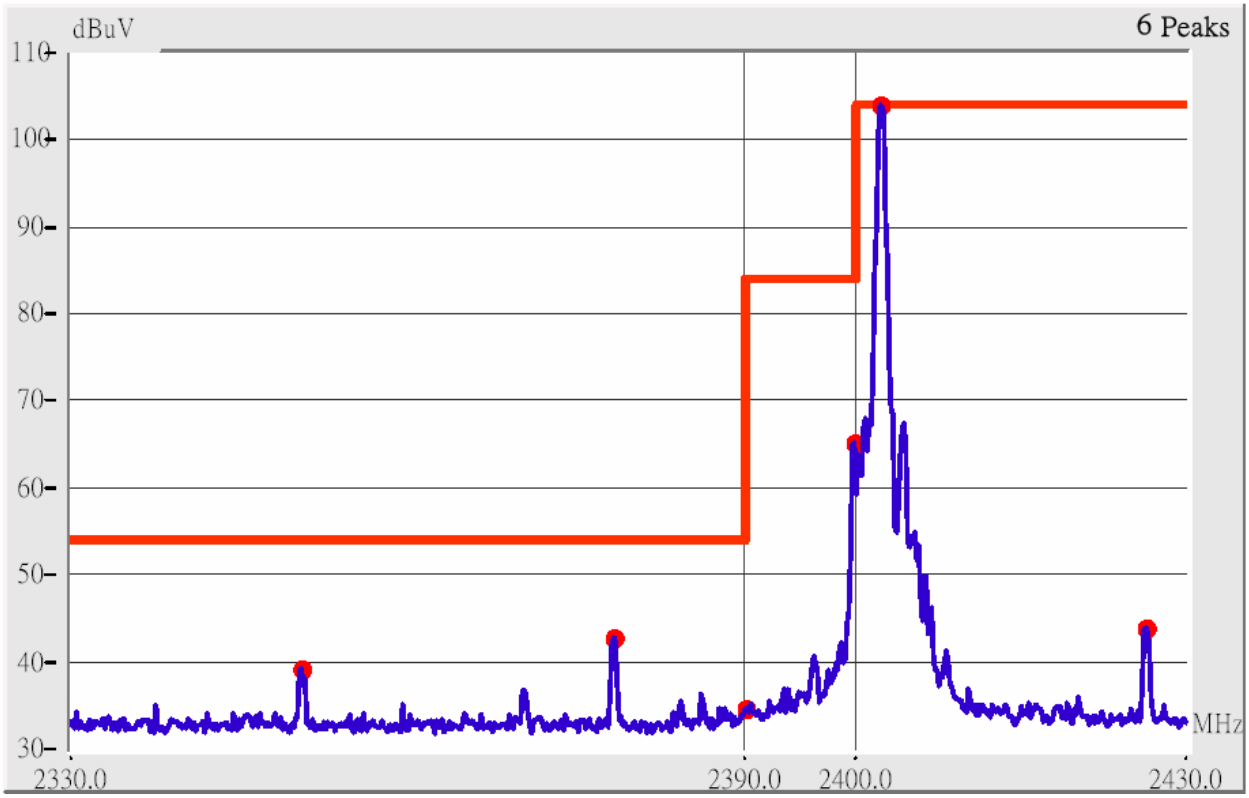
10.3 Test Instruments Configuration



10.4 Test Result of the Bandedge

The following pages show our observations referring to the channel 1 and 79 respectively.

Channel 1

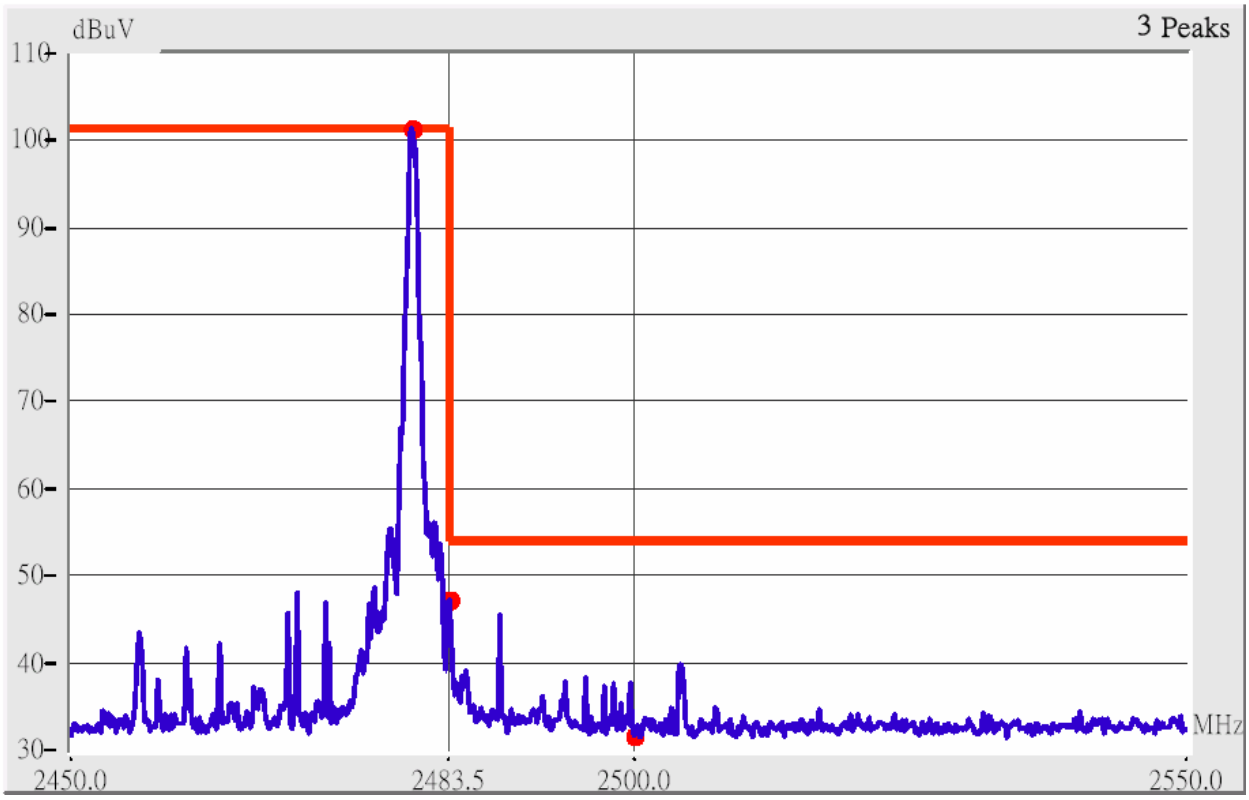


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

1. The lobe left by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					*Corrected Amplitude (dBμV/m)*		*Class B*		
Frequency (MHz)	*Ant. P.*	*Ant. H. (m)*	*Table ( )*	*Factors (dB)*	*Peak*	*Average*	*Limit (dBμV/m) Peak*	*Ave.*	*Margin (dB)*
2349.77	Hor	1.00	277	9.07	45.74	---	73.96	53.96	-8.22
2378.26	Hor	1.00	200	9.15	47.82	---	73.96	53.96	-6.14
2390.02	Hor	1.00	162	9.18	45.02	---	73.96	53.96	-8.94
2366.35	Ver	1.00	25	9.12	44.95	---	73.96	53.96	-9.01
2372.79	Ver	1.00	360	9.13	44.30	---	73.96	53.96	-9.66
2389.96	Ver	1.00	111	9.18	44.18	---	73.96	53.96	-9.78

Channel 79



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 79.

3. The lobe left by the fundamental side is already 20dB below the highest emission level.
4. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					*Corrected Amplitude (dBμV/m)*		*Class B*		
Frequency (MHz)	*Ant. P.*	*Ant. H. (m)*	*Table ( )*	*Factors (dB)*	*Peak*	*Average*	*Limit (dBμV/m) Peak*	*Ave.*	*Margin (dB)*
2483.71	Hor	1.00	340	9.44	55.61	37.27	73.96	53.96	-16.69
2492.83	Hor	1.00	96	9.47	47.80	---	73.96	53.96	-6.16
2500.01	Hor	1.00	353	9.49	43.66	---	73.96	53.96	-10.30
2511.21	Hor	1.00	292	9.51	47.01	---	73.96	53.96	-6.95
2483.50	Ver	1.00	321	9.44	46.11	---	73.96	53.96	-7.85
2487.76	Ver	1.00	179	9.46	44.96	---	73.96	53.96	-9.00
2500.01	Ver	1.00	270	9.49	42.82	---	73.96	53.96	-11.14
2506.48	Ver	1.00	340	9.50	46.67	---	73.96	53.96	-7.29

XI. Section 15.247(c) Spurious Radiated Emissions

11.1 Test Condition and Setup

We'd performed the test by the *radiated emission* skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. For the measurement above 1GHz, according to the guidance we'd set the spectrum analyzer's 6dB bandwidth RBW to 1MHz.

This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT. Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard 85460A EMI Receiver, SCHWARZECK whole range Small Biconical Antenna (Model No.: UBAA9114 & BBVU9135) is used to measure frequency from 30 MHz to 1GHz. The final test is used the HP 85460A spectrum and 8564E spectrum was examined from 1GHz to 25GHz using an Hewlett Packard Spectrum Analyzer, EMCO/HP Horn Antenna (Model 3115 / 84125-80008) for 1G to 25GHz.

At each frequency, the EUT was rotated 360 degrees, stand on **three orthogonal** planes respectively and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 25GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 25GHz) and the analyzer was operated in the maximum hold mode. There is a test condition applies in this test item, the test procedure description as the following:

Three channels were tested, one in the top (CH1), one in the middle (CH40) and the other in bottom (CH79). The setting up procedure is recorded on <1.3 test method>

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies corresponding to upper, middle and bottom channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB), and cable loss (dB) at the appropriate frequency. Since the EUT was set to transmit continuously, no *duty cycle* is present.

For frequency between 30MHz to 1000MHz

FIa (dBuV/m) = FIr (dBμV) + Correction Factors

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + (Cable Loss – Amplifier Gain) + Switching Box Loss

For frequency between 1GHz to 25GHz

FIa (dBμV/m) = FIr (dBμV) + Correction Factor

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + (Cable Loss – Amplifier Gain) + Switching Box Loss

11.2 List of Test Instruments

Calibration Date

Instrument Name	Model	Brand	Serial No.	Next time
EMI Receiver	8546A	HP	3520A00242	03/12/11
RF Filter Section	85460A	HP	3448A00217	03/12/11
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	09/21/11
Pre-amplifier	PA1F	TRC	1FAC	10/06/11
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	10/06/11
Coaxial Cable (Double shielded, 15 Meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	10/06/11
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	10/06/11
Spectrum Analyzer	8564E	HP	3720A00840	03/03/11
Microwave Preamplifier	84125C	HP	US36433002	10/19/11
Horn Antenna	3115	EMCO	9104-3668	01/20/11
Standard Guide Horn Antenna	84125-80008	HP	18-26.5GHz	01/19/11
Standard Guide Horn Antenna	84125-80001	HP	26.5-40GHz	01/15/11
Horn Antenna	1196E (3115)	HP (EMCO)	9704-5178	01/15/11
Pre-amplifier	PA2F	TRC	2F1GZ	04/10/11
Coaxial Cable (3 miter)	A30A30-0058-50FST118	JYEBAO	MSA-05	04/10/11
Coaxial Cable (1 meter)	A30A30-0058-50FST118	JYEBAO	MSA-04	04/10/11

11.3 Test Result of Spurious Radiated Emissions

The highest peak values of radiated emissions form the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. are recorded on the following. (worst case)

Test Conditions: Temperature : 25° C Humidity : 73% RH

Test mode: BT CH01 for 30MHz to 1GHz [Horizontal, X-plane]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV)*	*Ant. H. (m)*	*Table ( )*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
39.70	22.25	1.00	347	5.21	27.46	40.00	-12.54
74.86	26.37	1.00	167	0.98	27.35	40.00	-12.65
328.27	42.68	1.00	283	-2.54	40.14	46.00	-5.86
390.11	43.28	1.00	163	-1.32	41.96	46.00	-4.04
499.24	34.74	1.00	123	1.73	36.47	46.00	-9.53
901.79	21.07	1.00	70	15.18	36.25	46.00	-9.75

Test mode: BT CH01 for 30MHz to 1GHz [Vertical, Z-plane]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV)*	*Ant. H. (m)*	*Table ( )*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
40.91	21.89	1.00	199	4.98	26.87	40.00	-13.13
93.05	25.03	1.00	259	-0.15	24.88	43.50	-18.62
99.11	24.66	1.00	249	-0.48	24.18	43.50	-19.32
233.70	34.40	1.00	232	-3.80	30.60	46.00	-15.40
321.00	29.36	1.00	34	-2.64	26.72	46.00	-19.28
394.96	29.69	1.00	0	-1.20	28.49	46.00	-17.51

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain) + Switching Box Loss

Test mode: BT CH01 for 1GHz to 25GHz [Horizontal, X-plane]

Frequency	*Ant. H.*	*Table*	*Amplitude*		*Correction Factor*	*Corrected Amplitude*		*Limit*		*Margin*
			Peak / Ave.			*Peak / Ave.*		*Peak / Ave.*		
MHz	*m*	*degree*	*dBμV*		*dB/m*	*dBμV/m*		*dBμV/m*		*dB*
1604.17	1.00	239	34.33	---	14.27	48.60	---	73.96	53.96	-5.36
1904.17	1.00	346	40.00	---	9.59	49.59	---	73.96	53.96	-4.37
4805.00	1.00	240	44.60	---	3.69	48.29	---	73.96	53.96	-5.67
19214.79	1.00	137	46.99	---	1.60	48.59	---	73.96	53.96	-5.37
21619.58	1.00	168	44.82	---	2.79	47.61	---	73.96	53.96	-6.35
24020.83	1.00	126	44.49	---	3.14	47.63	---	73.96	53.96	-6.33

Test mode: BT CH01 for 1GHz to 25GHz [Vertical, Z-plane]

Frequency	*Ant. H.*	*Table*	*Amplitude*		*Correction Factor*	*Corrected Amplitude*		*Limit*		*Margin*
			Peak / Ave.			*Peak / Ave.*		*Peak / Ave.*		
MHz	*m*	*degree*	*dBμV*		*dB/m*	*dBμV/m*		*dBμV/m*		*dB*
1905.62	1.00	340	50.65	22.83	9.56	51.75	32.39	73.96	53.96	-21.57
2159.18	1.00	313	44.77	35.67	8.54	59.03	44.21	73.96	53.96	-9.75
4805.00	1.00	308	46.77	---	3.69	50.46	---	73.96	53.96	-3.50
19214.79	1.00	350	46.28	---	1.60	47.88	---	73.96	53.96	-6.08
21619.58	1.00	46	44.74	---	2.79	47.53	---	73.96	53.96	-6.43
24020.83	1.00	249	44.08	---	3.14	47.22	---	73.96	53.96	-6.74

Note:

1. Margin = Corrected - Limit.
2. The EUT utilizes a *permanently attached antenna*. In addition the spurious RF radiated emissions levels do comply with the *20dBc limit* both at its bandedges and other spurious emissions.
3. As stated in Section 15.35(b), for any frequencies above 1000MHz, radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. As the results of our test, the peak amplitudes are already below the FCC limit. Thus the average amplitudes of the rest are omitted.

Test mode: BT CH40 for 30MHz to 1GHz [Horizontal, Z-plane]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
38.49	21.95	1.00	272	5.43	27.38	40.00	-12.62
354.95	41.47	1.00	14	-2.15	39.32	46.00	-6.68
393.75	41.68	1.00	177	-1.23	40.45	46.00	-5.55
450.74	32.92	1.00	24	1.20	34.12	46.00	-11.88
513.79	32.10	1.00	180	2.66	34.76	46.00	-11.24
900.58	21.78	1.00	294	15.16	36.94	46.00	-9.06

Test mode: BT CH40 for 30MHz to 1GHz [Vertical, Z-plane]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
43.34	21.39	1.00	91	4.55	25.94	40.00	-14.06
99.11	23.76	1.00	81	-0.48	23.28	43.50	-20.22
232.49	33.26	1.00	114	-3.81	29.45	46.00	-16.55
387.69	28.22	1.00	47	-1.37	26.85	46.00	-19.15
896.94	21.07	1.00	83	15.04	36.11	46.00	-9.89
976.96	20.94	1.00	3	16.63	37.57	54.00	-16.43

Test mode: BT CH40 for 1GHz to 25GHz [Horizontal, Z-plane]

Frequency	Ant. H.	Table	Amplitude Peak / Ave.		Correction Factor	Corrected Amplitude Peak / Ave.		Limit Peak / Ave.		Margin
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
1906.25	1.00	177	36.67	---	9.55	46.22	---	73.96	53.96	-7.74
2159.04	1.00	204	57.65	41.50	8.54	66.19	50.04	73.96	53.96	-3.92
12206.04	1.00	336	38.61	---	9.79	48.40	---	73.96	53.96	-5.56
19526.46	1.00	98	47.82	---	1.70	49.52	---	73.96	53.96	-4.44
21970.21	1.00	226	45.74	---	2.95	48.69	---	73.96	53.96	-5.27
24410.42	1.00	243	46.78	---	3.10	49.88	---	73.96	53.96	-4.08

Test mode: BT CH40 for 1GHz to 25GHz [Vertical, Z-plane]

Frequency	Ant. H.	Table	Amplitude Peak / Ave.		Correction Factor	Corrected Amplitude Peak / Ave.		Limit Peak / Ave.		Margin
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2156.09	1.00	59	58.00	42.83	8.53	66.53	51.36	73.96	53.96	-2.60
4883.54	1.00	136	45.11	---	3.99	49.10	---	73.96	53.96	-4.86
12206.04	1.00	116	38.11	---	9.79	47.90	---	73.96	53.96	-6.06
19526.46	1.00	89	47.95	---	1.70	49.65	---	73.96	53.96	-4.31
21970.21	1.00	225	45.66	---	2.95	48.61	---	73.96	53.96	-5.35
24410.42	1.00	246	47.11	---	3.10	50.21	---	73.96	53.96	-3.75

Test mode: BT CH79 for 30MHz to 1GHz [Horizontal, X-plane]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
40.91	20.31	1.00	332	4.98	25.29	40.00	-14.71
377.99	35.78	1.00	229	-1.60	34.18	46.00	-11.82
448.31	41.67	1.89	320	1.11	42.78	46.00	-3.22
465.29	41.02	1.00	158	1.35	42.37	46.00	-3.63
522.27	30.46	1.00	166	3.22	33.68	46.00	-12.32
956.35	21.33	1.00	302	15.84	37.17	46.00	-8.83

Test mode: BT CH79 for 30MHz to 1GHz [Vertical, Z-plane]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
55.46	21.26	1.00	190	2.50	23.76	40.00	-16.24
100.32	24.73	1.00	75	-0.57	24.16	43.50	-19.34
236.12	34.03	1.00	278	-3.77	30.26	46.00	-15.74
396.17	29.13	1.00	272	-1.17	27.96	46.00	-18.04
699.30	20.92	1.00	343	9.51	30.43	46.00	-15.57
895.72	20.81	1.00	290	15.00	35.81	46.00	-10.19

Test mode: BT CH79 for 1GHz to 25GHz [Horizontal, X-plane]

Frequency	*Ant. H.*	*Table*	*Amplitude*		*Correction Factor*	*Corrected Amplitude*		*Limit*		*Margin*
			Peak / Ave.			*Peak / Ave.*		*Peak / Ave.*		
MHz	*m*	*degree*	*dBμV*		*dB/m*	*dBμV/m*		*dBμV/m*		*dB*
2872.92	1.00	106	35.33	---	10.19	45.52	---	73.96	53.96	-8.44
9922.29	1.00	278	33.44	---	11.66	45.10	---	73.96	53.96	-8.86
12399.37	1.00	239	36.44	---	9.02	45.46	---	73.96	53.96	-8.50
19841.67	1.00	275	46.16	---	1.90	48.06	---	73.96	53.96	-5.90
22320.83	1.00	214	45.82	---	3.33	49.15	---	73.96	53.96	-4.81
24800.00	1.00	187	45.15	---	2.22	47.37	---	73.96	53.96	-6.59

Test mode: BT CH79 for 1GHz to 25GHz [Vertical, Z-plane]

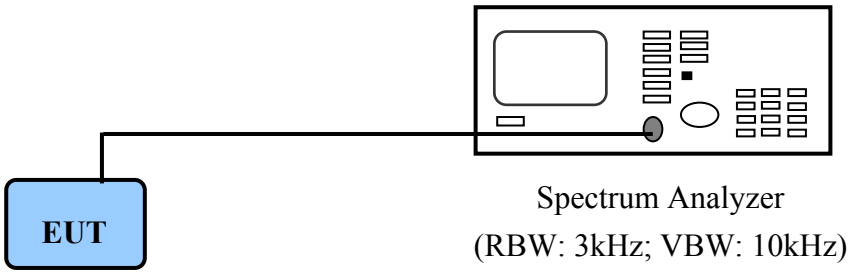
Frequency	*Ant. H.*	*Table*	*Amplitude*		*Correction Factor*	*Corrected Amplitude*		*Limit*		*Margin*
			Peak / Ave.			*Peak / Ave.*		*Peak / Ave.*		
MHz	*m*	*degree*	*dBμV*		*dB/m*	*dBμV/m*		*dBμV/m*		*dB*
1652.08	1.00	222	35.66	---	13.52	49.18	---	73.96	53.96	-4.78
7439.17	1.00	9	35.28	---	10.33	45.61	---	73.96	53.96	-8.35
12399.37	1.00	170	36.94	---	9.02	45.96	---	73.96	53.96	-8.00
19841.67	1.00	272	46.00	---	1.90	47.90	---	73.96	53.96	-6.06
22320.83	1.00	214	45.87	---	3.33	49.20	---	73.96	53.96	-4.76
24800.00	1.00	181	45.26	---	2.22	47.48	---	73.96	53.96	-6.48

XII. Section 15.247(d): Power Spectral Density

12.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode. The EUT is needed to force selection of output power level and channel number. While testing, the EUT was set to transmit continuously and to be tested by the contact manner with the spectrum analyzer.

12.2 Test Instruments Configuration



PC to control the EUT at maximal power output and channel number and set antenna kit

12.3 List of Test Instruments

				Calibration Date
Instrument Name	**Model No.**	**Brand**	**Serial No.**	**Next time**
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/15/11

12.4 Test Result of Power spectral density

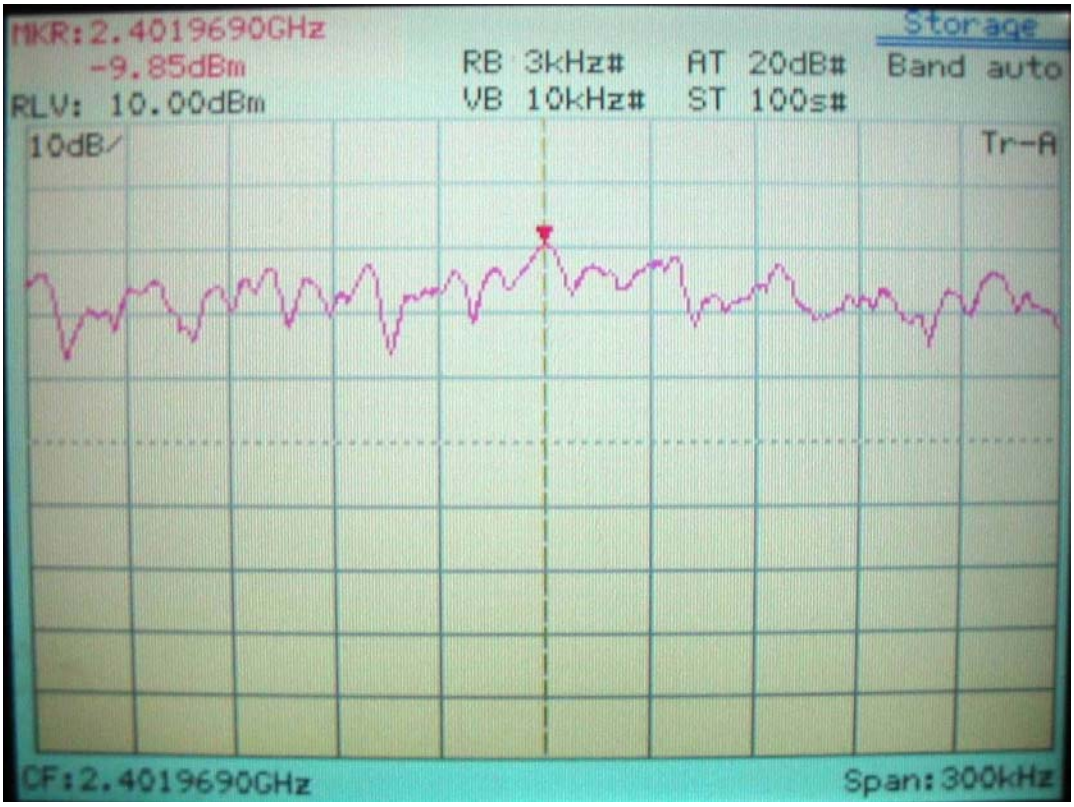
The following table shows a summary of the test results of the Power Spectral Density.

Channel	*Ppr (dBm)*	*Cable Loss (dB)*	*Ppq (dBm)*	*Limit (dB)*	*Margin (dB)*
CH 01	-9.85	1.50	-8.35	8.00	-16.35
CH 40	-9.04	1.50	-7.54	8.00	-15.54
CH 79	-9.17	1.50	-7.67	8.00	-15.67

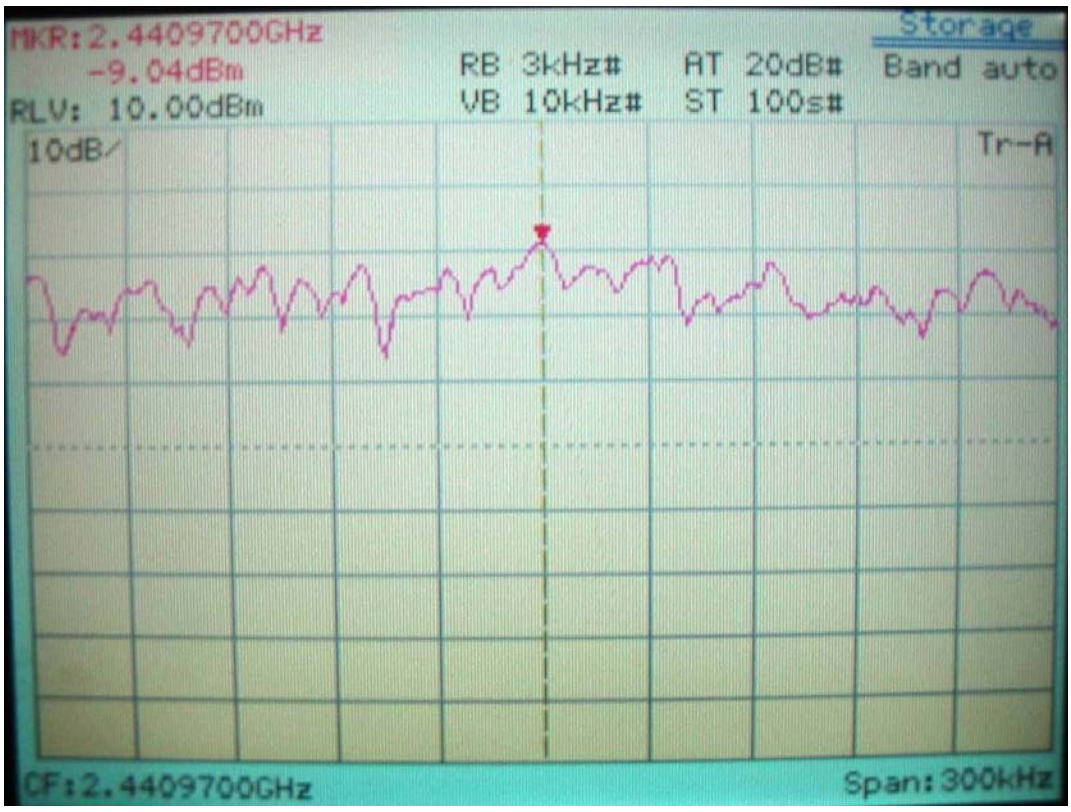
Note:

1. The following pages show the results of spectrum reading.
2. Ppr: spectrum read power density (using peak search mode),
   Ppq: actual peak power density in the spread spectrum band.
3. Ppq = Ppr + |Cable Loss|

Power Spectral Density for CH01



Power Spectral Density for CH40



Power Spectral Density for CH79