FCC RF Test Report

APPLICANT	:	**Sony Mobile Communications Inc.**
EQUIPMENT	:	**Bluetooth headphone**
BRAND NAME	:	**SONY**
FCC ID	:	**PY7-RD0200**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DSS) Spread Spectrum Transmitter**

The product was received on Feb. 10, 2015 and testing was completed on Feb. 25, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1ˢᵗ Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.
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FCC ID : PY7-RD0200

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR521016	Rev. 01	Initial issue of report	Apr. 21, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	NA	Pass	-
3.4	-	99% Bandwidth	-	Pass	-
3.5	15.247(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	≤ 20dBc	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.35 dB at 37.830 MHz
3.9	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 24.00 dB at 3.998 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

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1   General Description

1.1   Applicant

Sony Mobile Communications Inc.
Mobilvagen 10 Lund SE-22188 Sweden

1.2   Manufacturer

Sony Mobile Communications Inc.
1-8-15 Konan, Minato-ku, Tokyo,108-0075, Japan

1.3   Product Feature of Equipment Under Test

The Equipment Under Test (hereafter called: EUT) is Bluetooth headphone supporting, Bluetooth

features, and below is details of information.

Product Feature	
Equipment	Bluetooth headphone
Brand Name	SONY
FCC ID	PY7-RD0200
Sample 1	A04
Sample 2	B04
EUT supports Radios application	Bluetooth v3.0 EDR
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications
or user's manual for more detailed description.

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1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Maximum Output Power to Antenna	Bluetooth BR(1Mbps) : 8.98 dBm (0.0079 W) Bluetooth EDR (2Mbps) : 7.45 dBm (0.0056 W) Bluetooth EDR (3Mbps) : 7.73 dBm (0.0059 W)
99% Occupied Bandwidth	Bluetooth BR(1Mbps) : 0.844MHz Bluetooth EDR (2Mbps) : 1.164MHz Bluetooth EDR (3Mbps) : 1.148MHz
Antenna Type	Wire Antenna type with gain 2.34 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
Main board:R6 Left board:R1 USB board:R4	V3.05.00	N/A	RF conducted measurement
		N/A	Radiated Spurious Emission

Accessory List	
Battery	Model No. : AHB401230UPG-02
USB Cable 1	Model No. : EC300
	Type No. : AI-1000
	S/N : NA
USB Cable 2	Model No. : EC803
	Type No. : AI-0404
	S/N : NA

Remark:

1. For other wireless features of this EUT, test report will be issued separately.

2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH02-HY	CO05-HY	03CH07-HY

Note: The test site complies with ANSI C63.4 2009 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

⬧ FCC Part 15 Subpart C §15.247
⬧ FCC Public Notice DA 00-705
⬧ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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2   Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

Preliminary tests were performed in different data rates and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	π/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	7.62 dBm	5.22 dBm	5.55 dBm
Ch39	2441MHz	8.81 dBm	7.09 dBm	7.35 dBm
Ch78	2480MHz	8.98 dBm	7.45 dBm	7.73 dBm

Remark:

1. All the test data for each data rate were verified, but only the worst case was reported.

2. The data rate was set in 1Mbps for all the test items due to the highest RF output power.

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests, X, Y, Z in three orthogonal panels, and different data rates were conducted to determine the final configuration (X plane for Sample 1 amd Y plane for Sample 2 as worst plane) from all possible combinations, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode, and recorded in this report.

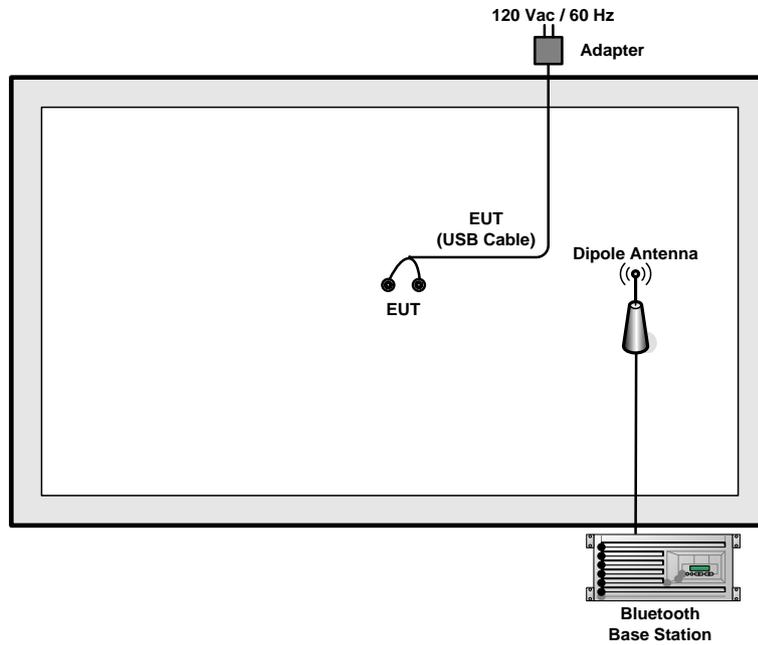b. AC power line Conducted Emission was tested under maximum output power.

2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.
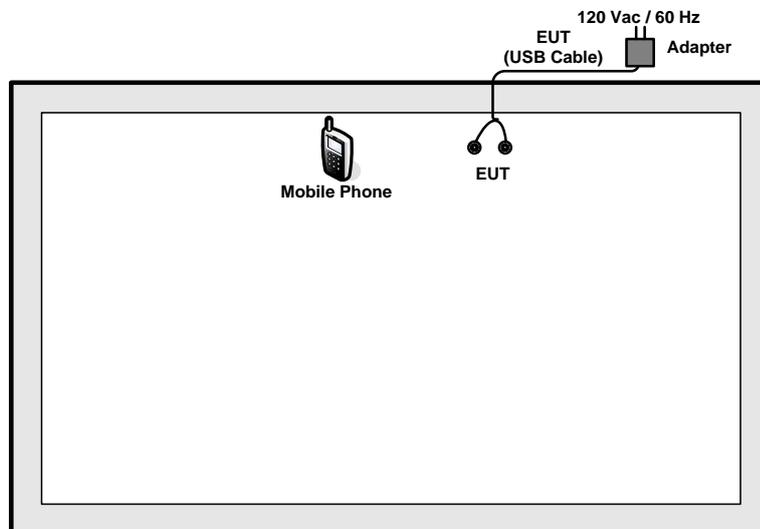
Summary table of Test Cases			
Test Item	**Data Rate / Modulation**		
	Bluetooth BR 1Mbps **GFSK**	**Bluetooth EDR 2Mbps** π/4-DQPSK	**Bluetooth EDR 3Mbps** **8-DPSK**
Conducted Test Cases	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated Test Cases	**Bluetooth BR 1Mbps** **GFSK**	**Bluetooth EDR 2Mbps** π/4-DQPSK	**Bluetooth EDR 3Mbps** **8-DPSK**
	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
AC Conducted Emission	Mode 1 :Bluetooth Link with Phone + MP3 + USB Cable 1 (Charging from Adapter) for Sample 1		

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2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>

120 Vac / 60 Hz

Adapter

EUT
(USB Cable)

Dipole Antenna
(((•)))

EUT

Bluetooth
Base Station

<AC Conducted Emission Mode>

120 Vac / 60 Hz

EUT
(USB Cable)

Adapter

EUT

Mobile Phone

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
2.	Mobe Phone	Sony	Z3	PY7PM-0800	N/A	N/A
3.	Adapter	Sony	EP880	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For Bluetooth function, the EUT get into the engineering modes to contact with Bluetooth base station for continuous transmitting and receiving signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

$$= 4.2 + 10 = 14.2 \text{ (dB)}$$

3   Test Result

3.1 Number of Channel Measurement

3.1.1   Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

3.1.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3   Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW $\geq$ 1% of the span; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

3.1.4   Test Setup

Spectrum Analyzer   EUT
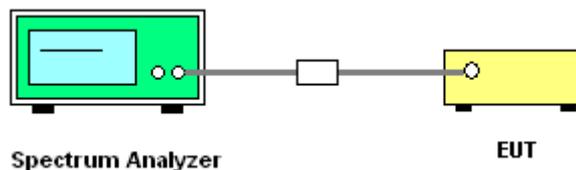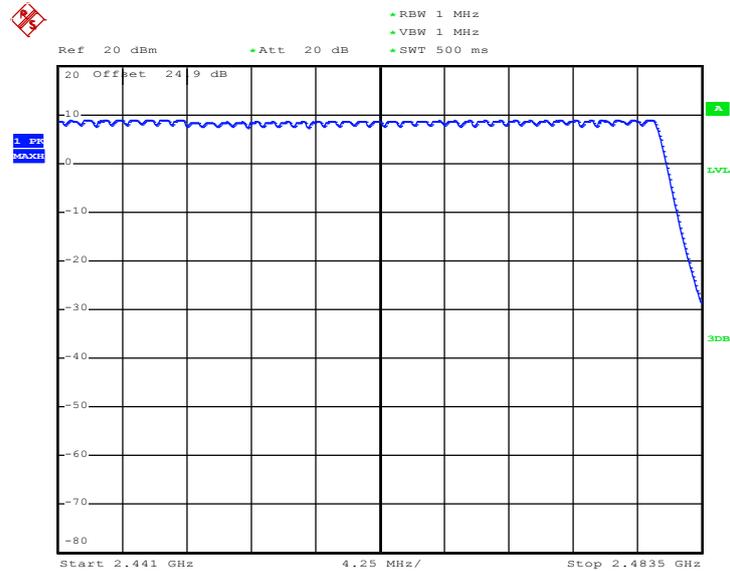
3.1.5   Test Result of Number of Hopping Frequency

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78
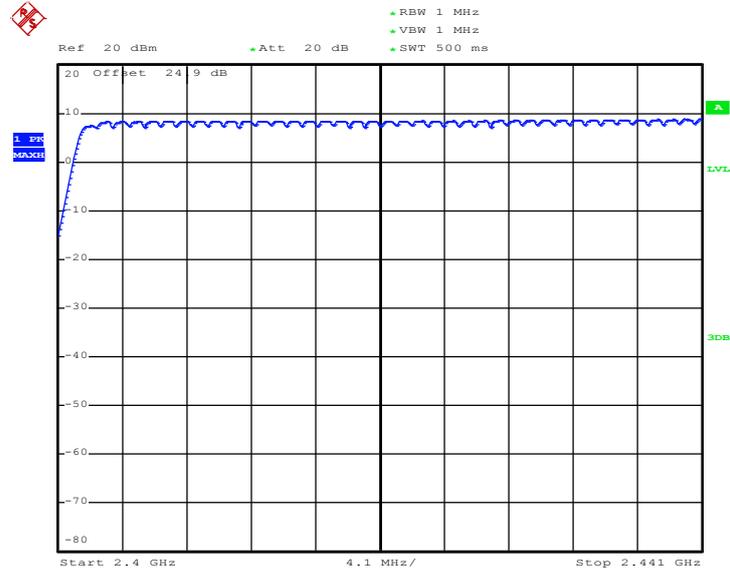
Date: 24.FEB.2015 23:21:22

Date: 24.FEB.2015 23:23:09

3.2 Hopping Channel Separation Measurement

3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW $\geq$ 1% of the span;
   VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
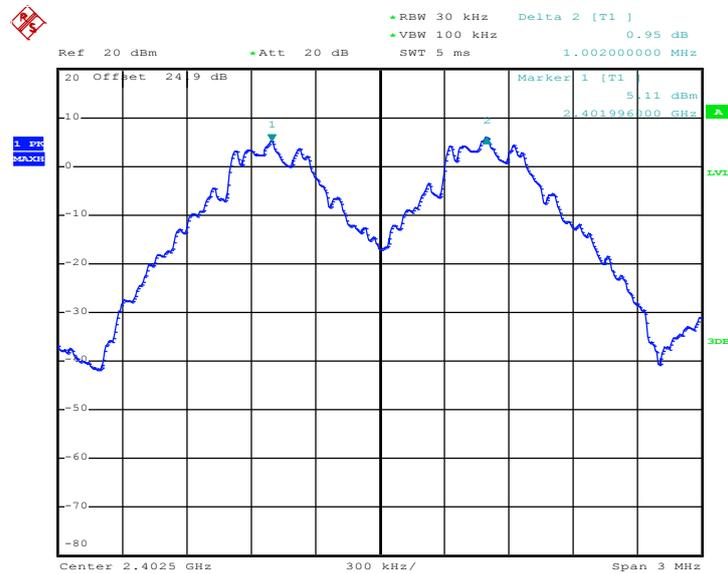6. Measure and record the results in the test report.

3.2.4 Test Setup

Spectrum Analyzer   EUT
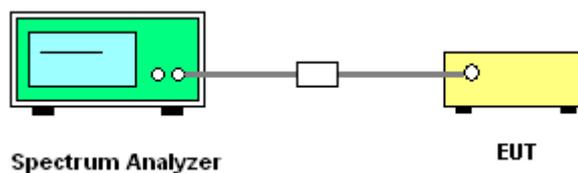
3.2.5 Test Result of Hopping Channel Separation

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.6027	Pass
39	2441	1.002	0.5973	Pass
78	2480	1.002	0.6000	Pass

Channel Separation Plot on Channel 00 - 01

Date: 24.FEB.2015 22:14:22

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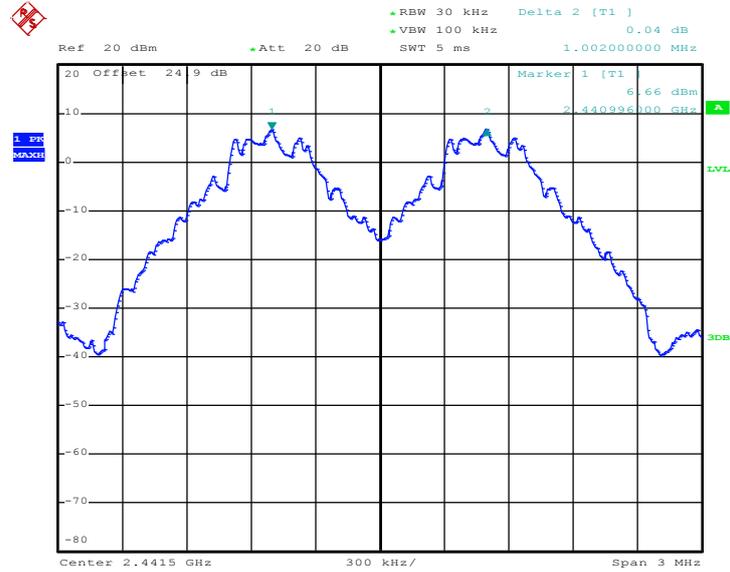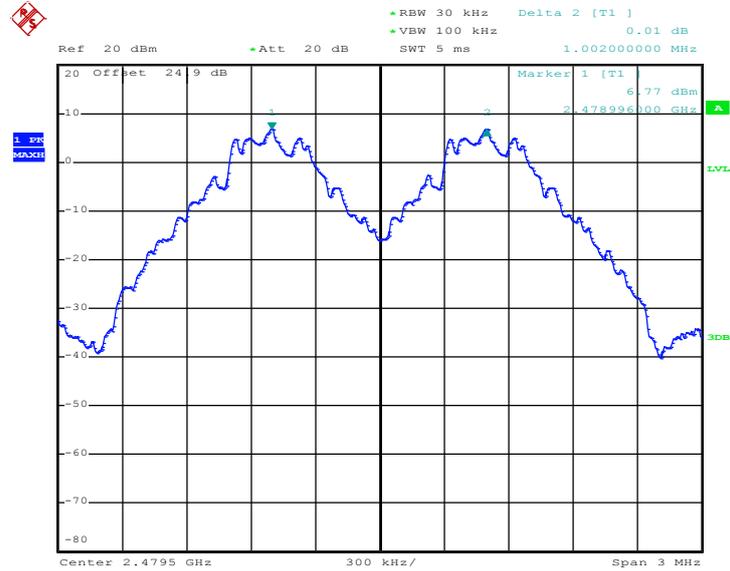
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Channel Separation Plot on Channel 39 - 40

Date: 24.FEB.2015 22:15:54

Channel Separation Plot on Channel 77 - 78

Date: 24.FEB.2015 22:19:05
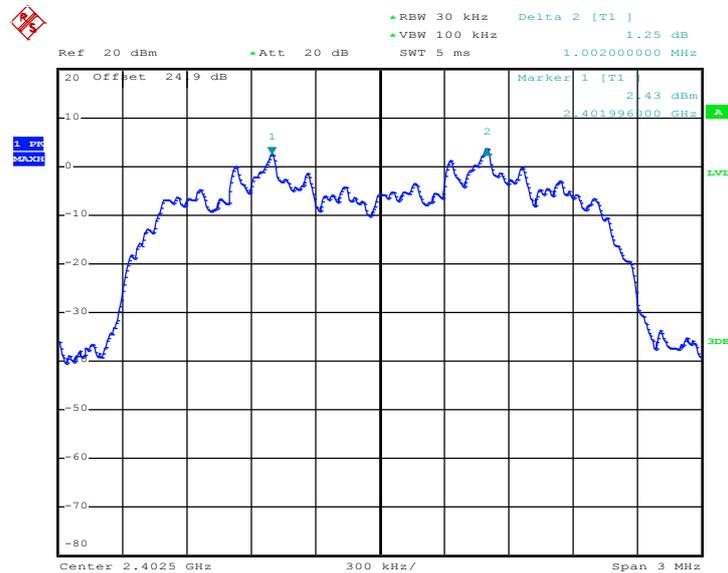
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Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8280	Pass
39	2441	1.002	0.8280	Pass
78	2480	1.002	0.8320	Pass

Channel Separation Plot on Channel 00 - 01

Date: 24.FEB.2015 22:21:05

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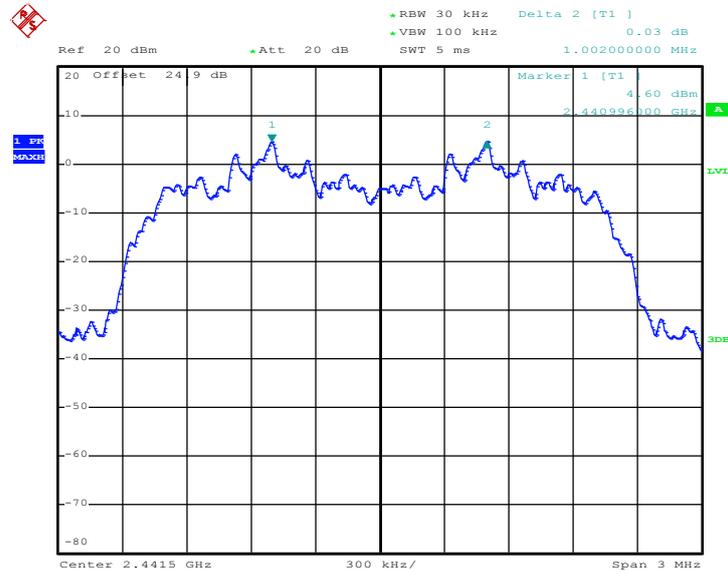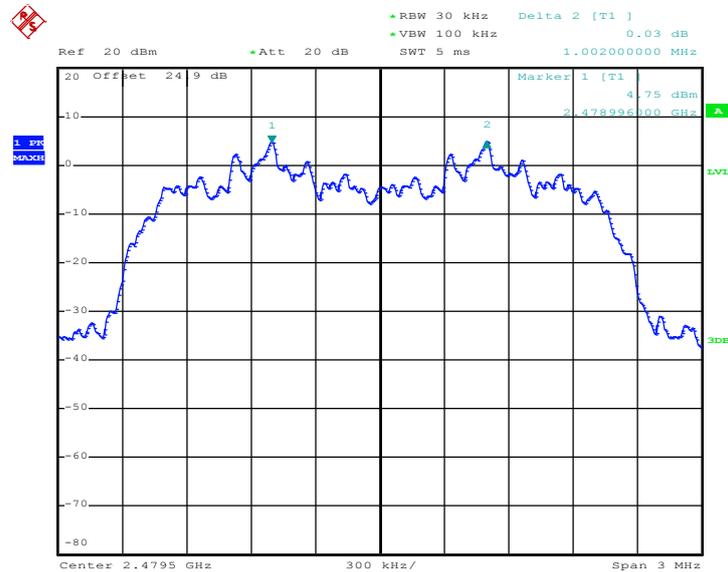Report Template No.: BU5-FR15CBT Version 1.0

Channel Separation Plot on Channel 39 - 40

Date: 24.FEB.2015 22:22:15

Channel Separation Plot on Channel 77 - 78

Date: 24.FEB.2015 22:23:16
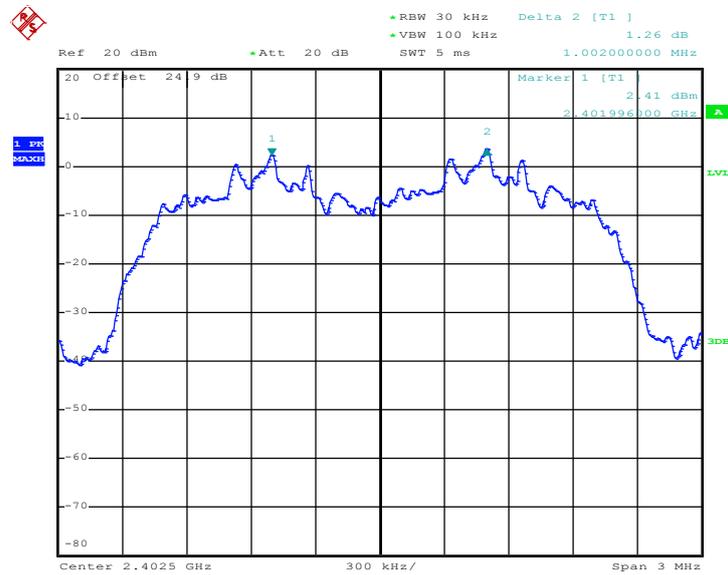
Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8160	Pass
39	2441	1.002	0.8160	Pass
78	2480	1.002	0.8160	Pass

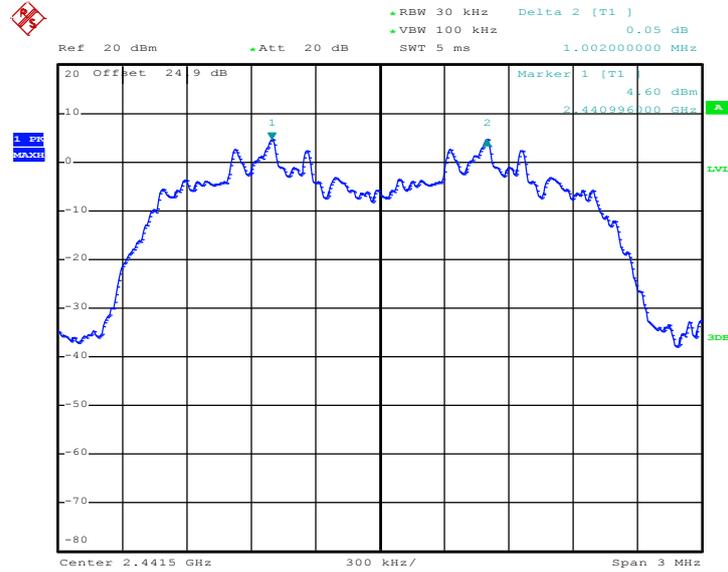### Channel Separation Plot on Channel 00 - 01
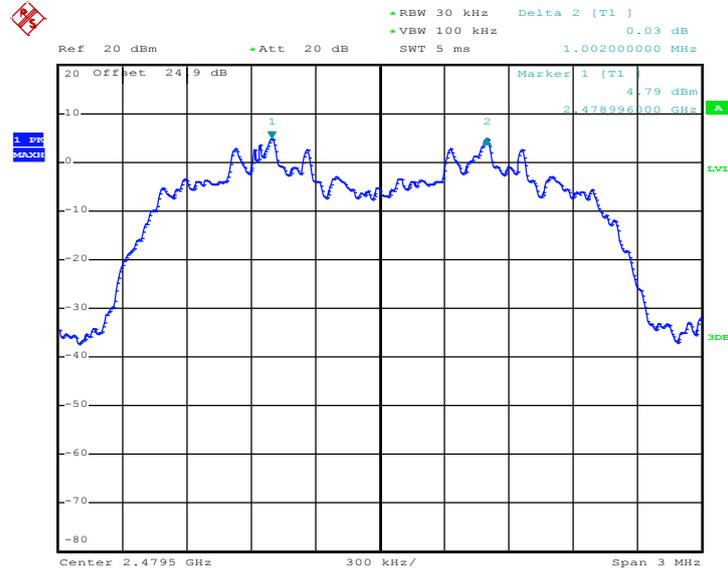

Date: 24.FEB.2015 22:25:40

Channel Separation Plot on Channel 39 - 40

Date: 24.FEB.2015 22:26:59

Channel Separation Plot on Channel 77 - 78

Date: 24.FEB.2015 22:28:56

3.3 Dwell Time Measurement

3.3.1   Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.3.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3   Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW $\geq$ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

3.3.4   Test Setup

Spectrum Analyzer   EUT
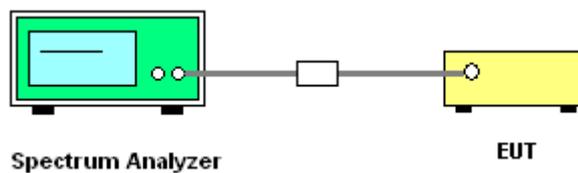
3.3.5 Test Result of Dwell Time

Test Mode :	DH5	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

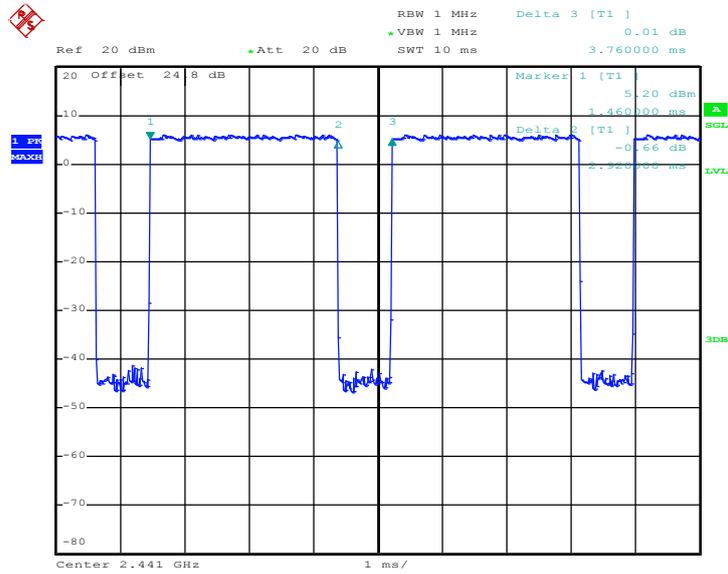| Mode	Hopping Channel Number	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Normal	79	106.67	2.92	0.31	0.4	Pass
AFH	20	53.33	2.92	0.16	0.4	Pass

Remark:

1. In normal mode, hopping rate is 1600 hops/s with 6 slots in 79 hopping channels.

    With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) (s),

    Hops Over Occupancy Time comes to (1600 / 6 / 79) x (0.4 x 79) = 106.67 hops.

2. In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels.

    With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 x 20) (s),

    Hops Over Occupancy Time comes to (800 / 6 / 20) x (0.4 x 20) = 53.33 hops.

3. Dwell Time(s) =   Hops Over Occupancy Time (hops) x Package Transfer Time

Package Transfer Time Plot


```
                                    RBW 1 MHz      Delta 3 [T1 ]
                                   ▲VBW 1 MHz            0.01 dB
        Ref  20 dBm      ▲Att  20 dB  SWT 10 ms      3.760000 ms

    20  Offset  24 8 dB                          Marker 1 [T1 ]
                                                        5.20 dBm
   -10                                                1.460000 ms
 1 PK                                              Delta 2 [T1 ]
MAXH                                                   -0.66 dB
   -0                                                 2.920000 ms

  -10

  -20

  -30

  -40

  -50

  -60

  -70

  -80
        Center 2.441 GHz                     1 ms/
```

Date: 24.FEB.2015 10:30:50

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3.4 20dB and 99% Bandwidth Measurement

3.4.1   Limit of 20dB and 99% Bandwidth

Reporting only

3.4.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3   Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
   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;
   Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
   For 99% Bandwidth measurement, the RBW=30kHz, and VBW = 100kHz. Sweep = auto ;
   Detector function = sample. Trace = max hold.
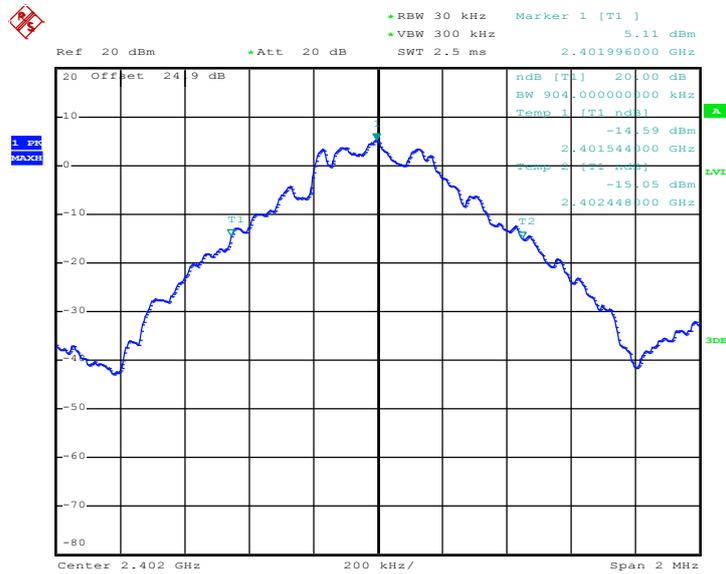6. Measure and record the results in the test report.

3.4.4   Test Setup

Spectrum Analyzer   EUT
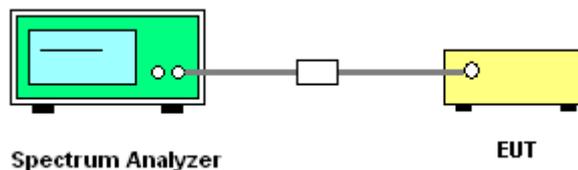
3.4.5 Test Result of 20dB Bandwidth

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.904
39	2441	0.896
78	2480	0.900

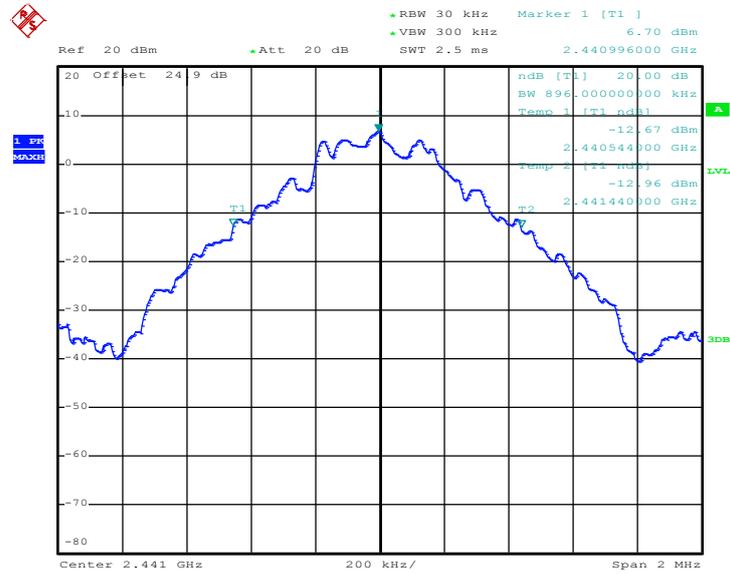**20 dB Bandwidth Plot on Channel 00**

Date: 24.FEB.2015 22:29:50

Note: The total loss is 24.9 dB of the RF cable and attenuator, and
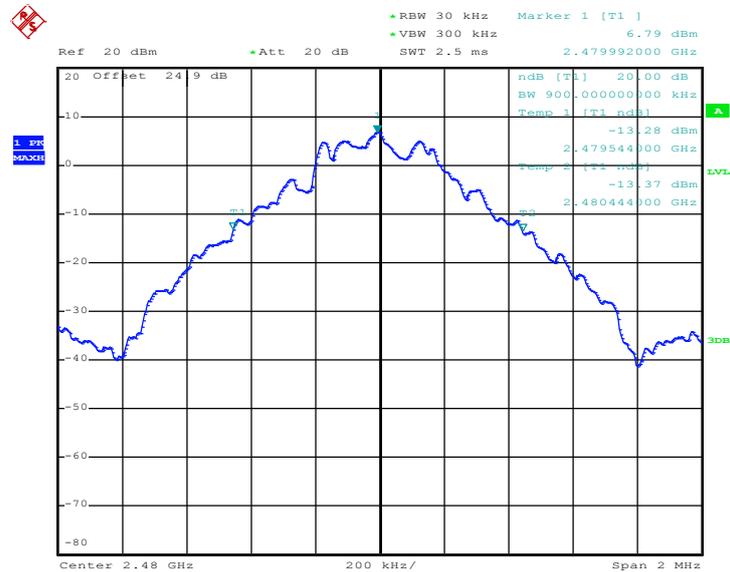has been compensated to the spectrum analyzer offset.

20 dB Bandwidth Plot on Channel 39

Date: 24.FEB.2015 22:30:51

20 dB Bandwidth Plot on Channel 78

Date: 24.FEB.2015 22:32:04

Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.242
39	2441	1.242
78	2480	1.248

20 dB Bandwidth Plot on Channel 00

Date: 24.FEB.2015 22:33:28

Note: The total loss is 24.9 dB of the RF cable and attenuator, and
has been compensated to the spectrum analyzer offset.

20 dB Bandwidth Plot on Channel 39

Date: 24.FEB.2015 22:36:24
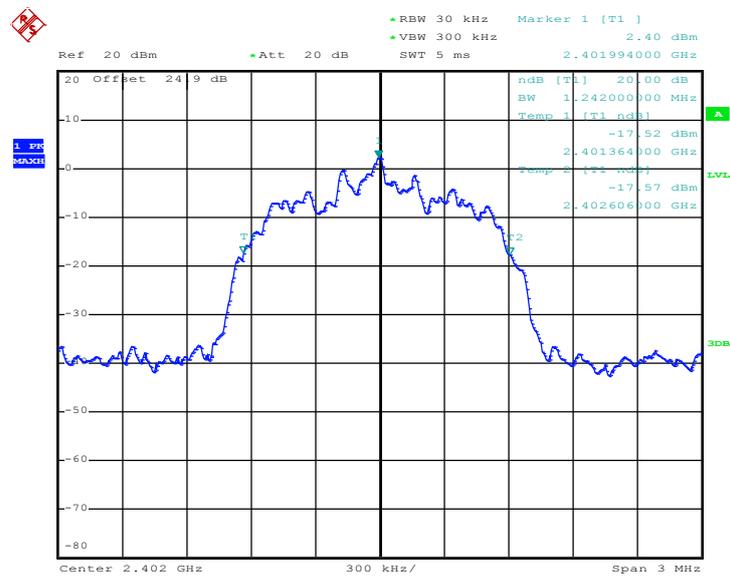
20 dB Bandwidth Plot on Channel 78

Date: 24.FEB.2015 22:37:42

Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

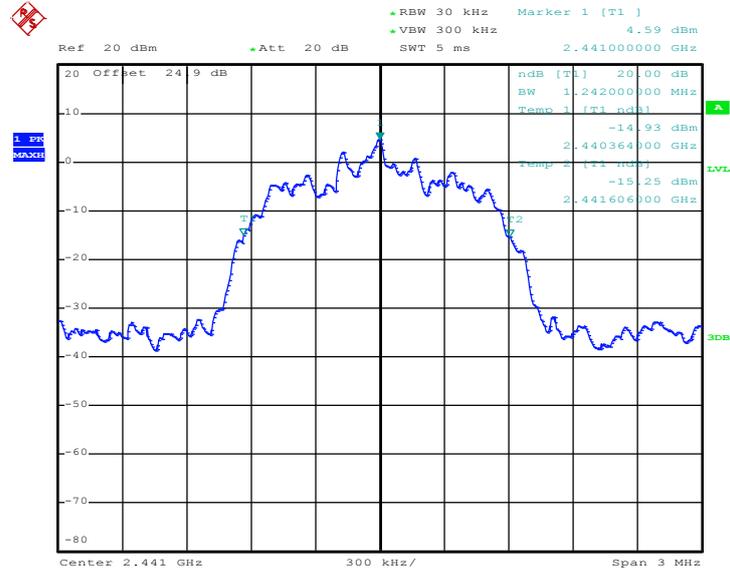| Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.224
39	2441	1.224
78	2480	1.224

20 dB Bandwidth Plot on Channel 00

Date: 24.FEB.2015 22:38:38

Note: The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.
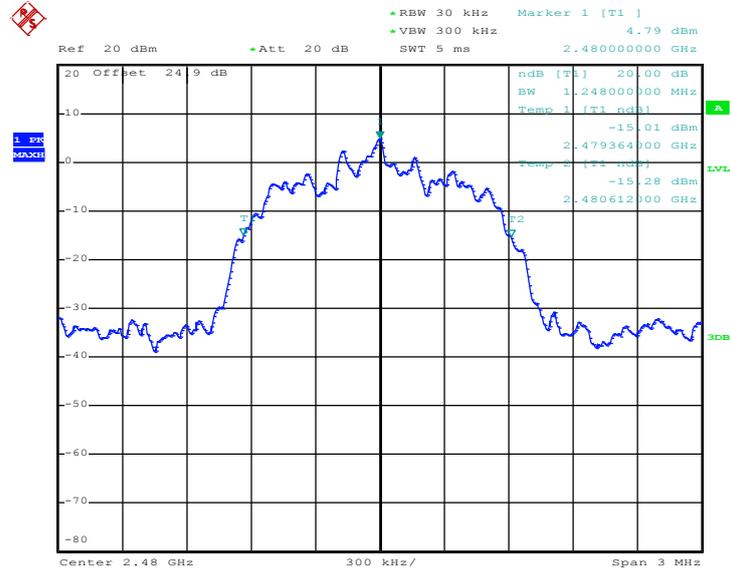
20 dB Bandwidth Plot on Channel 39

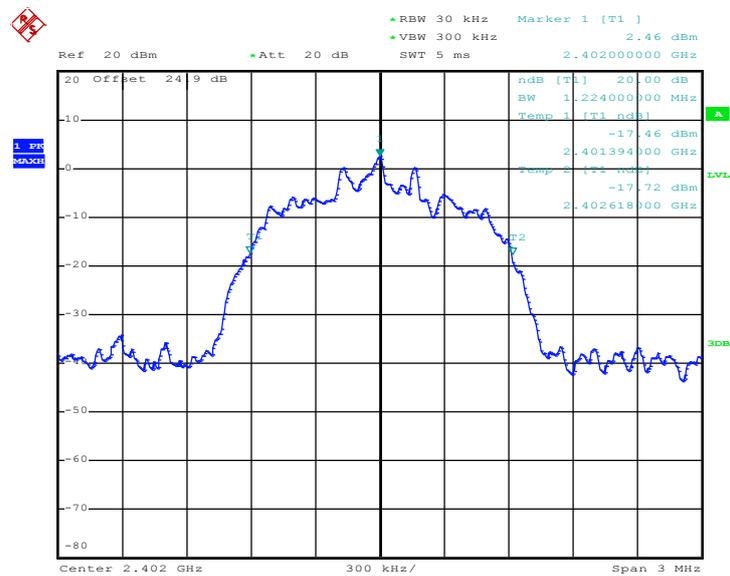Date: 24.FEB.2015 22:39:43

20 dB Bandwidth Plot on Channel 78
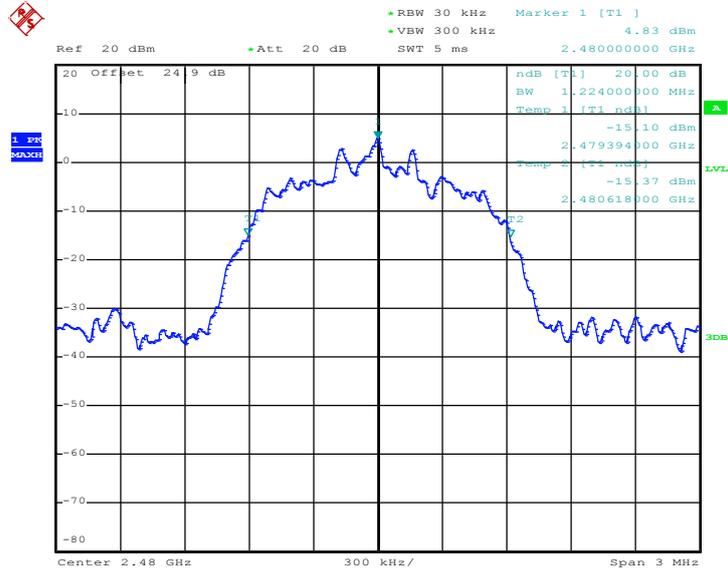
Date: 24.FEB.2015 22:40:12

3.4.6 Test Result of 99% Occupied Bandwidth

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.844
39	2441	0.844
78	2480	0.840

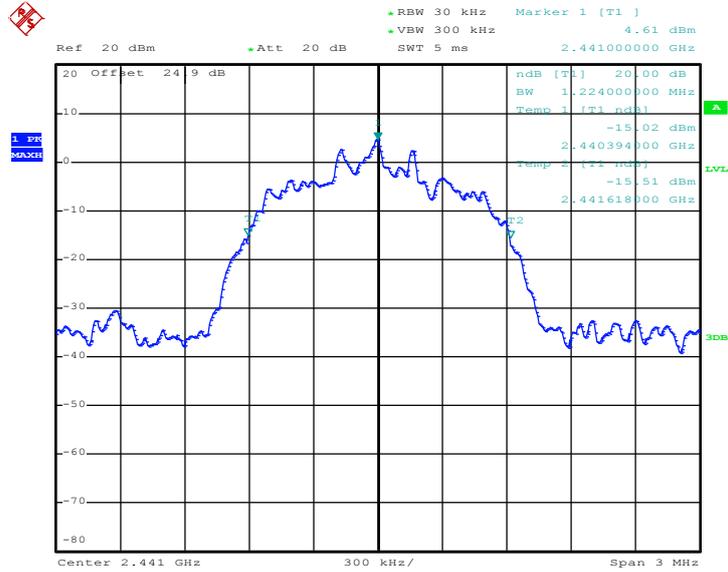**99% Occupied Bandwidth Plot on Channel 00**
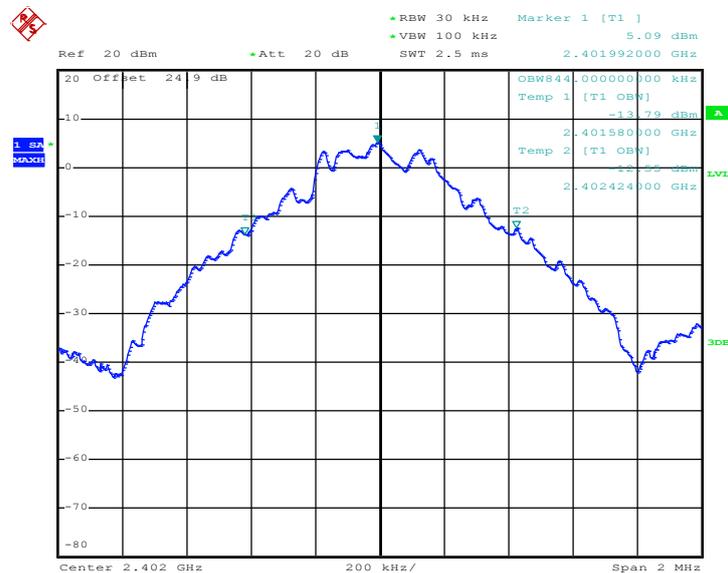
Date: 24.FEB.2015 22:41:07

Note: The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

99% Occupied Bandwidth Plot on Channel 39

Date: 24.FEB.2015 22:41:53

99% Occupied Bandwidth Plot on Channel 78

Date: 24.FEB.2015 22:48:58

Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.160
39	2441	1.160
78	2480	1.164

99% Occupied Bandwidth Plot on Channel 00

Date: 24.FEB.2015 22:50:48

Note: The total loss is 24.9 dB of the RF cable and attenuator, and
has been compensated to the spectrum analyzer offset.

99% Occupied Bandwidth Plot on Channel 39

Date: 24.FEB.2015 22:51:55

99% Occupied Bandwidth Plot on Channel 78

Date: 24.FEB.2015 22:52:39

Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.144
39	2441	1.148
78	2480	1.148

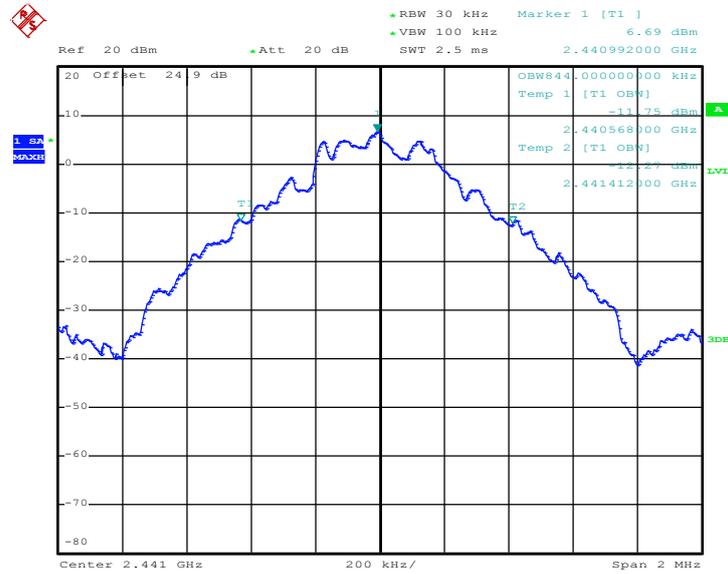**99% Occupied Bandwidth Plot on Channel 00**
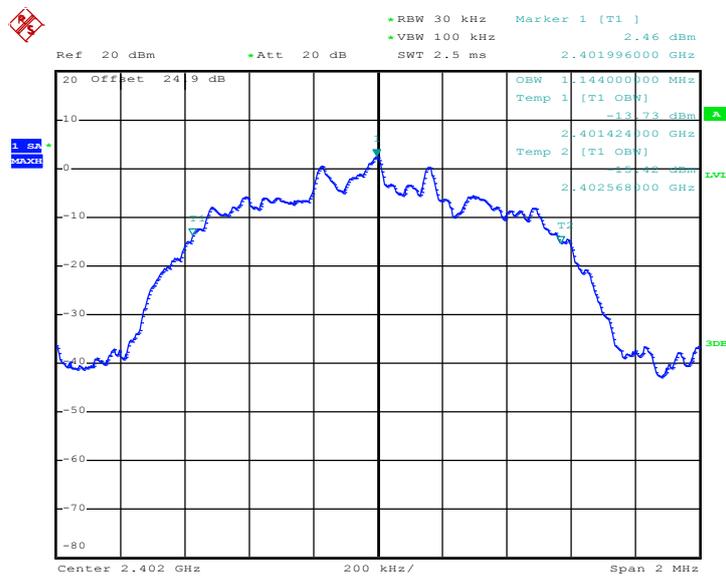
Date: 24.FEB.2015 22:53:32

Note: The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.
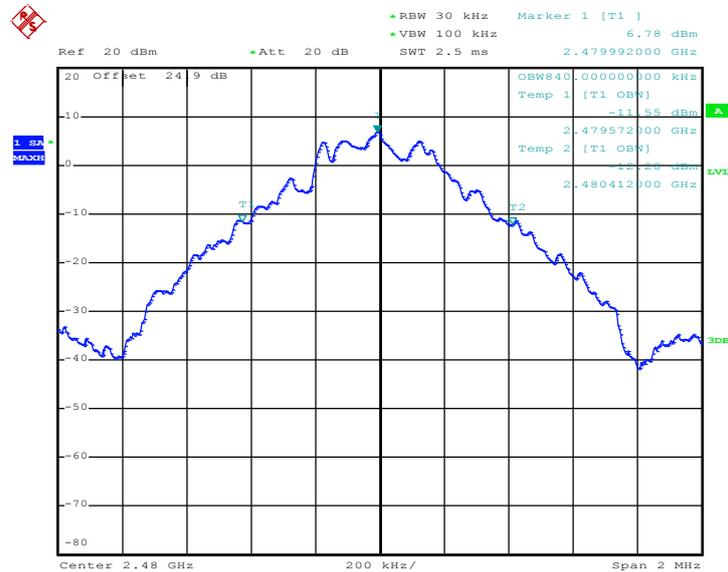
99% Occupied Bandwidth Plot on Channel 39
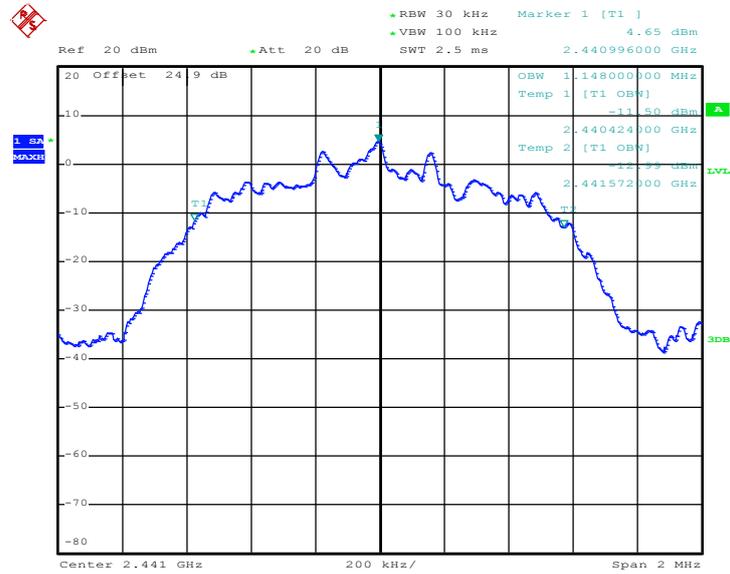
Date: 24.FEB.2015 22:54:35

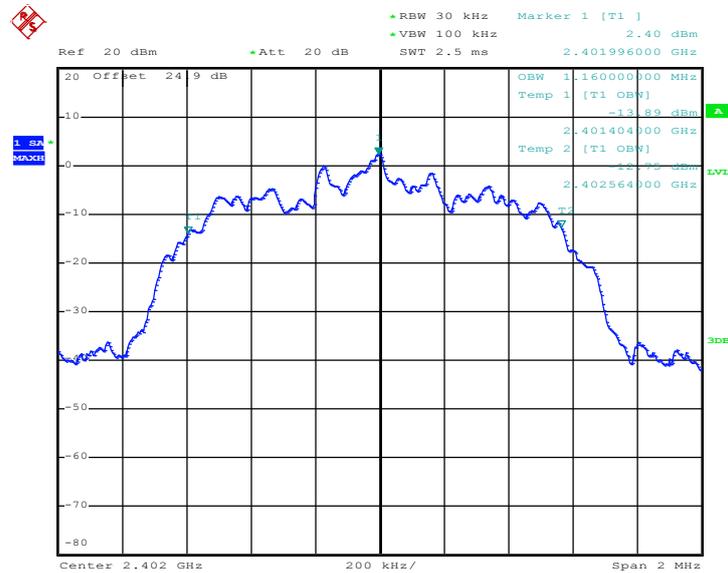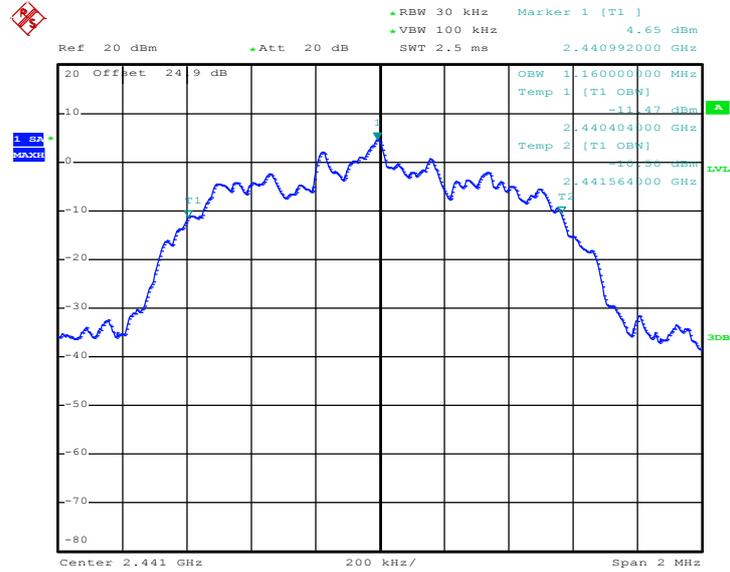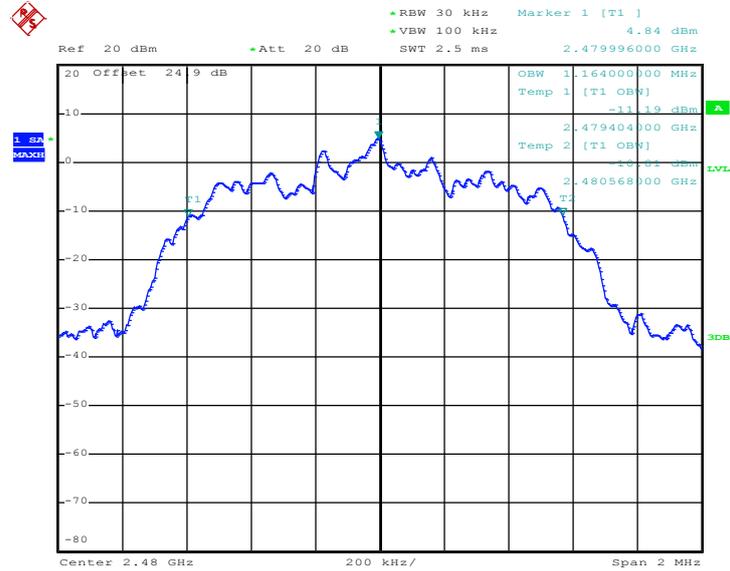## 99% Occupied Bandwidth Plot on Channel 78
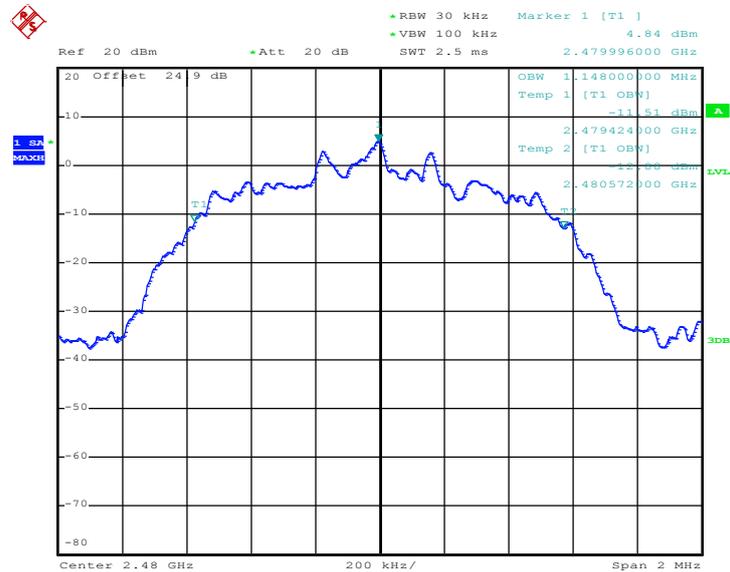
Date: 24.FEB.2015 22:55:51

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps is 1watt, and for 2Mbps, 3Mbps and AFH are 0.125 watts.

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.5.4 Test Setup

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3.5.5 Test Result of Peak Output Power

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	RF Power (dBm)		Pass/Fail
		GFSK 1 Mbps	Max. Limits (dBm)	
00	2402	7.62	20.97	Pass
39	2441	8.81	20.97	Pass
78	2480	8.98	20.97	Pass

Note: For AFH mode using 20 hopping channels, the maximum output power limit is 20.97dBm.

Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	RF Power (dBm)		Pass/Fail
		π/4-DQPSK 2 Mbps	Max. Limits (dBm)	
00	2402	5.22	20.97	Pass
39	2441	7.09	20.97	Pass
78	2480	7.45	20.97	Pass

Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

Channel	Frequency (MHz)	RF Power (dBm)		Pass/Fail
		8-DPSK 3 Mbps	Max. Limits (dBm)	
00	2402	5.55	20.97	Pass
39	2441	7.35	20.97	Pass
78	2480	7.73	20.97	Pass

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3.6 Conducted Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.
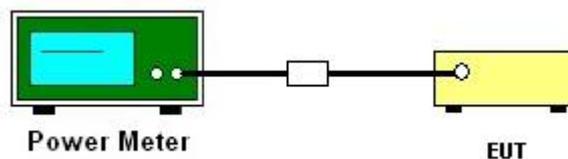
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz ($\geq$ 1% span=10MHz), VBW = 300kHz ($\geq$ RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

3.6.4 Test Setup
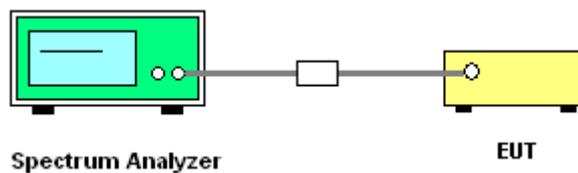
3.6.5   Test Result of Conducted Band Edges

Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00
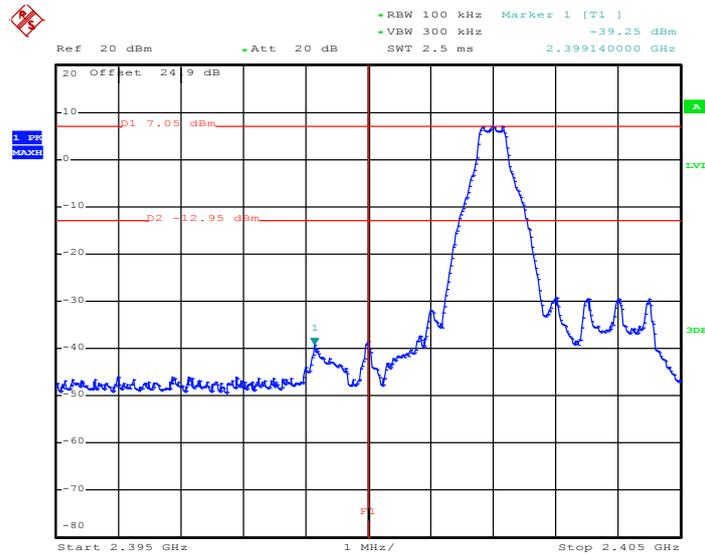
Date: 24.FEB.2015 23:32:19

High Band Edge Plot on Channel 78
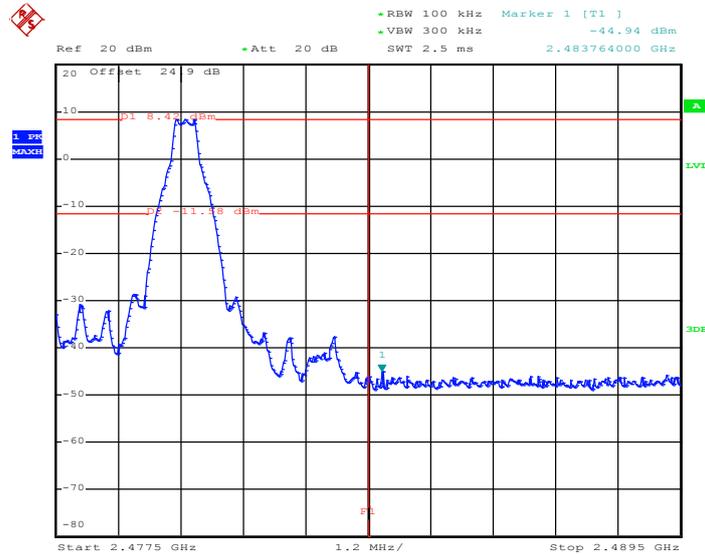
Date: 24.FEB.2015 23:33:47

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Test Mode :	2Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00
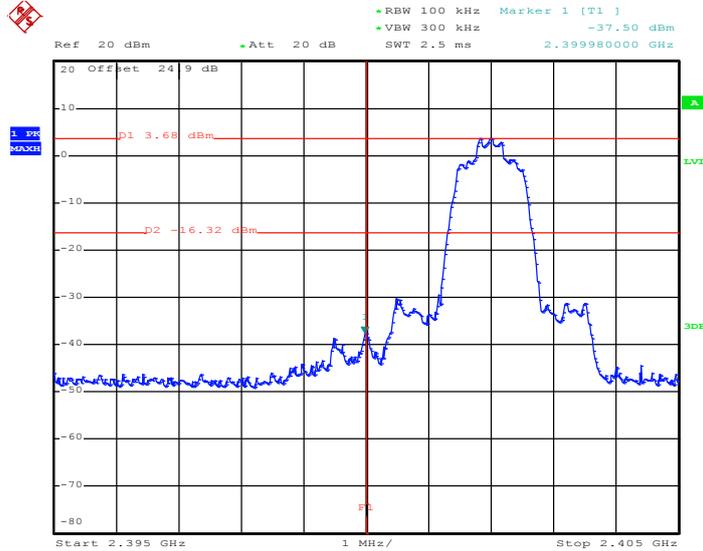
Date: 24.FEB.2015 23:37:06

High Band Edge Plot on Channel 78
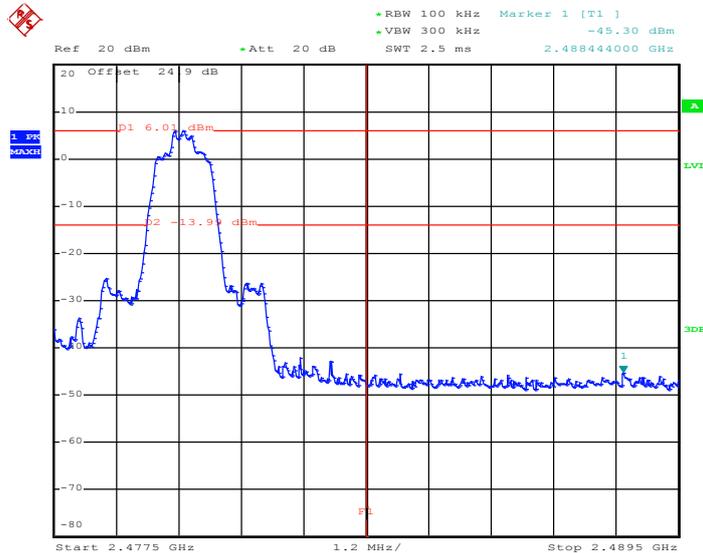
Date: 24.FEB.2015 23:37:43

Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

Low Band Edge Plot on Channel 00
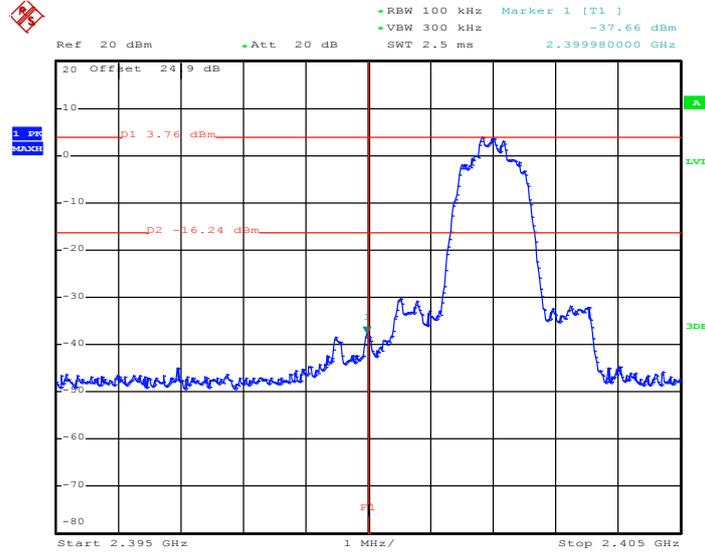
Date: 24.FEB.2015 23:38:23

High Band Edge Plot on Channel 78
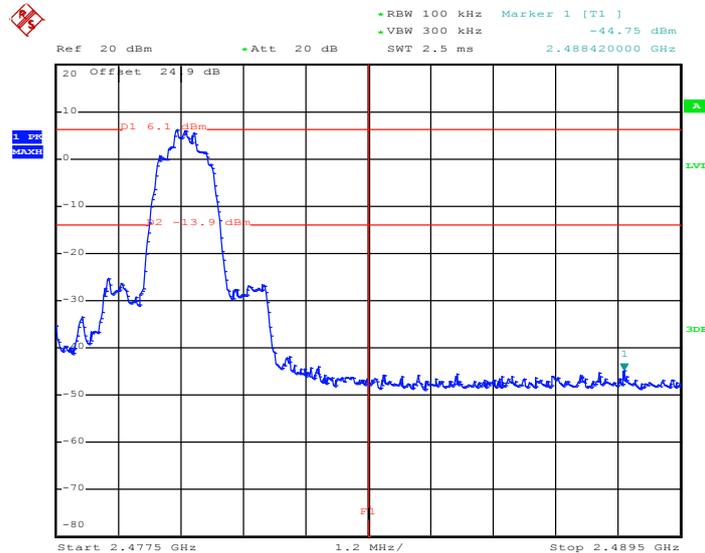
Date: 24.FEB.2015 23:38:53

3.6.6 Test Result of Conducted Hopping Mode Band Edges

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

1Mbps Hopping Mode Low Band Edge Plot
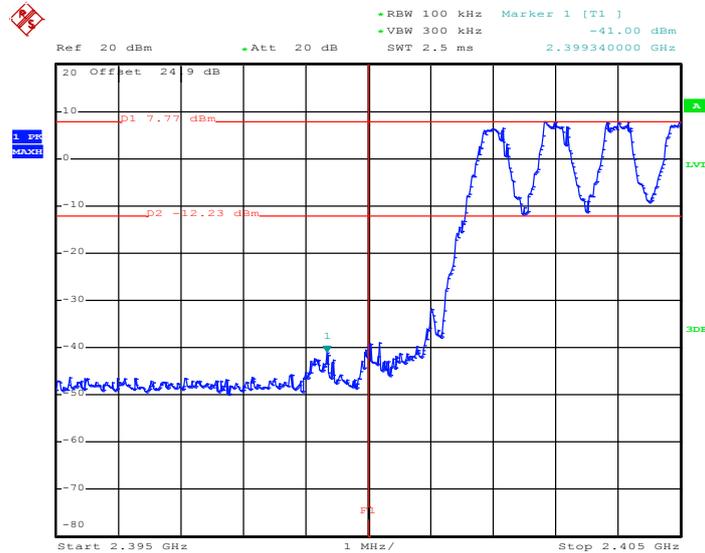
Date: 24.FEB.2015 23:23:27

1Mbps Hopping Mode High Band Edge Plot
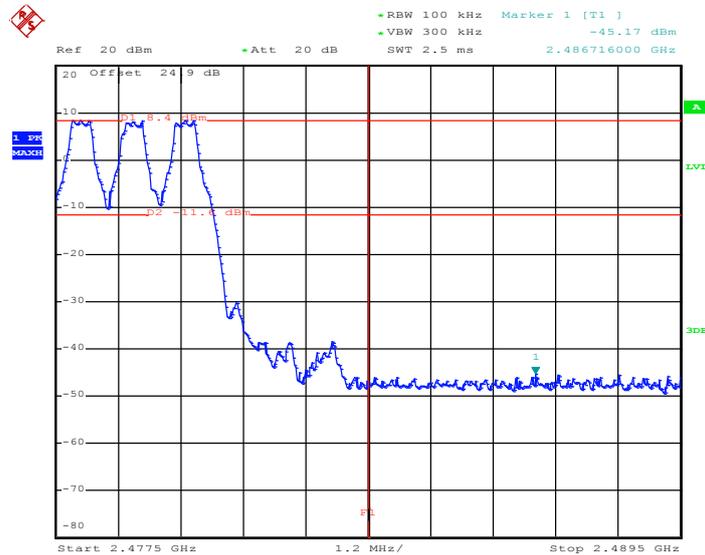
Date: 24.FEB.2015 23:23:53

Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

2Mbps Hopping Mode Low Band Edge Plot
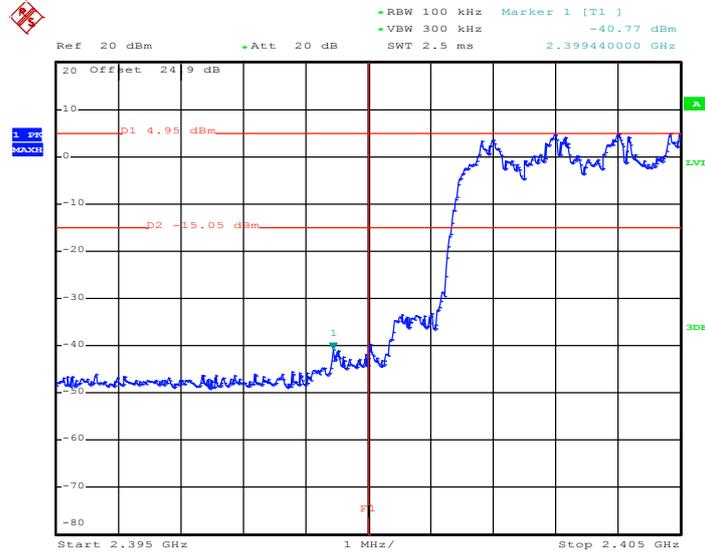
Date: 24.FEB.2015 23:24:58

2Mbps Hopping Mode High Band Edge Plot
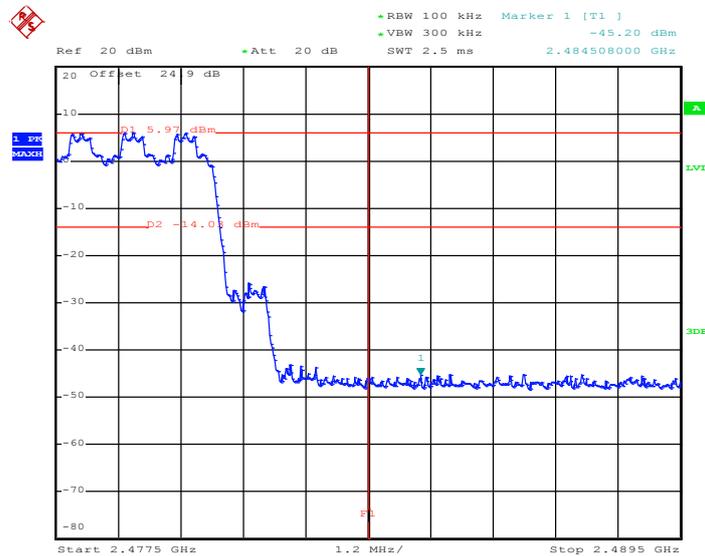
Date: 24.FEB.2015 23:25:42

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Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Osolemio Chang	Relative Humidity :	48~51%

3Mbps Hopping Mode Low Band Edge Plot
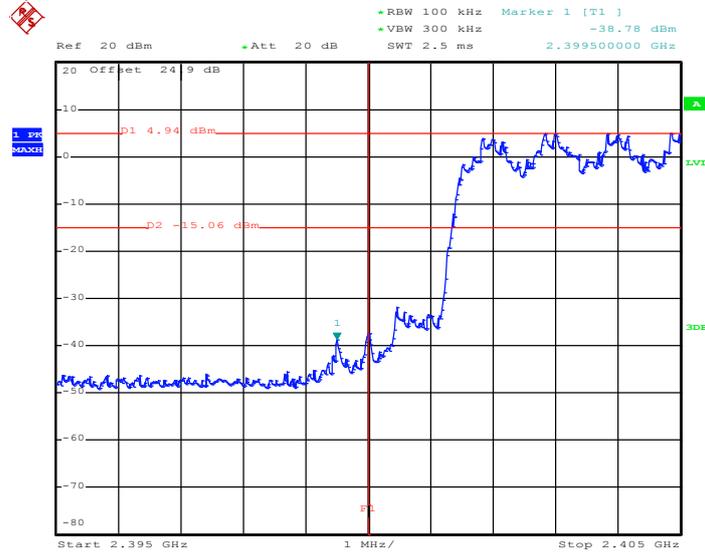
Date: 24.FEB.2015 23:28:40

3Mbps Hopping Mode High Band Edge Plot
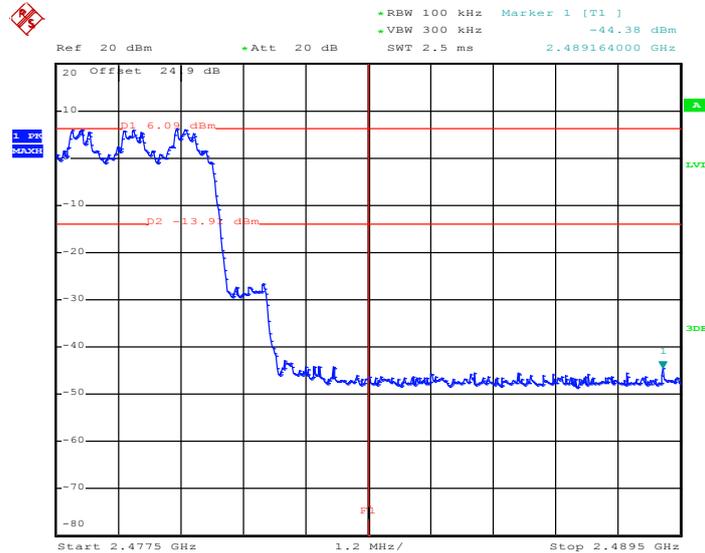
Date: 24.FEB.2015 23:29:10

3.7 Conducted Spurious Emission Measurement

3.7.1   Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.7.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3   Test Procedure

1.   The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2.   The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3.   Set to the maximum power setting and enable the EUT transmit continuously.
4.   Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5.   Measure and record the results in the test report.
6.   The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.4   Test Setup

Spectrum Analyzer   **EUT**
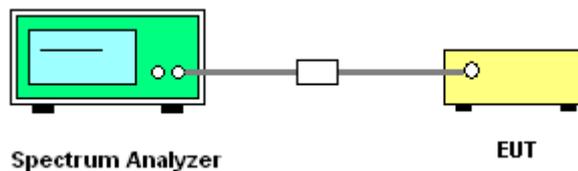
3.7.5 Test Result of Conducted Spurious Emission

Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz
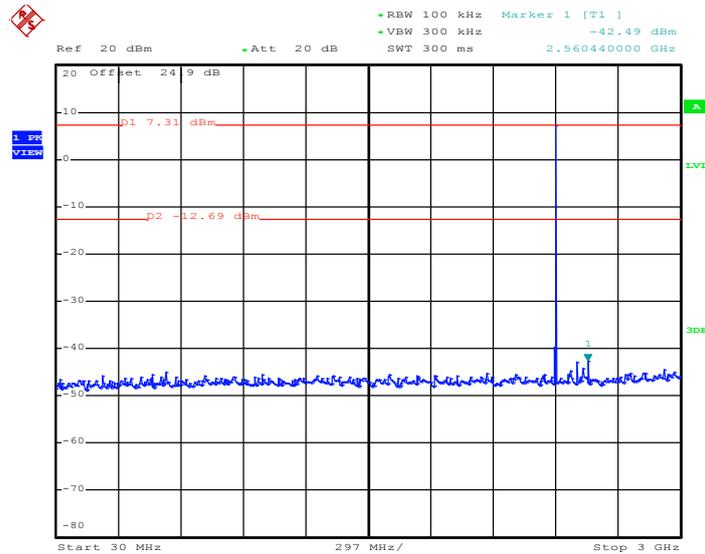

```
Date: 24.FEB.2015  23:00:59
```

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

1Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

Date: 24.FEB.2015 23:01:20

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz

Date: 24.FEB.2015 23:01:59

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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1Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz


```
                                        RBW 100 kHz   Marker 1 [T1 ]
                                        VBW 300 kHz          -28.83 dBm
        Ref  20 dBm          Att  20 dB SWT 2.3 s    24.954000000 GHz

   20  Offset   24 9 dB                                              A
    10
          D1 7.55 dBm                                              LVL

     0

   -10    D2 -12.45 dBm

   -20

   -30                                                             3DB

   -40

   -50

   -60

   -70

   -80
   Start 2 GHz              2.3 GHz/              Stop 25 GHz
```

Date: 24.FEB.2015 23:02:21

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

1Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz


```
                                    RBW 100 kHz   Marker 1 [T1 ]
                                    VBW 300 kHz            -43.98 dBm
       Ref  20 dBm        Att 20 dB  SWT 300 ms    2.584200000 GHz
```

Date: 24.FEB.2015 23:03:03

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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Report Template No.: BU5-FR15CBT Version 1.0

1Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz


```
                                              RBW 100 kHz   Marker 1 [T1 ]
                                              VBW 300 kHz         -28.67 dBm
              Ref  20 dBm          Att  20 dB  SWT 2.3 s    21.918000000 GHz
```

Date: 24.FEB.2015 23:03:24

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

| Test Mode :	2Mbps	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz


```
                                    ◆RBW 100 kHz   Marker 1 [T1 ]
                                    ◆VBW 300 kHz           -43.54 dBm
    Ref  20 dBm          ◆Att 20 dB  SWT 300 ms     2.506980000 GHz
```
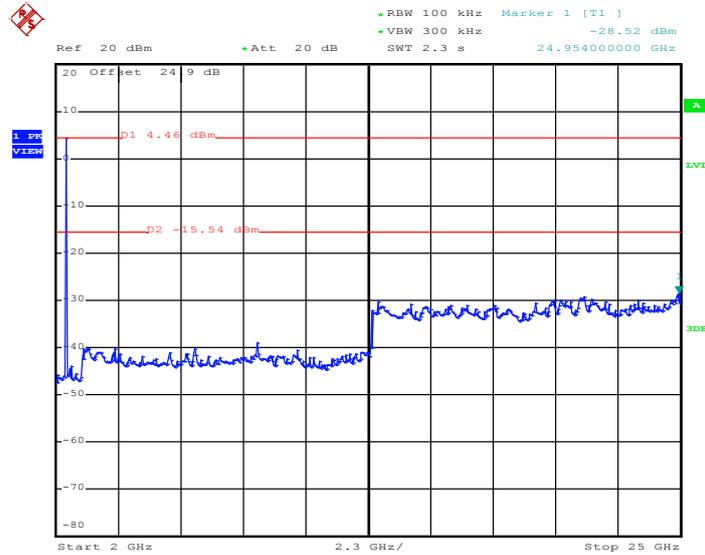
```
Date: 24.FEB.2015  23:05:13
```

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz
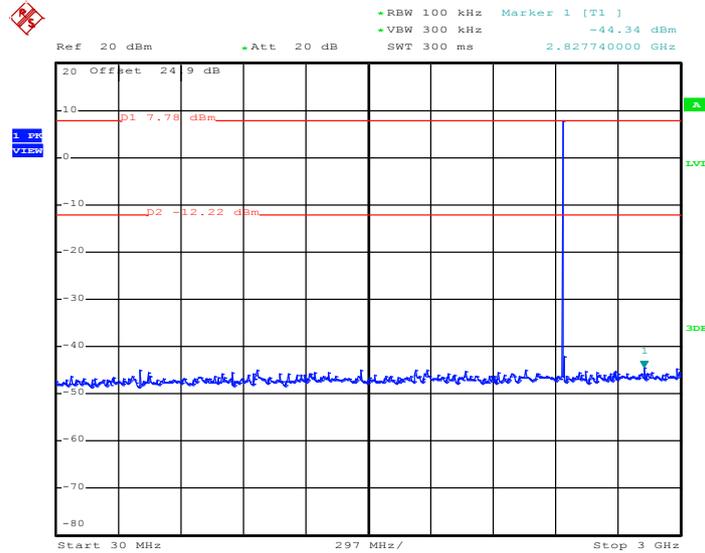

Date: 24.FEB.2015 23:05:35

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.
2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Mode :	2Mbps	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz


```
                                    RBW 100 kHz   Marker 1 [T1 ]
                                    VBW 300 kHz            -44.00 dBm
        Ref  20 dBm        Att  20 dB   SWT 300 ms       2.851500000 GHz

     20  Offset  24 9 dB                                              A
     -10
          D1 4.16 dBm                                               LVL
      0
     -10
          D2 -15.84 dBm
     -20
     -30
     -40                                                             3DB
     -50
     -60
     -70
     -80
     Start 30 MHz              297 MHz/              Stop 3 GHz
```
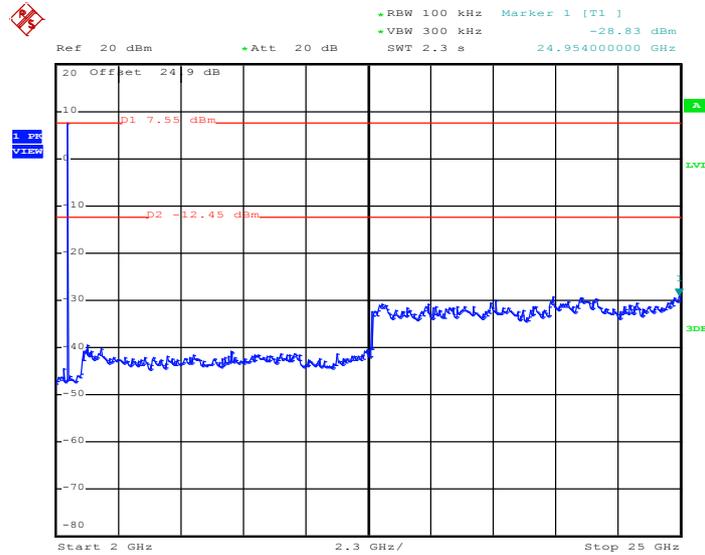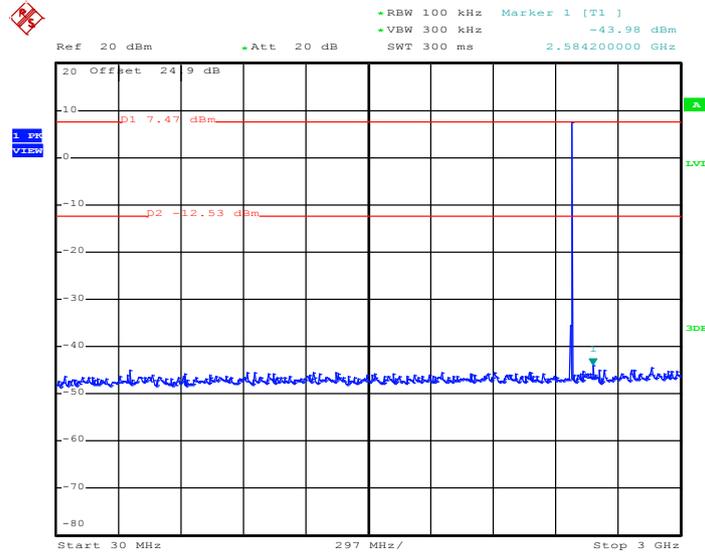
Date: 24.FEB.2015 23:07:12

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has
    been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the
    limit line in the operating frequency band.

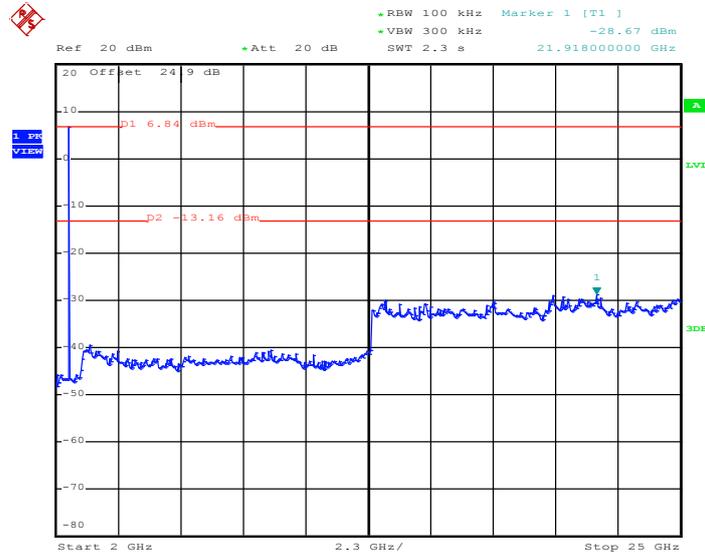### 2Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

Date: 24.FEB.2015 23:07:34

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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Test Mode :	2Mbps	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

2Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz
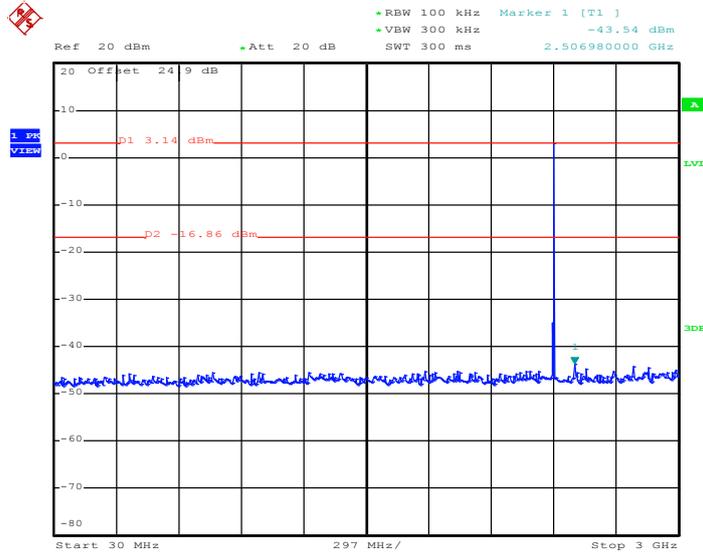

Date: 24.FEB.2015 23:08:28

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz


```
                                        RBW 100 kHz   Marker 1 [T1 ]
                                        VBW 300 kHz          -28.81 dBm
         Ref  20 dBm          Att  20 dB  SWT 2.3 s    24.770000000 GHz

    20  Offset   24 9 dB                                                    A
    10
                                                                          LVL
  1 PR
  VIEW   D1 0.83 dBm
    10
    20      D2 -19.17 dBm
                                                                          1
    30                                                                    3DB
    40
    50
    60
    70
    80
       Start 2 GHz              2.3 GHz/              Stop 25 GHz
```
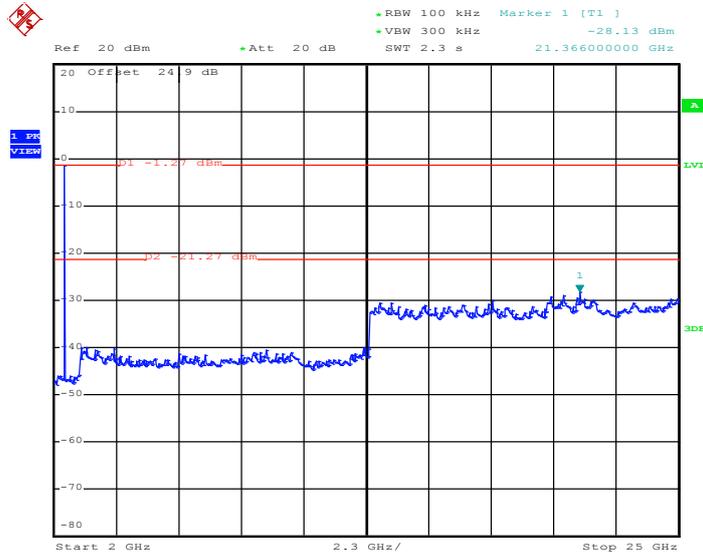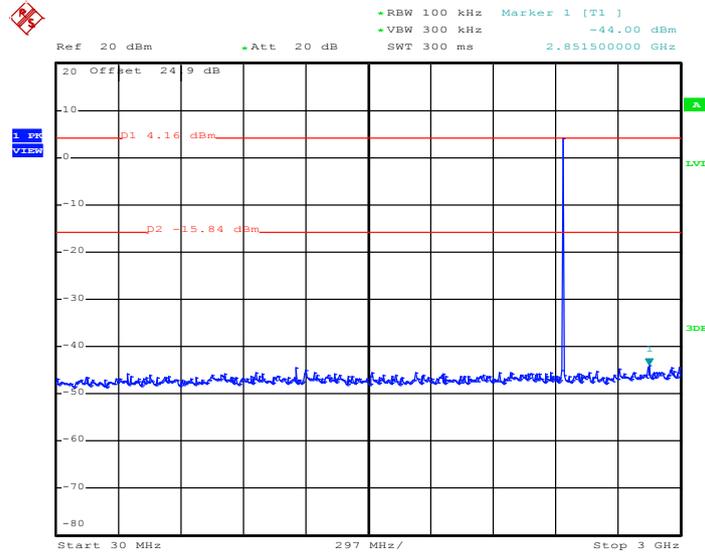
Date: 24.FEB.2015 23:08:49

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 00 between 30MHz ~ 3 GHz


```
                                    RBW 100 kHz   Marker 1 [T1 ]
                                    VBW 300 kHz          -43.76 dBm
    Ref  20 dBm          Att  20 dB  SWT 300 ms    2.560440000 GHz

 20  Offset   24 9 dB
                                                                        A
 -10
1 PK
VIEW                                                                   LVL
   0   D1 1.64 dBm

 -10

 -20   D2 -18.36 dBm

 -30

 -40                                                                  3DB

 -50

 -60

 -70

 -80
   Start 30 MHz              297 MHz/              Stop 3 GHz
```
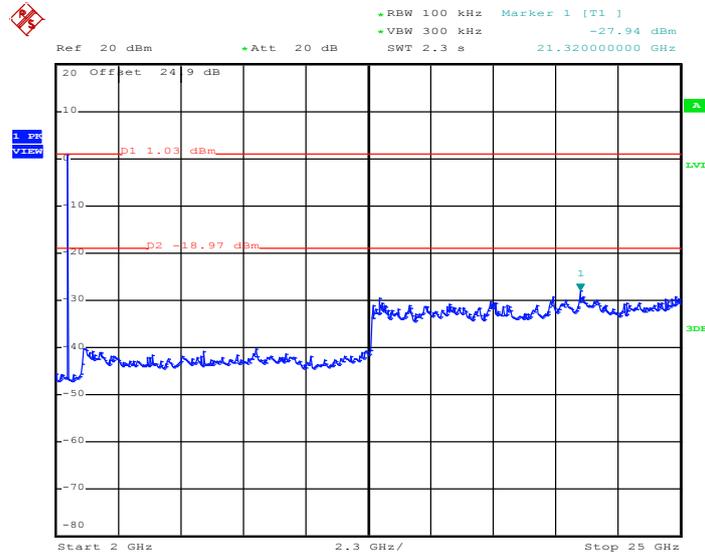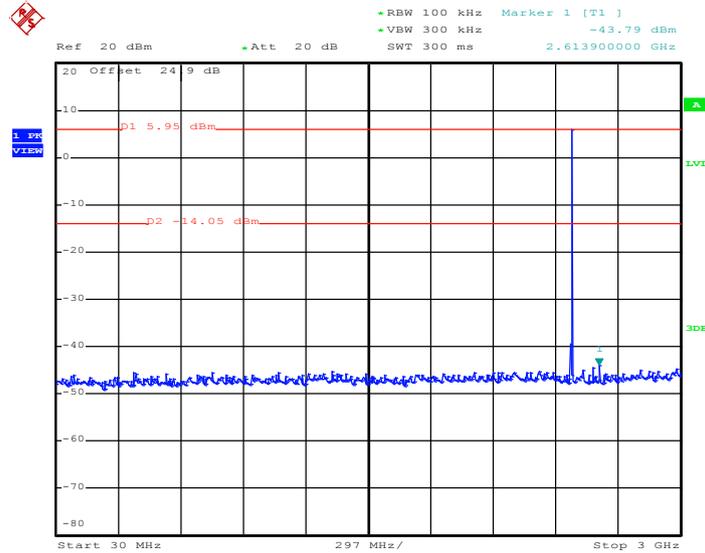
Date: 24.FEB.2015 23:17:01

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3Mbps CSE Plot on Ch 00 between 2 GHz ~ 25 GHz


```
                                    RBW 100 kHz   Marker 1 [T1 ]
                                    VBW 300 kHz          -28.06 dBm
        Ref  20 dBm        Att  20 dB   SWT 2.3 s      21.918000000 GHz
    20 Offset  24 9 dB                                                    A
    -10
                                                                        LVL
  1 PR    D1 2.63 dBm
  VIEW
    -10
            D2 -17.37 dBm
    -20
                                                              1
    -30                                                                 3DB
    -40
    -50
    -60
    -70
    -80
    Start 2 GHz              2.3 GHz/              Stop 25 GHz
```
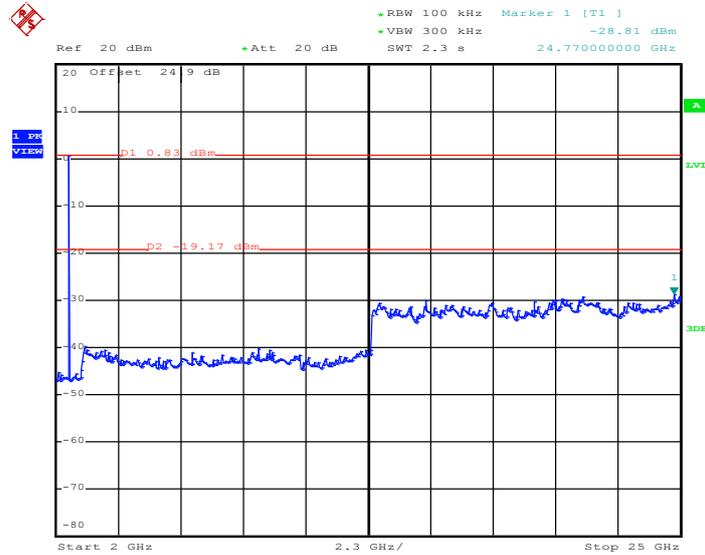
Date: 24.FEB.2015 23:17:23

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 39 between 30MHz ~ 3 GHz
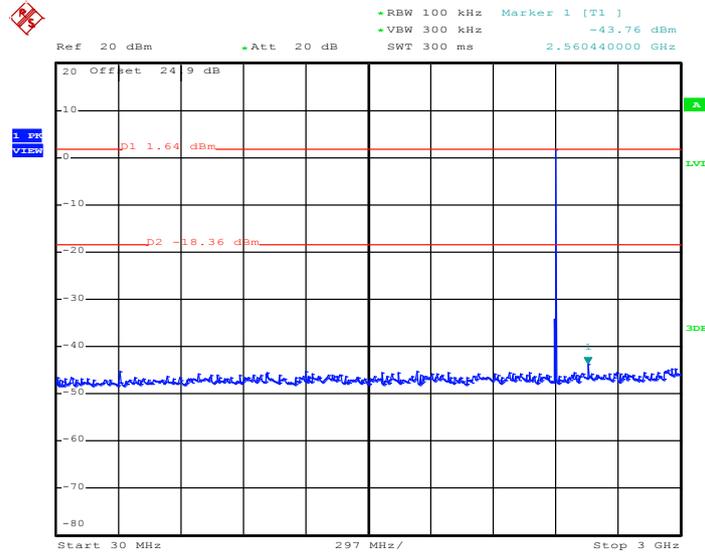

Date: 24.FEB.2015 23:10:59

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3Mbps CSE Plot on Ch 39 between 2 GHz ~ 25 GHz


```
                                          ♦RBW 100 kHz   Marker 1 [T1 ]
                                          ♦VBW 300 kHz        -29.21 dBm
          Ref  20 dBm        ♦Att  20 dB  SWT 2.3 s      21.366000000 GHz
    20 Offset   24 9 dB
  -10
1 PK        D1 4.17 dBm
VIEW -0
  -10
            D2 -15.83 dBm
  -20
  -30                                          1
  -40
  -50
  -60
  -70
  -80
    Start 2 GHz              2.3 GHz/              Stop 25 GHz
```
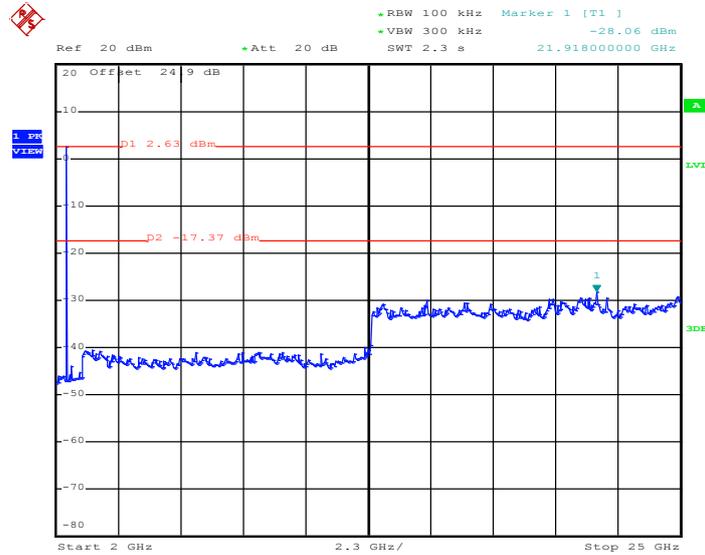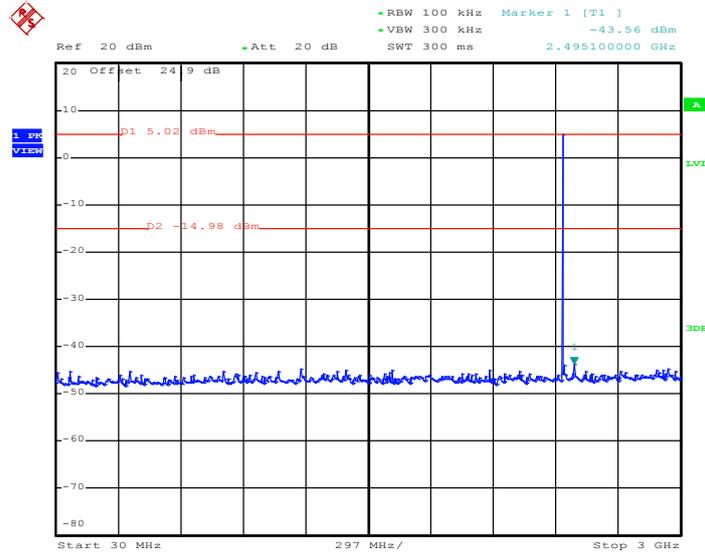
Date: 24.FEB.2015 23:11:21

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.
2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	48~51%
		Test Engineer :	Osolemio Chang

3Mbps CSE Plot on Ch 78 between 30MHz ~ 3 GHz


```
                                      ◆RBW 100 kHz   Marker 1 [T1 ]
                                      ▼VBW 300 kHz           -44.02 dBm
         Ref  20 dBm       ◆Att  20 dB   SWT 300 ms       2.851500000 GHz

     20  Offset   24 9 dB                                              A
   -10
         D1 4.26 dBm                                                  LVL
    0
   -10
         D2 -15.74 dBm
   -20
   -30
   -40                                                                3DB
   -50
   -60
   -70
   -80
     Start 30 MHz              297 MHz/              Stop 3 GHz
```
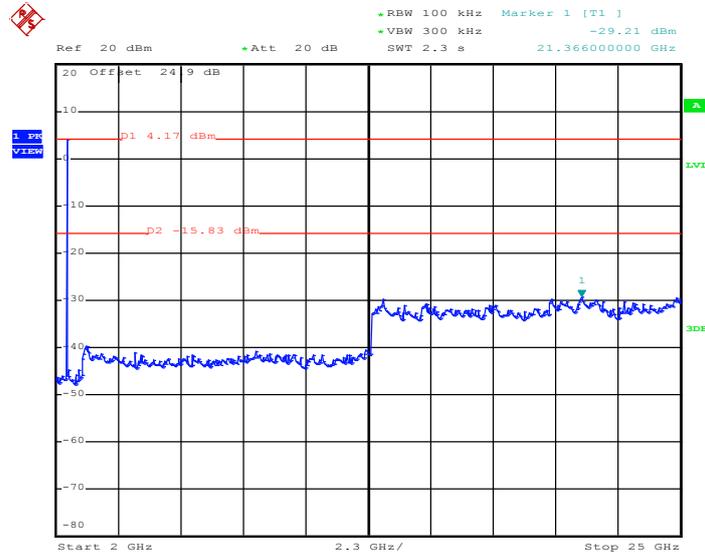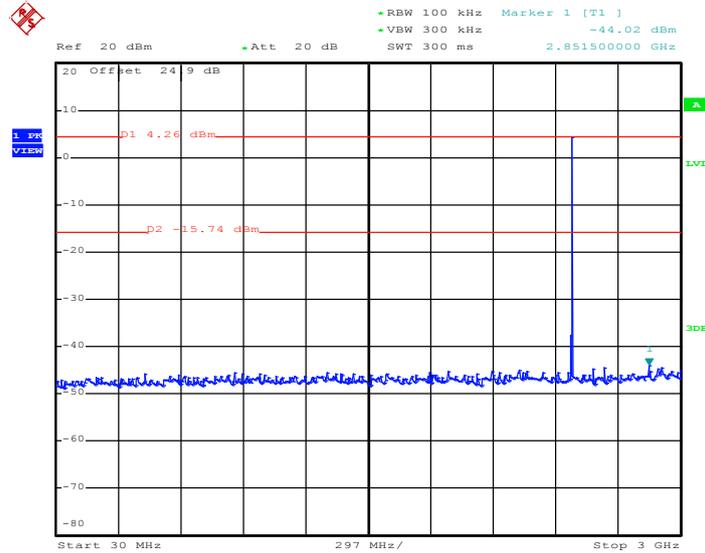
Date: 24.FEB.2015 23:13:43

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3Mbps CSE Plot on Ch 78 between 2 GHz ~ 25 GHz


```
                                    RBW 100 kHz   Marker 1 [T1 ]
                                    VBW 300 kHz          -28.78 dBm
        Ref  20 dBm        Att  20 dB   SWT 2.3 s      24.816000000 GHz
    20  Offset  24 9 dB
                                                                      A
    10
1 PR   D1 5.49 dBm
VIEW  0                                                               LVL

   -10
   -20   D2 -14.51 dBm

   -30                                                                1
                                                                      3DB
   -40

   -50

   -60

   -70

   -80
      Start 2 GHz             2.3 GHz/            Stop 25 GHz
```
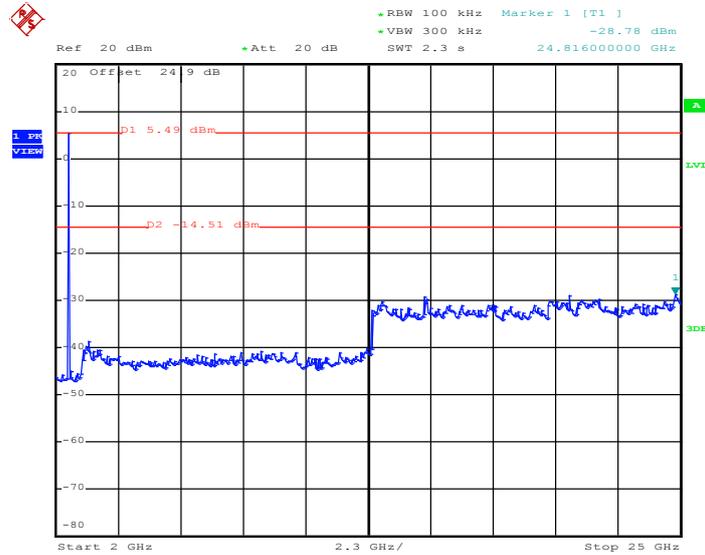
Date: 24.FEB.2015 23:14:05

Note:

1. The total loss is 24.9 dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer offset.

2. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1   Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.8.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

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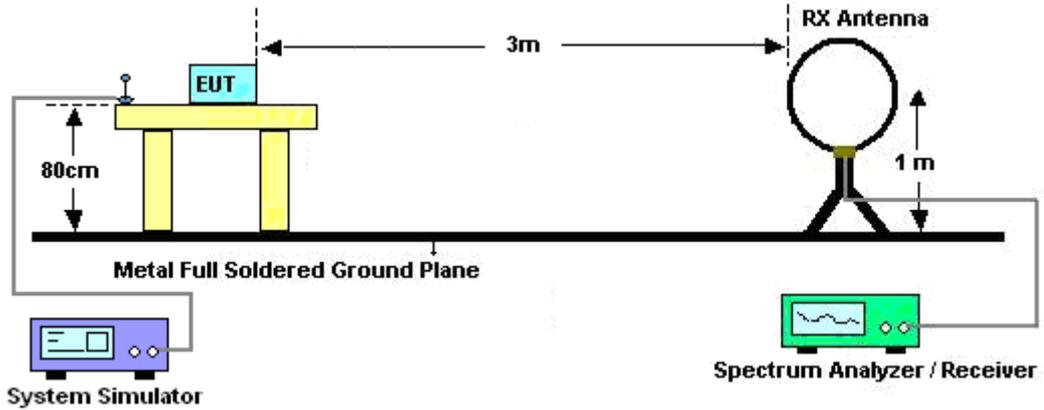Report Template No.: BU5-FR15CBT Version 1.0

3.8.3   Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.

2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Use the following spectrum analyzer settings:

    (1) Span shall wide enough to fully capture the emission being measured;

    (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak

    (3) For average measurement: use duty cycle correction factor method per 15.35(c).

    Duty cycle = On time/100 milliseconds

    On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$

    Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.

    Average Emission Level = Peak Emission Level + 20*log(Duty cycle)

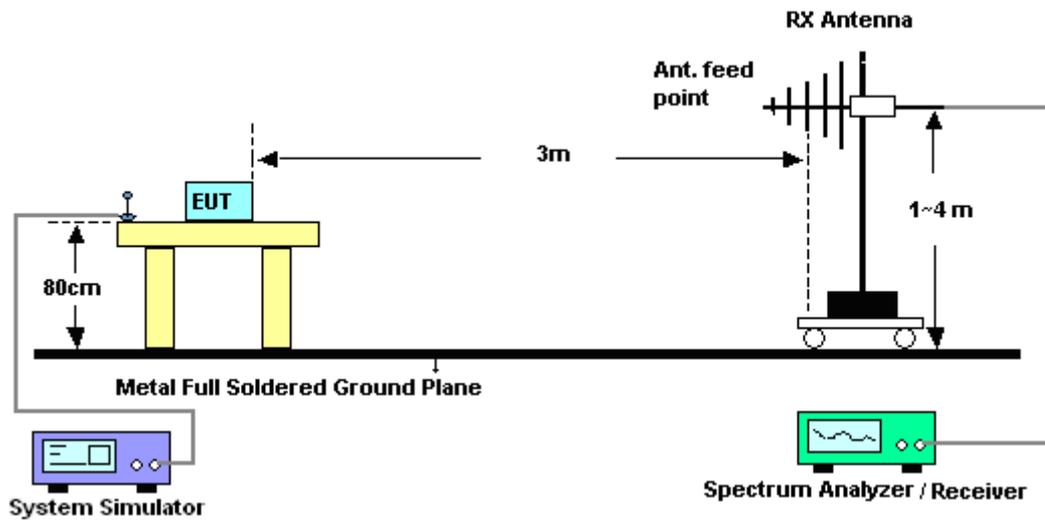7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.76dB for 1Mbps, -24.76dB for 2Mbps, and -24.76dB for 3Mbps) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.8.4 Test Setup

For radiated emissions below 30MHz

For radiated emissions from 30MHz to 1GHz

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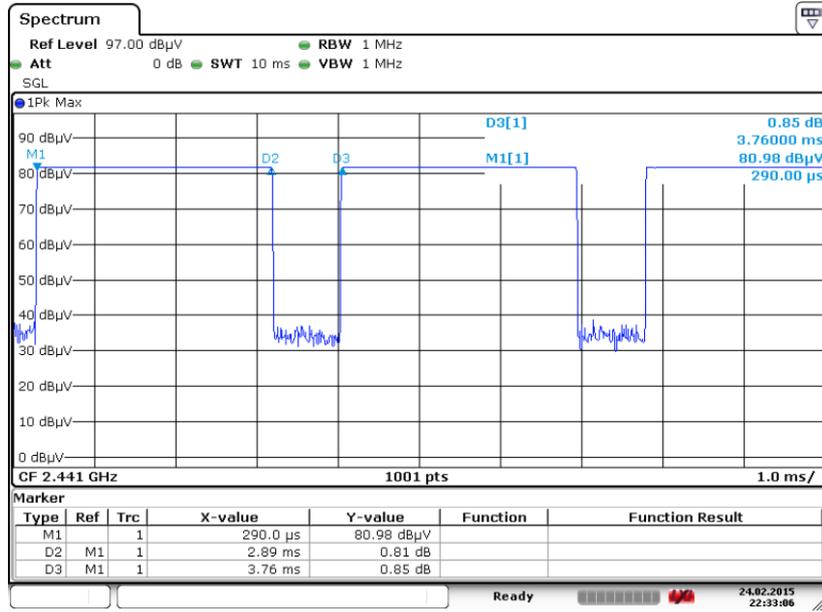
For radiated emissions above 1GHz
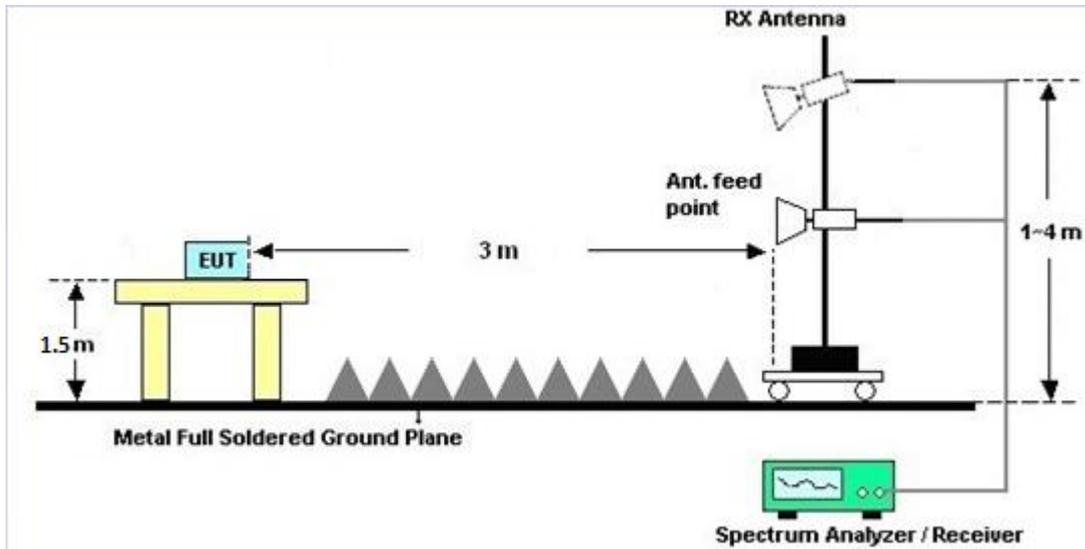
3.8.5   Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.8.6   Duty cycle correction factor for average measurement

DH5 on time (One Pulse) Plot on Channel 39

Date: 24.FEB.2015 22:33:05

DH5 on time (Count Pulses) Plot on Channel 39
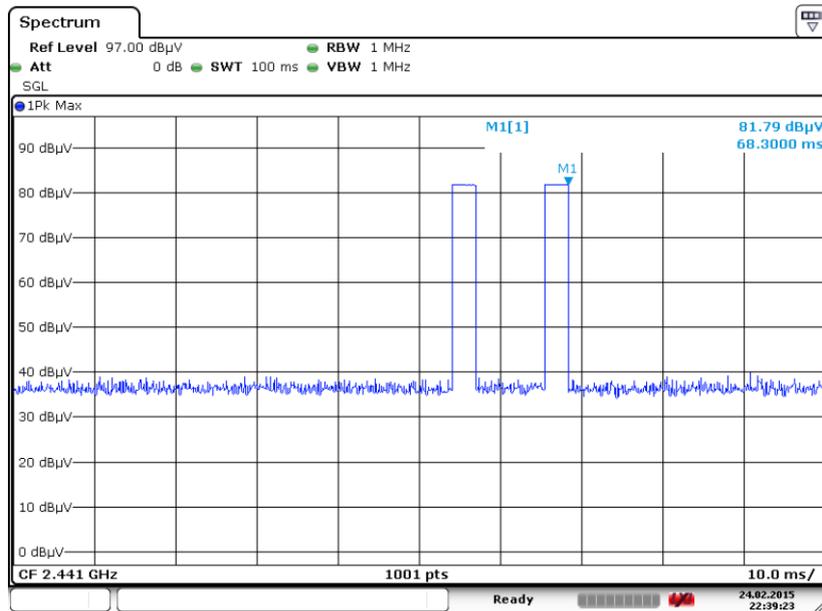
Date: 24.FEB.2015 22:39:23

Note:

1.   Worst case Duty cycle = on time/100 milliseconds = 2 * 2.89 / 100 = 5.78 %

2.   Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.76 dB

3.   DH5 has the highest duty cycle worst case and is reported.

2DH5 on time (One Pulse) Plot on Channel 39

Date: 24.FEB.2015 22:58:15

DH5 on time (Count Pulses) Plot on Channel 39

Date: 24.FEB.2015 23:03:26

Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.89 / 100 = 5.78 %

2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.76 dB

3. 2DH5 has the highest duty cycle worst case and is reported.

3DH5 on time (One Pulse) Plot on Channel 39

Date: 24.FEB.2015 23:29:09
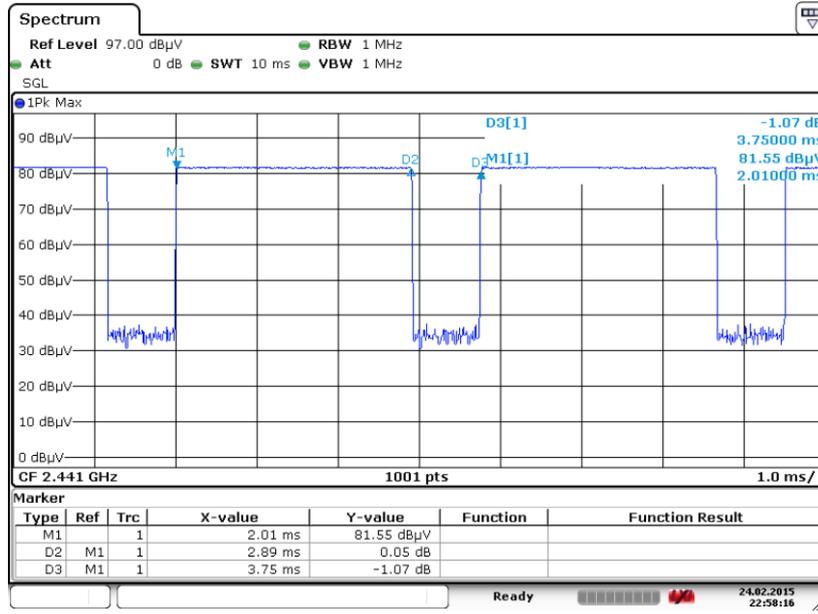
DH5 on time (Count Pulses) Plot on Channel 39
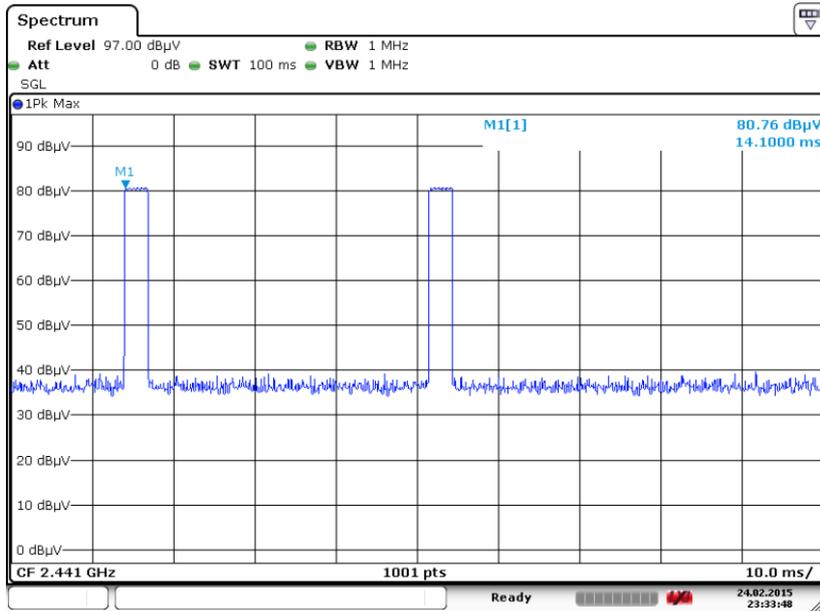
Date: 24.FEB.2015 23:33:48

Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.89 / 100 = 5.78 %

2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.76 dB

3. 3DH5 has the highest duty cycle worst case and is reported.

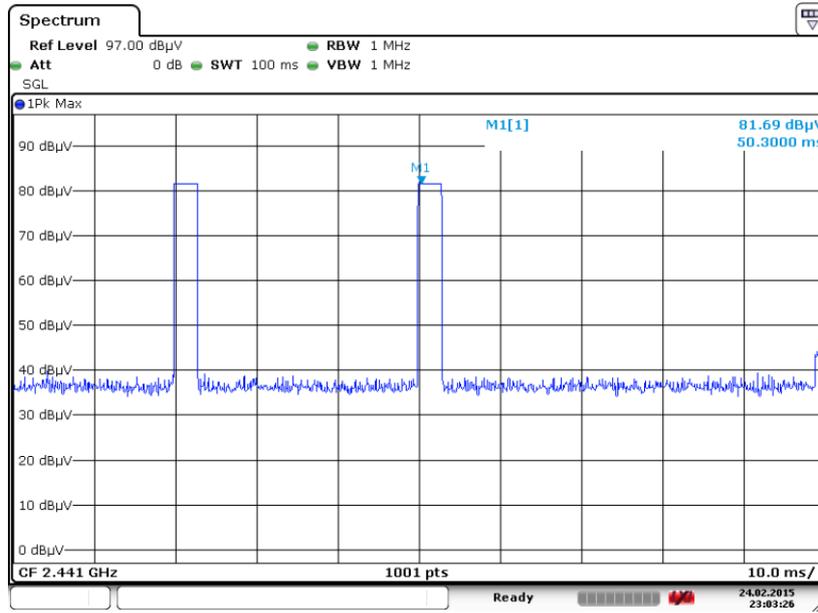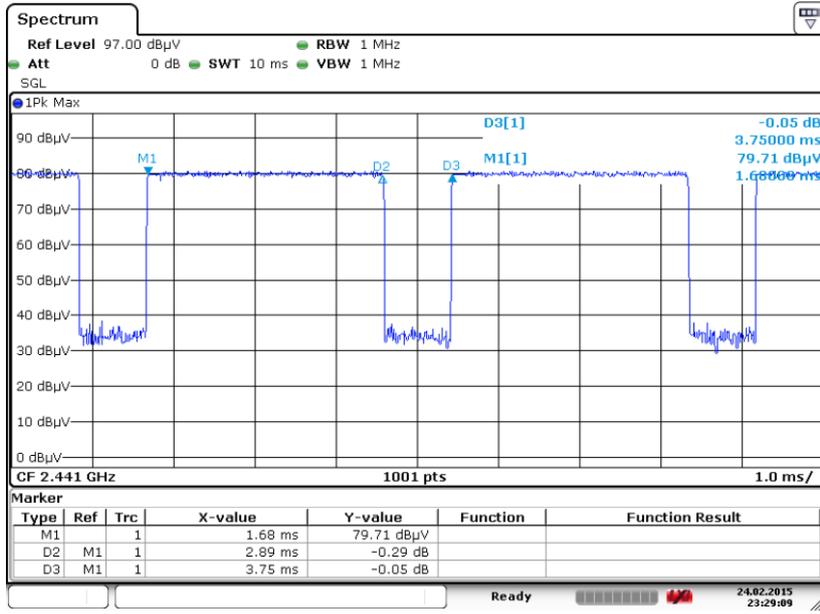**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

2.89 ms x 20 channels = 57.8 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100ms / 57.6ms] = 2 hops

Thus, the maximum possible ON time:

2.89 ms x 2 = 5.78 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.78 ms/100ms) = -24.76 dB

3.8.7   Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

3.8.8   Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix A.

3.9 AC Conducted Emission Measurement

3.9.1   Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	**Average**
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.9.2   Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.9.3   Test Procedures

1.   The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2.   Connect EUT to the power mains through a line impedance stabilization network (LISN).
3.   All the support units are connecting to the other LISN.
4.   The LISN provides 50 ohm coupling impedance for the measuring instrument.
5.   The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6.   Both sides of AC line were checked for maximum conducted interference.
7.   The frequency range from 150 kHz to 30 MHz was searched.
8.   Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.4   Test Setup

Non-conductive table

Rear of EUT to be flushed
with rear of table top

EUT

Receiver

50Ω RF Cable

80cm

80 cm to
ground
plane

3b)

AMN
(LISN)

2

Bonded to horizontal
ground plane

40 cm to vertical
reference plane

3c)

AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

System Simulator
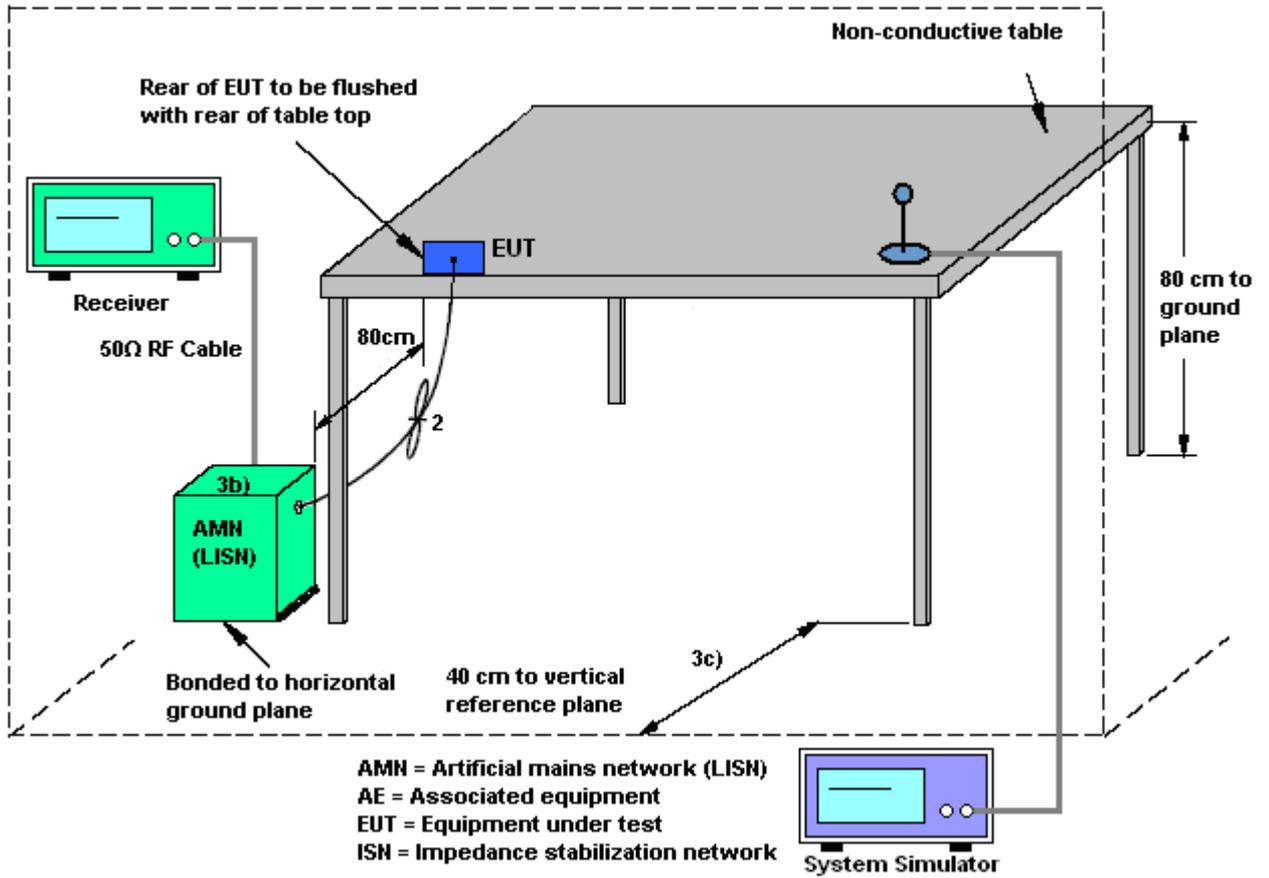
3.9.5　Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link with Phone + MP3 + USB Cable 1 (Charging from Adapter) for Sample 1		
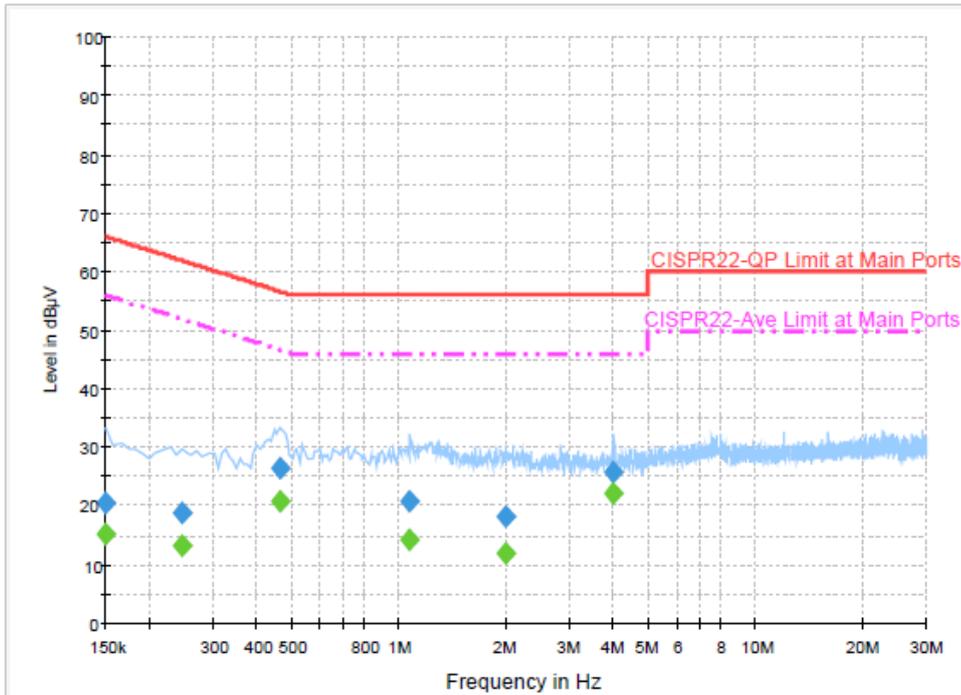
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	20.4	Off	L1	19.5	45.6	66.0
0.246000	18.7	Off	L1	19.4	43.2	61.9
0.462000	26.5	Off	L1	19.5	30.2	56.7
1.070000	20.6	Off	L1	19.5	35.4	56.0
1.990000	18.1	Off	L1	19.6	37.9	56.0
3.998000	25.7	Off	L1	19.7	30.3	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	15.2	Off	L1	19.5	40.8	56.0
0.246000	13.3	Off	L1	19.4	38.6	51.9
0.462000	20.8	Off	L1	19.5	25.9	46.7
1.070000	14.0	Off	L1	19.5	32.0	46.0
1.990000	12.0	Off	L1	19.6	34.0	46.0
3.998000	22.0	Off	L1	19.7	24.0	46.0

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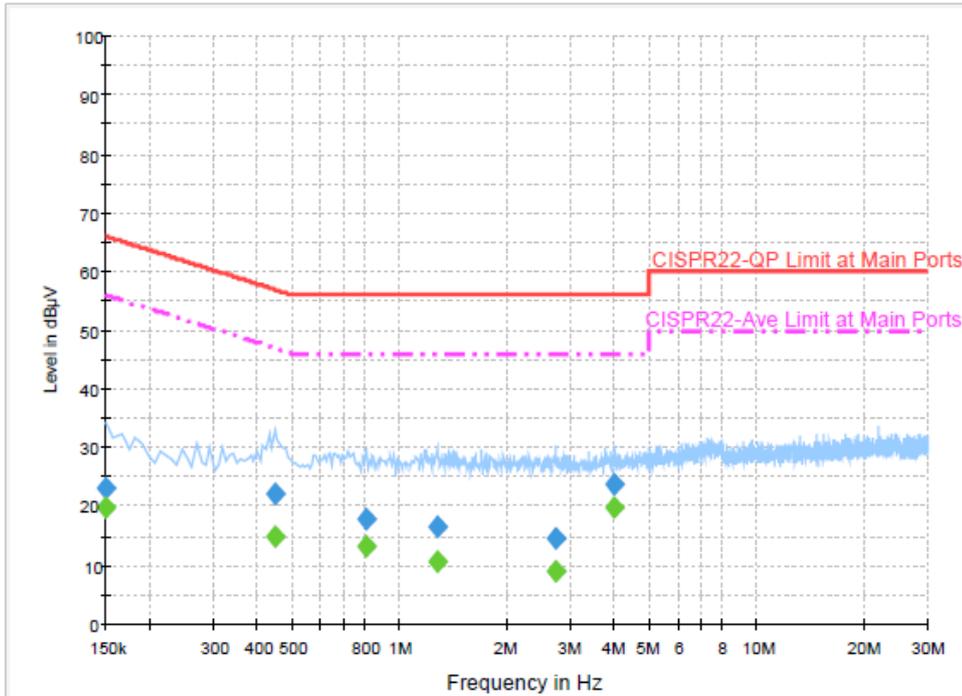| Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link with Phone + MP3 + USB Cable 1 (Charging from Adapter) for Sample 1		

Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	23.0	Off	N	19.5	43.0	66.0
0.446000	22.2	Off	N	19.5	34.7	56.9
0.806000	17.9	Off	N	19.6	38.1	56.0
1.270000	16.5	Off	N	19.6	39.5	56.0
2.726000	14.4	Off	N	19.6	41.6	56.0
3.998000	23.8	Off	N	19.6	32.2	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	19.8	Off	N	19.5	36.2	56.0
0.446000	14.9	Off	N	19.5	32.0	46.9
0.806000	13.1	Off	N	19.6	32.9	46.0
1.270000	10.7	Off	N	19.6	35.3	46.0
2.726000	8.8	Off	N	19.6	37.2	46.0
3.998000	19.7	Off	N	19.6	26.3	46.0

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3.10 Antenna Requirements

3.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4   List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Feb. 24, 2015	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	300MHz~40GHz	Jan. 14, 2015	Feb. 24, 2015	Jan. 13, 2016	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	300MHz~40GHz	Jan. 14, 2015	Feb. 24, 2015	Jan. 13, 2016	Conducted (TH02-HY)
Hygrometer	Testo	608-H1	34897199	N/A	May 06, 2014	Feb. 24, 2015	May 05, 2015	Conducted (TH02-HY)
RF cable	WOKEN	S05	S05-130708-038	N/A	Jan. 21 2015	Feb. 24, 2015	Jan. 20 2016	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9 kHz~7 GHz	Aug. 30, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Aug. 29, 2015	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV 30	100895	9kHz~30GHz	Apr. 11, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Apr. 10, 2015	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Jul. 27, 2015	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Sep. 26, 2015	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Aug. 18, 2015	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 251	18GHz~40GHz	Oct. 02, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Oct. 01, 2015	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 17, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Mar. 16, 2015	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Oct. 21, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Oct. 20, 2015	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	DC~18 GHz	Jul. 07, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Jul. 06, 2015	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	DC~18 GHz	Apr. 21, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Apr. 20, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Feb. 24, 2015 ~ Feb. 25, 2015	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Feb. 24, 2015 ~ Feb. 25, 2015	N/A	Radiation (03CH07-HY)
Hygrometer	Testo	608-H1	34897197	N/A	May 06, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	May 05, 2015	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY84209521	1GHz~40GHz	Dec. 04, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Dec. 03, 2015	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY84209521	9KHz~1GHz	Dec. 04, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Dec. 03, 2015	Radiation (03CH07-HY)
Test Software	Audix	E3 V6.0	N/A	N/A	N/A	Feb. 24, 2015 ~ Feb. 25, 2015	N/A	Radiation (03CH07-HY)
Low Pass Filter	Wainwright Instruments Gmbh	WLKS1200-8SS	SN3	1.2G LPF	Oct. 01, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Sep. 30, 2015	Radiation (03CH07-HY)
High Pass Filter	Microwave Circuits	H3G018G1	SN477220	3G HPF	Oct. 01, 2014	Feb. 24, 2015 ~ Feb. 25, 2015	Sep. 30, 2015	Radiation (03CH07-HY)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Dec. 01, 2014	Feb. 24, 2015	Nov. 30, 2015	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 08, 2014	Feb. 24, 2015	Dec. 07, 2015	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 02, 2014	Feb. 24, 2015	Dec. 01, 2015	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Feb. 24, 2015	N/A	Conduction (CO05-HY)
Test Software	N/A	EMC32	8.40.0	N/A	N/A	Feb. 24, 2015	N/A	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Apr. 23, 2014	Feb. 24, 2015	Apr. 22, 2015	Conduction (CO05-HY)
LF Cable	Shuner	RG-402	N/A	N/A	Oct. 07, 2014	Feb. 24, 2015	Oct. 06, 2015	Conduction (CO05-HY)

Note: Test equipment calibration is traceable to the procedure of ISO17025.

5   Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.26

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.50