

FCC RF Test Report

APPLICANT : NEC CASIO Mobile Communications, Ltd.
EQUIPMENT : GSM/EGPRS/WCDMA/LTE Mobile Phone
BRAND NAME : NEC
MODEL NAME : NE-201A1A
MARKETING NAME : KMP7R4AE1-1AB
FCC ID : A98-RSZ3446
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

The product was received on Oct. 31, 2012 and completely tested on Dec. 03, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : A98-RSZ3446

Page Number : 1 of 60

Report Issued Date : Dec. 25, 2012

Report Version : Rev. 01



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR2O3103B	Rev. 01	Initial issue of report	Dec. 25, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	$\geq 15\text{Chs}$	Pass	-
3.2	15.247(a)(1)	A8.1(b)	Hopping Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.3	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.4	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 1\text{ w}$ for 1Mbps $\leq 125\text{ Mw}$ for 2, 3Mbps	Pass	-
3.6	15.247(d)	A8.5	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.247(d)	A8.5	Conducted Spurious Emission	$\leq 20\text{dBc}$	Pass	-
3.8	15.247(d)	A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.85 dB at 355.300 MHz for Quasi-Peak
3.9	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 7.20 dB at 13.558 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

NEC CASIO Mobile Communications, Ltd.

31Fl., Tamagawa Renaissance City Tower N, 1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa
211-8666 Japan 2

1.2 Manufacturer

Arima Communications Corp.

6F., No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	GSM/EGPRS/WCDMA/LTE Mobile Phone
Brand Name	NEC
Model Name	NE-201A1A
Marketing Name	KMP7R4AE1-1AB
FCC ID	A98-RSZ3446
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/ WLAN 11bgn / Bluetooth / NFC
HW Version	EP2
SW Version	3.0.8
EUT Stage	Identical Prototype

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

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 (1Mbps) : 1.80 dBm (0.0015 W) Bluetooth EDR (2Mbps) : 2.55 dBm (0.0018 W) Bluetooth EDR (3Mbps) : 2.93 dBm (0.0020 W)
Antenna Type	Chip Antenna type with gain 1.40 dBi
Type of Modulation	Bluetooth 4.0 : GFSK Bluetooth (1Mbps) : GFSK Bluetooth 2.1 EDR (2Mbps) : π /4-DQPSK Bluetooth 2.1 EDR (3Mbps) : 8-DPSK Bluetooth 3.0 EDR : GFSK, π /4-DQPSK, 8-DPSK

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.			
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH02-HY	CO05-HY	03CH07-HY	722060/4086B-1

1.5 Applied 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 C63.4-2003 and ANSI C63.10-2009
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 3

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

Preliminary tests were performed in different data rate 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	1.80 dBm	2.55 dBm	2.93 dBm
Ch39	2441MHz	1.75 dBm	2.47 dBm	2.86 dBm
Ch78	2480MHz	1.46 dBm	2.25 dBm	2.61 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 3Mbps for all the test items due to the highest RF output power.
3. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and ANSI C63.10-2009 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).

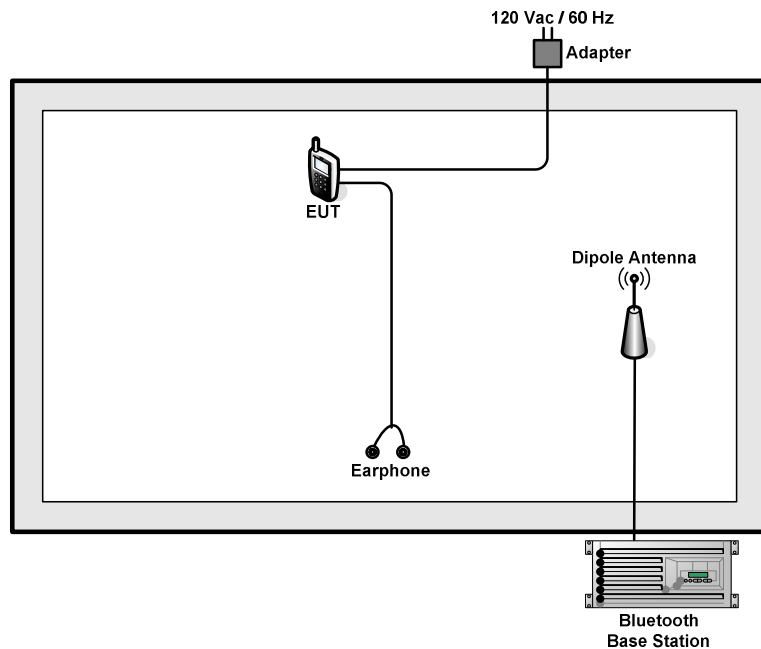
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases (X plane) and recorded in this report.

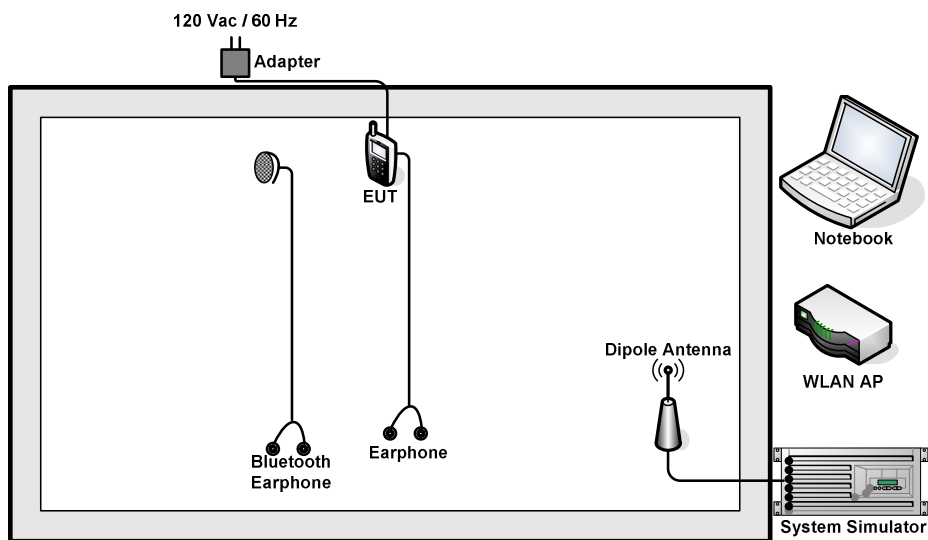
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	Pretest	Pretest	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :GSM1900 Idle + Bluetooth Link + WLAN Link + RFID On + Earphone + Battery + USB Cable (Charging from Adapter)		
Remark: For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, "Command" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for continuous transmitting and receiving signals.

2.5 Measurement Results Explanation Example

For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and 10dB attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and 10dB attenuator factor.

Offset = RF cable loss + attenuator factor.

Following table shows an offset computation example with cable loss 14.2 dB.

Example :

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

$$= 14.2 + 10 = 24.2 \text{ (dB)}$$

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.

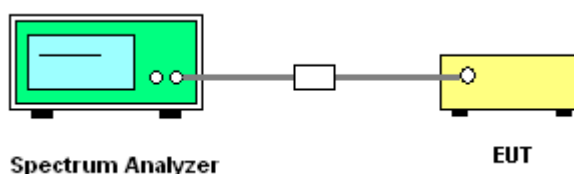
3.1.2 Measuring Instruments

See list of measuring instruments 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.

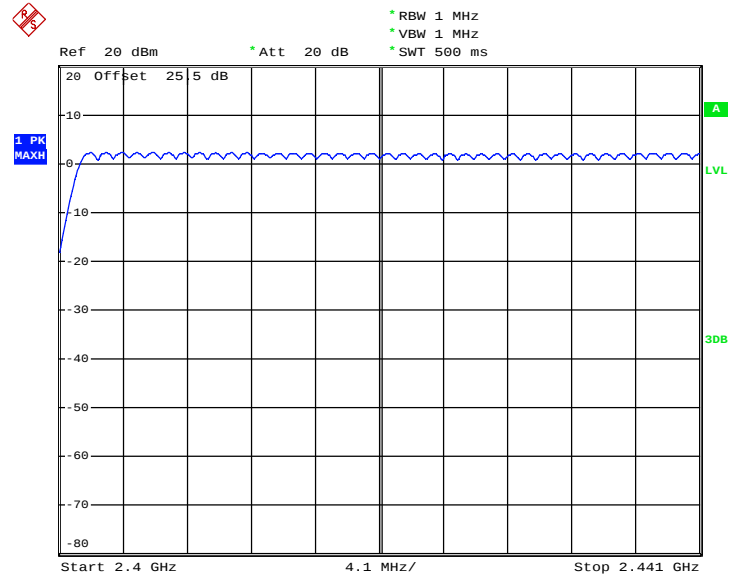
3.1.4 Test Setup



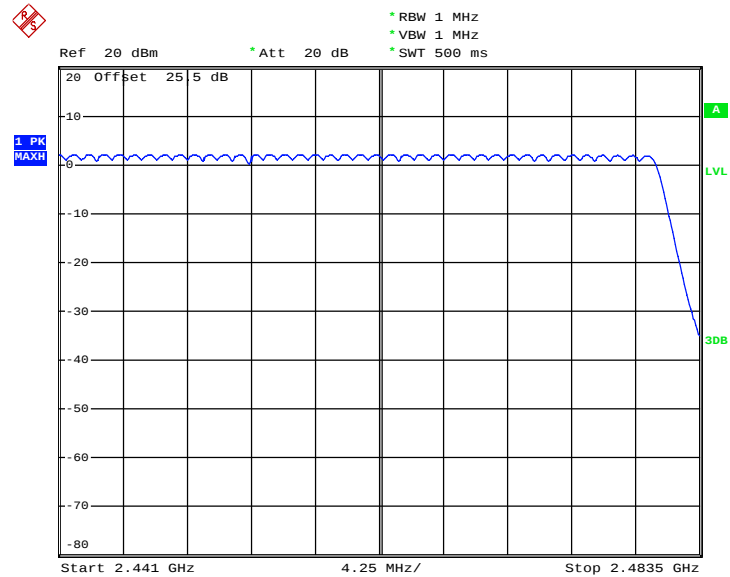
3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%
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: 16.NOV.2012 16:34:19



Date: 16.NOV.2012 16:37:49

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.

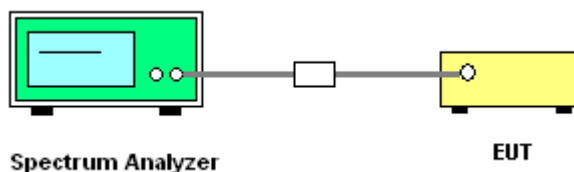
3.2.2 Measuring Instruments

See list of measuring instruments 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

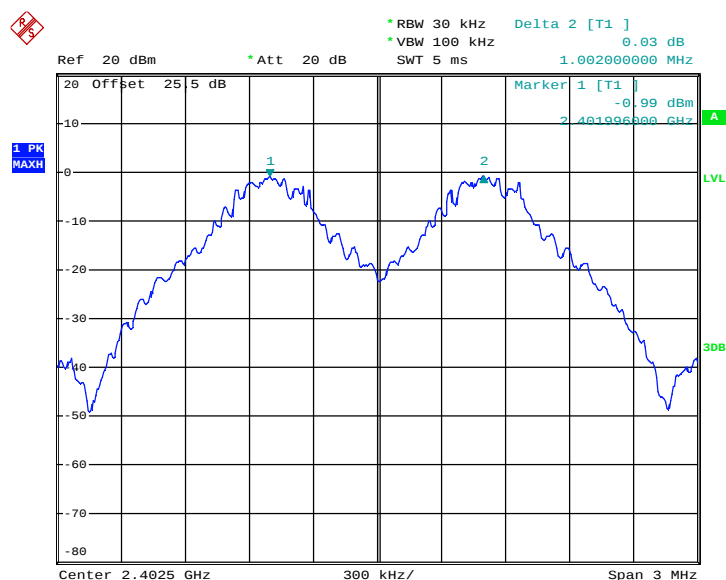


3.2.5 Test Result of Hopping Channel Separation

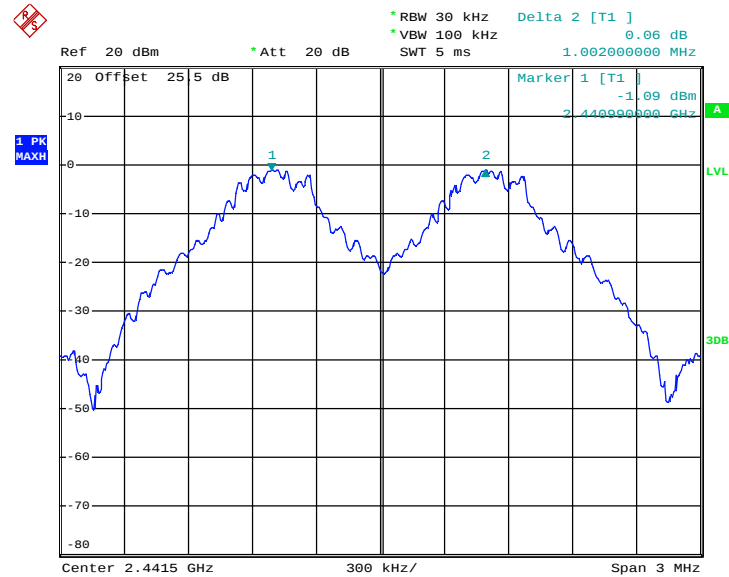
Test Mode :	1Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.6400	Pass
39	2441	1.002	0.6400	Pass
78	2480	1.002	0.6427	Pass

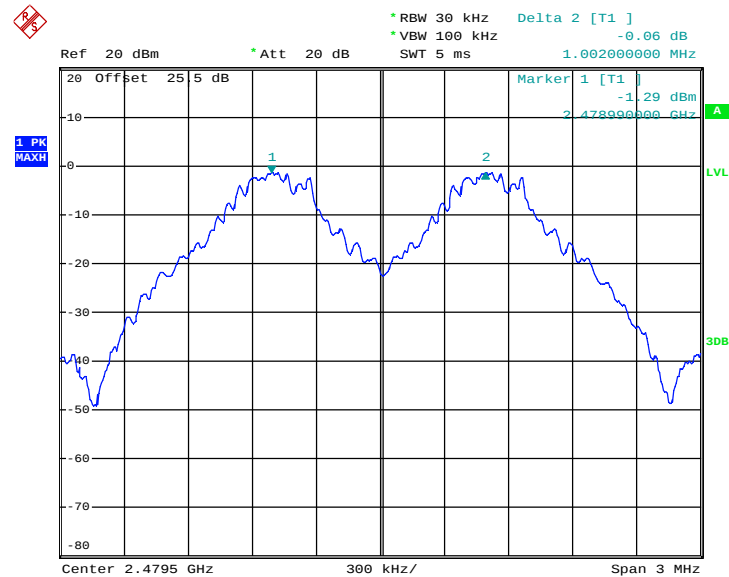
Channel Separation Plot on Channel 00 - 01



Date: 16.NOV.2012 15:16:53

Channel Separation Plot on Channel 39 - 40


Date: 16.NOV.2012 15:19:06

Channel Separation Plot on Channel 77 - 78


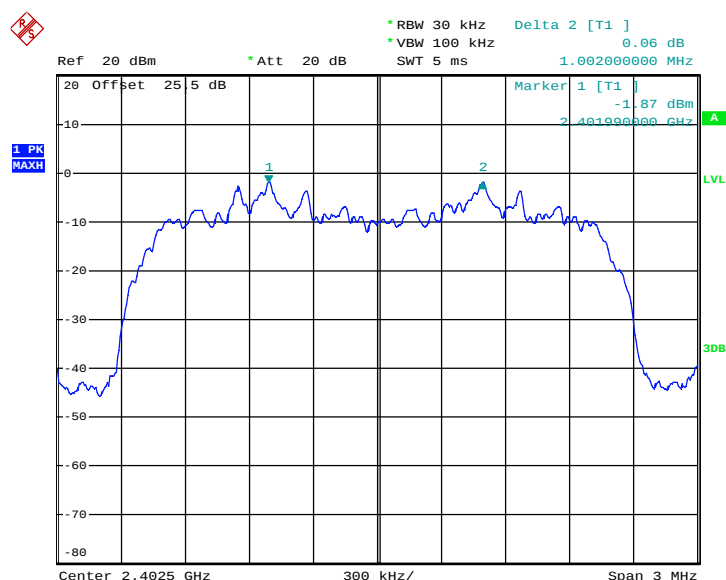
Date: 16.NOV.2012 15:19:45



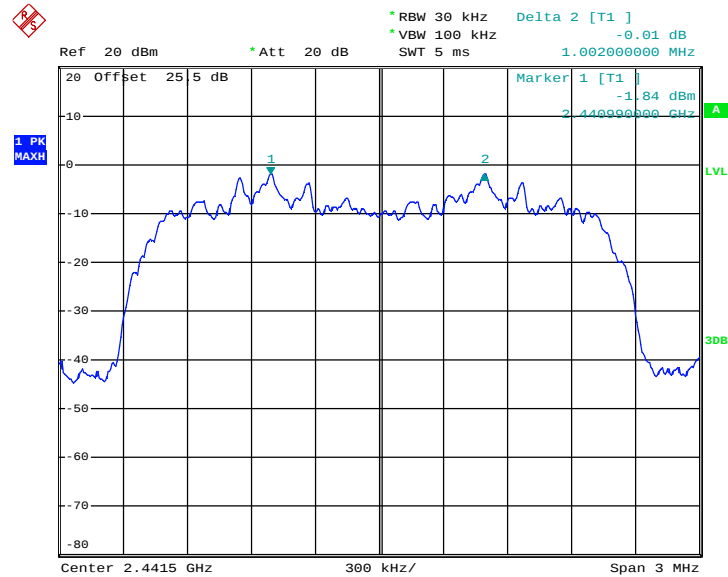
Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8600	Pass
39	2441	1.002	0.8600	Pass
78	2480	1.002	0.8600	Pass

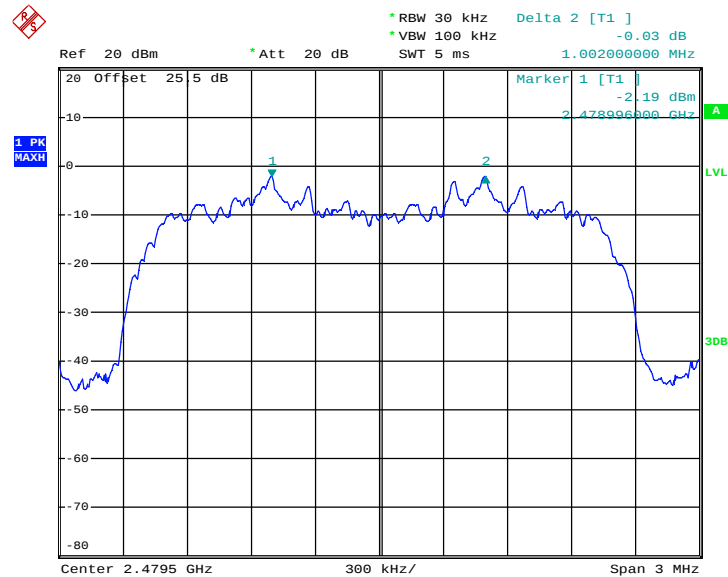
Channel Separation Plot on Channel 00 - 01



Date: 16.NOV.2012 15:21:48

Channel Separation Plot on Channel 39 - 40


Date: 16.NOV.2012 15:28:03

Channel Separation Plot on Channel 77 - 78


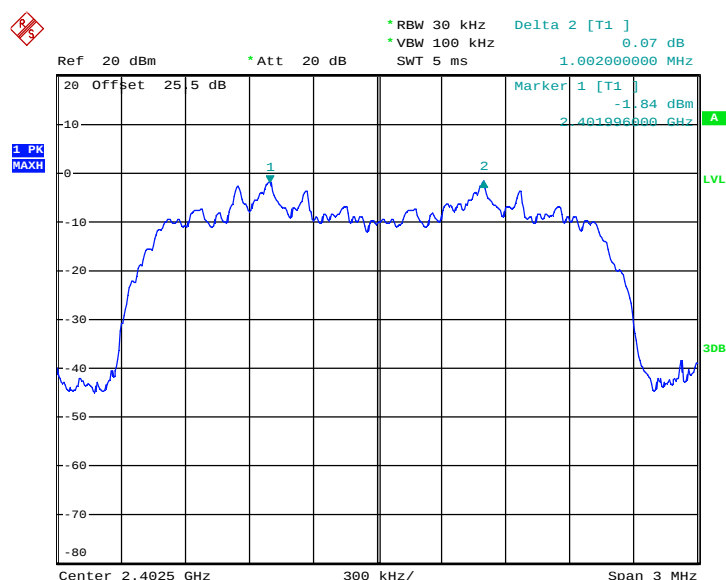
Date: 16.NOV.2012 15:31:57



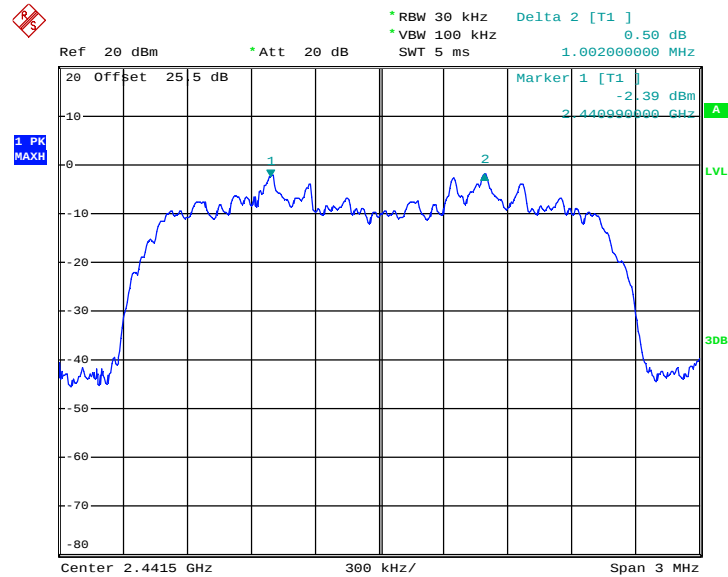
Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8680	Pass
39	2441	1.002	0.8680	Pass
78	2480	1.002	0.8680	Pass

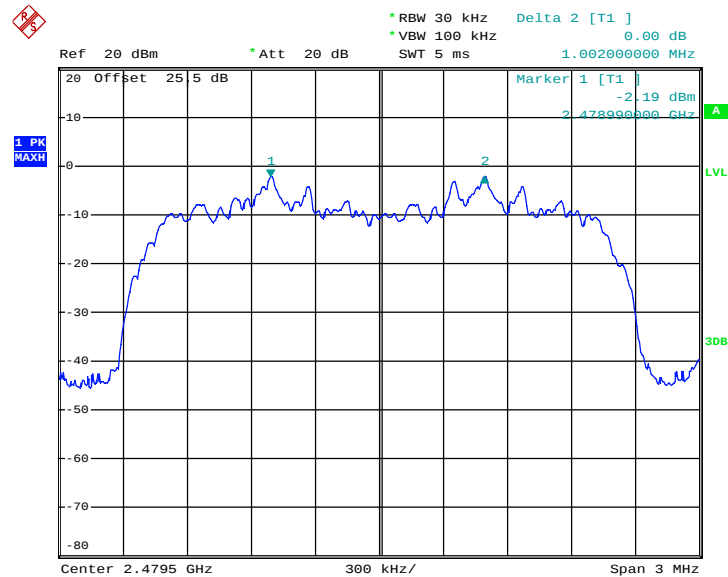
Channel Separation Plot on Channel 00 - 01



Date: 16.NOV.2012 15:33:41

Channel Separation Plot on Channel 39 - 40


Date: 16.NOV.2012 15:36:34

Channel Separation Plot on Channel 77 - 78


Date: 16.NOV.2012 15:38:47

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.

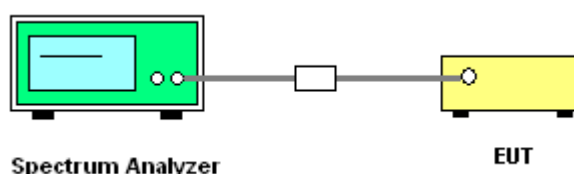
3.3.2 Measuring Instruments

See list of measuring instruments 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



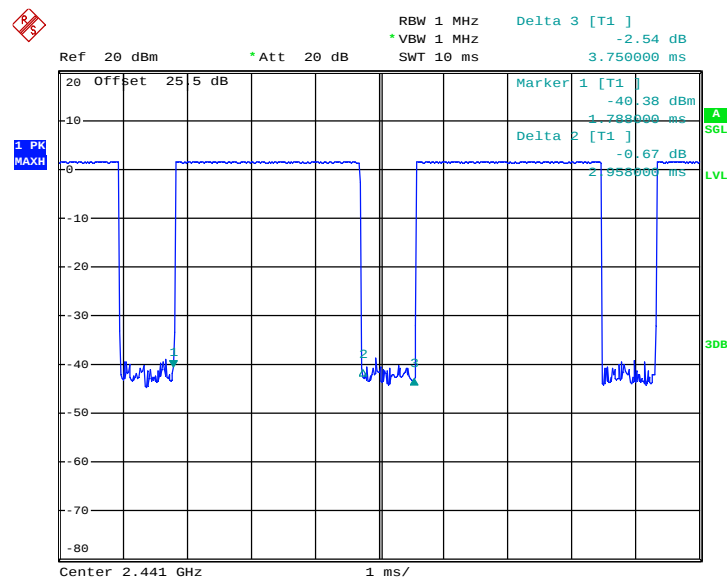
3.3.5 Test Result of Dwell Time

Test Mode :	DH5	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Mode	Hopping Channel Number	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Normal	79	106.67	2.958	0.32	0.4	Pass
AFH	20	53.34	2.958	0.16	0.4	Pass

Remark:

1. In normal mode, hopping rate is 1600hops/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 800hops/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) = 53.34 hops.
3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

Package Transfer Time Plot


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3.4 20dB Bandwidth Measurement

3.4.1 Limit of 20dB Bandwidth

Reporting only

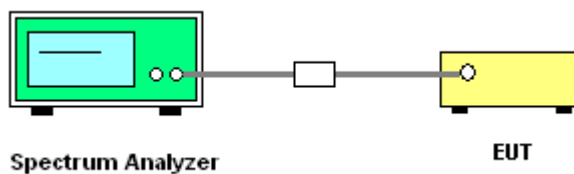
3.4.2 Measuring Instruments

See list of measuring instruments 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. Measure and record the results in the test report.

3.4.4 Test Setup

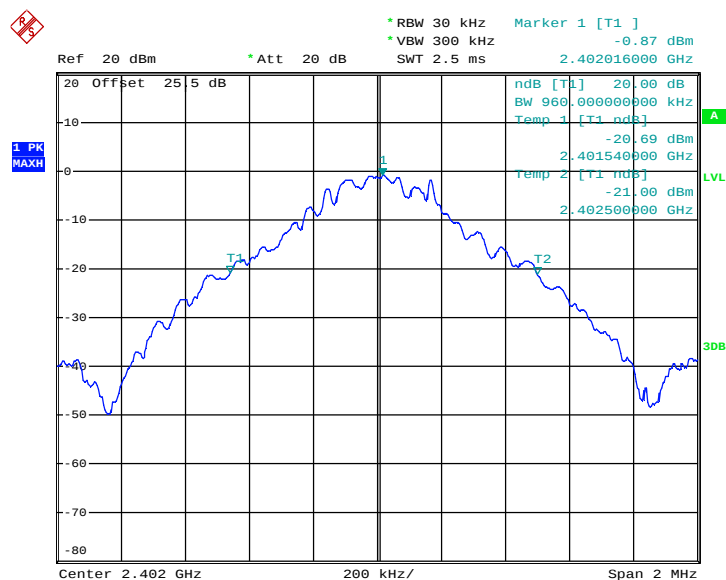


3.4.5 Test Result of 20dB Bandwidth

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.960
39	2441	0.960
78	2480	0.964

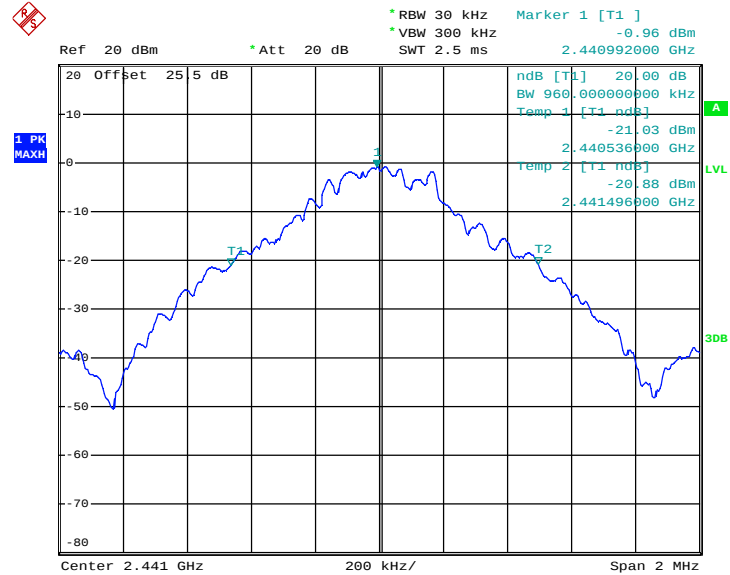
20 dB Bandwidth Plot on Channel 00



Date: 16.NOV.2012 15:56:21

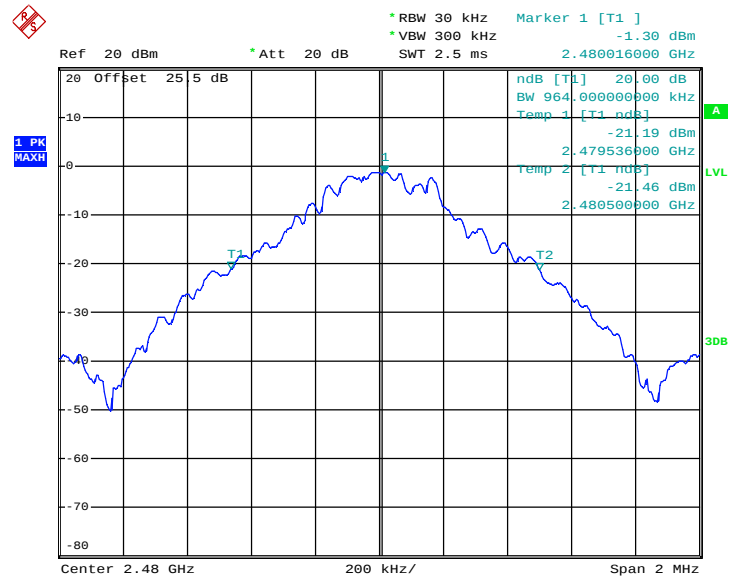


20 dB Bandwidth Plot on Channel 39



Date: 16.NOV.2012 15:56:42

20 dB Bandwidth Plot on Channel 78



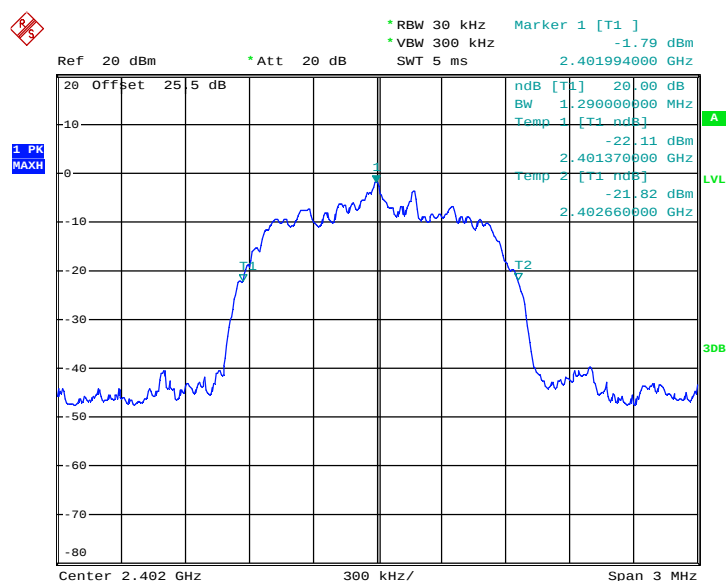
Date: 16.NOV.2012 15:57:03



Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

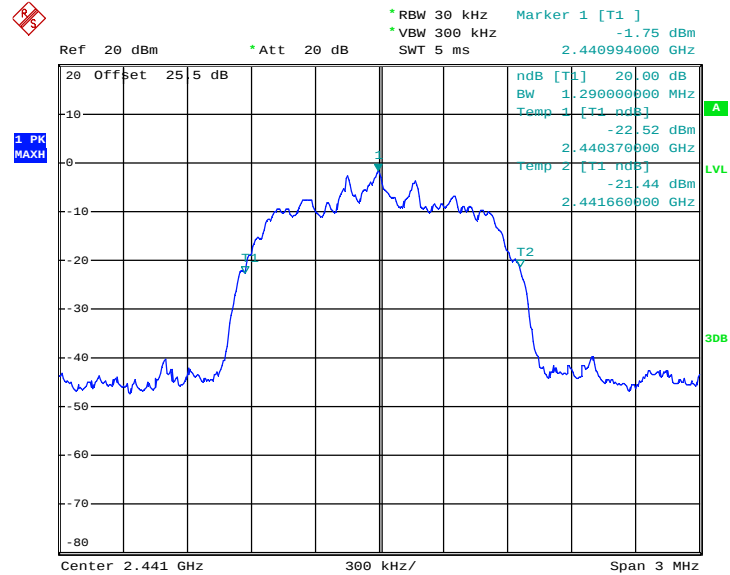
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.290
39	2441	1.290
78	2480	1.290

20 dB Bandwidth Plot on Channel 00



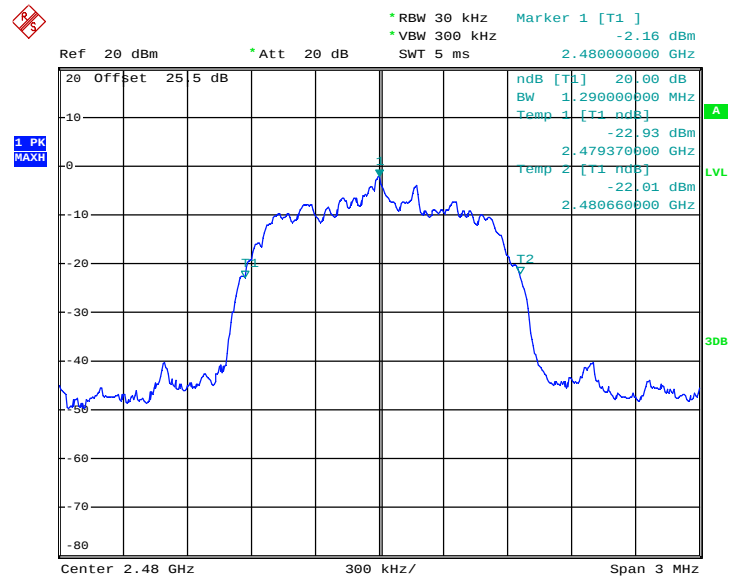
Date: 16.NOV.2012 15:57:23

20 dB Bandwidth Plot on Channel 39



Date: 16.NOV.2012 15:58:13

20 dB Bandwidth Plot on Channel 78



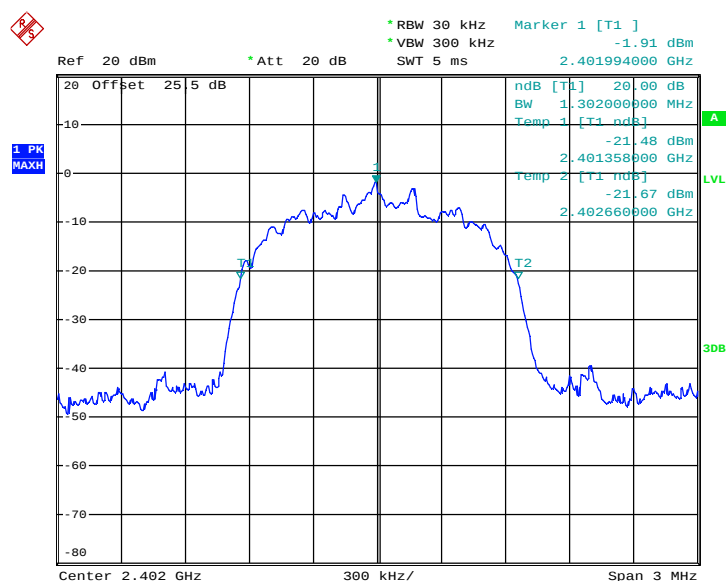
Date: 16.NOV.2012 15:58:31



Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.302
39	2441	1.302
78	2480	1.302

20 dB Bandwidth Plot on Channel 00



Date: 16.NOV.2012 15:58:45



1 PK MAX

Ref 20 dBm Att 20 dB RBW 30 kHz VBW 300 kHz SWT 5 ms

Marker 1 [T1] -1.83 dBm 2.440994000 GHz

ndB [T1] 20.00 dB BW 1.302000000 MHz Temp 1 [T1 ndB] -21.13 dBm 2.440358000 GHz Temp 2 [T1 ndB] -21.86 dBm 2.441660000 GHz

Center 2.441 GHz 300 kHz/ Span 3 MHz

Date: 16.NOV.2012 15:59:15

Ref 20 dBm Att 20 dB RBW 30 kHz VBW 300 kHz SWT 5 ms Marker 1 [T1] -2.18 dBm 2.480000000 GHz

20 Offset 25.5 dB

1 PK MAX

ndB [T1] 20.00 dB
BW 1.302000000 MHz
Temp 1 [T1 ndB] -22.11 dBm
2.479358000 GHz
Temp 2 [T1 ndB] -22.69 dBm
2.480660000 GHz

Center 2.48 GHz 300 kHz/ Span 3 MHz

Date: 16.NOV.2012 15:59:34

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, and 3Mbps are 0.125 watts.

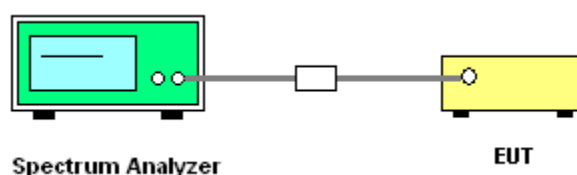
3.5.2 Measuring Instruments

See list of measuring instruments 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 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. 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

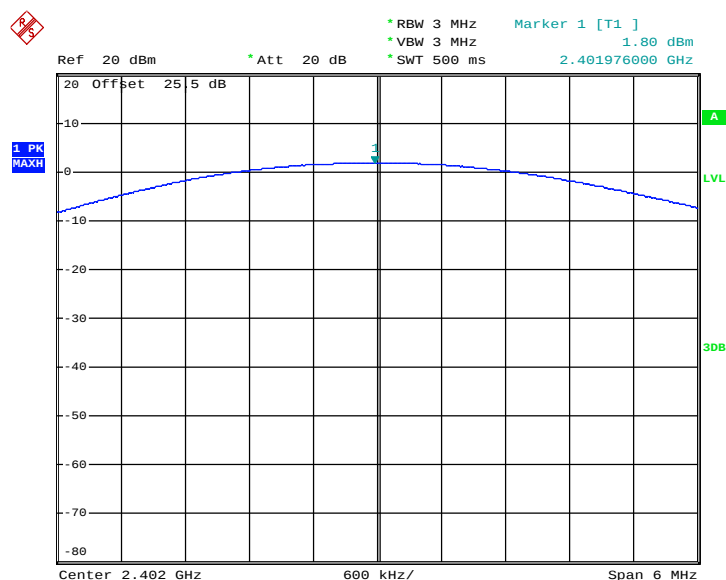


3.5.5 Test Result of Peak Output Power

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

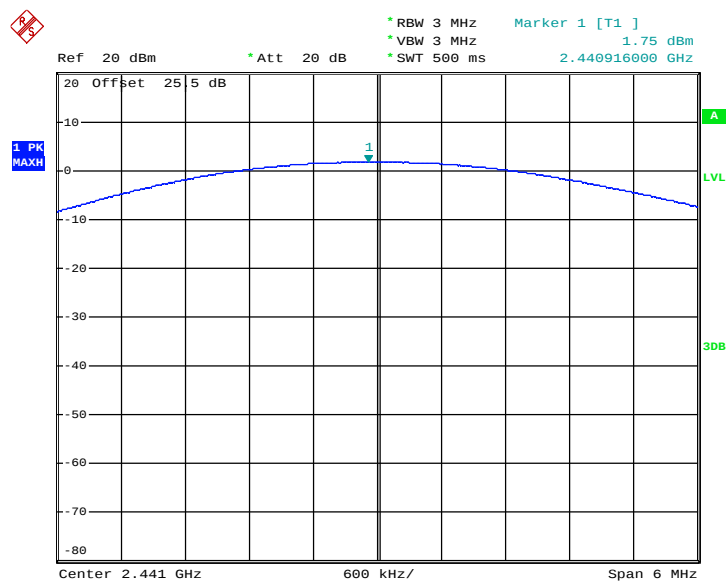
Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	1.80	30.00	Pass
39	2441	1.75	30.00	Pass
78	2480	1.46	30.00	Pass

Peak Output Power Plot on Channel 00



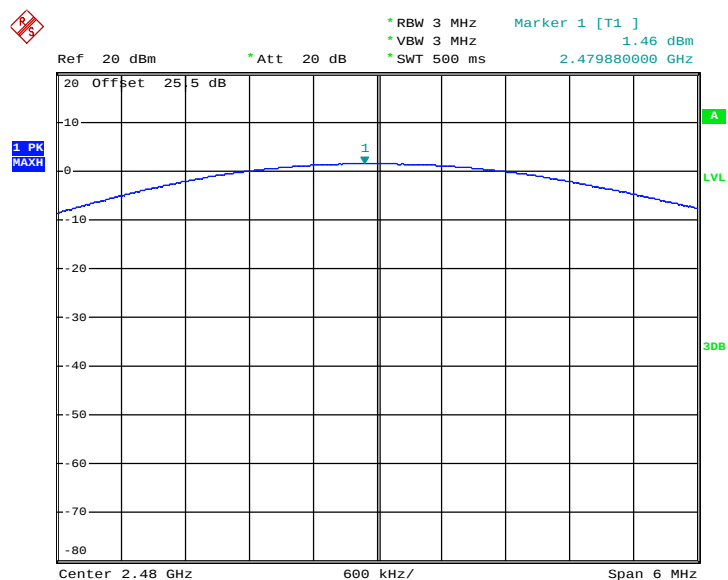
Date: 16.NOV.2012 15:04:10

Peak Output Power Plot on Channel 39



Date: 16.NOV.2012 15:05:25

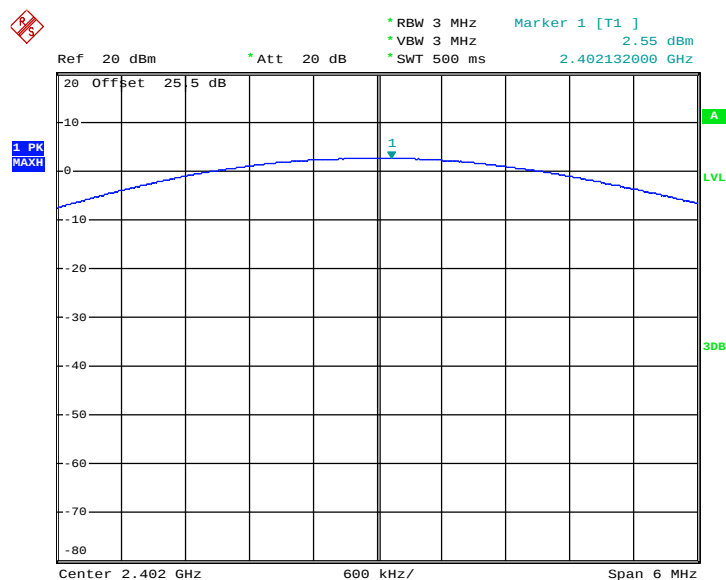
Peak Output Power Plot on Channel 78



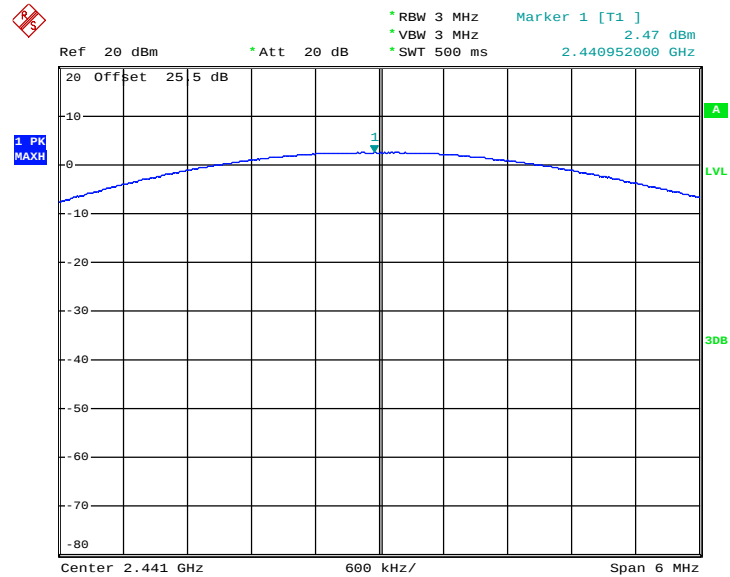
Date: 16.NOV.2012 15:06:40

Test Mode :	2Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

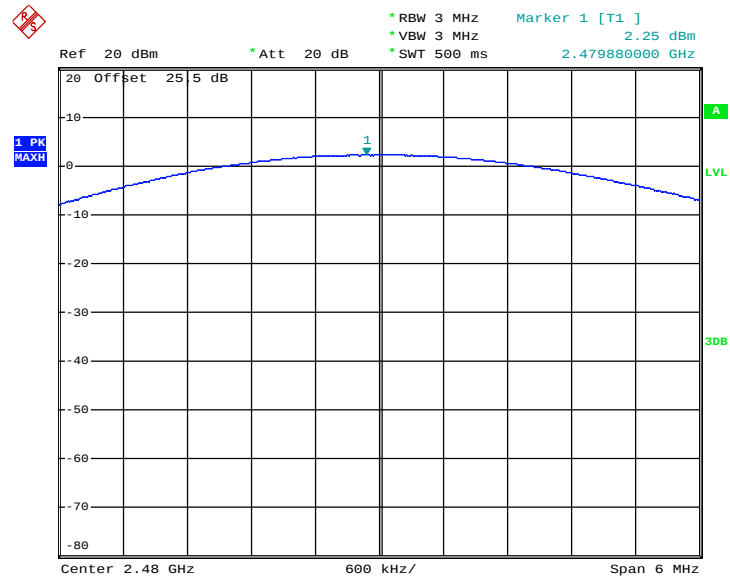
Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	2.55	20.97	Pass
39	2441	2.47	20.97	Pass
78	2480	2.25	20.97	Pass

Peak Output Power Plot on Channel 00


Date: 16.NOV.2012 15:04:35

Peak Output Power Plot on Channel 39


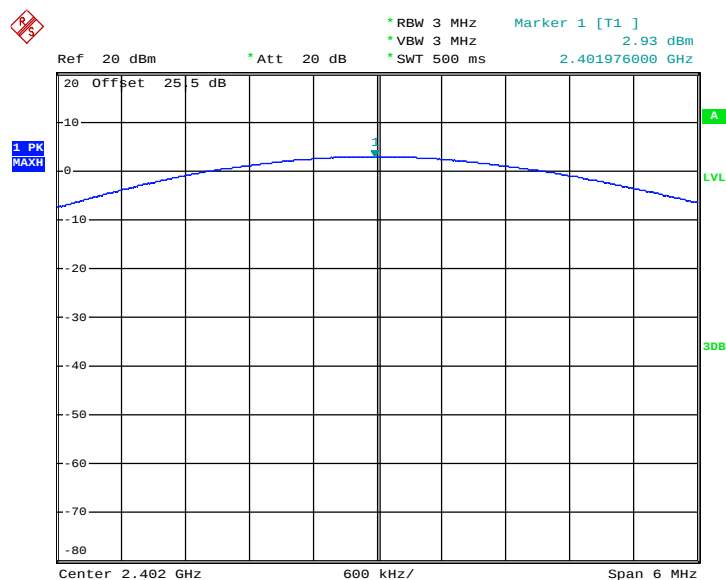
Date: 16.NOV.2012 15:05:50

Peak Output Power Plot on Channel 78


Date: 16.NOV.2012 15:07:05

Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

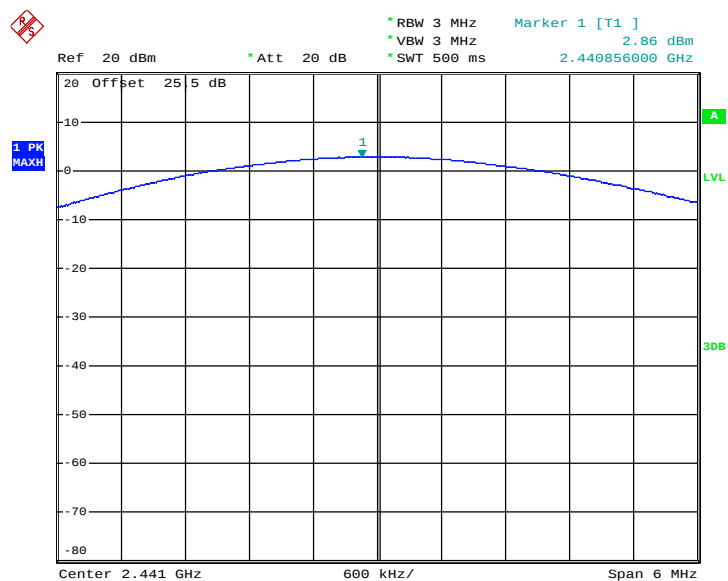
Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	2.93	20.97	Pass
39	2441	2.86	20.97	Pass
78	2480	2.61	20.97	Pass

Peak Output Power Plot on Channel 00


Date: 16.NOV.2012 15:05:00

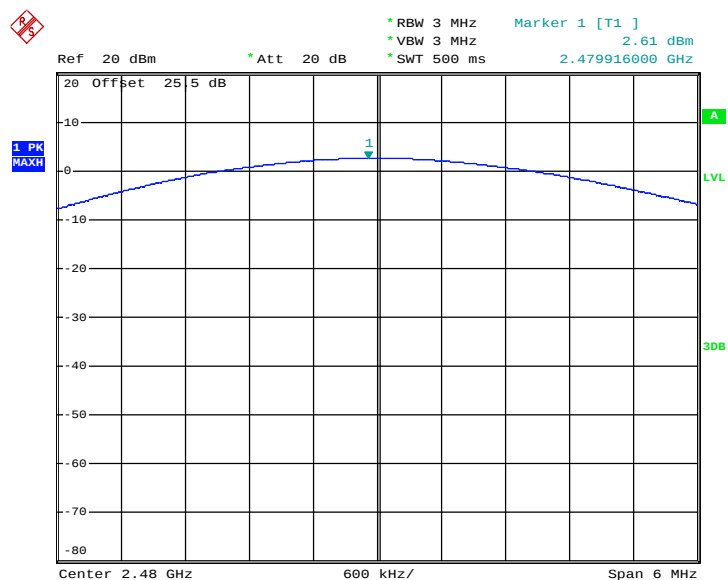


Peak Output Power Plot on Channel 39



Date: 16.NOV.2012 15:06:15

Peak Output Power Plot on Channel 78



Date: 16.NOV.2012 15:07:30

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.

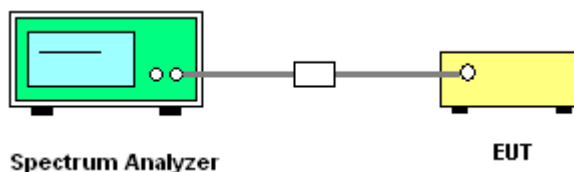
3.6.2 Measuring Instruments

See list of measuring instruments 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 = 300KHz ($\geq 1\%$ span=30MHz), 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 300KHz 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.

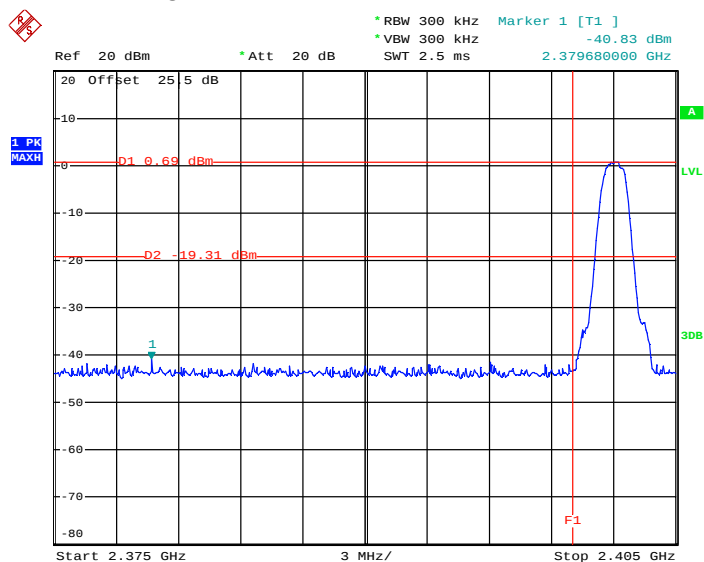
3.6.4 Test Setup



3.6.5 Test Result of Conducted Band Edges

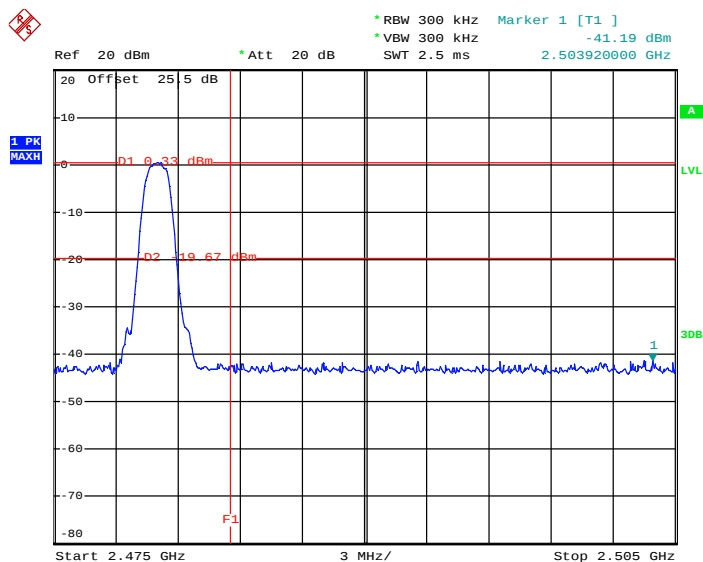
Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Coyote Lin

Low Band Edge Plot on Channel 00



Date: 16.NOV.2012 17:09:07

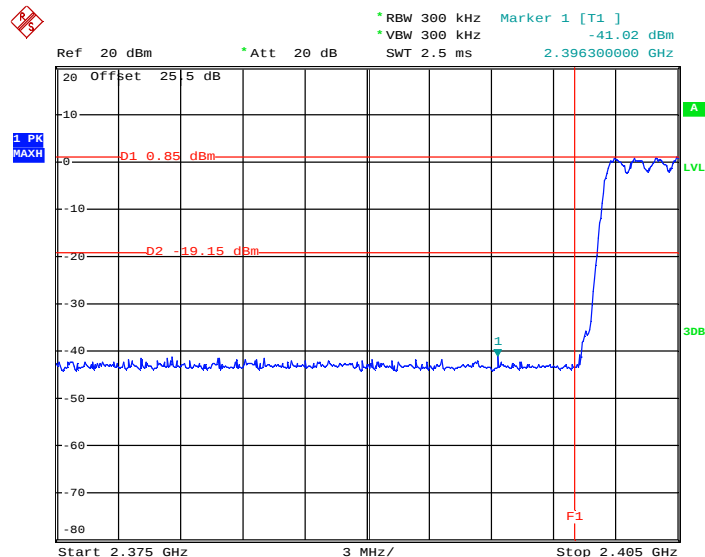
High Band Edge Plot on Channel 78



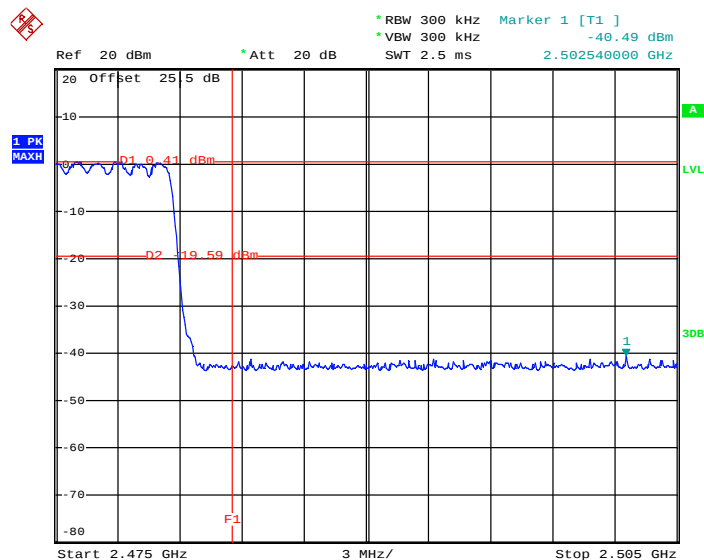
Date: 16.NOV.2012 16:19:32

3.6.6 Test Result of Conducted Hopping Mode Band Edges

Test Mode :	3Mbps	Temperature :	24~26°C
Test Engineer :	Coyote Lin	Relative Humidity :	50~53%

Hopping Mode Low Band Edge Plot


Date: 16.NOV.2012 17:33:54

Hopping Mode High Band Edge Plot


Date: 16.NOV.2012 17:36:23

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.

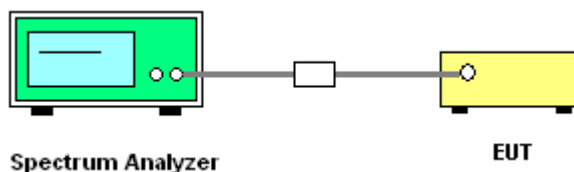
3.7.2 Measuring Instruments

See list of measuring instruments 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.

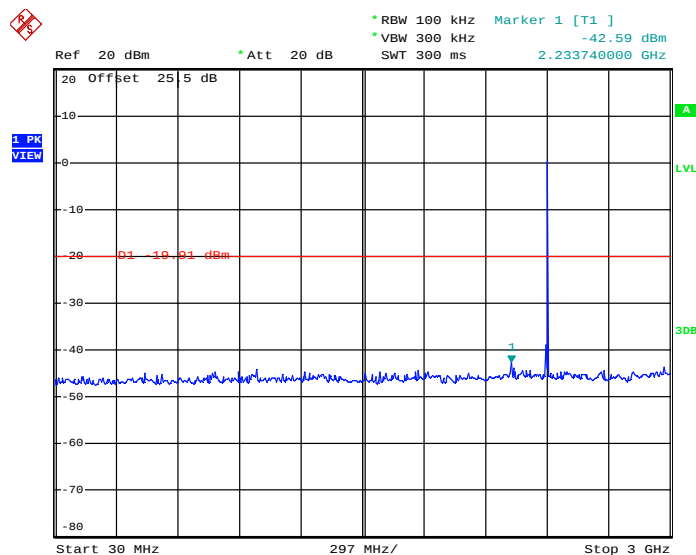
3.7.4 Test Setup



3.7.5 Test Result

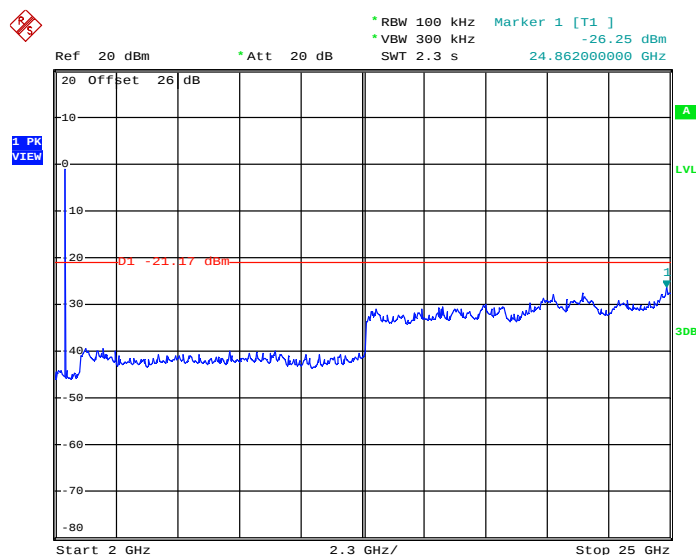
Test Mode :	3Mbps	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Coyote Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 16.NOV.2012 16:25:52

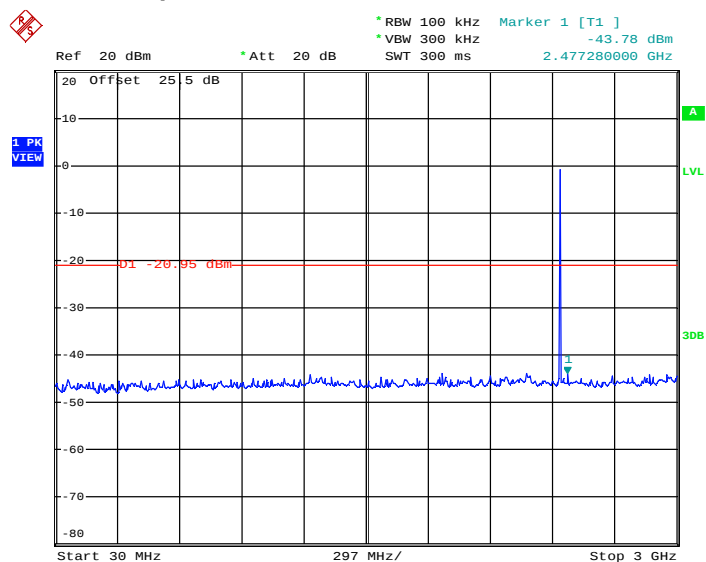
Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz



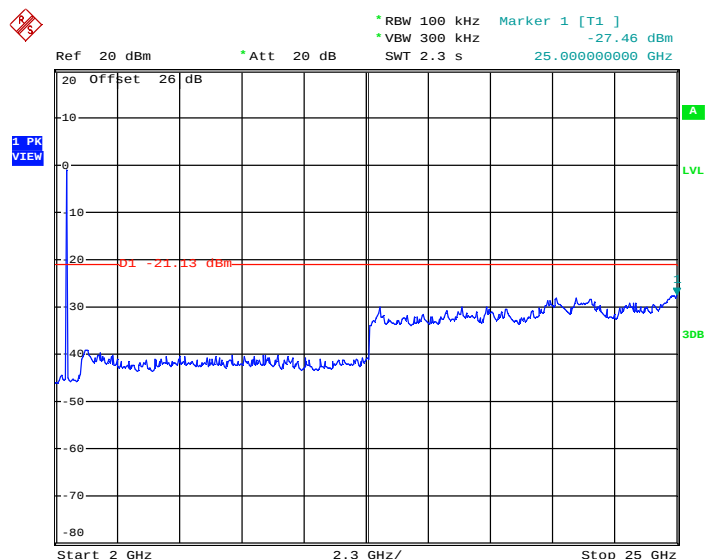
Date: 16.NOV.2012 16:26:44



Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Coyote Lin

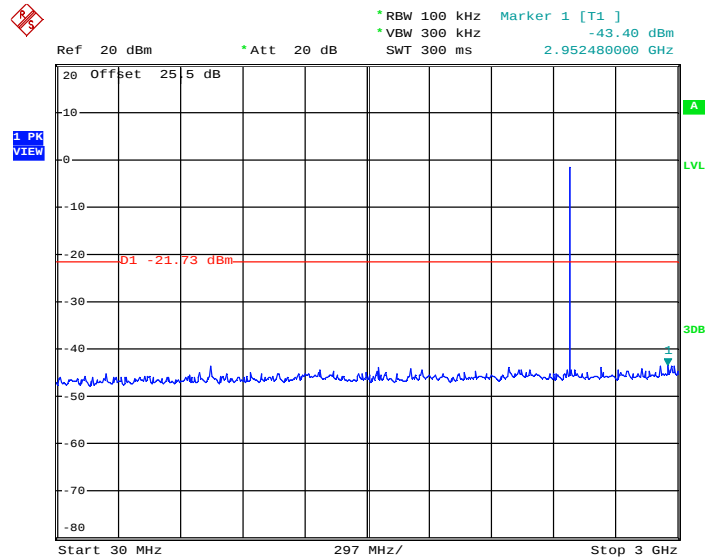
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 16.NOV.2012 16:27:36

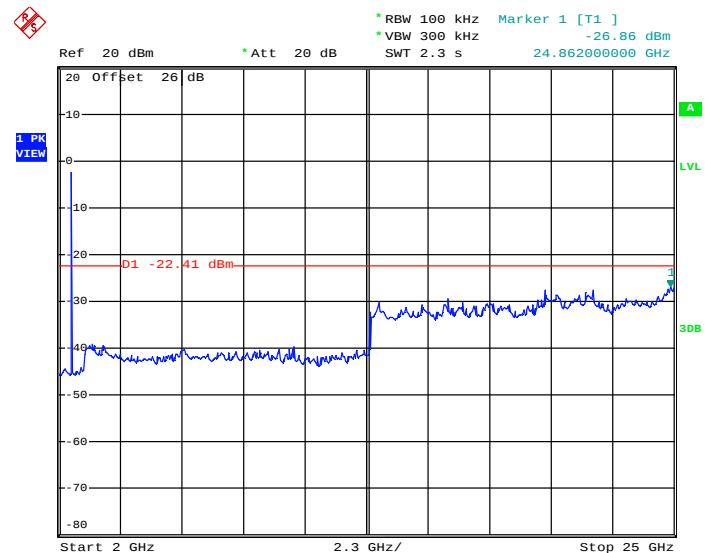
Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz

Date: 16.NOV.2012 16:28:28

Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Coyote Lin

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 16.NOV.2012 16:29:20

Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz


Date: 16.NOV.2012 16:30:12

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

See list of measuring instruments of this test report.

3.8.3 Test Procedures

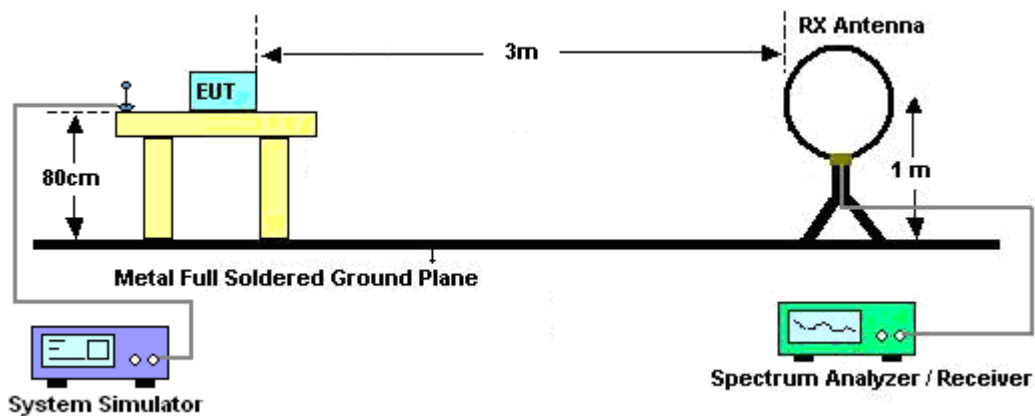
1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines and fulfills ANSI C63.4-2003 and the guidelines in ANSI C63.10-2009 test site requirement.
2. The EUT was placed on a turntable with 0.8 meter above ground.
3. The EUT was set 3 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 $f < 1 \text{ GHz}$, RBW=1MHz for $f > 1 \text{ GHz}$; 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 = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Level = Peak Level + $20 * \log(\text{Duty cycle})$
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 (24.79dB) derived from $20 \log (\text{dwell time}/100\text{ms})$.

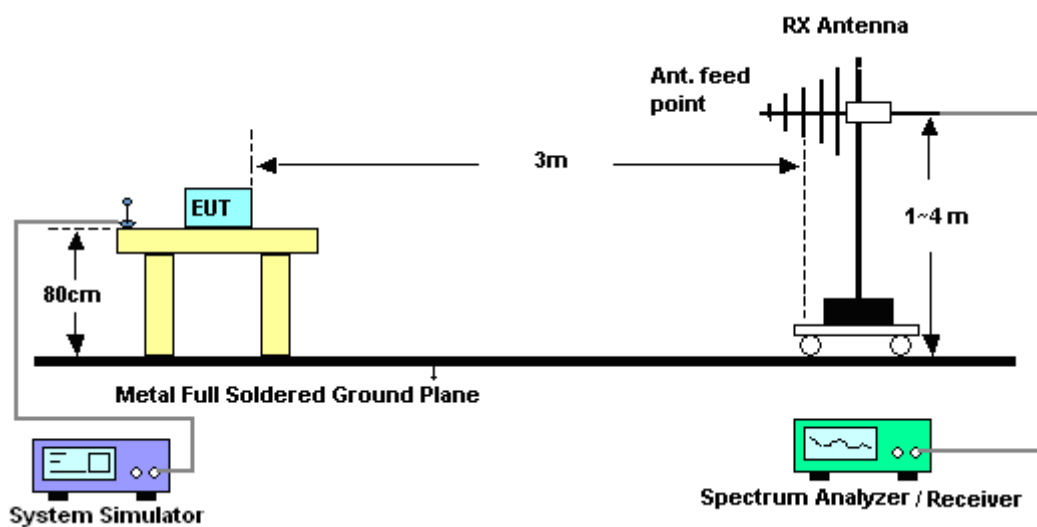
For example: Average level = $45.23\text{dBuV/m} - 24.79 \text{ (dB)} = 20.44\text{dBuV/m}$.

3.8.4 Test Setup

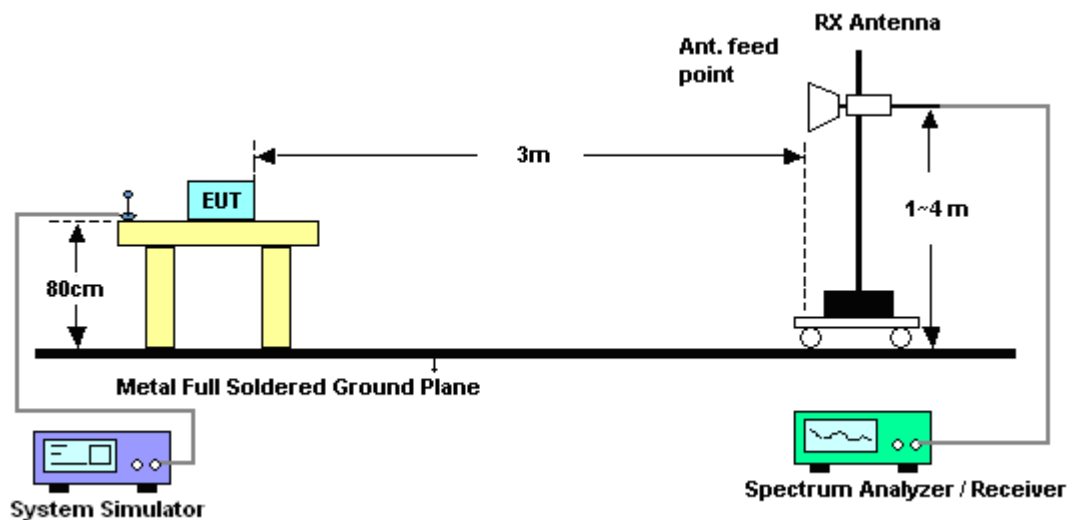
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

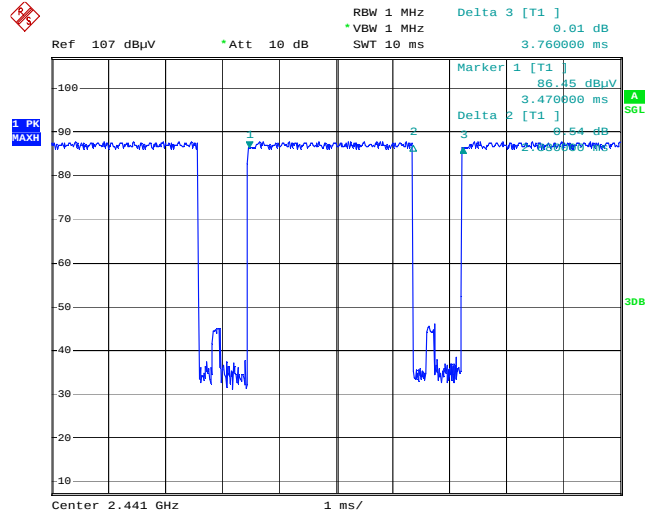


3.8.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

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.

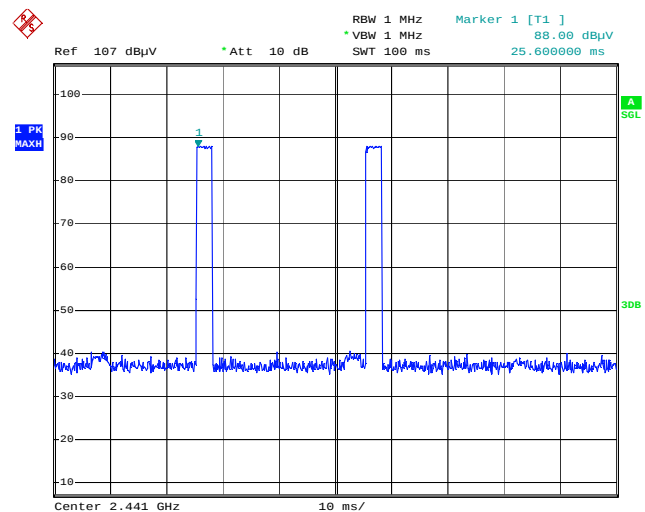
3.8.6 Duty cycle correction factor for average measurement

3DH5 on time/100ms (One Pulse) Plot on Channel 39



Date: 15.NOV.2012 09:47:15

3DH5 on time/100ms (Count Pulses) Plot on Channel 39



Date: 15.NOV.2012 09:55:36

Note:

1. Duty cycle = on time/100 milliseconds = $2 * 2.88 / 100 = 5.76 \%$
2. Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. 3DH5 has the highest duty cycle and is reported.

3.8.7 Test Result of Radiated Band Edges

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	00	Relative Humidity :	51~52%
		Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2348.61	45.23	-28.77	74	40.98	32.24	5.95	33.94	112	353	Peak
2348.61	20.44	-33.56	54	-	-	-	-	112	353	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2359.95	45.31	-28.69	74	41.01	32.26	5.99	33.95	100	345	Peak
2359.95	20.52	-33.48	54	-	-	-	-	100	345	Average

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.79dB) derived from $20\log(\text{dwell time}/100\text{ms})$.

For example: Average level = 45.23dBuV/m – 24.79 (dB) = 20.44dBuV/m.

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	78	Relative Humidity :	51~52%
		Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.52	59.04	-14.96	74	54.48	32.38	6.18	34	187	51	Peak
2483.52	34.25	-19.75	54	-	-	-	-	187	51	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	54.8	-19.2	74	50.24	32.38	6.18	34	124	346	Peak
2483.5	30.01	-23.99	54	-	-	-	-	124	346	Average



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

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	00	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2402 MHz is fundamental signal which can be ignored. 2. 7206 MHz and 9608 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 98.38 dBuV/m - 20dB = 78.38dBuV/m.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2402	98.38	-	-	94.01	32.3	6.03	33.96	112	353	Peak
2402	73.59	-	-	-	-	-	-	112	353	Average
4804	45.83	-28.17	74	60.21	33.98	9.11	57.47	100	0	Peak
4804	21.04	-32.96	54	-	-	-	-	100	0	Average
7206	44.5	-33.88	78.38	56.88	35.56	10.02	57.96	100	0	Peak
9608	46.14	-32.24	78.38	55.92	36.44	12.01	58.23	100	0	Peak

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.79dB) derived from $20\log(\text{dwell time}/100\text{ms})$.

For example: Average level = 98.38dBuV/m – 24.79 (dB) = 73.59dBuV/m.

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	00	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2402 MHz is fundamental signal which can be ignored. 2. 7206 MHz and 9608 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2402	93.38	-	-	89.01	32.3	6.03	33.96	100	345	Peak
2402	68.59	-	-	-	-	-	-	100	345	Average
7206	43.26	-30.12	73.38	55.64	35.56	10.02	57.96	100	0	Peak
9608	43.3	-30.08	73.38	53.08	36.44	12.01	58.23	100	0	Peak

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	39	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2441 MHz is fundamental signal which can be ignored. 2. 9764 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2441	98.06	-	-	93.58	32.35	6.11	33.98	168	349	Peak
2441	73.27	-	-	-	-	-	-	168	349	Average
9764	48.6	-29.46	78.06	58.22	36.69	11.93	58.24	100	0	Peak

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	39	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2441 MHz is fundamental signal which can be ignored. 2. 9764 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2441	92.98	-	-	88.5	32.35	6.11	33.98	100	350	Peak
2441	68.19	-	-	-	-	-	-	100	350	Average
9764	45.31	-27.67	72.98	54.93	36.69	11.93	58.24	100	0	Peak

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	78	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. 9920 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
140.97	32.3	-11.2	43.5	51.17	11.38	1.2	31.45	-	-	Peak
211.17	33.35	-10.15	43.5	53.47	9.91	1.37	31.4	-	-	Peak
281.64	41.91	-4.09	46	58.64	13.04	1.64	31.41	-	-	Peak
355.3	44.83	-1.17	46	59.43	14.79	2.02	31.41	100	334	Peak
355.3	44.15	-1.85	46	58.75	14.79	2.02	31.41	100	334	QP
422.5	40.98	-5.02	46	53.52	16.48	2.22	31.24	-	-	Peak
790.7	24.66	-21.34	46	29.82	21.95	3.12	30.23	-	-	Peak
2480	97.67	-	-	93.11	32.38	6.18	34	187	51	Peak
2480	72.88	-	-	-	-	-	-	187	51	Average
4960	46	-28	74	60.42	33.91	9.16	57.49	100	0	Peak
9920	48.65	-29.02	77.67	58.16	36.9	11.84	58.25	100	0	Peak

Test Mode :	3Mbps	Temperature :	22~24℃
Test Channel :	78	Relative Humidity :	51~52%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. 9920 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.26	36.67	-3.33	40	54.93	12.9	0.63	31.79	100	56	Peak
211.17	31.13	-12.37	43.5	51.25	9.91	1.37	31.4	-	-	Peak
284.88	32.46	-13.54	46	49.13	13.09	1.66	31.42	-	-	Peak
355.3	38.08	-7.92	46	52.68	14.79	2.02	31.41	-	-	Peak
498.8	35.53	-10.47	46	45.92	18.06	2.44	30.89	-	-	Peak
832.7	25.09	-20.91	46	29.84	22.43	3.23	30.41	-	-	Peak
2480	92.66	-	-	88.1	32.38	6.18	34	124	346	Peak
2480	67.87	-	-	-	-	-	-	124	346	Average
4960	43.13	-30.87	74	57.55	33.91	9.16	57.49	100	0	Peak
9920	45.38	-27.28	72.66	54.89	36.9	11.84	58.25	100	0	Peak

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 (dBuV)	
	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.

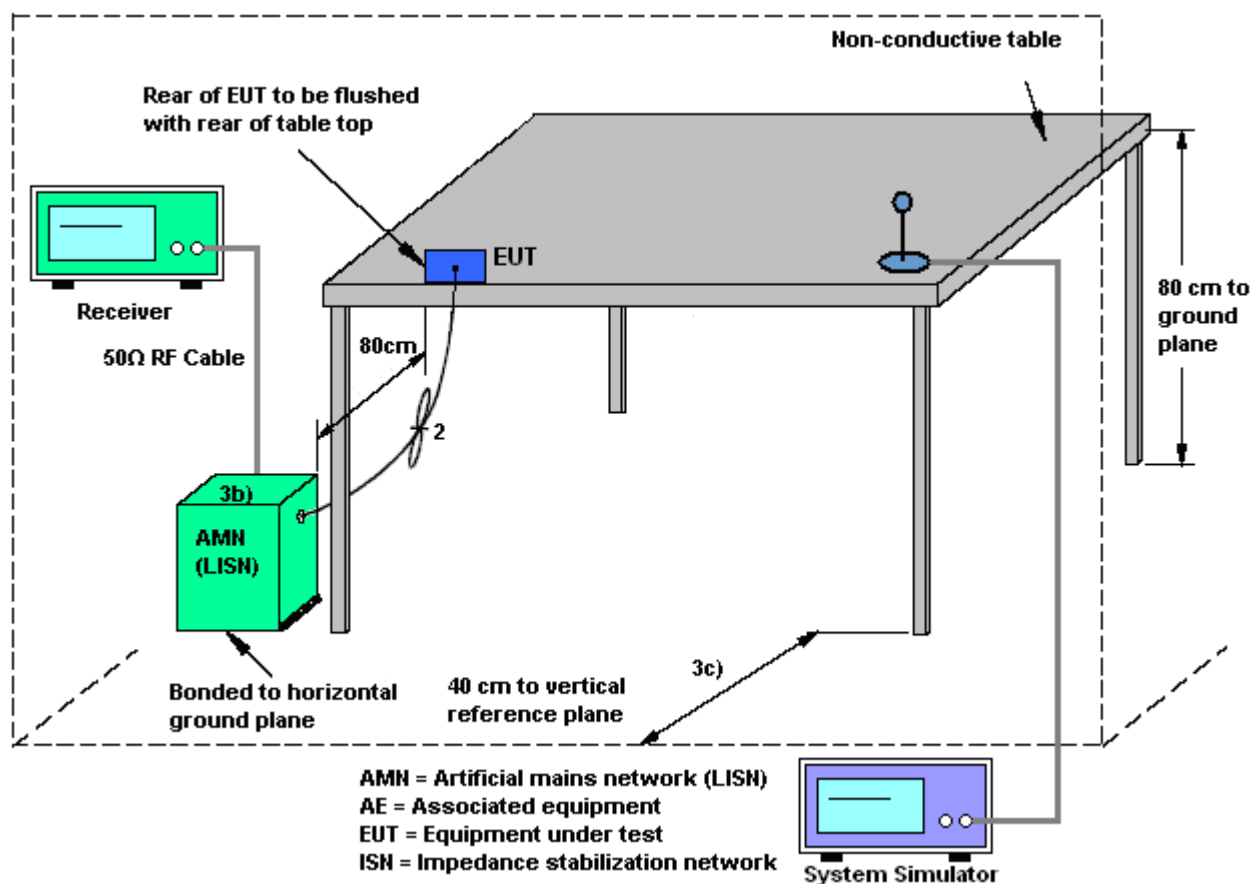
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

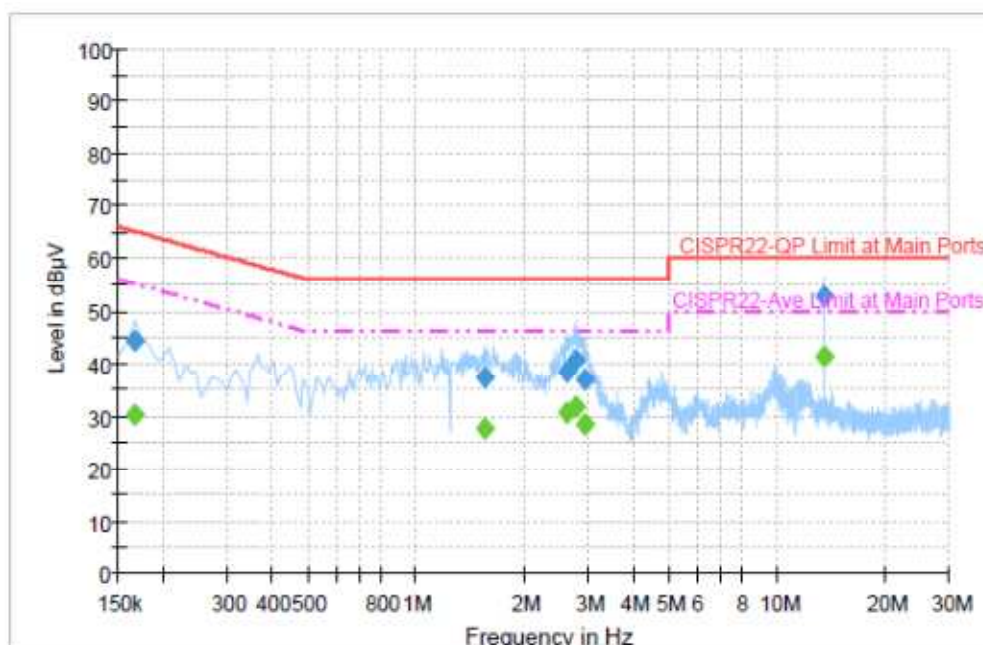
1. The test follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 KHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Slash Huang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM1900 Idle + Bluetooth Link + WLAN Link + RFID On + Earphone + Battery + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



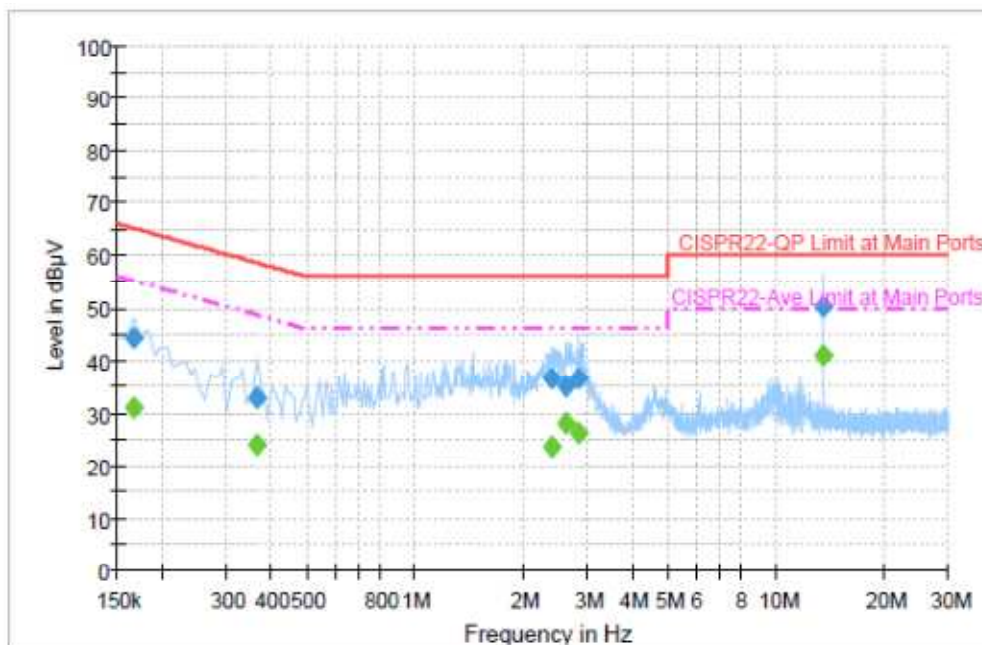
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	44.1	Off	L1	19.3	21.1	65.2
1.542000	37.3	Off	L1	19.4	18.7	56.0
2.622000	38.5	Off	L1	19.6	17.5	56.0
2.758000	40.8	Off	L1	19.6	15.2	56.0
2.934000	37.1	Off	L1	19.7	18.9	56.0
13.558000	52.8	Off	L1	19.9	7.2	60.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	30.4	Off	L1	19.3	24.8	55.2
1.542000	27.6	Off	L1	19.4	18.4	46.0
2.622000	30.6	Off	L1	19.6	15.4	46.0
2.758000	31.6	Off	L1	19.6	14.4	46.0
2.934000	28.5	Off	L1	19.7	17.5	46.0
13.558000	41.2	Off	L1	19.9	8.8	50.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Slash Huang	Relative Humidity :	50~52%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM1900 Idle + Bluetooth Link + WLAN Link + RFID On + Earphone + Battery + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	44.2	Off	N	19.3	21.0	65.2
0.366000	32.9	Off	N	19.3	25.7	58.6
2.398000	36.7	Off	N	19.6	19.3	56.0
2.606000	35.1	Off	N	19.6	20.9	56.0
2.838000	36.4	Off	N	19.7	19.6	56.0
13.558000	50.2	Off	N	19.9	9.8	60.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	30.9	Off	N	19.3	24.3	55.2
0.366000	24.1	Off	N	19.3	24.5	48.6
2.398000	23.5	Off	N	19.6	22.5	46.0
2.606000	28.1	Off	N	19.6	17.9	46.0
2.838000	26.1	Off	N	19.7	19.9	46.0
13.558000	41.1	Off	N	19.9	8.9	50.0

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 Connected Construction

Non-standard connector 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	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Nov. 16, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	Nov. 16, 2012	Feb. 08, 2014	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCI 7	100724	9kHz~7GHz	Sep. 03, 2012	Dec. 03, 2012	Sep. 02, 2013	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Dec. 03, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Dec. 03, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Dec. 03, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	Dec. 03, 2012	Jul. 27, 2013	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 06, 2012	Nov. 15, 2012~ Nov. 19, 2012	Oct. 05, 2013	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Nov. 15, 2012~ Nov. 19, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 22, 2012	Nov. 15, 2012~ Nov. 19, 2012	Aug. 21, 2013	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz ~ 26.5GHz	Dec. 05, 2011	Nov. 15, 2012~ Nov. 19, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Mar. 10, 2012	Nov. 15, 2012~ Nov. 19, 2012	Mar. 09, 2013	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Feb. 27, 2012	Nov. 15, 2012~ Nov. 19, 2012	Feb. 26, 2013	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 03, 2012	Nov. 15, 2012~ Nov. 19, 2012	Sep. 02, 2013	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA91702 51	15GHz ~ 40GHz	Sep. 28, 2012	Nov. 15, 2012~ Nov. 19, 2012	Sep. 27, 2013	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 03, 2012	Nov. 15, 2012~ Nov. 19, 2012	Jul. 02, 2014	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Feb. 09, 2012	Nov. 15, 2012~ Nov. 19, 2012	Feb. 08, 2014	Radiation (03CH07-HY)

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.54
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.72
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Appendix A. Photographs of EUT

Please refer to Sporton report number EP2O3103 as below.