FCC RF Test Report

APPLICANT	:	Lenovo Mobile Communication Technology Ltd.
EQUIPMENT	:	Mobile Phone GSM/WCDMA
BRAND NAME	:	lenovo
MODEL NAME	:	Lenovo S820
MARKETING NAME	:	Mobile Phone GSM/WCDMA
MID	:	82000011
FCC ID	:	YCNS820
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DSS) Spread Spectrum Transmitter

The product was received on Apr. 25, 2013 and completely tested on Jun. 06, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager

Testing Laboratory 2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR342509A	Rev. 01	Initial issue of report	Jun. 14, 2013

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	-
3.5	15.247(b)(1)	Peak Output Power	≤ 1 w for 1Mbps ≤ 125 Mw for 2, 3Mbps	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 4.86 dB at 46.490 MHz
3.9	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.00 dB at 0.490 MHz
3.10	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Lenovo Mobile Communication Technology Ltd.
No.999, Qishan North 2nd Road, Information & Optoelectronics Park, Torch Hi-tech Industry Development Zone, Xiamen, P.R.China

1.2 Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone GSM/WCDMA
Brand Name	lenovo
Model Name	Lenovo S820
Marketing Name	Mobile Phone GSM/WCDMA
MID	82000011
FCC ID	YCNS820
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+/DC-HSDPA/ WLAN 11bgn/Bluetooth/Bluetooth v4.0 - LE
HW Version	Swarovski_MB_H301
SW Version	Lenovo S820_ROW_S104_130514
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.

1.4 Product Specification of Equipment Under Test

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 BDR (1Mbps) : 7.66 dBm (0.0058 W) Bluetooth EDR (2Mbps) : 7.38 dBm (0.0055 W) Bluetooth EDR (3Mbps) : 7.59 dBm (0.0057 W)
Antenna Type	PIFA Antenna type with gain 1 dBi
Type of Modulation	Bluetooth BDR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.			
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398			
Test Site No.	**Sporton Site No.**			**FCC/IC Registration No.**
	TH01-SZ	03CH01-SZ	CO01-SZ	831040/4086F-1

The test site complies with ANSI C63.4 2003 requirement.

1.6 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 C63.10-2009

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.

2 Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

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	7.55 dBm	7.25 dBm	7.51 dBm
Ch39	2441MHz	7.42 dBm	7.13 dBm	7.37 dBm
Ch78	2480MHz	**7.66** dBm	7.38 dBm	7.59 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 pursuant to 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, and different data rates were conducted to determine the final configuration (Y plane 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 maxiumun output power.

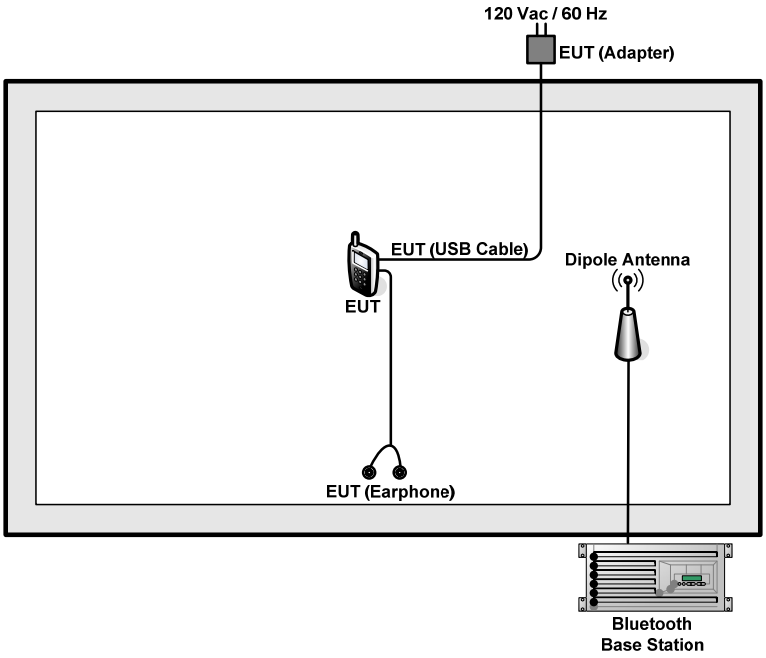
2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

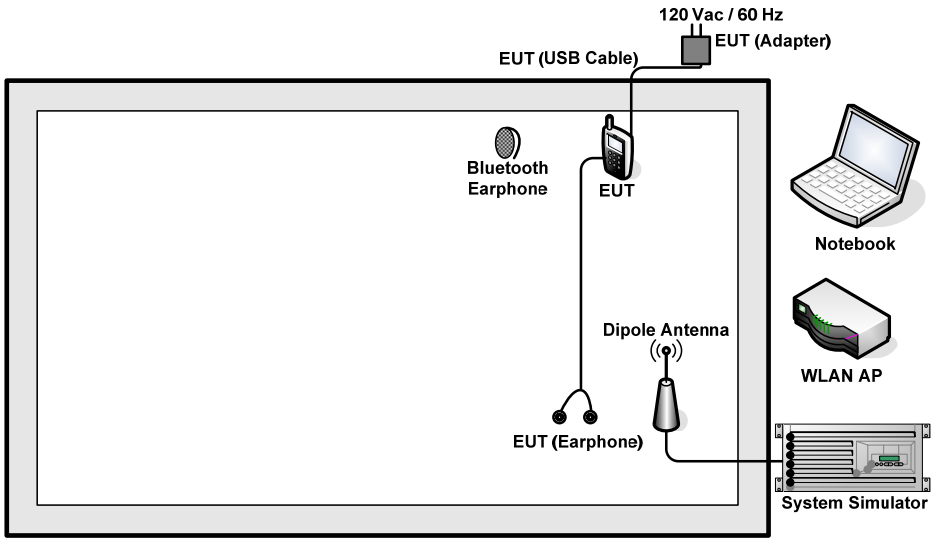
Summary table of Test Cases			
Test Item	**Data Rate / Modulation**		
	Bluetooth BDR 1Mbps GFSK	**Bluetooth EDR 2Mbps π/4-DQPSK**	**Bluetooth EDR 3Mbps 8-DPSK**
Conducted Test Cases	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated Test Cases	**Bluetooth BDR 1Mbps GFSK**		
	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz		
AC Conducted Emission	Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable 1 (Charging from Adapter) + Earphone		
Remark: For radiated test cases, the worst mode data rate 1Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and the conducted spurious emissions and conducted band edge measurement for each data rate are no worse than 1Mbps, and no other significantly frequencies found in conducted spurious emission.			

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Agilent	E5515C	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	Anritsu	MT8852B	FCC DoC	N/A	Unshielded, 1.8 m
3.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-612	N/A	N/A	Unshielded, 1.8 m
5.	Notebook	Lenovo	G480	PPD-AR5B195	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
6.	Bluetooth Earphone	Lenovo	LBH301	N/A	N/A	N/A

2.5 Description of RF Function Operation Test Setup

For Bluetooth function, key in "＃＃＃＃7820＃" on the EUT directly. Then, the EUT will get into the engineering modes to contact with Bluetooth base station for continuous transmitting and receiving signals.

2.6 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 7.5 dB.

Example :

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

= 7.5 + 10 = 17.5(dB)

For radiated band edges and spurious emission test :

Per part 15.35(c), the EUT Bluetooth average emission level could be determined by the peak emission level applying duty cycle correction factor, to represent averaging over the whole pulse train.

The average level is derived from the peak level corrected with “Duty cycle correction factor”.

Average Emission Level(dBuV/m) = Peak Emission Level(dBuV/m) + Duty cycle correction factor(dB)

*Duty cycle correction factor(dB) = 20 * log(Duty cycle).*
Duty cycle = On time / 100 milliseconds
On time = dwell time * hopping number in 100 ms

For example : bluetooth with dwell time 2.9ms and 2 hops in 100 ms, then
Duty cycle correction factor(dB) = 20 * log((2.90 * 2) / 100) = -24.73 dB

Following shows an average computation example with duty cycle correction factor = -24.73dB, and the peak emission level is 48.57 dBuV/m.

Example :
Average Emission Level(dBuV/m) = Peak Emission Level(dBuV/m) + duty cycle correction factor(dB)
= 48.57 + (-24.73) = 23.84 (dBuV/m)

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.

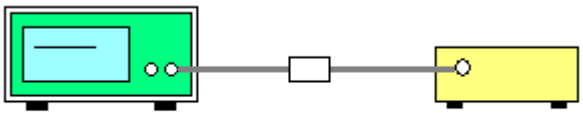
3.1.2 Measuring Instruments

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 ≥ 1% of the span; VBW ≥ 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

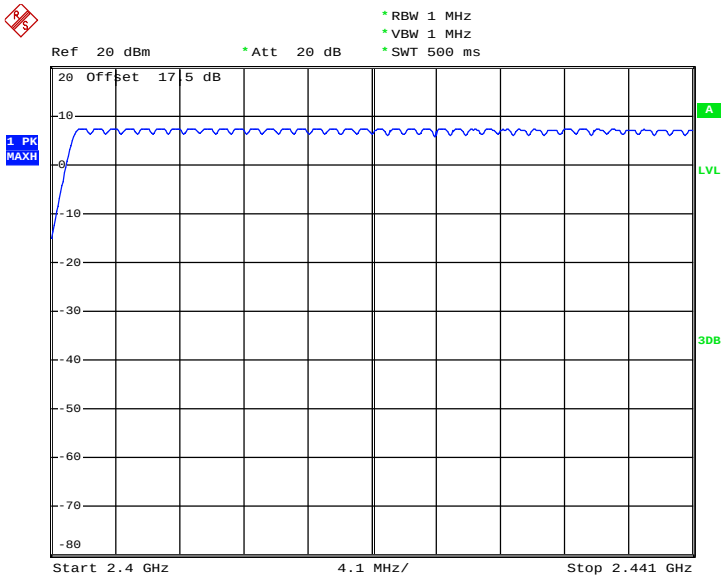


3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	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



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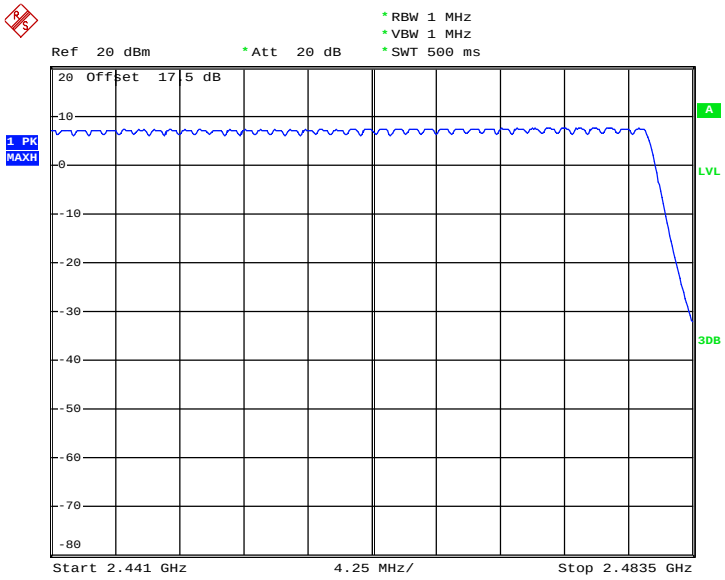

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3.2 Hopping Channel Separation Measurement

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.

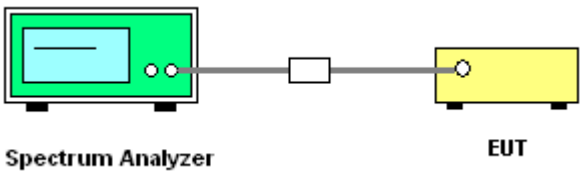
3.2.2 Measuring Instruments

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 ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

3.2.4 Test Setup

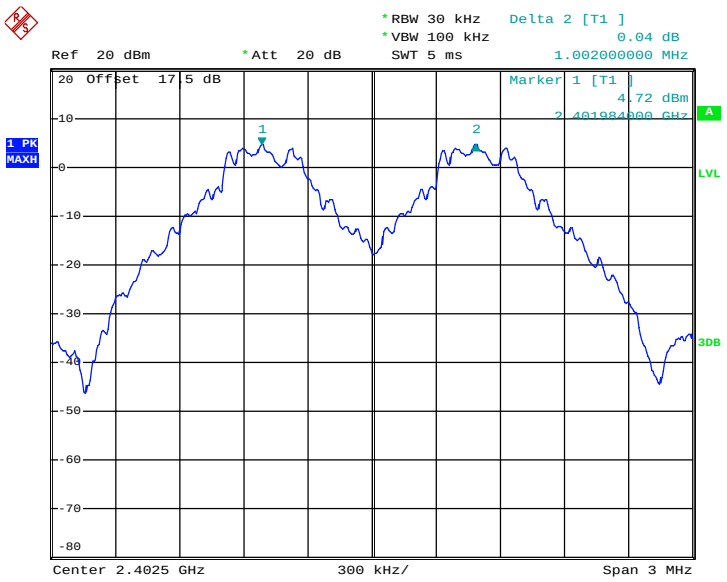


3.2.5 Test Result of Hopping Channel Separation

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

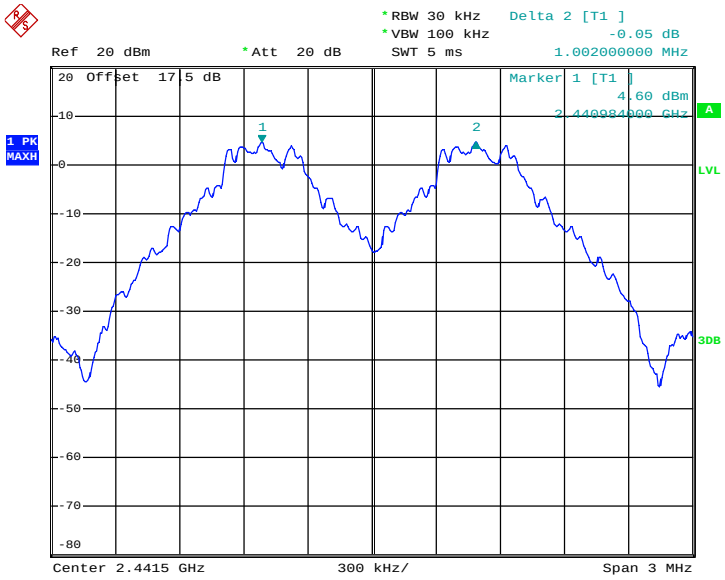
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.6080	Pass
39	2441	1.002	0.6053	Pass
78	2480	1.002	0.5627	Pass

Channel Separation Plot on Channel 00 - 01



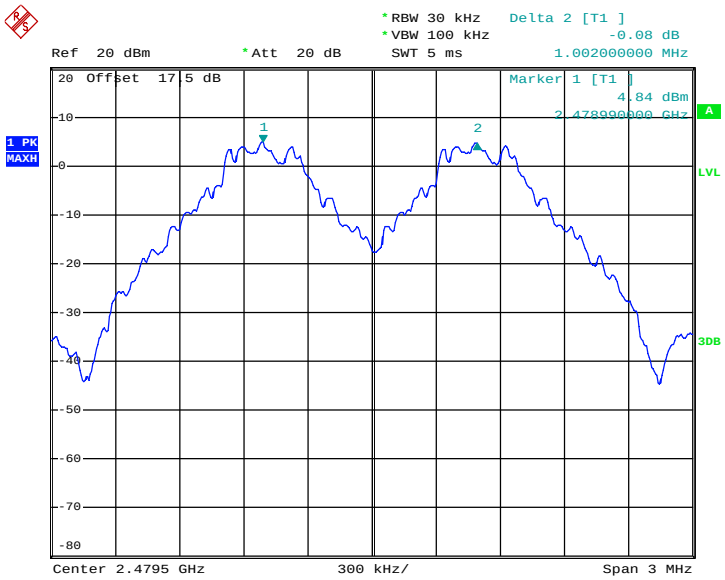
Date: 31.MAY.2013 10:28:54

Channel Separation Plot on Channel 39 - 40



Date: 31.MAY.2013 10:29:33

Channel Separation Plot on Channel 77 - 78



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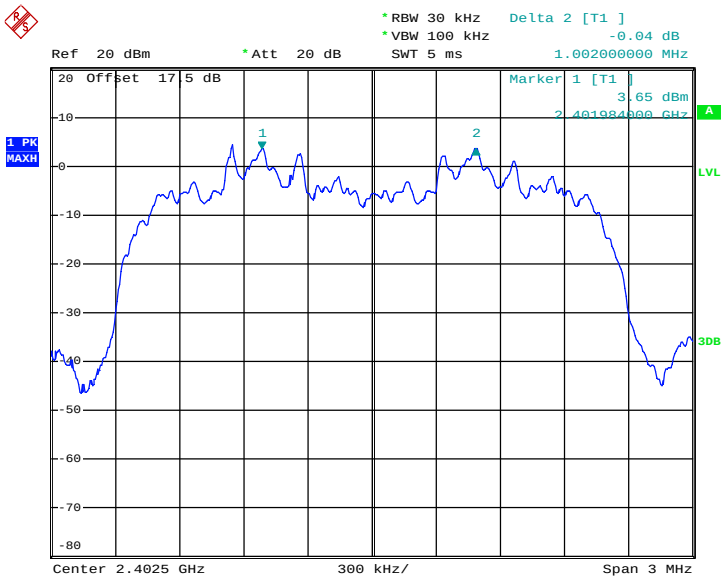
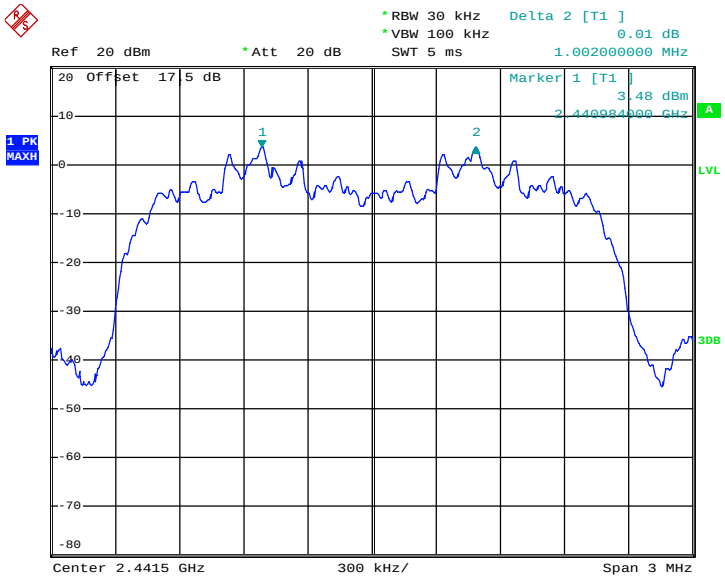
Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8440	Pass
39	2441	1.002	0.8440	Pass
78	2480	1.002	0.8160	Pass

Channel Separation Plot on Channel 00 - 01



Channel Separation Plot on Channel 39 - 40



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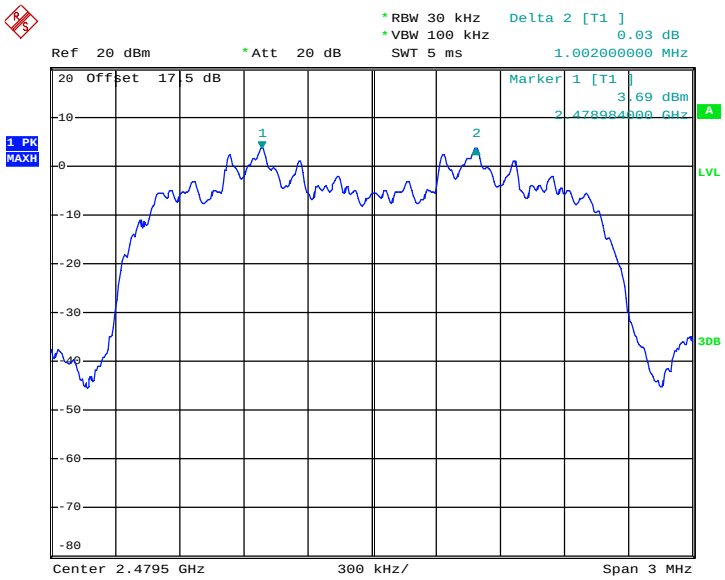
Channel Separation Plot on Channel 77 - 78

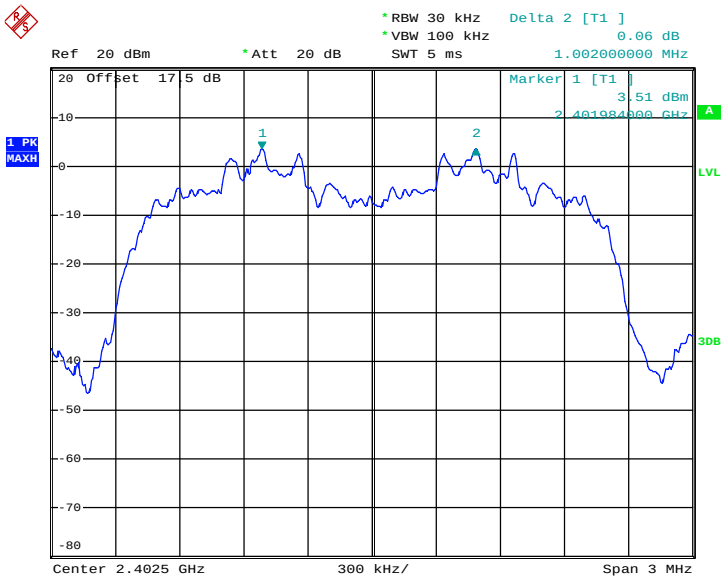


Date: 31.MAY.2013 10:32:30

Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

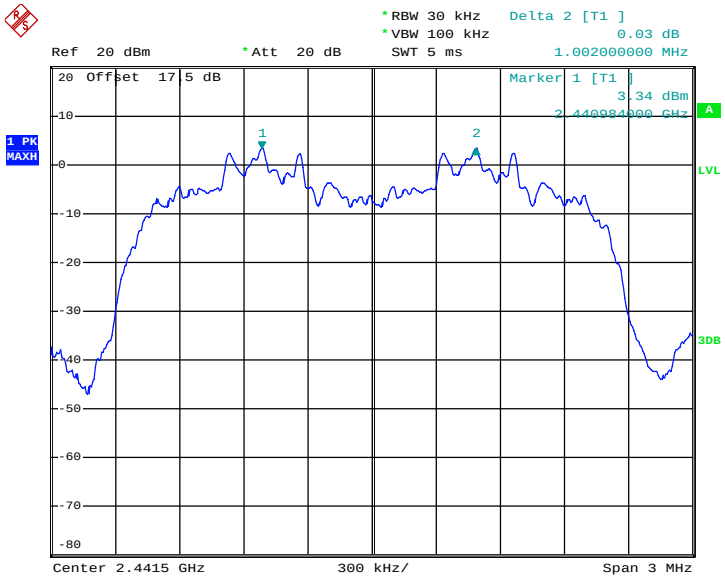
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.8200	Pass
39	2441	1.002	0.8200	Pass
78	2480	1.008	0.8200	Pass

Channel Separation Plot on Channel 00 - 01



Date: 31.MAY.2013 10:33:09

Channel Separation Plot on Channel 39 - 40



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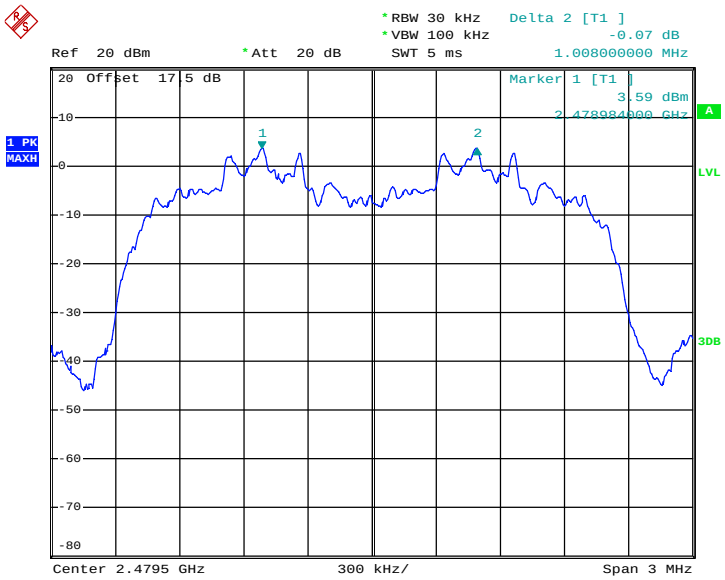
Channel Separation Plot on Channel 77 - 78



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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 ≥ 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℃
Test Engineer :	Blithe Li	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	2.886	0.31	0.4	Pass
AFH	20	53.34	2.886	0.15	0.4	Pass

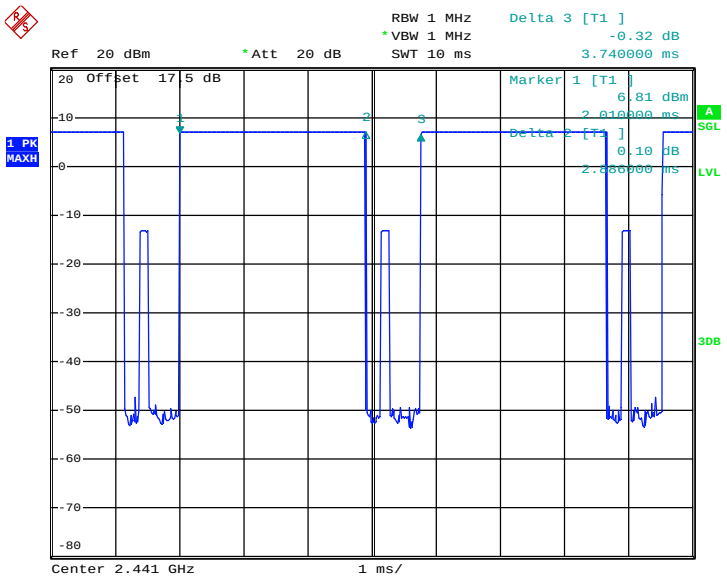
Remark:

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



Date: 30.MAY.2013 17:05:00

3.4 20dB Bandwidth Measurement

3.4.1 Limit of 20dB Bandwidth

Reporting only

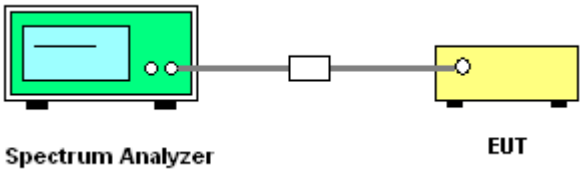
3.4.2 Measuring Instruments

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 ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. Measure and record the results in the test report.

3.4.4 Test Setup

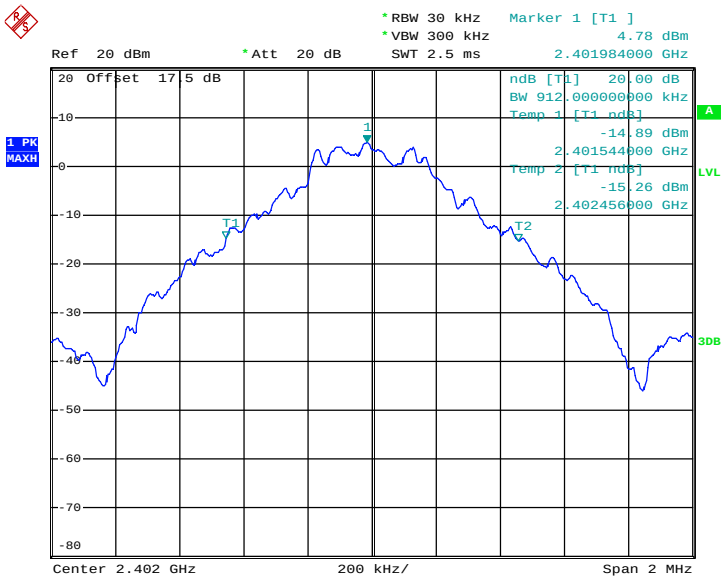


3.4.5 Test Result of 20dB Bandwidth

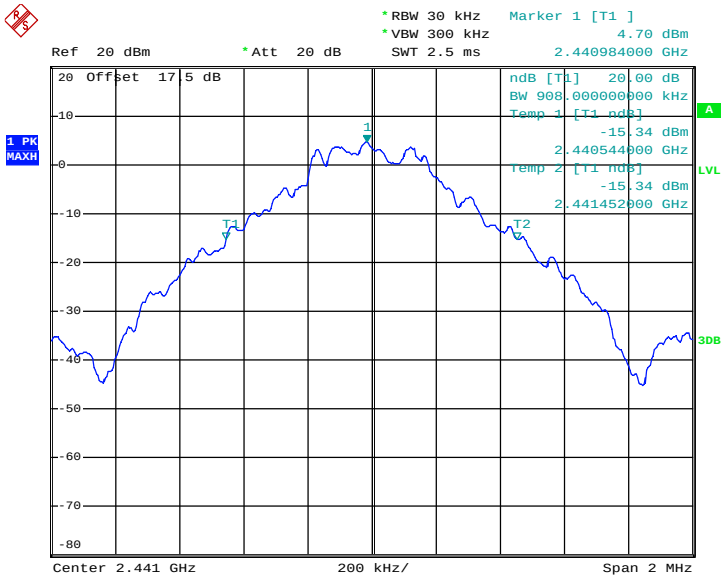
Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.912
39	2441	0.908
78	2480	0.844

20 dB Bandwidth Plot on Channel 00

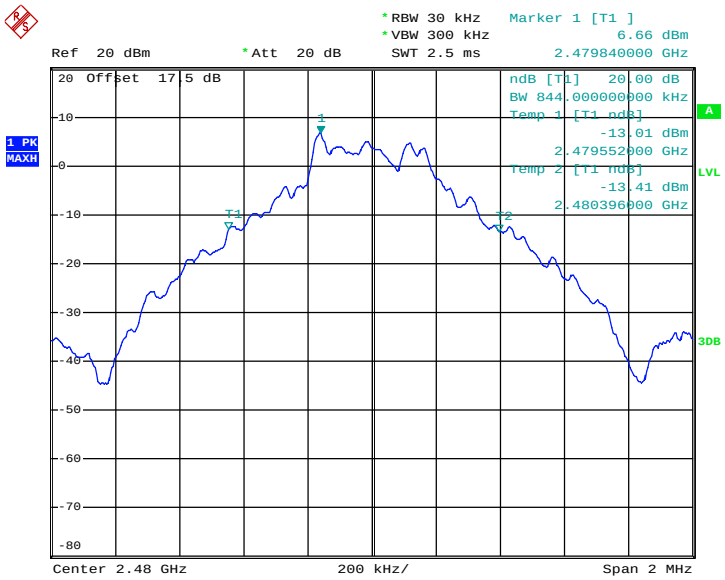


20 dB Bandwidth Plot on Channel 39



Date: 31.MAY.2013 10:38:20

20 dB Bandwidth Plot on Channel 78

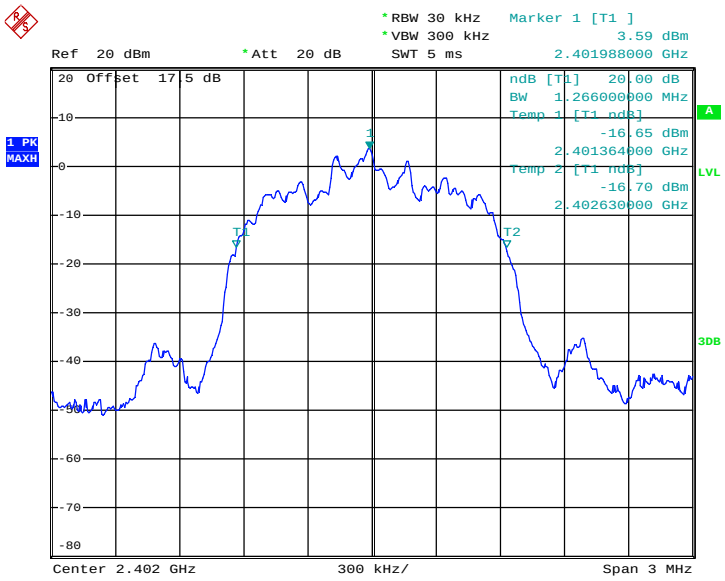


Date: 31.MAY.2013 10:38:43

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

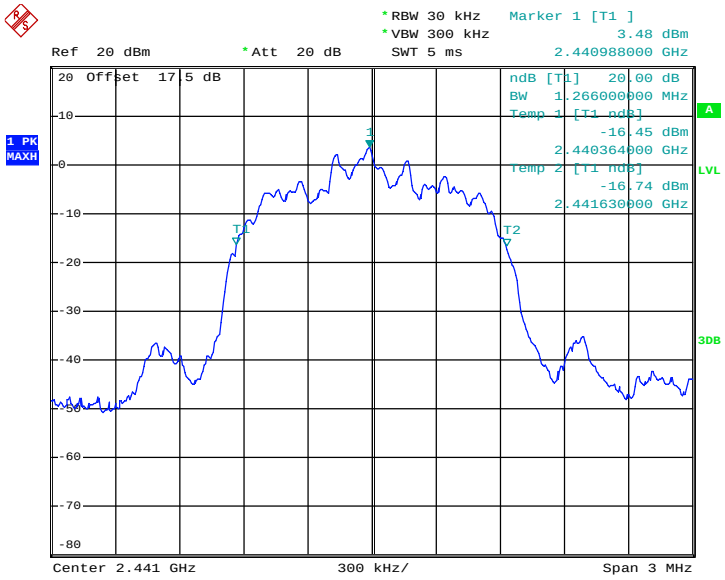
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.266
39	2441	1.266
78	2480	1.224

20 dB Bandwidth Plot on Channel 00



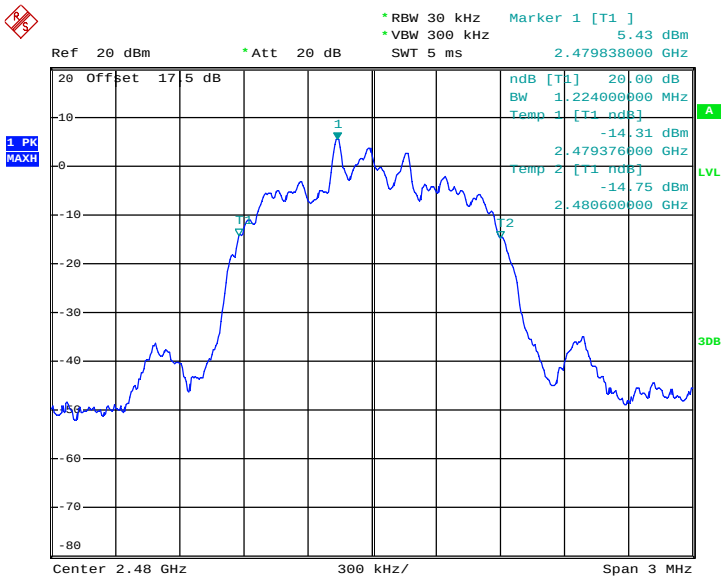
Date: 31.MAY.2013 10:39:08

20 dB Bandwidth Plot on Channel 39



Date: 31.MAY.2013 10:41:29

20 dB Bandwidth Plot on Channel 78

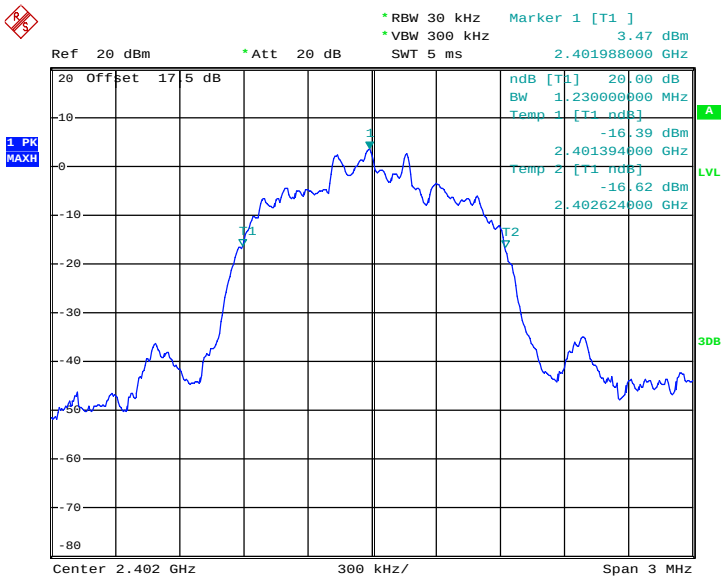


Date: 31.MAY.2013 10:42:05

Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

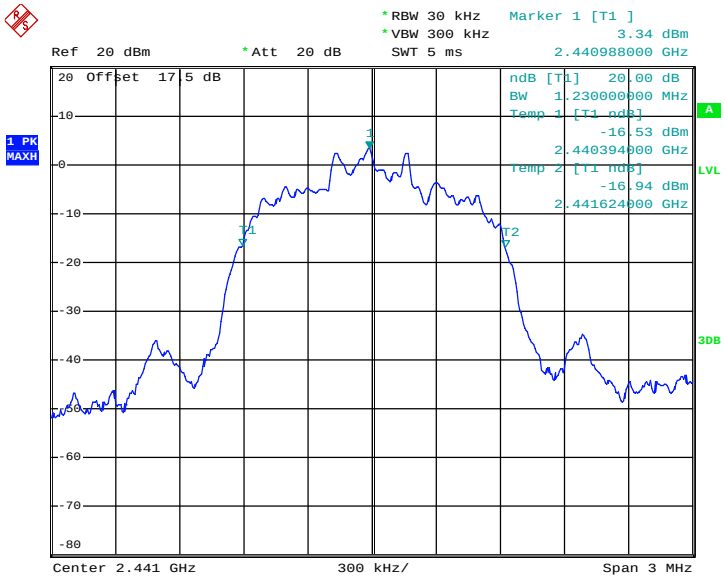
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.230
39	2441	1.230
78	2480	1.230

20 dB Bandwidth Plot on Channel 00



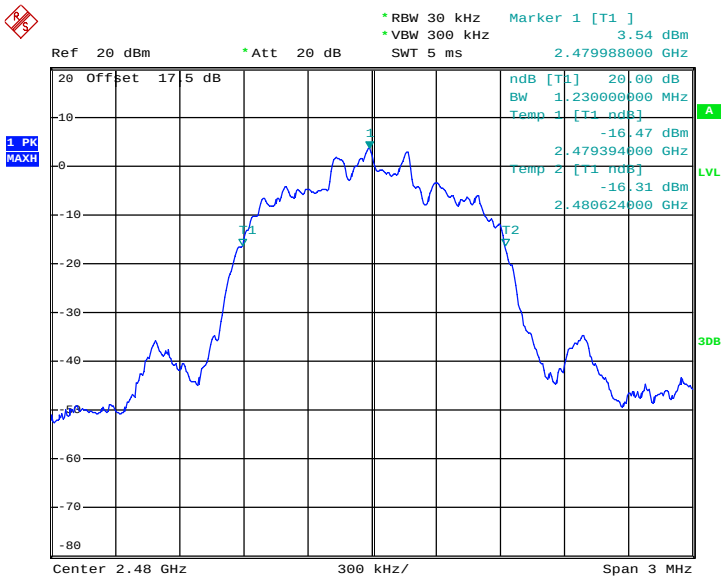
Date: 31.MAY.2013 10:42:35

20 dB Bandwidth Plot on Channel 39



Date: 31.MAY.2013 10:43:03

20 dB Bandwidth Plot on Channel 78



Date: 31.MAY.2013 10:43:40

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.

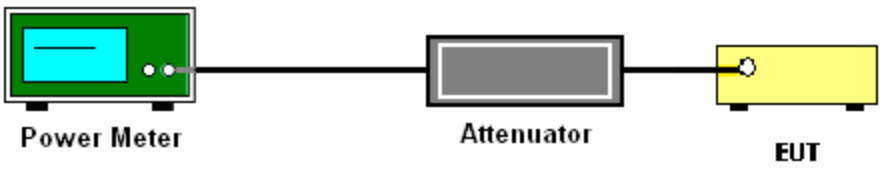
3.5.2 Measuring Instruments

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 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



3.5.5 Test Result of Peak Output Power

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

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	7.55	30.00	Pass
39	2441	7.42	30.00	Pass
78	2480	7.66	30.00	Pass

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

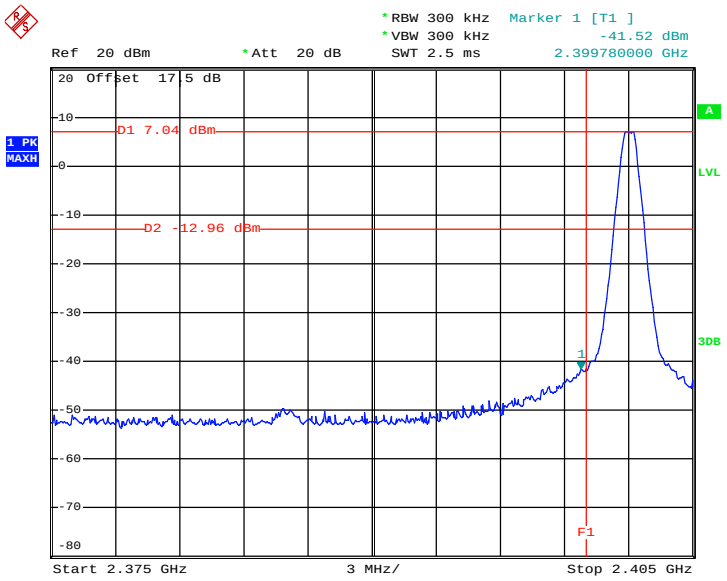
1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 300KHz (≥ 1% span=30MHz), VBW = 300KHz (≥ RBW). Band edge emissions 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

3.6.6 Test Result of Conducted Band Edges

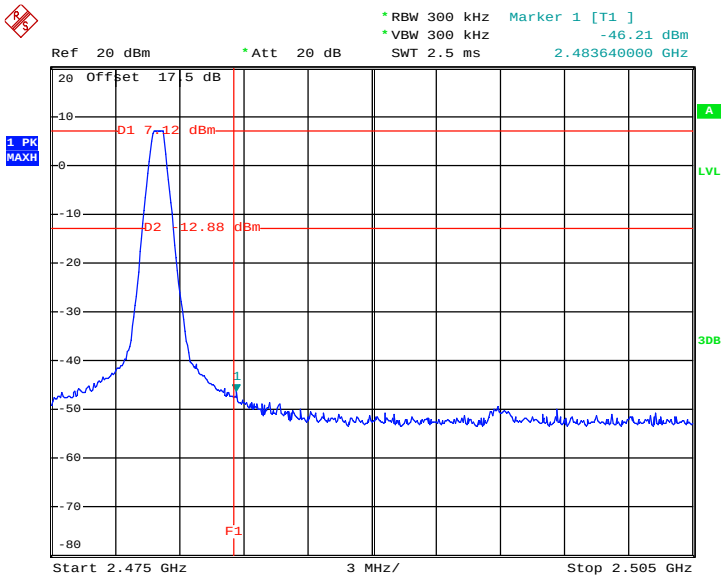
Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Blithe Li

Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 10:44:33

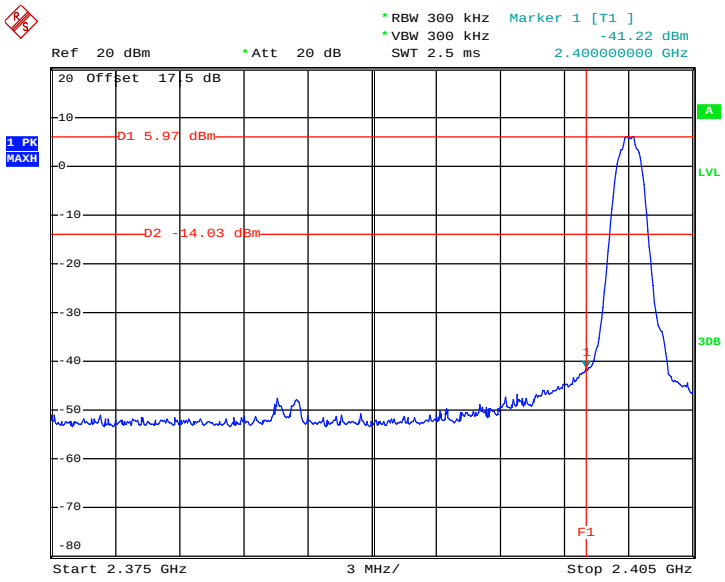
High Band Edge Plot on Channel 78



Date: 31.MAY.2013 10:45:36

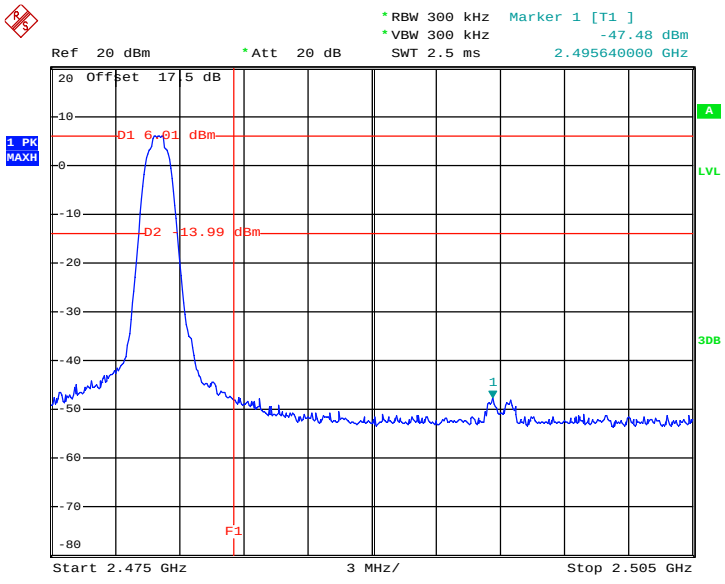
Test Mode :	2Mbps	**Temperature :**	24~26℃
Test Channel :	00 and 78	**Relative Humidity :**	50~53%
		Test Engineer :	Blithe Li

Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 10:46:28

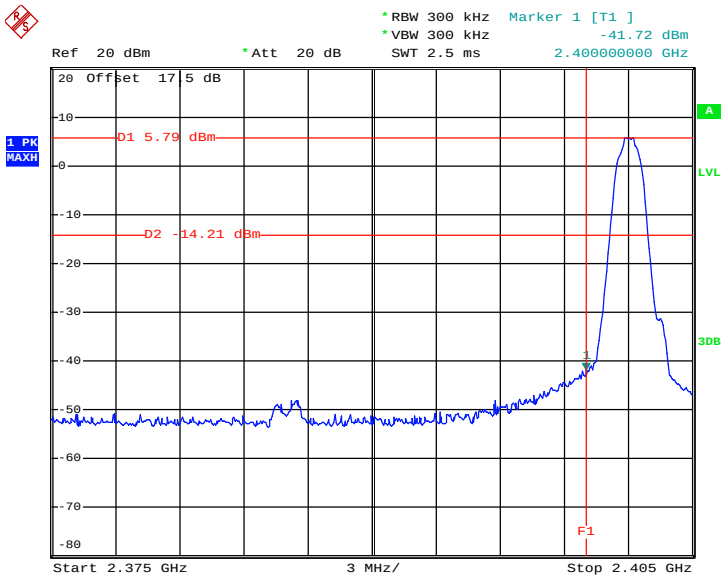
High Band Edge Plot on Channel 78



Date: 31.MAY.2013 10:47:31

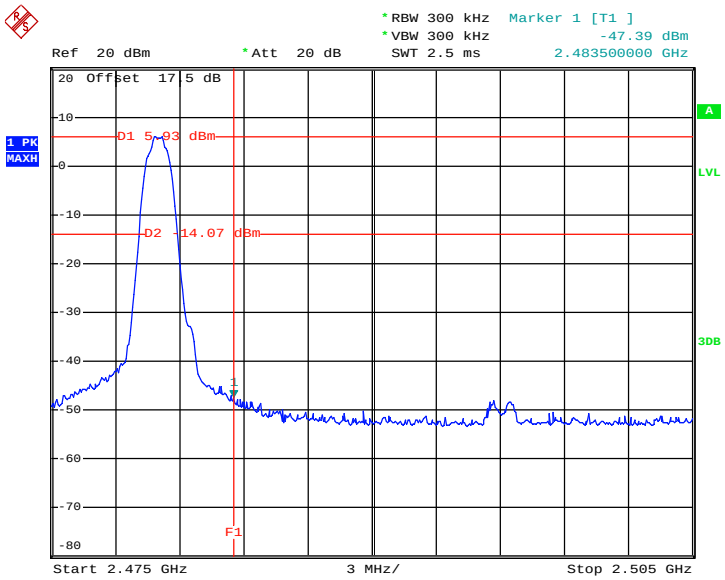
Test Mode :	3Mbps	Temperature :	24~26℃
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Blithe Li

Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 11:44:50

High Band Edge Plot on Channel 78

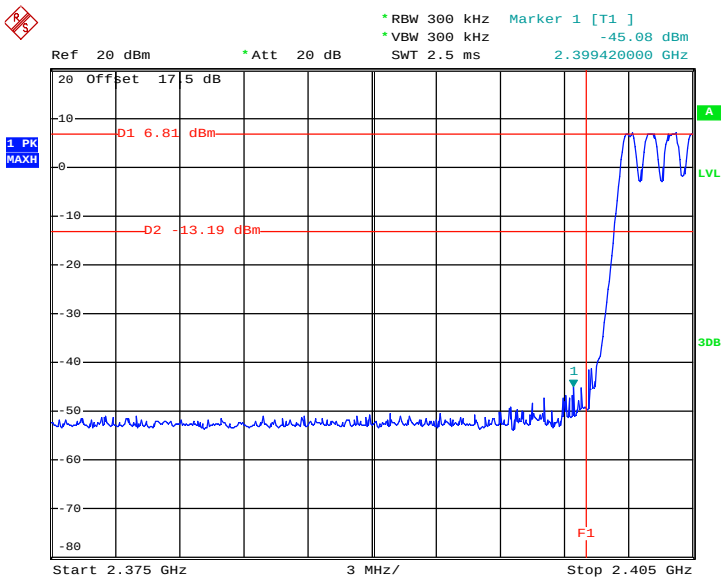


Date: 31.MAY.2013 10:49:25

3.6.7 Test Result of Conducted Hopping Mode Band Edges

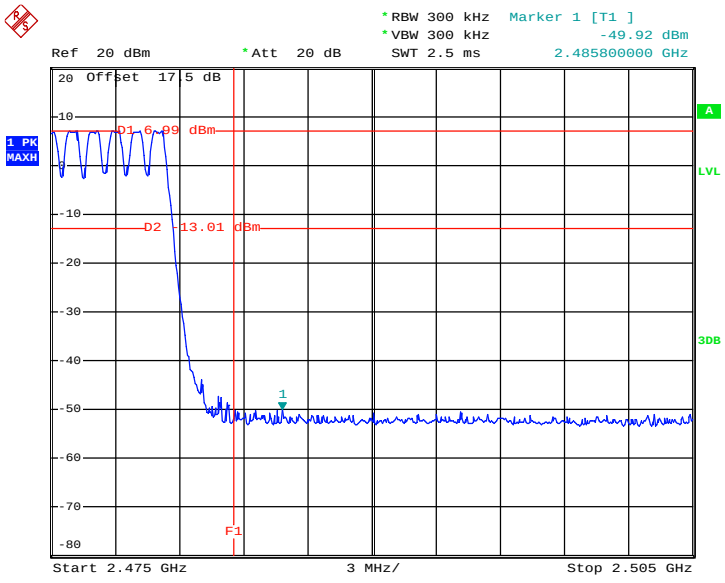
Test Mode :	1Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Hopping Mode Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 12:04:17

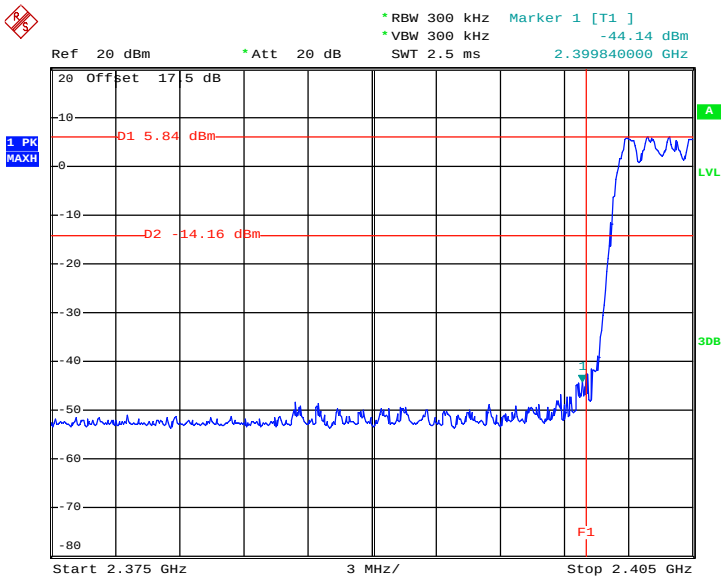
Hopping Mode High Band Edge Plot on Channel 78



Date: 31.MAY.2013 12:03:06

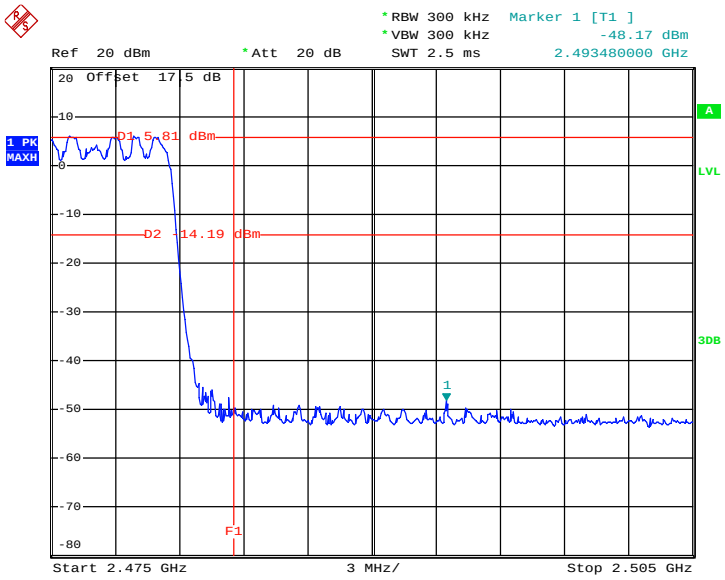
Test Mode :	2Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Hopping Mode Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 12:07:28

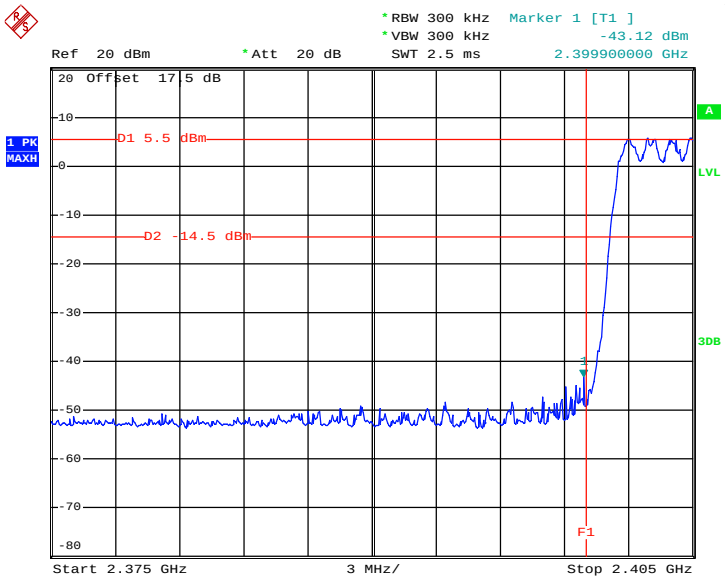
Hopping Mode High Band Edge Plot on Channel 78



Date: 31.MAY.2013 12:06:21

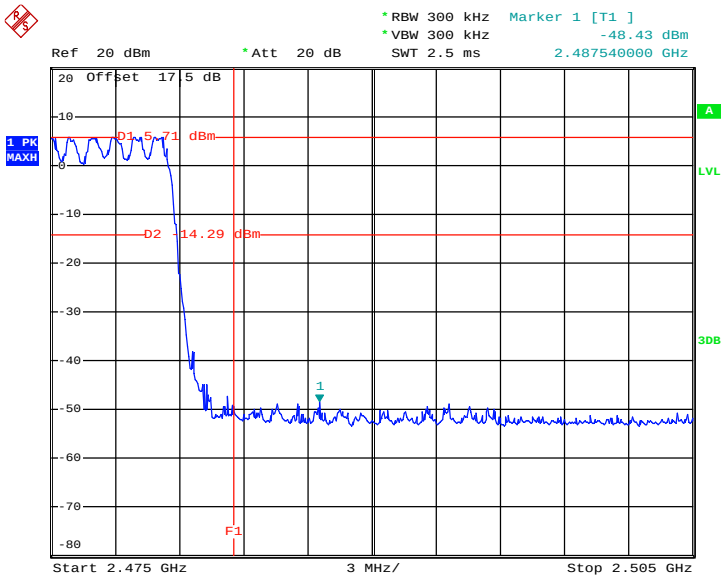
Test Mode :	3Mbps	Temperature :	24~26℃
Test Engineer :	Blithe Li	Relative Humidity :	50~53%

Hopping Mode Low Band Edge Plot on Channel 00



Date: 31.MAY.2013 12:10:32

Hopping Mode High Band Edge Plot on Channel 78



Date: 31.MAY.2013 12:09:31

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

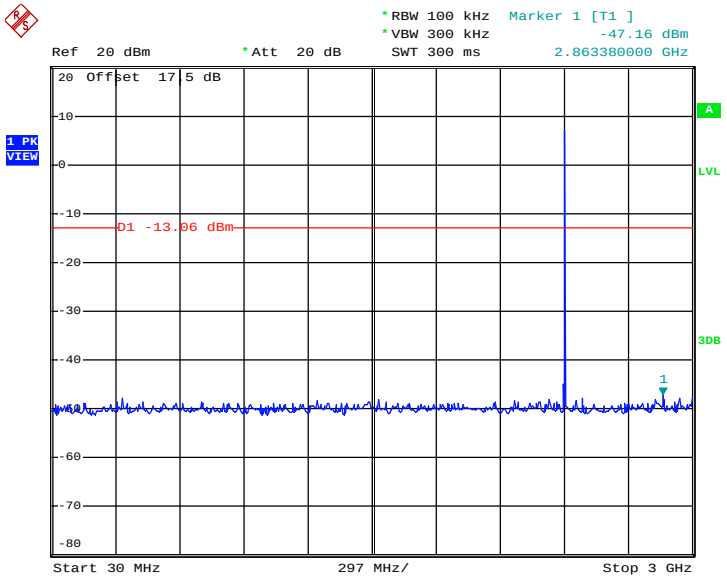
1. The testing follows the guidelines in Spurious RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum 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 Results

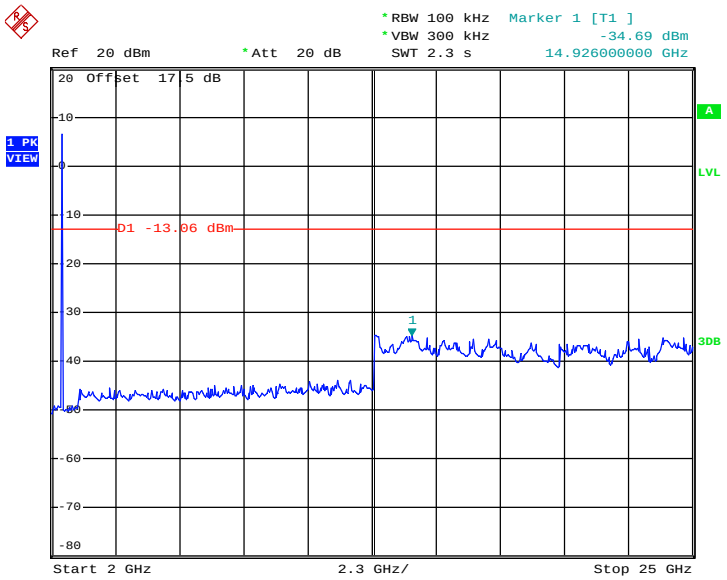
Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Blithe Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 31.MAY.2013 11:13:20

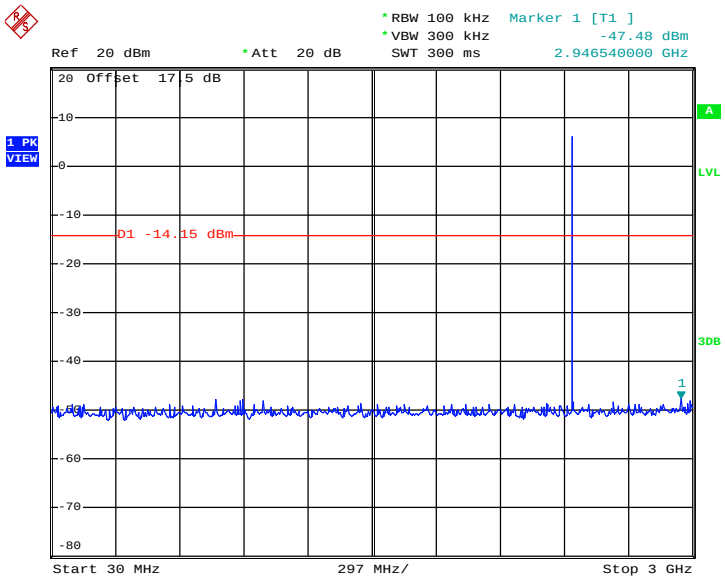
Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz



Date: 31.MAY.2013 11:14:13

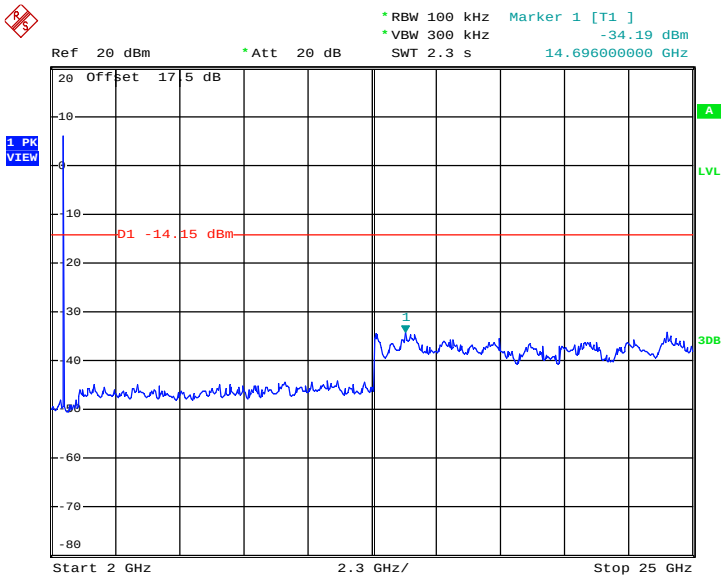
Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Blithe Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 31.MAY.2013 11:15:03

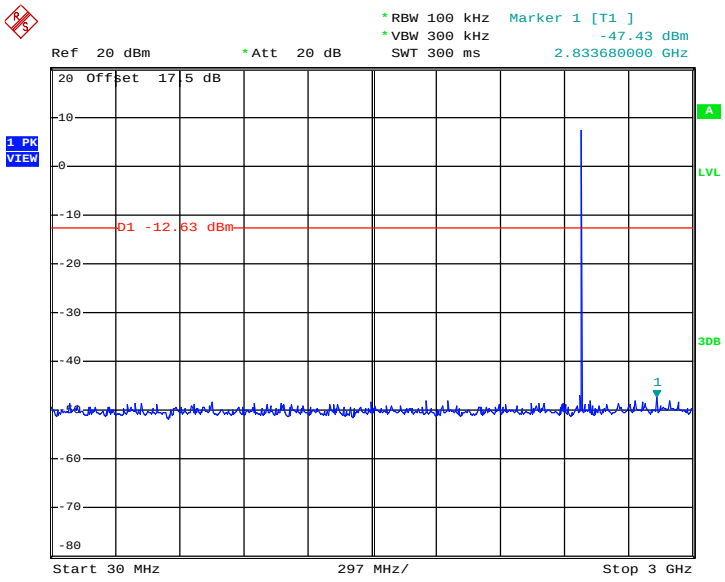
Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz



Date: 31.MAY.2013 11:15:56

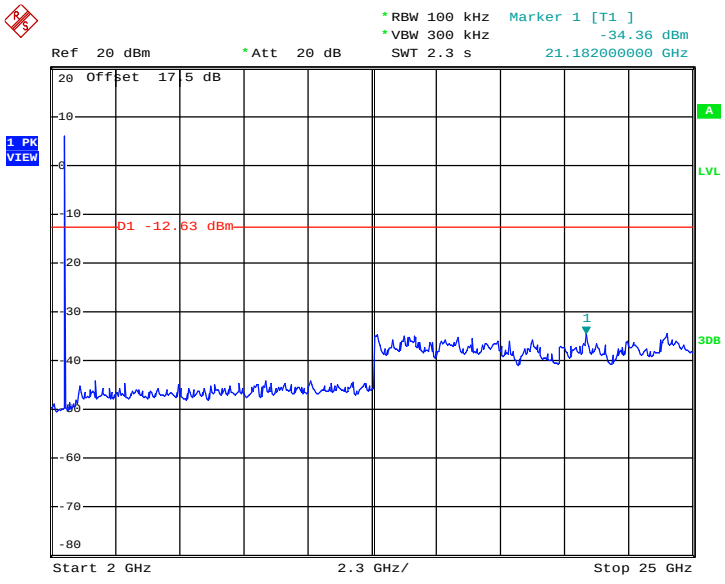
Test Mode :	1Mbps	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Blithe Li

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 31.MAY.2013 11:16:42

Conducted Spurious Emission Plot between 2 GHz ~ 25 GHz



Date: 31.MAY.2013 11:17:35

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.

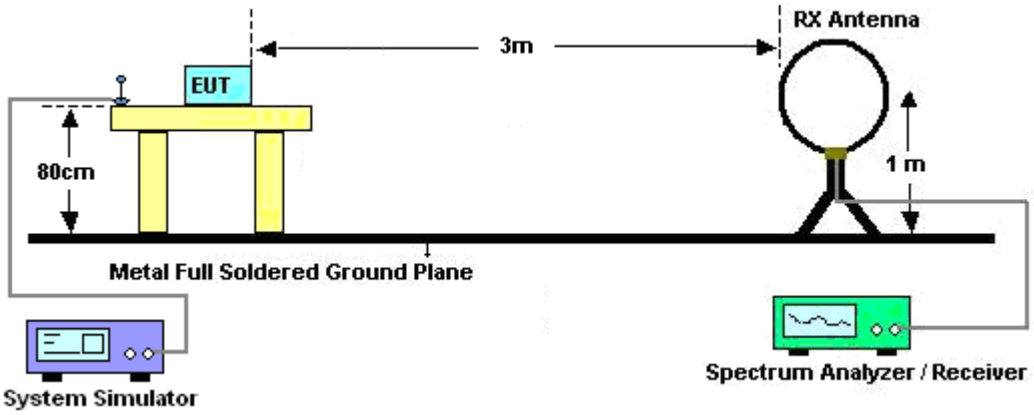
3.8.3 Test Procedures

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. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported
7. 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 ≥ 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 Level = Peak Level + 20*log(Duty cycle)
8. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

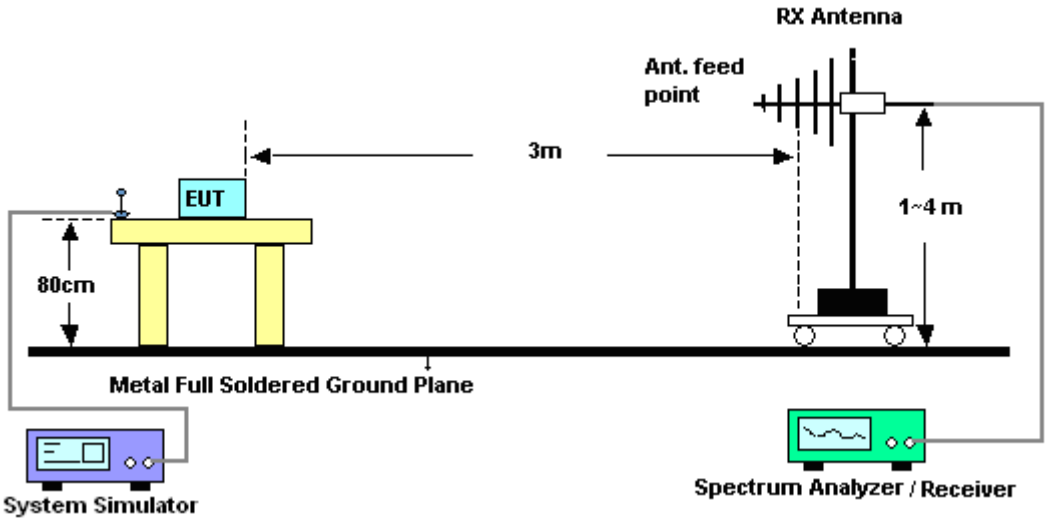
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.73dB) derived from 20log (dwell time/100ms).

3.8.4 Test Setup

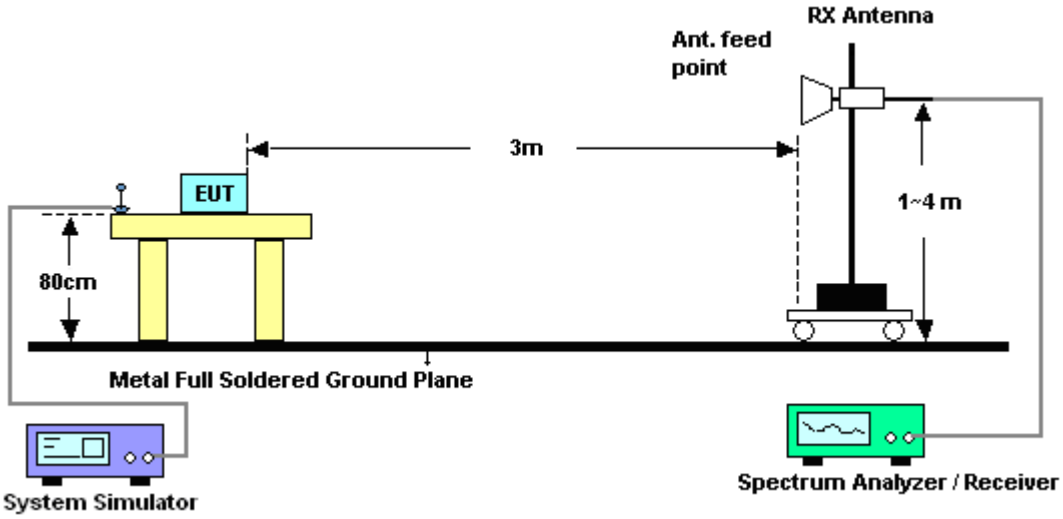
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

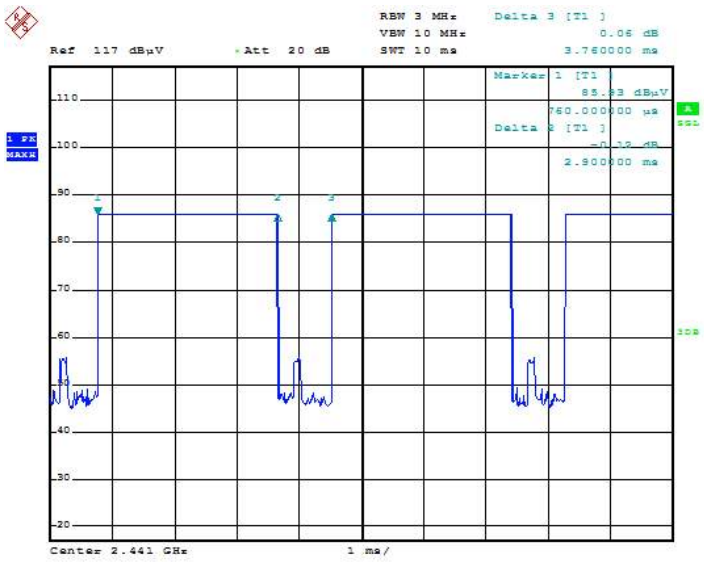


3.8.5 Test Results of Radiated Spurious Emission (9 KHz ~ 30 MHz)

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.

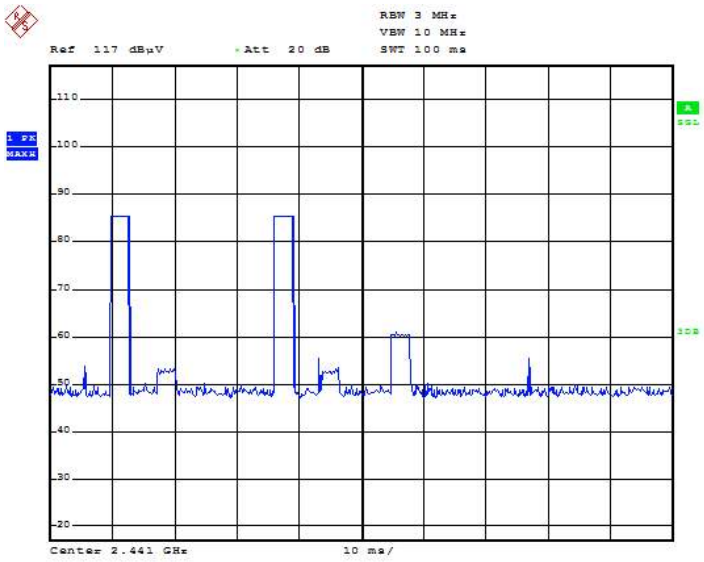
3.8.6 Duty cycle correction factor for average measurement

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



Date: 4.JUN.2013 03:04:00

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



Date: 4.JUN.2013 03:05:42

Note:

1. Duty cycle = on time/100 milliseconds = 2 * 2.90 / 100 = 5.80 %
2. Duty cycle correction factor = 20*log(Duty cycle) = -24.73 dB
3. DH5 has the highest duty cycle and is reported.

3.8.7 Test Result of Radiated Band Edges

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	00	Relative Humidity :	49~50%
		Test Engineer :	Robin Luo

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
2386.41	48.57	-25.43	74	41.8	32.14	4.42	29.79	122	360	Peak
2386.41	23.84	-30.16	54	-	-	-	-	-	-	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
2389.92	51.3	-22.7	74	44.52	32.14	4.42	29.78	102	61	Peak
2389.92	26.57	-27.43	54	-	-	-	-	-	-	Average

Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (24.73dB) derived from 20log (dwell time/100ms).

For example: Average level = 48.57dBuV/m – 24.73 (dB) = 23.84dBuV/m.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	49~50%
		Test Engineer :	Robin Luo

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
2483.5	63.53	-10.47	74	56.55	32.27	4.47	29.76	143	7	Peak
2483.5	38.80	-15.20	54	-	-	-	-	-	-	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	66.31	-7.69	74	59.33	32.27	4.47	29.76	100	48	Peak
2483.5	41.58	-12.42	54	-	-	-	-	-	-	Average

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

Note: Below 1GHz for radiated emission measurement, pre-scanned all test modes and only choose the worst case mode was recorded in the report.

Test Mode :	1Mbps	**Temperature :**	24~25°C
Test Channel :	00	**Relative Humidity :**	49~50%
Test Engineer :	Robin Luo	**Polarization :**	Horizontal
Remark :	1. 2402 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7206 MHz are not within restricted bands, and their limit lines 20dB below the highest emission level. For example, 105.4 dBuV/m - 20dB = 85.4dBuV/m. 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
2399	67.09	-18.31	85.4	60.31	32.14	4.42	29.78	122	360	Peak
2402	105.4	-	-	98.6	32.14	4.44	29.78	122	360	Peak
2402	80.67	-	-	-	-	-	-	122	360	Average
4804	37.64	-36.36	74	55.74	33.63	5.95	57.68	100	162	Peak
7206	38.45	-46.95	85.4	53.7	35.27	7.47	57.99	122	332	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	00	Relative Humidity :	49~50%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2402 MHz is fundamental signal which can be ignored. 2. 2399 MHz and 7206 MHz are not within restricted bands, and their limit lines 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
2399	68.78	-18.16	86.94	62	32.14	4.42	29.78	102	61	Peak
2402	106.94	-	-	100.14	32.14	4.44	29.78	102	61	Peak
2402	82.21	-	-	-	-	-	-	102	61	Average
4804	37.78	-36.22	74	55.88	33.63	5.95	57.68	163	57	Peak
7206	38.84	-48.1	86.94	54.09	35.27	7.47	57.99	132	152	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	39	Relative Humidity :	49~50%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2441 MHz is fundamental signal which can be ignored. 2. 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
2441	102.47	-	-	95.56	32.22	4.45	29.76	152	339	Peak
2441	77.74	-	-	-	-	-	-	152	339	Average
4882	37.63	-36.37	74	55.21	33.8	6.02	57.4	100	129	Peak
7323	40.68	-33.32	74	55.42	35.32	7.9	57.96	200	162	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	39	Relative Humidity :	49~50%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2441 MHz is fundamental signal which can be ignored. 2. 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
2441	105.6	-	-	98.69	32.22	4.45	29.76	147	194	Peak
2441	80.87	-	-	-	-	-	-	147	194	Average
4882	38.28	-35.72	74	55.86	33.8	6.02	57.4	120	336	Peak
7323	39.48	-34.52	74	54.22	35.32	7.9	57.96	100	45	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	49~50%
Test Engineer :	Robin Luo	Polarization :	Horizontal
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. 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
46.49	35.14	-4.86	40	56.08	8.7	0.88	30.52	100	196	Peak
86.26	25.04	-14.96	40	45.42	9.15	1.1	30.63	-	-	Peak
130.88	26.27	-17.23	43.5	43.19	12.4	1.24	30.56	-	-	Peak
255.04	31.55	-14.45	46	47.12	12.9	1.68	30.15	-	-	Peak
271.53	27.94	-18.06	46	43.5	12.85	1.68	30.09	-	-	Peak
337.49	24.93	-21.07	46	38.39	14.62	1.8	29.88	-	-	Peak
2480	102.56	-	-	95.58	32.27	4.47	29.76	143	7	Peak
2480	77.83	-	-	-	-	-	-	-	-	Average
4960	37.68	-36.32	74	54.59	34.01	6.13	57.05	100	122	Peak
7440	39.83	-34.17	74	54.31	35.37	8.08	57.93	100	194	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	1Mbps	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	49~50%
Test Engineer :	Robin Luo	Polarization :	Vertical
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. 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
46.49	24.4	-15.6	40	45.34	8.7	0.88	30.52	100	265	Peak
92.08	18.31	-25.19	43.5	37.62	10.2	1.14	30.65	-	-	Peak
118.27	22.02	-21.48	43.5	39.24	12.17	1.22	30.61	-	-	Peak
134.76	21.16	-22.34	43.5	38.37	12.1	1.24	30.55	-	-	Peak
259.89	17.89	-28.11	46	32.64	13.7	1.68	30.13	-	-	Peak
564.47	21.86	-24.14	46	30.22	18.66	2.23	29.25	-	-	Peak
2480	105.24	-	-	98.26	32.27	4.47	29.76	100	48	Peak
2480	80.51	-	-	-	-	-	-	-	-	Average
4960	38.19	-35.81	74	55.1	34.01	6.13	57.05	125	33	Peak
7440	40.89	-33.11	74	55.37	35.37	8.08	57.93	107	263	Peak

Note: Other harmonics are lower than background noise.

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.

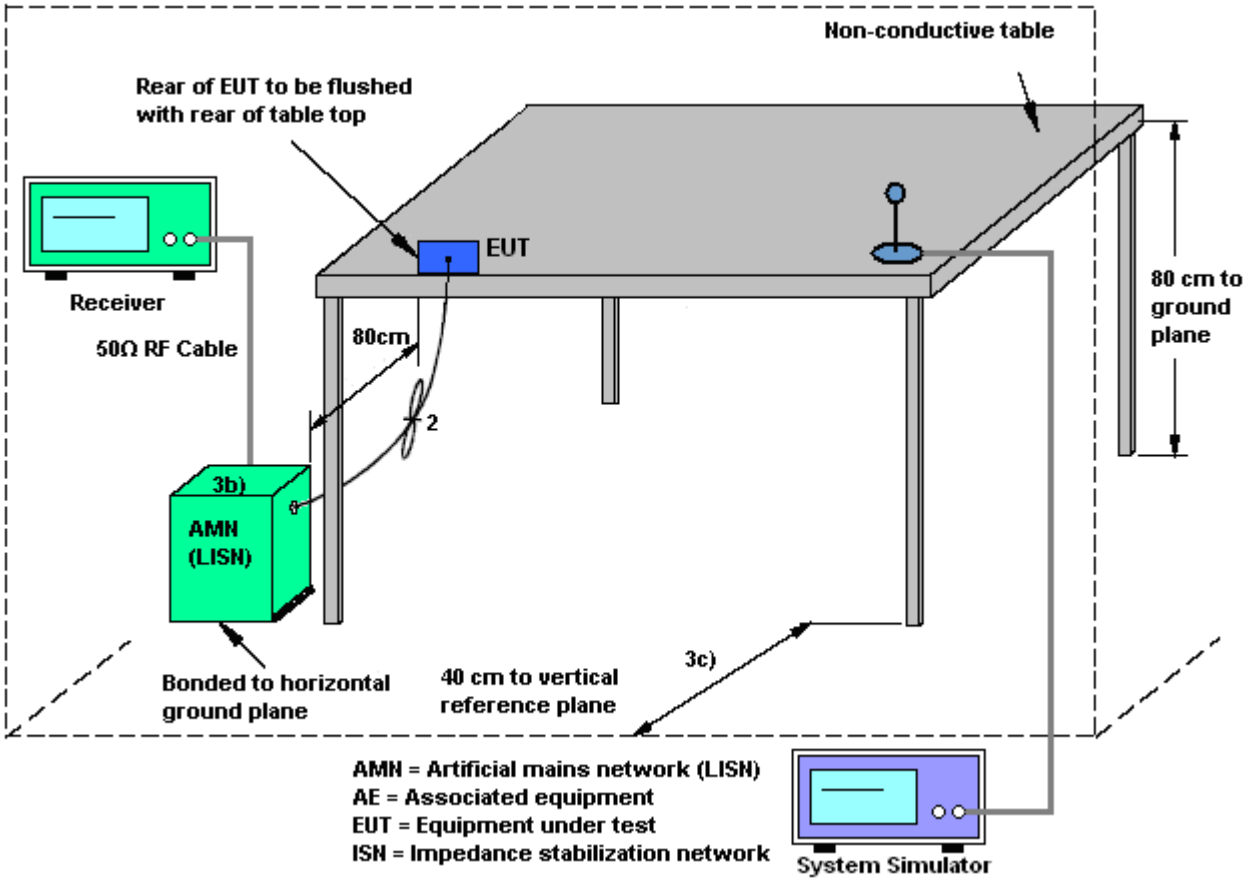
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

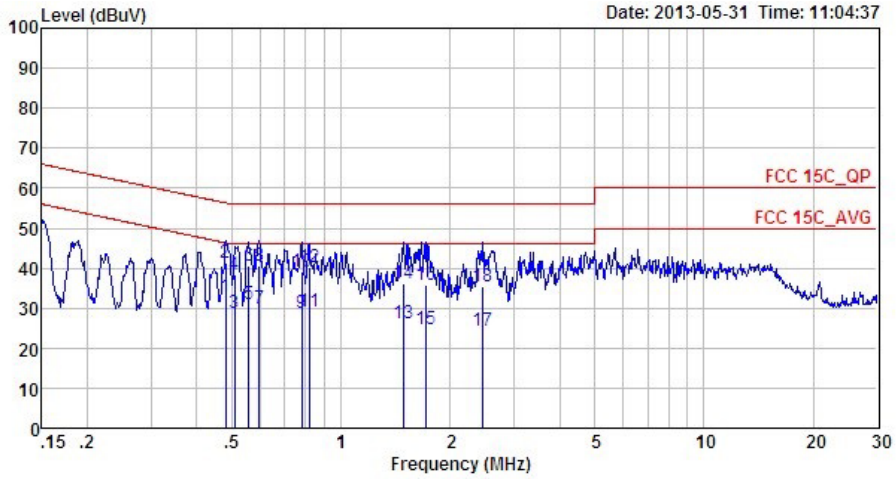
1. The test follows the guidelines in ANSI C63.10-2009 test site requirement.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization 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

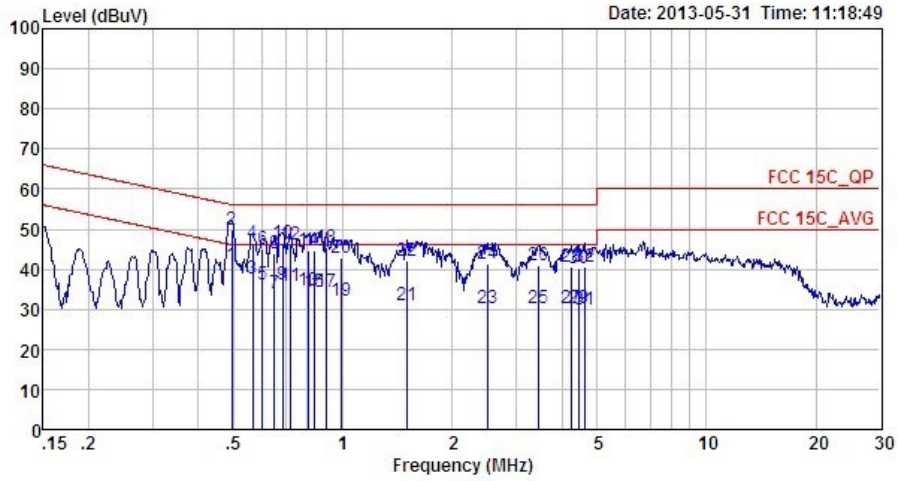
Test Mode :	Mode 1	Temperature :	25~26℃
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable 1 (Charging from Adapter) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_L_2000601 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.48	32.70	-13.62	46.32	22.60	0.02	10.08	Average
2		0.48	41.20	-15.12	56.32	31.10	0.02	10.08	QP
3		0.51	28.61	-17.39	46.00	18.50	0.02	10.09	Average
4		0.51	38.51	-17.49	56.00	28.40	0.02	10.09	QP
5		0.56	30.91	-15.09	46.00	20.80	0.02	10.09	Average
6		0.56	40.51	-15.49	56.00	30.40	0.02	10.09	QP
7		0.59	30.02	-15.98	46.00	19.91	0.02	10.09	Average
8		0.59	40.42	-15.58	56.00	30.31	0.02	10.09	QP
9		0.78	28.63	-17.37	46.00	18.51	0.02	10.10	Average
10		0.78	39.13	-16.87	56.00	29.01	0.02	10.10	QP
11		0.82	29.13	-16.87	46.00	19.00	0.02	10.11	Average
12		0.82	40.13	-15.87	56.00	30.00	0.02	10.11	QP
13		1.49	26.16	-19.84	46.00	16.00	0.03	10.13	Average
14		1.49	36.16	-19.84	56.00	26.00	0.03	10.13	QP
15		1.71	24.77	-21.23	46.00	14.61	0.03	10.13	Average
16		1.71	35.97	-20.03	56.00	25.81	0.03	10.13	QP
17		2.45	24.41	-21.59	46.00	14.20	0.04	10.17	Average
18		2.45	35.41	-20.59	56.00	25.20	0.04	10.17	QP

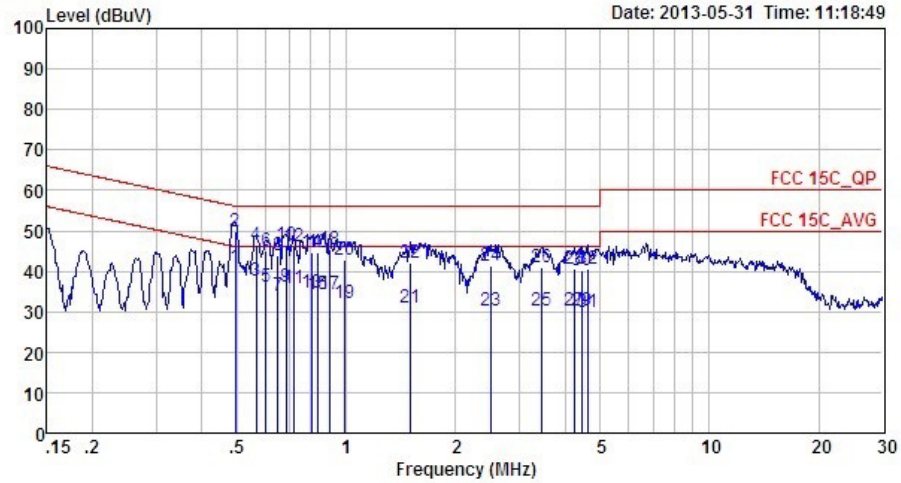
Test Mode :	Mode 1	Temperature :	25~26℃
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable 1 (Charging from Adapter) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C QP LISN N 2000601 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.49	41.10	-5.00	46.10	30.99	0.02	10.09	Average
2	0.49	49.80	-6.30	56.10	39.69	0.02	10.09	QP
3	0.56	37.51	-8.49	46.00	27.40	0.02	10.09	Average
4	0.56	46.41	-9.59	56.00	36.30	0.02	10.09	QP
5	0.60	36.01	-9.99	46.00	25.90	0.02	10.09	Average
6	0.60	45.01	-10.99	56.00	34.90	0.02	10.09	QP
7	0.65	34.12	-11.88	46.00	24.00	0.02	10.10	Average
8	0.65	43.92	-12.08	56.00	33.80	0.02	10.10	QP
9	0.68	36.22	-9.78	46.00	26.10	0.02	10.10	Average
10	0.68	46.32	-9.68	56.00	36.20	0.02	10.10	QP
11	0.72	35.82	-10.18	46.00	25.70	0.02	10.10	Average
12	0.72	46.12	-9.88	56.00	36.00	0.02	10.10	QP
13	0.80	34.63	-11.37	46.00	24.50	0.02	10.11	Average
14	0.80	44.63	-11.37	56.00	34.50	0.02	10.11	QP
15	0.83	34.43	-11.57	46.00	24.30	0.02	10.11	Average
16	0.83	44.73	-11.27	56.00	34.60	0.02	10.11	QP
17	0.90	34.33	-11.67	46.00	24.20	0.02	10.11	Average
18	0.90	45.53	-10.47	56.00	35.40	0.02	10.11	QP
19	0.99	32.13	-13.87	46.00	22.00	0.02	10.11	Average

Test Mode :	Mode 1	Temperature :	25~26℃
Test Engineer :	Leo Liao	Relative Humidity :	48~49%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable 1 (Charging from Adapter) + Earphone		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_N_2000601 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
20	0.99	42.63	-13.37	56.00	32.50	0.02	10.11	QP
21	1.50	30.85	-15.15	46.00	20.69	0.03	10.13	Average
22	1.50	41.95	-14.05	56.00	31.79	0.03	10.13	QP
23	2.51	30.41	-15.59	46.00	20.20	0.04	10.17	Average
24	2.51	41.41	-14.59	56.00	31.20	0.04	10.17	QP
25	3.45	30.34	-15.66	46.00	20.10	0.05	10.19	Average
26	3.45	41.04	-14.96	56.00	30.80	0.05	10.19	QP
27	4.25	30.26	-15.74	46.00	20.00	0.07	10.19	Average
28	4.25	40.46	-15.54	56.00	30.20	0.07	10.19	QP
29	4.48	30.16	-15.84	46.00	19.90	0.07	10.19	Average
30	4.48	40.36	-15.64	56.00	30.10	0.07	10.19	QP
31	4.62	30.06	-15.94	46.00	19.80	0.07	10.19	Average
32	4.62	40.76	-15.24	56.00	30.50	0.07	10.19	QP

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	FSP30	101400	9kHz~30GHz	Mar. 28, 2013	May 30, 2013~ May 31, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	May 30, 2013~ May 31, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	May 30, 2013~ May 31, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
DC Power Supply	TOPWORD	3303DR	N/A714621	N/A	Mar. 28, 2013	May 30, 2013~ May 31, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Thermal Chamber	Hongzhan	LP-150U	HD20120425	N/A	Mar. 28, 2013	May 30, 2013~ May 31, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Bluetooth Base Station	Anritsu	MT8852B	6K00004935	BT EDR	Oct. 12, 2012	May 30, 2013~ May 31, 2013	Oct. 11, 2013	Conducted (TH01-SZ)
ESCI TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Mar. 28, 2013	Jun. 04, 2013~ Jun. 06, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSP30	101362	9kHz~30GHz	Oct. 11, 2012	Jun. 04, 2013~ Jun. 06, 2013	Oct. 10, 2013	Radiation (03CH01-SZ)
Double Ridge Horn Amtenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2012	Jun. 04, 2013~ Jun. 06, 2013	Oct. 11, 2013	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Jun. 04, 2013~ Jun. 06, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3GHz Gain 30dB	Mar. 28, 2013	Jun. 04, 2013~ Jun. 06, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Jun. 04, 2013~ Jun. 06, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 23, 2012	Jun. 04, 2013~ Jun. 06, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100321	9KHz~30MHZ	Oct. 22, 2012	Jun. 04, 2013~ Jun. 06, 2013	Oct. 21, 2013	Radiation (03CH01-SZ)
Bluetooth Base Station	Anritsu	MT8852B	6K00004935	BT EDR	Oct. 12, 2012	Jun. 04, 2013~ Jun. 06, 2013	Oct. 11, 2013	Radiation (03CH01-SZ)
ESCIO TEST Receiver	R&S	1142.8007.03	100724	9kHz~3GHz	Mar. 28, 2013	May 31, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Mar. 28, 2013	May 31, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103892	9kHz~30MHz	Mar. 28, 2013	May 31, 2013	Mar. 27, 2014	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	N/A	Nov. 20, 2012	May 31, 2013	Nov. 19, 2013	Conduction (CO01-SZ)
AC Filter	ETS-LINDGREN	LRE-2030/PEN 256260	00093783	N/A	N/A	May 31, 2013	N/A	Conduction (CO01-SZ)
AC Filter	ETS-LINDGREN	LRE-2030/PEN 256260	00097973	N/A	N/A	May 31, 2013	N/A	Conduction (CO01-SZ)
System Simulator	Agilent	E5515C	MY50264168	GSM/WCDMA /CDMA2000	Oct. 09, 2012	May 31, 2013	Oct. 08, 2013	Conduction (CO01-SZ)

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))	2.54

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.72

Appendix A. Photographs of EUT

Please refer to Sporton report number EP342509 as below.