FCC RF Test Report

APPLICANT	:	HTC Corporation
EQUIPMENT	:	Smartphone
MODEL NAME	:	PK76310
FCC ID	:	NM8PK76310
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DSS) Spread Spectrum Transmitter

The product was received on Feb. 17, 2012 and completely tested on Mar. 22, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 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

Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR221711A	Rev. 01	Initial issue of report	Mar. 23, 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	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.8	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 7.70 dB at 0.190 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.30 dB at 2483.500 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

HTC Corporation
No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan

1.2 Manufacturer

HTC Corporation
No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smartphone
Model Name	PK76310
FCC ID	NM8PK76310
Sample 1	EUT with LCM1, Camera 1, and Battery 1
Sample 2	EUT with LCM2, Camera 2, and Battery 2
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 1.96 dBm (0.0016 W) Bluetooth EDR (2Mbps) : 1.56 dBm (0.0014 W) Bluetooth EDR (3Mbps) : 2.12 dBm (0.0016 W)
Antenna Type	PIFA Antenna with gain 2.00 dBi
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
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.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st 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.
	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
- 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A

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:

Band	Bluetooth RF Output Power		
Channel	00	39	78
Frequency	2402	2441	2480
Peak Power	1.76	2.12	1.98

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 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, laptop / tablet modes.

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

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

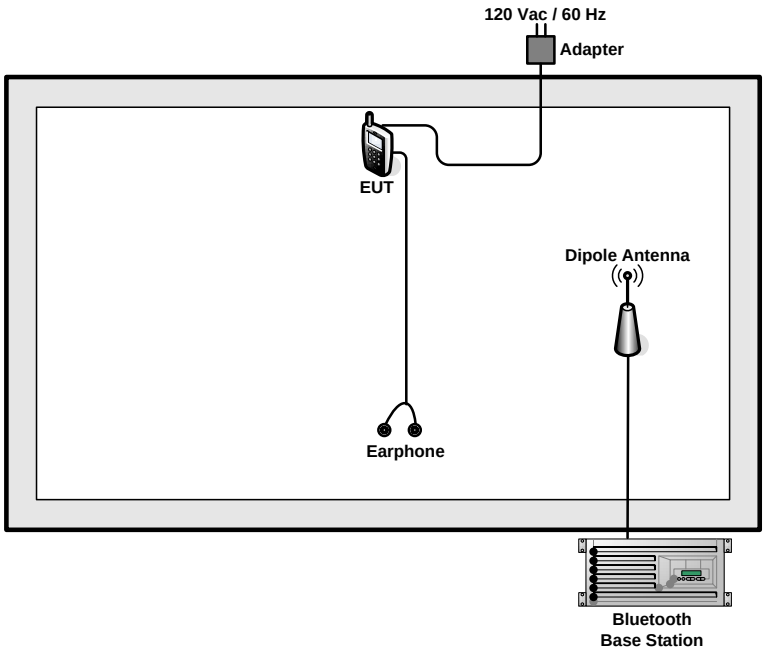
Test Cases			
Test Item	**Data Rate / Modulation**		
	Bluetooth 1Mbps GFSK	**Bluetooth EDR 2Mbps π/4-DQPSK**	**Bluetooth EDR 3Mbps 8-DPSK**
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 : CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 1 Mode 2: CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 2		

Remark:

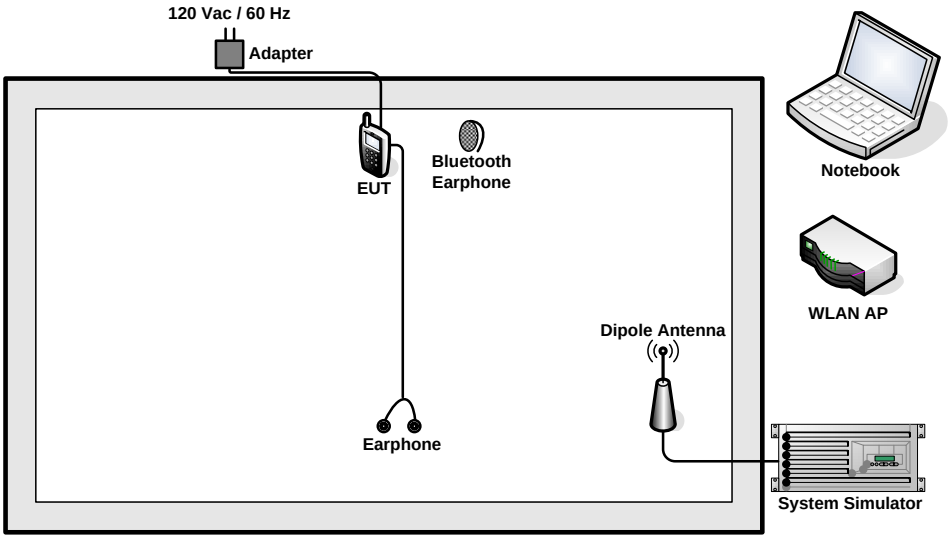
1. All the cases of conducted and radiation were only for Sample 1.
2. For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.
3. For conducted emission, the worst case is mode 1; only the test data of this mode was reported.
4. All the Radiation tests were performance with USB Cable 1, Adapter 1, and Earphone 1.

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, “HTC SSD Test Tool ==> Bluetooth Test Mode” was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

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 a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. 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.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

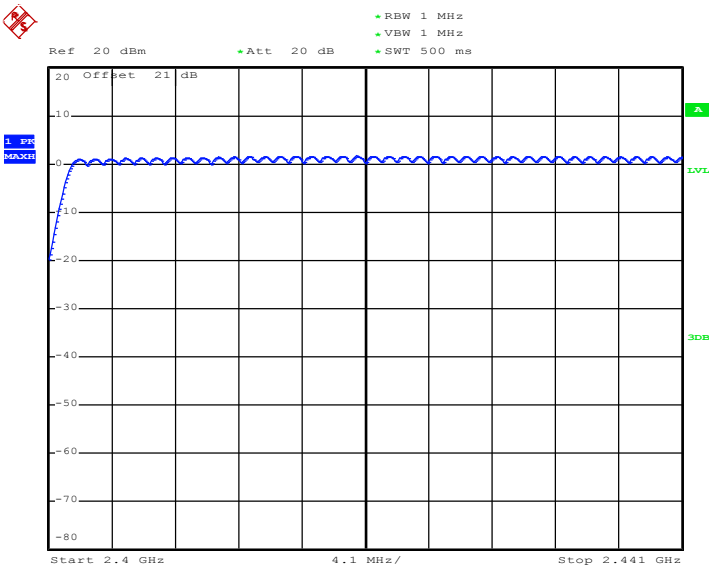
3.1.4 Test Setup

3.1.5 Test Result of Number of Hopping Frequency

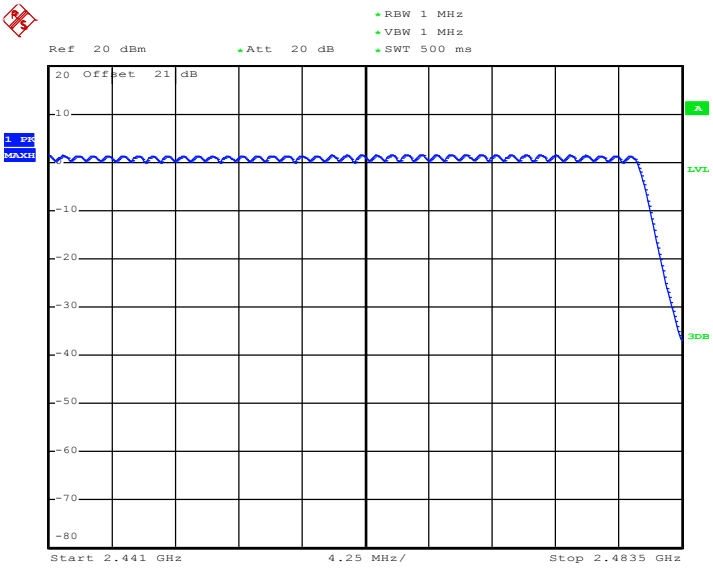
Test Mode :	Mode 7~9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 24.FEB.2012 01:53:24



Date: 24.FEB.2012 01:59:20

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

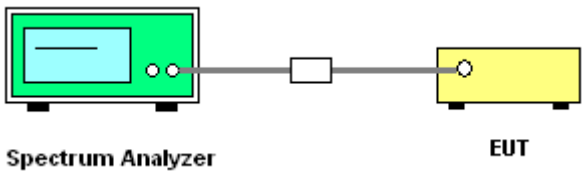
3.2.2 Measuring Instruments

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 a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   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. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

3.2.4 Test Setup

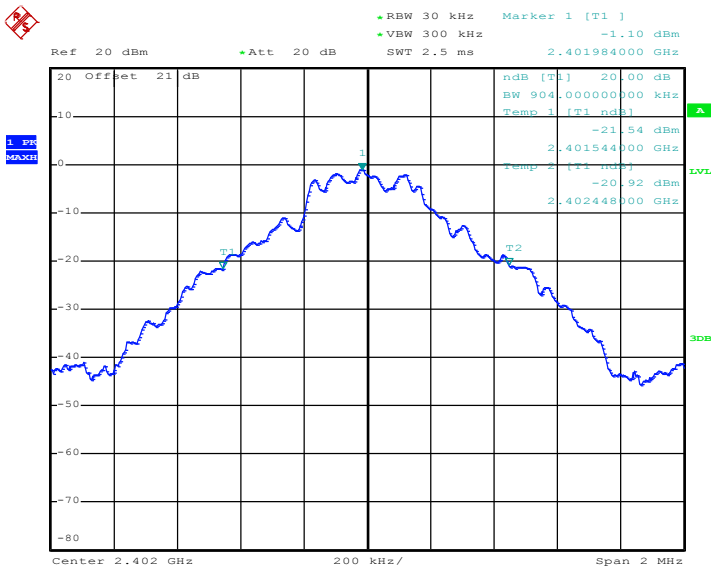


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

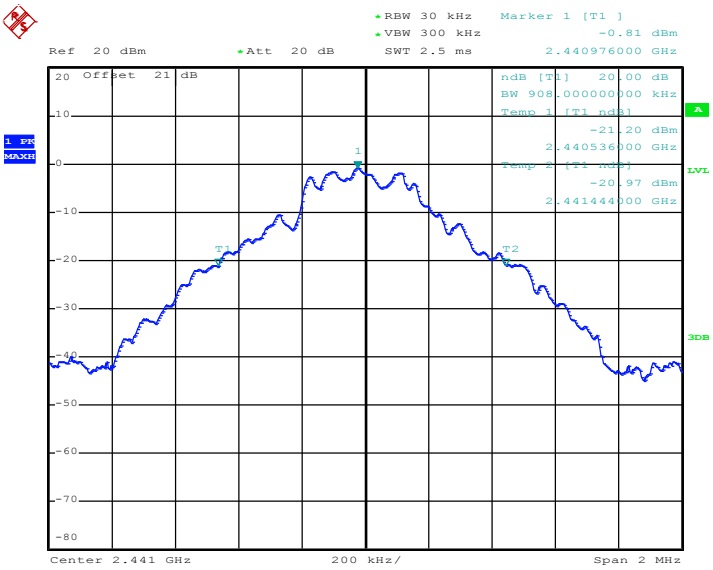
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.904
39	2441	0.908
78	2480	0.904

20 dB Bandwidth Plot on Channel 00



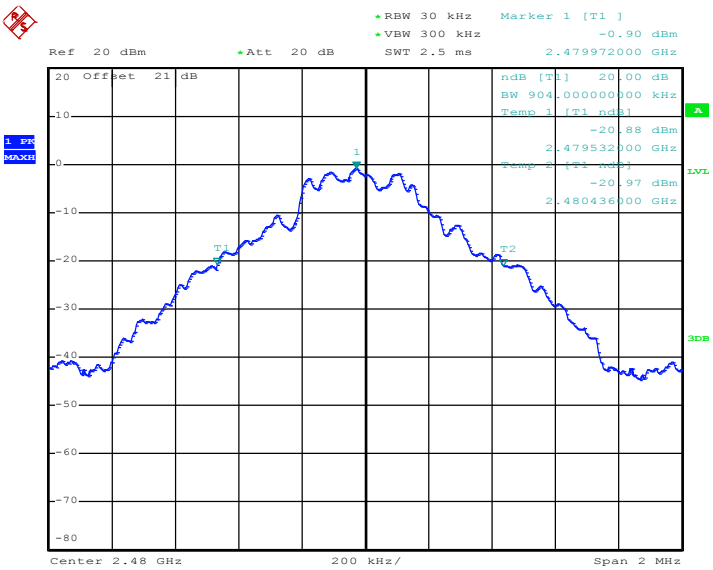
Date: 24.FEB.2012 01:26:19

20 dB Bandwidth Plot on Channel 39



Date: 24.FEB.2012 01:26:43

20 dB Bandwidth Plot on Channel 78

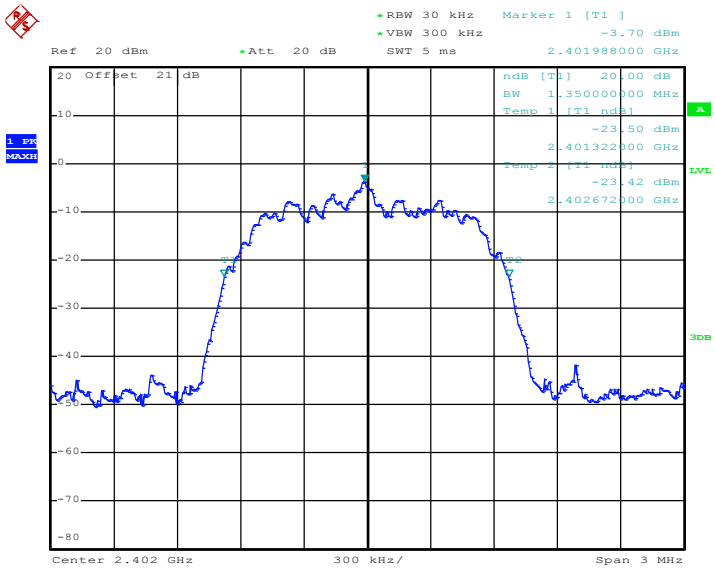


Date: 24.FEB.2012 01:27:17

Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

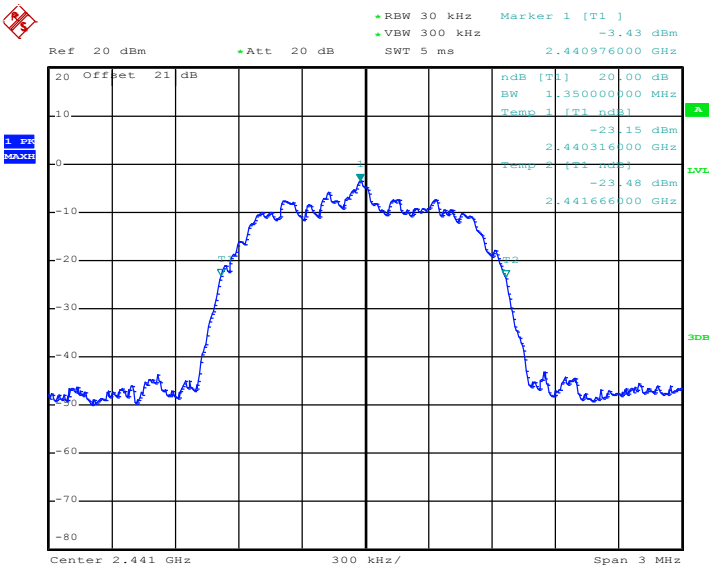
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.350
39	2441	1.350
78	2480	1.350

20 dB Bandwidth Plot on Channel 00



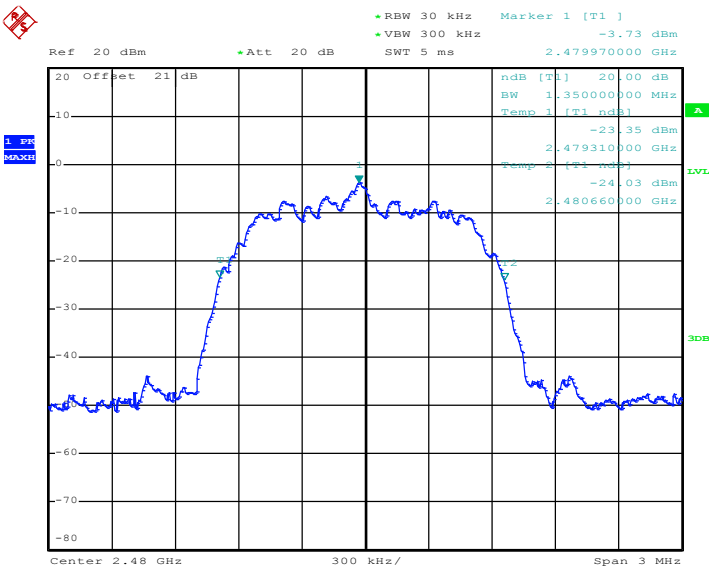
Date: 24.FEB.2012 01:27:45

20 dB Bandwidth Plot on Channel 39



Date: 24.FEB.2012 01:28:10

20 dB Bandwidth Plot on Channel 78

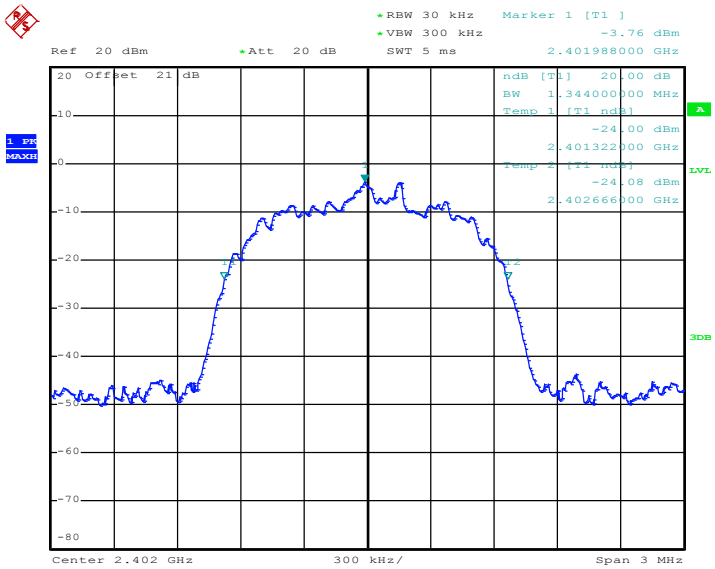


Date: 24.FEB.2012 01:28:31

Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

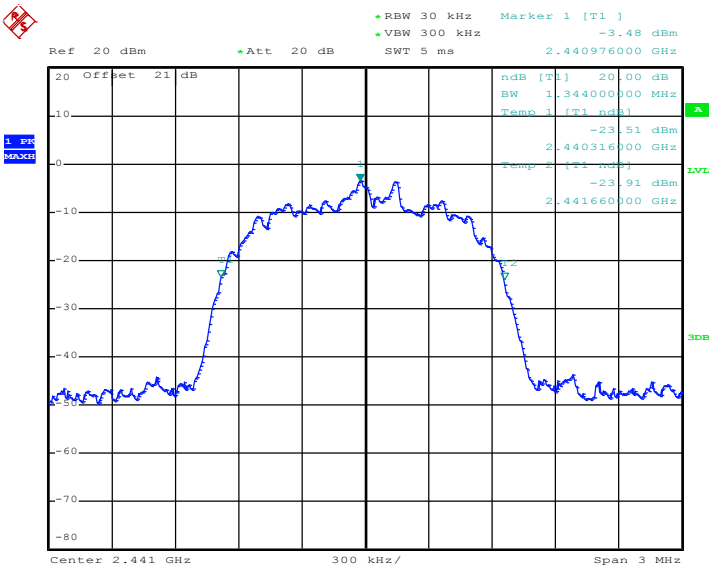
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.344
39	2441	1.344
78	2480	1.344

20 dB Bandwidth Plot on Channel 00



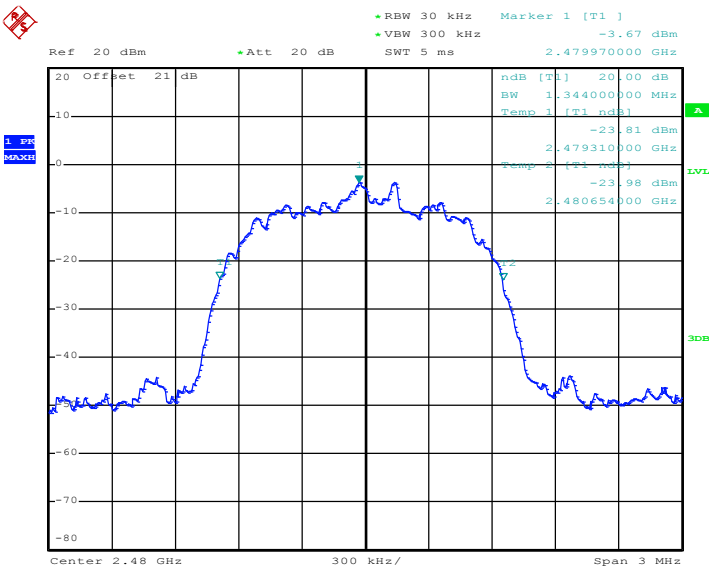
Date: 24.FEB.2012 01:28:59

20 dB Bandwidth Plot on Channel 39



Date: 24.FEB.2012 01:29:24

20 dB Bandwidth Plot on Channel 78



Date: 24.FEB.2012 01:29:54

3.3 Hopping Channel Separation Measurement

3.3.1 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.

3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. 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.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

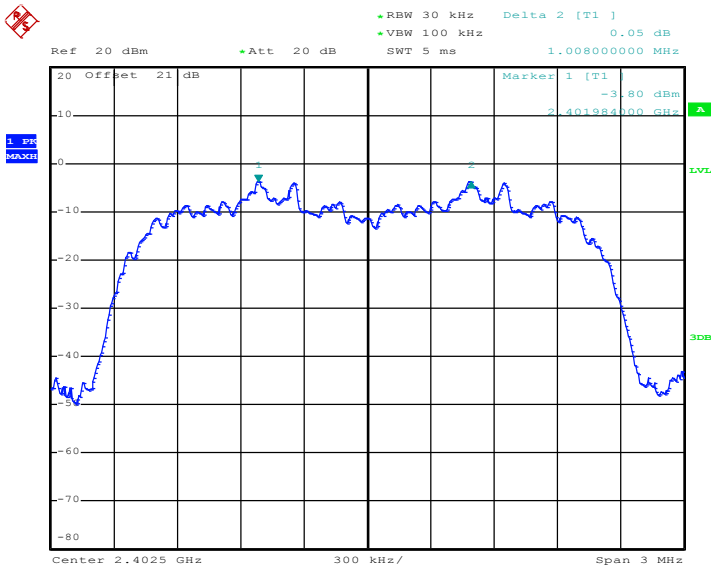
3.3.4 Test Setup

3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

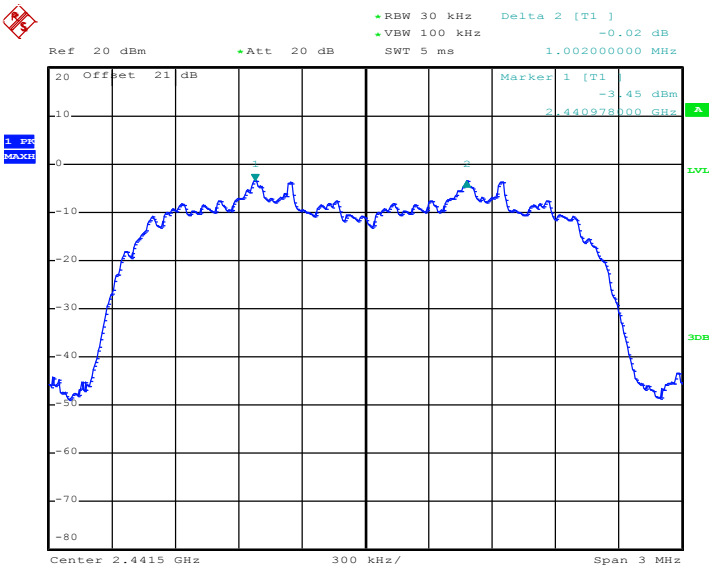
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.8960	Pass
39	2441	1.002	0.8960	Pass
78	2480	1.002	0.8960	Pass

Channel Separation Plot on Channel 00 - 01



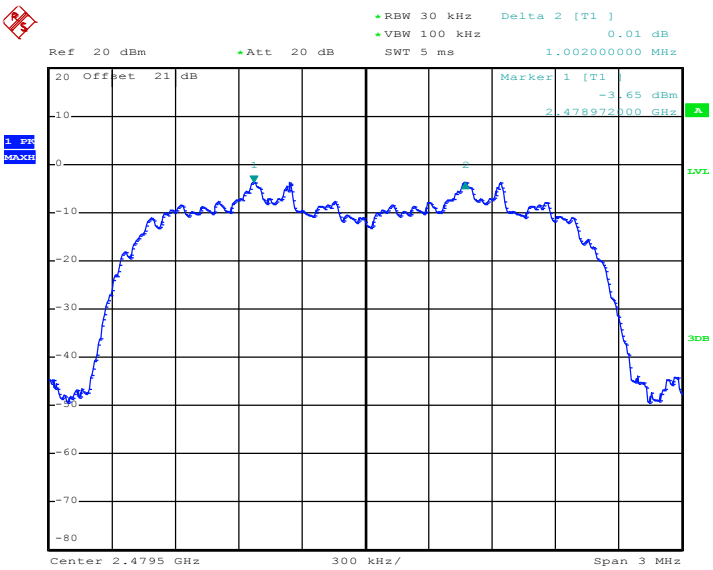
Date: 24.FEB.2012 01:24:27

Channel Separation Plot on Channel 39 - 40



Date: 24.FEB.2012 01:25:06

Channel Separation Plot on Channel 77 - 78



Date: 24.FEB.2012 01:25:45

3.4 Dwell Time Measurement

3.4.1 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.

3.4.2 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 a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. 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.
5. Use the marker-delta function to calculate the dwell time.

3.4.4 Test Setup

3.4.5 Test Result of Dwell Time

Test Mode :	Mode 8	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.60	2978.00	0.34	0.4	Pass

Remark:

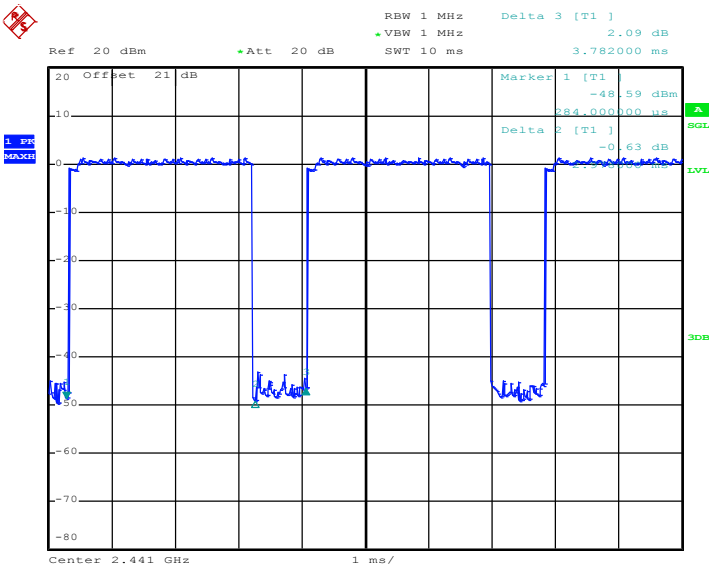
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time

2. 79 channels come from the Hopping Channel number.

3. Average Hopping Channel = hops/sweep time

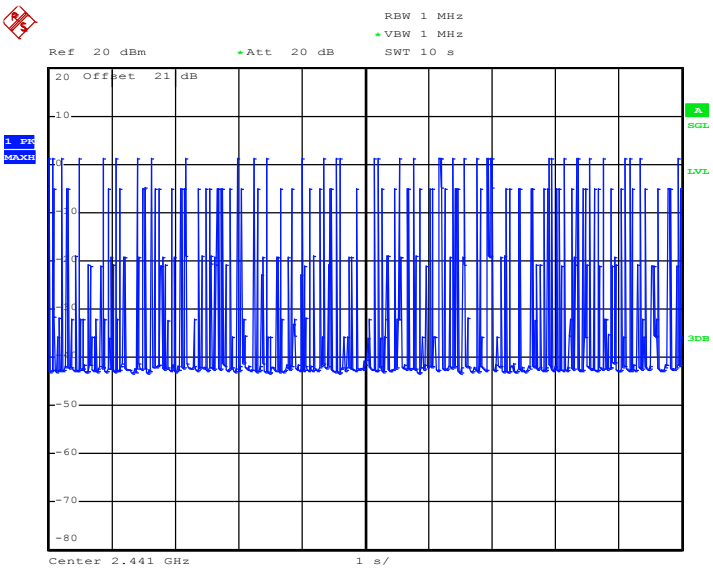
4. t: Package Transfer Time(us)

3DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 24.FEB.2012 01:13:24

3DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 24.FEB.2012 01:15:37

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 a low loss cable.

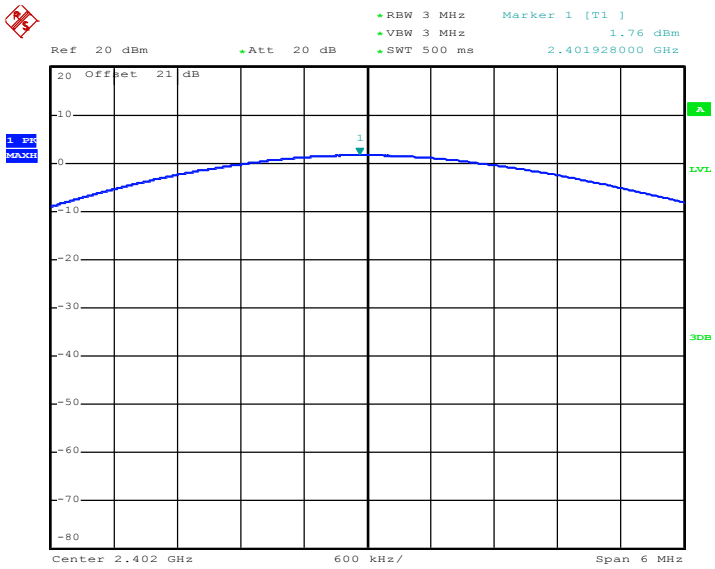
3.5.4 Test Setup

3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

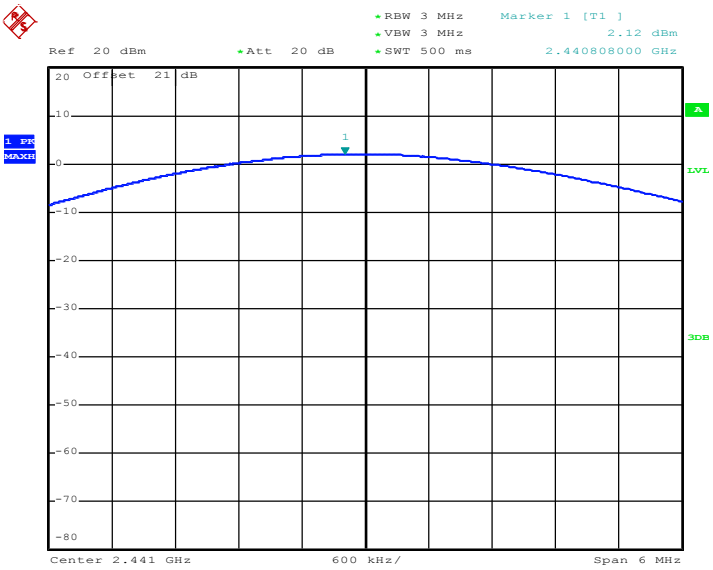
Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	1.76	20.97	Pass
39	2441	2.12	20.97	Pass
78	2480	1.98	20.97	Pass

Peak Output Power Plot on Channel 00



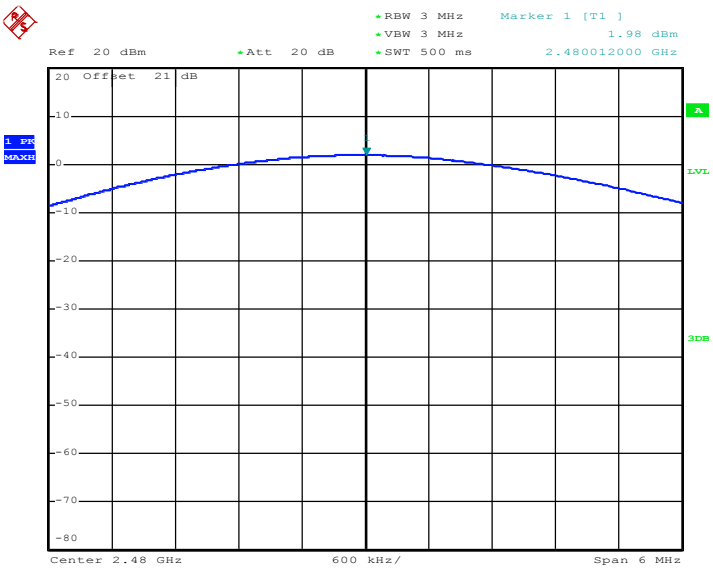
Date: 24.FEB.2012 01:01:39

Peak Output Power Plot on Channel 39



Date: 24.FEB.2012 01:02:54

Peak Output Power Plot on Channel 78



Date: 24.FEB.2012 01:04:09

3.6 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

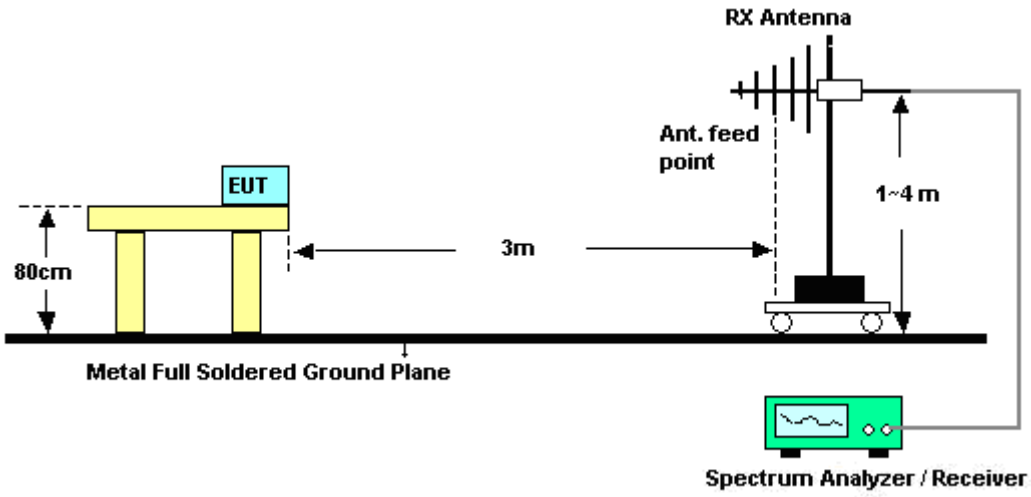
See list of measuring instruments of this test report.

3.6.3 Test Procedures

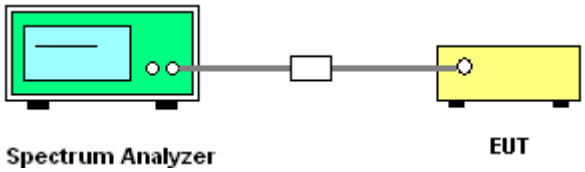
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300KHz, Video bandwidth (VBW) ≥ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.6.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
2383.34	44.33	-29.67	74	40.23	32.03	6.03	33.96	169	29	Peak
2383.34	32.03	-21.97	54	27.93	32.03	6.03	33.96	169	29	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
2336.22	44.34	-29.66	74	40.35	31.98	5.95	33.94	100	334	Peak
2336.22	31.9	-22.1	54	27.91	31.98	5.95	33.94	100	334	Average

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

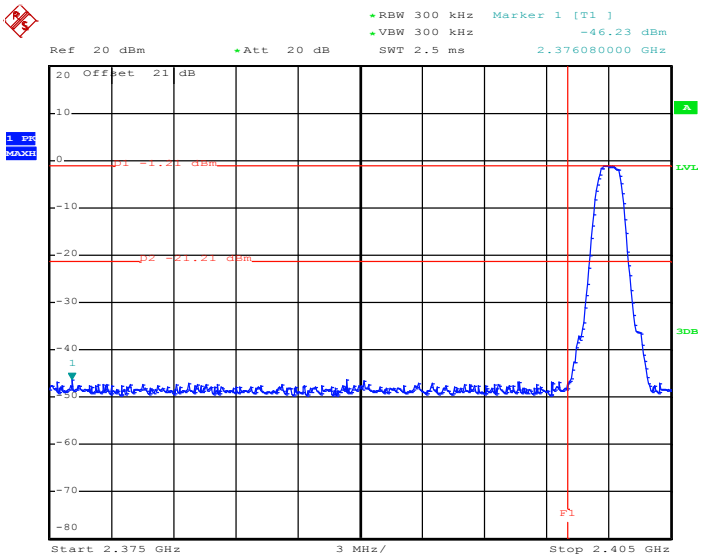
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	61.46	-12.54	74	57.1	32.18	6.18	34	200	29	Peak
2483.5	48.7	-5.3	54	44.34	32.18	6.18	34	200	29	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	58.03	-15.97	74	53.67	32.18	6.18	34	130	50	Peak
2483.5	46.27	-7.73	54	41.91	32.18	6.18	34	130	50	Average

3.6.6 Test Result of Conducted Band Edges

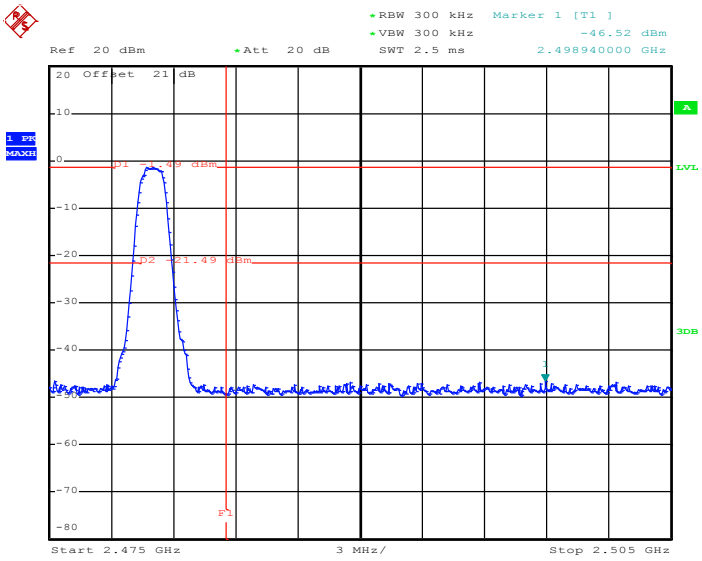
Test Mode :	Mode 7 and 9	**Temperature :**	24~26℃
Test Channel :	00 and 78	**Relative Humidity :**	50~53%
		Test Engineer :	Pinkston Tu

Low Band Edge Plot on Channel 00



Date: 24.FEB.2012 01:45:51

High Band Edge Plot on Channel 78



Date: 22.MAR.2012 15:11:29

3.7 Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

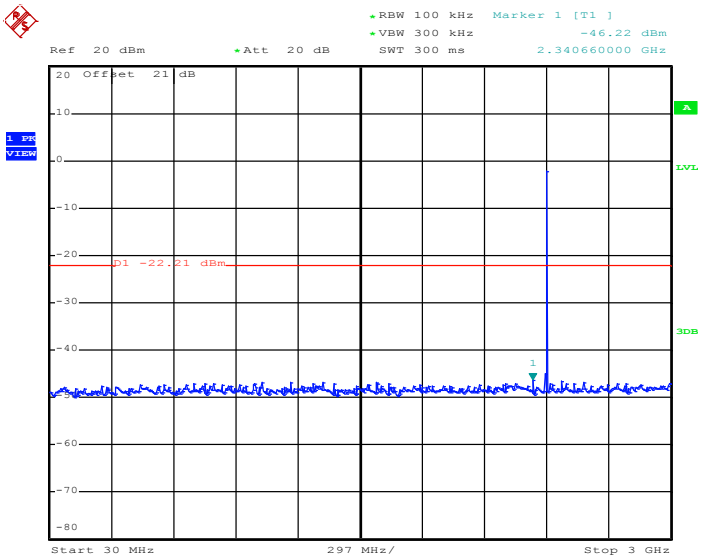
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 KHz, Video bandwidth (VBW) ≥ RBW, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 KHz RBW.

3.7.4 Test Setup

3.7.5 Test Result

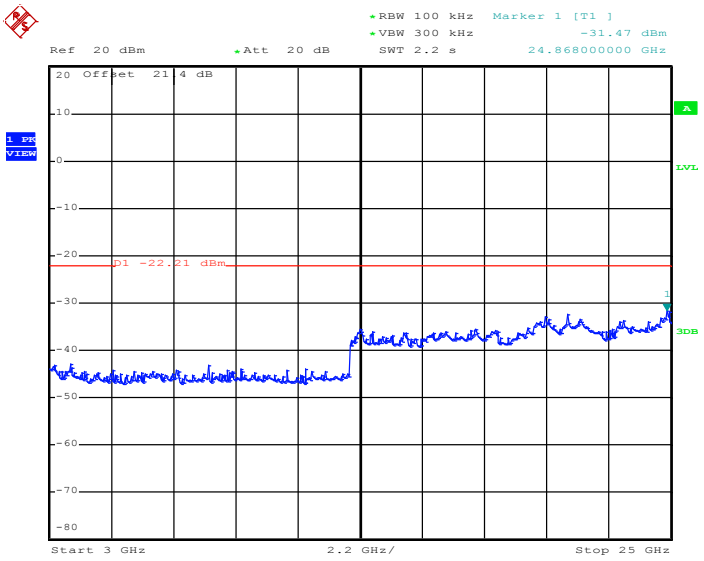
Test Mode :	Mode 7	Temperature :	24~26℃
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 24.FEB.2012 01:45:10

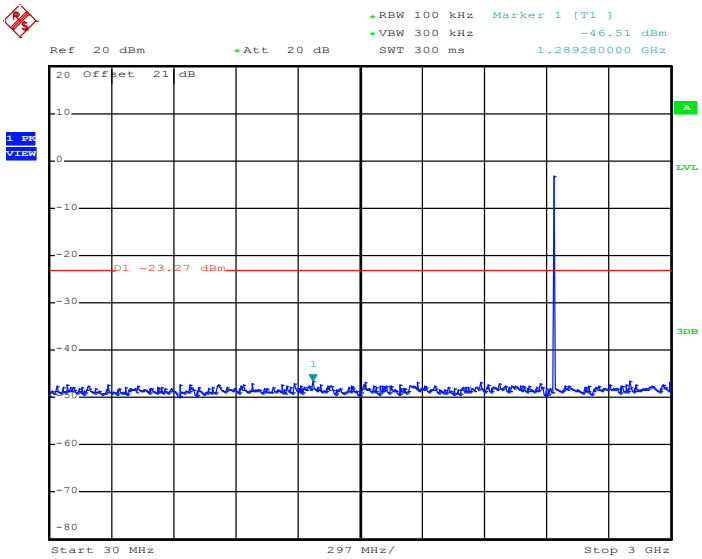
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 24.FEB.2012 01:45:32

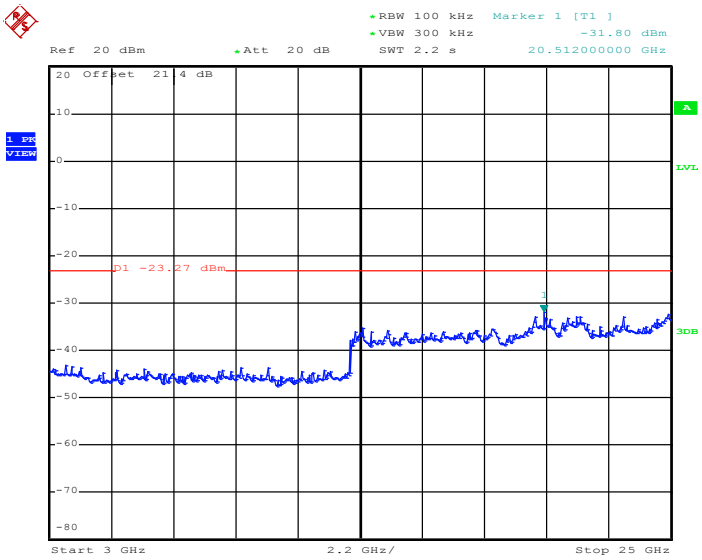
Test Mode :	Mode 8	Temperature :	24~26℃
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 24.FEB.2012 01:44:21

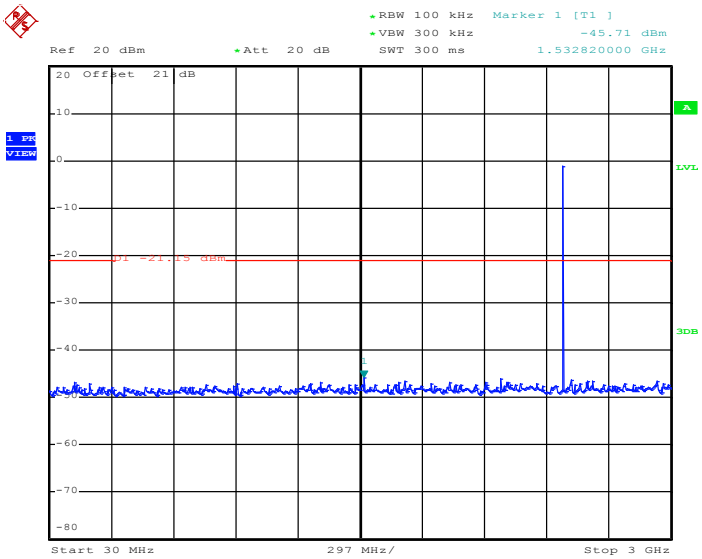
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 24.FEB.2012 01:44:43

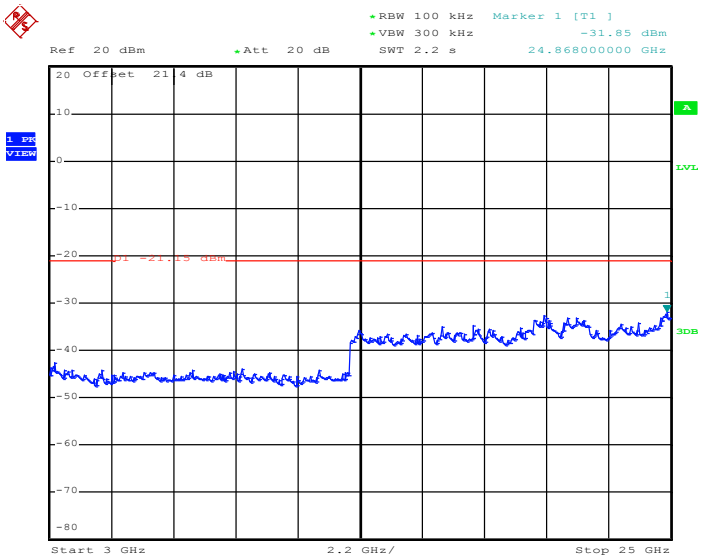
Test Mode :	Mode 9	Temperature :	24~26℃
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 24.FEB.2012 01:43:20

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 24.FEB.2012 01:43:42

3.8 AC Conducted Emission Measurement

3.8.1 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.

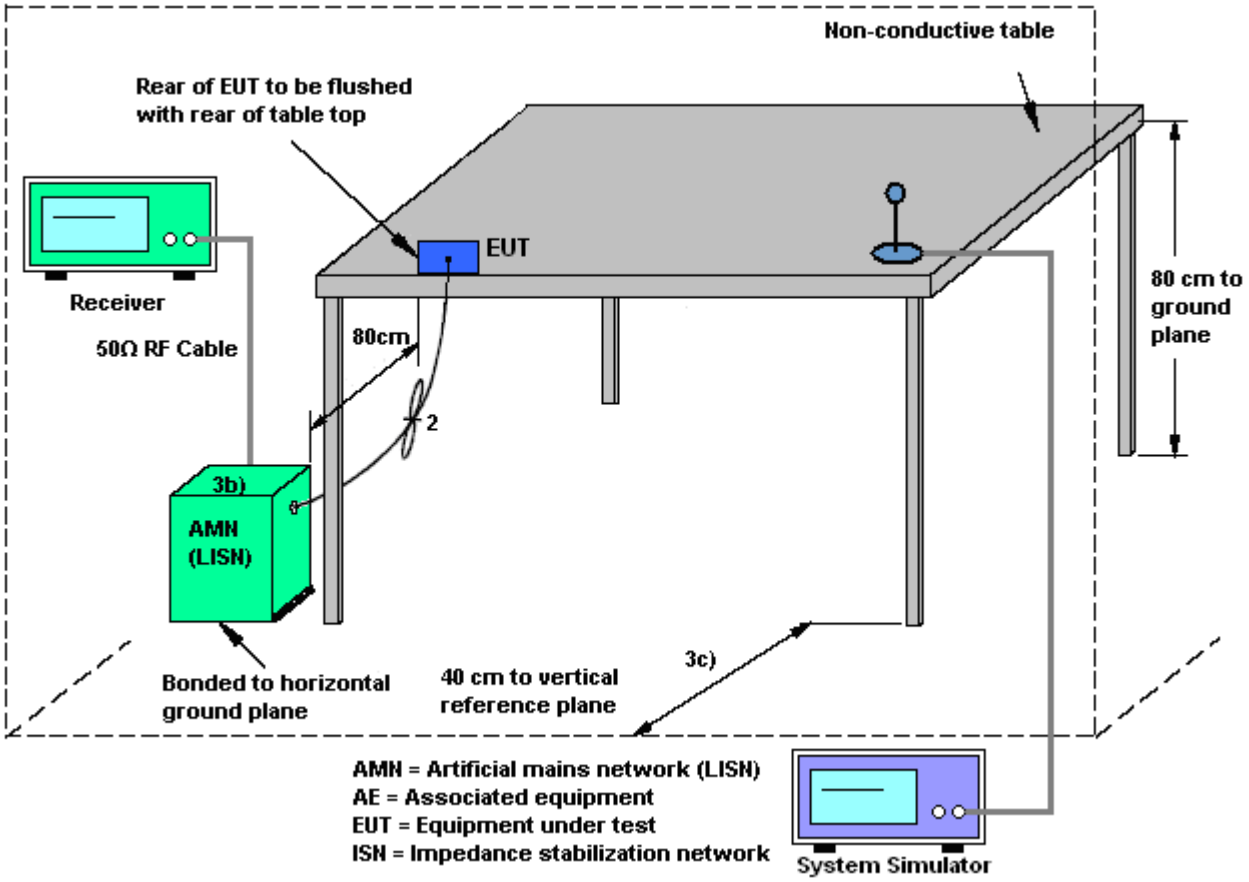
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

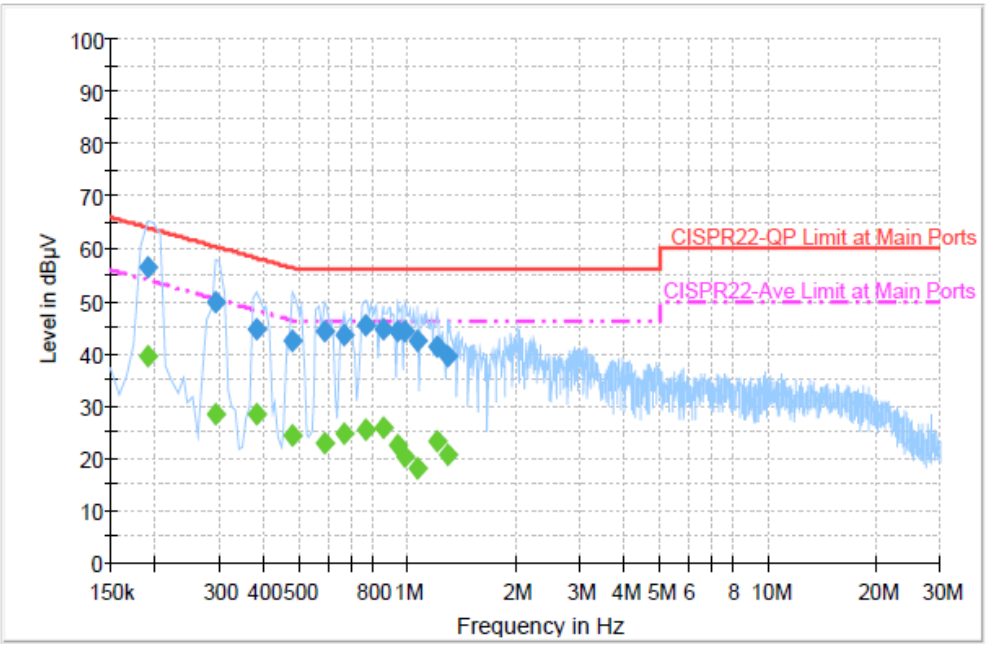
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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.

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

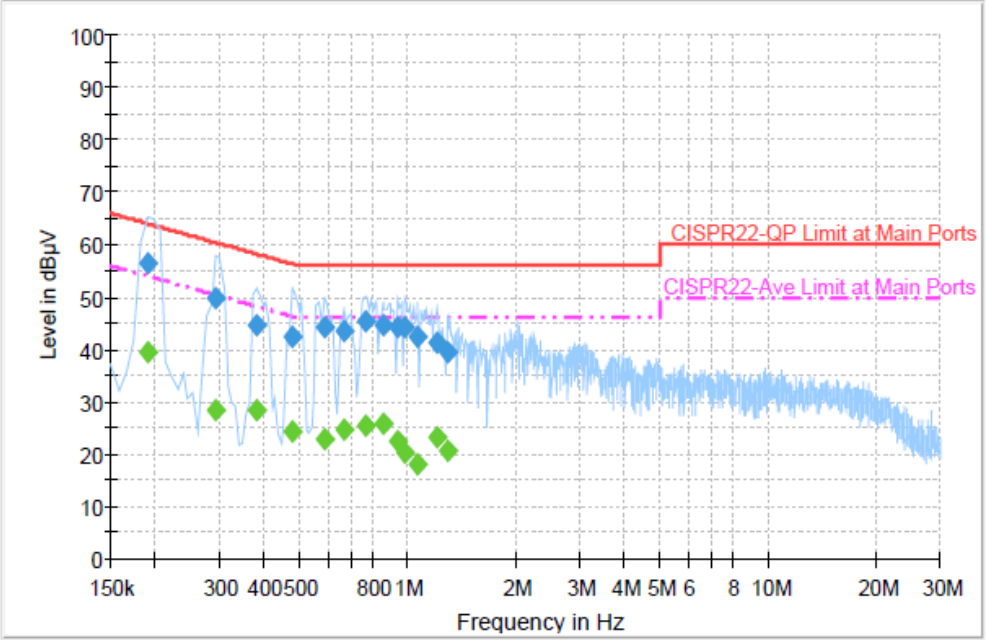
Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Engineer :	Hayden Wu	**Relative Humidity :**	47~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	56.3	Off	L1	19.4	7.7	64.0
0.294000	49.9	Off	L1	19.3	10.5	60.4
0.382000	44.6	Off	L1	19.4	13.6	58.2
0.478000	42.4	Off	L1	19.4	14.0	56.4
0.590000	44.3	Off	L1	19.3	11.7	56.0
0.670000	43.5	Off	L1	19.4	12.5	56.0
0.766000	45.3	Off	L1	19.4	10.7	56.0
0.854000	44.6	Off	L1	19.5	11.4	56.0
0.942000	44.2	Off	L1	19.4	11.8	56.0
0.982000	44.4	Off	L1	19.4	11.6	56.0
1.070000	42.6	Off	L1	19.4	13.4	56.0
1.206000	41.4	Off	L1	19.4	14.6	56.0
1.286000	39.6	Off	L1	19.4	16.4	56.0

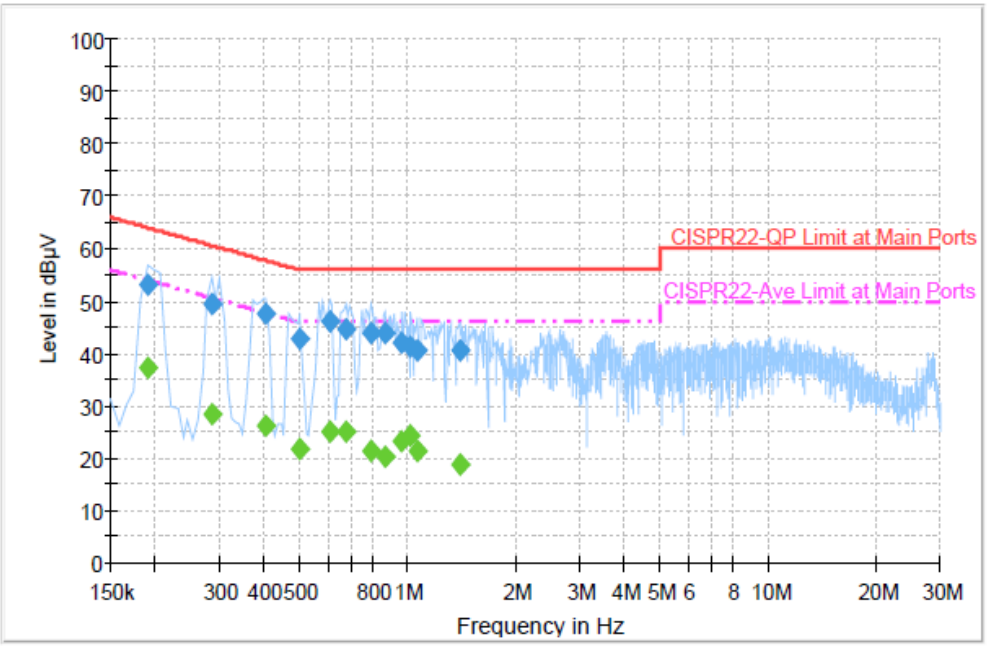
Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Engineer :	Hayden Wu	**Relative Humidity :**	47~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	39.6	Off	L1	19.4	14.4	54.0
0.294000	28.5	Off	L1	19.3	21.9	50.4
0.382000	28.3	Off	L1	19.4	19.9	48.2
0.478000	24.4	Off	L1	19.4	22.0	46.4
0.590000	22.7	Off	L1	19.3	23.3	46.0
0.670000	24.7	Off	L1	19.4	21.3	46.0
0.766000	25.4	Off	L1	19.4	20.6	46.0
0.854000	25.9	Off	L1	19.5	20.1	46.0
0.942000	22.6	Off	L1	19.4	23.4	46.0
0.982000	20.3	Off	L1	19.4	25.7	46.0
1.070000	18.1	Off	L1	19.4	27.9	46.0
1.206000	23.1	Off	L1	19.4	22.9	46.0
1.286000	20.7	Off	L1	19.4	25.3	46.0

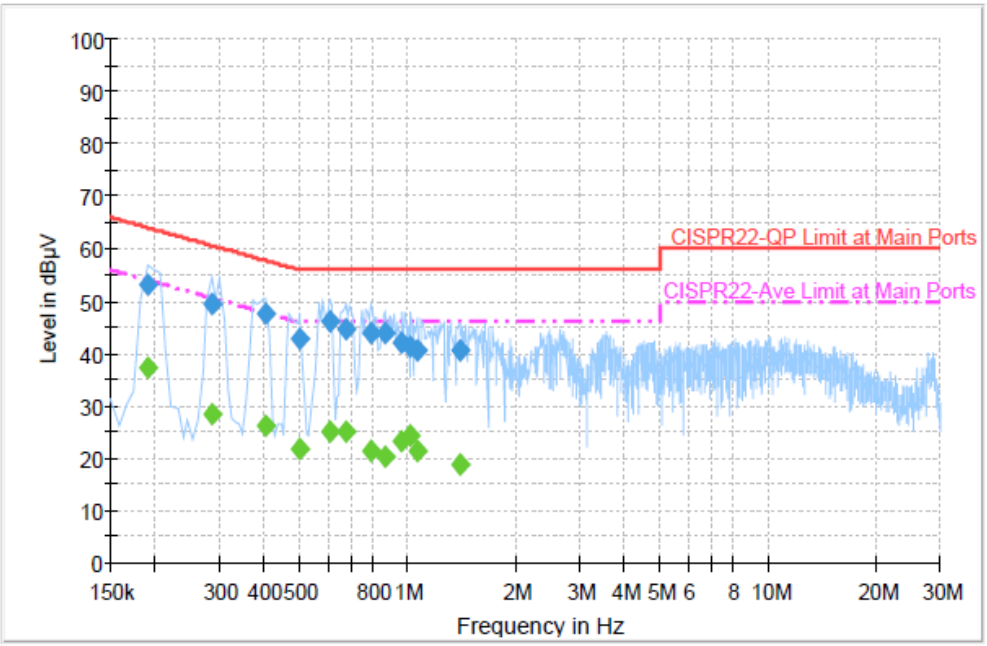
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Hayden Wu	Relative Humidity :	47~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	53.3	Off	N	19.4	10.7	64.0
0.286000	49.3	Off	N	19.3	11.3	60.6
0.406000	47.5	Off	N	19.4	10.2	57.7
0.502000	42.7	Off	N	19.3	13.3	56.0
0.606000	46.2	Off	N	19.4	9.8	56.0
0.678000	44.8	Off	N	19.5	11.2	56.0
0.790000	43.8	Off	N	19.4	12.2	56.0
0.870000	43.9	Off	N	19.4	12.1	56.0
0.966000	42.2	Off	N	19.4	13.8	56.0
1.022000	41.2	Off	N	19.4	14.8	56.0
1.062000	40.7	Off	N	19.4	15.3	56.0
1.398000	40.7	Off	N	19.4	15.3	56.0

Test Mode :	Mode 1	**Temperature :**	23~24℃
Test Engineer :	Hayden Wu	**Relative Humidity :**	47~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	CDMA2000 BC1 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone 2 + USB Cable 2 (Charging from Adapter 2) for Sample 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.190000	37.4	Off	N	19.4	16.6	54.0
0.286000	28.4	Off	N	19.3	22.2	50.6
0.406000	26.1	Off	N	19.4	21.6	47.7
0.502000	21.7	Off	N	19.3	24.3	46.0
0.606000	25.1	Off	N	19.4	20.9	46.0
0.678000	25.0	Off	N	19.5	21.0	46.0
0.790000	21.5	Off	N	19.4	24.5	46.0
0.870000	20.4	Off	N	19.4	25.6	46.0
0.966000	23.2	Off	N	19.4	22.8	46.0
1.022000	24.2	Off	N	19.4	21.8	46.0
1.062000	21.5	Off	N	19.4	24.5	46.0
1.398000	18.7	Off	N	19.4	27.3	46.0

3.9 Radiated Emission Measurement

3.9.1 Limit of Radiated 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

3.9.2 Measuring Instruments

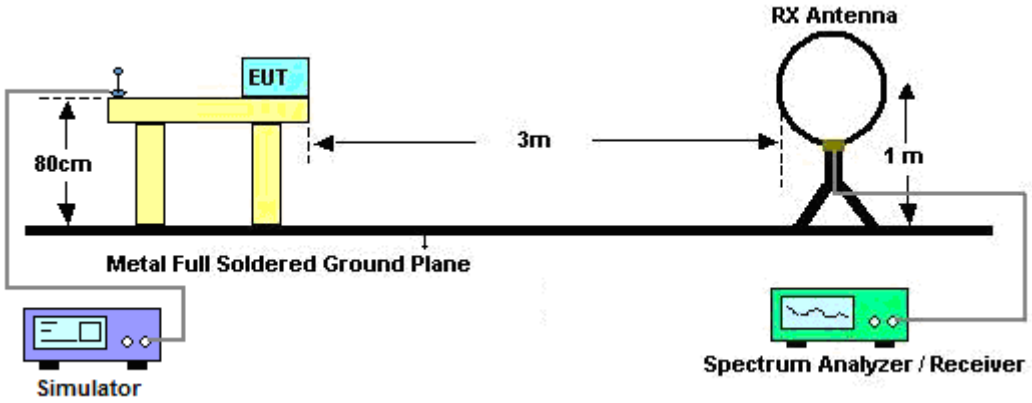
See list of measuring instruments of this test report.

3.9.3 Test Procedures

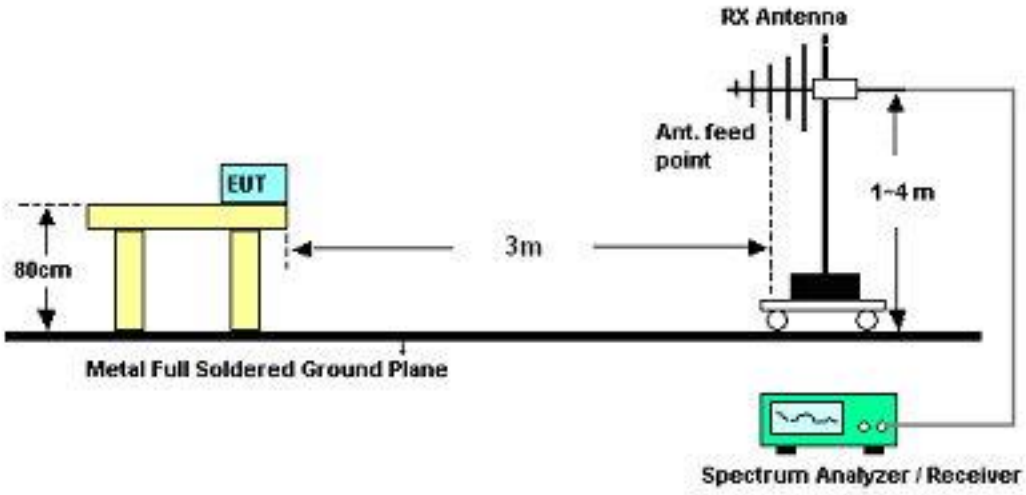
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
   (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 KHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
4. Measured average value for the peak value is greater than 54 dBuv/m

3.9.4 Test Setup

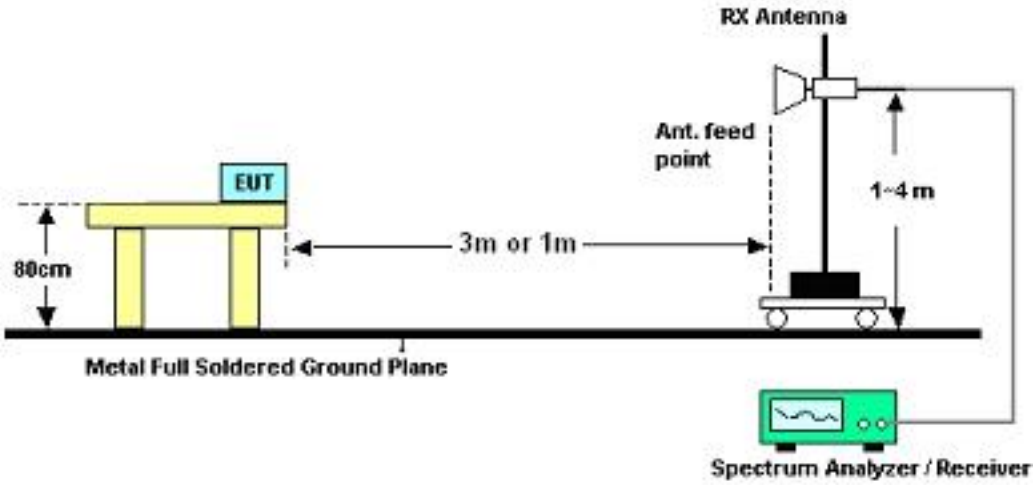
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.9.5 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.

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

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2402 MHz is fundamental signals which can be ignored.		

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
2383.34	44.33	-29.67	74	40.23	32.03	6.03	33.96	169	29	Peak
2383.34	32.03	-21.97	54	27.93	32.03	6.03	33.96	169	29	Average
2402	95.32	-	-	91.17	32.08	6.03	33.96	169	29	Peak
2402	79.06	-	-	74.93	32.06	6.03	33.96	169	29	Average
2492	31.49	-22.51	54	27.11	32.2	6.18	34	169	29	Average
2492	44.02	-29.98	74	39.64	32.2	6.18	34	169	29	Peak

Test Mode :	Mode 1	Temperature :	21~22°C
Test Channel :	00	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2402 MHz is fundamental signals which can be ignored.		

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
2336.22	44.34	-29.66	74	40.35	31.98	5.95	33.94	100	334	Peak
2336.22	31.9	-22.1	54	27.91	31.98	5.95	33.94	100	334	Average
2402	90.5	-	-	86.35	32.08	6.03	33.96	100	334	Peak
2402	75.37	-	-	71.24	32.06	6.03	33.96	100	334	Average
2492	31.4	-22.6	54	27.02	32.2	6.18	34	100	334	Average
2492	43.93	-30.07	74	39.55	32.2	6.18	34	100	334	Peak

Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2441 MHz is fundamental signals which can be ignored.		

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
2390	44.1	-29.9	74	39.97	32.06	6.03	33.96	200	29	Peak
2390	31.82	-22.18	54	27.69	32.06	6.03	33.96	200	29	Average
2441	96.08	-	-	91.82	32.13	6.11	33.98	200	29	Peak
2441	78.91	-	-	74.65	32.13	6.11	33.98	200	29	Average
2492	43.78	-30.22	74	39.4	32.2	6.18	34	200	29	Peak
2492	31.29	-22.71	54	26.91	32.2	6.18	34	200	29	Average

Test Mode :	Mode 2	Temperature :	21~22°C
Test Channel :	39	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2441 MHz is fundamental signals which can be ignored.		

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
2390	43.77	-30.23	74	39.64	32.06	6.03	33.96	100	44	Peak
2390	31.8	-22.2	54	27.67	32.06	6.03	33.96	100	44	Average
2441	92.81	-	-	88.55	32.13	6.11	33.98	100	44	Peak
2441	76.53	-	-	72.27	32.13	6.11	33.98	100	44	Average
2486	43.77	-30.23	74	39.41	32.18	6.18	34	100	44	Peak
2486	31.21	-22.79	54	26.85	32.18	6.18	34	100	44	Average

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	2480 MHz is fundamental signals which can be ignored.		

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
52.14	25.51	-14.49	40	48.64	7.7	0.71	31.54	-	-	Peak
153.93	26.44	-17.06	43.5	45.85	10.92	1.21	31.54	-	-	Peak
159.06	29.09	-14.41	43.5	48.82	10.57	1.22	31.52	107	152	Peak
340.6	25.92	-20.08	46	40.93	14.4	1.89	31.3	-	-	Peak
595.4	21.08	-24.92	46	29.61	19.72	2.68	30.93	-	-	Peak
666.1	22.22	-23.78	46	29.87	20.33	2.87	30.85	-	-	Peak
2390	43.49	-30.51	74	39.36	32.06	6.03	33.96	200	29	Peak
2390	31.37	-22.63	54	27.24	32.06	6.03	33.96	200	29	Average
2480	79.82	-	-	75.46	32.18	6.18	34	200	29	Average
2480	97.05	-	-	92.69	32.18	6.18	34	200	29	Peak
2483.5	61.46	-12.54	74	57.1	32.18	6.18	34	200	29	Peak
2483.5	48.7	-5.3	54	44.34	32.18	6.18	34	200	29	Average

Test Mode :	Mode 3	Temperature :	21~22°C
Test Channel :	78	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

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
51.06	25.1	-14.9	40	48.03	7.9	0.71	31.54	102	118	Peak
106.41	27.04	-16.46	43.5	47.13	10.43	1.03	31.55	-	-	Peak
229.53	23.75	-22.25	46	42.52	11.19	1.48	31.44	-	-	Peak
335.7	27.4	-18.6	46	42.56	14.27	1.87	31.3	-	-	Peak
442.1	19.28	-26.72	46	31.23	16.89	2.28	31.12	-	-	Peak
618.5	21.57	-24.43	46	29.77	19.95	2.75	30.9	-	-	Peak
2390	43.26	-30.74	74	39.13	32.06	6.03	33.96	130	50	Peak
2390	31.35	-22.65	54	27.22	32.06	6.03	33.96	130	50	Average
2480	77.12	-	-	72.76	32.18	6.18	34	130	50	Average
2480	93.74	-	-	89.38	32.18	6.18	34	130	50	Peak
2483.5	58.03	-15.97	74	53.67	32.18	6.18	34	130	50	Peak
2483.5	46.27	-7.73	54	41.91	32.18	6.18	34	130	50	Average

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

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

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. 13, 2011	Feb. 24, 2012~ Mar. 22, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	Feb. 24, 2012~ Mar. 22, 2012	May 31, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Mar. 06, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Mar. 06, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Mar. 06, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Mar. 06, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 21, 2011	Mar. 06, 2012	Oct. 20, 2012	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Mar. 14, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Mar. 14, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Mar. 14, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz ~ 26.5GHz	Dec. 05, 2011	Mar. 14, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10 ~ 1000MHz 32dB GAIN	Mar. 29, 2011	Mar. 14, 2012	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Aug. 22, 2011	Mar. 14, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 18, 2011	Mar. 14, 2012	Jul. 17, 2012	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100519	N/A	Jun. 01, 2011	Mar. 14, 2012	May 31, 2012	Radiation (03CH07-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 21, 2011	Mar. 14, 2012	Oct. 20, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Mar. 14, 2012	Jul. 28, 2012	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**		

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

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

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				