

FCC RF Test Report

APPLICANT : HUAWEI TECHNOLOGIES CO., LTD.
EQUIPMENT : GSM Mobile Phone
BRAND NAME : HUAWEI
MODEL NAME : HUAWEI G6610V
FCC ID : QISG6610V
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Feb. 03, 2010 and completely tested on Mar. 16, 2010. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



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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	≤ 1W	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 9.05 dB at 16.74 MHz
3.8	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.31 dB at 2377.83 MHz
3.9	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1. General Description

1.1 Applicant

HUAWEI TECHNOLOGIES CO., LTD.

Administration Building, Huawei Base, Bantian, Longgang District, Shenzhen 518129

1.2 Manufacturer

HUAWEI TECHNOLOGIES CO., LTD.

Administration Building, Huawei Base, Bantian, Longgang District, Shenzhen 518129

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM Mobile Phone
Brand Name	HUAWEI
Model Name	HUAWEI G6610V
FCC ID	QISG6610V
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	-1.03 dBm (0.79 mW)
Antenna Type	PIFA Antenna with gain -1.0 dBi
HW Version	EV503 V1.0
SW Version	G6610V.SS.P00.M21.01.03
Type of Modulation	GFSK
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).

List of Accessory:

Specification of Accessory		
AC Adapter	Brand Name	HUAWEI
	Model Name	HS-050040U6
	Power Rating	I/P:100-240Vac, 50-60Hz, 0.2A; O/P: 5.0Vdc, 400mA
Battery	Brand Name	HUAWEI
	Model Name	HB4G1
	Power Rating	3.7Vdc, 1000mAh
	Type	Li-ion
Earphone	Brand Name	HUAWEI
	Model Name	EMC179P-YE54
	Signal Line Type	1.5 meter non-shielded cable without ferrite core
USB Cable	Brand Name	HUAWEI
	Model Name	SU081230
	Signal Line Type	0.87 meter non-shielded cable without ferrite core

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 (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958
Test Site No.	Sporton Site No. CO01-KS ; 03CH01-KS

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 7

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 (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Base Station	Anritsu	8852B	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
3.	PC	DELL	MT320	FCC DoC	N/A	Unshielded, 1.8 m
4.	Monitor	Q-Bell	LC91	FCC DoC	Shielded, 1.2 m	Unshielded, 1.8 m
5.	(USB)Mouse	DELL	MO56UC	FCC DoC	Shielded, 1.8 m	N/A
6.	Bluetooth Earphone	Nokia	HS-12W	PYAHS-12W	N/A	N/A
7.	(USB)Keyboard	DELL	L100	FCC DoC	Shielded, 1.8 m with core	N/A
8.	Printer	HP	Laser Jet 1018	FCC DoC	Shielded, 1.8 m	Unshielded, 1.8 m
9.	iPod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A

2. Test Configuration of Equipment Under Test

2.1 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).

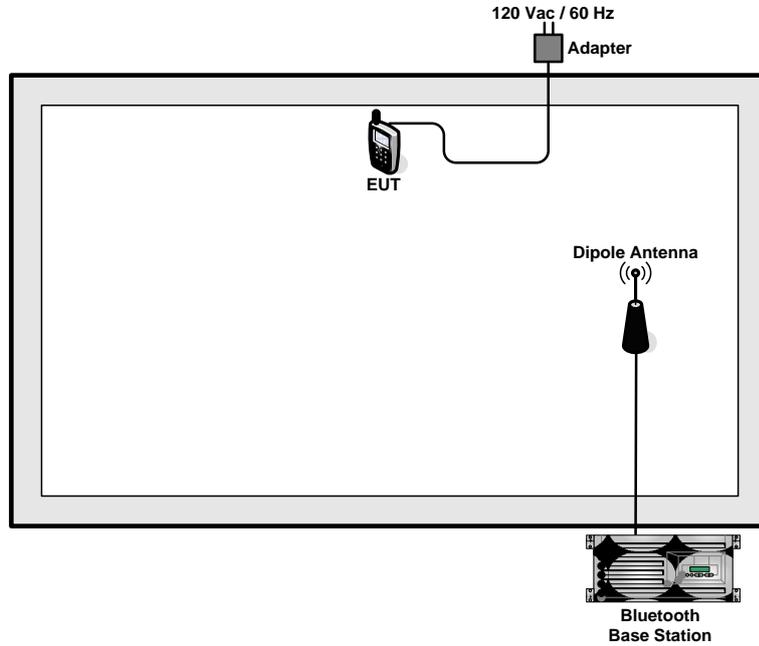
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

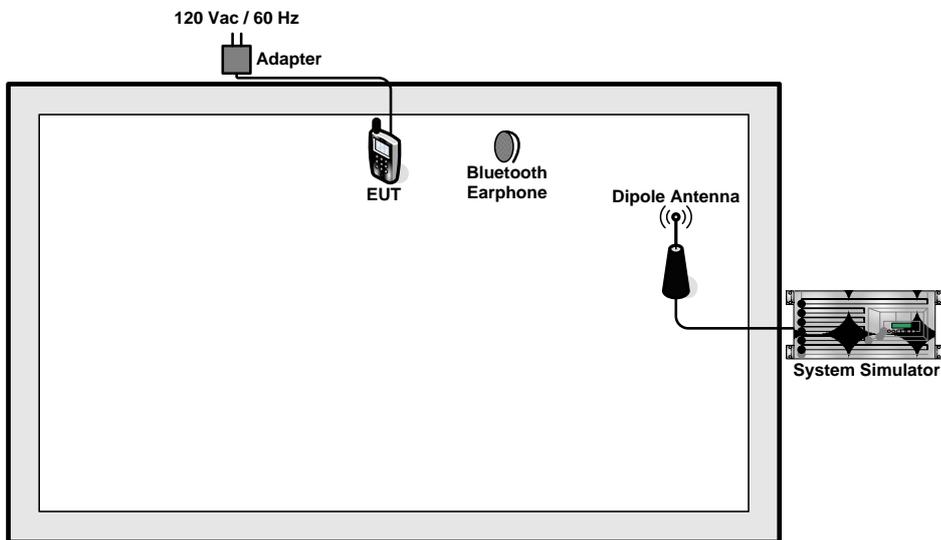
Test Cases	
Test Item	Data Rate / Modulation
	Bluetooth 1Mbps GFSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
Radiated TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :GSM850 Idle + Bluetooth Idle + Camera + Adapter Mode 2 :GSM1900 Idle + Bluetooth Idle + MPEG4 + Adapter Mode 3 :GSM850 Idle + Bluetooth Idle + USB Cable (Link with PC)
Remark: For conducted emission, the worst case is mode 3; only the test data of this mode was reported.	

2.2 Connection Diagram of Test System

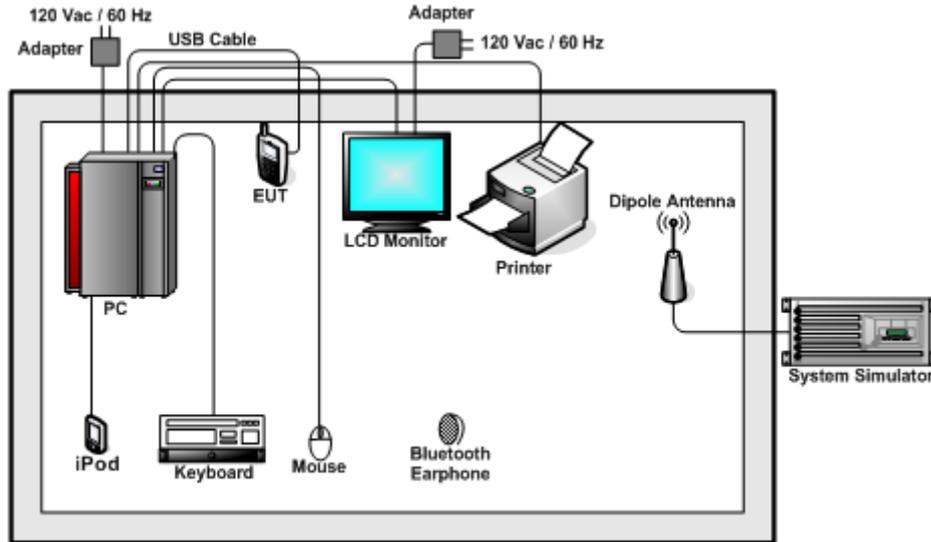
<Bluetooth Tx Mode>



<EUT with Adapter Mode>



<EUT with USB Cable (Link with PC) Mode>



2.3 RF Utility

Key-in “# * 888 # * #” at EUT in order to make EUT into engineering mode to link with Bluetooth Base Station.

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.

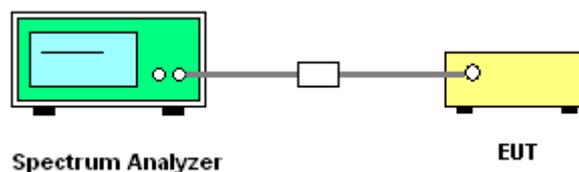
3.1.2 Measuring Instruments

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; $RBW \geq 1\%$ of the span; $VBW \geq RBW$; 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.

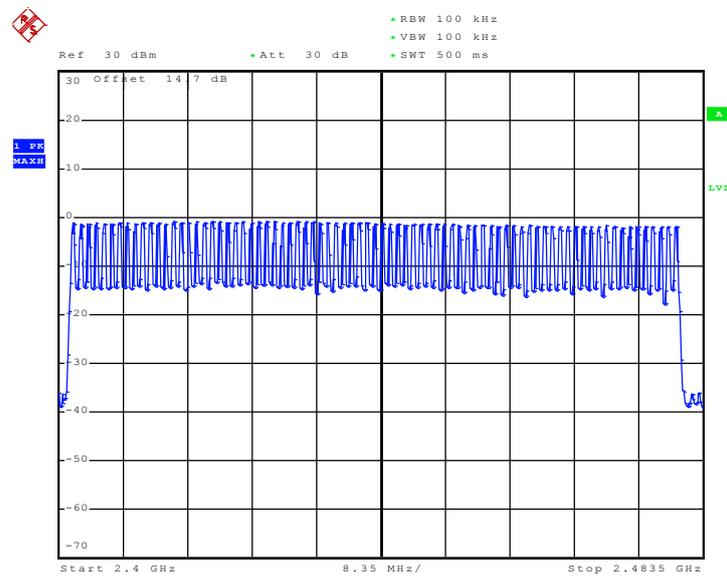
3.1.4 Test Setup



3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	24.0°C
Test Engineer :	Rain Zhou	Relative Humidity :	45%
Number of Hopping Channels (Channel)		Limits (Channel)	
79		> 15	
		Pass/Fail	
		Pass	

Number of Hopping Channel Plot on Channel 00 - 78



Date: 3.FRR.2010 10:21:45

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

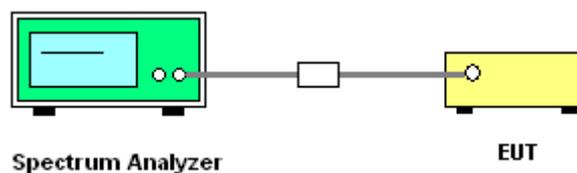
3.2.2 Measuring Instruments

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 \geq 1% of the 20 dB bandwidth; VBW \geq 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



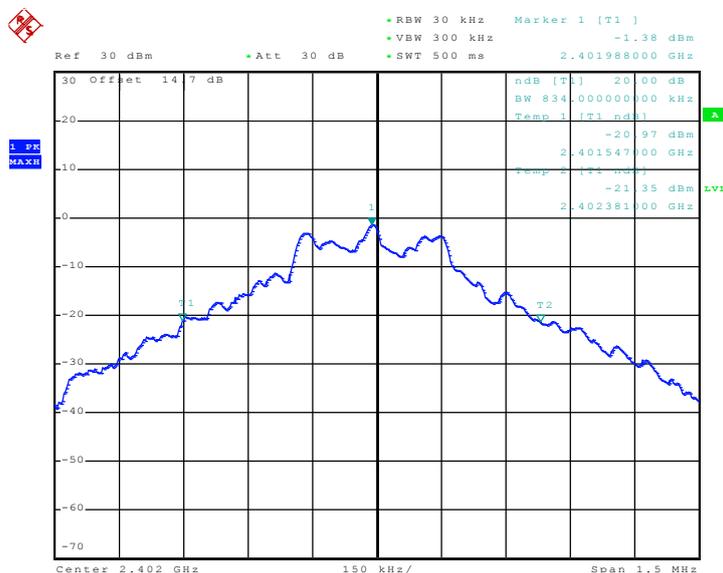


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24.0°C
Test Engineer :	Rain Zhou	Relative Humidity :	45%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.834
39	2441	0.840
78	2480	0.840

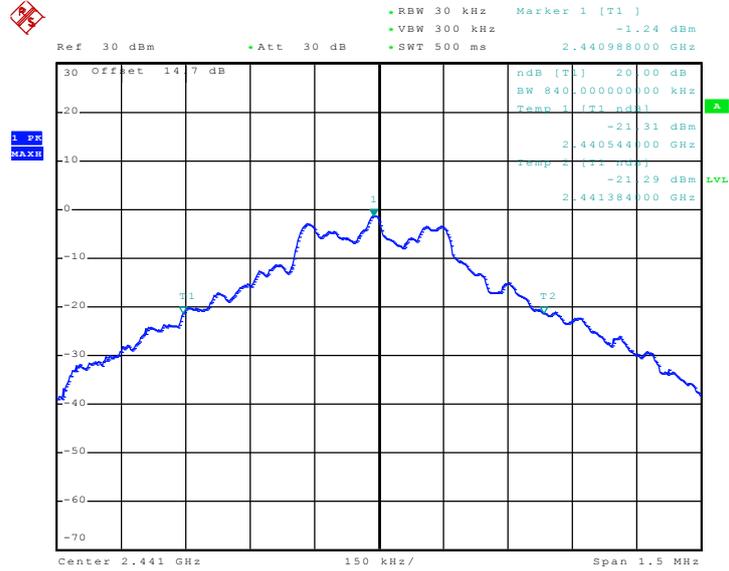
20 dB Bandwidth Plot on Channel 00



Date: 3.FEB.2010 09:25:45

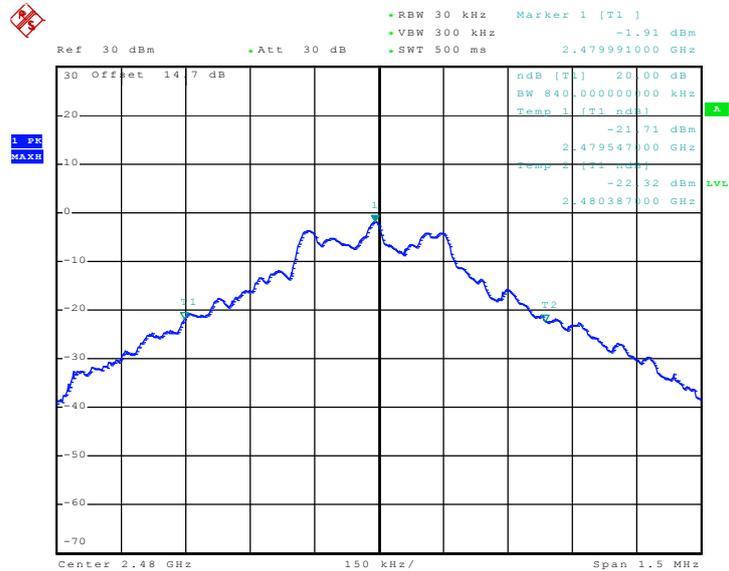


20 dB Bandwidth Plot on Channel 39



Date: 3.FEB.2010 09:26:09

20 dB Bandwidth Plot on Channel 78



Date: 3.FEB.2010 09:28:20

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.

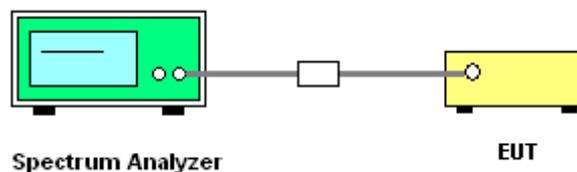
3.3.2 Measuring Instruments

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; $RBW \geq 1\%$ of the span;
VBW \geq 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



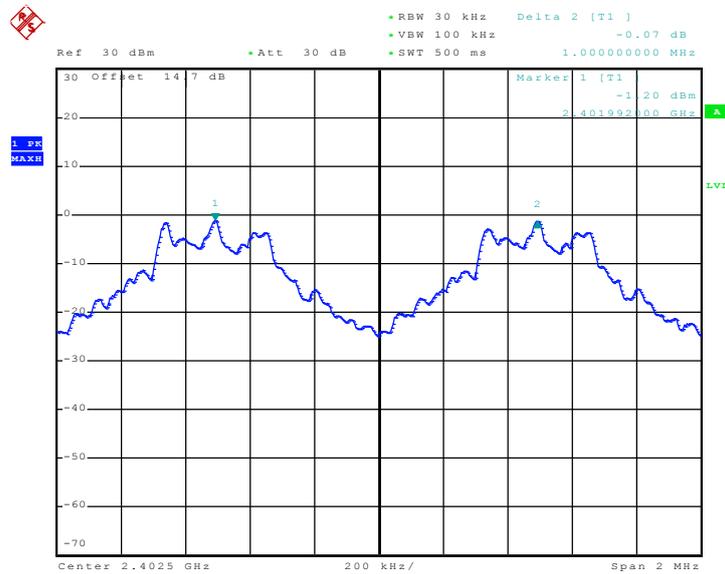


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	24.0°C
Test Engineer :	Rain Zhou	Relative Humidity :	45%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.000	0.556	Pass
39	2441	1.000	0.560	Pass
78	2480	1.000	0.560	Pass

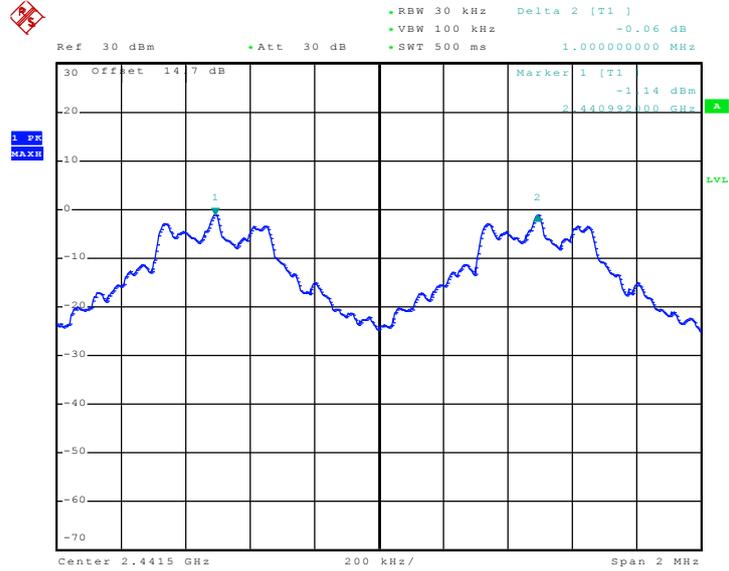
Channel Separation Plot on Channel 00 - 01



Date: 3.FEB.2010 10:32:48

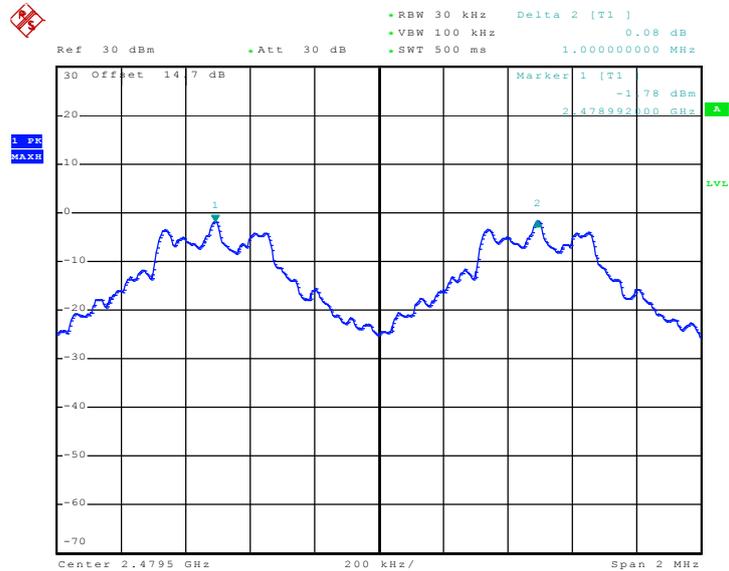


Channel Separation Plot on Channel 39 - 40



Date: 3.FEB.2010 10:35:10

Channel Separation Plot on Channel 77 - 78



Date: 3.FEB.2010 10:37:25

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.

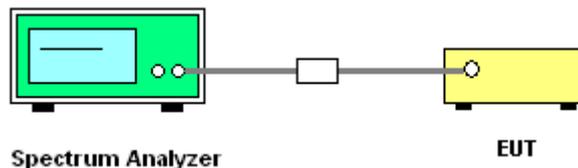
3.4.2 Measuring Instruments

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

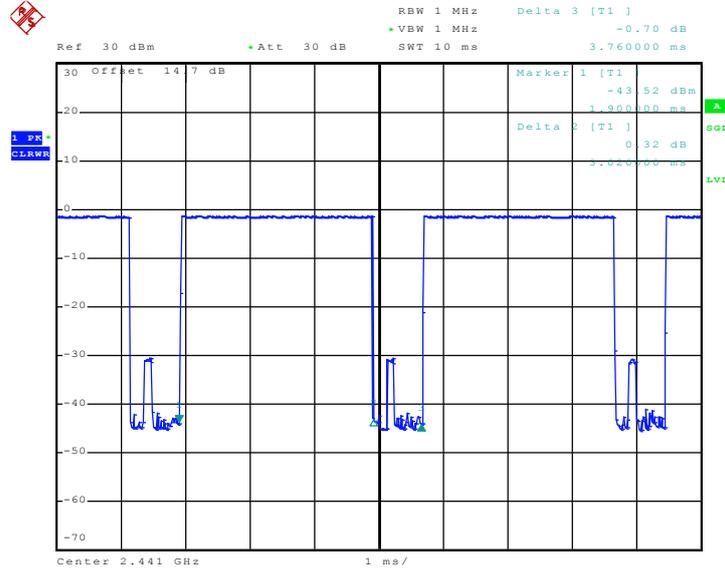
Test Mode :	Mode 2	Temperature :	24.0°C		
Test Engineer :	Rain Zhou	Relative Humidity :	45%		
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.00	3020.00	0.29	0.4	Pass

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)

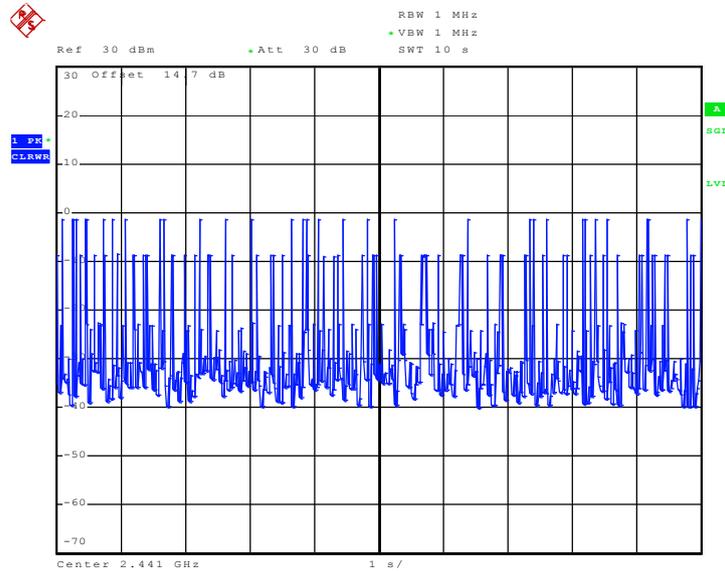


DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 3.FEB.2010 10:10:13

DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 3.FEB.2010 10:11:46

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1W (30 dBm).

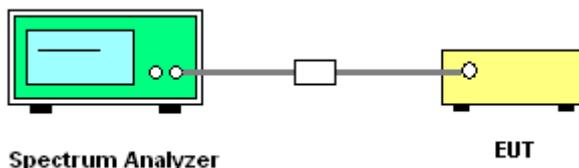
3.5.2 Measuring Instruments

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



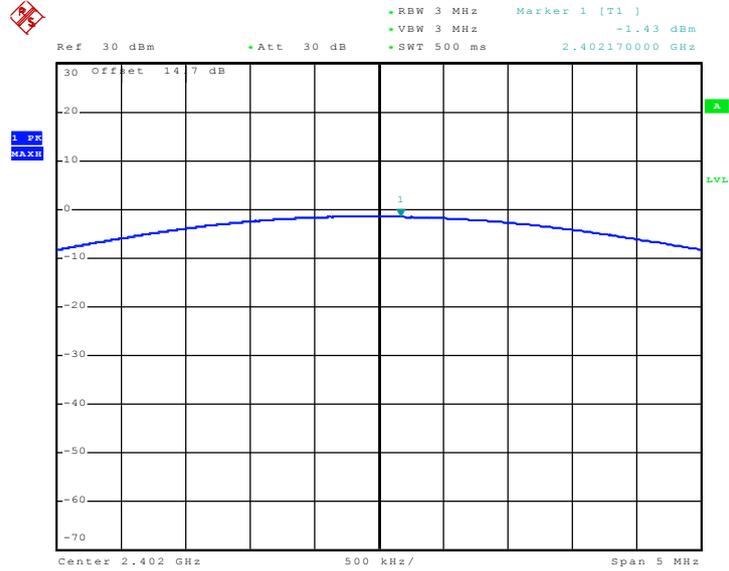
3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	24.0°C
Test Engineer :	Rain Zhou	Relative Humidity :	45%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	-1.43	30	Pass
39	2441	-1.03	30	Pass
78	2480	-1.72	30	Pass

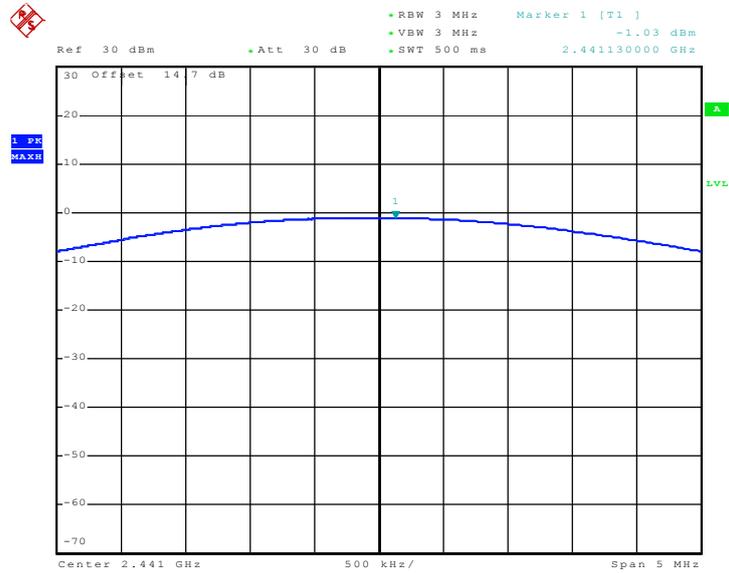


Peak Output Power Plot on Channel 00



Date: 3.FEB.2010 09:11:21

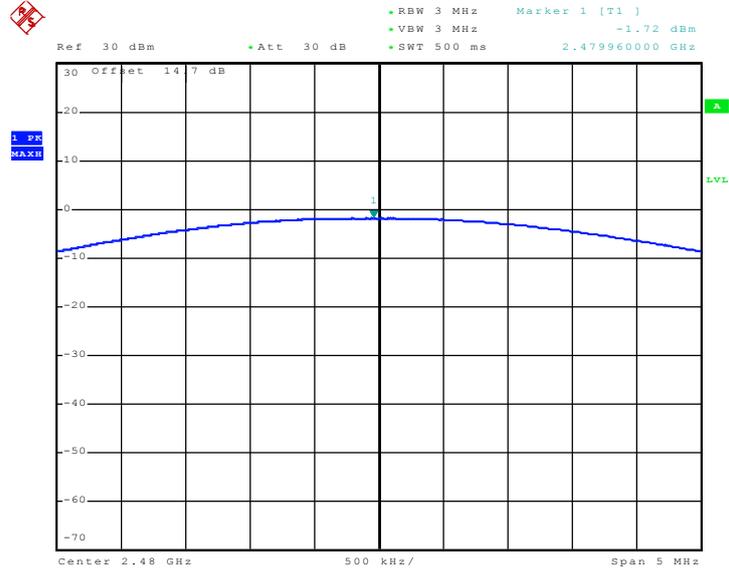
Peak Output Power Plot on Channel 39



Date: 3.FEB.2010 09:16:32



Peak Output Power Plot on Channel 78



Date: 3.FEB.2010 09:22:41



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

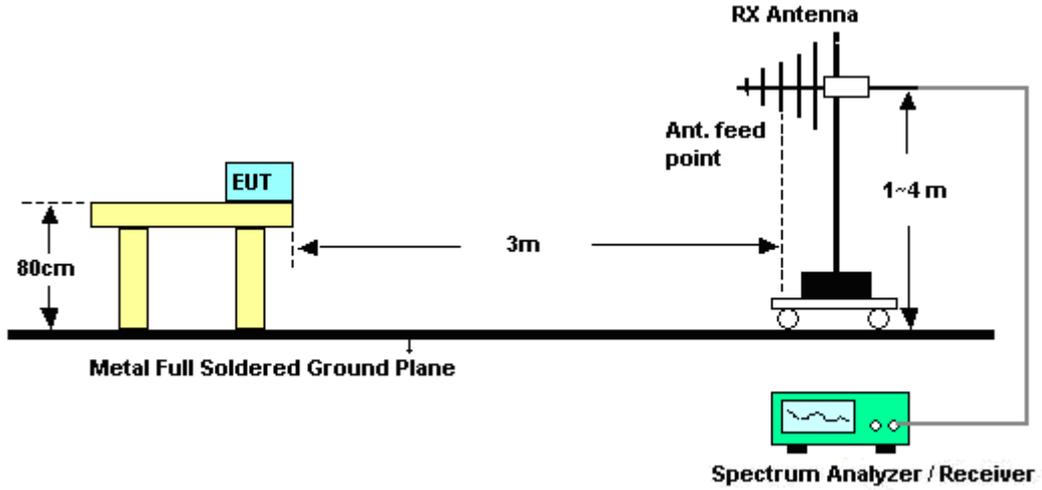
See list of measuring instruments of this test report.

3.6.3 Test Procedures

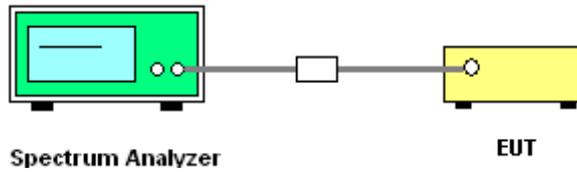
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 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 :	21~23°C
Test Channel :	00	Relative Humidity :	44~45%
		Test Engineer :	Mark Qu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2337.74	57.71	-16.29	74	56.66	32.78	3.1	34.83	113	356	Peak
2337.74	50.71	-3.29	54	49.66	32.78	3.1	34.83	113	356	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2338.12	52.26	-21.74	74	51.21	32.78	3.1	34.83	100	23	Peak
2338.12	45.98	-8.02	54	44.93	32.78	3.1	34.83	100	23	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	44~45%
		Test Engineer :	Mark Qu

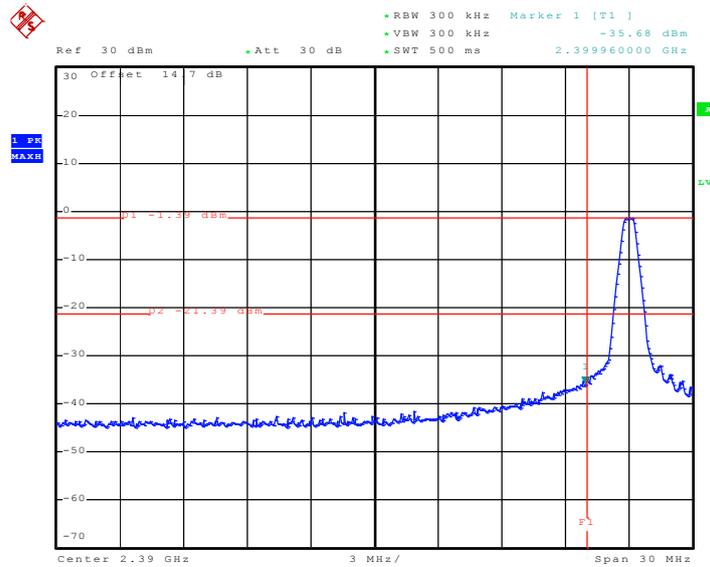
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	62.55	-11.45	74	61.19	33.01	3.2	34.85	107	4	Peak
2483.5	46.37	-7.63	54	45.01	33.01	3.2	34.85	107	4	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.04	57.32	-16.68	74	55.96	33.01	3.2	34.85	100	327	Peak
2484.04	43.2	-10.8	54	41.84	33.01	3.2	34.85	100	327	Average

3.6.6 Test Result of Conducted Band Edges

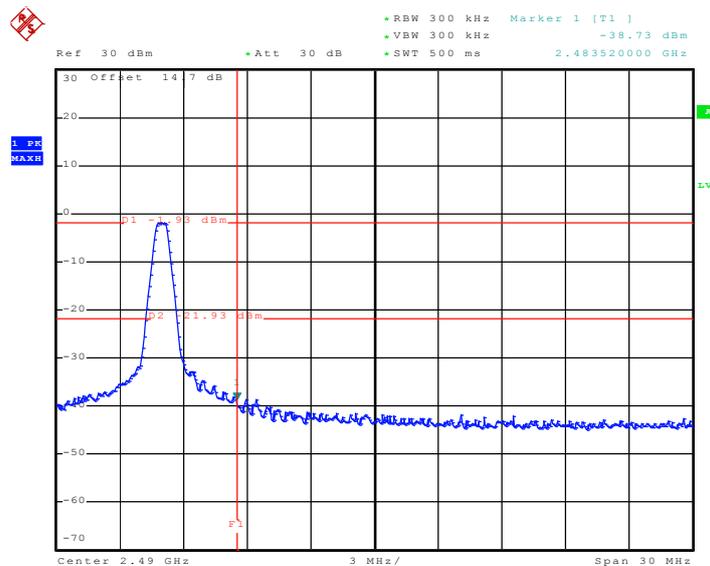
Test Mode :	Mode 1 and 3	Temperature :	24.0°C
Test Channel :	00 and 78	Relative Humidity :	45%
		Test Engineer :	Rain Zhou

Low Band Edge Plot on Channel 00



Date: 3.FEB.2010 09:32:14

High Band Edge Plot on Channel 78



Date: 3.FEB.2010 09:33:17

3.7 AC Conducted Emission Measurement

3.7.1 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.

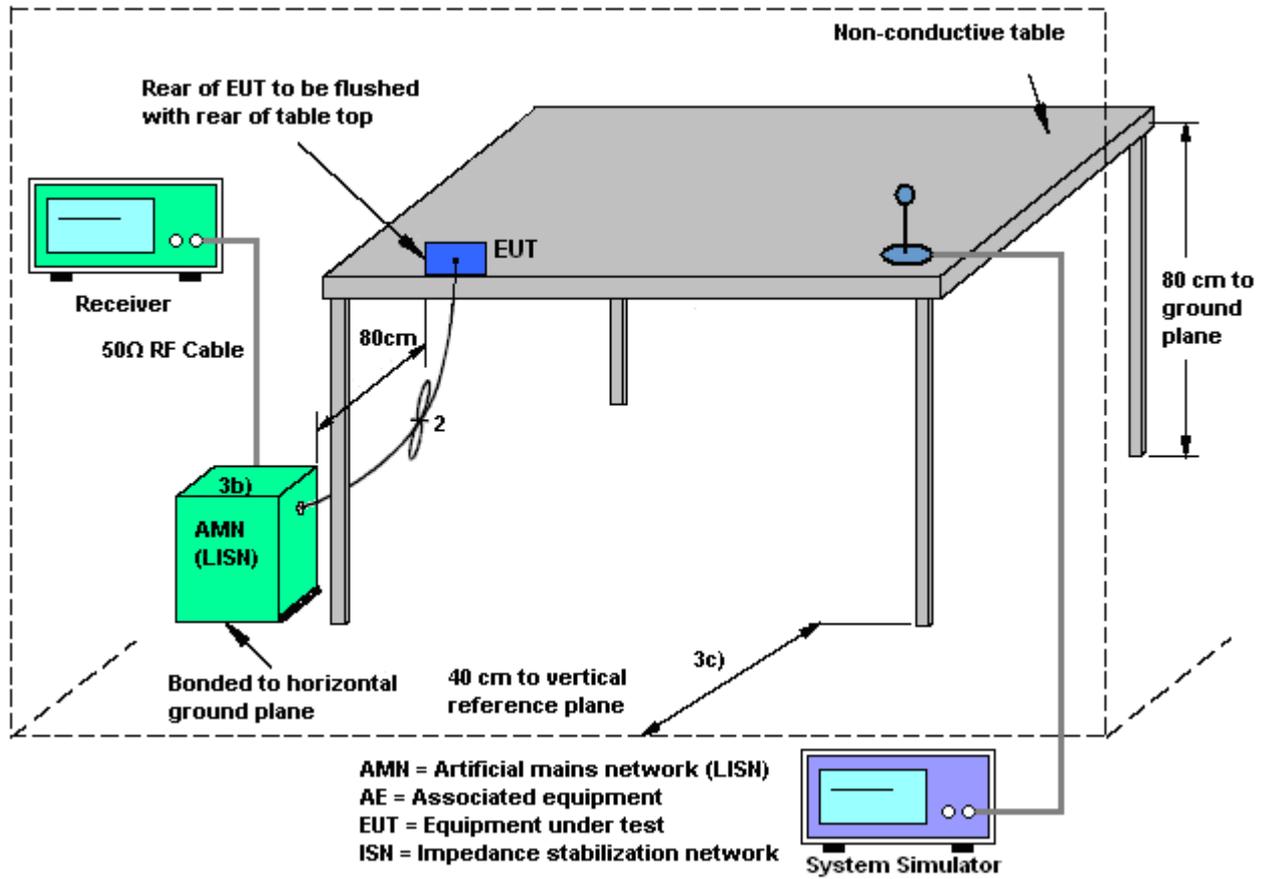
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

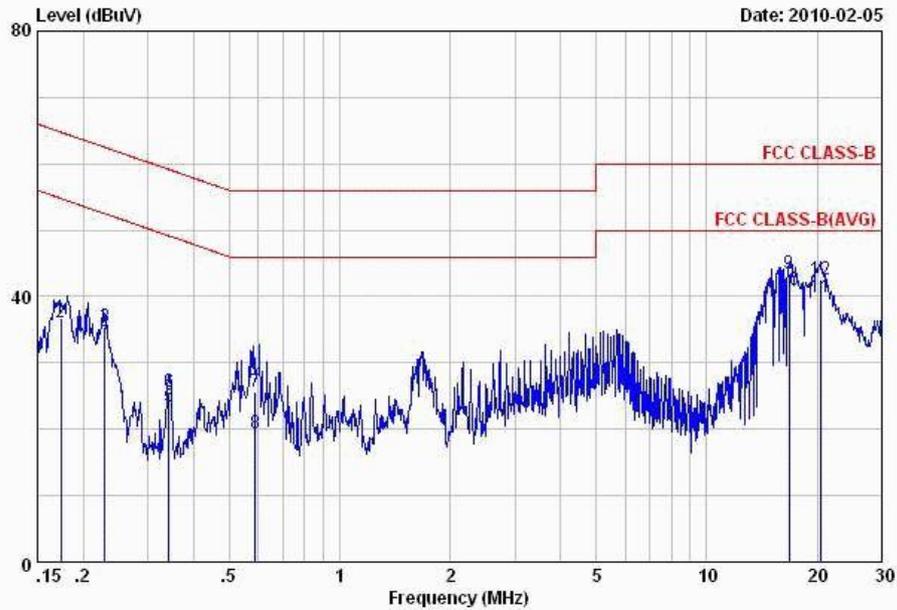
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All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

3.7.4 Test Setup



3.7.5 Test Result of AC Conducted Emission

Test Mode :	Mode 3	Temperature :	22~23°C
Test Engineer :	Rain Chou	Relative Humidity :	43~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Idle + USB Cable (Link with PC)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



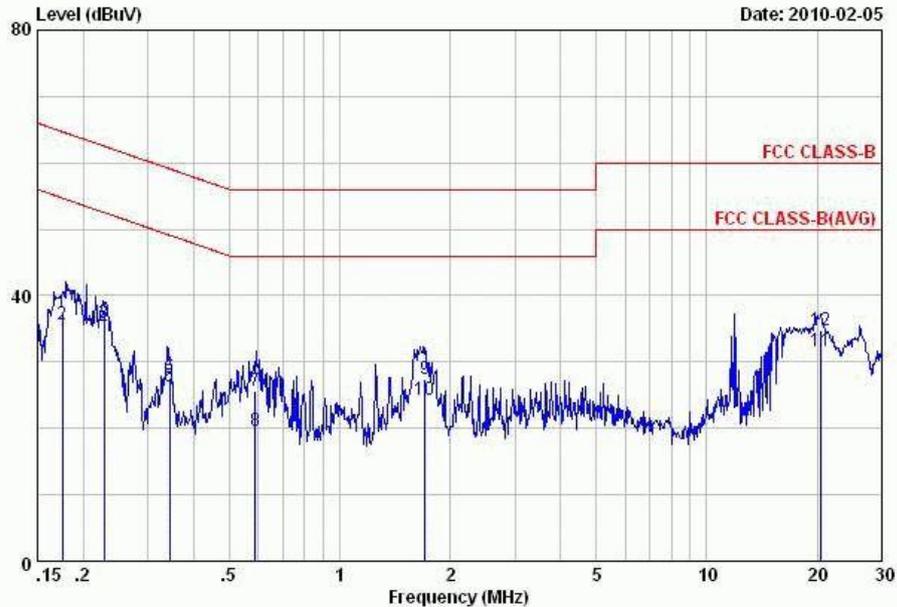
Site : C001-KS
 Condition: FCC CLASS-B LISN-071001 LINE

Memo : Mode 3

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	36.77	-27.99	64.76	26.70	-0.07	10.14	QP
2	0.17	36.17	-18.59	54.76	26.10	-0.07	10.14	Average
3	0.23	35.49	-27.01	62.50	25.40	-0.07	10.16	QP
4	0.23	34.29	-18.21	52.50	24.20	-0.07	10.16	Average
5	0.34	23.50	-25.67	49.17	13.40	-0.08	10.18	Average
6	0.34	25.60	-33.57	59.17	15.50	-0.08	10.18	QP
7	0.59	25.74	-30.26	56.00	15.60	-0.08	10.22	QP
8	0.59	19.44	-26.56	46.00	9.30	-0.08	10.22	Average
9	16.74	43.35	-16.65	60.00	32.81	0.01	10.53	QP
10	16.74	40.95	-9.05	50.00	30.41	0.01	10.53	Average
11	20.38	39.89	-10.11	50.00	29.20	0.12	10.57	Average
12	20.38	42.59	-17.41	60.00	31.90	0.12	10.57	QP



Test Mode :	Mode 3	Temperature :	22~23°C
Test Engineer :	Rain Chou	Relative Humidity :	43~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Idle + USB Cable (Link with PC)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
 Condition: FCC CLASS-B LISN-071001 NEUTRAL

Memo : Mode 3

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.18	37.47	-27.23	64.70	27.41	-0.08	10.14	QP
2	0.18	35.67	-19.03	54.70	25.61	-0.08	10.14	Average
3	0.23	35.88	-26.66	62.54	25.79	-0.07	10.16	QP
4	0.23	34.88	-17.66	52.54	24.79	-0.07	10.16	Average
5	0.34	27.60	-31.52	59.12	17.50	-0.08	10.18	QP
6	0.34	26.30	-22.82	49.12	16.20	-0.08	10.18	Average
7	0.59	25.64	-30.36	56.00	15.50	-0.08	10.22	QP
8	0.59	19.54	-26.46	46.00	9.40	-0.08	10.22	Average
9	1.71	27.31	-28.69	56.00	17.11	-0.11	10.31	QP
10	1.71	24.21	-21.79	46.00	14.01	-0.11	10.31	Average
11	20.53	31.59	-18.41	50.00	20.90	0.12	10.57	Average
12	20.53	34.79	-25.21	60.00	24.10	0.12	10.57	QP

3.8 Radiated Emission Measurement

3.8.1 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

3.8.2 Measuring Instruments

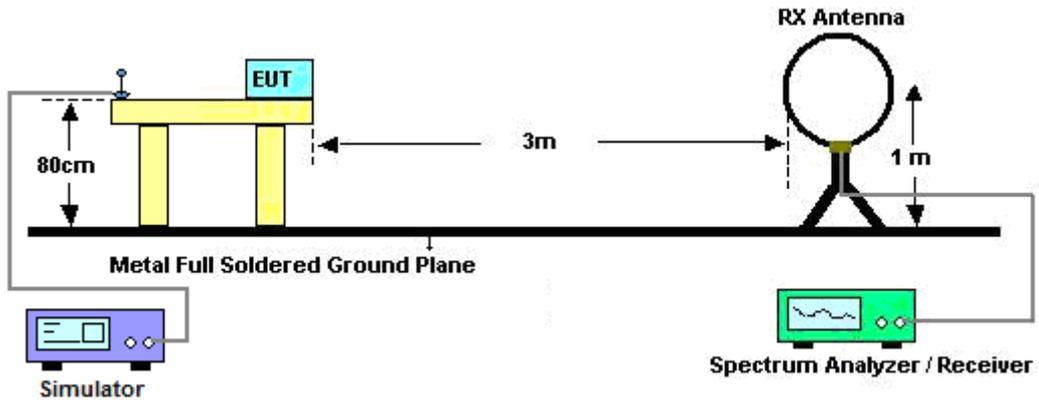
See list of measuring instruments of this test report.

3.8.3 Test Procedures

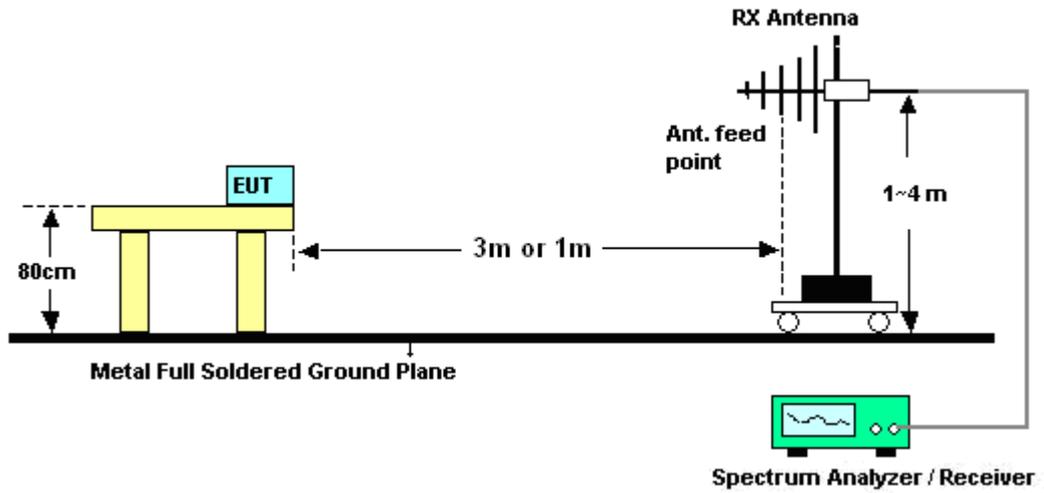
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector 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 = $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$ (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.

3.8.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





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

Test Engineer :	Mark Qu	Temperature :	21~23°C	
		Relative Humidity :	44~45%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.



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

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	21.56	-18.44	40	26.46	18	0.25	23.15	-	-	Peak
113.16	17.77	-25.73	43.5	28.52	11.8	0.45	23	-	-	Peak
276.78	18.66	-27.34	46	28.34	12.56	0.76	23	-	-	Peak
721.4	27.4	-18.6	46	28.69	19.55	1.15	21.99	-	-	Peak
819.4	27.69	-18.31	46	27.88	20.08	1.24	21.51	-	-	Peak
937	28.42	-17.58	46	26.98	20.67	1.31	20.54	100	160	Peak
2274	53.42	-20.58	74	52.49	32.69	3.06	34.82	179	332	Peak
2274	44.81	-9.19	54	43.88	32.69	3.06	34.82	179	332	Average
2337.74	57.71	-16.29	74	56.66	32.78	3.1	34.83	113	356	Peak
2337.74	50.71	-3.29	54	49.66	32.78	3.1	34.83	113	356	Average
2402	100.22	-	-	99.05	32.86	3.15	34.84	113	354	Peak
2402	87.38	-	-	86.21	32.86	3.15	34.84	113	354	Average
2465.99	45.2	-22.18	67.38	43.89	32.98	3.18	34.85	164	0	Average
2465.99	53.46	-26.76	80.22	52.15	32.98	3.18	34.85	164	0	Peak
2489.55	46.04	-27.96	74	44.64	33.05	3.2	34.85	100	0	Peak
2489.55	35.2	-18.8	54	33.8	33.05	3.2	34.85	100	0	Average



Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
47.55	30.29	-9.71	40	44.49	8.5	0.31	23.01	116	44	Peak
135.03	26.63	-16.87	43.5	37.78	11.3	0.55	23	-	-	Peak
189.03	26.71	-16.79	43.5	40.58	8.49	0.64	23	-	-	Peak
680.1	26.59	-19.41	46	28.7	19.15	1.13	22.39	-	-	Peak
842.5	28.16	-17.84	46	27.87	20.44	1.25	21.4	-	-	Peak
909	28.07	-17.93	46	27.09	20.49	1.29	20.8	-	-	Peak
2338.12	52.26	-21.74	74	51.21	32.78	3.1	34.83	100	23	Peak
2338.12	45.98	-8.02	54	44.93	32.78	3.1	34.83	100	23	Average
2402	92.04	-	-	90.87	32.86	3.15	34.84	100	59	Peak
2402	80.76	-	-	79.59	32.86	3.15	34.84	100	59	Average
2493.16	46.69	-27.31	74	45.28	33.05	3.21	34.85	100	0	Peak
2493.16	36.8	-17.2	54	35.39	33.05	3.21	34.85	100	0	Average



Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Horizontal
Remark :	1. 2441 MHz is Fundamental Signals which can be ignored. 2. 2508 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	21.63	-18.37	40	26.53	18	0.25	23.15	-	-	Peak
148.53	17.35	-26.15	43.5	29.63	10.14	0.58	23	-	-	Peak
290.01	19.17	-26.83	46	28.55	12.85	0.77	23	-	-	Peak
687.1	26.66	-19.34	46	28.65	19.21	1.13	22.33	-	-	Peak
826.4	27.57	-18.43	46	27.62	20.2	1.24	21.49	-	-	Peak
928.6	28.72	-17.28	46	27.4	20.62	1.3	20.6	100	141	Peak
2316	51.76	-22.24	74	50.76	32.73	3.1	34.83	177	356	Peak
2316	45.74	-8.26	54	44.74	32.73	3.1	34.83	177	356	Average
2378.21	50.21	-3.79	54	49.09	32.83	3.13	34.84	107	351	Average
2378.21	62.08	-11.92	74	60.96	32.83	3.13	34.84	168	340	Peak
2441	84.48	-	-	83.2	32.95	3.18	34.85	137	345	Average
2441	97.88	-	-	96.6	32.95	3.18	34.85	137	345	Peak
2489.74	31.97	-22.03	54	30.57	33.05	3.2	34.85	100	360	Average
2489.74	45.89	-28.11	74	44.49	33.05	3.2	34.85	100	360	Peak
2508	54.7	-23.18	77.88	53.26	33.08	3.21	34.85	144	356	Peak



Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Vertical
Remark :	1. 2441 MHz is Fundamental Signals which can be ignored. 2. 2508 MHz is not within a restricted band.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
47.82	30.84	-9.16	40	45.04	8.5	0.31	23.01	109	39	Peak
135.03	26.76	-16.74	43.5	37.91	11.3	0.55	23	-	-	Peak
189.03	25.79	-17.71	43.5	39.66	8.49	0.64	23	-	-	Peak
657.7	26.01	-19.99	46	28.49	18.95	1.11	22.54	-	-	Peak
846	28.84	-17.16	46	28.5	20.47	1.25	21.38	-	-	Peak
926.5	28.51	-17.49	46	27.22	20.61	1.3	20.62	-	-	Peak
2316	48.63	-25.37	74	47.63	32.73	3.1	34.83	103	41	Peak
2316	38.59	-15.41	54	37.59	32.73	3.1	34.83	103	41	Average
2377.83	51.69	-2.31	54	50.57	32.83	3.13	34.84	100	43	Average
2377.83	59.29	-14.71	74	58.17	32.83	3.13	34.84	100	43	Peak
2441	77.18	-	-	75.9	32.95	3.18	34.85	100	33	Average
2441	88.43	-	-	87.15	32.95	3.18	34.85	100	33	Peak
2484.99	32.02	-21.98	54	30.66	33.01	3.2	34.85	100	360	Average
2484.99	46.63	-27.37	74	45.27	33.01	3.2	34.85	100	360	Peak
2508	53.38	-15.05	68.43	51.94	33.08	3.21	34.85	100	284	Peak



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.27	21.51	-18.49	40	26.41	18	0.25	23.15	-	-	Peak
135.03	18.1	-25.4	43.5	29.25	11.3	0.55	23	-	-	Peak
287.04	18.93	-27.07	46	28.36	12.8	0.77	23	-	-	Peak
711.6	27.21	-18.79	46	28.72	19.41	1.15	22.07	-	-	Peak
831.3	27.73	-18.27	46	27.65	20.29	1.24	21.45	-	-	Peak
920.2	29.07	-16.93	46	27.88	20.56	1.3	20.67	100	145	Peak
2351.8	53.76	-20.24	74	52.66	32.81	3.12	34.83	100	146	Peak
2351.8	45.96	-8.04	54	44.86	32.81	3.12	34.83	100	146	Average
2416.21	58.21	-14.57	72.78	56.99	32.89	3.17	34.84	100	235	Peak
2416.21	48.03	-12.99	61.02	46.81	32.89	3.17	34.84	100	235	Average
2480.05	92.78	-	-	91.42	33.01	3.2	34.85	107	4	Peak
2480.05	81.02	-	-	79.66	33.01	3.2	34.85	107	4	Average
2483.5	62.55	-11.45	74	61.19	33.01	3.2	34.85	107	4	Peak
2483.5	46.37	-7.63	54	45.01	33.01	3.2	34.85	107	4	Average



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	44~45%
Test Engineer :	Mark Qu	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
47.82	31.84	-8.16	40	46.04	8.5	0.31	23.01	110	36	Peak
71.58	27.37	-12.63	40	44.54	5.46	0.37	23	-	-	Peak
135.03	26.66	-16.84	43.5	37.81	11.3	0.55	23	-	-	Peak
654.9	25.5	-20.5	46	28.03	18.93	1.11	22.57	-	-	Peak
781.6	27.62	-18.38	46	28.2	19.87	1.22	21.67	-	-	Peak
899.9	29.08	-16.92	46	28.24	20.45	1.29	20.9	-	-	Peak
2351.99	48.4	-25.6	74	47.3	32.81	3.12	34.83	100	56	Peak
2351.99	37.52	-16.48	54	36.42	32.81	3.12	34.83	100	56	Average
2415.83	52.08	-15.86	67.94	50.86	32.89	3.17	34.84	100	0	Peak
2415.83	42.82	-15.08	57.9	41.6	32.89	3.17	34.84	100	0	Average
2480	87.94	-	-	86.58	33.01	3.2	34.85	100	327	Peak
2480	77.9	-	-	76.54	33.01	3.2	34.85	100	327	Average
2484.04	57.32	-16.68	74	55.96	33.01	3.2	34.85	100	327	Peak
2484.04	43.2	-10.8	54	41.84	33.01	3.2	34.85	100	327	Average



3.9 Antenna Requirements

3.9.1 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.

3.9.2 Antenna Connected Construction

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

3.9.3 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	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY451015 55	N/A	Aug. 27, 2009	Aug. 26, 2010	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY444211 98	N/A	Aug. 28, 2009	Aug. 27, 2010	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI	100534	9kHz~2.75GHz	Nov. 17, 2009	Nov. 16, 2010	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 18, 2010	Jan. 17, 2011	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	N/A	Nov. 26, 2009	Nov. 25, 2010	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/06 6	Full-Band	Jan. 08, 2009	Jan. 07, 2011	Conduction (CO01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	75959	1GHz~18GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
Amplifier	Wireless	FPA6592G	60004	30MHz~2GHz	Feb. 02, 2010	Feb. 01, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
actice hore antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 18, 2009	Nov. 17, 2010	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 18, 2010	Jan. 17, 2011	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15-40GHz	Oct. 22, 2009	Oct. 21, 2010	Radiation (03CH01-KS)
Bluetooth Base Station	ANRITSU	MT8852B	6K000049 35	BT EDR	Sep.17, 2009	Sep.16, 2010	Radiation (03CH01-KS)

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 $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	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 $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+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				