

FCC RF Test Report

APPLICANT : Chi Mei Communication Systems, Inc.
EQUIPMENT : Smart phone
BRAND NAME : CMCS
MODEL NAME : F902_125
FCC ID : QDJ-F902
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Aug. 19, 2009 and completely tested on Oct. 08, 2009. 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:



Roy Wu / Manager



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	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Testing Site	7
1.5 Applied Standards	7
1.6 Ancillary Equipment List	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 RF Output Power	8
2.2 Test Mode	9
2.3 Connection Diagram of Test System	10
2.4 RF Utility	10
3 TEST RESULT	11
3.1 Number of Channel Measurement	11
3.2 20dB Bandwidth Measurement	13
3.3 Hopping Channel Separation Measurement	20
3.4 Dwell Time Measurement	23
3.5 Peak Output Power Measurement	25
3.6 Band Edges Measurement	28
3.7 AC Conducted Emission Measurement	31
3.8 Radiated Emission Measurement	35
3.9 Antenna Requirements	44
4 LIST OF MEASURING EQUIPMENT	45
5 UNCERTAINTY OF EVALUATION	46
6 CERTIFICATION OF TAF ACCREDITATION	48
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR981906B	Rev. 01	Initial issue of report	Jan. 15, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	$\geq 15\text{Chs}$	Pass	
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	$\geq 2/3$ of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 1\text{W}$	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.7	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 8.6 dB at 0.262 MHz
3.8	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.03 dB at 2483.5 MHz
3.9	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, Taipei County 23678, Taiwan

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, Taipei County 23678, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smart phone
Brand Name	CMCS
Model Name	F902_125
FCC ID	QDJ-F902
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) : -0.86 dBm (0.82 mW) Bluetooth EDR (2Mbps) : -0.91 dBm (0.81 mW) Bluetooth EDR (3Mbps) : -1.17 dBm (0.76 mW)
Antenna Type	PIFA Antenna with gain -2.42 dBi
HW Version	PR2
SW Version	0.125
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
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	PHIHONG
	Model Name	PSAI05R-050Q
	Power Rating	I/P:100-240Vac, 50-60Hz, 0.3A; O/P: 5Vdc, 1A
Battery	Brand Name	LICO
	Model Name	HH06
	Power Rating	3.7Vdc, 1270mAh, 4.69Wh
	Type	Li-ion
Earphone	Brand Name	Full-Sound
	Model Name	TDM-600-002
	Signal Line Type	1.7 meter non-shielded cable without ferrite core
USB Cable	Brand Name	Hon Hai
	Model Name	CUNC004B-T19-EF
	Signal Line Type	1.0 meter non-shielded cable without ferrite core
LCD Panel	Brand Name	INNOLUX
	Model Name	CT032TN02
Camera	Brand Name	Foxconn
	Model Name	C265

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-HY	TW1022/4086B-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 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	Anritus	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.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
6.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
7.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	-1.44 dBm	-1.43 dBm	-1.54 dBm
Ch39	2441MHz	-0.86 dBm	-0.91 dBm	-1.17 dBm
Ch78	2480MHz	-0.90 dBm	-1.09 dBm	-1.66 dBm

Remark:

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

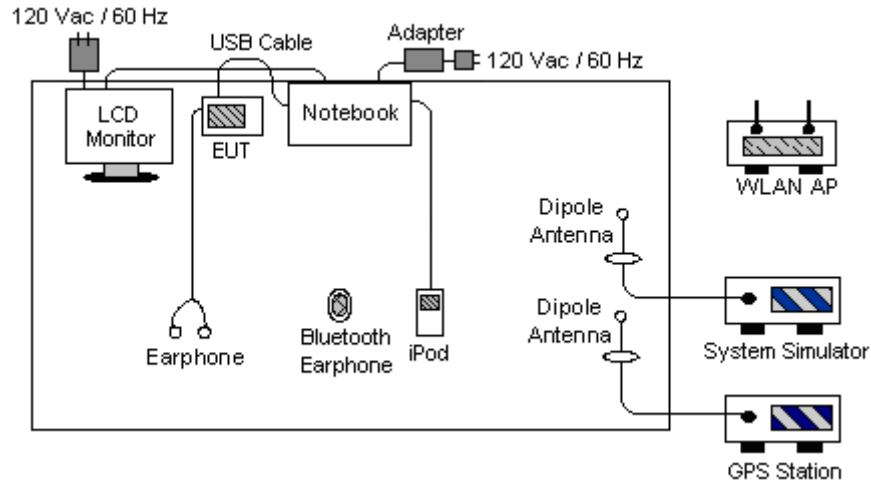
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

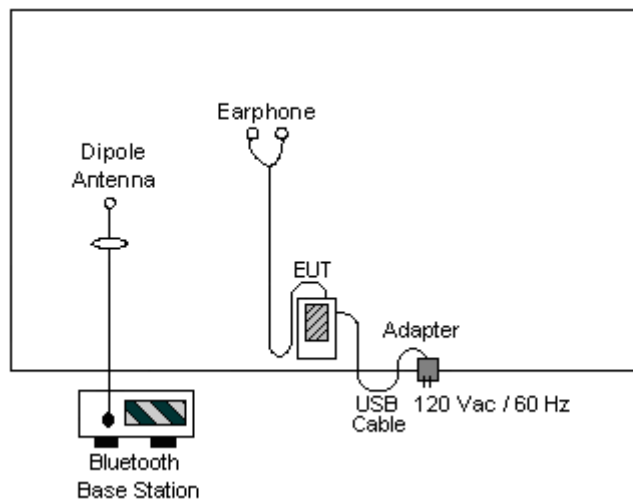
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	N/A	N/A
AC Conducted Emission	Mode 1 : WCDMA Band II Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Camera + USB Cable (Link with Notebook)		
Remark: For radiated TCs, the data rate was set in 1Mbps due to the highest RF output power; only the data of these modes was reported.			

2.3 Connection Diagram of Test System

<Conducted Emission>



<Radiated Emission>



2.4 RF Utility

For Bluetooth function, the RF utility, "BlueToothTestMode.apk" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with BT 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.

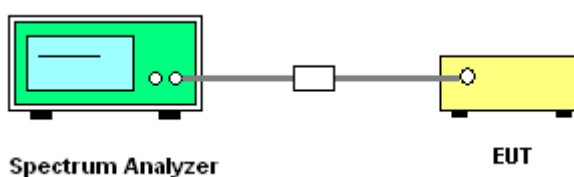
3.1.2 Measuring Instruments

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; $RBW \geq 1\%$ 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

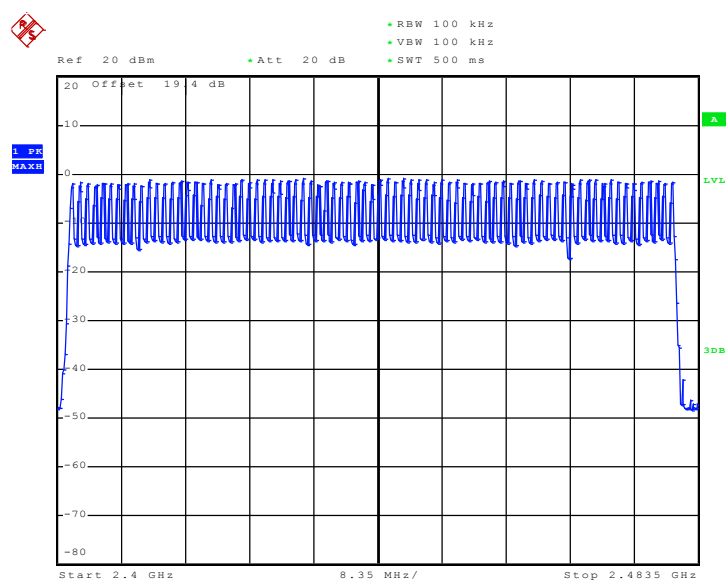




3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	26.4℃
Test Engineer :	Ken Hsu	Relative Humidity :	50%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 15.SEP.2009 19:38:03

3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

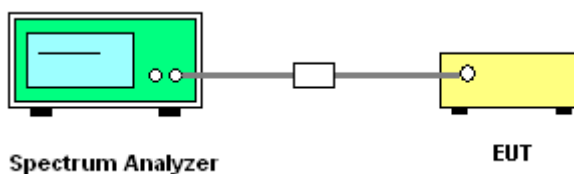
3.2.2 Measuring Instruments

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



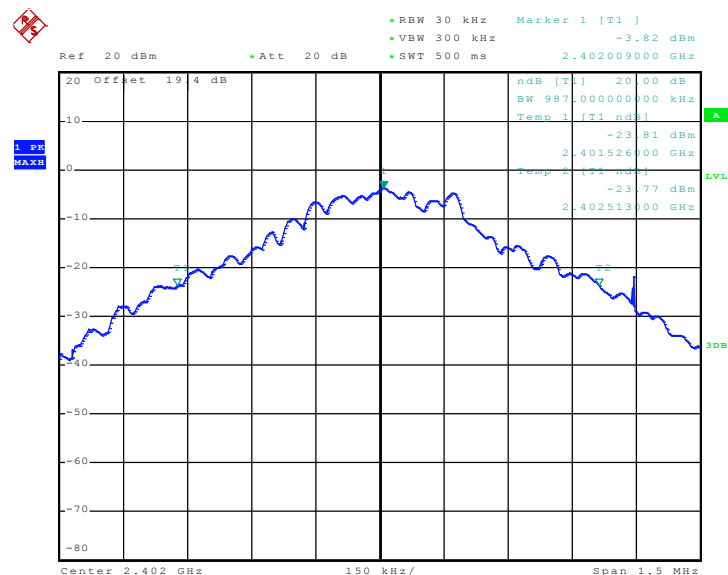


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	26.4℃
Test Engineer :	Ken Hsu	Relative Humidity :	50%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.987
39	2441	0.987
78	2480	0.987

20 dB Bandwidth Plot on Channel 00



Date: 15.SEP.2009 18:36:47



• RBW 30 kHz
 • VBW 300 kHz
 • SWT 500 ms

Ref 20 dBm
 Att 20 dB

Marker 1 [T1]
 -3.36 dBm
 2.441006000 GHz

1.76
 MAXdB

A
 LVL

3dB

Center: 2.441 GHz
 150 kHz/
 Span: 1.5 MHz

Date: 15.SEP.2009 18:39:08

• RBW 30 kHz Marker 1 [T1]
 • VBW 300 kHz -3.43 dBm
 • Att 20 dB 2.480006000 GHz

Ref 20 dBm
 • Att 20 dB 2.480006000 GHz

20 Offset 19.4 dB
 10
 0
 -10
 -20
 -30
 -40
 -50
 -60
 -70
 -80

n dB [T1] 20.00 dB
 BW 993.000000000 kHz
 Temp 1 [T1 n dB]
 -23.24 dBm
 2.479520000 GHz
 Temp 2 [T2 n dB]
 -23.49 dBm
 2.480513000 GHz

1.76
 MAXdB

3dB

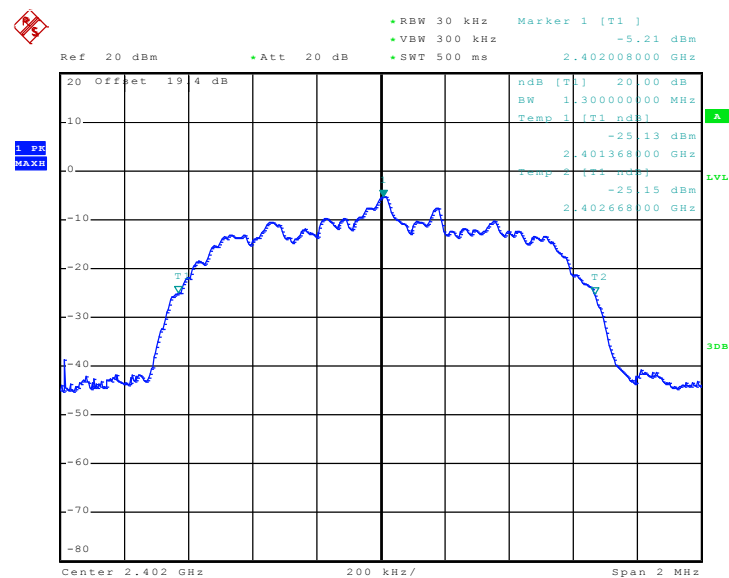
Center 2.48 GHz 150 kHz/ Span 1.5 MHz

Date: 15.SEP.2009 18:39:32



Test Mode :	Mode 4, 5, 6	Temperature :	26.4°C
Test Engineer :	Ken Hsu	Relative Humidity :	50%

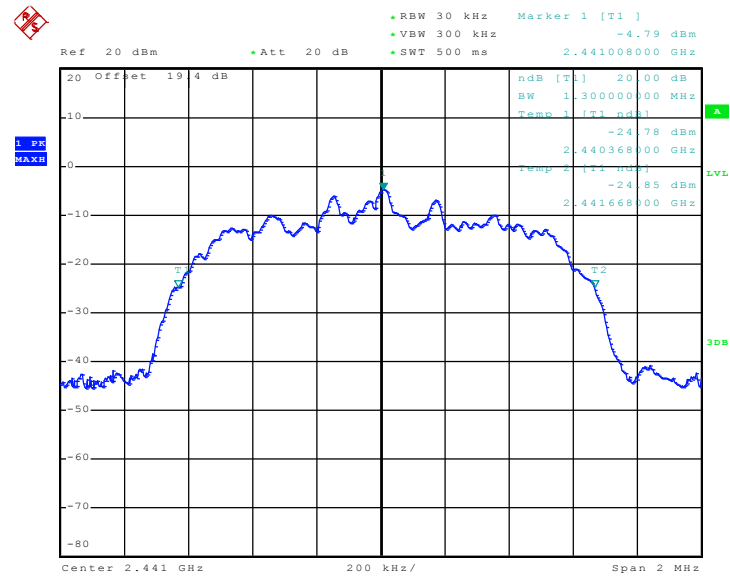
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.300
39	2441	1.300
78	2480	1.304

20 dB Bandwidth Plot on Channel 00

Date: 15.SEP.2009 18:41:30

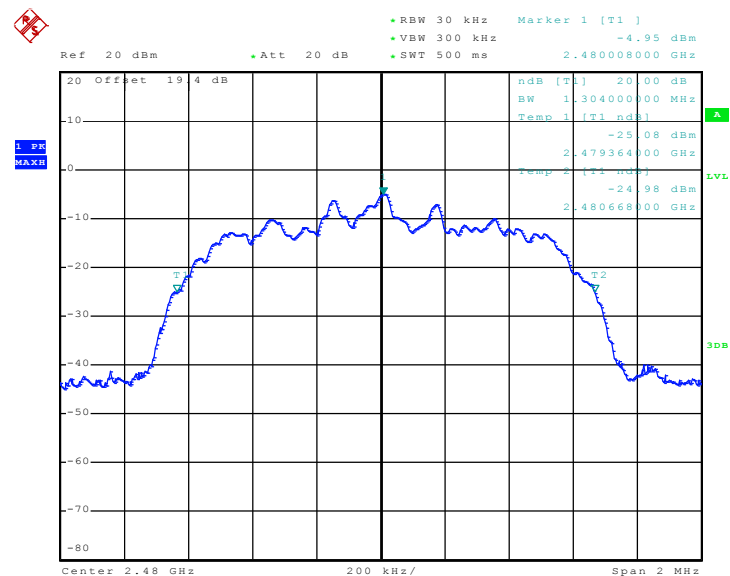


20 dB Bandwidth Plot on Channel 39



Date: 15.SEP.2009 18:40:54

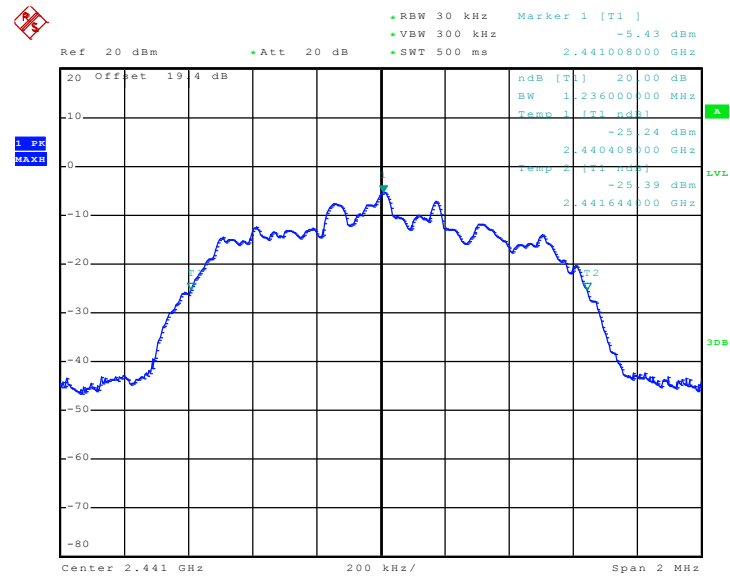
20 dB Bandwidth Plot on Channel 78



Date: 15.SEP.2009 18:41:46

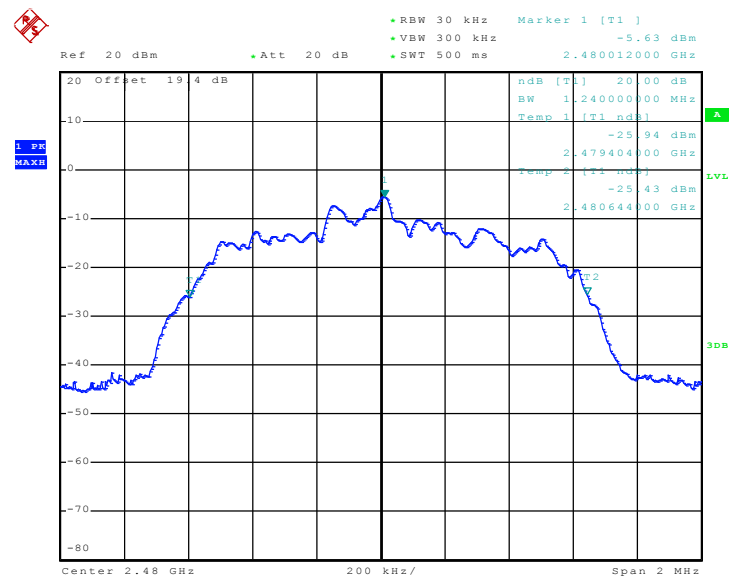


20 dB Bandwidth Plot on Channel 39



Date: 15.SEP.2009 18:44:43

20 dB Bandwidth Plot on Channel 78



Date: 15.SEP.2009 18:42:28

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.

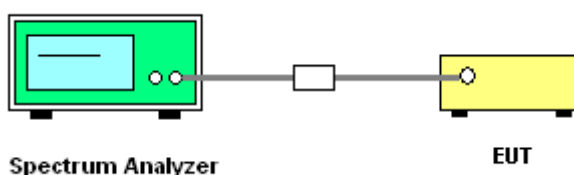
3.3.2 Measuring Instruments

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



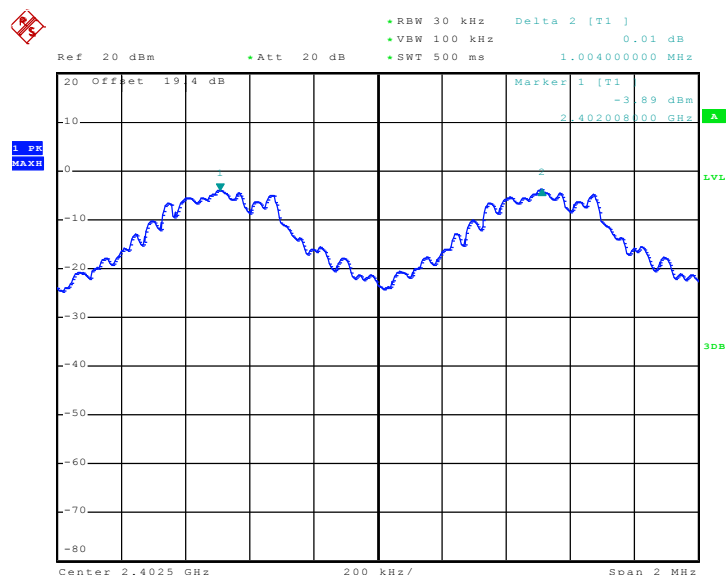


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	26.4℃
Test Engineer :	Ken Hsu	Relative Humidity :	50%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.004	0.658	Pass
39	2441	1.000	0.658	Pass
78	2480	1.000	0.662	Pass

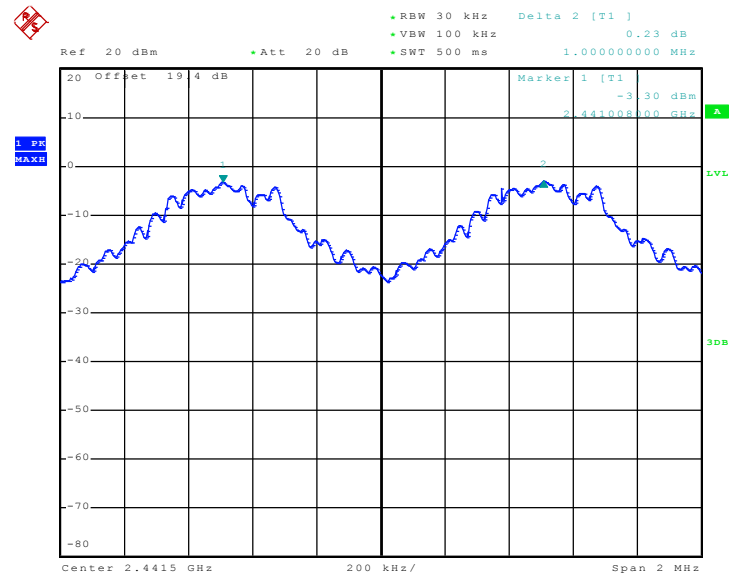
Channel Separation Plot on Channel 00 - 01



Date: 15.SEP.2009 18:47:27

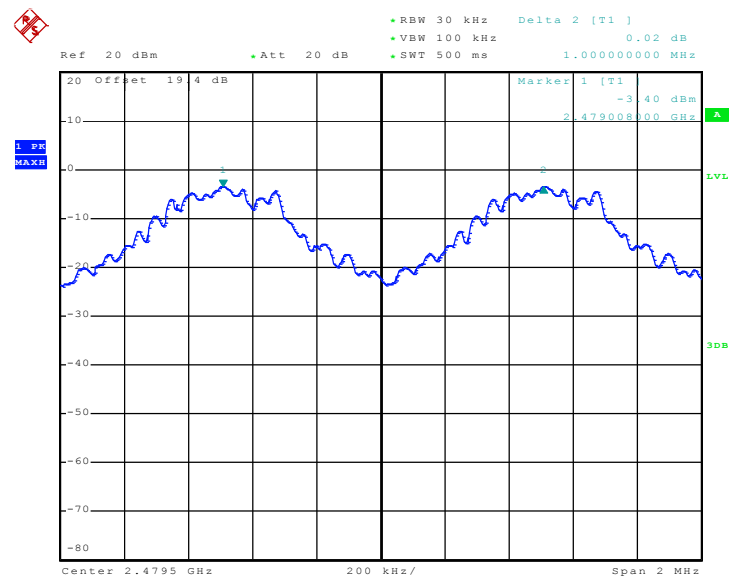


Channel Separation Plot on Channel 39 - 40



Date: 15.SEP.2009 19:39:08

Channel Separation Plot on Channel 77 - 78



Date: 15.SEP.2009 19:13:18

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.

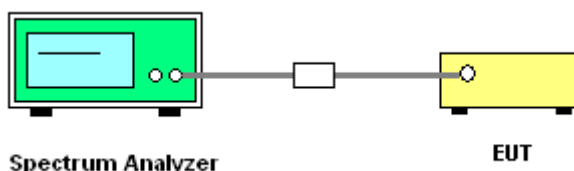
3.4.2 Measuring Instruments

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 $\geq$ 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 :	26.4°C
Test Engineer :	Ken Hsu	Relative Humidity :	50%

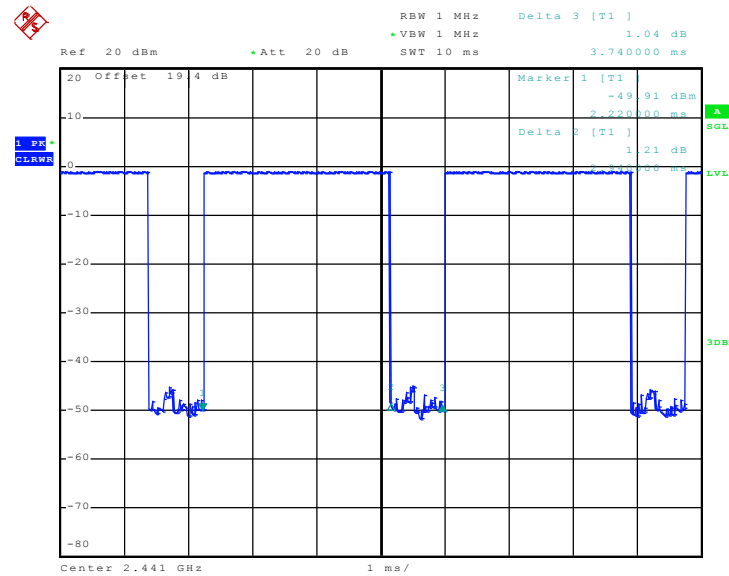
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.50	2940.00	0.33	0.4	Pass

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)

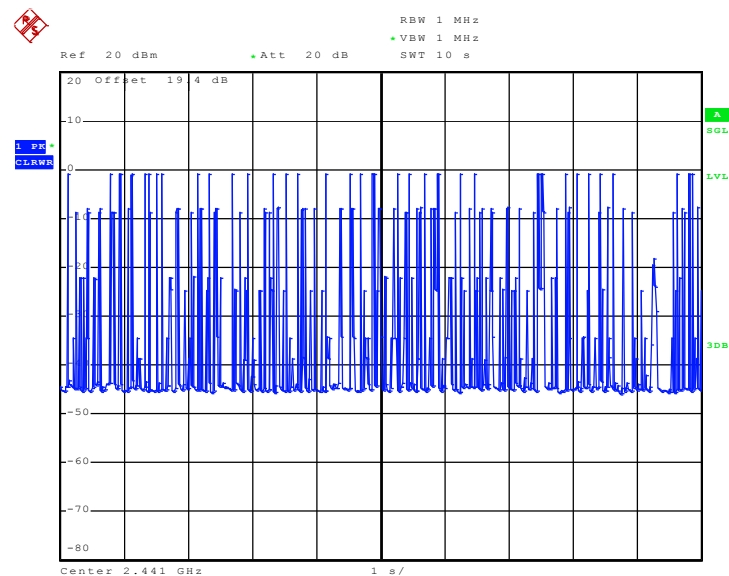


DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 15.SEP.2009 19:15:45

DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 15.SEP.2009 19:41:35

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).

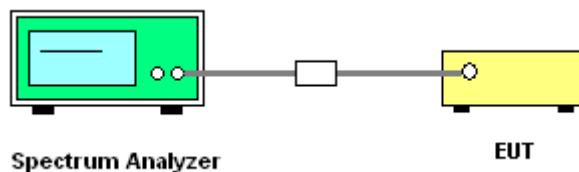
3.5.2 Measuring Instruments

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



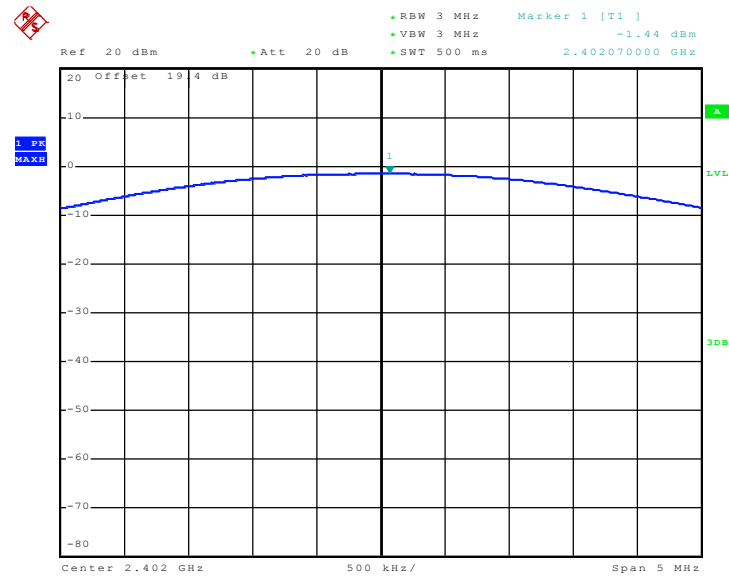
3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	26.4℃
Test Engineer :	Ken Hsu	Relative Humidity :	50%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	-1.44	30	Pass
39	2441	-0.86	30	Pass
78	2480	-0.90	30	Pass

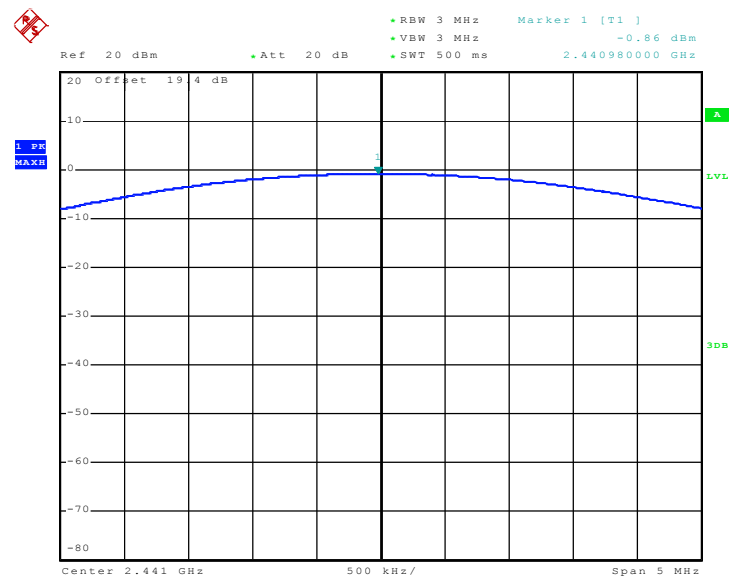


Peak Output Power Plot on Channel 00



Date: 15.SEP.2009 18:16:18

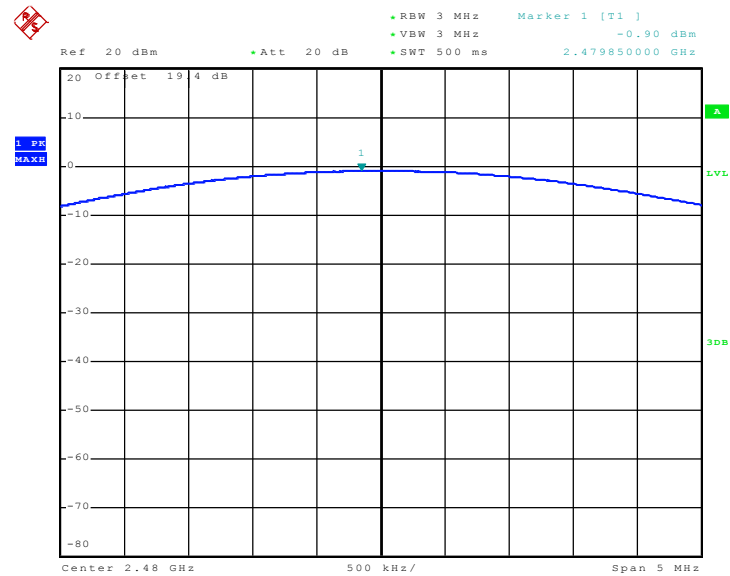
Peak Output Power Plot on Channel 39



Date: 15.SEP.2009 18:22:22



Peak Output Power Plot on Channel 78



Date: 15.SEP.2009 18:23:44

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.

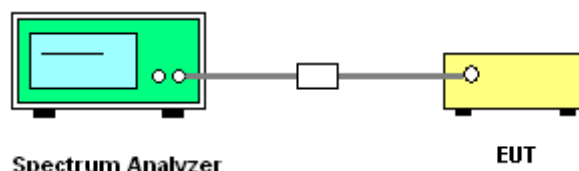
3.6.2 Measuring Instruments

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 = 1MHz, 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 1MHz 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



3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	24~25°C
Test Channel :	00	Relative Humidity :	46~47%
		Test Engineer :	Kai Wang

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
2369.66	47.33	-26.67	74.00	44.13	32.11	5.47	34.38	103	11	Peak
2369.66	38.33	-15.67	54.00	35.13	32.11	5.47	34.38	103	11	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
2369.66	46.06	-27.94	74.00	42.86	32.11	5.47	34.38	163	212	Peak
2369.66	34.22	-19.78	54.00	31.02	32.11	5.47	34.38	163	212	Average

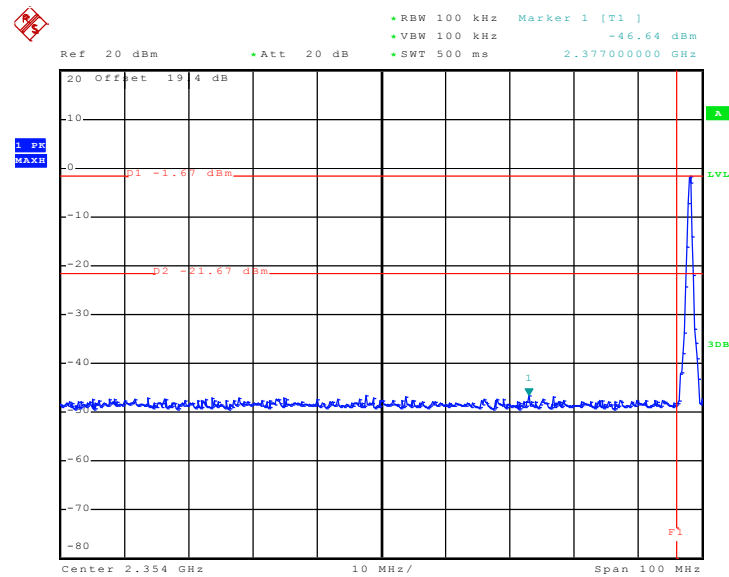
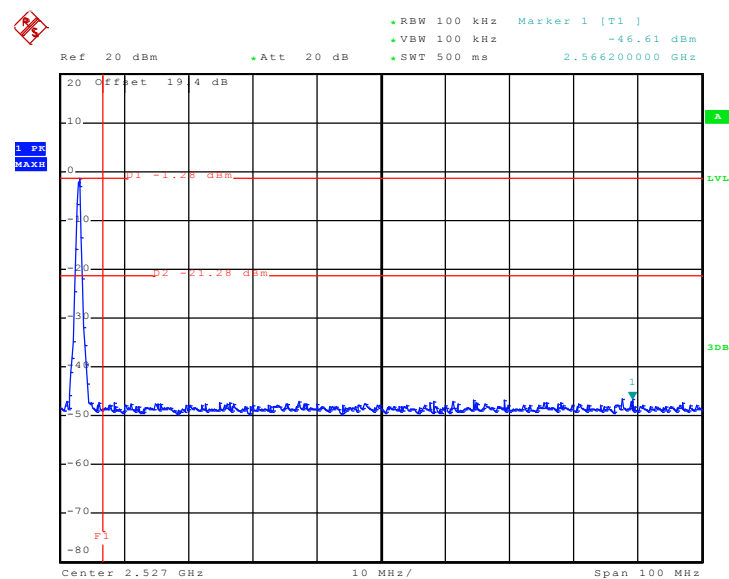
Test Mode :	Mode 3	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	46~47%
		Test Engineer :	Kai Wang

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
2483.50	61.72	-12.28	74.00	58.46	32.27	5.38	34.40	100	2	Peak
2483.50	50.97	-3.03	54.00	47.71	32.27	5.38	34.40	100	2	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
2483.50	57.73	-16.27	74.00	54.47	32.27	5.38	34.40	103	233	Peak
2483.50	48.03	-5.97	54.00	44.77	32.27	5.38	34.40	103	233	Average

**3.6.6 Test Result of Conducted Band Edges**

Test Mode :	Mode 1 and 3	Temperature :	26.4℃
Test Channel :	00 and 78	Relative Humidity :	50%
		Test Engineer :	Ken Hsu

Low Band Edge Plot on Channel 00**High Band Edge Plot on Channel 78**

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.

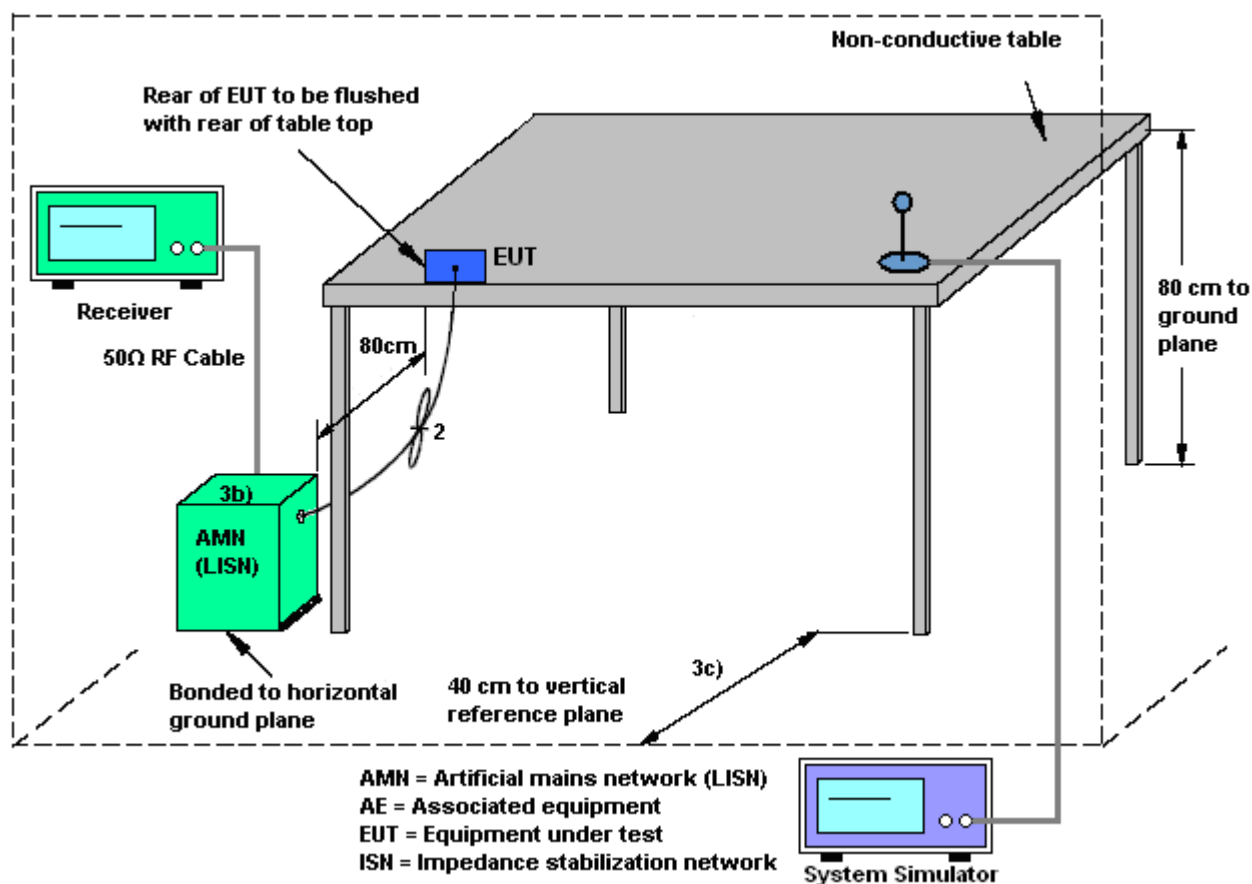
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

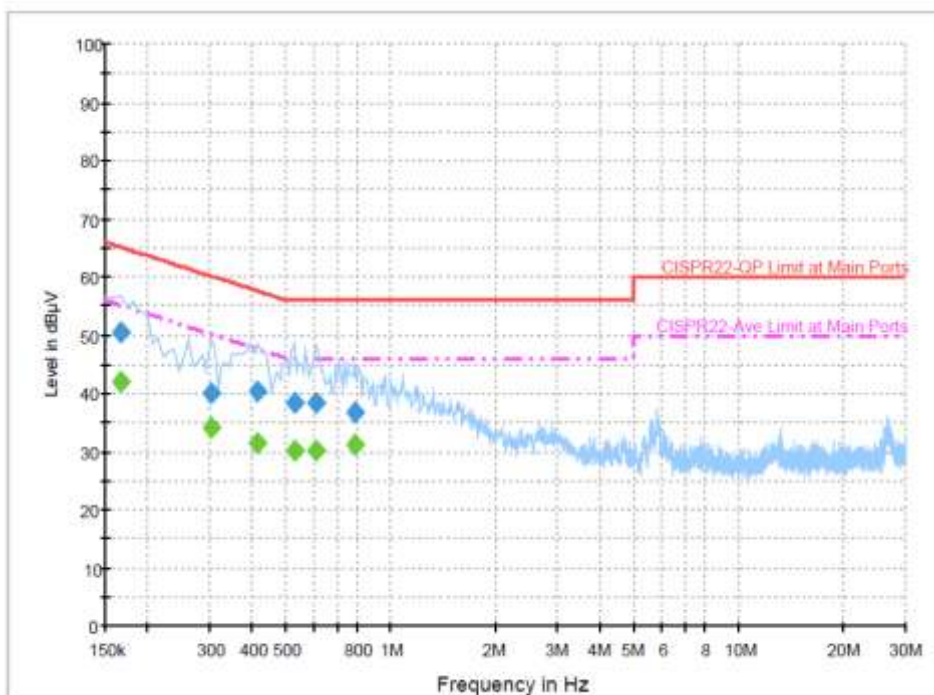
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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 1	Temperature :	24~25°C
Test Engineer :	Cona Huang	Relative Humidity :	45~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band II Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Camera + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



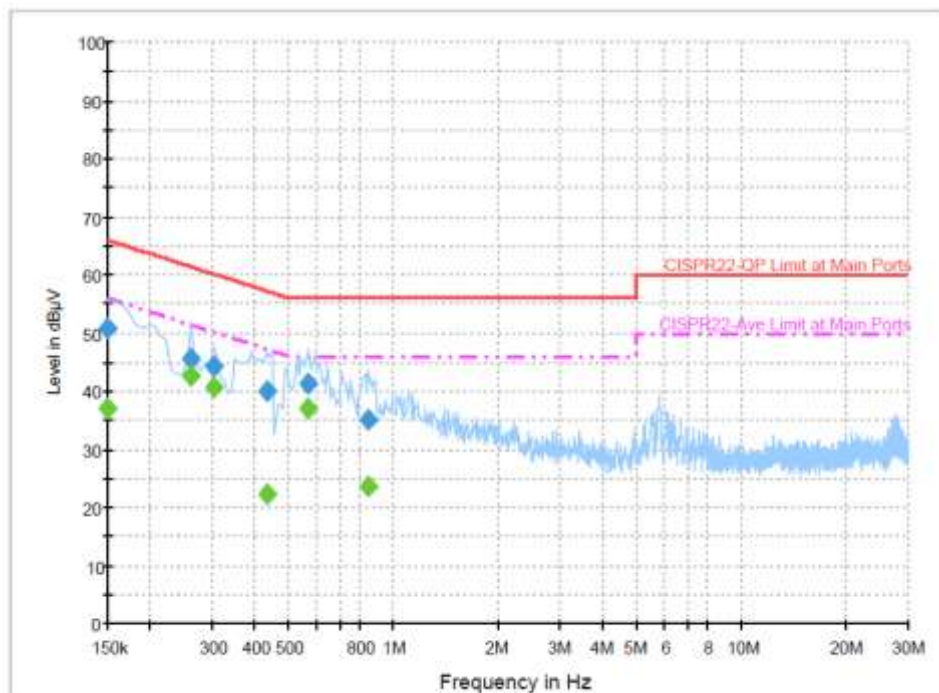
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	50.4	Off	L1	19.5	14.8	65.2
0.302000	40.0	Off	L1	19.4	20.2	60.2
0.414000	40.3	Off	L1	19.4	17.3	57.6
0.526000	38.5	Off	L1	19.5	17.5	56.0
0.606000	38.2	Off	L1	19.5	17.8	56.0
0.782000	36.7	Off	L1	19.5	19.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	42.1	Off	L1	19.5	13.1	55.2
0.302000	34.0	Off	L1	19.4	16.2	50.2
0.414000	31.4	Off	L1	19.4	16.2	47.6
0.526000	30.1	Off	L1	19.5	15.9	46.0
0.606000	30.1	Off	L1	19.5	16.0	46.0
0.782000	31.1	Off	L1	19.5	14.9	46.0

Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Cona Huang	Relative Humidity :	45~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band II Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Camera + USB Cable (Link with Notebook)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	51.0	Off	N	19.5	15.0	66.0
0.262000	45.4	Off	N	19.4	16.0	61.4
0.302000	44.1	Off	N	19.5	16.1	60.2
0.430000	40.0	Off	N	19.4	17.3	57.3
0.566000	41.3	Off	N	19.5	14.8	56.0
0.846000	35.0	Off	N	19.5	21.0	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	37.1	Off	N	19.5	18.9	56.0
0.262000	42.8	Off	N	19.4	8.6	51.4
0.302000	40.8	Off	N	19.5	9.4	50.2
0.430000	22.2	Off	N	19.4	25.1	47.3
0.566000	37.1	Off	N	19.5	8.9	46.0
0.846000	23.7	Off	N	19.5	22.3	46.0

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

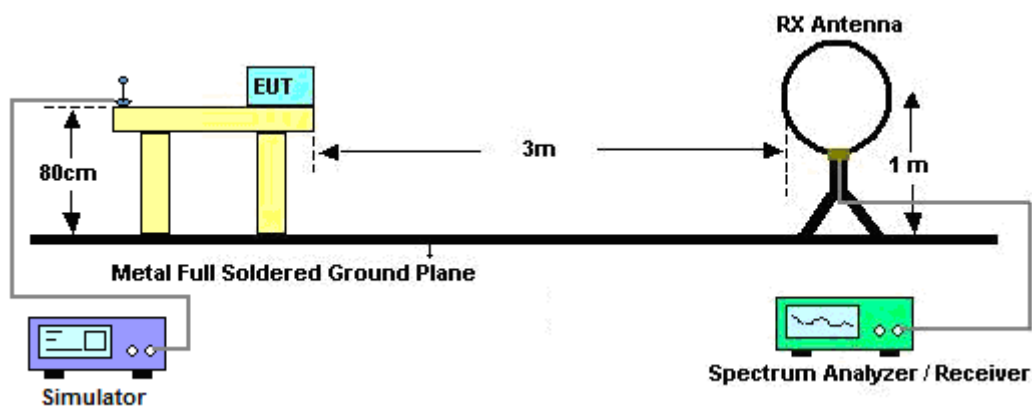
See list of measuring instruments of this test report.

3.8.3 Test Procedures

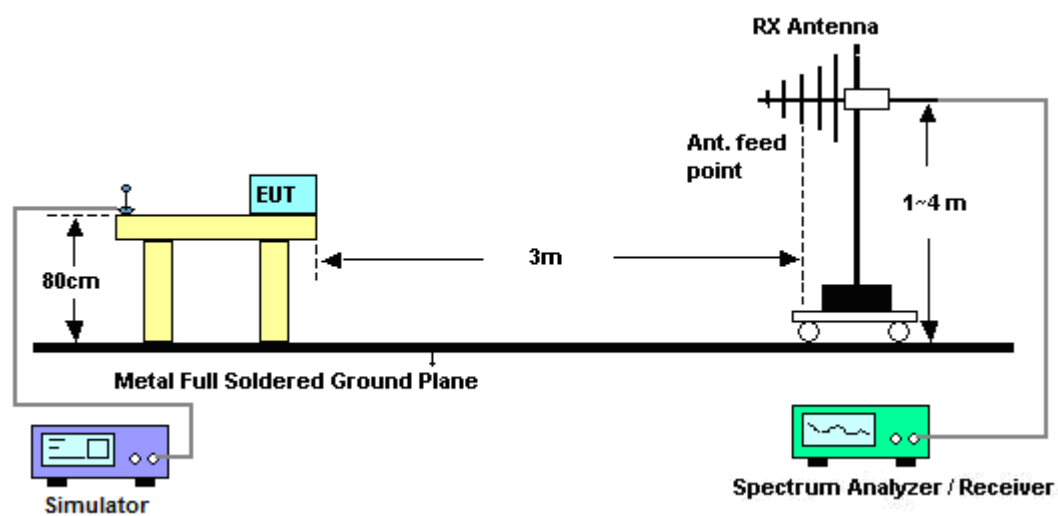
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
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 :	Kai Wang	Temperature :	24~25°C	
		Relative Humidity :	46~47%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

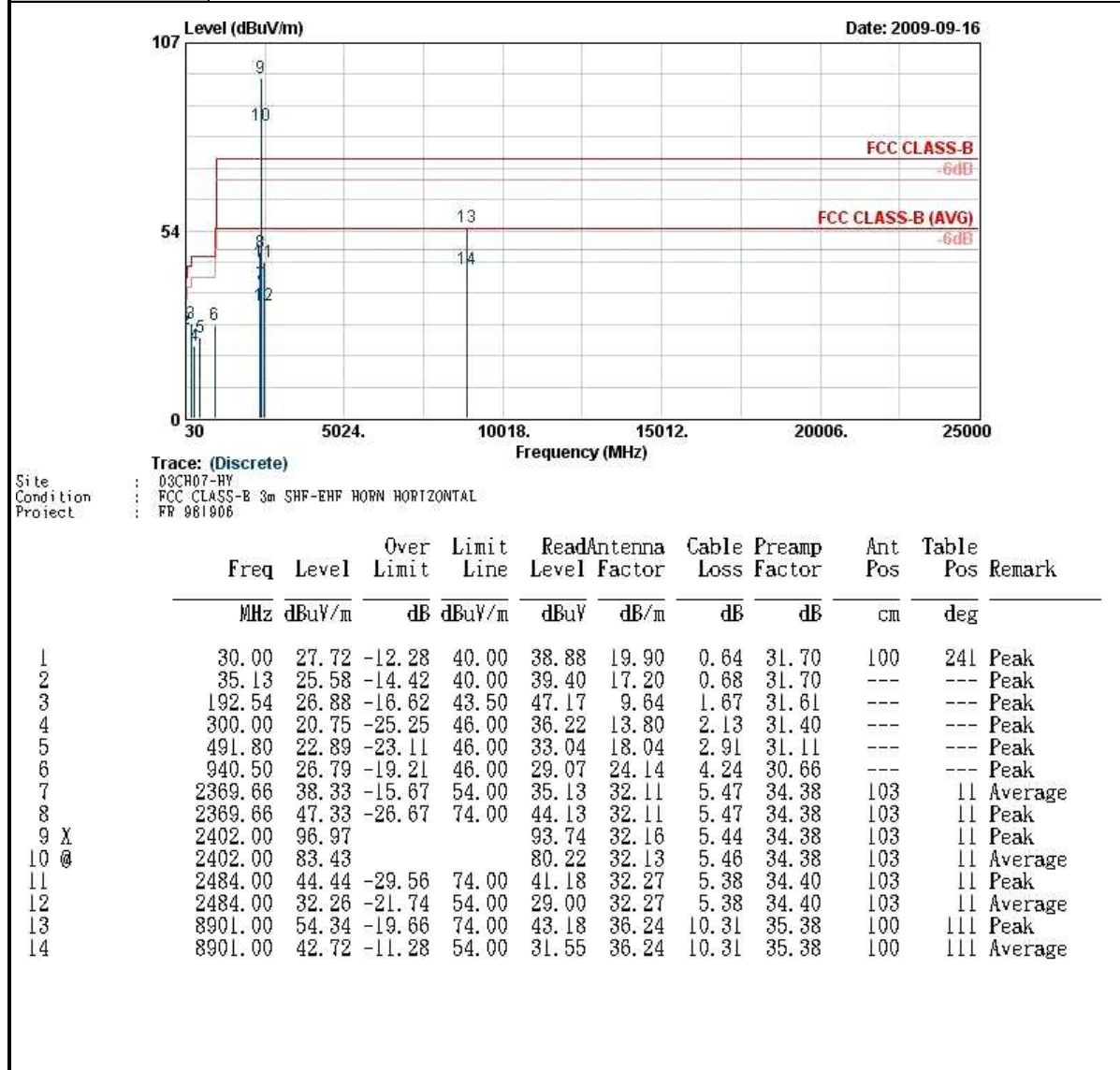
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

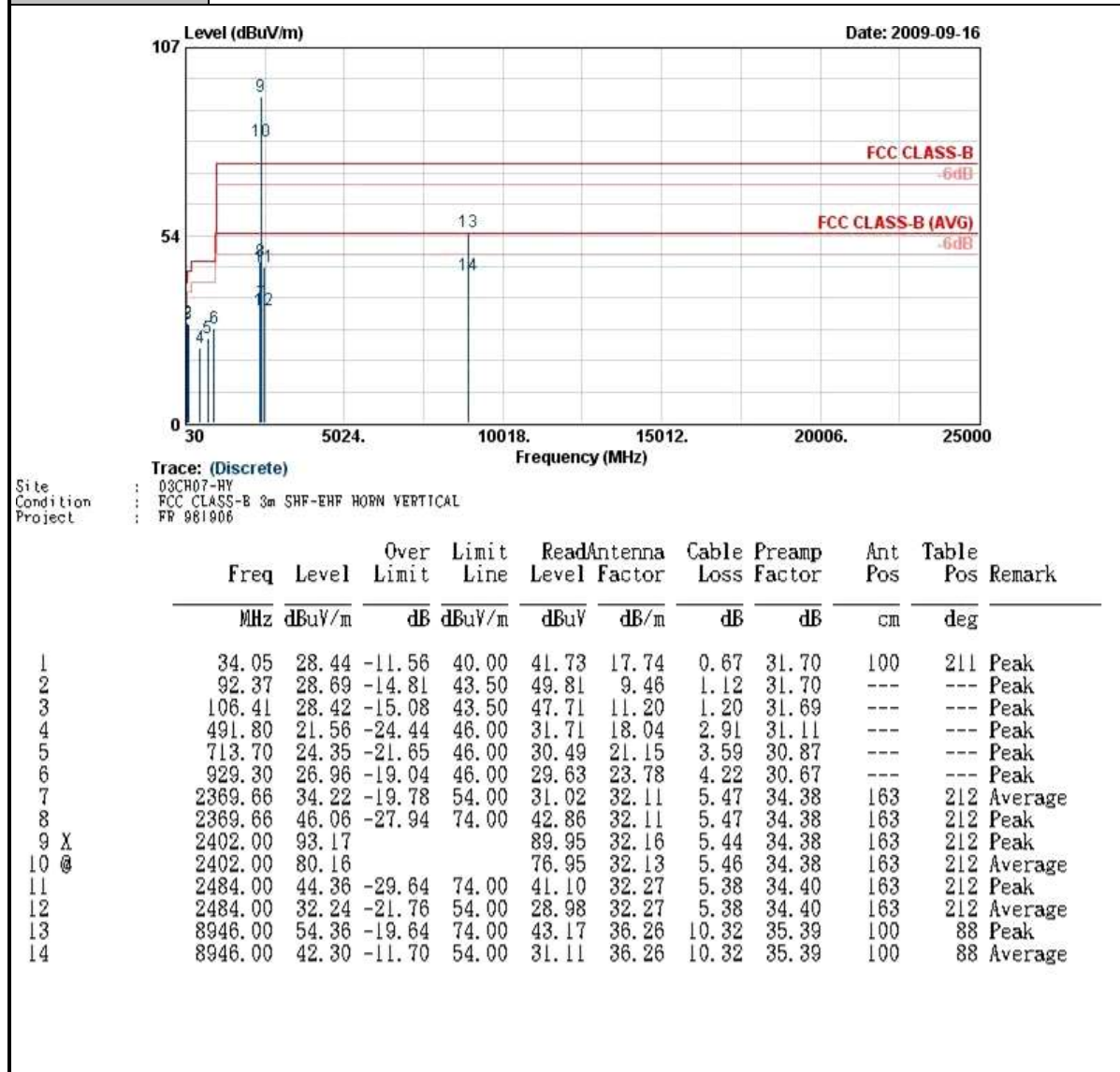
3.8.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	24~25°C
Test Channel :	00	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 1	Temperature :	24~25°C
Test Channel :	00	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

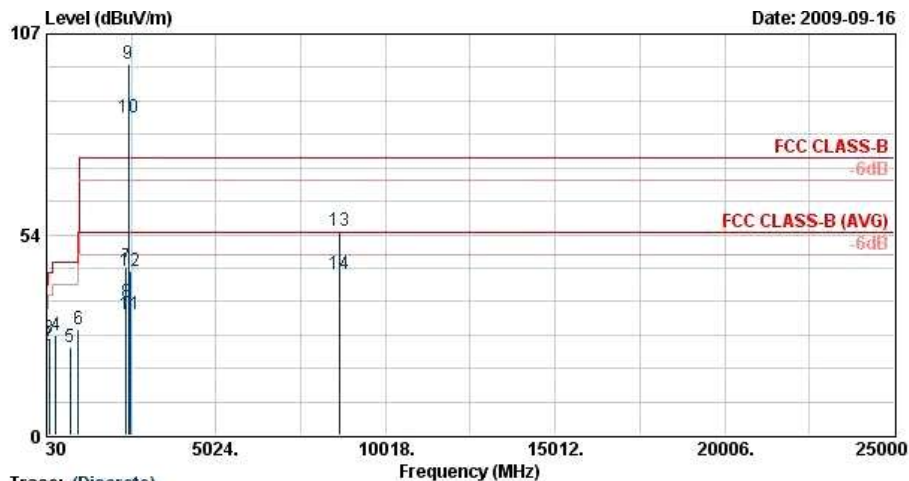




FCC RF Test Report

Report No. : FR981906B

Test Mode :	Mode 2	Temperature :	24~25°C
Test Channel :	39	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

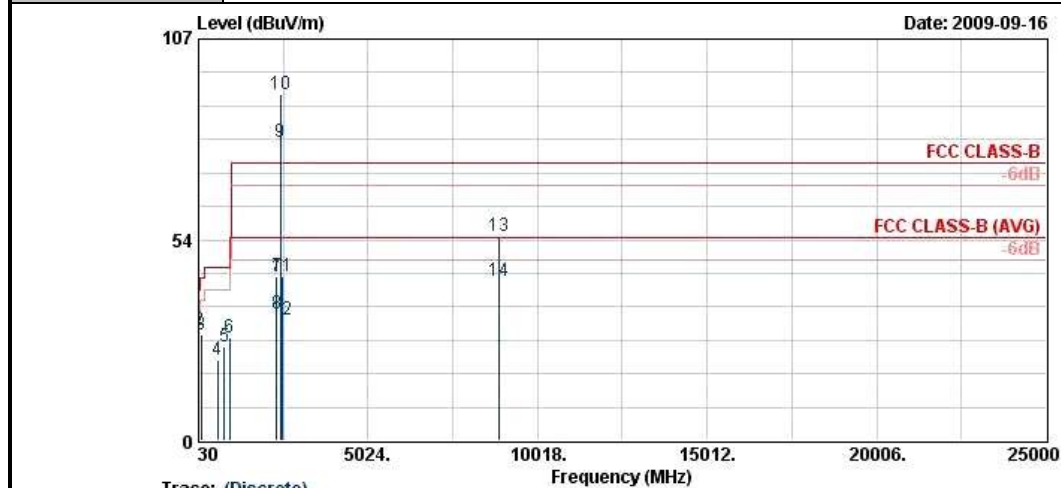


Site : 03CH07-RY
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 981906

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	26.61	-13.39	40.00	37.77	19.90	0.64	31.70	100	123	Peak
2	42.69	23.86	-16.14	40.00	42.15	12.68	0.72	31.70	---	---	Peak
3	106.41	25.75	-17.75	43.50	45.04	11.20	1.20	31.69	---	---	Peak
4	300.00	26.60	-19.40	46.00	42.07	13.80	2.13	31.40	---	---	Peak
5	727.00	23.65	-22.35	46.00	29.47	21.39	3.63	30.85	---	---	Peak
6	960.10	28.18	-25.82	54.00	30.17	24.36	4.29	30.64	---	---	Peak
7	2374.00	45.11	-28.89	74.00	41.91	32.11	5.47	34.38	101	11	Peak
8	2374.00	35.33	-18.67	54.00	32.13	32.11	5.47	34.38	101	11	Average
9 X	2441.00	99.05			95.81	32.22	5.41	34.39	101	11	Peak
10 @	2441.00	84.76			81.52	32.22	5.41	34.39	101	11	Average
11	2484.00	32.28	-21.72	54.00	29.02	32.27	5.38	34.40	101	11	Average
12	2484.00	43.84	-30.16	74.00	40.58	32.27	5.38	34.40	101	11	Peak
13	8658.00	54.45	-19.55	74.00	43.47	36.09	10.23	35.33	100	57	Peak
14	8658.00	42.87	-11.13	54.00	31.88	36.09	10.23	35.33	100	57	Average



Test Mode :	Mode 2	Temperature :	24~25°C
Test Channel :	39	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Site : 03CH07-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 981906

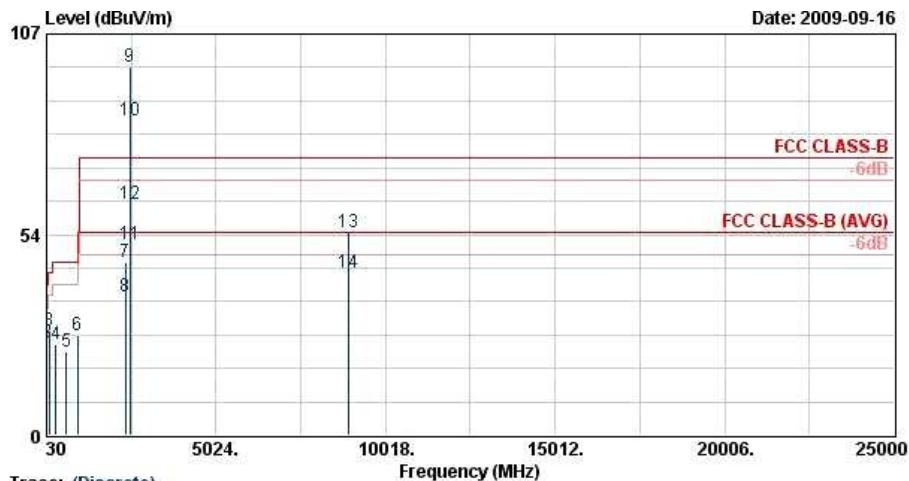
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	30.00	29.76	-10.24	40.00	40.92	19.90	0.64	31.70	100	257 Peak
2	34.86	29.45	-10.55	40.00	43.27	17.20	0.68	31.70	---	---
3	106.41	28.23	-15.27	43.50	47.53	11.20	1.20	31.69	---	---
4	598.90	21.53	-24.47	46.00	29.81	19.48	3.24	31.00	---	---
5	786.50	25.12	-20.88	46.00	30.16	21.87	3.81	30.73	---	---
6	945.40	27.52	-18.48	46.00	29.64	24.28	4.25	30.65	---	---
7	2326.00	43.92	-30.08	74.00	40.74	32.02	5.51	34.37	129	226 Peak
8	2326.00	33.70	-20.30	54.00	30.53	32.02	5.51	34.37	129	226 Average
9 @	2441.00	79.66			76.42	32.22	5.41	34.39	129	226 Average
10 X	2441.00	92.27			89.03	32.22	5.41	34.39	129	226 Peak
11	2500.00	43.92	-30.08	74.00	40.65	32.30	5.37	34.40	129	226 Peak
12	2500.00	32.24	-21.76	54.00	28.97	32.30	5.37	34.40	129	226 Average
13	8901.00	54.52	-19.48	74.00	43.36	36.24	10.31	35.38	100	284 Peak
14	8901.00	42.39	-11.61	54.00	31.22	36.24	10.31	35.38	100	284 Average



FCC RF Test Report

Report No. : FR981906B

Test Mode :	Mode 3	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Site : 03CH07-RY
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 981906

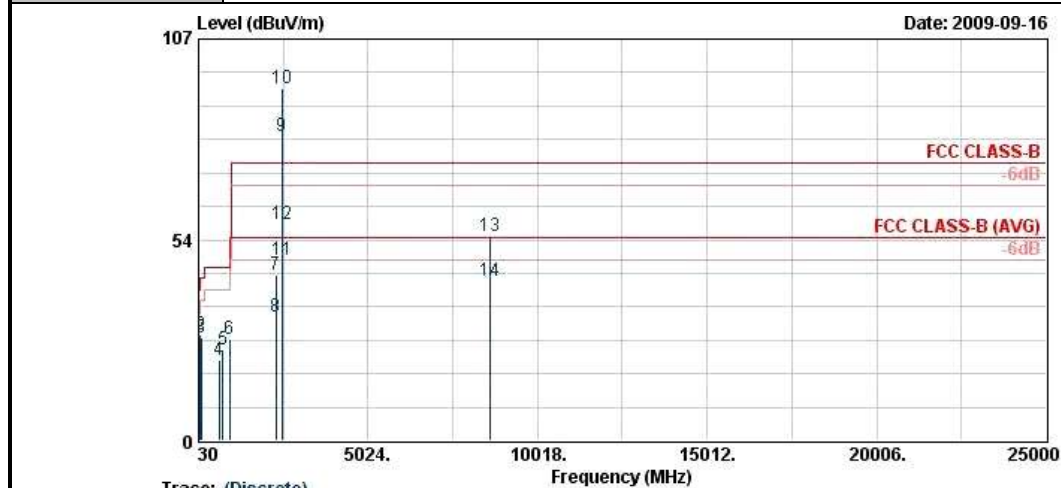
	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	28.41	-11.59	40.00	39.57	19.90	0.64	31.70	100	111	Peak
2	39.18	24.48	-15.52	40.00	40.58	14.88	0.72	31.70	---	---	Peak
3	101.82	27.84	-15.66	43.50	47.66	10.70	1.17	31.70	---	---	Peak
4	300.00	24.17	-21.83	46.00	39.64	13.80	2.13	31.40	---	---	Peak
5	624.10	22.20	-23.80	46.00	30.07	19.78	3.33	30.98	---	---	Peak
6	934.90	26.85	-19.15	46.00	29.32	23.96	4.23	30.67	---	---	Peak
7	2350.00	46.04	-27.96	74.00	42.86	32.05	5.50	34.37	100	2	Peak
8	2350.00	36.89	-17.11	54.00	33.71	32.05	5.50	34.37	100	2	Average
9 X	2480.00	98.06			94.80	32.27	5.38	34.40	100	2	Peak
10 @	2480.00	84.08			80.82	32.27	5.38	34.40	100	2	Average
11 !	2483.50	50.97	-3.03	54.00	47.71	32.27	5.38	34.40	100	2	Average
12	2483.50	61.72	-12.28	74.00	58.46	32.27	5.38	34.40	100	2	Peak
13	8946.00	54.22	-19.78	74.00	43.02	36.26	10.32	35.39	100	78	Peak
14	8946.00	43.30	-10.70	54.00	32.11	36.26	10.32	35.39	100	78	Average



FCC RF Test Report

Report No. : FR981906B

Test Mode :	Mode 3	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Trace: (Discrete)
 Site : 03CH07-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
 Project : FR 981906

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	34.59	28.35	-11.65	40.00	42.17	17.20	0.68	31.70	100	244	Peak
2	92.37	28.36	-15.14	43.50	49.48	9.46	1.12	31.70	---	---	Peak
3	106.41	27.60	-15.90	43.50	46.90	11.20	1.20	31.69	---	---	Peak
4	629.70	21.57	-24.43	46.00	29.34	19.85	3.34	30.97	---	---	Peak
5	735.40	24.10	-21.90	46.00	29.74	21.54	3.66	30.83	---	---	Peak
6	942.60	26.86	-19.14	46.00	29.07	24.19	4.25	30.66	---	---	Peak
7	2316.00	44.32	-29.68	74.00	41.16	32.00	5.53	34.36	103	233	Peak
8	2316.00	32.98	-21.02	54.00	29.82	32.00	5.53	34.36	103	233	Average
9 @	2480.00	81.03			77.77	32.27	5.38	34.40	103	233	Average
10 X	2480.00	94.06			90.80	32.27	5.38	34.40	103	233	Peak
11 !	2483.50	48.03	-5.97	54.00	44.77	32.27	5.38	34.40	103	233	Average
12	2483.50	57.73	-16.27	74.00	54.47	32.27	5.38	34.40	103	233	Peak
13	8637.00	54.56	-19.44	74.00	43.58	36.08	10.22	35.33	100	217	Peak
14	8637.00	42.52	-11.48	54.00	31.54	36.08	10.22	35.33	100	217	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	100055	9kHz~40GHz	Jun. 23, 2009	Jun. 22, 2010	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 17, 2009	Sep. 16, 2010	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 10, 2009	Sep. 09, 2010	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	105934	N/A	Nov. 11, 2008	Nov. 10, 2010	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Nov. 20, 2008	Nov. 19, 2009	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 02, 2008	Dec. 01, 2009	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 17, 2008	Dec. 16, 2009	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2009	Mar. 26, 2010	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)
Bluetooth Base Station	Anritsu	MT8852B	6K00005722	N/A	Oct. 23, 2007	Oct. 22, 2009	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 $U_c(y)$	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 $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				

6 Certification of TAF Accreditation



Certificate No. : L1190-100107

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2010 to January 09, 2013
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 07, 2010

P1, total 21 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



Appendix A. Photographs of EUT

Please refer to Sporton report number EP981906 as below.