

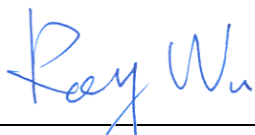
FCC RF Test Report

APPLICANT : Honeywell International Inc.
EQUIPMENT : Dolphin 9700 Mobile computer
BRAND NAME : Honeywell
MODEL NAME : Dolphin 9700
FCC ID : HD59700L0P
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Spread Spectrum (DSS)

The product was received on Oct. 30, 2009 and completely tested on Dec. 01, 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.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR903036-01B	Rev. 01	Initial issue of report	Dec. 24, 2009

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	-
3.2	-	Gen 4.4.1	99% Bandwidth	-	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	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.8	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 13.2 dB at 0.478 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 4.61 dB at 2483.50 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Honeywell International Inc.

700 Vision Drive, PO Box 208 Skeneateles Falls, NY 13513

1.2 Manufacturer

Honeywell International Inc.

700 Vision Drive, PO Box 208 Skeneateles Falls, NY 13513

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Dolphin 9700 Mobile computer
Brand Name	Honeywell
Model Name	Dolphin 9700
FCC ID	HD59700L0P
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) : 3.97 dBm (2.49 mW) Bluetooth EDR (2Mbps) : 1.61 dBm (1.45 mW) Bluetooth EDR (3Mbps) : 2.07 dBm (1.61 mW)
Antenna Type	PIFA Antenna with gain 0 dBi
HW Version	2.1
SW Version	01
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	DVE
	Model Name	DSA-0421S-09138
	Power Rating	I/P:100-240Vac, 50-60Hz, 1.2A, 80VA; O/P: 9.5Vdc, 4A
	DC Power Cord Type	1.0 meter non-shielded cable with ferrite core
Battery	Brand Name	Honeywell
	Model Name	200003231
	Power Rating	7.4Vdc, 1620mAh
	Type	Li-ion
RS232 Cable 1	Brand Name	NA
	Model Name	RS232 Charge Comm. Cable
	Signal Line Type	0.5 meter non-shielded cable without ferrite core
RS232 Cable 2	Brand Name	NA
	Model Name	RS232 Charge Comm. Cable
	Signal Line Type	1.8 meter non-shielded cable with ferrite core
USB Cable	Brand Name	NA
	Model Name	USB Charge Comm. Cable
	Signal Line Type	1.8 meter shielded cable with ferrite core
LCD Panel	Brand Name	CASIO
	Model Name	COM37H3M04XLC
Keypad 1	Brand Name	NA
	Model Name	Qwerty
Keypad 2	Brand Name	NA
	Model Name	Numeric
Scanner 1	Brand Name	Hand Held Products
	Model Name	IT5100 Series
Scanner 2	Brand Name	Hand Held Products
	Model Name	IT5300 Series

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	03CH06-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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	PC	DELL	T3400	FCC DoC	N/A	Unshielded, 1.8 m
4.	PC	DELL	OPTIPLEX 760	FCC DoC	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
7.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
8.	(USB) Mouse	Microsoft	X800898133	FCC DoC	Shielded, 1.8 m	N/A
9.	(USB) Keyboard	DELL	L100	FCC DoC	Shielded, 1.8 m with core	N/A
10.	(USB) Keyboard	DELL	SK-8115	FCC DoC	Shielded, 1.8 m	N/A
11.	i-pod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
12.	i-pod	Apple	A1199	FCC DoC	Unshielded, 1.2 m	N/A
13.	Modem	ACCEX	DM1414	IFAXDM1414	Shielded, 1.5 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	3.97 dBm	1.61 dBm	2.07 dBm
Ch39	2441MHz	3.08 dBm	0.72 dBm	1.24 dBm
Ch78	2480MHz	3.11 dBm	0.79 dBm	1.26 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).

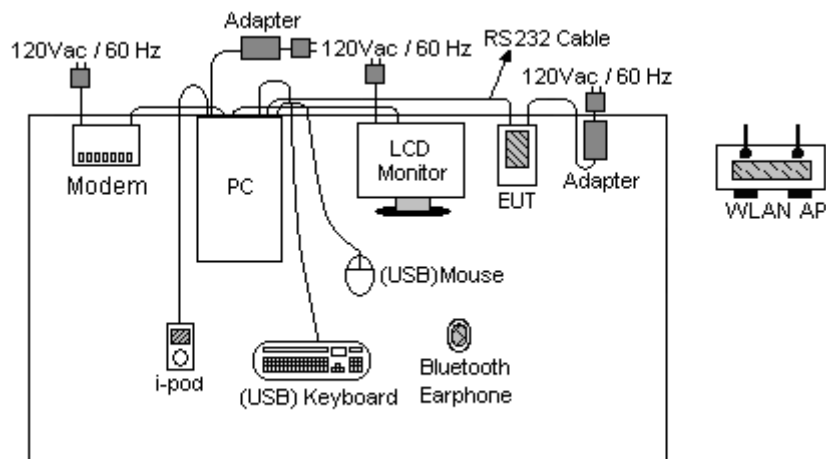
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

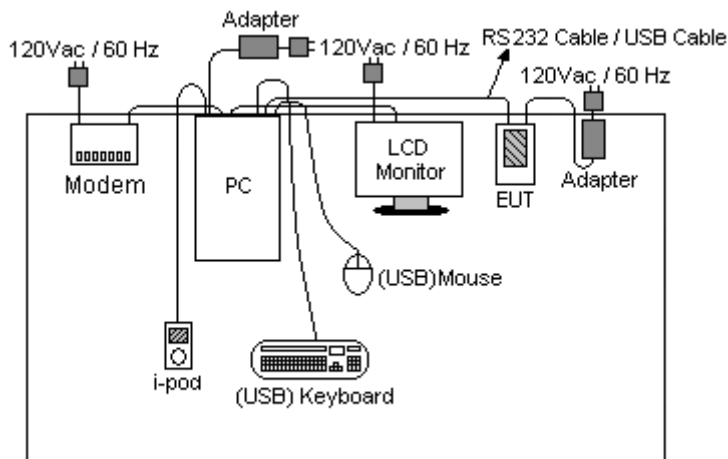
Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth 1Mbps GFSK	Bluetooth EDR 2Mbps π /4-DQPSK	Bluetooth EDR 3Mbps 8-DPSK
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	Mode 1: CH00_2402 MHz (EUT with Keypad 1, Scanner 2 and RS232 Cable 1) Mode 2: CH39_2441 MHz (EUT with Keypad 1, Scanner 2 and RS232 Cable 1) Mode 3: CH78_2480 MHz (EUT with Keypad 1, Scanner 2 and RS232 Cable 1) Mode 4: CH78_2480 MHz (EUT with Keypad 2, Scanner 1 and RS232 Cable 1) Mode 5: CH78_2480 MHz (EUT with Keypad 2, Scanner 1 and USB Cable)	N/A	N/A
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link + MP3 + Camera + Adapter + RS232 Cable 2 for EUT with Keypad 2 and Scanner 1		
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 was installed in EUT which was programmed in order to make the EUT 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.

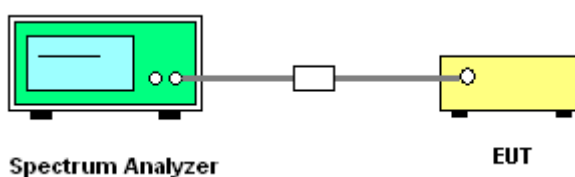
3.1.2 Measuring Instruments

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.

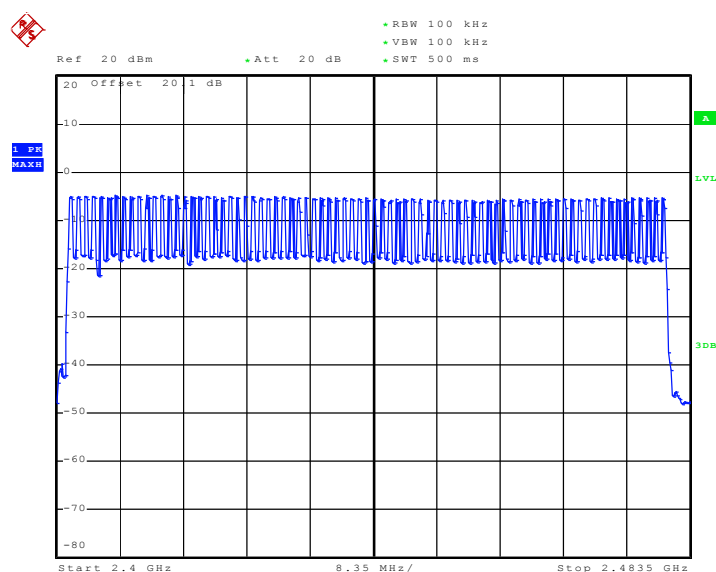
3.1.4 Test Setup



3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 1~3	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%
Number of Hopping Channels (Channel)		Limits (Channel)	Pass/Fail
79		> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 13.NOV.2009 01:11:12

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

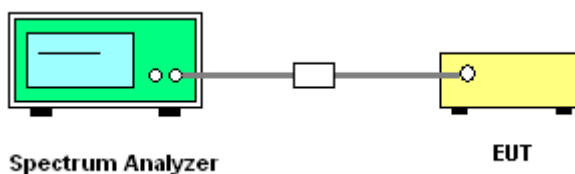
3.2.2 Measuring Instruments

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

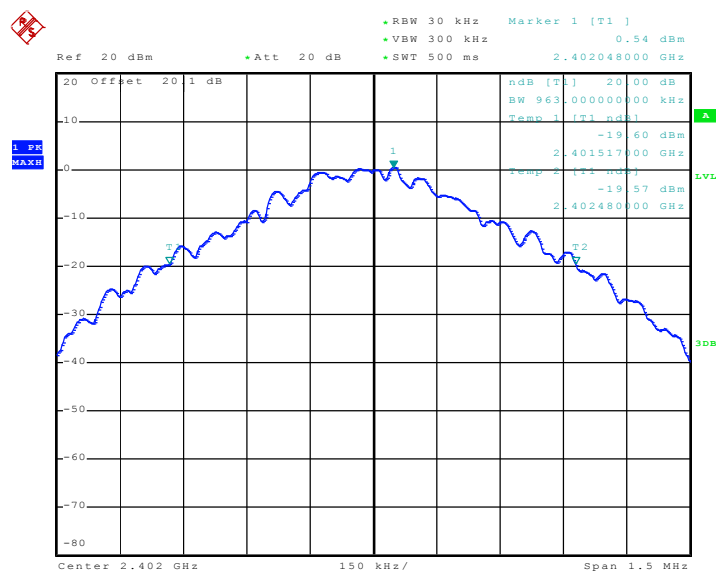


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.963
39	2441	0.963
78	2480	0.963

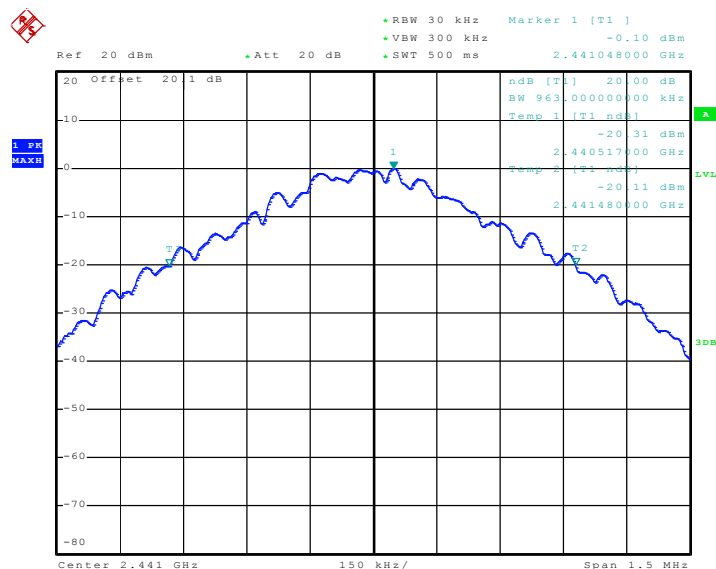
20 dB Bandwidth Plot on Channel 00



Date: 12.NOV.2009 23:59:24

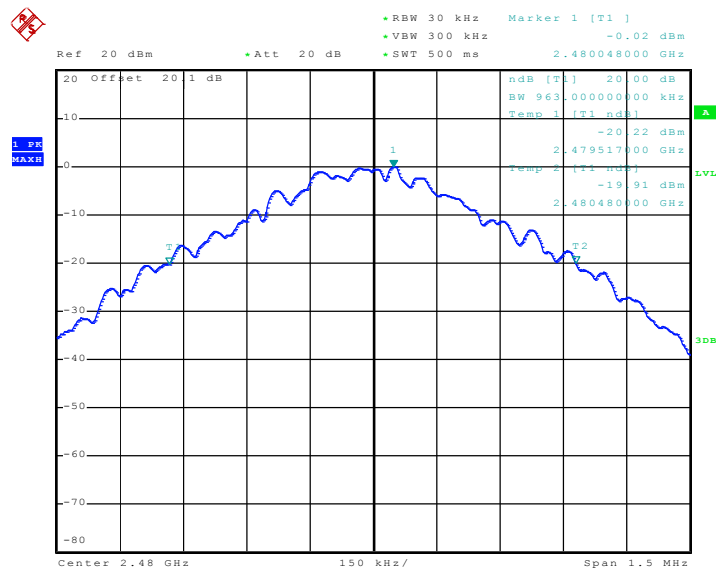


20 dB Bandwidth Plot on Channel 39



Date: 12.NOV.2009 23:59:03

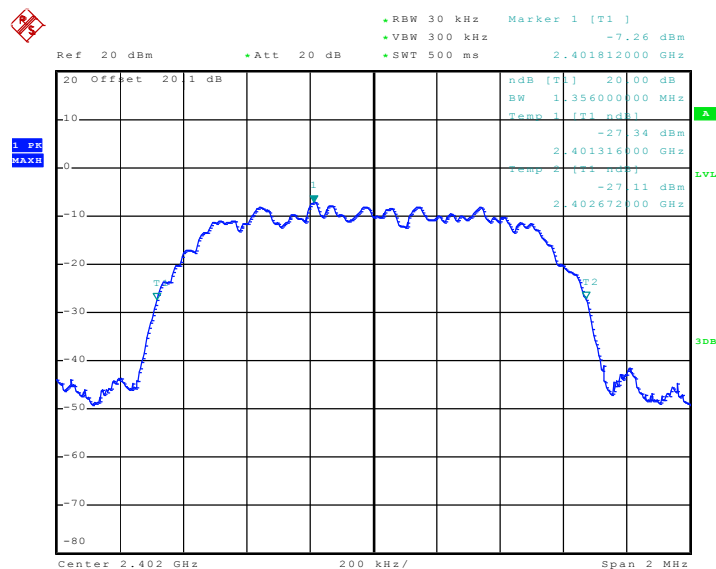
20 dB Bandwidth Plot on Channel 78



Date: 12.NOV.2009 23:58:34

Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

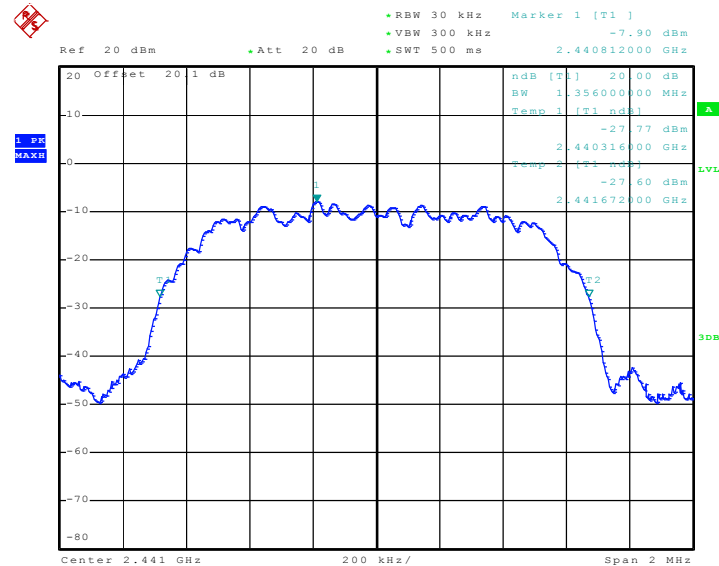
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.356
39	2441	1.356
78	2480	1.356

20 dB Bandwidth Plot on Channel 00


Date: 13.NOV.2009 00:00:01

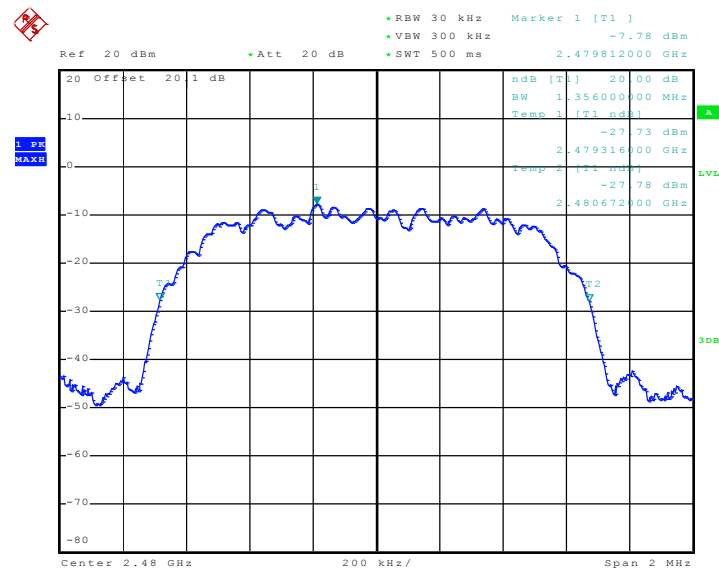


20 dB Bandwidth Plot on Channel 39



Date: 13.NOV.2009 00:00:35

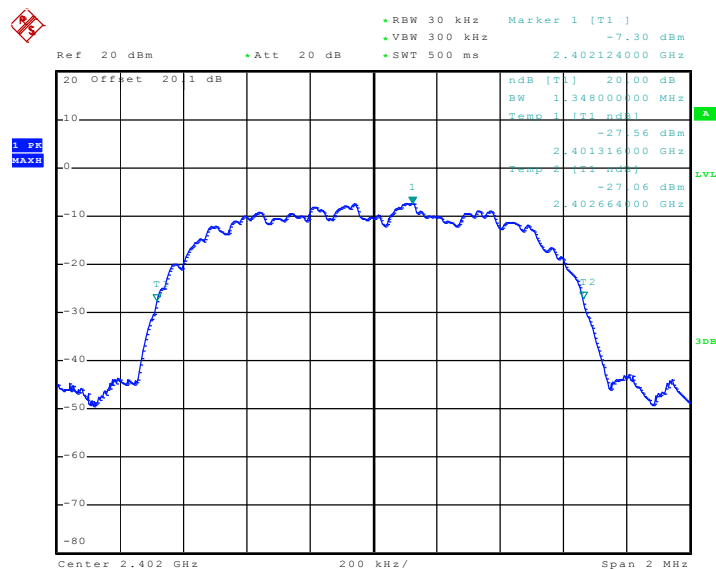
20 dB Bandwidth Plot on Channel 78



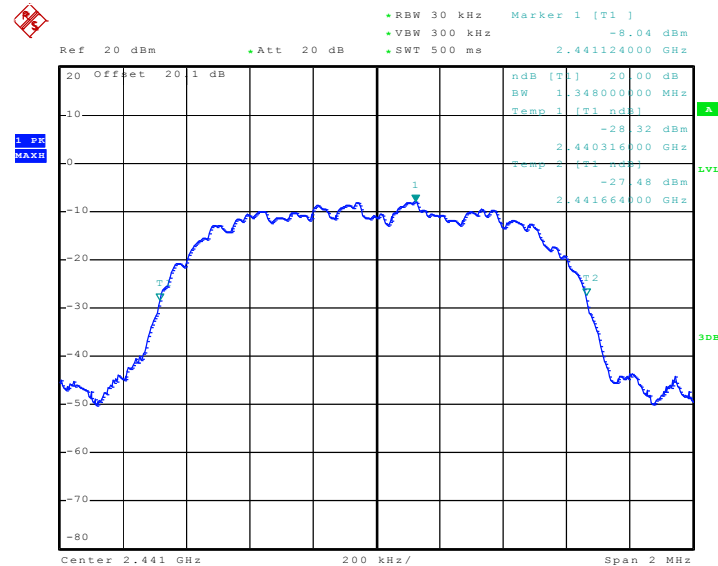
Date: 13.NOV.2009 00:00:57

Test Mode :	Mode 7, 8, 9	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

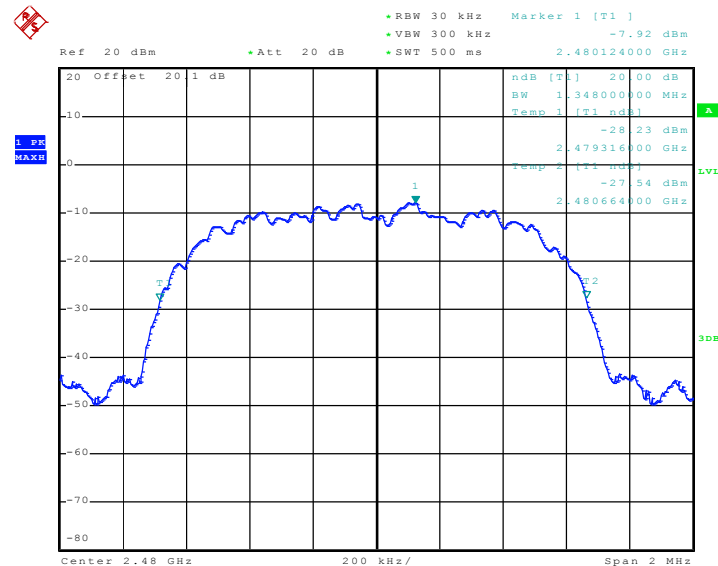
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.348
39	2441	1.348
78	2480	1.348

20 dB Bandwidth Plot on Channel 00


Date: 13.NOV.2009 00:02:12

20 dB Bandwidth Plot on Channel 39


Date: 13.NOV.2009 00:01:42

20 dB Bandwidth Plot on Channel 78


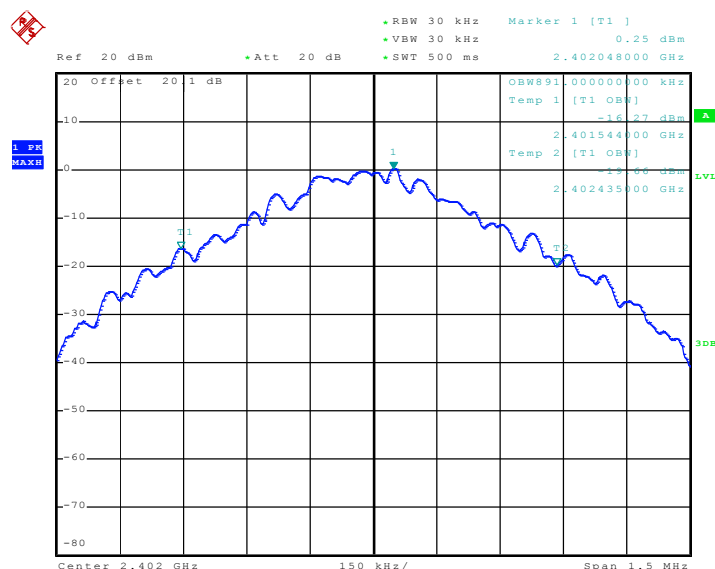
Date: 13.NOV.2009 00:01:16

3.2.6 Test Result of 99% Occupied Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.891
39	2441	0.894
78	2480	0.897

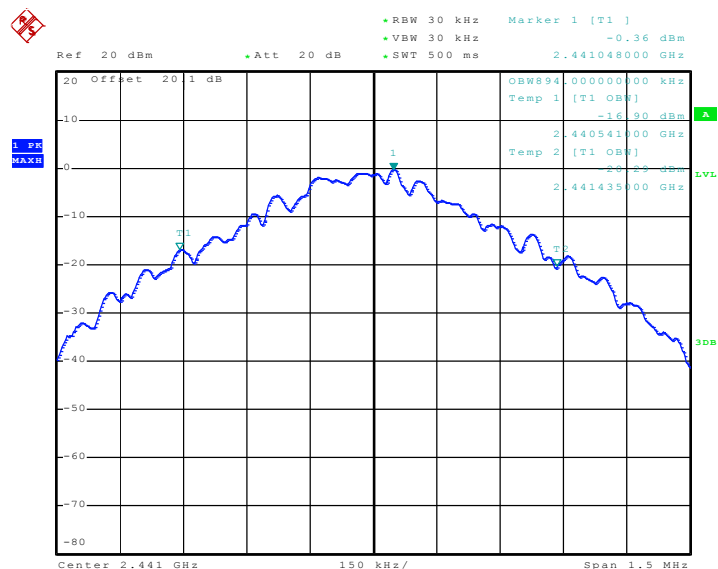
99% Bandwidth Plot on Channel 00



Date: 13.NOV.2009 00:05:18

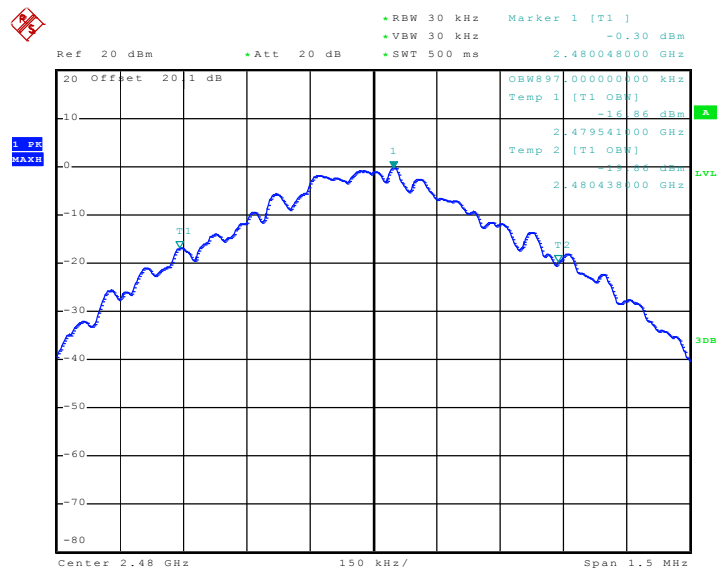


99% Occupied Bandwidth Plot on Channel 39



Date: 13.NOV.2009 00:05:50

99% Occupied Bandwidth Plot on Channel 78



Date: 13.NOV.2009 00:06:17

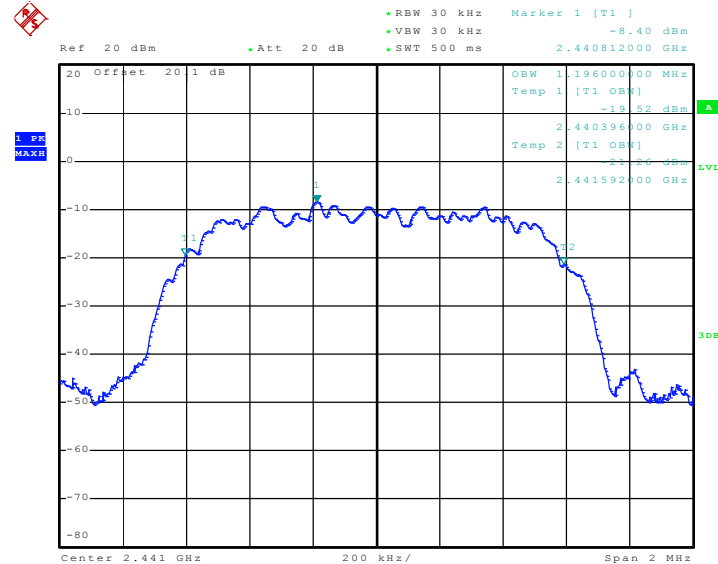


Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.196
39	2441	1.196
78	2480	1.196

Date: 13.NOV.2009 00:07:29

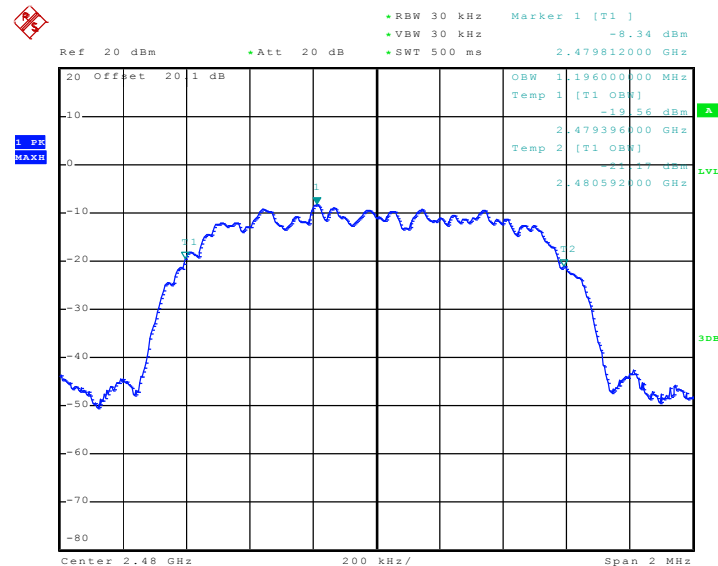


99% Occupied Bandwidth Plot on Channel 39



Date: 13.NOV.2009 00:07:06

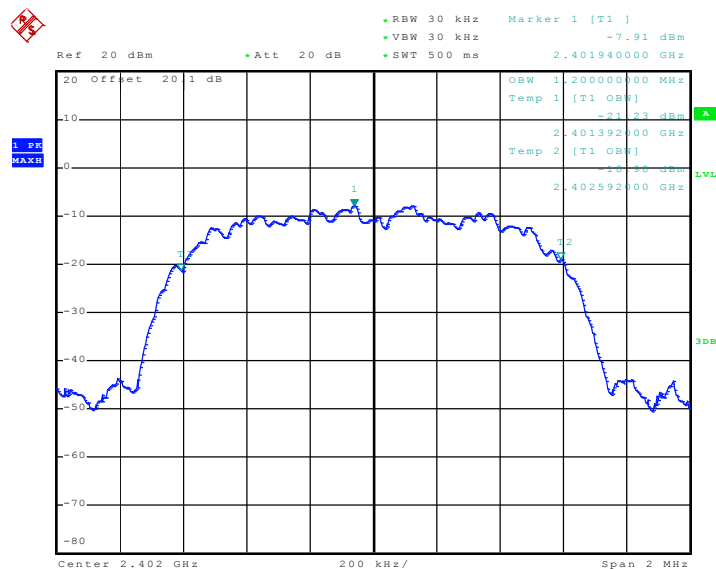
99% Occupied Bandwidth Plot on Channel 78



Date: 13.NOV.2009 00:06:43

Test Mode :	Mode 7, 8, 9	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

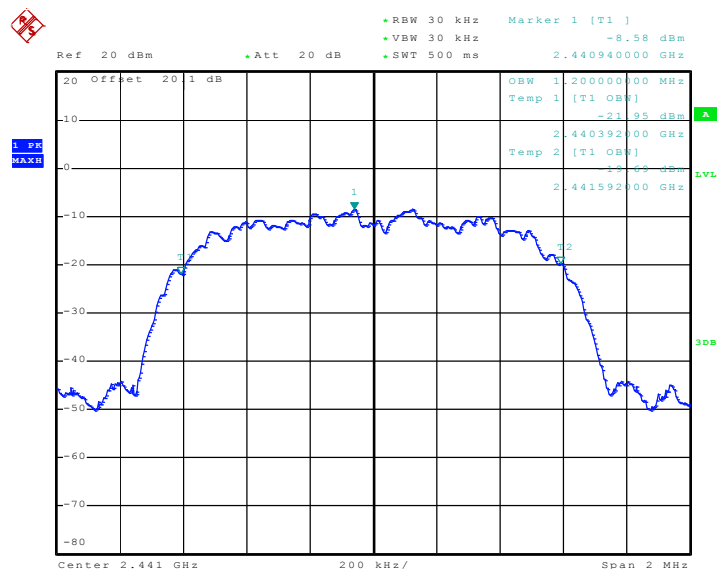
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.200
39	2441	1.200
78	2480	1.200

99% Bandwidth Plot on Channel 00


Date: 13.NOV.2009 00:07:51

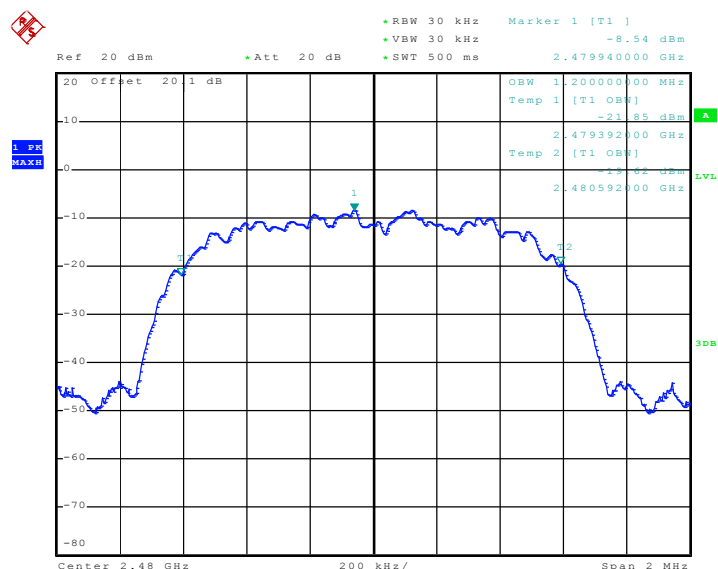


99% Occupied Bandwidth Plot on Channel 39



Date: 13.NOV.2009 00:08:32

99% Occupied Bandwidth Plot on Channel 78



Date: 13.NOV.2009 00:08:54

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.

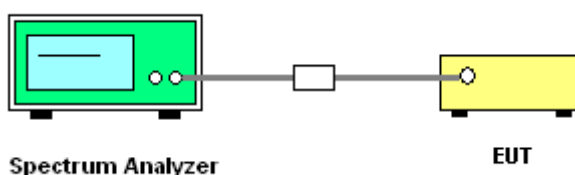
3.3.2 Measuring Instruments

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 $\geq$ 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

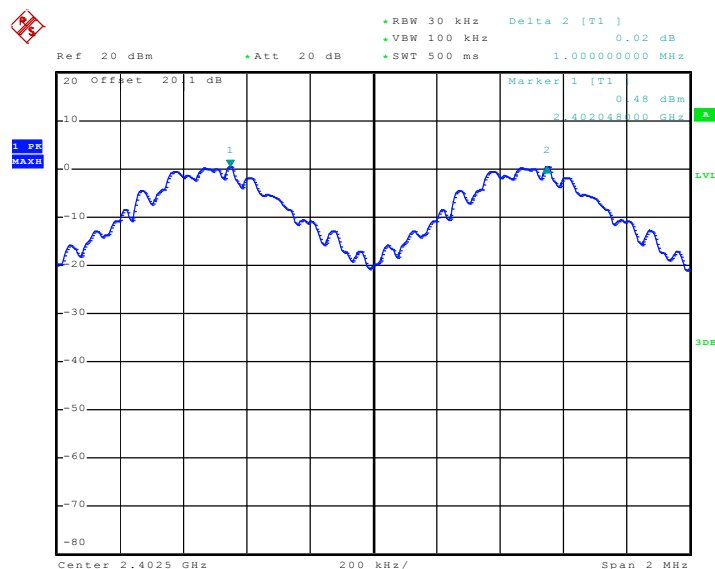


3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

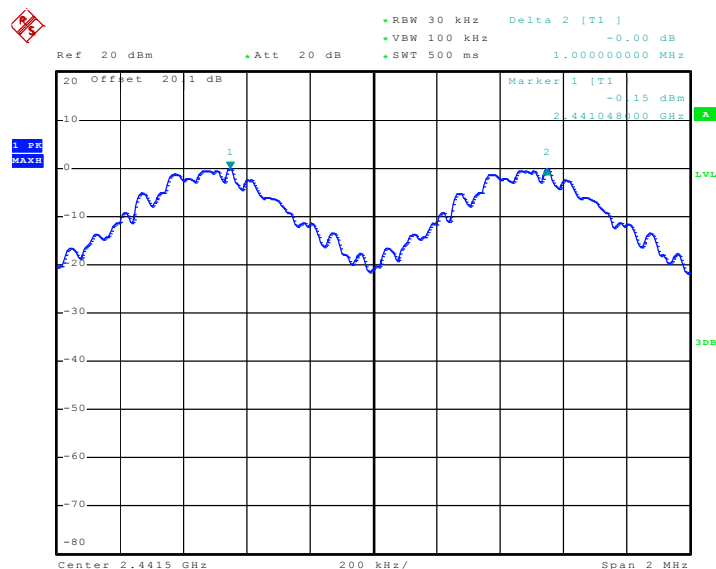
Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.000	0.642	Pass
39	2441	1.000	0.642	Pass
78	2480	1.000	0.642	Pass

Channel Separation Plot on Channel 00 - 01



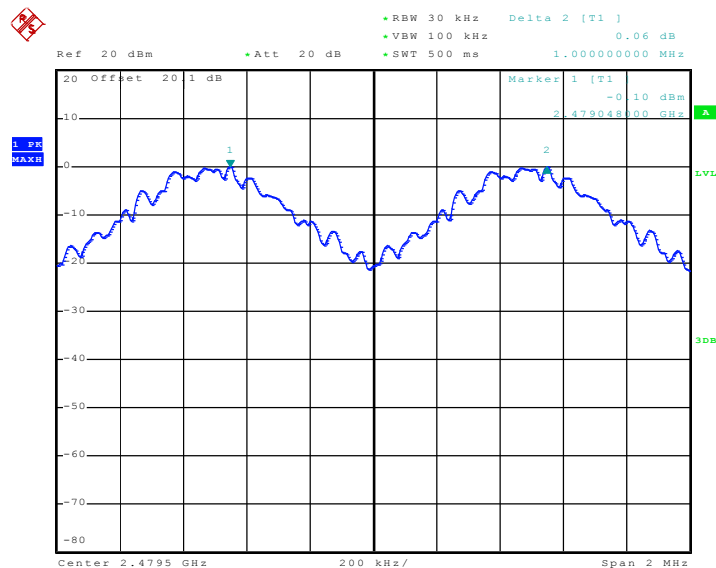
Date: 13.NOV.2009 00:21:34

Channel Separation Plot on Channel 39 - 40



Date: 13.NOV.2009 00:22:08

Channel Separation Plot on Channel 77 - 78



Date: 13.NOV.2009 00:22:47

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.

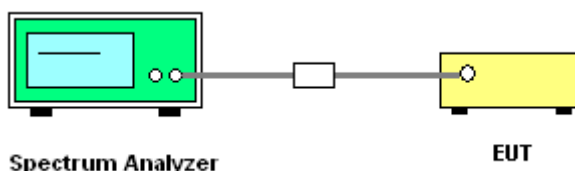
3.4.2 Measuring Instruments

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 :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

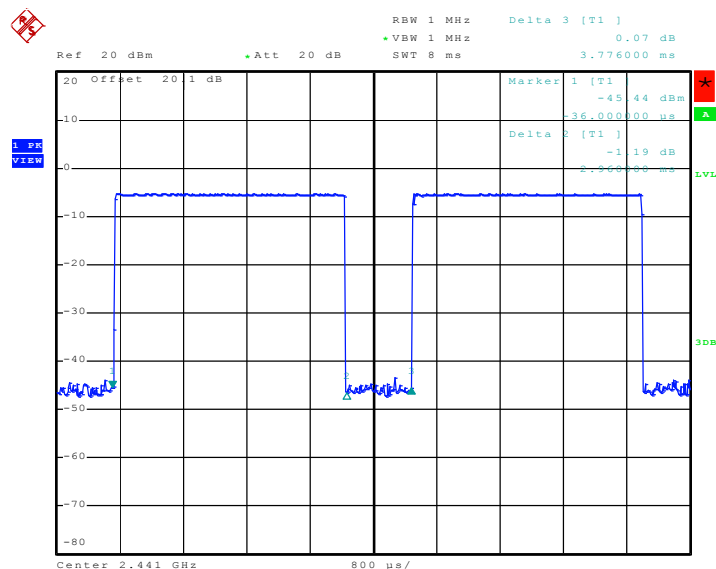
Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	3.50	2960.00	0.33	0.4	Pass

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)

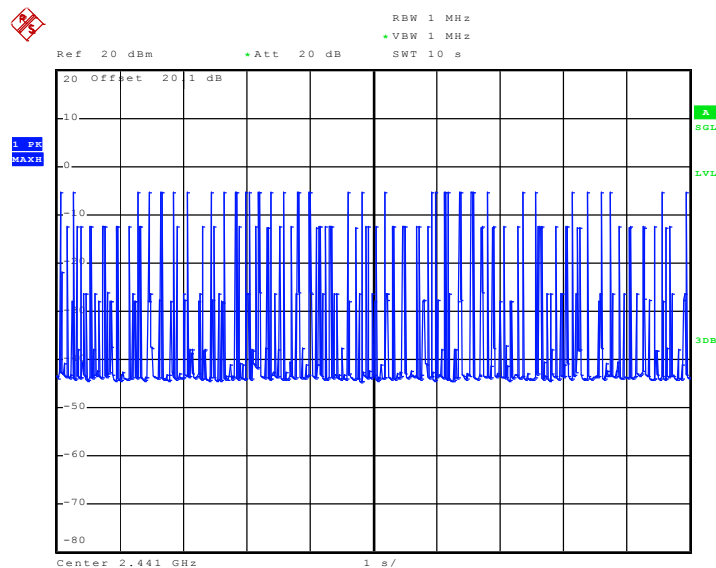


DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 13.NOV.2009 00:55:14

DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 13.NOV.2009 01:29:30

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).

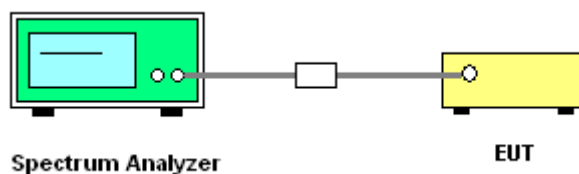
3.5.2 Measuring Instruments

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



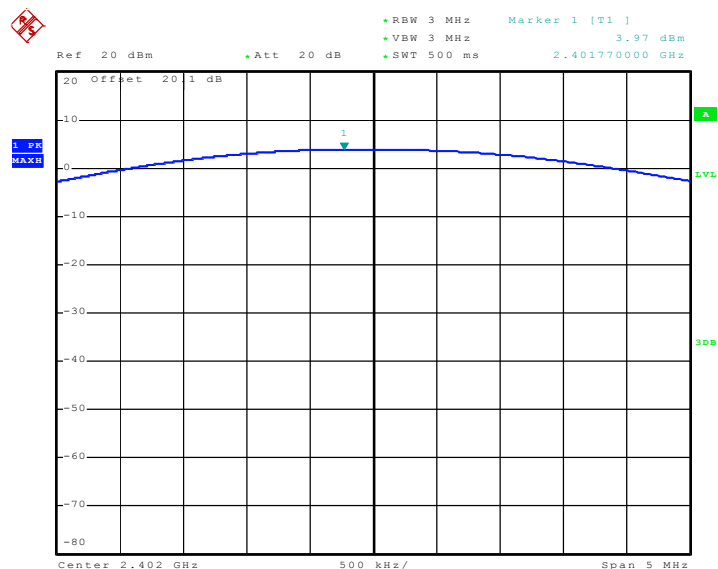
3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Tang Liu	Relative Humidity :	51~54%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	3.97	30	Pass
39	2441	3.08	30	Pass
78	2480	3.11	30	Pass

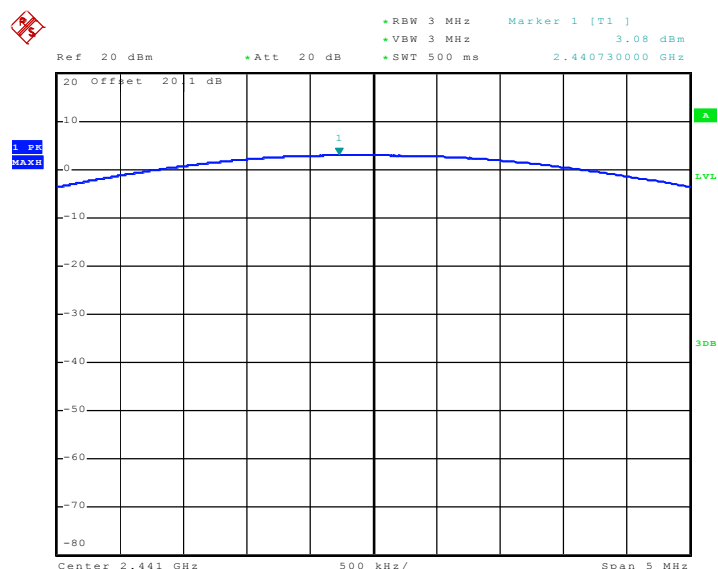


Peak Output Power Plot on Channel 00



Date: 12.NOV.2009 23:39:56

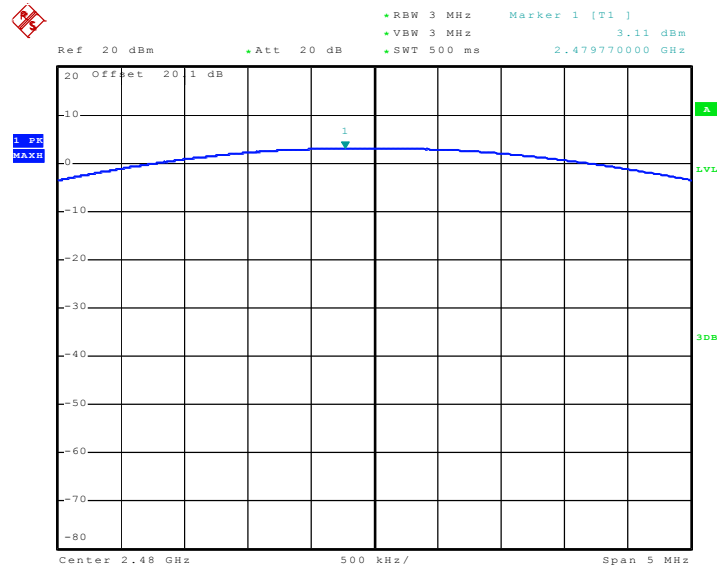
Peak Output Power Plot on Channel 39



Date: 12.NOV.2009 23:49:58



Peak Output Power Plot on Channel 78



Date: 12.NOV.2009 23:51:15

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

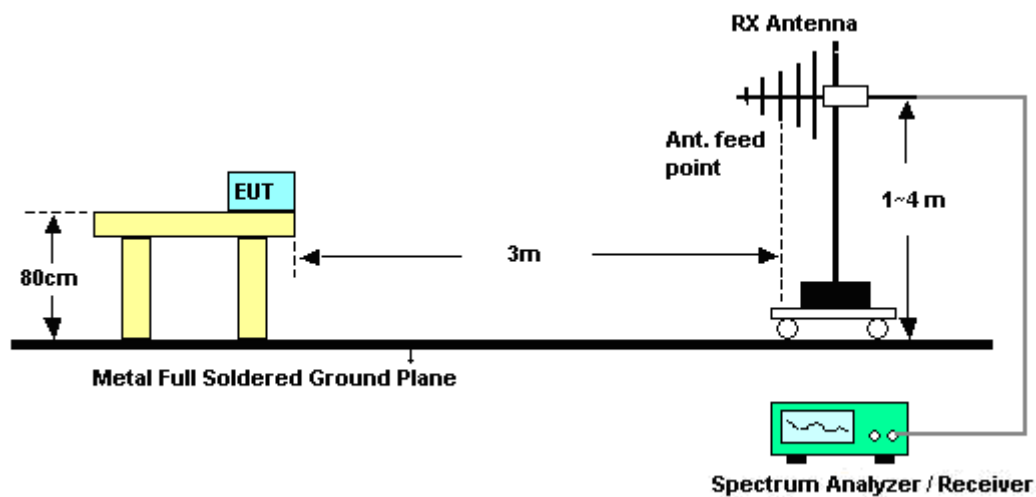
See list of measuring instruments of this test report.

3.6.3 Test Procedures

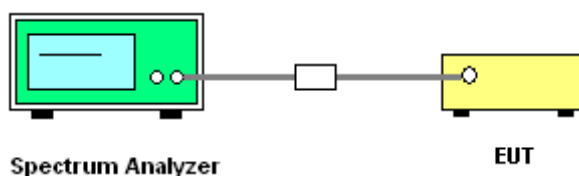
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band 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 :	46~48%
		Test Engineer :	Mac Lin and Elvis Chen

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
2384.10	44.14	-29.86	74.00	44.67	31.83	3.92	36.28	100	357	Peak
2384.10	31.43	-22.57	54.00	31.96	31.83	3.92	36.28	100	357	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
2387.33	43.93	-30.07	74.00	44.43	31.86	3.92	36.28	100	316	Peak
2387.33	31.55	-22.45	54.00	32.05	31.86	3.92	36.28	100	316	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
		Test Engineer :	Mac Lin and Elvis Chen

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	61.76	-12.24	74.00	62.02	31.98	4.05	36.29	100	290	Peak
2483.50	46.42	-7.58	54.00	46.68	31.98	4.05	36.29	100	290	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	95.85	53.07	42.78	54	-11.22	Pass
Hopping Mode	95.85	49.43	46.42	54	-7.58	Pass

Note : Average result = Maximum field strength – Delta result

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	53.76	-20.24	74.00	54.02	31.98	4.05	36.29	100	314	Peak
2483.50	47.95	-6.05	54.00	48.21	31.98	4.05	36.29	100	314	Average

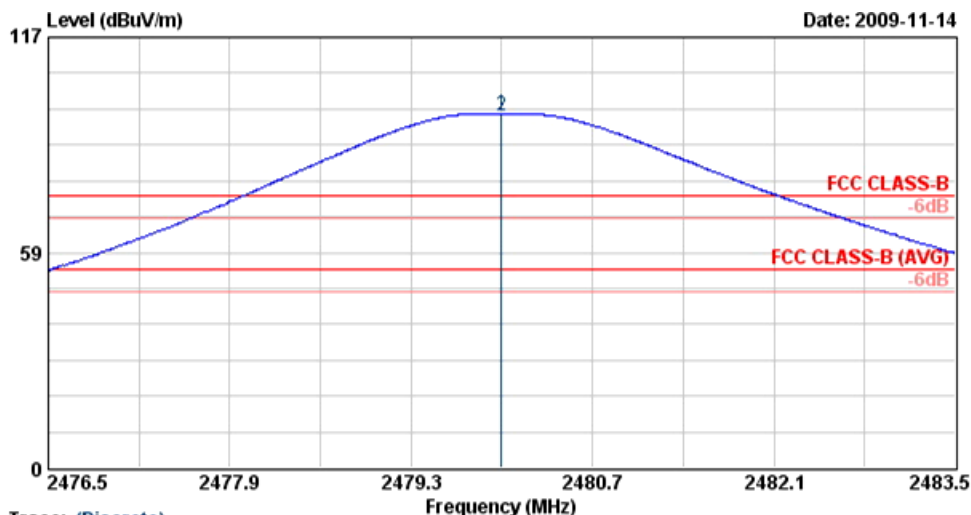
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	88.69	48.13	40.56	54	-13.44	Pass
Hopping Mode	88.69	40.74	47.95	54	-6.05	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal



Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
 Project : FR 903036
 Memo : Mode 3
 Temp. : 23 °C
 Humidity : 46 %

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamplifier	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2480.00	96.24	22.24	74.00	96.51	31.98	4.05	36.30	100	290	Peak
2 @	2480.00	95.85	41.85	54.00	96.12	31.98	4.05	36.30	100	290	Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Date: 2009-11-14

Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Project : FR 903036
Memo : Mode 3
Temp. : 23 °C
Humidity : 48 %

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	95.54	21.54	74.00	95.81	31.98	4.05	36.30	100	290	Peak
2	2484.04	42.47	-31.53	74.00	42.74	31.98	4.05	36.30	100	290	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 53.07 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Date: 2009-11-14

FCC CLASS-B -6dB

FCC CLASS-B (AVG) -6dB

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL

Project : FR 903036

Memo : Mode 3

Temp. : 23 °C

Humidity : 48 %

	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 X	2480.00	88.99	14.99	74.00	89.26	31.98	4.05	36.30	100	290	Peak
2	2485.36	39.56	-34.44	74.00	39.83	31.98	4.05	36.30	100	290	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 49.43 dB , Hopping Mode



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476.5

2477.9

2479.3

2480.7

2482.1

2483.5

Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project : FR 903036
Memo : Mode 3
Temp. : 23 °C
Humidity : 48 %

	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 X	2480.00	89.14	15.14	74.00	89.41	31.98	4.05	36.30	100	314	Peak
2 @	2480.00	88.69	34.69	54.00	88.96	31.98	4.05	36.30	100	314	Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Date: 2009-11-14

Trace: (Discrete)

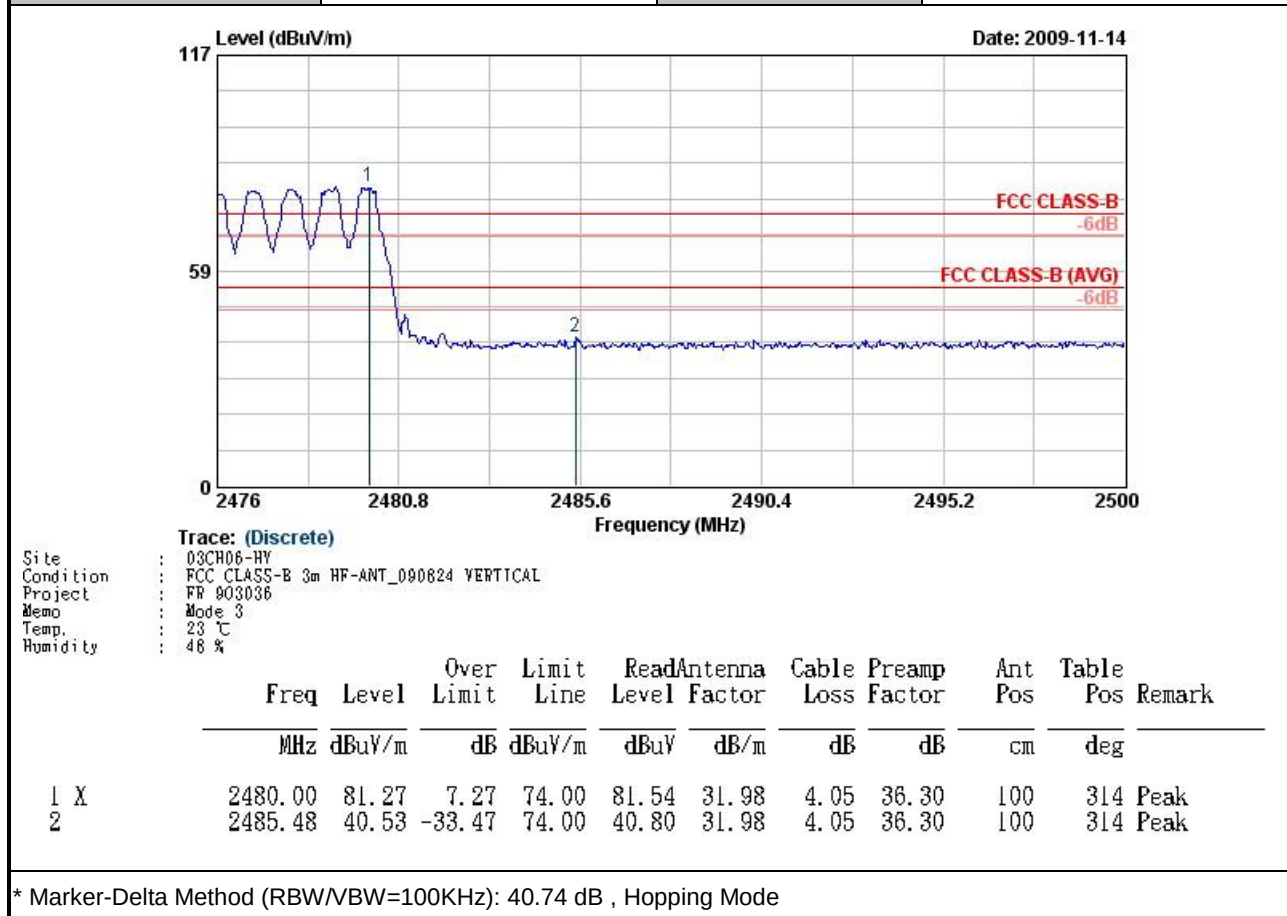
Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project : FR 903036
Memo : Mode 3
Temp. : 23 °C
Humidity : 48 %

	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	cm	deg	
1 X	2480.00	88.34	14.34	74.00	88.61	31.98	4.05	36.30	100	314 Peak
2	2483.92	40.21	-33.79	74.00	40.48	31.98	4.05	36.30	100	314 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 48.13 dB , single carrier Mode



Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
		Test Engineer :	Mac Lin and Elvis Chen

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	65.51	-8.49	74.00	65.77	31.98	4.05	36.29	100	6	Peak
2483.50	47.42	-6.58	54.00	47.68	31.98	4.05	36.29	100	6	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	99.77	55.1	44.67	54	-9.33	Pass
Hopping Mode	99.77	52.35	47.42	54	-6.58	Pass

Note : Average result = Maximum field strength – Delta result

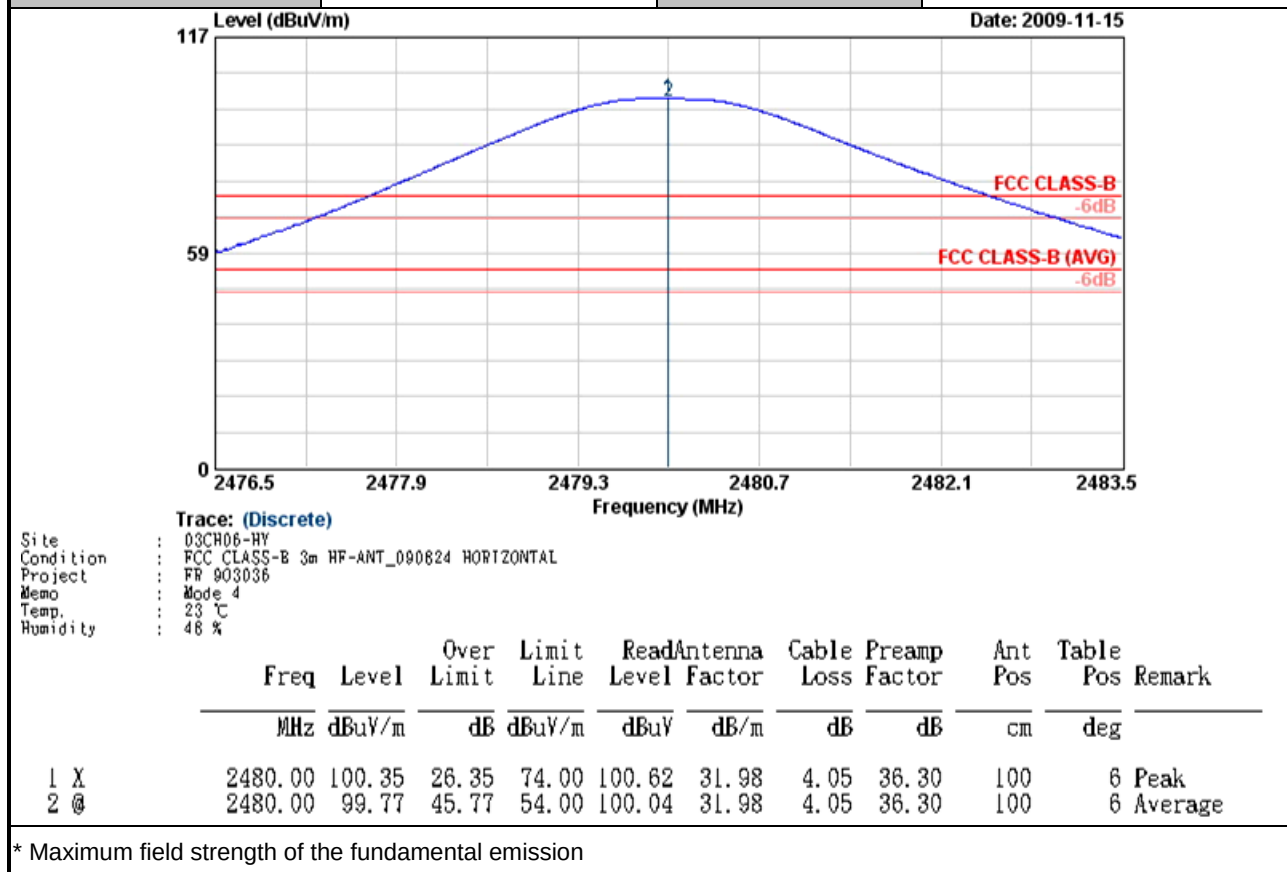
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	57.8	-16.2	74.00	58.06	31.98	4.05	36.29	100	98	Peak
2483.50	49.39	-4.61	54.00	49.65	31.98	4.05	36.29	100	98	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	92.96	52.06	40.9	54	-13.1	Pass
Hopping Mode	92.96	43.57	49.39	54	-4.61	Pass

Note : Average result = Maximum field strength – Delta result

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal





Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

Date: 2009-11-15

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL

Project : FR 903036

Memo : Mode 4

Temp. : 23 °C

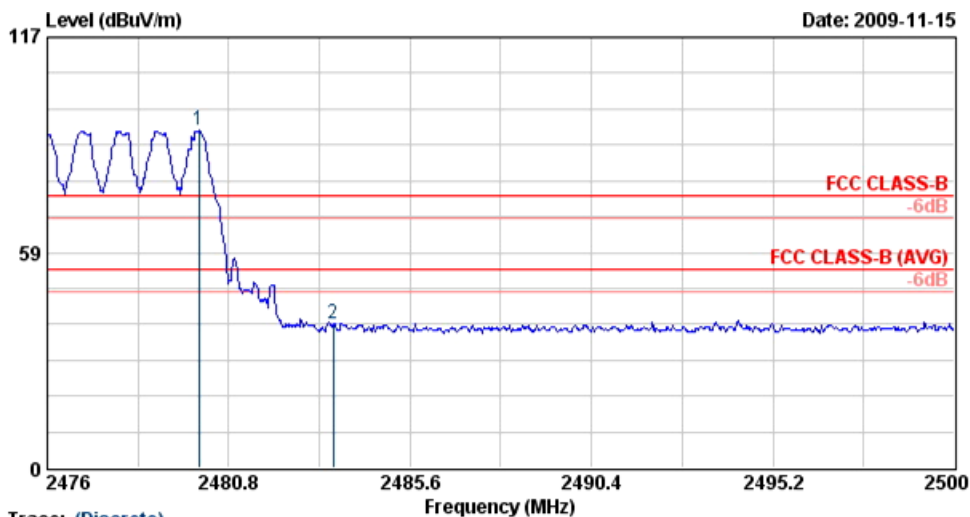
Humidity : 48 %

	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 X	2480.00	99.37	25.37	74.00	99.64	31.98	4.05	36.30	100	6	Peak
2	2483.94	44.27	-29.73	74.00	44.54	31.98	4.05	36.30	100	6	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 55.10 dB , single carrier Mode



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal



Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Project : FR 903036
Memo : Mode 4
Temp. : 23 °C
Humidity : 48 %

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	91.70	17.70	74.00	91.97	31.98	4.05	36.30	100	6	Peak
2	2483.56	39.35	-34.65	74.00	39.62	31.98	4.05	36.30	100	6	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 52.35 dB , Hopping Mode



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

Date: 2009-11-15

Trace: (Discrete)

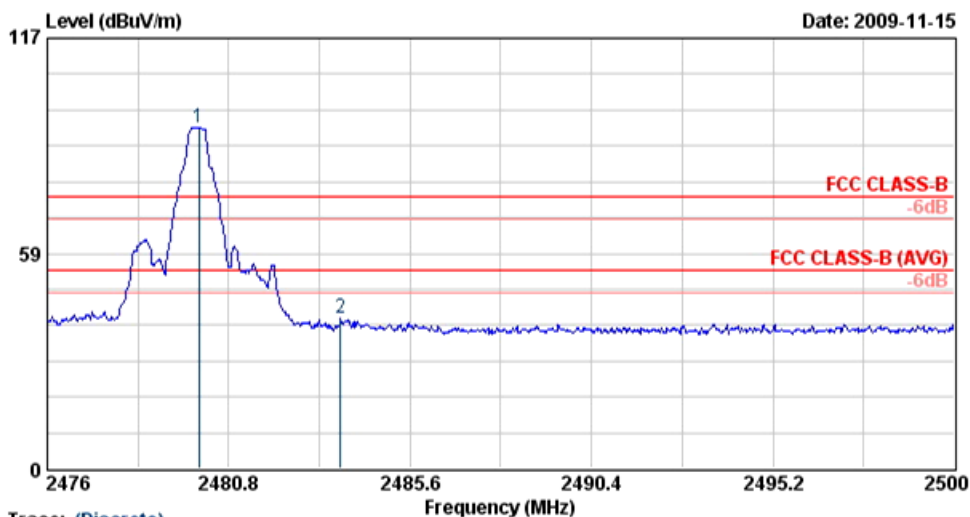
Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project : FR 903036
Memo : Mode 4
Temp. : 23 °C
Humidity : 48 %

	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 X	2480.00	93.87	19.87	74.00	94.14	31.98	4.05	36.30	100	98	Peak
2 @	2480.00	92.96	38.96	54.00	93.23	31.98	4.05	36.30	100	98	Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical



Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project : FR 903036
Memo : Mode 4
Temp. : 23 °C
Humidity : 46 %

	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 X	2480.00	92.83	18.83	74.00	93.10	31.98	4.05	36.30	100	98	Peak
2	2483.75	40.77	-33.23	74.00	41.04	31.98	4.05	36.30	100	98	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 52.06 dB , single carrier Mode



Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project : FR 903036
Memo : Mode 4
Temp. : 23 °C
Humidity : 48 %

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	X	2480.00	82.99	8.99	74.00	83.26	31.98	4.05	36.30	100	98 Peak
2		2483.50	39.42	-34.58	74.00	39.69	31.98	4.05	36.30	100	98 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 43.57 dB , Hopping Mode

Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
		Test Engineer :	Mac Lin and Elvis Chen

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	64.16	-9.84	74.00	64.43	31.98	4.05	36.30	100	8	Peak
2483.50	46.44	-7.56	54.00	46.71	31.98	4.05	36.30	100	8	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	98.29	54.38	43.91	54	-10.09	Pass
Hopping Mode	98.29	51.85	46.44	54	-7.56	Pass

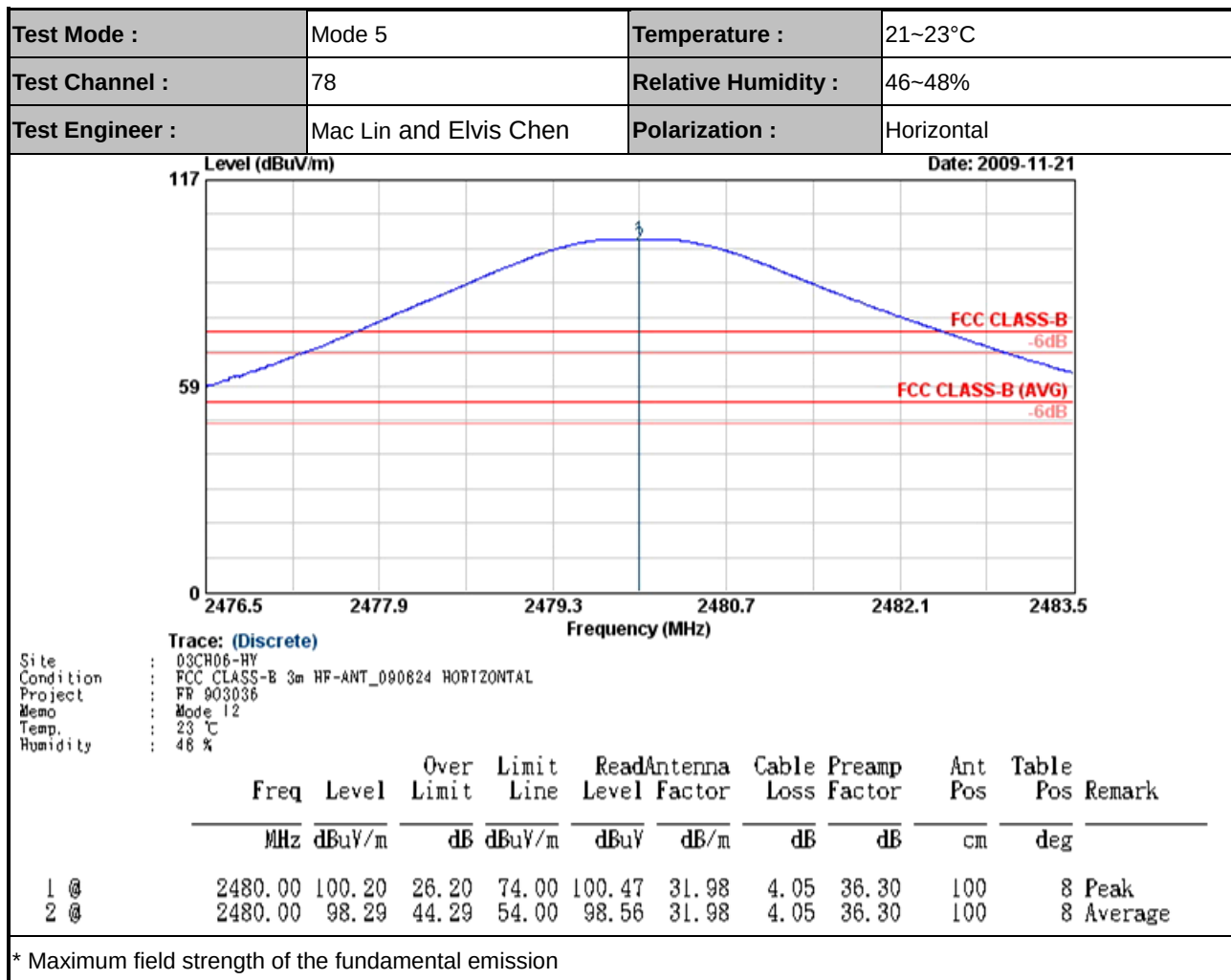
Note : Average result = Maximum field strength – Delta result

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	58.27	-15.73	74.00	58.54	31.98	4.05	36.30	169	222	Peak
2483.50	46.79	-7.21	54.00	47.06	31.98	4.05	36.30	169	222	Average

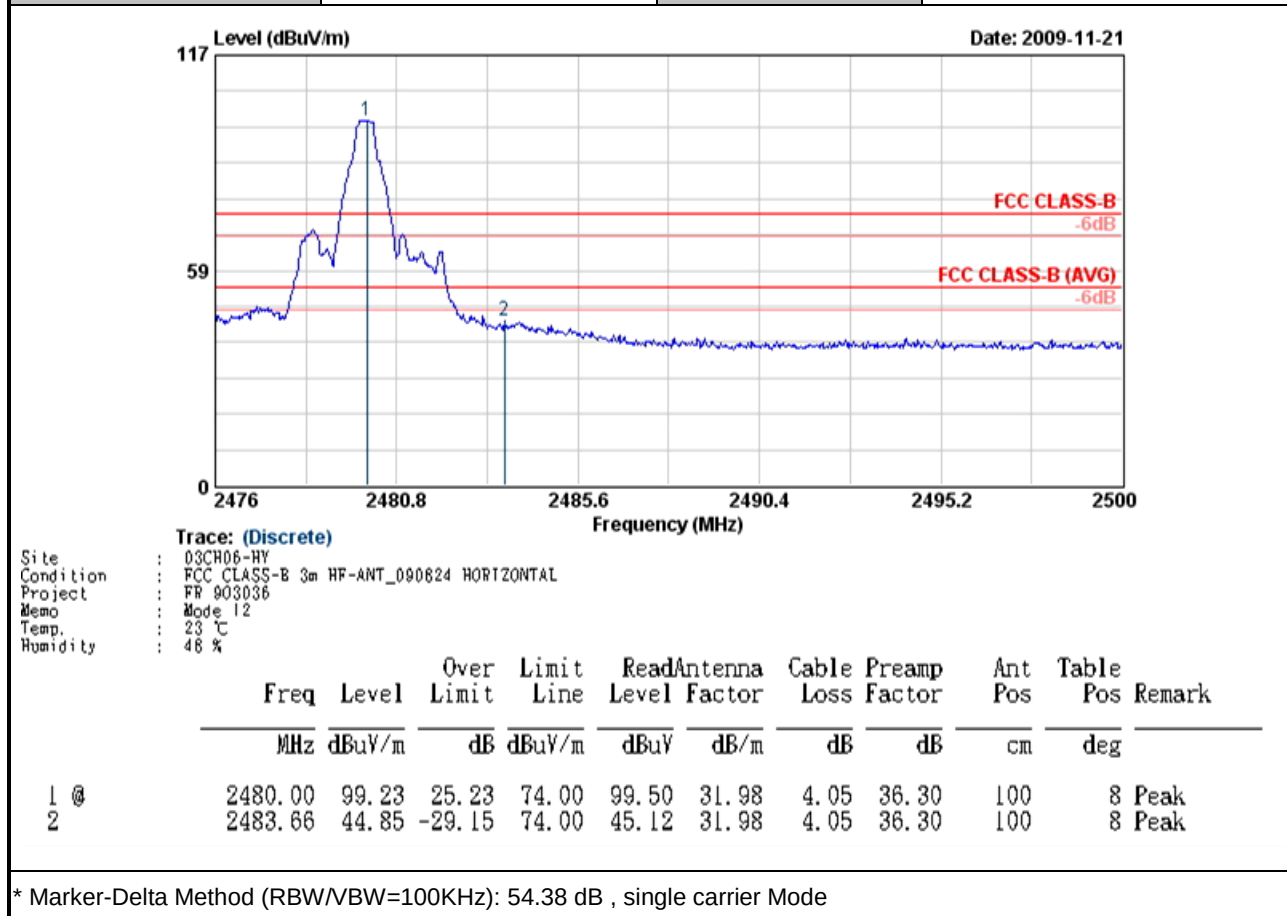
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	92.62	50.17	42.45	54	-11.55	Pass
Hopping Mode	92.62	45.83	46.79	54	-7.21	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal





Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Project : FR 903036
Memo : Mode 12
Temp. : 23 °C
Humidity : 48 %

	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 @	2480.00	91.28	17.28	74.00	91.55	31.98	4.05	36.30	100	8	Peak
2	2484.11	39.43	-34.57	74.00	39.70	31.98	4.05	36.30	100	8	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 51.85 dB , Hopping Mode



Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476.5

2477.9

2479.3

2480.7

2482.1

2483.5

Date: 2009-11-21

Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Project : FR 903036
Memo : Mode 12
Temp. : 23 °C
Humidity : 48 %

	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 @	2480.00	93.36	19.36	74.00	93.63	31.98	4.05	36.30	169	222	Peak
2 @	2480.00	92.62	38.62	54.00	92.89	31.98	4.05	36.30	169	222	Average

* Maximum field strength of the fundamental emission



Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical

Level (dBuV/m)

117

59

0

2476

2480.8

2485.6

2490.4

2495.2

2500

Date: 2009-11-21

FCC CLASS-B -6dB

FCC CLASS-B (AVG) -6dB

Trace: (Discrete)

Site : 03CH06-HY

Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL

Project : FR 903036

Memo : Mode 12

Temp. : 23 °C

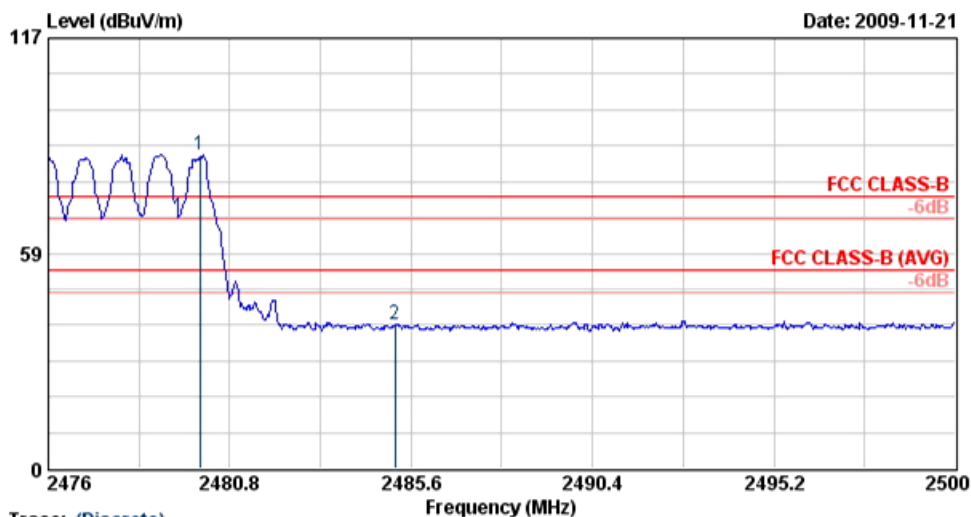
Humidity : 46 %

	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 @	2480.00	92.46	18.46	74.00	92.73	31.98	4.05	36.30	169	222	Peak
2	2484.02	42.29	-31.71	74.00	42.56	31.98	4.05	36.30	169	222	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 50.17 dB , single carrier Mode



Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Project : FR 903036
Memo : Mode 12
Temp. : 23 °C
Humidity : 46 %

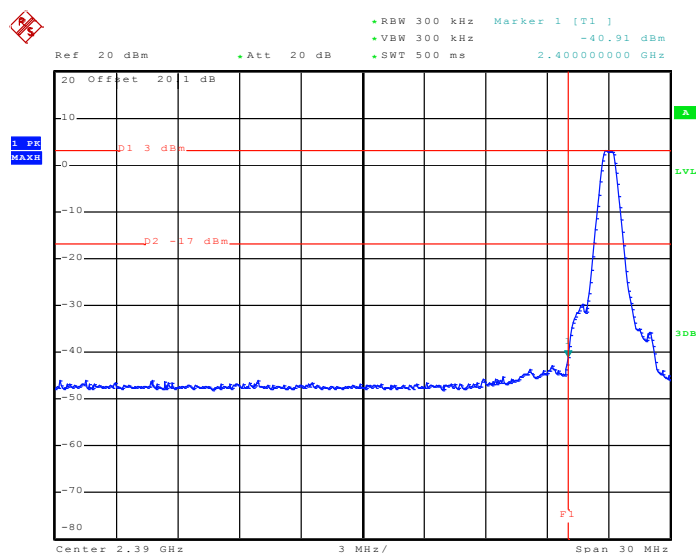
	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2480.00	85.04	11.04	74.00	85.31	31.98	4.05	36.30	169	222	Peak
2	2485.17	39.21	-34.79	74.00	39.48	31.98	4.05	36.30	169	222	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 45.83 dB , Hopping Mode

3.6.6 Test Result of Conducted Band Edges

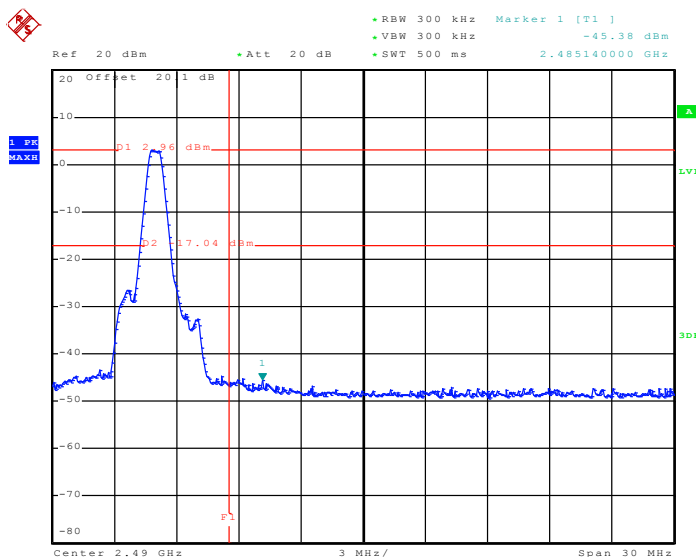
Test Mode :	Mode 1 and 3	Temperature :	25~27°C
Test Channel :	00 and 78	Relative Humidity :	51~54%
		Test Engineer :	Tang Liu

Low Band Edge Plot on Channel 00



Date: 13.NOV.2009 19:42:43

High Band Edge Plot on Channel 78



Date: 13.NOV.2009 19:46:00

3.7 Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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

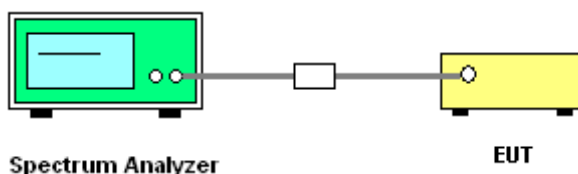
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

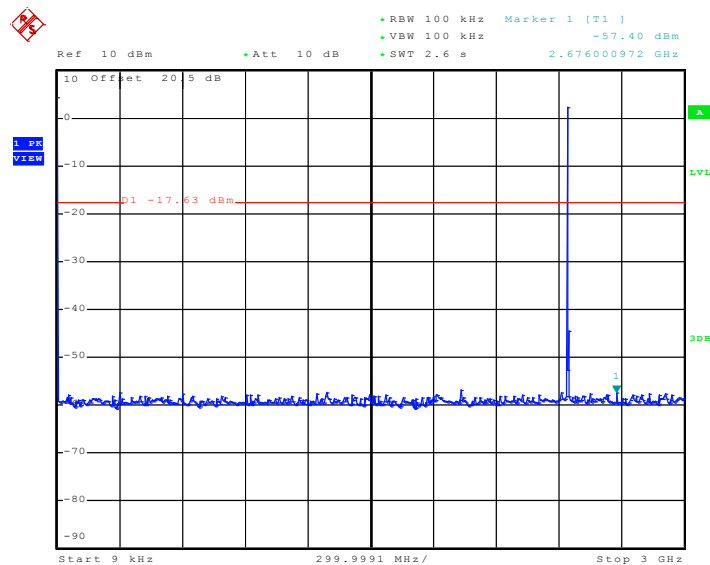
3.7.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ 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.

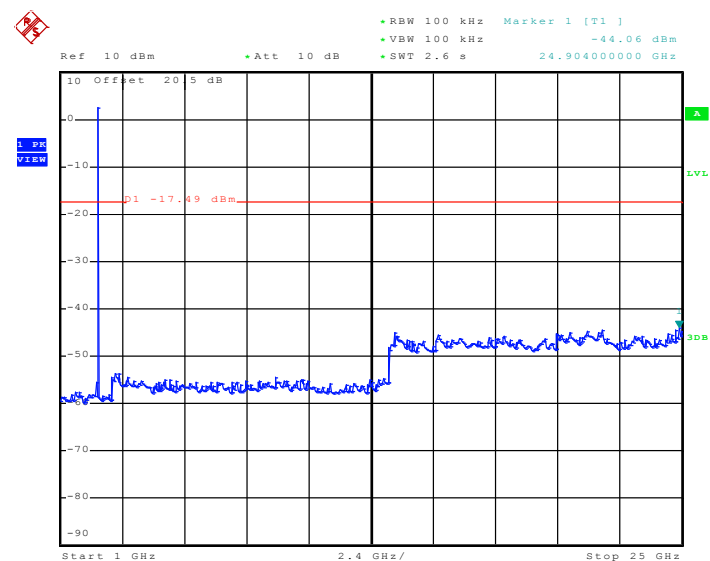
3.7.4 Test Setup



Test Mode :	Mode 2	Temperature :	25~27°C
Test Channel :	39	Relative Humidity :	51~54%
		Test Engineer :	Tang Liu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz


Date: 13.NOV.2009 01:33:34

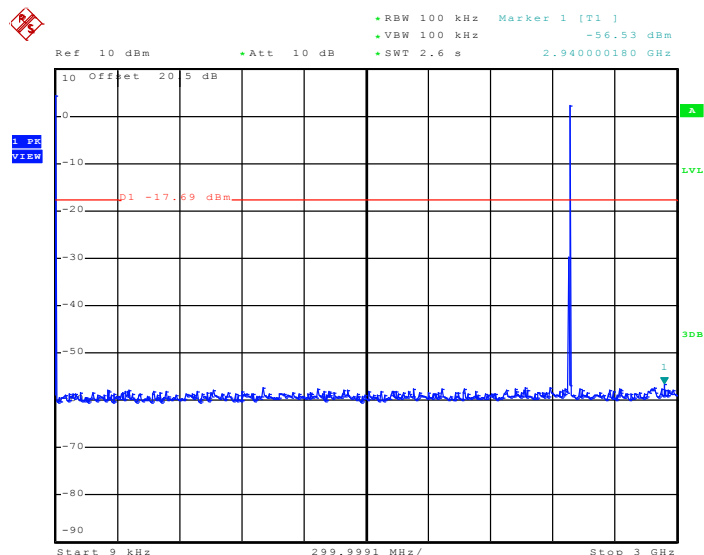
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


Date: 13.NOV.2009 01:33:51



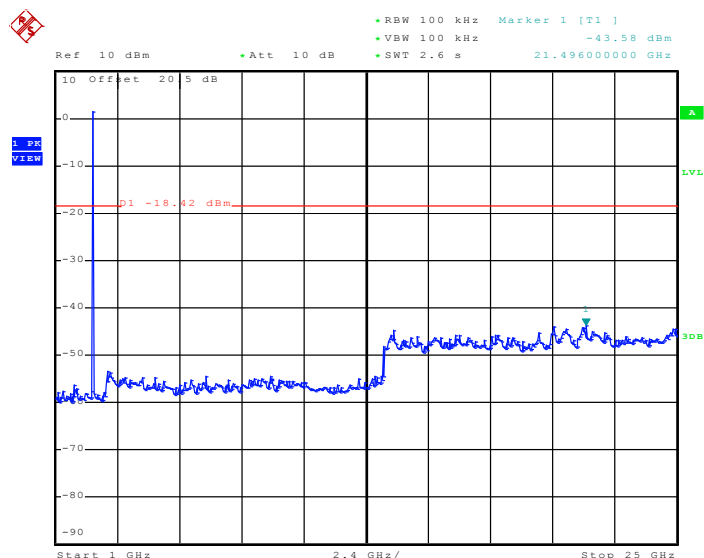
Test Mode :	Mode 3	Temperature :	25~27°C
Test Channel :	78	Relative Humidity :	51~54%
		Test Engineer :	Tang Liu

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 13.NOV.2009 01:34:09

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



Date: 13.NOV.2009 01:34:23

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.

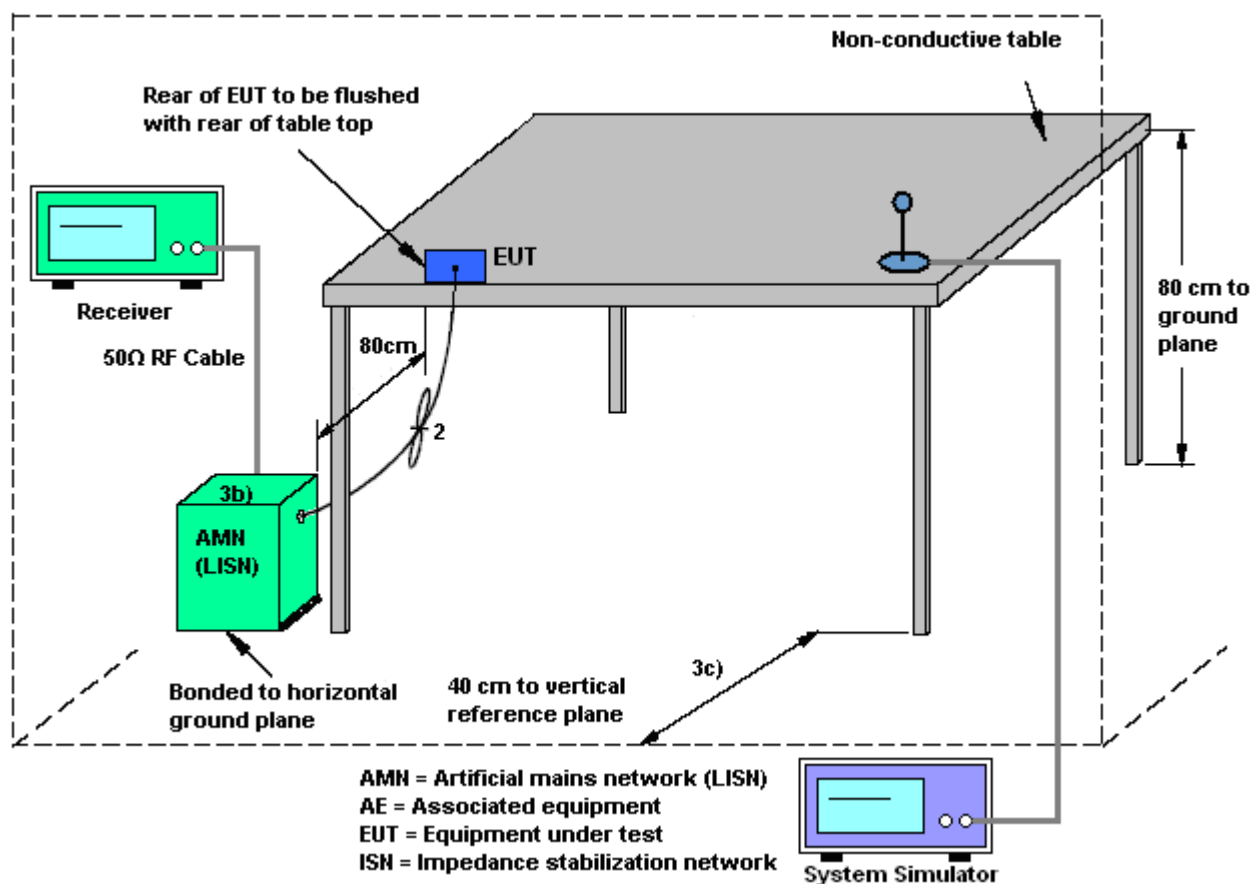
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

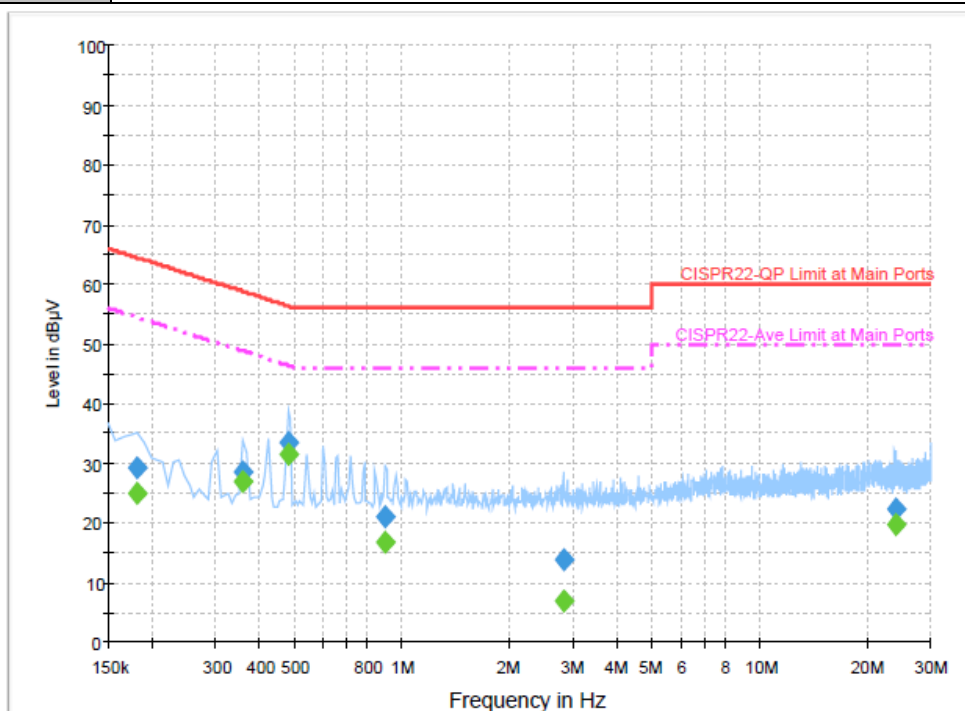
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All 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 :	22~24℃
Test Engineer :	Hayden Wu	Relative Humidity :	40~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + MP3 + Camera + Adapter + RS232 Cable 2 for EUT with Keypad 2 and Scanner 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



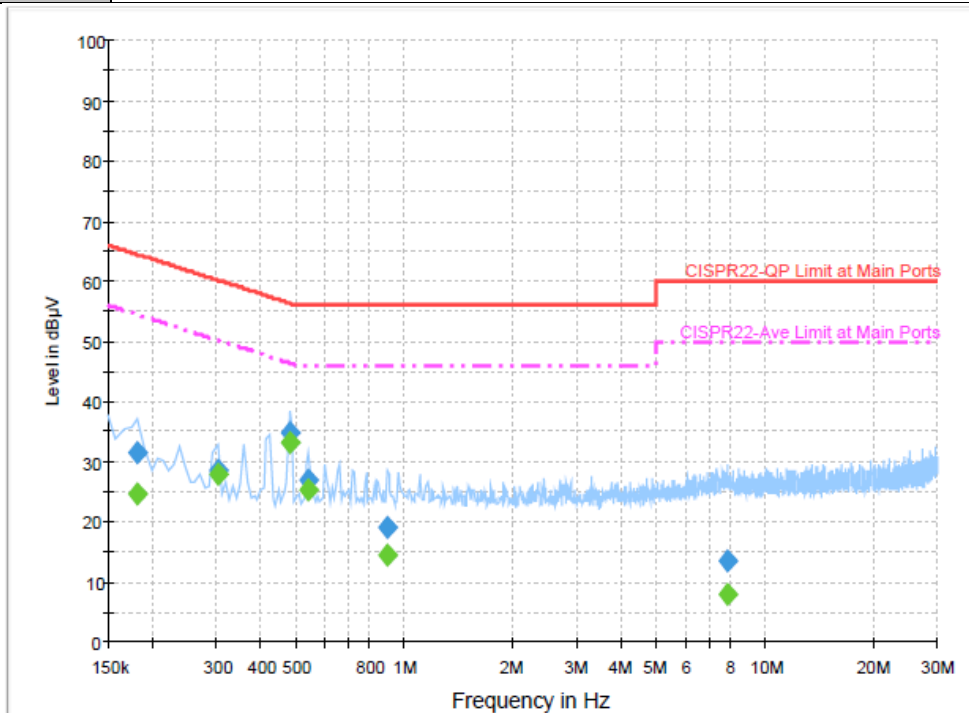
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	29.2	Off	L1	19.5	35.2	64.4
0.358000	28.5	Off	L1	19.5	30.3	58.8
0.478000	33.5	Off	L1	19.4	22.9	56.4
0.894000	20.8	Off	L1	19.4	35.2	56.0
2.814000	13.6	Off	L1	19.5	42.4	56.0
23.998000	22.2	Off	L1	19.7	37.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	24.8	Off	L1	19.5	29.6	54.4
0.358000	26.7	Off	L1	19.5	22.1	48.8
0.478000	31.6	Off	L1	19.4	14.8	46.4
0.894000	16.8	Off	L1	19.4	29.2	46.0
2.814000	6.9	Off	L1	19.5	39.1	46.0
23.998000	19.7	Off	L1	19.7	30.3	50.0

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Hayden Wu	Relative Humidity :	40~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + MP3 + Camera + Adapter + RS232 Cable 2 for EUT with Keypad 2 and Scanner 1		
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)
0.182000	31.6	Off	N	19.5	32.8	64.4
0.302000	28.5	Off	N	19.4	31.7	60.2
0.478000	34.8	Off	N	19.4	21.6	56.4
0.542000	27.0	Off	N	19.5	29.0	56.0
0.894000	19.1	Off	N	19.4	36.9	56.0
7.846000	13.6	Off	N	19.6	46.4	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	24.6	Off	N	19.5	29.8	54.4
0.302000	27.9	Off	N	19.4	22.3	50.2
0.478000	33.2	Off	N	19.4	13.2	46.4
0.542000	25.3	Off	N	19.5	20.7	46.0
0.894000	14.5	Off	N	19.4	31.5	46.0
7.846000	7.8	Off	N	19.6	42.2	50.0

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

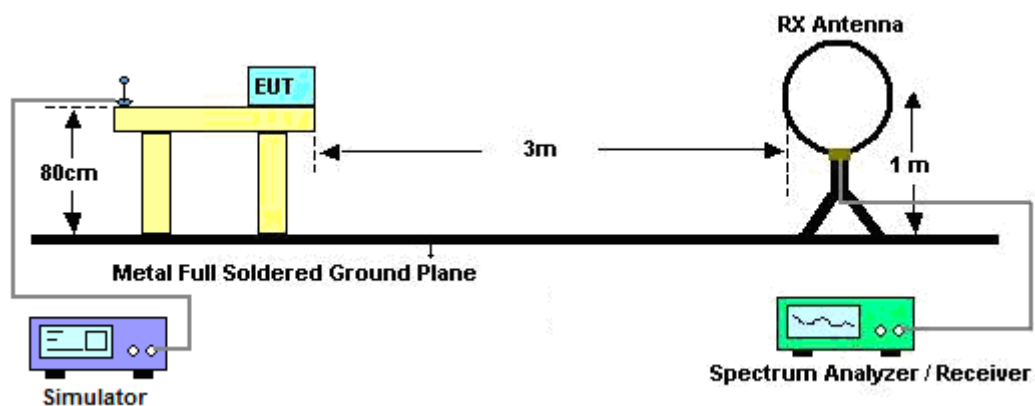
See list of measuring instruments of this test report.

3.9.3 Test Procedures

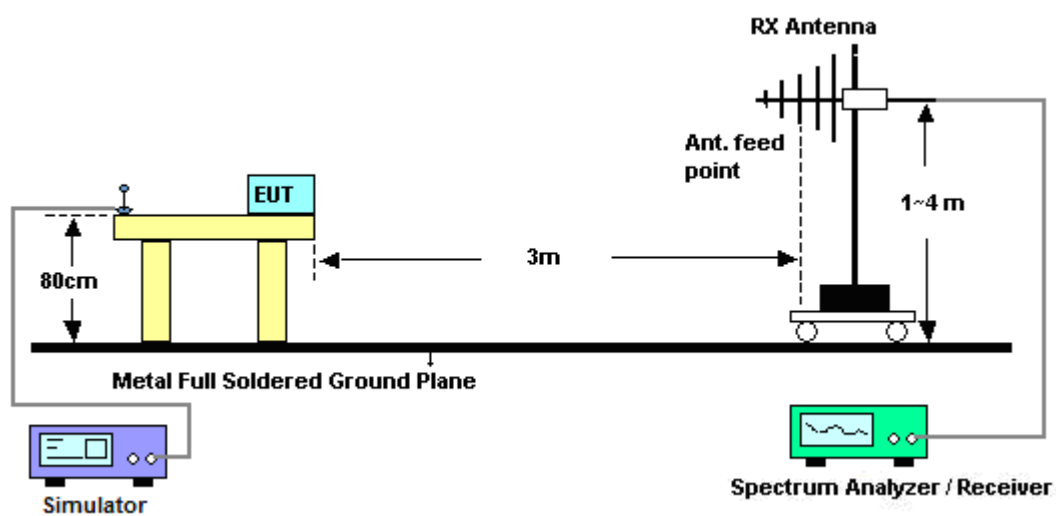
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector 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.

3.9.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	Mac Lin and Elvis Chen	Temperature :	21~23°C	
		Relative Humidity :	46~48%	

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

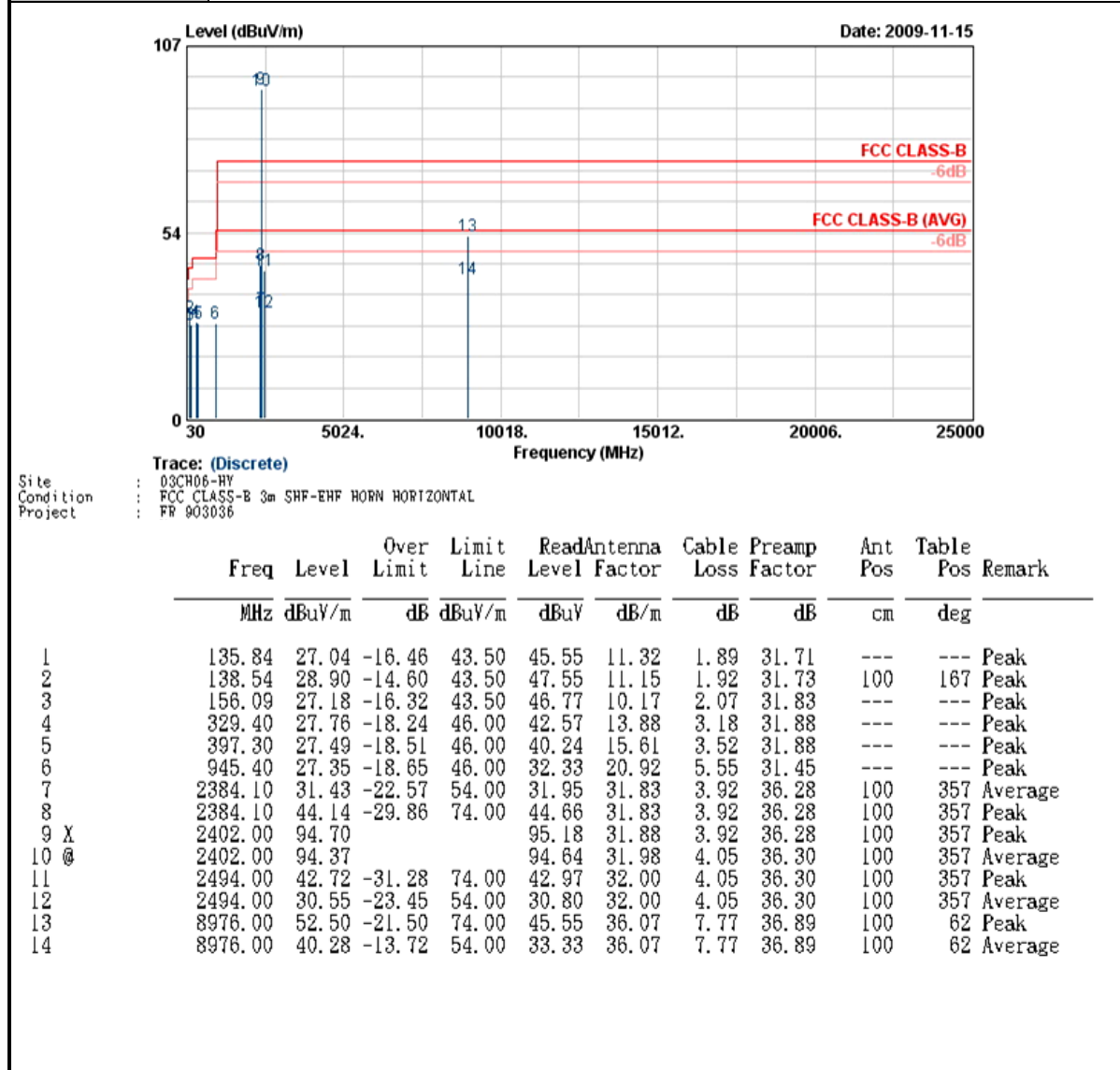
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

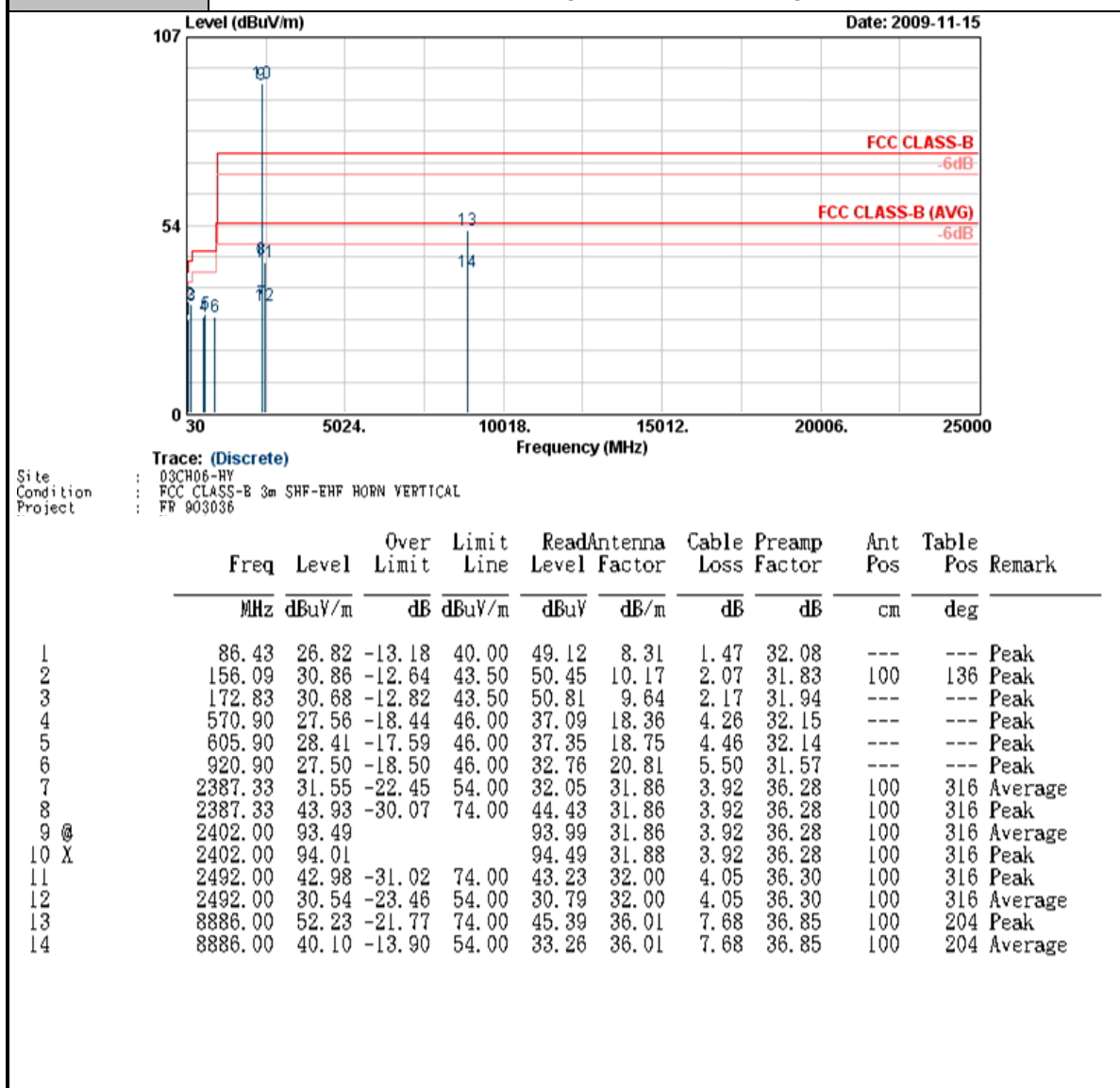
3.9.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 1	Temperature :	21~23°C
Test Channel :	00	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

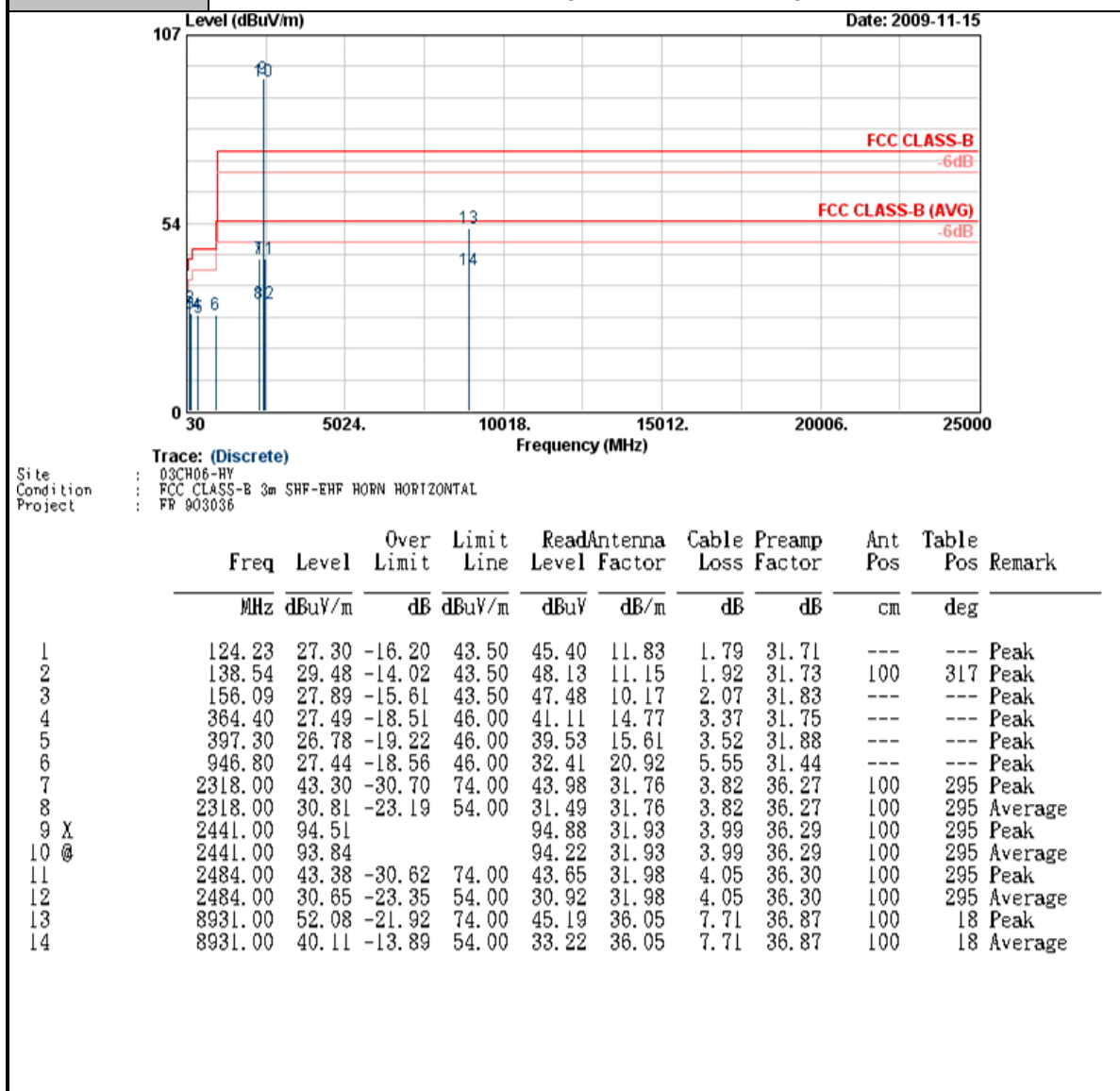




FCC RF Test Report

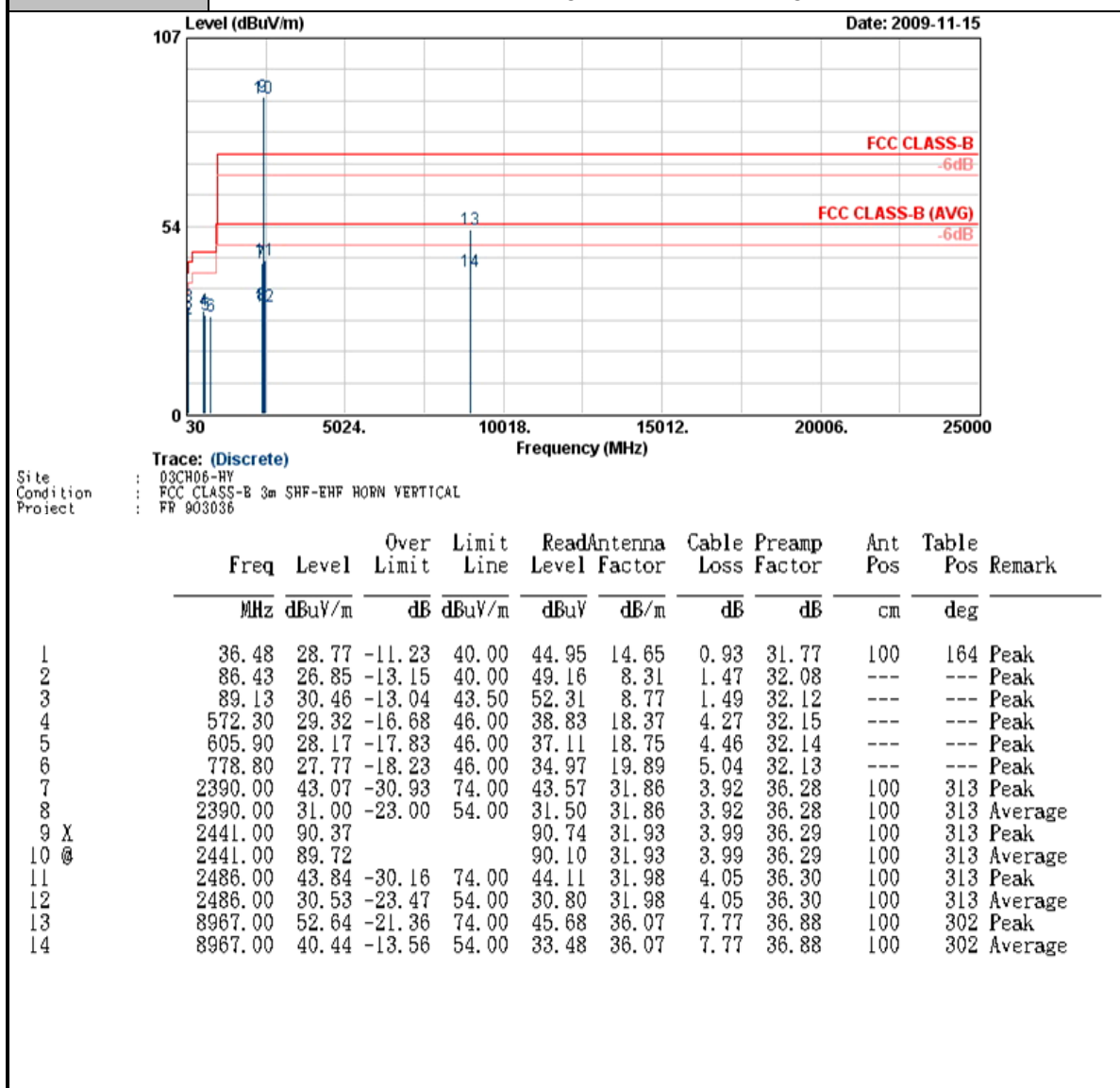
Report No. : FR903036-01B

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

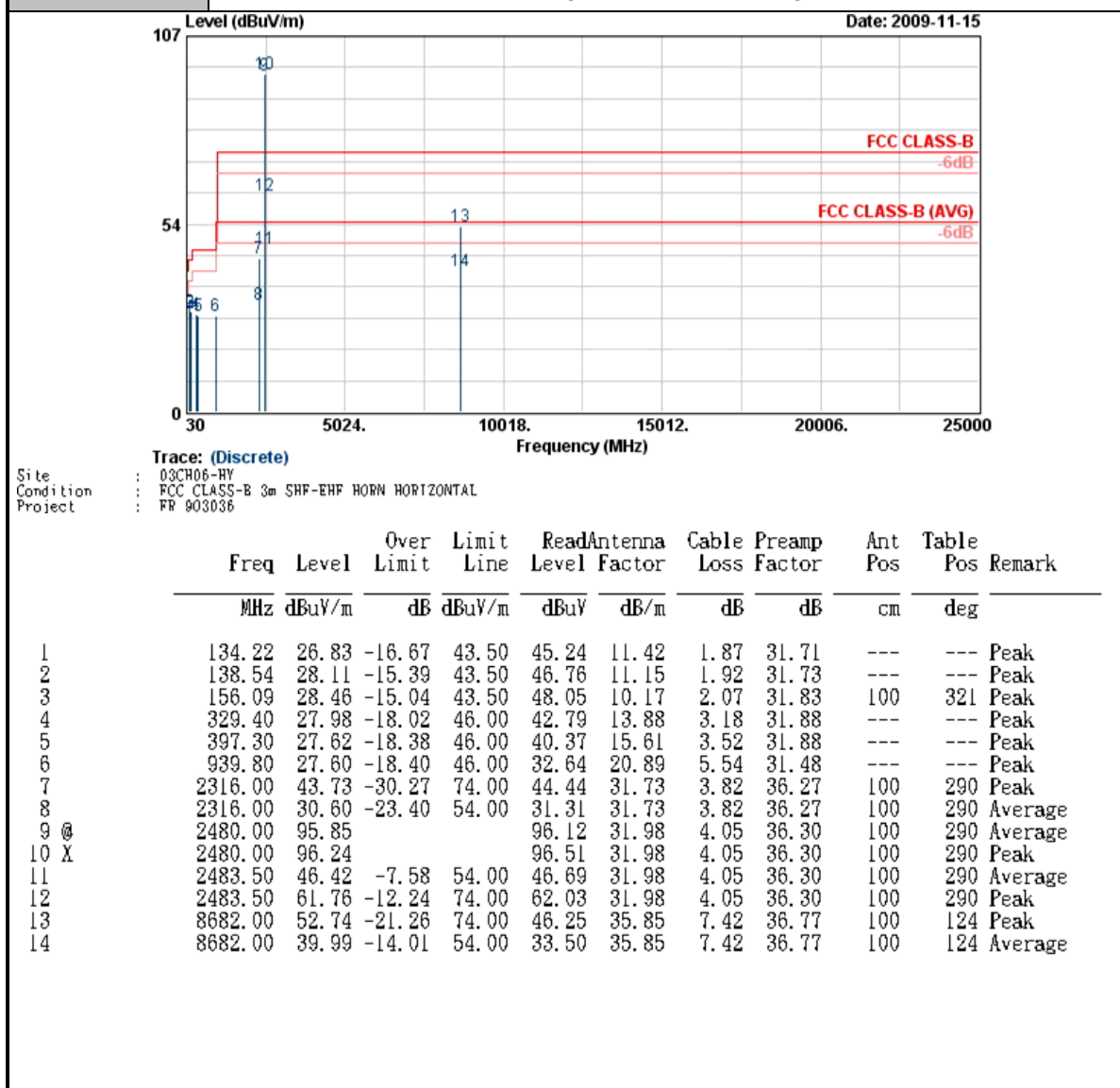




FCC RF Test Report

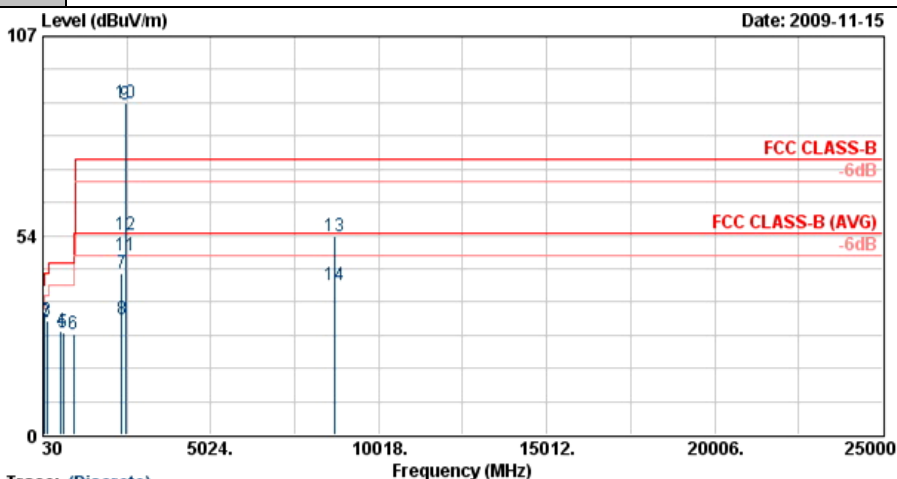
Report No. : FR903036-01B

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

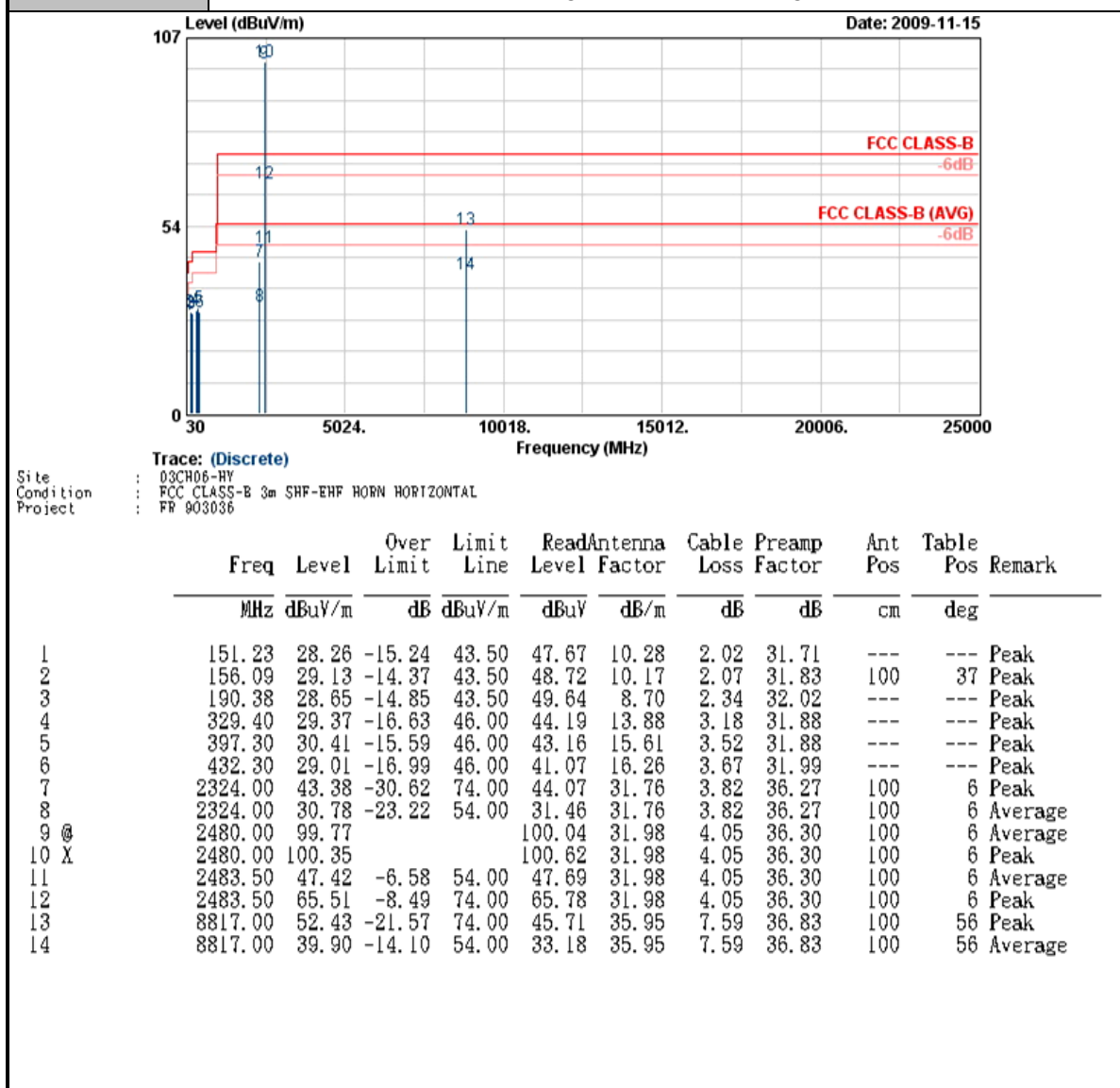


Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 903036

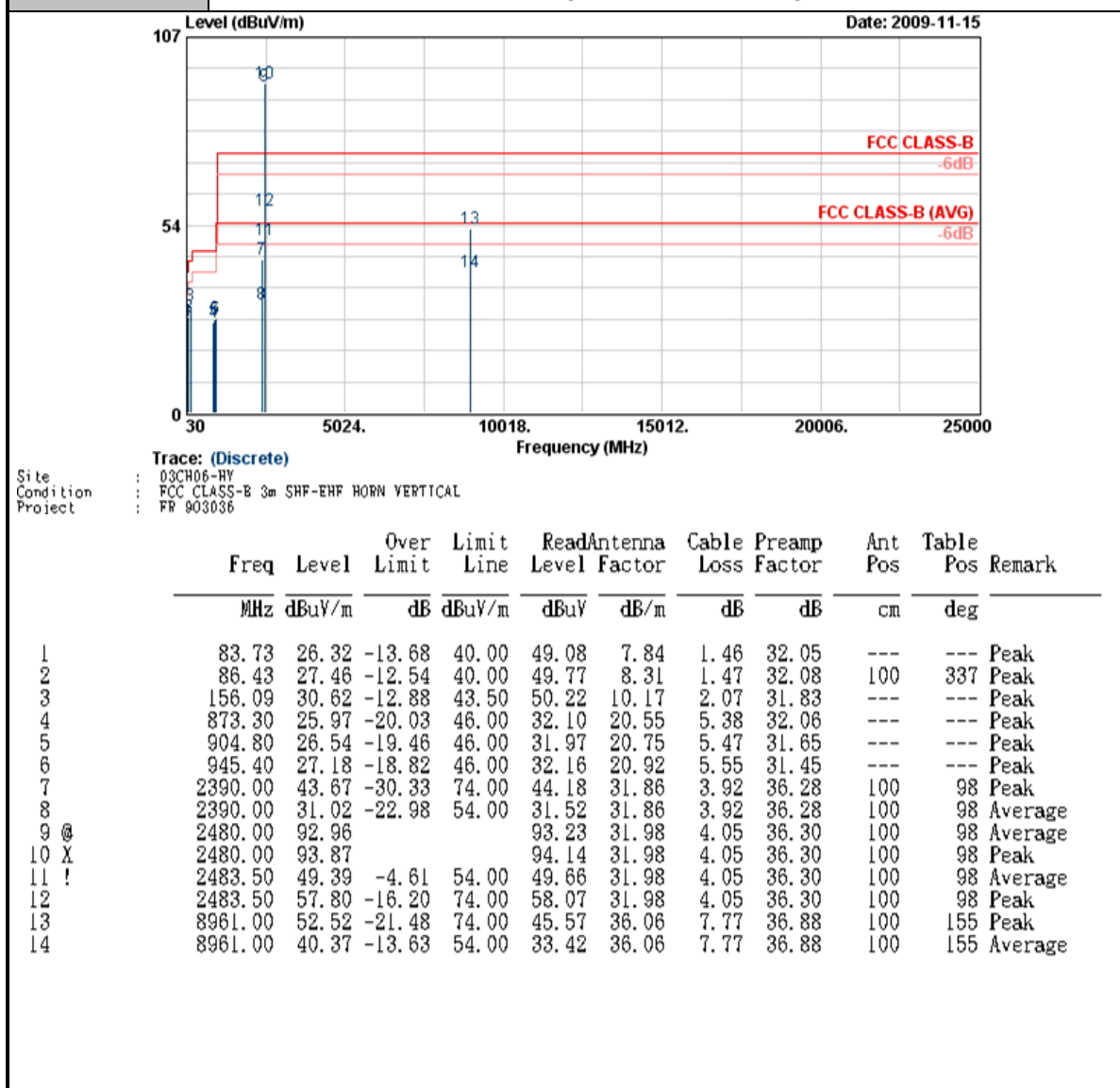
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	86.43	27.09	-12.91	40.00	49.39	8.31	1.47	32.08	100	166 Peak
2	89.13	30.19	-13.31	43.50	52.05	8.77	1.49	32.12	---	---
3	156.09	30.51	-12.99	43.50	50.10	10.17	2.07	31.83	---	---
4	572.30	27.67	-18.33	46.00	37.17	18.37	4.27	32.15	---	---
5	640.90	27.51	-18.49	46.00	35.97	18.93	4.55	31.93	---	---
6	936.30	26.87	-19.13	46.00	31.95	20.88	5.53	31.50	---	---
7	2382.00	43.27	-30.73	74.00	43.80	31.83	3.92	36.28	100	314 Peak
8	2382.00	30.93	-23.07	54.00	31.45	31.83	3.92	36.28	100	314 Average
9 @	2480.00	88.69			88.96	31.98	4.05	36.30	100	314 Average
10 X	2480.00	89.14			89.41	31.98	4.05	36.30	100	314 Peak
11	2483.50	47.95	-6.05	54.00	48.22	31.98	4.05	36.30	100	314 Average
12	2483.50	53.76	-20.24	74.00	54.03	31.98	4.05	36.30	100	314 Peak
13	8691.00	53.31	-20.69	74.00	46.82	35.85	7.42	36.78	100	75 Peak
14	8691.00	40.26	-13.74	54.00	33.78	35.85	7.42	36.78	100	75 Average

Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



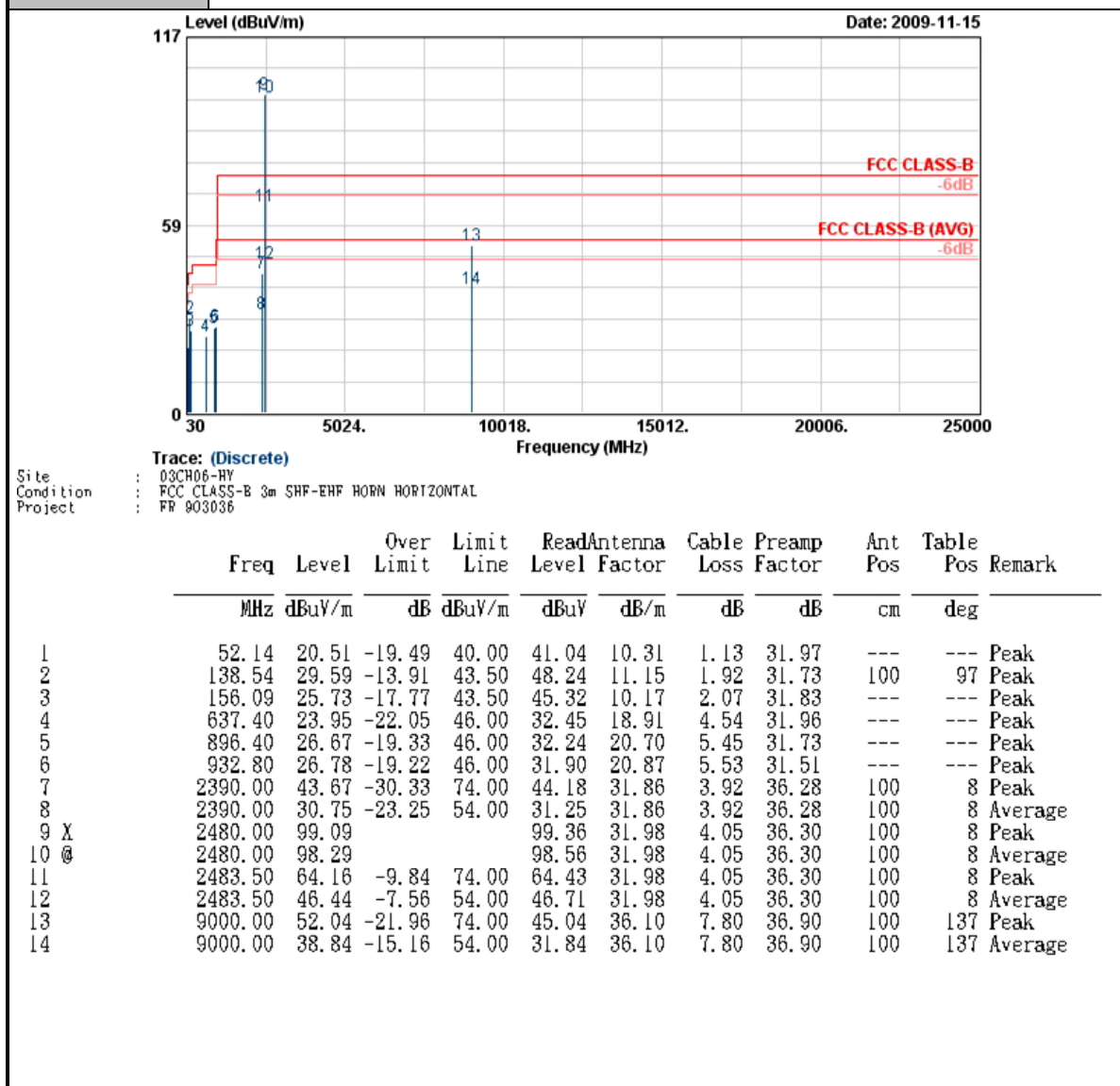


Test Mode :	Mode 4	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



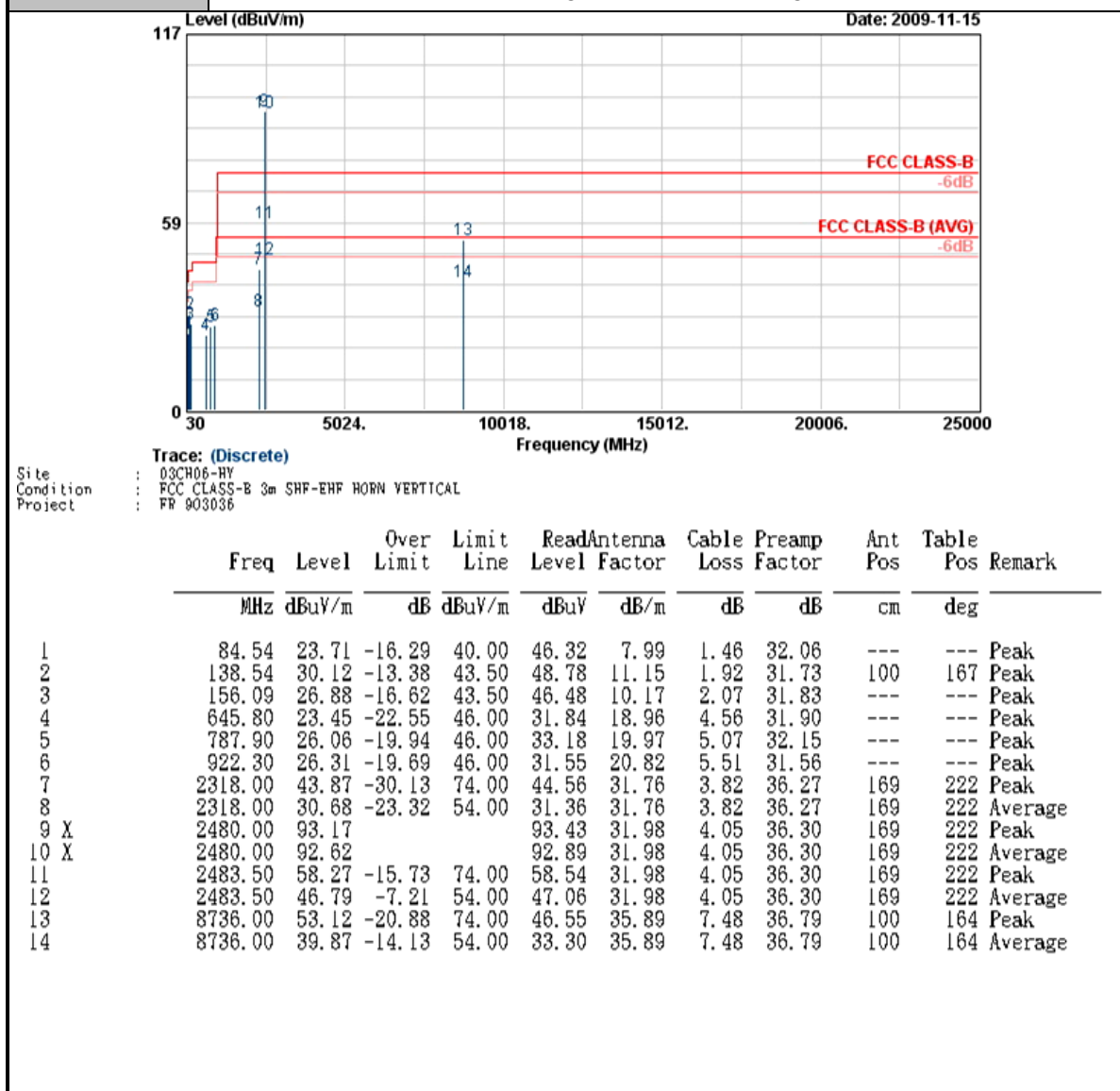


Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 5	Temperature :	21~23°C
Test Channel :	78	Relative Humidity :	46~48%
Test Engineer :	Mac Lin and Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



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	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. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 23, 2009	Oct. 22, 2010	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000MHz	Apr. 28, 2009	Apr. 27, 2010	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA91702 51	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 20, 2009	Apr. 19, 2010	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz~30MHz	May 22, 2008	May 21, 2010	Radiation (03CH06-HY)
System Simulator	R&S	CMU200	116456	N/A	Jun. 05, 2008	Jun. 04, 2010	-
Bluetooth Base Station	Anritsu	MT8852B	6K00005722	N/A	N/A	N/A	-

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. : L1190-090417

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, 2007 to January 09, 2010
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 : April 17, 2009

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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 EP9O3036-01 as below.