FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment	:	**ASUS WiCast**
Model No.	:	**EW2000 ;EW2000TX**
Brand Name	:	**ASUS**
Filing Type	:	**For Limit Module Approval**
Applicant	:	**ASUSTek COMPUTER INC.** No. 15,Li-Te Rd., Peitou, Taipei 112,Taiwan
FCC ID	:	**MSQ-EW2000TX**
Manufacturer	:	**Quanta Microsystems, Inc.** 5F, No.188, Wenhwa 2nd Rd., Kueishan, Taoyuan 33383, Taiwan, R.O.C.
Received Date	:	Apr. 15, 2010
Final Test Date	:	May 31, 2010

Statement

Test result included is only for the 5150~5350MHz / 5470~5725MHz of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

SPORTON International Inc.

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

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History of This Test Report

Original Issue Date: Jun. 10, 2010

Report No.: FR032517AA

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment	:	ASUS WiCast
Model No.	:	EW2000 ;EW2000TX
Brand Name	:	ASUS
Applicant	:	ASUSTek COMPUTER INC. No. 15,Li-Te Rd., Peitou, Taipei 112,Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 15, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu / Vice Manager

SPORTON International Inc.

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

1 SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
3.1	15.207	AC Power Line Conducted Emissions	Complies	8.31 dB
3.2	15.407(a)	26dB Spectrum Bandwidth	Complies	-
3.3	15.407(a)	Maximum Conducted Output Power	Complies	9.34 dB
3.4	15.407(a)	Power Spectral Density	Complies	6.66 dB
3.5	15.407(a)	Peak Excursion	Complies	2.03 dB
3.6	15.407(b)	Radiated Emissions	Complies	0.18 dB
3.7	15.407(b)	Band Edge Emissions	Complies	1.24 dB
3.8	15.407(g)	Frequency Stability	Complies	-
3.9	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of 5G band is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Modulation	OFDM
Frequency Range	5150~5350MHz; 5470~5725MHz
Channel Number	7
Channel Band Width (99%)	Band 1~Band 3: 37.80 MHz
Conducted Output Power	Band 1: 7.66 dBm ; Band 2: 7.44 dBm ; Band 3: 7.76 dBm
Antenna Type / Gain	Integrate Antenna / 2.11 dBi

2.2 Accessories

Power	Brand	Model	Rating
AC Adapter	ENERTRONIX	EXA0802UA1	INPUT : AC100-240V 50-60Hz, 0.5A OUTPUT : +5V 2A
I.T.E. Power Supply	AMIGO	AMS9-0502000FU2	INPUT : 100-240V~50/60Hz 0.5A OUTPUT : 5V 2.0A
Other			
Roll up USB cable, HDMI cable x3			

2.3 Table for Carrier Frequencies

For OFDM (40MHz)

Frequency Band	Frequency
5150~5250 MHz Band 1	5190 MHz
	5230 MHz

Frequency Band	Frequency
5250~5350 MHz Band 2	5270 MHz
	5310 MHz

Frequency Band	Frequency
5470~5725 MHz Band 3	5510 MHz
	5550 MHz
	5670 MHz

2.4 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on the entire possible Configuration for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
AC Power Conducted Emission	Mode 1	Auto	-
Max. Conducted Output Power 26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion	OFDM (40MHz)	63Mbps	5190 MHz / 5230 MHz / 5270 MHz / 5310 MHz / 5510 MHz / 5550 MHz / 5670 MHz
Radiated Emission Below 1GHz	Mode 2	Auto	-
Radiated Emission Above 1GHz Band Edge Emission	OFDM (40MHz)	63Mbps	5190 MHz / 5230 MHz / 5270 MHz / 5310 MHz / 5510 MHz / 5550 MHz / 5670 MHz
Frequency Stability	OFDM (40MHz)	63Mbps	5310 MHz / 5510 MHz

For conducted test, the following modes were tested:
Mode 1. EUT with Adapter: EXA0802UA1 and HDMI to roll up USB cable
Mode 2. EUT with Adapter: AMS9-0502000FU2 HDMI to roll up USB cable
Mode 3. EUT with Adapter: EXA0802UA1 HDMI to long USB cable
The Mode 1 is the worst result in this report.

For radiated below 1GHz test, the following modes were tested:
Mode 1. EUT with Adapter: AMS9-0502000FU2
Mode 2. EUT with HDMI short cable
The Mode 2 is the worst result in this report.
**During the all testing, the module put in the Host (EW2000 TX).

2.5 Table for Testing Locations

Test Site No.	Site Category	Location
CO01-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.6 Table for Supporting Units

Support Unit	Brand	Model	FCC ID	Remark
P.C.	HP	DC579AV	N/A	Conducted
Printer	EPSON	LQ300+	N/A	
Modem	ACEEX	DM1414	IFAXDM1414	
PS/2 Keyboard	BTC	9110	N/A	
USB Mouse	Microsoft	1004	DZL211029	
LCD Monitor	JET	JC278EC65E	N/A	
LCD Monitor	DELL	2408WFPb	N/A	
PS3	SONY	CECHH07	N/A	
WHDMI Box (RX) (Remote Workstation)	ASUS	EW2000	N/A	
Notebook P.C.	DELL	D505	DoC	Radiated
Test Fixture	-	-	-	

2.7 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters of OFDM (40MHz)

Test Software Version	RF-REG-2-ANT		
Frequency	5190 MHz	5230 MHz	5270 MHz
OFDM	4-3	4-4	4-3
Frequency	5310 MHz	5510 MHz	5550 MHz
OFDM	3-11	4-2	4-1
Frequency	5670 MHz		
OFDM	4-5		

2.8 EUT Operation during Test

Conducted:

The remote workstation transmits the signal to WHDMI Box by wire, and then the WHDMI Box transmits the signal to EUT via wireless. The monitor broadcast the image from EUT.

Radiated:

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating “H“ pattern was used as the test software.

At the same time, the following programs were executed:

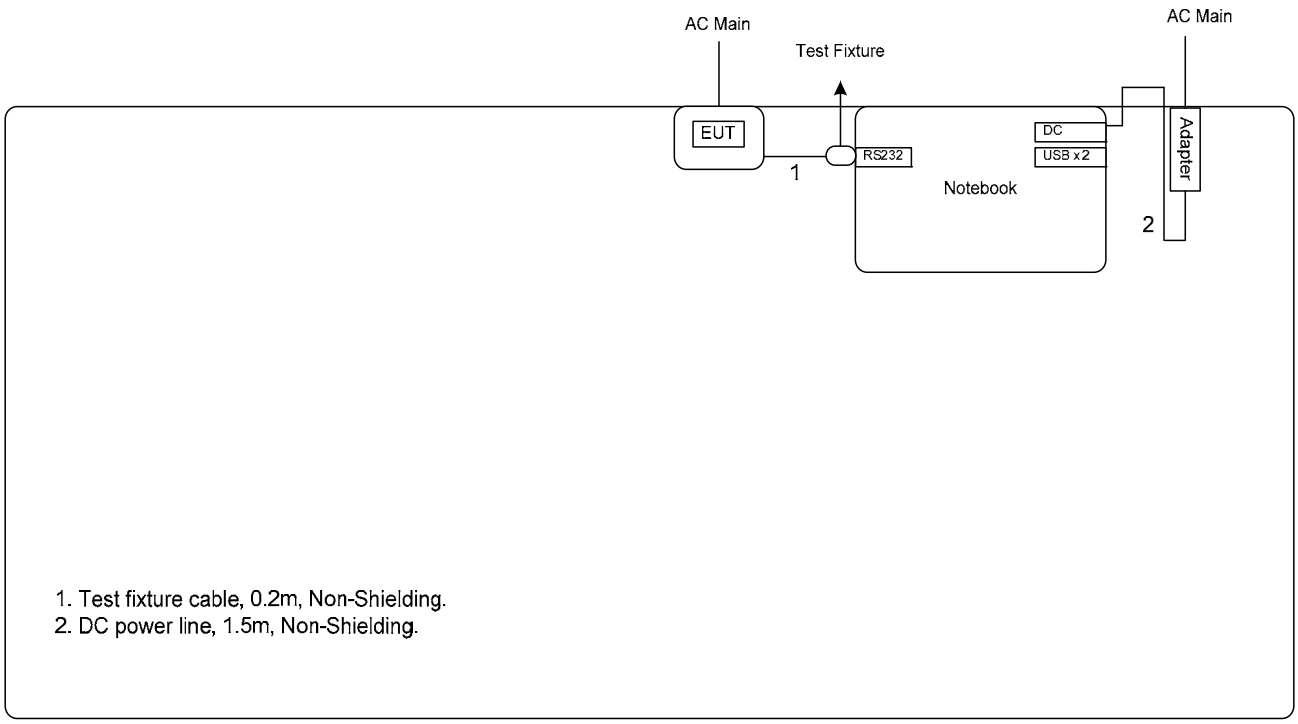
The EUT sends "H" messages to the monitor and displays "H" patterns on the screen.

-Executed “RF-REG-2-ANT” to keep transmitting signals at fixed frequency.

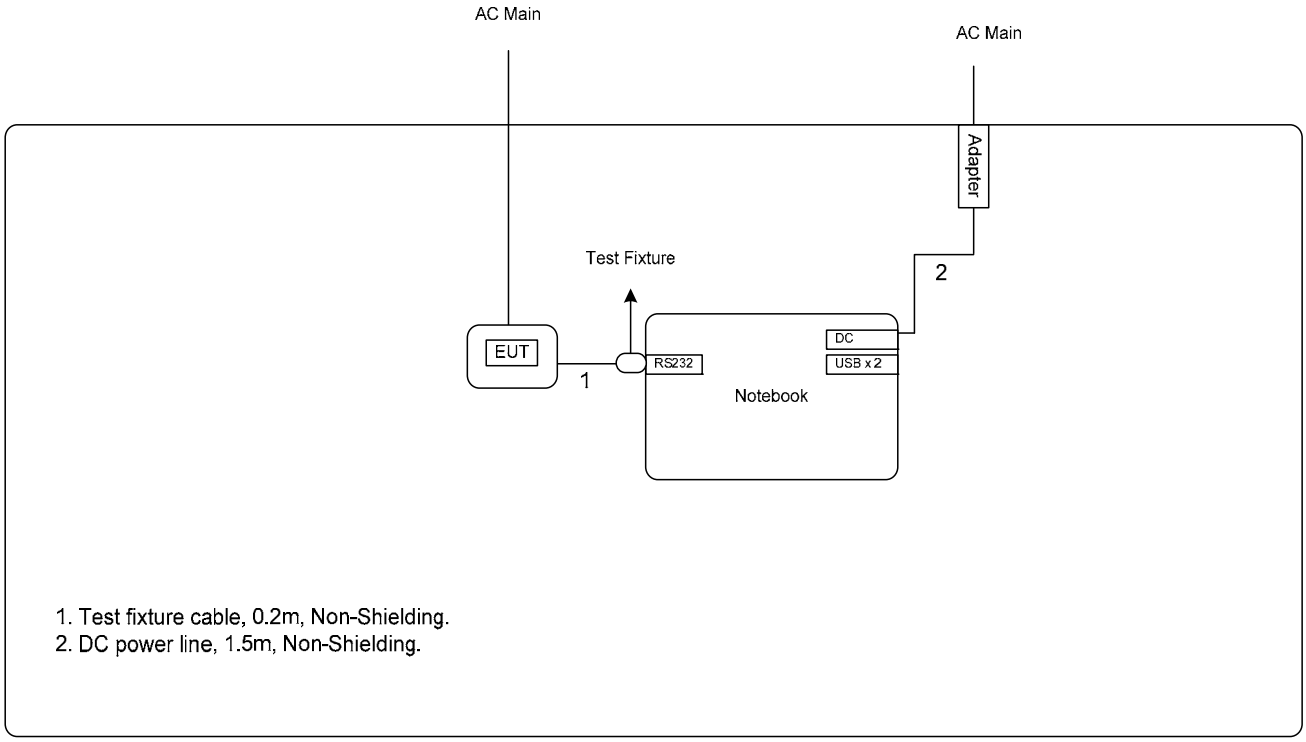
2.9 Test Configuration

2.9.1 Radiation Emissions Test Configuration

For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



1. Test fixture cable, 0.2m, Non-Shielding.
2. DC power line, 1.5m, Non-Shielding.

3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product that is designed to connect to the 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 below limits table.

Class B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

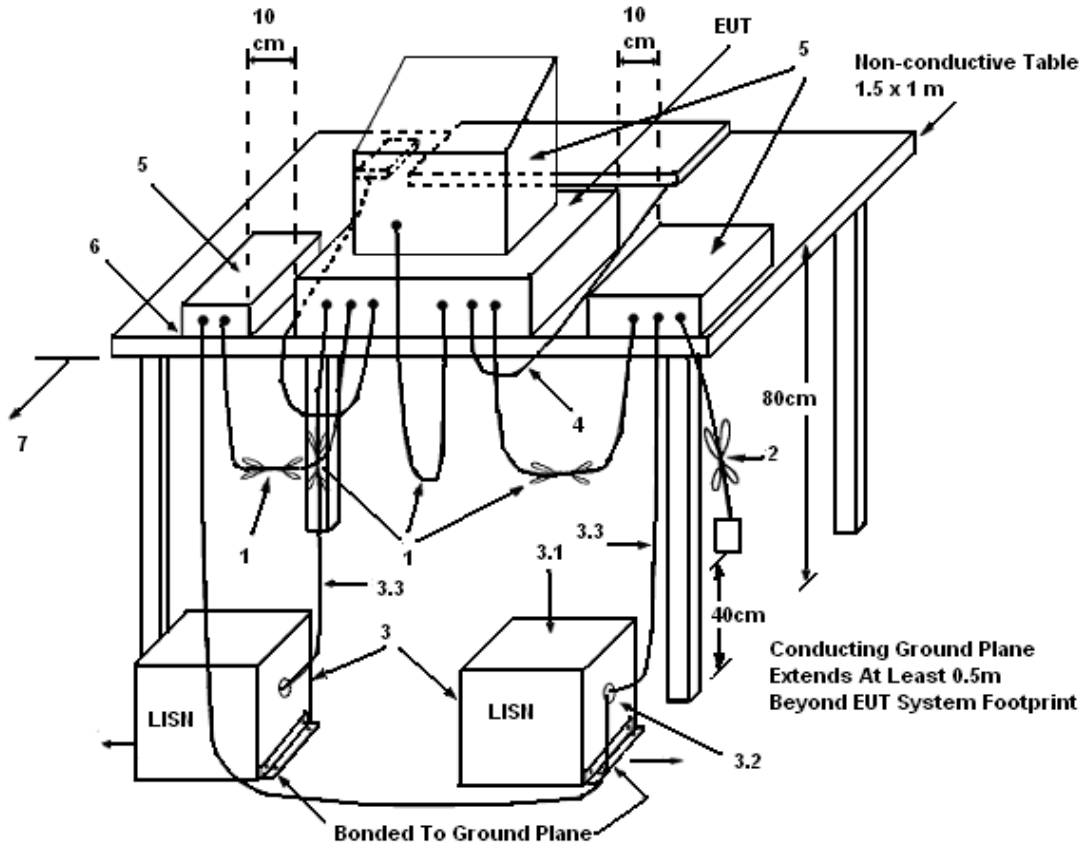
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.1.3 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



LEGEND:
(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
(3.1) All other equipment powered from additional LISN(s).
(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
(3.3) LISN at least 80 cm from nearest part of EUT chassis.
(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
(5) Non-EUT components of EUT system being tested.
(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5 Test Deviation

There is no deviation with the original standard.

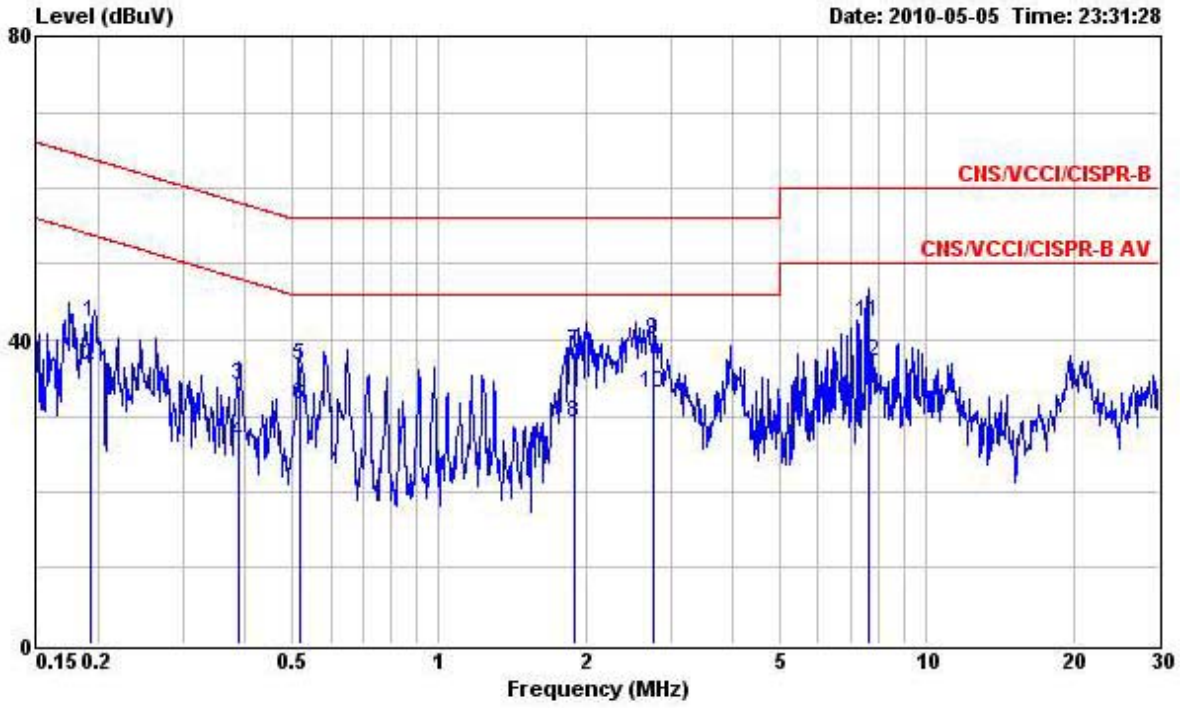
3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7 Results of AC Power Line Conducted Emissions Measurement

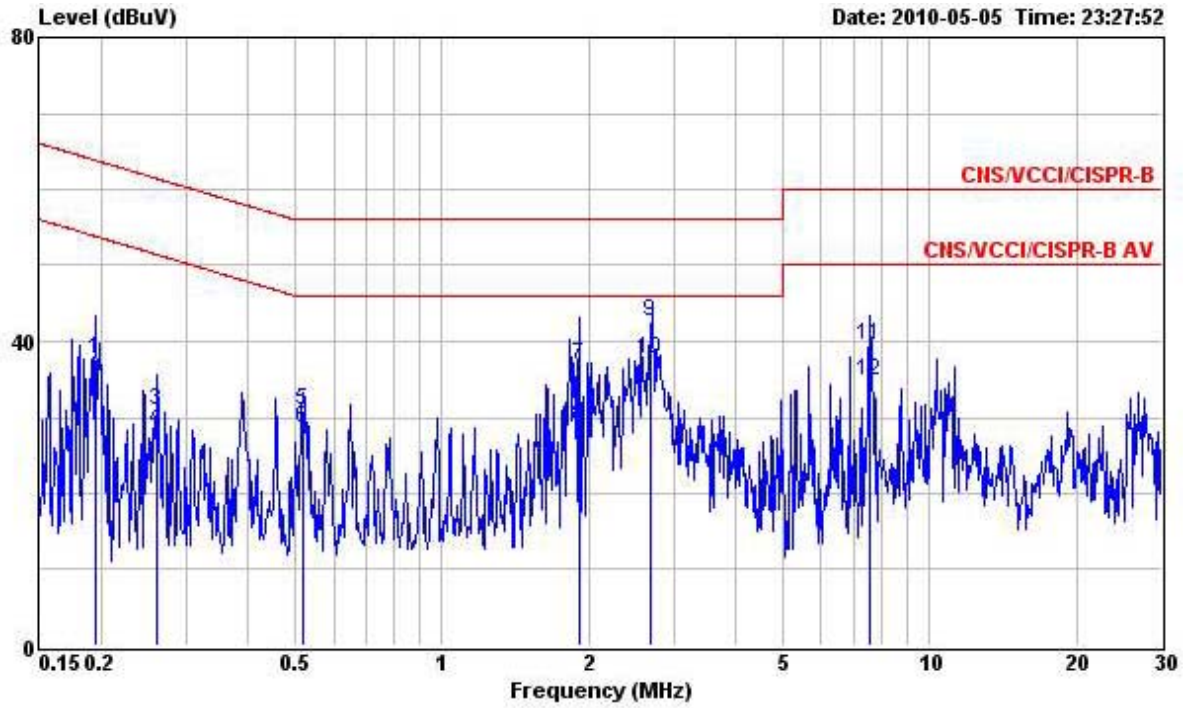
Final Test Date	May 05, 2010	**Test Site No.**	CO01-HY
Temperature	22.3℃	**Humidity**	58.9%
Test Engineer	Kobe	**Configuration**	Mode 1

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.193	42.39	-21.52	63.91	42.25	0.08	0.06	QP
2	0.193	36.59	-17.32	53.91	36.45	0.08	0.06	Average
3	0.389	33.98	-24.11	58.09	33.82	0.09	0.07	QP
4	0.389	26.38	-21.71	48.09	26.22	0.09	0.07	Average
5	0.518	36.53	-19.47	56.00	36.34	0.10	0.09	QP
6	0.518	31.42	-14.58	46.00	31.23	0.10	0.09	Average
7	1.890	38.39	-17.61	56.00	38.14	0.13	0.12	QP
8	1.890	29.04	-16.96	46.00	28.79	0.13	0.12	Average
9	2.760	40.02	-15.98	56.00	39.74	0.15	0.13	QP
10	2.760	33.11	-12.89	46.00	32.83	0.15	0.13	Average
11	7.593	42.27	-17.73	60.00	41.79	0.24	0.24	QP
12	7.593	37.15	-12.85	50.00	36.67	0.24	0.24	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.194	37.72	-26.14	63.86	37.60	0.06	0.06	QP
2	0.194	32.49	-21.37	53.86	32.37	0.06	0.06	Average
3	0.260	31.03	-30.40	61.43	30.91	0.06	0.06	QP
4	0.260	28.19	-23.24	51.43	28.07	0.06	0.06	Average
5	0.518	30.85	-25.15	56.00	30.68	0.08	0.09	QP
6	0.518	28.52	-17.48	46.00	28.35	0.08	0.09	Average
7	1.910	36.91	-19.09	56.00	36.68	0.11	0.12	QP
8	1.910	28.73	-17.27	46.00	28.50	0.11	0.12	Average
9	2.690	42.67	-13.33	56.00	42.42	0.12	0.13	QP
10	2.690	37.69	-8.31	46.00	37.44	0.12	0.13	Average
11	7.530	39.58	-20.42	60.00	39.12	0.22	0.24	QP
12	7.530	34.71	-15.29	50.00	34.25	0.22	0.24	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2 99% Occupied Bandwidth Measurement

3.2.1 Limit

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

3.2.2 Measuring Instruments and Setting

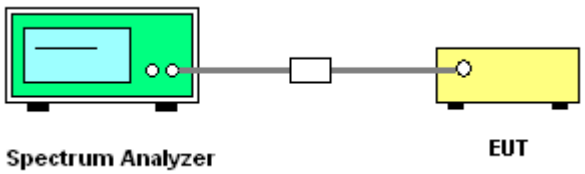
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RB	300 kHz
VB	1000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

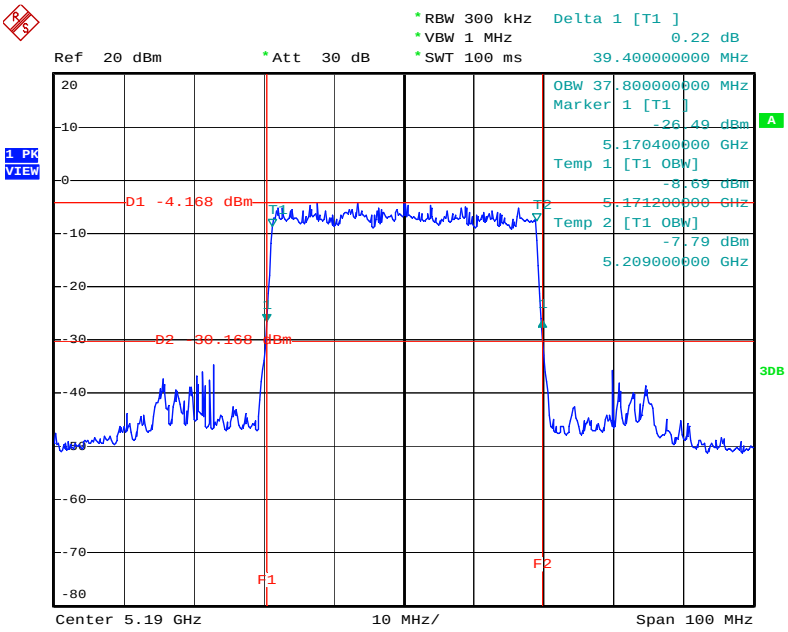
3.2.7 Test Result of 99% Occupied Bandwidth

Final Test Date	May 03, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	61%
Test Engineer	Ian	**Configuration**	OFDM

Configuration of OFDM (40MHz)

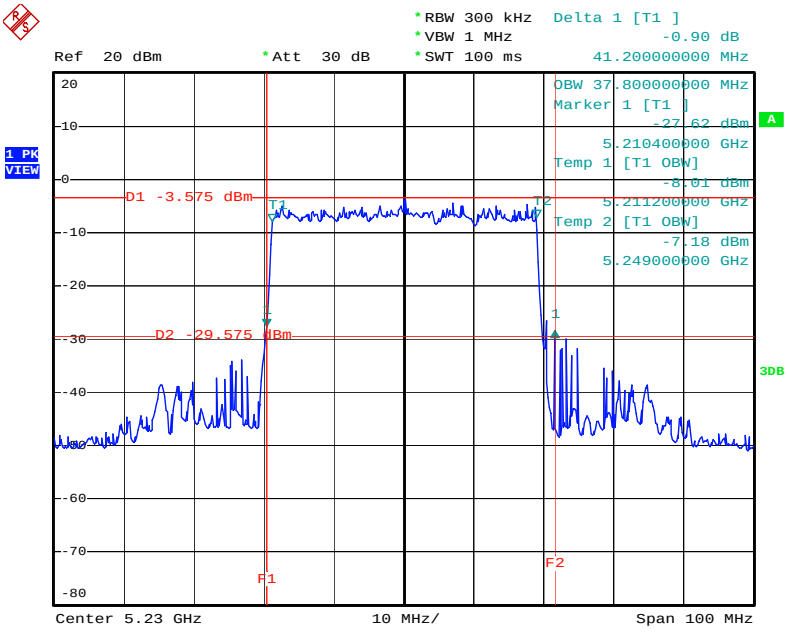
Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
5190 MHz	39.40	37.80
5230 MHz	41.20	37.80
5270 MHz	41.00	37.80
5310 MHz	39.80	37.80
5510 MHz	39.40	37.80
5550 MHz	39.20	37.80
5670 MHz	40.80	37.80

26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5190 MHz



Date: 3.MAY.2010 21:54:03

26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5230 MHz



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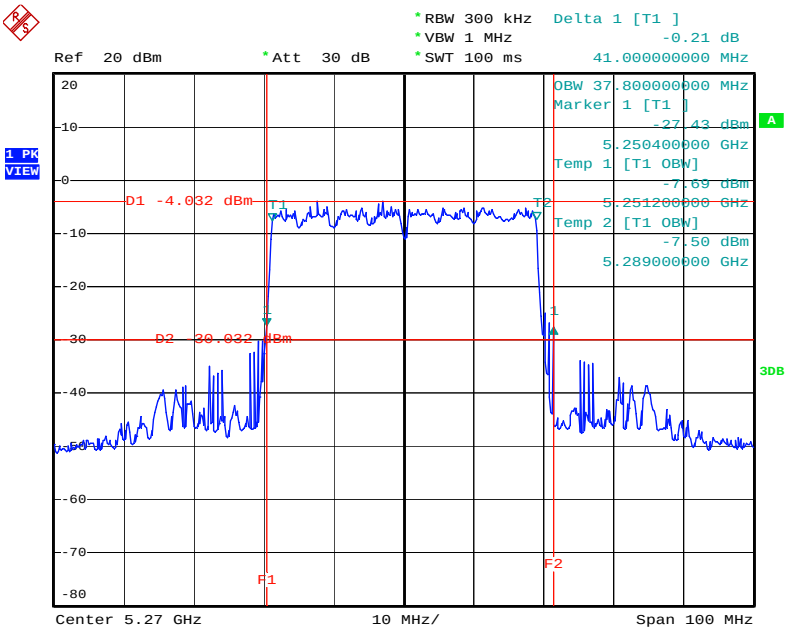
26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5270 MHz



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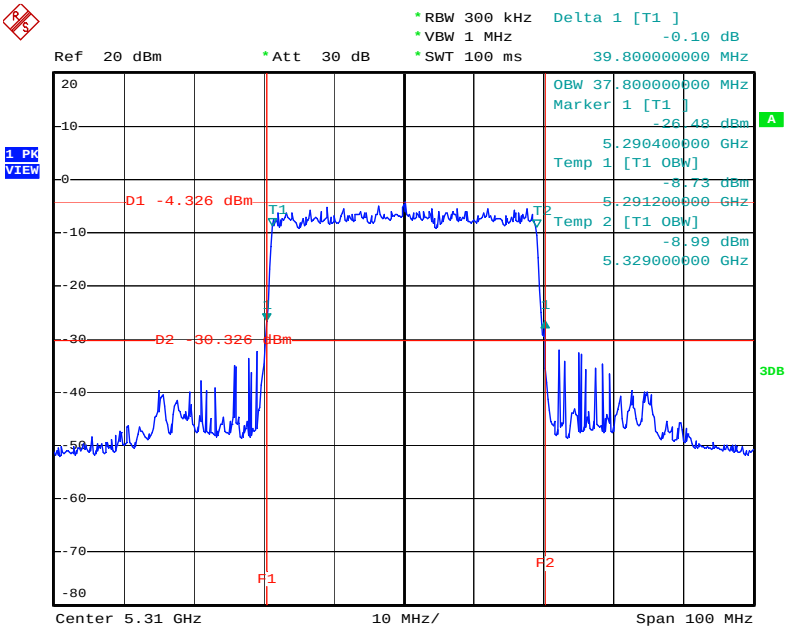
26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5310 MHz



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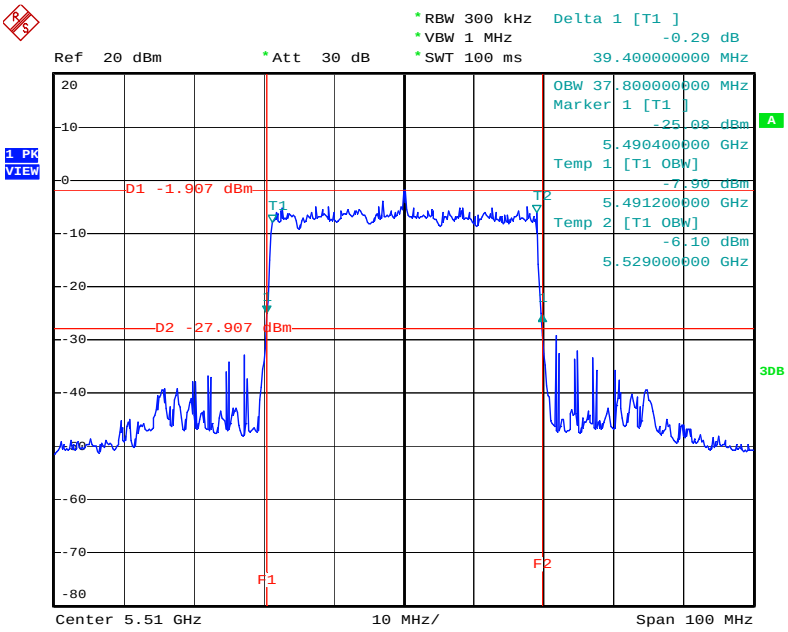
26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5510 MHz



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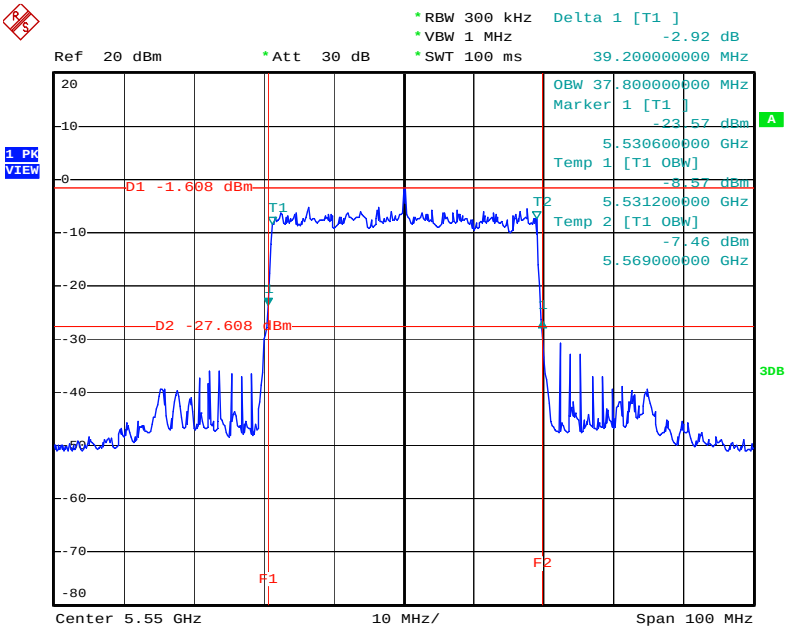
26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5550 MHz



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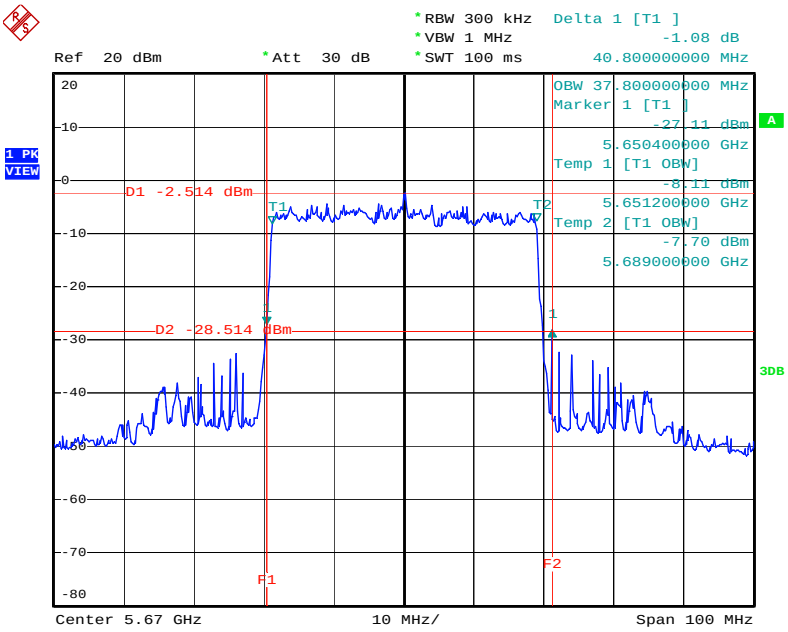
26 dB Bandwidth Plot on Configuration of OFDM (40MHz) / 5670 MHz



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3.3 Maximum Conducted Output Power Measurement

3.3.1 Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or 17 dBm + 10log B. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power and peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

3.3.2 Measuring Instruments and Setting

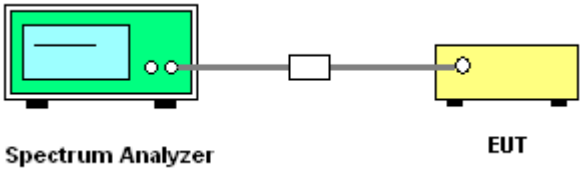
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	300 kHz
Detector	Sample
Trace	Max Hold
Sweep Time	60s

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with method #3 of FCC Public Notice DA-02-2138.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

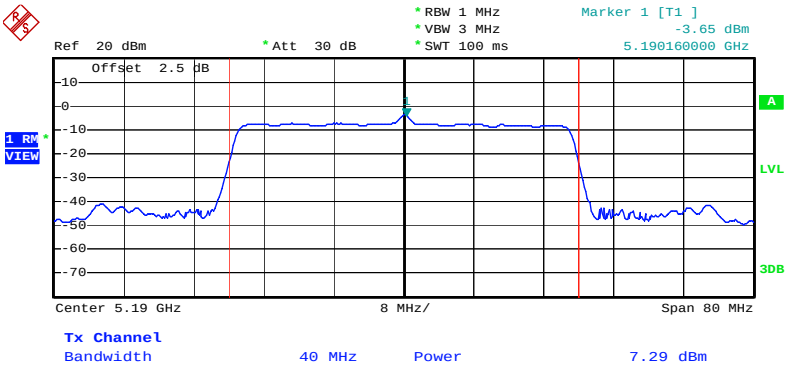
3.3.7 Test Result of Maximum Conducted Output Power

Final Test Date	May 03, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	61%
Test Engineer	Ian	**Configuration**	OFDM

Configuration of OFDM (40MHz)

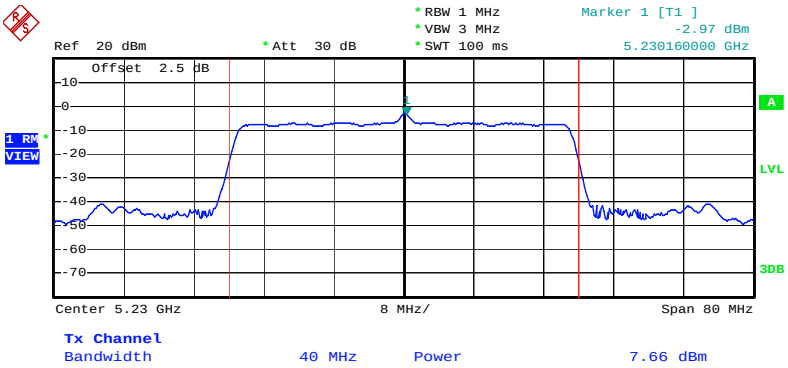
Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
5190 MHz	7.29	17.00	**Complies**
5230 MHz	7.66	17.00	**Complies**
5270 MHz	7.44	24.00	**Complies**
5310 MHz	7.01	24.00	**Complies**
5510 MHz	7.62	24.00	**Complies**
5550 MHz	7.08	24.00	**Complies**
5670 MHz	7.76	24.00	**Complies**

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5190 MHz



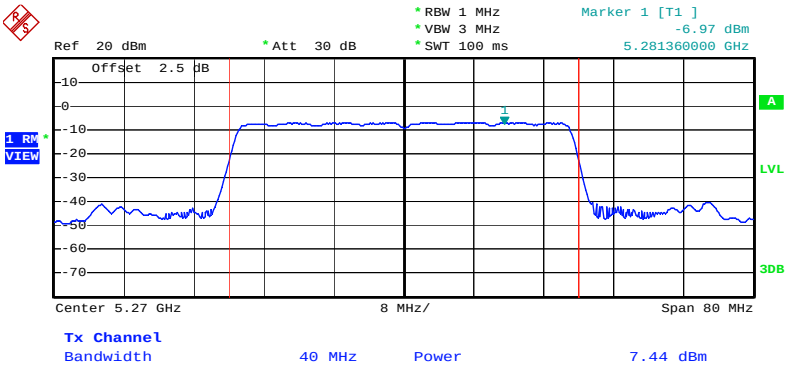
Date: 3.MAY.2010 21:53:37

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5230 MHz



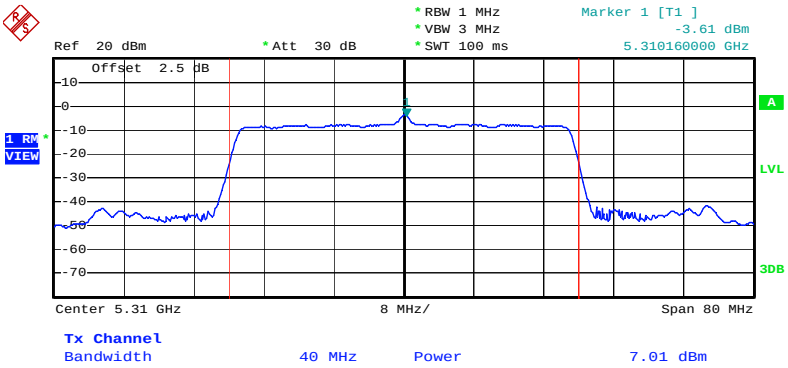
Date: 3.MAY.2010 21:56:57

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5270 MHz



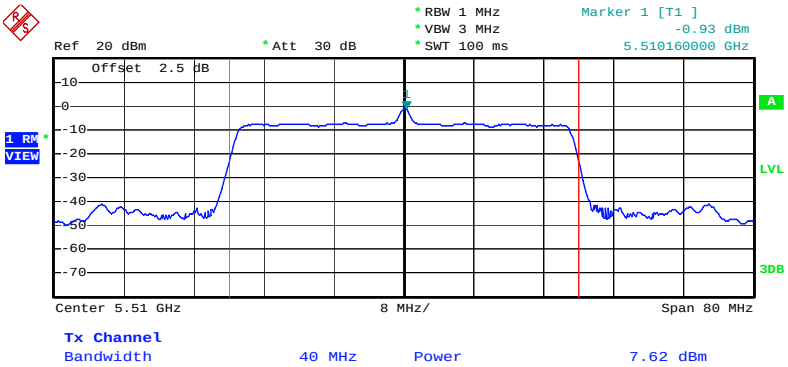
Date: 3.MAY.2010 22:00:45

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5310 MHz



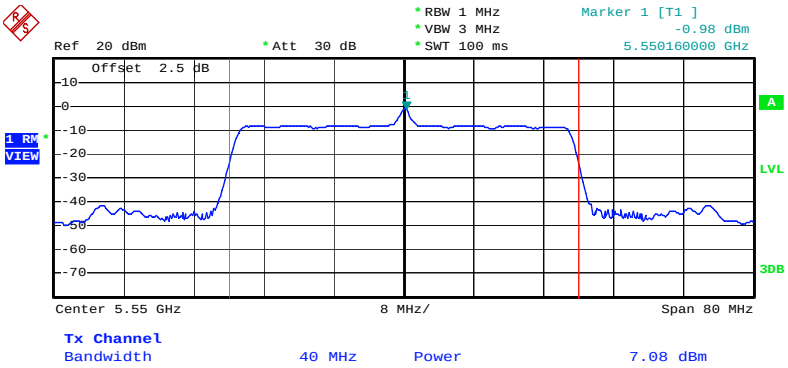
Date: 3.MAY.2010 22:03:31

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5510 MHz



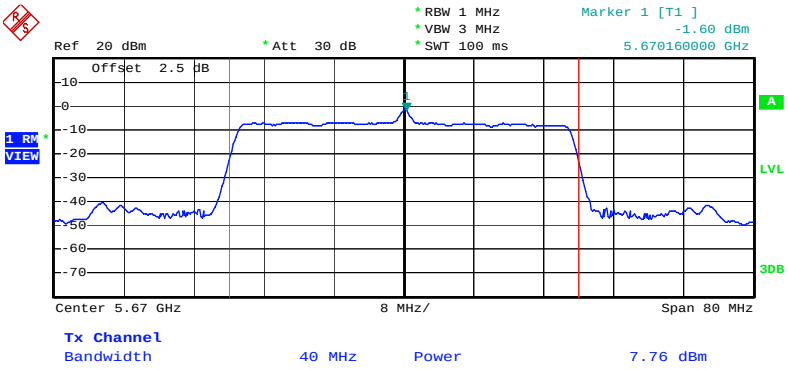
Date: 3.MAY.2010 22:06:02

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5550 MHz



Date: 3.MAY.2010 22:08:37

Channel Output Power Plot on Configuration of OFDM (40MHz) / 5670 MHz



Date: 3.MAY.2010 22:12:21

3.4 Power Spectral Density Measurement

3.4.1 Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 3.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4
5.25-5.35 GHz	11
5.725-5.825	17

3.4.2 Measuring Instruments and Setting

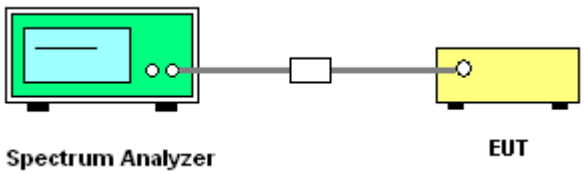
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to Peak, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

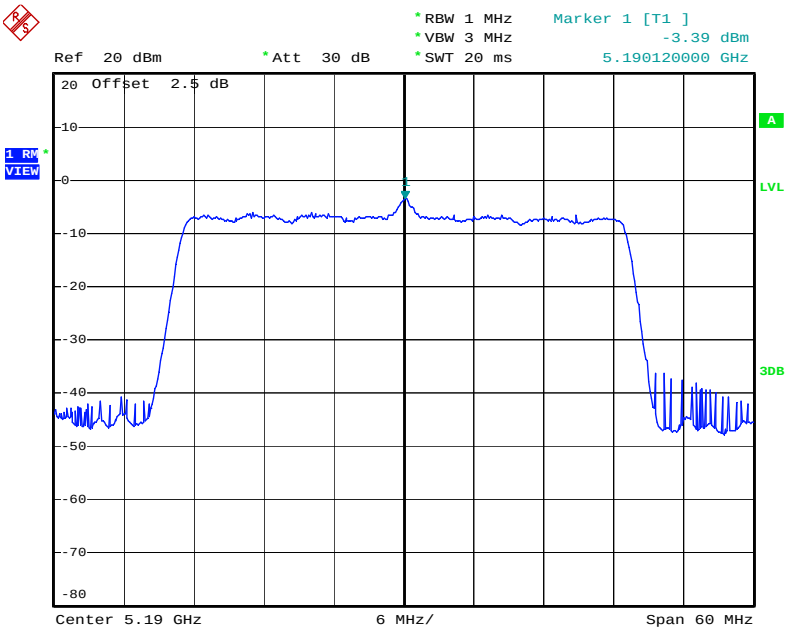
3.4.7 Test Result of Power Spectral Density

Final Test Date	May 03, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	61%
Test Engineer	Ian	**Configuration**	OFDM

Configuration of OFDM (40MHz)

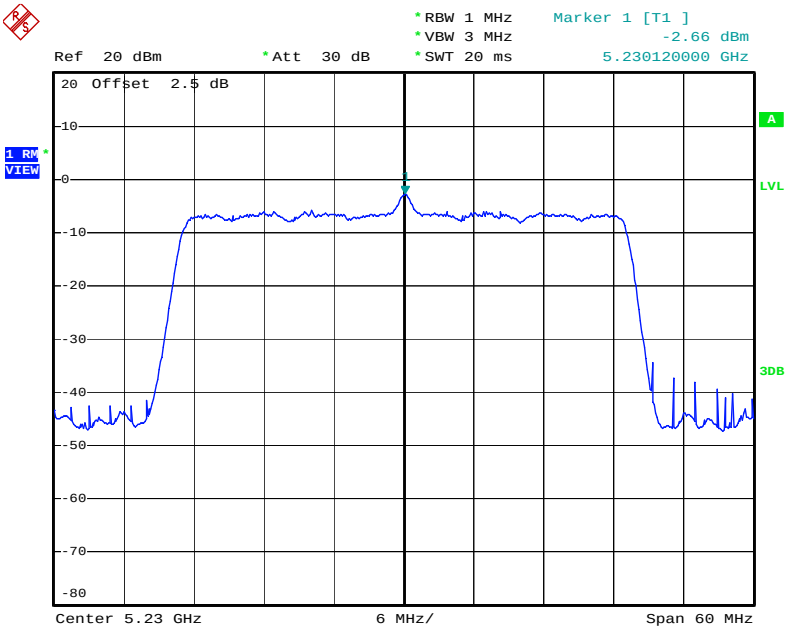
Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
5190 MHz	-3.39	4.00	**Complies**
5230 MHz	-2.66	4.00	**Complies**
5270 MHz	-5.96	11.00	**Complies**
5310 MHz	-3.36	11.00	**Complies**
5510 MHz	-0.78	11.00	**Complies**
5550 MHz	-0.79	11.00	**Complies**
5670 MHz	-1.49	11.00	**Complies**

Power Density Plot on Configuration of OFDM (40MHz) / 5190 MHz



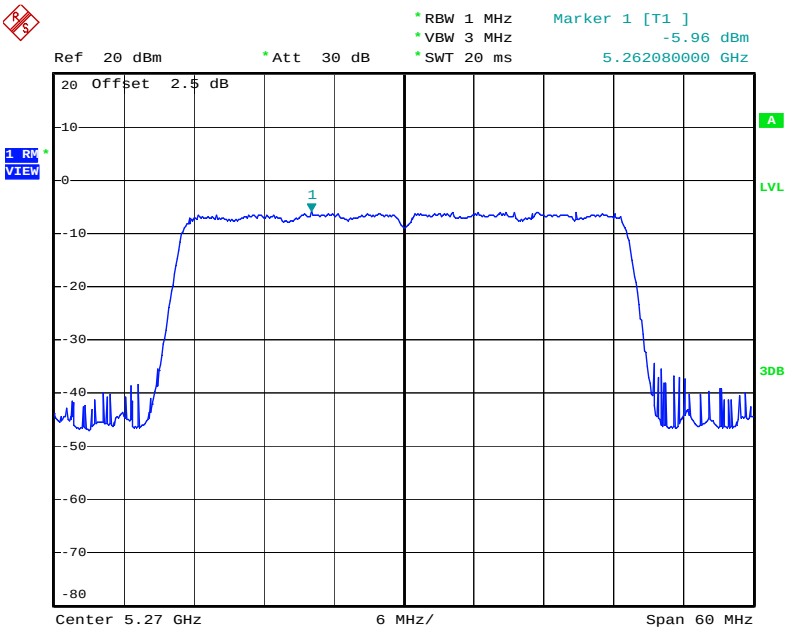
Date: 3.MAY.2010 21:53:49

Power Density Plot on Configuration of OFDM (40MHz) / 5230 MHz



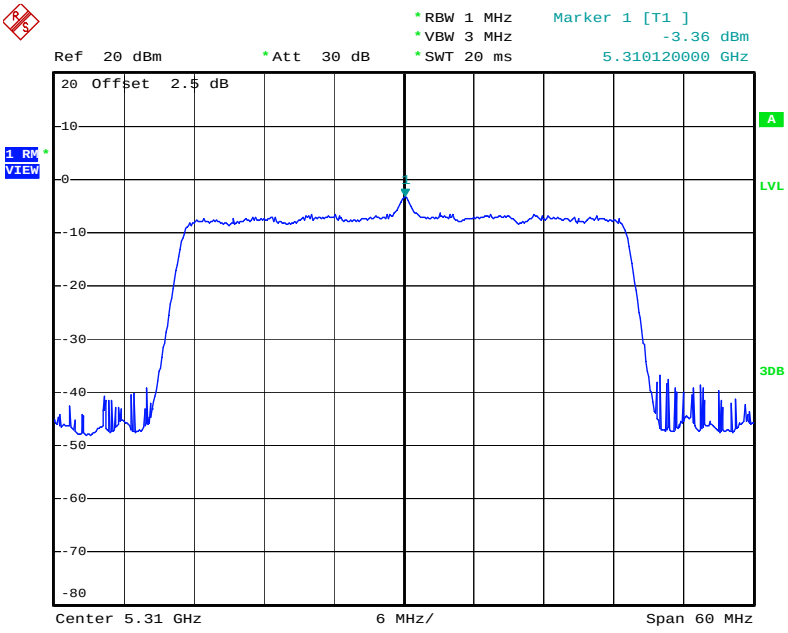
Date: 3.MAY.2010 21:57:12

Power Density Plot on Configuration of OFDM (40MHz) / 5270 MHz



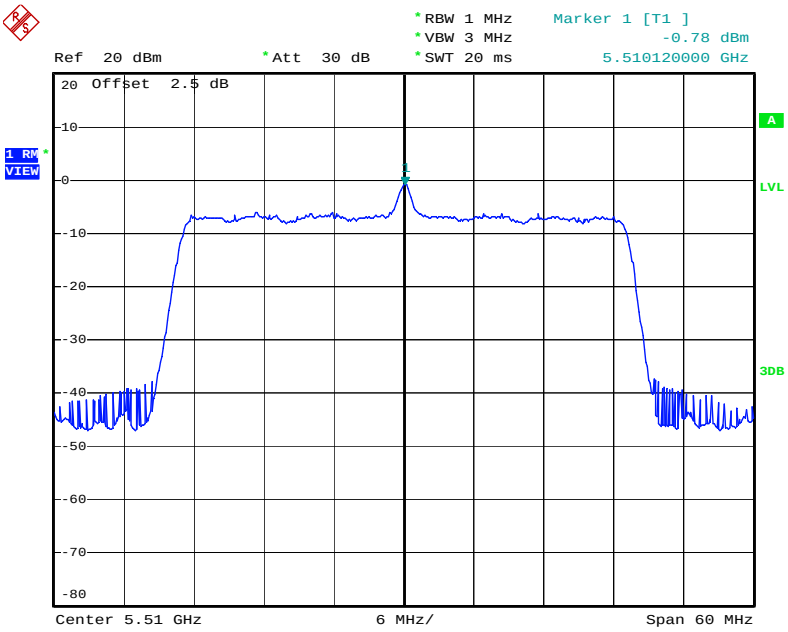
Date: 3.MAY.2010 22:00:58

Power Density Plot on Configuration of OFDM (40MHz) / 5310 MHz



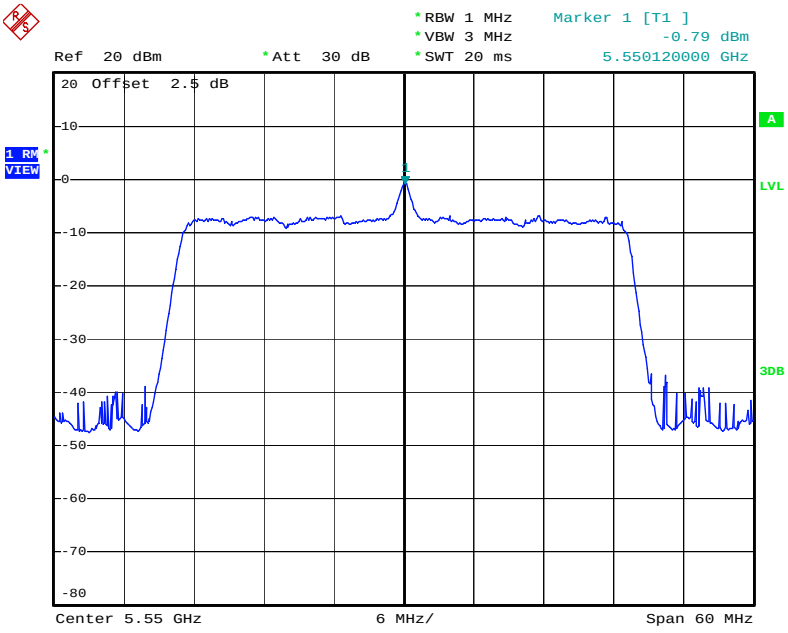
Date: 3.MAY.2010 22:03:43

Power Density Plot on Configuration of OFDM (40MHz) / 5510 MHz



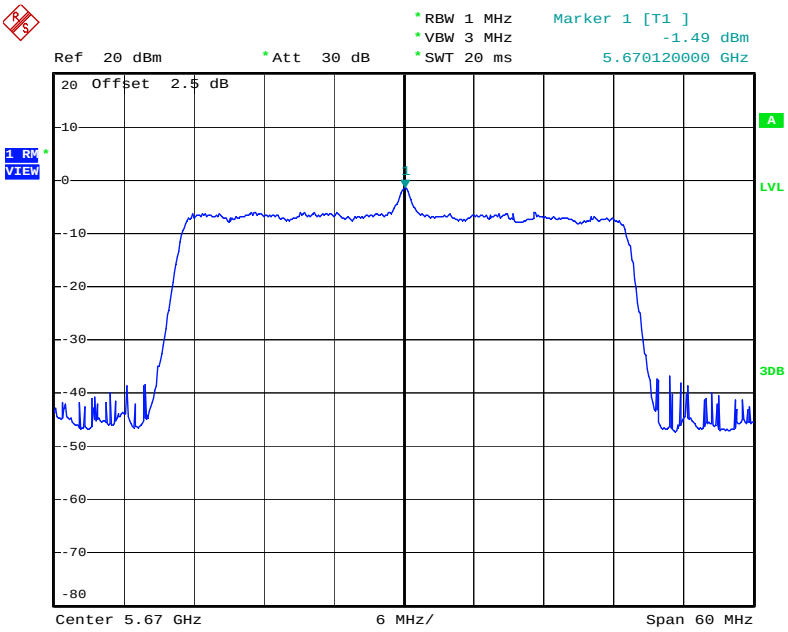
Date: 3.MAY.2010 22:06:15

Power Density Plot on Configuration of OFDM (40MHz) / 5550 MHz



Date: 3.MAY.2010 22:08:49

Power Density Plot on Configuration of OFDM (40MHz) / 5670 MHz



Date: 3.MAY.2010 22:12:33

3.5 Peak Excursion Measurement

3.5.1 Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

3.5.2 Measuring Instruments and Setting

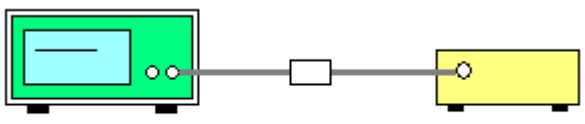
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz (Peak Trace) / 1000 kHz (Average Trace)
VB	3000 kHz (Peak Trace) / 300 kHz (Average Trace)
Detector	Peak (Peak Trace) / Sample (Average Trace)
Trace	Max Hold
Sweep Time	60s

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to “free run”. Set RBW = 1 MHz. Set VBW ≥ 1/T (IEEE 802.11a VBW = 300kHz ≥ 1/4μs). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

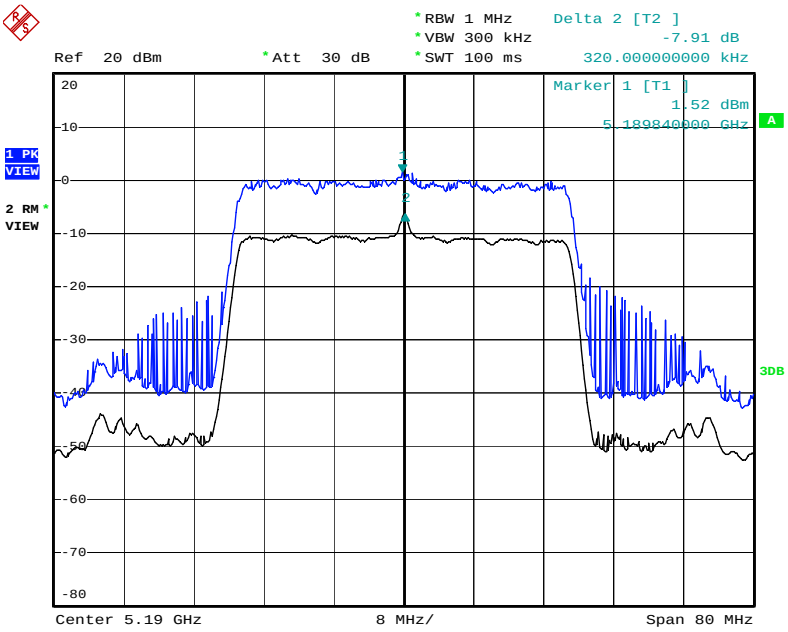
3.5.7 Test Result of Peak Excursion

Final Test Date	May 03, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	61%
Test Engineer	Ian	**Configuration**	OFDM

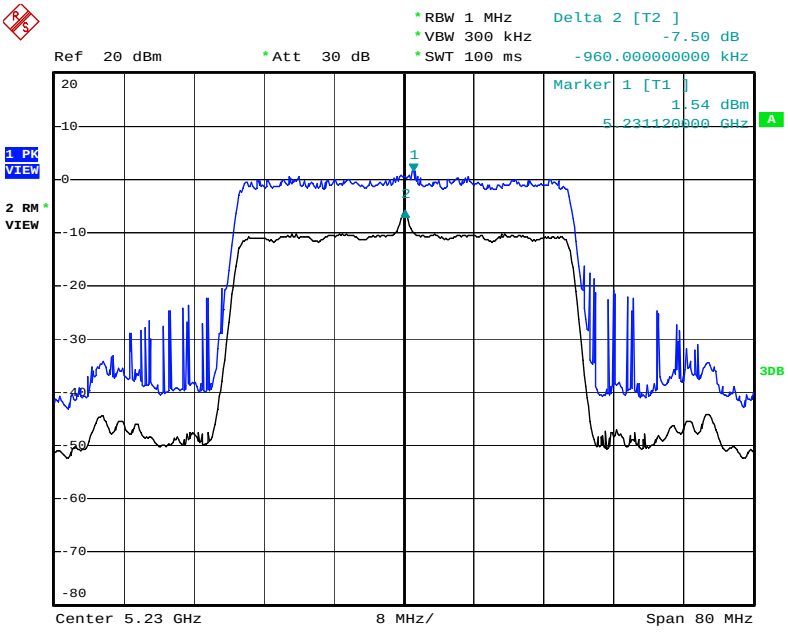
Configuration of OFDM (40MHz)

Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
5190 MHz	7.91	13	**Complies**
5230 MHz	7.50	13	**Complies**
5270 MHz	10.97	13	**Complies**
5310 MHz	7.75	13	**Complies**
5510 MHz	5.55	13	**Complies**
5550 MHz	5.86	13	**Complies**
5670 MHz	6.79	13	**Complies**

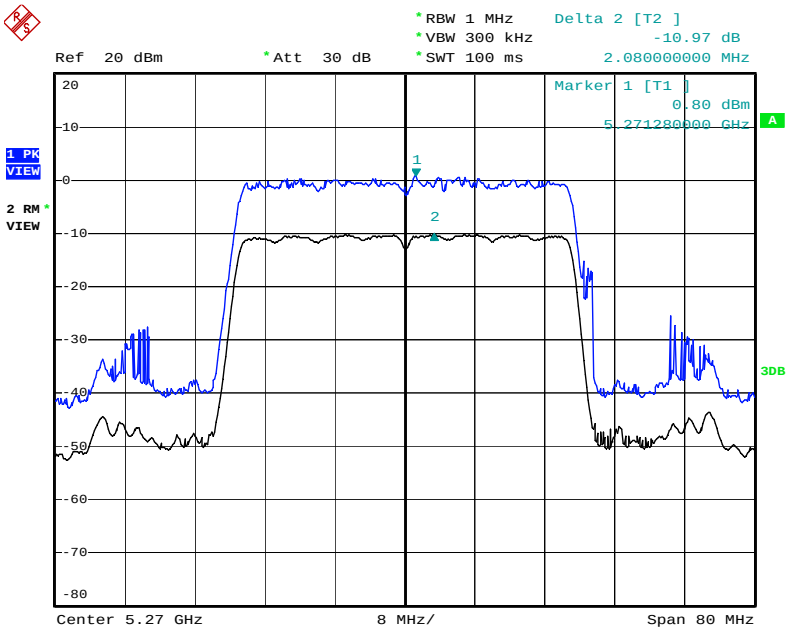
Peak Excursion Plot on Configuration of OFDM (40MHz) / 5190 MHz



Peak Excursion Plot on Configuration of OFDM (40MHz) / 5230 MHz

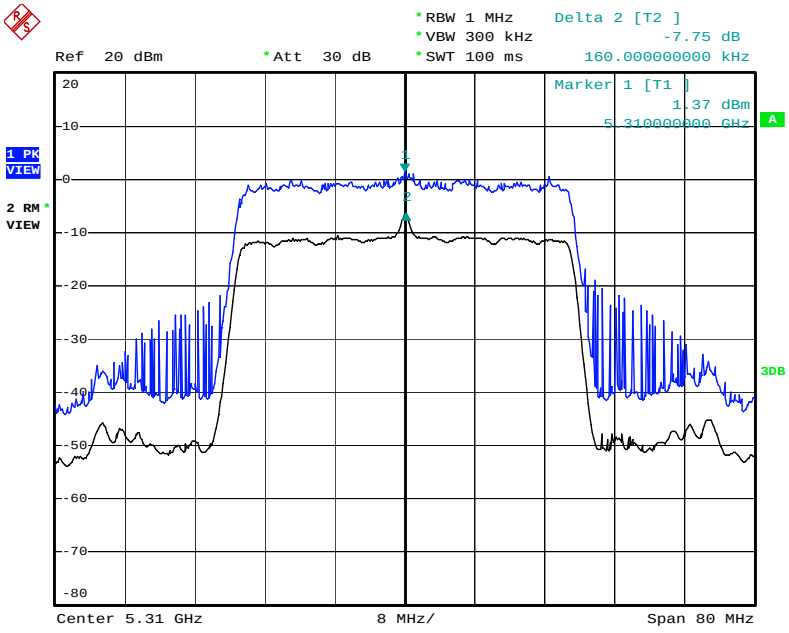


Peak Excursion Plot on Configuration of OFDM (40MHz) / 5270 MHz



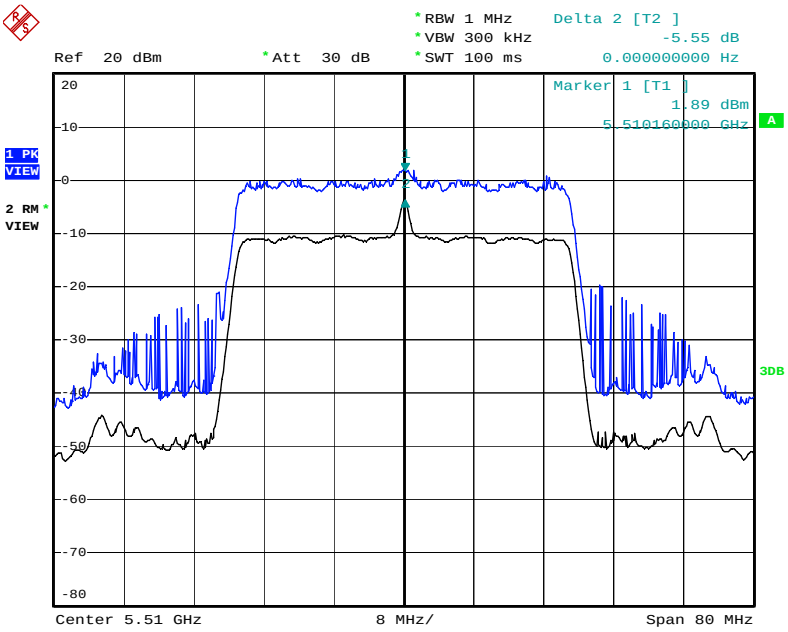
Date: 3.MAY.2010 22:01:30

Peak Excursion Plot on Configuration of OFDM (40MHz) / 5310 MHz



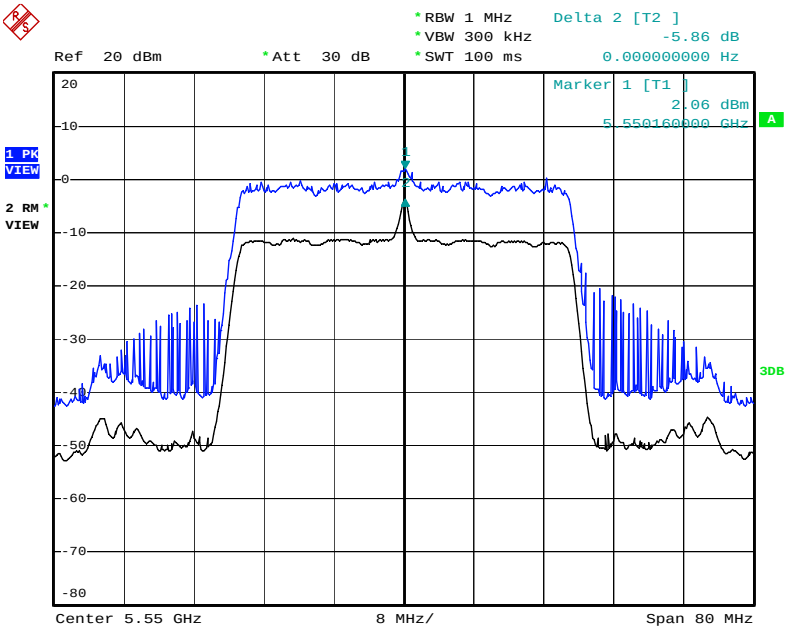
Date: 3.MAY.2010 22:04:14

Peak Excursion Plot on Configuration of OFDM (40MHz) / 5510 MHz



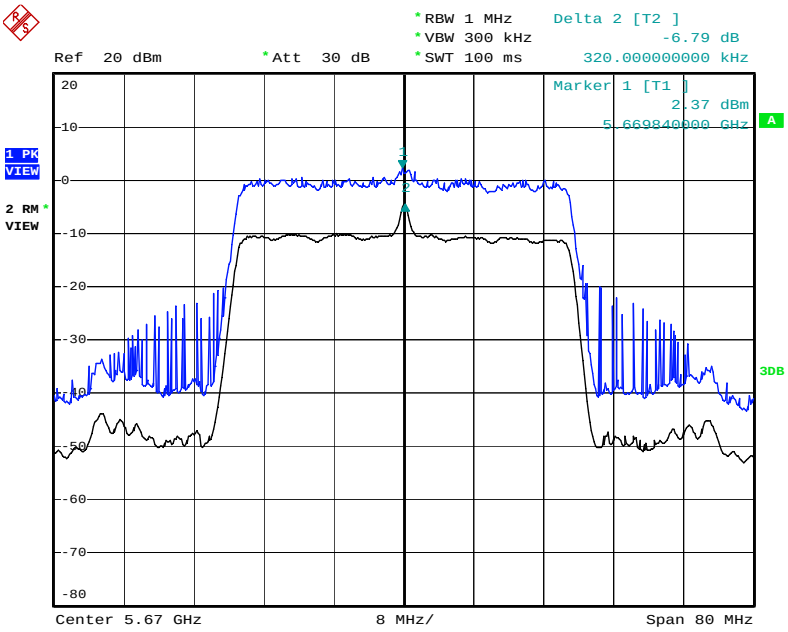
Date: 3.MAY.2010 22:06:47

Peak Excursion Plot on Configuration of OFDM (40MHz) / 5550 MHz



Date: 3.MAY.2010 22:09:21

Peak Excursion Plot on Configuration of OFDM (40MHz) / 5670 MHz



3.6 Radiated Emissions Measurement

3.6.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

3.6.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz z for peak

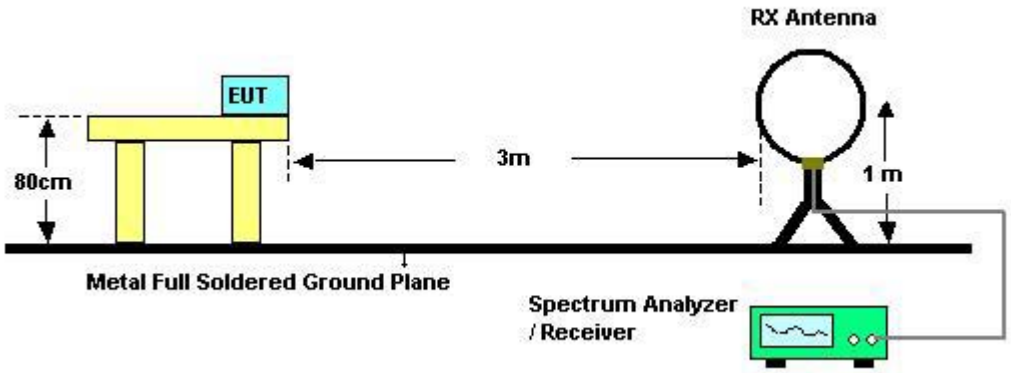
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.6.3 Test Procedures

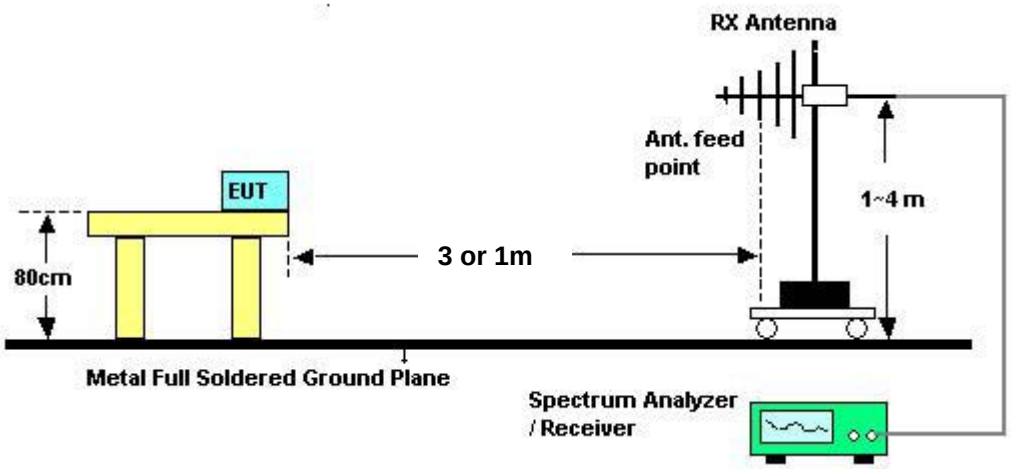
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.6.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	May 31, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy		

Freq. (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.

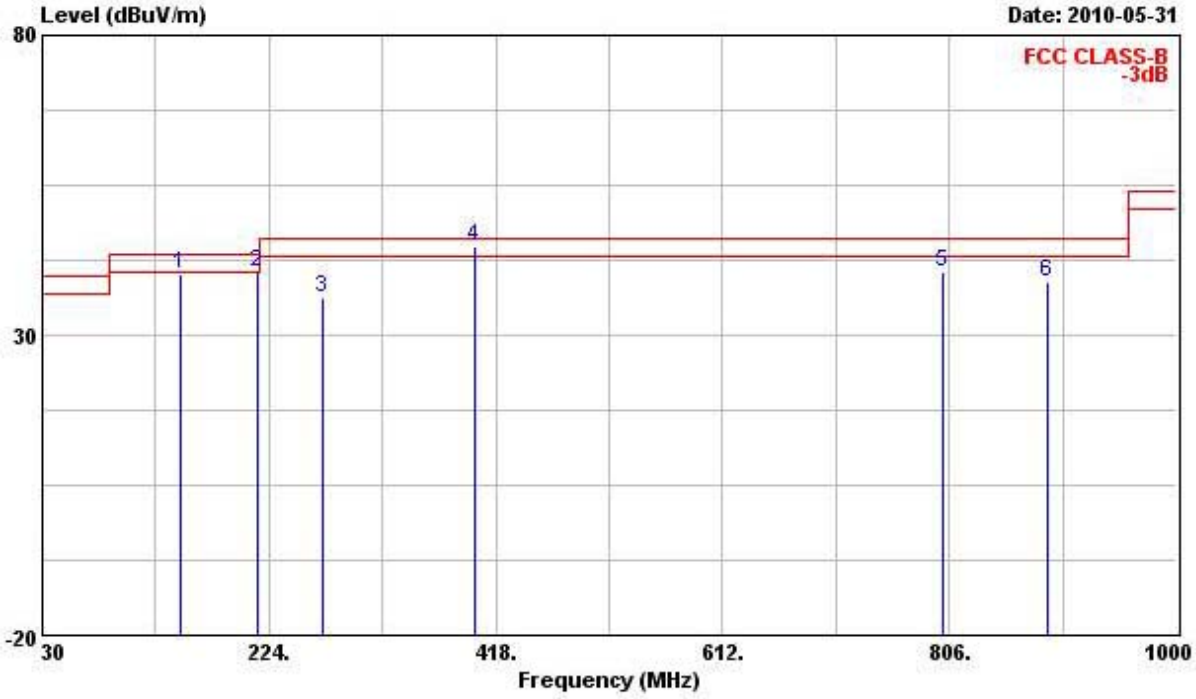
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

3.6.8 Results of Radiated Emissions (30MHz~1GHz)

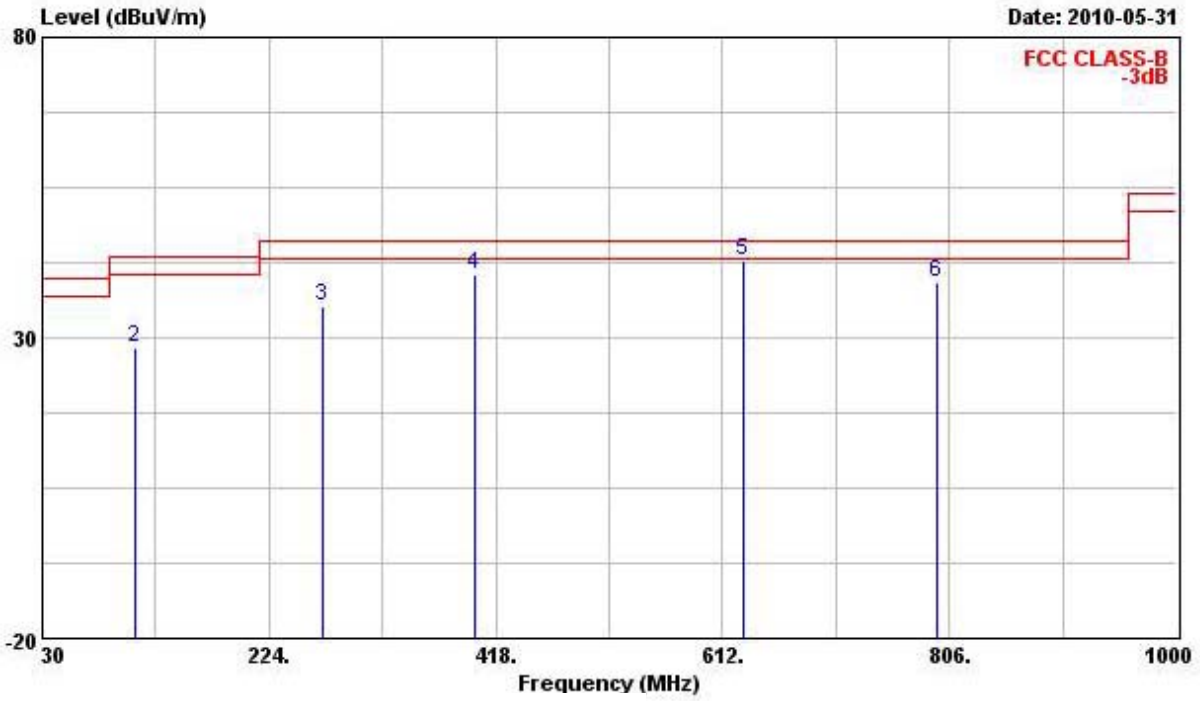
Final Test Date	May 31, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configurations**	Mode 2

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	148.340	40.09	-3.41	43.50	55.21	10.60	2.08	27.79	---	---	Peak
2 @	214.300	40.38	-3.12	43.50	56.68	9.29	2.48	28.07	---	---	Peak
3	269.590	36.22	-9.78	46.00	47.95	13.47	2.87	28.07	---	---	Peak
4 @	400.540	44.94	-1.06	46.00	54.23	16.48	3.44	29.21	---	---	QP
5	800.180	40.53	-5.47	46.00	44.17	20.75	5.08	29.47	---	---	Peak
6	890.390	39.04	-6.96	46.00	41.90	21.00	5.46	29.31	---	---	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	30.000	37.05	-2.95	40.00	46.26	18.48	0.73	28.42	---	---	QP
2	109.540	28.40	-15.10	43.50	41.90	12.40	1.77	27.67	---	---	QP
3	269.590	35.40	-10.60	46.00	47.13	13.47	2.87	28.07	---	---	Peak
4	400.540	40.43	-5.57	46.00	49.72	16.48	3.44	29.21	---	---	Peak
5 @	630.430	42.87	-3.13	46.00	48.25	19.50	4.60	29.48	---	---	Peak
6	796.300	39.19	-6.81	46.00	42.89	20.75	5.07	29.51	---	---	QP

Note:

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

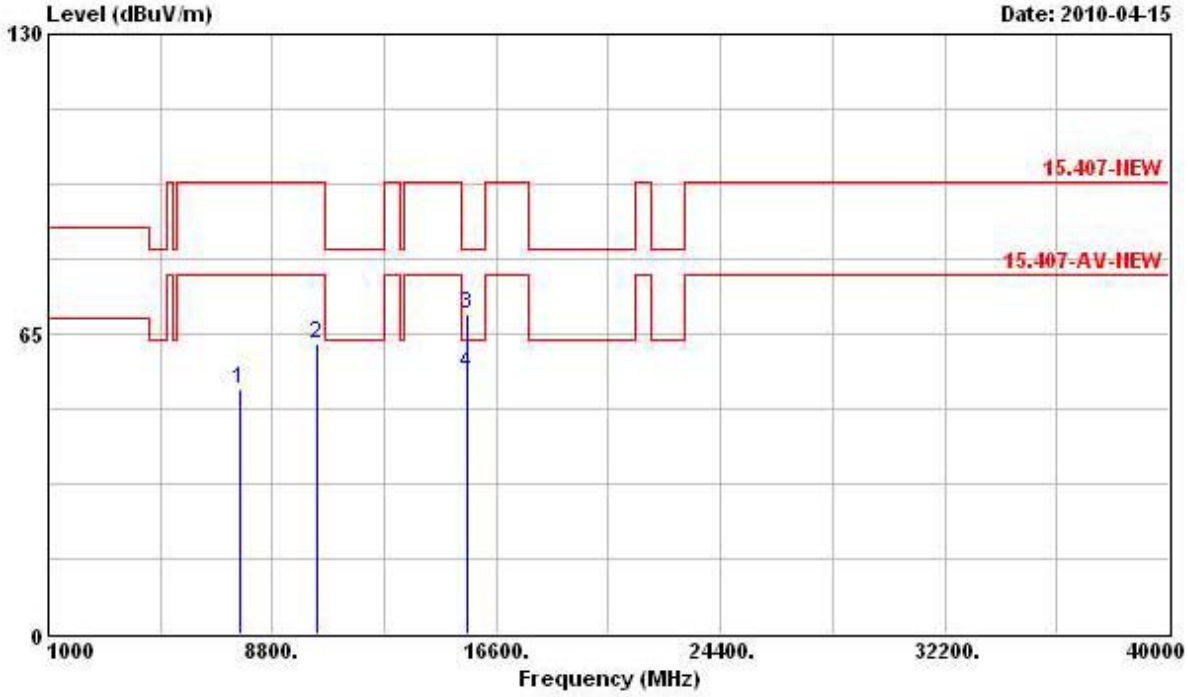
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.6.9 Results for Radiated Emissions (1GHz~40GHz)

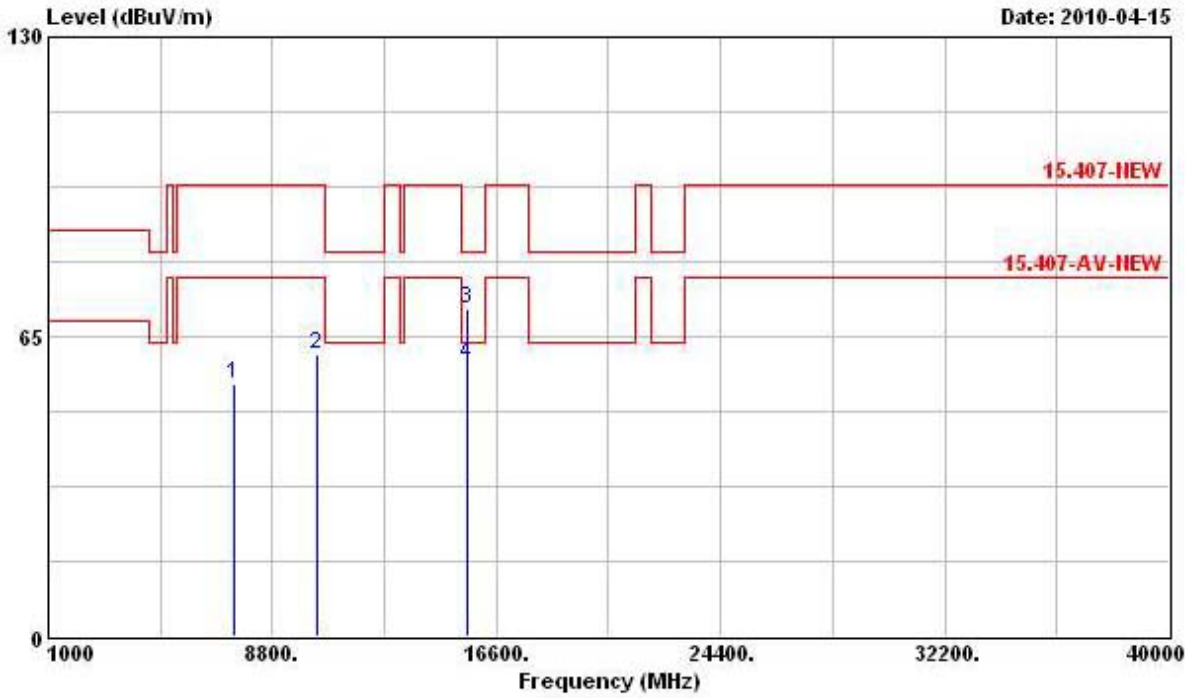
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5190 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7660.000	52.99	-24.85	77.84	43.60	38.00	5.71	34.32	PK
2	10380.000	62.79	-35.05	97.84	50.13	40.03	6.75	34.12	Peak
3	15570.000	69.08	-14.46	83.54	50.69	42.81	8.45	32.87	Peak
4	15570.000	56.31	-7.23	63.54	37.92	42.81	8.45	32.87	Average

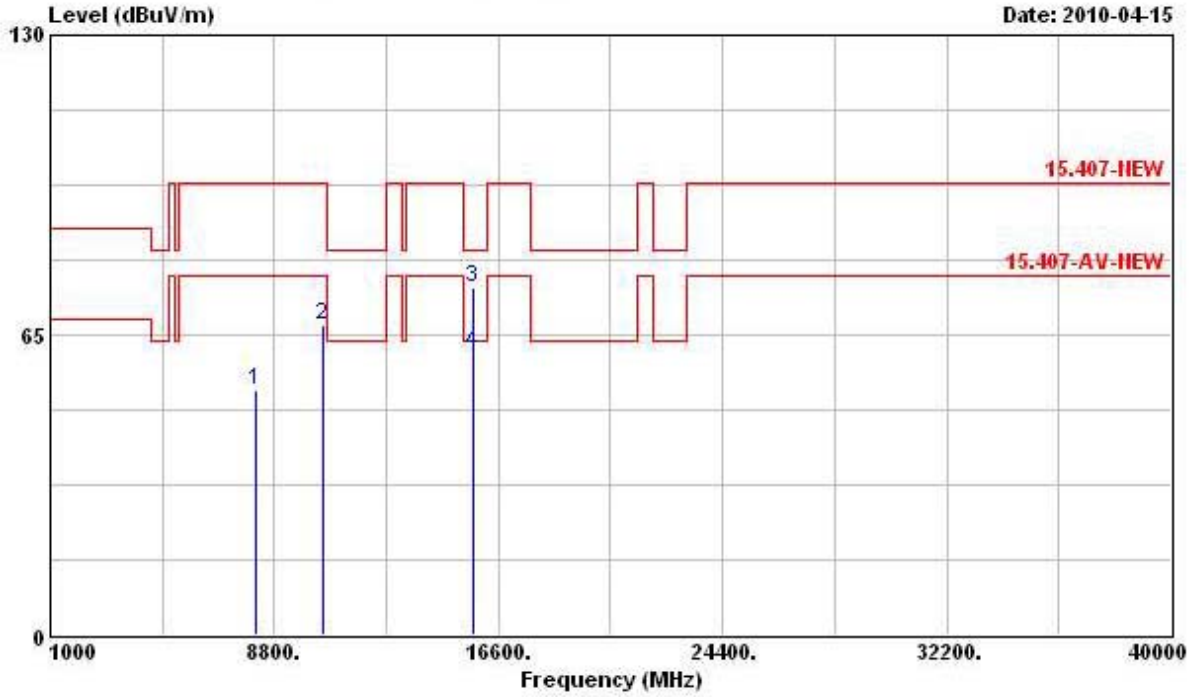
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7470.000	54.82	-23.02	77.84	45.55	37.90	5.66	34.29	PK
2	10380.000	61.31	-36.53	97.84	48.65	40.03	6.75	34.12	Peak
3	15570.000	71.08	-12.46	83.54	52.69	42.81	8.45	32.87	Peak
4	15570.000	59.08	-4.46	63.54	40.69	42.81	8.45	32.87	Average

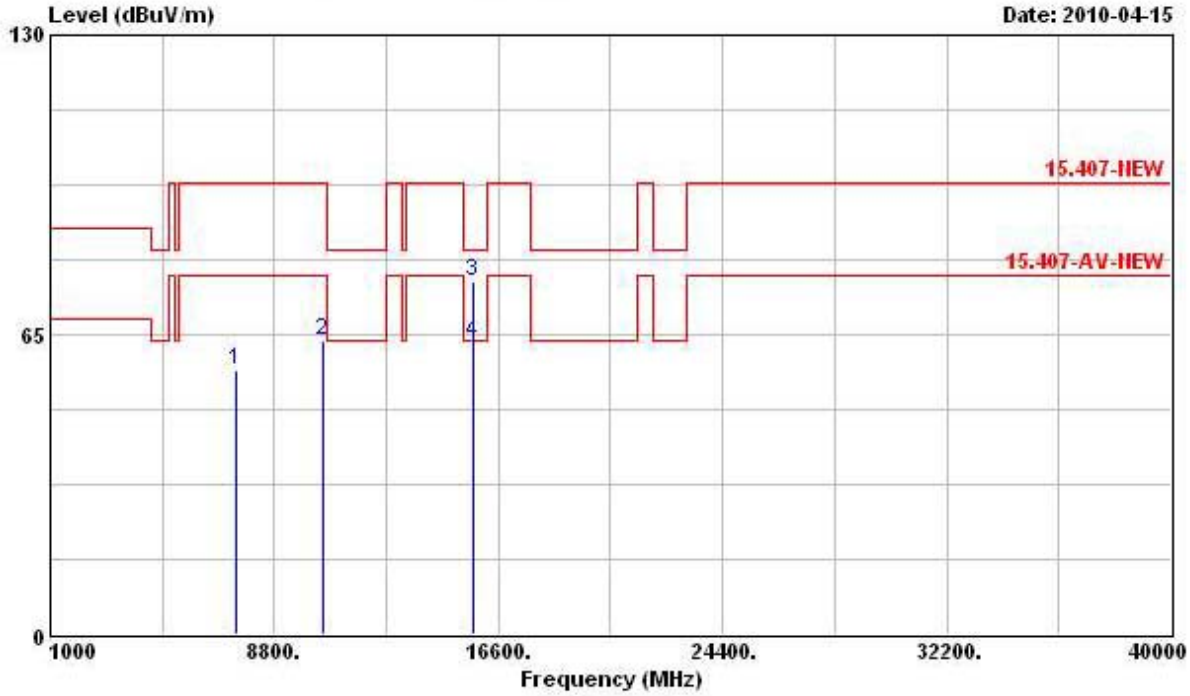
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5230 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8122.000	53.17	-24.67	77.84	43.39	38.27	5.84	34.33	PK
2	10460.000	67.25	-30.59	97.84	54.41	40.07	6.82	34.05	Peak
3	15690.000	75.48	-8.06	83.54	57.18	42.84	8.46	33.00	Peak
4	15690.000	61.02	-2.52	63.54	42.72	42.84	8.46	33.00	Average

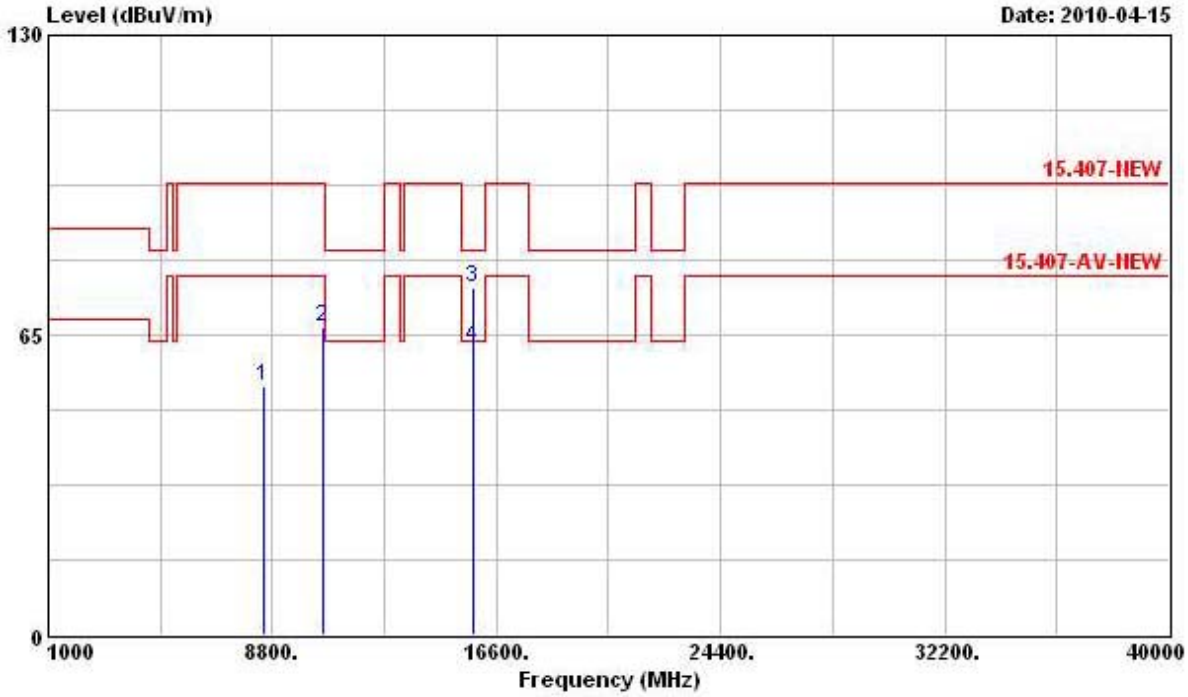
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7473.000	57.27	-20.57	77.84	48.00	37.90	5.66	34.29	PK
2	10460.000	63.61	-34.23	97.84	50.77	40.07	6.82	34.05	Peak
3	15690.000	76.74	-6.80	83.54	58.44	42.84	8.46	33.00	Peak
4	@15690.000	63.28	-0.26	63.54	44.98	42.84	8.46	33.00	Average

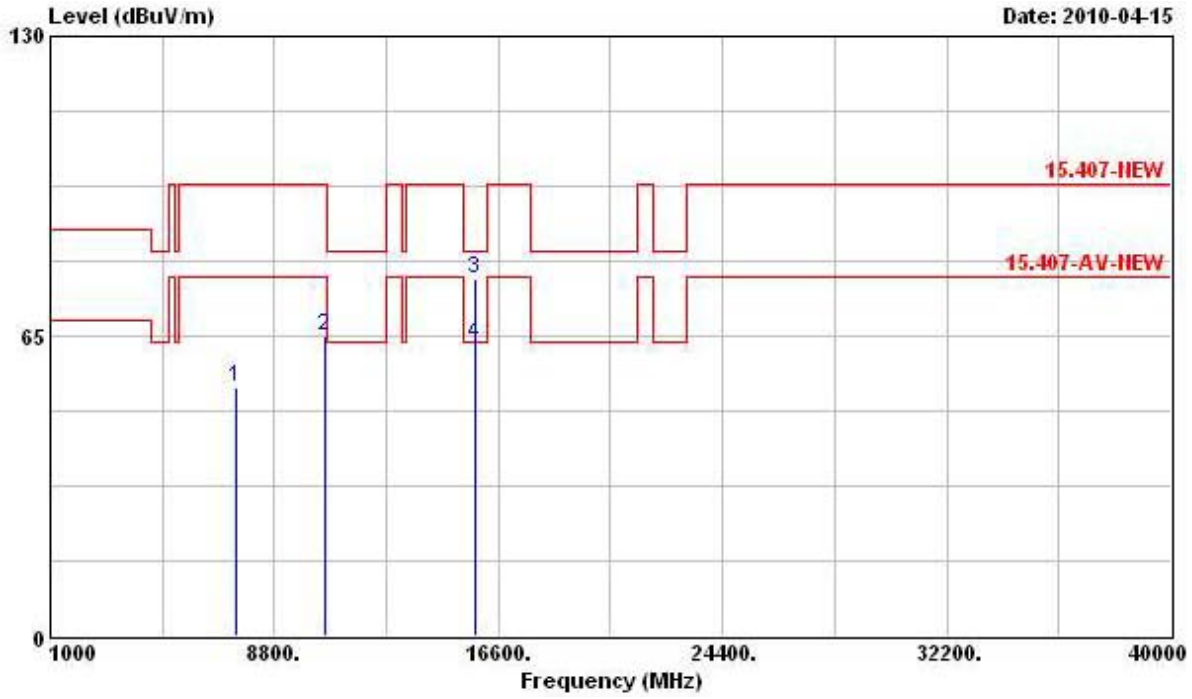
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5270 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8485.000	54.04	-23.80	77.84	43.81	38.49	5.94	34.20	PK
2	10540.000	66.56	-31.28	97.84	53.53	40.12	6.88	33.97	Peak
3	15810.000	75.31	-8.23	83.54	57.12	42.86	8.46	33.13	Peak
4	15810.000	62.40	-1.14	63.54	44.21	42.86	8.46	33.13	Average

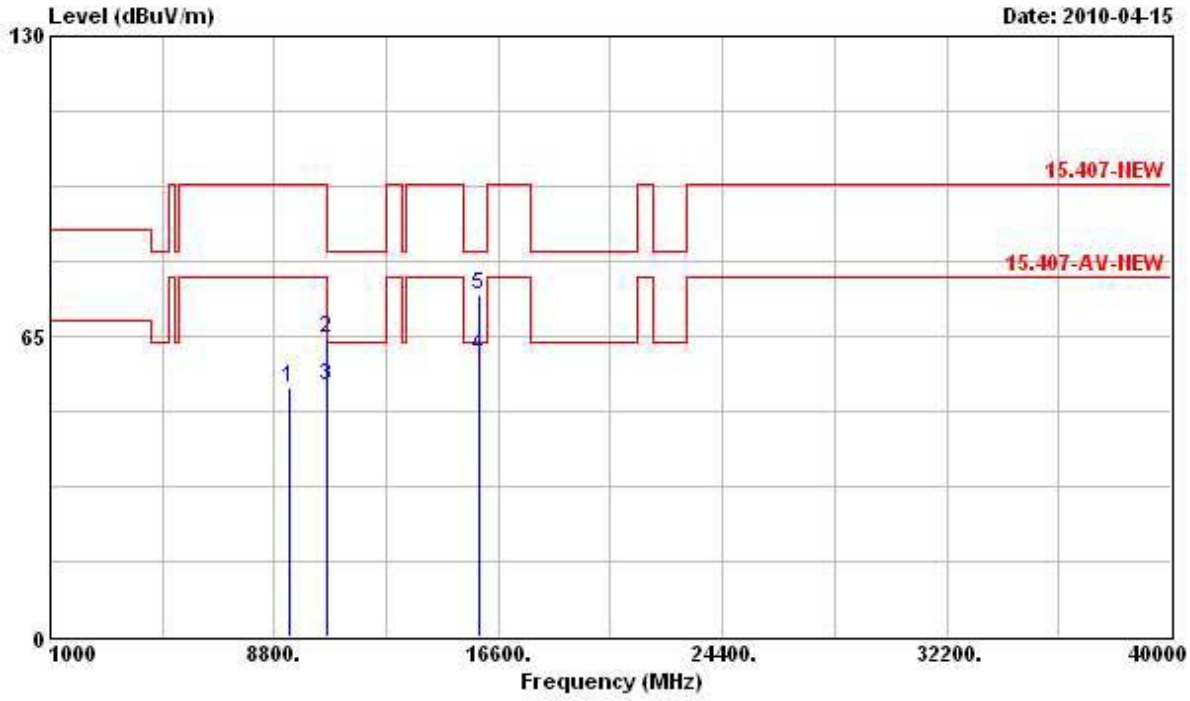
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7462.000	54.07	-23.77	77.84	44.81	37.89	5.66	34.29	PK
2	10540.000	65.02	-32.82	97.84	51.99	40.12	6.88	33.97	Peak
3	15810.000	77.49	-6.05	83.54	59.30	42.86	8.46	33.13	Peak
4	@15810.000	63.36	-0.18	63.54	45.17	42.86	8.46	33.13	Average

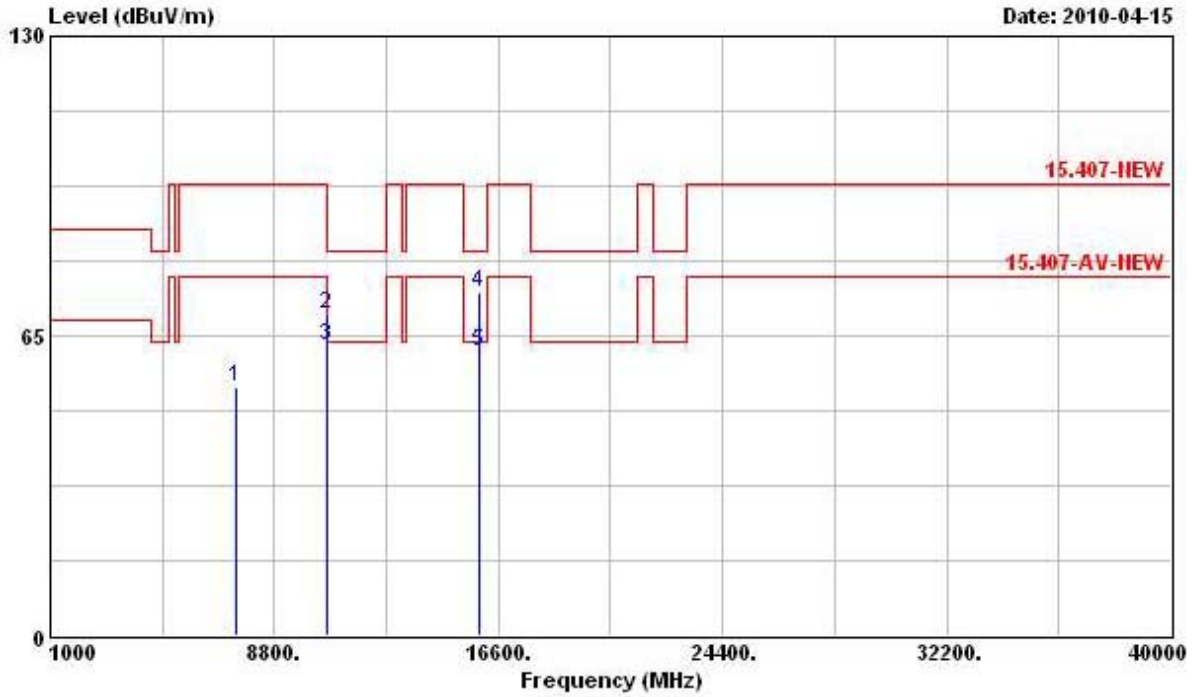
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5310 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	9321.000	53.83	-24.01	77.84	43.50	38.78	6.26	34.71	PK
2	10620.000	64.39	-19.15	83.54	51.16	40.17	6.93	33.87	Peak
3	10620.000	54.45	-9.09	63.54	41.22	40.17	6.93	33.87	Average
4	15930.000	60.79	-2.75	63.54	42.67	42.89	8.47	33.24	Average
5	15930.000	73.78	-9.76	83.54	55.66	42.89	8.47	33.24	Peak

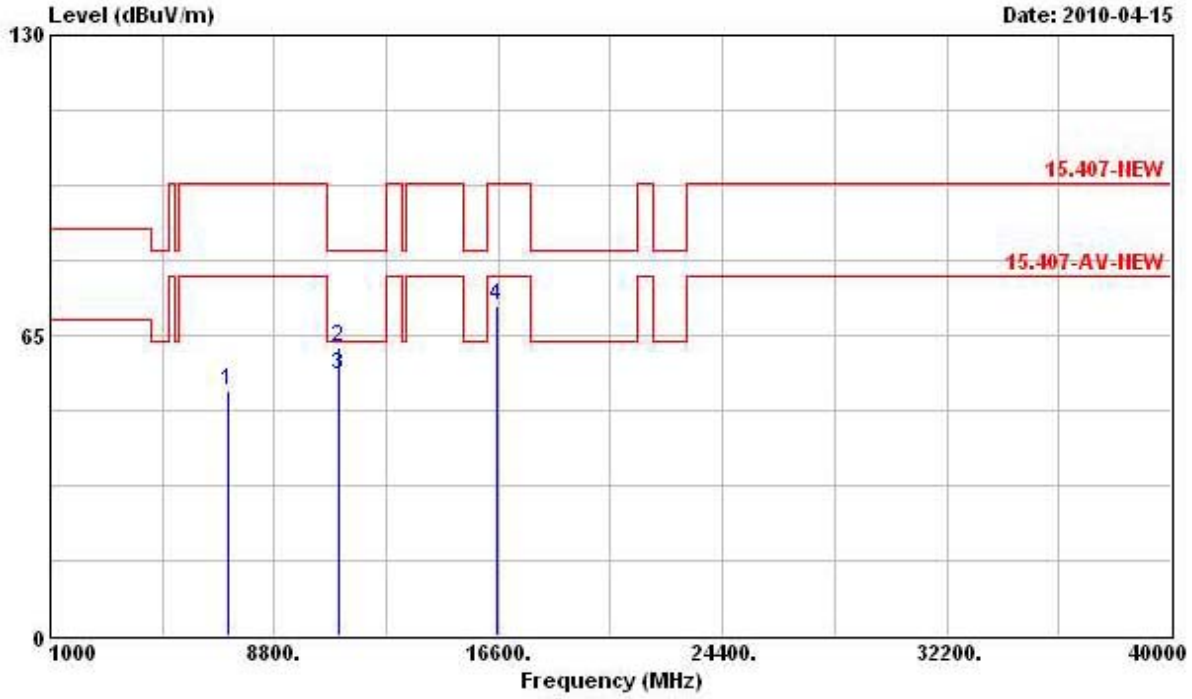
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7473.000	53.91	-23.93	77.84	44.64	37.90	5.66	34.29	PK
2	10620.000	69.78	-13.76	83.54	56.55	40.17	6.93	33.87	Peak
3	@10620.000	62.81	-0.73	63.54	49.58	40.17	6.93	33.87	Average
4	15930.000	74.60	-8.94	83.54	56.48	42.89	8.47	33.24	Peak
5	15930.000	61.63	-1.91	63.54	43.51	42.89	8.47	33.24	Average

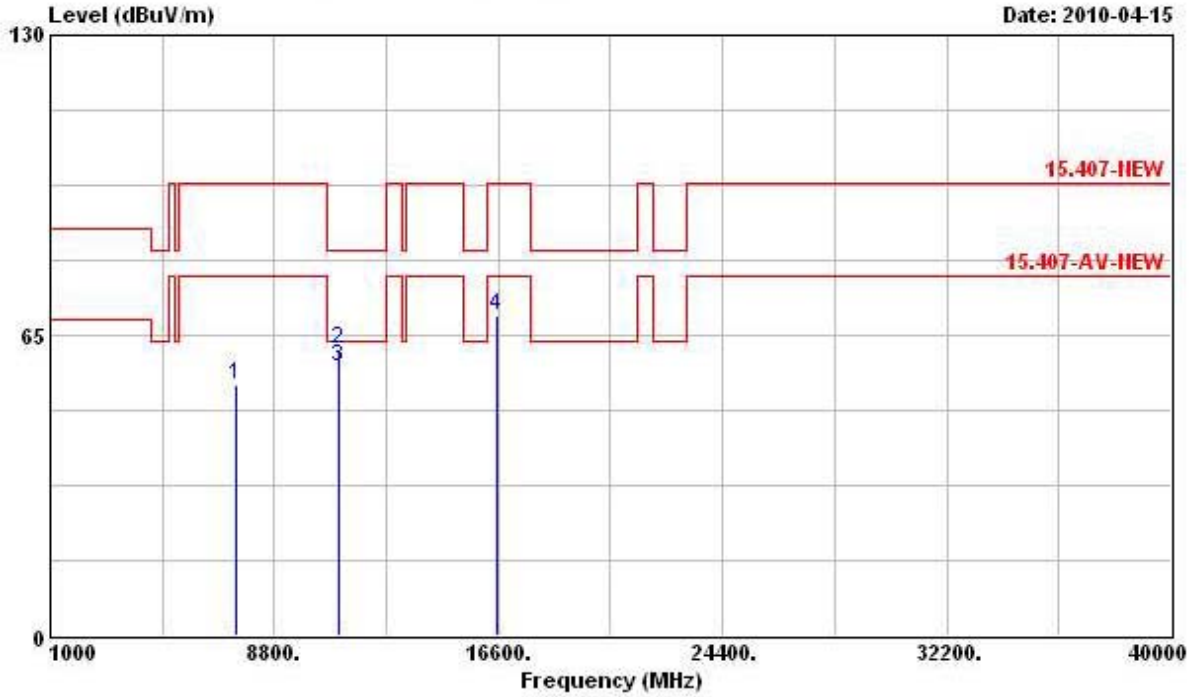
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5510 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7198.000	53.15	-44.69	97.84	43.98	37.84	5.62	34.29	Peak
2	11020.000	62.38	-21.16	83.54	48.24	40.41	7.13	33.40	Peak
3	11020.000	56.35	-7.19	63.54	42.21	40.41	7.13	33.40	Average
4	16530.000	71.42	-6.42	77.84	52.40	43.51	8.27	32.76	PK

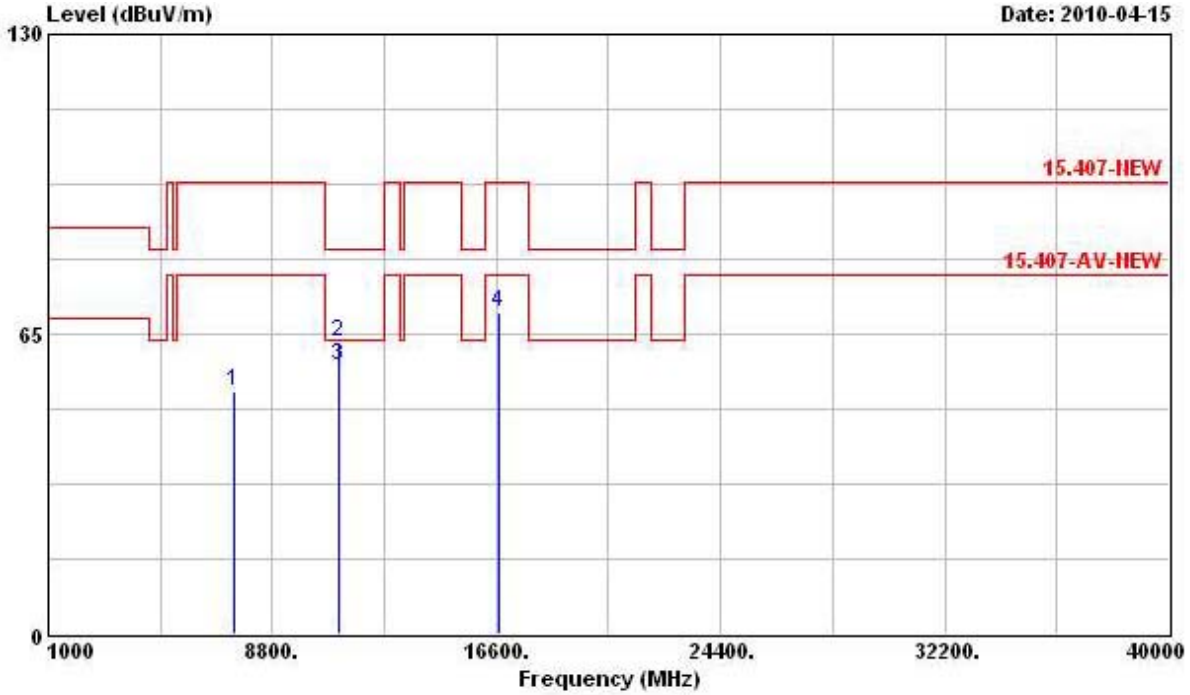
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7462.000	54.30	-23.54	77.84	45.04	37.89	5.66	34.29	PK
2	11020.000	62.16	-21.38	83.54	48.02	40.41	7.13	33.40	Peak
3	11020.000	58.15	-5.39	63.54	44.01	40.41	7.13	33.40	Average
4	16530.000	69.34	-8.50	77.84	50.32	43.51	8.27	32.76	PK

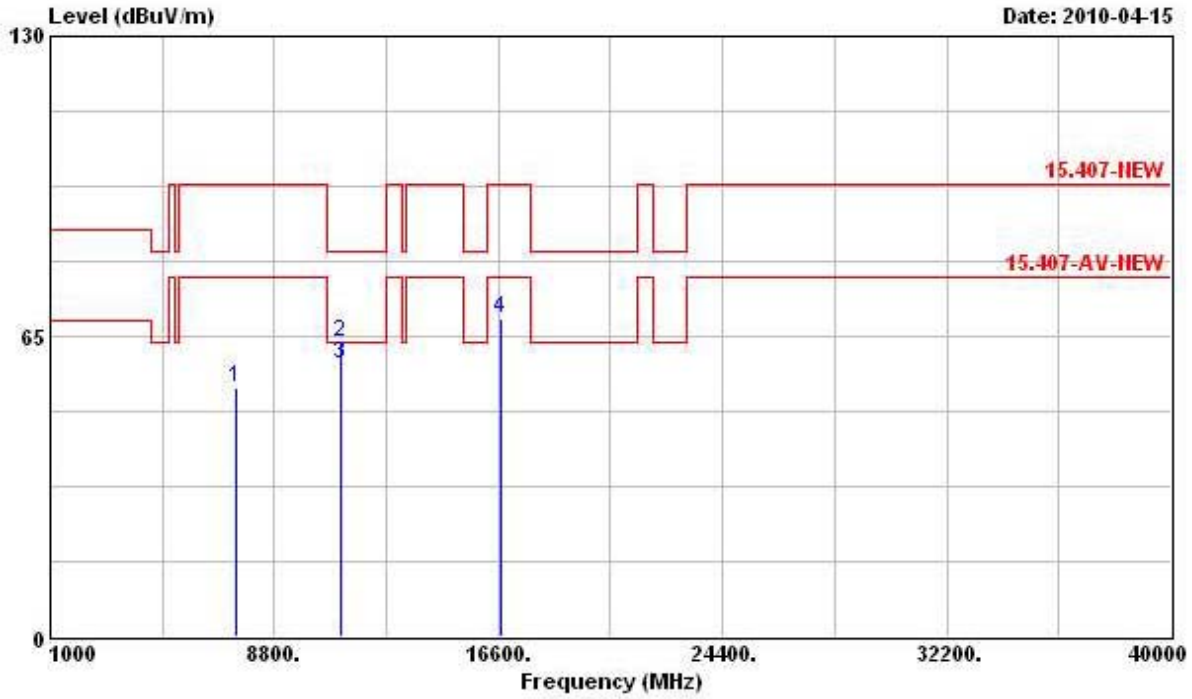
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5550 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7462.000	52.49	-25.35	77.84	43.23	37.89	5.66	34.29	PK
2	11100.000	63.20	-20.34	83.54	49.15	40.44	7.05	33.44	Peak
3	11100.000	58.09	-5.45	63.54	44.04	40.44	7.05	33.44	Average
4	16650.000	69.89	-7.95	77.84	50.60	43.56	8.37	32.64	PK

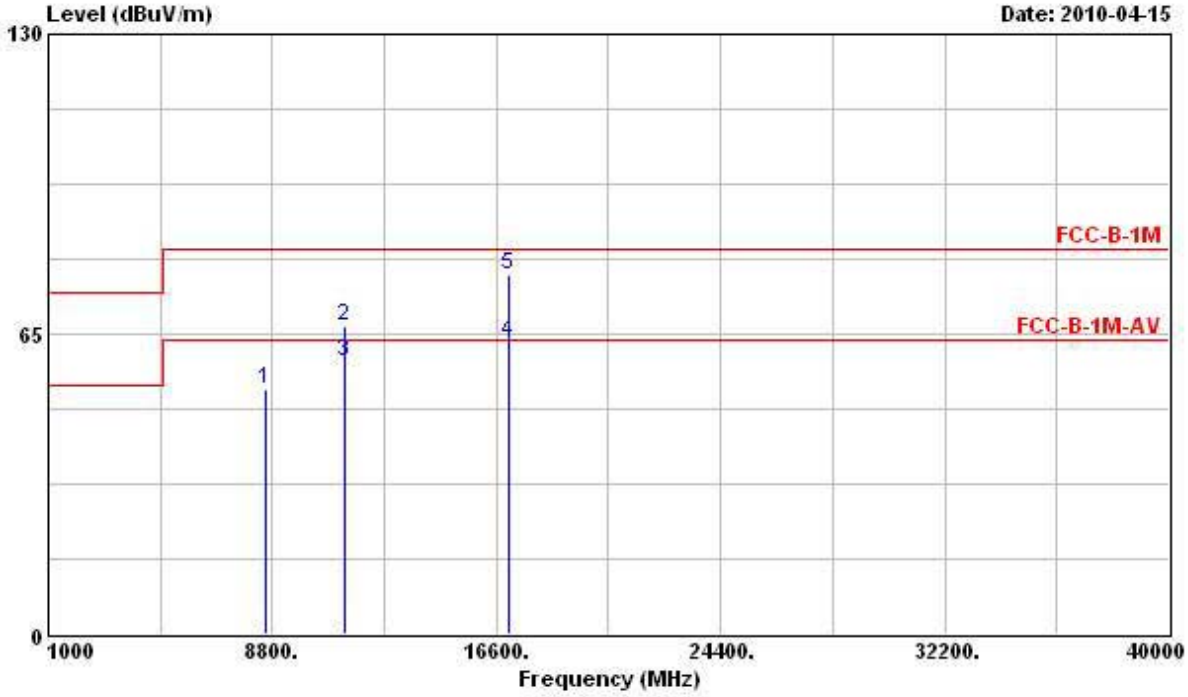
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7462.000	53.69	-24.15	77.84	44.43	37.89	5.66	34.29	PK
2	11100.000	63.91	-19.63	83.54	49.86	40.44	7.05	33.44	Peak
3	11100.000	59.09	-4.45	63.54	45.04	40.44	7.05	33.44	Average
4	16650.000	68.70	-9.14	77.84	49.41	43.56	8.37	32.64	PK

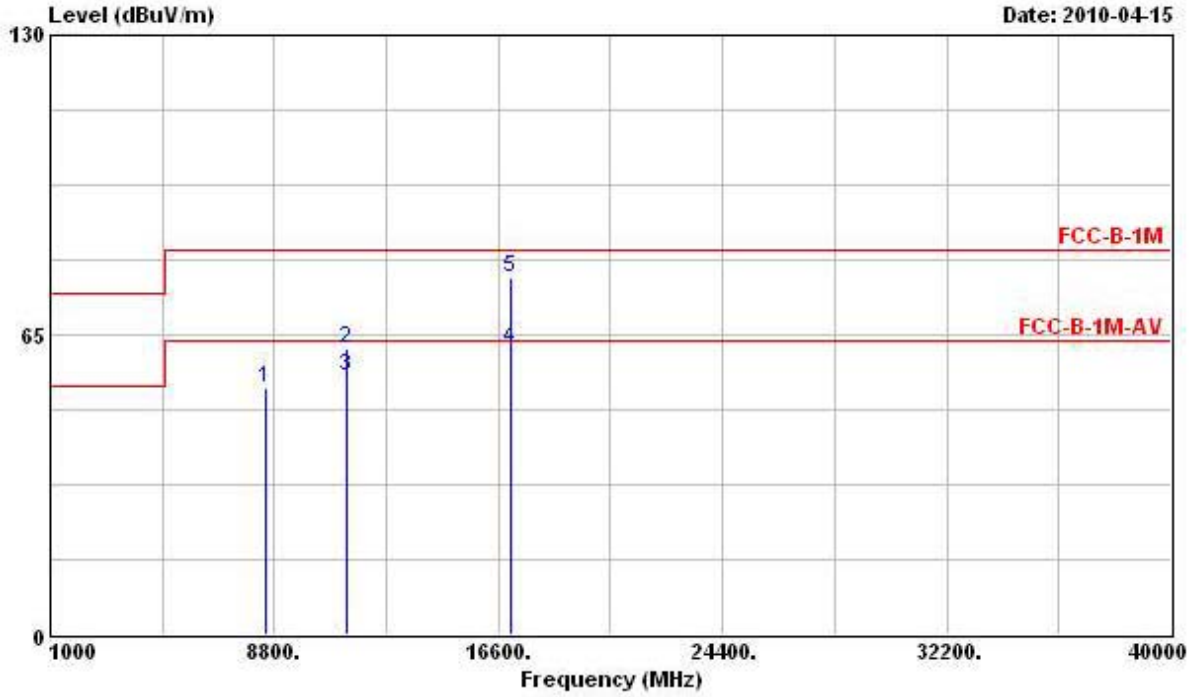
Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) 5670 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8562.000	53.00	-30.54	83.54	42.86	38.45	5.97	34.28	Peak
2	11340.000	66.78	-16.76	83.54	53.01	40.53	6.80	33.56	Peak
3	11340.000	59.10	-4.44	63.54	45.33	40.53	6.80	33.56	Average
4	@17010.000	63.33	-0.21	63.54	43.30	43.69	8.65	32.31	Average
5	17010.000	77.68	-5.86	83.54	57.65	43.69	8.65	32.31	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8529.000	53.34	-30.20	83.54	43.14	38.47	5.96	34.23	Peak
2	11340.000	62.10	-21.44	83.54	48.33	40.53	6.80	33.56	Peak
3	11340.000	55.89	-7.65	63.54	42.12	40.53	6.80	33.56	Average
4	17010.000	61.86	-1.68	63.54	41.83	43.69	8.65	32.31	Average
5	17010.000	77.52	-6.02	83.54	57.49	43.69	8.65	32.31	Peak

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.7 Band Edge and Fundamental Emissions Measurement

3.7.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

3.7.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1 MHz /1 MHz for Peak

3.7.3 Test Procedures

1. The test procedure is the same as section 3.6.3, only the frequency range investigated is limited to 100MHz around band edges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

3.7.4 Test Setup Layout

This test setup layout is the same as that shown in section 3.6.4.

3.7.5 Test Deviation

There is no deviation with the original standard.

3.7.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.7.7 Test Result of Band Edge and Fundamental Emissions

Final Test Date	Apr. 15, 2010	Test Site No.	03CH02-HY
Temperature	25.9℃	Humidity	64%
Test Engineer	Billy	Configuration	OFDM (40MHz)

5190 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	5149.990	74.39	-9.15	83.54	33.40	36.21	4.78	0.00	Peak
2 X	5176.650	114.81			73.75	36.26	4.80	0.00	Peak
1	5149.990	62.30	-1.24	63.54	21.31	36.21	4.78	0.00	Average
2 @	5189.850	101.51			60.45	36.26	4.80	0.00	Average

The item 2 is Fundamental Emissions.

5230 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	5138.750	74.51	-9.03	83.54	33.54	36.19	4.78	0.00	Peak
2 X	5233.750	118.25			77.10	36.33	4.82	0.00	Peak
1	5148.500	60.50	-3.04	63.54	19.51	36.21	4.78	0.00	Average
2 @	5229.750	108.96			67.82	36.33	4.81	0.00	Average

The item 2 is Fundamental Emissions.

5270 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	5110.200	72.78	-10.76	83.54	31.85	36.16	4.77	0.00	
2 X	5286.600	115.44			74.20	36.40	4.84	0.00	Peak
3	5382.900	73.39	-10.15	83.54	31.98	36.54	4.87	0.00	
1	5140.200	59.60	-3.94	63.54	18.61	36.21	4.78	0.00	Average
2 @	5263.800	102.85			61.66	36.37	4.82	0.00	Average
3	5399.700	60.14	-3.40	63.54	18.70	36.56	4.88	0.00	Average

The item 2 is Fundamental Emissions.

Final Test Date	Apr. 15, 2010	Test Site No.	03CH02-HY
Temperature	25.9℃	Humidity	64%
Test Engineer	Billy	Configuration	OFDM (40MHz)

5310 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	5306.100	115.71			74.45	36.42	4.84	0.00	Peak
2	5350.100	82.21	-1.33	83.54	40.85	36.49	4.87	0.00	Peak
1 @	5307.300	103.16			61.90	36.42	4.84	0.00	Average
2	5350.100	62.16	-1.38	63.54	20.80	36.49	4.87	0.00	Average

The item 1 is Fundamental Emissions.

5510 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	5458.180	74.75	-8.79	83.54	33.22	36.63	4.90	0.00	Peak
2 X	5509.850	117.43			75.80	36.70	4.93	0.00	Peak
1	5459.990	61.06	-2.48	63.54	19.53	36.63	4.90	0.00	Average
2 @	5509.850	114.73			73.10	36.70	4.93	0.00	Average

The item 2 is Fundamental Emissions.

5550 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	5451.680	72.96			31.43	36.63	4.90	0.00	Peak
1	5411.380	60.14			18.70	36.56	4.88	0.00	Average

The item 1 is Fundamental Emissions.

Final Test Date	Apr. 15, 2010	**Test Site No.**	03CH02-HY
Temperature	25.9℃	**Humidity**	64%
Test Engineer	Billy	**Configuration**	OFDM (40MHz) Ch. 134

Channel 134

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	5669.800	114.26			72.33	36.91	5.02	0.00	Peak
1 @	5669.800	104.74			62.81	36.91	5.02	0.00	Average

The item 1 is Fundamental Emissions.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.8 Frequency Stability Measurement

3.8.1 Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or ±20ppm (IEEE 802.11a specification).

3.8.2 Measuring Instruments and Setting

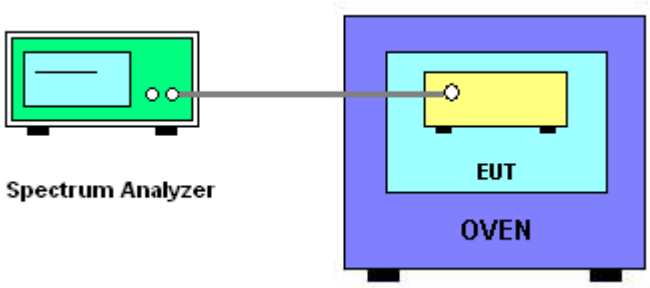
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RB	10 kHz
VB	10 kHz
Sweep Time	Auto

3.8.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11a specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -30°C~50°C.
8. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

3.8.4 Test Setup Layout



3.8.5 Test Deviation

There is no deviation with the original standard.

3.8.6 EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

3.8.7 Test Result of Frequency Stability

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5310 MHz(40MHz)	5510 MHz(40MHz)
126.5	5309.994600	5509.993400
110	5309.996400	5509.992800
93.5	5309.992800	5509.998200
Max. Deviation (MHz)	**0.007200**	**0.007200**
Max. Deviation (ppm)	**1.36**	**1.31**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(℃)	5310 MHz(40MHz)	5510 MHz(40MHz)
-30	-	-
-20	5310.028000	5510.032000
-10	5310.010200	5510.005400
0	5310.008400	5510.007800
10	5309.997000	5509.995200
20	5309.996400	5509.992800
30	5309.999400	5510.000600
40	5310.009600	5510.009000
50	5310.050000	5510.046200
Max. Deviation (MHz)	**0.050000**	**0.046200**
Max. Deviation (ppm)	**9.42**	**8.3848**

3.9 Antenna Requirements

3.9.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.9.2 Antenna Connector Construction

Please refer to section 2.2 in this test report; antenna connector complied with the requirements.

4 LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Sep. 01, 2009	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Jan. 19, 2010	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Mar. 01, 2010	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz – 30MHz	May 05, 2010	Conduction (CO01-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	Conduction (CO01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 12, 2010	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 24, 2010	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2009*	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is two year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz - 40GHz	Feb. 02, 2010	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 01, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 07, 2009	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 16, 2009	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Oct. 22, 2009	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 26, 2010	Radiation (03CH02-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX106	03CH02-HY	1GHz~40GHz	Feb. 26, 2010	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz - 2 GHz	Nov. 30, 2009	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.

5 TEST LOCATION

SHIJR	ADD	: 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	: 886-2-2696-2468
	FAX	: 886-2-2696-2255
HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	: 886-3-327-3456
	FAX	: 886-3-318-0055
LINKOU	ADD	: No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	: 886-2-2601-1640
	FAX	: 886-2-2601-1695
DUNGHU	ADD	: No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	: 886-2-2631-4739
	FAX	: 886-2-2631-9740
JUNGHE	ADD	: 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	: 886-2-8227-2020
	FAX	: 886-2-8227-2626
NEIHU	ADD	: 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	: 886-2-2794-8886
	FAX	: 886-2-2794-9777
JHUBEI	ADD	: No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	: 886-3-656-9065
	FAX	: 886-3-656-9085

6 TAF CERTIFICATE OF 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 Arrangment with Foreign Authorities

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

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