



SPORTON International Inc.

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FCC RADIO TEST REPORT

Applicant's company	AboCom Systems, Inc.
Applicant Address	No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.
FCC ID	MQ4WU5204
Manufacturer's company	AboCom Systems, Inc.
Manufacturer Address	No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.

Product Name	802.11 b/g/n Mini Wireless LAN USB 2.0 Adapter
Brand Name	AboCom, PCI
Model Name	WU5204 ,GW-USMini2N
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Jun. 06, 2008
Final Test Date	Jun. 24, 2008
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7



Statement

Test result included is only for the Draft n part 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 C**.

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



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History of This Test Report

Original Issue Date: Jul. 04, 2008

Report No.: FR860629AA

No additional attachment.

Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



1. CERTIFICATE OF COMPLIANCE

Product Name : 802.11 b/g/n Mini Wireless LAN USB 2.0 Adapter
Brand Name : AboCom, PCI
Model Name : WU5204 ,GW-USMini2N
Applicant : AboCom Systems, Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jun. 06, 2008 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
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	11.22 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	11.22 dB
4.3	15.247(e)	Power Spectral Density	Complies	19.27 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	6.18 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.16 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻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°C	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	see the below table for draft n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for Draft n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz) : 17.44 MHz MCS0 (40MHz) : 35.60 MHz
Conducted Output Power	MCS0 (20MHz) : 18.78 dBm MCS0 (40MHz) : 17.23 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)	
Band width Mode	20 MHz	40 MHz
Draft n	V	V

Draft n spec

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Data rate(Mbps)	
					20MHz	40MHz	20MHz	40MHz	800nsGI	
									20MHz	40MHz
0	1	BPSK	$\frac{1}{2}$	1	52	108	26	54	6.5	13.5
1	1	QPSK	$\frac{1}{2}$	2	104	216	52	108	13.0	27.0
2	1	QPSK	$\frac{3}{4}$	2	104	216	78	162	19.5	40.5
3	1	16-QAM	$\frac{1}{2}$	4	208	432	104	216	26.0	54.0
4	1	16-QAM	$\frac{3}{4}$	4	208	432	156	324	39.0	81.0
5	1	64-QAM	$\frac{2}{3}$	6	312	648	208	432	52.0	108.0
6	1	64-QAM	$\frac{3}{4}$	6	312	648	234	486	58.5	121.5
7	1	64-QAM	$\frac{5}{6}$	6	312	648	260	540	65.0	135.0

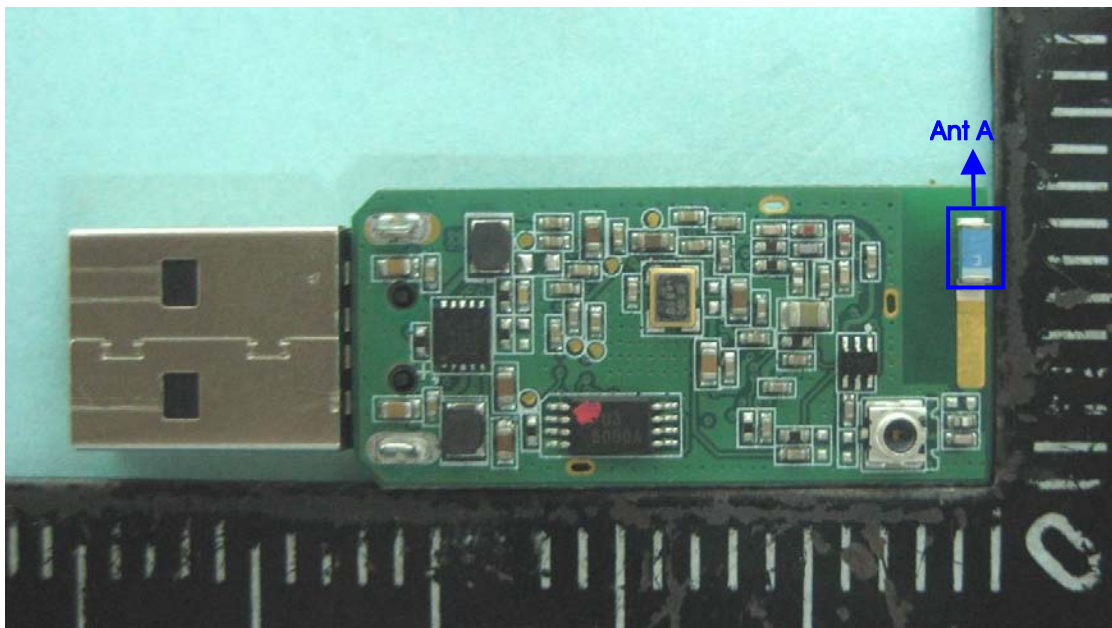
Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A	Walsin	RFANT3216120A5T	Chip Antenna	N/A	2	TX / RX Ant.



3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 1~Channel 11.

For both 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz		

3.5. 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 all the possible configurations 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	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Peak Conducted Output Power	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
Power Spectral Density 6dB Spectrum Bandwidth	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10 th Harmonic	MCS0/20MHz	6.5 Mbps	1/6/11	A
	MCS0/40MHz	13.5 Mbps	3/6/9	A
Band Edge Emissions	MCS0/20MHz	6.5 Mbps	1/11	A
	MCS0/40MHz	13.5 Mbps	3/9	A

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

3.7. Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Manufacturer
AboCom	WU5204	AboCom Systems, Inc.
PCI	GW-USMini2N	AboCom Systems, Inc.

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	E2KWM3945ABG
Mouse	QSKY	Lx-619B	DoC
Wireless AP	Planex	GW-AP54SGX	N/A

3.9. 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 Draft n MCS0 20MHz

Test Software Version	RALINK QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
Draft n	1B	1F	1C

Power Parameters of Draft n MCS0 40MHz

Test Software Version	RALINK QA		
Frequency	2422 MHz	2437 MHz	2452 MHz
Draft n	17	1B	18

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

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The NB sends " H " messages to the panel, and the panel displays " H " patterns on the screen.
- d. Repeat the steps from b to b.

At the same time, the following programs were executed:

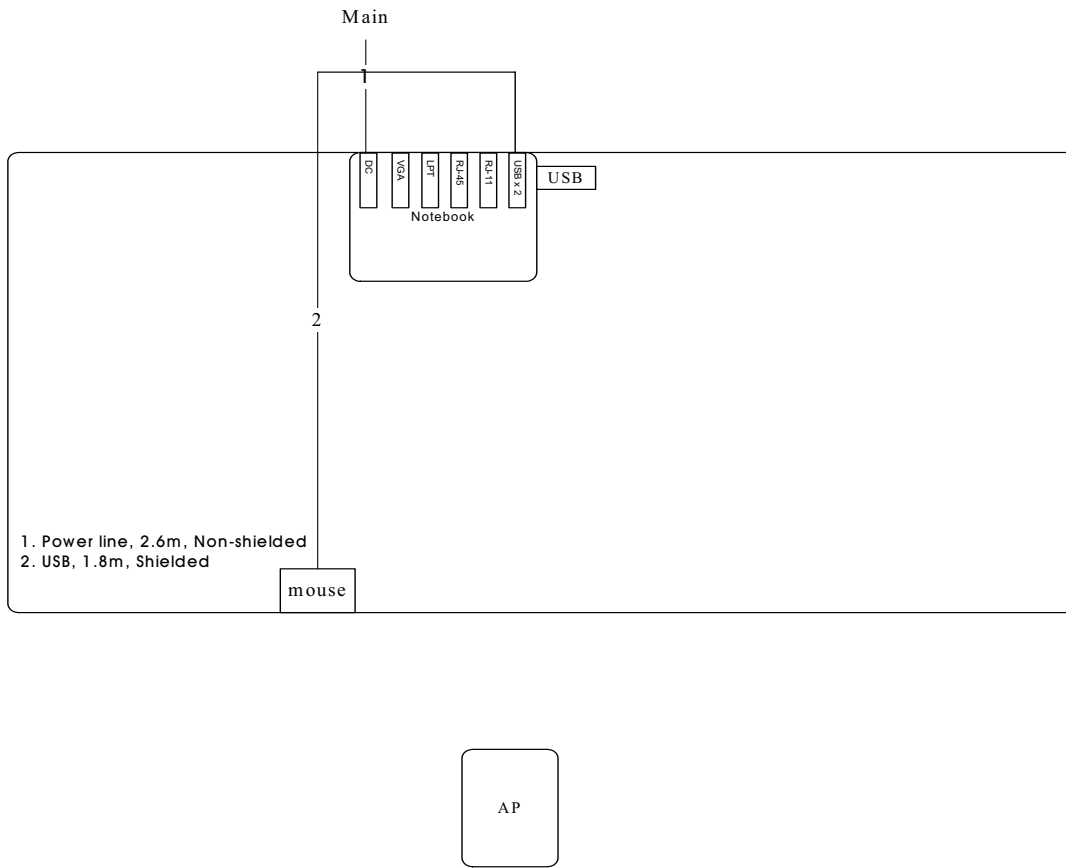
Executed "ping.exe" to link with the remote workstation to receive and transmit signal by WLAN.

Executed "RALINK QA" to control the EUT continuously transmit RF signal.

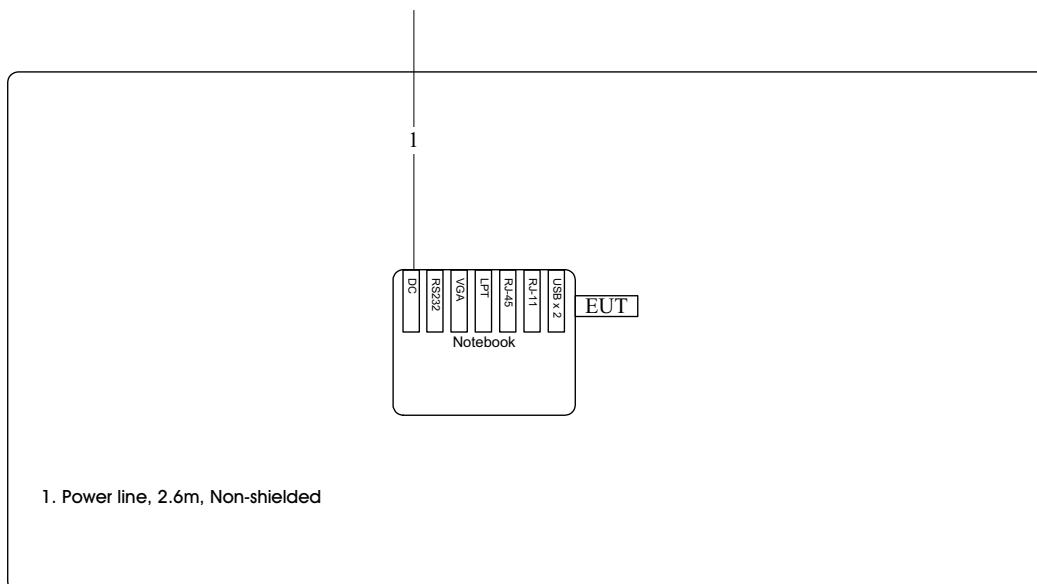
3.10. Test Configurations

3.10.1. Radiation Emissions Test Configuration

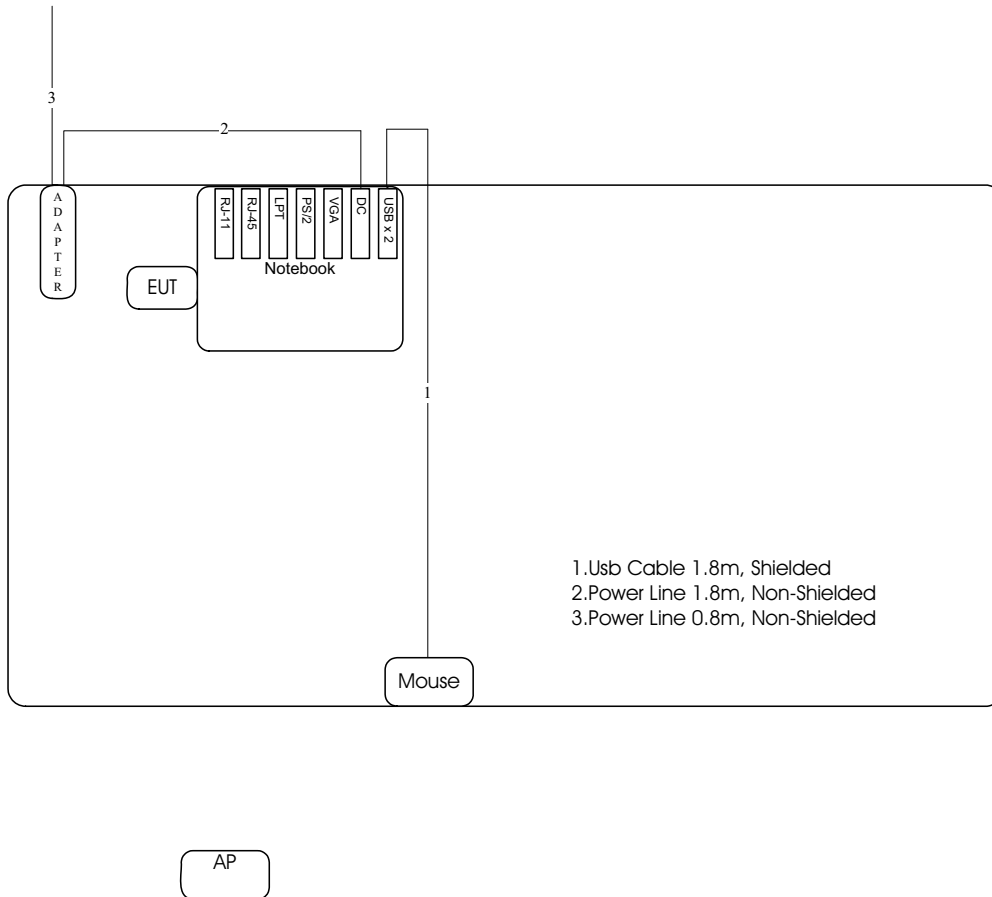
Test Configuration: 9KHz~1GHz



Test Configuration: Above 1GHz



3.10.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product which is designed to be connected 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.

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

4.1.2. Measuring Instruments and Setting

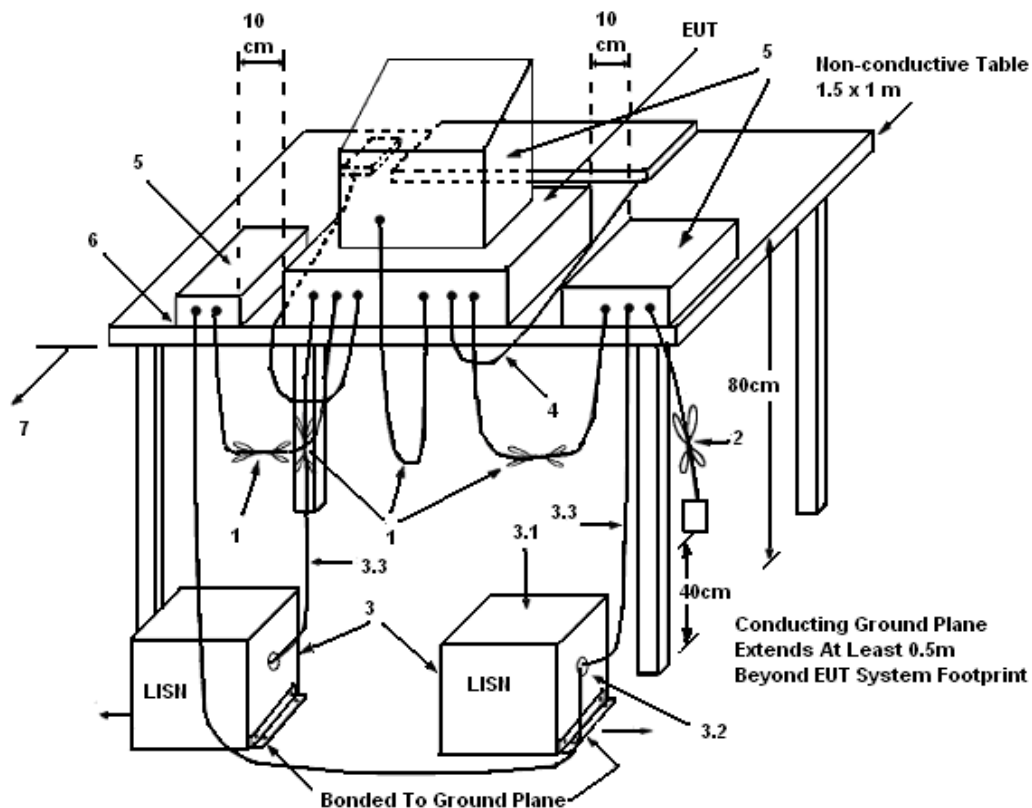
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. 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.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. 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 50Ω . 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.

4.1.5. Test Deviation

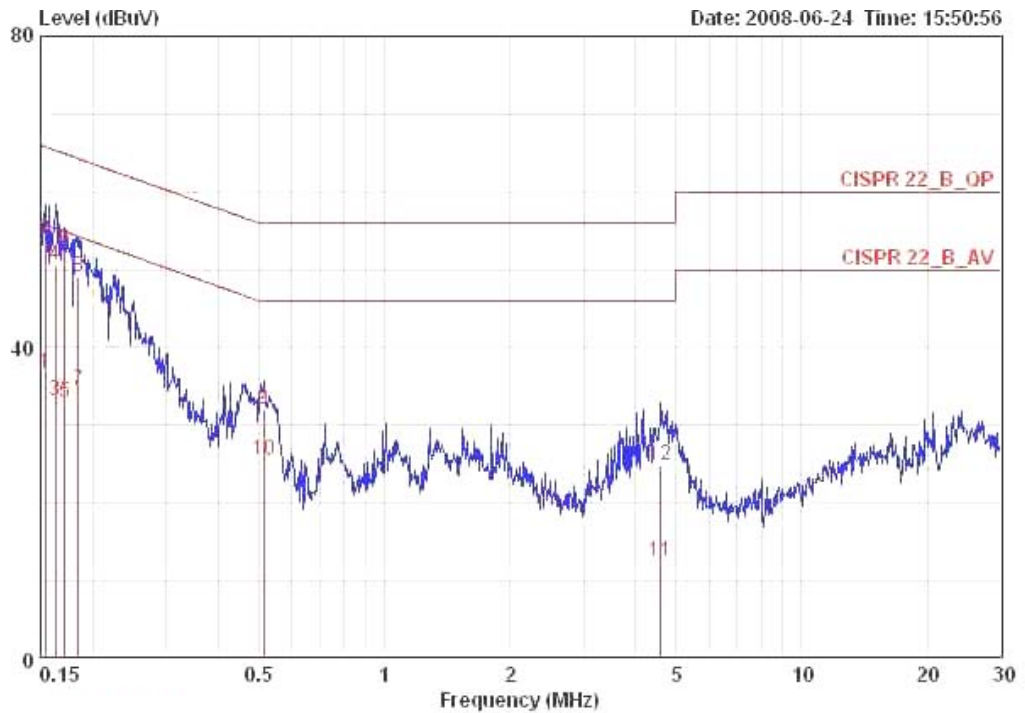
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

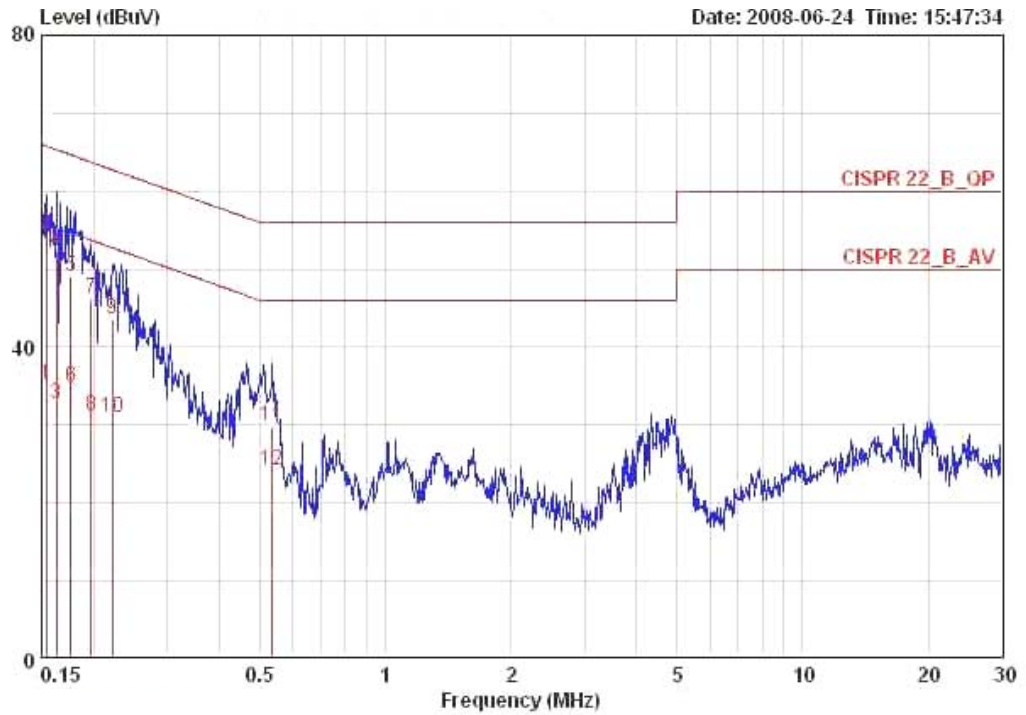
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.15403	36.60	-19.18	55.78	36.20	0.20	0.20	AVERAGE
2 @	0.15403	53.88	-11.90	65.78	53.48	0.20	0.20	QP
3	0.16241	33.08	-22.26	55.34	32.68	0.20	0.20	AVERAGE
4	0.16241	50.65	-14.69	65.34	50.25	0.20	0.20	QP
5	0.17125	32.85	-22.05	54.90	32.50	0.15	0.20	AVERAGE
6	0.17125	52.53	-12.37	64.90	52.18	0.15	0.20	QP
7	0.18443	34.40	-19.88	54.28	34.05	0.15	0.20	AVERAGE
8	0.18443	49.13	-15.15	64.28	48.78	0.15	0.20	QP
9	0.51278	32.04	-23.96	56.00	31.76	0.08	0.20	QP
10	0.51278	25.47	-20.53	46.00	25.19	0.08	0.20	AVERAGE
11	4.598	12.33	-33.67	46.00	12.02	0.01	0.30	AVERAGE
12	4.598	24.78	-31.22	56.00	24.47	0.01	0.30	QP

Temperature	23°C	Humidity	54%
Test Engineer	Rex Chiu	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15403	35.19	-20.59	55.78	34.69	0.30	0.20	AVERAGE
2	0.15403	54.56	-11.22	65.78	54.06	0.30	0.20	QP
3	0.16241	32.67	-22.67	55.34	32.17	0.30	0.20	AVERAGE
4	0.16241	52.26	-13.08	65.34	51.76	0.30	0.20	QP
5	0.17584	49.02	-15.66	64.68	48.57	0.25	0.20	QP
6	0.17584	34.78	-19.90	54.68	34.33	0.25	0.20	AVERAGE
7	0.19758	46.16	-17.55	63.71	45.76	0.20	0.20	QP
8	0.19758	31.11	-22.60	53.71	30.71	0.20	0.20	AVERAGE
9	0.22201	43.61	-19.13	62.74	43.21	0.20	0.20	QP
10	0.22201	30.89	-21.85	52.74	30.49	0.20	0.20	AVERAGE
11	0.53498	29.81	-26.19	56.00	29.51	0.10	0.20	QP
12	0.53498	24.29	-21.71	46.00	23.99	0.10	0.20	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1 dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

4.2.2. Measuring Instruments and Setting

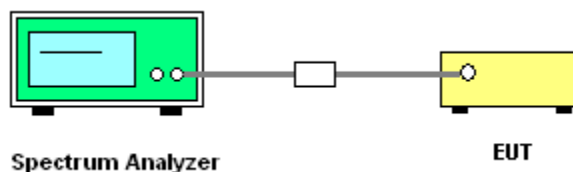
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	Draft n

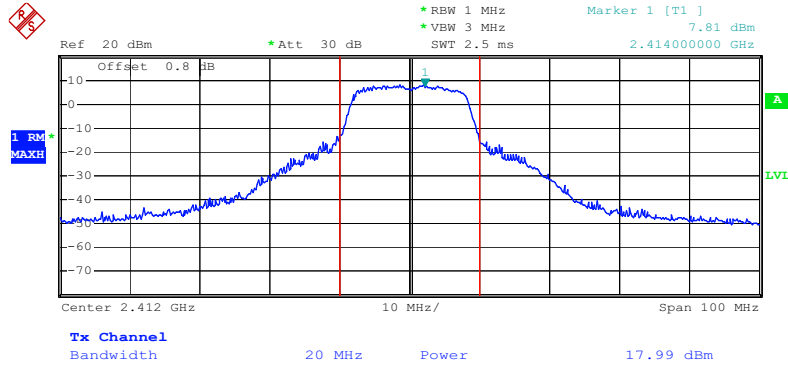
Configuration Draft n MCS0 20MHz

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.99	30.00	Complies
6	2437 MHz	18.78	30.00	Complies
11	2462 MHz	17.37	30.00	Complies

Configuration Draft n MCS0 40MHz

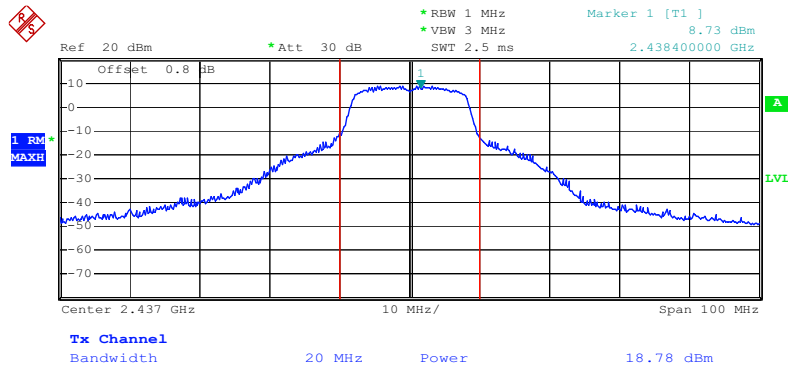
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	15.44	30.00	Complies
6	2437 MHz	17.23	30.00	Complies
9	2452 MHz	15.50	30.00	Complies

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz / 2412 MHz



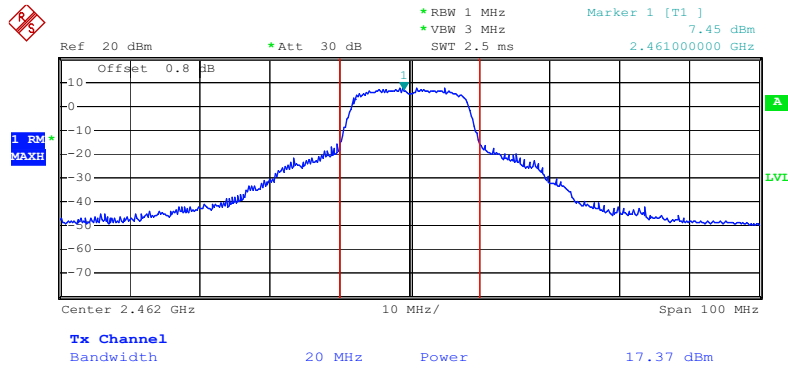
Date: 14.JUN.2008 13:38:04

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz / 2437 MHz



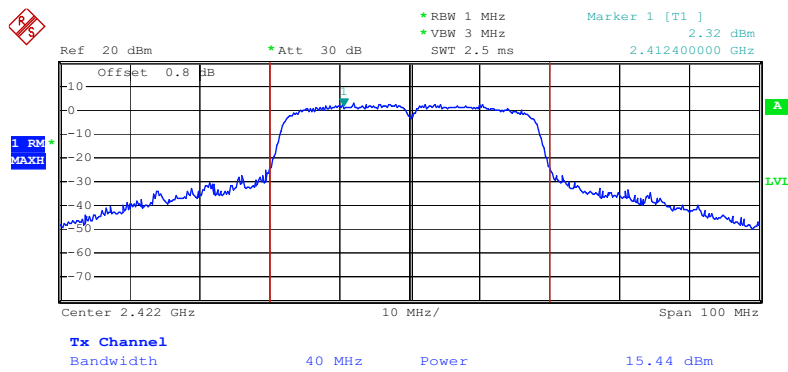
Date: 14.JUN.2008 13:38:46

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz / 2462 MHz



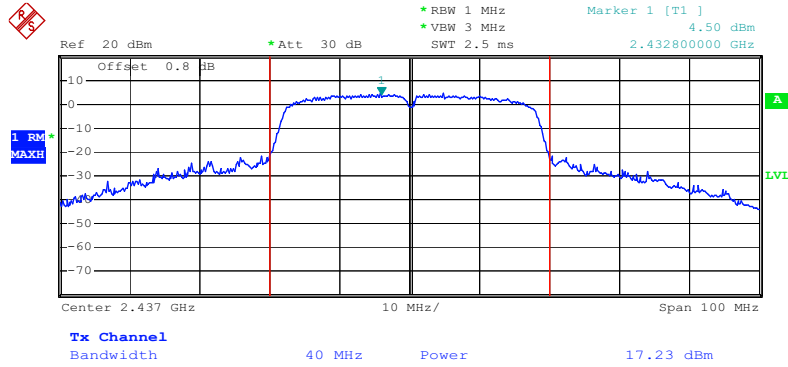
Date: 14.JUN.2008 13:40:50

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz / 2422 MHz



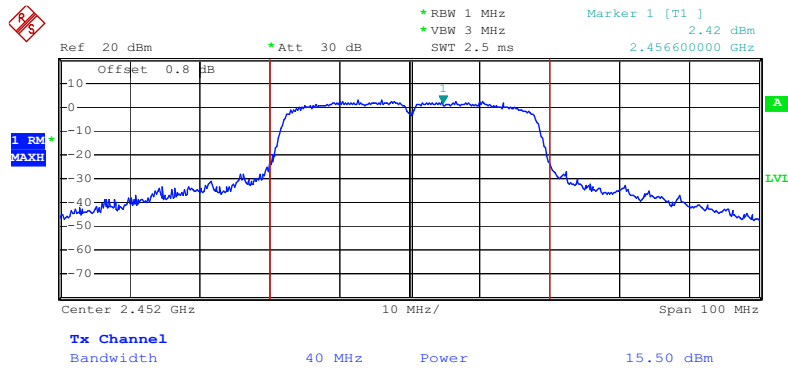
Date: 14.JUN.2008 13:45:33

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz / 2437 MHz



Date: 14.JUN.2008 13:46:07

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz / 2452 MHz



Date: 14.JUN.2008 13:46:41

4.3. Power Spectral Density Measurement

4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

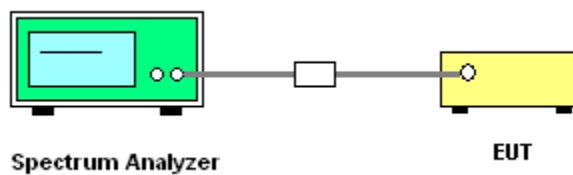
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	Draft n

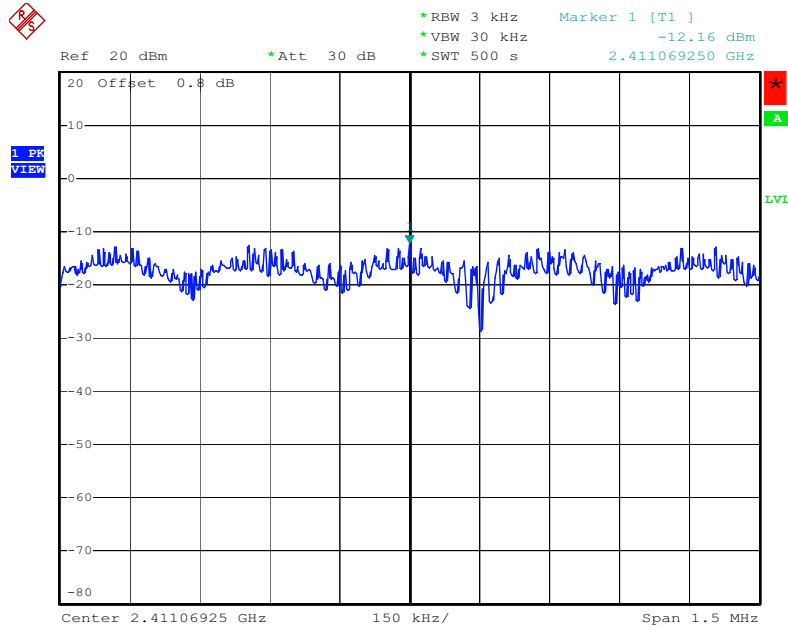
Configuration Draft n MCS0 20MHz

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-12.16	8.00	Complies
6	2437 MHz	-11.27	8.00	Complies
11	2462 MHz	-12.51	8.00	Complies

Configuration Draft n MCS0 40MHz

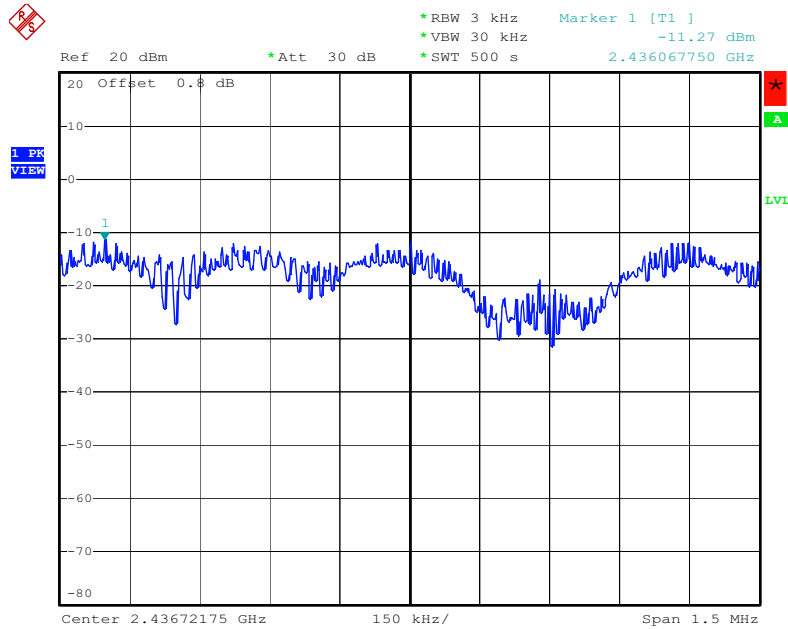
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-18.36	8.00	Complies
6	2437 MHz	-16.65	8.00	Complies
9	2452 MHz	-18.55	8.00	Complies

Power Density Plot on Configuration Drafft n MCS0 20MHz / 2412 MHz



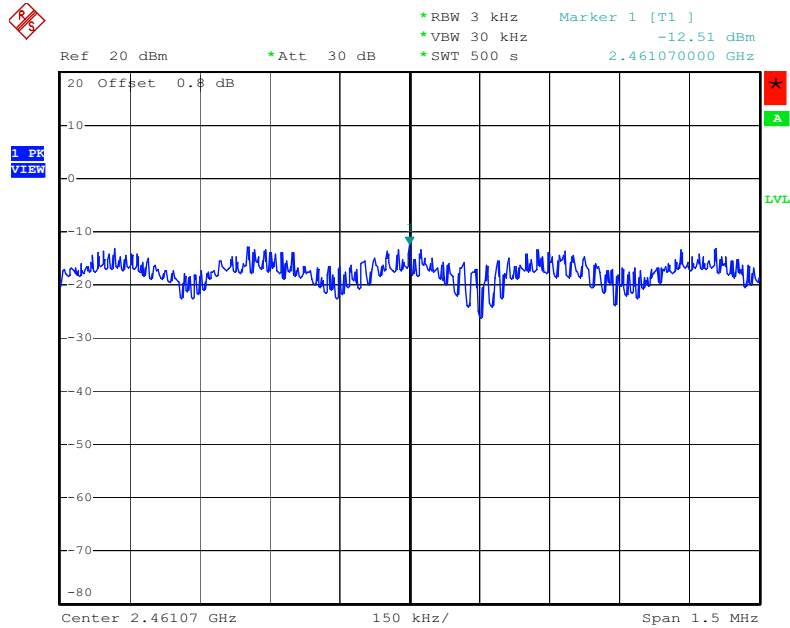
Date: 14.JUN.2008 13:52:05

Power Density Plot on Configuration Drafft n MCS0 20MHz / 2437 MHz



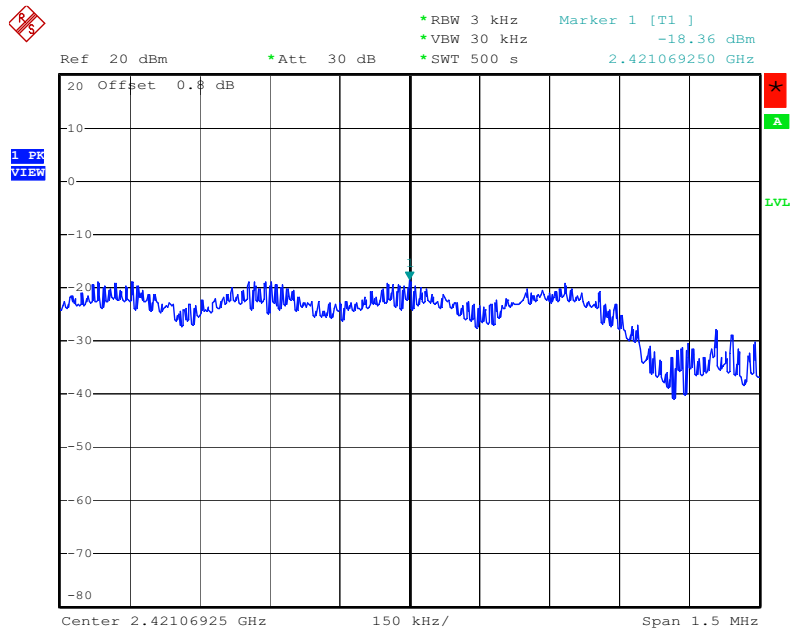
Date: 14.JUN.2008 13:54:26

Power Density Plot on Configuration Drafft n MCS0 20MHz / 2462 MHz



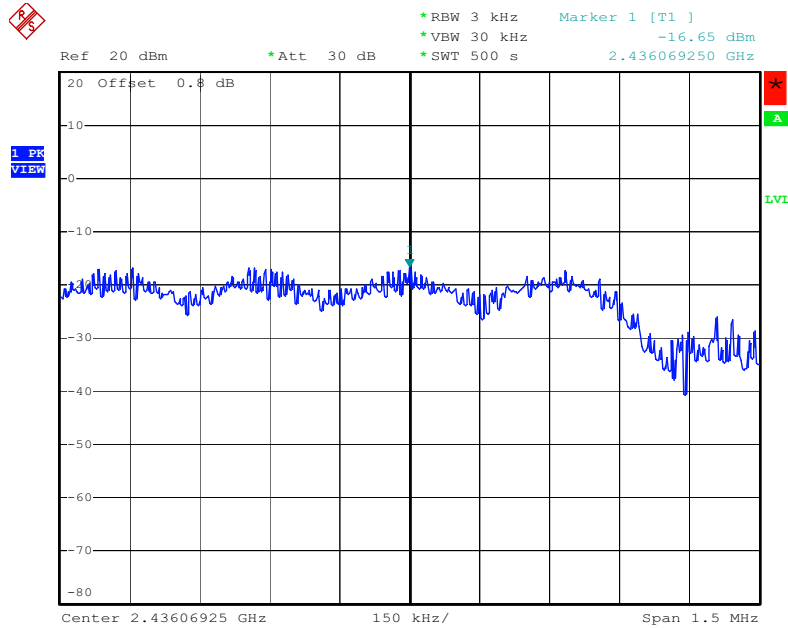
Date: 14.JUN.2008 13:55:09

Power Density Plot on Configuration Drafft n MCS0 40MHz / 2422 MHz



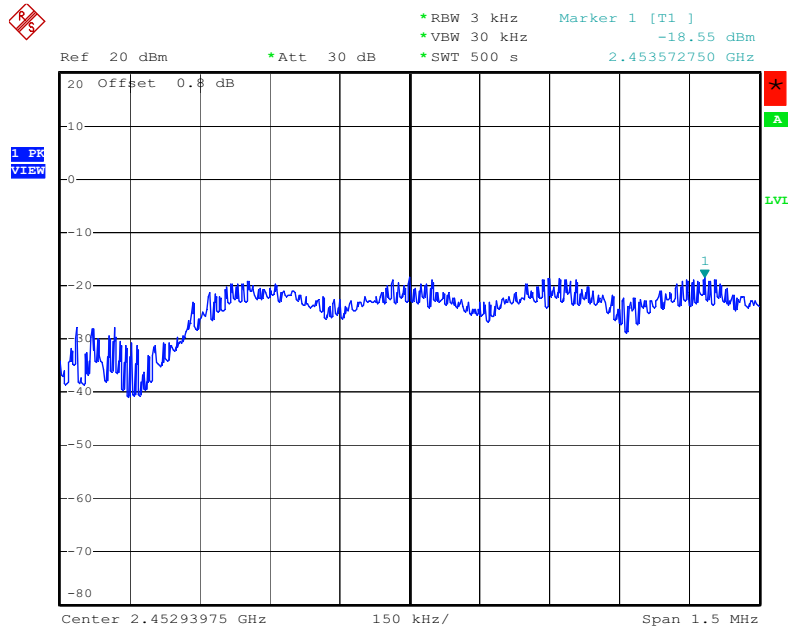
Date: 14.JUN.2008 13:50:21

Power Density Plot on Configuration Drafft n MCS0 40MHz / 2437 MHz



Date: 14.JUN.2008 13:49:27

Power Density Plot on Configuration Drafft n MCS0 40MHz / 2452 MHz



Date: 14.JUN.2008 13:48:32

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

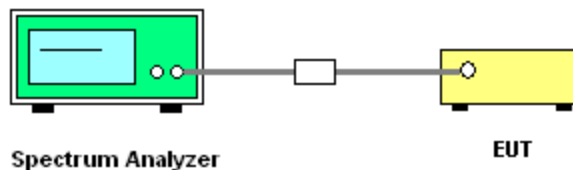
Please refer to section 5 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	23°C	Humidity	54%
Test Engineer	Sam Chen	Configurations	Draft n

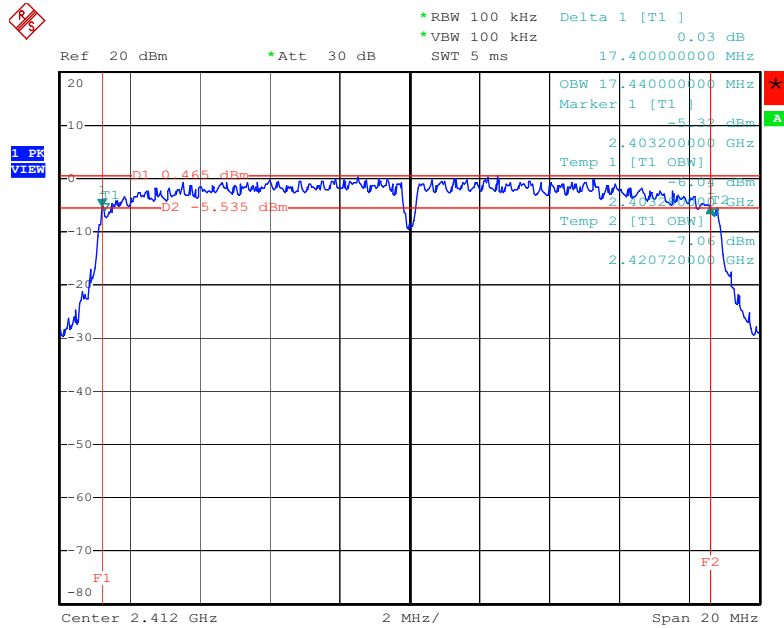
Configuration Draft n MCS0 20MHz

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.40	17.44	500	Complies
6	2437 MHz	17.56	17.44	500	Complies
11	2462 MHz	17.36	17.44	500	Complies

Configuration Draft n MCS0 40MHz

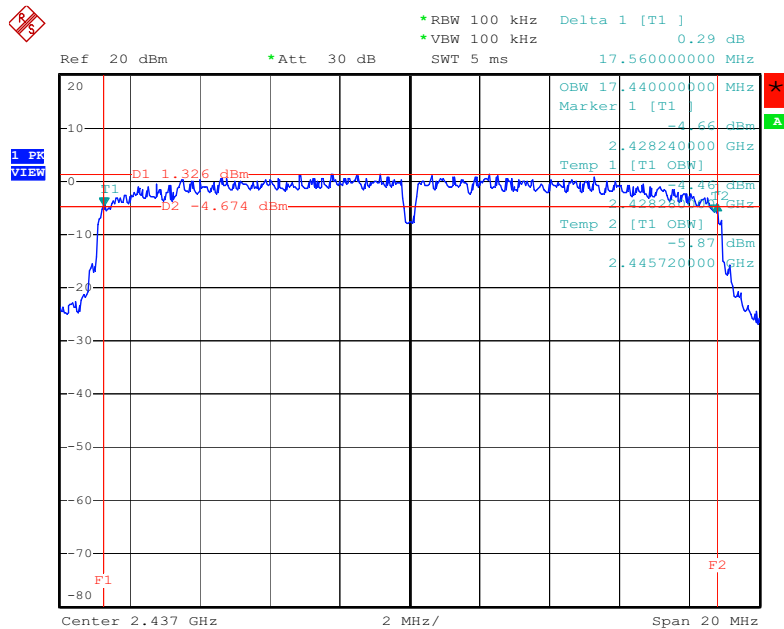
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	34.56	35.60	500	Complies
6	2437 MHz	35.12	35.52	500	Complies
9	2452 MHz	35.36	35.52	500	Complies

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz / 2412 MHz



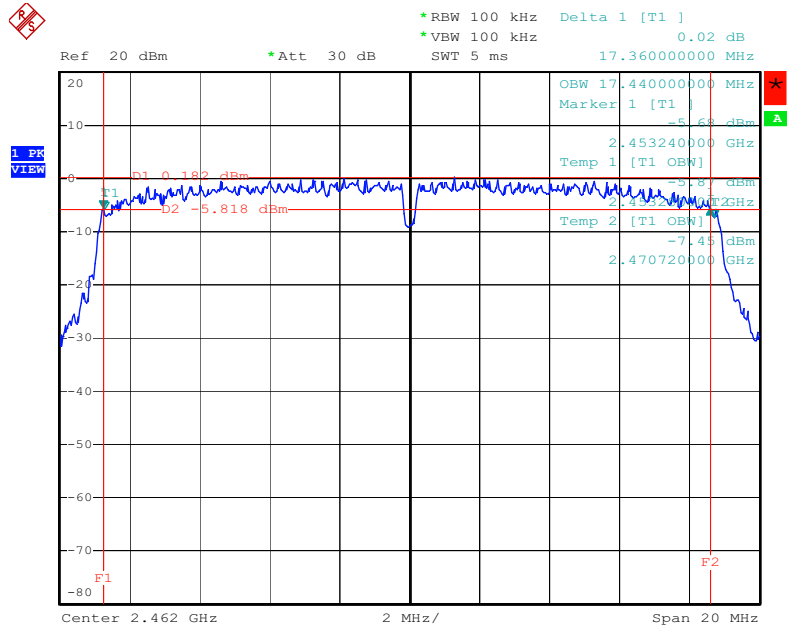
Date: 14.JUN.2008 13:51:40

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz / 2437 MHz



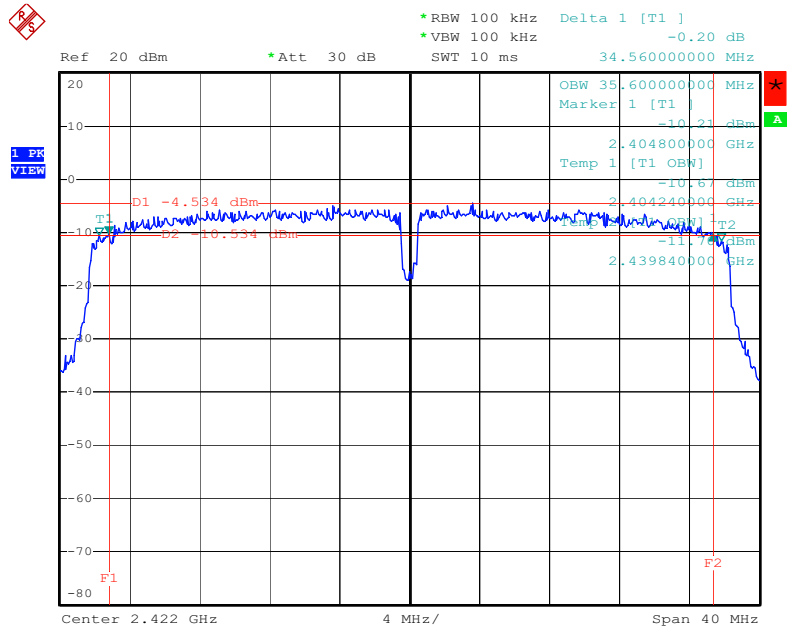
Date: 14.JUN.2008 13:54:10

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz / 2462 MHz



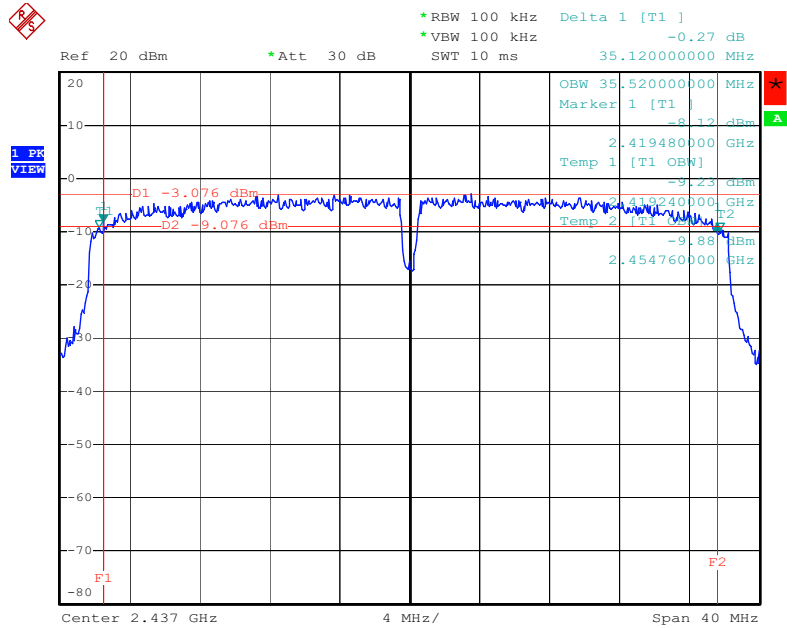
Date: 14.JUN.2008 13:54:53

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz / 2422 MHz



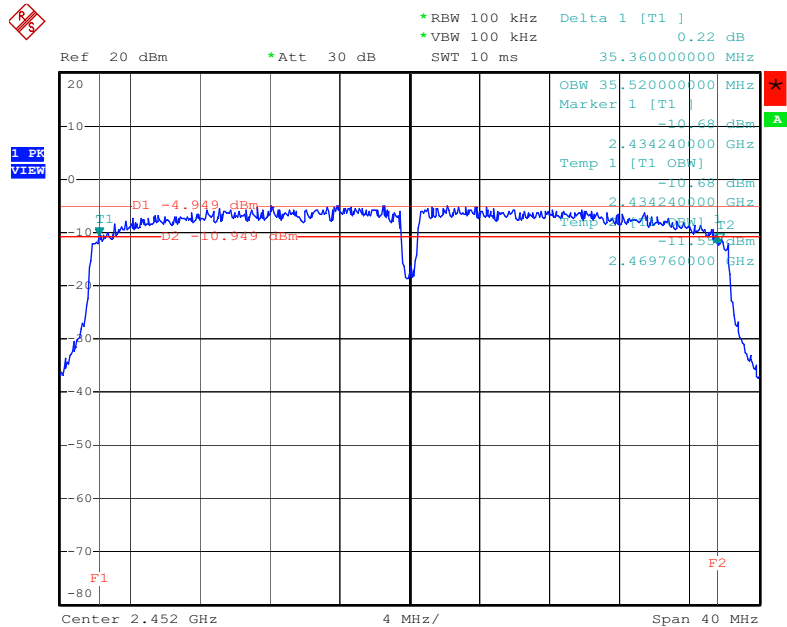
Date: 14.JUN.2008 13:49:56

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz / 2437 MHz



Date: 14.JUN.2008 13:49:01

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz / 2452 MHz



Date: 14.JUN.2008 13:48:06

4.5. Radiated Emissions Measurement

4.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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

4.5.2. Measuring Instruments and Setting

Please refer to section 5 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	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

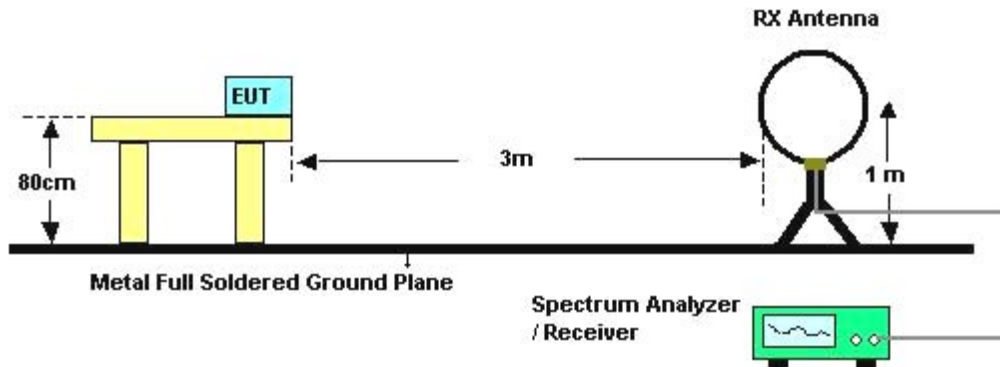
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

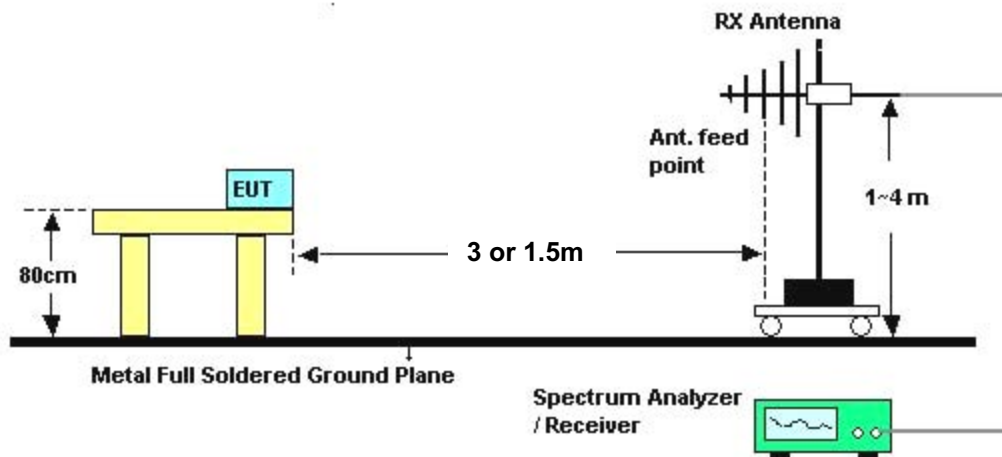
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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.

4.5.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	24°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Normal

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

Note:

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

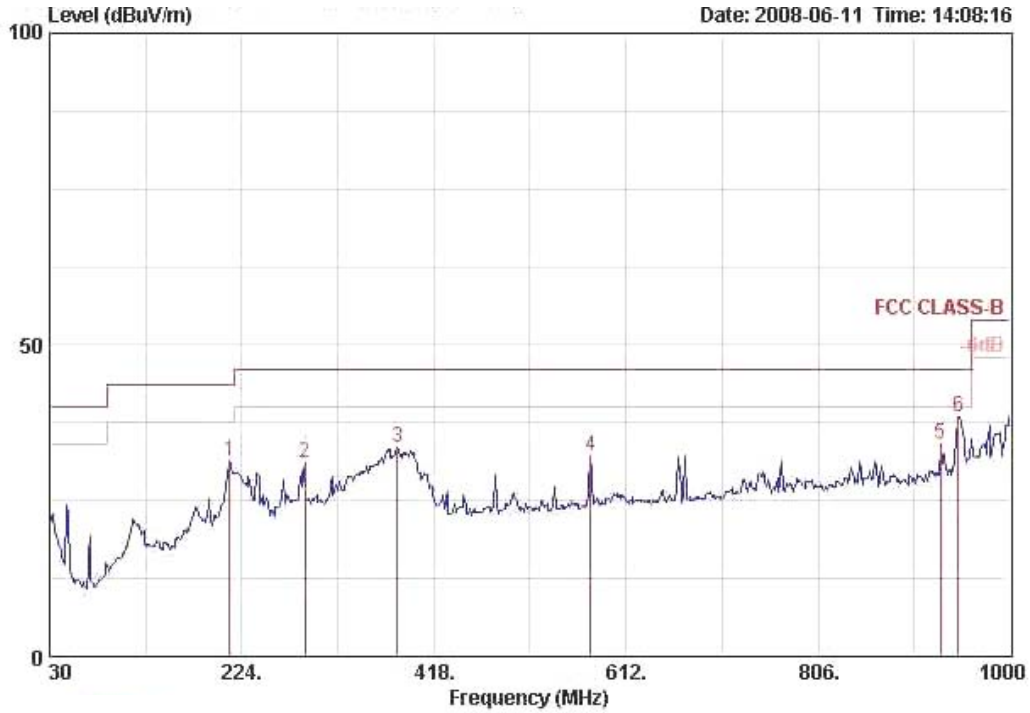
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

4.5.8. Results of Radiated Emissions (30MHz~1GHz)

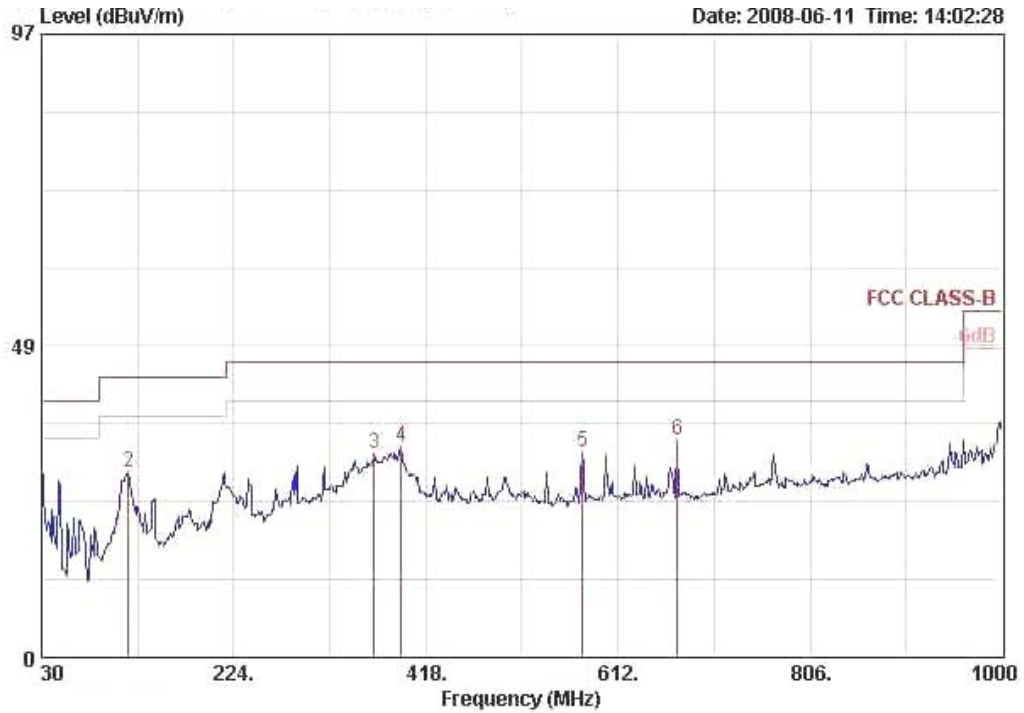
Temperature	24°C	Humidity	56%
Test Engineer	Roy Huang	Configurations	Normal Link

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	211.390	31.36	-12.14	43.50	45.90	9.91	1.00	25.45	Peak	100	0	HORIZONTAL
2	288.020	31.10	-14.90	46.00	41.79	13.22	1.14	25.05	Peak	100	0	HORIZONTAL
3	381.140	33.63	-12.37	46.00	41.96	15.56	1.44	25.34	Peak	100	0	HORIZONTAL
4	576.110	32.20	-13.80	46.00	38.10	18.49	1.85	26.25	Peak	100	0	HORIZONTAL
5	929.190	33.96	-12.04	46.00	35.70	20.75	2.91	25.40	Peak	100	0	HORIZONTAL
6	947.620	38.54	-7.46	46.00	40.09	20.89	3.05	25.48	Peak	100	0	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	30.000	29.80	-10.20	40.00	37.28	18.76	0.44	26.68	Peak	400	0	VERTICAL
2	117.300	28.78	-14.72	43.50	41.63	12.31	0.81	25.97	Peak	400	0	VERTICAL
3	365.620	31.82	-14.18	46.00	40.54	15.14	1.30	25.16	Peak	400	0	VERTICAL
4	392.780	32.70	-13.30	46.00	40.74	15.88	1.55	25.46	Peak	400	0	VERTICAL
5	576.110	32.02	-13.98	46.00	37.92	18.49	1.85	26.25	Peak	400	0	VERTICAL
6	672.140	33.94	-12.06	46.00	38.88	19.00	2.14	26.08	Peak	400	0	VERTICAL

Note:

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

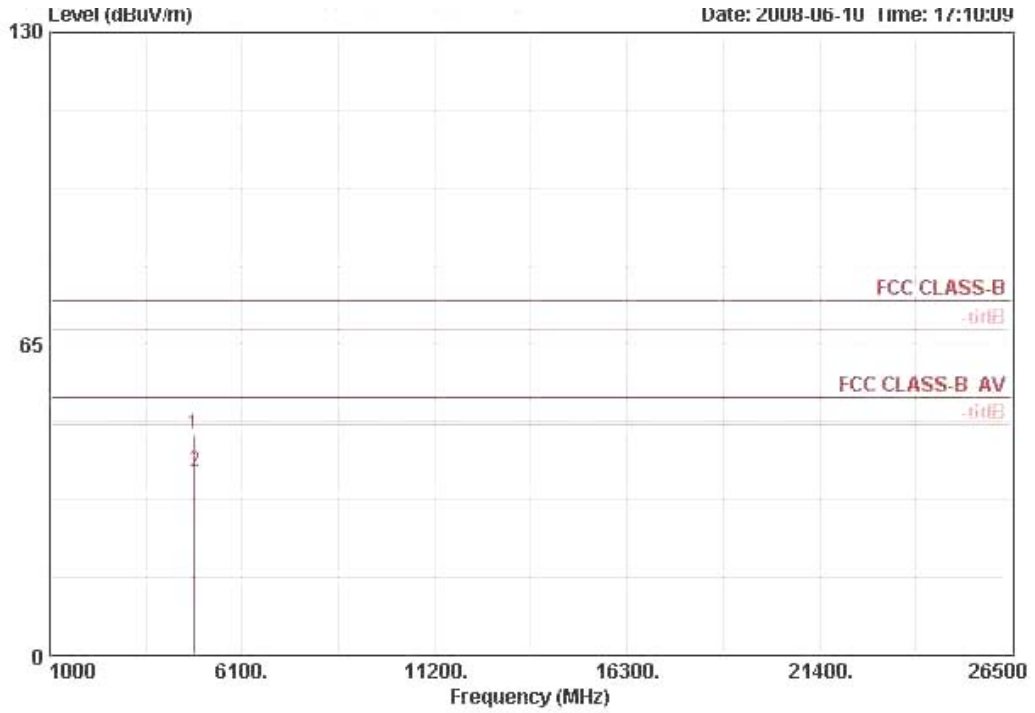
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

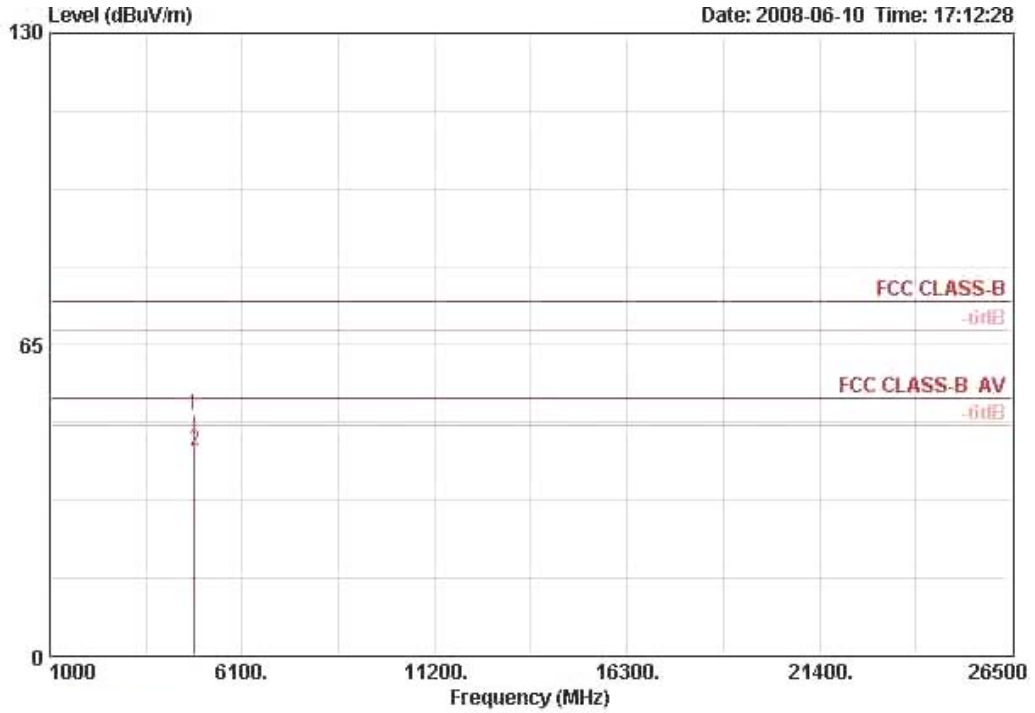
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 20MHz Ch 1 Ant. A

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4819.460	46.22	-27.78	74.00	44.71	33.39	3.37	35.25	PEAK	100	293	HORIZONTAL
2	4823.240	38.19	-15.81	54.00	36.68	33.39	3.37	35.25	AVERAGE	100	293	HORIZONTAL

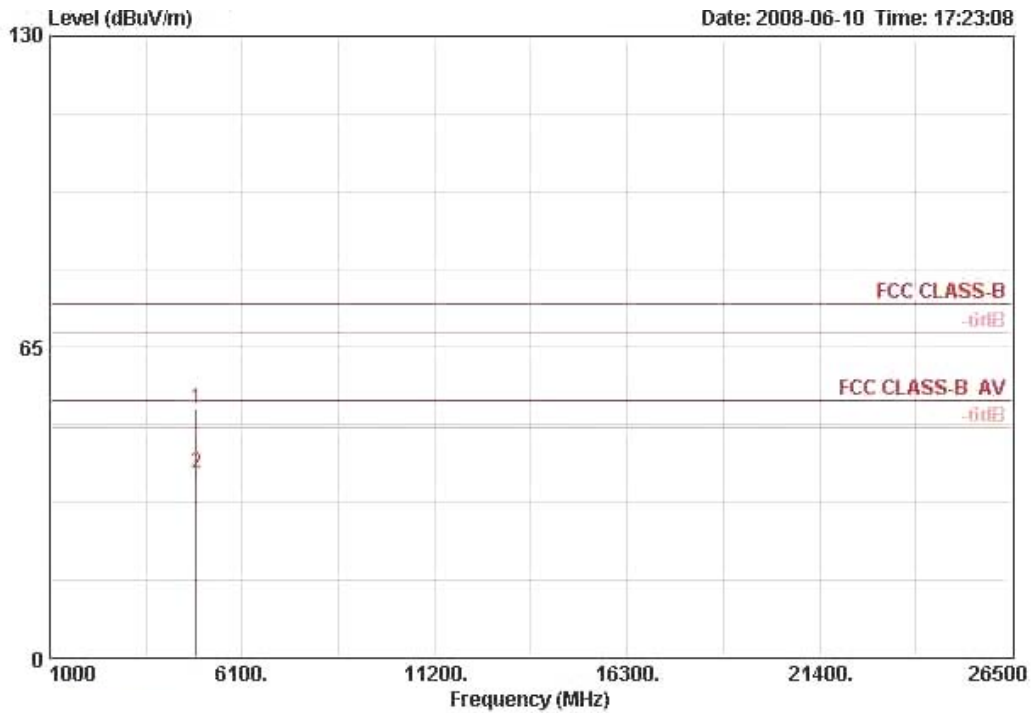
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4819.840	50.45	-23.55	74.00	48.94	33.39	3.37	35.25	PEAK	100	169	VERTICAL
2	4826.180	42.73	-11.27	54.00	41.22	33.39	3.37	35.25	AVERAGE	100	169	VERTICAL

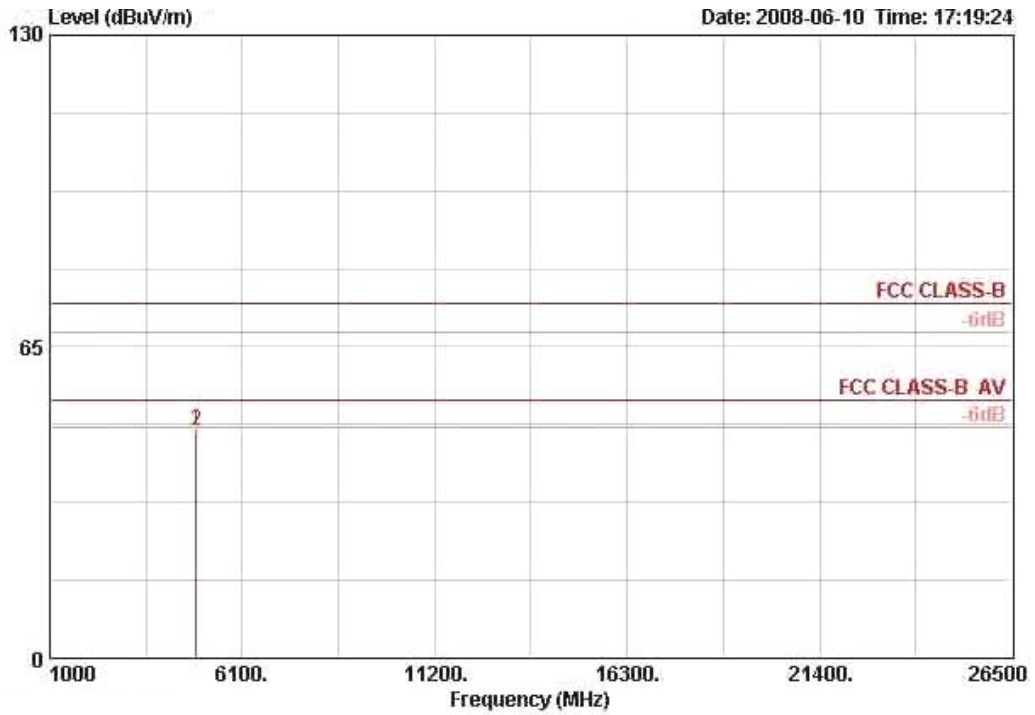
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 20MHz Ch 6 Ant. A

Horizontal



	Freq	Level	Over	Limit	ReadAntenna		Cable Preamp		Remark	Ant	Table	
			Limit	Line	Level	Factor	Loss	Factor		Pos	Pos	
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4871.720	52.17	-21.83	74.00	50.55	33.48	3.38	35.25	PEAK	100	308	HORIZONTAL
2	4875.940	38.72	-15.28	54.00	37.10	33.48	3.38	35.25	AVERAGE	100	308	HORIZONTAL

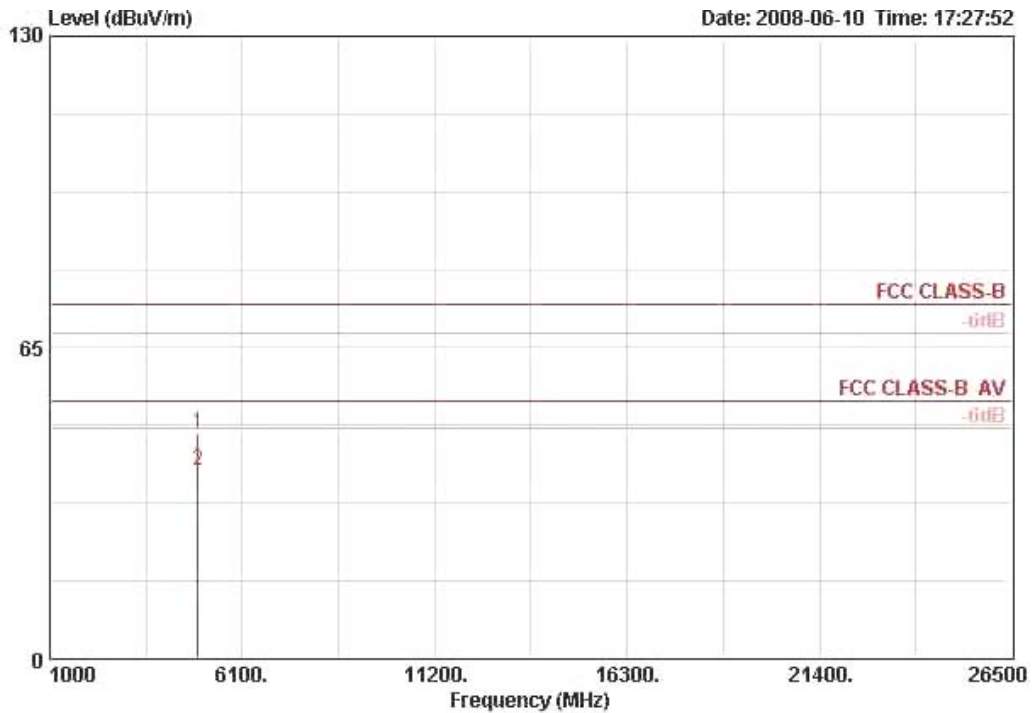
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4875.700	47.82	-6.18	54.00	46.20	33.48	3.38	35.25	AVERAGE	112	91	VERTICAL
2	4875.740	47.61	-26.39	74.00	45.99	33.48	3.38	35.25	PEAK	112	91	VERTICAL

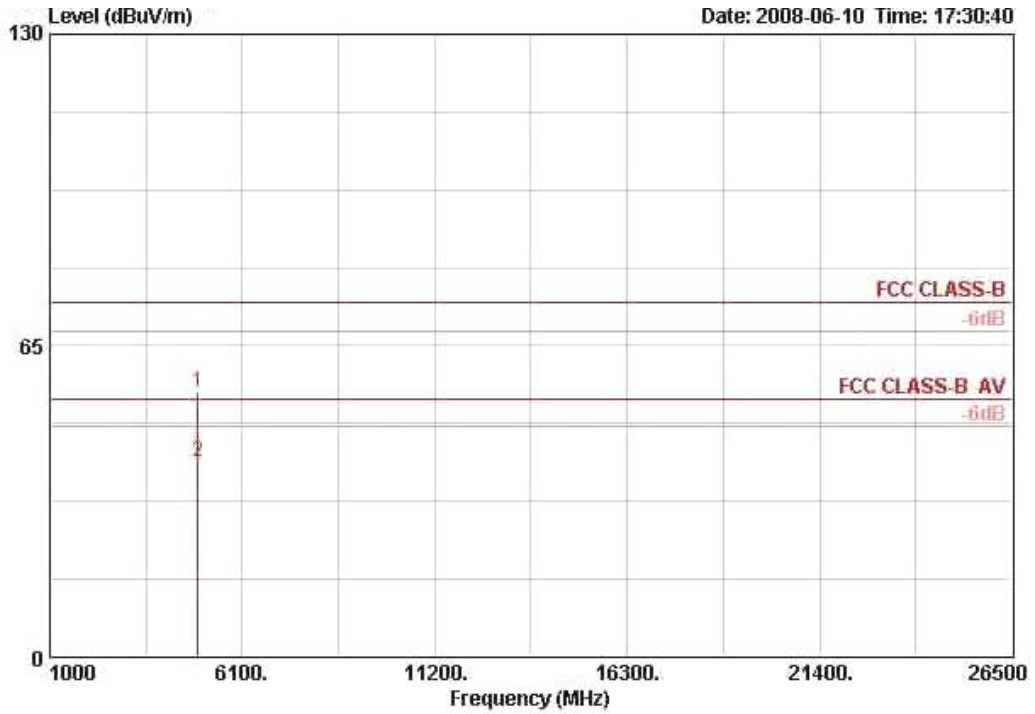
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 20MHz Ch11 Ant. A

Horizontal



	Freg	Level	Over	Limit	ReadAntenna		Cable	Preamp	Remark	Ant	Table	
			Limit	Line	Level	Factor	Loss	Factor		Pos	Pos	
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4920.060	46.99	-27.01	74.00	45.26	33.58	3.40	35.24	PEAK	100	15	HORIZONTAL
2	4924.220	39.33	-14.67	54.00	37.60	33.58	3.40	35.24	AVERAGE	100	15	HORIZONTAL

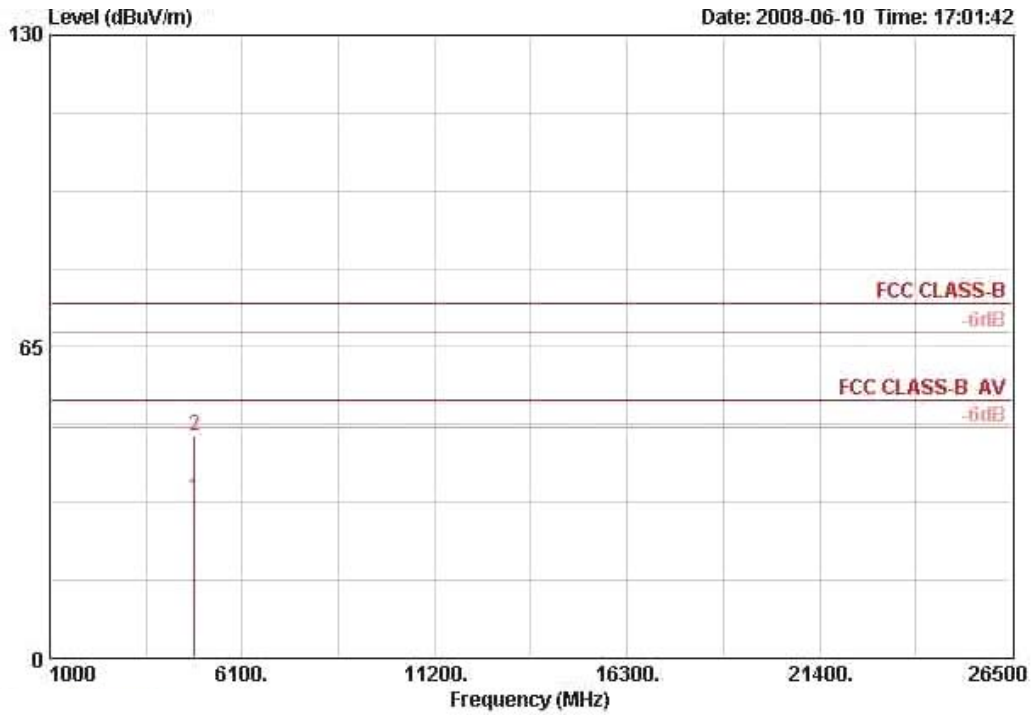
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4920.660	55.36	-18.64	74.00	53.63	33.58	3.40	35.24	PEAK	100	171	VERTICAL
2	4924.260	40.59	-13.41	54.00	38.86	33.58	3.40	35.24	AVERAGE	100	171	VERTICAL

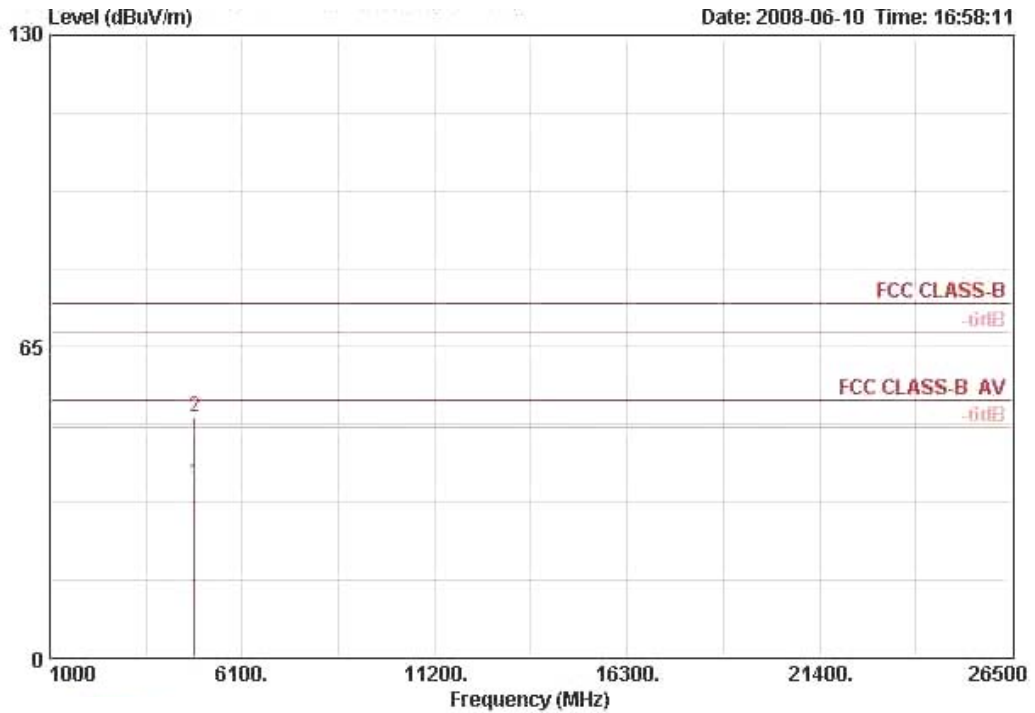
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 40MHz Ch 3 Ant. A

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4839.080	33.20	-20.80	54.00	31.65	33.42	3.38	35.25	AVERAGE	100	293	HORIZONTAL
2	4843.960	46.26	-27.74	74.00	44.71	33.42	3.38	35.25	PEAK	100	293	HORIZONTAL

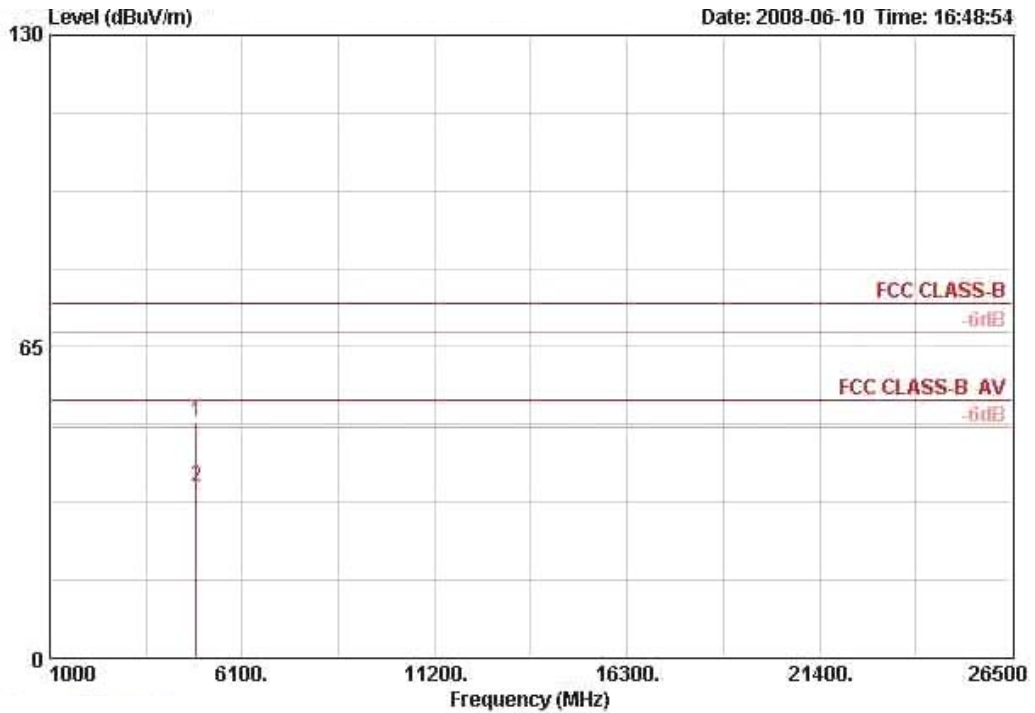
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4844.080	36.45	-17.55	54.00	34.90	33.42	3.38	35.25	AVERAGE	100	171	VERTICAL
2	4844.560	50.45	-23.55	74.00	48.90	33.42	3.38	35.25	PEAK	100	171	VERTICAL

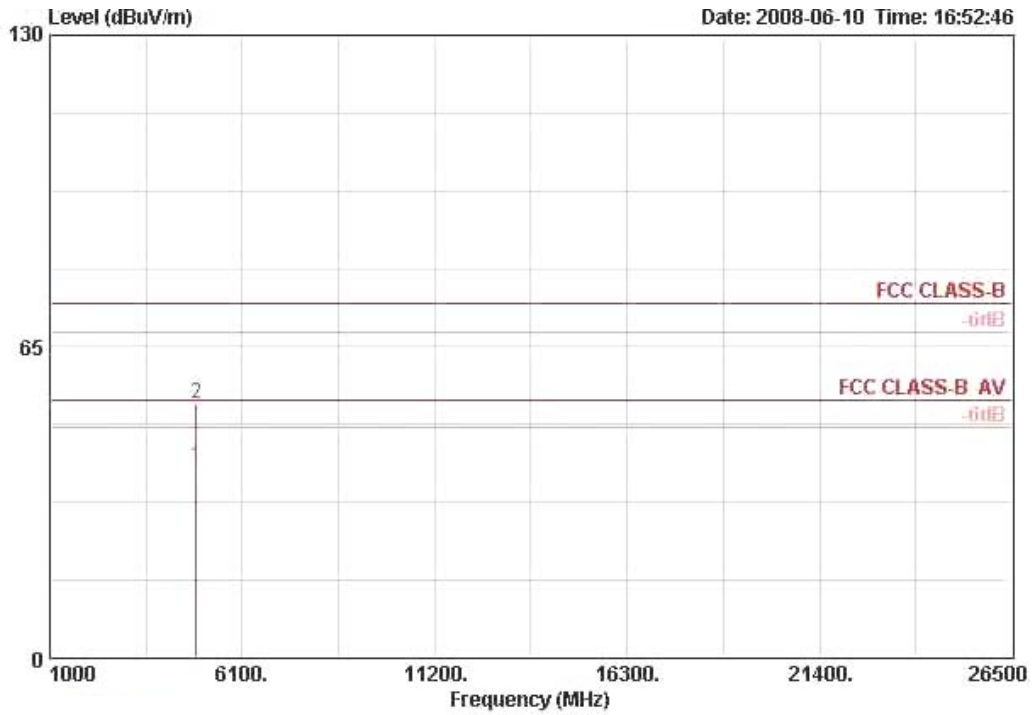
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 40MHz Ch 6 Ant. A

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4873.780	49.17	-24.83	74.00	47.55	33.48	3.38	35.25	PEAK	100	308	HORIZONTAL
2	4873.970	35.69	-18.31	54.00	34.07	33.48	3.38	35.25	AVERAGE	100	308	HORIZONTAL

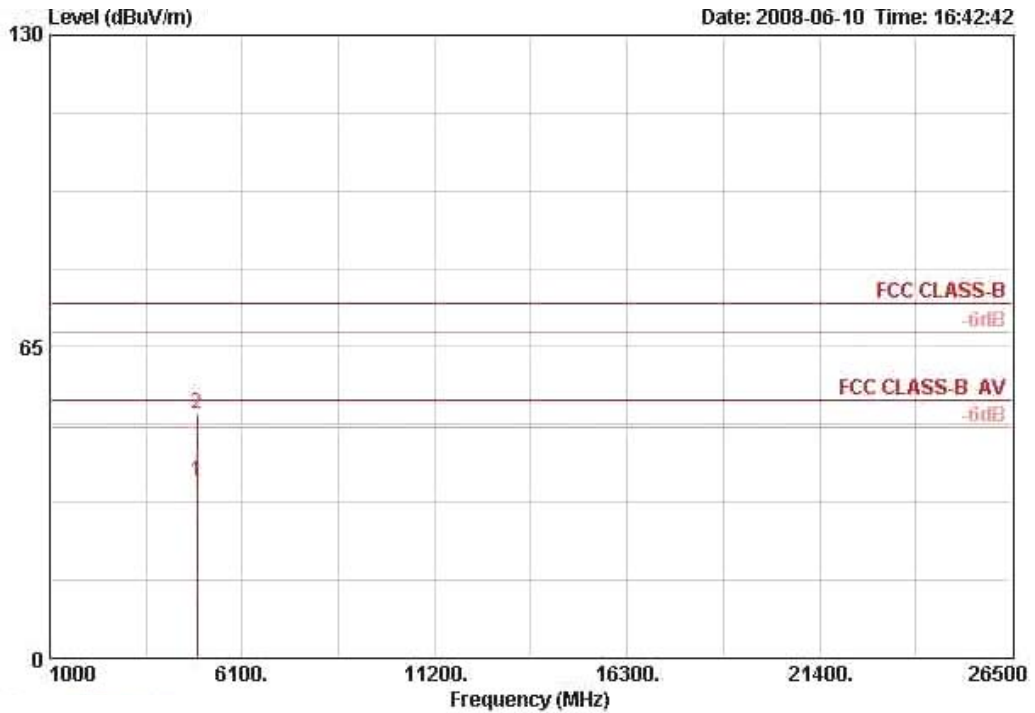
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4874.000	39.92	-14.08	54.00	38.30	33.48	3.38	35.25	AVERAGE	100	172	VERTICAL
2	4874.500	53.18	-20.82	74.00	51.56	33.48	3.38	35.25	PEAK	100	172	VERTICAL

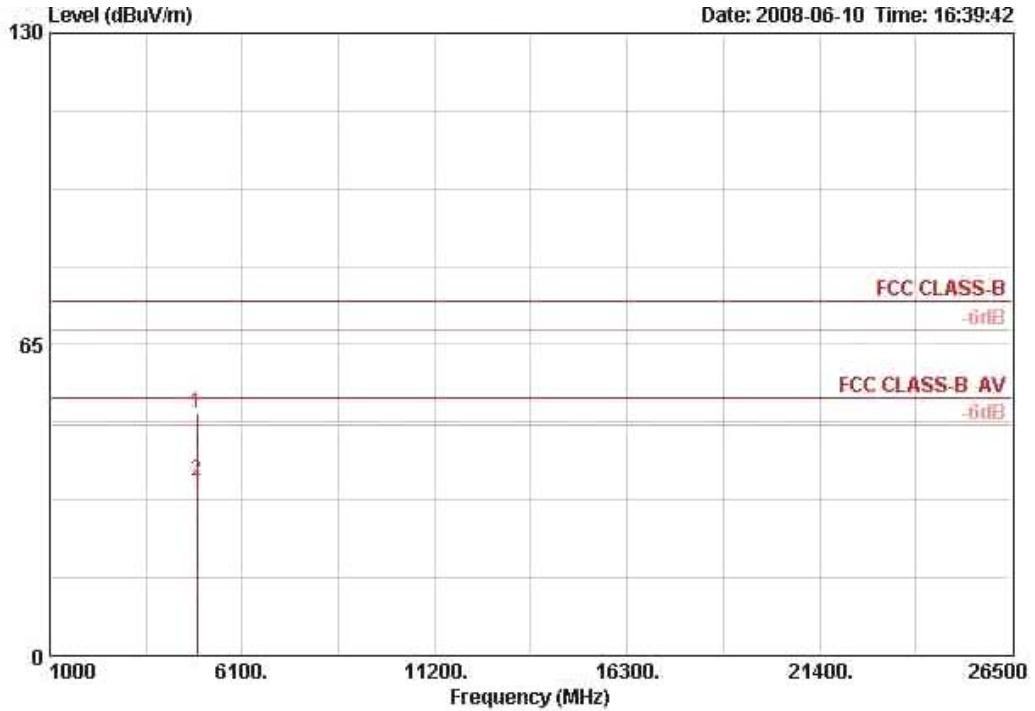
Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 40MHz Ch 9 Ant. A

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4904.130	36.88	-17.12	54.00	35.19	33.54	3.39	35.24	AVERAGE	104	12	HORIZONTAL
2	4904.470	51.07	-22.93	74.00	49.38	33.54	3.39	35.24	PEAK	104	12	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4903.970	50.66	-23.34	74.00	48.97	33.54	3.39	35.24	PEAK	100	171	VERTICAL
2	4904.130	36.66	-17.34	54.00	34.97	33.54	3.39	35.24	AVERAGE	100	171	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

4.6. Band Edge Emissions Measurement

4.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. 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 (micovolts/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

4.6.2. Measuring Instruments and Setting

Please refer to section 5 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)	100 KHz /100 KHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
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.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	62%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 20MHz Ch 1, 6, 11 Ant. A
Test Date	Jun. 09, 2008		

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2390.000	53.55	-0.45	54.00	23.13	28.05	2.36	0.00	AVERAGE	100	176	HORIZONTAL
2 @	2390.000	69.81	-4.19	74.00	39.40	28.05	2.36	0.00	PEAK	100	176	HORIZONTAL
3 @	2413.200	99.64			69.18	28.09	2.36	0.00	AVERAGE	100	176	HORIZONTAL
4 @	2413.400	109.06			78.61	28.09	2.36	0.00	PEAK	100	176	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2389.600	58.88	-15.12	74.00	28.48	28.05	2.35	0.00	PEAK	100	174	HORIZONTAL
2	2390.000	46.17	-7.83	54.00	15.76	28.05	2.36	0.00	AVERAGE	100	174	HORIZONTAL
3 @	2435.400	101.87			71.35	28.13	2.38	0.00	AVERAGE	100	174	HORIZONTAL
4 @	2435.800	111.21			80.70	28.13	2.38	0.00	PEAK	100	174	HORIZONTAL
5 @	2483.500	46.78	-7.22	54.00	16.11	28.26	2.41	0.00	AVERAGE	100	174	HORIZONTAL
6	2483.900	58.04	-15.96	74.00	27.36	28.26	2.41	0.00	PEAK	100	174	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2459.200	100.91			70.30	28.22	2.40	0.00	AVERAGE	100	171	HORIZONTAL
2 @	2460.600	109.83			79.21	28.22	2.40	0.00	PEAK	100	171	HORIZONTAL
3 @	2483.500	53.84	-0.16	54.00	23.17	28.26	2.41	0.00	AVERAGE	100	171	HORIZONTAL
4 @	2483.500	70.41	-3.59	74.00	39.74	28.26	2.41	0.00	PEAK	100	171	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	23°C	Humidity	54%
Test Engineer	Roy Huang	Configurations	Draft n MCS0 40MHz Ch 3, 6, 9 Ant. A
Test Date	Sep. 29, 2007		

Channel 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	2386.000	69.88	-4.12	74.00	39.48	28.05	2.35	0.00	PEAK	103	273	HORIZONTAL
2 !	2390.000	53.19	-0.81	54.00	22.77	28.05	2.36	0.00	AVERAGE	103	273	HORIZONTAL
3	2427.200	98.99			68.48	28.13	2.38	0.00	PEAK	103	273	HORIZONTAL
4 @	2431.200	93.81			63.29	28.13	2.38	0.00	AVERAGE	103	273	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 !	2390.000	49.22	-4.78	54.00	18.81	28.05	2.36	0.00	AVERAGE	105	271	HORIZONTAL
2	2391.000	65.55	-8.45	74.00	35.13	28.05	2.36	0.00	Peak	105	271	HORIZONTAL
3 @	2439.000	95.42			64.87	28.18	2.38	0.00	AVERAGE	105	271	HORIZONTAL
4	2447.400	104.99			74.41	28.18	2.40	0.00	Peak	105	271	HORIZONTAL
5 !	2483.500	68.91	-5.09	74.00	38.24	28.26	2.41	0.00	Peak	105	271	HORIZONTAL
6 !	2483.500	51.87	-2.13	54.00	21.20	28.26	2.41	0.00	AVERAGE	105	271	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 9

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2450.000	105.30			74.73	28.18	2.40	0.00	PEAK	108	272	HORIZONTAL
2 @	2450.000	96.36			65.79	28.18	2.40	0.00	AVERAGE	108	272	HORIZONTAL
3 @	2483.500	52.61	-1.39	54.00	21.94	28.26	2.41	0.00	AVERAGE	108	272	HORIZONTAL
4 @	2485.900	73.53	-0.47	74.00	42.86	28.26	2.41	0.00	PEAK	108	272	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

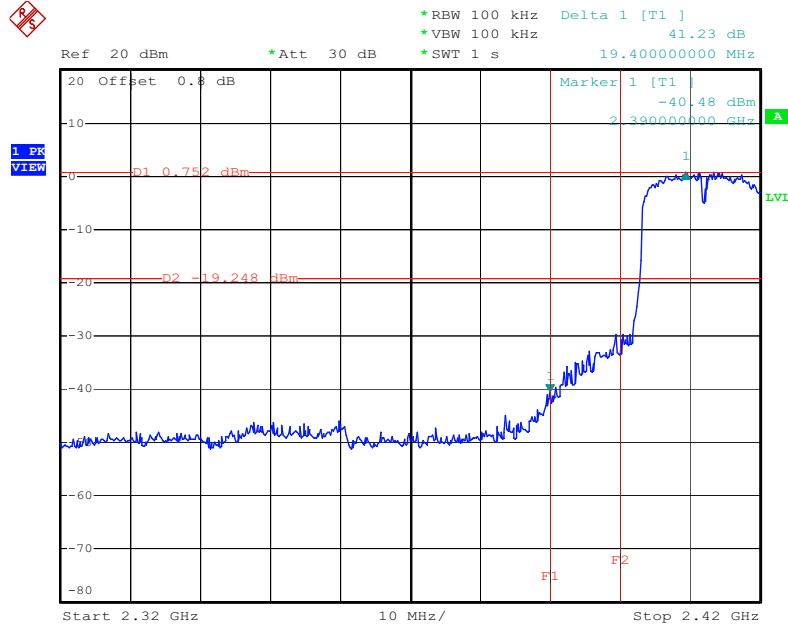
Note:

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

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

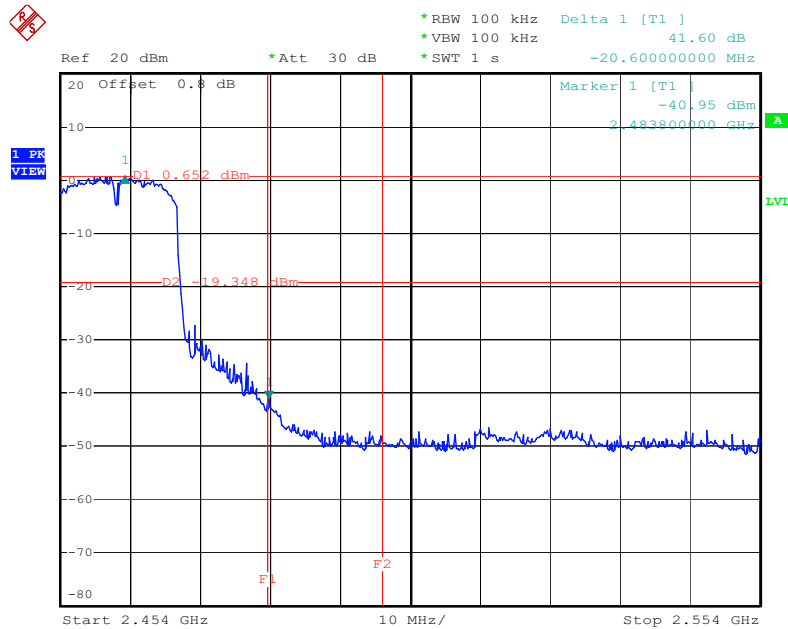
For Emission not in Restricted Band

Low Band Edge Plot on Configuration Draft n MCS0 20MHz / 2412 MHz



Date: 14.JUN.2008 13:52:14

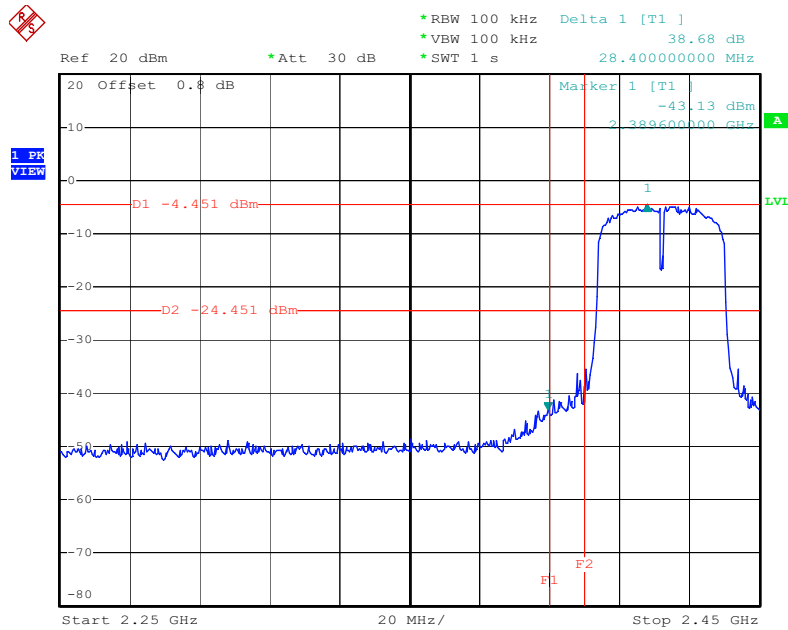
High Band Edge Plot on Configuration Draft n MCS0 20MHz / 2462 MHz



Date: 14.JUN.2008 13:55:17

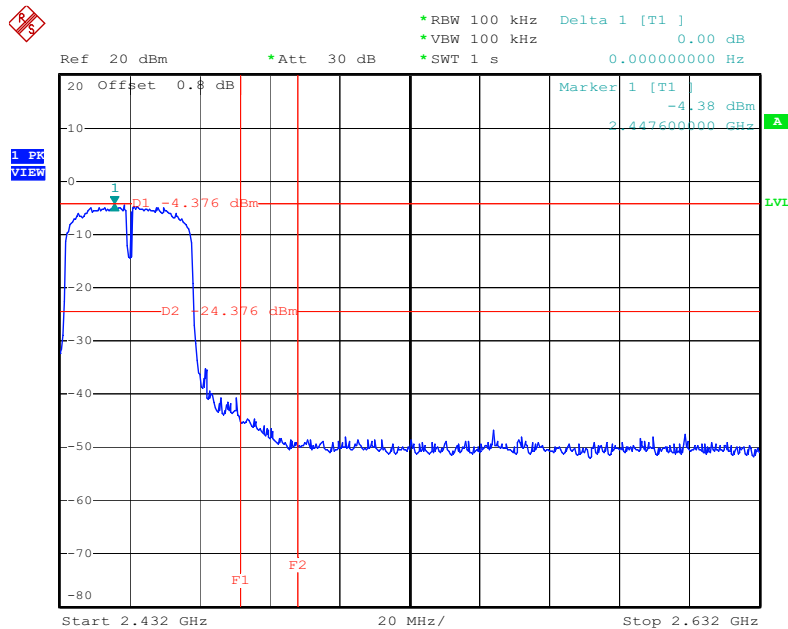
For Emission not in Restricted Band

Low Band Edge Plot on Configuration Drafft n MCS0 40MHz / 2422 MHz



Date: 14.JUN.2008 13:50:29

High Band Edge Plot on Configuration Drafft n MCS0 40MHz / 2452 MHz



Date: 14.JUN.2008 13:48:41

4.7. Antenna Requirements

4.7.1. 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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Mar. 03, 2008	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2008	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2008	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2008	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz – 30MHz	Mar. 27, 2008	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2008	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 14, 2008	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jun. 07, 2008	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Sep. 27, 2007	Radiation (03CH03-HY)
Loop Antenna	TESEQ	HLA6120	24155	9kHz ~ 30MHz	Jan. 18, 2007*	Radiation (03CH03-HY)
Bilog Antenna	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Sep. 29, 2007	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Mar. 04, 2008	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.18, 2008	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSEK30	100189	9kHz ~ 40GHz	Oct. 03, 2007	Radiation (05CH01-HY)
Amplifier	ADVANTEST	BB525C	CH100002	100kHz ~ 3GHz	Dec. 13, 2007	Radiation (05CH01-HY)
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Mar. 07, 2008	Radiation (05CH01-HY)
Amplifier	COM-POWER	PA-103	161073	1MHz~1MHz	Jul. 26, 2007	Radiation (05CH01-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2737	25MHz ~ 2GHz	Jul. 19, 2007	Radiation (05CH01-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz ~ 18GHz	Dec. 20, 2007	Radiation (05CH01-HY)
Horn Antenna	COM-POWER	AH-118	10091	1GHz ~ 18GHz	Jul. 30, 2007	Radiation (05CH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 10, 2008	Radiation (05CH01-HY)
RF Cable-R03m	Jye Bao	RG142	CB031	30MHz ~1GHz	Oct. 01, 2007	Radiation (05CH01-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	05CH01-HY	1GHz~26.5GHz	Jan. 03, 2008	Radiation (05CH01-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 18, 2008	Radiation (05CH01-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170221	15GHz ~ 40GHz	Jan. 16, 2008	Radiation (05CH01-HY)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (05CH01-HY)
Turn Table	HD	DS 420	420/655/12	0 ~ 360 degree	N/A	Radiation (05CH01-HY)
Antenna Mast	HD	MA 240	240/569/12	1 m ~ 4 m	N/A	Radiation (05CH01-HY)

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

* Calibration Interval of instruments listed above is two year.

6. 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 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : LI190-070110

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 Accreditation Program for Designated Testing Laboratory for Commodities Inspection
Specific Accreditation Program	: Accreditation Program for Telecommunication Equipment Testing Laboratory



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

P1, total 9 pages

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