FCC TEST REPORT

CATEGORY	:	Mobile
PRODUCT NAME	:	WLAN ENTERPRISE AP EAP2316A-38
FCC ID.	:	HEDEAP2316A
FILING TYPE	:	Certification
MODEL NAME	:	EAP2316A
BRAND NAME	:	Edge-corE
APPLICANT	:	**Accton Technology Corporation** No. 1 Creation Rd., III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.
MANUFACTURER	:	Same as applicant
ISSUED BY	:	**SPORTON INTERNATIONAL INC.** 6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Statements:

Only the test result of 802.11b/g part is shown in this test report.

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.

Certificate or Test Report could not be used by the applicant to claim the product endorsement by NVLAP or any agency of U.S. government.

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

Lab Code: 200079-0

Table of Contents

HISTORY OF THIS TEST REPORT

Received Date: Jul. 7, 2005
Test Date: Aug. 1, 2005
Original Report Issue Date: Aug. 9, 2005
Report No.: FR570703

■ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

with

47 CFR FCC Part 15 Subpart C

PRODUCT NAME	:	WLAN ENTERPRISE AP EAP2316A-38
MODEL NAME	:	EAP2316A
BRAND NAME	:	Edge-corE
APPLICANT	:	**Accton Technology Corporation** No. 1 Creation Rd., III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.
MANUFACTURER	:	Same as applicant

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4-2003 and all test are performed according to 47 CFR FCC Part 15 Subpart C. Testing was carried out on Aug. 1, 2005 at SPORTON International Inc. LAB.

Wayne Hsu / Supervisor
Sporton International Inc.

1. General Description of Equipment under Test

1.1. Applicant

Accton Technology Corporation
No. 1 Creation Rd., III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.

1.2. Manufacturer

Same as applicant

1.3. Basic Description of Equipment under Test

This product is a WLAN Access Point with 802.11b/g wireless solution. The technical data has been listed on section " Features of Equipment under Test ".

1.4. Features of Equipment under Test

Items	Description
Type of Modulation	DSSS (CCK / DQPSK / DBPSK) OFDM (16QAM / 64QAM / DQPSK / DBPSK)
Number of Channels	11
Frequency Band	2400 MHz ~ 2483.5 MHz
Carrier Frequency Range	2412 MHz ~ 2462 MHz
Carrier Frequency	See section 1.6 for details
Data Rate	1, 2, 5.5, 11 Mbps - DSSS 6, 12, 18, 24, 36, 48, 54 Mbps – OFDM 108 Mbps- OFDM - Turbo Mode
Channel Bandwidth	5 MHz
Max. Conducted Output Power	DSSS : 17.84 dBm OFDM : 19.87 dBm 11g Turbo Mode : 18.56 dBm
Antenna Type	See section 1.5 for details
Communication Type	Half-Duplex
Testing Duty Cycle	100.00%
Power Rating (DC/AC, Voltage)	5.00V DC from power adapter
Adapter Information	Brand: DVE, Model: DSA-0101F-05UP, Input: 100~240Vac 50/60Hz, Output: 5Vdc)
Test Power Source	120.00V AC
Temperature Range (Operating)	0 ~ 55 °C

1.5. Antenna Description

No.	Antenna Type	Gain (dBi)
1	Integral Antenna	2.50

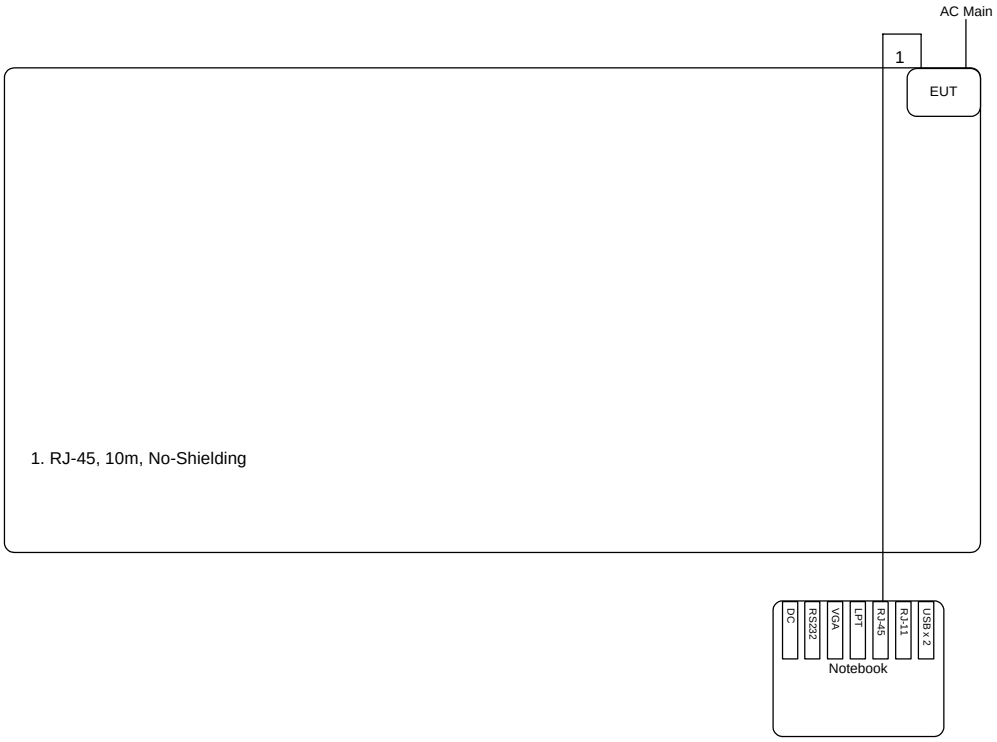
1.6. Table for Carrier Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	05	2432 MHz	09	2452 MHz	-	-
02	2417 MHz	06	2437 MHz	10	2457 MHz	-	-
03	2422 MHz	07	2442 MHz	11	2462 MHz	-	-
04	2427 MHz	08	2447 MHz	-	-	-	-

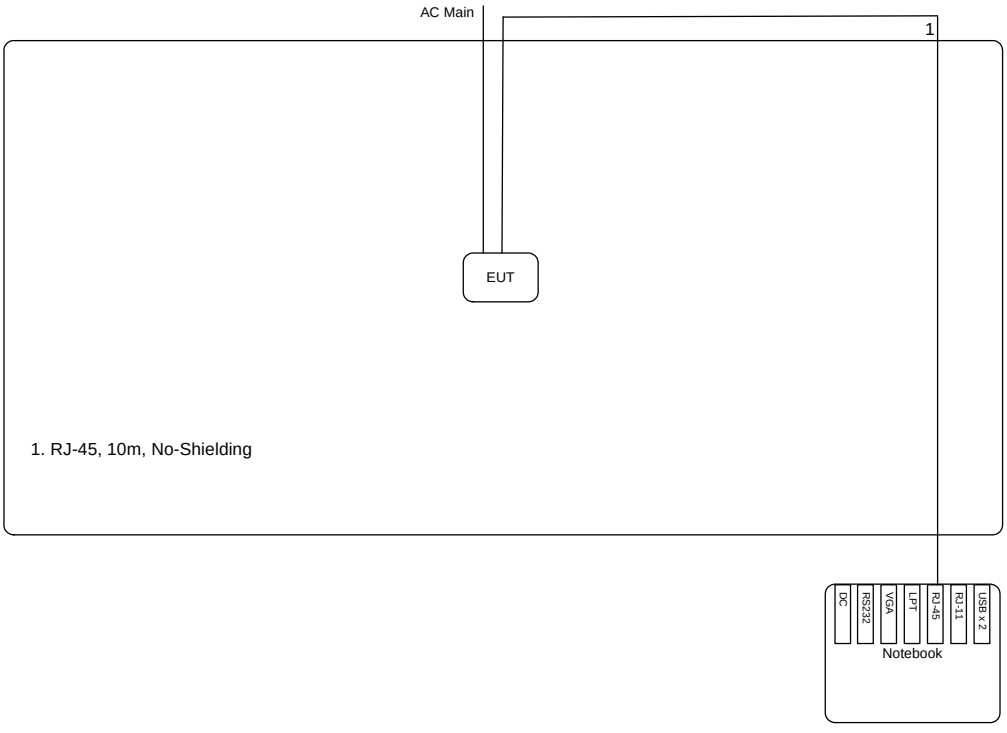
2. Test Configuration of the Equipment under Test

2.1. Connection Diagram of Conducted Test System

Conduction



Radiation



2.2. The Test Mode Description

1. For DSSS modulation, CCK (11 Mbps) is the worst case on all test items.
2. For OFDM modulation, BPSK (6 Mbps) is the worst case on all test items.
3. According to ANSI C63.4-2003: If frequency range of EUT is more than 10 MHz, we have to test the lowest, middle and highest channels of EUT.
4. Spurious emission below 1GHz is independent of channel selection and modulation types. So only channel 06 was tested.
5. Spurious emission above 1GHz in turbo mode is independent of channel selection, so only channel 06 was tested.
6. For AC conduction emission, the EUT was linked with notebook wirelessly.

2.3. Description of Test Supporting Units

Support unit	Brand	Model No.	FCC ID
Notebook	DELL	PP01L	DoC

3. General Information of Test

3.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.
: TEL 886-3-327-3456
: FAX 886-3-318-0055
Test Site No : 03CH03-HY / TH01-HY / CO04-HY

3.2. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.
ANSI C63.4-2003
47 CFR FCC Part 15 Subpart C

3.3. DoC Statement

This EUT is also classified as a device of computer peripheral Class B which DoC has to be followed. It has been verified according to the rule of 47 CFR part 15 Subpart B, and found that all the requirements has been fulfilled.

3.4. Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th carrier harmonic

3.5. Test Distance

The test distance of radiated emission (30MHz~1GHz) test from antenna to EUT is 3 M.
The test distance of radiated emission (1GHz~10th carrier harmonic) test from antenna to EUT is 3 M.

3.6. Test Software

Power Parameter Table

Software Version	: ART
Power Set Ch01 / DSSS	: 19 / TX Power
Power Set Ch06 / DSSS	: 19 / TX Power
Power Set Ch11 / DSSS	: 19 / TX Power
Power Set Ch01 / OFDM	: 16 / TX Power
Power Set Ch06 / OFDM	: 16 / TX Power
Power Set Ch11 / OFDM	: 16 / TX Power
Power Set Ch06 / 11g Turbo Mode	: 16 / TX Power

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Paragraph	**FCC Section**	**Description of Test**	**Result**
5.1	15.247(a)(2)	6dB Spectrum Bandwidth	Pass
5.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Pass
5.3	15.247(e)	Peak Power Spectral Density	Pass
5.4	15.247(d)	Band Edges Emission	Pass
5.5	15.207	AC Power Line Conducted Emission	Pass
5.5	15.247(d)	Spurious Radiated Emission	Pass
5.7	15.203/15.247(b)/(c)	Antenna Requirement	Pass
5.8	2.1091	Maximum Permissible Exposure	Pass

5. Test Result

5.1. Test of 6dB Spectrum Bandwidth

5.1.1. Applicable Standard

Section 15.247(a)(2): For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

5.1.2. Measuring Instruments

Item 18 of the table on section 6.

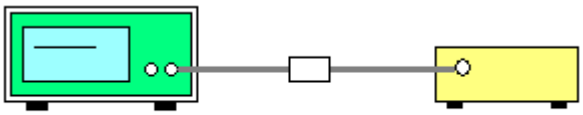
5.1.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP30
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2437 MHz / 2462 MHz
  Span Frequency : > 6dB Bandwidth
  RB : 100 kHz
  VB : 100 kHz
  Detector : Peak
  Trace : Max Hold
  Sweep Time : Auto

5.1.4. Test Procedures

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.Trace to Max hold and Detector PK.
3. The 6dB bandwidth is the spectrum width with level below the peak level.
4. Repeat above 1~3 points for the lowest, middle and highest channel of the EUT.

5.1.5. Test Setup Layout



5.1.6. Test Criteria

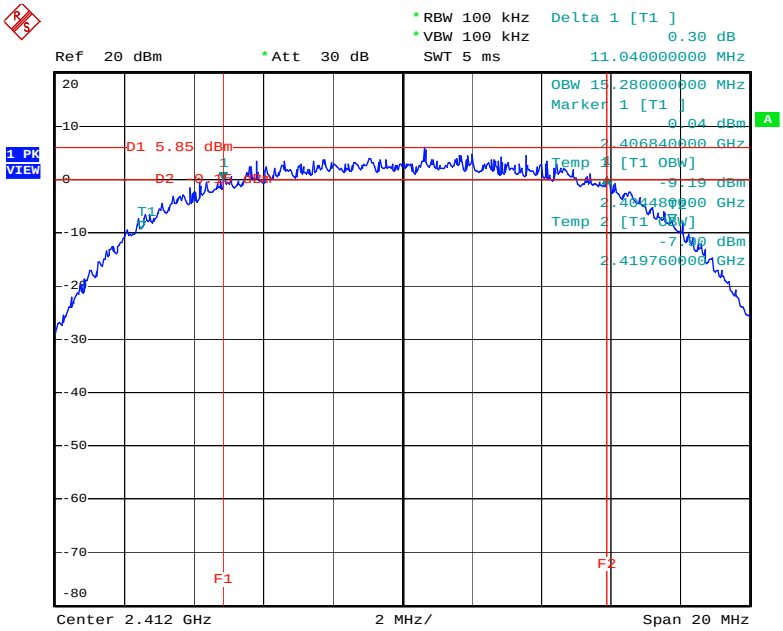
All test results complied with the requirements of 15.247(a)(2). Measurement Uncertainty is $1x10^{-5}$.

5.1.7. Test Result

- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung

Modulation Type	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Min. Limit
DSSS	01	2412 MHz	11.04	15.28	0.5
DSSS	06	2437 MHz	12.04	15.24	0.5
DSSS	11	2462 MHz	12.36	15.32	0.5
OFDM	01	2412 MHz	16.40	16.48	0.5
OFDM	06	2437 MHz	16.40	16.48	0.5
OFDM	11	2462 MHz	16.08	16.48	0.5
11g Turbo Mode	06	2437 MHz	31.36	32.88	0.5

Modulation Type: DSSS (Channel 01)：



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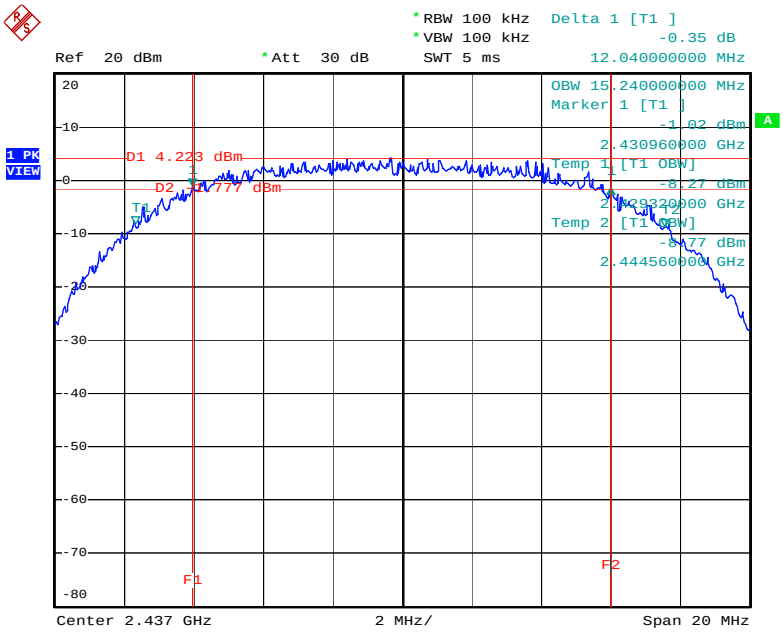
Modulation Type: DSSS (Channel 06)：



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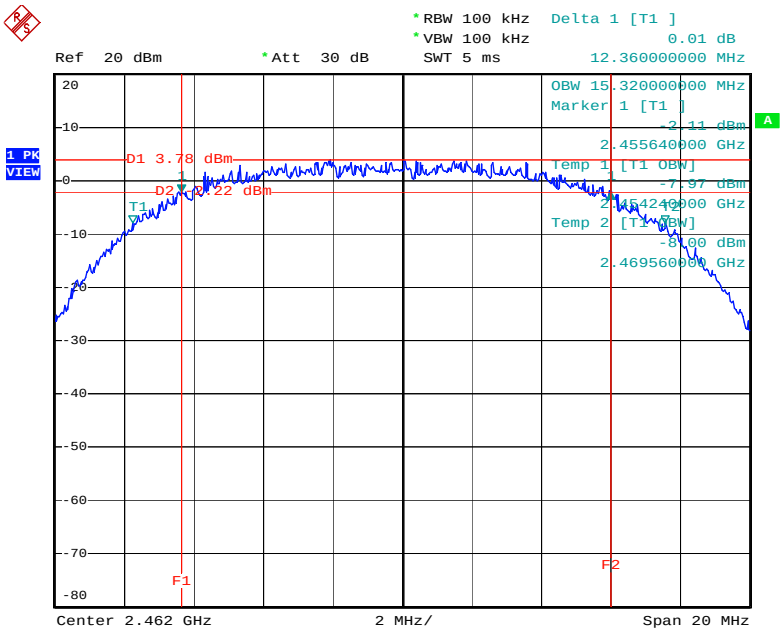
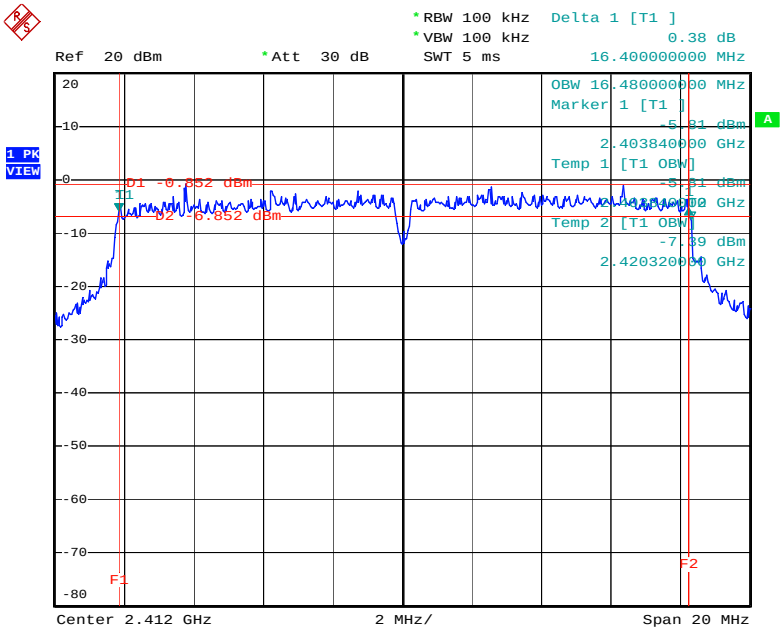
Modulation Type: DSSS (Channel 11)：



Date: 28.JUL.2005 17:06:27

Modulation Type: OFDM (Channel 01)：



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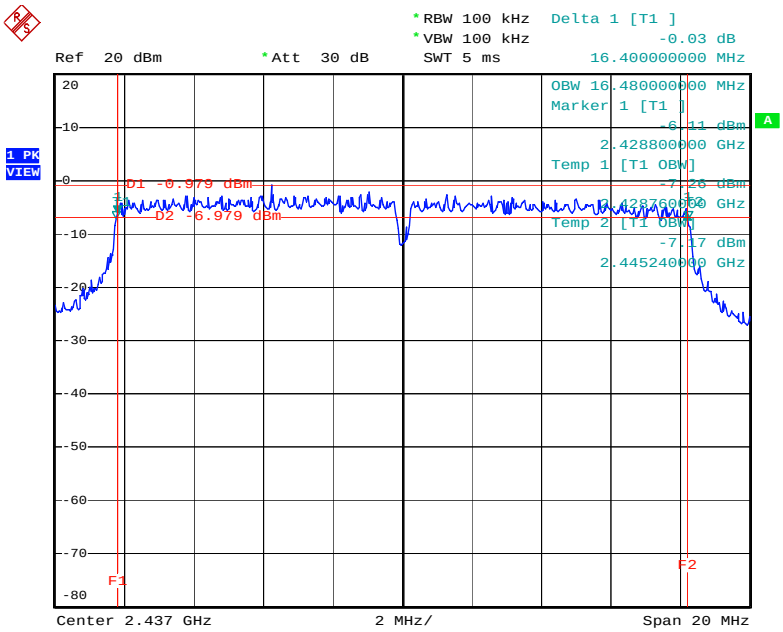
Modulation Type: OFDM (Channel 06)：



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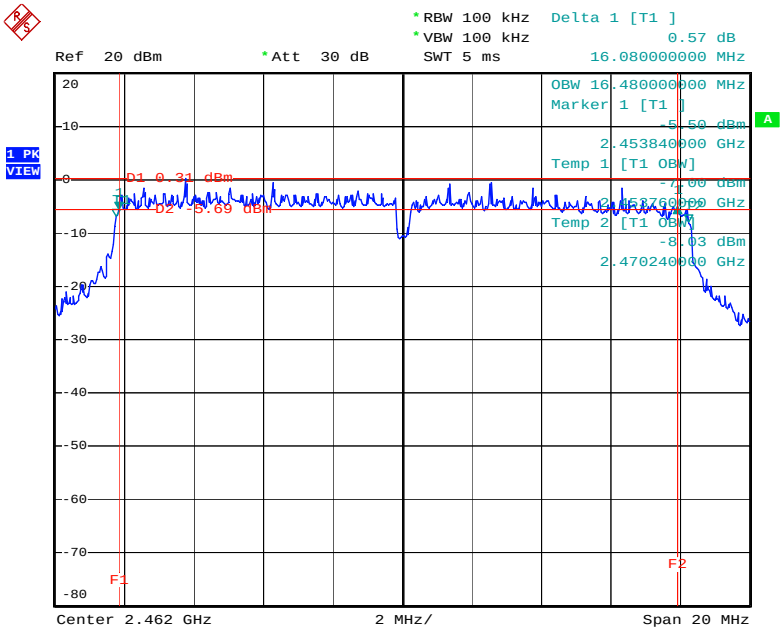
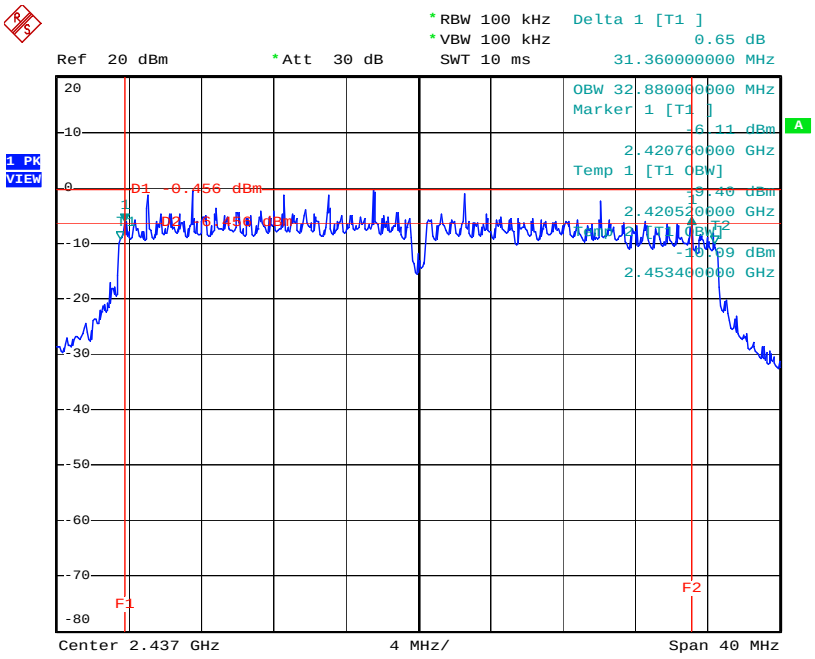
Modulation Type: OFDM (Channel 11)：



Date: 28.JUL.2005 17:10:24

Modulation Type: OFDM-11g Turbo Mode (Channel 06)：



5.2. Test of Maximum Peak Conducted Output Power

5.2.1. Applicable Standard

Section 15.247(b)(3): The maximum peak output power shall not exceed 1 watt (30dBm). Except as shown below, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the above stated values by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

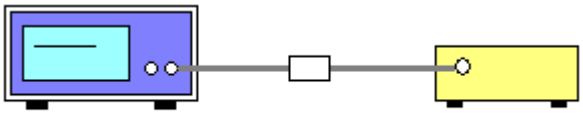
5.2.2. Measuring Instruments

Item 19, 21 of the table on section 6.

5.2.3. Test Procedures and Test Instruments Setting

1. The transmitter output was connected to the peak power meter through an attenuator.
2. Repeated point 1 for the lowest, middle and highest channel of the EUT.

5.2.4. Test Setup Layout



5.2.5. Test Criteria

All test results complied with the requirements of 15.247(b)(3). Measurement Uncertainty is 1.5dB.

5.2.6. Test Result of Conducted Power

- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)
DSSS	01	2412 MHz	17.84	30
DSSS	06	2437 MHz	17.56	30
DSSS	11	2462 MHz	17.69	30
OFDM	01	2412 MHz	19.87	30
OFDM	06	2437 MHz	19.43	30
OFDM	11	2462 MHz	19.87	30
11g Turbo Mode	06	2437 MHz	18.56	30

5.3. Test of Peak Power Spectral Density

5.3.1. Applicable Standard

Section 15.247(e): For digital modulation systems, the peak 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.

5.3.2. Measuring Instruments

Item 18 of the table on section 6.

5.3.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP30
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2437 MHz / 2462 MHz
  Span Frequency : 1.5MHz
  RB : 3 kHz
  VB : 30 kHz
  Detector : Peak
  Trace : Max Hold
  Sweep Time : 500s

5.3.4. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
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.
5. Repeated points 1~4 for the lowest, middle and highest channel of the EUT.

5.3.5. Test Setup Layout

5.3.6. Test Criteria

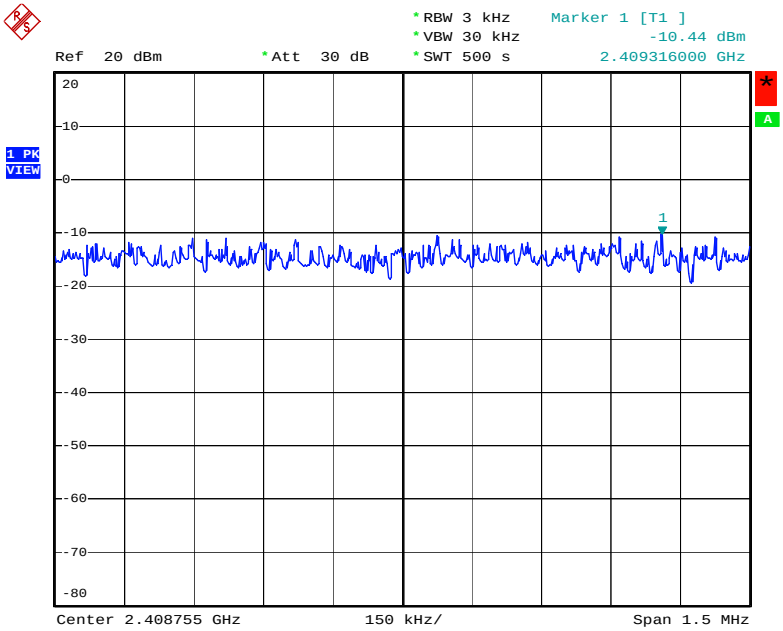
All test results complied with the requirements of 15.247(e). Measurement Uncertainty is 1.5dB.

5.3.7. Test Result

- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung

Modulation Type	Channel No.	Frequency (MHz)	Power Density (dBm)	Limits (dBm)
DSSS	01	2412 MHz	-10.44	8
DSSS	06	2437 MHz	-9.98	8
DSSS	11	2462 MHz	-10.18	8
OFDM	01	2412 MHz	-13.26	8
OFDM	06	2437 MHz	-14.49	8
OFDM	11	2462 MHz	-13.68	8
11g Turbo Mode	06	2437 MHz	-16.60	8

Modulation Type: DSSS (Channel 01)：



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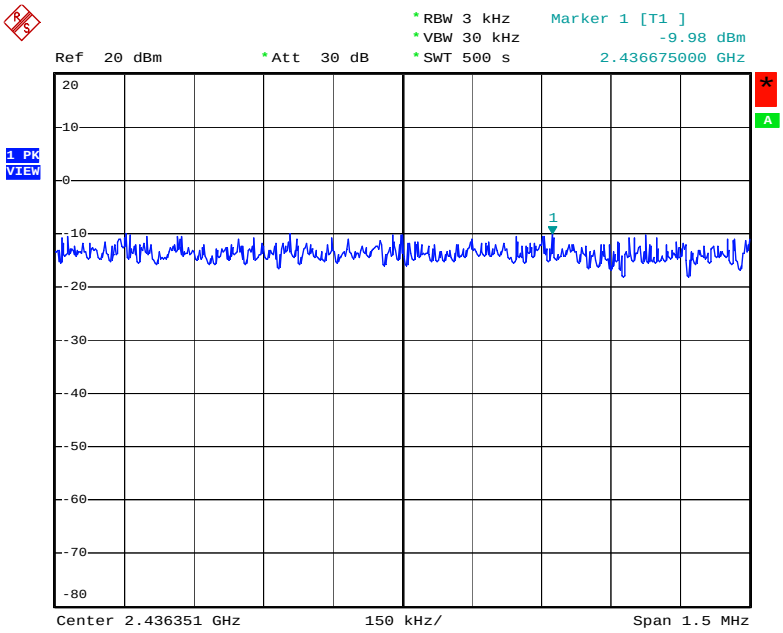
Modulation Type: DSSS (Channel 06)：



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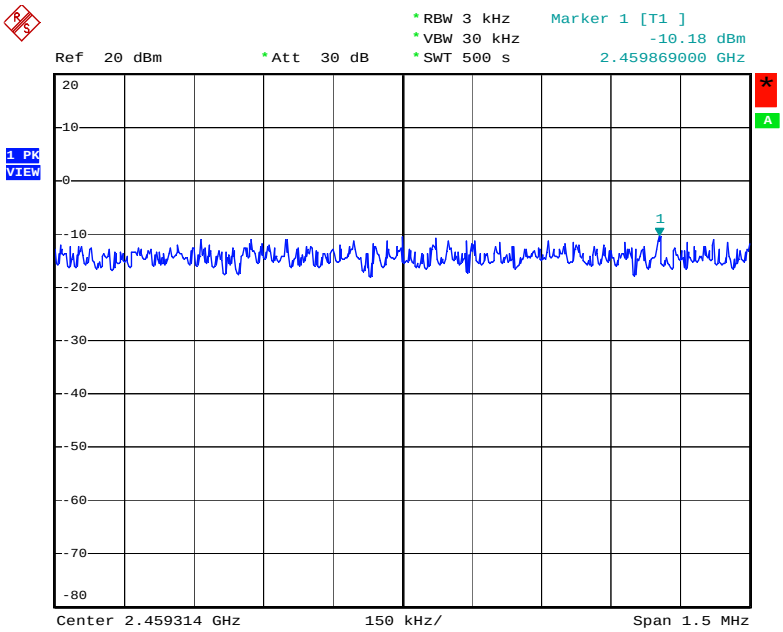
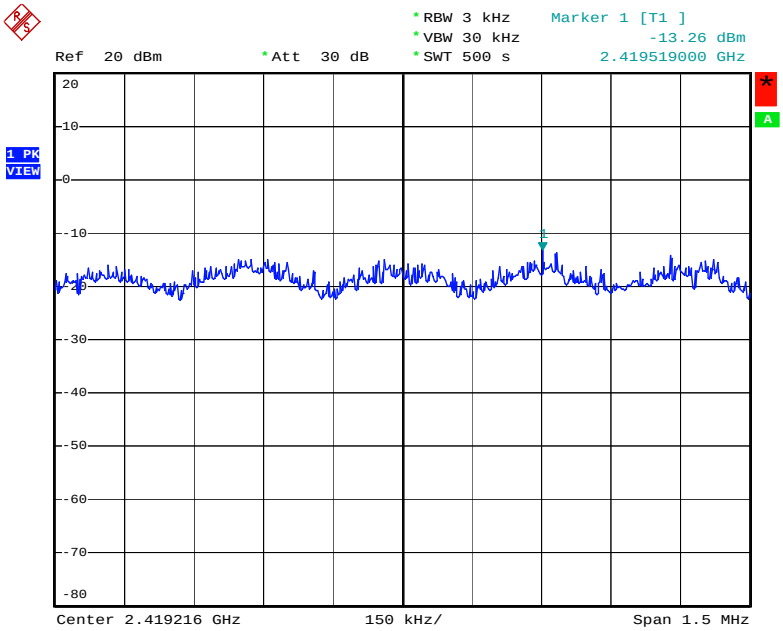
Modulation Type: DSSS (Channel 11)：



Date: 28.JUL.2005 17:06:43

Modulation Type: OFDM (Channel 01)：



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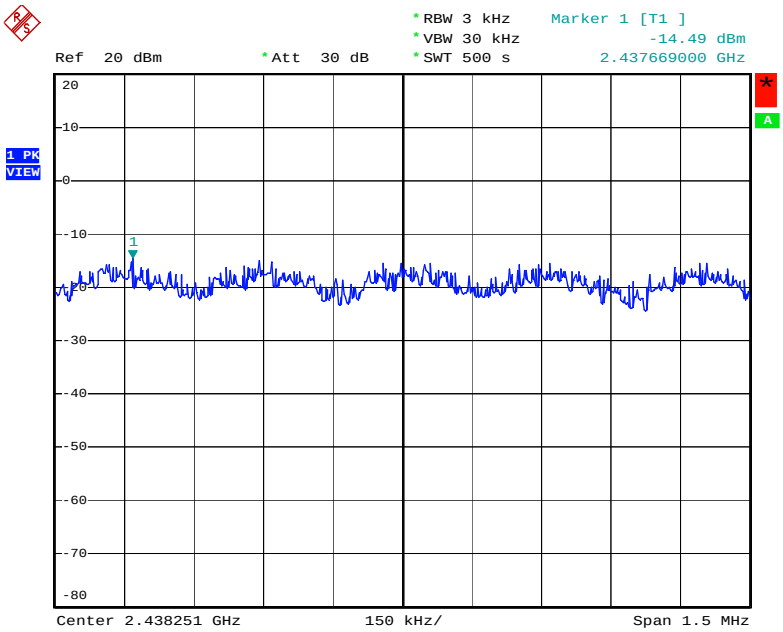
Modulation Type: OFDM (Channel 06)：



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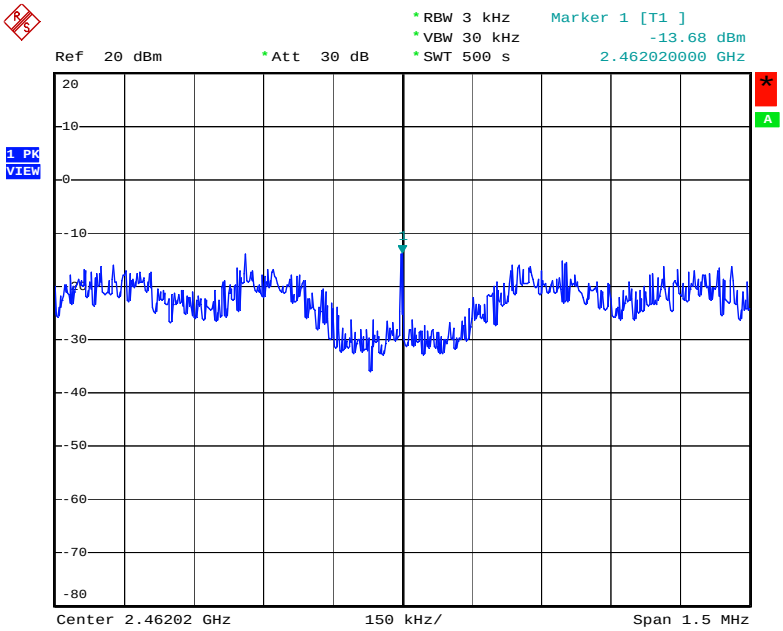
Modulation Type: OFDM (Channel 11)：



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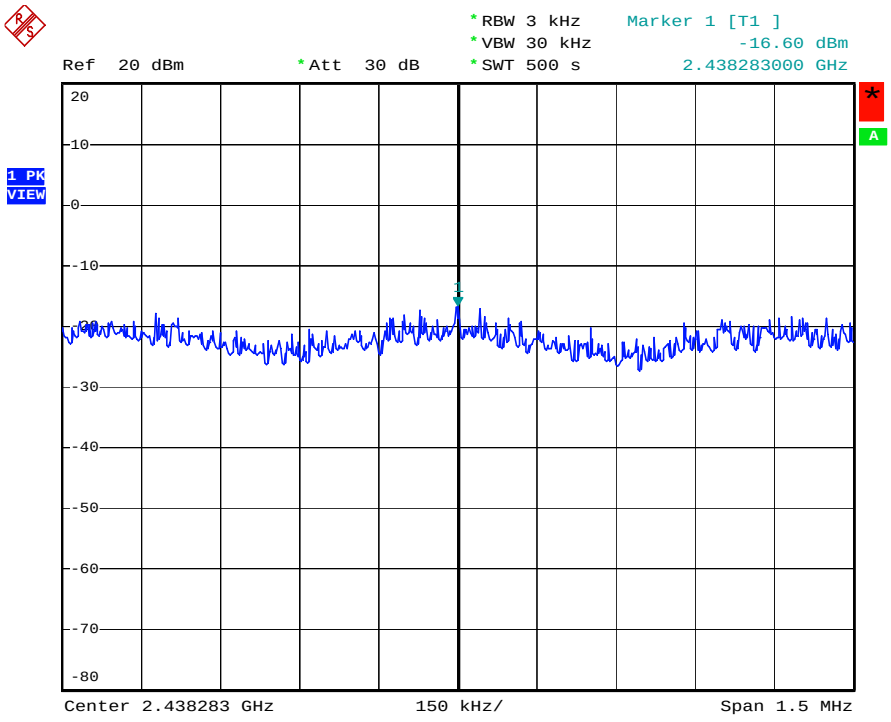
Modulation Type: OFDM-11g Turbo Mode (Channel 06)：



Date: 28.JUL.2005 17:12:45

5.4. Test of Band Edges Emission

5.4.1. Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

5.4.2. Measuring Instruments

Item 6~17 of the table on section 6 for radiated measurement.
Item 18 of the table on section 6 for conducted measurement.

5.4.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP30 (Conducted Measurement)
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2462 MHz
  Span Frequency : 100MHz
  RB : 100 kHz
  VB : 100 kHz
  Detector : Peak
  Trace : Max Hold
  Sweep Time : Auto

- Spectrum Analyzer : R&S FSP40 (Radiated Measurement)
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2462 MHz
  Span Frequency : 100MHz
  RB : 1 MHz for PK value / 1 MHz for AV value
  VB : 1 MHz for PK value / 10 Hz for AV value
  Detector : Peak
  Trace : Max Hold
  Sweep Time : Auto

5.4.4. Test Procedures and Test Instruments Setting

Conducted Measurement

1. The transmitter is set to the lowest channel.
2. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including

100MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.

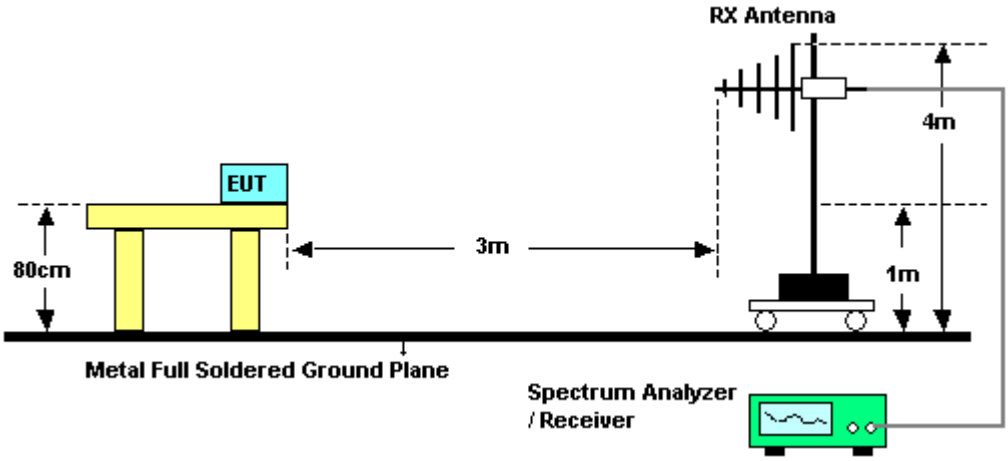
4. The lowest band edges emission was measured and recorded.
5. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

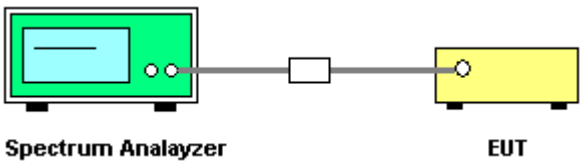
1. Configure the EUT according to ANSI C63.4-2003.
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For band edge emission in restriction bands, use 10Hz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1 MHz RBW for reading under PK.
6. The transmitter set to the highest channel and repeated 2~5.

5.4.5. Test Setup

Radiated Method



Conducted Method

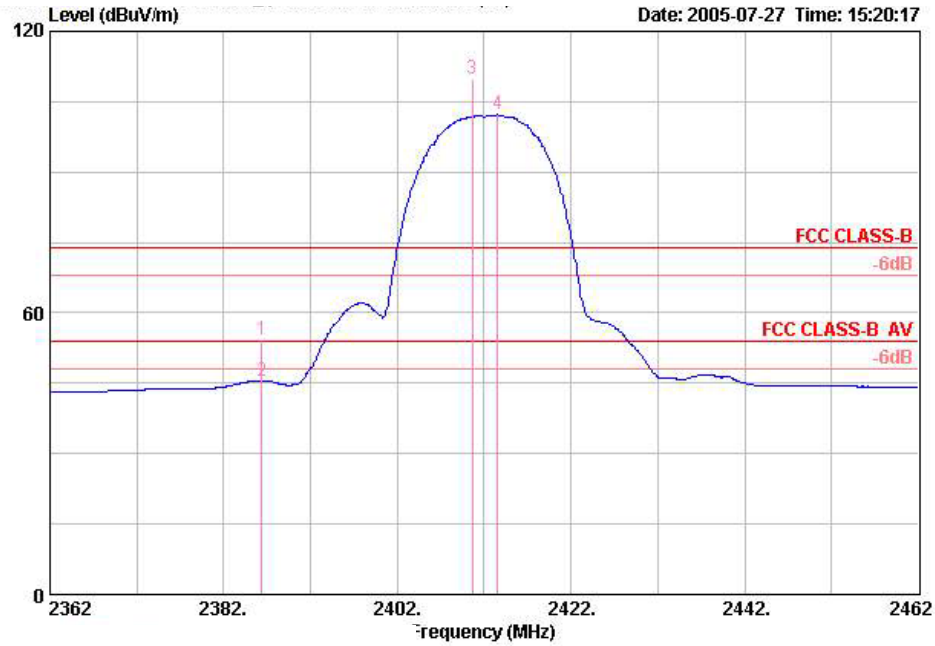


5.4.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is $1x10^{-5}$.

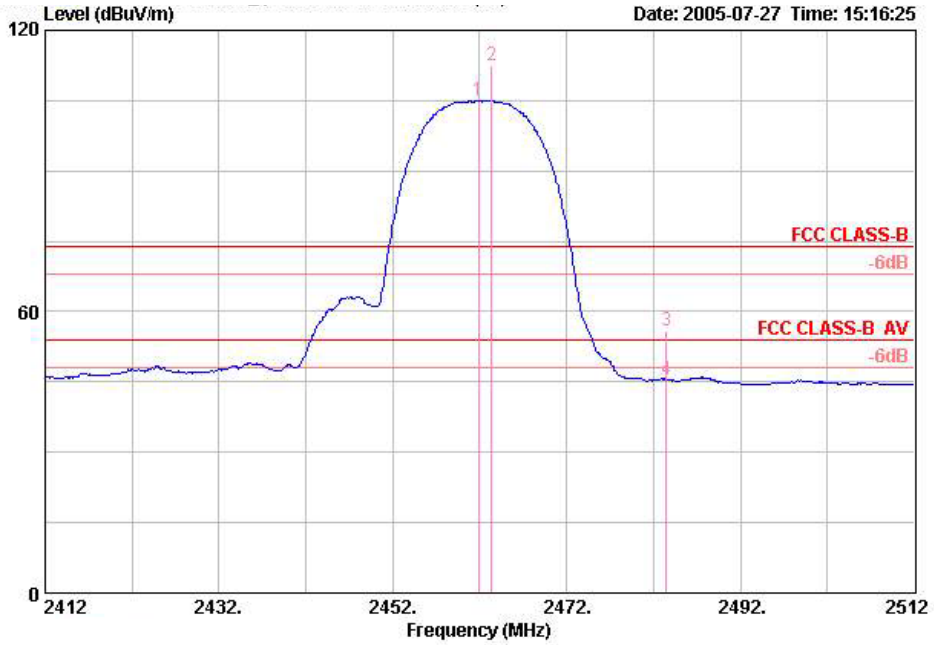
5.4.7. Test Result of Radiated Emission

- DSSS CH 01
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung



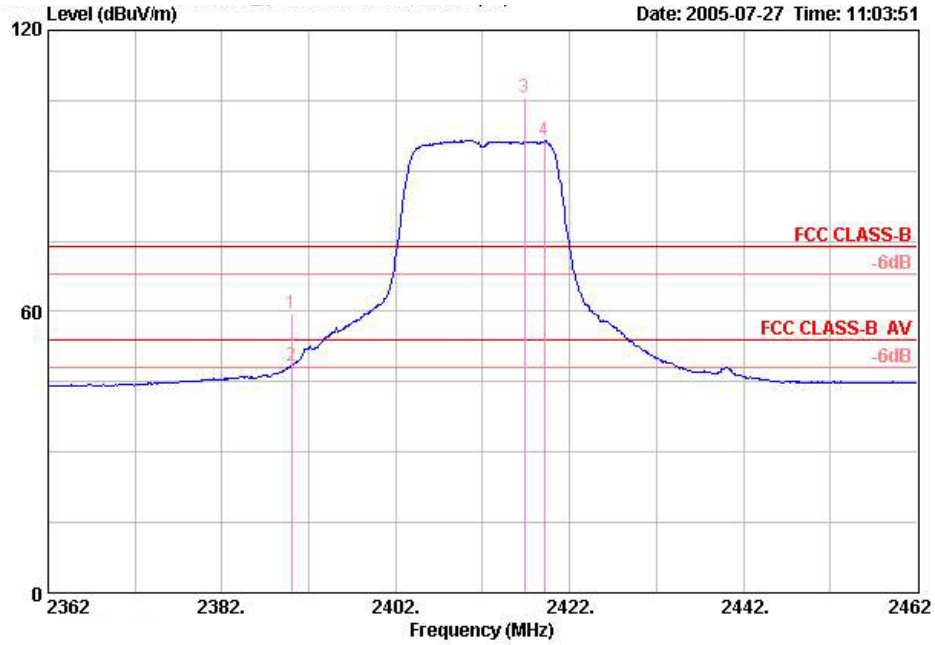
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	2386.400	54.40	-19.60	74.00	28.13	2.00	0.00	24.26	VERTICAL	PEAK
2 @	2386.400	45.61	-8.39	54.00	28.13	2.00	0.00	15.48	VERTICAL	AVERAGE

- DSSS CH 11
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung



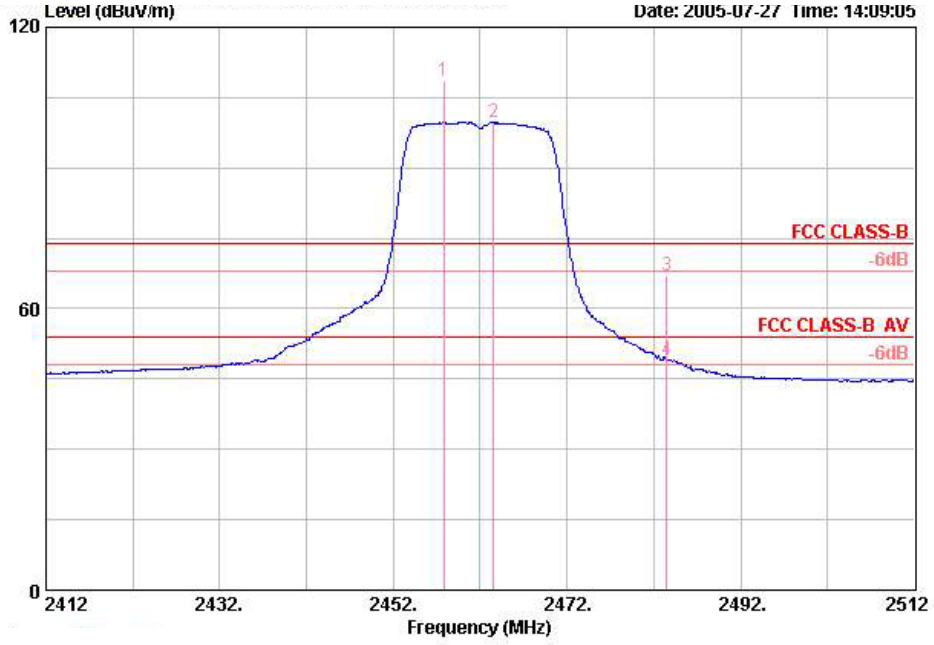
Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
2483.500	55.87	-18.13	74.00	28.36	2.04	0.00	25.48	VERTICAL	PEAK
2483.500	45.50	-8.50	54.00	28.36	2.04	0.00	15.11	VERTICAL	AVERAGE

- OFDM CH 01
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung



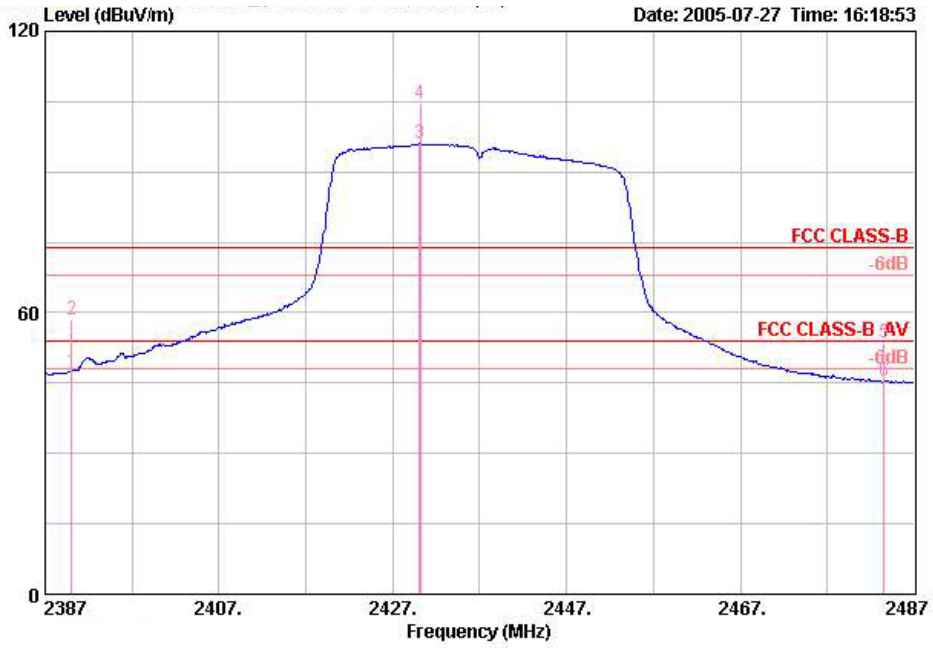
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	2390.000	59.46	-14.54	74.00	28.13	2.00	0.00	29.32	HORIZONTAL	PEAK
2 @	2390.000	48.27	-5.73	54.00	28.13	2.00	0.00	18.13	HORIZONTAL	AVERAGE

- OFDM CH 11
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung



Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
2483.500	66.94	-7.06	74.00	28.36	2.04	0.00	36.54	VERTICAL	PEAK
2483.500	48.92	-5.08	54.00	28.36	2.04	0.00	18.52	VERTICAL	AVERAGE

- OFDM CH 6
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Leo Hung

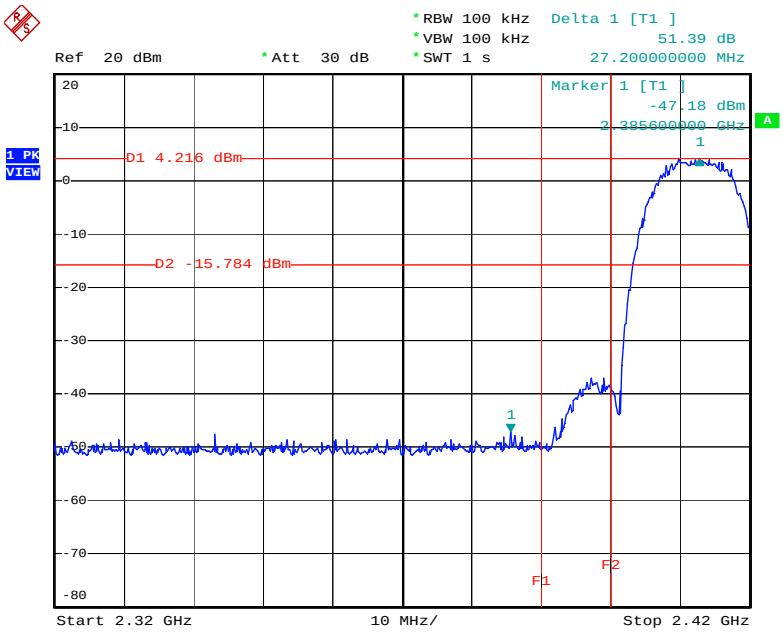


	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	2390.000	47.47	-6.53	54.00	28.13	2.00	0.00	17.34	VERTICAL	AVERAGE
2 @	2390.000	58.63	-15.37	74.00	28.13	2.00	0.00	28.50	VERTICAL	PEAK
3 @	2430.100	95.97	41.97	54.00	28.22	2.02	0.00	65.73	VERTICAL	Average
4 @	2430.200	104.53	30.53	74.00	28.22	2.02	0.00	74.29	VERTICAL	PEAK
5 @	2483.500	53.69	-20.31	74.00	28.36	2.04	0.00	23.29	VERTICAL	PEAK
6 @	2483.500	45.37	-8.63	54.00	28.36	2.04	0.00	14.97	VERTICAL	AVERAGE

5.4.8. Test Result of Conducted Emission

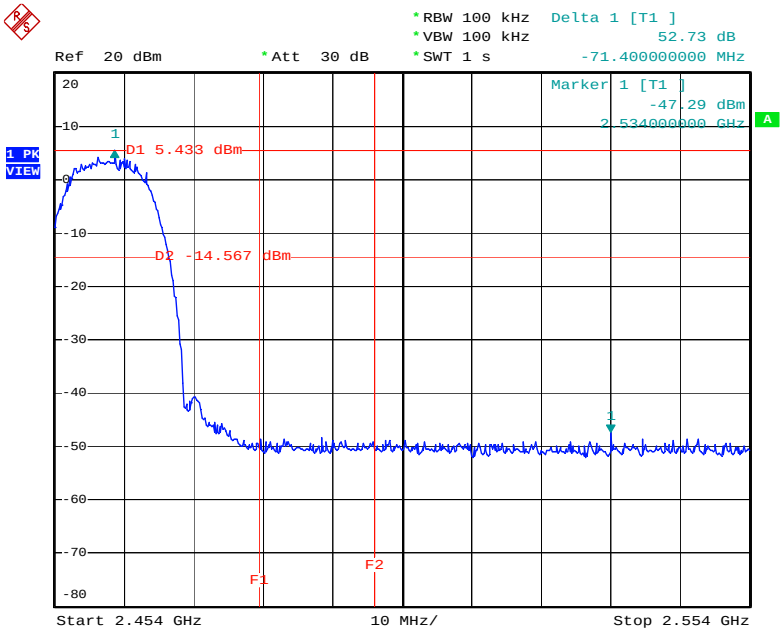
Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2385.60	-47.18	-31.40	-15.784	PK
DSSS	11	2534.00	-47.29	-32.72	-14.567	PK
OFDM	01	2389.80	-47.58	-27.65	-19.934	PK
OFDM	11	2518.00	-47.38	-26.84	-20.536	PK
OFDM (Turbo)	06	2304.60	-47.53	-27.03	-20.505	PK
OFDM (Turbo)	06	2548.60	-47.90	-27.63	-20.271	PK

Modulation Type: DSSS (Channel 01)：



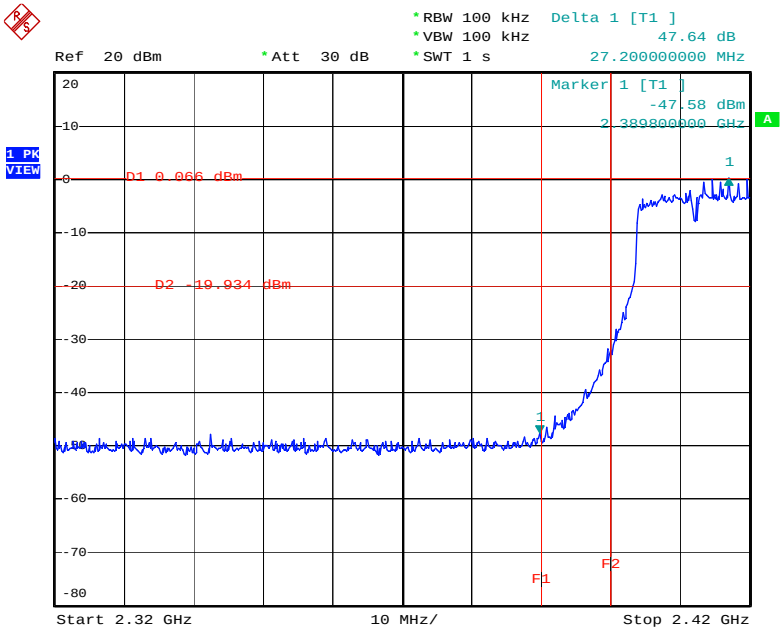
Date: 28.JUL.2005 17:04:40

Modulation Type: DSSS (Channel 11)：



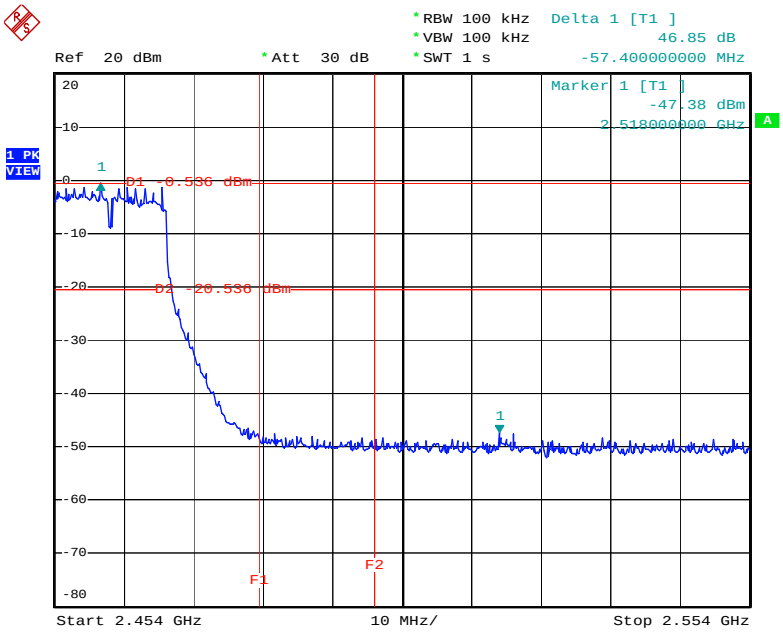
Date: 28.JUL.2005 17:06:50

Modulation Type: OFDM (Channel 01)：



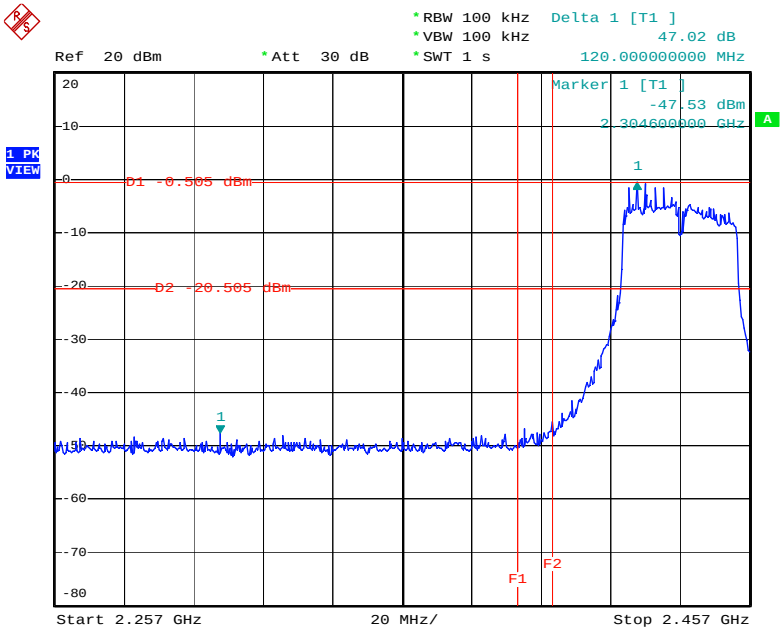
Date: 28.JUL.2005 17:08:49

Modulation Type: OFDM (Channel 11)：



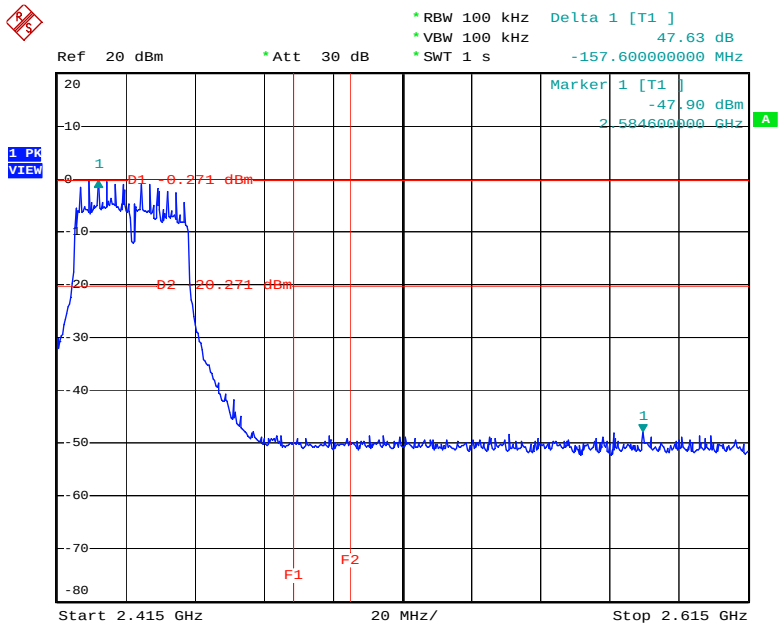
Date: 28.JUL.2005 17:10:47

Modulation Type: OFDM-11g Turbo Mode (Channel 06)：



Date: 28.JUL.2005 17:12:54

Modulation Type: OFDM-11g Turbo Mode (Channel 06)：



Date: 28.JUL.2005 17:13:03

5.5. Test of AC Power Line Conducted Emission

5.5.1. Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device 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

5.5.2. Measuring Instruments

Please reference item 1~5 in chapter 6 for the instruments used for testing.

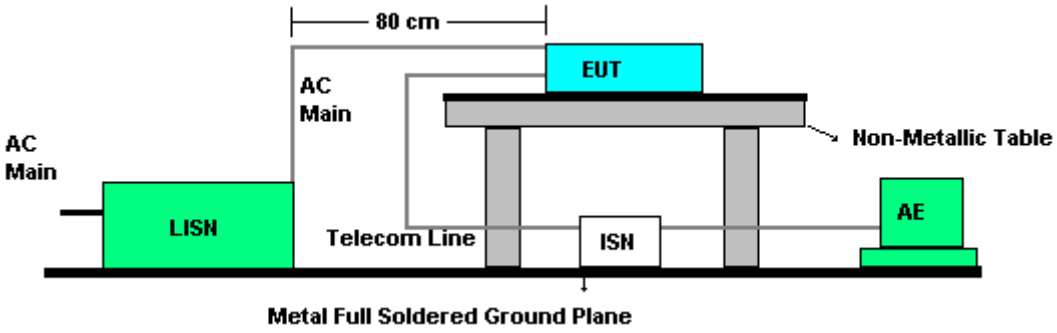
5.5.3. Description of Major Test Instruments Setting

- Test Receiver : R&S ESCS 30
  Attenuation : 10 dB
  Start Frequency : 0.15 MHz
  Stop Frequency : 30 MHz
  IF Bandwidth : 9 KHz

5.5.4. Test Procedures

1. Configure the EUT according to ANSI C63.4-2003.
2. The 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 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 for each RF channel.

5.5.5. Test Setup Layout



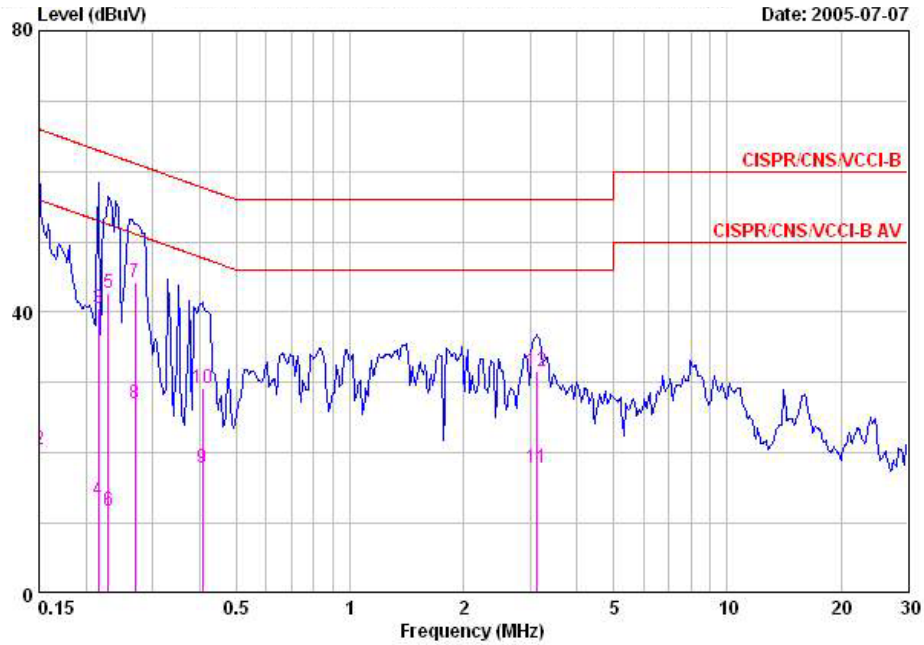
5.5.6. Test Criteria

All test results complied with the requirements of 15.207. Measurement Uncertainty is 2.54dB.

5.5.7. Test Result of Conducted Emission

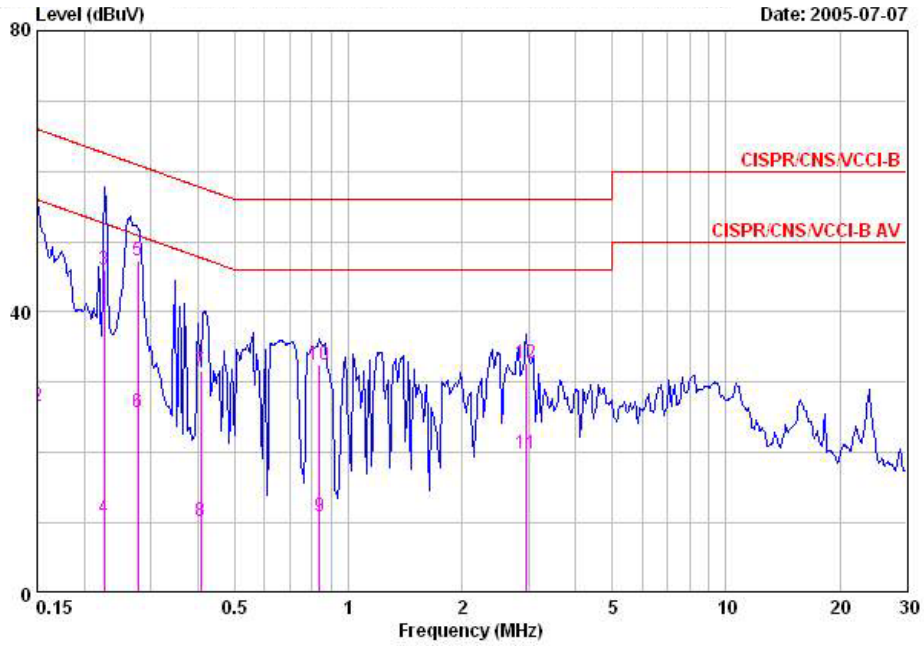
- Temperature: 24°C
- Relative Humidity: 67%
- Test Engineer: Stan Peng

Line to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15000	48.58	-17.42	66.00	46.38	2.00	0.20	QP
2	0.15000	20.54	-35.46	56.00	18.34	2.00	0.20	AVERAGE
3	0.21506	40.60	-22.41	63.01	39.25	1.15	0.20	QP
4	0.21506	13.32	-39.69	53.01	11.97	1.15	0.20	AVERAGE
5	0.22918	42.74	-19.74	62.48	41.53	1.01	0.20	QP
6	0.22918	11.74	-40.74	52.48	10.53	1.01	0.20	AVERAGE
7 @	0.26926	44.32	-16.82	61.14	43.22	0.90	0.20	QP
8	0.26926	26.98	-24.16	51.14	25.88	0.90	0.20	AVERAGE
9	0.40615	17.80	-29.93	47.73	17.06	0.54	0.20	AVERAGE
10	0.40615	29.17	-28.56	57.73	28.43	0.54	0.20	QP
11	3.125	17.89	-28.11	46.00	17.36	0.30	0.23	AVERAGE
12	3.125	31.61	-24.39	56.00	31.08	0.30	0.23	QP

Neutral to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.15000	52.76	-13.24	66.00	50.66	1.90	0.20	QP
2	0.15000	26.62	-29.38	56.00	24.52	1.90	0.20	AVERAGE
3 @	0.22556	45.90	-16.71	62.61	44.76	0.94	0.20	QP
4	0.22556	10.68	-41.93	52.61	9.54	0.94	0.20	AVERAGE
5 @	0.27692	47.39	-13.52	60.91	46.49	0.70	0.20	QP
6	0.27692	25.80	-25.11	50.91	24.90	0.70	0.20	AVERAGE
7	0.40596	31.56	-26.17	57.73	30.92	0.44	0.20	QP
8	0.40596	10.14	-37.59	47.73	9.50	0.44	0.20	AVERAGE
9	0.83932	10.86	-35.14	46.00	10.36	0.30	0.20	AVERAGE
10	0.83932	32.50	-23.50	56.00	32.00	0.30	0.20	QP
11	2.946	19.88	-26.12	46.00	19.38	0.30	0.20	AVERAGE
12	2.946	32.71	-23.29	56.00	32.21	0.30	0.20	QP

5.5.8. Photographs of Conducted Emission Test Configuration

FRONT VIEW

REAR VIEW

5.6. Test of Spurious Radiated Emission

5.6.1. Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

5.6.2. Measuring Instruments

Please reference item 6~17 in chapter 6 for the instruments used for testing.

5.6.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP40
  Attenuation : Auto
  Start Frequency : 1000 MHz
  Stop Frequency : 10th carrier harmonic
  RB / VB : 1 MHz / 1MHz for Peak
  RB / VB : 1 MHz / 10Hz for Average

- Test Receiver : R&S ESCS 30
  Attenuation : Auto
  Start Frequency : 9 MHz
  Stop Frequency : 1000 MHz
  RB : 120 KHz for QP or PK

5.6.4. Test Procedures

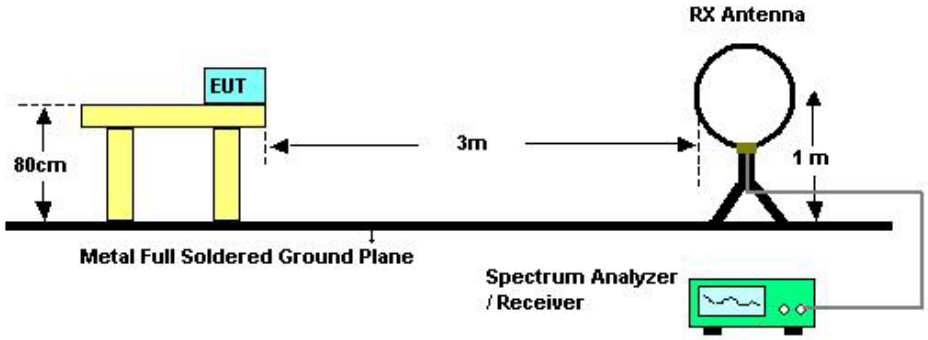
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

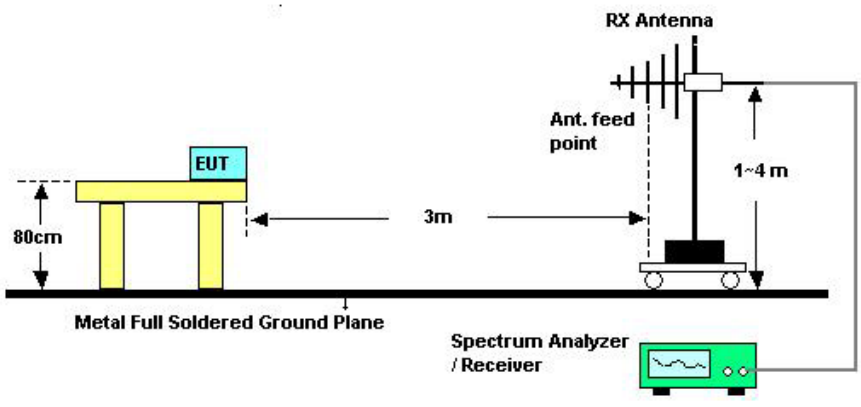
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For 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.

5.6.5. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



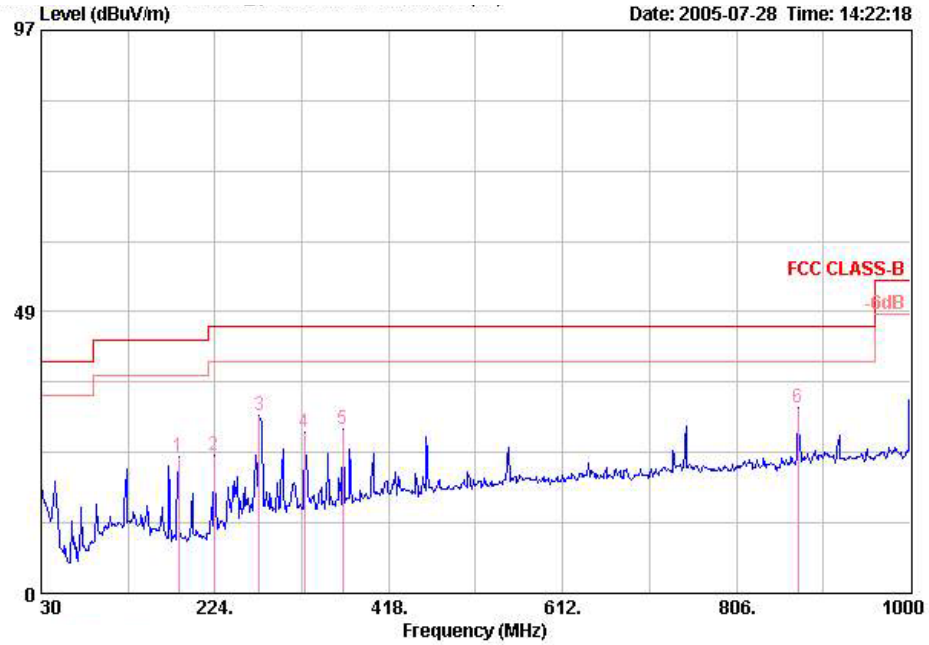
5.6.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is 2.26dB.

5.6.7. Test Results for CH 06 / 2437 MHz (for emission below 1GHz)

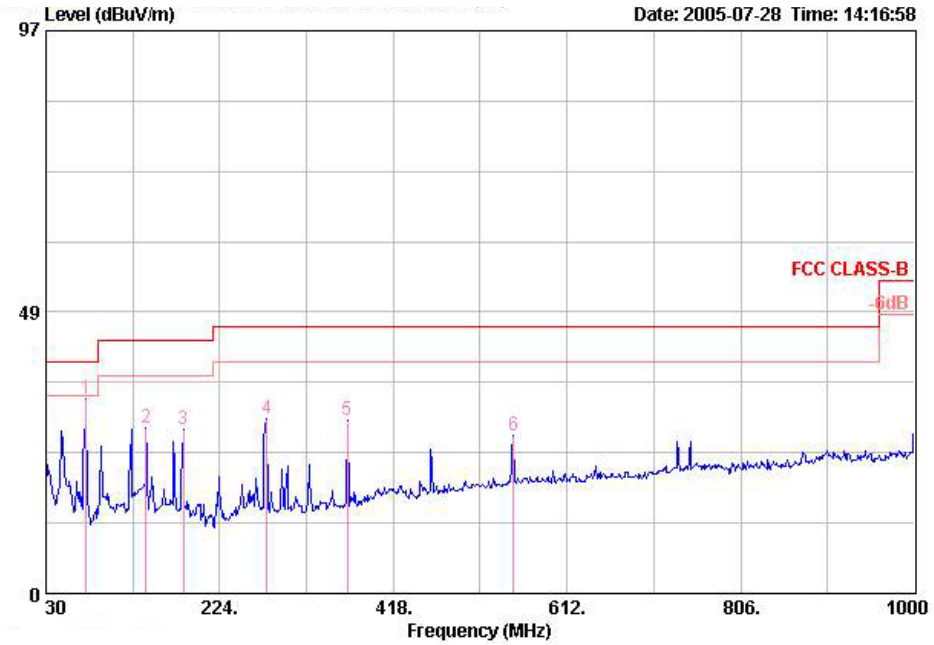
- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	183.260	23.49	-20.01	43.50	8.30	1.07	30.02	44.14	HORIZONTAL	Peak
2	223.030	23.84	-22.16	46.00	8.80	1.18	30.04	43.90	HORIZONTAL	Peak
3	273.470	30.61	-15.39	46.00	12.50	1.31	30.04	46.84	HORIZONTAL	Peak
4	323.910	27.65	-18.35	46.00	13.76	1.42	30.44	42.91	HORIZONTAL	Peak
5	366.590	28.35	-17.65	46.00	14.83	1.51	30.55	42.55	HORIZONTAL	Peak
6	874.870	31.91	-14.09	46.00	20.30	2.39	29.34	38.57	HORIZONTAL	Peak

(B) Polarization: Vertical



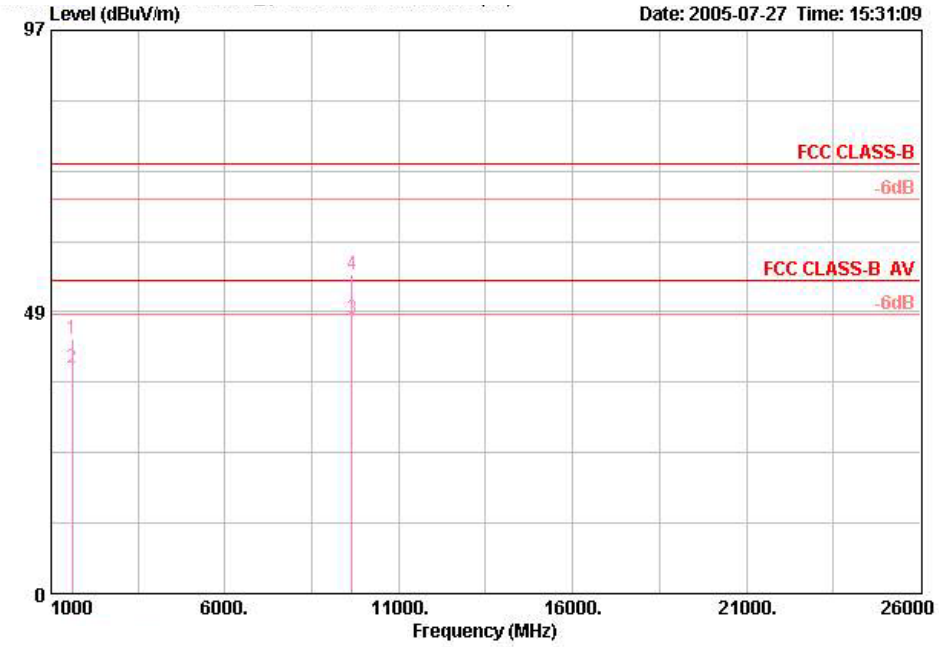
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	74.620	33.61	-6.39	40.00	6.05	0.70	29.98	56.84	VERTICAL	Peak
2	141.550	28.44	-15.06	43.50	10.85	0.94	30.04	46.69	VERTICAL	Peak
3	183.260	28.38	-15.12	43.50	8.30	1.07	30.02	49.03	VERTICAL	Peak
4	276.380	30.15	-15.85	46.00	12.50	1.31	30.04	46.38	VERTICAL	Peak
5	366.590	29.97	-16.03	46.00	14.83	1.51	30.55	44.17	VERTICAL	Peak
6	551.860	27.32	-18.68	46.00	18.39	1.87	30.64	37.70	VERTICAL	Peak

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level
Results for the radiated measurement below 30MHz, no emissions found and caused by the EUT. The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

5.6.8. Test Results for CH 01 / 2412 MHz (for emission above 1GHz)

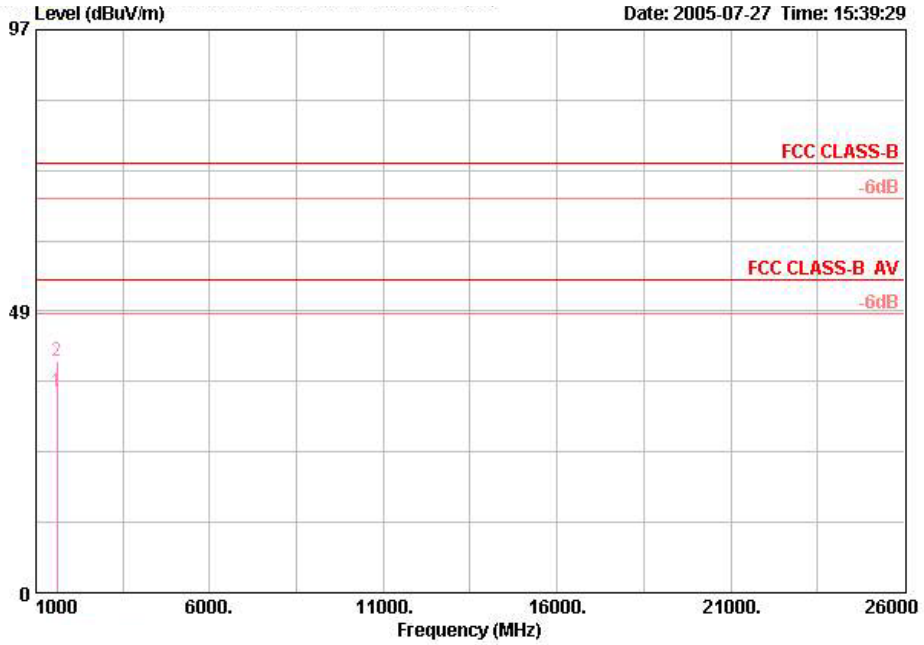
- Modulation Type: DSSS
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1608.010	43.84	-30.16	74.00	25.64	1.46	35.06	51.79	HORIZONTAL	PEAK
2 @	1608.010	38.95	-15.05	54.00	25.64	1.46	35.06	46.90	HORIZONTAL	AVERAGE
3 @	9648.080	47.22	-6.78	54.00	38.42	5.16	35.83	39.48	HORIZONTAL	AVERAGE
4 @	9648.080	55.11	-18.89	74.00	38.42	5.16	35.83	47.36	HORIZONTAL	PEAK

(B) Polarization: Vertical

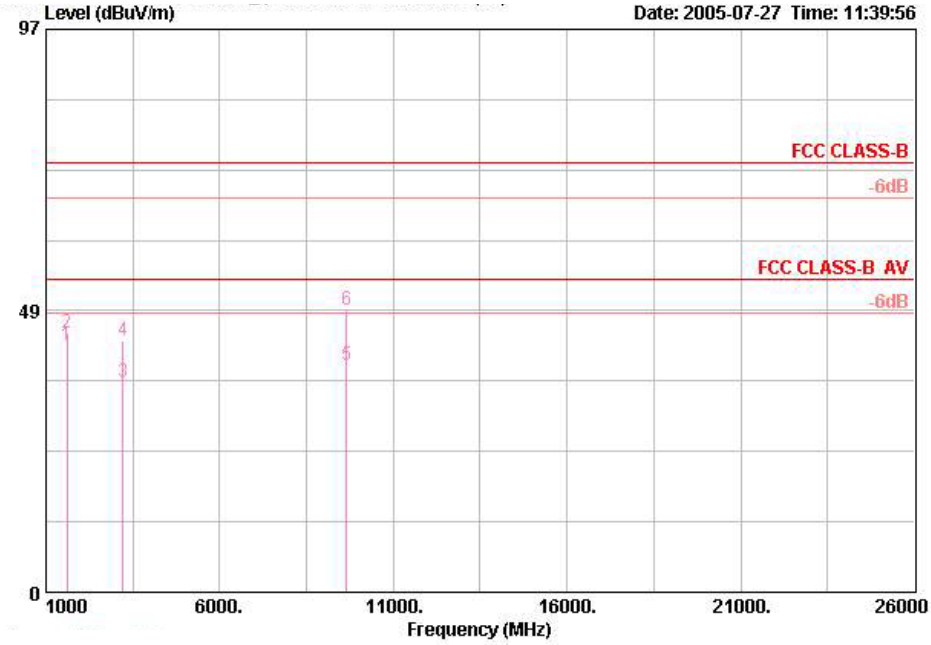


	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	1607.980	34.67	-19.33	54.00	25.64	1.46	35.06	42.62	VERTICAL	AVERAGE
2	1607.980	39.92	-34.08	74.00	25.64	1.46	35.06	47.87	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

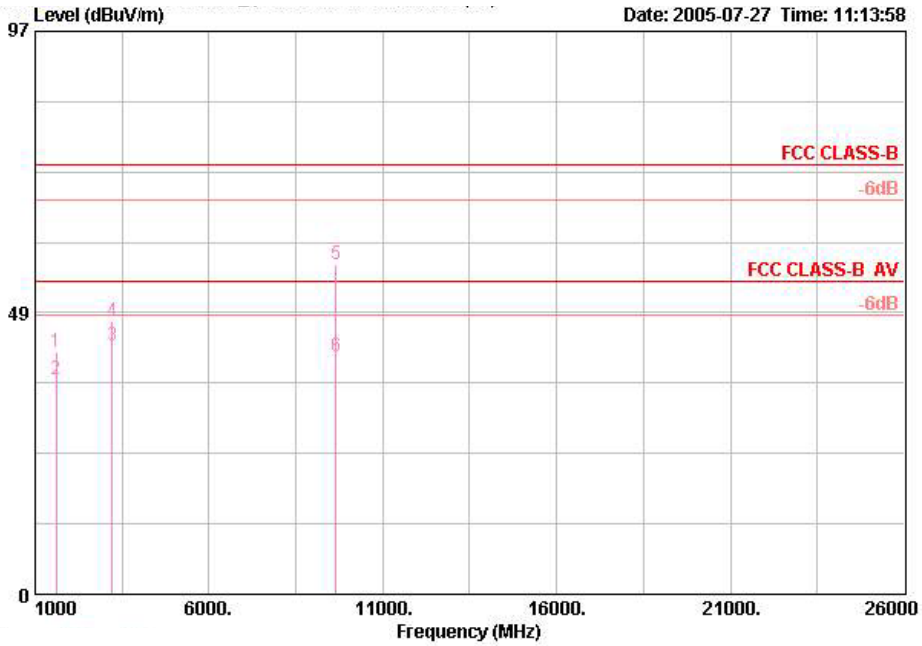
- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1608.040	42.54	-11.46	54.00	25.64	1.46	35.06	50.49	HORIZONTAL	AVERAGE
2 @	1608.040	44.60	-29.40	74.00	25.64	1.46	35.06	52.55	HORIZONTAL	PEAK
3 @	3216.040	36.10	-17.90	54.00	30.66	1.97	35.20	38.67	HORIZONTAL	AVERAGE
4 @	3216.040	43.38	-30.62	74.00	30.66	1.97	35.20	45.95	HORIZONTAL	PEAK
5 @	9648.000	38.99	-15.01	54.00	38.42	5.16	35.83	31.24	HORIZONTAL	AVERAGE
6 @	9648.000	48.58	-25.42	74.00	38.42	5.16	35.83	40.84	HORIZONTAL	PEAK

(B) Polarization: Vertical



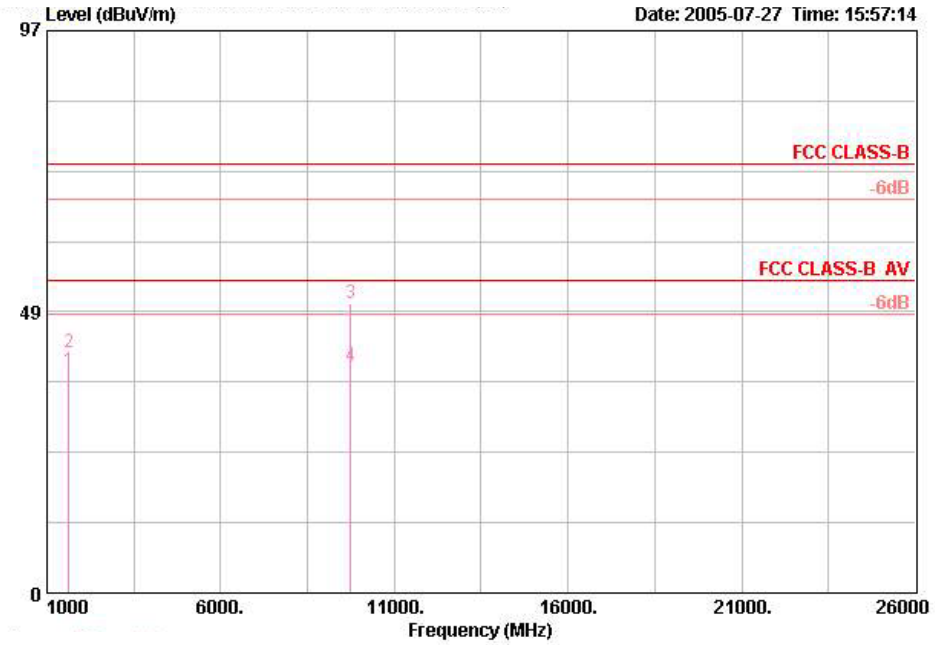
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1608.000	41.89	-32.11	74.00	25.64	1.46	35.06	49.84	VERTICAL	PEAK
2 @	1608.020	37.08	-16.92	54.00	25.64	1.46	35.06	45.03	VERTICAL	AVERAGE
3 @	3216.020	42.88	-11.12	54.00	30.66	1.97	35.20	45.46	VERTICAL	AVERAGE
4 @	3216.020	47.14	-26.86	74.00	30.66	1.97	35.20	49.72	VERTICAL	PEAK
5 @	9644.680	56.78	-17.22	74.00	38.42	5.16	35.83	49.04	VERTICAL	PEAK
6 @	9647.520	40.97	-13.03	54.00	38.42	5.16	35.83	33.23	VERTICAL	AVERAGE

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.6.9. Test Results for CH 06 / 2437 MHz (for emission above 1GHz)

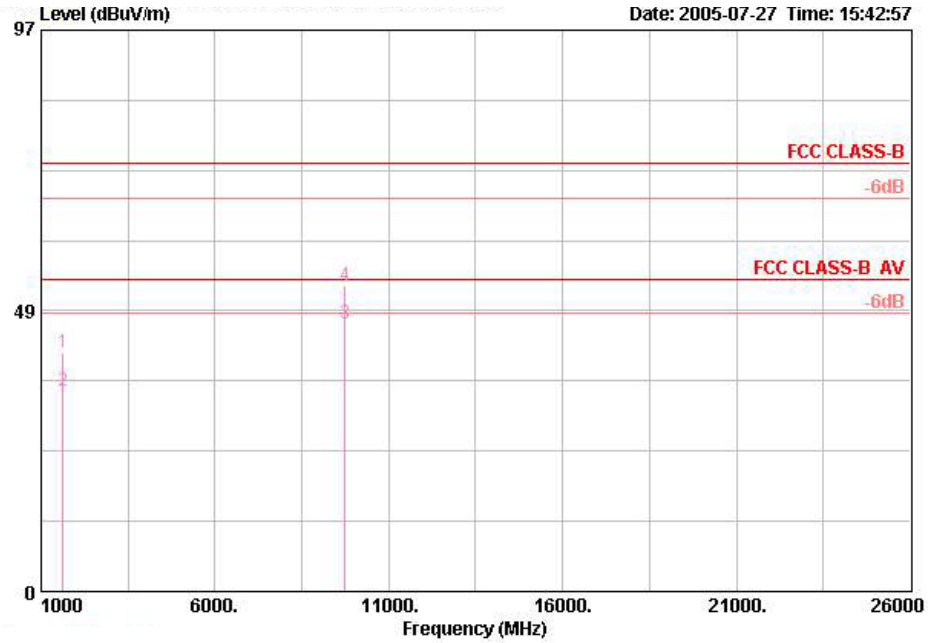
- Modulation Type: DSSS
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.660	38.40	-15.60	54.00	25.71	1.46	35.06	46.29	HORIZONTAL	AVERAGE
2 @	1624.660	41.51	-32.49	74.00	25.71	1.46	35.06	49.40	HORIZONTAL	PEAK
3 @	9748.120	49.89	-24.11	74.00	38.56	5.07	35.85	42.11	HORIZONTAL	PEAK
4 @	9748.120	39.20	-14.80	54.00	38.56	5.07	35.85	31.42	HORIZONTAL	AVERAGE

(B) Polarization: Vertical

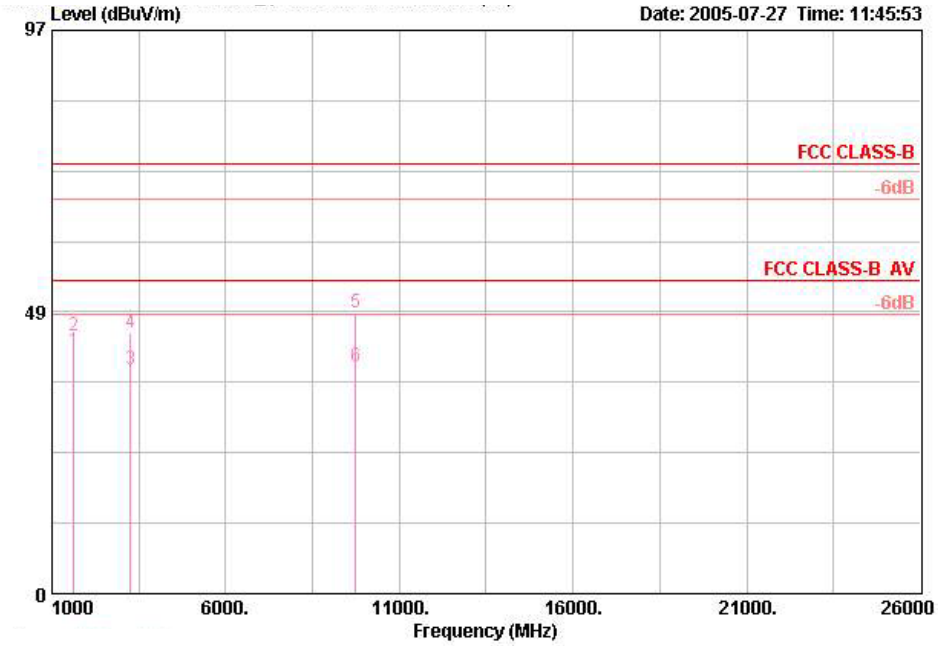


	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.700	41.24	-32.76	74.00	25.71	1.46	35.06	49.12	VERTICAL	PEAK
2 @	1624.700	34.71	-19.29	54.00	25.71	1.46	35.06	42.60	VERTICAL	AVERAGE
3 @	9748.040	46.20	-7.80	54.00	38.56	5.07	35.85	38.42	VERTICAL	AVERAGE
4 @	9748.040	52.95	-21.05	74.00	38.56	5.07	35.85	45.17	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

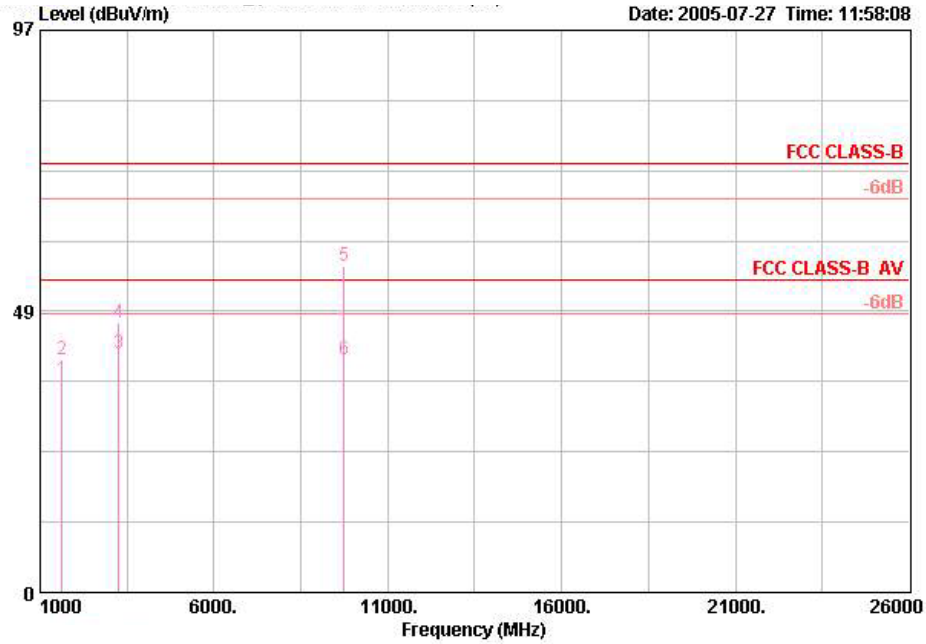
- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.680	41.70	-12.30	54.00	25.71	1.46	35.06	49.59	HORIZONTAL	AVERAGE
2 @	1624.680	44.37	-29.63	74.00	25.71	1.46	35.06	52.26	HORIZONTAL	PEAK
3 @	3249.350	38.68	-15.32	54.00	30.73	2.03	35.20	41.12	HORIZONTAL	AVERAGE
4 @	3249.350	44.95	-29.05	74.00	30.73	2.03	35.20	47.38	HORIZONTAL	PEAK
5 @	9748.300	48.30	-25.70	74.00	33.33	3.22	35.10	46.85	HORIZONTAL	Peak
6 @	9748.300	39.10	-14.90	54.00	33.33	3.22	35.10	37.65	HORIZONTAL	Average

(B) Polarization: Vertical



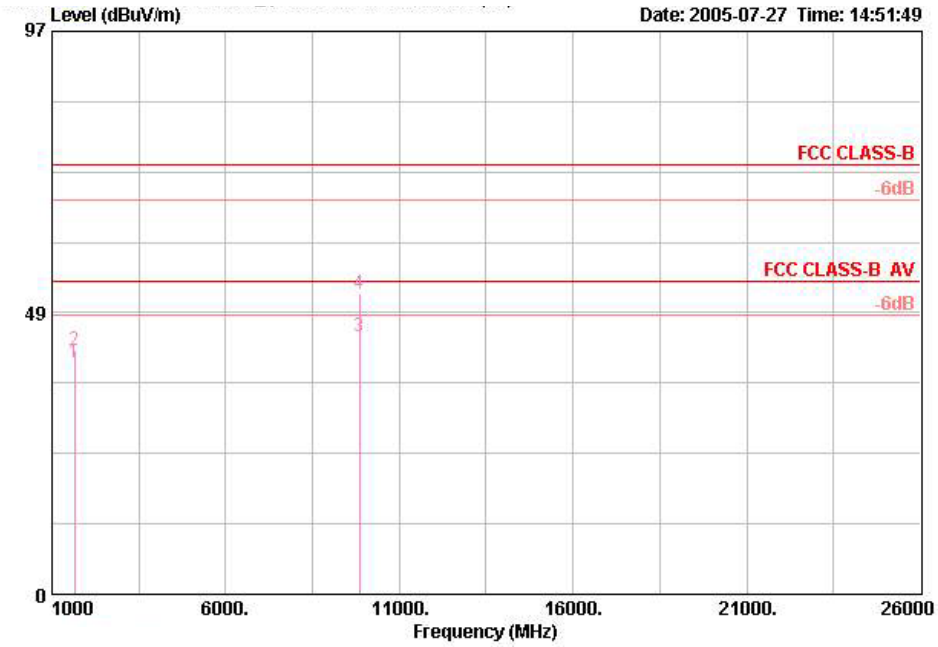
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.710	36.84	-17.16	54.00	25.71	1.46	35.06	44.72	VERTICAL	AVERAGE
2 @	1624.710	40.30	-33.70	74.00	25.71	1.46	35.06	48.19	VERTICAL	PEAK
3 @	3249.380	41.28	-12.72	54.00	30.73	2.03	35.20	43.71	VERTICAL	AVERAGE
4 @	3249.380	46.54	-27.46	74.00	30.73	2.03	35.20	48.98	VERTICAL	PEAK
5 @	9747.860	56.30	-17.70	74.00	38.56	5.07	35.85	48.52	VERTICAL	Peak
6 @	9747.860	40.20	-13.80	54.00	38.56	5.07	35.85	32.42	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.6.10. Test Results for CH 11 / 2462 MHz (for emission above 1GHz)

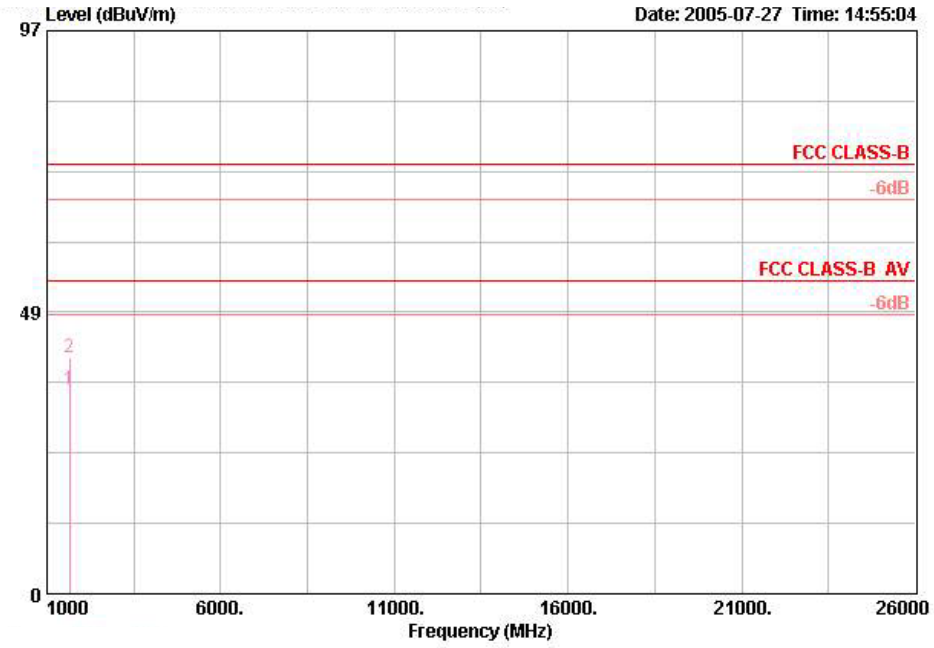
- Modulation Type: DSSS
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1641.380	39.82	-14.18	54.00	25.77	1.46	35.05	47.63	HORIZONTAL	AVERAGE
2 @	1641.380	41.93	-32.07	74.00	25.77	1.46	35.05	49.74	HORIZONTAL	PEAK
3 @	9847.900	44.43	-9.57	54.00	38.68	4.93	35.87	36.68	HORIZONTAL	AVERAGE
4 @	9847.900	51.89	-22.11	74.00	38.68	4.93	35.87	44.15	HORIZONTAL	PEAK

(B) Polarization: Vertical

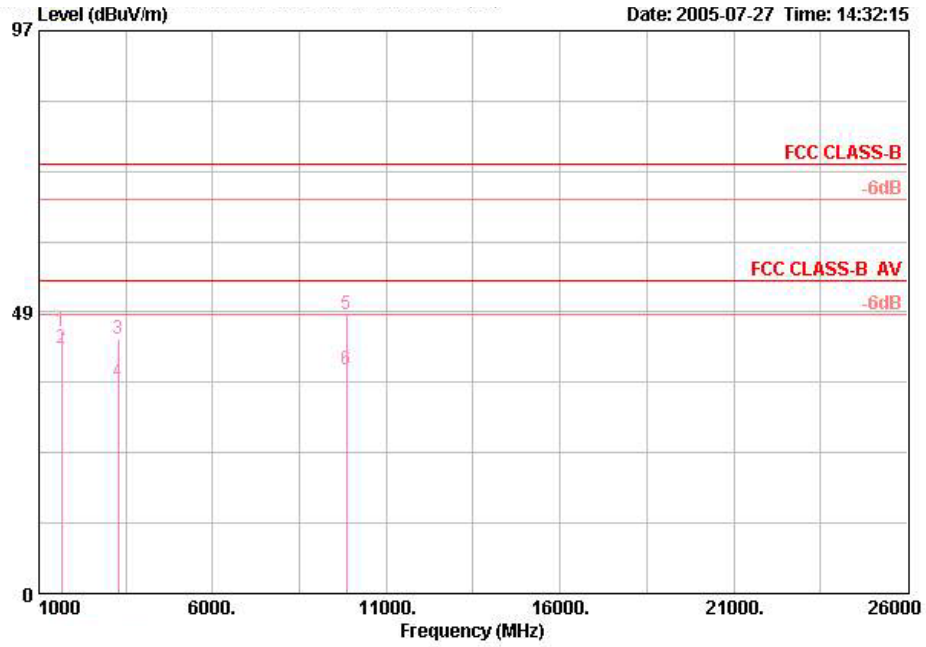


	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1	1641.350	35.12	-18.88	54.00	25.77	1.46	35.05	42.93	VERTICAL	AVERAGE
2	1641.350	40.71	-33.29	74.00	25.77	1.46	35.05	48.53	VERTICAL	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

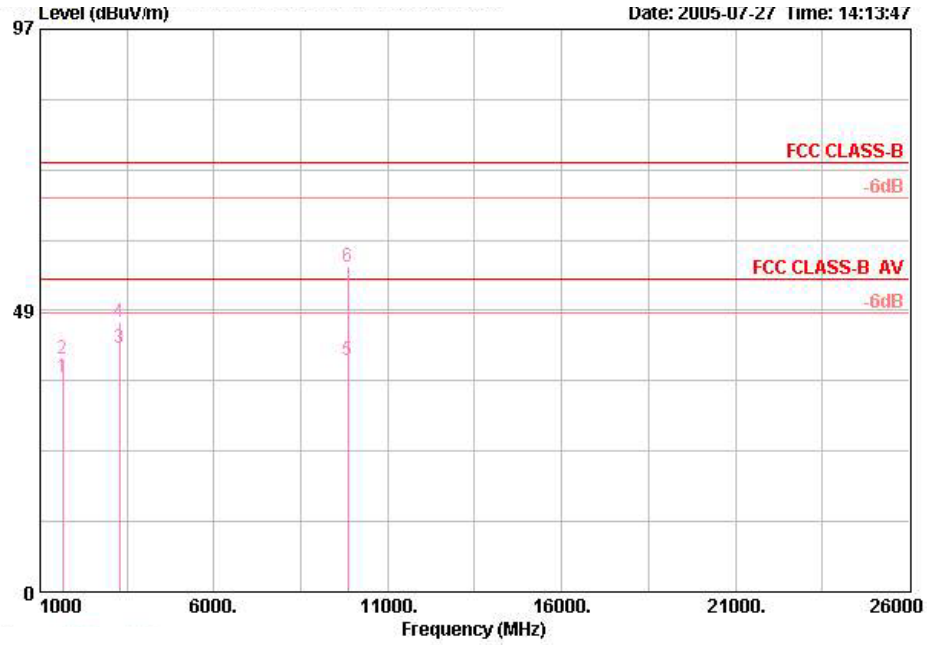
- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Rush Kao

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1641.400	45.07	-28.93	74.00	25.77	1.46	35.05	52.88	HORIZONTAL	PEAK
2 @	1641.400	42.23	-11.77	54.00	25.77	1.46	35.05	50.05	HORIZONTAL	AVERAGE
3 @	3282.680	43.96	-30.04	74.00	30.81	2.10	35.20	46.25	HORIZONTAL	PEAK
4 @	3282.680	36.57	-17.43	54.00	30.81	2.10	35.20	38.87	HORIZONTAL	AVERAGE
5 @	9848.200	48.20	-25.80	74.00	38.68	4.93	35.87	40.46	HORIZONTAL	Peak
6 @	9848.200	38.60	-15.40	54.00	38.68	4.93	35.87	30.86	HORIZONTAL	Average

(B) Polarization: Vertical



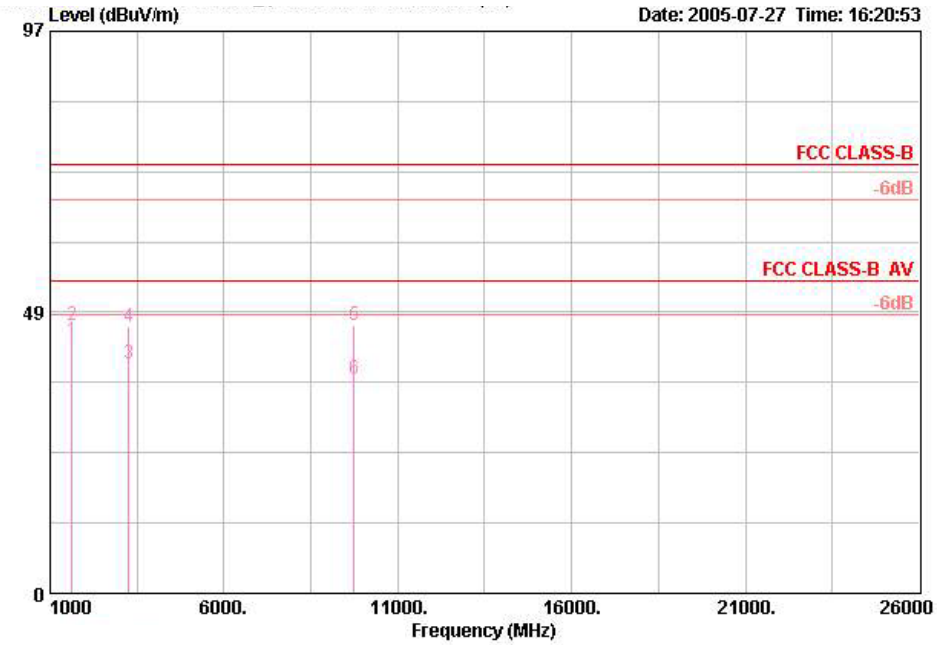
	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1641.390	37.06	-16.94	54.00	25.77	1.46	35.05	44.87	VERTICAL	AVERAGE
2 @	1641.390	40.12	-33.88	74.00	25.77	1.46	35.05	47.94	VERTICAL	PEAK
3 @	3282.670	42.03	-11.97	54.00	30.81	2.10	35.20	44.32	VERTICAL	AVERAGE
4 @	3282.670	46.50	-27.50	74.00	30.81	2.10	35.20	48.79	VERTICAL	PEAK
5 @	9848.340	40.00	-14.00	54.00	38.68	4.93	35.87	32.26	VERTICAL	AVERAGE
6 @	9848.340	56.00	-18.00	74.00	38.68	4.93	35.87	48.26	VERTICAL	Peak

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.6.11. Test Results for CH 06 / 2437 MHz (for emission above 1GHz)

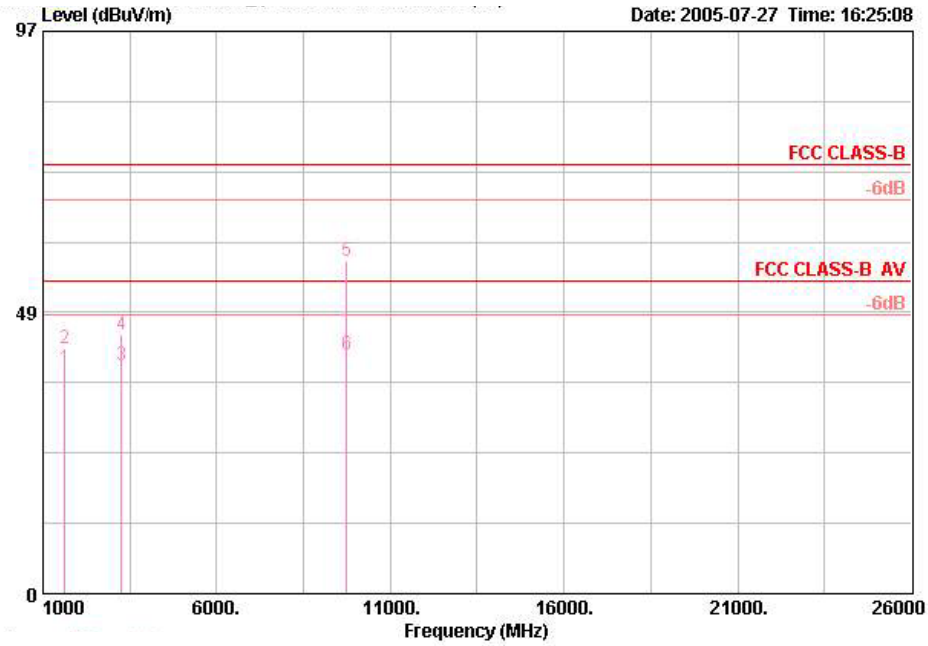
- Modulation Type: OFDM- 11g Turbo Mode
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chou

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.680	43.70	-10.30	54.00	25.71	1.46	35.06	51.59	HORIZONTAL	AVERAGE
2 @	1624.680	46.37	-27.63	74.00	25.71	1.46	35.06	54.26	HORIZONTAL	PEAK
3 @	3249.350	39.68	-14.32	54.00	30.73	2.03	35.20	42.12	HORIZONTAL	AVERAGE
4 @	3249.350	45.95	-28.05	74.00	30.73	2.03	35.20	48.38	HORIZONTAL	PEAK
5 @	9748.300	46.30	-27.70	74.00	33.33	3.22	35.10	44.85	HORIZONTAL	Peak
6 @	9748.300	37.10	-16.90	54.00	33.33	3.22	35.10	35.65	HORIZONTAL	Average

(B) Polarization: Vertical



	Freq	Level	Over Limit	Limit Line	Antenna Factor	Cable Loss	Preamp Factor	Read Level	Pol/Phase	Remark
	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	dB	dBuV		
1 @	1624.710	38.84	-15.16	54.00	25.71	1.46	35.06	46.72	VERTICAL	AVERAGE
2 @	1624.710	42.30	-31.70	74.00	25.71	1.46	35.06	50.19	VERTICAL	PEAK
3 @	3249.380	39.28	-14.72	54.00	30.73	2.03	35.20	41.71	VERTICAL	AVERAGE
4 @	3249.380	44.54	-29.46	74.00	30.73	2.03	35.20	46.98	VERTICAL	PEAK
5 @	9747.860	57.30	-16.70	74.00	38.56	5.07	35.85	49.52	VERTICAL	Peak
6 @	9747.860	41.20	-12.80	54.00	38.56	5.07	35.85	33.42	VERTICAL	Average

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.6.12. Photographs of Radiated Emission Test Configuration

FRONT VIEW

REAR VIEW

5.7. Antenna Requirements

5.7.1. Standard Applicable

Section 15.203:
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 a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):
If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.7.2. Antenna Connected Construction

There is no connector used in this intergral antenna.

5.7.3. Antenna Gain

Antenna gain of EUT is less than 6dBi. Therefore peak conducted power limit shall not be degraded any more. Antenna report of manufacturer will have more detail antenna gain or antenna pattern.

5.7.4. Test Criteria

All test results complied with the requirements of 15.203/15.247(b)/(c).

5.8. RF Exposure

5.8.1. Limit For Maximum Permissible Exposure (MPE)

This product can be classified as mobile device, so the 20cm separation distance warning is required. In this section, the power density at 20cm location is calculated to examine if it is lower than the limit.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F = frequency in MHz
*Plane-wave equivalent power density

5.8.2. MPE Calculation Method

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd\ (mW/cm^2) = \frac{E^2}{377}$$

E = Electric field (V/m)
P = Peak RF output power (mW)
G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the gain of the used antenna, the RF power density can be obtained.

5.8.3. Calculated Result and Limit

- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Eason Lu

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)
2.5	1.7783	19.8700	97.0510	0.034352	1

6. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 19, 2005	Conduction (CO04-HY)
2	LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Mar. 15, 2005	Conduction (CO04-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	May 06, 2005	Conduction (CO04-HY)
4	EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
5	RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9kHz – 30MHz	Dec. 23, 2004	Conduction (CO04-HY)
6	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 16, 2005	Radiation (03CH03-HY)
7	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
8	Amplifier	SCHAFFNER	CPA9231A	18667	9KHz – 2GHz	Jan. 04, 2005	Radiation (03CH03-HY)
9	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 22, 2005	Radiation (03CH03-HY)
10	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 22, 2005	Radiation (03CH03-HY)
11	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 02, 2004	Radiation (03CH03-HY)
12	Amplifier	MITEQ	AFS44	849984	100MHz~26.5GHz	Mar. 25, 2005	Radiation (03CH03-HY)
13	Horn Antenna	EMCO	3115	6741	1GHz – 18GHz	Feb. 18, 2005	Radiation (03CH03-HY)
14	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
15	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
16*	Horn Antenna	Schwarzbeck	BBHA9170	154	18GHz~40GHz	Jun. 09, 2004*	Radiation (03CH03-HY)
17	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 05, 2005	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.
* Calibration Interval of instruments listed above is two years.

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
18	Spectrum Analyzer	R&S	FSP30	100023	9kHz – 30GHz	Aug. 02, 2004	Conducted (TH01-HY)
19	Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
20	Power Sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
21	Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Apr. 28, 2005	Conducted (TH01-HY)
22	AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 – 300V	Apr. 21, 2005	Conducted (TH01-HY)
23	DC Power Source	G.W.	GPC-6030D	C671845	DC 1V – 60V	Dec. 28, 2004	Conducted (TH01-HY)
24	Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2004	Conducted (TH01-HY)
25	RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz – 7GHz	Jan. 01, 2005	Conducted (TH01-HY)
26	RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz – 1GHz	Jan. 01, 2005	Conducted (TH01-HY)
27	Data Generator	Tektronix	J310345	J310345	400Mbps	Dec. 21, 2004	Conducted (TH01-HY)
28	OscilloScope	Tektronix	TDS1012	C038520	100MHz-1Gs/s	Jan. 02, 2005	Conducted (TH01-HY)

※ Calibration Interval of instruments listed above is one year.

7. Company Profile

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test familial apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

7.1. Certificate of Accreditation

Taiwan	BSMI, CNLA, DGT
USA	FCC, NVLAP, UL
EU	Nemko, TUV
Japan	VCCI
Canada	Industry Canada

7.2. Test Location

SHIJR	ADD： 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL： 02-2696-2468 FAX： 02-2696-2255
HWA YA	ADD： No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL： 03-327-3456 FAX： 03-318-0055
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ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

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