



FCC TEST REPORT

CATEGORY : Mobile End Product

PRODUCT NAME : Wireless Access Point / Ethernet Bridge

FCC ID. : PPQ-WP310A

FILING TYPE : Certification

BRAND NAME : LITE-ON, Pro-Nets, SpeedCom+, NetoDragon,
TRANSGEAR

MODEL NAME : LWP3120, WP-310A, AP54GA, BA-100

APPLICANT : LITE-ON TECHNOLOGY CORP.

2F, No. 6, Lane 359, Sec.2, Chung-Shan Rd., Chung-Ho,
Taiwan, R.O.C.

MANUFACTURER : G-COM COMPUTER CORPORATION

1st Row Yin Shan Rd., Yin Hwu Industrial Area, Qingxi Town,
Dong Guan City, Guang Dong, China

ISSUED BY : SPORTON INTERNATIONAL INC.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien,
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Statements:

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 CNLA, NVLAP or any agency of U.S. government.

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


Dr. Alan Lane
Vice General Manager
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1190
ILAC MRA

NVLAP[®]

Lab Code: 200079-0

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History of this test report

- No additional attachment.
- Additional attachment were issued as following record:



1. General Description of Equipment under Test

1.1. Applicant

LITE-ON TECHNOLOGY CORP.

2F, No. 6, Lane 359, Sec.2, Chung-Shan Rd., Chung-Ho, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

This product is a Wireless Access Point / Ethernet Bridge 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 (10QAM, 64QAM)
Number of Channels	11
Frequency Band	2400MHz ~ 2483.5MHz
Carrier Frequency	Please reference table below.
Channel Bandwidth	22 MHz
Output Power	CCK : 18.92 dBm (peak) OFDM : 17.20 dBm (peak)
Antenna Type / Gain	Dipole Antenna / 2dBi
Function Type	Transceiver
Power Rating (DC/AC, Voltage)	5 VDC from 90~240VAC power adapter
Temperature Range (Operating)	0 ~ 40



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1.5. Table for Carrier Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412 MHz	5	2432 MHz	9	2452 MHz
2	2417 MHz	6	2437 MHz	10	2457 MHz
3	2422 MHz	7	2442 MHz	11	2462 MHz
4	2427 MHz	8	2447 MHz		



2. Test Configuration of the Equipment under Test

2.1. Description of the Test

- a. During testing, the equipment was placed on a non-conducting support.
- b. The following test modes were performed:
 - Mode 1 : CH 01 2412MHz
 - Mode 2 : CH 06 2437MHz
 - Mode 3 : CH 11 2462MHz
- c. Spurious emission below 1GHz is independent of channel selection, so only Channel 11 with OFDM modulation was tested.
- d. For spurious emission above 1GHz, lowest, middle and highest channel with 11Mbps and 54Mbps data rate was tested.
- e. The EUT has been programmed to continuously transmit or receive during testing. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2001.
- f. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- g. 3 meters measurement distance in semi-anechoic chamber was used in this test.
- h. There are two test modes performed for emission below 1GHz and power line conduction test. Mode 1 is for AC adapter model ADS6818-1505-W, Mode 2 is for model ADS6818-1505-U.

2.2. Frequency Range Investigated

- a. Conducted power line test: from 150 kHz to 30 MHz
- b. Radiated emission test: from 30 MHz to 25000 MHz



2.3. Description of Test Supporting Units

Support Unit 1. – Notebook (COMPAQ)

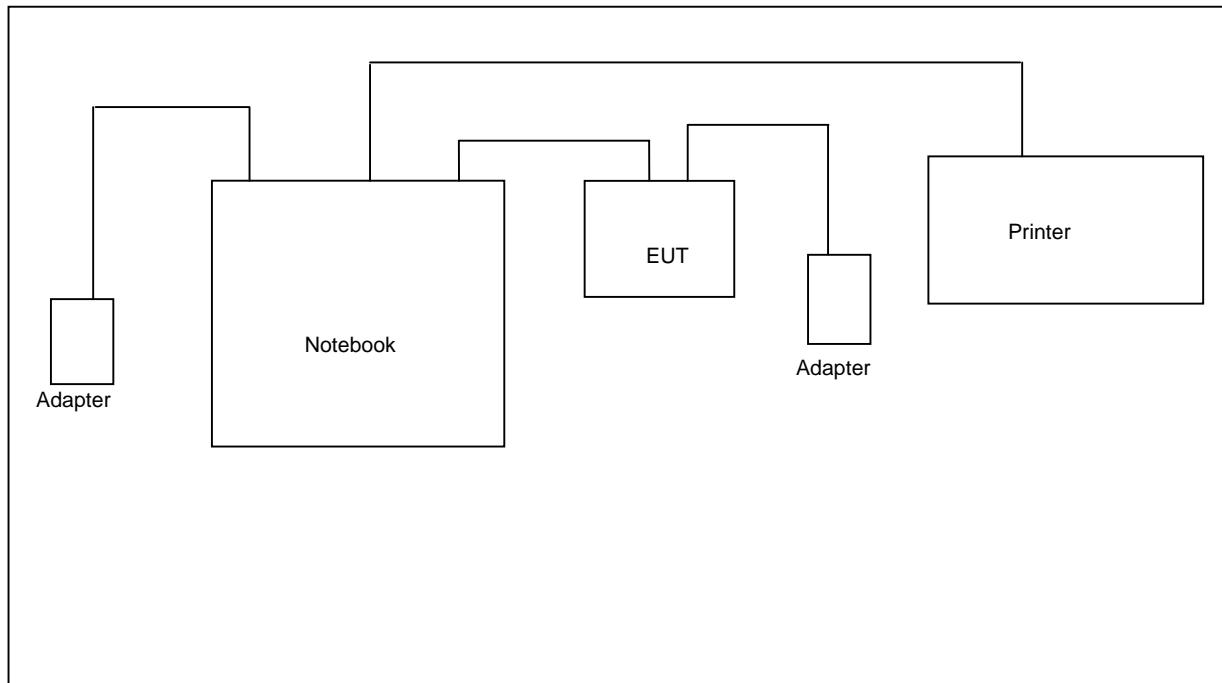
FCC ID : N/A
Model No. : Presario 1500
Serial No. : SP0004
Remark : This support device was tested to comply with FCC standards and authorized under Declaration of Conformity.

Support Unit 2. – Printer (EPSON)

FCC ID : N/A
Model No. : Stylus Color 680
Serial No. : SP0016
Remark : This support device was tested to comply with FCC standards and authorized under Declaration of Conformity and data cable is 1.35m of the shielded.



2.4. Connection Diagram of Test System





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2.5. Test Software

- a. Using telnet to drive the pre-installed software inside the EUT for channel and modulation selection.
- b. "H" Pattern Generator: Except Access Point, the supporting equipment such as monitor or printer is always available. Under testing, these supporting equipment has to also under working condition. "H" Pattern Generator is able to continuously transmitting "H" character to those supporting equipments.



3. Test Location and Standards

3.1. Test Location

Test Location : Sporton Hwa Ya Testing Building

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

Tel: +886 3 327 3456 Fax: +886 3 318 0055

Test Site No. : CO04-HY, 03CH03-HY

3.2. Test Conditions

Normal Voltage : 120V/60Hz

Extreme Voltage : 138V and 102V

Normal Temperature : 20

Extreme Temperature : 0 and 40

3.3. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

ANSI C63.4-2001

47 CFR Part 15 Subpart C (Section 15.247)

3.4. 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.



4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 15 and Part 2			
Paragraph	FCC Rule	Description of Test	Result
5.1	15.247(a)(2)	6dB Spectrum Bandwidth (DSSS System)	Pass
5.2	15.247(b)	Maximum Peak Output Power	Pass
5.3	15.247(d)	Peak Power Spectral Density	Pass
5.4	15.247(c)	Band Edges Emission	Pass
5.5	15.107/15.207	AC Power Line Conducted Emission	Pass
5.6	15.209/15.247(c)	Spurious Radiated Emission	Pass
5.7	15.203	Antenna Requirement	Pass



5. Test Result

5.1. Test of 6dB Spectrum Bandwidth (DSSS System)

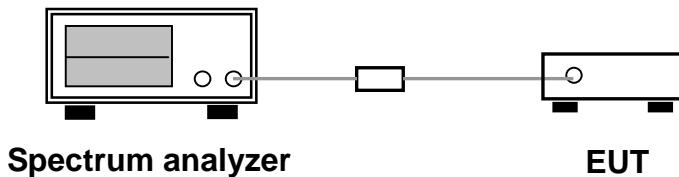
5.1.1. Measuring Instruments

Item 9 of the table on section 6.

5.1.2. 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.
3. The 6dB bandwidth is defined as the spectrum width with level higher than 6dB below the peak level.
4. Repeat above 1~3 points for the middle and highest channel of the EUT.

5.1.3. Test Setup Layout



5.1.4. Test Result : See spectrum analyzer plots below

- Modulation Type: CCK
- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

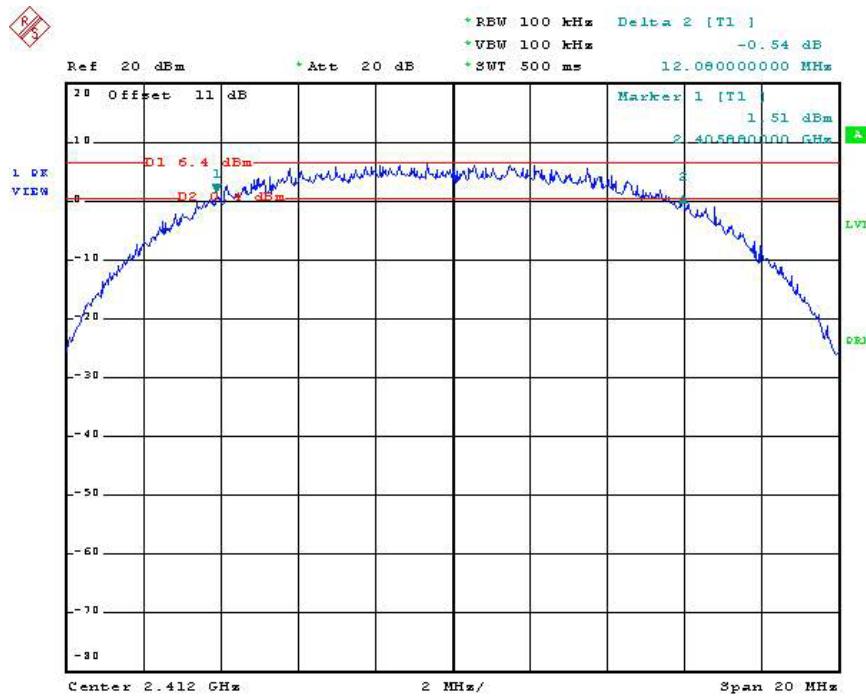
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (MHz)
01	2412	12.08	0.5
06	2437	11.60	0.5
11	2462	11.92	0.5



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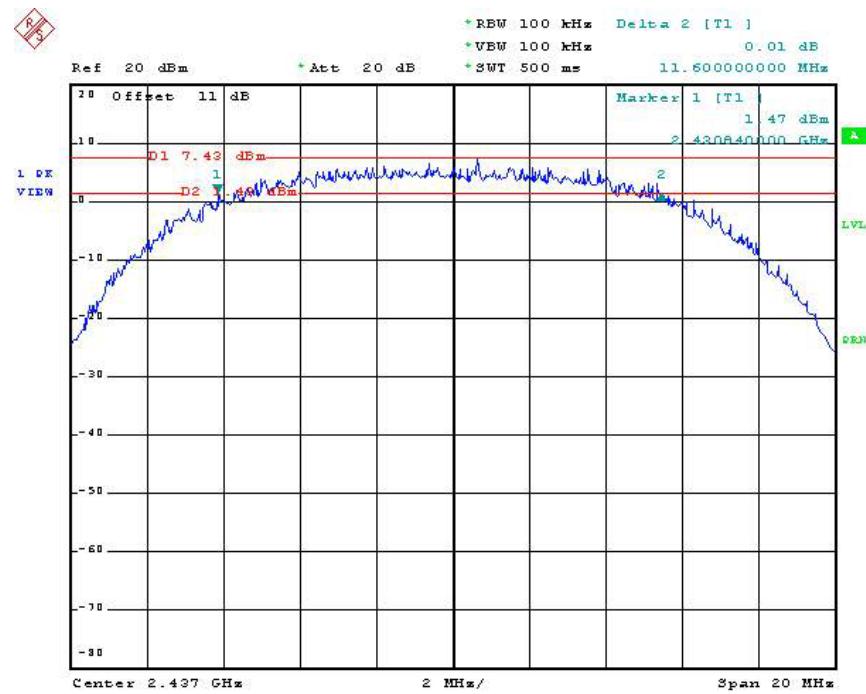
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Modulation Type: CCK (Channel 01) :



Date: 11. MAY. 2004 12:26:18

Modulation Type: CCK (Channel 06) :



Date: 11. MAY. 2004 12:29:41

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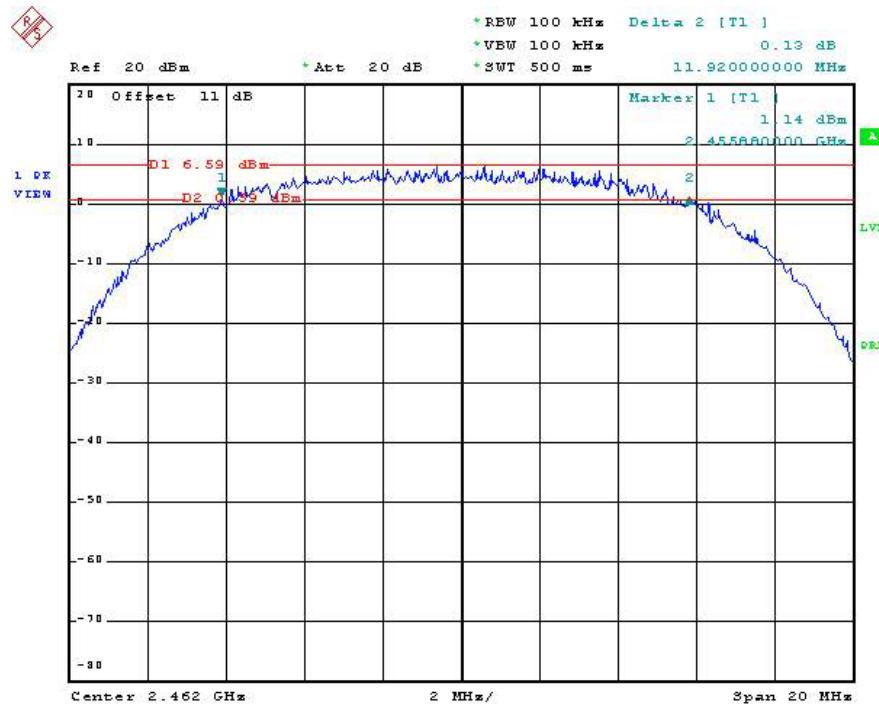
Issued Date : May 26, 2004



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Report No.: F443070

Modulation Type: CCK (Channel 11) :



Date: 11.MAY.2004 12:33:24

5.1.5. Test Result : See spectrum analyzer plots below

- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64 %
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (MHz)
01	2412	16.51	0.5
06	2437	16.51	0.5
11	2462	16.51	0.5

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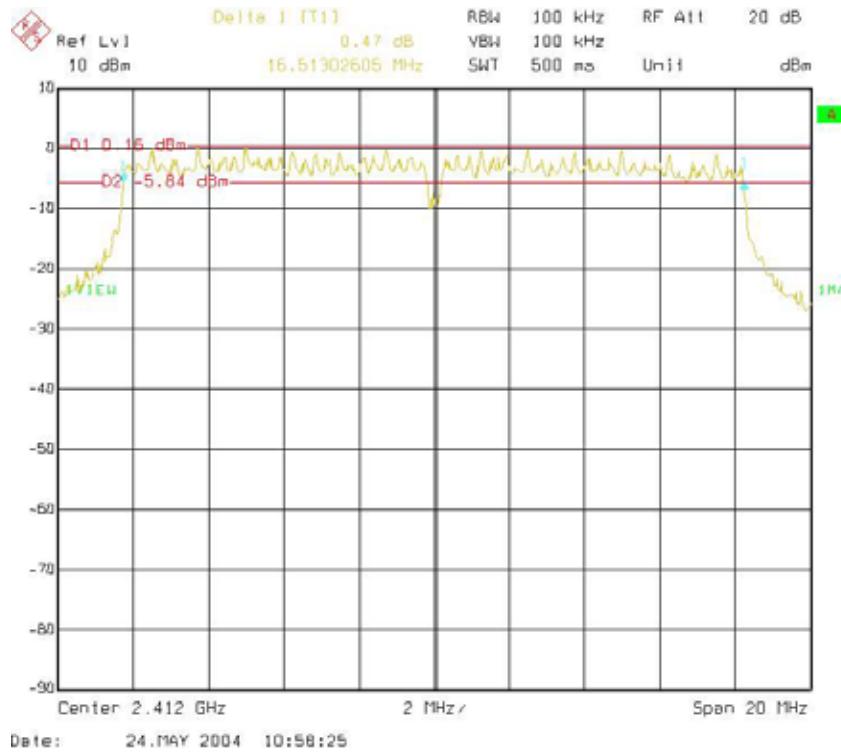
Issued Date : May 26, 2004



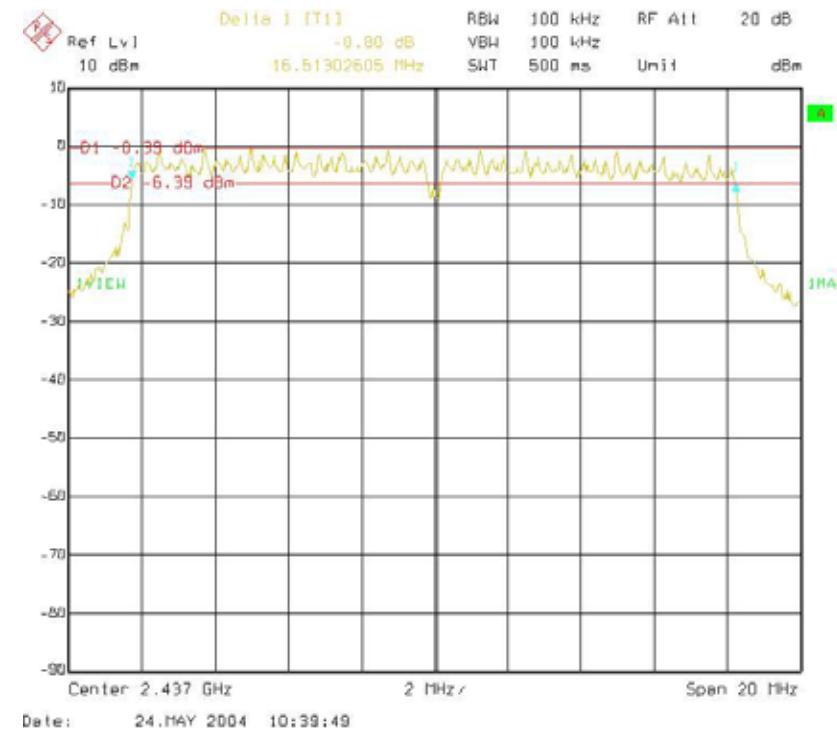
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Modulation Type: OFDM (Channel 01) :



Modulation Type: OFDM (Channel 06) :



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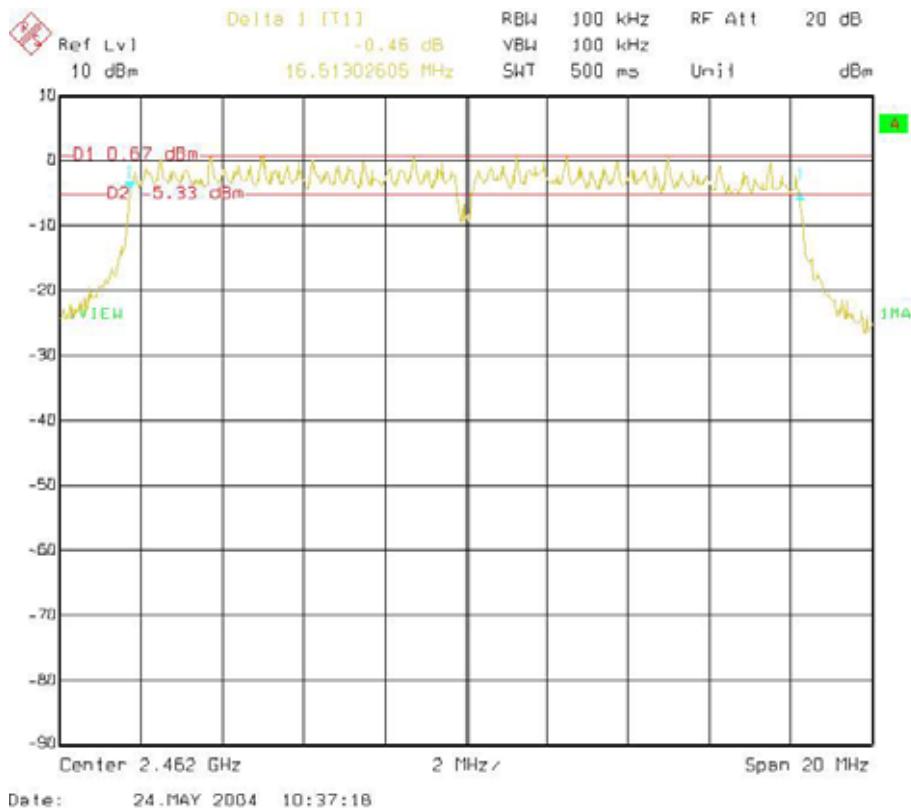
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5.2. Test of Maximum Peak Output Power

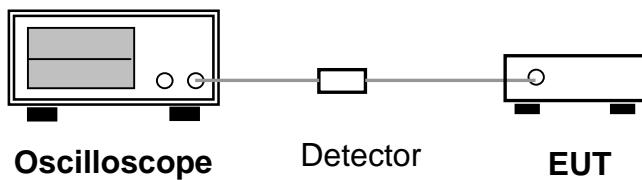
5.2.1. Measuring Instruments

Item 9 of the table on section 6.

5.2.2. Test Procedures

1. The transmitter output was connected to the vertical channel of the oscilloscope through a detector.
2. Observe the duty cycle X from the oscilloscope and the record the detected voltage level A.
3. Replace the EUT via the signal generator, calibrate the reading via the carrier frequency.
4. The duty cycle X has to be calibrated on the output power of the signal generator.
5. Repeated the 1~4 for the middle and highest channel of the EUT.

5.2.3. Test Setup Layout



5.2.4. Test Result : See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 64 %
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

Channel	Frequency	Output Power	Output Power	Limits
	(MHz)	(dBm)	(mWatt)	(dBm)
01	2412	18.92	77.983	30 dBm
06	2437	18.92	77.983	30 dBm
11	2462	18.92	71.121	30 dBm



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5.2.5. Test Result : See spectrum analyzer plots below

- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64 %
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mWatt)	Limits (dBm)
01	2412	16.20	41.687	30 dBm
06	2437	16.00	39.811	30 dBm
11	2462	17.20	52.481	30 dBm



5.3. Test of Peak Power Spectral Density

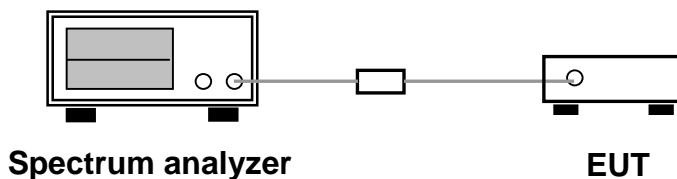
5.3.1. Measuring Instruments

Item 9 of the table on section 6.

5.3.2. 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.
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 the 1~4 for the middle and highest channel of the EUT.

5.3.3. Test Setup Layout



5.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 64 %
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

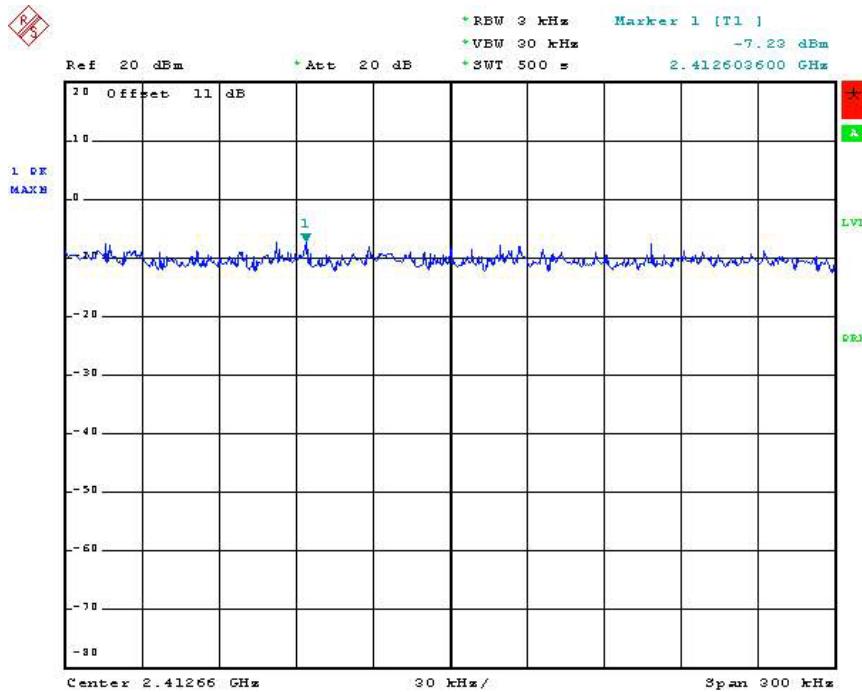
Channel	Frequency (MHz)	Power Density (dBm)	Limits
			(dBm)
01	2412	-7.23	8
06	2437	-7.14	8
11	2462	-6.97	8



FCC ID: PPQ-WP310A
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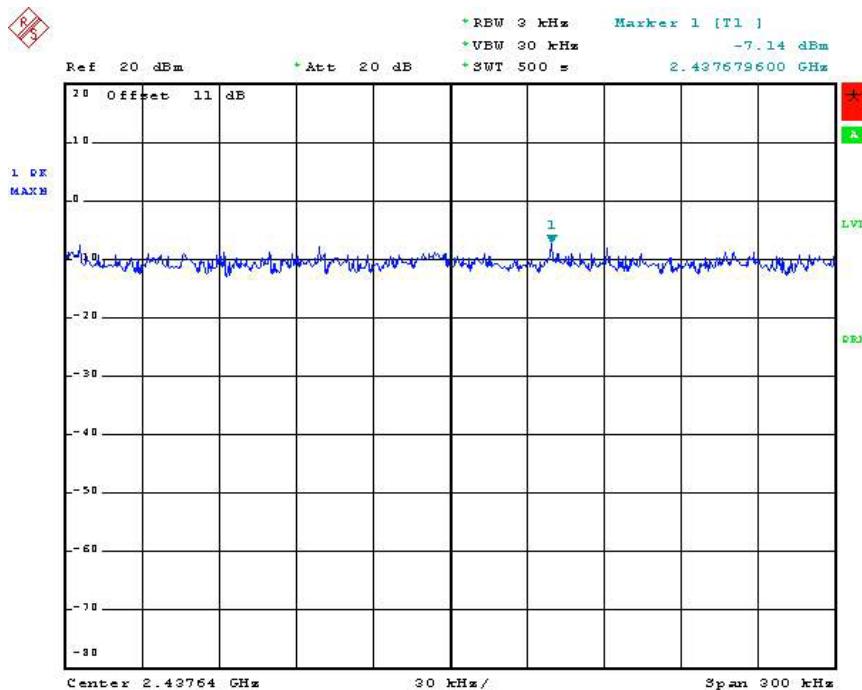
Report No.: F443070

Modulation Type: CCK (Channel 01) :



Date: 11.MAY.2004 12:54:48

Modulation Type: CCK (Channel 06) :



Date: 11.MAY.2004 12:56:34

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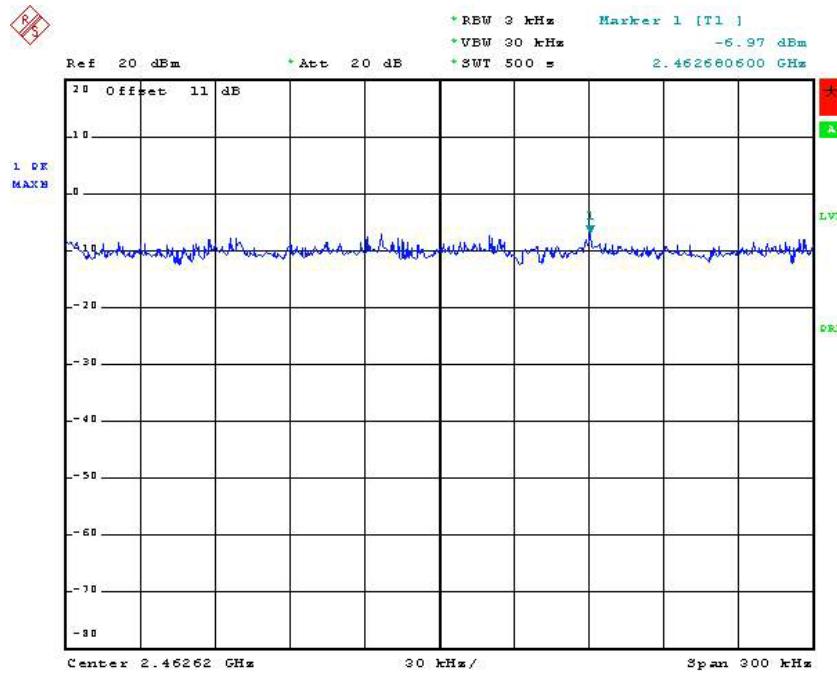
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Modulation Type: CCK (Channel 11) :



Date: 11.MAY.2004 12:57:57

5.3.5. Test Result : See spectrum analyzer plots below

- Modulation Type: OFDM
- Temperature: 26°C
- Relative Humidity: 64 %
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Murray Lu

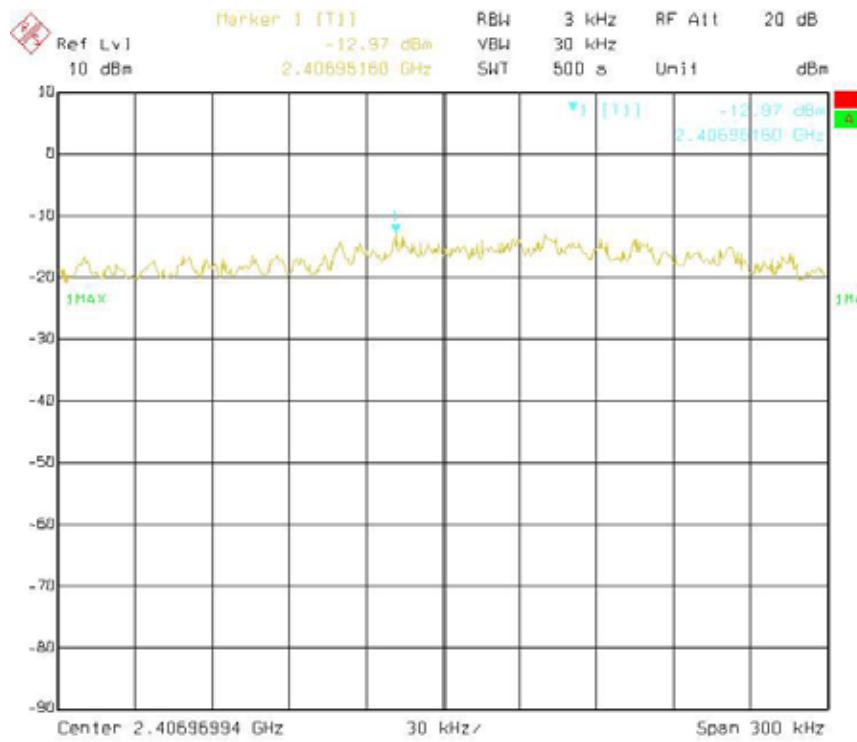
Channel	Frequency (MHz)	Power Density (dBm)	Limits	
			(dBm)	(dBm)
01	2412	-12.97		8
06	2437	-14.04		8
11	2462	-12.21		8



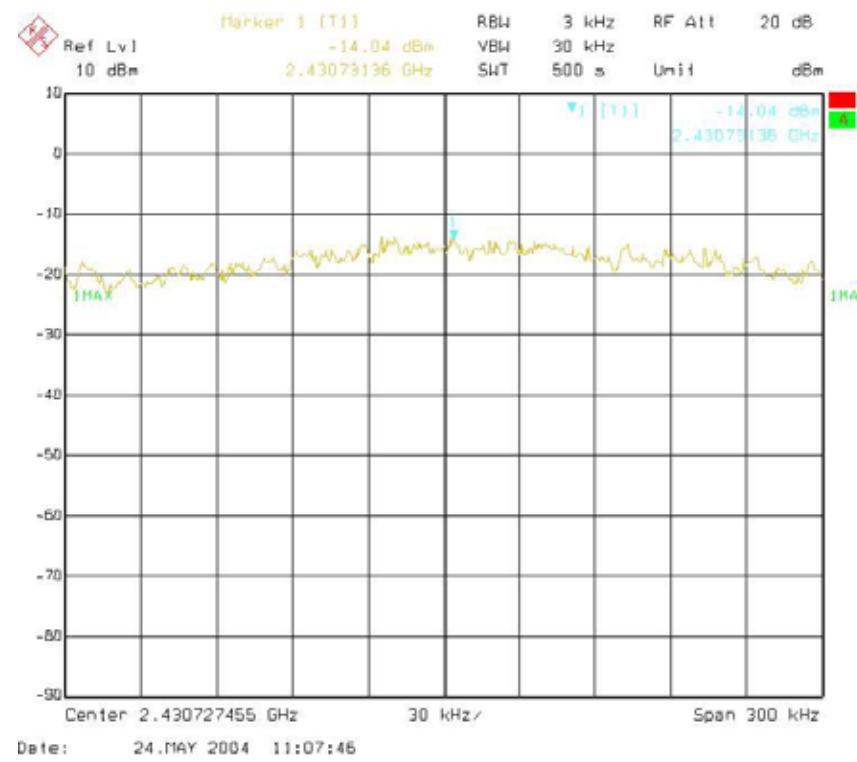
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Modulation Type: OFDM (Channel 01) :



Modulation Type: OFDM (Channel 06) :



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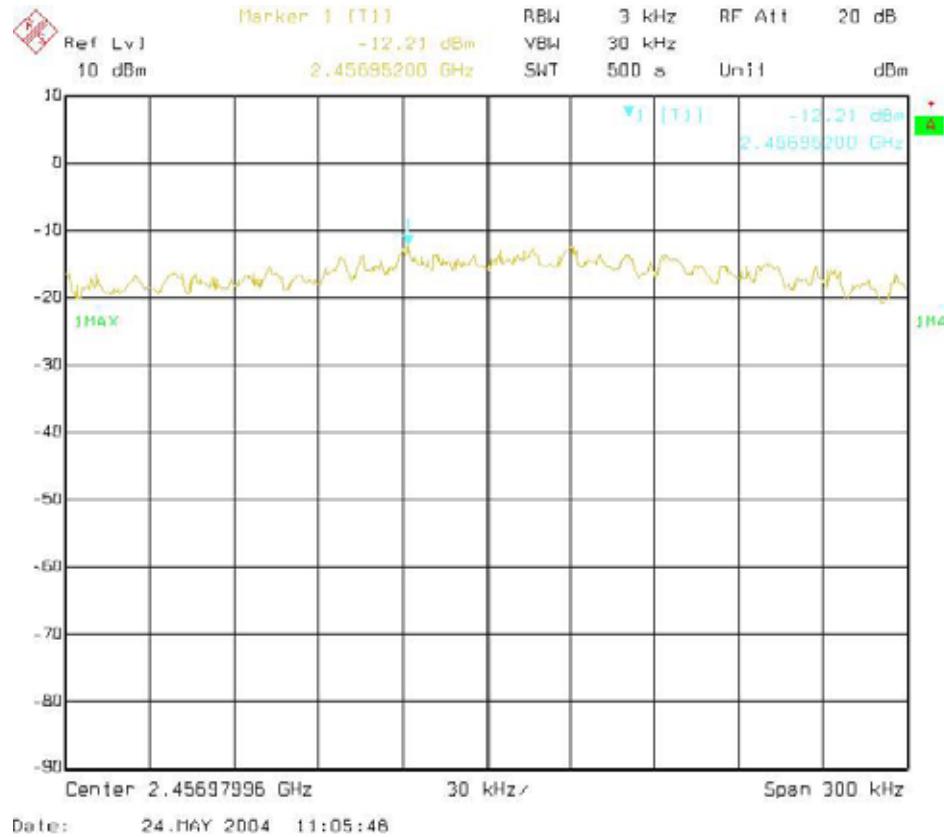
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5.4. Test of Band Edges Emission

5.4.1. Measuring Instruments

Item 9 of the table on section 6.

5.4.2. Test Procedures

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

5.4.3. Test Result :

- Test Engineer: Murray Lu

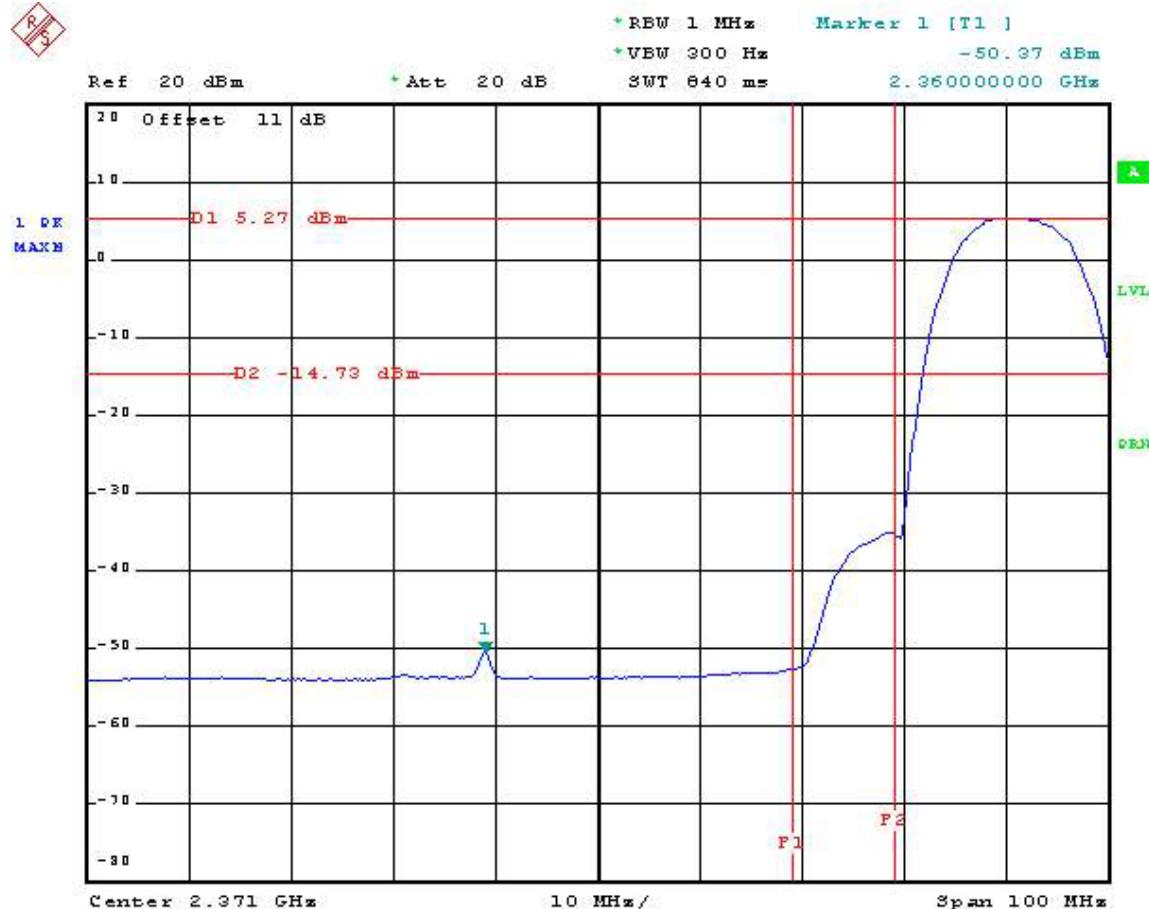
(A) Left Edge

The band edge emission plot shows 55.64dB delta between carrier maximum power and local maximum emission in the restricted band.

CH01 Carrier power strength (dBuV/m)	Delta (dB)	The maximum field strength in restrict band (dBuV/m)	Limit (dBuV/m)	Margin (dB)
90.05	55.64	34.41	54.00	-19.59



Modulation Type: CCK (Channel 01) :



Date: 11.MAY.2004 12:53:16



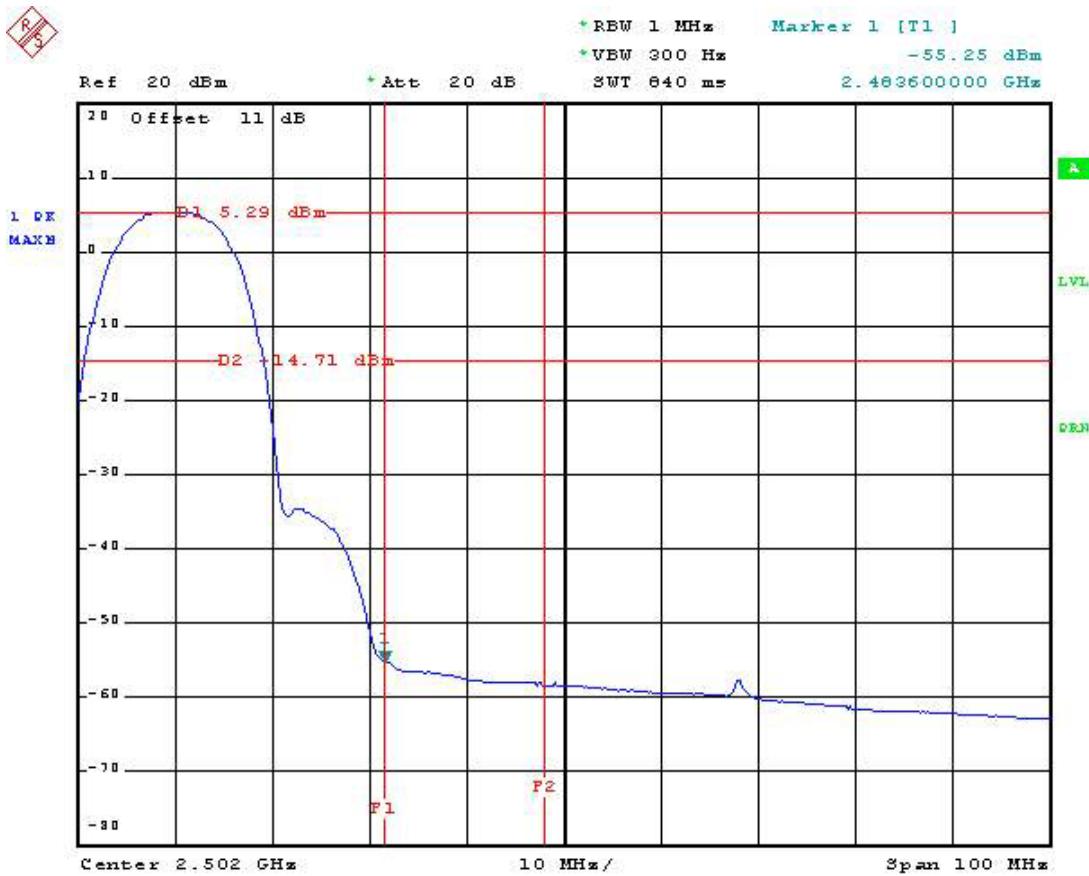
(B) Right Edge

The band edge emission plot shows 60.54 dB delta between carrier maximum power and local maximum emission in the restricted band.

CH11 Carrier power strength (dBuV/m)	Delta (dB)	The maximum field strength in restrict band (dBuV/m)	Limit (dBuV/m)	Margin (dB)
99.64	60.54	39.10	54.00	-14.90

* The maximum field strength in restricted band is the emission of carrier power strength subtract to the delta between carrier maximum power and local maximum emission in the restricted band.

Modulation Type: CCK (Channel 11) :



Date: 11.MAY.2004 12:38:25

Observation : All emissions in the 100kHz bandwidth are 20dB lower than the carrier strength.



5.4.4. Test Result :

- Modulation Type: OFDM
- Test Engineer: Murray Lu

(A) Left Edge

The band edge emission plot shows 50.37dB delta between carrier maximum power and local maximum emission in the restricted band.

CH01 Carrier power strength (dBuV/m)	Delta (dB)	The maximum field strength in restrict band (dBuV/m)	Limit (dBuV/m)	Margin (dB)
88.04	50.37	37.67	54.00	-16.33

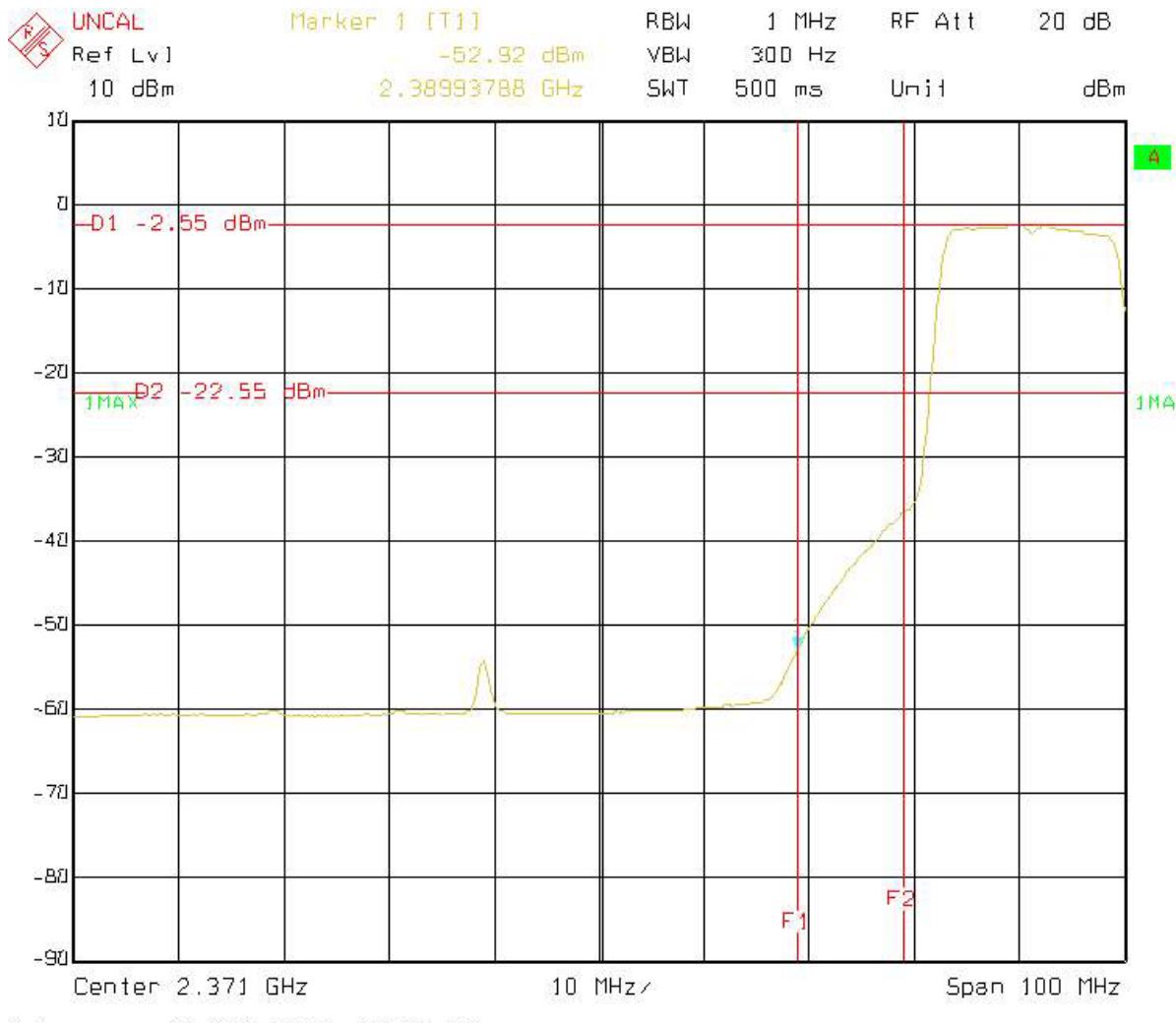
*The maximum field strength in restricted band is the emission of carrier power strength subtract to the delta between carrier maximum power and local maximum emission in the restricted band



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Modulation Type: OFDM (Channel 01) :



Date: 24.MAY.2004 10:50:02

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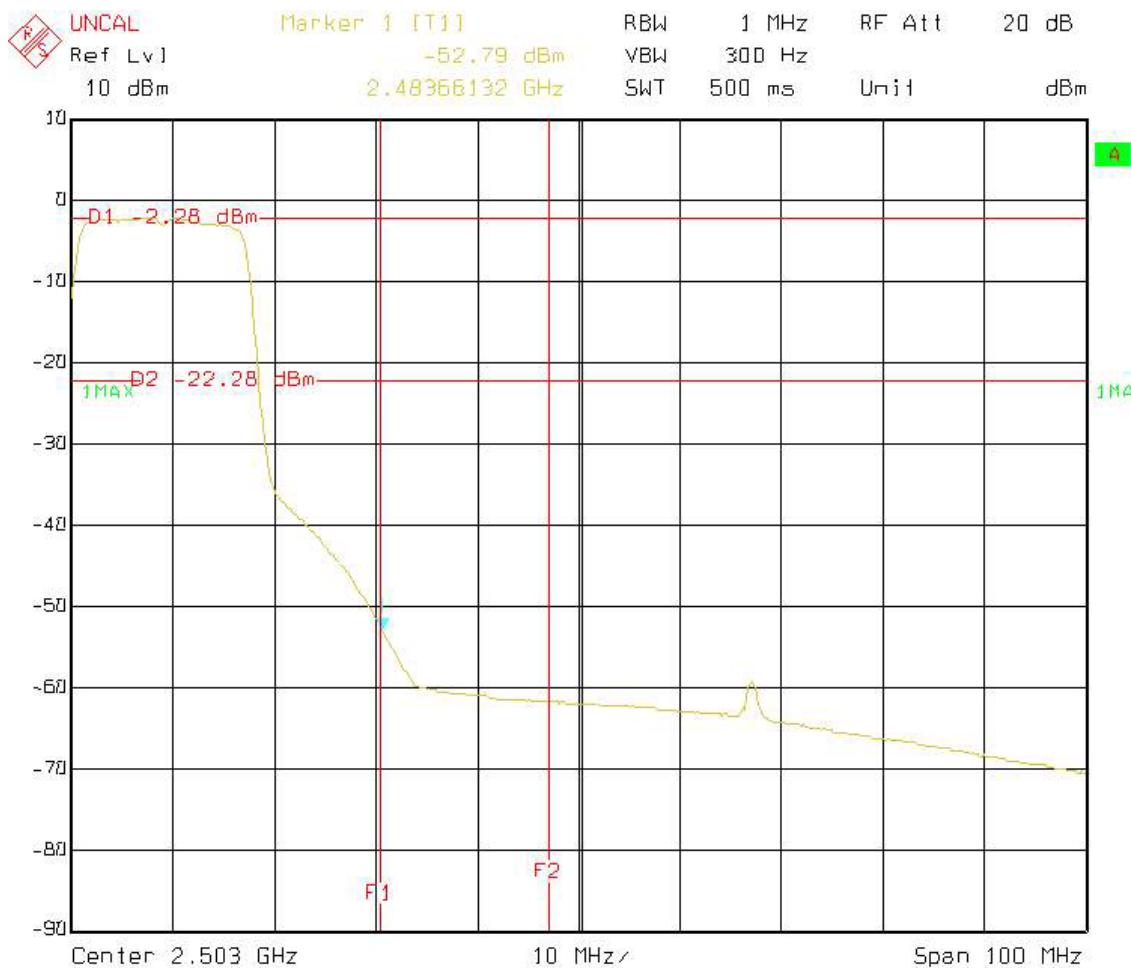
(B) Right Edge

The band edge emission plot shows 50.51dB delta between carrier maximum power and local maximum emission in the restricted band.

CH11 Carrier power strength (dBuV/m)	Delta (dB)	The maximum field strength in restrict band (dBuV/m)	Limit (dBuV/m)	Margin (dB)
87.43	50.51	36.92	54.00	-17.08

* The maximum field strength in restricted band is the emission of carrier power strength subtract to the delta between carrier maximum power and local maximum emission in the restricted band

Modulation Type: OFDM (Channel 11) :



Date: 24.MAY.2004 10:43:57

Observation : All emissions in the 100kHz bandwidth are 20dB lower than the carrier strength.



5.5. Test of AC Power Line Conducted Emission

5.5.1. Measuring Instruments

Please reference item 1~7 in chapter 6 for the instruments used for testing.

5.5.2. Test Procedures

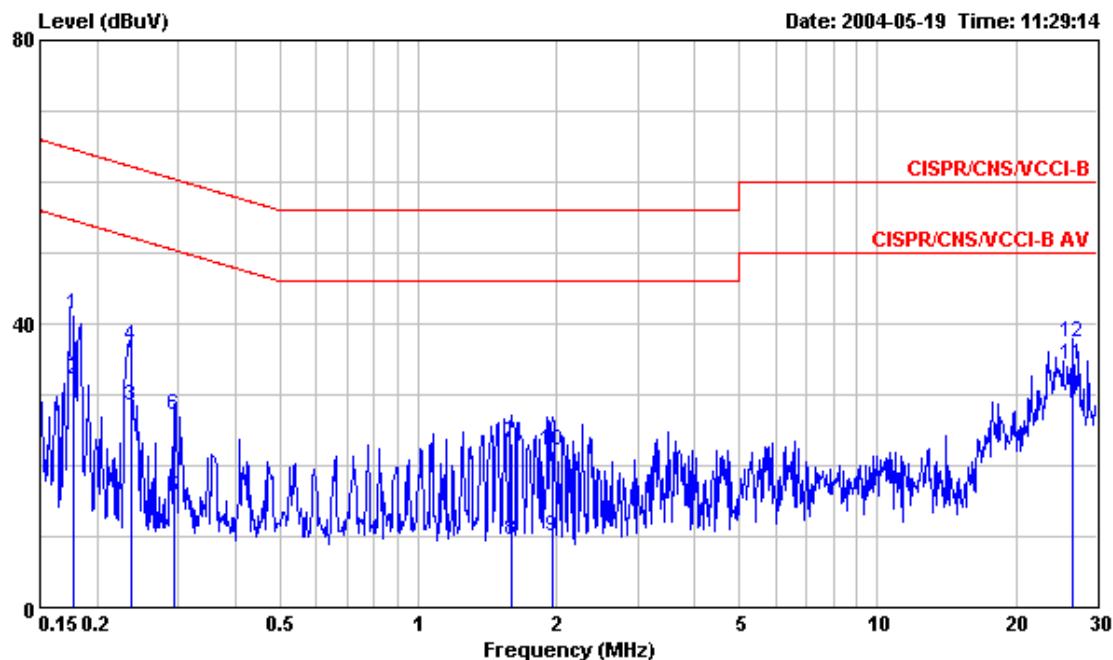
1. Configure the EUT according to ANSI C63.4.
2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provides 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the "H" Patter Generator software to make the supporting equipments stay on working condition.
7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
8. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.



5.5.3. Test Result of Conducted Emission

Test Mode	Adapter (ADS6818-1505-U)	Tested By	Steve Chen
Temperature / Humidity	26deg. C / 64%		

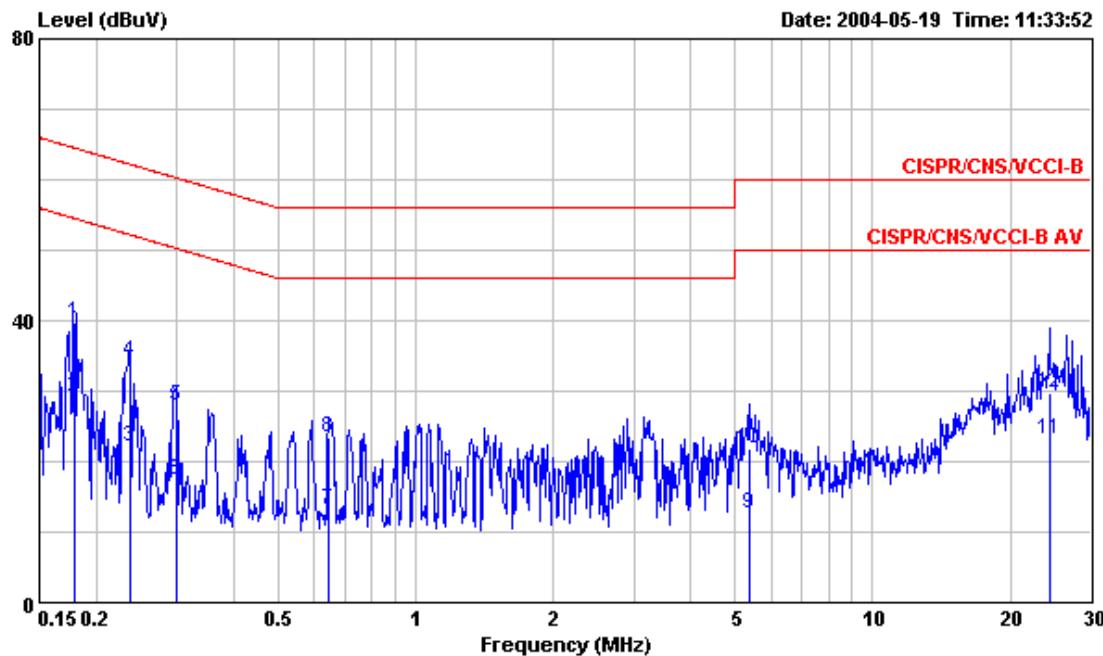
Line to Ground



Freq	Level	Over Limit	Limit		Pol/Phase	Distance
			Line	Remark		
1 @ 0.1781380	41.34	-23.23	64.57	QP	LINE	
2 @ 0.1781380	32.13	-22.44	54.57	Average	LINE	
3 @ 0.2372870	28.43	-23.76	52.19	Average	LINE	
4 @ 0.2372870	36.73	-25.46	62.19	QP	LINE	
5 @ 0.2939830	15.65	-34.76	50.41	Average	LINE	
6 @ 0.2939830	27.16	-33.25	60.41	QP	LINE	
7 @ 1.590	23.28	-32.72	56.00	QP	LINE	
8 @ 1.590	9.47	-36.53	46.00	Average	LINE	
9 @ 1.960	10.00	-36.00	46.00	Average	LINE	
10 @ 1.960	22.01	-33.99	56.00	QP	LINE	
11 @ 26.550	34.25	-15.75	50.00	Average	LINE	
12 @ 26.550	37.37	-22.63	60.00	QP	LINE	



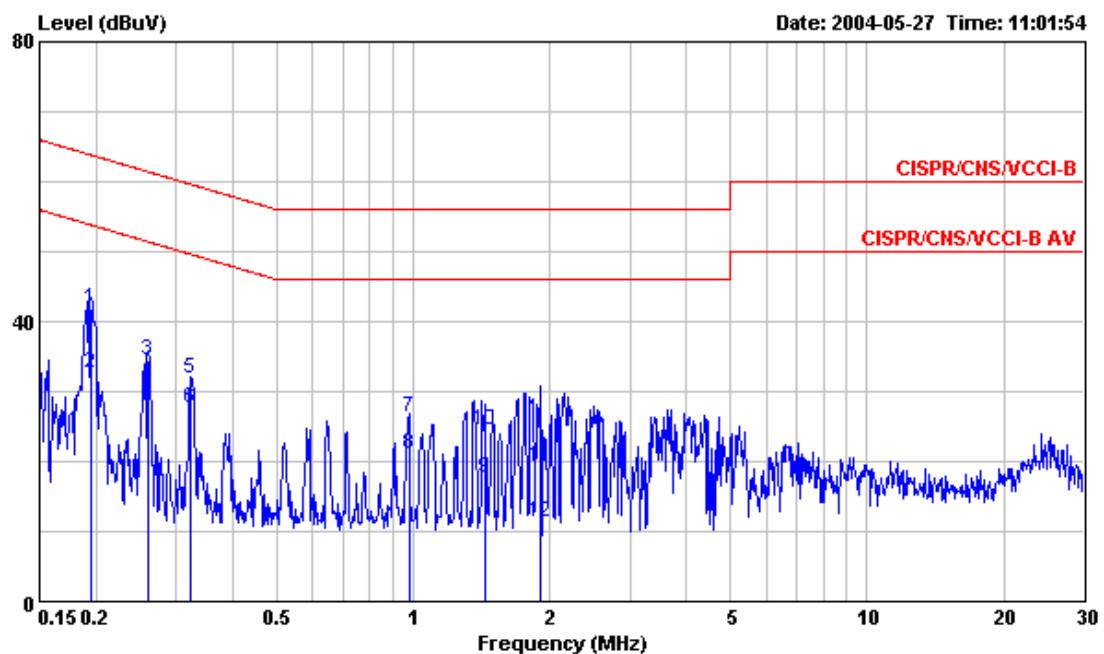
Neutral to Ground





Test Mode	Adapter (ADS6818-1505-W)	Tested By	Steve Chen
Temperature / Humidity	26deg. C / 64%		

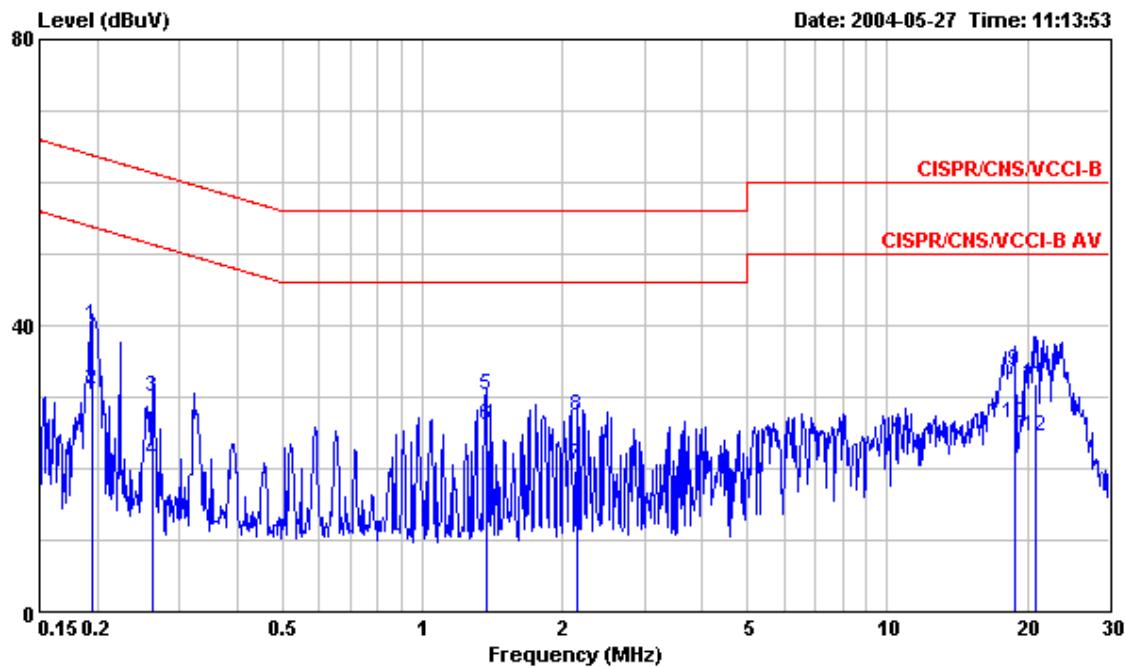
Line to Ground



Freq	Level	Over Limit	Line	Read		LISN	Cable	Remark
				Line	Level			
0.15	41.76	-22.08	63.84	41.65	0.10	0.01	QP	
0.2	32.63	-21.21	53.84	32.52	0.10	0.01	Average	
0.2602550	34.48	-26.94	61.42	34.37	0.10	0.01	QP	
0.2602550	27.95	-23.47	51.42	27.84	0.10	0.01	Average	
0.3234010	31.72	-27.90	59.62	31.60	0.10	0.02	QP	
0.3234010	27.74	-21.88	49.62	27.62	0.10	0.02	Average	
0.9787140	26.23	-29.77	56.00	26.09	0.10	0.04	QP	
0.9787140	20.95	-25.05	46.00	20.81	0.10	0.04	Average	
1.434	17.59	-28.41	46.00	17.46	0.10	0.03	Average	
1.434	24.48	-31.52	56.00	24.35	0.10	0.03	QP	
1.900	19.21	-36.79	56.00	19.09	0.10	0.02	QP	
1.900	11.42	-34.58	46.00	11.30	0.10	0.02	Average	



Neutral to Ground

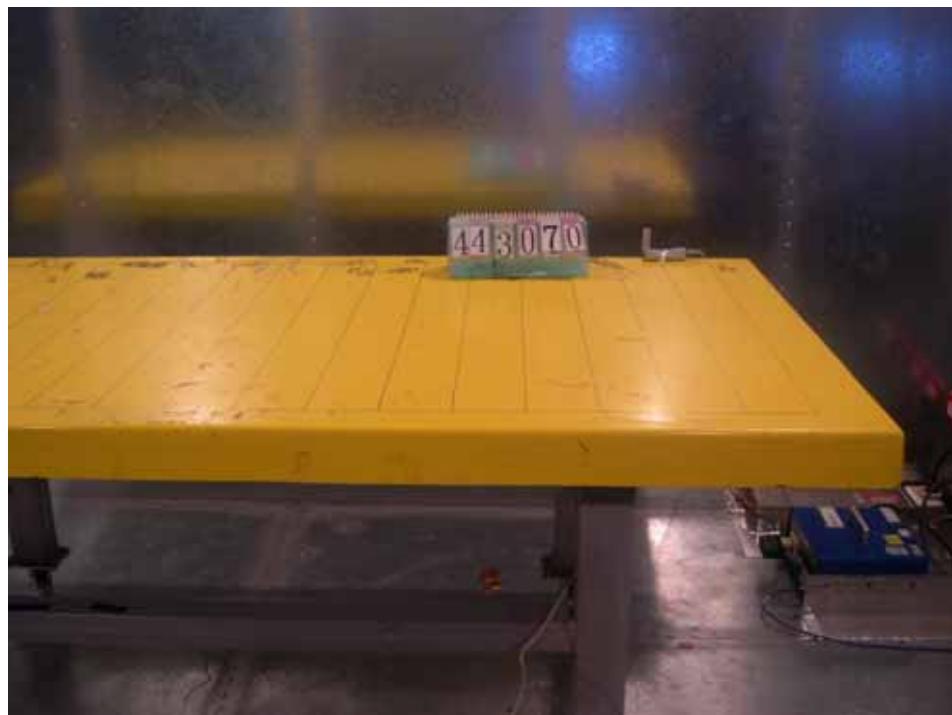


Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		Line	Level	Factor	Loss		
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @ 0.1954980	40.06	-23.74	63.80	39.95	0.10	0.01	QP
2 @ 0.1954980	31.03	-22.77	53.80	30.92	0.10	0.01	Average
3 @ 0.2630270	29.99	-31.35	61.34	29.88	0.10	0.01	QP
4 @ 0.2630270	21.08	-30.26	51.34	20.97	0.10	0.01	Average
5 @ 1.370	30.16	-25.84	56.00	30.03	0.10	0.03	QP
6 @ 1.370	26.07	-19.93	46.00	25.94	0.10	0.03	Average
7 @ 2.143	20.55	-25.45	46.00	20.42	0.10	0.03	Average
8 @ 2.143	27.37	-28.63	56.00	27.24	0.10	0.03	QP
9 @ 18.720	33.62	-26.38	60.00	33.15	0.28	0.19	QP
10 @ 18.720	26.24	-23.76	50.00	25.77	0.28	0.19	Average
11 @ 20.920	31.88	-28.12	60.00	31.34	0.34	0.20	QP
12 @ 20.920	24.38	-25.62	50.00	23.84	0.34	0.20	Average

5.5.4. Photographs of Conducted Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.
Adapter 1 (ADS6818-1505-U)

FRONT VIEW



REAR VIEW

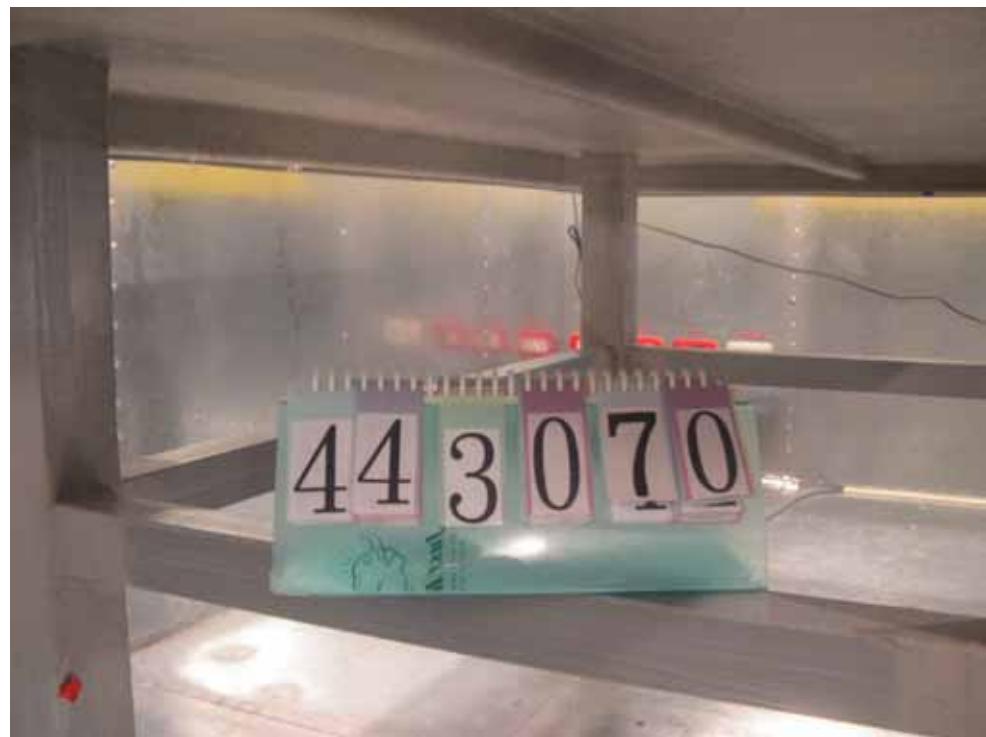




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SIDE VIEW



SPORTON International Inc.

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Adapter 2 (ADS6818-1505-W)

FRONT VIEW



REAR VIEW



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TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

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SIDE VIEW



SPORTON International Inc.

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5.6. Test of Spurious Radiated Emission

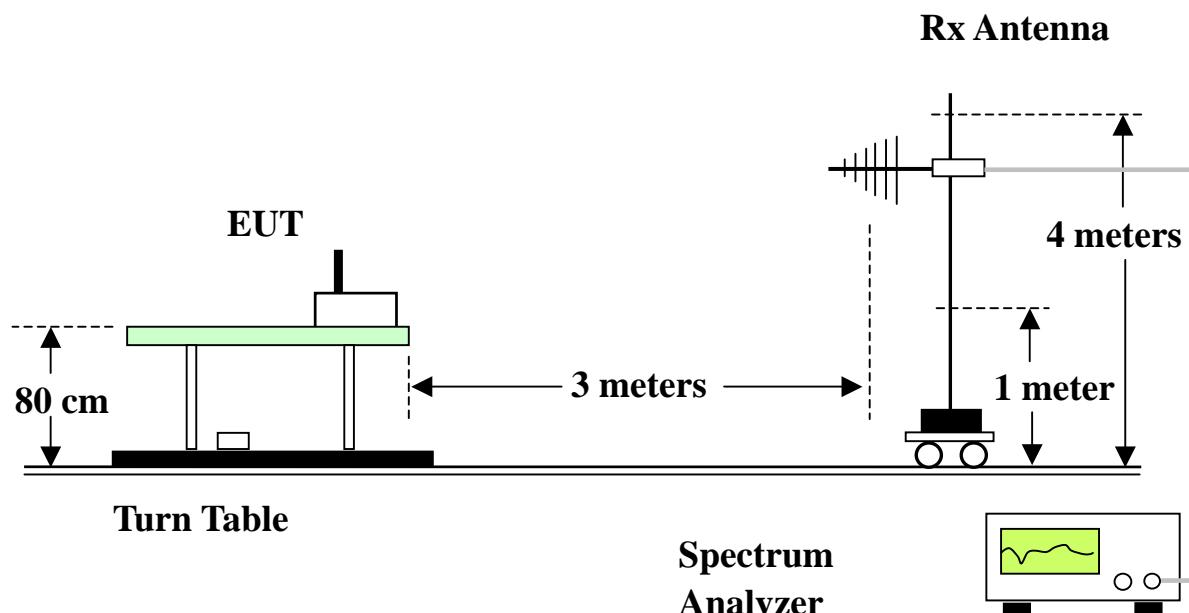
5.6.1. Measuring Instruments

Please reference item 8~19 in chapter 6 for the instruments used for testing.

5.6.2. Test Procedures

- a) Configure the EUT according to ANSI C63.4.
- b) The EUT was placed on the top of the turn table 0.8 meter above ground.
- c) 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 turn table.
- d) Power on the EUT and all the supporting units.
- e) The turn table was rotated by 360 degrees to determine the position of the highest radiation.
- f) 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.
- g) For each suspected 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.
- h) Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- i) For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
- j) If the emission 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 and average method for above the 1GHz. the reported.
- k) For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher than average limit (that means the emission 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.

5.6.3. Test Setup Layout





5.6.4. Test Results and Limit

Note:

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

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

Test Mode	Adapter (ADS6818-1505-U)	Temperature	25 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	66%		

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dB	dB			
1	144.750	29.05	-14.45	43.50	42.68	12.04	2.14	27.81 QP	---	---
2	185.550	29.75	-13.75	43.50	40.92	14.11	2.45	27.73 QP	---	---
3	190.820	33.17	-10.33	43.50	43.82	14.59	2.48	27.72 QP	---	---
1	359.200	32.57	-13.43	46.00	41.60	15.23	3.34	27.60 QP	---	---
2	448.800	34.41	-11.59	46.00	42.44	16.50	3.71	28.24 QP	---	---
3	720.000	32.70	-13.30	46.00	36.78	19.88	4.76	28.72 QP	---	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dB	dB			
1	35.100	31.14	-8.86	40.00	45.14	13.02	1.02	28.04 QP	---	---
2	54.140	33.06	-6.94	40.00	49.61	10.19	1.25	27.99 QP	---	---
3	141.180	34.83	-8.67	43.50	48.76	11.82	2.07	27.82 QP	---	---
1	448.800	34.78	-11.22	46.00	42.81	16.50	3.71	28.24 QP	---	---
2	720.000	38.11	-7.89	46.00	42.19	19.88	4.76	28.72 QP	---	---
3	900.000	39.90	-6.10	46.00	41.78	21.08	5.34	28.30 QP	106	218



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Test Mode	Adapter (ADS6818-1505-W)	Temperature	25 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	66%		

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line	Probe Level	Cable Preamp			Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		
1	104.460	29.38	-14.12	43.50	45.36	10.08	1.83	27.89	QP	---
2	162.430	27.42	-16.08	43.50	40.05	12.82	2.32	27.77	QP	---
3	180.110	31.64	-11.86	43.50	43.39	13.56	2.43	27.74	QP	---
1	359.200	32.82	-13.18	46.00	41.85	15.23	3.34	27.60	QP	---
2	448.800	36.45	-9.55	46.00	44.48	16.50	3.71	28.24	QP	---
3	720.000	34.19	-11.81	46.00	38.27	19.88	4.76	28.72	QP	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line	Probe Level	Cable Preamp			Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		
1	60.260	31.98	-8.02	40.00	48.51	10.15	1.30	27.98	QP	---
2	71.990	32.78	-7.22	40.00	50.31	8.99	1.43	27.95	QP	105 216
3	95.620	31.47	-12.03	43.50	48.29	9.42	1.67	27.91	QP	---
1	538.400	34.52	-11.48	46.00	41.46	17.68	4.12	28.74	QP	---
2	720.000	37.17	-8.83	46.00	41.25	19.88	4.76	28.72	QP	---
3	900.000	37.12	-8.88	46.00	39.00	21.08	5.34	28.30	QP	---



Modulation Type	CCK										
Test Mode	Mode 1 (2412MHz)			Temperature		25 deg. C		Tested By		Steve Chen	
Freq. Range	1GHz~25GHz			Humidity		66%					

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line		Probe Level	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	1076.450	46.26	-7.74	54.00	61.21	24.04	1.20	40.19	Average	---	---
2	2016.090	45.86	-8.14	54.00	58.04	27.16	1.58	40.92	Average	---	---
3	2282.970	48.62	-5.38	54.00	60.10	27.86	1.74	41.08	Average	---	---
1	2689.070	44.51	-9.49	54.00	54.63	29.11	1.97	41.20	Average	---	---
1	4822.000	43.11	-10.89	54.00	49.78	33.23	2.47	42.37	Average	---	---
1	7238.000	48.03	-5.97	54.00	51.71	36.09	2.93	42.70	Average	---	---
1	9650.000	49.94	-24.06	74.00	47.64	38.42	3.72	39.84	Peak	---	---
2	9650.000	48.52	-5.48	54.00	46.22	38.42	3.72	39.84	Average	---	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line		Probe Level	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	2244.050	50.10	-3.90	54.00	61.67	27.76	1.72	41.05	Average	---	---
2	2288.530	50.92	-3.08	54.00	62.39	27.87	1.74	41.08	Average	---	---
3	2360.810	50.72	-3.28	54.00	62.09	28.06	1.69	41.12	Average	---	---
1	2687.520	46.82	-7.18	54.00	56.94	29.11	1.97	41.20	Average	---	---
2	2807.350	43.67	-10.33	54.00	53.38	29.53	1.96	41.20	Average	---	---
1	4824.000	55.75	-18.25	74.00	62.41	33.23	2.48	42.37	Peak	---	---
2	4824.000	53.30	-0.70	54.00	59.96	33.23	2.48	42.37	Average	152	131
1	7238.000	54.19	-19.81	74.00	57.87	36.09	2.93	42.70	Peak	---	---
2	7238.000	47.69	-6.31	54.00	51.37	36.09	2.93	42.70	Average	---	---
1	9650.000	54.65	-19.35	74.00	52.35	38.42	3.72	39.84	Peak	---	---
2	9650.000	51.72	-2.28	54.00	49.42	38.42	3.72	39.84	Average	---	---



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Modulation Type	CCK									
Test Mode	Mode 2 (2437MHz)			Temperature		25 deg. C		Tested By		Steve Chen
Freq. Range	1GHz~25GHz			Humidity		66%				

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line	Probe Level	Cable Factor	Preamp Loss	Remark	Ant	Table
		MHz	dBuV/m	dB	dBuV/m	dB	dB	cm	deg	
1	1076.450	45.75	-8.25	54.00	60.70	24.04	1.20	40.19 Average	---	---
2	2016.090	45.33	-8.67	54.00	57.51	27.16	1.58	40.92 Average	---	---
3	2266.290	48.77	-5.23	54.00	60.30	27.81	1.73	41.07 Average	---	---
1	2687.000	45.71	-8.29	54.00	55.84	29.10	1.97	41.20 Average	---	---
1	4876.000	53.38	-20.62	74.00	59.95	33.35	2.52	42.44 Peak	---	---
2	4876.000	50.52	-3.48	54.00	57.09	33.35	2.52	42.44 Average	---	---
1	7313.000	50.97	-23.03	74.00	54.20	36.28	3.10	42.61 Peak	---	---
2	7313.000	48.94	-5.06	54.00	52.17	36.28	3.10	42.61 Average	---	---
1	9746.000	52.31	-21.69	74.00	49.77	38.56	3.72	39.74 Peak	---	---
2	9746.000	48.61	-5.39	54.00	46.07	38.56	3.72	39.74 Average	---	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line	Probe Level	Cable Factor	Preamp Loss	Remark	Ant	Table
		MHz	dBuV/m	dB	dBuV/m	dB	dB	cm	deg	
1	2013.310	43.85	-10.15	54.00	56.05	27.15	1.57	40.92 Average	---	---
2	2185.670	46.68	-7.32	54.00	58.41	27.60	1.69	41.02 Average	---	---
3	2260.730	49.77	-4.23	54.00	61.30	27.80	1.73	41.06 Average	---	---
1	2687.000	47.44	-6.56	54.00	57.57	29.10	1.97	41.20 Average	---	---
1	4876.000	58.31	-15.69	74.00	64.88	33.35	2.52	42.44 Peak	---	---
2	4876.000	53.50	-0.50	54.00	60.07	33.35	2.52	42.44 Average	107	219
1	7313.000	55.92	-18.08	74.00	59.15	36.28	3.10	42.61 Peak	---	---
2	7313.000	50.40	-3.60	54.00	53.63	36.28	3.10	42.61 Average	---	---
1	9734.000	55.46	-18.54	74.00	52.92	38.54	3.76	39.76 Peak	---	---
2	9734.000	51.47	-2.53	54.00	48.93	38.54	3.76	39.76 Average	---	---



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Modulation Type	CCK									
Test Mode	Mode 3 (2462MHz)			Temperature		25 deg. C		Tested By	Steve Chen	
Freq. Range	1GHz~25GHz			Humidity		66%				

(A) Polarization: Horizontal

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Ant	Table	Pos	Pos
		Limit	Line	Level	Factor	Loss	Factor				
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg
1	1076.450	45.85	-8.15	54.00	60.80	24.04	1.20	40.19	Average	---	---
2	2232.930	49.31	-4.69	54.00	60.92	27.73	1.71	41.05	Average	---	---
3	2298.260	49.61	-4.39	54.00	61.05	27.90	1.75	41.09	Average	---	---
1	2687.520	44.43	-9.57	54.00	54.55	29.11	1.97	41.20	Average	---	---
1	4924.000	57.68	-16.32	74.00	64.26	33.46	2.47	42.51	Peak	---	---
2	4924.000	53.27	-0.73	54.00	59.85	33.46	2.47	42.51	Average	101	205
1	7385.000	52.70	-21.30	74.00	55.98	36.45	2.79	42.52	Peak	---	---
2	7385.000	49.46	-4.54	54.00	52.74	36.45	2.79	42.52	Average	---	---
1	9845.000	56.25	-17.75	74.00	53.24	38.70	3.95	39.64	Peak	---	---
2	9845.000	52.79	-1.21	54.00	49.78	38.70	3.95	39.64	Average	---	---

(B) Polarization: Vertical

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Ant	Table	Pos	Pos
		Limit	Line	Level	Factor	Loss	Factor				
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg
1	1076.450	44.95	-9.05	54.00	59.90	24.04	1.20	40.19	Average	---	---
2	2231.540	48.88	-5.12	54.00	60.50	27.72	1.71	41.05	Average	---	---
3	2381.660	49.79	-4.21	54.00	61.10	28.12	1.71	41.14	Average	---	---
1	2687.000	48.40	-5.60	54.00	58.53	29.10	1.97	41.20	Average	---	---
1	4926.000	57.76	-16.24	74.00	64.34	33.46	2.47	42.51	Peak	---	---
2	4926.000	53.20	-0.80	54.00	59.78	33.46	2.47	42.51	Average	---	---
1	7385.000	55.13	-18.87	74.00	58.41	36.45	2.79	42.52	Peak	---	---
2	7385.000	51.46	-2.54	54.00	54.74	36.45	2.79	42.52	Average	---	---
1	9833.000	56.66	-17.34	74.00	53.71	38.68	3.93	39.66	Peak	---	---
2	9833.000	52.75	-1.25	54.00	49.80	38.68	3.93	39.66	Average	---	---

Sportun International Inc.

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FAX : 886-2-2696-2255

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Modulation Type	OFDM										
Test Mode	Mode 1 (2412MHz)			Temperature		25 deg. C		Tested By		Steve Chen	
Freq. Range	1GHz~25GHz			Humidity		66%					

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line		Probe Factor	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	1076.450	46.39	-7.61	54.00	61.34	24.04	1.20	40.19	Average	---	---
2	2016.090	42.83	-11.17	54.00	55.01	27.16	1.58	40.92	Average	---	---
3	2281.580	46.87	-7.13	54.00	58.36	27.85	1.74	41.08	Average	---	---
1	2519.660	40.21	-13.79	54.00	51.04	28.51	1.86	41.20	Average	---	---
2	2610.560	39.93	-14.07	54.00	50.38	28.83	1.92	41.20	Average	---	---
3	2687.520	46.51	-7.49	54.00	56.63	29.11	1.97	41.20	Average	---	---
1	4822.000	47.87	-6.13	54.00	54.54	33.23	2.47	42.37	Average	---	---
1	7241.000	47.76	-6.24	54.00	51.42	36.10	2.94	42.70	Average	---	---
1	9653.000	51.41	-22.59	74.00	49.08	38.43	3.74	39.84	Peak	---	---
2	9653.000	49.91	-4.09	54.00	47.58	38.43	3.74	39.84	Average	---	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line		Probe Factor	Cable Preamp		Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	1076.450	45.34	-8.66	54.00	60.29	24.04	1.20	40.19	Average	---	---
2	2016.090	47.70	-6.30	54.00	59.88	27.16	1.58	40.92	Average	---	---
3	2281.580	50.84	-3.16	54.00	62.33	27.85	1.74	41.08	Average	---	---
1	2688.550	47.80	-6.20	54.00	57.92	29.11	1.97	41.20	Average	---	---
1	4820.000	47.83	-6.17	54.00	54.50	33.23	2.46	42.36	Average	---	---
1	7241.000	51.57	-22.43	74.00	55.23	36.10	2.94	42.70	Peak	---	---
2	7241.000	49.53	-4.47	54.00	53.19	36.10	2.94	42.70	Average	---	---
1	9650.000	56.52	-17.48	74.00	54.22	38.42	3.72	39.84	Peak	---	---
2	9650.000	51.50	-2.50	54.00	49.20	38.42	3.72	39.84	Average	125	175



Modulation Type	OFDM									
Test Mode	Mode 2 (2437MHz)			Temperature		25 deg. C		Tested By	Steve Chen	
Freq. Range	1GHz~25GHz			Humidity		66%				

(A) Polarization: Horizontal

Freq	Level	Over Limit		Read Line		Probe Factor	Cable Preamp		Ant Remark	Table Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	1076.450	45.63	-8.37	54.00	60.58	24.04	1.20	40.19	Average	---	---
2	2016.090	45.67	-8.33	54.00	57.85	27.16	1.58	40.92	Average	---	---
3	2266.290	49.12	-4.88	54.00	60.65	27.81	1.73	41.07	Average	---	---
1	2689.070	44.87	-9.13	54.00	54.99	29.11	1.97	41.20	Average	---	---
1	7322.000	48.70	-5.30	54.00	52.06	36.30	2.94	42.60	Average	---	---
1	9749.000	52.29	-21.71	74.00	49.76	38.56	3.71	39.74	Peak	---	---
2	9749.000	50.01	-3.99	54.00	47.48	38.56	3.71	39.74	Average	---	---

(B) Polarization: Vertical

Freq	Level	Over Limit		Read Line		Probe Factor	Cable Preamp		Ant Remark	Table Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m		dBuV	dB			
1	1076.450	45.44	-8.56	54.00	60.39	24.04	1.20	40.19	Average	---	---
2	2260.730	49.74	-4.26	54.00	61.27	27.80	1.73	41.06	Average	---	---
3	2360.810	50.81	-3.19	54.00	62.18	28.06	1.69	41.12	Average	---	---
1	2687.520	48.50	-5.50	54.00	58.62	29.11	1.97	41.20	Average	---	---
1	4868.000	48.30	-5.70	54.00	54.88	33.33	2.52	42.43	Average	---	---
1	7322.000	52.40	-21.60	74.00	55.76	36.30	2.94	42.60	Peak	---	---
2	7322.000	50.49	-3.51	54.00	53.85	36.30	2.94	42.60	Average	---	---
1	9749.000	57.87	-16.13	74.00	55.34	38.56	3.71	39.74	Peak	---	---
2	9749.000	52.47	-1.53	54.00	49.94	38.56	3.71	39.74	Average	102	156



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Modulation Type	OFDM										
Test Mode	Mode 3 (2462MHz)			Temperature		25 deg. C		Tested By	Steve Chen		
Freq. Range	1GHz~25GHz			Humidity		66%					

(A) Polarization: Horizontal

	Freq	Over Level	Limit	Limit	Read Line	Probe Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1076.450	45.84	-8.16	54.00	60.79	24.04	1.20	40.19	Average	---	---
2	2016.090	41.91	-12.09	54.00	54.09	27.16	1.58	40.92	Average	---	---
3	2360.810	45.73	-8.27	54.00	57.10	28.06	1.69	41.12	Average	---	---
1	2687.520	46.92	-7.08	54.00	57.04	29.11	1.97	41.20	Average	---	---
1	4916.000	49.78	-4.22	54.00	56.36	33.44	2.48	42.50	Average	---	---
1	7373.000	47.52	-6.48	54.00	50.89	36.42	2.75	42.54	Average	---	---
1	9830.000	50.29	-3.71	54.00	47.38	38.68	3.89	39.66	Average	126	173

(B) Polarization: Vertical

	Freq	Over Level	Limit	Limit	Read Line	Probe Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1076.450	45.53	-8.47	54.00	60.48	24.04	1.20	40.19	Average	---	---
2	2016.090	47.22	-6.78	54.00	59.40	27.16	1.58	40.92	Average	---	---
3	2333.010	49.20	-4.80	54.00	60.62	27.99	1.70	41.11	Average	---	---
1	2688.030	48.60	-5.40	54.00	58.72	29.11	1.97	41.20	Average	---	---
1	4916.000	49.92	-4.08	54.00	56.50	33.44	2.48	42.50	Average	---	---
1	7382.000	52.54	-21.46	74.00	55.85	36.44	2.78	42.53	Peak	---	---
2	7382.000	49.17	-4.83	54.00	52.48	36.44	2.78	42.53	Average	---	---
1	9833.000	56.59	-17.41	74.00	53.64	38.68	3.93	39.66	Peak	---	---
2	9833.000	50.19	-3.81	54.00	47.24	38.68	3.93	39.66	Average	---	---

Sportun International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

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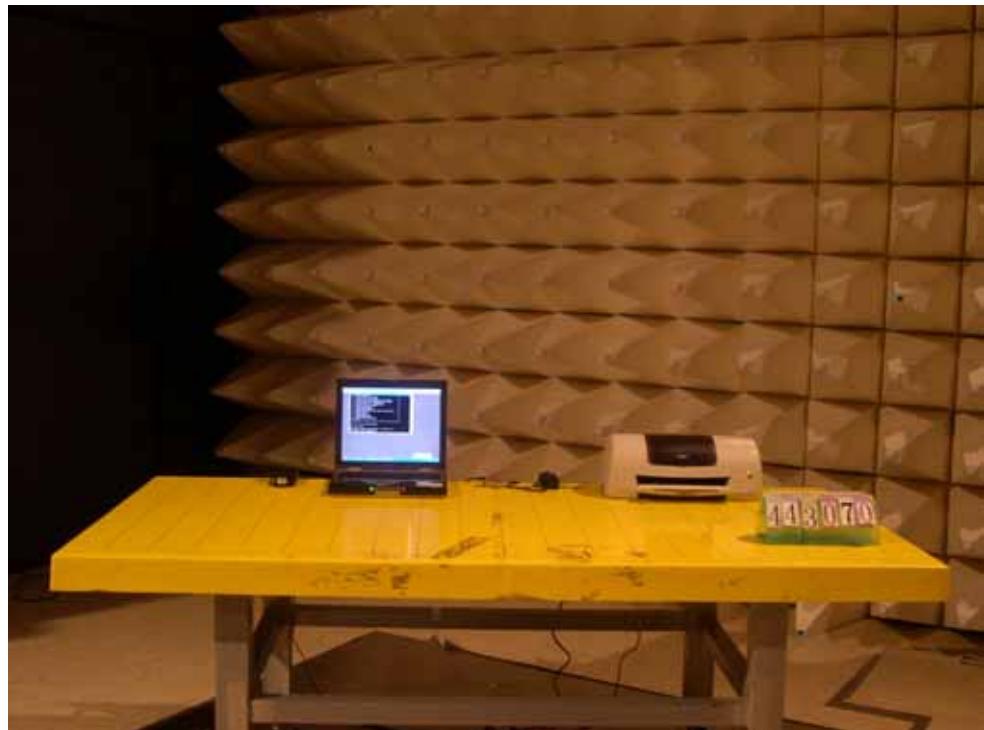
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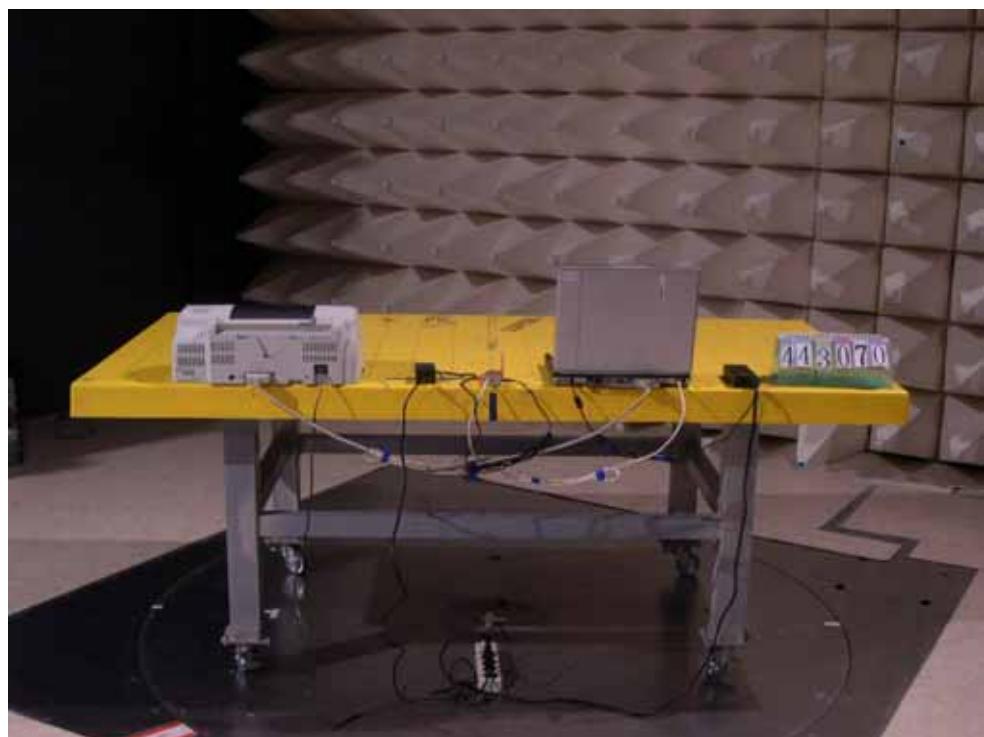
5.6.5 Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.
Adapter 1(ADS6818-1505-U)

FRONT VIEW



REAR VIEW





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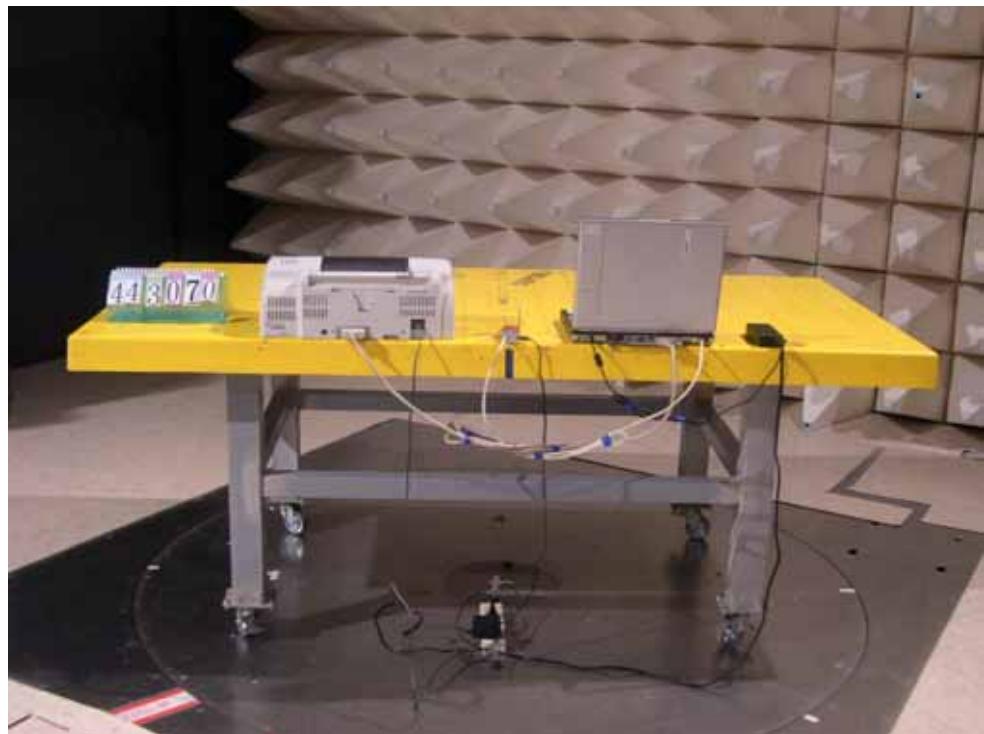
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Adapter 2 (ADS6818-1505-W)

FRONT VIEW



REAR VIEW



Sportun International Inc.

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5.7. Antenna Requirements

5.7.1. Standard Applicable

47 CFR Part15 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.

47 CFR Part15 Section 15.247 (b):

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

The antenna used in this product is mono-pole antenna without antenna connector.



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/ cm ²)	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/cm ²)	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

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

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

- Modulation Type: CCK
- Test Engineer: Murray Lu

Channel No.	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)
Channel 1	2	1.58	18.9200	77.9830	0.0246	1
Channel 6	2	1.58	18.9200	77.9830	0.0246	1
Channel 11	2	1.58	18.5200	71.1214	0.0224	1

From the calculated result shown in above table, the power density is lower than limit at location 20cm far away.



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- Modulation Type: OFDM
- Test Engineer: Murray Lu

Channel No.	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)
Channel 1	2	1.58	16.200	41.6869	0.0132	1
Channel 6	2	1.58	16.000	39.8107	0.0126	1
Channel 11	2	1.58	17.200	52.4807	0.0166	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	9 KHz – 2.75 GHz	Feb. 16, 2004	Conduction (CO04-HY)
2	LISN	MessTec	NNB-2/16Z	2001/004	9 KHz – 30 MHz	Jun. 02, 2003	Conduction (CO04-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9 KHz – 30 MHz	Apr. 27, 2004	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	Apr. 21, 2004	Conduction (CO04-HY)
7	Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
8	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 24, 2003	Radiation (03CH03-HY)
9	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2003	Radiation (03CH03-HY)
10	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
11	Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
12	Horn Antenna	COM-POWER	3115	6741	1GHz – 18GHz	Apr. 07, 2004	Radiation (03CH03-HY)
13	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
14	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
15	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
16	Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)
17	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.



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Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
19	Spectrum analyzer	R&S	FSP7	838858/014	9KHZ~7GHZ	Sep. 03, 2003	Conducted
20	Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2003	Conducted
21	Power sensor	R&S	NRV-Z55	100049	DC~40GHz	May 28, 2003	Conducted
22	Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	May 28, 2003	Conducted
23	AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 27, 2003	Conducted
24	AC power source	G.W.	GPC-6030D	C671845	DC 1V~60V	Nov. 06, 2003	Conducted
25	Temp. and	KSON	THS-C3L	612	N/A	Oct. 01, 2003	Conducted
26	RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2004	Conducted
27	RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2004	Conducted

※ Calibration Interval of instruments listed above is one year.