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FCC EMC TEST REPORT

Applicant's company	Aruba Networks, Inc.
Applicant Address	1344 Crossman Avenue Sunnyvale CA 94089, USA
Manufacturer's company	Wistron NeWeb Corporation
Manufacturer Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

Product Name	ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA / ARUBA 135 WIRELESS ACCESS POINT
Brand Name	Aruba
Model Name	AP-134 / AP-135
Test Standard	47 CFR FCC Part 15 Subpart B
Classification of ITE	Class B
Received Date	Dec. 10, 2010
Final Test Date	Mar. 09, 2011
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7

Statement

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

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

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

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



Testing Laboratory
1190

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History of This Test Report



1. CERTIFICATE OF COMPLIANCE

Product Name : ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA /
ARUBA 135 WIRELESS ACCESS POINT
Brand Name : Aruba
Model Name : AP-134 / AP-135
Applicant : Aruba Networks, Inc.
Test Standard : 47 CFR FCC Part 15 Subpart B

Sportun International as requested by the applicant to evaluate the EMI performance of the product sample received on Dec. 10, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMI nature.

Jordan Hsiao 2011.4.13

Jordan Hsiao

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart B				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.107	AC Power Line Conducted Emissions	Complies	3.49 dB
4.2	15.109	Radiated Emissions	Complies	3.13 dB

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Radiated Emissions	±1.9dB	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

<For 5GHz Band>:

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From POE and Power Adapter
Modulation	IEEE 802.11a: OFDM; IEEE 802.11an: see the below table
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54); IEEE 802.11an: see the below table
Frequency Range	5150 ~ 5250MHz / 5725 ~ 5850MHz
Channel Number	IEEE 802.11a: 9 IEEE 802.11an: 9 for 20MHz bandwidth ; 4 for 40MHz bandwidth
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

<For 2.4GHz Band>:

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From POE and Power Adapter
Modulation	IEEE 802.11b: DSSS; IEEE 802.11g: OFDM; IEEE 802.11n: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	IEEE 802.11b: DSSS (1/ 2/ 5.5/11) IEEE 802.11g: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n: see the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	IEEE 802.11b/g: 11 IEEE 802.11n: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna		Single (TX)				Three (TX)			
Band width Mode		20 MHz		40 MHz		20 MHz		40 MHz	
802.11a		X		X		V		X	
802.11b		X		X		V		X	
802.11g		X		X		V		X	
802.11n		X		X		V		V	

802.11n Spec

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate (Mbps)			
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

802.11n Bandwidth

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

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Antenna Gain		Cable Loss		Test Antenna gain	
					2.4GHz Band	5GHz Band	2.4GHz Band	5GHz Band	2.4GHz Band	5GHz Band
1	ARUBA	AP-ANT-1B	Omni Antenna	RP-SMA	3.8	5.8	1.8	3.3	2	2.5
2	ARUBA	AP-ANT-13B	Omni Antenna	RP-SMA	4.4	3.3	1.8	3.3	2.6	0
3	ARUBA	AP-ANT-16	Omni Antenna	RP-SMA	3.9	4.7	1.8	3.3	2.1	1.4
4	ARUBA	AP-ANT-17	Directional Antenna	RP-SMA	6	5	1.8	3.3	4.2	1.7
5	ARUBA	AP-ANT-18	Directional Antenna	RP-SMA	7	7.5	1.8	3.3	5.2	4.2
6	ARUBA	AP-ANT-19	Omni Antenna	RP-SMA	3	6	1.8	3.3	1.2	2.7
7	ARUBA	AP-ANT-93	Directional Antenna	RP-SMA	-	13	-	3.3	-	9.7
8	WNC	-	Embedded Antenna	I-PEX	4.5	6	1.8	3.3	3.5	4.5

Note 1: There are two types of EUT, one will collocate with external antennas (Ant. 1~Ant. 7) and another will collocate with internal antenna (Ant. 8).

Note 2: Ant. 7 only for IEEE 802.11a/n Band 4 uses.

Note 3: For IEEE 802.11b/g/n:

Ant. 2, Ant. 5 and Ant. 8 were selected to be tested and recorded in the report.

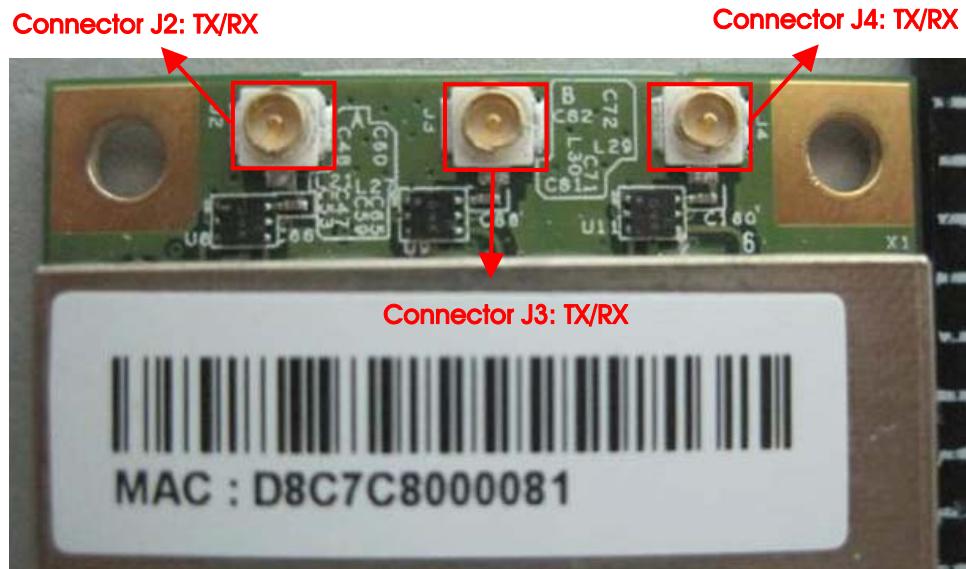
For IEEE 802.11a/n Band 1:

Ant. 5, Ant. 6 and Ant. 8 were selected to be tested and recorded in the report.

For IEEE 802.11a/n Band 4:

Ant. 5, Ant. 6, Ant. 7 and Ant. 8 were selected to be tested and recorded in the report.

Note 4: The EUT has three antenna connectors (Connector J2, J3 and J4) that can be used for transmitting and receiving simultaneously as 3TX and 3RX.



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

For IEEE 802.11b/g, use Channel 1~Channel 11.

There are two bandwidth systems for 802.11n.

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

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

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

For 5GHz Band:

For IEEE 802.11a, use Channel 36, 40, 44, 48, 149, 153, 157, 161, 165.

There are two bandwidth systems for 802.11n.

For both 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 149, 153, 157, 161, 165.

For both 40MHz bandwidth systems, use Channel 38, 46, 151, 159.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 MHz		

3.5. Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Antenna
AC Power Line Conducted Emissions	Normal Use	-
Radiated Emissions	CRX/Normal Use	2/5/6/7/8

Note: CRX=continuously receiving

All the test modes were listed as below:

Mode 1. EUT 1 with external antenna + Adapter

Mode 2. EUT 1 with external antenna + POE

Mode 3. EUT 2 with internal antenna + Adapter

Mode 4. EUT 2 with internal antenna + POE

<For Conducted Emissions Test>:

Due to Mode 1 and Mode 4 generated the worst test result, so both of them were recorded in this report.

<For Radiated Emissions Test>:

Adapter Mode and POE Mode were performed at Horizontal and Vertical and the worst-case was found at Horizontal, thus measurement will follow this same test mode.

Due to Mode 2 and Mode 4 generated the worst test result, so both of them were recorded in this report.

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH0-CB	SAC	Hwa Ya	187376	IC 4086D	-
CO01-CB	Conduction	Hwa Ya	187376	IC 4086D	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Multiple Listing

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

EUT	Product Name	Model No.	Description
1	ARUBA 134 WIRELESS ACCESS POINT, EXT ANTENNA	AP-134	EUT with external antenna
2	ARUBA 135 WIRELESS ACCESS POINT	AP-135	EUT with internal antenna

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D420	E2KWM3945ABG
Notebook	DELL	D420	E2KWM3945ABG
Notebook	DELL	1340	E2K4965AGNM
POE	HiPoE	N/A	9001G
Adaptor	LEI	IU18-2120150-WP	DOC
Notebook	DELL	D400	E2K24GBRL

3.9. EUT Operation during Test

During the test, the following programs under WIN XP were executed:

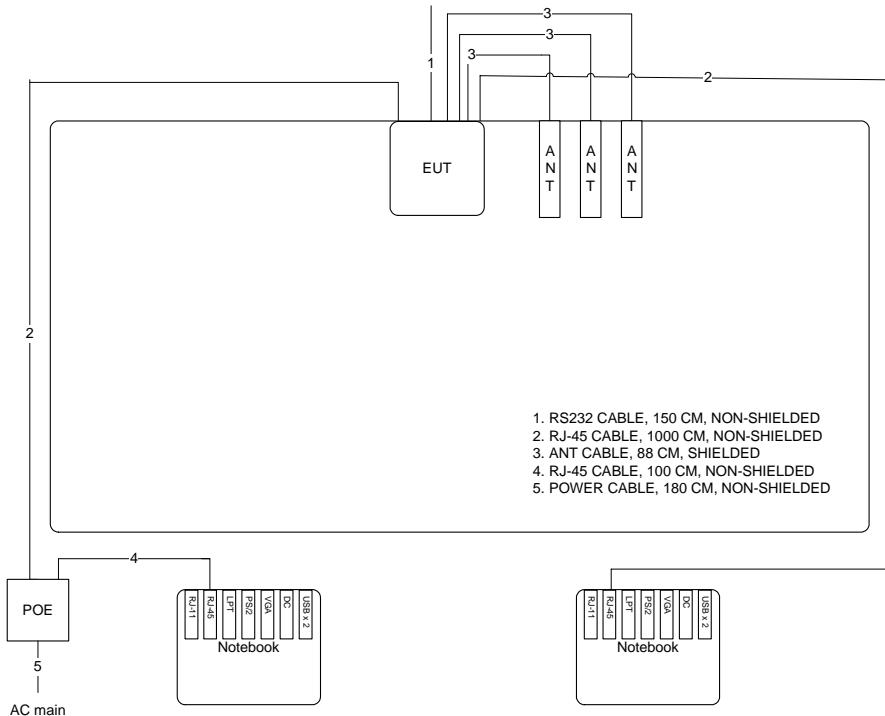
Executed "Hyper Terminal" to link with the remote workstation to receive and transmit data via RJ45 cables via EUT.

Executed "iperf" to receive and transmit data through EUT to notebook.

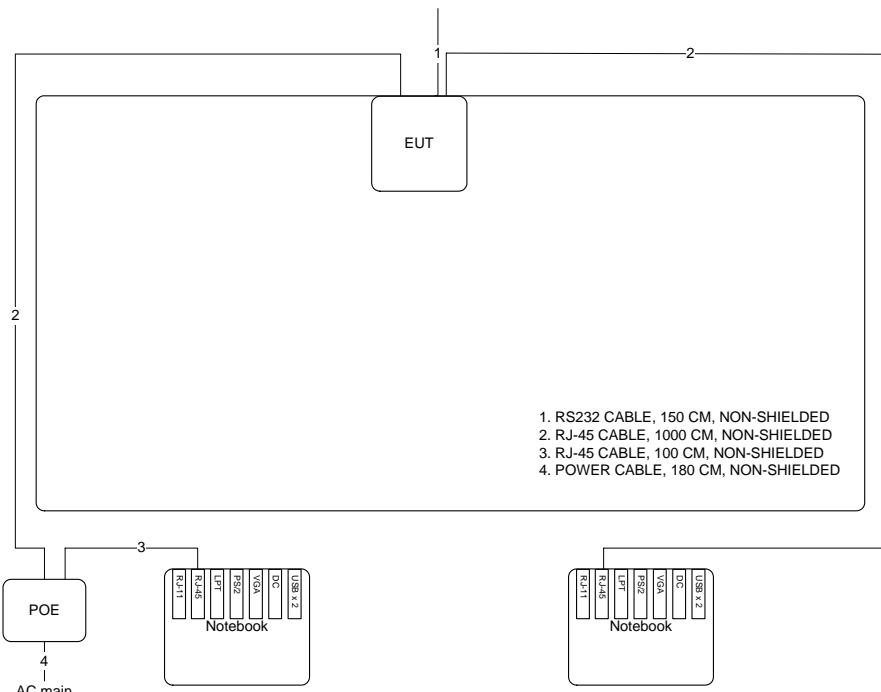
3.10. Test Configurations

3.10.1. Radiation Emissions Test Configuration

Test Mode: Mode 2

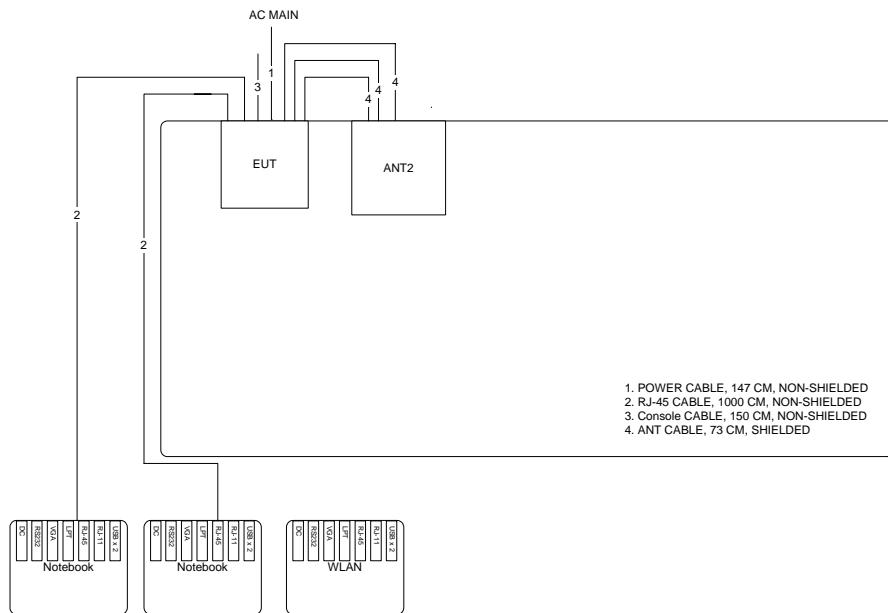


Test Mode: Mode 4

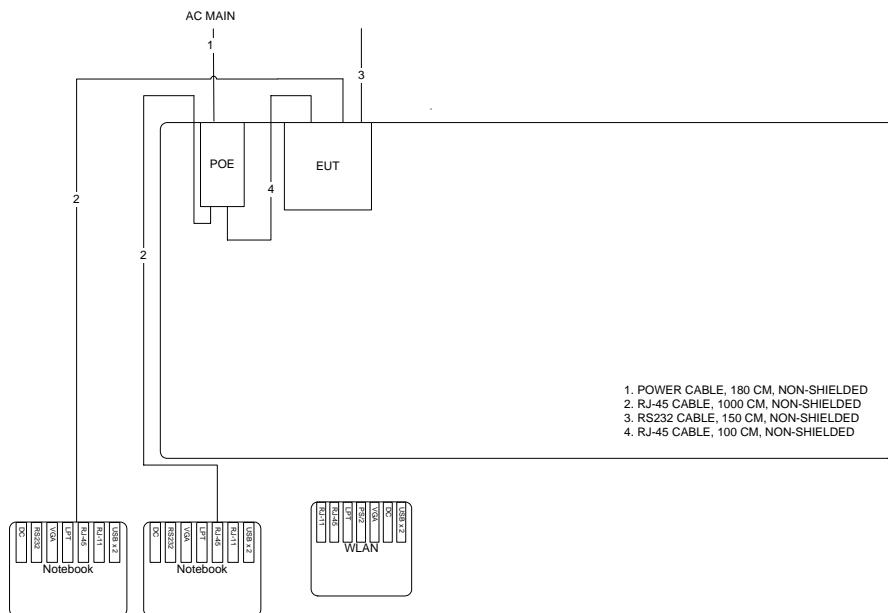


3.10.2.AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 1



Test Mode: Mode 4



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

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

4.1.2. Measuring Instruments and Setting

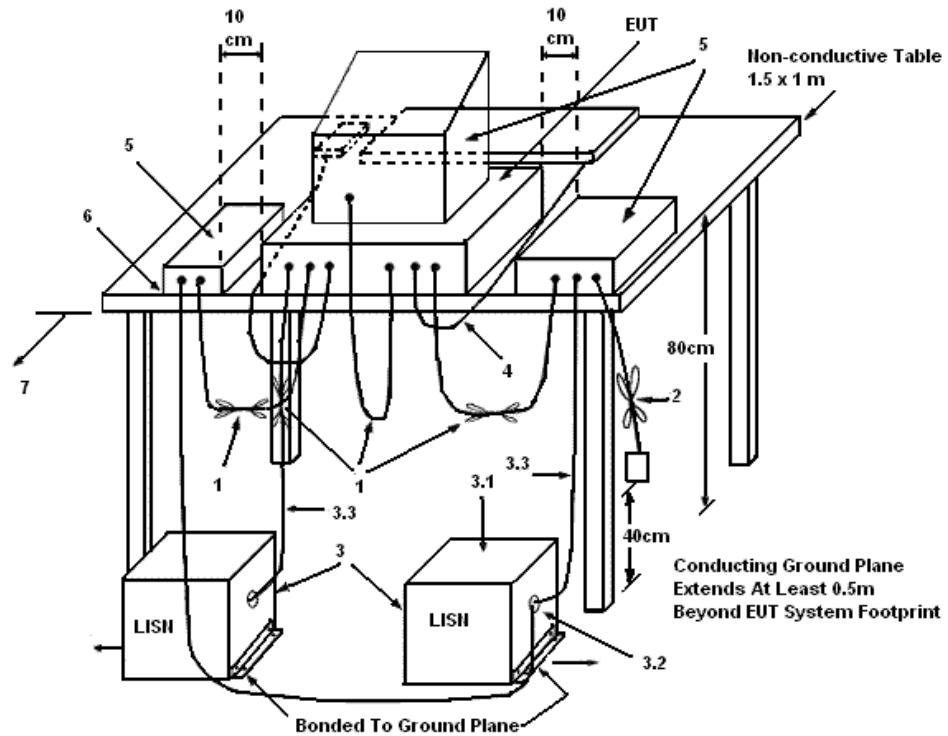
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

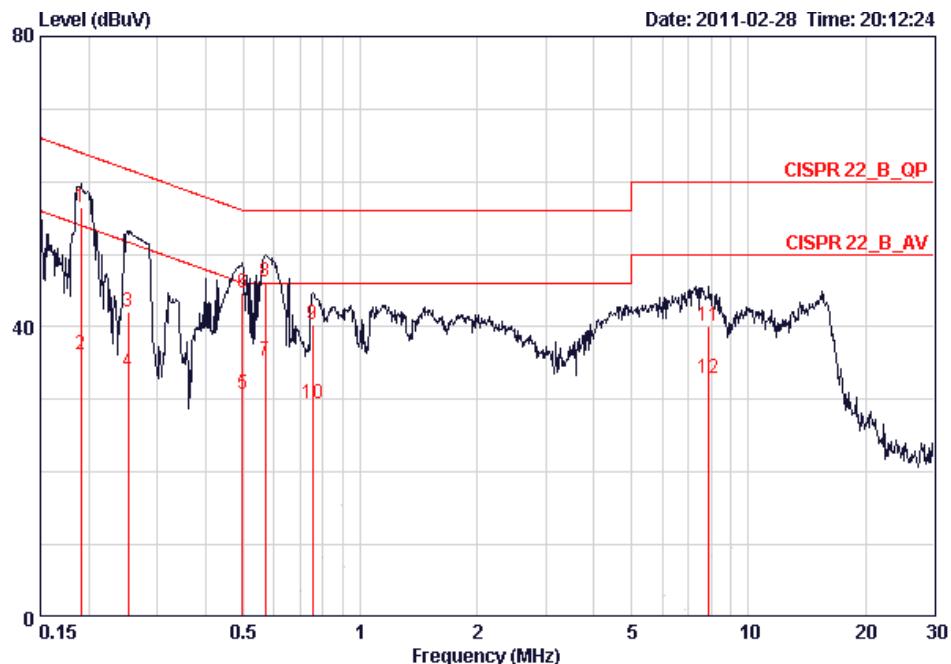
- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using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

4.1.5. Test Deviation

There is no deviation with the original standard.

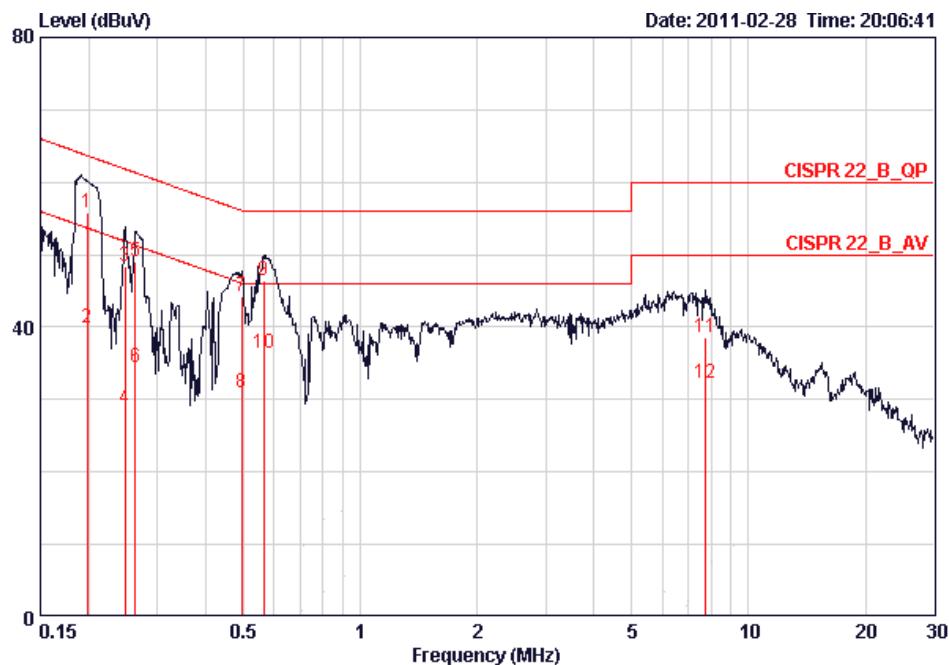
4.1.6. Results of AC Power Line Conducted Emissions Measurement

Temperature	21°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link / Mode 1		



Freq	Over		Limit	Read	LISN	Cable	
	Level	Limit					Remark
	MHz	dBuV	dB	dBuV	dB	dB	
1	0.19039	56.49	-7.53	64.02	56.24	0.05	0.20 QP
2	0.19039	36.18	-17.84	54.02	35.93	0.05	0.20 AVERAGE
3	0.25211	42.01	-19.67	61.69	41.77	0.04	0.20 QP
4	0.25211	33.81	-17.87	51.69	33.57	0.04	0.20 AVERAGE
5	0.49673	30.81	-15.25	46.05	30.60	0.03	0.18 QP
6	0.49673	44.67	-11.39	56.05	44.46	0.03	0.18 QP
7	0.57010	35.33	-10.67	46.00	35.10	0.03	0.20 AVERAGE
8	0.57010	46.24	-9.76	56.00	46.01	0.03	0.20 QP
9	0.75493	40.35	-15.65	56.00	40.12	0.03	0.20 QP
10	0.75493	29.40	-16.60	46.00	29.17	0.03	0.20 AVERAGE
11	7.893	40.05	-19.95	60.00	39.37	0.28	0.40 QP
12	7.893	32.93	-17.07	50.00	32.25	0.28	0.40 AVERAGE

Temperature	21°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 1		

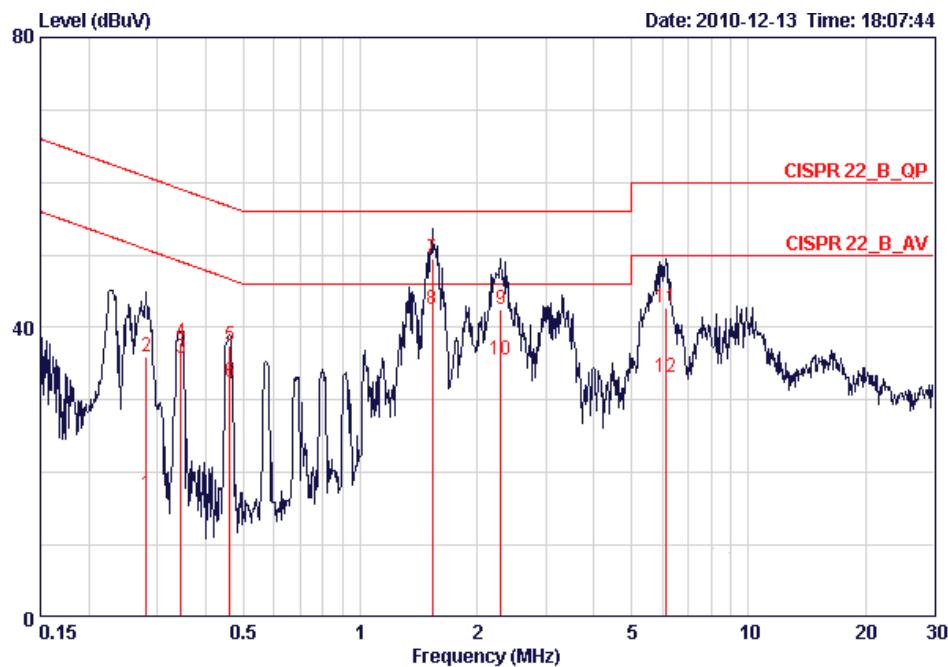


Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		Line	Limit	Level	Factor	Loss	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.19789	55.81	-7.89	63.70	55.53	0.08	0.20 QP
2	0.19789	39.98	-13.72	53.70	39.70	0.08	0.20 AVERAGE
3	0.24814	48.36	-13.46	61.82	48.08	0.08	0.20 QP
4	0.24814	28.80	-23.02	51.82	28.52	0.08	0.20 AVERAGE
5	0.26303	49.08	-12.26	61.34	48.80	0.08	0.20 QP
6	0.26303	34.40	-16.94	51.34	34.12	0.08	0.20 AVERAGE
7	0.49411	44.33	-11.77	56.10	44.08	0.07	0.18 QP
8	0.49411	31.00	-15.10	46.10	30.75	0.07	0.18 AVERAGE
9	0.56409	46.52	-9.48	56.00	46.25	0.07	0.20 QP
10	0.56409	36.48	-9.52	46.00	36.21	0.07	0.20 AVERAGE
11	7.769	38.51	-21.49	60.00	37.79	0.32	0.40 QP
12	7.769	32.22	-17.78	50.00	31.50	0.32	0.40 AVERAGE

Note:

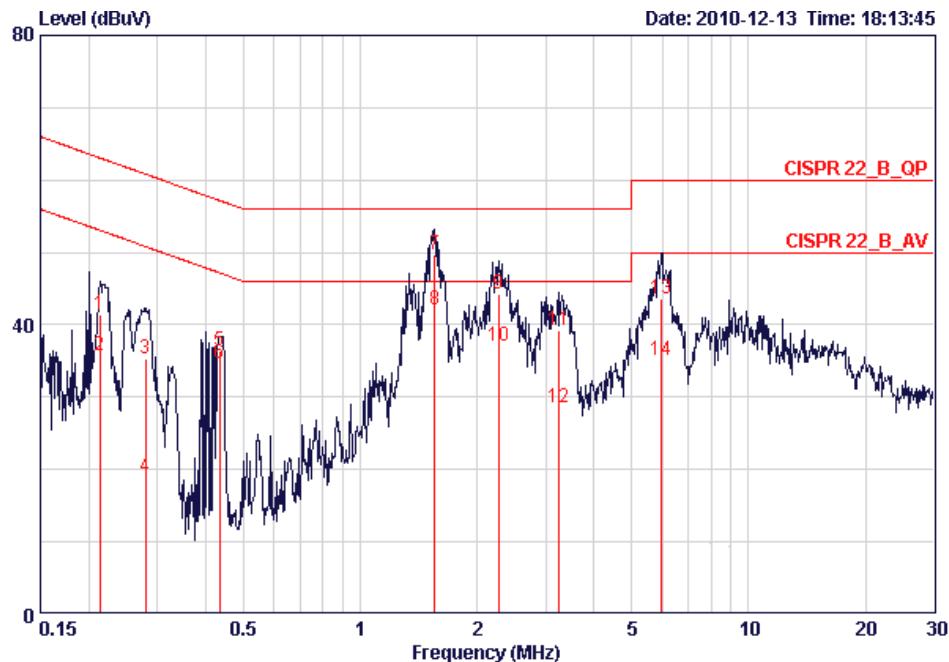
Level = Read Level + LISN Factor + Cable Loss.

Temperature	21°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link / Mode 4		



Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		Limit	Line	Level	Factor	dB	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.28178	17.03	-33.73	50.76	16.79	0.04	0.20 AVERAGE
2	0.28178	35.99	-24.77	60.76	35.75	0.04	0.20 QP
3	0.34463	35.74	-13.35	49.09	35.51	0.03	0.20 AVERAGE
4	0.34463	37.87	-21.22	59.09	37.64	0.03	0.20 QP
5	0.46122	37.59	-19.08	56.67	37.36	0.03	0.20 QP
6	0.46122	32.48	-14.19	46.67	32.25	0.03	0.20 AVERAGE
7	1.535	49.55	-6.45	56.00	49.40	0.04	0.11 QP
8	1.535	42.51	-3.49	46.00	42.36	0.04	0.11 AVERAGE
9	2.297	42.47	-13.53	56.00	42.21	0.06	0.20 QP
10	2.297	35.50	-10.50	46.00	35.24	0.06	0.20 AVERAGE
11	6.153	42.76	-17.24	60.00	42.21	0.22	0.34 QP
12	6.153	33.23	-16.77	50.00	32.68	0.22	0.34 AVERAGE

Temperature	21°C	Humidity	58%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 4		



Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		Line	dBuV	Level	Factor	dB	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.21392	41.52	-21.53	63.05	41.24	0.08	0.20 QP
2	0.21392	35.72	-17.33	53.05	35.44	0.08	0.20 AVERAGE
3	0.28029	35.35	-25.46	60.81	35.07	0.08	0.20 QP
4	0.28029	19.03	-31.78	50.81	18.75	0.08	0.20 AVERAGE
5	0.43511	36.47	-20.68	57.15	36.20	0.07	0.20 QP
6	0.43511	34.62	-12.53	47.15	34.35	0.07	0.20 AVERAGE
7	1.552	49.76	-6.24	56.00	49.57	0.08	0.11 QP
8	1.552	42.04	-3.96	46.00	41.85	0.08	0.11 AVERAGE
9	2.273	44.24	-11.76	56.00	43.94	0.10	0.20 QP
10	2.273	37.14	-8.86	46.00	36.84	0.10	0.20 AVERAGE
11	3.241	39.34	-16.66	56.00	38.96	0.12	0.25 QP
12	3.241	28.54	-17.46	46.00	28.16	0.12	0.25 AVERAGE
13	5.961	43.65	-16.35	60.00	43.10	0.25	0.30 QP
14	5.961	35.01	-14.99	50.00	34.46	0.25	0.30 AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Radiated Emissions Measurement

4.2.1. Limit

Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 5th harmonic of highest frequency. The quasi-peak measuring receiver shall be in accordance with clause 2 of CISPR 16-1. Receivers with peak detectors shall be in accordance with clause 3 of CISPR 16-1, and shall have a 6 dB bandwidth in accordance with clause 2 of CISPR 16-1.

Frequency of Emission (MHz)	Field Strength QP Limit (dBuV/m) at 3m
30~88	40
88~216	43.5
216~960	46
Above 960	54

4.2.2. Measuring Instruments and Setting

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

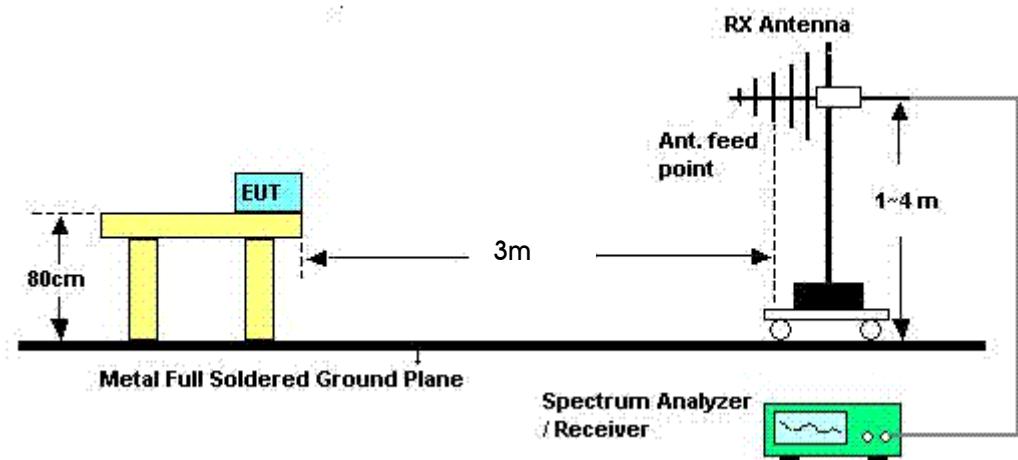
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

Spectrum Parameter	Setting
Start Frequency	1000 MHz
Stop Frequency	5th harmonic of highest frequency
RB / VB	1 MHz / 1MHz for Peak

4.2.3. Test Procedures

1. 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.

4.2.4. Test Setup Layout



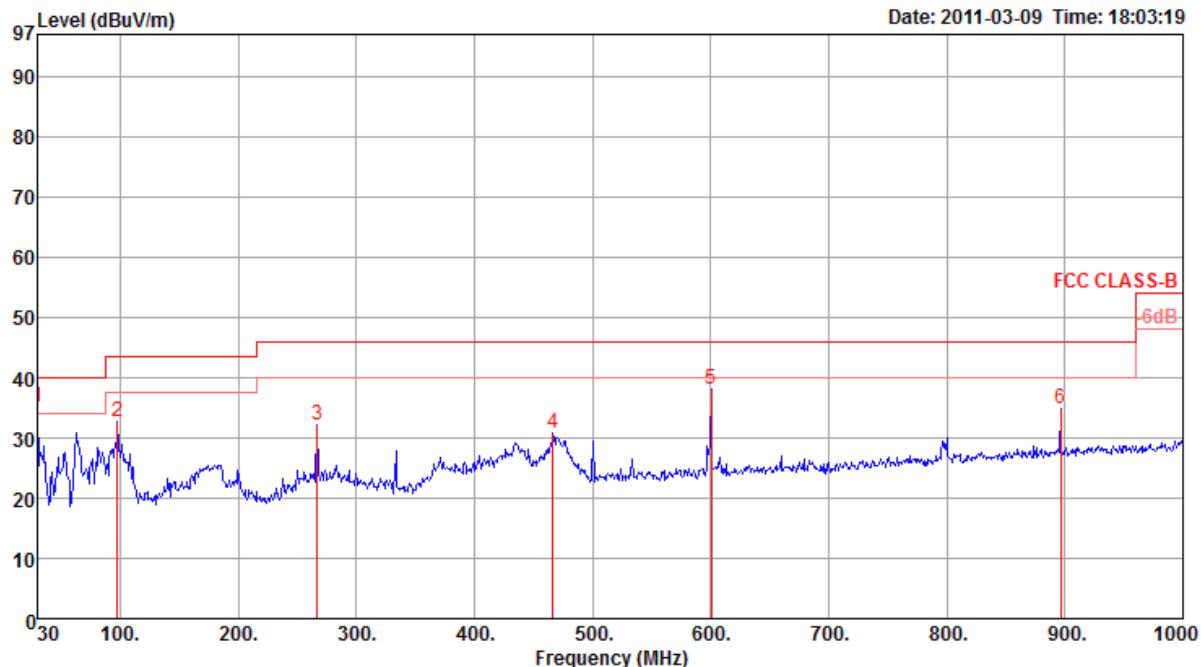
4.2.5. Test Deviation

There is no deviation with the original standard.

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

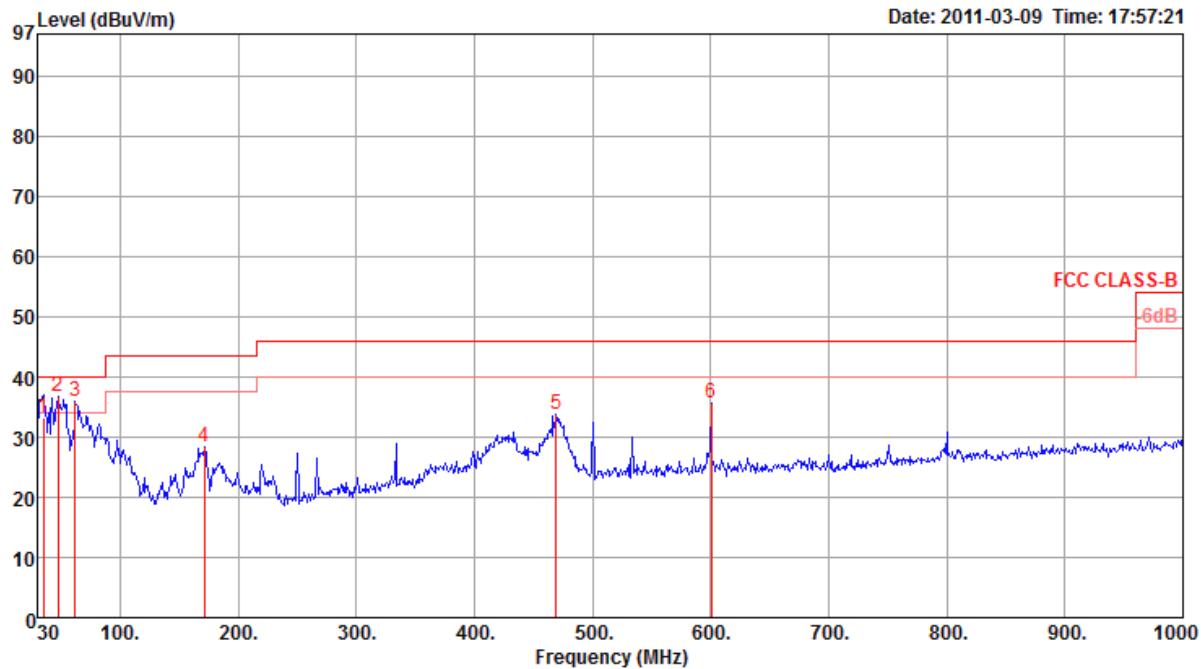
Temperature	23°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 2

Horizontal



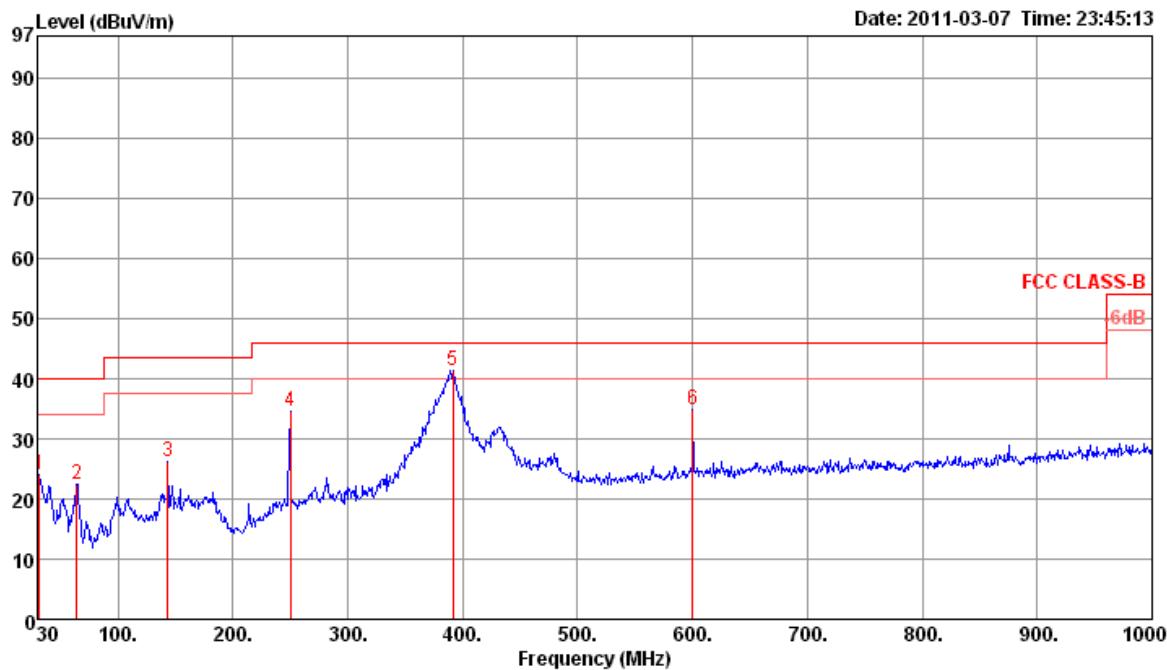
Freq MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Cable Loss Factor			T/Pos deg	A/Pos cm	Remark	Pol/Phase
					Preamp	Antenna	Factor				
1 P	30.00	35.03	40.00	-4.97	43.92	0.50	27.80	18.41	0	100	Peak
2	97.90	32.74	43.50	-10.76	48.76	1.16	27.61	10.43	0	100	Peak
3	266.68	32.16	46.00	-13.84	44.23	1.97	26.97	12.93	0	100	Peak
4	466.50	30.81	46.00	-15.19	38.99	2.63	27.93	17.12	0	100	Peak
5	600.36	38.12	46.00	-7.88	44.50	2.90	28.10	18.82	0	100	Peak
6	896.21	34.84	46.00	-11.16	37.53	3.58	27.41	21.14	0	100	Peak
											HORIZONTAL

Vertical

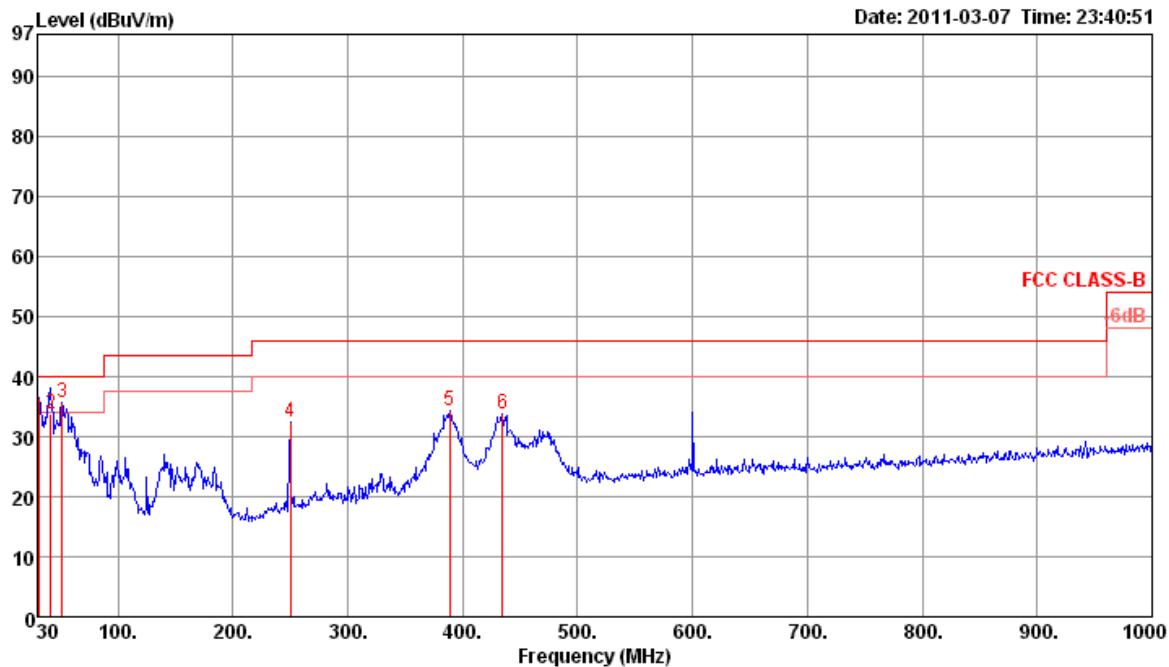


Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	deg	cm		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m				
1 ^q	34.85	33.30	40.00	-6.70	45.27	0.50	27.80	15.33	256	135 OP	VERTICAL
2 ^p	47.46	36.87	40.00	-3.13	55.47	0.70	27.80	8.50	0	400 Peak	VERTICAL
3 [!]	62.01	36.03	40.00	-3.97	56.67	0.84	27.75	6.27	0	400 Peak	VERTICAL
4	171.62	28.37	43.50	-15.13	44.73	1.56	27.24	9.32	0	400 Peak	VERTICAL
5	469.41	33.86	46.00	-12.14	42.01	2.64	27.95	17.16	0	400 Peak	VERTICAL
6	600.36	35.78	46.00	-10.22	42.16	2.90	28.10	18.82	0	400 Peak	VERTICAL

Temperature	23°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 4

Horizontal


Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
		Line	dB									
MHz	dBuV/m	dBuV/m	dB		dBuV	dB	dB	dB/m	deg	cm		
1	31.94	24.02	40.00	-15.98	33.63	0.50	27.80	17.69	0	100	Peak	HORIZONTAL
2	63.95	22.54	40.00	-17.46	42.68	0.88	27.74	6.72	0	100	Peak	HORIZONTAL
3	143.49	26.10	43.50	-17.40	39.89	1.42	27.38	12.17	0	100	Peak	HORIZONTAL
4	250.19	34.53	46.00	-11.47	46.86	1.90	27.00	12.77	0	100	Peak	HORIZONTAL
5 p	391.81	41.35	46.00	-4.65	50.77	2.28	27.55	15.85	0	100	Peak	HORIZONTAL
6	600.36	34.72	46.00	-11.28	41.15	2.90	28.10	18.77	0	100	Peak	HORIZONTAL

Vertical


Freq	Level	Limit	Over	Read	Cable			Antenna	T/Pos	A/Pos	Remark	Pol/Phase
					MHz	dBuV/m	dBuV/m	dB	dB	dB	dB/m	deg
1 p	30.97	36.59	40.00	-3.41	45.67	0.50	27.80	18.22	0	400	Peak	VERTICAL
2 q	41.63	33.89	40.00	-6.11	49.00	0.70	27.80	11.99	178	100	QP	VERTICAL
3 t	51.34	35.66	40.00	-4.34	54.38	0.72	27.79	8.35	0	400	Peak	VERTICAL
4	250.19	32.53	46.00	-13.47	44.86	1.90	27.00	12.77	0	400	Peak	VERTICAL
5	388.90	34.33	46.00	-11.67	43.80	2.28	27.52	15.77	0	400	Peak	VERTICAL
6	434.49	33.70	46.00	-12.30	42.36	2.51	27.77	16.60	0	400	Peak	VERTICAL

Note:

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

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

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

4.2.7. Results for Radiated Emissions (1GHz~5th harmonic of highest frequency)

Temperature	23°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 2
Test Date	Mar. 10, 2011		

Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable PreampAntenna			T/Pos	A/Pos	Remark	Pol/Phase
		Line	dB			dB	dB	dB/m				
1 p	1496.29	45.23	74.00	-28.77	52.90	1.56	34.73	25.50	200	100	Peak	HORIZONTAL
2 a	1498.12	34.91	54.00	-19.09	42.59	1.57	34.75	25.50	200	100	Average	HORIZONTAL

Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable PreampAntenna			T/Pos	A/Pos	Remark	Pol/Phase
		Line	dB			dB	dB	dB/m				
1 p	1496.38	45.11	74.00	-28.89	52.78	1.56	34.73	25.50	280	121	Peak	VERTICAL
2 a	1497.39	42.00	54.00	-12.00	49.68	1.57	34.75	25.50	280	121	Average	VERTICAL

Temperature	23°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	Normal Link / Mode 4
Test Date	Feb. 11, 2011		

Horizontal

Freq	Level	Limit		Over Line	Read Level	Cable		Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	3863.27	42.59	54.00	-11.41	43.10	2.84	31.81	35.16	14	127	Average	HORIZONTAL	
2	3863.29	46.83	74.00	-27.17	47.34	2.84	31.81	35.16	14	127	Peak	HORIZONTAL	

Vertical

Freq	Level	Limit		Over Line	Read Level	Cable		Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	3863.17	44.73	74.00	-29.27	45.24	2.84	31.81	35.16	328	101	Peak	VERTICAL	
2	3863.33	38.31	54.00	-15.69	38.82	2.84	31.81	35.16	328	101	Average	VERTICAL	

Note:

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

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100377	9kHz ~ 2.75GHz	Sep. 01, 2010	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Apr. 24, 2010	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9K ~ 30MHz	Oct. 30, 2010	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Jan. 04, 2010	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Jan. 04, 2011	Conduction (CO01-CB)
COND Cable	-	Cable	-	0.15MHz~30MHz	Dec. 01, 2010	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Oct. 17, 2010	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 13, 2010	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Oct. 08, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 06, 2010	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100304	9kHz ~ 40GHz	Nov. 06, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 06, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 06, 2011	Radiation (03CH01-CB)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Sep. 09, 2010*	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N/A	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N/A	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	-	30 MHz - 1 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	-	1 GHz - 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	-	1 GHz - 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)

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

* Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

6. TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION



Certificate of Accreditation

This is to certify that

Sportun International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria : ISO/IEC 17025:2005
Accreditation Number : 1190
Originally Accredited : December 15, 2003
Effective Period : January 10, 2010 to January 09, 2013
Accredited Scope : Testing Field, see described in the Appendix
Specific Accreditation Program : Accreditation Program for Designated Testing Laboratory for Commodities Inspection
Accreditation Program for Telecommunication Equipment Testing Laboratory
Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 30, 2009

PI, total 22 pages

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

Appendix A. Test Photos

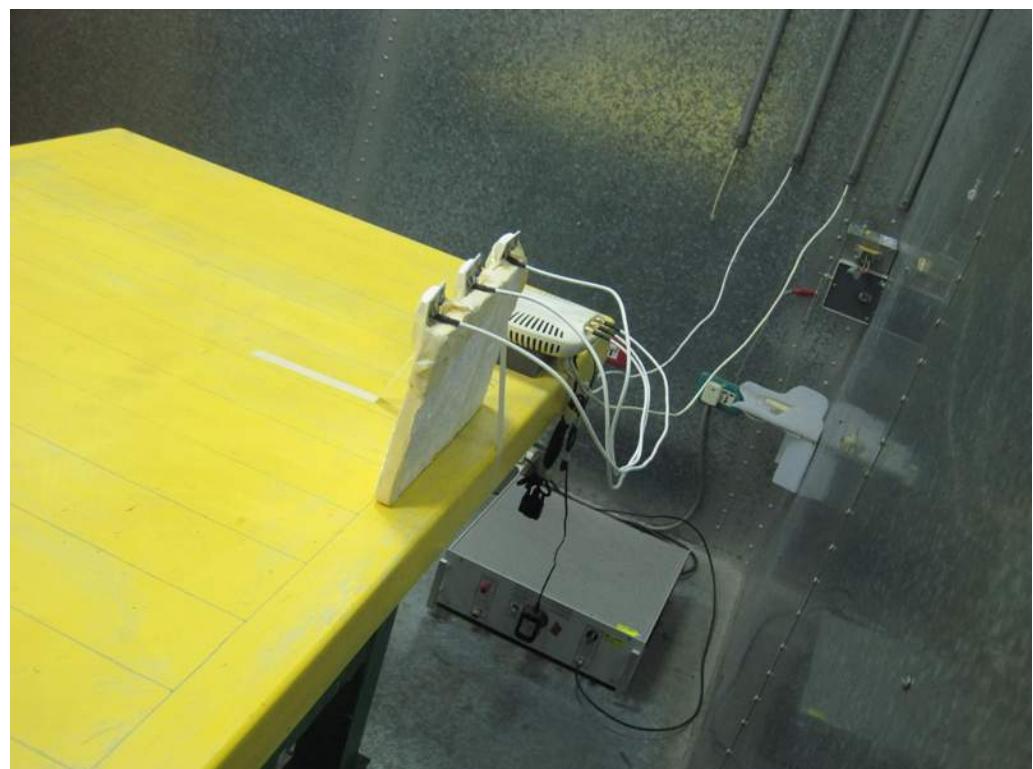
1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 1

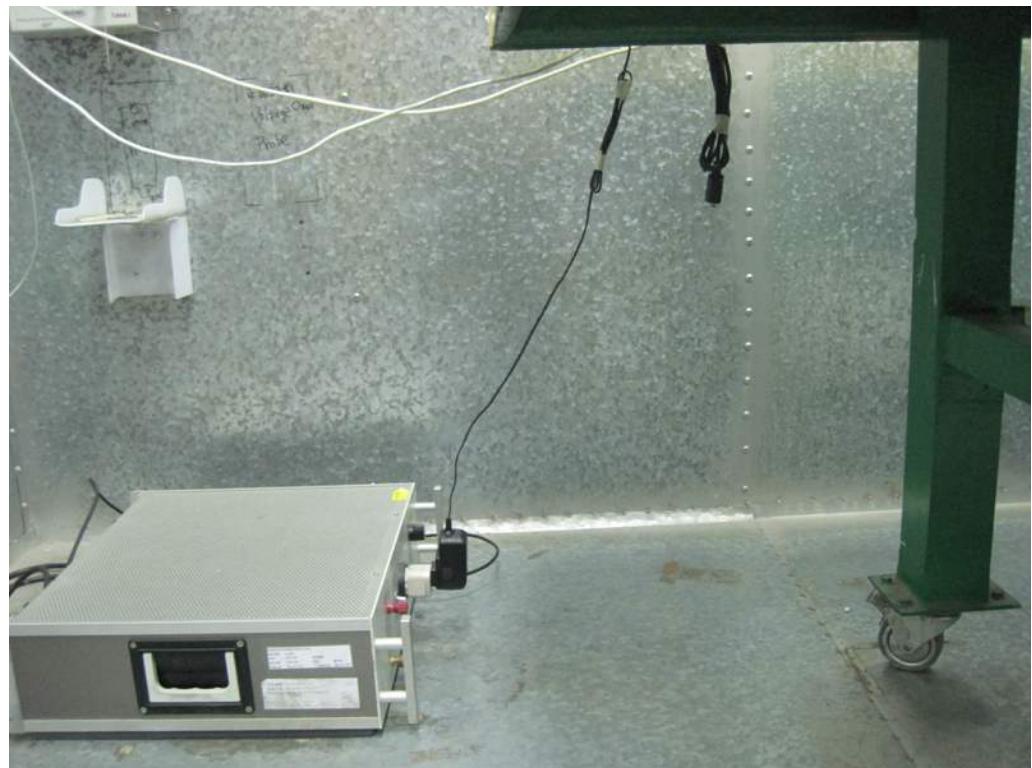
FRONT VIEW



REAR VIEW

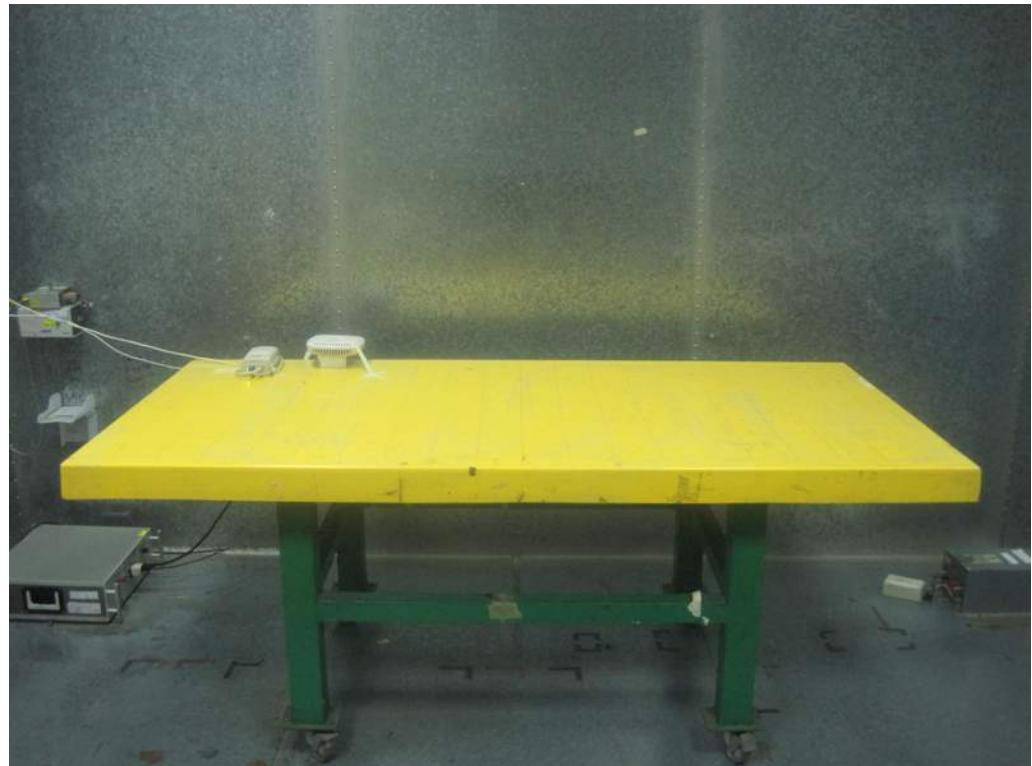


SIDE VIEW

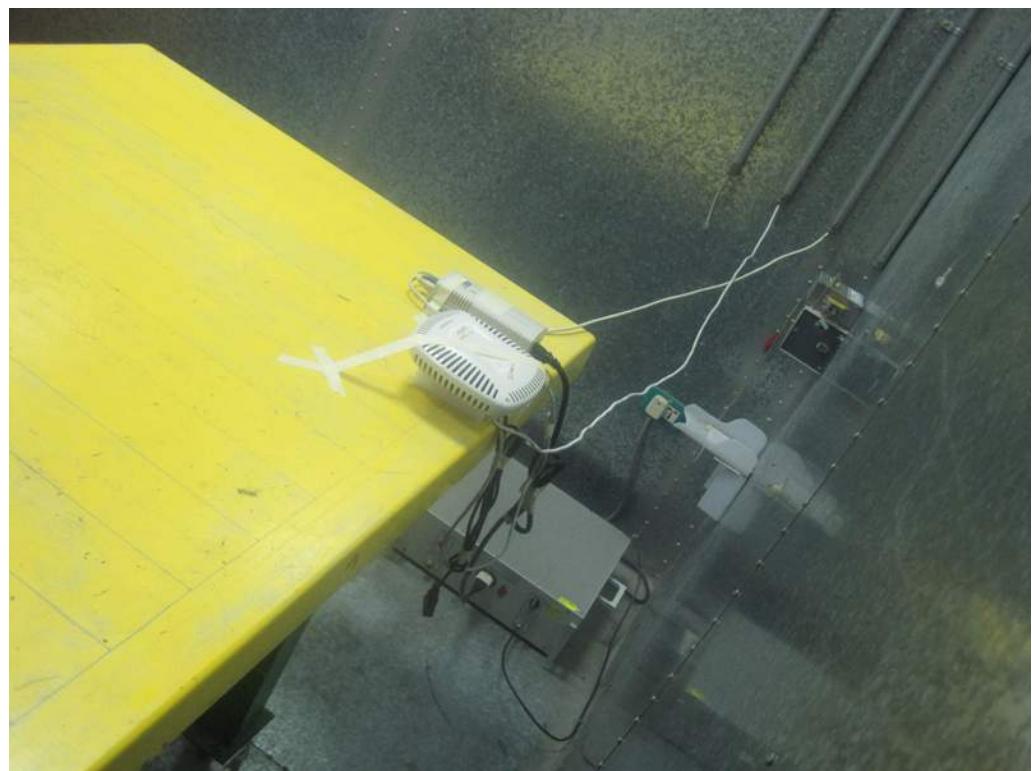


Test Mode: Mode 4

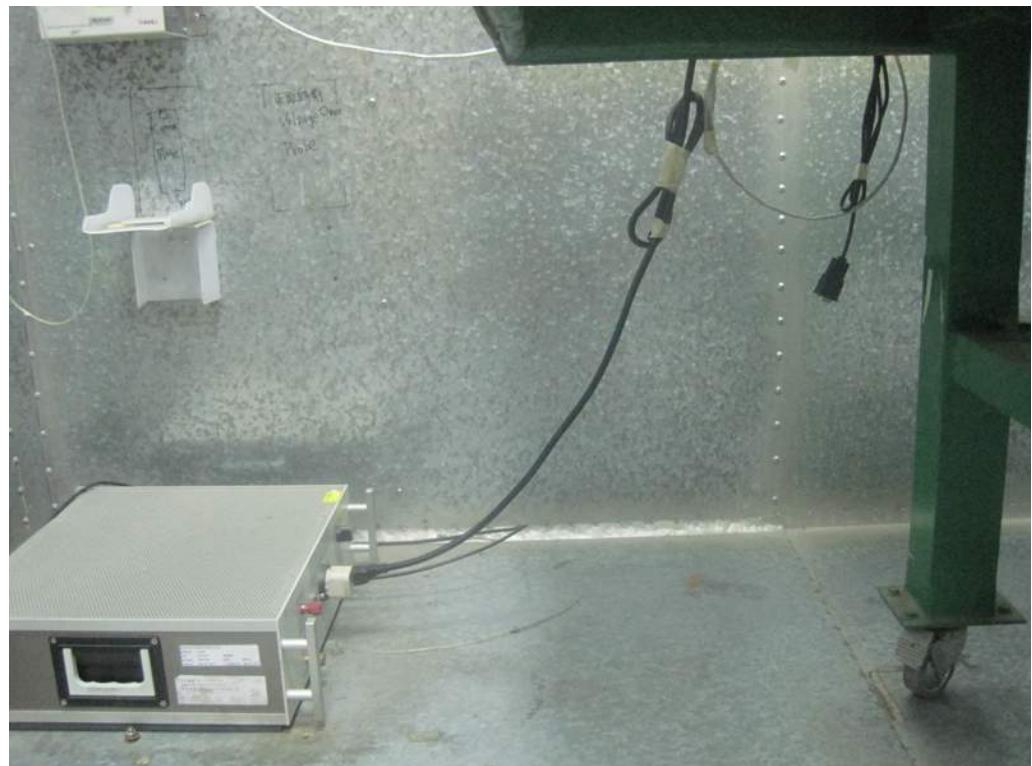
FRONT VIEW



REAR VIEW



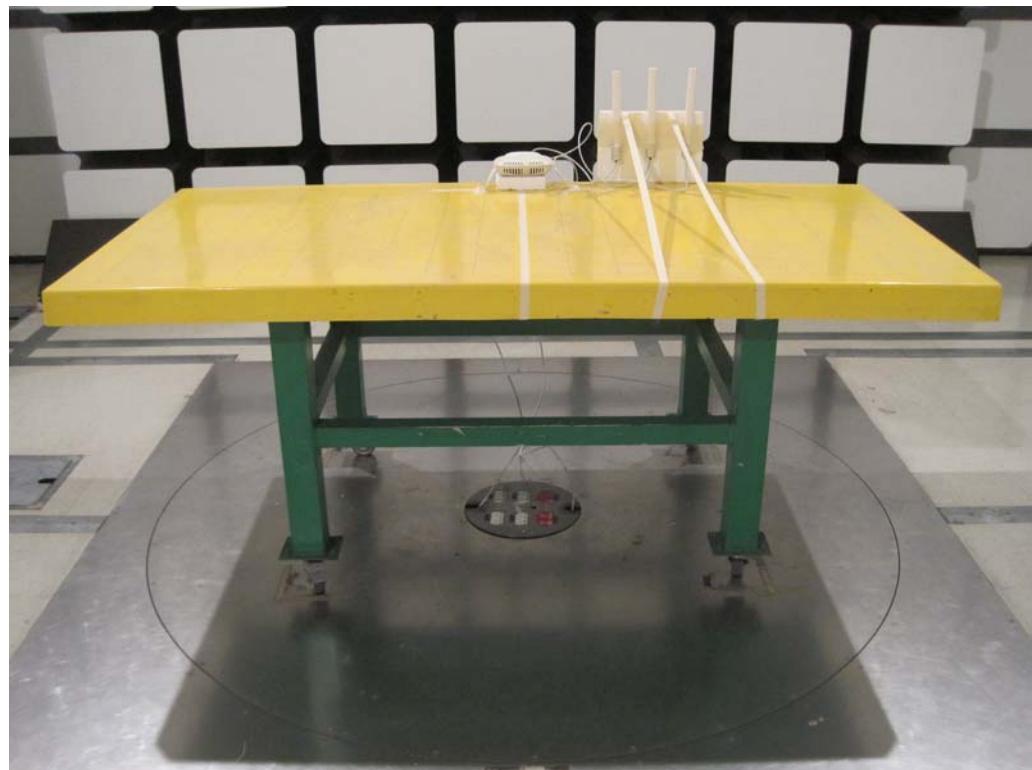
SIDE VIEW



2. Photographs of Radiated Emissions Test Configuration

Test Mode: Mode 2

FRONT VIEW



REAR VIEW



Test Mode: Mode 4

FRONT VIEW



REAR VIEW

