

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment	: Rugged Mobile Tablet Computer
Brand Name	: DAP
Model No.	: 9000WBWZV1
Filing Type	: New Application
CLASSIFICATION	: Digital Spread Spectrum (DSS)
Applicant	: DAP Technologies 7450 South Priest DR Tempe, AZ, US
FCC ID	: T5M9000WBWZV1
Manufacturer	: Venture Corporation Limited Blk5006, Ang Mo Kio Avenue 5, #03-07 TECHplace II, Singapore 569870
Received Date	: Aug. 19, 2011
Final Test Date	: Sep. 19, 2011

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 C**.

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



SPORTON International Inc.

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

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History of This Test Report

Original Issue Date: Oct. 04, 2011

Report No.: FR170707-04

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment : Rugged Mobile Tablet Computer
Brand Name : DAP
Model No. : 9000WBWZV1
Applicant : DAP Technologies
7450 South Priest DR Tempe, AZ, US

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 19, 2011 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Wayne Hsu / Assistant Manager

SPORTON International Inc.

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

1. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	13.98 dB
3.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	6.52 dB
3.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
3.4	15.249(a)/(d)	Radiated Emissions	Complies	16.18 dB
3.5	15.249(d)	Band Edge Emissions	Complies	4.09 dB
3.6	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Field Strength of Fundamental Emissions	±0.8dB	Confidence levels of 95%
20dB Spectrum Bandwidth	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2. GENERAL INFORMATION

2.1. Product Details

Items	Description
Power Type	15Vdc from adapter ; 7.4Vdc from battery
Modulation	O-QPSK
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 – 26
Channel Band Width (99%)	2.68 MHz
Max. Field Strength	87.48 dBuV/m at 3m (Average)
Antenna	Chip antenna (with gain of 2 dBi)

2.2. Accessories

Accessories Information					
Accessories or 2nd Source or Key Part	AC Adapter	Brand Name	CINCON ELECTRONICS	Model Name	RIM-C-0004ADUUS-001
		Power Rating	I/P: 100-240 Vac, 1000 mA, O/P: 15 Vdc, 2400mA		
		Power Cord	1.5 meter, non-shielded cable, with ferrite core (STEWART : 28A0434-0A2)		
	Power Cord 1	Brand Name	QUAIL	Model Name	1062.079(NAM032)
		Power Rating	I/P: 0-125 Vac, 10000 mA		
		Power Cord	2 meter, non-shielded cable, w/o ferrite core		
	Power Cord 2	Brand Name	QUAIL	Model Name	8002.079(NAM033)
		Power Rating	I/P: 0-125 Vac, 2500 mA		
	Power Cord 3	Brand Name	QUAIL	Model Name	9657.079(NAM034)
		Power Rating	2 meter, non-shielded cable, w/o ferrite core		
	Li-ion Battery	Brand Name	TOTEX	Model Name	VE026-8034-A0
		Power Rating	7.4 Vdc, 3100 mAh		
	LCD Panel	Brand Name	SGD	Model Name	GNTW70NNBA1E0
	Camera	Brand Name	DEMARREN	Model Name	Q5M03A
	Bluetooth Module	Brand Name	BlueGiga	Model Name	WT21-A-HCI
	WLAN Module	Brand Name	Summit Data Communication	Model Name	SDCPE15N
	WWAN Module	Brand Name	Sierra Wireless	Model Name	Gobi3000
	Zigbee Module	Brand Name	Atmel	Model Name	ATmega128RFA1

2.3. Table for Carrier Frequencies

Channel Number: 11 – 26

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400 ~ 2483.5MHz	11	2405 MHz	19	2445 MHz
	12	2410 MHz	20	2450 MHz
	13	2415 MHz	21	2455 MHz
	14	2420 MHz	22	2460 MHz
	15	2425 MHz	23	2465 MHz
	16	2430 MHz	24	2470 MHz
	17	2435 MHz	25	2475 MHz
	18	2440 MHz	26	2480 MHz

2.4. 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	Channel
AC Power Line Conducted Emissions	Normal Mode	-
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	2405 MHz / 2440 MHz / 2480 MHz
Radiated Emissions 9kHz~1GHz	CTX	2440 MHz
Radiated Emissions 1GHz~10 th Harmonic	CTX	2405 MHz / 2440 MHz / 2480 MHz
Band Edge Emissions	CTX	2405 MHz / 2480 MHz

Note: CTX=continuously transmitting.

2.5. Table for Testing Locations

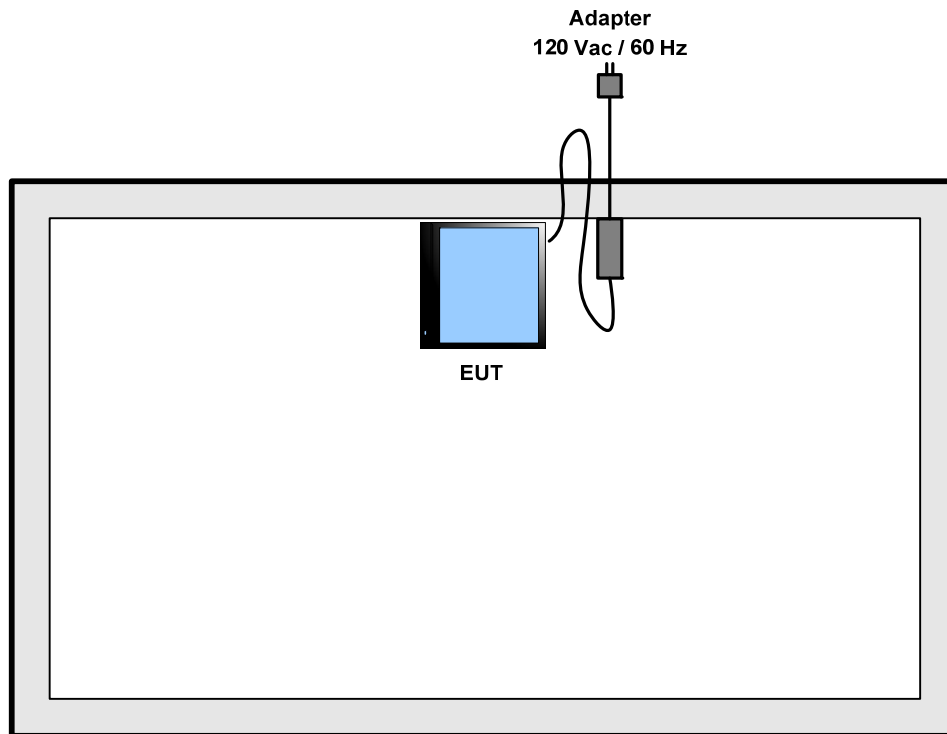
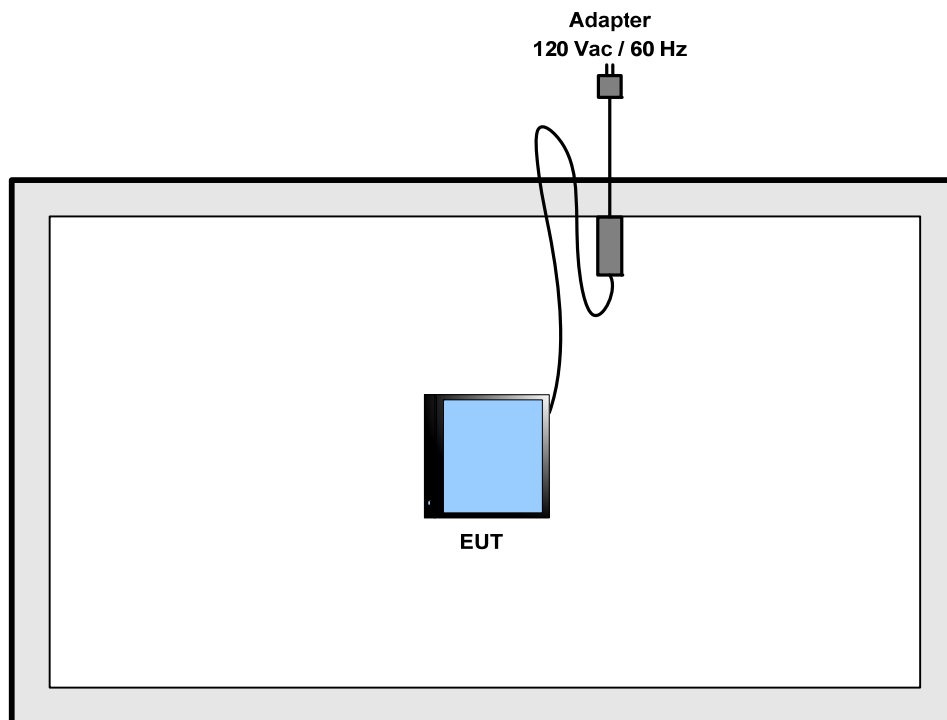
Test Site No.	Site Category	Location
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.6. Table for Supporting Units

Support Unit	Brand	Model	FCC ID	Remark
(USB) Mouse	MICROSOFT	1004	DOC	Conducted Emissions
Modem	ACEEX	DM1414	IFAXDM1414	
MIC+Earphone	PowerSync	MIC-02	DOC	

Note: The radiated emission was tested alone.

2.7. Test Configurations**2.7.1. Radiation Emissions Test Configuration****For radiated emissions 9kHz~1GHz****For radiated emissions above 1GHz**

3. TEST RESULT

3.1. AC Power Line Conducted Emissions Measurement

3.1.1. 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.

Class B

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

3.1.2. Measuring Instruments and Setting

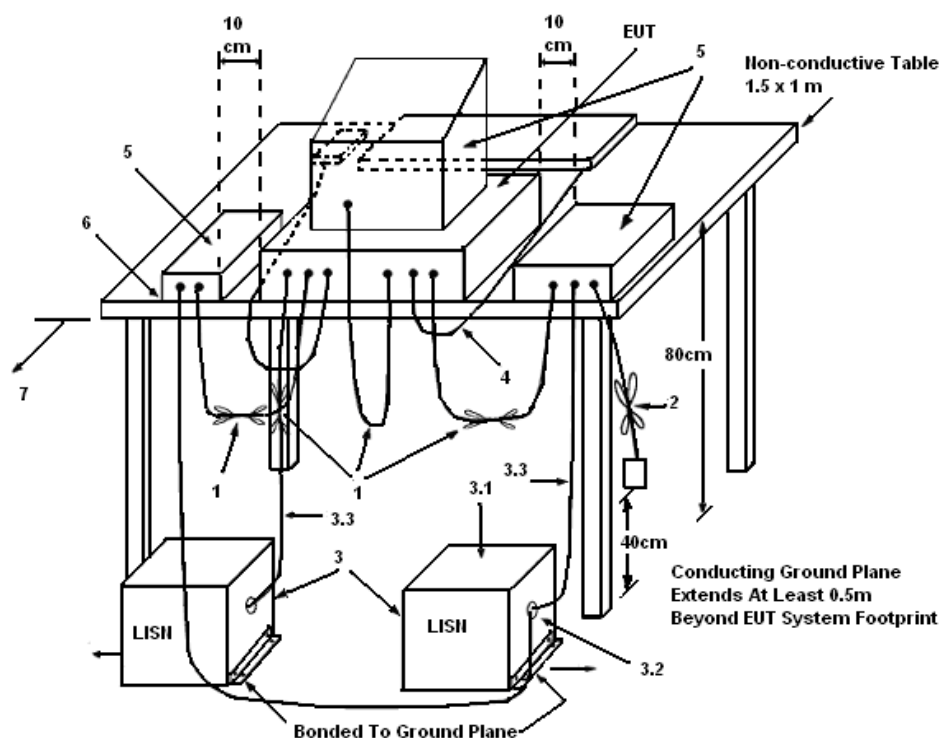
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

3.1.3. Test Procedures

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

3.1.4. Test Setup Layout



LEGEND:

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

3.1.5. Test Deviation

There is no deviation with the original standard.

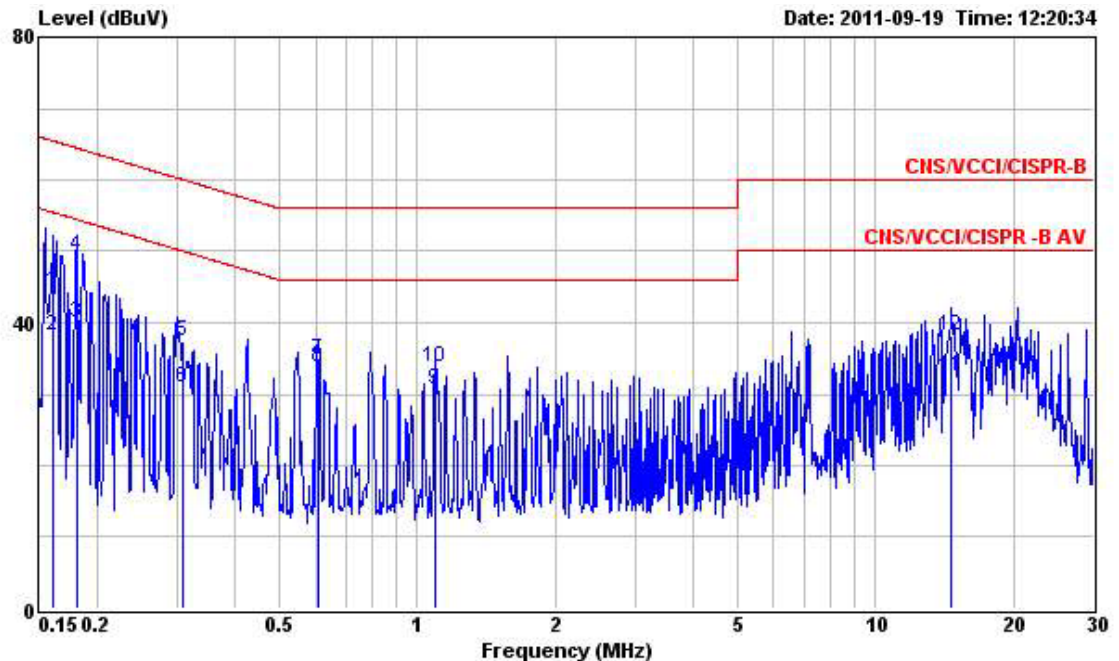
3.1.6. EUT Operation during Test

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

3.1.7. Results of AC Power Line Conducted Emissions Measurement

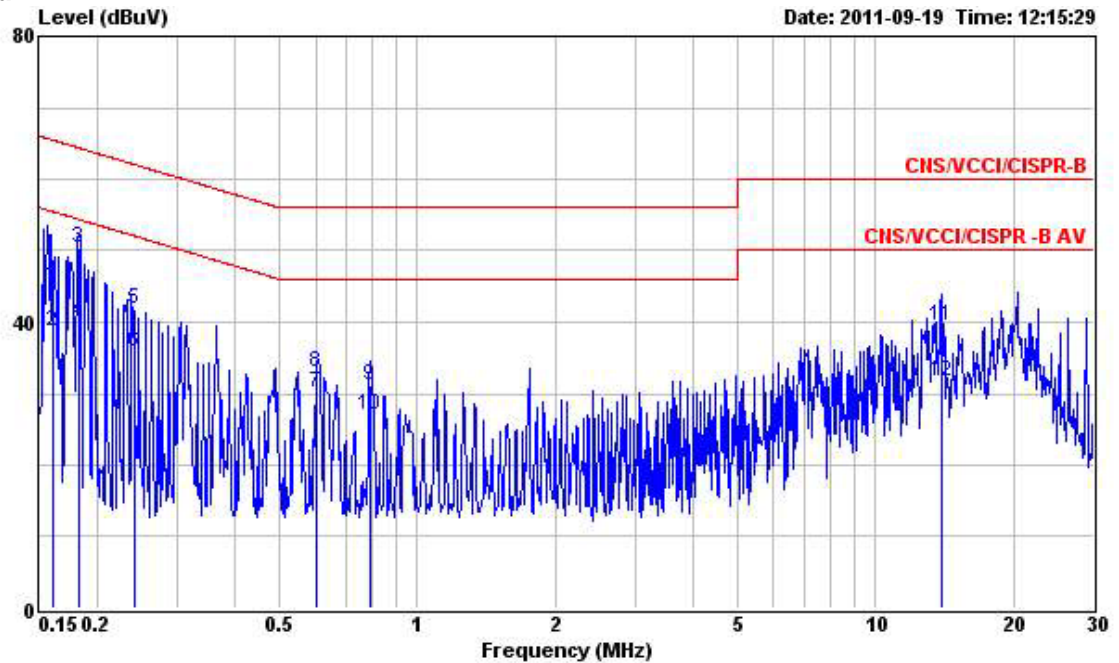
Final Test Date	Sep. 19, 2011	Test Site No.	CO04-HY
Temperature	25.6°C	Humidity	50.1%
Test Engineer	David	Configuration	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.160	44.40	-21.06	65.46	44.19	0.08	0.13	QP
2	0.160	38.21	-17.25	55.46	38.00	0.08	0.13	Average
3	0.180	40.12	-14.37	54.49	39.92	0.08	0.12	Average
4	0.180	49.29	-15.18	64.47	49.10	0.08	0.11	QP
5	0.309	37.48	-22.52	60.00	37.29	0.09	0.10	QP
6	0.309	30.95	-19.05	50.00	30.76	0.09	0.10	Average
7	0.608	34.72	-21.28	56.00	34.47	0.10	0.15	QP
8	0.608	33.82	-12.18	46.00	33.57	0.10	0.15	Average
9	1.090	30.76	-15.24	46.00	30.45	0.11	0.20	Average
10	1.090	33.85	-22.15	56.00	33.54	0.11	0.20	QP
11	14.670	32.49	-17.51	50.00	31.84	0.34	0.31	Average
12	14.670	38.23	-21.77	60.00	37.58	0.34	0.31	QP

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.160	45.20	-20.29	65.49	45.00	0.07	0.13	QP
2	0.160	38.69	-16.80	55.49	38.49	0.07	0.13	Average
3	0.182	50.41	-13.98	64.39	50.24	0.06	0.11	QP
4	0.182	40.09	-14.30	54.39	39.92	0.06	0.11	Average
5	0.242	41.74	-20.30	62.04	41.58	0.06	0.10	QP
6	0.242	35.85	-16.18	52.03	35.69	0.06	0.10	Average
7	0.604	30.04	-15.96	46.00	29.81	0.08	0.15	Average
8	0.604	32.96	-23.04	56.00	32.73	0.08	0.15	QP
9	0.792	31.20	-24.80	56.00	30.95	0.08	0.17	QP
10	0.792	26.97	-19.03	46.00	26.72	0.08	0.17	Average
11	13.939	39.37	-20.63	60.00	38.73	0.32	0.32	QP
12	13.939	31.73	-18.27	50.00	31.09	0.32	0.32	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2. Field Strength of Fundamental Emissions Measurement

3.2.1. Limit

The field strength of fundamental emissions within these bands specified at a distance of 3 meters (measurement instrumentation employing an average detector) shall comply with the following table.

Frequency Band (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
2400-2483.5	94

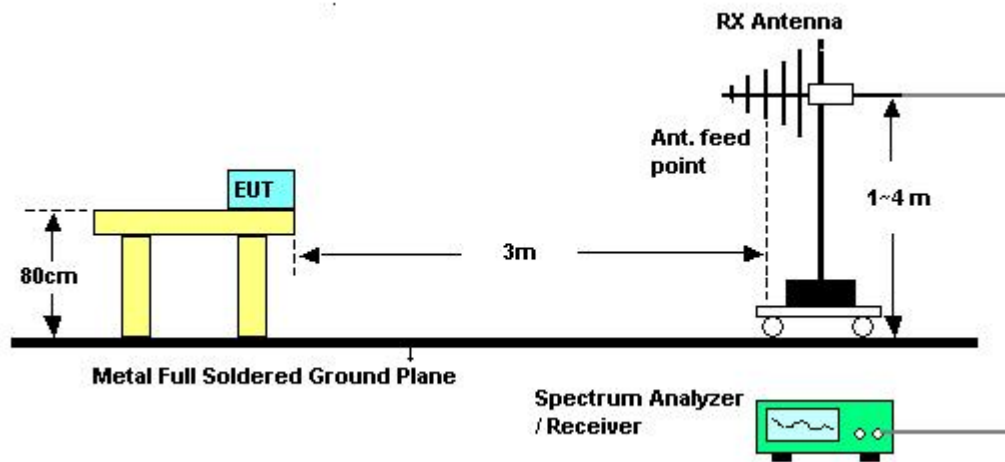
3.2.2. Measuring Instruments and Setting

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

Power Meter Parameter	Setting
RB	1 MHz Peak / 1MHz Average
VB	1 MHz Peak / 10Hz Average
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For Fundamental emissions, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
6. 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.

3.2.4. Test Setup Layout**3.2.5. Test Deviation**

There is no deviation with the original standard.

3.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7. Test Result of Field Strength of Fundamental Emissions

Final Test Date	Aug. 19, 2011	Test Site No.	03CH02-HY
Temperature	23°C	Humidity	65%
Test Engineer	Streak	Configurations	2405 MHz / 2440 MHz / 2480 MHz

2405 MHz
Vertical

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
3	2404.810	87.48	-6.52	94.00	52.60	31.86	3.02	0.00	Average	---	---
3	2404.620	109.30	-4.70	114.00	74.42	31.86	3.02	0.00	Peak	---	---

2440 MHz
Vertical

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2439.770	86.37	-7.63	94.00	51.33	31.99	3.05	0.00	Average	---	---
1	2439.580	108.19	-5.81	114.00	73.15	31.99	3.05	0.00	Peak	---	---

2480 MHz
Vertical

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2480.050	84.87	-9.13	94.00	49.66	32.13	3.08	0.00	Average	---	---
1	2480.620	106.69	-7.31	114.00	71.48	32.13	3.08	0.00	Peak	---	---

Note:

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

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

3.3. 20dB Spectrum Bandwidth Measurement

3.3.1. Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band.

3.3.2. Measuring Instruments and Setting

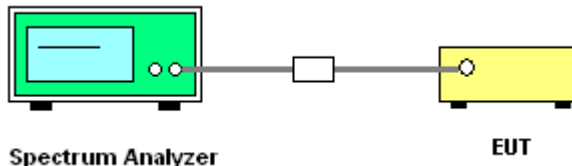
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

3.3.4. Test Setup Layout



3.3.5. Test Deviation

There is no deviation with the original standard.

3.3.6. EUT Operation during Test

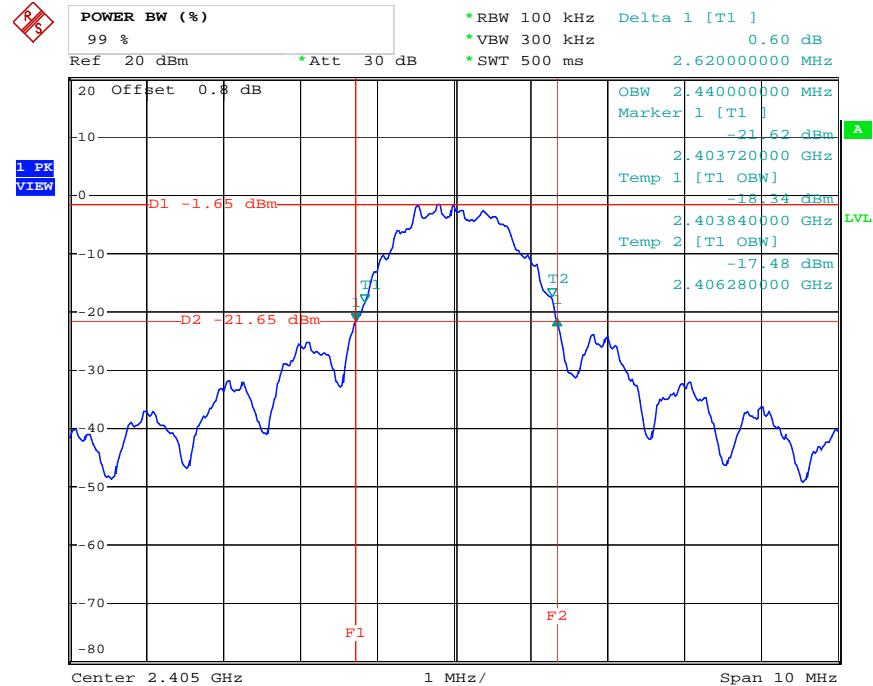
The EUT was programmed to be in continuously transmitting mode.

3.3.7. Test Result of 20dB Spectrum Bandwidth

Final Test Date	Sep. 07, 2011	Test Site No.	TH01-HY
Temperature	27°C	Humidity	65%
Test Engineer	Shiming	Configurations	2405 MHz / 2440 MHz / 2480 MHz

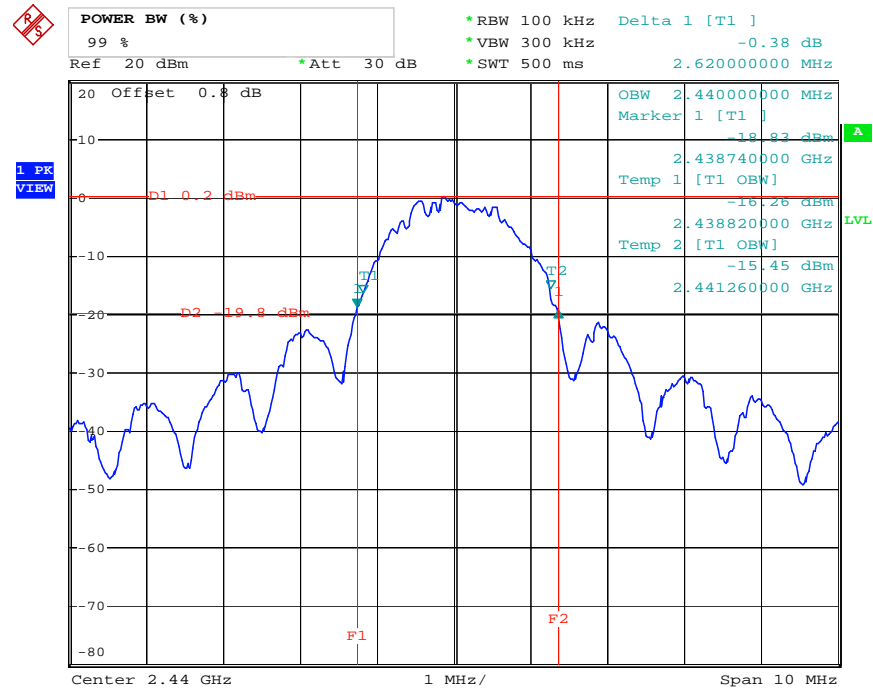
Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400\text{MHz}$	Frequency range (MHz) $f_H < 2483\text{MHz}$	Test Result
2405 MHz	2.44	2.62	2403.7200	-	Complies
2440 MHz	2.44	2.62	-	-	Complies
2480 MHz	2.62	2.68	-	2481.3800	Complies

20 dB/99% Bandwidth Plot on 2405 MHz



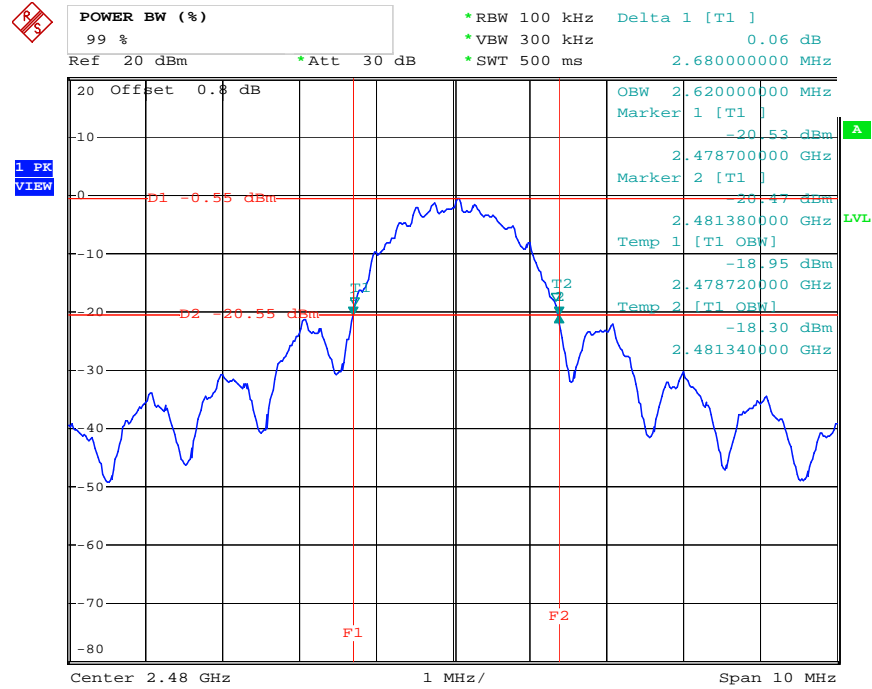
Date: 7.SEP.2011 16:18:05

20 dB/99% Bandwidth Plot on 2440 MHz



Date: 7.SEP.2011 16:32:18

20 dB/99% Bandwidth Plot on 2480 MHz



Date: 7.SEP.2011 16:46:08

3.4. Radiated Emissions Measurement

3.4.1. Limit

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.4.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

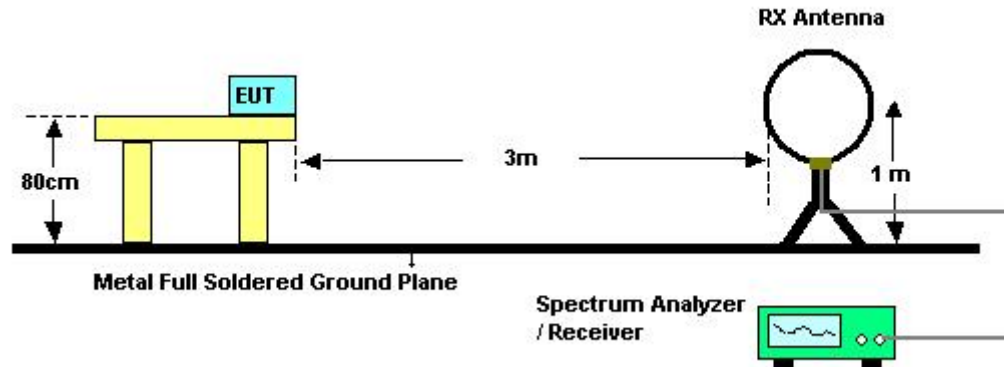
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.4.3. Test Procedures

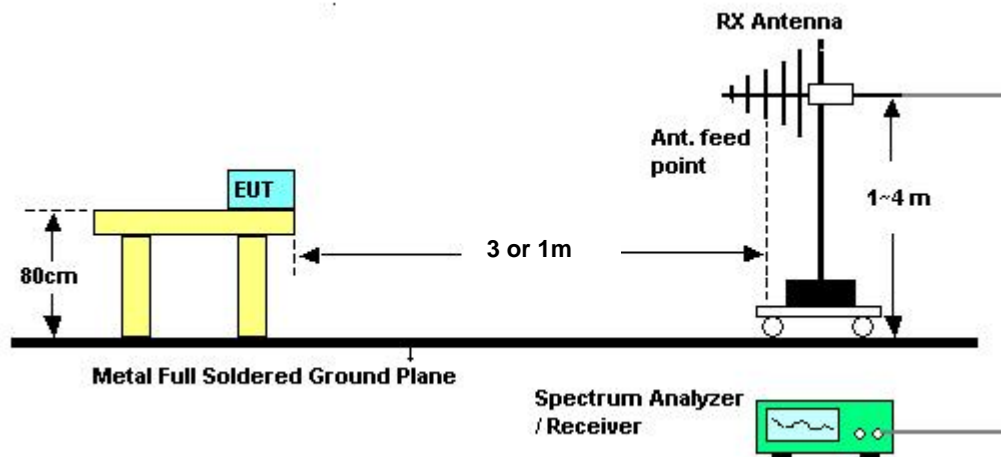
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

3.4.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

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

3.4.5. Test Deviation

There is no deviation with the original standard.

3.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Final Test Date	Sep. 02, 2011	Test Site No.	03CH02-HY
Temperature	23℃	Humidity	65%
Test Engineer	Streak		

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

Note:

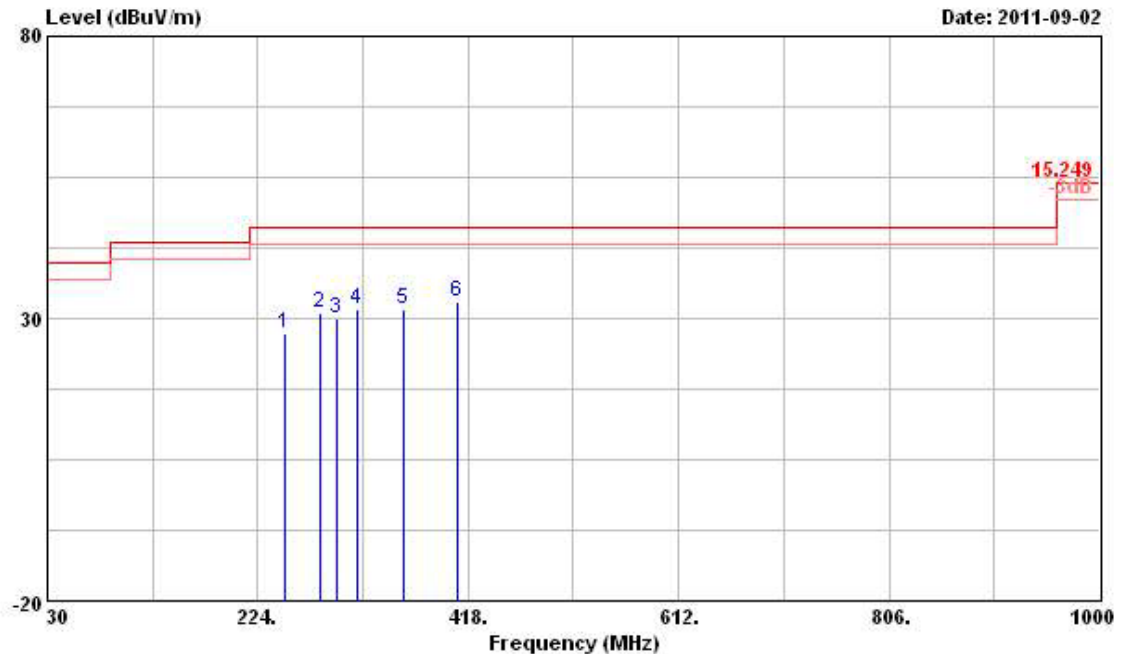
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

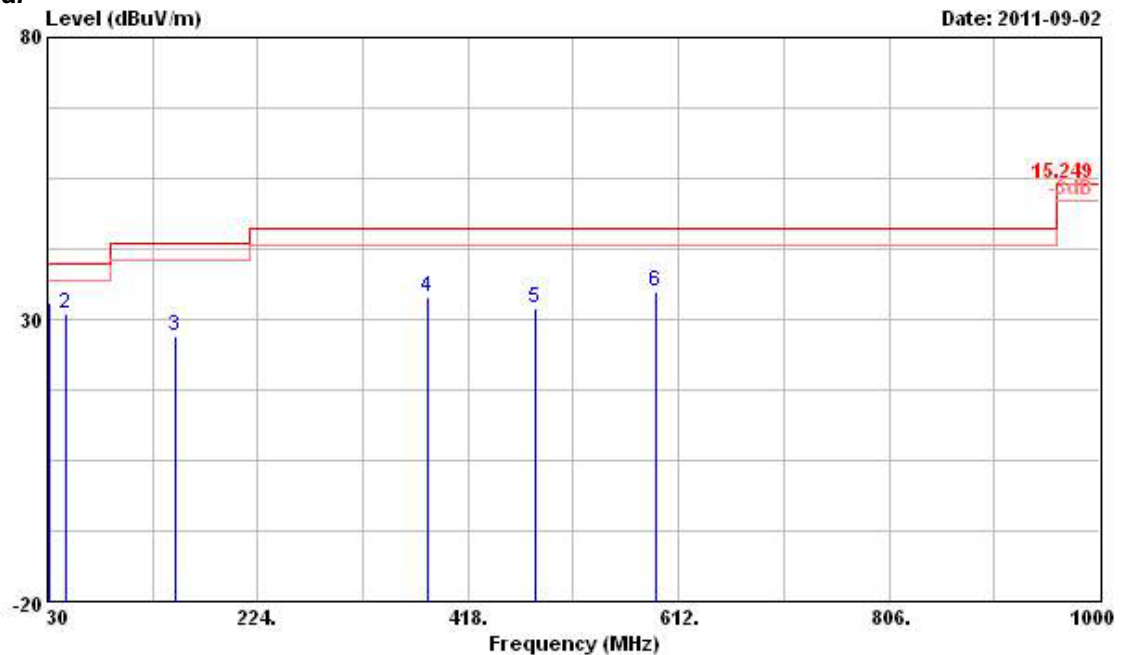
3.4.8. Results of Radiated Emissions (30MHz~1GHz)

Final Test Date	Sep. 02, 2011	Test Site No.	03CH02-HY
Temperature	23℃	Humidity	65%
Test Engineer	Streak	Configurations	2440 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	249.220	27.26	-18.74	46.00	38.90	12.97	2.68	27.29	Peak	---	---
2	281.230	30.95	-15.05	46.00	41.89	13.44	2.83	27.21	Peak	---	---
3	296.750	30.12	-15.88	46.00	40.73	13.66	2.90	27.17	Peak	---	---
4	316.150	31.59	-14.41	46.00	41.96	13.96	2.94	27.27	Peak	---	---
5	358.830	31.73	-14.27	46.00	41.62	14.61	3.07	27.57	Peak	---	---
6	408.300	32.89	-13.11	46.00	42.01	15.43	3.36	27.91	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	31.940	33.03	-6.97	40.00	44.71	15.48	0.78	27.94	Peak	---	---
2	47.460	31.04	-8.96	40.00	46.99	10.82	1.09	27.86	Peak	---	---
3	148.340	27.13	-16.37	43.50	41.86	10.90	2.01	27.64	Peak	---	---
4	381.140	33.86	-12.14	46.00	43.42	14.97	3.21	27.74	Peak	---	---
5	479.110	31.92	-14.08	46.00	39.66	16.87	3.66	28.27	Peak	---	---
6	590.660	34.92	-11.08	46.00	39.50	19.90	3.97	28.45	Peak	---	---

Note:

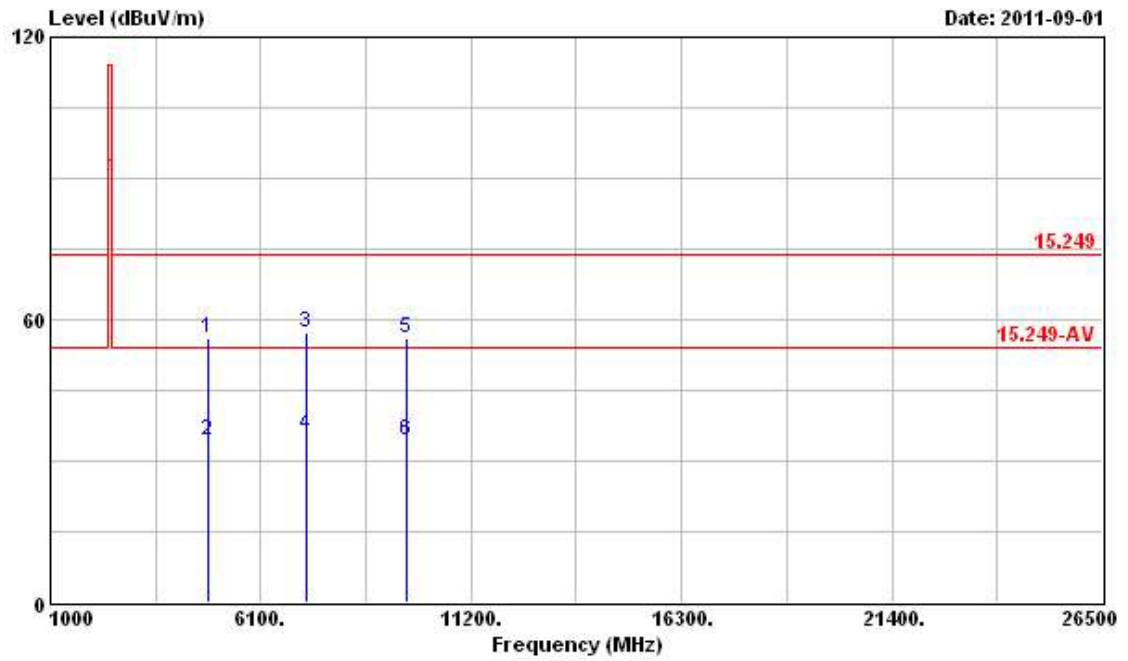
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

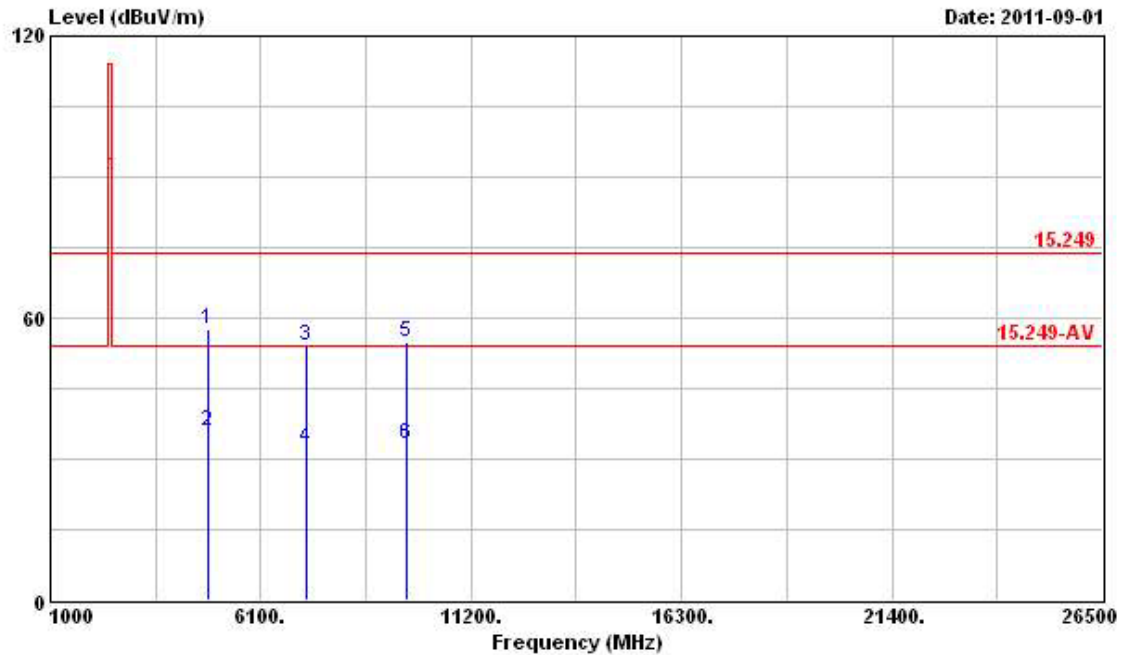
3.4.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Final Test Date	Sep. 01, 2011	Test Site No.	03CH02-HY
Temperature	23°C	Humidity	65%
Test Engineer	Streak	Configurations	2405 MHz

Horizontal

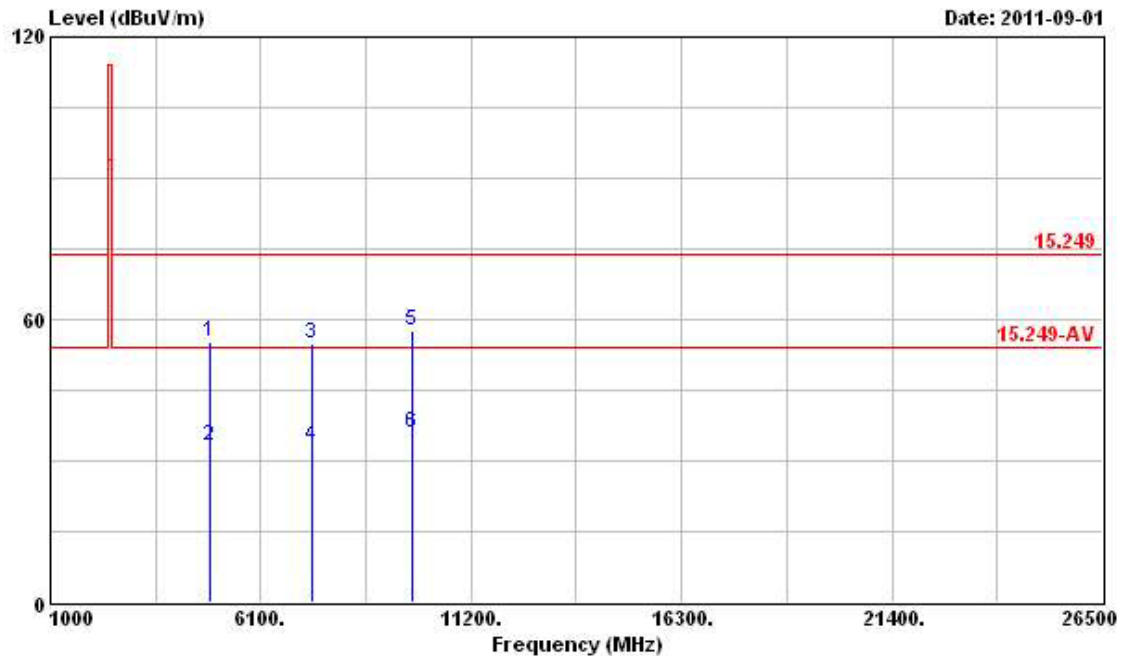
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4810.000	56.06	-17.94	74.00	50.55	35.73	4.58	34.80	Peak	---	---
2	4810.000	34.24	-19.76	54.00	28.73	35.73	4.58	34.80	Average	---	---
3	7215.000	57.24	-16.76	74.00	48.86	37.84	5.62	35.08	Peak	---	---
4	7215.000	35.42	-18.58	54.00	27.04	37.84	5.62	35.08	Average	---	---
5	9620.000	56.10	-17.90	74.00	45.89	39.34	6.34	35.47	Peak	---	---
6	9620.000	34.28	-19.72	54.00	24.07	39.34	6.34	35.47	Average	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4810.000	57.64	-16.36	74.00	52.75	35.11	4.58	34.80	Peak	---	---
2	4810.000	35.82	-18.18	54.00	30.93	35.11	4.58	34.80	Average	---	---
3	7215.000	54.24	-19.76	74.00	46.81	36.89	5.62	35.08	Peak	---	---
4	7215.000	32.42	-21.58	54.00	24.99	36.89	5.62	35.08	Average	---	---
5	9620.000	55.00	-19.00	74.00	45.59	38.54	6.34	35.47	Peak	---	---
6	9620.000	33.18	-20.82	54.00	23.77	38.54	6.34	35.47	Average	---	---

Final Test Date	Sep. 01, 2011	Test Site No.	03CH02-HY
Temperature	23°C	Humidity	65%
Test Engineer	Streak	Configurations	2440 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4880.000	55.07	-18.93	74.00	49.41	35.83	4.61	34.78	Peak	---	---
2	4880.000	33.25	-20.75	54.00	27.59	35.83	4.61	34.78	Average	---	---
3	7326.000	54.97	-19.03	74.00	46.56	37.87	5.64	35.10	Peak	---	---
4	7326.000	33.15	-20.85	54.00	24.74	37.87	5.64	35.10	Average	---	---
5	9760.000	57.67	-16.33	74.00	47.28	39.51	6.36	35.48	Peak	---	---
6	9760.000	35.85	-18.15	54.00	25.46	39.51	6.36	35.48	Average	---	---

Vertical

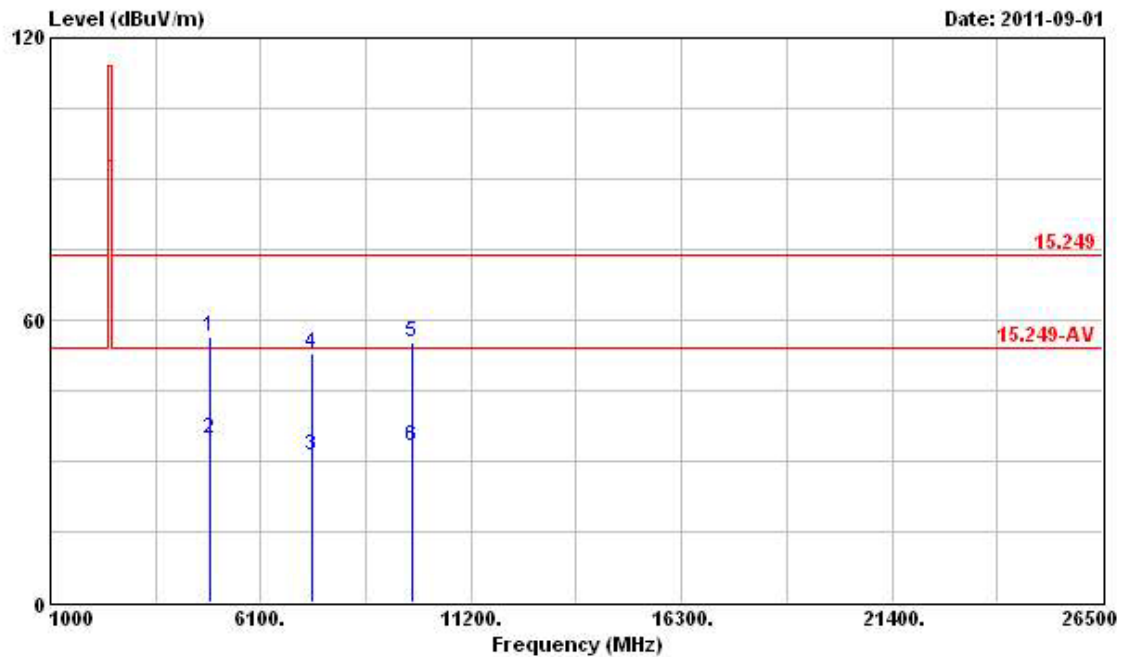
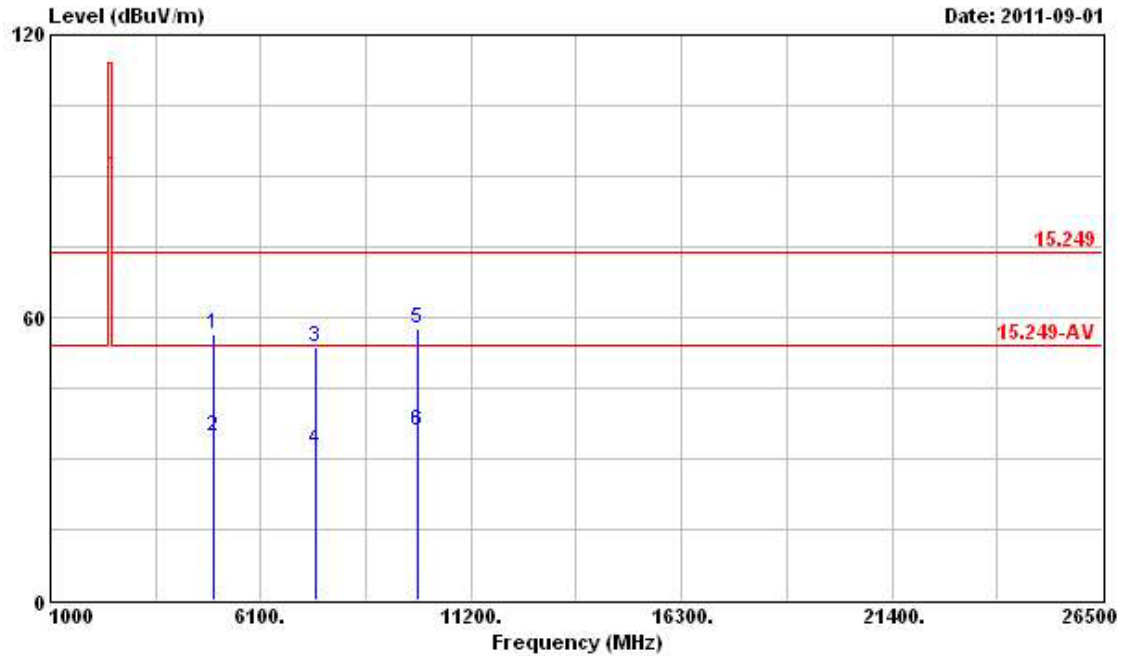


TABLE 1: MEASUREMENT RESULTS

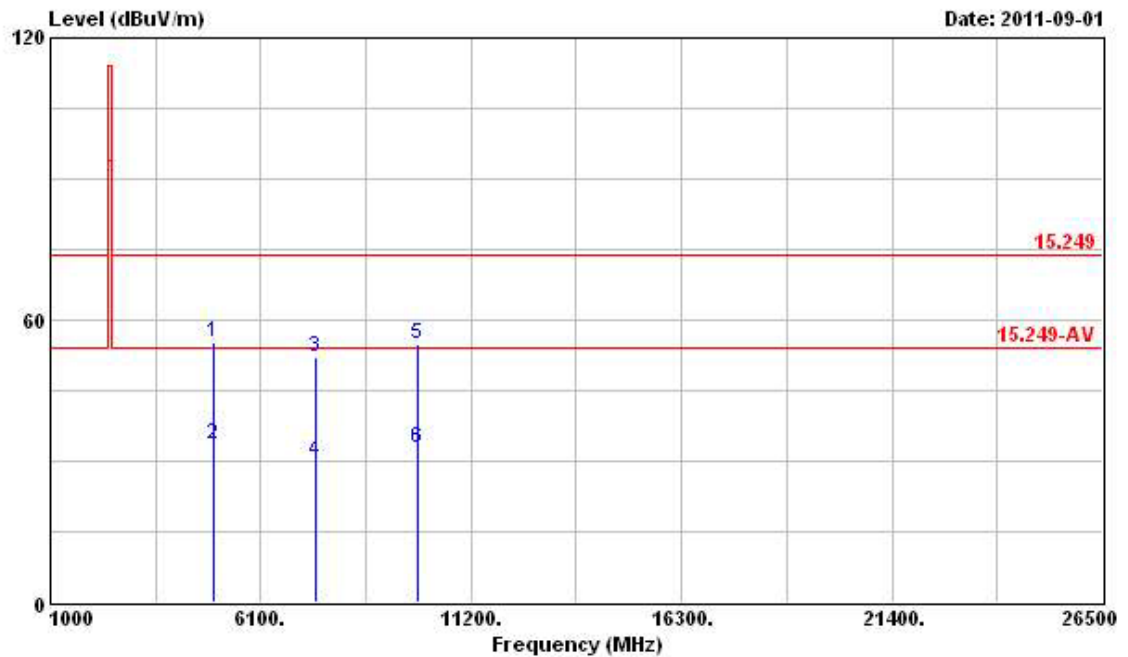
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4880.000	56.44	-17.56	74.00	51.43	35.18	4.61	34.78	Peak	---	---
2	4880.000	34.62	-19.38	54.00	29.61	35.18	4.61	34.78	Average	---	---
3	7320.000	31.12	-22.88	54.00	23.65	36.93	5.64	35.10	Average	---	---
4	7320.000	52.94	-21.06	74.00	45.47	36.93	5.64	35.10	Peak	---	---
5	9760.000	55.11	-18.89	74.00	45.52	38.71	6.36	35.48	Peak	---	---
6	9760.000	33.29	-20.71	54.00	23.70	38.71	6.36	35.48	Average	---	---

Final Test Date	Sep. 01, 2011	Test Site No.	03CH02-HY
Temperature	23°C	Humidity	65%
Test Engineer	Streak	Configurations	2480 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	56.48	-17.52	74.00	50.58	35.95	4.71	34.76	Peak	---	---
2	4960.000	34.66	-39.34	74.00	28.76	35.95	4.71	34.76	Peak	---	---
3	7440.000	53.85	-20.15	74.00	45.45	37.89	5.65	35.14	Peak	---	---
4	7440.000	32.03	-21.97	54.00	23.63	37.89	5.65	35.14	Average	---	---
5	9920.000	57.82	-16.18	74.00	47.20	39.72	6.39	35.49	Peak	---	---
6	9920.000	36.00	-18.00	54.00	25.38	39.72	6.39	35.49	Average	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	55.37	-18.63	74.00	50.15	35.27	4.71	34.76	Peak	---	---
2	4960.000	33.55	-20.45	54.00	28.33	35.27	4.71	34.76	Average	---	---
3	7440.000	52.01	-21.99	74.00	44.52	36.98	5.65	35.14	Peak	---	---
4	7440.000	30.19	-23.81	54.00	22.70	36.98	5.65	35.14	Average	---	---
5	9920.000	54.68	-19.32	74.00	44.86	38.92	6.39	35.49	Peak	---	---
6	9920.000	32.86	-21.14	54.00	23.04	38.92	6.39	35.49	Average	---	---

3.5. Band Edge Emissions Measurement

3.5.1. Limit

Band edge emissions radiated outside of the specified frequency bands shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

3.5.3. Test Procedures

1. The test procedure is the same as section 3.4.3, only the frequency range investigated is limited to 2MHz around band edges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

3.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 3.4.4.

3.5.5. Test Deviation

There is no deviation with the original standard.

3.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7. Test Result of Band Edge

Final Test Date	Aug. 19, 2011	Test Site No.	03CH02-HY
Temperature	23°C	Humidity	65%
Test Engineer	Streak	Configurations	2405 MHz / 2480 MHz

2405 MHz

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2389.610	49.91	-4.09	54.00	15.10	31.79	3.02	0.00	Average	---	---
2	2400.000	47.80	-6.20	54.00	12.99	31.79	3.02	0.00	Average	---	---
1	2385.810	62.23	-11.77	74.00	27.42	31.79	3.02	0.00	Peak	---	---
2	2400.000	69.62	-4.38	74.00	34.81	31.79	3.02	0.00	Peak	---	---

2480 MHz

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
2	2483.500	46.80	-7.20	54.00	11.59	32.13	3.08	0.00	Average	---	---
2	2483.500	68.62	-5.38	74.00	33.41	32.13	3.08	0.00	Peak	---	---

Note:

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

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

3.6. Antenna Requirements

3.6.1. Limit

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

3.6.2. Antenna Connector Construction

Please refer to section 2.1 in this test report; antenna connector complied with the requirements.

4. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 kHz ~ 2.75 GHz	Apr. 20, 2011	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan.17.2011	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	May 04, 2011	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 21, 2011	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 30	100023	9 KHz ~ 30 GHz	Mar. 15, 2011	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 03, 2011	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Oct. 22, 2010	Conducted (TH01-HY)
RF Cable-1m	Jye Bao	RG142	CB034-1m	20 MHz ~ 7 GHz	Dec. 02, 2010	Conducted (TH01-HY)
RF Cable-2m	Jye Bao	RG142	CB035-2m	20 MHz ~ 1 GHz	Dec. 02, 2010	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10 MHz ~ 40 GHz	Jun. 07, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300 MHz ~ 40 GHz	Jan. 06, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300 MHz ~ 40 GHz	Jan. 06, 2011	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 09, 2011*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz ~ 40 GHz	Feb. 11, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz ~ 1 GHz 3m	May 11, 2011	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz ~ 1.3 GHz	Jul. 25, 2011	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1 GHz ~ 26.5 GHz	Jul. 25, 2011	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1 GHz ~ 18 GHz	Nov. 11, 2010	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz ~ 1 GHz	Mar. 07, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1 GHz ~ 40 GHz	Mar. 07, 2011	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz ~ 2 GHz	Oct. 16, 2010	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 29, 2010*	Radiation (03CH03-HY)

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

5. TEST LOCATION

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

6. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-110111

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.**EMC & Wireless Communications Laboratory**

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

is accredited in respect of laboratory

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

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 11, 2011

Pl, total 24 pages

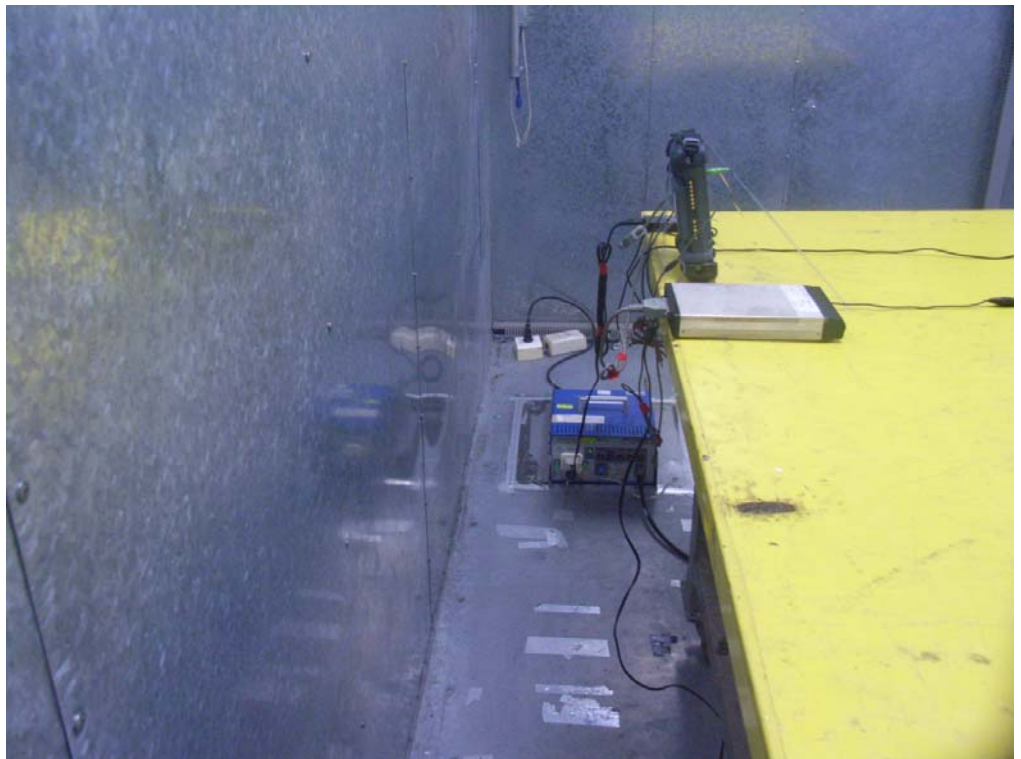
Appendix A. Test Photos

1 Photographs of Conducted Emissions Test Configuration

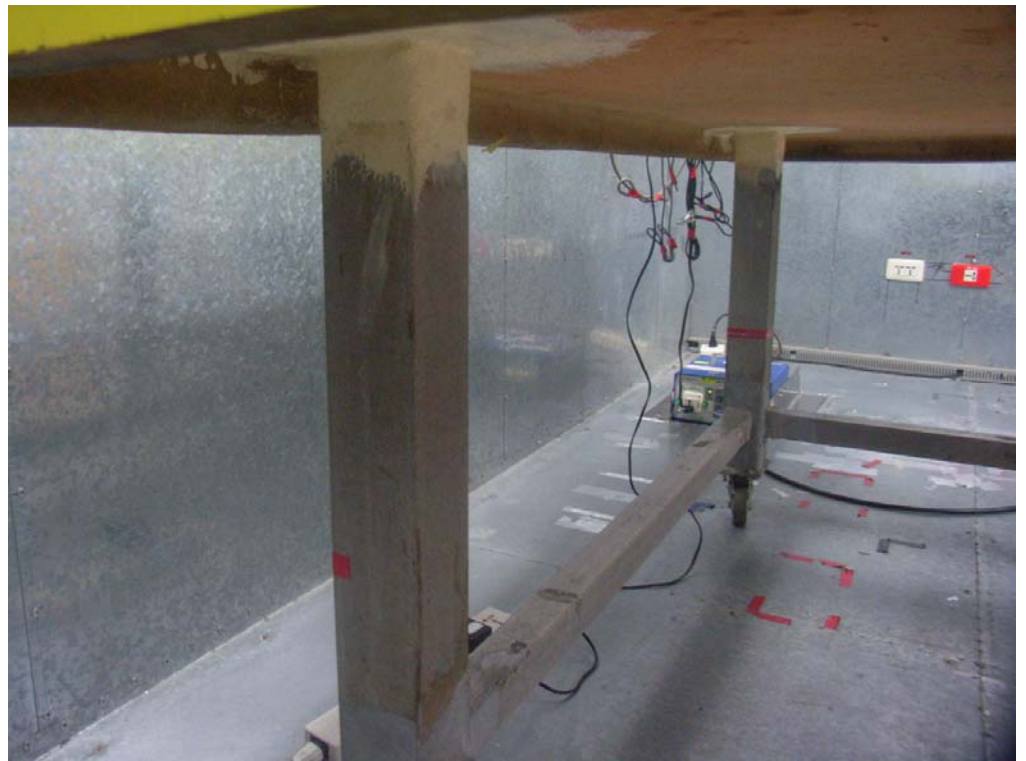
FRONT VIEW



REAR VIEW



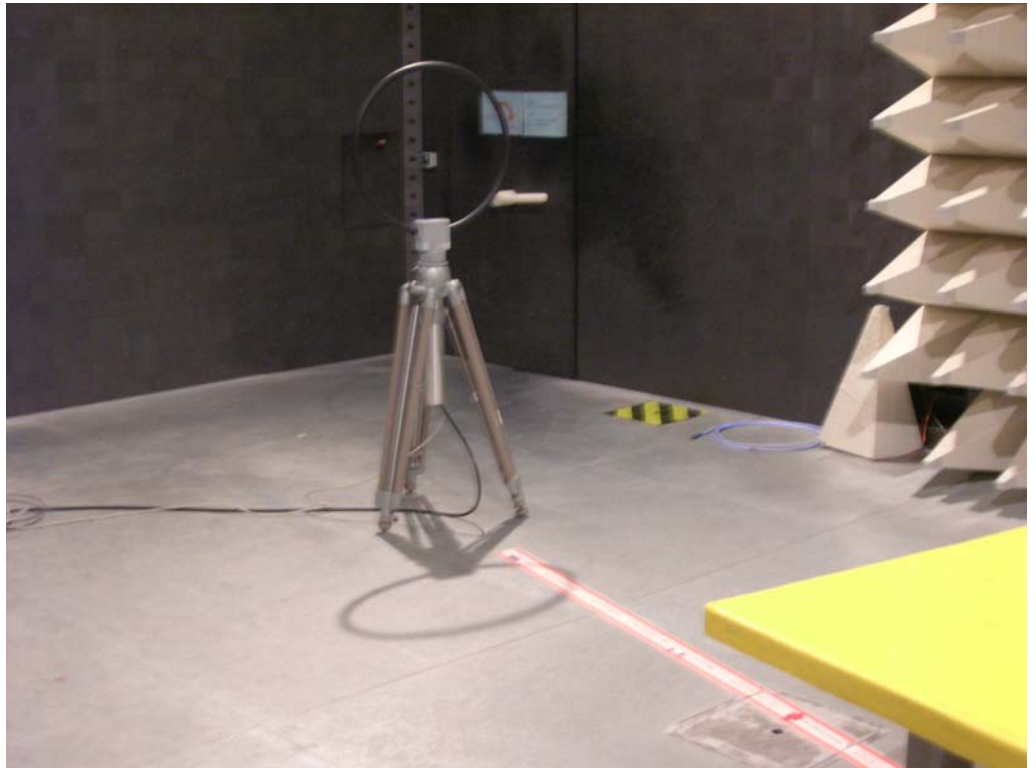
SIDE VIEW



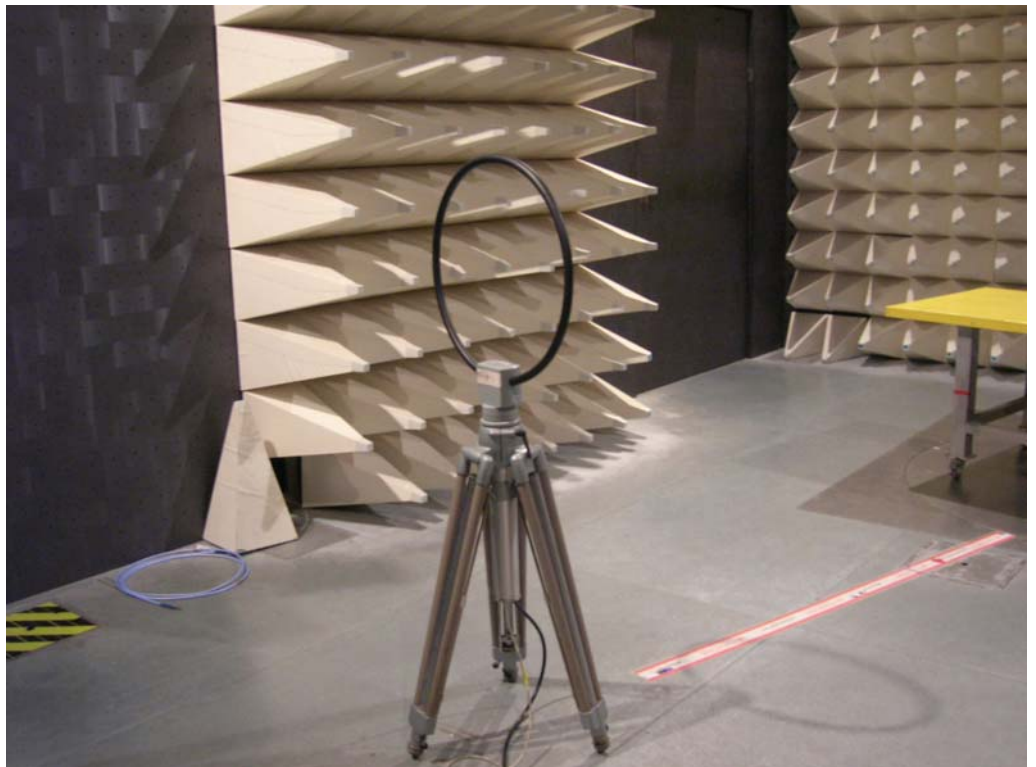
2 Photographs of Radiated Emissions Test Configuration

For radiated emissions 9kHz~30MHz

FRONT VIEW

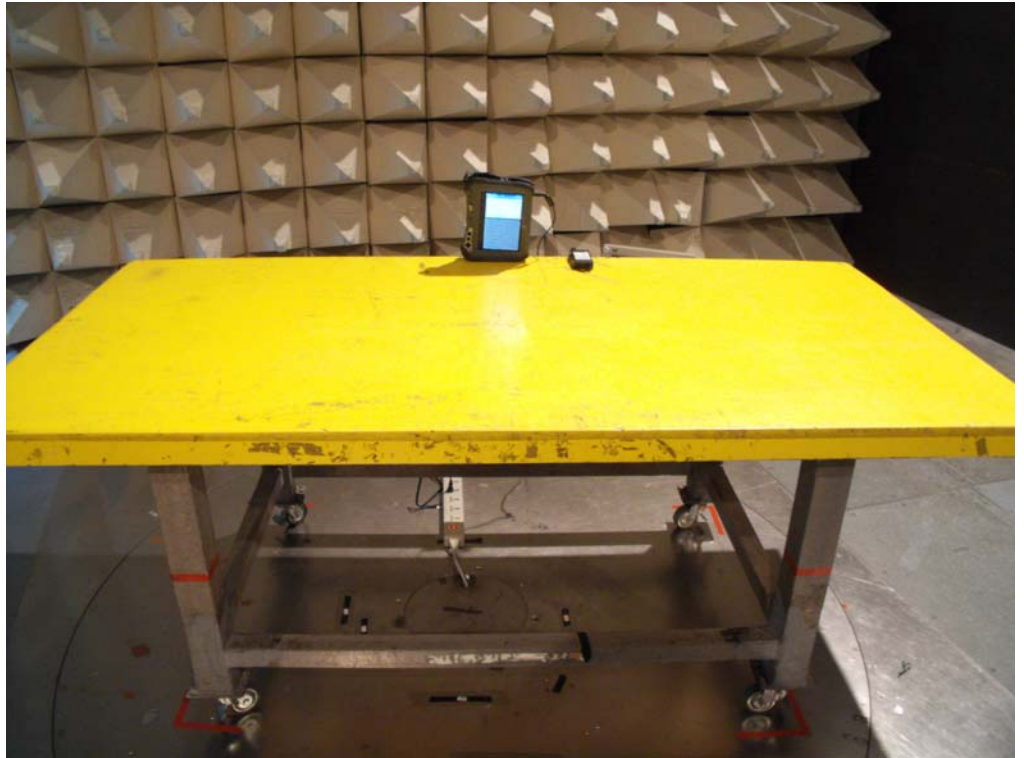


REAR VIEW

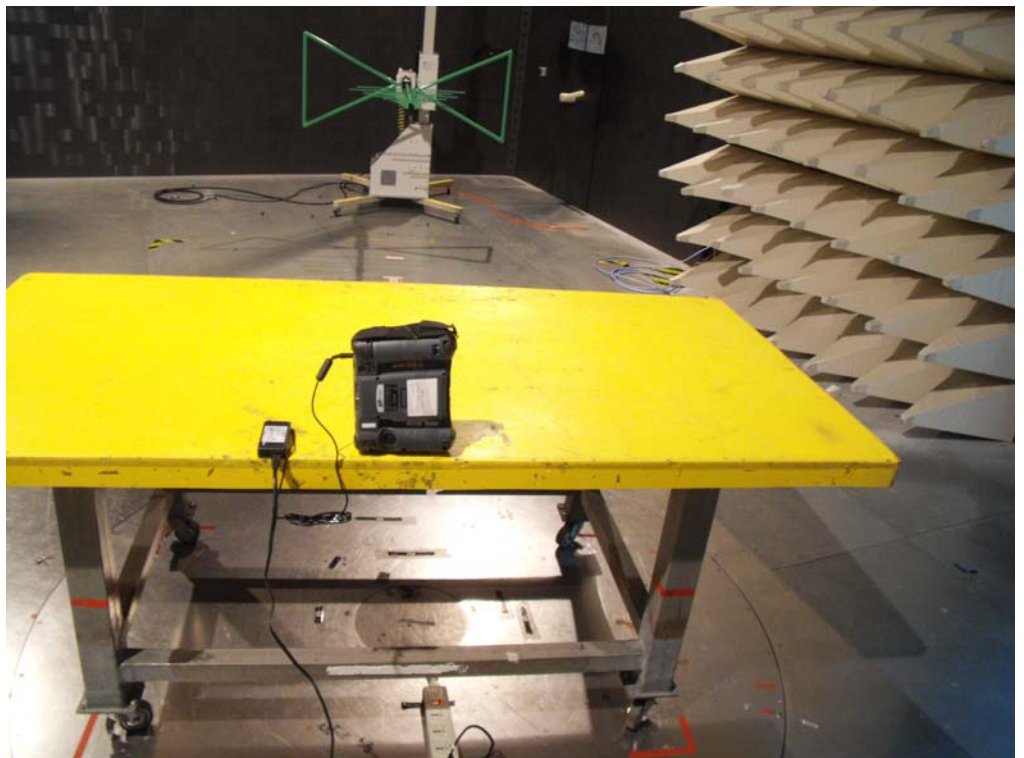


For radiated emissions 30MHz~1GHz

FRONT VIEW



REAR VIEW

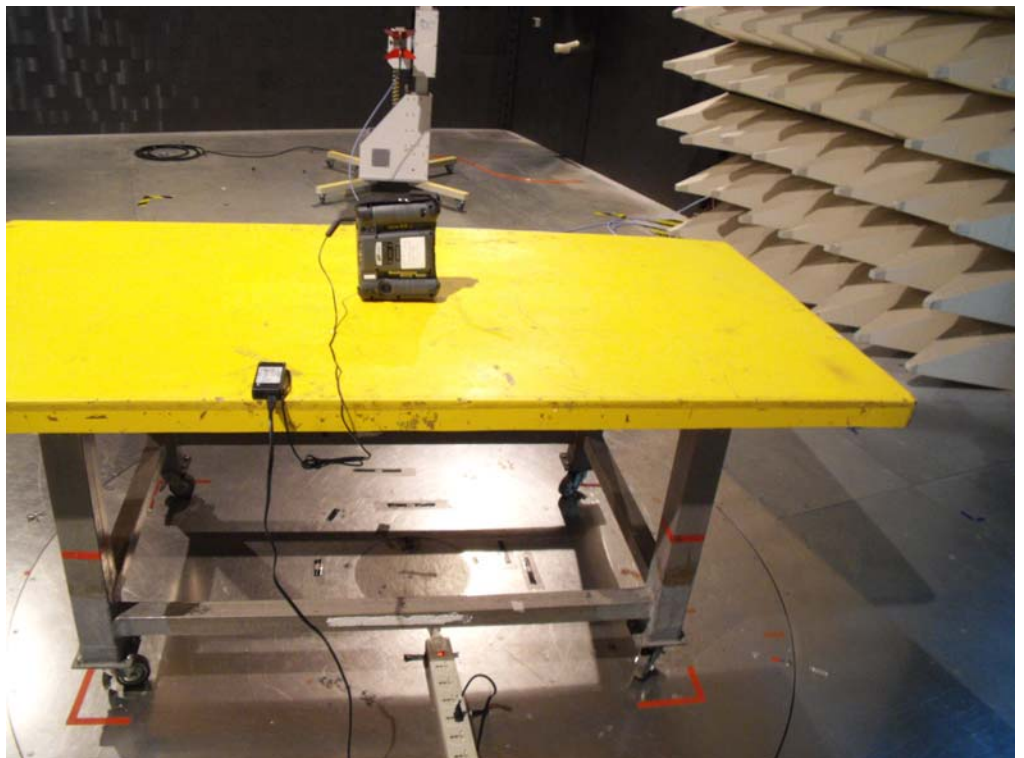


For radiated emissions above 1GHz

FRONT VIEW



REAR VIEW

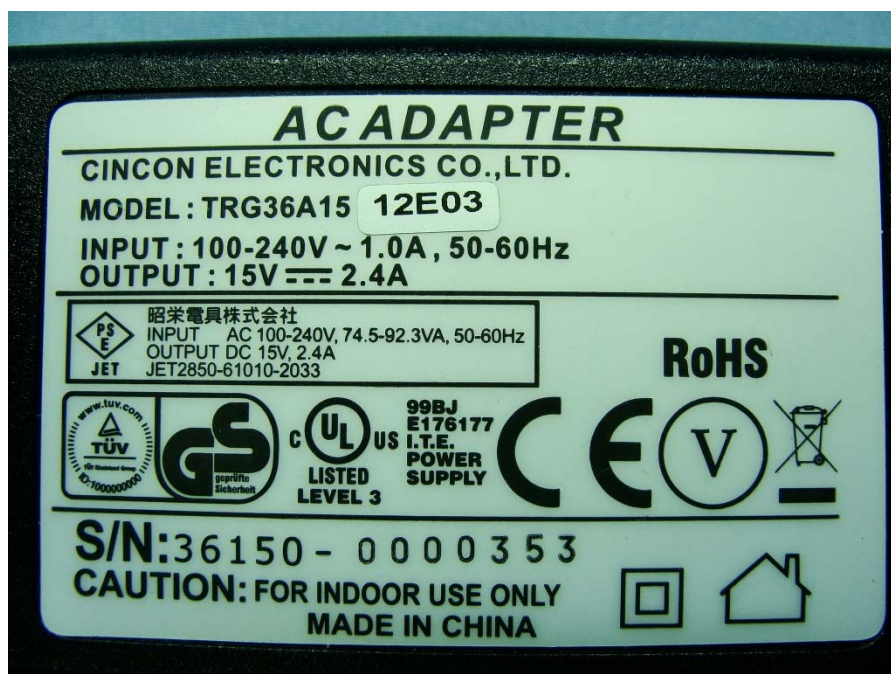


FCC TEST REPORT

APPENDIX B. Photographs of EUT



FCC TEST REPORT



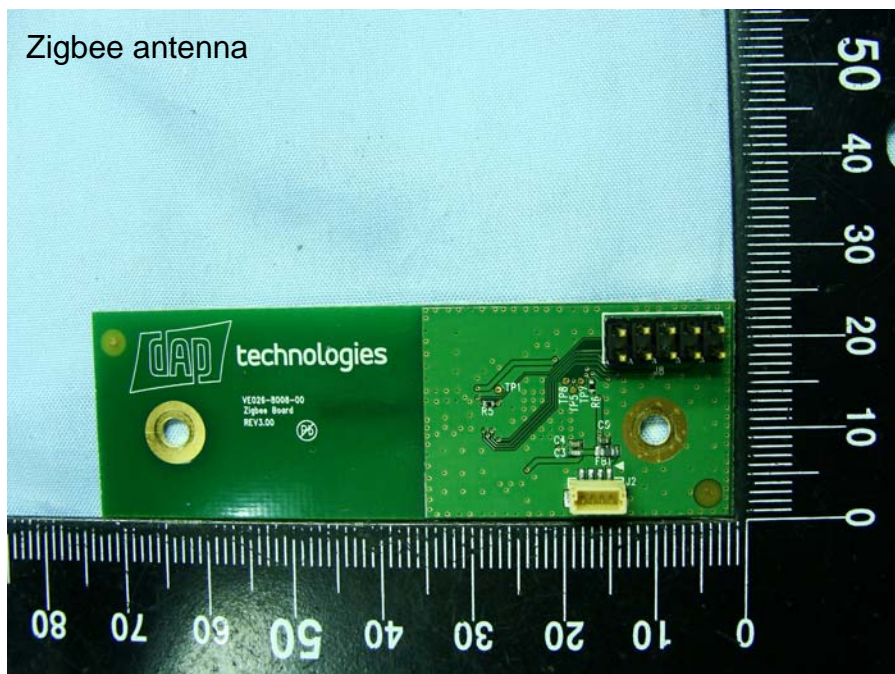
FCC TEST REPORT



FCC TEST REPORT



Zigbee antenna



FCC TEST REPORT

