FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment	:	**Wireless Keyboard**
Model No.	:	**KB010W**
Brand Name	:	**Enermax**
Filing Type	:	**New Application**
Applicant	:	**ENERMAX TECHNOLOGY CORPORATION** 15F-2, No.888, Jing-Guo Rd., Taoyuan City 330, Taiwan, R.O.C.
FCC ID	:	**W6L-KB010W**
Manufacturer	:	**ENERMAX TECHNOLOGY CORPORATION** 15F-2, No.888, Jing-Guo Rd., Taoyuan City 330, Taiwan, R.O.C.
Received Date	:	Apr. 29, 2010
Final Test Date	:	May 04, 2010

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.

Testing Laboratory
1190

SPORTON International Inc.

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

Table of Contents

History of This Test Report

Original Issue Date: May 07, 2010

Report No.: FR042722

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

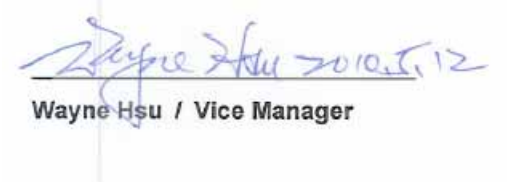
CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment	:	Wireless Keyboard
Model No.	:	KB010W
Brand Name	:	Enermax
Applicant	:	ENERMAX TECHNOLOGY CORPORATION 15F-2, No.888, Jing-Guo Rd., Taoyuan City 330, Taiwan, R.O.C.

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 29, 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 EMC nature.



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	N/A	-
3.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	16.93 dB
3.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
3.4	15.249(a)/(d)	Radiated Emissions	Complies	3.02 dB
3.5	15.249(d)	Band Edge Emissions	Complies	4.79 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	$\pm 8.5\times10^{-8}$	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	3Vdc from battery
Modulation	GFSK
Frequency Range	2400 ~ 2483.5MHz
Channel Number	64
Channel Band Width (99%)	6.52 MHz
Max. Field Strength	77.01 dBuV/m at 3m (Average)
Antenna	Internal Antenna (Without any antenna connector)

2.2 Table for Carrier Frequencies

Frequency Band	Frequency Group1		Frequency Group2	
2400 ~ 2483.5MHz	2407 MHz	2442 MHz	2405 MHz	2443 MHz
	2408 MHz	2447 MHz	2406 MHz	2444 MHz
	2412 MHz	2451 MHz	2409 MHz	2446 MHz
	2414 MHz	2452 MHz	2410 MHz	2448 MHz
	2417 MHz	2457 MHz	2411 MHz	2449 MHz
	2420 MHz	2458 MHz	2413 MHz	2453 MHz
	2421 MHz	2459 MHz	2415 MHz	2455 MHz
	2422 MHz	2460 MHz	2416 MHz	2456 MHz
	2427 MHz	2461 MHz	2418 MHz	2462 MHz
	2428 MHz	2465 MHz	2419 MHz	2463 MHz
	2431 MHz	2468 MHz	2423 MHz	2464 MHz
	2435 MHz	2469 MHz	2425 MHz	2466 MHz
	2436 MHz	2472 MHz	2429 MHz	2467 MHz
	2437 MHz	2473 MHz	2430 MHz	2470 MHz
	2438 MHz	2475 MHz	2432 MHz	2471 MHz
	2439 MHz	2476 MHz	2434 MHz	2474 MHz

2.3 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	Frequency	Ant.
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	2405 MHz / 2439 MHz / 2476 MHz	1
Radiated Emissions 9kHz~1GHz	Normal Mode	-	-
Radiated Emissions 1GHz~10th Harmonic	CTX	2405 MHz / 2439 MHz / 2476 MHz	1
Band Edge Emissions	CTX	2405 MHz / 2476 MHz	1

Note: CTX=continuously transmitting.

2.4 Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH02-HY	SAC	Hwa Ya	643075	IC 4086B-1
TH01-HY	OVEN Room	Hwa Ya	-	-

Semi Anechoic Chamber (SAC).

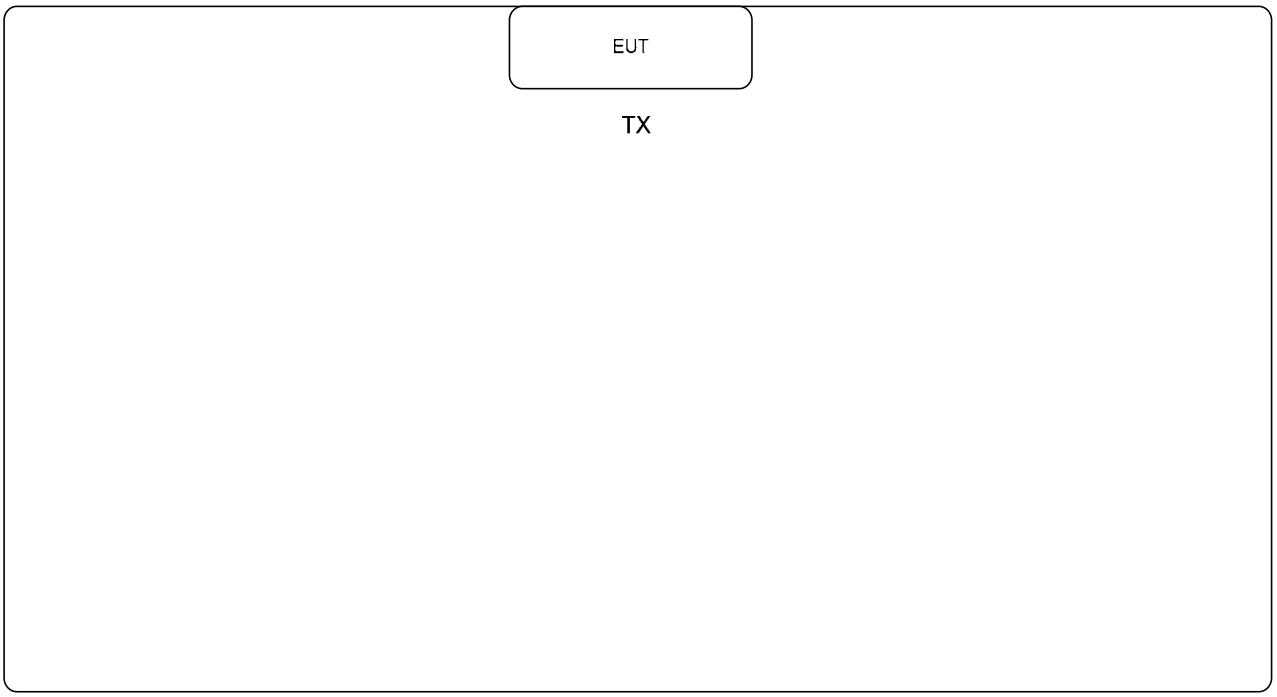
2.5 Table for Supporting Units

The EUT was tested alone.

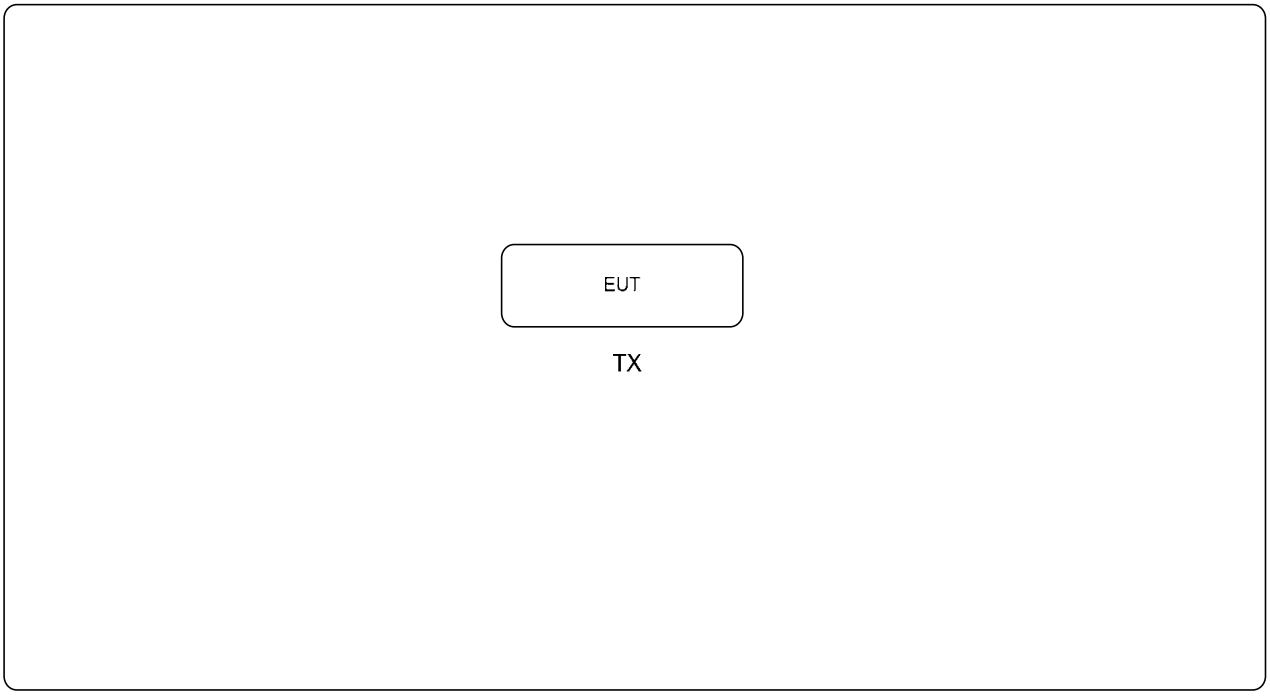
2.6 Test Configuration

2.6.1 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 A

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	79	66
0.5~30	73	60

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

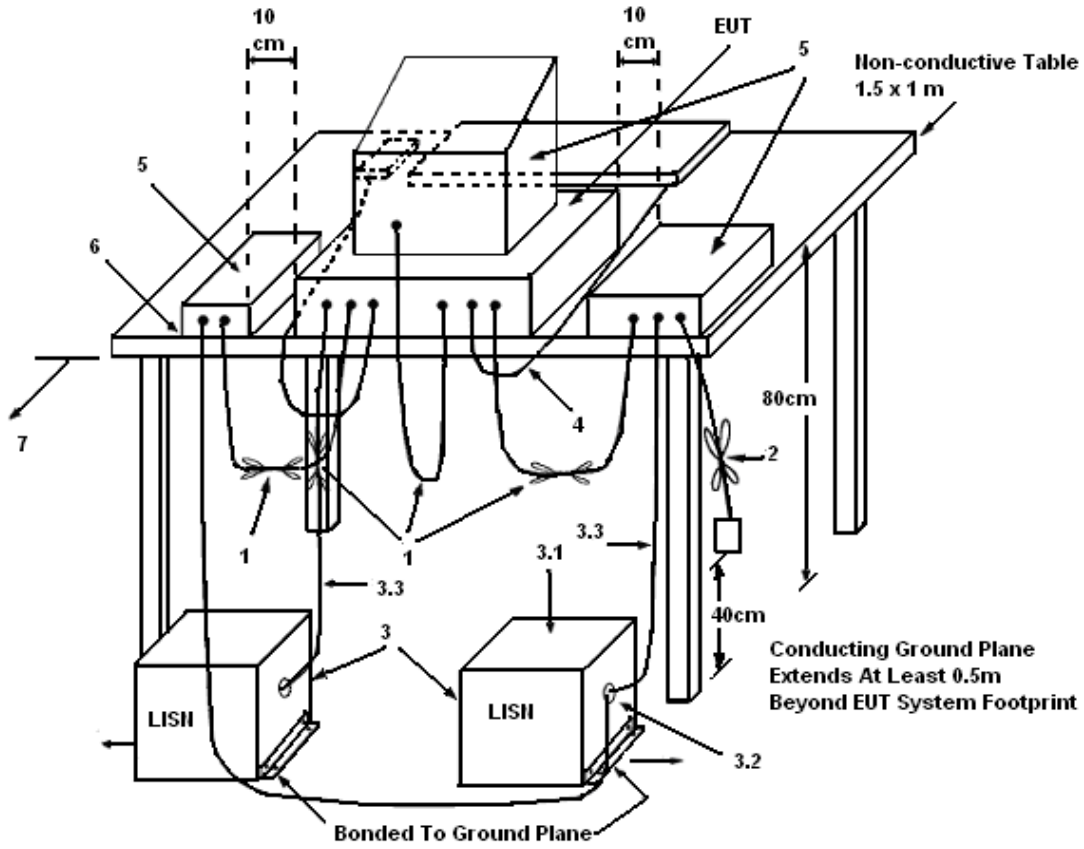
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

The EUT is battery powered and the AC power line Conducted Emission is not required.

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
5725-5875	94

3.2.2 Measuring Instruments and Setting

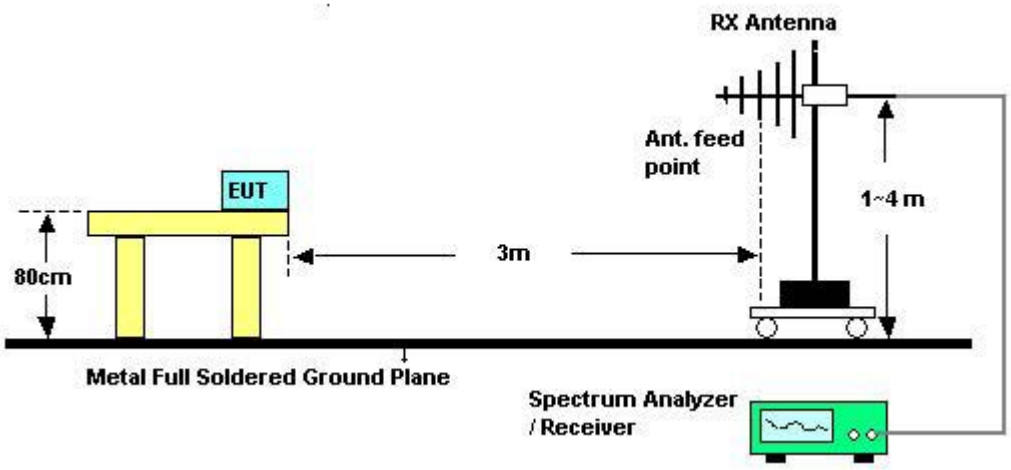
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Frequency 2405 MHz / 2439 MHz / 2476 MHz

2405 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
3	2404.810	87.67	-26.33	114.00	52.79	31.86	3.02	0.00	Peak
3	2404.810	71.79	-22.21	94.00	36.91	31.86	3.02	0.00	Average

2439 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2439.010	90.85	-23.15	114.00	55.81	31.99	3.05	0.00	Peak
1	2439.010	74.97	-19.03	94.00	39.93	31.99	3.05	0.00	Average

2476 MHz

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2476.250	92.95	-21.05	114.00	57.74	32.13	3.08	0.00	Peak
1	2476.250	77.07	-16.93	94.00	41.86	32.13	3.08	0.00	Average

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 (2400 ~ 2483.5MHz).

3.3.2 Measuring Instruments and Setting

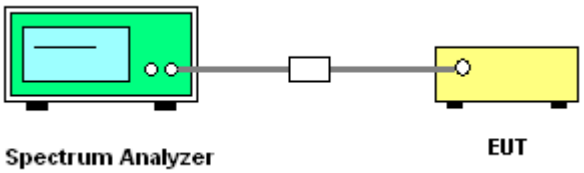
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 EUT Operation during Test

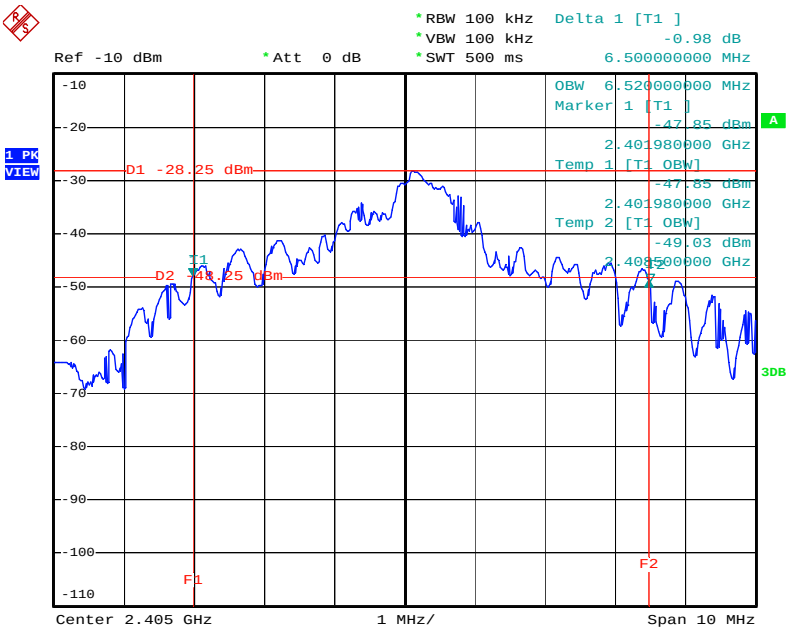
The EUT was programmed to be in continuously transmitting mode.

3.3.6 Test Result of 20dB Spectrum Bandwidth

Final Test Date	May 04, 2010	**Test Site No.**	TH01-HY
Temperature	28℃	**Humidity**	58%
Test Engineer	Ian	**Configuration**	Frequency 2405 MHz / 2439 MHz / 2476 MHz

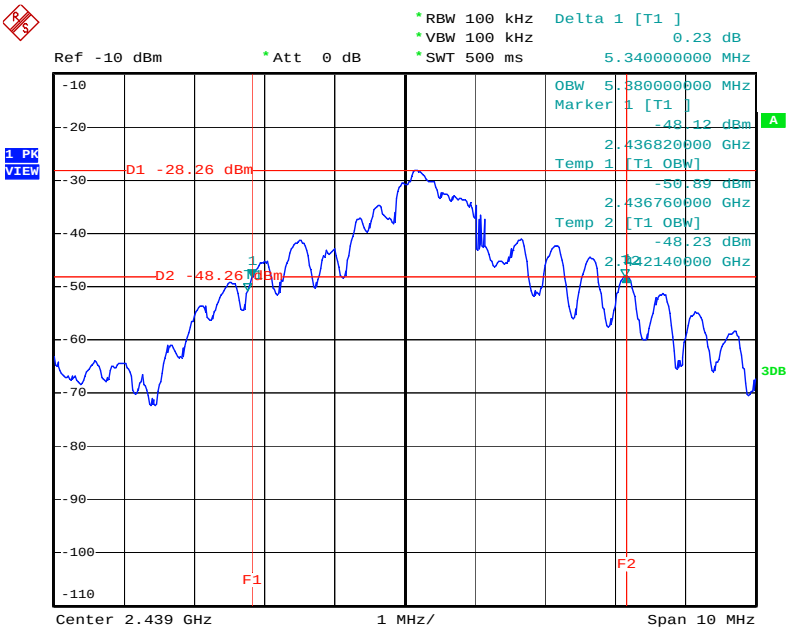
Frequency	**20dB BW (MHz)**	**99% OBW (MHz)**	**Frequency range (MHz) fL＞2400MHz**	**Frequency range (MHz) fH＜2483.5MHz**	**Test Result**
2405 MHz	6.500	6.520	2401.9800	-	Complies
2439 MHz	5.340	5.380	-	-	Complies
2476 MHz	2.220	2.340	-	2477.5600	Complies

20 dB/99% Bandwidth Plot on 2405 MHz



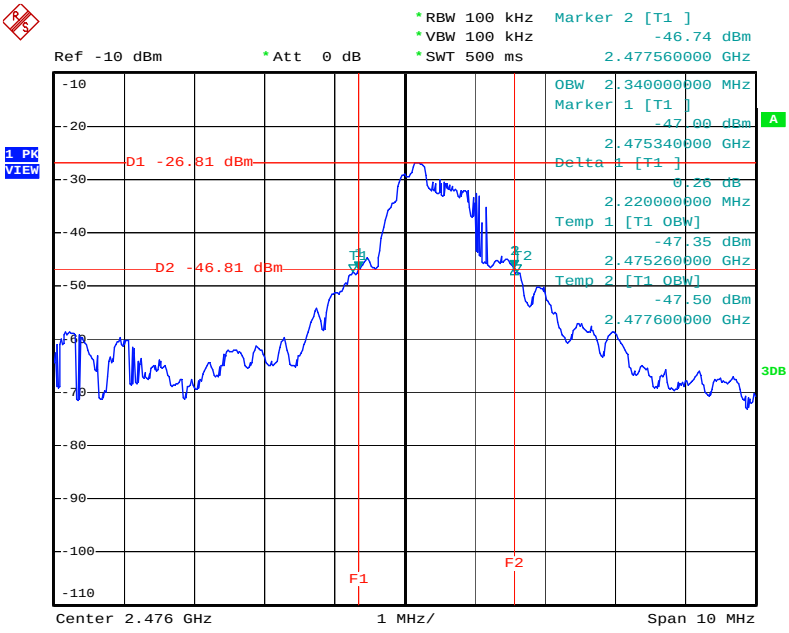
Date: 4.MAY.2010 14:47:03

20 dB/99% Bandwidth Plot on 2439 MHz



Date: 4.MAY.2010 14:51:50

20 dB/99% Bandwidth Plot on 2476 MHz



Date: 4.MAY.2010 14:53:59

3.4 Radiated Emissions Measurement

3.4.1 Limit

Harmonic emissions limits comply with below 54dBuV/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 (microvolt/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

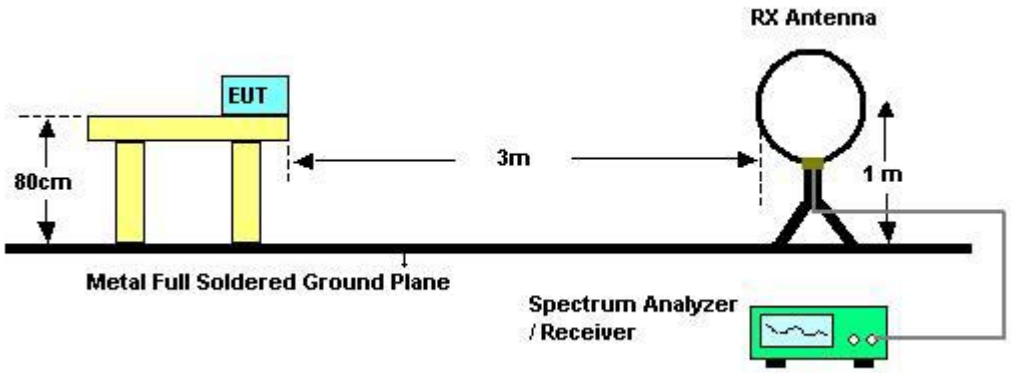
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.4.3 Test Procedures

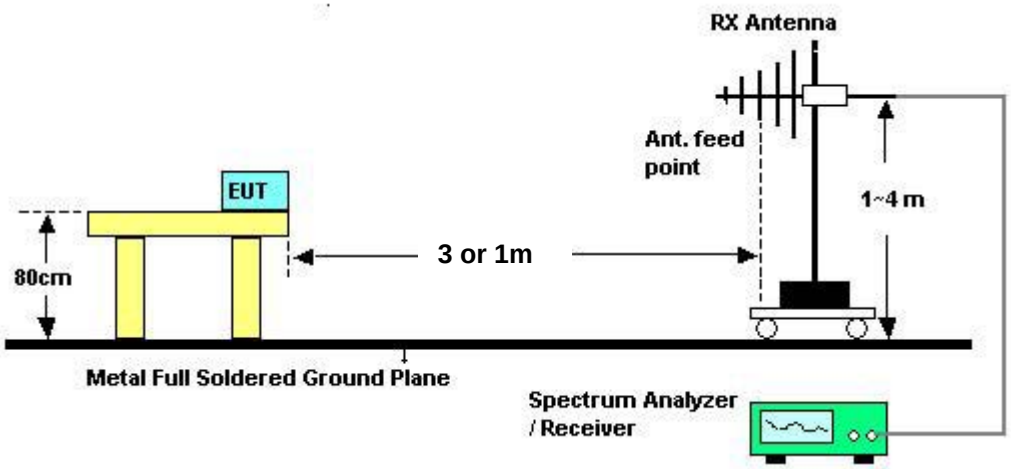
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

Distance extrapolation factor = 20 log (specific distance [3m] / 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	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil		

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.

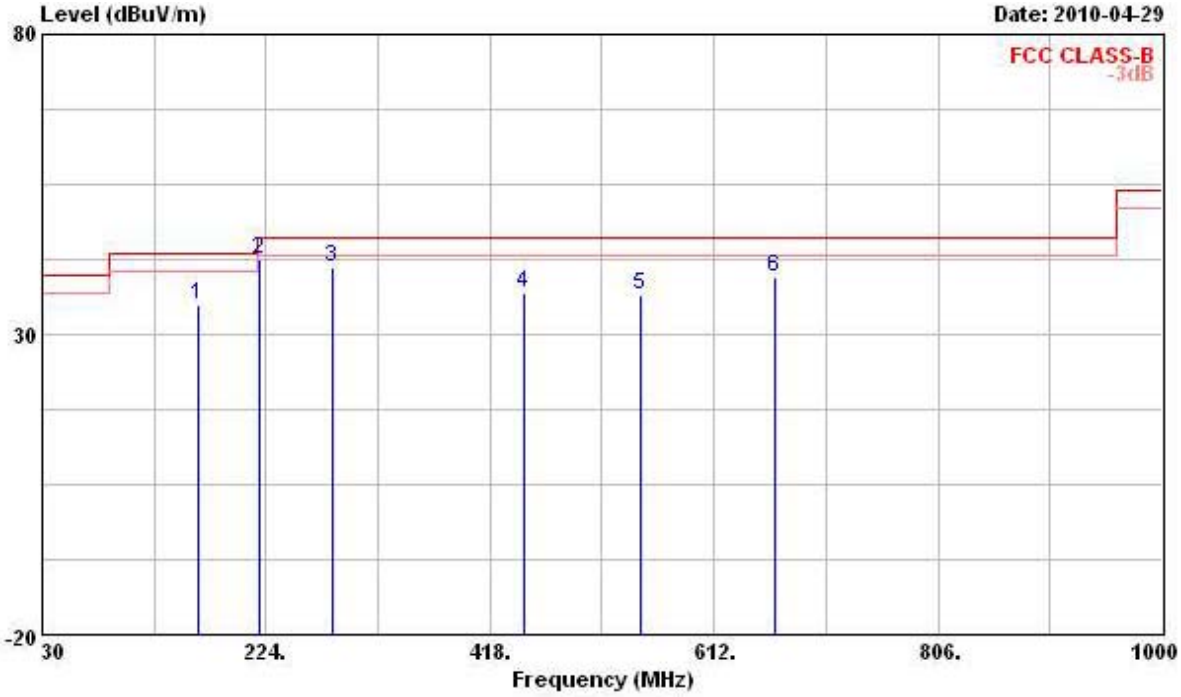
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

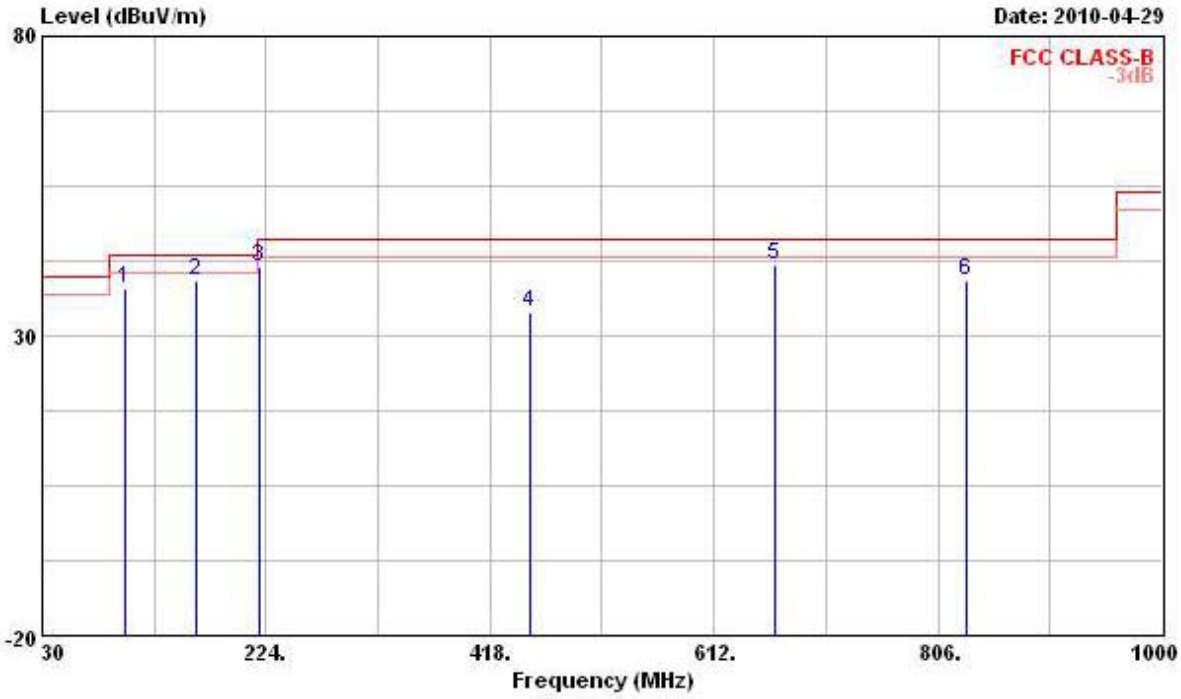
Final Test Date	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Normal Mode

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	164.830	34.92	-8.58	43.50	48.77	10.34	3.15	27.34	Peak
2 @	218.180	42.38	-3.62	46.00	53.62	11.95	3.78	26.97	Peak
3	281.230	41.02	-4.98	46.00	50.01	13.44	4.37	26.80	Peak
4	447.100	37.03	-8.97	46.00	42.89	16.22	5.83	27.91	Peak
5	548.950	36.43	-9.57	46.00	39.28	18.69	6.62	28.16	Peak
6	664.380	39.61	-6.39	46.00	41.23	19.32	7.13	28.07	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	101.780	37.82	-5.68	43.50	52.41	11.41	1.59	27.59	Peak
2	163.860	39.29	-4.21	43.50	53.13	10.38	3.13	27.35	QP
3	218.180	41.57	-4.43	46.00	52.81	11.95	3.78	26.97	Peak
4	451.950	34.04	-11.96	46.00	39.77	16.31	5.89	27.93	Peak
5	665.350	41.72	-4.28	46.00	43.35	19.31	7.13	28.07	Peak
6	831.220	39.21	-6.79	46.00	38.46	20.19	8.16	27.60	Peak

Note:

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

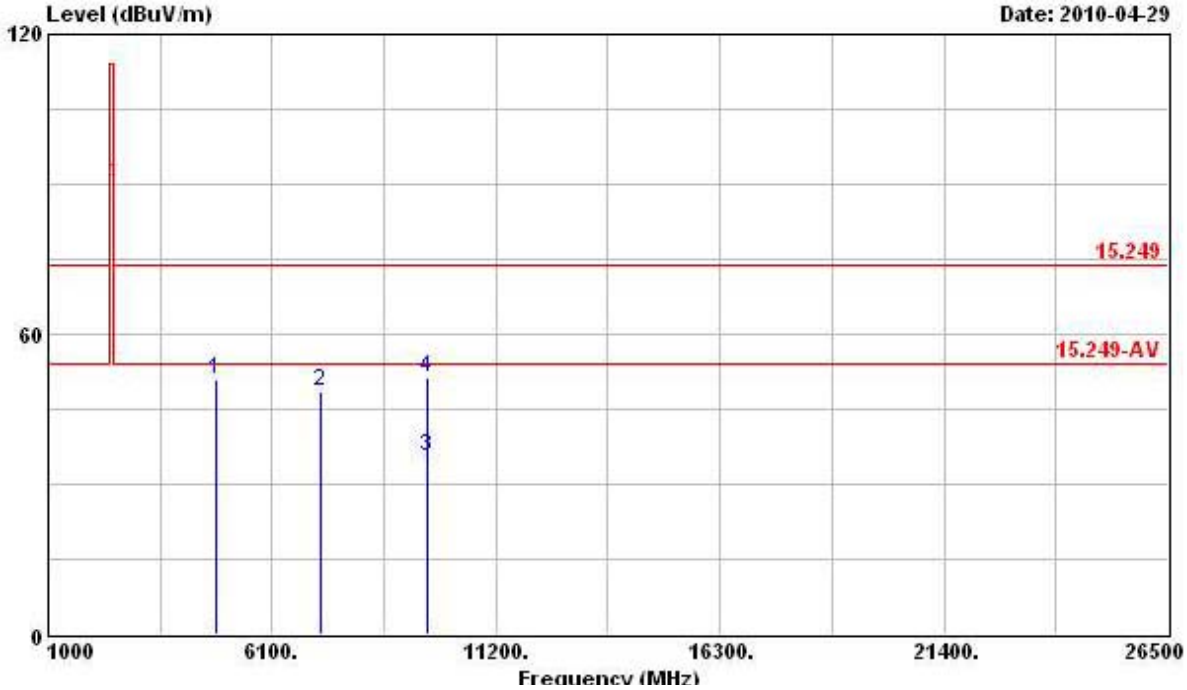
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

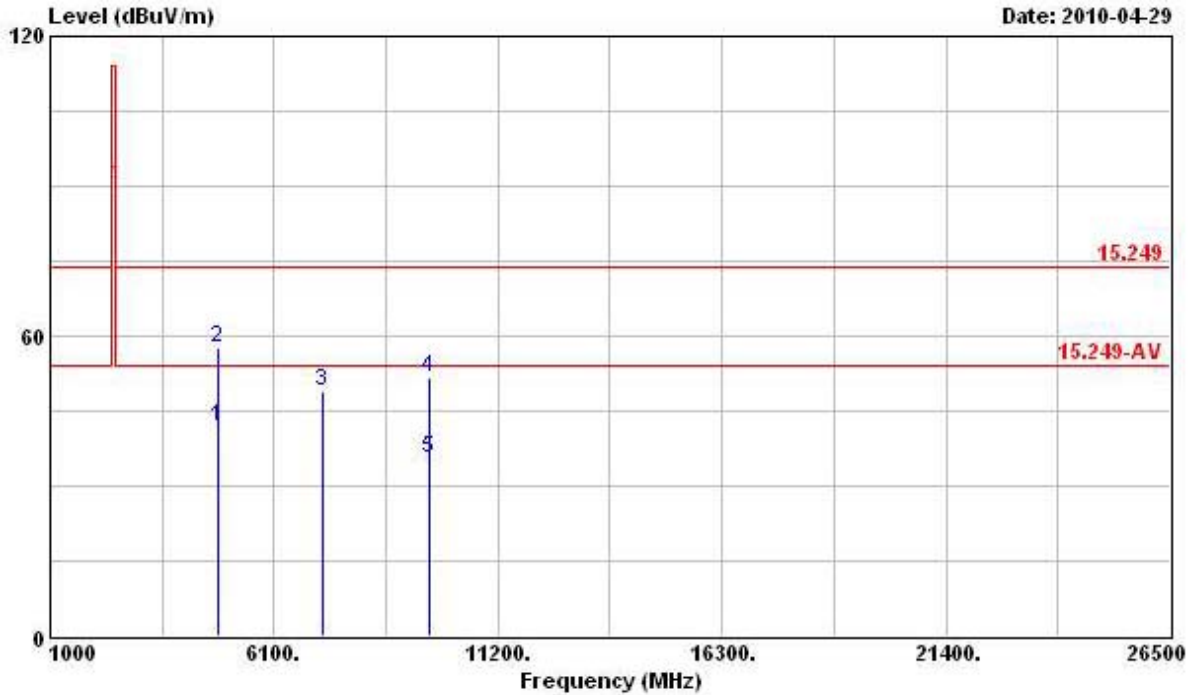
Final Test Date	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Frequency 2405 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	4810.000	50.85	-3.15	54.00	45.09	35.73	4.58	34.55	PK
2	7215.000	48.71	-5.29	54.00	39.54	37.84	5.62	34.29	PK
3	9620.000	35.36	-18.64	54.00	24.32	39.34	6.34	34.64	Average
4	9620.000	51.24	-22.76	74.00	40.20	39.34	6.34	34.64	Peak

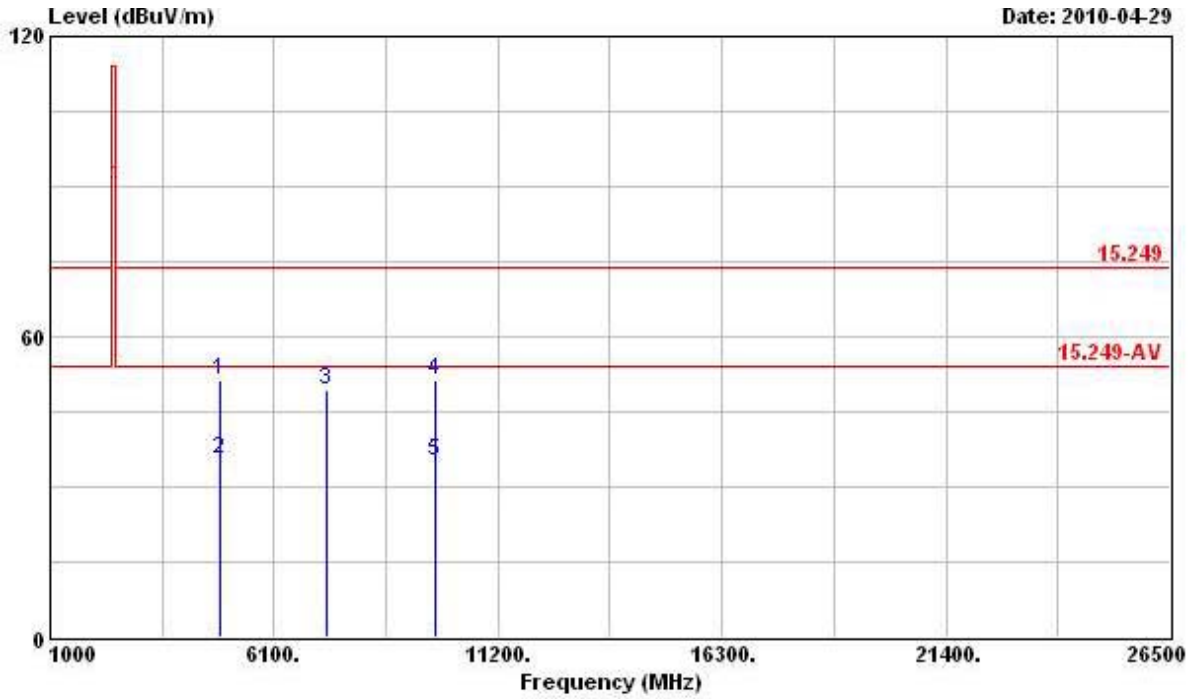
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4810.000	41.81	-12.19	54.00	36.67	35.11	4.58	34.55	Average
2	4810.000	57.69	-16.31	74.00	52.55	35.11	4.58	34.55	Peak
3	7215.000	48.92	-5.08	54.00	40.70	36.89	5.62	34.29	PK
4	9620.000	51.55	-22.45	74.00	41.31	38.54	6.34	34.64	Peak
5	9620.000	35.67	-18.33	54.00	25.43	38.54	6.34	34.64	Average

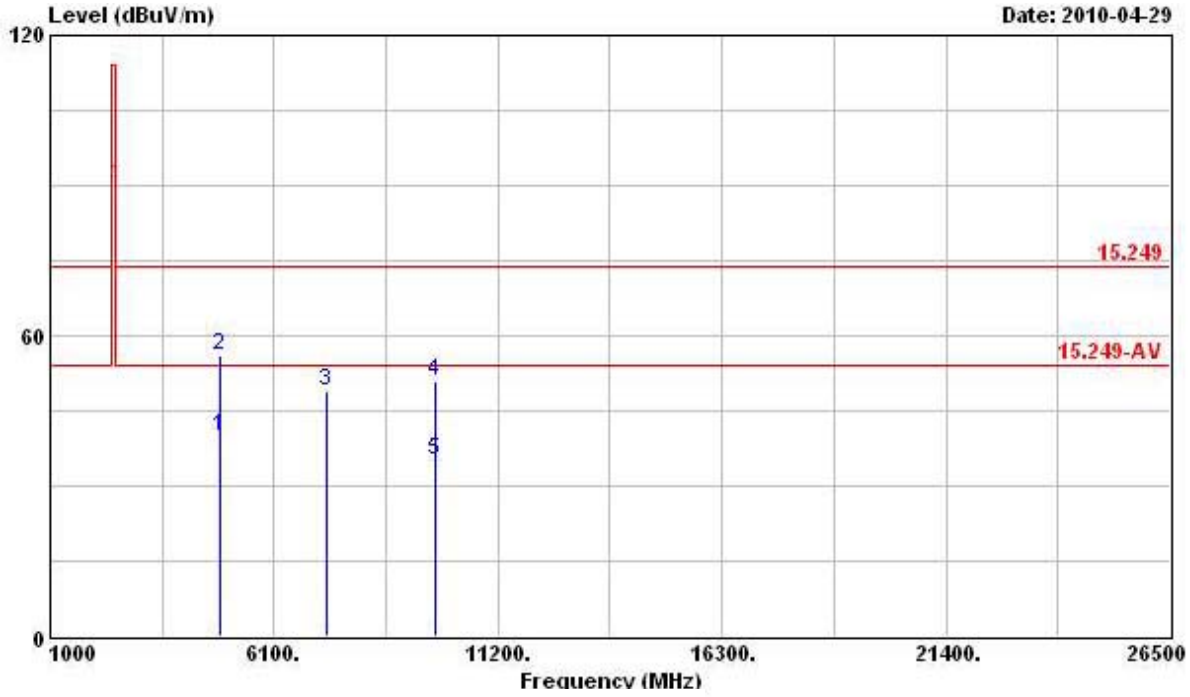
Final Test Date	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Frequency 2439 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4878.000	51.23	-22.77	74.00	45.24	35.83	4.61	34.45	Peak
2	4878.000	35.35	-18.65	54.00	29.36	35.83	4.61	34.45	Average
3	7317.000	49.44	-4.56	54.00	40.22	37.87	5.64	34.29	PK
4	9756.000	51.17	-22.83	74.00	39.88	39.51	6.36	34.58	Peak
5	9756.000	35.29	-18.71	54.00	24.00	39.51	6.36	34.58	Average

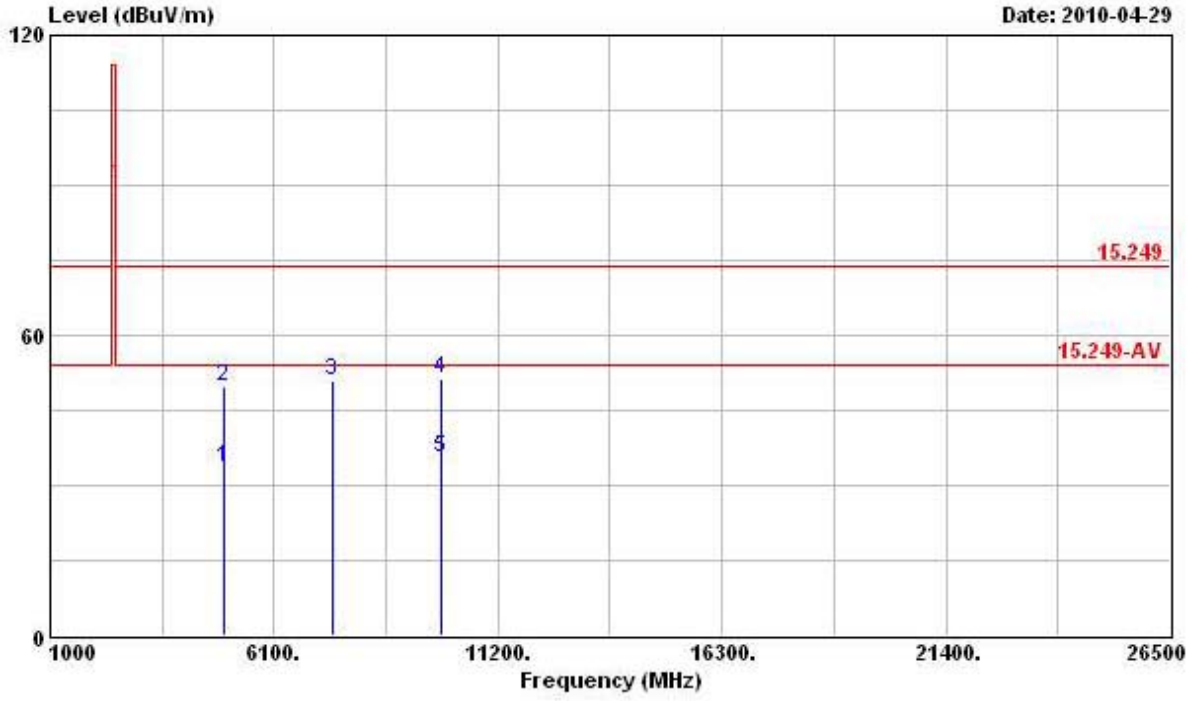
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4878.000	40.00	-14.00	54.00	34.66	35.18	4.61	34.45	Average
2	4878.000	55.88	-18.12	74.00	50.54	35.18	4.61	34.45	Peak
3	7317.000	49.13	-4.87	54.00	40.85	36.93	5.64	34.29	PK
4	9756.000	51.06	-22.94	74.00	40.57	38.71	6.36	34.58	Peak
5	9756.000	35.18	-18.82	54.00	24.69	38.71	6.36	34.58	Average

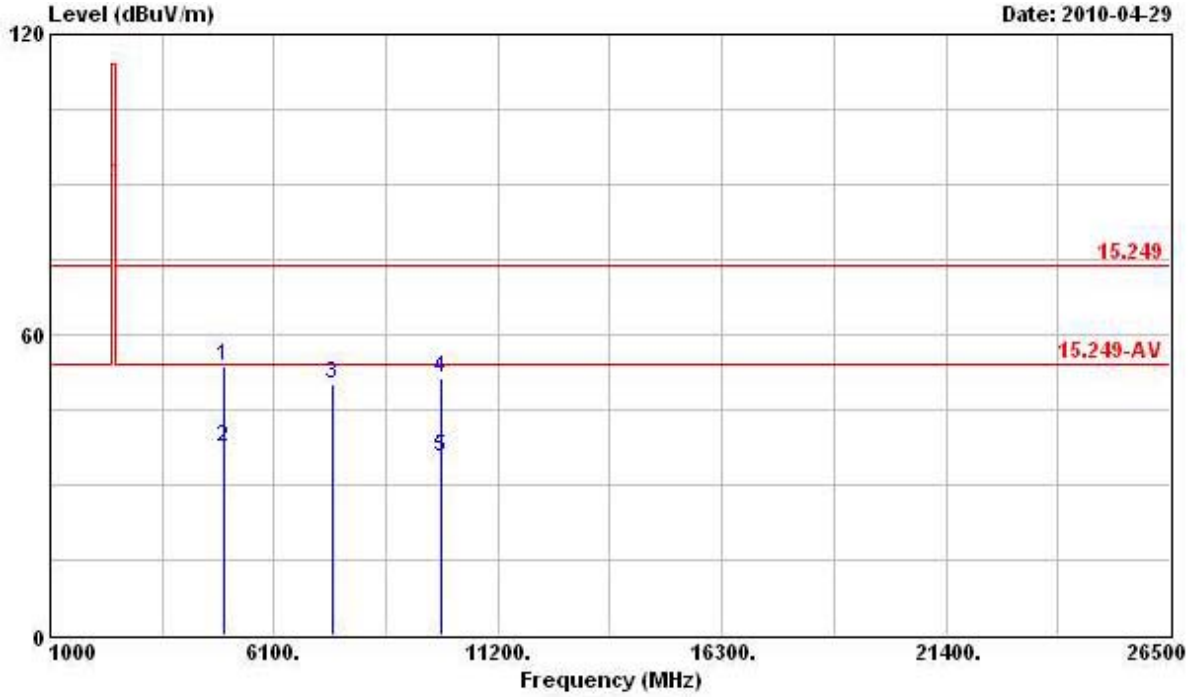
Final Test Date	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Frequency 2476 MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4952.000	33.71	-20.29	54.00	27.45	35.93	4.68	34.35	Average
2	4952.000	49.59	-24.41	74.00	43.33	35.93	4.68	34.35	Peak
3 @	7428.000	50.98	-3.02	54.00	41.73	37.89	5.65	34.29	PK
4	9904.000	51.48	-22.52	74.00	39.92	39.70	6.38	34.52	Peak
5	9904.000	35.60	-18.40	54.00	24.04	39.70	6.38	34.52	Average

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4952.000	53.56	-20.44	74.00	47.98	35.25	4.68	34.35	Peak
2	4952.000	37.68	-16.32	54.00	32.10	35.25	4.68	34.35	Average
3	7428.000	49.95	-4.05	54.00	41.62	36.97	5.65	34.29	PK
4	9904.000	51.42	-22.58	74.00	40.66	38.90	6.38	34.52	Peak
5	9904.000	35.54	-18.46	54.00	24.78	38.90	6.38	34.52	Average

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.

3.5 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 (microvolt/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 3.2.3, 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 3.2.4.

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 Emissions

Final Test Date	Apr. 29, 2010	**Test Site No.**	03CH02-HY
Temperature	24℃	**Humidity**	56%
Test Engineer	Phil	**Configuration**	Frequency 2405 MHz / 2476 MHz

2405 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2315.890	58.62	-15.38	74.00	24.22	31.44	2.96	0.00	Peak
2	2398.730	69.21	-4.79	74.00	34.40	31.79	3.02	0.00	Peak
1	2382.010	46.17	-7.83	54.00	11.46	31.72	2.99	0.00	Average
2	2398.730	46.21	-7.79	54.00	11.40	31.79	3.02	0.00	Average

2476 MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
2	2483.500	59.50	-14.50	74.00	24.29	32.13	3.08	0.00	Peak
2	2495.820	46.63	-7.37	54.00	11.35	32.20	3.08	0.00	Average

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
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2009	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	Jul. 12, 2009*	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 - 40GHz	Feb. 02, 2010	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 11, 2009	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 07, 2009	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 16, 2009	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Oct. 22, 2009	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 26, 2010	Radiation (03CH02-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX106	03CH02-HY	1GHz~40GHz	Feb. 26, 2010	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz - 2 GHz	Nov. 30, 2009	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 28, 2008*	Radiation (03CH02-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 2nd 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. : L1190-100107

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 Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 07, 2010

P1, total 21 pages