FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment	:	**2.4 GHz Wireless Keyboard Mouse**
Model No.	:	**KM1000**
Brand Name	:	**Raytac**
Filing Type	:	**New Application**
Applicant	:	**Raytac Corp.**
Manufacturer		12F., No.786, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan
FCC ID	:	**SH6KM1000**
Received Date	:	Mar. 08, 2011
Final Test Date	:	Mar. 11, 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.

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: Mar. 16, 2011
Report No.: FR130309

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.249

Equipment	:	**2.4 GHz Wireless Keyboard Mouse**
Model No.	:	**KM1000**
Brand Name	:	**Raytac**
Applicant	:	**Raytac Corp.** 12F., No.786, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 08, 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.

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	3.02 dB
3.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	15.14 dB
3.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
3.4	15.249(a)/(d)	Radiated Emissions	Complies	3.65 dB
3.5	15.249(d)	Band Edge Emissions	Complies	5.80 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	3.7V battery or USB cable
Modulation	GFSK
Frequency Range	2400 ~ 2483MHz
Channel Number	16
Channel Band Width (99%)	1.42 MHz
Max. Field Strength	78.86 dBuV/m at 3m (Average)
Antenna	Internal Antenna

2.2. Accessories

Please refer to the specifications or user's manual.

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	Channel
AC Power Line Conducted Emissions	USB charging cable	-
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~10th Harmonic	CTX	2405 MHz / 2440 MHz / 2480 MHz
Band Edge Emissions	CTX	2405 MHz / 2480 MHz

Note: CTX=continuously transmitting.

2.4. Table for Testing Locations

Test Site No.	Site Category	Location
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH03-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC).

2.5. Table for Supporting Units

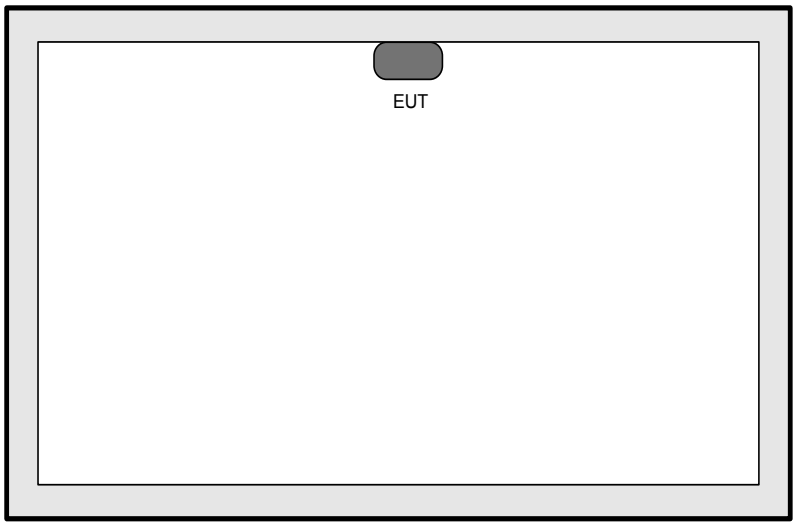
Support Unit	Brand	Model	FCC ID	Remark
Notebook	DELL	E5500	N/A	Conducted Emissions
(USB) Mouse	MICROSOFT	1004	N/A	
2.4 GHz Wireless Keyboard Mouse (RX Dongle)	Raytac	KM1000	Doc	

Note: The radiated emission was tested alone.

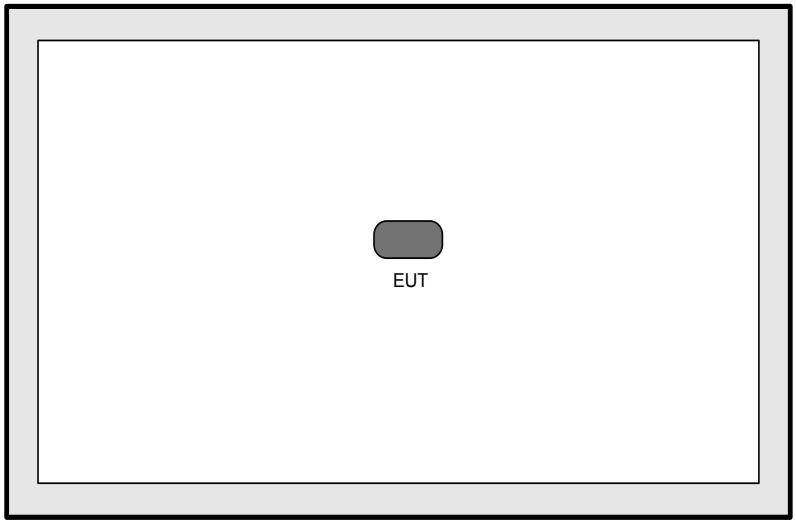
2.6. Test Configurations

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 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

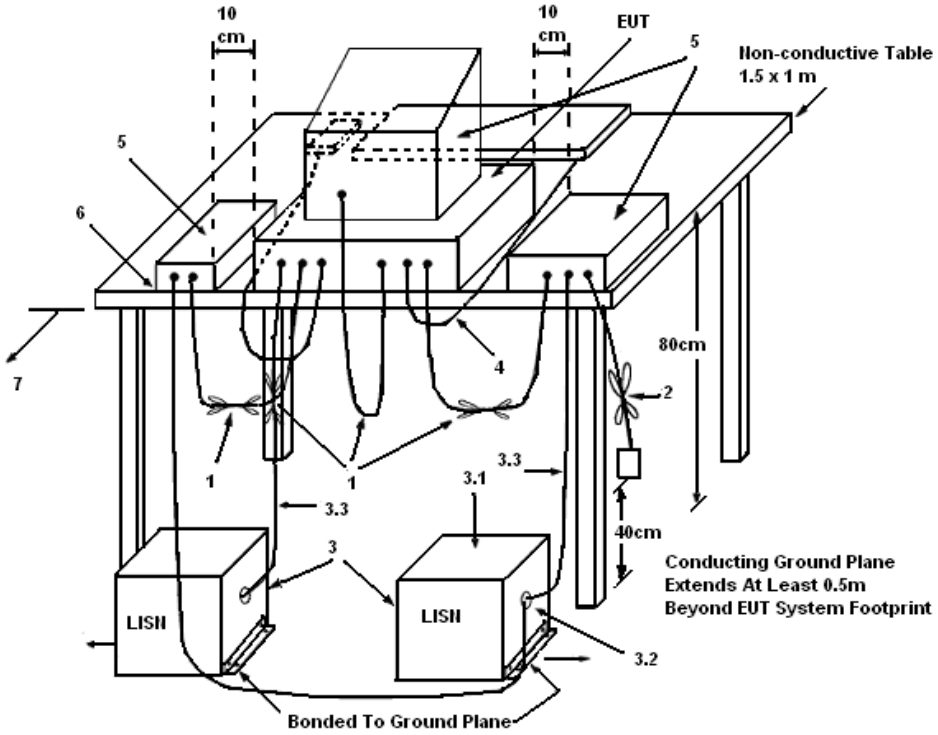
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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.

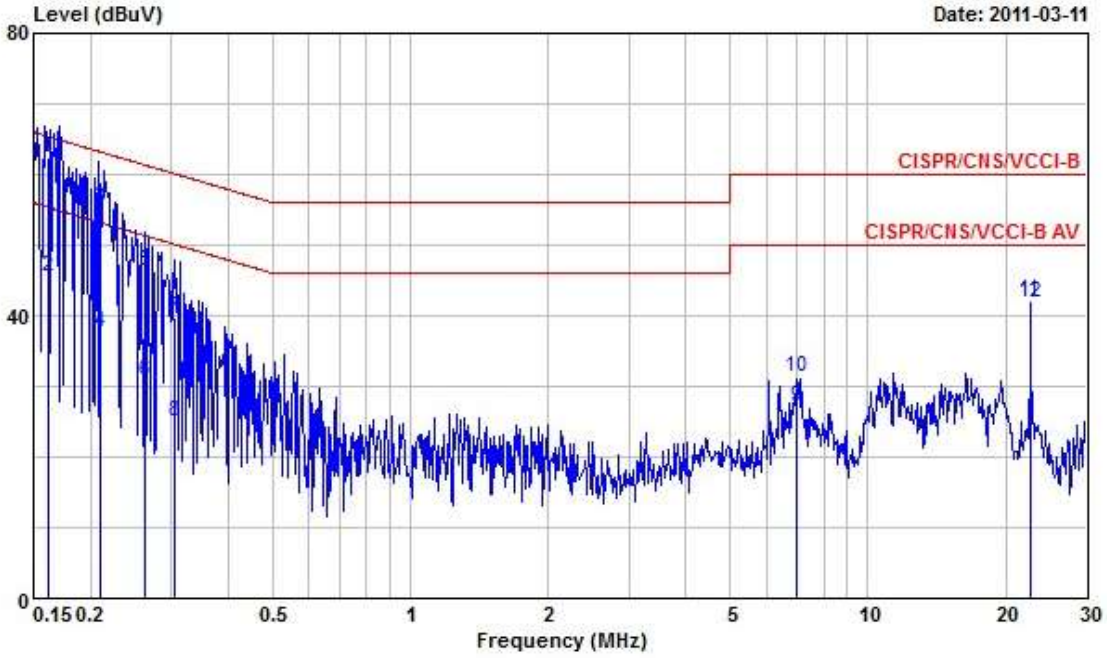
3.1.6. EUT Operation during Test

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

3.1.7. Results of AC Power Line Conducted Emissions Measurement

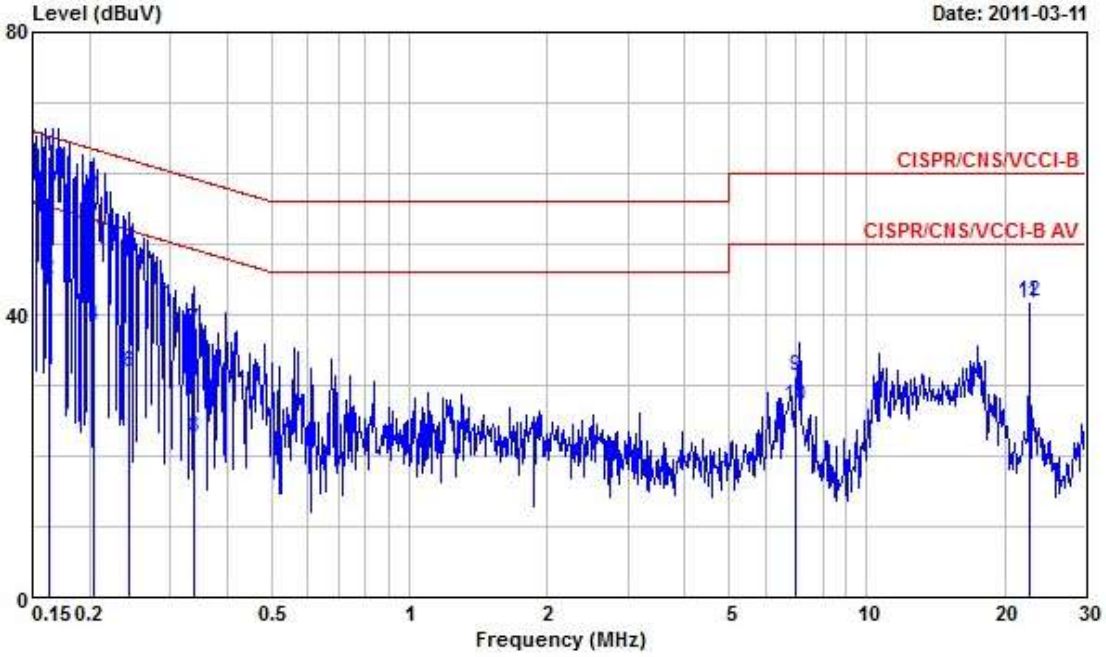
Final Test Date	Mar. 11, 2011	**Test Site No.**	CO04-HY
Temperature	22.7℃	**Humidity**	55.2%
Test Engineer	Jason	**Configuration**	USB charging cable

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1620200	62.34	-3.02	65.36	61.97	0.30	0.07	QP
2	0.1620200	45.65	-9.71	55.36	45.28	0.30	0.07	Average
3	0.2106320	55.24	-7.94	63.18	54.85	0.30	0.09	QP
4	0.2106320	37.75	-15.43	53.18	37.36	0.30	0.09	Average
5	0.2616370	46.31	-15.07	61.38	45.95	0.30	0.06	QP
6	0.2616370	30.70	-20.68	51.38	30.34	0.30	0.06	Average
7	0.3050910	39.70	-20.40	60.10	39.36	0.30	0.04	QP
8	0.3050910	24.99	-25.11	50.10	24.65	0.30	0.04	Average
9	6.960	27.13	-22.87	50.00	26.62	0.41	0.10	Average
10	6.960	31.38	-28.62	60.00	30.87	0.41	0.10	QP
11	22.570	42.08	-7.92	50.00	41.26	0.61	0.21	Average
12	22.570	41.84	-18.16	60.00	41.02	0.61	0.21	QP

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1628860	62.29	-3.03	65.32	61.96	0.26	0.07	QP
2	0.1628860	44.97	-10.35	55.32	44.64	0.26	0.07	Average
3	0.2039630	56.90	-6.55	63.45	56.55	0.25	0.10	QP
4	0.2039630	38.37	-15.08	53.45	38.02	0.25	0.10	Average
5	0.2429320	47.95	-14.05	62.00	47.63	0.25	0.07	QP
6	0.2429320	31.96	-20.04	52.00	31.64	0.25	0.07	Average
7	0.3374030	37.87	-21.40	59.27	37.61	0.24	0.02	QP
8	0.3374030	22.51	-26.76	49.27	22.25	0.24	0.02	Average
9	6.960	31.42	-28.58	60.00	30.97	0.35	0.10	QP
10	6.960	27.07	-22.93	50.00	26.62	0.35	0.10	Average
11	22.570	41.57	-18.43	60.00	40.85	0.51	0.21	QP
12	22.570	41.73	-8.27	50.00	41.01	0.51	0.21	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

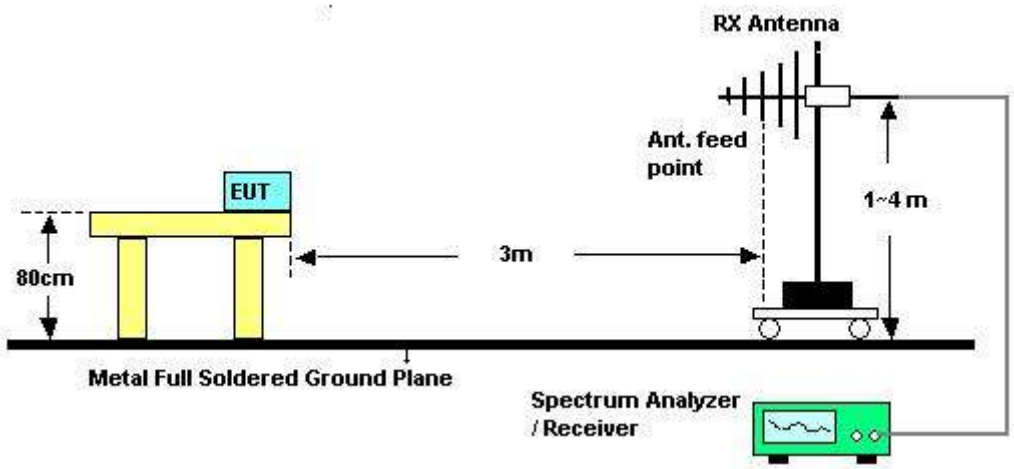
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	Mar. 08, 2011	Test Site No.	03CH03-HY
Temperature	22℃	Humidity	50%
Test Engineer	Cat	Configurations	2405 MHz / 2440 MHz / 2480 MHz

2405 MHz
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	
3	2404.810	100.07	-13.93	114.00	67.26	28.16	4.65	0.00	Peak
3	2404.810	78.55	-15.45	94.00	45.74	28.16	4.65	0.00	Average

2440 MHz
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	2439.770	100.24	-13.76	114.00	67.31	28.22	4.71	0.00	Peak
1	2439.770	78.86	-15.14	94.00	45.93	28.22	4.71	0.00	Average

2480 MHz
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	2479.860	98.84	-15.16	114.00	65.80	28.27	4.77	0.00	Peak
1	2480.050	78.06	-15.94	94.00	45.02	28.27	4.77	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.

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

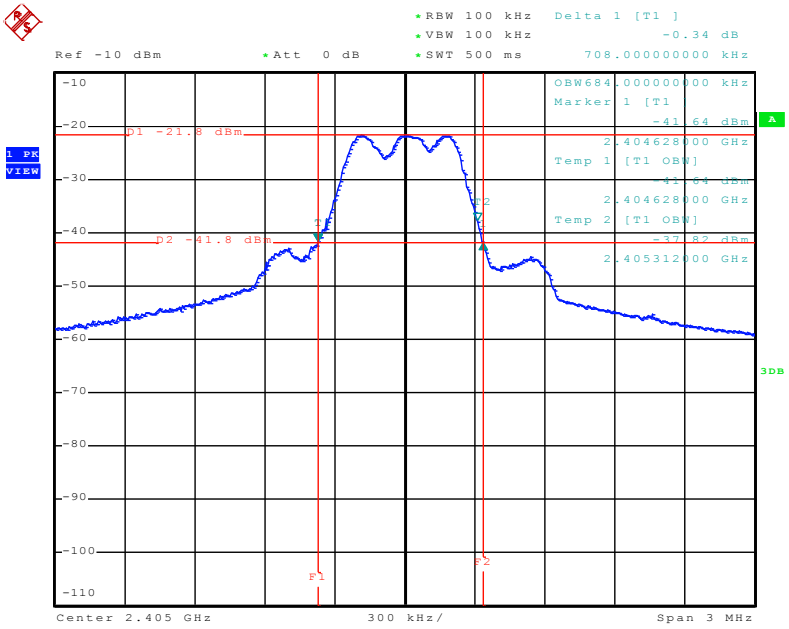
The EUT was programmed to be in continuously transmitting mode.

3.3.7. Test Result of 20dB Spectrum Bandwidth

Final Test Date	Mar. 11, 2011	**Test Site No.**	TH01-HY
Temperature	20℃	**Humidity**	62%
Test Engineer	Ian	**Configurations**	2405 MHz / 2440 MHz / 2480 MHz

Frequency	**20dB BW (MHz)**	**99% OBW (MHz)**	**Frequency range (MHz) f_L > 2400MHz**	**Frequency range (MHz) f_H < 2483MHz**	**Test Result**
2405 MHz	0.71	0.68	2404.6280	-	Complies
2440 MHz	0.71	0.64	-	-	Complies
2480 MHz	1.54	1.42	-	2480.7560	Complies

20 dB/99% Bandwidth Plot on 2405 MHz



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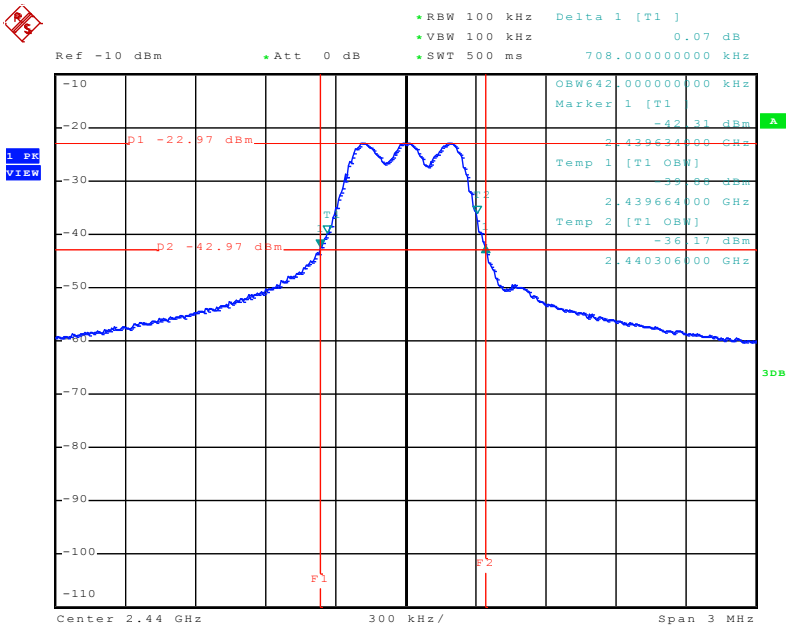
20 dB/99% Bandwidth Plot on 2440 MHz



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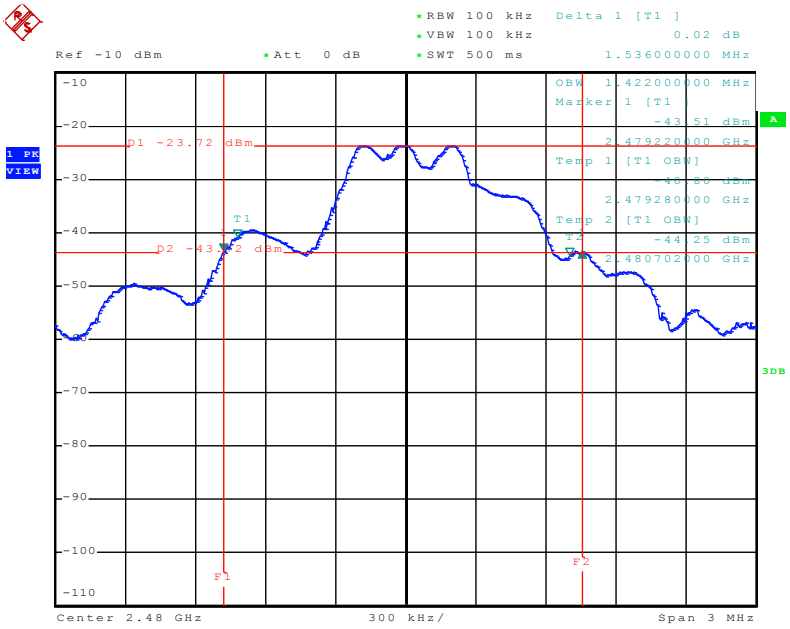
20 dB/99% Bandwidth Plot on 2480 MHz



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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

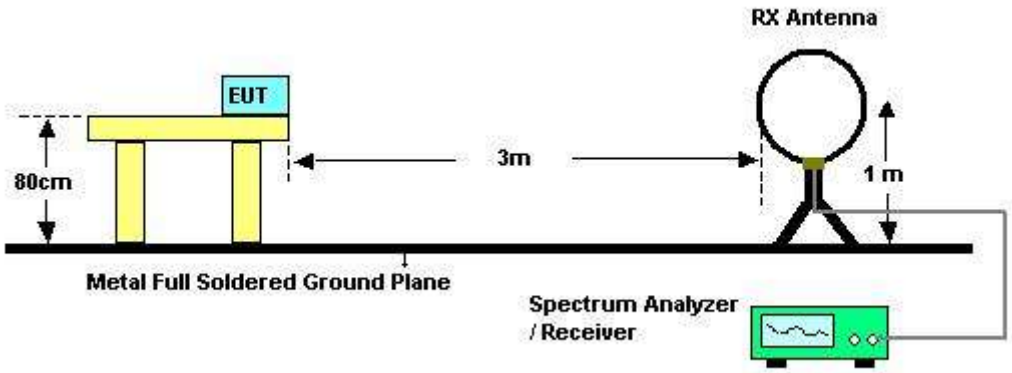
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.4.3. Test Procedures

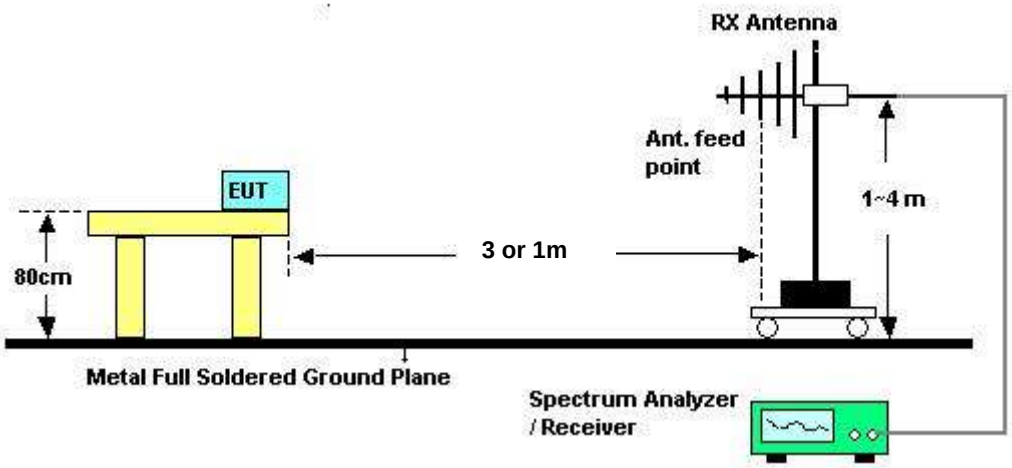
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 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	Mar. 08, 2011	**Test Site No.**	03CH03-HY
Temperature	22℃	**Humidity**	53%
Test Engineer	Cat		

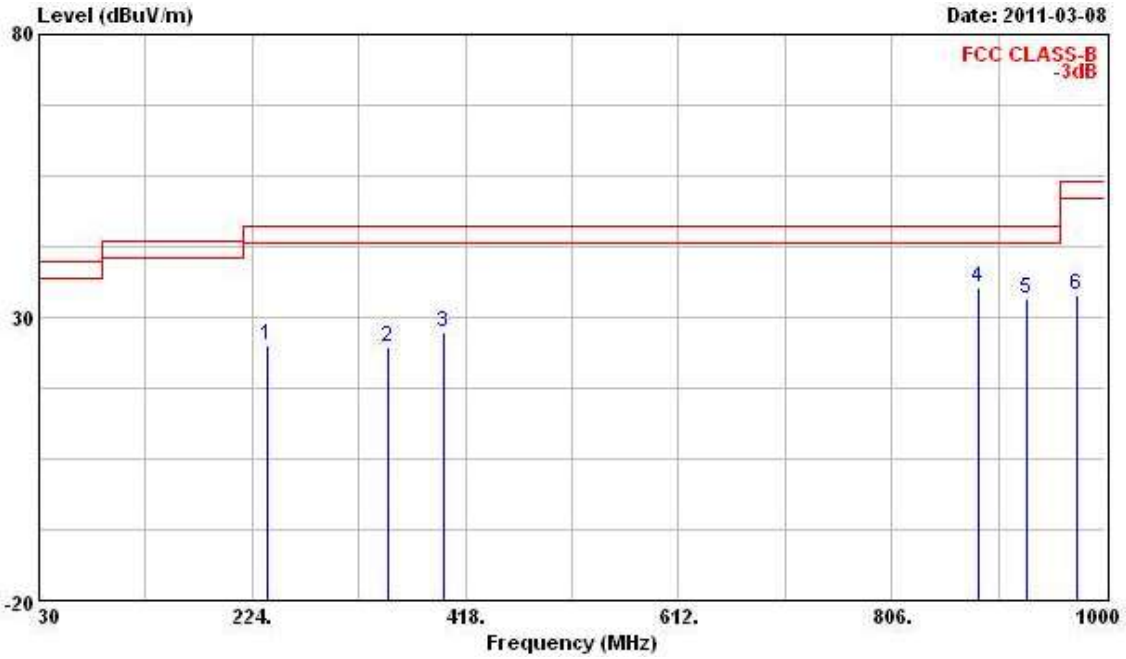
Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

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)

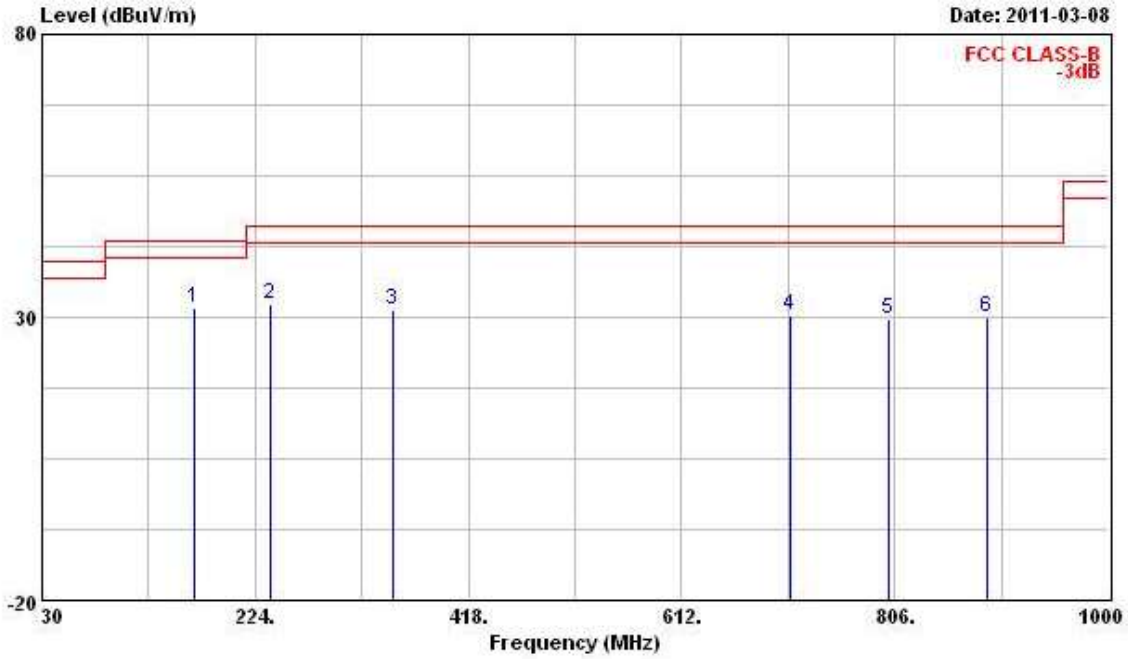
Final Test Date	Mar. 08, 2011	Test Site No.	03CH03-HY
Temperature	22℃	Humidity	53%
Test Engineer	Cat	Configurations	2440 MHz

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	238.550	25.13	-20.87	46.00	40.17	11.44	1.52	28.00	Peak
2	347.190	24.76	-21.24	46.00	36.08	14.92	2.21	28.45	Peak
3	397.630	27.43	-18.57	46.00	37.19	16.38	2.47	28.61	Peak
4	885.540	35.31	-10.69	46.00	38.90	20.98	4.81	29.38	Peak
5	929.190	33.40	-12.60	46.00	36.30	21.20	5.15	29.25	Peak
6	974.780	33.98	-20.02	54.00	36.64	21.11	5.38	29.15	Peak

Vertical



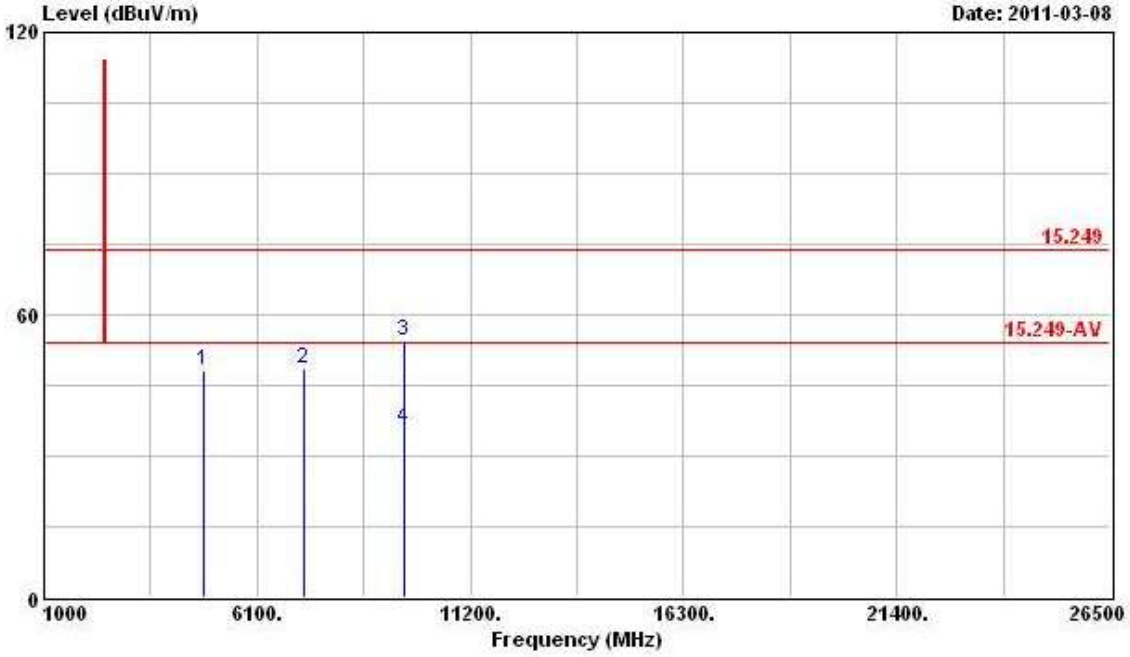
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	167.740	31.70	-11.80	43.50	48.45	9.81	1.28	27.84	Peak
2	238.550	32.39	-13.61	46.00	47.43	11.44	1.52	28.00	Peak
3	350.100	31.43	-14.57	46.00	42.66	14.99	2.23	28.46	Peak
4	710.940	30.30	-15.70	46.00	35.60	20.14	3.89	29.32	Peak
5	800.180	29.52	-16.48	46.00	33.83	20.75	4.41	29.47	Peak
6	889.420	30.16	-15.84	46.00	33.71	20.99	4.82	29.37	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)

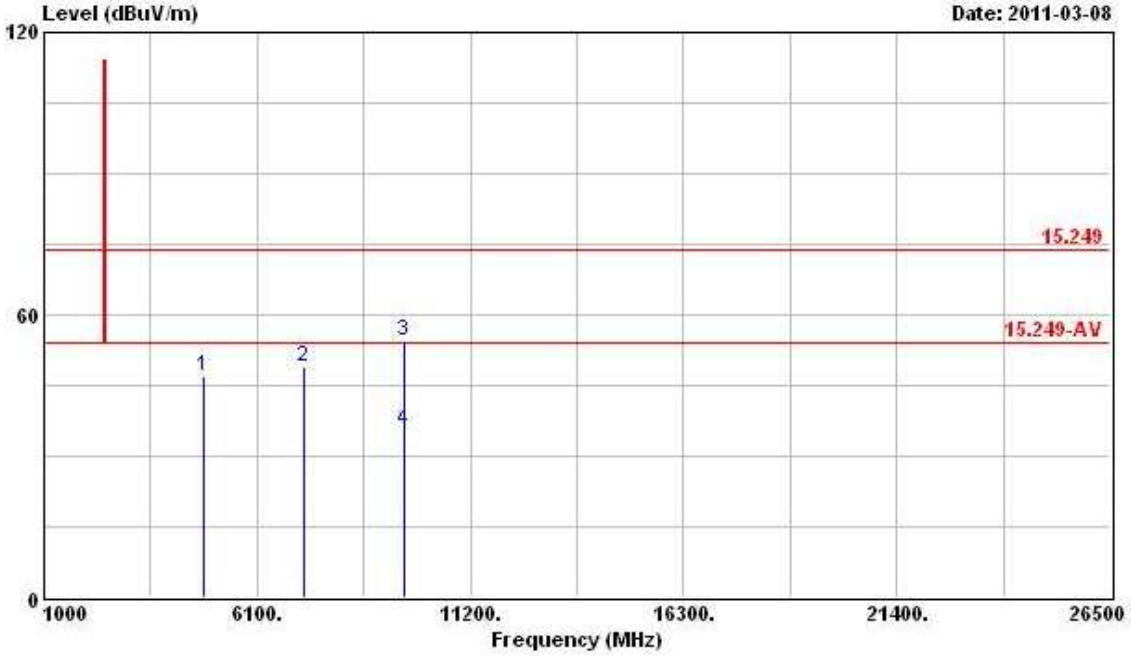
Final Test Date	Mar. 08, 2011	Test Site No.	03CH03-HY
Temperature	22℃	Humidity	53%
Test Engineer	Cat	Configurations	2405 MHz

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 @	4812.000	48.27	-5.73	54.00	42.46	33.02	5.43	32.64	PK
2 @	7212.000	48.70	-5.30	54.00	41.09	35.46	5.04	32.88	PK
3	9620.000	54.66	-19.34	74.00	42.98	38.34	6.68	33.34	PEAK
4	9620.000	35.82	-18.18	54.00	24.14	38.34	6.68	33.34	Average

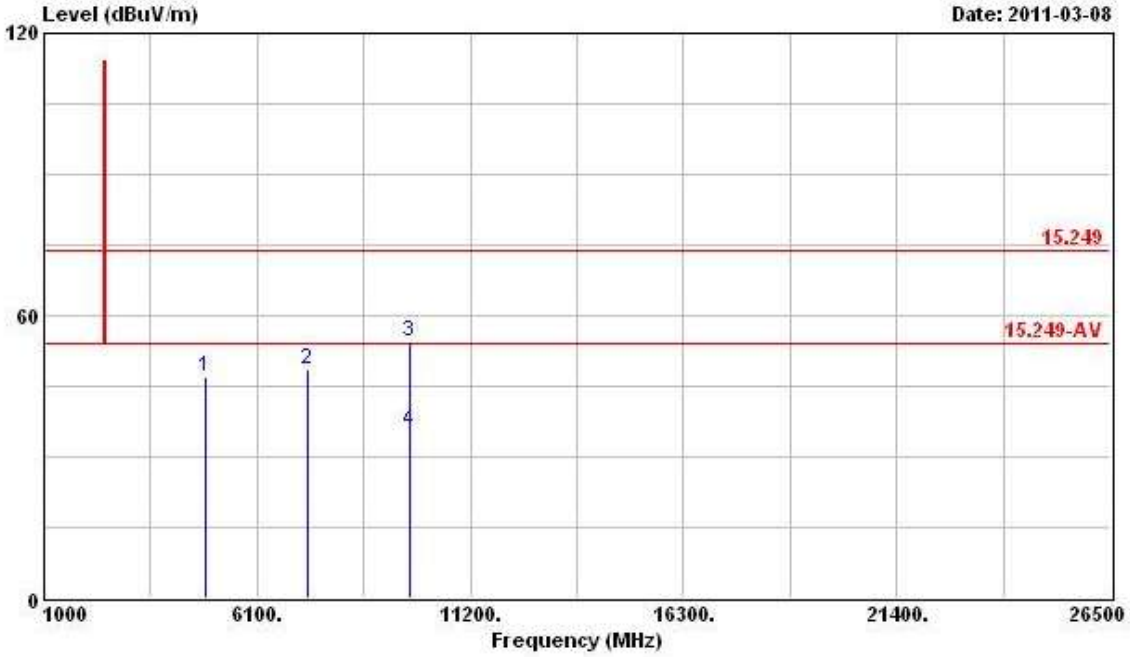
Vertical



	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	4812.000	46.98	-7.02	54.00	41.16	33.02	5.43	32.64	PK
2 @	7212.000	48.80	-5.20	54.00	41.19	35.46	5.04	32.88	PK
3	9620.000	54.55	-19.45	74.00	42.87	38.34	6.68	33.34	PEAK
4	9620.000	35.71	-18.29	54.00	24.03	38.34	6.68	33.34	Average

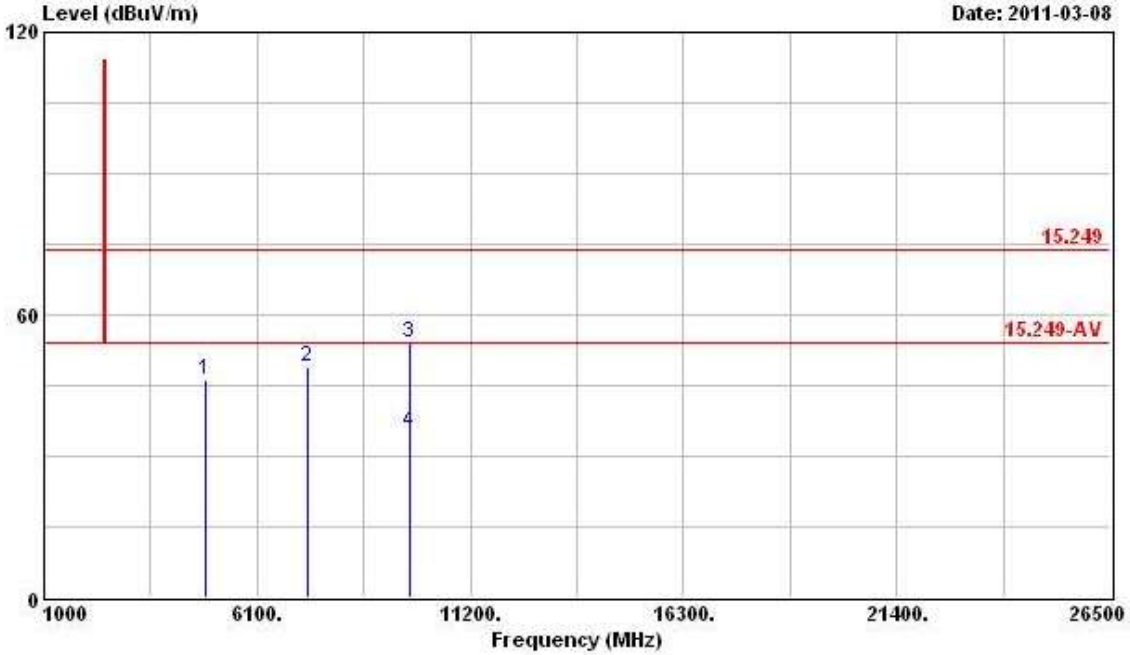
Final Test Date	Mar. 08, 2011	**Test Site No.**	03CH03-HY
Temperature	22℃	**Humidity**	53%
Test Engineer	Cat	**Configurations**	2440 MHz

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	4880.000	47.16	-6.84	54.00	41.20	33.16	5.43	32.62	PK
2 @	7320.000	48.65	-5.35	54.00	40.48	35.72	5.36	32.91	PK
3	9760.000	54.45	-19.55	74.00	42.41	38.62	6.76	33.33	PEAK
4	9760.000	35.61	-18.39	54.00	23.57	38.62	6.76	33.33	Average

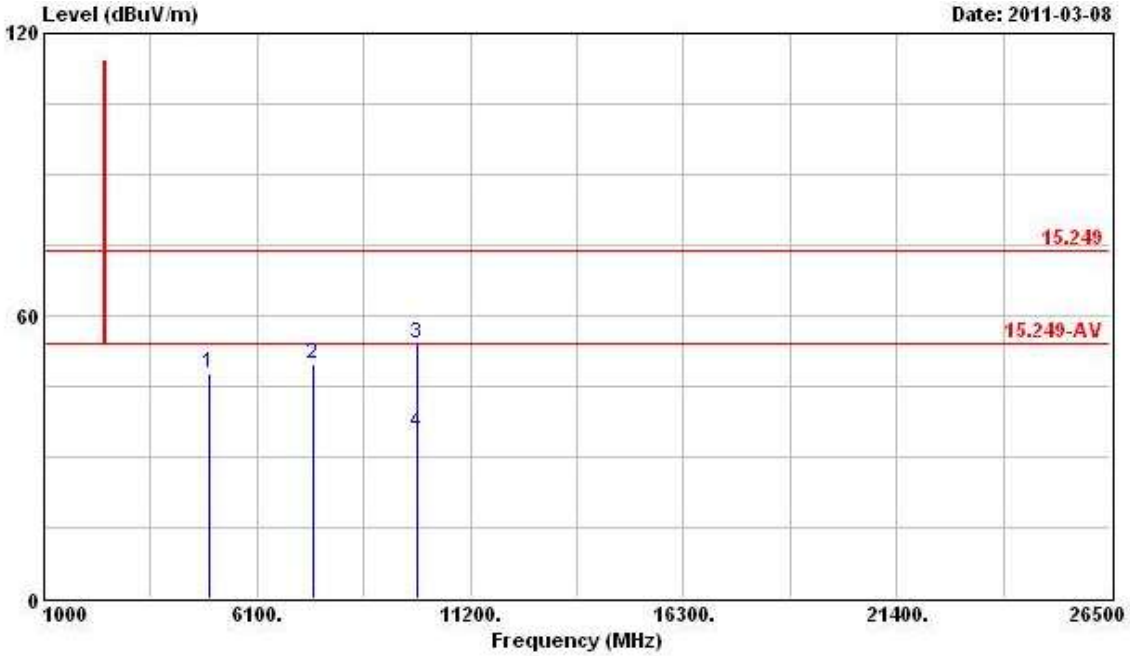
Vertical



	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	4880.000	46.16	-7.84	54.00	40.20	33.16	5.43	32.62	PK
2 @	7320.000	49.12	-4.88	54.00	40.95	35.72	5.36	32.91	PK
3	9760.000	54.08	-19.92	74.00	42.04	38.62	6.76	33.33	PEAK
4	9760.000	35.24	-18.76	54.00	23.20	38.62	6.76	33.33	Average

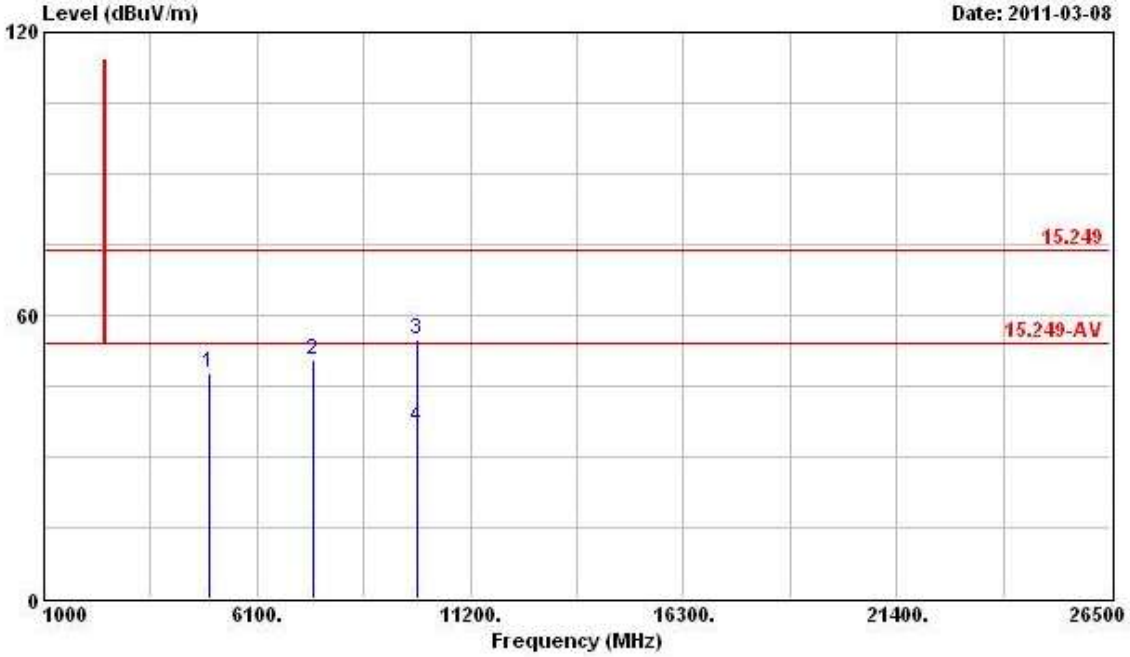
Final Test Date	Mar. 08, 2011	Test Site No.	03CH03-HY
Temperature	22℃	Humidity	53%
Test Engineer	Cat	Configurations	2480 MHz

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	4960.000	47.58	-6.42	54.00	41.45	33.33	5.41	32.61	PK
2 @	7440.000	49.73	-4.27	54.00	41.01	35.99	5.68	32.95	PK
3	9920.000	54.15	-19.85	74.00	41.67	38.96	6.84	33.32	PEAK
4	9920.000	35.31	-18.69	54.00	22.83	38.96	6.84	33.32	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 @	4960.000	47.80	-6.20	54.00	41.67	33.33	5.41	32.61	PK
2 @	7440.000	50.35	-3.65	54.00	41.63	35.99	5.68	32.95	PK
3	9920.000	54.97	-19.03	74.00	42.49	38.96	6.84	33.32	PEAK
4	9920.000	36.13	-17.87	54.00	23.65	38.96	6.84	33.32	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	Mar. 08, 2011	**Test Site No.**	03CH03-HY
Temperature	22℃	**Humidity**	53%
Test Engineer	Cat	**Configurations**	2405 MHz, 2480MHz

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 @	2390.000	67.73	-6.27	74.00	34.94	28.13	4.65	0.00	Peak
2	2400.000	62.23	-11.77	74.00	29.44	28.13	4.65	0.00	Peak
1 @	2387.900	48.20	-5.80	54.00	15.41	28.13	4.65	0.00	Average
2 @	2400.000	48.38	-5.62	54.00	15.59	28.13	4.65	0.00	Average

2480 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	64.98	-9.02	74.00	31.94	28.27	4.77	0.00	Peak
2	2483.500	44.20	-9.80	54.00	11.16	28.27	4.77	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
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 06, 2010	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	Mar. 23, 2010	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Apr. 29, 2010	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2010	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	FSU26.5	100015	20Hz ~ 26.5GHz	Jan. 06, 2011	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Apr. 16, 2010	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	20MHz ~ 7GHz	Dec. 02, 2010	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2010	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 30, 2010	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Jan. 06, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	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	Jul. 26, 2010*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 18, 2010	Radiation (03CH03-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 01, 2010	Radiation (03CH03HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Aug. 02, 2010	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004	9 kHz - 40 GHz	Nov. 17, 2010	Radiation (03CH03HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Oct. 16, 2010	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 20, 2010	Radiation (03CH03HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170221	15GHz ~ 40GHz	Jan. 25, 2011	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB031	30MHz ~1GHz	Feb. 08, 2011	Radiation (03CH03HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	05CH01-HY	1GHz~26.5GHz	Feb. 08, 2011	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03HY)

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 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. : L1190-110111

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 Arrangment with Foreign Authorities

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

P1, total 24 pages