

FCC RADIO TEST REPORT

Applicant's company	RELIGHT TECHNOLOGY CORPORATION
Applicant Address	5F.,No.253,Dong Sec.1 , Guangming 6th Rd.,Zhubei City, Hsinchu County 302,Taiwan ,R.O.C.
FCC ID	S39SS25253
Manufacturer's company	1. GIGANTEK KIN GTECHNOLOGY CO. ,LTD 2. Shuttle Board SCIENTIFIC CO.,LTD
Manufacturer Address	1.No.79, Lianxing 2nd St., Zhubei City, Hsinchu County 302, Taiwan (R.O.C.) 2. 1F.,No.13,Alley 21 , Lane 279, Jhongjheng Rd.,Yongkang Dist., Tainan City 710, Taiwan (R.O.C.)

Product Name	UKA RC Alarm
Brand Name	RELIGHT
Model Name	SS-25253
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2408 ~ 2444MHz
Received Date	Apr. 25, 2012
Final Test Date	May 29, 2012
Submission Type	Original Equipment



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 C63.10-2009** and **47 CFR FCC Part 15 Subpart C**.

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

Table of Contents

1. CERTIFICATE OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	3
3.3. Table for Filed Antenna.....	3
3.4. Table for Carrier Frequencies	4
3.5. Table for Test Modes	4
3.6. Table for Testing Locations.....	5
3.7. Table for Supporting Units	5
3.8. Table for Parameters of Test Software Setting	5
3.9. Test Configurations	6
4. PEAK OUTPUT POWER MEASUREMENT	7
4.2. Average Output Power Measurement	9
4.3. Power Spectral Density Measurement	11
4.4. 6dB Spectrum Bandwidth Measurement	15
4.5. Radiated Emissions Measurement	18
4.6. Band Edge Emissions Measurement	27
4.7. Antenna Requirements	30
5. LIST OF MEASURING EQUIPMENTS	31
6. TEST LOCATION.....	33
7. TAF CERTIFICATE OF ACCREDITATION	34
APPENDIX A. TEST PHOTOS	A1 ~ A4
APPENDIX B. MAXIMUM PERMISSIBLE EXPOSURE	B1 ~ B3

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR242510-01	Rev. 01	Initial issue of report	Jun. 07, 2012



1. CERTIFICATE OF COMPLIANCE

Product Name : UKA RC Alarm
Brand Name : RELight
Model Name : SS-25253
Applicant : RELIGHT TECHNOLOGY CORPORATION
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 25, 2012 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.

A handwritten signature in blue ink that reads "Jordan Hsiao".

Jordan Hsiao

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
-	15.207	AC Power Line Conducted Emissions	--	-
4.1	15.247(b)(3)	Peak Output Power	Complies	10.16 dB
4.2	-	Average Output Power	-	-
4.3	15.247(e)	Power Spectral Density	Complies	8.68 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	1.24 dB
4.6	15.247(d)	Band Edge Emissions	Complies	6.22 dB
4.7	15.203	Antenna Requirements	Complies	-

Note: The Power Supply of this EUT is from battery.

Conducted Powerline tests are not applicable for this EUT.

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	$\pm 2.3\text{dB}$	Confidence levels of 95%
Maximum Peak Output Power	$\pm 0.8\text{dB}$	Confidence levels of 95%
Power Spectral Density	$\pm 0.5\text{dB}$	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	$\pm 0.8\text{dB}$	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Temperature	$\pm 0.7^{\circ}\text{C}$	Confidence levels of 95%
Humidity	$\pm 3.2\%$	Confidence levels of 95%
DC / AC Power Source	$\pm 1.4\%$	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	From battery
Modulation	GFSK
Frequency Range	2408 ~ 2444MHz
Channel Number	7
Channel Space	6MHz
Channel Band Width (99%)	1.21 MHz
Peak Output Power	19.84 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	ACX	AT3216 -B2R7HAA	Chip Antenna	NA	0.5

3.4. Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
2408~2444MHz	1	2408 MHz
	2	2414 MHz
	3	2420 MHz
	4	2426 MHz
	5	2432 MHz
	6	2438 MHz
	7	2444 MHz

3.5. Table for Test Modes

Test Items	Mode	Data Rate	Channel	Antenna
Peak Output Power Average Output Power Power Spectral Density 6dB Spectrum Bandwidth	GFSK	-	1/4/7	1
Radiated Emissions 9kHz~1GHz	Normal Link	Auto	-	-
Radiated Emissions 1GHz~10 th Harmonic	GFSK	-	1/4/7	1
Band Edge Emissions	GFSK	-	1/4/7	1

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

N/A

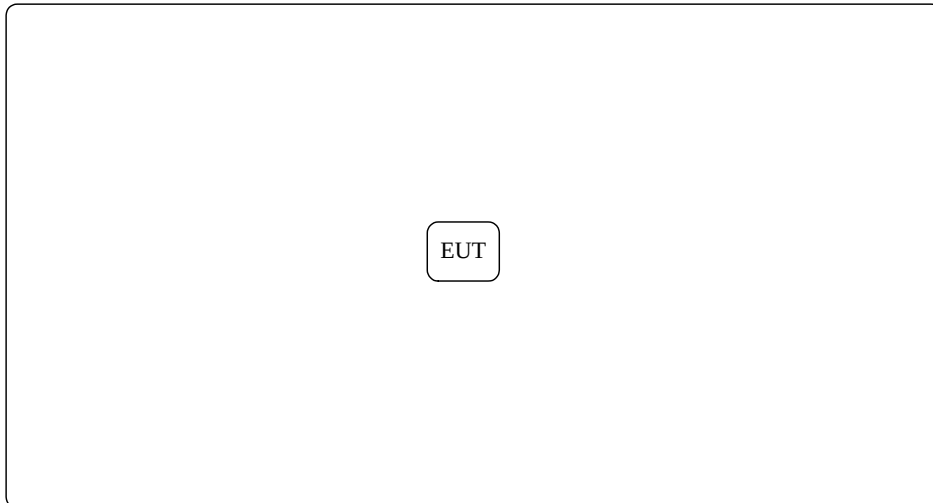
3.8. Table for Parameters of Test Software Setting

Power Parameters

Test Software Version	N/A		
Frequency	2408 MHz	2426 MHz	2444 MHz
GFSK	Default	Default	Default

3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration



4. PEAK OUTPUT POWER MEASUREMENT

4.1.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

4.1.2. Measuring Instruments and Setting

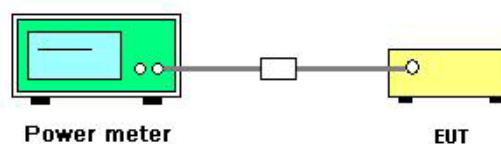
Please refer to section 5 of equipments list in this report. The following table is the setting of the peak power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak

4.1.3. Test Procedures

Spectrum Parameter	Setting
RF Output Power Method	☒ ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.2 Method 2 - zero-span mode with trace averaging

4.1.4. Test Setup Layout



4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of Peak Output Power

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	GFSK
Test Date	May 29, 2012		

Channel	Frequency	Conducted Peak Power (dBm)	Total Conducted Peak Power (dBm)	Max. Limit (dBm)	Result
1	2408 MHz	19.84	19.84	30.00	Complies
4	2426 MHz	19.82	19.82	30.00	Complies
7	2444 MHz	19.63	19.63	30.00	Complies

4.2. Average Output Power Measurement

4.2.1. Measuring Instruments and Setting

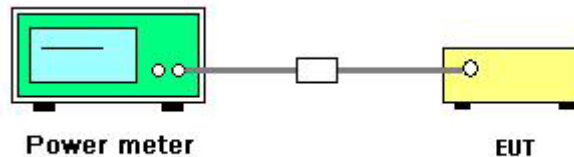
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

4.2.2. Test Procedures

Spectrum Parameter	Setting
RF Output Power Method	☒ ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.2 Method 2 - zero-span mode with trace averaging

4.2.3. Test Setup Layout



4.2.4. Test Deviation

There is no deviation with the original standard.

4.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

Note: Average output power is only for Maximum Permissible Exposure use.

4.2.6. Test Result of Average Output Power

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	GFSK
Test Date	May 29, 2012		

Channel	Frequency	Average Conducted Power (dBm)
1	2408 MHz	19.46
4	2426 MHz	19.67
7	2444 MHz	19.47

4.3. Power Spectral Density Measurement

4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

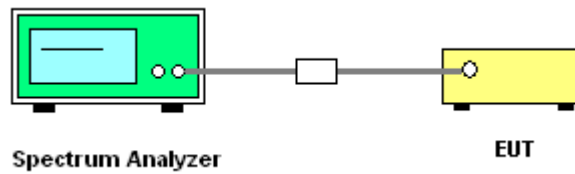
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the analyzer span to 5-30% greater than the EBW.
RB	100 kHz
VB	300 kHz
Detector	RMS
Trace	Single Sweep
Sweep Time	$\geq 10 \times (\text{number of measurement points in sweep}) \times (\text{transmission symbol period})$.

4.3.3. Test Procedures

1. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
2. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
3. Use the peak marker function to determine the maximum level in any 100 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent level in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where: $\text{BWCF} = 10\log(3 \text{ kHz}/100 \text{ kHz} = -15.2 \text{ dB})$.
5. The resulting PSD level must be $\leq 8 \text{ dBm}$.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

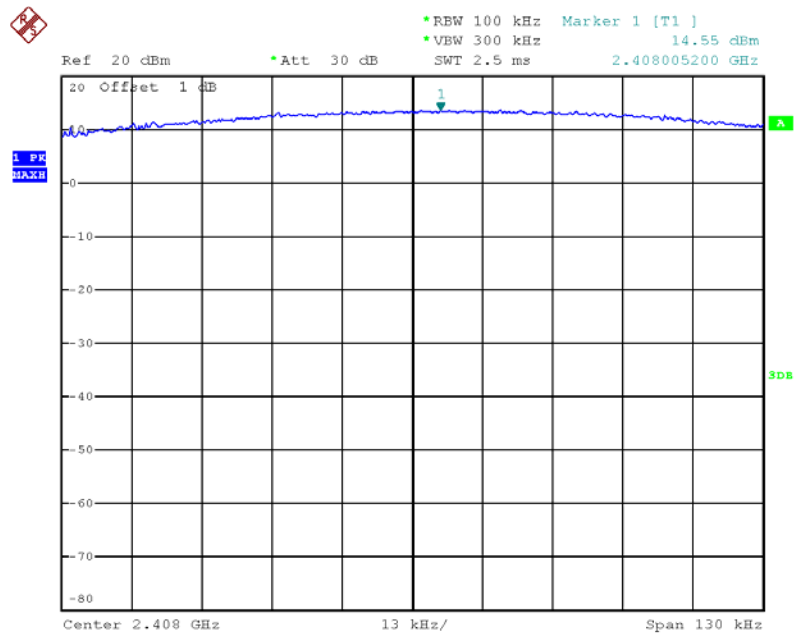
Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	GFSK

Channel	Frequency	Total Power Density (dBm/100kHz)	BWCF factor (100KHz to 3KHz)	Total Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
1	2408 MHz	14.55	-15.23	-0.68	8.00	Complies
4	2426 MHz	14.32	-15.23	-0.91	8.00	Complies
7	2444 MHz	14.28	-15.23	-0.95	8.00	Complies

Note: All the test values were listed in the report.

For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration / 2408 MHz



Date: 29.MAY.2012 16:32:28

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

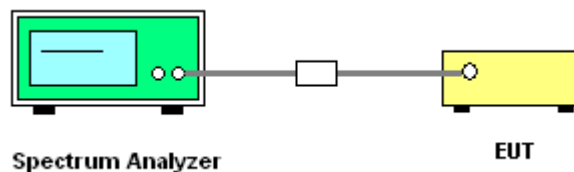
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. 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 6dB below carrier.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

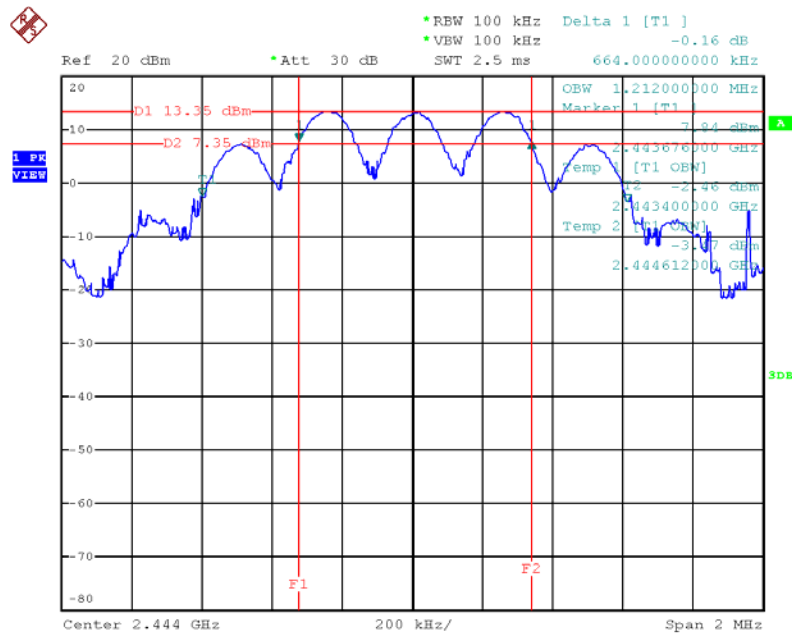
The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	25°C	Humidity	56%
Test Engineer	Satoshi Yang	Configurations	GFSK

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2408 MHz	0.67	1.20	500	Complies
4	2426 MHz	0.66	1.19	500	Complies
7	2444 MHz	0.66	1.21	500	Complies

6 dB Bandwidth Plot on Configuration / 2444 MHz



Date: 29.MAY.2012 16:23:30

4.5. Radiated Emissions Measurement

4.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 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

4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 3MHz for peak

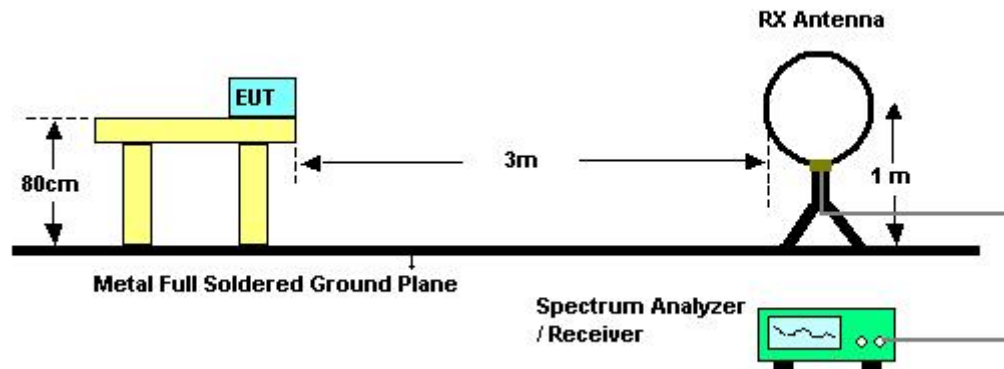
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

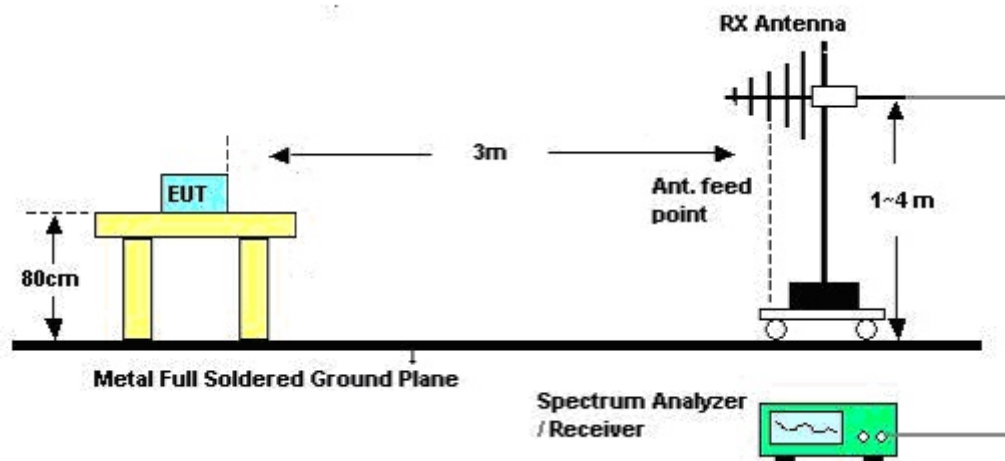
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 3MHz 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.

4.5.4. Test Setup Layout

For radiated emissions below 1GHz



For radiated emissions above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	Normal Link
Test Date	May 05, 2012		

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

Note:

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

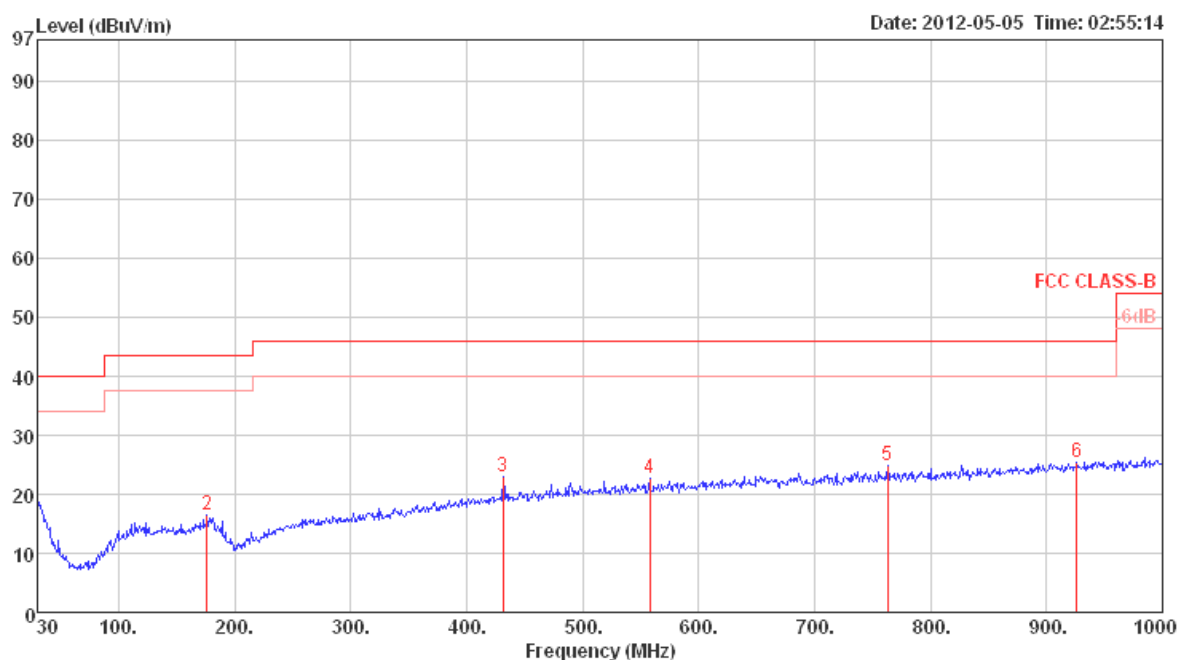
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

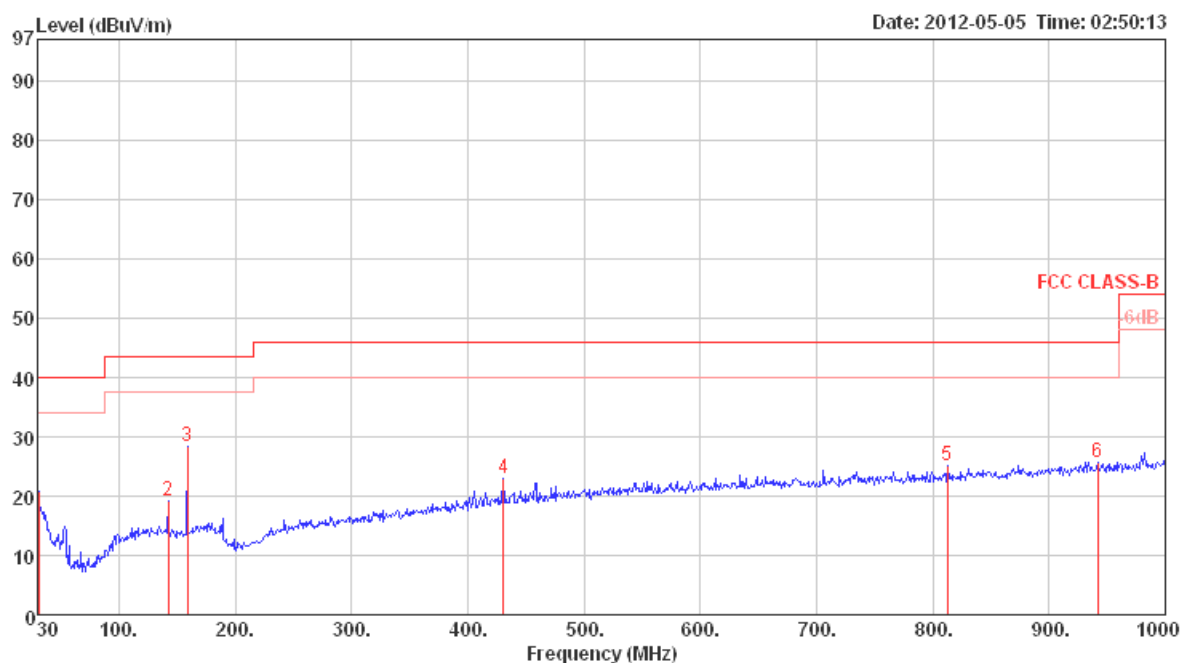
Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	Normal Link

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	Pol/Phase
1	30.00	18.95	40.00	-21.05	27.49	0.50	18.76	27.80	100	0	HORIZONTAL
2	176.47	16.45	43.50	-27.05	28.96	1.58	13.13	27.22	100	0	HORIZONTAL
3	431.58	22.88	46.00	-23.12	31.59	2.49	16.56	27.76	100	0	HORIZONTAL
4	557.68	22.80	46.00	-23.20	29.80	2.82	18.28	28.10	100	0	HORIZONTAL
5	763.32	24.74	46.00	-21.26	29.52	3.45	19.52	27.75	100	0	HORIZONTAL
6	926.28	25.42	46.00	-20.58	28.38	3.60	20.73	27.29	100	0	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	30.97	20.81	40.00	-19.19	29.89	0.50	18.22	27.80	Peak	400	0	VERTICAL
2	142.52	19.29	43.50	-24.21	33.06	1.41	12.21	27.39	Peak	400	0	VERTICAL
3	159.01	28.30	43.50	-15.20	42.10	1.50	12.01	27.31	Peak	400	0	VERTICAL
4	430.61	22.88	46.00	-23.12	31.61	2.48	16.54	27.75	Peak	400	0	VERTICAL
5	812.79	25.15	46.00	-20.85	29.52	3.33	19.87	27.57	Peak	400	0	VERTICAL
6	941.80	25.74	46.00	-20.26	28.52	3.60	20.85	27.23	Peak	400	0	VERTICAL

Note:

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

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

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

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

Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	GFSK CH 1
Test Date	May 07, 2012		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4815.43	72.35	74.00	-1.65	71.11	4.08	35.26	32.42	125	171	Peak	HORIZONTAL
2 a	4815.43	43.13	54.00	-10.87	41.89	4.08	35.26	32.42	125	171	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4815.43	68.61	74.00	-5.39	67.37	4.08	35.26	32.42	10	123	Peak	VERTICAL
2 a	4815.43	39.39	54.00	-14.61	38.15	4.08	35.26	32.42	10	123	Average	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	GFSK CH 4
Test Date	May 07, 2012		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4851.40	71.27	74.00	-2.73	69.85	4.10	35.20	32.52	264	146	Peak	HORIZONTAL
2 a	4851.40	42.05	54.00	-11.95	40.63	4.10	35.20	32.52	264	146	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4851.39	69.73	74.00	-4.27	68.31	4.10	35.20	32.52	33	132	Peak	VERTICAL
2 a	4851.39	40.51	54.00	-13.49	39.09	4.10	35.20	32.52	33	132	Average	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	GFSK CH 7
Test Date	May 07, 2012		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4887.41	72.76	74.00	-1.24	71.21	4.11	35.15	32.59	133	177	Peak	HORIZONTAL
2 a	4887.41	43.54	54.00	-10.46	41.99	4.11	35.15	32.59	133	177	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	4887.46	68.87	74.00	-5.13	67.32	4.11	35.15	32.59	360	137	Peak	VERTICAL
2 a	4887.46	39.65	54.00	-14.35	38.10	4.11	35.15	32.59	360	137	Average	VERTICAL

4.6. Band Edge Emissions Measurement

4.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 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

4.6.2. Measuring Instruments and Setting

Please refer to section 5 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 (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100 KHz / 300 KHz for Peak

4.6.3. Test Procedures

- The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
- 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.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	22°C	Humidity	60%
Test Engineer	Wen Chao	Configurations	GFSK / CH 1, 4, 7
Test Date	May 07, 2012		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	2358.27	67.78	74.00	-6.22	37.05	2.81	0.00	27.92	153	133	Peak	HORIZONTAL
2	2358.27	38.56	54.00	-15.44	7.83	2.81	0.00	27.92	153	133	Average	HORIZONTAL
3 p	2408.00	119.26			88.57	2.85	0.00	27.84	153	133	Peak	HORIZONTAL
4 a	2408.00	90.04			59.35	2.85	0.00	27.84	153	133	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2408 MHz.

Channel 4

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	2376.00	60.76	74.00	-13.24	30.04	2.83	0.00	27.89	90	100	Peak	VERTICAL
2	2376.00	31.54	54.00	-22.46	0.82	2.83	0.00	27.89	90	100	Average	VERTICAL
3 p	2426.40	112.55			81.88	2.86	0.00	27.81	90	100	Peak	VERTICAL
4 a	2426.40	83.33			52.66	2.86	0.00	27.81	90	100	Average	VERTICAL
5	2484.30	55.42	74.00	-18.58	24.79	2.90	0.00	27.73	90	100	Peak	VERTICAL
6	2484.30	26.20	54.00	-27.80	-4.43	2.90	0.00	27.73	90	100	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 2426 MHz.

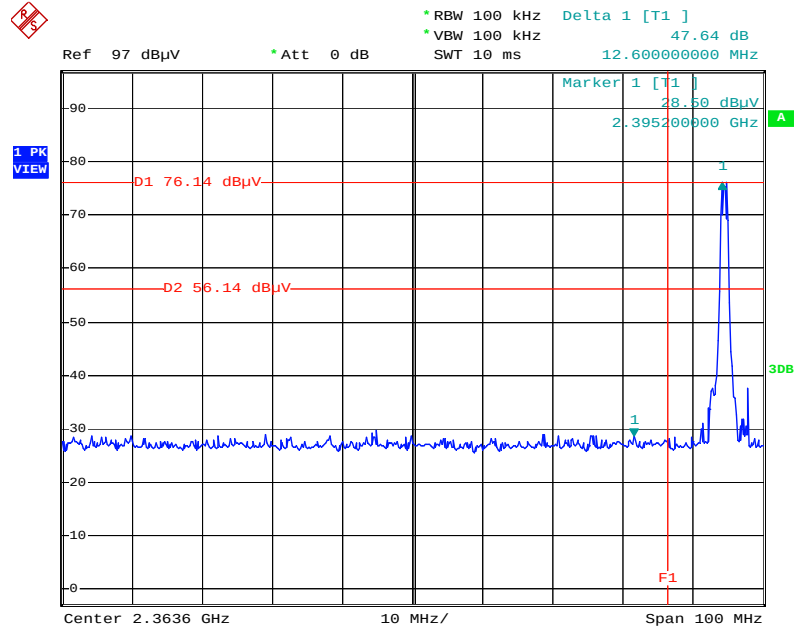
Channel 7

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	2443.80	110.91			80.26	2.87	0.00	27.78	87	100	Peak	VERTICAL
2 a	2443.80	81.69			51.04	2.87	0.00	27.78	87	100	Average	VERTICAL
3	2483.50	56.74	74.00	-17.26	26.11	2.90	0.00	27.73	87	100	Peak	VERTICAL
4	2483.50	27.52	54.00	-26.48	-3.11	2.90	0.00	27.73	87	100	Average	VERTICAL

Item 1, 2 are the fundamental frequency at 2444 MHz.

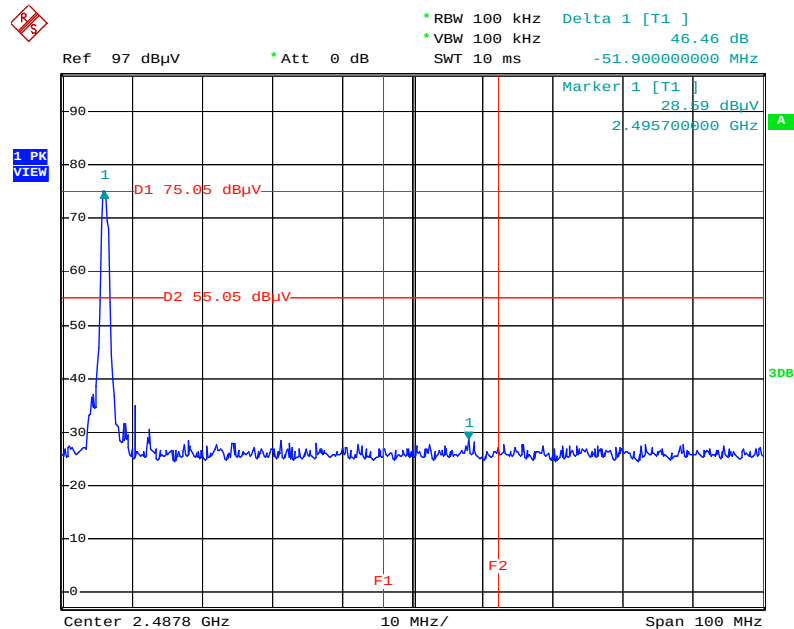
For Emission not in Restricted Band

Plot on Configuration / 2408 MHz



Date: 7.MAY.2012 19:11:24

Plot on Configuration / 2444 MHz



Date: 7.MAY.2012 18:50:09

4.7. Antenna Requirements

4.7.1. 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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Jan. 11, 2012	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 25, 2011	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 22, 2011	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2011	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 29, 2011	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 29, 2011	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9KHz~40GHz	Nov. 03, 2011	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Jan. 20, 2012	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Sep. 09, 2010*	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N/A	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N/A	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2011	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2011	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2011	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2011	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2011	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9KHz~40GHz	Sep. 26, 2011	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jan. 20, 2012	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 02, 2011	Conducted (TH01-CB)
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Nov. 22, 2011	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
Signal generator	R&S	SMU200A	102782	10MHz-40GHz	Jun. 07, 2011	Conducted (TH01-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	May 09, 2012	Conducted (TH01-CB)
Horn Antenna	COM-POWER	AH-118	071042	1GHz – 18GHz	Nov. 01, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 01, 2011	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 01, 2011	Conducted (TH01-CB)

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

Note: “*” Calibration Interval of instruments listed above is two years.

6. TEST LOCATION

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

7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-110702

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 Road, 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 : July 02, 2011

P1, total 22 pages

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