SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**JET OPTOELECTRONICS CO.,LTD.**
Applicant Address	3F.,No.300,Yangguang St.,Neihu Dist.,Taipei City 11491,Taiwan,R.O.C
FCC ID	**Z3K3010DABOX00**
Manufacturer's company	**3D Technologies(WuJiang) Co.,LTD**
Manufacturer Address	No.18, Yanbang Road, TongLi Science and Technology Park Wujiang Economic Development Zone, Jiangsu Province P.R.C.

Product Name	3010-DA Control Box (Plastic) / 3010-DA Control Box (metal)
Brand Name	JET
Model Name	KA000N0106 / KA000N0101
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.239
Test Freq. Range	88.3 ~ 107.7MHz
Received Date	Sep. 20, 2011
Final Test Date	Oct. 11, 2011
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7

Statement

The device is only possible within the range 88.1-107.9MHz.

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.

TAF
Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR192020	Rev. 01	Initial issue of report	Nov. 22, 2011

Certificate No.: CB10010058

1. CERTIFICATE OF COMPLIANCE

Product Name	:	3010-DA Control Box (Plastic) / 3010-DA Control Box (metal)
Brand Name	:	JET
Model Name	:	KA000N0106 / KA000N0101
Applicant	:	JET OPTOELECTRONICS CO.,LTD.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.239

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Sep. 20, 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.

Jordan Hsiao 2011.11.22

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	15.239(b)	Field Strength of Fundamental Emissions	Complies	1.07 dB
4.2	15.239(a)	20dB Spectrum Bandwidth	Complies	-
4.3	15.239(c)	Radiated Emissions	Complies	1.01 dB
4.4	15.239(c)	Band Edge Emissions	Complies	25.98 dB
4.5	15.203	Antenna Requirements	Complies	-

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

Conduced Powerline tests are not applicable for this EUT.

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Field Strength of Fundamental Emissions	±1.9dB	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 / Band Edge Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (1GHz~18GHz)	±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%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	Low Power Communication Device (FM Transmitter)
Radio Type	Intentional Transmitter
Power Type	Battery
Interface Type	DC IN / Line OUT / Antenna connect / FM
Modulation	FM
Frequency Range	88.3 ~ 107.7MHz
Channel Number	98
Channel Band Width (99%)	161.00 kHz
Max. Field Strength	46.93 dBuV/m at 3m (Average)
Carrier Frequencies	Please refer to section 3.3
Antenna	External Antenna (Without any antenna connector)

3.2. Accessories

Others
Remote Controller*1

3.3. Table for Carrier Frequencies

Frequency Band	Frequency	Frequency
88.3 ~ 107.7MHz	88.3 MHz	98.3 MHz
	:	:
	97.9 MHz	107.7 MHz
	98.1 MHz	-

3.4. Table for Test Modes

Audio input adjusted to maximize emission for test. 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	Antenna
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	88.3 / 98.1 / 107.7 MHz	-
Radiated Emissions 30MHz~1GHz	CTX	Auto	-
Radiated Emissions 1GHz~10th Harmonic	CTX	88.3 / 98.1 / 107.7 MHz	-
Band Edge Emissions	CTX	88.3 /107.7 MHz	-

Note: CTX=Continuously transmitting and audio modulating content a range of 100 to 5000 Hz.

The following test modes were performed for all tests:

Mode 1. EUT 1 (Metal case)

Mode 2. EUT 2 (Plastic case)

Due to Mode 2 generated the worst test result, so it was recorded in the report.

3.5. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO01-CB	Conduction	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.

3.6. Table for Multiple Listing

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

Product Name	Model Name	Description
3010-DA Control Box (metal)	KA000N0101	Metal case
3010-DA Control Box (Plastic)	KA000N0106	Plastic case

Note: All the models are identical except for the material of case.

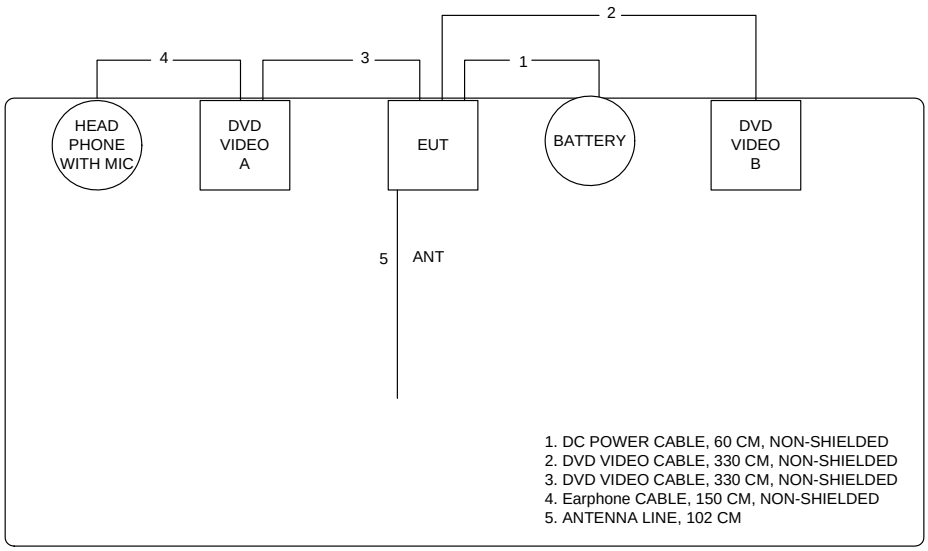
3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Earphone	SHYARO CHI	MIC-04	N/A
7"Monitor REV-LT ERVA07LEXXA1 GM A/B	Invision	K9070N4007	N/A
7"Monitor REV-LT ERVA07LEXXA1 GM A/B	Invision	K9070N4007	N/A

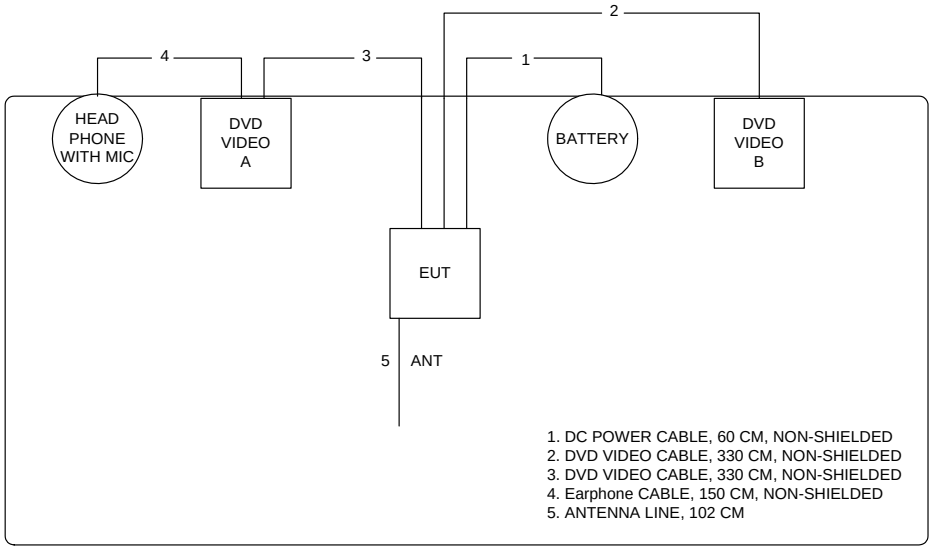
3.8. Test Configurations

3.8.1. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Test Configuration: Above 1GHz



4. TEST RESULT

4.1. Field Strength of Fundamental Emissions Measurement

4.1.1. Limit

The field strength of fundamental emissions shall comply with the following table.

Frequency Band (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
88~108	48 (Average)
88~108	68 (Peak)

4.1.2. Measuring Instruments and Setting

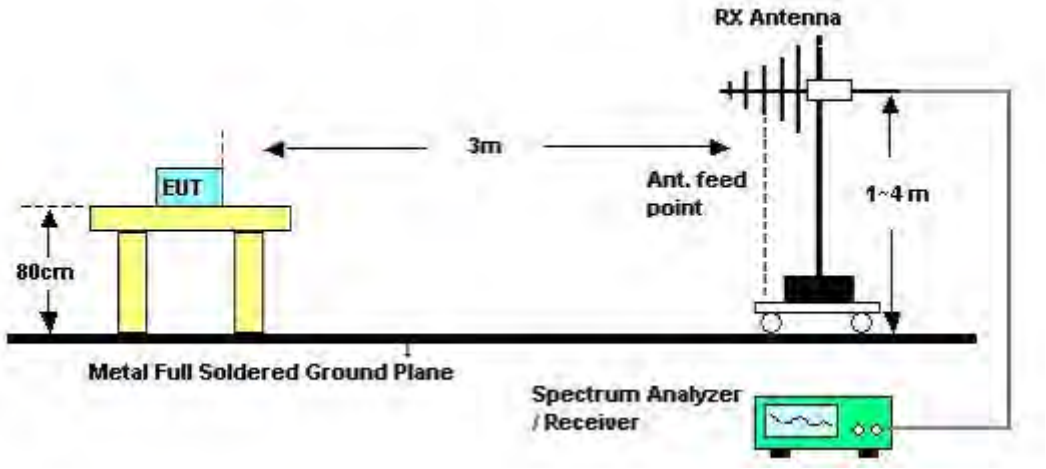
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	Auto
Center Frequency	Fundamental Frequency
RB	120 KHz
Detector	Peak / Average

4.1.3. 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. For Fundamental emissions, use the receiver to measure peak and average reading.
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.

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 Field Strength of Fundamental Emissions

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	88.3 MHz
Test Date	Oct. 03, 2011		

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		
2 p	88.38	45.81	68.00	-22.19	62.56	1.40	27.65	9.50	59	228	Peak	HORIZONTAL
3 a	88.39	45.31	48.00	-2.69	62.06	1.40	27.65	9.50	59	228	Average	HORIZONTAL

Item 2, 3 are fundamental frequency at 88.1 MHz.

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		
2 p	88.35	49.72	68.00	-18.28	66.47	1.40	27.65	9.50	130	172	Peak	VERTICAL
3 a	88.40	46.87	48.00	-1.13	63.62	1.40	27.65	9.50	130	172	Average	VERTICAL

Item 2, 3 are fundamental frequency at 88.1 MHz.

Note:

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

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

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	98.1 MHz
Test Date	Oct. 03, 2011		

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	98.10	47.18	68.00	-20.82	62.43	1.48	27.61	10.88	262	253	Peak	HORIZONTAL
2 a	98.16	46.17	48.00	-1.83	61.42	1.48	27.61	10.88	262	253	Average	HORIZONTAL

Item 1, 2 are fundamental frequency at 98.1 MHz.

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	98.08	48.57	68.00	-19.43	63.82	1.48	27.61	10.88	61	131	Peak	VERTICAL
2 a	98.13	46.86	48.00	-1.14	62.11	1.48	27.61	10.88	61	131	Average	VERTICAL

Item 1, 2 are fundamental frequency at 98.1 MHz.

Note:

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

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

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	107.7 MHz
Test Date	Oct. 03, 2011		

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	107.66	47.63	68.00	-20.37	61.57	1.55	27.56	12.07	173	123	Peak	HORIZONTAL
2 a	107.70	46.90	48.00	-1.10	60.84	1.55	27.56	12.07	173	123	Average	HORIZONTAL

Item 1, 2 are fundamental frequency at 107.9 MHz.

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 a	107.63	46.93	48.00	-1.07	60.87	1.55	27.56	12.07	250	238	Average	VERTICAL
2 p	107.68	48.27	68.00	-19.73	62.21	1.55	27.56	12.07	250	238	Peak	VERTICAL

Item 1, 2 are fundamental frequency at 107.9 MHz.

Note:

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

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

4.2. 20dB Spectrum Bandwidth Measurement

4.2.1. Limit

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency.

4.2.2. Measuring Instruments and Setting

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

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 20dB Bandwidth
RB	10 kHz
VB	30 kHz
Detector	Average
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. Check for a Bandwidth test with audio input CTX1(100Hz~5kHz) at maximum.
3. The resolution bandwidth of 10 kHz and the video bandwidth of 30 kHz were used.
4. Measured the spectrum width with power higher than 20dB below carrier.

4.2.4. Test Setup Layout

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

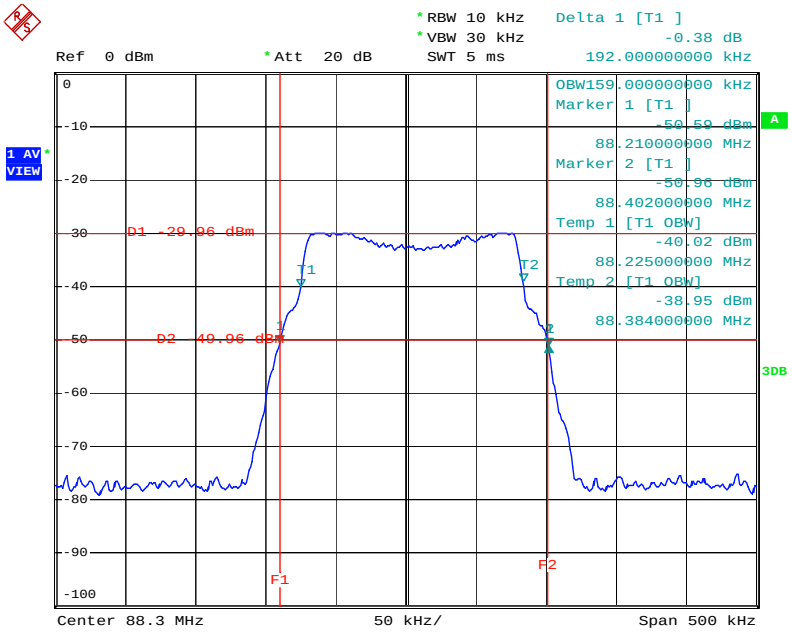
Input source through the Satellite Base Station continuously transmitter maximum audio input to EUT.

4.2.7. Test Result of 20dB Spectrum Bandwidth

Temperature	26℃	Humidity	63%
Test Engineer	Satoshi Yang	Configurations	Channel 錯誤! 找不到參照來源。/錯誤! 找不到參照來源。/錯誤! 找不到參照來源。

Frequency	20dB BW (kHz)	99% OBW (kHz)	Frequency range (MHz) f_L > 88MHz	Frequency range (MHz) f_H < 108MHz	Test Result
88.3 MHz	192.00	159.00	88.2100	-	Complies
98.1 MHz	194.00	161.00	-	-	Complies
107.7 MHz	189.00	161.00	-	107.8000	Complies

20 dB / 99% Bandwidth Plot on 88.3 MHz



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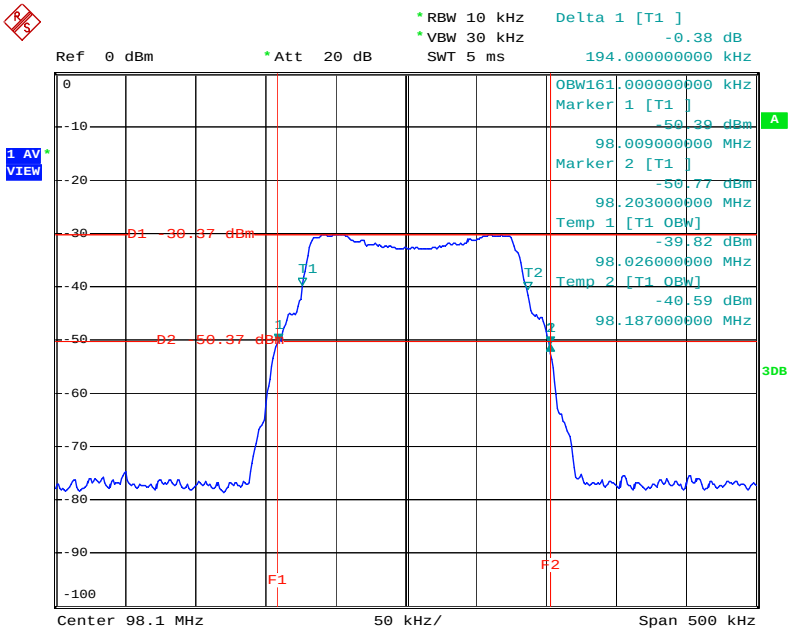
20 dB / 99% Bandwidth Plot on 98.1 MHz



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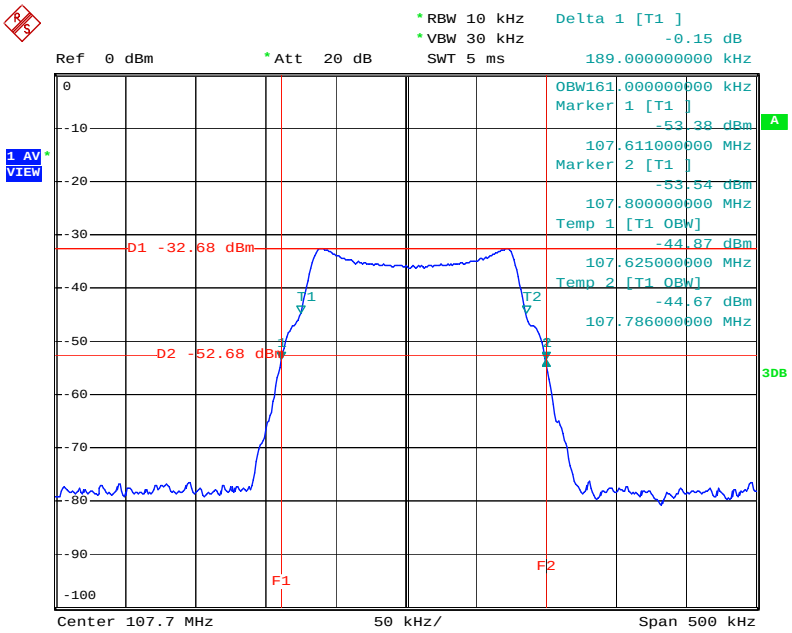
20 dB / 99% Bandwidth Plot on 107.7 MHz



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4.3. Radiated Emissions Measurement

4.3.1. Limit

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emissions limits in Section 15.209(a)

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

4.3.2. 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 and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	10th carrier harmonic
RB / VB	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

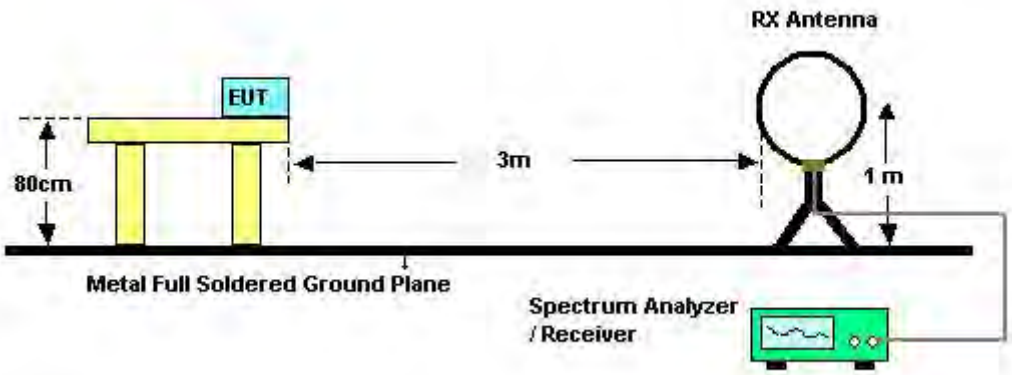
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.3.3. Test Procedures

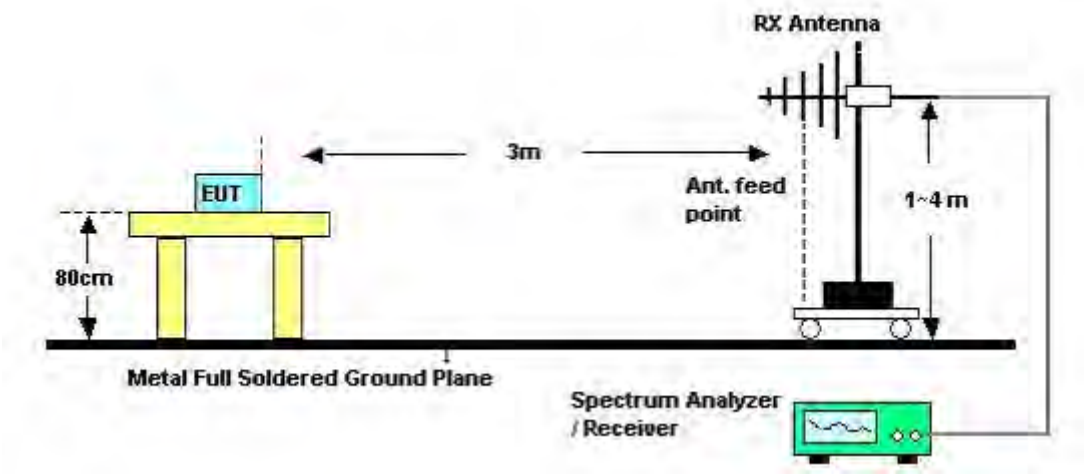
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.3.4. Test Setup Layout

For radiated emissions below 1GHz



For radiated emissions above 1GHz



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

Input source through the Satellite Base Station continuously transmitter maximum audio input to EUT.

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

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	CTX
Test Date	Oct. 01, 2011		

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.

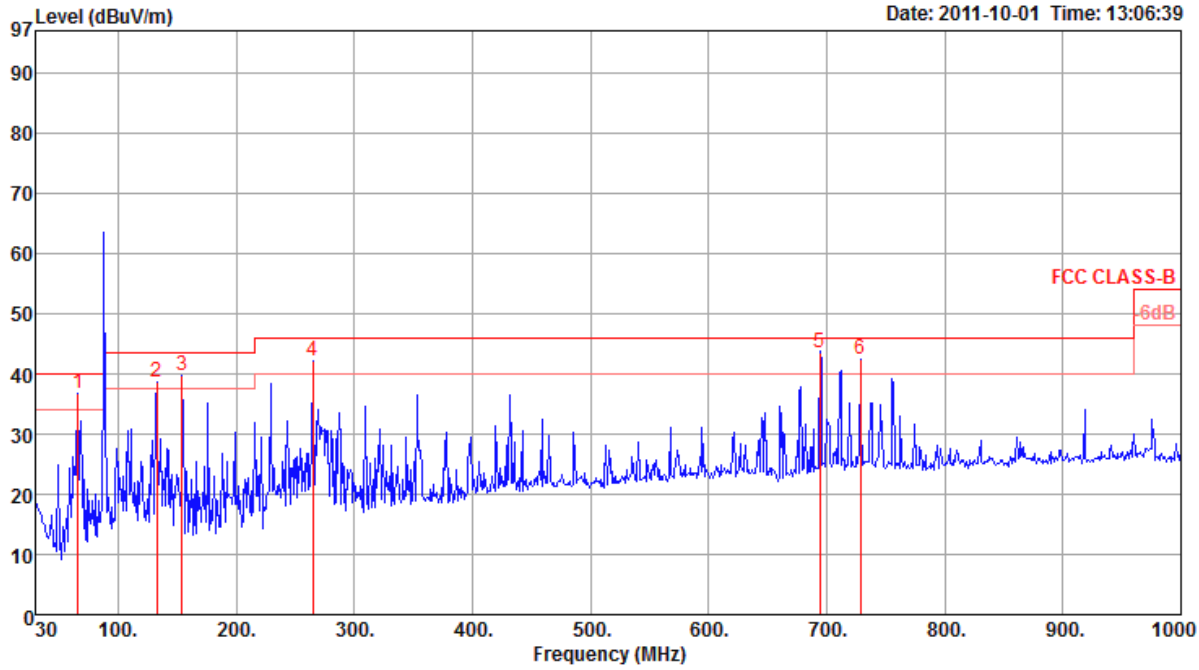
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

4.3.8. Results for Radiated Emissions (30MHz~1GHz)

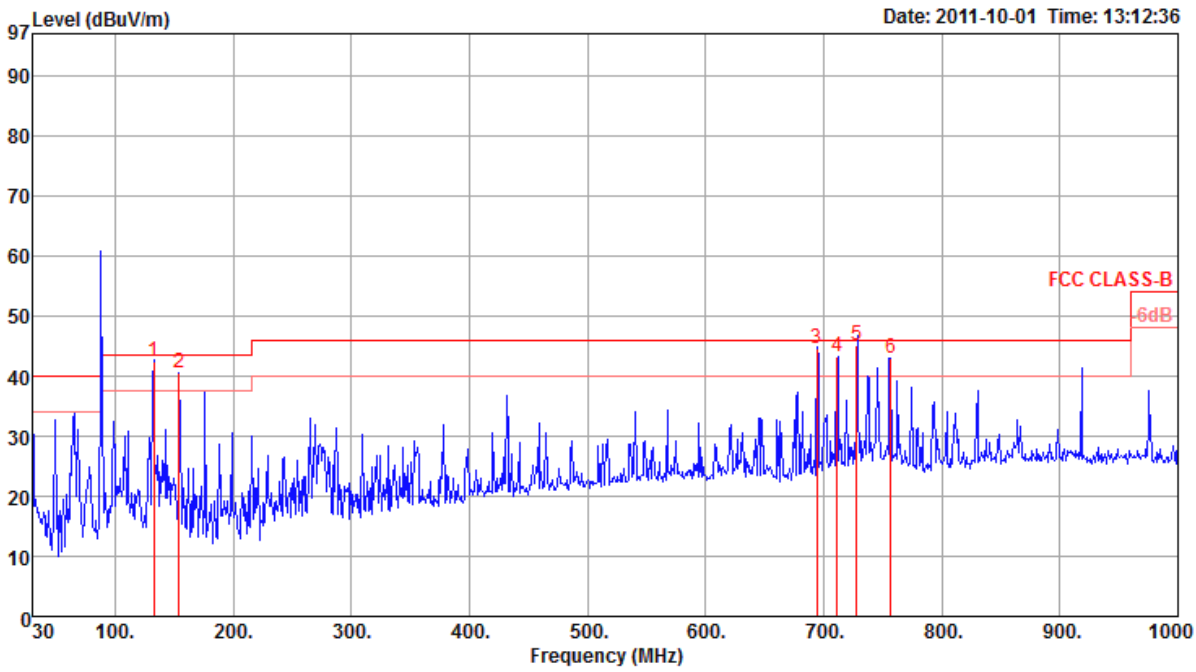
Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	88.3 MHz / Mode 2

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	65.89	36.62	40.00	-3.38	57.29	1.22	27.74	5.85	0	400	Peak	HORIZONTAL
2	!	132.82	38.58	43.50	-4.92	52.13	1.68	27.43	12.20	0	400	Peak	HORIZONTAL
3	!	154.16	39.64	43.50	-3.86	55.01	1.83	27.33	10.13	0	400	Peak	HORIZONTAL
4	!	264.74	42.03	46.00	-3.97	53.26	2.46	26.97	13.28	0	400	Peak	HORIZONTAL
5	q	694.29	43.58	46.00	-2.42	47.63	4.13	28.01	19.83	273	100	QP	HORIZONTAL
6	!	728.40	42.32	46.00	-3.68	45.33	4.19	27.88	20.68	0	400	Peak	HORIZONTAL

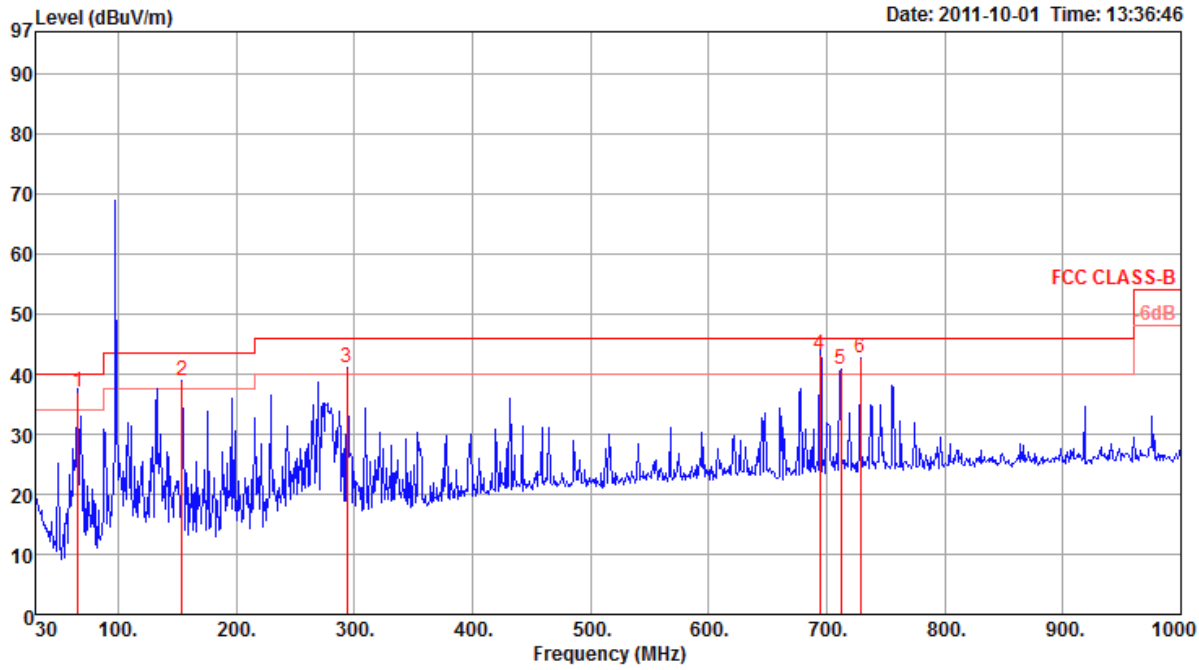
Vertical



		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	!	132.73	42.37	43.50	-1.13	55.93	1.68	27.44	12.20	177	100	QP	VERTICAL
2	!	154.16	40.49	43.50	-3.01	55.86	1.83	27.33	10.13	0	100	Peak	VERTICAL
3	!	694.32	44.46	46.00	-1.54	48.51	4.13	28.01	19.83	45	100	QP	VERTICAL
4	p	711.24	43.16	46.00	-2.84	46.89	4.17	27.95	20.05	265	100	Peak	VERTICAL
5	q	728.17	44.99	46.00	-1.01	48.09	4.19	27.88	20.59	29	100	QP	VERTICAL
6	!	756.53	42.99	46.00	-3.01	45.87	4.23	27.77	20.66	0	100	Peak	VERTICAL

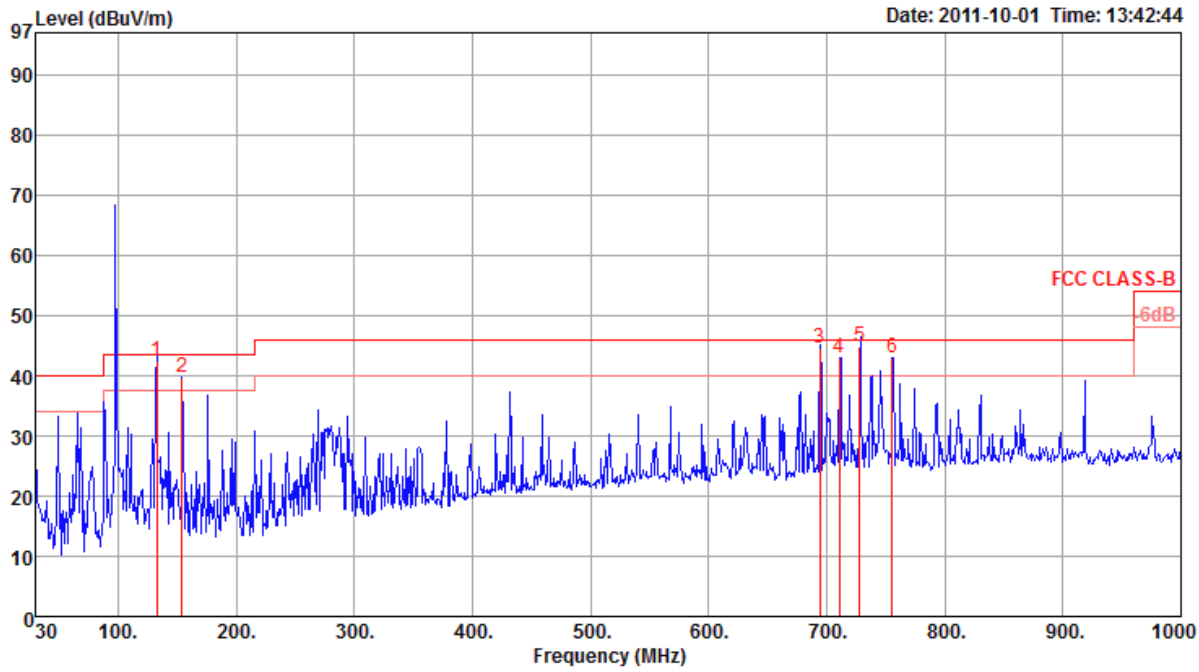
Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	98.1 MHz / Mode 2

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 !	65.89	36.95	40.00	-3.05	57.62	1.22	27.74	5.85	125	100	QP	HORIZONTAL
2 !	154.16	38.87	43.50	-4.63	54.24	1.83	27.33	10.13	0	400	Peak	HORIZONTAL
3 !	293.84	41.20	46.00	-4.80	52.14	2.52	26.91	13.45	0	400	Peak	HORIZONTAL
4 q	694.35	43.11	46.00	-2.89	47.16	4.13	28.01	19.83	102	100	QP	HORIZONTAL
5 !	711.91	40.84	46.00	-5.16	44.57	4.17	27.95	20.05	0	400	Peak	HORIZONTAL
6 p	728.40	42.71	46.00	-3.29	45.72	4.19	27.88	20.68	0	400	Peak	HORIZONTAL

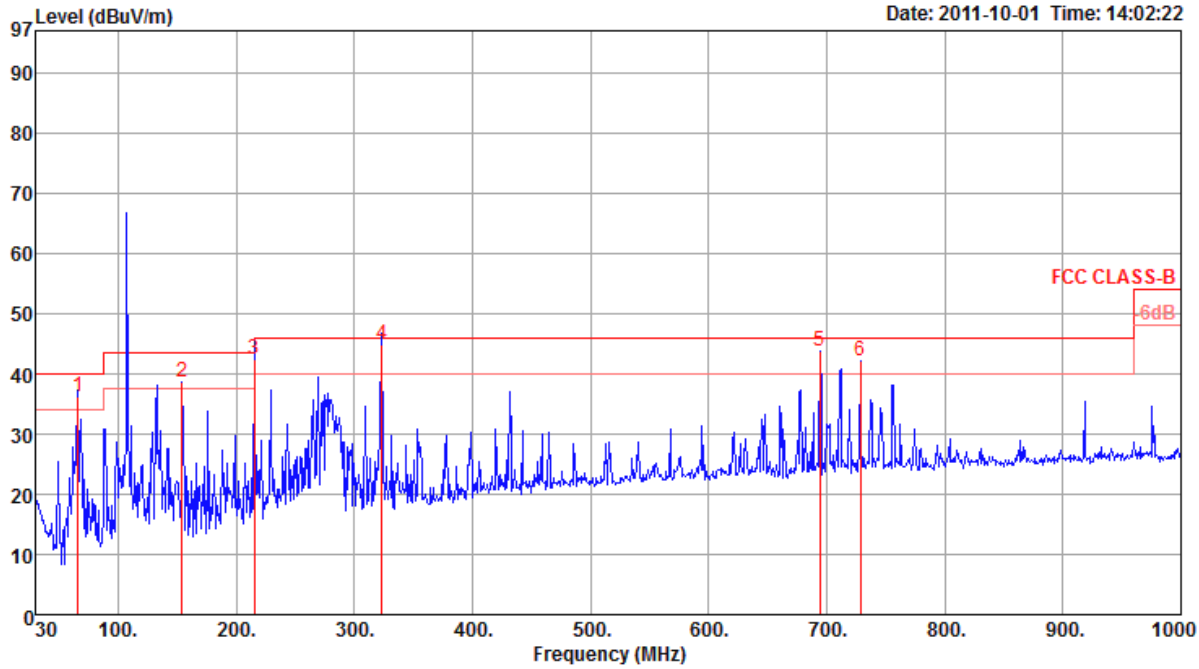
Vertical



	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 !	132.73	42.43	43.50	-1.07	55.99	1.68	27.44	12.20	173	100	QP	VERTICAL
2 !	154.16	39.75	43.50	-3.75	55.12	1.83	27.33	10.13	0	100	Peak	VERTICAL
3 !	694.30	44.56	46.00	-1.44	48.61	4.13	28.01	19.83	44	100	QP	VERTICAL
4 !	710.94	42.93	46.00	-3.07	46.66	4.17	27.95	20.05	0	100	Peak	VERTICAL
5 q	728.18	44.96	46.00	-1.04	48.06	4.19	27.88	20.59	36	100	QP	VERTICAL
6 p	755.56	42.96	46.00	-3.04	45.85	4.22	27.78	20.67	0	100	Peak	VERTICAL

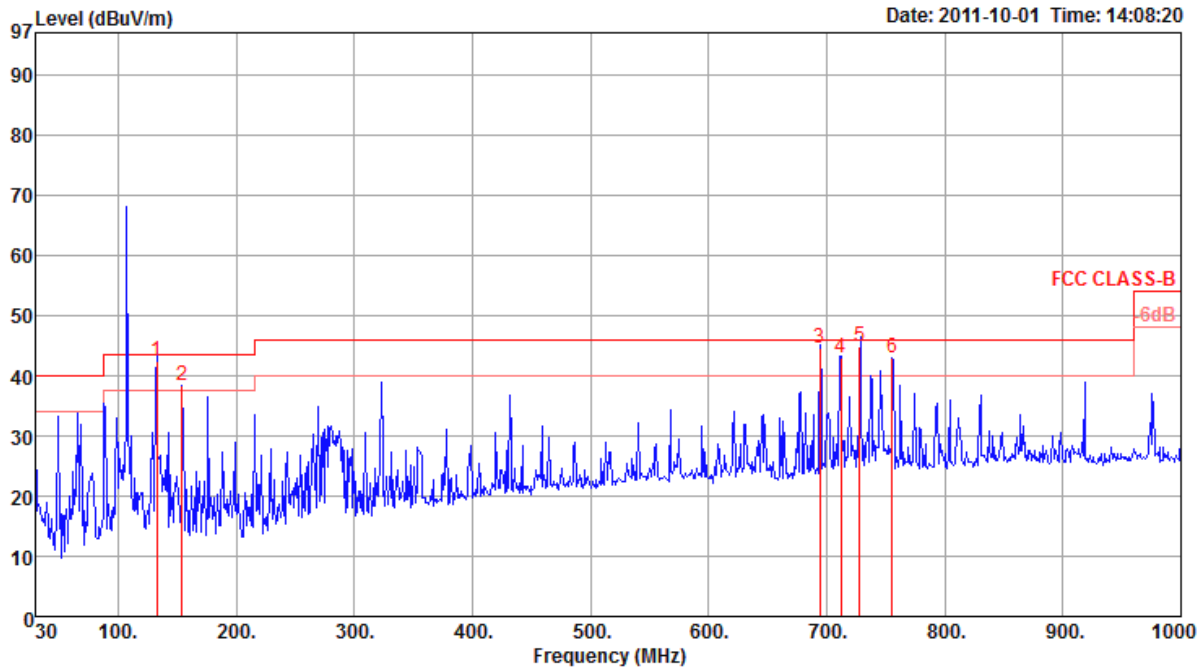
Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	107.7 MHz / Mode 2

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	65.89	36.34	40.00	-3.66	57.01	1.22	27.74	5.85	125	100	Peak	HORIZONTAL
2 !	154.16	38.55	43.50	-4.95	53.92	1.83	27.33	10.13	0	400	Peak	HORIZONTAL
3 !	215.40	42.43	43.50	-1.07	58.40	2.22	27.07	8.88	87	100	QP	HORIZONTAL
4 q	323.12	44.99	46.00	-1.01	55.00	2.65	27.06	14.40	63	100	QP	HORIZONTAL
5 !	694.30	43.65	46.00	-2.35	47.70	4.13	28.01	19.83	102	100	QP	HORIZONTAL
6 !	728.40	42.22	46.00	-3.78	45.23	4.19	27.88	20.68	0	400	Peak	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 q	132.72	42.44	43.50	-1.06	56.00	1.68	27.44	12.20	185	100	QP	VERTICAL
2 !	154.16	38.41	43.50	-5.09	53.78	1.83	27.33	10.13	0	100	Peak	VERTICAL
3 !	694.33	44.60	46.00	-1.40	48.65	4.13	28.01	19.83	45	100	QP	VERTICAL
4 !	711.80	43.00	46.00	-3.00	46.73	4.17	27.95	20.05	132	100	QP	VERTICAL
5 !	728.18	44.91	46.00	-1.09	48.01	4.19	27.88	20.59	35	100	QP	VERTICAL
6 p	755.56	42.98	46.00	-3.02	45.87	4.22	27.78	20.67	0	100	Peak	VERTICAL

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

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	88.3 MHz
Test Date	Oct. 01, 2011		

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	1843.45	54.38	74.00	-19.62	59.46	2.44	35.12	27.60	50	100	Peak	HORIZONTAL
2	a	1843.48	52.91	54.00	-1.09	57.99	2.44	35.12	27.60	50	100	Average	HORIZONTAL
3		2294.51	41.04	74.00	-32.96	44.84	3.04	34.87	28.03	196	100	Peak	HORIZONTAL
4		2295.13	29.36	54.00	-24.64	33.16	3.04	34.87	28.03	196	100	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	1843.49	48.56	74.00	-25.44	53.64	2.44	35.12	27.60	102	103	Peak	VERTICAL
2	a	1843.52	45.85	54.00	-8.15	50.93	2.44	35.12	27.60	102	103	Average	VERTICAL
3		2295.02	39.99	74.00	-34.01	43.79	3.04	34.87	28.03	241	100	Peak	VERTICAL
4		2295.11	30.40	54.00	-23.60	34.20	3.04	34.87	28.03	241	100	Average	VERTICAL

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	98.1 MHz
Test Date	Oct. 01, 2011		

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	1843.47	54.27	74.00	-19.73	59.35	2.44	35.12	27.60	47	100	Peak	HORIZONTAL
2	a	1843.50	52.97	54.00	-1.03	58.05	2.44	35.12	27.60	47	100	Average	HORIZONTAL
3		2293.92	39.11	74.00	-34.89	42.91	3.04	34.87	28.03	240	100	Peak	HORIZONTAL
4		2293.99	27.26	54.00	-26.74	31.06	3.04	34.87	28.03	240	100	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	a	1843.52	45.25	54.00	-8.75	50.33	2.44	35.12	27.60	102	100	Average	VERTICAL
2	p	1843.53	47.73	74.00	-26.27	52.81	2.44	35.12	27.60	102	100	Peak	VERTICAL
3		2293.99	27.58	54.00	-26.42	31.38	3.04	34.87	28.03	172	100	Average	VERTICAL
4		2294.02	39.25	74.00	-34.75	43.05	3.04	34.87	28.03	172	100	Peak	VERTICAL

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	107.7 MHz
Test Date	Oct. 01, 2011		

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	1843.46	54.28	74.00	-19.72	59.36	2.44	35.12	27.60	48	100	Peak	HORIZONTAL
2 a	1843.50	52.99	54.00	-1.01	58.07	2.44	35.12	27.60	48	100	Average	HORIZONTAL
3	2299.87	27.32	54.00	-26.68	31.12	3.04	34.87	28.03	232	100	Average	HORIZONTAL
4	2300.44	39.70	74.00	-34.30	43.50	3.04	34.87	28.03	232	100	Peak	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	1843.40	47.71	74.00	-26.29	52.79	2.44	35.12	27.60	101	100	Peak	VERTICAL
2 a	1843.50	44.55	54.00	-9.45	49.63	2.44	35.12	27.60	101	100	Average	VERTICAL
3	2299.75	39.67	74.00	-34.33	43.47	3.04	34.87	28.03	184	100	Peak	VERTICAL
4	2300.30	27.39	54.00	-26.61	31.19	3.04	34.87	28.03	184	100	Average	VERTICAL

Note:

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

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

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

4.4. Band Edge Emissions and Tuning Range of FM transmitter Measurement

4.4.1. Limit

Band edge emissions outside of the frequency bands shown in below table. Check the tuning range of FM transmitter.

Outside Frequency Band Edge	Limit (dBuV/m) at 3m
Below 88MHz	40.0 (QP)
Above 108MHz	43.5 (QP)

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 receiver.

Receiver Parameter	Setting
Center Frequency	Fundamental Frequency
RB	120 KHz
Detector	QP or Peak

4.4.3. Test Procedures

1. The test procedure is the same as section 4.1.3; 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.

4.4.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.1.4

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 Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	63%
Test Engineer	Serway Li	Configurations	88.3 / 98.1 / 107.7 MHz
Test Date	Oct. 03, 2011		

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 a	88.00	14.02	40.00	-25.98	31.29	1.40	27.65	8.98	130	172	QP	VERTICAL

Item 1 is fundamental frequency at 88.1 MHz.

Channel 100

	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		
3 q	108.00	13.89	43.50	-29.61	27.67	1.55	27.56	12.23	173	123	QP	HORIZONTAL

Item 3 is fundamental frequency at 107.9 MHz.

Note:

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

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

4.5. Antenna Requirements

4.5.1. 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.

4.5.2. Antenna Connector Construction

Please refer to section 3.1 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	Oct. 17, 2010	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 22, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2010	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 29, 2011	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100304	9kHz ~ 40GHz	Nov. 22, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 22, 2011	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, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV30	101026	9KHz~30GHz	Jul. 27, 2011	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	May 20, 2011	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 02, 2010	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)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)

RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 13, 2011	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 08, 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 2nd 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 Arrangment 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