



# SPORTON International Inc.

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## FCC EMC TEST REPORT

Applicant's company	Motorola Solutions, Inc.
Applicant Address	Unit A1 Linhay Business Park Eastern Road, Ashburton, Devon
Manufacturer's company	JOY TECHNOLOGY (SHENZHEN) CO., LTD.
Manufacturer Address	Building A, B, C, D, HengKeng Ind., Shangpai, Shangwu,Aiqun Rd., Shiyan Town,Shenzhen 518108 China

Product Name	PTP250 Point to Point Broadband Wireless System
Brand Name	Motorola
Model Name	WB3721/WB3723
Test Standard	47 CFR FCC Part 15 Subpart B
Classification of ITE	Class B
Received Date	Nov. 24, 2010
Final Test Date	Mar. 29, 2011
Submission Type	Original Equipment
Multiple Listing	Please refer to section 3.7



### Statement

**This test report covers operation in the Band 5725MHz to 5850MHz using 802.11n and 802.11a modes. Operation in other bands is not supported in the device.**

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 B**.

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



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## History of This Test Report



## 1. CERTIFICATE OF COMPLIANCE

Product Name : PTP250 Point to Point Broadband Wireless System  
Brand Name : Motorola  
Model Name : WB3721/WB3723  
Applicant : Motorola Solutions, Inc.  
Test Standard : 47 CFR FCC Part 15 Subpart B

Sporton International as requested by the applicant to evaluate the EMI performance of the product sample received on Nov. 24, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMI nature.

Jordan Hsiao 2011-4-29

Jordan Hsiao

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

<b>Applied Standard: 47 CFR FCC Part 15 Subpart B</b>				
<b>Part</b>	<b>Rule Section</b>	<b>Description of Test</b>	<b>Result</b>	<b>Under Limit</b>
4.1	15.107	AC Power Line Conducted Emissions	Complies	4.86 dB
4.2	15.109	Radiated Emissions	Complies	6.29 dB

<b>Test Items</b>	<b>Uncertainty</b>	<b>Remark</b>
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Radiated Emissions	±1.9dB	Confidence levels of 95%

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n

Items	Description
Product Type	For Antenna 1: WLAN (2TX, 2RX) For Antenna 2: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From POE
Test Voltage	120V/50Hz
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	5725 ~ 5850MHz
Number of Channels	5 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### 802.11a

Items	Description
Product Type	For Antenna 1: WLAN (2TX, 2RX) For Antenna 2: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From POE
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5725 ~ 5850MHz
Number of Channels	5
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### <For Antenna 1>

##### Antenna & Band width

Antenna	Single (TX)		Two (TX)	
Band width Mode	20 MHz	40 MHz	20 MHz	40 MHz
IEEE 802.11a	X	X	V	X
IEEE 802.11n	X	X	V	V

**<For Antenna 2>**
**Antenna & Band width**

Antenna	Single (TX)	
Band width Mode	20 MHz	40 MHz
IEEE 802.11a	V	X
IEEE 802.11n	V	V

**IEEE 802.11n spec**

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate (Mbps)			
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

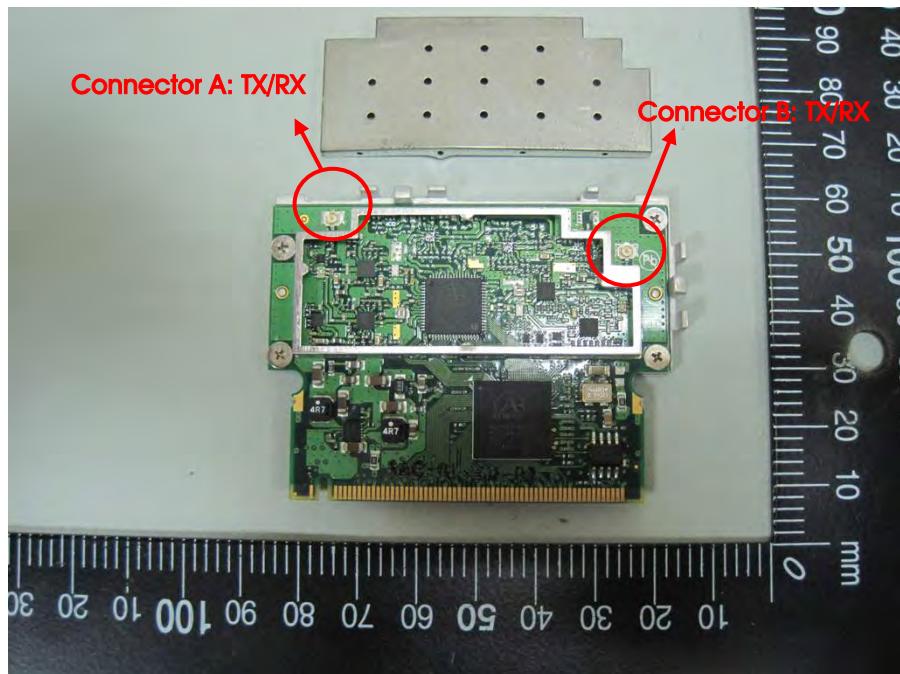
### 3.2. Accessories

Support Unit	Brand	Model	Rating
PIDU	MOTOROLA	WB2521	Input: 100~240VAC, 47-63Hz, 1.8A Output: 48-55VDC, 1A
POE	MOTOROLA	PD-7001G	Input: 100~240VAC, 50-60Hz, 0.8A Output: 55VDC, 0.57A

### 3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Cable Loss (dBi)
1-A	MOTOROLA	123200000093A-A0	Dual Polarised Antenna	I-pex	23	1.5
1-B	MOTOROLA	123200000093A-A0	Dual Polarised Antenna	I-pex	23	1.5
2	Radio Waves, Inc.	SP6-5.2	PARABOLIC SUBSCRIBER ANTENNAS	Type "N" female	37.6	1.0

Note: The EUT has two antenna ports (A/B) each of which can transmit or receive signals. Both antenna ports were connected when testing Antenna 1 but only port A was connected when testing Antenna 2 (dual polar dish not available)



### 3.4. Table for Carrier Frequencies

For IEEE 802.11a, use Channel 149, 153, 157, 161, 165.

There are two bandwidth systems for 802.11n.

For both 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For both 40MHz bandwidth systems, use Channel 151, 159.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 MHz	-	-

### 3.5. 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	Antenna
AC Power Line Conducted Emissions	CTX Link	1-A+1-B
Radiated Emissions	CTX Link	1-A+1-B/ 2

Note: CRX=continuously receiving

Test Mode 1. EUT + Antenna 1 + POE (PD-7001G)

Test Mode 2. EUT + Antenna 1 + POE (WB2521)

Test Mode 3. EUT + Antenna 2 + POE (PD-7001G)

Test Mode 4. EUT + Antenna 2 + POE (WB2521)

#### < AC Power Line Conducted Emissions >:

Due to Antenna would not affect test results, so that we choose the antenna 1 was tested and recorded in this report.

Mode 1 and Mode 2 were recorded the test data in the report.

#### <For Radiated Emissions Test Below 1GHz>:

All the test modes were tested and recorded the test data in the report.

#### <For Radiated Emissions Test Above 1GHz>:

Due to POE would not affect test results, so that we choose the POE (PD-7001G) was tested and recorded in this report.

Mode 1 and Mode 3 were recorded the test data in the report.

### 3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	187376	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	187376	IC 4086D	-

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 Multiple Listing

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

Model Name	Manufacturer
WB3720	PTP 250 Integrated Link, 5.8 GHz (FCC)
WB3721	PTP 250 Integrated Single End, 5.8 GHz (FCC)
WB3722	PTP 250 Connectorised Link, 5.8 GHz (FCC)
WB3723	PTP 250 Connectorised Single End 5.8 GHz (FCC)

Certification Model Number WB3721 covers Products WB3721 (integrated antenna model) and WB3723 (connectorised model). These products are also available as complete Radio Links under Product Numbers WB3720 (integrated antenna model) and WB3722 (connectorised model).

### 3.8. Table for Supporting Units

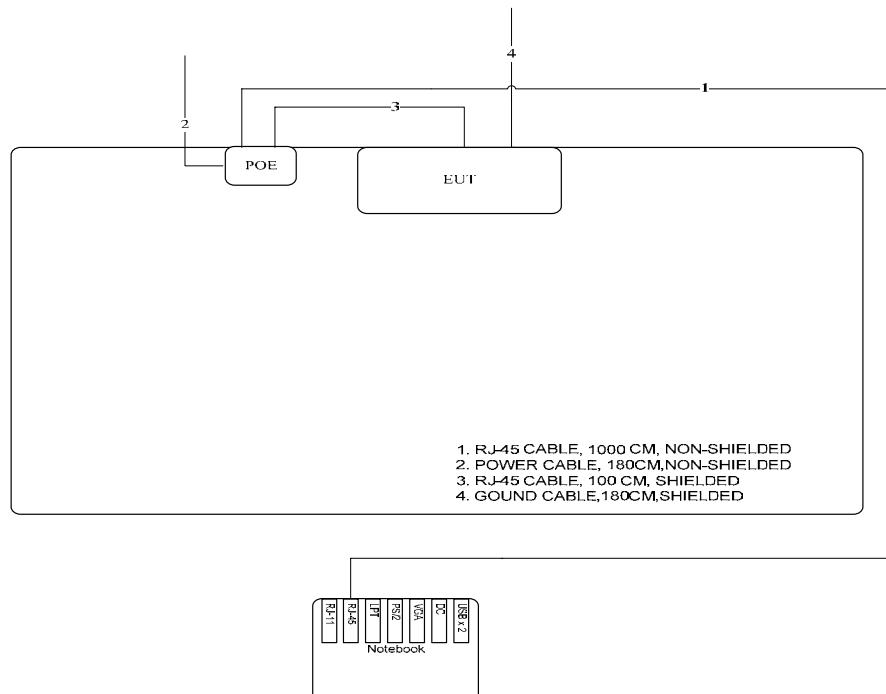
Support Unit	Brand	Model	FCC ID
PC	hp compaq	d330uT	DoC
LCD Monitor	DELL	1704FPTt	DoC
Keyboard	iCooky	SK068	DoC
Mouse	iCooky	AMS0706W	DoC
Notebook	DELL	D400	E2K24GBRL

### 3.9. EUT Operation during Test

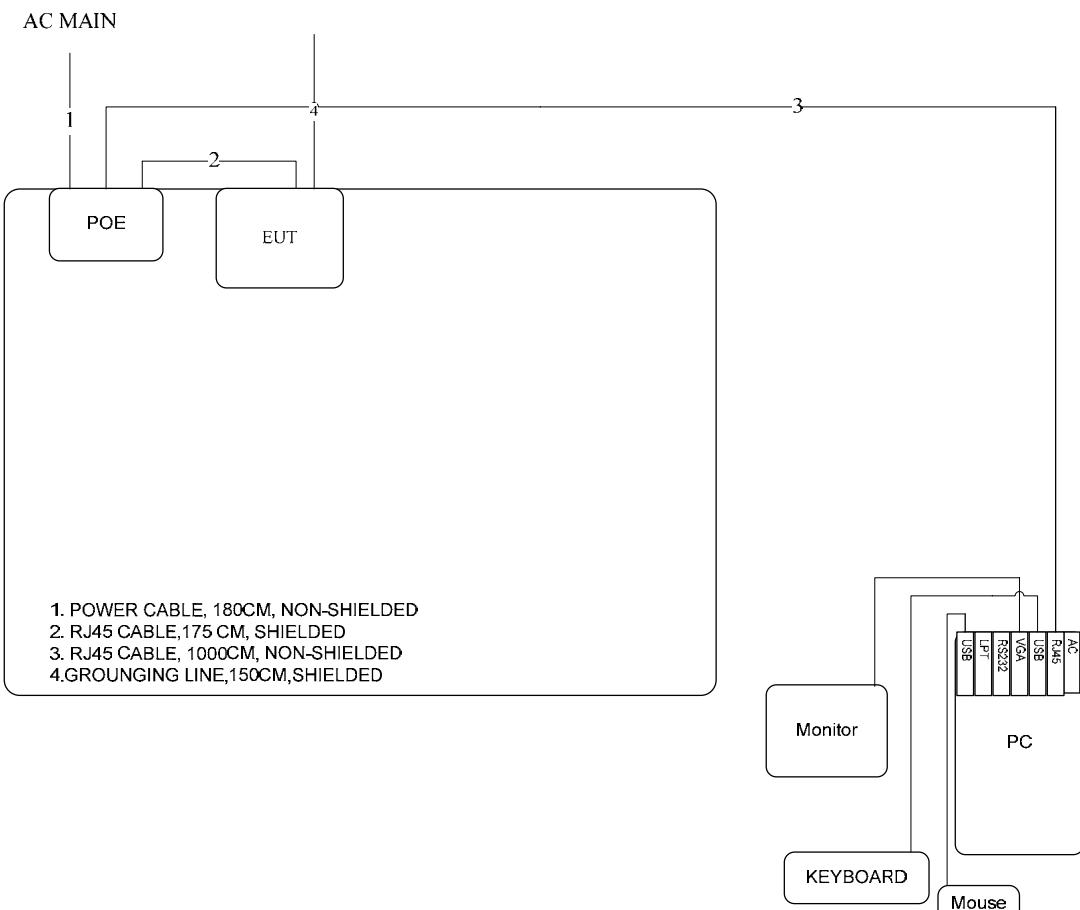
During the test, "ART V2.0.2X" under WIN XP was executed to control the EUT continuously receive RF signal.

## Test Configurations

### 3.9.1. Radiation Emissions Test Configuration



### 3.9.2. AC Power Line Conduction Emissions Test Configuration



## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. 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.

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

#### 4.1.2. Measuring Instruments and Setting

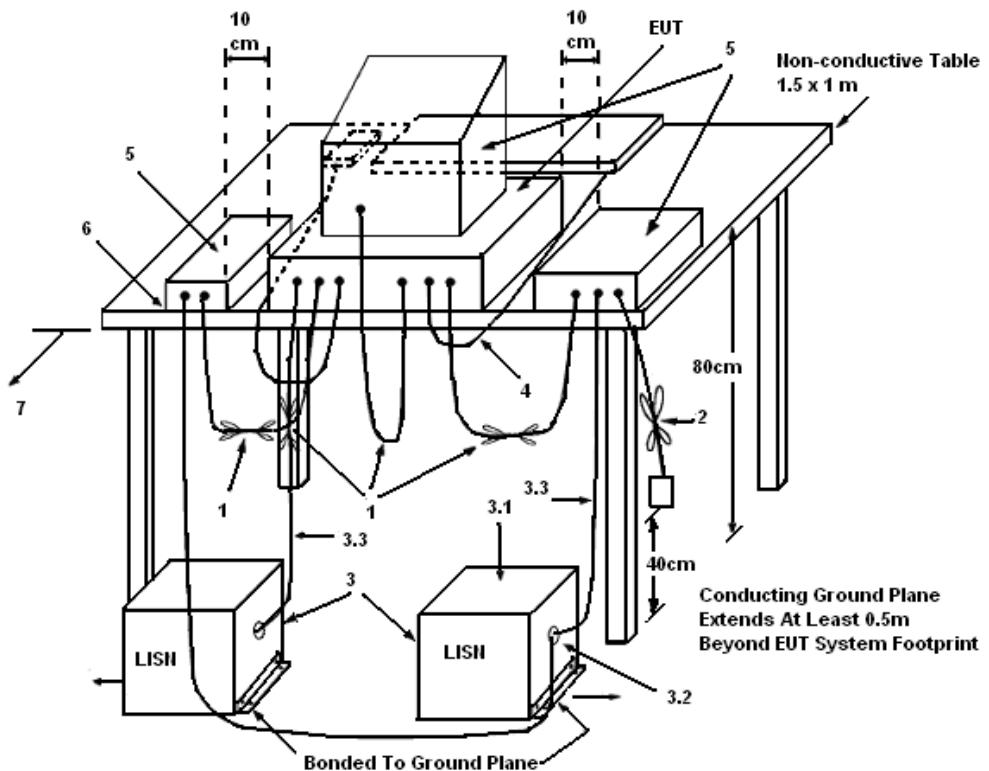
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

#### 4.1.3. Test Procedures

1. 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.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

#### 4.1.4. 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  $50\ \Omega$ . 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.

#### 4.1.5. Test Deviation

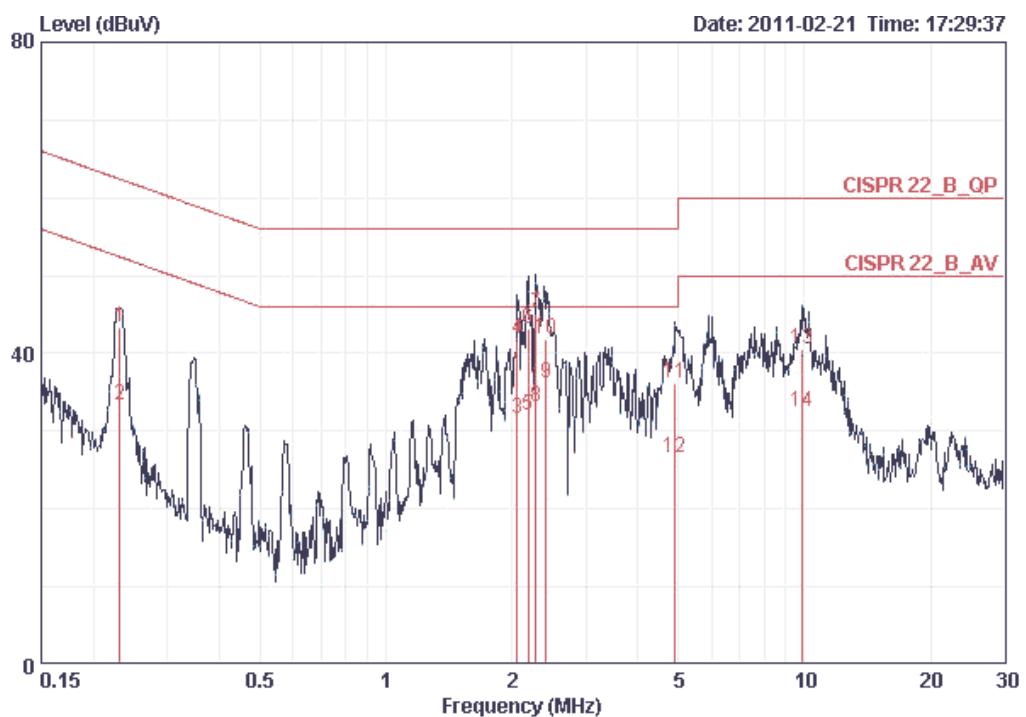
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

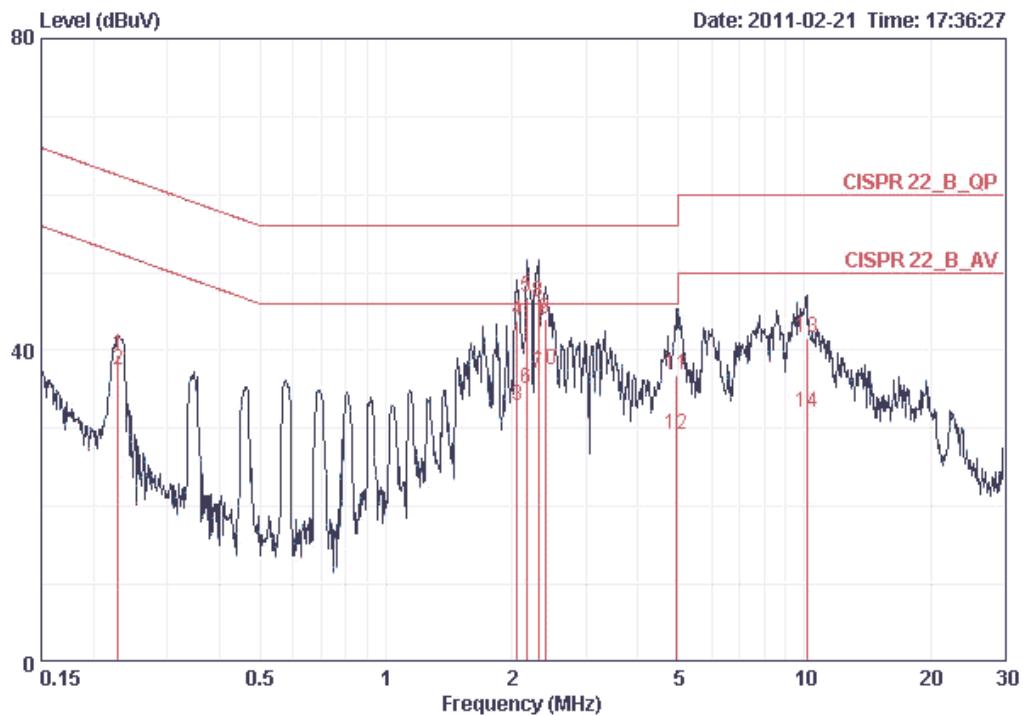
#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	13°C	Humidity	61%
Test Engineer	Peter Wu	Phase	Line
Configuration	CTX Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.23162	43.45	-18.95	62.39	43.20	0.05	0.20	QP
2	0.23162	33.34	-19.06	52.39	33.09	0.05	0.20	AVERAGE
3	2.055	31.57	-14.43	46.00	31.32	0.05	0.20	AVERAGE
4	2.055	41.85	-14.15	56.00	41.60	0.05	0.20	QP
5	2.190	32.14	-13.86	46.00	31.88	0.06	0.20	AVERAGE
6	2.190	43.20	-12.80	56.00	42.94	0.06	0.20	QP
7	2.285	45.20	-10.80	56.00	44.94	0.06	0.20	QP
8	2.285	33.03	-12.97	46.00	32.77	0.06	0.20	AVERAGE
9	2.409	36.13	-9.87	46.00	35.87	0.06	0.20	AVERAGE
10	2.409	41.79	-14.21	56.00	41.53	0.06	0.20	QP
11	4.900	36.20	-19.80	56.00	35.74	0.16	0.30	QP
12	4.900	26.70	-19.30	46.00	26.24	0.16	0.30	AVERAGE
13	9.913	40.54	-19.46	60.00	39.89	0.35	0.30	QP
14	9.913	32.46	-17.54	50.00	31.81	0.35	0.30	AVERAGE

<b>Temperature</b>	13°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Peter Wu	<b>Phase</b>	Neutral
<b>Configuration</b>	CTX Link / Mode 1		

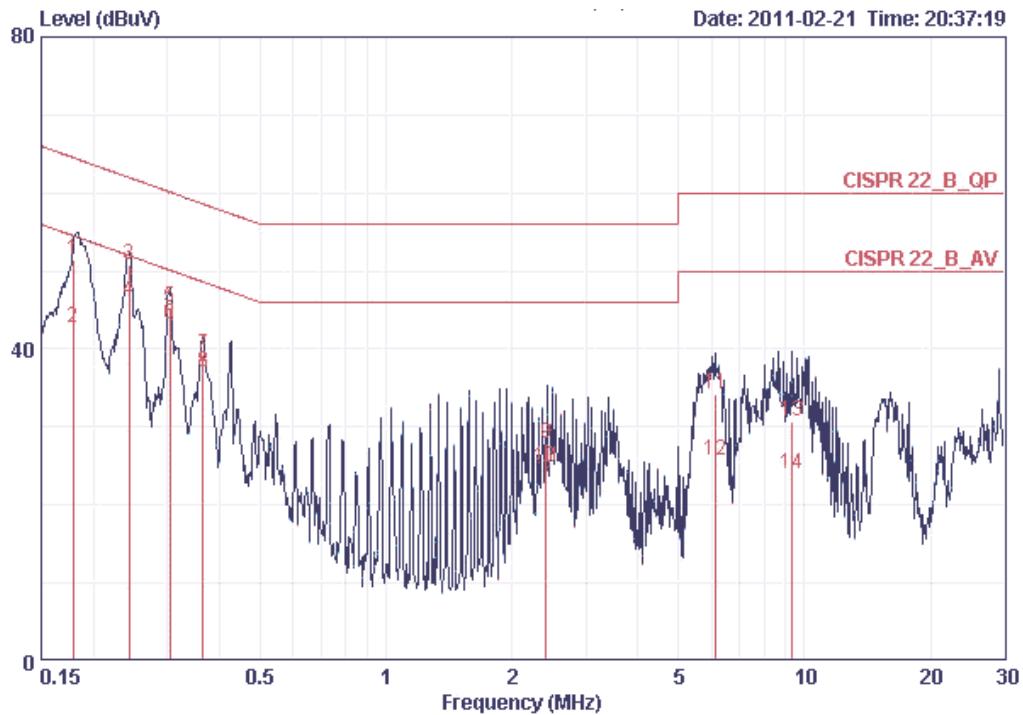


Freq	Level	Over	Limit	Read	LISN	Cable	Remark
		MHz	dB	Line	Level	Factor	
1	0.22918	39.52	-22.96	62.48	39.24	0.08	0.20 QP
2	0.22918	37.53	-14.95	52.48	37.25	0.08	0.20 AVERAGE
3	2.055	32.97	-13.03	46.00	32.68	0.09	0.20 AVERAGE
4	2.055	43.72	-12.28	56.00	43.43	0.09	0.20 QP
5	2.167	46.77	-9.23	56.00	46.47	0.10	0.20 QP
6	2.167	35.11	-10.89	46.00	34.81	0.10	0.20 AVERAGE
7	2.309	37.00	-9.00	46.00	36.70	0.10	0.20 AVERAGE
8	2.309	46.26	-9.74	56.00	45.96	0.10	0.20 QP
9	2.396	44.10	-11.90	56.00	43.80	0.10	0.20 QP
10	2.396	37.50	-8.50	46.00	37.20	0.10	0.20 AVERAGE
11	4.952	36.85	-19.15	56.00	36.35	0.20	0.30 QP
12	4.952	29.24	-16.76	46.00	28.74	0.20	0.30 AVERAGE
13	10.125	41.62	-18.38	60.00	40.90	0.39	0.32 QP
14	10.125	32.05	-17.95	50.00	31.33	0.39	0.32 AVERAGE

Note:

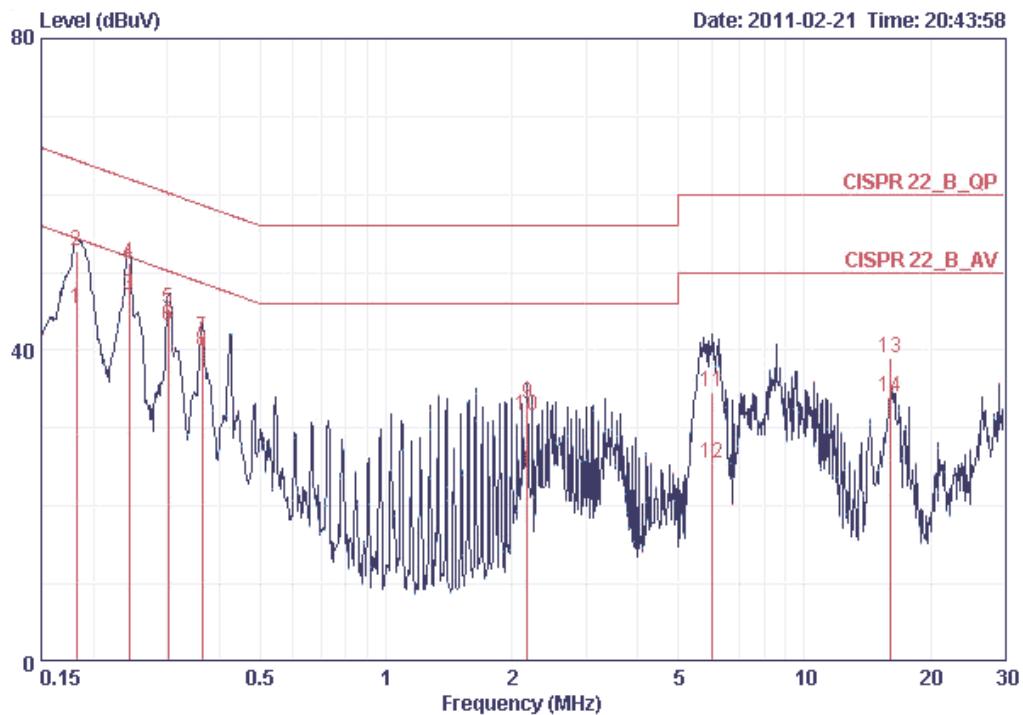
Level = Read Level + LISN Factor + Cable Loss

Temperature	13°C	Humidity	61%
Test Engineer	Peter Wu	Phase	Line
Configuration	CTX Link / Mode 2		



Freq	Level	Over	Limit	Read	LISN	Cable
		Limit	Line	Level	Factor	Loss
MHz	dBuV	dB	dBuV	dBuV	dB	dB
1	0.17846	51.46	-13.10	64.56	51.20	0.06
2	0.17846	42.70	-11.86	54.56	42.44	0.06
3	0.24293	50.73	-11.26	62.00	50.49	0.04
4	0.24293	46.12	-5.87	52.00	45.88	0.04
5	0.30509	45.35	-14.76	60.10	45.11	0.04
6	0.30509	43.10	-7.01	50.10	42.86	0.04
7	0.36531	39.25	-19.35	58.61	39.02	0.03
8	0.36531	37.05	-11.55	48.61	36.82	0.03
9	2.414	27.98	-28.02	56.00	27.72	0.06
10	2.414	24.91	-21.09	46.00	24.65	0.06
11	6.121	34.22	-25.78	60.00	33.68	0.22
12	6.121	25.81	-24.19	50.00	25.27	0.22
13	9.302	30.78	-29.22	60.00	30.15	0.33
14	9.302	24.03	-25.97	50.00	23.40	0.33

Temperature	13°C	Humidity	61%
Test Engineer	Peter Wu	Phase	Neutral
Configuration	CTX Link / Mode 2		



Freq	Level	Over	Limit	Read	LISN	Cable	
		Line	dBuV	Level	Factor	Loss	
MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.18249	45.25	-9.12	54.37	44.96	0.09	0.20 AVERAGE
2	0.18249	52.68	-11.69	64.37	52.39	0.09	0.20 QP
3 @	0.24293	47.14	-4.86	52.00	46.86	0.08	0.20 AVERAGE
4	0.24293	51.21	-10.79	62.00	50.93	0.08	0.20 QP
5	0.30188	45.30	-14.89	60.19	45.03	0.07	0.20 QP
6 @	0.30188	43.13	-7.06	50.19	42.86	0.07	0.20 AVERAGE
7	0.36338	41.66	-16.99	58.65	41.39	0.07	0.20 QP
8 @	0.36338	39.95	-8.70	48.65	39.68	0.07	0.20 AVERAGE
9	2.178	33.16	-22.84	56.00	32.86	0.10	0.20 QP
10	2.178	31.70	-14.30	46.00	31.40	0.10	0.20 AVERAGE
11	6.024	34.72	-25.28	60.00	34.16	0.25	0.31 QP
12	6.024	25.48	-24.52	50.00	24.92	0.25	0.31 AVERAGE
13	16.055	39.07	-20.93	60.00	38.04	0.63	0.40 QP
14	16.055	34.07	-15.93	50.00	33.04	0.63	0.40 AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss

## 4.2. Radiated Emissions Measurement

### 4.2.1. Limit

Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 5th harmonic of highest frequency. The quasi-peak measuring receiver shall be in accordance with clause 2 of CISPR 16-1. Receivers with peak detectors shall be in accordance with clause 3 of CISPR 16-1, and shall have a 6 dB bandwidth in accordance with clause 2 of CISPR 16-1.

Frequency of Emission (MHz)	Field Strength QP Limit (dBuV/m) at 3m
30~88	40
88~216	43.5
216~960	46
Above 960	54

### 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 spectrum analyzer and receiver.

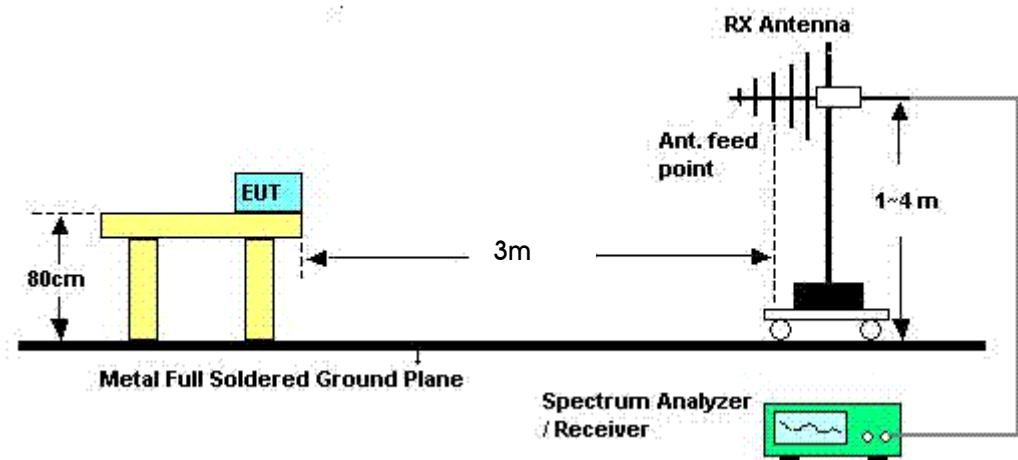
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

Spectrum Parameter	Setting
Start Frequency	1000 MHz
Stop Frequency	5th harmonic of highest frequency
RB / VB	1 MHz / 1MHz for Peak

### 4.2.3. Test Procedures

1. 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.

#### 4.2.4. Test Setup Layout



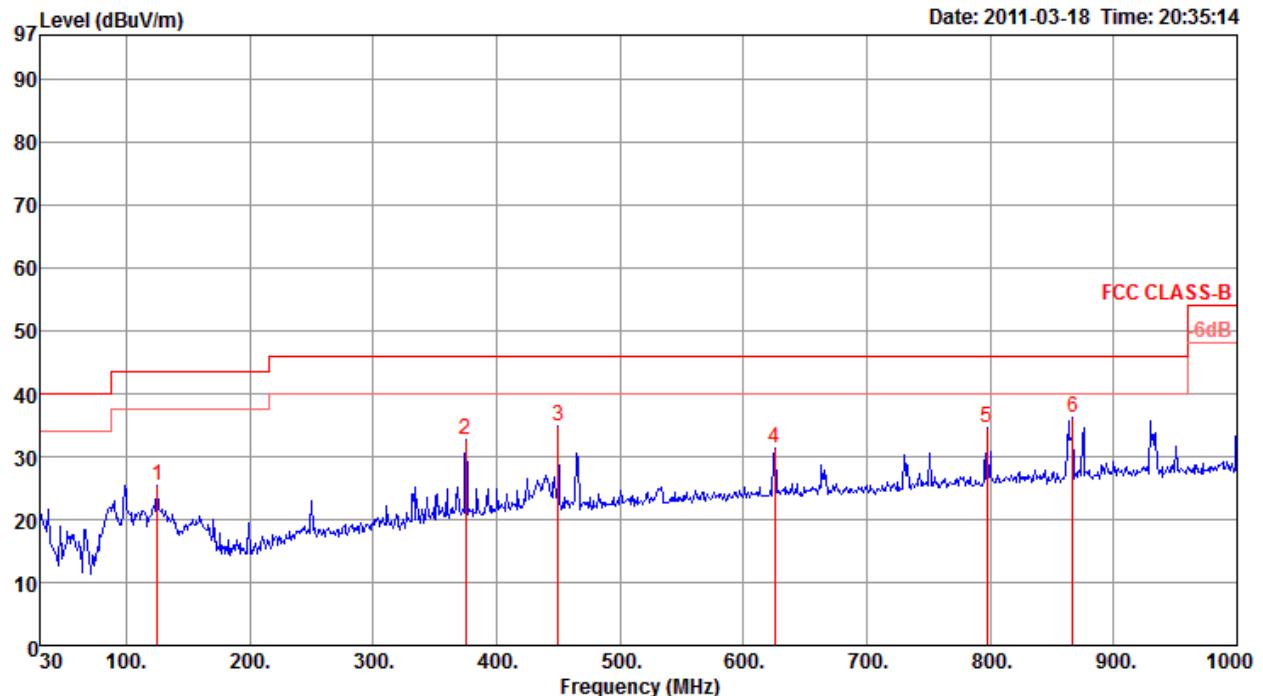
#### 4.2.5. Test Deviation

There is no deviation with the original standard.

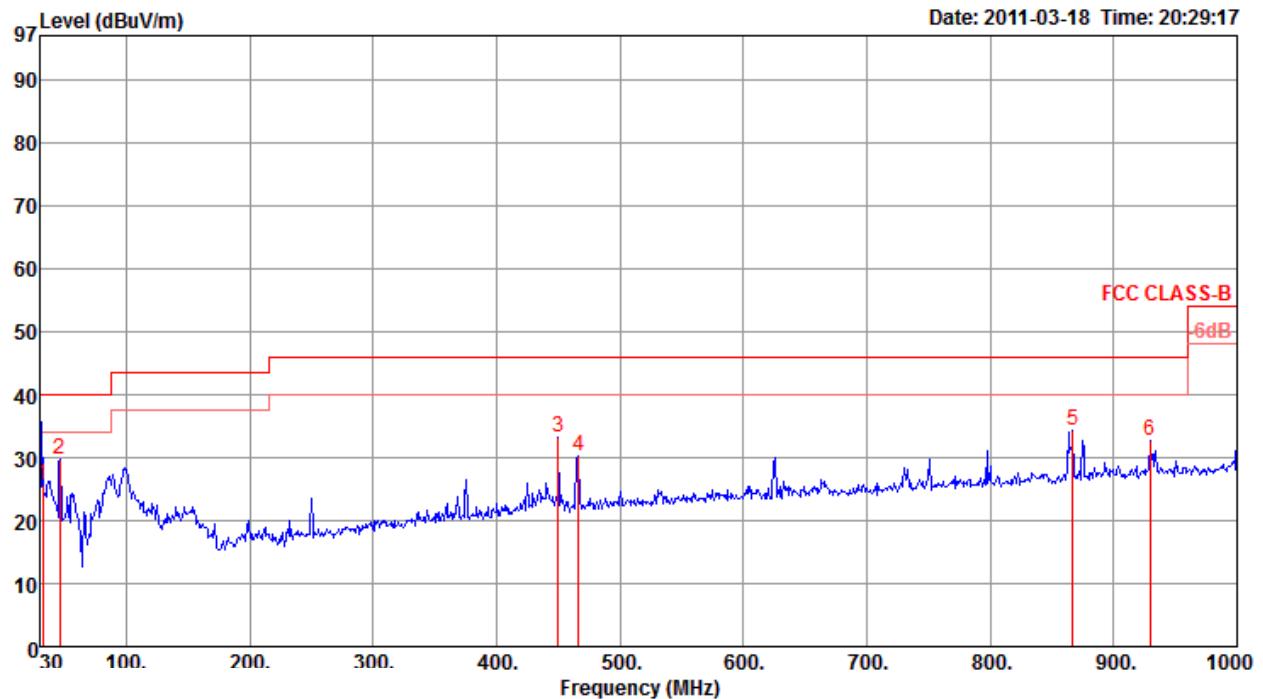
## 4.2.6. Results of Radiated Emissions (30MHz~1GHz)

Temperature	21°C	Humidity	62%
Test Engineer	Allen Liu	Configurations	CTX Link / Mode 1

## Horizontal



Freq	Level	Limit	Over	Read	Cable			Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
					Line	Limit	Level						
MHz	dBuV/m	dBuV/m			dB	dB	dBuV	dB	dB	deg	cm		
1	125.06	25.49	43.50	-18.01	39.41	1.25	27.48	12.31		0	100	Peak	HORIZONTAL
2	375.32	32.67	46.00	-13.33	42.31	2.25	27.43	15.54		0	100	Peak	HORIZONTAL
3	450.01	34.85	46.00	-11.15	43.20	2.60	27.85	16.90		0	100	Peak	HORIZONTAL
4	625.58	31.40	46.00	-14.60	37.53	3.05	28.07	18.89		0	100	Peak	HORIZONTAL
5	797.27	34.56	46.00	-11.44	38.62	3.31	27.61	20.24		0	100	Peak	HORIZONTAL
6 p	867.11	36.30	46.00	-9.70	39.42	3.47	27.47	20.88		0	100	Peak	HORIZONTAL

**Vertical**


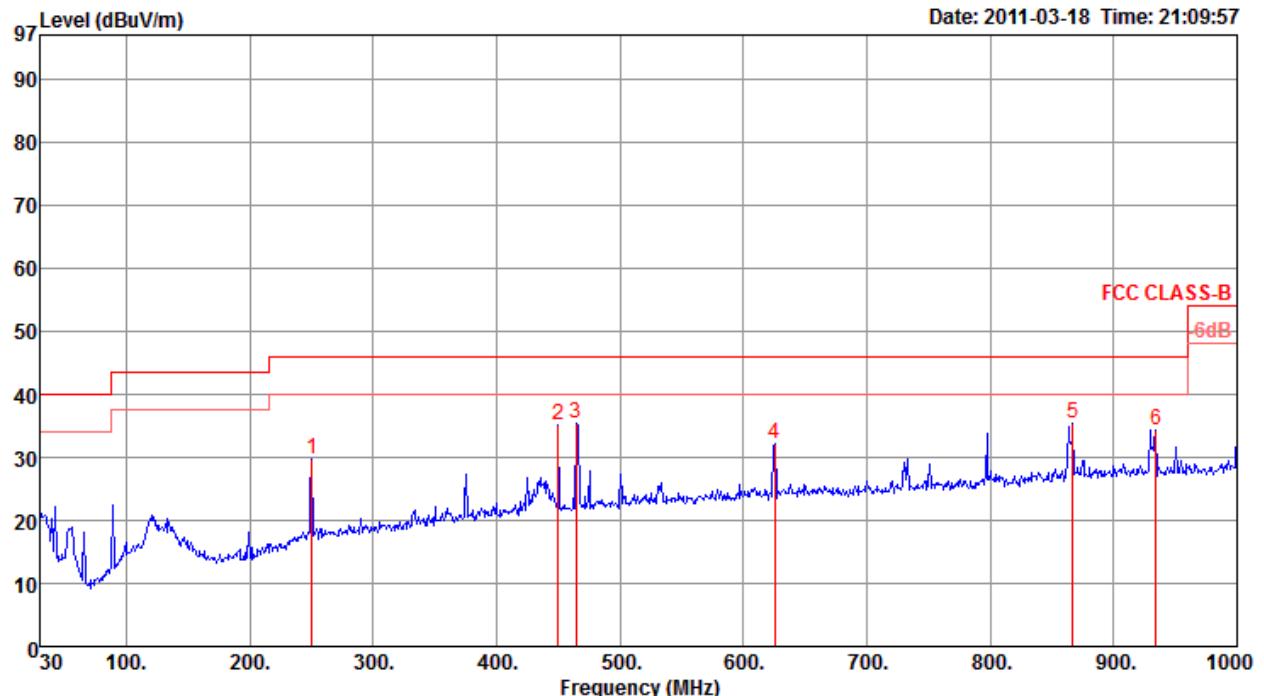
Freq	Level	Limit	Over	Read	Cable			Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
					Line	Limit	dB	dBuV	dB	dB	dB/m	deg	cm
1 q	32.19	25.58	40.00	-14.42	35.70	0.50	27.80	17.18	170	100	QP		VERTICAL
2 p	46.49	29.69	40.00	-10.31	47.95	0.70	27.80	8.84	0	400	Peak		VERTICAL
3	450.01	33.11	46.00	-12.89	41.46	2.60	27.85	16.90	0	400	Peak		VERTICAL
4	466.50	30.29	46.00	-15.71	38.47	2.63	27.93	17.12	0	400	Peak		VERTICAL
5	867.11	34.28	46.00	-11.72	37.40	3.47	27.47	20.88	0	400	Peak		VERTICAL
6	929.19	32.73	46.00	-13.27	35.10	3.60	27.28	21.31	0	400	Peak		VERTICAL

**Note:**

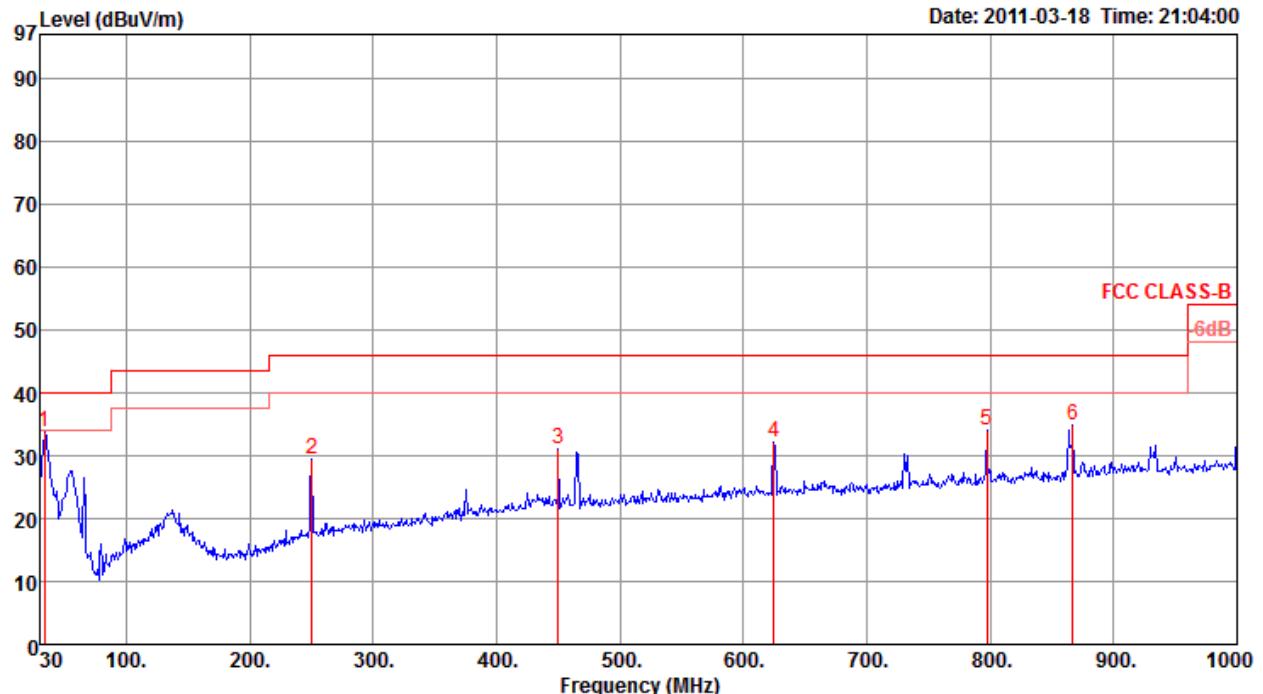
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

Temperature	21°C	Humidity	62%
Test Engineer	Allen Liu	Configurations	CTX Link / Mode 2

**Horizontal**


Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
1	250.19	29.63	46.00	-16.37	42.06	1.90	27.00	12.67	0	100	Peak
2	450.01	35.21	46.00	-10.79	43.56	2.60	27.85	16.90	0	100	Peak
3 P	464.56	35.45	46.00	-10.55	43.65	2.63	27.92	17.09	0	100	Peak
4	625.58	32.08	46.00	-13.92	38.21	3.05	28.07	18.89	0	100	Peak
5	867.11	35.34	46.00	-10.66	38.46	3.47	27.47	20.88	0	100	Peak
6	934.04	34.24	46.00	-11.76	36.56	3.60	27.26	21.34	0	100	Peak

**Vertical**


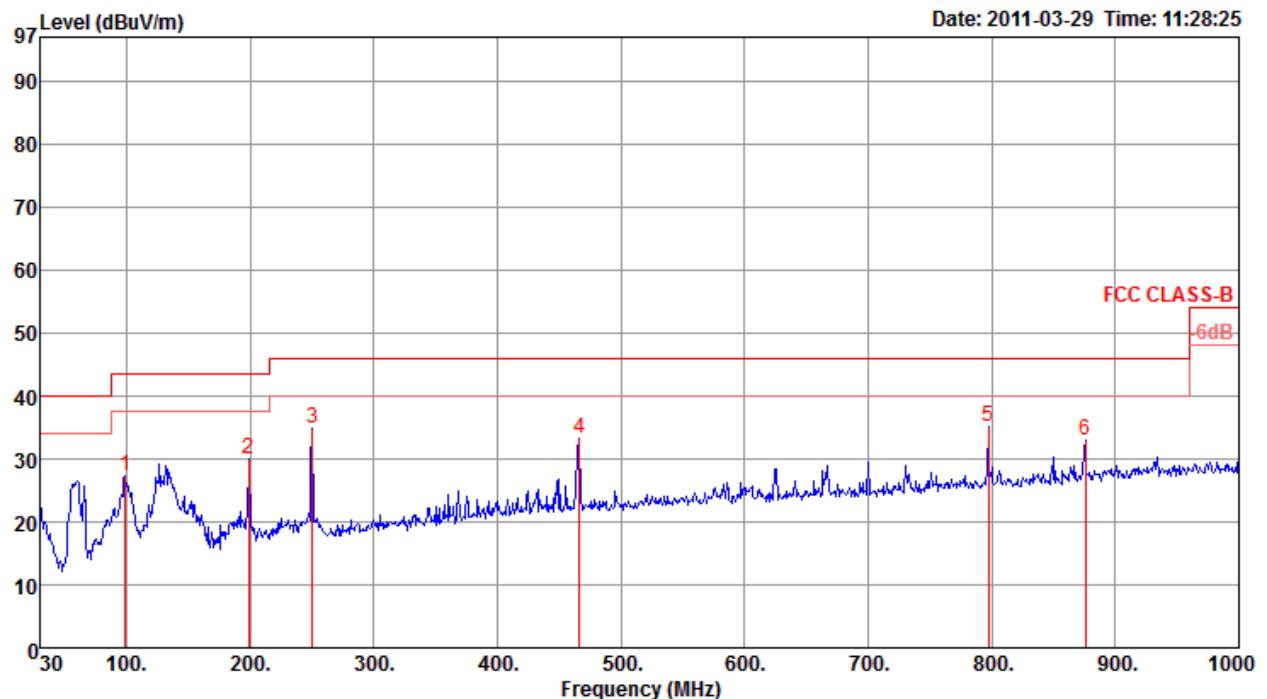
Freq MHz	Level dBuV/m	Limit Line dB	Over Limit dB	Read Level dBuV	Cable Loss dB	Preamp Factor dB	Antenna Factor dB/m	T/Pos deg	A/Pos cm	Remark	Pol/Phase
1 P	33.88	33.69	40.00	-6.31	45.04	0.50	27.80	15.95	0	400	Peak VERTICAL
2	250.19	29.42	46.00	-16.58	41.85	1.90	27.00	12.67	0	400	Peak VERTICAL
3	450.01	31.10	46.00	-14.90	39.45	2.60	27.85	16.90	0	400	Peak VERTICAL
4	624.61	32.10	46.00	-13.90	38.24	3.05	28.08	18.89	0	400	Peak VERTICAL
5	797.27	34.08	46.00	-11.92	38.14	3.31	27.61	20.24	0	400	Peak VERTICAL
6	867.11	34.93	46.00	-11.07	38.05	3.47	27.47	20.88	0	400	Peak VERTICAL

**Note:**

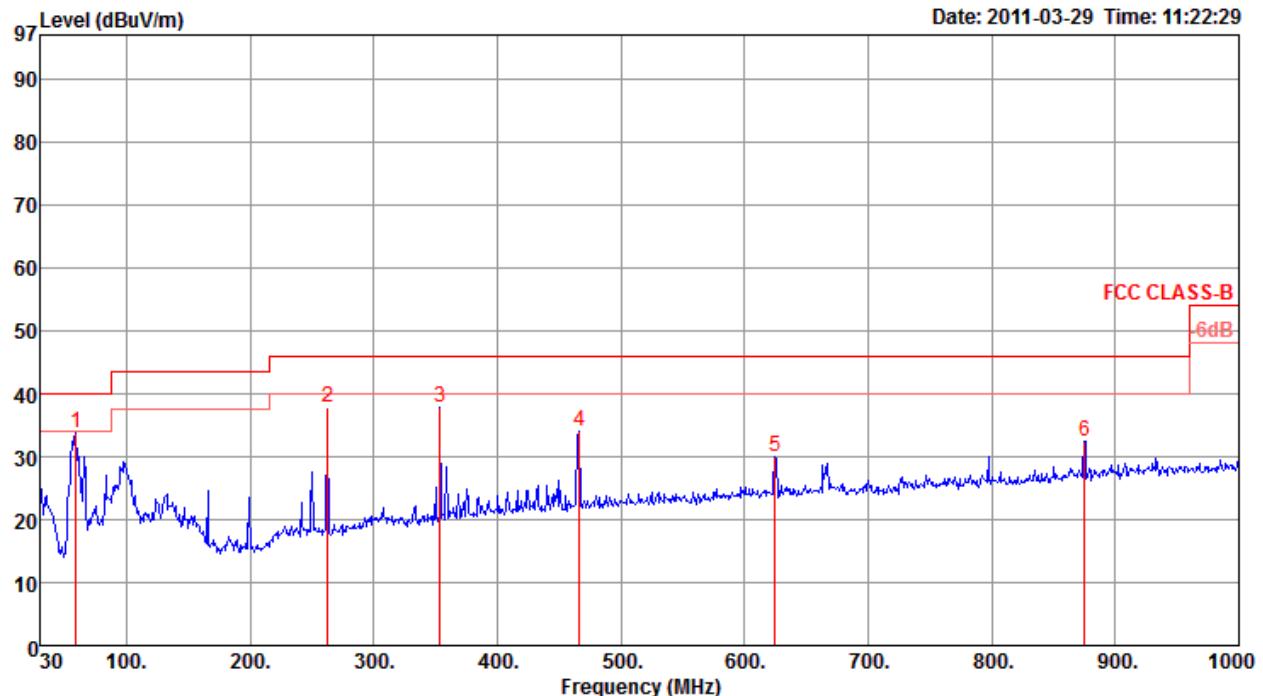
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

Temperature	21°C	Humidity	62%
Test Engineer	Allen Liu	Configurations	CTX Link / Mode 3

**Horizontal**


Freq	Level	Limit	Over	Read	Cable			Antenna	T/Pos	A/Pos	Remark	Pol/Phase
					Line	Limit	dB					
	MHz	dBuV/m	dBuV/m				dB	dBuV	dB	dB/m	deg	cm
1	98.87	27.29	43.50	-16.21	43.11	1.18	27.61	10.61	0	100	Peak	HORIZONTAL
2	198.78	29.91	43.50	-13.59	45.94	1.69	27.11	9.39	0	100	Peak	HORIZONTAL
3	250.19	34.86	46.00	-11.14	47.29	1.90	27.00	12.67	0	100	Peak	HORIZONTAL
4	466.50	33.14	46.00	-12.86	41.32	2.63	27.93	17.12	0	100	Peak	HORIZONTAL
5 p	797.27	35.04	46.00	-10.96	39.10	3.31	27.61	20.24	0	100	Peak	HORIZONTAL
6	875.84	33.02	46.00	-12.98	36.01	3.50	27.45	20.96	0	100	Peak	HORIZONTAL

**Vertical**


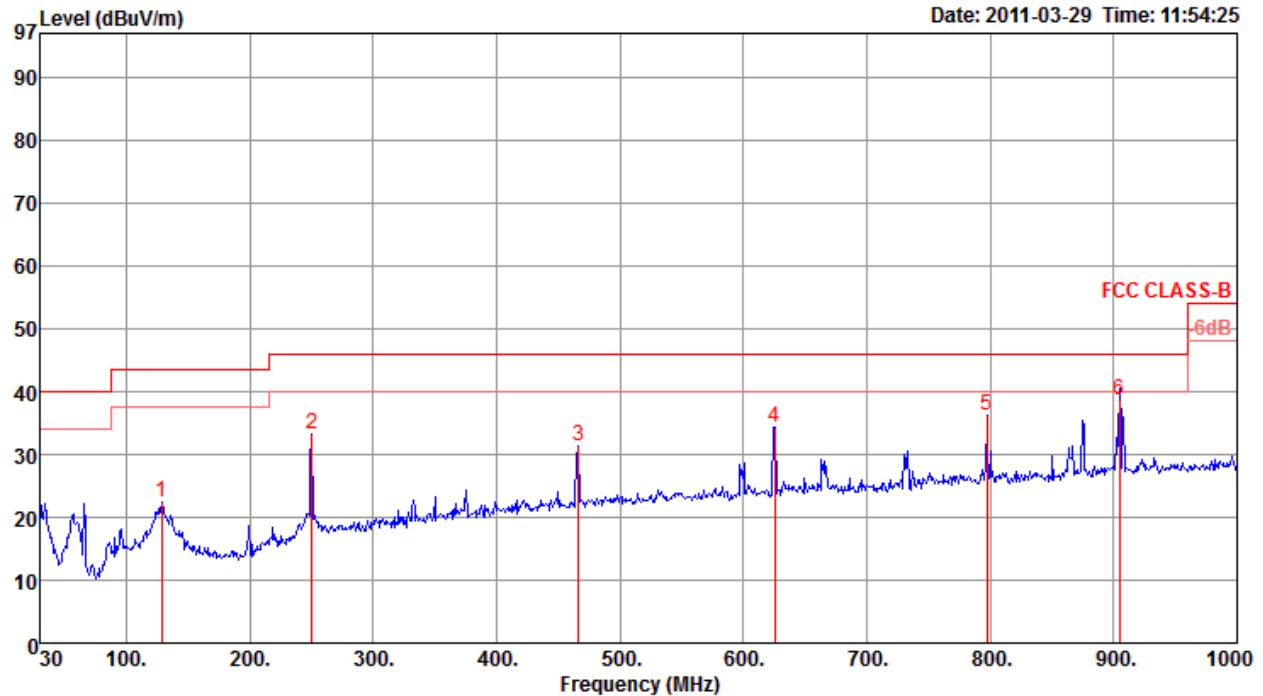
Freq MHz	Level dBuV/m	Limit Line dB	Over Limit dB	Read Level dBuV	Cable Loss dB	Preamp Factor dB	Antenna Factor dB/m	T/Pos deg	A/Pos cm	Remark	Pol/Phase
1 q	59.10	33.71	40.00	-6.29	54.28	0.80	27.76	6.39	257	100 OP	VERTICAL
2	262.80	37.79	46.00	-8.21	49.94	1.95	26.97	12.87	0	400 Peak	VERTICAL
3 p	353.98	37.80	46.00	-8.20	47.91	2.21	27.28	14.96	0	400 Peak	VERTICAL
4	466.50	34.08	46.00	-11.92	42.26	2.63	27.93	17.12	0	400 Peak	VERTICAL
5	624.61	29.94	46.00	-16.06	36.08	3.05	28.08	18.89	0	400 Peak	VERTICAL
6	874.87	32.54	46.00	-13.46	35.54	3.50	27.45	20.95	0	400 Peak	VERTICAL

**Note:**

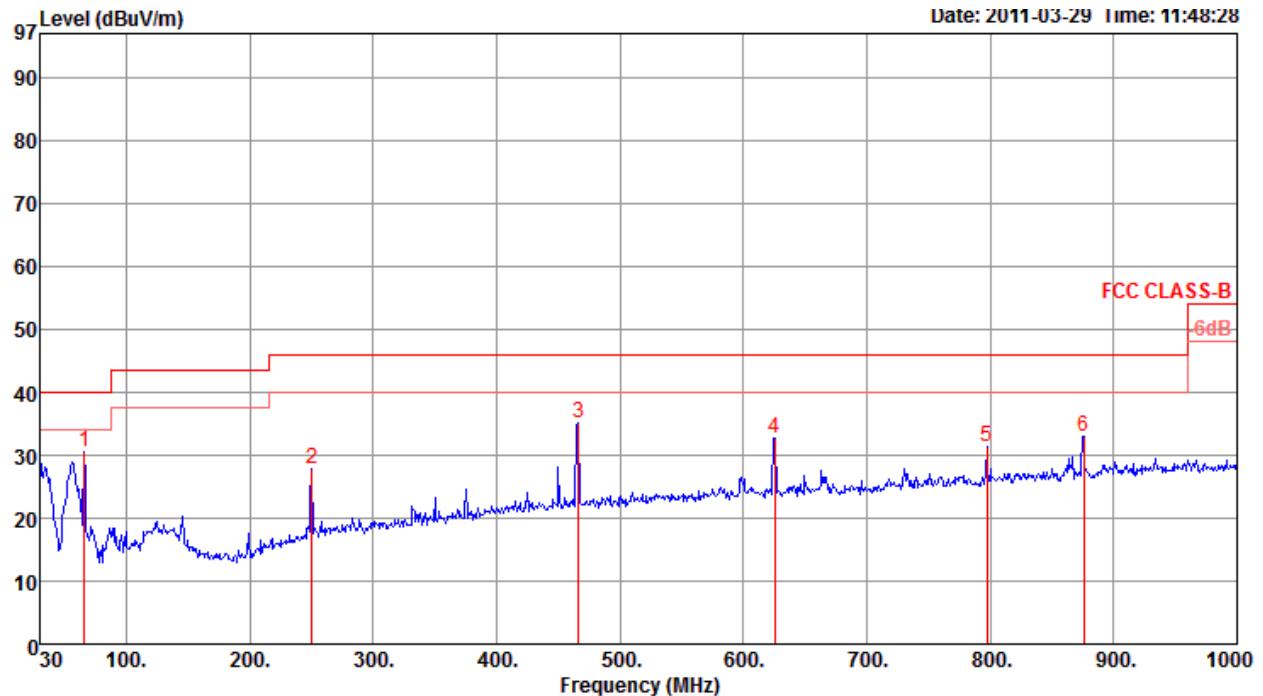
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

<b>Temperature</b>	21°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	Allen Liu	<b>Configurations</b>	CTX Link / Mode 4

**Horizontal**


Freq	Level	Limit	Over	Read	Cable			Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
					Line	Limit	Level						
MHz	dBuV/m	dBuV/m		dB	dBuV		dB	dB	dB/m	deg	cm		
1	128.94	22.47	43.50	-21.03	36.56	1.29	27.45	12.07		0	100	Peak	HORIZONTAL
2	250.19	33.30	46.00	-12.70	45.73	1.90	27.00	12.67		0	100	Peak	HORIZONTAL
3	466.50	31.48	46.00	-14.52	39.66	2.63	27.93	17.12		0	100	Peak	HORIZONTAL
4	625.58	34.37	46.00	-11.63	40.50	3.05	28.07	18.89		0	100	Peak	HORIZONTAL
5	797.27	36.09	46.00	-9.91	40.15	3.31	27.61	20.24		0	100	Peak	HORIZONTAL
6 p	904.94	38.62	46.00	-7.38	41.20	3.60	27.38	21.20		0	100	Peak	HORIZONTAL

**Vertical**


Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	T/Pos	A/Pos	Remark	Pol/Phase
		Line	Limit	Level	Loss	Factor	Factor	deg	cm		
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	65.89	30.52	40.00	-9.48	51.10	0.88	27.74	6.28	0	400	Peak VERTICAL
2	250.19	27.85	46.00	-18.15	40.28	1.90	27.00	12.67	0	400	Peak VERTICAL
3	466.50	35.25	46.00	-10.75	43.43	2.63	27.93	17.12	0	400	Peak VERTICAL
4	625.58	32.70	46.00	-13.30	38.83	3.05	28.07	18.89	0	400	Peak VERTICAL
5	797.27	31.27	46.00	-14.73	35.33	3.31	27.61	20.24	0	400	Peak VERTICAL
6	875.84	32.92	46.00	-13.08	35.91	3.50	27.45	20.96	0	400	Peak VERTICAL

**Note:**

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

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

## 4.2.7. Results for Radiated Emissions (1GHz~5th harmonic of highest frequency)

Temperature	21°C	Humidity	62%
Test Engineer	Allen Liu	Configurations	CTX Link / Mode 1
Test Date	Feb. 18, 2011		

## Horizontal

Freq	Level	Limit		Over Limit	Read Level	Cable PreampAntenna			T/Pos	A/Pos	Remark	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor				
1 p	1593.69	50.60	80.00	-29.40	57.67	1.61	34.78	26.10	238	100	Peak	HORIZONTAL
2 a	1593.74	45.91	60.00	-14.09	52.98	1.61	34.78	26.10	238	100	Average	HORIZONTAL

## Vertical

Freq	Level	Limit		Over Limit	Read Level	Cable PreampAntenna			T/Pos	A/Pos	Remark	Pol/Phase
		Line	dBuV/m			Loss	Factor	Factor				
1 p	1593.69	49.39	80.00	-30.61	56.46	1.61	34.78	26.10	220	100	Peak	VERTICAL
2 a	1593.72	44.86	60.00	-15.14	51.93	1.61	34.78	26.10	220	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.

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



Temperature	21°C	Humidity	62%
Test Engineer	Allen Liu	Configurations	CTX Link / Mode 3
Test Date	Feb. 18, 2011		

**Horizontal**

Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
		Line	dB									
1 p	1328.11	53.89	80.00	-26.11	62.67	1.47	35.09	24.84	223	200	Peak	HORIZONTAL
2 a	1328.12	49.01	60.00	-10.99	57.79	1.47	35.09	24.84	223	200	Average	HORIZONTAL

**Vertical**

Freq	Level	Limit		Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
		Line	dB									
1 a	1328.12	53.46	60.00	-6.54	62.24	1.47	35.09	24.84	128	200	Average	VERTICAL
2 p	1328.16	55.42	80.00	-24.58	64.20	1.47	35.09	24.84	128	200	Peak	VERTICAL

**Note:**

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

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

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100377	9kHz ~ 2.75GHz	Sep. 01, 2010	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Apr. 24, 2010	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9K ~ 30MHz	Oct. 30, 2010	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Jan. 04, 2011	Conduction (CO01-CB)
COND Cable	-	Cable	-	0.15MHz~30MHz	Dec. 01, 2010	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Oct. 17, 2010	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 13, 2010	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Oct. 08, 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. 06, 2010	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100304	9kHz ~ 40GHz	Nov. 06, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 06, 2011	Radiation (03CH01-CB)
Loop Antenna	R&S	HFH2-Z2	860004/001	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	-	30 MHz - 1 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	-	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)

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

Note: For "\*" 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 <sup>nd</sup> 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 of Accreditation

This is to certify that

**Sportun 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 : December 30, 2009

PI, total 22 pages

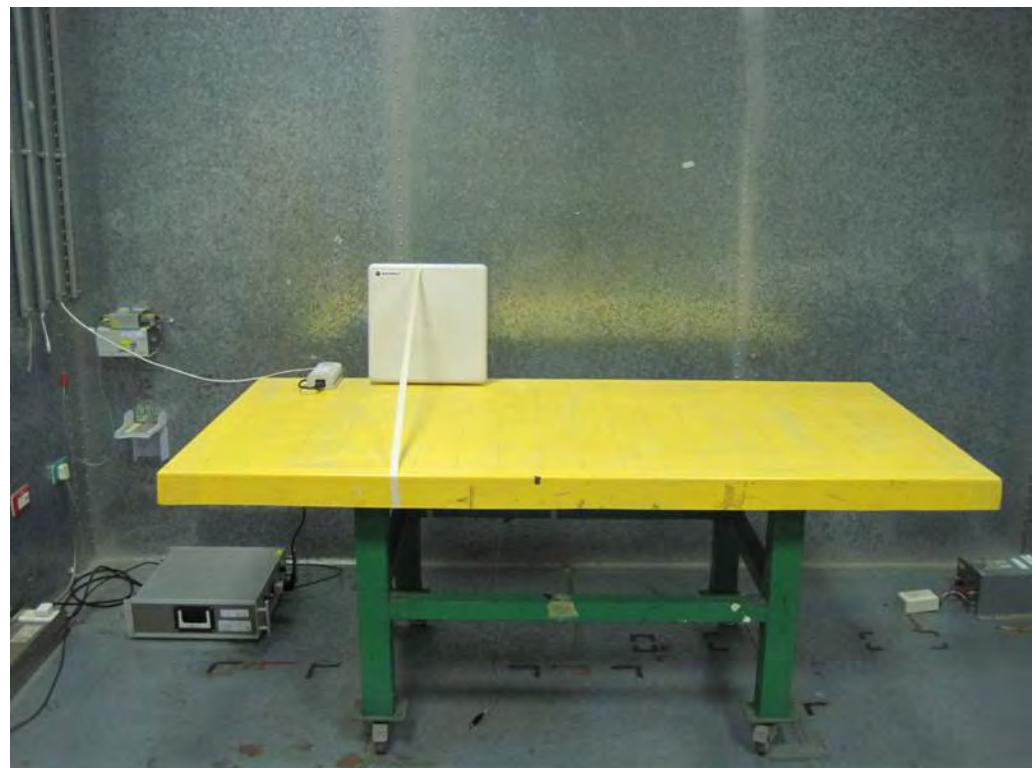
The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix

## Appendix A. Test Photos

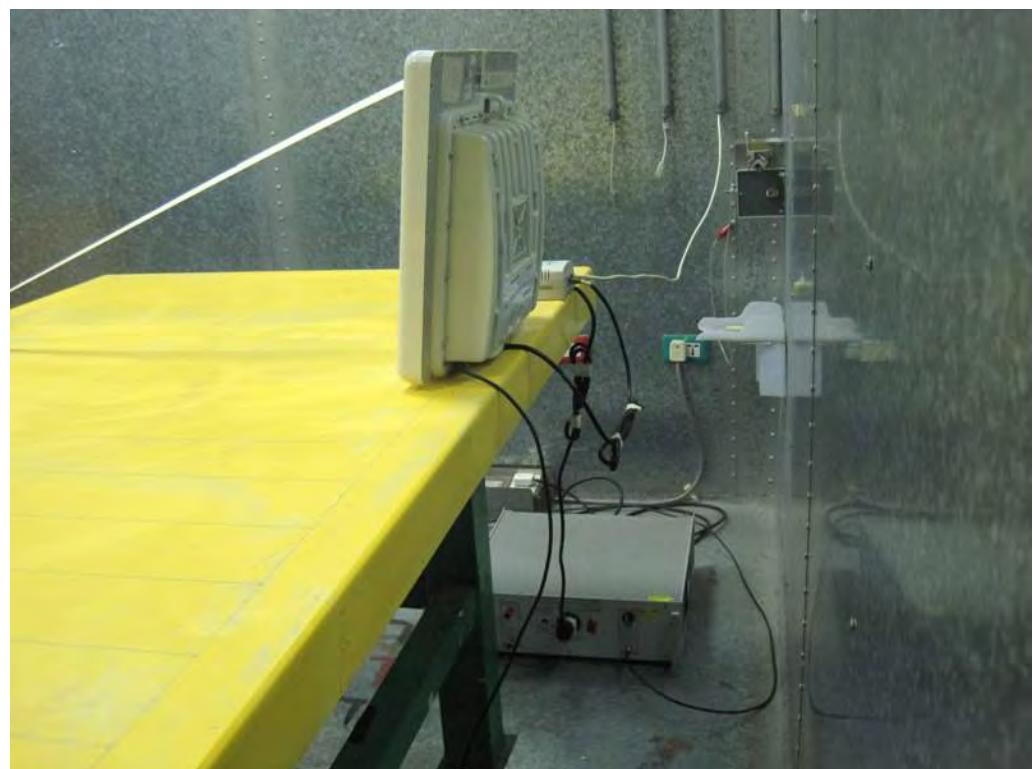
## 1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 1

**FRONT VIEW**



**REAR VIEW**

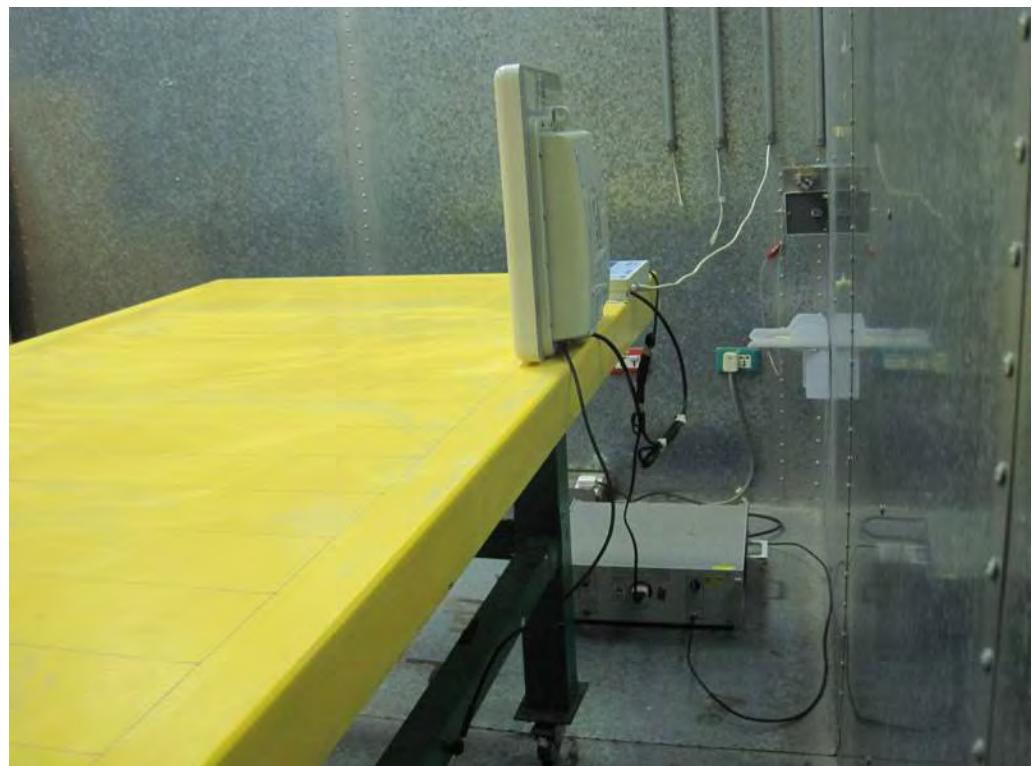


Test Mode: Mode 2

**FRONT VIEW**



**REAR VIEW**



## 2. Photographs of Radiated Emissions Test Configuration

Test Mode: Mode 1

**FRONT VIEW**



**REAR VIEW**



Test Mode: Mode 2

**FRONT VIEW**



**REAR VIEW**



Test Mode: Mode 3

**FRONT VIEW**



**REAR VIEW**



Test Mode: Mode 4

**FRONT VIEW**



**REAR VIEW**

