

FCC EMI TEST REPORT

REPORT NO. : FC491863
MODEL NO. : MWIR1
RECEIVED DATE : Sep. 18, 2014
FINAL TESTED DATE : Nov. 10, 2014
ISSUED DATE : Jan. 22, 2015

**TEST STANDARD : 47 CFR FCC Rules and Regulations Part 15
Subpart B, Class B Digital Device**

Filing Type : Certification

FCC ID : HLZMWIR1

APPLICANT : Acer Inc.
**ADDRESS : 8F, 88, Sec 1, Hsin Tai Wu Rd Hsichih, Taipei Hsien,
221 Taiwan**

Manufacturer : Abocom Systems, Inc.
**ADDRESS : No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County
35059, Taiwan R.O.C.**

ISSUED BY : SPORTON International Inc.
**LAB ADDRESS : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.**

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- This test report is only applicable to U.S.A..



Table of Contents

CERTIFICATE OF COMPLIANCE.....	1
1. Summary of Test Results	2
2. General Description of Equipment under Test.....	3
3. Test Configuration of Equipment under Test	4
4. General Information of Test.....	6
5. Test of Conducted Emission	7
6. Test of Radiated Emission.....	11
7. List of Measuring Equipment Used	23
8. Uncertainty of Test Site	25
Appendix A. TEST PHOTOS	A1 ~ A4

History of This Test Report

REPORT NO.	VERSION	ISSUED DATE	Description
FC491863	Rev. 01	Jan. 22, 2015	Initial issue of report

CERTIFICATE OF COMPLIANCE

EQUIPMENT NAME : Wireless for HDMI 60 GHz

BRAND NAME : Acer

MODEL NO. : MWIR1

APPLICANT : Acer Inc.

**ADDRESS : 8F, 88, Sec 1, Hsin Tai Wu Rd Hsichih, Taipei
Hsien, 221 Taiwan**

FINAL TESTED DATE : Nov. 10, 2014

**TEST STANDARD : 47 CFR FCC Rules and Regulations Part 15
Subpart B, Class B Digital Device**

I HEREBY CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2009**.

The above equipment has been tested by **SPORTON International Inc. LAB.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMI characteristics under the conditions specified in this report.



Ray Yeh

SPORTON INTERNATIONAL INC.

1. Summary of Test Results

After estimating all the combination of every test mode, the result shown as below is the worst case.

The EUT has been tested according to the following specifications.

EMISSION			
Test Standard	Test Type	Result	Remarks
47 CFR FCC Rules and Regulations Part 15 Subpart B, Class B Digital Device	AC Power Port Conducted emission test 150 kHz – 30 MHz	PASS	Meet minimum passing margin is -13.53dB at 0.27734MHz.
	Radiated emission test 30 MHz – 1,000 MHz @ 3 m 1,000 MHz – 18,000 MHz @ 3 m 18,000 MHz – 40,000 MHz @ 1 m	PASS	Meet minimum passing margin is -2.56dB at 2227.59MHz.

2. General Description of Equipment under Test

Product Detail	
Equipment Name	Wireless for HDMI 60 GHz
Model No.	MWIR1
Brand Name	Acer
Power Supply	From host system

2.1. Feature of Equipment under Test

1. Accessories

N/A

2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2. Modification of EUT

Please refer to the Photographs of EUT.

3. Test Configuration of Equipment under Test

3.1. Test Mode

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.

All test items	
Test Mode	Description
1	Normal Link

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

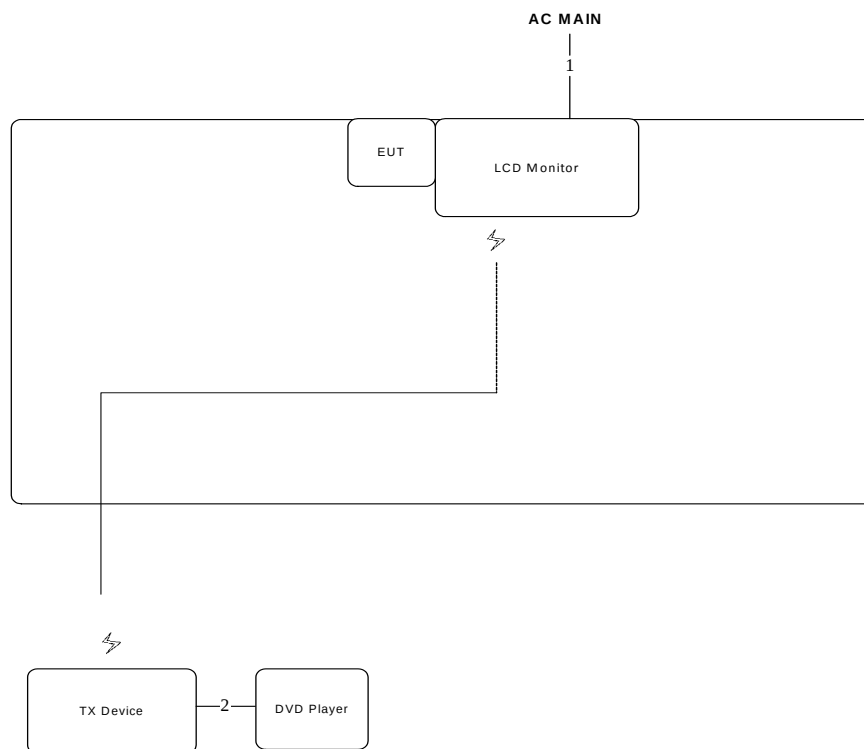
Support Unit	Brand	Model	FCC ID
DVD Player	Plioneer	DV-600AV-S	DoC
LCD Monitor	BenQ	EW2740-B	DoC
Wireless for HDMI 60 GHz (TX Device)	Acer	MWIT1	HLZMWIT1

3.3. EUT Operation Condition

The EUT transmits audio and video to local LCD Monitor from DVD player by WiHD.

3.4. Connection Diagram of Test System

3.4.1. AC Power Line Conduction and Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	HDMI cable	Yes	1.2m

4. General Information of Test

4.1. Test Facility

Test Site Location : 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
Test Site No. : Conduction: CO01-CB
Radiation: 03CH01-CB

4.2. Test Voltage

Power Type	Test Voltage
AC Power Supply	120 V / 60 Hz

4.3. Standard for Methods of Measurement

ANSI C63.4-2009

4.4. Frequency Range Investigated

Test Items	Frequency Range
Conducted emission test	150 kHz to 30 MHz
Radiated emission test	30 MHz to 40,000 MHz

4.5. Test Distance

Test Items	Test Distance
Radiated emission test below 1 GHz (30 MHz to 1,000 MHz)	3 m
Radiated emission test above 1 GHz (1,000 MHz to 18,000 MHz)	3 m
Radiated emission test above 1 GHz (18,000 MHz to 40,000 MHz)	1 m

5. Test of Conducted Emission

5.1. Limit

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

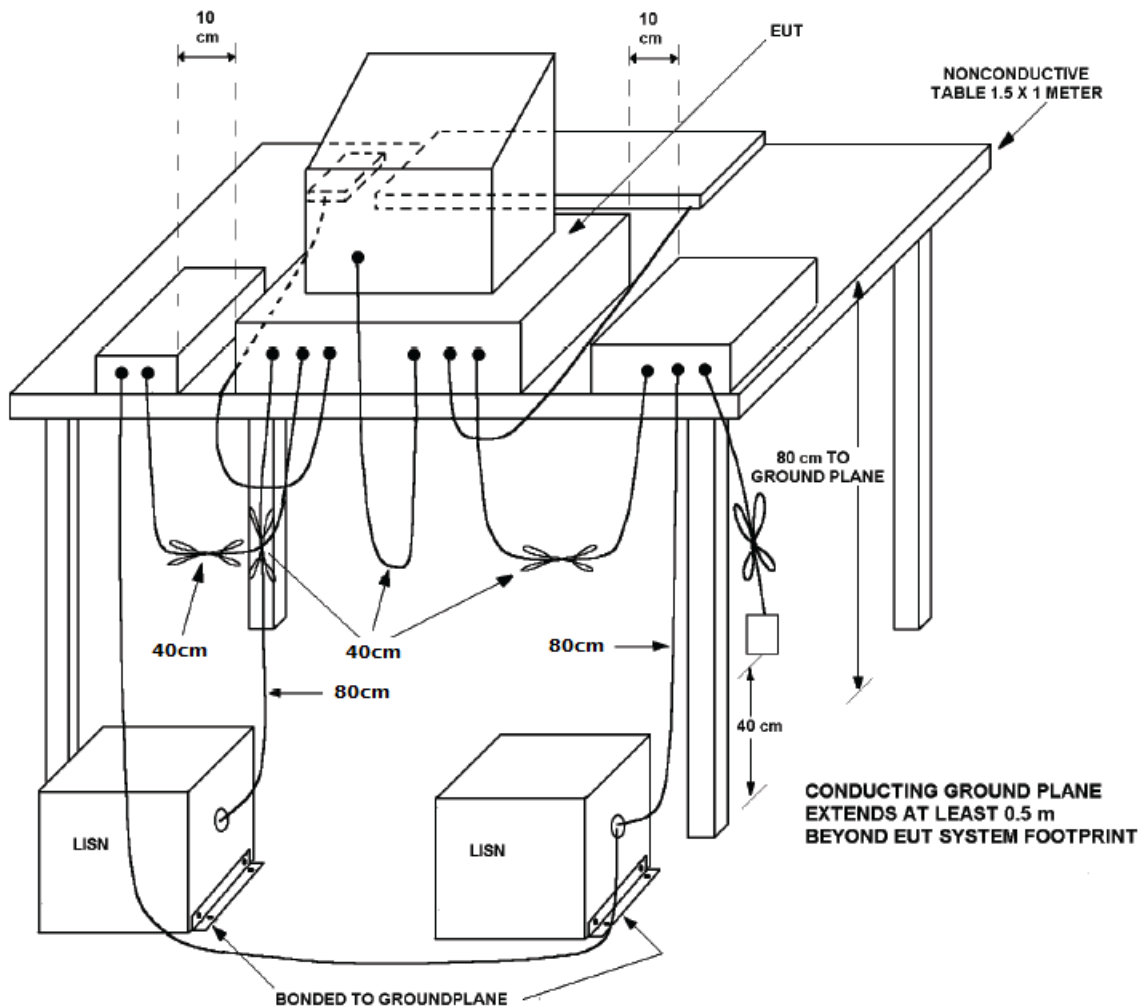
5.2. Description of Major Test Instruments

Test Receiver	R&S ESCS 30
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

5.3. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connect to the other LISN.
- The LISN provides 50 Ω coupling impedance for the measuring instrument.
- The FCC states that a 50 Ω , 50 μ H LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

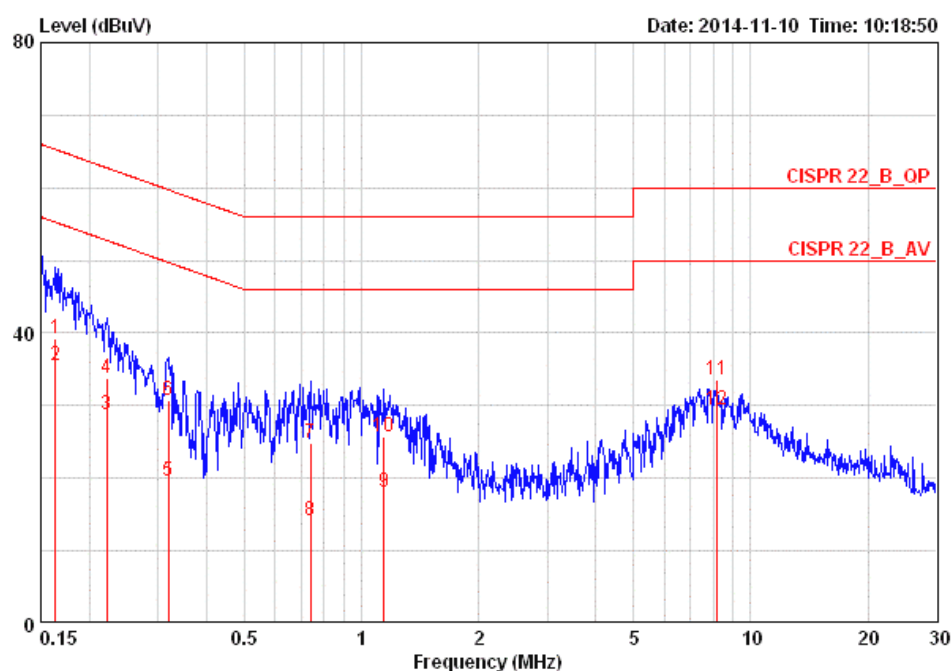
5.4. Typical Test Setup Layout of Conducted Emission



5.5. Test Result of AC Power Ports

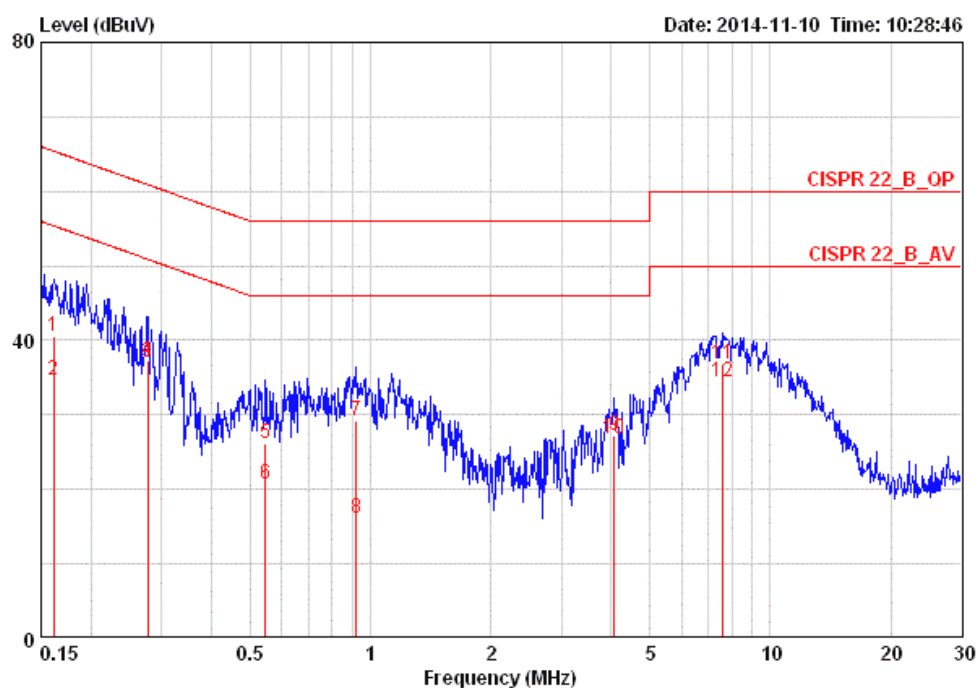
Temperature	23°C	Humidity	53%
Test Engineer	Edison Lin	Frequency Range	0.15 MHz to 30 MHz
Test Mode	Mode 1		
▪ Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level ▪ Margin = - Limit + (Read Level + LISN Factor + Cable Loss) ▪ All emissions not reported here are more than 10 dB below the prescribed limit. ▪ The test was passed at the minimum margin that marked by a frame in the following table			

Line



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.16327	39.34	-25.96	65.30	29.22	9.96	0.16	QP	LINE
2 @	0.16327	35.61	-19.69	55.30	25.49	9.96	0.16	AVERAGE	LINE
3	0.22201	28.79	-23.96	52.74	18.66	9.96	0.17	AVERAGE	LINE
4	0.22201	33.69	-29.06	62.74	23.56	9.96	0.17	QP	LINE
5	0.31830	19.59	-30.16	49.75	9.46	9.95	0.18	AVERAGE	LINE
6	0.31830	30.81	-28.94	59.75	20.68	9.95	0.18	QP	LINE
7	0.73910	24.81	-31.19	56.00	14.63	9.98	0.19	QP	LINE
8	0.73910	14.08	-31.92	46.00	3.90	9.98	0.19	AVERAGE	LINE
9	1.141	18.08	-27.93	46.00	7.86	10.01	0.21	AVERAGE	LINE
10	1.141	25.64	-30.37	56.00	15.42	10.01	0.21	QP	LINE
11	8.148	33.61	-26.39	60.00	23.06	10.19	0.36	QP	LINE
12 @	8.148	29.40	-20.60	50.00	18.85	10.19	0.36	AVERAGE	LINE

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.16155	40.53	-24.85	65.38	30.42	9.95	0.16	QP	NEUTRAL
2 @	0.16155	34.67	-20.71	55.38	24.56	9.95	0.16	AVERAGE	NEUTRAL
3	0.27734	37.05	-23.85	60.90	26.93	9.95	0.17	QP	NEUTRAL
4 @	0.27734	37.37	-13.53	50.90	27.25	9.95	0.17	AVERAGE	NEUTRAL
5	0.54644	26.09	-29.91	56.00	15.95	9.96	0.19	QP	NEUTRAL
6	0.54644	20.69	-25.31	46.00	10.55	9.96	0.19	AVERAGE	NEUTRAL
7	0.92330	29.11	-26.89	56.00	18.93	9.99	0.20	QP	NEUTRAL
8	0.92330	16.20	-29.80	46.00	6.02	9.99	0.20	AVERAGE	NEUTRAL
9 @	4.070	27.35	-18.65	46.00	17.00	10.05	0.30	AVERAGE	NEUTRAL
10	4.070	26.86	-29.14	56.00	16.51	10.05	0.30	QP	NEUTRAL
11	7.566	36.76	-23.24	60.00	26.25	10.15	0.36	QP	NEUTRAL
12 @	7.566	34.46	-15.54	50.00	23.95	10.15	0.36	AVERAGE	NEUTRAL

6. Test of Radiated Emission

6.1. Limit

Radiated Emission below 1 GHz test at 3 m:

Frequency (MHz)	QP (dBuV/m)
30~88	40
88~216	43.5
216~960	46
Above 960	54

Radiated Emission 1~18 GHz test at 3 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
1,000 to 18,000	74	54

Radiated Emission 18~40 GHz test at 1 m:

Frequency (MHz)	PK (dBuV/m)	AV (dBuV/m)
18,000 to 40,000	83.54	63.54

6.2. Description of Major Test Instruments

6.2.1. 30 MHz ~ 1,000 MHz

Receiver Parameter	Setting
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

6.2.2. Above 1 GHz

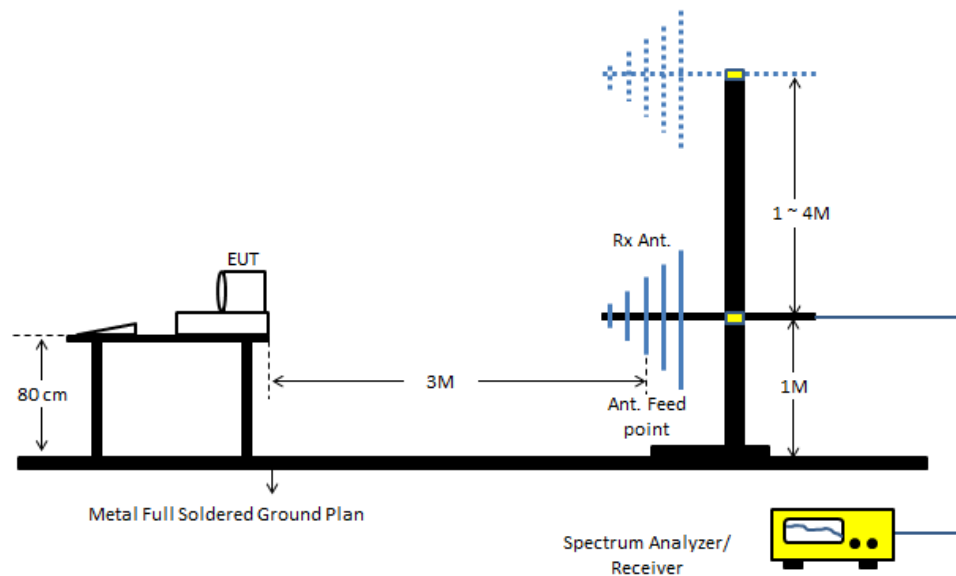
Spectrum Parameter	Setting
Start Frequency	1000 MHz
Stop Frequency	5th harmonic of highest frequency
RBW / VBW	1 MHz / 3MHz for Peak ; 1 MHz / 10Hz for Average

6.3. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3m meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the 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 and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission 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.

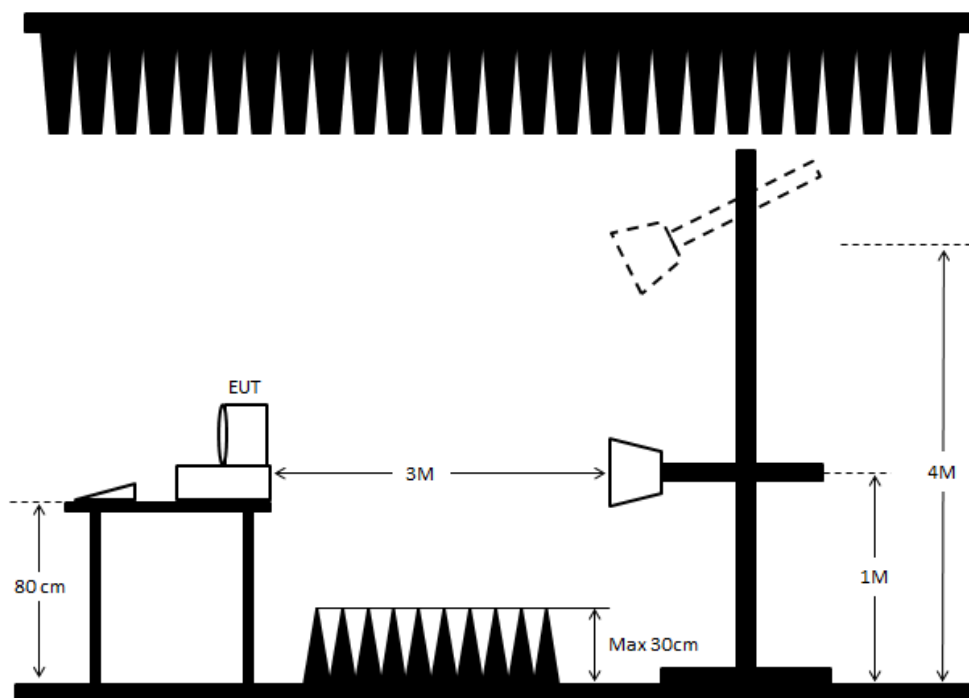
6.4. Typical Test Setup Layout of Radiated Emission

<Below 1 GHz>:

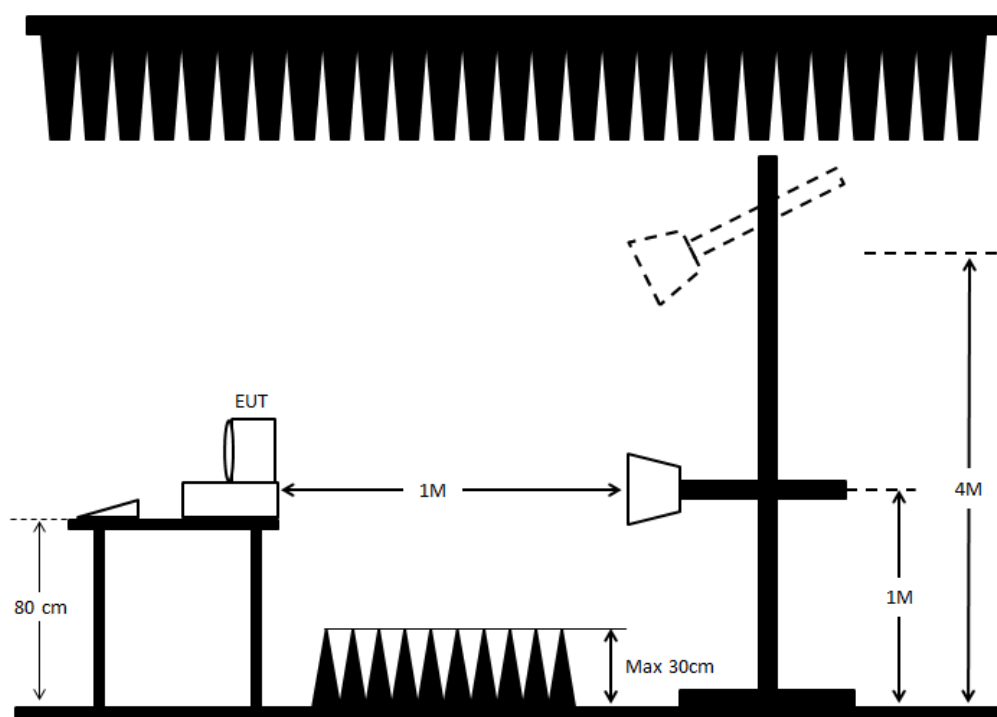


<Above 1 GHz>:

1,000~18,000 MHz



18,000~40,000 MHz



6.5. Test Result of Radiated Emission below 1 GHz

Temperature	23°C	Humidity	61%
Test Engineer	Satoshi Yang	Frequency Range	30 MHz to 1,000 MHz
Test Mode	Mode 1		
▪ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level ▪ Margin = - Limit + (Read Level + Antenna Factor + Cable Loss - Preamp Factor) ▪ The test was passed at the minimum margin that marked by the frame in the following test record			

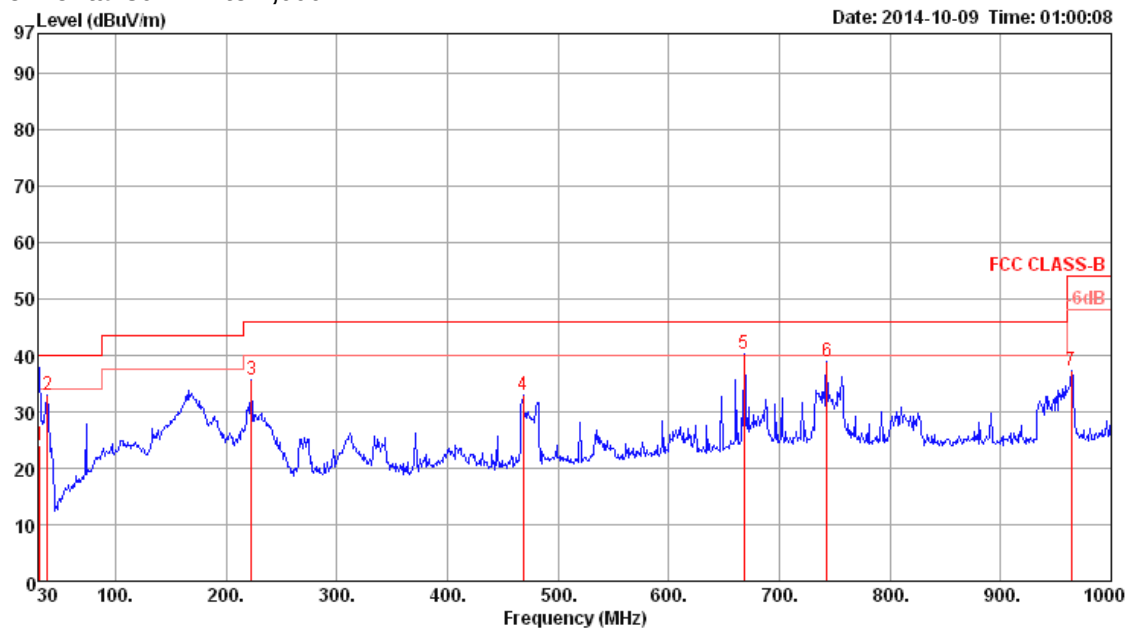
Vertical 30 MHz to 1,000 MHz



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	Remark	cm	deg	Pol/Phase
1	30.97	36.80	40.00	-3.20	45.75	0.63	18.22	27.80	Peak	400	0	VERTICAL
2	37.76	34.12	40.00	-5.88	46.94	0.68	14.30	27.80	Peak	400	0	VERTICAL
3	73.65	35.31	40.00	-4.69	55.25	0.94	6.83	27.71	Peak	400	0	VERTICAL
4	223.03	42.55	46.00	-3.45	57.11	1.72	10.77	27.05	QP	100	148	VERTICAL
5	466.50	34.19	46.00	-11.81	42.48	2.54	17.10	27.93	Peak	400	0	VERTICAL
6	668.26	35.51	46.00	-10.49	41.52	3.03	18.99	28.03	Peak	400	0	VERTICAL

Horizontal 30 MHz to 1,000 MHz

Date: 2014-10-09 Time: 01:00:08

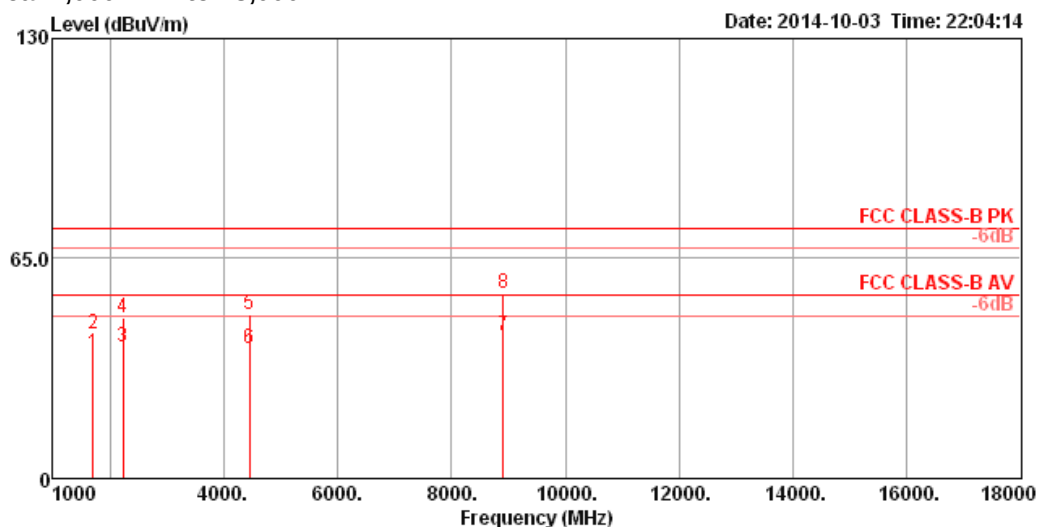


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	31.94	23.93	40.00	-16.07	33.39	0.65	17.69	27.80	QP	162	160
2	38.73	33.05	40.00	-6.95	46.48	0.67	13.70	27.80	Peak	100	0
3	223.03	35.56	46.00	-10.44	50.12	1.72	10.77	27.05	Peak	100	0
4	468.44	32.93	46.00	-13.07	41.20	2.54	17.13	27.94	Peak	100	0
5	668.26	40.25	46.00	-5.75	46.26	3.03	18.99	28.03	Peak	100	0
6	742.95	39.04	46.00	-6.96	44.30	3.19	19.38	27.83	Peak	100	0
7	964.11	37.19	54.00	-16.81	39.74	3.57	21.02	27.14	Peak	100	0

6.6. Test Result of Radiated Emission above 1 GHz

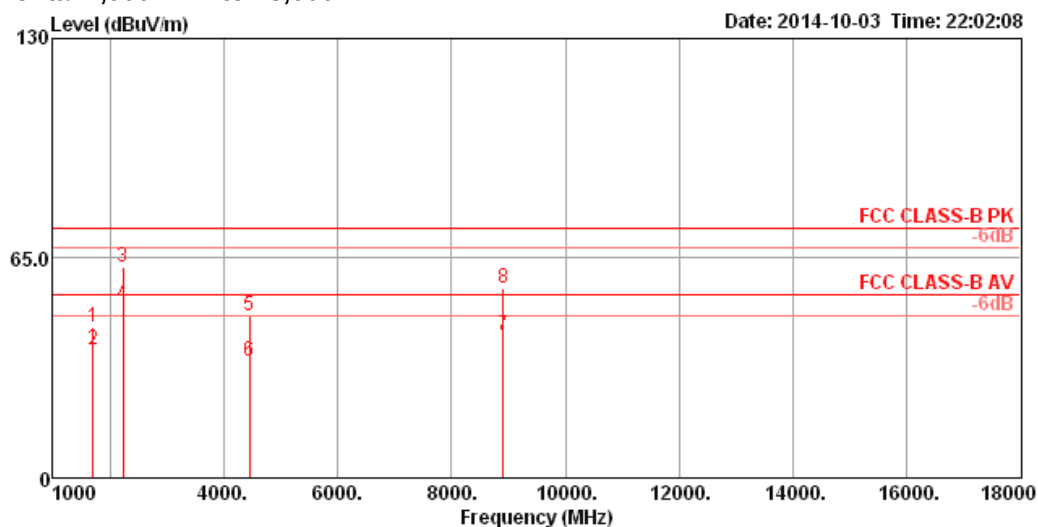
Temperature	26°C	Humidity	61%
Test Engineer	Satoshi Yang	Frequency Range	1,000 MHz to 40,000 MHz
Test Mode	Mode 1		
▪ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level ▪ Margin = - Limit + (Read Level + Antenna Factor + Cable Loss - Preamp Factor) ▪ The test was passed at the minimum margin that marked by the frame in the following test record			

Vertical 1,000 MHz to 18,000 MHz



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1707.75	36.98	54.00	-17.02	44.83	3.11	25.62	36.58	101	155	VERTICAL	Average
2	1707.81	42.50	74.00	-31.50	50.35	3.11	25.62	36.58	101	155	VERTICAL	Peak
3	2227.52	38.99	54.00	-15.01	43.21	3.58	27.91	35.71	190	190	VERTICAL	Average
4	2227.84	47.26	74.00	-26.74	51.47	3.59	27.91	35.71	190	190	VERTICAL	Peak
5	4454.36	48.28	74.00	-25.72	46.27	5.24	31.98	35.21	107	176	VERTICAL	Peak
6	4455.06	38.44	54.00	-15.56	36.43	5.24	31.98	35.21	107	176	VERTICAL	Average
7	8909.71	42.19	54.00	-11.81	32.49	7.60	37.70	35.60	159	171	VERTICAL	Average
8	8909.85	54.49	74.00	-19.51	44.79	7.60	37.70	35.60	159	171	VERTICAL	Peak

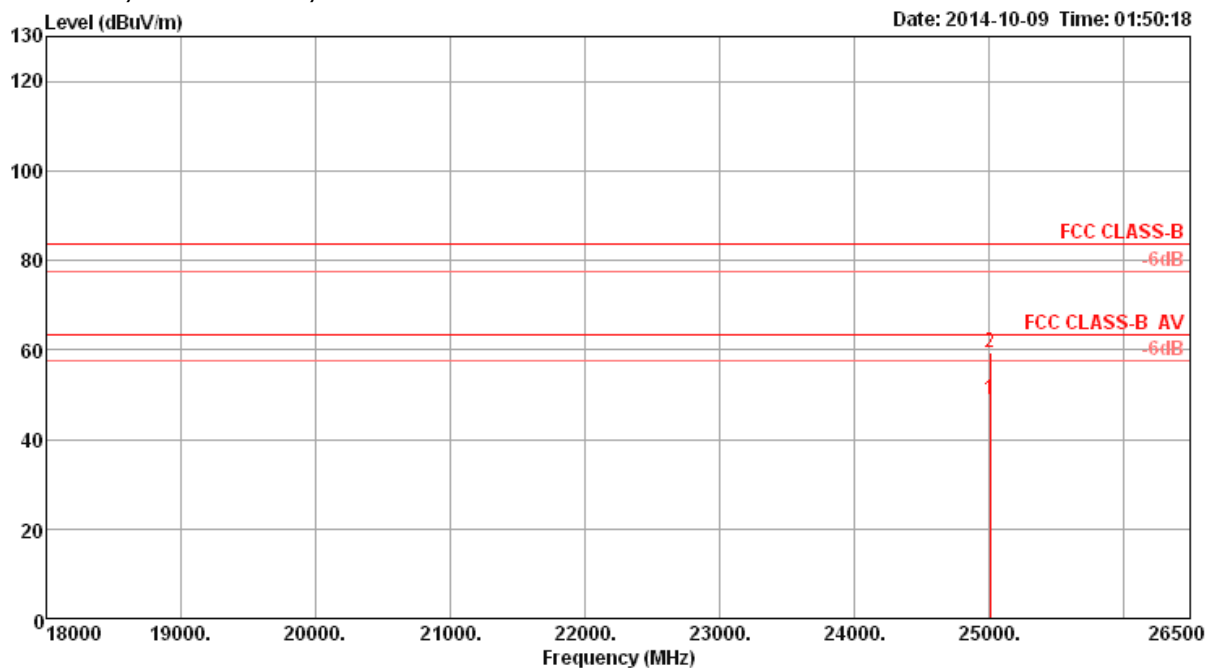
Horizontal 1,000 MHz to 18,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	1707.19	44.60	74.00	-29.40	52.45	3.11	25.62	36.58	123	278	HORIZONTAL Peak
2	1707.77	38.08	54.00	-15.92	45.93	3.11	25.62	36.58	123	278	HORIZONTAL Average
3	2227.28	62.31	74.00	-11.69	66.53	3.58	27.91	35.71	124	114	HORIZONTAL Peak
4	2227.59	51.44	54.00	-2.56	55.66	3.58	27.91	35.71	124	114	HORIZONTAL Average
5	4454.76	48.10	74.00	-25.90	46.09	5.24	31.98	35.21	100	145	HORIZONTAL Peak
6	4454.96	34.72	54.00	-19.28	32.71	5.24	31.98	35.21	100	145	HORIZONTAL Average
7	8909.28	41.98	54.00	-12.02	32.28	7.60	37.70	35.60	100	155	HORIZONTAL Average
8	8909.92	56.25	74.00	-17.75	46.55	7.60	37.70	35.60	100	155	HORIZONTAL Peak

Vertical 18,000 MHz to 26,500 MHz

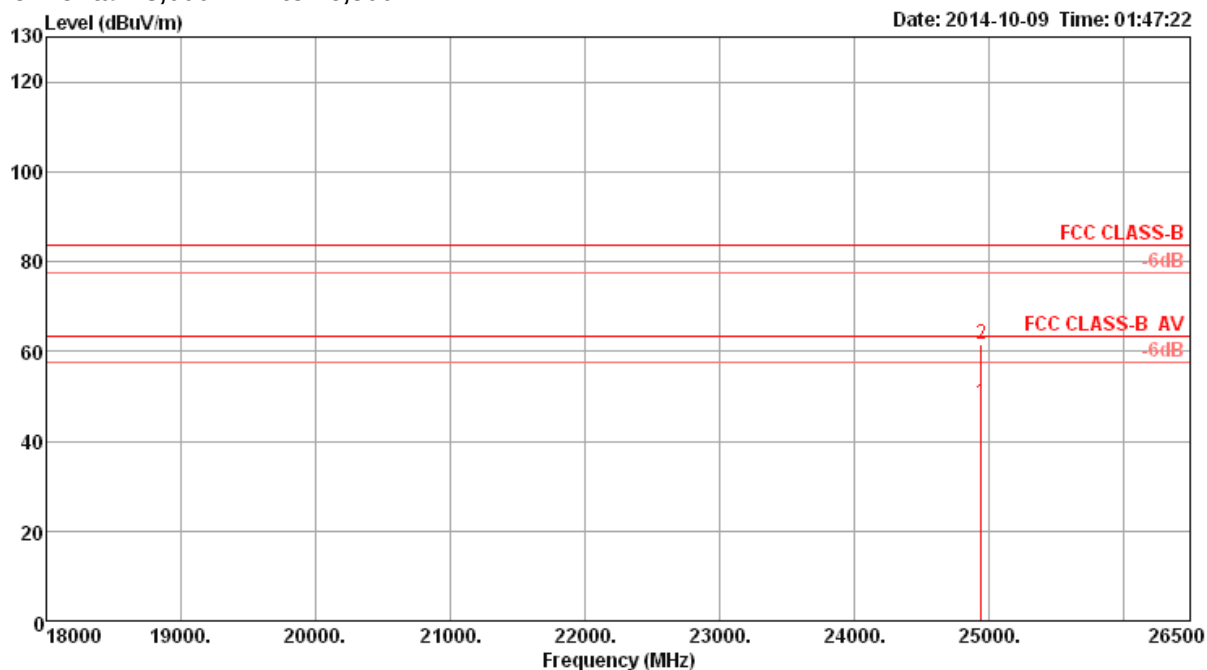
Date: 2014-10-09 Time: 01:50:18



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	25014.50	49.05	63.54	-14.49	33.44	11.71	39.09	35.19	Average	100	147
2	25014.50	59.28	83.54	-24.26	43.67	11.71	39.09	35.19	Peak	100	147

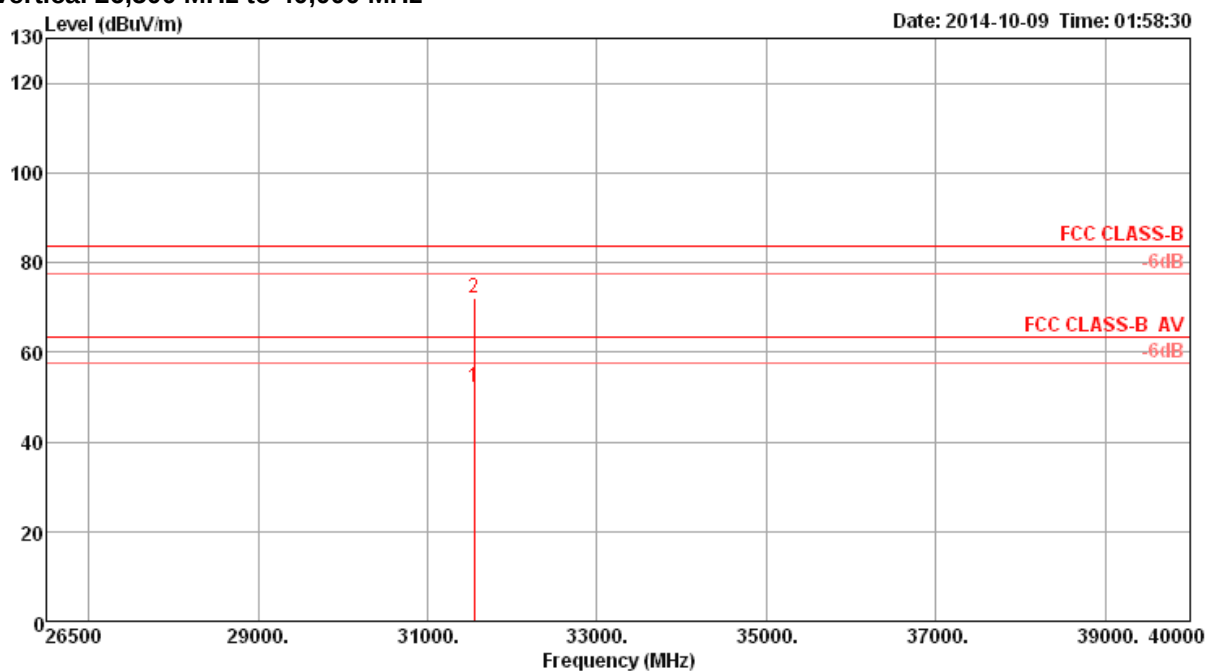
Horizontal 18,000 MHz to 26,500 MHz

Date: 2014-10-09 Time: 01:47:22



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	24945.00	48.57	63.54	-14.97	33.04	11.67	39.09	35.23	Average	100	20 HORIZONTAL
2	24945.00	61.68	83.54	-21.86	46.15	11.67	39.09	35.23	Peak	100	20 HORIZONTAL

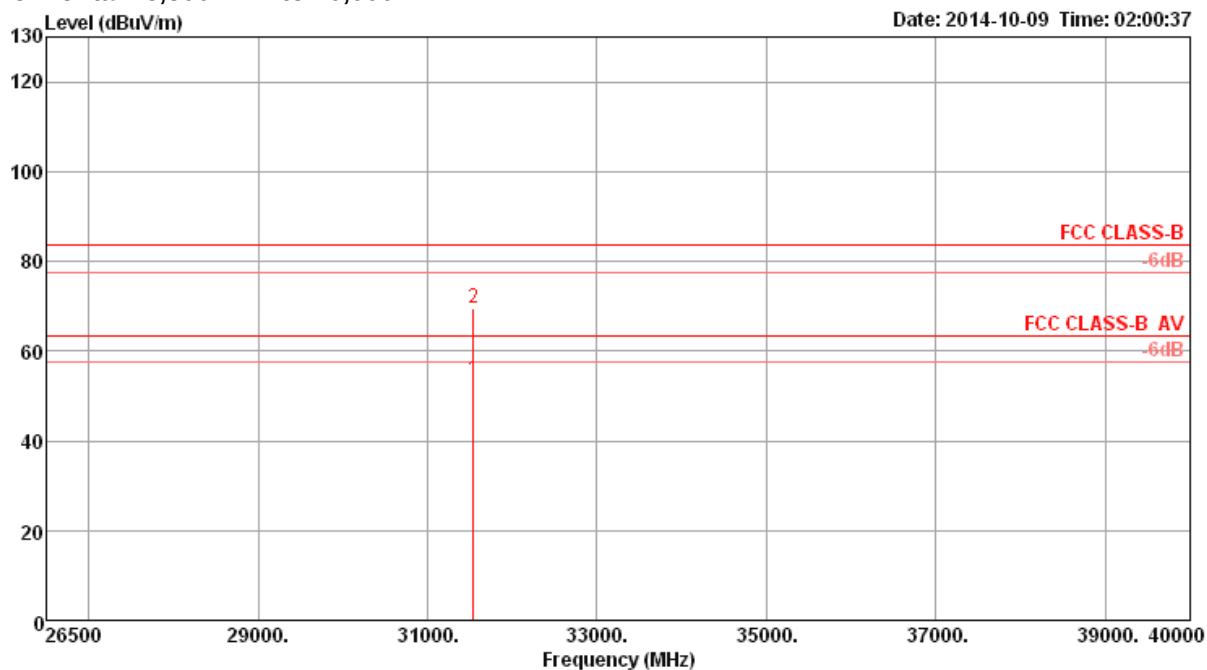
Vertical 26,500 MHz to 40,000 MHz



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	31547.97	52.22	63.54	-11.32	41.73	11.71	40.02	41.24	Average	100	357	VERTICAL
2	31553.21	72.09	83.54	-11.45	61.53	11.71	40.02	41.17	Peak	100	357	VERTICAL

Horizontal 26,500 MHz to 40,000 MHz

Date: 2014-10-09 Time: 02:00:37



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	31544.40	53.59	63.54	-9.95	43.10	11.71	40.02	41.24	Average	100	37 HORIZONTAL
2	31544.40	69.40	83.54	-14.14	58.91	11.71	40.02	41.24	Peak	100	37 HORIZONTAL

7. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 23, 2014	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	--	26GHz ~ 40GHz	Feb. 17, 2014	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Apr. 22, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)

RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
---------------	-------	--------------	-----	----------------	---------------	--------------------------

※ Calibration Interval of instruments listed above is one year.

※ NCR means Non-Calibration required.

8. Uncertainty of Test Site

Test Items	Uncertainty	Remark
Conducted Emissions	2.4 dB	Confidence levels of 95%
Radiated Emissions below 1GHz	3.6 dB	Confidence levels of 95%
Radiated Emissions 1GHz ~ 18GHz	3.7 dB	Confidence levels of 95%
Radiated Emissions 18GHz ~ 40GHz	3.5 dB	Confidence levels of 95%