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..



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History of This Test Report

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

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Certificate No.: CB10311271

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

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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

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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.

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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.

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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	Ploneer	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

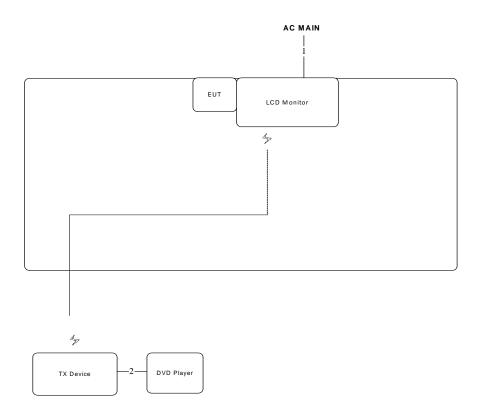
The EUT transmits audio and video to local LCD Monitor from DVD player by WiHD.

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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

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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

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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

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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

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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

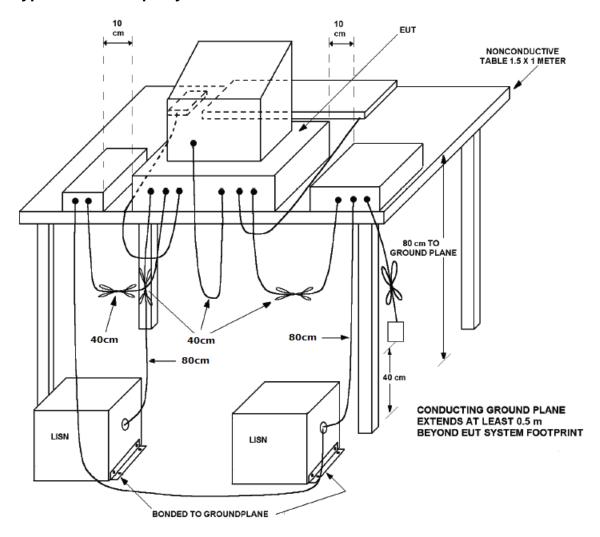
5.3. Test Procedures

- a. 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.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 Ω coupling impedance for the measuring instrument.
- e. The FCC states that a 50 Ω , 50 uH LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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5.4. Typical Test Setup Layout of Conducted Emission



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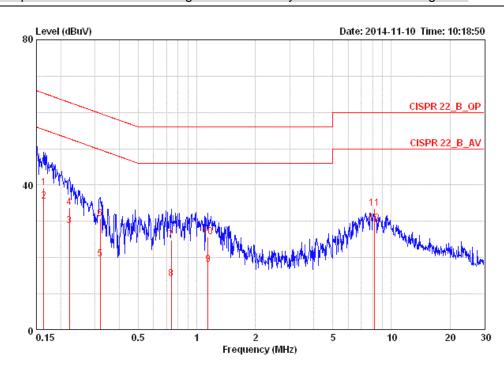
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5.5. Test Result of AC Power Ports

Temperature	23℃	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

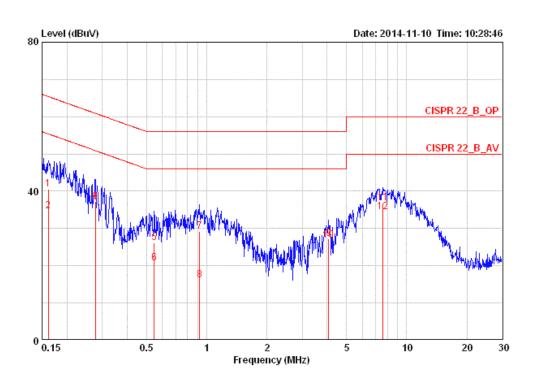
Line



			Uver	Limit	Kead	LIZN	Cable		
	Fre	I Level	Limit	Line	Level	Factor	Loss	Remark	Pol/Phase
	ми	z dBuV	- dB	dBuV	dBuV	dB	dB		
1	0.1632	7 39.34	-25.96	65.30	29.22	9.96	0.16	QP	LINE
2 @	0.1632	7 35.61	-19.69	55.30	25.49	9.96	0.16	AVERAGE	LINE
3	0.2220	1 28.79	-23.96	52.74	18.66	9.96	0.17	AVERAGE	LINE
4	0.2220	1 33.69	-29.06	62.74	23.56	9.96	0.17	QP	LINE
5	0.3183	0 19.59	-30.16	49.75	9.46	9.95	0.18	AVERAGE	LINE
6	0.3183	0 30.81	-28.94	59.75	20.68	9.95	0.18	QP	LINE
7	0.7391	0 24.81	-31.19	56.00	14.63	9.98	0.19	QP	LINE
8	0.7391	0 14.08	-31.92	46.00	3.90	9.98	0.19	AVERAGE	LINE
9	1.14	1 18.08	-27.93	46.00	7.86	10.01	0.21	AVERAGE	LINE
10	1.14	1 25.64	-30.37	56.00	15.42	10.01	0.21	QP	LINE
11	8.14	8 33.61	-26.39	60.00	23.06	10.19	0.36	QP	LINE
12 @	8.14	8 29.40	-20.60	50.00	18.85	10.19	0.36	AVERAGE	LINE

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Neutral



			0ver	Limit	Read	LISN	Cable		
	Freq	Level	Limit	Line	Level	Factor	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

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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

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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

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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.

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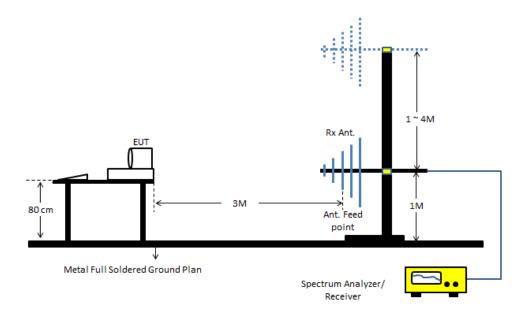
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization 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.

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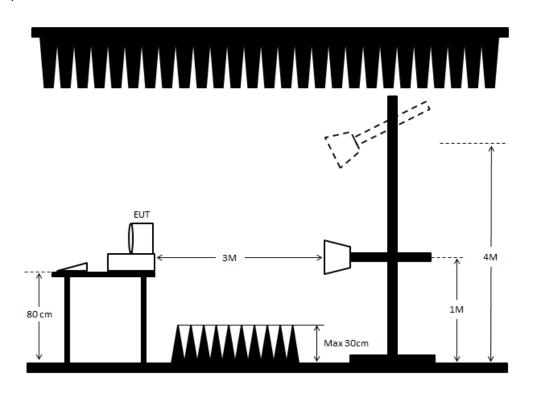
6.4. Typical Test Setup Layout of Radiated Emission

<Below 1 GHz>:



<Above 1 GHz>:

1,000~18,000 MHz

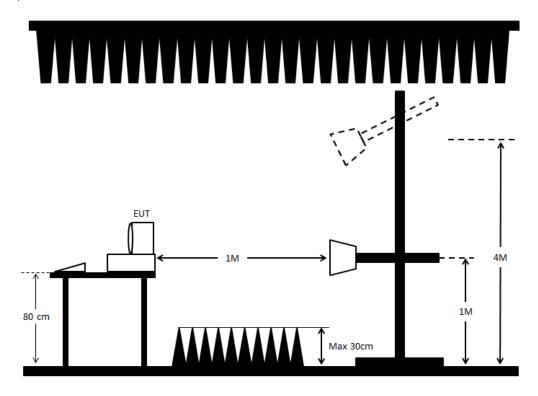


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18,000~40,000 MHz



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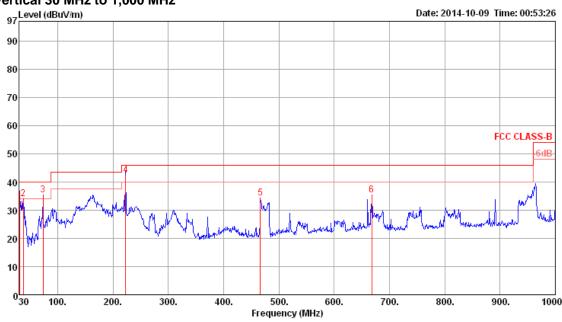
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6.5. Test Result of Radiated Emission below 1 GHz

Temperature	23 ℃	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

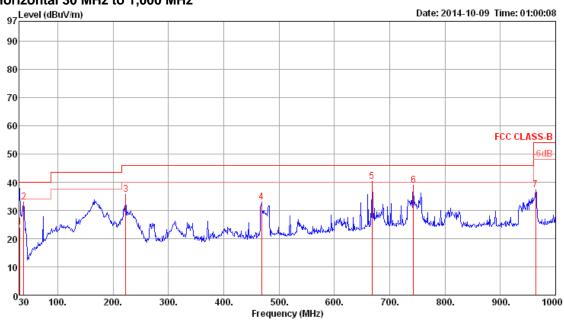


	Freq	Level	Limit Line	0∨er Limit	Read Level					A/Pos	T/Pos	Pol/Phase
	MHz	dBu√/m	dBu√/m	dB	dBu√	dB	dB/m	dB		cm	deg	
1	30.97	36.80	40.00	-3.20	45.75	0.63	18.22	27.80	Peak	400	0	VERTICAL
2	37.76	34.12	40.00	-5.88	46.94	0.68	14.30	27.80	Peak	400	0	VERTICAL
3	73.65	35.31	40.00	-4.69	55.25	0.94	6.83	27.71	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

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Horizontal 30 MHz to 1,000 MHz



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

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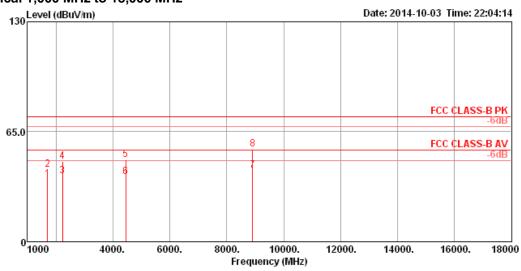
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6.6. Test Result of Radiated Emission above 1 GHz

Temperature	26℃	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

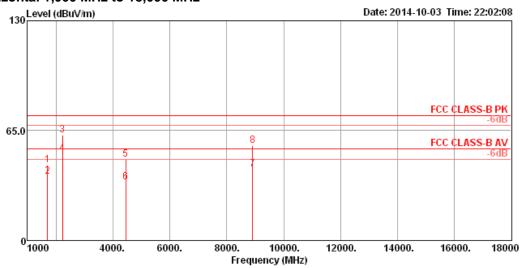


	Freq	Level	Limit Line	0ver Limit	Read Level	CableA Loss	ntenna Factor		A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBu\//m	dBu∀/m	dB	dBu∨	dB	dB/m	dB	cm	deg		
1	1707.75	36.98	54.00	-17.02	44.83	3.11	25.62	36.58	101	155	VERTICAL	Average
2	1707.81	42.50	74.00	-31.50	50.35	3.11	25.62	36.58	101	155	VERTICAL	Peak
3	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

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Horizontal 1,000 MHz to 18,000 MHz



	Freq	Level	Limit					Preamp Factor		T/Pos	Pol/Phase	Remark
	MHz	dBu∀/m	dBu∀/m	dB	dBu∀	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

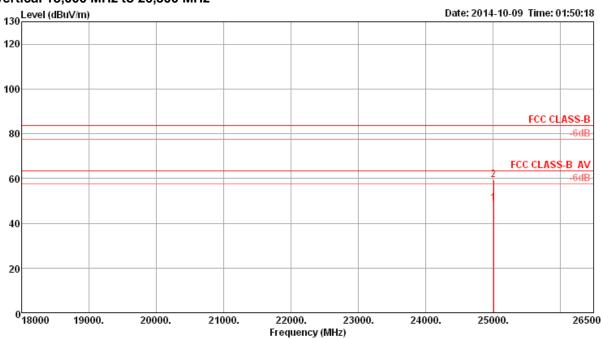
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Vertical 18,000 MHz to 26,500 MHz

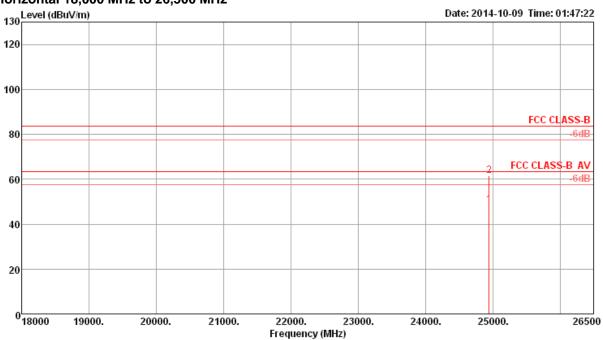


Freq	Level		0ver Limit					Remark	A/Pos	T/Pos Pol/Phase	
MHz	dBu\//m	dBu√/m	dB	dBu∖∕	dB	dB/m	dB		cm	deg	-
25014.50 25014.50									100 100	147 VERTICAL 147 VERTICAL	

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Horizontal 18,000 MHz to 26,500 MHz



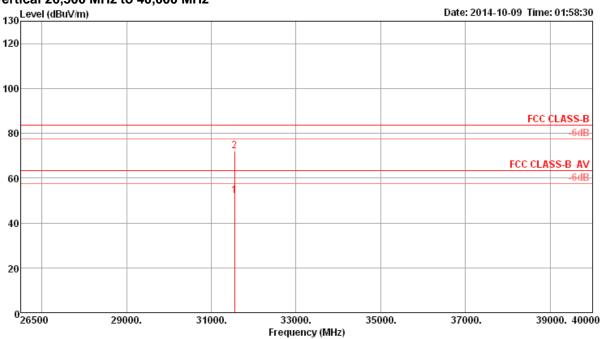
	Freq	Level	Limit Line	0ver Limit						A/Pos		Pol/Phase
	MHz	dBu∀/m	dBu\//m	dB	dBu∀	dB	dB/m	dB		cm	deg	
1	24945.00	48.57	63.54	-14.97	33.04	11.67	39.09	35.23	Average	100	20	HORIZONTAL
2	24945.00	61.68	83.54	-21.86	46.15	11.67	39.09	35.23	Peak	100	20	HORIZONTAL

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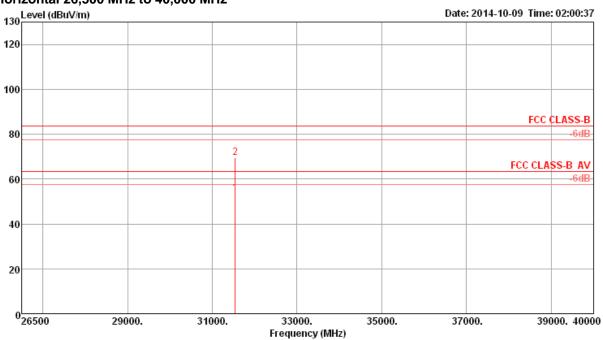


		Limit	0∨er	Read	Cable	\ntenna	Preamp		A/Pos	T/Pos	
Freq	Level	Line	Limit	Level	Loss	Factor	Factor	Remark			Pol/Phase
MHz	dBu√/m	dBu\//m	dB	dBu∀	dB	dB/m	dB			deg	
31547.97 31553.21									100 100		VERTICAL VERTICAL

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Horizontal 26,500 MHz to 40,000 MHz



	Freq	Level		0ver Limit					Remark	A/Pos		Pol/Phase
	MHz	dBu∨/m	dBu\//m	dB	dBu∀	dB	dB/m	dB			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

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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)

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RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
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 $[\]frak{\%}$ Calibration Interval of instruments listed above is one year.

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 $[\]divideontimes$ 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%

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