FCC PART 15 B

TEST REPORT

For

ISAW CAMERA INC.

#501, Suntech City 1st, Dunchon-Daero 474, Jungwon, Seongnam, Gyeonggi, Korea

FCC ID: 2AAHK-ISE1W

Report Type:	Product Type:
Original Report	ISAW-E1W

Test Engineer: Allen Qiao

Report Number: RDG150713001-00B

Report Date: 2015-07-31

Reviewed By: Sula Huang
RF Leader

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *ISAW CAMERA INC.*'s product, model number: *ISE1W(FCC ID: 2AAHK-ISE1W)* (or the "EUT") in this report was a *ISAW-E1W,* which was measured approximately: 5.5cm (L) x3.9 cm (W) x 2.7cm (H), rated input voltage: DC3.7V from Li-ion Battery or DC 5V charging from USB port.

Note: The series product, model ISE1W and ISE1, SCE1, SCE1W are electrically identical, the difference between them just is the model name, we selected ISE1W for fully testing, the details was explained in the attached declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 150713001 (Assigned by applicant). The EUT was received on 2015-07-14.*

Objective

This test report is prepared on behalf of *ISAW CAMERA INC.* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AAHK-ISE1W.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test Mode 1: Downloading

Test Mode 2: Charging&HDTV OUT

Equipment Modifications

The software "winthrax.exe" was used during test.

Local Support Equipment List and Details

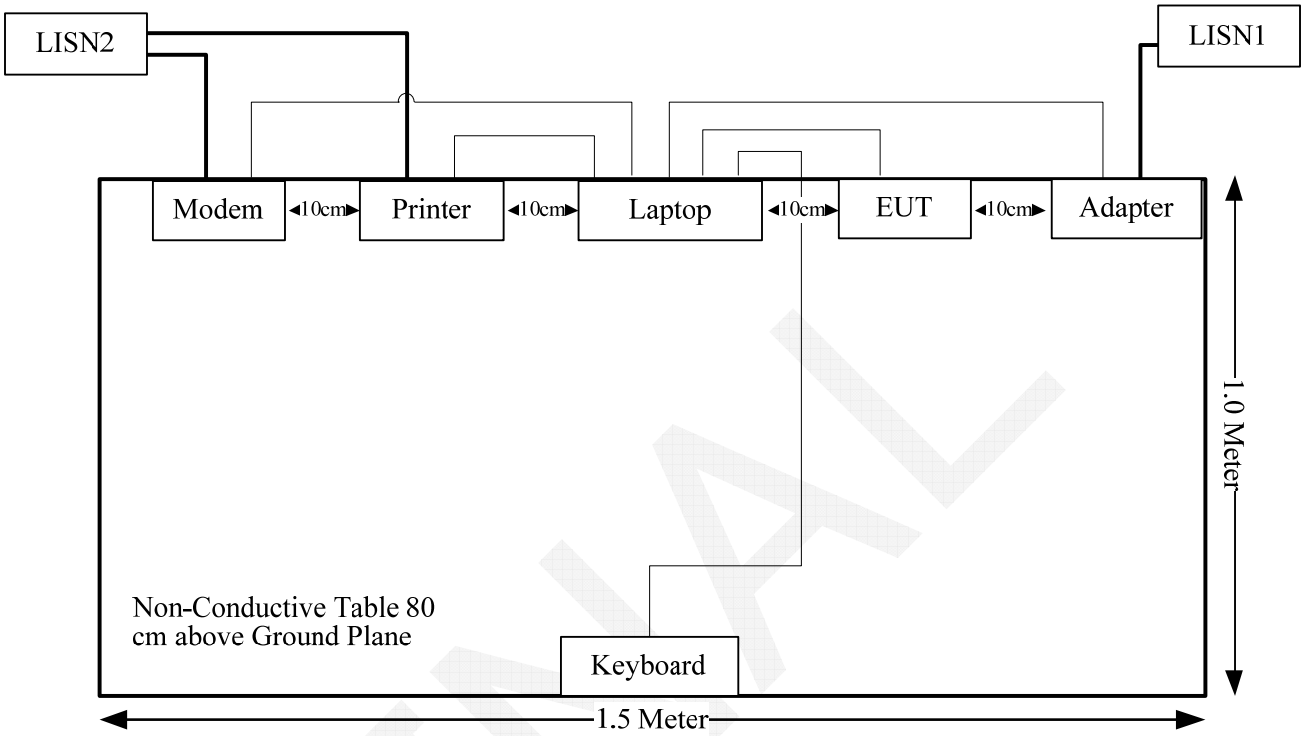
Manufacturer	Description	Model	Serial Number
For downloading mode			
HP	Printer	C3941A	JPTVOB2337
SAST	Modem	AEM-2100	0293
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Laptop	PP11L	N/A
SAMSUNG	TF Card	N/A	N/A
For charging&HDTV OUT			
SAMSUNG	Monitor	S22C330H	ZXDCHTHD10149K
Dongguan Aohai Power Technology Co.,Ltd	Adapter	A8-501000	N/A

Support Cable List and Details

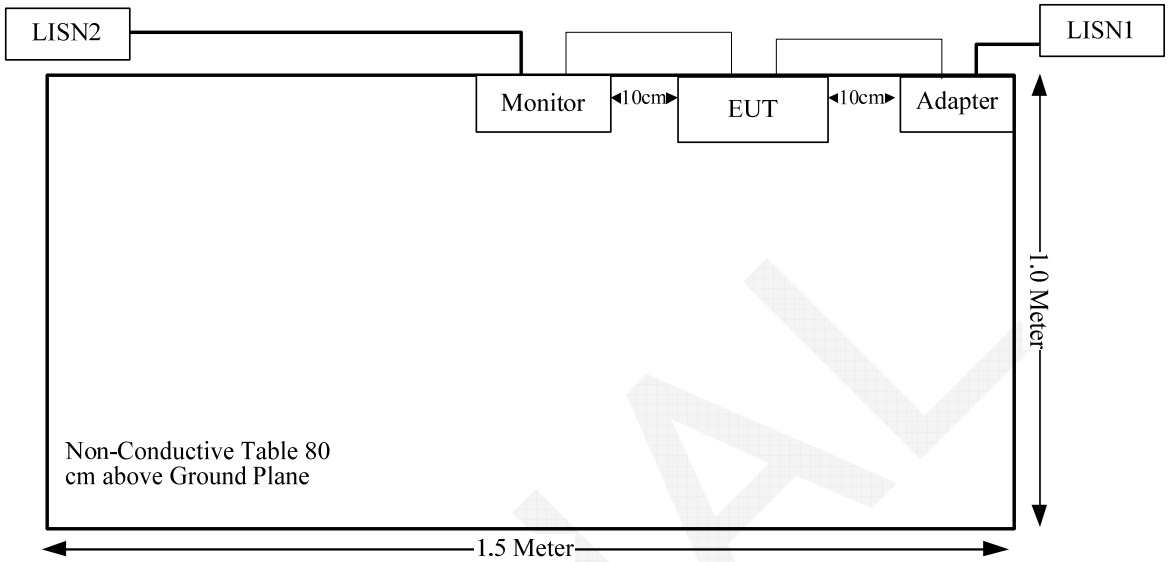
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
For downloading mode					
Parallel Cable	Yes	No	1.2	Parallel Port of Laptop	Printer
Serial Cable	Yes	No	1.2	Serial Port of Laptop	Modem
Keyboard Cable	Yes	No	1.8	USB Port of Laptop	Keyboard
USB Cable	Yes	No	0.6	USB Port of Laptop	EUT
For charging&HDTV OUT					
HDMI Cable	yes	yes	0.8	EUT	Monitor
USB Cable	Yes	No	0.6	USB Port of Adapter	EUT

Configuration of Test Setup

For downloading mode



For charging&HDTV OUT



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

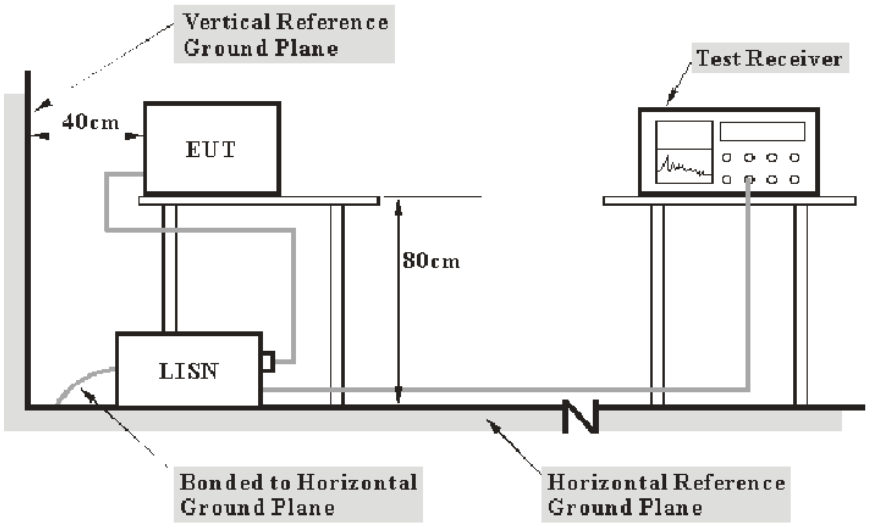
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120V/60Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2015-06-09	2016-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$

Herein,
V_C: corrected voltage amplitude

V_R: reading voltage amplitude

A_c: attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

2.60 dB at **0.639600 MHz** in the **Line** conducted mode

Test Data

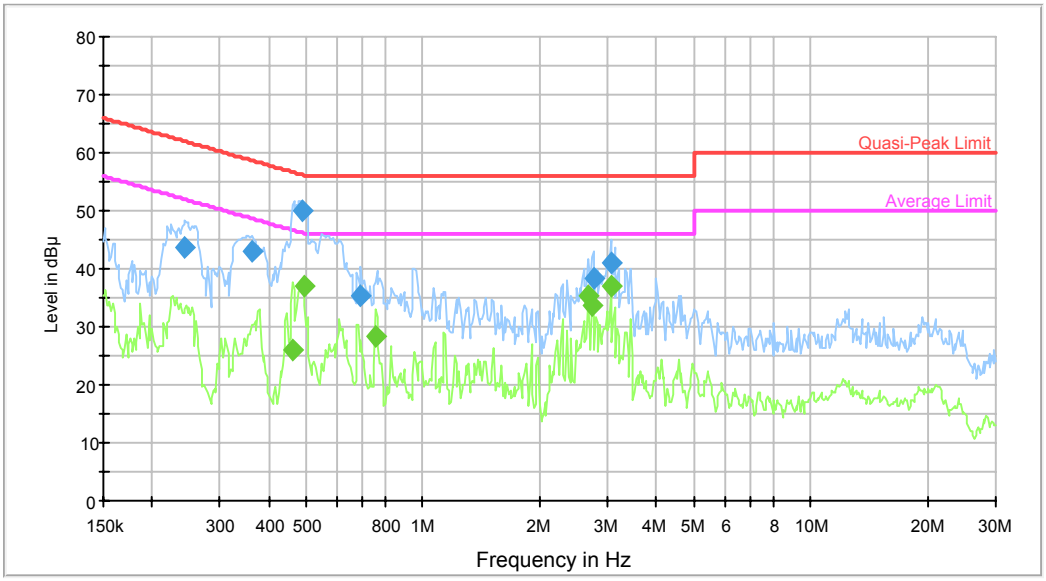
Environmental Conditions

Temperature:	28.6 °C
Relative Humidity:	57 %
ATM Pressure:	99.5kPa

The testing was performed by Allen Qiao on 2015-07-20.

Test Mode: Downloading

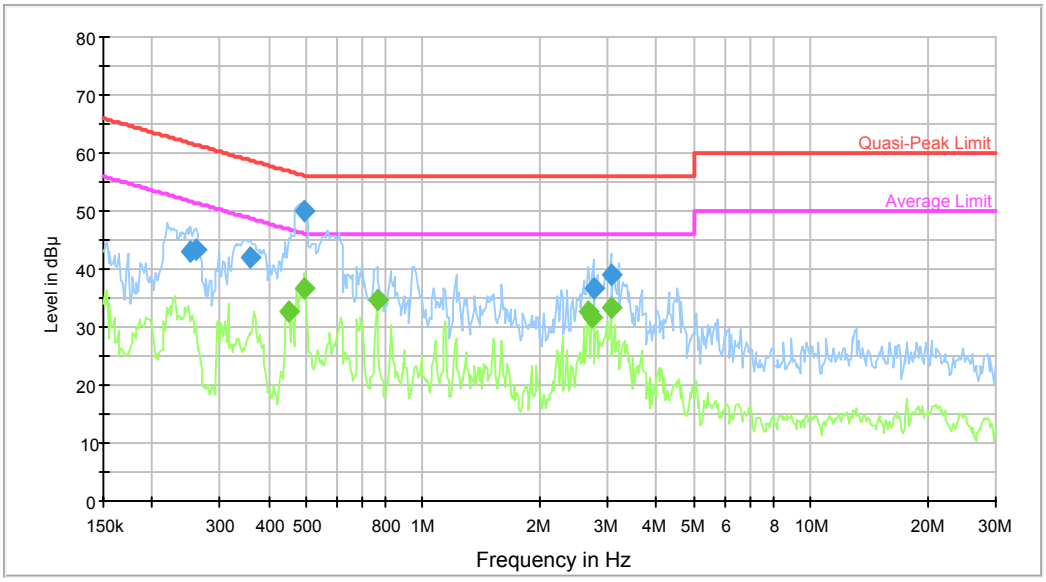
AC120V/60Hz,Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.243884	43.5	9.000	L1	10.2	18.4	62.0	Compliance
0.363254	43.0	9.000	L1	10.3	15.6	58.7	Compliance
0.487810	49.9	9.000	L1	10.1	6.3	56.2	Compliance
0.692650	35.3	9.000	L1	10.4	20.7	56.0	Compliance
2.749070	38.3	9.000	L1	10.5	17.7	56.0	Compliance
3.049107	40.9	9.000	L1	10.6	15.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.461346	25.9	9.000	L1	10.2	20.8	46.7	Compliance
0.491712	36.9	9.000	L1	10.1	9.3	46.1	Compliance
0.756101	28.3	9.000	L1	10.4	17.7	46.0	Compliance
2.662831	35.3	9.000	L1	10.5	10.7	46.0	Compliance
2.727252	33.7	9.000	L1	10.5	12.3	46.0	Compliance
3.049107	36.9	9.000	L1	10.6	9.1	46.0	Compliance

AC120V/60Hz,Neutral:

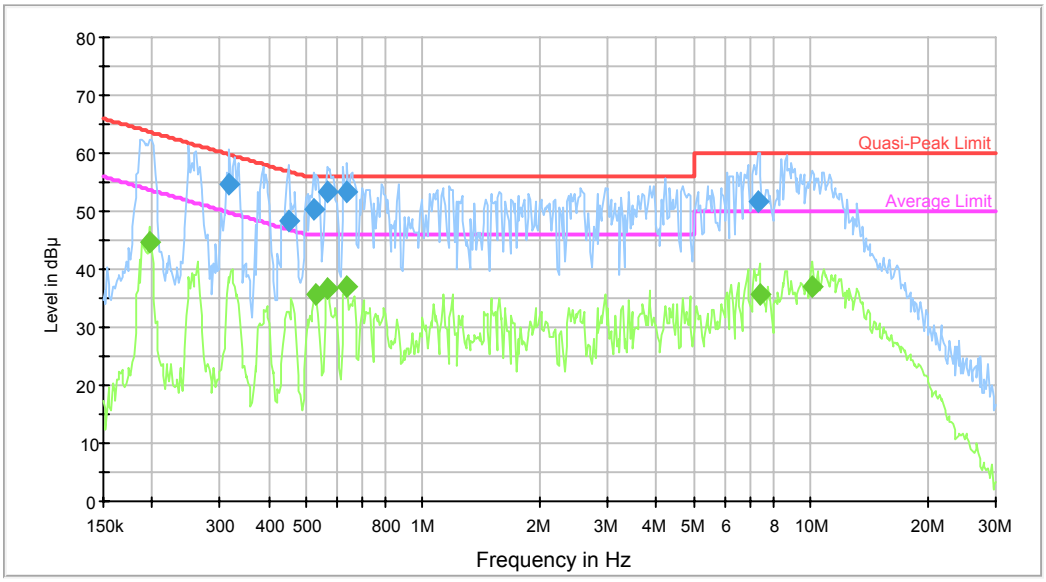


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.251783	42.9	9.000	N	10.2	18.8	61.7	Compliance
0.259937	43.3	9.000	N	10.2	18.2	61.4	Compliance
0.357511	42.1	9.000	N	10.3	16.7	58.8	Compliance
0.495646	49.9	9.000	N	10.1	6.1	56.1	Compliance
2.749070	36.6	9.000	N	10.5	19.4	56.0	Compliance
3.049107	39.1	9.000	N	10.6	16.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.450448	32.8	9.000	N	10.2	14.1	46.9	Compliance
0.495646	36.6	9.000	N	10.1	9.5	46.1	Compliance
0.762149	34.7	9.000	N	10.4	11.3	46.0	Compliance
2.662831	32.5	9.000	N	10.5	13.5	46.0	Compliance
2.727252	31.8	9.000	N	10.5	14.2	46.0	Compliance
3.049107	33.3	9.000	N	10.6	12.7	46.0	Compliance

Test Mode: Charging&HDTV OUT

AC120V/60Hz,Line:

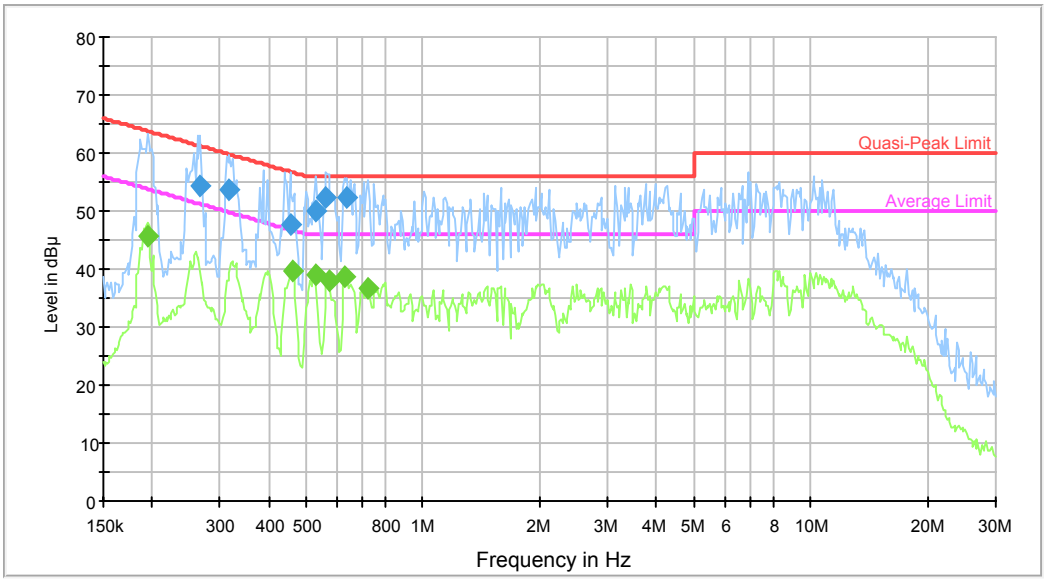


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.317235	54.5	9.000	L1	10.3	5.2	59.8	Compliance
0.450448	48.3	9.000	L1	10.2	8.6	56.9	Compliance
0.524077	50.3	9.000	L1	10.1	5.7	56.0	Compliance
0.567545	53.2	9.000	L1	10.2	2.8	56.0	Compliance
0.639600	53.4	9.000	L1	10.4	2.6*	56.0	Compliance
7.325398	51.6	9.000	L1	10.6	8.4	60.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.196675	44.5	9.000	L1	10.2	9.2	53.7	Compliance
0.528270	35.6	9.000	L1	10.1	10.4	46.0	Compliance
0.567545	36.8	9.000	L1	10.2	9.2	46.0	Compliance
0.639600	37.2	9.000	L1	10.4	8.8	46.0	Compliance
7.384001	35.8	9.000	L1	10.6	14.2	50.0	Compliance
10.075173	37.1	9.000	L1	10.6	12.9	50.0	Compliance

**Within measurement uncertainty!*

AC120V/60Hz,Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.266226	54.2	9.000	N	10.2	7.0	61.2	Compliance
0.317235	53.6	9.000	N	10.3	6.1	59.8	Compliance
0.454052	47.7	9.000	N	10.2	9.1	56.8	Compliance
0.532496	49.9	9.000	N	10.1	6.1	56.0	Compliance
0.563041	52.2	9.000	N	10.1	3.8	56.0	Compliance
0.639600	52.2	9.000	N	10.4	3.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.195114	45.8	9.000	N	10.2	8.0	53.8	Compliance
0.461346	39.8	9.000	N	10.1	6.9	46.7	Compliance
0.528270	39.0	9.000	N	10.1	7.0	46.0	Compliance
0.572086	37.9	9.000	N	10.2	8.1	46.0	Compliance
0.629488	38.7	9.000	N	10.3	7.3	46.0	Compliance
0.720803	36.8	9.000	N	10.4	9.2	46.0	Compliance

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

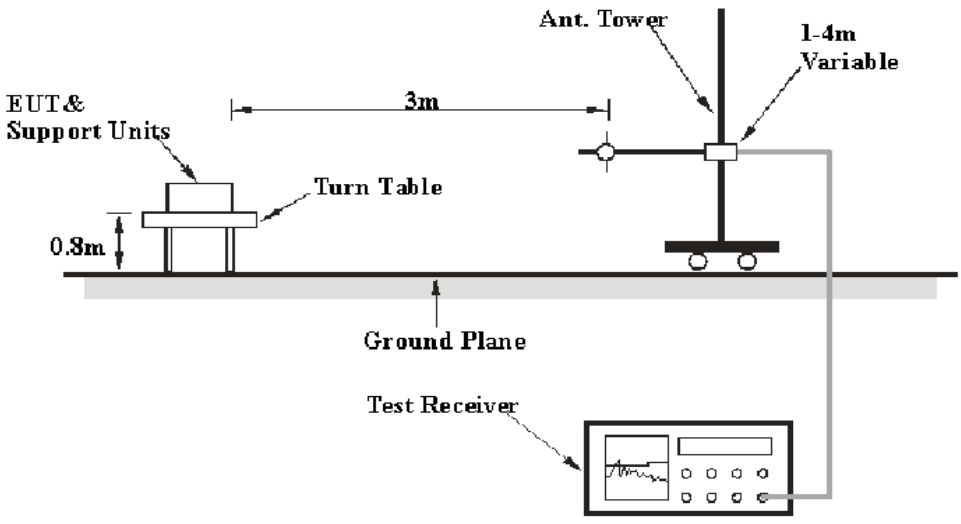
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

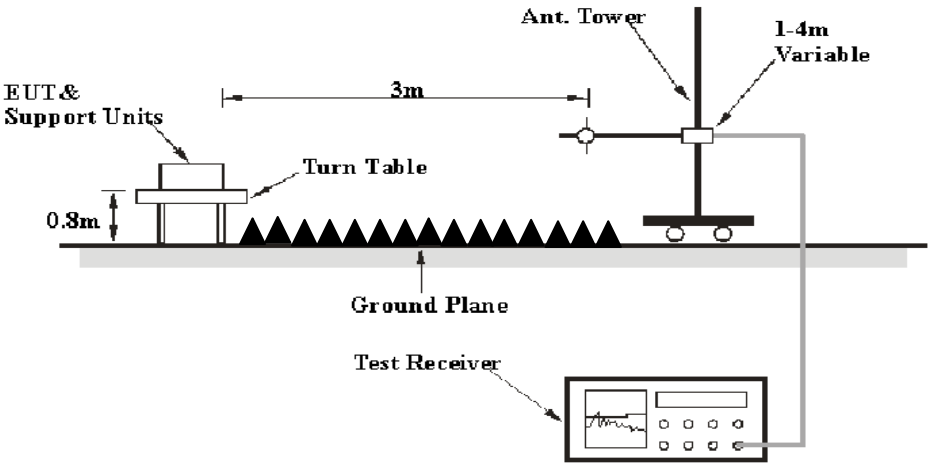
Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-05-09	2016-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2014-12-04	2015-12-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

3.00 dB at **693.4800 MHz** in the **Horizontal** polarization for **downloading** mode

Test Data

Environmental Conditions

Temperature:	26.9 °C
Relative Humidity:	61 %
ATM Pressure:	100.1 kPa

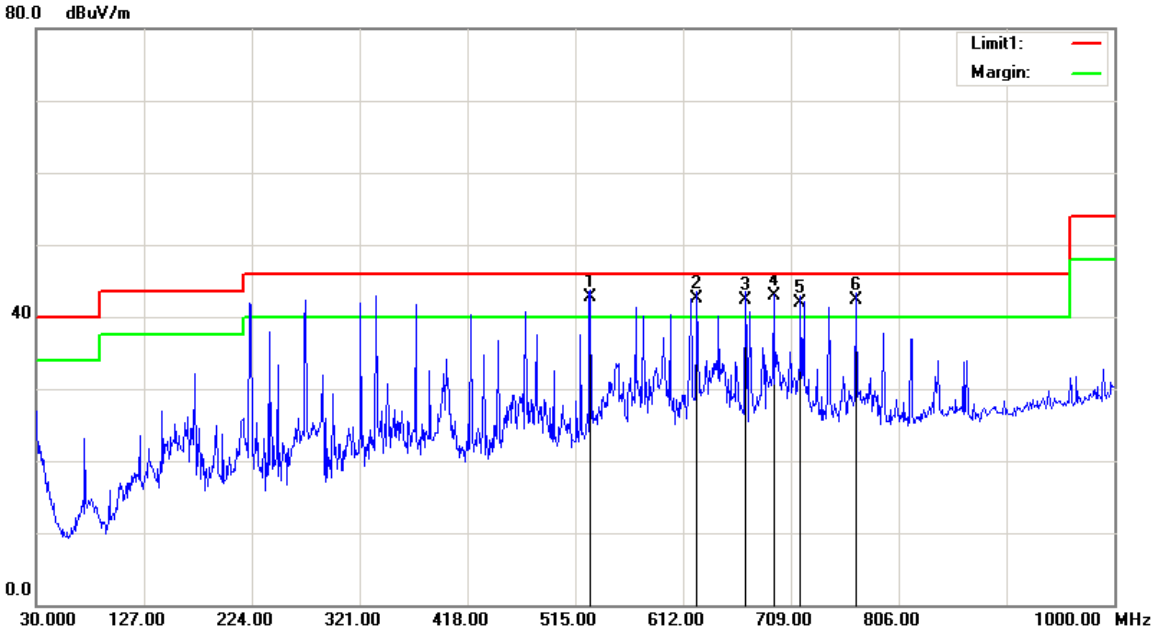
The testing was performed by Allen Qiao on 2015-07-24.

Test Result: Compliance

Test Mode: Downloading

Below 1G

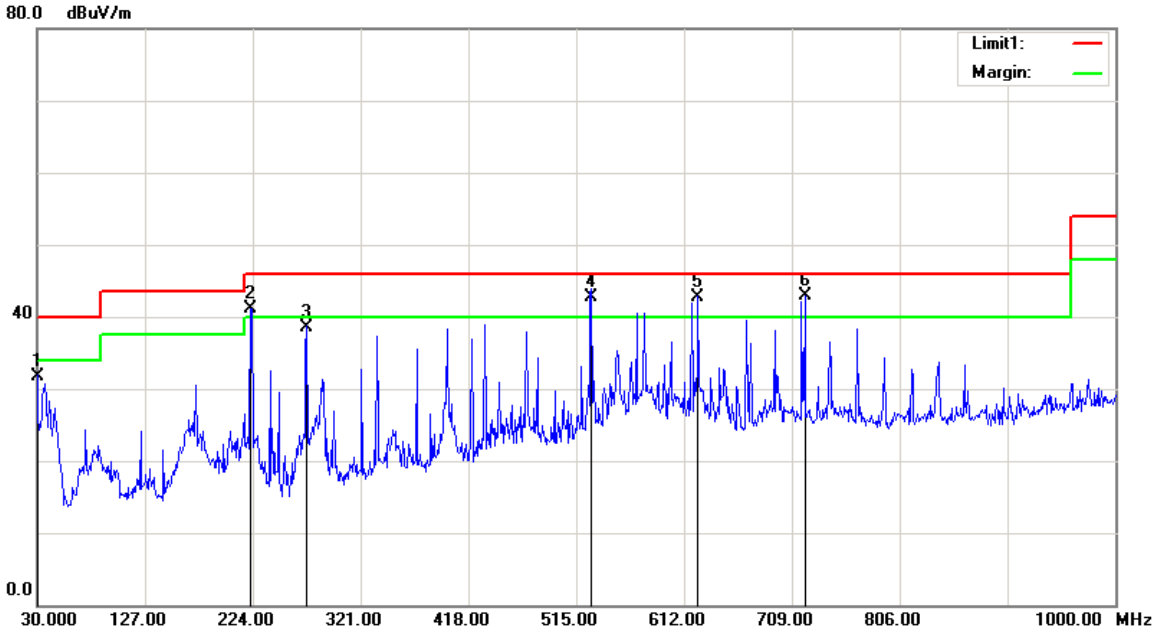
Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
528.5800	43.90	QP	-1.20	42.70	46.00	3.30*
624.6100	42.71	QP	-0.21	42.50	46.00	3.50*
668.2600	41.72	QP	0.68	42.40	46.00	3.60*
693.4800	42.01	QP	0.99	43.00	46.00	3.00*
717.7300	40.59	QP	1.31	41.90	46.00	4.10*
767.2000	40.51	QP	1.79	42.30	46.00	3.70*

**Within measurement uncertainty!*

Vertical

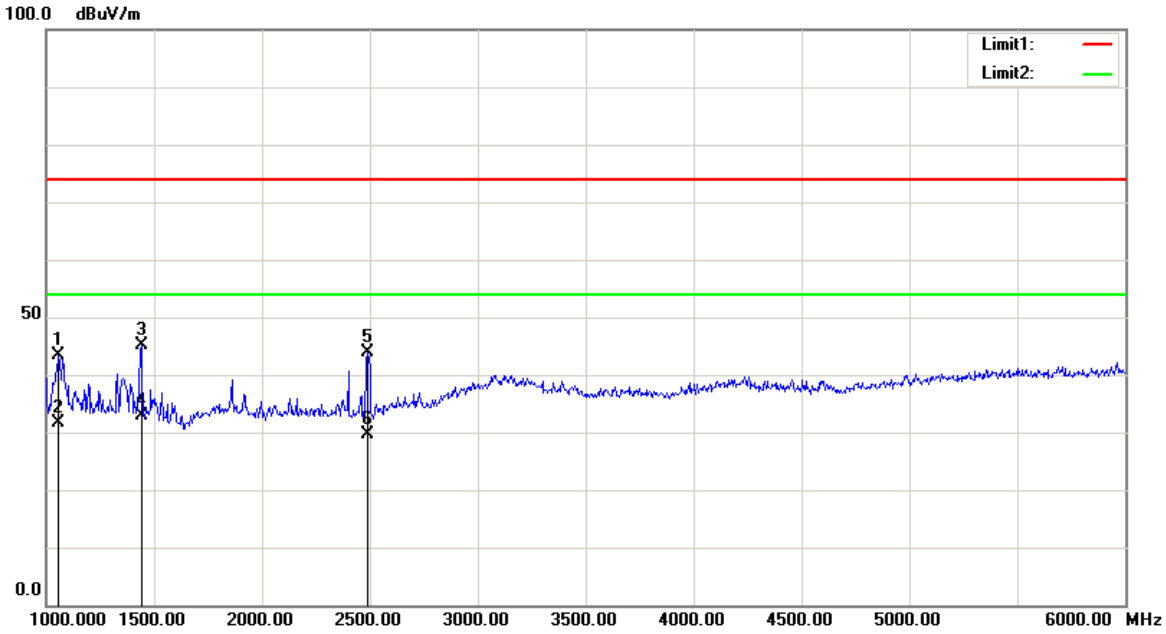


Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	30.92	QP	0.88	31.80	40.00	8.20
222.0600	49.85	QP	-8.75	41.10	46.00	4.90*
272.5000	44.85	QP	-6.25	38.60	46.00	7.40
528.5800	44.00	QP	-1.20	42.80	46.00	3.20*
624.6100	43.01	QP	-0.21	42.80	46.00	3.20*
720.6400	41.49	QP	1.41	42.90	46.00	3.10*

**Within measurement uncertainty!*

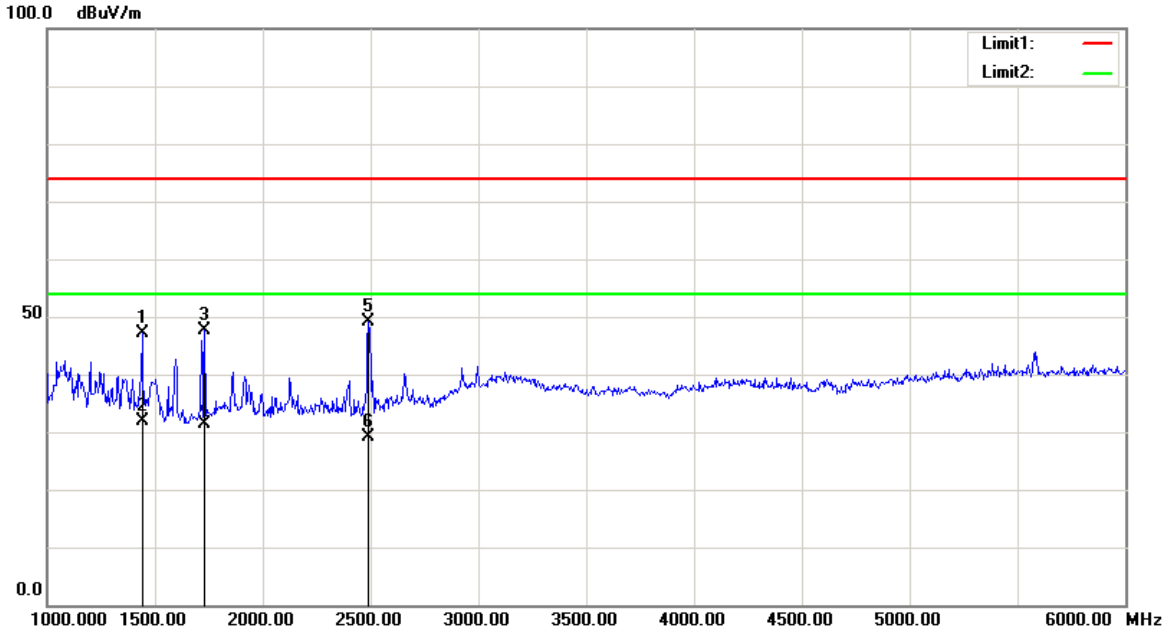
Above 1GHz

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1057.500	44.50	peak	-1.12	43.38	74.00	30.62
1057.500	32.64	AVG	-1.12	31.52	54.00	22.48
1440.000	45.91	peak	-0.76	45.15	74.00	28.85
1440.000	33.52	AVG	-0.76	32.76	54.00	21.24
2490.000	41.80	peak	2.15	43.95	74.00	30.05
2490.000	27.46	AVG	2.15	29.61	54.00	24.39

Vertical

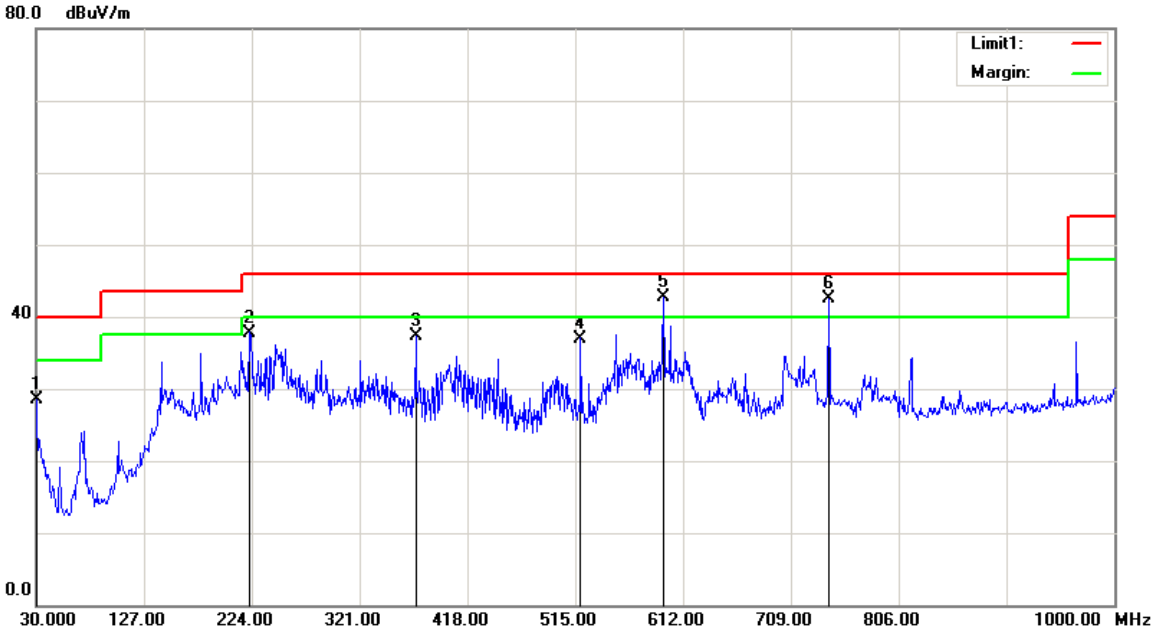


Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1440.000	47.85	peak	-0.76	47.09	74.00	26.91
1440.000	32.61	AVG	-0.76	31.85	54.00	22.15
1730.000	48.54	peak	-0.85	47.69	74.00	26.31
1730.000	32.13	AVG	-0.85	31.28	54.00	22.72
2492.500	47.02	peak	2.15	49.17	74.00	24.83
2492.500	26.93	AVG	2.15	29.08	54.00	24.92

Test Mode: Charging&HDTV OUT

Below 1G

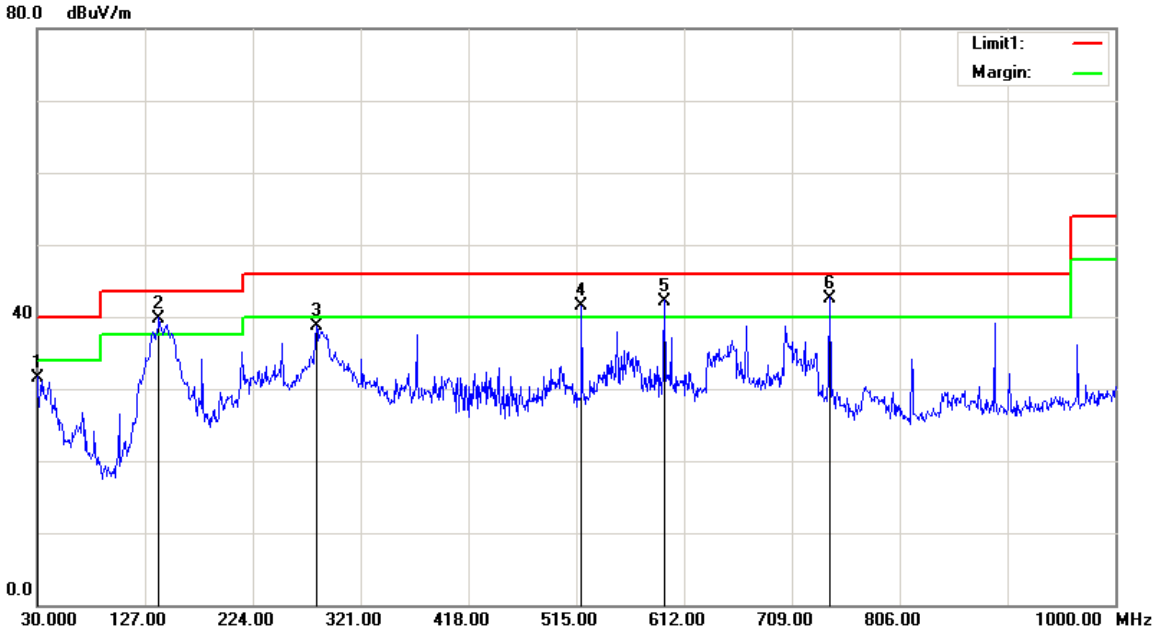
Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	27.62	QP	0.88	28.50	40.00	11.50
222.0600	46.55	QP	-8.75	37.80	46.00	8.20
371.4400	41.86	QP	-4.56	37.30	46.00	8.70
519.8500	38.41	QP	-1.41	37.00	46.00	9.00
594.5400	43.64	QP	-0.94	42.70	46.00	3.30*
742.9500	41.04	QP	1.46	42.50	46.00	3.50*

**Within measurement uncertainty!*

Vertical

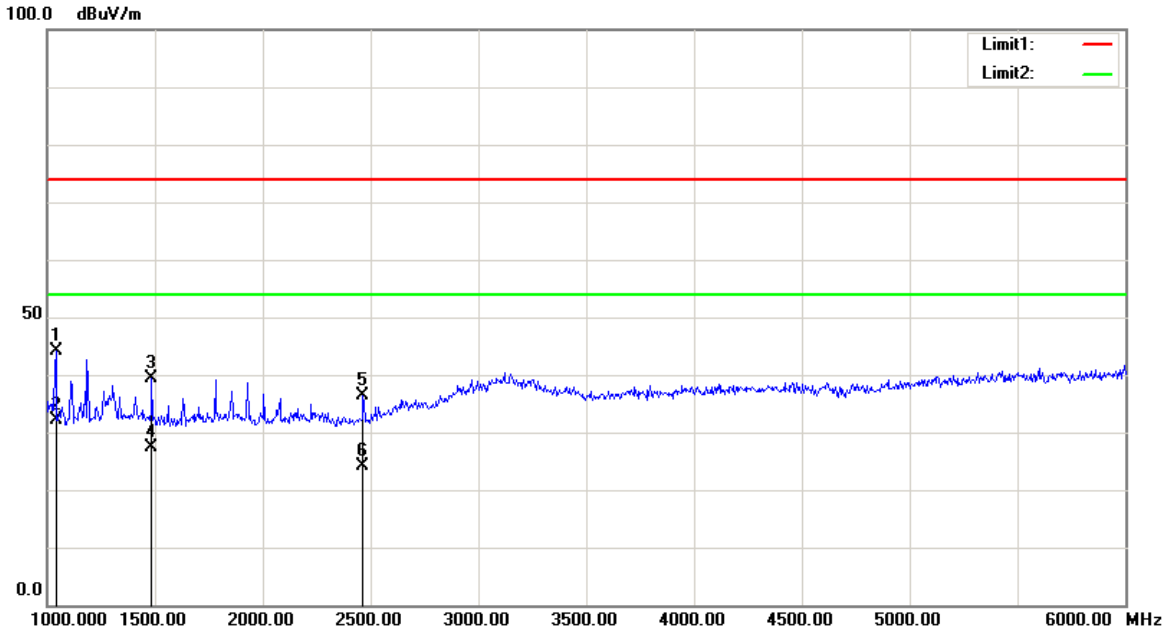


Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	30.72	QP	0.88	31.60	40.00	8.40
139.6100	46.76	QP	-6.96	39.80	43.50	3.70*
281.2300	44.89	QP	-6.19	38.70	46.00	7.30
519.8500	42.91	QP	-1.41	41.50	46.00	4.50*
594.5400	43.14	QP	-0.94	42.20	46.00	3.80*
742.9500	41.14	QP	1.46	42.60	46.00	3.40*

**Within measurement uncertainty!*

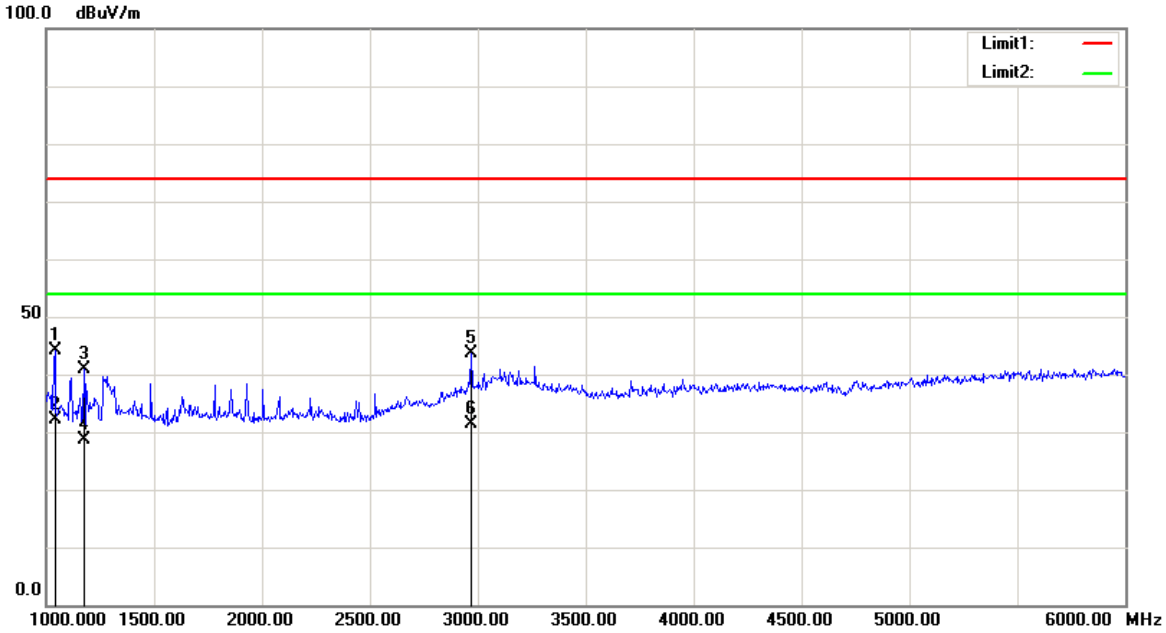
Above 1G

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1040.000	45.36	peak	-1.19	44.17	74.00	29.83
1040.000	33.20	AVG	-1.19	32.01	54.00	21.99
1485.000	40.53	peak	-1.09	39.44	74.00	34.56
1485.000	28.37	AVG	-1.09	27.28	54.00	26.72
2467.500	34.13	peak	2.20	36.33	74.00	37.67
2467.500	21.97	AVG	2.20	24.17	54.00	29.83

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1040.000	45.37	peak	-1.19	44.18	74.00	29.82
1040.000	33.21	AVG	-1.19	32.02	54.00	21.98
1175.000	41.88	peak	-1.05	40.83	74.00	33.17
1175.000	29.72	AVG	-1.05	28.67	54.00	25.33
2970.000	37.32	peak	6.27	43.59	74.00	30.41
2970.000	25.16	AVG	6.27	31.43	54.00	22.57

DECLARATION LETTER

ISAW CAMERA INC.
#501, Suntech City 1st, Dunchon-Daero 474, Jungwon, Seongnam, Gyeonggi, Korea
Tel: +82-31-777-2090 Fax: +82-777-2089

DECLARATION OF SIMILARITY

2015-07-20

To:

Dear Sir or Madam:

We, ISAW CAMERA INC., hereby declare that product: ISAW-E1W, Model numbers: ISE1W, ISE1, SCE1, SCE1W are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics. Model Number: ISE1, SCE1, SCE1W are electrically identical with the Model Number: ISE1W that was certified by BACL. Their only difference is the model name.

Please contact me should there be need for any additional clarification or information.

Best Regards,

DAE HWAN KIM
CHIEF OF SALES

ISAW CAMERA INC
M CHANG SEOP / Presid

*******END OF REPORT*******