

FCC DoC TEST REPORT

REPORT NO.: FD130503D06

MODEL NO.: P463, P463(C), MultiSync P463

RECEIVED: May 3, 2013

TESTED: May 3 ~ 7, 2013

ISSUED: May 9, 2013

APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd.,
Taoyuan Branch

LAB LOCATION: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei
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Table of Contents

RELEASE CONTROL RECORD	3
1 CERTIFICATION.....	4
2 SUMMARY OF TEST RESULTS	5
2.1 MEASUREMENT UNCERTAINTY	5
3 GENERAL INFORMATION	6
3.1 GENERAL DESCRIPTION OF EUT	6
3.2 DESCRIPTION OF TEST MODES	7
3.3 DESCRIPTION OF SUPPORT UNITS	8
4 EMISSION TEST	11
4.1 CONDUCTED EMISSION MEASUREMENT.....	11
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	11
4.1.2 TEST INSTRUMENTS.....	12
4.1.3 TEST PROCEDURE.....	12
4.1.4 DEVIATION FROM TEST STANDARD.....	13
4.1.5 TEST SETUP	13
4.1.6 EUT OPERATING CONDITIONS	14
4.1.7 TEST RESULTS (1).....	15
4.1.8 TEST RESULTS (2).....	17
4.2 RADIATED EMISSION MEASUREMENT.....	19
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	19
4.2.2 TEST INSTRUMENTS.....	21
4.2.3 TEST PROCEDURE.....	23
4.2.4 DEVIATION FROM TEST STANDARD.....	23
4.2.5 TEST SETUP.....	24
4.2.6 EUT OPERATING CONDITIONS	24
4.2.7 TEST RESULTS (1).....	25
4.2.8 TEST RESULTS (2).....	29
5 PHOTOGRAPHS OF THE TEST CONFIGURATION	33
6 INFORMATION ON THE TESTING LABORATORIES.....	39
7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	40



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FD130503D06	Original release	May 9, 2013

1 CERTIFICATION

PRODUCT: LCD Monitor

BRAND NAME: NEC

MODEL NO: P463, P463(C), MultiSync P463

APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: May 3 ~ 7, 2013

STANDARDS: FCC Part 15, Subpart B, Class B

ICES-003: 2012 Issue 5, Class B

ANSI C63.4-2009

The above equipment (model no.: P463) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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 EMC characteristics under the conditions specified in this report.

PREPARED BY : Sandra Lin , DATE: May 9, 2013
(Sandra Lin / Specialist)

APPROVED BY : Kenny Meng , DATE: May 9, 2013
(Kenny Meng / Assistant Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B, Class B	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is –10.66 dB at 0.22812 MHz
ICES-003: 2012 Issue 5, Class B	Radiated Test (30MHz ~ 6GHz)	PASS	Meets Class B Limit Minimum passing margin is –4.06 dB at 849.99 MHz

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	+/- 3.46 dB
Radiated emissions	30MHz ~ 1GHz	+/- 3.78 dB
	Above 1GHz	+/- 3.36 dB

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LCD Monitor
MODEL NO.	P463, P463(C), MultiSync P463
POWER SUPPLY	Internal Switching Power Supply Rating: 100-240V, 50-60Hz Power Cord: Non-shielded AC 3-pin (3.0m).
DATA CABLE SUPPLIED	Shielded D-Sub cable (4.0m) with two ferrite cores

NOTE:

1. The EUT is a LCD Monitor and the resolution is up to 1920 x 1080 (60Hz).
2. The EUT has several models, which are identical to each other except for their marketing differences only, as the following:

Model No.	Interfaces		Difference
P463	♦ D-Sub ♦ LAN (10/100Mbps) x2 ♦ RS232 ♦ DVI ♦ Audio in x 2 ♦ Audio out	♦ USB port ♦ Display in ♦ Display out ♦ HDMI in ♦ Earphone	marketing differences
P463(C)			
MultiSync P463			
Accessory			
Speaker (NEC/ SP-RM1)			
IR (NEC/ KT-RC)			
Remote control (NEC/ RU-M117)			

During the test, **model no.: P463** was selected as the representative one and therefore only its test data was recorded in this report.

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

3.2 DESCRIPTION OF TEST MODES

- The EUT was pre-tested under the following resolution & refresh rate modes:

Description		Pre-tested Mode												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Interface	DVI	v	v	v	v	v	v					v		
	HDMI							v						
	D-Sub								v					
	Display									v				
	HDMI to DVD 1080p										v			
	PIP mode												v	
	POP mode													v
Resolution	1920 x 1080 (60Hz)	v			v	v	v	v	v	v		v		
	1280 x 1024 (65Hz)		v											
	640 x 480 (60Hz)			v										
Monitor's Angle	Horizontal	v	v	v	v	v	v	v	v	v	v		v	v
	Vertical											v		
Input power	110Vac/60Hz	v	v	v				v	v	v	v	v	v	v
	100Vac/50Hz				v									
	230Vac/50Hz					v								
	120Vac/60Hz						v							

The worst emission level was found under **mode1**.

- According as per pre-test result and client's requirement, the final test modes were as the following:

Test Item	Test Mode	Description of Test Mode	Input power
Conducted Test	Mode 1	DVI, 1920 x 1080 (60Hz)	120Vac/60Hz
	Mode 2	HDMI to DVD, 1080P	
Radiated Test	Mode 1	DVI, 1920 x 1080 (60Hz)	110Vac/60Hz
	Mode 2	HDMI to DVD, 1080P	

All above test modes were recorded in this report.

3.3 DESCRIPTION OF SUPPORT UNITS

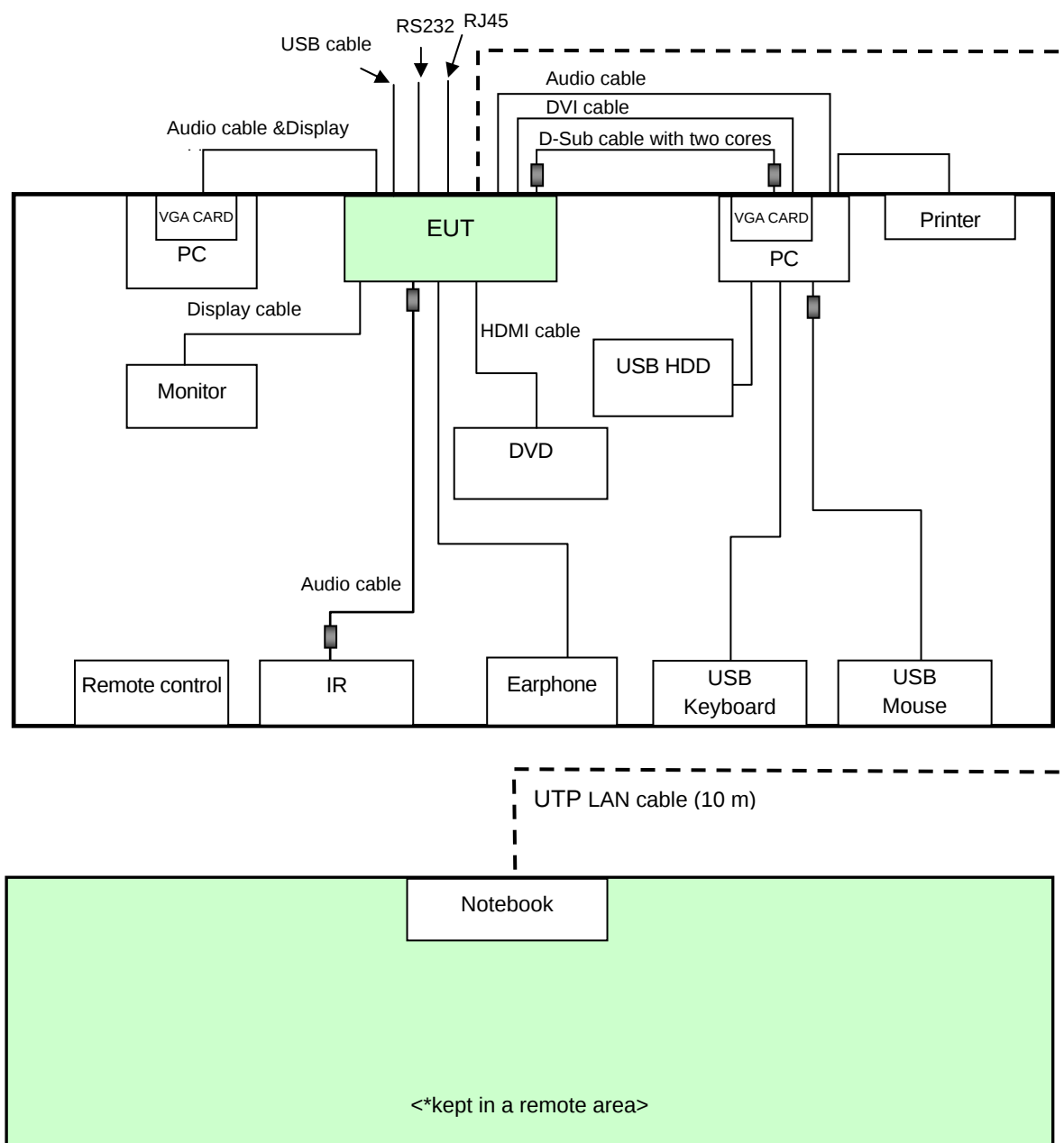
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	LENOVO	MT-M7611R89	R8CGYRN	FCC DoC Approved
2	PERSONAL COMPUTER	DELL	VOSTRO 470	7VBJYBX	FCC DoC Approved
3	24" LCD MONITOR	DELL	U2410	CN082WXD7287 20CC0KDL	FCC DoC Approved
4	USB KEYBOARD	BTC	5200U	G09302046487	E5XKB5122U
5	USB Mouse	Microsoft	1113	9170515772217	FCC DoC Approved
6	VGA CARD	DELL	X300SE	260629000067	FCC DoC Approved
7	VGA CARD	ASUS	ENGT440/DI/1G D3	BACVCM038606	FCC DoC Approved
8	PRINTER	LEXMARK	Z33	03331652570	FCC DoC Approved
9	USB 3.0 Hard Disk	WD	WDBACY5000A BL	WX41A1147318	FCC DoC Approved
10	DVD PLAYER	SONY	BDP-S470	3205078	Verification
11	NOTEBOOK COMPUTER	DELL	PP04X	CN-0HN341-4864 3-845-4295	FCC DoC Approved
12	EARPHONE	PHILIPS	SBC HL145	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8 m shielded DVI cable, 1.8 m shielded audio cable
2	1.8 m shielded audio cable, 1.8 m shielded display cable
3	1.8 m shielded display cable
4	1.5 m braid shielded wire, terminated with USB connector via drain wire, w/o core.
5	1.8 m foil shielded wire, terminated with USB connector via drain wire, with 1 core.
6	N/A
7	N/A
8	2.0 m foil shielded wire , terminated with USB connector via metallic frame, w/o core.
9	0.5 m shielded USB cable
10	1.8 m shielded HDMI cable
11	10 m UTP LAN cable
12	1.2 m wrapped shielded wire, terminated with 3.5mm phone plug via drain wire, w/o core.

NOTE: (1) All power cords of the above support units are non shielded (1.8m).
(2) The support unit 6 & 7 were installed into support unit 1 & 2.
(3) One USB cable (1.8m) was connected to EUT to form an open loop cable;
one RS232 cable was connected to EUT to form an open loop cable; one
RJ45 cable was connected to EUT to form an open loop cable.

TEST CONFIGURATION



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD:

FCC Part 15, Subpart B (Section: 15.107)

ICES-003:2012 Issue 5 (section: 6.1)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.
 (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	834115/016	Mar. 21, 2013	Mar. 20, 2014
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ESH2-Z5	828075/003	Sep. 05, 2012	Sep. 04, 2013
LISN With Adapter (for EUT)	AD10	C03Ada-001	Aug. 29, 2012	Aug. 28, 2013
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 16, 2012	Jul. 15, 2013
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C03.01	Jan. 04, 2013	Jan. 03, 2014
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 16, 2013	Jan. 15, 2014
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 23, 2013	Jan. 22, 2014

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 3.
3. The VCCI Site Registration No. C-274.
4. Tested Date: May 6, 2013.

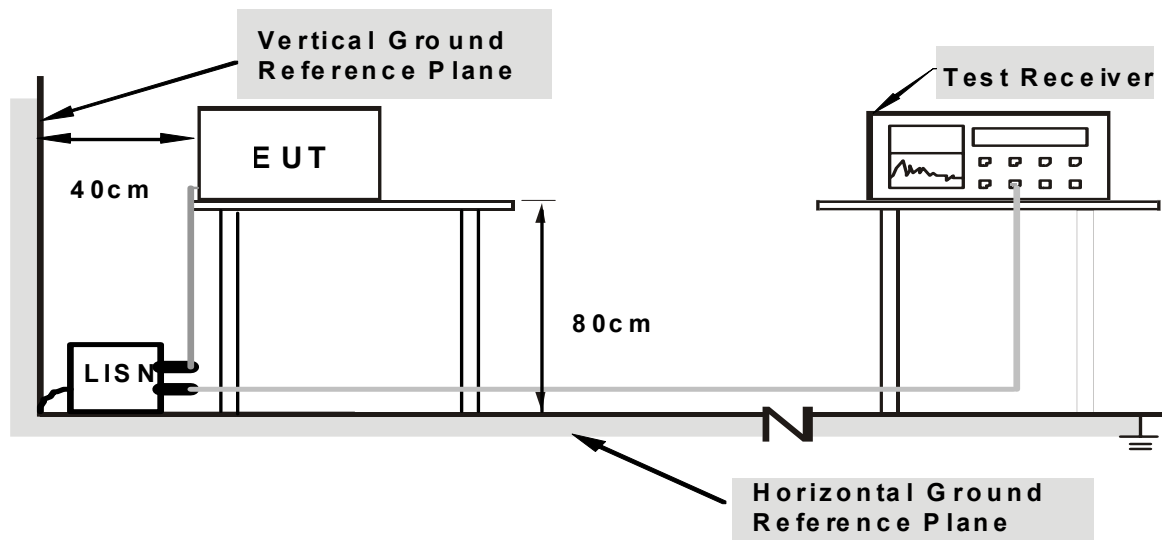
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. PC ran a test program (WinFCC) to enable all functions.
- c. PC read and wrote messages from HDD and ext. HDD.
- d. Notebook (kept in a remote area) sent and received messages to/from EUT via a UTP LAN cable.
- e. Notebook (kept in a remote area) sent "H" messages to EUT and ext. LCD monitor via EUT then they displayed "H" patterns on their screens simultaneously.
- f. PC sent "H" messages to EUT and to ext. monitor via EUT, and then they displayed them on its screen. **<For Mode 1>**
- g. DVD player sent color bars to EUT and to ext. monitor via EUT, and then they displayed them on its screen. **<For Mode 2>**
- h. PC sent messages to printer and printer printed them out.
- i. PC sent 1kHz audio signal to earphone via EUT. **<For Mode 1>**
- j. DVD player sent audio signal to earphone via EUT. **<For Mode 2>**
- k. Steps c-j were repeated.

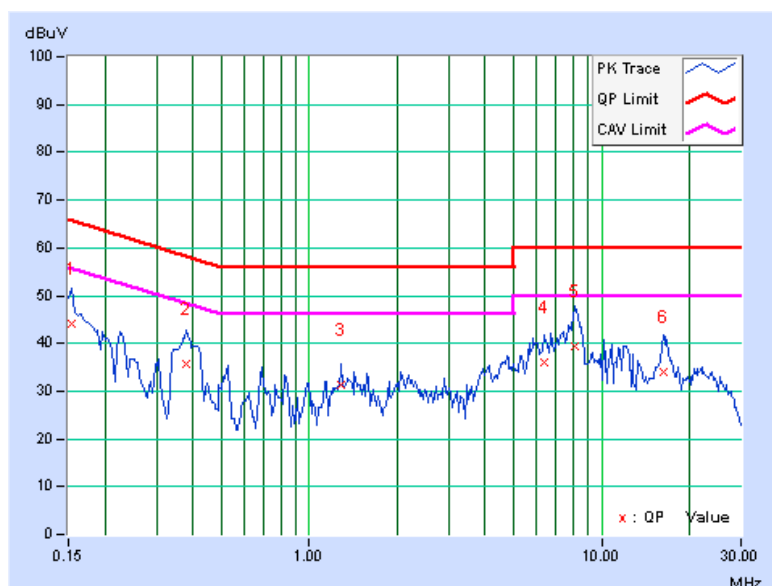
4.1.7 TEST RESULTS (1)

TEST MODE	Mode 1	6DB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Vincent Lin	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.20	44.00	40.08	44.20	40.28	65.79	55.79	-21.59	-15.51
2	0.38047	0.23	35.43	30.55	35.66	30.78	58.27	48.27	-22.61	-17.49
3	1.28516	0.28	30.94	22.07	31.22	22.35	56.00	46.00	-24.78	-23.65
4	6.32831	0.48	35.42	27.68	35.90	28.16	60.00	50.00	-24.10	-21.84
5	8.13672	0.54	38.89	26.94	39.43	27.48	60.00	50.00	-20.57	-22.52
6	16.22138	0.93	33.15	22.52	34.08	23.45	60.00	50.00	-25.92	-26.55

REMARKS:

- Q.P. and AV. are abbreviations of quasi-peak and average individually.
- The emission levels of other frequencies were very low against the limit.
- Margin value = Emission level - Limit value
- Correction factor = Insertion loss + Cable loss
- Emission Level = Correction Factor + Reading Value.

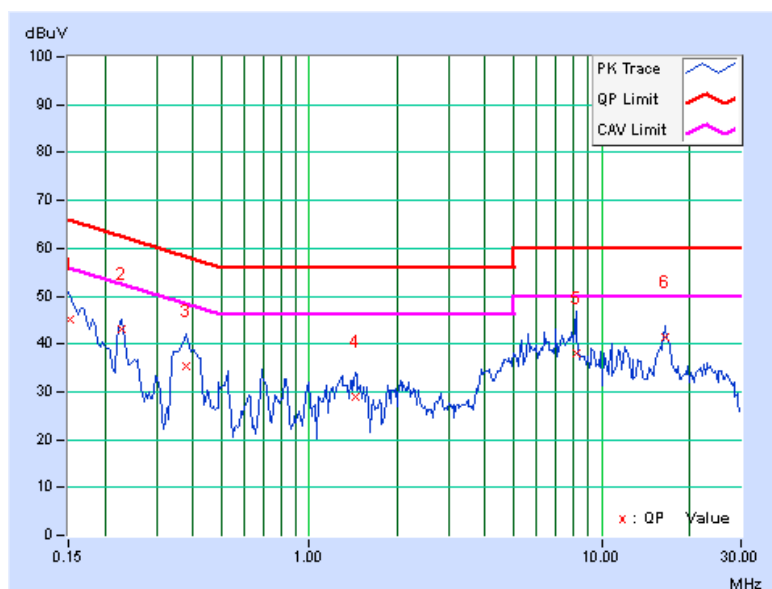


TEST MODE	Mode 1	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Vincent Lin	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15128	0.16	45.06	42.49	45.22	42.65	65.93	55.93	-20.71	-13.28
2	0.22812	0.17	42.93	41.69	43.10	41.86	62.52	52.52	-19.42	-10.66
3	0.38047	0.18	35.08	29.33	35.26	29.51	58.27	48.27	-23.01	-18.76
4	1.43750	0.23	28.73	18.68	28.96	18.91	56.00	46.00	-27.04	-27.09
5	8.18444	0.48	37.58	28.28	38.06	28.76	60.00	50.00	-21.94	-21.24
6	16.56765	0.77	40.61	28.01	41.38	28.78	60.00	50.00	-18.62	-21.22

REMARKS:

- Q.P. and AV. are abbreviations of quasi-peak and average individually.
- The emission levels of other frequencies were very low against the limit.
- Margin value = Emission level - Limit value
- Correction factor = Insertion loss + Cable loss
- Emission Level = Correction Factor + Reading Value.



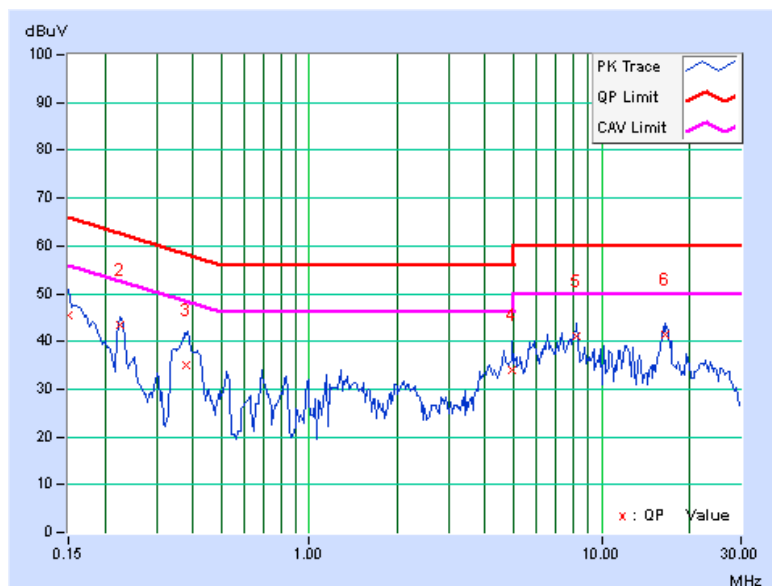
4.1.8 TEST RESULTS (2)

TEST MODE	Mode 2	6DB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Vincent Lin	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.19	45.12	42.37	45.31	42.56	66.00	56.00	-20.69	-13.44
2	0.22422	0.22	43.21	41.62	43.43	41.84	62.66	52.66	-19.23	-10.82
3	0.37775	0.23	34.82	29.63	35.05	29.86	58.33	48.33	-23.28	-18.47
4	4.95313	0.43	33.73	22.79	34.16	23.22	56.00	46.00	-21.84	-22.78
5	8.19531	0.55	40.53	28.23	41.08	28.78	60.00	50.00	-18.92	-21.22
6	16.56250	0.95	40.37	28.13	41.32	29.08	60.00	50.00	-18.68	-20.92

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

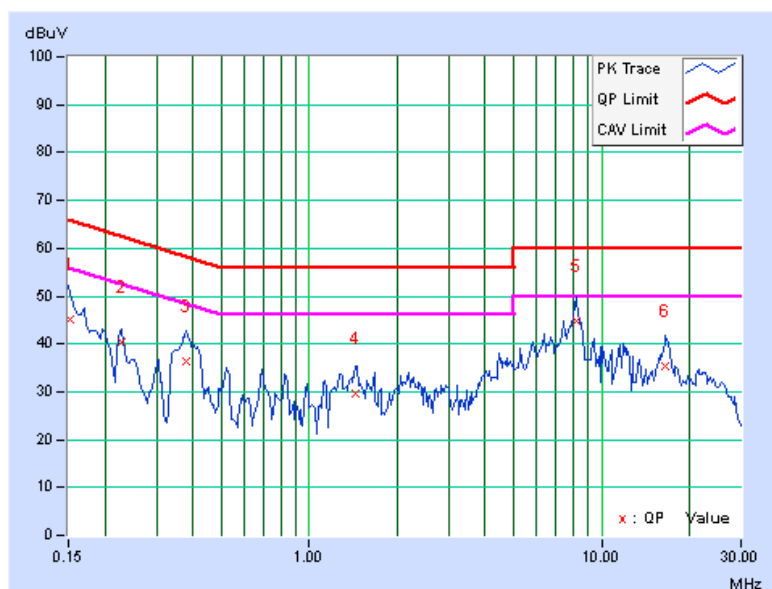


TEST MODE	Mode 2	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Vincent Lin	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15128	0.16	45.02	42.72	45.18	42.88	65.93	55.93	-20.75	-13.05
2	0.22812	0.17	40.11	38.83	40.28	39.00	62.52	52.52	-22.24	-13.52
3	0.38047	0.18	36.06	30.93	36.24	31.11	58.27	48.27	-22.03	-17.16
4	1.43750	0.23	29.47	19.37	29.70	19.60	56.00	46.00	-26.30	-26.40
5	8.19141	0.48	44.38	30.02	44.86	30.50	60.00	50.00	-15.14	-19.50
6	16.56641	0.77	34.42	23.37	35.19	24.14	60.00	50.00	-24.81	-25.86

REMARKS:

- Q.P. and AV. are abbreviations of quasi-peak and average individually.
- The emission levels of other frequencies were very low against the limit.
- Margin value = Emission level - Limit value
- Correction factor = Insertion loss + Cable loss
- Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD:

FCC Part 15, Subpart B (Section: 15.109)

ICES-003:2012 Issue 5 (section: 6.2)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960			57.5	47.5
960-1000	60	54		
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000			Avg: 60 Peak: 80	Avg: 54 Peak: 74

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 4. QP detector shall be applied if not specified.

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 TEST INSTRUMENTS

Frequency Range 30MHz~1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Preamplifier	8447D	2944A11062	Feb. 27, 2013	Feb. 26, 2014
Agilent Preamplifier	8447D	2944A11064	Feb. 27, 2013	Feb. 26, 2014
Agilent Test Spectrum	E4443A	MY46182050	Aug. 06, 2012	Aug. 05, 2013
Agilent Test Spectrum	E4443A	MY46182049	Jul. 23, 2012	Jul. 22, 2013
Agilent Test Preselector	N9039A	MY46520284	Aug. 06, 2012	Aug. 05, 2013
Agilent Test Preselector	N9039A	MY46520283	Jul. 23, 2012	Jul. 22, 2013
Agilent Signal Generator	N5181A	MY47421329	Jul. 13, 2012	Jul. 12, 2013
Schwarzbeck Antenna	VULB9168	9168-316	Mar. 25, 2013	Mar. 24, 2014
Schwarzbeck Antenna	VULB9168	9168-317	Mar. 25, 2013	Mar. 24, 2014
Max Full. Turn Table & Tower	MF7802	MF7802121	NA	NA
Max Full. Tower	MF7802	MF780208105	NA	NA
Software	ADT_Radiated_V8.7.07	NA	NA	NA
WOKEN RF cable	8D	CABLE-CH8-01.V	Dec. 19, 2012	Dec. 18, 2013
JYE BAO RF cable	8D	CABLE-CH8-02.H	Dec. 19, 2012	Dec. 18, 2013
JYE BAO RF cable	8D	CABLE-CH8-03.3M	Dec. 19, 2012	Dec. 18, 2013

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in Chamber No. 8.
 3. The Industry Canada Reference No. IC 7450E-8.
 4. The VCCI Site Registration No. R-2946
 5. The FCC Site Registration No. 493821.
 6. Tested Date: May 6 ~ 7, 2013.

Frequency Range above 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum	E4446A	MY46180666	Jul. 07, 2012	Jul. 06, 2013
Agilent Preamplifier	8449B	3008A02367	Feb. 27, 2013	Feb. 26, 2014
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2013	Feb. 28, 2014
Schwarzbeck Horn Antenna	BBHA-9170	BBHA9170190	Oct. 04, 2012	Oct. 03, 2013
EMCO Horn Antenna	3115	9312-4192	Apr. 29, 2013	Apr. 28, 2014
Max Full. Turn Table & Tower	MF7802	MF780208103	NA	NA
Software	ADT_Radiated_V8.7.07	NA	NA	NA
SUHNER RF cable	SF106-18	Cable-CH7	Aug. 19, 2012	Aug. 18, 2013

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in Chamber No. 7.
 3. The Industry Canada Reference No. IC 7450E-7.
 4. The FCC Site Registration No. 127748.
 5. The VCCI Site Registration No. G-39
 6. Tested Date: May 3, 2013.

4.2.3 TEST PROCEDURE

<Frequency Range 30MHz ~ 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

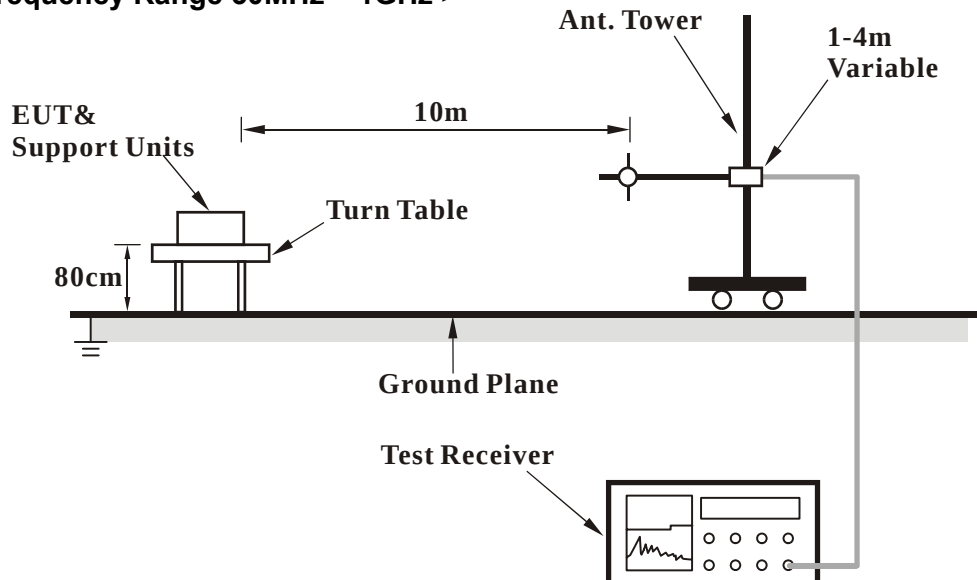
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.

4.2.4 DEVIATION FROM TEST STANDARD

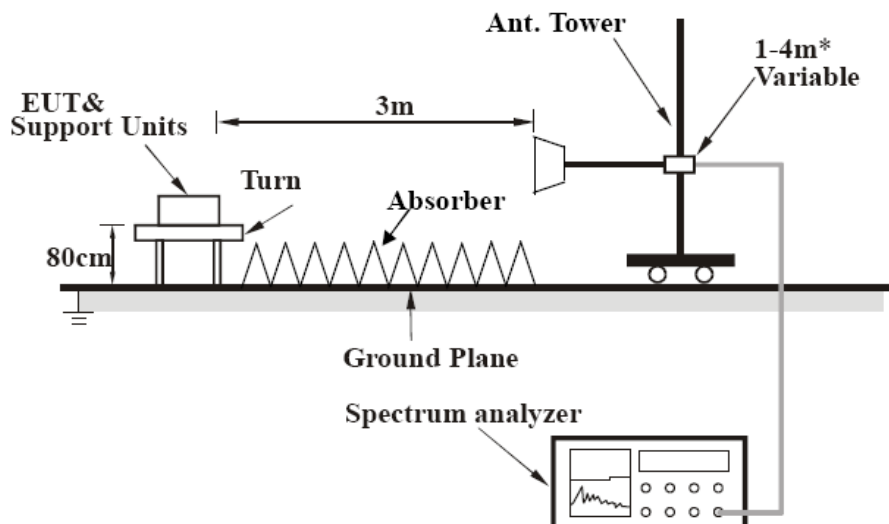
No deviation

4.2.5 TEST SETUP

<Frequency Range 30MHz ~ 1GHz >



<Frequency Range above 1GHz>



* depends on the EUT height and the antenna 3dB beamwidth both.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6

4.2.7 TEST RESULTS (1)

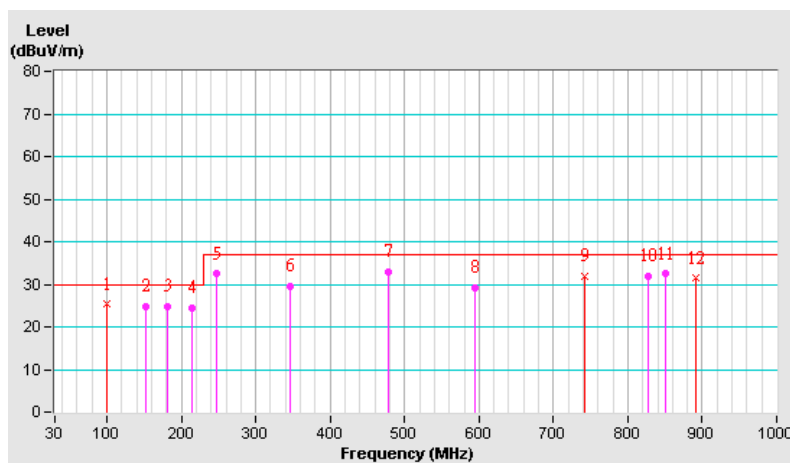
TEST MODE	Mode 1		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 74% RH	TESTED BY: Ian Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	99.01	25.33 QP	30.00	-4.67	4.00 H	23	42.86	-17.53
2	152.57	24.90 QP	30.00	-5.10	4.00 H	309	36.96	-12.06
3	181.46	24.73 QP	30.00	-5.27	4.00 H	347	38.45	-13.72
4	214.50	24.46 QP	30.00	-5.54	2.89 H	280	39.06	-14.60
5	247.54	32.40 QP	37.00	-4.60	2.63 H	292	44.98	-12.58
6	346.54	29.49 QP	37.00	-7.51	2.42 H	103	38.91	-9.42
7	478.47	32.88 QP	37.00	-4.12	1.57 H	208	39.44	-6.56
8	594.05	29.16 QP	37.00	-7.84	1.65 H	285	33.07	-3.91
9	742.53	32.02 QP	37.00	-4.98	1.08 H	115	32.64	-0.62
10	826.75	31.83 QP	37.00	-5.17	1.00 H	242	31.06	0.77
11	849.96	32.43 QP	37.00	-4.57	1.24 H	314	31.33	1.10
12	891.02	31.36 QP	37.00	-5.64	1.00 H	224	29.54	1.82

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



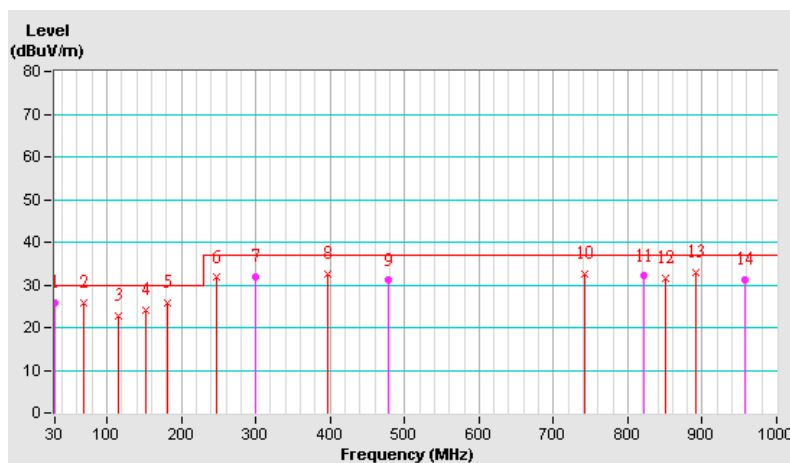
TEST MODE	Mode 1		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 74% RH	TESTED BY: Ian Chang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.36	25.84 QP	30.00	-4.16	1.00 V	234	40.03	-14.19
2	69.02	25.88 QP	30.00	-4.12	1.00 V	260	40.28	-14.40
3	114.55	22.84 QP	30.00	-7.16	1.00 V	332	37.73	-14.89
4	152.06	24.09 QP	30.00	-5.91	1.00 V	344	35.59	-11.50
5	181.50	25.81 QP	30.00	-4.19	1.00 V	335	38.93	-13.12
6	247.52	31.77 QP	37.00	-5.23	1.00 V	322	43.87	-12.10
7	299.41	31.83 QP	37.00	-5.17	1.00 V	306	41.73	-9.90
8	396.00	32.71 QP	37.00	-4.29	1.00 V	358	40.84	-8.13
9	478.47	31.09 QP	37.00	-5.91	1.42 V	298	37.27	-6.18
10	742.52	32.69 QP	37.00	-4.31	3.86 V	307	33.09	-0.40
11	821.77	32.08 QP	37.00	-4.92	2.13 V	305	31.34	0.74
12	849.99	31.57 QP	37.00	-5.43	2.85 V	311	30.50	1.07
13	891.02	32.80 QP	37.00	-4.20	1.97 V	83	30.88	1.92
14	957.37	31.16 QP	37.00	-5.84	2.52 V	297	28.02	3.14

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



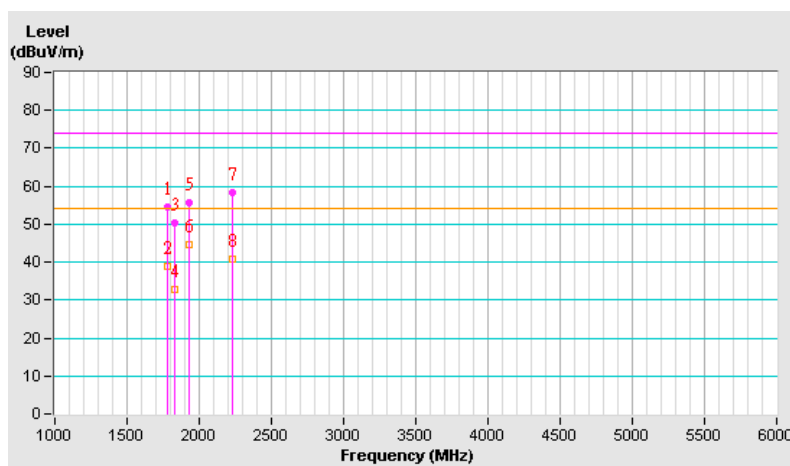
TEST MODE	Mode 1		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 77% RH	TESTED BY: Koven Chuang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1780.03	54.48 PK	74.00	-19.52	1.52 H	162	58.99	-4.51
2	1780.03	39.00 AV	54.00	-15.00	1.52 H	162	43.51	-4.51
3	1829.45	50.26 PK	74.00	-23.74	1.75 H	176	54.56	-4.30
4	1829.45	32.88 AV	54.00	-21.12	1.75 H	176	37.18	-4.30
5	1928.64	55.63 PK	74.00	-18.37	1.41 H	210	59.51	-3.88
6	1928.64	44.57 AV	54.00	-9.43	1.41 H	210	48.45	-3.88
7	2225.19	58.39 PK	74.00	-15.61	1.63 H	222	61.63	-3.24
8	2225.19	40.88 AV	54.00	-13.12	1.63 H	222	44.12	-3.24

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

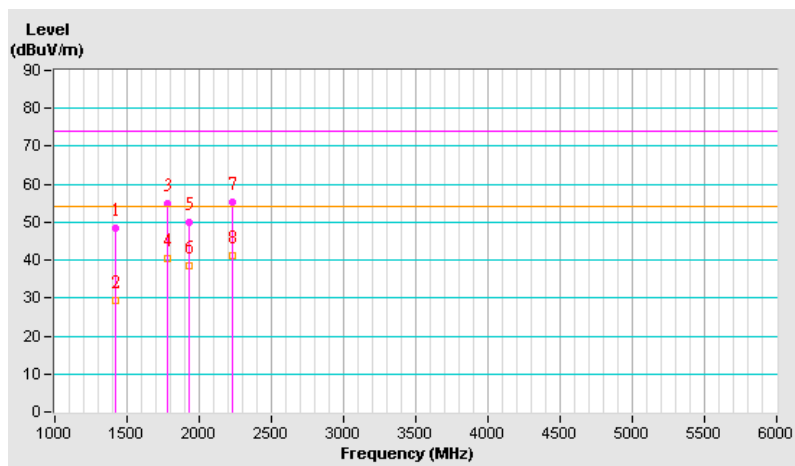


TEST MODE	Mode 1		
FREQUENCY RANGE	1-6GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 77% RH	TESTED BY: Koven Chuang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1424.09	48.55 PK	74.00	-25.45	1.00 V	149	54.86	-6.31
2	1424.09	29.33 AV	54.00	-24.67	1.00 V	149	35.64	-6.31
3	1780.14	54.88 PK	74.00	-19.12	1.98 V	213	59.39	-4.51
4	1780.14	40.43 AV	54.00	-13.57	1.98 V	213	44.94	-4.51
5	1928.55	49.84 PK	74.00	-24.16	1.89 V	186	53.72	-3.88
6	1928.55	38.51 AV	54.00	-15.49	1.89 V	186	42.39	-3.88
7	2225.29	55.30 PK	74.00	-18.70	1.58 V	180	58.54	-3.24
8	2225.29	41.15 AV	54.00	-12.85	1.58 V	180	44.39	-3.24

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



4.2.8 TEST RESULTS (2)

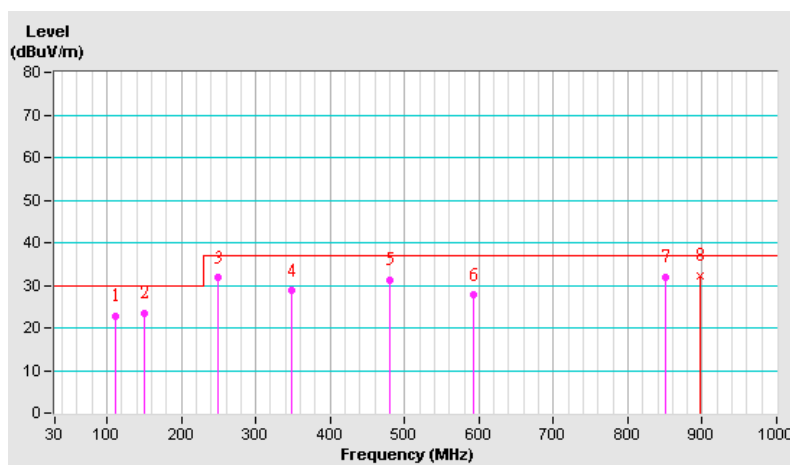
TEST MODE	Mode 2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 74% RH	TESTED BY: Ian Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	110.65	22.67 QP	30.00	-7.33	4.00 H	328	38.22	-15.55
2	149.96	23.32 QP	30.00	-6.68	4.00 H	45	35.83	-12.51
3	250.03	31.73 QP	37.00	-5.27	3.32 H	127	44.13	-12.40
4	347.61	28.66 QP	37.00	-8.34	2.41 H	92	38.07	-9.41
5	479.30	31.34 QP	37.00	-5.66	1.87 H	107	37.91	-6.57
6	593.34	27.67 QP	37.00	-9.33	1.73 H	95	31.60	-3.93
7	849.96	31.92 QP	37.00	-5.08	2.01 H	220	30.82	1.10
8	897.77	32.24 QP	37.00	-4.76	1.72 H	9	30.33	1.91

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



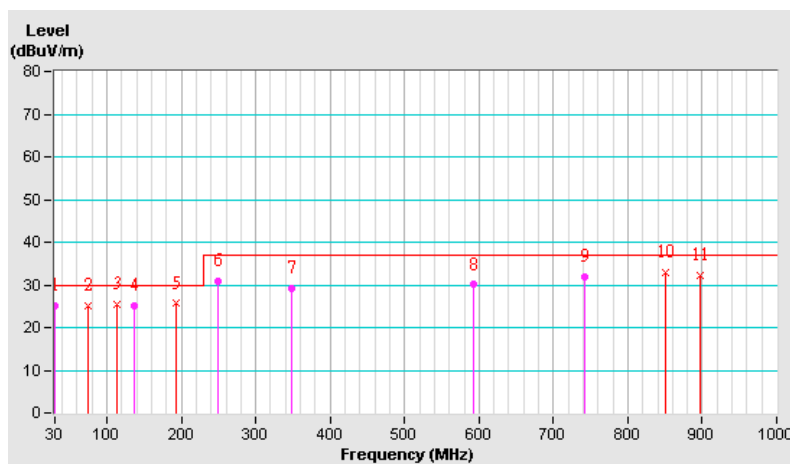
TEST MODE	Mode 2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 74% RH	TESTED BY: Ian Chang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	25.03 QP	30.00	-4.97	1.00 V	207	39.07	-14.04
2	74.57	25.17 QP	30.00	-4.83	1.63 V	312	40.82	-15.65
3	112.84	25.45 QP	30.00	-4.55	1.00 V	10	40.45	-15.00
4	137.05	25.12 QP	30.00	-4.88	1.00 V	312	37.76	-12.64
5	192.00	25.63 QP	30.00	-4.37	1.00 V	322	39.89	-14.26
6	250.03	30.83 QP	37.00	-6.17	1.00 V	322	42.70	-11.87
7	347.61	29.09 QP	37.00	-7.91	1.00 V	108	38.27	-9.18
8	593.46	30.01 QP	37.00	-6.99	1.58 V	306	33.74	-3.73
9	741.84	31.79 QP	37.00	-5.21	2.25 V	297	32.24	-0.45
10	849.99	32.94 QP	37.00	-4.06	2.69 V	115	31.87	1.07
11	897.73	32.27 QP	37.00	-4.73	1.88 V	140	30.27	2.00

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

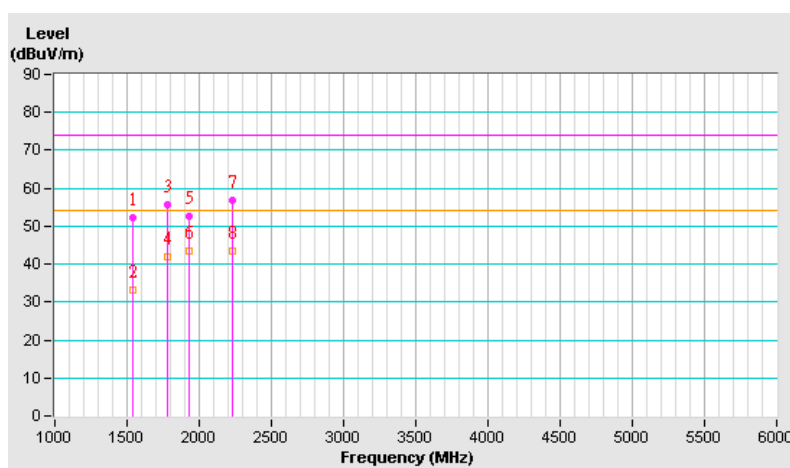


TEST MODE	Mode 2		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 77% RH	TESTED BY: Koven Chuang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1538.81	52.23 PK	74.00	-21.77	1.02 H	60	58.06	-5.83
2	1538.81	33.03 AV	54.00	-20.97	1.02 H	60	38.86	-5.83
3	1780.23	55.67 PK	74.00	-18.33	1.81 H	163	60.18	-4.51
4	1780.23	41.81 AV	54.00	-12.19	1.81 H	163	46.32	-4.51
5	1928.46	52.77 PK	74.00	-21.23	1.00 H	207	56.65	-3.88
6	1928.49	43.57 AV	54.00	-10.43	1.00 H	207	47.45	-3.88
7	2225.17	56.66 PK	74.00	-17.34	1.52 H	201	59.90	-3.24
8	2225.17	43.55 AV	54.00	-10.45	1.52 H	201	46.79	-3.24

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

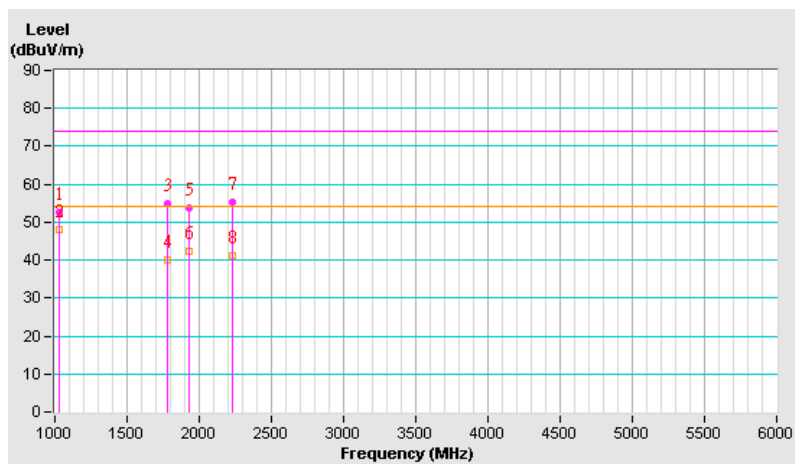


TEST MODE	Mode 2		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 77% RH	TESTED BY: Koven Chuang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1026.02	52.66 PK	74.00	-21.34	1.00 V	350	60.87	-8.21
2	1026.02	47.91 AV	54.00	-6.09	1.00 V	350	56.12	-8.21
3	1780.16	54.73 PK	74.00	-19.27	1.92 V	235	59.24	-4.51
4	1780.16	40.17 AV	54.00	-13.83	1.92 V	235	44.68	-4.51
5	1928.56	53.70 PK	74.00	-20.30	1.59 V	217	57.58	-3.88
6	1928.56	42.39 AV	54.00	-11.61	1.59 V	217	46.27	-3.88
7	2225.45	55.28 PK	74.00	-18.72	1.31 V	148	58.52	-3.24
8	2225.45	41.27 AV	54.00	-12.73	1.31 V	148	44.51	-3.24

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB) if use.
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST – For Mode 1



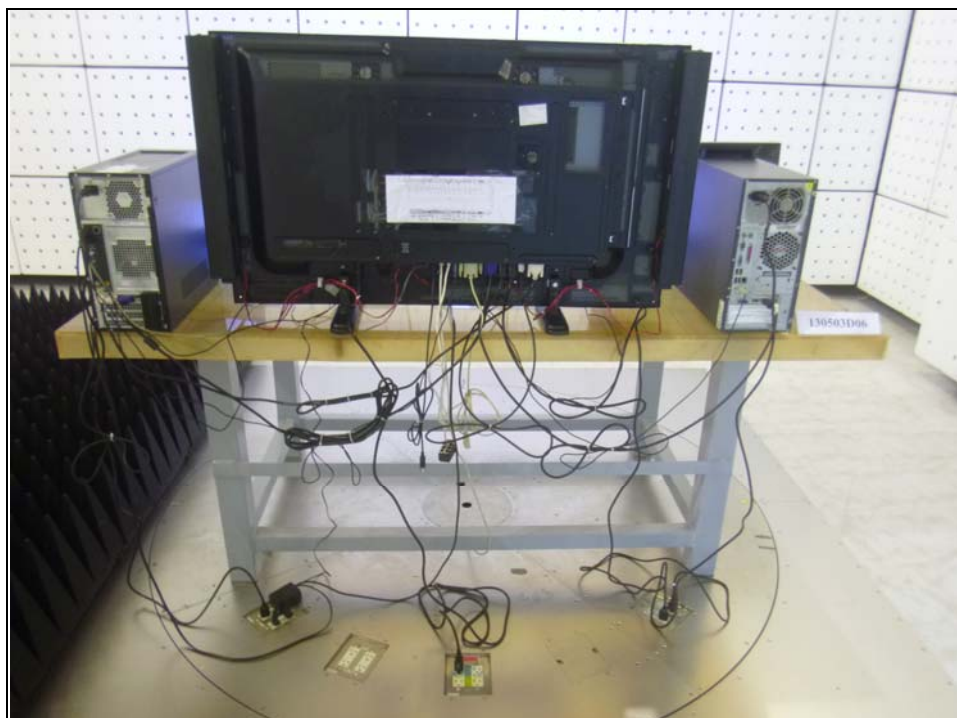
CONDUCTED EMISSION TEST – For Mode 2



RADIATED EMISSION TEST – For Mode 1 (Frequency Range 30MHz ~ 1GHz)



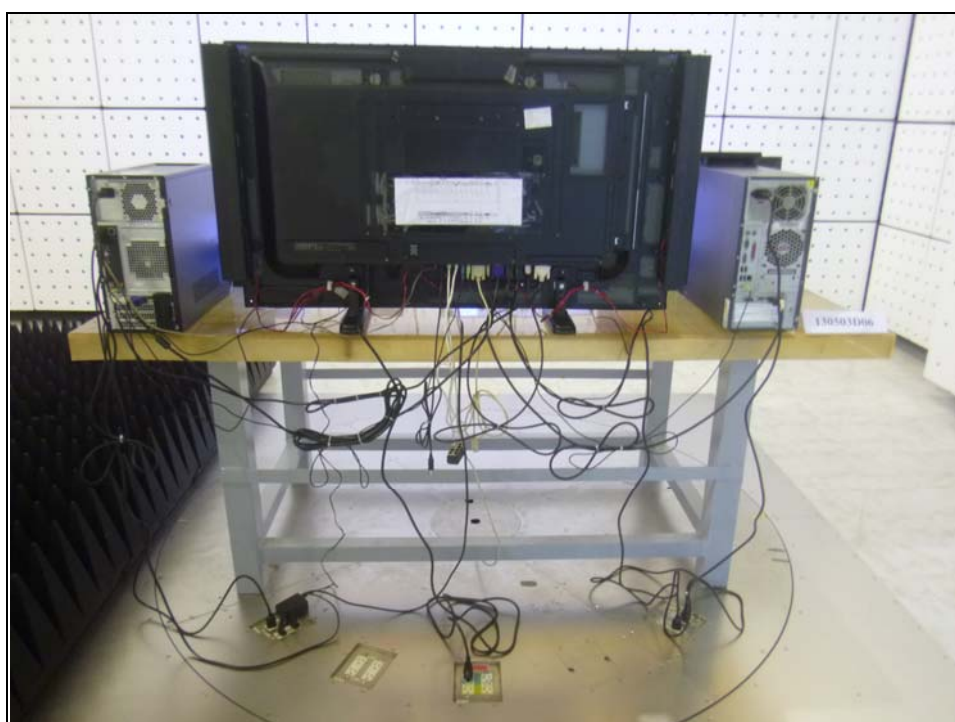
RADIATED EMISSION TEST – For Mode 1 (Frequency Range above 1GHz)



RADIATED EMISSION TEST – For Mode 2 (Frequency Range 30MHz ~ 1GHz)



RADIATED EMISSION TEST – For Mode 2 (Frequency Range above 1GHz)



6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com.tw

The address and road map of all our labs can be found in our web site also.

7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---