



UL Korea, Ltd

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Project: 07CA44566
File: MC15562
Report 07CA44566-FCC
Date: November 26, 2007
Model: AMM240WTD

Electromagnetic Compatibility Test Report

FCC Certification Part 15 Subpart B Class B

For

**ADVAN Int'l Corp.
47817 Fremont Blvd. Fremont CA 94538, Fremont, California, U.S.A**

UL Korea Ltd.

33rdFl. Gangnam finance Center, 737 Yeoksam-Dong, Kangnam-Gu, Seoul, 135-984, Korea
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Project Number: 07CA44566 File Number MC15562 Test Report No: 07CA44566 -FCC
Model Number: AMM240WTD Date of Issue: November 26, 2007

TEST REPORT DETAILS

Test report No: 07CA44566 -FCC
Tests Performed By: UL Korea Ltd.
33rd FL. Gangnam Finance Center, 737 Yeoksam-dong,
Kangnam-ku, Seoul, 135-984, Korea

Test site: ETL Inc.
#371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea
Registration No: 95422

The test facility was deemed to have the environment and capabilities necessary to perform the tests included in the test package

Tests Performed For: ADVAN Int'l Corp.
47817 Fremont Blvd. Fremont CA 94538, Fremont, California, U.S.A

Manufacturer: D&T Inc.
Daedeok Valley, 60-1, Jang Dong, Yuseong Gu, Daejeon,
305-343, Korea

Applicant Contact:
Title: Dae Sung Oh
General Manager
Phone: 82-2-703-5197
E-mail: pilotdan@advancorp.com
Test Report Date: November 23, 2007

Product Type: LCD Color Display
Trademark: ADVAN
Model Number: AMM240WTD
FCC ID: QVX AMM240WTD
Product standards FCC Part 15 Subpart B Class B

Sample Serial Number: None (Proto type)
Sample Receive Date: November 14, 2007
Testing Start Date: November 15, 2007
Date Testing Complete: November 22, 2007

Overall Results: **PASS**

UL Korea Ltd. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports.

TEST SUMMARY

Test Result

Requirement – Test	Reference standards	Verdict
AC Power line Conducted Emission Test	47CFR Part 15.107(a) / 47CFR Part 15.109(g)	Complied
Radiated Emission Test		Complied

Remark: Modifications to EUT required for compliance

- See Clause 6 of this report for modification details required for compliance to the radiated emission and photos of Internal product.

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea, Ltd. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

The equipment under test has

- met the technical requirements
- not met the technical requirements



Tested by
Sung Hoon, Baek, Associate Project Engineer
Conformity Assessment Services - 3014ASEO
UL Korea Ltd.
November 26, 2007



Reviewed by
Kyung Yong, Kim, Senior Project Engineer
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UL Korea Ltd.
November 28, 2007

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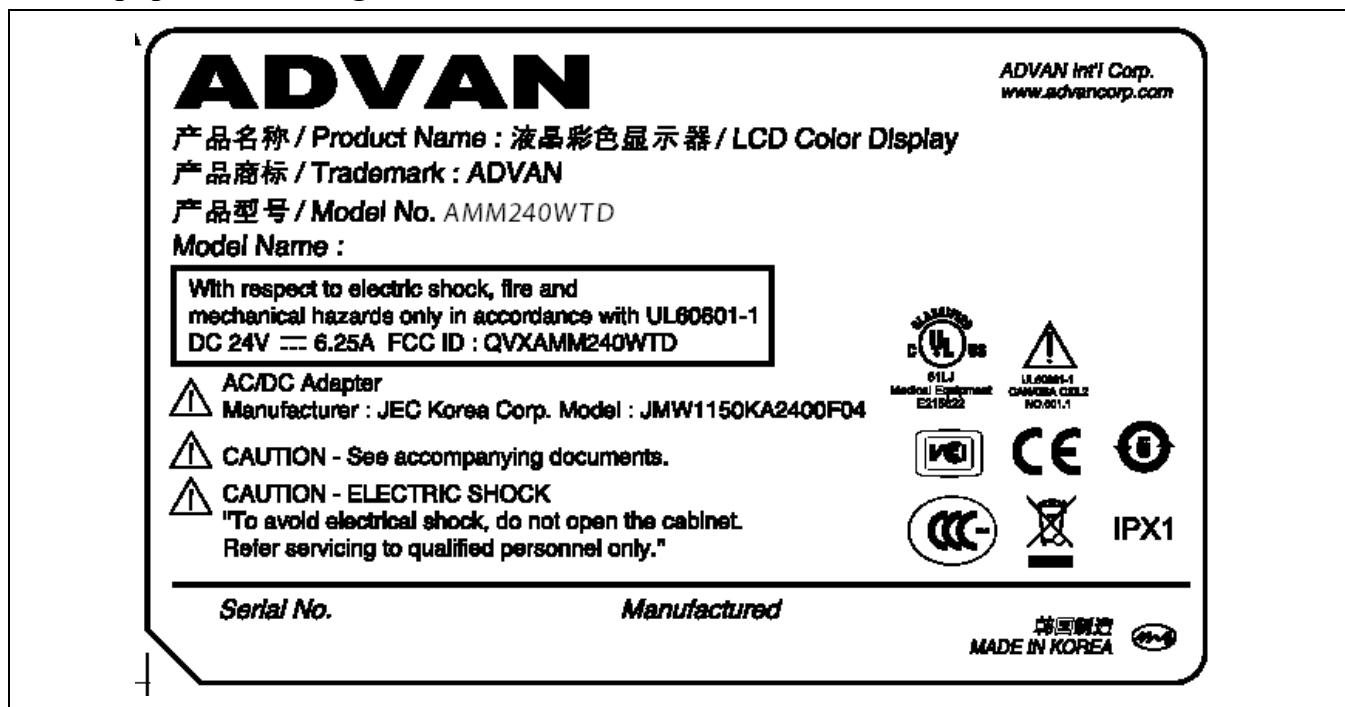
1. EQUIPMENT UNDER TEST (EUT)

1.1 Equipment Description

The following is specification provided by the manufacturer.

AMM240WTD	LCD Panel	24.0" TFT LCD Panel
	Type	Active Matrix
	Resolution	1920 x 1200 @ 60Hz
	Pixel Pitch	0.27mm
	Display Color	16.7M colors
	Color Tone	Up to 256 color tone
	Response Time	<25ms Typ.
	Face Finishing	Protective Filter with Anti-Reflected Hard Coated
	Viewing Angle	+/- 85°(Horizontal), +/- 85° (vertical)
Input Signal (Analog & Digital)	Sync (Analog)	2.5~5.0Vp-p separated sync
	Composite Sync (Analog)	Composite Video (NTSC/PAL)
	Y/C Sync (Analog)	S-Video (NTSC/PAL)
	Input Impedance (Analog)	Video - 75 Ohm, Sync - 1k Ohm
	Digital	3 channel TMDS receiver, single pixel 24-bit MSBaligned RGB TFT
Scanning Frequency	Horizontal	31.47~79.98kHz
	Vertical	50~75.3Hz
Display Size	H x V	20.4" x 12.8" (518.4mm x 324mm)
Brightness, Contrast Radtio, Gray Scales	Brightness	700 cd/m ² (Typ.)
	Contrast Ratio	900:1 (Typ.)
Signal Input Connector	Video	DVI, HD15, SD/HD-SDI 1 and 2, Component Y/G, Pb/B, Pr/R, H/CS, VS, C-Video and S-Video
	Communication	DB9 (RS232)
Signal Output Connector (Loop Through)	Video	SD/HD-SDI, Component Y/G, Pb/B, Pr/R, H/CS, VS, C-Video and S-Video
Power Source	Display Monitor	DC 24V
	AC-Adapter	AC100~240V,50;60 Hz 120W Max +/-10%
Dimension	Free Mount	23.54" (W) x 15.07" (H) x 4.39" (D) 598mm (W) x 382.9mm (H) x 111.5mm (D)
	Weight	16.9 lbs (7.66Kg)

1.2 Equipment Marking Plate



1.3 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	LCD Monitor	D&T Inc.	AMM240WTD	-
EUT	AC/DC adapter of LCD Monitor	SITECH	JMW1150KA2400F04	-
EUT	15 ft Extension Power Cord	JEC Korea Corp.	1501047	Optional
EUT	75 ft Extension Power Cord	JEC Korea Corp.	1501047001	Optional
AE	PC	Dell	DHM	-
AE	Keyboard	Chicony Electronics	KB-2971	-
AE	Serial Mouse	NONE	MUS5S	-
AE	USB Mouse	Logitech	M-UV69A	-
AE	Printer LEXMARK	INTERNATIONAL INC.	Color cap 330	-
AE	DVD Player	Alpha Cast	DVDP-M200T	-
AE	AC/DC Adapter	Yang Ming Industrial	DA-48M12	Connected to DVD Player
AE	SDI Pattern Generator	PHILIPS	PM5418TDS	-
AE	LCD TV	HARSPER	HL-2610HQ	Extension monitor

* Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, SIM - Simulator (Not Subjected to Test)

1.4 EUT Input/Output Ports

Port #	Name Type*	Cable Max. >3m	Cable	Shielded	Comments
1	Mains	AC	1.8 m	Unshielded	Hospital-grade AC Power cord
2	DVI In	I/O	1.8 m	Shielded	24 pin DVI-D
3	VGA In	I/O	1.8 m	Shielded	15 pin D-Sub
4	SDI In 1, 2	I/O	1.8 m	Shielded	BNC
5	SDI Out	I/O	1.8m	Shielded	BNC
6	RGB/Component In, Out	I/O	1.8m	Shielded	BNC to RCA Jack
7	C-Video In, Out	I/O	1.8m	Shielded	BNC
8	S-video In, Out	I/O	1.8m	Shielded	BNC

Note:

*AC = AC Power Port D.C = DC Power Port N/E = Non-Electrical

I/O = Signal Input or Output Port (Not Involved in Process Control)

TP = Telecommunication Ports

RS-232 port is used for service purpose only. No user interface port

1.5 EUT Internal Operating Frequencies

Frequency (MHz)	Description	Frequency (MHz)	Description
10.00 MHz	CPLD Clock	156.00 MHz	Panel Clock
27.00 MHz	System Clock	324.00 MHz	Memory Clock

1.6 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	AC 100-240	3.0	-	50-60 Hz	Single	-
1	AC 120	-	-	60 Hz	Single	-

2. EUT Operation Modes for EMC

2.1 Modes of EMI Testing

Mode	Mode	Comment
1	DVI Mode with extension power cable model 1501047001(75 ft)	Worst case condition
2	VGA Mode	-
3	SDI In/Out Mode	-
4	S-VIDEO In/Out Mode	-
5	C-Video In/Out Mode	-
6	Component (Y/Pb/Pr) In/Out Mode with extension power cable model 1501047001(75 ft)	Worst case condition

Note

1. Testing has been performed under continuous displaying "H" Patten for configuration modes of 1,2
2. Testing has been performed under continuous displaying "Color Bar" Patten for configuration modes of 3,4,5 and 6.
3. Radiation test was performed for both extension power cable model 1501047(15 ft) and 1501047001(75 ft) during the preliminary testing and selected extension power cable model 150104700 as worst case condition for final measurement
4. Conducted emission test was performed with extension power cable model 1501047001(75 ft).
5. All the configuration described above has been investigated during the preliminary testing and selected two Cases as worst case condition for final measurements.

2.2 Modes of Video resolution

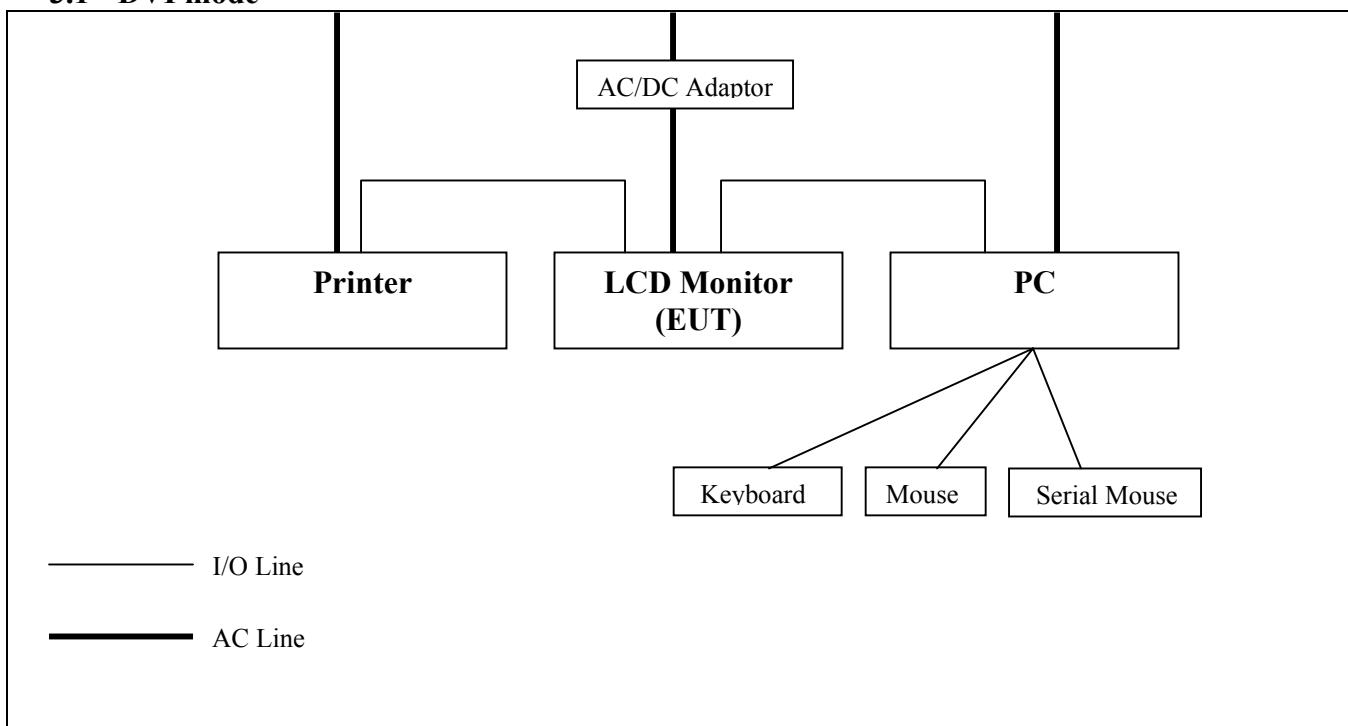
Mode	Mode	Resolution	Comment
1	VGA Mode with extension power cable model 1501047001(75 ft)	640 * 480 @ 75 Hz	-
2		1280 * 1024 @ 75Hz	-
3		1920 * 1200 @ 60Hz	-
4	DVI Mode with extension power cable model 1501047001(75 ft)	640 * 480 @ 75 Hz	-
5		1280 * 1024 @ 75Hz	-
6		1920 * 1200 @ 60Hz	Worst case condition
7	Component Mode with extension power cable model 1501047001(75 ft)	100/0/100/0	Worst case condition

Note

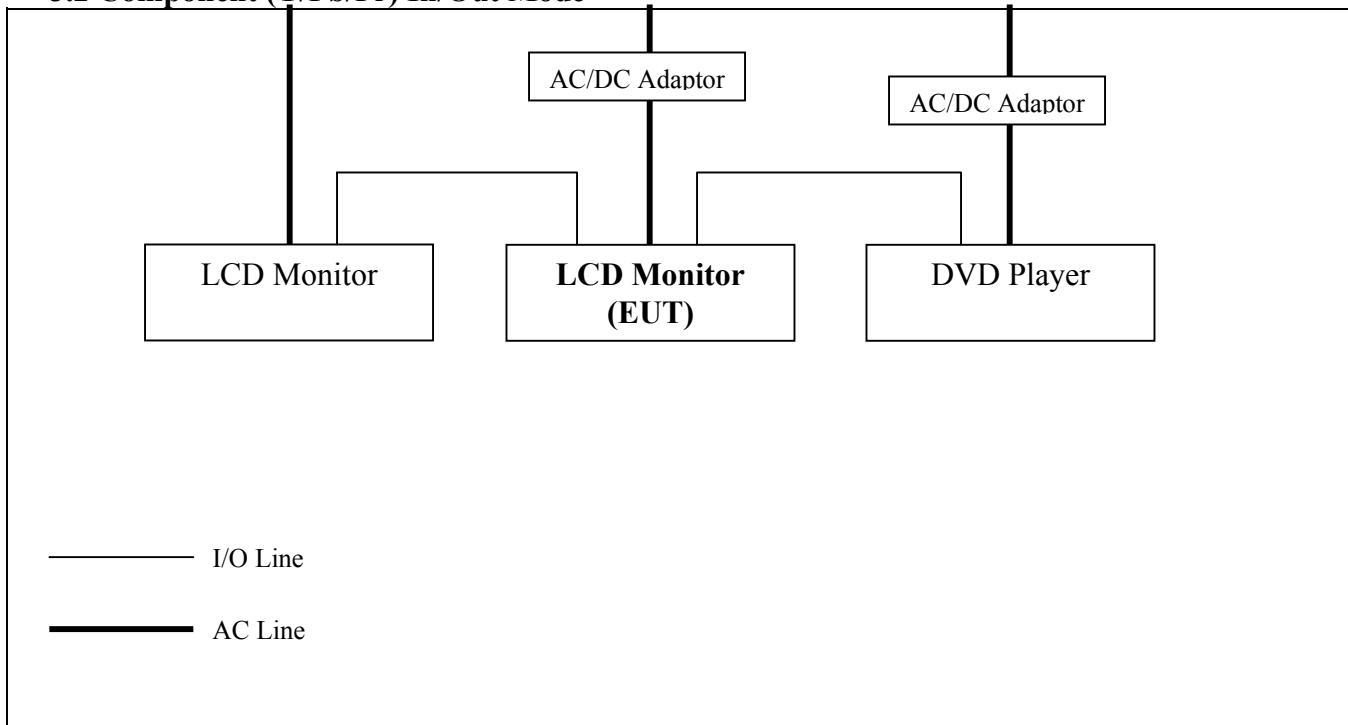
1. Video resolution where it refers from above is representative worst case.
2. The worst-case emission mode has been determined by the preliminary testing for all the video resolution modes described above.

3. EUT Configurations:

3.1 DVI mode



3.2 Component (Y/Pb/Pr) In/Out Mode



4. CONDUCTED EMISSION

TEST: Limits of mains terminal disturbance voltage					
Method	Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.	—			
Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C			
	Relative Humidity	10 to 90 %			
Parameters recorded during the test	Laboratory Ambient Temperature	22 °C			
	Relative Humidity	40 %			
	Frequency range on each side of line	Measurement Point			
Fully configured sample scanned over the following frequency range	150 kHz to 30 MHz	Mains			
Limits – Class A					
Frequency (MHz)	Limit (dB μ V)				
	Quasi-Peak	Results	Average	Results	
0.15 to 0.50	79	N/A	66	N/A	
0.50 to 30	73	N/A	60	N/A	
Limits – Class B					
Frequency (MHz)	Limit (dB μ V)				
	Quasi-Peak	Results	Average	Results	
0.15 to 0.50	66 to 56	Pass	56 to 46	Pass	
0.50 to 5	56	Pass	46	Pass	
5 to 30	60	Pass	50	Pass	
Supplementary information: None					
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	ROHDE& SCHWARZ	ESHS 30	840190/002	2007-05-15	2008-05-15
LISN	3816-2	EMCO	1001	2007-10-05	2008-10-05
LISN	3816-2	EMCO	1002	2007-10-05	2008-10-05

Project Number:
Model Number:

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AMM240WTD

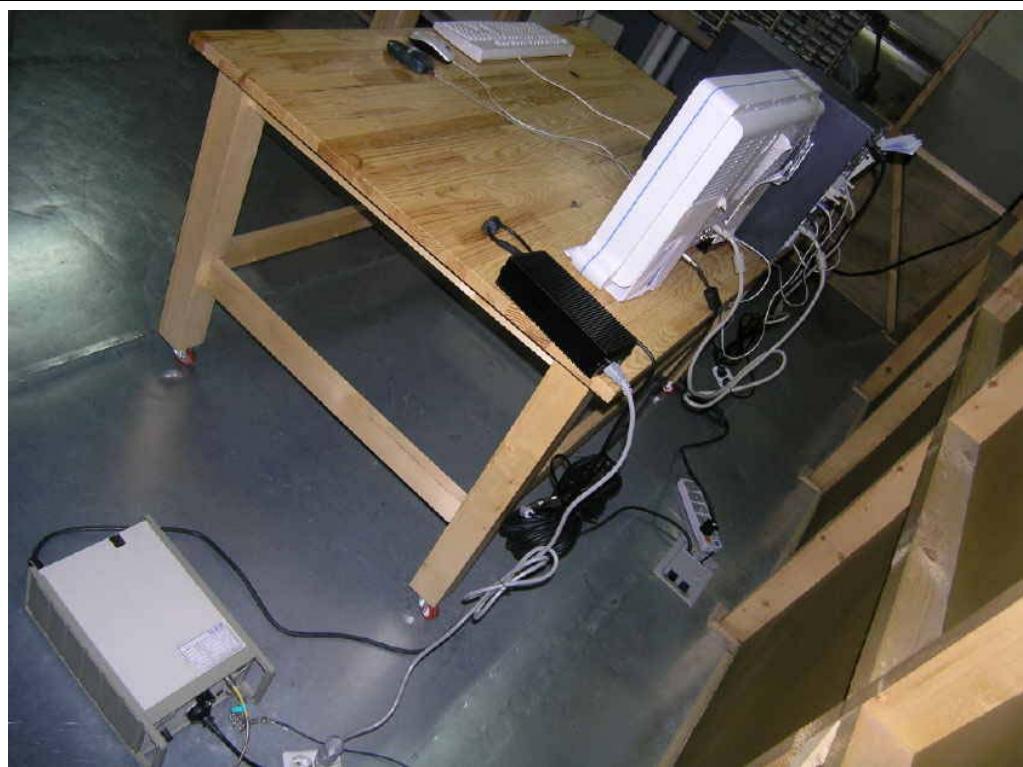
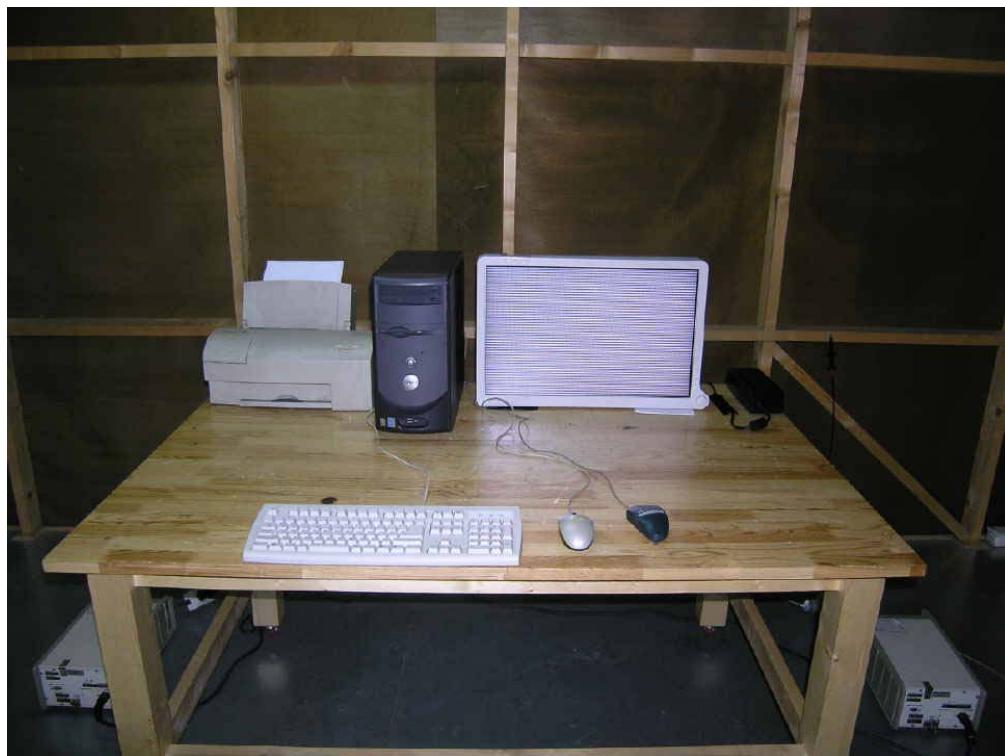
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Figure 1. Conducted Emission Test Setup

Test Condition: DVI Mode



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Figure 2. Conducted Emission Test Setup
Test Condition: Component (Y/Pb/Pr) In/Out Mode



Table 1.
Test data for conducted emission: DVI Mode

Test Frequency (MHz)	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.16	0.03	0.21	48.82	43.26	N	49.06	43.50	65.46	55.46	16.40	11.96
0.21	0.06	0.21	44.14	41.10	N	44.41	41.37	63.01	53.01	18.60	11.64
0.59	0.09	0.08	37.60	36.96	H	37.77	37.13	56.00	46.00	18.23	8.87
2.03	0.12	0.12	36.65	36.14	H	36.89	36.38	56.00	46.00	19.11	9.62
8.35	0.20	0.20	43.28	41.38	H	43.68	41.78	60.00	50.00	16.32	8.22
14.79	0.26	0.35	40.40	36.15	N	41.01	36.76	60.00	50.00	18.99	13.24

Note

- Margin (dB)= Limit (dBuV) - Level (dBuV)
- If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

Table 2.
Test data for conducted emission: Component (Y/Pb/Pr) In/Out Mode

Test Frequency (MHz)	Correction Factor		Reading value (dBuV)		Line	Level (dBuV)		Limit (dBuV)		Margin (dB)	
	Cable	LISN	QP	AV		QP	AV	QP	AV	QP	AV
0.16	0.03	0.21	48.76	42.90	N	49.00	43.14	65.46	55.46	16.46	12.32
0.21	0.06	0.21	43.06	39.48	N	43.33	39.75	63.01	53.01	19.68	13.26
0.59	0.09	0.10	35.84	34.96	N	36.03	35.15	56.00	46.00	19.97	10.85
1.39	0.10	0.06	35.51	34.74	H	35.67	34.90	56.00	46.00	20.33	11.10
8.46	0.20	0.25	42.12	39.16	N	42.57	39.61	60.00	50.00	17.43	10.39
15.85	0.27	0.31	41.13	36.14	N	41.71	36.72	60.00	50.00	18.29	13.28

Note

- Margin (dB)= Limit (dBuV) - Level (dBuV)
- If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

Figure 3. Graphical representation of conducted emissions
Operating condition: DVI Mode

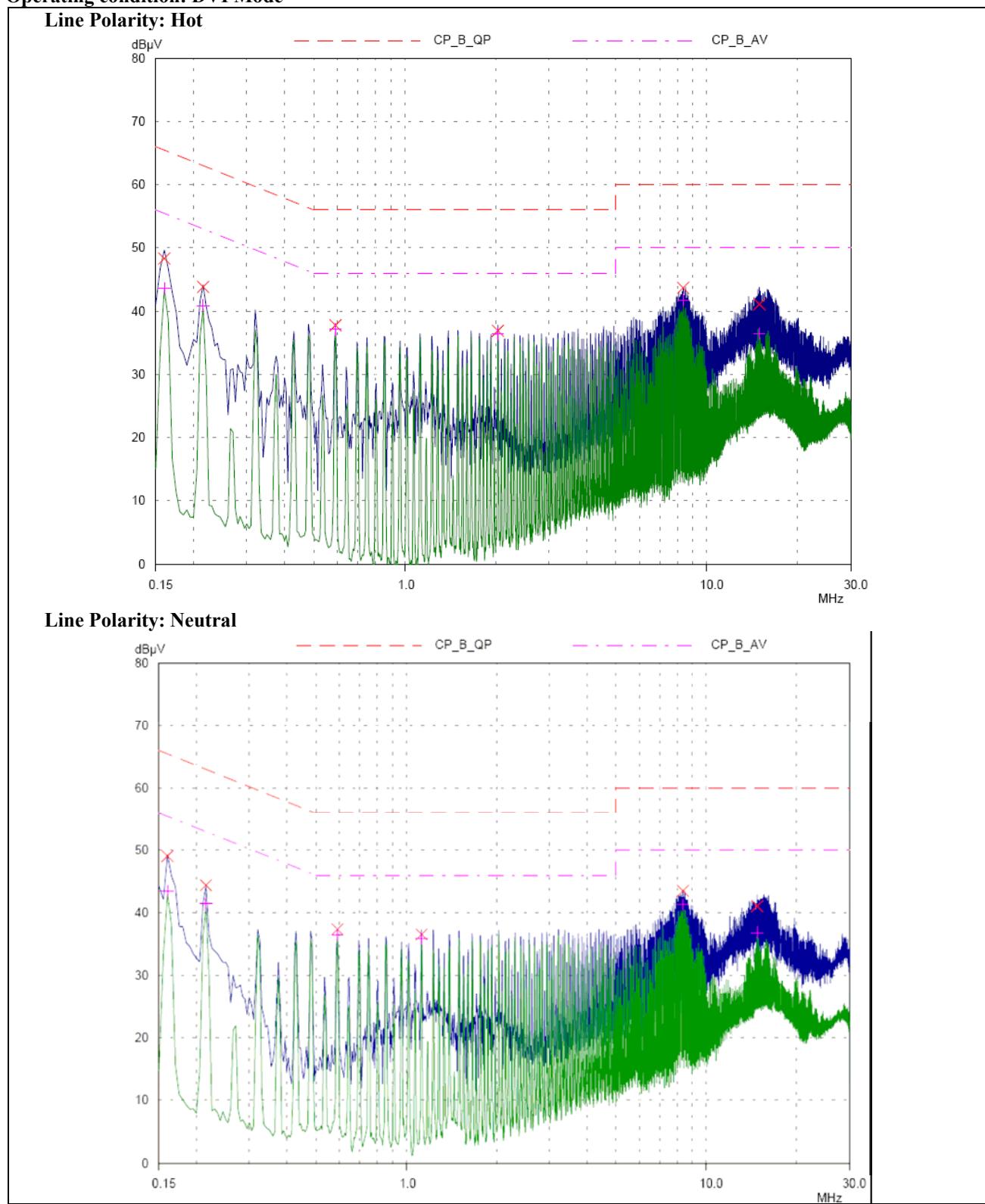
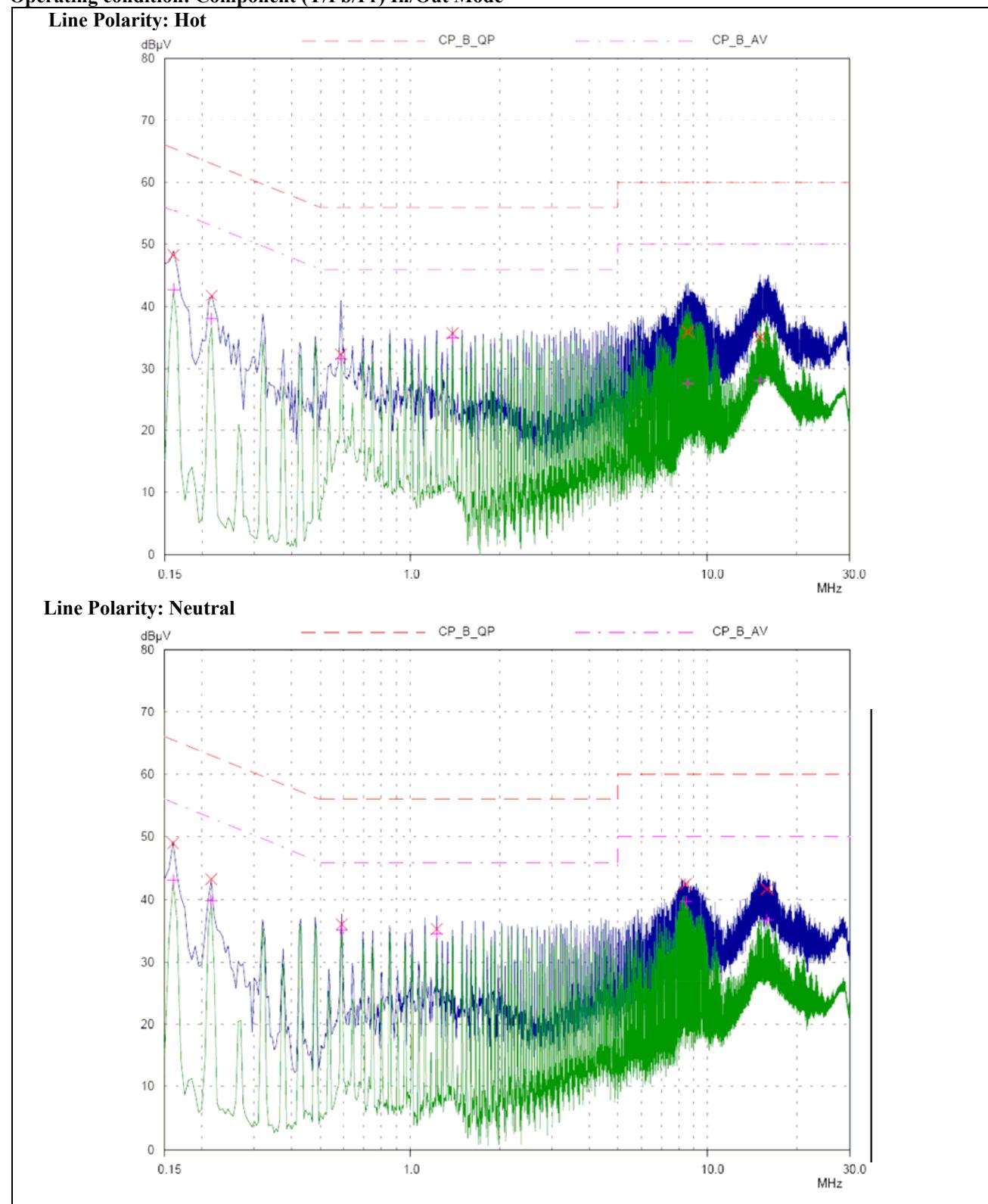


Figure 4. Graphical representation of conducted emissions
Operating condition: Component (Y/Pb/Pr) In/Out Mode



5. RADIATED EMISSION

TEST: Limits for radiated disturbance					
Method	Measurements were made at Open area test site that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at 1, 2, 3 and 4 meter heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	—			
Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C			
	Relative Humidity	10 to 90 %			
Parameters recorded during the test	Laboratory Ambient Temperature	23 °C			
	Relative Humidity	38 %			
	Frequency range	Measurement Point			
Fully configured sample scanned over the following frequency range	30 MHz – 1.0 GHz	(10 meter measurement distance)			
	1 GHz – 2.0GHz	(3 meter measurement distance)			
Limits - Class B					
Frequency (MHz)	Limit (dB μ V/m)				
	Quasi-Peak	Results			
30 to 230	30	Pass			
230 to 1000	37	Pass			
1000 to 2000	54 (Average)	Pass			
Supplementary information: None					
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2007.04.04	2008.04.04
BiconiLog ANT	CBL6112D	Schaffner	21784	2006.06.26	2008.06.26
Position controller	Inn-co	CO 2000	11261105/L	N/A	N/A
Antenna Mast	Inn-co	MA 4000	-	N/A	N/A
Turntable	Inn-co	DT 3000	-	N/A	N/A

Figure 5. Photo of Radiated emission test setup

DVI Mode Front



DVI Mode Rear



Figure 6. Photo of Radiated emission test setup

Component (Y/Pb/Pr) In/Out Mode Front



Component (Y/Pb/Pr) In/Out Mode Rear



Table 3
Radiated emission Test data: DVI Mode

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
39.17	15.75	QP	V	0	1.0	1.75	9.25	26.75	30.0	3.25
33.08	16.55	QP	V	45	1.0	1.46	8.81	26.82	30.0	3.18
52.72	13.92	QP	V	45	1.0	2.10	9.38	25.40	30.0	4.60
101.02	11.68	QP	V	180	1.0	2.72	9.34	23.74	30.0	6.26
186.21	10.98	QP	V	45	1.0	3.93	9.99	24.90	30.0	5.10
311.87	13.27	QP	H	95	3.5	5.64	12.91	31.82	37.0	5.18
389.92	9.81	QP	H	0	3.3	6.50	14.19	30.50	37.0	6.50

Supplementary information:
 This table is to be use when Gain/Loss and Transducer Factors are provided separately.

Table 4
Radiated emission Test data: Component (Y/Pb/Pr) In/Out Mode

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
38.47	15.19	QP	V	0	1.0	1.71	9.20	26.1	30.0	3.90
32.01	15.71	QP	V	0	1.0	1.44	8.75	25.9	30.0	4.10
51.05	13.14	QP	V	0	1.0	2.10	9.56	24.8	30.0	5.20
100.97	10.04	QP	V	0	1.0	2.72	9.34	22.1	30.0	7.90
111.52	9.81	QP	V	180	1.0	2.93	9.96	22.7	30.0	7.30
310.50	12.59	QP	H	46	3.5	5.63	12.88	31.1	37.0	5.90
321.86	8.86	QP	H	46	3.5	5.76	13.07	27.7	37.0	9.30

Supplementary information:
 This table is to be use when Gain/Loss and Transducer Factors are provided separately.

Table 5

Radiated emission Test data: DVI Mode at 1GHz to 2GHz

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
1000.00	15.1	PK	V	0	1.0	4.7	27.3	47.1	54	6.9
1060.00	21.0	PK	V	45	1.0	4.7	25.3	51.0	54	3.0
1513.75	18.3	PK	H	50	1.0	6.7	20.2	45.2	54	8.8
1513.75	21.6	PK	V	45	1.0	6.7	20.2	48.5	54	5.5
1585.00	17.6	PK	V	90	1.0	6.8	20.1	44.5	54	9.5
1828.75	16.5	PK	V	0	1.0	8.1	18.9	43.5	54	10.5

Supplementary information:

- This table is to be use when Gain/Loss and Transducer Factors are provided separately.
- Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

Table 6

Radiated emission Test data: Component (Y/Pb/Pr) In/Out Mode

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Gain/Loss Factor (dB)	Transducer Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
1000.00	14.7	PK	V	0	1.0	4.7	27.3	46.7	54	7.3
1003.75	12.9	PK	H	0	1.0	4.7	27.2	44.8	54	9.2
1082.50	15.6	PK	H	45	1.0	4.8	24.5	44.9	54	9.1
1082.50	19.0	PK	V	30	1.0	4.8	24.5	48.3	54	5.7
1161.25	15.0	PK	H	45	1.0	5.2	22.4	42.6	54	11.4
1161.25	17.1	PK	V	0	1.0	5.2	22.4	44.7	54	9.3
1236.25	19.9	PK	V	0	1.0	5.6	21.7	47.2	54	6.8
1498.75	19.3	PK	H	45	1.0	6.7	20.2	46.2	54	7.8
1498.75	20.1	PK	V	90	1.0	6.7	20.2	47.0	54	7.0

Supplementary information:

- This table is to be use when Gain/Loss and Transducer Factors are provided separately.
- Above 1 GHz, peak detector function mode is used using a resolution bandwidth of 1 MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

6. EUT Modification

EUT Modification for Radiation Disturbance

#1	Insert the ring style ferrite core (SCC Co.,Ltd. Type: SC14)to power cable.
#2	Insert the ring style ferrite core (SCC Co.,Ltd. Type: SC14)to power cable.
#3	Adhere EMI tape OSD cable to make shielding ground.
#4	Adhere EMI tape Temp Sensor cable to make shielding ground
#5	Adhere EMI tape to make more strong ground contact
#6	Adhere EMI tape LVDS Connector (JP3) to make more strong ground contact
#7	Adhere EMI tape on hole of main chassis to make shielding
#8	Adhere EMI tape on hole of main chassis to make shielding
#9	Attach the EMI form gasket (14x4x235mm) to enhance main frame and shield cover contact
#10	Attach the EMI form gasket to enhance I/O Connector and shield cover contact
#11	Attach the EMI form gasket (14x4x220mm) to enhance shield case and rear cover contact
#12	Attach the EMI form gasket (20x40x150) to make strong ground contact with main chassis
#13	Attach the EMI form gasket (20x34x150) to make strong ground contact with main chassis
#14	Insert the flat style ferrite core (SCC Co.,Ltd, type : PC2910) at this 2 point on LVDS cable
#15	Adhere EMI tape LVDS cable to make more strong contact with panel chassis
#16	Adhere EMI tape Inverter cable to make more strong contact with panel chassis
#17	Attach the EMI form gasket (20x40x150) to make strong ground contact with main chassis

Note: See photos of Internal product for modification details required for compliance to the radiated emission

7. Measurement Uncertainties

Test	Uncertainty
Radiated Emissions	± 3.50 dB
Conducted Emissions	± 5.49 dB