Underwriters Laboratories Inc.

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Project:	09CA10146-1
File:	TC8352
Report:	09CA10146-1-FCC
Date:	May 6, 2009
Model:	AMVX2408

FCC Test Report

For

LCD color display

FCC Certification
Part 15 Subpart B Class B

AMPRONIX INC.
15 Whatney Irvine CA 92618 USA

SUMMARY OF TEST RESULTS:

The following tests were performed on a sample submitted for evaluation of compliance with 47CFR PART 15.107(A) / 47CFR PART 15.109(G)				
Test #	Test Name Test Requirement/Specification	Compliant	Not Compliant	See Remark
1	AC Power line Conducted Emission Test	X	-	-
2	Radiated Emission Test	X	-	-

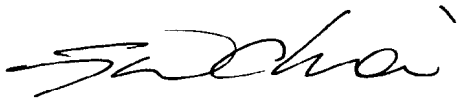
Conclusion:

The tests listed in the Summary of Testing section of this report have been performed as a witness testing and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being 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.
May 6, 2009



Reviewed by
Jea Woon Choi, Senior Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.
May 6, 2009

Test Report Details

Tests Performed By:	UL Korea Ltd. 33rd FL. GFC Bldg. 737 Yeoksam-dong, Kangnam-ku, Seoul, 135-984, Korea
Test Site:	CHUNGBUK TECHNOPARK 685-3 Yangcheong-ri, Ochang-eub,Cheongwon-kun,Chungbuk-province,Republic of Korea The test facility was deemed to have the environment and capabilities necessary to perform the tests included in the test package.
Applicant:	AMPRONIX INC. 15 Whatney Irvine CA 92618 USA
Manufacturer:	AMPRONIX INC. 15 Whatney Irvine CA 92618 USA
Factory:	D&T Inc. 59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343 KOREA
Applicant Contact: Title: Phone: E-mail:	Brian Yamada General Manager 949-273-8000 byamada@ampronix.com
Reference test Equipment information	Model: AMM240WTD Applicant: ADVAN Int'l Corp. FCC ID: QVXAMM240WTD Applicant Contact: Dae Sung Oh E-mail: pilotdan@advancorp.com
Product Type:	LCD color display
Trademark:	MEDVIX
Model Number:	AMVX2408
FCC ID	VYGAMVX2408
Product standards:	FCC Part 15 Subpart B Class B
Sample Serial Number:	N/A
Sample Receive Date:	March 17, 2009
Testing Start Date:	March 17, 2009
Date Testing Complete:	April 20, 2009
Test Report Date:	April 30, 2009
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.

REPORT DIRECTORY

1. GENERAL PRODUCT DESCRIPTION

1.1 Report Revision History

Revision Date	Description	Remarks	Revision reviewed By
April 30, 2009	1. LCD Panel Add. (Model: LM240WU4, Manufacturer: LG Display) 2. AC/DC Adapter Add. (Model: PMP150-14-K11, Manufacturer: Protek) 3. 5 ft DC Extension Cable Add. (Model: 1501047002, Manufacturer: BridgePower)	Original Report No: 07CA59143	

1.2 Equipment Description

Description:
The AMM240WTD is intended for use by general surgeons, gynecologists, urologists, thoracic, orthopedic, ENT, and plastic surgeons adequately trained in these surgical procedures.

1.3 Details of Test Equipment (EUT)

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LCD color display	AMPRONIX INC.	AMVX2408	-
2	AC/DC Adapter	BridgePower (AULT Korea Corp.)	JMW1150KA2400F04	-
3	AC/DC Adapter	Protek	PMP150-14-K11	-
4	DC Extension Cable	BridgePower	1501047001	75ft
5	DC Extension Cable	BridgePower	1501047	15ft
6	DC Extension Cable	BridgePower	1501047002	5ft
8	DVI cable	-	-	-
9	VGA HDDB15cable	-	-	-
10	Hospital-grade AC Power cord	-	-	-
11	BNC cable	-	-	-
12	S-Video cable	-	-	-

1.4 Technical Data:

Specification	
Display	
LCD Display Panel	24.0 TFT LCD Panel
Type	Active Matrix
Resolution	1920 x 1200 @ 60Hz
Pixel Pitch	0.27mm
Display Color	16.7M Colors
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	24-bit MSB RGB TMDS Dual Link
Scanning Frequency	
Horizontal	31.47~79.98kHz
Vertical	50~75Hz
Brightness, Contrast Radtio, Gray Scales	
Brightness	400 cd/m2 (Typ.)
Contrast Ratio	1000:1 (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 50-60Hz, 3.0A
Dimension	23.54 (W) x 15.07 (H) x 4.39 (D) 598mm(W) x 382.9mm(H) x 111.5mm(D)
Weight	16.45 lbs (7.47Kg)

1.5 EUT Internal operating frequency

Frequency (MHz)	Description	Frequency (MHz)	Description
324.00 MHz	Memory Clock	27.00 MHz	System Clock
77.00 MHz	Display Clock	28.322 MHz	System Clock

1.6 Technical descriptions and documents:

No.	Document Title and Description
1	AMM240WTD User Manual
Note: The manufacturer provided the following document.	

1.7 Equipment Marking Plate:

2. TEST CONDITION

2.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	LCD color display	AMPRONIX INC.	AMVX2408	-
AE	Headset	ACTTO	-	-
AE	Printer	SAMSUNG	ML-2250G	-
AE	USB mouse	DELL	SMOU50001WX-BK	-
AE	USB Keyboard	Keylim Industrial Co.	RBK-371UP	-
AE	Pattern generator	DEVICOR	Devicor Signal Generator #100-USB	Used for C-video, S-Video and Component mode
AE	Pattern generator AC/DC adapter	-	-	Connected to Pattern generator
AE	SDI Patten Generator	ASTRO	SC-2055A	Used for SDI mode
AE	External LCD Monitor	DNT Inc.	FS-L1901T	Connected to EUT
AE	LCD Monitor adapter	LISHIN INTERNATIONAL ENTERPRISE CORP.	LSE9901B1260	Connected to LCD monitor
AE	LCD Monitor	LG	L17NS-A	Connected to PC

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

2.2 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, Out	I/O	1.8 m	Shielded	BNC
5	S-Video In, Out	I/O	1.8 m	Shielded	S-Video
6	Component (Y/Pb/Pr) In, Out	I/O	1.8 m	Shielded	5 Port BNC
7	C-Video in, Out	I/O	1.8 m	Shielded	C-Video

Note:
* AC = AC Power Port DC = 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

2.3 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	100-240Vac	90m A	-	50-60Hz	-
1	120 V	-	-	60 Hz	-

2.4 Test Configuration #1

Test Mode #1	
Color Display Monitor	Manufacturer: AMPRONIX INC. Model: AMM240WTD
AC/DC Adapter	Manufacturer: BridgePower Model: JMW1150KA2400F04
DC Extension Cable	Manufacturer: BridgePower, Model: 1501047 (15ft)
Worst case operating mode	D-Sub and Component In/Out Mode

2.5 Test Configuration #2

Test Mode #2	
Color Display Monitor	Manufacturer: AMPRONIX INC. Model: AMM240WTD
AC/DC Adapter	Manufacturer: PROTEK Model: PMP150-14-K11
DC Extension Cable	Manufacturer: BridgePower, Model: 1501047 (15ft)
Worst case operating mode	DVI and Component In/Out Mode

2.6 Test Mode of LCD Color Display Monitor for Test Configuration #1

Mode #	Mode	Comments
1	DVI Mode	-
2	D-Sub Mode	Worst case condition
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	Worst case condition

Note:
1. All the configuration described above has been investigated during the preliminary testing and selected two cases as worst-case condition for final measurements.
2. EUT have been performed under continuous displaying “H” Patten for configuration modes of 1 to 2.
3. EUT has been performed under continuous displaying “Color Bar” Patten for configuration modes of 3, 4, 5 and 6.

2.7 Test Mode of LCD Color Display Monitor for Test Configuration #2

Mode #	Mode	Comments
1	DVI Mode	Worst case condition
2	DSUB 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	Worst case condition

Note:
1. All the configuration described above has been investigated during the preliminary testing and selected two cases as worst-case condition for final measurements.
2. EUT have been performed under continuous displaying “H” Patten for configuration modes of 1 to 2.
3. EUT has been performed under continuous displaying “Color Bar” Patten for configuration modes of 3, 4, 5 and 6.

2.8 Test Resolution of LCD Color Display Monitor for Test Configuration #1

Mode #		Resolution	Comments
1	D-Sub Mode	640 * 350 @ 60Hz	-
2		1024 * 768 @ 60Hz	-
3		1920 1200 @ 60Hz	Worst case condition
4	Component Mode	720p60h	Worst case condition
Note: 1. Video resolution where it refers from above is representative worst case.			

2.9 Test Resolution of LCD Color Display Monitor for Test Configuration #2

Mode #		Resolution	Comments
1	DVI Mode	640 * 350 @ 60Hz	-
2		1024 * 768 @ 60Hz	-
3		1920 1200 @ 60Hz	Worst case condition
4	Component Mode	720p60h	Worst case condition
Note: Video resolution where it refers from above is representative worst case.			

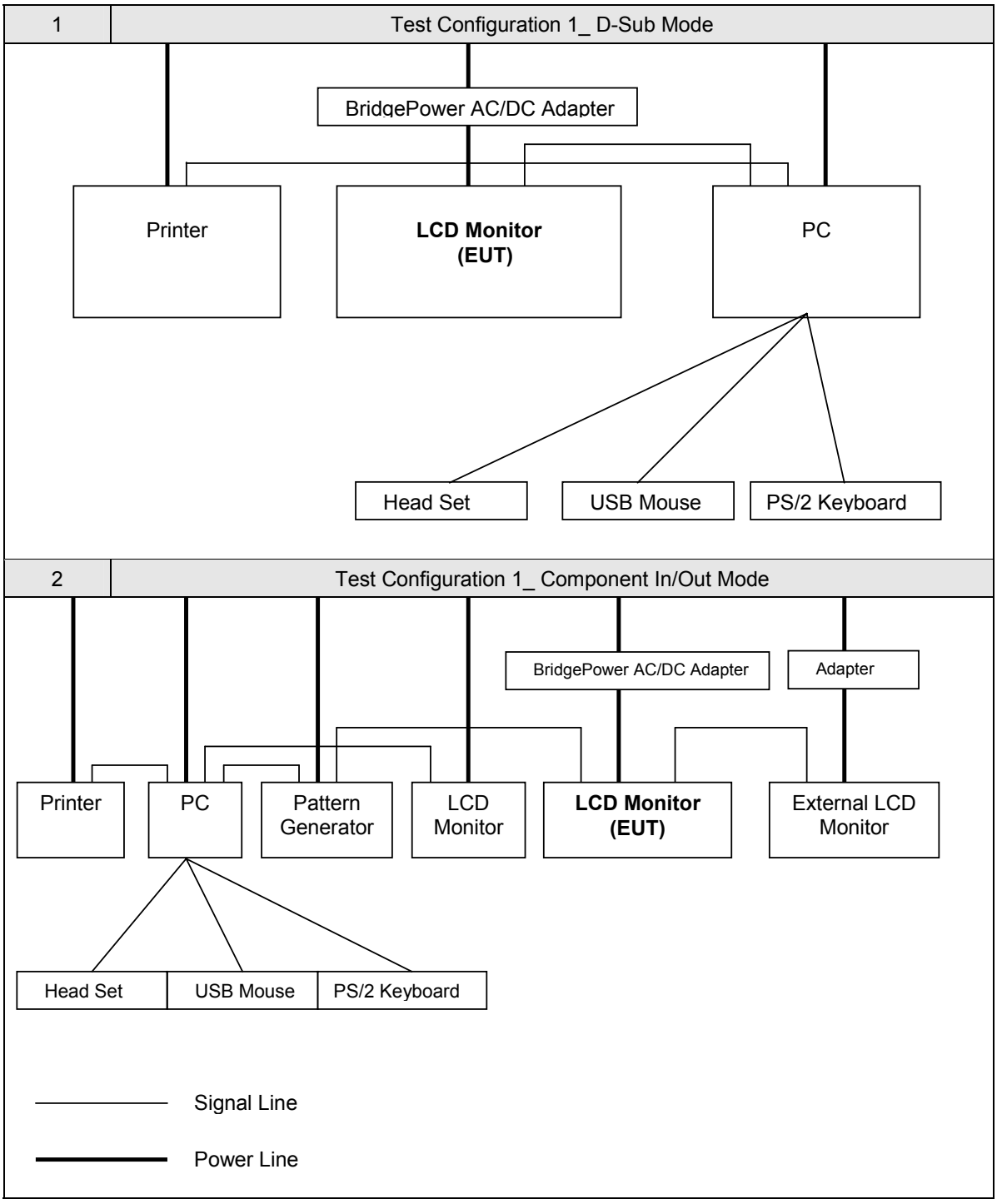
2.10 Used DC extension Cable for Test Configuration #1

Mode #	Manufacturer	Model	Preliminary Test Mode	Comment
1	BridgePower	1501047001	DVI, D-Sub, SDI, S-Video, C-Video, Component Mode.	75ft
2		1501047		15ft_ Worst test condition
3		1501047002		5ft
Note: Radiated emission and conducted emission test were performed for all extension power cable during the preliminary testing and selected worst-case condition for final measurements.				

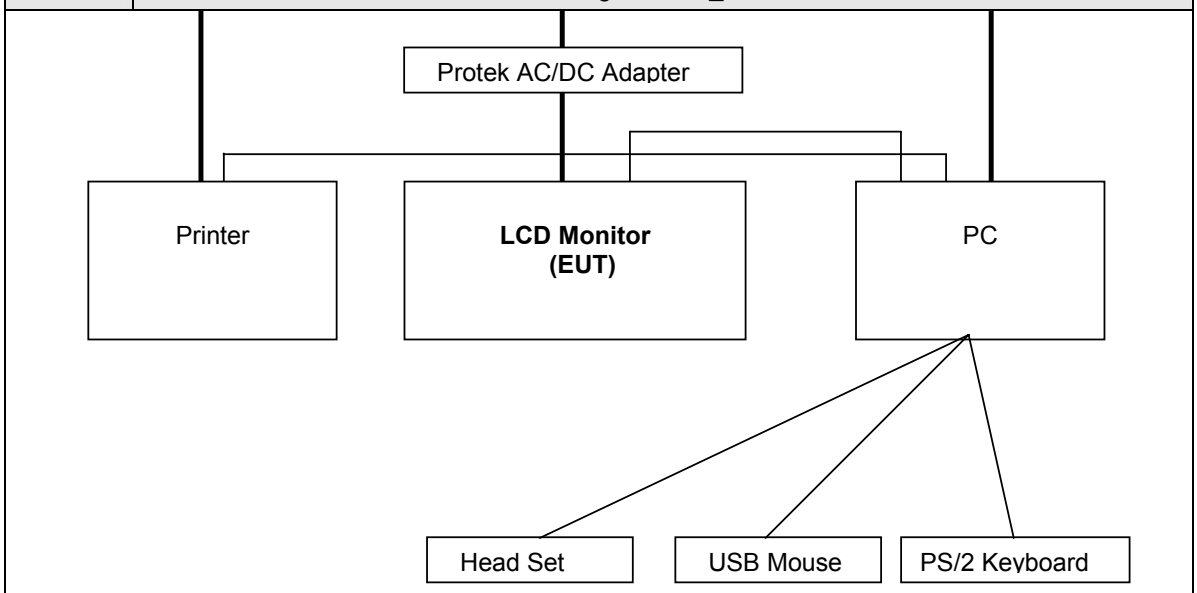
2.11 Used DC extension Cable for Test Configuration #2

Mode #	Manufacturer	Model	Preliminary Test Mode	Comment
1	BridgePower	1501047001	DVI, D-Sub, SDI, S-Video, C-Video, Component Mode.	75ft
2		1501047		15ft_ Worst test condition
3		1501047002		5ft
Note: Radiated emission and conducted emission test were performed for all extension power cable during the preliminary testing and selected worst-case condition for final measurements.				

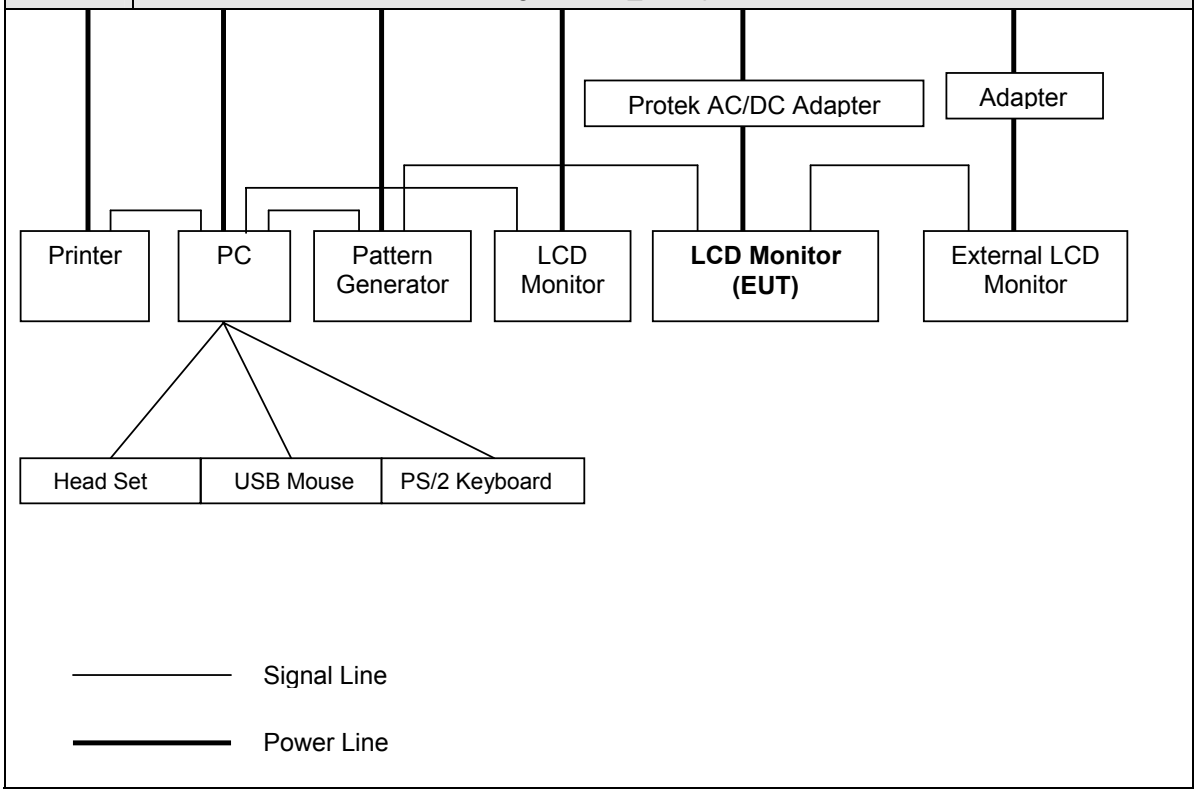
2.12 Test Configuration:



3	Test Configuration 2_ DVI Mode



4	Test Configuration 2_ Component In/Out Mode



3. EST CONDITION AND RESULTS

3.1 MAINS TERMINAL DISTURBANCE VOLTAGE TEST

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 recorded during the test		Laboratory Ambient Temperature	21.2°C
		Relative Humidity	38.4 %
-		Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range		150 kHz to 30 MHz	AC Input port of AC/DC Adapter.

Limits - Class B				
Frequency (MHz)	Limit (dBµV)			
	Quasi-Peak	Result	Average	Result
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**

EUT Configuration Settings:		
Power Interface Mode # (See Section 2.3)	EUT Operation Mode # (See 2.6 and 2.7)	EUT Configurations Mode # (See Section 2.12)
1	2 and 6 for test configuration 1, 1 and 6 for test configuration 2.	1 and 2 for test configuration 1, 3 and 4 for test configuration 2.

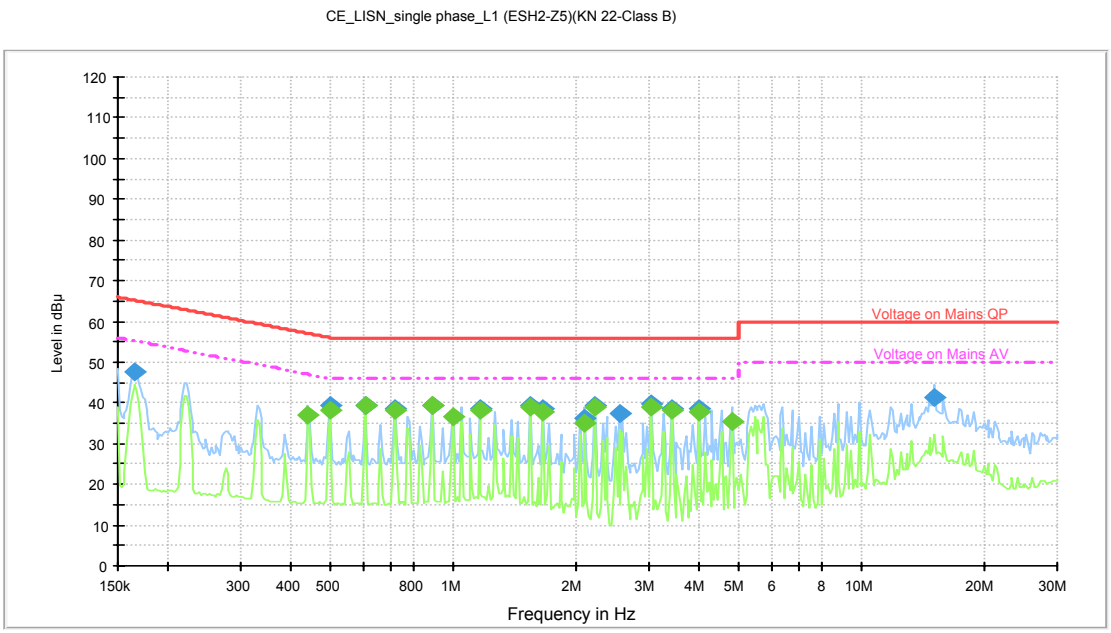
Conducted Emissions Test Equipment used:				
Description	Manufacturer	Model	Identifier	Cal. Due
Test Receiver	Rohde & Schwarz	ESPI	101798	2010.04.24
LISN	Rohde & Schwarz	ESH2-Z5	100146	2010.04.24
LISN	Schwarzbeck	NNLK8129	8129162	2010.04.24
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	3057.8810.54	2010.04.24

Figure 1. Conducted Emission Test Setup for Test Configuration 1

D-sub Mode

Figure 2. Graphical representation of Test Configuration 1

D-Sub Mode, Hot Line



D-Sub Mode, Neutral Line

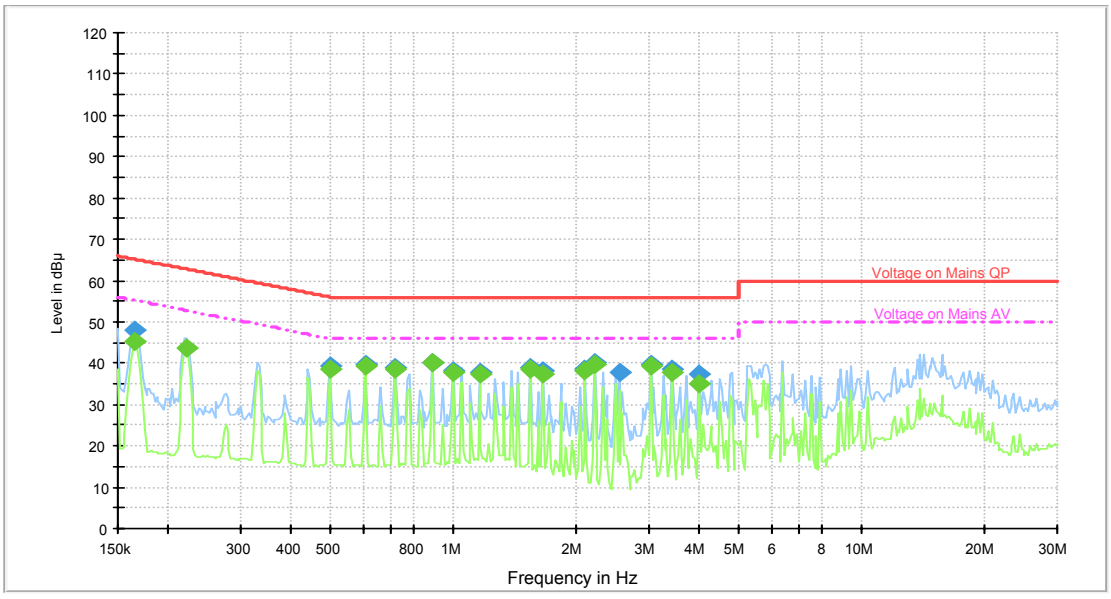


Table 1. Test data for conducted emission of Test Configuration 1

D-Sub 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
0.17	9.75	0.15	38.20	35.40	N	48.10	45.30	65.20	55.20	17.10	9.90
0.50	9.76	0.14	29.30	28.50	L1	39.20	38.40	56.10	46.10	16.90	7.70
0.60	9.79	0.11	29.70	29.60	N	39.60	39.50	56.00	46.00	16.40	6.50
0.72	9.79	0.11	29.00	28.80	N	38.90	38.70	56.00	46.00	17.10	7.30
0.88	9.80	0.20	29.40	29.20	L1	39.40	39.20	56.00	46.00	16.60	6.80
0.99	9.81	0.19	28.20	27.80	N	38.20	37.80	56.00	46.00	17.80	8.20
1.15	9.81	0.19	28.50	28.00	L1	38.50	38.00	56.00	46.00	17.50	8.00
1.54	9.84	0.16	29.40	29.10	L1	39.40	39.10	56.00	46.00	16.60	6.90
1.65	9.85	0.15	28.60	27.90	L1	38.60	37.90	56.00	46.00	17.40	8.10
2.10	9.88	0.22	28.40	27.90	N	38.50	38.00	56.00	46.00	17.50	8.00
2.20	9.88	0.22	29.90	29.60	N	40.00	39.70	56.00	46.00	16.00	6.30
2.53	9.88	0.22	27.80	24.40	N	37.90	34.50	56.00	46.00	18.10	11.50
3.03	9.92	0.28	29.40	28.80	L1	39.60	39.00	56.00	46.00	16.40	7.00
3.41	9.95	0.25	28.50	28.00	L1	38.70	38.20	56.00	46.00	17.30	7.80
3.96	10.01	0.29	28.20	27.70	L1	38.50	38.00	56.00	46.00	17.50	8.00

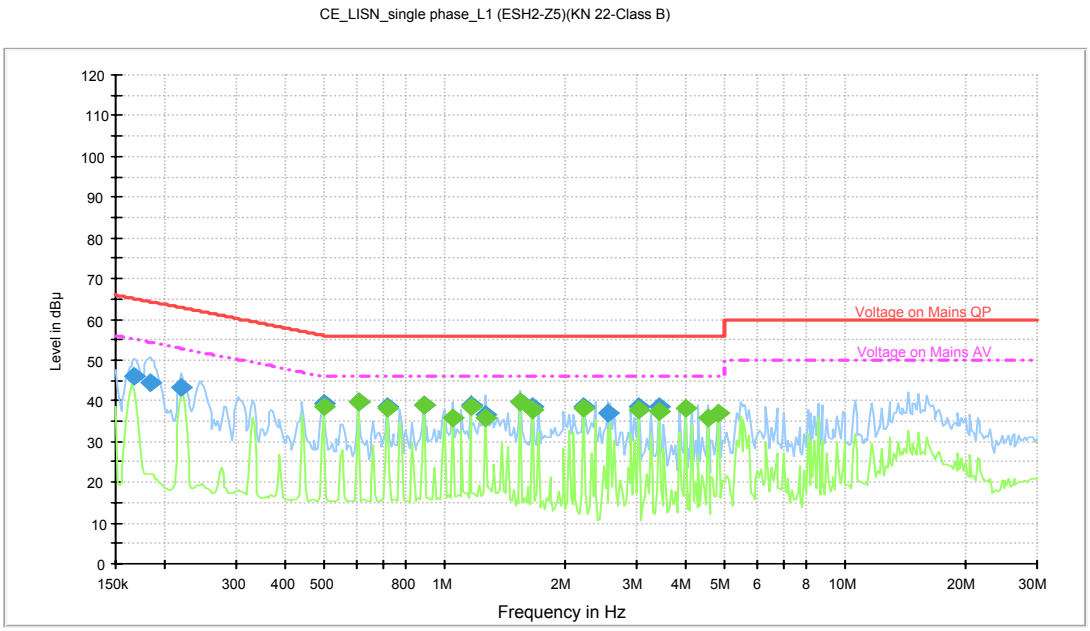
Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

Figure 3. Conducted Emission Test Setup for Test Configuration 1

Component In, Out Mode

Figure 4. Graphical representation Test Configuration 1

Component In, Out Mode, Hot Line



Component In, Out Mode, Neutral Line

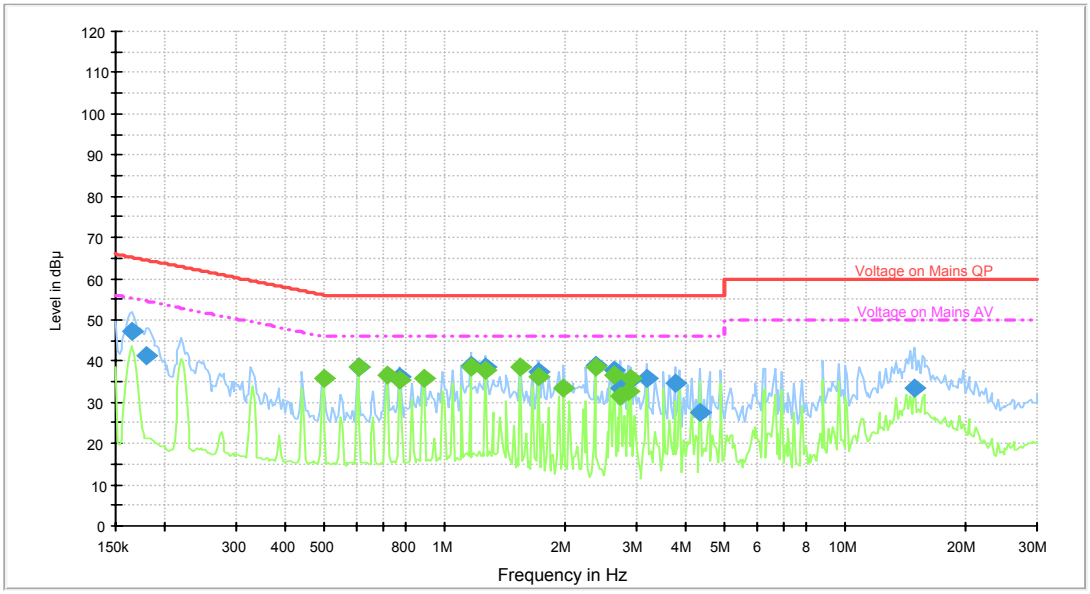


Table 2. Test data for conducted emission Test Configuration 1

Component 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
0.17	9.75	0.15	38.20	35.40	N	48.10	45.30	65.20	55.20	17.10	9.90
0.50	9.76	0.14	29.30	28.50	L1	39.20	38.40	56.10	46.10	16.90	7.70
0.60	9.79	0.11	29.70	29.60	N	39.60	39.50	56.00	46.00	16.40	6.50
0.72	9.79	0.11	29.00	28.80	N	38.90	38.70	56.00	46.00	17.10	7.30
0.88	9.80	0.20	29.40	29.20	L1	39.40	39.20	56.00	46.00	16.60	6.80
0.99	9.81	0.19	28.20	27.80	N	38.20	37.80	56.00	46.00	17.80	8.20
1.15	9.81	0.19	28.50	28.00	L1	38.50	38.00	56.00	46.00	17.50	8.00
1.54	9.84	0.16	29.40	29.10	L1	39.40	39.10	56.00	46.00	16.60	6.90
1.65	9.85	0.15	28.60	27.90	L1	38.60	37.90	56.00	46.00	17.40	8.10
2.10	9.88	0.22	28.40	27.90	N	38.50	38.00	56.00	46.00	17.50	8.00
2.20	9.88	0.22	29.90	29.60	N	40.00	39.70	56.00	46.00	16.00	6.30
2.53	9.88	0.22	27.80	24.40	N	37.90	34.50	56.00	46.00	18.10	11.50
3.03	9.92	0.28	29.40	28.80	L1	39.60	39.00	56.00	46.00	16.40	7.00
3.41	9.95	0.25	28.50	28.00	L1	38.70	38.20	56.00	46.00	17.30	7.80
3.96	10.01	0.29	28.20	27.70	L1	38.50	38.00	56.00	46.00	17.50	8.00

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

Figure 5. Conducted Emission Test Setup for Test Configuration 2

DVI Mode

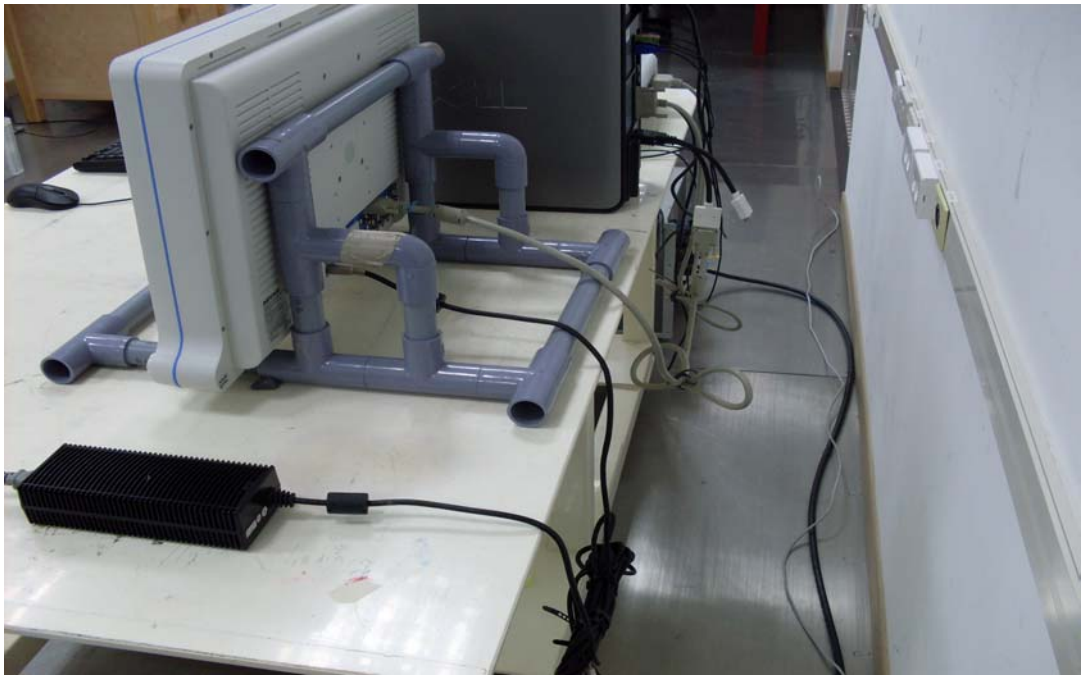
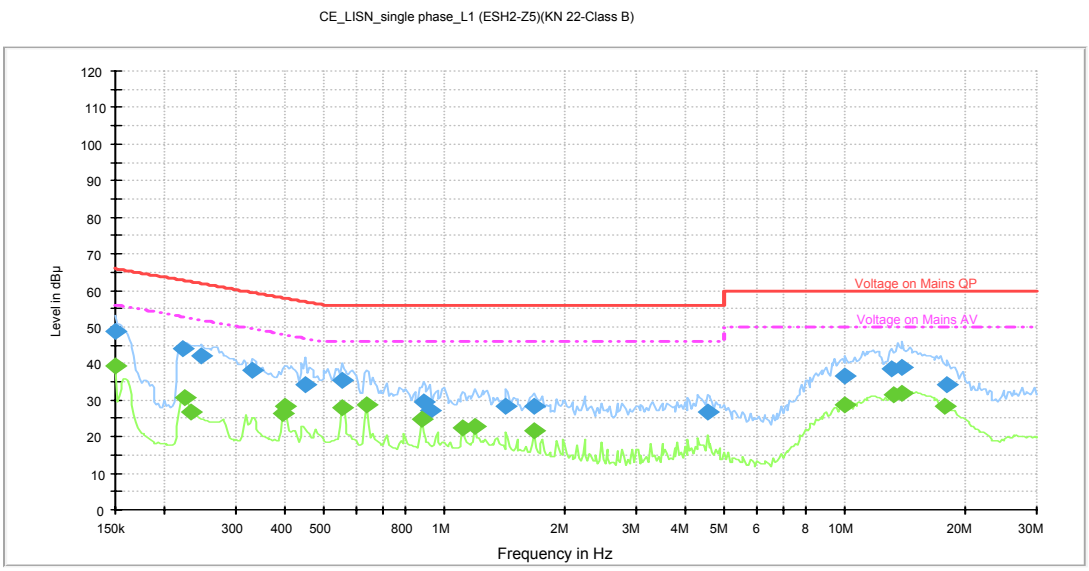


Figure 6. Graphical representation for Test Configuration 2

DVI mode, Hot Line



DVI Mode, Neutral Line

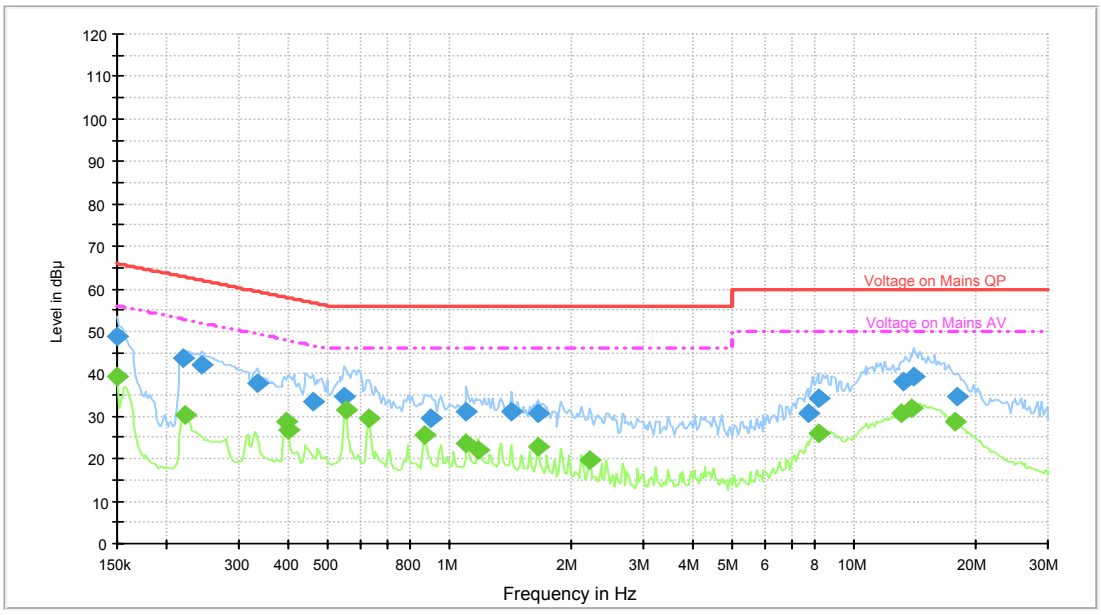


Table 3. Test data for conducted emission for Test Configuration 2

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
0.17	9.75	0.15	38.20	35.40	N	48.10	45.30	65.20	55.20	17.10	9.90
0.50	9.76	0.14	29.30	28.50	L1	39.20	38.40	56.10	46.10	16.90	7.70
0.60	9.79	0.11	29.70	29.60	N	39.60	39.50	56.00	46.00	16.40	6.50
0.72	9.79	0.11	29.00	28.80	N	38.90	38.70	56.00	46.00	17.10	7.30
0.88	9.80	0.20	30.20	30.10	N	40.20	40.10	56.00	46.00	15.80	5.90
1.15	9.81	0.19	28.50	28.00	L1	38.50	38.00	56.00	46.00	17.50	8.00
1.54	9.84	0.16	28.90	28.50	N	38.90	38.50	56.00	46.00	17.10	7.50
1.65	9.85	0.15	28.60	27.90	L1	38.60	37.90	56.00	46.00	17.40	8.10
2.10	9.88	0.22	26.10	24.80	L1	36.20	34.90	56.00	46.00	19.80	11.10
2.20	9.88	0.22	29.90	29.60	N	40.00	39.70	56.00	46.00	16.00	6.30
2.53	9.88	0.22	27.80	23.90	N	37.90	34.00	56.00	46.00	18.10	12.00
3.03	9.92	0.28	29.50	29.30	N	39.70	39.50	56.00	46.00	16.30	6.50
3.41	9.95	0.25	28.50	28.00	L1	38.70	38.20	56.00	46.00	17.30	7.80
3.96	10.01	0.29	28.20	27.70	L1	38.50	38.00	56.00	46.00	17.50	8.00

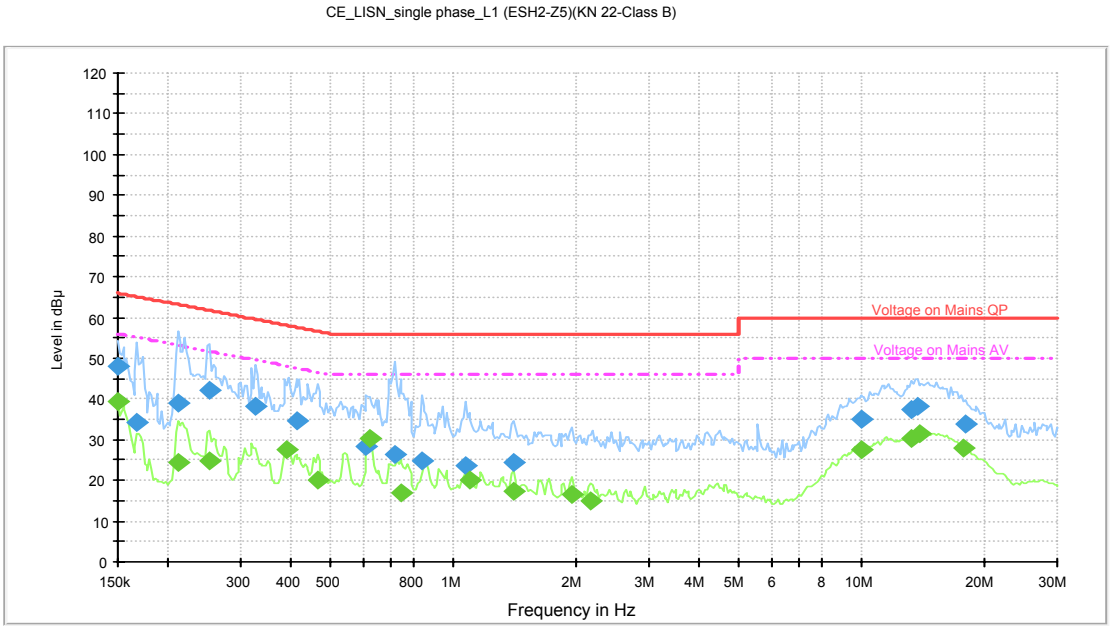
Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV)
2. If no frequencies are specified in the tables, no measurement for quasi-peak or average was necessary.

Figure 7. Conducted Emission Test Setup for Test Configuration 2

Component In/Out Mode

Figure 8. Graphical representation for Test Configuration 2

Component In/Out Mode, Hot Line



Component In/Out Mode, Neutral Line

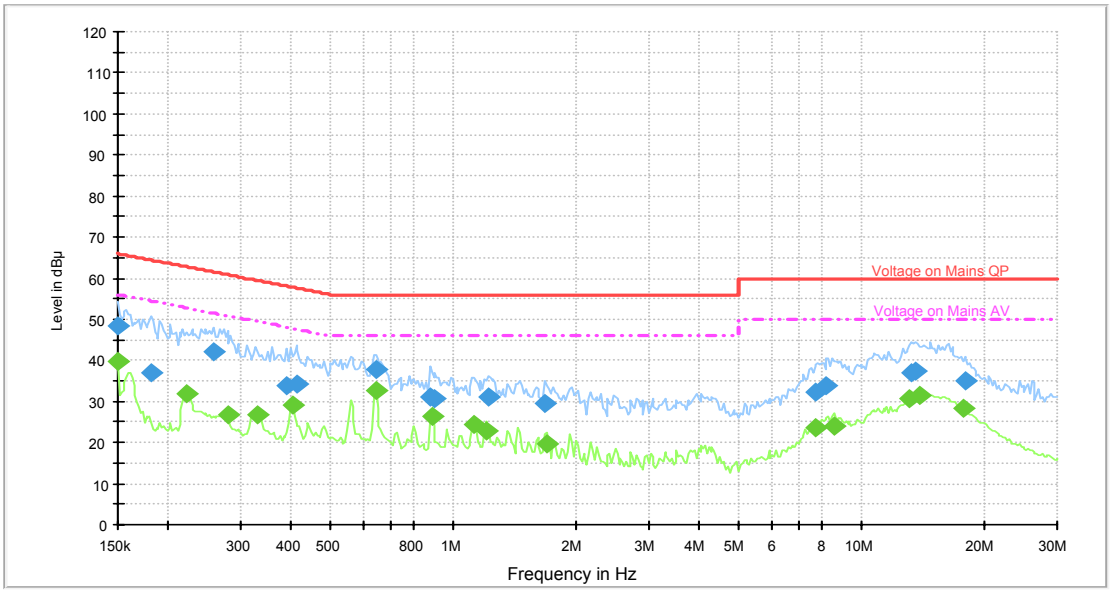


Table 4. Test data for conducted emission of Test Mode #2

Component 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
0.15	9.75	0.15	38.40	29.60	N	48.30	39.50	66.00	56.00	17.70	16.50
0.17	9.76	0.14	24.40	24.10	L1	34.30	34.00	65.10	55.10	30.80	21.10
0.18	9.76	0.14	27.00	9.10	N	36.90	19.00	64.40	54.40	27.50	35.40
0.21	9.76	0.14	29.00	14.30	L1	38.90	24.20	63.20	53.20	24.30	29.00
0.33	9.77	0.13	28.20	19.10	L1	38.10	29.00	59.60	49.60	21.50	20.60
0.41	9.76	0.14	24.50	19.10	N	34.40	29.00	57.70	47.70	23.30	18.70
0.64	9.80	0.10	27.90	22.70	N	37.80	32.60	56.00	46.00	18.20	13.40
0.87	9.81	0.19	20.90	8.00	N	30.90	18.00	56.00	46.00	25.10	28.00
1.07	9.81	0.19	13.60	10.00	L1	23.60	20.00	56.00	46.00	32.40	26.00
1.21	9.82	0.18	21.10	7.50	N	31.10	17.50	56.00	46.00	24.90	28.50
7.72	10.07	0.43	21.70	13.20	N	32.20	23.70	60.00	50.00	27.80	26.30
8.19	10.08	0.42	23.30	8.50	N	33.80	19.00	60.00	50.00	26.20	31.00
9.89	10.10	0.50	24.60	17.00	L1	35.20	27.60	60.00	50.00	24.80	22.40
13.20	10.09	0.71	26.70	19.30	L1	37.50	30.10	60.00	50.00	22.50	19.90
13.60	10.08	0.72	27.50	19.20	L1	38.30	30.00	60.00	50.00	21.70	20.00

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

3.2 RADIATED DISTURBANCE

TEST: Limits for radiated disturbance				
Method	A pretest was performed at 3m distances in an anechoic screened enclosure, scanning the frequency range, and locating any frequencies at the which EUT radiated. Frequency scans were conducted with a peak detector with horizontal and vertical polarization of the antenna. Measurements were done in the frequency range 30-1000 MHz. The main test was then conducted by measurements at each frequency found in the pretest. These measurements were done at an open area test site at 10m distances, with a quasi-peak detector. EUT was positioned on a wooden table 0.8m above the floor, at the edge of the turntable. Cables connected to EUT were fixed to cause maximum emission. A maximum emitting point for each frequency was found by turning EUT 0-360 degrees, and adjust the antenna height between 1-4m. A quasi-peak detector measurement was then done at the maximum emitting point.			
Parameters recorded during the test	Laboratory Ambient Temperature		26.7 °C	
	Relative Humidity		47.5 %	
-	Frequency range		Measurement Point	
Fully configured sample scanned over the following frequency range	30 MHz – 1.0 GHz		10 or 3 meter measurement distance	
Limits – Class B				
Frequency (MHz)	Limit (dBµV/m)			
	Quasi-Peak		Results	
30 to 230	30 at 10 meters		**Pass**	
230 to 1000	37at 10 meters		**Pass**	
-	Average	Peak	**-**	
1.0 GHz to 2.0 GHz	54 at 3 meters	74 at 3 meters	**Pass**	
EUT Configuration Settings:				
Power Interface Mode # (See Section 2.3)	EUT Operation Mode # (See 2.6 and 2.7)		EUT Configurations Mode # (See Section 2.12)	
1	2 and 6 for test configuration 1, 1 and 6 for test configuration 2.		1 and 2 for test configuration 1, 3 and 4 for test configuration 2.	

Radiated Emissions Test Equipment:				
Description	Manufacturer	Model	Identifier	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2010.04.24
BICONILOG ANT	Schaffner	CBL6112D	22022	2010.04.21
HORN Antenna	Schwarzbeck	BBHA9120D	9120D-539	2010.03.24
Antenna Mast	Inn-co	MA 4000	-	-

Figure 9, Radiated emission test setup for Test Configuration 1

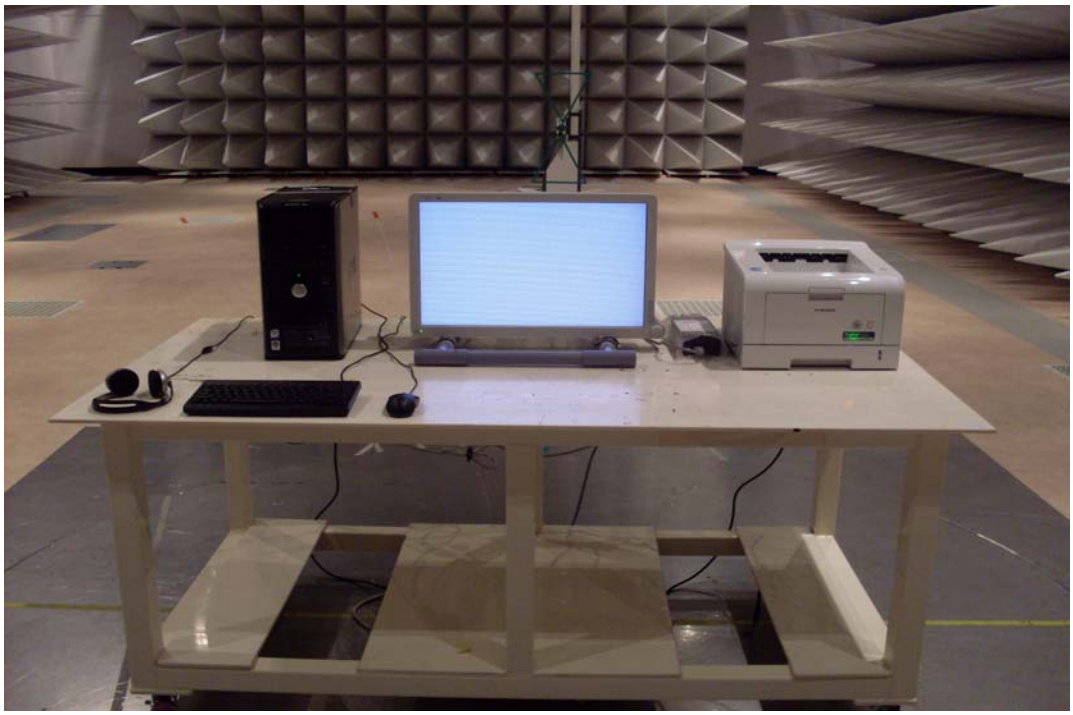
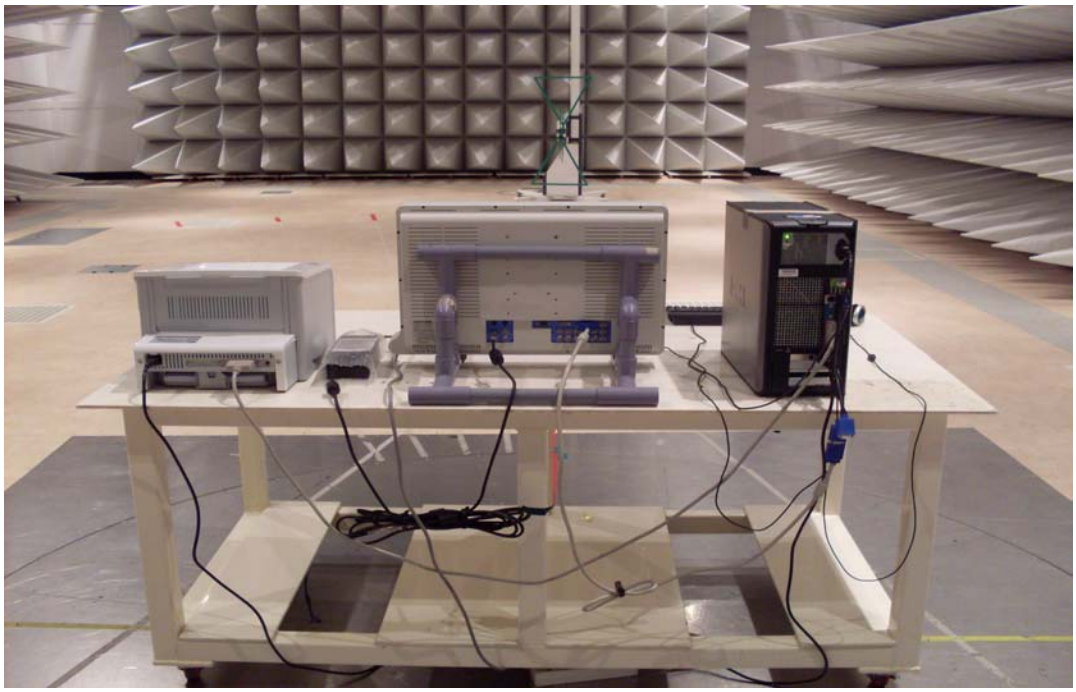
D-Sub Mode_ 30 to 1.0 GHz



Figure 10. Graphical representation of Test Configuration 1

D-Sub Mode_30 MHz to 1.0 GHz_ Horizontal and Vertical

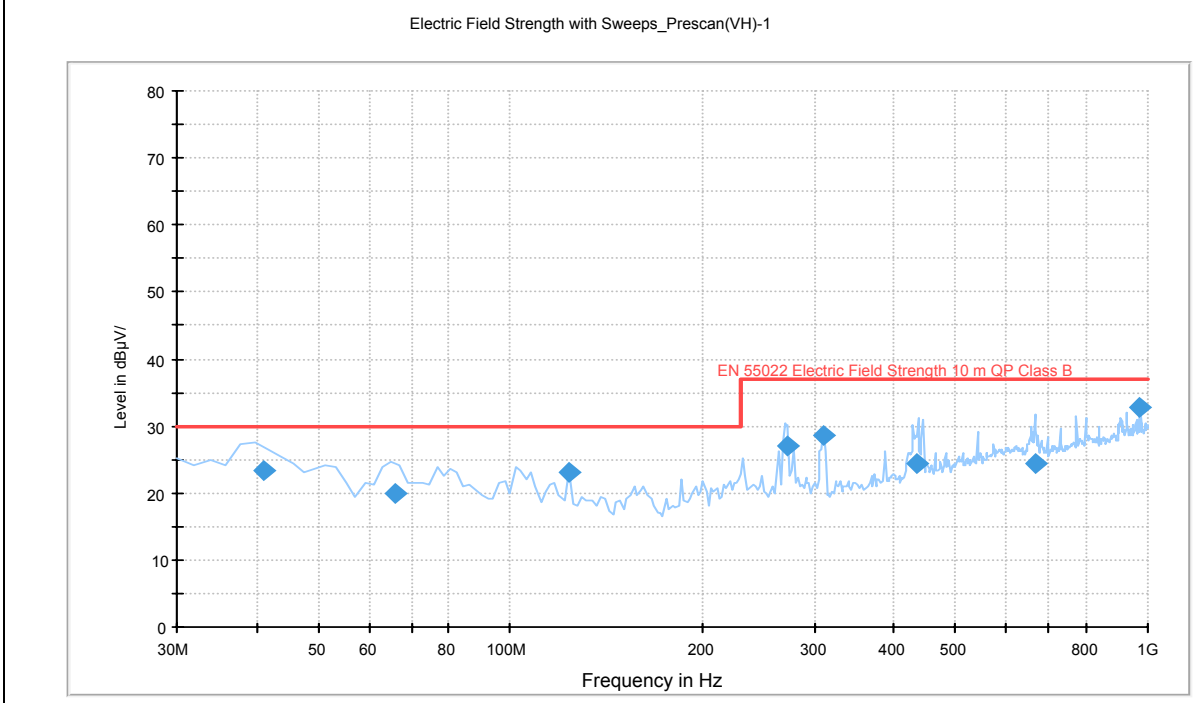


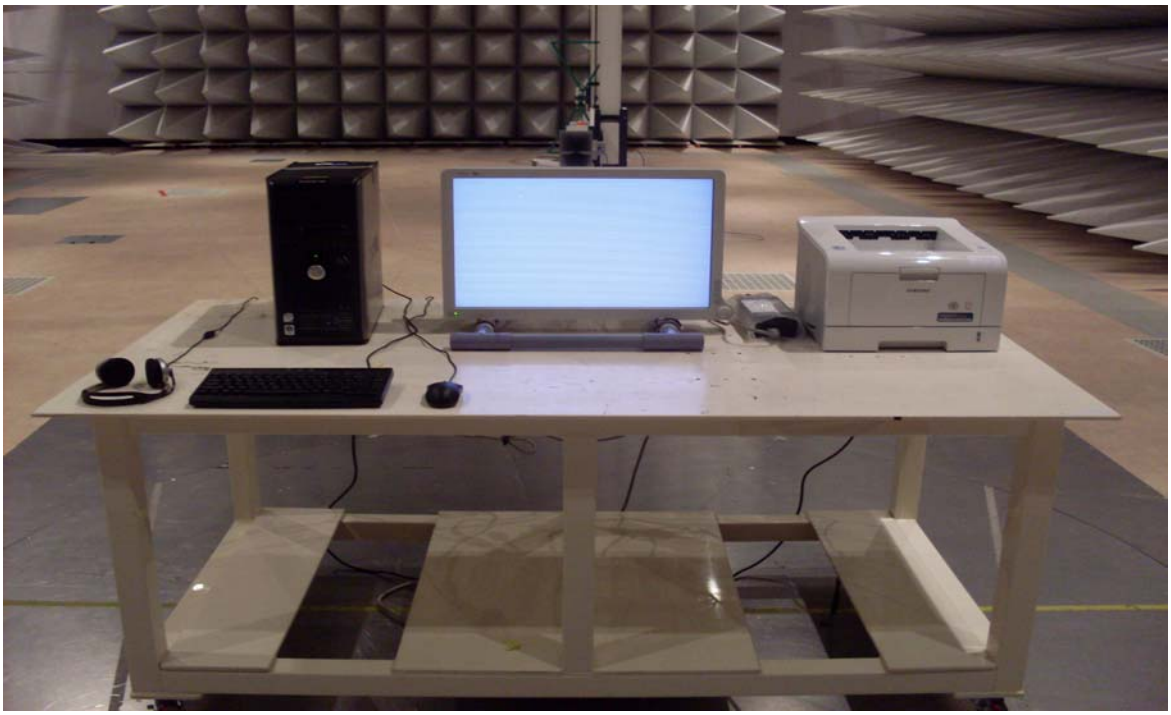
Table 5. Radiated emission Test data of configuration 1

Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Cable Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
40.99	10.40	QP	V	358	1.00	0.24	12.76	23.4	30	6.6
66.03	12.70	QP	V	299	3.00	1.42	5.78	19.9	30	10.1
123.72	9.20	QP	V	0	1.00	1.85	11.95	23.0	30	7.0
271.69	10.90	QP	H	46	2.00	3.02	13.18	27.1	37	9.9
309.26	11.70	QP	V	75	1.00	2.96	13.94	28.6	37	8.4
435.20	4.50	QP	H	110	2.00	3.71	16.09	24.3	37	12.7
664.29	1.80	QP	H	160	2.00	3.78	18.72	24.3	37	12.7
972.02	7.70	QP	H	172	1.00	3.88	21.22	32.8	37	4.2

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

Figure 9, Radiated emission test setup for Test Configuration 1

D-Sub Mode_ 1.0 to 2.0 GHz



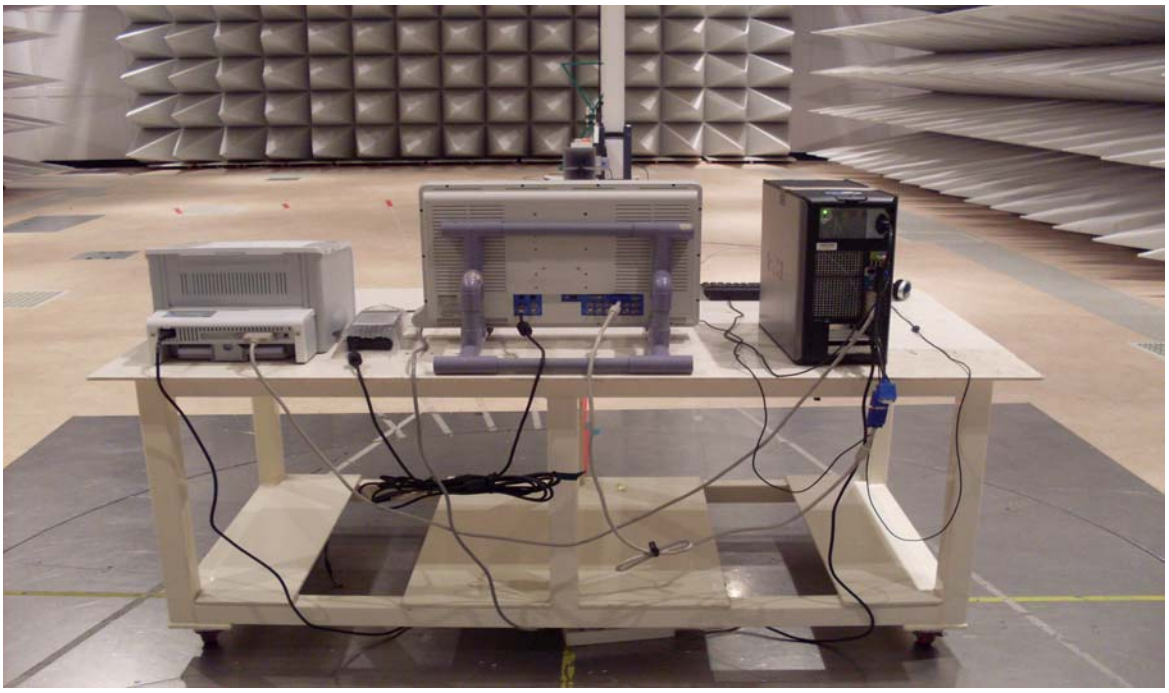
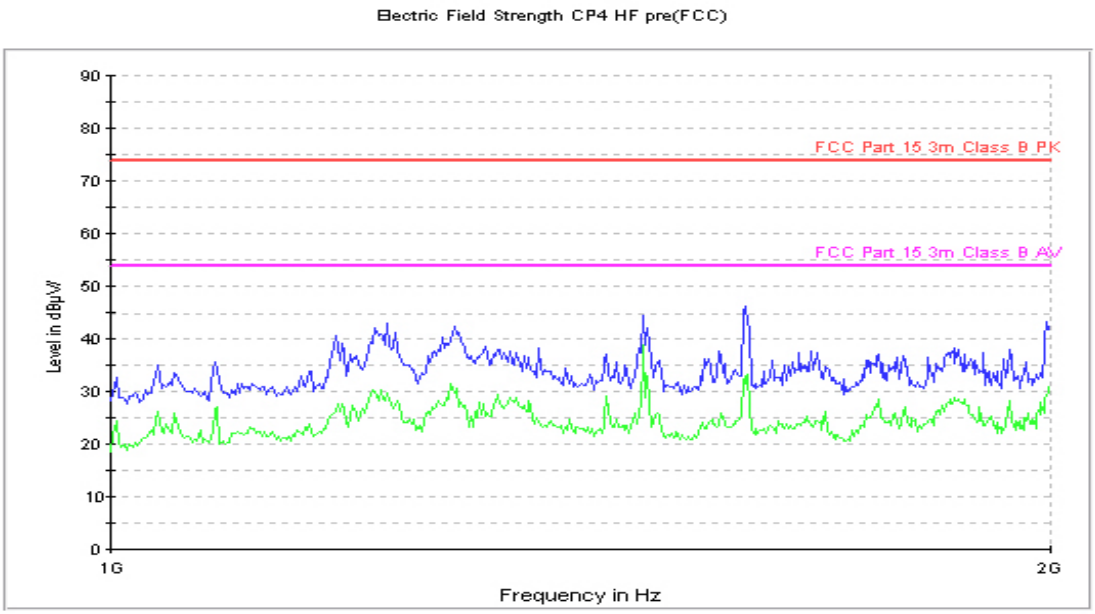
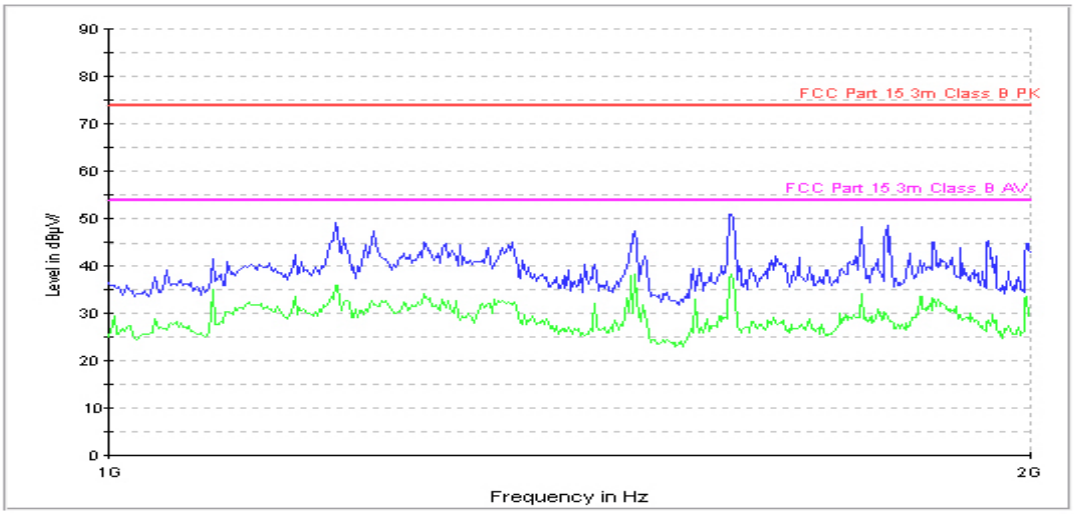


Figure 10. Graphical representation of Test Configuration 1

D-Sub Mode_ 1 GHz to 2.0 GHz_ Horizontal



D-Sub Mode_ 1 GHz to 2.0 GHz_ Vertical



Note: Blue: Peak, Green: Average

Table 5. Radiated emission Test data of configuration 1

Test Frequency (GHz)	Correction Factor dB		Antenna Height (m)	Detector Type, Polarity	Limit dBuV/m	Reading Level dBuV/m	Result dBuV/m	Margin (dB)
	Antenna	Cable						
1.04	8.30	4.50	1.00	PK, H	74.00	22.23	35.03	38.97
1.19	7.20	4.70	1.00	PK, V	74.00	37.01	48.91	25.09
1.48	5.90	5.30	1.00	PK, V	74.00	36.13	47.33	26.67
1.60	5.70	5.50	1.00	PK, V	74.00	39.34	50.54	23.46
1.80	5.00	5.90	1.00	PK, V	74.00	37.47	48.37	25.63
1.04	8.30	4.50	1.00	AV, H	54.00	13.70	26.50	27.50
1.19	7.20	4.70	1.00	AV, V	54.00	24.00	35.90	18.10
1.48	5.90	5.30	1.00	AV, V	54.00	26.00	37.20	16.80
1.60	5.70	5.50	1.00	AV, V	54.00	24.50	35.70	18.30
1.80	5.00	5.90	1.00	AV, V	54.00	19.10	30.00	24.00

Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV).
2. If no frequencies are specified in the tables, no measurement for peak or average was necessary.
3. PK: Peak, AV: Average.
4. H: Horizontal, V: Vertical

Figure 11. Radiated emission test setup for Test Configuration 1

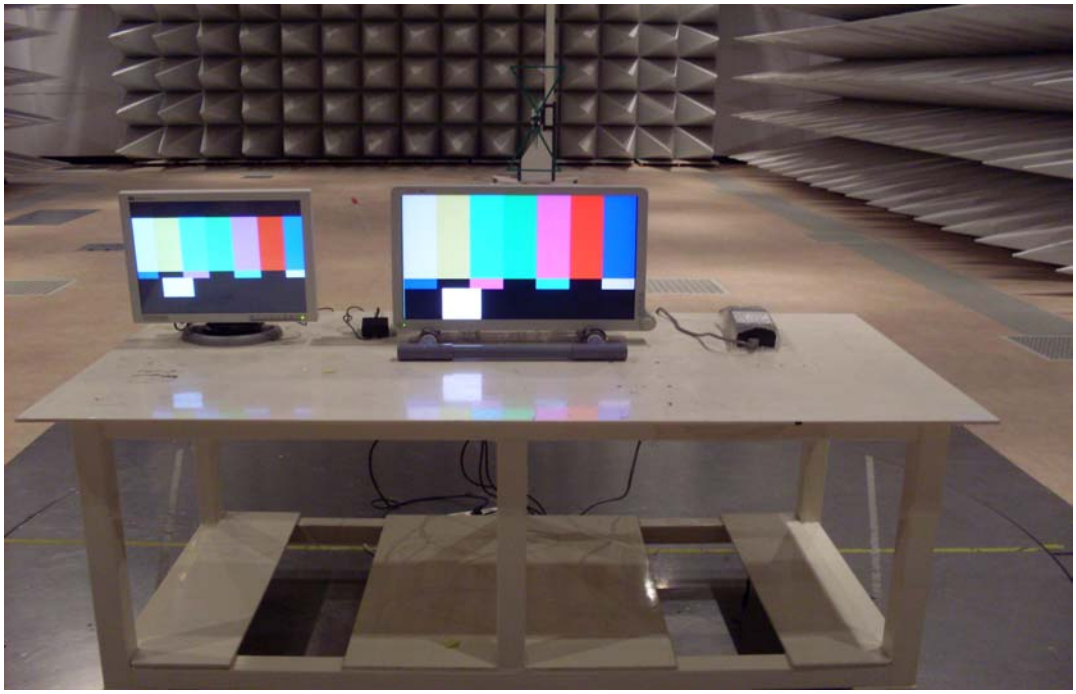
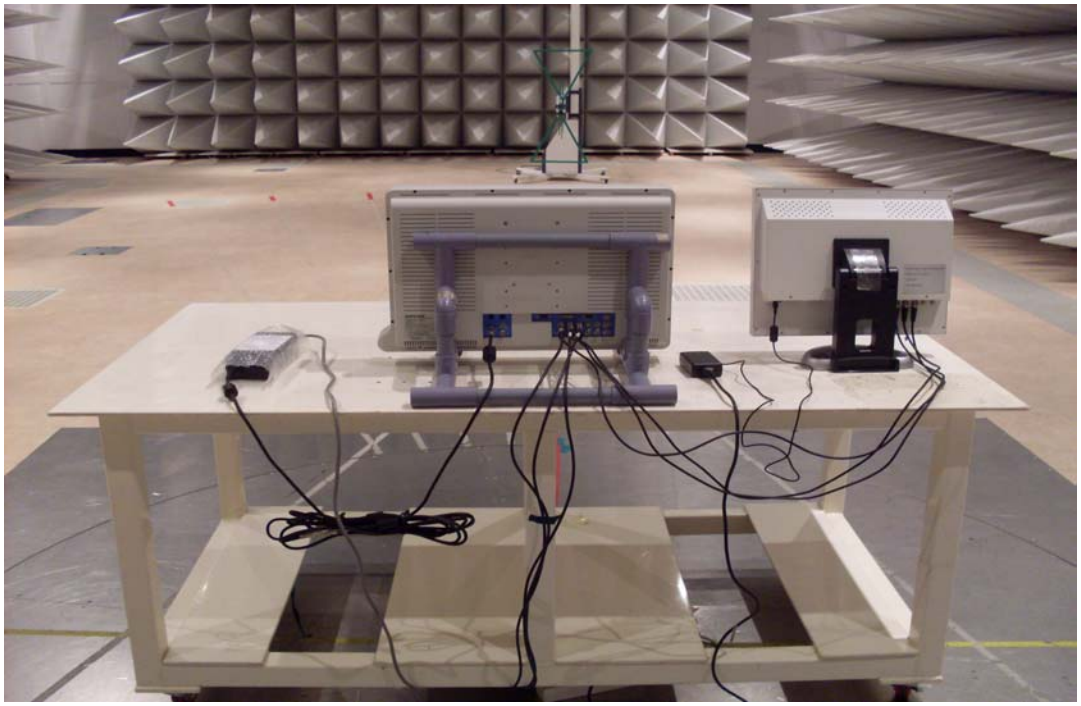
Component In/Out Mode



Figure 12. Graphical representation of Test Configuration 1

Component In/Out Mode_ Horizontal and Vertical

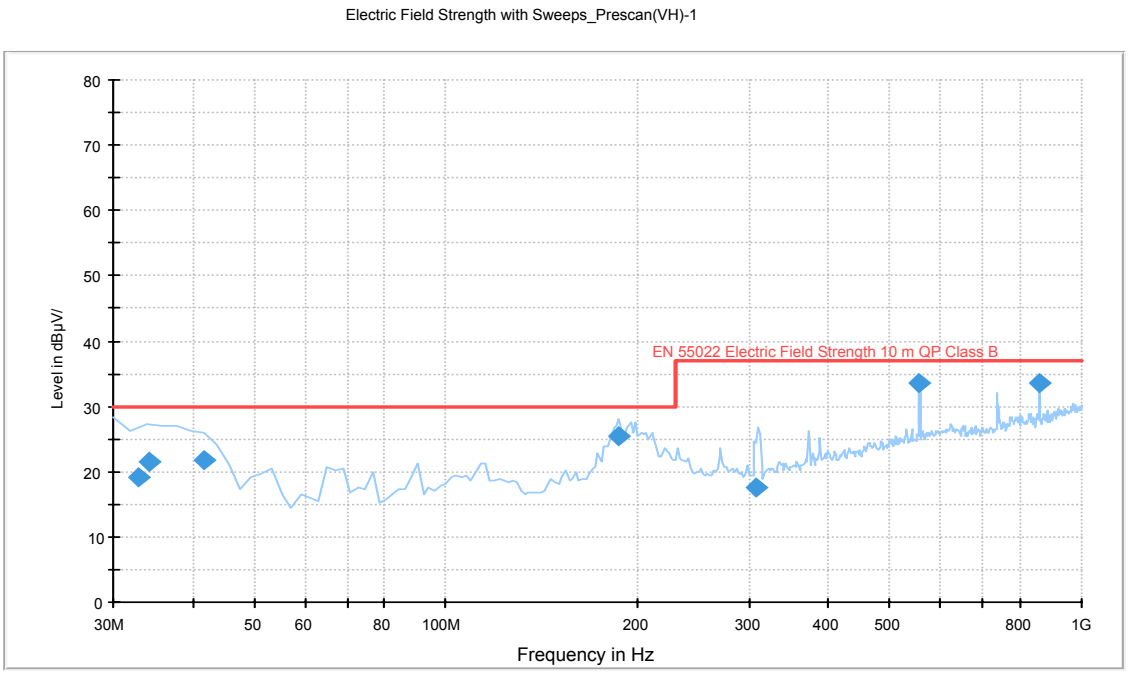


Table 6. Radiated emission Test data of Test Configuration 1,

Component In/Out Mode										
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Cable Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
32.77	0.481	QP	V	13	1.00	0.889	17.83	19.2	30.0	10.8
34.21	4.724	QP	V	58	1.00	0.896	15.98	21.6	30.0	8.4
41.78	7.93	QP	V	327	1.00	1.01	12.76	21.7	30.0	8.3
186.97	13.419	QP	H	162	4.00	2.171	9.81	25.4	30.0	4.6
306.97	0.915	QP	H	346	3.00	2.845	13.94	17.7	37.0	19.3
555.26	10.922	QP	V	339	2.00	3.988	18.69	33.6	37.0	3.4
857.66	8.56	QP	H	199	1.00	5.1	19.84	33.5	37.0	3.5

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

Figure 9, Radiated emission test setup for Test Configuration 1

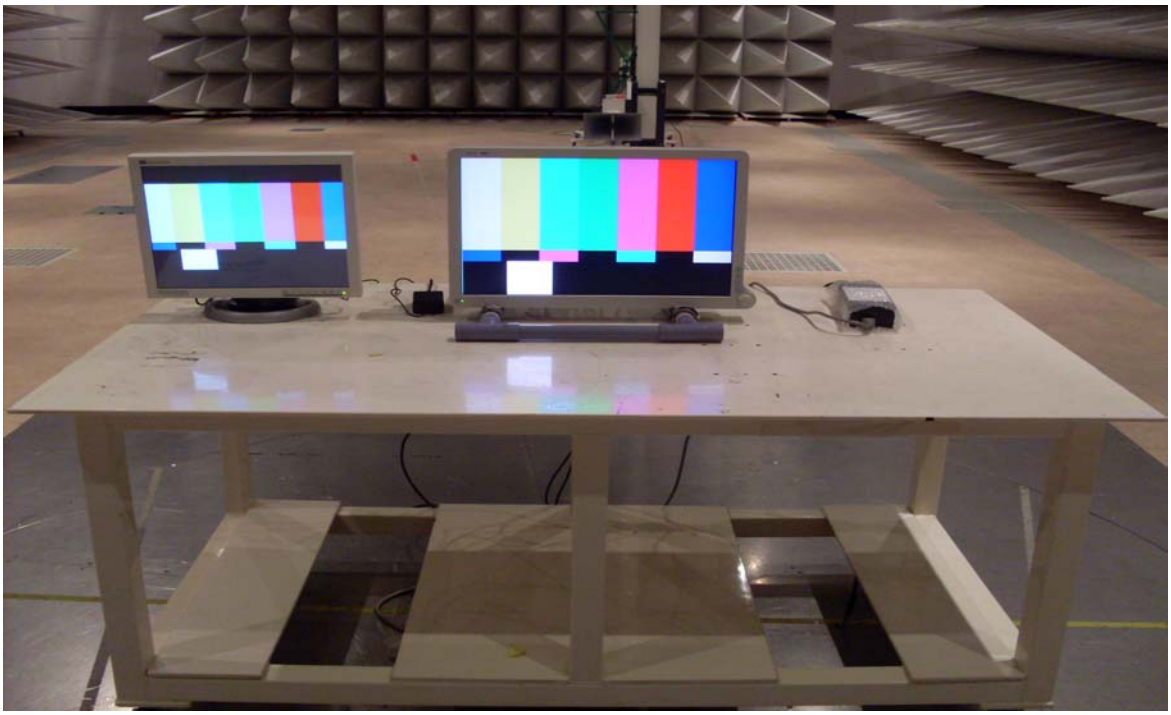
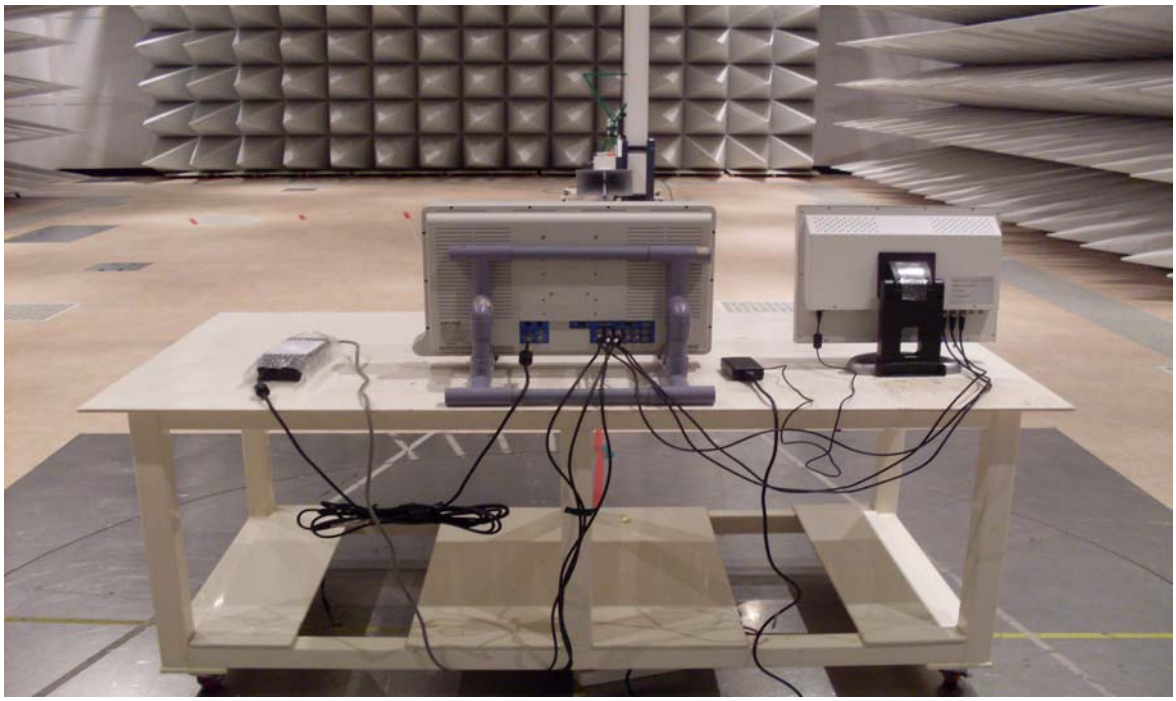
Component In/Out Mode _ 1.0 to 2.0 GHz



Figure 10. Graphical representation of Test Configuration 1

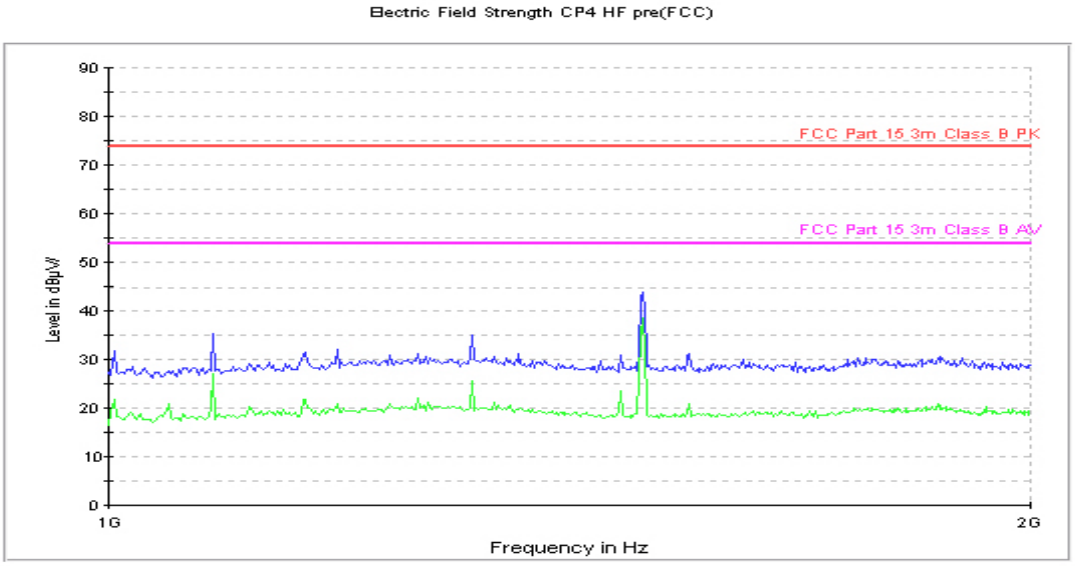
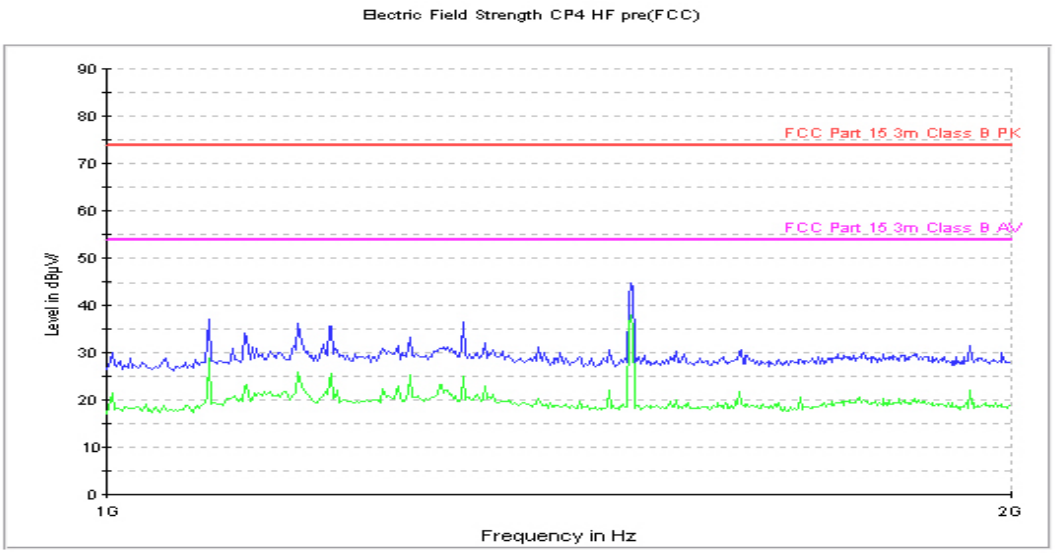
Component In/Out Mode _ 1 GHz to 2.0 GHz_ Horizontal

Component In/Out Mode _ 1 GHz to 2.0 GHz_ Vertical

Note: Blue: Peak, Green: Average

Table 5. Radiated emission Test data of configuration 1

Test Frequency (GHz)	Correction Factor dB		Antenna Height (m)	Detector Type, Polarity	Limit dBuV/m	Reading Level dBuV/m	Result dBuV/m	Margin (dB)
	Antenna	Cable						
1.08	8.80	4.30	1.00	PK, H	74.00	22.40	35.50	38.50
1.16	8.30	4.70	4.00	PK, V	74.00	23.30	36.30	37.70
1.19	8.30	4.70	4.00	PK, V	74.00	22.81	35.81	38.19
1.31	5.80	5.10	4.00	PK, V	74.00	25.65	36.55	37.45
1.49	5.90	5.30	4.00	PK, V	74.00	32.67	43.87	30.13
1.08	8.80	4.30	1.00	AV, H	54.00	13.80	26.90	27.10
1.16	8.30	4.70	4.00	AV, V	54.00	12.50	25.50	28.50
1.19	8.30	4.70	4.00	AV, V	54.00	12.20	25.20	28.80
1.31	5.80	5.10	4.00	AV, V	54.00	14.10	25.00	29.00
1.49	5.90	5.30	4.00	AV, V	54.00	24.90	36.10	17.90

Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV).
2. If no frequencies are specified in the tables, no measurement for peak or average was necessary.
3. PK: Peak, AV: Average.
4. H: Horizontal, V: Vertical

Figure 13, Radiated emission test setup for Test Configuration 2

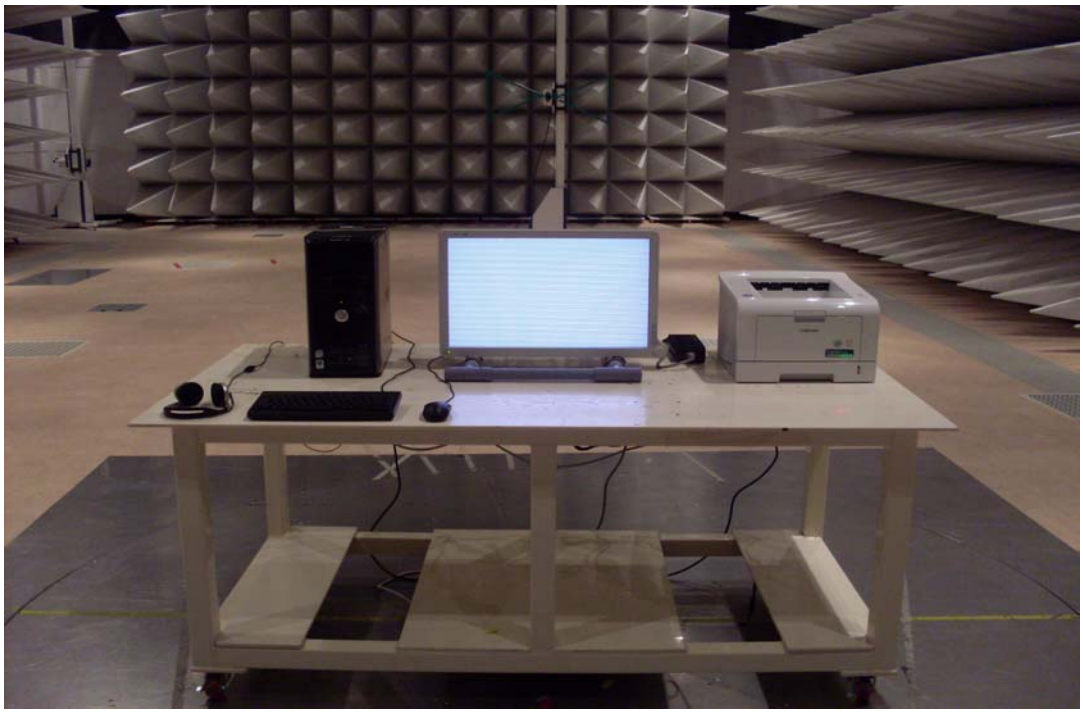
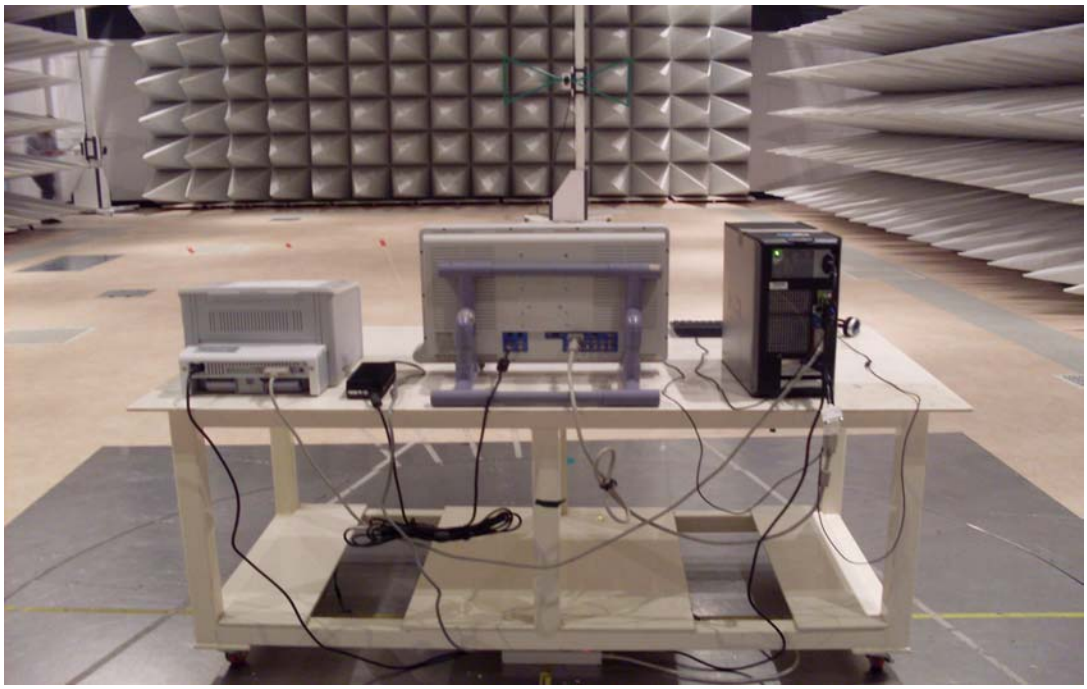
DVI Mode



Figure 14. Graphical representation of Test Configuration 2

DVI Mode_ Horizontal and Vertical

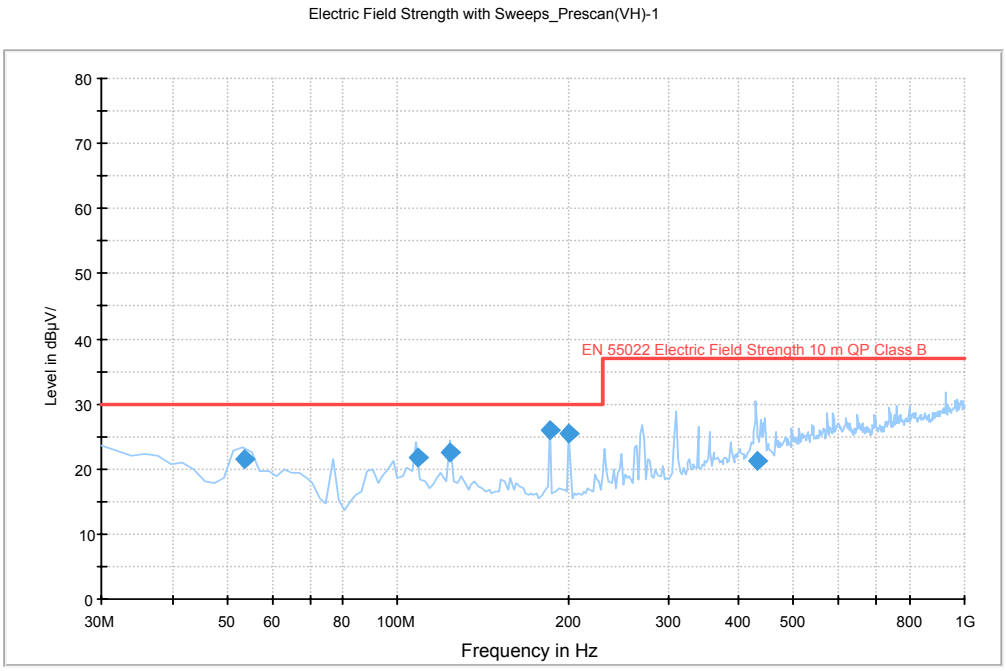


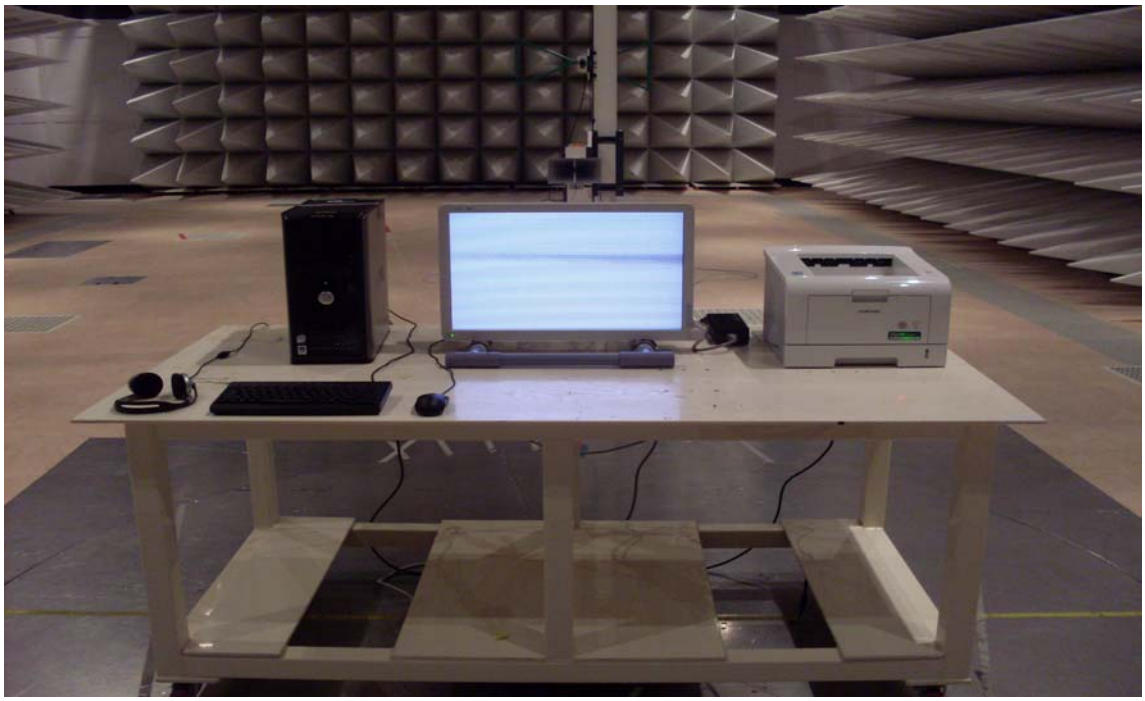
Table 7. Radiated emission Test data of Test Configuration 2

DVI Mode										
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Cable Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
53.525	13.70	QP	V	263	1.00	0.43	7.47	21.6	30	8.4
108.242	9.10	QP	V	353	1.00	2.22	10.58	21.9	30	8.1
123.697	8.90	QP	V	162	1.00	1.85	11.95	22.7	30	7.3
185.565	13.60	QP	H	81	4.00	1.81	10.59	26	30	4
201.020	12.80	QP	H	116	4.00	2.21	10.59	25.6	30	4.4
429.164	1.60	QP	H	21	2.00	3.61	16.09	21.3	37	15.7

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

Figure 9, Radiated emission test setup for Test Configuration 2

DVI Mode _ 1.0 to 2.0 GHz



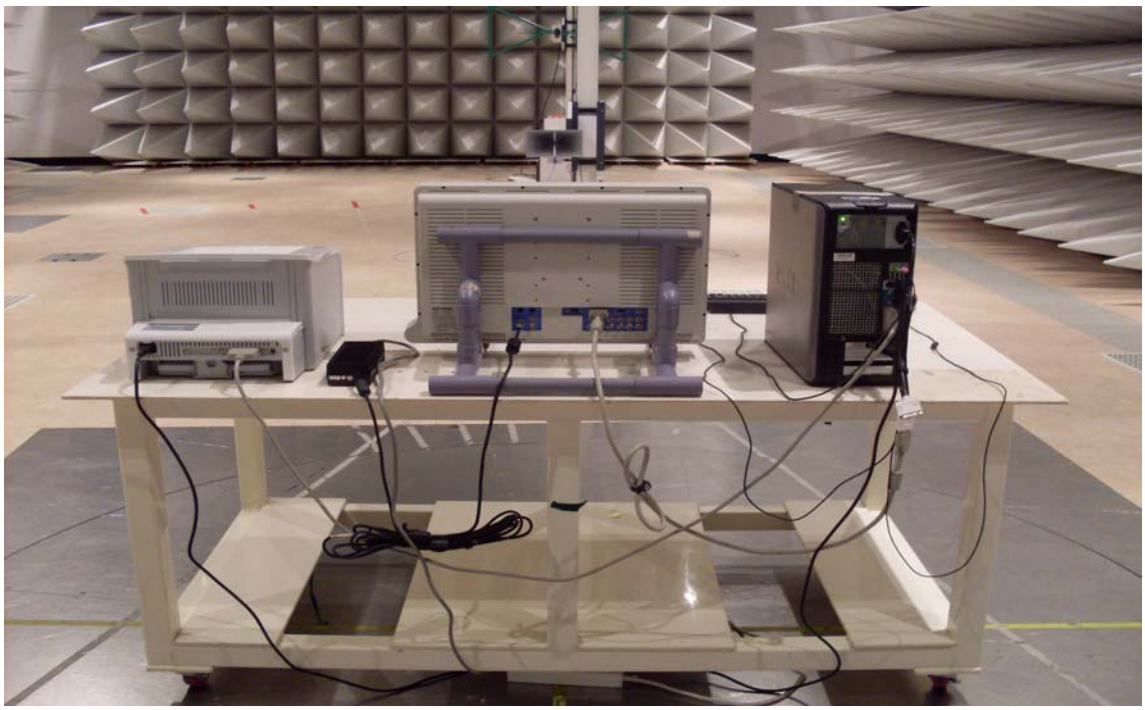
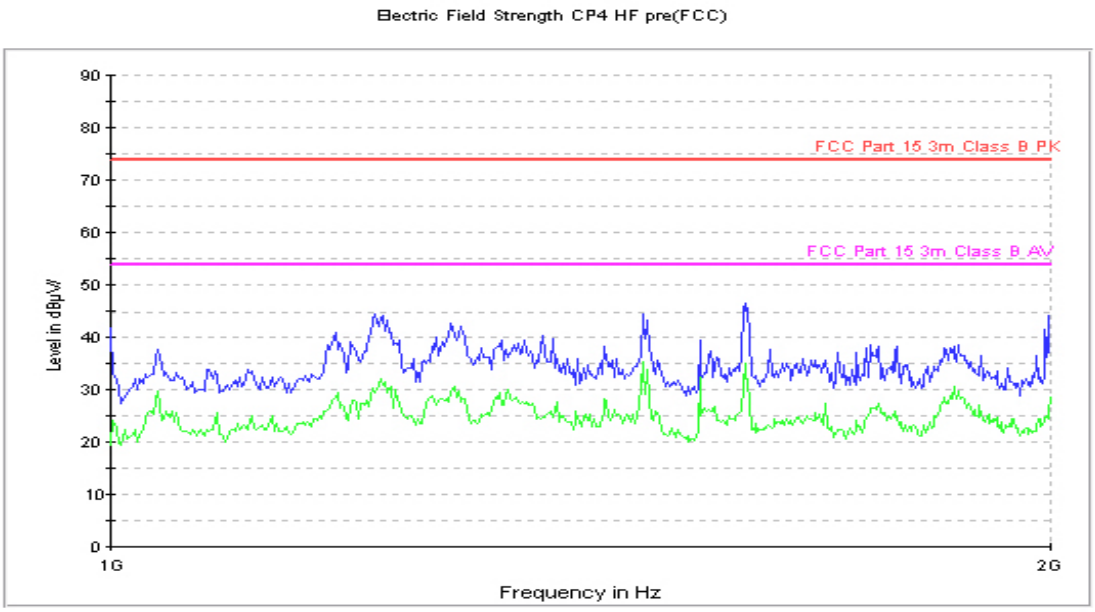
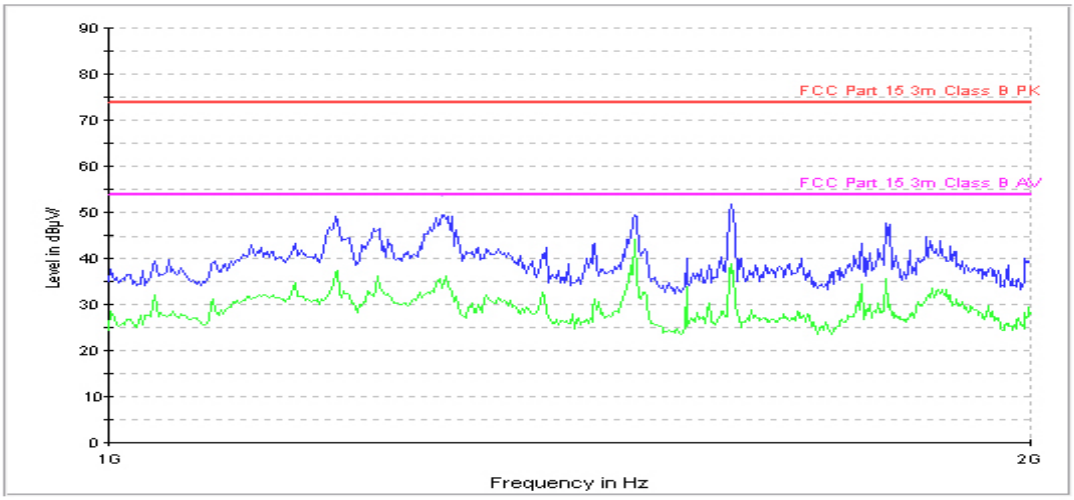


Figure 10. Graphical representation of Test Configuration 2

DVI Mode _ 1 GHz to 2.0 GHz_ Horizontal



Component In/Out Mode _ 1 GHz to 2.0 GHz_ Vertical



Note: Blue: Peak, Green: Average

Table 5. Radiated emission Test data of configuration 2_ DVI Mode.

Test Frequency (GHz)	Correction Factor dB		Antenna Height (m)	Detector Type, Polarity	Limit dBuV/m	Reading Level dBuV/m	Result dBuV/m	Margin (dB)
	Antenna	Cable						
1.19	7.20	4.70	1.00	PK, V	74.00	37.20	49.10	24.90
1.29	6.20	4.90	1.00	PK, V	74.00	38.76	49.86	24.14
1.48	5.90	5.30	1.00	PK, V	74.00	38.90	50.10	23.90
1.60	5.70	5.50	1.00	PK, V	74.00	40.30	51.50	22.50
1.79	5.00	5.90	1.00	PK, V	74.00	36.56	47.46	26.54
1.19	7.20	4.70	1.00	AV, V	54.00	25.10	37.00	17.00
1.29	6.20	4.90	1.00	AV, V	54.00	24.90	36.00	18.00
1.48	5.90	5.30	1.00	AV, V	54.00	32.90	44.10	9.90
1.60	5.70	5.50	1.00	AV, V	54.00	26.40	37.60	16.40
1.79	5.00	5.90	1.00	AV, V	54.00	24.50	35.40	18.60

Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV).
2. If no frequencies are specified in the tables, no measurement for peak or average was necessary.
3. PK: Peak, AV: Average.
4. H: Horizontal, V: Vertical

Figure 15, Radiated emission test setup for Test Configuration 2

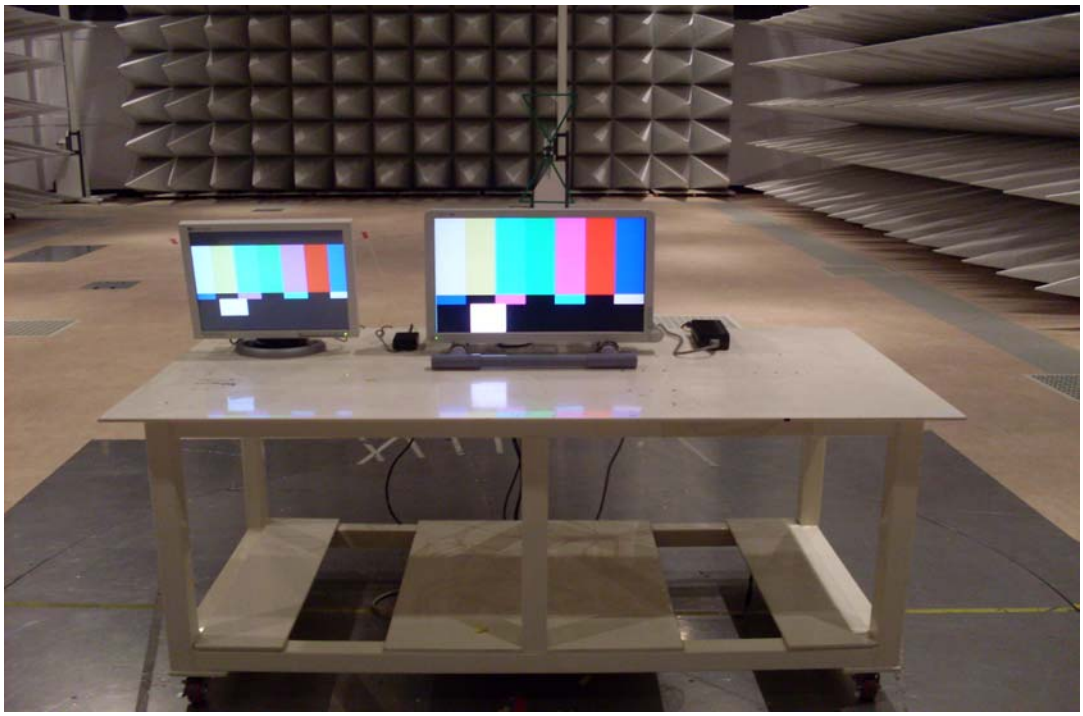
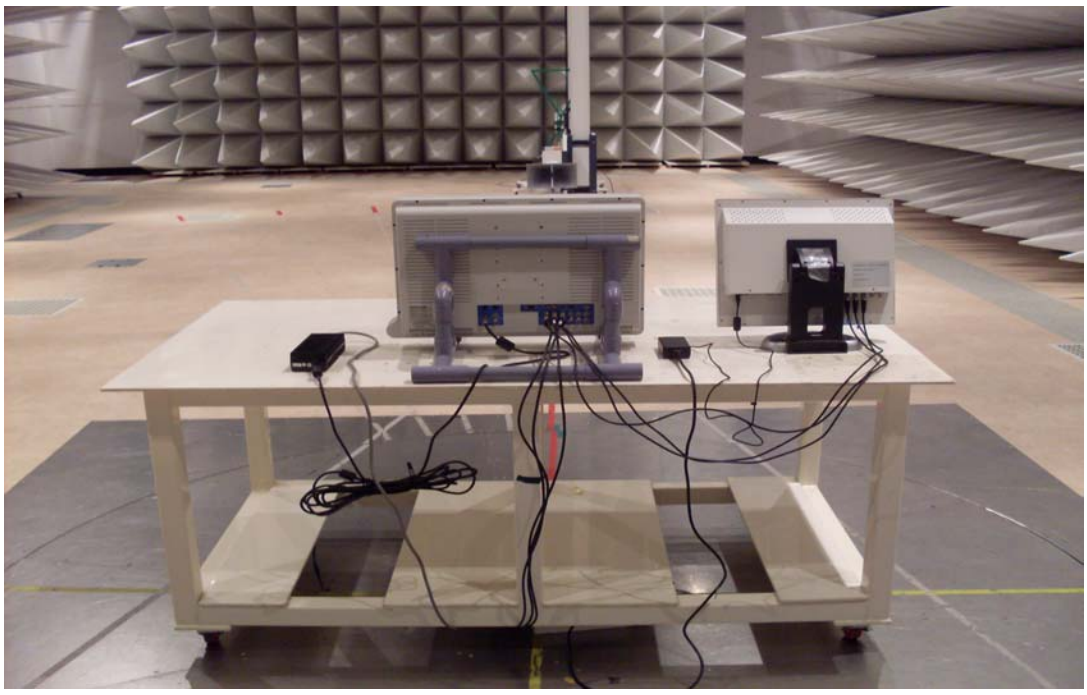
Component In/Out Mode



Figure 16. Graphical representation of Test Configuration 2

Component In/Out Mode

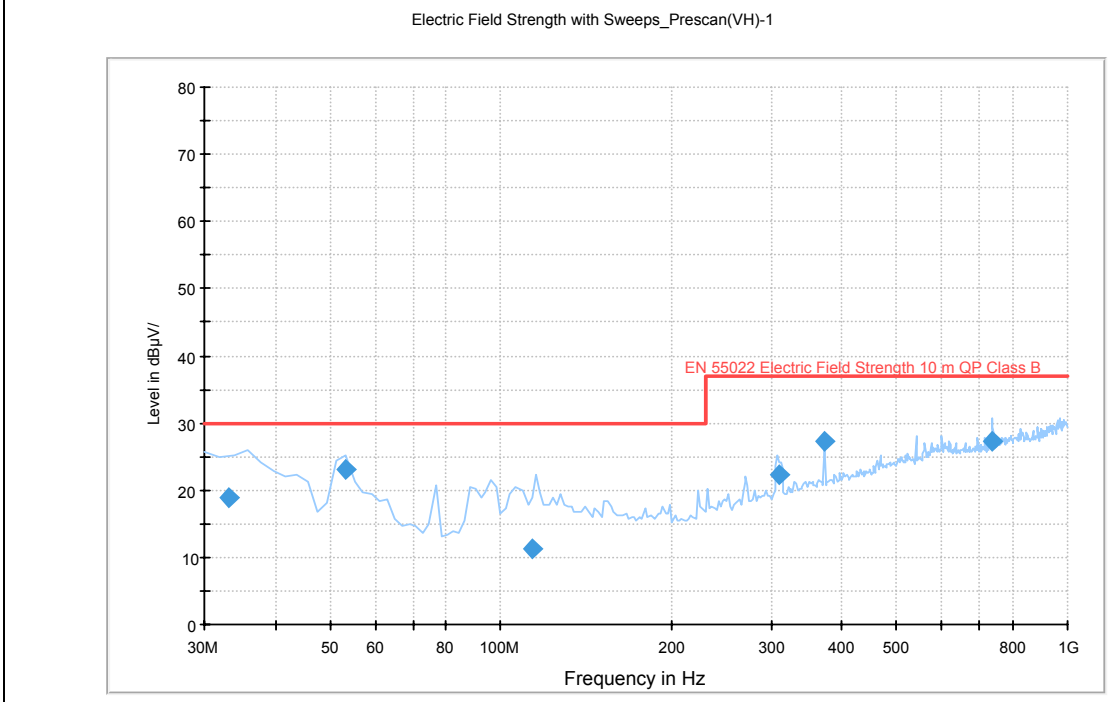


Table 8. Radiated emission Test data of Test Configuration 2

Component In/Out Mode										
Test Frequency (MHz)	Meter Reading (dBuV)	Detector (Pk/QP)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (m)	Cable Loss Factor (dB)	Antenna Factor (dB/m)	Level dBuV/m	Limit dBuV/m	Margin (dB)
33.156	0.9	QP	V	353	1.00	1.92	15.98	18.8	30	11.2
53.284	15.2	QP	V	252	1.00	0.43	7.47	23.1	30	6.9
113.889	-1.8	QP	V	278	1.00	2.52	10.58	11.3	30	18.7
309.316	5.5	QP	H	33	2.00	2.96	13.94	22.4	37	14.6
371.240	8.6	QP	H	91	2.00	2.51	16.09	27.2	37	9.8
734.338	4.4	QP	H	84	4.00	4.18	18.72	27.3	37	9.7

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

Figure 9, Radiated emission test setup for Test Configuration 2

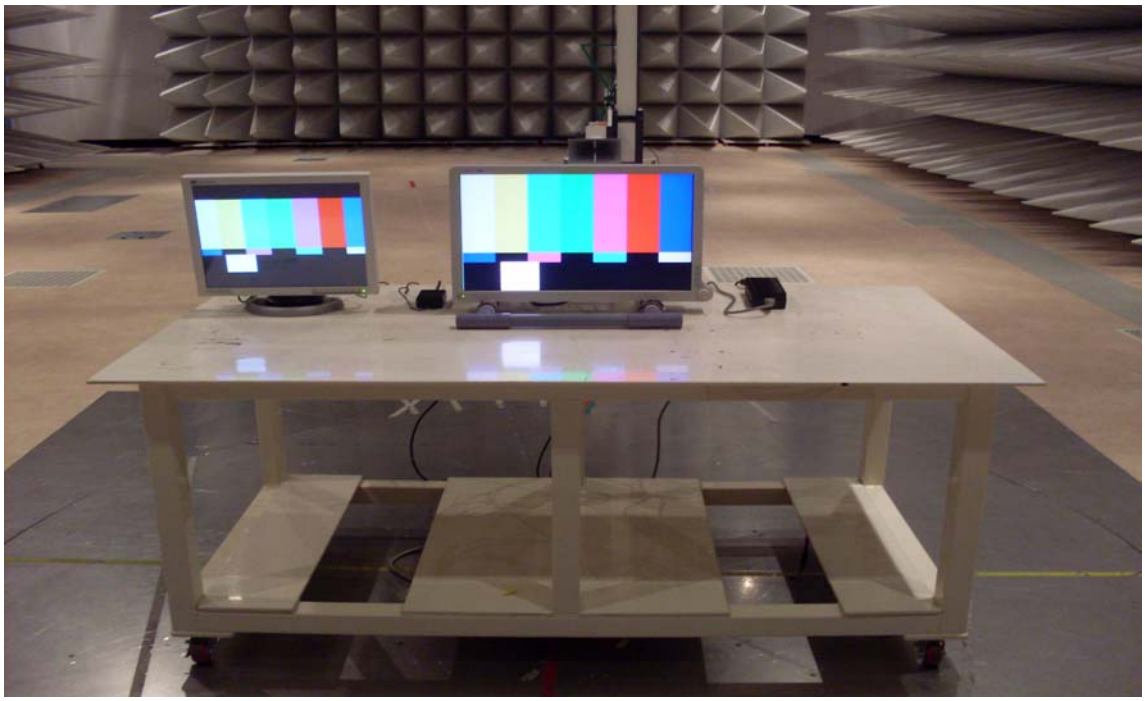
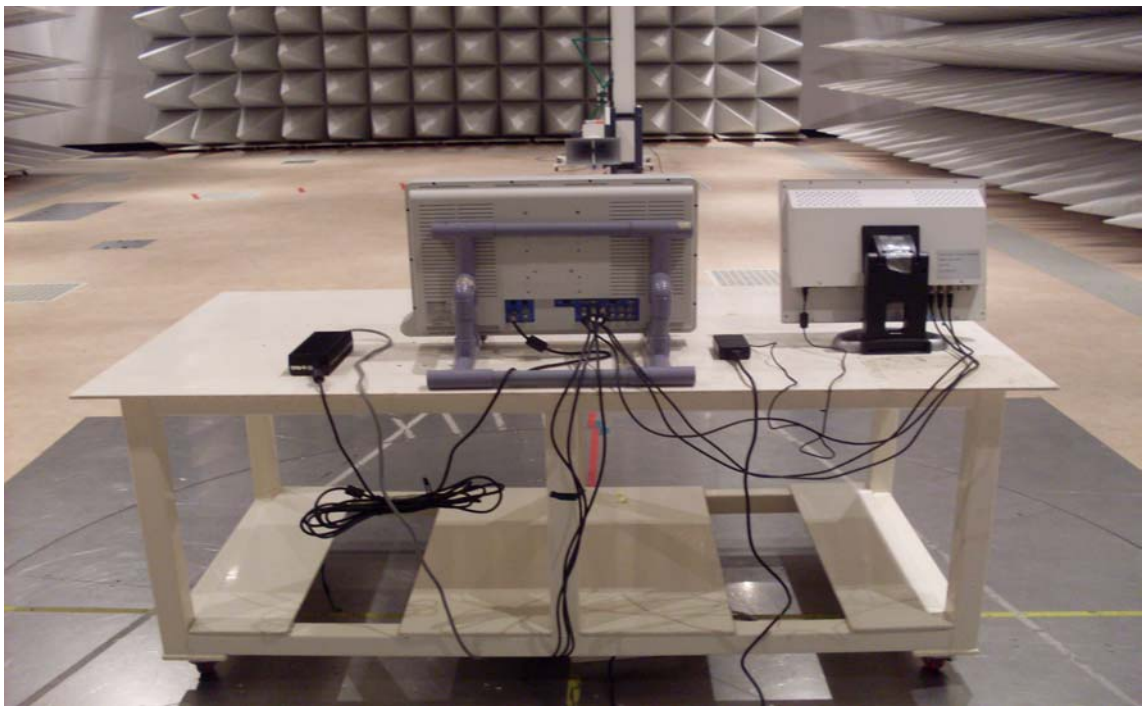
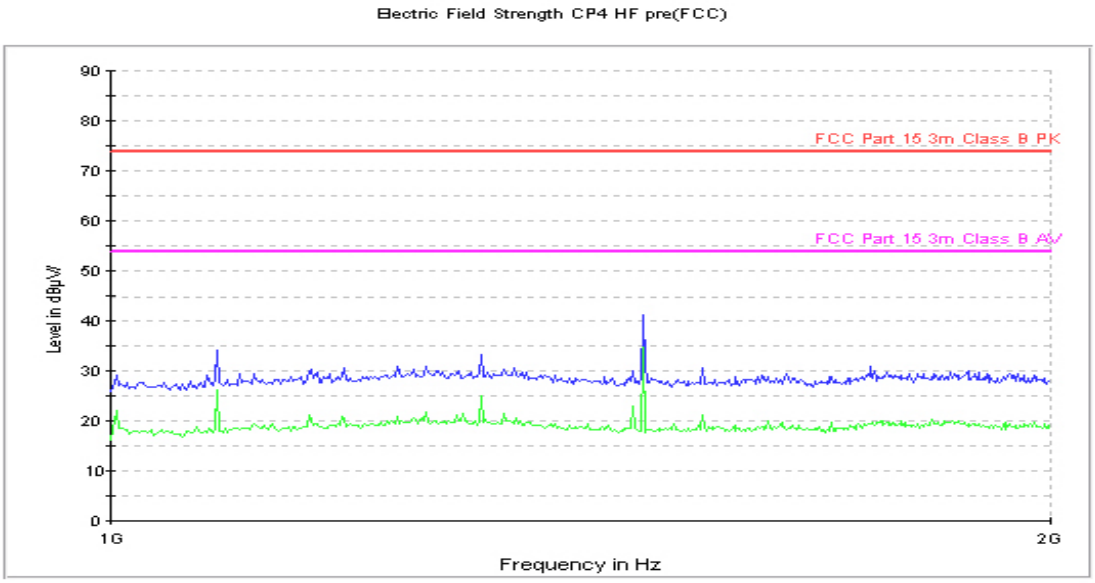
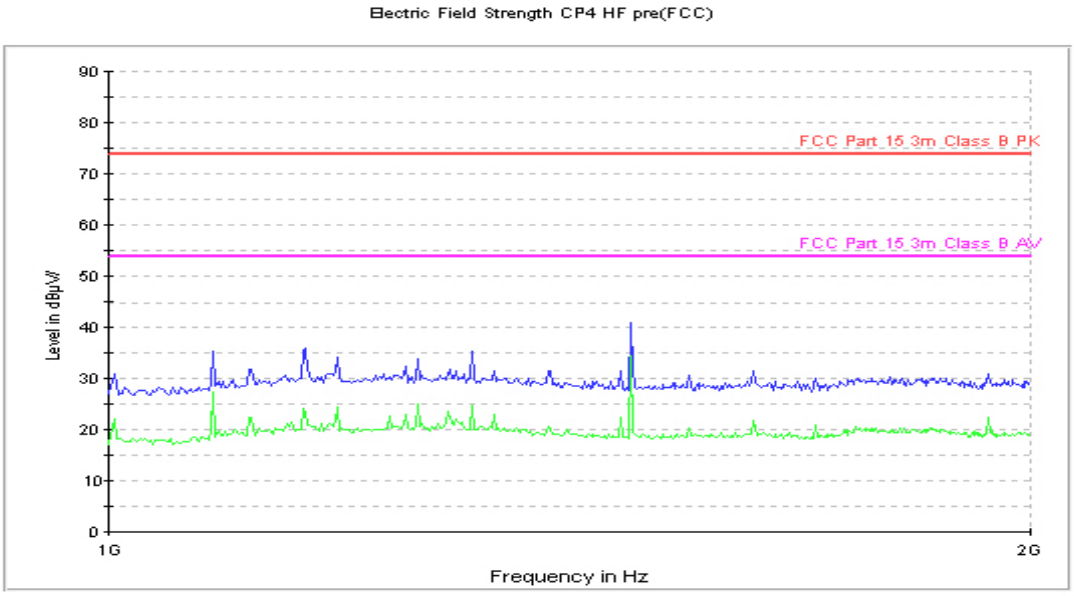
Component In/Out Mode _ 1.0 to 2.0 GHz



Figure 10. Graphical representation of Test Configuration 2

Component In/Out Mode _ 1 GHz to 2.0 GHz_ Horizontal



Component In/Out Mode _ 1 GHz to 2.0 GHz_ Vertical



Note: Blue: Peak, Green: Average

Table 5. Radiated emission Test data of configuration 2_ Component In/Out Mode

Test Frequency (GHz)	Correction Factor dB		Antenna Height (m)	Detector Type, Polarity	Limit dBuV/m	Reading Level dBuV/m	Result dBuV/m	Margin (dB)
	Antenna	Cable						
1.08	7.90	4.50	1.00	PK, V	74.00	23.08	35.48	38.52
1.16	7.30	4.70	1.00	PK, V	74.00	24.08	36.08	37.92
1.19	7.20	4.70	1.00	PK, V	74.00	22.43	34.33	39.67
1.31	5.80	5.10	1.00	PK, V	74.00	24.45	35.35	38.65
1.48	5.90	5.30	1.00	PK, H	74.00	30.17	41.37	32.63
1.08	7.90	4.50	1.00	AV, V	54.00	25.10	37.00	17.00
1.16	7.30	4.70	1.00	AV, V	54.00	24.90	36.00	18.00
1.19	7.20	4.70	1.00	AV, V	54.00	32.90	44.10	9.90
1.31	5.80	5.10	1.00	AV, V	54.00	26.40	37.60	16.40
1.48	5.90	5.30	1.00	AV, V	54.00	24.50	35.40	18.60

Note:
1. Margin (dB)= Limit (dBuV) - Level (dBuV).
2. If no frequencies are specified in the tables, no measurement for peak or average was necessary.
3. PK: Peak, AV: Average.
4. H: Horizontal, V: Vertical