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Project: 08CA62337

File: TC8345

Report: 08CA62337-FCC

Date: January 10, 2009

Model: VP 4726

FCC Test Report

Part 15 Subpart B Class B For

D&T Inc.

59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343 KOREA

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Project Number: 08CA62337
Model Number: VP 4726
Client Name: D&T Inc.

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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) Class B				
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.
January 10, 2009



Reviewed by
Seawoon, Choi, Senior Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.
January 12, 2009

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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: D&T Inc.
59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343
KOREA

Manufacturer: D&T Inc.
59-9 JANG-DONG YUSEONG-GU DAEJEON 305-343
KOREA

Applicant Contact: MR. Won-Woo Lee
Phone: 82-42-360-8055
E-mail: Wwlee88@foreseeson.co.kr
Product Type: Medical Monitor
Model Number: VP 4726
Model Number multiple
listing: VP 4726F

Product standards: 47CFR PART 15.107(A) / 47CFR PART 15.109(G) Class B

Sample Serial Number: N/A
Sample Receive Date: December 02, 2008
Testing Start Date: December 02, 2008
Date Testing Complete: January 9, 2009
Test Report Date: January 10, 2009

Overall Results: Pass

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1. GENERAL PRODUCT DESCRIPTION

1.1 Report Revision History

Revision Date	Description	Remarks	Revision reviewed By
-	Original	-	-

1.2 Equipment Description

Description:
The VP 4726 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	26" LCD Color Display	D&T Inc.	VP 4726 / VP 4726F	-
2	AC/DC Adapter	Bridgepower	JMW1150KA2400F09	-
3	DC Extension Cable	ConMed Linvatec	900-0034-00	75ft plenum cable
4	DVI cable	-	-	1 EA
5	VGA HDDB15cable	-	-	1 EA
6	Hospital-grade AC power cord	-	-	1 EA
7	BNC cable	-	-	1 EA
8	S-Video cable	-	-	1 EA

1.4 Technical Data:

Specification	
Display	
LCD Display Panel	25.54 inches, (a-Si TFT Active matrix LCD)
Synchronization	2.5 - 5.0 Vpp separated sync
Response Time	<25ms Typ
View Angle	+/-89° (L/R) × +/-89° (U/D)
Display Colors	16 million colors
Native Resolution	1920 dots × 1200 dots
Input Signal	1 × DVI 1 × Optical DVI 1 × VGA 1 × HD/SD-SDI 1 × C-Video/SOG 1 × S-Video 1 × Component (Y/G, Pb/B, Pr/R, H/CS, VS)
Electrical	
Power Adapter	AC 100-240V; DC 24V
Power Consumption	150W (max)
Dimensions	
Dimensions (W × H × D)	618(W) x 412(H) x 99.5(D) (mm)
Weight	18.7 lbs / 8.5Kg
Operating Conditions	
Operating Temperature	41 to 90°F (5 to 32.2°C)
Relative Humidity	10 to 60%
Atmospheric Pressure Range	500 to 1060 hPa
Electrical Input Rating	24V DC 6.25A

1.5 EUT Internal operating frequency

Frequency (MHz)	Description	Frequency (MHz)	Description
192.375 MHz	Memory Clock	27.00 MHz	System Clock
158.625 MHz	Display Clock	28.322 MHz	System Clock

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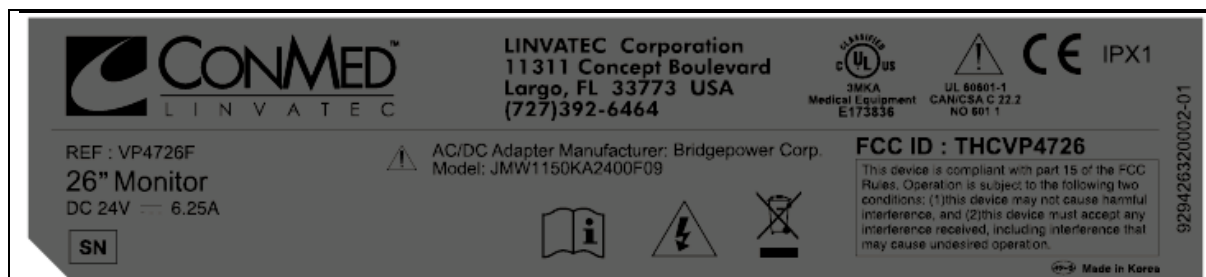
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1.6 Technical descriptions and documents:

No.	Document Title and Description
1	VP 4726 User Manual
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	26" LCD Color Display	D&T Inc.	VP 4726 / VP 4726F	-
EUT	AC/DC Adapter	Bridgepower	JMW1150KA2400F09	-
AE	PC	DELL	OPTIPLEX 755	Used for DVI, Optical-DVI, D-sub and Component mode
AE	Headset	ACTTO	-	-
AE	Printer	SAMSUNG	ML-2250G	-
AE	USB mouse	ANYZEN	SMOU50001WX-BK	-
AE	USB Keyboard	SAMSUNG	SEM-DT35US	-
AE	SDI Patten Generator	doremi	HDG-20	Used for SDI mode
AE	AC/DC adapter	DOREMI LABS, INC.	GT-21089-1305-T3	Connected to SDI Patten Generator
AE	Pattern generator	Chroma	22291	Used for C-video, S-Video mode
AE	LCD Monitor	ADVAN Int'l Corp.	240-030-970	Used for External Monitor
AE	LCD Monitor adapter	AULT KOREA Corp.	JMW1150KA2400F07	Connected to External Monitor
AE	DVI to Optical DVI	Self EDID	DDL-T001	-
* Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, SIM - Simulator (Not Subjected to Test)				

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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	Optical DVI In	I/O	22.6 m	Unshielded	Optical Cable
4	VGA In	I/O	1.8 m	Shielded	15 pin D-Sub
5	SDI In, Out	I/O	1.8 m	Shielded	BNC
6	S-Video In	I/O	1.8 m	Shielded	S-Video
7	Component (Y/Pb/Pr) In	I/O	1.8m	Shielded	5 Port BNC
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	3 A	-	50-60	-
1	AC 120 V	-	-	60	-

2.4 EUT Operation Modes:

Mode #	Mode	Comments
1	DVI Mode	-
2	Optical DVI Mode	Worst case condition
3	VGA Mode	-
4	SDI In/Out Mode	Worst case condition
5	S-VIDEO Mode	-
6	C-Video Mode	-
7	Component (Y/Pb/Pr) Mode	-

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 3
3. EUT has been performed under continuous displaying "Color Bar" Patten for configuration modes of 4 to 7.

2.5 Used DC extension Cable for EMI Testing

Mode #	Configuration	Preliminary Test Mode	Comment
1	AC/DC Adapter Only	DVI, Optical DVI, VGA, SDI, S-Video, C-Video, Component Mode.	-
2	AC/DC Adapter with DC Extension Cable		Worst Mode

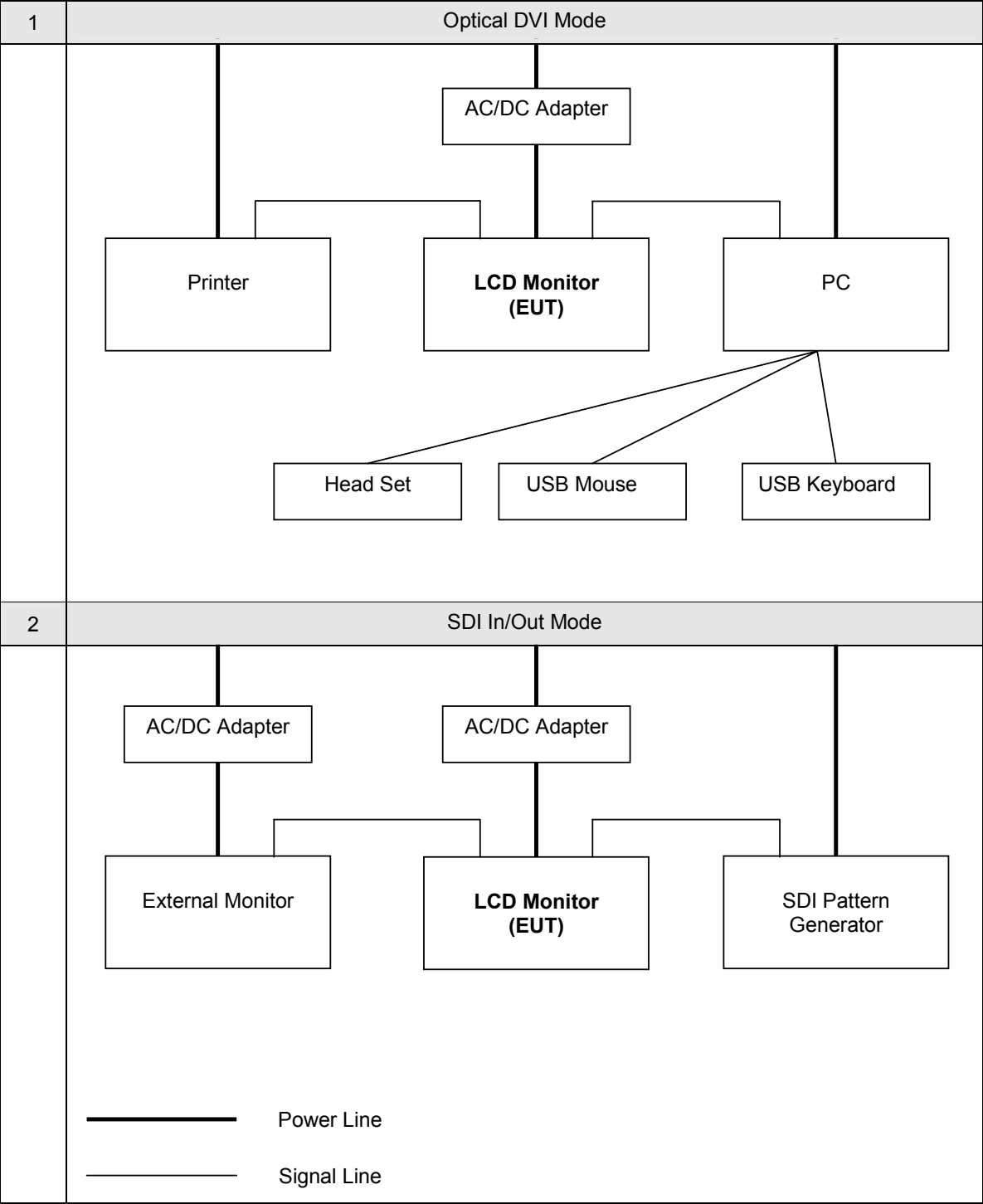
Note: Radiated emission and conducted emission test were performed for extension power cable during the preliminary testing and selected worst-case condition for final measurements.

2.6 Modes of Video resolution

Mode #		Resolution	Comments
1	Optical DVI Mode	640 * 480 @ 60Hz	-
2		1024 * 768 @ 60Hz	-
3		1920 1200 @ 60Hz	Worst case condition
4	SDI Mode	720p	Worst case condition

Note: Video resolution where it refers from above is representative worst case.

2.7 Test Configuration:



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2.8 Result of Testing

No	Test requirements	Standard	Results	Verdict
1	AC Power line Conducted Emission Test	47CFR PART 15.107(A) / 47CFR PART 15.109(G) Class B	Met limit Class B	Complied
2	Radiated Emission Test		Met limit Class B	Complied
Note: This product has been tested in accordance with the measurement procedures specified 47CFR PART 15.107(A) / 47CFR PART 15.109(G) Class B at the CBTL EMC Laboratory and the test results has been shown to be complied with the EMC requirements specified in the standard above.				

3. TEST 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	22 °C	
		Relative Humidity	41 %	
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 2.4)		EUT Configurations Mode # (See Section 2.7)
1		2, 4		1, 2
Conducted Emissions Test Equipment used:				
Description	Manufacturer	Model	Identifier	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2009.05.26
LISN	Rohde & Schwarz	ESH2-Z5	100146	2009.03.28
LISN	Schwarzbeck	NNLK8129	8129162	2009.03.28
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	3057.8810.54	2009.05.26

Figure 1. Conducted Emission Test Setup



Figure 2. Graphical representation of conducted emissions, Optical DVI Mode

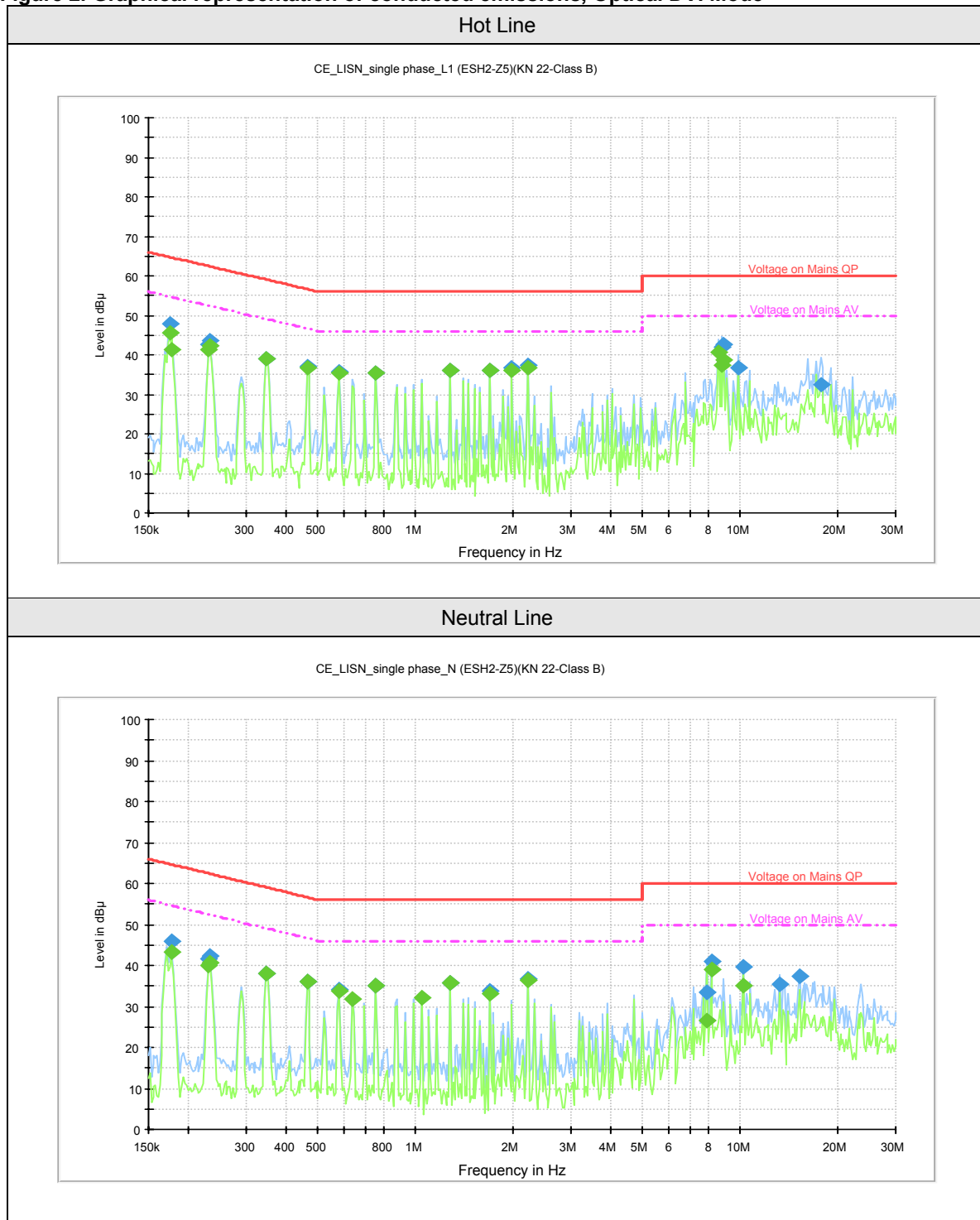


Table 1. Test data for conducted emission, Optical DVI Mode

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
0.174	0.15	9.75	38.00	35.50	H	47.90	45.40	64.80	54.80	16.90	9.40
0.176	0.13	9.77	36.00	33.30	N	45.90	43.20	64.70	54.70	18.80	11.50
0.230	0.14	9.76	31.80	30.20	N	41.70	40.10	62.40	52.40	20.70	12.30
0.232	0.14	9.76	33.60	32.30	H	43.50	42.20	62.40	52.40	18.90	10.20
0.462	0.13	9.77	26.20	26.00	N	36.10	35.90	56.70	46.70	20.60	10.80
1.274	0.16	9.84	25.90	25.80	N	35.90	35.80	56.00	46.00	20.10	10.20
1.974	0.24	9.86	26.50	25.90	H	36.60	36.00	56.00	46.00	19.40	10.00
2.202	0.22	9.88	27.40	26.80	H	37.50	36.90	56.00	46.00	18.50	9.10
8.109	0.43	10.07	30.60	28.40	N	41.10	38.90	60.00	50.00	18.90	11.10
8.694	0.41	10.09	31.60	26.80	H	42.10	37.30	60.00	50.00	17.90	12.70
8.869	0.41	10.09	32.00	28.10	H	42.50	38.60	60.00	50.00	17.50	11.40
10.194	0.49	10.11	29.10	24.60	N	39.70	35.20	60.00	50.00	20.30	14.80

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

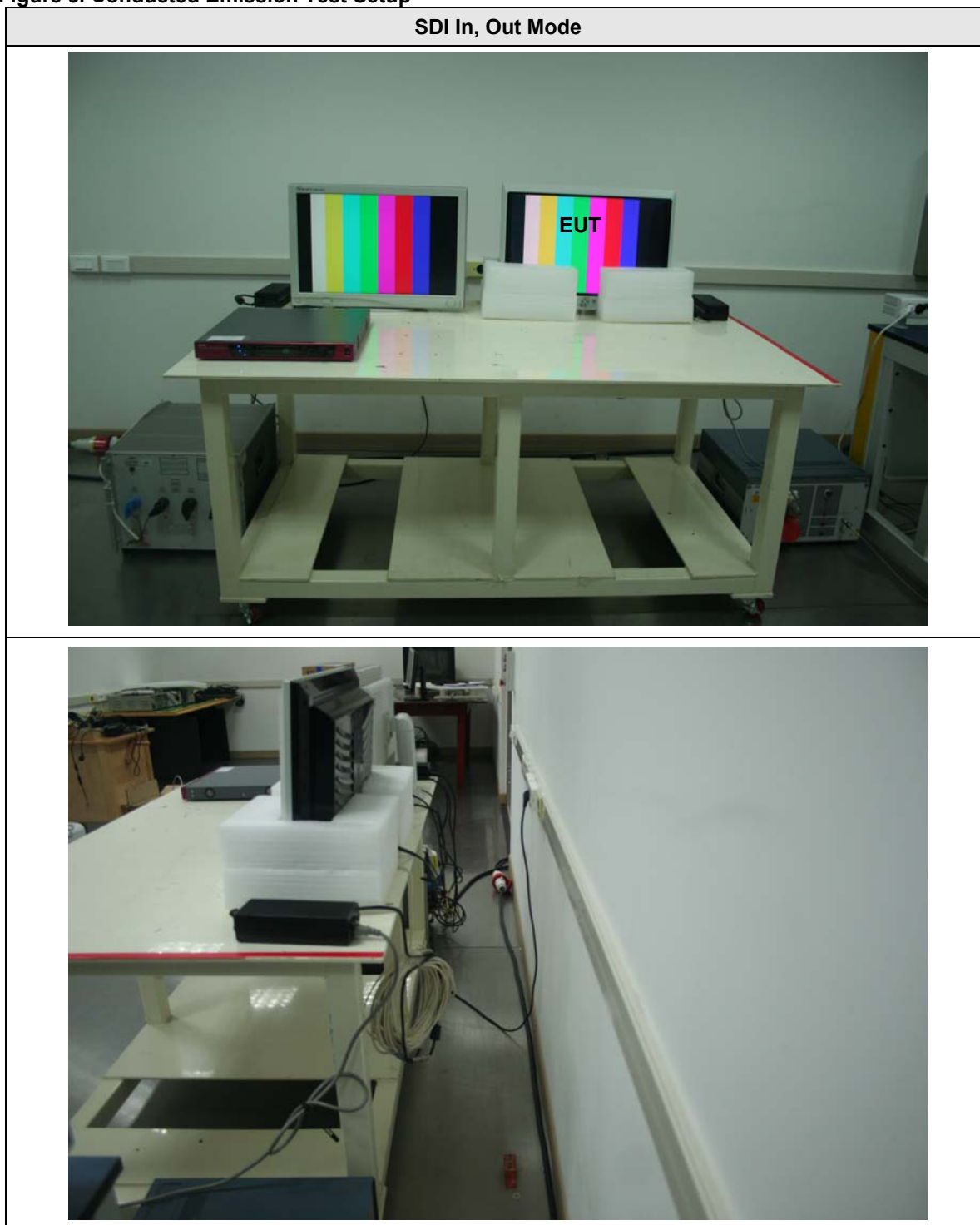


Figure 4. Graphical representation of conducted emissions, SDI In/Out Mode

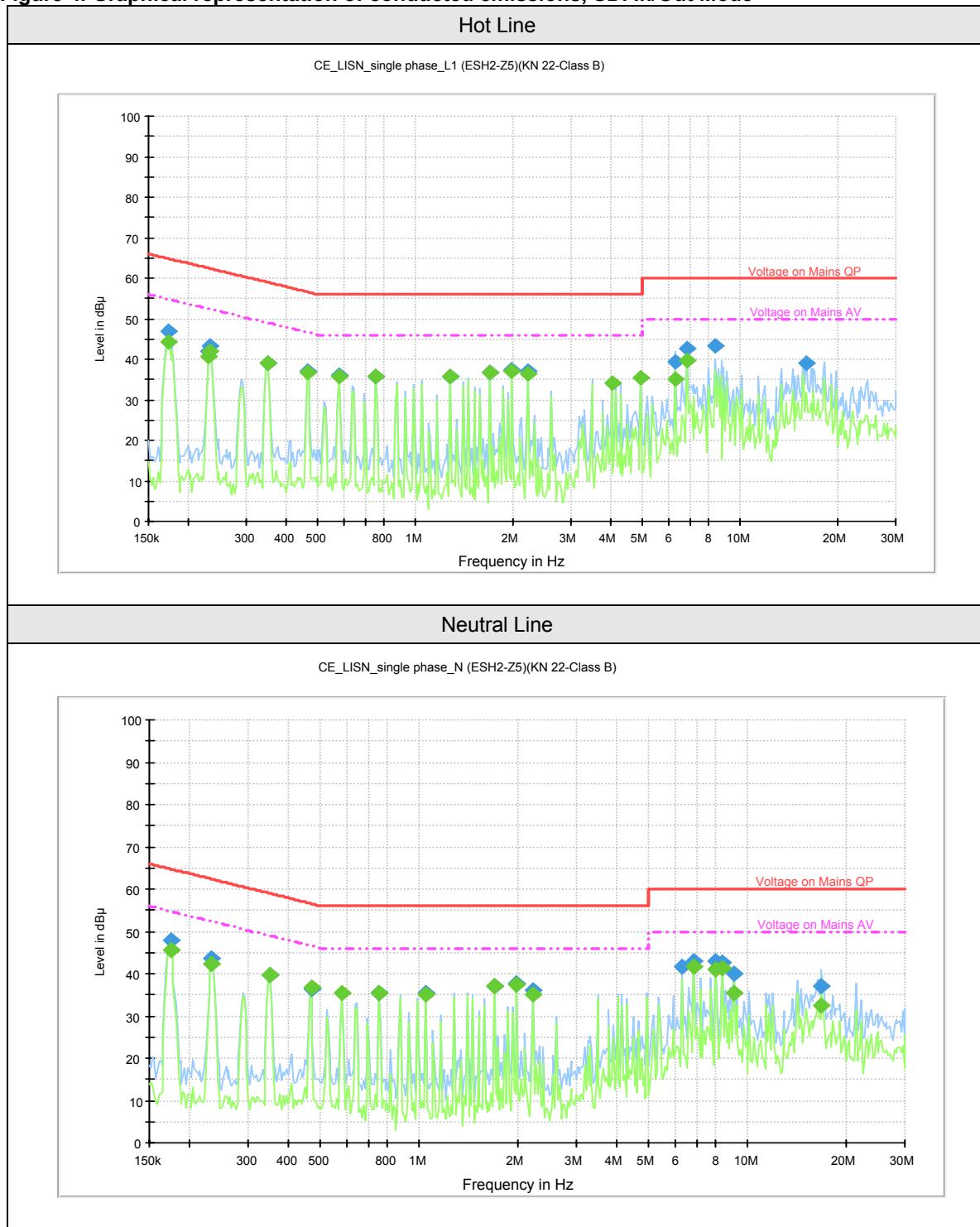


Table 2. Test data for conducted emission, SDI In, Out Mode

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
0.172	0.14	9.76	37.00	34.50	H	46.90	44.40	64.80	54.80	17.90	10.40
0.174	0.15	9.75	38.00	35.60	N	47.90	45.50	64.80	54.80	16.90	9.30
0.232	0.14	9.76	33.30	31.90	H	43.20	41.80	62.40	52.40	19.20	10.60
0.349	0.13	9.77	29.10	29.10	H	39.00	39.00	59.00	49.00	20.00	10.00
0.462	0.13	9.77	27.00	26.70	H	36.90	36.60	56.70	46.70	19.80	10.10
1.683	0.16	9.84	27.20	25.10	N	37.20	35.10	56.00	46.00	18.80	10.90
1.974	0.24	9.86	27.50	27.00	N	37.60	37.10	56.00	46.00	18.40	8.90
2.202	0.22	9.88	26.90	26.10	H	37.00	36.20	56.00	46.00	19.00	9.80
6.323	0.30	10.10	31.30	24.70	N	41.70	35.10	60.00	46.00	18.30	10.90
6.847	0.30	10.10	32.50	31.20	N	42.90	41.60	60.00	50.00	17.10	8.40
7.949	0.40	10.10	32.60	30.40	N	43.10	40.90	60.00	50.00	16.90	9.10
8.355	0.42	10.08	32.60	25.70	H	43.10	36.20	60.00	50.00	16.90	13.80
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	21 °C	
		Relative Humidity	42 %	
-	Frequency range	Measurement Point		
Fully configured sample scanned over the following frequency range	30 MHz to 1.0 GHz	10 meter measurement distance		
	1.0 GHz to 2.0 GHz	3 meter measurement distance		
Limits – Class B				
Frequency (MHz)		Limit (dBµV/m)		
		Quasi-Peak	Results	
30 to 230		30	Pass	
230 to 1000		37	Pass	
1000 to 2000		54 (Average), 74 (Peak)	Pass	
EUT Configuration Settings:				
Power Interface Mode # (See Section 2.3)		EUT Operation Mode # (See 2.4)	EUT Configurations Mode # (See Section 2.7)	
1		2, 4	1, 2	
Radiated Emissions Test Equipment:				
Description	Manufacturer	Model	Identifier	Cal. Due
Test Receiver	Rohde & Schwarz	ESIB26	100359	2009.05.26
BiconiLog ANT	Schaffner	CBL6112D	22022	2010.04.21
Horn Antenna	Schwarzbeck	BBHA9120D	9120D–539	2010.03.24

Figure 5. Photo of Radiated emission test setup, 30 to 1000 MHz

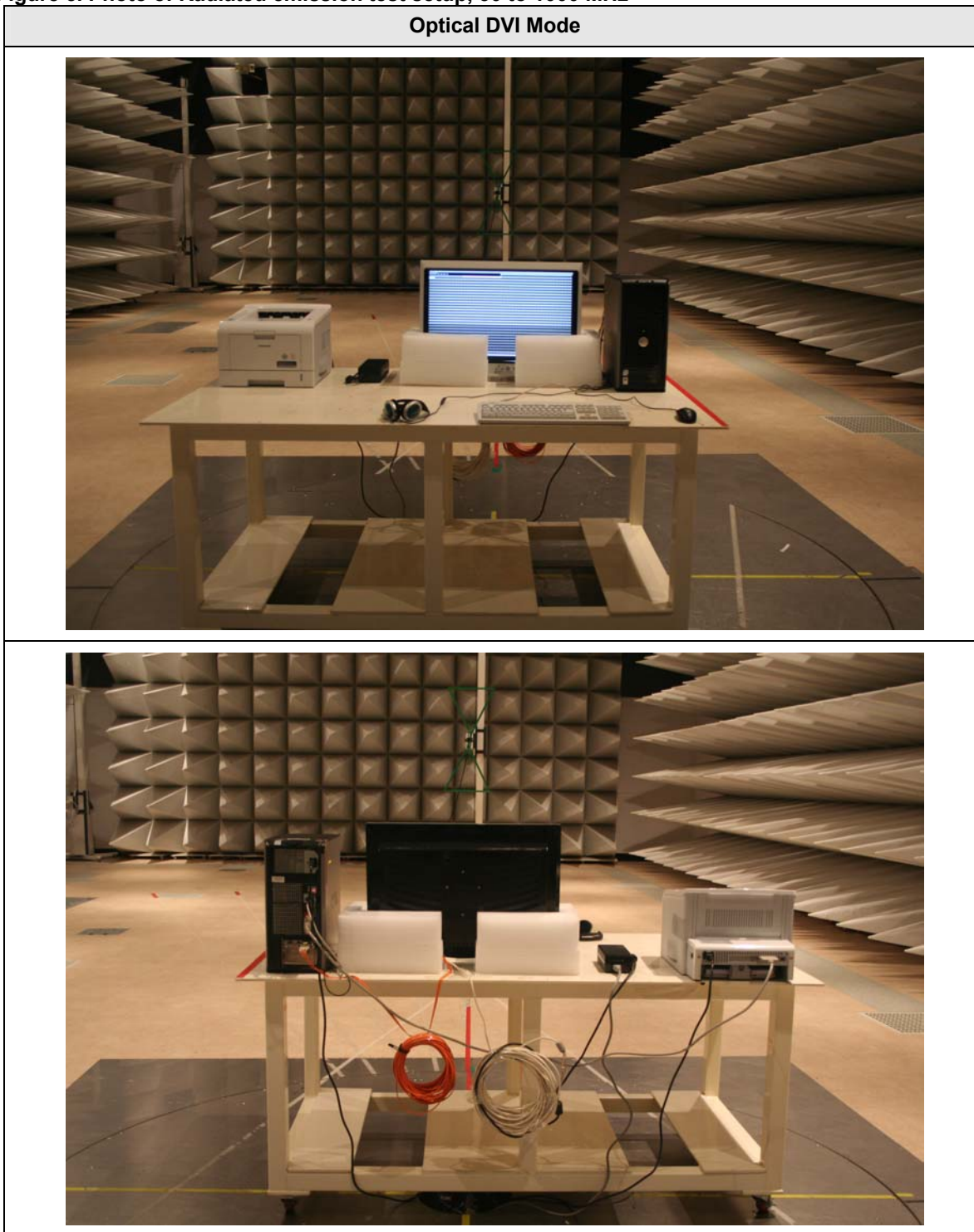


Figure 6. Graphical representation, 30 MHz to 1000 MHz

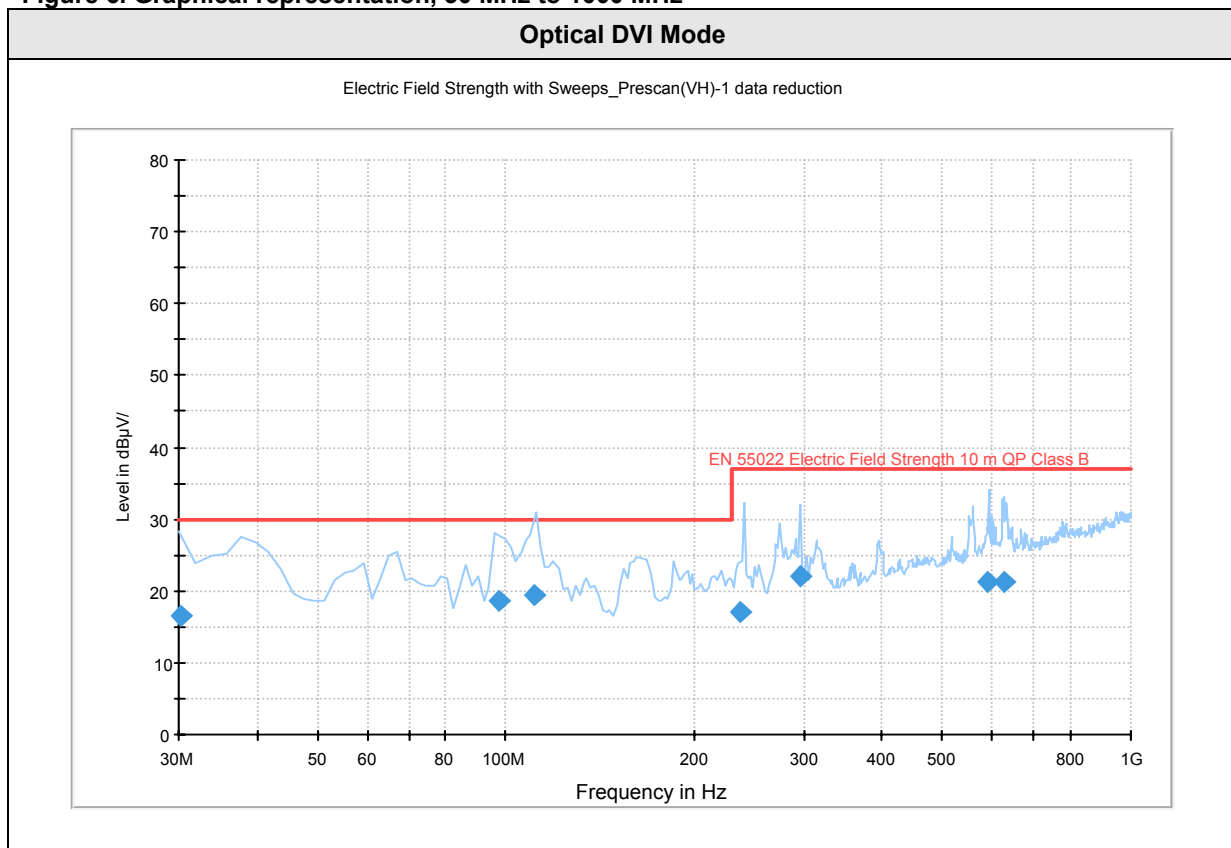


Table 3. Radiated emission Test data, Optical DVI Mode, 30 MHz to 1000 MHz

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)
111.34	11.4	QP	V	90	1.00	0.41	12.49	24.30	30.00	5.70
240.99	3.0	QP	V	280	1.00	0.49	14.71	18.20	37.00	18.80
296.68	5.5	QP	H	344	2.10	0.49	16.21	22.20	37.00	14.80
593.48	2.1	QP	V	20	4.00	0.49	22.31	24.90	37.00	12.10
625.67	4.1	QP	V	20	1.00	0.50	22.60	27.20	37.00	9.80

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. Photo of Radiated emission test setup, 1.0 GHz to 2.0 GHz

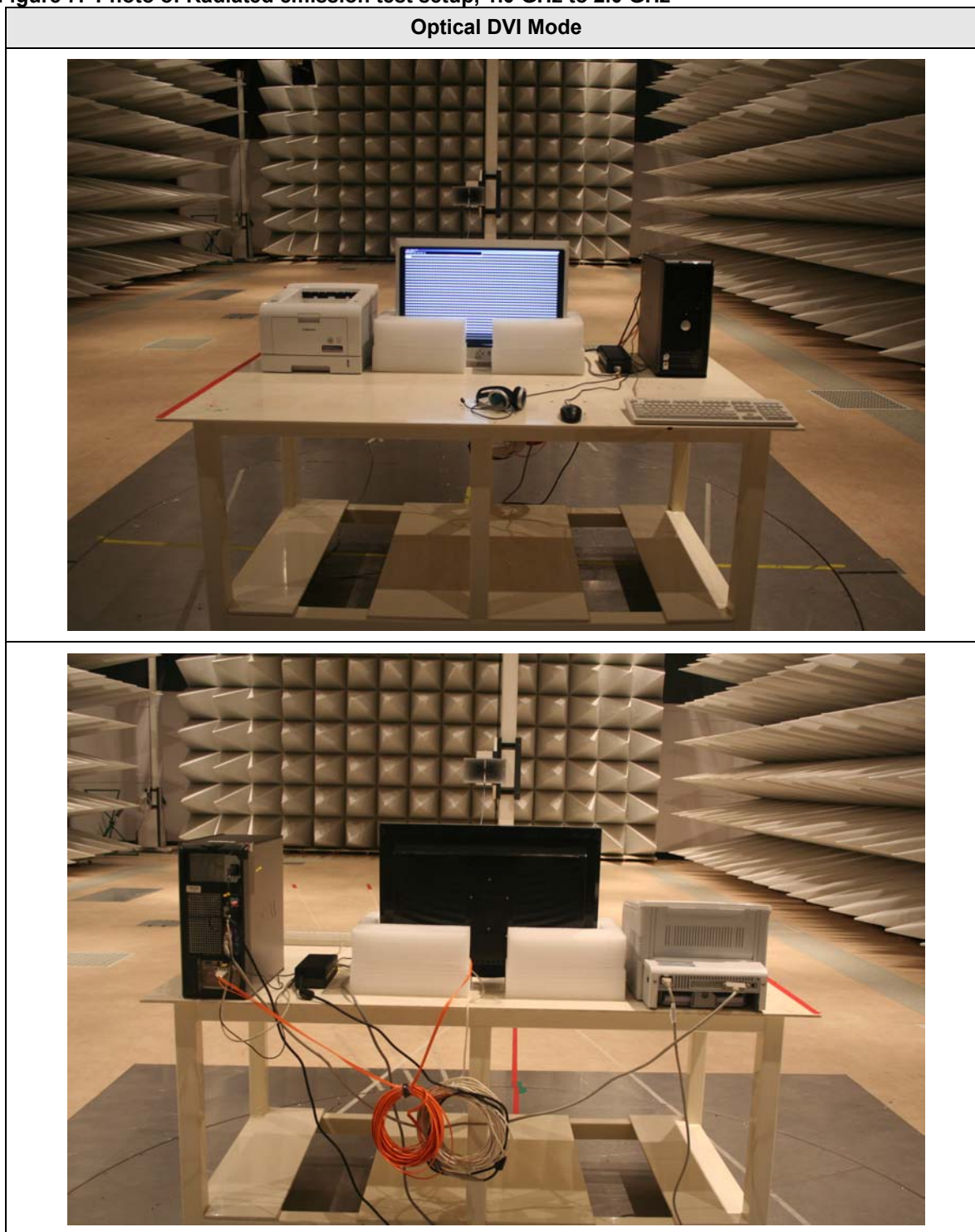
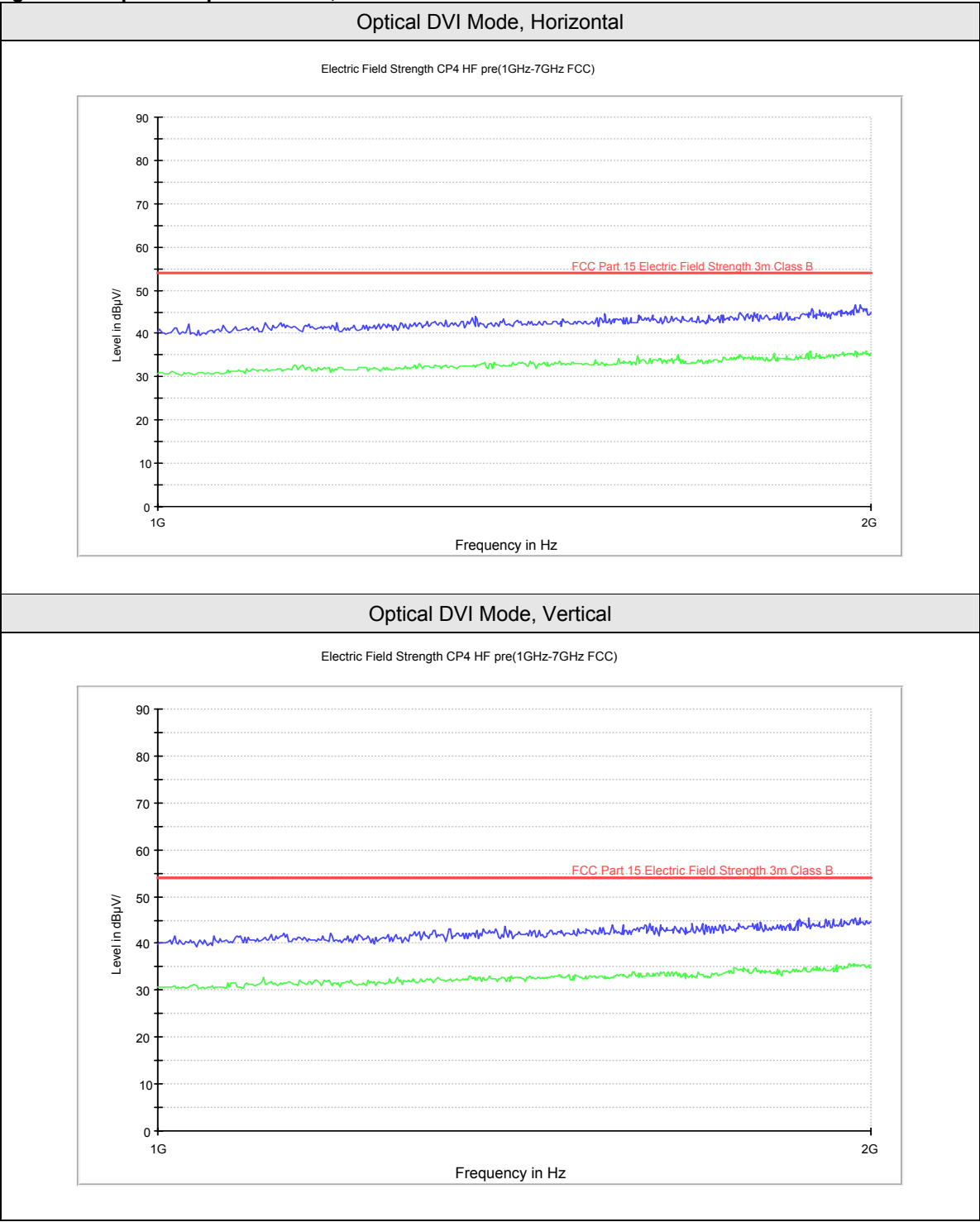


Figure 8. Graphical representation, 1.0 GHz to 2.0 GHz



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Table 4. Radiated emission Test data, Optical DVI Mode, 1.0 GHz to 2.0 GHz

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)
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note: The test results were under required limit with 20dB margin or more.

Figure 9. Photo of Radiated emission test setup, SDI In, Out Mode, 30 MHz to 1000 MHz

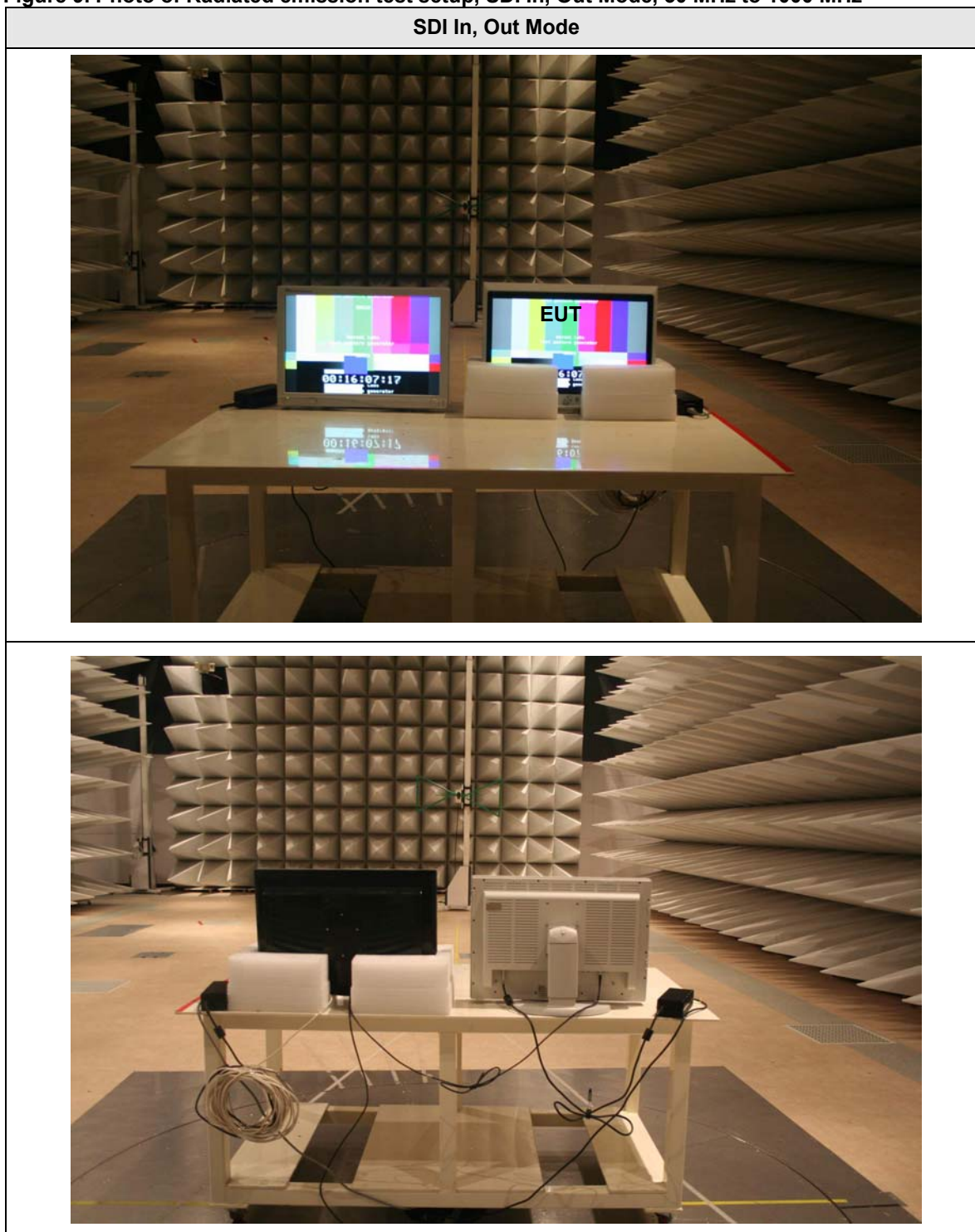


Figure 10. Graphical representation, SDI In, Out Mode, 30 MHz to 1000 MHz

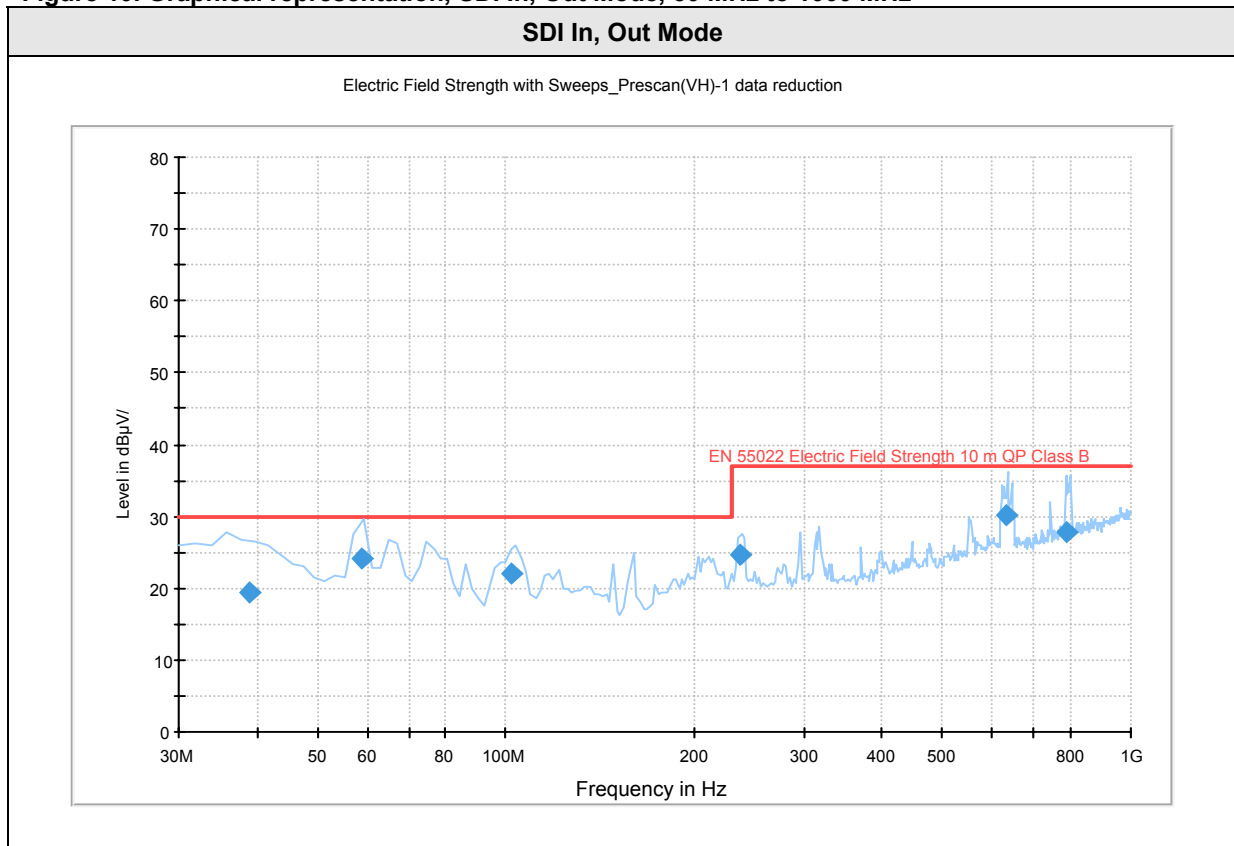


Table 5. Radiated emission Test data, SDI In, out Mode, 30 MHz to 1000 MHz

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)
38.77	4.90	QP	V	217	1.05	0.10	14.40	19.40	30.00	10.60
59.02	15.88	QP	V	289	3.20	0.41	6.69	22.98	30.00	7.02
102.01	9.80	QP	V	242	1.05	0.49	11.81	22.10	30.00	7.90
239.47	7.80	QP	V	340	1.00	0.49	14.61	22.90	37.00	14.10
631.99	7.49	QP	V	0	2.00	0.49	22.61	30.59	37.00	6.41
797.97	5.40	QP	V	3	3.00	0.50	23.80	29.70	37.00	7.30

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 11. Photo of Radiated emission test setup, SDI In, Out Mode, 1.0 GHz to 2.0 GHz

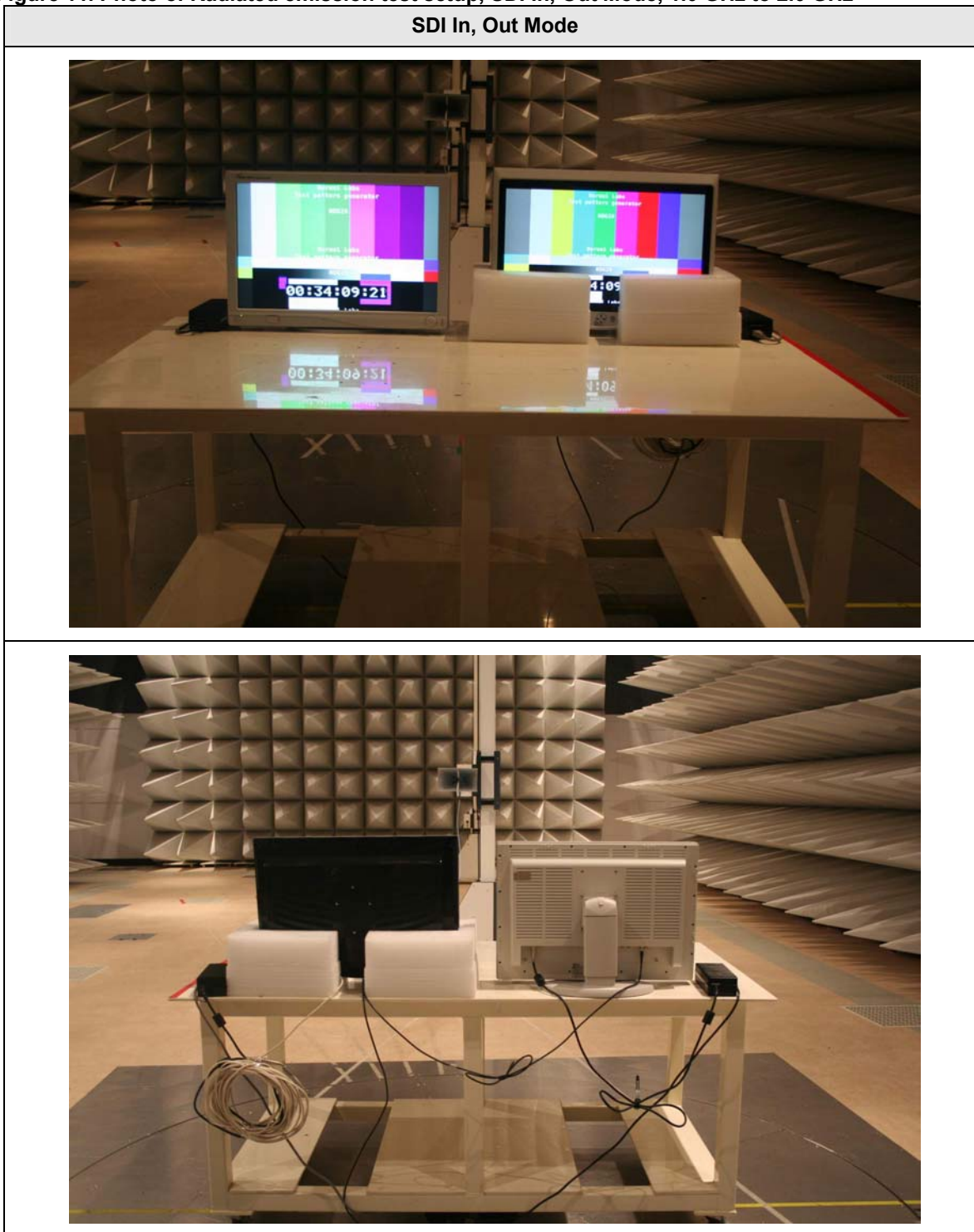
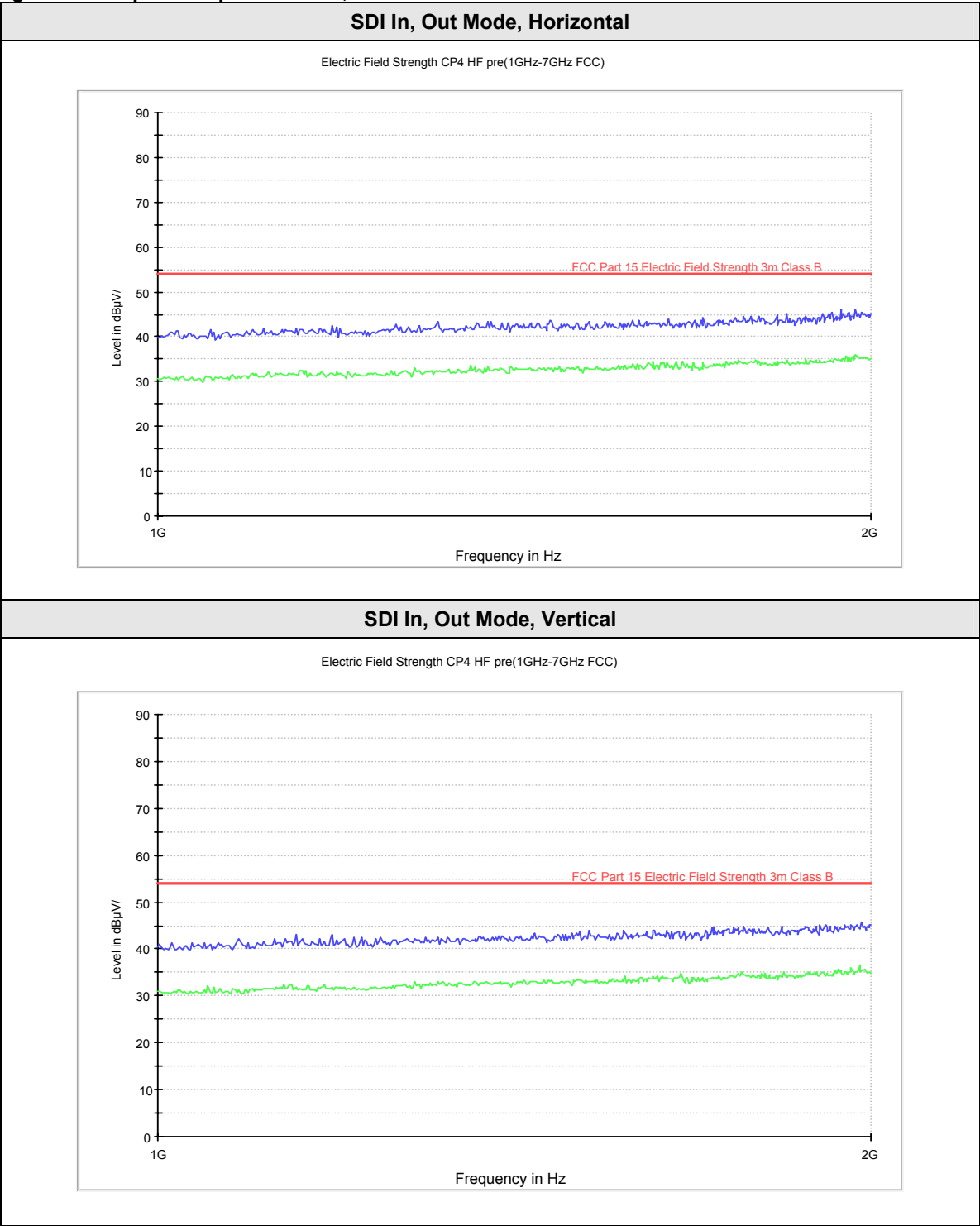


Figure 12. Graphical representation, 1.0 GHz to 2.0 GHz



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Table 6. Radiated emission Test data, SDI in, out Mode, 1.0 GHz to 2.0 GHz

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)
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
Note: The test results were under required limit with 20dB margin or more.										