Underwriters Laboratories Inc.

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Project: 12CA17113
File: MC16222
Report: 12CA17113-FCC
Date: May 10, 2012
Model: 240-030-960

Electromagnetic Compatibility Test Report

For

LCD Monitor

ADVAN INT'L CORP
47817 Fremont Blvd. Fremont CA 94538 U.S.A.

Summary of Test Results:

The following tests were performed on a sample submitted for evaluation of compliance 47 CFR Part 15.107 (a) / 47 CFR 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	-	-
***Note:** No modifications were made to the EUT in order to achieve and maintain compliance to the standards described in this report.				

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.

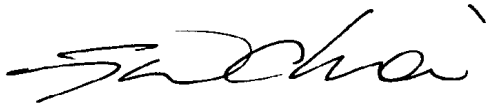
The equipment under test has

☐ Met the technical requirements

☒ Met the technical requirements under the limited condition

☐ Not met the technical requirements

Tested by
Sung Hoon Baek, Senior Project Engineer
UL Verification Services – 3014ASEO
UL Korea Ltd.
May 10, 2012



Reviewed by
Jeawoon Choi, WiSE Engineering Leader
UL Verification Services – 3014ASEO
UL Korea Ltd.
May 10, 2012

Test Report Details

Test report No:	12CA17113-CE
File No:	MC16222
Tests Performed By:	UL Korea Ltd. 33rd FL. GFC Bldg. 737 Yeoksam-dong, Kangnam-ku, Seoul, 135-984, Korea
Test Site:	Digital EMC Co., Ltd 683-3, Yuban-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea The test facility was deemed to have the environment and capabilities necessary to perform the tests included in the test package.
Applicant:	ADVAN INT'L CORP 47817 Fremont Blvd. Fremont CA 94538 U.S.A.
Manufacturer:	ADVAN INT'L CORP 47817 Fremont Blvd. Fremont CA 94538 U.S.A.
Factory:	D&T Inc. Daedeok Valley, 59-9, Jang Dong, Yuseong Gu, Daejeon, Korea, 305-343
Applicant Contact:	Jun Ho Jang
Phone:	82-2-703-5197
E-mail:	andyjang@advancorp.com
Product Type:	LCD MONITOR
Model Number:	240-030-960
FCC ID:	QVXAMM260WTDS
Trademark:	N/A
Product standards:	FCC Part 15 Subpart B
Test Procedure:	ANSI C63.4-2009
Sample Serial Number:	N/A
Sample Receive Date:	April 06, 2012
Testing Start Date:	April 12, 2012
Date Testing Complete:	May 7, 2012
Test Report Date:	May 10, 2012
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 Equipment Description:

Description:
The 240-030-960 (Vision Elect HDTV, 0240030960) LCD Monitor intended for use in endoscopic surgical applications.

1.2 Details of Equipment Under Test (EUT):

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LCD Monitor	ADVAN INT'L CORP.	240-030-960	N/A
2	Power Supply Unit	BridgePower Corp.	BPM150S24F11	Two Ferrite Core
3	Extension power cord (optional)	BridgePower Corp.	1501047002 (5ft), 1501047 (15ft), 1501047001 (75ft)	Two Ferrite core
4	Hospital-grade AC Power cord	N/A	N/A	-
5	DVI Cable	-	-	Two Ferrite core, 1.8m
6	VGA Cable	-	-	-
7	Composite Video BNC Jack Cable	-	-	1.8m
8	Super Video Cable	-	-	1.8m

1.3 Technical Data:

Display	
LCD Monitor Panel	25.54 inches (a-Si TFT Active matrix LCD)
Synchronization	2.5 - 5.0 Vpp separated sync
Native Resolution	1920 dots × 1200 dots
Input Signal	1 × 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)
Maximum Pixel Clock	170MHz
Electrical	
Power Adapter	AC 100-240V; DC 24V
Power Consumption	150W (max)

Dimensions	
Dimensions (W × H × D)	616.4 × 428.8 × 121.2mm (24.27 × 16.88 × 4.77 inches)
Power Consumption	150W (max)

1.4 EUT Internal operating Frequency

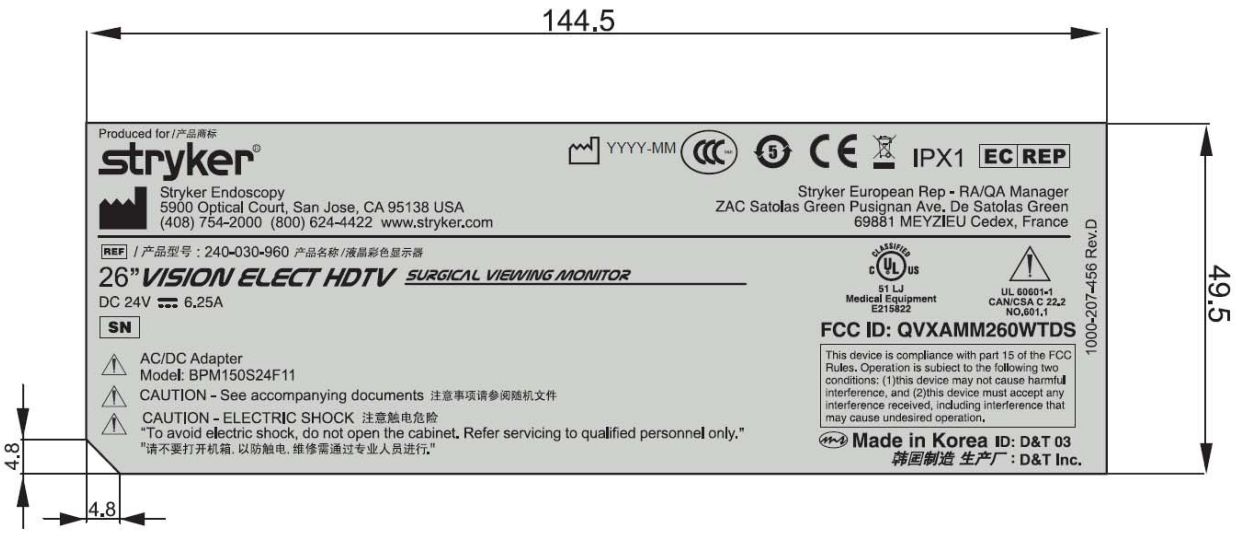
Frequency (MHz)	Description	Frequency (MHz)	Description
154MHz	Display clock	154MHz	Pixel Clock
192MHz	Memory clock	170MHz	Maximum Pixel Clock
324.00MHz	Memory Clock	-	-

1.5 Technical descriptions and documents:

No.	Document Title and Description
1	240-030-960 User Manual
***Note:** The manufacturer provided the following document.	

1.6 Equipment Marking Plate of Product:

Product Label



2. TEST CONDITION

2.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	LCD Monitor	ADVAN INT'L CORP.	240-030-960	-
EUT	Power Supply	BridgePower Corp.	BPM150S24F11	Two Ferrite core,
EUT	Extension power cord (optional)	BridgePower Corp.	1501047002 (5ft), 1501047 (15ft), 1501047001 (75ft)	Two Ferrite core
AE	PC	DELL	VOSTRO220	DVI, DSUB Source
AE	Mouse	LOGITECH	M-SBF96	-
AE	Keyboard	MONITEREY INTERNATIONAL CORP.	SKG-210PB	-
AE	HDMI to 3G SDI Scaler	Gefen	N/A	HD-SDI Source
AE	HDMI to 3G SDI Scaler Adapter	N/A	HK-H5-A05	Connected with HDMI to 3G SDI Scaler
***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	29 pin DVI-I, Two Ferrite core
3	VGA In	I/O	1.8 m	Shielded	15 pin D-Sub, Two Ferrite core
4	SDI In, Out	I/O	1.8 m	Shielded	BNC type
5	S-Video In, Out	I/O	1.8 m	Shielded	S-Video Cable
6	C-Video In, Out	I/O	1.8 m	Shielded	BNC type
7	Component (Y/Pb/Pr) In	I/O	1.8 m	Shielded	5 Port BNC type
*** 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	2.5A	-	50-60Hz	Rated of Power Supply
1	120Vac	-	-	60Hz	-

2.4 Test Operating Mode:

Mode #	Mode	Comments
1	DVI Mode	Worst case condition
2	VGA Mode	-
3	HD-SDI In/Out Mode	Worst case condition
4	S-VIDEO Mode	-
5	C-Video / SOG Mode	-
6	Component (Y/Pb/Pr) Mode/ Analog RGBS 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 2
3. EUT has been performed under continuous displaying "Color Bar" Patten for configuration Modes of 3 to 6.

2.5 Modes of Video Resolution:

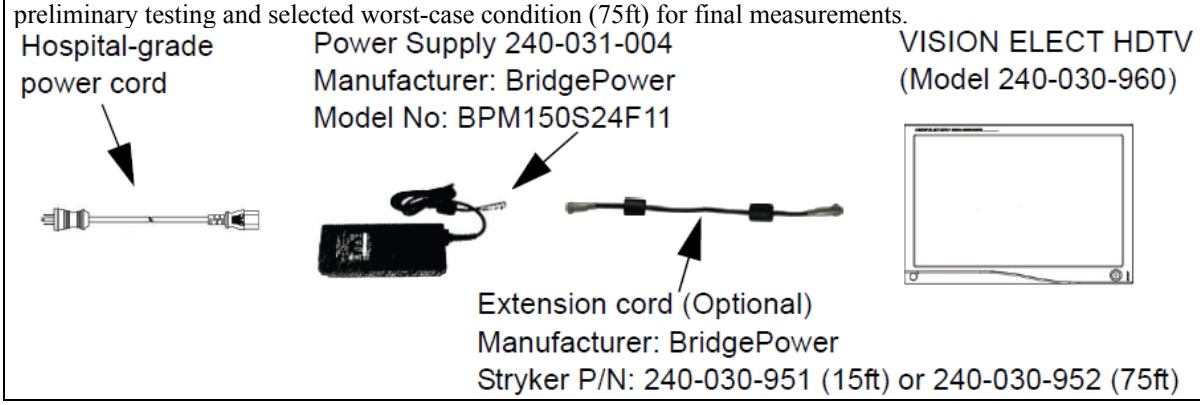
Mode #		Resolution	Comments
1	DVI Mode	800 * 600 @ 60Hz	-
2		1024 * 768 @ 60Hz	-
3		1920 * 1200 @ 60Hz	Worst case condition (Range of Brightness: 100, Range of contrast: 100 And range of backlight: 100.
4	HD-SDI In/Out Mode	1080i	Worst case condition (Range of Brightness: 100, Range of contrast: 100 And range of backlight: 100.

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

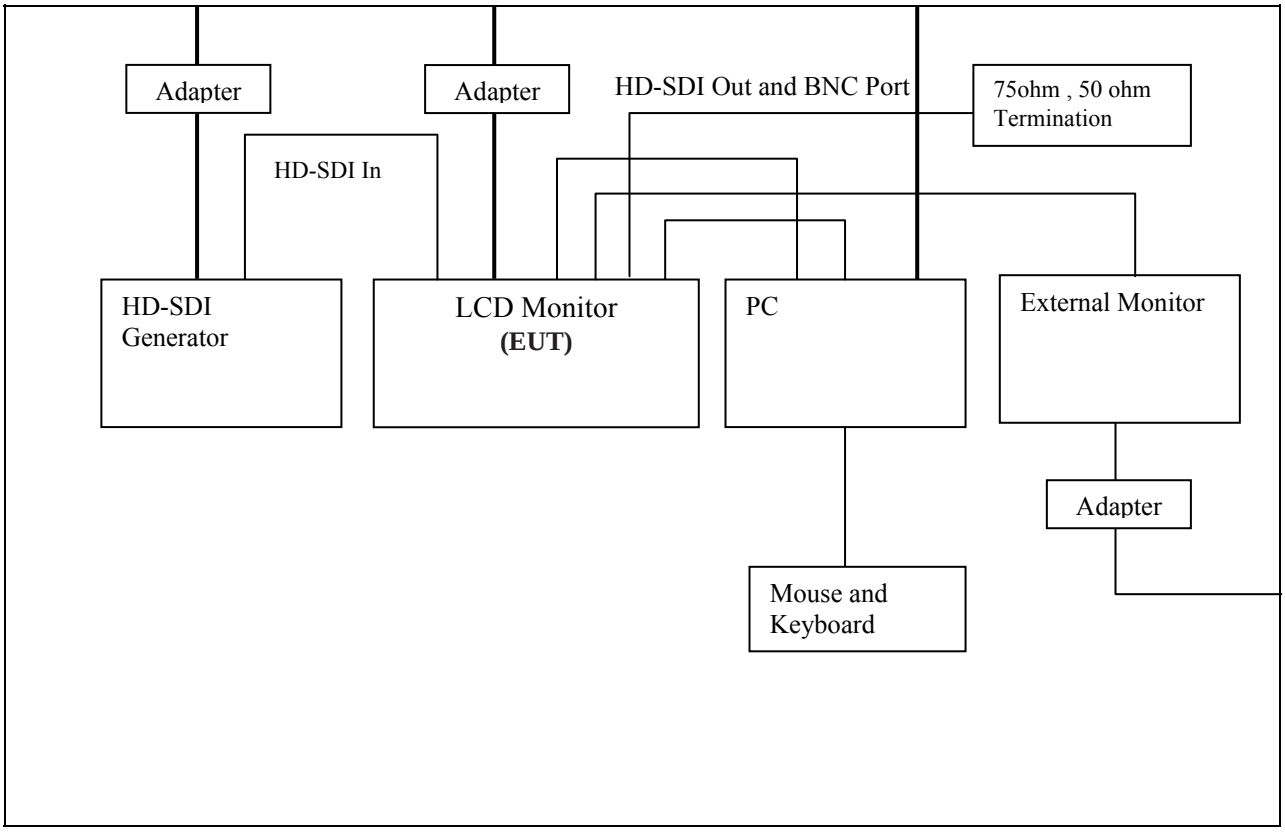
2.6 Used D.C. Extension Cable for EMC Test:

No.	Cable Length	Preliminary Test	Comment
1	5ft	DVI and HD-SDI In/Out Mode	-
2	15ft		
3	75ft		Worst case condition

*** Note:** Radiated emission and conducted emission test were performed for all extension power cable during the preliminary testing and selected worst-case condition (75ft) for final measurements.



2.7 Test Configuration:



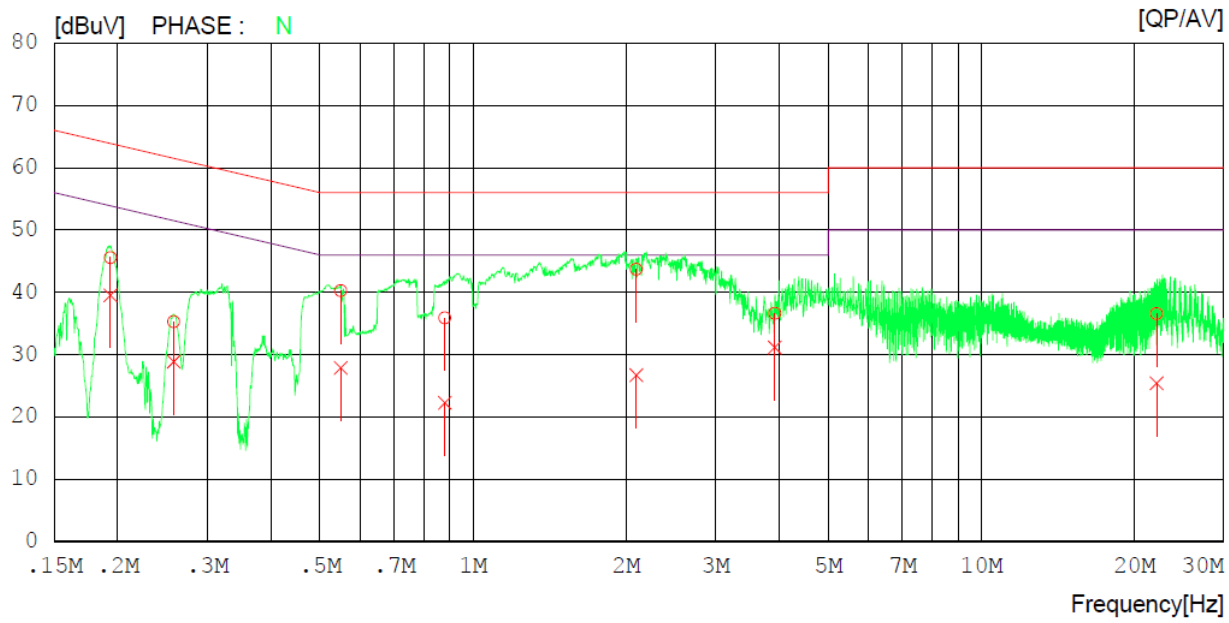
3. TEST CONDITION AND RESULTS

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.				
Basic Standard		FCC Part 15			
Parameters recorded during the test		Laboratory Ambient Temperature	21 °C		
		Relative Humidity	38.0 %		
-		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 EUT		
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		1, 3		1	
Conducted Emissions Test Equipment used:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100364	2012-03-06	2013-03-06
LISN (EUT)	R&S	ESH2-Z5	828739/006	2011-09-30	2012-09-30
LISN(Ancillary)	TTI	LISN1600	197204	2011-07-02	2012-07-02
50 Ohm terminator	TME	CT-01	N/A	2012-01-09	2013-01-09

Figure 1. Graphical representation of conducted emissions, DVI Mode

Hot Line



Neutral Line

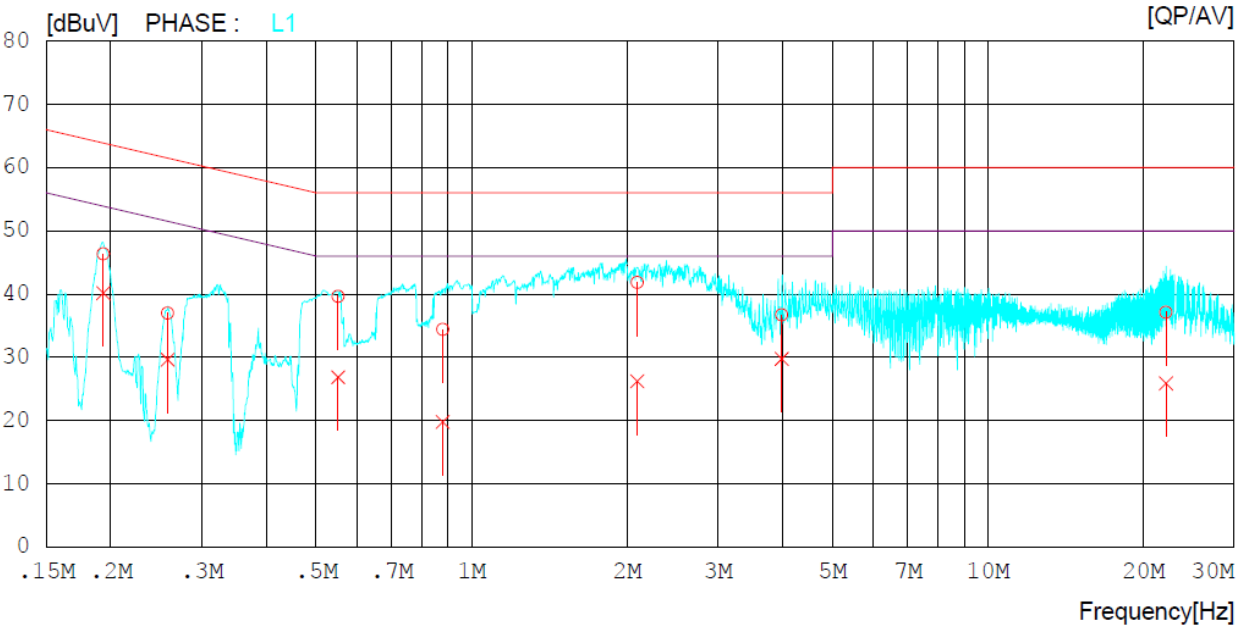
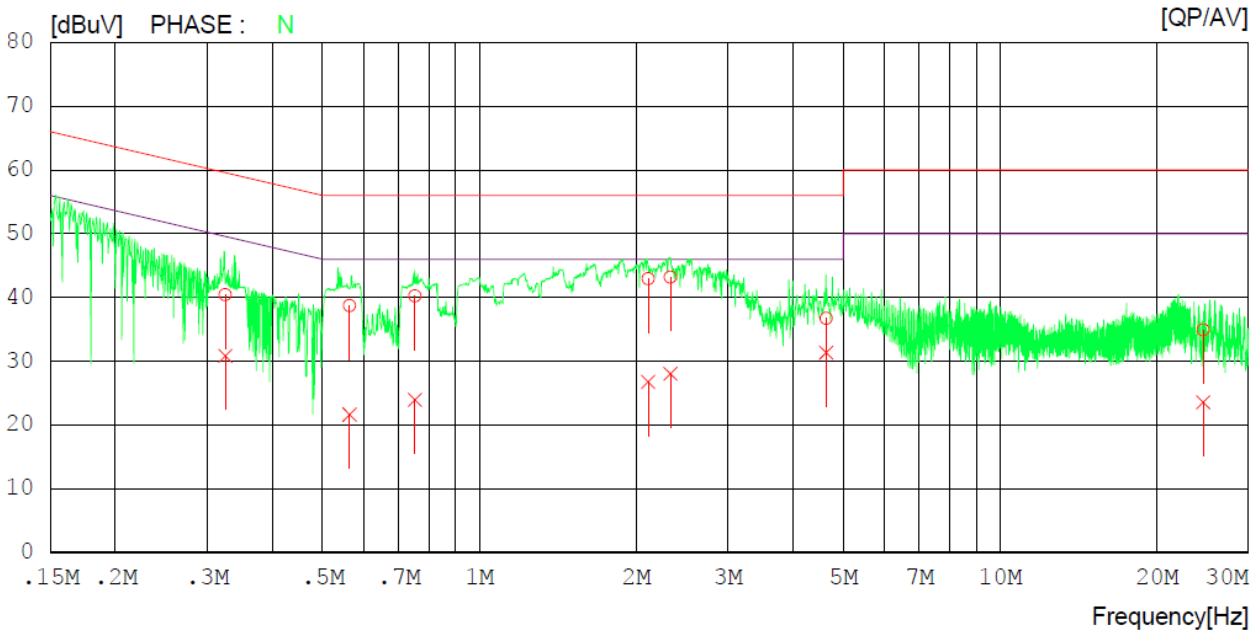


Table 1. Test data for conducted emission, DVI Mode

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.19346	45.4	39.3	0.2	45.6	39.5	63.9	53.9	18.3	14.4	N
2	0.25771	35.1	28.7	0.2	35.3	28.9	61.5	51.5	26.2	22.6	N
3	0.54925	40.1	27.7	0.2	40.3	27.9	56.0	46.0	15.7	18.1	N
4	0.88033	35.6	22.0	0.3	35.9	22.3	56.0	46.0	20.1	23.7	N
5	2.09600	43.4	26.4	0.3	43.7	26.7	56.0	46.0	12.3	19.3	N
6	3.92400	36.2	30.8	0.4	36.6	31.2	56.0	46.0	19.4	14.8	N
7	22.13200	35.4	24.2	1.2	36.6	25.4	60.0	50.0	23.4	24.6	N
8	0.19335	46.2	39.9	0.2	46.4	40.1	63.9	53.9	17.5	13.8	L1
9	0.25778	36.8	29.4	0.2	37.0	29.6	61.5	51.5	24.5	21.9	L1
10	0.55145	39.4	26.6	0.2	39.6	26.8	56.0	46.0	16.4	19.2	L1
11	0.87945	34.1	19.5	0.3	34.4	19.8	56.0	46.0	21.6	26.2	L1
12	2.09350	41.5	25.9	0.3	41.8	26.2	56.0	46.0	14.2	19.8	L1
13	3.98950	36.3	29.4	0.4	36.7	29.8	56.0	46.0	19.3	16.2	L1
14	22.13150	35.9	24.7	1.2	37.1	25.9	60.0	50.0	22.9	24.1	L1

Figure 2. Graphical representation of conducted emissions, HD-SDI Mode

Hot Line



Neutral Line

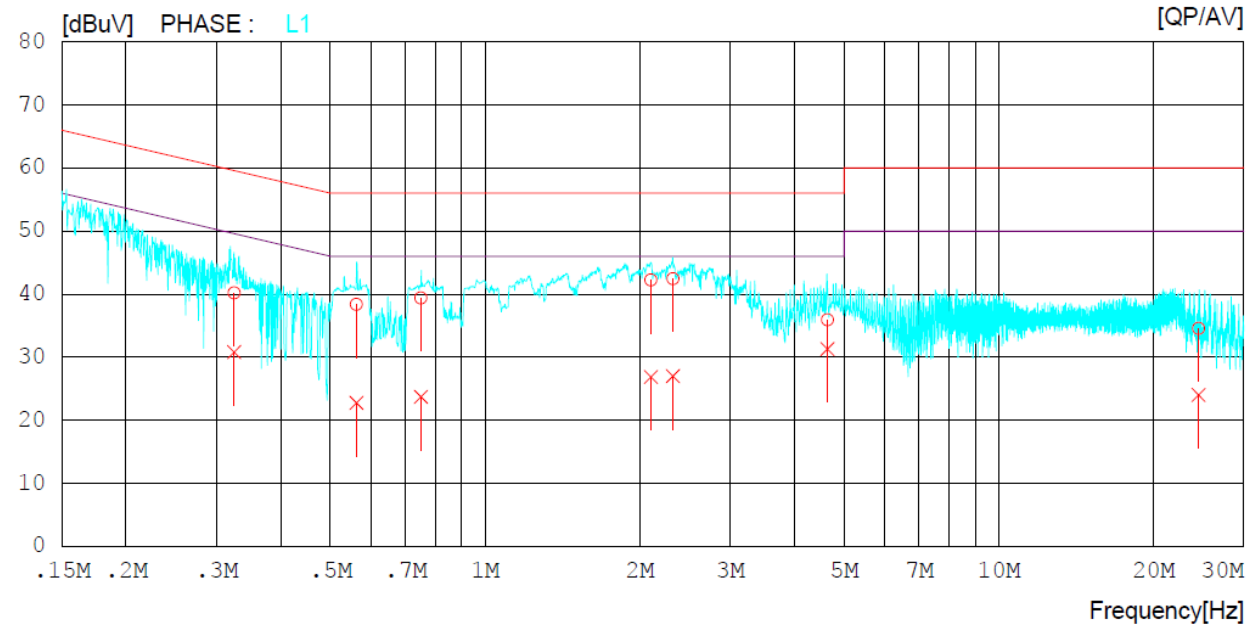


Table 2. Test data for conducted emission, HD-SDI Mode

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.32505	40.2	30.6	0.2	40.4	30.8	59.6	49.6	19.2	18.8	N
2	0.56330	38.5	21.4	0.2	38.7	21.6	56.0	46.0	17.3	24.4	N
3	0.75181	40.0	23.7	0.2	40.2	23.9	56.0	46.0	15.8	22.1	N
4	2.10950	42.6	26.5	0.3	42.9	26.8	56.0	46.0	13.1	19.2	N
5	2.32800	42.9	27.7	0.3	43.2	28.0	56.0	46.0	12.8	18.0	N
6	4.63500	36.3	30.9	0.4	36.7	31.3	56.0	46.0	19.3	14.7	N
7	24.56950	33.7	22.4	1.2	34.9	23.6	60.0	50.0	25.1	26.4	N
8	0.32470	40.0	30.6	0.2	40.2	30.8	59.6	49.6	19.4	18.8	L1
9	0.56168	38.2	22.6	0.2	38.4	22.8	56.0	46.0	17.6	23.2	L1
10	0.75001	39.2	23.5	0.2	39.4	23.7	56.0	46.0	16.6	22.3	L1
11	2.10400	42.0	26.6	0.3	42.3	26.9	56.0	46.0	13.7	19.1	L1
12	2.32250	42.1	26.7	0.3	42.4	27.0	56.0	46.0	13.6	19.0	L1
13	4.64150	35.5	30.9	0.4	35.9	31.3	56.0	46.0	20.1	14.7	L1
14	24.50650	33.4	22.8	1.2	34.6	24.0	60.0	50.0	25.4	26.0	L1

3.2 RADIATED DISTURBANCE

TEST: Limits for radiated disturbance					
Method	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. The measurements (above 1 GHz) were made 3 m distance test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane. The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna. The measurements were conducted with Average and Peak value.				
Basic Standards	FCC Part 15				
Parameters recorded during the test	Laboratory Ambient Temperature	21.2 °C			
	Relative Humidity	39.0 %			
-	Frequency range	Measurement Point			
Fully configured sample scanned over the following frequency range	30 MHz ~ 1.0 GHz	10 meter measurement distance			
	1.0 GHz ~ 2.0 GHz	3 meter measurement distance			

Limits – Class B			
Frequency (MHz)	Limit (dBμV/m)		
	Quasi-Peak		**Results**
30 to 230	30 at 10m		Pass
230 to 1000	37 at 10m		Pass
-	Average	Peak	-
Above 1000	54	74	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	1, 3	1

Radiated Emissions Test Equipment:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	R/S	ESU	100014	2012-03-08	2013-03-08
Bilog Antenna	Schaffner	CBL6112B	2737	2010-07-14	2012-07-14

Amplifier	H/P	8447E	2945A02865	2012-01-09	2013-01-09
Horn antenna	Schaffner	BBHA9120A	556	2011-06-14	2012-06-14
Amplifier	TSJ	MLA-00108-B02-36	1518831	2012-01-09	2013-01-09

Figure 3. Graphical representation of DVI Mode, 30 MHz to 1000 MHz

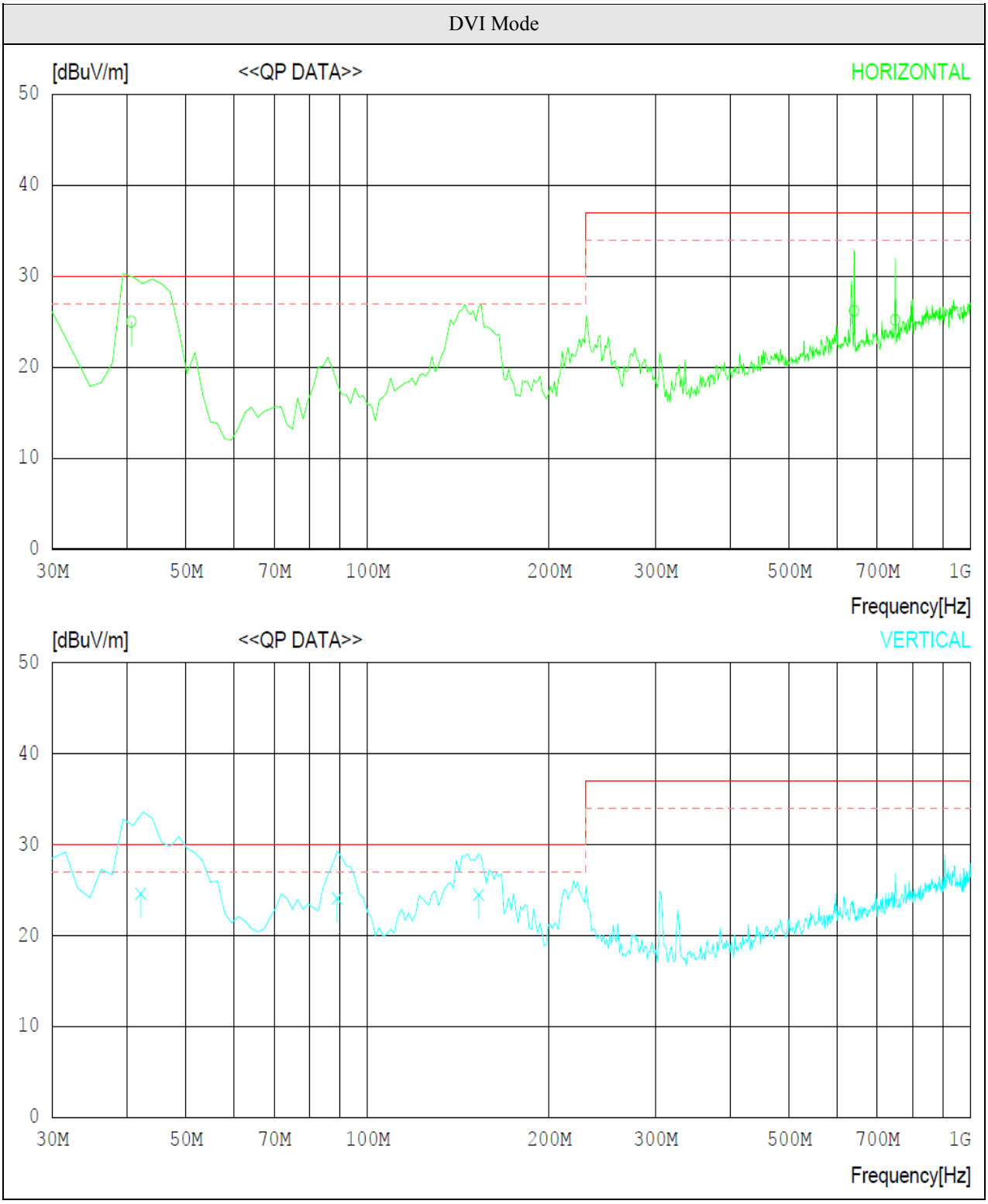


Table 3. Radiated emission Test data of DVI Mode

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
--- Horizontal ------										
1	40.610	33.0	13.9	1.1	23.0	25.0	30.0	5.0	100	1
2	640.913	27.5	18.8	4.4	24.5	26.2	37.0	10.8	100	74
3	749.600	24.7	19.6	4.9	24.0	25.2	37.0	11.8	100	240
--- Vertical ------										
4	42.072	32.4	14.0	1.1	22.9	24.6	30.0	5.4	400	1
5	89.071	36.4	8.9	1.6	22.8	24.1	30.0	5.9	100	358
6	152.805	35.2	10.4	2.0	23.1	24.5	30.0	5.5	100	358

***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 4. Graphical representation, 1 GHz to 6 GHz_ Peak

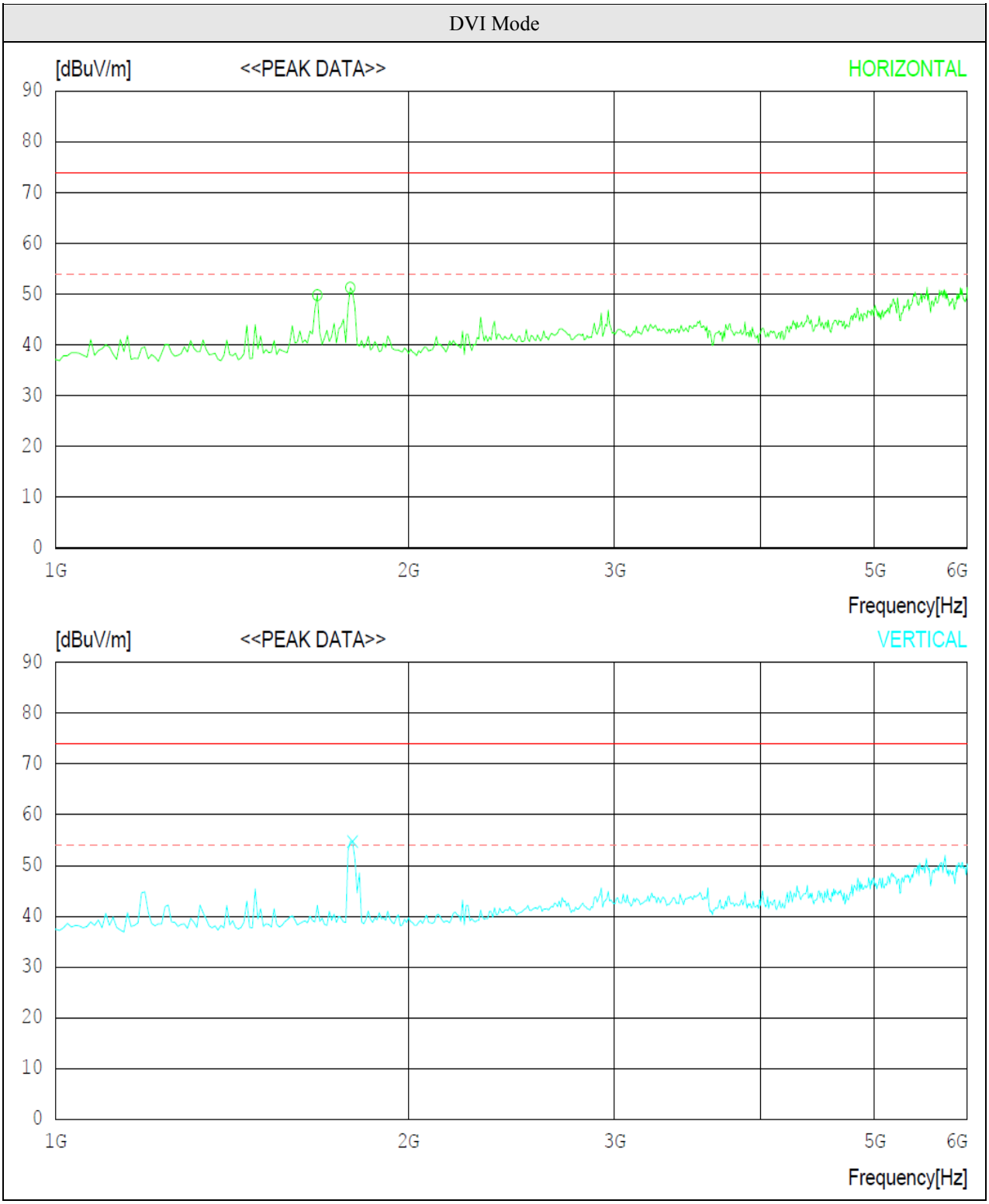


Table 4. Radiated emission Test data of DVI Mode

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
--- Horizontal ------										
1	1673.077	61.7	25.2	4.8	41.9	49.8	74.0	24.2	100	358
2	1785.256	63.1	25.2	5.0	42.0	51.3	74.0	22.7	100	358
--- Vertical ------										
3	1793.269	66.5	25.2	5.0	42.0	54.7	74.0	19.3	100	186

Figure 5. Graphical representation, 1 GHz to 6 GHz_ AV

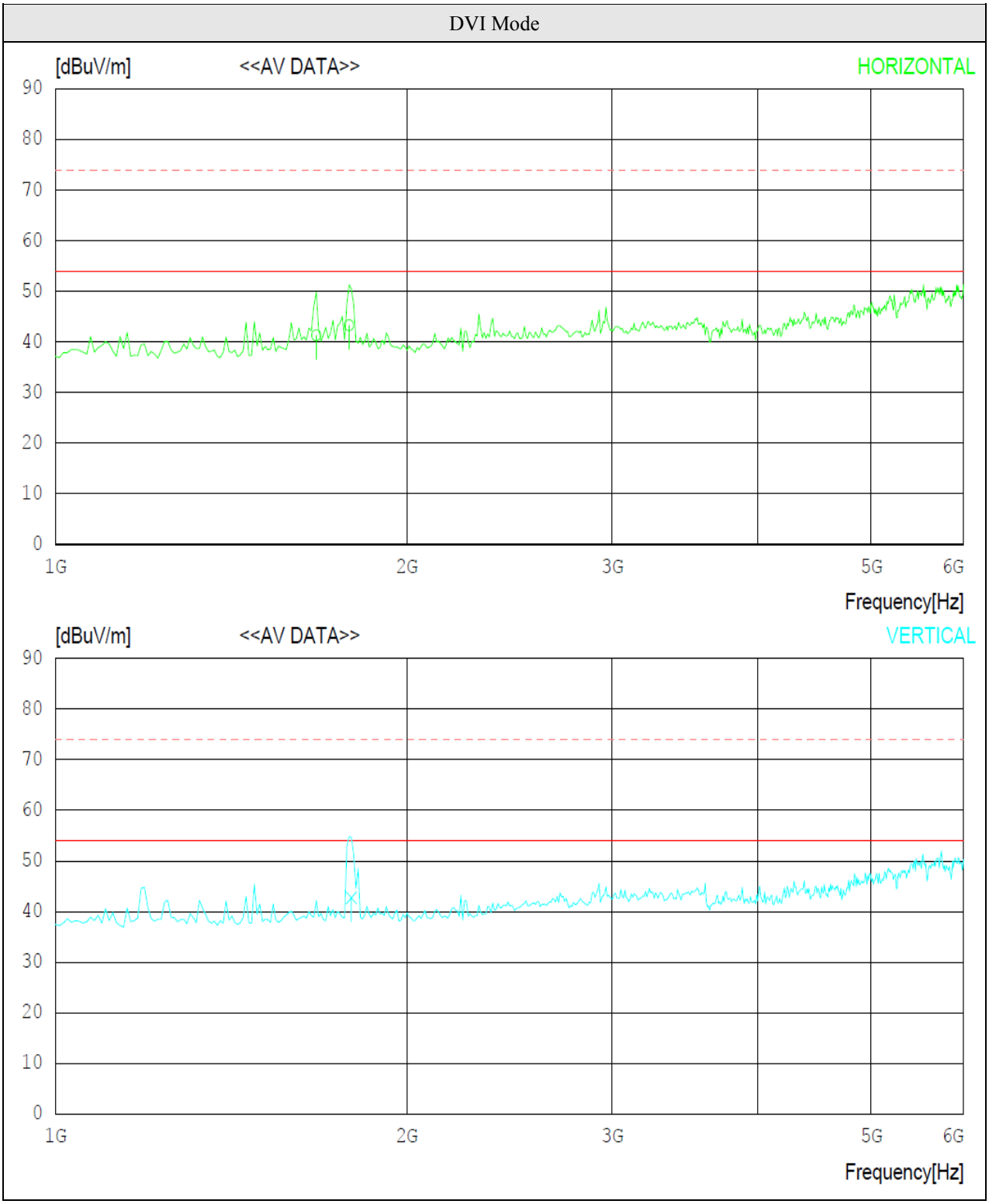


Table 5. Radiated emission Test data of DVI Mode

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ------										
1	1673.077	53.2	25.2	4.8	41.9	41.3	54.0	12.7	100	358
2	1785.256	55.1	25.2	5.0	42.0	43.3	54.0	10.7	100	358
---- Vertical ------										
3	1793.269	54.5	25.2	5.0	42.0	42.7	54.0	11.3	100	186

Figure 6. Graphical representation, 30 MHz to 1000 MHz

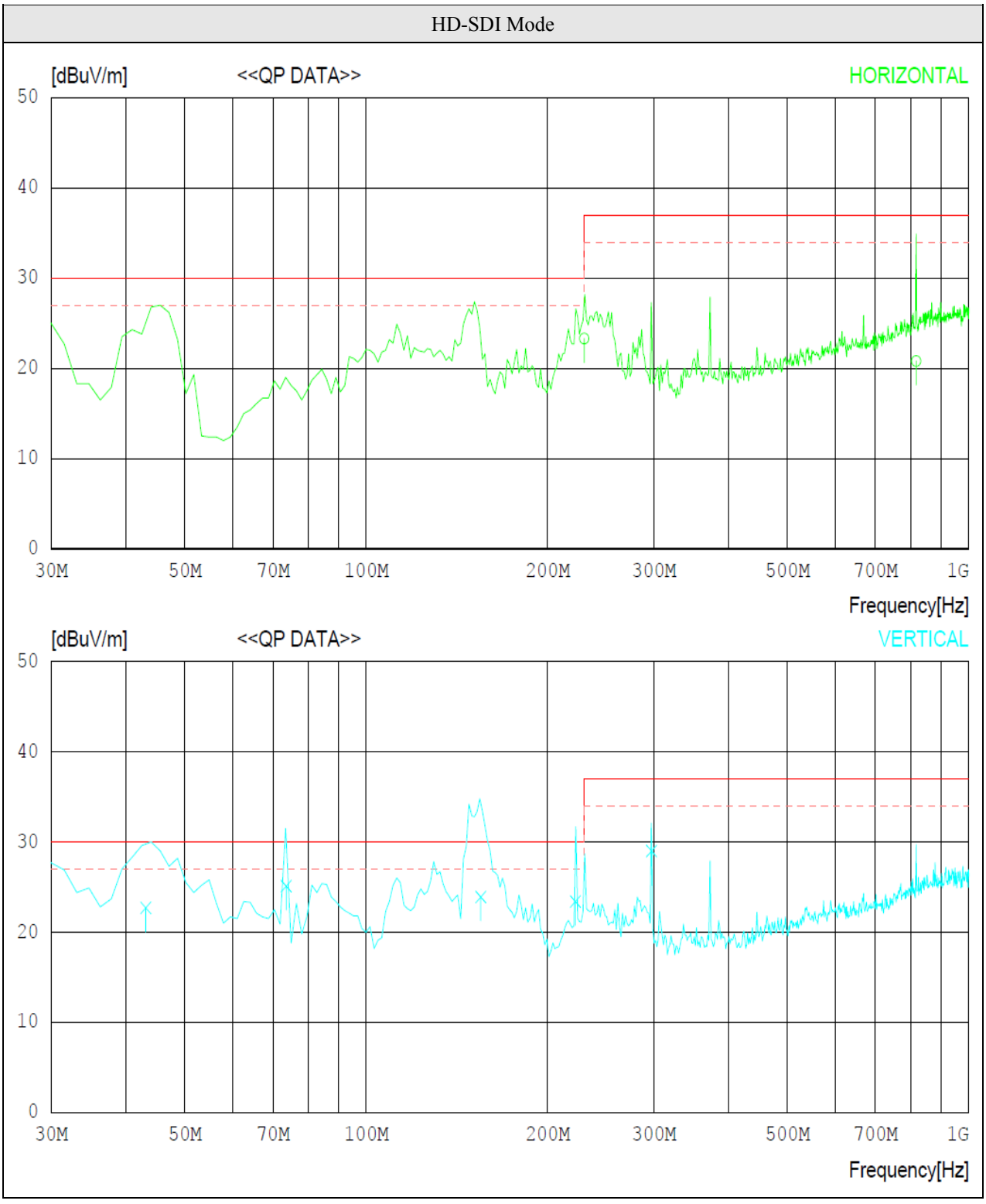


Table 6. Radiated emission Test data of HD-SDI Mode

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
--- Horizontal ------										
1	230.114	32.6	11.7	2.5	23.5	23.3	37.0	13.7	400	38
2	818.048	18.9	20.4	5.1	23.6	20.8	37.0	16.2	100	358
--- Vertical ------										
3	43.089	30.4	14.1	1.1	22.9	22.7	30.0	7.3	400	358
4	73.657	39.9	6.6	1.4	22.8	25.1	30.0	4.9	100	2
5	154.953	34.7	10.3	2.0	23.1	23.9	30.0	6.1	100	287
6	222.437	33.2	11.2	2.5	23.5	23.4	30.0	6.6	100	1
7	297.532	36.2	13.8	2.9	23.9	29.0	37.0	8.0	100	1

Figure 7. Graphical representation, 1 GHz to 6 GHz_ Peak

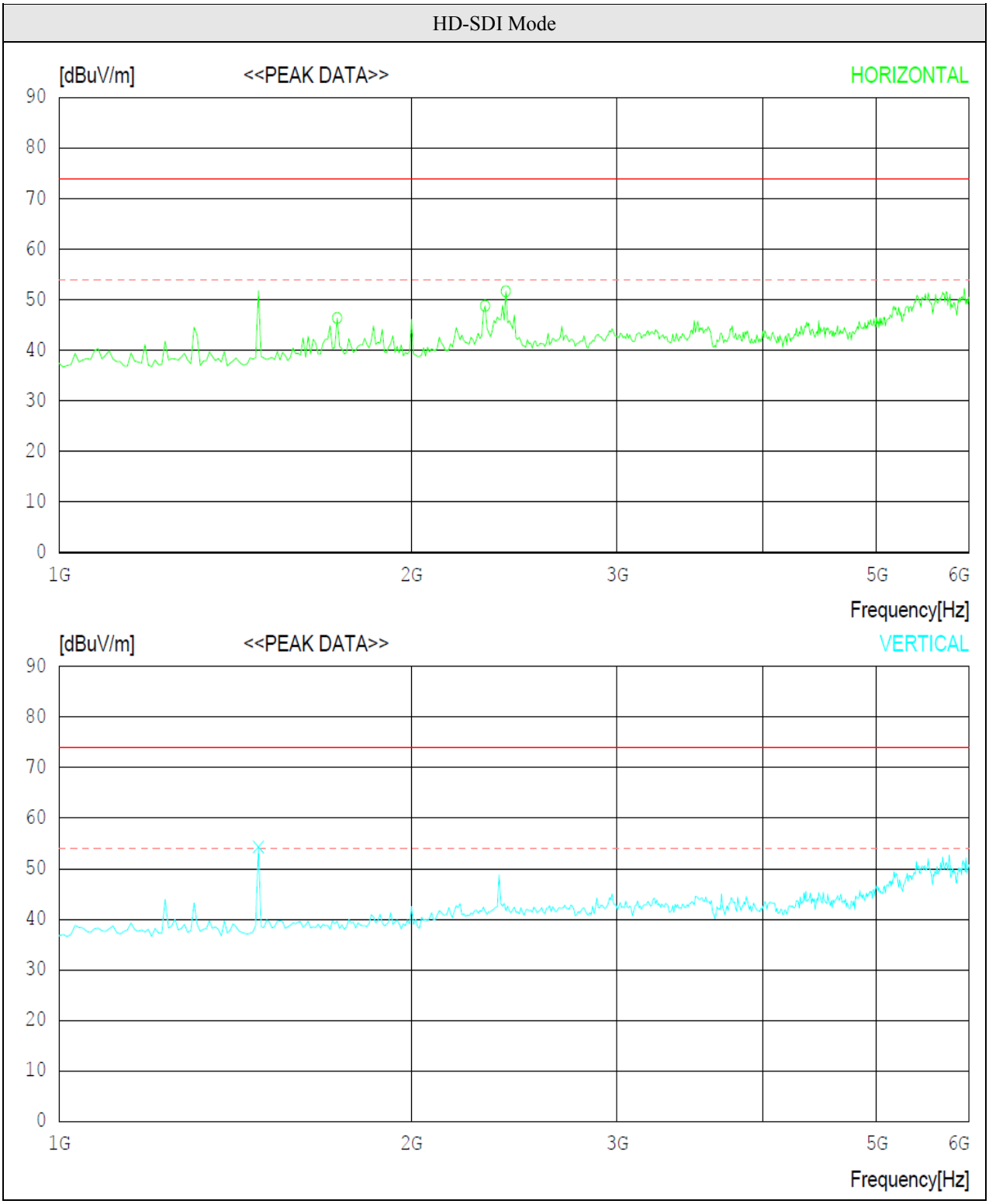


Table 7. Radiated emission Test data of HD-SDI Mode

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
--- Horizontal ------										
1	1729.166	58.7	24.7	4.9	41.9	46.4	74.0	27.6	100	244
2	2314.106	57.2	27.8	5.8	42.0	48.8	74.0	25.2	100	213
3	2410.261	60.2	27.6	5.9	42.0	51.7	74.0	22.3	100	222
--- Vertical ------										
4	1480.769	67.1	24.6	4.5	41.9	54.3	74.0	19.7	100	211

Figure 8. Graphical representation, 1 GHz to 6 GHz_ AV

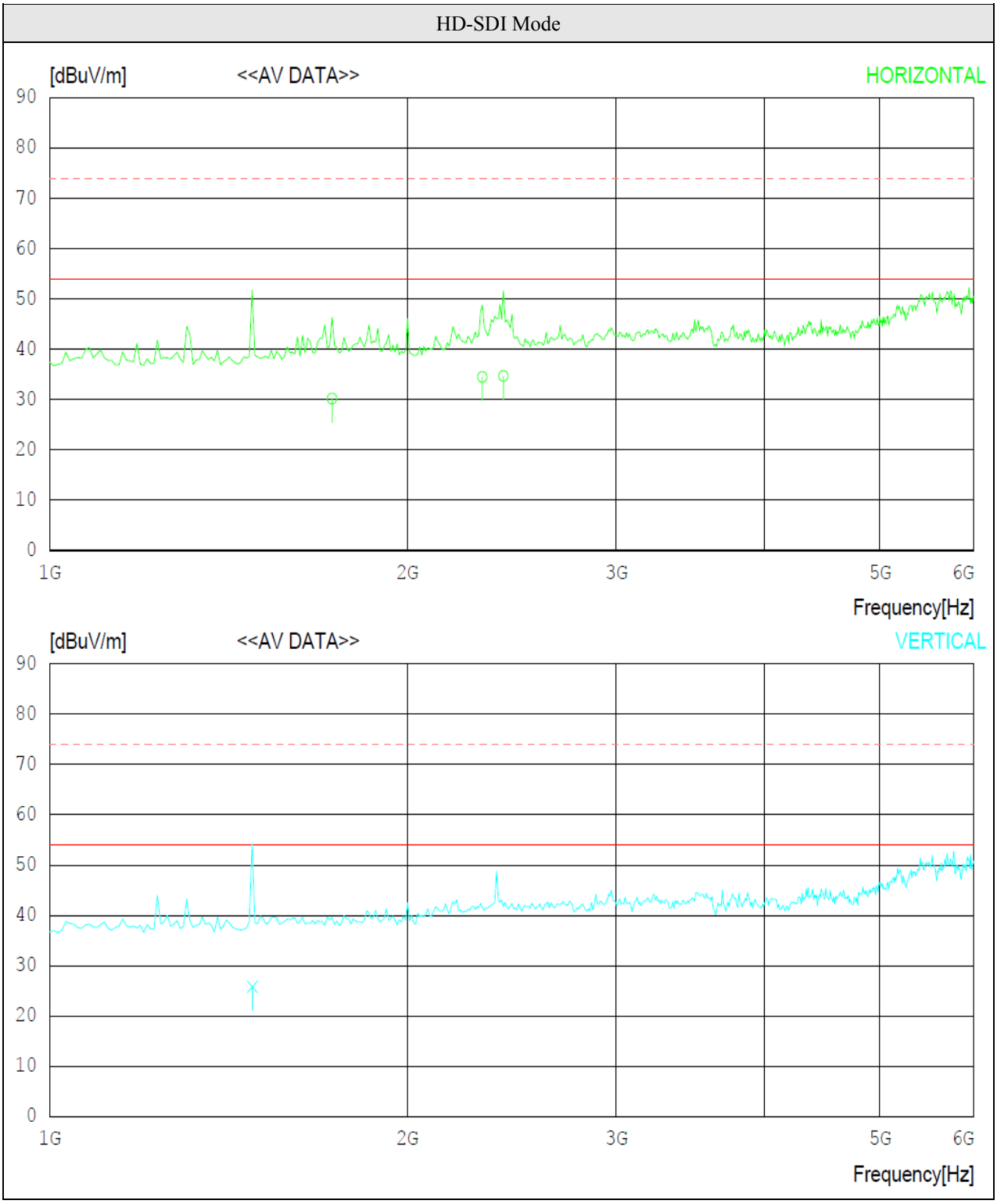


Table 8. Radiated emission Test data of HD-SDI Mode

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
--- Horizontal ------										
1	1729.240	42.5	24.7	4.9	41.9	30.2	54.0	23.8	100	244
2	2314.106	42.9	27.8	5.8	42.0	34.5	54.0	19.5	100	213
3	2410.261	43.2	27.6	5.9	42.0	34.7	54.0	19.3	100	222
--- Vertical ------										
4	1481.416	38.6	24.6	4.5	41.9	25.8	54.0	28.2	100	211