

TEST REPORT


Applicant: Bentel Sistem SRL

Address of Applicant: HEGEL STREET NO.1, 400448 Cluj-Napoca, Romania

Equipment Under Test (EUT)

Product Name: DIGITAL VIDEO RECORDER(DVR)

Model No.: NAV-T08S, NAV-T16PRO, NAV-T16S, NAV-T32PRO, NGD-8232, NGD-8832PRO, NGD-8216, NGD-8208

Trade Mark: 

Applicable standards: EN 55013:2013
EN 55020:2007 +A11:2011
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2013

Date of sample receipt: 20 Aug. 2012

Date of Test: 20 Aug.-17 Sept. 2012

Date of report issued: 19 Mar. 2015

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version


Report No.	Version No.	Date	Description
GTSE12080094701	00	17 Sept. 2012	Original
GTSE14060091201	01	05 Jun. 2014	New report*
GTSE15030028401	02	19 Mar. 2015	New report1*

Remark:

The differences between New report1* and New report* are applicant, address of applicant, model name and trade mark, there is no difference test, for the detail, please refer to section 1 and 5.

Prepared By:  **Date:** 19 Mar. 2015

Project Engineer

Reviewed By:  **Date:** 19 Mar. 2015

Reviewer

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4 Test Summary

Test Item	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission	EN 55013	EN 55013	Table 5	N/A
Conducted Emission	EN 55013	EN 55013	Table 1	Pass
Disturbance voltage at antenna terminal	EN 55013	EN 55013	Table 2	N/A
Disturbance Power	EN 55013	EN 55013	Table 4	Pass
Harmonic Emission	EN 61000-3-2	EN 61000-3-2	Class D	N/A
Flicker Emission	EN 61000-3-3	EN 61000-3-3	Clause 5	Pass
ESD	EN 55020	EN 61000-4-2:2009	Contact ± 4 kV Air ± 8 kV	Pass
Electrical Fast Transients	EN 55020	EN 61000-4-4:2012	AC ± 1.0 kV	Pass
Input Immunity	EN 55020	EN 55020	Table 6	N/A
Immunity for audio connectors, loudspeaker, headphone and power mains	EN 55020	EN 55020	Table 12, 13	Pass
RF Voltage Common mode AM modulated	EN 55020	EN 55020	Table 8	N/A
Immunity to ambient electromagnetic fields	EN 55020	EN 55020	Table 17	Pass
Screening effectiveness	EN 55020	EN 55020	Table 8a	N/A
Immunity to electromagnetic fields Keyed Carrier	EN 55020	EN 55020	Table 15	Pass

Remark:

Pass: Comply with the essential requirements in the standard.

N/A; not applicable

5 General Information

5.1 Client Information

Applicant:	Bentel Sistem SRL
Address of Applicant:	HEGEL STREET NO.1, 400448 Cluj-Napoca, Romania
Manufacturer:	SHENZHEN TVT DIGITAL TECHNOLOGY CO., LTD.
Address of Manufacturer:	6/E, North Block, CE Lighting House, Hi-Tech Park, Nanshan District, Shenzhen, P.R. China

5.2 General Description of EUT

Product Name:	DIGITAL VIDEO RECORDER(DVR)
Model No.:	NAV-T08S, NAV-T16PRO, NAV-T16S, NAV-T32PRO, NGD-8232, NGD-8832PRO, NGD-8216, NGD-8208
Power supply:	DC 12.0V, 4A (power from adapter)

5.3 Test mode and Test voltage

Test mode:	
On mode	Keep the EUT working normal
Test voltage:	
Adapter Input :AC 230V/50Hz Output :DC12.0V/4A	

5.4 Description of Support Units

Description	Manufacturer	Model	Serial Number
PC Host	Lenovo	M6900	EA05257893
KEYBOARD	DELL	SK-8115	N/A
MOUSE	DELL	N/A	N/A
USB disk	Sony	2GB	N/A
DVD Player	Pioneer	DV-420V-K	090502-11
Printer	Canon	IP1600	GTS222
LCD TV	PHILIPS	19PFL3120/T3	AU1A1212002906

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Visual:	Monitor the display& indicator light of the EUT
Audio:	Monitor the sound of the EUT

5.8 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

- **Industry Canada (IC) —Registration No.: 9079A-1**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.9 Test Location

S2a, S3 and S5 tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab, No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.
All other tests were performed at:
Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480; Fax: 0755-27798960

6 Test Instruments List

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Sep. 08 2011	Sep. 07 2013
2	EMI Test Receiver	R&S	ESCS30	GTS223	Jul. 07 2012	Jul. 06 2013
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	Jul. 07 2012	Jul. 06 2013
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 07 2012	Jul. 06 2013
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	Jul. 07 2012	Jul. 06 2013
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 07 2012	Jul. 06 2013
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	Jul. 27 2012	Jul. 26 2013

Disturbance Power:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Sep. 08 2011	Sep. 07 2013
2	EMI Test Receiver	R&S	ESCS30	GTS223	Jul. 07 2012	Jul. 06 2013
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 07 2012	Jul. 06 2013
4	Absorbing clamp	Liithi	MDS-21	GTS229	Jul. 07 2012	Jul. 06 2013
5	Coaxial Cable	GTS	N/A	GTS228	Jul. 07 2012	Jul. 06 2013
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	Jul. 27 2012	Jul. 26 2013

Flicker:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date
1	Power Analyzer	EMTEST	DPA500	GTS235	Sep. 11 2012	Sep. 10 2013
2	AC Power Source	EMTEST	ACS500	GTS236	Sep. 11 2012	Sep. 10 2013
3	Test software	EMTEST	ACS	N/A	N/A	N/A
4	Thermo meter	KTJ	TA328	GTS256	Jul. 06 2012	Jul. 05 2013

Electrostatic discharge:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date
1	ESD Simulator	EMPEK	ESD-2030A	GTS242	Jul. 07 2012	Jul. 06 2013
2	Thermo meter	KTJ	TA328	GTS243	Jul. 06 2012	Jul. 05 2013

Electrical fast transients:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date
1	EMTEST system	EMTEST	UCS500N	GTS239	Jul. 07 2012	Jul. 06 2013
2	Thermo meter	KTJ	TA328	GTS238	Jul. 27 2012	Jul. 26 2013

TS9980 test system:						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date	Cal.Due date
SEL0166	Shielding Room	ChangZhou ZhongYu	JB88	N/A	N/A	N/A
SEL0143	Signal Generator 9 KHz ~ 2.2GHz	Rohde & Schwarz	SML02	101112	Oct. 21 2012	Oct. 20 2013
SEL0135	Signal Generator 9 KHz ~ 1.1GHz	Rohde & Schwarz	SML01	102281	Oct. 21 2012	Oct. 20 2013
SEL0144	Power Meter	Rohde & Schwarz	NRVS	100839	Oct. 21 2012	Oct. 20 2013
SEL0137	RF Level Meter	Rohde & Schwarz	URV35	100193	Oct. 21 2012	Oct. 20 2013
SEL0145	RF Probe	Rohde & Schwarz	URV5-Z7	100287	Sept. 21 2012	Sept. 20 2013
SEL0136	Audio Analyzer	Rohde & Schwarz	UPL	100855	Oct. 21 2012	Oct. 20 2013
SEL0157	RF-Amplifier 150KHz ~150MHz	BONN Elektronik	BSA1515-25	035527-02	Mar. 18 2012	Mar. 17 2013
SEL0167	Stripline Test Cell	Erika Fiedler	VDE0872	N/A	N/A	N/A
SEL0159	TV Test Transmitter	Rohde & Schwarz	SFM	100117	May 16 2012	May 15 2013
SEL0138	TV Generator Pal	Rohde & Schwarz	SGPF	100103	Nov. 10 2012	Nov.09 2013
SEL0140	TV Generator Ntsc	Rohde & Schwarz	SGMF	100025	Oct. 23 2012	Oct. 22 2013
SEL0139	TV Generator Secam	Rohde & Schwarz	SGSF	100033	Oct. 23 2012	Oct. 22 2013
SEL0142	TV-Test Transmitter 0.3MHz ~ 3300MHz	Rohde & Schwarz	SFQ	100353	Oct. 23 2012	Oct. 22 2013
SEL0141	MPEG2 Measurement Generator	Rohde & Schwarz	DVG	100223	Oct. 23 2012	Oct. 22 2013
SEL0146	Matching Pad	Rohde & Schwarz	RAM	100394	N/A	N/A
SEL0148	Matching Pad	Rohde & Schwarz	RAM	100395	N/A	N/A
SEL0158	Absorbing Clamp	Rohde & Schwarz	MDS21	100137	May 16 2012	May 15 2013
SEL0149	Coupling Set /	Erika Fiedler	RCo, RCi, MC, AC, LC	N/A	N/A	N/A
SEL0150	Filters	Erika Fiedler	Sr, LBS	N/A	N/A	N/A
SEL0151	Matching Network	Erika Fiedler	MN, T1	N/A	N/A	N/A

General used equipment:						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date	Cal.Due date
1	Barometer	ChangChun	DYM3	GTS257	July 10 2012	July 09 2013

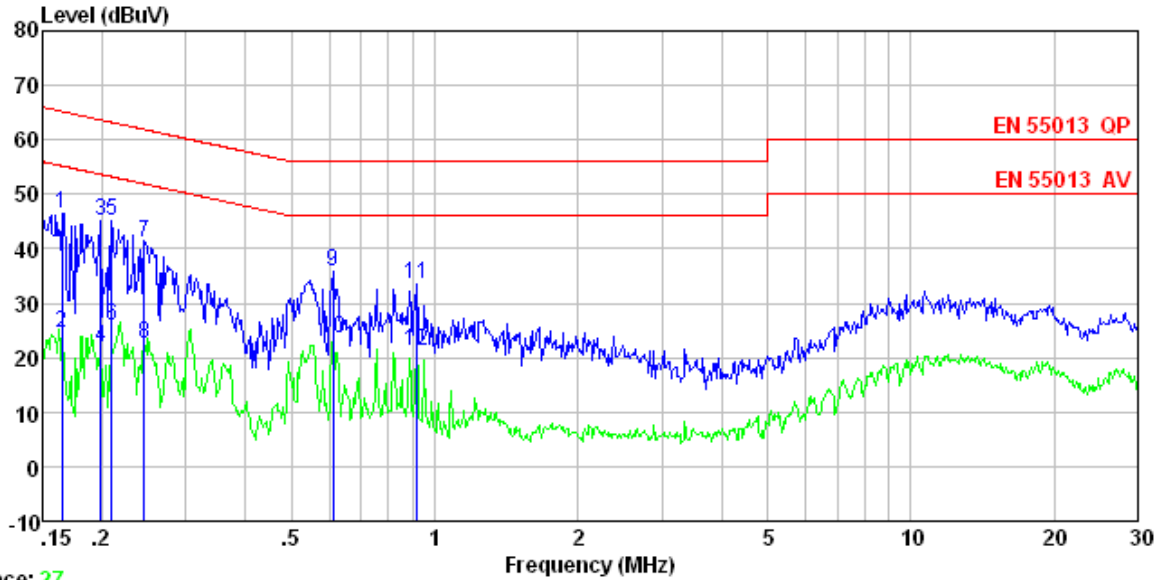
7 Emission Test Results

7.1 Conducted Emissions

Test Requirement:	EN 55013														
Test Method:	EN 55013														
Test Frequency Range:	150kHz to 30MHz														
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBμV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	Frequency range (MHz)	Limit (dB μ V)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dB μ V)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test setup:	<p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55022 Class B on conducted measurement. 														
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar														
Measurement Record:	Uncertainty: \pm 3.45dB														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

Measurement Data

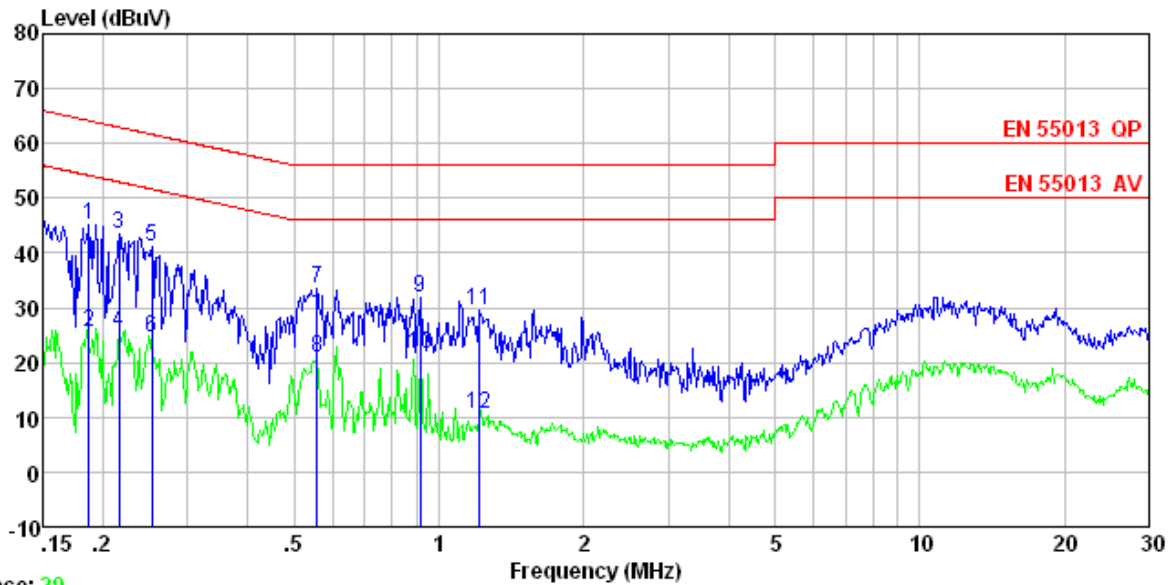
Test mode:	On mode	Phase Polarity:	Line
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Trace: 27
 Condition : EN 55013 QP LISN-2012 LINE
 Job No. : 947IT
 Test Mode : on mode
 Test Engineer: Edward

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.165	46.75	-0.26	0.10	46.59	65.21	-18.62	QP
2	0.165	24.57	-0.26	0.10	24.41	55.21	-30.80	Average
3	0.199	45.35	-0.23	0.10	45.22	63.67	-18.45	QP
4	0.199	22.07	-0.23	0.10	21.94	53.67	-31.73	Average
5	0.209	45.27	-0.23	0.10	45.14	63.23	-18.09	QP
6	0.209	25.93	-0.23	0.10	25.80	53.23	-27.43	Average
7	0.246	41.12	-0.23	0.10	40.99	61.91	-20.92	QP
8	0.246	22.62	-0.23	0.10	22.49	51.91	-29.42	Average
9	0.611	36.03	-0.20	0.10	35.93	56.00	-20.07	QP
10	0.611	23.50	-0.20	0.10	23.40	46.00	-22.60	Average
11	0.914	33.65	-0.21	0.10	33.54	56.00	-22.46	QP
12	0.914	21.44	-0.21	0.10	21.33	46.00	-24.67	Average

Test mode:	On mode	Phase Polarity:	Neutral
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Trace: 29

Condition : EN 55013 QP LISN-2012 NEUTRAL
 Job No. : 947IT
 Test Mode : on mode
 Test Engineer: Edward

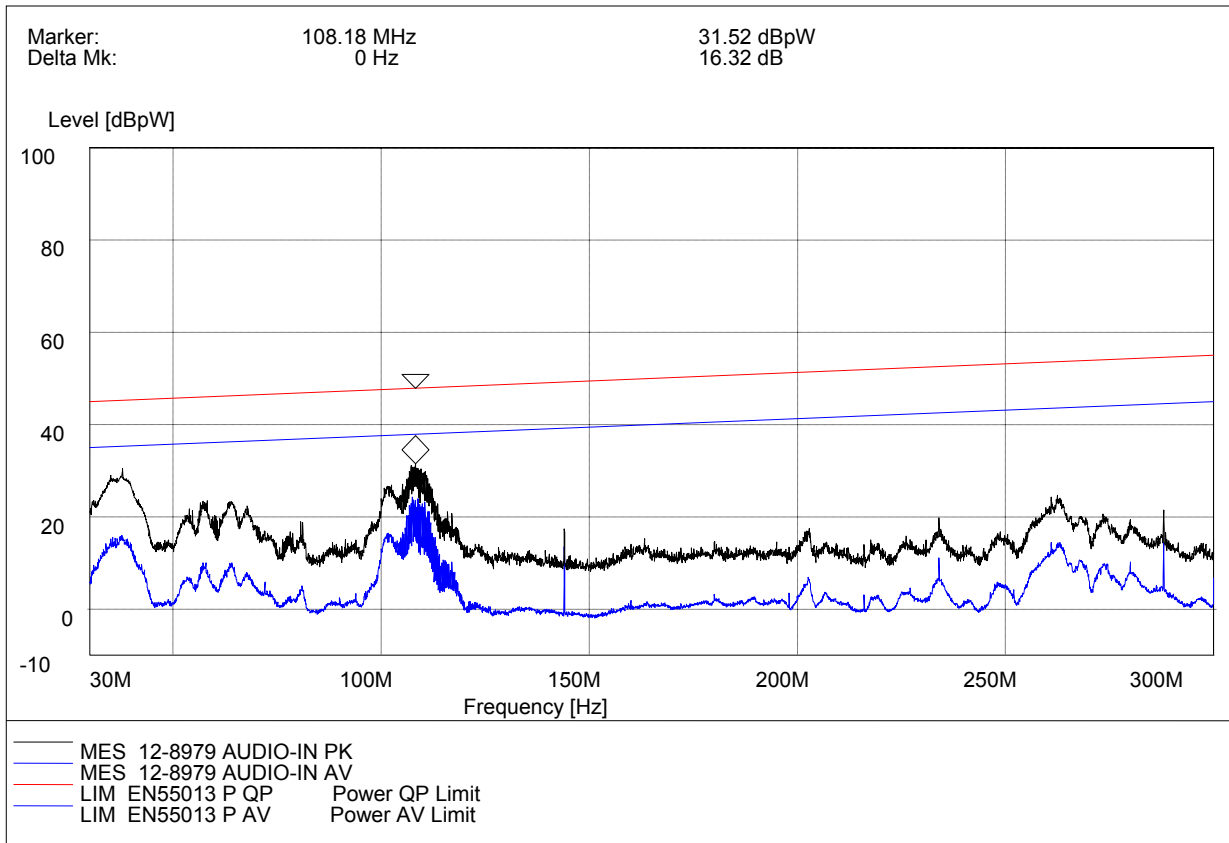
	Read Freq	Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.187	45.05	-0.09	0.10	45.06	64.15	-19.09	QP
2	0.187	25.50	-0.09	0.10	25.51	54.15	-28.64	Average
3	0.216	43.41	-0.09	0.10	43.42	62.96	-19.54	QP
4	0.216	25.39	-0.09	0.10	25.40	52.96	-27.56	Average
5	0.253	41.09	-0.09	0.10	41.10	61.64	-20.54	QP
6	0.253	24.64	-0.09	0.10	24.65	51.64	-26.99	Average
7	0.558	33.38	-0.08	0.10	33.40	56.00	-22.60	QP
8	0.558	20.80	-0.08	0.10	20.82	46.00	-25.18	Average
9	0.914	31.87	-0.09	0.10	31.88	56.00	-24.12	QP
10	0.914	21.44	-0.09	0.10	21.45	46.00	-24.55	Average
11	1.216	29.51	-0.09	0.10	29.52	56.00	-26.48	QP
12	1.216	10.69	-0.09	0.10	10.70	46.00	-35.30	Average

7.2 Disturbance Power

Test Requirement:	EN 55013		
Test Method:	EN 55013		
Test Frequency Range:	30MHz to 300MHz		
Limit:	Frequency range (MHz)		Limit (dB μ V)
			Quasi-peak Average
	30 to 300		45 to 55 ^a 35 to 45 ^a
^a Increasing linearly with the frequency.			
Test setup:			
Test environment:	Temp.: 25 °C	Humid.: 50%	Press.: 1 012mbar
Measurement Record:	Uncertainty: \pm 3.68dB		
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement Data

Test mode:	On mode	Test Line:	AUDIO-IN line
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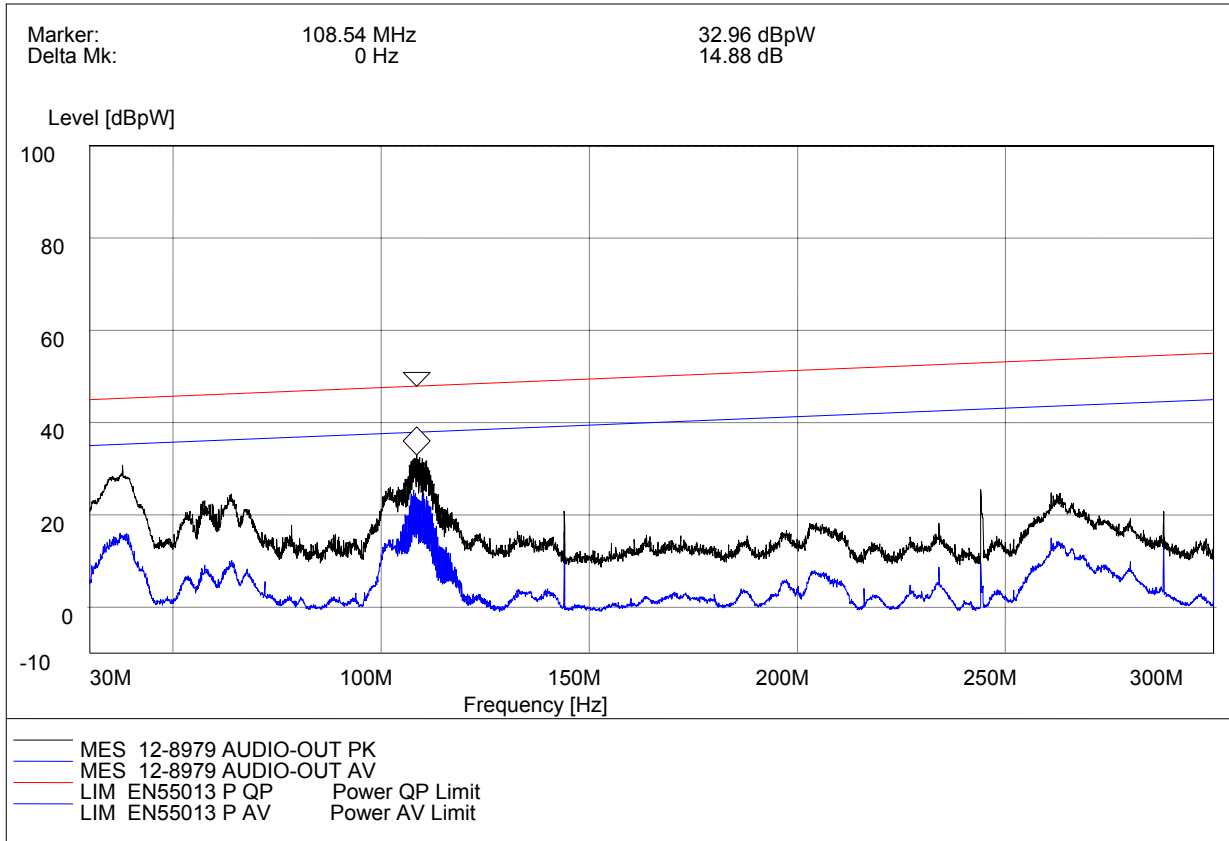


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 18:52

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	26.50	45.30	13.20	35.30
108.180000	28.20	47.90	21.00	37.90

Test mode:	On mode	Test Line:	AUDIO-OUT Line
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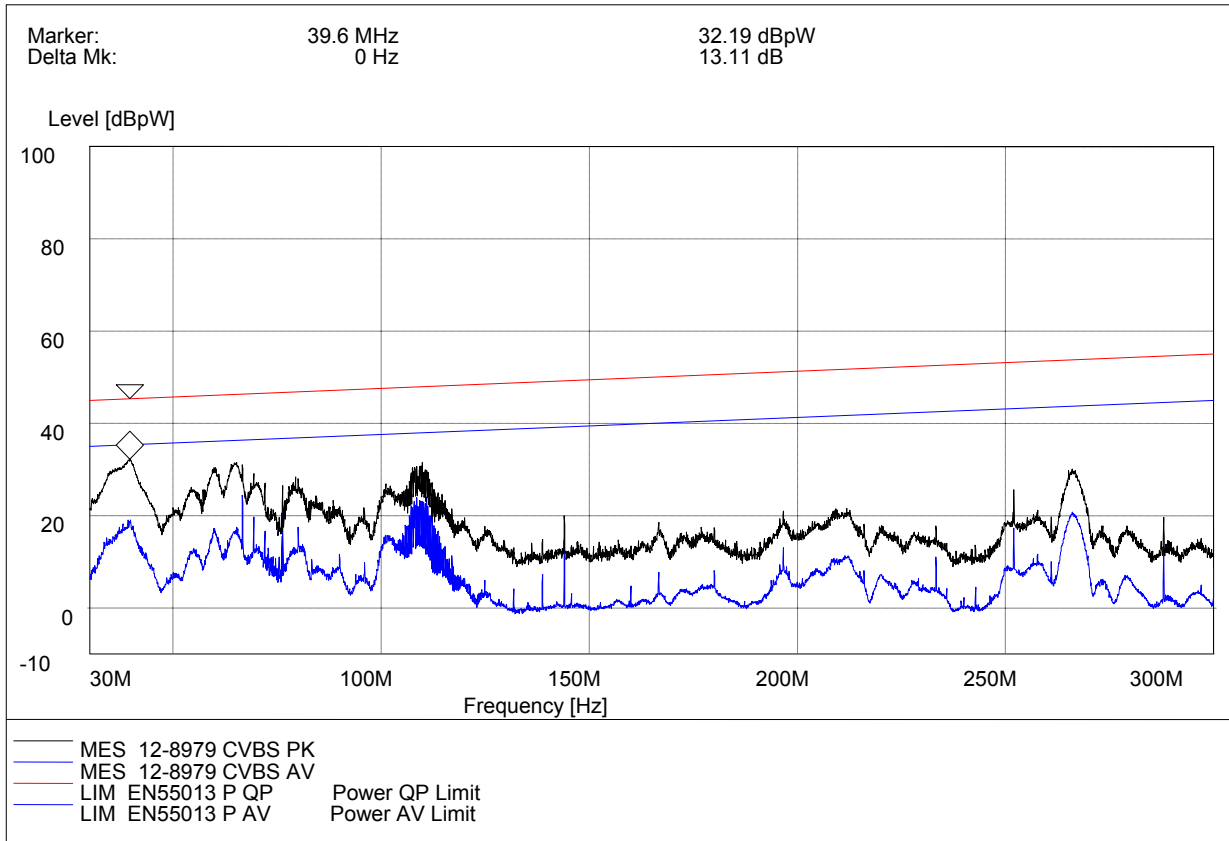


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 18:46

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	26.10	45.30	13.50	35.30
108.540000	29.60	47.90	22.80	37.90

Test mode:	On mode	Test Line:	CVBS Line
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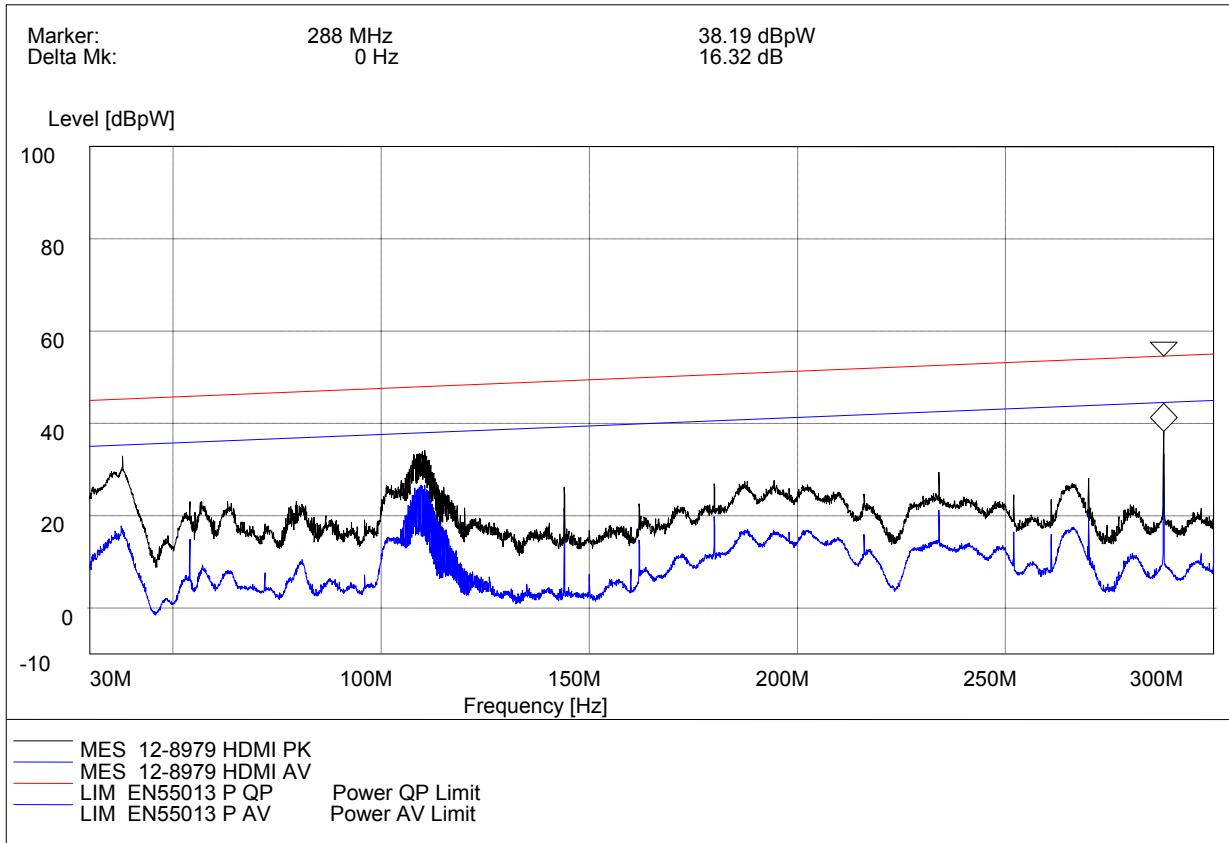


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 18:09

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
39.600000	28.90	45.40	18.30	35.40
66.660000	26.80	46.40	22.60	36.40
109.860000	28.40	48.00	20.10	38.00

Test mode:	On mode	Test Line:	HDMI Line
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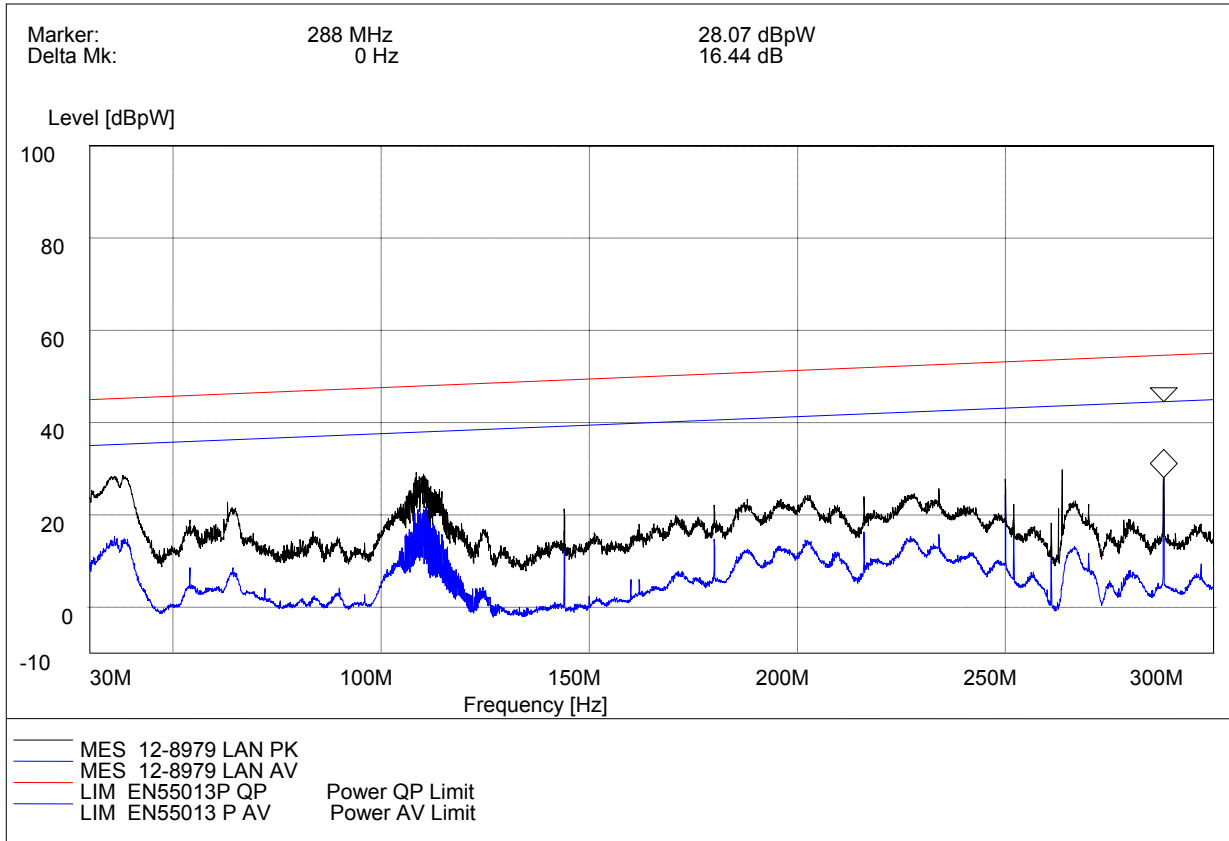


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 19:00

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	28.70	45.30	16.90	35.30
110.520000	30.40	48.00	23.00	38.00
288.000000	35.90	54.60	31.40	44.60

Test mode:	On mode	Test Line:	LAN Line
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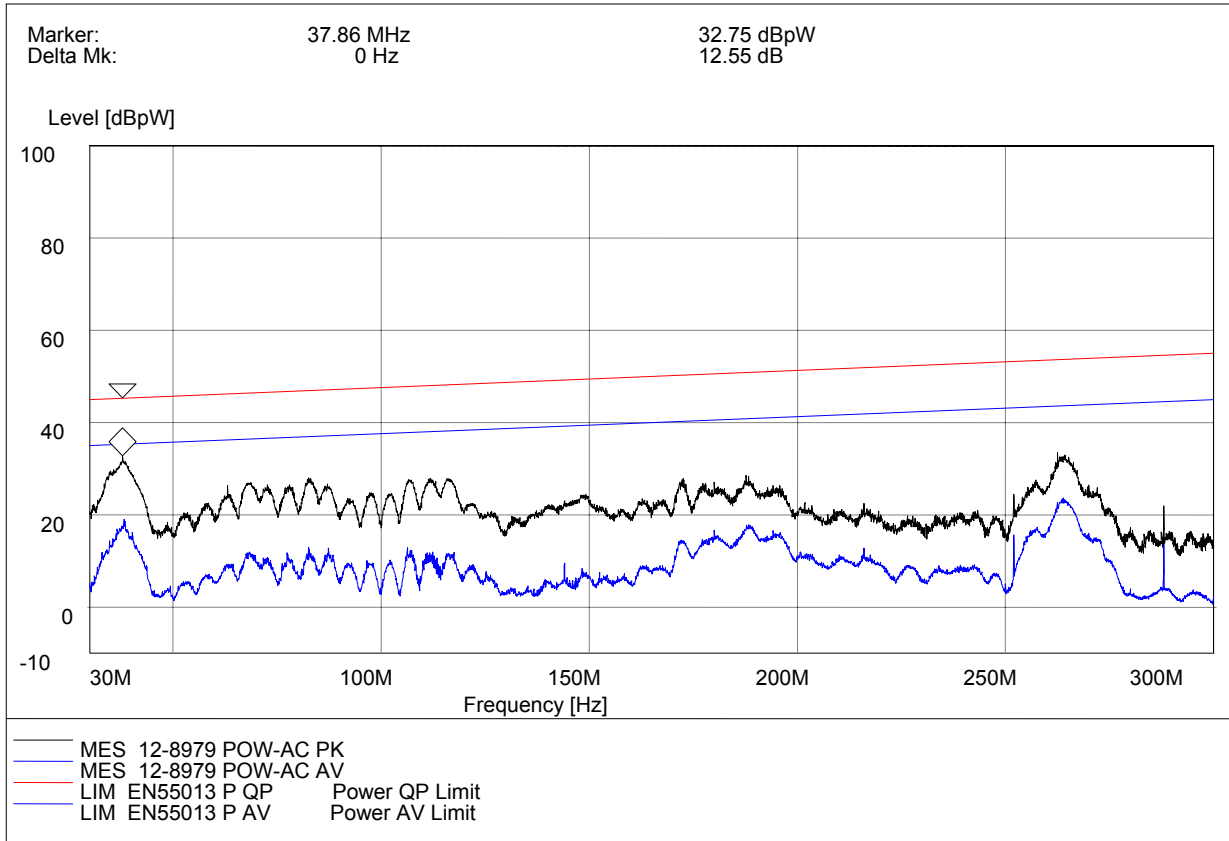


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-19 8:25

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.800000	26.90	45.30	15.10	35.30
108.420000	25.20	47.90	17.60	37.90
288.000000	30.30	54.60	26.50	44.60

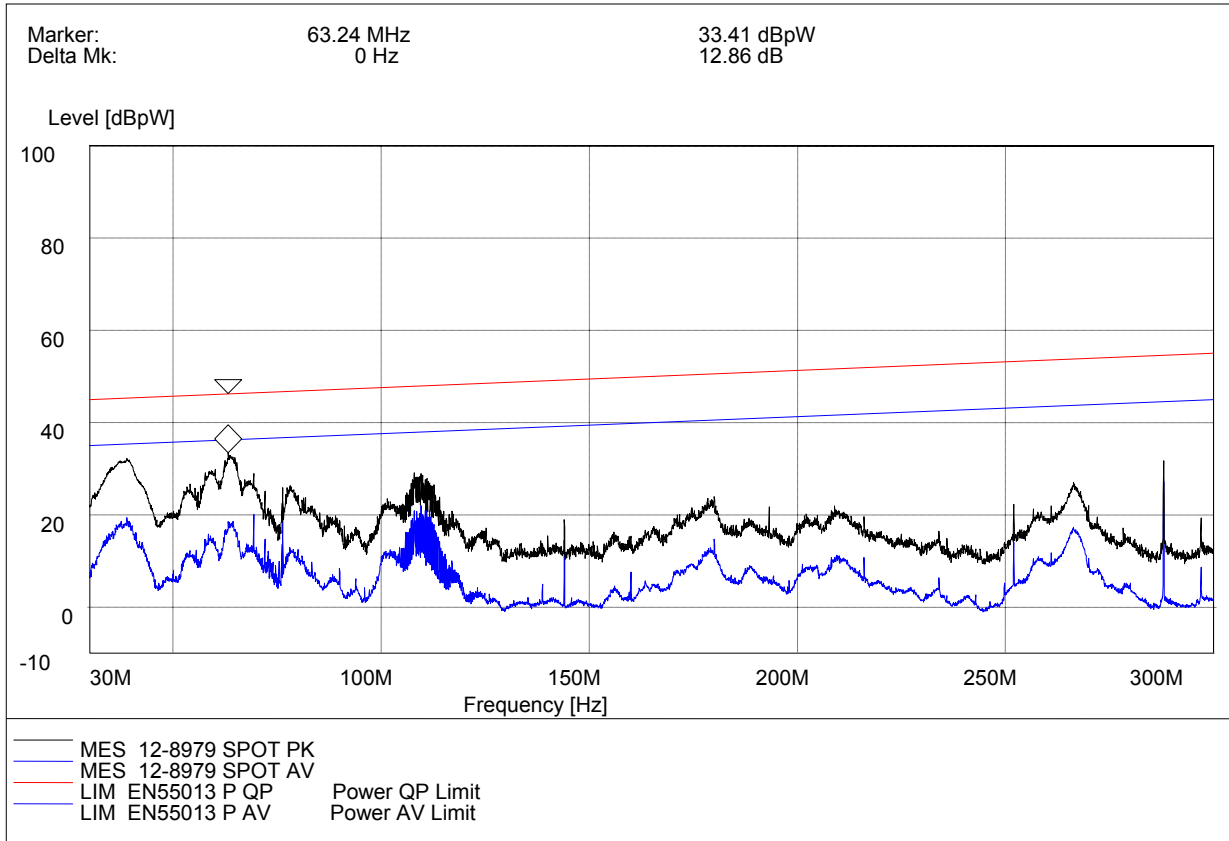
Test mode:	On mode	Test Line:	POW-AC Line
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MEASUREMENT RESULT: " EN55013 Power QP-AV"

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	27.50	45.30	16.30	35.30
82.620000	24.70	46.90	11.20	36.90
262.540000	28.10	53.60	21.50	43.60

Test mode:	On mode	Test Line:	SPOT Line
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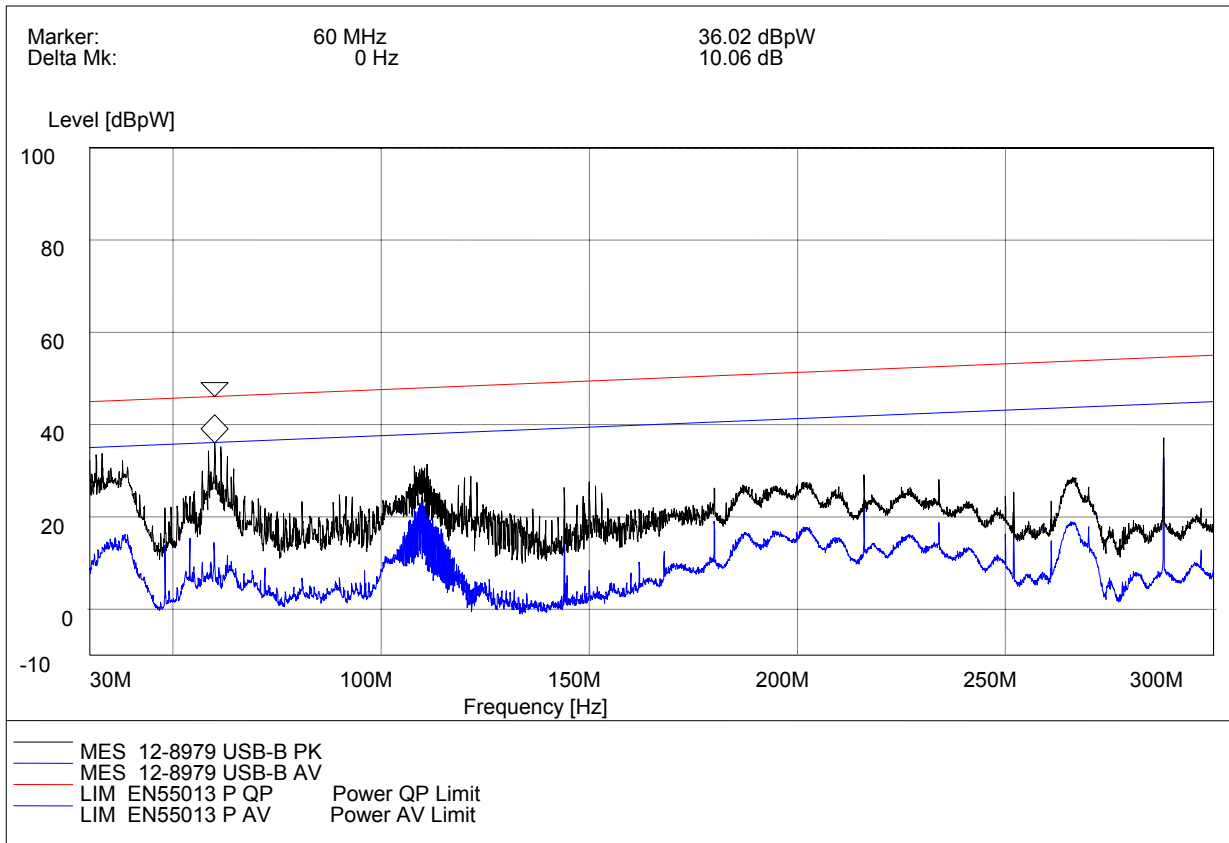


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 18:37

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
38.880000	28.20	45.30	17.80	35.30
63.240000	27.60	46.20	17.30	36.20
288.000000	29.70	54.60	26.00	44.60

Test mode:	On mode	Test Line:	USB-B Line
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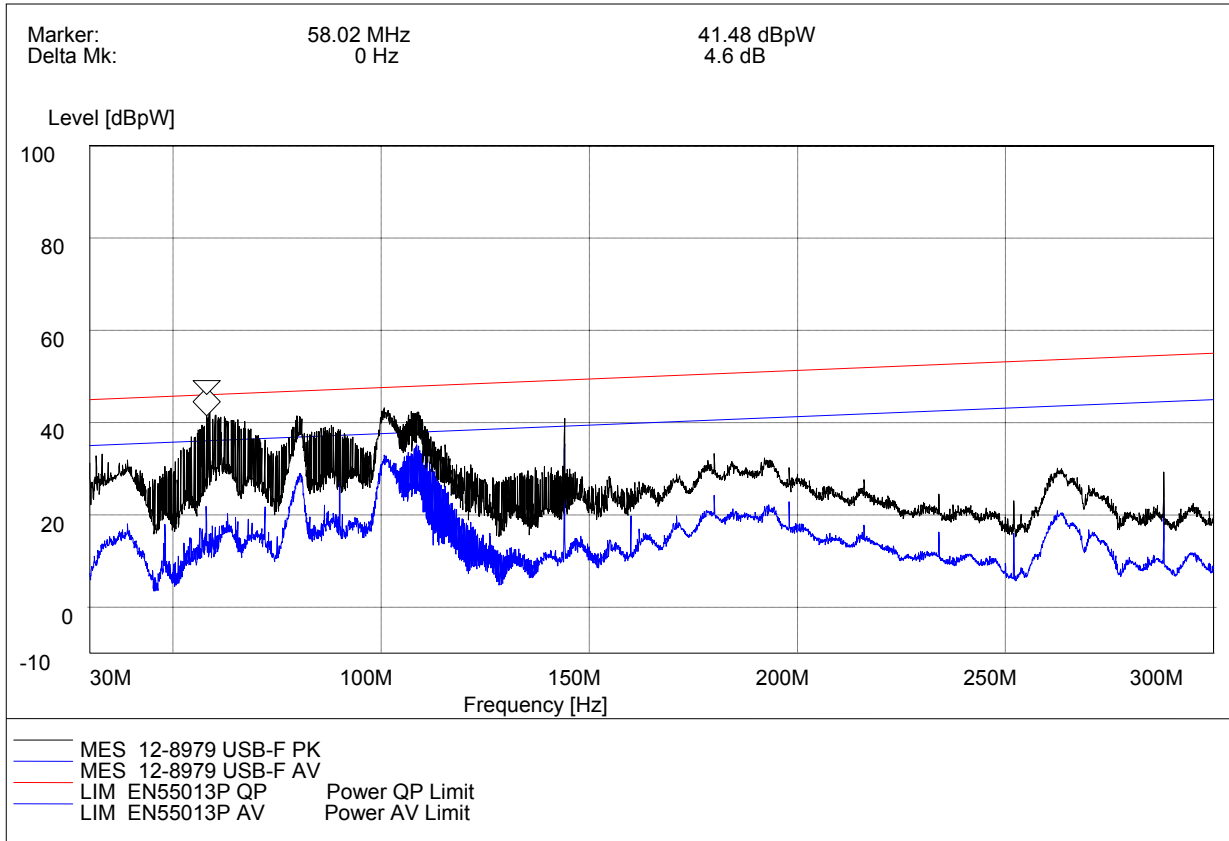


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-19 8:32

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
33.000000	28.20	45.10	11.50	35.10
60.000000	33.10	46.10	10.00	36.10
288.000000	33.60	54.60	30.50	44.60

Test mode:	On mode	Test Line:	USB-F Line
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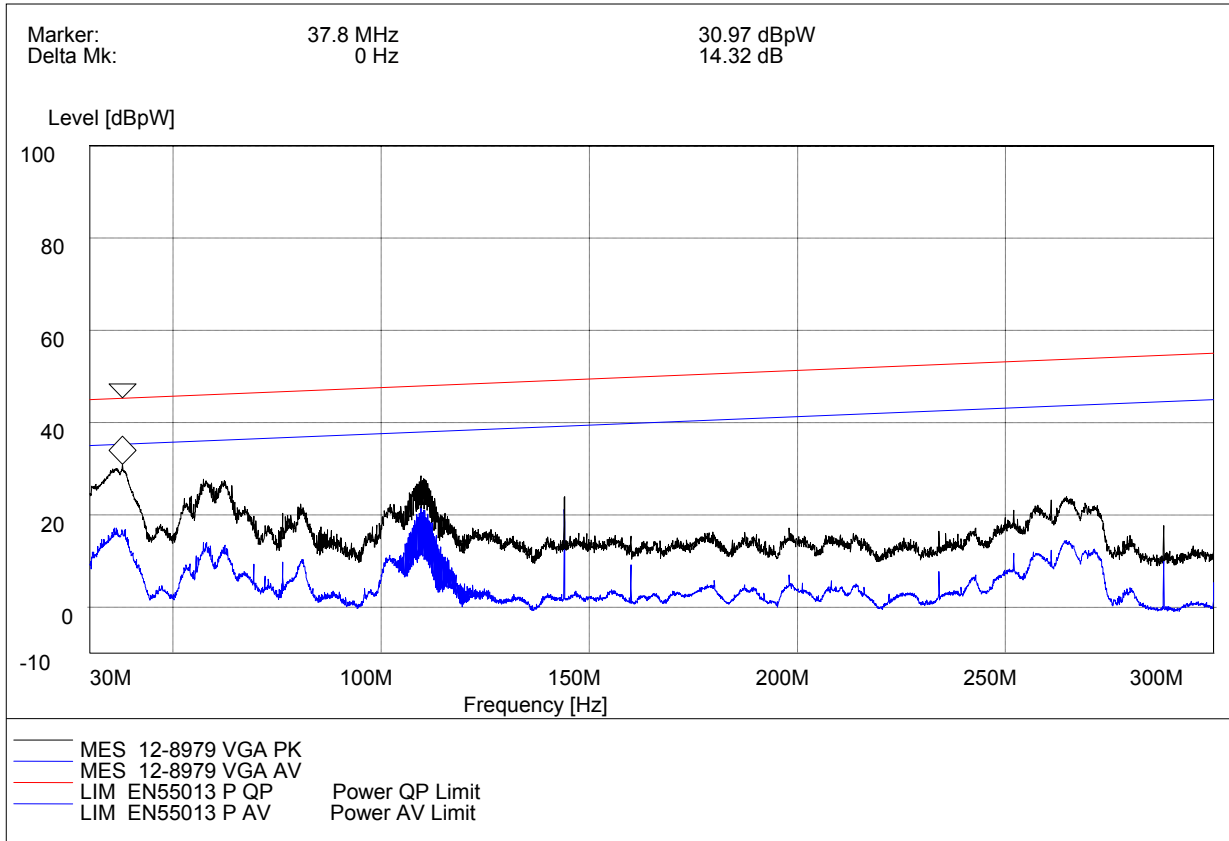


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-19 8:44

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
58.800000	36.70	46.10	12.90	36.10
100.720000	35.40	47.60	26.50	37.60
108.580000	37.50	47.90	32.50	37.90
144.040000	35.30	49.20	33.20	39.20

Test mode:	On mode	Test Line:	VGA Line
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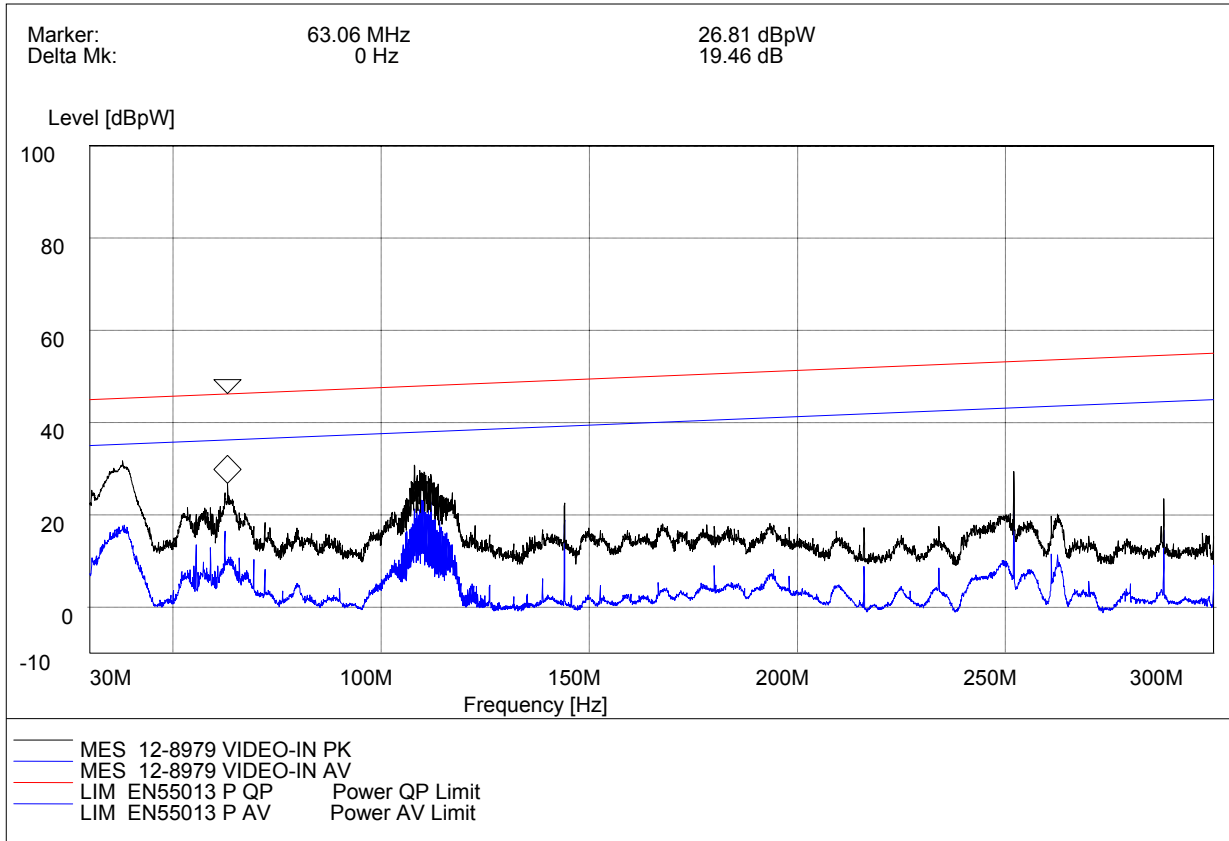


MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-18 19:00

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	27.90	45.30	15.30	35.30
57.240000	25.70	46.00	12.60	36.00
109.500000	24.40	47.90	17.80	37.90

Test mode:	On mode	Test Line:	VIDEO-IN Line
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MEASUREMENT RESULT: " EN55013 Power QP-AV"

2012-12-19 8:58

Frequency MHz	Level dBpW	Limit-QP dBpW	Level dBpW	Limit-AV dBpW
37.860000	27.20	45.30	16.90	35.30
110.320000	25.90	48.00	21.50	38.00
252.040000	26.30	53.20	20.30	43.20

7.3 Harmonics Test Results

Test Requirement:	EN 61000-3-2
Test Method:	N/A: See Remark Below
Remark	<p>There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.</p> <p>For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states:</p> <p>“For the following categories of equipment limits are not specified in this edition of the standard. Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”</p>

7.4 Flicker Test Result

Test Requirement:	EN 61000-3-3
Test Method:	EN 61000-3-3
Class/Severity:	Clause 5 of EN 61000-3-3
Measurement Time:	10 min
Detector:	As per EN 61000-3-3
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Test Item	EUT values	Limit	Result
Pst	0.027	1.00	Pass
dc [%]	0.006	3.30	Pass
dmax [%]	0.079	4.00	Pass
dt [s]	0.007	0.50	Pass

8 Immunity Test Results

8.1 Performance Criteria Description in Clause 7 of EN 55020

Criterion A:	<p>The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test.</p> <p>The equipment is supposed to operated as intended if the criteria of Evaluation of audio quality and picture quality are fulfilled.</p>
Criterion B:	<p>The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which casue temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the test. During the test, degradation of performance is allowed.</p>

8.2 Electrostatic Discharge

Test Requirement:	EN 55020
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: ±4kV Air Discharge: ±2kV, ±4kV, ±8kV HCP/VCP: ±4kV
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	<p>1. Air discharge: The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed</p> <p>2. Contact Discharge: The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.</p> <p>3. Indirect discharge for horizontal coupling plane At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. Consideration should be given to exposing all sides of the EUT.</p> <p>4. Indirect discharge for vertical coupling plane At least 10 single discharges were applied to the center of one vertical</p>

	edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test mode:	Refer to section 6 for details
Test Instruments:	Refer to section 5.3 for details
Test results:	Pass

Measurement Record:

Test points:	I: Audio in port, audio out port, HDMI port, USB port			
	II: All plastic seams, buttons, indicator light			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 4	Contact	I	A	Pass
± 2, ± 4, ± 8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observation Performance	Result
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

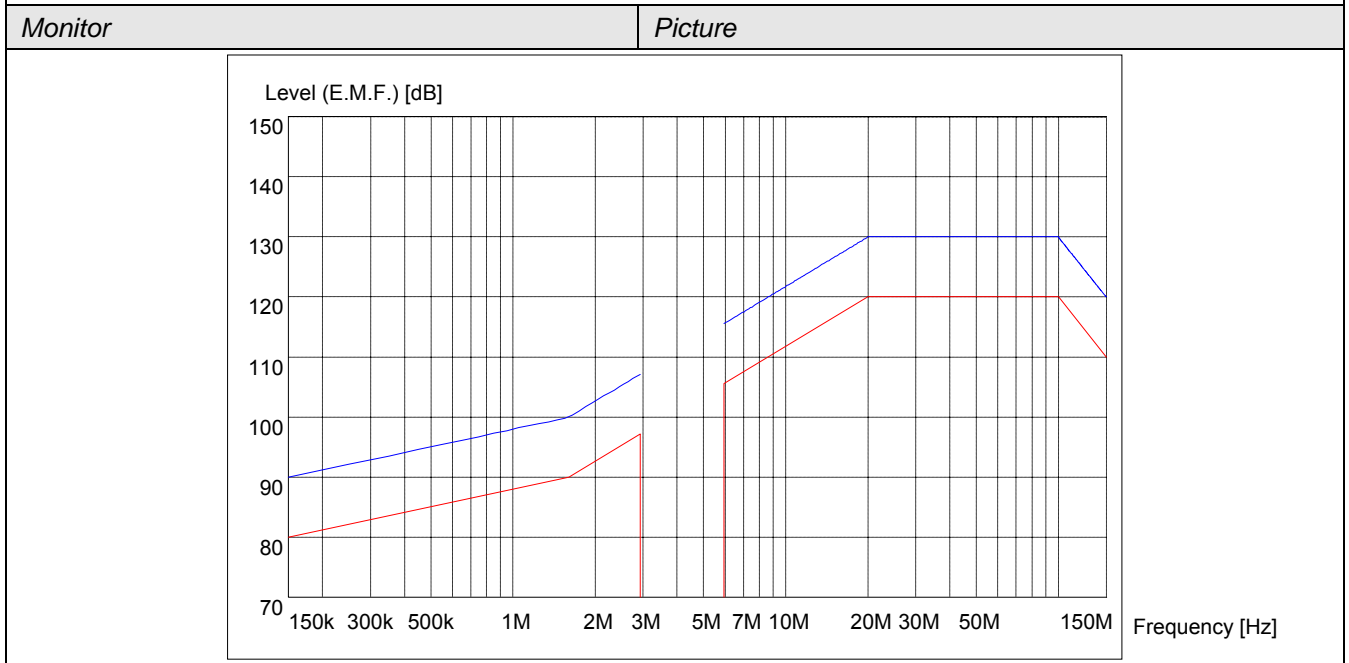
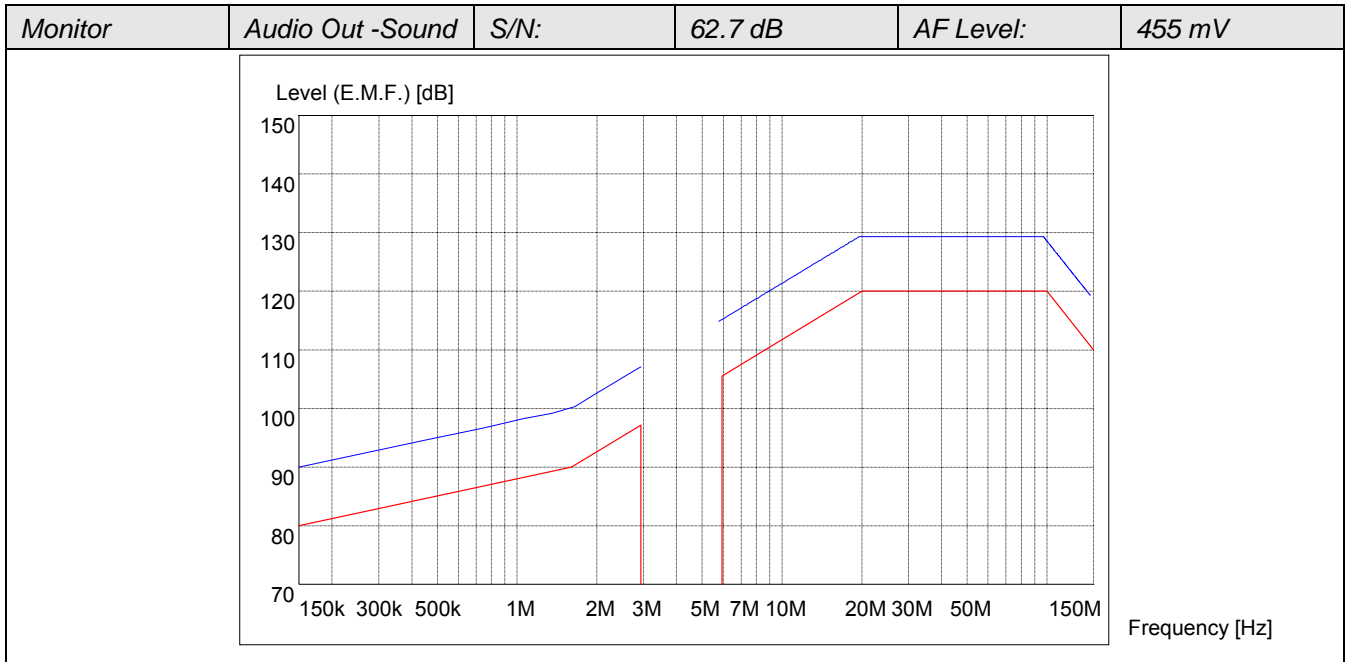
Remark:

A: No degradation in performance of the EUT was observed.

	Rs rated source impedance of the audio input (1 k Ω in the case of video tape equipment).
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

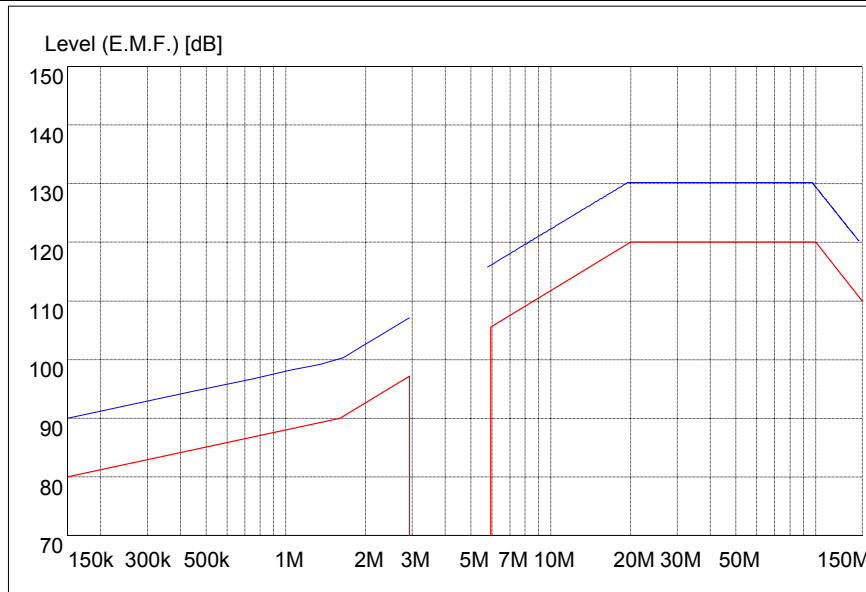
Measurement Data:

Test mode:	AV	Test channel:	- (0.00 MHz)	Country:	- (IF 38.90 MHz)
Interf. Signal	Audio In,				

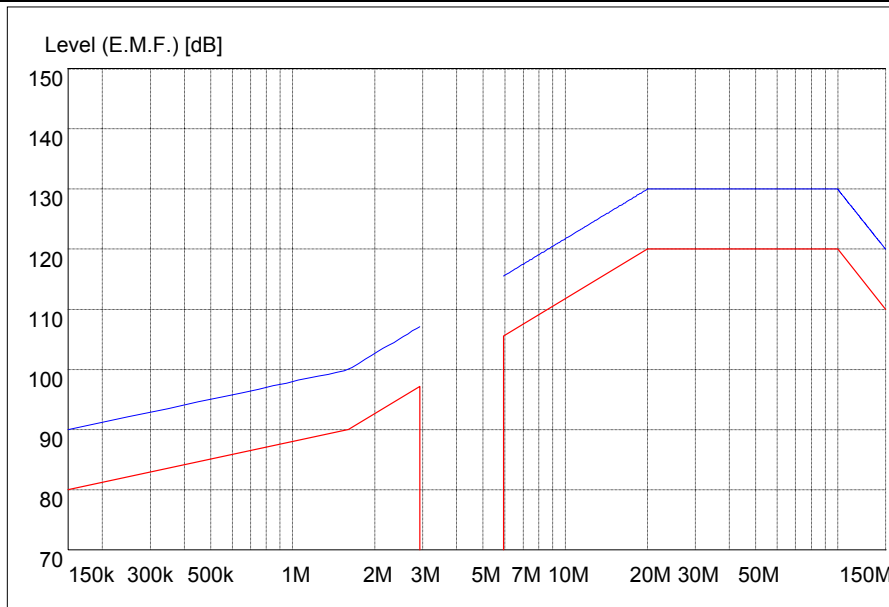


Test mode:	AV	Test channel:	- (0.00 MHz)	Country:	- (IF 38.90 MHz)
Interf. Signal	Audio Out,				

Monitor	Audio Out- Sound	S/N:	58.8 dB	AF Level:	455 mV
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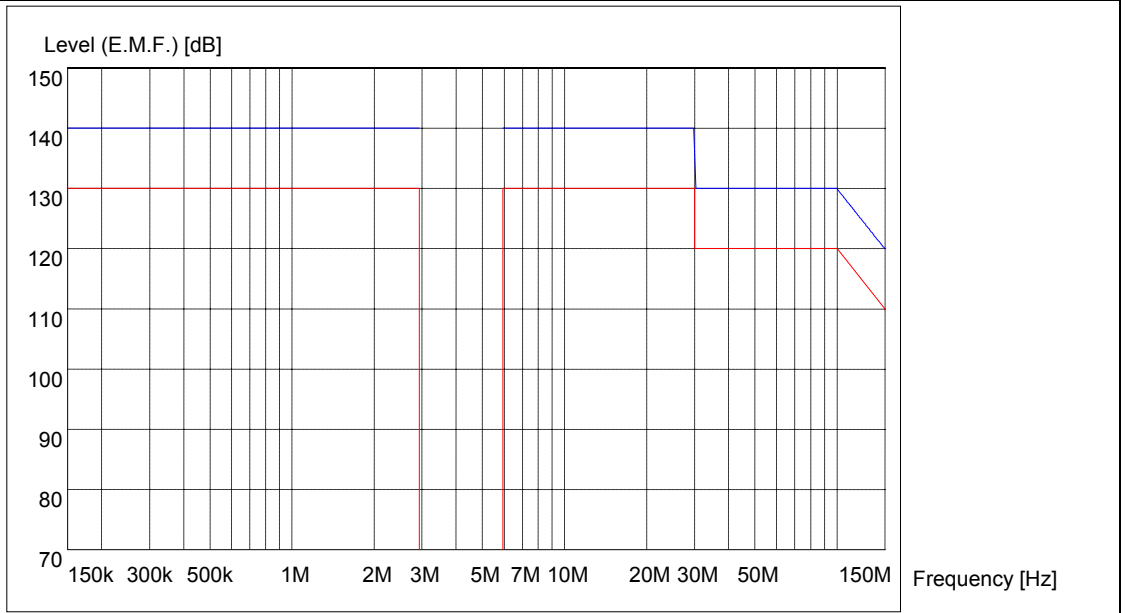


Monitor	Picture
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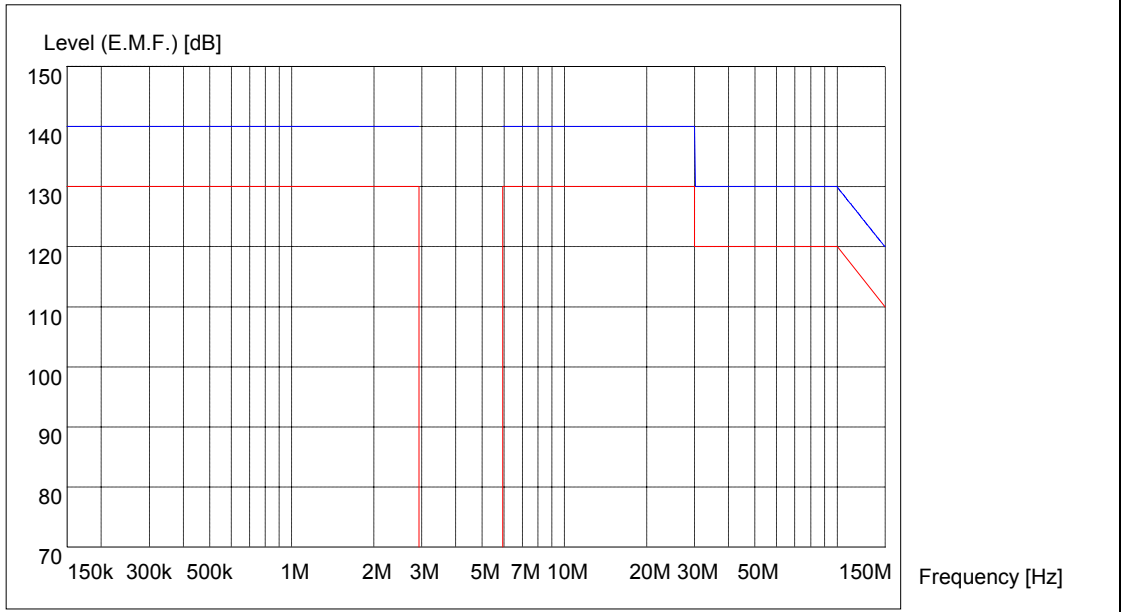


Test mode:	AV	Test channel:	- (0.00 MHz)	Country:	- (IF 38.90 MHz)
Interf. Signal	Mains,				

Monitor	Audio Out- Sound	S/N:	59.8 dB	AF Level:	455 mV
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Monitor	Picture
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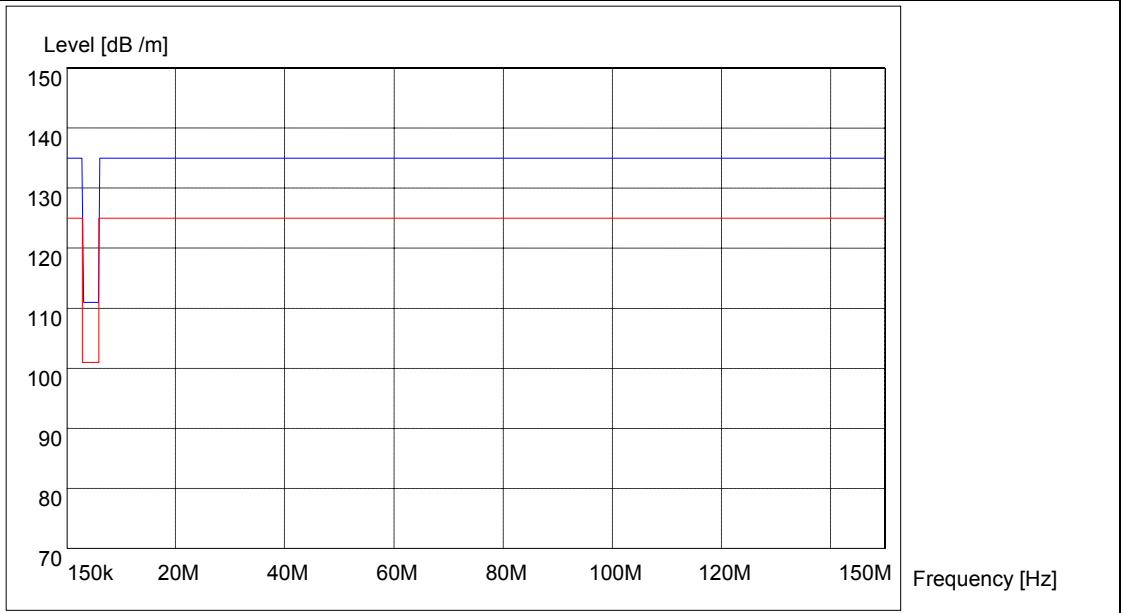
8.4 Immunity to ambient electromagnetic fields (S3)

Test Requirement:	EN 55020
Test Method:	EN 55020
Performance Criterion:	A
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

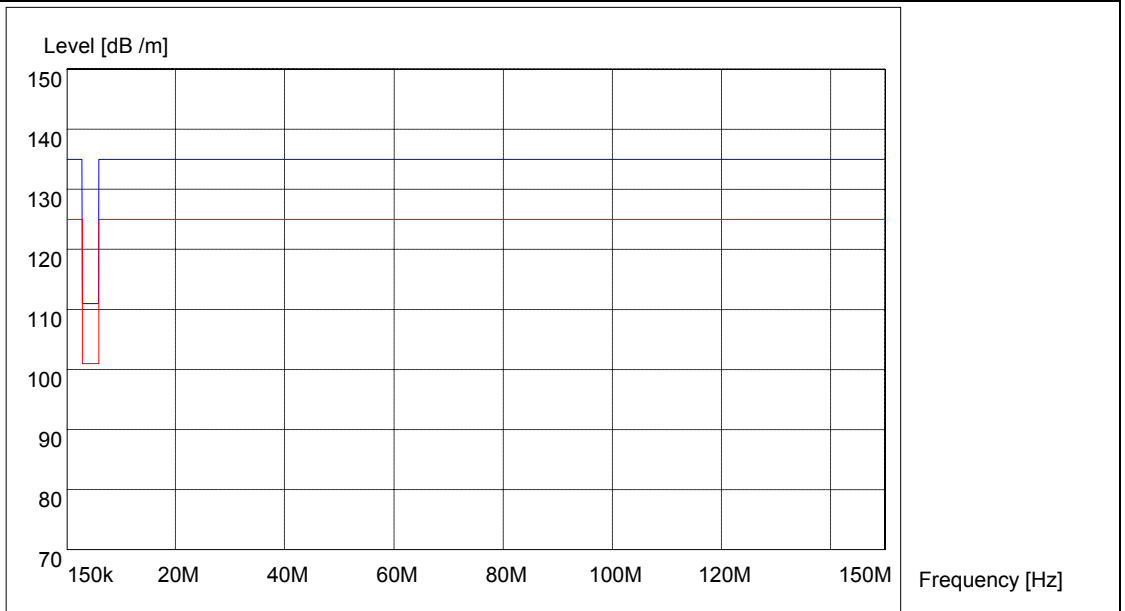
Measurement Data:

Test mode:	AV	Test channel:	- (0.00 MHz)	Country:	- (IF 38.90 MHz)
Interf. Signal	Scan, K2 = 6.0 dB				

Monitor	Audio Out- Sound	S/N:	58.2 dB	AF Level:	454 mV
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Monitor	Picture
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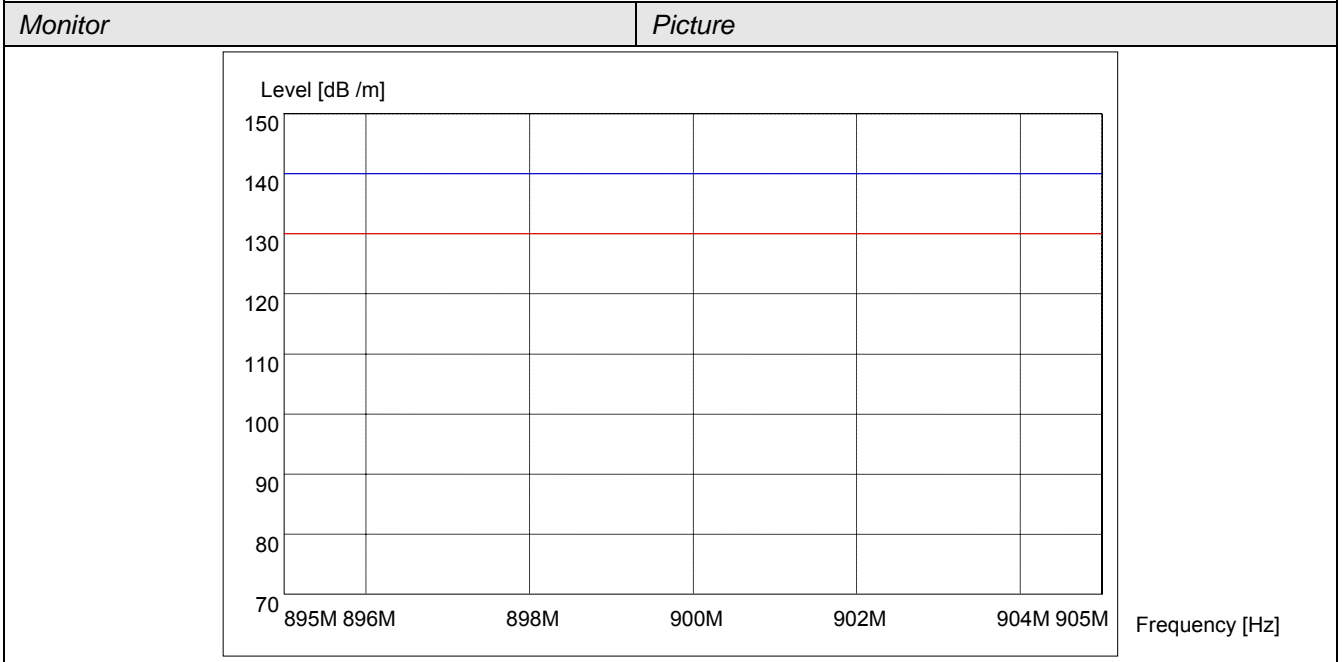
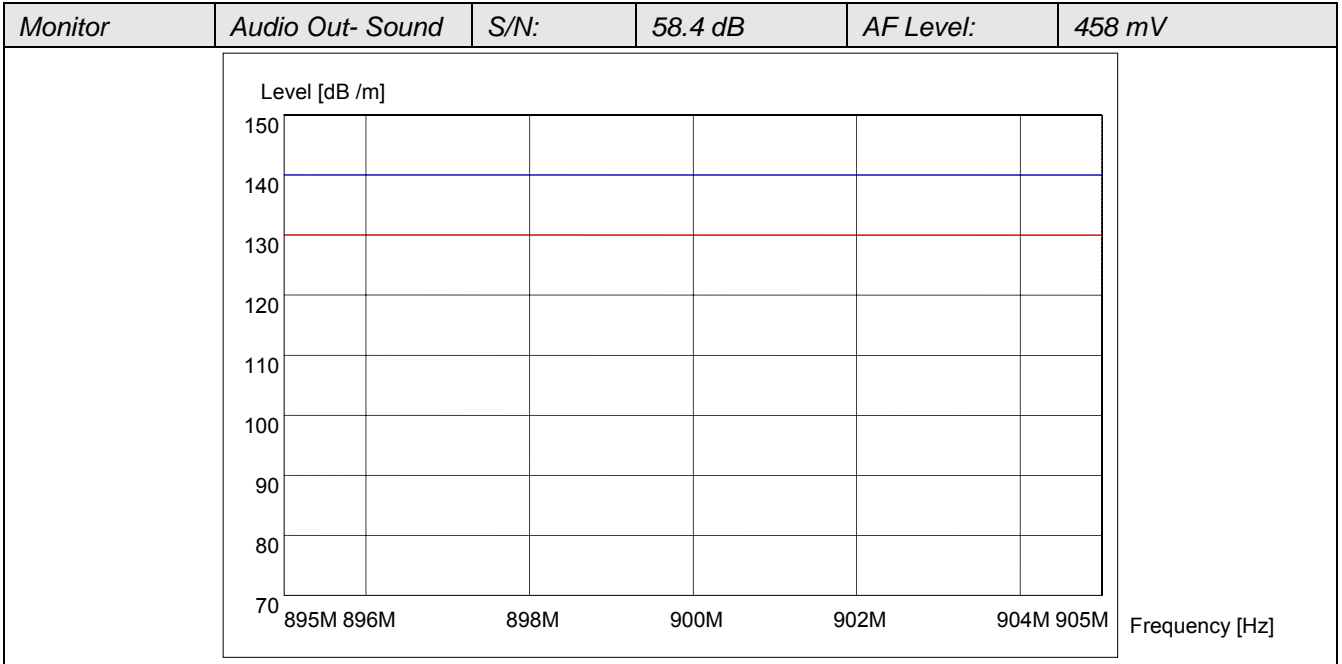


8.5 Immunity to electromagnetic fields Keyed Carrier (S5)

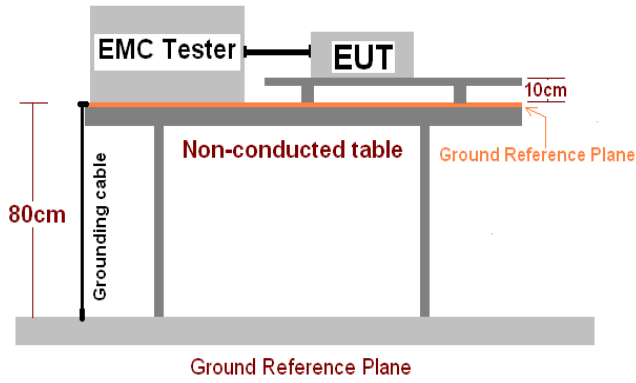
Test Requirement:	EN 55020
Test Method:	EN 55020
Performance Criterion:	A
Unwanted Signal:	900MHz, 3V/m, duty cycle 1/8, 217Hz repetition frequency
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

Test mode:	AV	Test channel:	- (0.00 MHz)	Country:	- (IF 38.90 MHz)
Interf. Signal	Scan,				



8.6 Electrical Fast Transients

Test Requirement:	EN 55020
Test Method:	EN 61000-4-4
Test Level:	1.0kV on AC port
Polarity:	Positive & Negative
Test signal specification:	Rise time=5ns, Duration time=50ns; Burst Duration=15ms, Burst Period=300ms; Repetition Frequency=5KHz
Test Duration:	1 minute per level & polarity
Performance Criterion:	B
Test setup:	 <p>The diagram illustrates the test setup. An EMC Tester is connected to an EUT. Both are placed on a non-conducted table. The table is supported by a wood support structure. A grounding cable is connected to the table. A ground reference plane is shown below the table, with a 10cm gap between the table and the plane. The height of the table is 80cm.</p>
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. 2. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. 3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. 4. The length of the signal and power lines between the coupling device and the EUT is 0.5m 5. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. 6. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes.
Test environment:	Temp.: 26 °C Humid.: 54% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Record:

Lead under Test	Level (\pm kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass

Remark:

A: No degradation in performance of the EUT was observed.

9 Test Setup Photo

Conducted Emissions



Disturbance Power



Electrostatic discharge



S2a



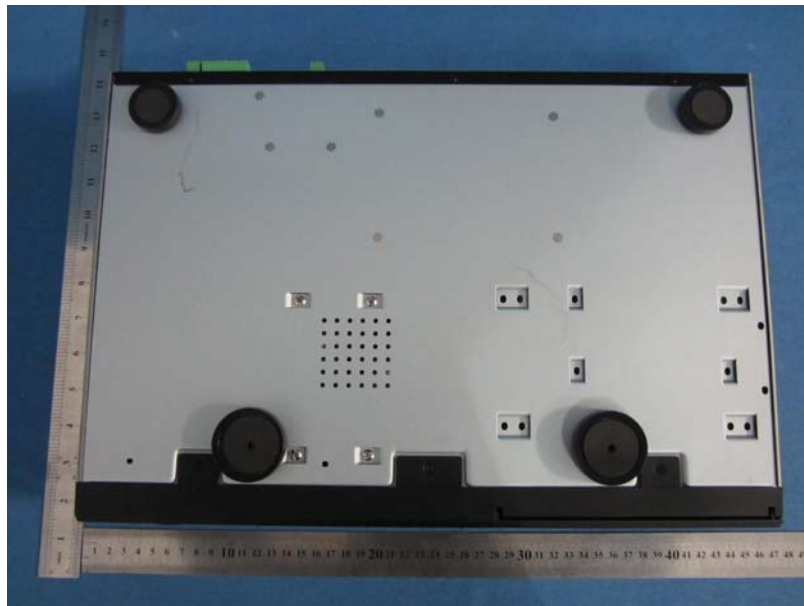
S3



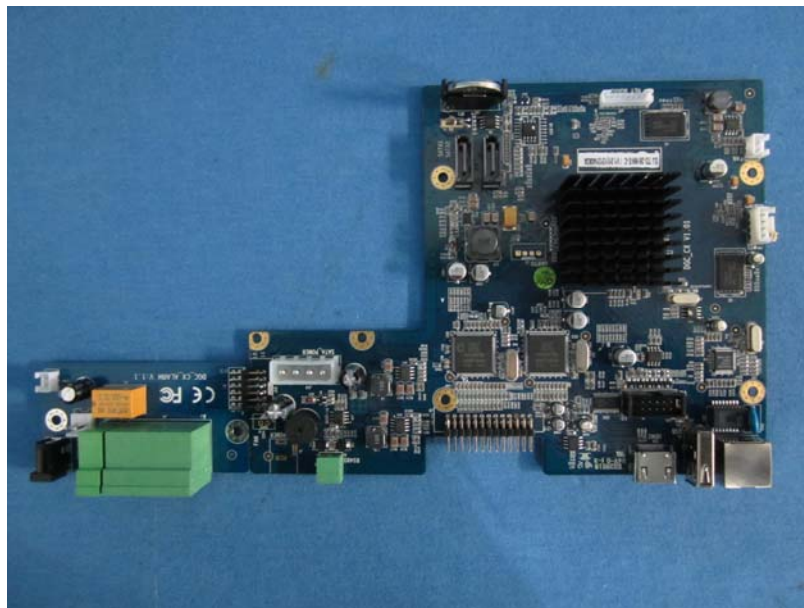
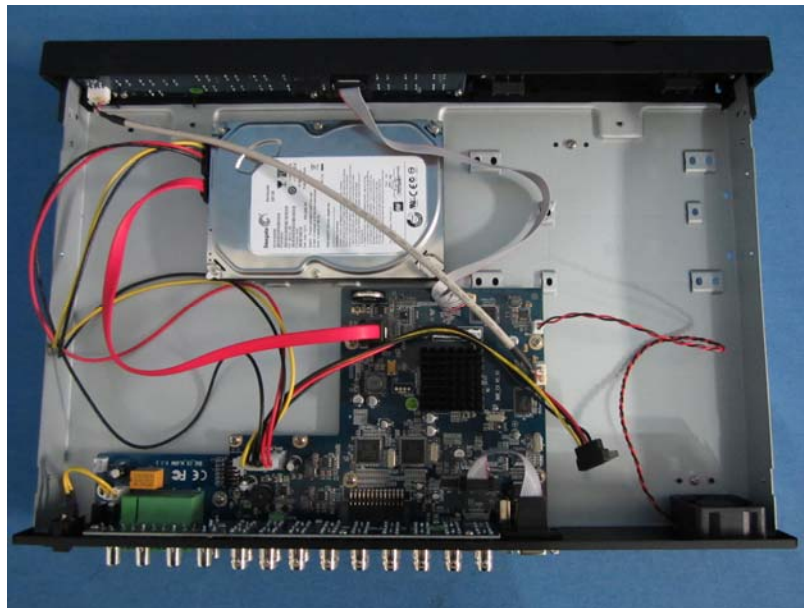
Electrical Fast Transients

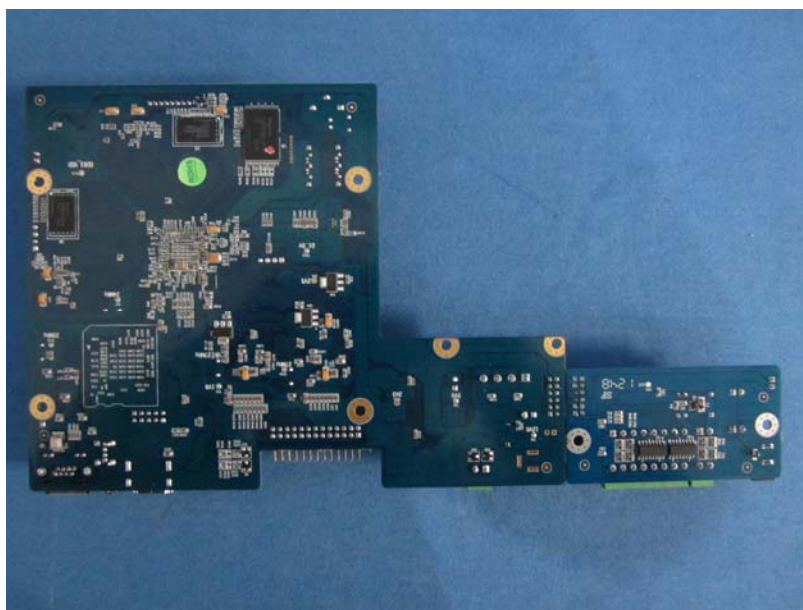


10 EUT Constructional Details









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