

TEST REPORT


Applicant: Bentel Sistem SRL

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

Equipment Under Test (EUT)

Product Name: DVR

Model No.: NGD-8108POE, NGD-8232POE

Trade Mark: 

Applicable standards: EN 55022:2010/AC:2011
EN 55024:2010
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2013

Date of sample receipt: 02 Dec. 2013

Date of Test: 02-24 Dec. 2013

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
GTSE13120190401	00	24 Dec. 2013	Original
GTSE14060091501	01	05 Jun. 2014	New report*
GTSE15030028001	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 55022	EN 55022	Class B	Pass
Conducted Emission	EN 55022	EN 55022	Class B	Pass
Harmonic Emission	EN 61000-3-2	EN 61000-3-2	Class A	N/A
Flicker Emission	EN 61000-3-3	EN 61000-3-3	Clause 5	Pass
Electrostatic discharge	EN 55024	EN 61000-4-2:2009	Contact $\pm 2, \pm 4$ kV Air $\pm 2, \pm 4, \pm 8$ kV	Pass
Radio-frequency electromagnetic field Amplitude modulated	EN 55024	EN 61000-4-3: 2006+A1: 2008 +A2: 2010	3V/m 80%, 1kHz, AM	Pass
Electrical fast transients	EN 55024	EN 61000-4-4: 2012	AC ± 1.0 kV	Pass
Surges	EN 55024	EN 61000-4-5: 2014	± 1 kV D.M ± 2 kV C.M	Pass
Radio-frequency continuous conducted	EN 55024	EN 61000-4-6: 2014	3Vrms (emf), 80%, 1kHz Amp. Mod.	Pass
Voltage dips and Voltage interruptions	EN 55024	EN 61000-4-11: 2004	0 % U_T^* for 0.5per 0 % U_T^* for 250per 70 % U_T^* for 25per	Pass

Remark:

1. Pass: Comply with the essential requirements in the standard.
2. U_T : the nominal supply voltage; D.M: Differential Mode; C.M: Common Mode.
3. N/A: not applicable
4. # Refer to EN55022 clause 6.2 conditional testing procedure :

The highest frequency generated or used in the EUT	Test frequency range of Radiated emission
<108MHz	30MHz ~ 1GHz
108MHz ~ 500MHz	30MHz ~ 2GHz
500MHz ~ 1GHz	30MHz ~ 5GHz
>1GHz	30MHz ~ 5times the highest frequency or 30MHz ~ 6 GHz, whichever is less

The highest frequency of the internal sources of the EUT is 1333MHz.

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:	DVR
Model No.:	NGD-8108POE, NGD-8232POE
Power supply:	AC100-240V 50/60Hz

5.3 Test mode and Test voltage

Test mode:	
On mode	Keep the EUT in operation mode
Test voltage:	
Apapter Input: AC 230V, 50Hz	

5.4 Description of Support Units

Description	Manufacturer	Model	Serial Number
LCD TV	PHILIPS	19PFL3120/T3	AU1A1212002906
provide by client	signal system	N/A	N/A

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Visual:	Monitor communication state
Audio:	Monitor the sound

5.8 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● 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, June 28, 2013. ● Industry Canada (IC) —Registration No.: 9079A-2 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-2, June 26, 2013.

5.9 Test Location

RI and CI tests were performed at:

China Shenzhen Academy of Metrology and Quality Inspection,
Metrology and Quality Inspection building, Central Section of LongZhu Road, Nan Shan, Shenzhen

All other test items 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

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	Mar. 29 2013	Mar. 28 2014
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	Jun. 29 2013	Jun. 29 2014
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	Jun. 29 2013	Jun. 29 2014
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	Jun. 29 2013	Jun. 29 2014
6	RF Amplifier	HP	8347A	GTS204	Jun. 29 2013	Jun. 29 2014
7	Preamplifier	HP	8349B	GTS206	Jun. 29 2013	Jun. 29 2014
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	Jul. 07 2013	Jul. 06 2014
10	Coaxial Cable	GTS	N/A	GTS211	Jul. 07 2013	Jul. 06 2014
11	Thermo meter	N/A	N/A	GTS256	Jul. 01 2013	Jul. 01 2014

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Sep. 07 2013	Sep. 06 2014
2	EMI Test Receiver	R&S	ESCS30	GTS223	Jun. 29 2013	Jun. 28 2014
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	Jun. 29 2013	Jun. 28 2014
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 29 2013	Jun. 28 2014
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	Jun. 29 2013	Jun. 28 2014
6	Coaxial Cable	GTS	N/A	GTS227	Sep. 07 2013	Sep. 06 2014
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	Jul. 01 2013	Jun. 31 2014

Electrical fast transients/ Surges/ Voltage dips and interruptions						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMTEST system	EMTEST	UCS500N	GTS239	Jun. 29 2013	Jun. 29 2014
2	Thermo meter	KTJ	TA328	GTS238	Jul. 01 2013	Jul. 01 2014

Electrostatic discharge						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	ESD Simulator	EMPEK	ESD-2030A	GTS242	Jul.03 2013	Jul. 03 2014
2	Thermo meter	KTJ	TA328	GTS243	Jul. 01 2013	Jul. 01 2014

Flicker						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Power Analyzer	EMTEST	DPA500	GTS235	Jun. 29 2013	Jun. 29 2014
2	AC Power Source	EMTEST	ACS500	GTS236	Jun. 29 2013	Jun. 29 2014
3	Test software	EMTEST	ACS	N/A	N/A	N/A
4	Thermo meter	KTJ	TA328	GTS256	Jul. 01 2013	Jul. 01 2014

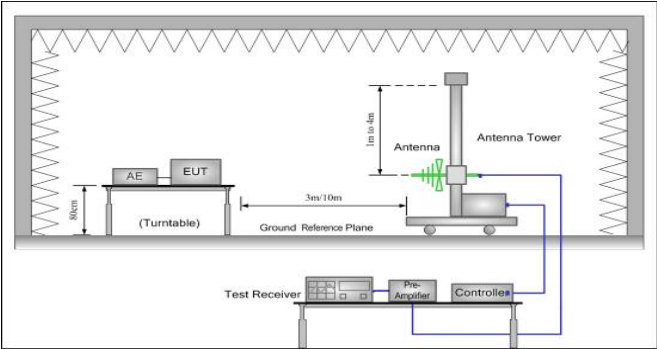
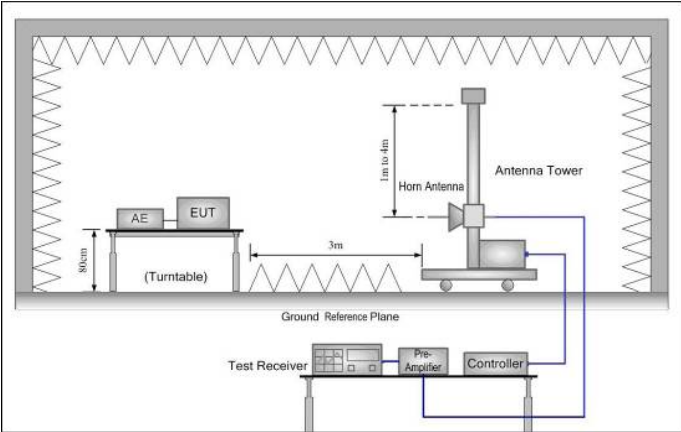
Conducted Immunity:					
Item	Test Equipment	Manufacturer	Model No.	Serial NO.	Cal.Due Date (mm-dd-yy)
1	CW sine Generator	EMTEST	CWS500	0399-11	Jan. 18 2014
2	CDN	EMTEST	CDN-M2	9907105C	Jan. 18 2014
3	CDN	EMTEST	CDN-M3	9905170C	Jan. 18 2014

Radio-frequency electromagnetic fields:					
Item	Test Equipment	Manufacturer	Model No.	Serial NO.	Cal.Due Date (mm-dd-yy)
1	Signal Generator	Rohde & Schwarz	SMT03	100059	Jan. 18 2014
2	Power Amplifier	AR	150W1000	300999	Jan. 18 2014
3	Power Amplifier	AR	25S1G4AM1	305993	Jan. 20 2014
4	Power Amplifier	AR	150A220M6	305965	Mar. 07 2014
5	Broadband antenna	CHASE	CBL6111C	2576	Jan. 18 2014
6	Horn Antenna	AR	AT4002A	#N/A	#N/A
7	Anechoic Chamber	Albatross Projects	MCDC	----	Oct. 08 2014

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Barometer	ChangChun	DYM3	GTS257	Jul. 27 2013	Jul. 27 2014

7 Emission Test Results

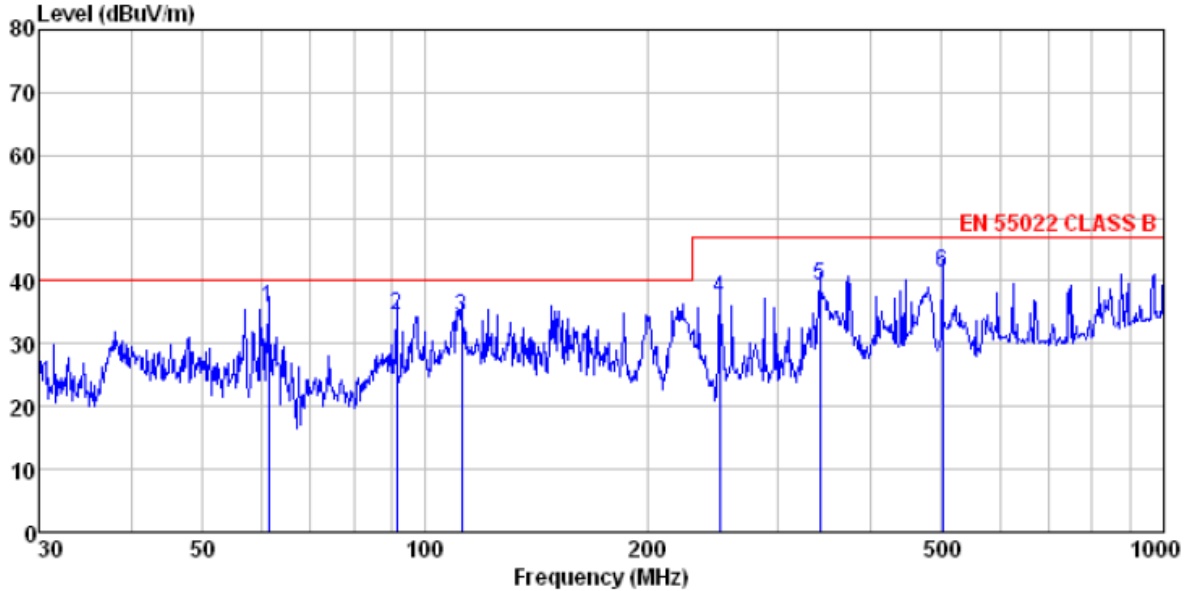
7.1 Radiated Emission

Test Requirement:	EN 55022																			
Test Method:	EN 55022																			
Test Frequency Range:	30MHz to 6GHz																			
Class / Severity:	Class B																			
Test site:	Measurement Distance: 3m																			
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120KHz</td> <td>300KHz</td> <td>Quasi-peak</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Average</td> </tr> </tbody> </table>	Frequency	Detector	RBW	VBW	Value	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	3MHz	Average
Frequency	Detector	RBW	VBW	Value																
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak																
Above 1GHz	Peak	1MHz	3MHz	Peak																
	Peak	1MHz	3MHz	Average																
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBμV/m @3m)</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>30MHz-230MHz</td> <td>40.00</td> <td>Quasi-peak</td> </tr> <tr> <td>230MHz-1GHz</td> <td>47.00</td> <td>Quasi-peak</td> </tr> <tr> <td>1GHz-3GHz</td> <td>70.00</td> <td>Peak</td> </tr> <tr> <td>1GHz-3GHz</td> <td>50.00</td> <td>Average</td> </tr> </tbody> </table>	Frequency	Limit (dB μ V/m @3m)	Value	30MHz-230MHz	40.00	Quasi-peak	230MHz-1GHz	47.00	Quasi-peak	1GHz-3GHz	70.00	Peak	1GHz-3GHz	50.00	Average				
Frequency	Limit (dB μ V/m @3m)	Value																		
30MHz-230MHz	40.00	Quasi-peak																		
230MHz-1GHz	47.00	Quasi-peak																		
1GHz-3GHz	70.00	Peak																		
1GHz-3GHz	50.00	Average																		
Test setup:	<p>Below 1GHz:</p>  <p>Above 1GHz:</p> 																			
Test Procedure:	<p>From 30MHz to 1GHz:</p> <ol style="list-style-type: none"> The radiated emissions test was conducted in a semi-anechoic 																			

	<p>chamber.</p> <ol style="list-style-type: none"> 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. <p>Above 1GHz:</p> <ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Measurement Record:	Uncertainty: ± 4.50dB
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data
Below 1GHz:

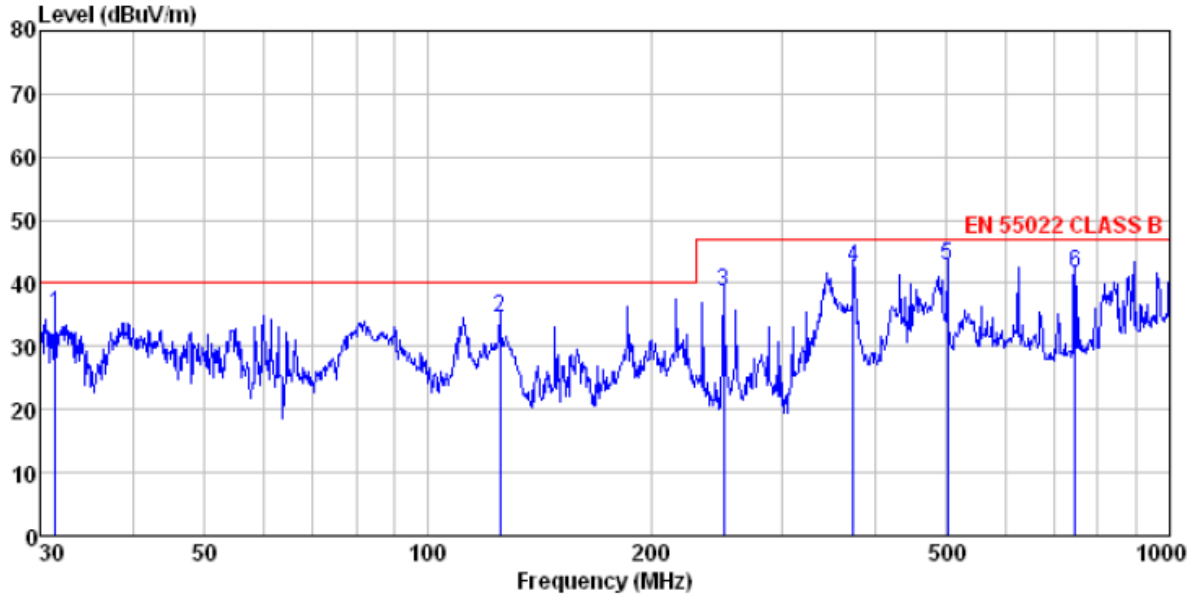
Test mode:	On mode	Antenna Polarity:	Horizontal
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Site : 3m chamber
 Condition : EN 55022 CLASS B 3m VULB9163-2013M HORIZONTAL
 Job No. : 1904AV
 Test Mode : On mode
 Test Engineer: Yang

	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	61.346	52.49	14.16	0.87	31.93	35.59	40.00	-4.41	QP
2	91.495	50.93	14.24	1.12	31.73	34.56	40.00	-5.44	QP
3	112.131	50.93	13.83	1.30	31.82	34.24	40.00	-5.76	QP
4	250.301	53.29	14.07	2.12	32.16	37.32	47.00	-9.68	QP
5	341.979	52.61	16.15	2.58	32.05	39.29	47.00	-7.71	QP
6	501.179	50.95	18.63	3.31	31.56	41.33	47.00	-5.67	QP

Test mode:	On mode	Antenna Polarity:	Vertical
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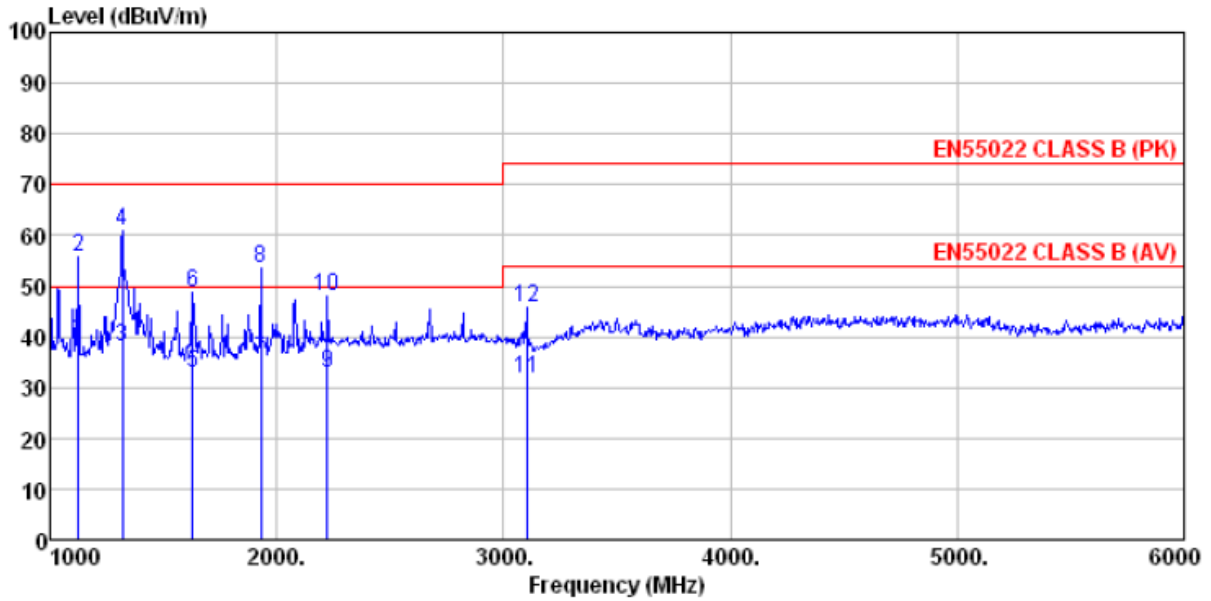


Site : 3m chamber
 Condition : EN 55022 CLASS B 3m VULB9163-2013M VERTICAL
 Job No. : 1904AV
 Test Mode : On mode
 Test Engineer: Yang

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	31.510	52.44	14.32	0.57	32.06	35.27	40.00 -4.73 QP
2	125.007	53.42	11.70	1.40	31.88	34.64	40.00 -5.36 QP
3	250.301	54.53	14.07	2.12	32.16	38.56	47.00 -8.44 QP
4	374.623	55.32	16.54	2.74	31.96	42.64	47.00 -4.36 QP
5	501.179	52.36	18.63	3.31	31.56	42.74	47.00 -4.26 QP
6	744.866	47.27	21.39	4.26	31.25	41.67	47.00 -5.33 QP

Above 1GHz:

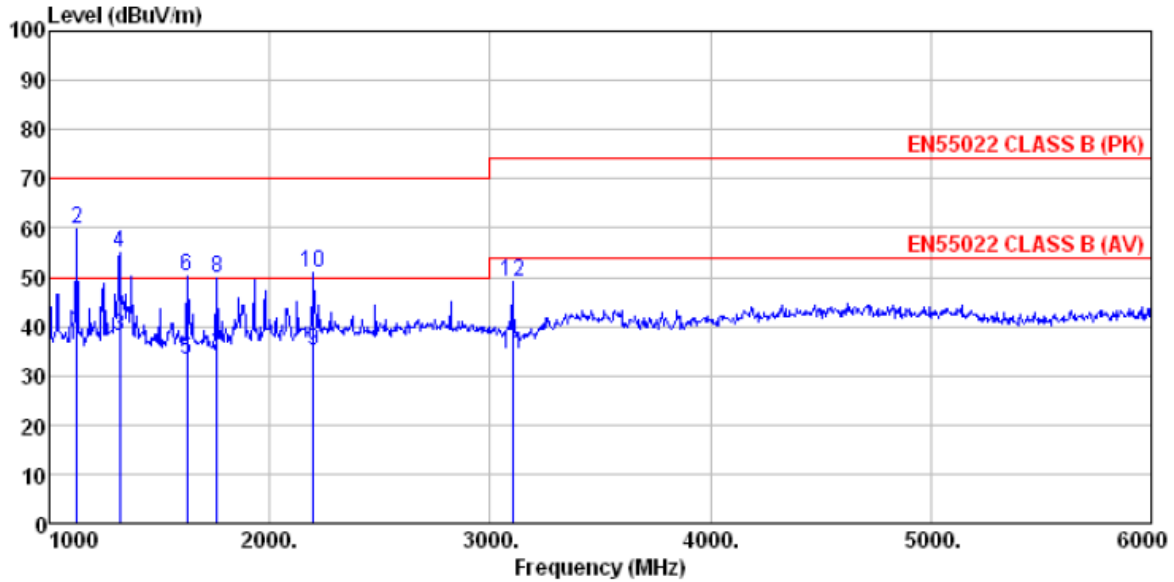
Test mode:	On mode	Antenna Polarity:	Horizontal
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Site : 3m chamber
 Condition : EN55022 CLASS B (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
 Job No. : 1904AV
 Test Mode : On mode
 Test Engineer: Yang

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1125.000	43.24	24.86	4.40	32.95	39.55	50.00	-10.45	Average
2	1125.000	59.24	24.86	4.40	32.95	55.55	70.00	-14.45	Peak
3	1320.000	41.08	25.66	4.56	33.30	38.00	50.00	-12.00	Average
4	1320.000	64.08	25.66	4.56	33.30	61.00	70.00	-9.00	Peak
5	1630.000	37.02	24.91	4.76	33.82	32.87	50.00	-17.13	Average
6	1630.000	53.02	24.91	4.76	33.82	48.87	70.00	-21.13	Peak
7	1930.000	39.02	25.86	4.92	34.34	35.46	50.00	-14.54	Average
8	1930.000	57.02	25.86	4.92	34.34	53.46	70.00	-16.54	Peak
9	2225.000	33.94	27.99	5.21	34.21	32.93	50.00	-17.07	Average
10	2225.000	48.94	27.99	5.21	34.21	47.93	70.00	-22.07	Peak
11	3100.000	30.29	28.70	6.13	33.20	31.92	54.00	-22.08	Average
12	3100.000	44.29	28.70	6.13	33.20	45.92	74.00	-28.08	Peak

Test mode:	On mode	Antenna Polarity:	Vertical
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Site : 3m chamber
 Condition : EN55022 CLASS B (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
 Job No. : 1904AV
 Test Mode : On mode
 Test Engineer: Yang

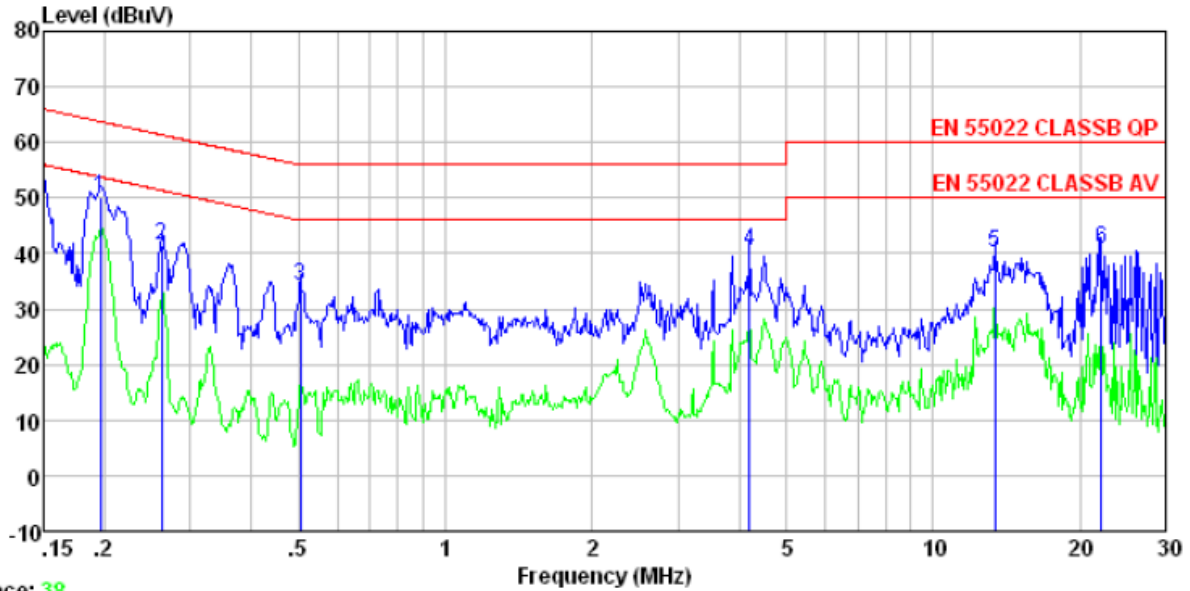
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1125.000	42.64	24.86	4.40	32.95	38.95	50.00	-11.05	Average
2	1125.000	63.64	24.86	4.40	32.95	59.95	70.00	-10.05	Peak
3	1320.000	41.11	25.66	4.56	33.30	38.03	50.00	-11.97	Average
4	1320.000	58.11	25.66	4.56	33.30	55.03	70.00	-14.97	Peak
5	1625.000	37.49	24.92	4.76	33.82	33.35	50.00	-16.65	Average
6	1625.000	54.49	24.92	4.76	33.82	50.35	70.00	-19.65	Peak
7	1760.000	37.87	25.12	4.84	34.05	33.78	50.00	-16.22	Average
8	1760.000	54.02	25.12	4.84	34.05	49.93	70.00	-20.07	Peak
9	2200.000	35.97	27.95	5.19	34.23	34.88	50.00	-15.12	Average
10	2200.000	52.03	27.95	5.19	34.23	50.94	70.00	-19.06	Peak
11	3100.000	32.76	28.70	6.13	33.20	34.39	54.00	-19.61	Average
12	3100.000	47.39	28.70	6.13	33.20	49.02	74.00	-24.98	Peak

7.2 Conducted Emission

Test Requirement:	EN 55022														
Test Method:	EN 55022														
Test Frequency Range:	150kHz to 30MHz														
Class / Severity:	Class B														
Receiver setup:	RBW=9kHz, VBW=30kHz														
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><i>Remark</i> 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.: 24 °C Humid.: 51% Press.: 1012mbar														
Measurement Record:	Uncertainty: ± 3.45 dB														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

Measurement Data

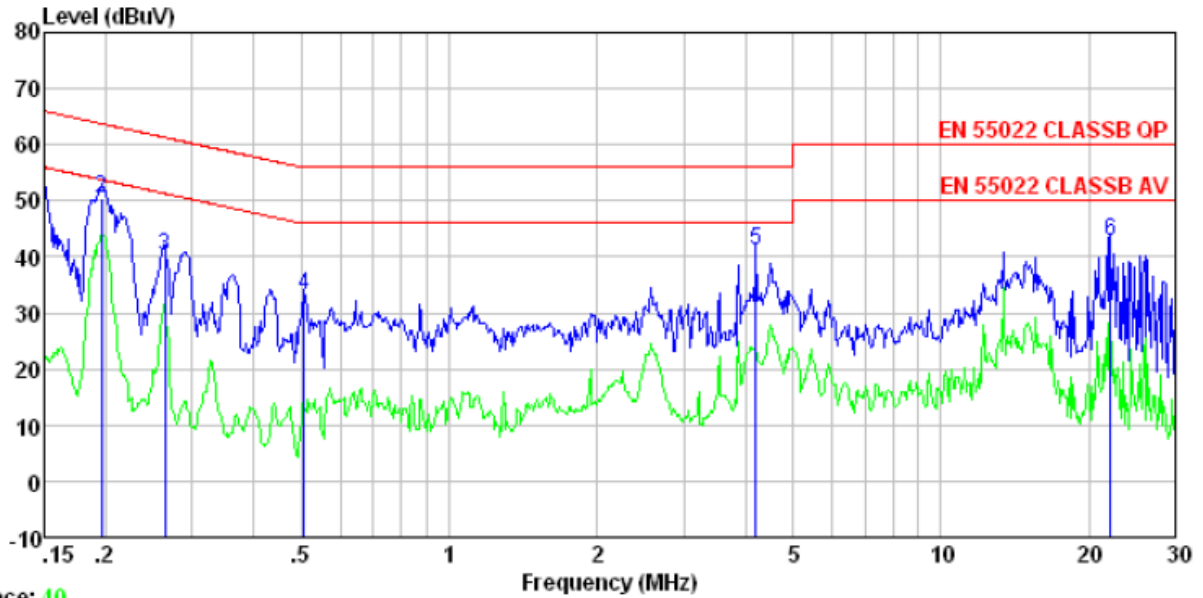
Test mode:	On mode	Phase Polarity:	Line
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Trace: 38
 Condition : EN 55022 CLASSB QP LISN-2012 LINE
 Job No. : 1904AV
 Test mode : On mode
 Test Engineer: Bing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.197	50.08	-0.23	0.10	49.95	63.76	-13.81	QP
2	0.262	41.50	-0.23	0.10	41.37	61.38	-20.01	QP
3	0.505	34.19	-0.21	0.10	34.08	56.00	-21.92	QP
4	4.202	40.72	-0.29	0.10	40.53	56.00	-15.47	QP
5	13.408	40.34	-0.50	0.20	40.04	60.00	-19.96	QP
6	22.180	41.20	-0.70	0.21	40.71	60.00	-19.29	QP

Test mode:	On mode	Phase Polarity:	Neutral
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Trace: 40
 Condition : EN 55022 CLASSB QP LISN-2012 NEUTRAL
 Job No. : 1904AV
 Test mode : On mode
 Test Engineer: Bing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	51.04	-0.13	0.10	51.01	66.00	-14.99	QP
2	0.197	50.56	-0.09	0.10	50.57	63.76	-13.19	QP
3	0.264	40.16	-0.09	0.10	40.17	61.29	-21.12	QP
4	0.507	33.00	-0.08	0.10	33.02	56.00	-22.98	QP
5	4.202	41.12	-0.15	0.10	41.07	56.00	-14.93	QP
6	22.180	43.17	-0.60	0.21	42.78	60.00	-17.22	QP

Remark: If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

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	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.006	3.30	PASS
dmax [%]	0.061	4.00	PASS
dt [s]	0.000	0.50	PASS

8 Immunity Test Results

8.1 Performance Criteria Description in Clause 7 of EN 55024

<p>Criterion A:</p>	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
<p>Criterion B:</p>	<p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
<p>Criterion C:</p>	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

8.2 Electrostatic discharge

Test Requirement:	EN 55024
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 2\text{kV}$, $\pm 4\text{kV}$
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 25 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Performance Criterion:	Passed*(The client accepts the degradation)
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 25 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</p>

	At least 10 single discharges were applied to the center of one vertical 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:	on mode
Test results:	Passed

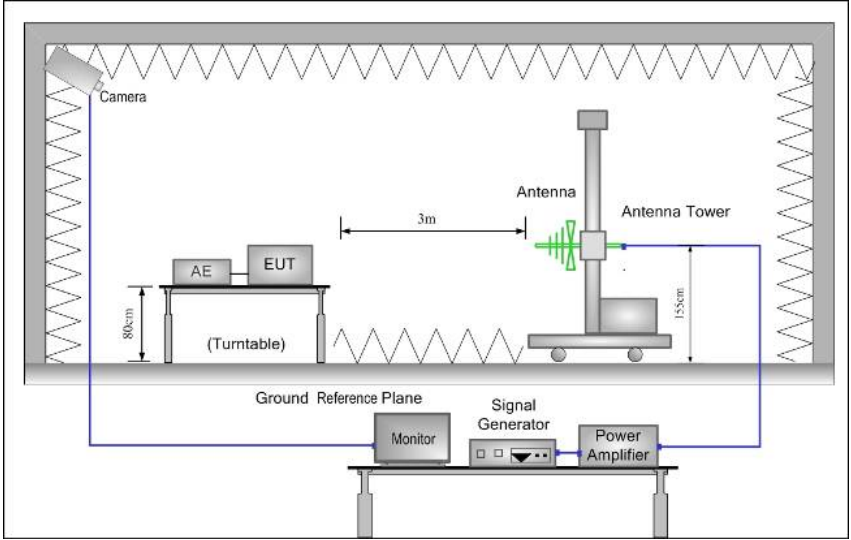
Measurement Record:

Test points:	I: Metal cover			
	II: All plastic seams,			
Direct discharge				
Discharge Voltage (KV)	Type of discharge	Test points	Observations (Performance Criterion)	Result
± 2, ± 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
± 2, ± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 2, ± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remark:

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

8.3 Radio-frequency electromagnetic field Amplitude modulated

Test Requirement:	EN 55024
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 1GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criterion A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned

	vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	on mode
Test results:	Pass

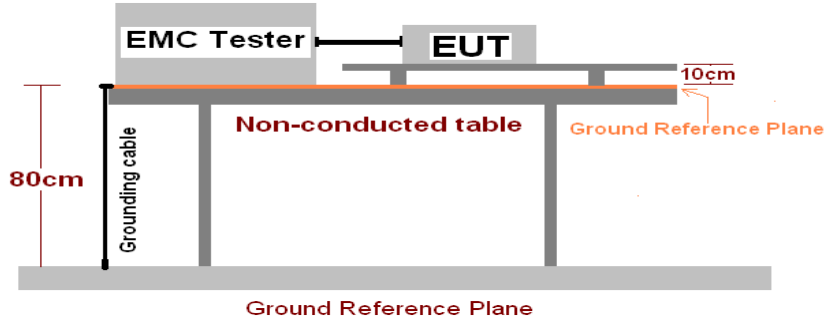
Measurement Record:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A	Pass
			H		A	Pass
			V	Rear	A	Pass
			H		A	Pass
			V	Left	A	Pass
			H		A	Pass
			V	Right	A	Pass
			H		A	Pass
			V	Top	A	Pass
			H		A	Pass
			V	Bottom	A	Pass
			H		A	Pass

Remark:

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

8.4 Electrical fast transients

Test Requirement:	EN 55024
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:	2 minute per level & polarity
Performance Criterion:	Criterion B
Test setup:	 <p>The diagram illustrates the test setup. An EMC Tester and an EUT (Equipment Under Test) are placed on a non-conducted table. The table is supported by a wood support that is 80cm high. The table is 10cm above a ground reference plane. A grounding cable is connected to the table. The ground reference plane is a 1m*1m metallic sheet with a minimum thickness of 0.65mm.</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

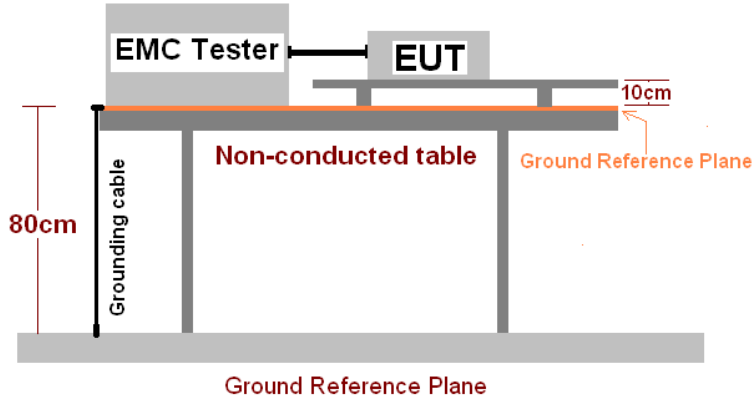
Measurement Record:

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
L-PE	± 1.0	Direct	A	Pass
N-PE	± 1.0	Direct	A	Pass
L-N-PE	± 1.0	Direct	A	Pass

Remark:

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

8.5 Surges

Test Requirement:	EN 55024
Test Method:	EN 61000-4-5
Test Level:	1kV line to line: Differential mode 2kV Live to Earth or Neutral to Earth: Common mode
Polarity:	Positive & Negative
Generator source impedance:	2Ω (line-line coupling) 12Ω (line-earth coupling)
Test signal specification:	Rise time=1.2us, Duration time=50us; Test Interval: 60s between each surge;
No. of surges:	5 positive, 5 negative at 0°, 90°, 180°, 270°.
Performance Criterion:	Criterion B
Test setup:	 <p>The diagram illustrates the test setup. An EMC Tester and an EUT (Equipment Under Test) are positioned on a non-conducted table. The table is 80cm high. A grounding cable is connected to the table. A Ground Reference Plane is shown below the table. The distance between the top surface of the table and the EUT is 10cm.</p>
Test Procedure:	<ol style="list-style-type: none"> 1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. 2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. 3. Different phase angles are done individually. 4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	on mode
Test results:	Pass

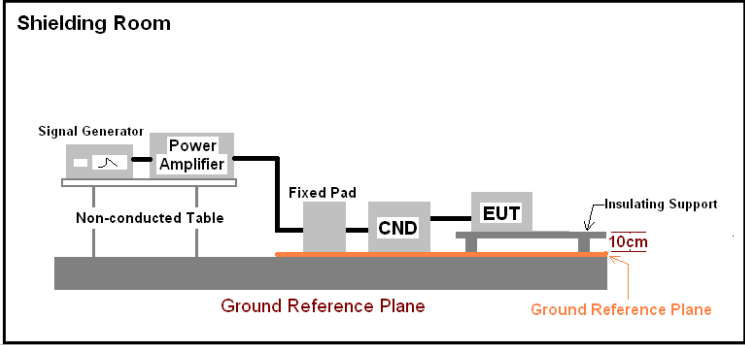
Measurement Record:

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	± 1	5	60s	0°	A	Pass
				90°	A	Pass
				180°	A	Pass
				270°	A	Pass
L-PE/ N-PE	± 2	5	60s	0°	A	Pass
				90°	A	Pass
				180°	A	Pass
				270°	A	Pass

Remark:

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

8.6 Radio-frequency continuous conducted

Test Requirement:	EN 55024
Test Method:	EN 61000-4-6
Frequency range:	0.15MHz to 80MHz
Test Level:	3V rms on AC Ports (unmodulated emf into 150 Ω)
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criterion A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 2. The disturbance signal described below is injected to EUT through CDN. 3. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 4. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.
Test environment:	Temp.: 24 °C Humid.: 51% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	on mode
Test results:	Pass

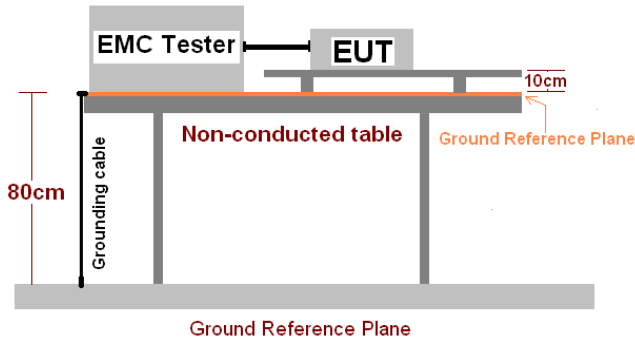
Measurement Record:

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	AC Mains	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=2seconds	A	Pass

Remark:

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

8.7 Voltage dips and Voltage interruptions

Test Requirement:	EN 55024
Test Method:	EN 61000-4-11
Test Level:	0% of VT(Supply Voltage) for 0.5 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
Number of Dips / Interruptions:	3 per Level
Performance Criterion:	>95% VD, 0.5 period----Performance criterion: B 30% VD, 25 period----Performance criterion: C >95% VI, 250 period----Performance criterion: C
Test setup:	 <p>The diagram shows the test setup. An EMC Tester and an EUT are placed on a non-conducted table. The table is 80cm high. A grounding cable is connected to the table. A ground reference plane is located 10cm above the table surface.</p>
Test Procedure:	<ol style="list-style-type: none"> The EUT and test generator were setup as shown on above setup photo. The interruptions are introduced at selected phase angles with specified duration. Record any degradation of performance.
Test environment:	Temp.: 26 °C Humid.: 53% Press.: 1 012mbar
Test Instruments:	Refer to section 6 for details
Test mode:	on mode
Test results:	Pass

Measurement Record:

Test Level % U_T	Duration (Periods)	Phase angle	No. of drop out	Time between dropout	Observations (Performance Criterion)	Result
0	0.5	0°, 90°, 180°, 270°	3	10s	A	Pass
70	25	0°, 90°, 180°, 270°	3	10s	A	Pass
0	250	0°, 90°, 180°, 270°	3	10s	C	Pass

Remark:

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

C: During the test, EUT power off, after the experiment, the function can be reset by user.

9 Test Setup Photo

Radiated Emission



Conducted Emissions



Electrostatic discharge



Flicker



Electrical fast transients/ Surges/ Voltage dips and interruptions



10 EUT Constructional Details



