



CE EMC Test Report

(EN 50155 & EN 50121-3-2)

Report No.: CE150723C22-1

Test Model: IVH-7700-QRD

Series Model: Vecow IVH Series, IVH-7700-QRDM, IVH-XXXXXXXXXXXXXXXXXXXXX
("X" can be 0-9, A-Z or blank for marketing purpose)

Received Date: Jul. 23, 2015

Test Date: Aug. 04 ~ Sep. 04, 2015

Issued Date: Sep. 07, 2015

Applicant: Vecow Co.,Ltd.

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A D T

Release Control Record

Issue No.	Description	Date Issued
CE150723C22-1	Original release.	Sep. 07, 2015

1 Certificate of Conformity

Product: High Performance Fanless In-Vehicle System
Brand: Vecow
Test Model: IVH-7700-QRD
Series Model: Vecow IVH Series, IVH-7700-QRDM, IVH-XXXXXXXXXXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Sample Status: Engineering sample
Applicant: Vecow Co.,Ltd.
Test Date: Aug. 04 ~ Sep. 04, 2015
Standards: EN 50155:2007 +AC:2010 +AC:2012, Clause 12.2.7 & 12.2.8
EN 50121-1:2006 +AC:2008
EN 50121-3-2:2006 +AC:2008
EN 55011:2009 +A1:2010
EN 61000-4-2:2009
EN 61000-4-3:2006 +A1:2008 +A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2006
EN 61000-4-6:2014

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Suntee Liu , Date: Sep. 07, 2015
Suntee Liu / Specialist

Approved by : Ken Liu , Date: Sep. 07, 2015
Ken Liu / Senior Manager

2 Summary of Test Results

EN 50121-3-2:2006 + AC:2008, Emission EN 50155:2007 +AC:2010 +AC:2012, Clause 12.2.8.2					
Table Clause	Basic Standard	Port	Test Item / specifications	Result/Remarks	Verdict
3.1	EN 55011:2009 +A1:2010	Auxiliary a.c. or d.c. power ports	Conducted disturbance 9 kHz-150 kHz: no limits 150 kHz- 500 kHz: 99 dB μ V quasi-peak 500 kHz- 30 MHz: 93 dB μ V quasi-peak	Minimum passing margin is -36.29 dB at 0.16096 MHz	Pass
6.1	EN 55011:2009 +A1:2010	Enclosure	Radiated disturbance 30 MHz- 230 MHz: 40 dB μ V/m quasi-peak 230 MHz -1 GHz: 47 dB μ V/m quasi-peak	Minimum passing margin is -4.53 dB at 85.83 MHz	Pass

EN 50121-3-2:2006 + AC:2008, Immunity requirements EN 50155:2007 +AC:2010 +AC:2012, Clause 12.2.7 & 12.2.8.1					
Table Clause	Basic standard	Port	Test Item / specifications	Result/Remarks	Verdict
7.1	EN 61000-4-6:2014	Auxiliary a.c. power input ports (rated voltage \leq 400 Vrms)	Radio-frequency common mode (CS) 80% AM (1kHz) 0.15-80 MHz, 10V Performance Criterion A	Performance Criterion A	Pass
7.2	EN 61000-4-4:2012	Auxiliary a.c. power input ports (rated voltage \leq 400 Vrms)	Fast Transients (EFT) 5/50 (T_r/T_h) ns, 5kHz \pm 2kV Performance Criterion A	Meets the requirements of manufacturer's performance criterion	Pass
7.3	EN 61000-4-5:2006	Auxiliary a.c. power input ports (rated voltage \leq 400 Vrms)	Surges 1.2/50 (8/20) (T_r/T_h) μ s Line to ground: \pm 2kV 42 Ω , 0.5 μ F Line to line: \pm 1kV 42 Ω , 0.5 μ F Performance Criterion B	Performance Criterion A	Pass
8.1	EN 61000-4-6:2014	Signal & communication, process measurement & control ports	Radio-frequency common mode (CS) 80% AM (1kHz) 0.15-80 MHz, 10V Performance Criterion A	Performance Criterion A	Pass
8.2	EN 61000-4-4:2012	Signal & communication, process measurement & control ports	Fast Transients (EFT) 5/50 (T_r/T_h) ns, 5kHz \pm 2kV, Capacitive clamp Performance Criterion A	Meets the requirements of manufacturer's performance criterion	Pass

EN 50121-3-2:2006 + AC:2008, Immunity requirements
EN 50155:2007 +AC:2010 +AC:2012, Clause 12.2.7 & 12.2.8.1

Table Clause	Basic standard	Port	Test Item / specifications	Result/Remarks	Verdict
9.1	EN 61000-4-3:2006 +A1:2008 +A2:2010	Enclosure ports	Radio-frequency electromagnetic field amplitude modulated (RS) ¹ , 80% AM (1kHz) 80-1000 MHz, 20V/m Performance Criterion A	Performance Criterion A	Pass
9.2	EN 61000-4-3:2006 +A1:2008 +A2:2010	Enclosure ports	Radio-frequency electromagnetic field from digital mobile telephones (RS) ² , 80% AM (1kHz) 800-1000 MHz, 20V/m 1400-2100 MHz, 10V/m 2100-2500 MHz, 5V/m Performance Criterion A	Performance Criterion A	Pass
9.3	EN 61000-4-2:2009	Enclosure ports	Electrostatic Discharges (ESD) ±6kV Contact discharge ±8kV Air discharge Performance Criterion B	Performance Criterion B	Pass

Note 1: This limit applies to equipment mounted in the passenger compartments, drivers cab or external to the rolling stock (roof, underframe). For equipment mounted in all other areas a severity level of 10 V/m may be used.

Note 2: For large apparatus (e.g. traction drives, auxiliary converters) it is often not practical to perform the immunity test to radiated electromagnetic fields on the complete unit. In such cases the manufacturer should test susceptible sub-systems (e.g. control electronics). The test report should justify the selection or not of sub-systems and any assumptions made (e.g. reduction of field due to case shielding).

Note: There is no deviation to the applied test methods and requirements covered by the scope of this report.

2.1 Performance Criteria

General Performance Criteria

The general performance criteria apply for those ports for which no specific performance criteria are defined (e.g. auxiliary ports) in the report.

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended..

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is selfrecoverable or can be restored by the operation of the controls.

2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty (k=2) (\pm)	Maximum allowable uncertainty (\pm)
Conducted disturbance at mains port using AMN, 150kHz ~ 30MHz	2.44 dB	3.4 dB (U_{cispr})
Radiated disturbance, 30MHz ~ 1GHz	4.70 dB	6.3 dB (U_{cispr})

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.3 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Features of EUT

The tests reported herein were performed according to the method specified by Vecow Co.,Ltd., for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

Product	High Performance Fanless In-Vehicle System
Brand	Vecow
Test Model	IVH-7700-QRD
Series Model	Vecow IVH Series, IVH-7700-QRDM, IVH-XXXXXXXXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Model Difference	Refer to Note
Sample Status	Engineering sample
Operating Software	Win 7
Power Supply Rating	24Vdc (adapter)
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. All models are listed as below. Model IVH-7700-QRD is the representative for final test.

Brand	Model	Difference
Vecow	Vecow IVH Series	All models are electrically identical, different model names are for marketing purpose.
	IVH-7700-QRD	
	IVH-7700-QRDM	
	IVH-XXXXXXXXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)	

2. The EUT tested with following adapter (support unit only).

Brand	MW
Model	GS160A24
Input Power	100-240Vac, 50/60Hz, 2.0A
Output Power	24Vdc, 6.67Am, 160W MAX.
Power Line	1.15m DC cable with 1 core attached on adapter

3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

EUT has been pre-tested under following modes, and mode 1 was the worst case for final test.

Mode	Test Condition
1	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200
2	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 1280*1024, DP 1280*1024
3	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 800*600, DP 800*600
4	LAN 1~2 100Mbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200
5	LAN 1~2 10Mbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200

Test modes are presented in the report as below.

Mode	Test Condition
Conducted emission test	
-	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200
Radiated emission test	
-	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200
Immunity tests	
-	LAN 1~2 1Gbps, LAN 3~6 with camera, DVI 1920*1200, DP 1920*1200

3.4 Test Program Used and Operation Descriptions

Emission tests:

- a. EUT sent "H" patterns to monitors and monitors displayed them.
- b. EUT sent "H" patterns to modems.
- c. EUT read and wrote date with HDDs.
- d. EUT sent audio signal to earphone.
- e. EUT sent data to notebooks and cameras through LAN by command PING.

Immunity tests:

- a. EUT sent "H" patterns to monitors and monitors displayed them.
- b. EUT sent "H" patterns to modems.
- c. EUT read and wrote date with HDDs or flashes.
- d. EUT sent audio signal to earphone.
- e. EUT sent data to notebooks and cameras through LAN by command PING.

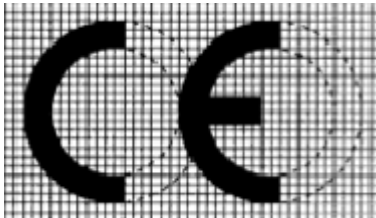
3.5 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 3.3 GHz provided by Vecow Co.,Ltd., for detailed internal source, please refer to the manufacturer's specifications.

3.6 Miscellaneous

➤ Affix CE marking

The marking must be placed visibly and legibly on the product or, if not possible due to the nature of the product, be affixed to the packaging and the accompanying document. The CE marking shall consist of the initials 'CE' taking the following form:



The various components of the CE marking must have the same vertical dimension, and may not be smaller than 5 mm. If the CE marking is reduced or enlarged, the proportions given in the graduated drawing above must be respected.

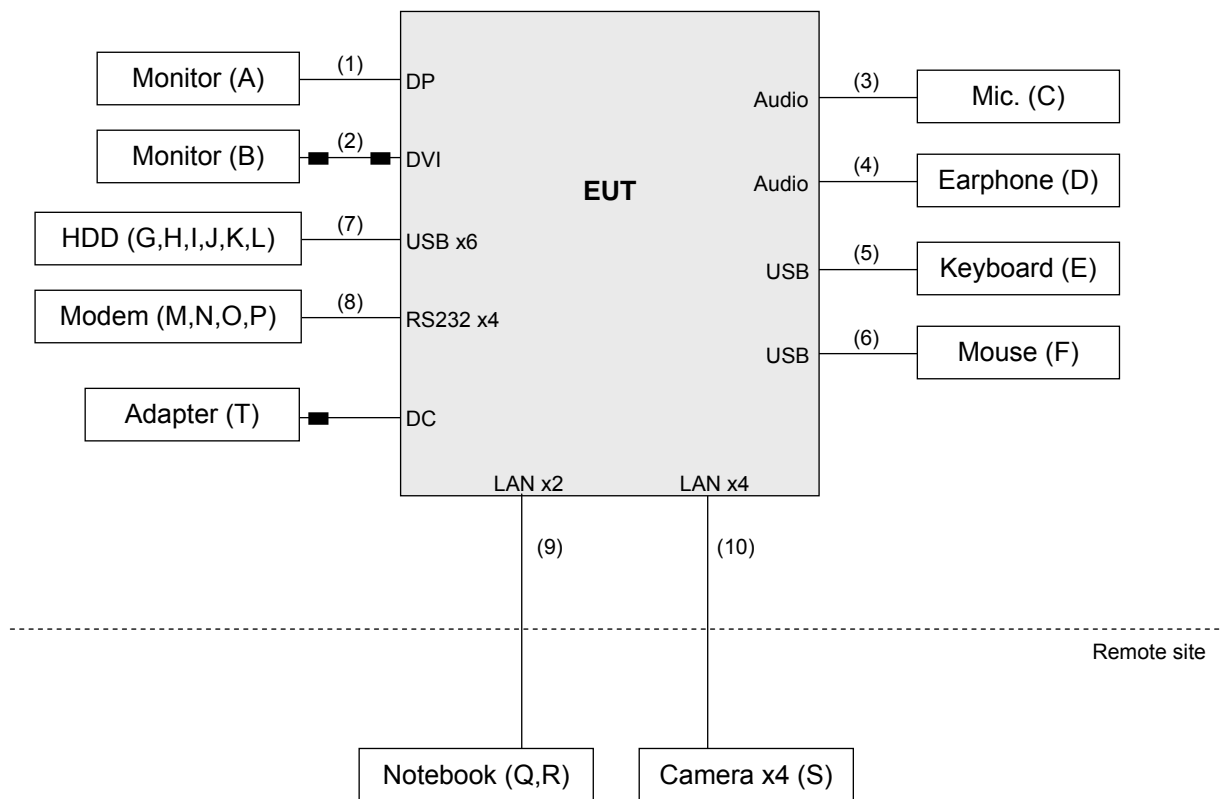
When the product is subject to other Directives covering other aspects and which also provide for the 'CE' marking, the accompanying documents must indicate that the product also conforms to those other Directives.

However, when one or more of those Directives allow the manufacturer, during a transitional period, to choose which arrangements to apply, the 'CE' marking has to indicate conformity only with the Directives applied by the manufacturer. In this case, the particularities of the Directives applied, as published in the Official Journal of the European Union, must be given in the documents, notices or instructions required by the Directives and accompanying such products.

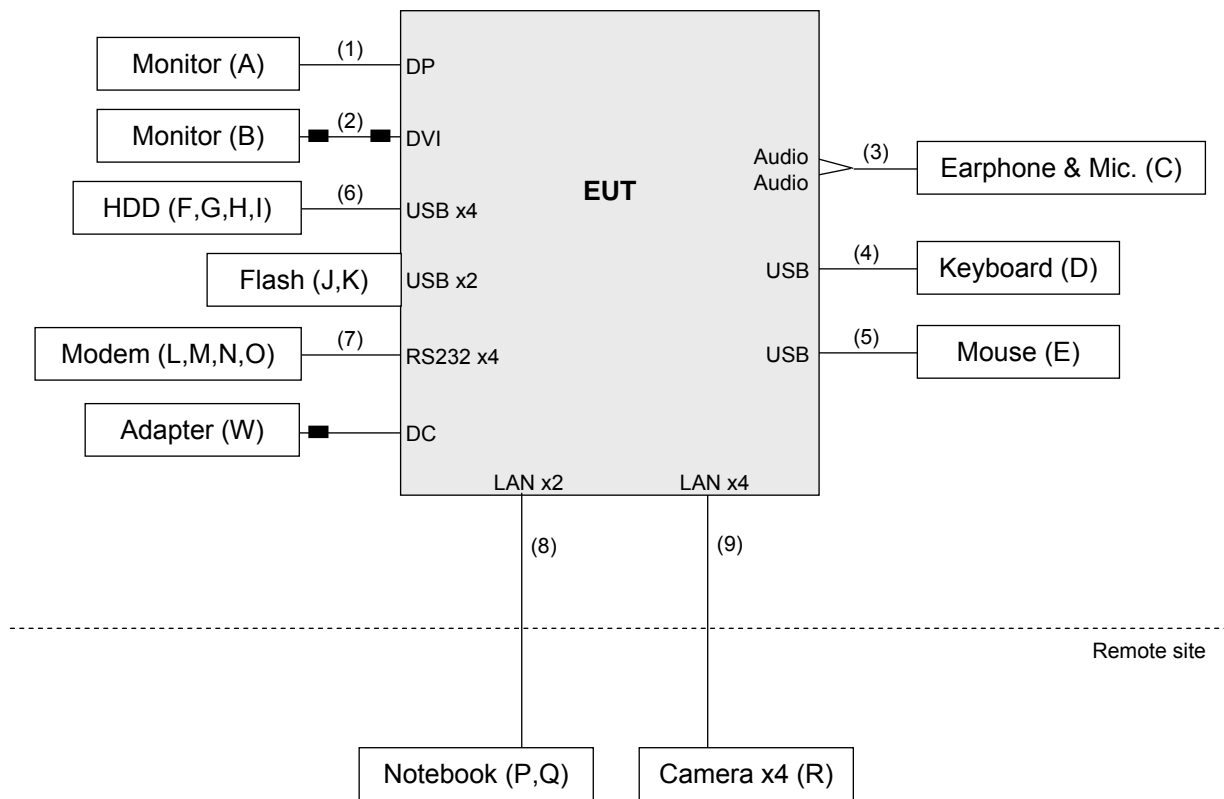
4 Configuration and Connections with EUT

4.1 Connection Diagram of EUT and Peripheral Devices

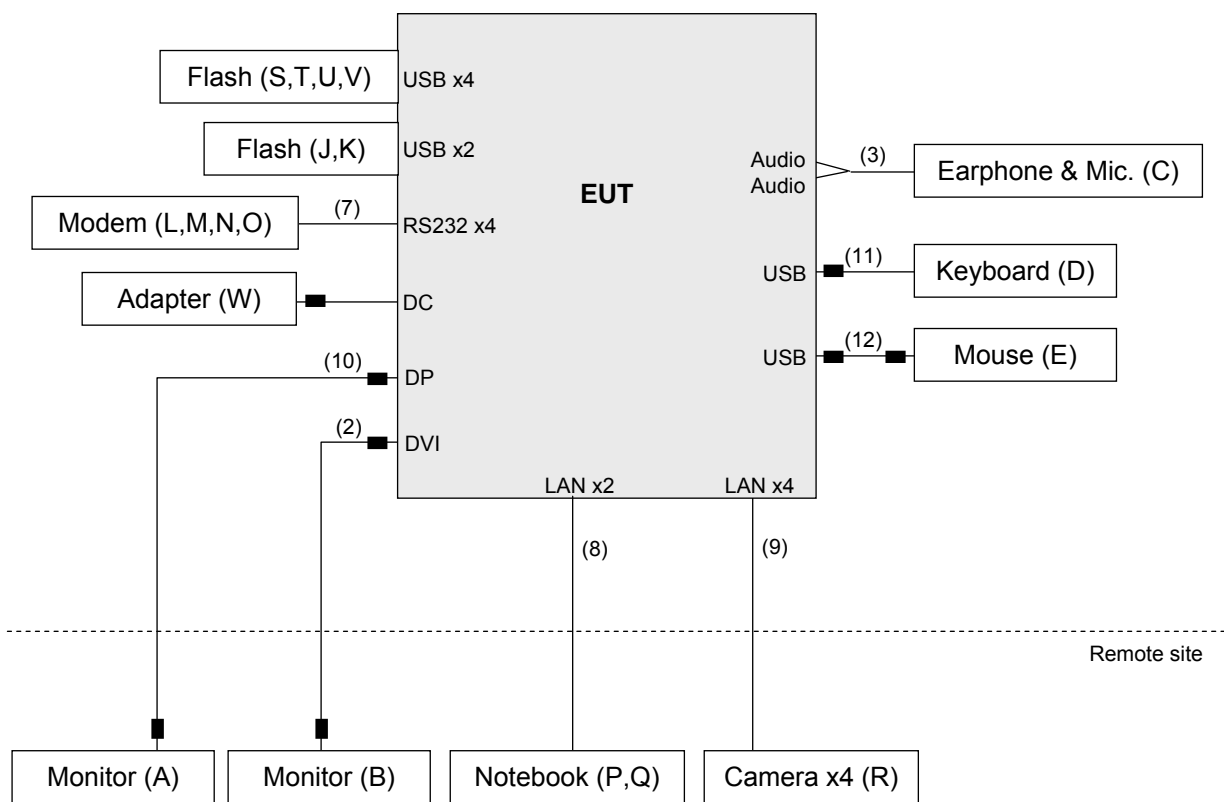
Emission tests:

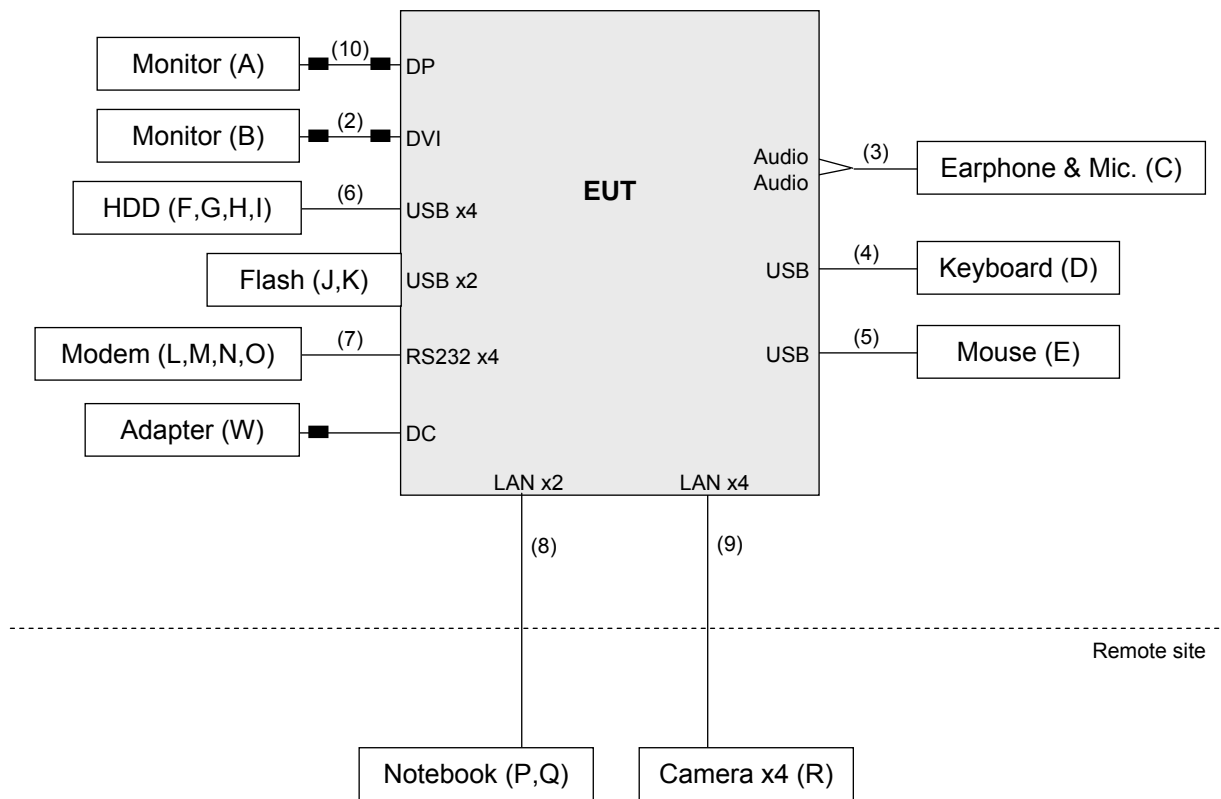


ESD, Surge, CS tests:



RS test:



EFT test:

4.2 Configuration of Peripheral Devices and Cable Connections

Emission tests:

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	24" LCD MONITOR	DELL	U2410	CN-0J257M-72872-0 A6-02NL	FCC DoC Approved	-
B.	24" LCD MONITOR	DELL	U2410	CN-0J257M-72872-0 A6-08JL	FCC DoC Approved	-
C.	MICROPHONE	Labtec	LVA7313	NA	NA	-
D.	EARPHONE	PHILIPS	SBC HL150	NA	NA	-
E.	Keyboard	DELL	SK-8115	MY-0DJ325-71619-68 U-1757	FCC DoC Approved	-
F.	MOUSE	DELL	M056U0	349003901	FCC DoC Approved	-
G.	External Hard Disk	WD	WDBACY5000ABL	WX81E71WXC27	FCC DoC Approved	-
H.	External Hard Disk	WD	WDBACY5000ABL -01	WXS1CC1D3606	FCC DoC Approved	-
I.	External Hard Disk	WD	WDBACY5000ABL	WX81E71TTS16	FCC DoC Approved	-
J.	External Hard Disk	TOSHIBA	V63700-B	53E2CFNUTSX4	FCC DoC Approved	-
K.	External Hard Disk	TOSHIBA	V63700-B	43J4T0EFTTS9	FCC DoC Approved	-
L.	External Hard Disk	TOSHIBA	V63700-B	53ERP61GTSX4	FCC DoC Approved	-
M.	MODEM	ACEEX	1414V/3	0401008246	IFAXDM1414	-
N.	MODEM	ACEEX	1414V/3	0401008268	IFAXDM1414	-
O.	MODEM	ACEEX	1414V/3	0401008244	IFAXDM1414	-
P.	MODEM	ACEEX	1414V/3	0401008263	IFAXDM1414	-
Q.	NB	DELL	V3560D	HGZ5RX1	FCC DoC Approved	-
R.	NB	lenovo	20AYA00MTW	MP042EKY	FCC DoC Approved	-
S.	Camera x4	NA	NA	NA	NA	Provided by manufacturer
T.	Adapter	MW	GS160A24	NA	NA	Provided by manufacturer

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items Q~S acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Display	1	1.8	Y	0	-
2.	DVI	1	1.8	Y	2	-
3.	Microphone	1	2.2	N	0	-
4.	Earphone	1	1.2	N	0	-
5.	USB	1	1.8	Y	0	-
6.	USB	1	1.8	Y	0	-
7.	USB	6	0.5	Y	0	-
8.	RS232	4	1.2	Y	0	-
9.	RJ45, Cat5e	2	10	N	0	-
10.	RJ45, Cat5e	4	10	N	0	-

Note: The core(s) is(are) originally attached to the cable(s).

Immunity tests:

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	24" LCD MONITOR	DELL	2407WFPb	CN-0FC255-46633-6 65-07US	FCC DoC Approved	-
B.	24" LCD MONITOR	DELL	2408FPb	CN-0G293H-74261- 874-237S-A00	FCC DoC Approved	-
C.	Earphone & Mic.	PHILIPS	SHM2100	NA	NA	-
D.	Keyboard	DELL	SK-8110	MY-05N456-71679-3 C1-1635	FCC DoC Approved	-
E.	MOUSE	DELL	MS111-P	CN-011D3V-71581-1 CJ-01A8	FCC DoC Approved	-
F.	External Hard Disk	ADATA	HV620	1E3620122267	FCC DoC Approved	-
G.	External Hard Disk	ADATA	HV620	1E3620122271	FCC DoC Approved	-
H.	External Hard Disk	ADATA	HV620	1E3620122277	FCC DoC Approved	-
I.	External Hard Disk	ADATA	HV620	1E3620122297	FCC DoC Approved	-
J.	USB Flash Drive	ADATA	S102	03	FCC DoC Approved	-
K.	USB Flash Drive	ADATA	S102	04	FCC DoC Approved	-
L.	MODEM	ACEEX	1414V/3	0401008257	IFAXDM1414	-
M.	MODEM	ACEEX	1414V/3	0401008260	IFAXDM1414	-
N.	MODEM	ACEEX	1414V/3	0401008241	IFAXDM1414	-
O.	MODEM	ACEEX	1414V/3	0401008262	IFAXDM1414	-
P.	Notebook	DELL	PP02X	T7CRDYR7FVTJM WXWHR22PPMH6	QDS-BRCM1005-D	-
Q.	Notebook	DELL	PP02X	Q6KMKR74WGCTY 8GHHGMTQT4J3	QDS-BRCM1005-D	-
R.	Camera x4	NA	NA	NA	NA	Provided by manufacturer
S.	USB Flash Drive	Transcend	8G	NA	FCC DoC Approved	-
T.	USB Flash Drive	Transcend	8G	NA	FCC DoC Approved	-
U.	USB Flash Drive	Transcend	8G	NA	FCC DoC Approved	-
V.	USB Flash Drive	Transcend	8G	NA	FCC DoC Approved	-
W.	Adapter	MW	GS160A24	NA	NA	Provided by manufacturer

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items P~R acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Display	1	1.8	Y	0	-
2.	DVI	1	1.8	Y	2	-
3.	Earphone	1	1.8	N	0	-
4.	USB	1	1.8	Y	0	-
5.	USB	1	1.8	Y	0	-
6.	USB	4	0.5	Y	0	-
7.	RS232	4	1.2	Y	0	-
8.	RJ45, Cat5e	2	3	N	0	-
9.	RJ45, Cat5e	4	3	N	0	-
10.	Display	1	1.8	Y	2	-
11.	USB	1	1.8	Y	1	-
12.	USB	1	1.8	Y	2	-

Note: The core(s) is(are) originally attached to the cable(s).

5 Conducted Disturbance at Auxiliary a.c. or d.c. Power Ports

5.1 Limits

Frequency (MHz)	Quasi-peak, (dBuV)
0.009 - 0.15	no limits
0.15 - 0.5	99
0.5 - 30	93

Notes: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Test Instruments

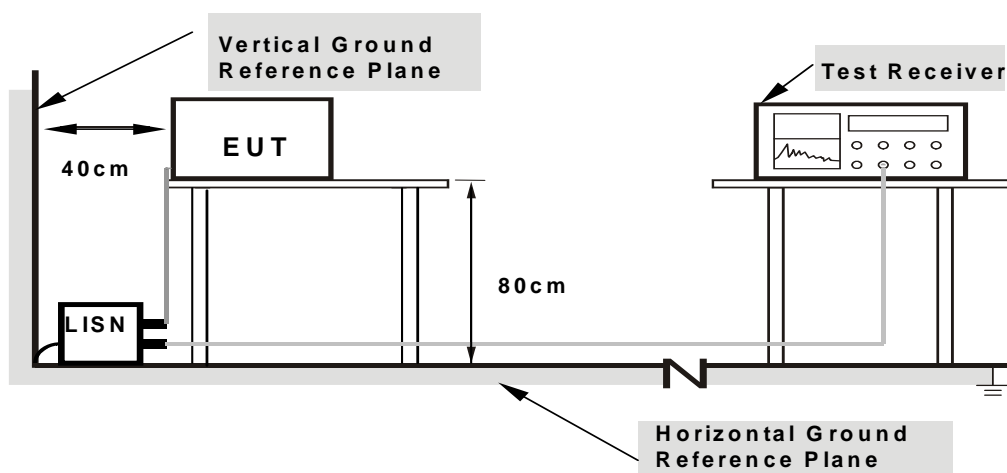
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

5.3 Test Arrangement

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



- Note:**
- Support units were connected to second LISN.
 - Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

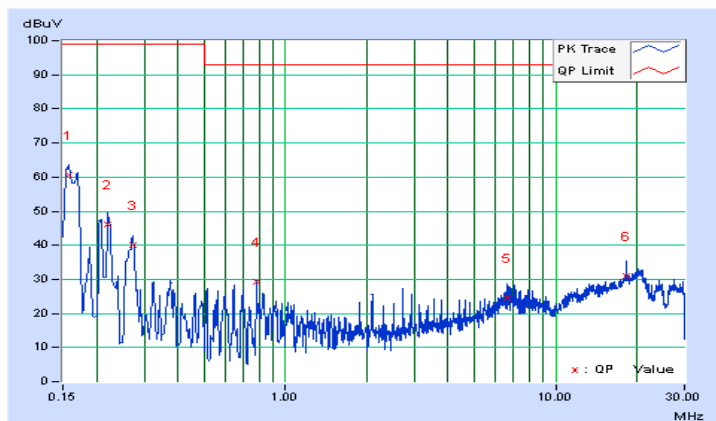
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230 Vac, 50 Hz (System)	Environmental Conditions	20°C, 60%RH
Tested by	Pon Tsai	Test Date	2015/8/4

Phase of Power : Line (L)						
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)
			Q.P.	Q.P.	Q.P.	Q.P.
1	0.15782	0.05	60.55	60.60	99.00	-38.40
2	0.22038	0.06	46.02	46.08	99.00	-52.92
3	0.27120	0.06	40.08	40.14	99.00	-58.86
4	0.78342	0.07	29.27	29.34	93.00	-63.66
5	6.60932	0.30	24.36	24.66	93.00	-68.34
6	18.24548	0.82	30.09	30.91	93.00	-62.09

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

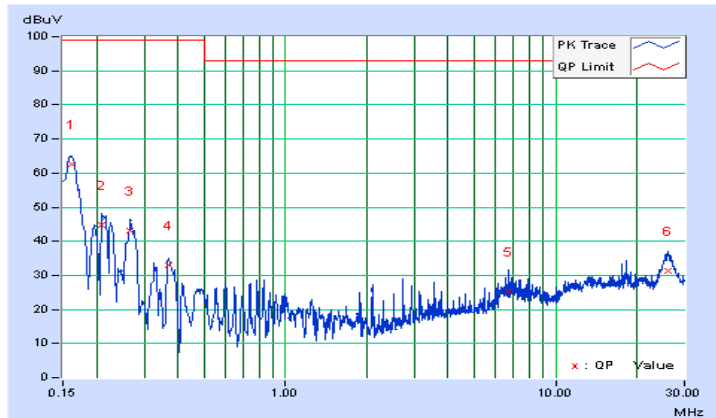


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230 Vac, 50 Hz (System)	Environmental Conditions	20°C, 60%RH
Tested by	Pon Tsai	Test Date	2015/8/4

Phase of Power : Neutral (N)						
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)
			Q.P.	Q.P.	Q.P.	Q.P.
1	0.16096	0.05	62.66	62.71	99.00	-36.29
2	0.20893	0.05	44.68	44.73	99.00	-54.27
3	0.26730	0.05	43.06	43.11	99.00	-55.89
4	0.36913	0.06	32.79	32.85	99.00	-66.15
5	6.70316	0.29	25.08	25.37	93.00	-67.63
6	26.01074	0.81	30.61	31.42	93.00	-61.58

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



6 Radiated Disturbance up to 1 GHz

6.1 Limits

Frequency (MHz)	dBuV/m (at 10m) / quasi-peak
30 - 230	40
230 - 1000	47

- Notes:
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2 Test Instruments

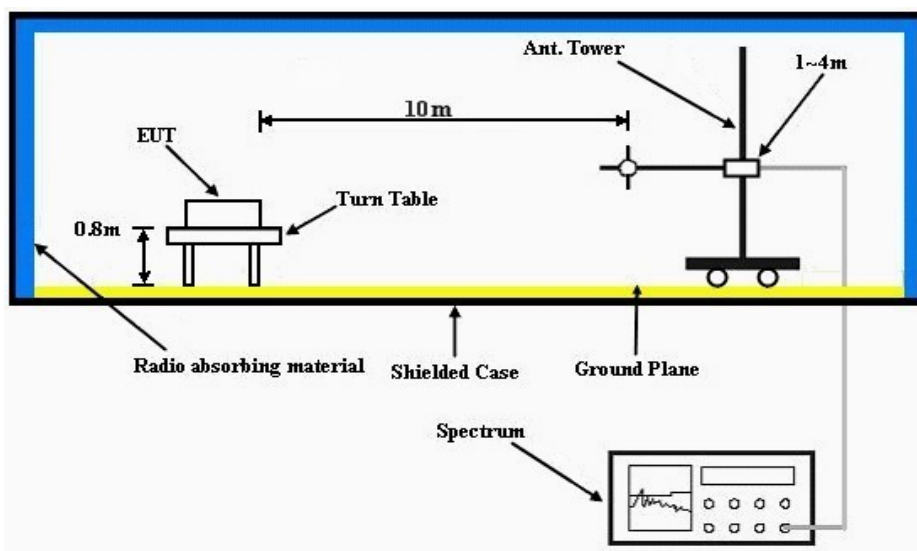
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ (V)	ESR	101240	Sep. 29, 2014	Sep. 28, 2015
Test Receiver ROHDE & SCHWARZ (H)	ESR	101264	Dec. 04, 2014	Dec. 03, 2015
BILOG Antenna SCHWARZBECK (V)	VULB9168	9168-149	Feb. 03, 2015	Feb. 02, 2016
BILOG Antenna SCHWARZBECK (H)	VULB9168	9168-154	Feb. 03, 2015	Feb. 02, 2016
Preamplifier Agilent (V)	8447D	2944A10636	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent (H)	8447D	2944A10637	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8449B	3008A01959	Oct. 17, 2015	Oct. 17, 2015
RF signal cable Woken (V)	8D-FB	Cable-CH(V)-01	Oct. 24, 2015	Oct. 24, 2015
RF signal cable Woken (H)	8D-FB	Cable-CH(H)-01	Oct. 24, 2015	Oct. 24, 2015
Software BV ADT	BV ADT_Radiated_ V 8.7.07	NA	NA	NA
Antenna Tower (V)	MFA-440	9707	NA	NA
Antenna Tower (H)	MFA-440	970705	NA	NA
Turn Table	DS430	50303	NA	NA
Controller (V)	MF7802	074	NA	NA
Controller (H)	MF7802	08093	NA	NA

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 1.
 3. The FCC Site Registration No. is 477732.
 4. The IC Site Registration No. is IC 7450F-1.
 5. The VCCI Site Registration No. is R-1893.

6.3 Test Arrangement

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.



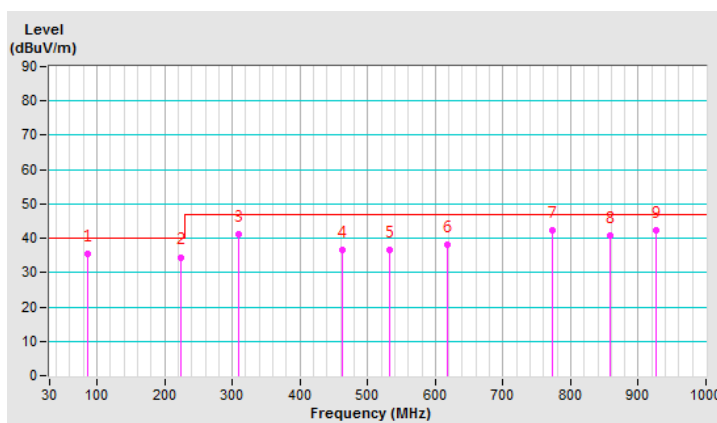
6.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	230 Vac, 50 Hz (System)	Environmental Conditions	20°C, 61%RH
Tested by	Rolan Zheng	Test Date	2015/8/7

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	85.83	35.47 QP	40.00	-4.53	4.00 H	233	54.90	-19.43
2	223.19	34.51 QP	40.00	-5.49	3.00 H	303	50.24	-15.73
3	309.03	41.06 QP	47.00	-5.94	3.00 H	234	52.44	-11.38
4	463.51	36.69 QP	47.00	-10.31	2.00 H	68	44.69	-8.00
5	532.19	36.64 QP	47.00	-10.36	1.50 H	79	43.41	-6.77
6	618.04	38.02 QP	47.00	-8.98	2.00 H	63	42.47	-4.45
7	772.57	42.25 QP	47.00	-4.75	1.50 H	86	43.80	-1.55
8	858.42	40.87 QP	47.00	-6.13	1.00 H	196	41.09	-0.22
9	927.10	42.19 QP	47.00	-4.81	3.50 H	258	40.98	1.21

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

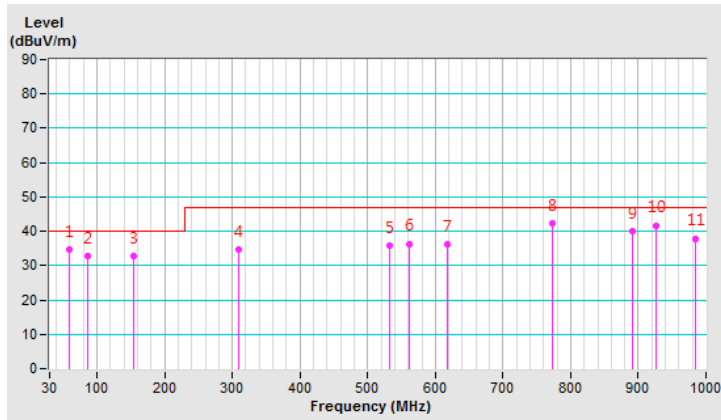


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Input Power	230 Vac, 50 Hz (System)	Environmental Conditions	20°C, 61%RH
Tested by	Rolan Zheng	Test Date	2015/8/7

Antenna Polarity & Test Distance : Vertical at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	59.83	34.76 QP	40.00	-5.24	1.50 V	33	48.74	-13.98
2	85.83	32.88 QP	40.00	-7.12	3.50 V	335	52.02	-19.14
3	154.51	32.84 QP	40.00	-7.16	1.00 V	277	45.55	-12.71
4	309.03	34.70 QP	47.00	-12.30	4.00 V	153	45.44	-10.74
5	532.19	35.84 QP	47.00	-11.16	1.00 V	319	41.84	-6.00
6	562.51	36.42 QP	47.00	-10.58	4.00 V	317	41.87	-5.45
7	618.04	36.22 QP	47.00	-10.78	4.00 V	314	39.94	-3.72
8	772.57	42.46 QP	47.00	-4.54	2.00 V	303	42.83	-0.37
9	890.63	39.91 QP	47.00	-7.09	2.00 V	279	38.51	1.40
10	927.10	41.73 QP	47.00	-5.27	2.50 V	246	39.18	2.55
11	984.43	37.92 QP	47.00	-9.08	2.00 V	340	34.70	3.22

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



7 Electrostatic Discharge Immunity Test (ESD)

7.1 Test Specification

Basic Standard:	EN/IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: ± 2 , ± 4 , ± 8 kV (Direct) Contact Discharge: ± 2 , ± 4 , ± 6 kV (Direct/Indirect)
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

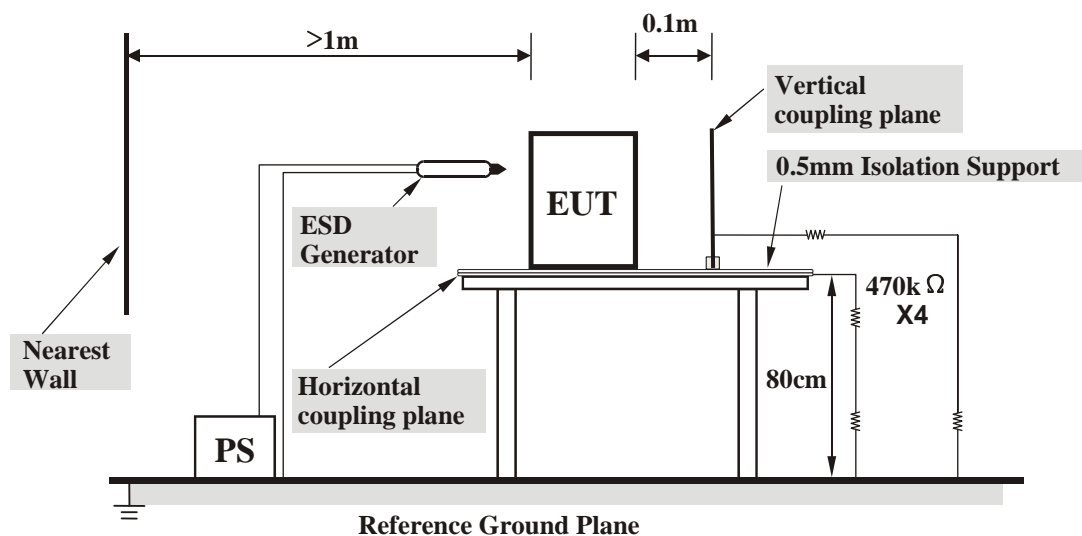
7.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Schaffner ESD generator	NSG 435	6008	Nov. 04, 2014	Nov. 03, 2015

- Notes: 1. The test was performed in Hwa Ya ESD Room 4.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.3 Test Arrangement

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



7.4 Test Results

Input Power	24 Vdc	Test Date	2015/8/12
Environmental Conditions	24 °C, 55% RH 984 mbar	Tested by	Tom Tang

Test Results of Direct Application

Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2	+/-	1-4	Note 1	NA	A
4, 6	+/-	1-4	Note 2	NA	B
2, 4	+/-	5-6	Note 1	NA	A
6	+/-	5-6	Note 2	NA	B
2, 4	+/-	7-9	NA	Note 1	A
8	+/-	7-9	NA	Note 2	B
2, 4	+/-	10	NA	Note 1	A
8	+/-	10	NA	Note 3	B

Description of test points of direct application: Please refer to following page for representative mark only.

Test Results of Indirect Application

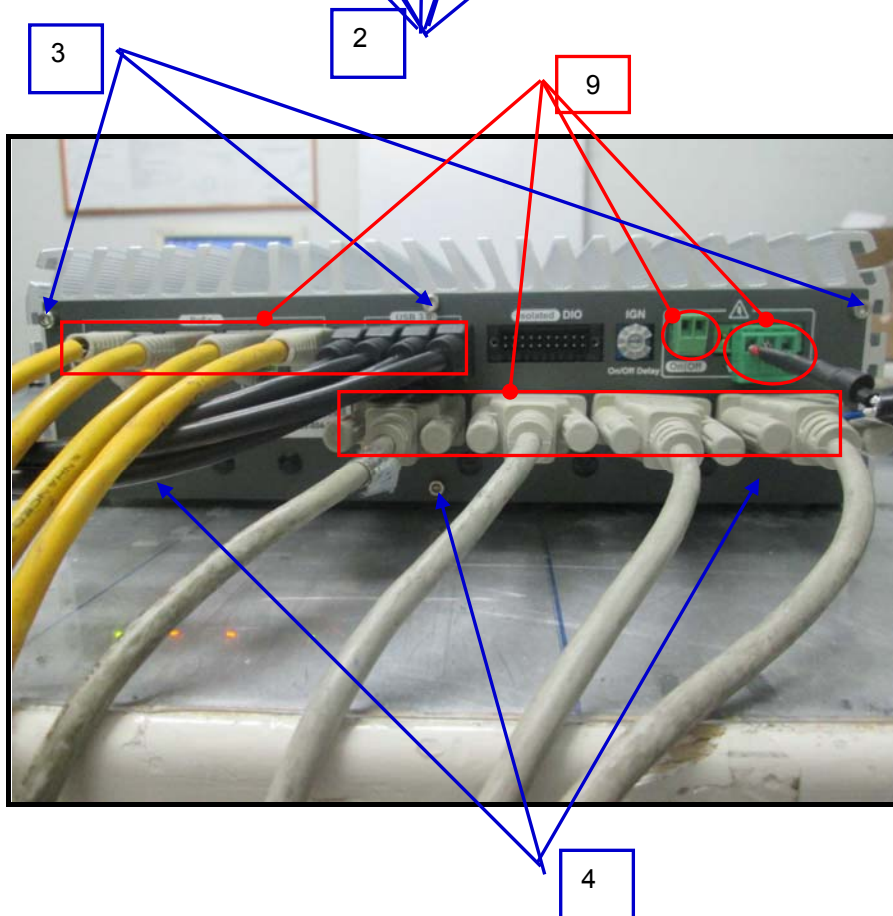
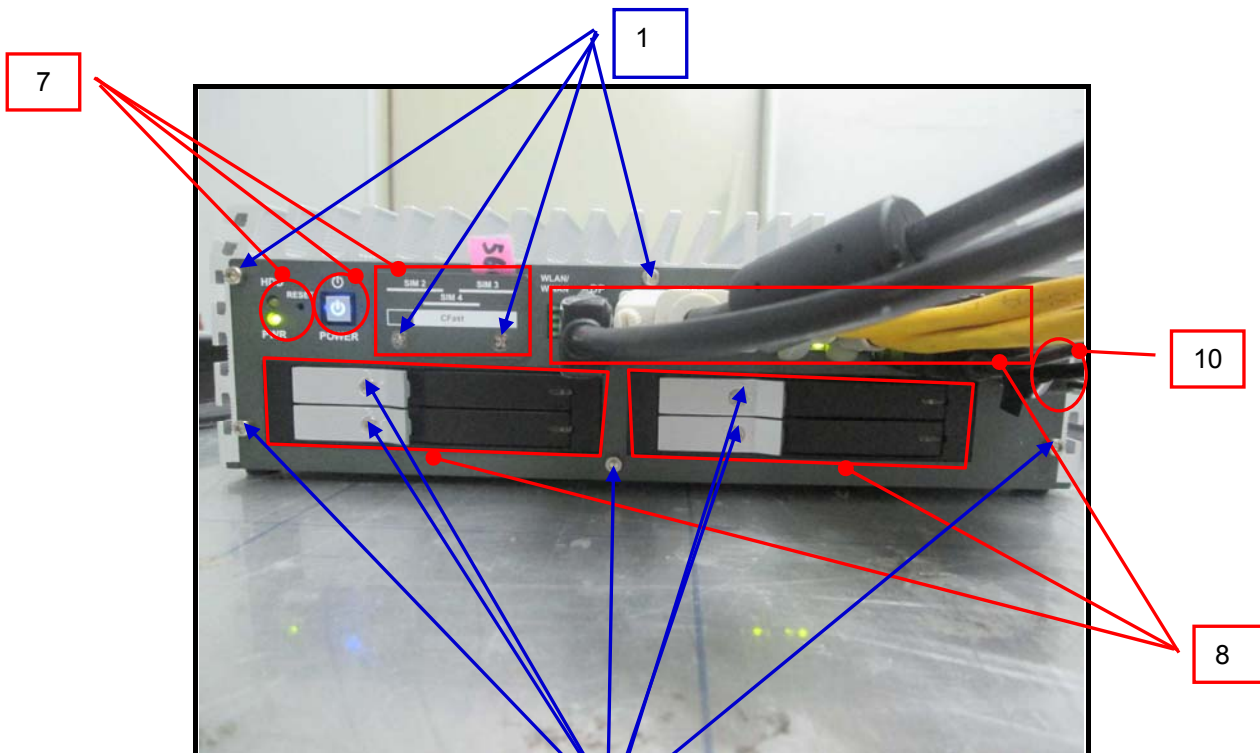
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A
6	+/-	Four Sides	Note 3	Note 3	B

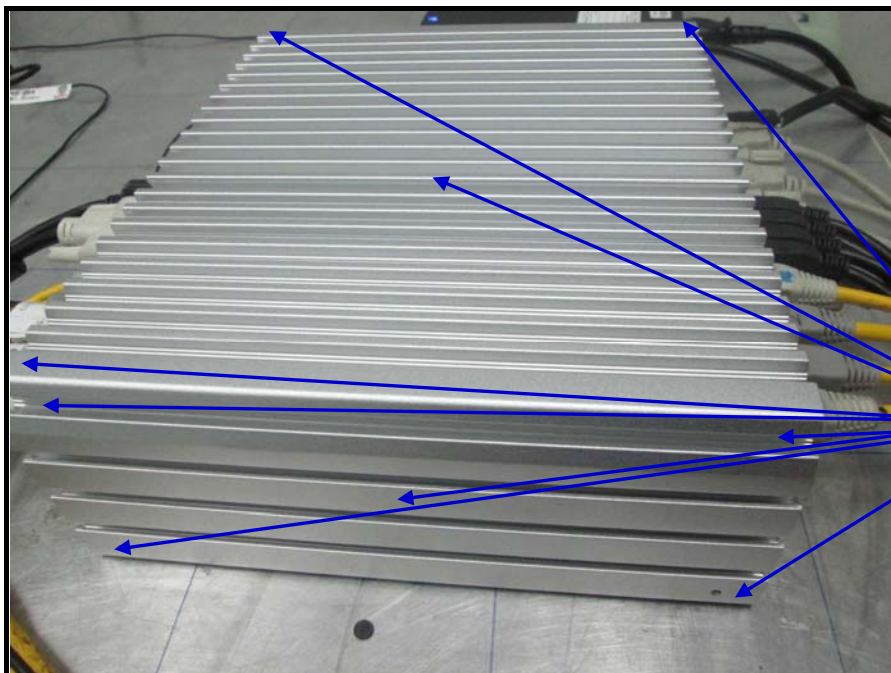
Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

- Note: 1. The EUT function was correct during the test.
 2. The screen showed water line during the test, but could self-recover after the test.
 3. The earphone had disturbance noise during the test, but could self-recover after the test.

Description of Test Points





5



6

8 Radio-frequency Electromagnetic Field Immunity Test (RS)

8.1 Test Specification

Basic Standard:	EN/IEC 61000-4-3
	80-1000 MHz, 20V/m ¹
Frequency Range, Field Strength:	800-1000 MHz, 20V/m
	1400-2100 MHz, 10V/m
	2100-2500 MHz, 5V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.55m
Dwell Time:	3 seconds

Note 1: This limit applies to equipment mounted in the passenger compartments, drivers cab or external to the rolling stock (roof, underframe). For equipment mounted in all other areas a severity level of 10 V/m may be used.

8.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Power Amp ROHDE & SCHWARZ	BBA 100	101761	NA	NA
Power Amp ROHDE & SCHWARZ	BBA150	101714	NA	NA
Power Sensor ROHDE & SCHWARZ	NRP-Z91	102733	Oct. 13, 2014	Oct. 12, 2015
Power Sensor ROHDE & SCHWARZ	NRP-Z91	102732	Oct. 13, 2014	Oct. 12, 2015
Signal Generator ROHDE & SCHWARZ	SMBV100A	260761	Oct. 14, 2014	Oct. 13, 2015
R&S Software	EMC32 Version 9.15.03	NA	NA	NA
LOG ANTENNA Schwarzbeck	STLP9149	9149-280	NA	NA
LOG ANTENNA Amplifier Research	AT5080ANT	303730	NA	NA
ELECTRIC FIELD PROBE AR	FL7006	0338717	May 19, 2015	May 18, 2016

- Notes: 1. The test was performed in Hwa Ya RS Room 1.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The transmit antenna was located at a distance of 3 meters from the EUT.

8.3 Test Arrangement

The test procedure was in accordance with EN/IEC 61000-4-3.

- The testing was performed in a modified semi-anechoic chamber.
- The frequency ranges and field strength levels are 80-1000 MHz, 20V/m & 800-1000 MHz, 20V/m & 1400-2100 MHz, 10V/m and 2100-2500 MHz, 5V/m with the signal 80% amplitude modulated with a 1kHz sine wave.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

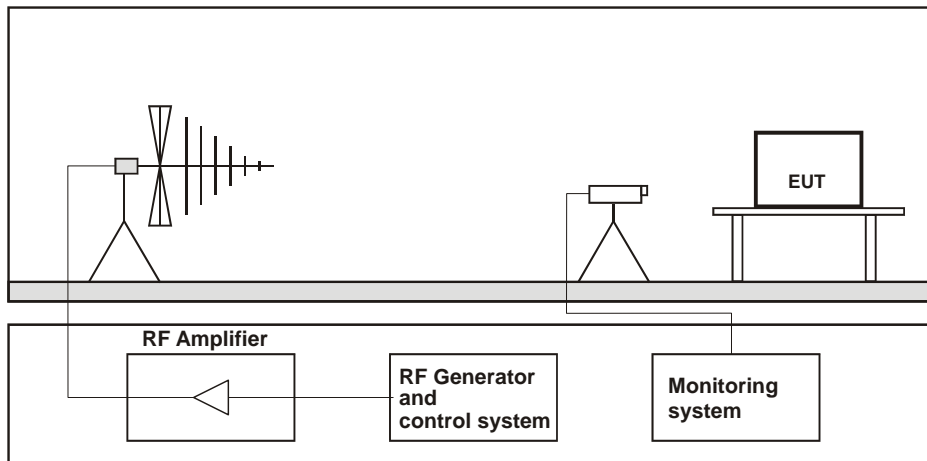


Table-top Equipment

The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

8.4 Test Results

Input Power	24 Vdc	Test Date	2015/8/27
Environmental Conditions	24 °C, 58% RH	Tested by	Vison Tseng

Frequency (MHz)	Polarity	Azimuth (°)	Applied Field Strength (V/m)	Observation	Performance Criterion
80-1000	V&H	0, 90, 180, 270	20	Note 1	A
800-1000	V&H	0, 90, 180, 270	20	Note 1	A
1400-2100	V&H	0, 90, 180, 270	10	Note 1	A
2100-2500	V&H	0, 90, 180, 270	5	Note 1	A

Note: 1. The EUT function was correct during the test.

9 Electrical Fast Transient/Burst Immunity Test (EFT)

9.1 Test Specification

Basic Standard:	EN/IEC 61000-4-4
Test Voltage:	Signal & communication, process measurement & control ports: $\pm 2\text{kV}$, Capacitive clamp Auxiliary a.c. power input ports (rated voltage $\leq 400\text{ Vrms}$): $\pm 2\text{kV}$
Impulse Repetition Frequency:	5kHz
Impulse Wave Shape:	5/50 (T_r/T_h) ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 min.

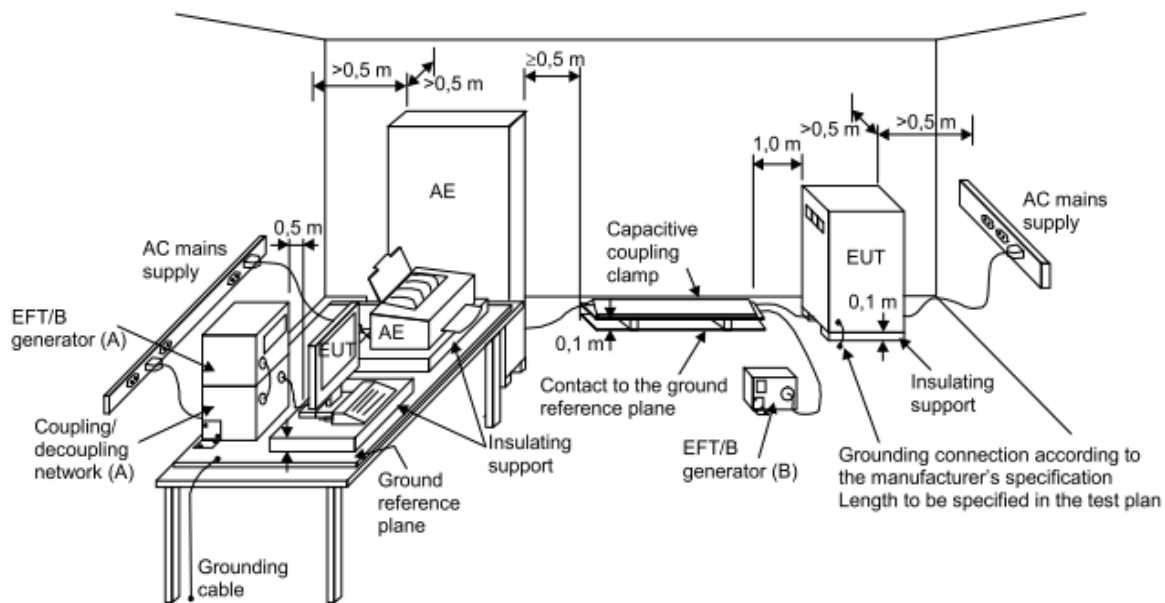
9.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC-Partner EFT Generator	TRA2000 EFT-C1	623	May 14, 2015	May 13, 2016
EMC-Partner Capacitive Coupling clamp	CN-EFT1000	364	May 14, 2015	May 13, 2016
EFT Adapter WONPRO	WA	EF1Ada-001	NA	NA
Software	EMC-Partner GENECS	NA	NA	NA

- Notes: 1. The test was performed in Hwa Ya EFT Room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

9.3 Test Arrangement

- Both positive and negative polarity discharges were applied.
- The distance between any coupling devices and the EUT should be 0.5 m for table-top equipment testing, and 1.0 m for floor standing equipment.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with EN/IEC 61000-4-4, 5/50 ns.



IEC 645/12

Note:

- location for supply line coupling
- location for signal lines coupling

9.4 Supplementary Information

The requirement followed by the manufacturer's specification.

9.5 Test Results

Input Power	24 Vdc	Test Date	2015/9/4
Environmental Conditions	24 °C, 65% RH	Tested by	Josh Lin

Signal port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
2	LAN 1	+/-	Note 1, 2, 3	Pass*
2	LAN 2	+/-	Note 1, 2, 3	Pass*
2	LAN 3	+/-	Note 1, 2, 3	Pass*
2	LAN 4	+/-	Note 1, 2, 3	Pass*
2	LAN 5	+/-	Note 1, 2, 3	Pass*
2	LAN 6	+/-	Note 1, 2, 3	Pass*

*The criterion classified to pass result is judged by the manufacturer. It is an inherent phenomenon according to manufacturer's performance criterion.

- Note: 1. The screen showed water line during the test, but could self-recover after the test.
 2. The earphone had disturbance noise during the test, but could self-recover after the test.
 3. The EUT lost of LAN PING during the test, but could self-recover after the test.

Input Power	230 Vac, 50 Hz (System)	Test Date	2015/8/25
Environmental Conditions	24 °C, 65% RH	Tested by	Josh Lin

Power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
2	L1	+/-	Note 1, 2, 3	Pass*
2	L2	+/-	Note 1, 2, 3	Pass*
2	PE	+/-	Note 1, 2, 3	Pass*
2	L1-L2-PE	+/-	Note 1, 2, 3	Pass*

Signal port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
2	LAN 1	+/-	Note 1, 2, 3	Pass*
2	LAN 2	+/-	Note 1, 2, 3	Pass*
2	LAN 3	+/-	Note 1, 2, 3	Pass*
2	LAN 4	+/-	Note 1, 2, 3	Pass*
2	LAN 5	+/-	Note 1, 2, 3	Pass*
2	LAN 6	+/-	Note 1, 2, 3	Pass*

*The criterion classified to pass result is judged by the manufacturer. It is an inherent phenomenon according to manufacturer's performance criterion.

- Note: 1. The screen showed water line during the test, but could self-recover after the test.
 2. The earphone had disturbance noise during the test, but could self-recover after the test.
 3. The EUT lost of LAN PING during the test, but could self-recover after the test.

10 Surge Immunity Test

10.1 Test Specification

Basic Standard:	EN/IEC 61000-4-5
Wave-Shape:	Auxiliary a.c. power input ports (rated voltage ≤ 400 Vrms): 1.2/50 μ s Open Circuit Voltage 8/20 μ s Short Circuit Current
Test Voltage:	Line to line: $\pm 0.5, \pm 1$ kV, Line to ground: $\pm 0.5, \pm 1, \pm 2$ kV output impedance of 42 Ω (40 Ω and 2 Ω generator) and a coupling capacitance of 0,5 μ F
AC Phase Angle (degree):	0°, 90°, 180°, 270°
Pulse Repetition Rate:	1 time / 60 sec.
Number of Tests:	5 positive and 5 negative at selected points

10.2 Test Instruments

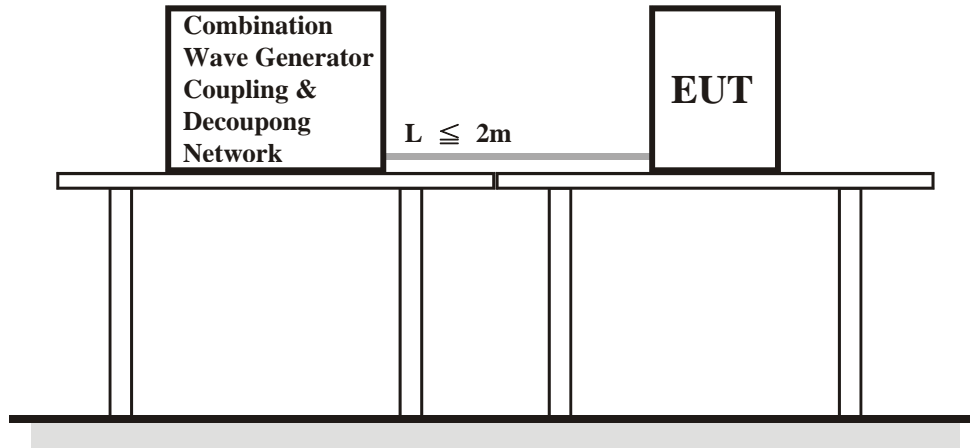
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Modular Impulse Generator EMC-Partner	MIG0603IN3 IEC-ANSI	352	Sep. 02, 2014	Sep. 01, 2015
Universal Surge Coupling De-Coupling Network EMC-Partner	CDN-UTP8	011	Sep. 02, 2014	Sep. 01, 2015
Surge Adapter WONPRO	WA	SU1 Ada-001	NA	NA

- Notes: 1. The test was performed in Hwa Ya Surge Room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

10.3 Test Arrangement

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.



10.4 Supplementary Information

The requirement followed by the manufacturer's specification.

10.5 Test Results

Input Power	230 Vac, 50 Hz (System)	Test Date	2015/8/25
Environmental Conditions	24 °C, 65% RH	Tested by	Josh Lin

Power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5, 1	L1-L2	+/-	Note 1	A
0.5, 1, 2	L1-PE	+/-	Note 1	A
0.5, 1, 2	L2-PE	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

11 Immunity to Conducted Disturbances Induced by RF Fields (CS)

11.1 Test Specification

Basic Standard:	EN/IEC 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	Auxiliary a.c. power input ports (rated voltage \leq 400 Vrms): NA Signal & communication, process measurement & control ports: 10 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

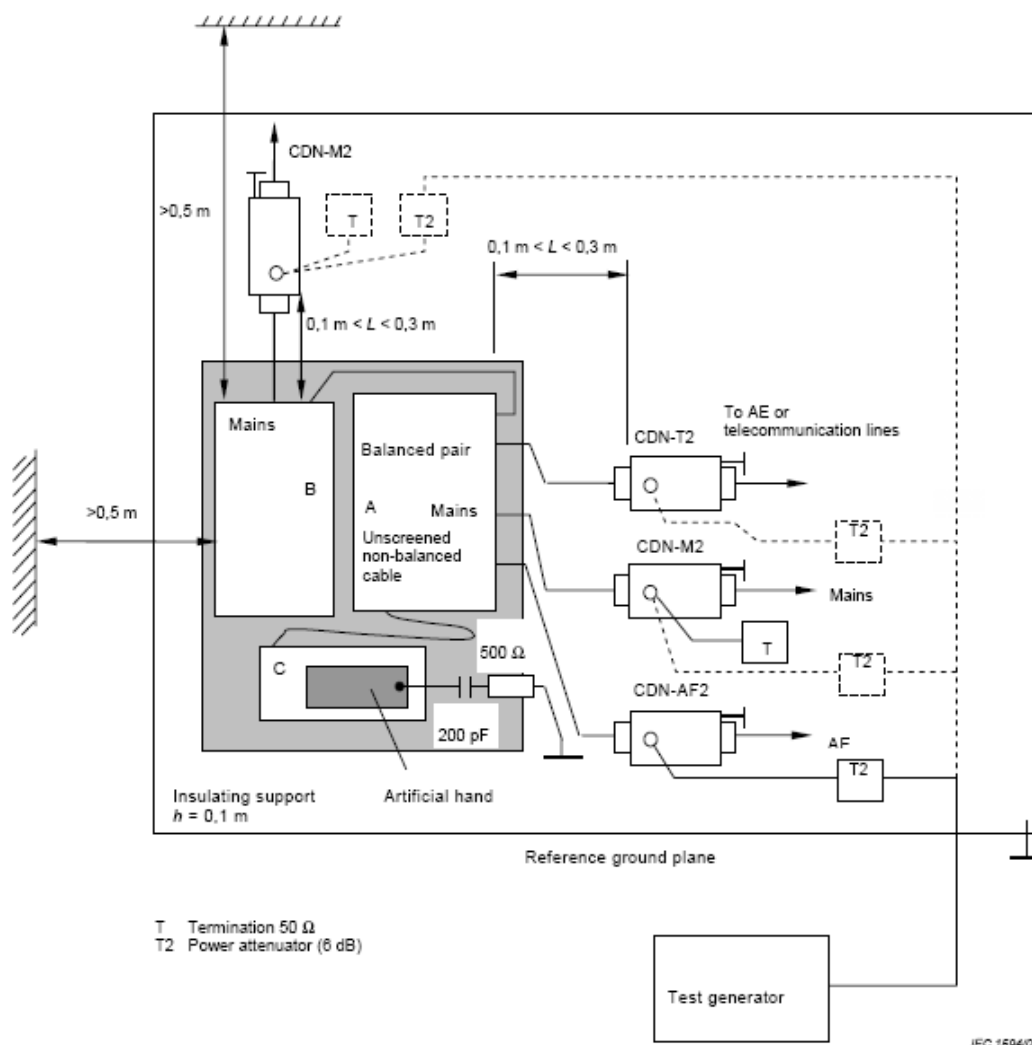
11.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M1-25A	03030	Apr. 22, 2015	Apr. 21, 2016
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M2-25A	03049	Nov. 07, 2014	Nov. 06, 2015
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M2-25A	03050	Nov. 07, 2014	Nov. 06, 2015
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M3-25A	03056	Nov. 07, 2014	Nov. 06, 2015
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M3-25A	03057	Nov. 07, 2014	Nov. 06, 2015
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-T2	03030	Nov. 07, 2014	Nov. 06, 2015
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-T4	03031	Nov. 07, 2014	Nov. 06, 2015
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	F-090407-1004-1	100923	Jul. 13, 2015	Jul. 12, 2016
EMI Injection Clamp	F203I-23MM	434	Nov. 07, 2014	Nov. 06, 2015
Amplifier Research Power Amplifier	75A250AM2	307804	NA	NA
BOONTON 4232ARF POWER METER	4232A	104302	Nov. 24, 2014	Nov. 23, 2015
R&S Signal Generator	SML01	102148	Nov. 14, 2014	Nov. 13, 2015
Software	ADT_CS_V37	NA	NA	NA
POWER SENSOR	51011-EMC	30028	Nov. 24, 2014	Nov. 23, 2015
POWER SENSOR	51011-EMC	33029	Nov. 24, 2014	Nov. 23, 2015
6dB Attenuator	HFP-575-3/6-N M/F	NA	NA	NA

- Notes: 1. The test was performed in Hwa Ya CS Room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

11.3 Test Arrangement

- The EUT shall be tested within its intended operating and climatic conditions.
- An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- One of the CDNs not used for injection was terminated with 50 ohm, providing only one return path. All other CDNs were coupled as decoupling networks.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.



- Note:
- The EUT clearance from any metallic obstacles shall be at least 0,5 m.
 - Interconnecting cables (≤ 1 m) belonging to the EUT shall remain on the insulating support.

11.4 Supplementary Information

The requirement followed by the manufacturer's specification.

11.5 Test Results

Input Power	24 Vdc	Test Date	2015/8/13
Environmental Conditions	24 °C, 56% RH	Tested by	Leo Chan

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 80	10	LAN 1	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 2	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 3	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 4	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 5	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 6	CDN-T8	CDN-M2	Note 1	A

Note: 1. The EUT function was correct during the test.

Input Power	230 Vac, 50 Hz (System)	Test Date	2015/8/13
Environmental Conditions	24 °C, 56% RH	Tested by	Leo Chan

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 80	10	AC Power	CDN-M3	CDN-T8	Note 1	A
0.15 – 80	10	LAN 1	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 2	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 3	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 4	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 5	CDN-T8	CDN-M2	Note 1	A
0.15 – 80	10	LAN 6	CDN-T8	CDN-M2	Note 1	A

Note: 1. The EUT function was correct during the test.

12 Pictures of Test Arrangements

12.1 Conducted Disturbance at Auxiliary d.c. power ports



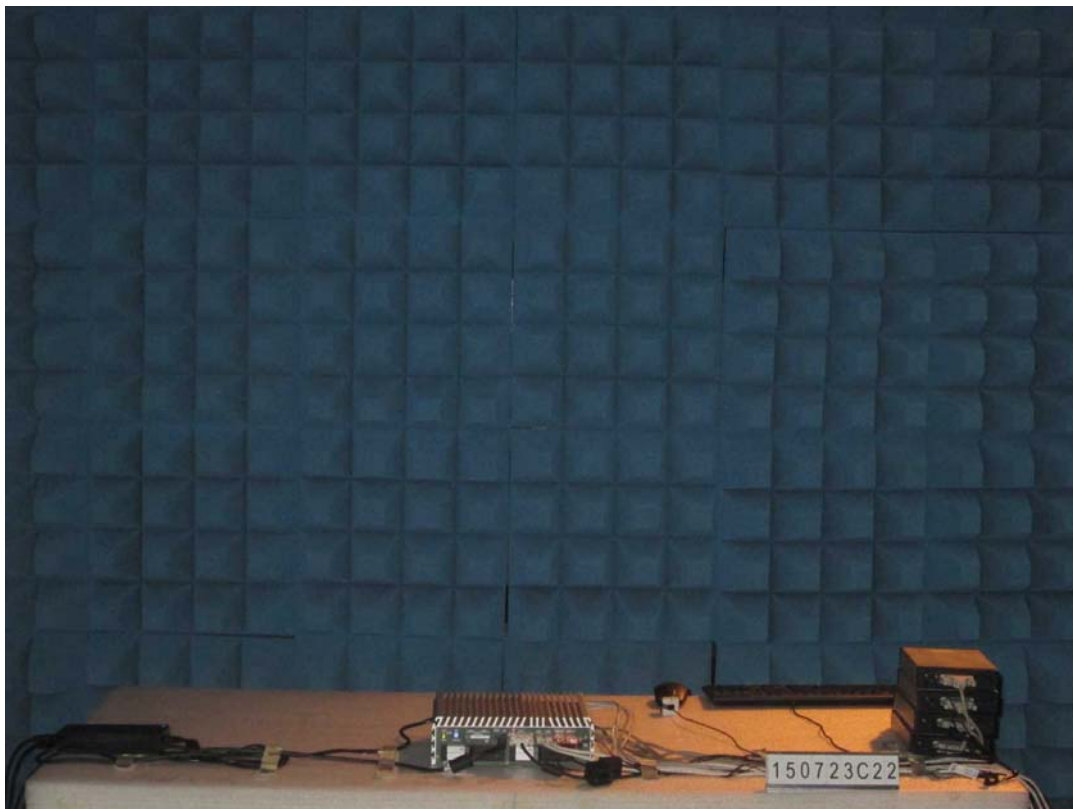
12.2 Radiated Disturbance up to 1 GHz



12.3 Electrostatic Discharge Immunity Test (ESD)



12.4 Radio-frequency Electromagnetic Field Immunity Test (RS)



12.5 Fast Transients (EFT)

LAN 1, 2 port (DC)



LAN 3, 4, 5, 6 port (DC)



AC power port



LAN 1, 2 port (AC)



LAN 3, 4, 5, 6 port (AC)



12.6 Surge

Mains ports



12.7 Radio-frequency common mode (CS)

LAN 1, 2 port (DC)



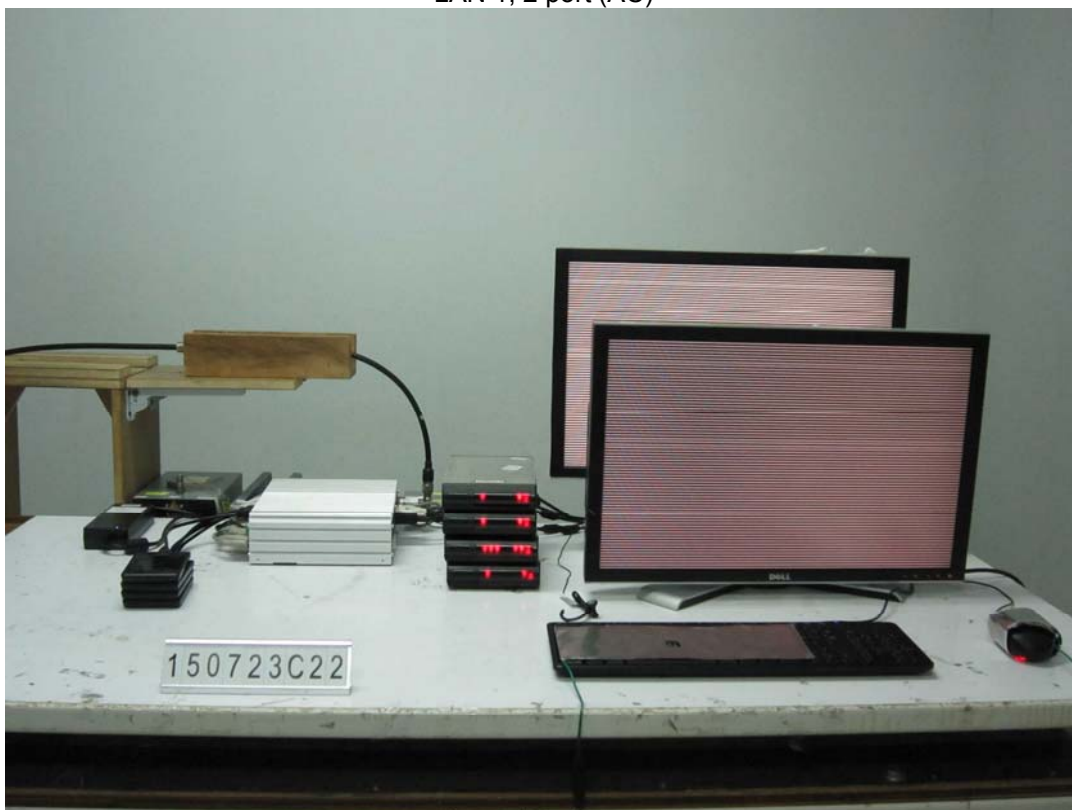
LAN 3, 4, 5, 6 port (DC)



AC power port



LAN 1, 2 port (AC)



LAN 3, 4, 5, 6 port (AC)





Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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