EMC Test Report

Issued Date : Nov. 30, 2010
Project No. : 0703C143A
Equipment : 3.5" SATA Mobile Rack
Model Name : T-7-SA;T-7-M1

Applicant : iStarUSA Inc.
Address : 727 Phillips Drive, City of Industry, CA 91748, USA

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Mar. 30, 2007
Date of Test:
Mar. 30, 2007 ~Apr. 04, 2007

Testing Engineer: _____ (Josh Lin)

Technical Manager: _____ (Jeff Yang)

Authorized Signatory : _____ (Andy Chiu)

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NVLAP Lab Code: 200145-0 ilac-MRA TAF Testing Laboratory 0659 VCCI R-2669 R-2829 C-2918

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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1. CERTIFICATION

Equipment:	3.5” SATA Mobile Rack
Brand Name:	iStar
Model Name:	T-7-SA;T-7-M1
Applicant:	iStarUSA Inc.
Date of Test:	Mar. 30, 2007 ~Apr. 04, 2007
Test Item:	ENGINEERING SAMPLE
Standards:	EN 55022:1998+A1:2000+A2:2003 Class B
	EN 55024:1998+A1: 2001+A2: 2003
	IEC 61000-4-2: 2001
	IEC 61000-4-3: 2002
	IEC 61000-4-4: 2004
	IEC 61000-4-5: 2001
	IEC 61000-4-6: 2003+A1:2004
	IEC 61000-4-8: 2001
	IEC 61000-4-11: 2001

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-EMC-1-0703C143A)were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55022:1998 +A1:2000+A2:2003	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	
EN 61000-3-2:2006	Harmonic Current Emission	Class A or D **NOTE (2)**	N/A	N/A
EN 61000-3-3:1995 +A1: 2001	Voltage Fluctuations & Flicker	------	N/A	N/A
EMC Immunity EN 55024:1998+A1: 2001+A2: 2003				
Section	Test Item	Performance Criteria	Judgment	Remark
IEC 61000-4-2:2001	Electrostatic Discharge	B	PASS	
IEC 61000-4-3:2002	RF electromagnetic field	A	PASS	
IEC 61000-4-4:2004	Fast transients	B	PASS	
IEC 61000-4-5:2001	Surges	B	PASS	
IEC 61000-4-6: 2003+A1:2004	Injected Current	A	PASS	
IEC 61000-4-8:2001	Power Frequency Magnetic Field	A	PASS	
IEC 61000-4-11:2001	Volt. Interruptions Volt. Dips	B / C / C **NOTE (3)**	PASS	

NOTE:

(1) ” N/A” denotes test is not applicable in this Test Report.

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: ＞95% reduction – Performance Criteria **B**
Voltage dip: 30% reduction – Performance Criteria **C**
Voltage Interruption: ＞95% reduction – Performance Criteria **C**

(4) For client’s request and manual description, the test will not be executed.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **C01/OS02** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95**%。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
OS-02	ANSI	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	3.5” SATA Mobile Rack
Brand Name	iStar
Model Name	T-7-SA;T-7-M1
OEM Brand/Model Name	N/A
Model Difference	Compared with previous report (NEI-EMC-1-0703C143), Model name, brand and applicant are changed. Model difference is model name.
Product Description	The EUT is a 3.5” SATA Mobile Rack. Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Power Source	Supplied from PC Power.
Power Rating	N/A
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A
EUT Modification(s)	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

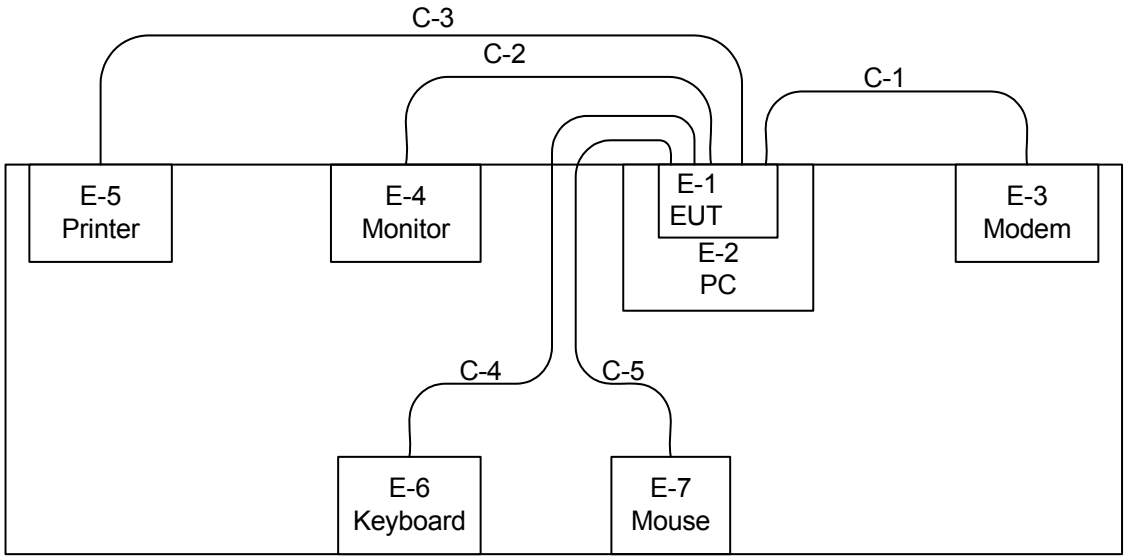
Pretest Mode	Description
Mode 1	SYSTEM LOAD

The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For Conducted / Radiated Test	
Final Test Mode	Description
Mode 1	SYSTEM LOAD

For EMS Test	
Final Test Mode	Description
Mode 1	SYSTEM LOAD

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



C-1 Interface Cable
C-2 VGA Cable
C-3 Centronics Cable
C-4 Data Cable
C-5 DataCable

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	3.5" SATA Mobile Rack	iStar	T-7-SA	DOC	N/A	EUT
E-2	PC	IBM	8434-INV	DOC	99FCL27	
E-3	Modem	ACEEX	DM-1414V	DOC	8041708	
E-4	Monitor	HITACHI	CM753ET	DOC	T8L000003	
E-5	Printer	SII	DPU-414	DOC	1045105A	
E-6	PS/2 K/B	Dell	M-SAW34	DOC	N/A	
E-7	USB Mouse	Dell	M-UVDEL1	DOC	23-271883	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.8M	
C-2	YES	YES	1.8M	
C-3	YES	NO	1.5M	
C-4	YES	NO	1.5M	
C-5	YES	NO	1.8M	

Note:

(1) The support equipment was authorized by Declaration of Conformity.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION (FREQUENCY RANGE 150KHZ-30MHZ)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	Rolf Heine	NNB-2/16Z	98053	Dec. 18, 2007
2	LISN	EMCO	3816/2	00042991	Jan. 08, 2008
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 28, 2007
4	50Ω Terminator	N/A	N/A	N/A	May.11, 2007
5	Test Cable	N/A	C01	N/A	Nov. 28, 2007
6	EMI Test Receiver	R&S	ESCI	100082	Jan. 31, 2008

Remark: ” N/A” denotes No Model Name, Serial No. or No Calibration specified.

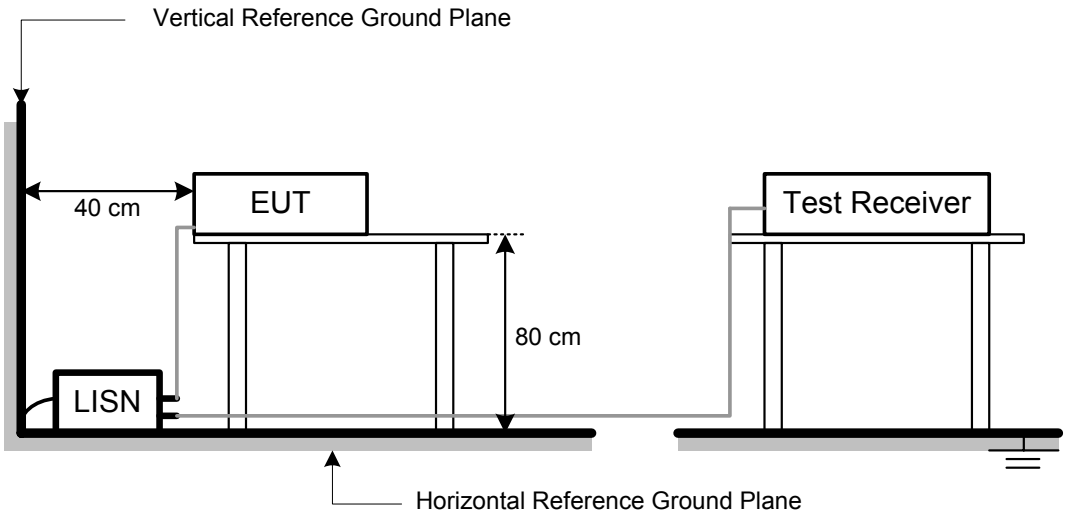
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.
f. First the whole spectrum of emission caused by equipment under test(EUT) is recorded with Detector set to peak. Peak value recorded in table if the margin from QP Limit is larger than 2dB,otherwise,QP value is recorded, Measuring frequency range from 150KHz to 30MHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



4.1.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The program contained on a PC hard disk and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from (to) mass storage device.
2. Send " H " pattern to video port device (Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to serial port device (Modem).
5. EUT send messages to PC.
6. Repeated from 2 to 5 continuously.

As the keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

4.1.7 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	25℃	Relative Humidity :	65 %
Pressure :	1009 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

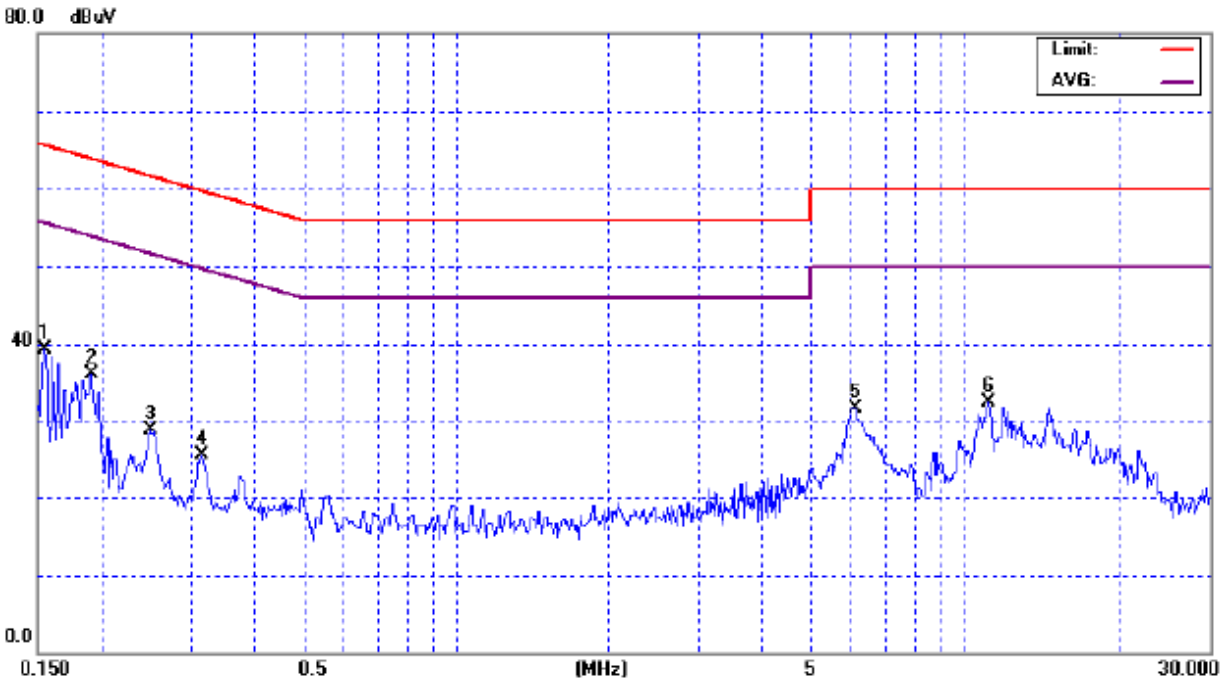
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Line	39.32	*	65.77	55.77	-26.45	(QP)
0.19	Line	36.02	*	64.01	54.01	-27.99	(QP)
0.25	Line	28.86	*	61.78	51.78	-32.92	(QP)
0.32	Line	25.70	*	59.83	49.83	-34.13	(QP)
6.10	Line	31.68	*	60.00	50.00	-28.32	(QP)
11.10	Line	32.49	*	60.00	50.00	-27.51	(QP)

Remark

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz；SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=10KHz,VBW=10KHz, Swp. Time =0.3 sec./MHz 。

(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn‘t perform。In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured 。

(3) Measuring frequency range from 150KHz to 30MHz 。



E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	25℃	Relative Humidity :	65 %
Pressure :	1009 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

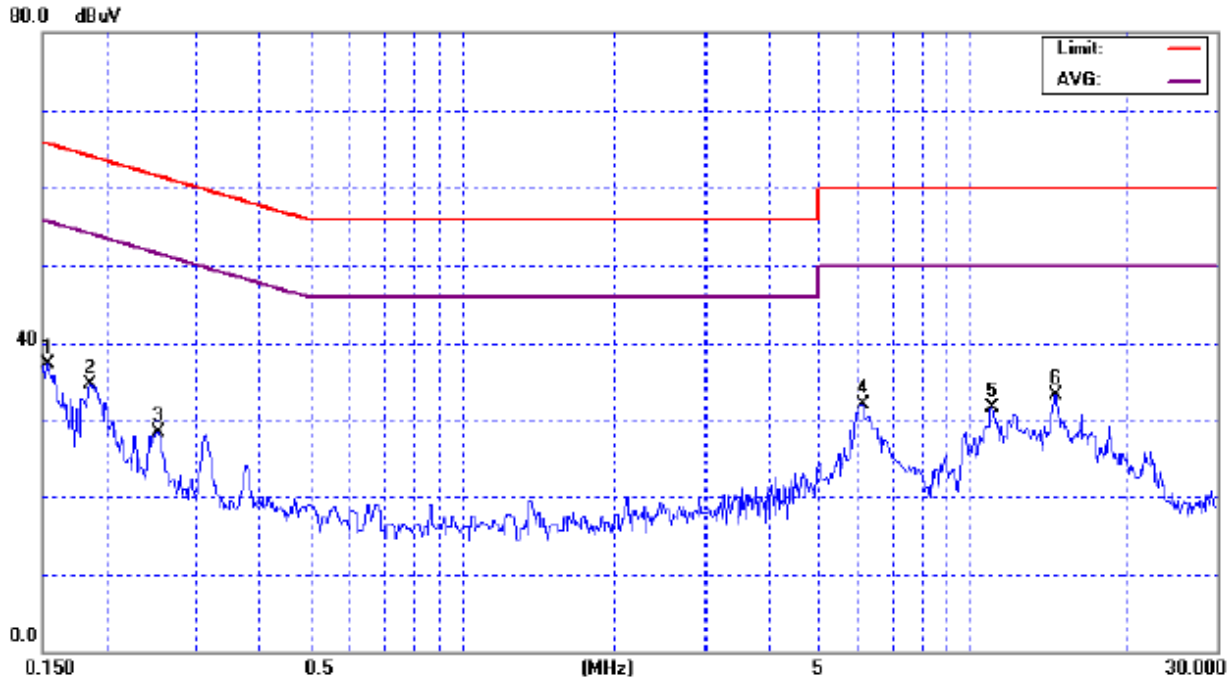
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Neutral	37.30	*	65.85	55.85	-28.55	(QP)
0.19	Neutral	34.66	*	64.23	54.23	-29.57	(QP)
0.25	Neutral	28.47	*	61.68	51.68	-33.21	(QP)
6.10	Neutral	32.02	*	60.00	50.00	-27.98	(QP)
11.00	Neutral	31.71	*	60.00	50.00	-28.29	(QP)
14.70	Neutral	33.40	*	60.00	50.00	-26.60	(QP)

Remark

(1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz；SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=10KHz,VBW=10KHz, Swp. Time =0.3 sec./MHz 。

(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn‘t perform。In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured 。

(3) Measuring frequency range from 150KHz to 30MHz 。



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 – 1000	47	37

Notes:

(1) The limit for radiated test was performed according to as following: CISPR 22/ FCC PART 15B /ICES-003.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Cable	N/A	CISPR 14	N/A	Oct. 01, 2007
2	EMI Test Receiver	R&S	ESCI	100082	Jan. 31, 2008
3	Absorbing Clamp	Schwarzbeck	MDS-21	03195	Jun. 28, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

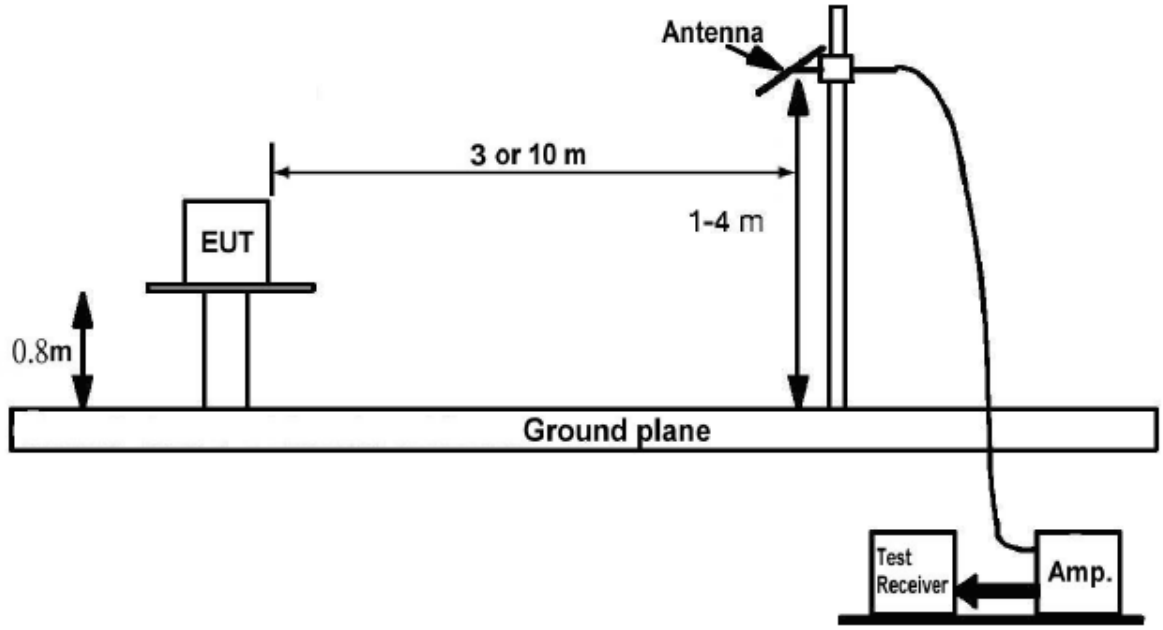
4.2.3 TEST PROCEDURE

a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.7 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	56%
Pressure :	1009 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
30.00	V	30.81	-8.19	23.92	30.00	- 6.08	
43.58	V	31.15	-6.33	17.60	30.00	- 12.40	
431.58	V	25.51	-6.63	16.80	37.00	- 20.20	
456.80	V	27.43	-8.16	19.27	37.00	- 17.73	
596.42	V	27.92	-9.05	22.67	37.00	- 14.33	(QP)
871.96	V	27.78	9.03	25.42	37.00	- 11.58	

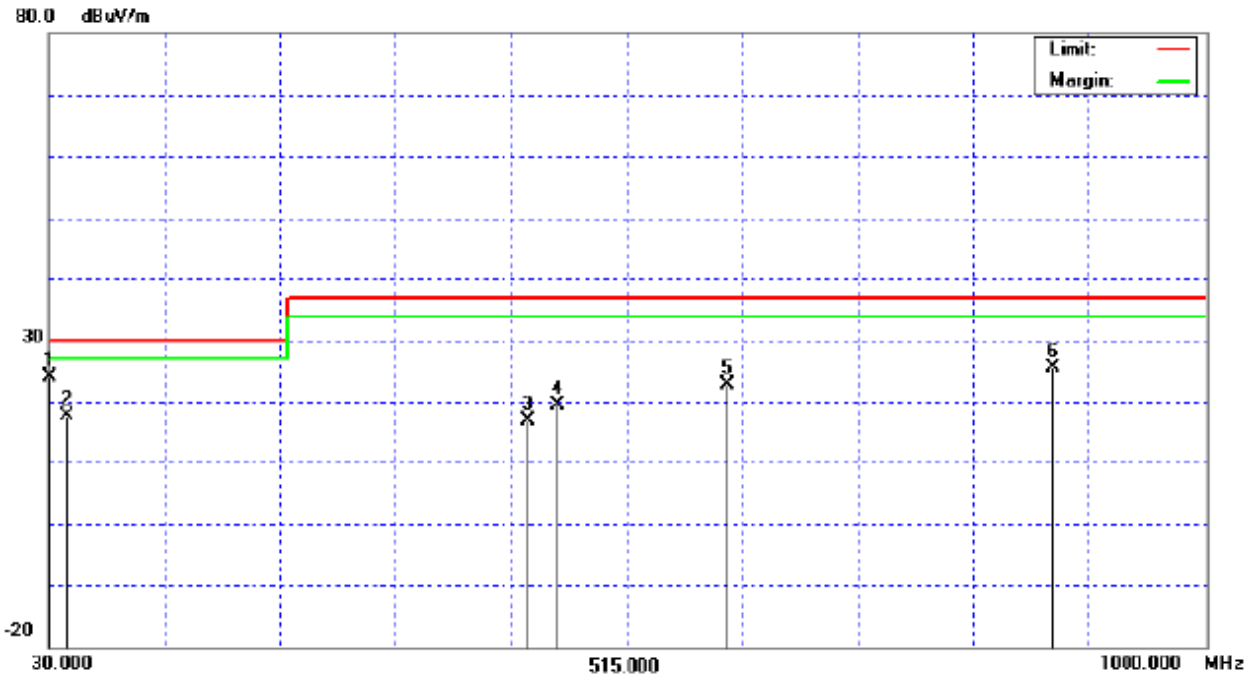
Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform。

(3) Measuring frequency range from 30MHz to 1000MHz。

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table。



E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50 %
Pressure :	1009 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
456.80	H	25.95	-8.19	17.79	37.00	- 19.21	
526.64	H	26.35	-6.33	19.74	37.00	- 17.26	
598.42	H	35.94	-6.63	30.69	37.00	- 6.31	
757.50	H	26.43	-8.16	23.01	37.00	- 13.99	
798.24	H	25.46	-9.05	22.26	37.00	- 14.74	(QP)
891.36	H	32.24	9.03	30.40	37.00	- 6.60	

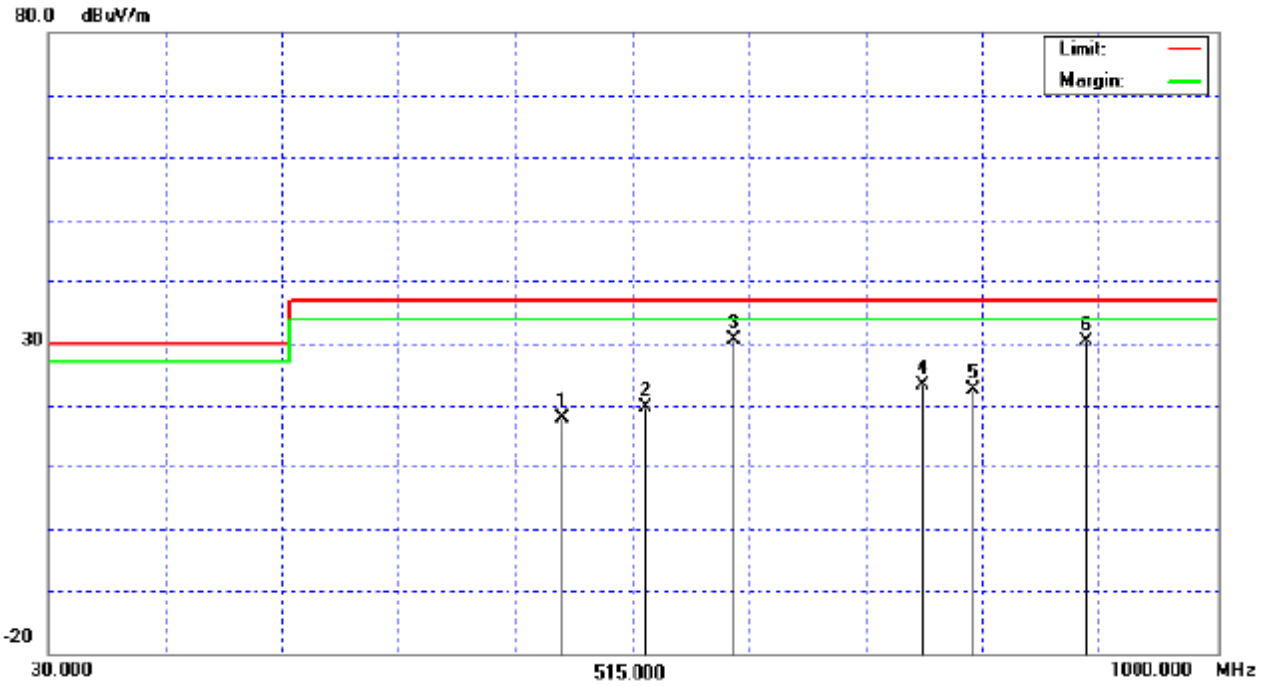
Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz。

(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform。

(3) Measuring frequency range from 30MHz to 1000MHz。

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table。



5. EMC IMMUNITY TEST

5.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION Level	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC/EN 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B	
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B	
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure	A	
3. EFT/Burst IEC/EN 61000-4-4	1.0KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	Power Supply Port	B	
	0.5 KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port	B	N/A (2)
4. Surges IEC/EN 61000-4-5	1 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-N	B	
	2 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-PE N-PE	B	
5 Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A	N/A (2)
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	AC Power Port	A	
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	DC Power Port	A	N/A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz, 1A/m	Enclosure	A	
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage dip＞95% Voltage dip 30% Interruption＞95%	AC Power Port	B C C	

* Remark:

N/A : denotes test is not applicable in this Test Report

(1) : The EUT is a battery operating device and no any other cable connection to PC device.

(2) : Applicable only to cables which according to the manufacturer's specification supports communication on cables lengths greater than 3 m.

(3) : Applicable only to equipment containing devices susceptible to magnetic fields

5.2 GENERAL PERFORMANCE CRITERIA

According to **EN55024** standard, the general performance criteria as following:

Criterion A	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 product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	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 phenomenon 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. During the test, degradation of performance is allowed. However, no change of operating state if stored data allowed to persist after the test. 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.
Criterion C	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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 ESD TESTING

5.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge：2kV/4kV/8kV (Direct) Contact Discharge：2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Simulator	Thermo	MZ-15/EC	0502184	Nov, 26, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.4.3 TEST PROCEDURE

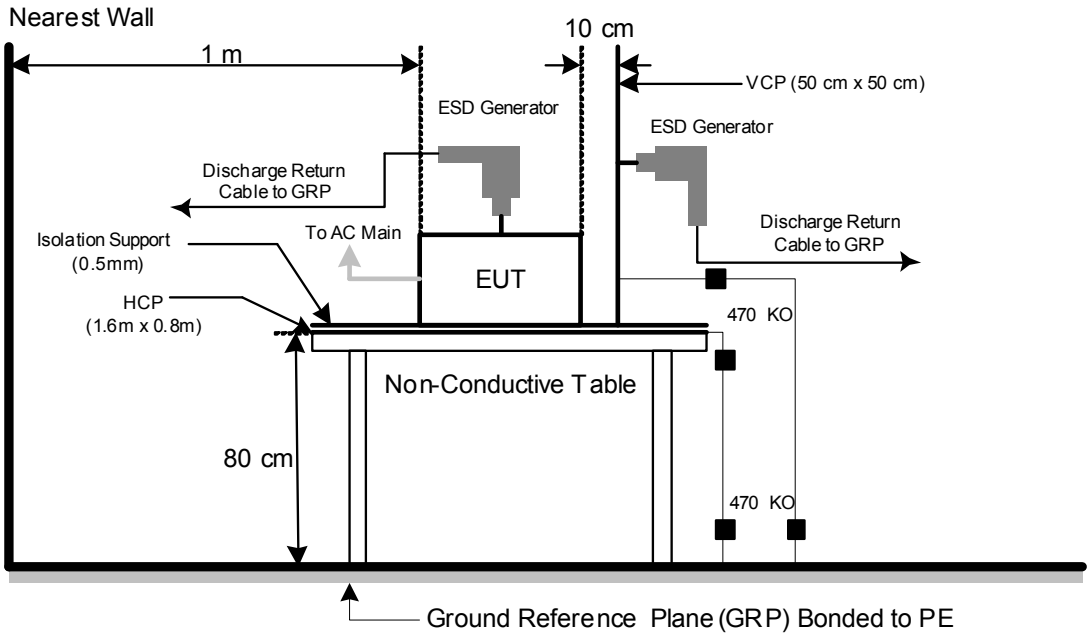
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.
   During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.
   If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
   Vertical Coupling Plane (VCP):
   The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.
   Horizontal Coupling Plane (HCP):
   The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.
b. Air discharges at insulation surfaces of the EUT.
   It was at least ten single discharges with positive and negative at the same selected point.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

5.4.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	25℃	Relative Humidity :	40%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

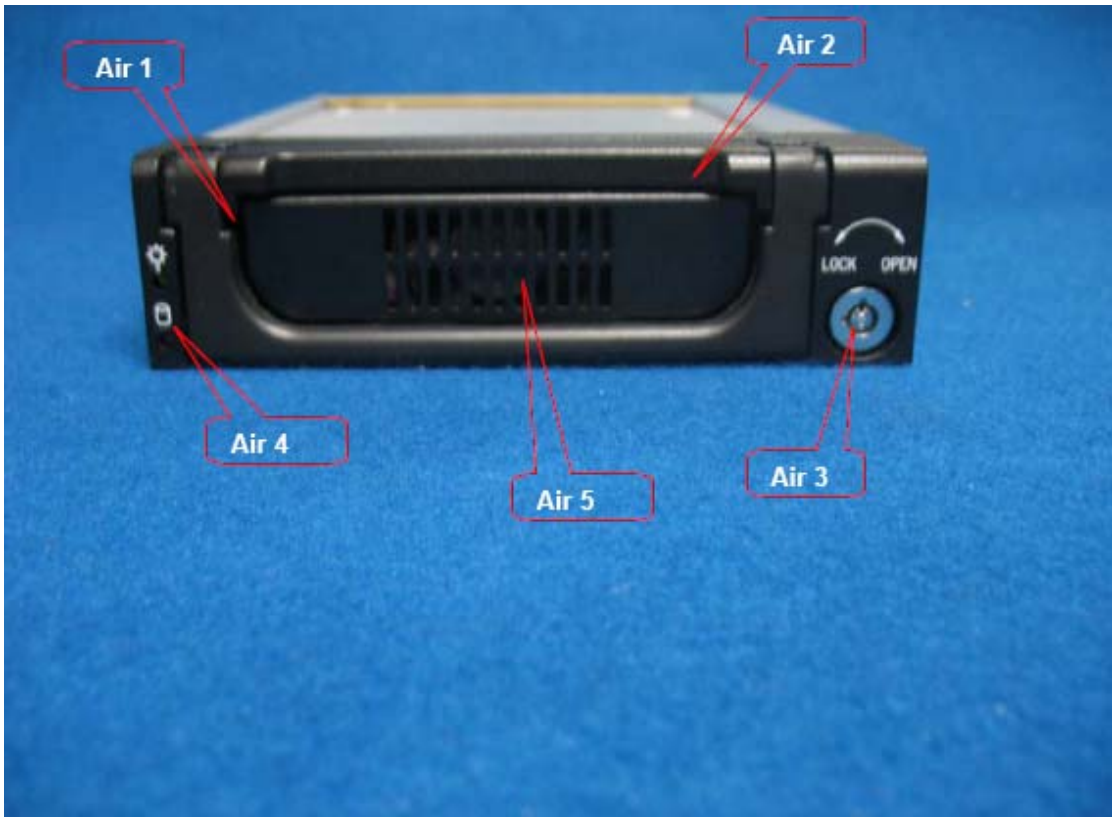
Mode	Air Discharge								Contact Discharge							
	2KV		4KV		8KV		15KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A										
2	A	A	A	A	A	A										
3	A	A	A	A	A	A										
4	A	A	A	A	A	A										
5	A	A	A	A	A	A										
6																
7																
8																
9																
10																
Criteria	**B**								**B**							
Result	**A**								**N/A**							
Judgment	**PASS**								**N/A**							

Mode	HCP Discharge								VCP Discharge							
	2KV		4KV		6KV		8KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A					A	A	A	A				
2	A	A	A	A					A	A	A	A				
3	A	A	A	A					A	A	A	A				
4	A	A	A	A					A	A	A	A				
Criteria	**B**								**B**							
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) Test condition:
   Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges: Minimum 10 times (Positive/Negative) at each point.
3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
4) The Indirect (HCP/VCP) discharges description of test point as following:
   1.left side 2.right side 3.front side 4.rear side
5) N/A - denotes test is not applicable in this test report
6) Criteria A: There was no change operated with initial operating during the test.
7) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
8) Criteria C: The system shut down during the test.

5.4.7 PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED



5.5 RS TESTING

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

5.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	R&S	SMT 06	832080/007	Jul, 26, 2007
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	Aug, 16, 2007
3	Power Amplifier	AR	150W1000M1	320946	Sep, 24. 2008

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.5.3 TEST PROCEDURE

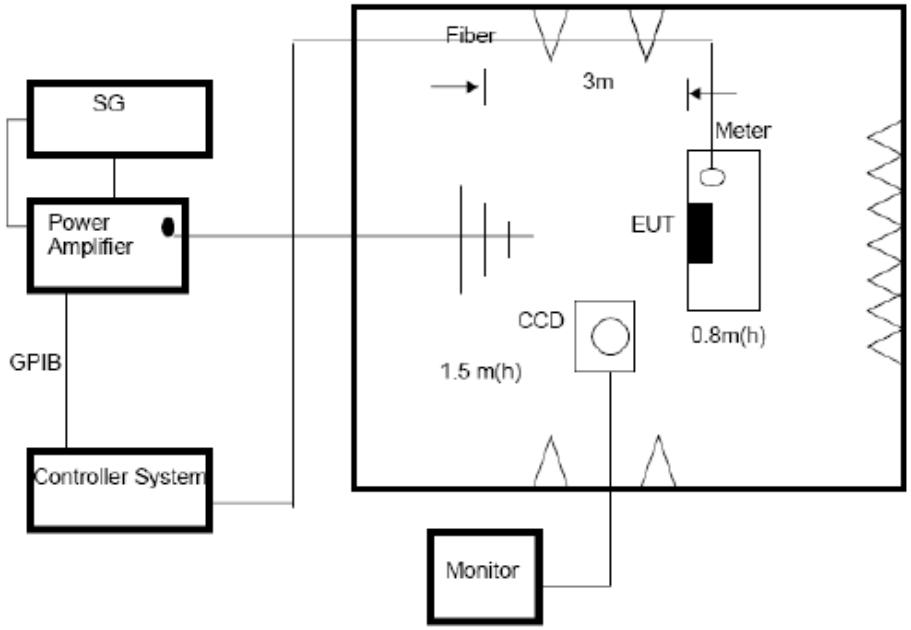
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength level was 3V/m.
b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 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.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

5.5.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	0	**A**	**A**	**PASS**
			90			
			180			
			270			

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) N/A - denotes test is not applicable in this test report.
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

5.6 EFT/BURST TESTING

5.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	B
Test Voltage :	Power Line: 1 kV Signal/Control Line: 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

5.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 10, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.6.3 TEST PROCEDURE

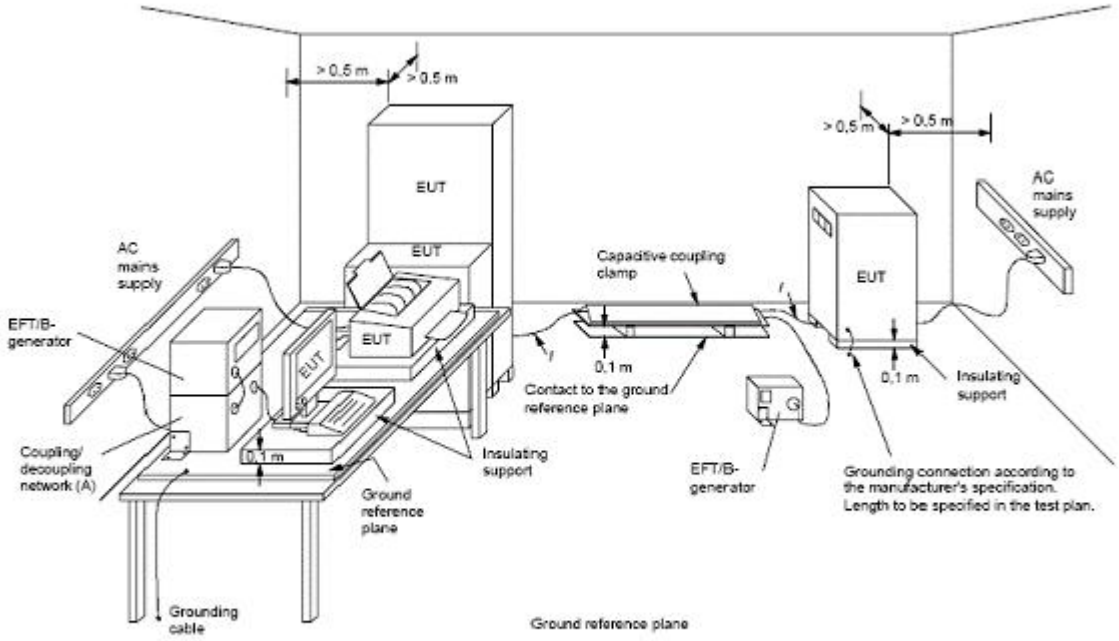
The EUT and support equipment(s) are placed on a table that is 0.8 meter high above a metal ground plane and should be located 0.1m+/-0.01m high above the Ground Reference Plane (1m*1m min. and 0.65mm thick min).
The other condition as following manner:

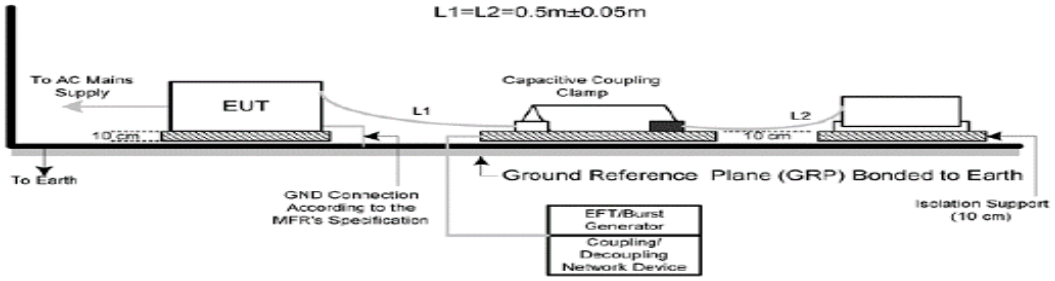
a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.
b. Both positive and negative polarity discharges were applied.
c. The duration time of each test sequential was 1 minute
d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP





Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane and should be located 0.1m+/-0.01m above the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

5.6.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Mode	(**V**) AC Power Line		( ) DC Power Line		( ) Signal/Control Line	
Test Level	1KV		0.5KV		0.5KV	
Port(s)	Polarity	Results	Polarity	Results	Polarity	Results
Line (L)	P	A	P		P	
	N	A	N		N	
Neutral (N)	P	A	P		P	
	N	A	N		N	
Ground (PE)	P	A	P		P	
	N	A	N		N	
Signal/Control Line	P		P		P	
	N		N		N	
Criteria	**B**		**B**		**B**	
Result	**A**		**N/A**		**N/A**	
Judgment	**PASS**		**N/A**		**N/A**	

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) N/A - denotes test is not applicable in this test report
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

5.7 SURGE TESTING

5.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage :	Power Line：0.5 kV, 1 kV, 2 kV
Surge Input/Output:	L1-L2, L1-PE, L2-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

5.7.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 10, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.7.3 TEST PROCEDURE

a. For EUT power supply:

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 2meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

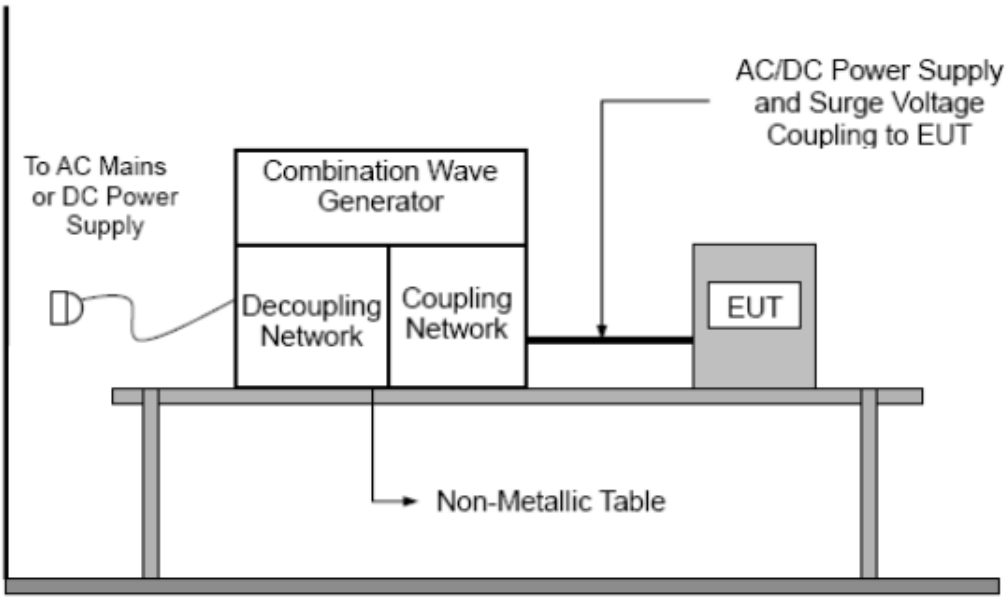
The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.7.4 DEVIATION FROM TEST STANDARD

No deviation

5.7.5 TEST SETUP



5.7.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Judgment
	Polarity	Phase	Voltage					
			0.5Kv	1kV	1.5kV	2kV		
L - N	+/-	0°	A	A			**B**	**PASS**
	+/-	90°	A	A				
	+/-	180°	A	A				
	+/-	270°	A	A				
L - PE	+/-	0°	A	A	A	A	**B**	**PASS**
	+/-	90°	A	A	A	A		
	+/-	180°	A	A	A	A		
	+/-	270°	A	A	A	A		
N - PE	+/-	0°	A	A	A	A	**B**	**PASS**
	+/-	90°	A	A	A	A		
	+/-	180°	A	A	A	A		
	+/-	270°	A	A	A	A		
Signal Line (N/A)	+/-	0°					**B**	**N/A**
	+/-	90°						
	+/-	180°						
	+/-	270°						

Note:

1) Polarity and Numbers of Impulses：5 Pst / Ngt at each tested mode
2) N/A - denotes test is not applicable in this Test Report
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

5.8 INJECTION CURRENT TESTING

5.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Dwell Time:	at least 3 seconds

5.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	IFR	2023A	202301/368	Apr, 02, 2008
2	Power Amplifier	AR	75A250AM1	0320709	Sep, 24, 2008
3	CDN	FCC	FCC-801-M3 -16A	06043	Jun, 04, 2008

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.8.3 TEST PROCEDURE

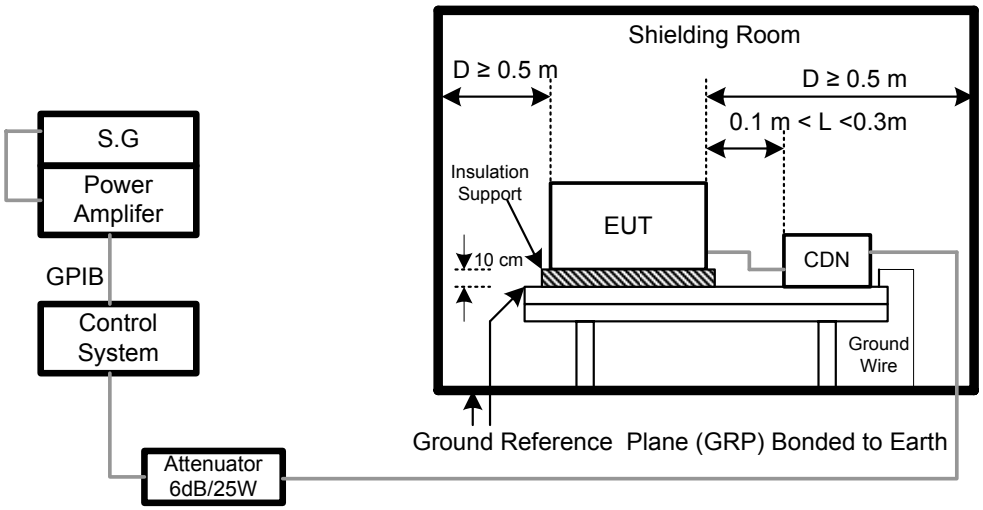
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
The other condition as following manner:

a. The field strength level was 3V.
b. The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.8.4 DEVIATION FROM TEST STANDARD

No deviation

5.8.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

5.8.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	**A**	**A**	**PASS**
Input/ Output DC. Power Port	0.15 --- 80		**A**	**N/A**	**N/A**
Signal Line (N/A)	0.15 --- 80		**A**	**N/A**	**N/A**

Note:

1) N/A - denotes test is not applicable in this Test Report.
2) Criteria A: There was no change operated with initial operating during the test.
3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
4) Criteria C: The system shut down during the test.

5.9 POWER FREQUENCY MAGNETIC FIELD TESTING

5.9.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-8
Required Performance	A
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

5.9.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 10, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

5.9.3 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

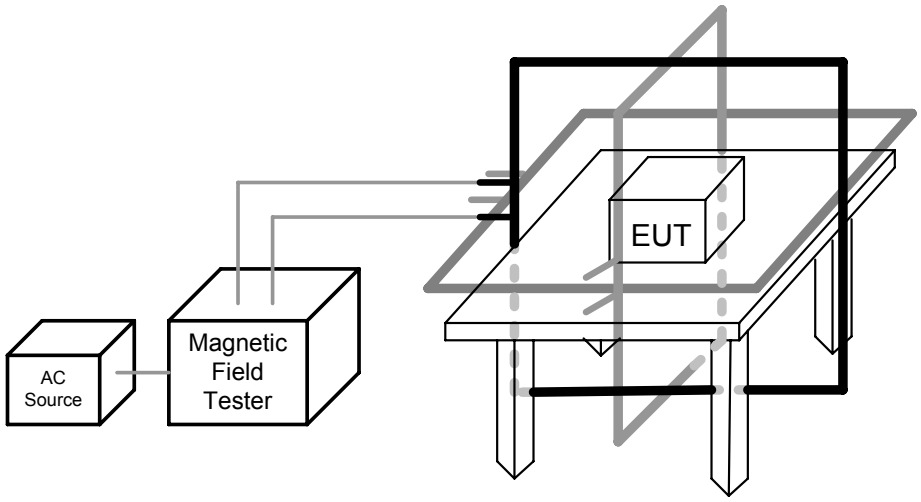
The other condition as following manner:

a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.9.4 DEVIATION FROM TEST STANDARD

No deviation

5.9.5 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 56% of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

5.9.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

Test Mode	Test Level	Antenna aspect	Duration (s)	Perform Criteria	Results	Judgment
Enclosure	1 A/m	X	60 s	**A**	**A**	**PASS**
Enclosure	1 A/m	Y	60 s	**A**	**A**	**PASS**
Enclosure	1 A/m	Z	60 s	**A**	**A**	**PASS**

Note:

1) N/A - denotes test is not applicable in this test report
2) Criteria A: There was no change operated with initial operating during the test.
3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
4) Criteria C: The system shut down during the test.

5.10 VOLTAGE INTERRUPTION/DIPS TESTING

5.10.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance	B (For >95% Voltage Dips) C (For 30% Voltage Dips) C (For >95% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

5.10.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Thermo	EMCPRO PLUS	0502176	Dec. 10, 2007

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

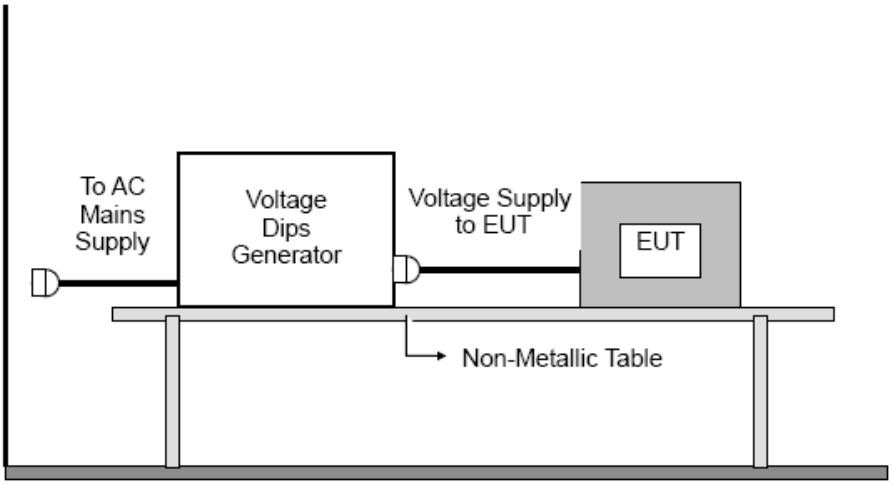
5.10.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

5.10.4 DEVIATION FROM TEST STANDARD

No deviation

5.10.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.10.6 TEST RESULTS

E.U.T :	3.5” SATA Mobile Rack	Model Name :	T-7-SA
Temperature :	22℃	Relative Humidity :	50%
Pressure :	1015 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	SYSTEM LOAD		

AC 230V/50Hz				
Voltage Reduction	Periods	Perform Criteria	Results	Judgment
Voltage dip ＞95%	0.5	**B**	**A**	**PASS**
Voltage dip 30%	25	**C**	**A**	**PASS**
Interruption＞95%	250	**C**	**C**	**PASS**

Note:

1). N/A - denotes test is not applicable in this test report.
2) Criteria A: There was no change operated with initial operating during the test.
3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
4) Criteria C: The system shut down during the test.

6. EUT TEST PHOTO

Conducted Measurement Photos

Radiated Measurement Photos