



EMC TEST REPORT (Class B)

REGULATORY MODEL NUMBER: 25190

REGULATORY TYPE: N/A

REPORT NUMBER: TA13027C

ISSUED DATE: September 25, 2013

Applicant: LSI Corporation

3718 N. Rock Road Wichita, KS 67226 USA

Manufacturer: LSI Corporation

3718 N. Rock Road Wichita, KS 67226 USA

Issued By: Inventec Corporation (Taoyuan) EMC Lab

No. 349, Section 2, Jen-Ho Road, 33547 Tachi, Taoyuan, Taiwan

Receipt date of EUT: September 03, 2013

Date of testing: September 03, 2013 ~ September 11, 2013

Approved By

Jane Lin / EMC Lab Manager
Inventec Corp. (Taoyuan) EMC Lab



The test results in this report only apply to the tested sample.

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1. PRODUCT INFORMATION

1.1. GENERAL DESCRIPTION

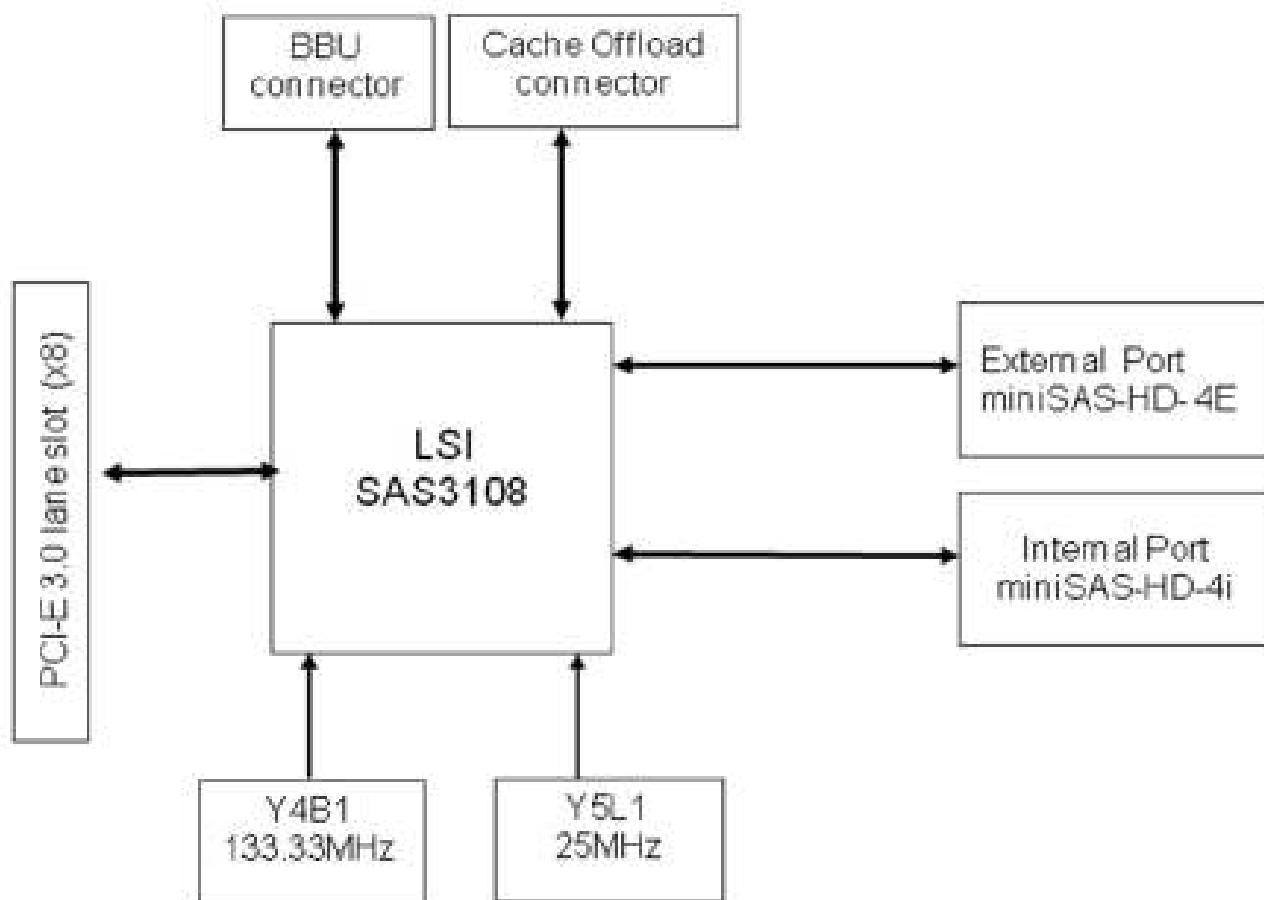
Product Type:	PCI-E SAS HBA Card (Host Bus Adaptor Card)
Regulatory Model:	25190
Regulatory Type:	N/A
Serial Number:	SR316P0026
Firmware Version:	24.0.1.0063
Host System:	ML350p Gen8 (Server) for conducted and radiated emission tests DL360p Gen8 (Server) for powerline harmonic, voltage flicker, and immunity tests
Host Operating System:	Windows Server 2008 R2
Condition:	Engineering Sample
Brand:	LSI
Applicant:	LSI Corporation 3718 N. Rock Road Wichita, KS 67226 USA
Issued By:	Inventec Corporation (Taoyuan) EMC Lab
Standard:	EN 55022:2010/ AC:2011 and CISPR 22:2008 EN 61000-3-2:2006 +A1:2009 +A2:2009 and EN 61000-4-7:2002 +A1:2009 EN 61000-3-3:2008 EN 55024:2010 and CISPR 24:2010 EN 61000-4-2:2009 EN 61000-4-3:2006 +A1:2008 +A2:2010 EN 61000-4-4:2004 +A1:2010 EN 61000-4-5:2006 EN 61000-4-6:2009 EN 61000-4-8:2010 EN 61000-4-11:2004

1.2. PRODUCT FEATURE

Feature Description
• LSI SAS3108 SAS Interface Controller • PCI Express 3.0 x8 lanes • One internal vertical mini SAS HD connector • One external mini SAS HD connector • On board DDR3 1866MHz Memory • Cache retention through "BBU Option" or "Cache Offload Option Using Supercaps" • Low profile and full height bracket

Note: The above EUT information was declared by manufacturer, and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

1.3. PRODUCT BLOCK DIAGRAM



1.4. PRODUCT COMPONENTS

Component	Manufacturer	Model / Part Number	Serial Number
PCI-E SAS HBA Card	LSI	25190	SR316P0026
Daughter Card (for Conducted emission, Radiated emission and RS tests, with Supercap support)	LSI	H2-25444-051	SR244P0024
Daughter Card (for EMS tests except RS test, with Supercap support)	LSI	H2-25444-051	SR315P0050
iBBU09 Battery	LSI	BAT1S1P-A	SY25112736MA
Tecate Battery (Supercap)	TECATE	TPL 13.5V 6.4F	ST21301962
ML350p Gen8 Host System for conducted and radiated emission tests			
ML350p Gen8 Host System	HP	TPS-F003	SGH22689K1
Motherboard	HP	FXNESSN-002	PCUXA0BTM2O0AI
Memory (DDR3 4GB)	HP	RBYYU8DXR2V09C	647647-071
CPU	Intel	E5-2603	1.80GHz, 4 Core
HDD (2.5" SAS 300GB), for OS	HP	EG0300FBDBR	THH237I447
HDD (2.5" SAS 600GB)	HP	EG0600FBDSR	PHD219E117
			PHD219E1CZ
			PHD219E1CU
			PHD219E1BN
Power Supply (1200W)	HP (Delta)	HSTNS-PD30 (DPS-1200SB A)	5BXR0C0B4D1L10V
DL360p Gen8 Host System for powerline harmonic, voltage flicker, and immunity tests			
DL360p Gen8 Host System	HP	HSTNS-2141	CN724000VK
Motherboard	HP	HP4K1245	HF29WP9636
Memory (DDR3 4GB)	HP (Samsung)	M393B5270DH0-YH9Q8	664688-001
CPU	Intel	E5-2603	1.80GHz, 4 Core
HDD (2.5" SAS 300GB), for OS	HP	EG0300FBDBR	THH237I476
HDD (2.5" SAS 600GB)	HP	EG0600FBDSR	PHD219E117
			PHD219E1CZ
			PHD219E1CU
			PHD219E1BN
Power Supply (1200W)	HP (LiteOn)	HSTNS-PL30	5BXRKX3LL0R08E

Note: Tecate Battery (Supercap) must be attached on EUT through daughter card while iBBU09 battery links to EUT directly.

2. TEST INFORMATION

2.1. TEST MODE DESCRIPTION

2.1.1. FOR CONDUCTED AND RADIATED EMISSION TESTS

The EUT (in Host: ML350p Gen8) has been pre-tested for conducted and radiated emission tests as the following configurations:

Component	Manufacturer	Type / Specification	SKU	
			1	2
PCI-E SAS HBA Card (EUT)	LSI	25190	*1	*1
Daughter Card (with Supercap support)	LSI	H2-25444-051	*1	-
iBBU09 Battery	LSI	BAT1S1P-A	-	*1
Tecate Battery (Supercap)	TECATE	TPL 13.5V 6.4F	*1	-
Components in ML350p Gen8 Host System for conducted and radiated emission tests				
Motherboard	HP	FXNESSN-002	*1	*1
Memory	HP	4GB, DDR3 DIMM	*1	*1
CPU	Intel	1.8GHz, 4 Core	*1	*1
HDD	HP	2.5" SAS HDD, 300GB	*1	*1
	HP	2.5" SAS HDD, 600GB	*4	*4
Power Supply	HP (Delta)	HSTNS-PD30 (1200W)	*1	*1

Note:

1. According to pre-test data, SKU 1 was the worst combination for both conducted emission test and radiated emission test.

2.1.2. FOR POWERLINE HARMONIC, VOLTAGE FLICKER, AND IMMUNITY TESTS

The EUT configuration (in Host: DL360p Gen8) in powerline harmonic, voltage flicker, and immunity tests is SKU 3 as follows:

Component	Manufacturer	Type / Specification	SKU
			3
PCI-E SAS HBA Card (EUT)	LSI	25190	*1
Daughter Card (with Supercap support)	LSI	H2-25444-051	*1
Tecate Battery (Supercap)	TECATE	TPL 13.5V 6.4F	*1
Components in DL360p Gen8 Host System for powerline harmonic, voltage flicker, and immunity tests			
Motherboard	HP	HP4K1245	*1
Memory	HP (Samsung)	4GB, DDR3 DIMM	*1
CPU	Intel	1.8GHz, 4 Core	*1
HDD	HP	2.5" SAS HDD, 300GB	*1
	HP	2.5" SAS HDD, 600GB	*4
Power Supply	HP (LiteOn)	HSTNS-PL30 (1200W)	*1

2.2. EUT OPERATING CONDITIONS

Programs should be run on EUT during the test are listed below:

- Run the program "WinEMI" on host server in Windows OS. Access "H" pattern among the EUT, peripherals, and all the HDDs.
- Run the program "Smasher.exe" on host server. Access data between the EUT and all the HDDs.

2.3. SUPPORT TEST PERIPHERALS & CABLE CONFIGURATION

2.3.1. FOR CONDUCTED EMISSION TEST

Test Peripherals							Cables		
No.	Name	Brand	Model	Serial Number	FCC ID or DoC	I/O Port	Shielded	LTH	Qty
1	Monitor	HP	ZR24W	CNT04516KN	DoC	VGA	Yes	1.85m	1
2	USB Keyboard	HP	KU-0841	CD00904657	DoC	USB	Yes	1.8m	1
3	USB Mouse	HP	M-UAE96	FATSK0K5BZF35U	DoC	USB	Yes	1.8m	1
4	USB HDD	PQI	H566	PQ1011-0178024	DoC	USB	Yes	1.0m	1
5	USB HDD	PQI	H566	PQ1011-0178018	DoC	USB	Yes	1.0m	1
6	USB HDD	PQI	H566	PQ1011-0178021	DoC	USB	Yes	1.0m	1
7	USB HDD	PQI	H566	PQ1011-0178006	DoC	USB	Yes	1.0m	1
8	USB HDD	PQI	H566	PQ1011-0178003	DoC	USB	Yes	1.0m	1
9	USB HDD	PQI	H566	PQ1011-0178012	DoC	USB	Yes	1.0m	1
10	Modem	Hayes	3124US	A01031003415	BFJ9D9231AA	Series	Yes	1.8m	1
11	HUB	D-Link	DGS-1024D	DRC5BAC000184	DoC	RJ45	No	5.0m	5
12	Client (Server) for SAS port	HP	TPS-F003	SGH22689JY	DoC	SAS	Yes	10.0m	1
13	Power	-	-	-	-	Power	No	1.8m	1

Note: The item 12 is test peripheral of EUT and the others listed above are test peripherals of ML350p Gen8 Host System for conducted and radiated emission (above 1GHz) tests.

2.3.2. FOR RADIATED EMISSION (30MHz~1000MHz) TEST

Test Peripherals							Cables		
No.	Name	Brand	Model	Serial Number	FCC ID or DoC	I/O Port	Shielded	LTH	Qty
1	Monitor	HP	ZR24W	CNT04516KN	DoC	VGA	Yes	1.85m	1
2	USB Keyboard	HP	KU-0841	CD00904657	DoC	USB	Yes	1.8m	1
3	USB Mouse	HP	M-UAE96	FATSK0K5BZF35U	DoC	USB	Yes	1.8m	1
4	USB HDD	DELL	RD1000	85550124615	DoC	USB	Yes	1.8m	1
5	USB HDD	DELL	RD1000	85550124254	DoC	USB	Yes	1.8m	1
6	USB HDD	DELL	RD1000	85550124276	DoC	USB	Yes	1.8m	1
7	USB HDD	Seagate	9ZR8N1-500	NA0H1F3R	DoC	USB	Yes	1.0m	1
8	USB HDD	WD	WDBKXH5000ASL-03	WX41E72EH737	DoC	USB	Yes	1.0m	1
9	USB HDD	WD	WDBKXH5000ASL-03	WX81A23P5878	DoC	USB	Yes	1.0m	1
10	Modem	Hayes	3124US	A01031003415	BFJ9D9231AA	Series	Yes	1.8m	1
11	Client (Server) for RJ45 ports	HP	TPS-F003	SGH22689JY	DoC	RJ45	No	5.0m	5
12	Client (Server) for SAS port					SAS	Yes	10.0m	1
13	Power	-	-	-	-	Power	No	1.8m	1

Note: The item 12 is test peripheral of EUT and the others listed above are test peripherals of ML350p Gen8 Host System for radiated emission (30MHz~1000MHz) test.

2.3.3. FOR RADIATED EMISSION (ABOVE 1GHz) TEST

Test Peripherals							Cables		
No.	Name	Brand	Model	Serial Number	FCC ID or DoC	I/O Port	Shielded	LTH	Qty
1	Monitor	HP	ZR24W	CNT04516KN	DoC	VGA	Yes	1.85m	1
2	USB Keyboard	HP	KU-0841	CD00904469	DoC	USB	Yes	1.8m	1
3	USB Mouse	HP	M-UAE96	FATSK0K5BZF33K	DoC	USB	Yes	1.8m	1
4	USB HDD	PQI	H566	PQ1011-0178024	DoC	USB	Yes	1.0m	1
5	USB HDD	PQI	H566	PQ1011-0178018	DoC	USB	Yes	1.0m	1
6	USB HDD	PQI	H566	PQ1011-0178021	DoC	USB	Yes	1.0m	1
7	USB HDD	PQI	H566	PQ1011-0178006	DoC	USB	Yes	1.0m	1
8	USB HDD	PQI	H566	PQ1011-0178003	DoC	USB	Yes	1.0m	1
9	USB HDD	PQI	H566	PQ1011-0178012	DoC	USB	Yes	1.0m	1
10	Modem	Hayes	3124US	A01031003415	BFJ9D9231AA	Series	Yes	1.8m	1
11	HUB	D-Link	DGS-1024D	DRC5BAC000184	DoC	RJ45	No	5.0m	5
12	Client (Server) for SAS port	HP	TPS-F003	SGH22689JY	DoC	SAS	Yes	10.0m	1
13	Power	-	-	-	-	Power	No	1.8m	1

Note: The item 12 is test peripheral of EUT and the others listed above are test peripherals of ML350p Gen8 Host System for conducted and radiated emission (above 1GHz) tests.

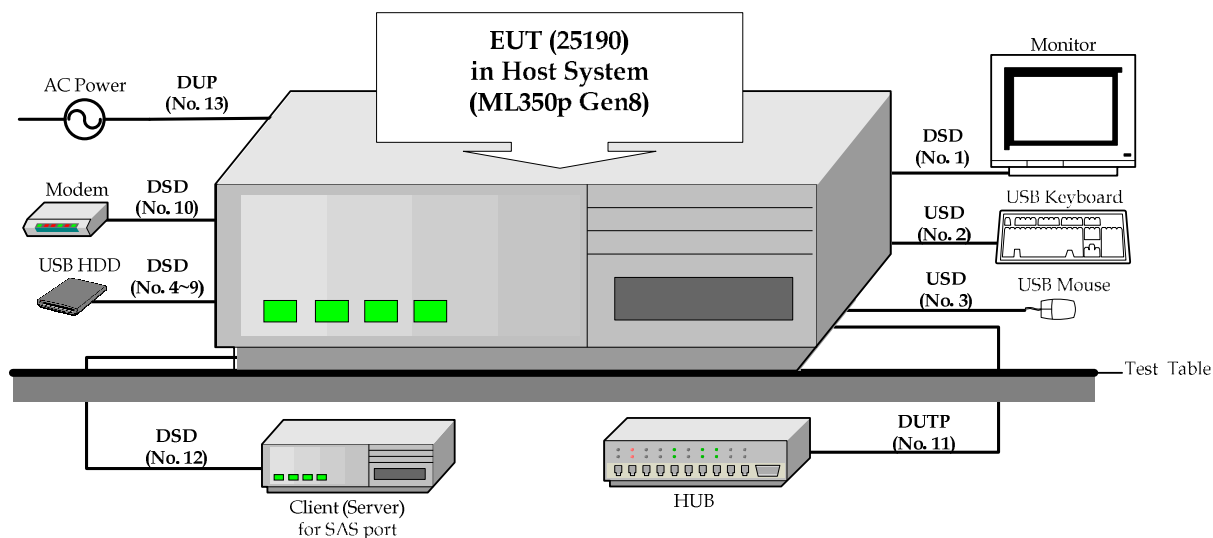
2.3.4. FOR POWERLINE HARMONIC, VOLTAGE FLICKER, AND IMMUNITY TESTS

Test Peripherals							Cables		
No.	Name	Brand	Model	Serial Number	FCC ID or DoC	I/O Port	Shielded	LTH	Qty
1	Monitor	HP	ZR24W	CNT04516KN	DoC	VGA	Yes	1.85m	1
2	USB Keyboard	HP	KU-0841	CD00904657	DoC	USB	Yes	1.8m	1
3	USB Mouse	HP	M-UAE96	FATSK0K5BZF35U	DoC	USB	Yes	1.8m	1
4	USB HDD	Onnto	TAS12T	A04824-H26-0190	DoC	USB	Yes	0.6m	1
5	USB HDD	Onnto	TAS12T	A04824-H26-0195	DoC	USB	Yes	0.6m	1
6	USB HDD	Onnto	TAS12T	A04824-H26-0192	DoC	USB	Yes	0.6m	1
7	USB HDD	Onnto	TAS12T	A04824-H26-0072	DoC	USB	Yes	0.6m	1
8	Modem	Hayes	3124US	A01031003415	BFJ9D9231AA	Series	Yes	1.8m	1
9	HUB	D-Link	DGS-1024D	DRC5BAC000184	DoC	RJ45	No	5.0m	1
10	Client (Server) for SAS port	HP	TPS-F003	SGH22689JY	DoC	SAS	Yes	10.0m	1
11	Power	-	-	-	-	Power	No	1.8m	1

Note: The item 10 is test peripheral of EUT and the others listed above are test peripherals of DL360p Gen8 Host System for powerline harmonic, voltage flicker, and immunity tests.

2.4. BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND TEST PERIPHERAL

2.4.1. FOR CONDUCTED EMISSION TEST



Legend:

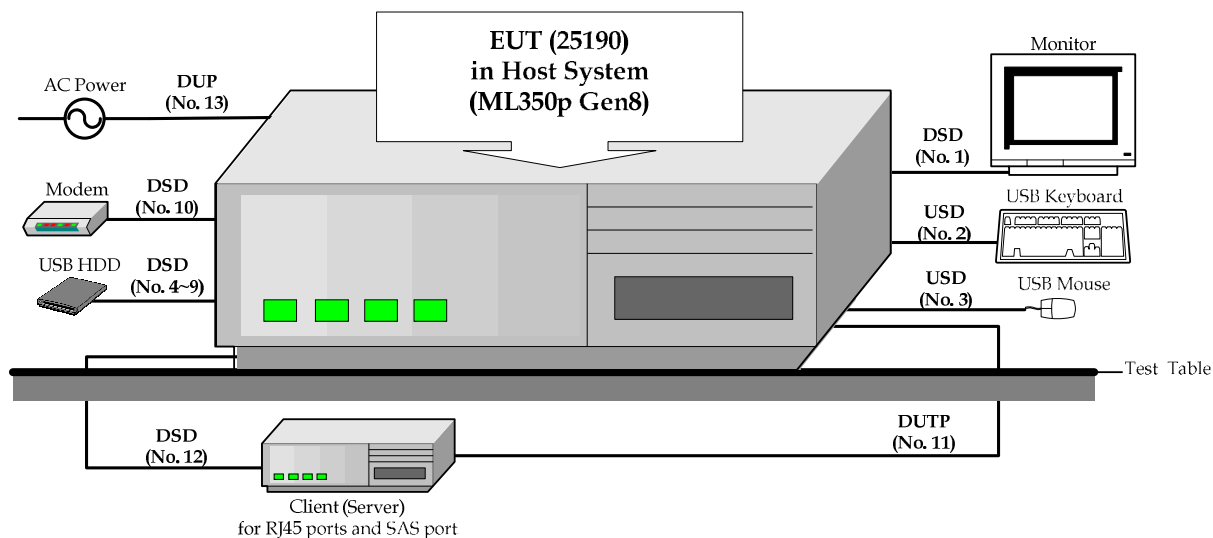
USD = Undetachable Shielded Data cable (No. refer to Sec. 2.3.1.)

DSD = Detachable Shielded Data cable (No. refer to Sec. 2.3.1.)

DUP = Detachable Unshielded Power cord (No. refer to Sec. 2.3.1.)

DUTP = Detachable Unshielded Twisted Pair cable (No. refer to Sec. 2.3.1.)

2.4.2. FOR RADIATED EMISSION (30MHz~1000MHz) TEST



Legend:

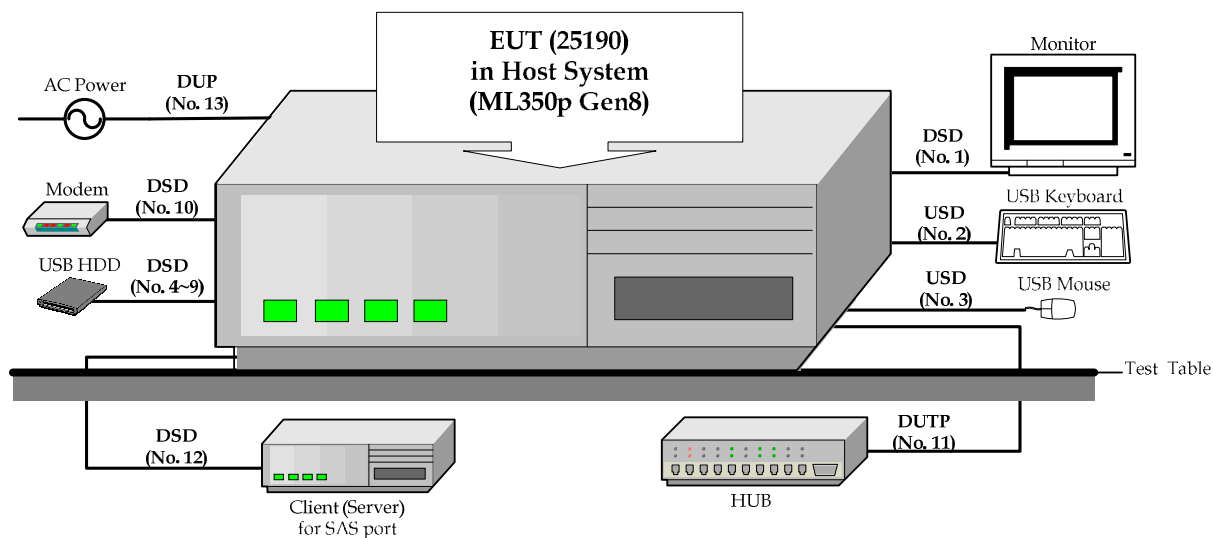
USD = Undetachable Shielded Data cable (No. refer to Sec. 2.3.2.)

DSD = Detachable Shielded Data cable (No. refer to Sec. 2.3.2.)

DUP = Detachable Unshielded Power cord (No. refer to Sec. 2.3.2.)

DUTP = Detachable Unshielded Twisted Pair cable (No. refer to Sec. 2.3.2.)

2.4.3. FOR RADIATED EMISSION (ABOVE 1GHz) TEST



Legend:

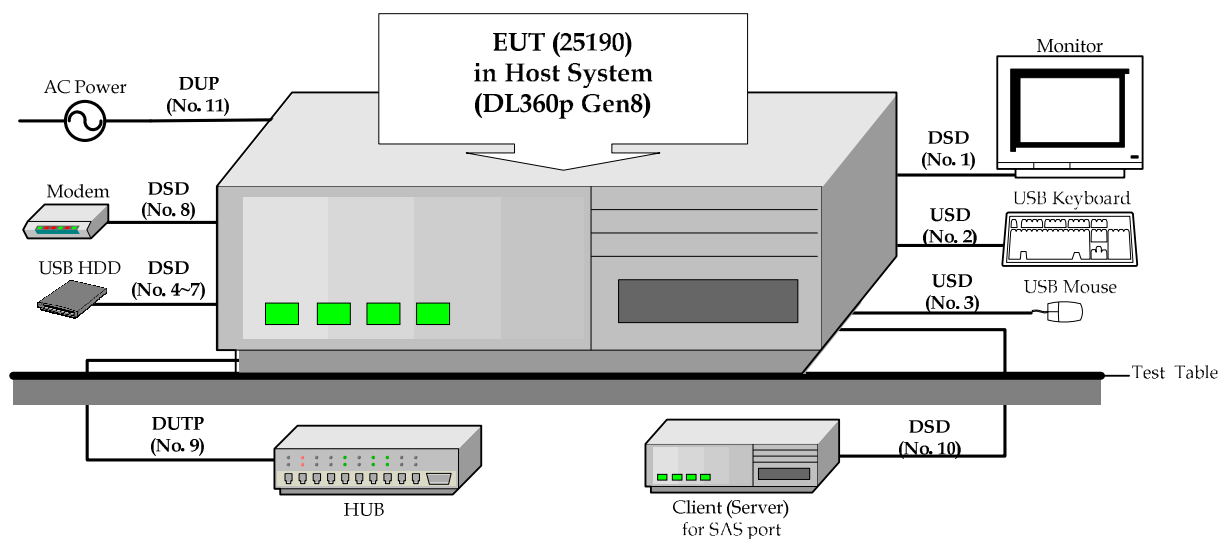
USD = Undetachable Shielded Data cable (No. refer to Sec. 2.3.3.)

DSD = Detachable Shielded Data cable (No. refer to Sec. 2.3.3.)

DUP = Detachable Unshielded Power cord (No. refer to Sec. 2.3.3.)

DUTP = Detachable Unshielded Twisted Pair cable (No. refer to Sec. 2.3.3.)

2.4.4. FOR POWERLINE HARMONIC, VOLTAGE FLICKER, AND IMMUNITY TESTS



Legend:

USD = Undetachable Shielded Data cable (No. refer to Sec. 2.3.4.)

DSD = Detachable Shielded Data cable (No. refer to Sec. 2.3.4.)

DUP = Detachable Unshielded Power cord (No. refer to Sec. 2.3.4.)

DUTP = Detachable Unshielded Twisted Pair cable (No. refer to Sec. 2.3.4.)

2.5. SUMMARY OF TEST RESULTS

The worst data was found as following:

EMISSION				
Standard	Test Item	Test Result	Remarks	Tester
EN 55022:2010/ AC:2011 and CISPR 22:2008	Conducted Emission for Mains Ports	PASS	Worst emission frequency is <u>9.799</u> MHz at <u>Neutral</u> And minimum passing margin is <u>-8.06</u> dB, <u>Average</u>	A-Kuan Yu <i>A-Kuan Yu</i>
	Conducted Emission for Telecommunication Ports	N/A	Not applicable	N/A
	Radiated Emission (30MHz~1000MHz)	PASS	Worst emission frequency is <u>1000.0</u> MHz at <u>Vertical</u> And minimum passing margin is <u>-3.54</u> dB, <u>Quasi-Peak</u> Height of antenna is <u>1.28</u> m Angle of turntable is <u>190</u> deg.	A-Kuan Yu <i>A-Kuan Yu</i>
	Radiated Emission (Above 1GHz)	PASS	Worst emission frequency is <u>6000.0</u> MHz at <u>Vertical</u> And minimum passing margin is <u>-3.81</u> dB, <u>Average</u> Height of antenna is <u>1.42</u> m Angle of turntable is <u>197</u> deg.	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-3-2: 2006 +A1:2009 +A2:2009 and EN 61000-4-7: 2002 +A1:2009	Powerline Harmonic	PASS	Pmax = <u>110.71</u> W	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-3-3: 2008	Voltage Flicker	PASS	Meets the requirements	A-Kuan Yu <i>A-Kuan Yu</i>

Note:

1. The EUT has no telecommunication ports, so there's no need to test for Conducted Emission for Telecommunication Ports.
2. The EUT's highest operating frequency is 6GHz. Radiated Emission need to be measured up to 6GHz.

IMMUNITY (EN 55024:2010 and CISPR 24:2010)				
Standard	Test Item	Test Result	Remarks	Tester
EN 61000-4-2: 2009	Electrostatic Discharge Immunity Test	PASS	(1) Air discharge: up to ± 8.0 kV (Plastic) (2) Contact discharge: up to ± 6.0 kV (Metal)	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-3: 2006 +A1:2008 +A2:2010	Radio Frequency Electromagnetic Field Immunity Test	PASS	80-1000MHz and 6 sensitive frequencies: 100MHz, 133.33MHz, 150MHz, 450MHz, 667MHz, 750MHz (AM 80% @ 1kHz): ≤ 3 V/m	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-4: 2004 +A1:2010	Electrical Fast Transient/Burst Immunity Test	PASS	(1) AC Input: ± 1.0 kV (2) Signals, Telecom.: ± 0.5 kV	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-5: 2006	Powerline Surge Transient Immunity Test	PASS	(1) Common Mode: up to ± 2.0 kV (2) Differential Mode: up to ± 1.0 kV	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-6: 2009	Conducted RF Immunity Test	PASS	0.15-80MHz (AM 80% @ 1kHz): ≤ 3 V	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-8: 2010	Power Frequency Magnetic Field Immunity Test	PASS	Test field strength: ≤ 1 A/m	A-Kuan Yu <i>A-Kuan Yu</i>
EN 61000-4-11: 2004	Voltage Dips/ Interruption Immunity Test	PASS	>95% Dips reduction, 0.5 period 30% Dips reduction, 25 periods >95% Interruption reduction, 250 periods	A-Kuan Yu <i>A-Kuan Yu</i>

2.6. 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:

Measurement	Frequency	Test Site	Uncertainty
Conducted Emission	150kHz ~ 30MHz (Mains ports)	SR No.4	2.50dB
Radiated Emission	30MHz ~ 1000MHz	10m Chamber	4.54dB
	Above 1GHz	3m Chamber No.2	5.11dB
Powerline Harmonic	-	EMS Test No.1	N/A
Voltage Flicker	-	EMS Test No.1	N/A
Electrostatic Discharge Immunity Test	-	ESD Test No.1	N/A
Radiated Immunity	80MHz to 1000MHz	3m Chamber No.1	3.44dB
Electrical Fast Transient/Burst Immunity Test	-	EMS Test No.1	N/A
Powerline Surge Transient Immunity Test	-	EMS Test No.1	N/A
Conducted Immunity	0.15MHz to 80MHz	EMS Test No.3	4.09dB
Power Frequency Magnetic Field Immunity Test	-	EMS Test No.1	N/A
Voltage Dips/Interruption Immunity Test	-	EMS Test No.1	N/A

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.7. TEST FACILITY

The Inventec Corp. (Taoyuan) EMC lab located at:

No. 349, Section 2, Jen-Ho Road, 33547 Tachi, Taoyuan, Taiwan

The Lab has a turntable with a diameter at maximum 3 meters and can measure ITE products at the 3 and 10 meters of antenna distance.

A site description and calibration report to ANSI C63.4 is available upon request.

It is authorized for testing ITE devices by NVLAP, NEMKO, TAF (BSMI) and VCCI.

EMC Laboratory Accreditation:

NVLAP Lab Code: 200140-0

Nemko ELA No. 127

BSMI EMI Testing Lab: SL2-IN-E-0009

TAF Accreditation No. 1119

VCCI Registration No. C-3891, T-2011 (SR No.1)

C-3951, T-1043 (SR No.2)

C-4179, T-1210 (SR No.3)

C-4138, T-1172 (SR No.4)

C-4178, T-1209 (SR No.5)

R-3519, G-336 (10m Chamber)

R-3477, G-302 (3m Chamber No.1)

R-3540, G-346 (3m Chamber No.2)

R-3696, G-444 (3m Chamber No.3)

2.8. TEST SETUP

2.8.1. TEST METHODOLOGY

A. Emission tests were performed according to the following methods and procedures:

- ANSI C63.4
Methods of Measurement of Radio-Noise Emissions for Low Voltage
Electrical and Electronic Equipment in the range of 9kHz to 40GHz.
- EN 55022, CISPR 22
Limits and Methods of Measurement of Radio Interference Characteristics of
Information Technology Equipment.
- EN 61000-3-2/IEC 61000-3-2 Harmonic
- EN 61000-4-7/IEC 61000-4-7 General Guide on Harmonics and Interharmonics Measurements
and Instrumentation
- EN 61000-3-3/IEC 61000-3-3 Voltage Flicker

B. Immunity tests were performed according to the following methods and procedures:

- EN 55024
Information technology equipment - Immunity characteristics - Limits and methods of
measurement.
- EN 61000-4-2/IEC 61000-4-2 Electrostatic Discharge Immunity Test
- EN 61000-4-3/IEC 61000-4-3 Radio Frequency Electromagnetic Field Immunity Test
- EN 61000-4-4/IEC 61000-4-4 Electrical Fast Transient/Burst Immunity Test
- EN 61000-4-5/IEC 61000-4-5 Powerline Surge Transient Immunity Test
- EN 61000-4-6/IEC 61000-4-6 Conducted RF Immunity Test
- EN 61000-4-8/IEC 61000-4-8 Power Frequency Magnetic Field Immunity Test
- EN 61000-4-11/IEC 61000-4-11 Voltage Dips/Interruption Immunity Test

C. Description of departing from standard test method & any other specific: NONE

2.8.2. MODIFICATIONS IMPLEMENTED FOR COMPLIANCE

No modifications were made to the equipment under test by Test Laboratory.

2.8.3. TECHNICAL BASIC FOR COMPLIANCE

It was examined to the following sections of the standards EN 55022, CISPR 22 and EN 55024
underlying the basic requirements of the EMC directive 2004/108/EC.

2.8.4. RELATED SUBMITTAL(S) NOTES

- A. The results relate only to the items tested.
- B. The report must not be used by the client to claim product certification, approval or endorsement by
NVLAP or any agency of the federal government.
- C. There are no related submittals to this file.

2.8.5. TEST CONDITION

2.8.5.1. Test of Conducted Emission

Conducted emissions were measured from 0.15MHz to 30MHz with a resolution bandwidth of 9kHz and return leads of the EUT according to the methods defines in Standard EN55022, Clause 9.

The EUT was placed on a nonmetallic stand in a shielded room, 0.8 meter above the ground plane, as shown in section 3.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum conducted emissions.

2.8.5.2. Test of Radiated Emission

Radiated emissions from 30MHz to 1000MHz were measured with a resolution bandwidth of 120kHz according to the methods defines in Standard CISPR 22, Clause 10 and above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 4.3.

The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

Frequency range of radiated measurement:

Highest frequency generated or used within the EUT or on which the EUT operates or tunes (MHz)	Upper frequency of measurement range (GHz)
Below 108	1
108 ~ 500	2
500 ~ 1000	5
Above 1000	Up to 5 times of the highest frequency or 6GHz, whichever is less

3. CONDUCTED EMISSION MEASUREMENT

3.1. TEST LIMIT

Test Standard: EN55022 (Class B)		
Frequency range (MHz)	Limit [dB(μV)]	
	Quasi-Peak	Average
0.15 ~ 0.50	66 ~ 56	56 ~ 46
0.50 ~ 5	56	46
5 ~ 30	60	50

Note:

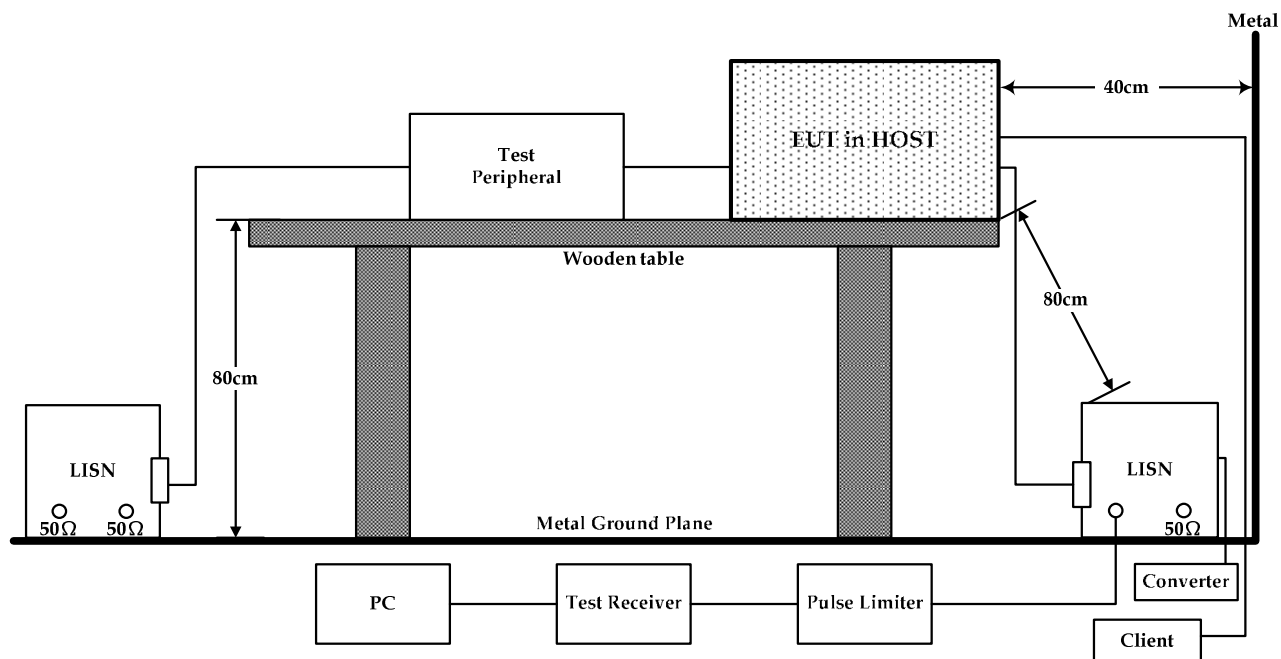
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 ~ 0.50MHz.

3.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	Rohde & Schwarz	ESCI 7	100766	01-Oct-2012	01-Oct-2013
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101168	13-Jun-2013	13-Jun-2014
LISN	Rohde & Schwarz	ENV216	101062	12-Jun-2013	12-Jun-2014
LISN	Rohde & Schwarz	ENV216	101103	19-Dec-2012	19-Dec-2013
RF Cable	Harbour Industries	RG400	N/A	16-Nov-2012	16-Nov-2013
EMI Test Program	Audix	e3(Ver. 6)	N/A	N/A	N/A

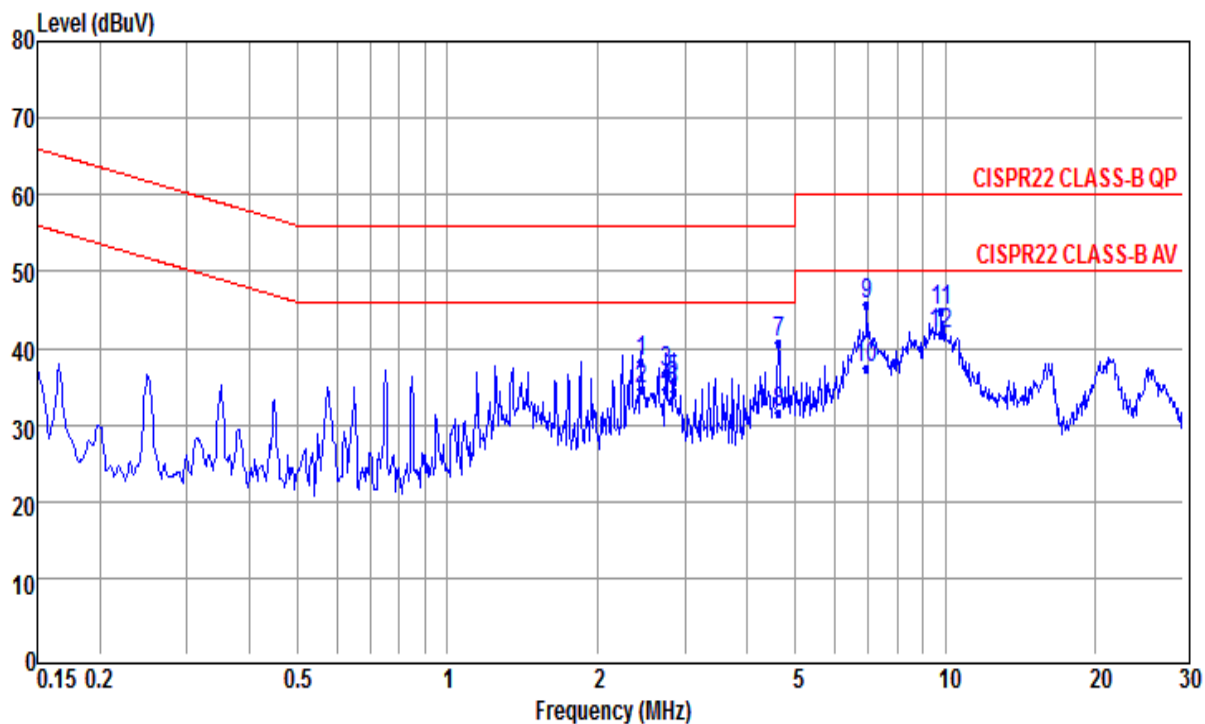
Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

3.3. BLOCK DIAGRAM OF TEST SETUP



3.4. TEST DATA

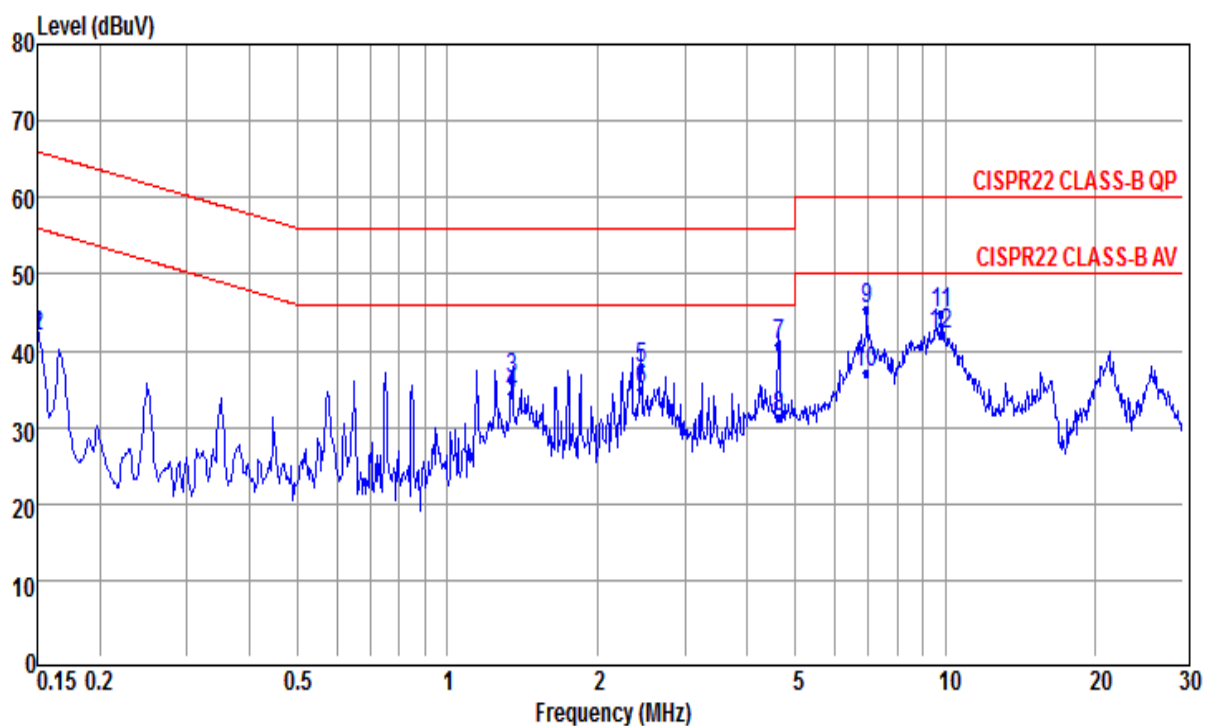
Data Log: 3413090705	Date of Test: Sep 07, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 1
Temperature (°C): 24	Humidity (%): 61	Frequency Range: 0.15MHz~30MHz



Item (Mark)	Freq (MHz)	Read Level dBμV	Total Factor dB	Level dBμV	Limit Line dB(μV)	Over Limit dB	Detector	Phase
1	2.448	18.44	19.71	38.15	56.00	-17.85	QP	Line
2	2.448	14.92	19.71	34.63	46.00	-11.37	Average	Line
3	2.746	17.13	19.72	36.85	56.00	-19.15	QP	Line
4	2.746	14.94	19.72	34.66	46.00	-11.34	Average	Line
5	2.845	16.08	19.72	35.80	56.00	-20.20	QP	Line
6	2.845	14.61	19.72	34.33	46.00	-11.67	Average	Line
7	4.625	20.81	19.80	40.61	56.00	-15.39	QP	Line
8	4.625	11.76	19.80	31.56	46.00	-14.44	Average	Line
9	6.953	25.59	19.97	45.56	60.00	-14.44	QP	Line
10	6.953	17.38	19.97	37.35	50.00	-12.65	Average	Line
11	9.799	24.72	20.11	44.83	60.00	-15.17	QP	Line
12	9.799	21.79	20.11	41.90	50.00	-8.10	Average	Line

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.



Item (Mark)	Freq (MHz)	Read Level dBμV	Total Factor dB	Level dBμV	Limit Line dB(μV)	Over Limit dB	Detector	Phase
1	0.150	22.18	19.60	41.78	66.00	-24.22	QP	Neutral
2	0.150	22.11	19.60	41.71	56.00	-14.29	Average	Neutral
3	1.349	16.65	19.64	36.29	56.00	-19.71	QP	Neutral
4	1.349	14.62	19.64	34.26	46.00	-11.74	Average	Neutral
5	2.450	17.95	19.70	37.65	56.00	-18.35	QP	Neutral
6	2.450	15.18	19.70	34.88	46.00	-11.12	Average	Neutral
7	4.625	20.80	19.79	40.59	56.00	-15.41	QP	Neutral
8	4.625	11.60	19.79	31.39	46.00	-14.61	Average	Neutral
9	6.954	25.50	19.96	45.46	60.00	-14.54	QP	Neutral
10	6.954	17.17	19.96	37.13	50.00	-12.87	Average	Neutral
11	9.799	24.66	20.11	44.77	60.00	-15.23	QP	Neutral
12	9.799	21.83	20.11	41.94	50.00	-8.06	Average	Neutral

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.

3.5. CALCULATION

1. Freq. (MHz), means Conducted Emission frequency.
2. Reading Level (dB μ V), means the reading of Analyzer or Test Receiver.
3. Total Factor (dB), means the value of LISN(or ISN) Loss + Cable Loss + Pulse Limiter.
4. Conducted Emission (dB μ V), means the values of Reading Level add CF added.
 $CE=RL+CF$
5. Ave. Limit (dB μ V), means Limit stated in Standard.
6. Ave. DELTA (dB), Reading in reference to Limit.
 $AD=CE - AL$

4. RADIATED EMISSION MEASUREMENT

4.1. TEST LIMIT

Test Standard: EN55022 (Class B)		
Frequency range (MHz)	Distance (Meter)	Quasi-peak limits dB(μV/m)
30 ~ 230	10	30
230 ~ 1000	10	37

Note: 1. The lower limit shall apply at the transition frequency.

2. Additional provisions may be required for cases where interference occurs.

Test Standard: EN55022 (Class B)			
Frequency range (GHz)	Distance (Meter)	Peak limit dB(μV/m)	Average limit dB(μV/m)
1 ~ 3	3	70	50
3 ~ 6	3	74	54

Note: The lower limit shall apply at the transition frequency.

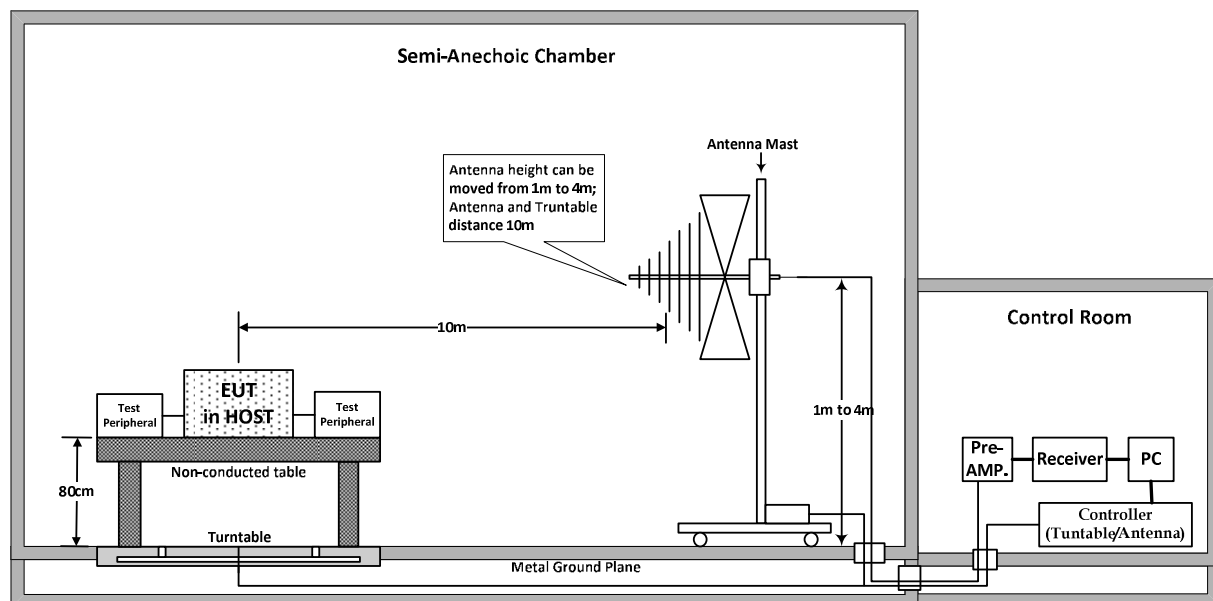
4.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	Rohde & Schwarz	ESU 8	100285	26-Jul-2013	26-Jul-2014
Receiver	Rohde & Schwarz	ESU 8	100365	01-Oct-2012	01-Oct-2013
Receiver	Rohde & Schwarz	ESU 40	100218	29-Jul-2013	29-Jul-2014
Antenna	TESEQ	CBL6111D	29797	19-Aug-2013	19-Aug-2014
Antenna	TESEQ	CBL6111D	29798	19-Aug-2013	19-Aug-2014
Antenna	ETS · LINDGREN	3117	00075934	26-Mar-2013	26-Mar-2014
Pre-amp	Agilent	11909A	186996	13-Sep-2012	13-Sep-2013
Pre-amp	Agilent	11909A	186999	13-Sep-2012	13-Sep-2013
Pre-amp	EMC Instruments	EMC051845	980073	04-Jun-2013	04-Jun-2014
RF Cable	Huber+Suhner	S 07262 BD	N/A	07-Jan-2013	07-Jan-2014
RF Cable	Huber+Suhner	S 07262 BD	N/A	07-Jan-2013	07-Jan-2014
RF Cable	SUCOFLEX	104	N/A	07-Jan-2013	07-Jan-2014
Test Program	Audix	e3(Ver. 6)	N/A	N/A	N/A

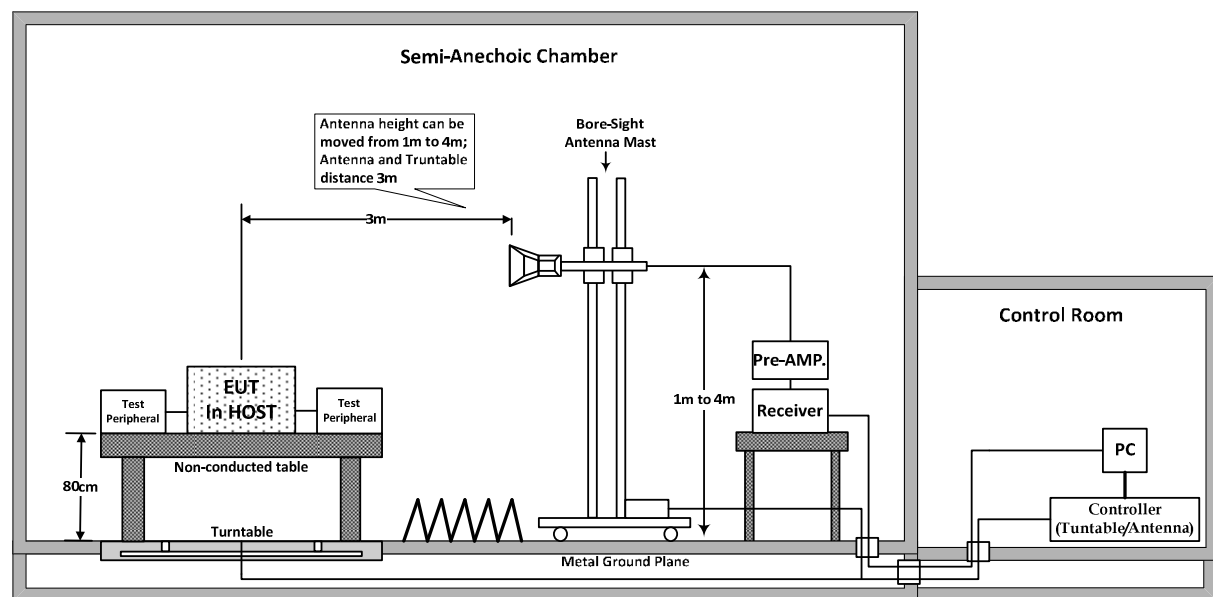
Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

4.3. BLOCK DIAGRAM OF TEST SETUP

4.3.1. TEST SETUP FOR 30MHz~1000MHz



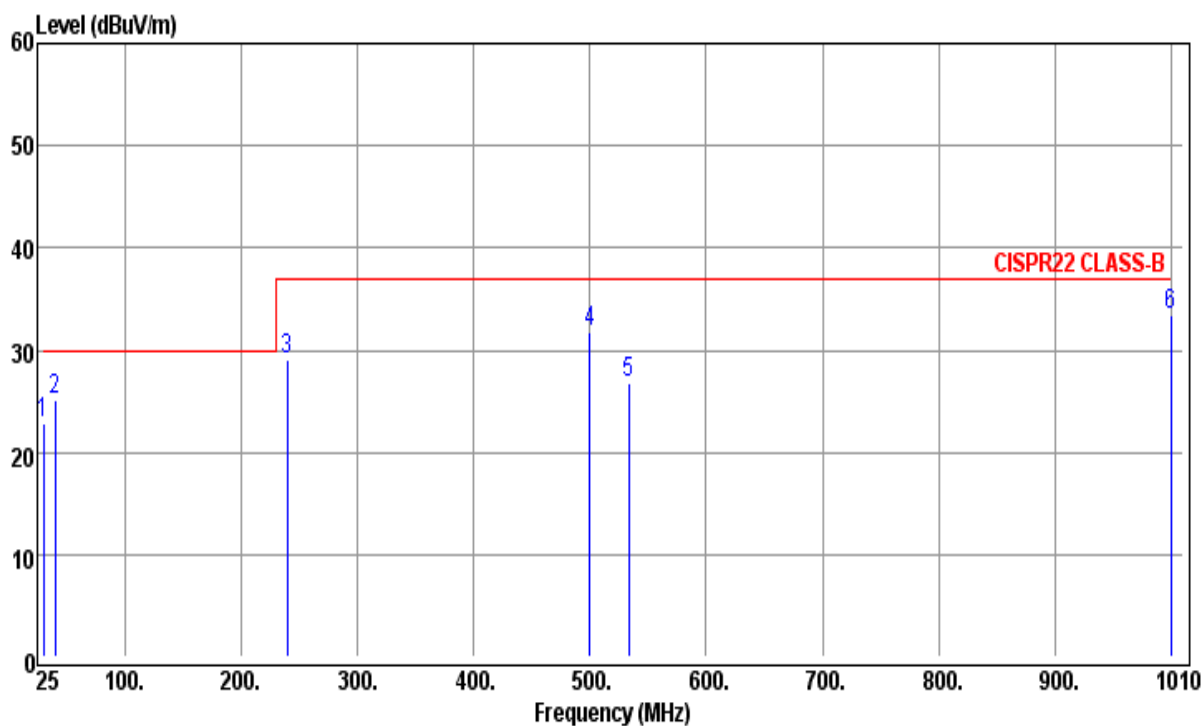
4.3.2. TEST SETUP FOR ABOVE 1GHz



4.4. TEST DATA

4.4.1. FREQUENCY RANGE (30MHz~1000MHz)

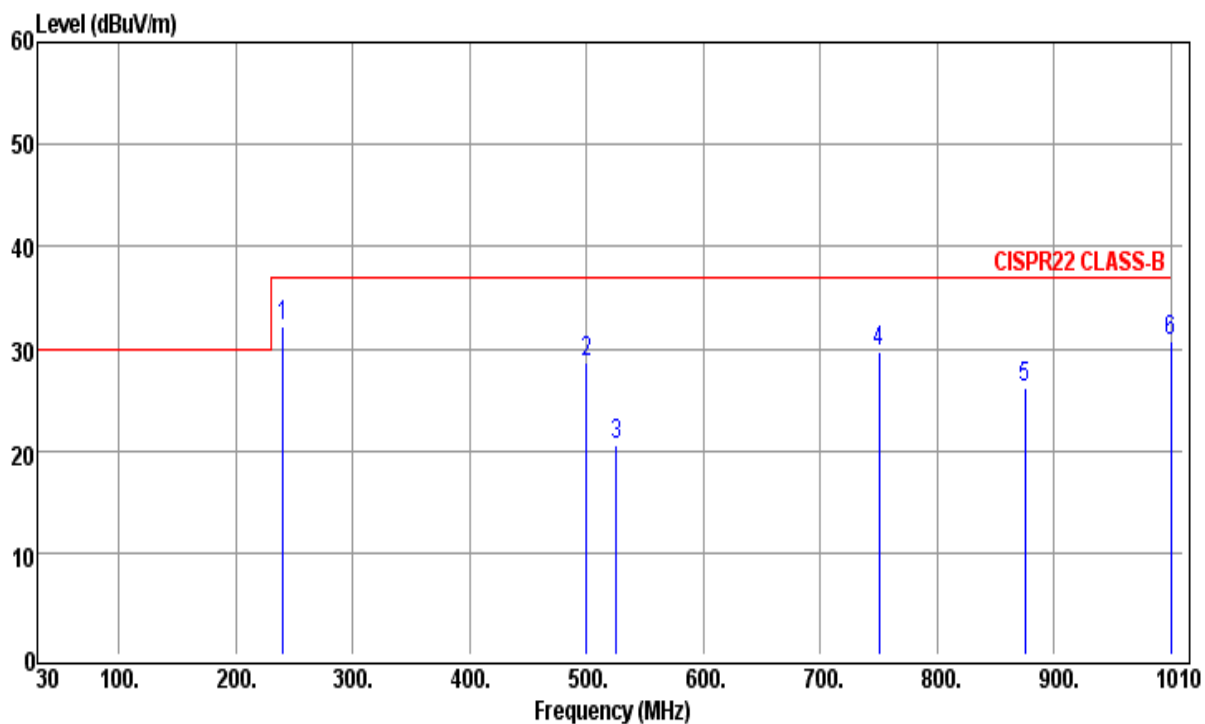
Data Log: 2013090605	Date of Test: Sep 06, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 1
Temperature (°C): 21	Humidity (%): 59	Frequency Range: 30MHz~1000MHz



Item (Mark)	Freq (MHz)	Read Level dBμV	Total Factor dB/m	Level dBμV/m	Limit Line dB(μV/m)	Over Limit dB	Detector	Ant. Height (cm)	Table Ang. (deg)	Ant. Pol.
1	30.34	35.22	-12.45	22.77	30.00	-7.23	QP	100	197	Vertical
2	40.66	43.25	-18.22	25.03	30.00	-4.97	QP	154	315	Vertical
3	240.01	47.65	-18.60	29.05	37.00	-7.95	QP	100	205	Vertical
4	499.99	42.61	-10.94	31.67	37.00	-5.33	QP	100	240	Vertical
5	533.32	36.53	-9.68	26.85	37.00	-10.15	QP	100	353	Vertical
6	1000.00	34.47	-1.01	33.46	37.00	-3.54	QP	128	190	Vertical

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.



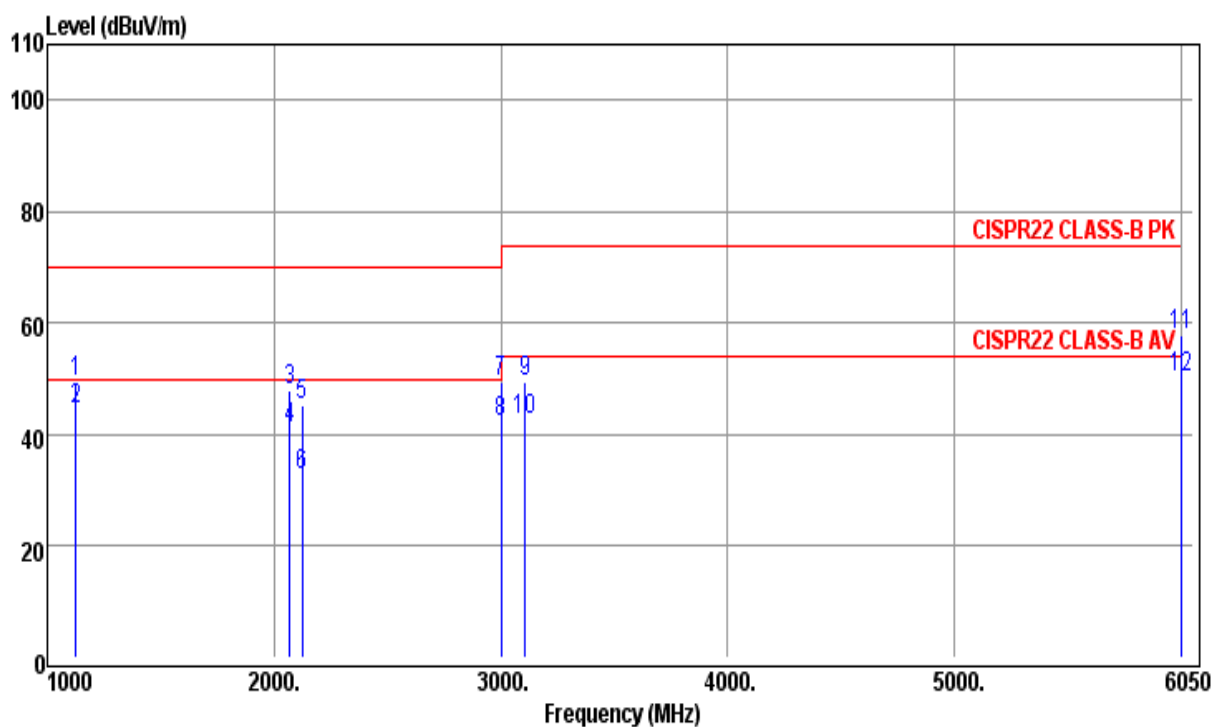
Item (Mark)	Freq (MHz)	Read Level dB μ V	Total Factor dB/m	Level dB μ V/m	Limit Line dB(μ V/m)	Over Limit dB	Detector	Ant. Height (cm)	Table Ang. (deg)	Ant. Pol.
1	240.02	51.35	-19.10	32.25	37.00	-4.75	QP	400	266	Horizontal
2	500.01	40.21	-11.64	28.57	37.00	-8.43	QP	400	266	Horizontal
3	525.05	31.42	-10.95	20.47	37.00	-16.53	QP	400	225	Horizontal
4	750.02	36.82	-7.06	29.76	37.00	-7.24	QP	375	214	Horizontal
5	875.01	31.31	-5.16	26.15	37.00	-10.85	QP	400	278	Horizontal
6	1000.00	33.33	-2.52	30.81	37.00	-6.19	QP	400	313	Horizontal

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.

4.4.2. FREQUENCY RANGE (ABOVE 1GHz)

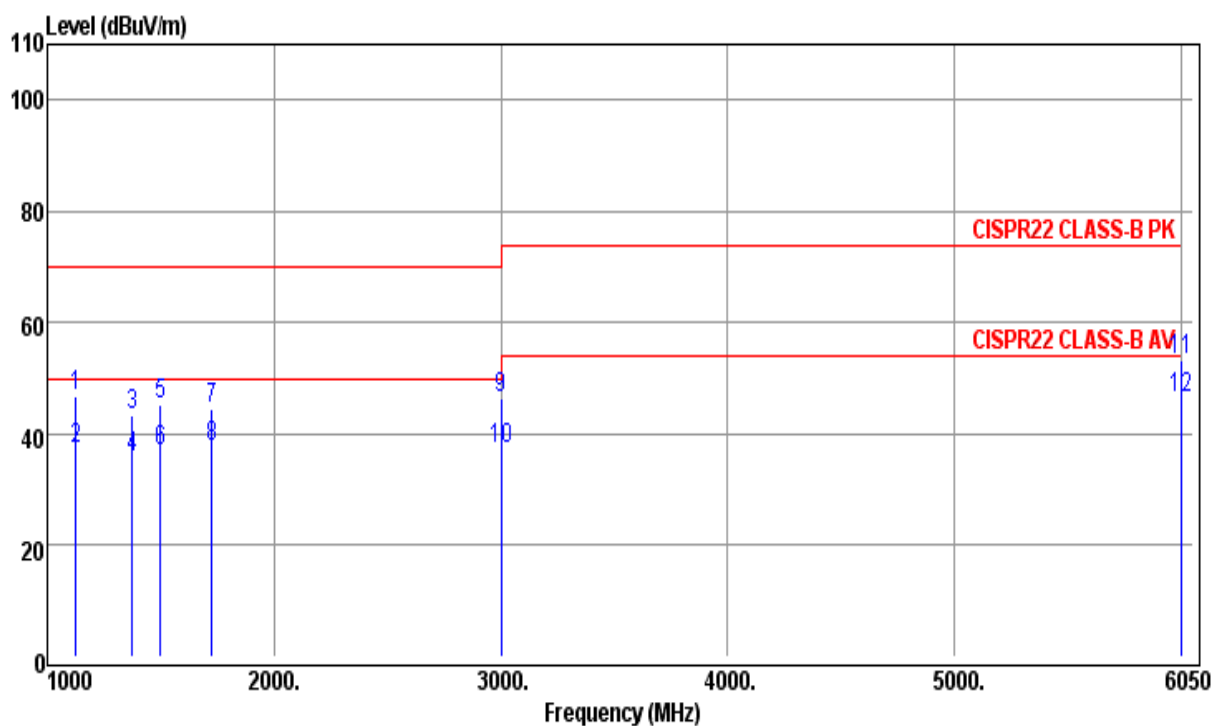
Data Log: 1213090305	Date of Test: Sep 03, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 1
Temperature (°C): 21	Humidity (%): 53	Frequency Range: Above 1GHz



Item (Mark)	Freq (MHz)	Read Level dBμV	Total Factor dB/m	Level dBμV/m	Limit Line dB(μV/m)	Over Limit dB	Detector	Ant. Height (cm)	Table Ang. (deg)	Ant. Pol.
1	1124.97	72.06	-22.65	49.41	70.00	-20.59	Peak	109	173	Vertical
2	1124.97	67.24	-22.65	44.59	50.00	-5.41	Average	109	173	Vertical
3	2070.04	67.23	-19.21	48.02	70.00	-21.98	Peak	149	197	Vertical
4	2070.04	60.23	-19.21	41.02	50.00	-8.98	Average	149	197	Vertical
5	2125.07	64.25	-19.14	45.11	70.00	-24.89	Peak	117	185	Vertical
6	2125.07	51.88	-19.14	32.74	50.00	-17.26	Average	117	185	Vertical
7	3000.00	67.08	-17.64	49.44	70.00	-20.56	Peak	143	186	Vertical
8	3000.00	60.03	-17.64	42.39	50.00	-7.61	Average	143	186	Vertical
9	3104.91	66.92	-17.48	49.44	74.00	-24.56	Peak	126	9	Vertical
10	3104.91	60.15	-17.48	42.67	54.00	-11.33	Average	126	9	Vertical
11	6000.00	67.62	-9.94	57.68	74.00	-16.32	Peak	142	197	Vertical
12	6000.00	60.13	-9.94	50.19	54.00	-3.81	Average	142	197	Vertical

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.



Item (Mark)	Freq (MHz)	Read Level dBμV	Total Factor dB/m	Level dBμV/m	Limit Line dB(μV/m)	Over Limit dB	Detector	Ant. Height (cm)	Table Ang. (deg)	Ant. Pol.
1	1124.94	69.46	-22.65	46.81	70.00	-23.19	Peak	171	326	Horizontal
2	1124.94	60.13	-22.65	37.48	50.00	-12.52	Average	171	326	Horizontal
3	1375.02	66.35	-22.96	43.39	70.00	-26.61	Peak	184	75	Horizontal
4	1375.02	58.80	-22.96	35.84	50.00	-14.16	Average	184	75	Horizontal
5	1500.00	68.24	-23.11	45.13	70.00	-24.87	Peak	206	287	Horizontal
6	1500.00	60.04	-23.11	36.93	50.00	-13.07	Average	206	287	Horizontal
7	1724.97	65.80	-21.40	44.40	70.00	-25.60	Peak	212	237	Horizontal
8	1724.97	59.12	-21.40	37.72	50.00	-12.28	Average	212	237	Horizontal
9	3000.00	63.96	-17.64	46.32	70.00	-23.68	Peak	202	250	Horizontal
10	3000.00	55.10	-17.64	37.46	50.00	-12.54	Average	202	250	Horizontal
11	6000.00	63.17	-9.94	53.23	74.00	-20.77	Peak	192	232	Horizontal
12	6000.00	56.24	-9.94	46.30	54.00	-7.70	Average	192	232	Horizontal

Remark:

1. Negative number in the margin column indicates the amount (in dB) that the recorded emission is below the limit.

4.5. CALCULATION

The field strength is calculated by adding the Total Factor to the receiver or analyzer reading to determine the resultant field strength.

The Total Factor is determined by adding the antenna factor and the loss of the cables connection the antenna to the receiver.

Front-end amplifier gain – if any – is accounted for in the receiver reading.

The basic equation with a sample calculation is as follows:

$$FS \text{ (dB}\mu\text{V/m)} = RA \text{ (dB}\mu\text{V)} + TF \text{ (dB/m)}$$

The sum of Total Factor is measured mean Antenna Factor, Cable Loss Factor and Amplifier Gain

$$TF = AF + CL - AG$$

FS = Field Strength

AF = Antenna Factor

CL = Cable Loss Factor

RA = Receiver Amplitude

AG = Amplifier Gain

The difference between Field Strength and Test Limit, Delta (dB) = FS – Limit [dB(μV/m)]

Assume a receiver reading of 22dBμV is obtained.

The Antenna factor of 7.4dB and a cable loss factor of 1.1dB are added to yield 8.5dB Total Factor.

The Calculated Field Strength is the sum of 22 + 8.5 = 30.5dBμV/m.

All values are listed as dB, either referenced to 1μV or 1μV/m.

5. POWERLINE HARMONIC MEASUREMENT

5.1. TEST LIMIT

Test Standard: EN 61000-3-2 (According to EN 61000-4-7)		
Limits for Class D equipment		
Harmonic order (Odd)	Max current (mA/W)	Max current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.3	0.21
$15 \leq n \leq 39$ (Odd only)	$3.85/n$	$0.15 \times 15/n$

Note:

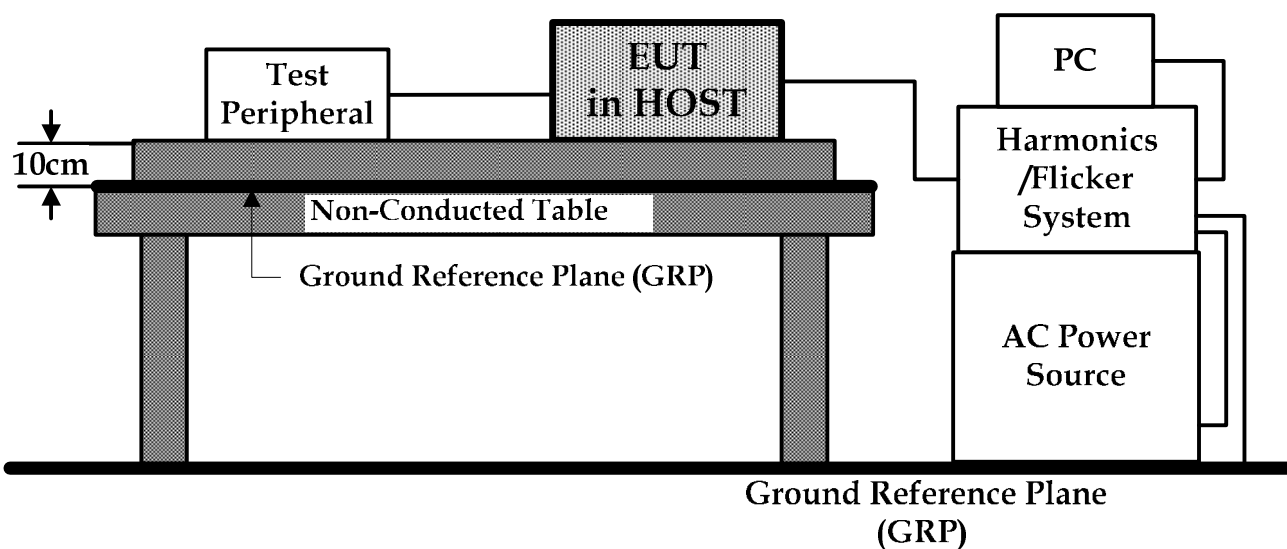
1. Class D is classified according to item section 5 of EN 61000-3-2.
2. According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having and active input power >75W and no limits apply for equipment with an active input power up to and including 75W.

5.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
HARMONICS/FLICKER SYSTEM	EMC-PARTNER	HAR1000-1P	190	31-Jul-2013	31-Jul-2014
Software	EMC-PARTNER	HARCS (Ver. 4.20)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

5.3. BLOCK DIAGRAM OF TEST SETUP



5.4. TEST DATA

Data Log: 4113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Temperature (°C): 22	Humidity (%): 51	

Urms = 230.1V Freq = 50.000 Range: 1A
 Irms = 0.481A Ipk = 0.705A cf = 1.463
 P = 106.0W S = 110.8VA pf = 0.957
 THDi = 11.7 % THDu = 0.20% Class D

Test - Time: 10min (100%)

Limit Reference: Pmax = 110.71W

Order	Iavg [A]	Iavg%L [%]	Irms [A]	Irms%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	0.4625		0.4790		0.5004			
2	0.0058		0.0056		0.0140			
3	0.0267	7.0824	0.0262	6.9565	0.0322	8.5618	0.3764	
4	0.0002		0.0023		0.0078			
5	0.0340	16.141	0.0344	16.337	0.0353	16.801	0.2103	
6	0.0000		0.0016		0.0051			
7	0.0191	17.239	0.0195	17.587	0.0257	23.211	0.1107	
8	0.0000		0.0014		0.0058			
9	0.0086	15.504	0.0099	17.973	0.0251	45.430	0.0554	
10	0.0000		0.0020		0.0044			
11	0.0006	1.5010	0.0025	6.4584	0.0239	61.749	0.0387	
12	0.0000		0.0023		0.0045			
13	0.0009	2.7910	0.0045	13.590	0.0233	70.928	0.0328	
14	0.0000		0.0024		0.0038			
15	0.0002	0.6423	0.0010	3.4369	0.0219	77.115	0.0284	
16	0.0000		0.0007		0.0038			
17	0.0040	15.960	0.0055	21.910	0.0211	83.988	0.0251	
18	0.0000		0.0018		0.0032			
19	0.0089	39.567	0.0090	40.269	0.0198	88.428	0.0224	
20	0.0000		0.0012		0.0035			
21	0.0106	52.145	0.0120	58.942	0.0186	91.721	0.0203	
22	0.0000		0.0012		0.0029			
23	0.0069	36.985	0.0060	32.607	0.0173	93.211	0.0185	
24	0.0000		0.0013		0.0032			
25	0.0127	74.669	0.0131	76.613	0.0161	94.156	0.0170	
26	0.0000		0.0018		0.0024			
27	0.0096	60.833	0.0105	66.503	0.0146	92.409	0.0158	
28	0.0000		0.0010		0.0027			
29	0.0065	44.291	0.0060	40.698	0.0132	89.702	0.0147	
30	0.0000		0.0012		0.0019			
31	0.0055	40.051	0.0057	41.729	0.0118	85.678	0.0137	
32	0.0000		0.0010		0.0020			
33	0.0006	4.3150	0.0048	36.860	0.0104	80.809	0.0129	
34	0.0000		0.0009		0.0013			
35	0.0001	1.0689	0.0032	26.564	0.0092	75.181	0.0122	
36	0.0000		0.0008		0.0014			
37	0.0002	1.9156	0.0034	29.672	0.0080	69.410	0.0115	
38	0.0000		0.0013		0.0013			
39	0.0002	1.8701	0.0035	32.392	0.0072	65.902	0.0109	
40	0.0000		0.0006		0.0015			

6. VOLTAGE FLICKER MEASUREMENT

6.1. TEST LIMIT AND TEST DATA

Test Standard: EN 61000-3-3

Data Log: 9113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Temperature (°C): 22	Humidity (%): 51	

Urms = 230.1V Freq = 50.000 Range: 1A
 Irms = 0.486A Ipk = 0.715A cf = 1.470
 P = 107.1W S = 111.9VA pf = 0.957

Test - Time: 12 x 10min = 120min (100%)

LIN (Line Impedance Network): L: 0.24ohm + j0.15ohm N: 0.16ohm + j0.10ohm

Limits: Plt: 0.65 Pst: 1.00
 dmax: 4.00% dc: 3.30%
 dtLim: 3.30% dt>Lim: 500ms

Plt= 0.074

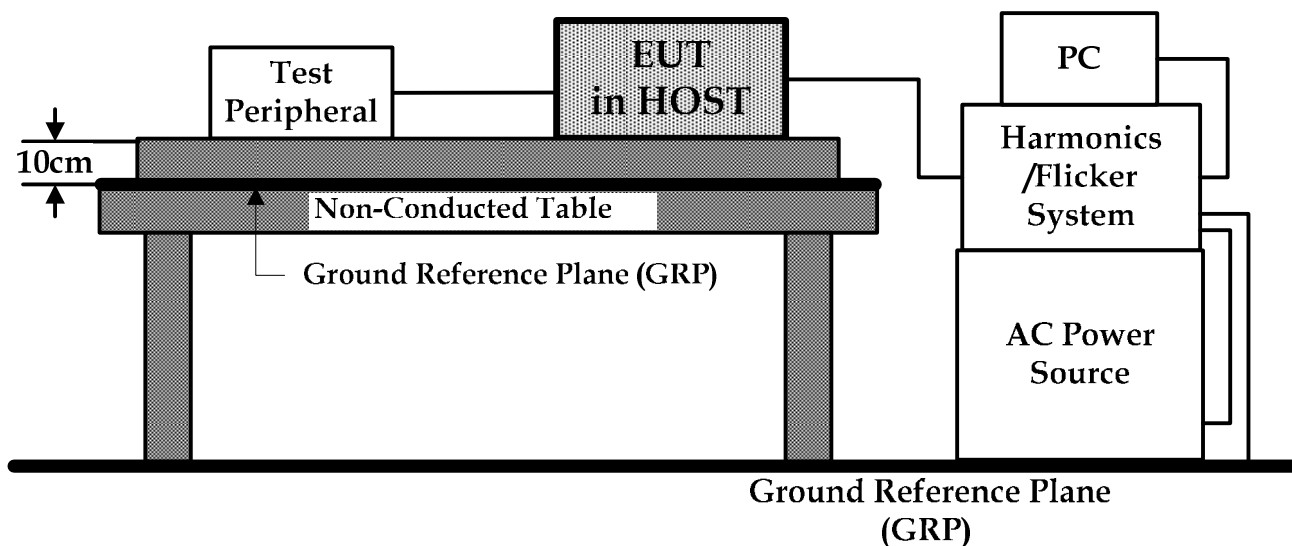
	Pst	P50s	P10s	P3s	P1s	P0.1s	dmax [%]	dc [%]	dt>Lim [ms]
1	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000
2	0.072	0.010	0.010	0.010	0.010	0.010	0.070	0.130	0.000
3	0.078	0.010	0.010	0.010	0.010	0.041	0.180	0.120	0.000
4	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000
5	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000
6	0.078	0.010	0.010	0.010	0.010	0.040	0.180	0.150	0.000
7	0.072	0.010	0.010	0.010	0.010	0.010	0.150	0.130	0.000
8	0.078	0.010	0.010	0.010	0.010	0.040	0.180	0.140	0.000
9	0.072	0.010	0.010	0.010	0.010	0.012	0.160	0.120	0.000
10	0.079	0.010	0.010	0.010	0.010	0.043	0.150	0.120	0.000
11	0.077	0.010	0.010	0.010	0.010	0.038	0.000	0.150	0.000
12	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.030	0.000

6.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
HARMONICS/FLICKER SYSTEM	EMC-PARTNER	HAR1000-1P	190	31-Jul-2013	31-Jul-2014
Software	EMC-PARTNER	HARCS (Ver. 4.20)	N/ A	N/ A	N/ A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

6.3. BLOCK DIAGRAM OF TEST SETUP



7.4. TEST DATA

Data Log: 5113091001	Date of Test: Sep 10, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Temperature (°C): 24	Humidity (%): 40	Pressure (kPa): 99.1

Air Discharge

Discharge Location	Test Point	Amount of Discharge	Interval time (sec)	Voltage (kV)	Required Criteria	Complied to Criteria	Result
Front HDDs and panel of host	A1	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	A	Pass
USB ports of host	A2	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	A	Pass
Lock of host	A3	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	B	Pass
VGA port of host	A4	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	A	Pass
COM port of host	A5	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	A	Pass
PSUs of host	A6	20	1	+/- 2.0	B	A	Pass
		20	1	+/- 4.0	B	A	Pass
		20	1	+/- 8.0	B	A	Pass

Contact Discharge

Discharge Location	Test Point	Amount of Discharge	Interval time (sec)	Voltage (kV)	Required Criteria	Complied to Criteria	Result
Front side of host	C1	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
Rear side of host	C2	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	B	Pass
Top side of host	C3	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	B	Pass
Left side of host	C4	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
Right side of host	C5	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
EUT bracket at rear side of host	C6	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	B	Pass
SAS port of EUT	C7	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
Lock of host	C8	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
RJ45 port of host	C9	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
PSUs of host	C10	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
HCP	Note 1	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass
VCP	Note 2	25	1	+/- 2.0	B	A	Pass
		25	1	+/- 4.0	B	A	Pass
		25	1	+/- 6.0	B	A	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

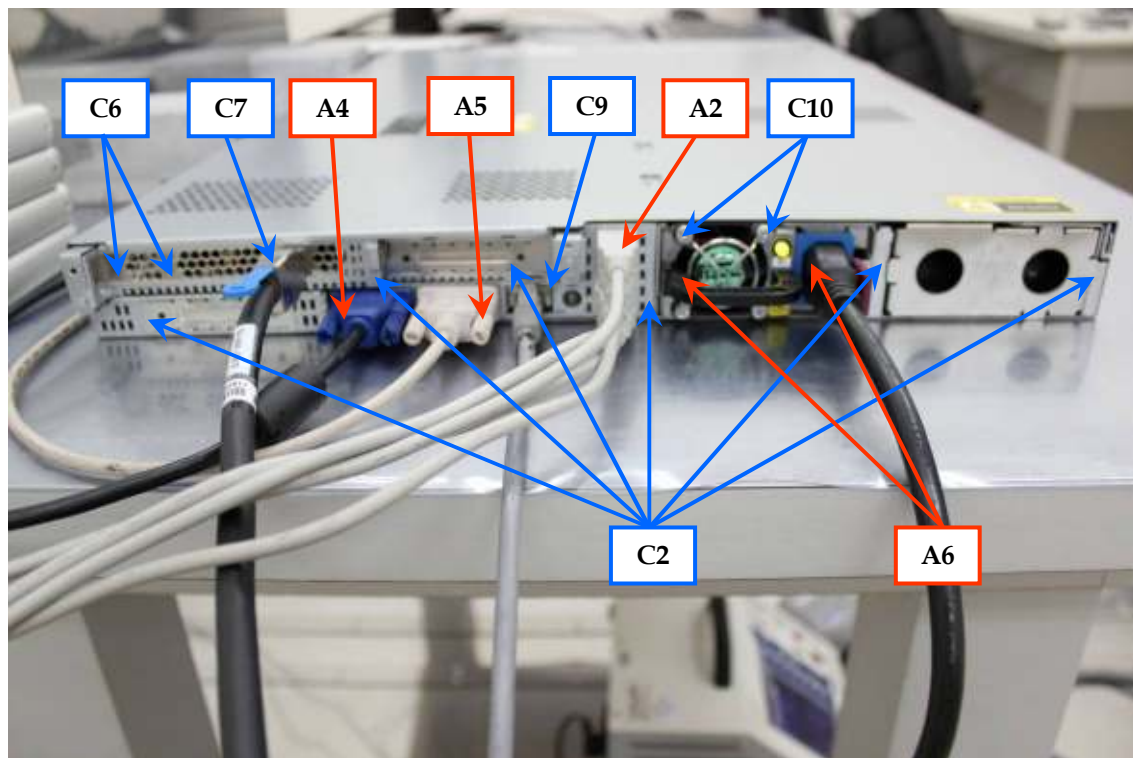
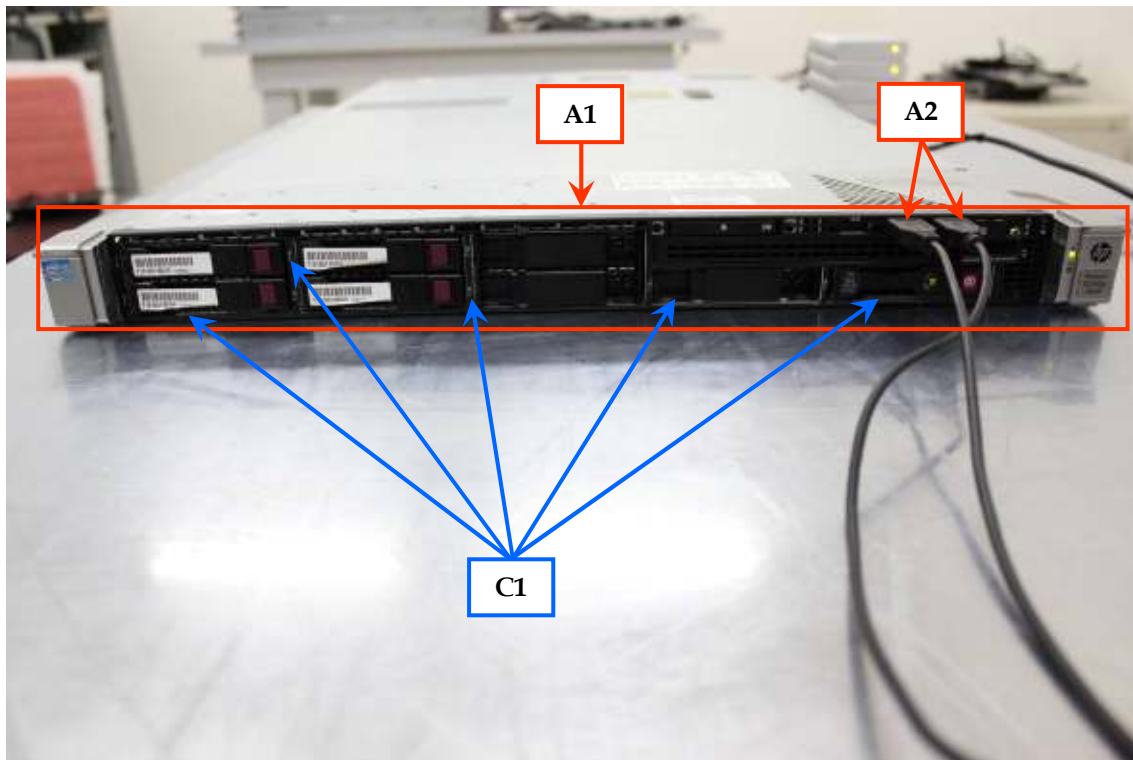
D means "Degradation or loss of function, not recoverable"

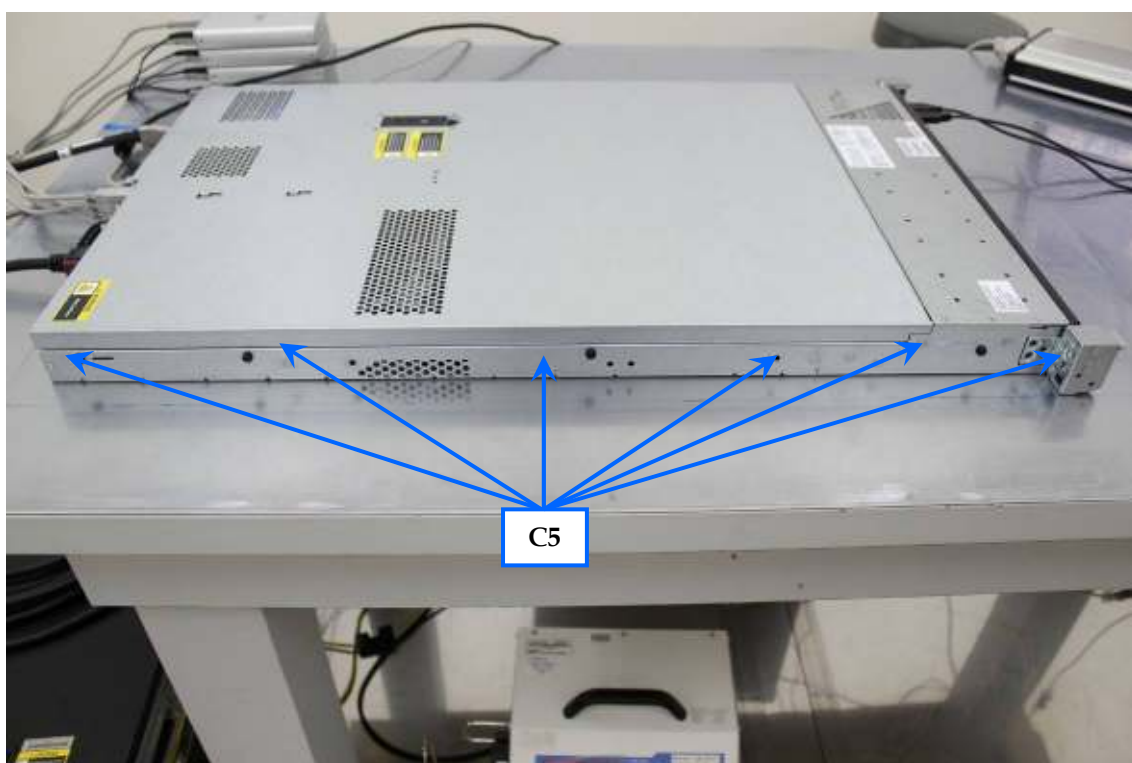
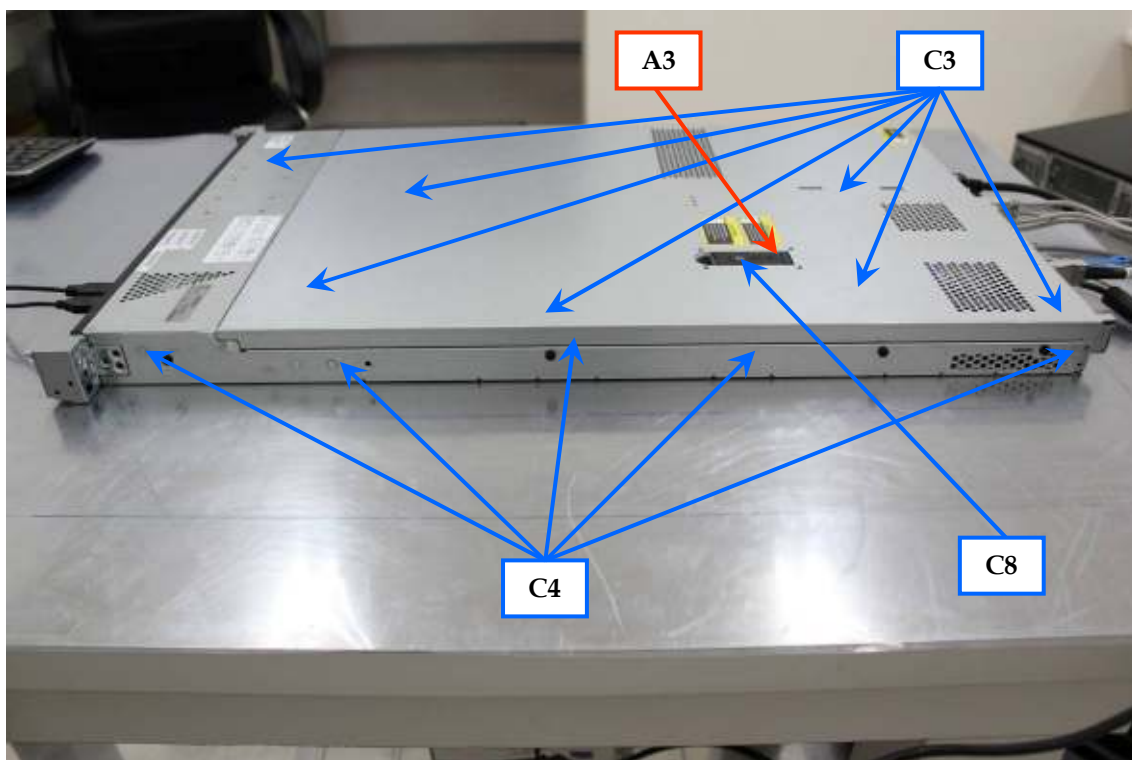
N/A = Not Tested

Note: 1. Applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT.

2. Applied to the centre of one vertical edge of the coupling plane.

7.5. PHOTOGRAPHS OF TEST POINT





8. RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

8.1. APPLY LEVEL

Test Standard: EN 61000-4-3		
Customer Apply to	Level	Test field strength (V/m)
[]	1	1
[V]	2	3
[]	3	10
[]	X	special

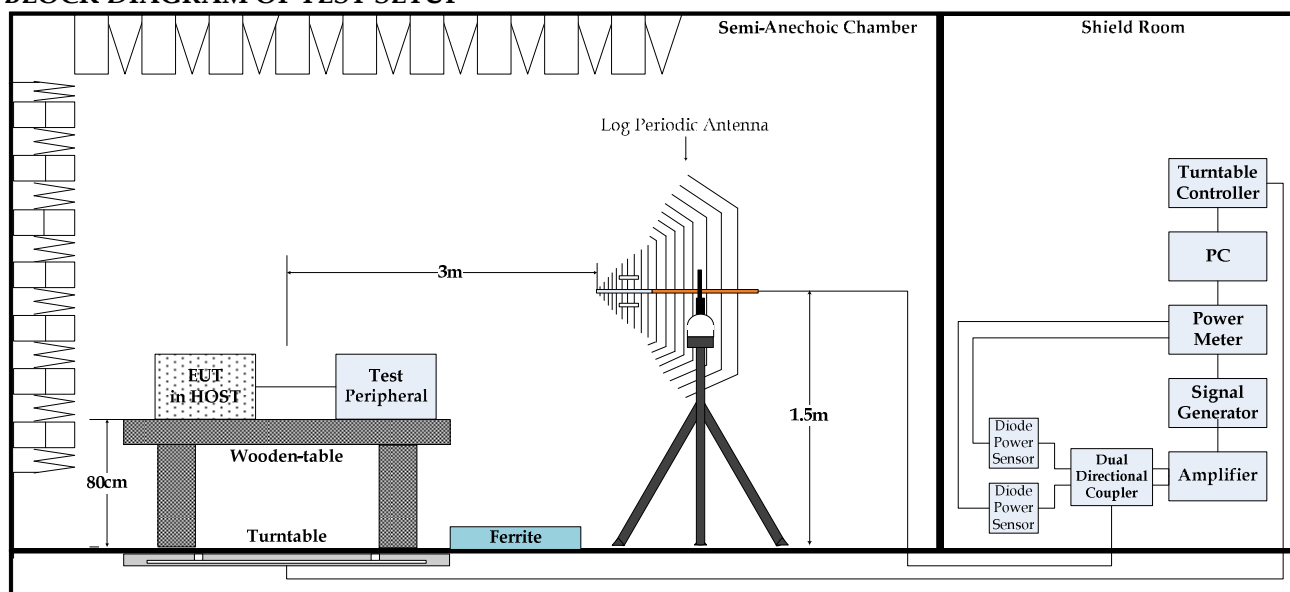
Note: "X" is an open level. This level can be given in the product specification.

8.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Log Periodic Antenna	AR	ATR80M6G	0334576	03-Nov-2012	03-Nov-2013
Amplifier	AR	150W1000M3	0333433	03-Nov-2012	03-Nov-2013
Signal Generator	HP	E4421B	US38440545	12-Aug-2013	12-Aug-2014
Dual Directional Coupler	AR	DC6180A	0334873	26-Sep-2012	26-Sep-2013
RF Power Meter	Boonton	4242-01-02	13566	26-Nov-2012	26-Nov-2013
50ohms Diode Power Sensor	Boonton	51013-4E	35517	26-Nov-2012	26-Nov-2013
50ohms Diode Power Sensor	Boonton	51013-4E	35518	26-Nov-2012	26-Nov-2013
Software	Audix	i2 (Ver. 4.110131)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

8.3. BLOCK DIAGRAM OF TEST SETUP



8.4. TEST DATA

Data Log: 6113090501	Date of Test: Sep 05, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Antenna Distance (m): 3	Antenna Height (m): 1.5	Modulation AM/1KHz (%): 80
Temperature (°C): 23	Humidity (%): 53	Frequency Step (%): 1

Frequency Range (MHz)	Position Angle (deg.)	Field (V/m)	Dwell Time (sec)	Polarization	Required Criteria	Complied to Criteria	Result
80 ~ 1000	0, 90, 180, 270	3	4	Vertical, Horizontal	A	A	Pass
100	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass
133.33	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass
150	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass
450	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass
667	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass
750	0, 90, 180, 270	3	60	Vertical, Horizontal	A	A	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

D means "Degradation or loss of function, not recoverable"

N/A = Not Tested

9. ELECTRICAL FAST TRANSIENT / BURST IMMUNITY TEST

9.1. APPLY LEVEL

Test Standard: EN 61000-4-4					
Customer Apply to	Open-circuit output test voltage +/- 10%		Customer Apply to	Open-circuit output test voltage +/- 10%	
	Level	On Power Supply port		Level	On I/O signal, data and control ports
[]	1	0.5kV	[]	1	0.25kV
[V]	2	1.0kV	[V]	2	0.5kV
[]	3	2.0kV	[]	3	1.0kV
[]	4	4.0kV	[]	4	2.0kV
[]	X	special	[]	X	special

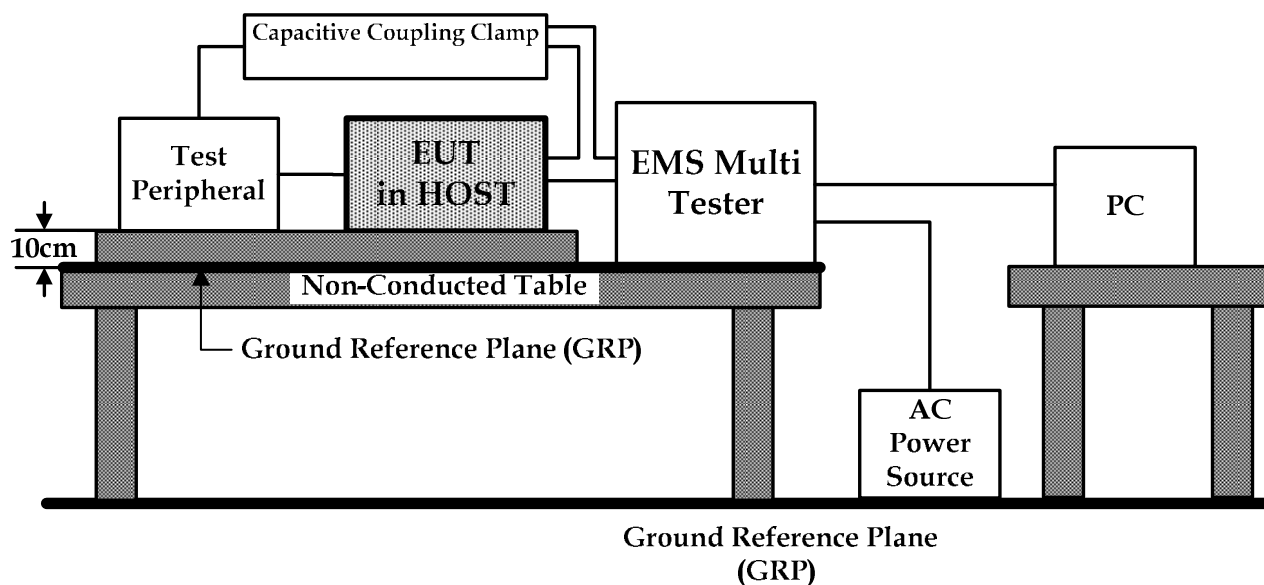
Note: "X" is an open level. This level has to be specified in the dedicated equipment specification.

9.2. TEST INSTRUMENTS

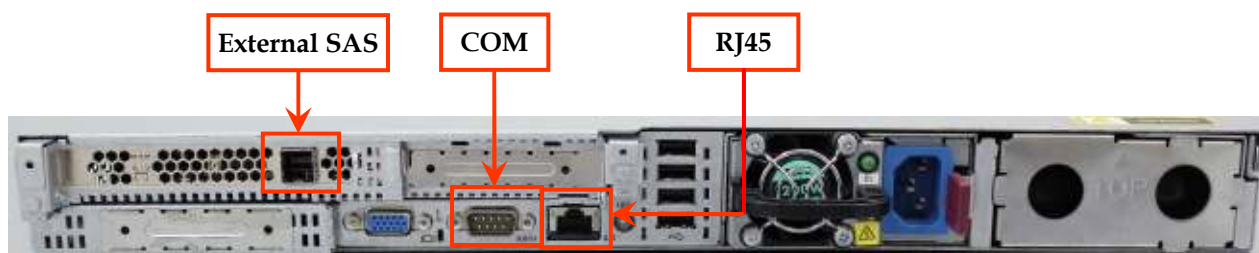
Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMS Multi Tester	EMC PARTNER	TRA2000IN6	1148	05-Jul-2013	05-Jul-2014
Capacitive Coupling Clamp	EMC PARTNER	CN-EFT1000	708	05-Jul-2013	05-Jul-2014
Software	EMC PARTNER	GENECS (Ver. 3.40)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

9.3. BLOCK DIAGRAM OF TEST SETUP



9.4. LOCATIONS OF TEST



9.5. TEST DATA

Data Log: 7113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Burst Period (msec): 300	Burst Duration (msec): 15	Test Duration (min): 1
Temperature (°C): 22	Humidity (%): 51	Pressure (kPa): 98.6
Repetition Rate (kHz): 5		

On Power Supply Port

Inject Line	Voltage (kV)	Polarity	Inject Method	Attached Cable	Required Criteria	Complied to Criteria	Result
L	1.0	+	Direct	E90165	B	B	Pass
	1.0	-	Direct	E90165	B	B	Pass
N	1.0	+	Direct	E90165	B	B	Pass
	1.0	-	Direct	E90165	B	B	Pass
PE	1.0	+	Direct	E90165	B	B	Pass
	1.0	-	Direct	E90165	B	B	Pass
L+N+PE	1.0	+	Direct	E90165	B	B	Pass
	1.0	-	Direct	E90165	B	B	Pass

On I/O signal, data and control ports

Test Port	Voltage (kV)	Polarity	Inject Method	Attached Cable	Required Criteria	Complied to Criteria	Result
COM.	0.5	+	Indirect	3.0m Shielded Cable *1	B	B	Pass
	0.5	-	Indirect	3.0m Shielded Cable *1	B	B	Pass
RJ45	0.5	+	Indirect	5.0m CAT 6/1074E UTP *1	B	B	Pass
	0.5	-	Indirect	5.0m CAT 6/1074E UTP *1	B	B	Pass
External SAS	0.5	+	Indirect	10.0m Shielded Cable *1	B	B	Pass
	0.5	-	Indirect	10.0m Shielded Cable *1	B	B	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

D means "Degradation or loss of function, not recoverable"

N/A = Not Tested

10. POWERLINE SURGE TRANSIENT IMMUNITY TEST

10.1. APPLY LEVEL

Test Standard: EN 61000-4-5							
Customer Apply to	Mode	Level	Open-circuit test voltage +/-10 %	Customer Apply to	Mode	Level	Open-circuit test voltage +/-10 %
[]	Common	1	0.5kV	[]	Differential	1	—
[]	Common	2	1.0kV	[]	Differential	2	0.5kV
[V]	Common	3	2.0kV	[V]	Differential	3	1.0kV
[]	Common	4	4.0kV	[]	Differential	4	2.0kV
[]	Common	X	special	[]	Differential	X	special

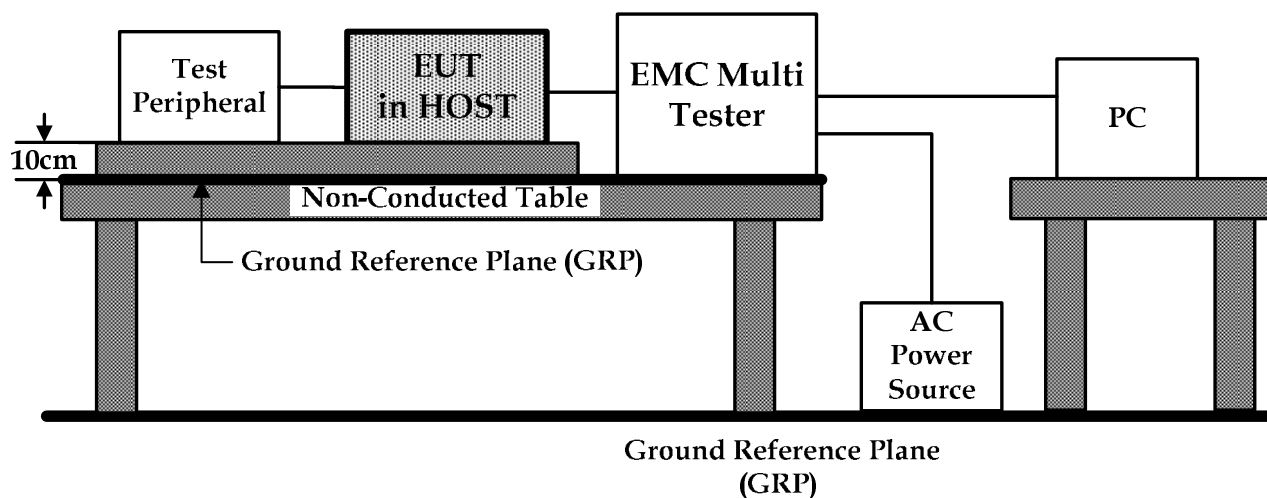
Note: "X" is an open level. This level can be specified in the product specification.

10.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMS Multi Tester	EMC PARTNER	TRA2000IN6	1148	05-Jul-2013	05-Jul-2014
Software	EMC PARTNER	GENECS (Ver. 3.40)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

10.3. BLOCK DIAGRAM OF TEST SETUP



10.4. TEST DATA

Data Log: 8113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Number of Surge: 5	Interval (sec): 60	
Temperature (°C): 22	Humidity (%): 51	Pressure (kPa): 98.6

Common Mode

Inject Line	Voltage (kV)	Phase Angle (deg.)	Required Criteria	Complied to Criteria	Result
L → PE	+0.5	0, 90, 180, 270	B	A	Pass
	-0.5	0, 90, 180, 270	B	A	Pass
	+1.0	0, 90, 180, 270	B	A	Pass
	-1.0	0, 90, 180, 270	B	A	Pass
	+2.0	0, 90, 180, 270	B	B	Pass
	-2.0	0, 90, 180, 270	B	B	Pass
N → PE	+0.5	0, 90, 180, 270	B	A	Pass
	-0.5	0, 90, 180, 270	B	A	Pass
	+1.0	0, 90, 180, 270	B	A	Pass
	-1.0	0, 90, 180, 270	B	A	Pass
	+2.0	0, 90, 180, 270	B	B	Pass
	-2.0	0, 90, 180, 270	B	B	Pass

Differential Mode

Inject Line	Voltage (kV)	Phase Angle (deg.)	Required Criteria	Complied to Criteria	Result
L → N	+0.5	0, 90, 180, 270	B	A	Pass
	-0.5	0, 90, 180, 270	B	A	Pass
	+1.0	0, 90, 180, 270	B	A	Pass
	-1.0	0, 90, 180, 270	B	A	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

D means "Degradation or loss of function, not recoverable"

N/A = Not Tested

11. CONDUCTED RF IMMUNITY TEST

11.1. APPLY LEVEL

Test Standard: EN 61000-4-6		
Customer Apply to	Level	Test field strength (V)
[]	1	1
[V]	2	3
[]	3	10
[]	X	special

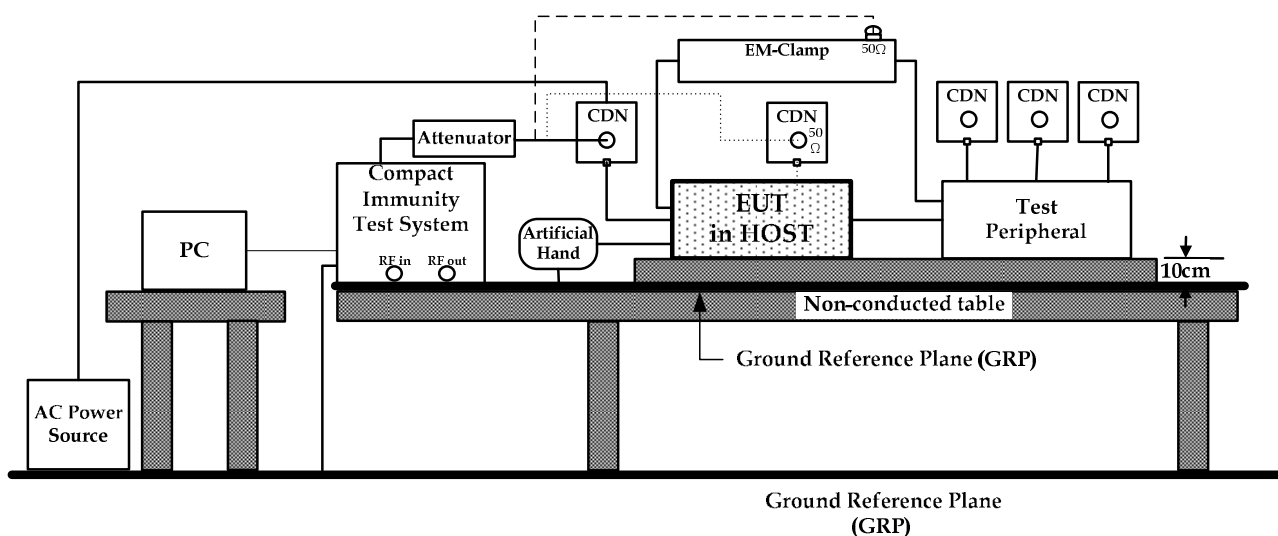
Note: "X" is an open level. This level can be specified in the product specification.

11.2. TEST INSTRUMENTS

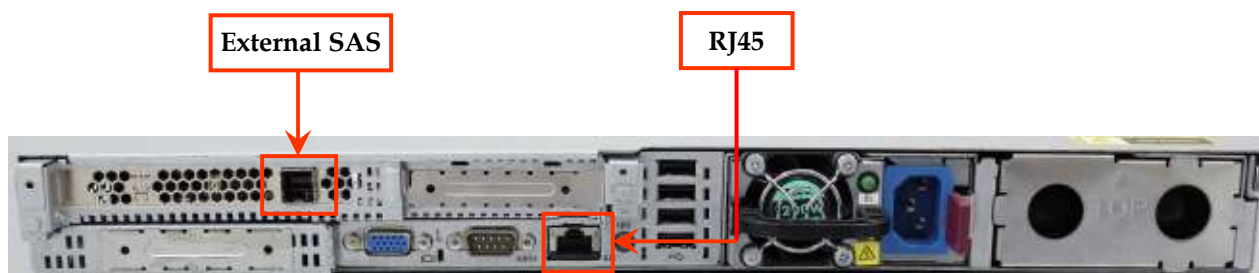
Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Conducted Immunity Test System	FRANKONIA	CIT-10/75	126B1175/2011	05-Nov-2012	05-Nov-2013
CDN (for EUT)	FCC	FCC-801-M2/M3-16A	101101	09-Nov-2012	09-Nov-2013
CDN (for EUT)	FCC	F-090407-1004-1	101072	09-Nov-2012	09-Nov-2013
EM Clamp (for EUT)	FCC	F-2031-23mm	101104	10-Nov-2012	10-Nov-2013
6dB Attenuator	TESEQ	ATN6075	29484	28-Aug-2013	28-Aug-2014
CDN (for peripheral)	FRANKONIA	CDN-M3	A3003051	20-Mar-2013	20-Mar-2014
CDN (for peripheral)	FRANKONIA	CDN-M3	A3003052	20-Mar-2013	20-Mar-2014
CDN (for peripheral)	FRANKONIA	CDN-M3	A3003053	20-Mar-2013	20-Mar-2014
Terminator ×1 (50 ohms)	---	N/A	N/A	09-Nov-2012	09-Nov-2013
Software	HUBERT	IEC/EN61000-4-6 (Ver. 1.1.2)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

11.3. BLOCK DIAGRAM OF TEST SETUP



11.4. LOCATIONS OF TEST



11.5. TEST DATA

Data Log: A213091101	Date of Test: Sep 11, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Modulation AM/1KHz (%): 80	Step Size (%): 1	Dwell Time (sec): 2.9
Temperature (°C): 25	Humidity (%): 51	

Frequency Range (MHz)	Inject Line	Field Strength (V)	Inject Method	Required Criteria	Complied to Criteria	Result
0.15 ~ 80	AC Line	3	Direct	A	A	Pass
0.15 ~ 80	RJ45	3	Direct	A	A	Pass
0.15 ~ 80	External SAS	3	Indirect	A	A	Pass

Performance criteria: A means "Must maintain normal operating conditions"
 B means "Self-restoring"
 C means "Temporary degradation or loss function, requires operator intervention"
 D means "Degradation or loss of function, not recoverable"

N/A = Not Tested

12. POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

12.1. APPLY LEVEL

Test Standard: EN 61000-4-8		
Customer Apply to	Level	Test field strength (A/m)
[V]	1	1
[]	2	3
[]	3	10
[]	4	30
[]	5	100
[]	X	special

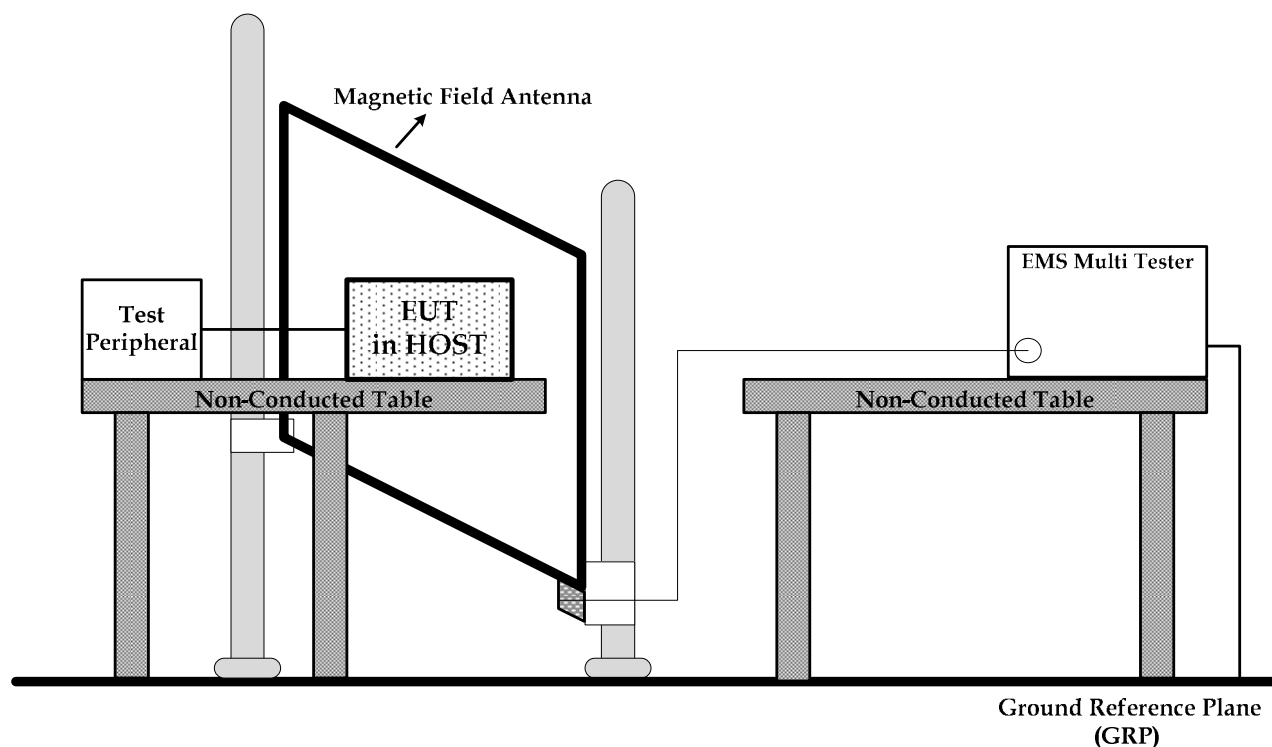
Note: "X" is an open level. This level can be specified in the product specification.

12.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMS Multi Tester	EMC PARTNER	TRA2000IN6	1148	08-Jul-2013	08-Jul-2014
Magnetic Field Antenna	EMC PARTNER	MF-1000-1	189	08-Jul-2013	08-Jul-2014
Software	EMC PARTNER	GENECS (Ver. 3.40)	N/A	N/A	N/A

Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

12.3. BLOCK DIAGRAM OF TEST SETUP



12.4. TEST DATA

Data Log: B113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Temperature (°C): 22	Humidity (%): 51	Pressure (kPa): 98.6

Power Frequency (Hz)	Field Strength (A/m)	Test Duration (sec)	Orthogonal Axes	Required Criteria	Complied to Criteria	Result
50	1	60	X-axis	A	A	Pass
50	1	60	Y-axis	A	A	Pass
50	1	60	Z-axis	A	A	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

D means " Degradation or loss of function, not recoverable"

N/A = Not Tested

13. VOLTAGE DIPS/INTERRUPTION IMMUNITY TEST

13.1. APPLY LEVEL AND TEST DATA

Test Standard: EN 61000-4-11

Data Log: C113090901	Date of Test: Sep 09, 2013	Tested By: A-Kuan Yu
EUT: 25190	Main: 230V/50Hz	Test Mode: SKU 3
Temperature (°C): 22	Humidity (%): 51	Pressure (kPa): 98.6
Voltage Rating (V): 100, 110~120, 200~240		

Environmental Phenomenon	Reduction (%)	Phase Angle (deg.)	Duration (Periods)	Repetition Rate (sec.)	Required Criteria	Complied to Criteria	Result
Voltage Dips	> 95	0	0.5	10	B	A	Pass
	30	0, 90, 180	25	10	C	C	Pass
Voltage Interruption	> 95	0, 90, 180	250	10	C	C	Pass

Performance criteria: A means "Must maintain normal operating conditions"

B means "Self-restoring"

C means "Temporary degradation or loss function, requires operator intervention"

D means "Degradation or loss of function, not recoverable"

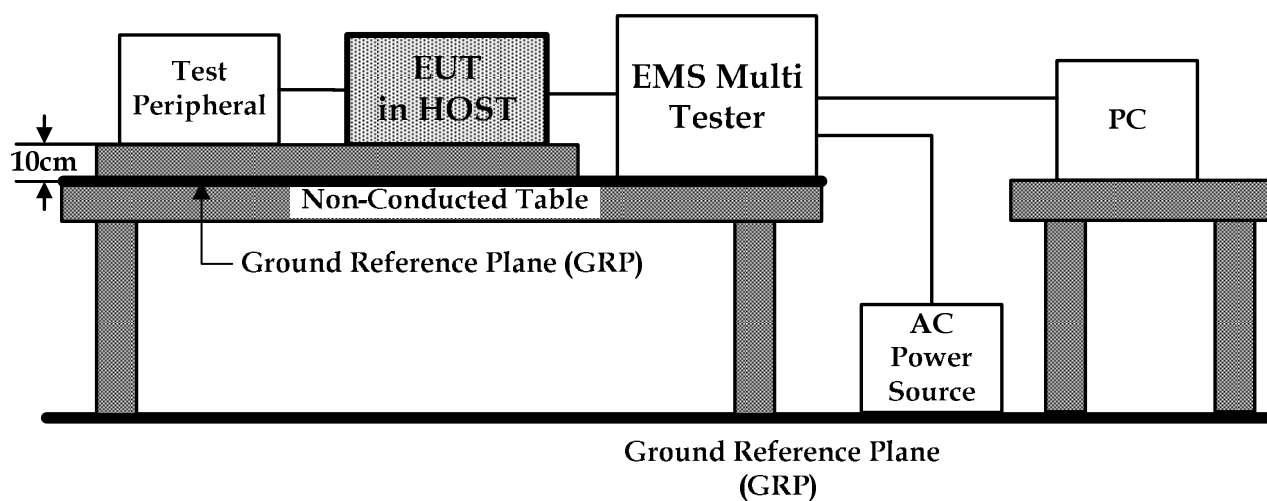
N/A = Not Tested

13.2. TEST INSTRUMENTS

Name	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMS Multi Tester	EMC PARTNER	TRA2000IN6	1148	05-Jul-2013	05-Jul-2014
Software	EMC PARTNER	GENECS (Ver. 3.40)	N/A	N/A	N/A

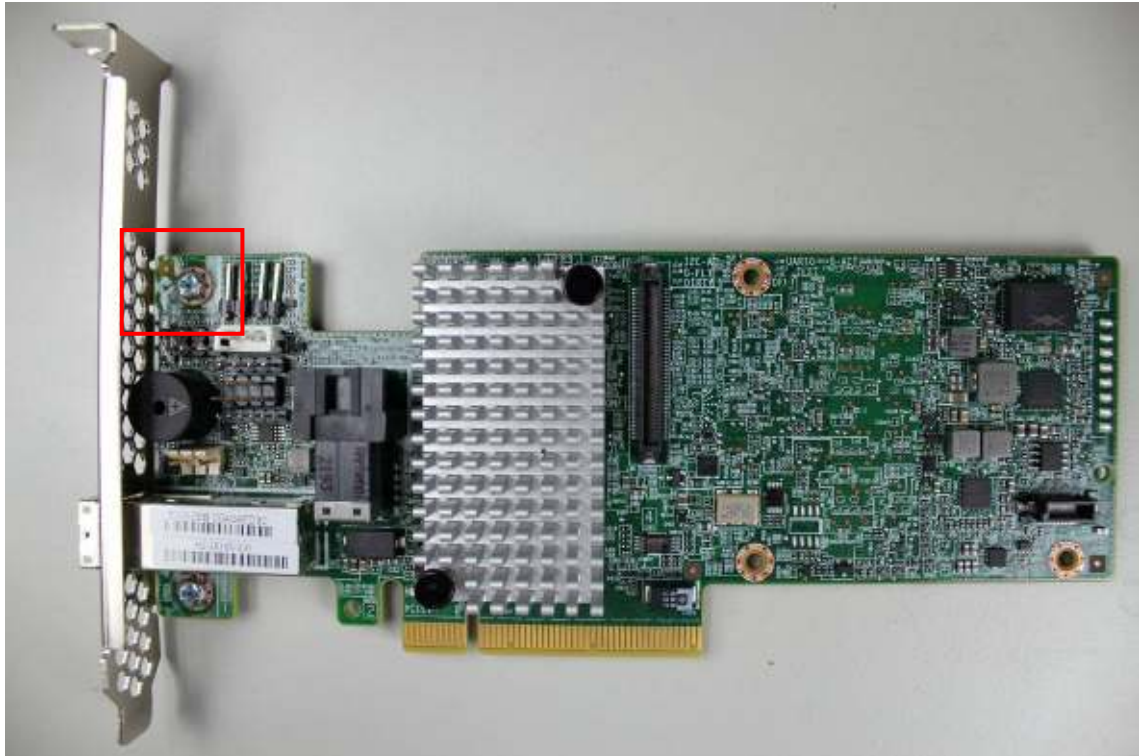
Note: The test equipments used are calibrated and can be traced to National ITRI and International Standards.

13.3. BLOCK DIAGRAM OF TEST SETUP

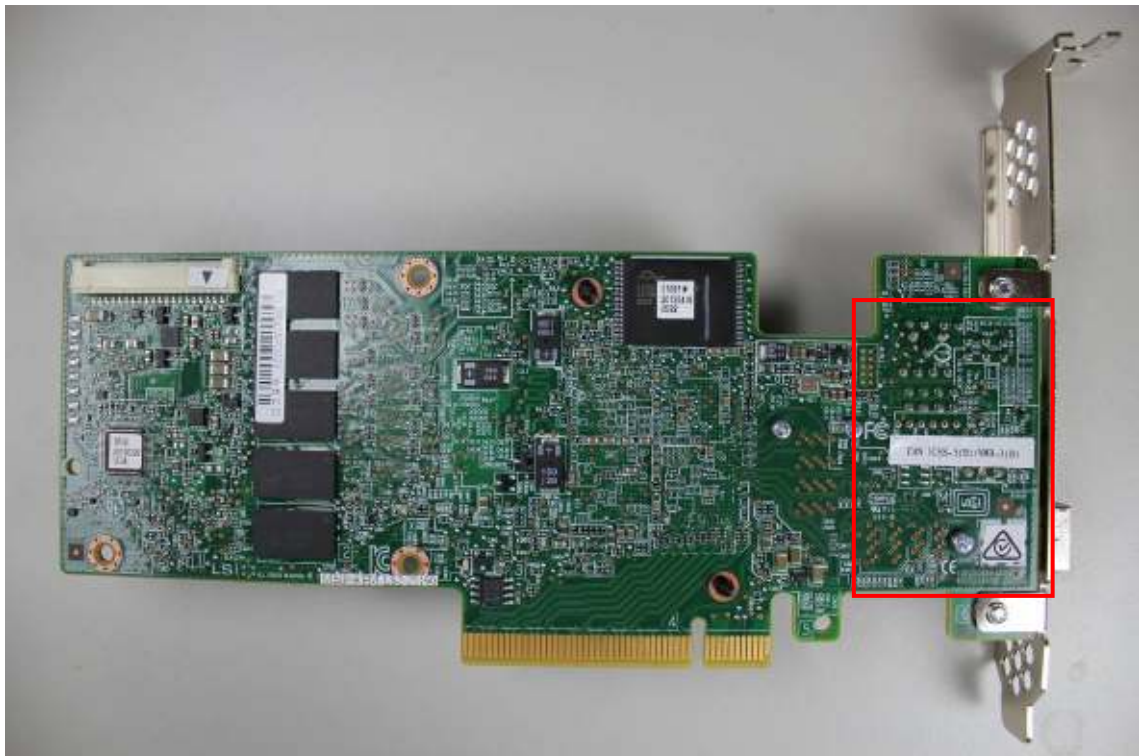


14. PRODUCT LABELING

14.1. LOCATION OF THE LABEL ON EUT FRONT SIDE

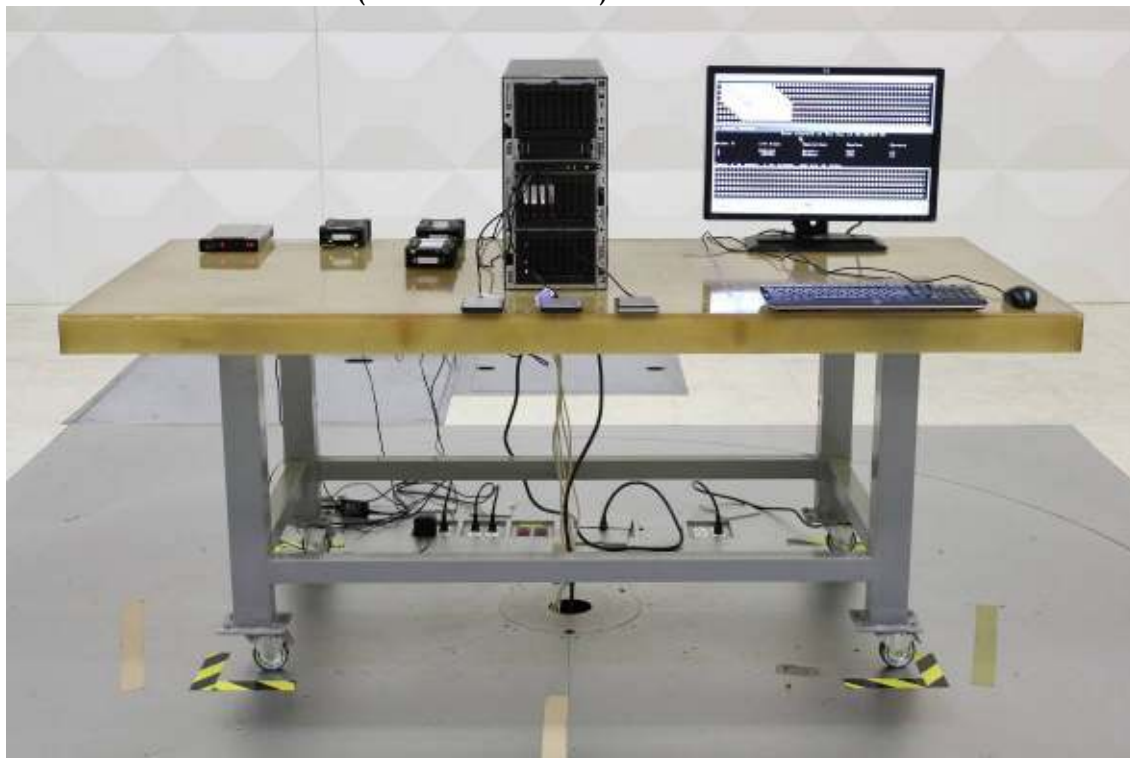


14.2. LOCATION OF THE LABEL ON EUT REAR SIDE

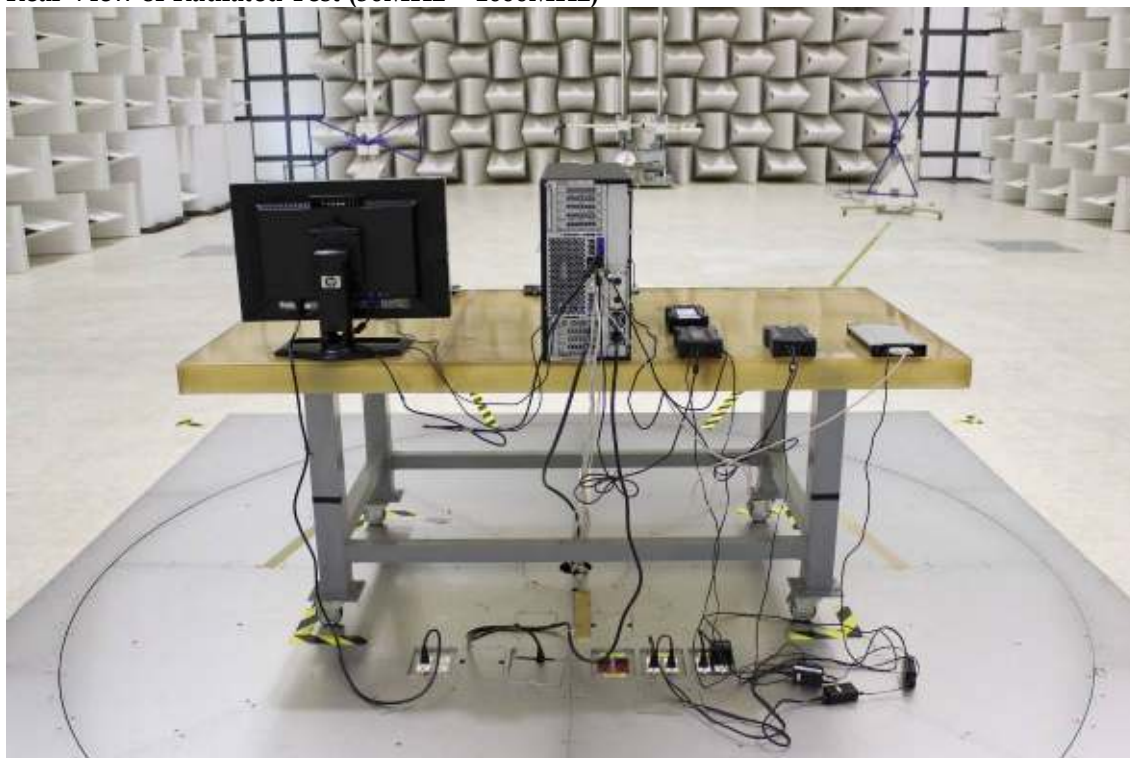


15. PHOTOGRAPHS

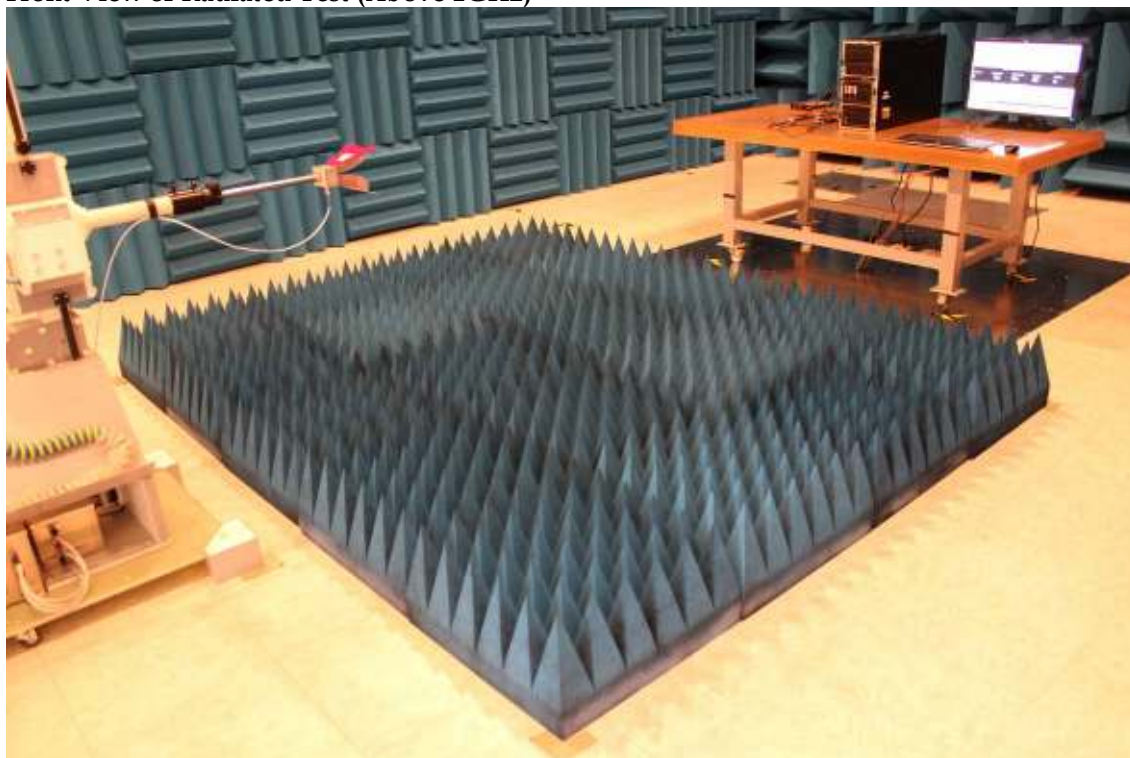
Front View of Radiated Test (30MHz ~ 1000MHz)



Rear View of Radiated Test (30MHz ~ 1000MHz)



Front View of Radiated Test (Above 1GHz)



Rear View of Radiated Test (Above 1GHz)



Front View of Conducted Test



Side View of Conducted Test



View of Harmonics/Voltage Flicker Test



View of ESD Test



Front View of Radiated Immunity Test



Rear View of Radiated Immunity Test



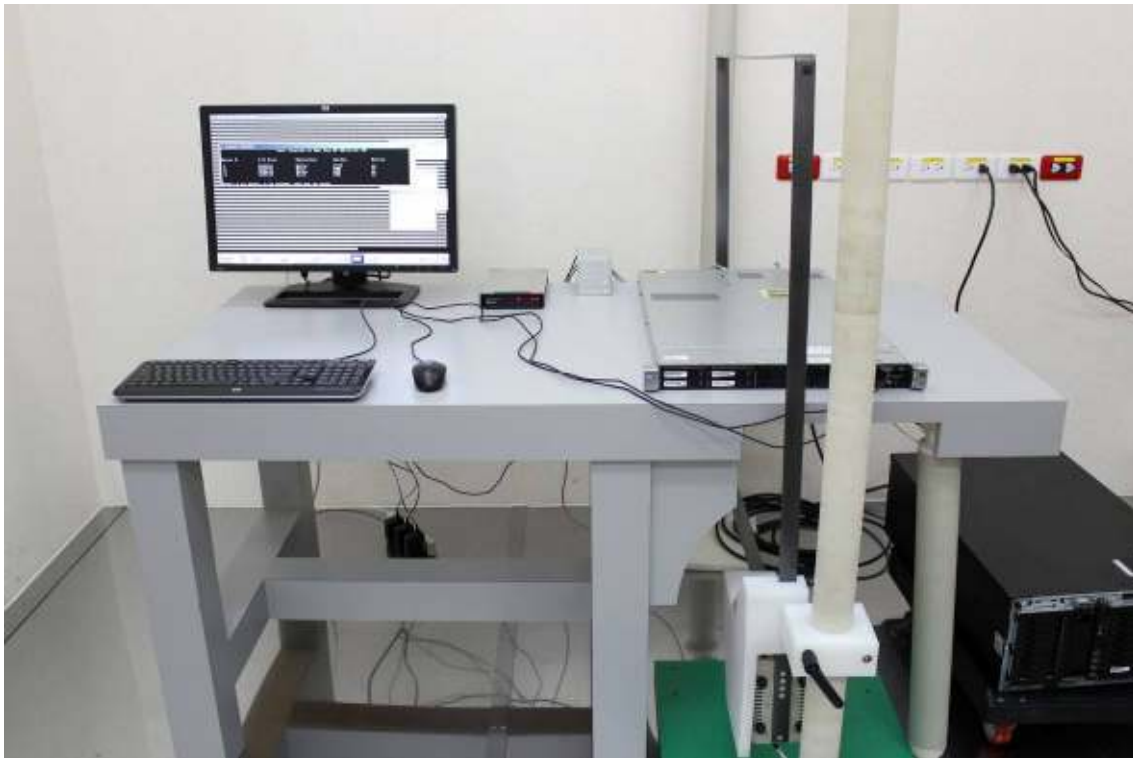
View of Surge/Dips Test



View of Conducted Immunity Test



View of PFMF Test



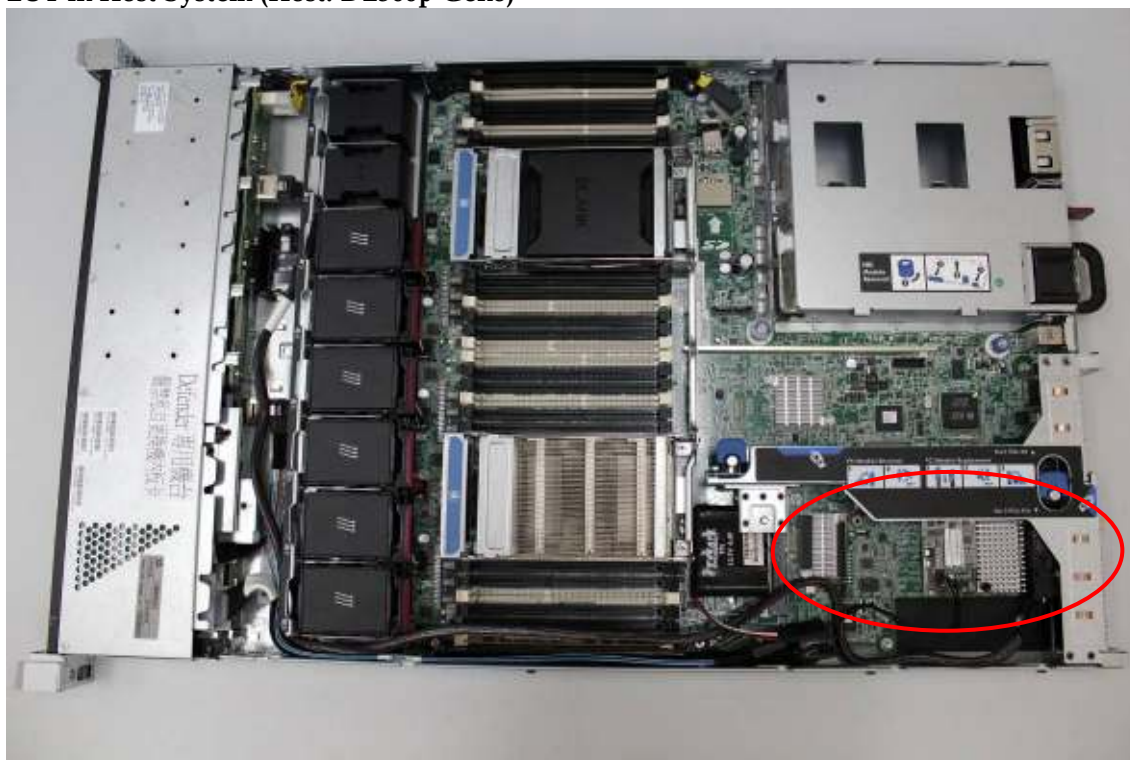
View of EFT Test



EUT in Host System (Host: ML350p Gen8)



EUT in Host System (Host: DL360p Gen8)



EUT Appearance (in SKU 1) 1



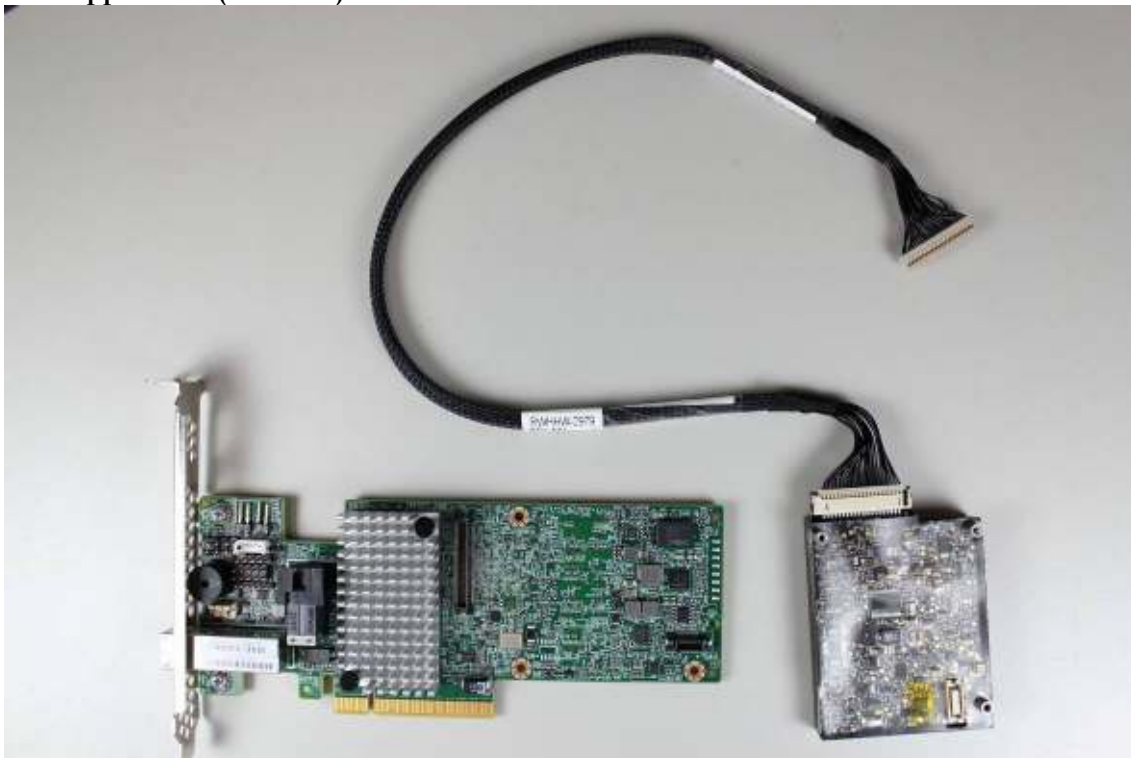
EUT Appearance (in SKU 1) 2



EUT Appearance (in SKU 2) 1



EUT Appearance (in SKU 2) 2



Front View of EUT



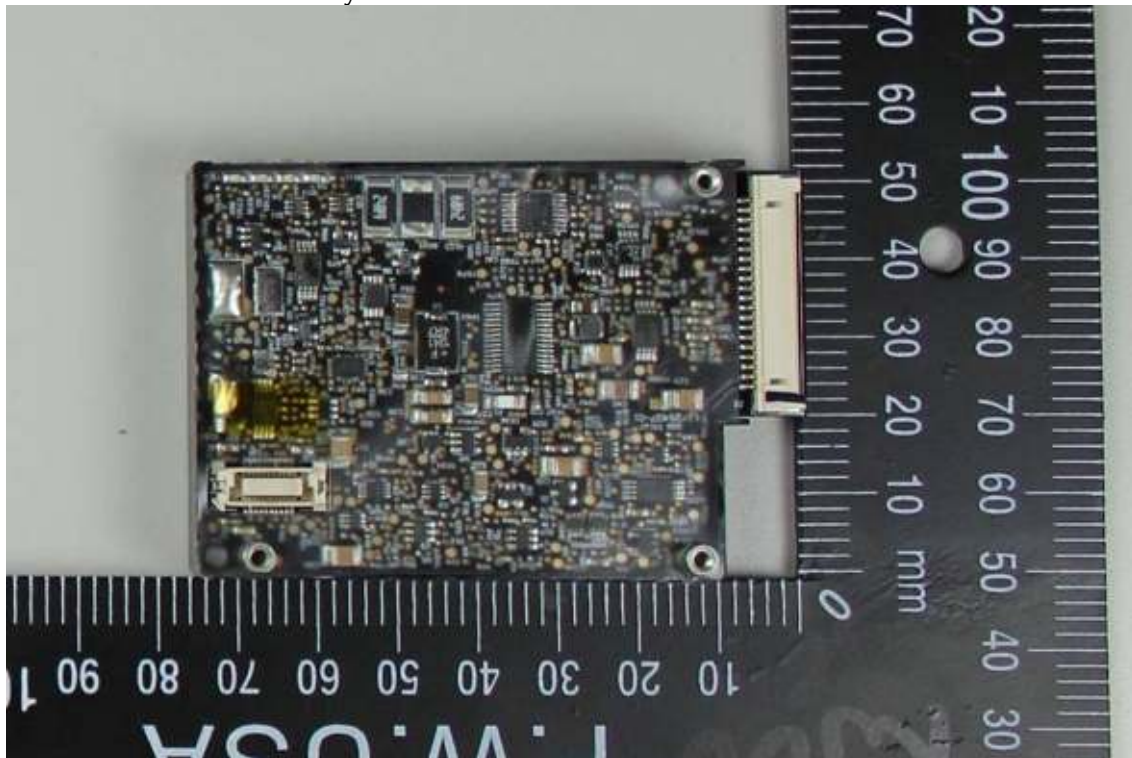
Rear View of EUT



Front View of iBBU09 Battery



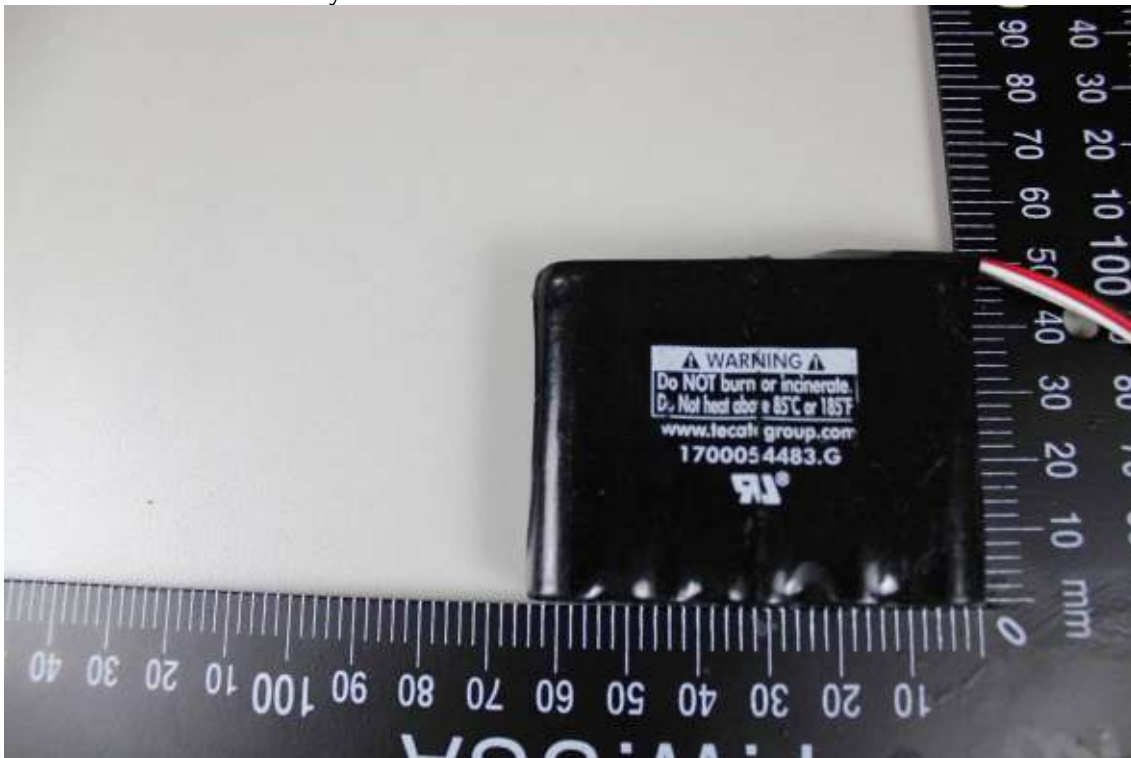
Rear View of iBBU09 Battery



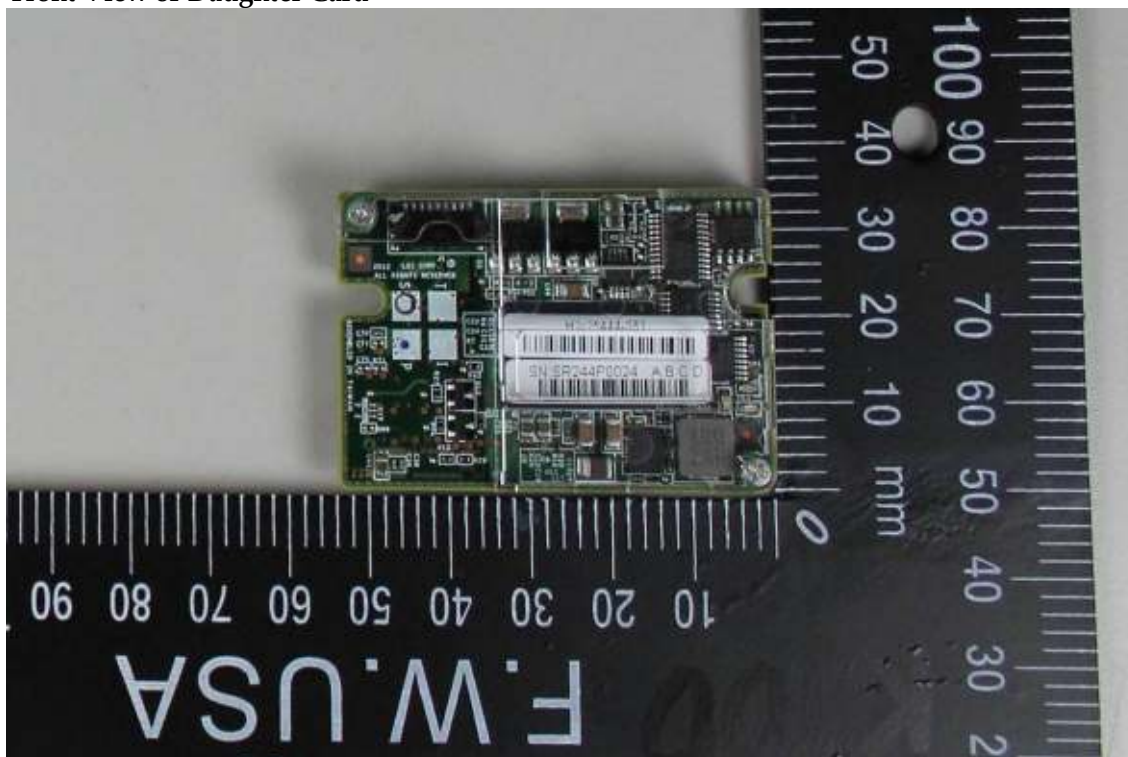
Front View of Tecate Battery



Rear View of Tecate Battery



Front View of Daughter Card



Rear View of Daughter Card

