

Verification of Compliance

Product Name : **Notebook Computer**
Brand Name : **acer**
Model Number : **N19C1, EH5L1, A315-54K, A315-54KG, EH5LW, A315-54, A315-54G, EH5LP, A315-42, A315-42G, FH5T1, EX215-51K, EX215-51KG, FH5TW, EX215-51, EX215-51G, A315-56, FH5LI, EX215-52, GH5TI**
Applicant : **Acer Incorporated**
Address : **8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)**
Report Number : **S2O-A170-1903-297**
Issue Date : **May 25, 2020**
Applicable Standards : **ETSI EN 301 489-1 V2.1.1
ETSI EN 301 489-17 V3.1.1
EN 55032:2015+AC:2016-07 Class B ITE
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2014
EN 61000-4-6:2014
EN 61000-4-11:2004
EN 55024:2010+A1:2015
AS/NZS CISPR32:2015 Class B ITE**



Based on European Council EMC Directive 2014/30/EU, Radio equipment Directive 2014/53/EU and the specifications of the customer, one sample of the designated product has been tested in our laboratory and found to be in compliance with the EMC standards cited above.



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Date: May 25, 2020

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FCC CAB Code TW1104, TW0019

VCCI Accep. No. R-11527, C-11609, T-11441, G-10010, C-20010

NV LAP Lab Code 200575-0

T-20009, G-10614

CE EMC Test Report

for

Notebook Computer

Trade Name : *acer*
Model No. : N19C1, EH5L1, A315-54K, A315-54KG,
EH5LW, A315-54, A315-54G,
EH5LP, A315-42, A315-42G, FH5T1,
EX215-51K, EX215-51KG, FH5TW,
EX215-51, EX215-51G, A315-56,
FH5LI, EX215-52, GH5TI
Report Number : S2O-A170-1903-297
Date of Receipt : October 22, 2019
Date of Report : May 25, 2020

Prepared for

Acer Incorporated

8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)

Prepared by



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Verification of Compliance

Equipment Under Test : Notebook Computer
Model No. : N19C1, EH5L1, A315-54K, A315-54KG, EH5LW, A315-54, A315-54G, EH5LP, A315-42, A315-42G, FH5T1, EX215-51K, EX215-51KG, FH5TW, EX215-51, EX215-51G, A315-56, FH5LI, EX215-52, GH5TI
Applicant : Acer Incorporated
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ETSI EN 301 489-17 V3.1.1
EN 55032:2015+AC:2016-07 Class B ITE
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012
EN 61000-4-5:2014
EN 61000-4-6:2014
EN 61000-4-11:2004
EN 55024:2010+A1:2015
AS/NZS CISPR32:2015 Class B ITE
Date of Testing : November 6~11, 2019
Deviation : The method, configuration and arrangement of the tests are following the requirement of customer and the applicable standards cited above.
Condition of Test Sample: Engineering Sample



We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Rosa Hsieh , **DATE** : May 25, 2020
(Rosa Hsieh/System Executive)
APPROVED BY : Tsun-Yu Shih , **DATE** : May 28, 2020
(Tsun-Yu Shih/General Manager)

Contents

1. General Description.....	6
1.1 General Description of EUT	6
1.2 Test Mode	9
1.3 Applied standards	10
1.4 Description of Performance Criteria	11
1.5 Test Setup for the EUT	14
1.6 The Support Units	15
1.7 Layout of the Setup	18
1.8 Test Capability	24
2. Conducted Emission Measurement.....	26
2.1 Limits for Emission Measurement	26
2.2 Test Instruments	28
2.3 Test Procedures	30
2.4 Test Configurations	31
2.5 Photographs of the Test Configurations	31
2.6 Test Results	32
3. Radiated Emission Measurement	39
3.1 Limits for Emission Measurement	39
3.2 Test Instruments	42
3.3 Test Procedures	46
3.4 Test Configurations	48
3.5 Photographs of the Test Configurations	49
3.6 Test Results	50
4. Harmonic Current Emission Measurement	54
4.1 Limits for Emission Measurement	54
4.2 Test Instruments	55
4.3 Test Procedures	56
4.4 Test Configurations	57
4.5 Photographs of the Test Configurations	57
4.6 Test Results	58
5. Voltage Fluctuations and Flickers Emission Measurement.....	60

5.1	Limits for Emission Measurement	60
5.2	Test Instruments	60
5.3	Test Procedures.....	61
5.4	Test Configurations.....	62
5.5	Photographs of the Test Configurations	62
5.6	Test Results	63
6.	Electrostatic Discharge (ESD) Immunity Test.....	64
6.1	Specifications of Immunity Test Requirement.....	64
6.2	Test Instruments.....	65
6.3	Test Procedures.....	66
6.4	Test Configurations.....	68
6.5	Photographs of the Test Configurations	68
6.6	Test Results	69
7.	Radiated Electromagnetic Field (RS) Immunity Test.....	73
7.1	Specifications of Immunity Test Requirement.....	73
7.2	Test Instruments.....	74
7.3	Test Procedures.....	75
7.4	Test Configurations.....	76
7.5	Photographs of the Test Configurations	76
7.6	Test Results	77
8.	Electrical fast transient / burst (EFT) Immunity Test.....	79
8.1	Specifications of Immunity Test Requirement.....	79
8.2	Test Instruments.....	80
8.3	Test Procedures.....	81
8.4	Test Configurations.....	82
8.5	Photographs of the Test Configurations	82
8.6	Test Results	83
9.	Surge Immunity Test	84
9.1	Specifications of Immunity Test Requirement.....	84
9.2	Test Instruments.....	85
9.3	Test Procedures.....	86
9.4	Test Configurations.....	87

9.5	Photographs of the Test Configurations	87
9.6	Test Results	88
10.	Conducted disturbances (CS) Immunity Test	90
10.1	Specifications of Immunity Test Requirement	90
10.2	Test Instruments	91
10.3	Test Procedures	92
10.4	Test Configurations	93
10.5	Photographs of the Test Configurations	93
10.6	Test Results	94
11.	Voltage dips, short interruptions Immunity Test.....	96
11.1	Specifications of Immunity Test Requirement	96
11.2	Test Instruments	98
11.3	Test Procedures	99
11.4	Test Configurations	100
11.5	Photographs of the Test Configurations	100
11.6	Test Results	101

Attachment 1 – Photographs of the Test Configurations
Attachment 2 – Photographs of Production

1. General Description

This report is a copy version for adding model numbers: FH5LI, EX215-52, GH5TI due to the requirements of marketing. All the test data are copies from the report: S1O-A170-1903-297 of Central Research Technology Co.

1.1 General Description of EUT

Equipment Under Test : Notebook Computer
Model No. : N19C1, EH5L1, A315-54K, A315-54KG, EH5LW, A315-54, A315-54G, EH5LP, A315-42, A315-42G, FH5T1, EX215-51K, EX215-51KG, FH5TW, EX215-51, EX215-51G, A315-56, FH5LI, EX215-52, GH5TI
Power in : Supplied by the power adapter listed on page 8
Highest Operating Frequency: 2.6GHz from the test specification
Manufacturer : Acer Incorporated

Function Description :

The EUT is an engineering sample of the Notebook Computer. Please refer to the user's manual for the details.

The products of all the models are identical, they are for different market only.

The I/O ports of EUT for final verification test are listed below:

No.	I/O Port Type	Quantity
1	USB 2.0 port	2
2	USB 3.0 port	1
3	HDMI port	1
4	Audio output/ Mic. combo port	1
5	LAN port	1

The devices (supplied by manufacturer) can be installed inside the EUT are listed below:

Components	Vendor	Description
MB Board	compal	LA-H80
		LA-H781
		LA-H782
		LA-H791
		LA-H792
		LA-J801
CPU	AMD	Product Description of Processor Manufacturer an Max Speed Up to and include 2.6GHz
	Intel	Product Description of Processor Manufacturer an Max Speed Up to and include 2.3GHz
LCD	INNOLUX	N156HGA (FHD)
		N156BGA (HD)
	AUO	B156HTN06 (FHD)
		B156XTN08 (HD)
	BOE	NT156FHM (FHD)
		NT156WHM (HD)
Camera	Chicony	CNFHH6221004970LH
		CNFG02321004970LH
	Liteon	6SF009N2
	TECH-FRONT	1YHJZZZ000S
		1YHJZZZ000P
MEMORY	Modules:DDR4 2666	
	Modules:DDR4 3200	
ON BOARD MEMORY	Modules:DDR4 2666	
PCIE SSD	Max up to 1 pcs	
SATA HDD	Max up to 1 pcs	
Battery	MURATA	AP16M4J
		AP18C4K
	PANASONIC	AP16M5J
	LGC	AP18C8K
		AC14B18J
WLAN+BT Combo (optional)	Intel	3168 NGW
	LITE-ON	NFA435A

Components	Vendor	Description
Adaptor	DELTA	ADP-45FE F
		ADP-65DE B
	CHICONY	A18-045N2A
		A18-065N3A
	LITE-ON	PA-1650-50
		PA-1450-26

1.2 Test Mode

Final Verification Mode from test specification

Test Mode		Test Model No.	Test Voltage	Test Item
1	External Monitor HDMI 3840*2160@60Hz + EUT panel 1920*1080@60Hz	A315-56	230V/50Hz	1. Conducted Emission Test(LISN&ISN) 2. EN 61000-3-2, EN 61000-3-3 and all EMS tests shown in clause 1.3 (excluding Dip Test)
			120V/60Hz	Conducted Emission Test (LISN)
			110V/60Hz	Radiated Emission Test (30MHz~1GHz & above 1GHz)
			240V/50Hz	Dip Test
			100V/50Hz	

All the devices listed below are chosen by the applicant to be the representative configuration for testing in this report.

Device	Specification
MB	Compal / LA-J801
CPU (1526 Pin)	Intel / i5-1035G1 1G
LCD	AUO / B156HTN06 (FHD)
Camera	TECH-FRONT/ 1YHJZZZ000P
on board Memory	DDR4 2666 4GB
MEMORY	DDR4 2666 4GB
SSD	KINGSTON / RBU-SNS8154P3 256G
HDD	TOSHIBA DIGI / MQ04ABF100 1TB
BATTERY	LGC / AP18C8K
WLAN+BT	Qualcomm Atheros / QCNFA435
ADAPTER	LITE-ON / PA-1450-26

1.3 Applied standards

Based on European Council EMC Directive 2014/30/EU, Radio equipment Directive 2014/53/EU and the specifications of the manufacturer, the applied standards to evaluate the compliance of the EUT are as following:

Applied Standards		Test Items	Results
<input checked="" type="checkbox"/> ETSI EN 301 489-1 V2.1.1 <input checked="" type="checkbox"/> ETSI EN 301 489-17 V3.1.1	<input checked="" type="checkbox"/> EN 55032:2015+AC:2016-07 Class B ITE	Conducted Emission Measurement	<u>PASS</u>
		Radiated Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-3-2:2014	Harmonic Current Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-3-3:2013	Voltage Fluctuation and Flicker Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-2:2009	Electrostatic discharge Test (ESD)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-3:2006+A1:2008+A:2010	Radiated electromagnetic field immunity Test (RS)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-4:2012	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-5:2014	Surge immunity Test	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-6:2014	Immunity to conducted disturbances, induced by radio-frequency fields (CS)	<u>PASS</u>
<input checked="" type="checkbox"/> EN 55024:2010+A1:2015	<input checked="" type="checkbox"/> EN 61000-4-2:2009	Electrostatic discharge Test (ESD)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-3:2006+A1:2008+A2:2010	Radiated electromagnetic field immunity Test (RS)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-4:2012	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-5:2014	Surge immunity Test	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-6:2014	Immunity to conducted disturbances, induced by radio-frequency fields (CS)	<u>PASS</u>
	<input type="checkbox"/> EN 61000-4-8:2010	Power frequency magnetic field immunity Test (PFM)	<u>N/A*</u>
	<input checked="" type="checkbox"/> EN 61000-4-11:2004	Voltage dips, short interruptions Test	<u>PASS</u>
<input checked="" type="checkbox"/> AS/NZS CISPR32:2015 Class B ITE		Conducted Emission Measurement	<u>PASS</u>
		Radiated Emission Measurement	<u>PASS</u>

Remark: *: The manufacturer determines from the electrical characteristic and intended usage of the EUT that one or more measurements (tests) are unnecessary.

According to applied standards, the measurement instrumentation uncertainty is not taken into account in the determination of compliance.

1.4 Description of Performance Criteria

Product Standard : EN 55024

Criteria A : normal performance within levels specified by the manufacturer, requestor or purchaser;

Criteria B : temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention;

Criteria C : temporary loss of function or degradation of performance, the correction of which requires operator intervention;

Product Standard : ETSI EN 301 489-17

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Pass/Fail verdict:

During the link test, the Wifi link shall have been maintained and the windows of monitor PC may not deviate from those before the test.

Monitoring:

The status of connection has been monitored from the display of the monitor PC via a camera or witness.

1.5 Test Setup for the EUT

The EUT is an unique unit connected with other necessary accessories and support units listed in the next section. It has been tested against each standard after the following setup steps:

- a. Connect the EUT and all the support units to the appropriate power source.
- b. Turn on the EUT and all the accessories and support units.
- c. The EUT load an EMC test software (BurnIn Test V8.1) and execute it under the Windows environment.
- d. The EUT runs ITU color bar on the display device(s) continuously.(for EN 55032 tests)
- e. The EUT runs “H” pattern on the display device(s) continuously. (for other tests)
- f. The EUT sends audio signal to the audio device(s).
- g. The EUT sends the CCD receiving image to the display device(s) continuously.
- h. The EUT reads/ writes messages from/ to the internal & external storage device(s) continuously.
- i. Let the Wireless functions of EUT operating continuously.
- j. Another PC sends/receives messages to/from the EUT through Wireless AP Router by executing the command of “PING”.
- k. For Wifi function [EN 301 489-17]
 - k-1. Via wireless access point, EUT transmits/receives messages to/from another PC.
 - k-2. Monitor the status of connection by seeing the window of another PC.
- l. Repeat and keep the setup steps listed above before and during all tests.

1.6 The Support Units

Conducted Emission Test

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	U2718Q/ 1JD0FJ2	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4308GL/ 20160904	DoC	xiaomi.tw	N/A	✓	
3	USB Mouse	SM-9625/ 12702544	DoC	ACER	N/A	✓	
4	USB 3.0 HDD	SRD00F1/ NA9EN6MD	DoC	Seagate	N/A	✓	
5	USB 2.0 HDD	320G FreeAgent Go/ 2GE6K3PZ	DoC	Seagate	N/A	✓	

Radiated Emission Test

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	P2715Q/ 9W3RBC2	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 20170203	DoC	xiaomi.tw	N/A	✓	
3	USB 3.0 HDD	Canvio Basics/ 88GSSF27SHJG	DoC	TOSHIBA	N/A	✓	

ESD Test

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	U2718Q/ CN-0M5R5f-QDC00- 7BT-0HWL-A02	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 20170208	DoC	xiaomi.tw	N/A	✓	
3	USB Mouse	MS111-P/ CN-011D3V-71581-091- 3BS9	DoC	DELL	N/A	✓	
4	USB 3.0 HDD	HD-LB2.0TU3-A2/ 55292030316682	DoC	BUFFALO	1.2m	✓	
5	USB 2.0 HDD	F12-UF/ A0100223-36h0001	DoC	TeraSys	N/A	✓	

RS and CS Tests

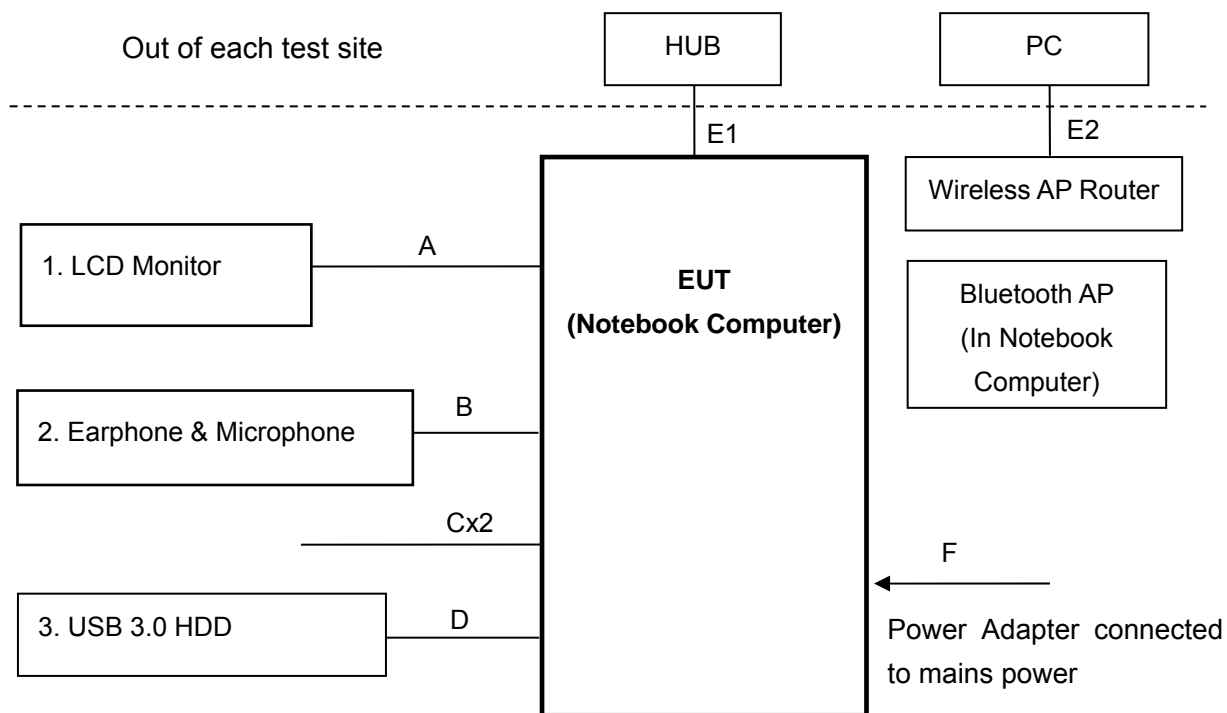
No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	P2715Q/ CN-0NTMTN-74445- 6CA-ABVL	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 20170209	DoC	KTNET	N/A	✓	
3	USB Mouse	MS111-L/ CN-09RRC7-48729- 37C-255X	DoC	DELL	N/A	✓	
4	USB 3.0 HDD	HD-PCTU3/ 85295534404863	DoC	BUFFALO	N/A	✓	
5	USB 2.0 HDD	F12/ A0100206-2740015	DoC	TeraSys	N/A	✓	

Other Tests

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	P2715Q/ CN-0NTMTN-74445- 6CA-ABVL	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4308GL/ 20160908	DoC	xiaomi.tw	N/A	✓	
3	USB Mouse	MS111-P/ CN-093H7Y-71581-3A9- 0DFW	DoC	DELL	N/A	✓	
4	USB 3.0 HDD	HD-PCTU3/ 85295534404825	DoC	BUFFALO	N/A	✓	
5	USB 2.0 HDD	320G FreeAgent Go/ 2GE4N4X3	DoC	Seagate	N/A	✓	

1.7 Layout of the Setup

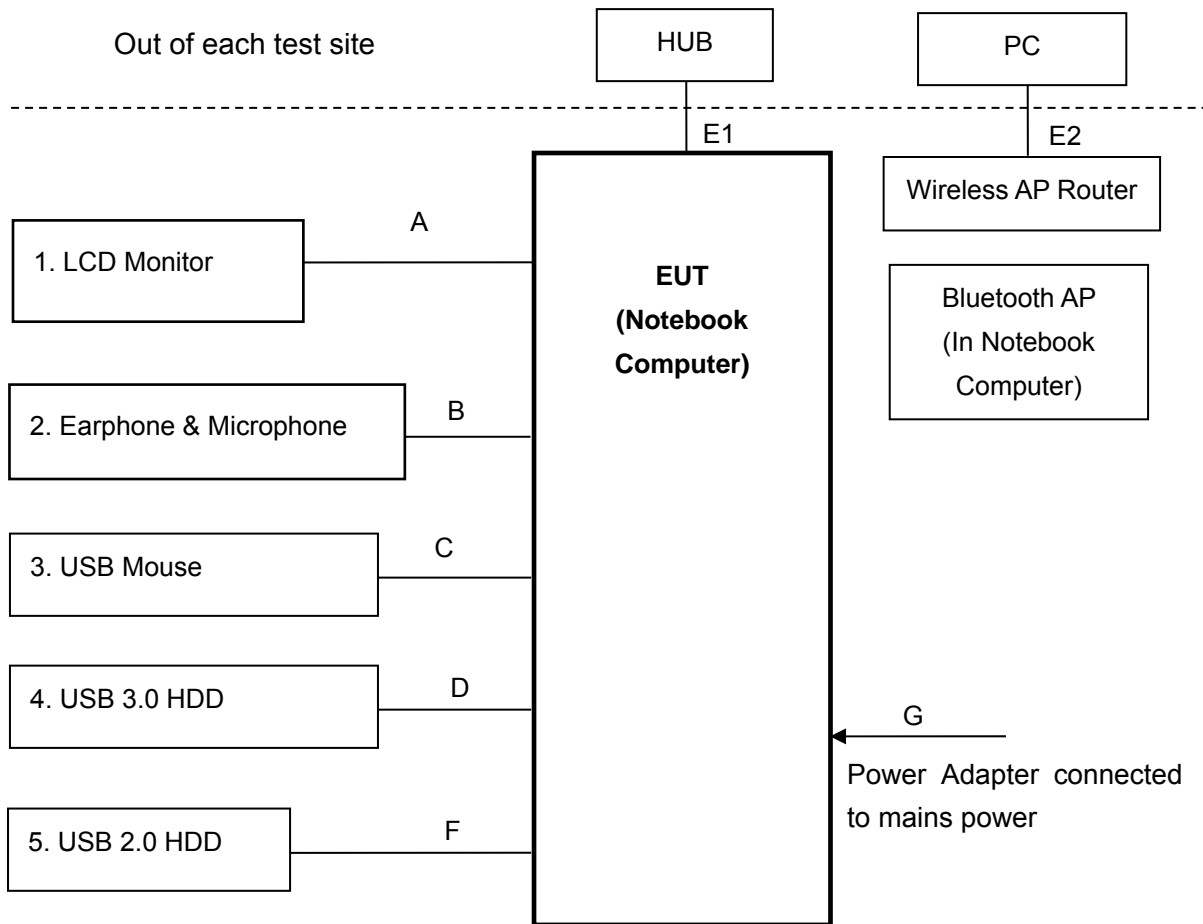
Radiated Emission Test



Connecting Cables:

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.5m	✓			✓	Model Name: RP-CDHS15-K
B	Earphone & Microphone Cable	Earphone & Microphone to EUT Audio/ Mic. port	1.2m	✓			✓	
C	USB 2.0 A to B cable	USB 2.0 A to B cable to EUT USB 2.0 port	1.8m	✓			✓	Floating, Model Name: H-USB-ABPP01
D	USB 3.0 A to Micro USB cable	USB 3.0 HDD to EUT USB 3.0 port	1.0m	✓			✓	Model Name: JS-41-14021
E1	LAN Cable	Server (HUB) to EUT LAN port.	1.5m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	1.5m				✓	Cat.5e
F	Power cable	Power Adapter to EUT DC port	1.5m					

Other Tests



Connecting Cables:**For ESD Test**

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.8m	✓			✓	Model Name: JS41-14050
B	Earphone & Microphone Cable	Earphone & Microphone to EUT Audio/ Mic. port	1.2m	✓			✓	
C	USB Mouse Cable	USB Mouse to EUT USB 2.0 port	1.8m	✓			✓	
D	USB 3.0 A to B cable	USB 3.0 HDD to EUT USB 3.0 port	1.8m	✓			✓	Model Name: BUSB3180ABM B
E1	LAN Cable	Server (HUB) to EUT LAN port.	1.5m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	1.5m				✓	Cat.5e
F	USB 2.0 A to B cable	USB 2.0 HDD to EUT USB 2.0 port	1.8m	✓			✓	Model Name: H-USB-ABPP01
G	Power cable	Power Adapter to EUT DC port	1.5m					

For RS and CS Tests

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.8m	✓			✓	Model Name: JS41-14050
B	Earphone & Microphone Cable	Earphone & Microphone to EUT Audio/ Mic. port	1.2m	✓			✓	
C	USB Mouse Cable	USB Mouse to EUT USB 2.0 port	1.8m	✓			✓	
D	USB 3.0 A to Micro USB cable	USB 3.0 HDD to EUT USB 3.0 port	1.0m	✓			✓	Model Name: JS-41-14021
E1	LAN Cable	Server (HUB) to EUT LAN port.	1.5m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	1.5m				✓	Cat.5e
F	USB 2.0 A to B cable	USB 2.0 HDD to EUT USB 2.0 port	1.8m	✓			✓	Model Name: H-USB-ABPP01
G	Power cable	Power Adapter to EUT DC port	1.5m					

For Other Tests

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.8m	✓			✓	Model Name: JS41-14050
B	Earphone & Microphone Cable	Earphone & Microphone to EUT Audio/ Mic. port	1.2m	✓			✓	
C	USB Mouse Cable	USB Mouse to EUT USB 2.0 port	1.8m	✓			✓	
D	USB 3.0 A to Micro USB cable	USB 3.0 HDD to EUT USB 3.0 port	1.0m	✓			✓	Model Name: JS-41-14021
E1	LAN Cable	Server (HUB) to EUT LAN port.	1.5m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	1.5m				✓	Cat.5e
F	USB 2.0 A to Mini USB cable	USB 2.0 HDD to EUT USB 2.0 port	1.0m	✓			✓	Model Name: JS-41-14032
G	Power cable	Power Adapter to EUT DC port	1.5m					

1.8 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16 series and IEC/EN 61000-4-3.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber	For the radiated emission measurement. (below 1GHz)
TR1	10m semi-anechoic chamber with absorber	For the radiated emission measurement. (above 1GHz)
TR11	3m semi-anechoic chamber	For the radiated emission measurement. (below 1GHz)
TR5	Shielding Room	For the conducted emission measurement.
TR20	Shielding Room	
TR3	3m fully-anechoic chamber	For the radiated immunity test.
TR7	Shielding Room	For the Current Harmonic / Voltage Flicker and other immunity tests.
TR8	Shielding Room	
TR4	Shielding Room	
AR	Shielding Room	
TR12	Plane Grounding Site	
TR14	Plane Grounding Site	
TR300	3m fully-anechoic chamber	For the radiated emission measurement. (above 1GHz)

Test Laboratory Competence Information

Central Research Technology Co. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	USA	FCC	TW1104, TW0019	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033, SL2-L1-E-0033	ISO/IEC 17025
	Canada	IC	TW0905	ISO/IEC 17025
Site Filing Document	Japan	VCCI	R-11527,C-11609,T-11441, G-10010,C-20010, G-10614, T-20009	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	UA 50235497	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

2. Conducted Emission Measurement

Test Result : **PASS**

2.1 Limits for Emission Measurement

Test Standard: **ETSI EN 301 489-1**
ETSI EN 301 489-17
 as §1.3 described

Limits for conducted disturbances at the power mains

Frequency (MHz)	Used in industrial environment or telecom. center		Normal Used	
	Quasi-peak (dBµV)	Average (dBµV)	Quasi-peak (dBµV)	Average (dBµV)
0.15 to 0.5	79	66	66 – 56	56 – 46
0.5 to 5	73	60	56	46
5 to 30	73	60	60	50

Note 1- The lower limit shall apply at the transition frequency.
 Note 2- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class B equipment.

Limits for conducted common mode disturbances at telecommunication ports

Frequency (MHz)	Used in industrial environment or telecom. center				Normal Used			
	Voltage Limits		Current Limits		Voltage Limits		Current Limits	
	Q.P. (dBµV)	Average (dBµV)	Q.P. (dBµA)	Average (dBµA)	Q.P. (dBµV)	Average (dBµV)	Q.P. (dBµA)	Average (dBµA)
0.15 to 0.5	97 - 87	84 – 74	53 – 43	40 – 30	84 – 74	74 - 64	40 – 30	30 - 20
0.5 to 30	87	74	43	30	74	64	30	20

Note 1- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.
 Note 2- The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test.

Test Standard: EN 55032
as §1.3 described

Limits for conducted disturbances at the mains ports

Frequency (MHz)	Class A Equipment		Class B Equipment	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 to 0.5	79	66	66 – 56	56 – 46
0.5 to 5	73	60	56	46
5 to 30	73	60	60	50

Note 1- The lower limit shall apply at the transition frequency.
Note 2- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class B equipment.

Limits for conducted common mode disturbances at telecommunication ports

Frequency (MHz)	Class A Equipment				Class B Equipment			
	Voltage Limits		Current Limits		Voltage Limits		Current Limits	
	Q.P. (dB μ V)	Average (dB μ V)	Q.P. (dB μ A)	Average (dB μ A)	Q.P. (dB μ V)	Average (dB μ V)	Q.P. (dB μ A)	Average (dB μ A)
0.15 to 0.5	97 - 87	84 – 74	53 – 43	40 – 30	84 – 74	74 - 64	40 – 30	30 - 20
0.5 to 30	87	74	43	30	74	64	30	20

Note 1- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.
Note 2- The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test.

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESR/ 102550	April 15, 2019	April 15, 2020
LISN	SchwarzBeck	NSLK-8128-RC/ 8128-383	July 2, 2019	July 2, 2020
2 nd LISN	R&S	ENV4200/ 833209/010	May 5, 2019	May 5, 2020
ISN	FCC	<input type="checkbox"/> FCC-TLISN-T2- 02/20269	Aug. 2, 2019	Aug. 2, 2020
	TESEQ	<input type="checkbox"/> ISN T400A/ 28575	Aug. 2, 2019	Aug. 2, 2020
		<input type="checkbox"/> ISN T800/ 36191	Aug. 2, 2019	Aug. 2, 2020
50Ω terminator	SHHNER	65 BNC-50-0-1/133 NE/005	May 21, 2019	May 21, 2020
RF Switch	R&S	RSU28/ 338965/002	June 19, 2019	Dec. 19, 2019
RF Cable	N/A	N/A/ C0052 ~ 56	June 19, 2019	Dec. 19, 2019
Test Software	Audix	e3/ V6.20110303a1	NCR	NCR
TR5 shielded room	ETS LINDGREN	TR5/ 15353-F	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Measurement Uncertainty

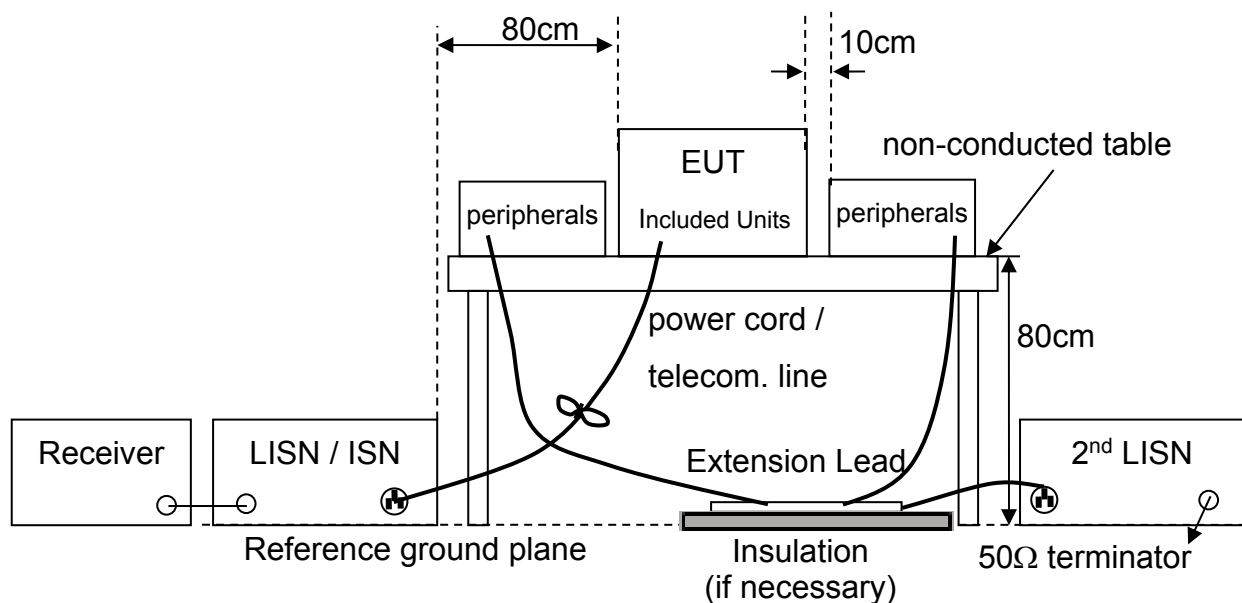
The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{CISPR} in table 1 of CISPR 16-4-2 and the compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit.

Test Item	Uncertainty Value
Conducted emissions using a LISN : NSLK-8128-RC	1.84dB
Conducted emissions using a LISN : ENV 4200	1.92dB
Conducted emissions using a ISN : FCC-TLISN-T2-02	1.80dB
Conducted emissions using a ISN : ISN T400A	1.94dB
Conducted emissions using a ISN : ISN T800	2.08dB

2.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane.
- c. For EN 55032, all cables connecting to AE located outside the chamber shall drop directly to, but be insulated from, the RGP (or turntable). The thickness of the insulation shall not be more than 150 mm.
- d. Connect the EUT's power source / telecommunication lines to the appropriate power mains / peripherals through the LISN / ISN.
- e. All the other peripherals are connected to the 2nd LISN, if any.
- f. The LISN / ISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.
- g. Measure the conducted emissions on each power line (Neutral Line and Line 1 – Hot side) of the EUT's power source by using the test receiver connected to the coupling RF output port of LISN.
- h. Rapidly scan the signal from 150kHz to 30MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each measured line.
- i. Then measure the maximum level of conducted disturbance for each frequency found from step g. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.
- j. Record the level for each frequency and compare with the required limit.
- k. If required, measure the conducted emissions on telecommunication lines of EUT by using the test receiver connected to the coupling RF output port of ISN and repeat step g. to i.
- l. If the peak emission level is lower than the specified Average limit, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. or Average values will be measured and presented.

2.4 Test Configurations

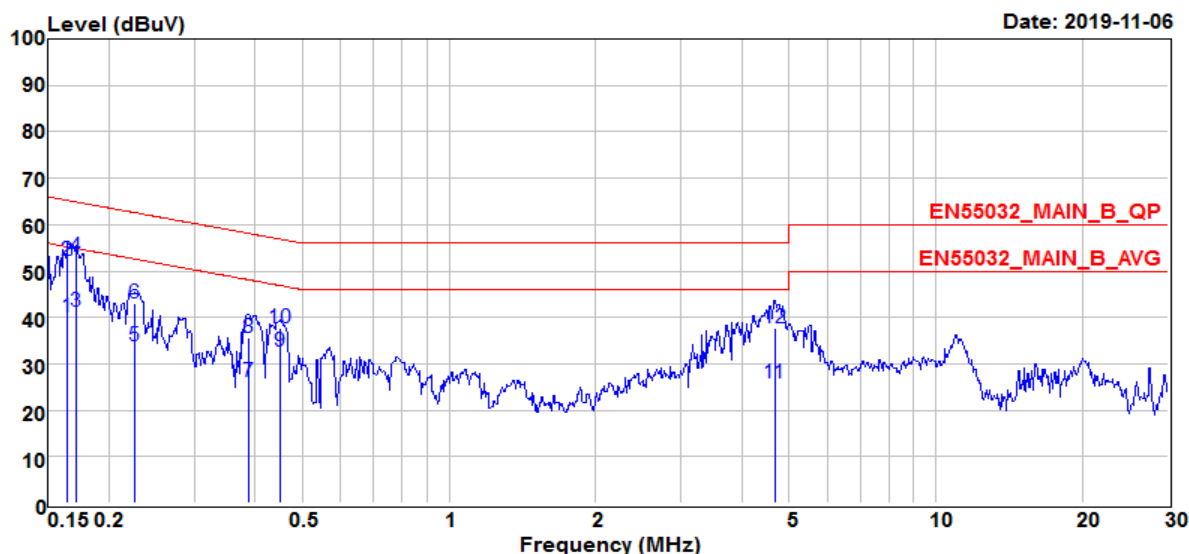


2.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

2.6 Test Results

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Line



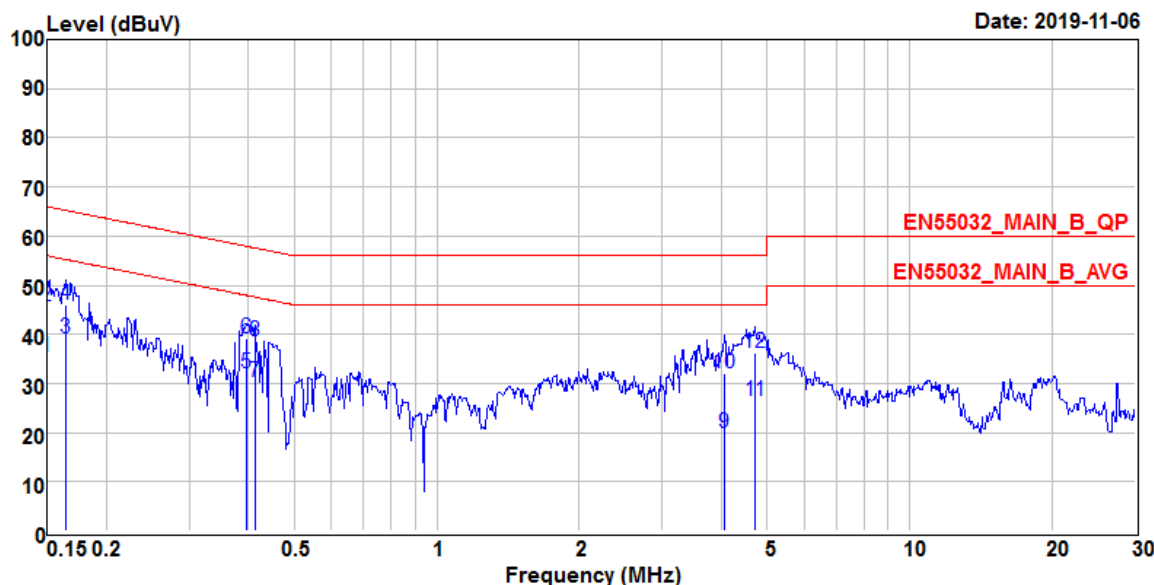
Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO LINE
Power : 230V/50Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.165	40.17	40.08	0.09	55.21	-15.04	Average
2	0.165	52.30	52.21	0.09	65.21	-12.91	QP
3	0.171	41.17	41.08	0.09	54.90	-13.73	Average
4	0.171	53.06	52.97	0.09	64.90	-11.84	QP
5	0.227	33.84	33.75	0.09	52.57	-18.73	Average
6	0.227	42.91	42.82	0.09	62.57	-19.66	QP
7	0.387	26.14	26.04	0.10	48.12	-21.98	Average
8	0.387	35.51	35.41	0.10	58.12	-22.61	QP
9	0.452	32.71	32.61	0.10	46.85	-14.14	Average
10	0.452	37.59	37.49	0.10	56.85	-19.26	QP
11	4.672	25.74	25.47	0.27	46.00	-20.26	Average
12	4.672	37.64	37.37	0.27	56.00	-18.36	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Neutral



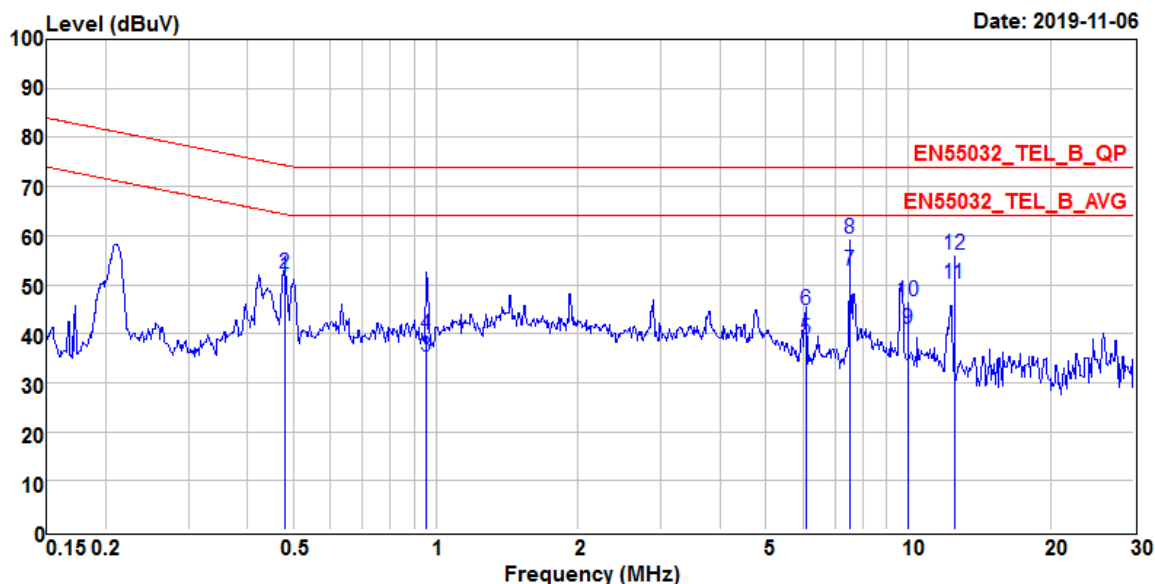
Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO NEUTRAL
Power : 230V/50Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.150	35.43	35.35	0.08	56.00	-20.57	NEUTRAL	Average
2	0.150	45.86	45.78	0.08	66.00	-20.14	NEUTRAL	QP
3	0.165	39.21	39.13	0.08	55.21	-16.00	NEUTRAL	Average
4	0.165	46.04	45.96	0.08	65.21	-19.17	NEUTRAL	QP
5	0.396	32.00	31.91	0.09	47.95	-15.95	NEUTRAL	Average
6	0.396	39.12	39.03	0.09	57.95	-18.83	NEUTRAL	QP
7	0.413	30.32	30.23	0.09	47.59	-17.27	NEUTRAL	Average
8	0.413	38.56	38.47	0.09	57.59	-19.03	NEUTRAL	QP
9	4.070	19.78	19.55	0.23	46.00	-26.22	NEUTRAL	Average
10	4.070	32.07	31.84	0.23	56.00	-23.93	NEUTRAL	QP
11	4.721	26.50	26.24	0.26	46.00	-19.50	NEUTRAL	Average
12	4.721	36.13	35.87	0.26	56.00	-19.87	NEUTRAL	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN for 10Mbps



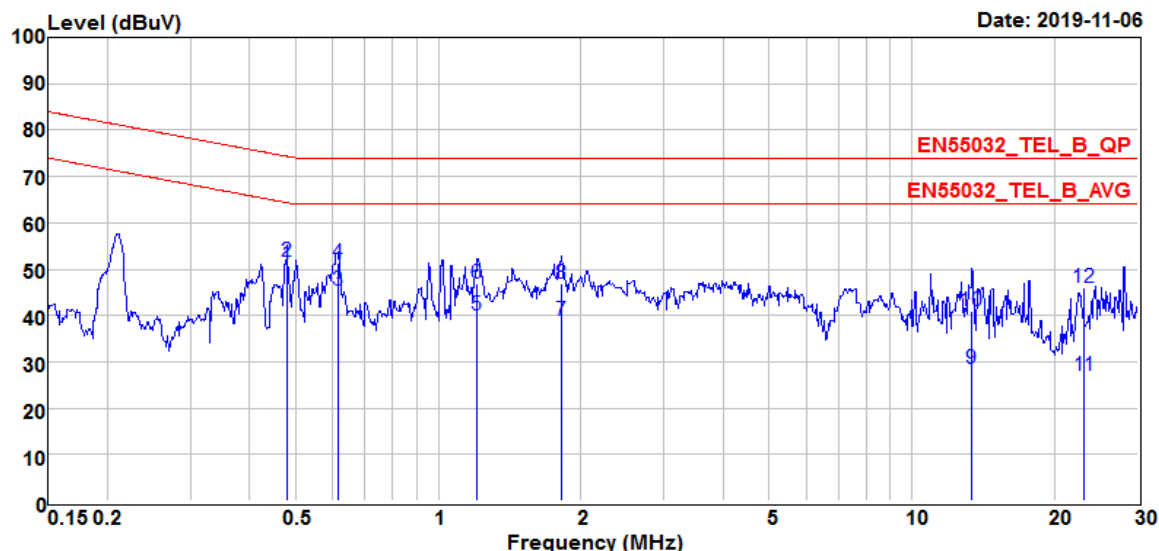
Site : TR5 Conduction Emission Chamber
Condition : EN55032_TEL_B_QP ISN_T400A_CAT5-LAN LINE
Power : 230V/50Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.479	51.56	41.84	9.72	64.36	-12.80	Average
2	0.479	52.11	42.39	9.72	74.36	-22.25	QP
3	0.953	35.38	25.76	9.62	64.00	-28.62	Average
4	0.953	39.92	30.30	9.62	74.00	-34.08	QP
5	6.089	38.90	29.31	9.59	64.00	-25.10	Average
6	6.089	44.78	35.19	9.59	74.00	-29.22	QP
7	7.500	52.98	43.38	9.60	64.00	-11.02	Average
8	7.500	59.42	49.82	9.60	74.00	-14.58	QP
9	10.000	40.88	31.26	9.62	64.00	-23.12	Average
10	10.000	46.67	37.05	9.62	74.00	-27.33	QP
11	12.500	50.17	40.52	9.65	64.00	-13.83	Average
12	12.500	56.05	46.40	9.65	74.00	-17.95	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN/ ISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN for 100Mbps



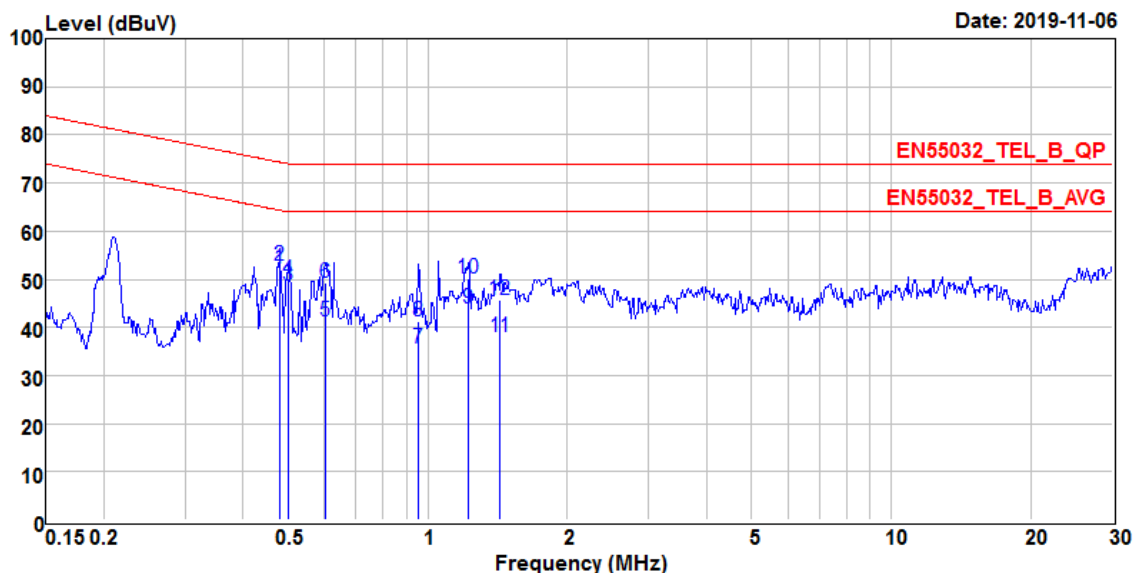
Site : TR5 Conduction Emission Chamber
Condition : EN55032_TEL_B_QP ISN_T400A_CAT5-LAN LINE
Power : 230V/50Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.479	51.16	41.44	9.72	64.36	-13.20	LINE	Average
2	0.479	51.71	41.99	9.72	74.36	-22.65	LINE	QP
3	0.614	45.31	35.63	9.68	64.00	-18.69	LINE	Average
4	0.614	51.27	41.59	9.68	74.00	-22.73	LINE	QP
5	1.210	39.93	30.32	9.61	64.00	-24.07	LINE	Average
6	1.210	46.81	37.20	9.61	74.00	-27.19	LINE	QP
7	1.819	38.97	29.38	9.59	64.00	-25.03	LINE	Average
8	1.819	46.80	37.21	9.59	74.00	-27.20	LINE	QP
9	13.408	28.53	18.88	9.65	64.00	-35.47	LINE	Average
10	13.408	41.04	31.39	9.65	74.00	-32.96	LINE	QP
11	23.128	27.04	17.30	9.74	64.00	-36.96	LINE	Average
12	23.128	45.93	36.19	9.74	74.00	-28.07	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN/ ISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN for 1Gbps



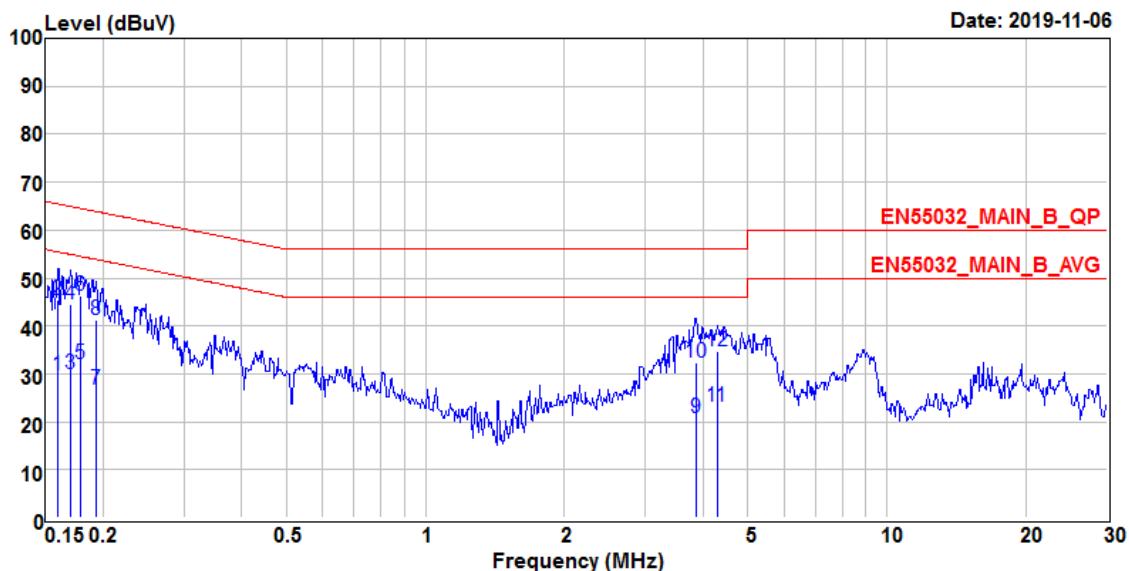
Site : TR5 Conduction Emission Chamber
Condition : EN55032_TEL_B_QP ISN_T800_CAT5-LAN LINE
Power : 230V/50Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Limit	Over			
	MHz	dBuV	dBuV	Factor	Line	Limit	Pol/Phase	Remark
				dB	dBuV	dB		
1	0.479	52.15	42.36	9.79	64.36	-12.21	LINE	Average
2	0.479	52.70	42.91	9.79	74.36	-21.66	LINE	QP
3	0.499	48.76	38.98	9.78	64.01	-15.25	LINE	Average
4	0.499	49.77	39.99	9.78	74.01	-24.24	LINE	QP
5	0.601	41.29	31.54	9.75	64.00	-22.71	LINE	Average
6	0.601	49.20	39.45	9.75	74.00	-24.80	LINE	QP
7	0.953	35.60	25.90	9.70	64.00	-28.40	LINE	Average
8	0.953	41.16	31.46	9.70	74.00	-32.84	LINE	QP
9	1.223	44.00	34.31	9.69	64.00	-20.00	LINE	Average
10	1.223	50.22	40.53	9.69	74.00	-23.78	LINE	QP
11	1.433	38.09	28.41	9.68	64.00	-25.91	LINE	Average
12	1.433	45.61	35.93	9.68	74.00	-28.39	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN/ ISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 120Vac/60Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Line



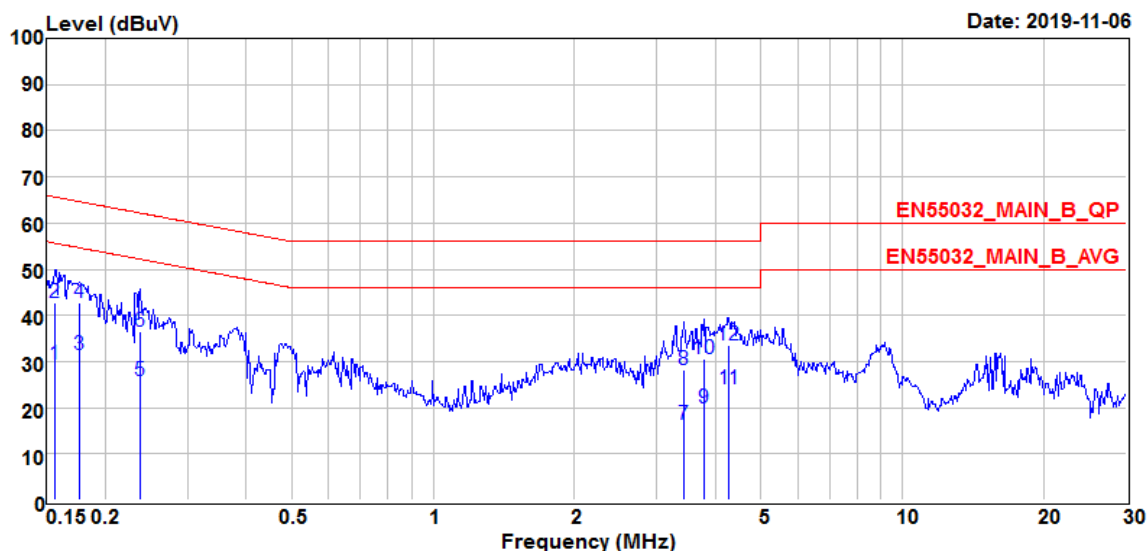
Site : TR5 Conduction Emission Chamber
 Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO LINE
 Power : 120V/60Hz
 Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read	Limit	Over			
	MHz	dBuV	Level	Factor	Line	Limit	Pol/Phase	Remark
			dBuV	dB	dBuV	dB		
1	0.160	29.64	29.55	0.09	55.47	-25.83	LINE	Average
2	0.160	45.42	45.33	0.09	65.47	-20.05	LINE	QP
3	0.170	30.06	29.97	0.09	54.94	-24.88	LINE	Average
4	0.170	44.49	44.40	0.09	64.94	-20.45	LINE	QP
5	0.180	32.16	32.07	0.09	54.50	-22.34	LINE	Average
6	0.180	46.41	46.32	0.09	64.50	-18.09	LINE	QP
7	0.193	26.61	26.52	0.09	53.89	-27.28	LINE	Average
8	0.193	41.34	41.25	0.09	63.89	-22.55	LINE	QP
9	3.860	20.83	20.59	0.24	46.00	-25.17	LINE	Average
10	3.860	32.44	32.20	0.24	56.00	-23.56	LINE	QP
11	4.292	23.25	22.99	0.26	46.00	-22.75	LINE	Average
12	4.292	34.59	34.33	0.26	56.00	-21.41	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Mode 1
Test Voltage : 120Vac/60Hz to the power adapter
Tester : Sam Huang **Temperature** : 26°C
Humidity : 52%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Neutral



Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO NEUTRAL
Power : 120V/60Hz
Operator : Sam Huang T:26 H:52 P:1014

	Freq	Level	Read Level	Limit Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.156	29.27	29.19	0.08	55.65	-26.38	NEUTRAL	Average
2	0.156	42.62	42.54	0.08	65.65	-23.03	NEUTRAL	QP
3	0.177	31.56	31.48	0.08	54.64	-23.08	NEUTRAL	Average
4	0.177	42.69	42.61	0.08	64.64	-21.95	NEUTRAL	QP
5	0.238	25.81	25.73	0.08	52.17	-26.36	NEUTRAL	Average
6	0.238	36.57	36.49	0.08	62.17	-25.60	NEUTRAL	QP
7	3.417	16.43	16.22	0.21	46.00	-29.57	NEUTRAL	Average
8	3.417	28.11	27.90	0.21	56.00	-27.89	NEUTRAL	QP
9	3.779	20.00	19.77	0.23	46.00	-26.00	NEUTRAL	Average
10	3.779	30.56	30.33	0.23	56.00	-25.44	NEUTRAL	QP
11	4.269	23.90	23.65	0.25	46.00	-22.10	NEUTRAL	Average
12	4.269	33.43	33.18	0.25	56.00	-22.57	NEUTRAL	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

3. Radiated Emission Measurement

Test Result : PASS

3.1 Limits for Emission Measurement

Type of EUT	Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
<input type="checkbox"/>	Below 108	1000
<input type="checkbox"/>	108 - 500	2000
<input type="checkbox"/>	500 - 1000	5000
<input checked="" type="checkbox"/>	Above 1000	5 th harmonic of the highest frequency or 6GHz, whichever is lower

**Test Standard: ETSI EN 301 489-1
 ETSI EN 301 489-17
 as §1.3 described**

Limits for radiated disturbances at a measuring distance of 10m

Frequency (MHz)	Used in industrial environment or telecom. center		Normal Used	
	Quasi-peak (dBµV/m)		Quasi-peak (dBµV/m)	
30 to 230	40		30	
230 to 1000	47		37	

Note 1- The lower limit shall apply at the transition frequency.
 Note 2- Additional provisions may be required for cases where interference occurs.

Limits for radiated disturbances at a measuring distance of 3m

Frequency (GHz)	Used in industrial environment or telecom. center		Normal Used	
	Peak (dBµV/m)	Average (dBµV/m)	Peak (dBµV/m)	Average (dBµV/m)
1 to 3	76	56	70	50
3 to 6	80	60	74	54

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

Test Standard: EN 55032
as §1.3 described

Limits for radiated disturbances at a measuring distance of 10m

Frequency (MHz)	Class A Equipment		Class B Equipment	
	Quasi-peak (dB μ V/m)		Quasi-peak (dB μ V/m)	
30 to 230	40		30	
230 to 1000	47		37	

Note 1- The lower limit shall apply at the transition frequency.
Note 2- Additional provisions may be required for cases where interference occurs.

Limits for radiated disturbances at a measuring distance of 3m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dB μ V/m)	Average (dB μ V/m)	Peak (dB μ V/m)	Average (dB μ V/m)
1 to 3	76	56	70	50
3 to 6	80	60	74	54

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

3.2 Test Instruments

 Below 1GHz measurement

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR/ 102308	July 11, 2019	July 11, 2020
Bilog Antenna with 5 dB Attenuator	SCHWARZBEC K & Mini-Circuits	VULB 9168 & BW-N5W5+ / VULB 9168-618 & 001	June 10, 2019	June 10, 2020
Bilog Antenna with 5 dB Attenuator	SCHWARZBEC K & Mini-Circuits	VULB 9168 & BW-N5W5+/ VULB 9168-619 & 002	June 27, 2019	June 27, 2020
Pre-Amplifier	EMCI	EMC9135/ 980630	June 29, 2019	Dec. 29, 2019
Pre-Amplifier	EMCI	EMC9135/ 980550	June 29, 2019	Dec. 29, 2019
Spectrum Analyzer	R&S	FSP7/ 100106	March 21, 2019	March 21, 2020
Spectrum Analyzer	R&S	FSP7/ 100384	Feb. 13, 2019	Feb. 13, 2020
RF Cable	JYEBAO	0214/ C0058 + C0049 + C0049-2 + RSU + C0050-3	June 29, 2019	Dec. 29, 2019
RF Cable	JYEBAO	0214/ C0059 + C0050 + C0050-2 + RSU + C0050-3	June 29, 2019	Dec. 29, 2019
Test Software	Audix	e3/ V6.20110303a1	NCR	NCR
TR1 Semi - anechoic Chamber	ETS. LINDGREN	TR1/ 17627-B	Feb. 23, 2019	Feb. 23, 2020

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the chamber TR1 listed above is the date of NSA measurement.

Above 1GHz measurement (TR1)

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Horn Antenna	EMCO	3117/ 0082847	Nov. 20, 2018	Nov. 20, 2019
Bore-sight Antenna Mast	Sunol	TLT2/ 051110-5	NCR	NCR
Pre-Amplifier	MITEQ	TTA1800-30-HG-N-M/ 1904295	Nov. 20, 2018	Nov. 20, 2019
RF Cable	Suhner	Sucoflex 106P / C0091	Nov. 20, 2018	Nov. 20, 2019
MXA Signal Analyzer	KeySight	N9020A/ MY54420147	July 2, 2019	July 2, 2020
Test Software	Audix	e3/ V9 20150907c	NCR	NCR
TR1 Semi-anechoic chamber with absorber	ETS. LINDGREN	TR1/ 17627-B	Feb. 23, 2019	Feb. 23, 2020

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the chamber TR1 listed above is the date of site VSWR measurement.

Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cisprr} in table 1 of CISPR 16-4-2 and the compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit.

Test Site (Measuring distance)	Polarization	Frequency Range	
		30MHz ~ 200MHz	200MHz ~ 1000MHz
TR1(10m)	Horizontal	3.98dB	3.10dB
	Vertical	3.76dB	3.28dB

Test Site (Measuring distance)	Polarization	Frequency Range
		1GHz ~ 6GHz
TR1(3m)	Horizontal	4.70dB
	Vertical	4.78dB
TR300(3m)	Horizontal	5.06dB
	Vertical	4.98dB

3.3 Test Procedures

Below 1GHz measurement

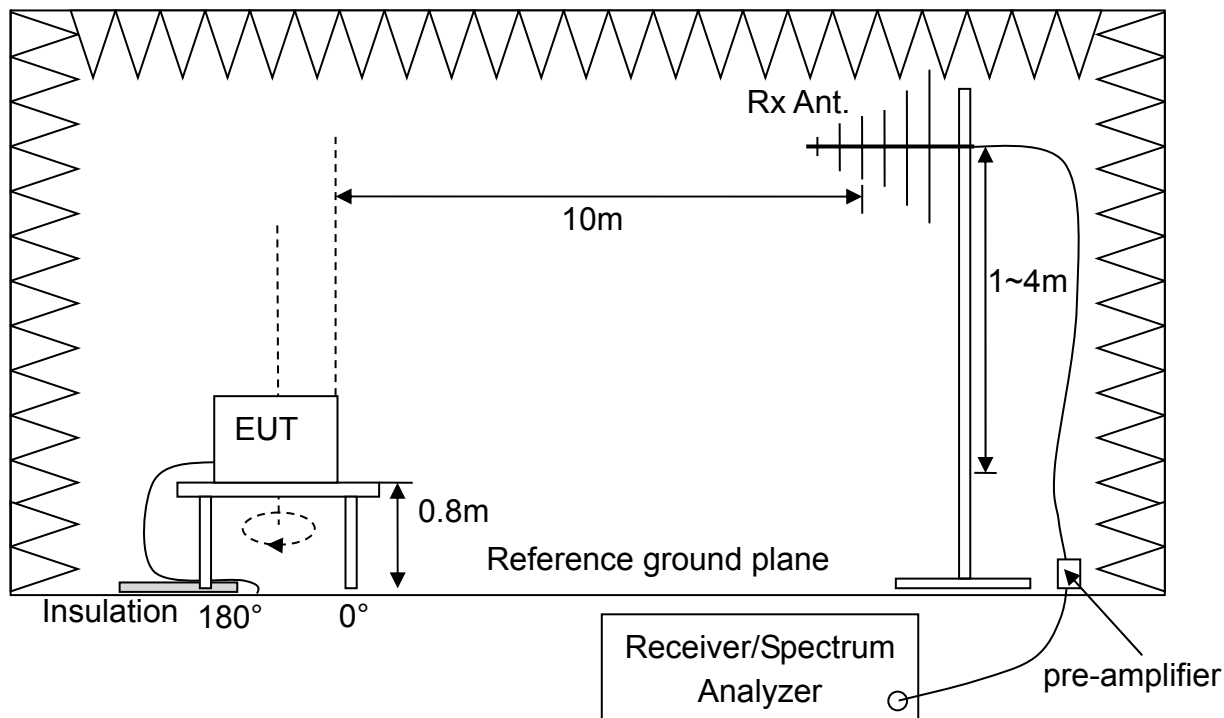
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 10 meters away from the interference receiving antenna in the semi-anechoic chamber.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane and 10 meters away from the interference-receiving antenna in the semi-anechoic chamber.
- d. For EN 55032, all cables connecting to AE located outside the chamber shall drop directly to, but be insulated from, the RGP (or turntable). The thickness of the insulation shall not be more than 150 mm.
- e. Rapidly sweep the signal from 30MHz to 1GHz by using the spectrum through the Maximum-peak detector.
- f. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine at least three frequencies associated with higher emission levels and record them.
- g. Then measure each frequency found from step e. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.
- h. Finely tune the antenna and turntable around the recorded position of each frequency found from step f. by using the receiver through the Quasi-Peak detector per CISPR 16-1 to find out where the maximum level occurred.
- i. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.
- j. Change the receiving antenna to another polarization to measure radiated emission by following step d. to h. again.
- k. If the peak emission level measured from step e. is 4dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

Above 1GHz measurement

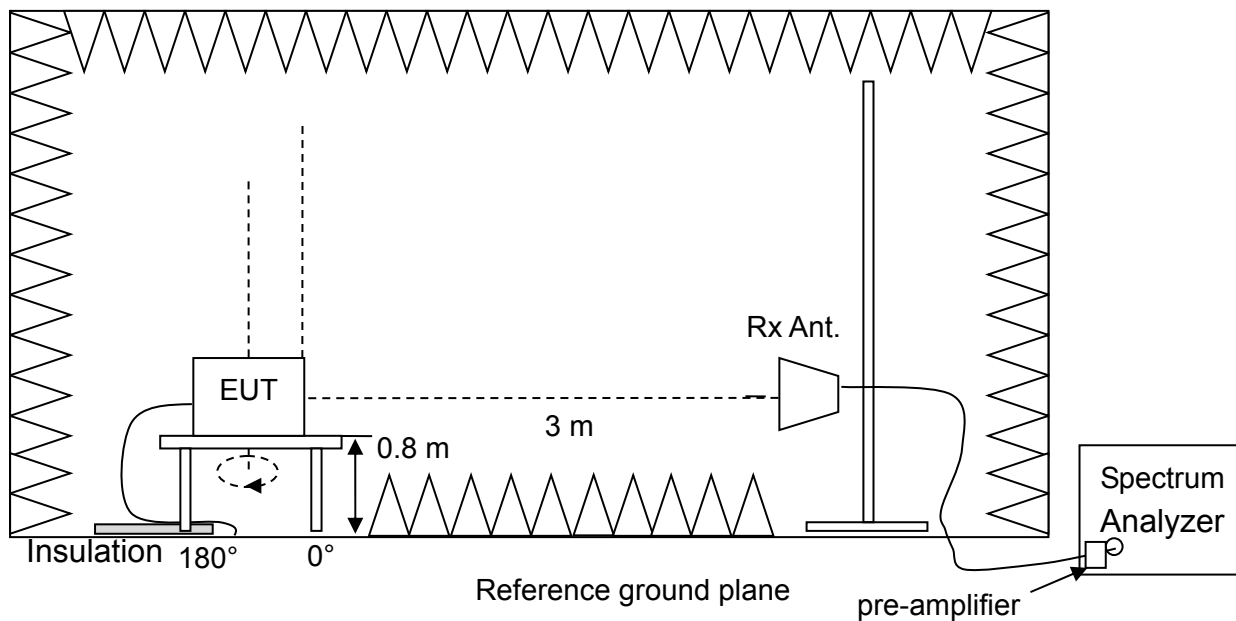
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it should be placed on a non-conducted table with a height of 0.8 meters above the reference ground plane and 3 meters away from the interference receiving antenna in the fully-anechoic chamber.
- c. If the EUT is floor-standing equipment, it should be placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane and 3 meters away from the interference-receiving antenna in the fully-anechoic chamber.
- d. For EN 55032, all cables connecting to AE located outside the chamber shall drop directly to, but be insulated from, the RGP (or turntable). The thickness of the insulation shall not be more than 150 mm.
- e. Rapidly sweep the signal from 1GHz to the upper frequency of measurement range by using the spectrum through the Maximum-peak detector.
- f. If the 3dB beamwidth of the receiving antenna (minima w is 2.8m @ 1GHz to 6GHz while test distance is 3m) encompasses EUT height, the center of the receiving antenna will be fixed at the height of the center of the EUT. If w of a 1m-height receiving antenna encompasses the whole EUT, the antenna will be fixed at 1m height. For any EUT with the height larger than w , the receiving antenna will travelled vertically so that the antenna beam scans the whole EUT.
- g. Rotate the EUT from 0° to 360° continuously and position the receiving antenna at specified height above the reference ground plane to determine the frequencies associated with higher emission levels and record them.
- h. Then measure each frequency found from step e. by using the spectrum with rotating the EUT to determine the maximum peak and average level.
- i. Record frequency, azimuth angle of the turntable and compare the maximum level with the required limit.
- j. Change the receiving antenna to another polarization to measure radiated emission by following step d. to g. again.

3.4 Test Configurations

Below 1GHz measurement



Above 1GHz measurement



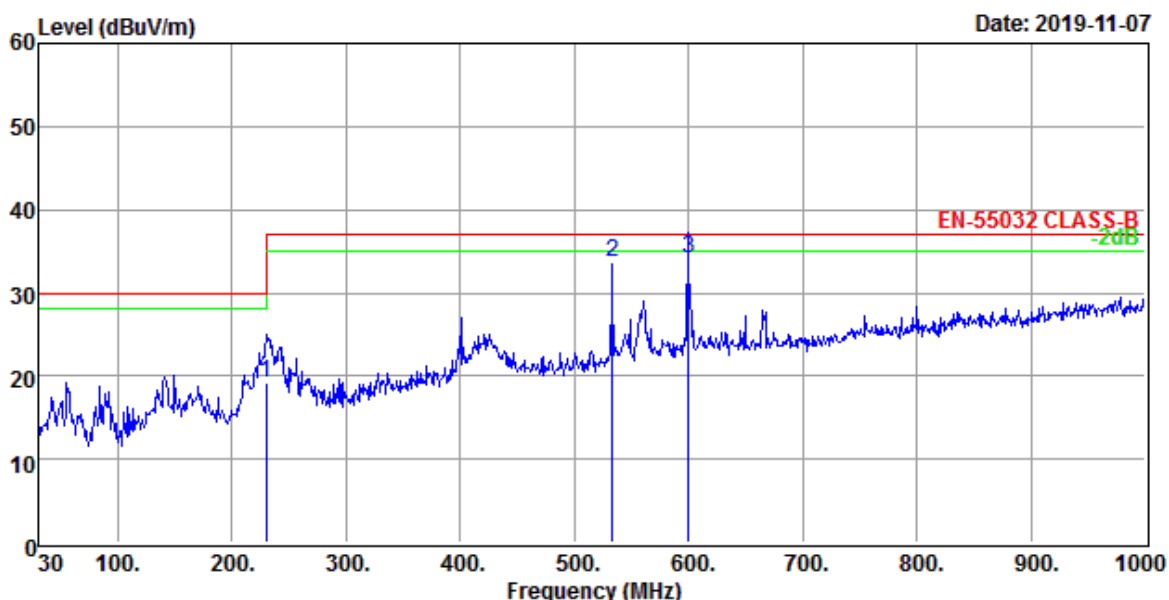
3.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

3.6 Test Results

Radiated Emission Measurement below 1000MHz

Test Mode : Mode 1
Test Voltage : 110Vac/60Hz to the power adapter
Tester : Jeffry **Temperature** : 24°C
Humidity : 56%RH **Frequency Range** : 30MHz~1GHz
IF Bandwidth : 120kHz **Polarization** : Horizontal



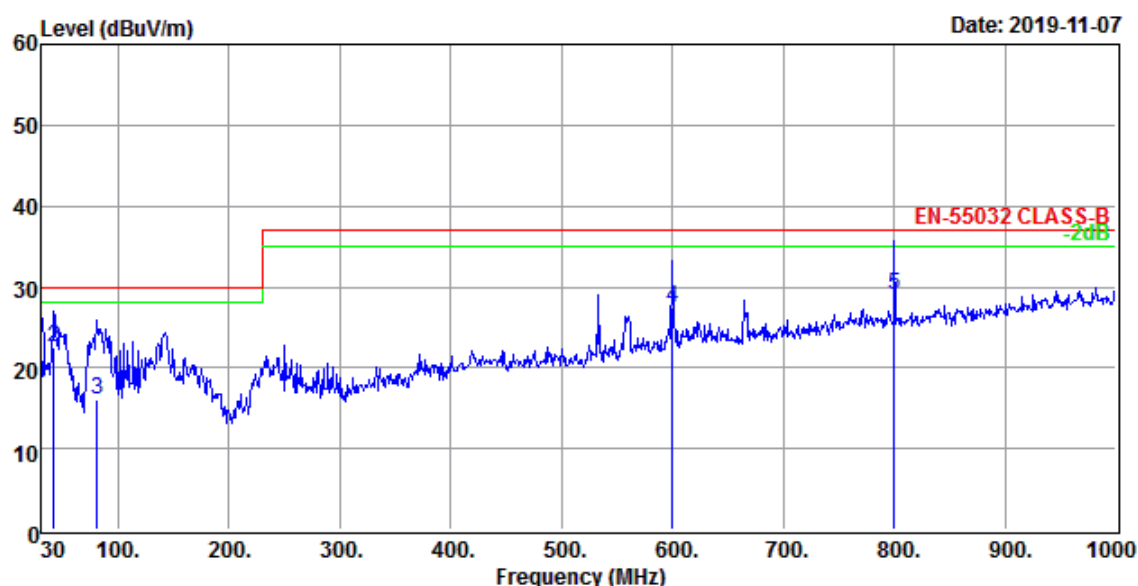
Site : TR1 10M RE CHAMBER
Condition : EN-55032 CLASS-B 10m VULB_9168-619 HORIZONTAL
Power : 110V/60Hz
Operator : Jeffry (1M) ' T:24 ' H:56 ' P:1014

	Freq	Level	Read Level	Limit Factor	Limit Line	Over Limit	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	230.000	19.11	37.95	-18.84	30.00	-10.89	399	131	HORIZONTAL	QP
2	533.326	33.66	43.63	-9.97	37.00	-3.34	144	266	HORIZONTAL	QP
3	599.977	34.16	42.38	-8.22	37.00	-2.84	102	277	HORIZONTAL	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Test Mode : Mode 1
Test Voltage : 110Vac/60Hz to the power adapter
Tester : Jeffry **Temperature** : 24°C
Humidity : 56%RH **Frequency Range** : 30MHz~1GHz
IF Bandwidth : 120kHz **Polarization** : Vertical



Site : TR1 10M RE CHAMBER
 Condition : EN-55032 CLASS-B 10m VULB_9168-618 VERTICAL
 Power : 110V/60Hz
 Operator : Jeffry (1M) ' T:24 ' H:56 ' P:1014

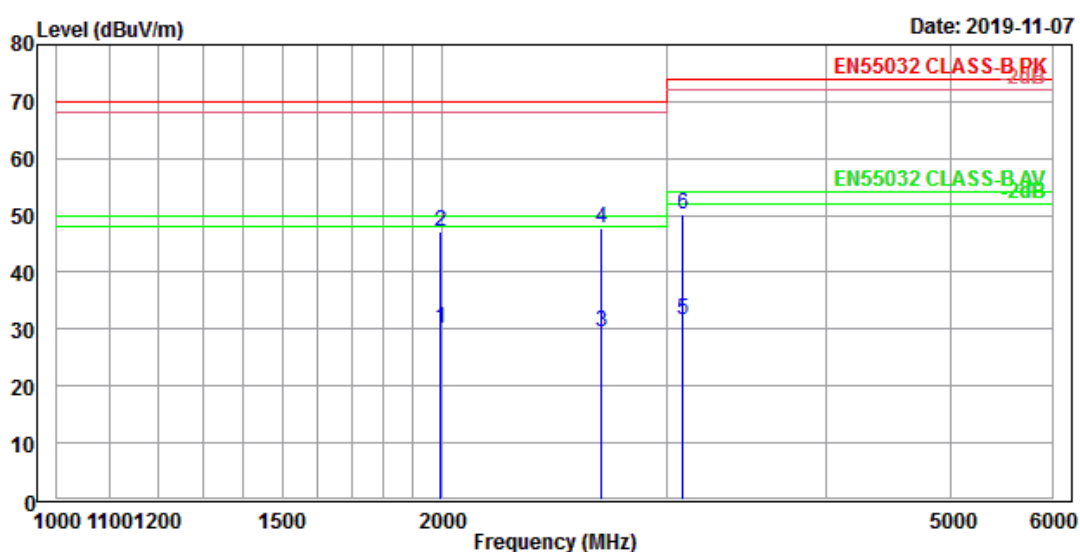
	Freq	Level	Read Level	Factor	Limit Line	Over Limit	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	30.313	18.04	37.05	-19.01	30.00	-11.96	104	96	VERTICAL	QP
2	41.479	22.43	40.31	-17.88	30.00	-7.57	105	126	VERTICAL	QP
3	80.486	16.14	38.15	-22.01	30.00	-13.86	105	185	VERTICAL	QP
4	600.014	27.52	34.72	-7.20	37.00	-9.48	285	61	VERTICAL	QP
5	800.054	28.91	32.59	-3.68	37.00	-8.09	193	0	VERTICAL	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Radiated Emission Measurement above 1000MHz

Test Mode : Mode 1
Test Voltage : 110Vac/60Hz to the power adapter
Tester : Jack **Temperature** : 24°C
Humidity : 55%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Horizontal



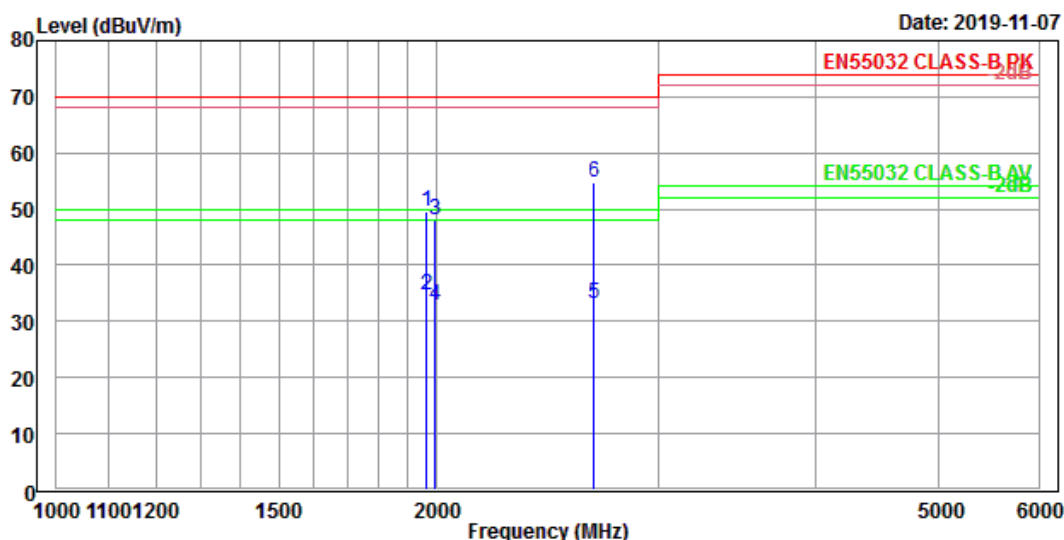
Condition : EN55032 CLASS-B PK 3m EMCO_3117_82847 Horizontal
 : SWT:Auto DET:Positive
POWER : 110V/60Hz
OPERATOR : Jack, T:24, H:55, P:1011

	Freq	Level	Read Level	Limit Factor	Limit Line	Over Limit	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1993.155	29.98	47.86	-17.88	50.00	-20.02	100	216	Horizontal	Average
2	1994.296	47.07	64.95	-17.88	70.00	-22.93	100	209	Horizontal	Peak
3	2663.634	29.36	45.90	-16.54	50.00	-20.64	100	259	Horizontal	Average
4	2664.341	47.73	64.27	-16.54	70.00	-22.27	100	264	Horizontal	Peak
5	3088.142	31.53	47.72	-16.19	54.00	-22.47	100	255	Horizontal	Average
6	3089.347	50.22	66.40	-16.18	74.00	-23.78	100	248	Horizontal	Peak

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode : Mode 1
Test Voltage : 110Vac/60Hz to the power adapter
Tester : Jack **Temperature** : 24°C
Humidity : 55%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Vertical



Condition : EN55032 CLASS-B PK 3m EMCO_3117_82847 VERTICAL
 : SWT:Auto DET:Positive
POWER : 110V/60Hz
OPERATOR : Jack, T:24, H:55, P:1011

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	1964.412	49.56	67.51	-17.95	70.00	-20.44	100	24	VERTICAL	Peak
2	1965.236	34.59	52.54	-17.95	50.00	-15.41	100	15	VERTICAL	Average
3	1994.741	48.03	65.91	-17.88	70.00	-21.97	100	5	VERTICAL	Peak
4	1995.719	32.72	50.60	-17.88	50.00	-17.28	100	1	VERTICAL	Average
5	2661.771	33.17	49.70	-16.53	50.00	-16.83	100	23	VERTICAL	Average
6	2662.417	54.63	71.16	-16.53	70.00	-15.37	100	30	VERTICAL	Peak

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

4. Harmonic Current Emission Measurement

Test Result : **PASS**

4.1 Limits for Emission Measurement

Limits for Class A equipment

Harmonic order (n) Odd harmonics	Maximum permissible harmonic current (A)	Harmonic order (n) Even Harmonics	Maximum permissible harmonic current (A)
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.3
9	0.40	$8 \leq n \leq 40$	0.23 8/n
11	0.33		
13	0.21		
$15 \leq n \leq 39$	0.15 15/n		

Limits for Class B equipment

It shall not exceed the values give in class A multiplied by a factor of 1.5.

Limits for Class C equipment

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	30·λ (λ is the circuit power factor)
5	
7	10
9	7
11 ≤ n ≤ 39 (odd harmonics only)	5
	3

Limits for Class D equipment

Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic 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
$13 \leq n \leq 39$ (odd harmonics only)	3.85/n	See class A

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 14, 2019	Oct. 14, 2020
Power Analyzer		PACS-1/ 72398	Oct. 14, 2019	Oct. 14, 2020
Test Software	C.I.	CTS 4/ Ver. 4.24	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

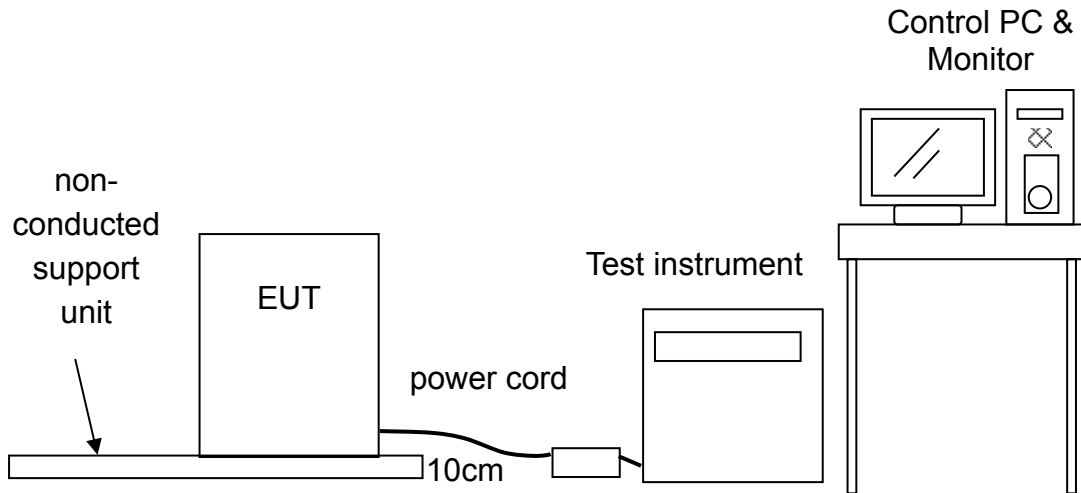
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

4.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the classification of the EUT as following:
 - Class A** : - balanced three-phase equipment
 - household appliances, excluding equipment identified as class D
 - tools, excluding portable tools
 - dimmers for incandescent lamps
 - audio equipment
 - equipments not specified in one of the three other classes
 - Class B** : - portable tools
 - arc welding equipment which is not professional equipment.
 - Class C** : - lighting equipment
 - Class D** : - Equipment specified power less than or equal to 600W of the following types
 - personal computers and personal computer monitors
 - television receivers
 - refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).
- e. Connects the EUT's power source to the mains power supplied by the test instrument. Turn on the EUT.
- f. Operating the EUT as required and measuring the harmonic current emissions on the current carrying lines of EUT's power source.

4.4 Test Configurations



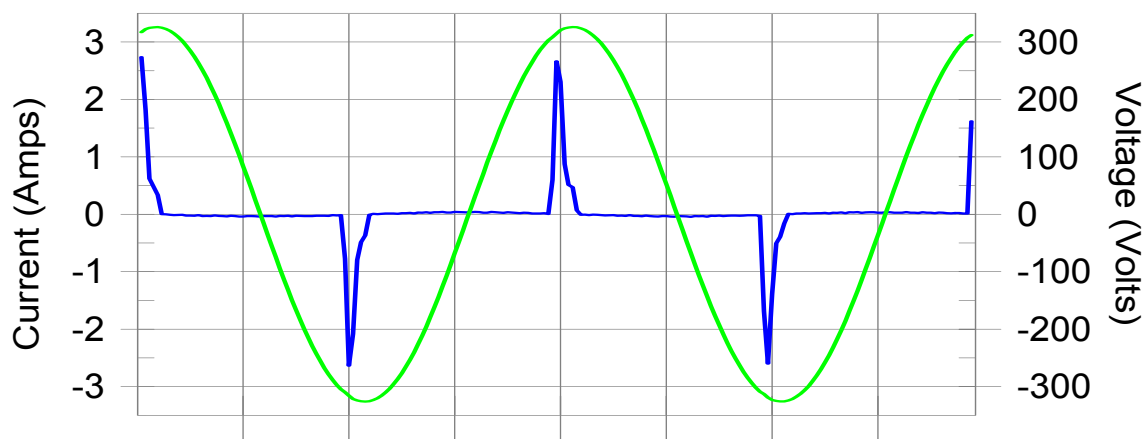
4.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

4.6 Test Results

Test Mode : Mode 1
Tester : Jeff
Temperature : 22°C
Humidity : 56%RH

Test Frequency (Hz)	50
Test Voltage (V)	230
Test observation period (Minutes)	10
Reference Current (A)	0.509
Power Factor	0.385
Power (Watt)	44.7
Total Harmonic Current, THC (A)	0.463
Total Harmonic Distortion, THD (%)	227.5



Note: The EUT power level is below 75.0 Watts and therefore has no defined limits.

Test Raw Data:

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	0.000	N/A	0.001	0.000	N/A	N/L
3	0.192	0.152	N/A	0.193	0.228	N/A	N/L
4	0.001	0.000	N/A	0.001	0.000	N/A	N/L
5	0.183	0.085	N/A	0.183	0.127	N/A	N/L
6	0.001	0.000	N/A	0.001	0.000	N/A	N/L
7	0.170	0.045	N/A	0.170	0.067	N/A	N/L
8	0.001	0.000	N/A	0.001	0.000	N/A	N/L
9	0.154	0.022	N/A	0.154	0.034	N/A	N/L
10	0.001	0.000	N/A	0.001	0.000	N/A	N/L
11	0.137	0.016	N/A	0.138	0.023	N/A	N/L
12	0.001	0.000	N/A	0.001	0.000	N/A	N/L
13	0.121	0.013	N/A	0.121	0.020	N/A	N/L
14	0.000	0.000	N/A	0.001	0.000	N/A	N/L
15	0.106	0.012	N/A	0.107	0.017	N/A	N/L
16	0.000	0.000	N/A	0.001	0.000	N/A	N/L
17	0.094	0.010	N/A	0.095	0.015	N/A	N/L
18	0.001	0.000	N/A	0.001	0.000	N/A	N/L
19	0.085	0.009	N/A	0.086	0.014	N/A	N/L
20	0.001	0.000	N/A	0.001	0.000	N/A	N/L
21	0.079	0.008	N/A	0.080	0.012	N/A	N/L
22	0.001	0.000	N/A	0.002	0.000	N/A	N/L
23	0.075	0.007	N/A	0.076	0.011	N/A	N/L
24	0.001	0.000	N/A	0.002	0.000	N/A	N/L
25	0.070	0.007	N/A	0.071	0.010	N/A	N/L
26	0.001	0.000	N/A	0.002	0.000	N/A	N/L
27	0.065	0.006	N/A	0.066	0.010	N/A	N/L
28	0.001	0.000	N/A	0.002	0.000	N/A	N/L
29	0.058	0.006	N/A	0.060	0.009	N/A	N/L
30	0.001	0.000	N/A	0.002	0.000	N/A	N/L
31	0.051	0.006	N/A	0.052	0.008	N/A	N/L
32	0.001	0.000	N/A	0.002	0.000	N/A	N/L
33	0.043	0.005	N/A	0.043	0.008	N/A	N/L
34	0.001	0.000	N/A	0.002	0.000	N/A	N/L
35	0.034	0.005	N/A	0.035	0.007	N/A	N/L
36	0.001	0.000	N/A	0.002	0.000	N/A	N/L
37	0.026	0.005	N/A	0.026	0.007	N/A	N/L
38	0.001	0.000	N/A	0.001	0.000	N/A	N/L
39	0.019	0.004	N/A	0.019	0.007	N/A	N/L
40	0.001	0.000	N/A	0.001	0.000	N/A	N/L

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

5. Voltage Fluctuations and Flickers Emission Measurement

Test Result : **PASS**

5.1 Limits for Emission Measurement

- the short-term flicker indicator, P_{st} , shall not be greater than 1.0;
- the long-term flicker indicator, P_{lt} , shall not be greater than 0.65;
- the relative steady-state voltage change, d_c , shall not exceed 3.3%;
- the voltage change with time, $d(t)$, during a voltage change shall not exceed 3.3% for more than 500ms.
- the maximum relative voltage change, d_{max} , shall not exceed
 - a) 4% without additional conditions;
 - b) 6% for equipment which is switched manually
 - c) 7% for equipment which is attended whilst in use

5.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 14, 2019	Oct. 14, 2020
Power Analyzer		PACS-1/ 72398	Oct. 14, 2019	Oct. 14, 2020
Test Software	C.I.	CTS 4/ Ver. 4.24	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

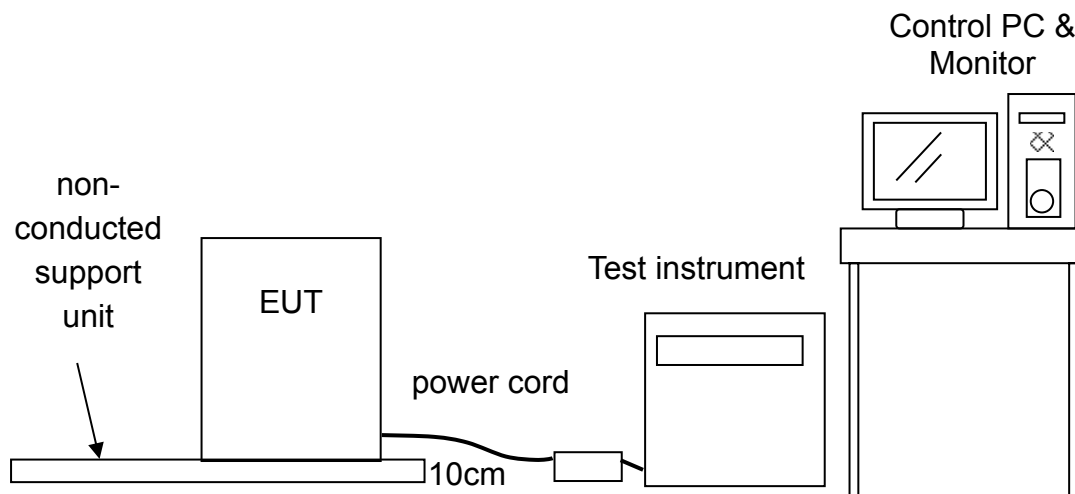
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

5.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the type of EUT to define the d_{max} limit and its corresponding test methods described in the relative standard.
- e. Maintain the supply voltage to be $\pm 2\%$ of the EUT's rated voltage and also the frequency to be $50\text{Hz} \pm 0.5\%$.
- f. Connects the EUT's power source to the mains power supplied by the test instrument.
- g. Operating the EUT as required and measuring the voltage fluctuation and flickers of EUT's power source.
- h. Verify the fluctuations of the test supply voltage to be less than 0.4 before and after the test.

5.4 Test Configurations



5.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

5.6 Test Results

Test Mode : Mode 1
Tester : Jeff
Temperature : 22°C
Humidity : 56%RH

TEST FREQ	50 Hz	
TEST VOLTS	230 VAC	
TEST TIME	10 Minutes	
	EUT Data	Limit
d(t)>3.3% (ms)	0	500
d _c (%)	0	3.3
d _{max} (%)	0	4
P _{st} max	0.064	1
P _{lt} max	0.028	0.65

6. Electrostatic Discharge (ESD) Immunity Test

Test Result : PASS

6.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 EN 55024 as §1.3 described and requirement of manufacturer
Basic Standard	:	EN 61000-4-2
Required Performance	:	TT / TR (EN 301 489) B (EN 55024)
Test Level	:	2 (Contact discharge) 3 (Air discharge)
Discharge Voltage	:	Contact → ±2kV, ±4kV (Direct / Indirect discharge) Air → ±2kV, ±4kV, ±8kV (Direct discharge)
Time Interval	:	1 sec. minimum
Number of discharges	:	Minimum 50 times at each test point (Contact) Minimum 20 times at each test point (Air)
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Marco / Wilson
Ambient Temperature	:	23°C
Relative Humidity	:	45%
Atmospheric Pressure	:	1016mbar

6.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Electrostatic Generator	EM TEST	DITO/ V0537100716	May 21, 2019	May 21, 2020
TR8 shielded room	ETS. LINDGREN	TR8/ 15353-C	NCR	NCR

Note:

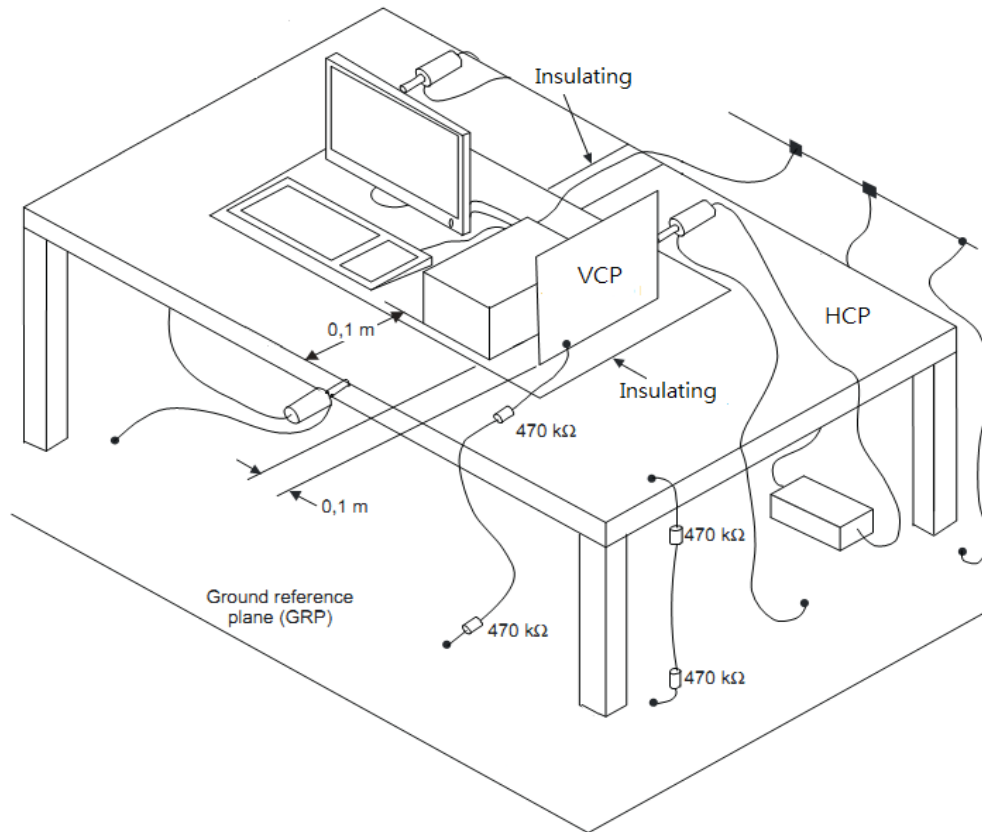
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

6.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the ground reference plane in the shielded room. Also a HCP (Horizontal Coupling Plane) which was connected to the ground reference plane via a cable with a 470k Ω resistor located at each end was placed on the wooden table and isolated with the EUT by an insulating support 0.5mm thick. The ground reference plane shall project beyond the EUT or HCP by at least 0.5m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.5m on all sides.
- d. Keep the EUT 1m away from all other metallic walls in the shielded room as the minimum distance.
- e. The static electricity discharges shall be applied only to those points and surfaces of the EUT which are accessible to persons during normal use. Contact discharge is the preferred test method and it is applied to the conductive surfaces of EUT and coupling planes. Air discharge shall be used where contact discharge cannot be performed and it is applied to the insulating surfaces of EUT.
- f. The discharge return cable of the generator shall be kept at a distance of at least 0.2m from the EUT whilst the discharge is being applied.
- g. The time interval between successive single discharges was at least 1 second.
- h. Select appropriate points of the EUT for contact discharge and put marks on it to indicate the tested point(s). Then start the contact discharge with the tip of the discharge electrode to touch the EUT before the discharge switch is operated.
- i. Use the round discharge tip of the discharge electrode to scan the EUT to select the points for air discharge. Then start the air discharge by approaching the discharge electrode as fast as possible to touch the EUT. After each discharge, the ESD generator shall be removed from the EUT.
- j. The indirect HCP discharge test is applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

- k. The indirect VCP (Vertical Coupling Plane) discharge test is applied to the center of one vertical edge of the coupling plane. The VCP, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. It shall be applied with sufficient different positions such that the four faces of the EUT are completely illuminated.

6.4 Test Configurations



6.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

6.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Discharge Voltage (kV)	Type of discharge	Label for Dischargeable Points	Result (Pass/Fail)
±2	Contact	A	Pass(1)
±4	Contact	A	Pass(1)
±2	Air	No dischargeable point	Pass(1)
+4	Air	4,7,9,10,13	Pass(1)
-4	Air	4,7	Pass(1)
±8	Air	1~15	Pass(1)
±2	HCP-Bottom	Edge of the HCP	Pass(1)
±2	VCP-Front	Center of the VCP	Pass(1)
±2	VCP-Left	Center of the VCP	Pass(1)
±2	VCP-Back	Center of the VCP	Pass(1)
±2	VCP-Right	Center of the VCP	Pass(1)
±4	HCP-Bottom	Edge of the HCP	Pass(1)
±4	VCP-Front	Center of the VCP	Pass(1)
±4	VCP-Left	Center of the VCP	Pass(1)
±4	VCP-Back	Center of the VCP	Pass(1)
±4	VCP-Right	Center of the VCP	Pass(1)

Observation of Performance during Test

(1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

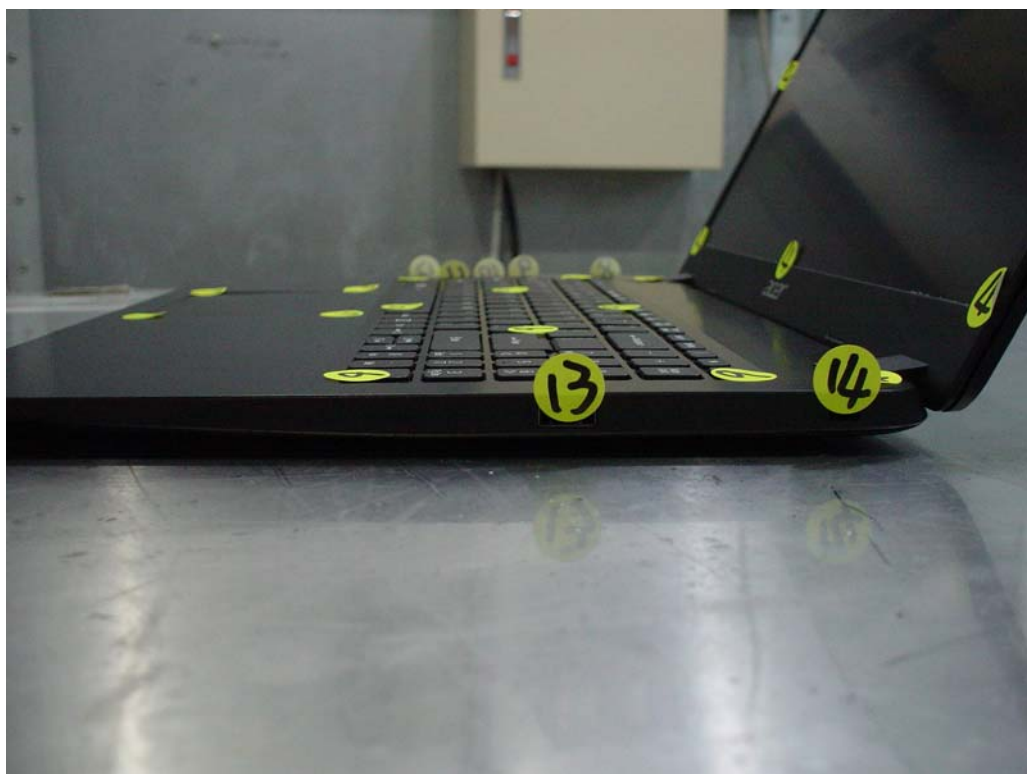
Discharge Voltage (kV)	Type of discharge	Label for Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±2	Contact	A	B	A(1)	Pass
±4	Contact	A	B	A(1)	Pass
±2	Air	No dischargeable point	B	A(1)	Pass
+4	Air	4,7,9,10,13	B	A(1)	Pass
-4	Air	4,7	B	A(1)	Pass
±8	Air	1~15	B	A(1)	Pass
±2	HCP-Bottom	Edge of the HCP	B	A(1)	Pass
±2	VCP-Front	Center of the VCP	B	A(1)	Pass
±2	VCP-Left	Center of the VCP	B	A(1)	Pass
±2	VCP-Back	Center of the VCP	B	A(1)	Pass
±2	VCP-Right	Center of the VCP	B	A(1)	Pass
±4	HCP-Bottom	Edge of the HCP	B	A(1)	Pass
±4	VCP-Front	Center of the VCP	B	A(1)	Pass
±4	VCP-Left	Center of the VCP	B	A(1)	Pass
±4	VCP-Back	Center of the VCP	B	A(1)	Pass
±4	VCP-Right	Center of the VCP	B	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

Photographs of the Test Points on the EUT for ESD Test





7. Radiated Electromagnetic Field (RS) Immunity Test

Test Result : PASS

7.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 EN 55024 as §1.3 described
Basic Standard	:	EN 61000-4-3
Required Performance	:	CT / CR (EN 301 489) A (EN 55024)
Test Level	:	2
Field Strength	:	3 V/m
Test Frequency Range	:	80MHz ~ 6GHz (EN 301 489) 80MHz ~ 1GHz (EN 55024)
Frequency Step	:	1% of the momentary frequency
Dwell Time	:	Minimum 3 sec. per frequency
Modulation	:	1kHz Sine Wave with 80% Amplitude Modulation
Polarization of Antenna	:	Horizontal and Vertical
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Jeff
Ambient Temperature	:	23°C
Relative Humidity	:	54%
Atmospheric Pressure	:	1012mbar

7.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SMB 100A / 113868	Feb. 25, 2019	Feb. 25, 2020
Dual Directional Coupler	AR	DC 6180A / 0350436	Feb. 26, 2019	Feb. 26, 2020
	AR	DC7205A / 0347145	Feb. 26, 2019	Feb. 26, 2020
Boardband Amplifier	TESEQ	CBA 1G-275 / T4428	NCR	NCR
	R&S	BBA150 / 308785	NCR	NCR
Log Antenna	R&S	HL046 / 359132/004	NCR	NCR
Stacked log.-Per Antenna	Schwarzbeck Mess - Elektronik	STLP 9149 / 9149-467	NCR	NCR
Isotropic E Field Probe	AR	FL7006 / 336500	Jan. 15, 2019	Jan. 15, 2020
Average Power Sensor	R&S	NRP6AN / 101001	Feb. 26, 2019	Feb. 26, 2020
Test Software	Audix	i2 / 5.16_20181108	NCR	NCR
TR3 fully-anechoic chamber	ETS. LINDGREN	TR3/ 15353-I	March 8, 2019	March 8, 2020

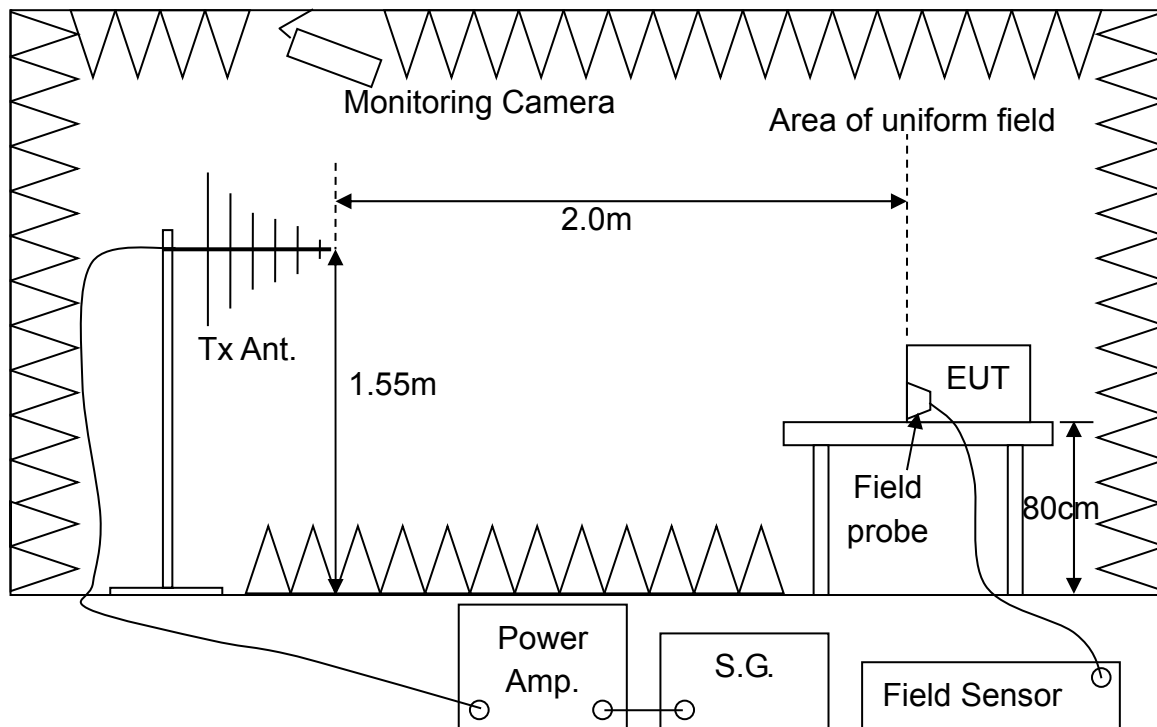
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the fully-anechoic chamber listed above is the date of Field Uniformity Calibration measurement.

7.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters and 2.0 meters away from the transmitting antenna in the fully anechoic chamber.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters and 2.0 meters away from the transmitting antenna in the fully anechoic chamber. Also if the floor-standing equipment which is capable of being stood on a non-conducting 0.8m high platform may be so arranged.
- d. All EUT's individual faces shall be fully enclosed by the "uniform area" and its wires shall be arranged parallel to the uniform area of the field.
- e. Before testing the EUT, the intensity of the established field strength is checked by placing the field sensor at a calibration grid point to give the calibrated field strength to measure the EUT.
- f. After the calibration has been verified, the test field can be generated using the values obtained from the calibration.
- g. Perform the test with the specified immunity level in the test frequency range and with the specified modulation type.
- h. The transmitting antenna is normally facing each of the four sides of the EUT with two polarizations (Vertical and Horizontal) to perform the test.
- i. The dwell time at each frequency shall be not less than the time necessary for the EUT to be exercised and be able to respond.
- j. The sensitive frequencies of EUT shall be analyzed separately, if any.
- k. Record the performance of the EUT.

7.4 Test Configurations



7.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

7.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Test Frequency Range : 80MHz ~ 6GHz		
Side of the EUT	Polarization	Result (Pass/Fail)
Front	H	Pass(1)
	V	Pass(1)
Left	H	Pass(1)
	V	Pass(1)
Back	H	Pass(1)
	V	Pass(1)
Right	H	Pass(1)
	V	Pass(1)

Observation of Performance during Test

(1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

Test Frequency Range : 80MHz ~ 1GHz				
Side of the EUT	Polarization	Performance		Result (Pass/Fail)
		Required	Observation	
Front	H	A	A(1)	Pass
	V	A	A(1)	Pass
Left	H	A	A(1)	Pass
	V	A	A(1)	Pass
Back	H	A	A(1)	Pass
	V	A	A(1)	Pass
Right	H	A	A(1)	Pass
	V	A	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

8. Electrical fast transient / burst (EFT) Immunity Test

Test Result : PASS

8.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 EN 55024 as §1.3 described
Basic Standard	:	EN 61000-4-4
Required Performance	:	TT / TR (EN 301 489) B (EN 55024)
Test Level	:	2
Voltage Peak	:	<input checked="" type="checkbox"/> ±1kV (on power supply port) <input checked="" type="checkbox"/> ±0.5kV (on I/O signal, data and control port)
Impulse Frequency	:	5kHz
Wave Shape of the Pulse (Tr/T_r)	:	5ns / 50ns
Burst Duration	:	15ms
Burst Period	:	300ms
Time Duration	:	1 min
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Jeff
Ambient Temperature	:	22°C
Relative Humidity	:	56%
Atmospheric Pressure	:	1013mbar

8.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EFT/Burst Simulator	EMC PARTNER	TRA2000IN6/ 870	May 13, 2019	May 13, 2020
Coupling Clamp	EMC PARTNER	CN-EFT1000/ 532	Aug. 22, 2019	Aug. 22, 2020
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

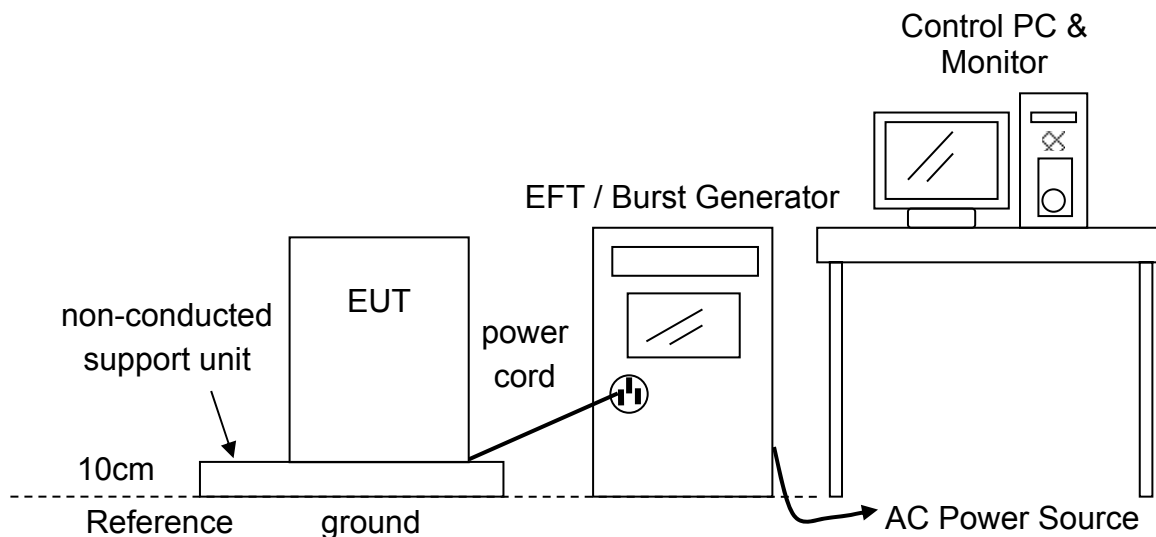
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

8.3 Test Procedures

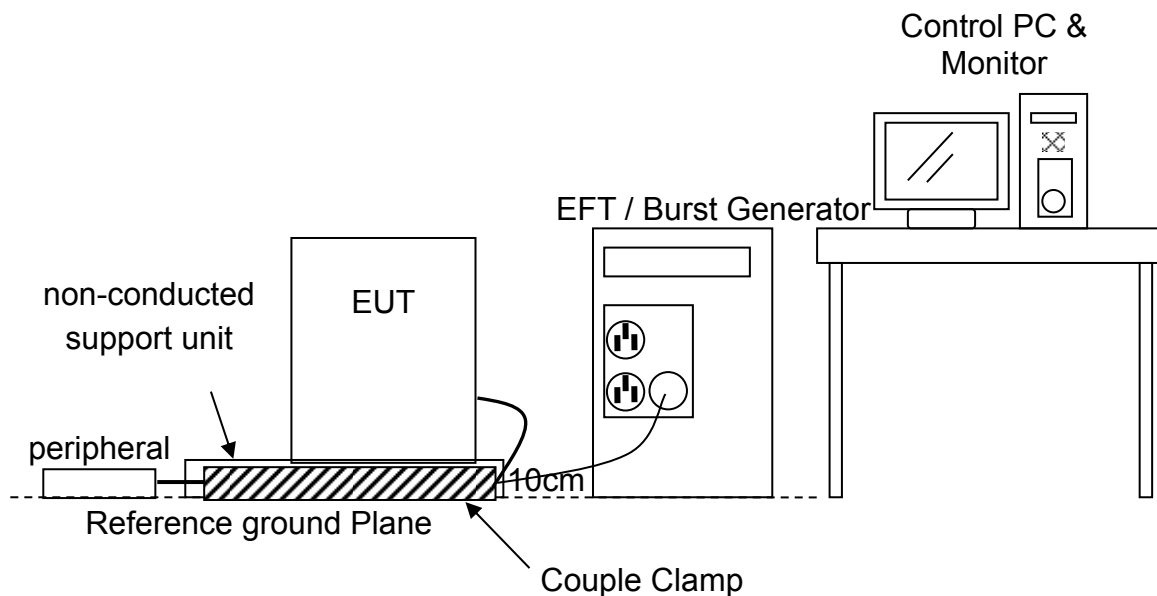
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground reference plane is placed on a wooden table with a height of 0.8 meters in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- d. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
- e. All cables to the EUT shall be placed on the insulation support 0.1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
- f. Keep the EUT 0.5m away from all other conductive structures, except the ground reference plane beneath the EUT as the minimum distance. Also if any, the minimum distance between the coupling clamp and all other conductive structures, except the ground reference plane beneath the coupling clamp and EUT shall be 0.5m.
- g. Keep the length of the power and signal lines, if required, between the coupling device and the EUT to be 0.5m. If a non-detachable supply cable more than 0.5m long, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0,1 m above the ground reference plane.
- h. Connect the EUT's power source to the appropriate power through the coupling devices and perform the specified test level.
- i. If any, connect all the I/O signal, data and control lines between EUT and accessories/support units through the coupling devices and perform the specified test level.
- j. Record the performance of the EUT.

8.4 Test Configurations

Power supply port Test



I/O signal, data and control port Test (if any)



8.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

8.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Injected Line	Voltage Peak (kV)	Injected Method	Result (Pass/Fail)
L1	±1.0	Direct	Pass(1)
L2	±1.0	Direct	Pass(1)
PE	±1.0	Direct	Pass(1)
L1 - L2 - PE	±1.0	Direct	Pass(1)
Data Line (RJ-45)	±0.5	Clamp Coupling	Pass(1)

Observation of Performance during Test

- (1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

Injected Line	Voltage Peak (kV)	Injected Method	Performance		Result (Pass/Fail)
			Required	Observation	
L1	±1.0	Direct	B	B(1)	Pass
L2	±1.0	Direct	B	B(1)	Pass
PE	±1.0	Direct	B	B(1)	Pass
L1 - L2 - PE	±1.0	Direct	B	B(1)	Pass
Data Line (RJ-45)	±0.5	Clamp Coupling	B	B(1)	Pass

Observation of Performance during Test

- (1) The noise would appear from speaker of EUT while test is performing, it could self-recover after the test.

9. Surge Immunity Test

Test Result : PASS

9.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 EN 55024 as §1.3 described
Basic Standard	:	EN 61000-4-5
Required Performance	:	TT / TR (EN 301 489) B (EN 55024)
Test Level	:	<input checked="" type="checkbox"/> 3 (line to line on power supply port) <input checked="" type="checkbox"/> 3 (line to earth (ground) on power supply port) <input type="checkbox"/> 2 (on I/O signal, data and control port)
Open-circuit Test Voltage	:	<input checked="" type="checkbox"/> ±0.5kV, ±1kV (line to line on power supply port) <input checked="" type="checkbox"/> ±0.5kV, ±1kV, ±2kV (line to earth (ground) on power supply port) <input type="checkbox"/> ±0.5kV, ±1kV (on I/O signal, data and control port)
CW Waveform (T_r/T_h)	:	1.2 / 50µs (open-circuit voltage) 8 / 20µs (short-circuit current)
Phase Angle	:	0°, 90°, 180°, 270°
Time interval	:	1min. or less
Number of Test	:	at least 5 positive and 5 negative at selected points
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Jeff
Ambient Temperature	:	22°C
Relative Humidity	:	56%
Atmospheric Pressure	:	1013mbar

9.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Surge Simulator	EMC PARTNER	TRA2000IN6/870	May 13, 2019	May 13, 2020
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

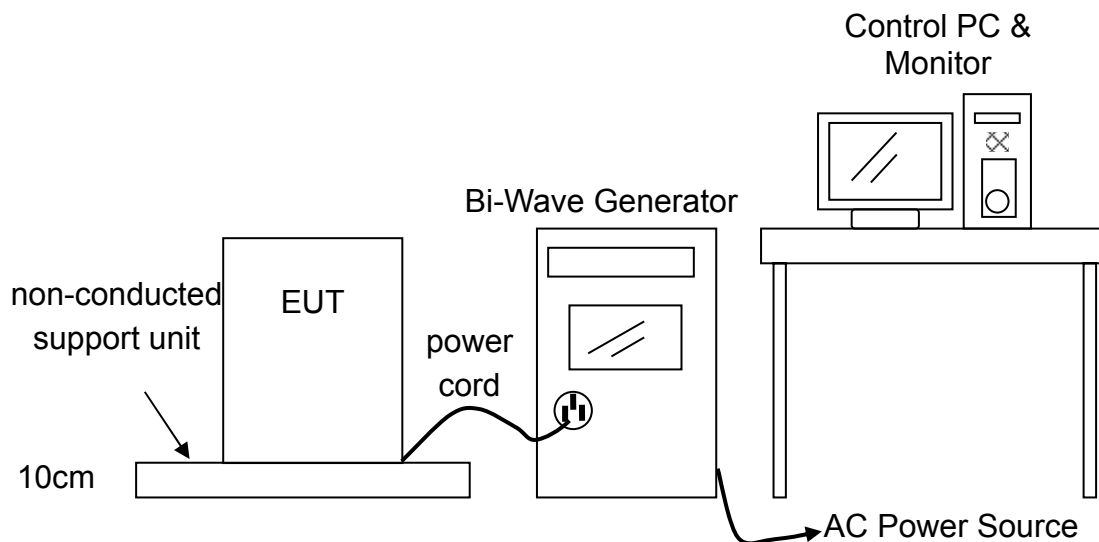
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

9.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. For the surge test applied to EUT's power supply and unshielded unsymmetrical interconnection lines, if required, the capacitive coupling network are used.
- e. If any, the surge test applied to the unshielded symmetrically interconnection lines of EUT, the gas arrestors coupling network are used.
- f. Keep the interconnection line, if required, or power cord between the EUT or its power source and the coupling / decoupling network to be 2m in length (or shorter).
- g. The surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).
- h. All lower levels including the selected test level shall be satisfied and the test voltage has to be increased by steps up to the specified test level.
- i. Connect the EUT's power source to the appropriate power through the coupling devices and perform the specified test level.
- j. If any, connect all the interconnection lines between EUT and accessories/support units through the coupling devices and perform the specified test level.
- k. Record the performance of the EUT.

9.4 Test Configurations



9.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

9.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Coupled Line	Open-circuit Test Voltage (kV)	Result (Pass/Fail)			
		0°	90°	180°	270°
L1 - PE	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L2 - PE	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L1 - L2	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L1 - PE	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L2 - PE	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L1 - L2	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L1 - PE	±2	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L2 - PE	±2	Pass(1)	Pass(1)	Pass(1)	Pass(1)

Observation of Performance during Test

- (1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

Coupled Line	Open-circuit Test Voltage (kV)	Performance					Result (Pass/Fail)
		Required	Observation				
			0°	90°	180°	270°	
L1 - PE	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - L2	±0.5	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - PE	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - L2	±1	B	A(1)	A(1)	A(1)	A(1)	Pass
L1 - PE	±2	B	A(1)	A(1)	A(1)	A(1)	Pass
L2 - PE	±2	B	A(1)	A(1)	A(1)	A(1)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.

10. Conducted disturbances (CS) Immunity Test

Test Result : PASS

10.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 EN 55024 as §1.3 described
Basic Standard	:	EN 61000-4-6
Required Performance	:	CT / CR (EN 301 489) A (EN 55024)
Test Level	:	2
Voltage Level(e.m.f.)	:	3V (e.m.f.)
Test Frequency Range	:	150kHz ~ 80MHz
Frequency Step	:	1% of the momentary frequency
Dwell Time	:	Minimum 3 sec. per frequency
Modulation	:	1kHz Sine Wave with 80% Amplitude Modulation
Coupling Devices	:	<input checked="" type="checkbox"/> CDN-M3 (on power supply port) <input type="checkbox"/> CDN-T2 (on RJ-11 port) <input checked="" type="checkbox"/> CDN-T4 (on LAN port) <input checked="" type="checkbox"/> CDN-T8 (on LAN port) <input type="checkbox"/> EM Clamp (on I/O signal, data and control port)
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Sam Huang
Ambient Temperature	:	22°C
Relative Humidity	:	60%
Atmospheric Pressure	:	1013mbar

10.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SML03/ 101676	July 28, 2019	July 28, 2020
Dual Directional Coupler	AR	DC2600/ 28834	Feb. 15, 2019	Feb. 15, 2020
Power Amplifier	AR	75A250/ 28845	NCR	NCR
CDN	FCC	<input type="checkbox"/> FCC-801-M2-16A/ 2032	Feb. 25, 2019	Feb. 25, 2020
		<input checked="" type="checkbox"/> FCC-801-M3-16A/ 2060	Jan. 28, 2019	Jan. 28, 2020
		<input type="checkbox"/> FCC-801-M5-16A/ 2020	Nov. 12, 2018	Nov. 12, 2019
	FCC	<input type="checkbox"/> FCC-801-T2/ 2032	Oct. 16, 2019	Oct. 16, 2020
		<input type="checkbox"/> FCC-801-T4-RJ45/ 08031	Oct. 16, 2019	Oct. 16, 2020
		<input type="checkbox"/> NCDN-T8-RJ45/ 06016	Oct. 16, 2019	Oct. 16, 2020
ATTENUATOR	BIRD	300-A-MFN-06/ 37	Oct. 21, 2019	Oct. 21, 2020
EM CLAMP	TESEQ	KEMZ 801A / 38676	Oct. 15, 2019	Oct. 15, 2020
Dual Channel Power Meter	R&S	NRVD/ 839374/012	Nov. 13, 2018	Nov. 13, 2019
Power Sensor	R&S	URV5-Z2/ 835640/013	Jan. 24, 2019	Jan. 24, 2020
	R&S	URV5-Z2/ 100731	Jan. 24, 2019	Jan. 24, 2020
Test Software	Audix	i2 / 5.16_20181108	NCR	NCR
TR4 shielded room	ETS LINDGREN	TR4/ 15353-E	NCR	NCR

Note:

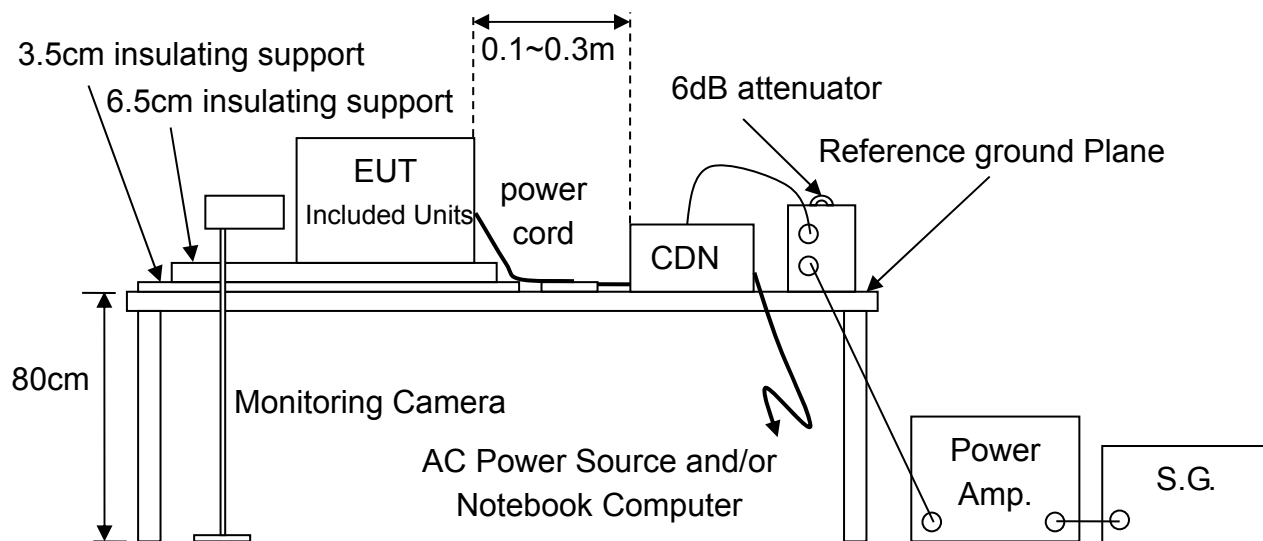
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

10.3 Test Procedures

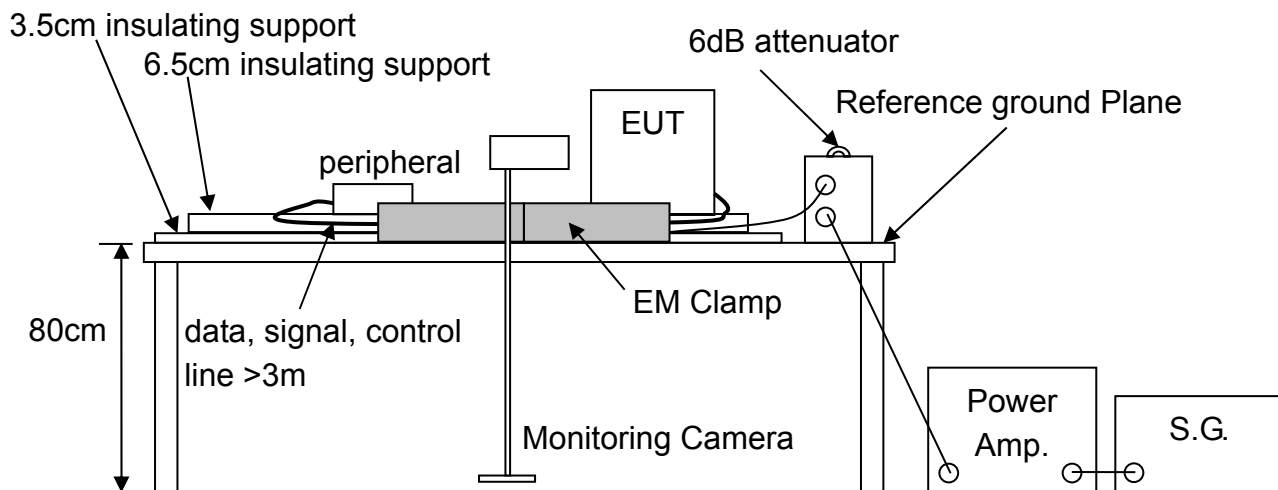
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground reference plane is placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. Decide the injection methods and test points according to the relative standard.
- e. All relevant cables shall be provide with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on the ground reference plane.
- f. All cables connected to each Auxiliary Equipment (AE), other than those being connected to the EUT, shall not be bundled nor wrapped and shall be kept between 30mm and 50mm above the ground reference plane.
- g. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor.
- h. Perform the test with the specified immunity level in the test frequency range and with the specified modulation type.
- i. The dwell time at each frequency shall be not less than the time necessary for the EUT to be exercised and be able to respond.
- j. The sensitive frequencies of EUT and harmonics or frequencies of dominant interest shall be analyzed separately, if any.
- k. Record the performance of the EUT.

10.4 Test Configurations

Power supply and/or LAN port Test



I/O signal, data and control port Test (if any)



10.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

10.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Injected Line	Coupling Devices	Result (Pass/Fail)
Power Lines	CDN-M3	Pass(1)
Data Lines (RJ-45)	CDN-T4 (10Mbps)	Pass(1)
	CDN-T4 (100Mbps)	Pass(1)
	CDN-T8 (1Gbps)	Pass(1)

Observation of Performance during Test

(1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

Injected Line	Coupling Devices	Performance		Result (Pass/Fail)
		Required	Observation	
Power Lines	CDN-M3	A	A(1)	Pass
Data Lines (RJ-45)	CDN-T4 (10Mbps)	A	A(1)	Pass
	CDN-T4 (100Mbps)	A	A(1)	Pass
	CDN-T8 (1Gbps)	A	A(1)	Pass

Observation of Performance during Test

(1) Normal operation condition specified by manufacturer during the test.

11. Voltage dips, short interruptions Immunity Test

Test Result : PASS

11.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	:	ETSI EN 301 489-1 ETSI EN 301 489-17 as §1.3 described
Basic Standard	:	EN 61000-4-11
Required Performance and Test Level	:	<input checked="" type="checkbox"/> TT/TR 0% residual voltage dips with 0.5 cycle <input checked="" type="checkbox"/> TT/TR 0% residual voltage dips with 1 cycle <input checked="" type="checkbox"/> TT/TR 70% residual voltage dips with 25 cycles <input checked="" type="checkbox"/> TT/TR 0% residual voltage interruptions with 250 cycles
Basis Test Voltage Level (U_T)	:	240Vac/50Hz to the power adapter 100Vac/50Hz to the power adapter
Test Duration	:	Maximum 3 dips/interruptions with a sequence
Time interval	:	10s minimum between each test event
Phase Angle of Abrupt Changes	:	0°, 180°
Tester	:	Jeff
Ambient Temperature	:	22°C
Relative Humidity	:	56%
Atmospheric Pressure	:	1013mbar

Product (Generic) Standard	: EN 55024 as §1.3 described
Basic Standard	: EN 61000-4-11
Required Performance and Test Level	: <input checked="" type="checkbox"/> B for 0% residual voltage dips with 0.5 cycles <input checked="" type="checkbox"/> C for 70% residual voltage dips with 25/30 cycles <input checked="" type="checkbox"/> C for 0% voltage interruptions with 250/300 cycles
Basis Test Voltage Level (U_T)	: 240Vac/50Hz to the power adapter 100Vac/50Hz to the power adapter
Test Duration	: Maximum 3 dips/interruptions with a sequence
Time interval	: 10s minimum between each test event
Phase Angle of Abrupt Changes	: 0°
Tester	: Jeff
Ambient Temperature	: 22°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1013mbar

11.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Voltage DIP Tester	EMC PARTNER	TRA2000IN6/870	May 13, 2019	May 13, 2020
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

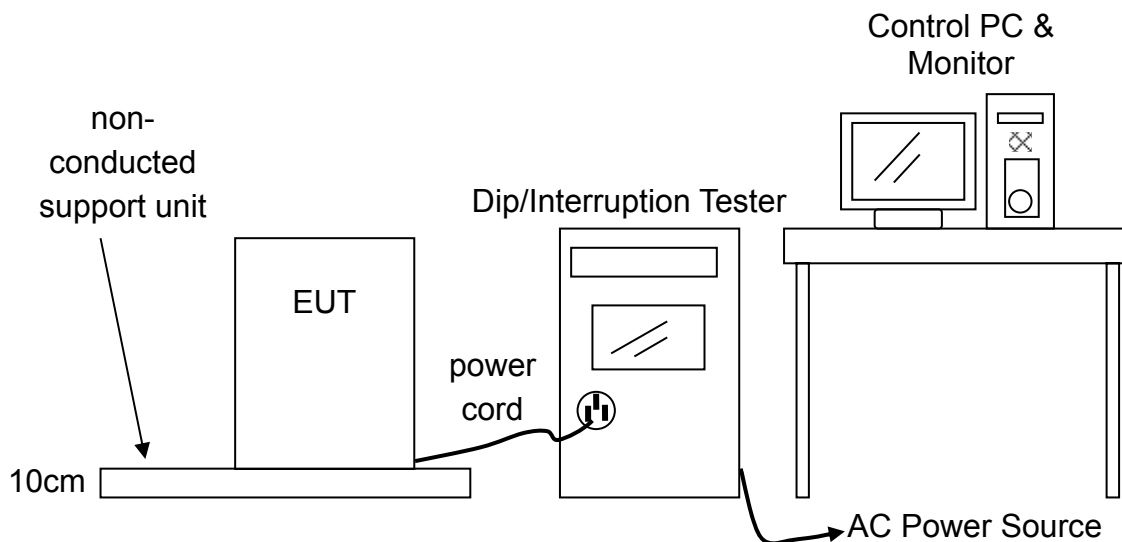
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

11.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height 0.8 meters above the ground reference plane in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room.
- d. The test shall be performed with the EUT connected to the test Generator with the shortest power supply cable as specified by the manufacturer.
- e. If any, tests on the three-phase EUT are accomplished by using three sets of equipment mutually synchronized.
- f. During the tests, the main voltage for testing is monitored within an accuracy of 2% and the zero crossing control of the generators must have an accuracy of $\pm 10^\circ$.
- g. The EUT shall be tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 sec. minimum (between each test event). Each representative mode of operation shall be test.
- h. Abrupt changes in supply voltage shall occur at zero crossings of the voltage and additional angles preferably selected from 0° , 45° , 90° , 135° , 180° , 225° , 270° , 315° on each phase.
- i. Connect the EUT's power source to the appropriate power through the test generator and perform the specified test level.
- j. Record the performance of the EUT.

11.4 Test Configurations



11.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

11.6 Test Results

Test Mode : Mode 1

Product (Generic) Standard : ETSI EN 301 489-1
ETSI EN 301 489-17

Test Voltage : 240Vac/50Hz to the power adapter

Voltage Dips Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Result (Pass/Fail)
0	100	0.5	Pass(1)
0	100	1	Pass(1)
70	30	25	Pass(1)

Voltage Interruption Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Result (Pass/Fail)
0	100	250	Pass(1)

Observation of Performance during Test

(1) Normal operation condition specified on § 1.4 performance criteria during the test.

Test Voltage : 100Vac/50Hz to the power adapter

Voltage Dips Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Result (Pass/Fail)
0	100	0.5	Pass(1)
0	100	1	Pass(1)
70	30	25	Pass(1)

Voltage Interruption Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Result (Pass/Fail)
0	100	250	Pass(1)

Observation of Performance during Test

(1) Normal operation condition specified on § 1.4 performance criteria during the test.

Product (Generic) Standard : EN 55024

Test Voltage : 240Vac/50Hz to the power adapter

Voltage Dips Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	0.5	B	A(1)	Pass
70	30	25	C	A(1)	Pass

Voltage Interruption Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	250	C	B(2)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.
- (2) The power adapter connected to the EUT would function off while test is performed, it could self-recover after the test.

Test Voltage : 100Vac/50Hz to the power adapter

Voltage Dips Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	0.5	B	B(2)	Pass
70	30	25	C	A(1)	Pass

Voltage Interruption Test

Test level (% residual voltage)	Reduction Voltage (%)	Duration (cycle)	Performance		Result (Pass/Fail)
			Required	Observation	
0	>95	250	C	B(2)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.
- (2) The power adapter connected to the EUT would function off while test is performed, it could self-recover after the test.

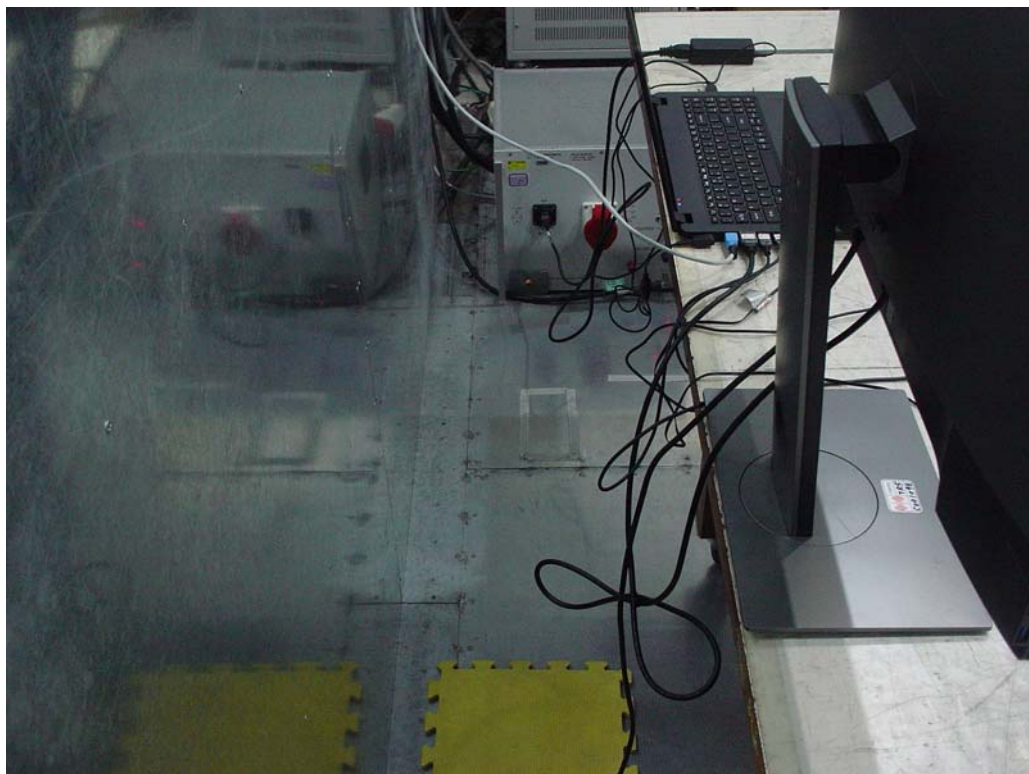
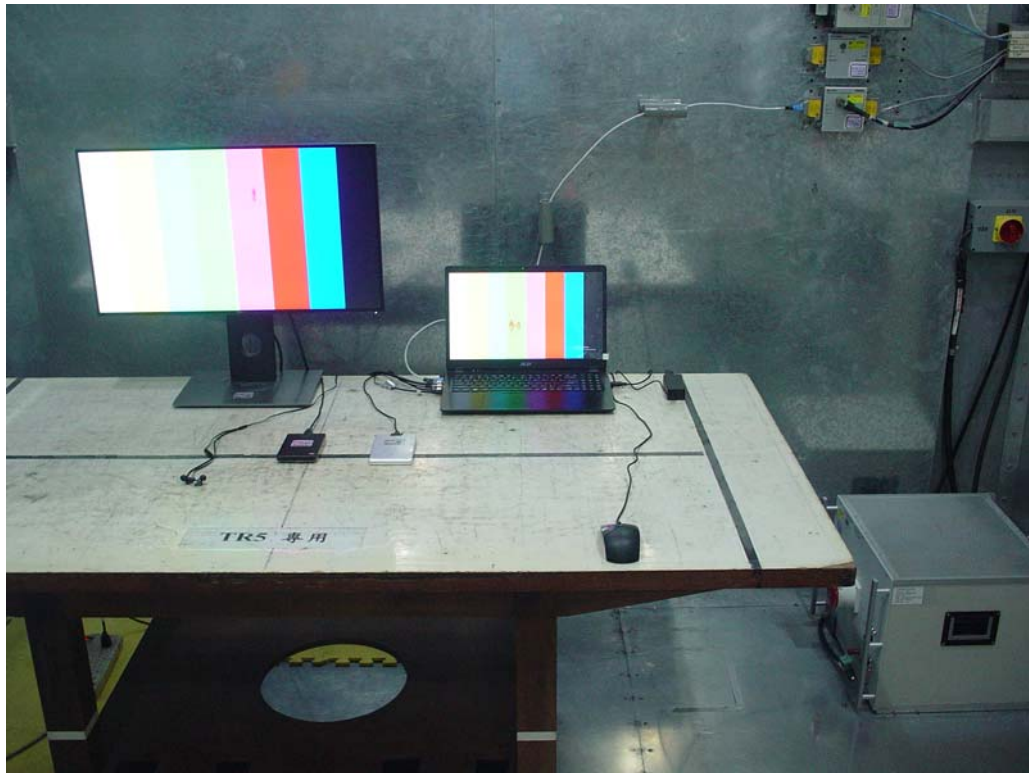
Attachment 1

Photographs of the Test Configurations

Contents

1. Conducted Emission Measurement.....	1
2. Radiated Emission Measurement	2
3. Harmonic Current & Voltage Fluctuations Emission Measurement.....	3
4. Electrostatic Discharge (ESD) Immunity Test.....	4
5. Radiated Electromagnetic Field (RS) Immunity Test.....	4
6. Electrical fast transient / burst (EFT) Immunity Test.....	5
7. Surge Immunity Test	6
8. Conducted disturbances (CS) Immunity Test	7
9. Voltage dips, short interruptions Immunity Test.....	9

1. Conducted Emission Measurement



2. Radiated Emission Measurement



3. Harmonic Current & Voltage Fluctuations Emission Measurement



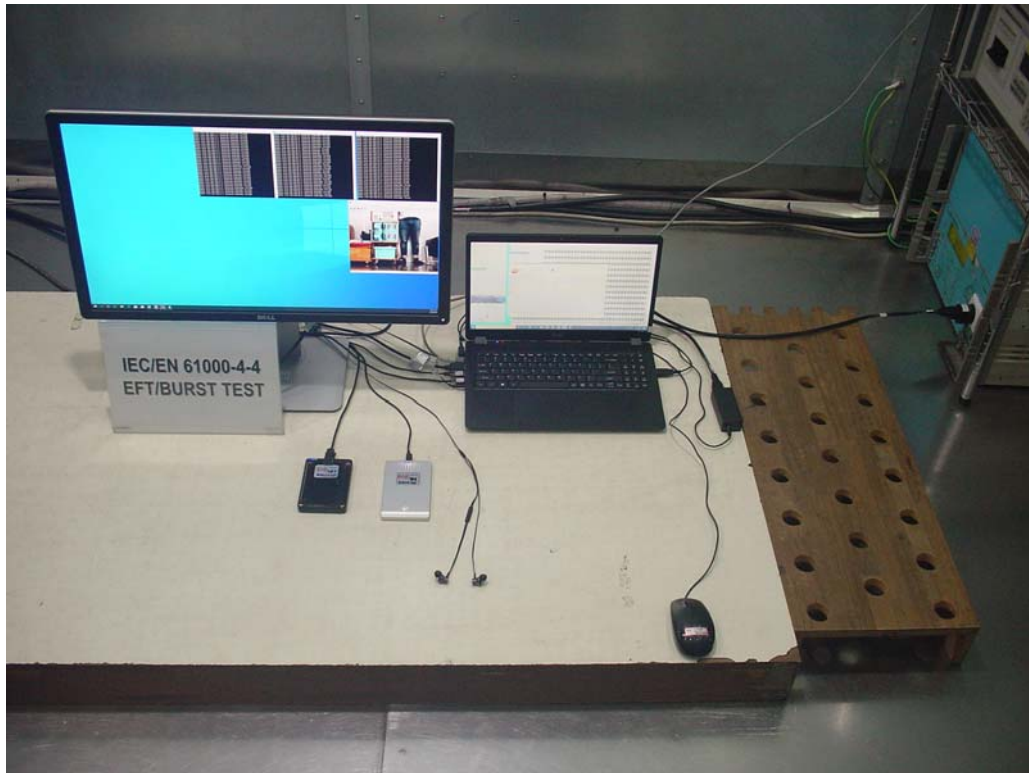
4. Electrostatic Discharge (ESD) Immunity Test



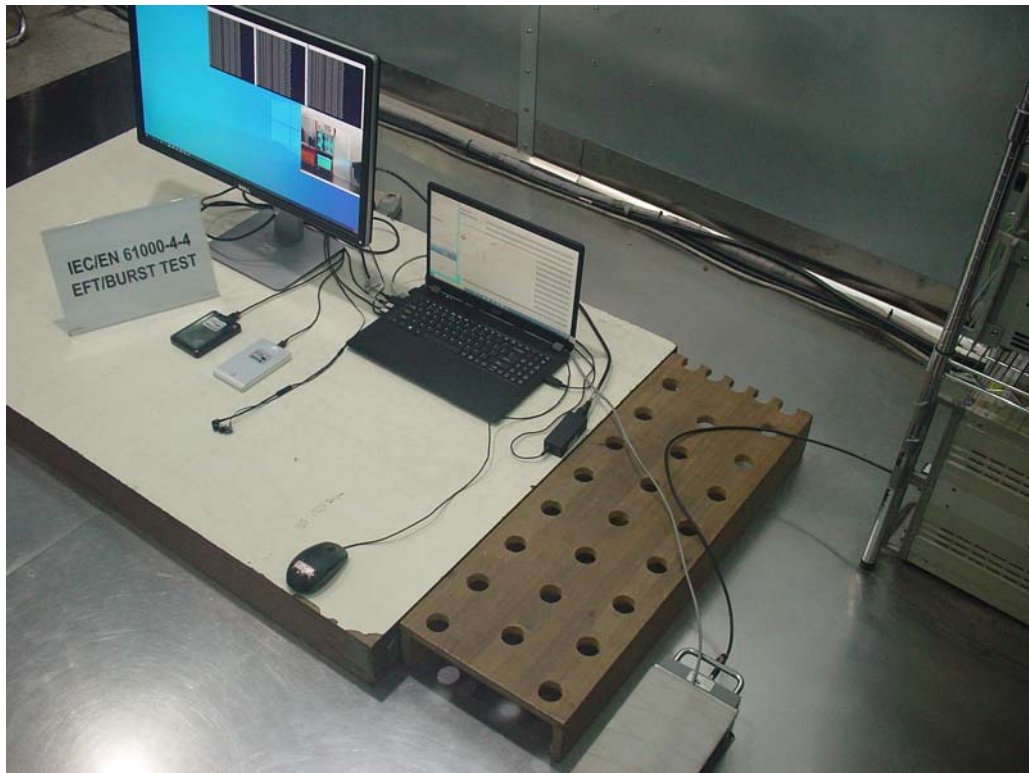
5. Radiated Electromagnetic Field (RS) Immunity Test



6. Electrical fast transient / burst (EFT) Immunity Test



Test for LAN port



7. Surge Immunity Test



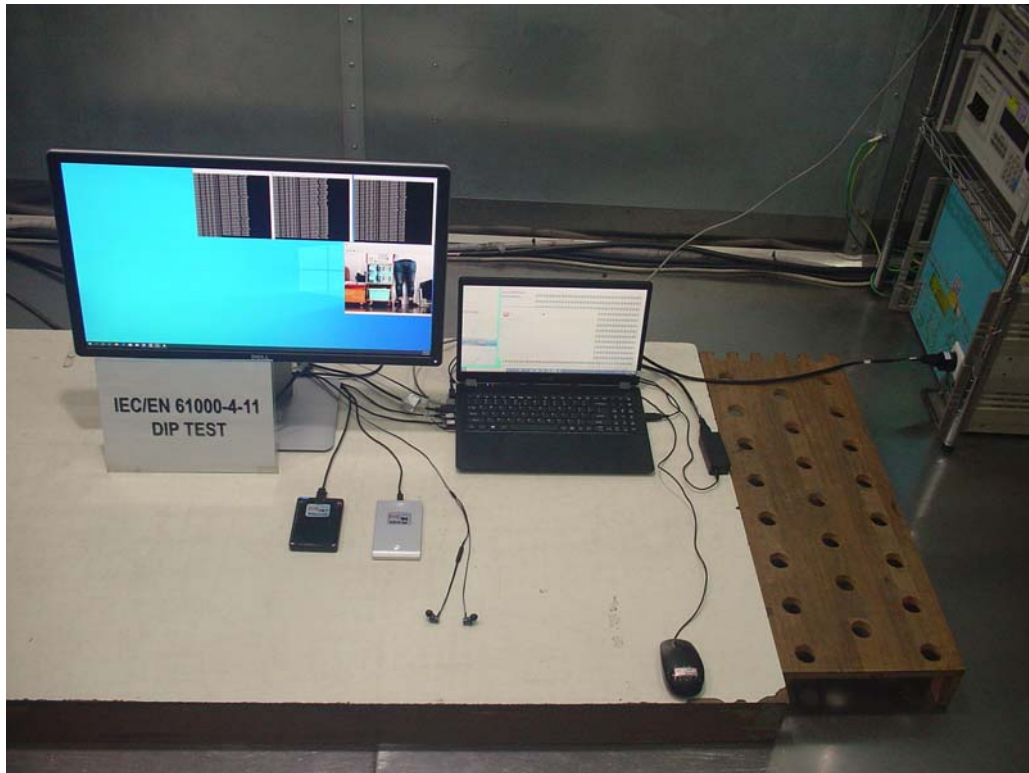
8. Conducted disturbances (CS) Immunity Test



Test for LAN port



9. Voltage dips, short interruptions Immunity Test



Attachment 2

Photographs of Production

(Adding Device Supplied by Customer)

MB
Compal / LA-J801

