

Verification of Compliance

Product Name : Notebook Computer
Brand Name : **acer**
Model Number : N22C6, HH5A4, A515-57, A515-57G, A515-57T, A515-57GT, S50-54, HH5J4, A315-59, A315-59G, HH5AB, A515-47, EX215-55, EX215-55G, IH5T4
N22C7, HH7A4, A517-53, A517-53G, HH7J4, A317-54, A317-54G
Applicant : Acer Incorporated
Address : 8F., No.88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C.)
Report Number : S2O-A170-2111-146
Issue Date : April 11, 2022
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 /
BS EN55032:2015+AC:2016-07
EN 61000-3-2:2014/ BS EN 61000-3-2:2014
EN 61000-3-3:2013/ BS EN 61000-3-3:2013
EN 61000-4-2:2009/ BS EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010/
BS EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012/ BS EN 61000-4-4:2012
EN 61000-4-5:2014/ BS EN 61000-4-5:2014
EN 61000-4-6:2014/ BS EN 61000-4-6:2014
EN 61000-4-11:2004/ BS EN 61000-4-11:2004
EN 55035:2017+A11:2020/ BS EN 55035:2017+A11:2020
AS/NZS CISPR32:2015 Class B



Based on the European Council Radio equipment Directive 2014/53/EU, EMC Directive 2014/30/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: April 11, 2022

TAF 0905

FCC CAB Code TW1104, TW0019

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ISED CAB Code TW0905

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

T-20009, G-10614

CE EMC Test Report

for

Notebook Computer

Trade Name : **acer**
Model No. : N22C6, HH5A4, A515-57, A515-57G,
A515-57T, A515-57GT, S50-54, HH5J4,
A315-59, A315-59G, HH5AB, A515-47,
EX215-55, EX215-55G, IH5T4
N22C7, HH7A4, A517-53, A517-53G,
HH7J4, A317-54, A317-54G
Report No. : S2O-A170-2111-146
Date of Receipt : March 7, 2022
Date of Report : April 11, 2022

Prepared for

Acer Incorporated

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

Prepared by



Central Research Technology Co.

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Verification of Compliance

Equipment Under Test : Notebook Computer
Model No. : N22C6, HH5A4, A515-57, A515-57G, A515-57T, A515-57GT, S50-54, HH5J4, A315-59, A315-59G, HH5AB, A515-47, EX215-55, EX215-55G, IH5T4, N22C7, HH7A4, A517-53, A517-53G, HH7J4, A317-54, A317-54G

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

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 /
BS EN 55032:2015+AC:2016-07
EN 61000-3-2:2014/ BS EN 61000-3-2:2014
EN 61000-3-3:2013/ BS EN 61000-3-3:2013
EN 61000-4-2:2009/ BS EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010/
BS EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012/ BS EN 61000-4-4:2012
EN 61000-4-5:2014/ BS EN 61000-4-5:2014
EN 61000-4-6:2014/ BS EN 61000-4-6:2014
EN 61000-4-11:2004/ BS EN 61000-4-11:2004
EN 55035:2017+A11:2020/ BS EN 55035:2017+A11:2020
AS/NZS CISPR32:2015 Class B

Date of Testing : March 10~17, 2022
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** : April 11, 2022
(Rosa Hsieh/System Executive)

APPROVED BY : Jim Chien , **DATE** : April 11, 2022
(Jim Chien/Technical Manager)

Contents

1. General Description.....	6
1.1 General Description of EUT	6
1.2 Test Mode	10
1.3 Applied standards	11
1.4 Description of Performance Criteria	13
1.5 Test Setup for the EUT	16
1.6 The Support Units	17
1.7 Layout of the Setup	19
1.8 Test Capability	27
2. Conducted Emission Measurement.....	29
2.1 Limits for Emission Measurement	29
2.2 Test Instruments	31
2.3 Test Procedures.....	33
2.4 Test Configurations.....	34
2.5 Photographs of the Test Configurations	34
2.6 Test Results	35
3. Radiated Emission Measurement	46
3.1 Limits for Emission Measurement	46
3.2 Test Instruments	49
3.3 Test Procedures.....	53
3.4 Test Configurations.....	55
3.5 Photographs of the Test Configurations	56
3.6 Test Results	57
4. Harmonic Current Emission Measurement.....	61
4.1 Limits for Emission Measurement	61
4.2 Test Instruments	62
4.3 Test Procedures.....	63
4.4 Test Configurations.....	64
4.5 Photographs of the Test Configurations	64
4.6 Test Results	65

5. Voltage Fluctuations and Flickers Emission Measurement.....	67
5.1 Limits for Emission Measurement	67
5.2 Test Instruments	67
5.3 Test Procedures.....	68
5.4 Test Configurations.....	69
5.5 Photographs of the Test Configurations	69
5.6 Test Results	70
6. Electrostatic Discharge (ESD) Immunity Test.....	71
6.1 Specifications of Immunity Test Requirement.....	71
6.2 Test Instruments	72
6.3 Test Procedures.....	73
6.4 Test Configurations.....	75
6.5 Photographs of the Test Configurations	75
6.6 Test Results	76
7. Radiated Electromagnetic Field (RS) Immunity Test.....	80
7.1 Specifications of Immunity Test Requirement.....	80
7.2 Test Instruments	82
7.3 Test Procedures.....	83
7.4 Test Configurations	84
7.5 Photographs of the Test Configurations	84
7.6 Test Results	85
8. Electrical fast transient / burst (EFT) Immunity Test.....	89
8.1 Specifications of Immunity Test Requirement.....	89
8.2 Test Instruments	90
8.3 Test Procedures.....	91
8.4 Test Configurations.....	92
8.5 Photographs of the Test Configurations	92
8.6 Test Results	93
9. Surge Immunity Test	94
9.1 Specifications of Immunity Test Requirement.....	94
9.2 Test Instruments	96
9.3 Test Procedures.....	97

9.4	Test Configurations	98
9.5	Photographs of the Test Configurations	98
9.6	Test Results	99
10.	Conducted disturbances (CS) Immunity Test	101
10.1	Specifications of Immunity Test Requirement	101
10.2	Test Instruments	103
10.3	Test Procedures	105
10.4	Test Configurations	106
10.5	Photographs of the Test Configurations	106
10.6	Test Results	107
11.	Voltage dips, short interruptions Immunity Test.....	110
11.1	Specifications of Immunity Test Requirement	110
11.2	Test Instruments	112
11.3	Test Procedures	113
11.4	Test Configurations	114
11.5	Photographs of the Test Configurations	114
11.6	Test Results	115

Attachment 1 – Photographs of the Test Configurations

Attachment 2 – Photographs of Production

1. General Description

This report is based on the report: S3O-A170-2111-146 of Central Research Technology Co. for adding model numbers HH5AB, A515-47, EX215-55, EX215-55G, IH5T4 and some components of Sample 1 (boldface marked in the components list) due to the requirements of marketing.

1.1 General Description of EUT

Equipment Under Test : Notebook Computer
Model No. : N22C6, HH5A4, A515-57, A515-57G, A515-57T, A515-57GT, S50-54, HH5J4, A315-59, A315-59G, HH5AB, A515-47, EX215-55, EX215-55G, IH5T4, N22C7, HH7A4, A517-53, A517-53G, HH7J4, A317-54, A317-54G

Power in : Supplied by the power adapter listed on page 9

Highest Operating Frequency: 2.7GHz from the test specification

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 the Sample 1 models: N22C6, HH5A4, A515-57, A515-57G, A515-57T, A515-57GT, S50-54, HH5J4, A315-59, A315-59G, HH5AB, A515-47, EX215-55, EX215-55G and IH5T4 are identical, they are for different market only.

The products of the Sample 2 models: N22C7, HH7A4, A517-53, A517-53G, HH7J4, A317-54 and A317-54G are identical, they are for different market only.

The Model No.: N22C6 (Sample 1) was designated by its manufacturer to perform all tests. It was taken as the representative condition for testing and its data are recorded in the present document.

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

Intel Type

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

AMD Type

No.	I/O Port Type	Quantity
1	USB 3.0 port	3
2	Type C 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-M214 (AMD)
		LA-M211 (Intel)
CPU	Intel	Product Description of Processor Manufacturer an Max Speed Up to and include 2.7GHz
	AMD	Product Description of Processor Manufacturer an Max Speed Up to and include 2.7GHz
LCD	CMI	N156HGA (FHD)
		N156HCA (FHD)
		N156HCN (FHD)
		N156BGA (HD)
	AUO	B156HTN06 (FHD)
		B156HAN02 (FHD)
	LG	LP156WFH (FHD)
	BOE	NT156FHM (FHD)
		NV156FHM (HD)
VGA	Nvidia	GN18-S5
		GN20-S7
		GN20-S5
Camera	Chicony	CNFLH3421004970LH
	TECH-FRONT	1YHVZZZ0008
MEMORY	Two DDR4 slots, total max capacity to 32G	
PCIE SSD	Max up to 2 pcs	
SATA HDD	Max up to 1 pcs	
Battery	PANASONIC	AP19B5L
		AP19B5K
	SIMPLO	AP18C7K
	COSMX	AP20CBL
	LG	AP19B8K
		AP18C8K
WLAN+BT Combo	INTEL	AX201NGW
		AX211NGW
		9560NGW

Components	Vendor	Description
WLAN+BT Combo	Mediatek	MT7921
		MT7922A22M
		MT7663
	Realtek	RTL8852BE
Adaptor	CHICONY	A18-045N2A
		A18-065N3A
	DELTA	ADP-45FE
		ADP-65DE
	LITE-ON	PA-1450-26
		PA-1650-50

1.2 Test Mode

Final Verification Mode assigned by the applicant from test specification

Test Description	Test Voltage	Test Item
External Monitor HDMI 3840*2160@60Hz + EUT panel 1920*1080@60Hz	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.

Test Mode 1	
Component	Description
MB	Compal / LA-M214
CPU	AMD / R75825U 2G
LCD	AUO / B156HAN02 (FHD)
Camera	Chicony / CNFLH3421004970LH
Memory(1)	DDR4 3200 16GB
Memory(2)	DDR4 3200 16GB
HDD	N/A
SSD(1)	Hynix / HFM512GD3JX016N
SSD(2)	N/A
Battery	LGC / AP18C8K
WLAN+BT Combo	FOXCONN / T99H315
Power Adapter	LITE-ON / PA-1650-50

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/ BS EN 55032:2015+AC:2016-07 Class B	Conducted Emission Measurement	<u>PASS</u>
		Radiated Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-3-2:2014/ BS EN 61000-3-2:2014	Harmonic Current Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-3-3:2013/ BS EN 61000-3-3:2013	Voltage Fluctuation and Flicker Emission Measurement	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-2:2009/ BS 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/ BS 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/ BS EN 61000-4-4:2012	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-5:2014/ BS EN 61000-4-5:2014	Surge immunity Test	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-6:2014/ BS EN 61000-4-6:2014	Immunity to conducted disturbances, induced by radio-frequency fields (CS)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-11:2004/ BS EN 61000-4-11:2004	Voltage dips, short interruptions Test	<u>PASS</u>

Applied Standards		Test Items	Results
<input checked="" type="checkbox"/> EN 55035:2017+ A11:2020/ BS EN 55035: 2017+A11:2020	<input checked="" type="checkbox"/> EN 61000-4-2:2009/ BS 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/ BS 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/ BS EN 61000-4-4:2012	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-5:2014/ BS EN 61000-4-5:2014	Surge immunity Test	<u>PASS</u>
	<input checked="" type="checkbox"/> EN 61000-4-6:2014/ BS 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/ BS 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/ BS EN 61000-4-11:2004	Voltage dips, short interruptions Test	<u>PASS</u>
<input checked="" type="checkbox"/> AS/NZS CISPR32:2015 Class B		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 55035

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).
<p>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.</p> <p>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.</p> <p>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.</p>		

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 V9.2) and execute it under the Windows environment.
- d. The EUT runs ITU color bar on the display device(s) continuously.
- e. The EUT sends audio signal to the audio device(s).
- f. The EUT sends the CCD receiving image to the display device(s) continuously.
- g. The EUT reads/ writes messages from/ to the internal & external storage device(s) continuously.
- h. Let the Wireless functions of EUT operating continuously.
- i. Another PC sends/receives messages to/from the EUT through a Hub and Wireless AP Router by executing the command of "PING".
- j. For Wifi function [EN 301 489-17]
 - j-1. Via wireless access point, EUT transmits/receives messages to/from another PC.
 - j-2. Monitor the status of connection by seeing the window of another PC.
- k. 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/ CN-0KDCJF-QDC00- 76T-121L-A00	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 201912-1	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	✓	
		SRD00F1/ NA9EN6PZ	DoC	Seagate	N/A	✓	
5	Type C HDD	Neutrino U3.1/ SK21D1621D00H4	DoC	AKiTio	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/ 9M159C2	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	HSEJ03JY/ 202010-5	DoC	xiaomi.tw	N/A	✓	
3	USB 3.0 HDD	Canvio Basics/ 79V3TOELTHJG	DoC	TOSHIBA	N/A	✓	
		Canvio Basics/ 88GSSF27SHJG	DoC	TOSHIBA	N/A	✓	
		Canvio Basics/ 88FTSFQDSHJG	DoC	TOSHIBA	N/A	✓	
4	Type C HDD	Neutrino U3.1/ SK21D2027D0035	DoC	AKiTio	N/A	✓	

ESD Test

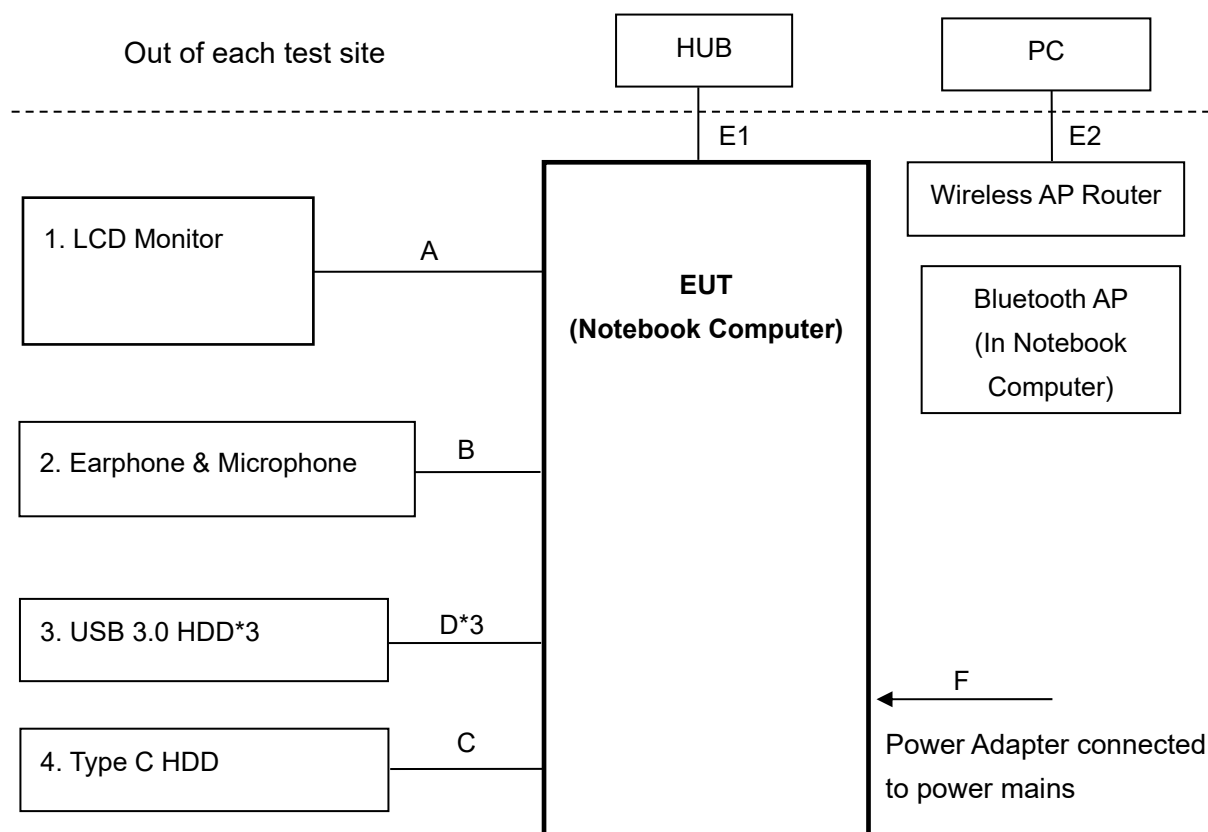
No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	P2715Q/ CN-0NTMTN-74445- 6CA-ABVL	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 201912-4	DoC	xiaomi.tw	N/A	✓	
3	USB Mouse	MO56UC/ 516011428	DoC	DELL	N/A	✓	
4	USB 3.0 HDD	Canvio Basics/ 20M4T0OMTRNG	DoC	TOSHIBA	N/A	✓	
		Canvio Basics/ 20M3T0QETRNG	DoC	TOSHIBA	N/A	✓	
5	Type C HDD	Neutrino U3.1/ SK21D2027D002K	DoC	AKiTio	N/A	✓	

Other Tests

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.	Note
1	LCD Monitor	U2718Q/ CN-0M5R5F-QDC00- 9CL-0D1L-A10	DoC	DELL	1.8m	✓	
2	Earphone & Microphone	ZBW4354TY/ 20170210	DoC	xiaomi.tw	N/A	✓	
3	USB Mouse	M056U0A/ F0L0226E	DoC	DELL	N/A	✓	
4	USB 3.0 HDD	HD-PCTU3/ 85295434302634	DoC	Buffalo	N/A	✓	
		HD-PCTU3/ 85295534404825	DoC	Buffalo	N/A	✓	
5	Type C HDD	Neutrino U3.1/ SK21D1718X008E	DoC	AKiTio	N/A	✓	

1.7 Layout of the Setup

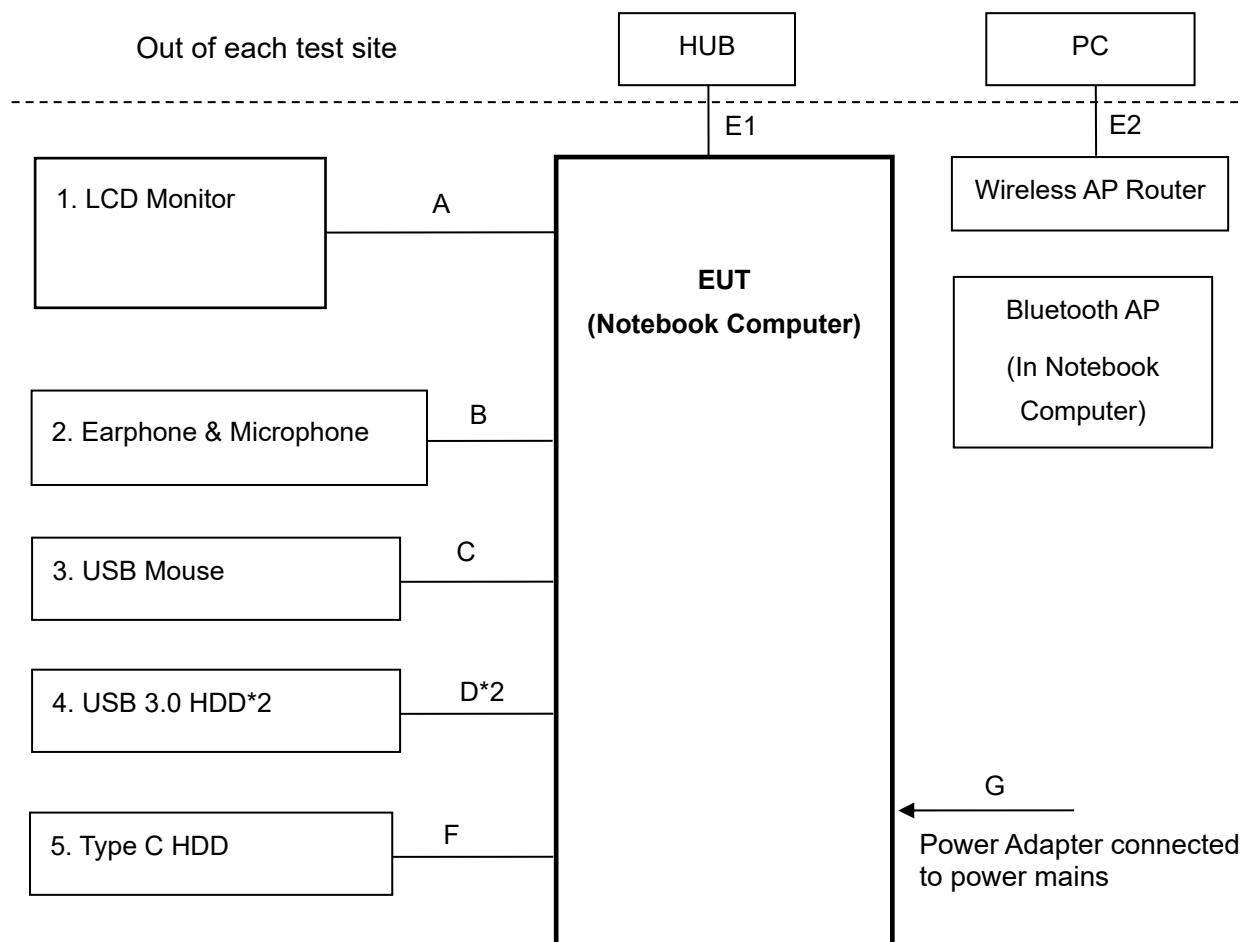
Radiated Emission Test



Connecting Cables:

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.8m	✓			✓	Model Name: JS41-14050
B	Earphone & Microphone Cable	Earphone & Microphone to EUT Audio/ Mic. port	1.2m	✓			✓	
C	Type-C cable	Type C HDD to EUT Type C port	1.0m	✓			✓	Model Name: C8F1M3 A01BE1 M0
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.	2.0m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	2.0m				✓	Cat.5e
F	Power cable	Power Adapter to EUT DC port	1.8m		1			

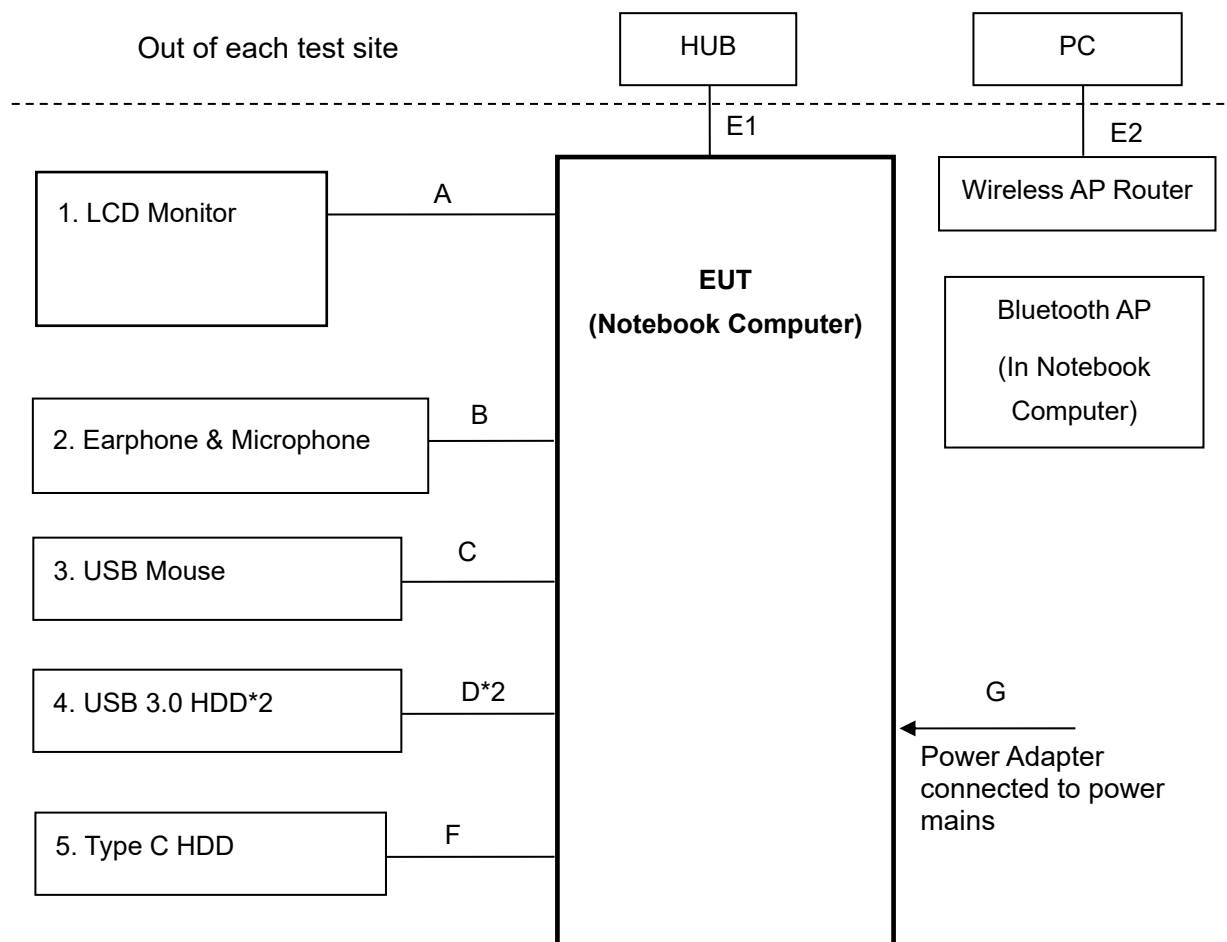
Conducted Emission Test



Connecting Cables:

No.	Cable	Path	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	HDMI Cable	Monitor to EUT HDMI port.	1.8m	✓			✓	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 3.0 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.	2.0m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	2.0m				✓	Cat.5e
F	Type-C cable	Type C HDD to EUT Type C port	1.0m	✓			✓	Model Name: C8F1M3 A01BE1 M0
G	Power cable	Power Adapter to EUT DC port	1.8m		1			

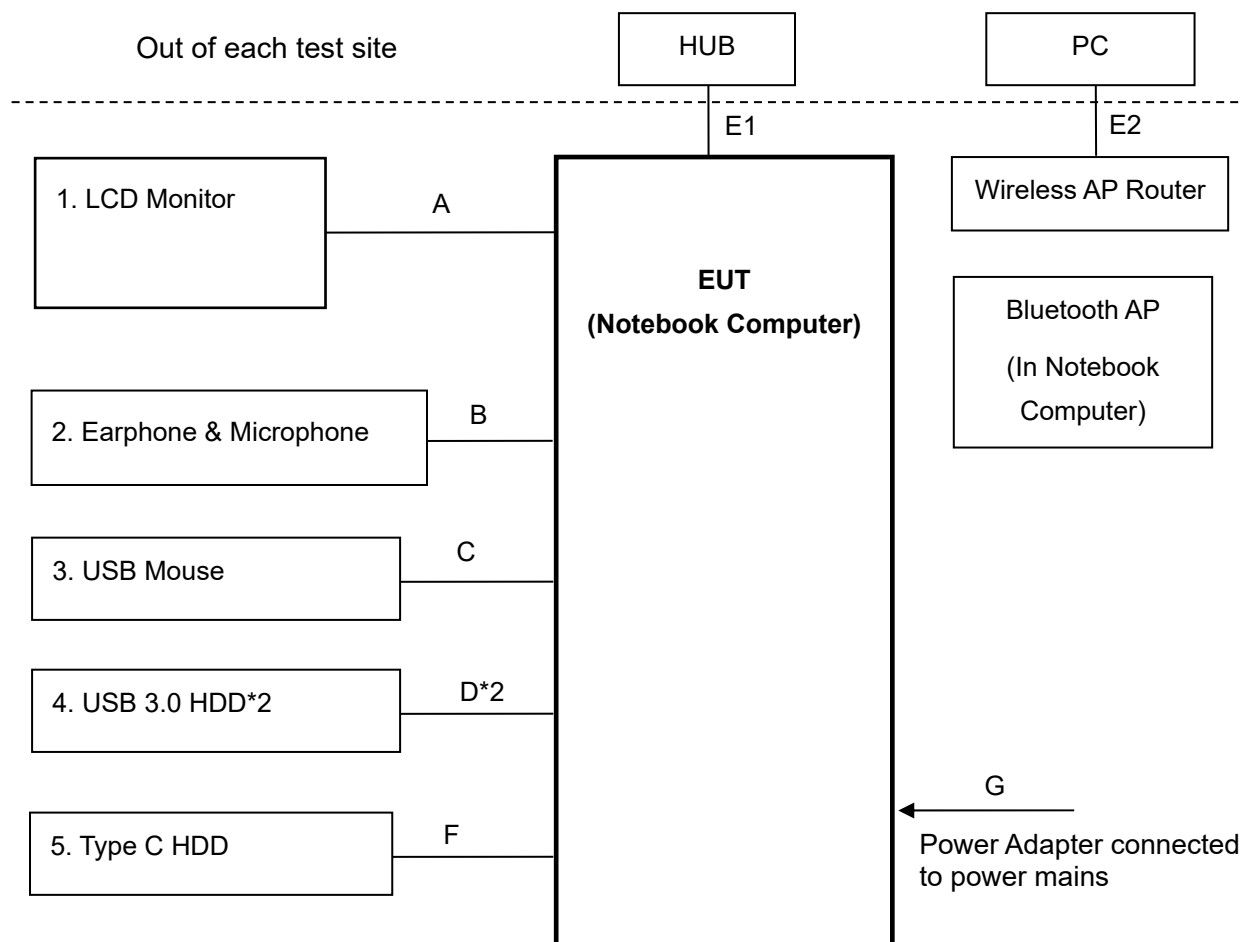
ESD Test



Connecting Cables:

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 3.0 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	Type-C cable	Type C HDD to EUT Type C port	1.0m	✓			✓	Model Name: C8F1M3 A01BE1 M0
G	Power cable	Power Adapter to EUT DC port	1.8m		1			

Other Tests



Connecting Cables:

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 3.0 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.	2.0m				✓	Cat.5e
E2		Wireless AP Router to PC LAN port.	2.0m				✓	Cat.5e
F	Type-C cable	Type C HDD to EUT Type C port	1.0m	✓			✓	Model Name: C8F1M3 A01BE1 M0
G	Power cable	Power Adapter to EUT DC port	1.8m		1			

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	ISED	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*

*: According to test specification of customer, the criteria is 2dB under the required limit of standard.

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 21, 2021	April 21, 2022
LISN	SchwarzBeck	NSLK-8128-RC/ 8128-383	July 7, 2021	July 7, 2022
2 nd LISN	R&S	ENV4200/ 833209/010	May 5, 2021	May 5, 2022
ISN	FCC	<input type="checkbox"/> FCC-TLISN-T2- 02/20269	Aug. 15, 2021	Aug. 15, 2022
	TESEQ	<input checked="" type="checkbox"/> ISN T400A/ 28575	Aug. 15, 2021	Aug. 15, 2022
		<input checked="" type="checkbox"/> ISN T800/ 36191	Aug. 16, 2021	Aug. 16, 2022
50Ω terminator	SUHNER	65 BNC-50-0-1/133 NE/005	June 1, 2021	June 1, 2022
RF Switch	R&S	RSU28/ 338965/002	Nov. 12, 2021	May 12, 2022
RF Cable	N/A	N/A/ C0052 ~ 56	Nov. 12, 2021	May 12, 2022
Test Software	Audix	e3/ V6.110303a2	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

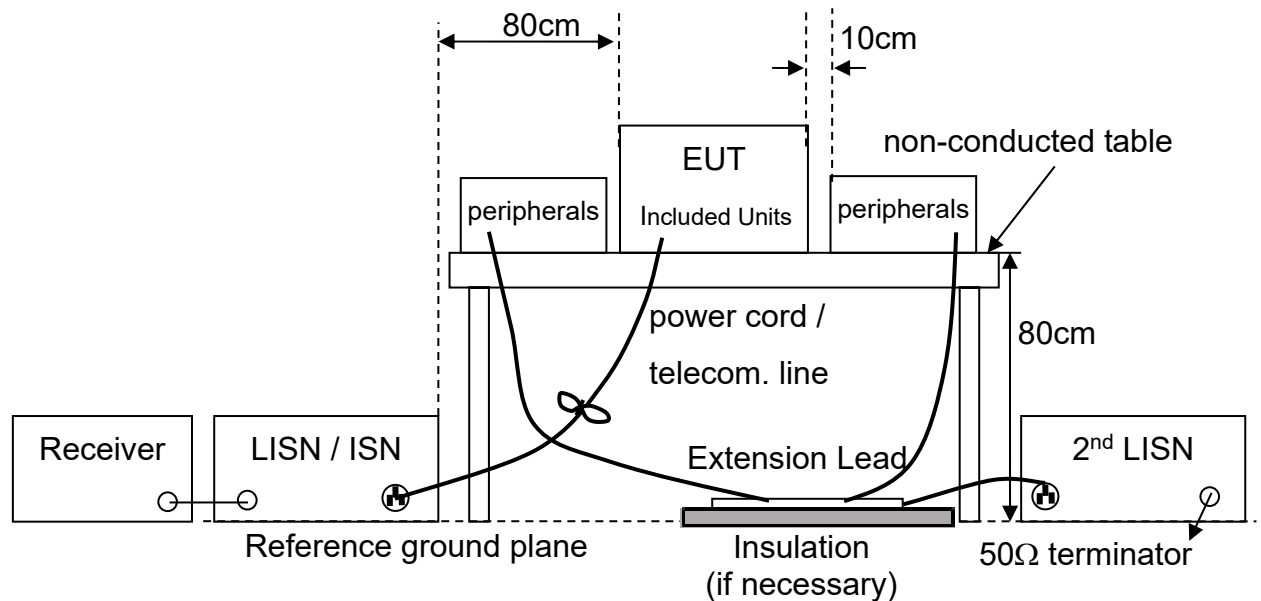
The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{CISPR} in table 1 of CISPR 16-4-2 and the compliance is deemed to occur if no measured disturbance level exceeds the disturbance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

Test Item	Uncertainty Value
Conducted emissions using a LISN : NSLK-8128-RC	2.92dB
Conducted emissions using a LISN :ENV 4200	2.90dB
Conducted emissions using a ISN : FCC-TLISN-T2-02	2.88dB
Conducted emissions using a ISN : ISN T400A	2.92dB
Conducted emissions using a ISN : ISN T800	3.24dB

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

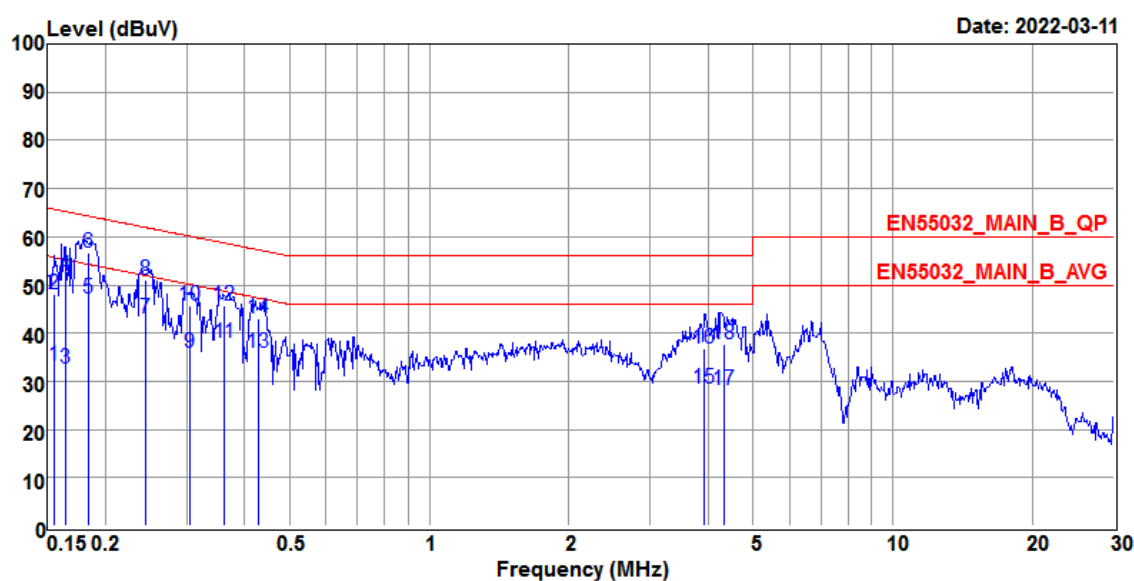


2.5 Photographs of the Test Configurations

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 : Der-Jan Ken Temperature : 24°C
Humidity : 56%RH Frequency Range : 150kHz~30MHz
IF Bandwidth : 9kHz Phase : Line



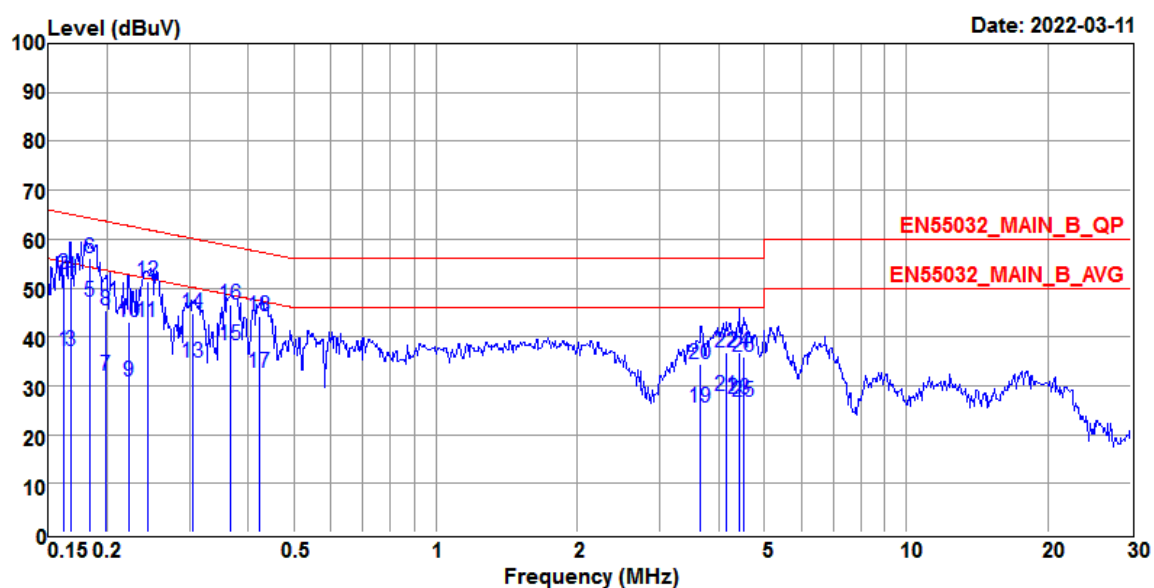
Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO LINE
Power : 50Hz/230V
Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.155	33.12	23.10	10.02	55.74	-22.62	LINE	Average
2	0.155	47.95	37.93	10.02	65.74	-17.79	LINE	QP
3	0.164	32.57	22.55	10.02	55.25	-22.68	LINE	Average
4	0.164	51.84	41.82	10.02	65.25	-13.41	LINE	QP
5	0.184	47.31	37.30	10.01	54.28	-6.97	LINE	Average
6	0.184	56.71	46.70	10.01	64.28	-7.57	LINE	QP
7	0.244	43.15	33.14	10.01	51.95	-8.80	LINE	Average
8	0.244	50.91	40.90	10.01	61.95	-11.04	LINE	QP
9	0.305	36.02	26.01	10.01	50.10	-14.08	LINE	Average
10	0.305	45.69	35.68	10.01	60.10	-14.41	LINE	QP
11	0.361	38.07	28.06	10.01	48.69	-10.62	LINE	Average
12	0.361	45.76	35.75	10.01	58.69	-12.93	LINE	QP
13	0.428	36.06	26.05	10.01	47.29	-11.23	LINE	Average
14	0.428	43.15	33.14	10.01	57.29	-14.14	LINE	QP
15	3.922	28.62	18.44	10.18	46.00	-17.38	LINE	Average
16	3.922	36.90	26.72	10.18	56.00	-19.10	LINE	QP
17	4.338	28.23	18.03	10.20	46.00	-17.77	LINE	Average
18	4.338	37.67	27.47	10.20	56.00	-18.33	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.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Der-Jan Ken Temperature : 24°C
Humidity : 56%RH Frequency Range : 150kHz~30MHz
IF Bandwidth : 9kHz Phase : Neutral



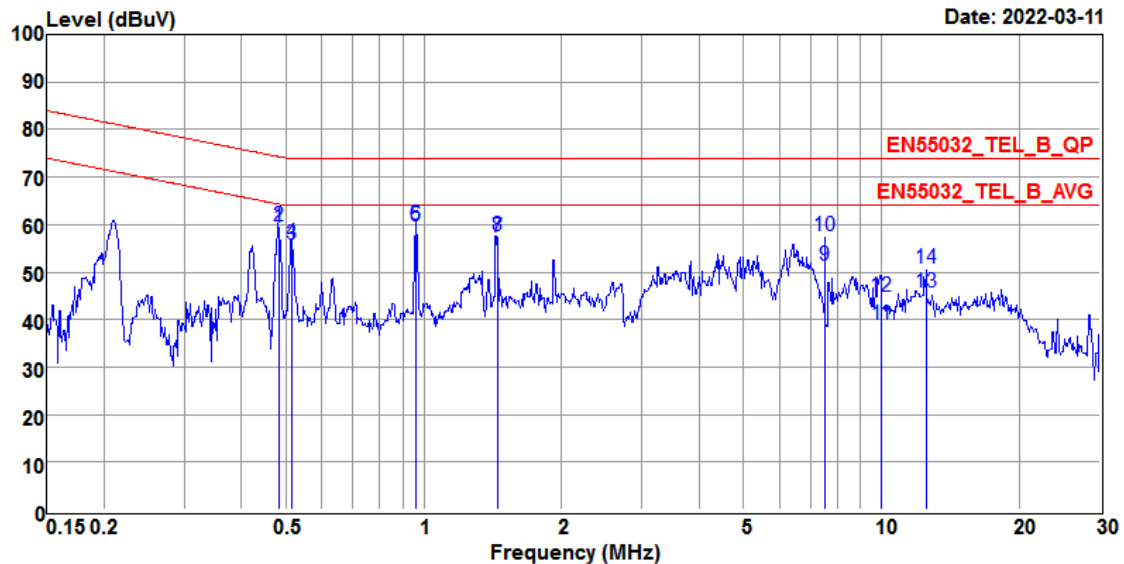
Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO NEUTRAL
Power : 50Hz/230V
Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.162	36.96	26.98	9.98	55.34	-18.38	NEUTRAL	Average
2	0.162	52.89	42.91	9.98	65.34	-12.45	NEUTRAL	QP
3	0.168	37.10	27.12	9.98	55.08	-17.98	NEUTRAL	Average
4	0.168	52.31	42.33	9.98	65.08	-12.77	NEUTRAL	QP
5	0.184	47.12	37.14	9.98	54.28	-7.16	NEUTRAL	Average
6	0.184	56.07	46.09	9.98	64.28	-8.21	NEUTRAL	QP
7	0.200	31.96	21.98	9.98	53.62	-21.66	NEUTRAL	Average
8	0.200	45.45	35.47	9.98	63.62	-18.17	NEUTRAL	QP
9	0.223	30.97	20.99	9.98	52.70	-21.73	NEUTRAL	Average
10	0.223	43.18	33.20	9.98	62.70	-19.52	NEUTRAL	QP
11	0.244	42.95	32.97	9.98	51.95	-9.00	NEUTRAL	Average
12	0.244	51.25	41.27	9.98	61.95	-10.70	NEUTRAL	QP
13	0.305	34.70	24.72	9.98	50.10	-15.40	NEUTRAL	Average
14	0.305	44.88	34.90	9.98	60.10	-15.22	NEUTRAL	QP
15	0.365	38.26	28.28	9.98	48.61	-10.35	NEUTRAL	Average
16	0.365	46.49	36.51	9.98	58.61	-12.12	NEUTRAL	QP
17	0.421	32.54	22.56	9.98	47.42	-14.88	NEUTRAL	Average
18	0.421	44.18	34.20	9.98	57.42	-13.24	NEUTRAL	QP
19	3.661	25.68	15.55	10.13	46.00	-20.32	NEUTRAL	Average
20	3.661	34.50	24.37	10.13	56.00	-21.50	NEUTRAL	QP
21	4.136	27.79	17.65	10.14	46.00	-18.21	NEUTRAL	Average
22	4.136	36.84	26.70	10.14	56.00	-19.16	NEUTRAL	QP
23	4.430	27.39	17.23	10.16	46.00	-18.61	NEUTRAL	Average
24	4.430	36.93	26.77	10.16	56.00	-19.07	NEUTRAL	QP
25	4.525	26.70	16.54	10.16	46.00	-19.30	NEUTRAL	Average
26	4.525	35.96	25.80	10.16	56.00	-20.04	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.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Der-Jan Ken **Temperature** : 24°C
Humidity : 56%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN for 10Mbps



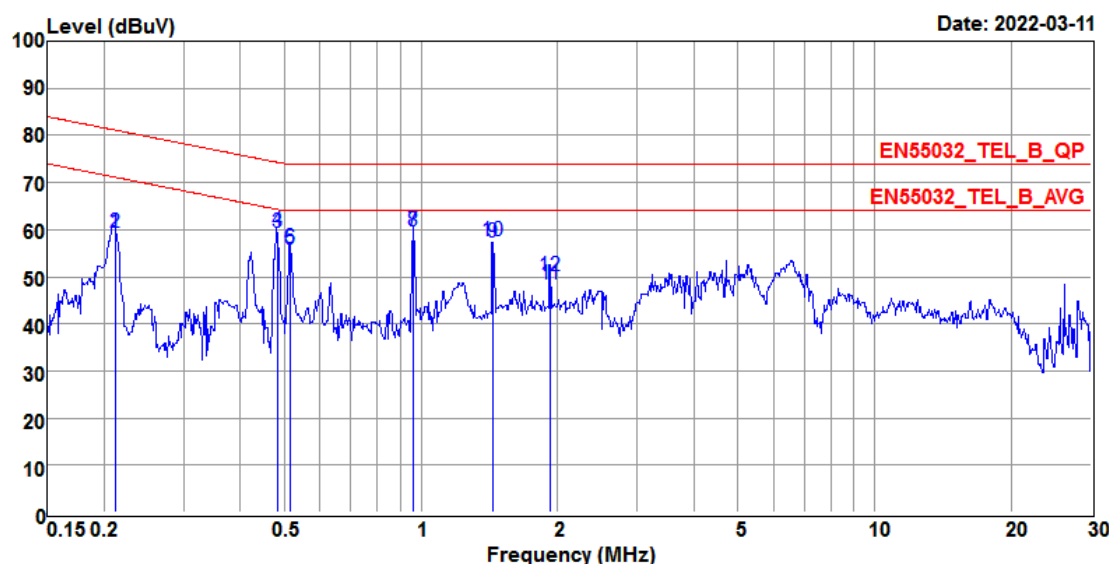
Site : TR5 Conduction Emission Chamber
 Condition : EN55032_TEL_B_QP ISN_T400A_CAT5-LAN LINE
 Power : 50Hz/230V
 Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.482	59.44	49.67	9.77	64.30	-4.86	LINE	Average
2	0.482	59.63	49.86	9.77	74.30	-14.67	LINE	QP
3	0.515	55.69	45.94	9.75	64.00	-8.31	LINE	Average
4	0.515	56.09	46.34	9.75	74.00	-17.91	LINE	QP
5	0.965	59.60	49.93	9.67	64.00	-4.40	LINE	Average
6	0.965	59.83	50.16	9.67	74.00	-14.17	LINE	QP
7	1.447	57.14	47.50	9.64	64.00	-6.86	LINE	Average
8	1.447	57.54	47.90	9.64	74.00	-16.46	LINE	QP
9	7.500	51.39	41.75	9.64	64.00	-12.61	LINE	Average
10	7.500	57.72	48.08	9.64	74.00	-16.28	LINE	QP
11	10.000	38.83	29.18	9.65	64.00	-25.17	LINE	Average
12	10.000	44.72	35.07	9.65	74.00	-29.28	LINE	QP
13	12.500	45.85	36.17	9.68	64.00	-18.15	LINE	Average
14	12.500	50.85	41.17	9.68	74.00	-23.15	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.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Der-Jan Ken Temperature : 24°C
Humidity : 56%RH Frequency Range : 150kHz~30MHz
IF Bandwidth : 9kHz Phase : LAN for 100Mbps



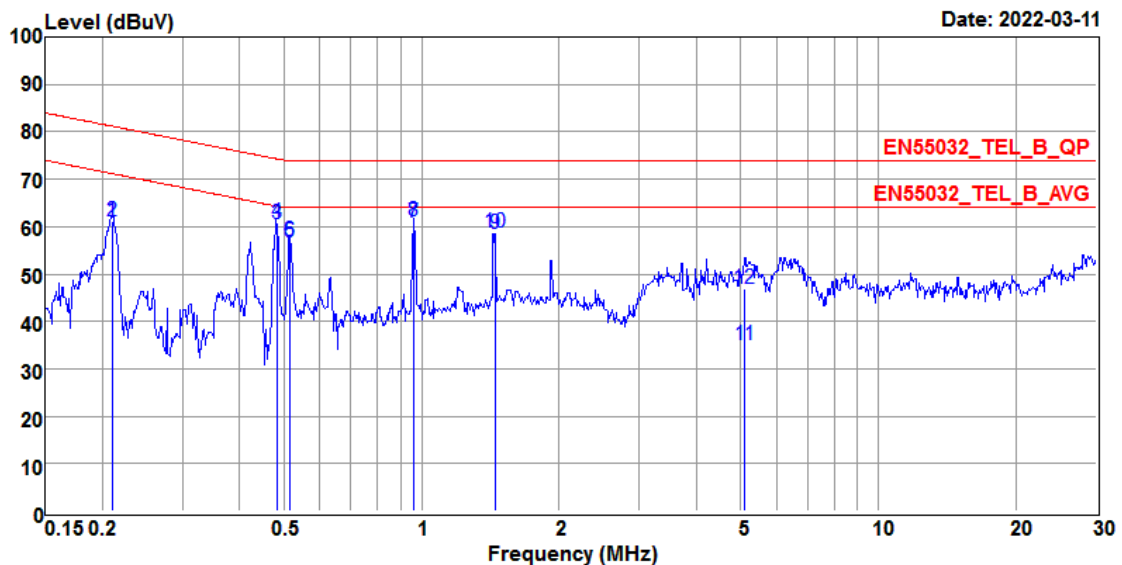
Site : TR5 Conduction Emission Chamber
Condition : EN55032_TEL_B_QP ISN_T400A_CAT5-LAN LINE
Power : 50Hz/230V
Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.212	59.24	49.26	9.98	71.11	-11.87	LINE	Average
2	0.212	59.27	49.29	9.98	81.11	-21.84	LINE	QP
3	0.482	59.41	49.64	9.77	64.31	-4.90	LINE	Average
4	0.482	59.58	49.81	9.77	74.31	-14.73	LINE	QP
5	0.516	55.72	45.97	9.75	64.00	-8.28	LINE	Average
6	0.516	56.01	46.26	9.75	74.00	-17.99	LINE	QP
7	0.964	59.53	49.86	9.67	64.00	-4.47	LINE	Average
8	0.964	59.74	50.07	9.67	74.00	-14.26	LINE	QP
9	1.446	57.17	47.53	9.64	64.00	-6.83	LINE	Average
10	1.446	57.49	47.85	9.64	74.00	-16.51	LINE	QP
11	1.928	48.32	38.70	9.62	64.00	-15.68	LINE	Average
12	1.928	50.03	40.41	9.62	74.00	-23.97	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.

Test Mode : Mode 1
Test Voltage : 230Vac/50Hz to the power adapter
Tester : Der-Jan Ken **Temperature** : 24°C
Humidity : 56%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : LAN for 1Gbps



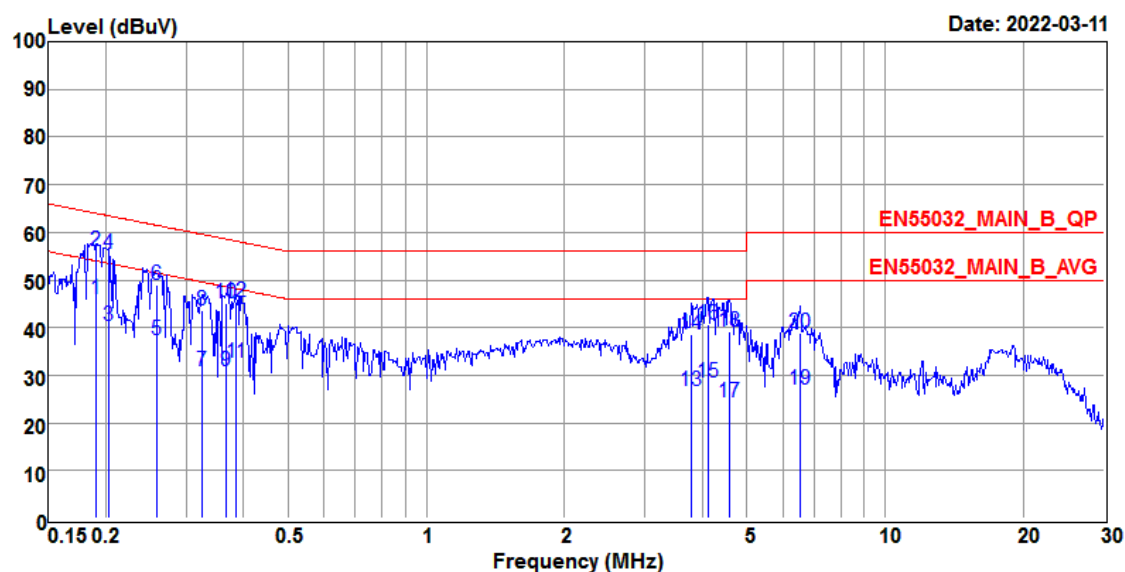
Site : TR5 Conduction Emission Chamber
 Condition : EN55032_TEL_B_QP ISN_T800_CAT5-LAN LINE
 Power : 50Hz/230V
 Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.211	61.03	50.88	10.15	71.18	-10.15	LINE	Average
2	0.211	61.09	50.94	10.15	81.18	-20.09	LINE	QP
3	0.482	60.61	50.66	9.95	64.31	-3.70	LINE	Average
4	0.482	60.77	50.82	9.95	74.31	-13.54	LINE	QP
5	0.516	56.78	46.85	9.93	64.00	-7.22	LINE	Average
6	0.516	57.07	47.14	9.93	74.00	-16.93	LINE	QP
7	0.964	60.85	50.99	9.86	64.00	-3.15	LINE	Average
8	0.964	61.07	51.21	9.86	74.00	-12.93	LINE	QP
9	1.446	58.47	48.64	9.83	64.00	-5.53	LINE	Average
10	1.446	58.79	48.96	9.83	74.00	-15.21	LINE	QP
11	5.099	35.01	25.20	9.81	64.00	-28.99	LINE	Average
12	5.099	46.95	37.14	9.81	74.00	-27.05	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.

Test Mode : Mode 1
Test Voltage : 120Vac/60Hz to the power adapter
Tester : Der-Jan Ken Temperature : 24°C
Humidity : 56%RH Frequency Range : 150kHz~30MHz
IF Bandwidth : 9kHz Phase : Line



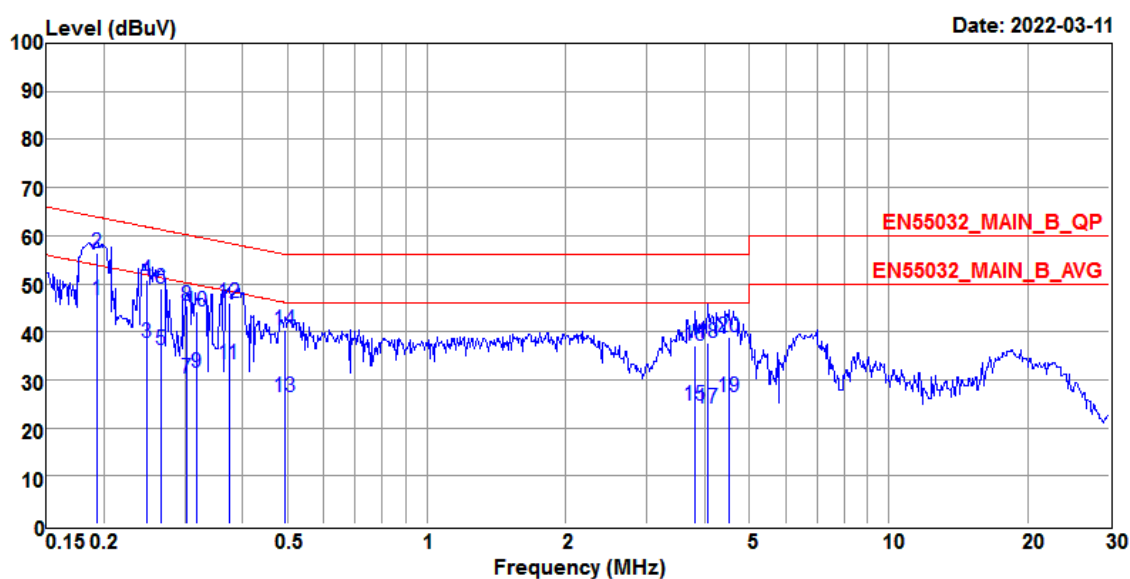
Site : TR5 Conduction Emission Chamber
Condition : EN55032_MAIN_B_QP NSLK_8128RC_WO LINE
Power : 60Hz/120V
Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.191	46.03	36.02	10.01	53.98	-7.95	LINE	Average
2	0.191	56.22	46.21	10.01	63.98	-7.76	LINE	QP
3	0.203	40.44	30.43	10.01	53.49	-13.05	LINE	Average
4	0.203	55.44	45.43	10.01	63.49	-8.05	LINE	QP
5	0.259	37.47	27.46	10.01	51.47	-14.00	LINE	Average
6	0.259	48.99	38.98	10.01	61.47	-12.48	LINE	QP
7	0.325	30.75	20.74	10.01	49.57	-18.82	LINE	Average
8	0.325	43.72	33.71	10.01	59.57	-15.85	LINE	QP
9	0.365	30.77	20.76	10.01	48.61	-17.84	LINE	Average
10	0.365	44.97	34.96	10.01	58.61	-13.64	LINE	QP
11	0.385	32.53	22.52	10.01	48.17	-15.64	LINE	Average
12	0.385	45.31	35.30	10.01	58.17	-12.86	LINE	QP
13	3.779	26.78	16.60	10.18	46.00	-19.22	LINE	Average
14	3.779	38.55	28.37	10.18	56.00	-17.45	LINE	QP
15	4.114	28.55	18.37	10.18	46.00	-17.45	LINE	Average
16	4.114	40.77	30.59	10.18	56.00	-15.23	LINE	QP
17	4.574	24.26	14.06	10.20	46.00	-21.74	LINE	Average
18	4.574	39.19	28.99	10.20	56.00	-16.81	LINE	QP
19	6.523	27.08	16.80	10.28	50.00	-22.92	LINE	Average
20	6.523	38.77	28.49	10.28	60.00	-21.23	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.

Test Mode : Mode 1
Test Voltage : 120Vac/60Hz to the power adapter
Tester : Der-Jan Ken Temperature : 24°C
Humidity : 56%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 : 60Hz/120V
Operator : DER-JAN KEN T24/H56/P1016

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB		
1	0.193	46.53	36.55	9.98	53.89	-7.36	NEUTRAL	Average
2	0.193	56.48	46.50	9.98	63.89	-7.41	NEUTRAL	QP
3	0.248	37.75	27.77	9.98	51.82	-14.07	NEUTRAL	Average
4	0.248	50.64	40.66	9.98	61.82	-11.18	NEUTRAL	QP
5	0.266	36.18	26.20	9.98	51.25	-15.07	NEUTRAL	Average
6	0.266	48.83	38.85	9.98	61.25	-12.42	NEUTRAL	QP
7	0.303	30.30	20.32	9.98	50.15	-19.85	NEUTRAL	Average
8	0.303	45.30	35.32	9.98	60.15	-14.85	NEUTRAL	QP
9	0.318	31.52	21.54	9.98	49.75	-18.23	NEUTRAL	Average
10	0.318	44.12	34.14	9.98	59.75	-15.63	NEUTRAL	QP
11	0.373	33.27	23.29	9.98	48.43	-15.16	NEUTRAL	Average
12	0.373	46.10	36.12	9.98	58.43	-12.33	NEUTRAL	QP
13	0.494	26.40	16.43	9.97	46.10	-19.70	NEUTRAL	Average
14	0.494	40.39	30.42	9.97	56.10	-15.71	NEUTRAL	QP
15	3.820	24.65	14.51	10.14	46.00	-21.35	NEUTRAL	Average
16	3.820	37.23	27.09	10.14	56.00	-18.77	NEUTRAL	QP
17	4.070	24.13	13.99	10.14	46.00	-21.87	NEUTRAL	Average
18	4.070	37.75	27.61	10.14	56.00	-18.25	NEUTRAL	QP
19	4.501	26.50	16.34	10.16	46.00	-19.50	NEUTRAL	Average
20	4.501	38.82	28.66	10.16	56.00	-17.18	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.

3. Radiated Emission Measurement

Test Result: PASS*

*: According to test specification of customer, the criteria is 2dB under the required limit of standard.

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 (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)	Used in industrial environment or telecom. center		Normal Used	
	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.

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 8, 2021	July 8, 2022
Bilog Antenna with 5 dB Attenuator	SCHWARZBEC K & Mini-Circuits	VULB 9168 & BW-N5W5+ / VULB 9168-618 & 001	June 3, 2021	June 3, 2022
Bilog Antenna with 5 dB Attenuator	SCHWARZBEC K & JYEBAO	VULB 9168 & FAT-NM5NF5T10G2W5/ VULB 9168-01007 & 002	Aug. 31, 2021	Aug. 31, 2022
Pre-Amplifier	EMCI	EMC9135/ 980630	Nov. 13, 2021	May 13, 2022
Pre-Amplifier	EMCI	EMC9135/ 980550	Nov. 13, 2021	May 13, 2022
Spectrum Analyzer	R&S	FSP 7/ 100106	Mar. 24, 2021	Mar. 24, 2022
Spectrum Analyzer	R&S	FSP 7/ 100384	Feb. 18, 2022	Feb. 18, 2023
RF Cable	JYEBAO	0214/ C0058 + C0049 + C0049-2 + RSU + C0050-3	Nov. 13, 2021	May 13, 2022
RF Cable	JYEBAO	0214/ C0059 + C0050 + C0050-2 + RSU + C0050-3	Nov. 13, 2021	May 13, 2022
Test Software	Audix	e3/ V6.110303a2	NCR	NCR
TR1 Semi - anechoic Chamber	ETS. LINDGREN	TR1/ 17627-B	Jan. 29, 2022	Jan. 29, 2023

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. 9, 2021	Nov. 9, 2022
ANTENNA MAST	MF	MFA-560BSN/ 1308728	NCR	NCR
Pre-Amplifier	MITEQ	TTA1800-30-HG-N-M/ 1904295	Oct. 28, 2021	Oct. 28, 2022
RF Cable	Suhner	Sucoflex 106P / C0091	Oct. 4, 2021	Oct. 4, 2022
MXA Signal Analyzer	KeySight	N9020A/ MY54420147	July 5, 2021	July 5, 2022
Test Software	Audix	e3/ V9 20150907c	NCR	NCR
TR1 Semi- anechoic chamber with absorber	ETS. LINDGREN	TR1/ 17627-B	Jan. 30, 2022	Jan. 30, 2023

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 $U_{cisp\text{r}}$ 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 ~ 1000MHz
TR1(10m)	Horizontal	5.08dB
	Vertical	5.14dB

Test Site (Measuring distance)	Polarization	Frequency Range
		1GHz ~ 6GHz
TR1(3m)	Horizontal	4.62dB
	Vertical	4.48dB
TR300(3m)	Horizontal	4.94dB
	Vertical	4.88dB

3.3 Test Procedures

Below 1GHz measurement

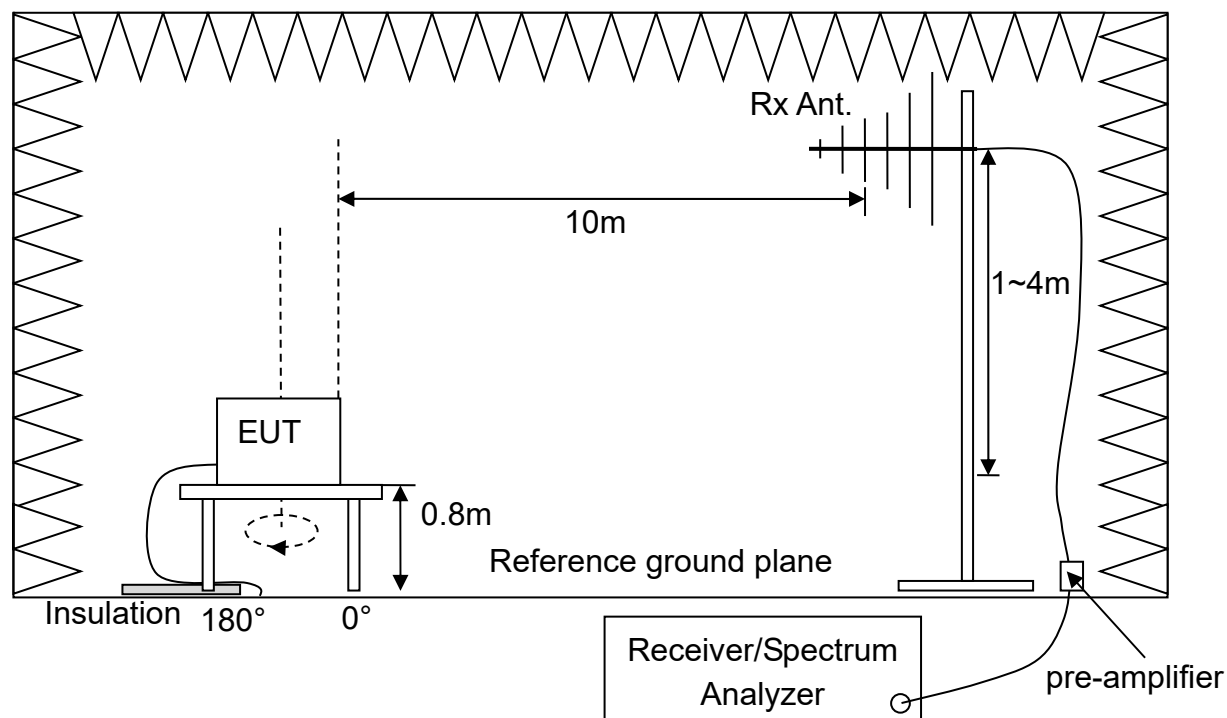
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 10 meters away from 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

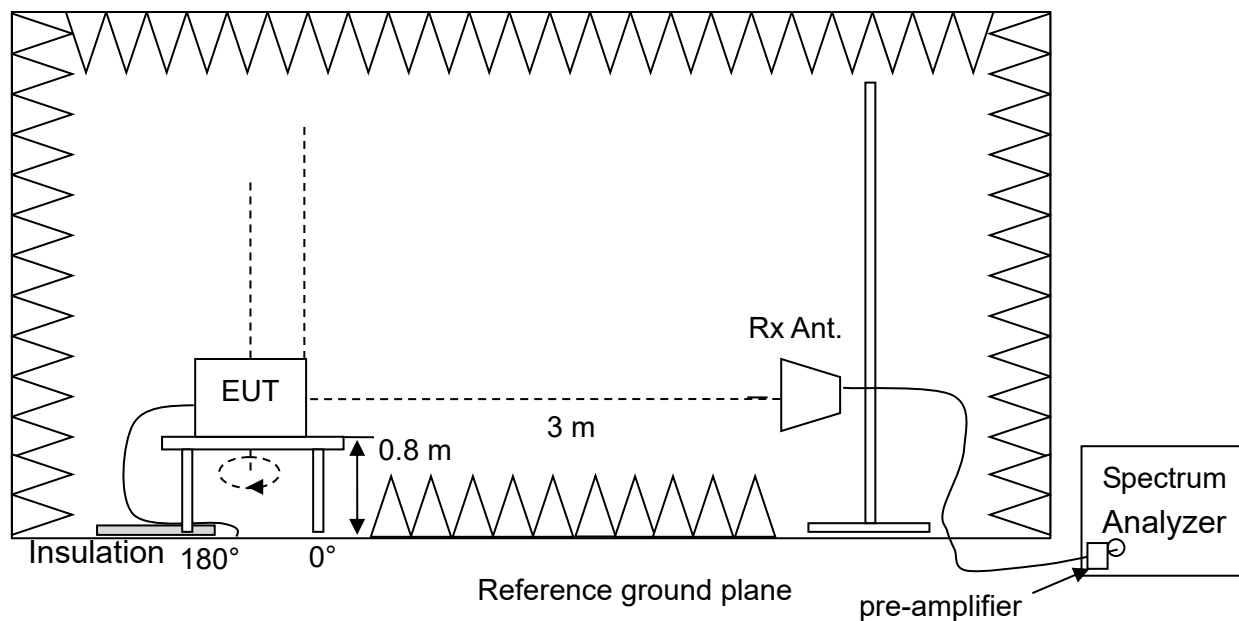
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it should be placed on a non-conducted table with a height of 0.8 meters above the reference ground plane and 3 meters 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



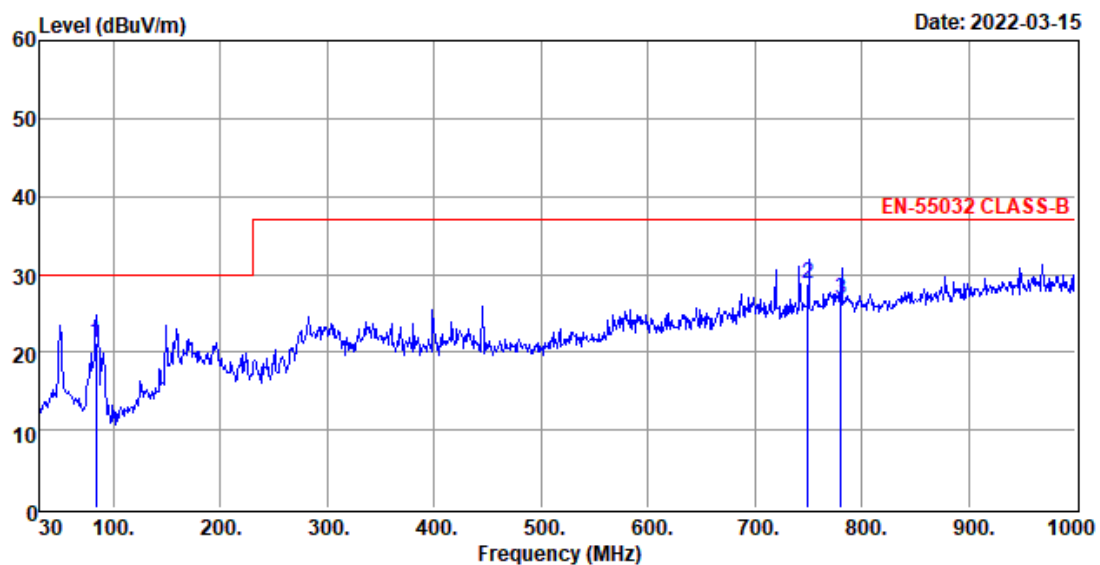
3.5 Photographs of the Test Configurations

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 : Jack Temperature : 22°C
Humidity : 55%RH Frequency Range : 30MHz~1GHz
IF Bandwidth : 120kHz Polarization : Horizontal



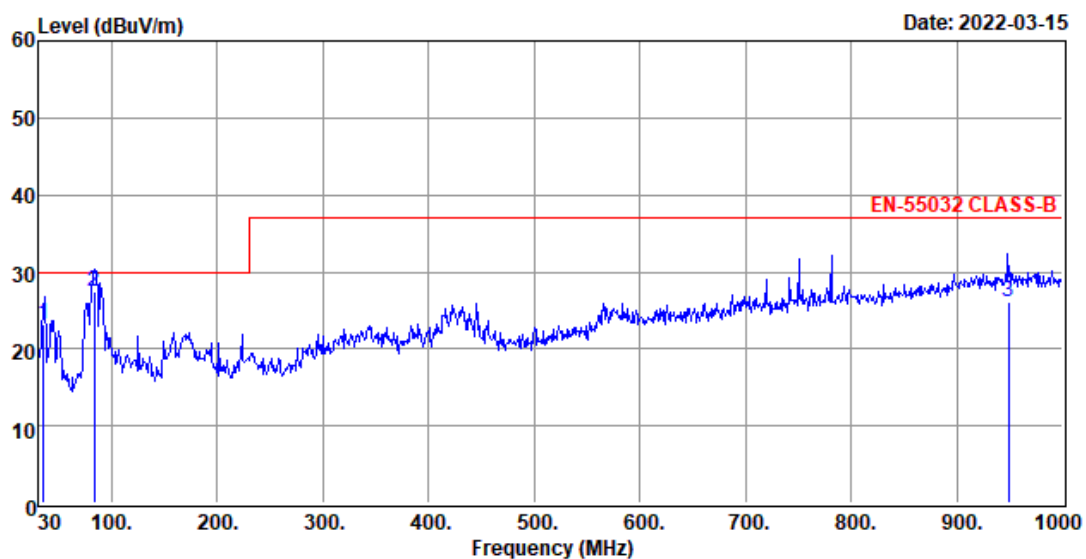
Site : TR1 10M RE CHAMBER
Condition : EN-55032 CLASS-B 10m VULB_9168-01007 HORIZONTAL
Power : 110V/60Hz
Operator : Jack (1M) ' T:22 ' H:55 ' P:1012

	Freq	Level	Read	Limit	Over	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	Level	Line	Limit				
			Factor						
			dB/m	dBuV/m	dB	cm	deg		
1	83.400	21.18	43.94 -22.76	30.00	-8.82	389	256	HORIZONTAL	QP
2	749.948	28.83	33.89 -5.06	37.00	-8.17	114	22	HORIZONTAL	QP
3	781.045	26.82	31.75 -4.93	37.00	-10.18	110	22	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 : Jack Temperature : 22°C
Humidity : 55%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 : Jack (1M) ' T:22 ' H:55 ' P:1012

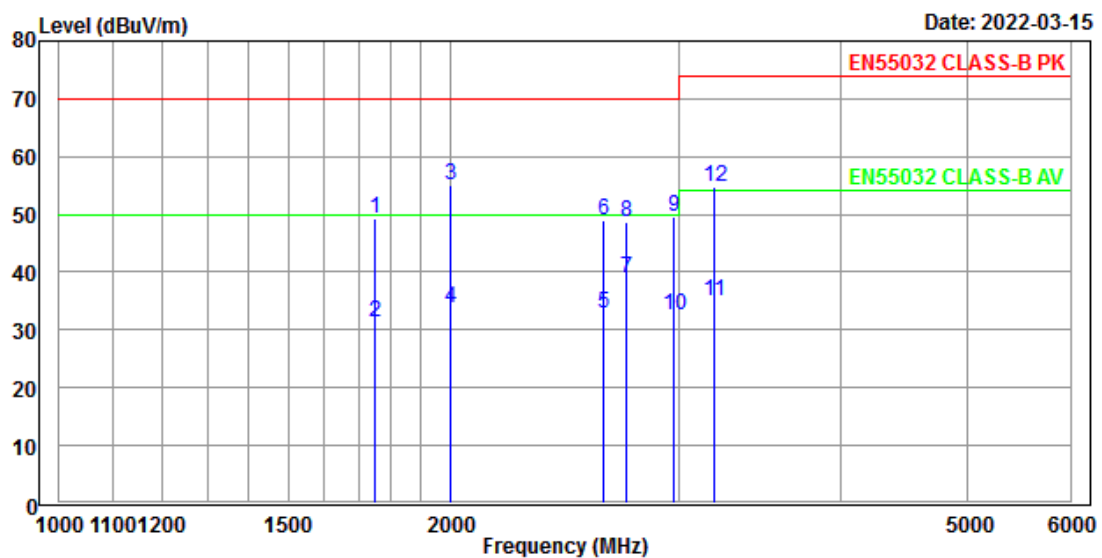
	Freq	Level	Read	Limit	Over	A/Pos	T/Pos		
	MHz	dBuV/m	Level	Line	Limit			Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg	
1	35.598	23.28	41.07	-17.79	30.00	-6.72	106	229 VERTICAL	QP
2	83.360	27.44	48.76	-21.32	30.00	-2.56	119	262 VERTICAL	QP
3	948.840	25.99	26.15	-0.16	37.00	-11.01	390	244 VERTICAL	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** : 22°C
Humidity : 55%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Horizontal



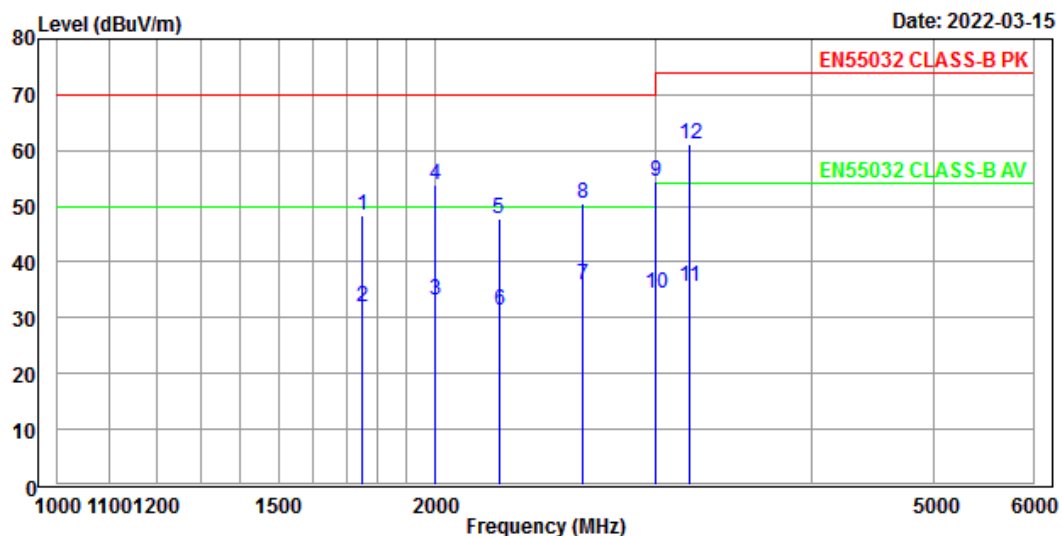
Condition : EN55032 CLASS-B PK 3m EMCO_3117_82847 Horizontal
POWER : 110V/60Hz
OPERATOR : Jack, T:22, H:55, P:1012

	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	1748.694	49.24	67.84	-18.60	70.00	-20.76	100	199	Horizontal	Peak
2	1749.266	31.21	49.81	-18.60	50.00	-18.79	100	204	Horizontal	Average
3	1999.906	54.96	71.59	-16.63	70.00	-15.04	100	206	Horizontal	Peak
4	2000.308	33.84	50.47	-16.63	50.00	-16.16	100	210	Horizontal	Average
5	2624.728	32.86	47.54	-14.68	50.00	-17.14	100	247	Horizontal	Average
6	2625.371	49.08	63.76	-14.68	70.00	-20.92	100	242	Horizontal	Peak
7	2729.511	39.08	54.12	-15.04	50.00	-10.92	100	175	Horizontal	Average
8	2730.273	48.66	63.71	-15.05	70.00	-21.34	100	179	Horizontal	Peak
9	2968.814	49.51	64.31	-14.80	70.00	-20.49	100	105	Horizontal	Peak
10	2969.449	32.52	47.32	-14.80	50.00	-17.48	100	101	Horizontal	Average
11	3189.578	34.97	49.67	-14.70	54.00	-19.03	100	166	Horizontal	Average
12	3190.073	54.69	69.39	-14.70	74.00	-19.31	100	160	Horizontal	Peak

Note:

- Emission Level = reading value + correction factor.
- 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** : 22°C
Humidity : 55%RH **Frequency Range** : 1GHz~6GHz
IF Bandwidth : 1MHz **Polarization** : Vertical



Condition : EN55032 CLASS-B PK 3m EMCO_3117_82847 Vertical
POWER : 110V/60Hz
OPERATOR : Jack, T:22, H:55, P:1012

	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	1749.980	48.35	66.95	-18.60	70.00	-21.65	100	169	Vertical	Peak
2	1750.247	32.06	50.66	-18.60	50.00	-17.94	100	173	Vertical	Average
3	1999.647	33.08	49.71	-16.63	50.00	-16.92	100	214	Vertical	Average
4	2000.079	53.83	70.46	-16.63	70.00	-16.17	100	221	Vertical	Peak
5	2248.534	47.79	63.48	-15.69	70.00	-22.21	100	233	Vertical	Peak
6	2249.285	31.34	47.01	-15.67	50.00	-18.66	100	239	Vertical	Average
7	2624.732	35.75	50.43	-14.68	50.00	-14.25	100	223	Vertical	Average
8	2625.141	50.38	65.06	-14.68	70.00	-19.62	100	227	Vertical	Peak
9	2999.986	54.58	69.34	-14.76	70.00	-15.42	100	183	Vertical	Peak
10	3000.332	34.37	49.13	-14.76	54.00	-19.63	100	178	Vertical	Average
11	3192.792	35.51	50.22	-14.71	54.00	-18.49	100	15	Vertical	Average
12	3193.141	61.11	75.82	-14.71	74.00	-12.89	100	11	Vertical	Peak

Note:

- Emission Level = reading value + correction factor.
- 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	$8 \leq n \leq 40$	$0.23 \cdot 8/n$
11	0.33		
13	0.21		
$15 \leq n \leq 39$	$0.15 \cdot 15/n$		

☐ 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	$30 \cdot \lambda$ (λ is the circuit power factor)
5	
7	
9	
11 $\leq n \leq 39$ (odd harmonics only)	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	PACIFIC	140-TMX/ 247	March 10, 2022	March 10, 2023
Power Analyzer	California Instrument	PACS-1/ 72398	March 10, 2022	March 10, 2023
Test Software	C.I.	CTS 4/ Ver. 4.26	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.

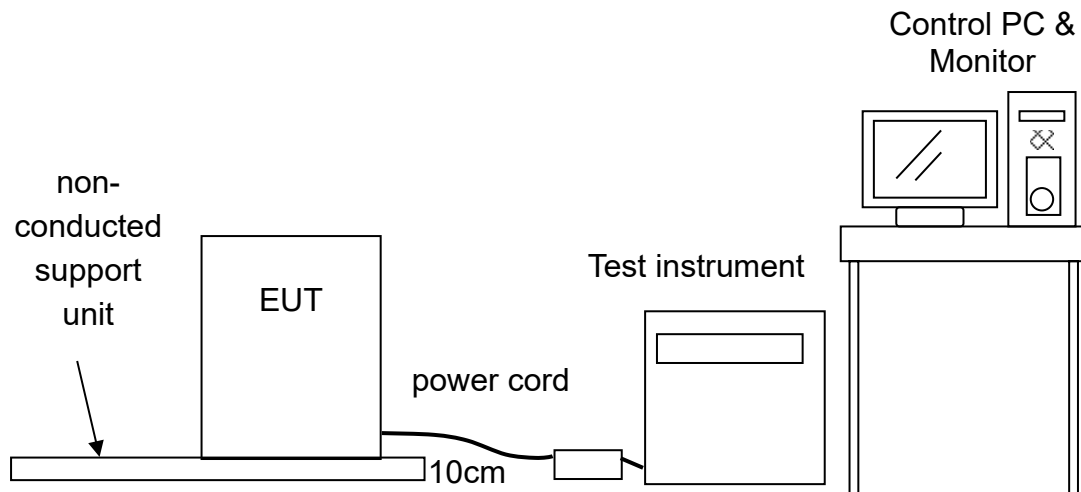
Class C : - lighting equipment

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

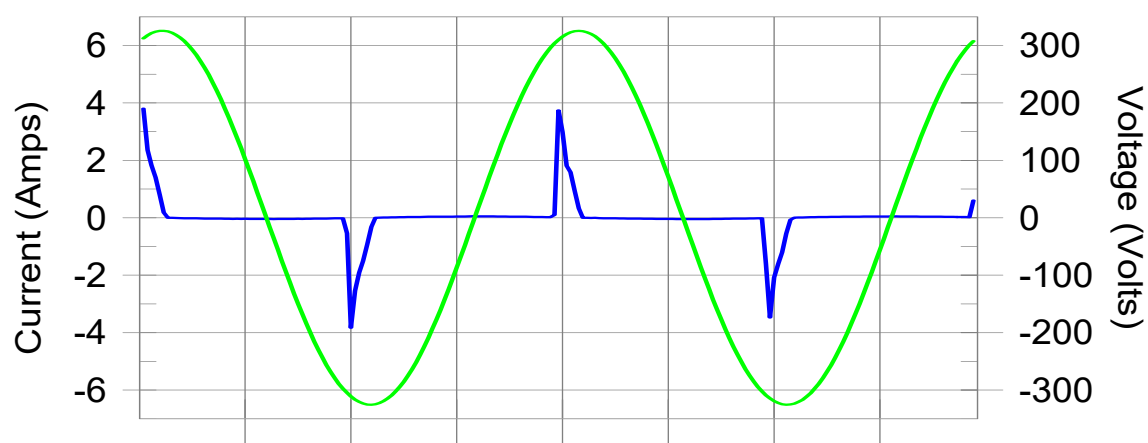


4.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

4.6 Test Results

Test Mode : Mode 1
Tester : Jeff
Temperature : 24°C
Humidity : 56%RH
Date of Testing : March 15, 2022
Test observation period : 10 min



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

Test Raw Data:

THC(A): 0.654 I-THD(%): 199.0 POHC(A): 0.218 POHC Limit(A): 0.031

Highest parameter values during test:

V_RMS (Volts):	230.10	Frequency(Hz):	50.00
I_Peak (Amps):	4.045	I_RMS (Amps):	0.741
I_Fund (Amps):	0.329	Crest Factor:	6.298
Power (Watts):	71.8	Power Factor:	0.422

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.000	N/A	0.005	0.000	N/A	N/L
3	0.306	0.244	N/A	0.309	0.366	N/A	N/L
4	0.002	0.000	N/A	0.006	0.000	N/A	N/L
5	0.286	0.136	N/A	0.288	0.205	N/A	N/L
6	0.002	0.000	N/A	0.006	0.000	N/A	N/L
7	0.257	0.072	N/A	0.259	0.108	N/A	N/L
8	0.002	0.000	N/A	0.006	0.000	N/A	N/L
9	0.223	0.036	N/A	0.225	0.054	N/A	N/L
10	0.002	0.000	N/A	0.006	0.000	N/A	N/L
11	0.187	0.025	N/A	0.188	0.038	N/A	N/L
12	0.002	0.000	N/A	0.006	0.000	N/A	N/L
13	0.151	0.022	N/A	0.151	0.032	N/A	N/L
14	0.002	0.000	N/A	0.006	0.000	N/A	N/L
15	0.119	0.019	N/A	0.120	0.028	N/A	N/L
16	0.002	0.000	N/A	0.006	0.000	N/A	N/L
17	0.096	0.017	N/A	0.096	0.025	N/A	N/L
18	0.002	0.000	N/A	0.006	0.000	N/A	N/L
19	0.083	0.015	N/A	0.084	0.022	N/A	N/L
20	0.002	0.000	N/A	0.006	0.000	N/A	N/L
21	0.080	0.013	N/A	0.080	0.020	N/A	N/L
22	0.002	0.000	N/A	0.006	0.000	N/A	N/L
23	0.080	0.012	N/A	0.081	0.018	N/A	N/L
24	0.002	0.000	N/A	0.006	0.000	N/A	N/L
25	0.081	0.011	N/A	0.082	0.017	N/A	N/L
26	0.002	0.000	N/A	0.006	0.000	N/A	N/L
27	0.079	0.010	N/A	0.080	0.015	N/A	N/L
28	0.002	0.000	N/A	0.006	0.000	N/A	N/L
29	0.075	0.010	N/A	0.076	0.014	N/A	N/L
30	0.002	0.000	N/A	0.006	0.000	N/A	N/L
31	0.069	0.009	N/A	0.069	0.013	N/A	N/L
32	0.002	0.000	N/A	0.006	0.000	N/A	N/L
33	0.062	0.008	N/A	0.062	0.012	N/A	N/L
34	0.002	0.000	N/A	0.006	0.000	N/A	N/L
35	0.056	0.008	N/A	0.056	0.012	N/A	N/L
36	0.002	0.000	N/A	0.006	0.000	N/A	N/L
37	0.050	0.007	N/A	0.051	0.011	N/A	N/L
38	0.002	0.000	N/A	0.006	0.000	N/A	N/L
39	0.046	0.007	N/A	0.047	0.011	N/A	N/L
40	0.002	0.000	N/A	0.005	0.000	N/A	N/L

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%;
- T_{max} , the accumulated time value of $d(t)$ with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms;
- 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	PACIFIC	140-TMX/ 247	March 10, 2022	March 10, 2023
Power Analyzer	California Instrument	PACS-1/ 72398	March 10, 2022	March 10, 2023
Test Software	C.I.	CTS 4/ Ver. 4.26	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

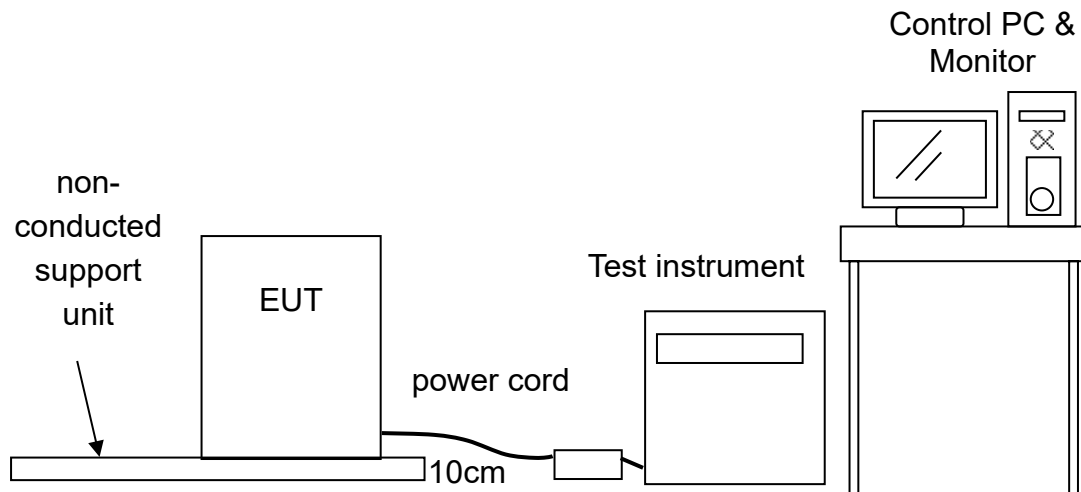
Note:

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 : 24°C
Humidity : 56%RH
Date of Testing : March 15, 2022

TEST FREQ	50	
TEST VOLTS	230	
TEST TIME	10 Minutes	
	EUT Data	Limit
T_{\max} (ms)	0	500
d_c (%)	0	3.3
d_{\max} (%)	0.25	4
P_{st} max	0.184	1
P_{it} max	0.080	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 55035 / BS EN 55035 as §1.3 described and requirement of manufacturer
Basic Standard	: EN 61000-4-2 / BS EN 61000-4-2
Required Performance	: TT / TR (EN 301 489) B (EN 55035 / BS EN 55035)
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
Ambient Temperature	: 21°C
Relative Humidity	: 41%
Atmospheric Pressure	: 1009mbar
Date of Testing	: March 17, 2022

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	Aug. 17, 2021	Aug. 17, 2022
TR8 shielded room	ETS. LINDGREN	TR8/ 15353-C	NCR	NCR

Note:

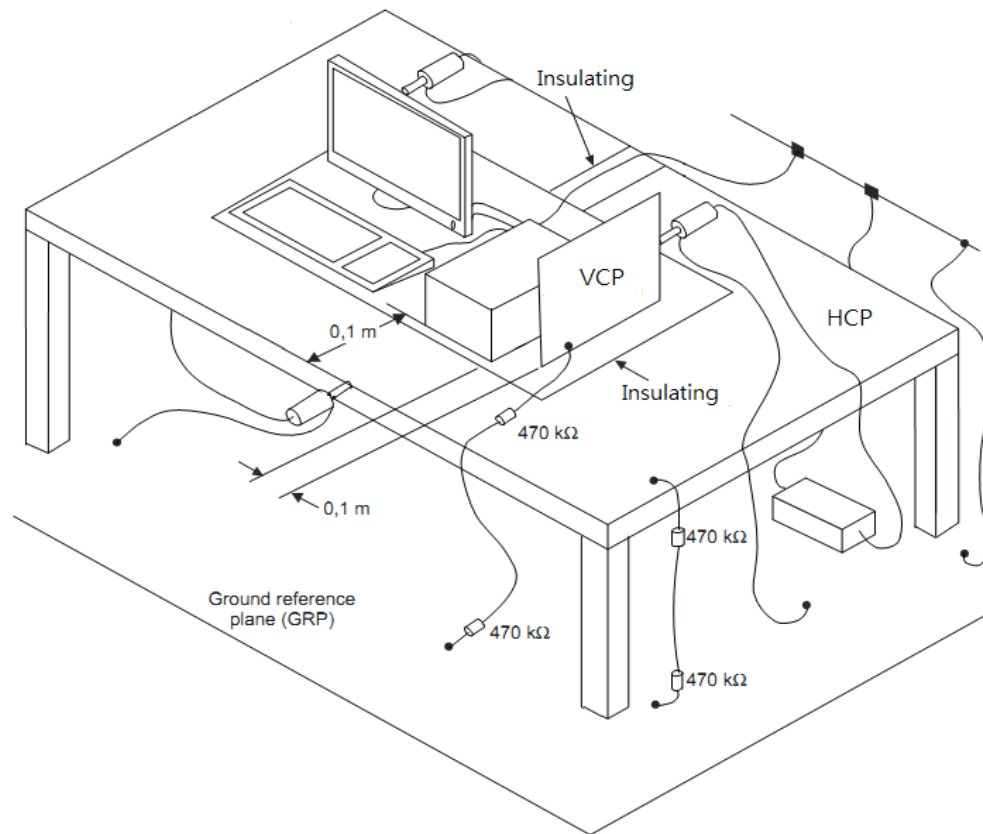
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

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,B	Pass(1)
±4	Contact	A,B	Pass(1)
±2	Air	10,19	Pass(1)
±4	Air	6,9,10,12,14,15,19	Pass(1)
		4	Pass(1)
+8	Air	1~3,5~7,9~19	Pass(1)
		4,8	Pass(1)
-8		1~3,5~19	Pass(1)
		4	Pass(1)
±2	HCP-Bottom	Front 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	Front 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.

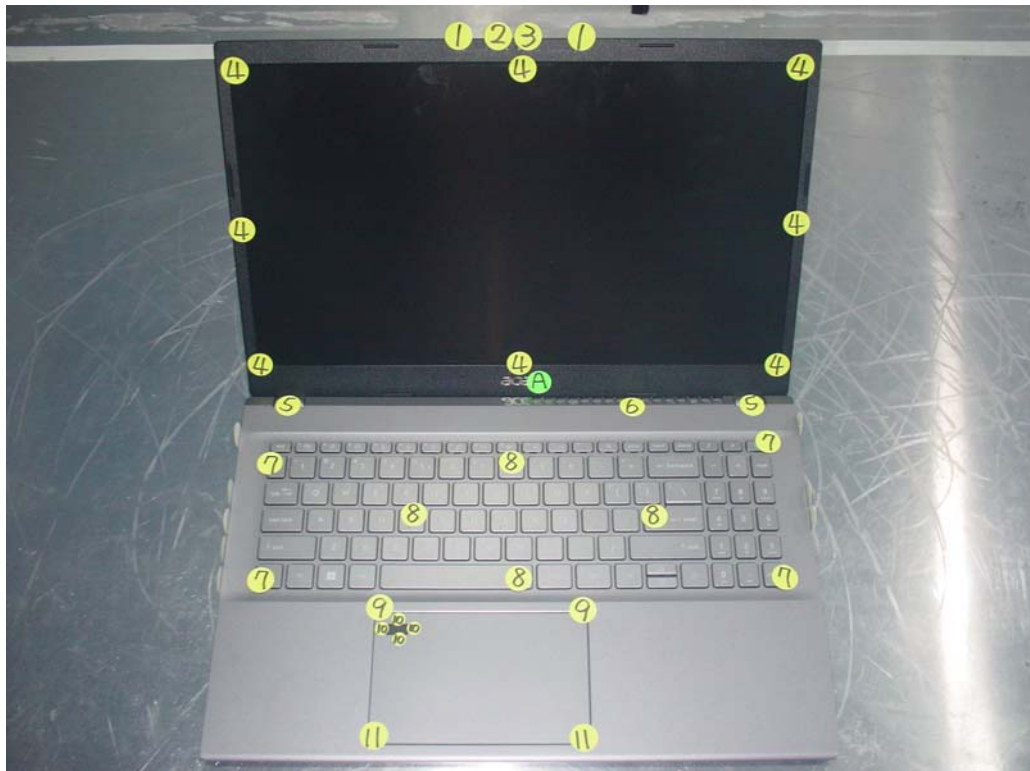
Product (Generic) Standard : EN 55035 / BS EN 55035

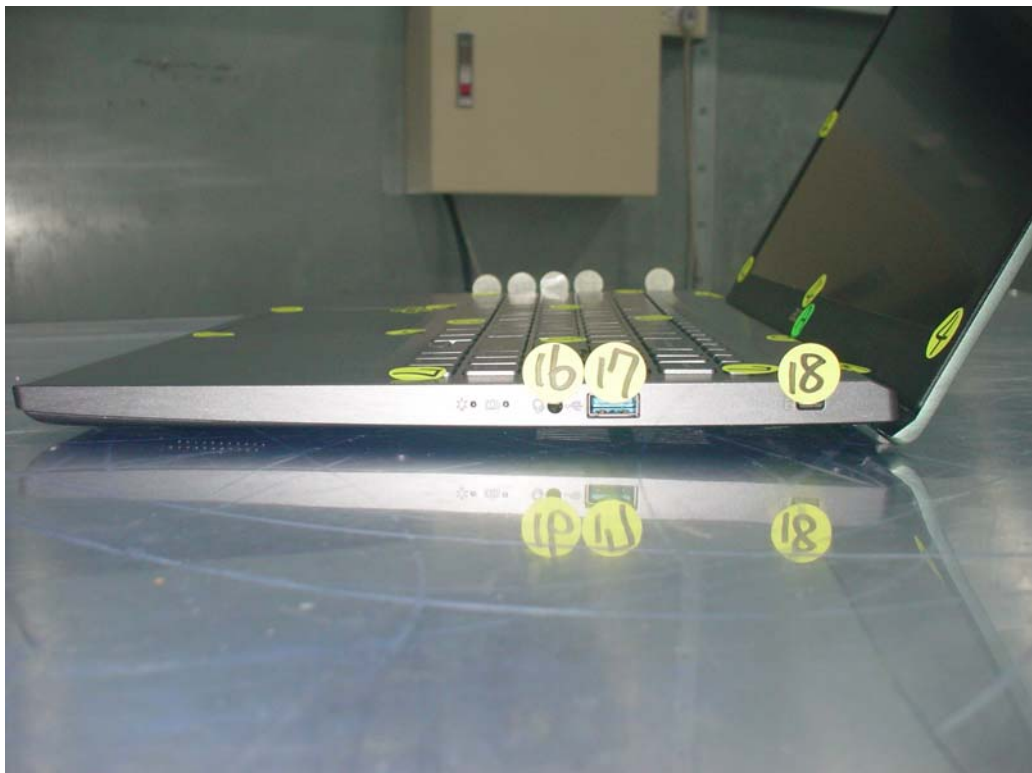
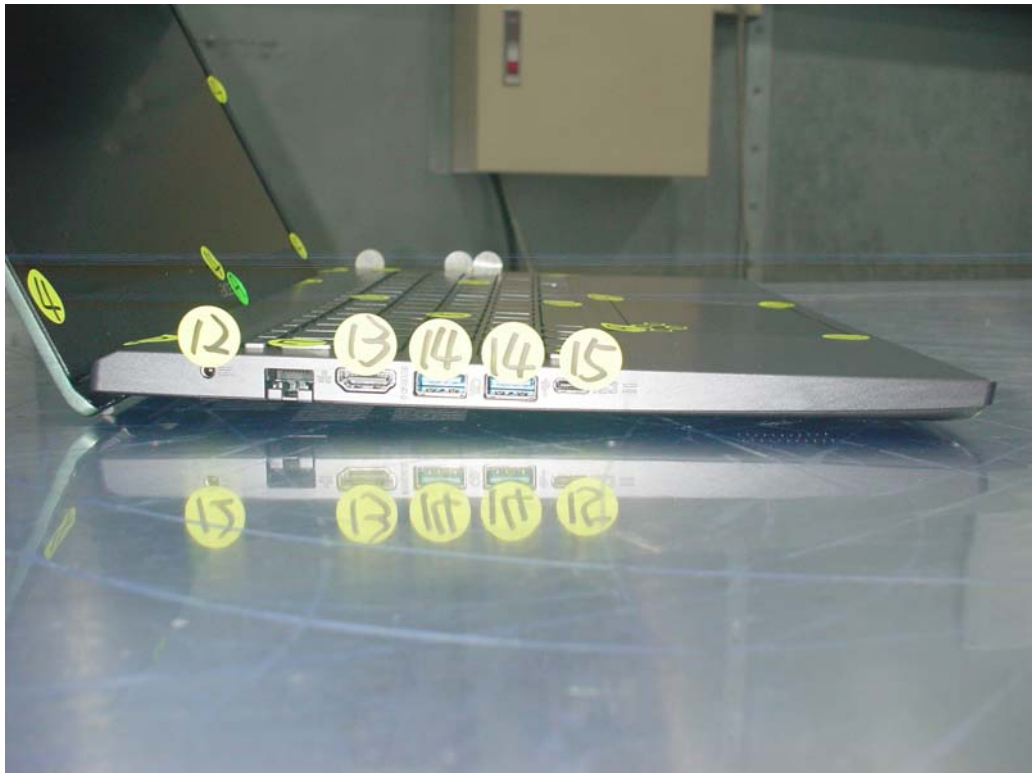
Discharge Voltage (kV)	Type of discharge	Label for Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±2	Contact	A,B	B	A(1)	Pass
±4	Contact	A,B	B	A(1)	Pass
±2	Air	10,19	B	A(1)	Pass
±4	Air	6,9,10,12,14,15,19	B	A(1)	Pass
		4	B	B(2)	Pass
+8	Air	1~3,5~7,9~19	B	A(1)	Pass
		4,8	B	B(2)(3)	Pass
-8		1~3,5~19	B	A(1)	Pass
		4	B	B(2)	Pass
±2	HCP-Bottom	Front 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	Front 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.
- (2) The white line would appear on the display of EUT and the picture on the display of EUT would flicker while test is performing, it could self-recover after the test.
- (3) The light of keyboard would turn on while test is performing, it could self-recover after 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 as §1.3 described
Basic Standard	: EN 61000-4-3 / BS EN 61000-4-3
Required Performance	: CT / CR
Test Level	: 2
Field Strength	: 3 V/m
Test Frequency Range	: 80MHz ~ 6GHz
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
For Speaker	
Tester	: Eddie
Ambient Temperature	: 22°C
Relative Humidity	: 52%
Atmospheric Pressure	: 1012mbar
Date of Testing	: March 16, 2022
For Audio Line-out port (Right & Left Channel)	
Tester	: Eddie
Ambient Temperature	: 23°C
Relative Humidity	: 55%
Atmospheric Pressure	: 1018mbar
Date of Testing	: March 14, 2022

Product (Generic) Standard	: EN 55035 / BS EN 55035 as §1.3 described
Basic Standard	: EN 61000-4-3 / BS EN 61000-4-3
Required Performance	: A
Test Level	: 2
Field Strength	: 3 V/m
Test Frequency Range	: (a) 80MHz~1GHz (b) Spot Frequency: 1.8GHz, 2.6GHz, 3.5GHz, 5GHz
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
For Speaker	
Tester	: Eddie
Ambient Temperature	: 22°C
Relative Humidity	: 52%
Atmospheric Pressure	: 1012mbar
Date of Testing	: March 16, 2022
For Audio Line-out port (Right & Left Channel)	
Tester	: Eddie
Ambient Temperature	: 23°C
Relative Humidity	: 55%
Atmospheric Pressure	: 1018mbar
Date of Testing	: March 14, 2022

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. 24, 2022	Feb. 24, 2023
Dual Directional Coupler	AR	DC 6180A / 0350436	March 4, 2022	March 4, 2023
Boardband Amplifier	TESEQ	CBA 1G-275 / T44287	NCR	NCR
	R&S	BBA150 / 102412	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 / 0336500	Feb. 24, 2022	Feb. 24, 2023
Average Power Sensor	R&S	NRP6AN / 101001	Feb. 23, 2022	Feb. 23, 2023
Microphone Unit	Brüel & Kjær	4192-L-001/ 3038774	Oct. 28, 2021	Oct. 28, 2022
2-channel Microphone Conditioning Amplifier	Brüel & Kjær	2690-A-0S2/ 3008818	Oct. 28, 2021	Oct. 28, 2022
Test Software	Audix	i2 / 5.16_20181108	NCR	NCR
TR3 fully-anechoic chamber	ETS. LINDGREN	TR3/ 15353-I	March 9, 2022	March 9, 2023

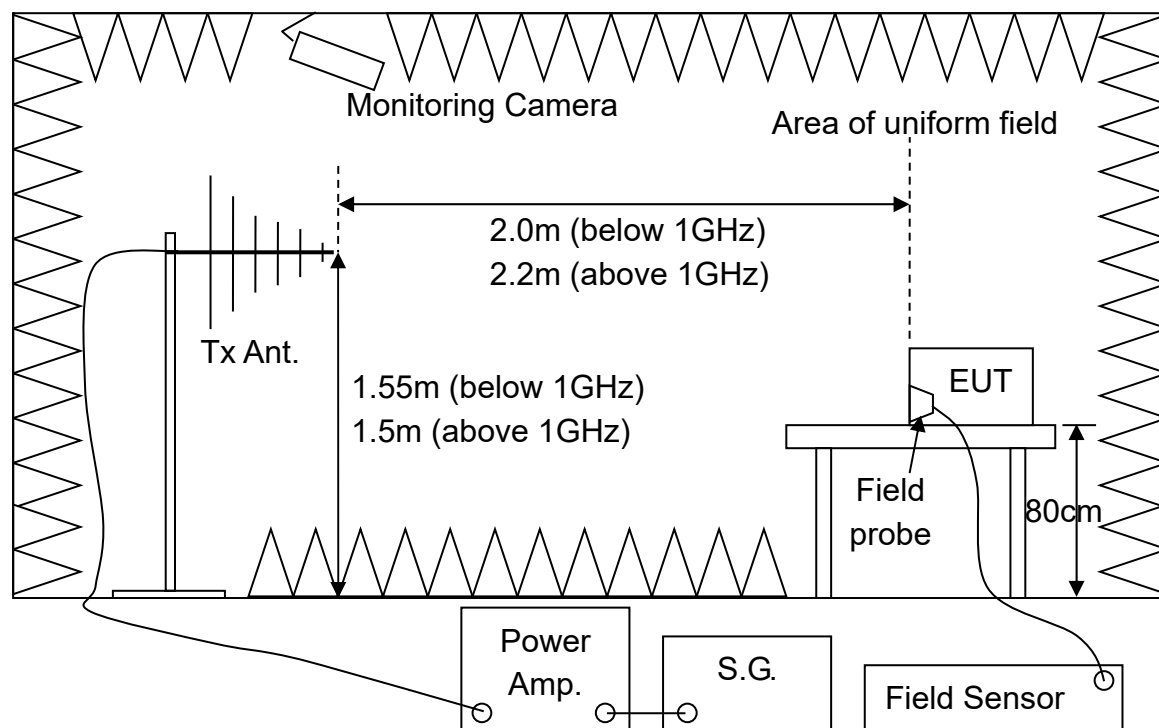
Note:

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 2.0/2.2 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 2.0/2.2 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 55035 / BS EN 55035

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

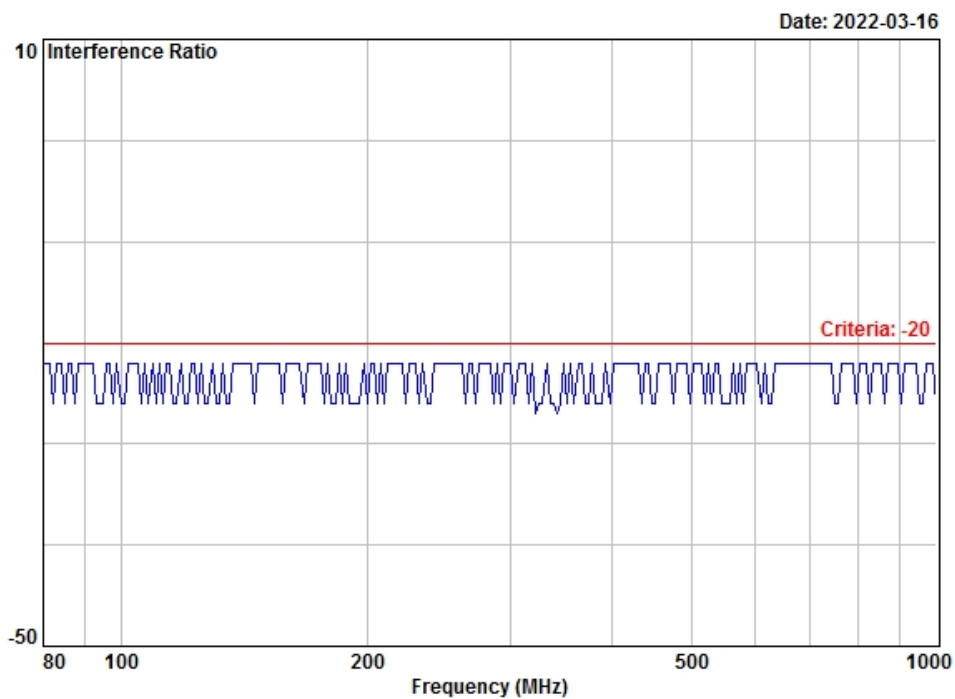
Spot Frequency, with 1kHz Sine Wave 80% Amplitude Modulation				
Frequency (GHz)	Side of the EUT & Polarization	Performance		Result (Pass/Fail)
		Required	Observation	
1.8	Front/ Left/Back/ Right H / V	A	A(1)	Pass
2.6	Front/ Left/Back/ Right H / V	A	A(1)	Pass
3.5	Front/ Left/Back/ Right H / V	A	A(1)	Pass
5	Front/ Left/Back/ Right H / V	A	A(1)	Pass

Observation of Performance during Test

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

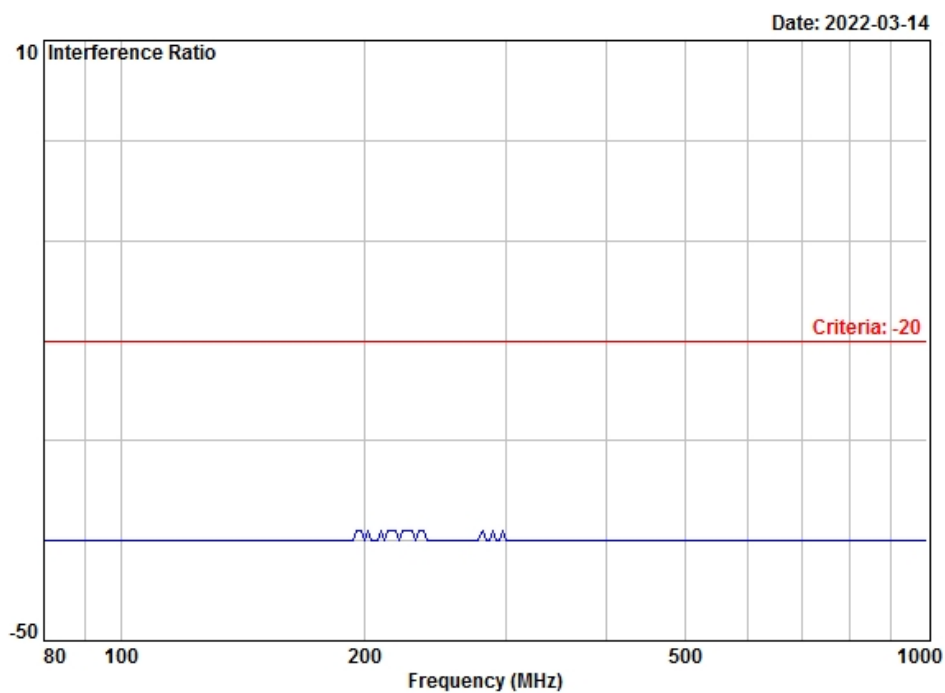
For Speaker

Acoustic interference ratio:



For Audio Line-out port (Right & Left Channel)

Electric interference ratio:



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 55035 / BS EN 55035 as §1.3 described
Basic Standard	:	EN 61000-4-4 / BS EN 61000-4-4
Required Performance	:	TT / TR (EN 301 489) B (EN 55035 / BS EN 55035)
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)
Repetition frequency	:	5kHz
Wave Shape of the Pulse (T_r/T_h)	:	5ns / 50ns
Burst Duration	:	15ms
Burst Period	:	300ms
Time Duration	:	1 min
Test Voltage	:	230Vac/50Hz to the power adapter
Tester	:	Jeff
Ambient Temperature	:	24°C
Relative Humidity	:	56%
Atmospheric Pressure	:	1011mbar
Date of Testing	:	March 15, 2022

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	April 21, 2021	April 21, 2022
Coupling Clamp	EMC PARTNER	CN-EFT1000/ 532	Aug. 23, 2021	Aug. 23, 2022
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

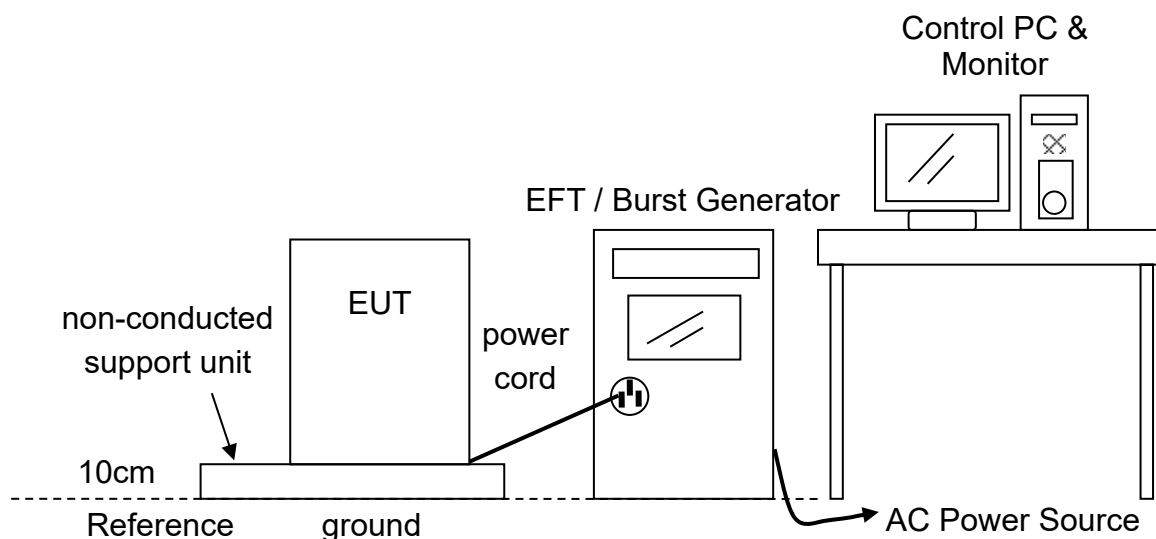
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

8.3 Test Procedures

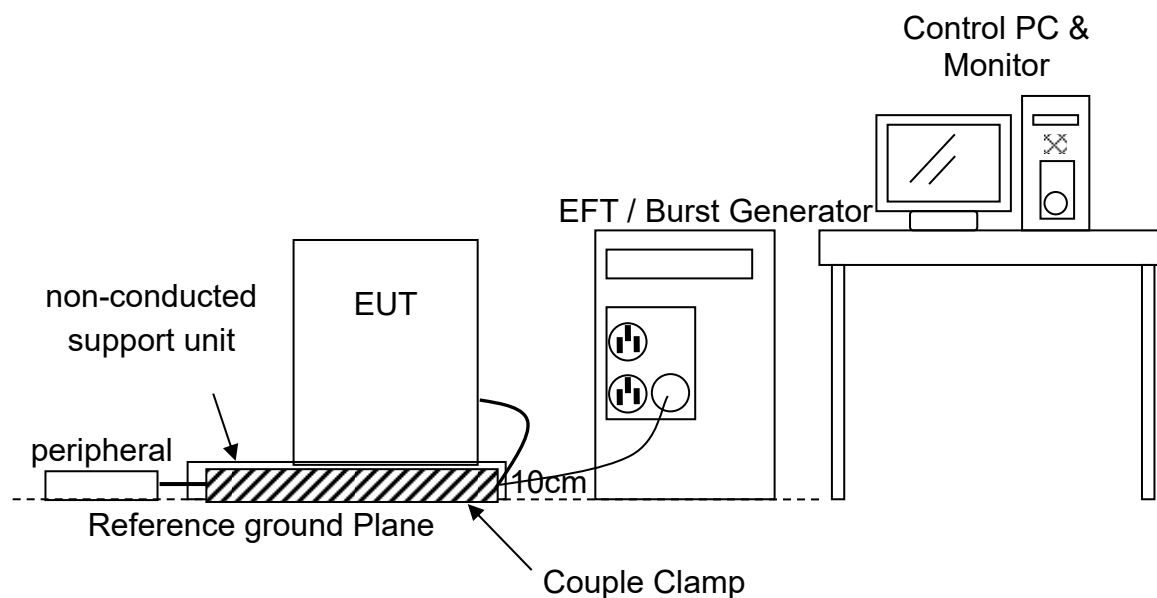
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground 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 0.1m 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)
L	±1.0	Direct	Pass(1)
N	±1.0	Direct	Pass(1)
PE	±1.0	Direct	Pass(1)
L - N - 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 55035 / BS EN 55035

Injected Line	Voltage Peak (kV)	Injected Method	Performance		Result (Pass/Fail)
			Required	Observation	
L	±1.0	Direct	B	B(2)	Pass
N	±1.0	Direct	B	B(2)	Pass
PE	±1.0	Direct	B	B(2)	Pass
L - N - PE	±1.0	Direct	B	B(2)	Pass
Data Line (RJ-45)	±0.5	Clamp Coupling	B	B(2)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.
(2) The noise would appear from the speaker 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 as §1.3 described
Basic Standard	: EN 61000-4-5 / BS EN 61000-4-5
Required Performance	: TT / TR
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 (Tr/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	: 24°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1011mbar
Date of Testing	: March 15, 2022

Product (Generic) Standard	: EN 55035 / BS EN 55035 as §1.3 described
Basic Standard	: EN 61000-4-5 / BS EN 61000-4-5
Required Performance	: B
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 (Tr/Th)	: 1.2 / 50µs (open-circuit voltage) 8 / 20µs (short-circuit current)
Phase Angel	: 90°, 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	: 24°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1011mbar
Date of Testing	: March 15, 2022

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	April 21, 2021	April 21, 2022
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

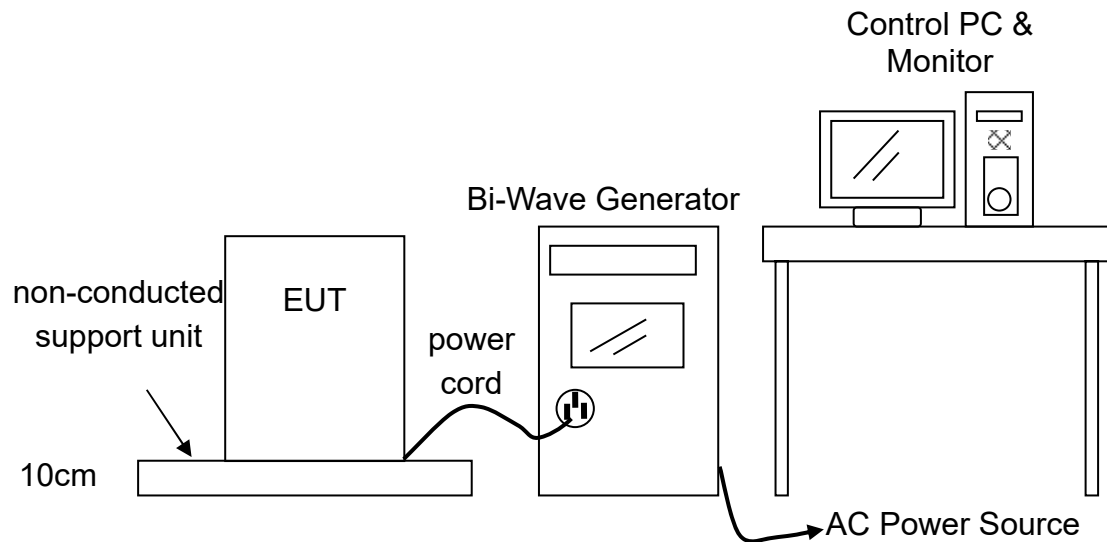
Note:

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°
L - PE	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
N - PE	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L - N	±0.5	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L - PE	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
N - PE	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L - N	±1	Pass(1)	Pass(1)	Pass(1)	Pass(1)
L - PE	±2	Pass(1)	Pass(1)	Pass(1)	Pass(1)
N - 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 55035 / BS EN 55035

Coupled Line	Open-circuit Test Voltage (kV)	Performance			Result (Pass/Fail)
		Required	Observation		
			90°	270°	
L - PE	+0.5	B	A(1)	N/A	Pass
	-0.5	B	N/A	A(1)	Pass
N - PE	+0.5	B	N/A	A(1)	Pass
	-0.5	B	A(1)	N/A	Pass
L - N	+0.5	B	A(1)	N/A	Pass
	-0.5	B	N/A	A(1)	Pass
L - PE	+1	B	A(1)	N/A	Pass
	-1	B	N/A	A(1)	Pass
N - PE	+1	B	N/A	A(1)	Pass
	-1	B	A(1)	N/A	Pass
L - N	+1	B	A(1)	N/A	Pass
	-1	B	N/A	A(1)	Pass
L - PE	+2	B	A(1)	N/A	Pass
	-2	B	N/A	A(1)	Pass
N - PE	+2	B	N/A	A(1)	Pass
	-2	B	A(1)	N/A	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 as §1.3 described
Basic Standard	: EN 61000-4-6 / BS EN 61000-4-6
Required Performance	: CT / CR
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 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	: Marco
Ambient Temperature	: 23°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1017mbar
Date of Testing	: March 10, 2022

Product (Generic) Standard	: EN 55035 / BS EN 55035 as §1.3 described
Basic Standard	: EN 61000-4-6 / BS EN 61000-4-6
Required Performance	: A
Test Level	: 2
Voltage Level(e.m.f.)	: (a) 3V (e.m.f.) (b) 3V to 1V (e.m.f.) (c) 1V (e.m.f.)
Test Frequency Range	: (a) 150kHz ~ 10MHz (b) 10MHz ~ 30MHz (c) 30MHz ~ 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 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	: Marco
Ambient Temperature	: 23°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1017mbar
Date of Testing	: March 10, 2022

10.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SML 03/ 101676	Aug. 6, 2021	Aug. 6, 2022
Dual Directional Coupler	AR	DC2600/ 28834	Feb. 15, 2022	Feb. 15, 2023
Power Amplifier	AR	75A250/ 28845	NCR	NCR
CDN	FCC	<input type="checkbox"/> FCC-801-M2-16A/ 2032	Feb. 17, 2022	Feb. 17, 2023
		<input checked="" type="checkbox"/> FCC-801-M3-16A/ 2060	Feb. 17, 2022	Feb. 17, 2023
		<input type="checkbox"/> FCC-801-M5-16A/ 2020	Nov. 23, 2021	Nov. 23, 2022
	FCC	<input type="checkbox"/> FCC-801-T2/ 2032	Oct. 31, 2021	Oct. 31, 2022
		<input type="checkbox"/> FCC-801-T4-RJ45/ 08031	Oct. 31, 2021	Oct. 31, 2022
		<input checked="" type="checkbox"/> NCDN-T8-RJ45/ 06016	Oct. 31, 2021	Oct. 31, 2022
ATTENUATOR	BIRD	300-A-MFN-06/ 0037	Oct. 25, 2021	Oct. 25, 2022
EM CLAMP	TESEQ	KEMZ 801A / 38676	Oct. 31, 2021	Oct. 31, 2022
Dual Channel Power Meter	R&S	NRVD/ 839374/012	Nov. 23, 2021	Nov. 23, 2022
Power Sensor	R&S	URV5-Z2/ 835640/013	Feb. 9, 2022	Feb. 9, 2023
	R&S	URV5-Z2/ 100731	Feb. 9, 2022	Feb. 9, 2023
Microphone Unit	Brüel & Kjær	4192-L-001/ 3038774	Oct. 28, 2021	Oct. 28, 2022
2-channel Microphone Conditioning Amplifier	Brüel & Kjær	2690-A-0S2/ 3008818	Oct. 28, 2021	Oct. 28, 2022

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Software	Audix	i2 / 5.16_20181108	NCR	NCR
TR4 shielded room	ETS LINDGREN	TR4/ 15353-E	NCR	NCR

Note:

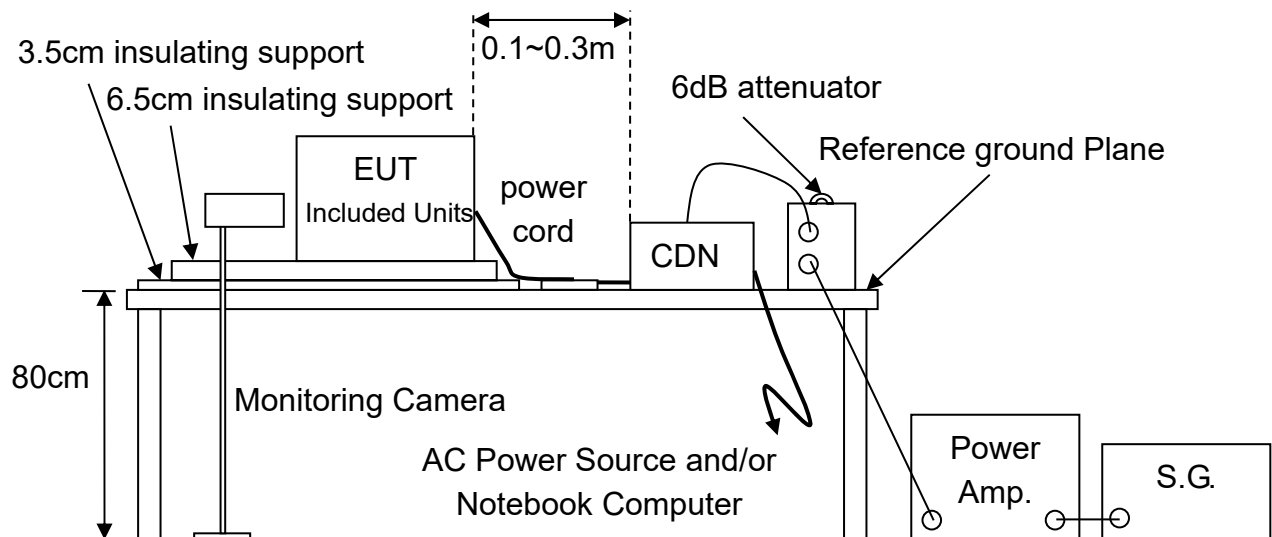
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

10.3 Test Procedures

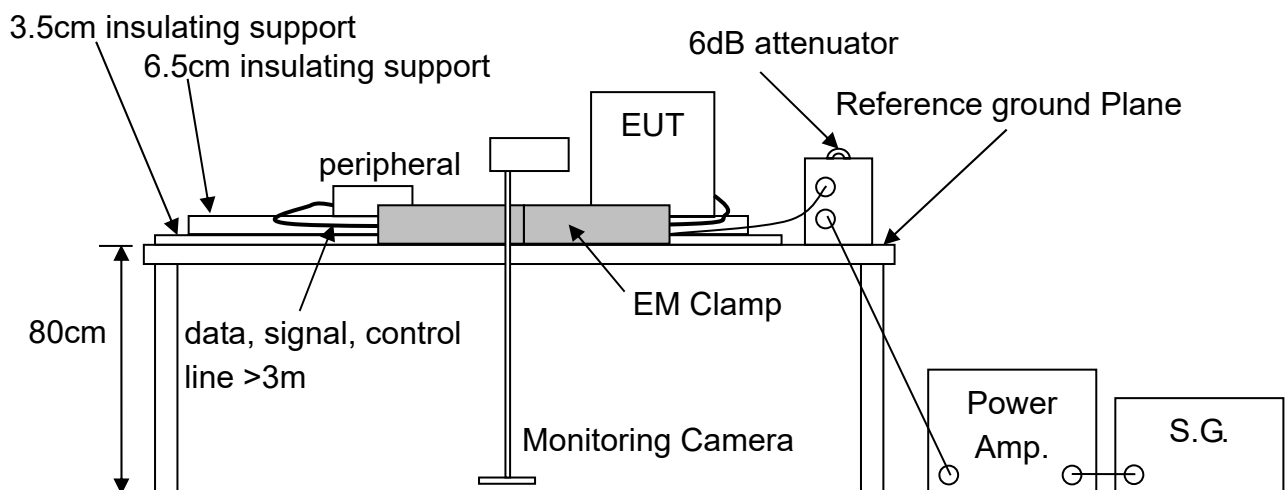
- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a non-conducted support with a height 0.1 meters above the ground reference plane. Also the ground 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-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 55035 / BS EN 55035

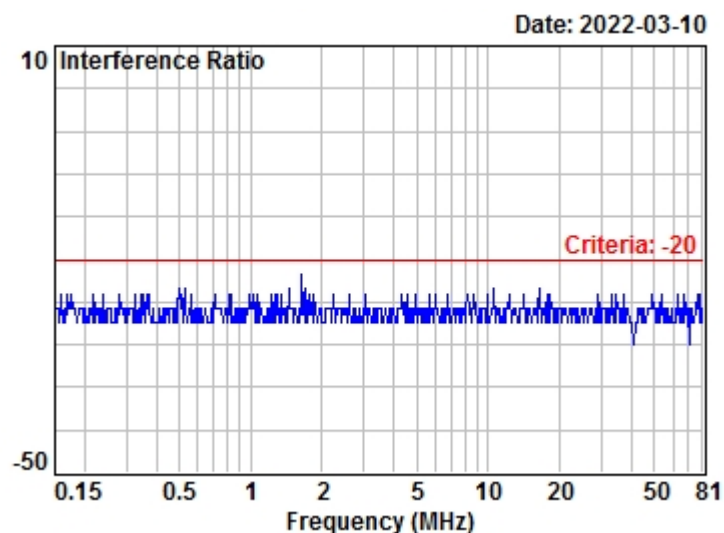
Injected Line	Test Frequency Range	Voltage Level	Coupling Devices	Performance		Result (Pass/Fail)
				Required	Observation	
Power Lines	150kHz ~ 10MHz	3V (e.m.f)	CDN-M3	A	A(1)	Pass
	10MHz ~ 30MHz	3V to 1V (e.m.f.)		A	A(1)	Pass
	30MHz ~ 80MHz	1V (e.m.f)		A	A(1)	Pass
Data Lines (RJ-45)	150kHz ~ 10MHz	3V (e.m.f)	CDN-T8 (1Gbps)	A	A(1)	Pass
	10MHz ~ 30MHz	3V to 1V (e.m.f.)		A	A(1)	Pass
	30MHz ~ 80MHz	1V (e.m.f)		A	A(1)	Pass

Observation of Performance during Test

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

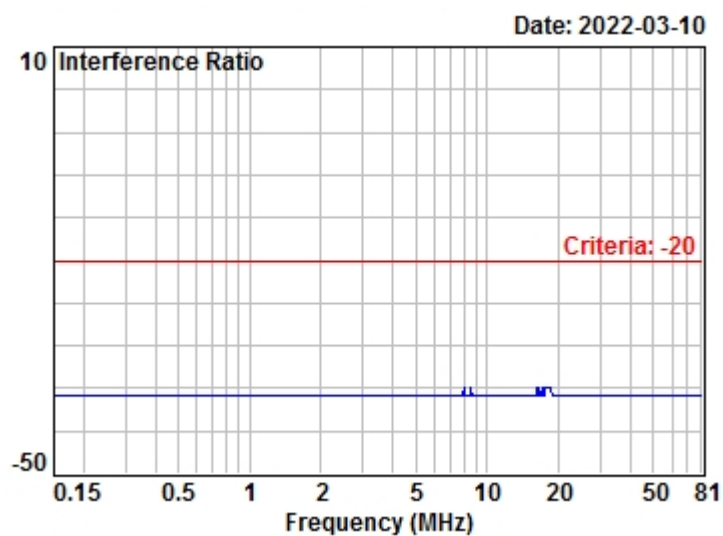
For Speaker

Acoustic interference ratio:



For Audio Line-out port (Right & Left Channel)

Electric interference ratio:



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 / BS 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	: 24°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1011mbar
Date of Testing	: March 15, 2022

Product (Generic) Standard	: EN 55035 / BS EN 55035 as §1.3 described
Basic Standard	: EN 61000-4-11 / BS EN 61000-4-11
Required Performance and Test Level	: <input checked="" type="checkbox"/> B for 0% residual voltage dips with 0.5 cycle <input checked="" type="checkbox"/> C for 70% residual voltage dips with 25 cycles <input checked="" type="checkbox"/> C for 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°
Tester	: Jeff
Ambient Temperature	: 24°C
Relative Humidity	: 56%
Atmospheric Pressure	: 1011mbar
Date of Testing	: March 15, 2022

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	April 21, 2021	April 21, 2022
Test Software	EMC PARTNER	TEMA/ Ver. 2.05	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

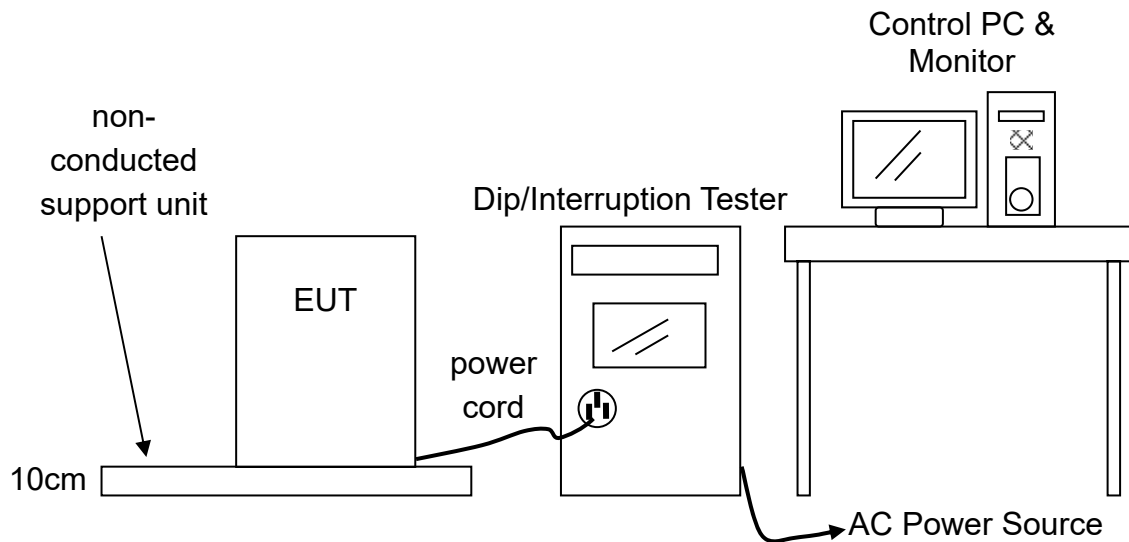
Note:

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 55035 / BS EN 55035

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	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.

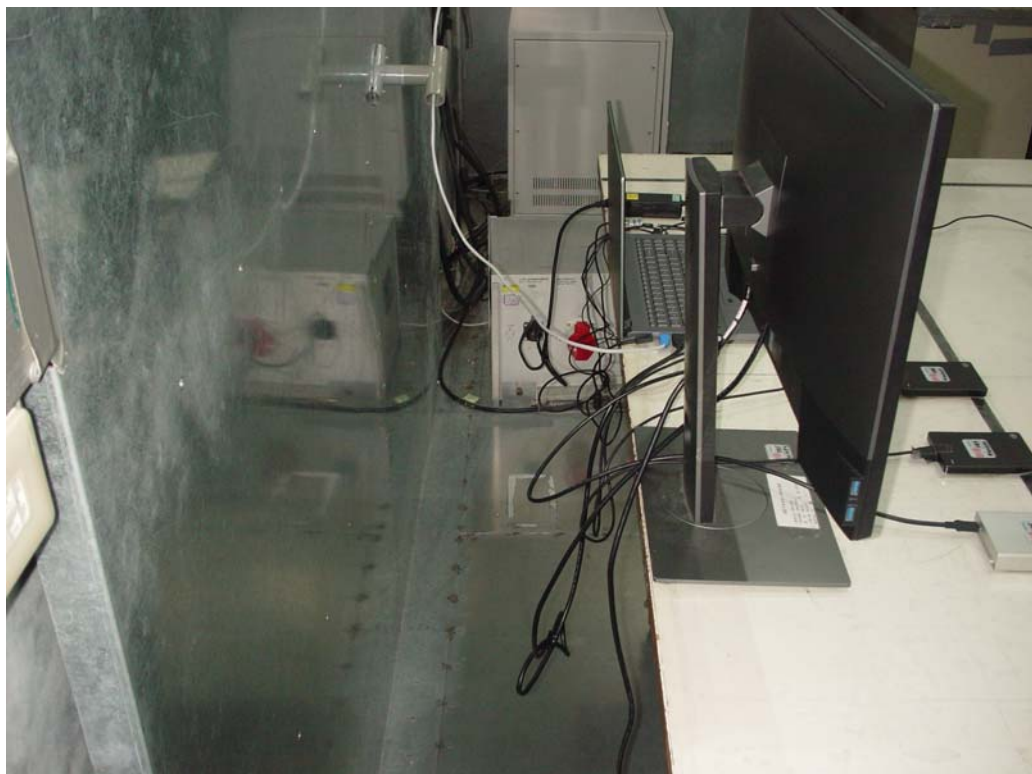
Attachment 1

Photographs of the Test Configurations

Contents

1. Conducted Emission Measurement.....	1
2. Radiated Emission Measurement	2
3. Harmonic Current & Voltage Fluctuations Emission Measurement.....	4
4. Electrostatic Discharge (ESD) Immunity Test	5
5. Radiated Electromagnetic Field (RS) Immunity Test.....	5
6. Electrical fast transient / burst (EFT) Immunity Test.....	6
7. Surge Immunity Test	7
8. Conducted disturbances (CS) Immunity Test	8
9. Voltage dips, short interruptions Immunity Test.....	10

1. Conducted Emission Measurement

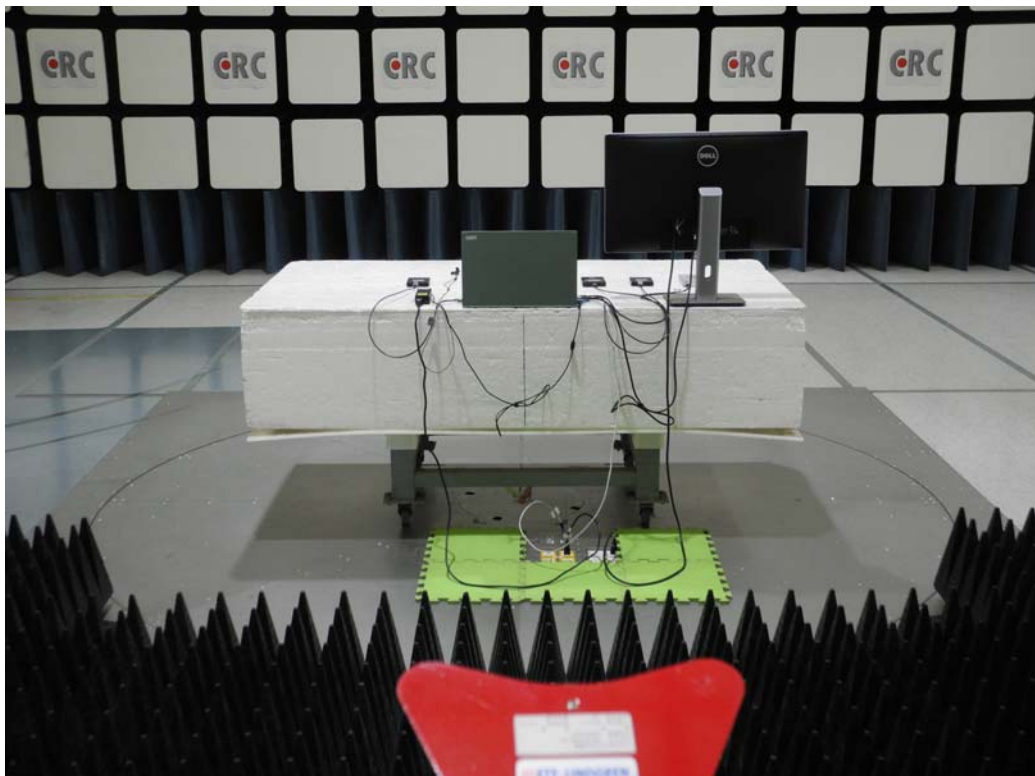


2. Radiated Emission Measurement

30MHz~1GHz



Above 1GHz



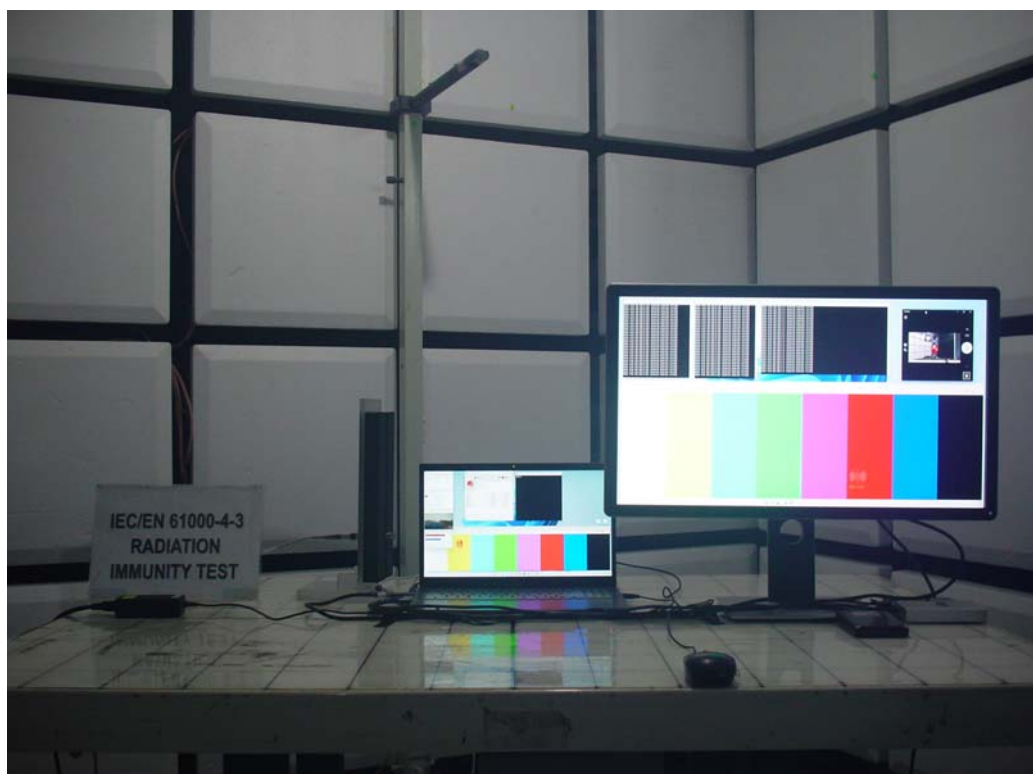
3. Harmonic Current & Voltage Fluctuations Emission Measurement



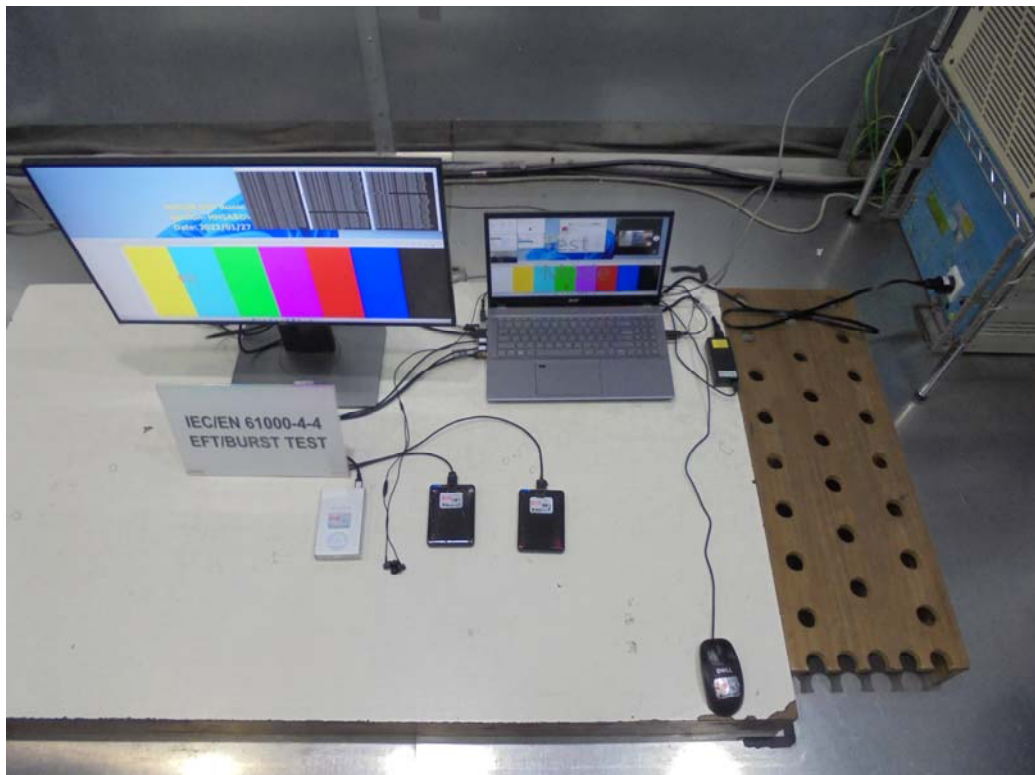
4. Electrostatic Discharge (ESD) Immunity Test



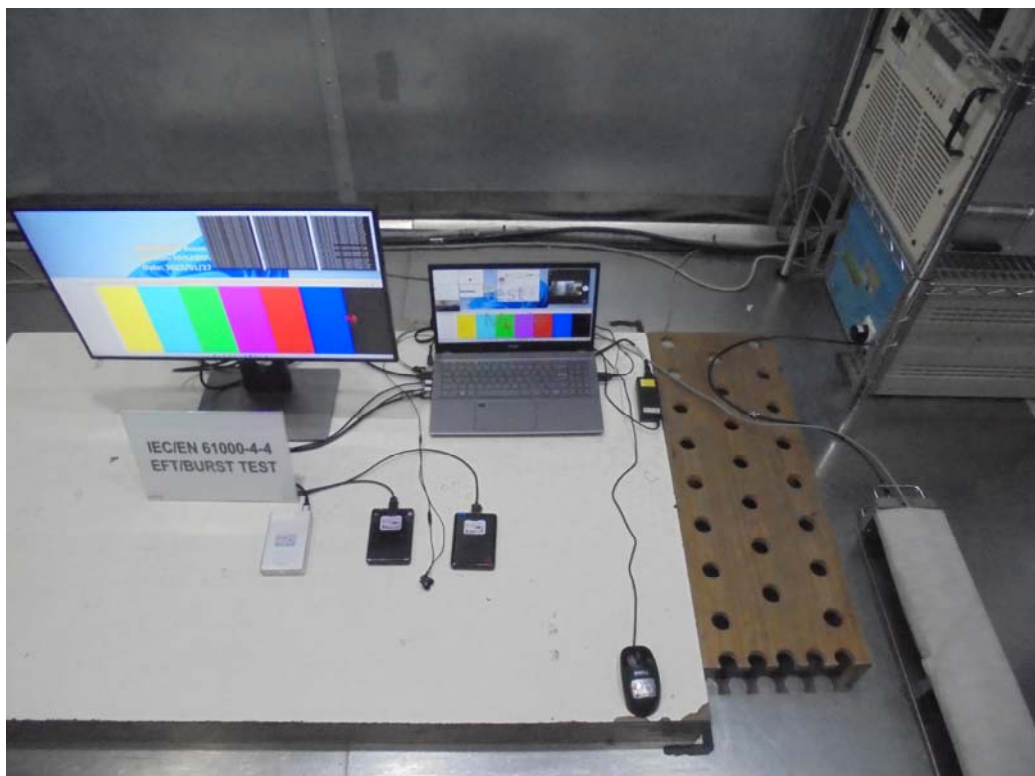
5. Radiated Electromagnetic Field (RS) Immunity Test



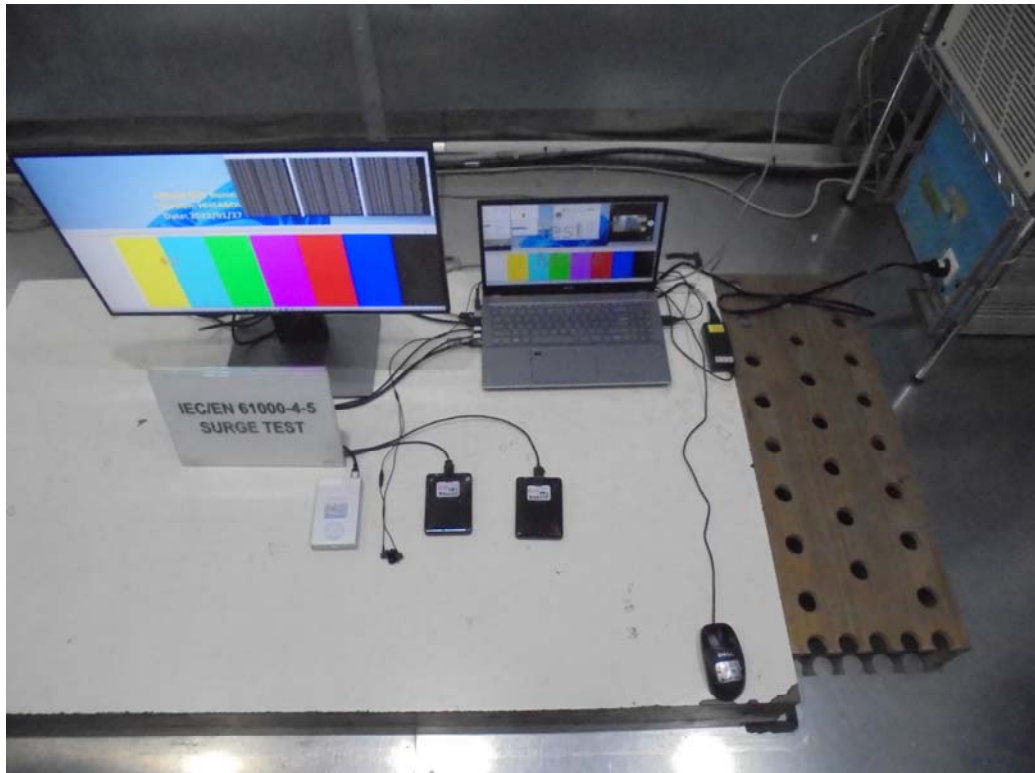
6. Electrical fast transient / burst (EFT) Immunity Test



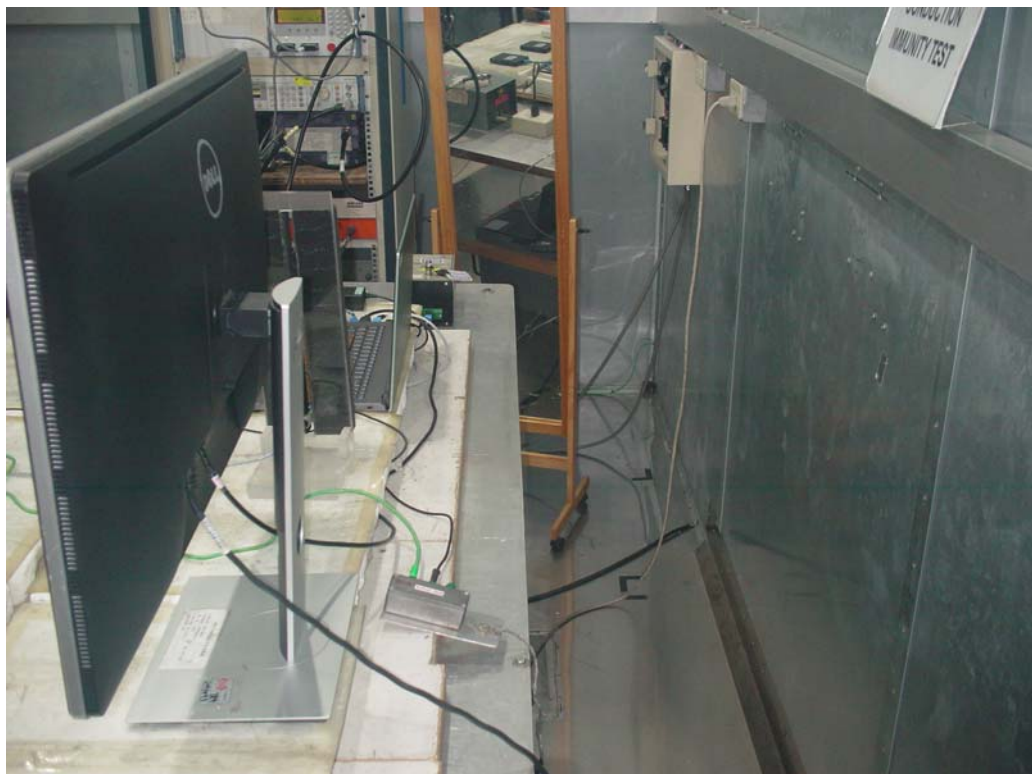
Test for LAN port



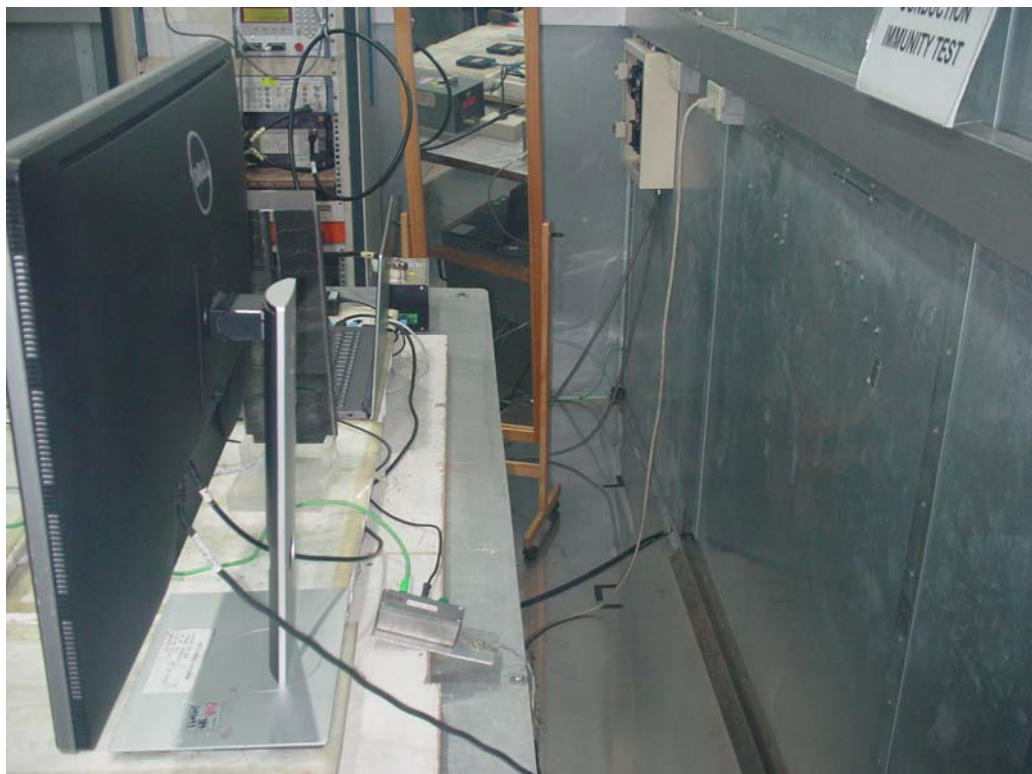
7. Surge Immunity Test



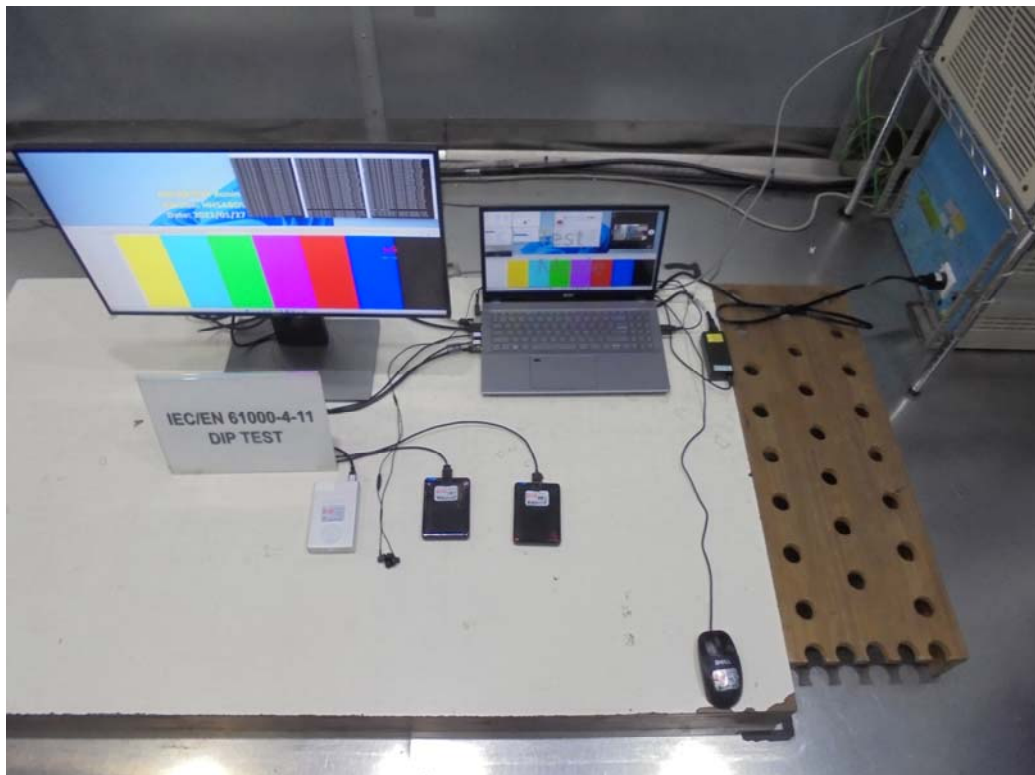
8. Conducted disturbances (CS) Immunity Test



Test for LAN port



9. Voltage dips, short interruptions Immunity Test



Attachment 2

Photographs of Production

(Supplied by Customer)







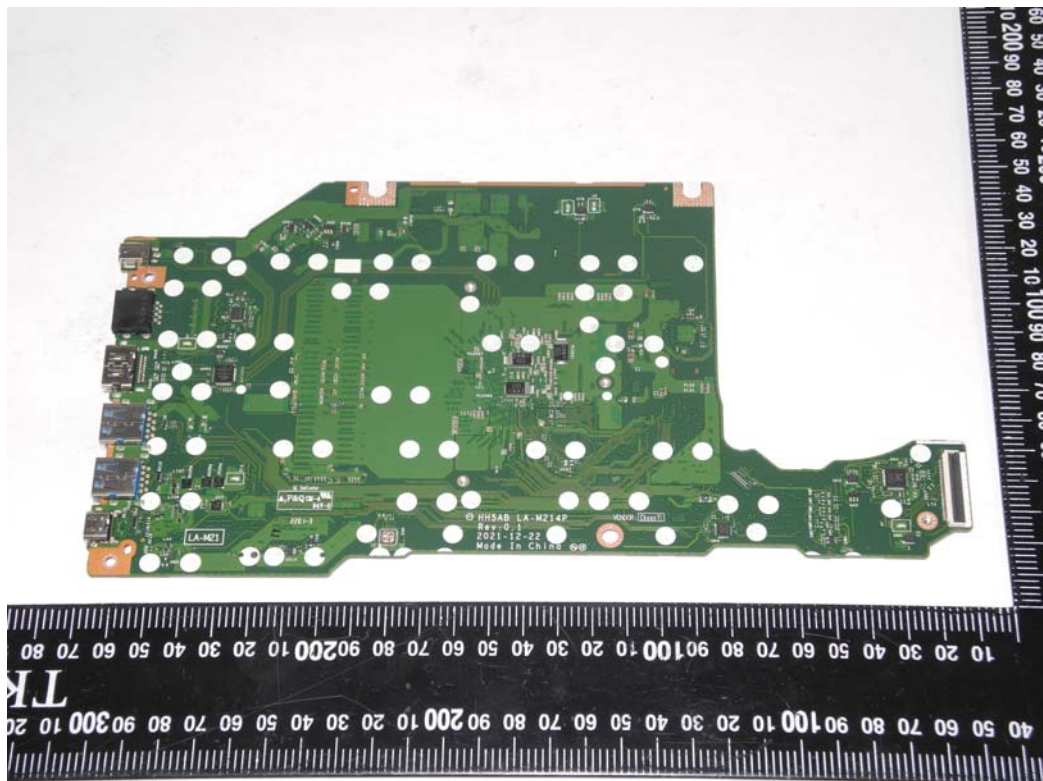
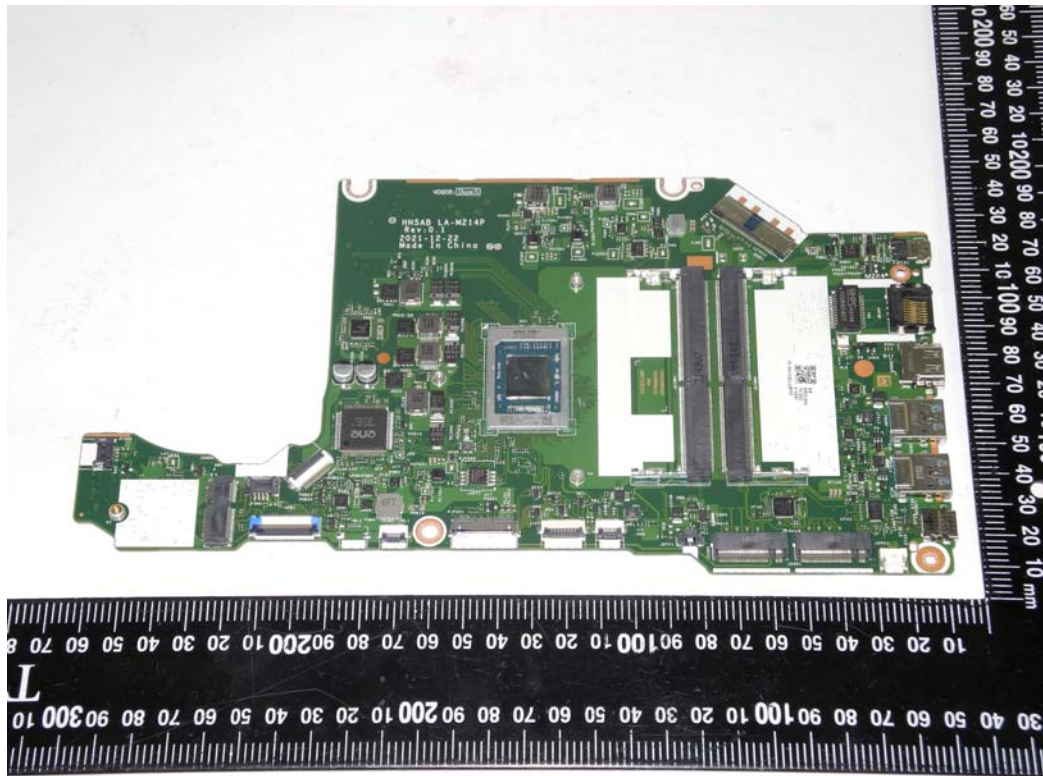






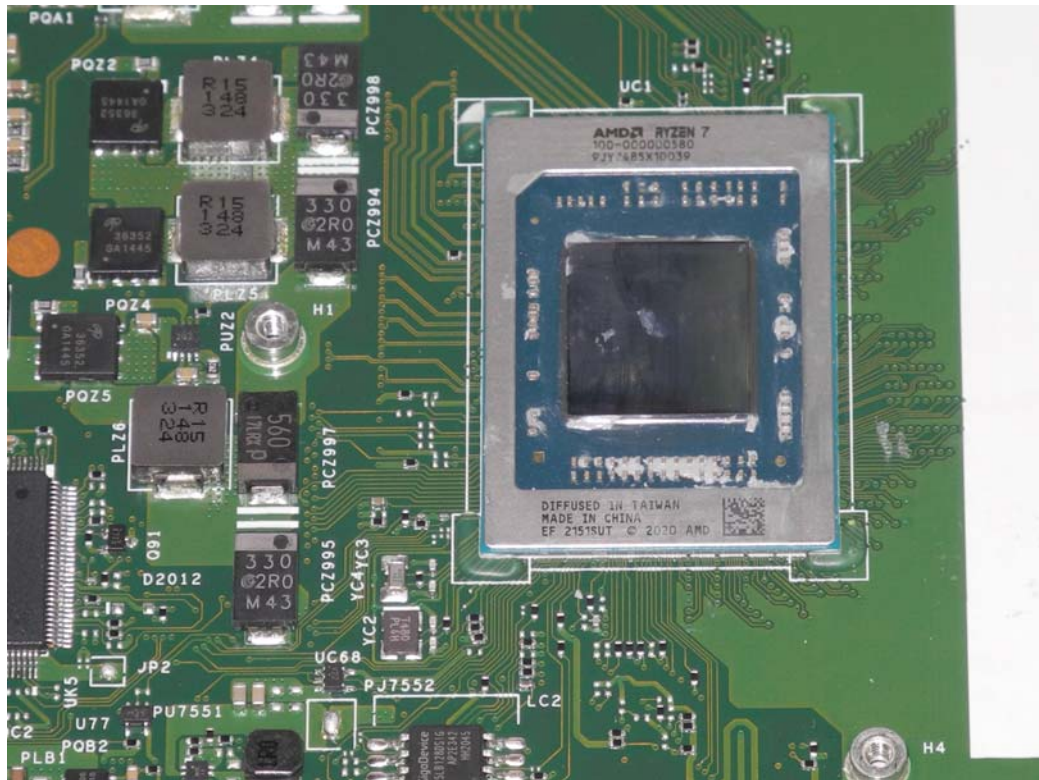
MB

Compal / LA-M214



CPU

AMD / R75825U 2G



LCD

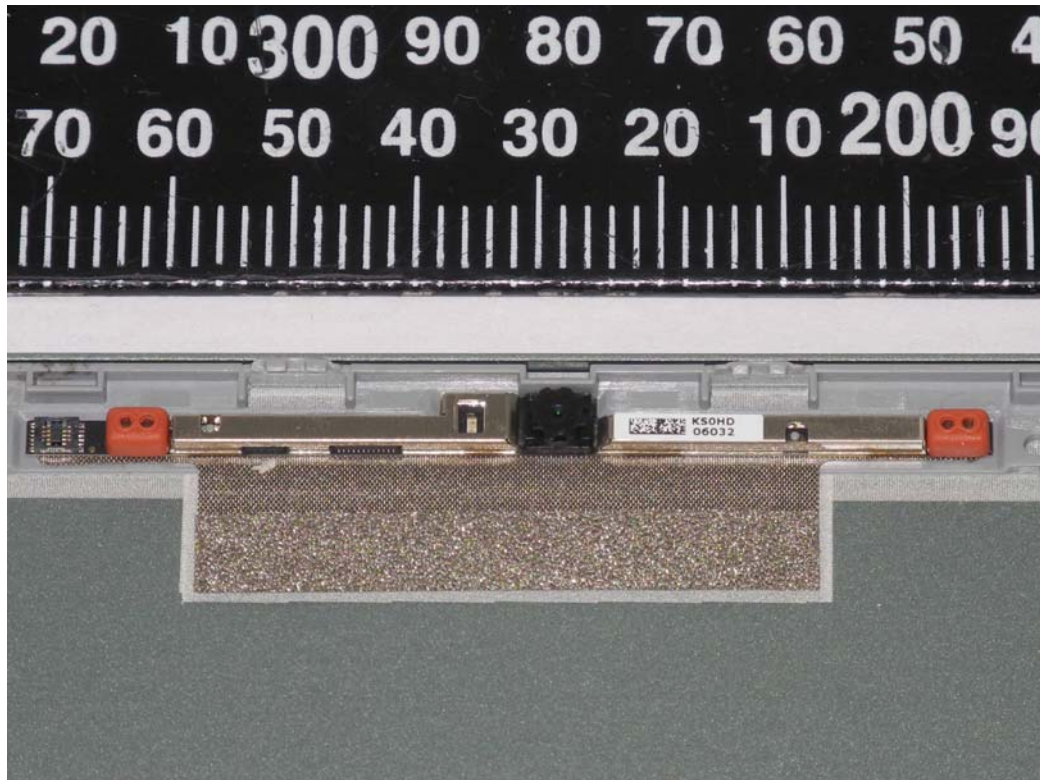
AUO / B156HAN02 (FHD)





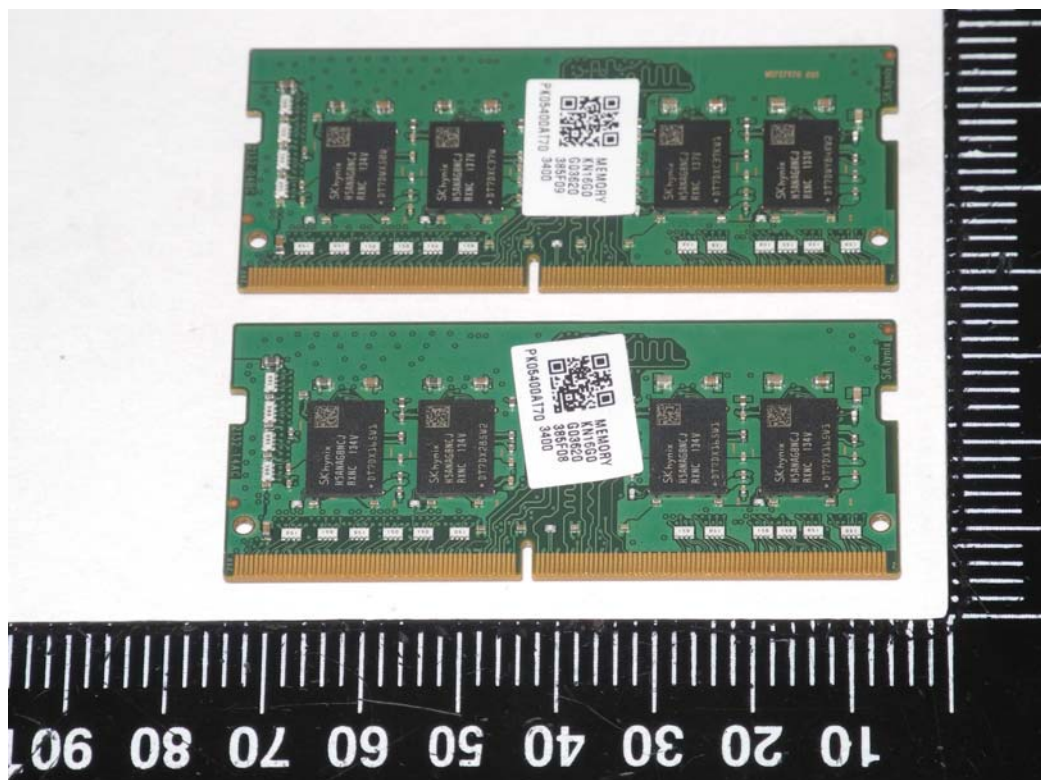
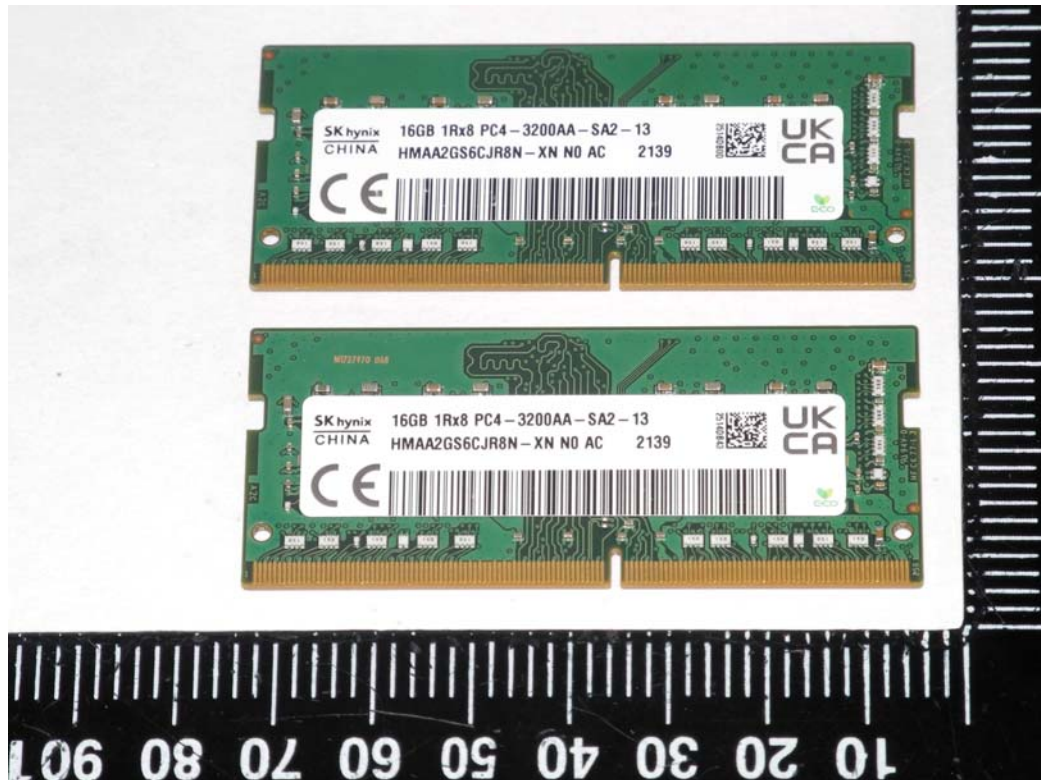
Camera

Chicony / CNFLH3421004970LH



Memory (1)/ Memory (2)

DDR4 3200 16GB



SSD(1)

Hynix / HFM512GD3JX016N

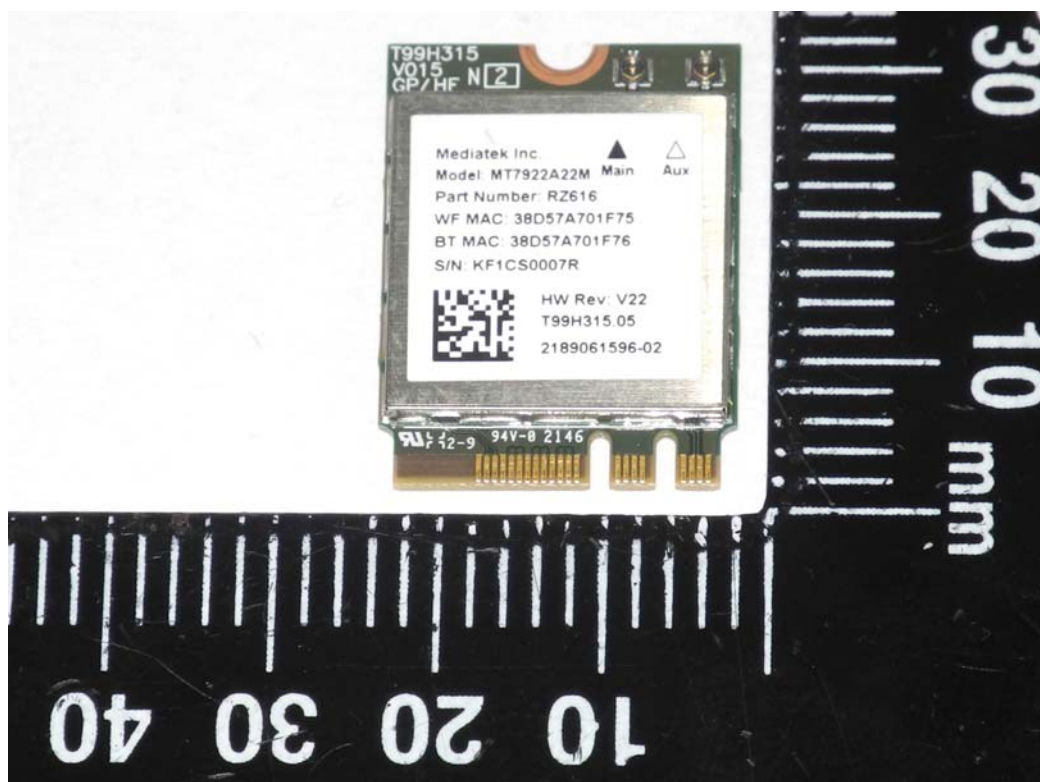


Battery
LGC / AP18C8K





WLAN+BT Combo
FOXCONN / T99H315



Power Adapter

LITE-ON / PA-1650-50





