

Technical Compliance Statement

EMC Test Report

For the following information

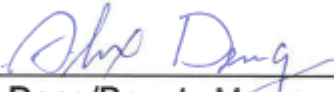
Ref. File No.: C1M2005147

Product : LCD Monitor
Model Number : M277D4
Brand Name : NEC
Applicant : Compal Electronics, Inc.
Manufacturer : Compal Display electronics (Kunshan) Co., Ltd.
Standards :

EN 55032:2012 +AC:2013 (CISPR 32:2012), Class B
EN 55032:2015 +AC:2016+A11:2020 (CISPR 32:2015 +COR1:2016), Class B
AS/NZS CISPR 32:2013 (CISPR 32:2012)
AS/NZS CISPR 32:2015 (CISPR 32:2015)
EN 61000-3-2:2014 and EN 61000-3-3:2013+A1:2019
EN 55035:2017 (CISPR 35:2016)
(IEC 61000-4-2:2008, IEC 61000-4-3:2010, IEC 61000-4-4:2012,
IEC 61000-4-5:2014 +A1:2017, IEC 61000-4-6:2013,
IEC 61000-4-8:2009, IEC 61000-4-11:2004+A1:2017)

We hereby certify that the above product has been tested by us with the listed standards and found in compliance with the council EMC directive 2014/30/EU. The test data and results are issued on the EMC test report no. **EM-E180712A**.

Signature



Alex Deng/Deputy Manager
Date: 2020. 05. 26

Test Laboratory:
Audix Technology Corporation, EMC Department
TAF Accreditation No.: 1724
Web Site: www.audixtech.com

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

TEST REPORT

Product: LCD Monitor

Model: M277D4

Brand: NEC

Applicant for:

Compal Electronics, Inc.
No. 581 & 581-1, Ruiguang Rd., Neihu District,
Taipei City 11492, Taiwan

Prepared by:

Audix Technology Corporation, EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan



File No. : C1M2005147
Report No. : EM-E180712A
Date of Report of Rev. A : 2020. 05. 26

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
This report contains data that are not covered by the NVLAP accreditation.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Test Report

Applicant : Compal Electronics, Inc.
Manufacturer : Compal Display electronics (Kunshan) Co., Ltd.
EUT Description
(1) Product : LCD Monitor
(2) Model : M277D4
(3) Brand : NEC
(4) Power Rating : AC 100-240V, 50/60Hz

Applicable Standards:

EN 55032:2012 +AC:2013 (CISPR 32:2012), Class B
EN 55032:2015 +AC:2016+A11:2020 (CISPR 32:2015 +COR1:2016), Class B
AS/NZS CISPR 32:2013 (CISPR 32:2012)
AS/NZS CISPR 32:2015 (CISPR 32:2015)
EN 61000-3-2:2014 and EN 61000-3-3:2013+A1:2019
EN 55035:2017 (CISPR 35:2016)
(IEC 61000-4-2:2008, IEC 61000-4-3:2010, IEC 61000-4-4:2012,
IEC 61000-4-5:2014 +A1:2017, IEC 61000-4-6:2013,
IEC 61000-4-8:2009, IEC 61000-4-11:2004+A1:2017)

The device described above was tested by Audix Technology Corporation to determine the maximum emission levels emanating from the device, its ensured severity levels, and performance criterion. This test report contains the measurement results, and Audix Technology Corporation assumes full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is technically compliance with the requirements of **EN 55032**、**EN 61000-3-2**, **-3** and **EN 55035** standards.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Audix Technology Corporation.

This report is based on report of EM-E180712.

Date of Report of Rev. A: 2020. 05. 26

Reviewed by: Albee Lee (Albee Lee/Administrator)

Approved by: Alex Deng (Alex Deng/Deputy Manager)

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APPENDIX (Photos of EUT)

1. Revision of Test Report

Issued Date	Revision Summary	Report Number
2018. 11. 23	Original Report.	EM-E180712
2020. 05. 26	1.To add a LCD panel. 2. To update the standard to the latest version, refer to page 3.	EM-E180712A

2. Summary of Test Result

2.1. Test Result

Emission			
Test Item	Referred Standard	Limit	Result
Conducted emissions at AC mains power port	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	Pass
			Margin 7.08dB at 0.277MHz
Asymmetric mode conducted emissions at wired network port	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	N/A
Asymmetric mode conducted emissions at broadcast receiver tuner port	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	N/A
Asymmetric mode conducted emissions at broadcast receiver tuner port	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	N/A
Radiated emissions (30 – 1000MHz)	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	Pass
			Margin 8.61dB at 32.615MHz
Radiated emissions (1 – 6GHz)	EN 55032:2012 +AC:2013 (CISPR 32:2012) EN 55032:2015 +AC:2016 +A11:2020 (CISPR 32:2015 +COR1:2016)	Class B	Pass
			Margin 12.27dB at 2254.466MHz
Harmonic current emissions	EN 61000-3-2:2014	Class D	Pass
Voltage fluctuations & flicker	EN 61000-3-3:2013+A1:2019	Section 5	Pass
Note : 1. The uncertainties value is not used in determining the result. 2. N/A is an abbreviation for Not Applicable 3. Special measures: None 4. Decision and justification not to measure: None 5. The EN 55032 emission measurement results are deemed satisfactory evidence of compliance with AS/NZS CISPR 32 regulations.			

Immunity				
Test Item	Basic Standard	Standard Criteria	EUT Criteria	Result
Electrostatic discharge	EN 55035:2017 (IEC 61000-4-2:2008)	B	A	Pass
Continuous RF Electromagnetic Field Disturbances Immunity Test	EN 55035:2017 (IEC 61000-4-3:2010)	A	A	Pass
Electrical fast transient/burst	EN 55035:2017 (IEC 61000-4-4:2012)	B	A	Pass
Surges at AC main power port	EN 55035:2017 (IEC 61000-4-5:2014 +A1:2017)	B	A	Pass
Surges at analogue/digital data ports (coaxial or shielded)	EN 55035:2017 (IEC 61000-4-5:2014 +A1:2017)	B	N/A	N/A
Continuous Induced by RF Disturbances Immunity Test	EN 55035:2017 (IEC 61000-4-6:2013)	A	A	Pass
Power frequency magnetic field	EN 55035:2017 (IEC 61000-4-8:2009)	A	A	Pass
Voltage dips, <5% residual	EN 55035:2017 (IEC 61000-4-11:2004 +A1:2017)	B	A	Pass
Voltage dips, 70% residual		C	A	Pass
Voltage interruptions, <5% residual		C	C	Pass
Note : 1. The uncertainties value is not used in determining the result. 2. N/A is an abbreviation for Not Applicable 3. Special measures: None 4. Decision and justification not to measure: None				

2.2. Description of Performance Criteria

Performance Criteria	
Criteria A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended. Performance criterion A for continuous radiated and conducted disturbances tests - Apply criterion A as defined in the general performance criterion. Additionally, an increase in any degradation greater than just perceptible by observation of the image shall not occur as a consequence of the application of the test. Examples of such degradations are: • superimposed patterning; • positional disturbances due to synchronization errors; • geometric distortion; • change of contrast or brightness; • picture artifacts; • freezing or disturbance of motion; • image loss; video data or decoding errors. Performance criterion A for the power frequency magnetic field tests - Alternative 1: A continuous magnetic field of 1 A/m: The jitter (in mm) shall not exceed the value $\frac{(\text{character height in mm} + 0,3) \times 2,5}{33,3}$ Alternative 2: An increased power frequency magnetic field ≤ 50 A/m: The amplitude of the disturbing field shall be increased by a factor K, where $1 \leq K \leq 50$. The jitter shall not exceed K times the value given in alternative 1. The value of K should be chosen to avoid saturation of any magnetic screening materials. When the EUT is subjected to fields above $K = 1$ and the performance criteria are satisfied for all relevant functions of the EUT, the EUT shall be deemed to satisfy the requirement. When the EUT is subjected to fields above $K = 1$ and the display function is shown to meet these performance criteria, but the performance criteria for other relevant functions are NOT satisfied, the EUT shall be retested at $K = 1$ (the field level required in table clause 1.1) to assess compliance for those other functions.

Performance Criteria	
Criteria A	Audio output function The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20dB or better.
Criteria B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

2.3. Description of Test Firm

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099301 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	(1) No. 7 Shielding Room (2) No. 1 10m Semi-Anechoic Chamber (3) No. 2 EMS Test Room

3. General Information

3.1. Description of Application

Applicant	Compal Electronics, Inc. No. 581 & 581-1, Ruiguang Rd., Neihu District, Taipei City 11492, Taiwan
Manufacturer	Compal Display electronics (Kunshan) Co., Ltd. No. 1881 Liji Road Shipai Bacheng Town, Kunshan, Jiangsu, P.R.China
Product	LCD Monitor
Brand	NEC
Model No.	M277D4

3.2. Description of the EUT

Test Model	M277D4
Serial Number	N/A
Power Rating	AC 100-240V, 50/60Hz
Firmware Version	N/A
Sample Status	Trial sample
Date of Receipt of Rev. A	2020. 05. 18
Data of Test of Rev. A	2020. 05. 19 ~ 25
I/O Ports List	Back View: • One DP Pot • One HDMI port • One D-Sub port • One Audio port • One AC In port Side View: • One Audio port
Accessories	• DP Cable • D-Sub Cable • AC Power Cord (3C)

3.3. Highest Frequency within EUT

The highest frequency is above 108MHz of EUT.

3.4. Description of Compliance Measurement

- The EUT is an additional version with original report number EM-E180712.
The differences with original reports is
(1) **to add a LCD panel. (LG Display / LM270WF7-SSD3)**
(2) **To update the standard to the latest version, refer to page 3.**
- Depending on all additions, the EUT selected the worst test mode “HDMI, 1920*1080/60Hz” was re-tested to comply with the standards requirements.
The supplementary test data are recorded in this report of EM-E180712.

3.5. List of Key Components of EUT

Item	Supplier/Brand	Model	Specification
LCD Panel	LG Display	LM270WF7-SSD3	Max. Resolution: 1920*1080/60Hz
Power board	Comapl	VP-2713	---
Touch key board	Sunjet	SJT5CRB0	---
Main board	Comapl	VL-2713	---

3.6. Final Test Configuration Mode

The worst showed as following configuration was tested and recorded in the report.

Test Item	Test Voltage	Panel Angle	Input Port	Resolution & Frequency
Conducted emissions at AC mains power port	AC 230V/50Hz	0°	HDMI	"H Pattern", 1920*1080/60Hz
Radiated emission (30 – 1000MHz)	AC 230V/50Hz	0°	HDMI	"H Pattern", 1920*1080/60Hz
Radiated emission (1 – 6GHz)	AC 230V/50Hz	0°	HDMI	"H Pattern", 1920*1080/60Hz
Harmonics current emission	AC 230V/50Hz	0°	HDMI	"H Pattern", 1920*1080/60Hz
Voltage fluctuations & flicker	AC 230V/50Hz	0°	HDMI	"H Pattern", 1920*1080/60Hz
Electrostatic Discharge Immunity	AC 230V/50Hz	0°	HDMI	Color bar, 1920*1080/60Hz
		90°	HDMI	Color bar, 1080*1920/60Hz
All Immunity tests	AC 230V/50Hz	0°	HDMI	Color bar, 1920*1080/60Hz

4. Measurement Arrangement

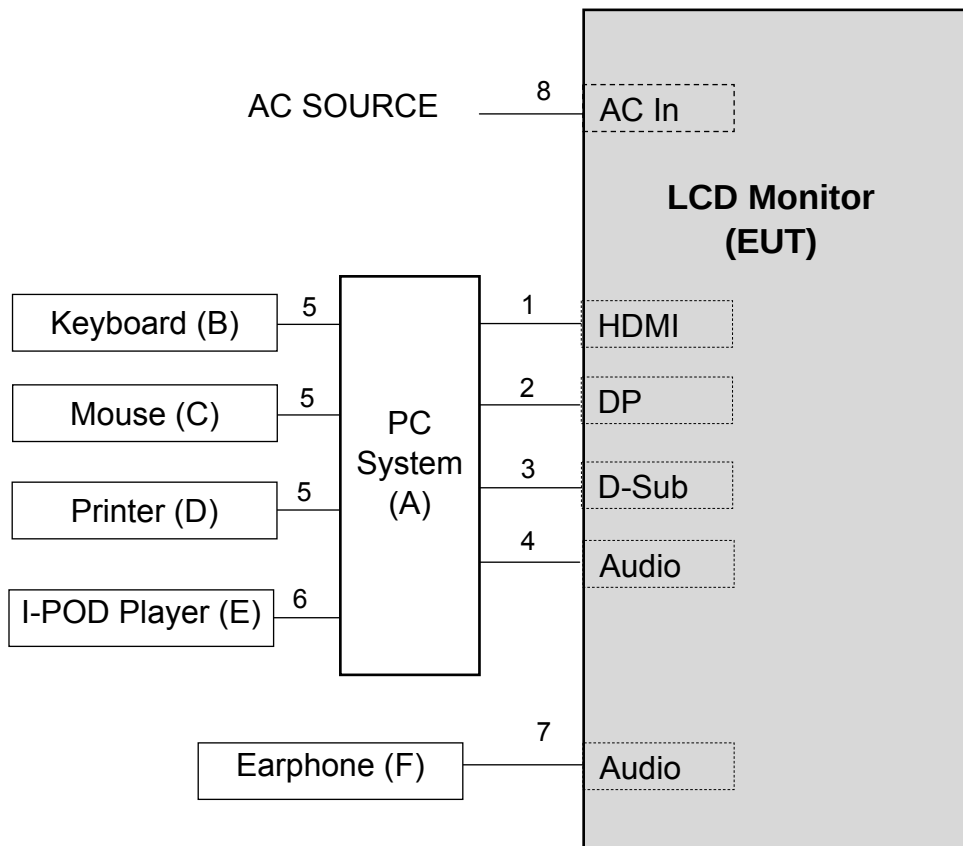
4.1. Equipment and cables arrangement

- Connection Diagram of EUT and Peripheral Devices

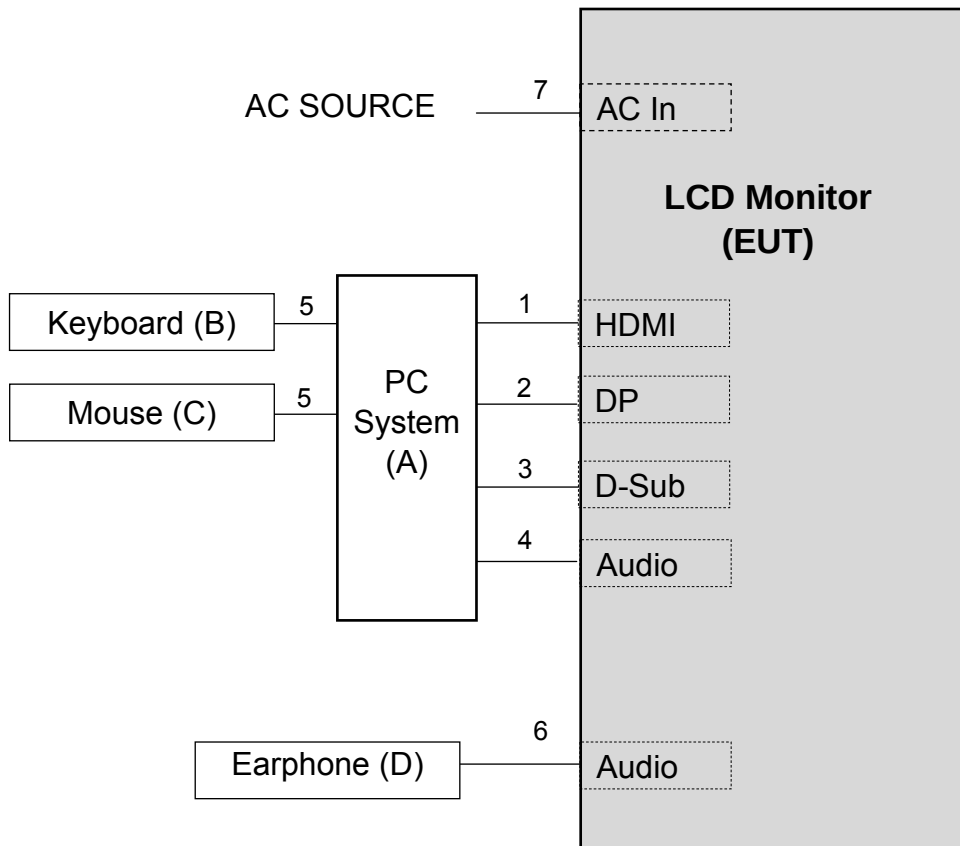
The EUT and peripherals were arranged as the requirement of CISPR 32 Annex D.

For Conducted & Radiated

****Worst Mode****



- Connection Diagram of EUT and Peripheral Devices
For harmonics, flicker and immunity tests
****Worst Mode****



4.2. Method of Exercising EUT

- The methods for exercising the EUT during the measurement specified in EN 55032 (CISPR 32) Annex B were used.

Operating System	Windows 7 of PC system
Test Program	“ITU-R BT 1729”, “Windows Media Player”, “BurnIn Test 8.1”, “ITU-R BT 471-1”
Video Signal (Display Image)	Standard Color bars with moving picture element (signal according to ITU-R BT 1729)
Audio Signal	Play 1kHz Audio Signal
Other	Other peripheral devices were driven and operated in turn

- The methods for exercising the EUT during the measurement specified in EN 55024 & EN 55035 was used.

Operating System	Windows 7 of PC system
Test Program	“Color bar”, “BurnIn Test 8.1”
Video Signal (Display Image)	Scrolling H characters
Audio Signal	Play 1kHz Audio Signal
Other	Other peripheral devices were driven and operated in turn

- Display and video parameters

Function	Setting
Hardware acceleration	Maximum
Screen settings	High/Middle/Low effective resolution (including the settings for pixel and frame rate)
Colour quality	Highest colour bit depth
Brightness, contrast, colour saturation	Use either the factory default settings
Other	Adjusted to obtain a typical picture using settings giving the highest performance

4.3. List of Supported Units under Test

Item	Product	Brand	Model No.	Serial No.	Approval
For Conducted and Radiated test					
A	PC System	Lenovo	RK4	PBFBK914	By DoC
B	USB Key-board	Lenovo	KU-1619	8SSD50L79990AVL C9A400WV	By DoC
C	USB Mouse	Lenovo	SM-8823	8SSM50L24506AVL C99H048T	By DoC
D	Printer	Samsung	ML-1630	4561B1CP600023X	FCCID: A3LML1 630
E	I-POD Player	APPLE	A1204	4H722T6KVTE	By DoC
F	Earphone	Cheng Jia	CJ-323	N/A	N/A
For Harmonic, Flicker and Immunity Tests					
A	PC System	Lenovo	MT-M 2697-AH5	PBFBK914	By DoC
B	USB Keyboard	Lenovo	SK-8825	00556782	By DoC
C	USB Mouse	Lenovo	M-U0025-0	N/A	By DoC
D	Earphone	Apple	N/A	N/A	N/A

4.4. List of Used Cables under Test

Item	Type	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remark
For conducted and radiated test						
1	HDMI Cable	1	1.8	Yes	0	Provided by LAB
2	DP Cable	1	1.8	Yes	0	Accessory of EUT
3	D-Sub Cable	1	1.8	Yes	2	Accessory of EUT
4	Audio Cable	1	1.8	No	0	Provided by LAB
5	USB Cable	3	1.8	Yes	0	Provided by LAB
6	USB Cable	1	1.0	Yes	0	Provided by LAB
7	Earphone Cable	1	2.0	No	0	Provided by LAB
8	AC Power Cord (3C)	1	1.5	No	0	Accessory of EUT
9	AC Power Cord	2	1.8	No	0	Provided by LAB for above supported units
For harmonic, flicker and immunity test						
1	HDMI Cable	1	1.8	Yes	0	Provided by LAB
2	DP Cable	1	1.8	Yes	0	Accessory of EUT
3	D-Sub Cable	1	1.8	Yes	2	Accessory of EUT
4	Audio Cable	1	1.8	No	0	Provided by LAB
5	USB Cable	2	1.8	Yes	0	Provided by LAB
6	Earphone Cable	1	0.9	No	0	Provided by LAB
7	AC Power Cord (3C)	1	1.5	No	0	Accessory of EUT
8	AC Power Cord	1	1.8	No	0	Provided by LAB for above supported units

5. Measurement of Conducted Emissions

5.1. List of Test Instruments

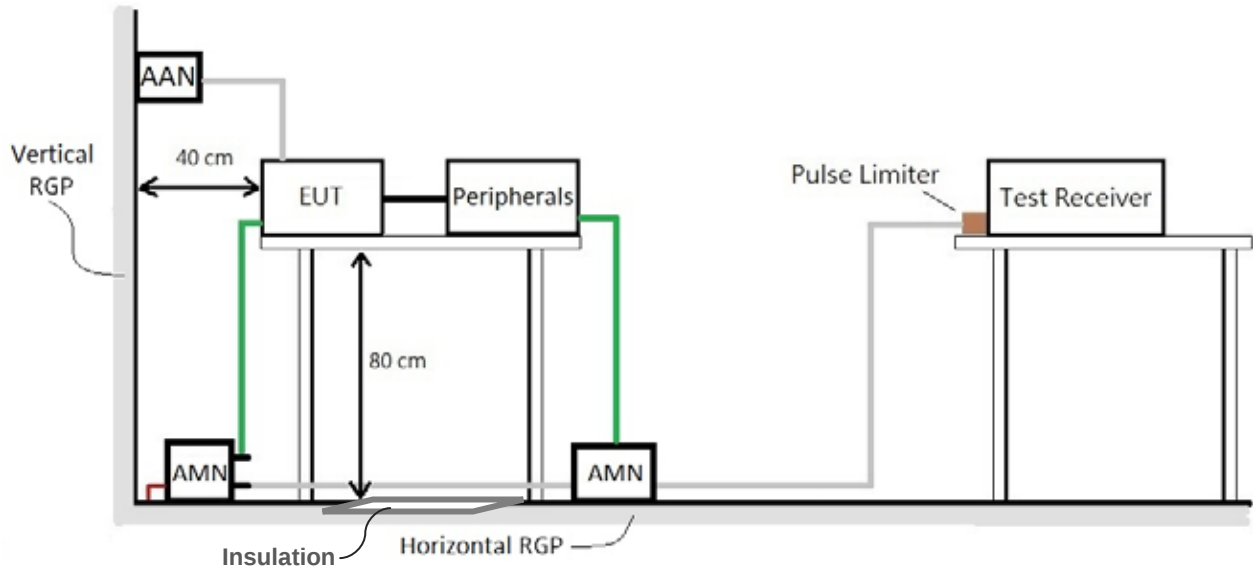
- For AC mains power port use

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R&S	ESCI	101276	2020. 03. 11	1 Year
2	A.M.N.	R&S	ESH2-Z5	100366	2019. 07. 10	1 Year
3	L.I.S.N.	Kyoritsu	KNW-407	8-1539-3	2020. 01. 07	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101495	2020. 01. 12	1 Year
5	Signal Cable	Thermax/CDT	RG-142	CE-07	2019. 05. 24	1 Year
6	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
7	Digital Ther- mo-Hygro Me- ter	iMax	HTC-1	No.7 S/R	2020. 04. 17	1 Year

5.2. Test Setup

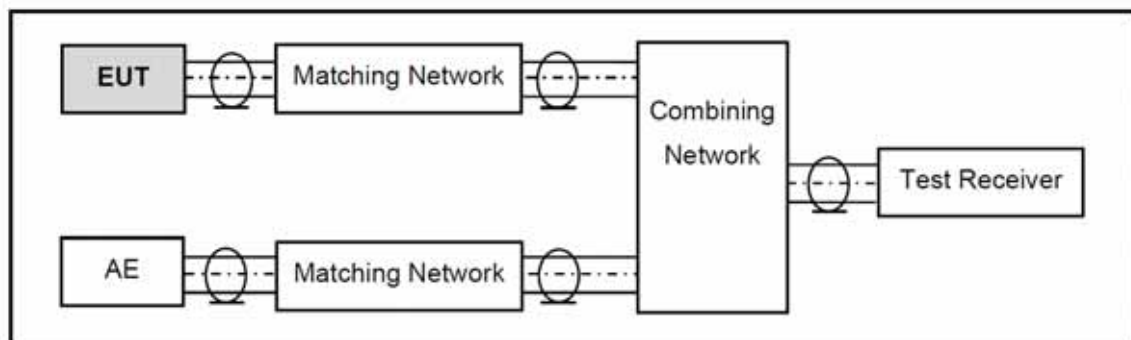
The EUTs and test equipment were configured in accordance with the requirement of EN 55032 (CISPR 32) Annex C, D:

- For AC mains power port
- For wired network port
- For TV broadcast receiver tuner port, asymmetric mode



EUT, local AE and associated cabling; and metal surfaces other than the RGP 80cm

- For TV broadcast receiver tuner port, differential voltage



5.3. Applicable Limits

- For conducted emissions from the AC mains power ports

Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Class A Limit dB(μ V)	Class B Limit dB(μ V)
0.15 – 0.5	AMN	Quasi Peak / 9 kHz	79	66 – 56
0.5 – 5.0			73	56
5.0 – 30			73	60
0.15 – 0.5	AMN	Average / 9 kHz	66	56 – 46
0.5 – 5.0			60	46
5.0 – 30			60	50

- For asymmetric mode conducted emissions

Applicable to:

- (1) Wired network ports
- (2) Optical fibre ports with metallic shield or tension members
- (3) Broadcast receiver tuner ports
- (4) Antenna ports

Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Class A Voltage Limit dB(μV)	Class A Current Limit dB(μA)
0.15 – 0.5	AAN	Quasi Peak / 9 kHz	79 – 87	n/a
0.5 – 30			87	
0.15 – 0.5	AAN	Average / 9 kHz	84 – 74	
0.5 – 30			74	
0.15 – 0.5	CVP and current probe	Quasi Peak / 9 kHz	79 – 87	53 – 43
0.5 – 30			87	43
0.15 – 0.5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
0.5 – 30			74	30
0.15 – 0.5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
0.5 – 30				43
0.15 – 0.5	Current Probe	Average / 9 kHz		40 – 30
0.5 – 30				30

Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Class B Voltage Limit dB(μV)	Class B Current Limit dB(μA)
0.15 – 0.5	AAN	Quasi Peak / 9 kHz	84 – 74	n/a
0.5 – 30			74	
0.15 – 0.5	AAN	Average / 9 kHz	74 – 64	
0.5 – 30			64	
0.15 – 0.5	CVP and current probe	Quasi Peak / 9 kHz	84 – 74	40 – 30
0.5 – 30			74	30
0.15 – 0.5	CVP and current probe	Average / 9 kHz	74 – 64	30 – 20
0.5 – 30			64	20
0.15 – 0.5	Current Probe	Quasi Peak / 9 kHz	n/a	40 – 30
0.5 – 30				30
0.15 – 0.5	Current Probe	Average / 9 kHz		30 – 20
0.5 – 30				20

● For conducted differential voltage emissions

Applicable to:

- (1) TV broadcast receiver tuner ports with an accessible connector
- (2) RF modulator output ports
- (3) FM broadcast receiver tuner ports with an accessible connector

Frequency Range (MHz)	Detector Type / Bandwidth	Class B Limit dB(μ V) 75 Ω			Applicability
		Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
30 – 950	For frequencies ≤ 1 GHz Quasi Peak / 120 k	46	46	46	See ^a
950 – 2150		46	54	54	
950 – 2150		46	54	54	See ^b
30 – 300	For frequencies ≥ 1 GHz Peak / 1MHz	46	54	50	See ^c
300 – 1000				52	
30 – 300		46	66	59	See ^d
300 – 1000				52	
30 – 950		46	76	46	See ^e
950 – 2150			n/a	54	

^a Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

^b Tuner units (not the LNB) for satellite signal reception

^c Frequency modulation audio receivers and PC tuner cards.

^d Frequency modulation car radio.

^e Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports. Limits specified for the LO are for the RF modulator carrier signal and harmonics.

5.4. Measurement Procedure

For AC mains power port

The method of EN 55032 (CISPR 32) clause 6.3 was used.

- Setup the EUTs and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect the EUT power cord to the main A.M.N and associated equipment to the second A.M.N. All ports of the A.M.N not connecting to the measuring equipment was terminated into 50 ohm resistive load.
- Connect receiver tuner port to an AAN that is bonded to the RGP.
- Setup the resolution bandwidth of the test receiver as section 5.3 defined.
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of the EUT power cord with the peak detector by each of the EUT operation over the specified frequency range and record it, and then
- For final measurement, select the EUT operation mode that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the current-carrying conductors of each of the EUT power cords, except the ground conductor, must be measured over the specified frequency range.
- The measurement result was calculated by following formula :
- $\text{Emission Level} = \text{Reading (Receiver)} + \text{Factor (A.M.N)} + \text{Insertion Loss (Pulse Limiter)} + \text{Cable Loss}$
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

For Wired network port

The method of EN 55032 (CISPR 32) Annex C 4.1.6.2 was used.

- Setup the EUTs and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect wired network port between EUT and AE through the AAN.
- Setup the resolution bandwidth of the test receiver as section 5.3 defined.
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of the EUT LAN port with the peak detector by each of the transmission rate over the specified frequency range and record it, and then
- For final measurement, select the worst network port that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the transmission rates must be measured over the specified frequency range.
- The measurement result was calculated by following formula :
- $\text{Emission Level} = \text{Reading (Receiver)} + \text{Factor (AAN)} + \text{Insertion Loss (Pulse Limiter)} + \text{Cable Loss}$
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

For TV broadcast receiver tuner port, Asymmetric mode

The method of EN 55032 (CISPR 32) Annex C 4.1.6.2 was used.

- Setup the EUTs and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect TV broadcast receiver tuner port between EUT and S.G. through the AAN.
- Setup the resolution bandwidth of the test receiver at 9kHz (while testing within 0.15 to 30MHz).
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on TV broadcast receiver tuner port with the peak detector by the TV channel over the specified frequency range and record it, and then
- For final measurement, the TV channel that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the transmission rates must be measured over the specified frequency range.
- The measurement result was calculated by following formula:
Emission Level =
Reading (Receiver) + Factor (AAN) + Insertion Loss (Pulse Limiter) + Cable Loss
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

For TV broadcast receiver tuner port, Differential voltage

The method of EN 55032 (CISPR 32) Annex C 4.1.6.2 was used.

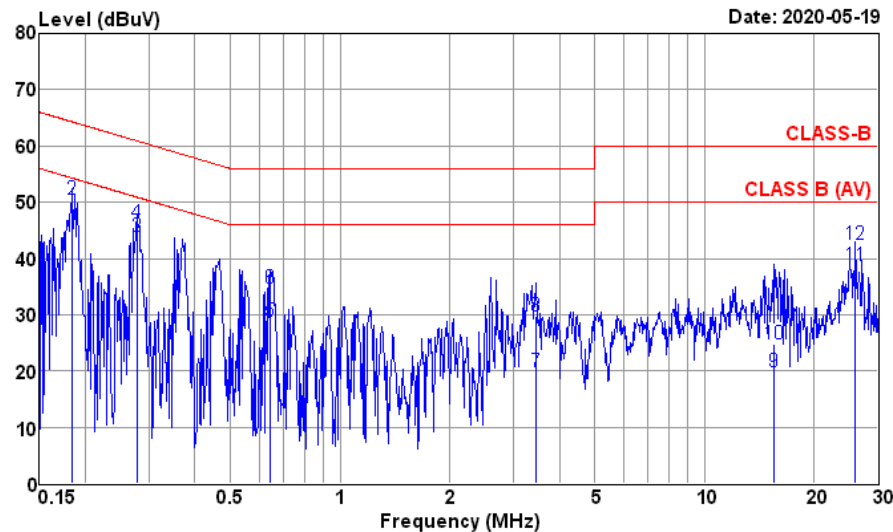
- The EUT and test equipment was set-up as section 4.1 and 5.2.
- The resolution bandwidth of the test receiver was at 120kHz (Quasi Peak) for frequencies below 1GHz or 1MHz (Peak) for frequencies above 1GHz.
- The antenna input terminal of EUT was connected to the test receiver via 75-50 ohm matching pad and T-Pad. The EUT and TV Pattern Generator or USB Compact Modulator were set to one of the same frequency (channel) specified in following test channel and frequency list, measuring both radiated frequency and disturbance voltage present at antenna input terminal over the frequency range from 30MHz up to at last the second harmonic of the highest local oscillator frequency (2150MHz).
- Record the final readings from test receiver with Quasi-Peak detector.
- The measurement result was calculated by following formula:
Measurement Level =
Factor (Matching Pad Loss + Cable Loss) + Test Receiver Reading

5.5. Measurement Result

The following data are the worst emissions based on the prescan measurement result.

● Result for AC Mains Power Port

Test Phase	Neutral	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		

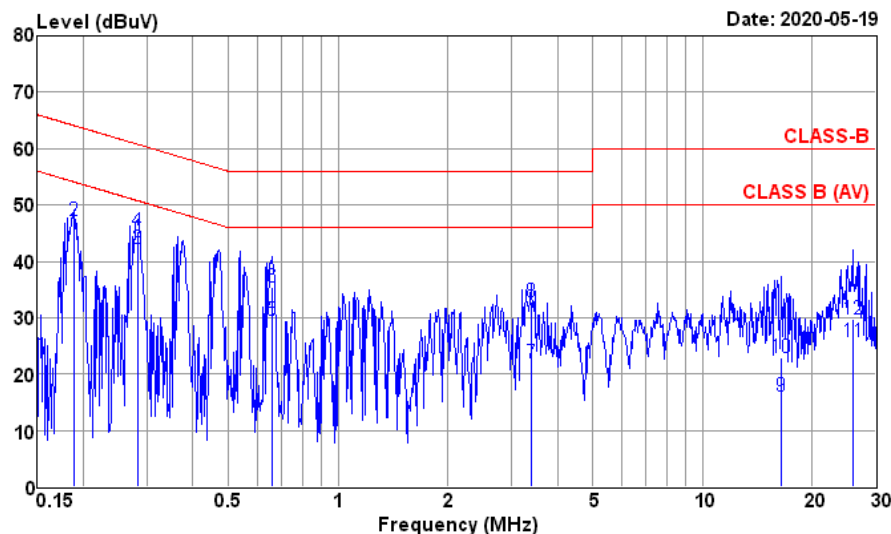


Site No.	: No.7 Shielded Room	Data No.	: 2
Instrument 1	: Receiver ESCI(276)		
Instrument 2	: ESH2-Z5 (366)(A) CE-07 ESH3-Z2 (495)		
Limit	: CLASS-B	Phase	: NEUTRAL
Environment	: 25°C / 45%	Engineer	: Ken Yang
EUT Model	: M277D4	Test Rating	: 230Vac/50Hz
Test Mode	: 1920*1080/60Hz HDMI		

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.184	0.16	0.03	9.86	35.02	45.07	54.28	9.21	Average
2	0.184	0.16	0.03	9.86	40.49	50.54	64.28	13.74	QP
3	0.277	0.16	0.03	9.86	33.77	43.82	50.90	7.08	Average
4	0.277	0.16	0.03	9.86	36.19	46.24	60.90	14.66	QP
5	0.644	0.19	0.04	9.86	18.67	28.76	46.00	17.24	Average
6	0.644	0.19	0.04	9.86	24.72	34.81	56.00	21.19	QP
7	3.454	0.28	0.09	9.88	9.57	19.82	46.00	26.18	Average
8	3.454	0.28	0.09	9.88	19.42	29.67	56.00	26.33	QP
9	15.552	0.77	0.19	9.94	8.99	19.89	50.00	30.11	Average
10	15.552	0.77	0.19	9.94	13.98	24.88	60.00	35.12	QP
11	26.001	0.90	0.25	10.00	27.57	38.72	50.00	11.28	Average
12	26.001	0.90	0.25	10.00	31.30	42.45	60.00	17.55	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Phase	Line	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		



Site No. : No.7 Shielded Room Data No. : 1
 Instrument 1 : Receiver ESCI(276)
 Instrument 2 : ESH2-Z5 (366)(A)|CE-07|ESH3-Z2 (495)
 Limit : CLASS-B Phase : LINE
 Environment : 25°C / 45% Engineer : Ken Yang
 EUT Model : M277D4 Test Rating : 230Vac/50Hz
 Test Mode : 1920*1080/60Hz HDMI

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.188	0.06	0.03	9.86	34.91	44.86	54.11	9.25	Average
2	0.188	0.06	0.03	9.86	37.15	47.10	64.11	17.01	QP
3	0.283	0.07	0.03	9.86	32.26	42.22	50.72	8.50	Average
4	0.283	0.07	0.03	9.86	35.27	45.23	60.72	15.49	QP
5	0.658	0.10	0.04	9.86	19.47	29.47	46.00	16.53	Average
6	0.658	0.10	0.04	9.86	25.34	35.34	56.00	20.66	QP
7	3.381	0.18	0.09	9.87	11.86	22.00	46.00	24.00	Average
8	3.381	0.18	0.09	9.87	22.71	32.85	56.00	23.15	QP
9	16.486	0.68	0.20	9.95	5.28	16.11	50.00	33.89	Average
10	16.486	0.68	0.20	9.95	12.05	22.88	60.00	37.12	QP
11	25.864	0.95	0.25	10.00	14.49	25.69	50.00	24.31	Average
12	25.864	0.95	0.25	10.00	18.59	29.79	60.00	30.21	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
 2. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

6. Measurement of Radiated Emissions

6.1. List of Test Instruments

- For measurement of 30 to 1000MHz frequency range

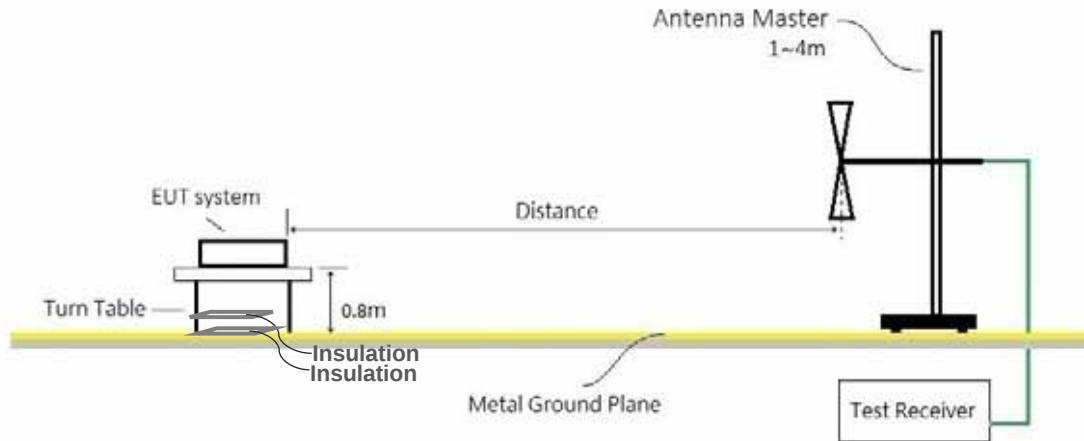
Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-503	MY51250850	2020. 02. 26	1 Year
2	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2019. 12. 11	1 Year
3	Test Receiver	R&S	ESCI7	100922	2019. 05. 27	1 Year
4	Amplifier	EMCI	EMC9135	980530	2019. 09. 17	1 Year
5	Amplifier	EMCI	EMC9135	980531	2019. 09. 17	1 Year
6	TRILOG Broad band antenna	Schwarzbeck	VULB 9168	711	2019. 07. 16	1 Year
7	TRILOG Broad band antenna	Schwarzbeck	VULB 9168	712	2019. 07. 16	1 Year
8	Signal Cable	HUBER + SUHNER	S07212BD	RE-22	2020. 01. 31	1 Year
9	Signal Cable	HUBER + SUHNER	S07212BD	RE-23	2020. 01. 31	1 Year
10	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
11	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 10m A/C	2020. 04. 17	1 Year

- For measurement of above 1GHz frequency range

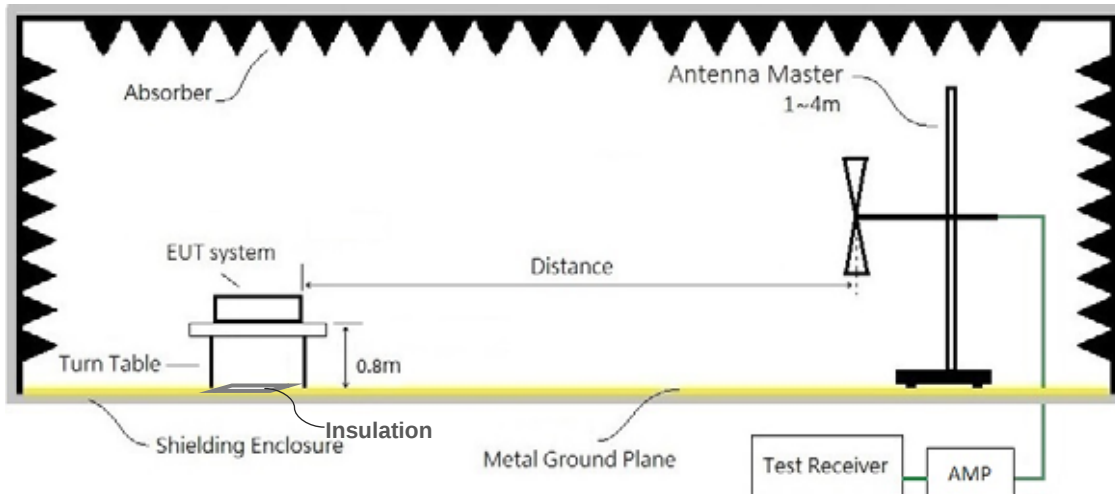
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-526	MY51250943	2020. 02. 14	1 Year
2	Microwave Preamplifier	HP	8449B	3008A01284	2019. 05. 30	1 Year
3	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00227046	2020. 03. 24	1 Year
4	Signal Cable	HUBER+ SUHNER	SUCOFLEX 104	10m ACCL 1-18G	2020. 04. 22	1 Year
5	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 10m A/C	2020. 04. 17	1 Year
6	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.

6.2. Test Setup

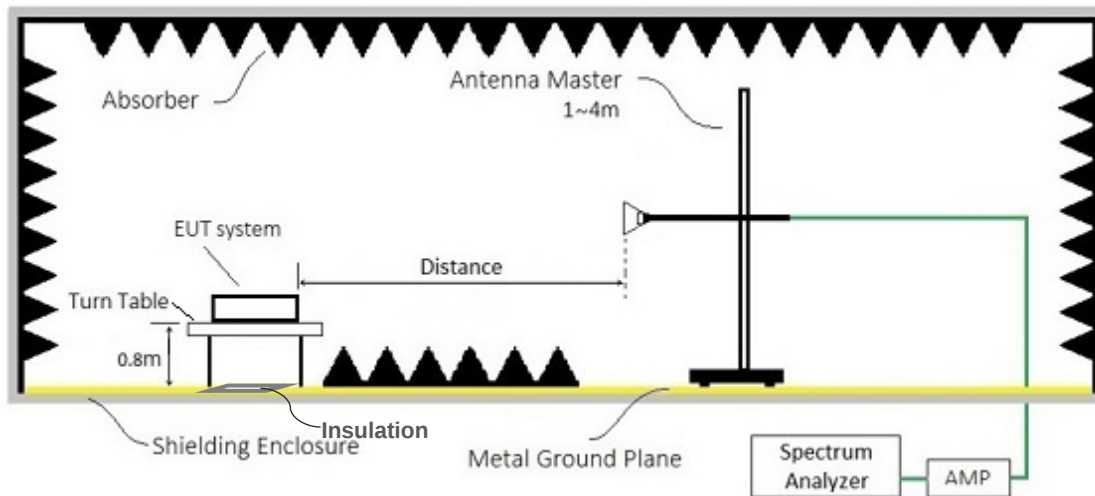
- For frequency range 30 to 1000MHz (at Open Area Test Site)



- For frequency range 30 to 1000MHz (at Semi-Anechoic Chamber)



- For frequency range 1 to 6GHz (at Semi-Anechoic Chamber)



6.3. Applicable Limits

- For radiated emissions at frequencies up to 1GHz

Frequency Range (MHz)	Measurement			Class A Limits dB(μV/m)	Class B Limits dB(μV/m)
	Facility	Distance (m)	Detector Type/ Bandwidth		
30 – 230	OATS/ SAC	10	Quasi Peak/ 120 kHz	40	30
230 – 1000				47	37
30 – 230		3		50	40
230 – 1000				57	47

- For radiated emissions at frequencies above 1GHz

Frequency Range (MHz)	Measurement			Class A Limits dB(μV/m)	Class B Limits dB(μV/m)
	Facility	Distance (m)	Detector Type/ Bandwidth		
1000 – 3000	FSOATS	3	Average/ 1 MHz	56	50
3000 – 6000				60	54
1000 – 3000			Peak/ 1 MHz	76	70
3000 – 6000				80	74

- For radiated emissions at frequencies from FM receivers

Frequency Range (MHz)	Measurement			Class B Limits dB(μV/m)	
	Facility	Distance (m)	Detector Type/ Bandwidth	Fundamental	Harmonics
30 – 230	OATS/ SAC	10	Quasi Peak/ 120 kHz	50	42
230 – 300					42
300 – 1000					46
30 – 230	OATS/ SAC	3		60	52
230 – 300					52
300 – 1000					56

- Required highest frequency for radiated measurement

Highest frequency generated or used in the EUT or on which the EUT operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6GHz, whichever is less

- For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.
- For outdoor units of home satellite receiving systems highest measured frequency shall be 18 GHz.

6.4. Measurement Procedure

The measurement procedure specified in EN 55032 (CISPR 32) clause 6.3 was performed.

- The EUT and peripherals were placed on the rotatable non-conduction table, which is 0.8meters above the ground reference plane at the semi-anechoic chamber or OATS as described in section 4.1 and 6.2.
- The measurement distance is set as specified in section 6.3. The specified distance is between the horizontal projection onto the ground plane of the closest periphery of the EUT and the projection onto the ground plane of the center of the axis of the elements of the receiving antenna.
- The resolution bandwidth of the test receiver was set as section 6.3 defined.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of antenna polarization with the peak detector by each of the EUT operations over the specified frequency range and record it, and then
- For final measurement, select the EUT operation mode that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it.
- In order to determine the maximum emission level, must rotate the table in 360 degree and move the receiving antenna between 1~4m height above the ground reference plane.
- Both polarizations of receiving antenna were determined.
- The measurement result was calculated by following formulas:

(30 – 1000MHz)

Emission Level = Reading (Receiver) + Cable Loss + Antenna Factor

(Above 1GHz)

Emission Level = Reading (Spectrum) + Cable Loss + Antenna Factor – Preamp Gain

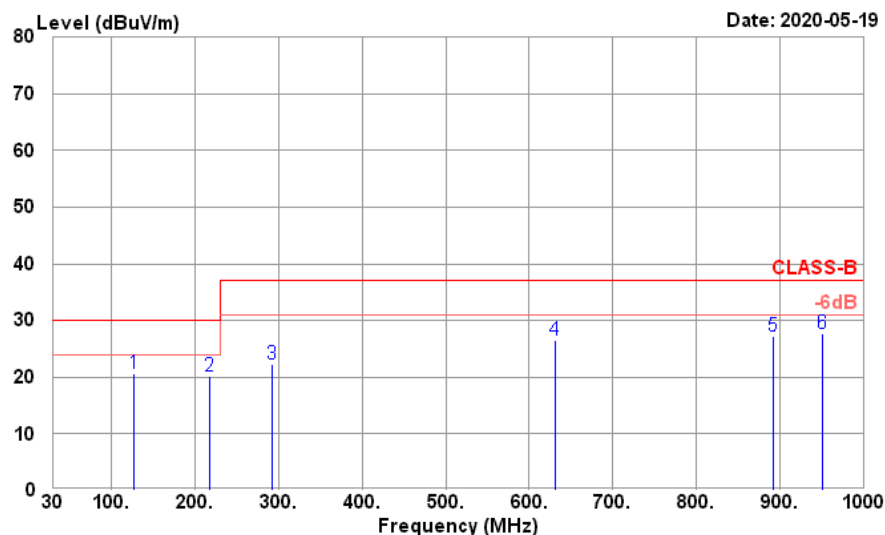
- The 3dB bandwidth of the horn antenna is minimum 52 degree (w=2.93m at 3m distance) for 1~6 GHz.

6.5. Measurement Result

The following data are the worst emissions based on the prescan measurement result.

- For frequency range 30 – 1000MHz

Ant. Polarity	Horizontal	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		

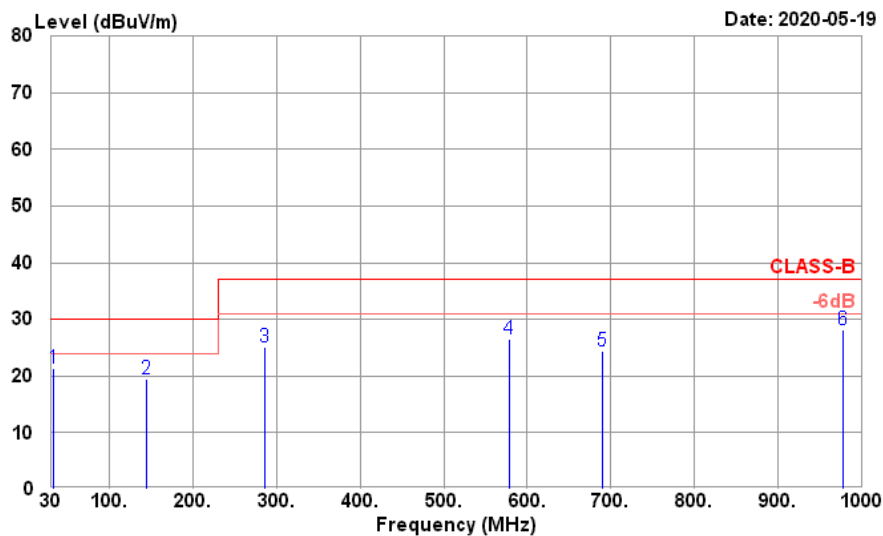


Site No. : No.1 10m Semi Anechoic Chamber Data No. : 4
 Instrument 1 : Spectrum N9010A(119)|Receiver ESCI(922)
 Instrument 2 : VULB 9168 (712)|RE-23|EMC9135 (531)
 Distance/Limit : 10m / CLASS-B Ant. Pol. : HORIZONTAL
 Environment : 22°C / 58% Engineer : Nick Du
 EUT Model : M277D4 Test Rating : 230Vac/50Hz
 Test Mode : 1920*1080/60Hz HDMI

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	126.465	17.64	2.45	36.99	37.46	20.56	30.00	9.44	QP
2	217.457	16.40	3.17	36.88	37.46	20.15	30.00	9.85	QP
3	291.376	18.92	3.65	36.94	36.61	22.24	37.00	14.76	QP
4	631.645	25.85	5.41	37.23	32.45	26.48	37.00	10.52	QP
5	891.415	29.01	6.50	37.30	28.96	27.17	37.00	9.83	QP
6	950.476	29.39	6.84	37.07	28.54	27.70	37.00	9.30	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emissions not reported are 20 dB lower than the specified limit.

Ant. Polarity	Vertical	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		



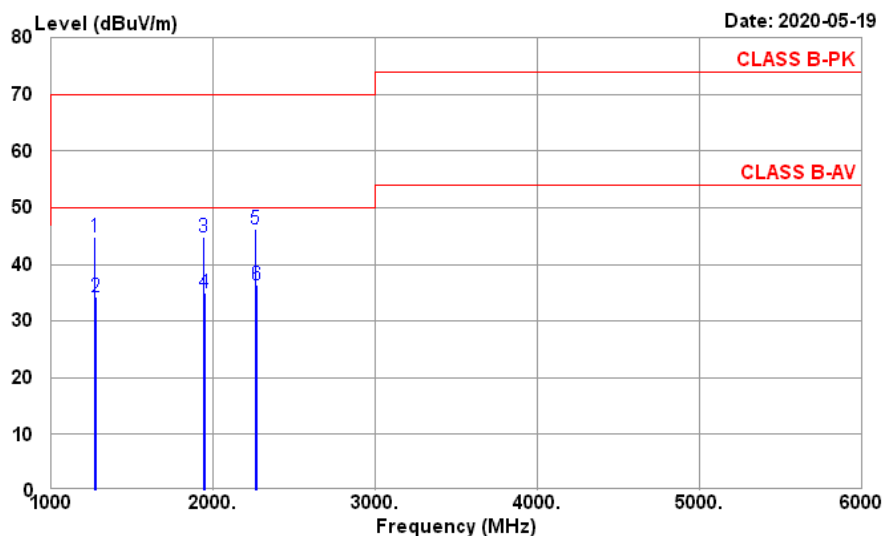
Site No. : No.1 10m Semi Anechoic Chamber Data No. : 3
 Instrument 1 : Spectrum N9010A(850)|Receiver ESCI(922)
 Instrument 2 : VULB 9168 (711)|RE-22|EMC9135 (530)
 Distance/Limit : 10m / CLASS-B Ant. Pol. : VERTICAL
 Environment : 22°C / 58% Engineer : Nick Du
 EUT Model : M277D4 Test Rating : 230Vac/50Hz
 Test Mode : 1920*1080/60Hz HDMI

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	32.615	18.67	0.67	37.41	39.46	21.39	30.00	8.61	QP
2	144.461	18.79	1.55	36.85	35.89	19.38	30.00	10.62	QP
3	285.651	18.93	2.31	36.80	40.74	25.18	37.00	11.82	QP
4	578.645	24.86	3.47	37.25	35.47	26.55	37.00	10.45	QP
5	689.462	26.50	3.78	37.27	31.46	24.47	37.00	12.53	QP
6	977.341	29.39	4.73	36.74	30.77	28.15	37.00	8.85	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emissions not reported are 20 dB lower than the specified limit.

- For frequency range Above 1GHz

Ant. Polarity	Horizontal	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		

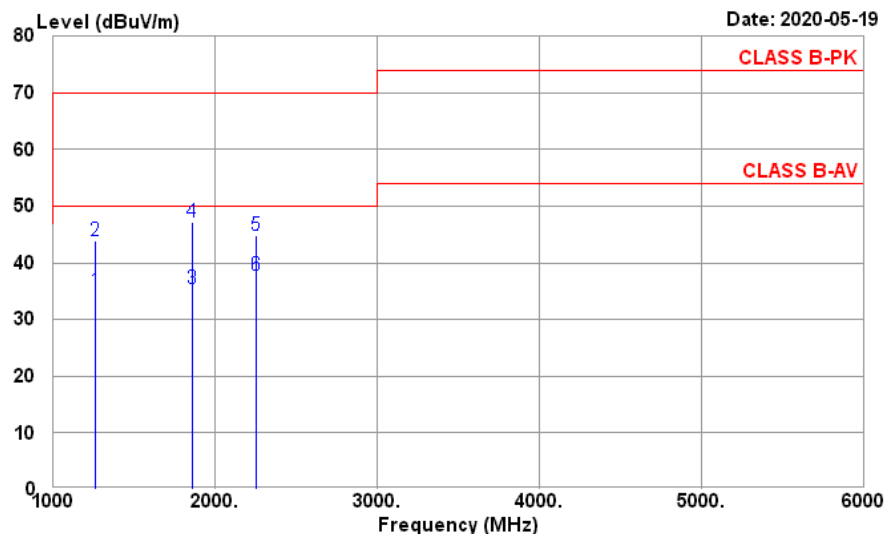


Site No. : No.1 10m Semi Anechoic Chamber Data No. : 16
 Instrument 1 : Spectrum N9010A(943)
 Instrument 2 : 3117 (046)|RE-24|8449B (284)
 Distance/Limit : 3m / CLASS B-PK Ant. Pol. : HORIZONTAL
 Environment : 22°C / 58% Engineer : Nick Du
 EUT Model : M277D4 Test Rating : 230Vac/50Hz
 Test Mode : 1920*1080/60Hz HDMI

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1267.446	27.68	2.15	40.42	55.49	44.90	70.00	25.10	Peak
2	1273.696	27.55	2.16	40.42	45.06	34.35	50.00	15.65	Average
3	1938.465	30.89	2.64	40.06	51.46	44.93	70.00	25.07	Peak
4	1945.495	30.94	2.64	40.06	41.49	35.01	50.00	14.99	Average
5	2265.000	31.80	2.86	40.02	51.53	46.17	70.00	23.83	Peak
6	2267.790	31.69	2.86	40.02	41.79	36.32	50.00	13.68	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emissions not reported are 20 dB lower than the specified limit.

Ant. Polarity	Vertical	Test Result	Pass
Test Mode	HDMI, 1920*1080/60Hz		



Site No. : No.1 10m Semi Anechoic Chamber Data No. : 15
 Instrument 1 : Spectrum N9010A(943)
 Instrument 2 : 3117 (046)|RE-24|8449B (284)
 Distance/Limit : 3m / CLASS B-PK Ant. Pol. : VERTICAL
 Environment : 22°C / 58% Engineer : Nick Du
 EUT Model : M277D4 Test Rating : 230Vac/50Hz
 Test Mode : 1920*1080/60Hz HDMI

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	1258.455	27.81	2.15	40.43	45.54	35.07	50.00	14.93	Average
2	1264.452	27.74	2.15	40.42	54.50	43.97	70.00	26.03	Peak
3	1856.161	31.21	2.59	40.10	41.80	35.50	50.00	14.50	Average
4	1861.795	31.12	2.60	40.09	53.49	47.12	70.00	22.88	Peak
5	2251.945	31.40	2.85	40.02	50.59	44.82	70.00	25.18	Peak
6	2254.466	31.40	2.85	40.02	43.50	37.73	50.00	12.27	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Preamp Gain + Reading.
 2. The emissions not reported are 20 dB lower than the specified limit.

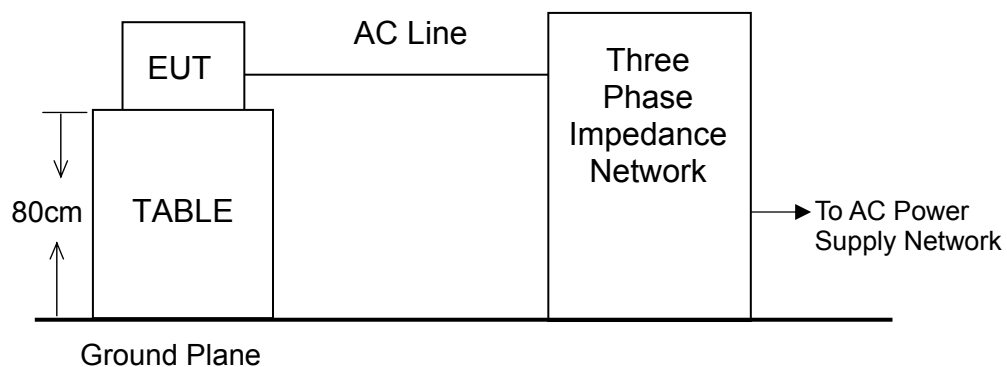
7. Measurement of Harmonics Current Emissions

7.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	AC Power Source	TESEQ	NSG 1007-45	1248A04038	2017. 11. 28	3 Years
2	Signal Conditioning Unit	TESEQ	CCN 1000-3	1234A03680	2017. 11. 28	3 Years
3	Three Phase Impedance Network	TESEQ	INA 2197	1234A03681	2017. 11. 28	3 Years
4	Proflin AC Switching Unit	TESEQ	NSG 2200-3	EK 22713	2019. 07. 04	2 Years
5	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Harmon-ics Room	2020. 04. 17	1 Year

7.2. Test Setup

The EUT and test equipment were configured in accordance with the requirement of EN 61000-3-2.



7.3. Applicable Standard and Limits

Limits for Class D Equipment

Class D is classified according to section 5 of EN 61000-3-2

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
Odd Harmonics Only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
$15 \leq n \leq 39$	$3.85/n$	$0.15 \times 15/n$

Note:

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

7.4. Measurement Procedure

The measurement procedure specified in EN 61000-3-2 clause 6.2 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.
- Let EUT work as stated and through three phase impedance network to measure the EUT to get the harmonic current for Odd & Even harmonics up to 40th.

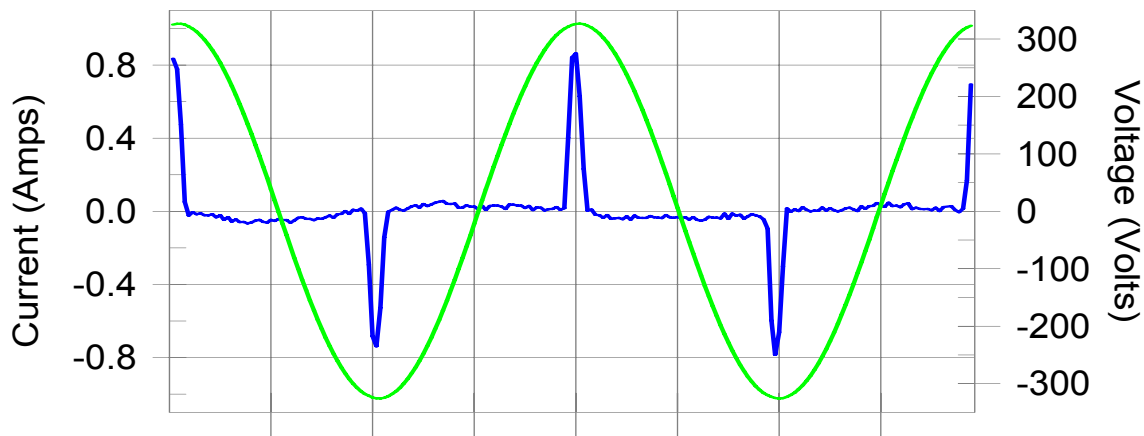
7.5. Measurement Result

Test Date	2020. 05. 25	Environment	26°C, 40%
Input Power	AC 230V, 50Hz	Test Result	Pass (Class D)
Tested By	Newman Yang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Test Result: N/L

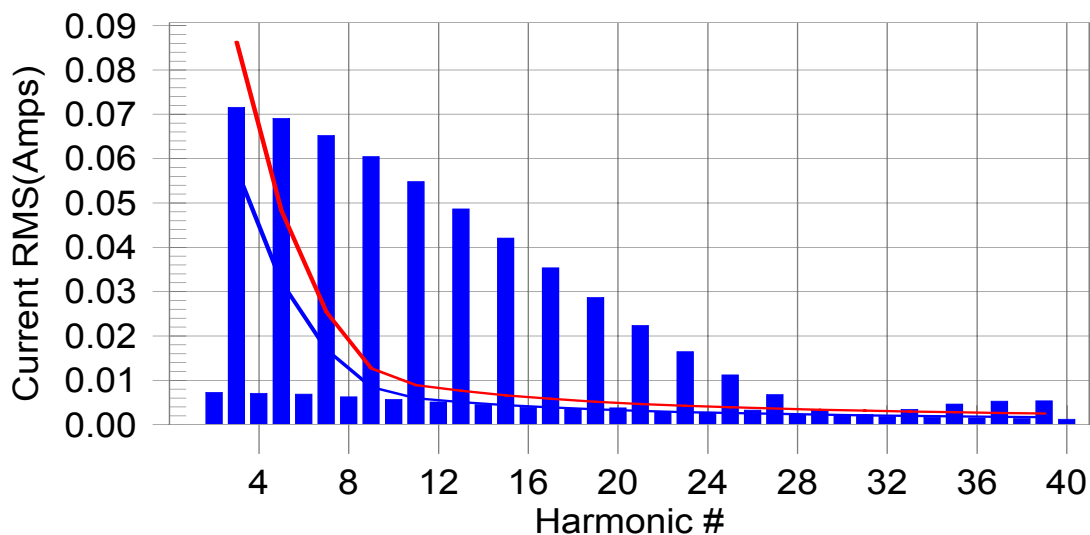
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class D limit line

European Limits



Test result: N/L Worst harmonics H0-0.0% of 150% limit, H0-0% of 100% limit.

Test Result: N/L Source qualification: Normal
 THC(A): 0.169 I-THD(%): 211.7 POHC(A): 0.032 POHC Limit(A): 0.007

Highest parameter values during test:

V_RMS (Volts):	230.607	Frequency(Hz):	50.00
I_Peak (Amps):	0.936	I_RMS (Amps):	0.187
I_Fund (Amps):	0.080	Crest Factor:	5.030
Power (Watts):	16.9	Power Factor:	0.399

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.007	0.000	N/A	0.008	0.000	N/A	Pass
3	0.072	0.058	N/A	0.072	0.086	N/A	Pass
4	0.007	0.000	N/A	0.008	0.000	N/A	Pass
5	0.069	0.032	N/A	0.069	0.048	N/A	Pass
6	0.007	0.000	N/A	0.008	0.000	N/A	Pass
7	0.065	0.017	N/A	0.065	0.025	N/A	Pass
8	0.006	0.000	N/A	0.007	0.000	N/A	Pass
9	0.060	0.008	N/A	0.061	0.013	N/A	Pass
10	0.006	0.000	N/A	0.006	0.000	N/A	Pass
11	0.055	0.006	N/A	0.055	0.009	N/A	Pass
12	0.005	0.000	N/A	0.005	0.000	N/A	Pass
13	0.049	0.005	N/A	0.049	0.008	N/A	Pass
14	0.005	0.000	N/A	0.005	0.000	N/A	Pass
15	0.042	0.004	N/A	0.042	0.007	N/A	Pass
16	0.004	0.000	N/A	0.004	0.000	N/A	Pass
17	0.035	0.004	N/A	0.036	0.006	N/A	Pass
18	0.004	0.000	N/A	0.004	0.000	N/A	Pass
19	0.029	0.003	N/A	0.029	0.005	N/A	Pass
20	0.004	0.000	N/A	0.004	0.000	N/A	Pass
21	0.022	0.003	N/A	0.023	0.005	N/A	Pass
22	0.003	0.000	N/A	0.003	0.000	N/A	Pass
23	0.016	0.003	N/A	0.017	0.004	N/A	Pass
24	0.003	0.000	N/A	0.003	0.000	N/A	Pass
25	0.011	0.003	N/A	0.011	0.004	N/A	Pass
26	0.003	0.000	N/A	0.003	0.000	N/A	Pass
27	0.007	0.002	N/A	0.007	0.004	N/A	Pass
28	0.002	0.000	N/A	0.002	0.000	N/A	Pass
29	0.003	0.002	N/A	0.004	0.003	N/A	Pass
30	0.002	0.000	N/A	0.002	0.000	N/A	Pass
31	0.002	0.002	N/A	0.002	0.003	N/A	Pass
32	0.002	0.000	N/A	0.002	0.000	N/A	Pass
33	0.003	0.002	N/A	0.004	0.003	N/A	Pass
34	0.002	0.000	N/A	0.002	0.000	N/A	Pass
35	0.005	0.002	N/A	0.005	0.003	N/A	Pass
36	0.002	0.000	N/A	0.002	0.000	N/A	Pass
37	0.005	0.002	N/A	0.005	0.003	N/A	Pass
38	0.001	0.000	N/A	0.001	0.000	N/A	Pass
39	0.005	0.002	N/A	0.005	0.003	N/A	Pass
40	0.001	0.000	N/A	0.001	0.000	N/A	Pass

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

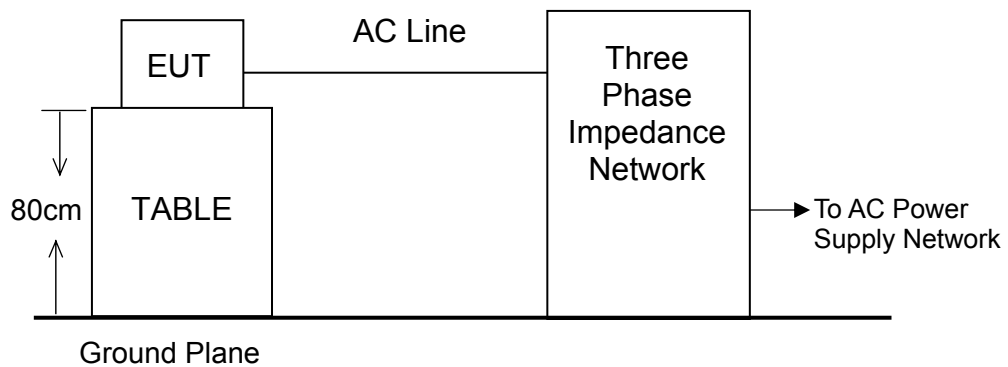
8. Measurement of Voltage Fluctuations and Flicker Emissions

8.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	AC Power Source	TESEQ	NSG 1007-45	1248A04038	2017. 11. 28	3 Years
2	Signal Conditioning Unit	TESEQ	CCN 1000-3	1234A03680	2017. 11. 28	3 Years
3	Three Phase Impedance Network	TESEQ	INA 2197	1234A03681	2017. 11. 28	3 Years
4	Profling AC Switching Unit	TESEQ	NSG 2200-3	EK 22713	2019. 07. 04	2 Years
5	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Harmon-ics Room	2020. 04. 17	1 Year

8.2. Test Setup

The EUT and test equipment were configured in accordance with the requirement of EN 61000-3-3.



8.3. Applicable Standard and Limits

(1) Limits is according to section 5 of EN 61000-3-3

Tested Items	Description	Limit
P_{st}	Short-term Flicker Indicator	≤ 1.0
P_{lt}	Long-term Flicker Indicator	≤ 0.65
$d_{(t)}$	Voltage change more than 500ms	$\leq 3.3\%$
T_{max}	Maximum time duration during the observation period that the voltage deviation $d_{(t)}$ exceeds the limit for d_c	500ms
d_c	Relative steady-state voltage change	$\leq 3.3\%$
d_{max}	Maximum relative voltage change	$\leq 4\%$
	Maximum relative voltage change	$\leq 6\%$
	Maximum relative voltage change	$\leq 7\%$

8.4. Measurement Procedure

The measurement procedure specified in EN 61000-3-3 clause 6 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.
- Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.
- If the maximum r.m.s input current (including inrush current) does not exceed 20A, and the supply current after inrush is within a variation band of 1.5A, it's not applicable to test the manual switching.

8.5. Measurement Result

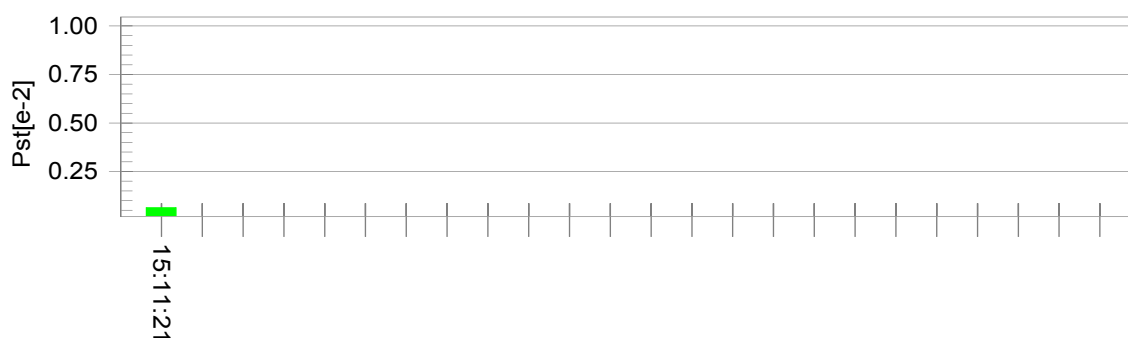
Test Date	2020. 05. 25	Environment	26°C, 40%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Newman Yang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Test Result: Pass

Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.56		
T-max (mS):	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.03	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass

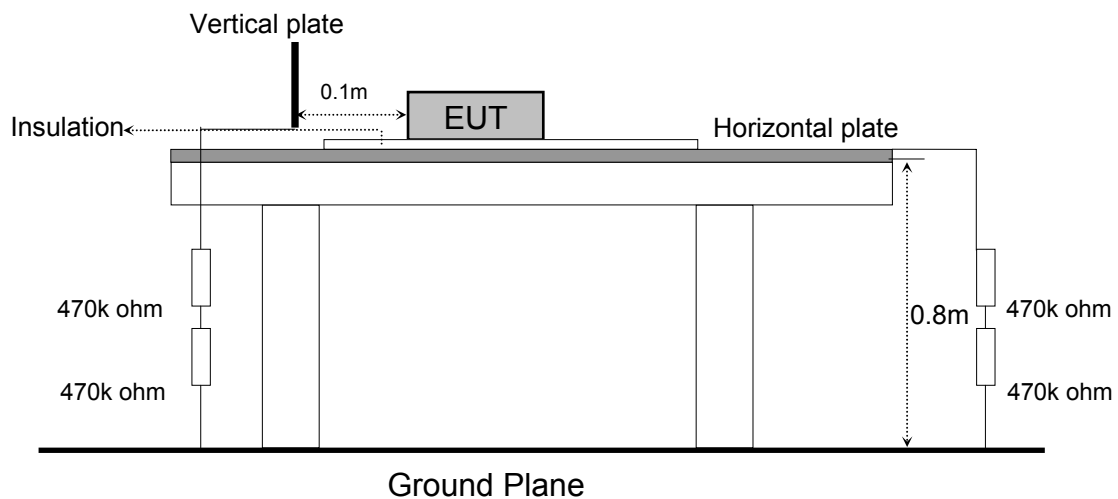
9. Electrostatic Discharge Immunity Test

9.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	ESD Simulator	TESEQ	NSG 438	1497	2019. 11. 20	1 Year
2	Digital Ther-mo-Hygrometer	CUSTOM	WF-301	01780	2019. 10. 14	1 Year

9.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-2.



9.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN/CISPR 35 clause 4.2.1
Test specification is in accordance with CISPR 35 Table 1.4
Basic standard is in accordance with IEC 61000-4-2

Test Specification		Performance Criterion
Contact Discharge Voltage	$\pm 2\text{kV}$ and $\pm 4\text{kV}$	B
Air Discharge Voltage	$\pm 2\text{kV}$, $\pm 4\text{kV}$ and $\pm 8\text{kV}$	

- Deviation from applicable standard
No deviation

9.4. Measurement Procedure

The measurement procedure specified in IEC 61000-4-2 clause 8.3.1 and A.5 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- Air Discharge

This test is done on a non-conductive surfaces. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the ESD generator discharge electrode shall be removed from the EUT. The generator is then retriggered for a new single discharge and repeated 10 discharges each at positive and negative polarity for each preselected test point. This procedure shall be repeated until all the air discharge completed.

- Contact Discharge
All the procedure is same as foregoing subclause. except that the tip of the discharge electrode shall touch the EUT conductive surfaces & repeated 25 discharges each discharges each at positive and negative polarity for each test point before the discharge switch is operated.
- Indirect discharge for horizontal coupling plane
At least 25 discharges each at positive and negative polarity shall be applied to the horizontal coupling plane, at points on each side of the EUT. The ESD generator positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.
- Indirect discharge for vertical coupling plane
At least 25 discharges each at positive and negative polarity shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
- For above tests, the voltage was increased from the minimum to the selected test level.

9.5. Test Result

Test Date	2020. 05. 21	Environment	22°C, 49%, 99KPa
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Minxiang Yang	Test Model	M277D4
Test Mode	Panel Angle: 0°, HDMI, 1920*1080/60Hz		

Air Discharge	Voltage kV Level / Discharge per polarity 10 / Result										
Test Location	+2	-2	+4	-4	+8	-8					Comments
Screen*2(1~2)	ND	ND	ND	ND	ND	ND					
Screen*2(3~4)	ND	ND	ND	ND	A	A					
LED(5)	ND	ND	ND	ND	ND	ND					
Seam*3(6~8)	ND	ND	ND	ND	ND	ND					
Hole*4(9~12)	ND	ND	ND	ND	ND	ND					
EAR(13)	ND	ND	ND	ND	A	A					
Audio(14)	ND	ND	ND	ND	A	A					
D-SUB(15)	ND	ND	ND	ND	A	A					
HDMI(16)	ND	ND	ND	ND	A	A					
DP(17)	ND	ND	ND	ND	A	A					
AC IN(18)	ND	ND	ND	ND	ND	ND					
Contact Discharge	Voltage kV Level / Discharge per polarity 25 / Result										
Test Location	+2	-2	+4	-4							Comments
Screws*4(19~22)	A	A	B	B							Note2
Screws*2(23~24)	A	A	B1	B1							Note1
Metal*5(25~29)	A	A	B	B							Note2
Indirect Contact	Voltage kV Level / Discharge per polarity 25 / Result										
Test Location	+2	-2	+4	-4							Comments
VCP Front	A	A	A	A							
VCP Right	A	A	A	A							
VCP Left	A	A	A	A							
VCP Back	A	A	A	A							
HCP Bottom	A	A	A	A							
Additional Notes											
Measurement Points	Please refer to the Photos of ESD Test Points										
ND=No discharge after test.											
Note 1: The screen flashes and turns black, and the screen will be restored after stopping interference for about 6 ~ 7 seconds											
Note2: The screen flashes and turns black, and it will automatically recover after stopping interference											

Test Date	2020. 05. 21	Environment	22°C, 49%, 99KPa
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Minxiang Yang	Test Model	M277D4
Test Mode	Panel Angle: 90°, HDMI, 1080*1920/60Hz		

Indirect Contact	Voltage kV Level / Discharge per polarity 10 / Observation Criterion								
Test Location	+2	-2	+4	-4					Comments
VCP Front	A	A	A	A					
VCP Right	A	A	A	A					
VCP Left	A	A	A	A					
VCP Back	A	A	A	A					
HCP Bottom	A	A	A	A					
Additional Notes									
Measurement Points	Please refer to the Photos of ESD Test Points								
Remark : No error occurred.									

10. Radiated, Radio-frequency, Electromagnetic Field Immunity Test

10.1. List of Test Instruments

● For 80MHz - 1GHz

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immunity System	TESEQ	ITS 6006	033009	2019. 09. 03	1 Year
2	Power Amplifier	TESEQ	CBA 1G-275	T44214	N.C.R.	N.C.R.
3	Power Meter	TESEQ	PM 6006	073365	2019. 09. 04	1 Year
4	Power Antenna	Schwarzbeck	STLP 9128 E	9128E084	N.C.R.	N.C.R.
5	Direction Coupler	WERLATONE	C5982-10	98618	2019. 08. 08	1 Year
6	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020. 04. 17	1 Year
7	Audio Analyzer	R&S	UPV	103012	2020/4/17	1 Year

● For 1.8GHz & 2.6GHz

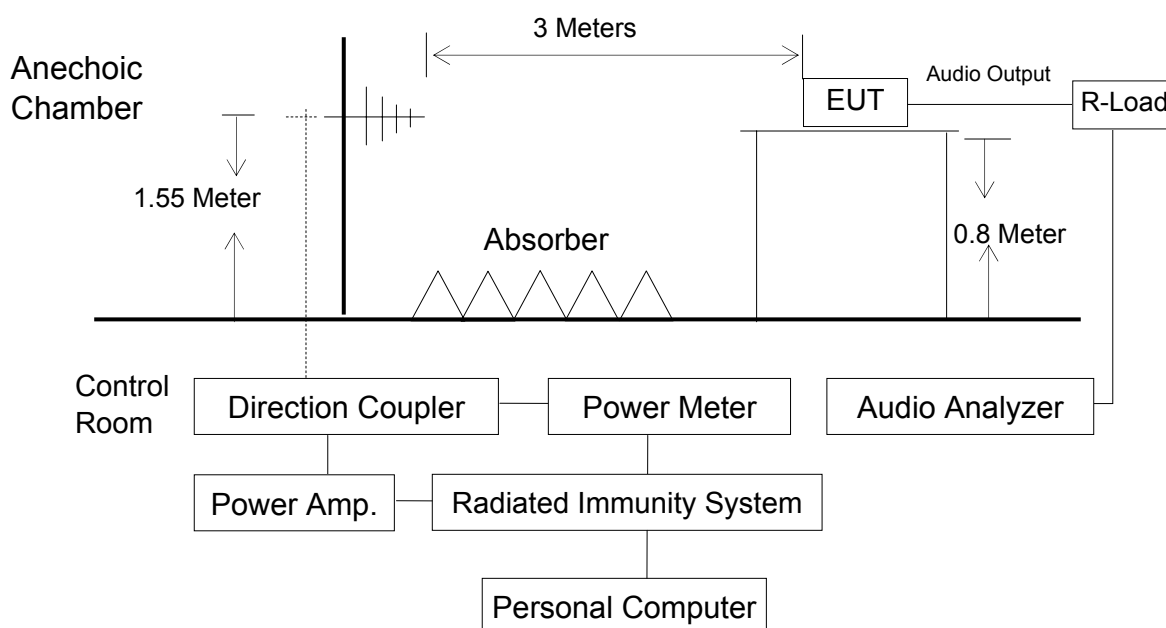
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immunity System	TESEQ	ITS 6006	033009	2019. 09. 03	1 Year
2	Power Amplifier	TESEQ	CBA 3G-050	T44215	N.C.R.	N.C.R.
3	Power Meter	TESEQ	PM 6006	073363	2019. 09. 04	1 Year
4	Power Antenna	Schwarzbeck	STLP 9149	9149-185	N.C.R.	N.C.R.
5	Direction Coupler	TESEQ	C6187-10	98619	2019. 08. 08	1 Year
6	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020. 04. 17	1 Year
7	Audio Analyzer	R&S	UPV	103012	2020/4/17	1 Year

● For 3.5GHz & 5.0GHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immunity System	TESEQ	ITS 6006	033009	2019. 09. 03	1 Year
2	Power Amplifier	TESEQ	CBA 6G-050	1053053	N.C.R.	N.C.R.
3	Power Meter	TESEQ	PM 6006	073364	2019. 09. 04	1 Year
4	Power Antenna	Schwarzbeck	STLP 9149	9149-185	N.C.R.	N.C.R.
5	Directional Coupler	WERLATONE	C6187-10	98619	2019. 08. 08	1 Year
6	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020. 04. 17	1 Year
7	Audio Analyzer	R&S	UPV	103012	2020/4/17	1 Year

10.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-3.



10.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN/CISPR 35 clause 4.2.2 and 4.2.2.2
Test specification is in accordance with CISPR 35 Table 1.2 and 1.3
Basic standard is in accordance with IEC 61000-4-3

Test Specification		Performance Criterion
Swept test -		
Frequency Range	80–1000MHz	A
Field Strength	3V/m (unmodulated, r.m.s)	
Amplitude Modulated	80%, 1kHz AM	
Spot test -		
Frequency(±1 %)	1800MHz, 2600MHz, 3500MHz, 5000MHz	A
Field Strength	3V/m (unmodulated, r.m.s)	
Amplitude Modulated	80%, 1kHz AM	

- Deviation from applicable standard

No deviation

10.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-3 clause 8 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on a non-conductive table 0.8 meter above the ground, the EUT and its simulators on the turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1.55 meter height.
- The test was performed with the EUT exposed to both horizontally and vertically polarized fields on each of the four sides.
- All the scanning conditions are as follows:

Field Strength:	3 V/m (r.m.s, Unmodulated)
Scanning Frequency:	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Amplitude Modulated:	AM 1kHz, 80%
Step Size:	1% increments
The Rate of Sweep:	0.0015 decade/s
Dwell Time:	3sec.
Test Position Angle:	0°, 90°, 180° and 270°
Polarity of Antenna:	H: Horizontal, V: Vertical

The broadcast reception function test :

(The method of EN/CISPR 35 Annex A.3 was used)

- The broadcast reception function has been tested in each reception mode for which the receiver is designe, for example analogue reception, DVB-T, DVB-T2, DVB-C, DVB-C2, DVB-S, DVB-S2. The receiver tuned to one channel and provided with an appropriate wanted signal on that channel or other input typical of normal use.

The audio output function test:

(The method of EN/CISPR 35 Annex G.6.4, G7 and G8 were used)

This method establishes an acoustic reference level using an SPL meter and microphone. During the test, the demodulated audio levels are measured, the interference ratio is then established and the results are compared to the interference ratio limits given in Clause G.7.

- Configure the measuring transducer to measure the level of acoustic output from the port under test.
- Configure the EUT in accordance with Clause G.5
- Apply an appropriate input signal to the EUT so that a sine wave (tone) at the frequency that will be used to modulate the applied disturbance (typically 1 kHz) is generated from the port under test at a level equal to the acoustic reference level.
- Record the resulting dB (SPL) level (or other appropriate dB unit) as the value of L0.
- Change the input to the EUT so that the port under test is silent, or represents silence. This change shall not alter the terminating impedance at the EUT's input.
- Apply the RF disturbance to the applicable port of the EUT and record the resulting demodulated audio level in dB (SPL) (or other dB unit used in step d)) as the value of L1.
- Ensure that non-linear processing does not impact the measurements.
- Calculate the acoustic interference ratio using the following formula:

Acoustic interference ratio = $L1 - L0$

- Compare the acoustic interference ratio with the relevant limit.
The measured acoustic interference ratio and/or the measured electrical interference ratio during the test was -20 dB or better.
- Repeat above steps for all required disturbance frequencies.

10.5. Test Result

Test Date	2020. 05. 25	Environment	24°C, 51%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Sam Yan	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Frequency Range (MHz)	Position Angle (°)	Polarity (H or V)	Field Strength (V/m)	Observation Criterion
80 - 1000	0	H	3V/m +Modulated	A
80 - 1000	90	H	3V/m +Modulated	A
80 - 1000	180	H	3V/m +Modulated	A
80 - 1000	270	H	3V/m +Modulated	A
80 - 1000	0	V	3V/m +Modulated	A
80 - 1000	90	V	3V/m +Modulated	A
80 - 1000	180	V	3V/m +Modulated	A
80 - 1000	270	V	3V/m +Modulated	A
1800	0	H	3V/m +Modulated	A
1800	90	H	3V/m +Modulated	A
1800	180	H	3V/m +Modulated	A
1800	270	H	3V/m +Modulated	A
1800	0	V	3V/m +Modulated	A
1800	90	V	3V/m +Modulated	A
1800	180	V	3V/m +Modulated	A
1800	270	V	3V/m +Modulated	A
2600	0	H	3V/m +Modulated	A
2600	90	H	3V/m +Modulated	A
2600	180	H	3V/m +Modulated	A
2600	270	H	3V/m +Modulated	A
2600	0	V	3V/m +Modulated	A
2600	90	V	3V/m +Modulated	A
2600	180	V	3V/m +Modulated	A
2600	270	V	3V/m +Modulated	A

Remark1: Modulation Signal: 1kHz 80% AM.
Remark 2: No error occurred.

Test Date	2020. 05. 25	Environment	24°C, 51%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Sam Yan	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Frequency Range (MHz)	Position Angle (°)	Polarity (H or V)	Field Strength (V/m)	Observation Criterion
3500	0	H	3V/m +Modulated	A
3500	90	H	3V/m +Modulated	A
3500	180	H	3V/m +Modulated	A
3500	270	H	3V/m +Modulated	A
3500	0	V	3V/m +Modulated	A
3500	90	V	3V/m +Modulated	A
3500	180	V	3V/m +Modulated	A
3500	270	V	3V/m +Modulated	A
5000	0	H	3V/m +Modulated	A
5000	90	H	3V/m +Modulated	A
5000	180	H	3V/m +Modulated	A
5000	270	H	3V/m +Modulated	A
5000	0	V	3V/m +Modulated	A
5000	90	V	3V/m +Modulated	A
5000	180	V	3V/m +Modulated	A
5000	270	V	3V/m +Modulated	A
Remark1:Modulation Signal:1kHz 80% AM. Remark 2: No error occurred.				

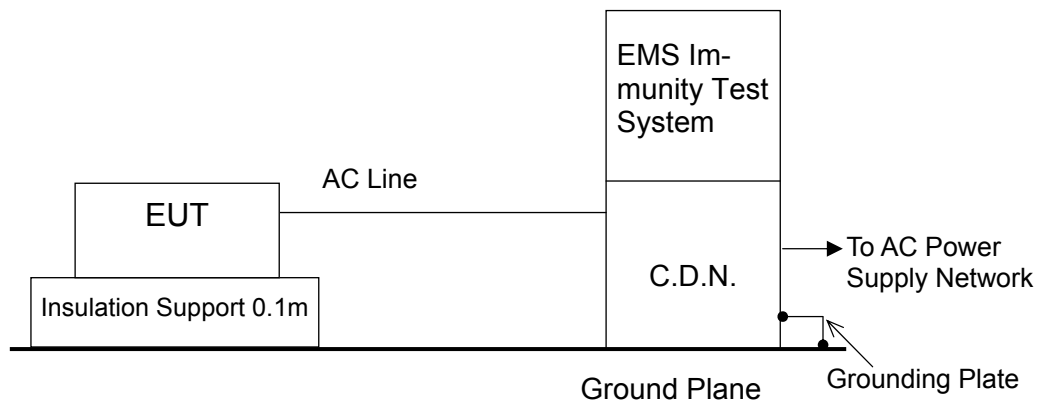
11. Electrical fast transient/burst Immunity Test

11.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	EMS Immunity Test System	TESEQ	NSG 3060	1519	2019. 07. 04	1 Year
2	CDN	TESEQ	CDN 3063	2074	2019. 07. 04	1 Year
3	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 EFT/SURGE	2020. 04. 17	1 Year

11.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-4.



11.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN/CISPR 35 clause 4.2.4
Test specification is in accordance with CISPR 35 Table 2.5 and 3.3 and 4.5
Basic standard is in accordance with IEC 61000-4-4

Test Specification (Test Level)	Performance Criteria
Analogue/digital data ports: $\pm 0.5\text{kV}$ DC network power ports: $\pm 0.5\text{kV}$ AC mains power ports: $\pm 1\text{kV}$	B
Tr/Th: 5/50ns	
Repetition frequency: 5kHz	

- Deviation from applicable standard
No deviation

11.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-4 clause 8 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The EUT and its simulators was placed 0.1m high above the ground reference plane which was a min. 1m*1m metallic sheet with 0.65mm minimum thickness.
- This reference ground plane is project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

- For input and output AC power ports

The EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines, and the length of the power line between the coupling device and the EUT shall be 0.5m or less. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 1min.

- For signal lines and control lines ports

The I/O interface cable of the EUT is connected to its simulator through a capacitive coupling clamp that is 1 meter long. The capacitive coupling clamp is impressed with burst noise for 1min and indirectly couples burst to I/O interface cable.

[Remark: Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.]

- For DC input and DC output power ports

The DC power cable of the EUT is connected to the DC power source by using a coupling device which couples the EFT interference signal to DC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 2min

[Remark: Applicable only to DC power ports when the EUT supports this ports.]

11.5. Test Result

Test Date	2020 05. 20	Environment	21°C, 47%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Joe Huang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Input AC Power Port					
Inject Line	Polarity (+/-)	Test Voltage Peak (kV)	Inject Time (s)	Inject Method	Observation Criterion
L	+	0.5, 1	60	Direct	A
L	-	0.5, 1	60	Direct	A
N	+	0.5, 1	60	Direct	A
N	-	0.5, 1	60	Direct	A
PE	+	0.5, 1	60	Direct	A
PE	-	0.5, 1	60	Direct	A
L, N, PE	+	0.5, 1	60	Direct	A
L, N, PE	-	0.5, 1	60	Direct	A
Remark: No error occurred.					

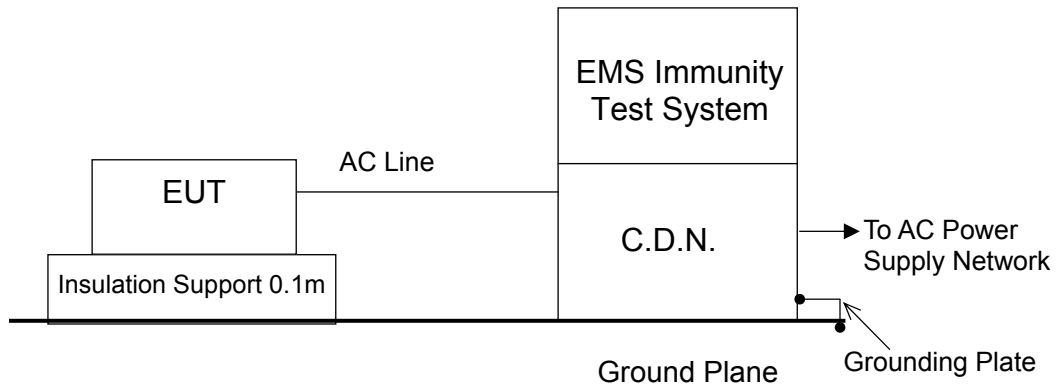
12. Surge Immunity Test

12.1.List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	EMS Immunity Test System	TESEQ	NSG 3060	1519	2019. 07. 04	1 Year
2	CDN	TESEQ	CDN 3063	2074	2019. 07. 04	1 Year
3	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 EFT/SURGE	2020. 04. 17	1 Year

12.2.Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-5.



12.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN/CISPR 35 clause 4.2.5
Test specification is in accordance with CISPR 35 Table 2.4 and 3.2 and 4.4
Basic standard is in accordance with IEC 61000-4-5

Test Specification	Performance Criteria
Analogue/digital data ports Port type: unshielded symmetrical -line to ground: ± 1 and 4kV (primary protection is intended) ± 1 kV(primary protection is not intended) WaveformTr/Th: 10/700 (5/320) μ s (*)	C
Analogue/digital data ports Port type: coaxial or shielded --shield to ground: ± 0.5 kV WaveformTr/Th: 1.2/50(8/20) μ s	B
DC network power ports Surges are applied line to reference ground for each individual line: ± 0.5 kV WaveformTr/Th: 1.2/50(8/20) μ s	B
ACmains power ports --line to line : ± 1 kV --line to earth (ground): ± 2 kV WaveformTr/Th: 1.2/50(8/20) μ s	B
(*)Where the coupling network for the 10/700 (5/320) μ s waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) μ s waveform and appropriate coupling network.	

- Deviation from applicable standard
No deviation

12.4.Measurement Procedure

For Input and Output AC Power Port

The measurement procedure specified in IEC 61000-4-5 clause 8 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- For line to line coupling mode, provided a 0.5/1kV 1.2/50 μ s current surge (at open-circuit condition) and 8/20 μ s current surge to EUT selected points.
- At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate.
- Different phase angles (at 0°, 90°, 180° and 270°) were done individually.
- Repeat above procedure except the open-circuit test voltages 0.5kV/1kV/2kV for line to earth coupling mode test.

For Telecommunication Port

- Setup the EUTs and associated equipment described as clause 4.1.
- For Off Line Mode: The waveform is an open-circuit voltage front time of 10 μ s, and an open-circuit voltage time to half value of 700 μ s.
- For On Line mode: The waveform is an open-circuit voltage front time of 1.2 μ s, and an open-circuit voltage time to half value of 50 μ s.
- In the case of shielded line, the surge is applied to direct application.

12.5. Test Result

Test Date	2020 05. 20	Environment	21°C, 47%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Joe Huang	Test Model	M277D4
Test Mode	D-Sub, 1920*1080/60Hz		

Input AC Power Port, Open Circuit Voltage					
Location	Polarity (+/-)	Phase Angle (°)	Test Voltage Peak (kV)	No of Pulse	Observation Criterion
L-N	+	0	0.5, 1	5	A
	+	90	0.5, 1	5	A
	+	180	0.5, 1	5	A
	+	270	0.5, 1	5	A
	-	0	0.5, 1	5	A
	-	90	0.5, 1	5	A
	-	180	0.5, 1	5	A
	-	270	0.5, 1	5	A
L-PE	+	0	0.5, 1, 2	5	A
	+	90	0.5, 1, 2	5	A
	+	180	0.5, 1, 2	5	A
	+	270	0.5, 1, 2	5	A
	-	0	0.5, 1, 2	5	A
	-	90	0.5, 1, 2	5	A
	-	180	0.5, 1, 2	5	A
	-	270	0.5, 1, 2	5	A
N-PE	+	0	0.5, 1, 2	5	A
	+	90	0.5, 1, 2	5	A
	+	180	0.5, 1, 2	5	A
	+	270	0.5, 1, 2	5	A
	-	0	0.5, 1, 2	5	A
	-	90	0.5, 1, 2	5	A
	-	180	0.5, 1, 2	5	A
	-	270	0.5, 1, 2	5	A
Remark: No error occurred.					

13. Immunity to Conducted Disturbances, Induced by Radio-Frequency Field Immunity Test

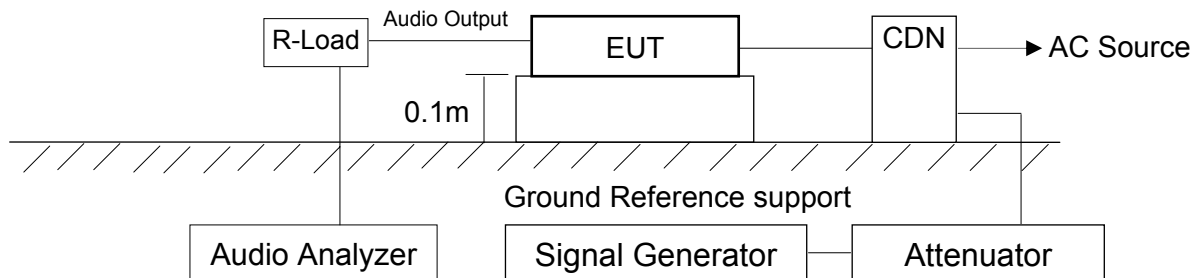
13.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Signal Generator	R & S	SML03	103251	2020. 02. 05	1 Year
2	Power Amplifier	A & R	100A250A	0330351	N.C.R.	N.C.R.
3	Attenuator	Weinschel	40-6-34	NB538	2020. 04. 23	1 Year
4	CDN	Fischer	FCC-801-M3-25A	9961	2020. 02. 25	1 Year
5	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 CS Room	2020. 04. 17	1 Year
6	Audio Analyzer	R&S	UPV	103012	2020. 04. 17	1 Year

13.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-6.

● Common Mode Test Setup



13.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN/CISPR 35 clause 4.2.2 and 4.2.2.3
Test specification is in accordance with CISPR 35 Table 2.1 and 3.1 and 4.1
Basic standard is in accordance with IEN 61000-4-6

Test Specification		Performance Criterion
Analogue/digital data port, DC network power ports, AC mains power ports		A
Frequency Range: Test Level:	0.15–10MHz 3V (unmoulded, r.m.s)	
Frequency Range: Test Level:	10–30MHz 3V–1V (unmoulded, r.m.s)	
Frequency Range: Test Level:	30–80MHz 1V (unmoulded, r.m.s)	
Amplitude Modulated	80%, 1kHz AM	

- Deviation from applicable standard
No deviation

13.4.Measurement Procedure

The measurement procedure specified in EN 61000-4-6clause 8 was used.

For AC Mains Power Ports

Setup the EUT and associated equipment described as clause 4.1.

- The EUT and supporting equipment were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane making contact with it at about 0.1-0.3m from EUT. Cables between CDN and EUT were as short as possible.
- The disturbance signal described below was injected to EUT through CDN.
- The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- The frequency range was swept from 0.15 to 80MHz using 3V or 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
- The rate of sweep shall not exceed 1.5×10^3 decades/s. Where the frequency was swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

The broadcast reception function test

- The mode of operation described as section 11.4.

The audio output function test

- The method of audio measurement described as section 11.4.

For Signal Data Ports

- The EUT and supporting equipment were placed on an insulating support 0.1m high above a ground reference plane. EM Injection Clamp (coupling and decoupling device) was placed on the ground plane making contact with it at about 0.1-0.3m from EUT. Cables between EM Injection Clamp and EUT were as short as possible.
- The CDN was placed on between AE and EUT. The EUT and AE of power through CDN, CDN terminated with 50Ω at the RF disturbance input port.
- The disturbance signal described below was injected to EUT through EM Injection Clamp.

13.5. Test Result

Test Date	2020. 05. 21	Environment	23°C, 45%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Rex Wang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Frequency Range (MHz)	Injected Position	Voltage Level	Observation Criterion
0.15 – 10	Main (Input AC Power Line)	3V(rms) + Modulated	A
10 – 30	Main (Input AC Power Line)	3~1V(rms) + Modulated	A
30 – 80	Main (Input AC Power Line)	1V(rms) + Modulated	A
Remark 1: Modulation Signal: 1kHz 80% AM. Remark 2: No error occurred.			

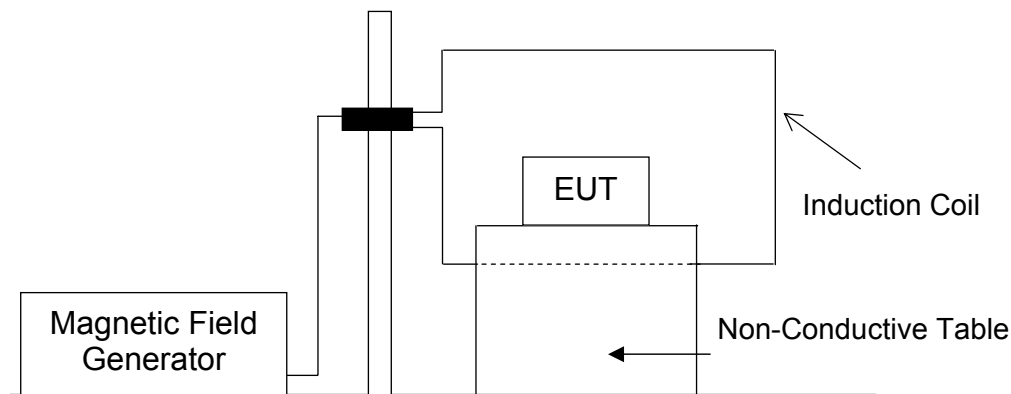
14. Power Frequency Magnetic Field Immunity Test

14.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Magnetic Field Generator	Narda S.T.S. / PMM	PMM1008	0100X30101	2019. 09. 27	1 Year
2	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Mag-netic Room	2020. 04. 17	1 Year

14.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-8.



14.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 55024 clause 4.2.4
Test specification is in accordance with EN 55024 Table 1.1
Basic standard is in accordance with IEC 61000-4-8

Test Specification (Test Level)		Performance Criteria
Power Frequency	50Hz or 60Hz	A
Magnetic Field Strength	1A/m (rms)	

- Deviation from applicable standard
No deviation

14.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-8 clause 8 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The equipment cabinets which can be earthed shall be connected to the safety earth directly on the GRP or via the earth terminal to PE.
- The EUT was placed on 0.8m high table, and subjected to the test magnetic field by using the induction coil of standard dimensions (1m x 2.6m).
- The induction coil rotated by 90 degrees in order to expose the EUT to the test field with different orientations (at X-axis, Y-axis and X-axis).
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- All cables of EUT exposed to magnetic field for 1m of their length.
- The preferential range of test levels, respectively for continuous of the magnetic field, applicable to distribution networks at 50 Hz or 60 Hz.

14.5. Test Result

Test Date	2020. 05. 25	Environment	26°C, 40%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Newman Yang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Power Frequency	Magnetic Field Strength	Coil Orientation	Testing Duration	Observation Criterion
50Hz	1A/m	X-axis	1 Min	A
50Hz	1A/m	Y-axis	1 Min	A
50Hz	1A/m	Z-axis	1 Min	A

Remark: No error occurred.

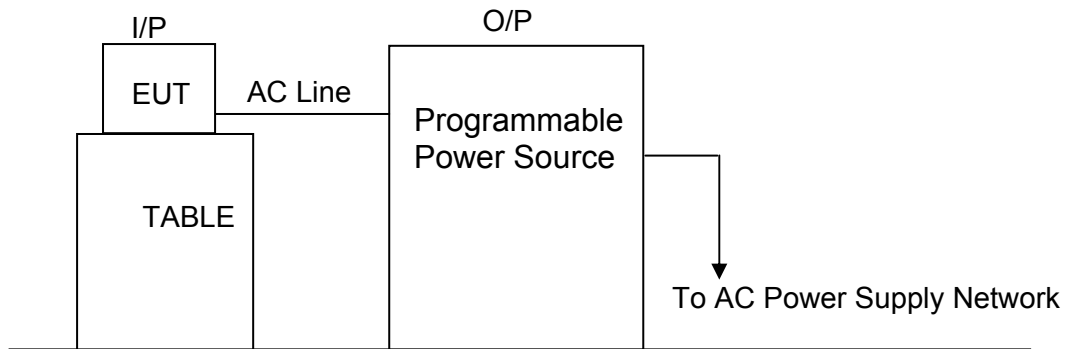
15. Voltage Dips and Interruptions Immunity Test

15.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Programmable Power Source	TESEQ	NSG1007-45	1248A04038	2017. 11. 28	3 Years
2	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Har-monics Room	2020. 04. 17	1 Year

15.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-11.



15.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 55024 clause 4.2.6
Test specification is in accordance with EN 55024 Table 4.2 and 4.3
Basic standard is in accordance with IEC 61000-4-11

Test Specification (Test Level)		Performance Criteria
Voltage dips	>95% reduction, 0.5period	B
	30% reduction , 25period	C
Voltage interruptions	>95% reduction , 250period	C

- Deviation from applicable standard
No deviation

15.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-11 clause 8 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- During the tests, the mains voltage for testing shall be monitored within an accuracy of 2 %.
- 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 s minimum (between each test event). Each representative mode of operation shall be tested.
- For voltage dips, changes in supply voltage shall occur at zero crossings of the voltage, and at additional angles considered critical by product committees or individual product specifications preferably selected from 45°, 90°, 135°, 180°, 225°, 270° and 315° on each phase.
- For short interruptions, the angle shall be defined by the product committee as the worst case. In the absence of definition, it is recommended to use 0° for one of the phases.
- For each test, any degradation of performance shall be recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the EUT during and after the tests. After each group of tests, a full functional check shall be performed.

15.5. Test Result

Test Date	2020. 05. 25	Environment	26°C, 40%
Input Power	AC 100-240V, 50/60Hz	Test Result	Pass
Tested By	Newman Yang	Test Model	M277D4
Test Mode	HDMI, 1920*1080/60Hz		

Type of Test	Test Voltage	Phase Angle (°)	Reduction (%)	Cycle	Results & Performance Criterion
Voltage Dips	100V 240V	0, 45, 90, 135, 180, 225, 270, 315	>95	0.5	Pass, A
		0, 45, 90, 135, 180, 225, 270, 315	30	25	Pass, A
Voltage Interruptions	100V 240V	0, 45, 90, 135, 180, 225, 270, 315	>95	250	Pass B, Note
Note: Criterion B, The screen of EUT was stopped during the test, but it's self-recoverable after test.					

16. Measurement Uncertainty List

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted emissions at AC mains power port	9kHz-150kHz	±3.7dB
	150kHz-30MHz	±3.5dB
Conducted emissions at wired network port	150kHz-30MHz	±3.5dB
Conducted emissions at broadcast receiver tuner port	150kHz-30MHz	±3.5dB
Conducted emissions Power Clamp (No. 7 Shielded Room)	30MHz-300MHz	±4.4dB
Conducted emissions Power Clamp (No. 8 Shielded Room)	30MHz-300MHz	±4.4dB
Radiated, magnetic field (Triple-Loop Antenna)	9kHz-30MHz	±0.5dB
Radiated, magnetic field (Loop Antenna)	9kHz-150kHz	±3.1dB
	150kHz-30MHz	±3.0dB
Radiated emissions (No.1 10m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.1dB
	30MHz-200MHz, 3m, Vertical	±4.3dB
	200MHz-1000MHz, 3m, Vertical	±4.2dB
	30MHz-200MHz, 10m, Horizontal	±4.3dB
	200MHz-1000MHz, 10m, Horizontal	±3.9dB
	30MHz-200MHz, 10m, Vertical	±4.3dB
	200MHz-1000MHz, 10m, Vertical	±3.9dB
	1GHz-6GHz, 3m	±4.1dB
	6GHz-18GHz, 3m	±4.4dB
Radiated emissions (No.2 10m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.2dB
	30MHz-200MHz, 3m, Vertical	±4.1dB
	200MHz-1000MHz, 3m, Vertical	±4.4dB
	30MHz-200MHz, 10m, Horizontal	±4.3dB
	200MHz-1000MHz, 10m, Horizontal	±4.0dB
	30MHz-200MHz, 10m, Vertical	±4.1dB
	200MHz-1000MHz, 10m, Vertical	±4.1dB
	1GHz-6GHz, 3m	±4.2dB
	6GHz-18GHz, 3m	±4.4dB

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Radiated emissions (No.1 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	$\pm 4.1\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 3.9\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.1\text{dB}$
	1GHz-6GHz, 3m	$\pm 4.2\text{dB}$
	6GHz-18GHz, 3m	$\pm 4.6\text{dB}$
Radiated emissions (No.2 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	$\pm 3.7\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.0\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.5\text{dB}$
	1GHz-6GHz, 3m	$\pm 4.3\text{dB}$
	6GHz-18GHz, 3m	$\pm 4.7\text{dB}$
Radiated emissions (No.3 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	$\pm 3.9\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 3.9\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.1\text{dB}$
Radiated emissions (No.4 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.0\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	1GHz-6GHz, 3m	$\pm 4.5\text{dB}$
	6GHz-18GHz, 3m	$\pm 4.6\text{dB}$
Radiated emissions (No.5 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	$\pm 4.0\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 3.9\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.3\text{dB}$
	1GHz-6GHz, 3m	$\pm 4.3\text{dB}$
	6GHz-18GHz, 3m	$\pm 4.7\text{dB}$

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Radiated emissions (No.3 Open Area Test Site)	30MHz-200MHz, 3m, Horizontal	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.0\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.2\text{dB}$
Radiated emissions (No.5 Open Area Test Site)	30MHz-200MHz, 3m, Horizontal	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.4\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.9\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.7\text{dB}$
Radiated emissions (No.6 Open Area Test Site)	30MHz-200MHz, 3m, Horizontal	$\pm 3.6\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.4\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.0\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 3.6\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.0\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.0\text{dB}$
Radiated emissions (No.7 Open Area Test Site)	30MHz-200MHz, 3m, Horizontal	$\pm 3.6\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.5\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.7\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 3.6\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.3\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.5\text{dB}$
Radiated emissions (No.8 Open Area Test Site)	30MHz-200MHz, 3m, Horizontal	$\pm 3.8\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.3\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 3.7\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.0\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.1\text{dB}$

Test Items/Facilities	Frequency/Equipment/Unit		Uncertainty
Harmonic current	NSG 1007-45		±0.7%
Voltage fluctuations & flicker	NSG 1007-45		±0.2%
Electrostatic discharge (ESD)	NSG 437		Ucurrent = 13.8% Uvoltage = 1.3%
	Ditto		Ucurrent = 23.7% Uvoltage = 3.0%
	MZ-15/EC		Ucurrent = 27.5% Uvoltage = 3.1%
	NSG 437		Ucurrent = 4.8% Uvoltage = 4.7%
Radio-frequency electromagnetic field, Continuous radiated disturbances (RS)	80MHz-1000MHz		±1.6dB
	1GHz-6GHz		±2.2dB
Radio-frequency electromagnetic field, Continuous radiated disturbances (RS) (Audio)	80MHz-1000MHz		±1.6dB
	1GHz-6GHz		±2.2dB
Electrical fast transient/burst (EFT)	ECM Pro Plus	AC power port	Uvoltage = 5.6% Utime = 29.4%
		Signal port	Uvoltage = 5.1% Utime = 20.3%
	E411	AC power port	Uvoltage = 5.6% Utime = 14.2%
		Signal port	Uvoltage = 5.1% Utime = 29.4%
Surge	Open-circuit output voltage		Uvoltage = 3.8%
	Rise time		Utime = 13.3%
	Duration time		Utime = 17.9%
	Short-circuit output current		Ucurrent = 5.6%
	Rise time		Utime = 17.0%
	Duration time		Utime = 9.5%
Radio-frequency, continuous conducted disturbances (CS)	CDN (AC power port)		2.9dB
	EM-Clamp (Signal port)		3.6dB
Radio-frequency, continuous conducted disturbances (CS) (Audio)	CDN (AC power port)		2.9dB
	EM-Clamp (Signal port)		3.6dB
Power-frequency magnetic field (PFMF)	MAG100.1		4%
	PMM1008		2.4%
Voltage dips	TESEQ		Uvoltage = 0.1% Ucurrent = 0.2%

17. Photographs

17.1. Conducted Emissions Measurement

- For AC Mains Power Port



Front View of Conducted Measurement



Back View of Conducted Measurement

17.2. Radiated Emissions Measurement

- For Frequency Range 30 – 1000MHz



Front View of Radiated Measurement



Back View of Radiated Measurement

- For Frequency Range Above 1GHz



Front View of Radiated Measurement



Back View of Radiated Measurement

17.3. Harmonics Current Measurement



17.4. Voltage Fluctuation and Flicks Measurement



17.5. Electrostatic Discharge Immunity Test

- Air & Contact Discharge



- HCP & VCP



- ESD Test Points



- ESD Test Points



- ESD Test Points



- ESD Test Points



- ESD Test Points



- ESD Test Points

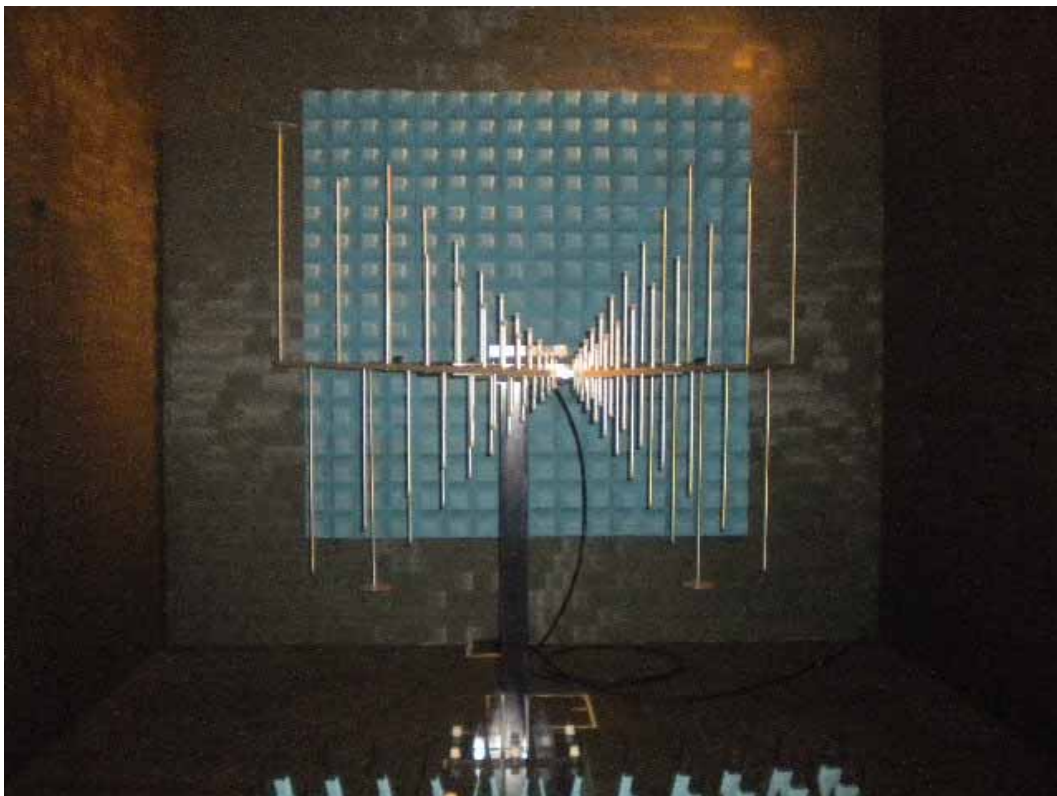


- ESD Test Points

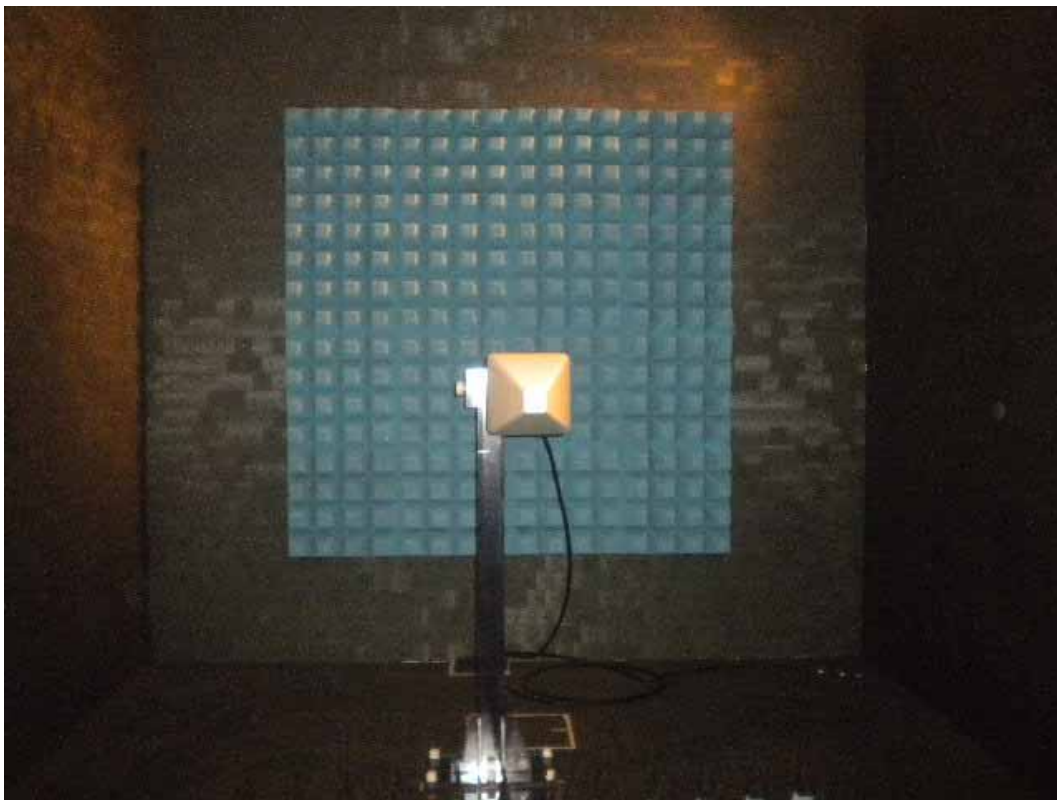


17.6. Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

- For 80MHz - 1000MHz



- For Above 1GHz



17.7. Electrical Fast Transient/Burst Immunity Test



17.8. Surge Immunity Test



17.9. Immunity to Conducted Disturbances Induced by RF Fields



17.10. Power Frequency Magnetic Field Immunity Test



17.11.Voltage Dips and Interruptions Immunity Test



APPENDIX

(Photos of EUT)

(Total Page: 2 Pages)

Figure 1
General Appearance (LGD Panel/ Front View)



Figure 2
General Appearance (LGD Panel/ Back View)



Figure 3
General Appearance (LGD Panel/ Product Label)

