Technical Compliance Statement

EMC Test Report

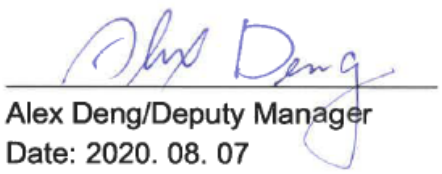
For the following information **Ref. File No.: C1M2005205**

Product	:	APC Charge Mobile Power Supply for Surface Hub 2
Model Number	:	(1)CSH2 (2)CSH2-I
Brand	:	APC by Schneider Electric
Applicant	:	American Power Conversion Holdings Inc., Taiwan Branch
Manufacturer	:	American Power Conversion Holdings Inc., Taiwan Branch
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 32:2015 (CISPR 32:2015), Class B
EN IEC 61000-3-2:2019 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-E200324**.

Signature



Alex Deng/Deputy Manager
Date: 2020. 08. 07

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: APC Charge Mobile Power Supply for Surface Hub 2
Model: (1)CSH2 (2)CSH2-I
Brand: APC by Schneider Electric

Applicant for:
American Power Conversion Holdings Inc., Taiwan Branch
5F., No. 189, Sec. 2, Jiuzong Rd., Neihu Dist.,
Taipei City 11494, Taiwan (R.O.C.)

Prepared by:
AUDIX Technology Corporation, EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan

Testing Laboratory
1724

TESTING
NVLAP LAB CODE200077-0

File No.	:	C1M2005205
Report No.	:	EM-E200324
Date of Report	:	2020. 08. 07

The test report is based on a single evaluation of one sample of the above-mentioned products. It does notimply 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, TAF 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	:	American Power Conversion Holdings Inc., Taiwan Branch
Manufacturer	:	American Power Conversion Holdings Inc., Taiwan Branch
EUT Description		
(1) Product	:	APC Charge Mobile Power Supply for Surface Hub 2
(2) Model	:	(1)CSH2 (2)CSH2-I
(3) Brand	:	APC by Schneider Electric
(4) Power Rating	:	AC 110-240V, 50-60Hz
(4)Test Voltage	:	AC 230V/50Hz

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 32:2015 (CISPR 32:2015), Class B
EN IEC 61000-3-2:2019 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 IEC 61000-3-2、EN 61000-3-3 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.

Date of Report: 2020. 08. 07

Reviewed by: (Ariel Chen/Administrator)

Approved by: (Alex Deng/Deputy Manager)

Table of Content

1. Revision of Test Report

Issued Date	Revision Summary	Report Number
2020. 08. 07	Original Report.	EM-E200324

2. Summary of Test Result

2.1. Test Result

Emissions			
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** Margin3.63dB at 1.746MHz
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)	N/A	**N/A**
Conducted differential voltage 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)	N/A	**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 3.08dB at 170.220MHz
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 17.62dB at 2061.188MHz
Harmonic current emissions	EN IEC 61000-3-2:2019	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

Immunity (EN 55035)				
Test Item	**Basic Standard**	**Standard Criteria**	**EUT Criteria**	**Result**
Electrostatic discharge	IEC 61000-4-2:2008	B	A	**Pass**
Continuous RF electro-magnetic field distur-bances, spot test	IEC 61000-4-3:2010	A	A	**Pass**
Electrical fast tran-sient/burst	IEC 61000-4-4:2012	B	A	**Pass**
Surges at AC main power port	IEC 61000-4-5:2014 +A1:2017	B	A	**Pass**
Surges at network port	IEC 61000-4-5:2014 +A1:2017	C	N/A	**N/A**
Continuous induced by RF disturbances	IEC 61000-4-6:2013	A	A	**Pass**
Power frequency magnetic field	IEC 61000-4-8:2009	A	A	**Pass**
Voltage dips, <5% residual	IEC 61000-4-11:2004 +A1:2017	B	A	**Pass**
Voltage dips, 70% residual		C	A	**Pass**
Voltage interruptions, <5% residual		C	B	**Pass**

Note :

1. The uncertainties value is not used in determining the result.
2. N/Ais an abbreviation for Not Applicable
3. Special measures: None
4. Decision and justification not to measure: None

2.2. Description of Performance Criteria

- EN 55035

Performance Criteria	
Criterion 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.
Criterion 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.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery back-up, shall not be lost.

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.

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: +886-2-26099303 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.3 Shielding Room (2) No.6 Open Area Test Site (3) No.2 3m Semi Anechoic Chamber (4) No.2 EMS Test Room

3. GeneralInformation

3.1. Description of Application

Applicant	American Power Conversion Holdings Inc., Taiwan Branch 5F., No. 189, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 11494, Taiwan (R.O.C.)
Product	APC Charge Mobile Power Supply for Surface Hub 2
Brand	APC by Schneider Electric
Model Number	(1)CSH2 (2)CSH2-I The difference between above models was in sales marketing.

3.2. Description of the EUT

Test Model	CSH2
Serial Number	N/A
Power Rating	AC Input: 110-240Vac, 8A, 50-60Hz AC Output: 110-240Vac, 4A, 403W DC Output: 24V, 16.2A, 388W
Firmware Version	N/A
Sample Status	Trial sample
Date of Receipt	2020. 05. 21
Date of Test	2020. 06. 04 ~ 07. 22
I/O Ports List	• USB x1 • AC Out x1 • DC Out x1 • AC Inx1
Accessories Supplied	None

3.3. Highest Frequency within EUT

The highest frequency is 192MHz of EUT.

3.4. Determination of Worse Case Operating Modes

According to the specification, the EUT was estimated to determine the highest emissions by following configurations:

Test Item	Test Voltage	Operating of EUT
Conducted emissions at AC mains power port	AC 230V, 50Hz	Online Discharge Mode
		Online Charge Mode
		Battery Mode
	AC 110V, 60Hz	Online Discharge Mode
Radiated emission (30-1000MHz)	AC 230V, 50Hz	Online Discharge Mode
		Online Charge Mode
		Battery Mode
	AC 110V, 60Hz	Online Discharge Mode
Radiated emission (above 1GHz)	AC 230V, 50Hz	Online Charge Mode
Harmonics current emission	AC 230V, 50Hz	Online Charge Mode
		Online Discharge Mode
Voltage fluctuations & flicker	AC 230V, 50Hz	Online Charge Mode
		Online Discharge Mode
Electrostatic discharge & Continuous RF electromagnetic field disturbances, spot test	AC 230V, 50Hz	Online Discharge Mode
		Online Charge Mode
		Battery Mode
Other Immunity tests	AC 230V, 50Hz	Online Charge Mode

3.5. Final Test Configuration

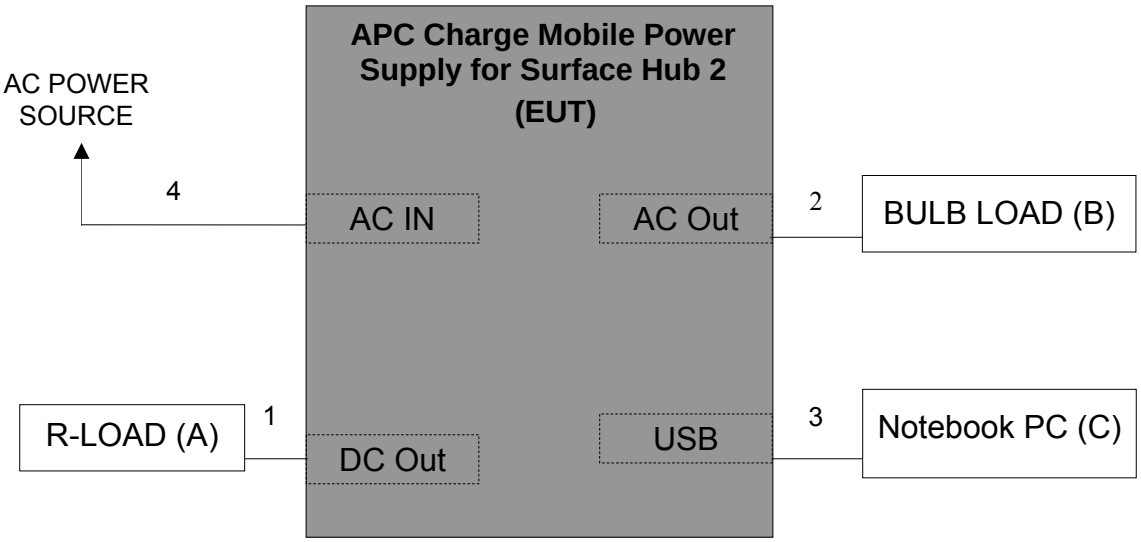
The worst showed as following configuration was tested and recorded in the report.

Test Item	Test Voltage	Operating of EUT
Conducted emissions at AC mains power port	AC 230V, 50Hz	Online Discharge Mode
Radiated emission	AC 230V, 50Hz	Online Charge Mode
Harmonics current emission	AC 230V, 50Hz	Online Charge Mode
Voltage fluctuations & flicker	AC 230V, 50Hz	Online Charge Mode
Electrostatic discharge & Continuous RF electromagnetic field disturbances, spot test	AC 230V, 50Hz	Online Charge Mode
Other Immunity tests	AC 230V, 50Hz	Online Charge Mode

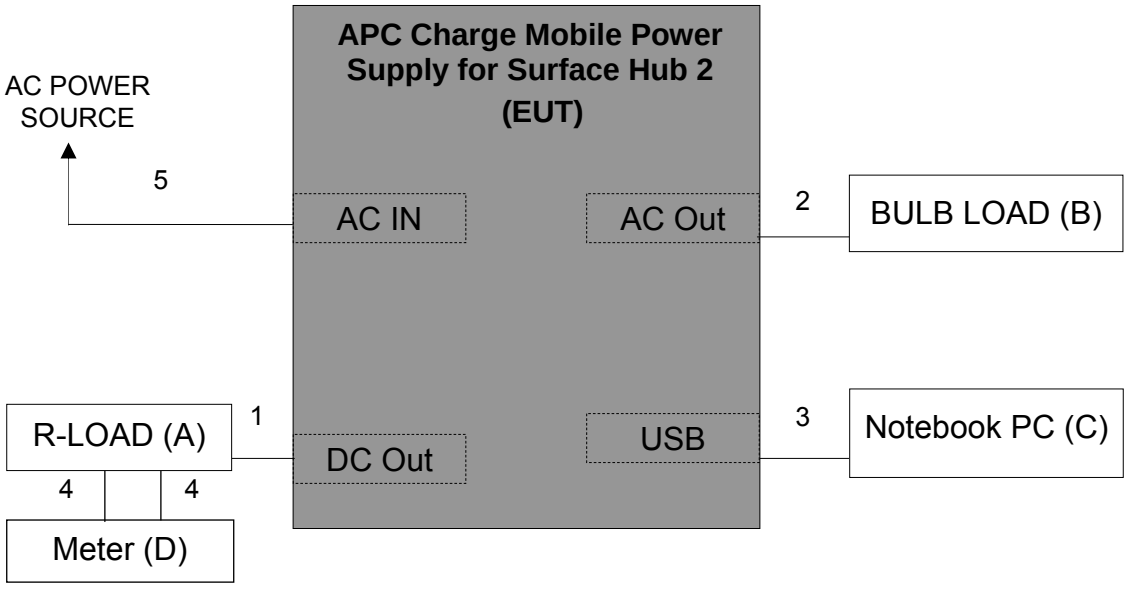
4. Measurement Arrangement

4.1. Equipment and cables arrangement

- Connection Diagram of EUT and Peripheral Devices
  For conducted and radiated test



- Connection Diagram of EUT and Peripheral Devices
  For harmonics, flicker and immunity test



4.2. Method of ExercisingEUT

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

1. Turn on the power of all equipments.
2. Set EUT under Online Discharge or Online Charge or battery mode.
3. The AC outputs of EUT was linked to bulb loads with full load.
4. The other peripheral devices were driven and operated in turn during all testing.

- The methods for exercising the EUT during the measurement specified in EN IEC 61000-3-2、EN 61000-3-3 and EN 55035 were used.

5. Turn on the power of all equipments.
6. Set EUT under Online Discharge or Online Charge or battery mode.
7. The AC outputs of EUT was linked to bulb loads with full load.
8. The other peripheral devices were driven and operated in turn during all testing.

4.3. List of Supported Units under Test

Item	Product	Brand	Model No.	Serial No.	Approval
For Conducted and Radiated test					
A	R-Load (388W)	N/A	N/A	N/A	N/A
B	Bulb Load (400W)	N/A	N/A	N/A	N/A
C	Notebook PC	Lenovo	81LG	PF210KKS	By DoC
For Harmonic、Flicker and Immunity Tests					
A	R-Load (388W)	N/A	N/A	N/A	N/A
B	Bulb Load (400W)	N/A	N/A	N/A	N/A
C	Notebook PC	Lenovo	81LG	PF210KKS	By DoC
D	Digital Multimeter	Agilent	34401A	MY41005248	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	DC Power Cord	1	1.2	No	0	Provided by LAB
2	AC Power Cord	1	1.0	No	0	Provided by LAB
3	USB Cable	1	1.2	Yes	0	Provided by LAB
4	AC Power Cord (3C)	1	1.9	No	0	Provided by LAB for above supported units
For Harmonic、Flicker and Immunity Tests						
1	DC Power Cord	1	1.2	No	0	Provided by LAB
2	AC Power Cord	1	1.0	No	0	Provided by LAB
3	USB Cable	1	1.2	Yes	0	Provided by LAB
4	Power Wire	2	1.5	No	0	Provided by LAB
5	AC Power Cord (3C)	1	1.9	No	0	Provided by LAB for above supported units

5. Measurement of Conducted Emissions

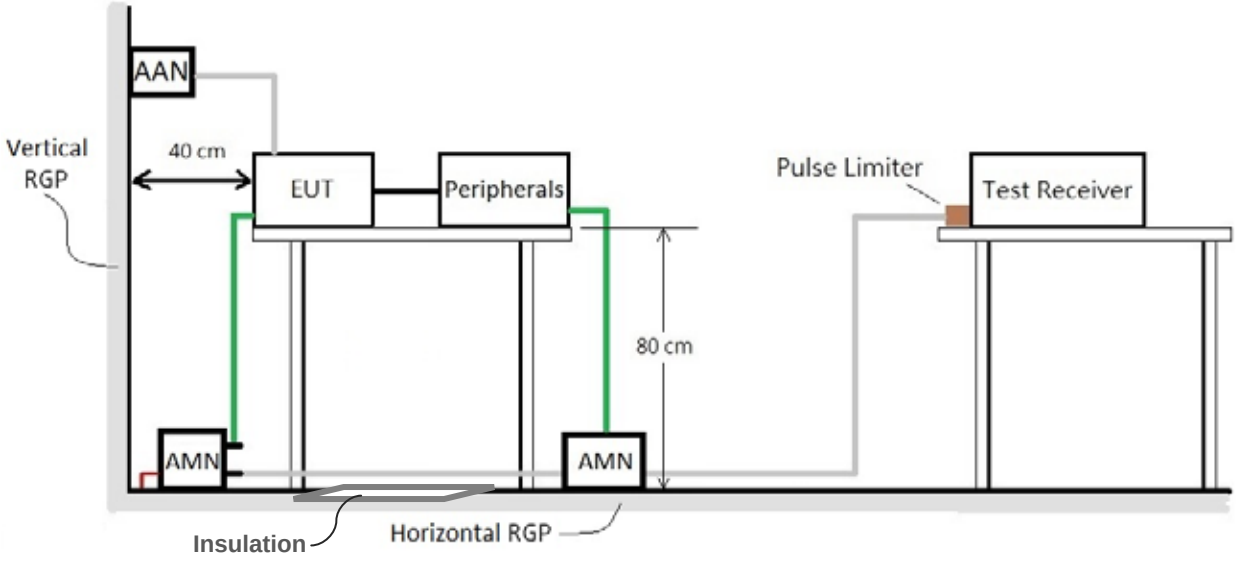
5.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R&S	ESR3	101772	2020. 02. 04	1 Year
2	A.M.N.	R&S	ENV4200	100003	2019. 09. 10	1 Year
3	L.I.S.N.	Kyoritsu	KNW-407	8-1370-9	2020. 01. 17	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	100041	2020. 01. 05	1 Year
5	Signal Cable	CDM Electronics, Inc.	RG-142	CE-02	2020. 01. 31	1 Year
6	Digital Thermo-Hygro Meter	YICHUN	TFC-9606	No.3 S/R	2020. 04. 17	1 Year
7	Test Software	Audix	e3	V6.120703a	N.C.R.	N.C.R.

5.2. Test Setup

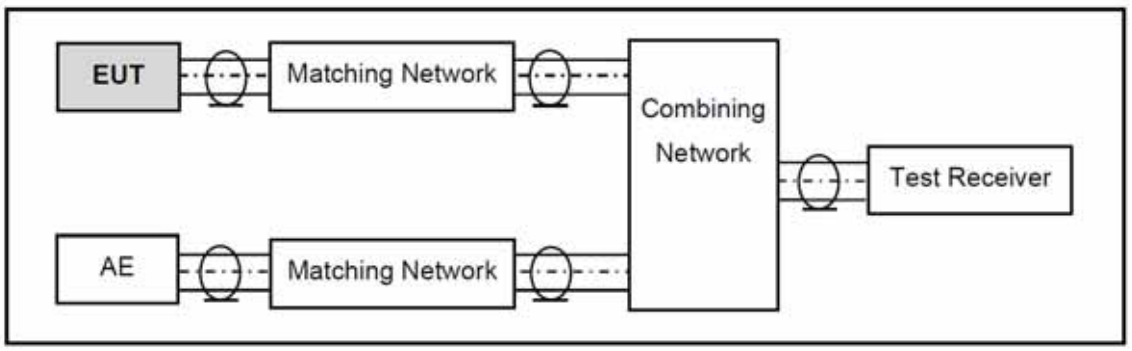
The EUTs and test equipment were configured in accordance with the requirement of EN 55032 (CISPR 32) Annex C, D:

- 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(μV)	Class B Limit dB(μV)
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 portswith 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	97– 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	97– 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(μV)75Ω			Applica-bility
		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		46	54	50	See [c]
300–1000				52	
30 – 300	For frequencies ≥1 GHz Peak / 1MHz	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 measurement procedure specified in EN 55032 (CISPR 32) clause 6.3 was used.

- Setup the EUT 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.
- Connectreceiver tuner port to an AAN that is bondedto the RGP.
- 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 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：

  Emission Level = Reading (Receiver) + Factor(A.M.N)+ 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 Wired network port

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

- Setup the EUT 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 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 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：

  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, Asymmetric mode

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

- Setup the EUT 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

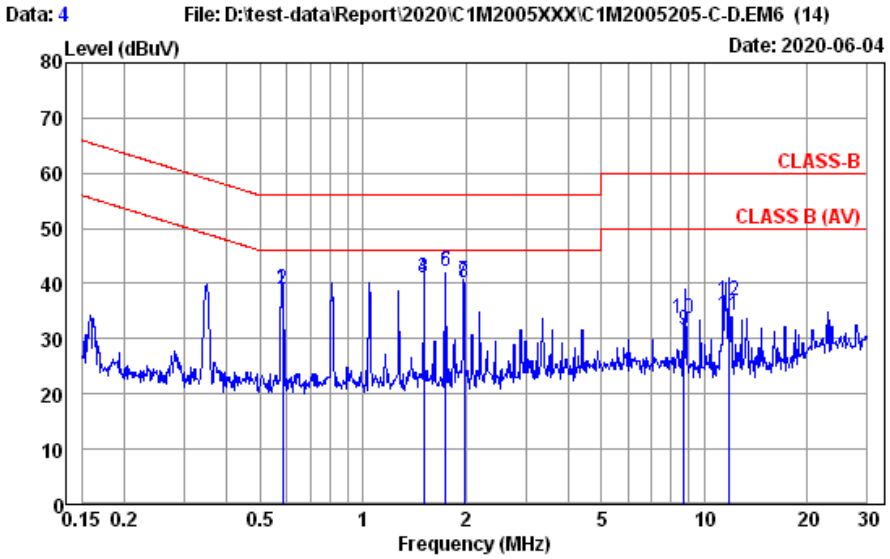
The method of EN 55032 (CISPR 32) Annex C 4.1.6.2 was used.

- 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 DVB-T signal card (inside PC system) 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).
- Recordthe 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.

Test Phase	Neutral	Test Result	Pass
Test Mode	Online Discharge Mode		

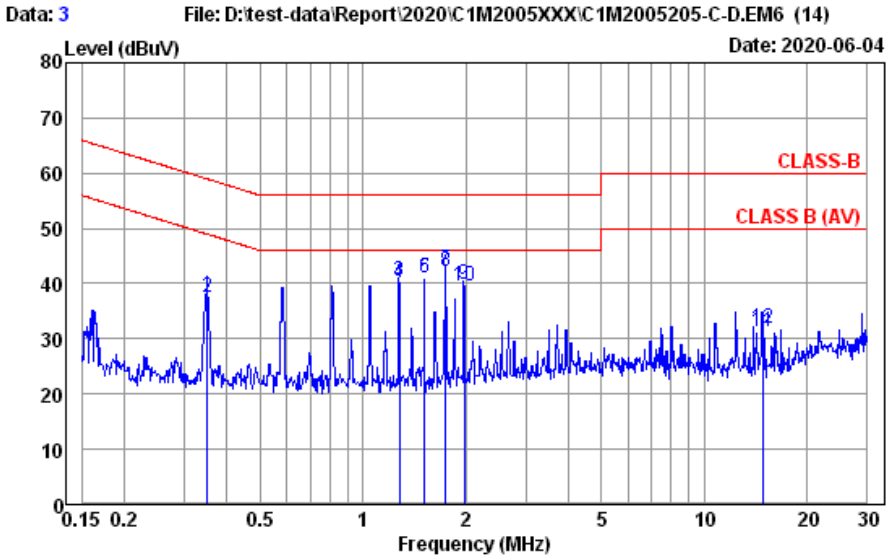


Site No. : No.3 Shielded Room Data No. : 4
Instrument 1 : Receiver ESR(772)
Instrument 2 : ENV4200 (8/003)(A)|CE-02|ESH3-Z2 (041)
Limit : CLASS-B Phase : NEUTRAL
Environment : 23°C / 52% Engineer : John He
EUT Model : CSH2 Test Rating : 230Vac / 50Hz
Test Mode : Online DisCharge

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.582	10.28	0.04	9.85	18.92	39.09	46.00	6.91	Average
2	0.582	10.28	0.04	9.85	18.78	38.95	56.00	17.05	QP
3	1.511	10.28	0.06	9.86	20.87	41.07	46.00	4.93	Average
4	1.511	10.28	0.06	9.86	20.72	40.92	56.00	15.08	QP
5	1.743	10.29	0.07	9.86	22.08	42.30	46.00	3.70	Average
6	1.743	10.29	0.07	9.86	21.96	42.18	56.00	13.82	QP
7	1.976	10.29	0.07	9.86	20.10	40.32	46.00	5.68	Average
8	1.976	10.29	0.07	9.86	19.96	40.18	56.00	15.82	QP
9	8.724	10.50	0.12	9.91	11.15	31.68	50.00	18.32	Average
10	8.724	10.50	0.12	9.91	13.25	33.78	60.00	26.22	QP
11	11.744	10.81	0.14	9.92	13.42	34.29	50.00	15.71	Average
12	11.744	10.81	0.14	9.92	15.94	36.81	60.00	23.19	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	Online Discharge Mode		



Site No. : No.3 Shielded Room Data No. : 3
Instrument 1 : Receiver ESR(772)
Instrument 2 : ENV4200 (8/003)(A)|CE-02|ESH3-Z2 (041)
Limit : CLASS-B Phase : LINE
Environment : 23°C / 52% Engineer : John He
EUT Model : CSH2 Test Rating : 230Vac / 50Hz
Test Mode : Online DisCharge

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.349	10.25	0.04	9.85	17.61	37.75	48.98	11.23	Average
2	0.349	10.25	0.04	9.85	17.38	37.52	58.98	21.46	QP
3	1.281	10.26	0.06	9.86	20.16	40.34	46.00	5.66	Average
4	1.281	10.26	0.06	9.86	20.03	40.21	56.00	15.79	QP
5	1.514	10.27	0.06	9.86	20.92	41.11	46.00	4.89	Average
6	1.514	10.27	0.06	9.86	20.77	40.96	56.00	15.04	QP
7	1.746	10.27	0.07	9.86	22.17	42.37	46.00	3.63	Average
8	1.746	10.27	0.07	9.86	22.01	42.21	56.00	13.79	QP
9	1.980	10.28	0.07	9.86	19.60	39.81	46.00	6.19	Average
10	1.980	10.28	0.07	9.86	19.44	39.65	56.00	16.35	QP
11	14.915	10.99	0.15	9.94	10.31	31.39	50.00	18.61	Average
12	14.915	10.99	0.15	9.94	10.71	31.79	60.00	28.21	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

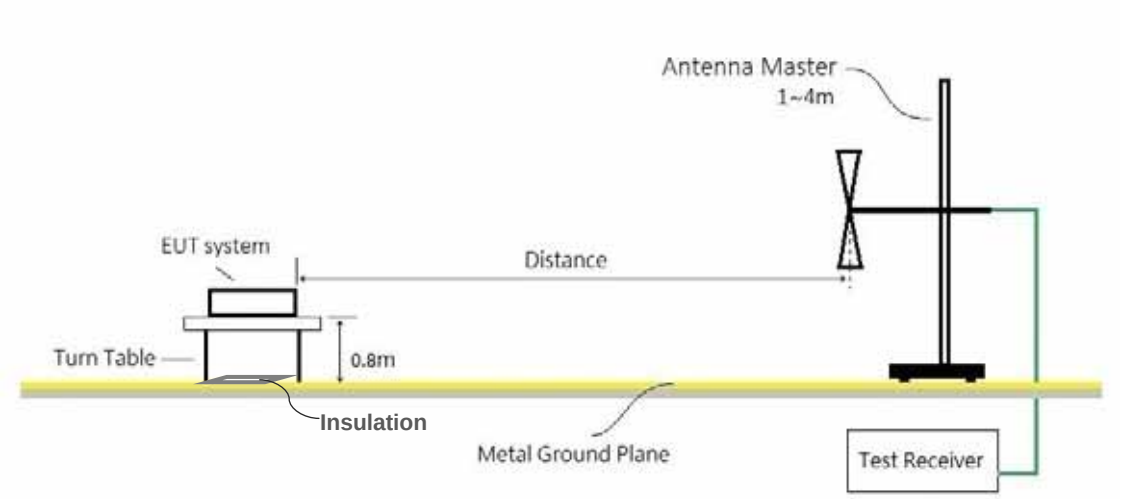
Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-503	MY51120074	2019. 10. 16	1 Year
2	Test Receiver	R&S	ESCS30	100337	2020. 05. 06	1 Year
3	Amplifier	HP	8447D	2727A05737	2020. 01. 05	1 Year
4	Bilog Antenna	Schaffner	CBL6112B	2818	2020. 01. 17	1 Year
5	Signal Cable	HUBER+SUHNER	RG217U	RE-07	2020. 01. 31	1 Year
6	Test Software	Audix	e3	V5.04507	N.C.R.	N.C.R.
7	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.6 O/S	2020. 04. 17	1 Year

- For measurement of above 1GHz frequency range

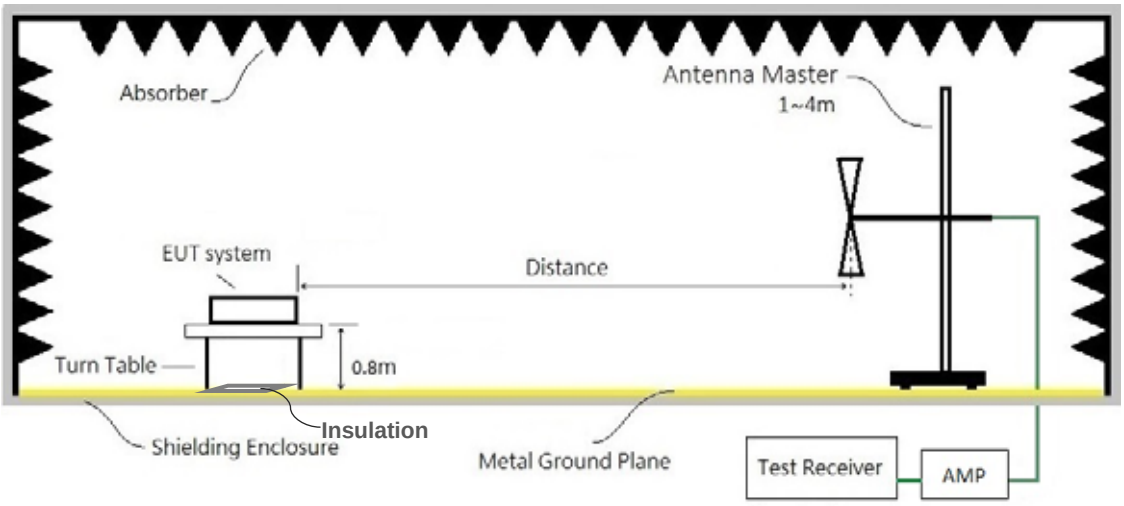
Item	Type	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Keysight	N9010B-526	MY57410128	2020. 01. 12	1 Year
2	Microwave Preamplifier	Agilent	8449B	3008A02681	2020. 03. 20	1 Year
3	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00227045	2020. 03. 10	1 Year
4	Digital Thermo -Hygro Meter	iMax	HTC-1	No.3 3m A/C	2020. 04. 17	1 Year
5	Signal Cable	HUBER+SUHNER	SUCOFLEX 104	RE-15	2020. 01. 31	1 Year
6	Test Software	Audix	e3	V9.20180702	N.C.R.	N.C.R.

6.2. Test Setup

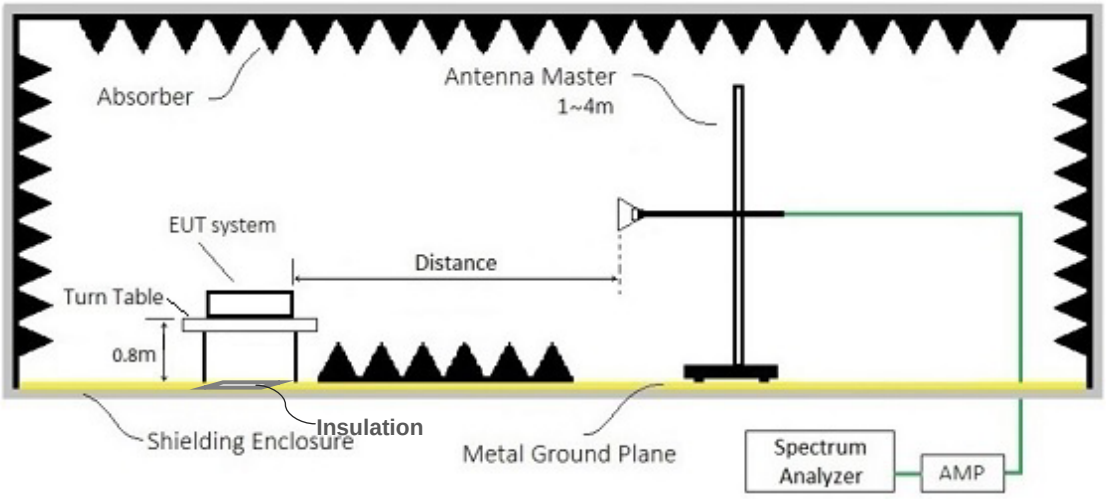
- For frequency range 30 to 1000MHz (at Open Area Test Site)



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



- For frequency range 1 to 6GHz (at SemiAnechoic 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 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 semianechoic chamber 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 at 120kHz (testingfrom 30 to 1000MHz) or 1MHz (testing above 1000MHz).
- 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)

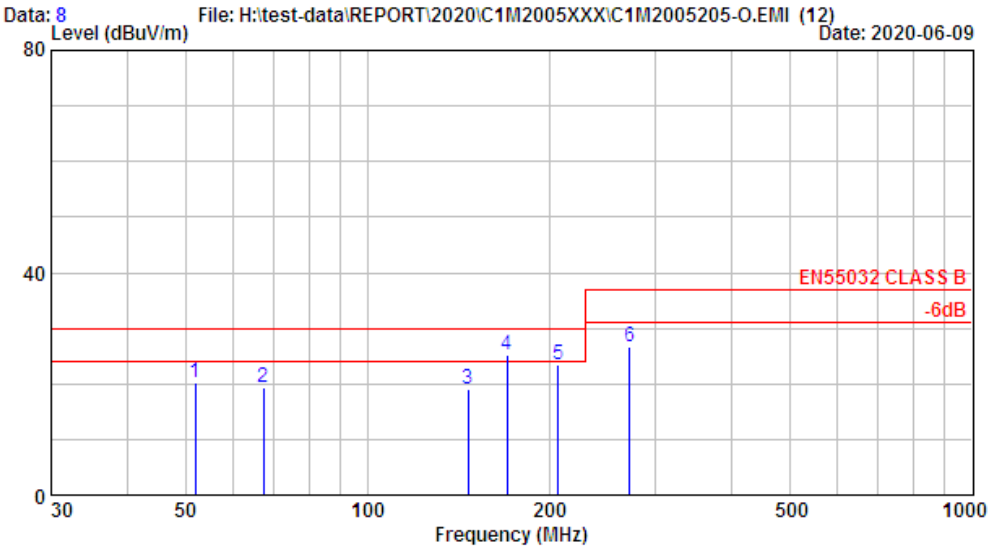
  Emission Level = Reading (Spectrum) + Cable Loss+ Antenna Factor – Preamp Gain
- The 3dB bandwidth of the horn antenna is minimum 52 degree (or w=2.93m at 3m distance) for 1~6 GHz.

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	Online Charge Mode		

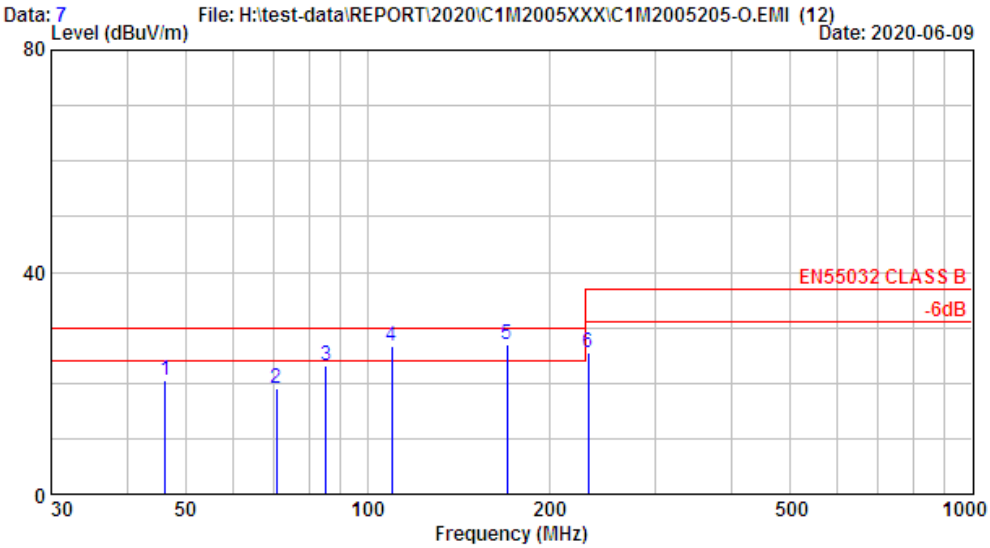



```
Site No.          : NO.6 Open Area Test Site     Data No.   : 8
Instrument 1      : Receiver ESCS(337)
Instrument 2      : CBL6112B (818)|RE-07
Distance / Limit  : 10m    / EN55032 CLASS B     Ant. Pol.    : HORIZONTAL
Environment       : 26*C / 69%                   Engineer     : Eason Hsu
EUT Model         : CSH2                         Test Rating  : 230Vac / 50Hz
Test Mode         : Online Charge
```

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	51.891	13.39	0.97	5.97	20.32	30.00	9.68	QP
2	67.410	12.28	1.12	5.90	19.30	30.00	10.70	QP
3	146.918	16.45	1.82	0.79	19.06	30.00	10.94	QP
4	170.260	15.26	2.06	7.80	25.12	30.00	4.88	QP
5	207.220	15.45	2.27	5.60	23.32	30.00	6.68	QP
6	271.619	18.45	2.51	5.62	26.57	37.00	10.43	QP

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

Ant. Polarity	Vertical	Test Result	Pass
Test Mode	Online Charge Mode		



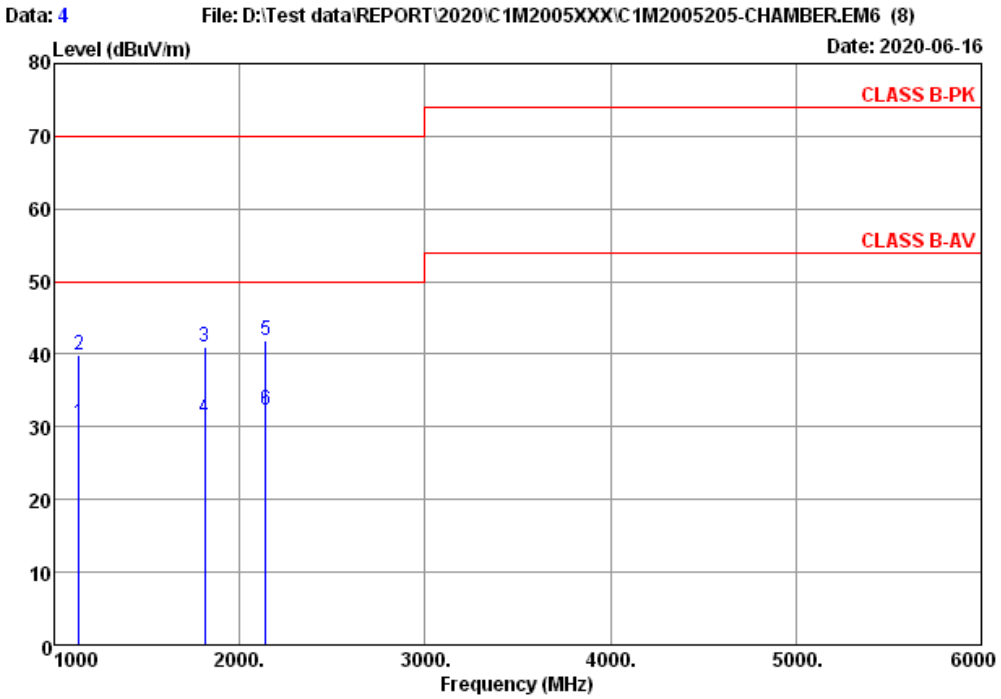

```
Site No.          : NO.6 Open Area Test Site     Data No.   : 7
Instrument 1      : Receiver ESCS(337)
Instrument 2      : CBL6112B (818)|RE-07
Distance / Limit  : 10m    / EN55032 CLASS B     Ant. Pol.    : VERTICAL
Environment       : 26*C / 69%                   Engineer     : Eason Hsu
EUT Model         : CSH2                         Test Rating  : 230Vac / 50Hz
Test Mode         : Online Charge
```

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	46.375	15.68	0.92	4.06	20.65	30.00	9.35	QP
2	70.660	12.33	1.15	5.50	18.98	30.00	11.02	QP
3	85.560	14.03	1.28	7.90	23.21	30.00	6.79	QP
4	109.860	17.33	1.49	7.90	26.72	30.00	3.28	QP
5	170.220	15.26	2.06	9.60	26.92	30.00	3.08	QP
6	232.230	17.04	2.35	6.18	25.57	37.00	11.43	QP

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

- For frequency range 1 – 6 GHz

Ant. Polarity	Horizontal	Test Result	Pass
Test Mode	Online Charge Mode		



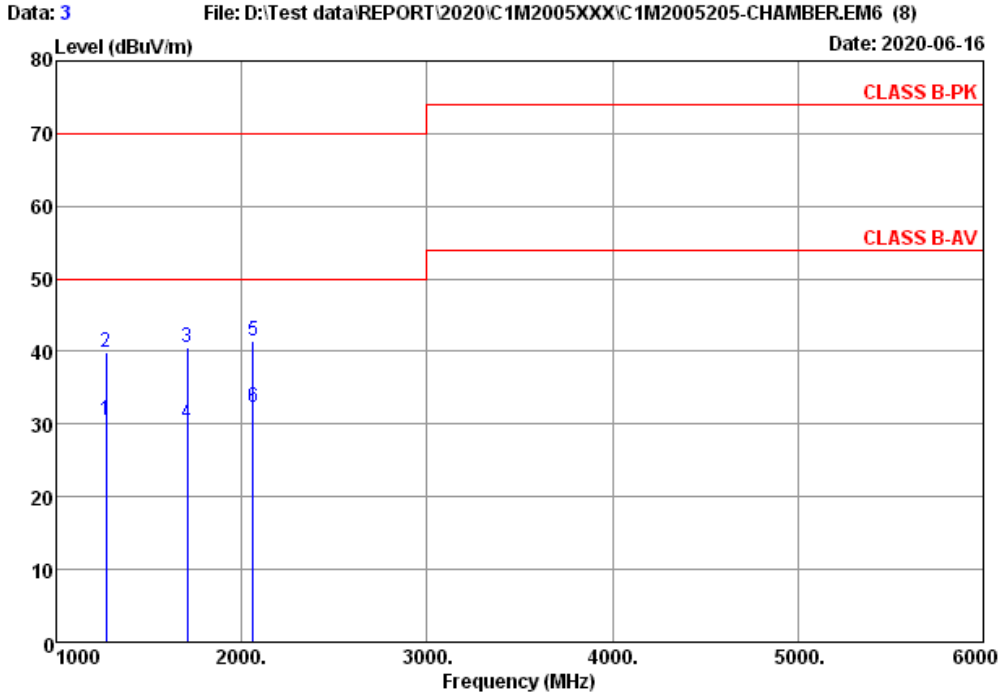
Site No. : No.2 3m Semi Anechoic Chamber
Instrument 1 : Spectrum N9010B(128)
Instrument 2 : 3117 (045)|RE-15|8449B (681)
Distance/Limit : 3m / CLASS B-PK
Environment : 25°C / 53%
EUT Model : CSH2
Test Mode : Online Charge

Data No. : 4
Ant. Pol. : HORIZONTAL
Engineer : Jemy Wang
Test Rating : 230Vac/50Hz

	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	1134.917	28.41	4.21	36.15	34.08	30.55	50.00	19.45	Average
2	1135.000	28.41	4.21	36.15	43.41	39.88	70.00	30.12	Peak
3	1810.000	30.84	5.24	35.59	40.62	41.11	70.00	28.89	Peak
4	1811.122	30.84	5.24	35.59	30.74	31.23	50.00	18.77	Average
5	2140.000	31.48	5.79	35.56	40.25	41.96	70.00	28.04	Peak
6	2141.142	31.48	5.79	35.56	30.51	32.22	50.00	17.78	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	Online Charge Mode		



Site No. : No.2 3m Semi Anechoic Chamber Data No. : 3
Instrument 1 : Spectrum N9010B(128)
Instrument 2 : 3117 (045)|RE-15|8449B (681)
Distance/Limit : 3m / CLASS B-PK Ant. Pol. : VERTICAL
Environment : 25°C / 53% Engineer : Jemy Wang
EUT Model : CSH2 Test Rating : 230Vac/50Hz
Test Mode : Online Charge

	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	1269.365	27.81	4.30	35.99	34.43	30.55	50.00	19.45	Average
2	1270.000	27.81	4.30	35.99	43.82	39.94	70.00	30.06	Peak
3	1705.000	29.49	5.04	35.64	41.66	40.55	70.00	29.45	Peak
4	1706.118	29.49	5.04	35.64	31.26	30.15	50.00	19.85	Average
5	2060.000	31.17	5.63	35.54	40.14	41.40	70.00	28.60	Peak
6	2061.188	31.17	5.63	35.54	31.12	32.38	50.00	17.62	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.

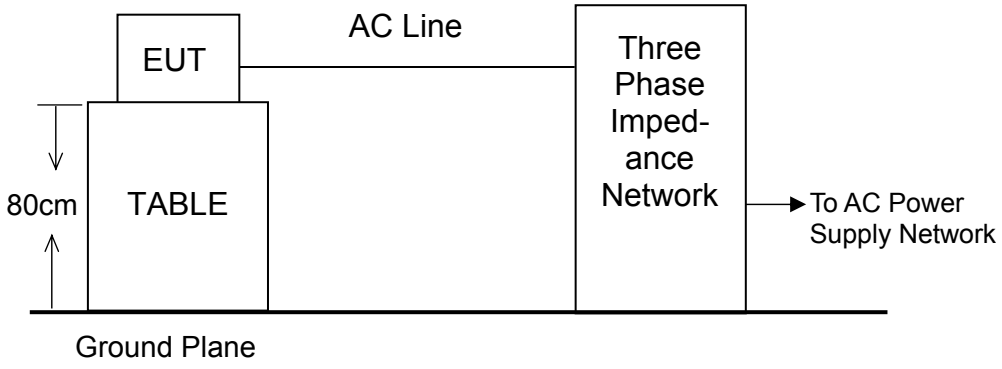
7. Measurement of Harmonics Current Emissions

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 Condi-tioning 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	Profline 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 Har-monics Room	2020. 04. 17	1 Year

7.2. Test Setup

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



7.3. Applicable Standard and Limits

Limits for Class A Equipment

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

Harmonic order n	Maximum permissible harmonic current A
Odd Harmonics Only	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15 ≤ n ≤ 39	0.15x15/n
Even Harmonics	
2	1.08
4	0.43
6	0.30
8 ≤ n ≤ 40	0.23x8/n

Note:

According to section 7 of EN IEC 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.

Limits for Class D Equipment

Class D is classified according to section 5 of EN IEC 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≤n≤39	3.85/n	0.15x15/n

Note:

According to section 7 of EN IEC 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 IEC 61000-3-2 clause 6.2 was used.

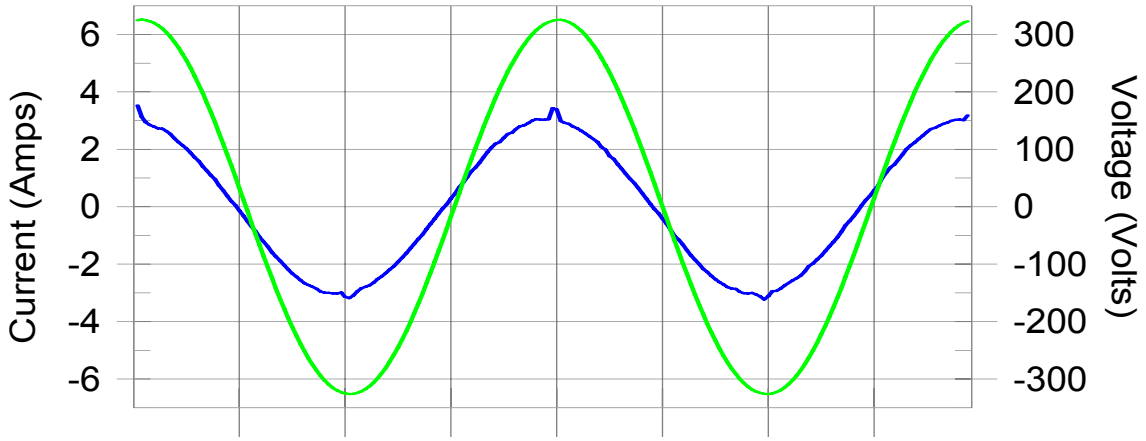
- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- Apply a 230V/50Hz rated test voltage which shall be maintained within ±2.0% and the frequency within ±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

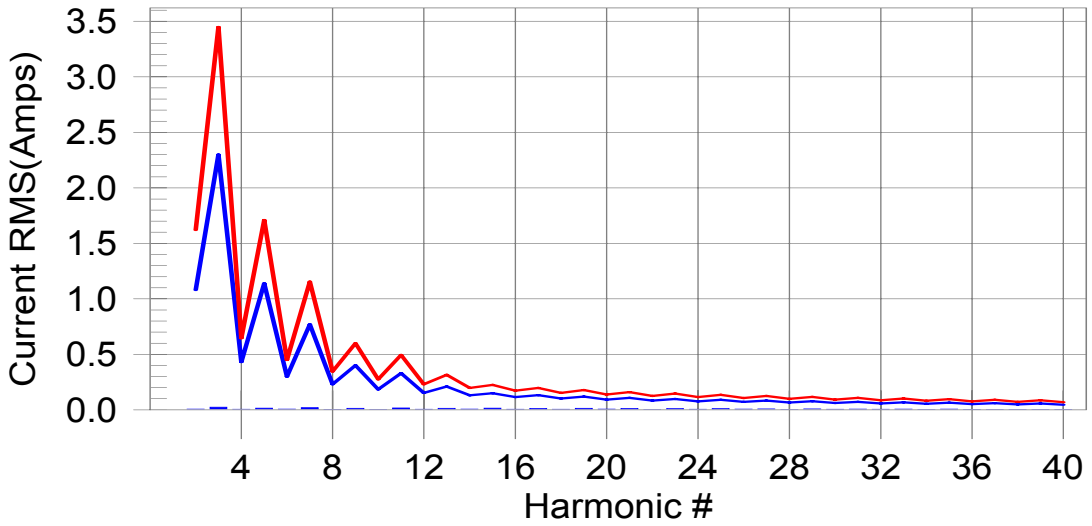
Test Date	2020. 06. 12	Environment	26ºC, 43%
Input Power	AC 230V, 50Hz	Test Result	Pass (Class A)
Tested By	Newman Yang		
Test Mode	Online Charge Mode		

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonics H23-8.6% of 150% limit, H25-12.3% of 100% limit.**

Test Result: Pass **Source qualification: Normal**

THC(A): 0.062 **I-THD(%): 2.9** **POHC(A): 0.027** **POHC Limit(A): 0.251**

Highest parameter values during test:

V_RMS (Volts):	**230.443**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**3.616**	**I_RMS (Amps):**	**2.166**
I_Fund (Amps):	**2.165**	**Crest Factor:**	**1.670**
Power (Watts):	**492.8**	**Power Factor:**	**0.987**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.007	1.080	0.6	0.009	1.620	0.6	Pass
3	0.024	2.300	1.1	0.025	3.450	0.7	Pass
4	0.006	0.430	1.4	0.008	0.645	1.3	Pass
5	0.016	1.140	1.4	0.016	1.710	0.9	Pass
6	0.007	0.300	2.3	0.008	0.450	1.8	Pass
7	0.019	0.770	2.5	0.019	1.155	1.7	Pass
8	0.005	0.230	N/A	0.005	0.345	N/A	Pass
9	0.014	0.400	3.6	0.015	0.600	2.5	Pass
10	0.005	0.184	N/A	0.005	0.276	N/A	Pass
11	0.017	0.330	5.3	0.018	0.495	3.6	Pass
12	0.005	0.153	3.6	0.006	0.230	2.6	Pass
13	0.014	0.210	6.8	0.015	0.315	4.6	Pass
14	0.006	0.131	4.8	0.007	0.197	3.3	Pass
15	0.015	0.150	9.8	0.015	0.225	6.7	Pass
16	0.005	0.115	4.7	0.006	0.173	3.3	Pass
17	0.013	0.132	10.1	0.015	0.198	7.3	Pass
18	0.005	0.102	5.3	0.006	0.153	3.8	Pass
19	0.014	0.118	11.4	0.014	0.178	8.1	Pass
20	0.007	0.092	7.7	0.008	0.138	5.4	Pass
21	0.011	0.107	10.7	0.012	0.161	7.6	Pass
22	0.005	0.084	6.1	0.005	0.125	4.3	Pass
23	0.011	0.098	11.5	0.013	0.147	8.6	Pass
24	0.006	0.077	7.6	0.006	0.115	5.4	Pass
25	0.011	0.090	12.3	0.012	0.135	8.5	Pass
26	0.007	0.071	9.7	0.007	0.107	6.8	Pass
27	0.008	0.083	9.5	0.008	0.125	6.5	Pass
28	0.005	0.066	N/A	0.005	0.099	N/A	Pass
29	0.009	0.078	12.0	0.010	0.116	8.3	Pass
30	0.006	0.061	9.6	0.006	0.092	6.8	Pass
31	0.007	0.073	9.6	0.007	0.109	6.6	Pass
32	0.005	0.058	9.6	0.006	0.086	6.7	Pass
33	0.007	0.068	10.3	0.007	0.102	7.2	Pass
34	0.005	0.054	N/A	0.005	0.081	N/A	Pass
35	0.006	0.064	9.8	0.007	0.096	6.9	Pass
36	0.005	0.051	9.8	0.005	0.077	6.9	Pass
37	0.005	0.061	N/A	0.005	0.091	N/A	Pass
38	0.004	0.048	N/A	0.004	0.073	N/A	Pass
39	0.005	0.058	8.8	0.005	0.087	6.2	Pass
40	0.004	0.046	N/A	0.004	0.069	N/A	Pass

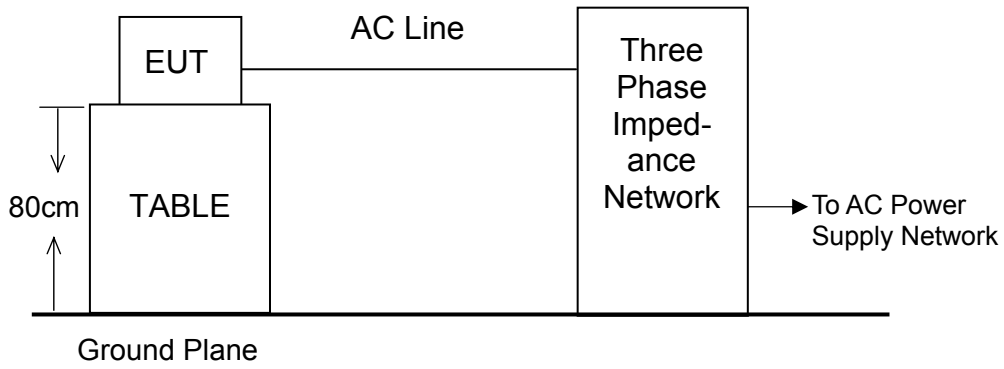
8. Measurement of Voltage Fluctuations and Flicker Emissions

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 Condi-tioning 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	Profline 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 Har-monics 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	≤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	≤3.3%
d_{max}	Maximum relative voltage change	≤4%
	Maximum relative voltage change	≤6%
	Maximum relative voltage change	≤7%

8.4. Measurement Procedure

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

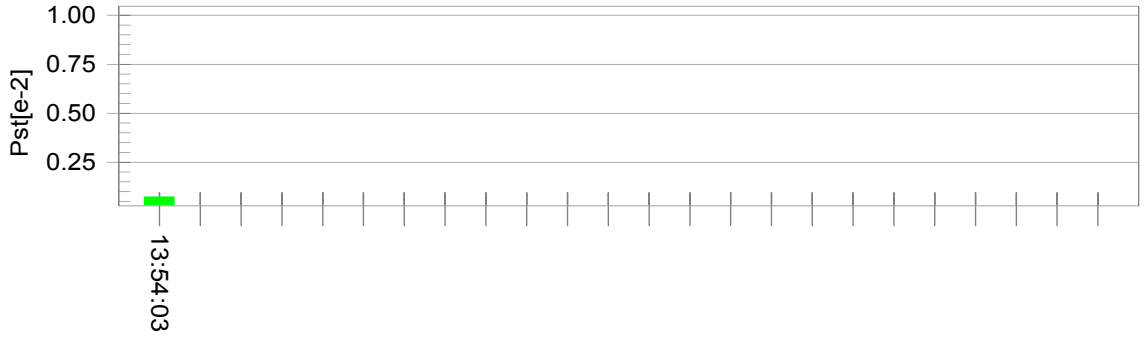
- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- The observation period for short-term flicker indicator 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 ±2.0% and the frequency within ±0.5% of the nominal value to EUT.

8.5. Measurement Result

Test Date	2020. 06. 12	Environment	26ºC, 43%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Newman Yang		
Test Mode	Online Charge Mode		

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):	**229.64**			
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):	**0.073**	**Test limit:**	**1.000**	**Pass**

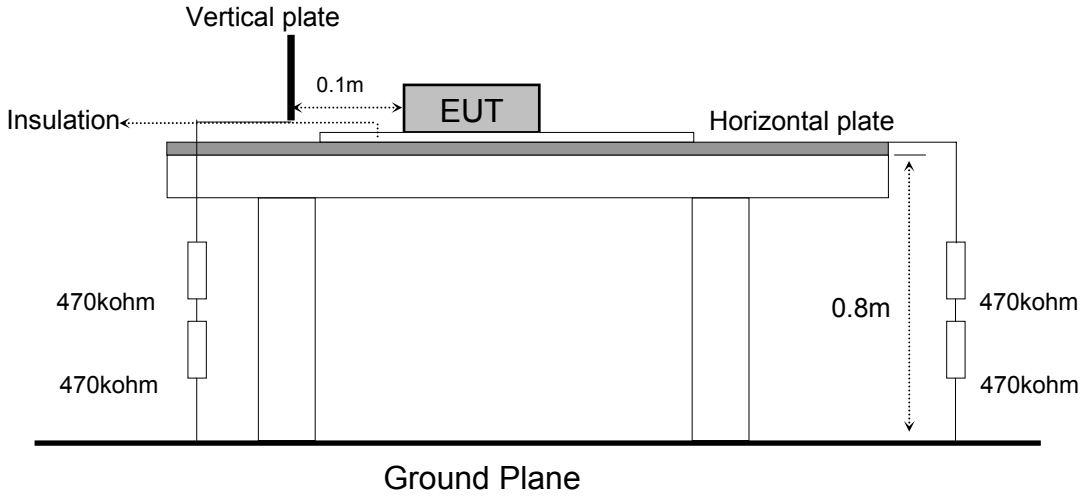
9. Electrostatic Discharge Immunity Test

9.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	ESD Simulator	EM TEST	dito	V0503100055	2020. 03. 11	1 Year
2	Digital Ther-mo-Hygro meter	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	±2kV and ±4kV	B
Air Discharge Voltage	±2kV, ±4kV and ±8kV	

- 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 EUTs 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 retrigged 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(10) 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(10) dischargeseach 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(10)dischargeseach at positive and negative polarity shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5mx0.5m, 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

- For EN 55035

Test Date	2020. 06. 11	Environment	22ºC, 41%, 99.3kPa
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Sam Yan		
Test Mode	Online Charge Mode		

Air Discharge	**Voltage Level kV / Discharge per polarity 10 / ObservationCriterion**								
Test Location	+2	-2	+4	-4	+8	-8			Comments
Seam*4*(1~4)	A	A	A	A	A	A			
LED(5)	ND	ND	A	A	A	A			
USB(17)	ND	ND	A	A	A	A			
AC IN(18)	ND	ND	A	A	A	A			
AC OUT(19)	ND	ND	A	A	A	A			
DC OUT(20)	ND	ND	A	A	A	A			
Contact Discharge	**Voltage Level kV / Discharge per polarity 10 / ObservationCriterion**								
Test Location	+2	-2	+4	-4					Comments
Screw*5(6~10)	A	A	A	A					
METAL*6(11~16)	A	A	A	A					
Indirect Contact	**Voltage kV Level / Discharge per polarity 10/ ObservationCriterion**								
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									
MeasurementPoints	**Please refer to the Photos of ESD Test Points**								
ND=No Discharge; Meets criteria but unable to obtain an electrostatic discharge (ESD) at this test point.									

10.Continuous RF Electromagnetic Field Disturbances Immunity Test (EN 55035)

10.1.List of Test Instruments

- For 80MHz - 1GHz

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immuni-ty 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	073364	2019.09.04	1 Year
4	Power Antenna	Schwarzbeck	STLP 9128 E	9128E084	N.C.R.	N.C.R.
5	Direction Coupler	TESEQ	C5982-10	98618	2019.08.08	1 Year
6	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020.04.17	1 Year

- For 1GHz ~ 3GHz

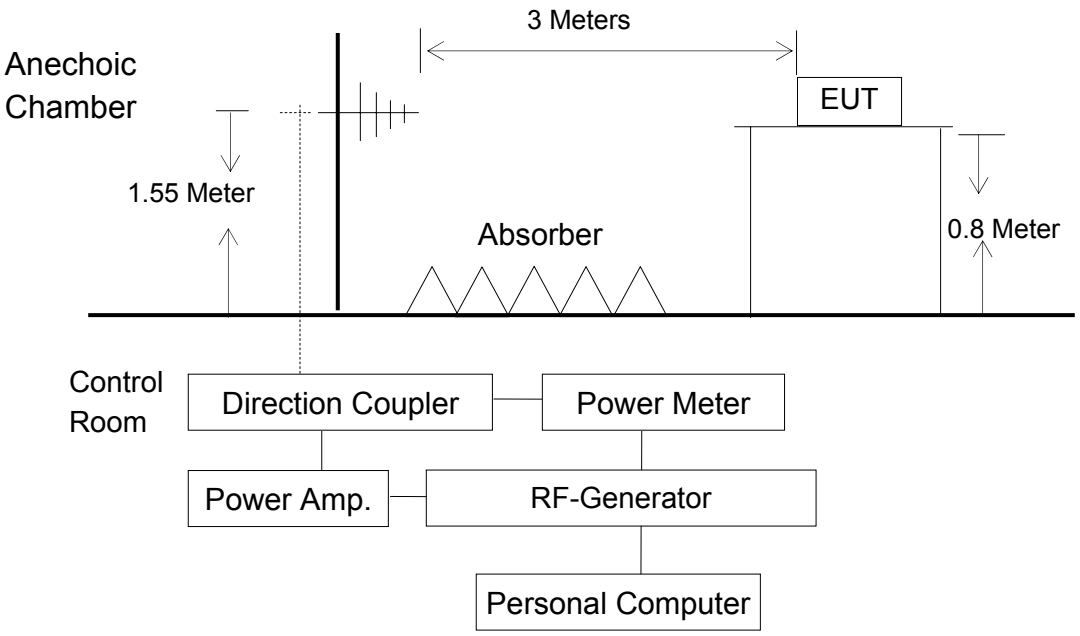
Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immuni-ty System	TESEQ	ITS 6006	033009	2019.09.03	1 Year
2	Power Amplifier	TESEQ	CBA 3G-050	T44215	N.C.R.	N.C.R.
3	Power Meter	TESEQ	PM 6006	073363	2019.09.04	1 Year
4	Power Antenna	Schwarzbeck	STLP 9149	9149-185	N.C.R.	N.C.R.
5	Direction Coupler	TESEQ	C5982-10	98618	2019.08.08	1 Year
6	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020.04.17	1 Year

- For 3GHz ~ 6GHz

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Radiated Immuni-ty 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	Direction Coupler	TESEQ	C5982-10	98618	2019.08.08	1 Year
6	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 RS Room	2020.04.17	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 35Table 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

  Additional Test:
  Test Specification from applicant requirement.
  Frequency level is up to 1~3GHz & 3~6GHz.
  Field Strength level is up to 5V/m

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:	5 V/m (r.m.s, Unmodulated)
Scanning Frequency:	80-1000MHz, 1-3GHz, 3-6GHz
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. 07. 22	Environment	23ºC, 44%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Joe Huang		
Test Mode	Online Charge Mode		

Frequency Range (MHz)	Position Angle (º)	Polarity (H or V)	Field Strength (V/m)	Observation Criterion
80 - 1000	0	H	5V/m +Modulated	A
80 - 1000	90	H	5V/m +Modulated	A
80 - 1000	180	H	5V/m +Modulated	A
80 - 1000	270	H	5V/m +Modulated	A
80 - 1000	0	V	5V/m +Modulated	A
80 - 1000	90	V	5V/m +Modulated	A
80 - 1000	180	V	5V/m +Modulated	A
80 - 1000	270	V	5V/m +Modulated	A
1000 - 3000	0	H	5V/m +Modulated	A
1000 – 3000	90	H	5V/m +Modulated	A
1000 – 3000	180	H	5V/m +Modulated	A
1000 – 3000	270	H	5V/m +Modulated	A
1000 – 3000	0	V	5V/m +Modulated	A
1000 – 3000	90	V	5V/m +Modulated	A
1000 – 3000	180	V	5V/m +Modulated	A
1000 – 3000	270	V	5V/m +Modulated	A
3000- 6000	0	H	5V/m +Modulated	A
3000- 6000	90	H	5V/m +Modulated	A
3000- 6000	180	H	5V/m +Modulated	A
3000- 6000	270	H	5V/m +Modulated	A
3000- 6000	0	V	5V/m +Modulated	A
3000- 6000	90	V	5V/m +Modulated	A
3000- 6000	180	V	5V/m +Modulated	A
3000- 6000	270	V	5V/m +Modulated	A

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

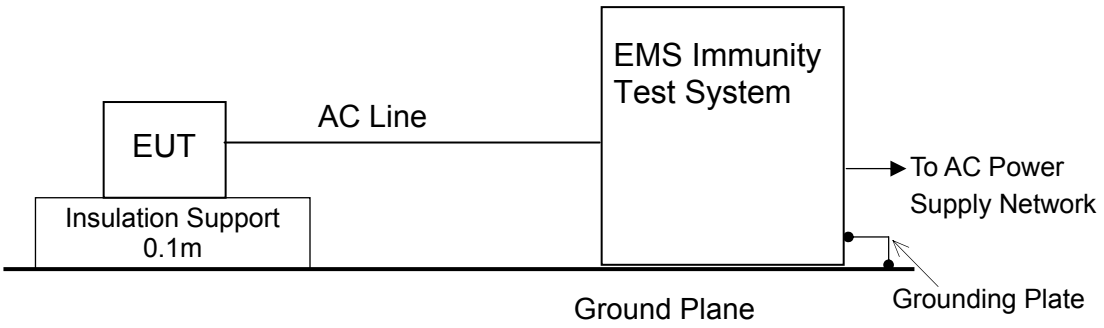
11.Electrical fast transient/burstImmunity Test

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	Automated three phase Coupl-ing/Decoupling Networks	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: ±0.5kV DC network power ports: ±0.5kV AC mains power ports: ±1kV	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 EUTs 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 projectbeyond 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 lengthsgreater 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. 06. 11	Environment	21ºC, 53%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Fans Lee		
Test Mode	Online Charge Mode		

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.					

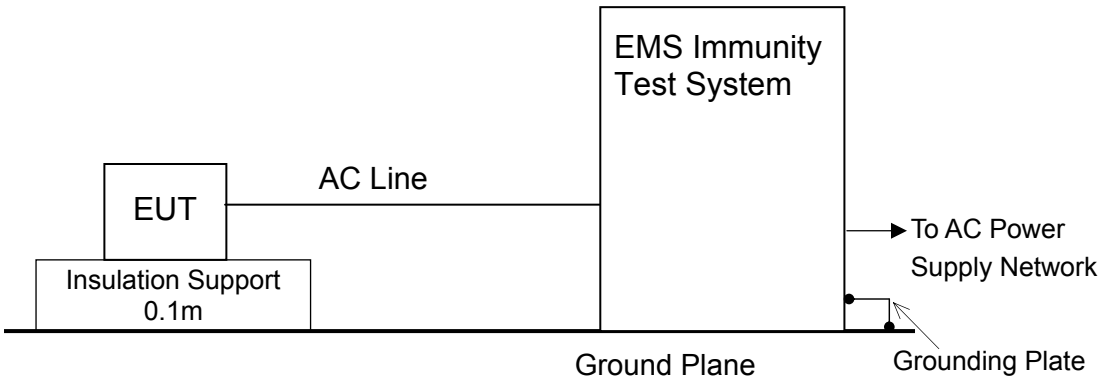
12.SurgeImmunity Test

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	Automated three phase Coupl-ing/Decoupling Networks	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) ±1kV(primary protection is not intended) Waveform*Tr*/*Th*: 10/700 (5/320) μs (*)	C
Analogue/digital data ports Port type: coaxial or shielded --shield to ground: ±0.5kV Waveform*Tr*/*Th*: 1.2/50(8/20)μs	B
DC network power ports Surges are applied line to reference ground for each individual line: ±0.5kV Waveform*Tr*/*Th*: 1.2/50(8/20)μs	B
ACmains power ports --line to line : ±1kV --line to earth (ground): ±2kV Waveform*Tr*/*Th*: 1.2/50(8/20)μs	B
(*)Where the coupling network for the 10/700 (5/320) μs waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) μs 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 1.2/50μs current surge (at open-circuit condition) and 8/20μscurrent 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 0º, 90º, 180º and 270º) 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 μs, and an open-circuit voltage time to half value of 700 μs.
- For On Line mode: The waveform is an open-circuit voltage front time of 1.2 μs, and an open-circuit voltage time to half value of 50 μs.
- In the case of shielded line, the surge is applied to direct application.

12.5.Test Result

Test Date	2020. 06. 11	Environment	21ºC, 53%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Fans Lee		
Test Mode	Online Charge Mode		

Input AC Power Port, Open Circuit Voltage					
Location	Polarity (+/-)	Phase Angle (º)	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.					

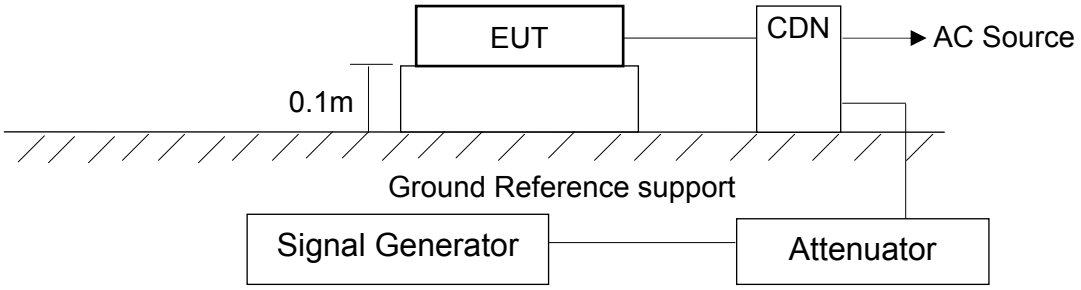
13.Continuous Induced by RF Disturbances Immunity Test (EN 55035)

13.1.List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Signal Genera-tor	R&S	SML03	103251	2020. 02. 15	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	C.D.N.	Fischer	FCC-801-M2 -25A	2010	2020. 03. 04	1 Year
5	Digital Ther-mo-Hygrometer	iMax	HTC-1	No.2 CS Room	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.



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 IEC 61000-4-6

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

- Deviation from applicable standard

  No deviation

13.4.Measurement Procedure

The measurement procedure specified in IEC 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*10^3decades/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. 06. 11	Environment	24ºC, 44%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Joe Huang		
Test Mode	Online Charge Mode		

Frequency Range (MHz)	Injected Position	Voltage Level	Observation Criterion
0.15 – 10	Main (Input ACPower 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. Remark2: No error occurred.			

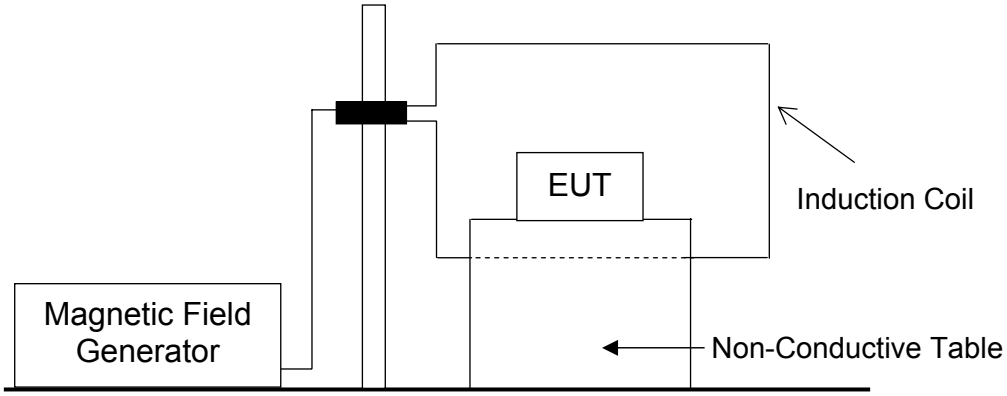
14.Power Frequency Magnetic FieldImmunity Test

14.1.List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Magnetic Field Tester	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/CISPR 35 clause 4.2.3

  Test specification is in accordance with EN/CISPR 35 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 EN 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 Z-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. 06. 12	Environment	29ºC, 36%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Newman Yang		
Test Mode	Online Charge Mode		

Power Frequency	Magnetic Field Strength	Coil Orientation	Testing Duration	Observation Criterion
50Hz	1 A/m	X-axis	1 Min	A
50Hz	1 A/m	Y-axis	1 Min	A
50Hz	1 A/m	Z-axis	1 Min	A
Remark: No error occurred.				

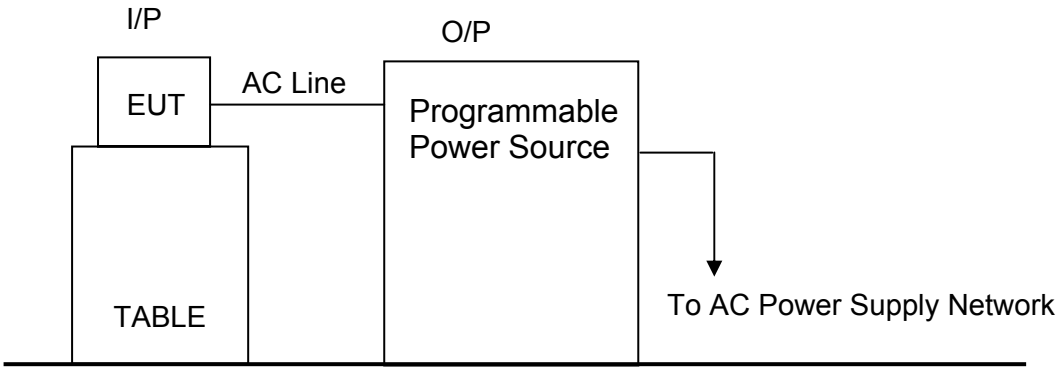
15.Voltage Dips and Interruptions Immunity Test

15.1.List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Power Source	TESEQ	NSG 1007-45	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/CISPR 35 clause 4.2.6

  Test specification is in accordance with CISPR 35 Table 4.2 and 4.3

  Basic standard is in accordance withIEC 61000-4-11

Test Specification		Performance Criterion
Voltage Dips	<5% residual, 0.5 cycles	B
Voltage Dips	70% residual, 25 cycles for 50Hz 70% residual, 30 cycles for 60Hz	C
Voltage Interruptions	<5% residual, 250 cycles for 50Hz <5% residual, 300 cycles for 60Hz	C

- Deviation from applicable standard

  No deviation

15.4.Measurement Procedure

The measurement procedure specified in EN 61000-4-11clause 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 0°, 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°, 45°, 90°, 135°, 180°, 225°, 270° and 315° on each phase.
- 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

- For EN 55035

Test Date	2020. 06. 12	Environment	29ºC, 36%
Input Power	AC 100-240V, 50/60Hz	Test Result	Pass
Tested By	Newman Yang		
Test Mode	Online Charge Mode		

Type of Test	Test Voltage	Phase Angle(°)	Residual (%)	Cycle		Observation Criterion
				50Hz	60Hz	
Voltage Dips	100V 240V	0	0	0.5	0.5	A
		0	70	25	30	A
Voltage Interruptions	100V 240V	0	0	250	300	B (Note)
Note: During the test, the EUT with bulb load was stopped working, 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 emissionsat wired network port	150kHz-30MHz	±3.5dB
Conducted emissionsat 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	±4.1dB
	200MHz-1000MHz, 3m, Horizontal	±3.9dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	1GHz-6GHz, 3m	±4.2dB
	6GHz-18GHz, 3m	±4.6dB
Radiated emissions (No.2 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±3.7dB
	200MHz-1000MHz, 3m, Horizontal	±4.0dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±4.5dB
	1GHz-6GHz, 3m	±4.3dB
	6GHz-18GHz, 3m	±4.7dB
Radiated emissions (No.3 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±3.9dB
	200MHz-1000MHz, 3m, Horizontal	±3.9dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
Radiated emissions (No.4 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.0dB
	30MHz-200MHz, 3m, Vertical	±4.3dB
	200MHz-1000MHz, 3m, Vertical	±4.4dB
	1GHz-6GHz, 3m	±4.5dB
	6GHz-18GHz, 3m	±4.6dB
Radiated emissions (No.5 3m Semi Anechoic Chamber)	30MHz-200MHz, 3m, Horizontal	±4.0dB
	200MHz-1000MHz, 3m, Horizontal	±3.9dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±4.3dB
	1GHz-6GHz, 3m	±4.3dB
	6GHz-18GHz, 3m	±4.7dB

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

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

Front View of Conducted Measurement

Back View of Conducted Measurement

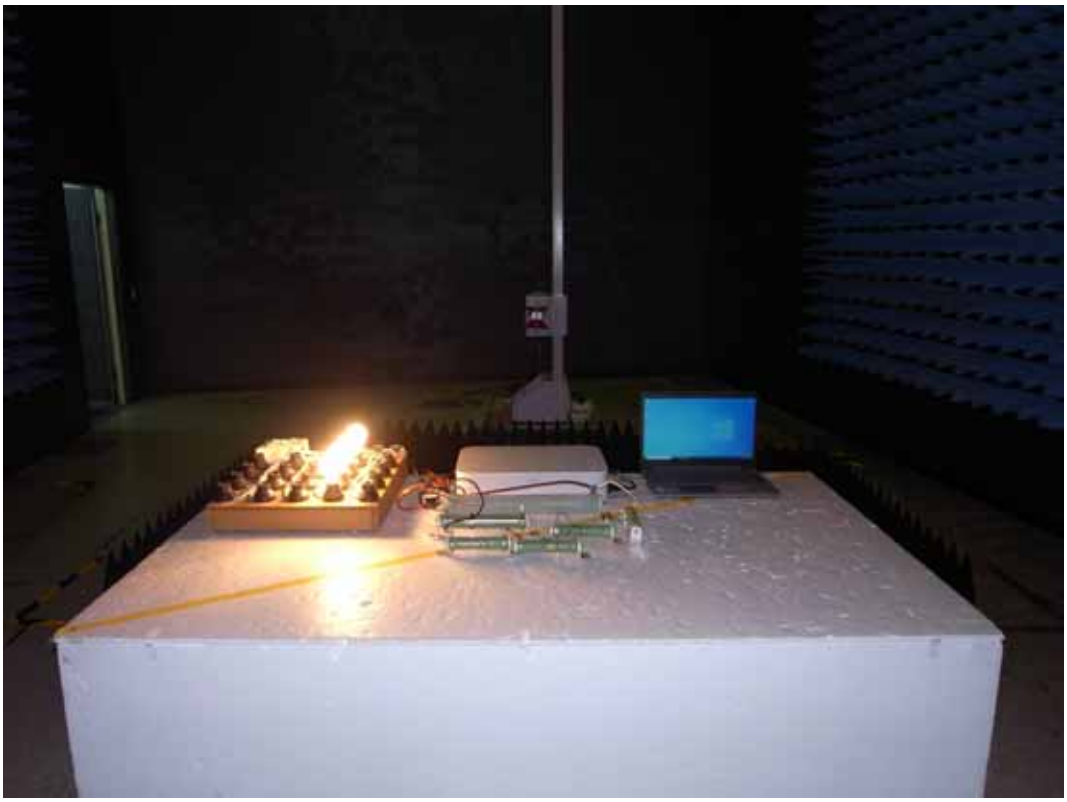
17.2.Radiated Emissions Measurement

- For Frequency Range 30 – 1000MHz

Front View of Radiated Measurement

Back View of Radiated Measurement

- For Frequency Range 1 – 6GHz



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

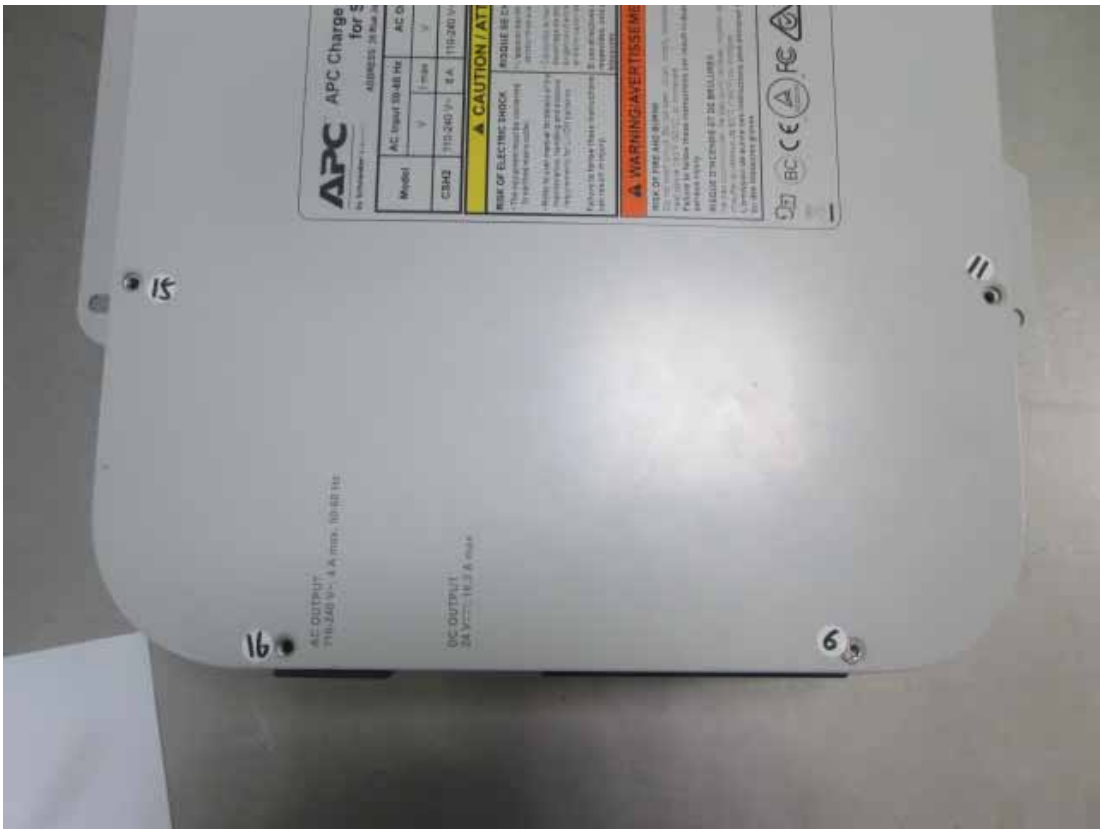
- Air& Contact Discharge

- HCP &VCP

- ESD Test Points

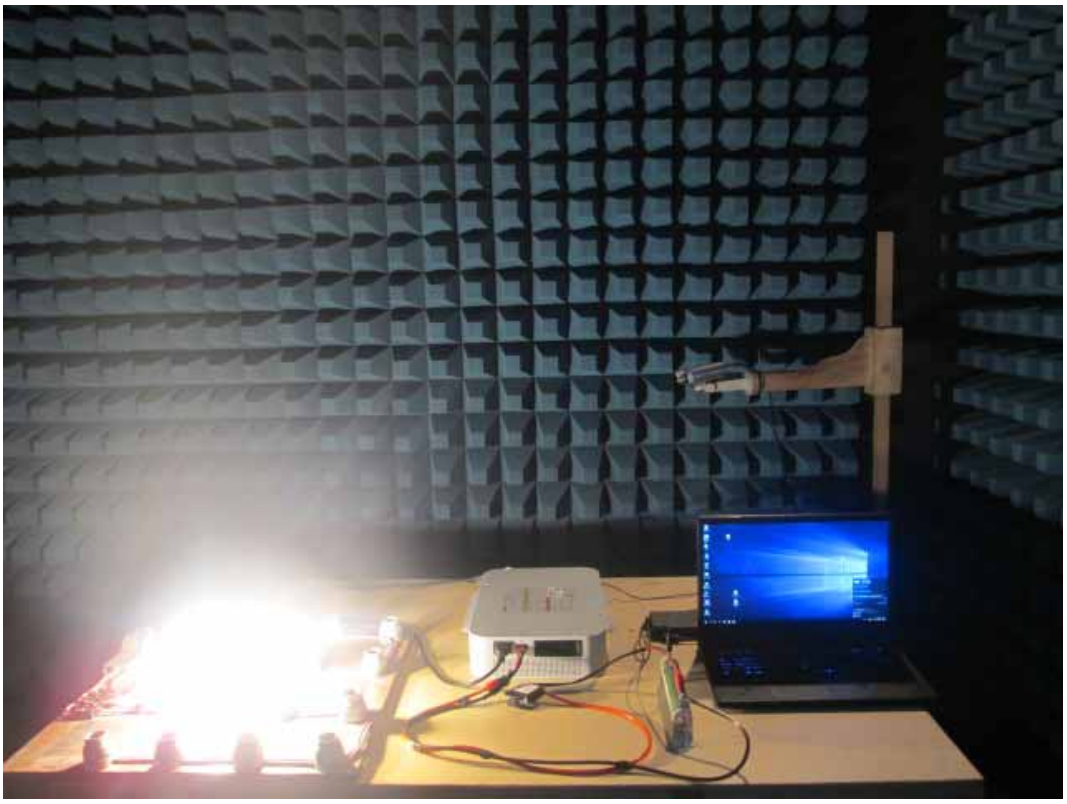
- ESD Test Points

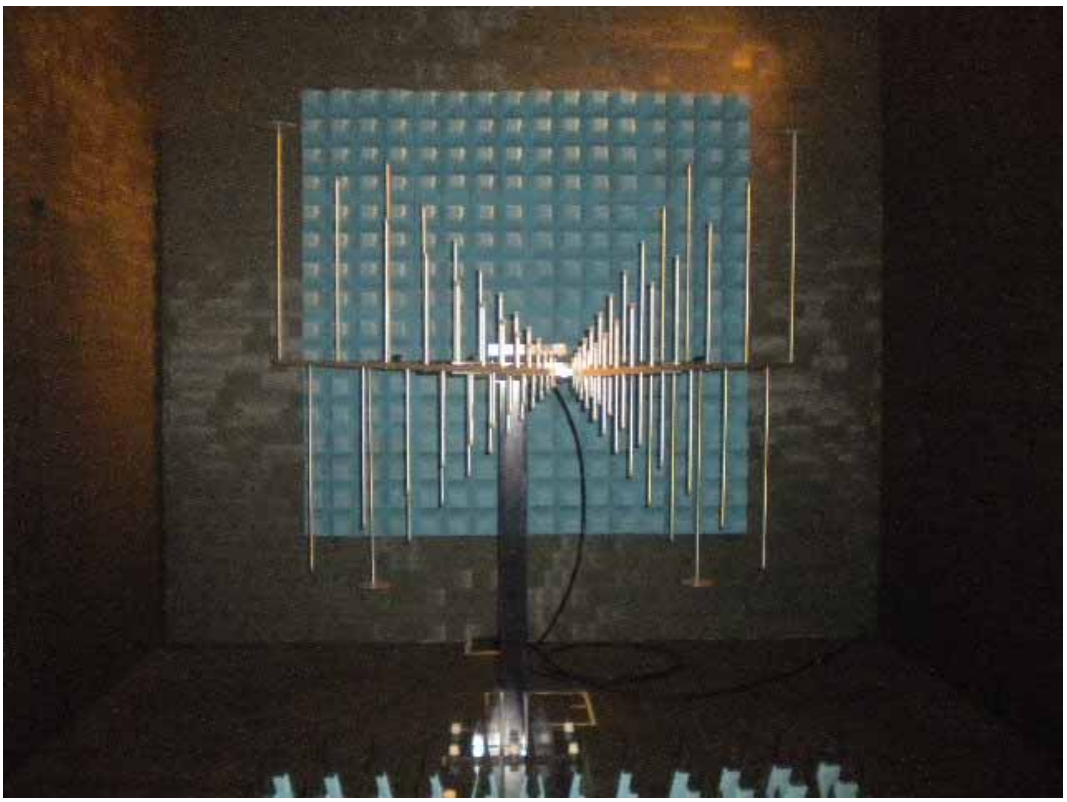
- ESD Test Points



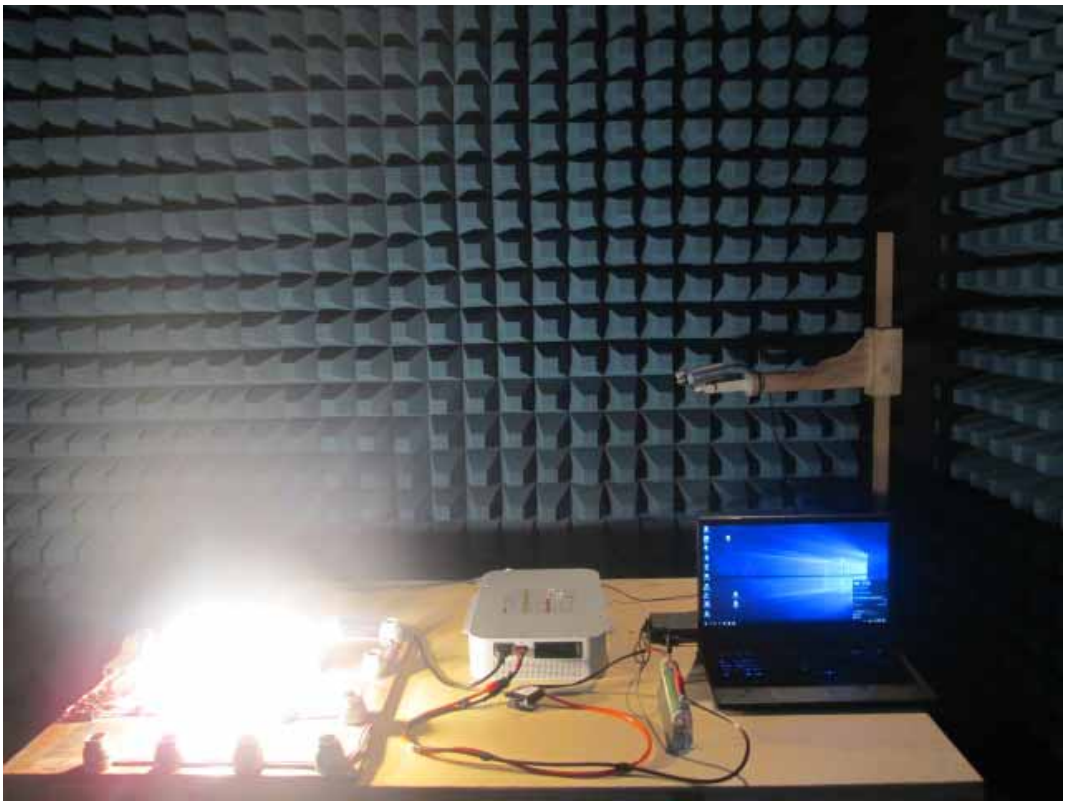
17.6.Continuous RF Electromagnetic Field Disturbances Immunity Test (EN 55035)

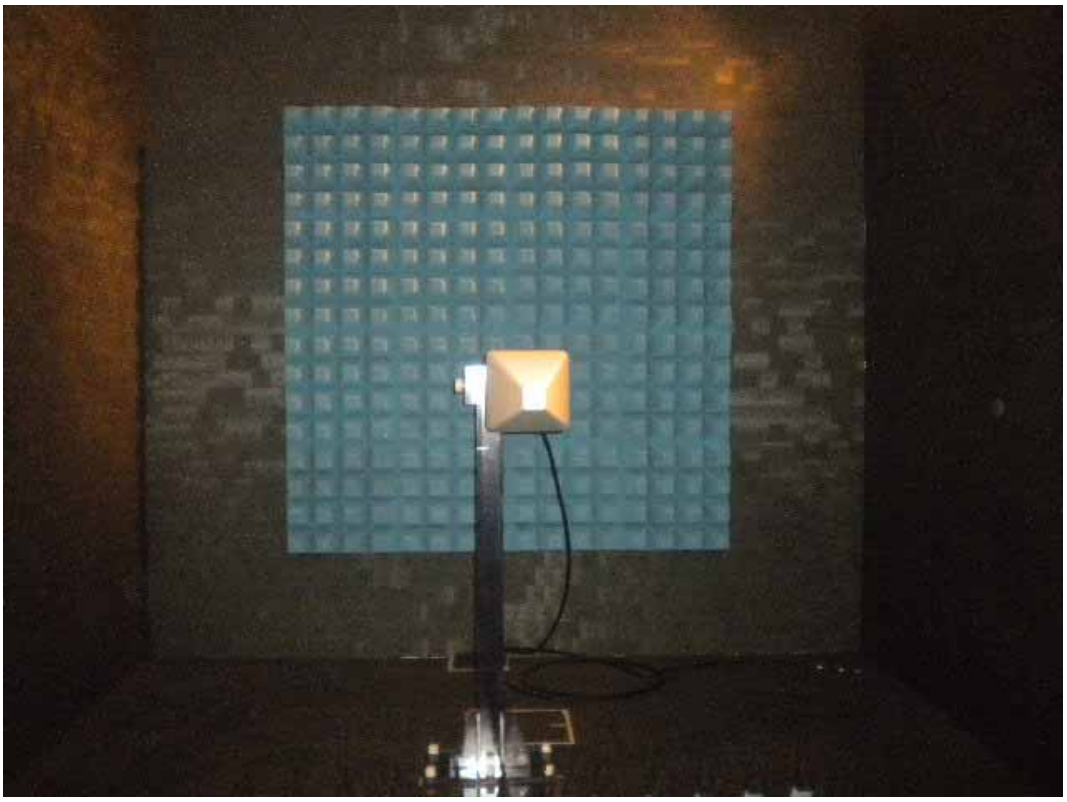
- For 80MHz - 1000MHz





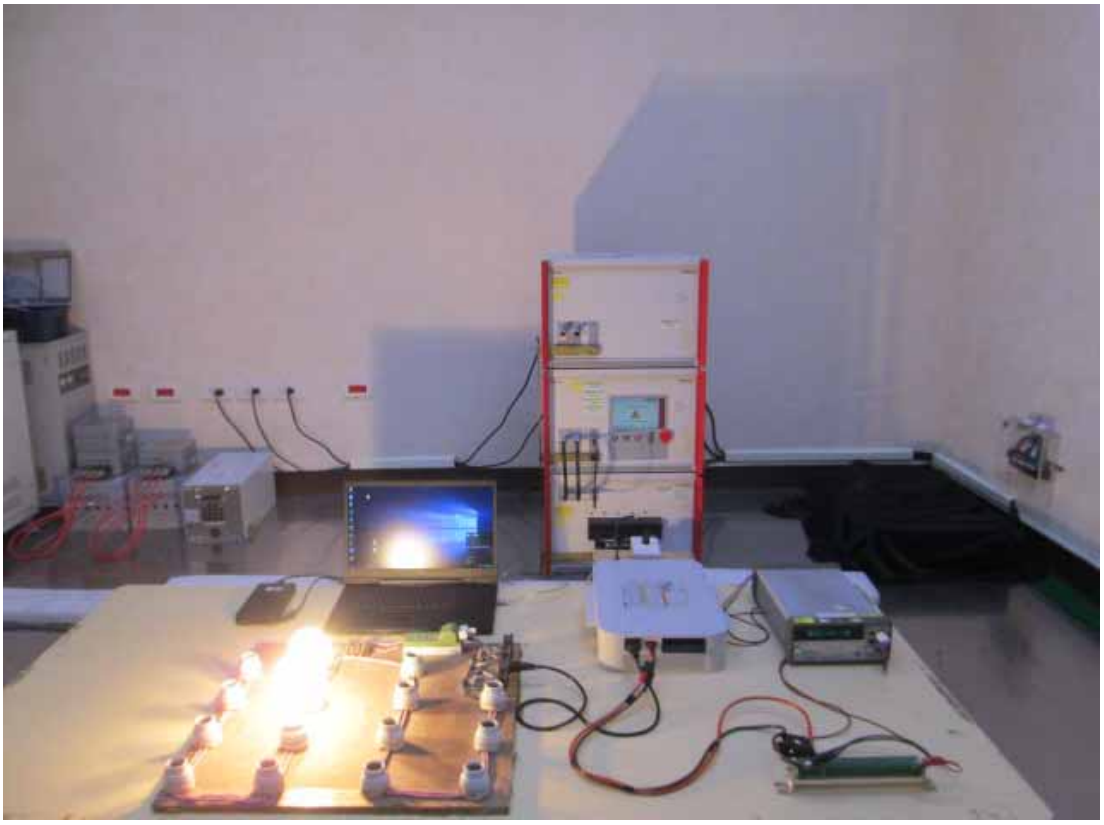
- For Above 1GHz





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)

Figure 1
General Appearance(Front& Side View)

Figure 2
General Appearance(Back & Side View)

Figure 3
General Appearance(I/O View)

Figure 4
General Appearance(I/O View)

Figure 5
General Appearance(LabelView)

Figure 6
Internal View (Removed Covers)

Figure 7
Internal View (Removed Covers)

Figure 8
Internal View (Removed Covers)

Figure 9
Internal View (Battery, Front & Side View)

Figure 10
Internal View (Battery Label View)

Figure 11
Internal View (Main Board, Front View)

Figure 12
Internal View (Main Board, Back View)

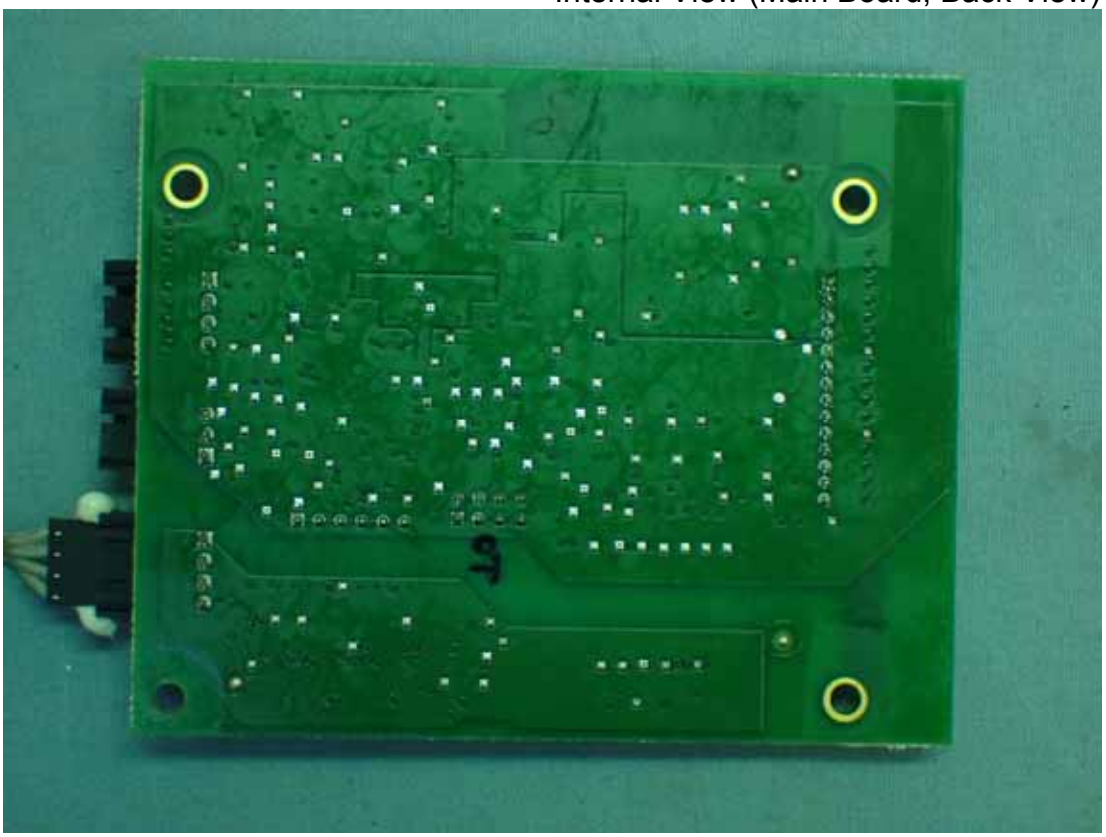


Figure 13
Internal View (Internal Board, Front View)

Figure 14
Internal View (Internal Board, Back View)

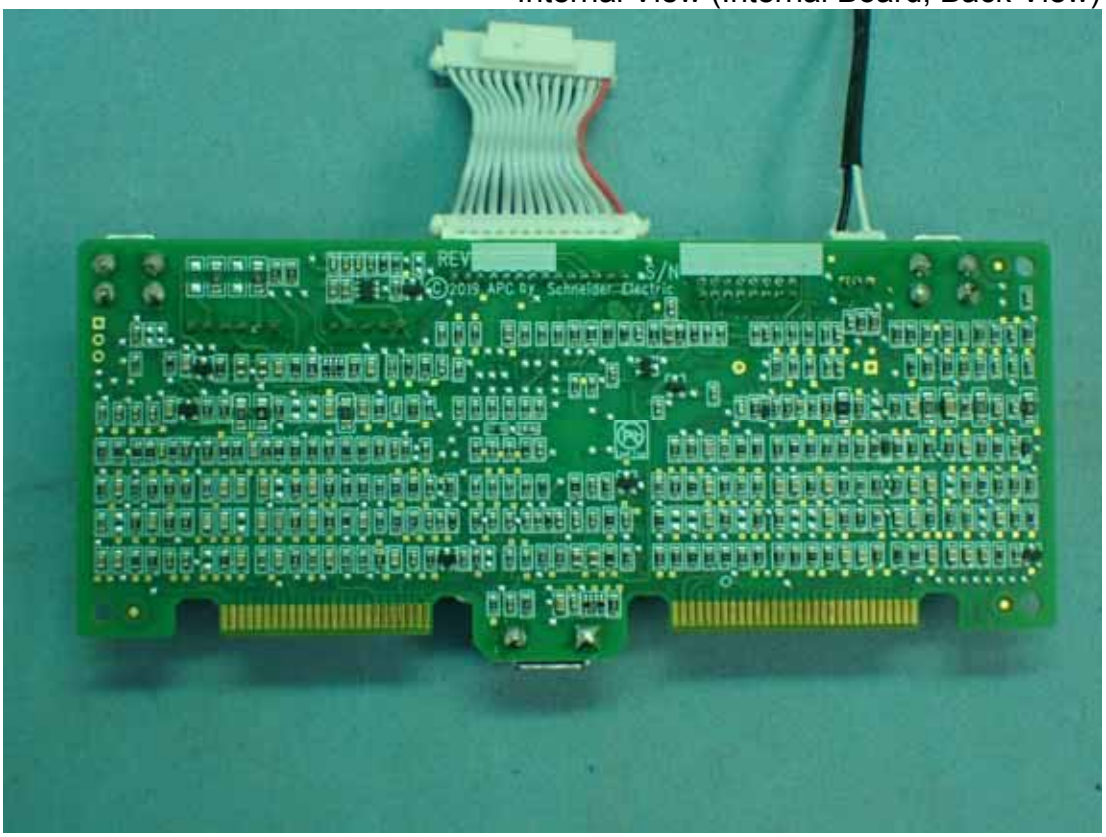


Figure 15
Internal View (Power Board, Front View)

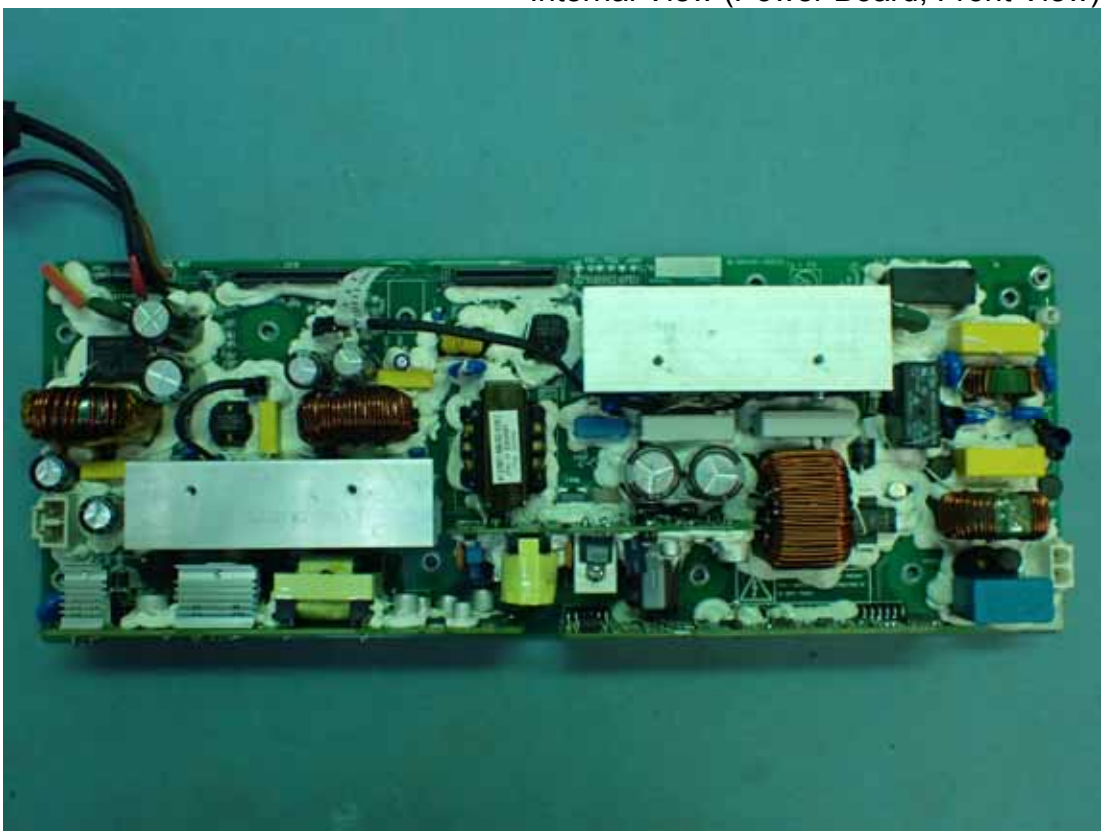


Figure 16
Internal View (Power Board, Back View)

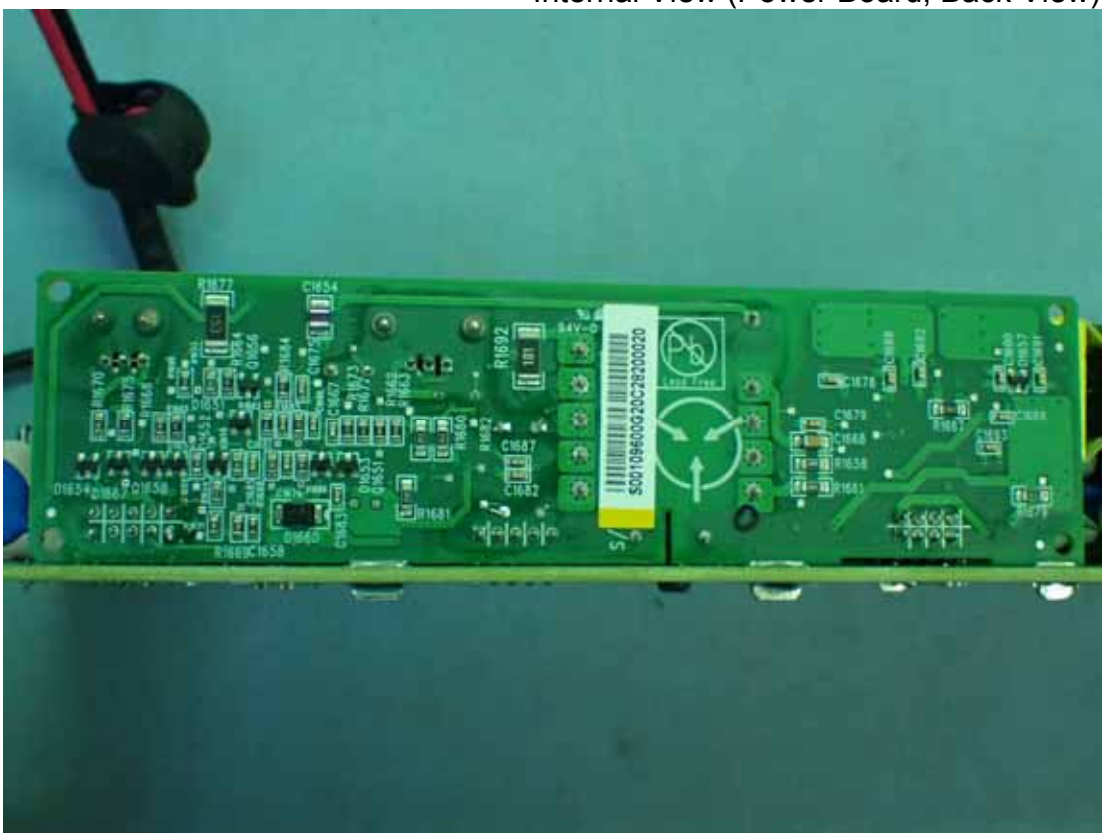


Figure 17
Internal View (Internal Board, Front View)

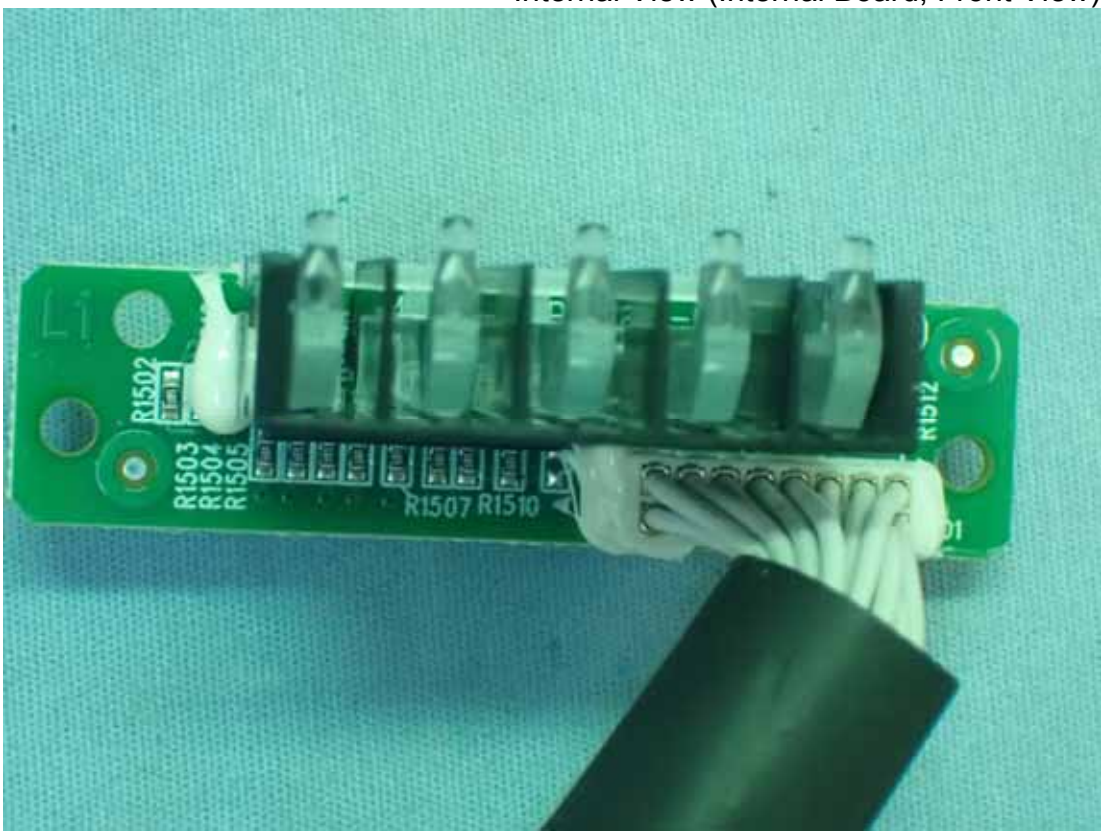


Figure 18
Internal View (Internal Board, Back View)

Figure 19
Internal View (FAN View)