ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-3 V2.1.1 (2019-03)
ETSI EN 301 489-17 V3.2.4 (2020-09)
ETSI EN 301 489-52 V1.1.0 (2016-11)
EN 55032:2015+A11:2020
EN 55035:2017/A11:2020
EN 61000-3-2:2014
EN 61000-3-3:2013+A1:2019

TEST REPORT

For

Xiamen Milesight IoT Co., Ltd.

4/F, NO. 63-2 Wanghai Road, 2nd Software Park, Xiamen, China

Tested Model: UG65-L00E-868M-EA
Multiple Models: UG65-L00E-868M, UG65-868M-EA, UG65-868M, UG65-L04EU-868M-EA, UG65-L04EU-868M

Report Type:	**Product Type:**
Original Report	LoRaWAN Gateway

Report Number:	RXM200911053-02
Report Date:	2020-12-30
Reviewed By:	Nancy Wang RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	LoRaWAN Gateway
Tested Model	UG65-L00E-868M-EA
Multiple Models	UG65-L00E-868M, UG65-868M-EA, UG65-868M, UG65-L04EU-868M-EA, UG65-L04EU-868M
Model Differences	Refer to the DoS letter
Voltage Range	DC12.0V from adapter or DC48V from POE
Date of Test	2020-09-30 to 2020-12-10
Sample serial number	RXM200911053-RF-S1, RXM200911053-RF-S2, RXM200911053-RF-S3, RXM200911053-RF-S4 (Assigned by BACL, Shenzhen)
Received date	2020-09-11
Sample/EUT Status	Good condition
Adapter information	Model: OH-1015A1201000U3-VDE Input: AC 100-240V, 50/60Hz, 0.35A Output: DC 12.0V, 1.0 A, 12.0W

Objective

This test report is in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility; ETSI EN 301 489-3 V2.1.1 (2019-03), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU. ETSI EN 301 489-17 V3.2.4 (2020-09), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU; ETSI EN 301 489-52 V1.1.0 (2016-11), Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU; EN 55032: Electromagnetic compatibility of multimedia equipment -Emission Requirements. EN 55035: Electromagnetic compatibility of multimedia equipment - Immunity requirements. EN 61000-3-2, Limits – Limits for harmonic current emissions (equipment input current up to and including 16 A per phase), and also in accordance with EN 61000-3-3, Limits Section 3; Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current<16A.

The objective is to determine compliance with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-3 V2.1.1 (2019-03), ETSI EN 301 489-17 V3.2.4 (2020-09), ETSI EN 301 489-52 V1.1.0 (2016-11) and EN 55032, EN 55035, EN 61000-3-2 and EN 61000-3-3.

Performance criterion

General performance criteria

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance 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.

Performance 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.

Performance 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 backup, shall not be lost.

6.2 Performance table

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

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

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

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

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11).

All measurements contained in this report were conducted with CISPR 16-1-1:2010+A1:2010+A2:2014, specification for radio disturbance and immunity measuring apparatus and methods P1-1: radio disturbance and immunity measuring apparatus measuring apparatus. CISPR16-1-4:2010+A1:2012 , Specification for radio disturbance and immunity measuring apparatus and methods-Part 1-4: Radio disturbance and immunity measuring apparatus -Ancillary equipment -Radiated disturbances. CISPR 16-2-1:2014, specification for radio disturbance and immunity measuring apparatus and methods P2-1: methods of measurement of disturbance and immunity conducted disturbance measurements. CISPR 16-2-3:2010+A1:2010+A2:2014, specification for radio disturbance and immunity measuring apparatus and methods P2-3 methods of measurement of disturbances and immunity radiated disturbance measurements. CISPR 16-4-2:2011, Specification for radio disturbance and immunity measuring apparatus and methods-Part 4-2: Uncertainties, statistics and limit modeling-Uncertainty in EMC measurements.
All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 Meters.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will be taken into consideration for the test data recorded in the report.

Item		Expanded Measurement uncertainty
Conducted Emissions	AC Mains	1.95 dB (k=2, 95% level of confidence)
	CAT 3	3.70 dB (k=2, 95% level of confidence)
	CAT 5	3.86 dB (k=2, 95% level of confidence)
	CAT 6	4.64 dB (k=2, 95% level of confidence)
Radiated emission	Below 1GHz	4.75 dB (k=2, 95% level of confidence)
	Above 1GHz	4.88 dB (k=2, 95% level of confidence)

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

Test Mode 1: GSM/DCS/EDGE transmitting (working and monitoring with CMU200)

Test Mode 2: WCDMA transmitting (working and monitoring with CMU200)

Test Mode 3: LTE transmitting (working and monitoring with CMW500)

Test Mode 4: Wi-Fi transmitting (working and monitoring with laptop)

Test Mode 5: Lora transmitting (working and monitoring with SPECTRUM ANALYZER)

Test Mode 6: Connect the eut to network via WAN connection (working and monitoring with laptop)

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	Latitude E5430	11429208685
SHENZHEN GOSPELL DIGITAL TECHNOLOGY CO.,LTD.	POE	G0720-480-050	G0720-480-050
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh

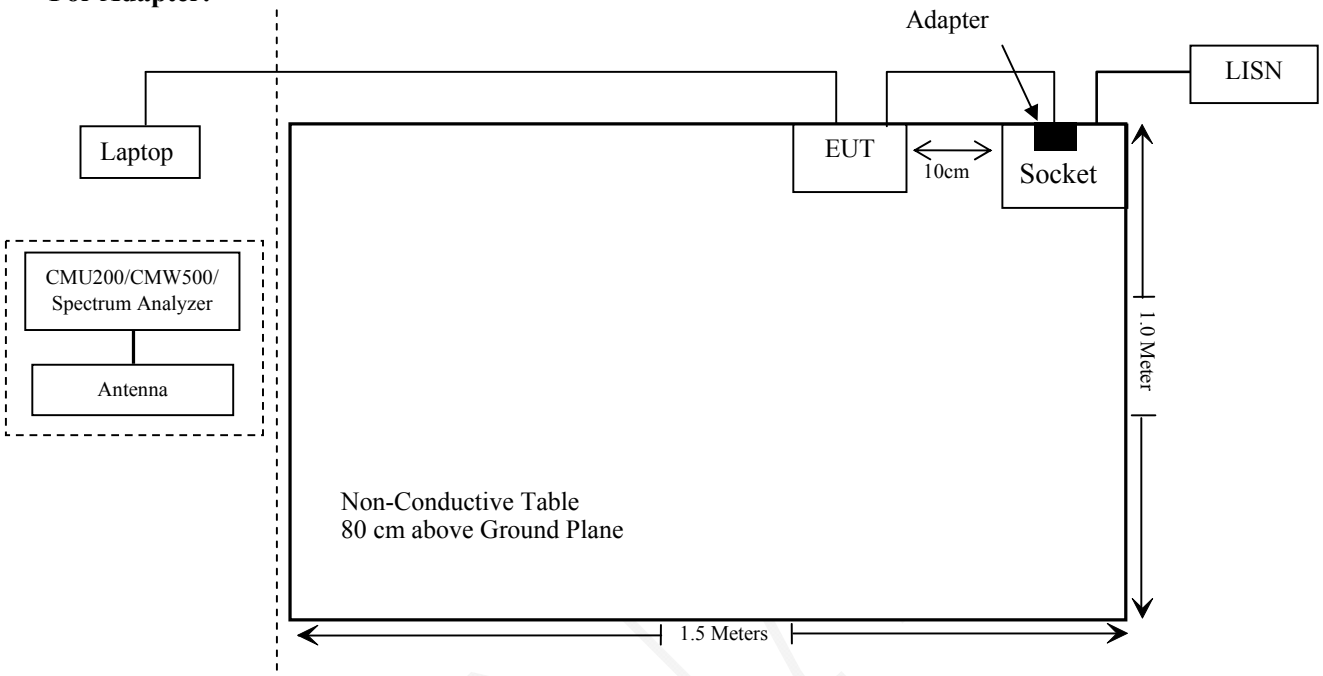
External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-Detachable AC Cable	1.0	Socket	LISN
Un-shielding Detachable AC Cable	1.2	POE	LISN
Un-shielding Un-Detachable DC Cable	2.5	Adapter	EUT
Un-Shielding Detachable RJ45 Cable	8.0	EUT/ISN/POE	Laptop
Un-Shielding Detachable RJ45 Cable	2.0	EUT	ISN
Un-Shielding Detachable RJ45 Cable	1.0	EUT	POE

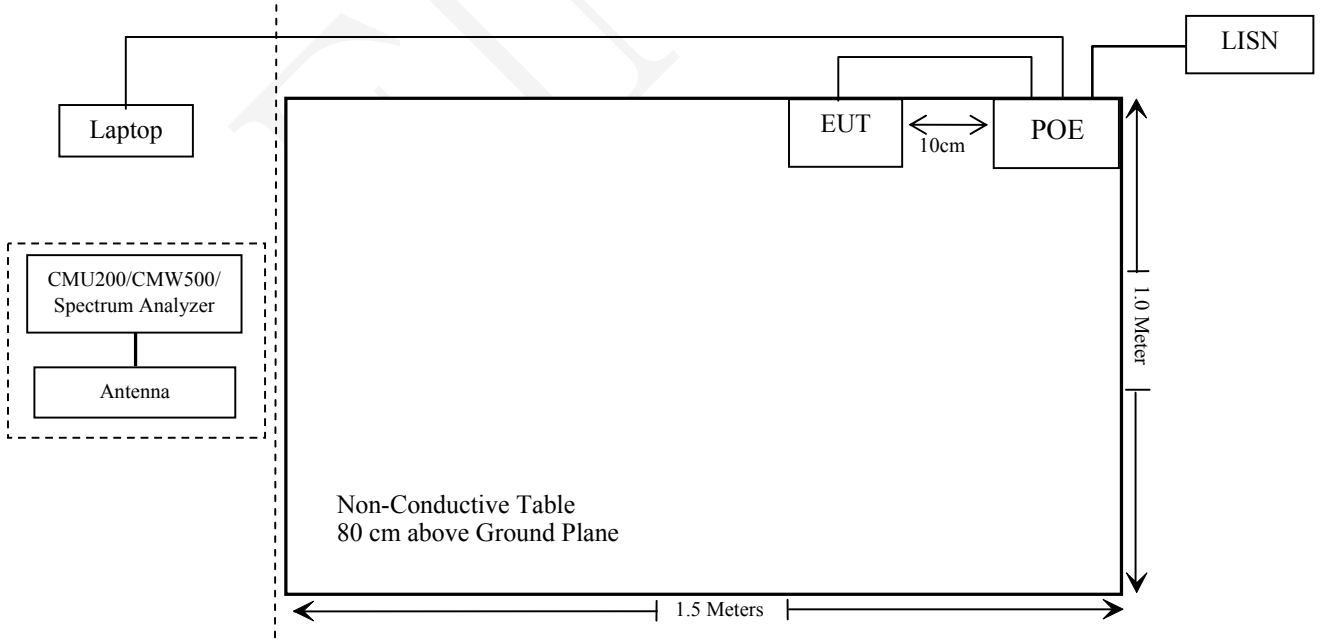
Block Diagram of Test Setup

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6:

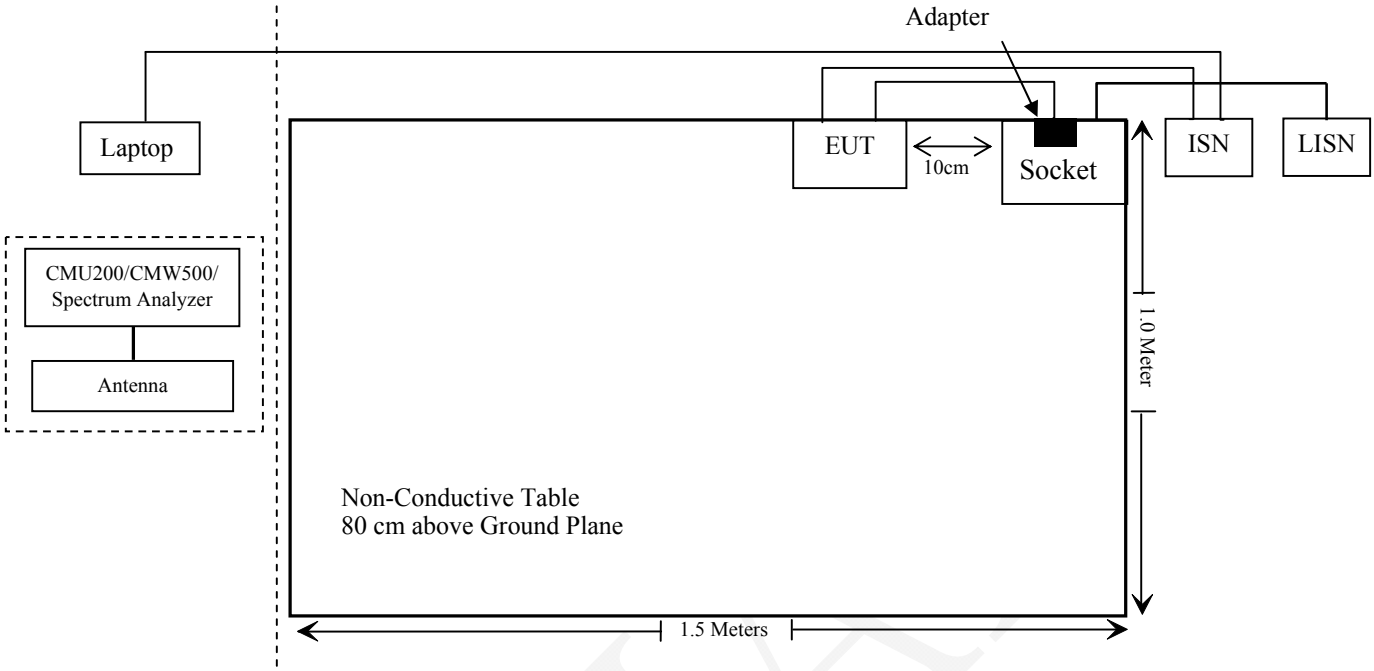
For Adapter:



For POE:



For RJ45 Port:



SUMMARY OF TEST RESULTS

EN 301 489

Rules	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliance
	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable
	Reference to clauses EN 301 489-1 §8.2 Enclosure port of ancillary equipment measured on a stand alone basis	Compliance
	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Not Applicable
	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliance
	Reference to clauses EN 301 489-1 §8.7 Wired network ports	Compliance
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 6000 MHz) (EN 61000-4-3)	Compliance
	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliance
	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliance
	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliance
	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	Not Applicable
	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliance
	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliance

Not Applicable: Please refer to Applicability overview tables in sections 7.1 and 7.2 of EN 301 489-1 requirements for Radio and ancillary equipment.

EN 55032

RULE	DESCRIPTION	RESULTS
§ A.3	Conducted Disturbance	Compliance
§ A.2	Radiated Disturbance	Compliance

EN 55035

RULE	DESCRIPTION	RESULTS
§4.2.1	Electrostatic Discharges IEC 61000-4-2	Compliance
§4.2.2.2	Continuous RF Electromagnetic Field Disturbances IEC 61000-4-3	Compliance
§4.2.2.3	Continuous Induced RF Disturbances IEC 61000-4-6	Compliance
§4.2.3	Power Frequency Magnetic Field IEC 61000-4-8	Compliance
§4.2.4	Electrical Fast Transients IEC 61000-4-4	Compliance
§4.2.5	Surges IEC 61000-4-5	Compliance
§4.2.6	Voltage Dips And Interruptions, IEC 61000-4-11	Compliance
§4.2.7	Broadband Impulsive Conducted Disturbances IEC 61000-4-6	Not Applicable

EN 61000-3-2

Rule	Description	Results
§7	Harmonic Current Emissions	Not Applicable

EN 61000-3-3

Rule	Description	Results
§5	Voltage Fluctuation and Flicker	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMI					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2020/08/04	2021/08/03
Rohde & Schwarz	LISN	ENV216	101613	2020/08/04	2021/08/03
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Schwarzbeck	ISN Cat 6	NTFM 8158	cat 5-8158-0011	2020/08/04	2021/08/03
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
Unknown	Cable	Chamber Cable 1	F-03-EM236	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2020/08/04	2021/08/03
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
EM TEST	Harmonics/flicker Analyer	DPA 500N	V0939105176	2020/01/25	2021/01/24
EM TEST	AC Source	ACS500	303276	2019/12/25	2020/12/24
EM Test	DPA.Control	V5.0.3.0	Unknown	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMS					
EM Test	ESD Generator	NSG 438	1476	2020/05/12	2021/05/11
HP	Signal Generator	8665B	3744A01692	2020/07/31	2021/07/30
AR	Amplifier	500W1000B	0348446	2020/03/02	2021/03/01
AR	Amplifier	60S1G6	0348712	2020/03/02	2021/03/01
AR	Antenna	ATL80M1G	0348837	NCR	NCR
AR	Antenna	ATT700M12G	0349411	NCR	NCR
BACL	Test Software	VEE PRO	V2.3 VXE	NCR	NCR
HP	Signal Generator	8648C	3426A01345	2020/07/31	2021/07/30
A&R	Power Amplifier	15A250	13444	2020/01/14	2021/01/13
WEINSCHEL	6dB Attenuator	50-6	R4376	NCR	NCR
Com-Power Corporation	CDN	CDN M325E	521145	2020/08/04	2021/08/03
Com-Power Corporation	CDN	CDN T8E	581609	2020/08/04	2021/08/03
EM TEST	EMS Combination Tester	UCS 500 N5	V0939105172	2020/03/02	2021/03/01
EM TEST	AC Source	MV2616	V0939105173	2020/01/14	2021/01/13
EM TEST	AC Source	CNV 504N	V0939105174	2020/04/03	2021/04/02
EM TEST	EFT Clamp	HFK	0809/59	2020/04/03	2021/04/02
EM TEST	CDN	CNV 504S1	V0939105175	2019/12/24	2020/12/24
EM TEST	IEC.Control	V5.0.9.0	Unknown	NCR	NCR

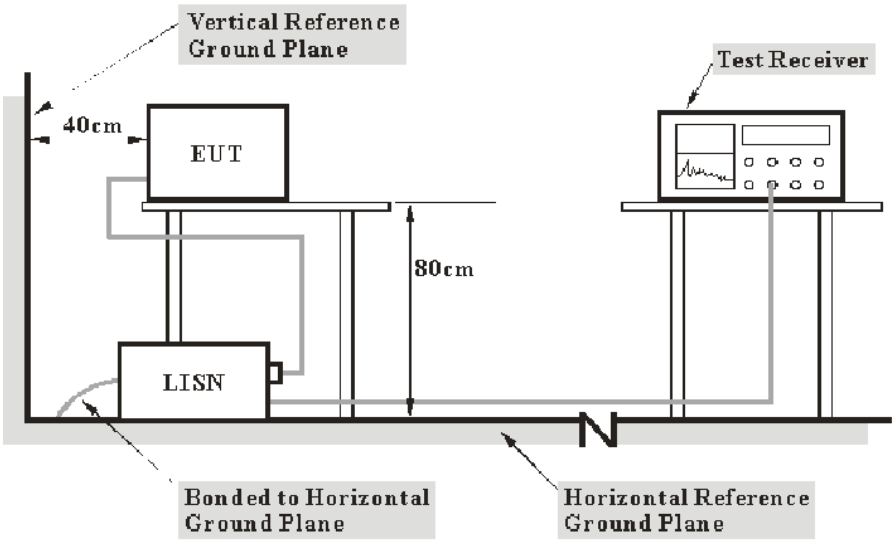
*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§7.1 & EN 55032 §A.3 - CONDUCTED EMISSIONS

Applicable Standard

According to EN 55032 §A.3 & EN 301 489-1

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per EN 301 489-1 & CISPR 16-1-1:2010+A1:2010+A2:2014, CISPR 16-2-1:2014 measurement procedures. The specification used was with the EN 301 489-1 & EN 55032 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the EN 301 489-1 & EN 55032.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

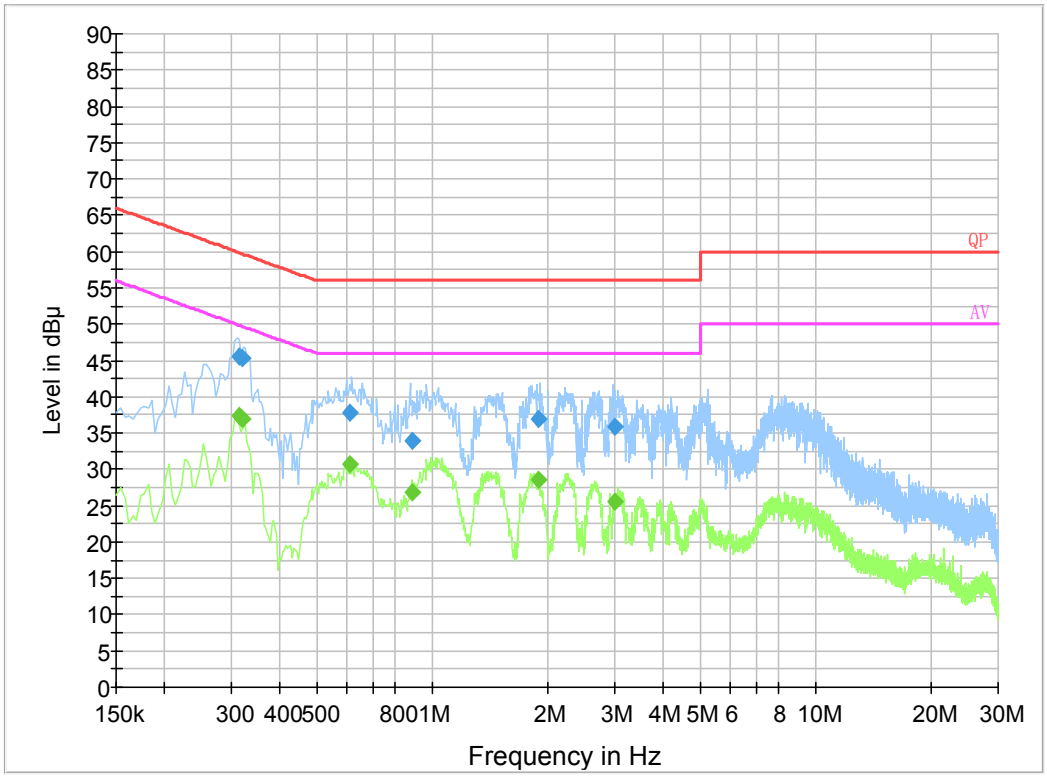
Temperature:	25 ℃
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2020-09-30 and 2020-10-10.

Test Mode 1:(Worst case)

For Adapter:

AC 230 V/ 50 Hz, Line:



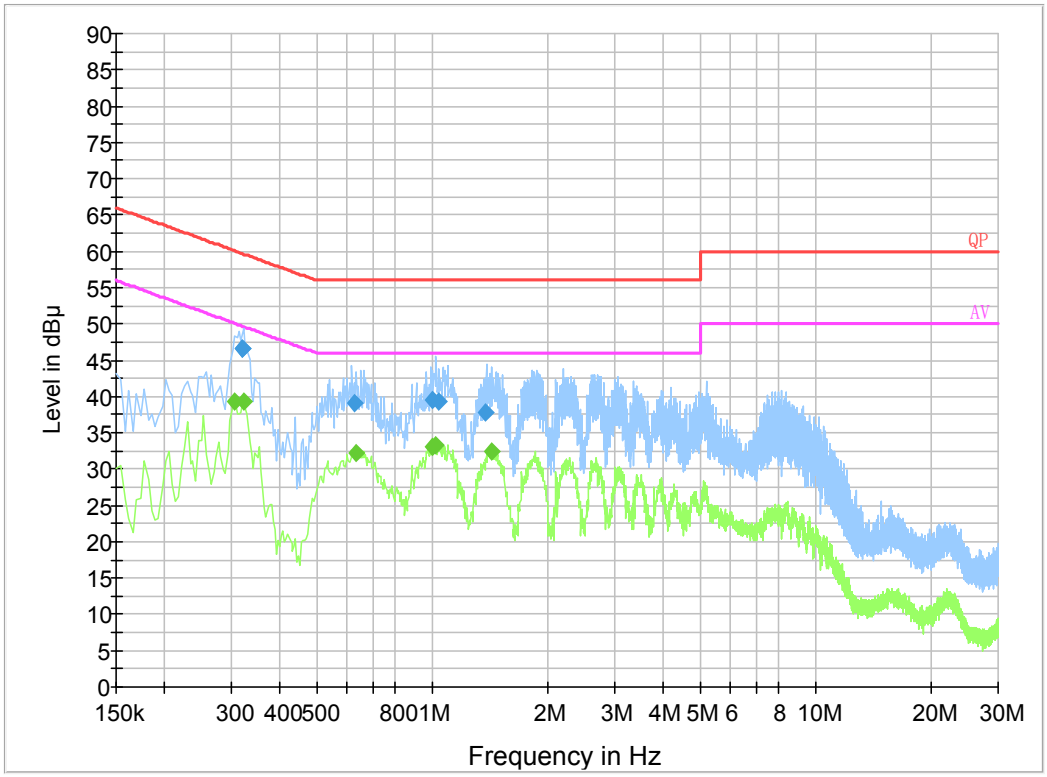
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.314650	45.5	9.000	L1	19.8	14.3	59.8
0.321110	45.3	9.000	L1	19.8	14.4	59.7
0.612730	37.7	9.000	L1	19.8	18.3	56.0
0.884830	33.9	9.000	L1	19.8	22.1	56.0
1.897350	36.9	9.000	L1	19.9	19.1	56.0
3.001570	35.9	9.000	L1	19.9	20.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.314650	37.4	9.000	L1	19.8	12.4	49.8
0.321110	37.0	9.000	L1	19.8	12.7	49.7
0.612730	30.7	9.000	L1	19.8	15.3	46.0
0.884830	26.9	9.000	L1	19.8	19.1	46.0
1.897350	28.5	9.000	L1	19.9	17.5	46.0
3.001570	25.5	9.000	L1	19.9	20.5	46.0

AC 230 V/ 50 Hz, Neutral:



Final Result 1

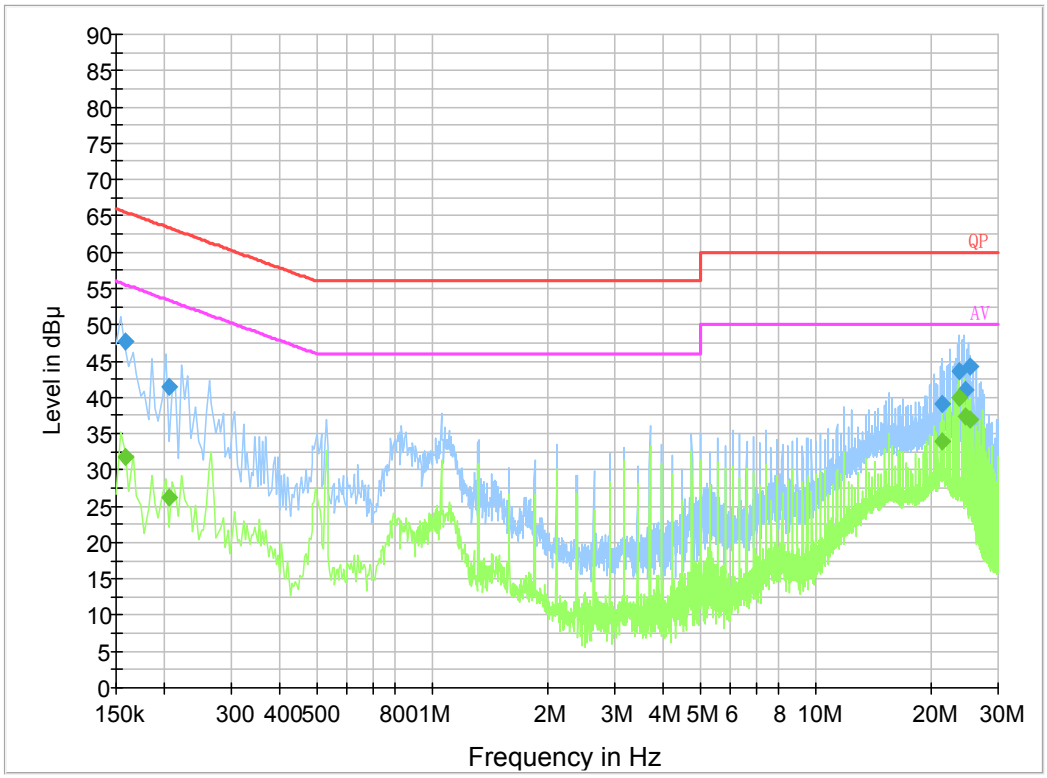
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.318710	46.5	9.000	N	19.8	13.2	59.7
0.321170	46.7	9.000	N	19.8	13.0	59.7
0.627270	39.1	9.000	N	19.8	16.9	56.0
0.999090	39.5	9.000	N	19.8	16.5	56.0
1.038610	39.3	9.000	N	19.8	16.7	56.0
1.377210	37.8	9.000	N	19.8	18.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.306000	39.3	9.000	N	19.7	10.8	50.1
0.322000	39.4	9.000	N	19.8	10.3	49.7
0.634000	32.3	9.000	N	19.8	13.7	46.0
1.002000	33.1	9.000	N	19.8	12.9	46.0
1.026000	33.2	9.000	N	19.8	12.8	46.0
1.430000	32.4	9.000	N	19.8	13.6	46.0

For POE:

AC 230V/50 Hz, Line



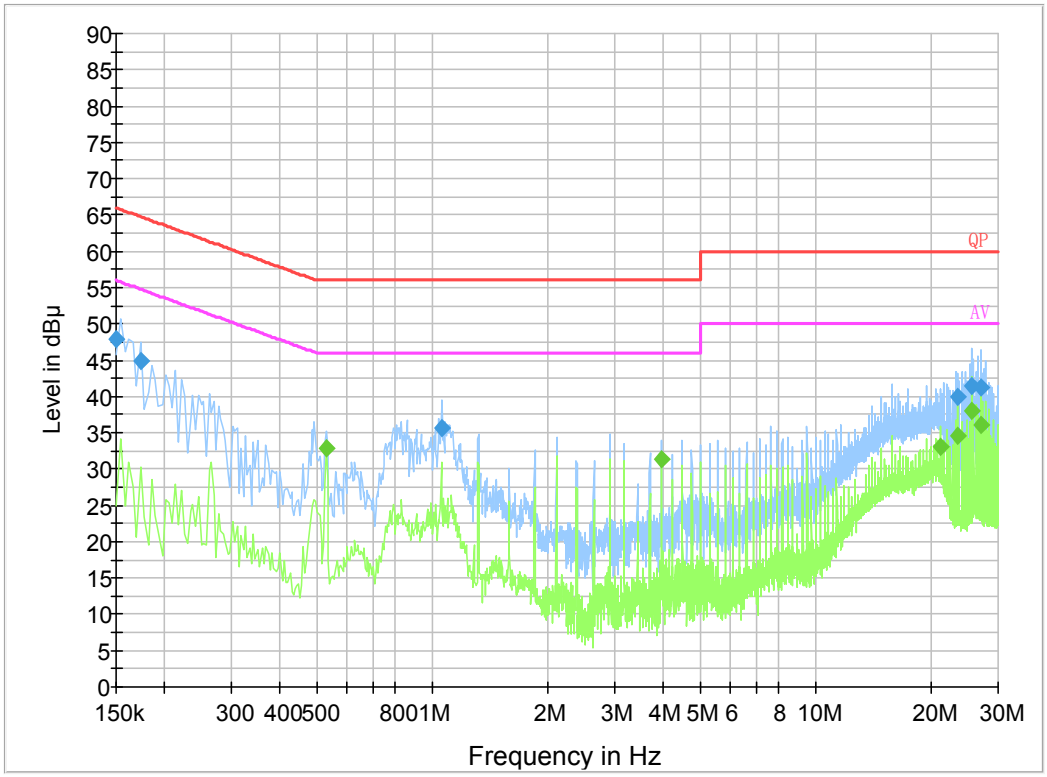
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	47.6	9.000	L1	19.8	18.0	65.6
0.206500	41.5	9.000	L1	19.8	21.8	63.3
21.440370	39.1	9.000	L1	20.5	20.9	60.0
23.824610	43.6	9.000	L1	20.3	16.4	60.0
24.620690	41.0	9.000	L1	20.3	19.0	60.0
25.412750	44.2	9.000	L1	20.3	15.8	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	31.7	9.000	L1	19.8	23.9	55.6
0.206500	26.1	9.000	L1	19.8	27.2	53.3
21.440370	33.9	9.000	L1	20.5	16.1	50.0
23.824610	39.9	9.000	L1	20.3	10.1	50.0
24.620690	37.4	9.000	L1	20.3	12.6	50.0
25.412750	36.9	9.000	L1	20.3	13.1	50.0

AC 230V/50 Hz, Neutral:



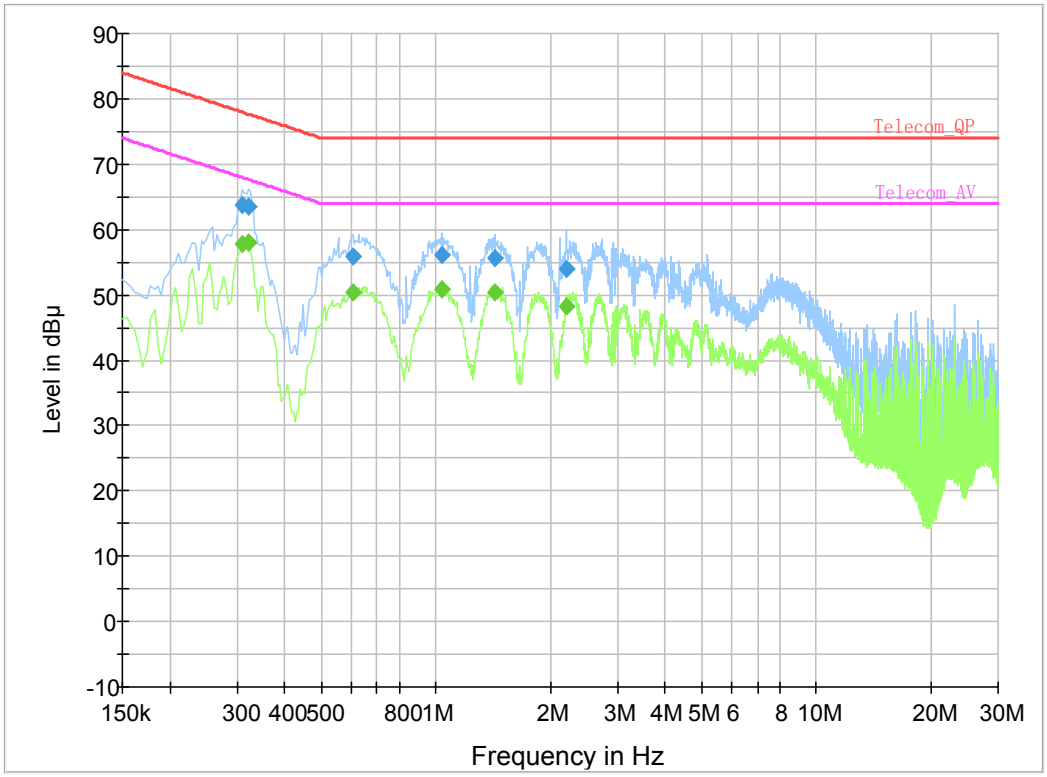
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	47.8	0.200	N	19.8	18.2	66.0
0.173500	45.0	9.000	N	19.8	19.8	64.8
1.058010	35.6	9.000	N	19.8	20.4	56.0
23.556650	39.9	9.000	N	20.3	20.1	60.0
25.676830	41.5	9.000	N	20.2	18.5	60.0
26.996970	41.3	9.000	N	20.2	18.7	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.530000	32.8	9.000	N	19.8	13.2	46.0
3.970000	31.3	9.000	N	19.9	14.7	46.0
21.174000	33.0	9.000	N	20.4	17.0	50.0
23.558000	34.7	9.000	N	20.3	15.3	50.0
25.674000	38.0	9.000	N	20.2	12.0	50.0
27.002000	36.1	9.000	N	20.2	13.9	50.0

RJ45: (worst case at 1000Mbps, AC power supply)



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.310000	63.8	9.000	19.7	14.2	78.0
0.322000	63.6	9.000	19.8	14.1	77.7
0.606000	55.8	9.000	19.8	18.2	74.0
1.034000	56.1	9.000	19.8	17.9	74.0
1.426000	55.7	9.000	19.8	18.3	74.0
2.198000	54.0	9.000	19.8	20.0	74.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.310000	57.9	9.000	19.7	10.1	68.0
0.322000	58.1	9.000	19.8	9.6	67.7
0.606000	50.5	9.000	19.8	13.5	64.0
1.034000	50.8	9.000	19.8	13.2	64.0
1.426000	50.4	9.000	19.8	13.6	64.0
2.198000	48.1	9.000	19.8	15.9	64.0

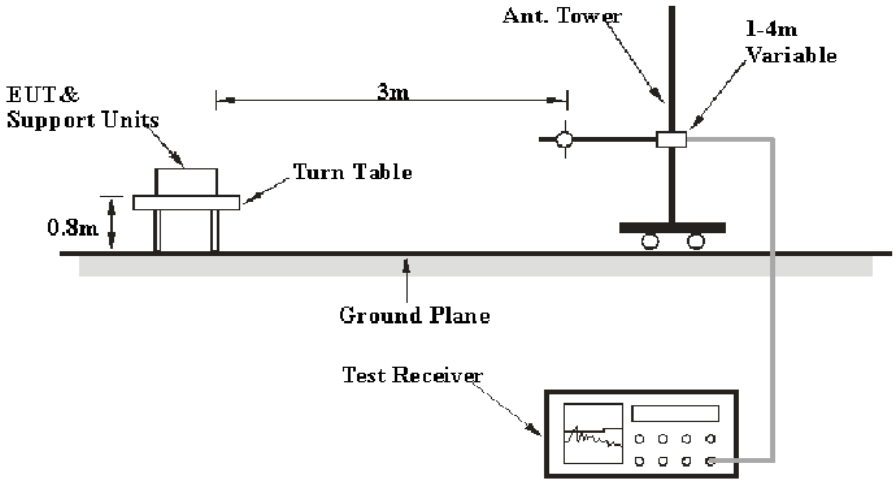
§7.1 & EN 55032 §A.2 - RADIATED EMISSIONS

Applicable Standard

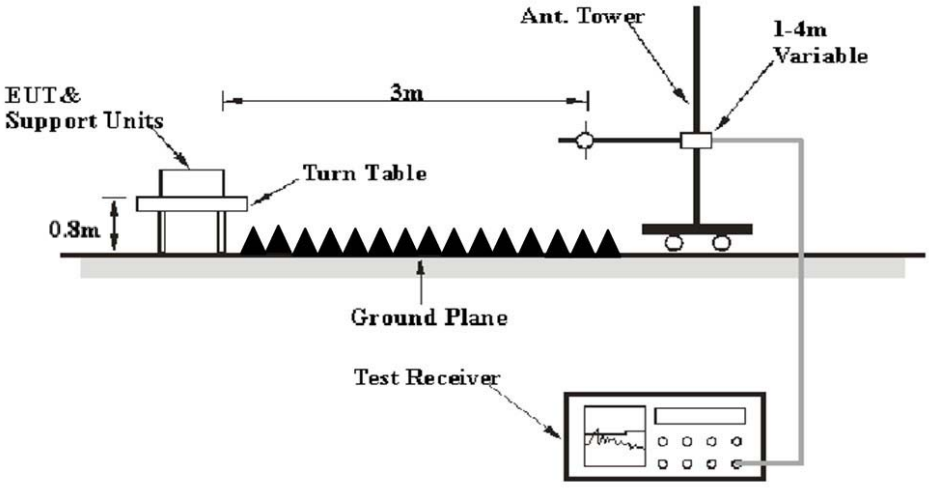
EN 55032 §A.2 & EN 301 489-1

Test System Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the CISPR 16-1-4:2012, CISPR 16-2-3:2010, CISPR16-1-4:2010+A1:2012, CISPR 16-2-3:2010+A1:2010+A2:2014. The limit was specified in EN 301 489-1 & EN 55032.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
1 GHz – 6 GHz	1 MHz	3 MHz	-	Peak
1 GHz – 6 GHz	1 MHz	10Hz	-	Peak

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit for Class B. The equation for margin calculation is as follows:

Margin = Limit –Corrected Amplitude.

Test Results Summary

According to the recorded data in following table, the EUT complied with the EN 301 489-1 & EN 55032.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	29~29.1 ℃
Relative Humidity:	47~56 %
ATM Pressure:	100.9~101.0 kPa

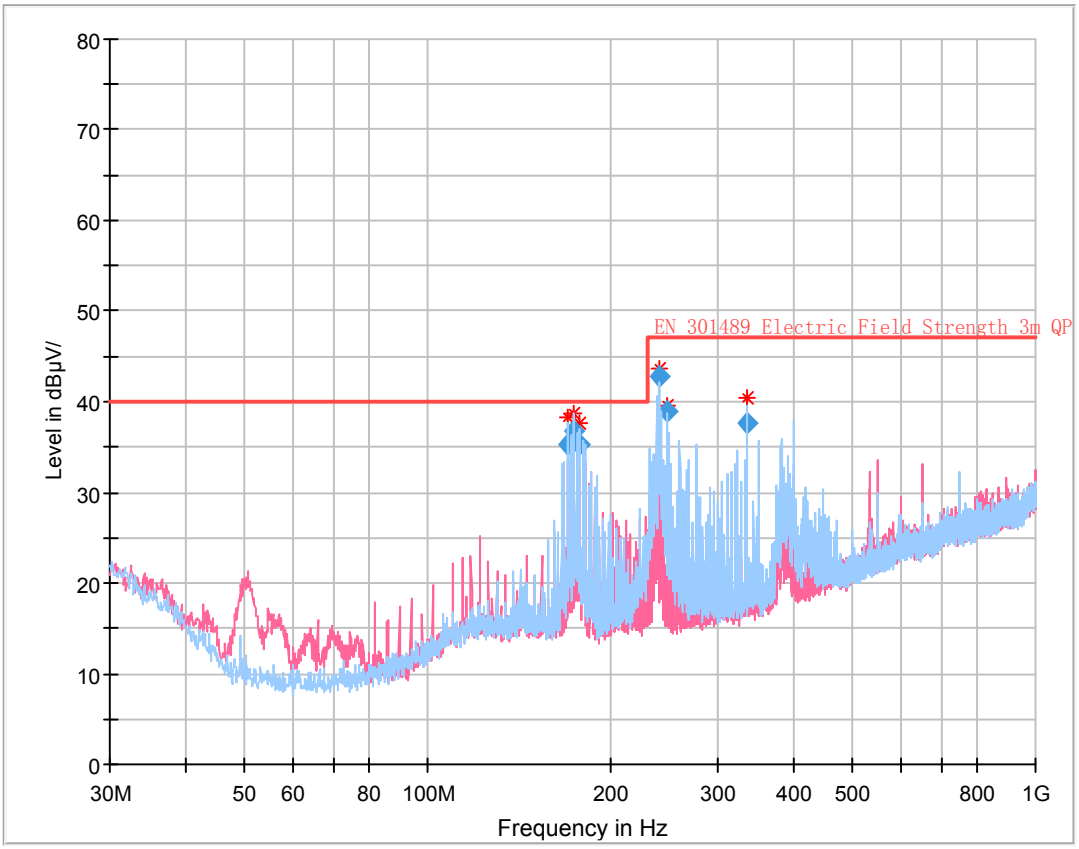
The testing was performed by Holland Yang on 2020-11-12 for below 1GHz and Lovan Liang on 2020-09-30for above 1GHz.

Test Mode 1: Worst Case

Test Model: UG65-L00E-868M-EA *(Presan with all models, the model UG65-L00E-868M-EA is worst case)*

For Adapter:

30 MHz-1 GHz:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
169.988375	35.26	40.00	4.74	238.0	H	90.0	-11.7
173.994250	36.82	40.00	3.18	237.0	H	99.0	-11.8
177.993875	35.26	40.00	4.74	231.0	H	104.0	-11.9
240.008750	42.73	47.00	4.27	123.0	H	257.0	-10.8
247.989500	38.98	47.00	8.02	126.0	H	256.0	-10.8
336.012875	37.61	47.00	9.39	102.0	H	94.0	-8.6

1-6 GHz:

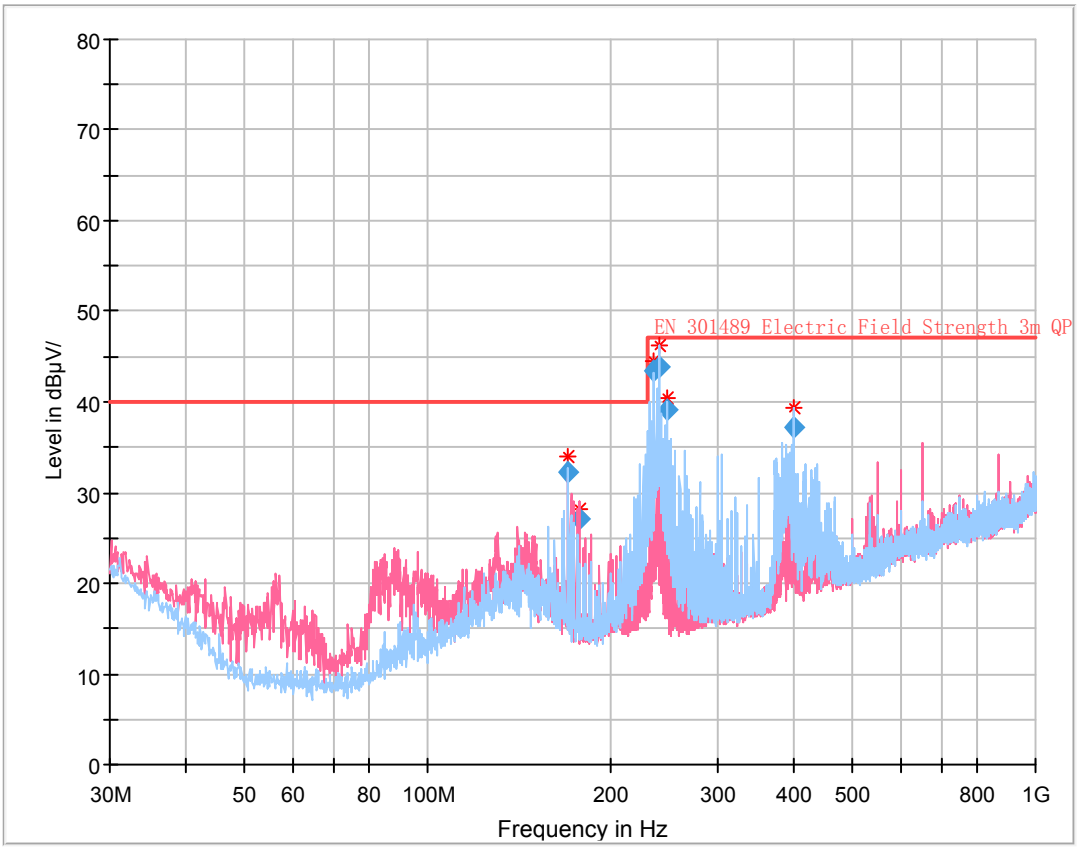
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	EN 301 489-1	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
1199.90	68.91	PK	350	1.9	H	-4.88	64.03	70	5.97
1199.90	51.85	Ave.	350	1.9	H	-4.88	46.97	50	3.03
1199.90	67.98	PK	91	1.0	V	-4.88	63.10	70	6.90
1199.90	51.77	Ave.	91	1.0	V	-4.88	46.89	50	3.11
1372.60	52.94	PK	245	2.5	H	-3.52	49.42	70	20.58
1372.60	48.42	Ave.	245	2.5	H	-3.52	44.90	50	5.10
1372.60	50.26	PK	296	2.1	V	-3.52	46.74	70	23.26
1372.60	44.88	Ave.	296	2.1	V	-3.52	41.36	50	8.64

Note:

1) Corrected Amplitude = Meter Reading + Correction Factor
2) Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain
3) Margin = Limit – Corrected Amplitude

For POE:

30 MHz~1 GHz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
169.991750	32.17	40.00	7.83	235.0	H	79.0	-11.7
178.012875	27.11	40.00	12.89	101.0	V	0.0	-11.9
236.016375	43.44	47.00	3.56	114.0	H	277.0	-10.8
240.012250	43.84	47.00	3.16	118.0	H	275.0	-10.8
247.994875	39.05	47.00	7.95	108.0	H	85.0	-10.8
399.217250	37.15	47.00	9.85	118.0	H	280.0	-7.5

1-6 GHz

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	EN 55032	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
1126.60	54.31	PK	161	1.9	H	-5.43	48.88	70	21.12
1126.60	39.13	Ave.	317	1.4	H	-5.43	33.70	50	16.30
1126.60	52.09	PK	184	1.6	V	-5.43	46.66	70	23.34
1126.60	40.78	Ave.	184	1.6	V	-5.43	35.35	50	14.65
1199.00	65.62	PK	353	2.4	H	-4.88	60.74	70	9.26
1199.00	50.24	Ave.	355	1.1	H	-4.88	45.36	50	4.64
1199.00	66.82	PK	254	2.4	V	-4.88	61.94	70	8.06
1199.00	52.24	Ave.	254	2.4	V	-4.88	47.36	50	2.64

Note:

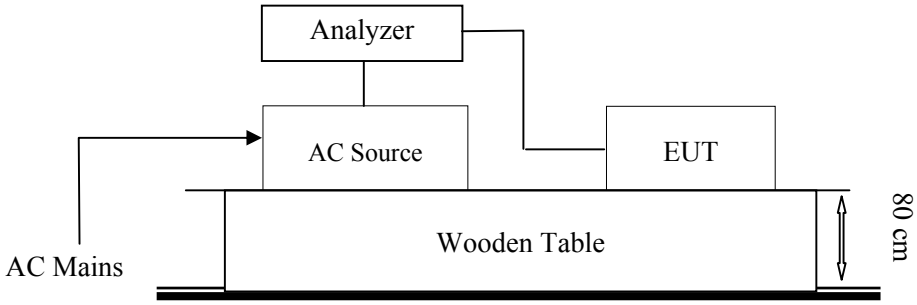
1) Corrected Amplitude = Meter Reading + Correction Factor
2) Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain
3) Margin = Limit – Corrected Amplitude

§7.1 & EN 61000-3-2 - HARMONIC CURRENT EMISSIONS

According to EN 61000-3-2: 2014 section 7: Equipment with a rated power of 75 Watt or less, other than lighting equipment, are not included in this standard.

§7.1 & EN 61000-3-3 -VOLTAGE FLUCTUATION AND FLICKER

Test System Setup



Test Standard

EN 61000-3-3:2013+A1:2019

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.
The following limits apply:
– the value of Pst shall not be greater than 1,0;
– the value of Plt shall not be greater than 0,65;
– the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
– the relative steady-state voltage change, dc, shall not exceed 3,3 %;
– the maximum relative voltage change dmax, shall not exceed
a) 4 % without additional conditions;
b) 6 % for equipment which is:
– switched manually, or
– switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.
c) 7 % for equipment which is
– attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

– switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

For Adapter:

Date of test:	8:46 11.Nov 2020
Tester:	Harris He
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Flicker meter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Model:	UG65-L00E-868M-EA
EUT operation mode	Test Mode 1(Worst case)

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.037	1.00	Pass
Plt	0.029	0.65	Pass
dc [%]	0.014	3.30	Pass
dmax [%]	0.273	4.00	Pass
dt [s]	0.000	0.50	Pass

For POE:

Date of test:	10:50 11.Nov 2020
Tester:	Harris He
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Flicker meter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Model:	UG65-L00E-868M-EA
EUT operation mode	Test Mode 1(Worst case)

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.043	1.00	Pass
Plt	0.030	0.65	Pass
dc [%]	0.011	3.30	Pass
dmax [%]	0.270	4.00	Pass
dt [s]	0.000	0.50	Pass

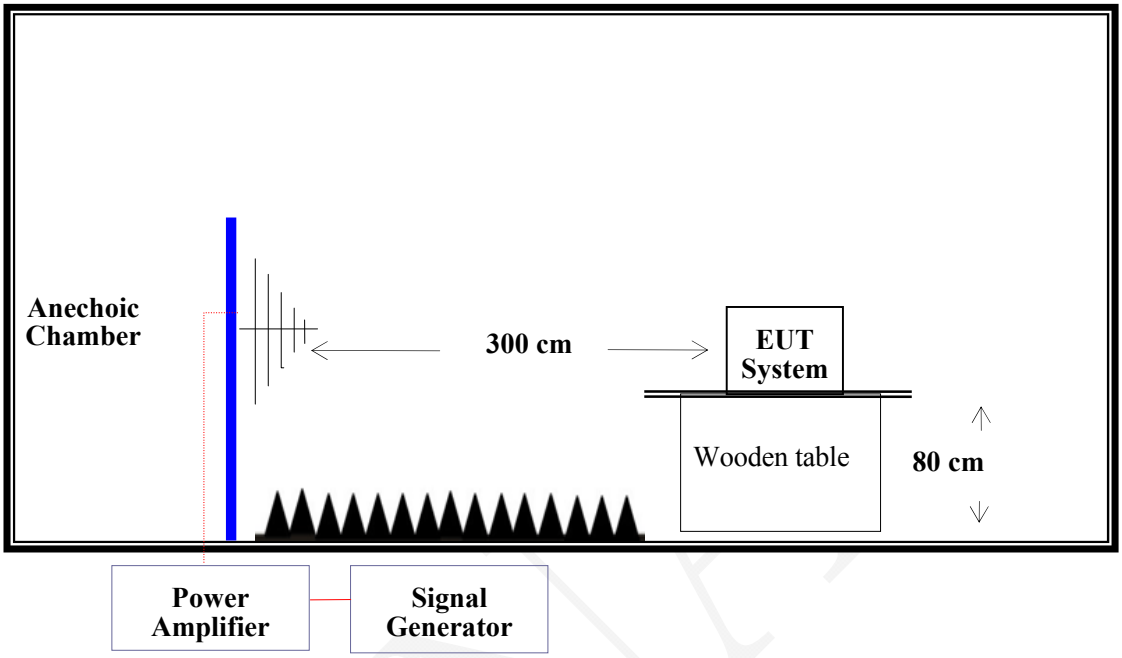
For Adapter

For POE

Test Setup Photos

§7.2 & EN 55035 §4.2.2.2- RF ELECTROMAGNETIC FIELD (80 MHz to 6000 MHz)

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-3:2006+A1:2008 +A2: 2010 & EN 55035:2017/A11:2020 (IEC 61000-4-3: 2006 + A1:2007 + A2:2010)

Test Level

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.
All the scanning conditions are as follows:

Condition of Test	Remarks
EN 301 489:	
1. Field Strength	3 V/m (Test Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 6000 MHz
4. Frequency step	1%
5. Dwell Time	1 Sec.
EN 55035:	
1. Field Strength	3 V/m (Test level 2)
2. Radiated Signal	AM 80%, 1 kHz Modulation
3. Scanning Frequency	80 – 1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
4. Frequency step	1%
5. Dwell Time	1 sec.

Test Data and Setup Photo

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

For Adapter & POE:

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6:

EN 301 489:

Modulation: Amplitude 80%, 1 kHz sine wave

Frequency Range (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-6000	A	A	A	A	A	A	A	A

Performance Criterion: A

EUT Operation Mode 1:
Note: The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence. Or during and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level.

EUT Operation Mode 2:
Note: "A" stand for, in the data transfer mode, the BER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,001 during the test sequence.

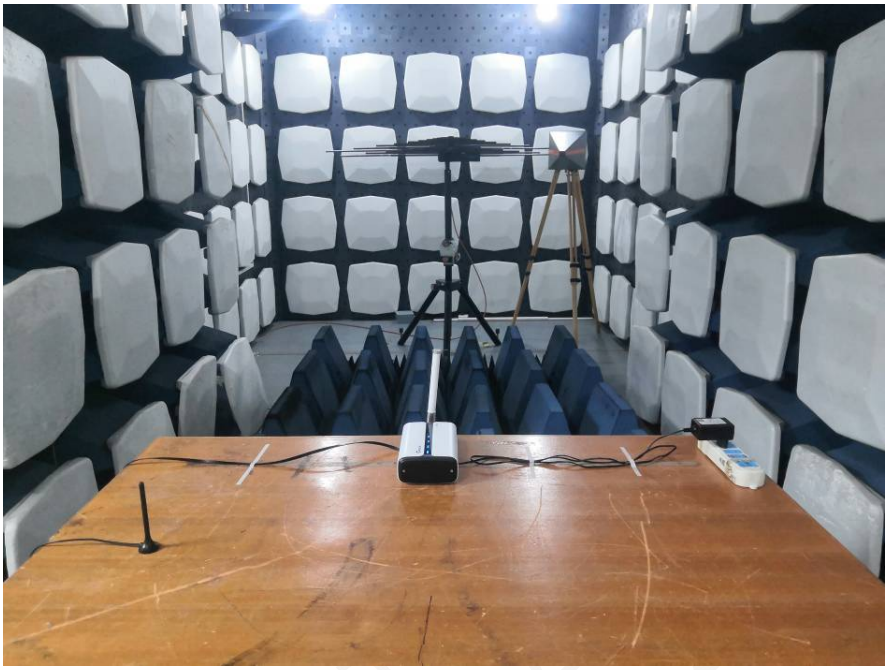
EUT Operation Mode 3:
Note: "A" stand for, In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.

EUT Operation Mode 4 & EUT Operation Mode 5:
Note: "A" stand for, during test, operate as intended No loss function, no degradation of performance,no unintentional transimissions.and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

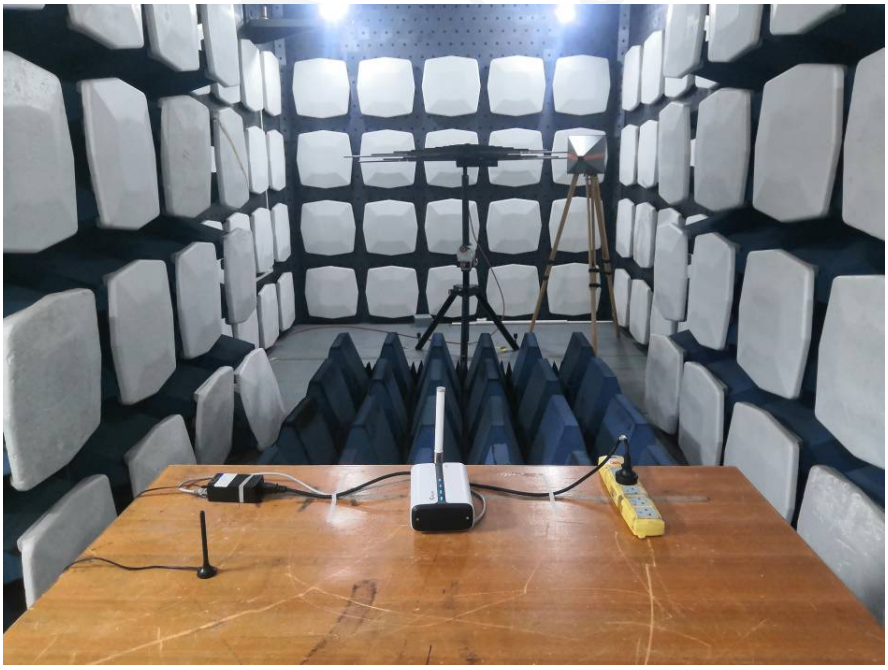
EN 55035: EUT Operation Mode 6

Frequency (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1800	A	A	A	A	A	A	A	A
2600	A	A	A	A	A	A	A	A
3500	A	A	A	A	A	A	A	A
5000	A	A	A	A	A	A	A	A

For Adapter



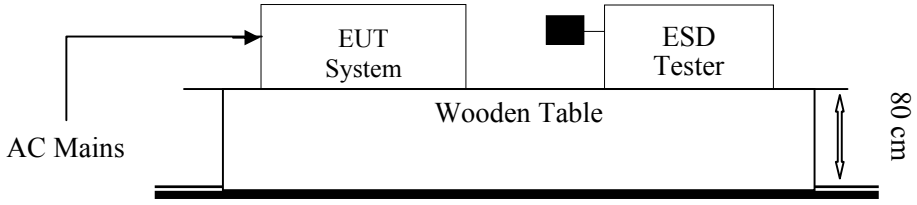
For POE



Test Setup Photos

§7.2 & EN 55035 §4.2.1- ELECTROSTATIC DISCHARGE

Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2:2009 &
EN 55035:2017/A11:2020 (IEC 61000-4-2:2008)

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode 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 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m ×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.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11 and 2020-12-10.

For Adapter & POE:

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6:

Test Model: UG65-L00E-868M-EA

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Back	(1 point)	A	A	A	A	A	A	/	/
Top	(2 points)	A	A	A	A	A	A	/	/
Bottom	(5 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front	(2 points)	A	A	A	A	/	/	/	/
Top	(2 points)	A	A	A	A	/	/	/	/
Bottom	(1 point)	A	A	A	A	/	/	/	/

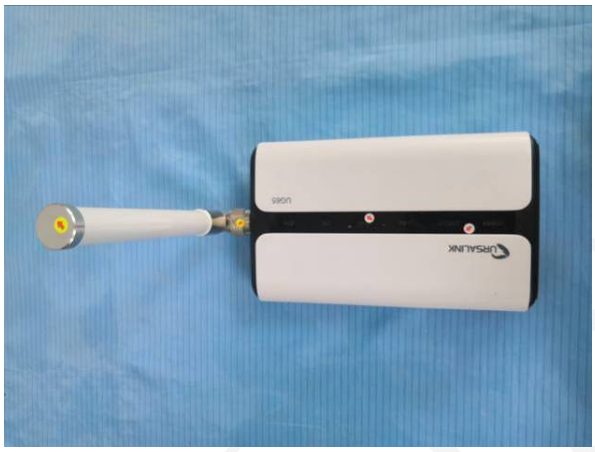
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

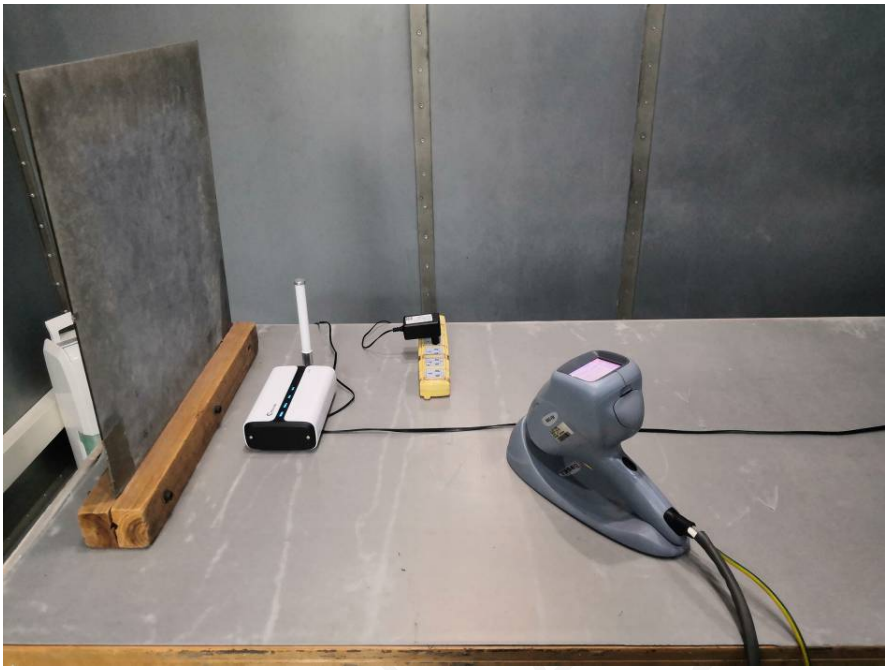




Note: represents air discharge, represents direct contact

Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.

For Adapter



For POE

Test Setup Photos

Test Model: UG65-L00E-868M

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front	(2 points)	A	A	A	A	A	A	/	/
Back	(2 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front	(2 points)	A	A	A	A	/	/	/	/
Back	(2 points)	A	A	A	A	/	/	/	/
Top	(3 points)	A	A	A	A	/	/	/	/
Bottom	(2 points)	A	A	A	A	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Note: represents air discharge, represents direct contact

Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.

For Adapter

For POE

Test Setup Photos

Test Model: UG65-868M-EA

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front	(2 points)	A	A	A	A	A	A	/	/
Back	(2 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front	(2 points)	A	A	A	A	/	/	/	/
Back	(2 points)	A	A	A	A	/	/	/	/
Top	(4 points)	A	A	A	A	/	/	/	/
Bottom	(2 points)	A	A	A	A	/	/	/	/

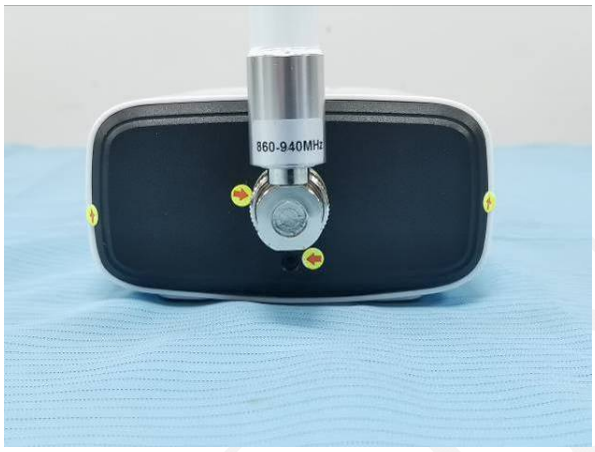
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/



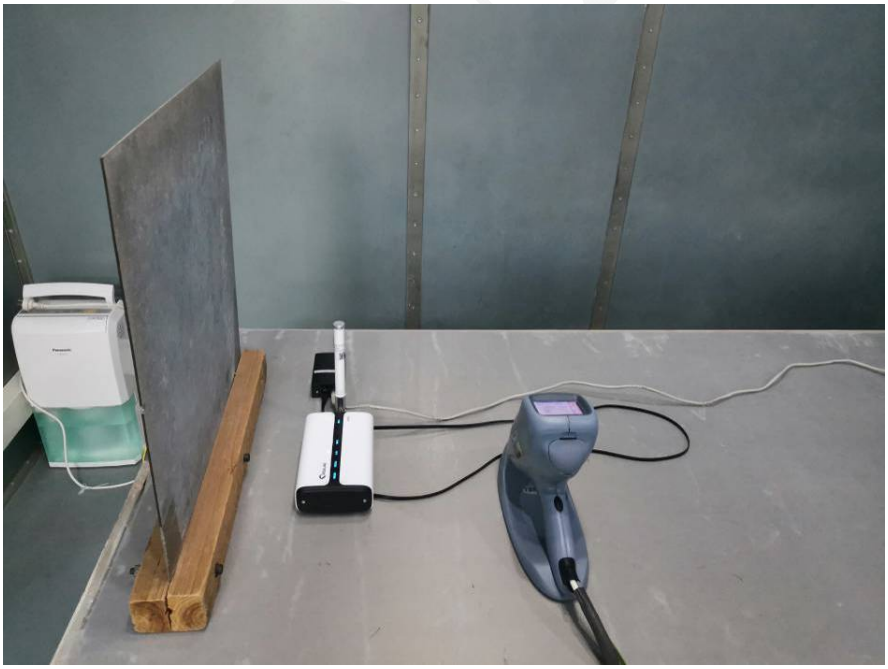


Note: represents air discharge, represents direct contact

Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.

For Adapter

For POE



Test Setup Photos

Test Model: UG65-868M

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front	(2 points)	A	A	A	A	A	A	/	/
Back	(2 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points		Test Levels							
		-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front	(2 points)	A	A	A	A	/	/	/	/
Back	(2 points)	A	A	A	A	/	/	/	/
Top	(3 points)	A	A	A	A	/	/	/	/
Bottom	(2 points)	A	A	A	A	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Note: represents air discharge, represents direct contact

Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.

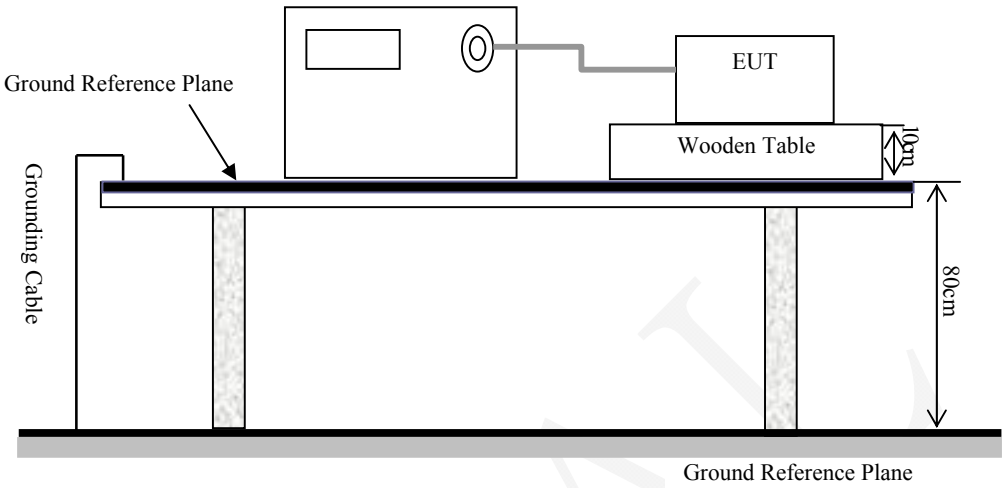
For Adapter

For POE

Test Setup Photos

§7.2 & EN 55035 §4.2.4- ELECTRICAL FAST TRANSIENT IMMUNITY

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-4: 2004 + A1:2010 & EN 55035:2017/A11:2020 (IEC 61000-4-4:2012)

Test Level

Open Circuit Output Test Voltage ±10%		
Level	**On Power Supply Lines**	**On I/O (Input/Output) Signal data and control lines**
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6:

For Adapter:

EN 61000-4-4 Test Points		Test Levels (kV)							
		+0. 5	-0. 5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L1	/	/	A	A	/	/	/	/
	N	/	/	A	A	/	/	/	/
	PE	/	/	/	/	/	/	/	/
	L1/N	/	/	A	A	/	/	/	/
	L1/PE	/	/	/	/	/	/	/	/
	N/PE	/	/	/	/	/	/	/	/
	L1/N/PE	/	/	/	/	/	/	/	/
Signal Port	RJ45	A	A	/	/	/	/	/	/

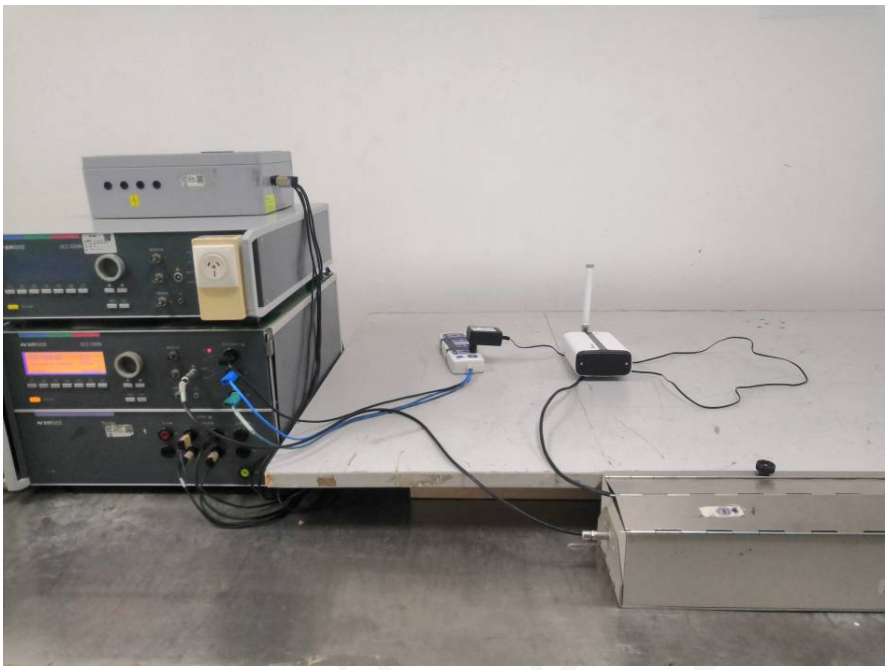
For POE:

EN 61000-4-4 Test Points		Test Levels (kV)							
		+0. 5	-0. 5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L1	/	/	A	A	/	/	/	/
	N	/	/	A	A	/	/	/	/
	PE	/	/	A	A	/	/	/	/
	L1/N	/	/	A	A	/	/	/	/
	L1/PE	/	/	A	A	/	/	/	/
	N/PE	/	/	A	A	/	/	/	/
	L1/N/PE	/	/	A	A	/	/	/	/
Signal Port	RJ45	/	/	/	/	/	/	/	/

For Adapter

For POE

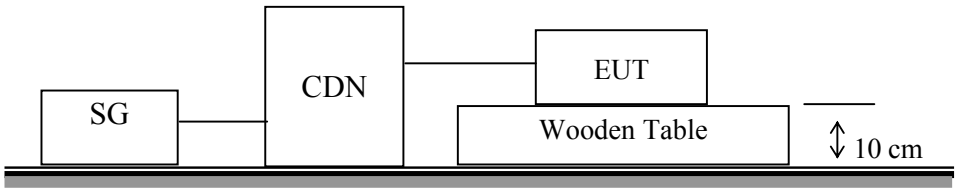
RJ45 Port



Test Setup Photos

§7.2 & EN 55035 §4.2.2.3 - RF COMMON MODE

Test Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) /EN 61000-4-6: 2009 &
EN 55035:2017/A11:2020 (IEC 61000-4-6:2008)

Test Level

EN 301 489:

Level	Voltage Level (r.m.s.) (U_0)
1	1
2	3
3	10
X	Special

EN 55035:

Frequency(MHz)	Voltage Level (r.m.s.) (V)
0.15 to 10	3
10 to 30	3 to 1
30 to 80	1

Performance Criterion: A

Note: “A” stand for, during test, operate as intended no loss function, no degradation of performance,no unintentional reansimissions.and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Test Procedure

1) Let the EUT work in test mode and test it.
2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
3) The disturbance signal described below is injected to EUT through CDN.
4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
6) The rate of sweep shall not exceed $1.5*10^{-3}$decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
7) An artificial ear and sound level meter are used to monitor the sound pressure level. RF communication test set is used to monitor the noise level.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data and Setup Photo

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

For Adapter & POE:

EN 301 489: Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5

Table 1: AC mains power input port
Frequency range: 150 kHz to 80 MHz
Modulation: Amplitude 80%, 1 kHz sine wave
Test level: 3V r.m.s.

Level	Voltage Level (r.m.s.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

Table 2: RJ45 Port
Frequency range: 150 kHz to 80 MHz
Modulation: Amplitude 80%, 1 kHz sine wave
Test Level: 3V r.m.s

Level	Voltage Level (r.m.s.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

EN 55035: Test Mode 6

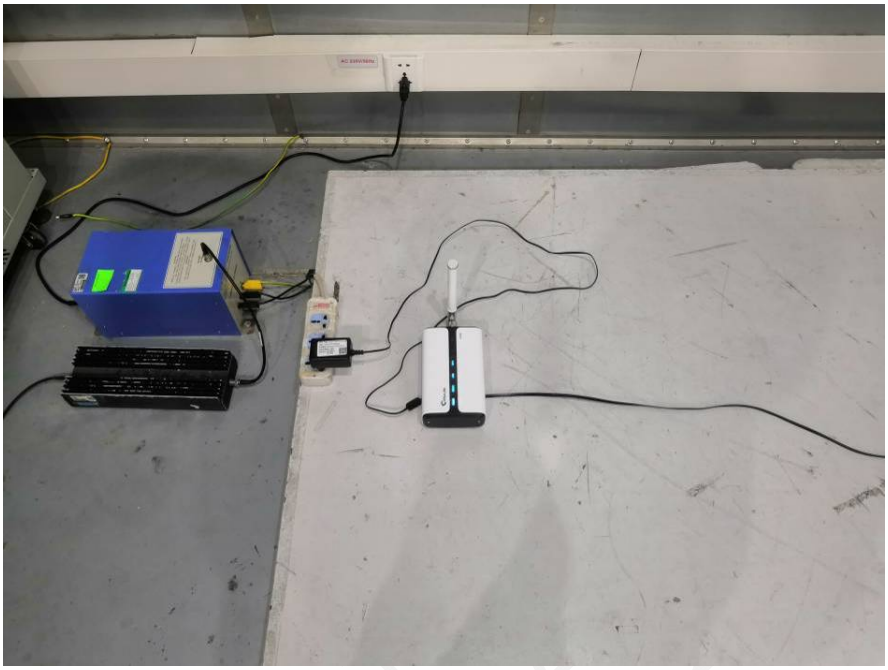
AC Mains
Modulation: Amplitude 80%, 1 kHz sine wave
Test Level:

Frequency (MHz)	Voltage Level (r.m.s.) (V)	Pass	Fail
0.15 to 10	3	A	/
10 to 30	3 to 1	A	/
30 to 80	1	A	/
X	Special	/	/

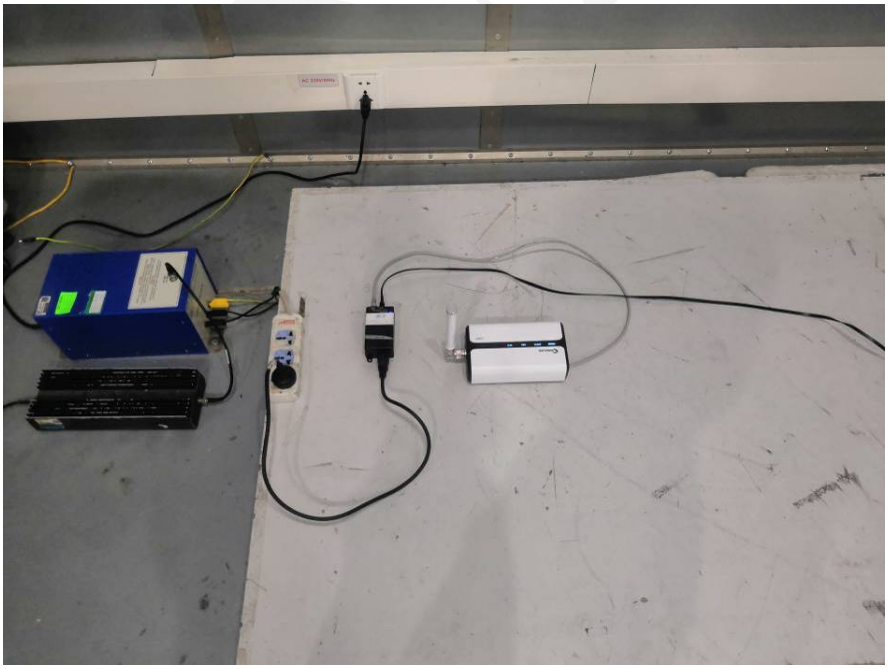
RJ45 Port
Modulation: Amplitude 80%, 1 kHz sine wave
Test Level:

Frequency (MHz)	Voltage Level (r.m.s.) (V)	Pass	Fail
0.15 to 10	3	A	/
10 to 30	3 to 1	A	/
30 to 80	1	A	/
X	Special	/	/

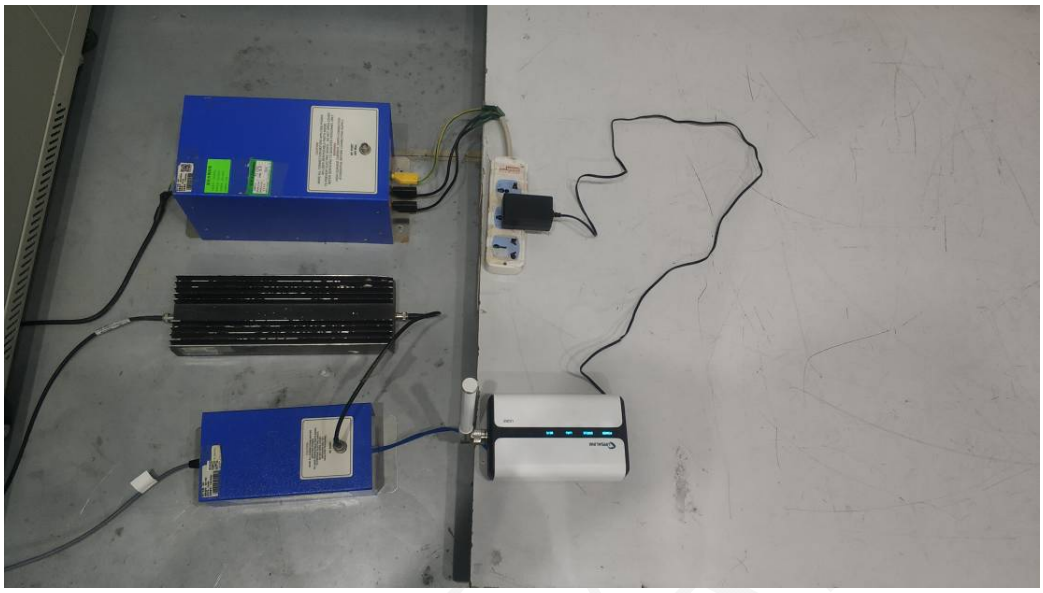
For Adapter



For POE



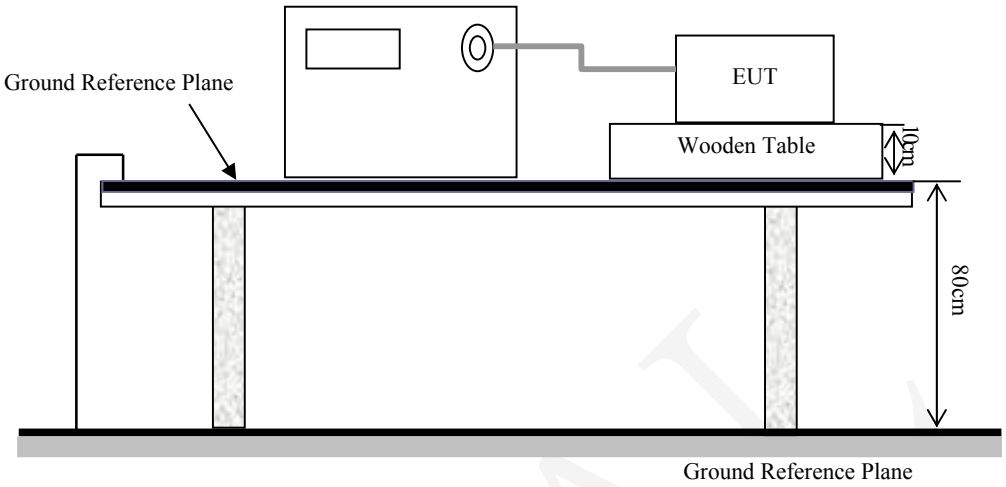
RJ45 Port



Test Setup Photos

§7.2 & EN 55035 §4.2.5 - SURGES, LINE TO LINE AND LINE TO GROUND

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2006 &
EN 55035:2017/A11:2020 (IEC 61000-4-5:2005)

Test Level

Level	Open Circuit Output Test Voltage ±10%	Performance Criterion	
		AC Mains	Signal Port
1	0.5 kV	B	C
2	1 kV	B	C
3	2 kV	B	C
4	4 kV	B	C
X	Special	/	/

Test Procedure

1) For line to line coupling mode, provide a 1.2/50μs voltage surge (at open-circuit condition) and a 8/20 μs current surge into a short circuit.
2) For telecommunication port, provide a 10/700μs voltage surge (at open-circuit condition) and a 5/320 μs current surge into a short circuit.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6:

For Adapter:

Table 1: AC mains power input port

Level	Voltage	Poll	Path	Pass	Fail
1	0.5 kV	±	L1/N	A	/
2	1 kV	±	L1/N	A	/
3	2 kV	±	L1/PE, N/PE, L1/N/PE	/	/
4	4 kV	±	L1/PE, N/PE, L1/N/PE	/	/

Table 2: RJ45 Port

Level	Voltage	Poll	Path	Pass	Fail
1	0.5 kV	±	Line-Ground	A	/
2	1 kV	±	Line-Ground	A	/
3	2 kV	±	Line-Ground	/	/
4	4 kV	±	Line-Ground	/	/

For POE:

Table 1: AC mains power input port

Level	Voltage	Poll	Path	Pass	Fail
1	0.5 kV	±	L1/N, L1/PE, N/PE	A	/
2	1 kV	±	L1/N, L1/PE, N/PE	A	/
3	2 kV	±	L1/PE, N/PE	A	/
4	4 kV	±	L1/PE, N/PE, L1/N/PE	/	/

For Adapter

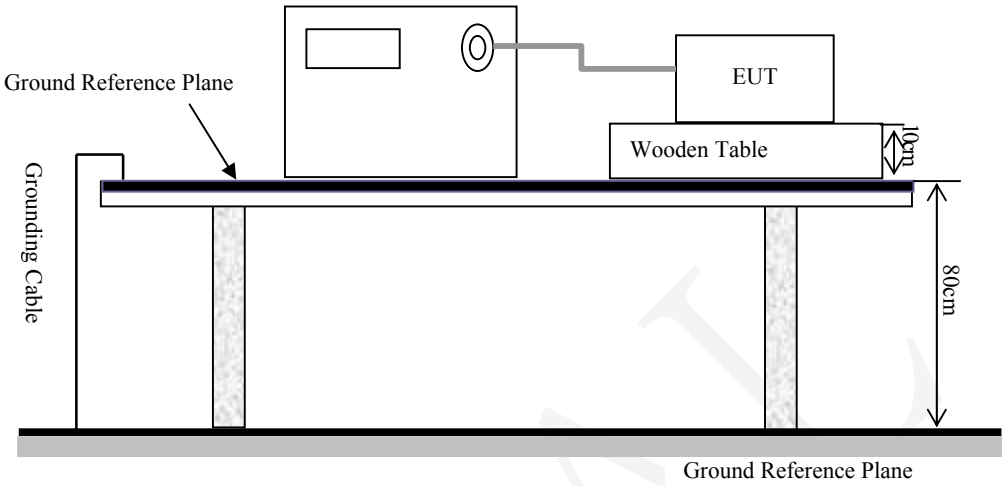
For POE

RJ45 Port

Test Setup Photos

§7.2 & EN 55035 §4.2.6 - VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST

Test Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-11: 2004 &
EN 55035:2017/A11:2020 (IEC 61000-4-11:2004)

Test Level

EN 301 489:

Test Level	Voltage dip and short interruptions (% Residual Voltage)	Duration (in period)	Performance criterion:
1	0	0.5	B
2	0	1	B
3	70	25	C
4	0	250	C

EN 55035:

Test Level	Voltage dip and short interruptions %UT	Duration (Periods)	Performance Criterion
1	>95	0.5	B
2	30	25	C
3	>95	250	C

Test Procedure

1) The interruption is introduced at selected phase angles with specified duration.
2) Record any degradation of performance.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

For Adapter & POE:

EN 301 489: *Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5*

Level	Voltage dip and short interruptions (% Residual Voltage)	Periods	Phase Angle	N	Result
1	0	0.5	0/180	3	A
2	0	1	0/180	3	A
3	70	25	0/180	3	A
4	0	250	0/180	3	C

Note: "C" means "The EUT transmitting was interrupted during the test, and need reset by operator".

EN 55035: *Test Mode 6*

Level	U2 (%Residual)	Td(Periods)	Phase Angle	N	Pass	Fail
1	0	0.5	0/180	3	A	/
2	70	25	0/180	3	A	/
3	0	250	0/180	3	C	/

Note: "C" means "The EUT working was interrupted during the test, and need reset by operator".

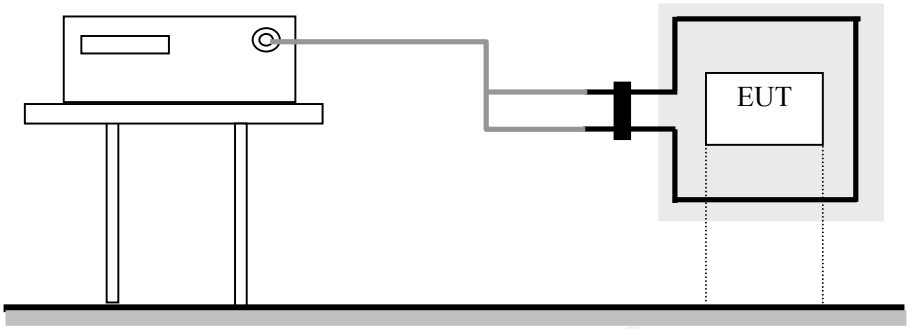
For Adapter

For POE

Test Setup Photos

EN 55035 §4.2.3-POWER FREQUENCY MAGNETIC FIELD (IEC 61000-4-8)

Test Setup



Test Standard

EN 55035:2017/A11:2020 (IEC 61000-4-8:2009)

Test Level

Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X.	Special

Performance criterion: A

Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1 m*1 m). The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

Test Data and Setup Photo

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Harris He on 2020-11-11.

For Adapter & POE:

EUT Operation Mode: Test mode 6

Level	Magnetic Field Strength A/m	X (Horizontal)	Y (Vertical)	Z (Special)
1	1	A	A	A
2	3	/	/	/
3	10	/	/	/
4	30	/	/	/
5	100	/	/	/
X	Special	/	/	/

For Adapter

For POE

Test Setup Photos

EXHIBIT A - EUT PHOTOGRAPHS

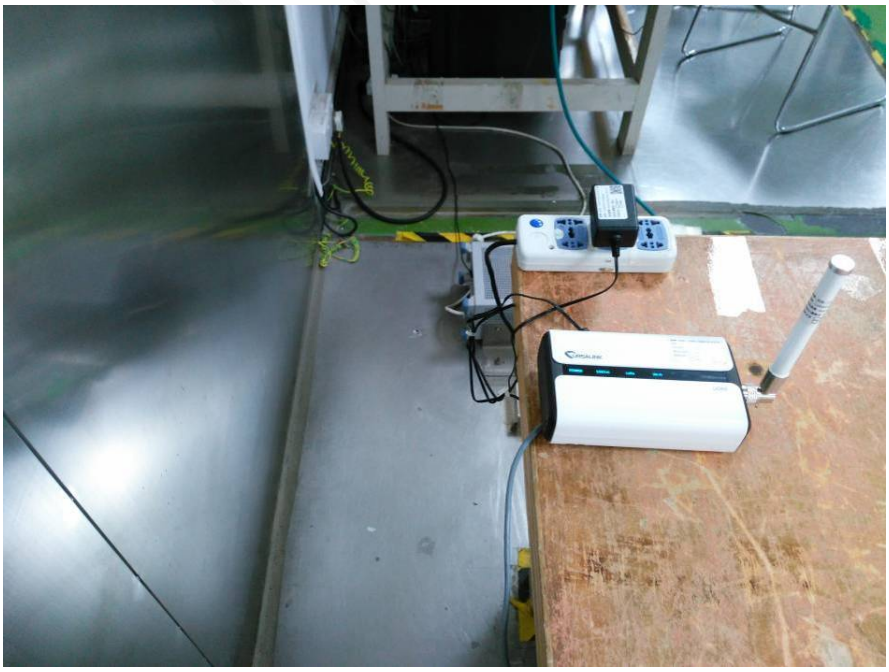
Please refer to the Attachment.

EXHIBIT B - TEST SETUP PHOTOGRAPHS

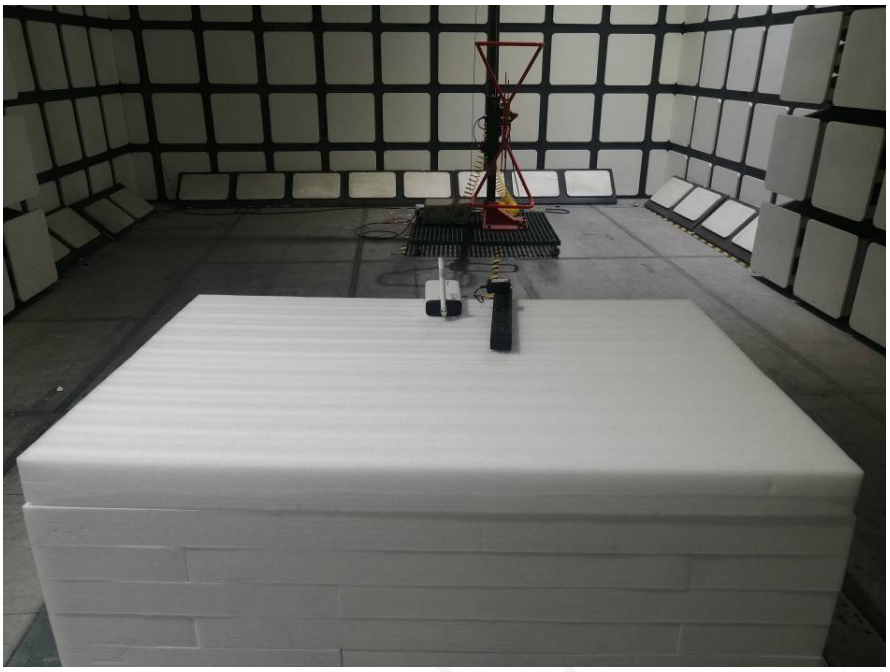
For Adapter

Conducted Emissions - Front View

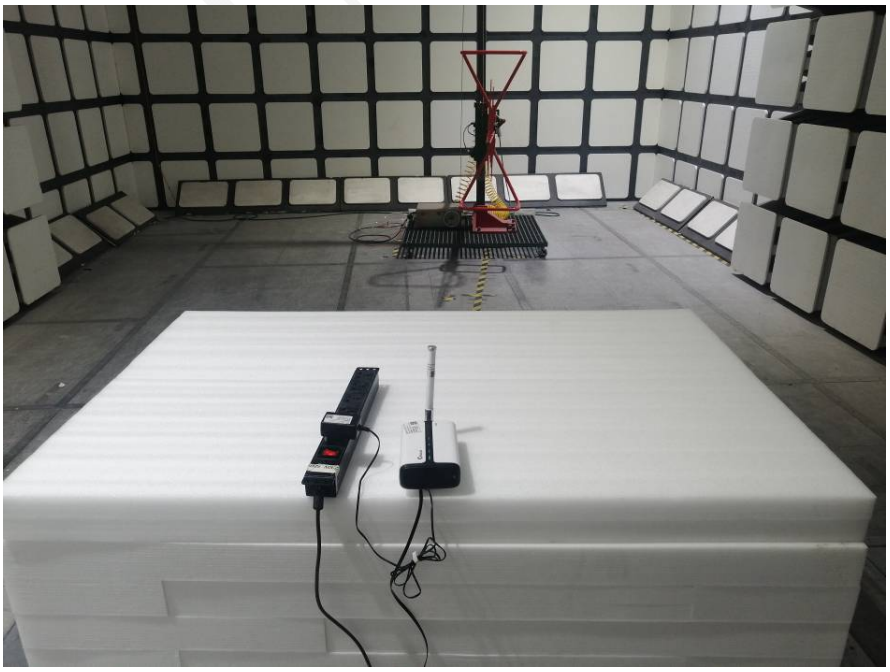
Conducted Emissions - Side View



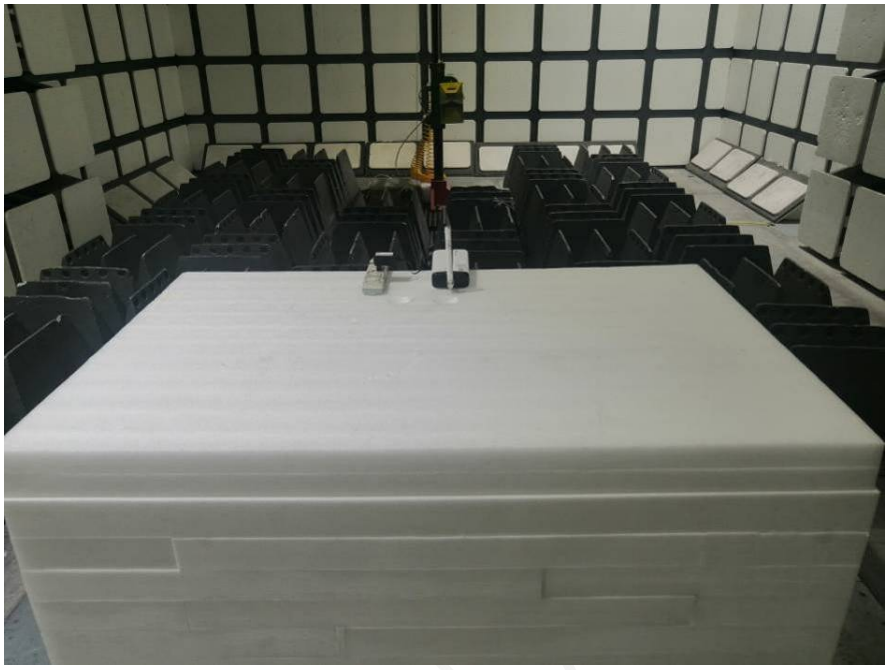
Radiated Emissions View - Front View (Below 1 GHz)



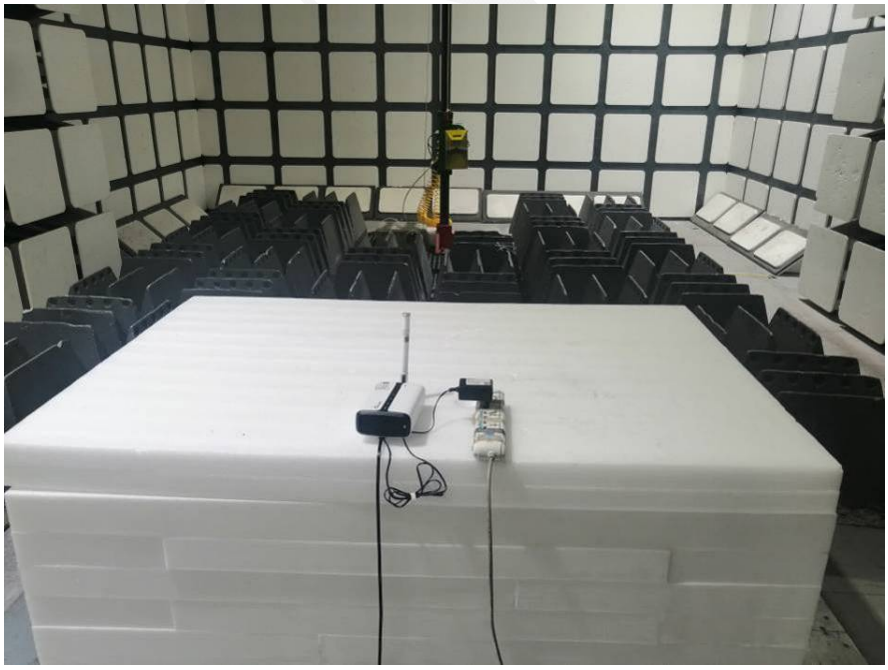
Radiated Emissions View - Side View (Below 1 GHz)



Radiated Emissions – Front View (Above 1 GHz)



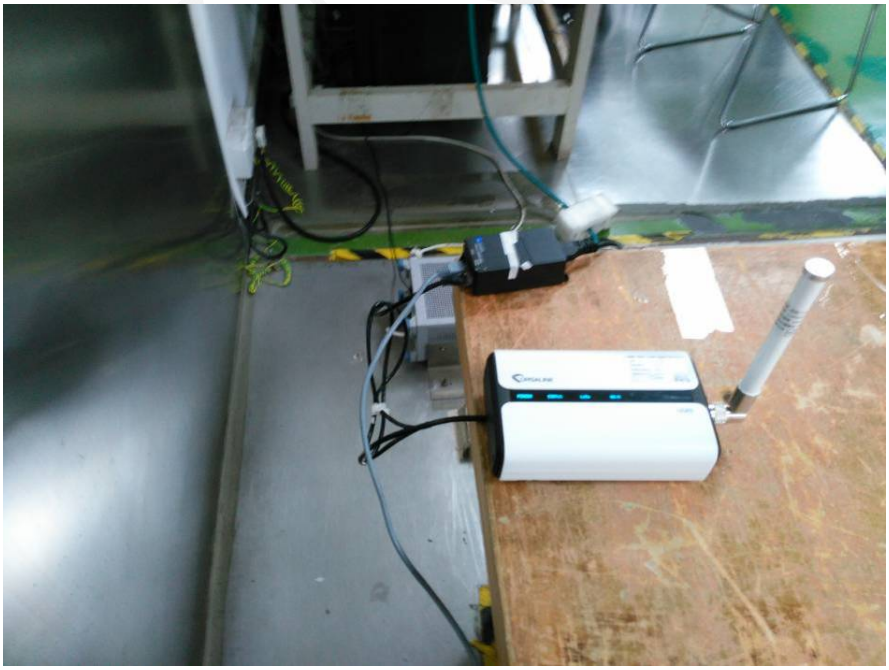
Radiated Emissions – Rear View (Above 1 GHz)



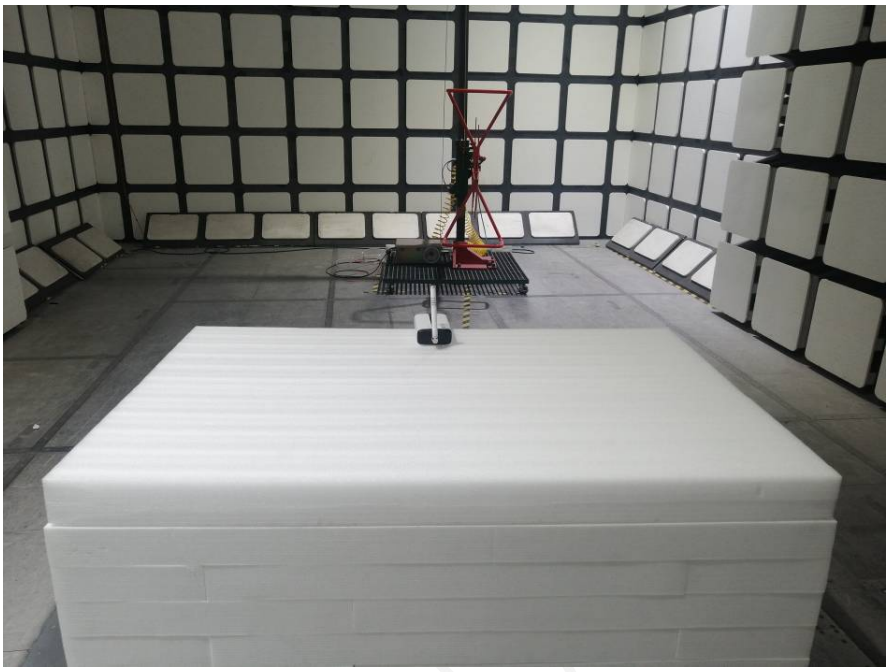
For POE

Conducted Emissions - Front View

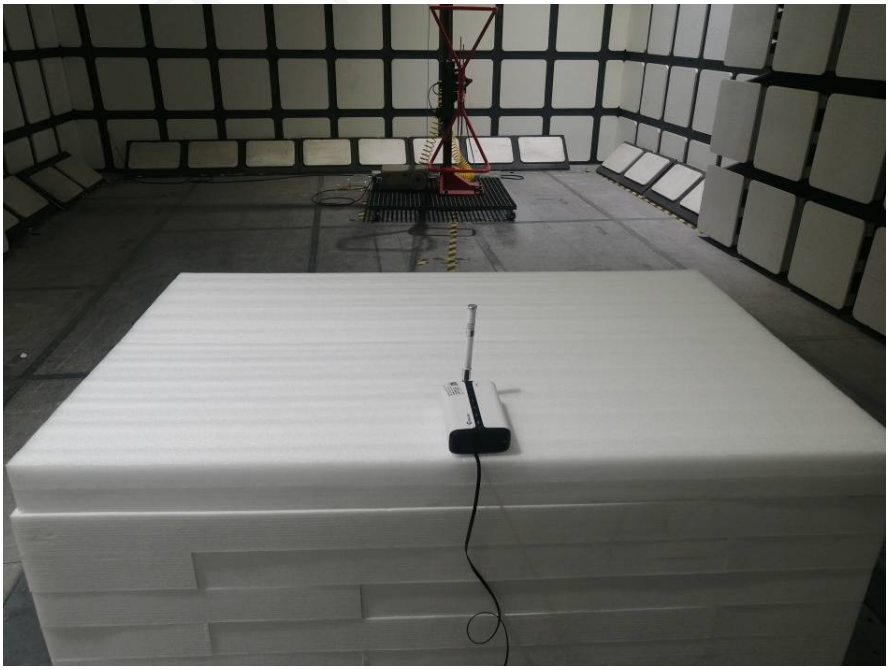
Conducted Emissions - Side View



Radiated Emissions View - Front View (Below 1 GHz)

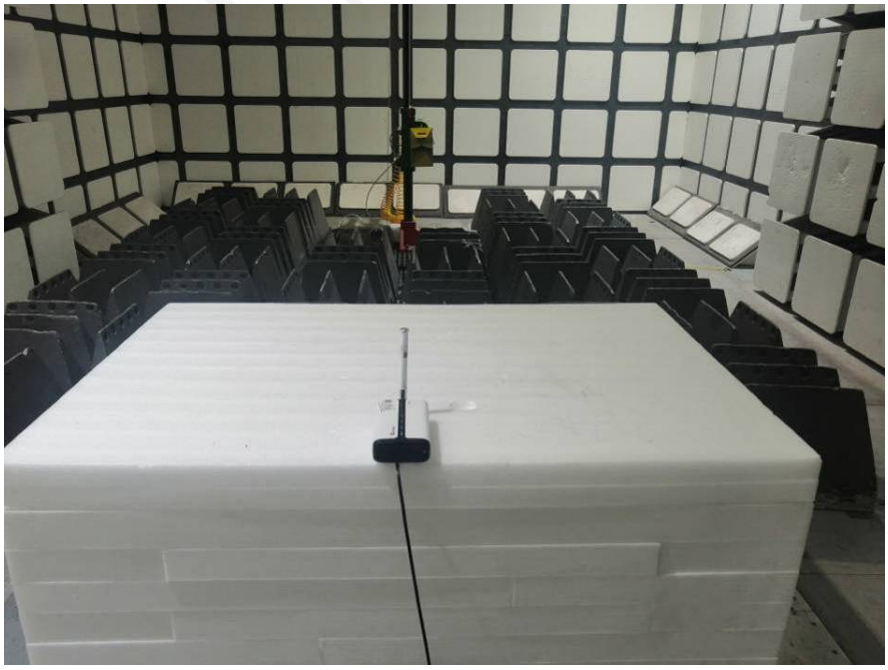


Radiated Emissions View - Side View (Below 1 GHz)



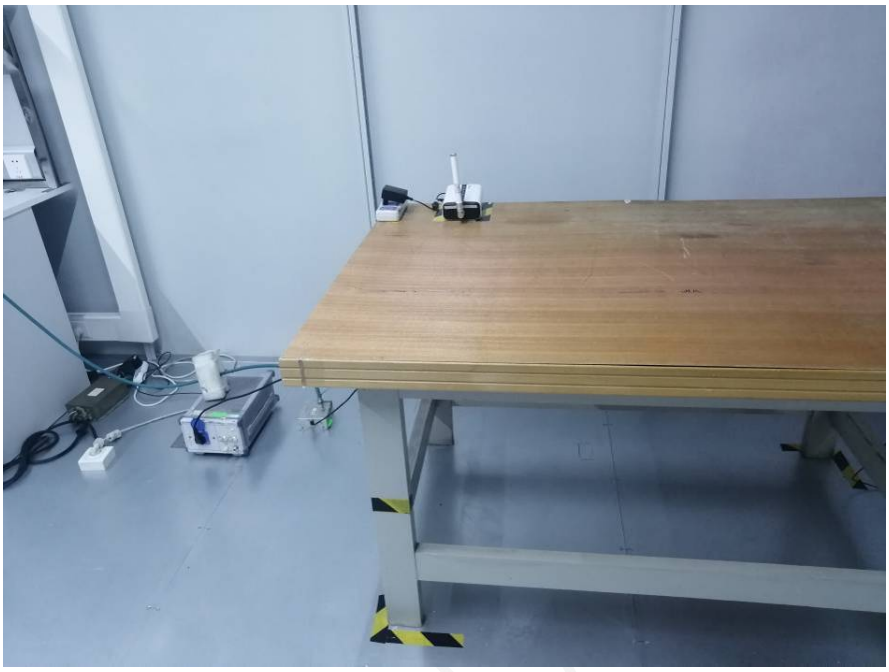
Radiated Emissions – Front View (Above 1 GHz)

Radiated Emissions – Rear View (Above 1 GHz)



RJ45 Port

Conducted Emissions - Front View



Conducted Emissions - Side View

*******END OF REPORT*******