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TESTING
CNAS L5662

ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,LTD.

6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

Test Model: O1-5G

Report Type: Original Report	**Product Type:** 5GHz 9dBi 11AC 867Mbps Outdoor CPE
Report Number:	DG2220302-06789E-02
Report Date:	2022-08-03
Reviewed By:	Rocky Xiao RF Engineer
Approved By:	Ivan Cao Assistant Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		5GHz 9dBi 11AC 867Mbps Outdoor CPE
EUT Model:		O1-5G
EU Adapter Information	**Model:**	BN073-A12012E
	Input:	100-240Vac 50/60Hz 0.4A
	Output:	12V 1A
UK Adapter Information	**Model:**	BN073-A12012B
	Input:	100-240Vac 50/60Hz 0.4A
	Output:	12V 1A
Rated Input Voltage:		12Vdc from adapter or 12V from POE
Serial Number:		DG2220302-06789E-RF-S1
EUT Received Date:		2022.03.05
EUT Received Status:		Good

Objective

This report is prepared on behalf of ***SHENZHEN TENDA TECHNOLOGY CO.,LTD.*** 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 301 489-17 V3.2.4 (2020-09) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems;

The objective is to determine the compliance of EUT with: ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09),

Test Methodology

All measurements contained in this report were conducted 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.

Declarations

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 a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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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: Operating

Note: The two adapters are same in circuit and structure, they are just different in power Plug-in Pins, ***BN073-A12012E*** *was selected for fully testing.*

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

Software "LanTest.exe" was used for testing.

Support Equipment List and Details

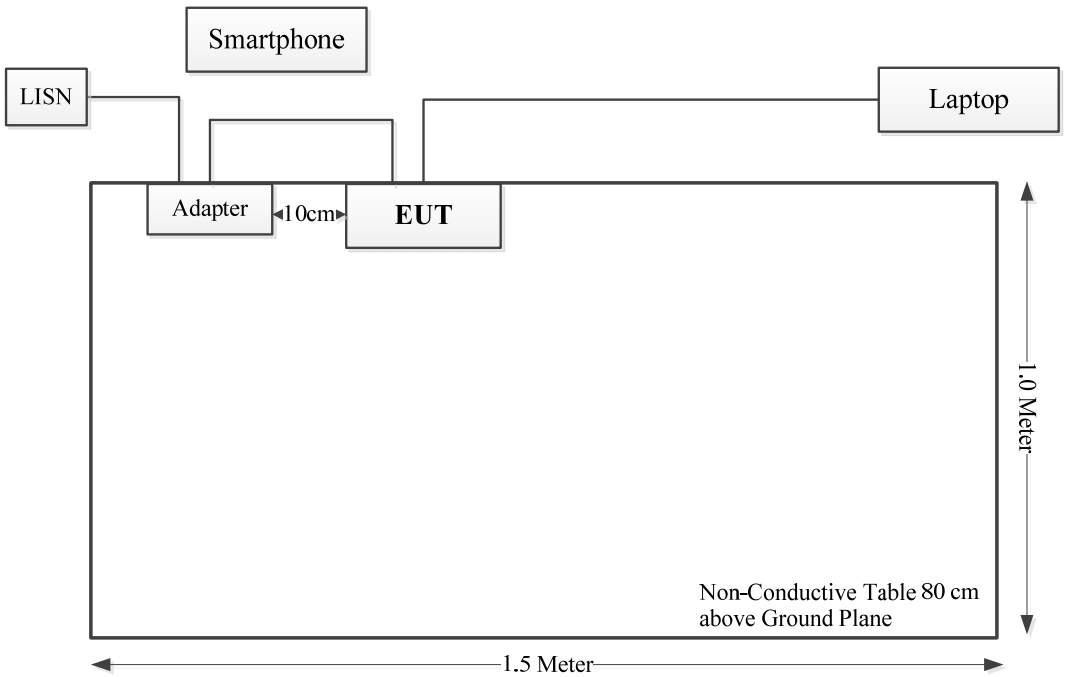
Manufacturer	Description	Model	Serial Number
Huawei	Smartphone	EVR-AL00	A000009E3F501E
DELL	Laptop	E6410	GMLGPM1

Support Cable List and Details

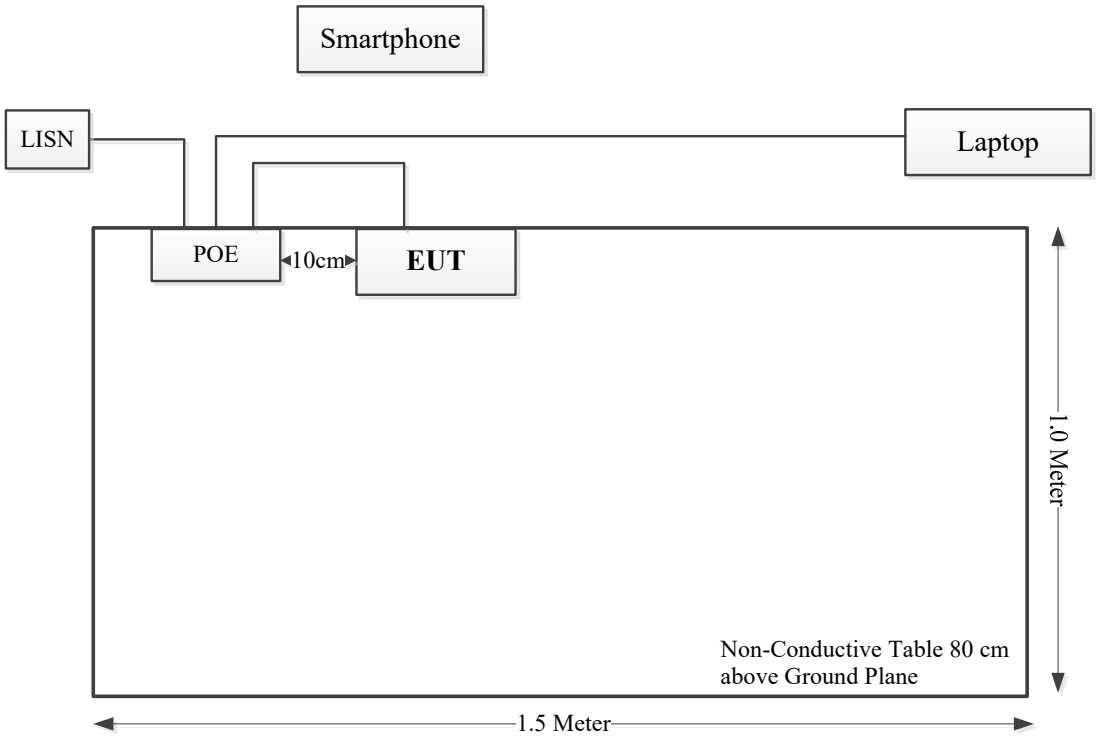
Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	Yes	No	1.5	POE	EUT
RJ45 Cable	Yes	No	20	POE	Laptop
DC Cable	No	No	1.8	Adapter	EUT/POE

Block Diagram of Test Setup

Adapter:



POE:



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV 216	101614	2021-10-26	2022-10-25
TESEQ	ISN	T800	34379	2021-10-26	2022-10-25
R&S	EMI Test Receiver	ESCI	101121	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2021-09-05	2022-09-04
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A
Radiated emissions below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2021-10-26	2022-10-25
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2021-08-19	2022-08-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2021-08-19	2022-08-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2021-08-19	2022-08-18
Sonoma	Amplifier	310N	185914	2021-08-19	2022-08-18
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
AH	Double Ridge Guide Horn Antenna	SAS-571	1394	2019-05-18	2022-05-17
Agilent	Spectrum Analyzer	E4440A	MY44303352	2021-04-26	2022-04-25
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2021-10-13	2022-10-12
AH	Preamplifier	PAM-0118	135	2021-10-13	2022-10-12
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2021-05-06	2022-05-05
Flicker & Harmonic					
ELGAR	AC Power Source	1751SX	5611	2022-01-05	2023-01-05
EM TEST	Harmonic & Flicker Analyzer	DPA 500	303278	2021-10-27	2022-10-26
CS					
HP	Signal Generator	8648A	3246A00831	2021-09-11	2022-09-10
R&S	Power Amplifier	15A250	12934	N/A	N/A
Werlatone	Dual Directional Coupler	C5091-10	113192	2022-02-09	2023-02-08
HP	Power Meter	HP EPM-441A	GB37481494	2021-07-22	2022-07-21
Agilent	8482A Power sensor	8482A	US37296108	2021-07-22	2022-07-21
NARDA	Attenuator	769-6	2754	N/A	N/A
COM-POWER	CDN	M325E	521064	2021-07-22	2022-07-21
COM-POWER	CDN	T8E	581607	2019-05-09	2022-05-09
EFT & Surge & Dips					
EM TEST	Ultra Compact Generator	UCS 500N5	P1406130994	2021-07-22	2022-07-21
EM TEST	Autotransformer	MV2616	P1450144859	N/A	N/A
EM TEST	CDN	CNV508 S1	311137	2022-01-26	2023-01-25
EM TEST	EFT Clamp	N/A	300886	2021-07-22	2022-07-21
ESD					
HAEFELY	Electrostatic Discharge Simulator	ONYX	180786	2021-10-27	2022-10-26
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A

AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2021-07-22	2022-07-21
AR	Power Amplifier	500W1000C	0353561	N/A	N/A
AR	Power Amplifier	60S1G6	0348711	N/A	N/A
PASTERNACK	Dual Directional Coupler	PE2239-30	1711	2021-07-15	2022-07-14
Agilent	EPM Series Power Meter	E4419B	MY45103907	2021-07-22	2022-07-21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2021-07-22	2022-07-21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2021-07-22	2022-07-21

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

Environmental Conditions

Test Item:	Conducted emission	Radiated emissions below 1GHz	Radiated emissions above 1GHz	EMS &Flicker*
Temperature:	25.2°C	22.2°C	23.0~24.4°C	22.7~26.5°C
Relative Humidity:	72%	67%	71~76%	58~69%
ATM Pressure:	100.5kPa	101.1kPa	101.2~101.5kPa	101.0kPa
Tester:	Walker Chen	Leo Yuan	Bill Yang	April Wu
Test Date:	2022-03-22	2022-03-25	2022-03-27~2022-03-28	2022-03-30

Note:
*The relative humidity of ESD test environment is 58%.

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 301 489 Clause 8.2	Enclosure of ancillary equipment measured on a stand alone basis	Compliant
2	EN 301 489 Clause 8.3	DC power input/output ports	Not applicable
3	EN 301 489 Clause 8.4	AC mains power input/output ports	Compliant
4	EN 301 489 Clause 8.5	Harmonic current emissions (AC mains input port)	Not applicable
5	EN 301 489 Clause 8.6	Voltage fluctuations and flicker (AC mains input port)	Compliant
6	EN 301 489 Clause 8.7	Wired network ports	Compliant
7	EN 301 489 Clause 9.2	Radio frequency electromagnetic fields (80 MHz to 6 000 MHz)	Compliant
8	EN 301 489 Clause 9.3	Electrostatic discharges	Compliant
9	EN 301 489 Clause 9.4	Fast transients, common mode	Compliant
10	EN 301 489 Clause 9.5	Radio frequency, common mode	Compliant
11	EN 301 489 Clause 9.6	Transients and surges in the vehicular environment	Not applicable
12	EN 301 489 Clause 9.7	Voltage dips and short interruptions	Compliant
13	EN 301 489 Clause 9.8	Surges	Compliant

Note:
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.

1 - ENCLOSURE OF ANCILLARY EQUIPMENT MEASURED ON A STAND ALONE BASIS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
−compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
−non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
−compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
−non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

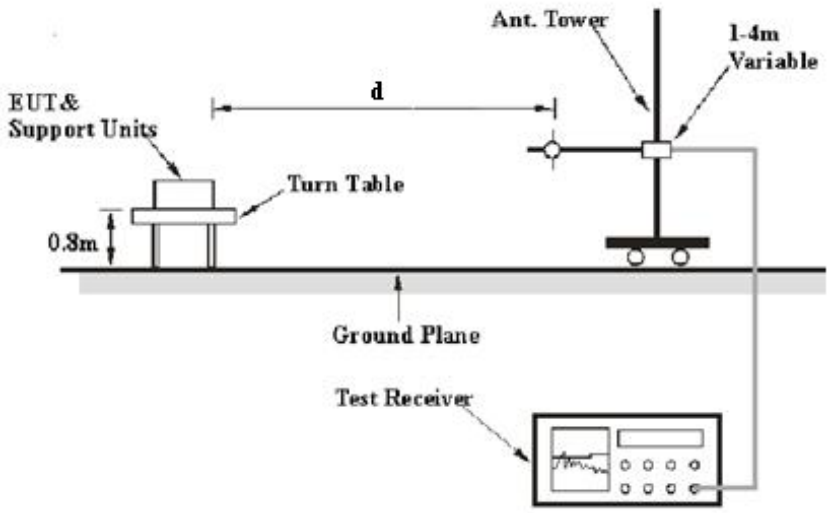
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 - Values of U_{cispr}

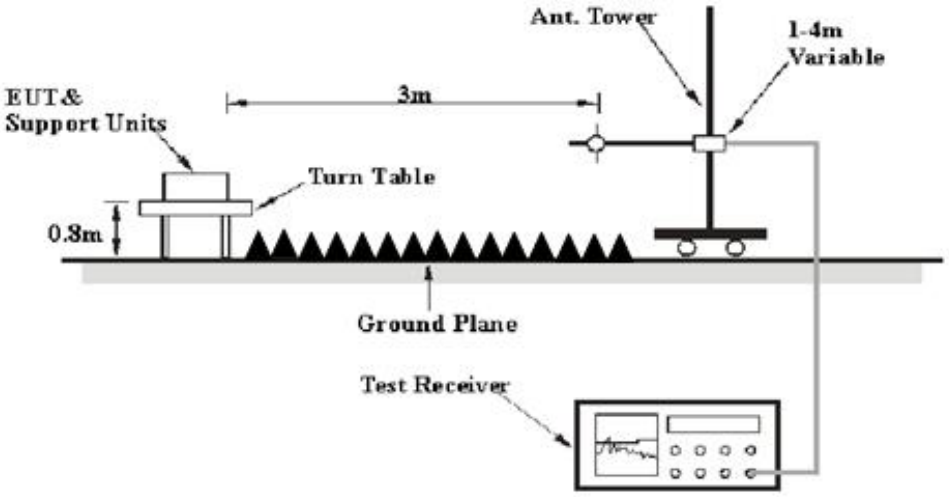
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)(6 GHz to 18 GHz)	5.5 dB

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 3 meters, above 1GHz were performed in the 3 meters. The specification used was EN 301 489 Class A limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

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
30MHz - 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	10Hz	/	Average

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1GHz.

Corrected Amplitude & Margin Calculation

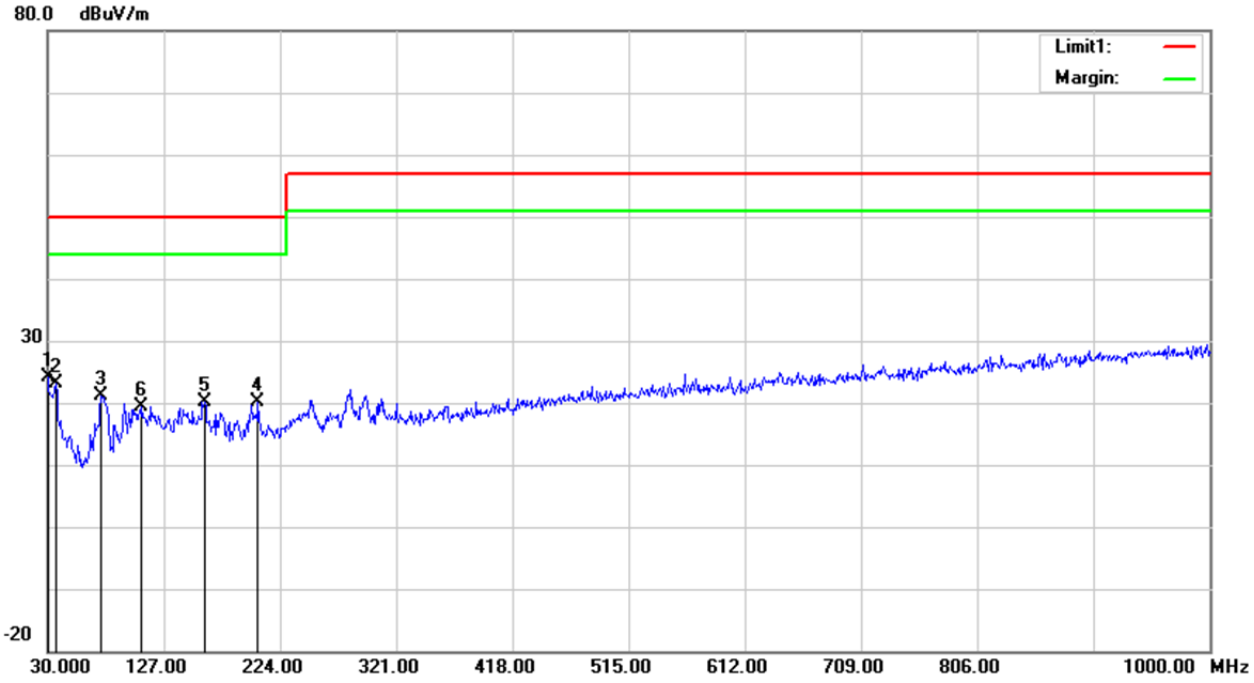
The basic equation is as follows: Result = Meter Reading+ Corrected
Note:
Corrected = Antenna Factor + Cable Loss - Amplifier Gain, or
Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain
The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit-Result

Test Data

Please refer to following table and plots:

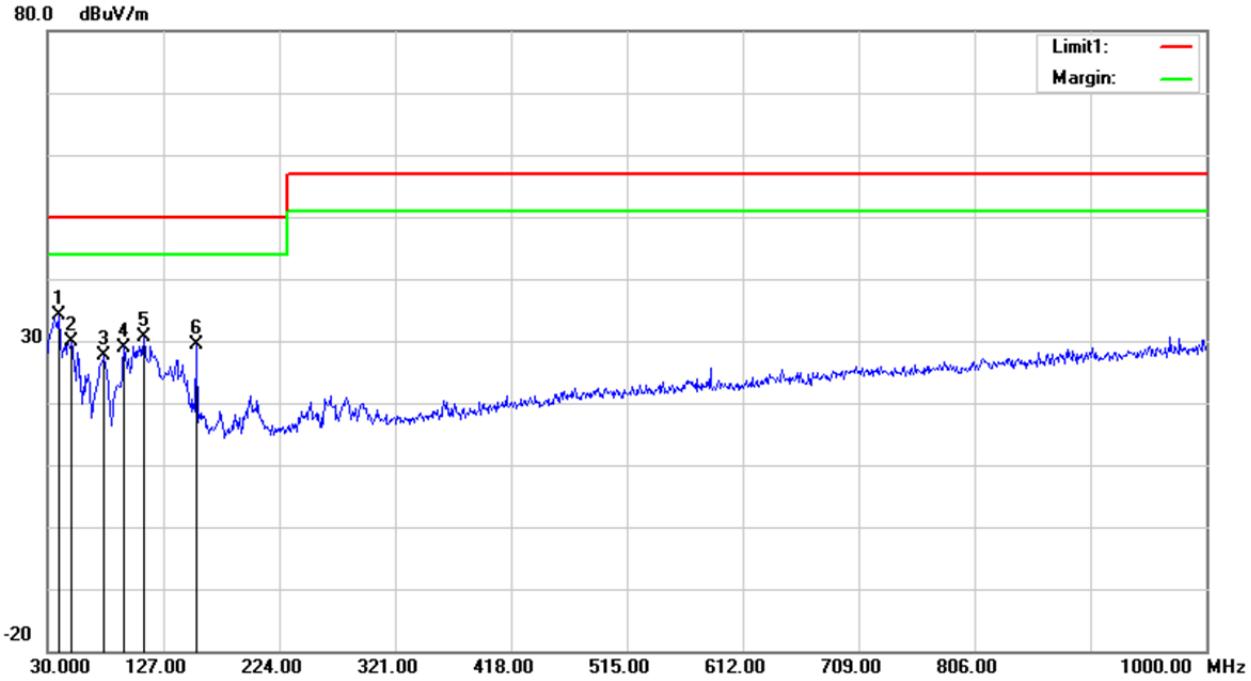
Below 1GHz

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**Adapter**	**Distance:**	3m



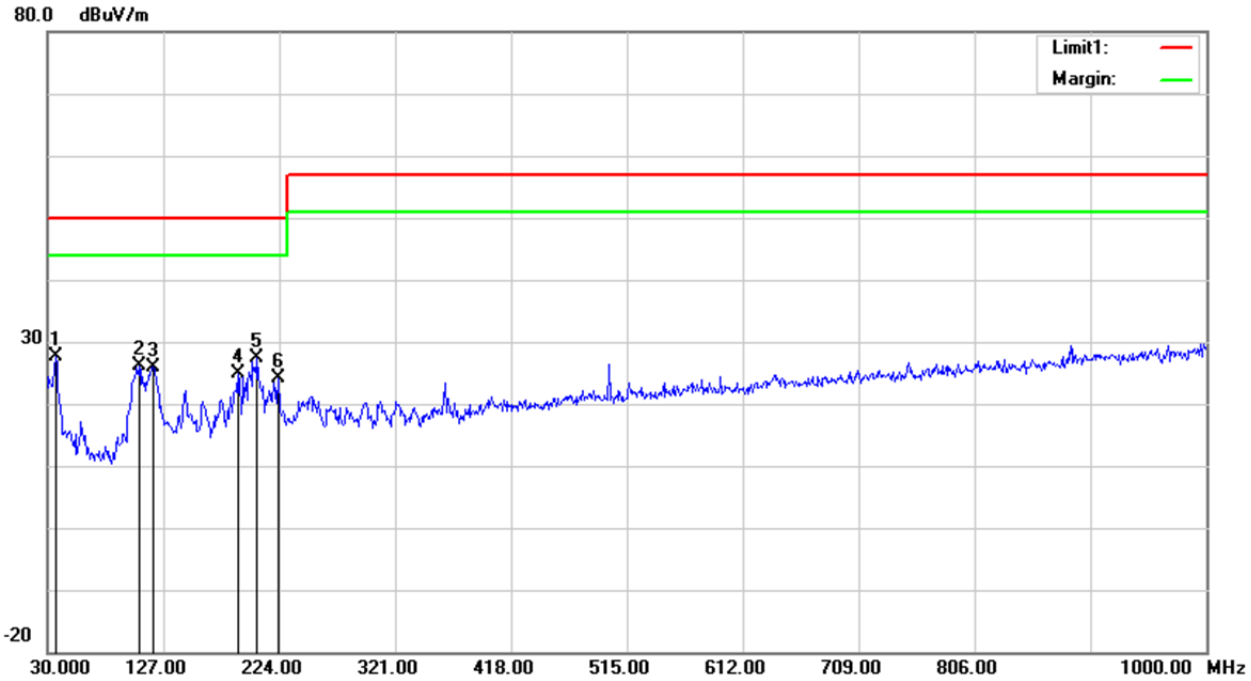
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.58	peak	-3.49	24.09	50.00	25.91
2	36.7900	31.56	peak	-8.55	23.01	50.00	26.99
3	74.6200	37.72	peak	-16.52	21.20	50.00	28.80
4	205.5700	33.38	peak	-13.30	20.08	50.00	29.92
5	160.9500	32.29	peak	-12.09	20.20	50.00	29.80
6	108.5700	31.75	peak	-12.33	19.42	50.00	30.58

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**Adapter**	**Distance:**	3m



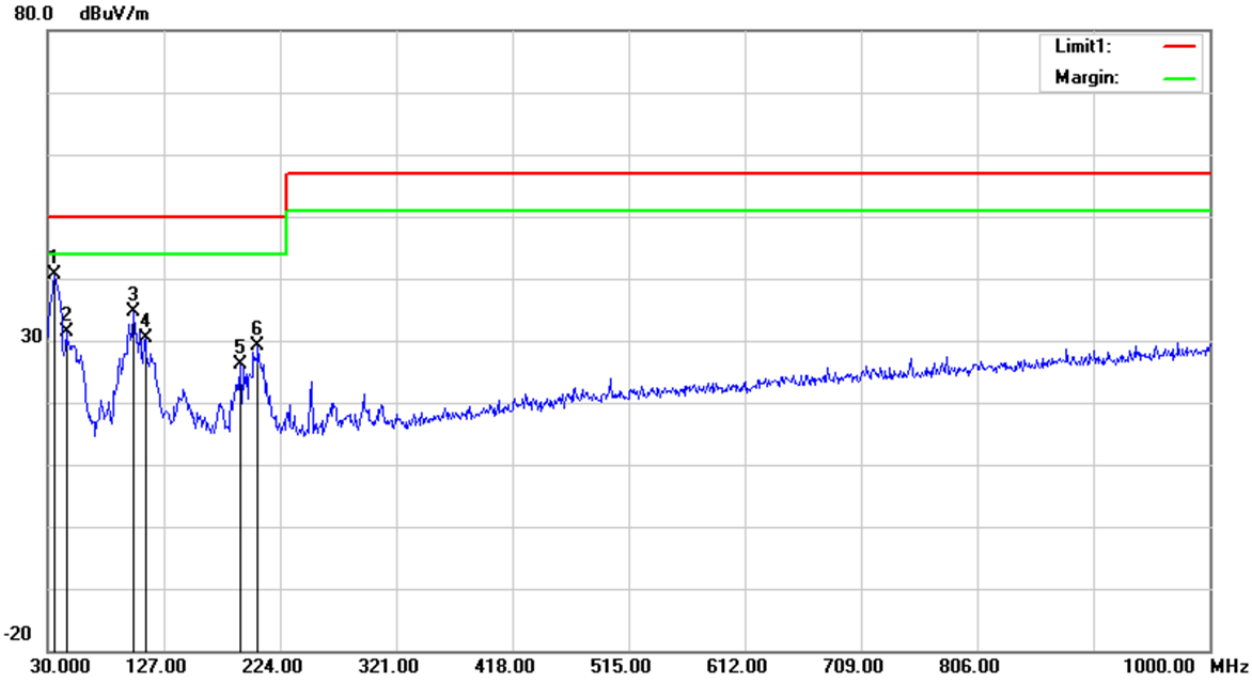
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	39.7000	44.98	peak	-10.88	34.10	50.00	15.90
2	50.3700	46.41	peak	-16.60	29.81	50.00	20.19
3	77.5300	44.16	peak	-16.65	27.51	50.00	22.49
4	94.0200	45.18	peak	-16.18	29.00	50.00	21.00
5	110.5100	42.66	peak	-11.92	30.74	50.00	19.26
6	154.1600	41.37	peak	-11.95	29.42	50.00	20.58

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**POE**	**Distance:**	3m



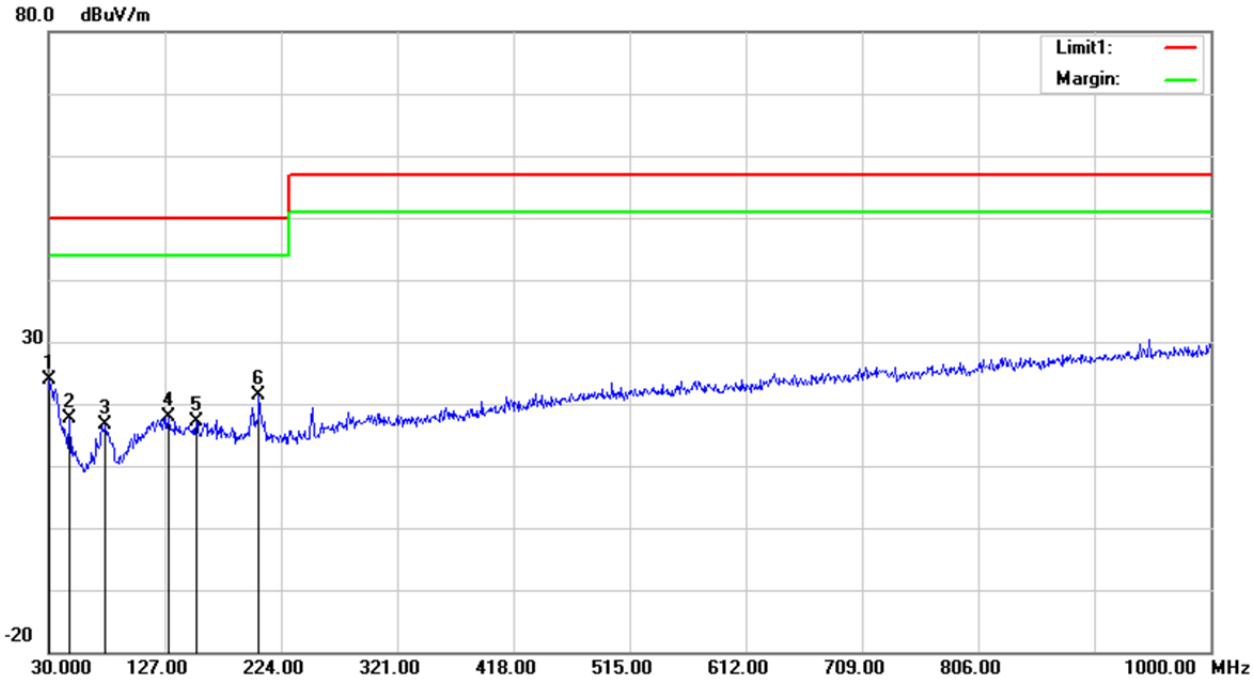
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	36.7900	36.25	peak	-8.55	27.70	50.00	22.30
2	106.6300	38.99	peak	-12.75	26.24	50.00	23.76
3	118.2700	36.63	peak	-10.63	26.00	50.00	24.00
4	189.0800	38.25	peak	-13.44	24.81	50.00	25.19
5	205.5700	40.56	peak	-13.30	27.26	50.00	22.74
6	223.0300	37.51	peak	-13.47	24.04	50.00	25.96

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**POE**	**Distance:**	3m



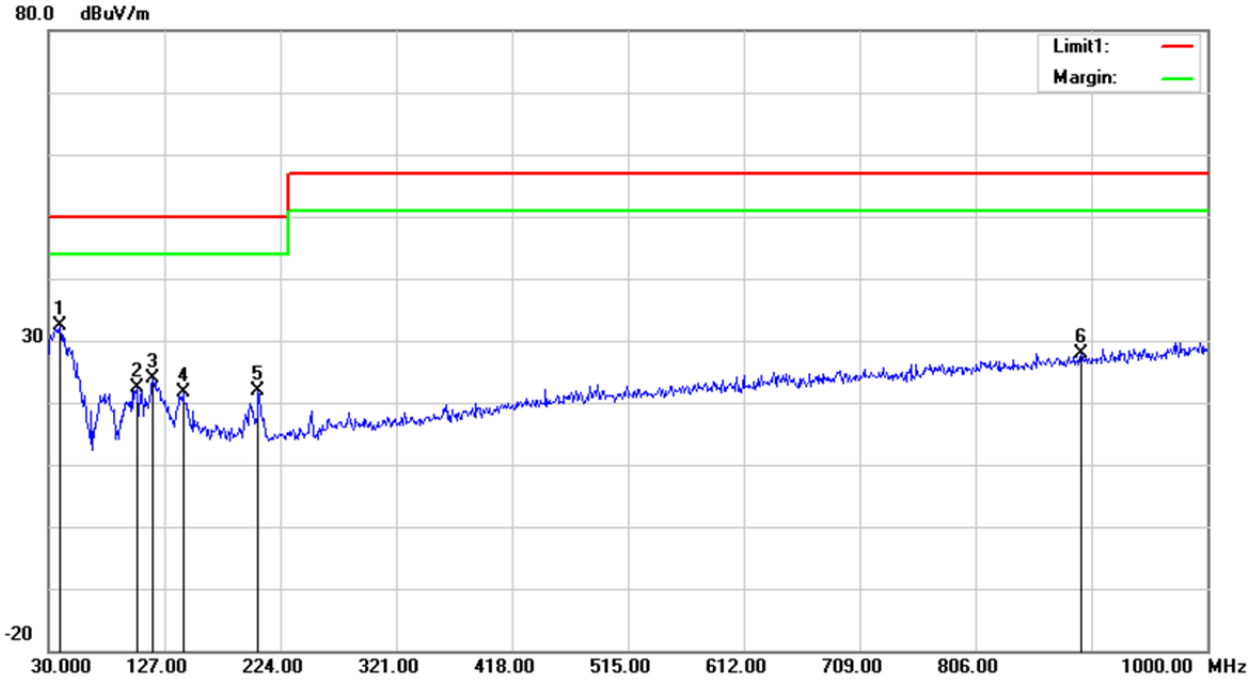
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	35.8200	48.50	peak	-7.76	40.74	50.00	9.26
2	45.5200	46.01	peak	-14.70	31.31	50.00	18.69
3	101.7800	48.69	peak	-13.99	34.70	50.00	15.30
4	111.4800	42.12	peak	-11.71	30.41	50.00	19.59
5	191.0200	39.42	peak	-13.38	26.04	50.00	23.96
6	205.5700	42.49	peak	-13.30	29.19	50.00	20.81

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**Adapter**	**Distance:**	3m



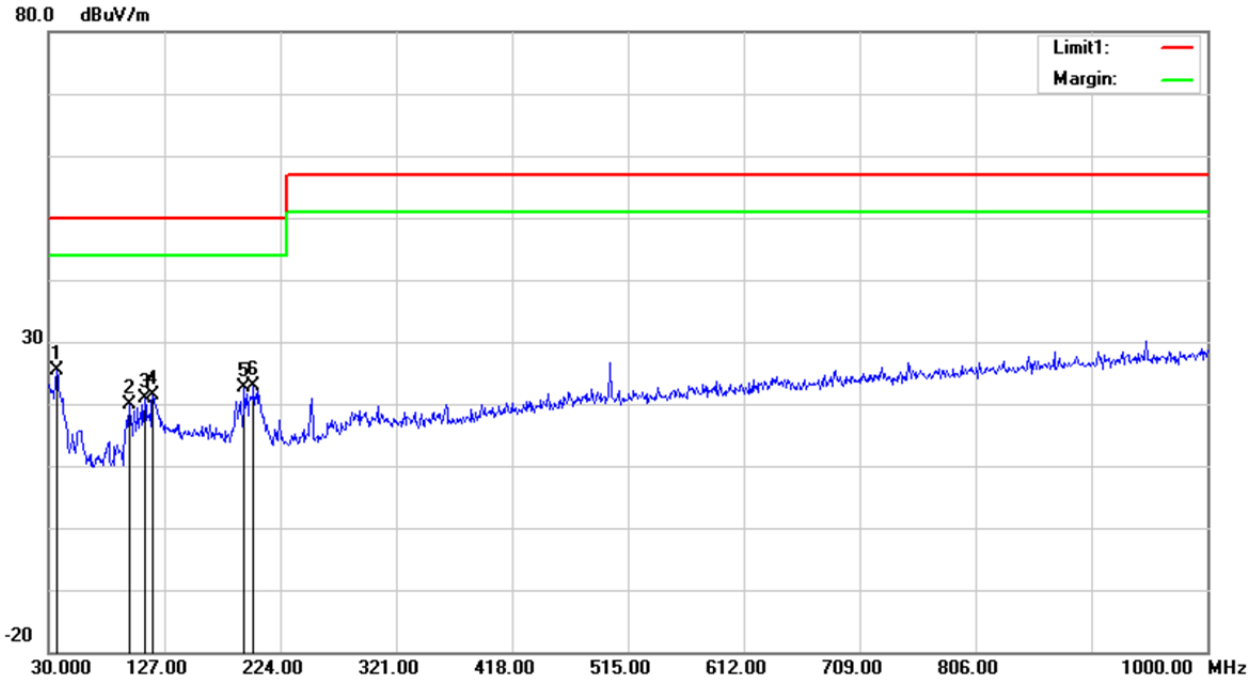
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.42	peak	-3.49	23.93	50.00	26.07
2	47.4600	33.41	peak	-15.66	17.75	50.00	32.25
3	77.5300	33.34	peak	-16.65	16.69	50.00	33.31
4	129.9100	28.57	peak	-10.77	17.80	50.00	32.20
5	153.1900	29.06	peak	-11.97	17.09	50.00	32.91
6	205.5700	34.59	peak	-13.30	21.29	50.00	28.71

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**Adapter**	**Distance:**	3m



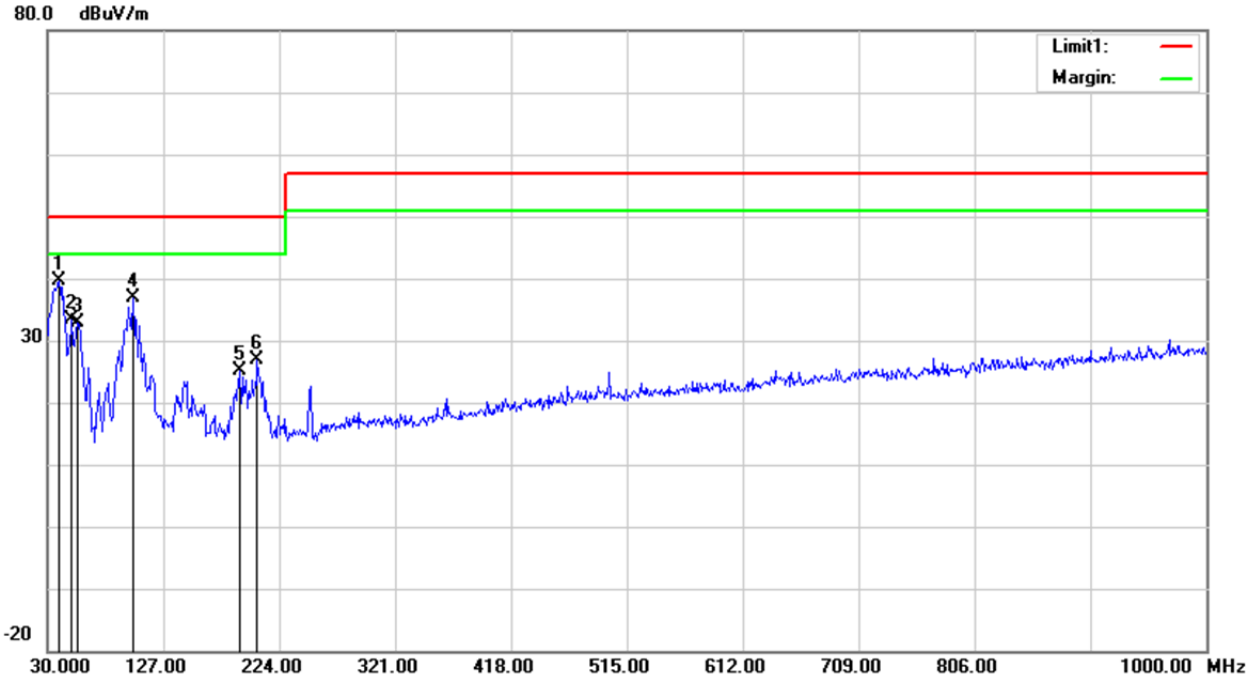
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	39.7000	43.15	peak	-10.88	32.27	50.00	17.73
2	104.6900	35.65	peak	-13.23	22.42	50.00	27.58
3	117.3000	34.52	peak	-10.74	23.78	50.00	26.22
4	142.5200	33.58	peak	-11.93	21.65	50.00	28.35
5	205.5700	35.06	peak	-13.30	21.76	50.00	28.24
6	894.2700	27.10	peak	0.87	27.97	57.00	29.03

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**POE**	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	36.7900	33.81	peak	-8.55	25.26	50.00	24.74
2	97.9000	34.99	peak	-15.18	19.81	50.00	30.19
3	110.5100	32.90	peak	-11.92	20.98	50.00	29.02
4	117.3000	32.14	peak	-10.74	21.40	50.00	28.60
5	193.9300	35.69	peak	-13.11	22.58	50.00	27.42
6	201.6900	35.09	peak	-12.27	22.82	50.00	27.18

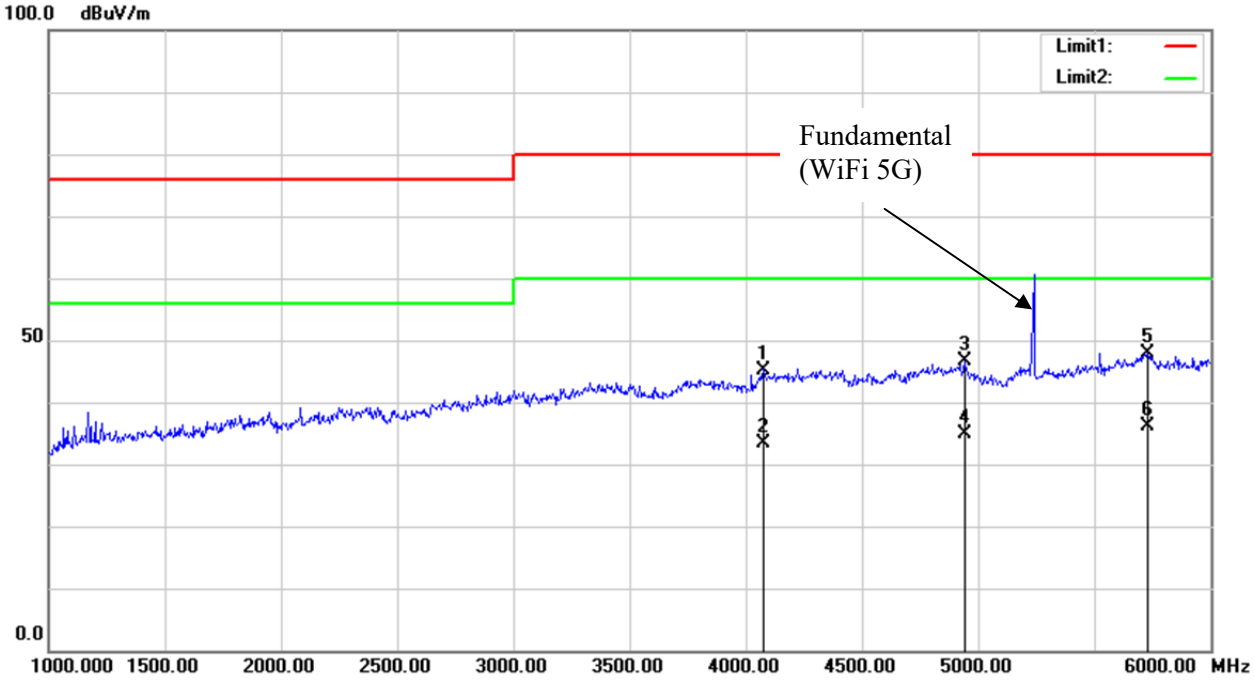
Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**POE**	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	39.7000	50.47	peak	-10.88	39.59	50.00	10.41
2	50.3700	49.94	peak	-16.60	33.34	50.00	16.66
3	55.2200	50.23	peak	-17.40	32.83	50.00	17.17
4	101.7800	50.89	peak	-13.99	36.90	50.00	13.10
5	191.0200	38.41	peak	-13.38	25.03	50.00	24.97
6	205.5700	40.24	peak	-13.30	26.94	50.00	23.06

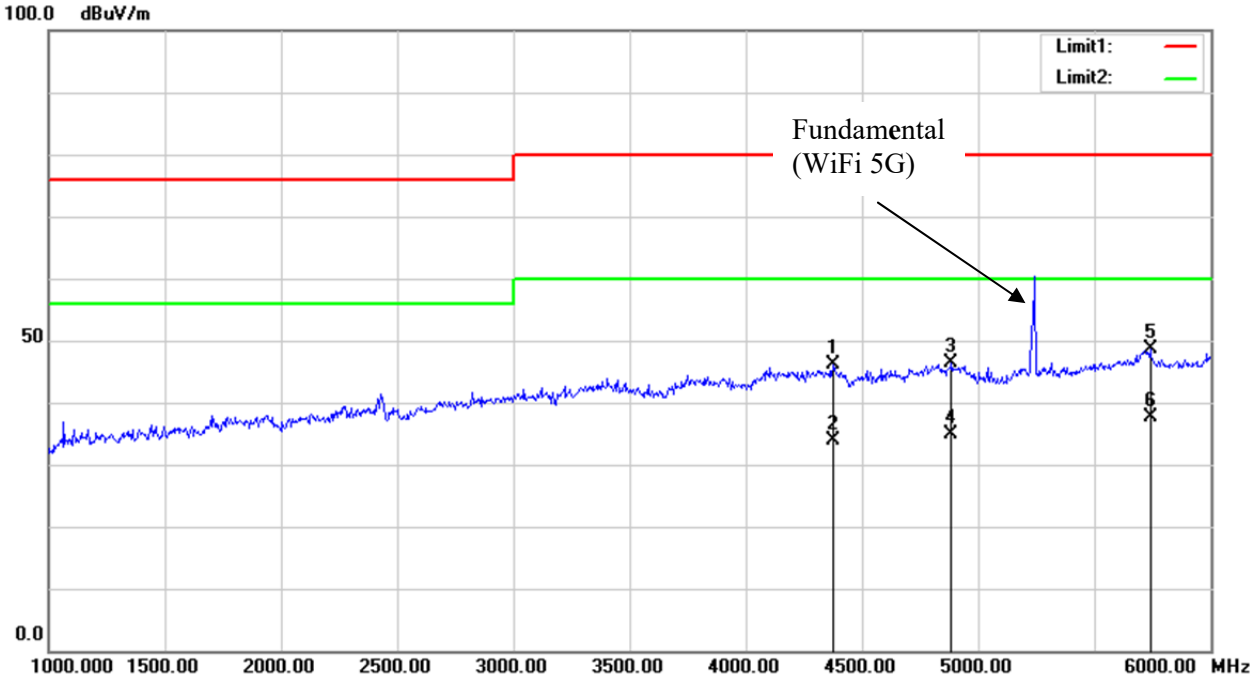
Above 1GHz

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**Adapter**	**Distance:**	3m



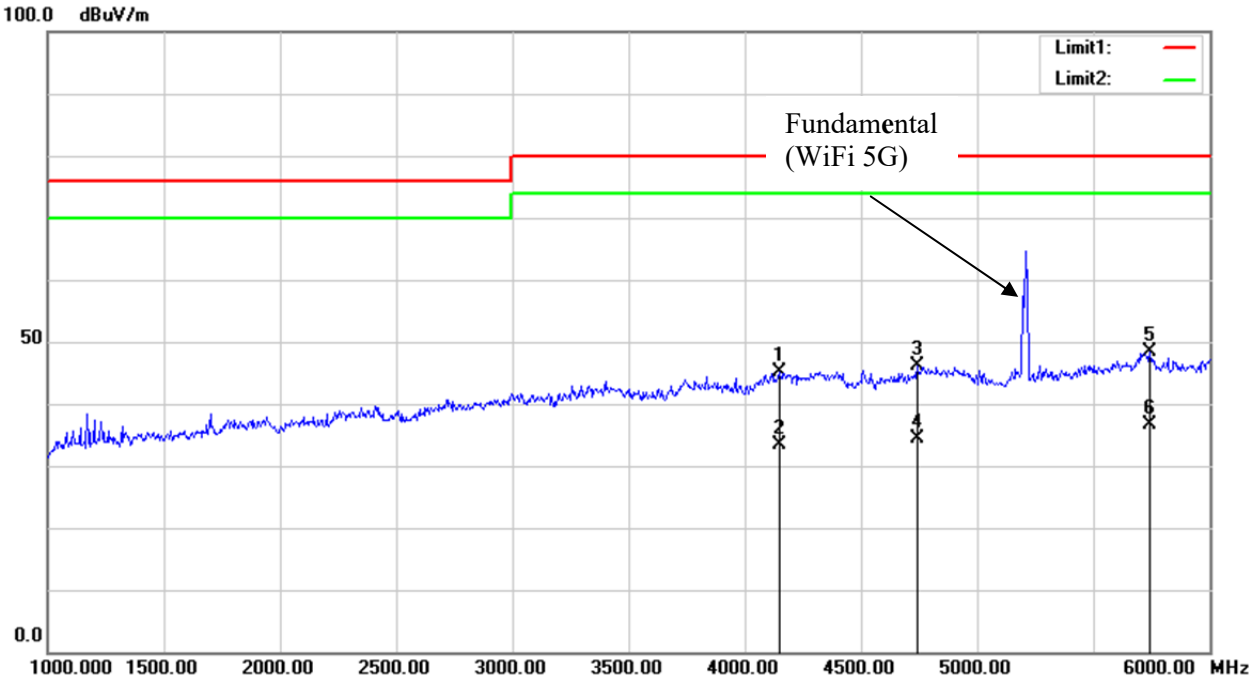
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	4077.500	49.35	peak	-4.10	45.25	80.00	34.75
2	4077.500	37.49	AVG	-4.10	33.39	60.00	26.61
3	4942.500	49.89	peak	-3.37	46.52	80.00	33.48
4	4942.500	38.15	AVG	-3.37	34.78	60.00	25.22
5	5732.500	48.30	peak	-0.36	47.94	80.00	32.06
6	5732.500	36.48	AVG	-0.36	36.12	60.00	23.88

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**Adapter**	**Distance:**	3m



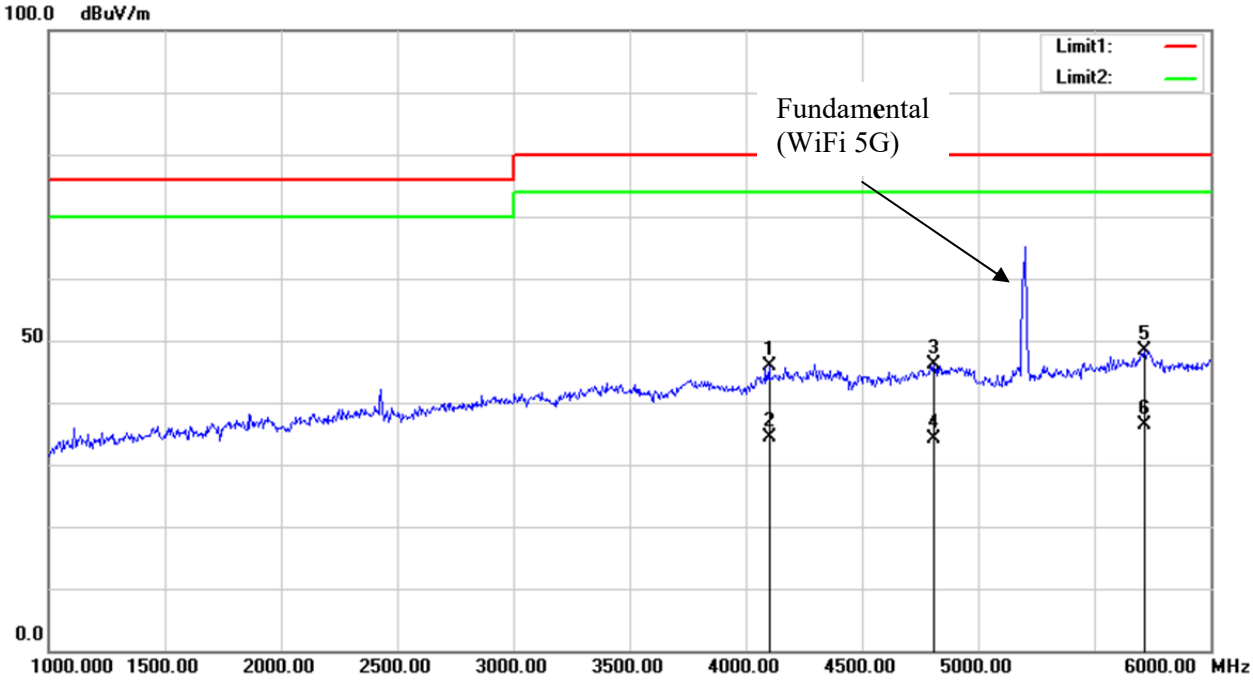
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	4377.500	49.91	peak	-3.90	46.01	80.00	33.99
2	4377.500	37.89	AVG	-3.90	33.99	60.00	26.01
3	4885.000	49.33	peak	-2.97	46.36	80.00	33.64
4	4885.000	37.89	AVG	-2.97	34.92	60.00	25.08
5	5740.000	49.03	peak	-0.29	48.74	80.00	31.26
6	5740.000	37.89	AVG	-0.29	37.60	60.00	22.40

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**POE**	**Distance:**	3m



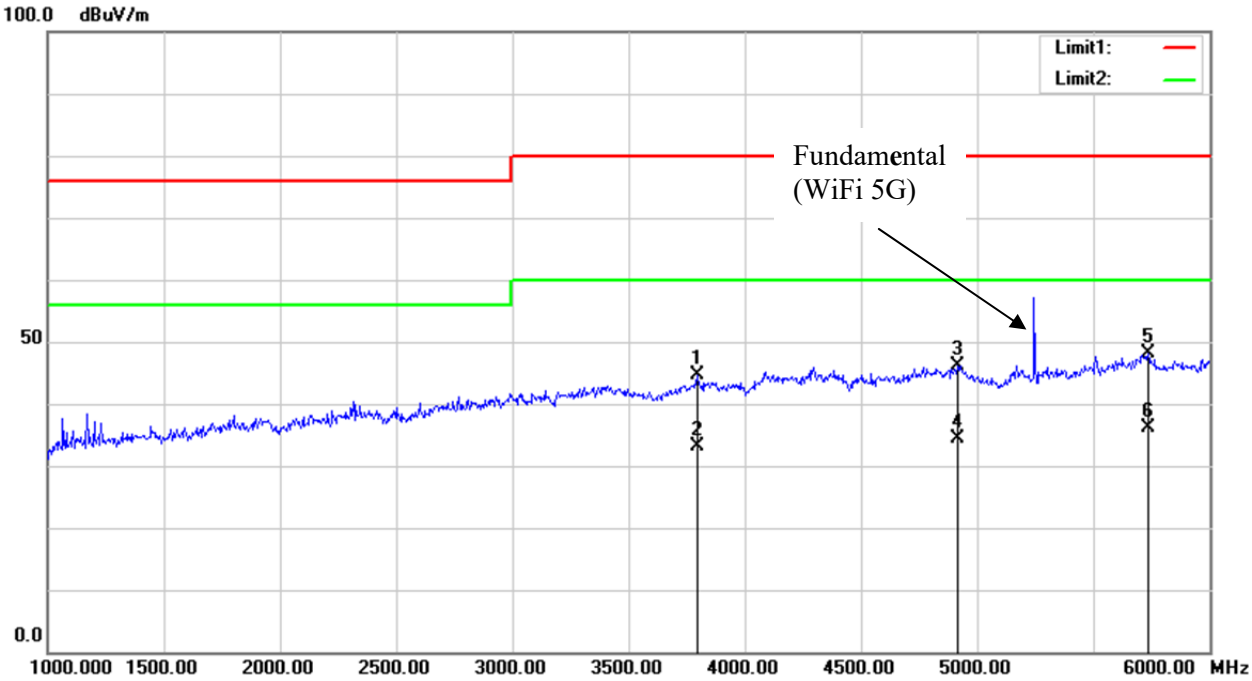
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	4152.500	49.21	peak	-4.19	45.02	80.00	34.98
2	4152.500	37.48	AVG	-4.19	33.29	74.00	40.71
3	4742.500	49.75	peak	-3.69	46.06	80.00	33.94
4	4742.500	38.12	AVG	-3.69	34.43	74.00	39.57
5	5747.500	48.68	peak	-0.24	48.44	80.00	31.56
6	5747.500	36.98	AVG	-0.24	36.74	74.00	37.26

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 230V/50Hz**
Test Mode:	**POE**	**Distance:**	3m



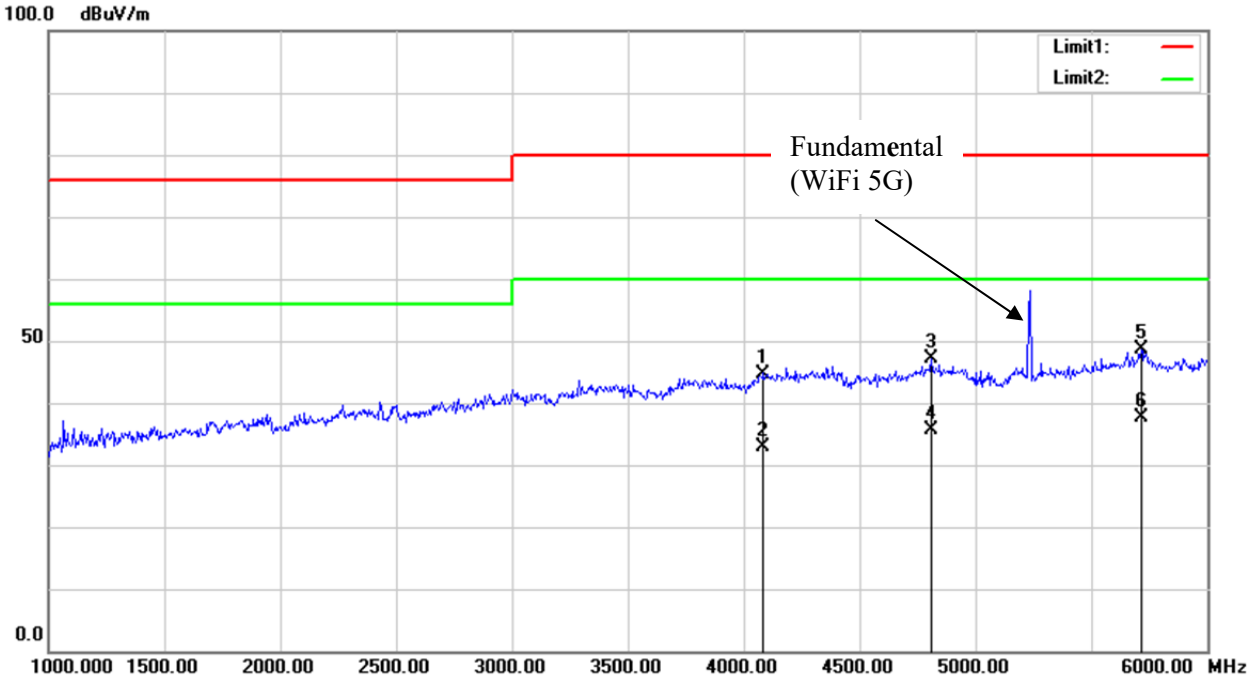
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	4102.500	49.61	peak	-3.85	45.76	80.00	34.24
2	4102.500	38.12	AVG	-3.85	34.27	74.00	39.73
3	4812.500	49.39	peak	-3.36	46.03	80.00	33.97
4	4812.500	37.45	AVG	-3.36	34.09	74.00	39.91
5	5715.000	48.85	peak	-0.50	48.35	80.00	31.65
6	5715.000	36.98	AVG	-0.50	36.48	74.00	37.52

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**Adapter**	**Distance:**	3m



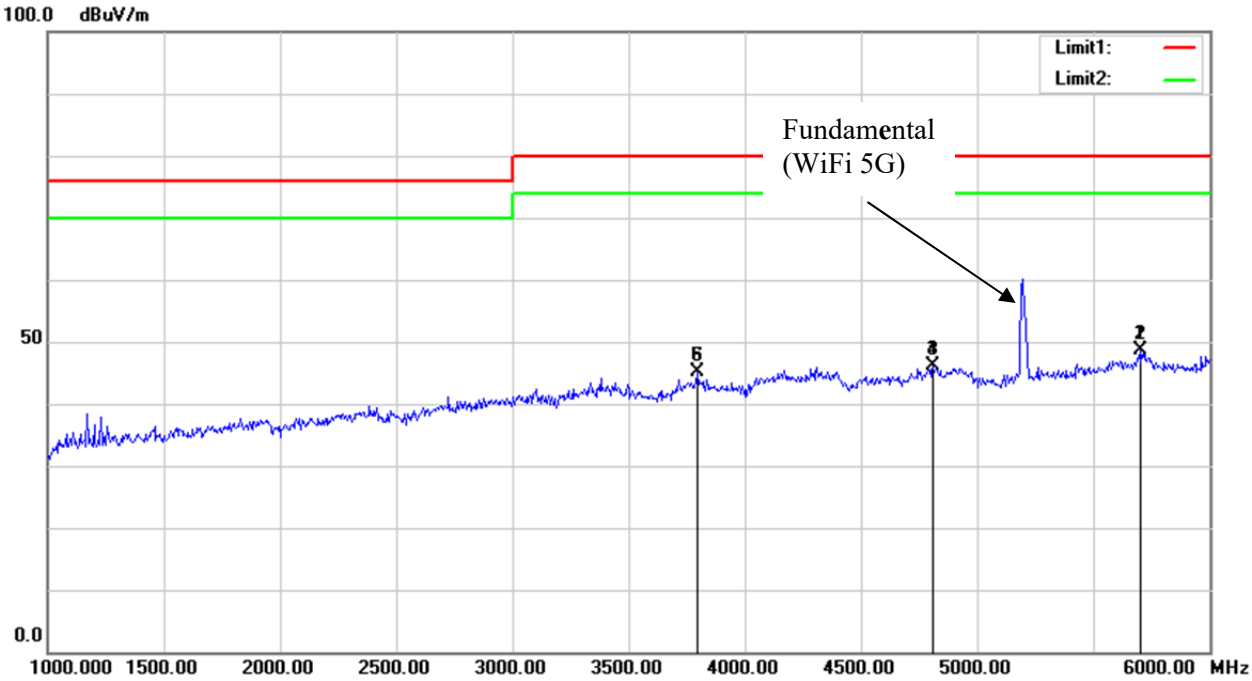
No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	3795.000	49.68	peak	-4.98	44.70	80.00	35.30
2	3795.000	38.12	AVG	-4.98	33.14	60.00	26.86
3	4917.500	49.14	peak	-3.00	46.14	80.00	33.86
4	4917.500	37.48	AVG	-3.00	34.48	60.00	25.52
5	5735.000	48.56	peak	-0.34	48.22	80.00	31.78
6	5735.000	36.48	AVG	-0.34	36.14	60.00	23.86

Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**Adapter**	**Distance:**	3m



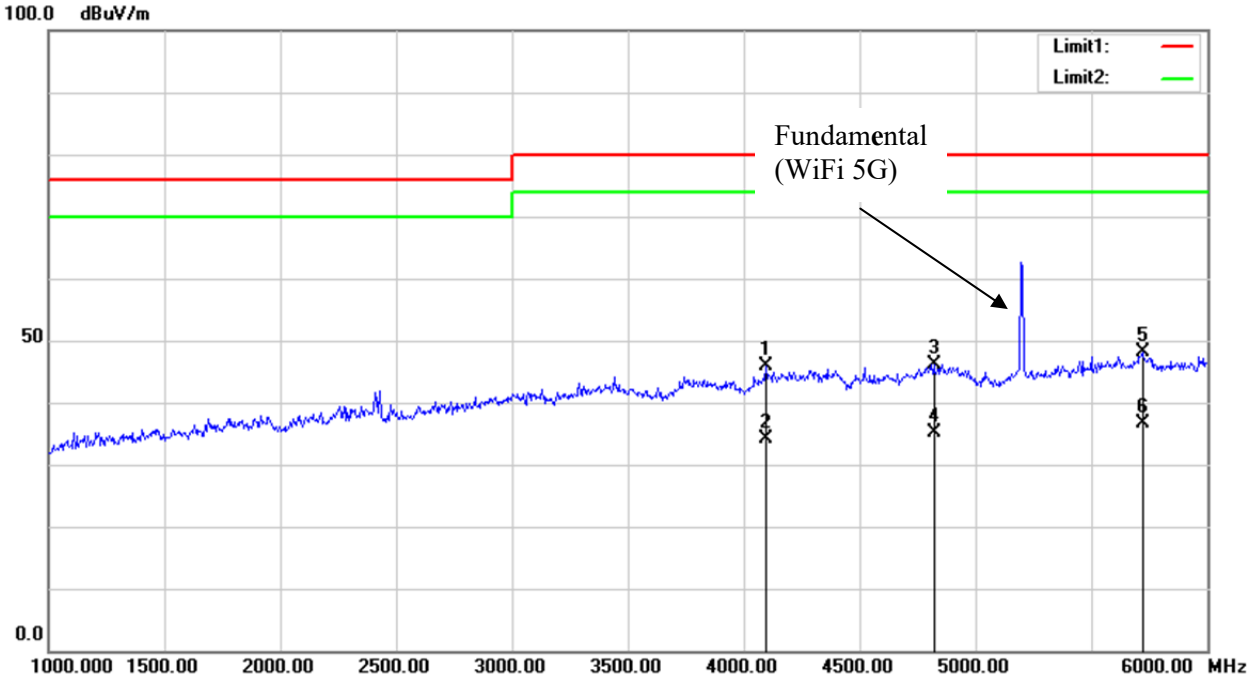
No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	4085.000	48.76	peak	-4.01	44.75	80.00	35.25
2	4085.000	36.99	AVG	-4.01	32.98	60.00	27.02
3	4810.000	50.41	peak	-3.35	47.06	80.00	32.94
4	4810.000	38.96	AVG	-3.35	35.61	60.00	24.39
5	5717.500	49.03	peak	-0.47	48.56	80.00	31.44
6	5717.500	38.01	AVG	-0.47	37.54	60.00	22.46

Condition:	**EN 301 489 Class A**	**Polarization:**	**Horizontal**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**POE**	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	5707.500	49.19	peak	-0.56	48.63	80.00	31.37
2	5707.500	49.19	peak	-0.56	48.63	80.00	31.37
3	4812.500	49.57	peak	-3.36	46.21	80.00	33.79
4	4812.500	49.57	peak	-3.36	46.21	80.00	33.79
5	3795.000	50.11	peak	-4.98	45.13	80.00	34.87
6	3795.000	50.11	peak	-4.98	45.13	80.00	34.87

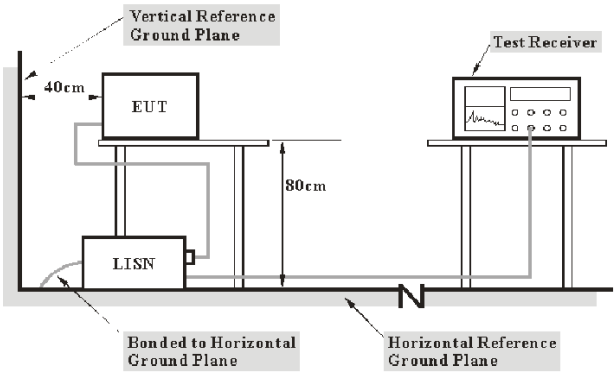
Condition:	**EN 301 489 Class A**	**Polarization:**	**Vertical**
Model:	**Operating**	**Power:**	**AC 110V/60Hz**
Test Mode:	**POE**	**Distance:**	3m



No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	4095.000	49.65	peak	-3.89	45.76	80.00	34.24
2	4095.000	38.12	AVG	-3.89	34.23	74.00	39.77
3	4820.000	49.59	peak	-3.39	46.20	80.00	33.80
4	4820.000	38.56	AVG	-3.39	35.17	74.00	38.83
5	5720.000	48.52	peak	-0.45	48.07	80.00	31.93
6	5720.000	37.15	AVG	-0.45	36.70	74.00	37.30

3 - AC MAINS POWER INPUT/OUTPUT PORTS

Test System 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 measurement procedures. The specification used was with the EN 301 489-1 limits.

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

The spacing between the peripherals was 10cm.

The adapter was connected to AC230V/50Hz power source.

EMI Test Receiver Setup

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

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

During the conducted emissions test, the adapter was connected to the main outlet of the first LISNand the other support equipments were connected to the outlet of the second LISN.

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

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

Corrected Amplitude & Margin Calculation

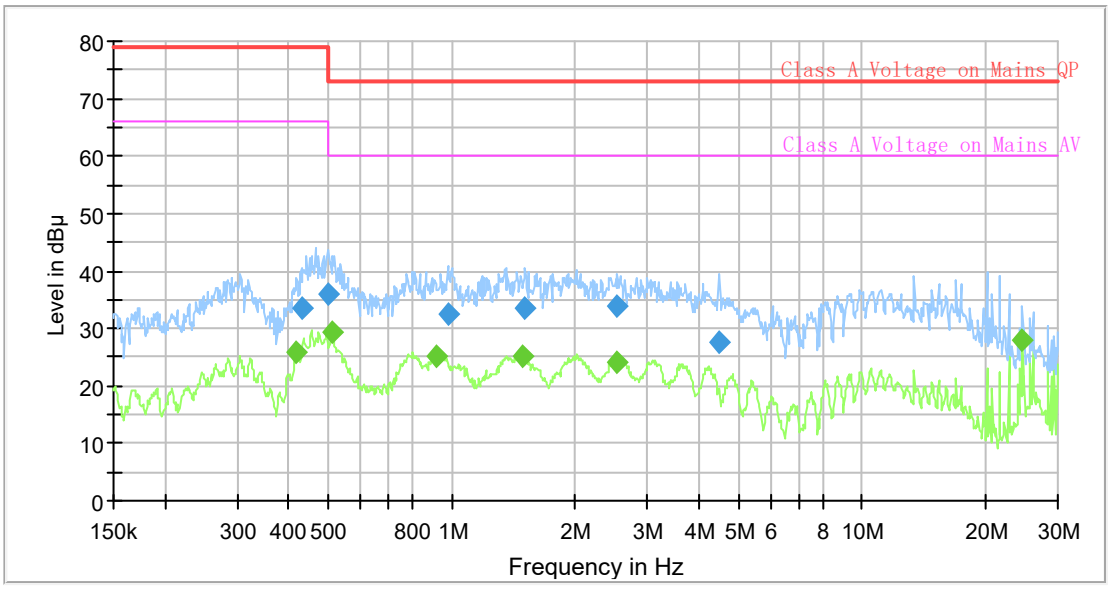
The basic equation is as follows: Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:
Corr. = Cable loss + Factor of coupling device
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit -Result

Test Data

Please refer to following table and plots:

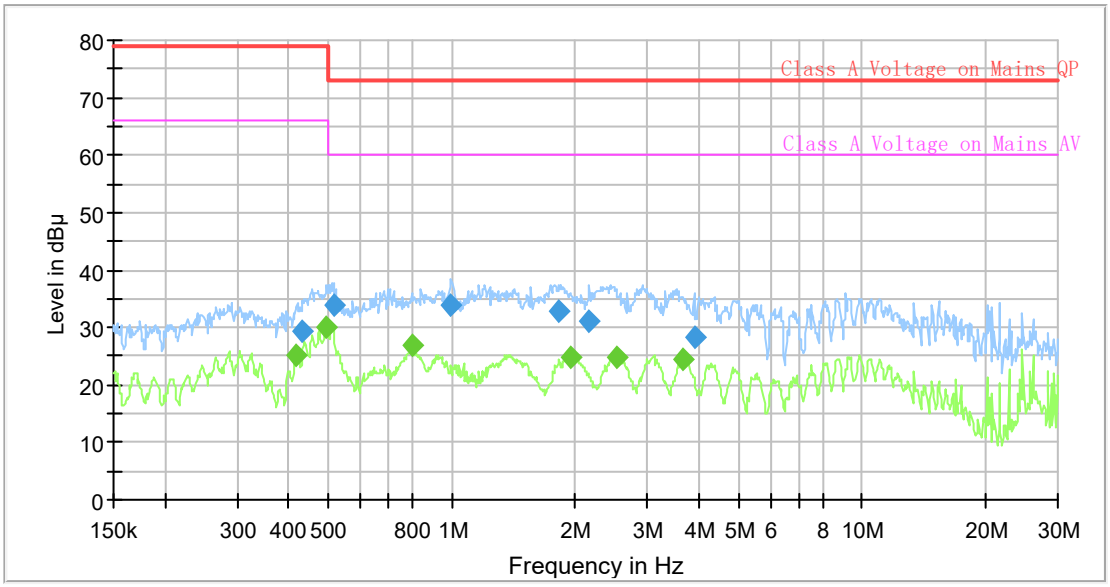
Port:	L
Test Mode:	Operating _ Powered by Adapter
Power Source:	AC 230V/50Hz
Note:	



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.419083	---	25.99	66.00	40.01	9.000	L1	9.6
0.429665	33.59	---	79.00	45.41	9.000	L1	9.6
0.501508	36.15	---	73.00	36.85	9.000	L1	9.6
0.511614	---	29.19	60.00	30.81	9.000	L1	9.6
0.912443	---	25.31	60.00	34.69	9.000	L1	9.7
0.978432	32.58	---	73.00	40.42	9.000	L1	9.7
1.495016	---	25.15	60.00	34.85	9.000	L1	9.7
1.510003	33.70	---	73.00	39.30	9.000	L1	9.7
2.511402	---	24.21	60.00	35.79	9.000	L1	9.7
2.536578	33.83	---	73.00	39.17	9.000	L1	9.7
4.501377	27.73	---	73.00	45.27	9.000	L1	9.7
24.536148	---	28.12	60.00	31.88	9.000	L1	10.0

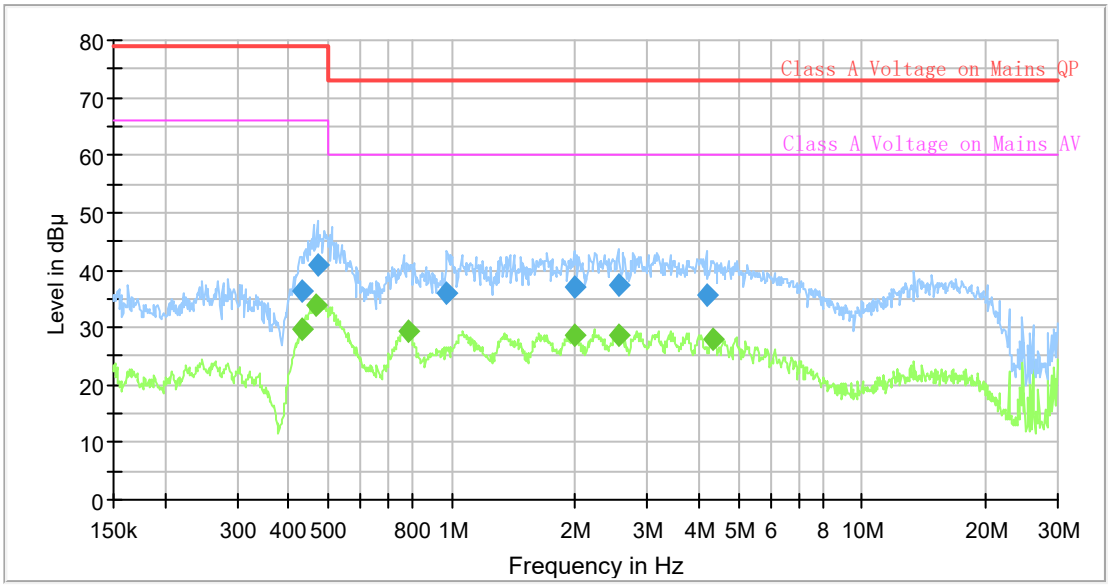
Port: N
Test Mode: Operating _ Powered by Adapter
Power Source: AC 230V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.419083	---	25.05	66.00	40.95	9.000	N	9.6
0.431814	29.29	---	79.00	49.71	9.000	N	9.6
0.496531	---	29.93	66.00	36.07	9.000	N	9.6
0.514172	34.05	---	73.00	38.95	9.000	N	9.6
0.801471	---	26.94	60.00	33.06	9.000	N	9.6
0.998148	34.02	---	73.00	38.98	9.000	N	9.6
1.825106	32.87	---	73.00	40.13	9.000	N	9.6
1.947363	---	24.80	60.00	35.20	9.000	N	9.6
2.162391	31.05	---	73.00	41.95	9.000	N	9.6
2.511402	---	24.93	60.00	35.07	9.000	N	9.6
3.650655	---	24.54	60.00	35.46	9.000	N	9.6
3.895198	28.43	---	73.00	44.57	9.000	N	9.6

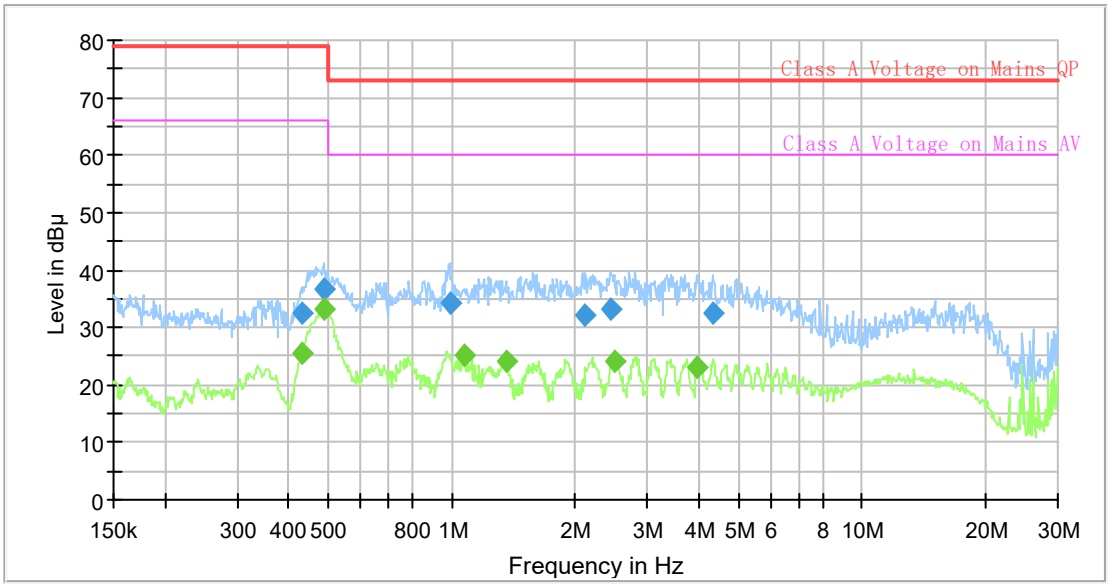
Port: L
Test Mode: Operating _ Powered by Adapter
Power Source: AC 110V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.429665	---	29.69	66.00	36.31	9.000	L1	9.6
0.429665	36.38	---	79.00	42.62	9.000	L1	9.6
0.467685	---	33.78	66.00	32.22	9.000	L1	9.6
0.470023	40.82	---	79.00	38.18	9.000	L1	9.6
0.781732	---	29.32	60.00	30.68	9.000	L1	9.7
0.973564	36.03	---	73.00	36.97	9.000	L1	9.7
1.986604	37.09	---	73.00	35.91	9.000	L1	9.7
1.986604	---	28.63	60.00	31.37	9.000	L1	9.7
2.549261	37.44	---	73.00	35.56	9.000	L1	9.7
2.562008	---	28.62	60.00	31.38	9.000	L1	9.7
4.176904	35.68	---	73.00	37.32	9.000	L1	9.7
4.346933	---	28.07	60.00	31.93	9.000	L1	9.7

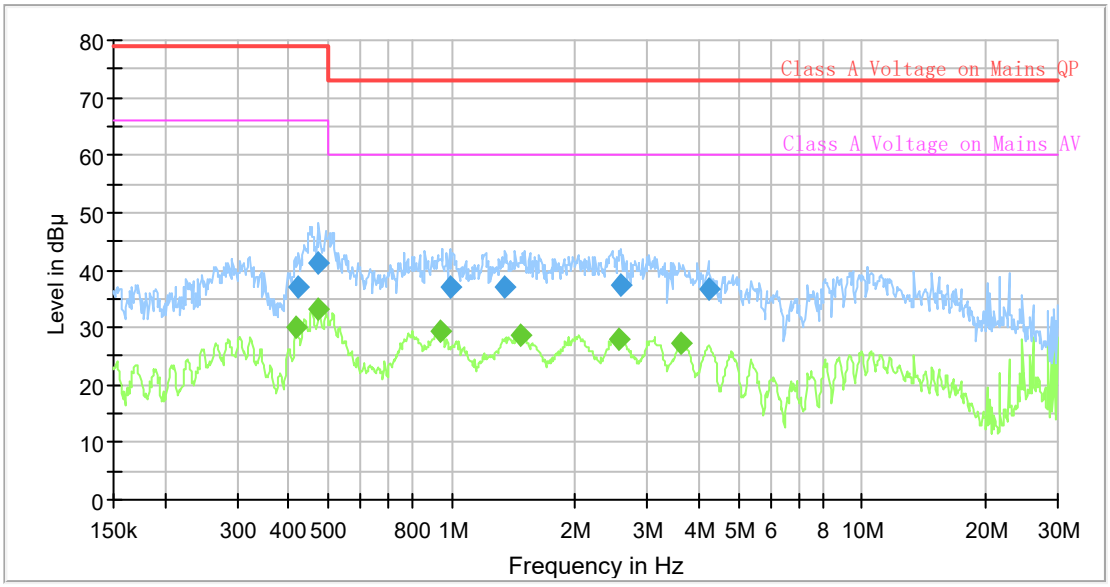
Port: N
Test Mode: Operating _ Powered by Adapter
Power Source: AC 110V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.429665	---	25.34	66.00	40.66	9.000	N	9.6
0.429665	32.56	---	79.00	46.44	9.000	N	9.6
0.486723	36.66	---	79.00	42.34	9.000	N	9.6
0.489157	---	33.21	66.00	32.79	9.000	N	9.6
0.988240	34.28	---	73.00	38.72	9.000	N	9.6
1.070335	---	25.00	60.00	35.00	9.000	N	9.6
1.353083	---	24.09	60.00	35.91	9.000	N	9.6
2.119679	32.16	---	73.00	40.84	9.000	N	9.6
2.437361	33.15	---	73.00	39.85	9.000	N	9.6
2.486475	---	24.16	60.00	35.84	9.000	N	9.6
3.973689	---	23.19	60.00	36.81	9.000	N	9.6
4.325306	32.47	---	73.00	40.53	9.000	N	9.6

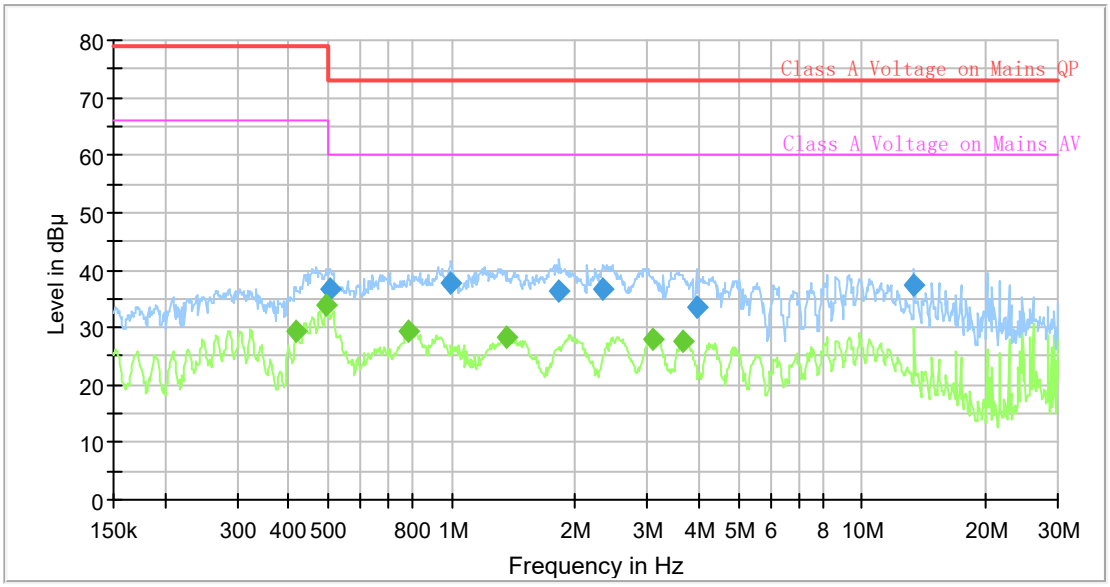
Port: L
Test Mode: Operating _ Powered by POE
Power Source: AC 230V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.419083	---	29.93	66.00	36.07	9.000	L1	9.6
0.423284	36.88	---	79.00	42.12	9.000	L1	9.6
0.474735	---	33.09	66.00	32.91	9.000	L1	9.6
0.474735	41.08	---	79.00	37.92	9.000	L1	9.6
0.935483	---	29.47	60.00	30.53	9.000	L1	9.7
0.988240	36.88	---	73.00	36.12	9.000	L1	9.7
1.346351	37.19	---	73.00	35.81	9.000	L1	9.7
1.472813	---	28.53	60.00	31.47	9.000	L1	9.7
2.549261	---	27.85	60.00	32.15	9.000	L1	9.7
2.587692	37.55	---	73.00	35.45	9.000	L1	9.7
3.614420	---	27.15	60.00	32.85	9.000	L1	9.7
4.218777	36.64	---	73.00	36.36	9.000	L1	9.7

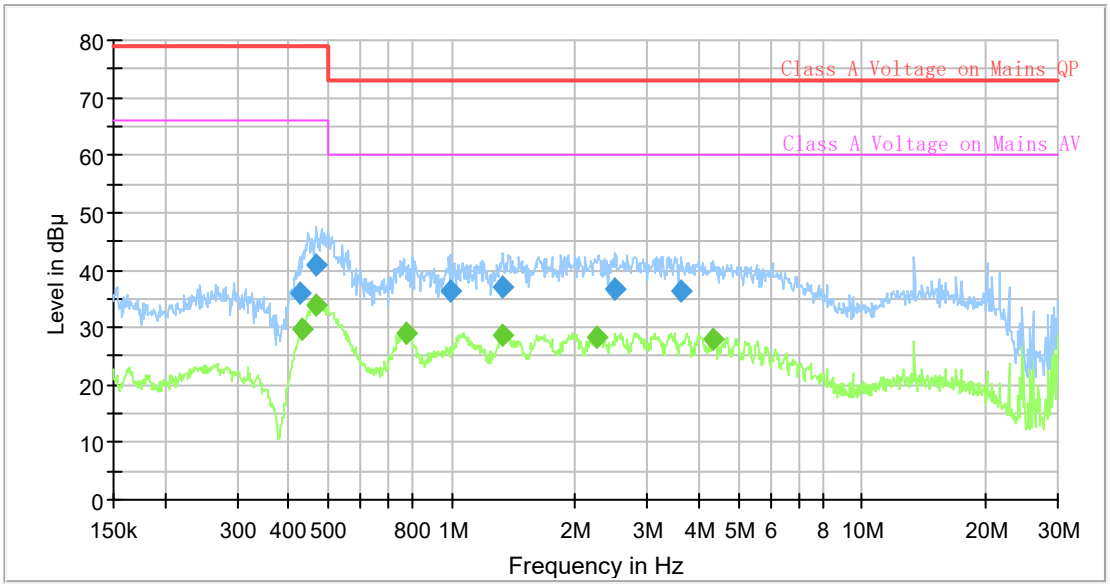
Port: N
Test Mode: Operating _ Powered by POE
Power Source: AC 230V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.419083	---	29.27	66.00	36.73	9.000	N	9.6
0.496531	---	33.92	66.00	32.08	9.000	N	9.6
0.506536	36.77	---	73.00	36.23	9.000	N	9.6
0.781732	---	29.42	60.00	30.58	9.000	N	9.6
0.998148	37.72	---	73.00	35.28	9.000	N	9.6
1.359849	---	28.26	60.00	31.74	9.000	N	9.6
1.825106	36.33	---	73.00	36.67	9.000	N	9.6
2.342024	36.76	---	73.00	36.24	9.000	N	9.6
3.081234	---	27.87	60.00	32.13	9.000	N	9.6
3.668908	---	27.64	60.00	32.36	9.000	N	9.6
3.953919	33.46	---	73.00	39.54	9.000	N	9.6
13.418776	37.31	---	73.00	35.69	9.000	N	9.8

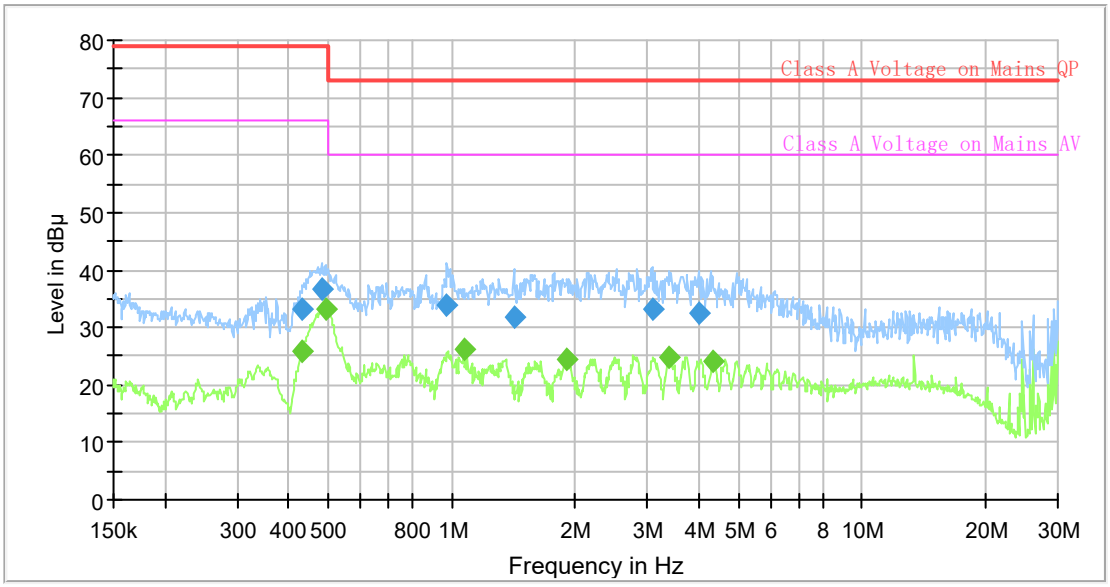
Port: L
Test Mode: Operating _ Powered by POE
Power Source: AC 110V/50Hz
Note:



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.425401	35.95	---	79.00	43.05	9.000	L1	9.6
0.429665	---	29.74	66.00	36.26	9.000	L1	9.6
0.467685	---	33.81	66.00	32.19	9.000	L1	9.6
0.467685	40.90	---	79.00	38.10	9.000	L1	9.6
0.773973	---	29.03	60.00	30.97	9.000	L1	9.7
0.993182	36.21	---	73.00	36.79	9.000	L1	9.7
1.326356	---	28.61	60.00	31.39	9.000	L1	9.7
1.332988	36.97	---	73.00	36.03	9.000	L1	9.7
2.250416	---	28.32	60.00	31.68	9.000	L1	9.7
2.498907	36.62	---	73.00	36.38	9.000	L1	9.7
3.632492	36.44	---	73.00	36.56	9.000	L1	9.7
4.346933	---	28.01	60.00	31.99	9.000	L1	9.7

Port: N
Test Mode: Operating _ Powered by POE
Power Source: AC 110V/50Hz
Note:

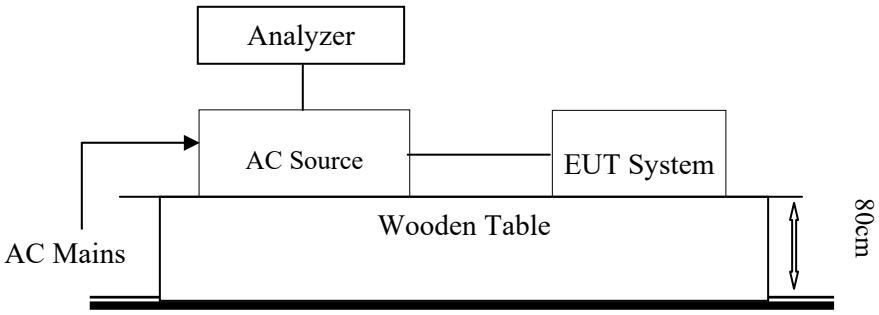


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.431814	---	25.98	66.00	40.02	9.000	N	9.6
0.431814	33.04	---	79.00	45.96	9.000	N	9.6
0.481892	36.68	---	79.00	42.32	9.000	N	9.6
0.491602	---	33.30	66.00	32.70	9.000	N	9.6
0.973564	33.80	---	73.00	39.20	9.000	N	9.6
1.070335	---	26.12	60.00	33.88	9.000	N	9.6
1.415204	31.69	---	73.00	41.31	9.000	N	9.6
1.908898	---	24.49	60.00	35.51	9.000	N	9.6
3.081234	33.28	---	73.00	39.72	9.000	N	9.6
3.387504	---	24.70	60.00	35.30	9.000	N	9.6
3.993557	32.62	---	73.00	40.38	9.000	N	9.6
4.325306	---	24.18	60.00	35.82	9.000	N	9.6

5 - VOLTAGE FLUCTUATIONS AND FLICKER (AC MAINS INPUT PORT)

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 adelayed 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

Please refer to following tables:

Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurement)
Test Mode:	Operating(Adapter) Operating(POE)
Power Source:	AC 230V/50Hz
Test Result	PASS

Maximum Flicker results (Adapter)

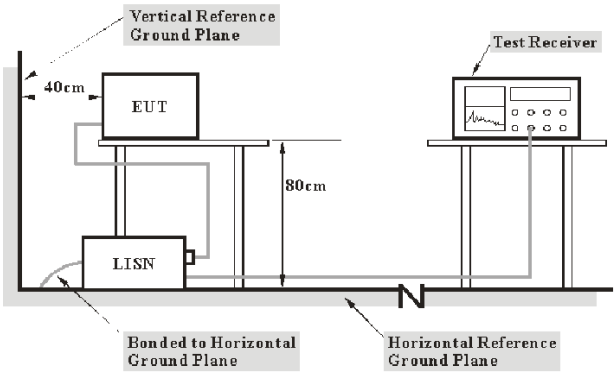
	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.017	3.30	PASS
dmax [%]	0.425	4.00	PASS
dt [s]	0.000	0.50	PASS

Maximum Flicker results (POE)

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.038	3.30	PASS
dmax [%]	0.451	4.00	PASS
dt [s]	0.000	0.50	PASS

6 - WIRED NETWORK PORTS

Test System 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 measurement procedures. The specification used was with the EN 301 489-1 limits.

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

The spacing between the peripherals was 10cm.

EMI Test Receiver Setup

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

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

During the conducted emissions test, the adapter was connected to the main outlet of the first LISNand the other support equipments were connected to the outlet of the second LISN.

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

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

Corrected Amplitude & Margin Calculation

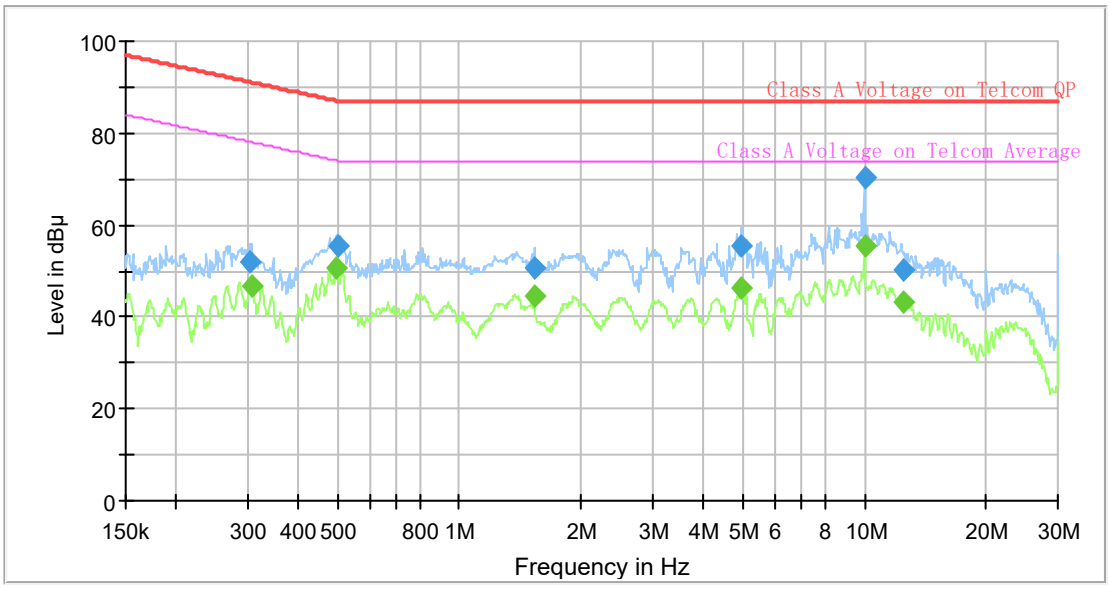
The basic equation is as follows: Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:
Corr. = Cable loss + Factor of coupling device
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit -Result

Test Data

Please refer to following table and plots:

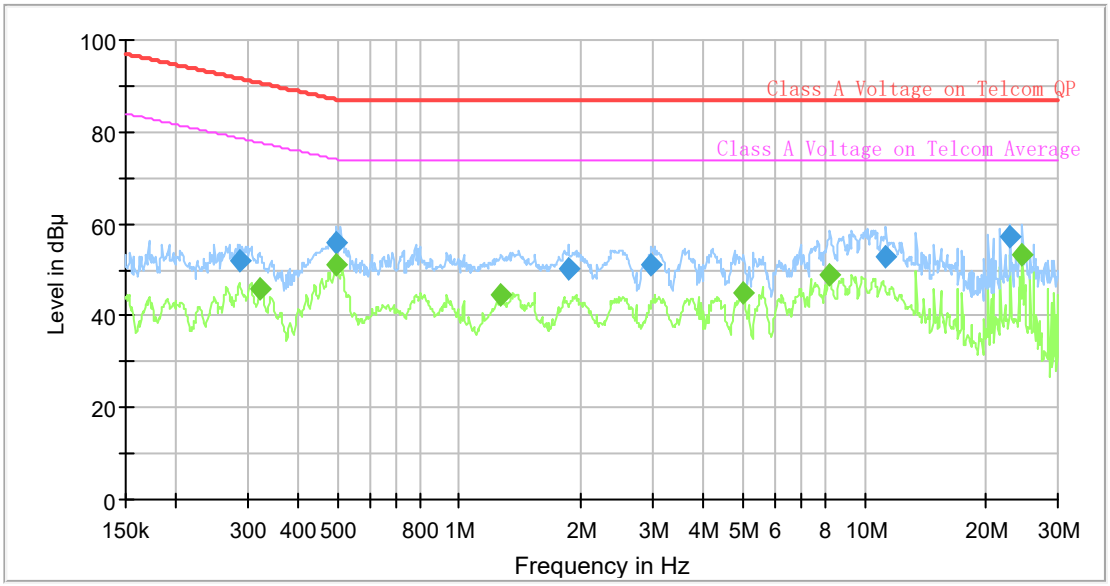
Port:	RJ45
Test Mode:	10Mbps
Power Source:	AC 230V/50Hz
Note:	Operating



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.304559	52.10	---	91.12	39.02	9.000	Line 1	9.9
0.306082	---	46.83	78.08	31.25	9.000	Line 1	9.9
0.494060	---	50.71	74.10	23.39	9.000	Line 1	9.8
0.501508	55.43	---	87.00	31.57	9.000	Line 1	9.8
1.532767	---	44.54	74.00	29.46	9.000	Line 1	9.6
1.532767	50.71	---	87.00	36.29	9.000	Line 1	9.6
4.948807	---	46.23	74.00	27.77	9.000	Line 1	9.6
4.973551	55.35	---	87.00	31.65	9.000	Line 1	9.6
9.998049	70.44	---	87.00	16.56	9.000	Line 1	9.6
9.998049	---	55.63	74.00	18.37	9.000	Line 1	9.6
12.451509	---	43.24	74.00	30.76	9.000	Line 1	9.6
12.513766	50.38	---	87.00	36.62	9.000	Line 1	9.6

Port:	RJ45
Test Mode:	100Mbps
Power Source:	AC 230V/50Hz
Note:	Operating

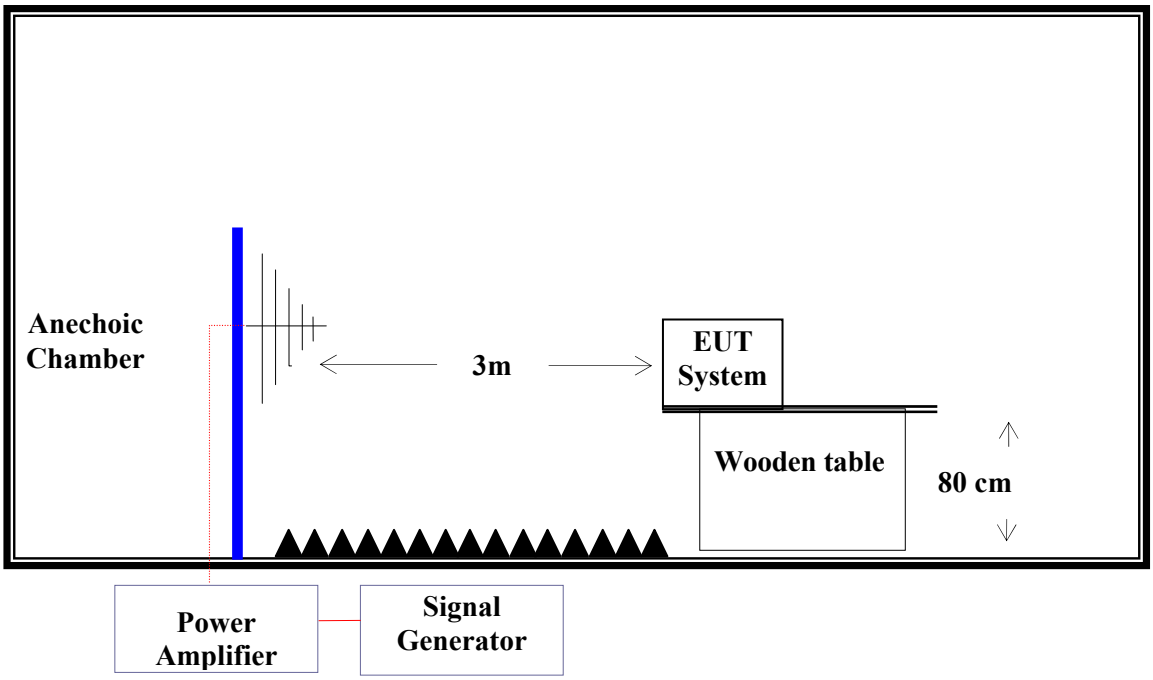


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.286866	52.12	---	91.61	39.49	9.000	Line 1	9.9
0.323344	---	45.89	77.62	31.73	9.000	Line 1	9.9
0.496531	---	51.17	74.06	22.89	9.000	Line 1	9.8
0.496531	56.02	---	87.06	31.04	9.000	Line 1	9.8
1.268136	---	44.44	74.00	29.56	9.000	Line 1	9.7
1.861883	50.13	---	87.00	36.87	9.000	Line 1	9.6
2.975516	50.99	---	87.00	36.01	9.000	Line 1	9.6
5.023411	---	44.89	74.00	29.11	9.000	Line 1	9.6
8.230739	---	49.02	74.00	24.98	9.000	Line 1	9.6
11.269399	52.88	---	87.00	34.12	9.000	Line 1	9.6
22.881343	57.08	---	87.00	29.92	9.000	Line 1	9.7
24.536148	---	53.39	74.00	20.61	9.000	Line 1	9.8

7 - RADIO FREQUENCY ELECTROMAGNETIC FIELDS (80 MHZ TO 6 000 MHZ)

Test System Setup



Test Level

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

Performance Criterion: A

General Performance Criteria:

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacture as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

D. The apparatus is broken, cannot be normal operated.

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 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 antenna and measured individually.

In order to judge the EUT performance, a CCD camera, Smartphone and Laptop were used to monitor the EUT.

Test Data

Please refer to following tables:

Test Mode: **Operating(Adapter)**
Operating(POE)

Note:

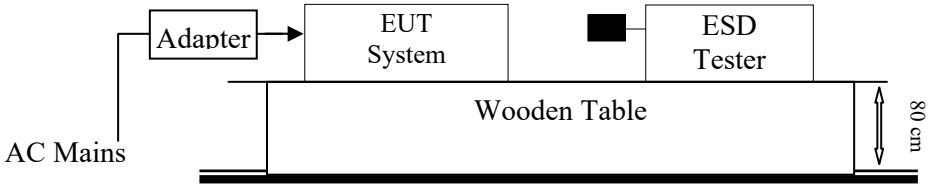
Condition of Test	Remarks
Field Strength	3 V/m (Test Level 2)
RF Signal	1 kHz, 80% AM, sine wave
Sweep Frequency Step	1%, logarithmic
Dwell Time	1 Sec

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

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

8 - ELECTROSTATIC DISCHARGES

Test System Setup



Remark: ■ is the tip of the electrode

EN61000-4-2 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 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

Test Level 3 for Air Discharge at ±8 kV
Test Level 2 for Direct Discharge at ±4 kV

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 X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Please refer to following tables:

Test Mode: **Operating(Adapter)**
Operating(POE)

Note:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Non-metallic Shell	A	A	A	A	A	A	/	/
DC Port	A	A	A	A	A	A	/	/
DC Cable	A	A	A	A	A	A	/	/
RJ45 Port	A	A	A	A	A	A	/	/
POE Port	A	A	A	A	A	A	/	/
Button	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
/	/	/	/	/	/	/	/	/

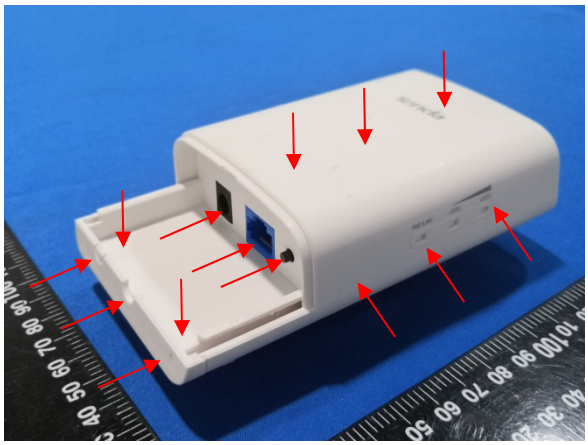
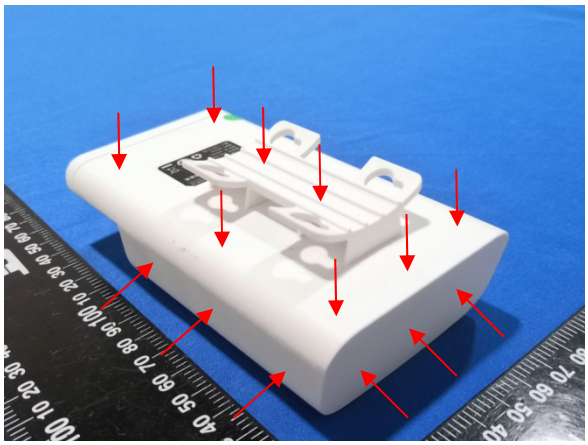
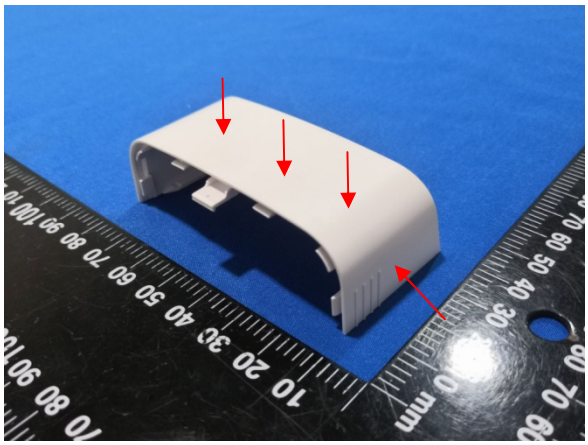
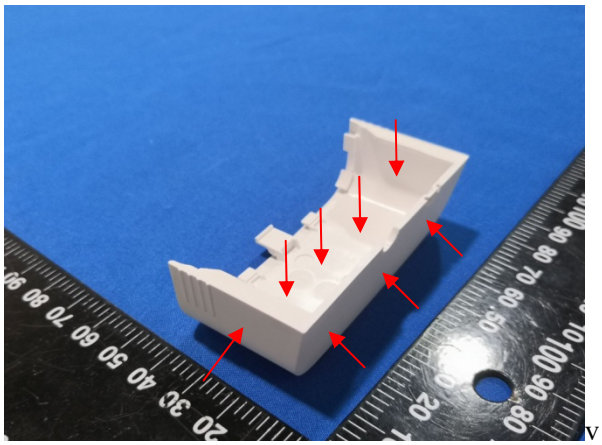
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

Test Points Location	Test Level							
	-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)

Test Points Location	Test Level							
	-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	/	/	/	/

ESD Location Photo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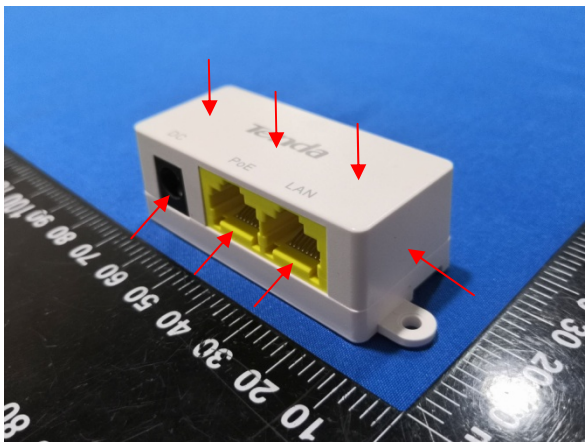
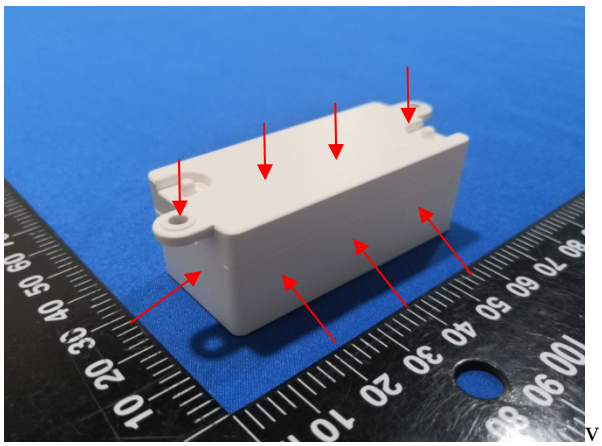
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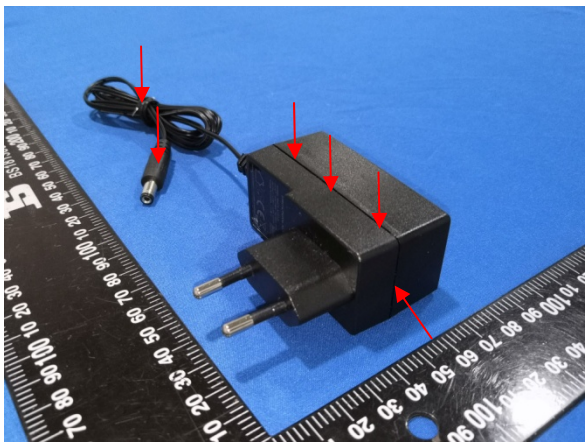
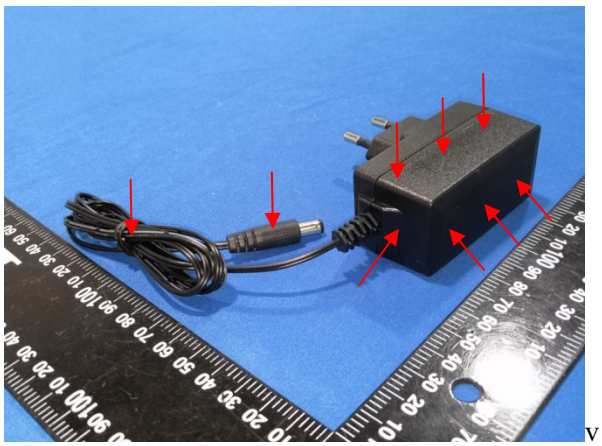
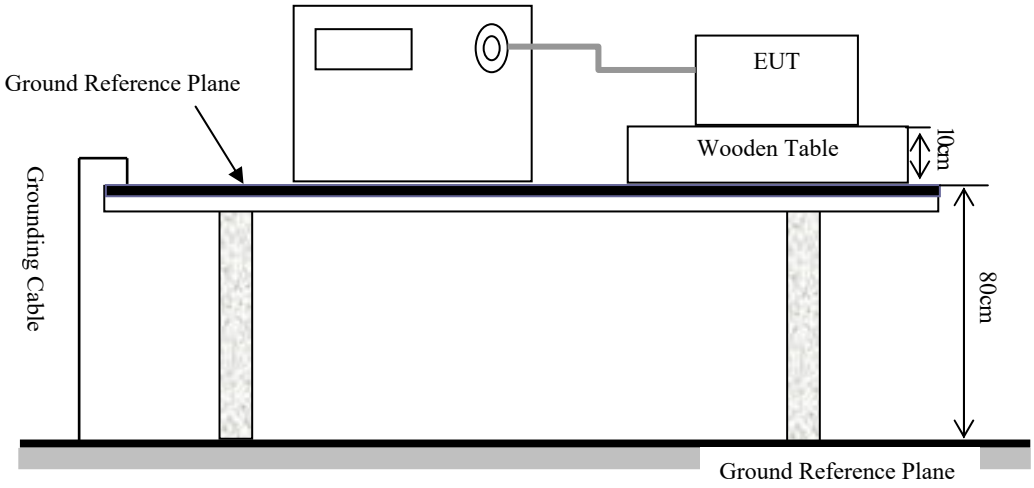


V

Air Discharge: → Direct Contact: →

9 - FAST TRANSIENTS, COMMON MODE

Test System Setup



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

Please refer to following tables:

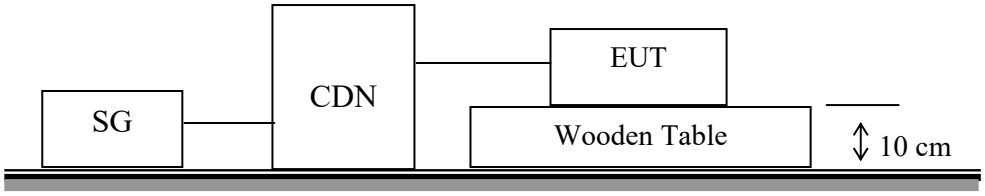
Test Mode: **Operating(Adapter)**
Operating(POE)

Note:

Test Points		Test Level (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC mains power input ports	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
	L+N	A	A	A	A	/	/	/	/
	L + Earth	/	/	/	/	/	/	/	/
	N + Earth	/	/	/	/	/	/	/	/
	L+N+Earth	/	/	/	/	/	/	/	/
Signal ports	RJ45	A	A	/	/	/	/	/	/

10 - RADIO FREQUENCY, COMMON MODE

Test System Setup



Test Level

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

Performance Criterion: A

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) Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s.
7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data

Please refer to following tables:

Test Mode: **Operating(Adapter)**
Operating(POE)

Note:

Table 1: ACmains power input port
Frequency range:150kHz to80MHz
■Modulated: Amplitude 80%, 1kHz sine wave □ Unmodulated □ Other:
Severity Level: 3V Unmodulated , r.m.s

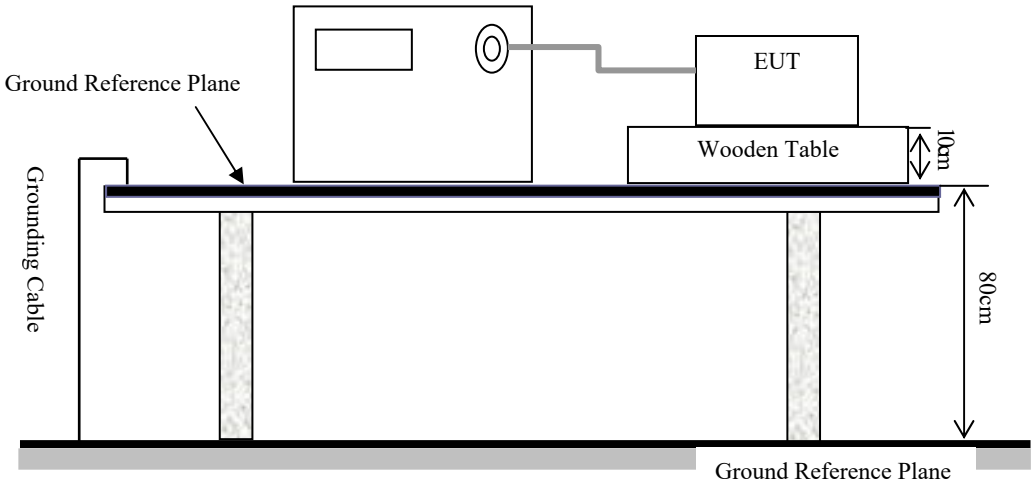
Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

Table 2: Signal Port : RJ45
Frequency range: 150 kHz to80MHz
■Modulated: Amplitude 80%, 1kHz sine wave □Unmodulated □ Other:
Severity Level: 3 V Unmodulated , r.m.s

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

12 - VOLTAGE DIPS AND SHORT INTERRUPTIONS

Test System Setup



Test Level and Performance Criterion

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

Test Procedure

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

Test Data

Please refer to following tables:

Test Mode: **Operating(Adapter)**
Operating(POE)

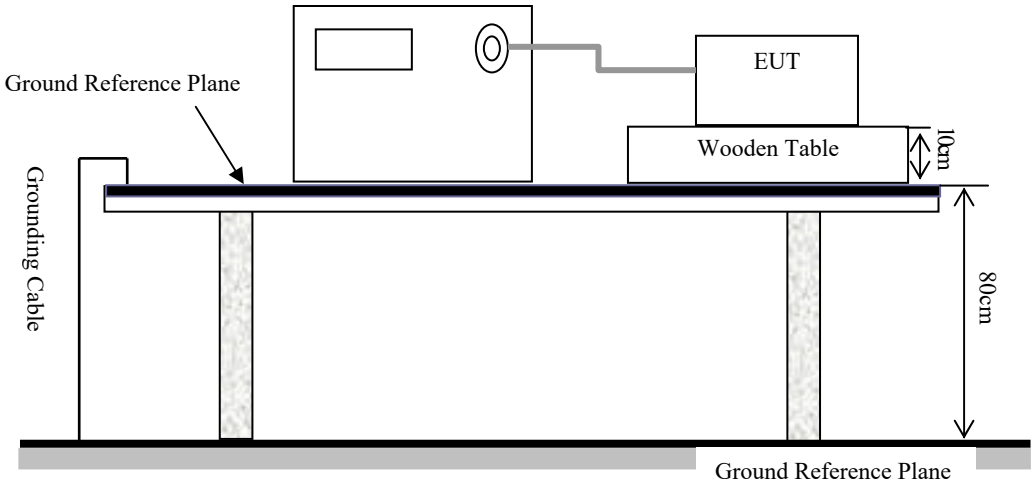
Note: B indicates that the power supply of the EUT was interrupted during the test, and the EUT was restarted. After the test, it can automatically return to normal use.

Table 1: Voltage Dips/Interruptions Test

U2 (% Reduction)	Td (Periods)	Phase Angle	N	Result
100	0.5	0/90/180/270	3	A
100	1	0/90/180/270	3	A
30	25	0/90/180/270	3	A
100	250	0/90/180/270	3	B

13 - SURGES

Test System Setup



Test Level

Level	Open Circuit Output Test Voltage ±10%
1	0.5 kV
2	1 kV
3	2 kV
4	4 kV
X	Special

Performance Criterion: B

Test Procedure

1) For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
3) Different phase angles are done individually.
4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data

Please refer to following tables:

Test Mode: **Operating(Adapter)**
Operating(POE)

Note:

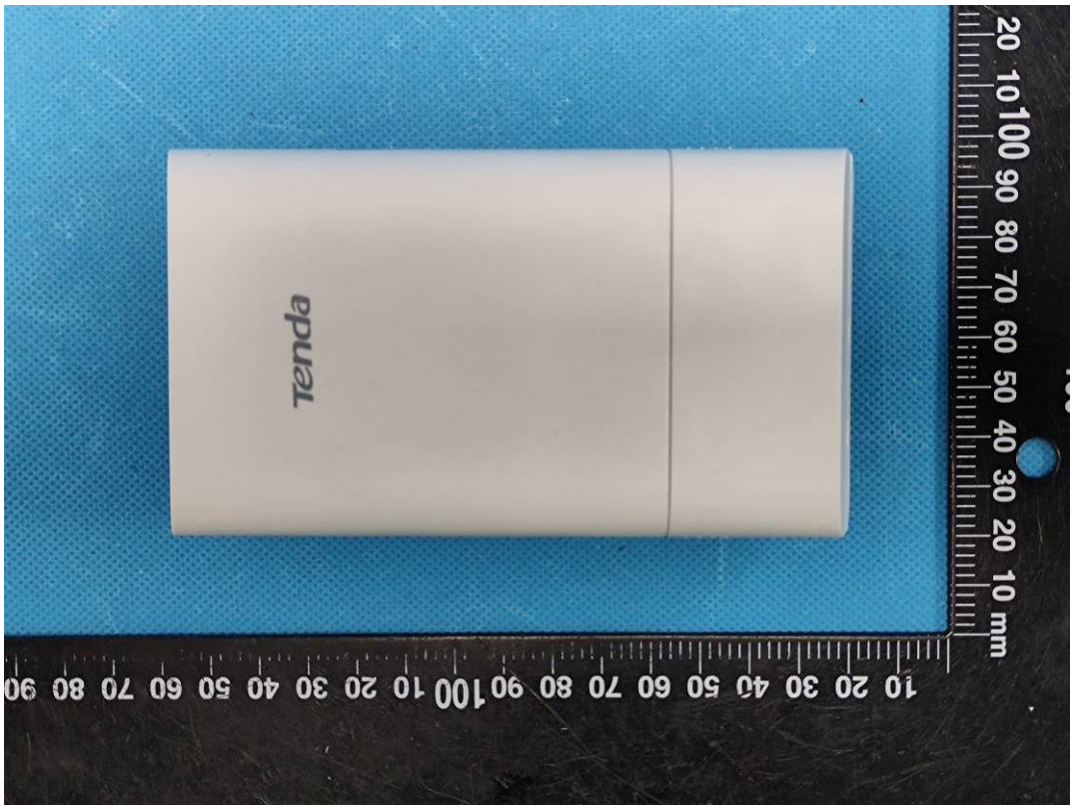
Table 1:AC mains power input port

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

Table 2: RJ45 I/O Circuit and Lines

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

EXHIBITA - EUT PHOTOGRAPHS

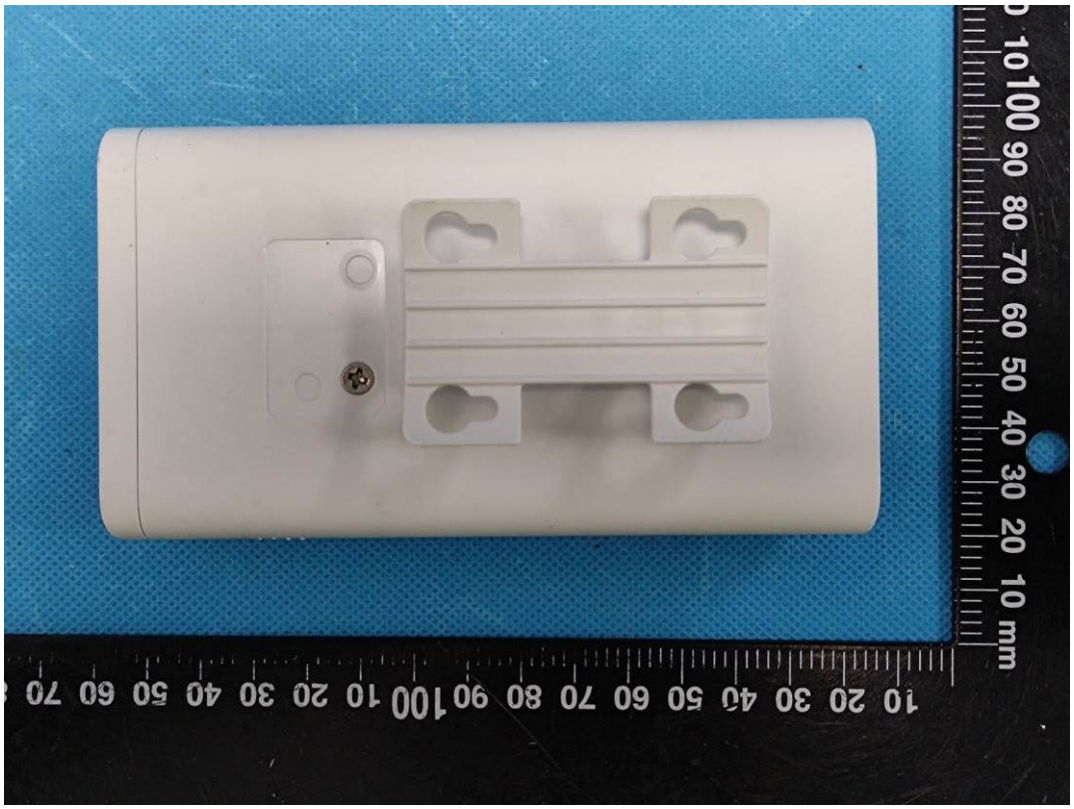



Tenda


Tenda

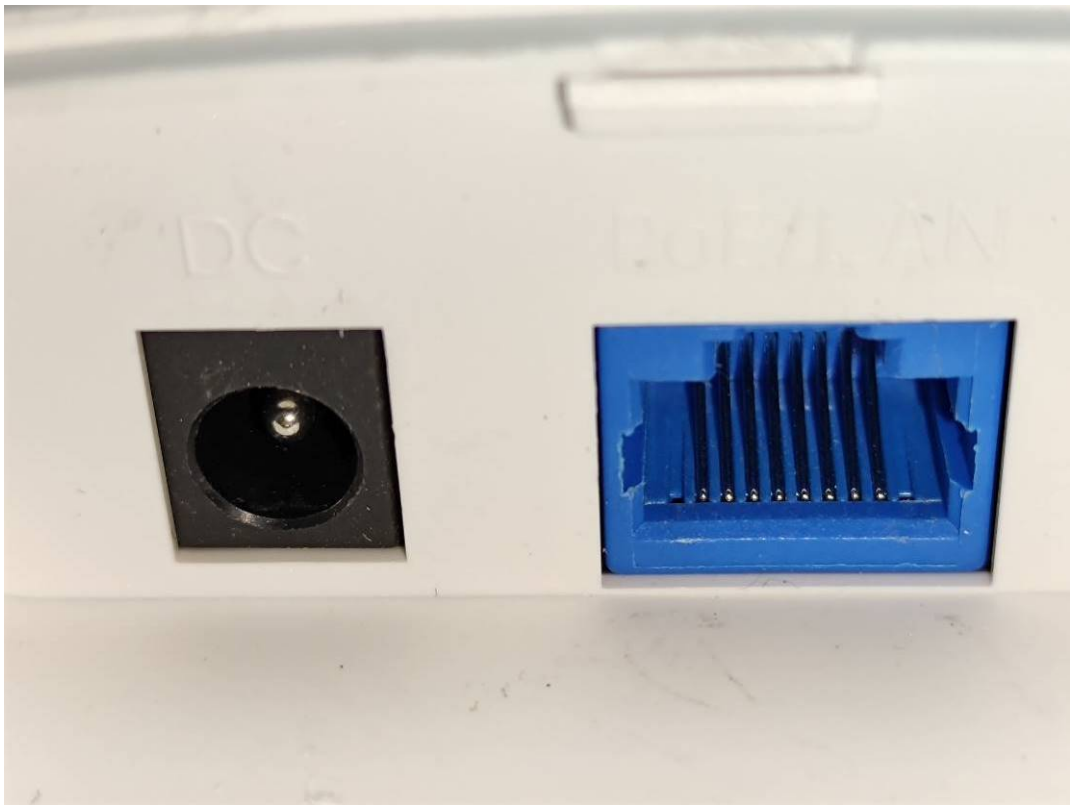

Tenda
PoE/LAN
LED1
LED2

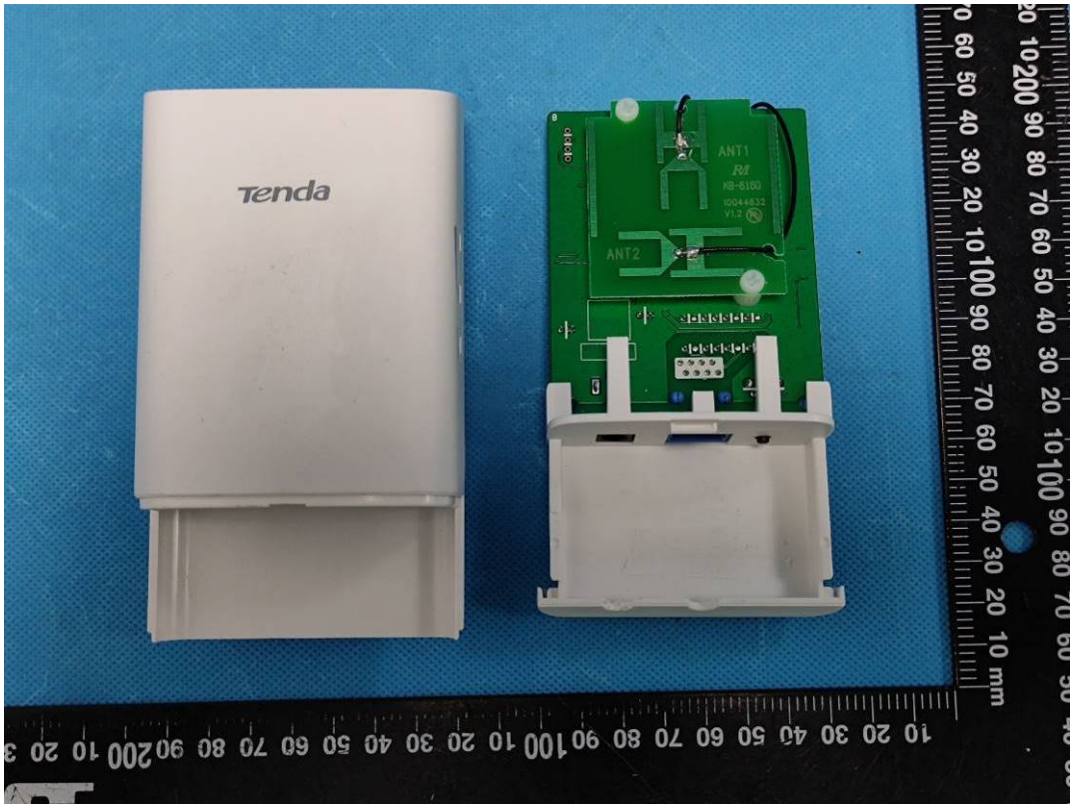

Tenda

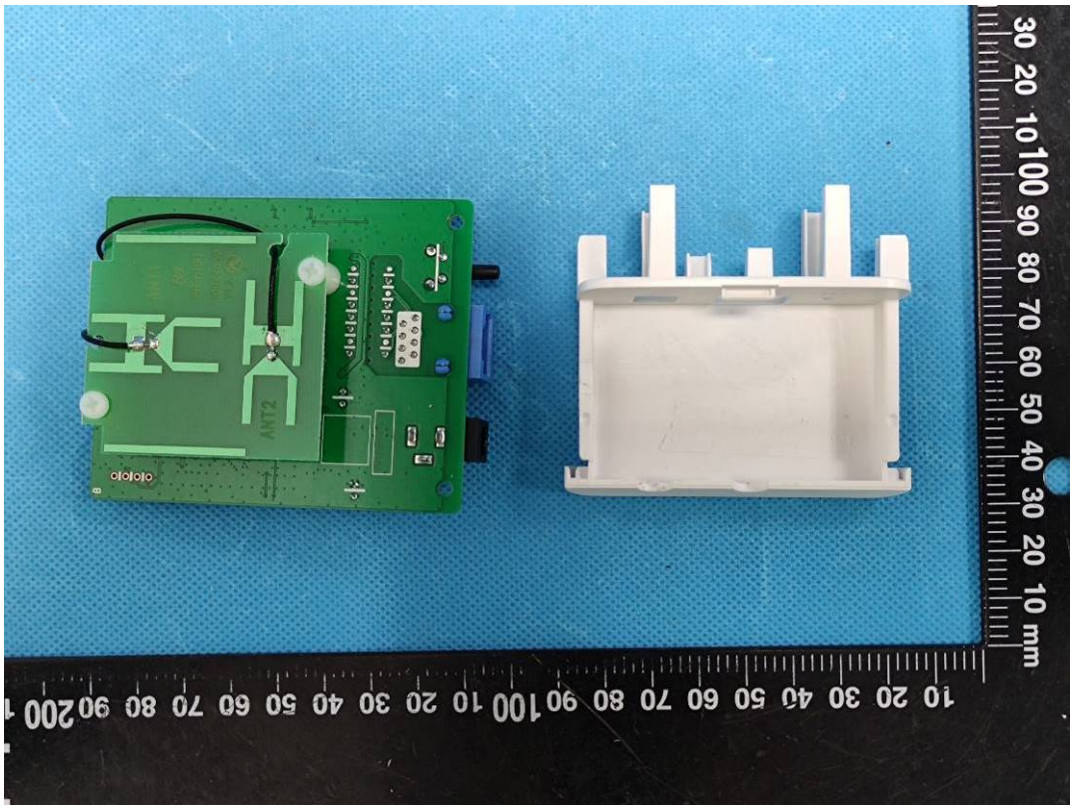



Tenda

Port



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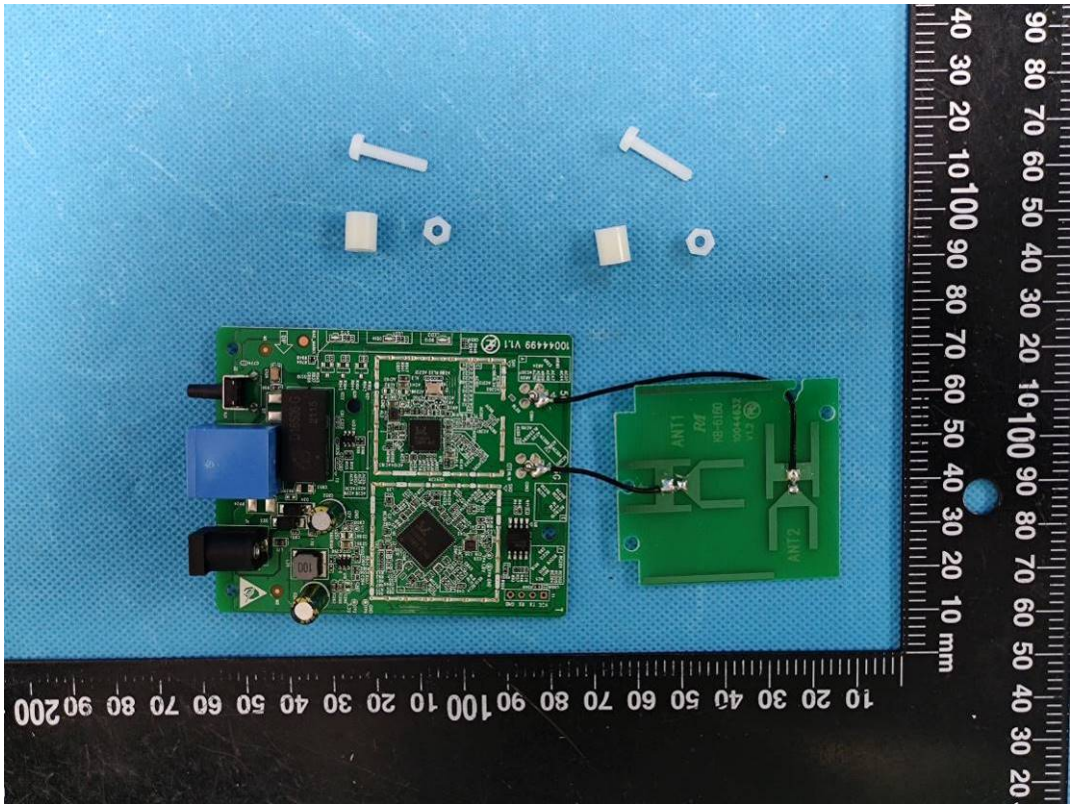
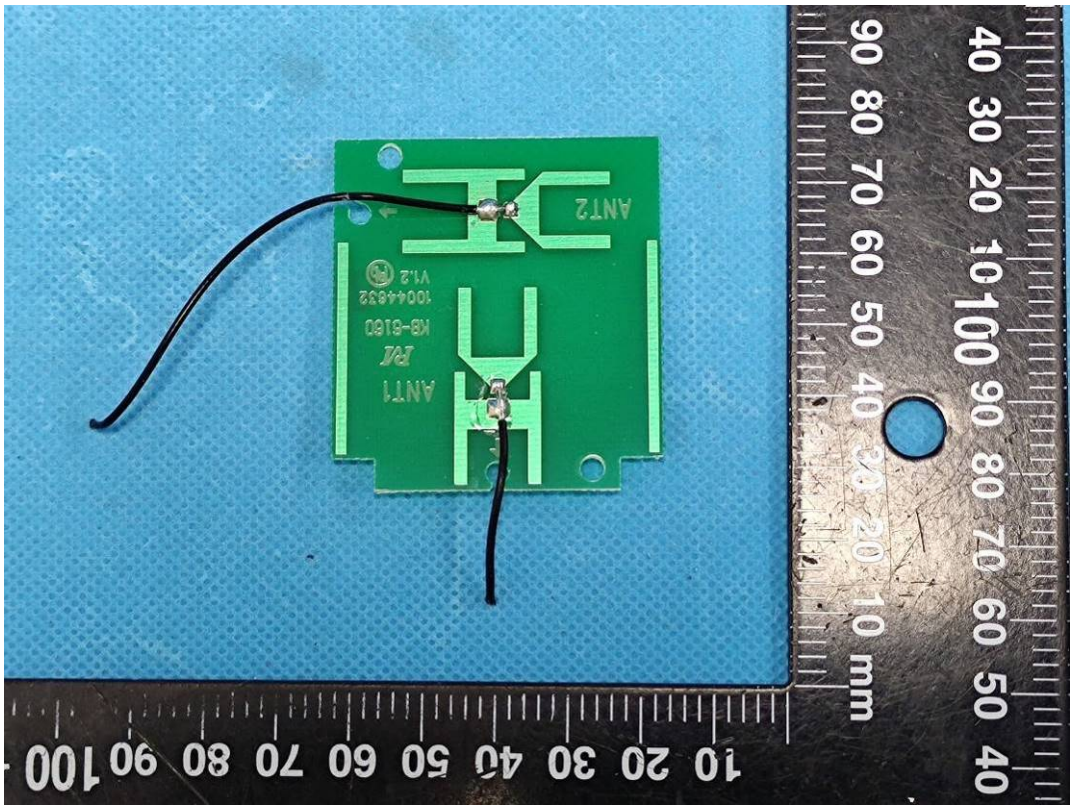
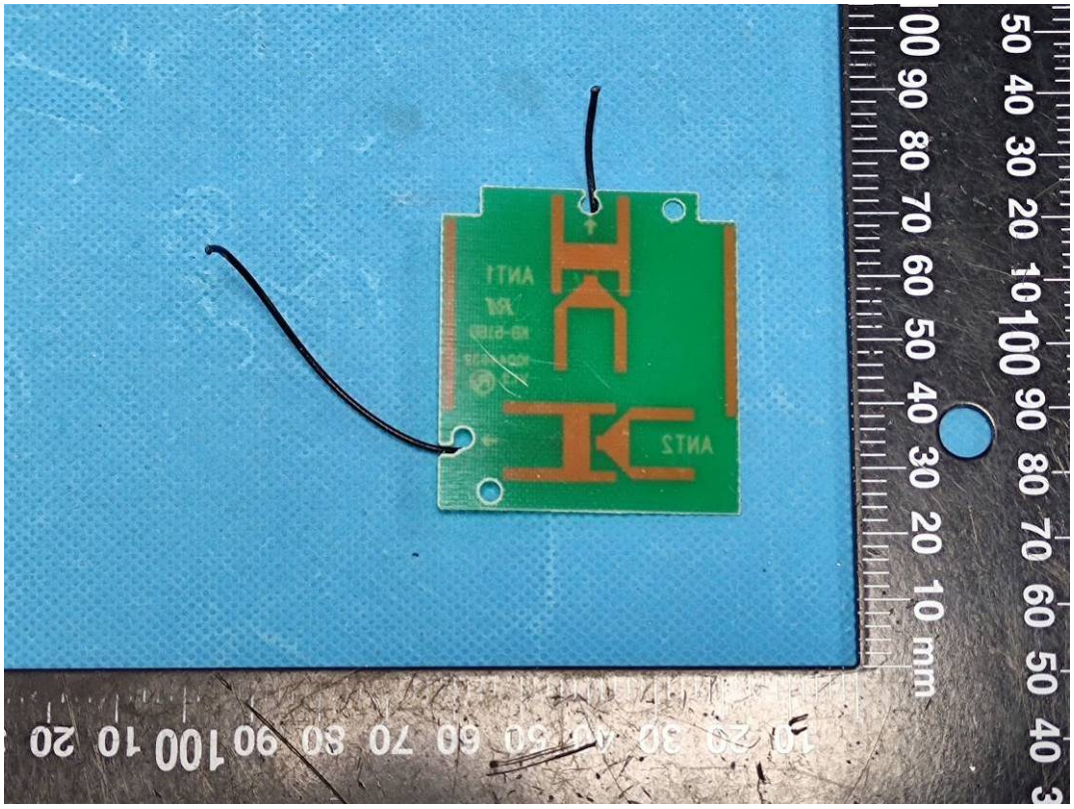
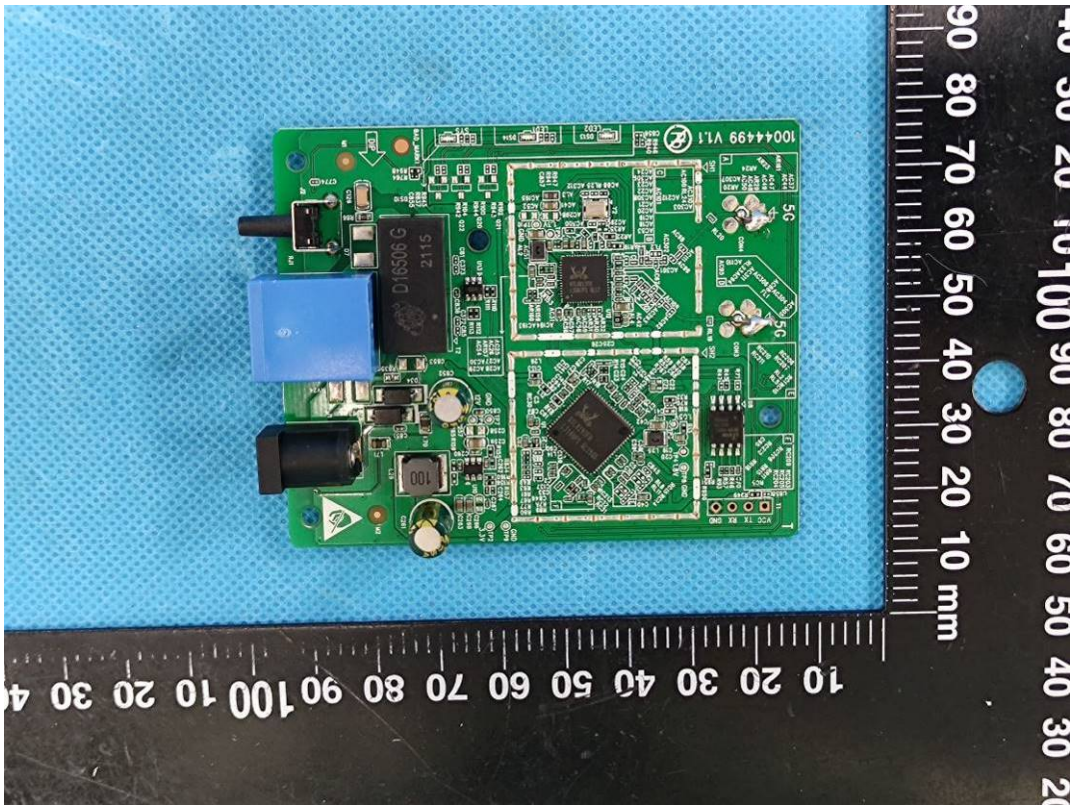

ANT1
ANT2

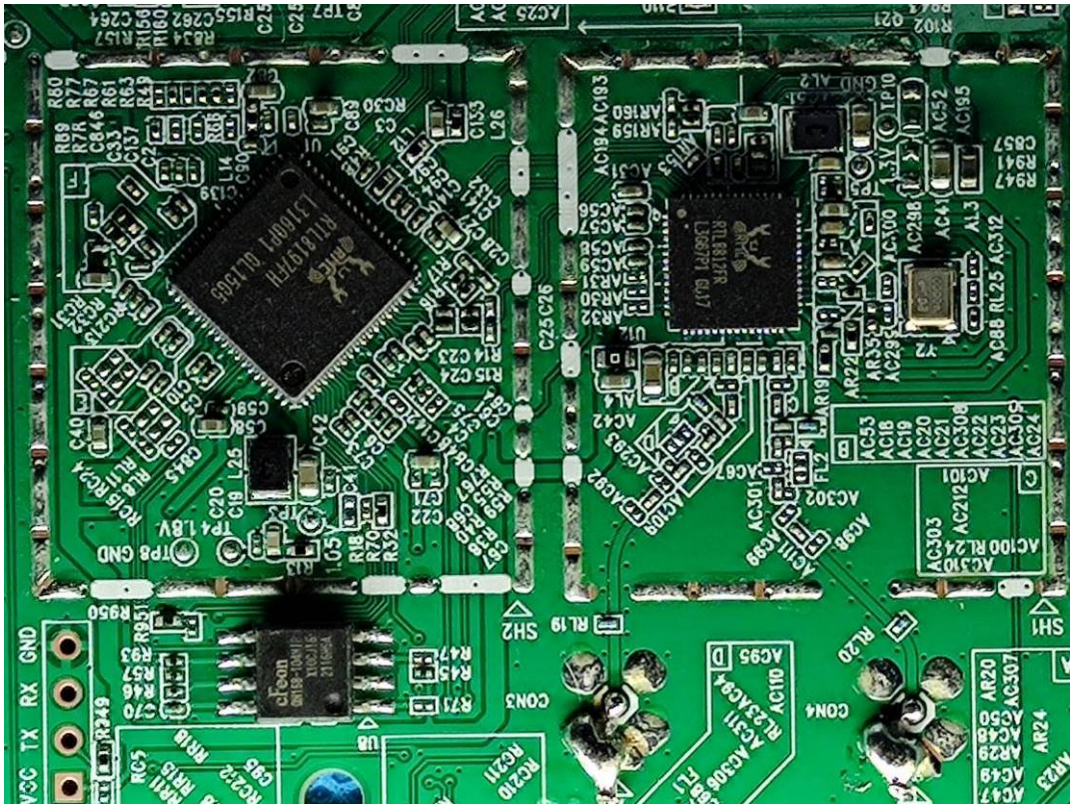
Antenna

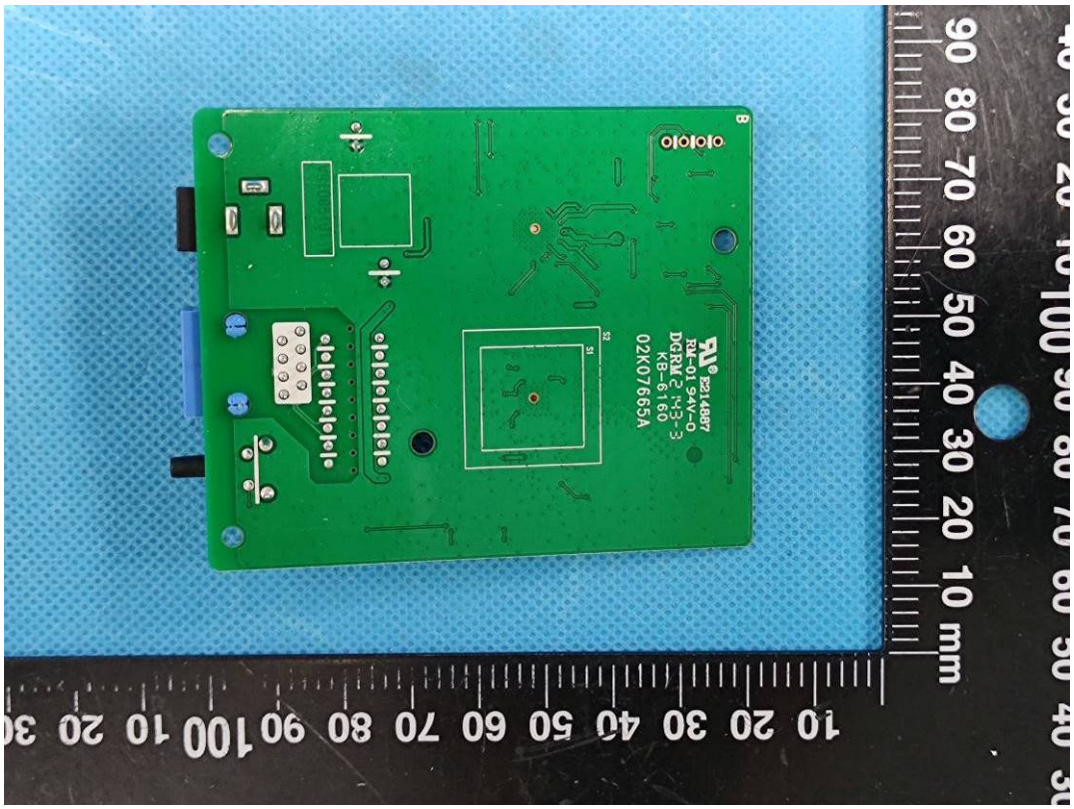






Chip1

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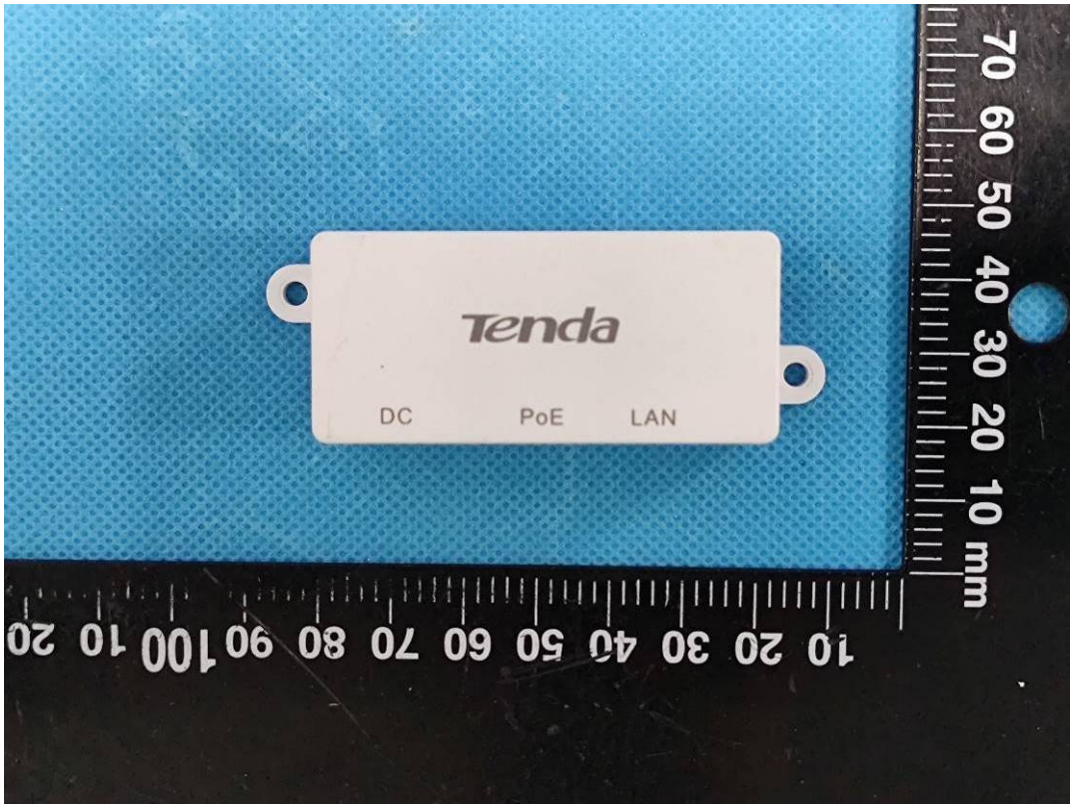
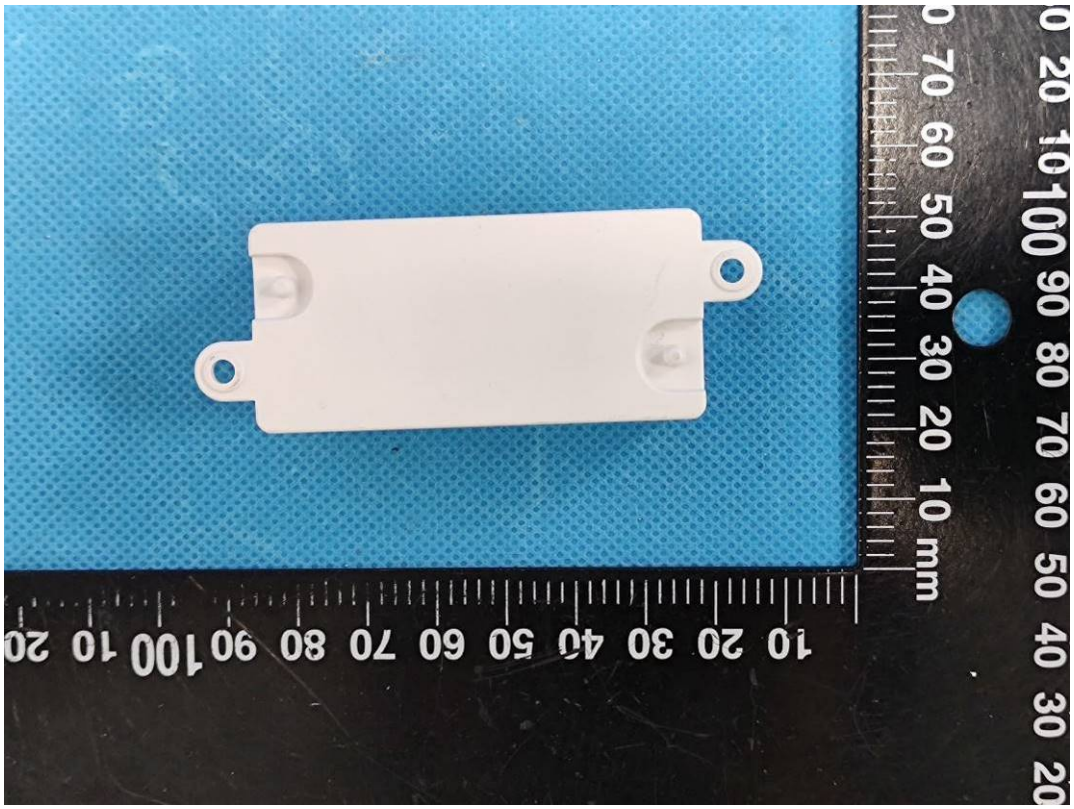
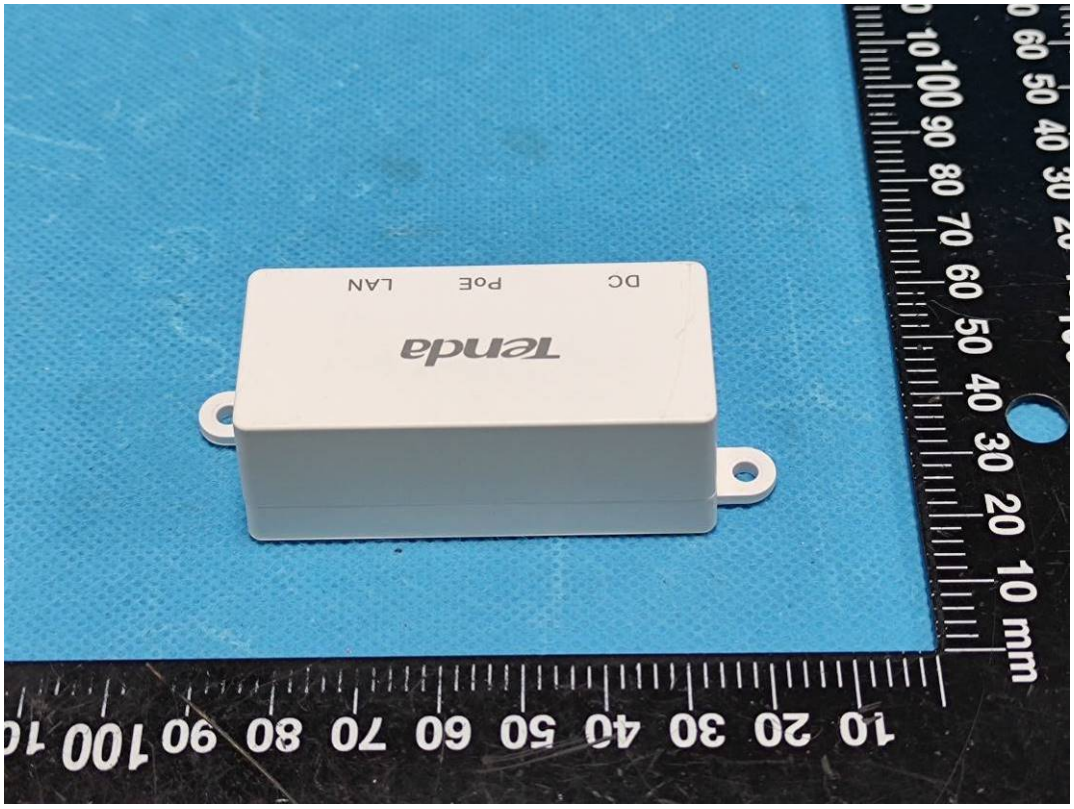
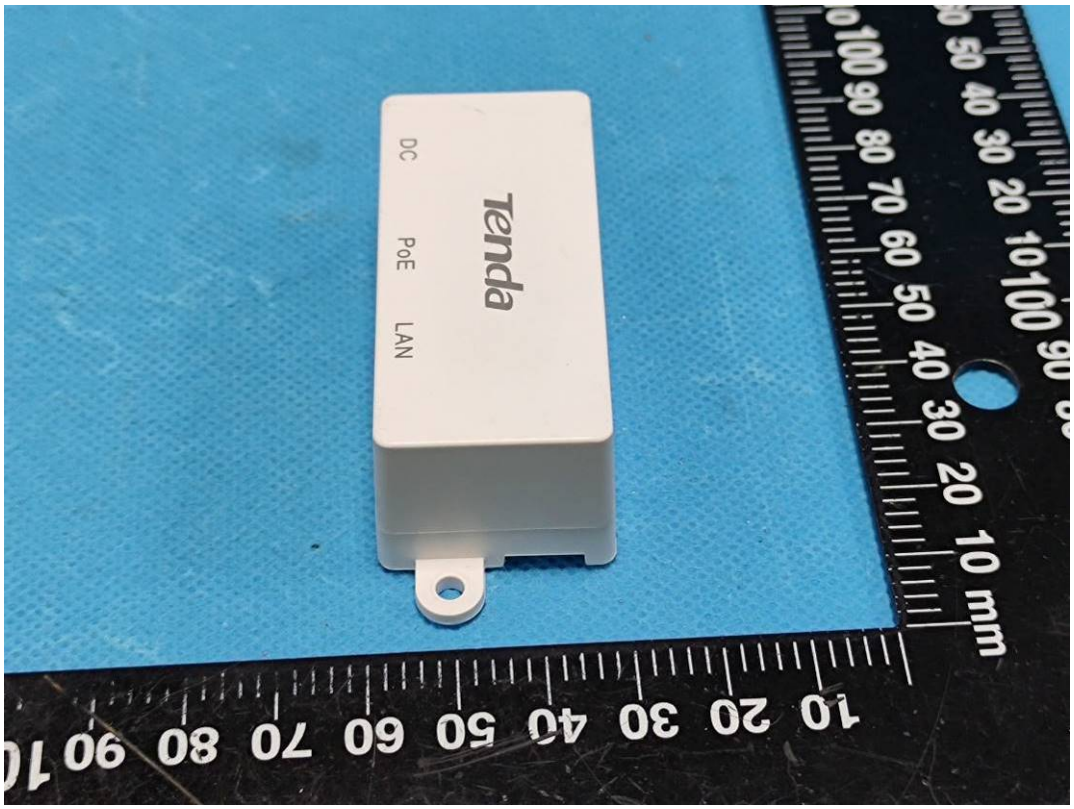
DGRM2 H3-3
KB-6160
02K07665A

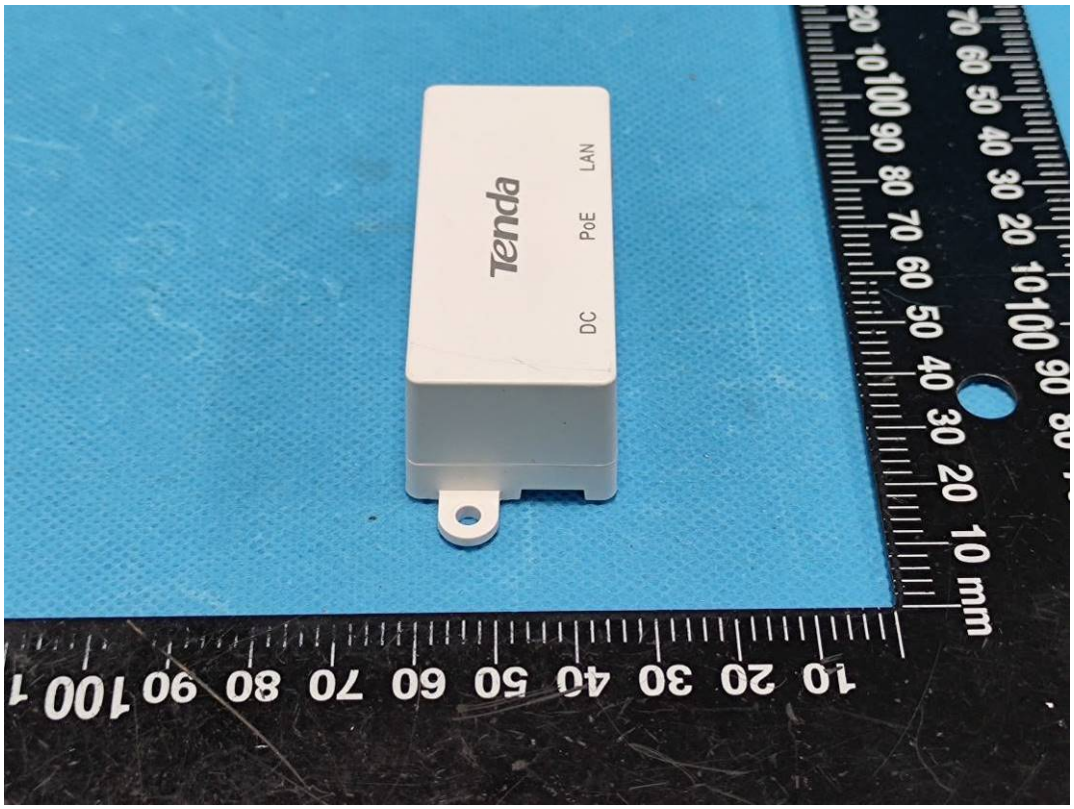

Tenda
DC
PoE
LAN



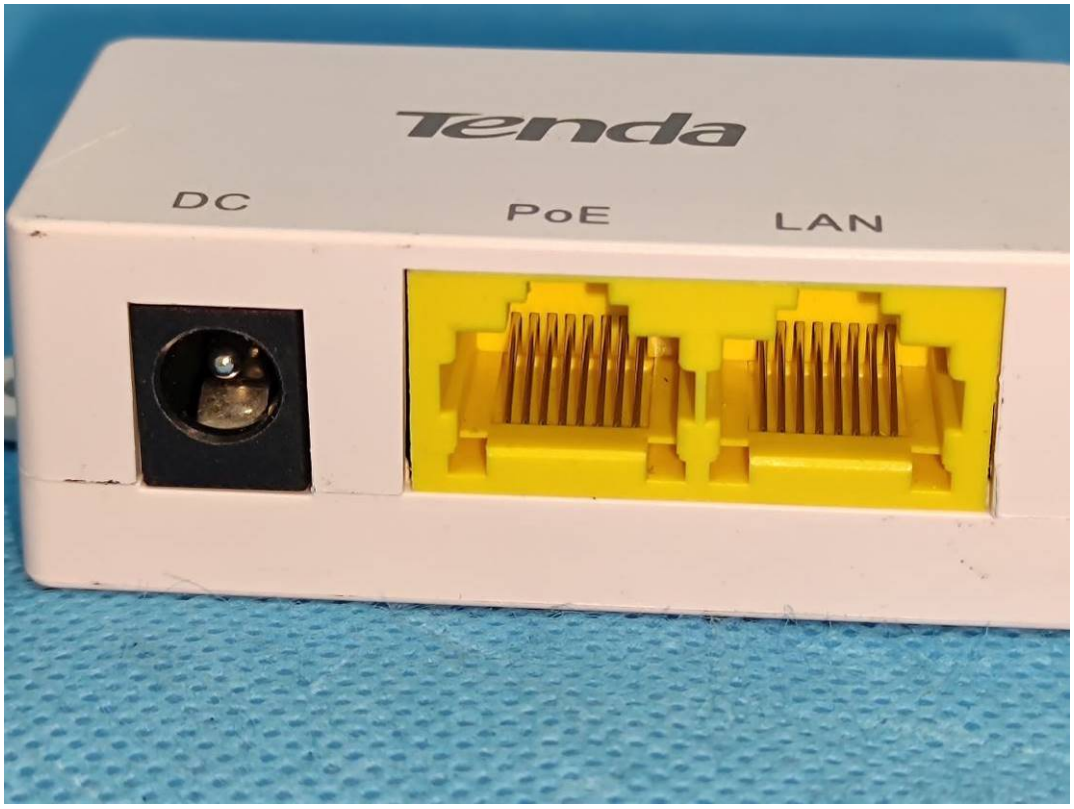

DC
PoE
LAN
Tenda


DC
PoE
LAN
Tenda

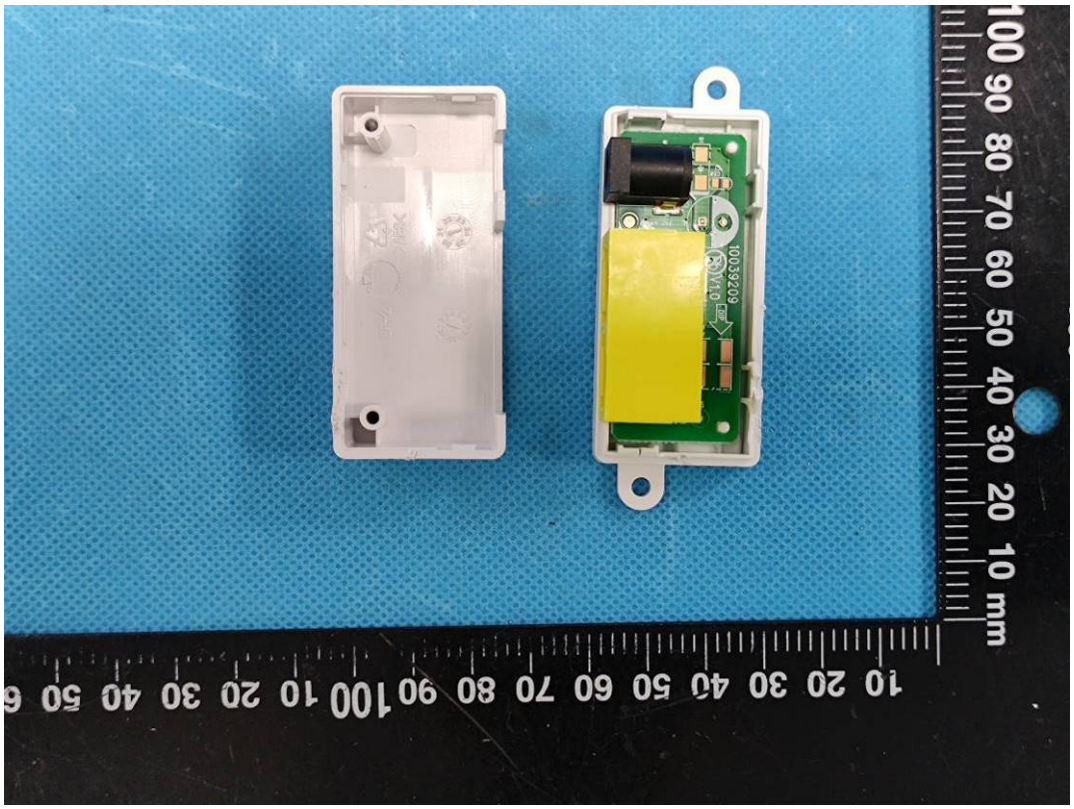

Tenda
DC
PoE
LAN

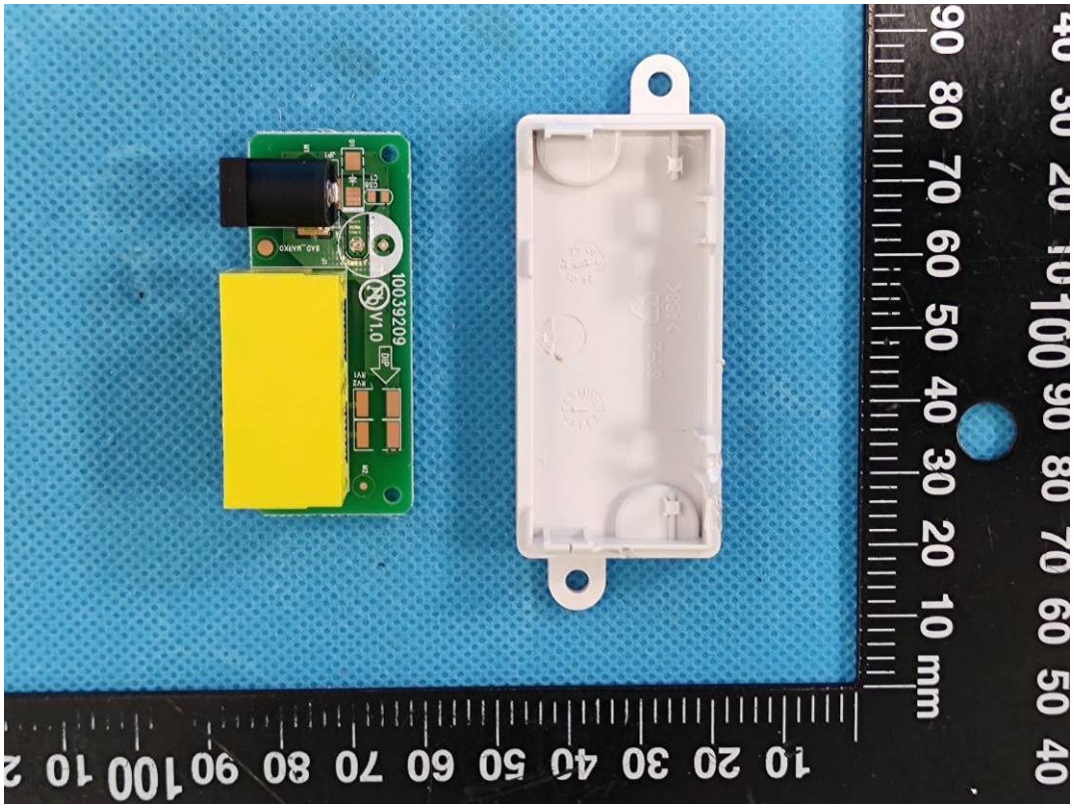


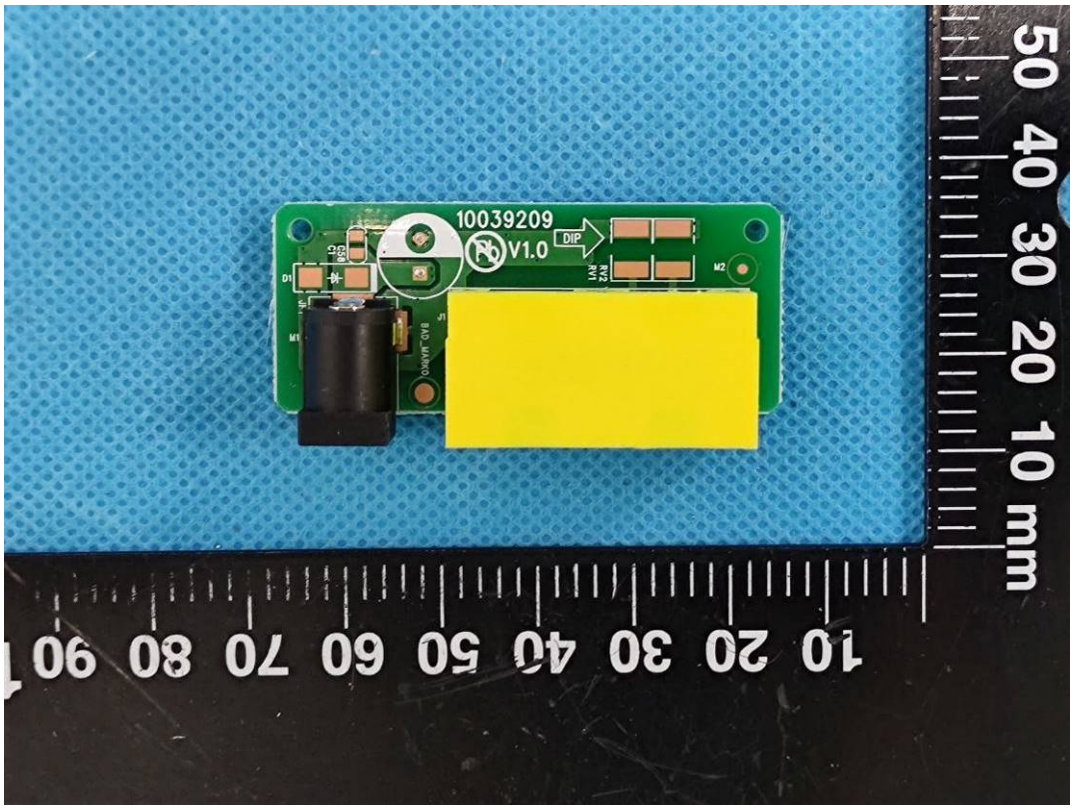
Port



Uncover



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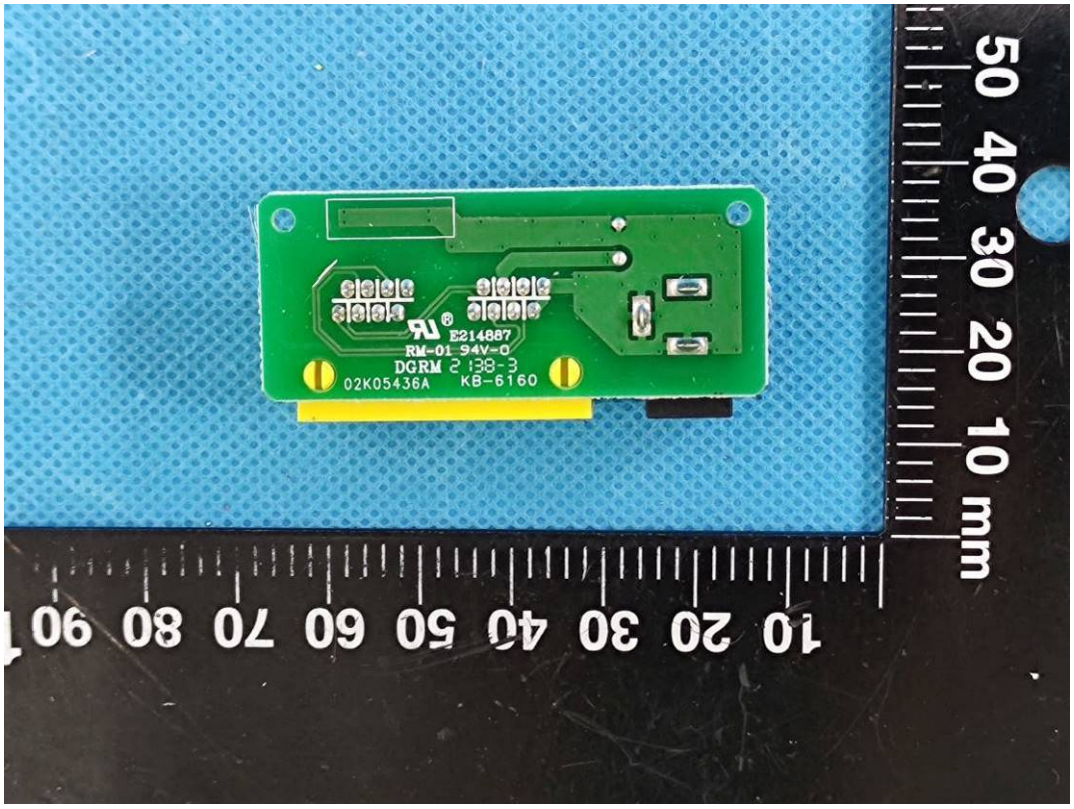
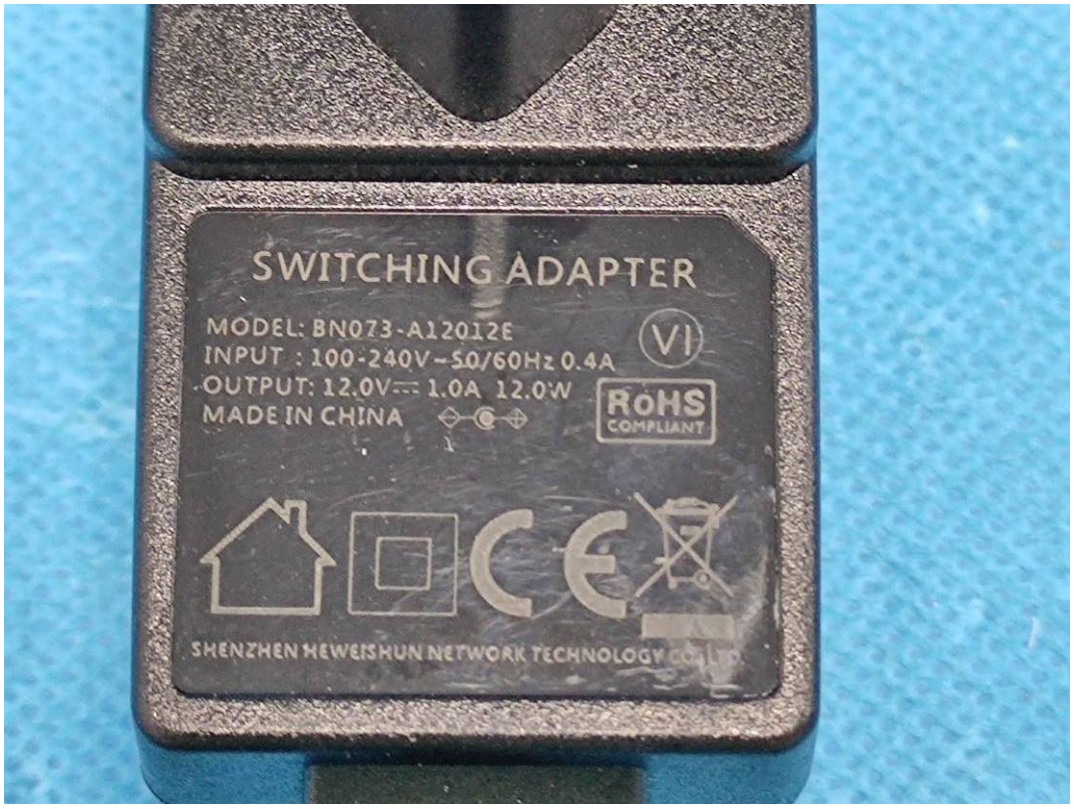
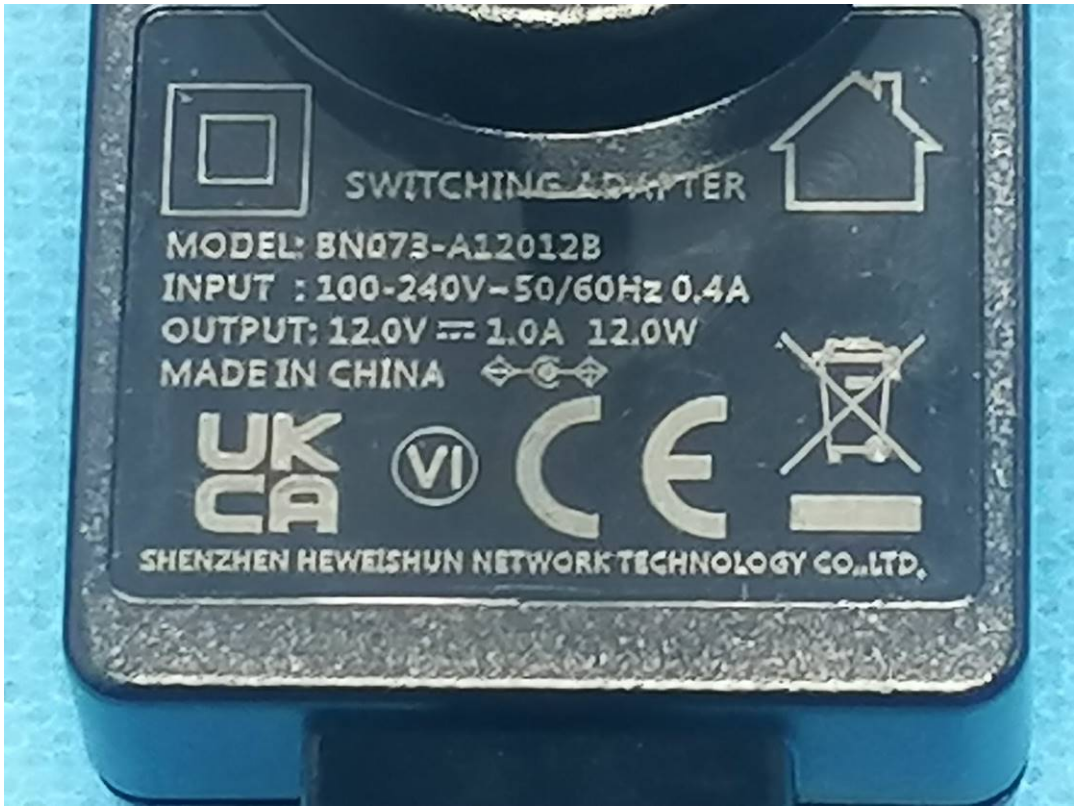
V1.0
DIP
RV2
RV1
M2
D1
BAD_MARK0
50 40 30 20 10 mm
10 20 30 40 50 60 70 80 90


E214887
RM-01 94V-0
DGRM 2138-3
02K05436A
KB-6160
50 40 30 20 10 mm
10 20 30 40 50 60 70 80 90


SWITCHING ADAPTER
mm


SWITCHING ADAPTER
MODEL: BN073-A12012E
INPUT : 100-240V~50/60Hz 0.4A
OUTPUT: 12.0V⎓ 1.0A 12.0W
MADE IN CHINA
VI
RoHS
COMPLIANT
SHENZHEN HEWEISHUN NETWORK TECHNOLOGY

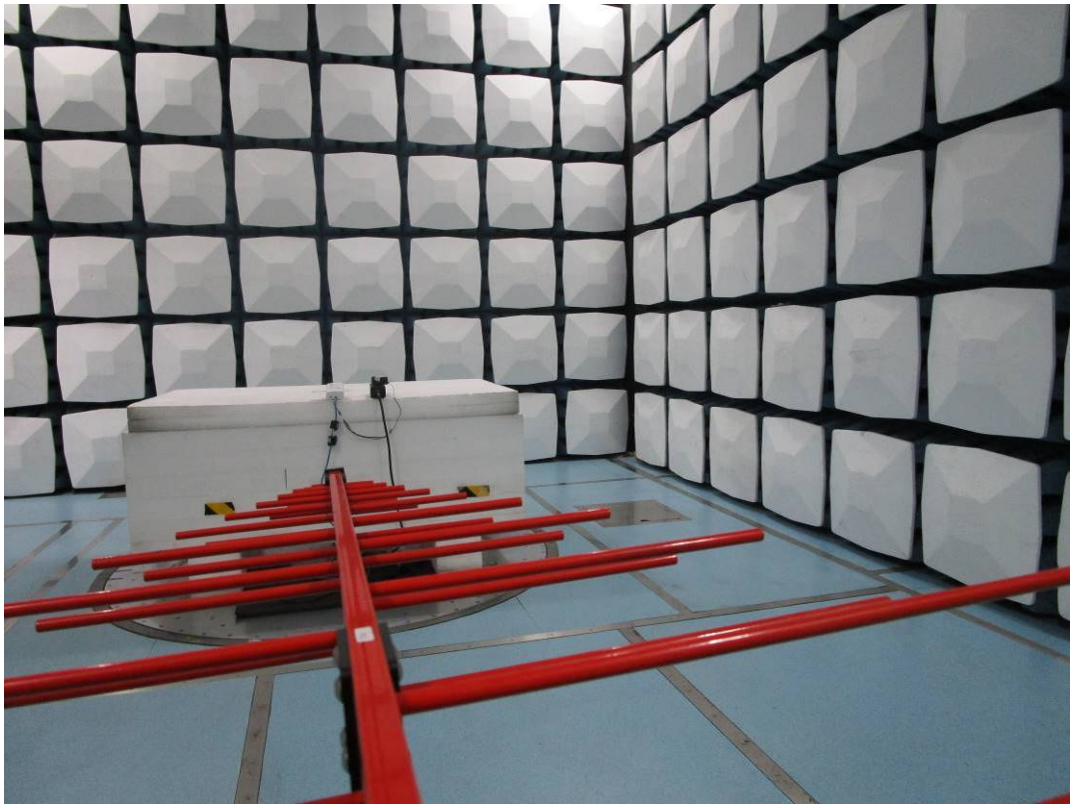

SWITCHING ADAPTER
MODEL: BN073-A12012B
INPUT : 100-240V~50/60Hz 0.4A
OUTPUT: 12.0V ⎓ 1.0A 12.0W
MADE IN CHINA
SHENZHEN HEWEISHUN NETWORK TECHNOLOGY CO.,LTD.

EXHIBITB - TEST SETUP PHOTOGRAPHS

RE

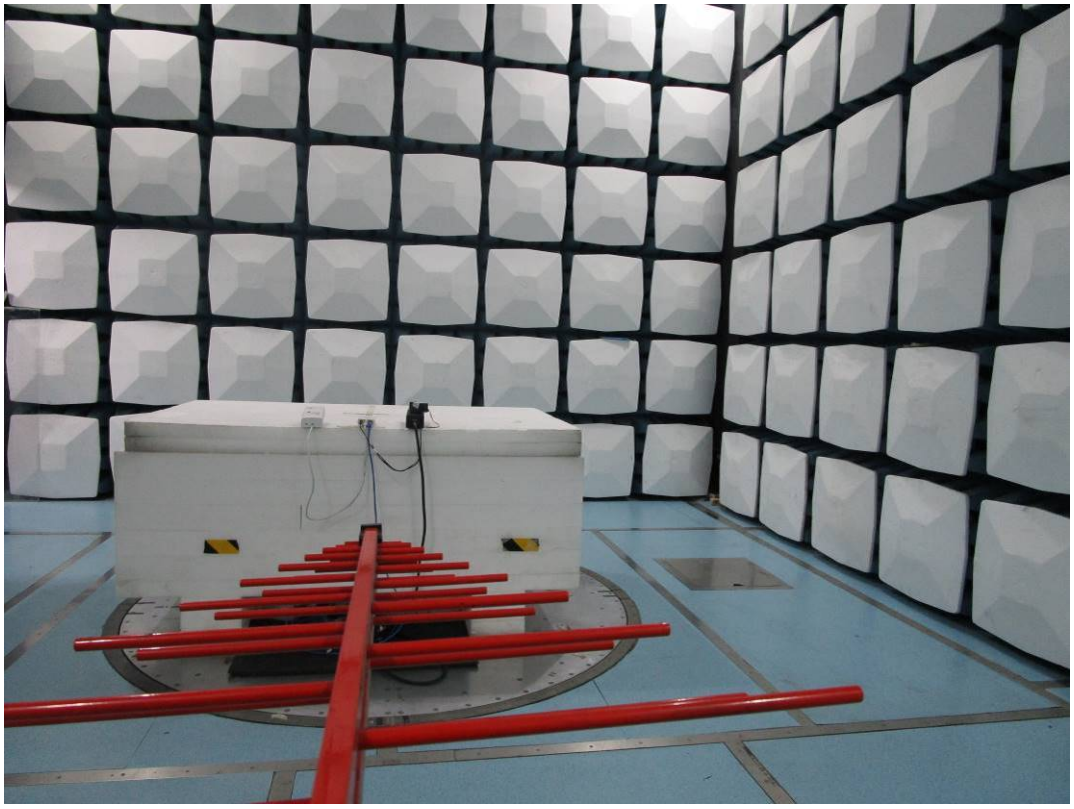
Radiated Emissions Below 1GHz front View- Adapter

Radiated Emissions Below 1GHz rear View-Adapter

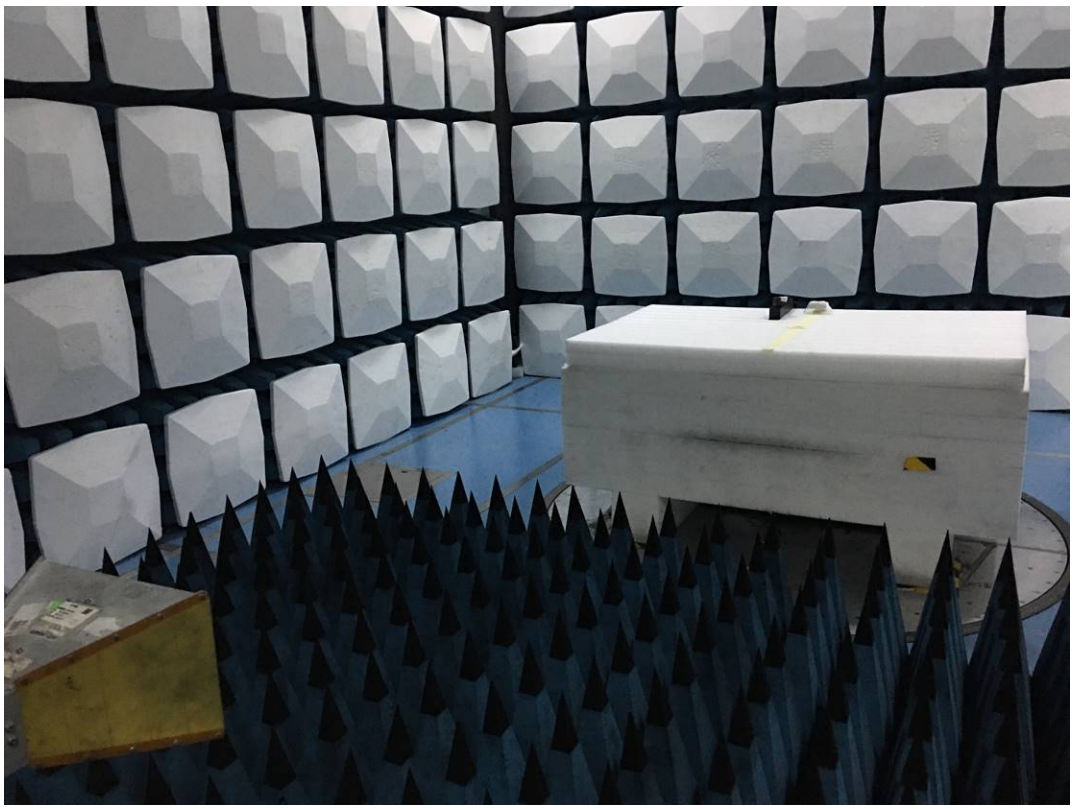


Radiated Emissions Below 1GHz front View- POE

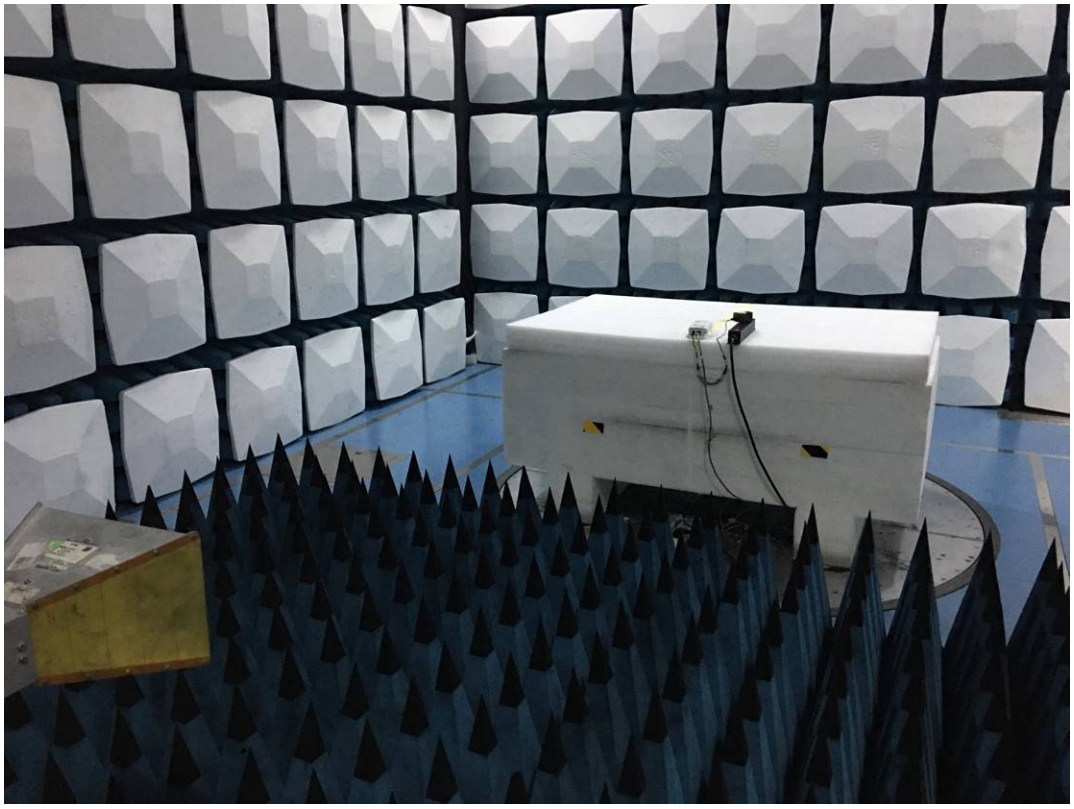
Radiated Emissions Below 1GHz rear View- POE



Radiated Emissions Above 1GHz front View-Adapter

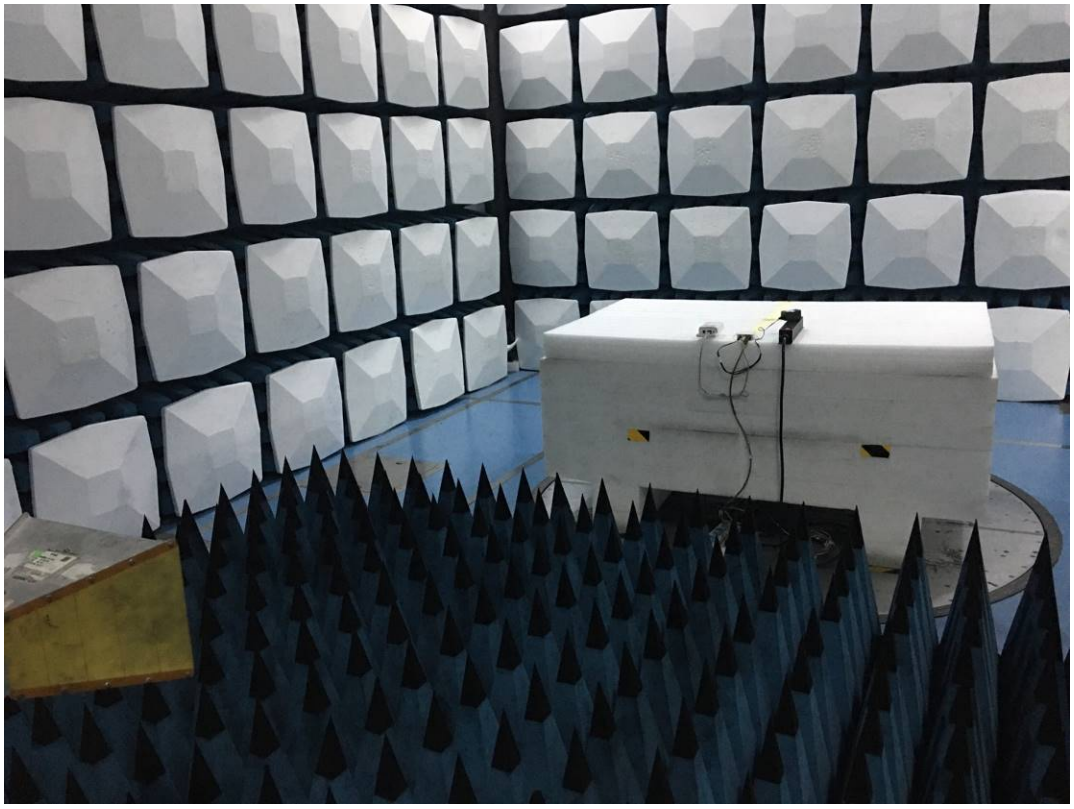


Radiated Emissions Above 1GHz rear View-Adapter



Radiated Emissions Above 1GHz front View- POE

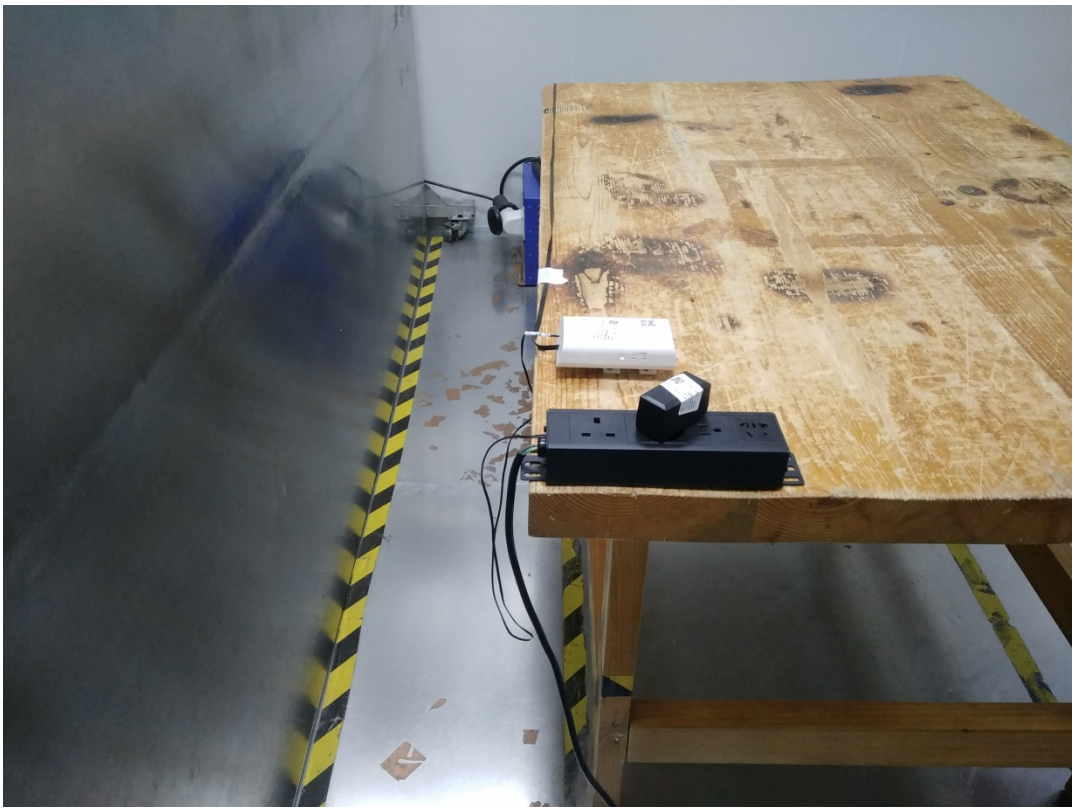
Radiated Emissions Above 1GHz rear View- POE



CE_AC

CE front View- Adapter

CE side View- Adapter



CE front View- POE

CE side View- POE

CE front View ISN- Adapter

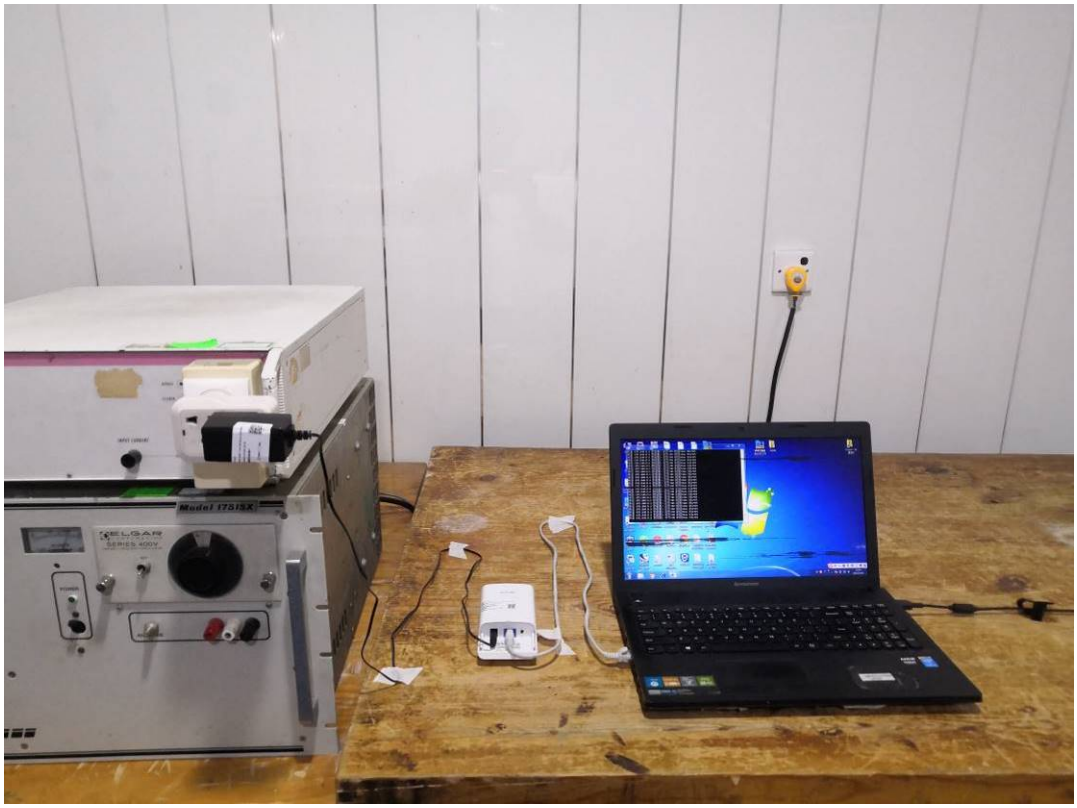
CE side View ISN - Adapter

CE front View ISN - POE

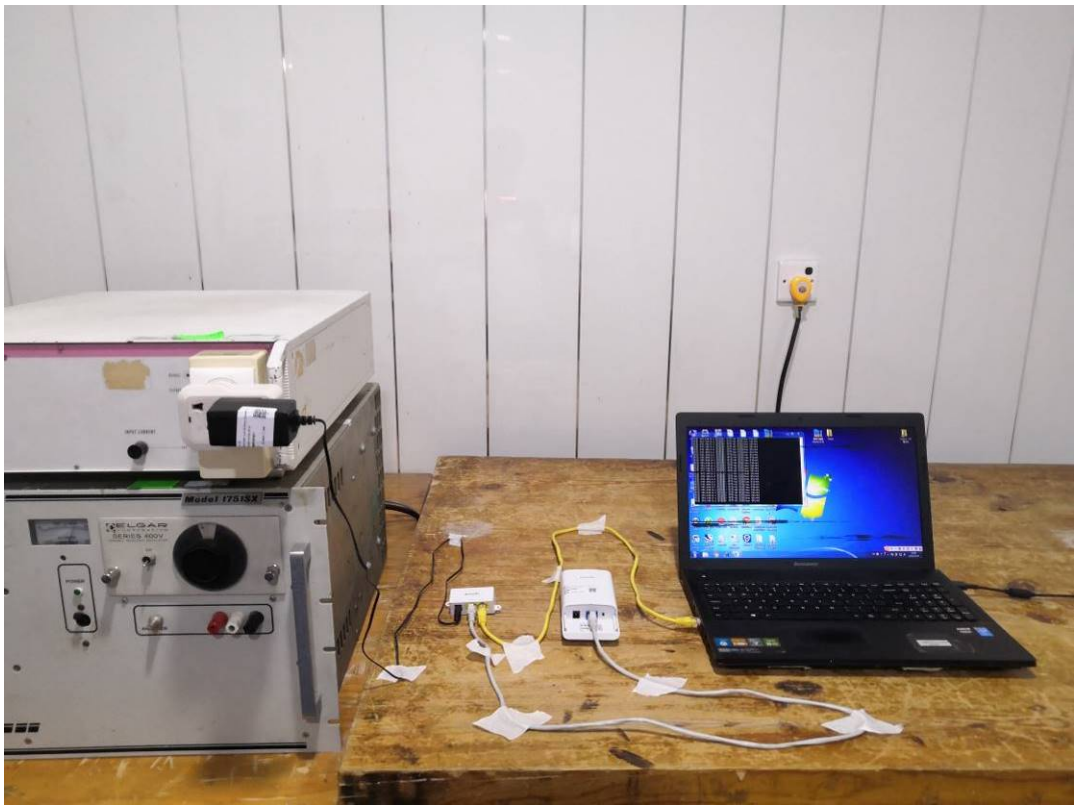
CE side View ISN - POE

Flicker

Test Setup Photo View- Adapter

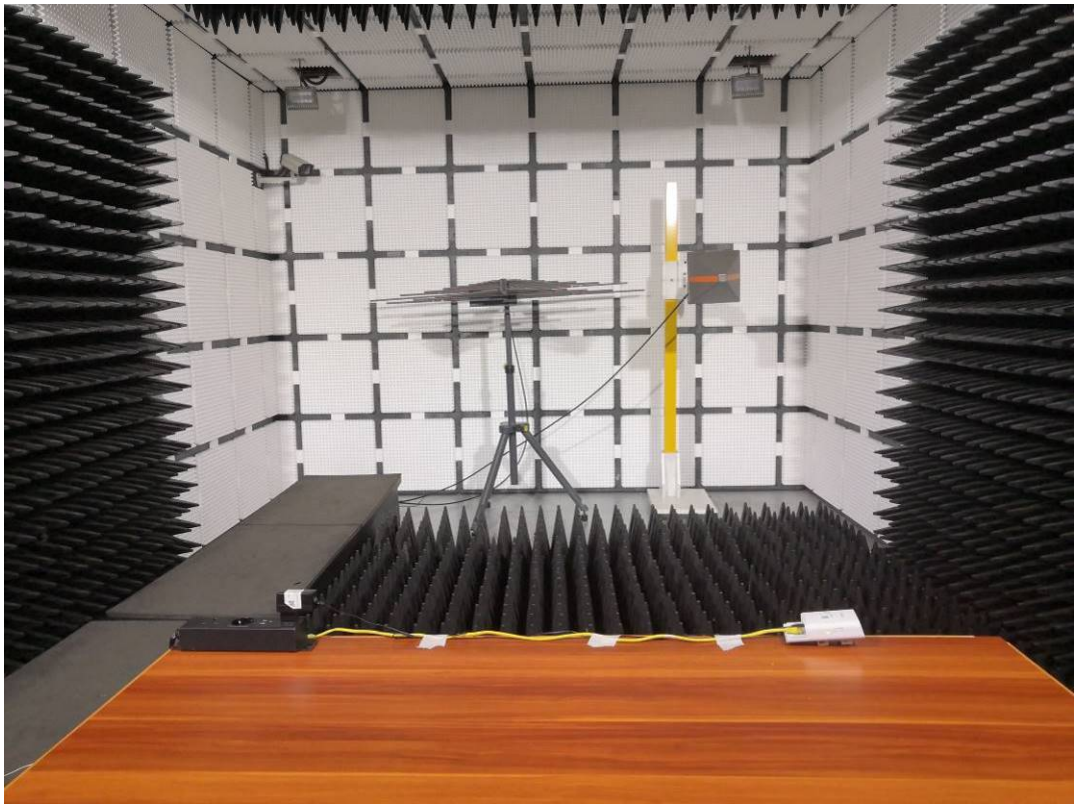


Test Setup Photo View-POE

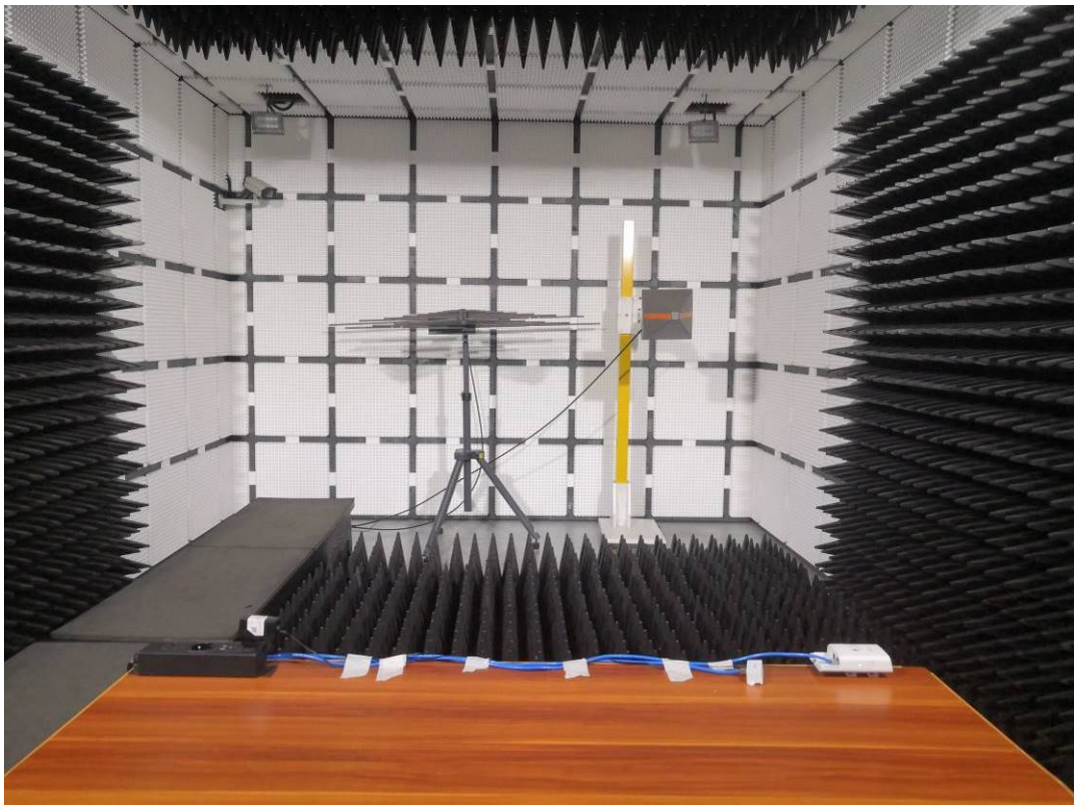


RS

Test Setup Photo View- Adapter



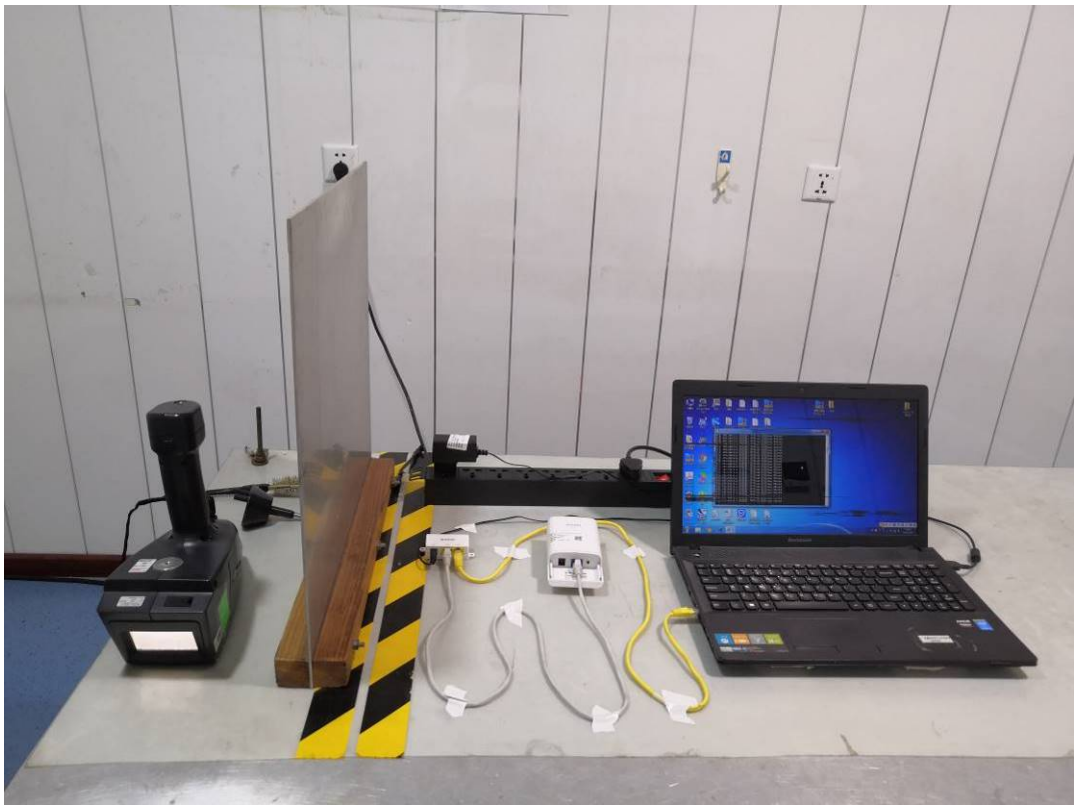
Test Setup Photo View-POE



ESD

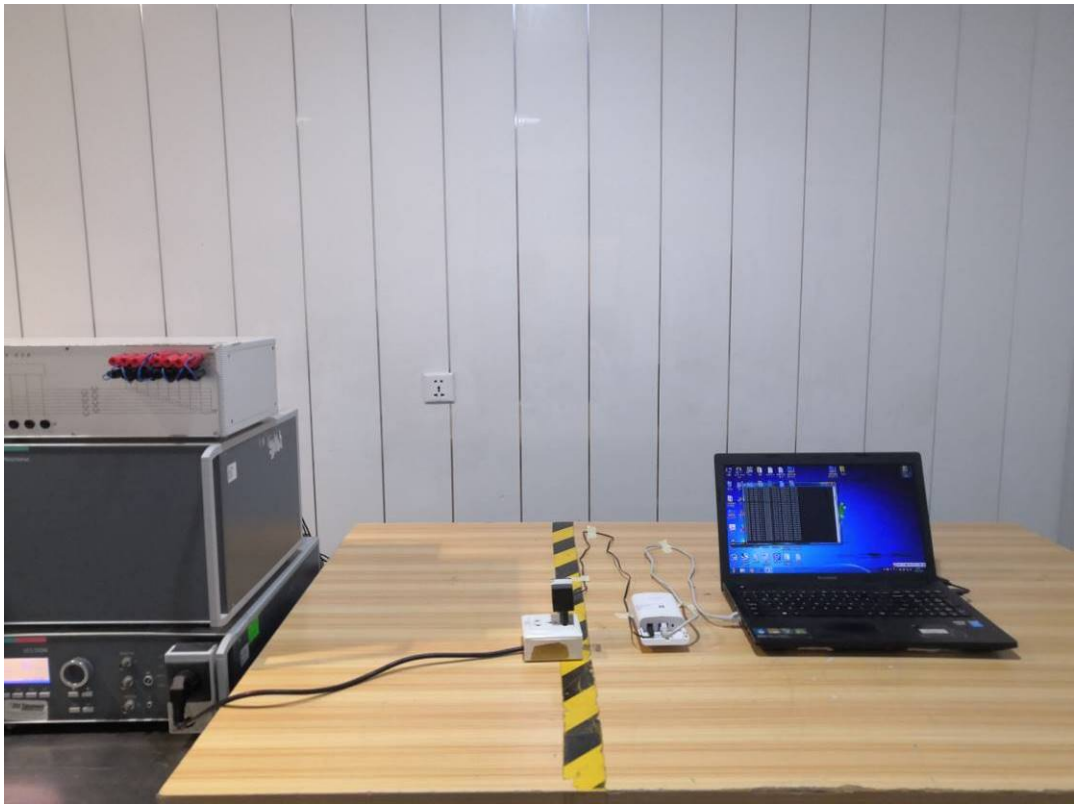
Test Setup Photo View- Adapter

Test Setup Photo View-POE



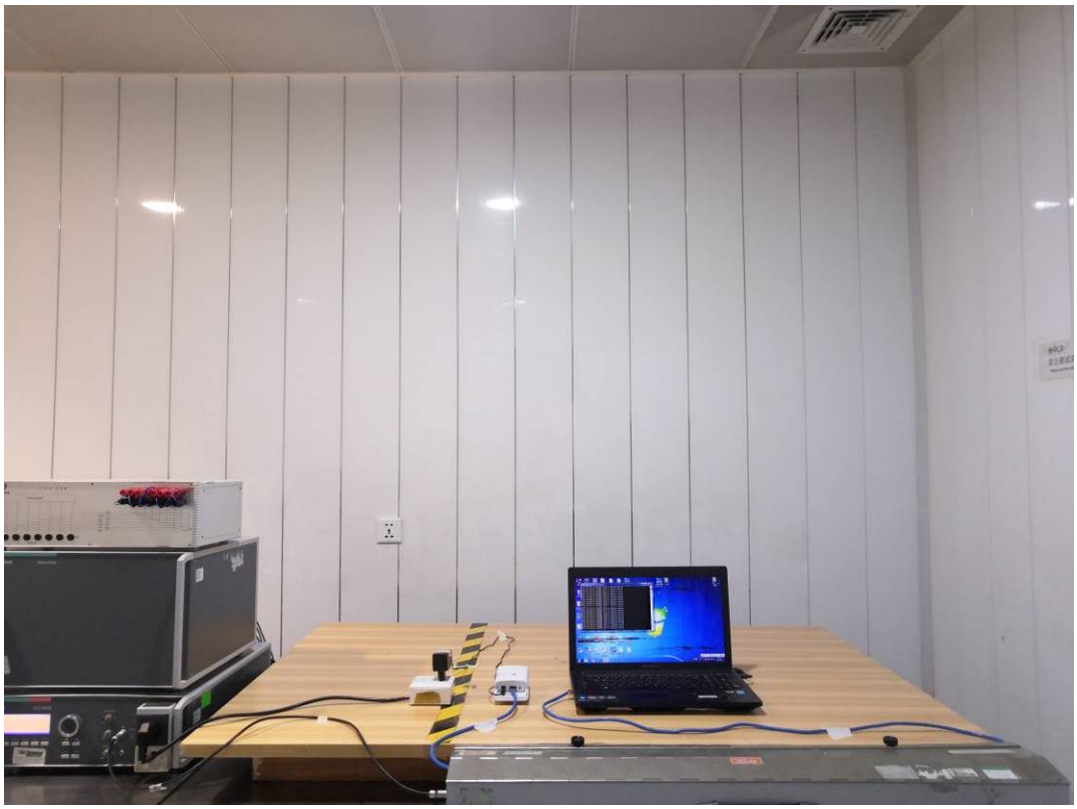
EFT

Test Setup Photo View- Adapter

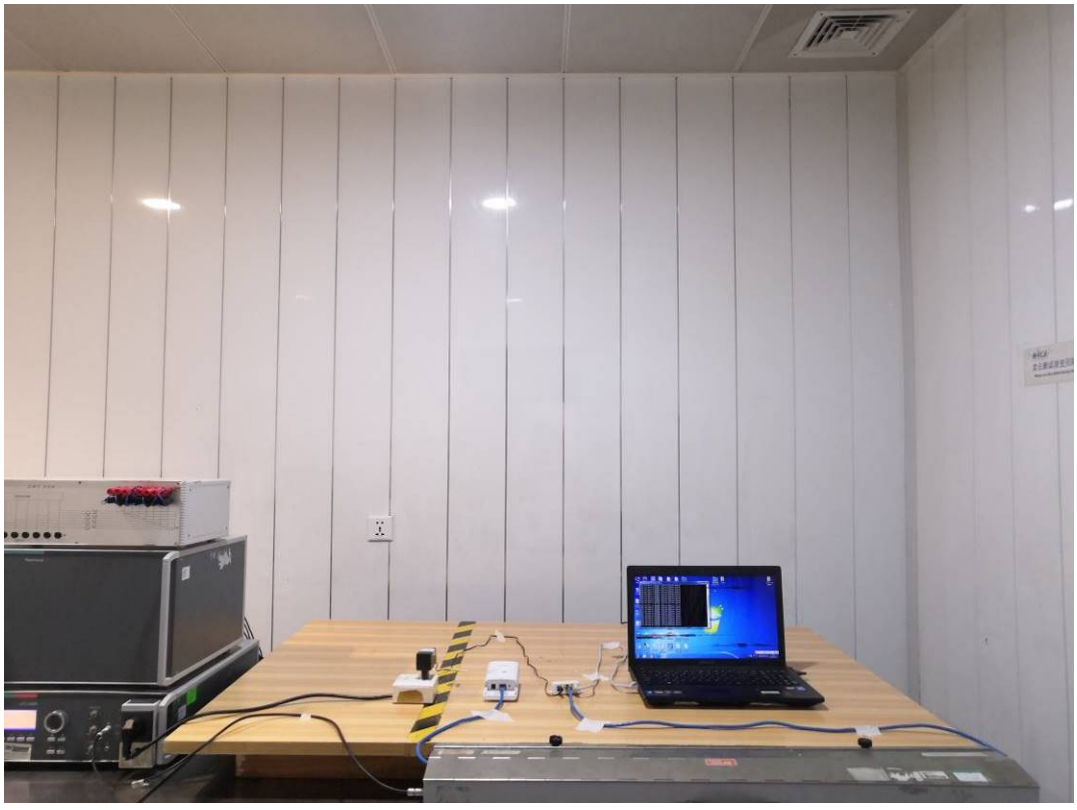


Test Setup Photo View-POE

Signal Port Test Setup Photo View - Adapter



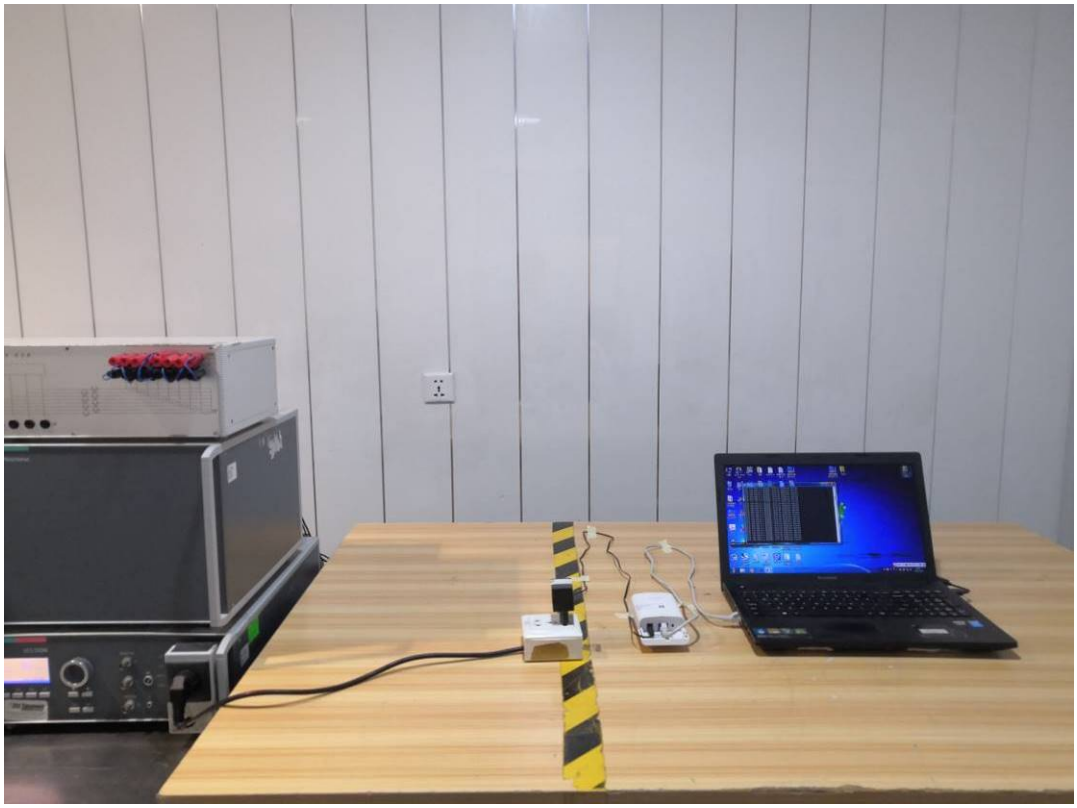
Signal Port Test Setup Photo View-POE



Signal Port Test Setup Photo View -POE

Dips

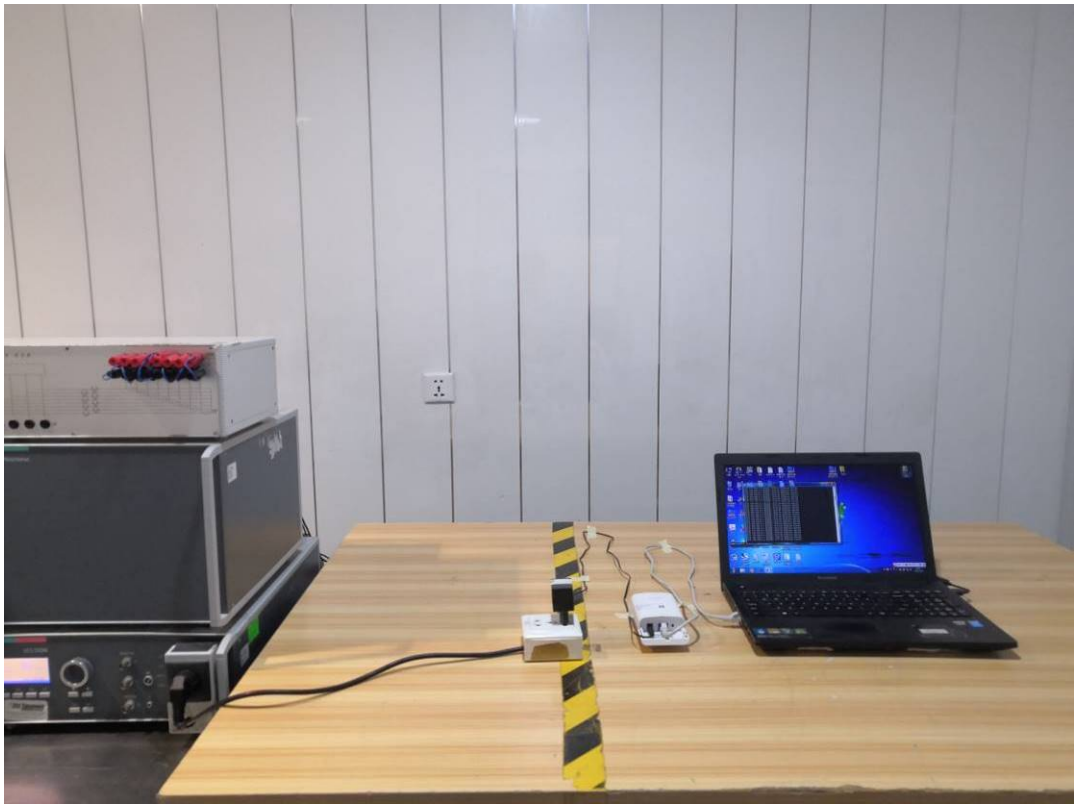
Test Setup Photo View- Adapter



Test Setup Photo View-POE

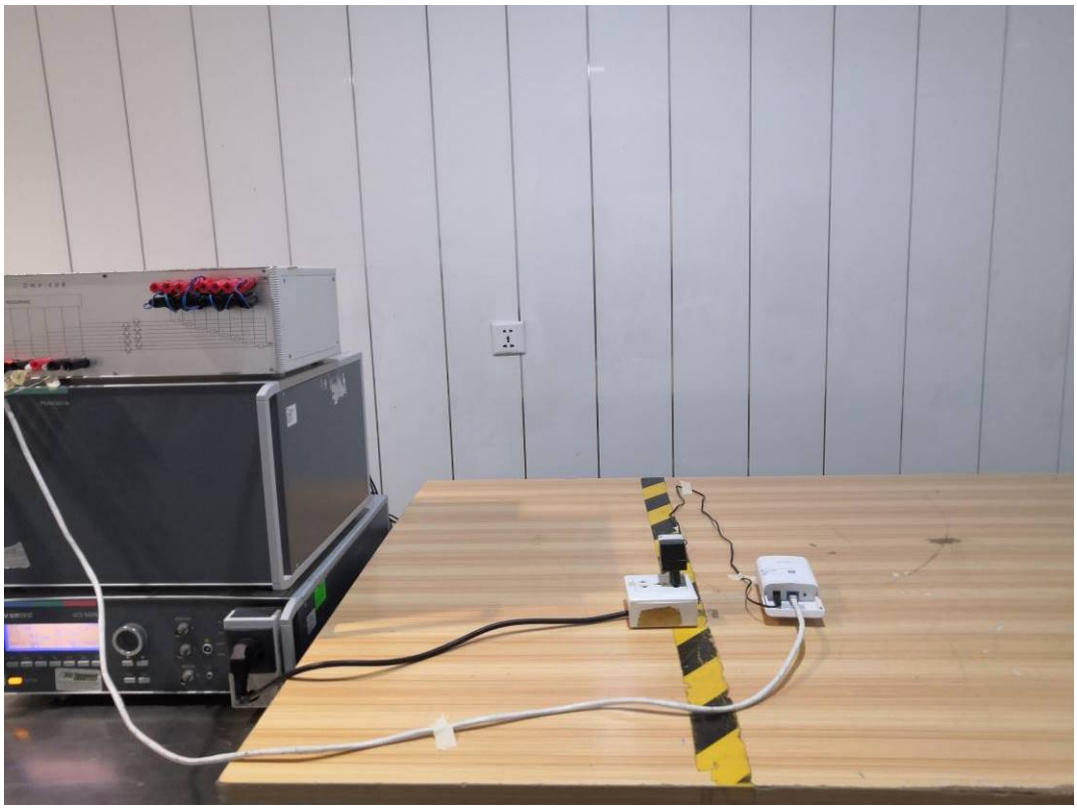
Surge

Test Setup Photo View- Adapter

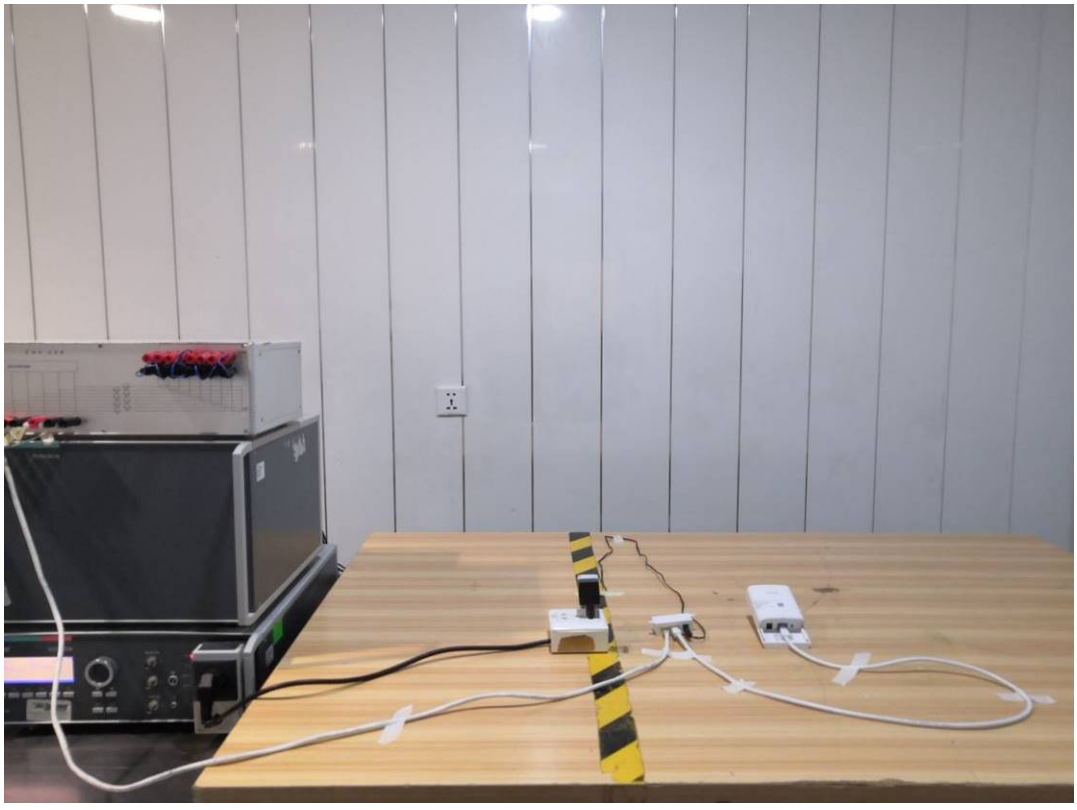


Test Setup Photo View-POE

Signal Port Test Setup Photo View - Adapter



Signal Port Test Setup Photo View-POE



CS

Test Setup Photo View- Adapter

Test Setup Photo View-POE

Signal Port Test Setup Photo View - Adapter

Signal Port Test Setup Photo View-POE

Signal Port Test Setup Photo View -POE

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