

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

SHENZHEN TENDA TECHNOLOGY CO.,LTD

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Model:HG1

Report Type: Original Report	Product Type: GPON ONT
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		GPON ONT
EUT Model:		HG1
Multiple Models:		N/A
Rated Input Voltage:		100-240V~, 50/60Hz
Adapter Information	Model:	BN003-A05009E
	Input:	100-240V~, 50/60Hz
	Output:	DC 9V/0.6A
The Highest Operating Frequency:		>108 MHz
Serial Number:		RDG201117001-EM-S3
EUT Received Date:		2020/11/18
EUT Received Status:		Good

Objective

This report is prepared on behalf of *SHENZHEN TENDA TECHNOLOGY CO.,LTD* in accordance with EN 55032:2015+A11:2020 Electromagnetic compatibility of multimedia equipment — Emission Requirements; EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment — Immunity Requirements; EN 61000-3-2:2014 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase); EN 61000-3-3:2013+A1:2019 Electromagnetic compatibility (EMC) Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

The objective is to determine the compliance of EUT with:

EN 55032:2015+A11:2020

EN 55035:2017+A11:2020

EN 61000-3-2:2014

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

Test Methodology

All measurements contained in this report were conducted with EN 55032:2015+A11:2020 Electromagnetic compatibility of multimedia equipment — Emission Requirements; EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment — Immunity Requirements; EN 61000-3-2:2014 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase); EN 61000-3-3:2013+A1:2019 Electromagnetic compatibility (EMC) Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

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.

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

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk “★ ”.

FINAL

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

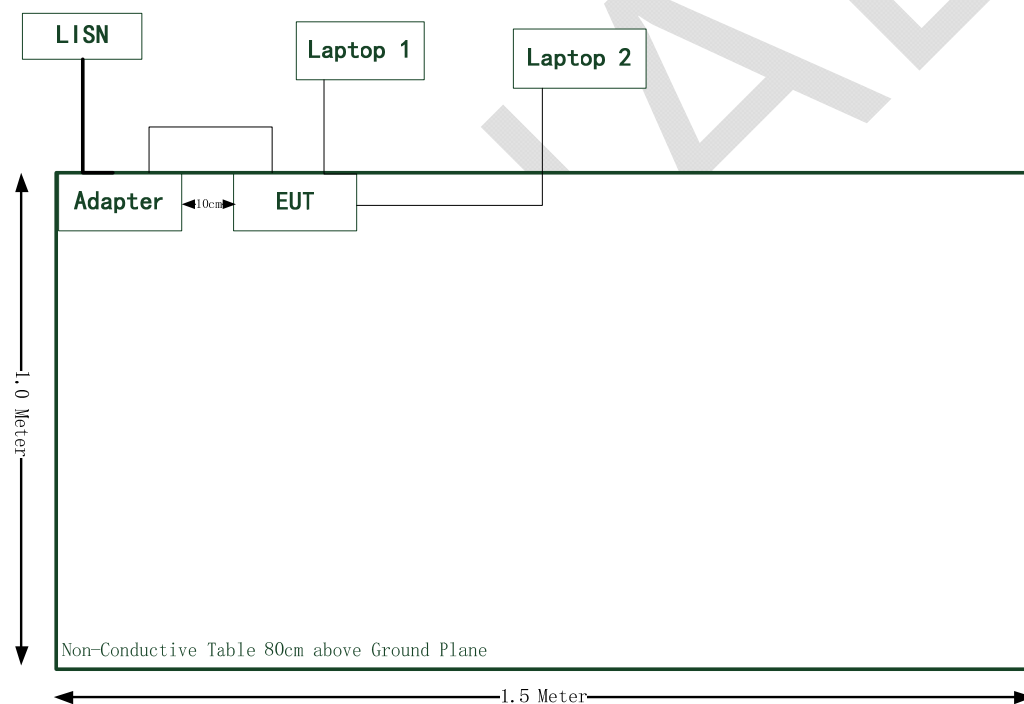
Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No EUT software was used for testing.

Block Diagram of Test Setup



Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop 1	E450	PF-0MR8KV 16/08
DELL	Laptop 2	E6410	GMLGPM1

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
Power Cable	Yes	No	1.2	Adapter	EUT
RJ45 Cable	Yes	No	3	EUT	Laptop 1

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV 216	101614	2020-09-12	2021-09-12
TESEQ	ISN	T800	34379	2020-09-12	2021-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-07-07	2021-07-07
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2020-09-05	2021-09-05
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	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2020-09-24	2021-09-24
Sonoma	Amplifier	310N	185914	2020-10-13	2021-10-13
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2020-05-06	2021-05-06
ESD					
HAEFELY	Electrostatic Discharge Simulator	ONYX	180786	2020-09-16	2021-09-16
EFT & Surge & Dips					
EM TEST	Ultra Compact Generator	UCS500-M6B	V6016101357	2020-07-07	2021-07-07
EM TEST	Auto Transformer	MV2616	0403-16	N/A	N/A
EM TEST	CDN	CNV508 S1	311137	2020-11-13	2021-11-12
EM TEST	EFT Clamp	N/A	300886	2020-11-12	2021-11-11
Flicker & Harmonic					
ELGAR	AC Power Source	1751SX	5611	2020-09-23	2021-09-23
EM TEST	Harmonic & Flicker	DPA 500	303278	2020-09-17	2021-09-16

	Analyzer				
PFMF					
EM TEST	Current Transformer	MC2630	301873	N/A	N/A
EM TEST	Loop Antenna	MS100	303298	N/A	N/A
PAOFN	Transformer	AC250	250003	N/A	N/A
FLUKE	Clamp Meter	317	42270435WS	2020-07-01	2021-07-01
CS					
HP	Signal Generator	8648A	3246A00831	2020-09-12	2021-09-12
R&S	Power Amplifier	15A250	12934	N/A	N/A
Werlatone	Dual Directional Coupler	C5091-10	113192	2020-02-09	2021-02-09
HP	Power Meter	HP EPM-441A	GB37481494	2020-09-12	2021-09-12
Agilent	8482A Power sensor	8482A	US37296108	2020-09-12	2021-09-12
NARDA	Attenuator	769-6	2754	N/A	N/A
COM-POWER	CDN	M325E	521064	2020-09-12	2021-09-12
COM-POWER	CDN	T8E	581607	2019-05-09	2022-05-09
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A
AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2020-09-12	2021-09-12
AR	Power Amplifier	500W1000C	0353561	N/A	N/A
AR	Power Amplifier	60S1G6	0348711	N/A	N/A
PASTERNAK	Dual Directional Coupler	PE2239-30	1711	2020-07-16	2021-07-16
Agilent	EPM Series Power Meter	E4419B	MY45103907	2020-09-12	2021-09-12
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2020-09-12	2021-09-12
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2020-09-12	2021-09-12

* 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

Temperature:	20.8~27.4°C
Relative Humidity:	36~64%*
ATM Pressure:	101.1~102.5kPa
Tester:	Dylan Duan, Leo Long, Lee Li, Barry Yang
Test Date:	2020/12/1~2020.12.16

Note:

*The relative humidity of ESD test environment is 38%.

FINAL

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 55032 Clause A.3	Conducted emissions	Compliance
2	EN 55032 Clause A.2	Radiated emissions	Compliance
3	EN 55035 Clause 4.2.1	Electrostatic discharges IEC 61000-4-2	Compliance
4	EN 55035 Clause 4.2.2.2	Continuous radiated disturbances IEC 61000-4-3	Compliance
5	EN 55035 Clause 4.2.2.3	Continuous conducted disturbances IEC 61000-4-6	Compliance
6	EN 55035 Clause 4.2.3	Power frequency magnetic fields IEC 61000-4-8	Compliance
7	EN 55035 Clause 4.2.4	Electrical fast transients/burst IEC 61000-4-4	Compliance
8	EN 55035 Clause 4.2.5	Surges IEC 61000-4-5	Compliance
9	EN 55035 Clause 4.2.6	Voltage dips and short interruptions IEC 61000-4-11	Compliance
10	EN 61000-3-2	Harmonic current emissions	Not applicable*
11	EN 61000-3-3	Voltage fluctuations and flicker	Compliance

Note:

Not applicable*: The EUT power is less than 75W

1 – CONDUCTED EMISSIONS

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_{cisp} 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_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

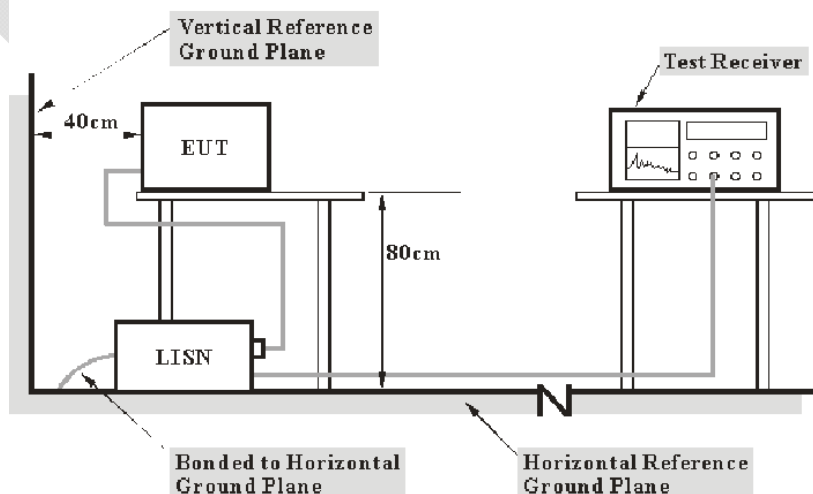
Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 dB (150 kHz to 30 MHz), and conducted disturbance at telecommunication port using AAN is 5.0 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cisp}

Measurement	U_{cisp}
Conducted disturbance at mains port using AMN (9 kHz to 150 kHz)	3.8 dB
(150 kHz to 30 MHz)	3.4 dB
Conducted disturbance at mains port using voltage probe (9 kHz to 30 MHz)	2.9 dB
Conducted disturbance at telecommunication port using AAN (150 kHz to 30 MHz)	5.0 dB
Conducted disturbance at telecommunication port using CVP (150 kHz to 30 MHz)	3.9 dB
Conducted disturbance at telecommunication port using CP (150 kHz to 30 MHz)	2.9 dB

Note: 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.

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 CISPR 16-1-1:2010+A1:2010, CISPR 16-2-1:2008+A1:2010 measurement procedure. The specification used was the EN 55032 Class Blimits.

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 a 230V/50Hz AC line 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

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 maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Procedure

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

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

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

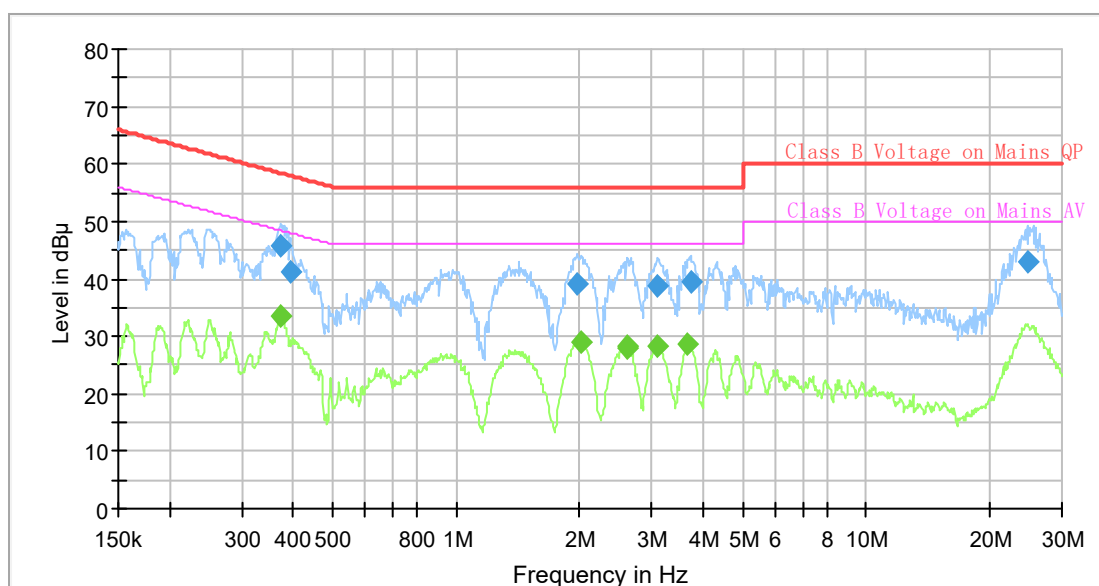
Except for the recorded frequency points (no more than 6), the remaining frequency points have a margin more than 20dB.

Test Data

Please refer to following table and plots:

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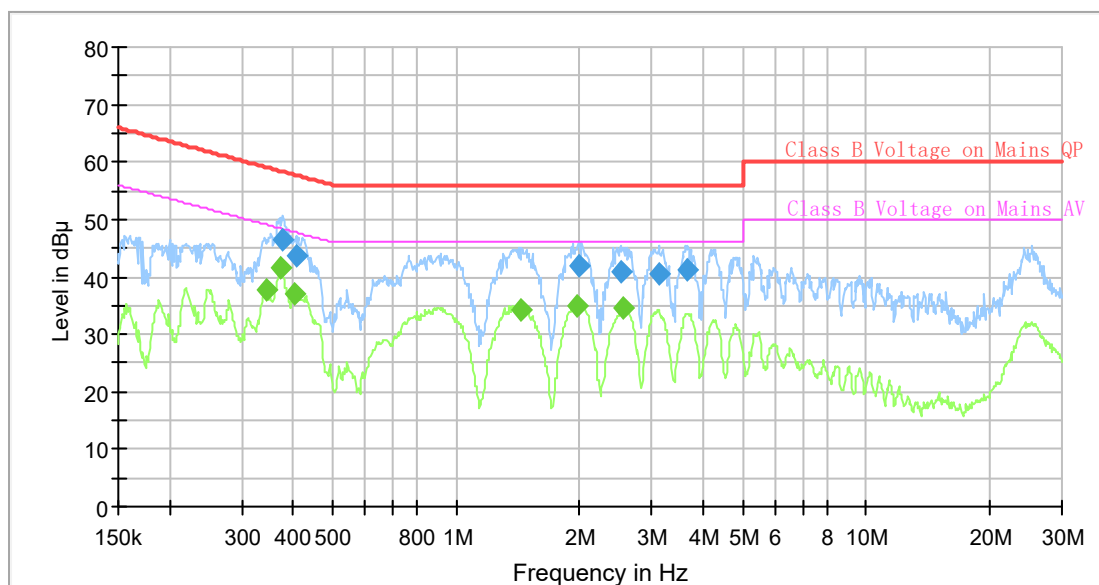
Model Number: HG1
 Port: L
 Test Mode: Normal Work
 Power Source: AC 230V/50Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.371804	---	33.59	48.46	14.87	9.000	L1	9.6
0.373663	45.88	---	58.42	12.54	9.000	L1	9.6
0.392773	41.29	---	58.00	16.71	9.000	L1	9.6
1.976720	38.97	---	56.00	17.03	9.000	L1	9.7
2.026635	---	28.83	46.00	17.17	9.000	L1	9.7
2.600630	---	28.28	46.00	17.72	9.000	L1	9.7
2.626701	---	28.10	46.00	17.90	9.000	L1	9.7
3.096640	38.92	---	56.00	17.08	9.000	L1	9.7
3.096640	---	28.38	46.00	17.62	9.000	L1	9.7
3.668908	---	28.48	46.00	17.52	9.000	L1	9.7
3.724217	39.54	---	56.00	16.46	9.000	L1	9.7
24.658828	42.98	---	60.00	17.02	9.000	L1	10.0

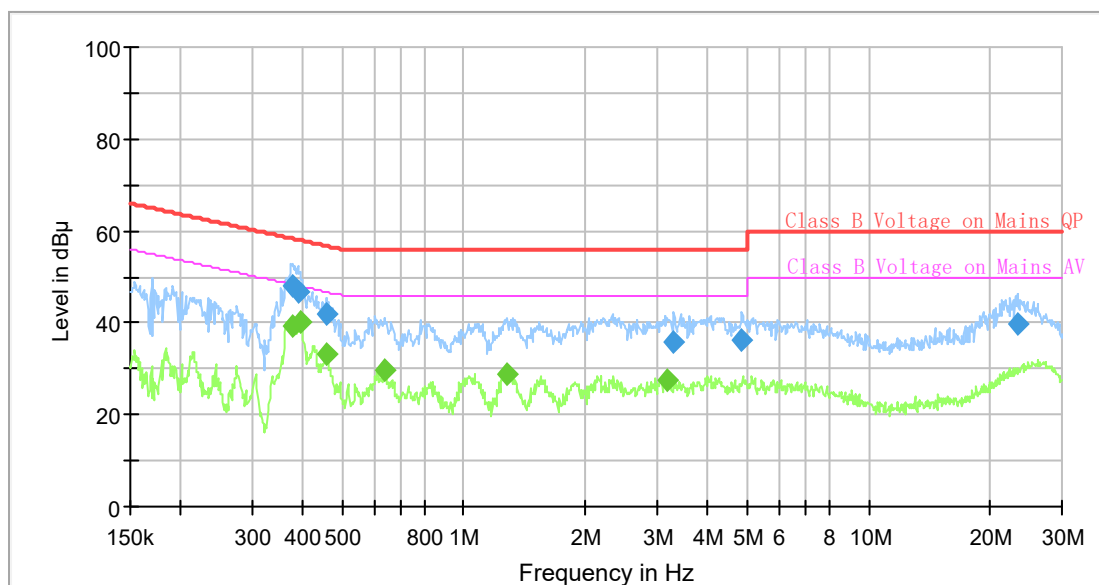
Model Number: HG1
 Port: N
 Test Mode: Normal Work
 Power Source: AC 230V/50Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.343287	---	37.56	49.12	11.56	9.000	N	9.6
0.373663	---	41.55	48.42	6.87	9.000	N	9.6
0.379296	46.41	---	58.29	11.88	9.000	N	9.6
0.402691	---	37.18	47.80	10.62	9.000	N	9.6
0.406728	43.63	---	57.71	14.08	9.000	N	9.6
1.436538	---	34.31	46.00	11.69	9.000	N	9.6
1.976720	---	35.10	46.00	10.90	9.000	N	9.6
1.986604	41.85	---	56.00	14.15	9.000	N	9.6
2.511402	40.71	---	56.00	15.29	9.000	N	9.6
2.562008	---	34.62	46.00	11.38	9.000	N	9.6
3.127684	40.57	---	56.00	15.43	9.000	N	9.6
3.668908	41.06	---	56.00	14.94	9.000	N	9.6

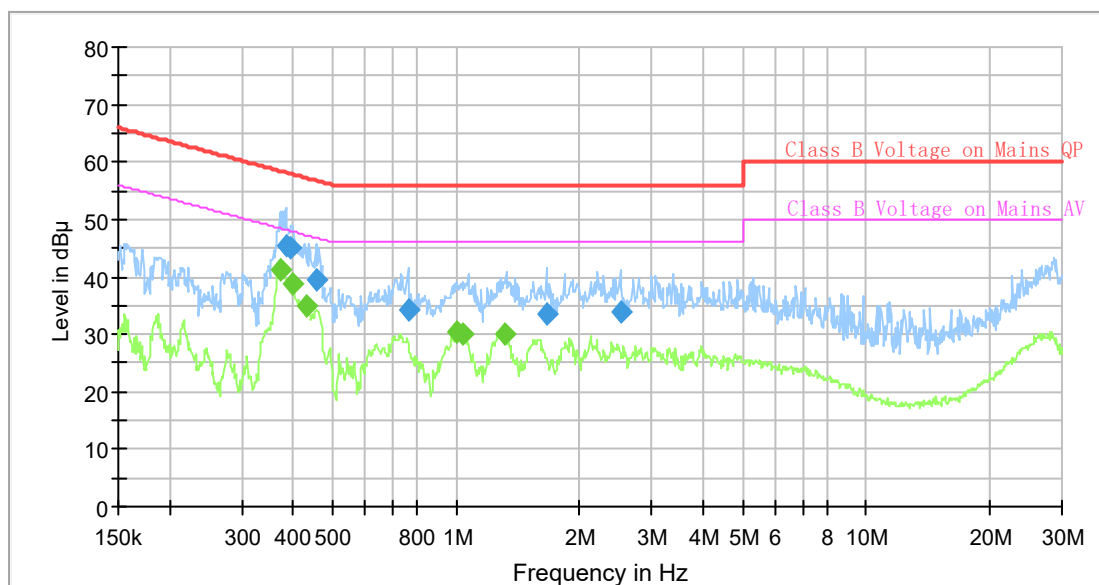
Model Number: HG1
 Port: L
 Test Mode: Normal work
 Power Source: AC 110V/60Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.379296	---	39.19	48.29	9.10	9.000	L1	9.6
0.379296	48.19	---	58.29	10.10	9.000	L1	9.6
0.390819	46.81	---	58.05	11.24	9.000	L1	9.6
0.394736	---	40.04	47.96	7.92	9.000	L1	9.6
0.458447	41.83	---	56.72	14.89	9.000	L1	9.6
0.458447	---	33.32	46.72	13.40	9.000	L1	9.6
0.637161	---	29.54	46.00	16.46	9.000	L1	9.6
1.280849	---	28.85	46.00	17.15	9.000	L1	9.7
3.174834	---	27.56	46.00	18.44	9.000	L1	9.7
3.304072	35.67	---	56.00	20.33	9.000	L1	9.7
4.851056	36.37	---	56.00	19.63	9.000	L1	9.7
23.342413	39.60	---	60.00	20.40	9.000	L1	10.0

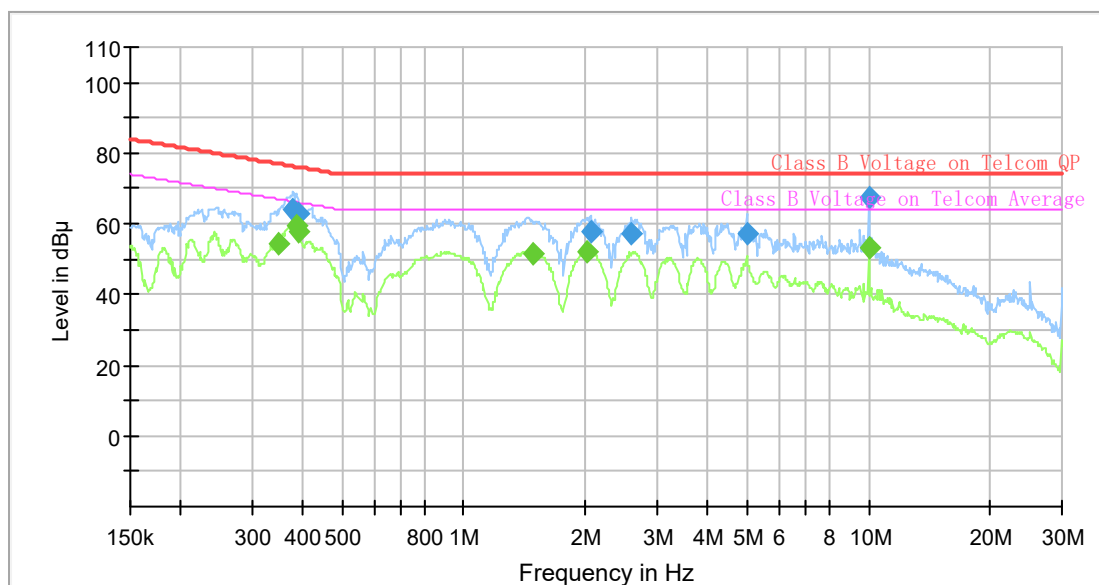
Model Number: HG1
 Port: N
 Test Mode: Normal work
 Power Source: AC 110V/60Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.371804	---	41.05	48.46	7.41	9.000	N	9.6
0.385014	45.27	---	58.17	12.90	9.000	N	9.6
0.396710	45.05	---	57.92	12.87	9.000	N	9.6
0.398694	---	38.65	47.88	9.23	9.000	N	9.6
0.433973	---	34.84	47.18	12.34	9.000	N	9.6
0.456166	39.33	---	56.76	17.43	9.000	N	9.6
0.762478	34.32	---	56.00	21.68	9.000	N	9.6
1.008154	---	30.39	46.00	15.61	9.000	N	9.6
1.038779	---	29.92	46.00	16.08	9.000	N	9.6
1.313192	---	29.91	46.00	16.09	9.000	N	9.6
1.660095	33.43	---	56.00	22.57	9.000	N	9.6
2.511402	33.76	---	56.00	22.24	9.000	N	9.6

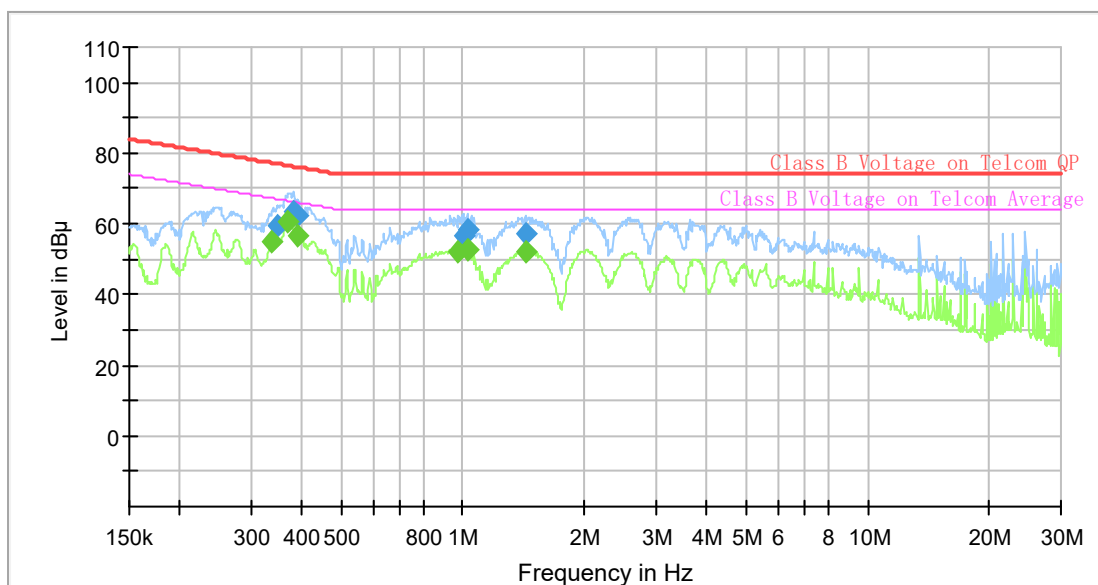
Model Number: HG1
 Port: RJ45
 Test Mode: ISN 10Mbps
 Power Source: AC 230V/50Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.346729	---	54.14	67.04	12.90	9.000	Line 1	9.9
0.379296	64.00	---	76.29	12.29	9.000	Line 1	9.9
0.385014	---	59.67	66.17	6.50	9.000	Line 1	9.8
0.390819	62.80	---	76.05	13.25	9.000	Line 1	9.8
0.390819	---	57.81	66.05	8.24	9.000	Line 1	9.8
1.480177	---	51.80	64.00	12.20	9.000	Line 1	9.6
2.016552	---	52.19	64.00	11.81	9.000	Line 1	9.6
2.057187	57.50	---	74.00	16.50	9.000	Line 1	9.6
2.587692	57.14	---	74.00	16.86	9.000	Line 1	9.6
4.998419	56.95	---	74.00	17.05	9.000	Line 1	9.6
9.998049	---	53.15	64.00	10.85	9.000	Line 1	9.6
9.998049	67.25	---	74.00	6.75	9.000	Line 1	9.6

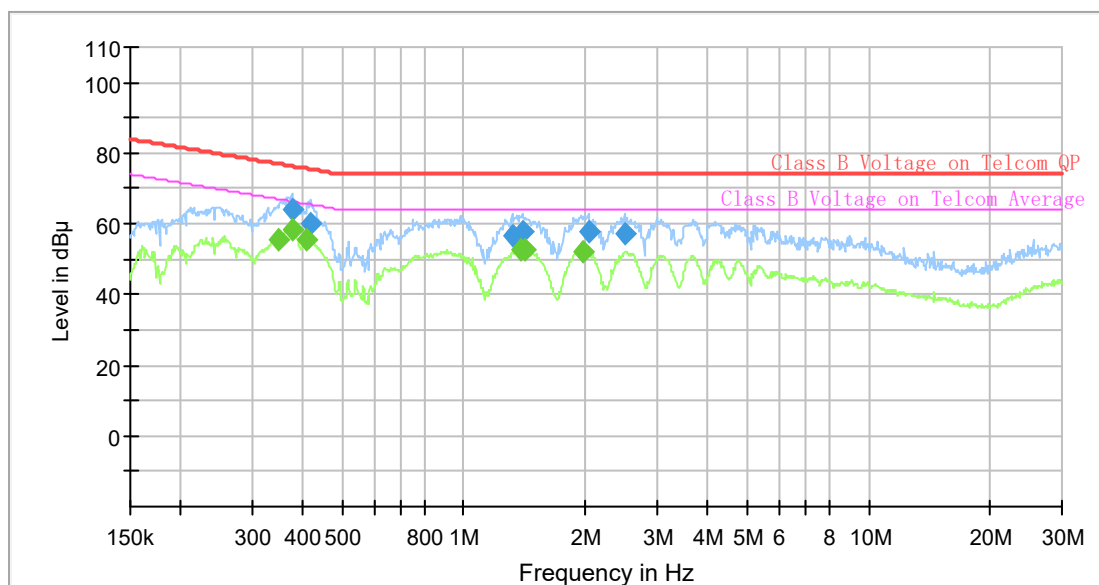
Model Number: HG1
Port: RJ45
Test Mode: ISN 100Mbps
Power Source: AC 230V/50Hz
Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.338189	---	55.08	67.25	12.17	9.000	Line 1	9.9
0.346729	59.22	---	77.04	17.82	9.000	Line 1	9.9
0.369955	---	60.69	66.50	5.81	9.000	Line 1	9.9
0.383099	63.34	---	76.21	12.87	9.000	Line 1	9.9
0.390819	---	56.67	66.05	9.38	9.000	Line 1	9.8
0.390819	62.44	---	76.05	13.61	9.000	Line 1	9.8
0.973564	---	51.99	64.00	12.01	9.000	Line 1	9.7
1.003138	56.63	---	74.00	17.37	9.000	Line 1	9.7
1.023352	58.08	---	74.00	15.92	9.000	Line 1	9.7
1.023352	---	52.48	64.00	11.52	9.000	Line 1	9.7
1.429391	---	52.22	64.00	11.78	9.000	Line 1	9.6
1.429391	57.00	---	74.00	17.00	9.000	Line 1	9.6

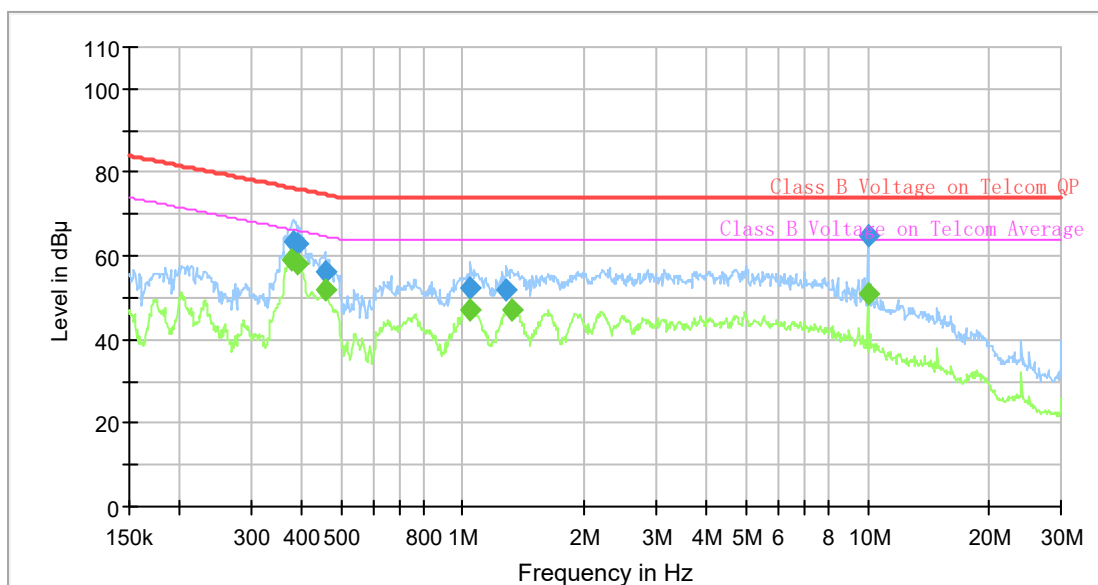
Model Number: HG1
Port: RJ45
Test Mode: ISN 1000Mbps
Power Source: AC 230V/50Hz
Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.346729	---	55.43	67.04	11.61	9.000	Line 1	9.9
0.375532	63.76	---	76.38	12.62	9.000	Line 1	9.9
0.377409	---	58.40	66.34	7.94	9.000	Line 1	9.9
0.410805	---	55.44	65.63	10.19	9.000	Line 1	9.8
0.419083	60.21	---	75.47	15.26	9.000	Line 1	9.8
1.319758	56.69	---	74.00	17.31	9.000	Line 1	9.7
1.380348	---	52.83	64.00	11.17	9.000	Line 1	9.7
1.394186	57.49	---	74.00	16.51	9.000	Line 1	9.7
1.408163	---	52.49	64.00	11.51	9.000	Line 1	9.6
1.976720	---	52.37	64.00	11.63	9.000	Line 1	9.6
2.036768	57.56	---	74.00	16.44	9.000	Line 1	9.6
2.498907	57.28	---	74.00	16.72	9.000	Line 1	9.6

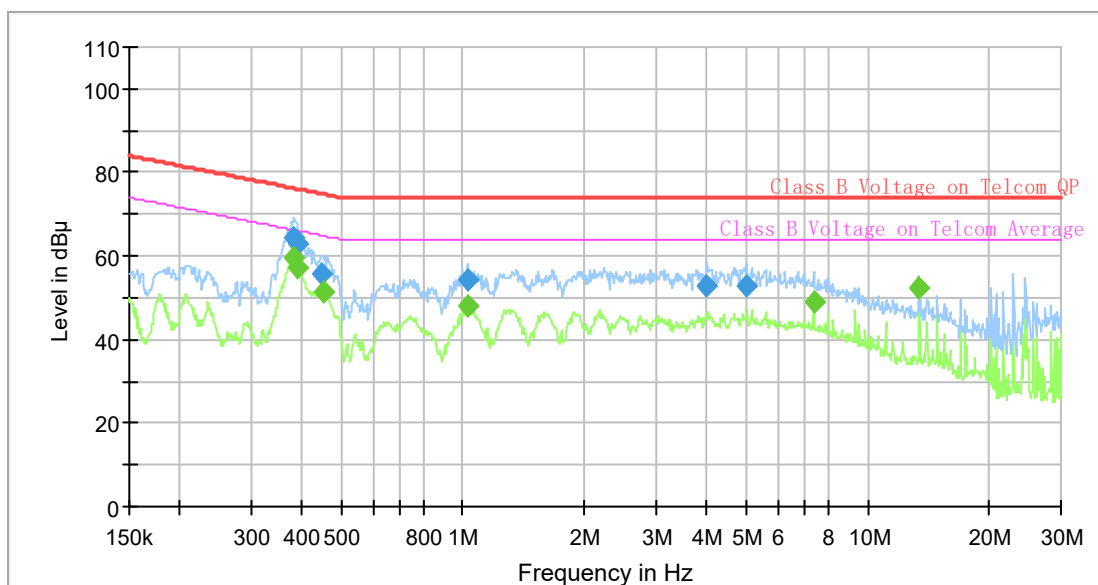
Model Number: HG1
Port: RJ45
Test Mode: ISN 10Mbps
Power Source: AC 110V/60Hz
Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.379296	---	59.00	66.29	7.29	9.000	Line 1	9.9
0.383099	63.64	---	76.21	12.57	9.000	Line 1	9.9
0.390819	63.04	---	76.05	13.01	9.000	Line 1	9.8
0.392773	---	58.09	66.00	7.91	9.000	Line 1	9.8
0.456166	---	51.98	64.76	12.78	9.000	Line 1	9.8
0.458447	56.44	---	74.72	18.28	9.000	Line 1	9.8
1.043973	52.18	---	74.00	21.82	9.000	Line 1	9.7
1.043973	---	46.99	64.00	17.01	9.000	Line 1	9.7
1.280849	51.82	---	74.00	22.18	9.000	Line 1	9.7
1.319758	---	47.08	64.00	16.92	9.000	Line 1	9.7
9.998049	---	50.68	64.00	13.32	9.000	Line 1	9.6
9.998049	64.63	---	74.00	9.37	9.000	Line 1	9.6

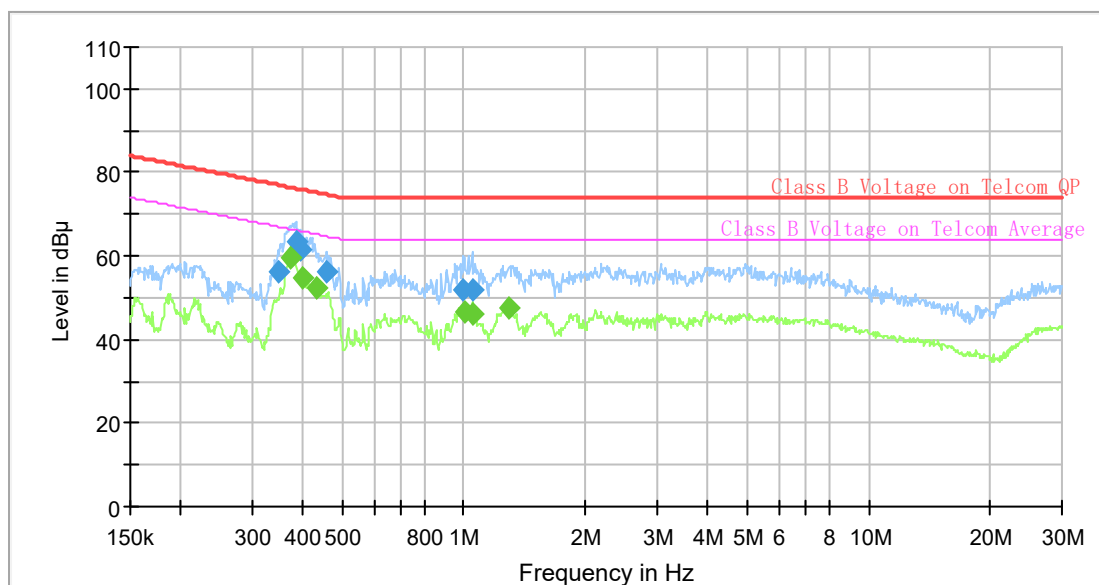
Model Number: HG1
 Port: RJ45
 Test Mode: ISN 100Mbps
 Power Source: AC 110V/60Hz
 Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.381193	---	59.79	66.25	6.46	9.000	Line 1	9.9
0.383099	64.31	---	76.21	11.90	9.000	Line 1	9.9
0.390819	63.05	---	76.05	13.00	9.000	Line 1	9.8
0.392773	---	57.16	66.00	8.84	9.000	Line 1	9.8
0.449391	55.74	---	74.89	19.15	9.000	Line 1	9.8
0.451638	---	51.31	64.84	13.53	9.000	Line 1	9.8
1.023352	54.07	---	74.00	19.93	9.000	Line 1	9.7
1.023352	---	47.96	64.00	16.04	9.000	Line 1	9.7
4.013525	52.66	---	74.00	21.34	9.000	Line 1	9.6
5.023411	52.78	---	74.00	21.22	9.000	Line 1	9.6
7.375399	---	48.86	64.00	15.14	9.000	Line 1	9.6
13.418776	---	52.36	64.00	11.64	9.000	Line 1	9.6

Model Number: HG1
Port: RJ45
Test Mode: ISN 1000Mbps
Power Source: AC 110V/60Hz
Note:



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.346729	56.08	---	77.04	20.96	9.000	Line 1	9.9
0.373663	---	59.45	66.42	6.97	9.000	Line 1	9.9
0.385014	63.49	---	76.17	12.68	9.000	Line 1	9.8
0.396710	61.72	---	75.92	14.20	9.000	Line 1	9.8
0.398694	---	54.88	65.88	11.00	9.000	Line 1	9.8
0.433973	---	52.30	65.18	12.88	9.000	Line 1	9.8
0.458447	56.32	---	74.72	18.40	9.000	Line 1	9.8
0.998148	52.09	---	74.00	21.91	9.000	Line 1	9.7
1.003138	---	46.51	64.00	17.49	9.000	Line 1	9.7
1.049193	---	45.95	64.00	18.05	9.000	Line 1	9.7
1.049193	51.72	---	74.00	22.28	9.000	Line 1	9.7
1.287253	---	47.54	64.00	16.46	9.000	Line 1	9.7

2 - RADIATED EMISSIONS

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_{cisp} 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_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, 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.

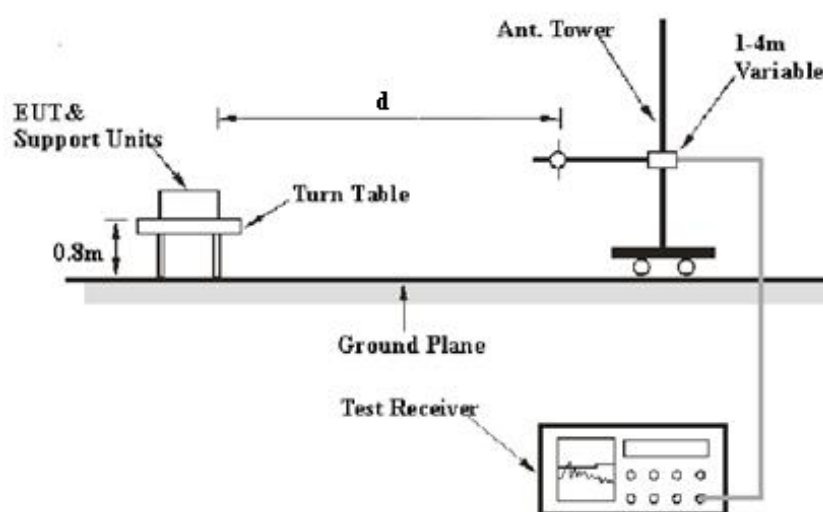
Table 1 – Values of U_{cisp}

Measurement	U_{cisp}
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

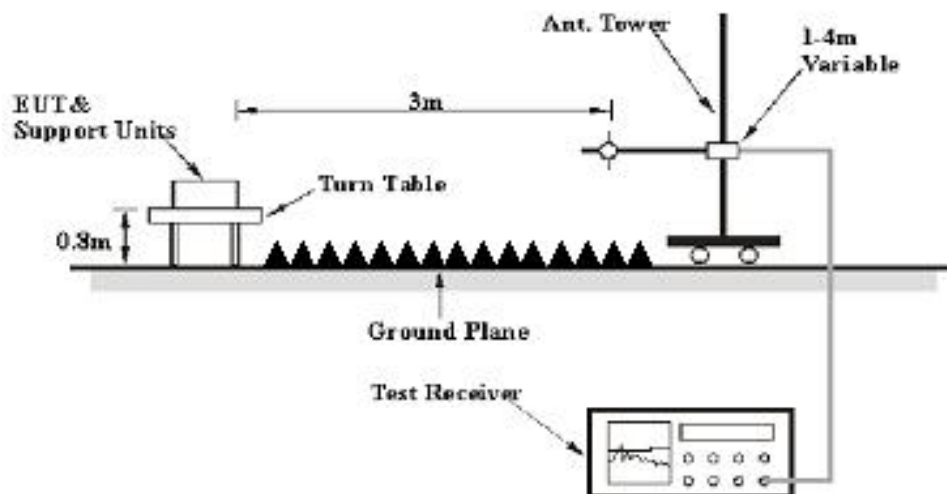
Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 10 meters, above 1GHz were performed in the 3 meters, using the setup accordance with the CISPR 16-1-1:2010+A1:2010, CISPR 16-1-4:2010, CISPR 16-2-3:2010. The specification used was EN 55032 Class B 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 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	/	Peak

Test Procedure

During the radiated emissions, maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$\text{Result} = \text{Meter Reading} + \text{Corrected}$$

Note:

$$\text{Corrected} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

or

$$\text{Corrected} = \text{Antenna Factor} + \text{Cable Loss} + \text{Insertion loss of attenuator} - \text{Amplifier Gain}$$

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 for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Result}$$

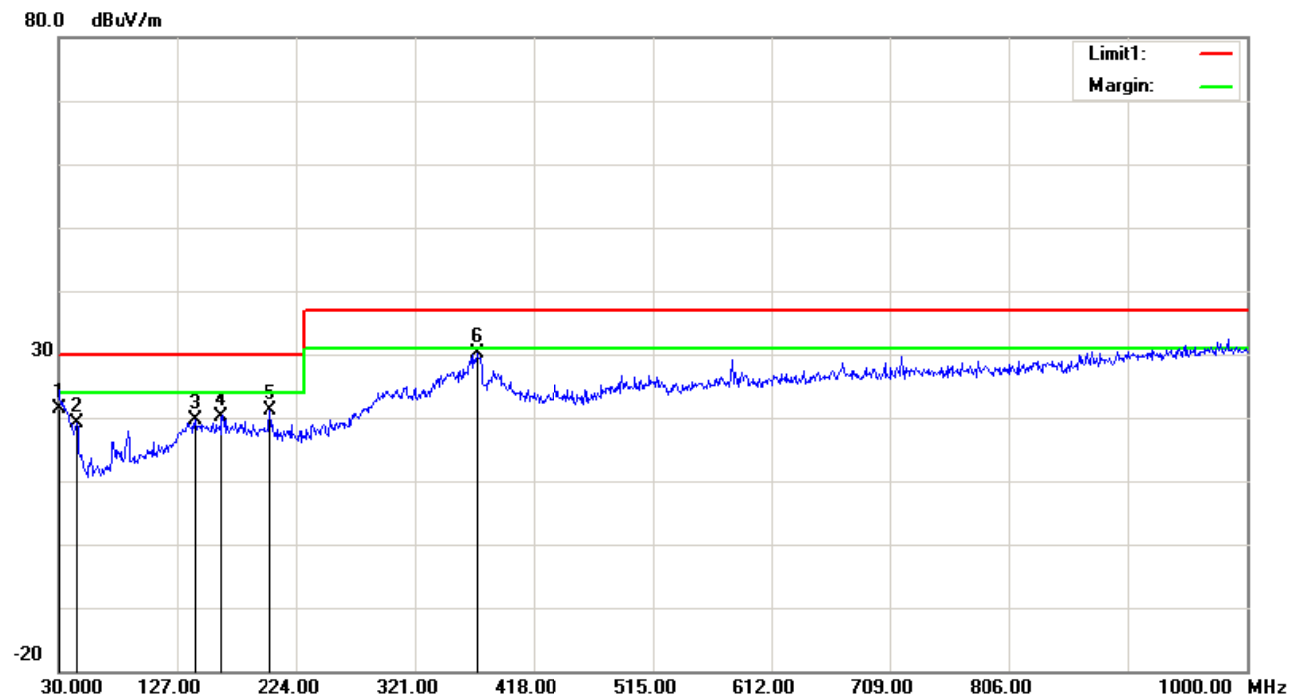
FINAL

Test Data

Please refer to following table and plots:

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

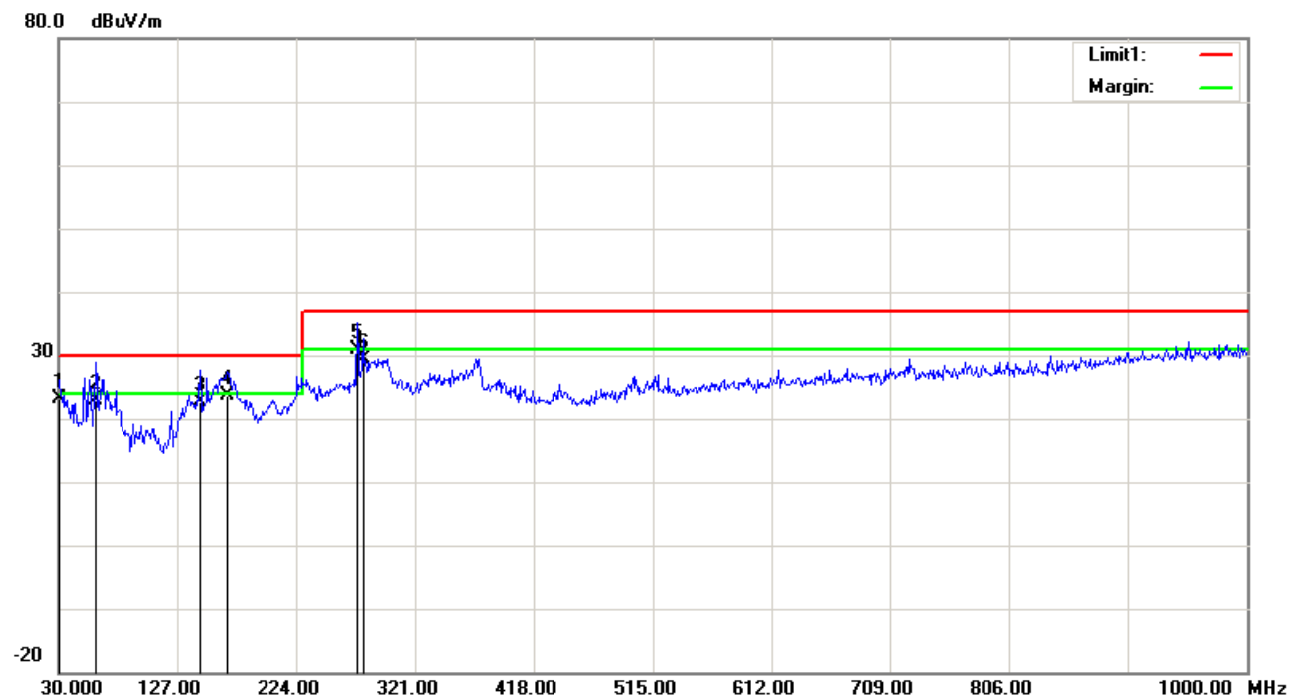
Polarization: Horizontal
Power: AC 230V/50Hz
Distance: 10m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	30.0000	25.57	QP	-4.10	21.47	30.00	8.53
2	44.5500	31.54	peak	-12.41	19.13	30.00	10.87
3	141.5500	28.79	peak	-9.17	19.62	30.00	10.38
4	162.8900	29.59	peak	-9.39	20.20	30.00	9.80
5	202.6600	30.78	peak	-9.69	21.09	30.00	8.91
6	371.4400	36.08	peak	-5.95	30.13	37.00	6.87

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

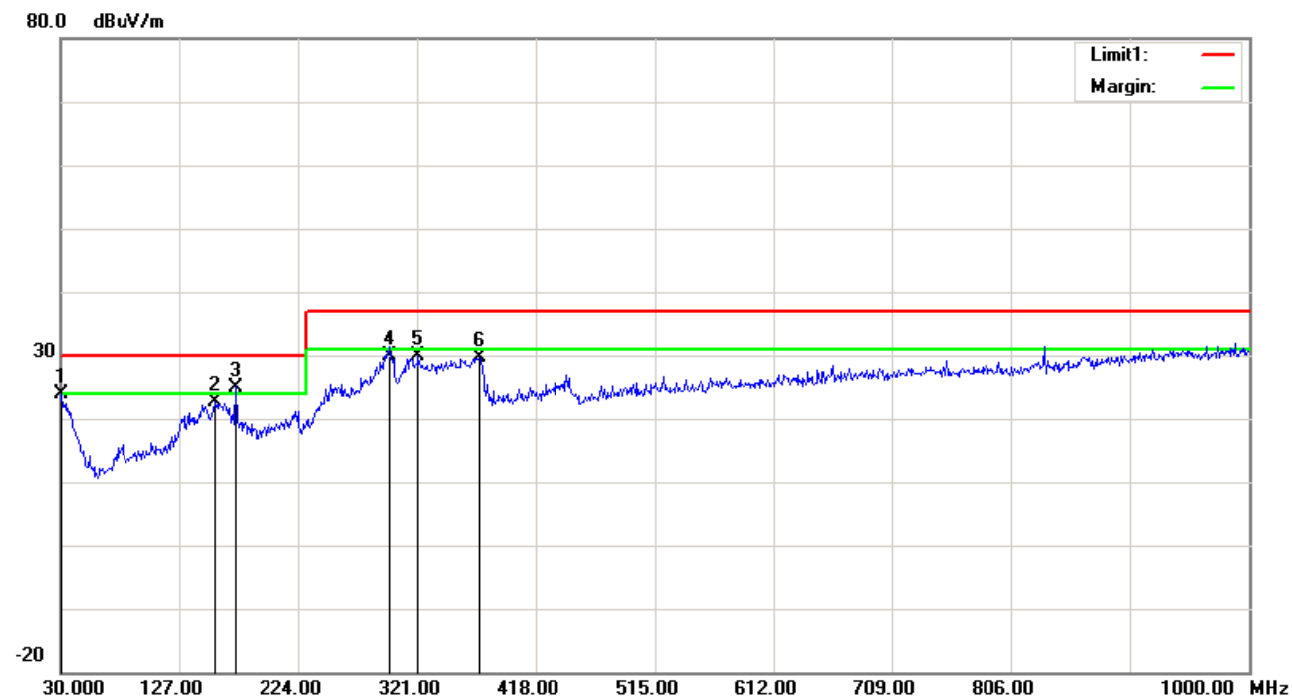
Polarization: Vertical
Power: AC 230V/50Hz
Distance: 10m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	30.0000	27.14	QP	-4.10	23.04	30.00	6.96
2	60.0700	39.30	QP	-16.40	22.90	30.00	7.10
3	145.4300	31.62	QP	-9.11	22.51	30.00	7.49
4	167.7400	33.19	QP	-9.44	23.75	30.00	6.25
5	273.4700	39.43	QP	-8.57	30.86	37.00	6.14
6	278.3200	37.89	QP	-8.55	29.34	37.00	7.66

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

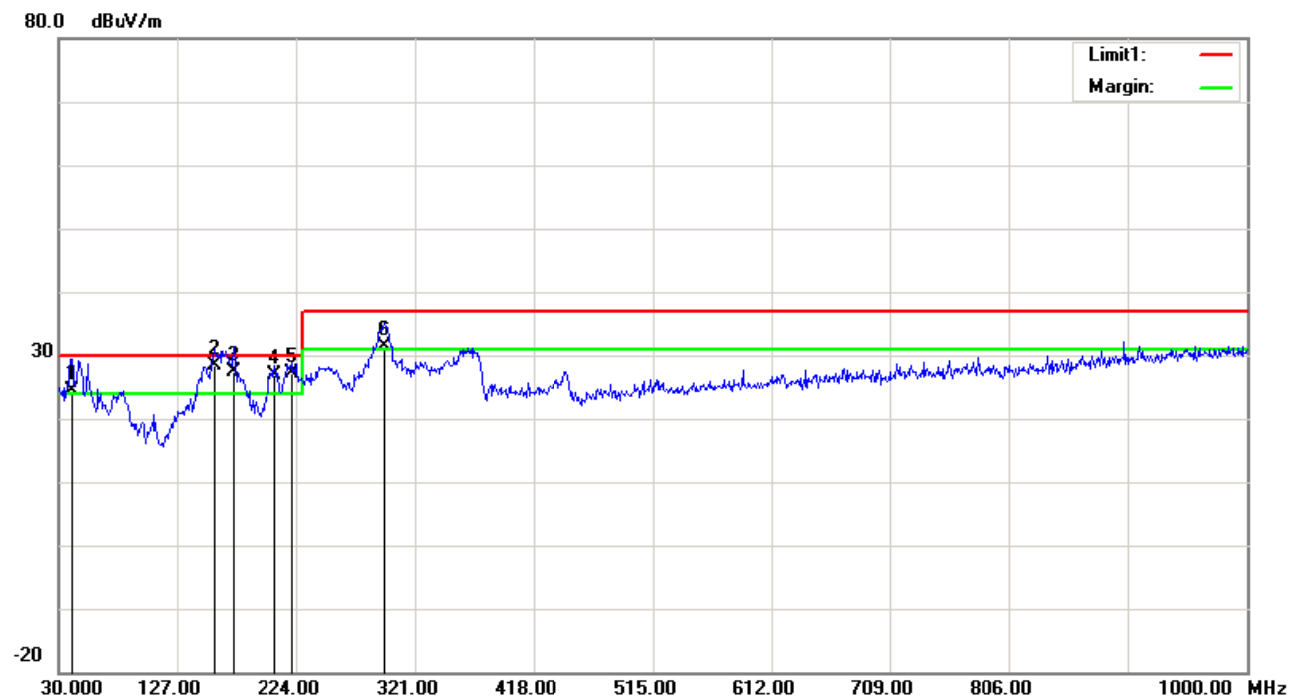
Polarization: Horizontal
Power: AC 110V/60Hz
Distance: 10m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	30.9700	28.61	peak	-4.66	23.95	30.00	6.05
2	156.1000	32.03	peak	-9.38	22.65	30.00	7.35
3	172.5900	34.53	QP	-9.53	25.00	30.00	5.00
4	298.6900	37.32	QP	-7.42	29.90	37.00	7.10
5	321.9700	36.89	peak	-7.02	29.87	37.00	7.13
6	371.4400	35.63	peak	-5.95	29.68	37.00	7.32

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

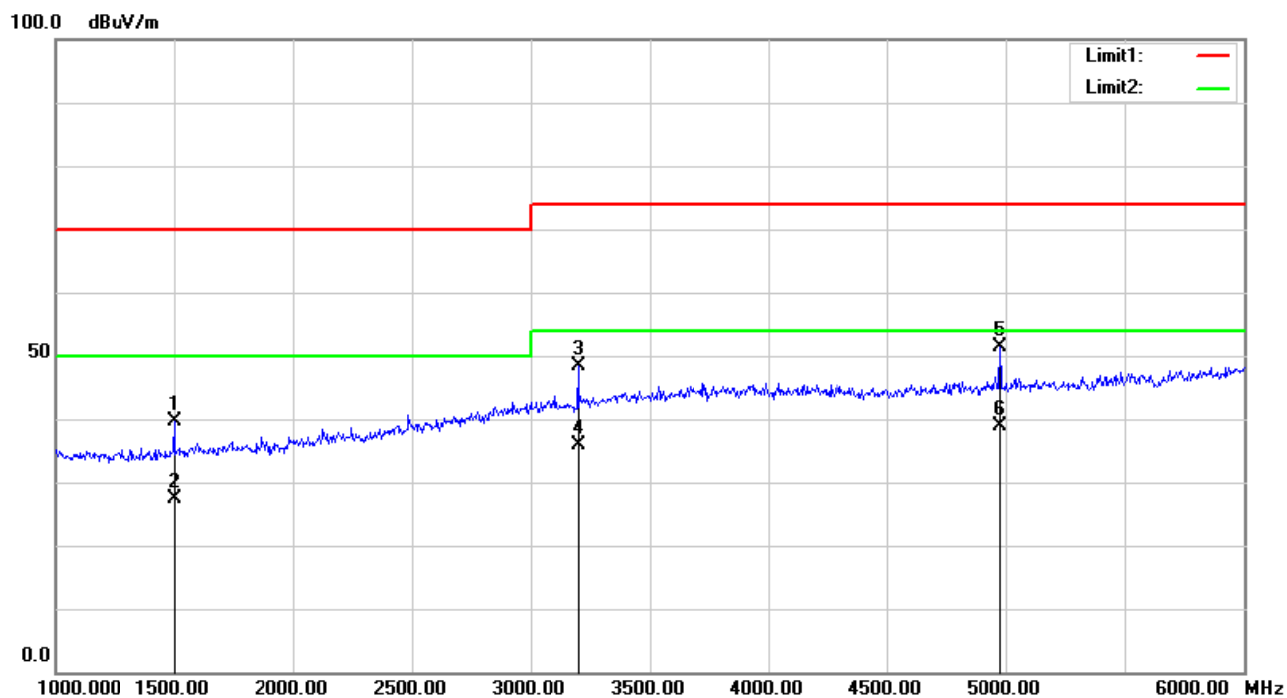
Polarization: Vertical
Power: AC 110V/60Hz
Distance: 10m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	40.6700	34.07	QP	-9.67	24.40	30.00	5.60
2	157.0700	37.67	QP	-9.37	28.30	30.00	1.70
3	172.5900	36.93	QP	-9.53	27.40	30.00	2.60
4	206.5400	37.47	QP	-10.57	26.90	30.00	3.10
5	220.1200	38.25	QP	-11.05	27.20	30.00	2.80
6	295.7800	39.00	QP	-7.70	31.30	37.00	5.70

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

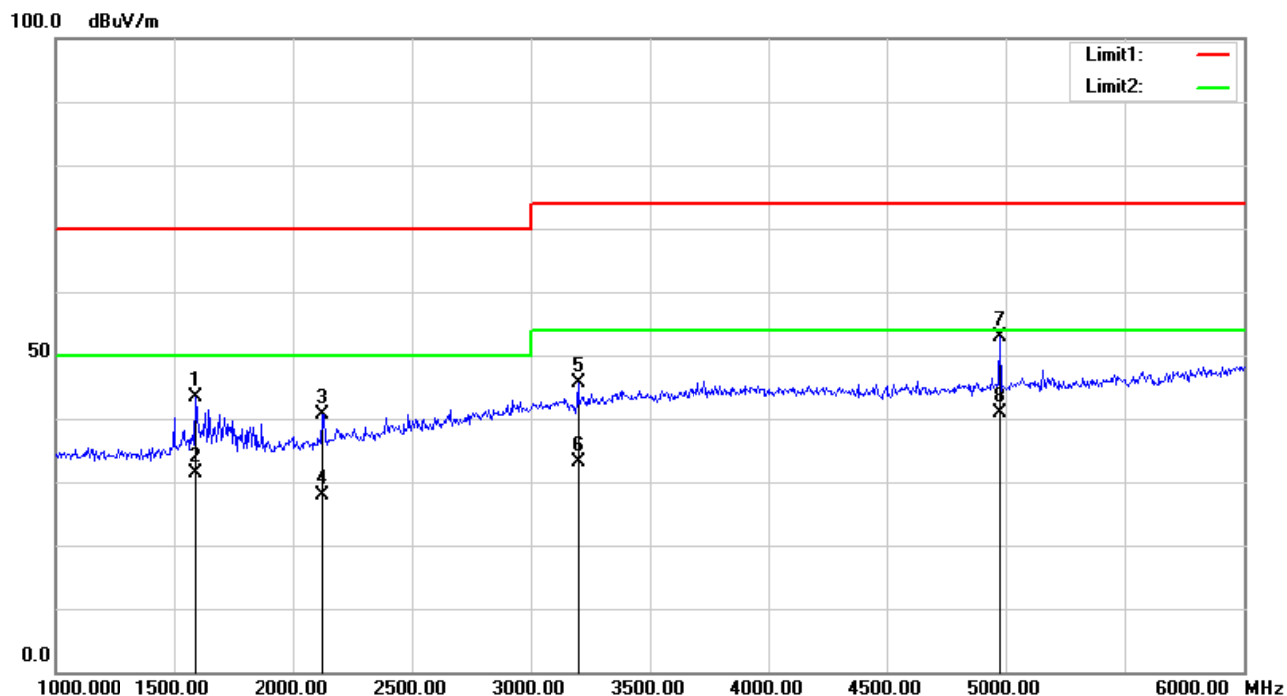
Polarization: Horizontal
Power: AC 230V/50Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1500.000	38.45	peak	1.23	39.68	70.00	30.32
2	1500.000	26.15	AVG	1.23	27.38	50.00	22.62
3	3200.000	41.50	peak	6.87	48.37	74.00	25.63
4	3200.000	29.13	AVG	6.87	36.00	54.00	18.00
5	4977.500	40.62	peak	10.84	51.46	74.00	22.54
6	4977.500	28.16	AVG	10.84	39.00	54.00	15.00

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

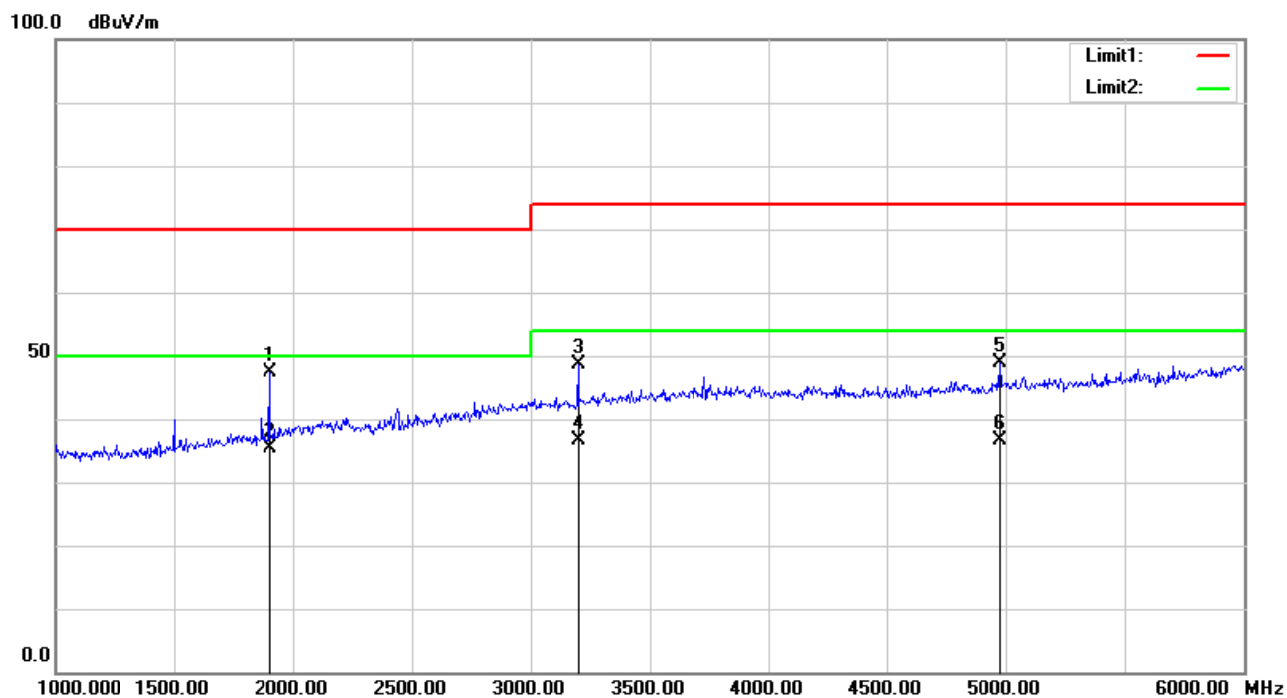
Polarization: Vertical
Power: AC 230V/50Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1592.500	42.01	peak	1.43	43.44	70.00	26.56
2	1592.500	30.06	AVG	1.43	31.49	50.00	18.51
3	2127.500	36.81	peak	3.82	40.63	70.00	29.37
4	2127.500	24.17	AVG	3.82	27.99	50.00	22.01
5	3200.000	38.68	peak	6.87	45.55	74.00	28.45
6	3200.000	26.17	AVG	6.87	33.04	54.00	20.96
7	4977.500	42.07	peak	10.84	52.91	74.00	21.09
8	4977.500	30.01	AVG	10.84	40.85	54.00	13.15

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

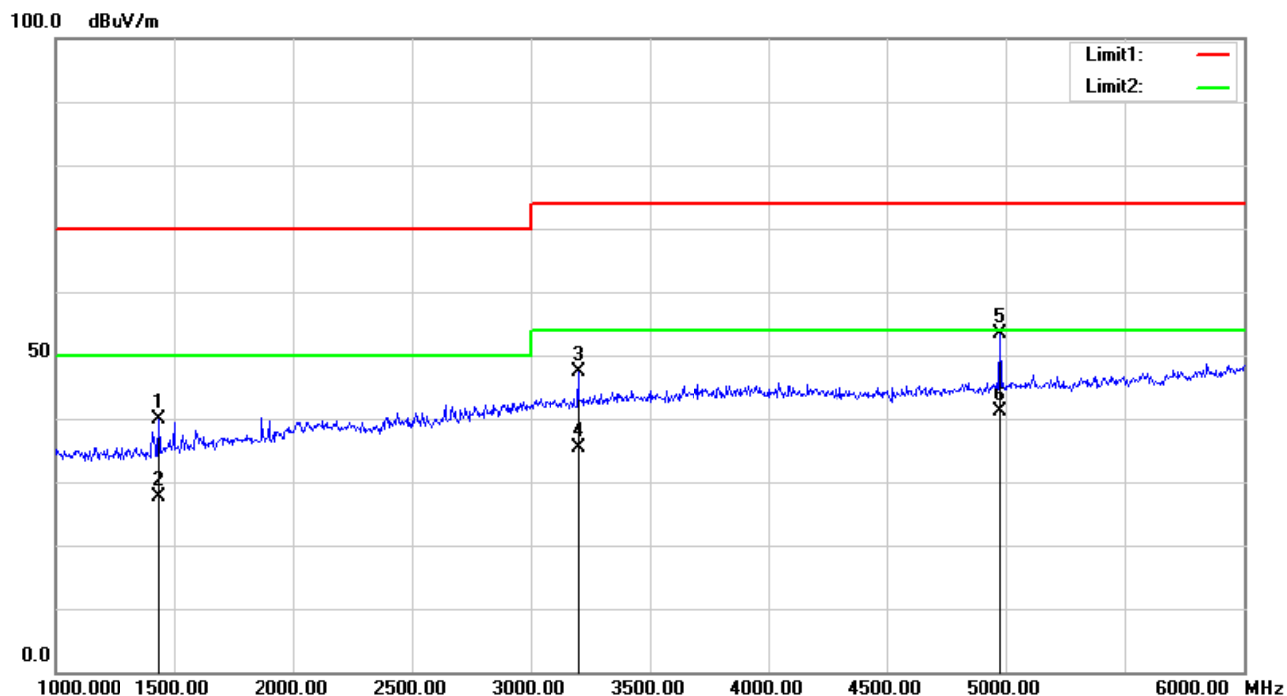
Polarization: Horizontal
Power: AC 110V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1902.500	45.03	peak	2.37	47.40	70.00	22.60
2	1902.500	33.02	AVG	2.37	35.39	50.00	14.61
3	3200.000	41.86	peak	6.87	48.73	74.00	25.27
4	3200.000	29.65	AVG	6.87	36.52	54.00	17.48
5	4977.500	37.97	peak	10.84	48.81	74.00	25.19
6	4977.500	25.83	AVG	10.84	36.67	54.00	17.33

Condition: EN 55032 Class B
EUT: GPON ONT
Model: HG1
Test Mode: Normal work
Note:

Polarization: Vertical
Power: AC 110V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1435.000	39.17	peak	0.61	39.78	70.00	30.22
2	1435.000	27.08	AVG	0.61	27.69	50.00	22.31
3	3200.000	40.54	peak	6.87	47.41	74.00	26.59
4	3200.000	28.39	AVG	6.87	35.26	54.00	18.74
5	4977.500	42.42	peak	10.84	53.26	74.00	20.74
6	4977.500	30.35	AVG	10.84	41.19	54.00	12.81

3 - ELECTROSTATIC DISCHARGES IEC 61000-4-2

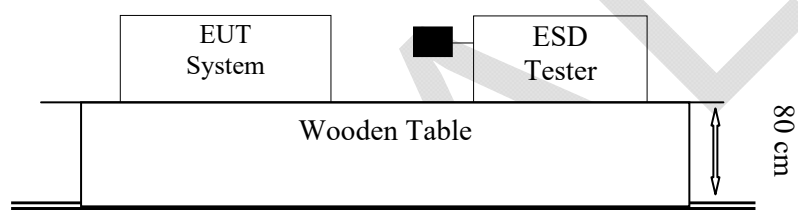
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-2) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	$\leq 15\%$	15%
Peak current I_p	$\leq 7\%$	6.30%
Current at 30 ns	$\leq 7\%$	6.30%
Current at 60 ns	$\leq 7\%$	6.30%

Note: 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.

Test System Setup



Remark: ■ is the tip of the electrode

IEC61000-4-2 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

EN 55035:2017+A11:2020(IEC 61000-4-2:2008)

Test level 3 for Air Discharge at ± 8 kV

Test level 2 for Contact Discharge at ± 4 kV

Test Level

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

Performance criteria: 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 IEC 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 $0.5\text{m} \times 0.5\text{m}$, 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: Normal work

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	/	/
RJ45 Port	A	A	A	A	A	A	/	/
FIBER Port	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/
Indicator light	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
/	/	/	/	/	/	/	/	/

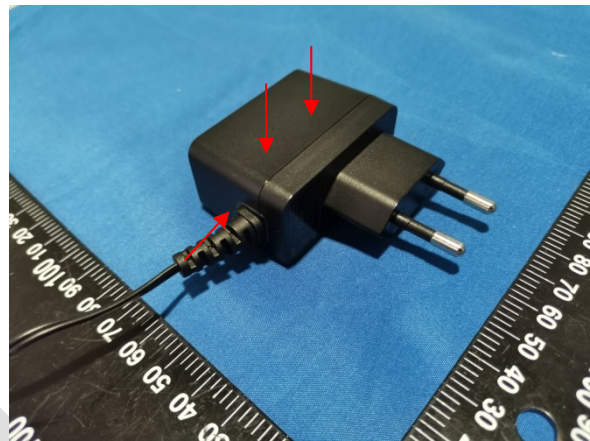
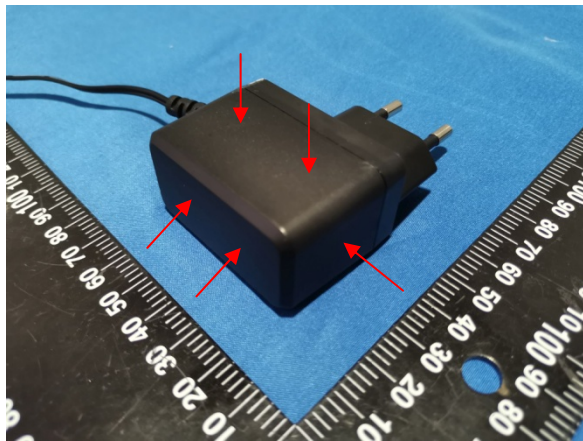
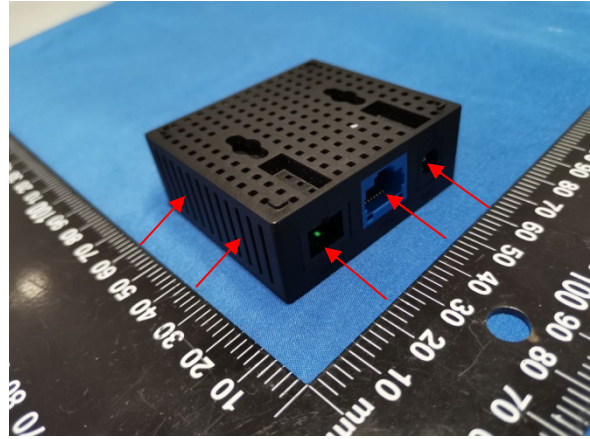
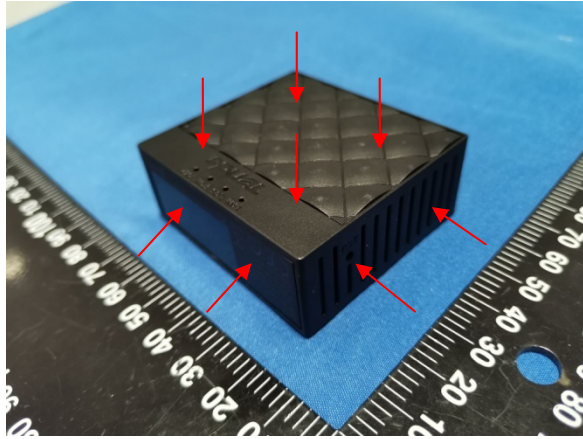
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

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



Air Discharge:



Direct Contact:



4 - CONTINUOUS RADIATED DISTURBANCES IEC 61000-4-3

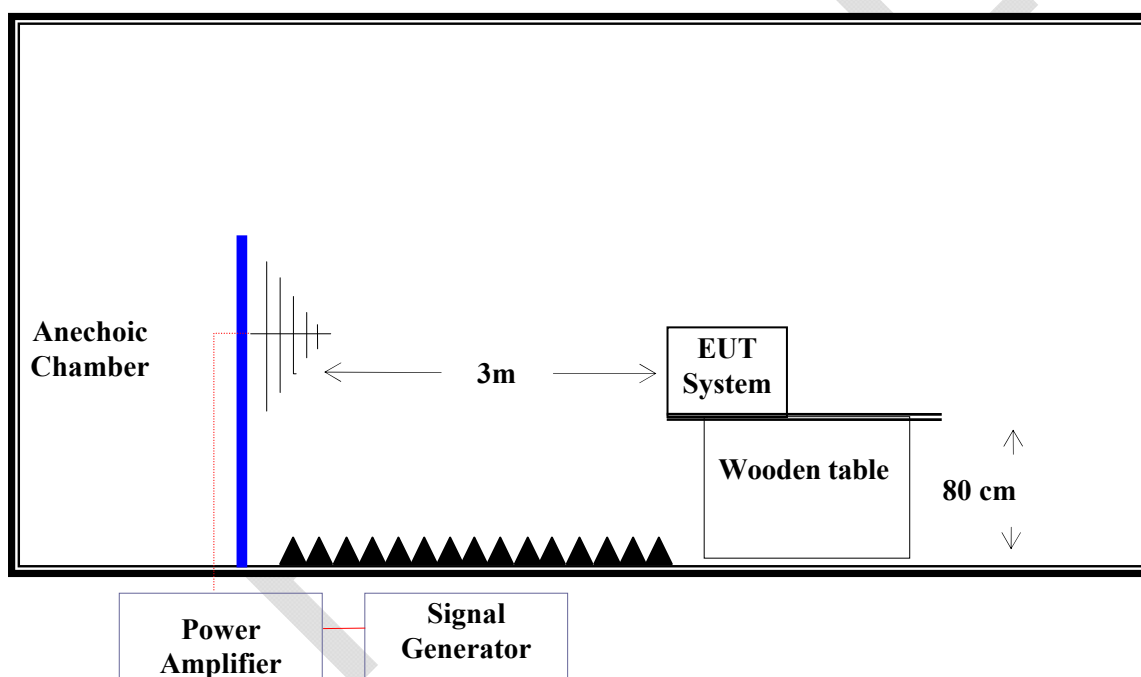
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-3) please refer to the following:

Parameter	U_{EN}	U_{lab}
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

Note: 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.

Test System Setup



Test Standard

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 criteria: 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. In order to judge the EUT performance, a CCD camera is used to monitor the EUT.

Test Data

Please refer to following tables:

Test Mode: Normal work

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

Table 1: Radiated RF-Electromagnetic Field Immunity

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

Table 2: Radiated RF-Electromagnetic Field Immunity

Spot Test (MHz)	Front Side		Rear Side		Left Side		Right Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
1800, 2600, 3500, 5000	A	A	A	A	A	A	A	A

5 - CONTINUOUS CONDUCTED DISTURBANCES IEC 61000-4-6

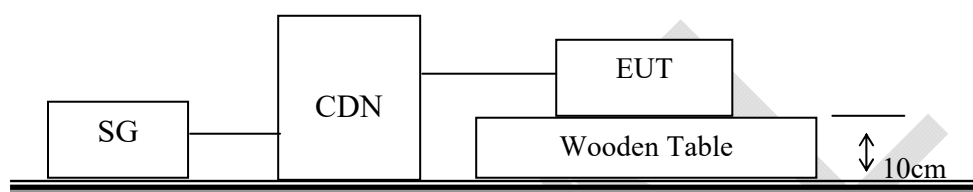
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-6) please refer to the following:

Parameter	U_{EN}	U_{lab}
CDN calibration process	1.27 dB	1.27 dB
CDN test process	1.36 dB	1.36 dB

Note: 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.

Test Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-6:2008)

Test level 2 at 3 V (r.m.s.), 0.15MHz ~ 80MHz,

Test Level

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

Performance criteria: A

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m 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 80MHz 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: Normal work

Note:

Table 1: ACmains power input port

Frequency range: 150kHz to 80MHz

■ Modulated: Amplitude 80%, 1kHz sine wave □ Unmodulated
Dwell Time 1 Sec

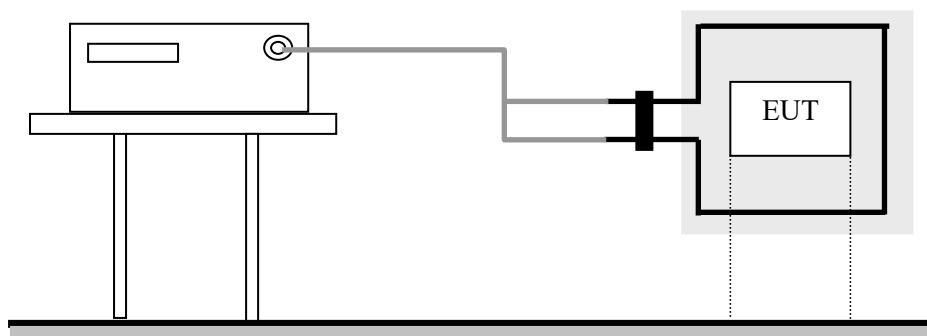
Frequency(MHz)	Voltage Level	Pass	Fail
0.15-10	3V	A	/
10-30	3V-1V		
30-80	1V		

Table 3: Signal Port : RJ45

Frequency range: 150 kHz to 80MHz

■ Modulated: Amplitude 80%, 1kHz sine wave □ Unmodulated □ Other:
Dwell Time 1 Sec

Frequency(MHz)	Voltage Level	Pass	Fail
0.15-10	3V	A	/
10-30	3V-1V		
30-80	1V		

6 - POWER FREQUENCY MAGNETIC FIELDS 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 criteria: A**Test Procedure**

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

Test Data

Please refer to following tables:

Test Mode: Normal work

Note:

Severity Level: 1 A/m(r. m. s)

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	/	/	/

7 - ELECTRICAL FAST TRANSIENTS/BURST IEC 61000-4-4

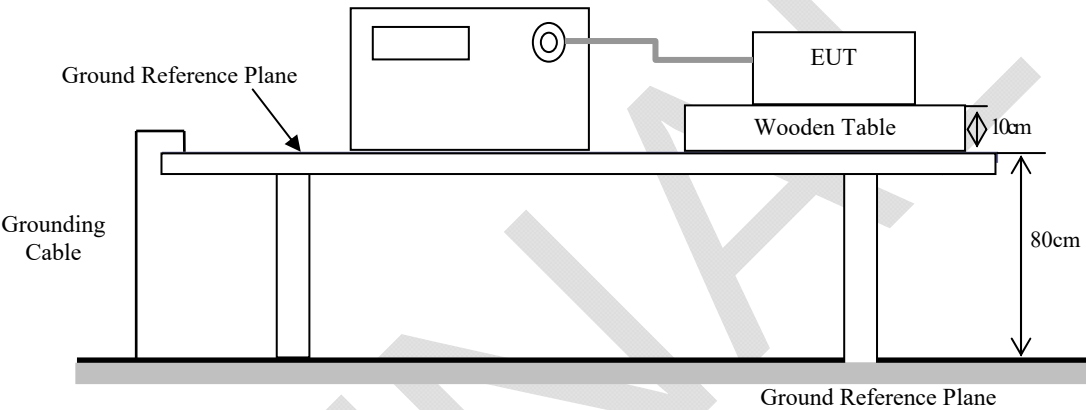
Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-4) please refer to the following:

Parameter	U_{EN}	U_{lab}
Rise time t_r	6.20%	6.20%
Peak voltage value V_p	8.60%	8.60%
Voltage pulse width t_w	5.90%	5.90%

Note: 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.

Test System Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-4:2012)
AC mains: Test level 2 at1 kV

Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
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 criteria: 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:

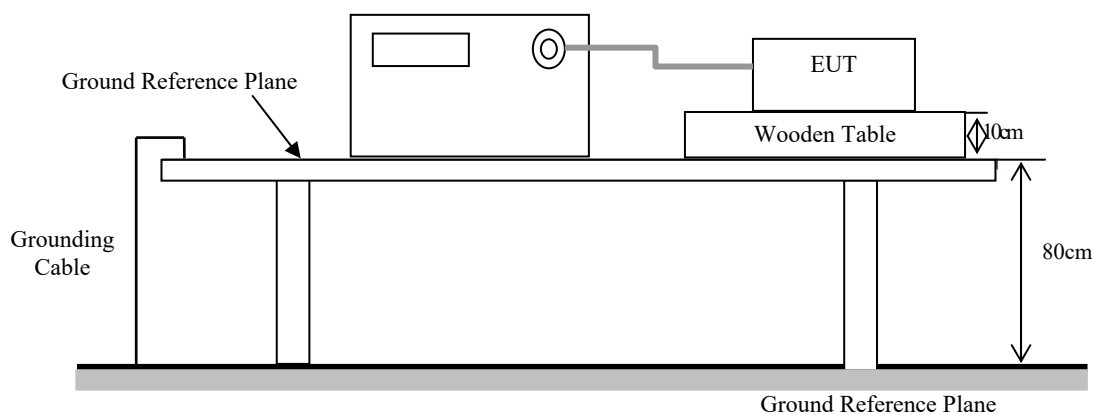
Test Mode: Normal work

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	/	/	/	/	/	/

8 - SURGES IEC 61000-4-5

Test System Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-5:2005)

AC Mains: L-N: Test level 2 at 1kV

Test Level

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

Performance criteria: B

Test Procedure

- 1) Provide disturbance signal described below is injected to EUT.
- 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: Normal work

Note:

Table 1: _____ **AC mains power input port**

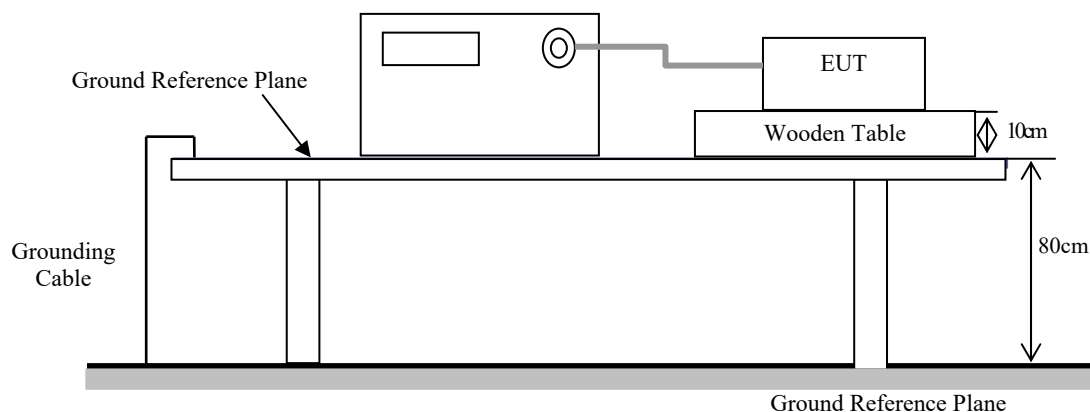
Level	Voltage	Poll	Path	Phase Angle	Pass	Fail
1	0.5kV	+	Line- neutral	90	A	/
1	0.5kV	-	Line- neutral	270	A	/
2	1kV	+	Line- neutral	90	A	/
2	1kV	-	Line- neutral	270	A	/

Table 2: RJ45I/O Circuit and Lines

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

9 - VOLTAGE DIPS AND SHORT INTERRUPTIONS IEC 61000-4-11

Test Setup



Test Standard

EN 55035:2017+A11:2020 (IEC 61000-4-11:2004)
Test levels and Performance Criterion

Test Level

Test Level	U2 (% Reduction)	Duration (Periods)	Performance Criteria
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

Please refer to following tables:

Test Mode: Normal work

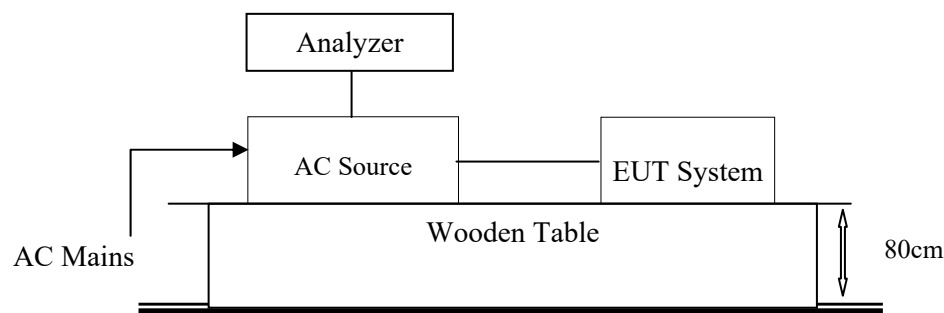
Note: B indicates that EUT charging was interrupted during the test,
but it can automatically resume normal use after the test.

Table 1: Voltage Dips/Interruptions Test

U2 (% Reduction)	Td (Periods)	Phase Angle	N	Result
>95	0.5	0/90/180/270	3	A
30	25	0/90/180/270	3	A
>95	250	0/90/180/270	3	B

11 – VOLTAGE FLUCTUATIONS 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 P_{st} 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, d_c , shall not exceed 3,3 %;
- the maximum relative voltage change d_{max} , 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 P_{st} and Plt limit. For example: a d_{max} 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

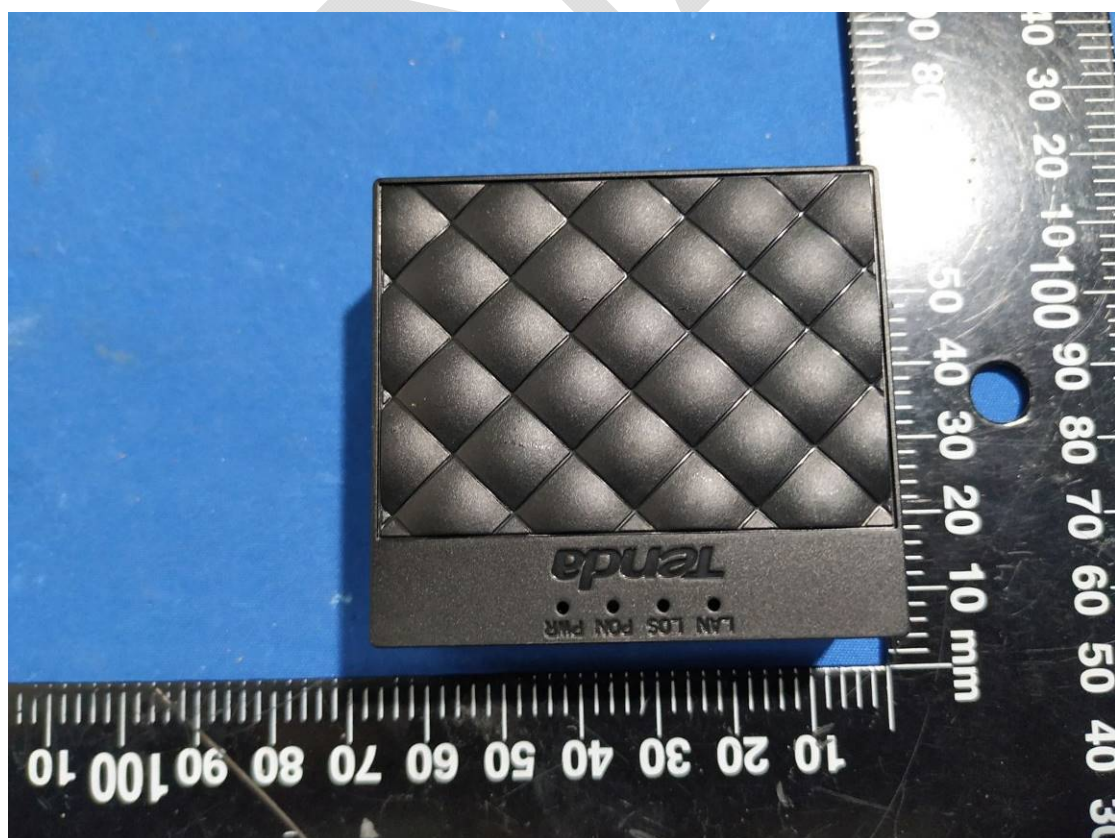
Please refer to following tables:

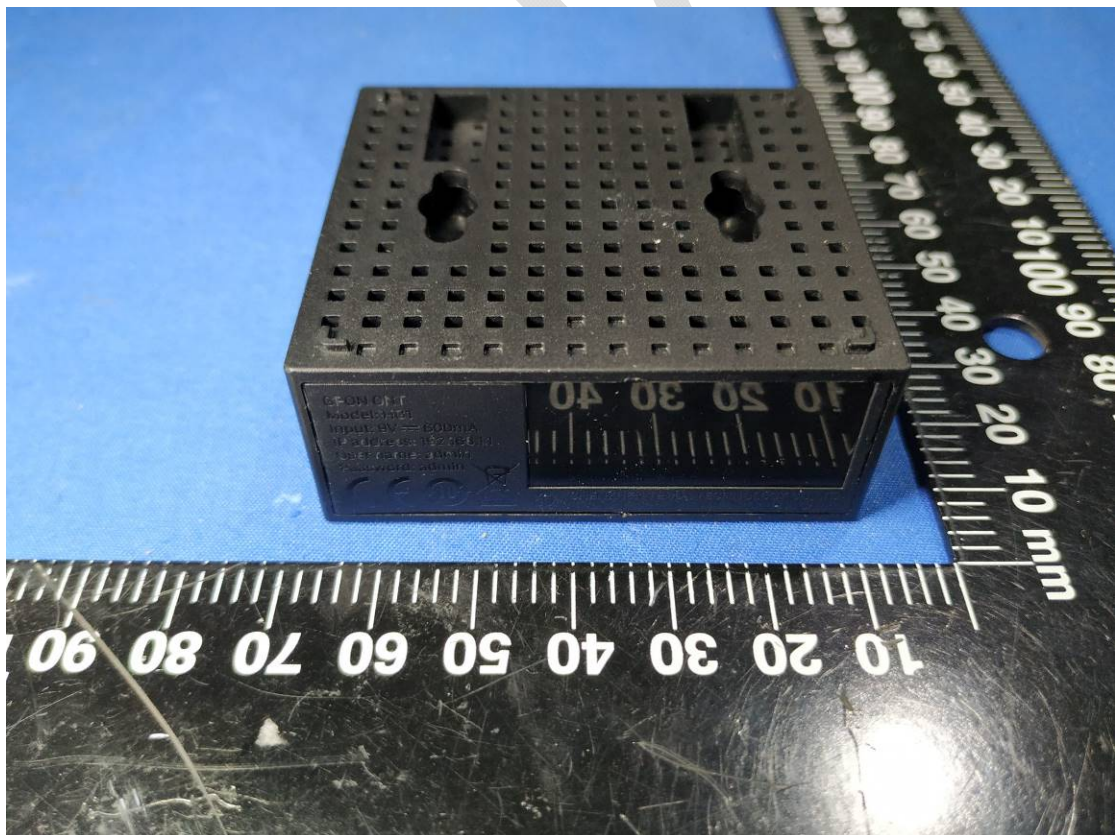
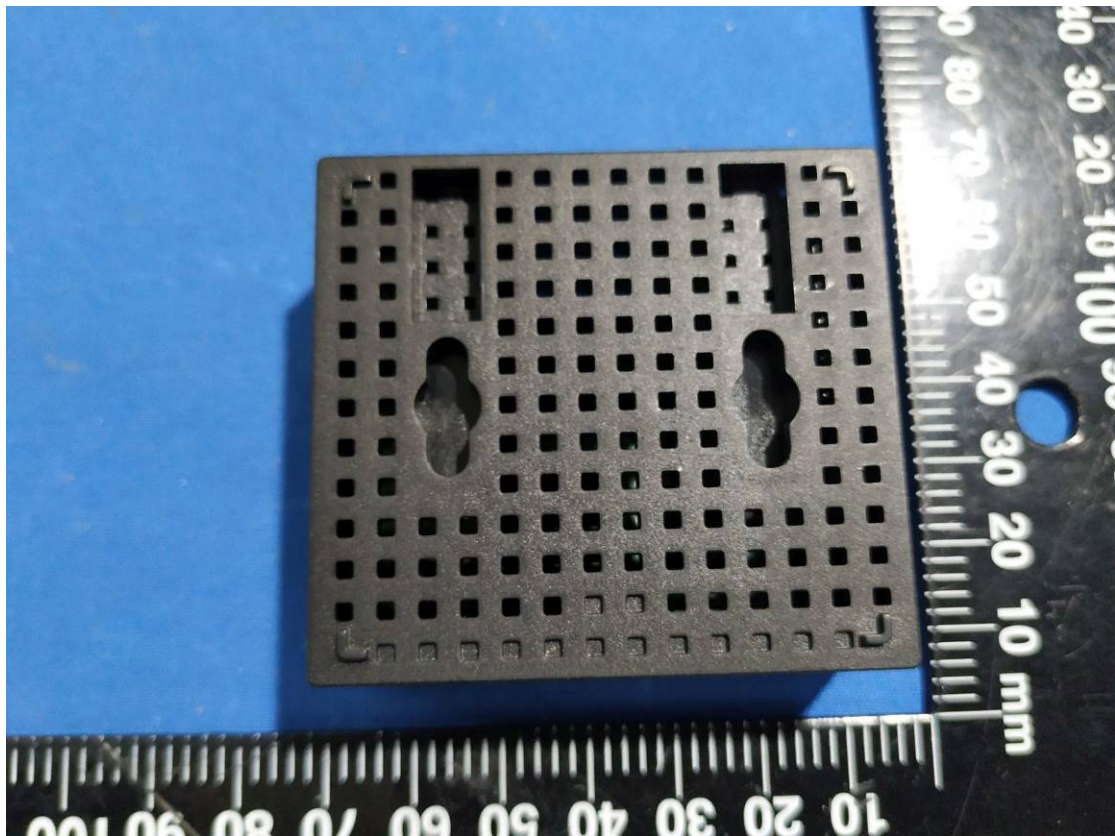
Short time (Pst): 10 min
Observation time: 120 min (12 Flicker measurement)
Test Mode: Normal work
Power Source: AC 230V/50Hz
Test Result: PASS

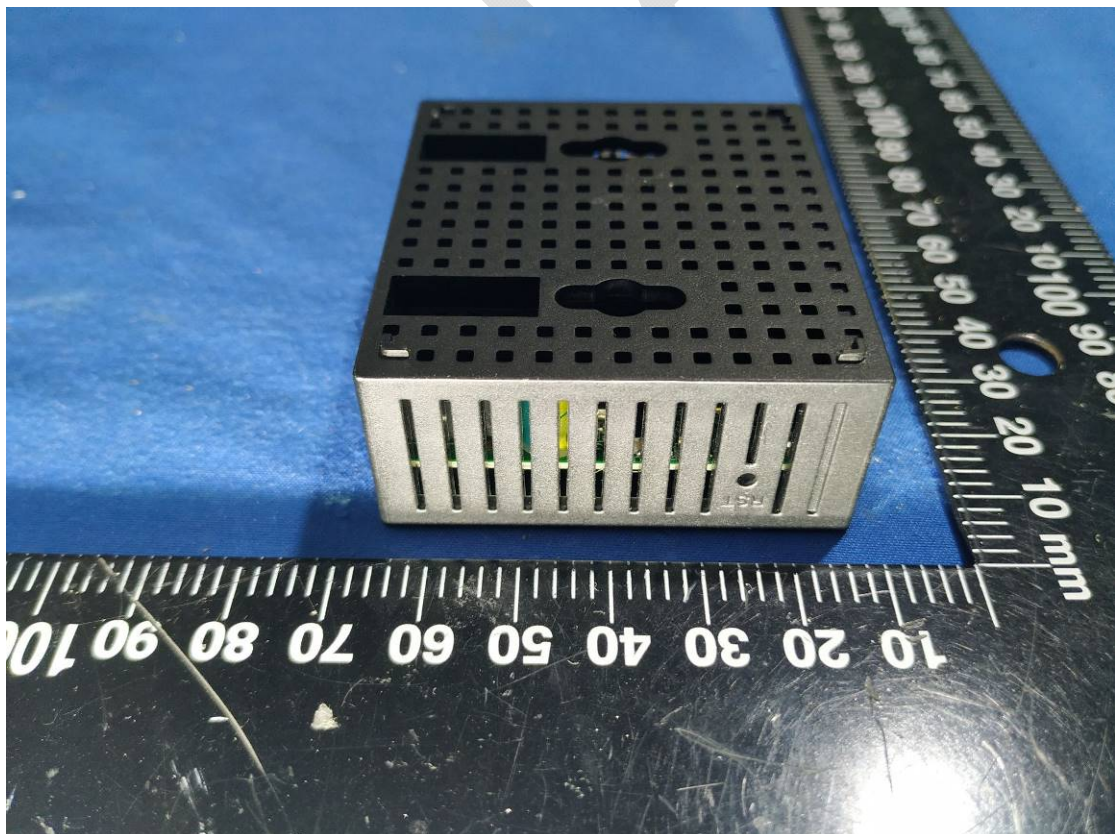
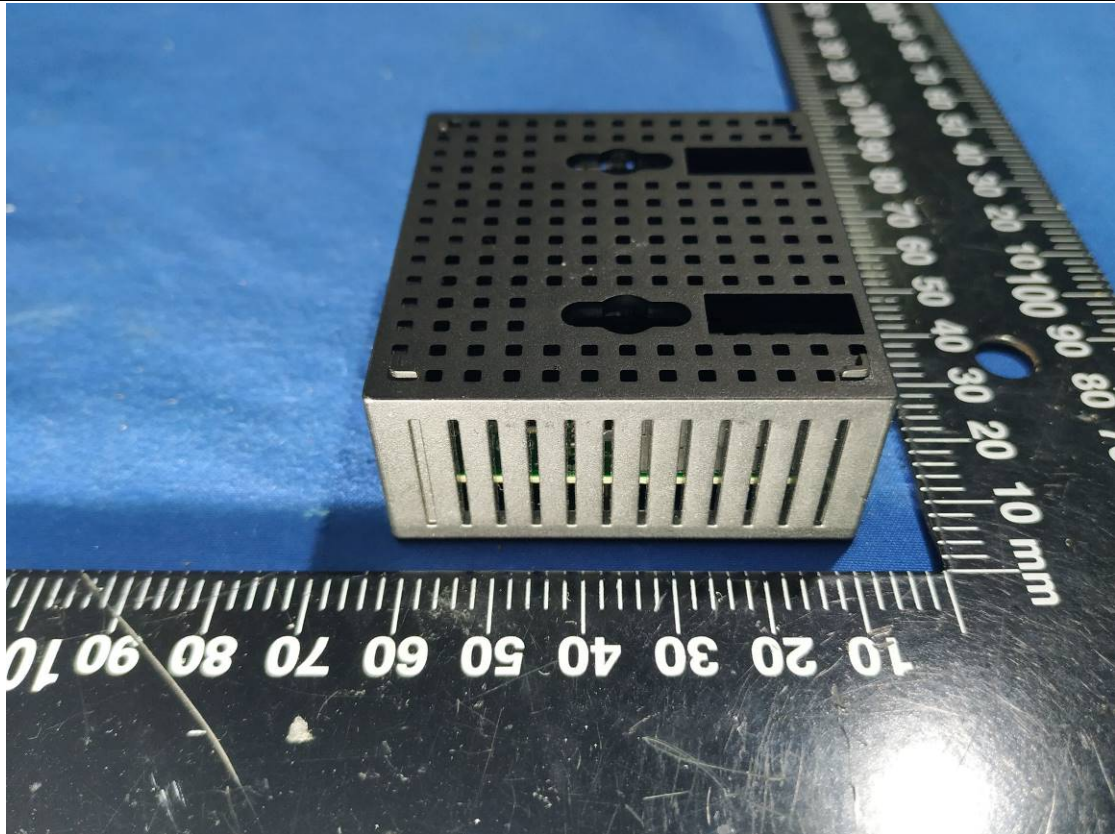
Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.012	3.30	PASS
dmax [%]	0.250	4.00	PASS
dt [s]	0.000	0.50	PASS

EXHIBITA – EUT PHOTOGRAPHS

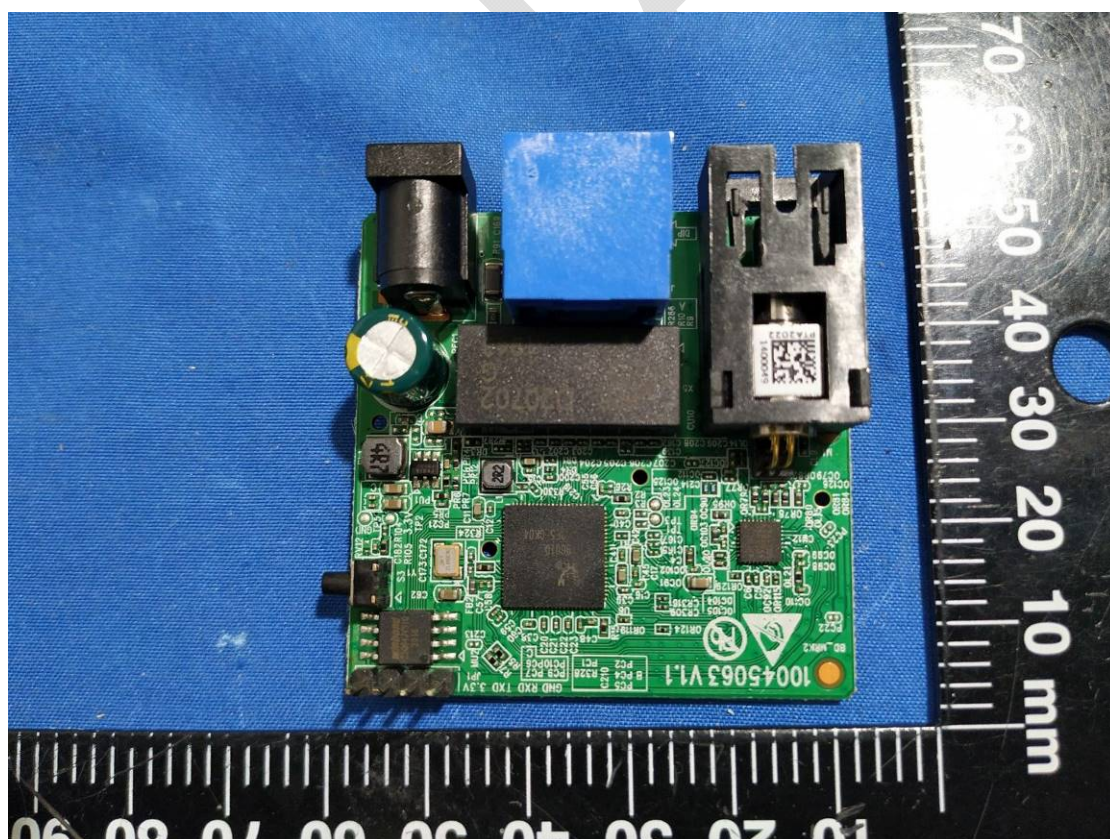
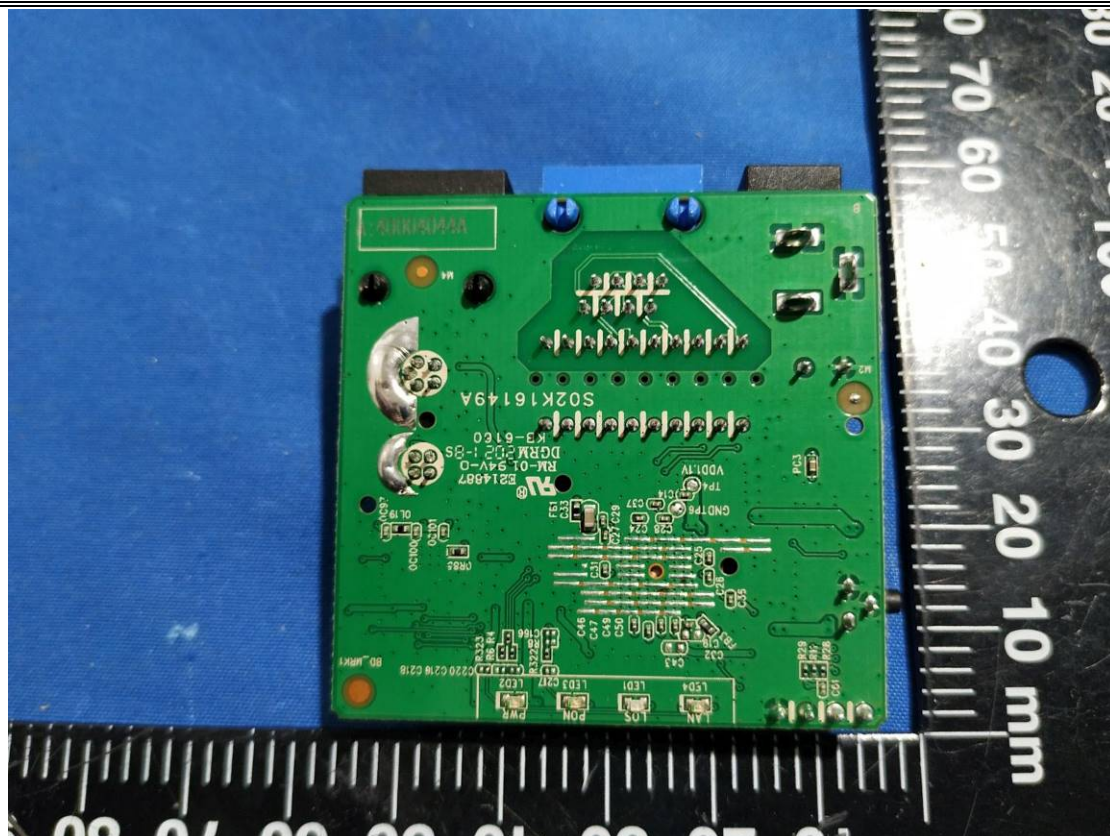


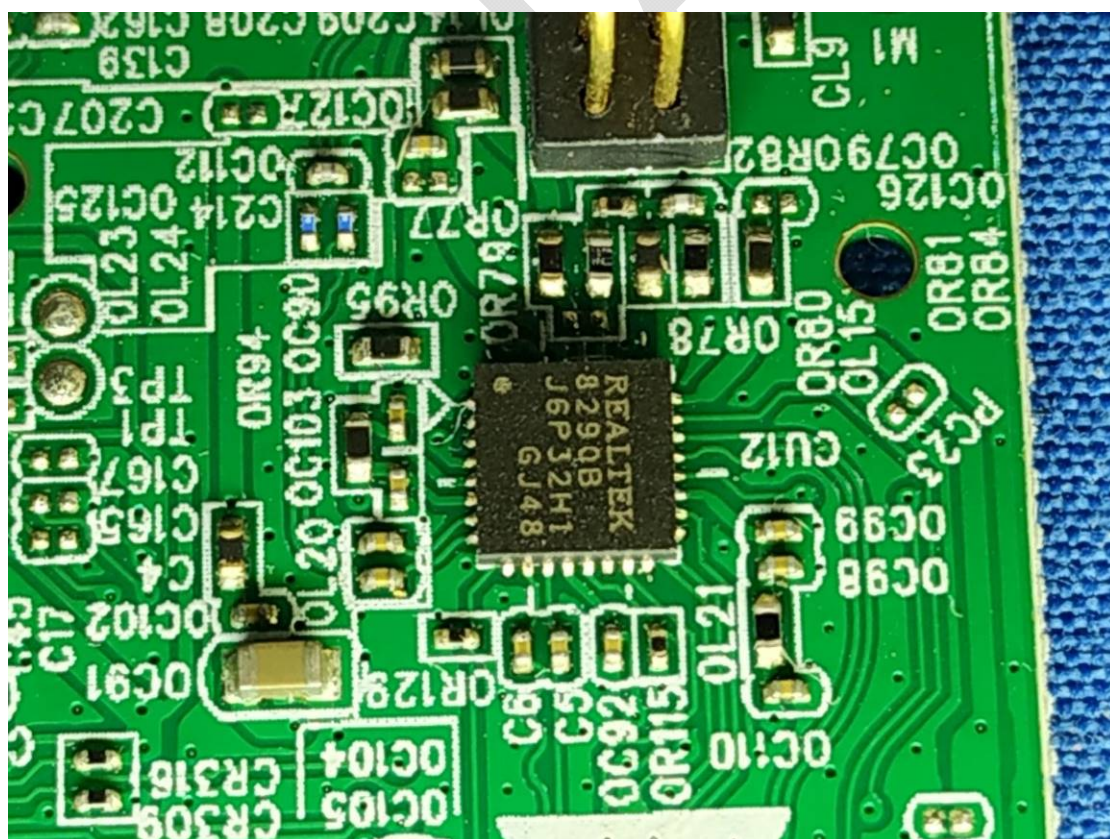














EXHIBITB – TEST SETUP PHOTOGRAPHS

CE

CE front View



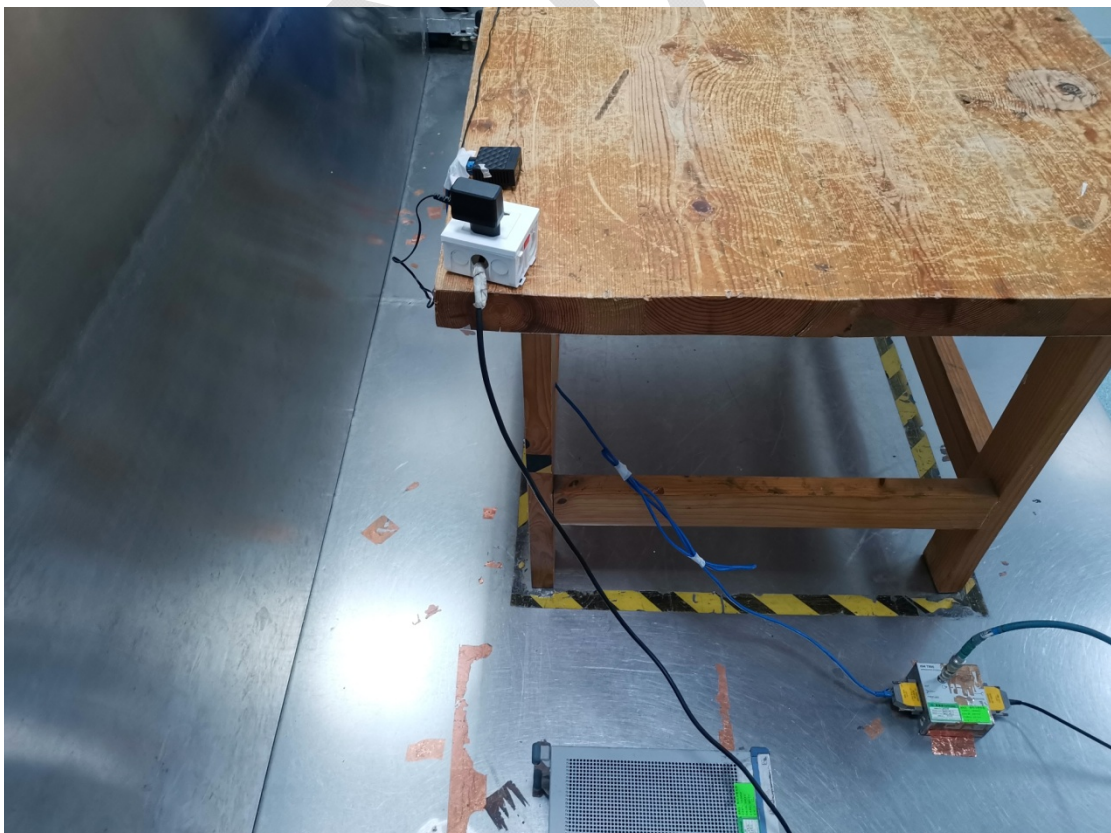
CE side View



CE front-ISM View

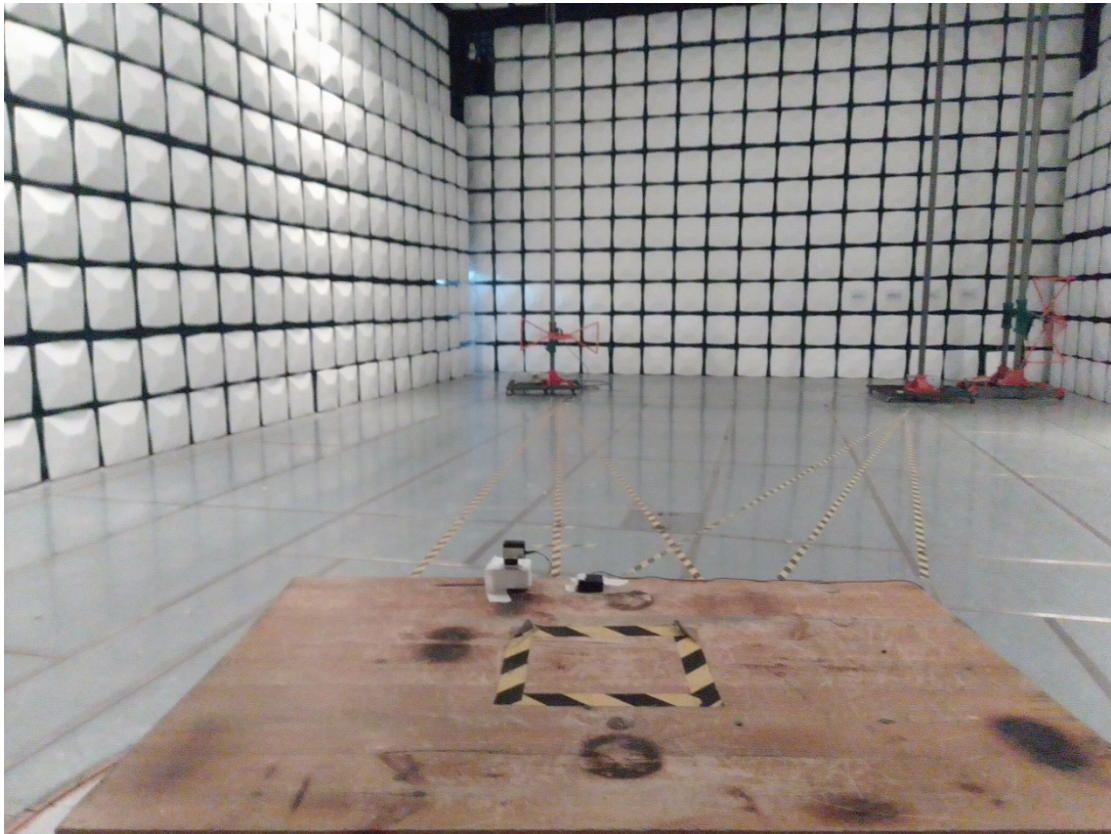


CE side-ISM View

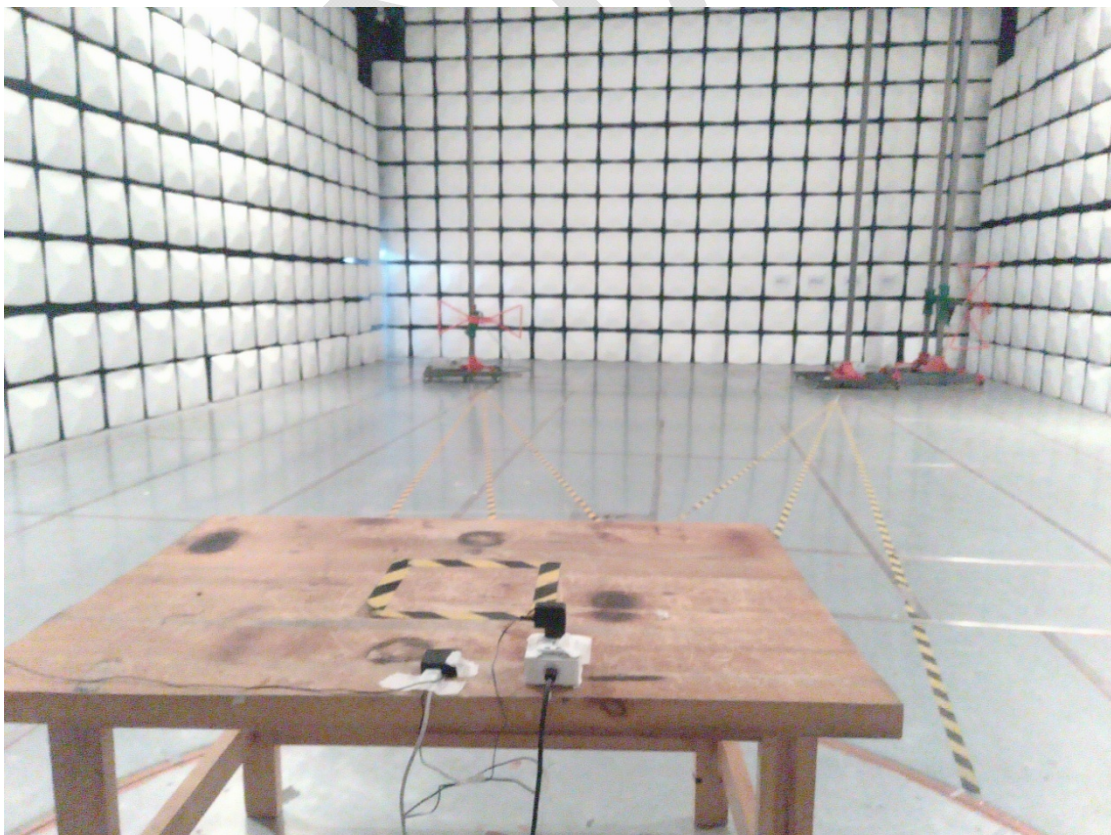


RE

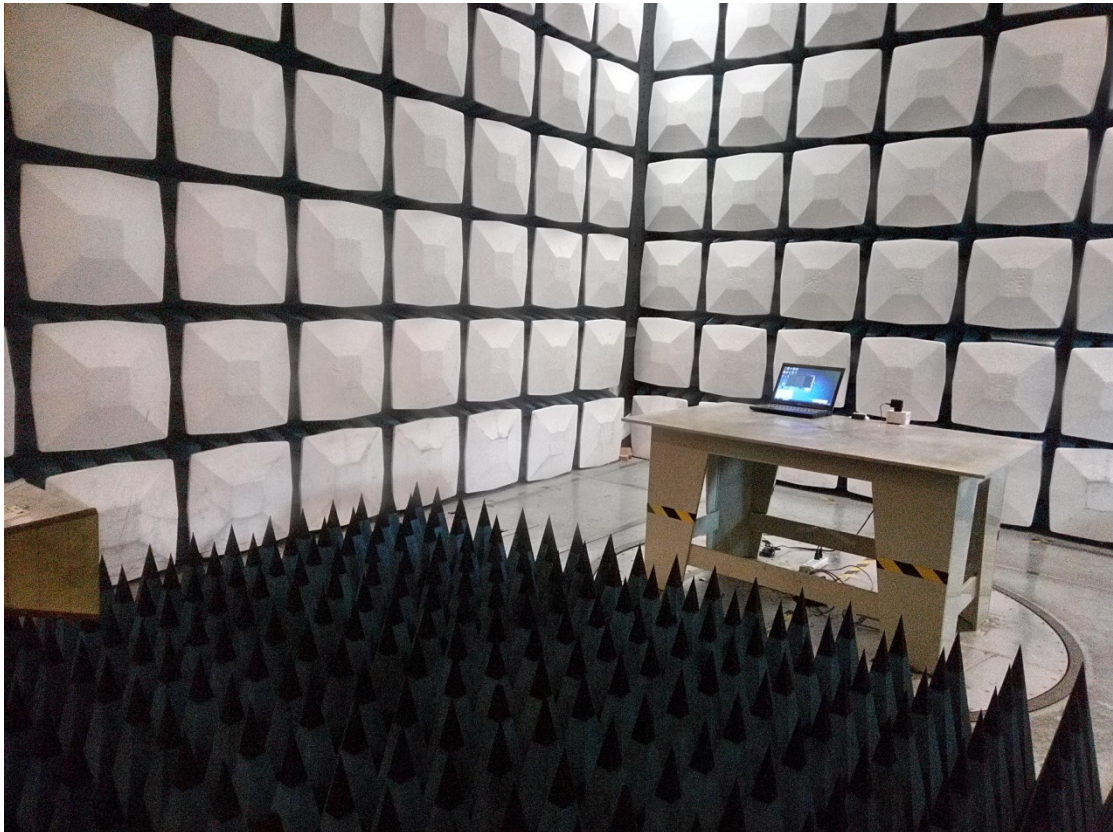
RE Below 1G front View



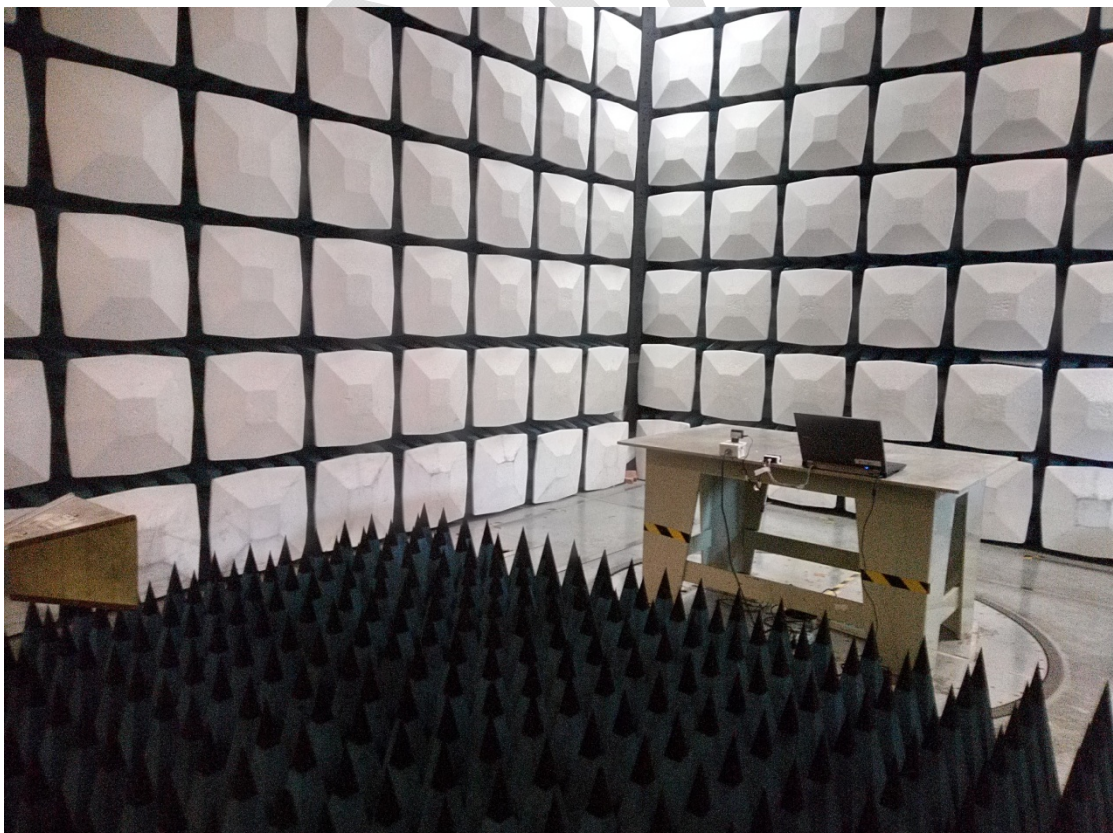
RE Below 1G rear View



RE above 1G front View



RE above 1G rear View



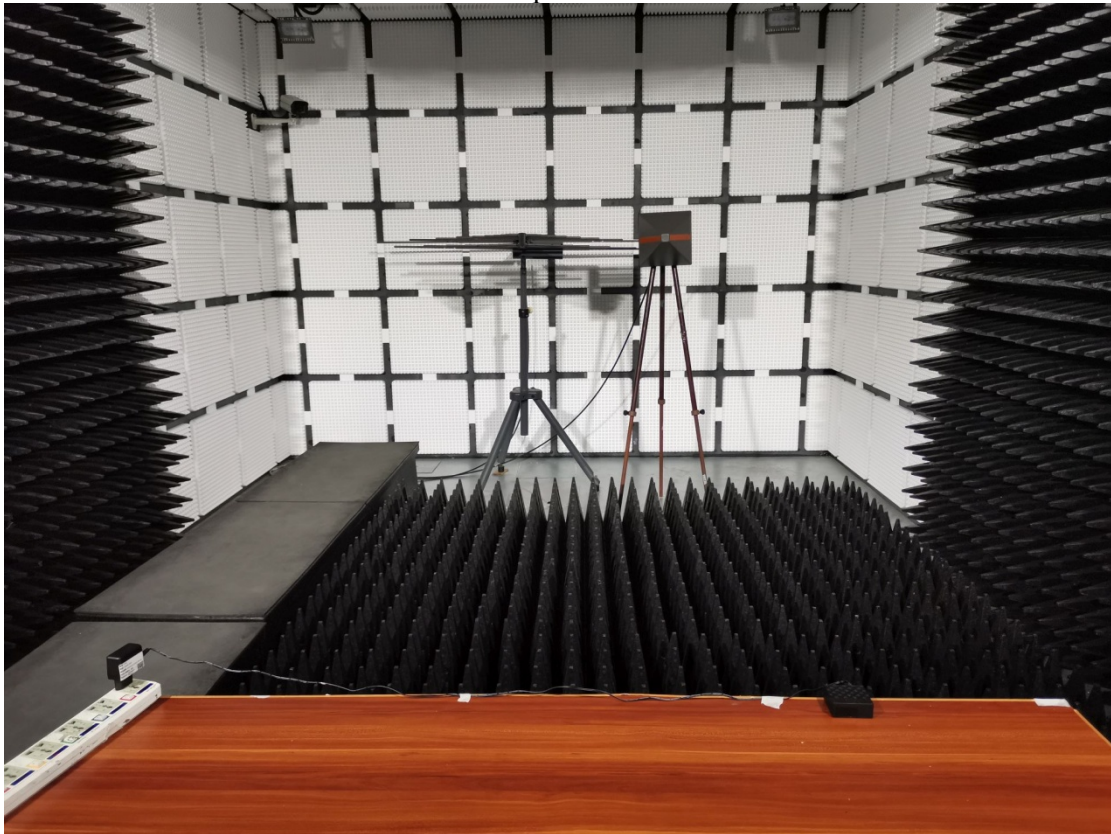
ESD

Test Setup Photo View



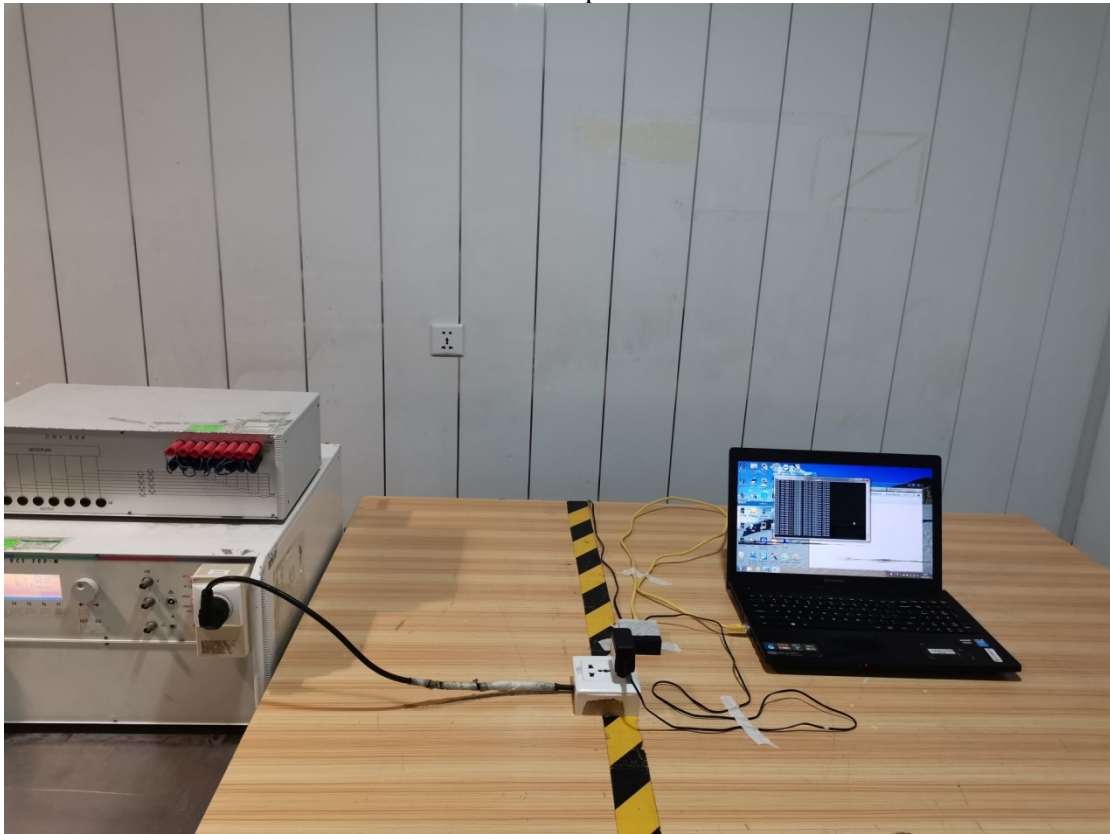
RS

Test Setup Photo View



EFT

AC Port Test Setup Photo View

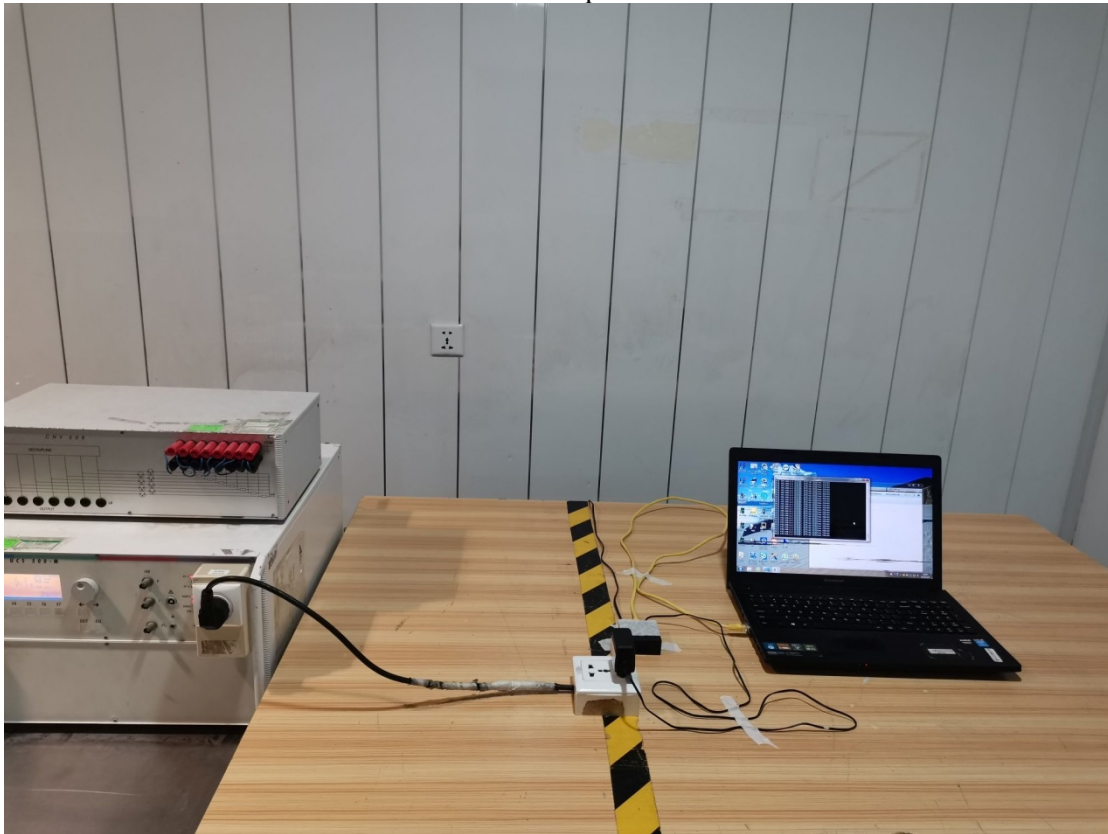


AC Port Test Setup Photo RJ45 View

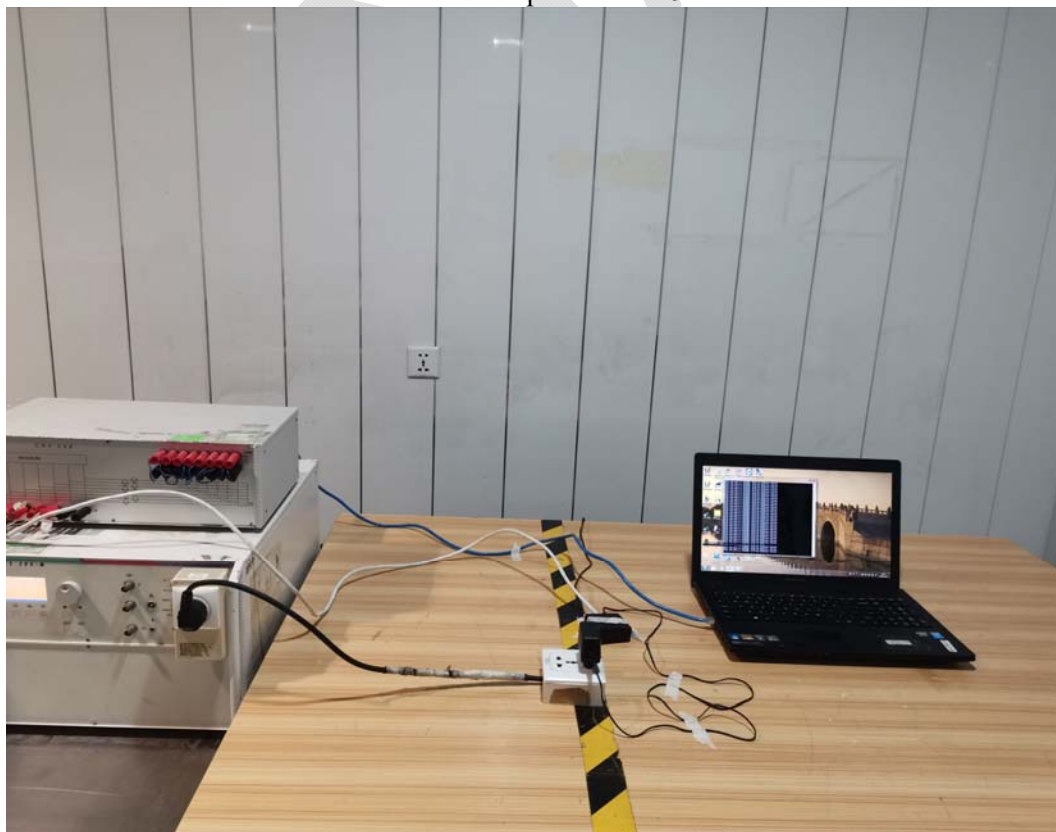


Surge

AC Port Test Setup Photo View



AC Port Test Setup Photo RJ45 View



CS

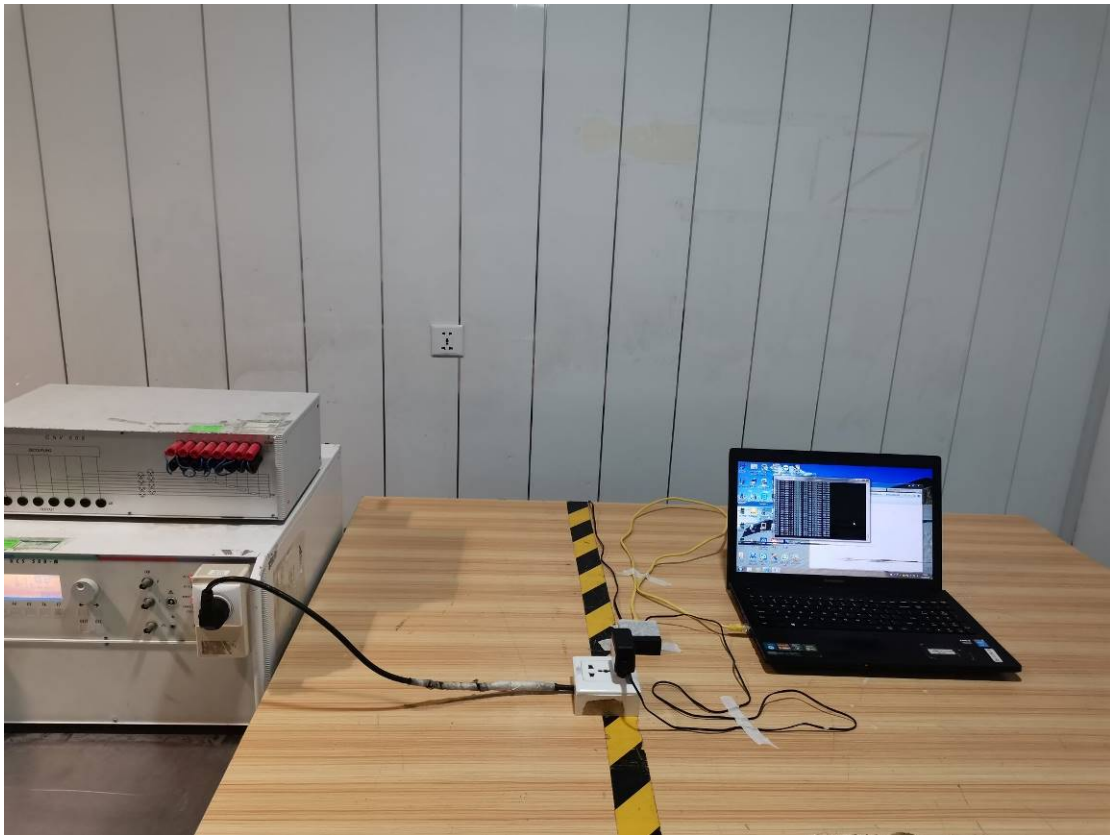
AC Port Test Setup Photo View



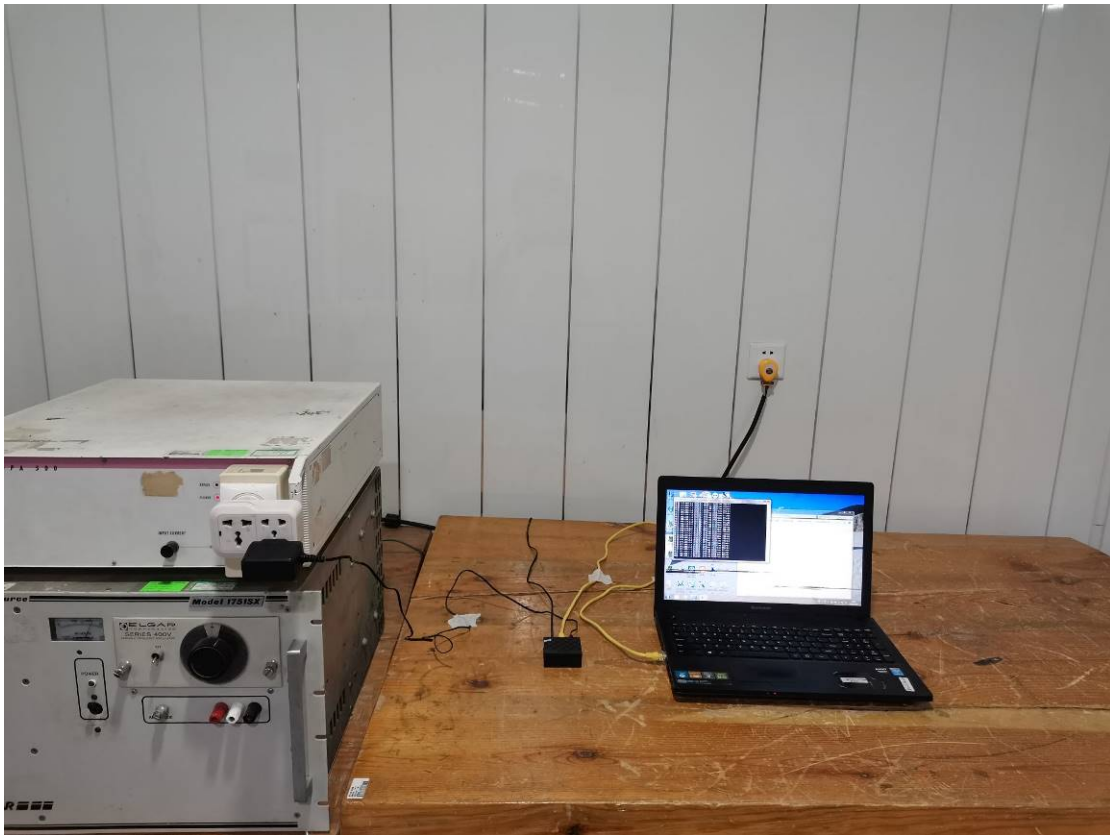
AC Port Test Setup Photo RJ45 View



Dips



Flicker



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