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CNAS L5662



**EN 55032:2015+A11:2020+A1:2020**

**EN 55035:2017+A11:2020**

**EN IEC 61000-3-2:2019+A1:2021**

**EN 61000-3-3:2013+A1:2019+A2:2021**

**BS EN 55032:2015+A11:2020+A1:2020**

**BS EN 55035:2017+A11:2020**

**BS EN IEC 61000-3-2:2019+A1:2021**

**BS EN 61000-3-3:2013+A2:2021**

## **TEST REPORT**

For

**SHENZHEN TENDA TECHNOLOGY CO.,LTD.**

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

**Tested Model: TC3B24C**

<b>Report Type:</b> Original Report		<b>Product Type:</b> Smart IP Camera	
<b>Report Number:</b> 2502R48036E-01			
<b>Report Date:</b> 2025/4/2			
<b>Reviewed By:</b> Joyce Qiao Project Engineer		<i>Joyce Qiao</i>	
<b>Approved By:</b> Dylan Zhang EMC Supervisor			
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## **TABLE OF CONTENTS**

<b>DOCUMENT REVISION HISTORY .....</b>	<b>4</b>
<b>GENERAL INFORMATION .....</b>	<b>5</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	5
OBJECTIVE .....	5
TEST METHODOLOGY .....	5
TEST FACILITY .....	6
DECLARATIONS .....	6
<b>SYSTEM TEST CONFIGURATION .....</b>	<b>7</b>
DESCRIPTION OF TEST CONFIGURATION .....	7
EQUIPMENT MODIFICATIONS .....	7
EUT EXERCISE SOFTWARE .....	7
SUPPORT EQUIPMENT LIST AND DETAILS .....	7
SUPPORT CABLE LIST AND DETAILS .....	7
BLOCK DIAGRAM OF TEST SETUP .....	8
TEST EQUIPMENT LIST .....	9
ENVIRONMENTAL CONDITIONS .....	10
<b>SUMMARY OF TEST RESULTS .....</b>	<b>11</b>
<b>1 - CONDUCTED EMISSIONS .....</b>	<b>12</b>
MEASUREMENT UNCERTAINTY .....	12
TEST SYSTEM SETUP .....	12
EMI TEST RECEIVER SETUP .....	13
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	13
TEST PROCEDURE .....	13
TEST DATA .....	14
<b>2 - RADIATED EMISSIONS .....</b>	<b>22</b>
MEASUREMENT UNCERTAINTY .....	22
TEST SYSTEM SETUP .....	22
EMI TEST RECEIVER AND SPECTRUM ANALYZER SETUP .....	24
TEST PROCEDURE .....	24
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	25
TEST DATA .....	26
<b>3 - ELECTROSTATIC DISCHARGES IEC 61000-4-2 .....</b>	<b>34</b>
MEASUREMENT UNCERTAINTY .....	34
TEST SYSTEM SETUP .....	34
TEST STANDARD .....	34
TEST PROCEDURE .....	35
TEST DATA .....	36
<b>4 - CONTINUOUS RADIATED DISTURBANCES IEC 61000-4-3 .....</b>	<b>38</b>
MEASUREMENT UNCERTAINTY .....	38
TEST SYSTEM SETUP .....	38
TEST STANDARD .....	38
TEST LEVEL .....	39
TEST PROCEDURE .....	39
TEST DATA .....	40
<b>5 - CONTINUOUS CONDUCTED DISTURBANCES IEC 61000-4-6 .....</b>	<b>41</b>
MEASUREMENT UNCERTAINTY .....	41
TEST SETUP .....	41
TEST STANDARD .....	41
TEST PROCEDURE .....	42
TEST DATA .....	42

<b>6 - POWER FREQUENCY MAGNETIC FIELDS IEC 61000-4-8.....</b>	<b>43</b>
TEST SETUP.....	43
TEST STANDARD .....	43
TEST LEVEL .....	43
TEST PROCEDURE.....	43
TEST DATA.....	44
<b>7 - ELECTRICAL FAST TRANSIENTS/BURST IEC 61000-4-4 .....</b>	<b>45</b>
MEASUREMENT UNCERTAINTY .....	45
TEST SYSTEM SETUP .....	45
TEST STANDARD .....	45
TEST PROCEDURE.....	46
TEST DATA.....	46
<b>8 - SURGES IEC 61000-4-5.....</b>	<b>48</b>
TEST SYSTEM SETUP .....	48
TEST STANDARD .....	48
TEST PROCEDURE.....	48
TEST DATA.....	49
<b>9 -VOLTAGE DIPS AND SHORT INTERRUPTIONS IEC 61000-4-11 .....</b>	<b>51</b>
TEST SETUP.....	51
TEST STANDARD .....	51
TEST PROCEDURE.....	51
TEST DATA.....	52
<b>11 -VOLTAGE FLUCTUATIONS AND FLICKER.....</b>	<b>53</b>
TEST SYSTEM SETUP .....	53
TEST STANDARD .....	53
TEST DATA.....	54
<b>EXHIBIT A - EUT PHOTOGRAPHS .....</b>	<b>55</b>
<b>EXHIBIT B - TEST SETUP PHOTOGRAPHS.....</b>	<b>66</b>
CONDUCTED EMISSIONS .....	66
RADIATED EMISSIONS .....	70
ESD .....	74
RS .....	75
EFT .....	76
DIPS .....	78
CS .....	79
FLICKER .....	81
SURGE .....	82
PFMF .....	84

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2502R48036E-01	Original Report	2025/4/2

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

<b>EUT Name:</b>	Smart IP Camera
<b>EUT Model:</b>	TC3B24C
<b>Rated Input Voltage:</b>	DC12V from adapter or DC48V from POE
<b>The Highest Operating Frequency<sup>▲</sup>:</b>	1000MHz
<b>Serial Number:</b>	2ZQT-1
<b>EUT Received Date:</b>	2025/3/14
<b>EUT Received Status:</b>	Good

### Objective

This report is prepared on behalf of **SHENZHEN TENDA TECHNOLOGY CO.,LTD.** in accordance with EN 55032:2015+A11:2020+A1:2020 and BS EN 55032:2015+A11:2020+A1:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements; EN 55035:2017+A11:2020 and BS EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment - Immunity requirements; EN IEC 61000-3-2:2019+A1:2021 and BS EN IEC 61000-3-2:2019+A1:2021 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase); EN 61000-3-3:2013+A1:2019+A2:2021 and BS EN 61000-3-3:2013+A2:2021 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  $\leq 16$  A per phase and not subject to conditional connection.

The objective is to determine the compliance of EUT with:

EN 55032:2015+A11:2020+A1:2020  
EN 55035:2017+A11:2020  
EN IEC 61000-3-2:2019+A1:2021  
EN 61000-3-3:2013+A1:2019+A2:2021  
BS EN 55032:2015+A11:2020+A1:2020  
BS EN 55035:2017+A11:2020  
BS EN IEC 61000-3-2:2019+A1:2021  
BS EN 61000-3-3:2013+A2:2021.

### Test Methodology

All measurements contained in this report were conducted with EN 55032:2015+A11:2020+A1:2020 and BS EN 55032:2015+A11:2020+A1:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements; EN 55035:2017+A11:2020 and BS EN 55035:2017+A11:2020 Electromagnetic compatibility of multimedia equipment - Immunity requirements; EN IEC 61000-3-2:2019+A1:2021 and BS EN IEC 61000-3-2:2019+A1:2021 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase); EN 61000-3-3:2013+A1:2019+A2:2021 and BS EN 61000-3-3:2013+A2:2021 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  $\leq 16$  A per phase and not subject to conditional connection.

## Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.

## Declarations

The information marked ▲ is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.

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

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Each test item follows the test standard(s) without deviation.

## 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:

Test Mode 1: Normal working ( Powered by Adapter)

Test Mode 2: Normal working ( Powered by POE)

### Equipment Modifications

No modification was made to the EUT.

### EUT Exercise Software

No EUT software is used for testing.

### Support Equipment List and Details

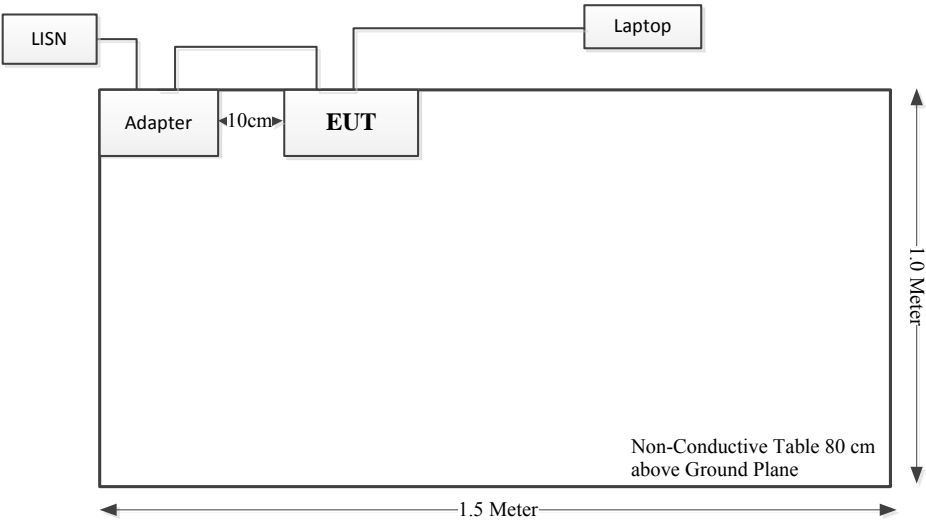
Manufacturer	Description	Model	Serial Number
CWT	Adapter	KPH-040012	1002398
DELL	Laptop	E6410	G4JJPM1
I.T.E	POE	G1080-PoE48G	EMZBPA21206001

### Support Cable List and Details

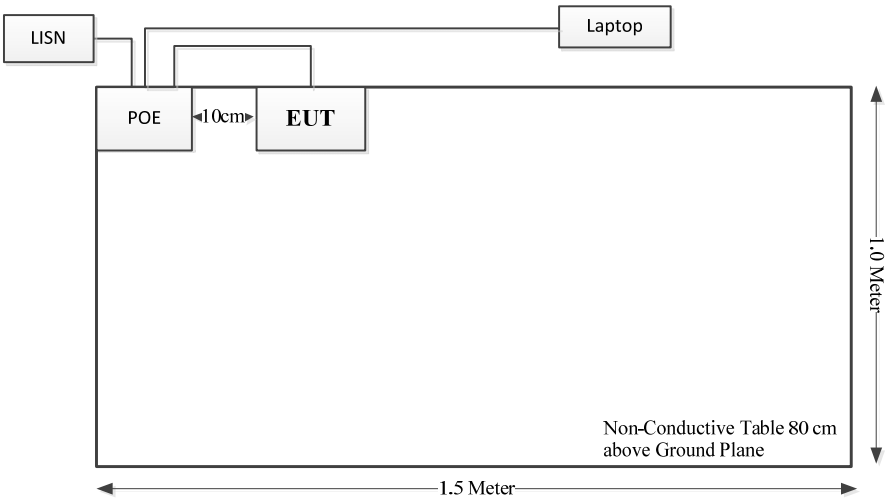
Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	Yes	No	10	EUT	Laptop
AC Cable	No	No	1	LISN	POE
RJ45 Cable	No	No	1	POE	EUT

Block Diagram of Test Setup

Test Mode 1:



Test Mode 2:





## Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV216	101614	2024/9/5	2025/9/4
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2024/9/5	2025/9/4
R&S	EMI Test Receiver	ESCI	101121	2024/9/5	2025/9/4
Audix	Test Software	E3	191218 V9	N/A	N/A
TESEQ	ISN	T800	34379	2024/8/26	2025/8/25
Radiated emissions below 1GHz					
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	185914	2024/8/26	2025/8/25
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25
Audix	Test Software	E3	191218 V9	N/A	N/A
Radiated emissions above 1GHz					
AH	Horn Antenna	SAS-571	1177	2023/2/22	2026/2/21
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2024/7/1	2025/6/30
Mini-Circuits	Preamplifier	ZVZ-183-S+	5696001267	2025/2/14	2026/2/13
R&S	Spectrum Analyzer	FSP 38	100478	2024/9/5	2025/9/4
Audix	Test Software	E3	191218 V9	N/A	N/A
EFT & Surge & Dips					
EM TEST	Single-phase Toroidal Transformer With Autowinding	V4780	0811-10	2024/5/15	2025/5/14
EM TEST	Ultra Compact Generator	UCS 500N5	V1204111721	2024/5/15	2025/5/14
EM TEST	Capacitive Coupling Clamp	HFK	0908-20	2024/5/15	2025/5/14
EM TEST	CDN	CNV 504A	V0523100466	2024/5/15	2025/5/14
Flicker					
EVERFINE	Harmonic & Flicker Measurement System	HFM3000	P630850CD1411115	2024/9/5	2025/9/4
EVERFINE	Harmonic & Flicker Testing Power Source	HFS-4000	P624486CD1411122	2024/9/5	2025/9/4
ESD					
TESEQ	ESD Generator	NSG 438	1019	2024/9/6	2025/9/5
CS					
HP	Signal Generator	8648A	3426A00831	2024/10/17	2025/10/16
AR	Power Amplifier	15A250	12934	N/A	N/A
Werlatone	Dual Directional Coupler	C5091-10	113192	N/A	N/A
NARDA	Coaxial Attenuator	769-6	02754	N/A	N/A
HP	Power Meter	EPM-441A	GB37481494	2024/9/5	2025/9/4
Agilent	Power sensor	8482A	US37296108	2024/9/5	2025/9/4
COM-POWER	CDN	M325E	521064	2024/8/26	2025/8/25

COM-POWER	CDN	T8E	581607	2023/8/18	2026/8/17
PFMF					
Haefely	Magnetic Field Tester	MAG 100.1	080136-09	N/A	N/A
Global Engineering	Loop Antenna	1313-S1-1M	4080511	N/A	N/A
Daoxiang	AC Transformer	TDGC2-5KVA	F-08-EM011	N/A	N/A
FLUKE	Clamp Meter	317	42270435WS	2024/9/6	2025/9/5
F.W.BELL	Gauss Meter	4190	0808 003	2022/4/25	2025/4/24
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A
AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2024/9/5	2025/9/4
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	N/A	N/A
Agilent	Power Meter	E4419B	MY45103907	2024/10/18	2025/10/17
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2024/10/18	2025/10/17
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2024/9/5	2025/9/4

\* 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:	25.4 °C	22.3 °C	20.2 °C	21.4~23 °C	22.9 °C
Relative Humidity:	49%	50%	44%	41~49%	45%
ATM Pressure:	100.2kPa	101.8kPa	101.5kPa	101.8kPa	101.8kPa
Tester:	Yukin Qiu	Zoo Zou	Lancer Zhang	Yolo Fan	Yolo Fan
Test Date:	2025/3/26	2025/3/21	2025/3/31	2025/3/21	2025/3/21

Note:\*The relative humidity of ESD test environment is 46%.

**SUMMARY OF TEST RESULTS**

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

Note:

Not applicable\*: The maximum power of this EUT 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  $U_{cispr}$  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.

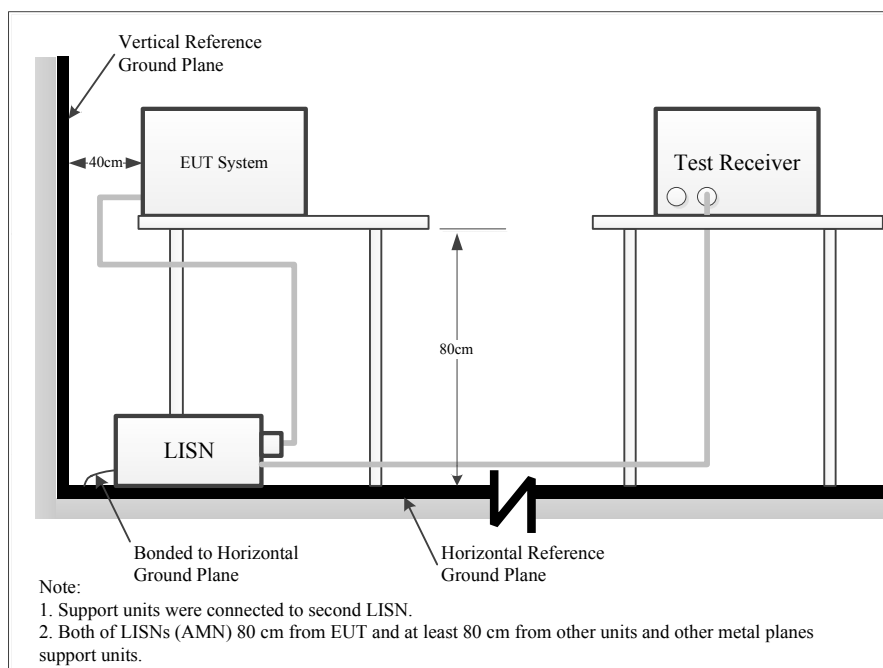
Based on CISPR 16-4-2-2011<sup>\*</sup>, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 dB (150 kHz to 30 MHz), and conducted disturbance at telecommunication port using AAN is 5.0 dB (150 kHz to 30 MHz).

Table 1 - Values of  $U_{cispr}$

Measurement	$U_{cispr}$
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



The setup of EUT is according with CISPR 16-1-1:2010+A1:2010+A2 2014\*, CISPR 16-2-1:2008+A1:2010+A2 2013\* measurement procedure. The specification used was the EN 55032 and BS EN 55032 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.

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.

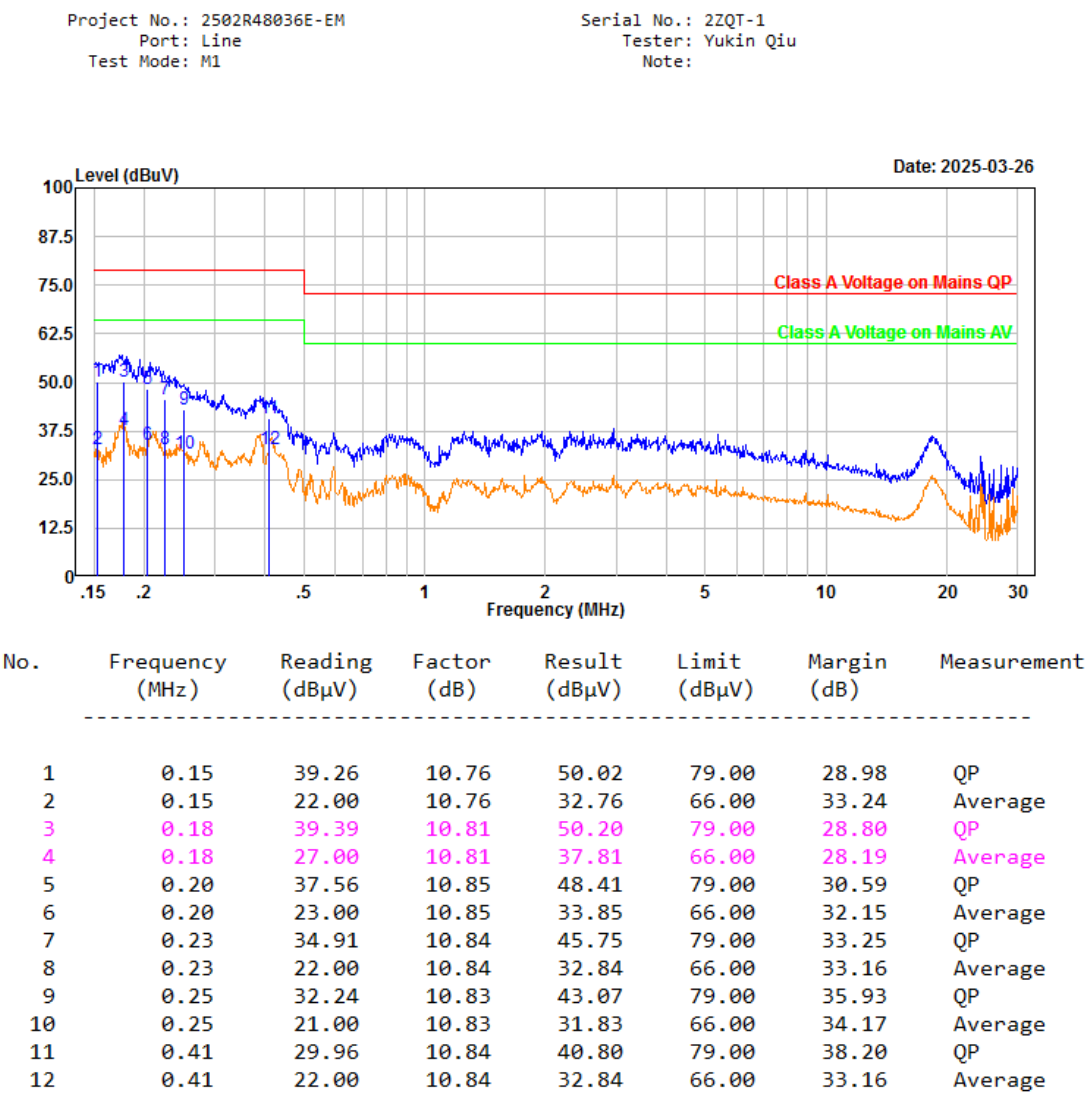
Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

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

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

Test Data

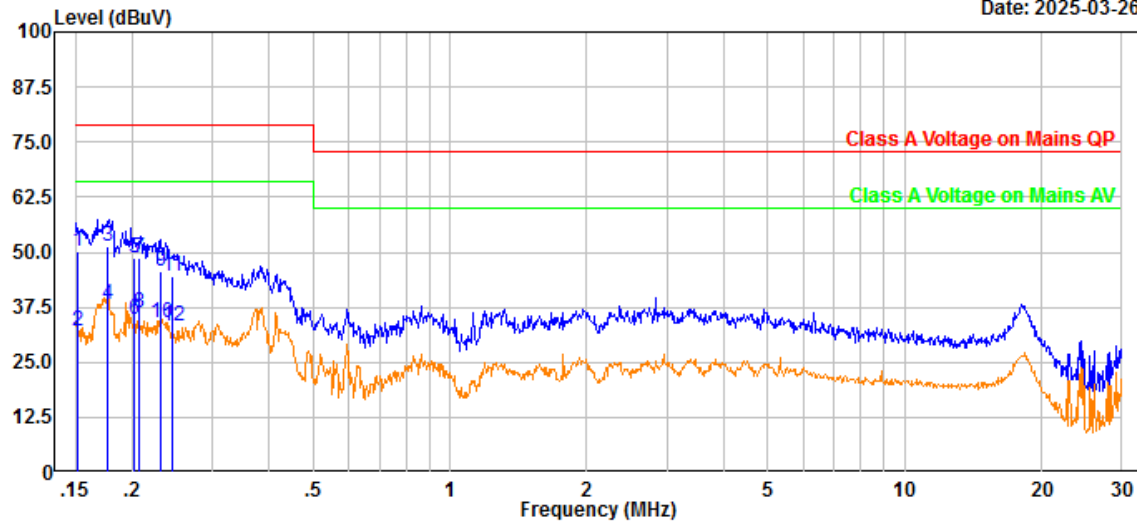
Please refer to following table and plots:



Project No.: 2502R48036E-EM  
Port: neutral  
Test Mode: M1

Serial No.: 2ZQT-1  
Tester: Yukin Qiu  
Note:

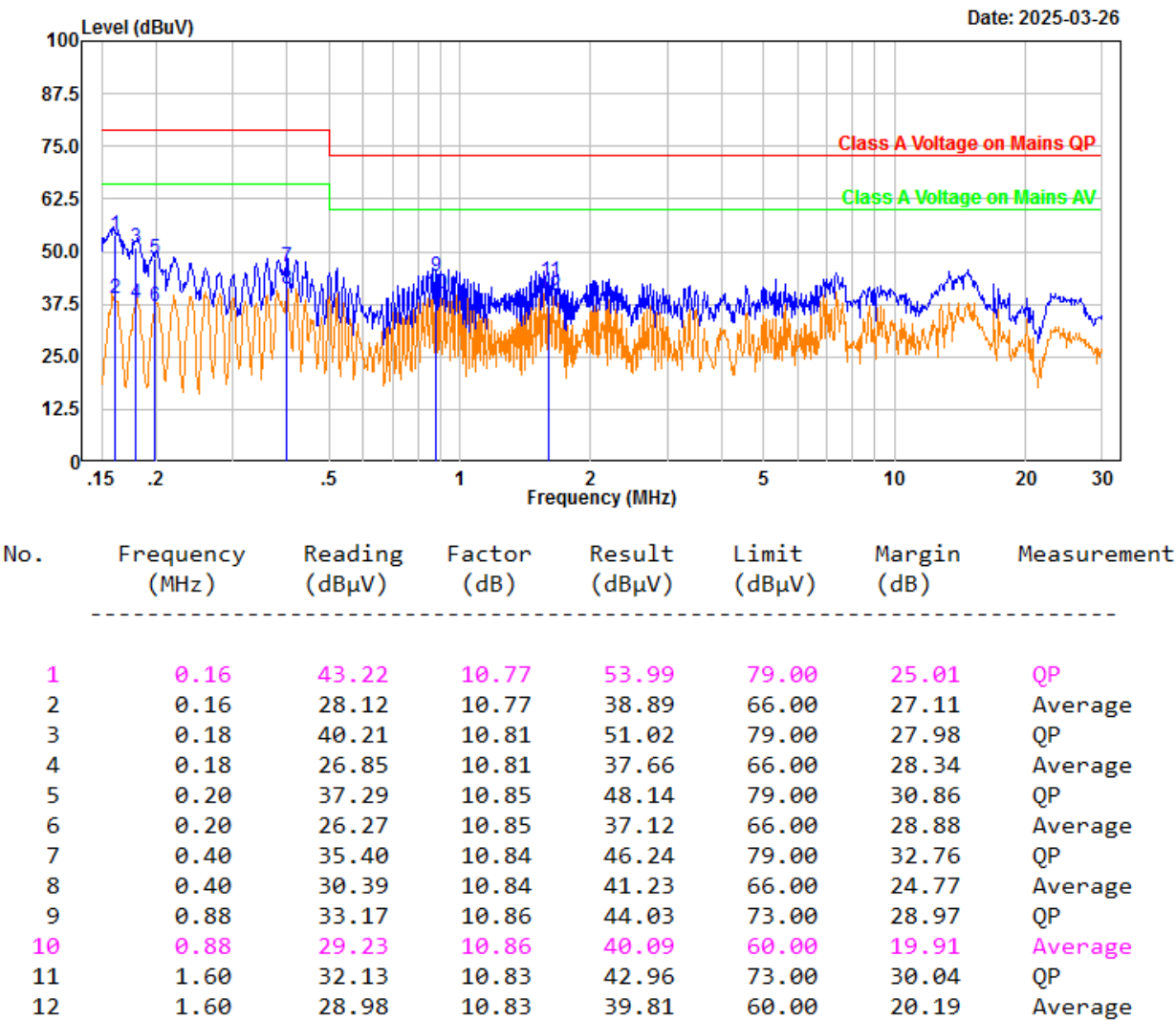
Date: 2025-03-26



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Measurement
1	0.15	39.50	10.85	50.35	79.00	28.65	QP
2	0.15	21.21	10.85	32.06	66.00	33.94	Average
3	0.18	40.43	10.85	51.28	79.00	27.72	QP
4	0.18	27.19	10.85	38.04	66.00	27.96	Average
5	0.20	37.99	10.85	48.84	79.00	30.16	QP
6	0.20	24.04	10.85	34.89	66.00	31.11	Average
7	0.21	37.95	10.85	48.80	79.00	30.20	QP
8	0.21	25.53	10.85	36.38	66.00	29.62	Average
9	0.23	34.76	10.83	45.59	79.00	33.41	QP
10	0.23	22.95	10.83	33.78	66.00	32.22	Average
11	0.24	33.62	10.83	44.45	79.00	34.55	QP
12	0.24	22.50	10.83	33.33	66.00	32.67	Average

Project No.: 2502R48036E-EM  
Port: Line  
Test Mode: M2

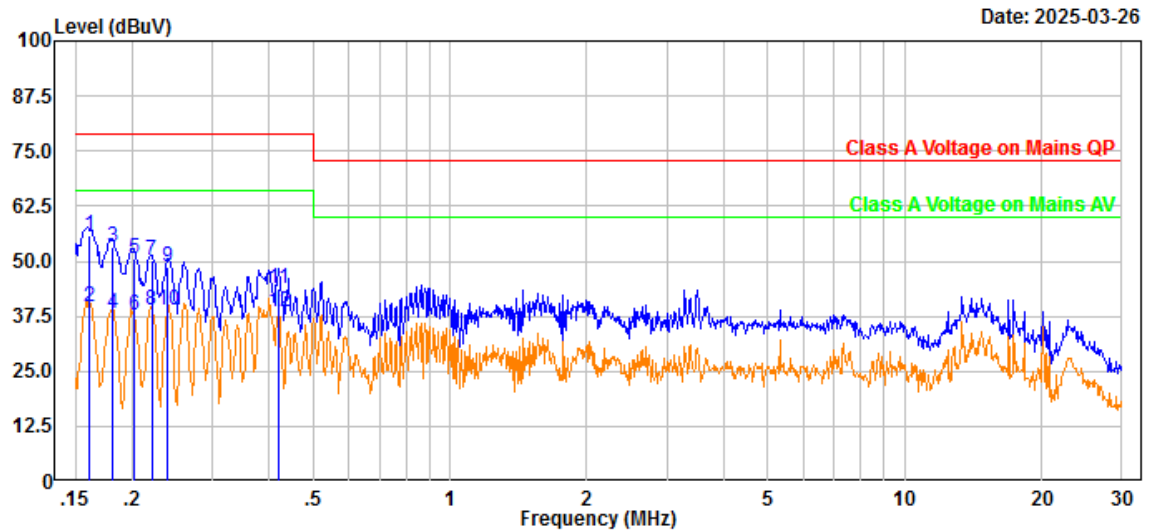
Serial No.: 2ZQT-1  
Tester: Yukin Qiu  
Note:





Project No.: 2502R48036E-EM  
Port: neutral  
Test Mode: M2

Serial No.: 2ZQT-1  
Tester: Yukin Qiu  
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Measurement
1	0.16	44.97	10.85	55.82	79.00	23.18	QP
2	0.16	28.85	10.85	39.70	66.00	26.30	Average
3	0.18	42.28	10.85	53.13	79.00	25.87	QP
4	0.18	27.43	10.85	38.28	66.00	27.72	Average
5	0.20	39.68	10.85	50.53	79.00	28.47	QP
6	0.20	26.78	10.85	37.63	66.00	28.37	Average
7	0.22	39.33	10.83	50.16	79.00	28.84	QP
8	0.22	27.90	10.83	38.73	66.00	27.27	Average
9	0.24	37.82	10.83	48.65	79.00	30.35	QP
10	0.24	28.07	10.83	38.90	66.00	27.10	Average
11	0.42	33.13	10.77	43.90	79.00	35.10	QP
12	0.42	27.63	10.77	38.40	66.00	27.60	Average

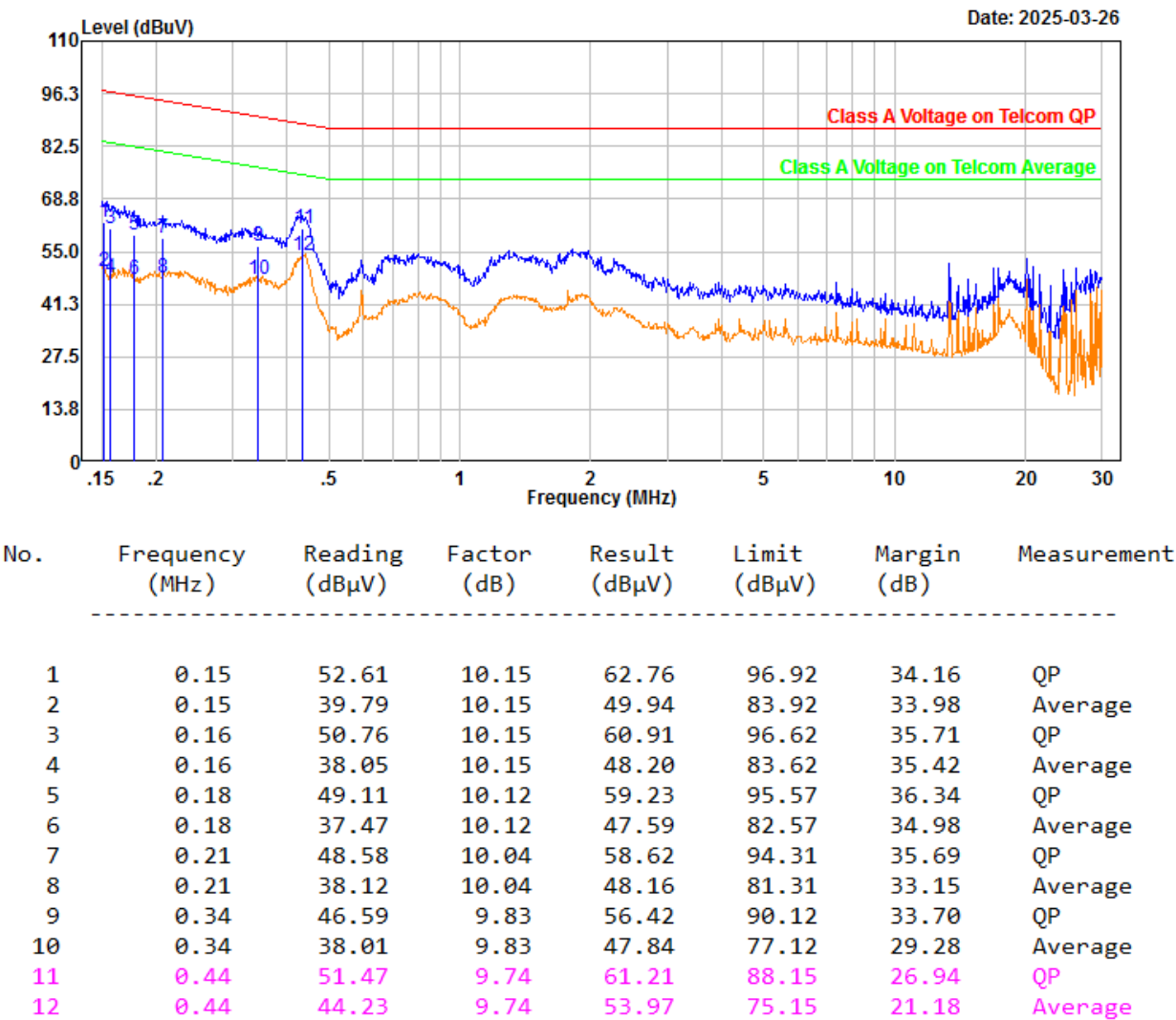
Project No.: 2502R48036E-EM

Serial No.: 2ZQT-1

Tester: Yukin Qiu

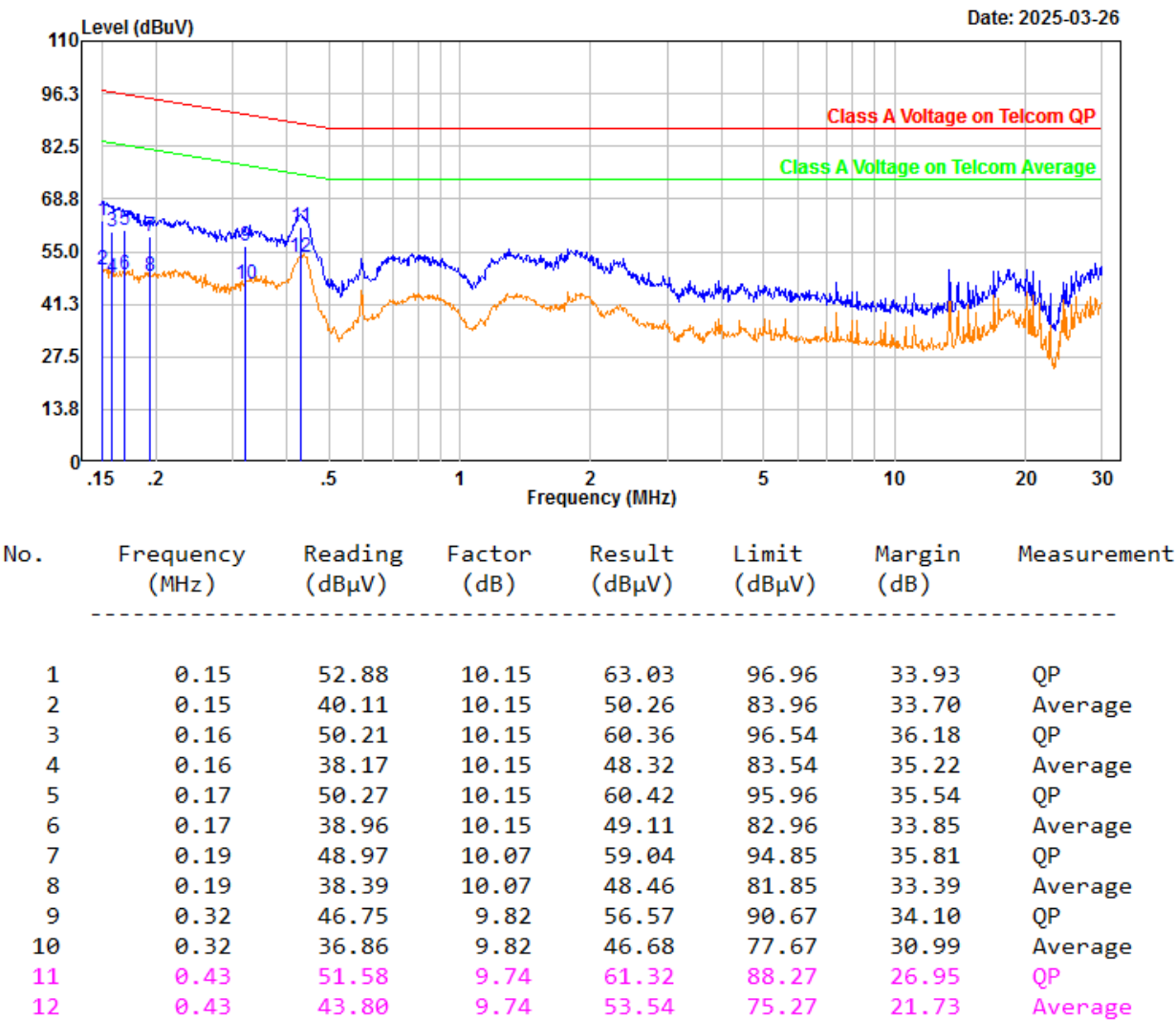
Test Mode: 10Mbps

Note: M1



Project No.: 2502R48036E-EM  
Tester: Yukin Qiu  
Note: M1

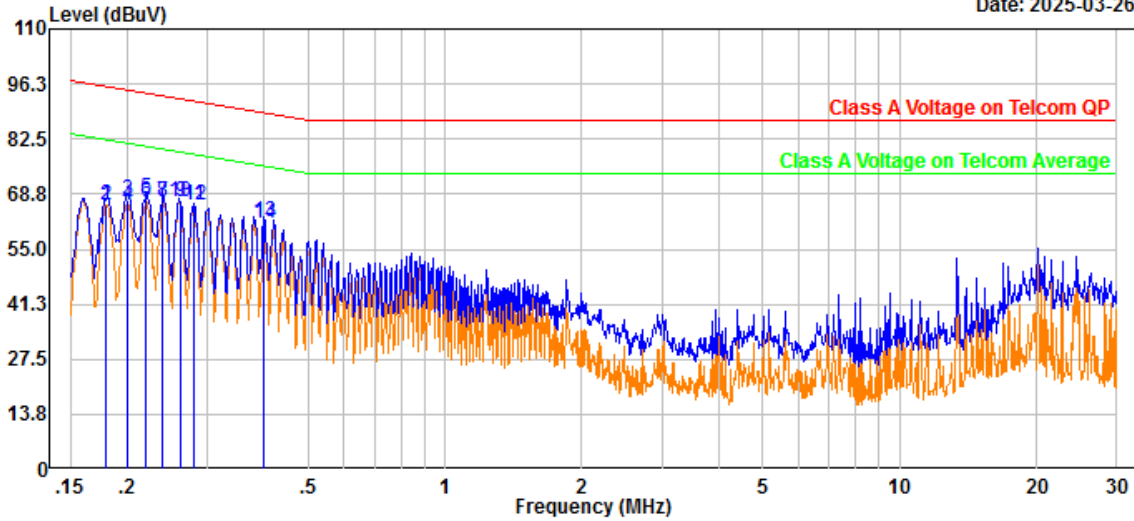
Serial No.: 2ZQT-1  
Test Mode: 100Mbps



Project No.: 2502R48036E-EM  
Tester: Yukin Qiu  
Note: M2

Serial No.: 2ZQT-1  
Test Mode: 10Mbps

Date: 2025-03-26

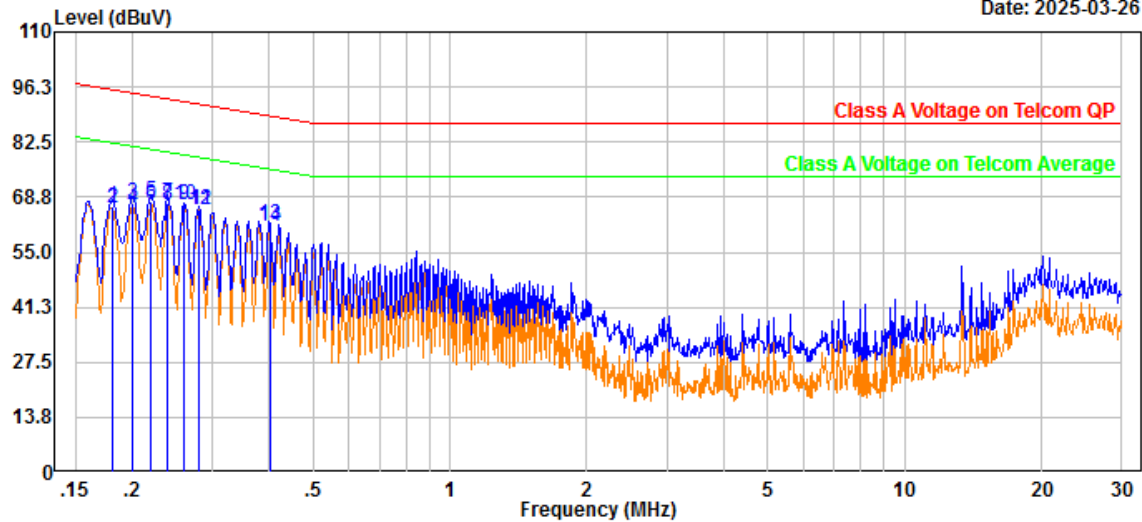


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Measurement
1	0.18	56.05	10.12	66.17	95.49	29.32	QP
2	0.18	55.89	10.12	66.01	82.49	16.48	Average
3	0.20	57.06	10.05	67.11	94.62	27.51	QP
4	0.20	56.08	10.05	66.13	81.62	15.49	Average
5	0.22	57.82	10.00	67.82	93.80	25.98	QP
6	0.22	56.88	10.00	66.88	80.80	13.92	Average
7	0.24	57.07	9.96	67.03	93.11	26.08	QP
8	0.24	57.00	9.96	66.96	80.11	13.15	Average
9	0.26	56.87	9.91	66.78	92.39	25.61	QP
10	0.26	56.82	9.91	66.73	79.39	12.66	Average
11	0.28	56.06	9.87	65.93	91.79	25.86	QP
12	0.28	55.96	9.87	65.83	78.79	12.96	Average
13	0.40	52.19	9.74	61.93	88.85	26.92	QP
14	0.40	51.66	9.74	61.40	75.85	14.45	Average

Project No.: 2502R48036E-EM  
Tester: Yukin Qiu  
Note: M2

Serial No.: 2ZQT-1  
Test Mode: 100Mbps

Date: 2025-03-26



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Measurement
1	0.18	56.14	10.12	66.26	95.46	29.20	QP
2	0.18	56.03	10.12	66.15	82.46	16.31	Average
3	0.20	57.04	10.05	67.09	94.61	27.52	QP
4	0.20	56.15	10.05	66.20	81.61	15.41	Average
5	0.22	57.63	10.00	67.63	93.79	26.16	QP
6	0.22	56.87	10.00	66.87	80.79	13.92	Average
7	0.24	57.15	9.96	67.11	93.10	25.99	QP
8	0.24	57.03	9.96	66.99	80.10	13.11	Average
9	0.26	56.93	9.91	66.84	92.42	25.58	QP
10	0.26	56.89	9.91	66.80	79.42	12.62	Average
11	0.28	55.86	9.87	65.73	91.78	26.05	QP
12	0.28	55.77	9.87	65.64	78.78	13.14	Average
13	0.40	52.13	9.74	61.87	88.83	26.96	QP
14	0.40	51.68	9.74	61.42	75.83	14.41	Average

## 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  $U_{cisprr}$  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  $U_{cisprr}$  of Table 1, then:

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

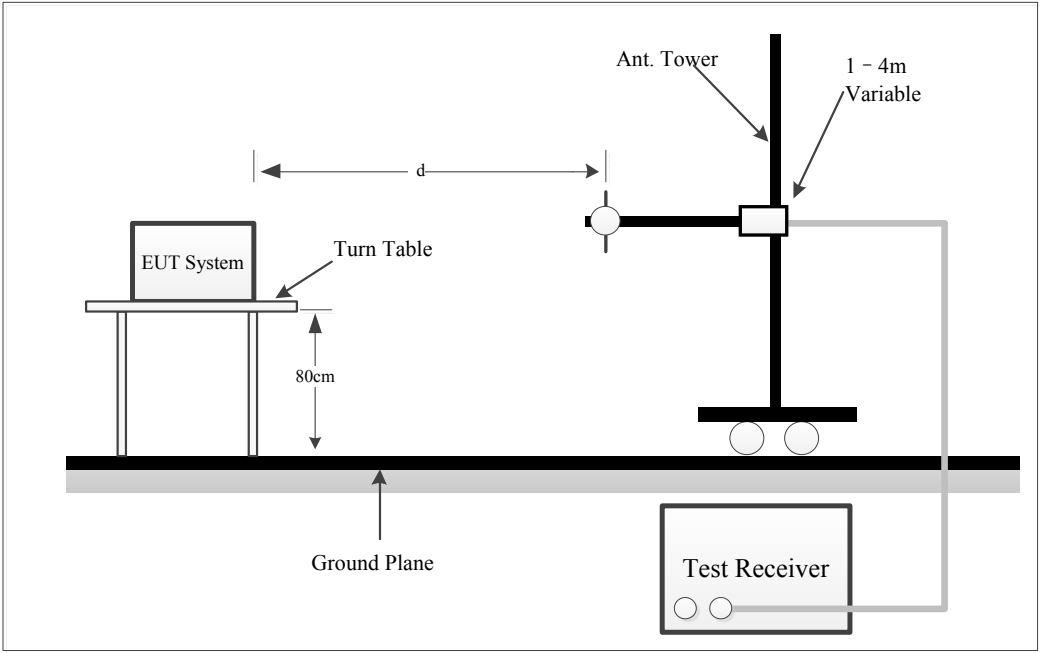
Table 1 - Values of  $U_{cisprr}$

Measurement	$U_{cisprr}$
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

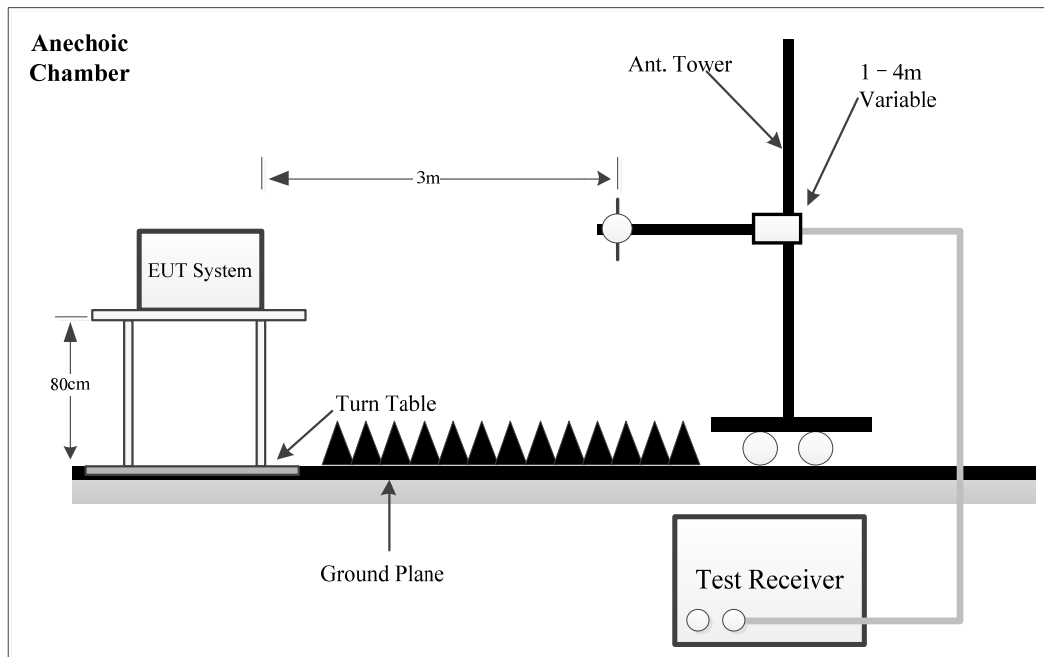
Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

### Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 3 meters, above 1GHz were performed in the 3 meters, using the setup accordance with the CISPR 16-1-1:2010+A1:2010+A2:2014<sup>\*</sup>, CISPR 16-1-4:2010 + A1:2012<sup>\*</sup>, CISPR 16-2-3:2010+A1:2010+A2:2014<sup>\*</sup>. The specification used was EN 55032 and BS EN 55032 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 and Spectrum Analyzer Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver(Below 1GHz) and Spectrum Analyzer(Above 1GHz) were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz - 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10Hz	/	Ave.

## 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, 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. The equation for margin calculation is as follows:

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

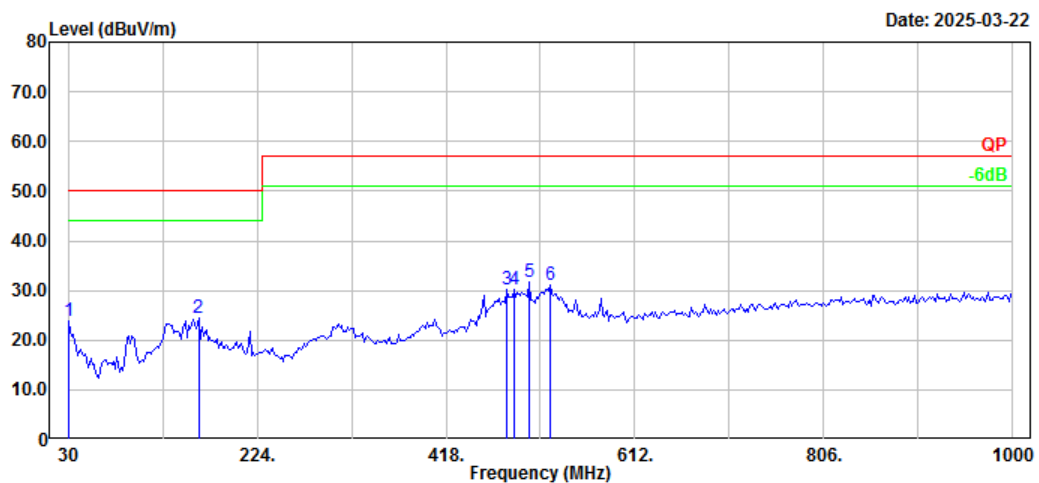
## Test Data

Please refer to following table and plots:

### Below 1G

Project No.: 2502R48036E-EM  
Polarization: Horizontal  
Test Mode: M1  
Note:

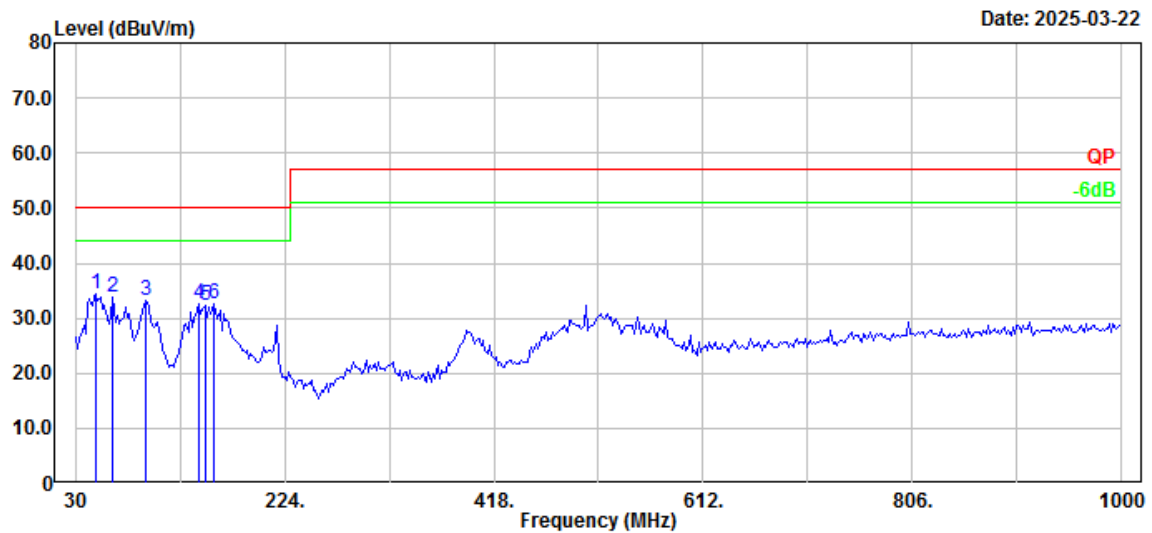
Serial No.: 2ZQT-1  
Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	30.000	27.55	-3.80	23.75	50.00	26.25	Peak
2	163.860	35.73	-11.39	24.34	50.00	25.66	Peak
3	480.080	34.80	-4.71	30.09	57.00	26.91	Peak
4	487.840	34.87	-4.54	30.33	57.00	26.67	Peak
5	503.360	35.98	-4.22	31.76	57.00	25.24	Peak
6	524.700	34.93	-3.86	31.07	57.00	25.93	Peak

Project No.: 2502R48036E-EM  
Polarization: Vertical  
Test Mode: M1  
Note:

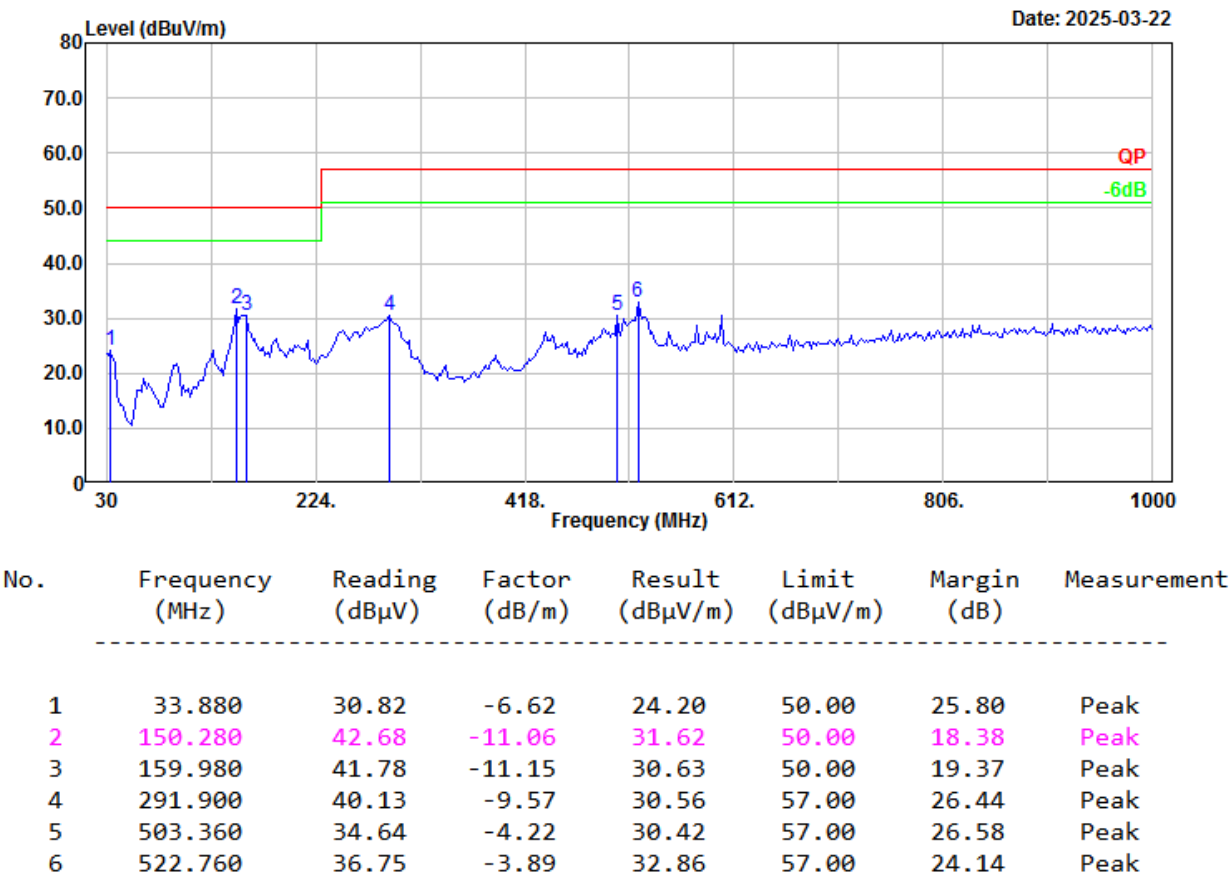
Serial No.: 2ZQT-1  
Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	49.400	50.46	-16.14	34.32	50.00	15.68	Peak
2	64.920	50.46	-16.50	33.96	50.00	16.04	Peak
3	95.960	48.29	-15.22	33.07	50.00	16.93	Peak
4	144.460	43.28	-10.73	32.55	50.00	17.45	Peak
5	150.280	43.32	-11.06	32.26	50.00	17.74	Peak
6	158.040	43.83	-11.13	32.70	50.00	17.30	Peak

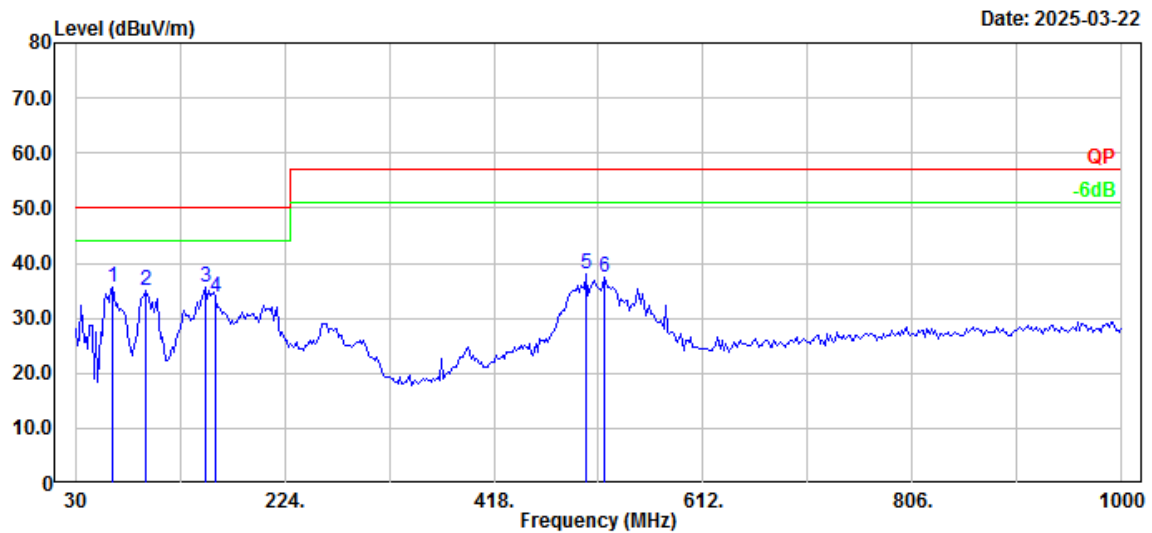
Project No.: 2502R48036E-EM  
Polarization: Horizontal  
Test Mode: M2  
Note:

Serial No.: 2ZQT-1  
Tester: Zoo Zou



Project No.: 2502R48036E-EM  
Polarization: Vertical  
Test Mode: M2  
Note:

Serial No.: 2ZQT-1  
Tester: Zoo Zou

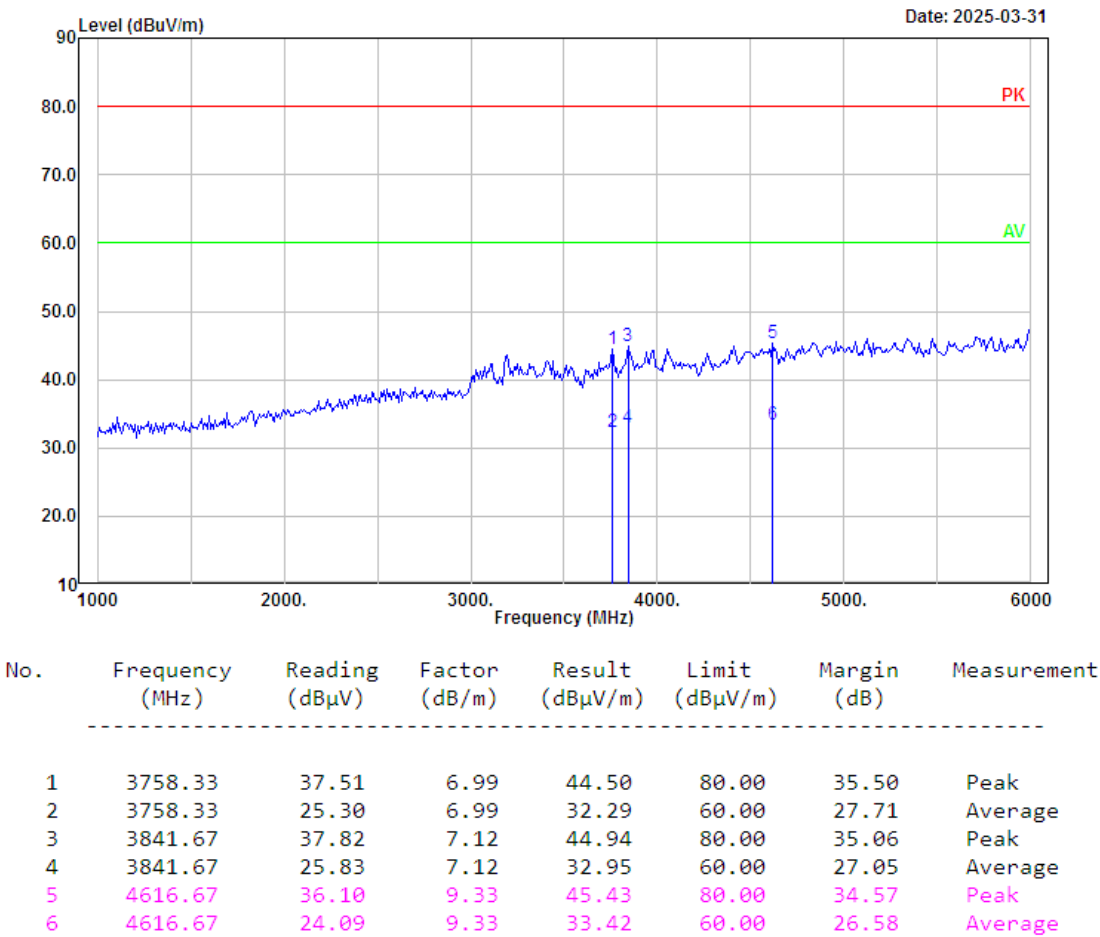


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Measurement
1	64.920	52.13	-16.50	35.63	50.00	14.37	Peak
2	95.960	50.09	-15.22	34.87	50.00	15.13	Peak
3	150.280	46.74	-11.06	35.68	50.00	14.32	Peak
4	159.980	45.04	-11.15	33.89	50.00	16.11	Peak
5	503.360	42.32	-4.22	38.10	57.00	18.90	Peak
6	520.820	41.46	-3.92	37.54	57.00	19.46	Peak

Above 1G

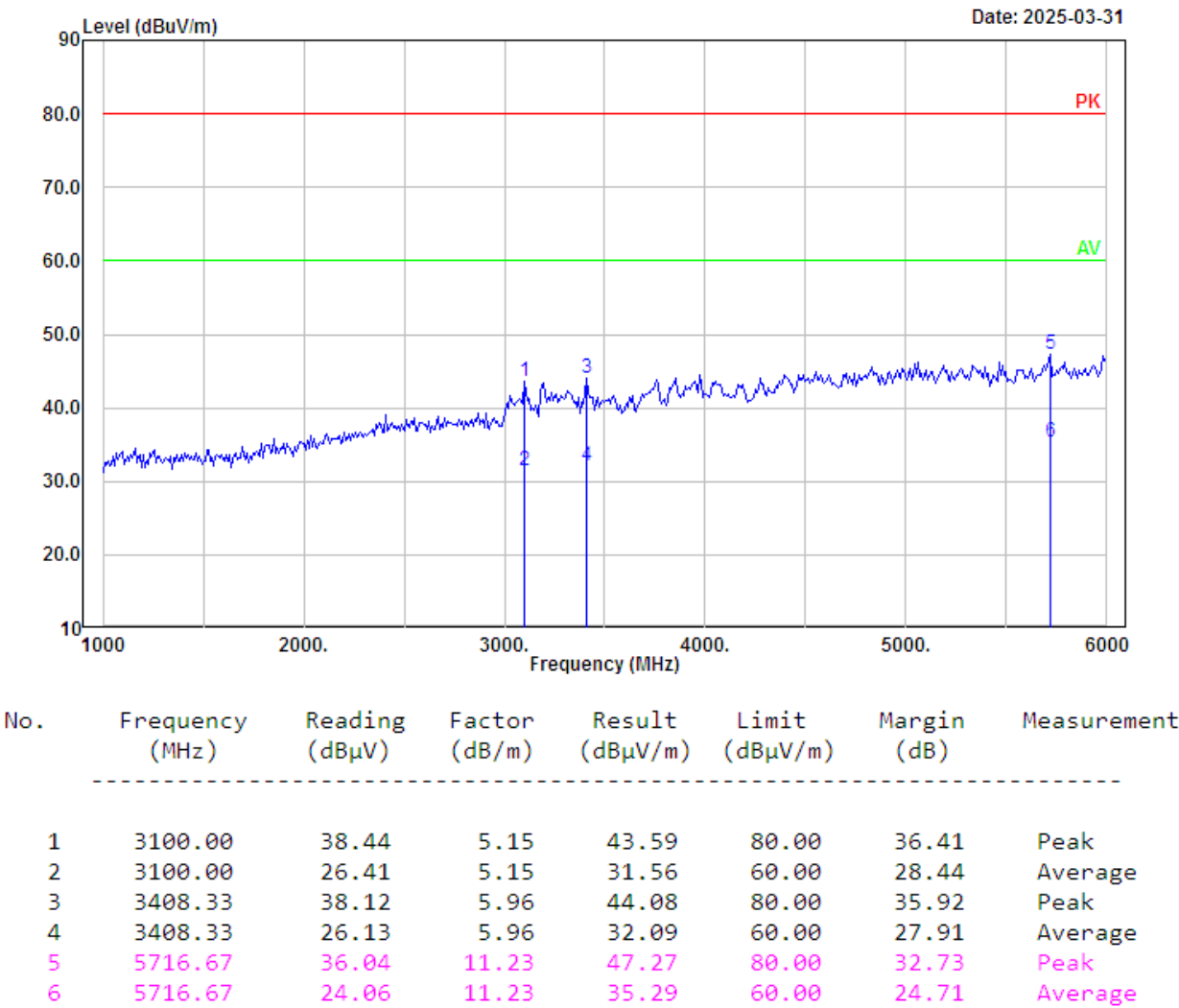
Project No.: 2502R48036E-EM  
Polarization: Horizontal  
Test Mode: M1  
Note:  
:

Serial No.: 2ZQT-1  
Tester: Lancer Zhang



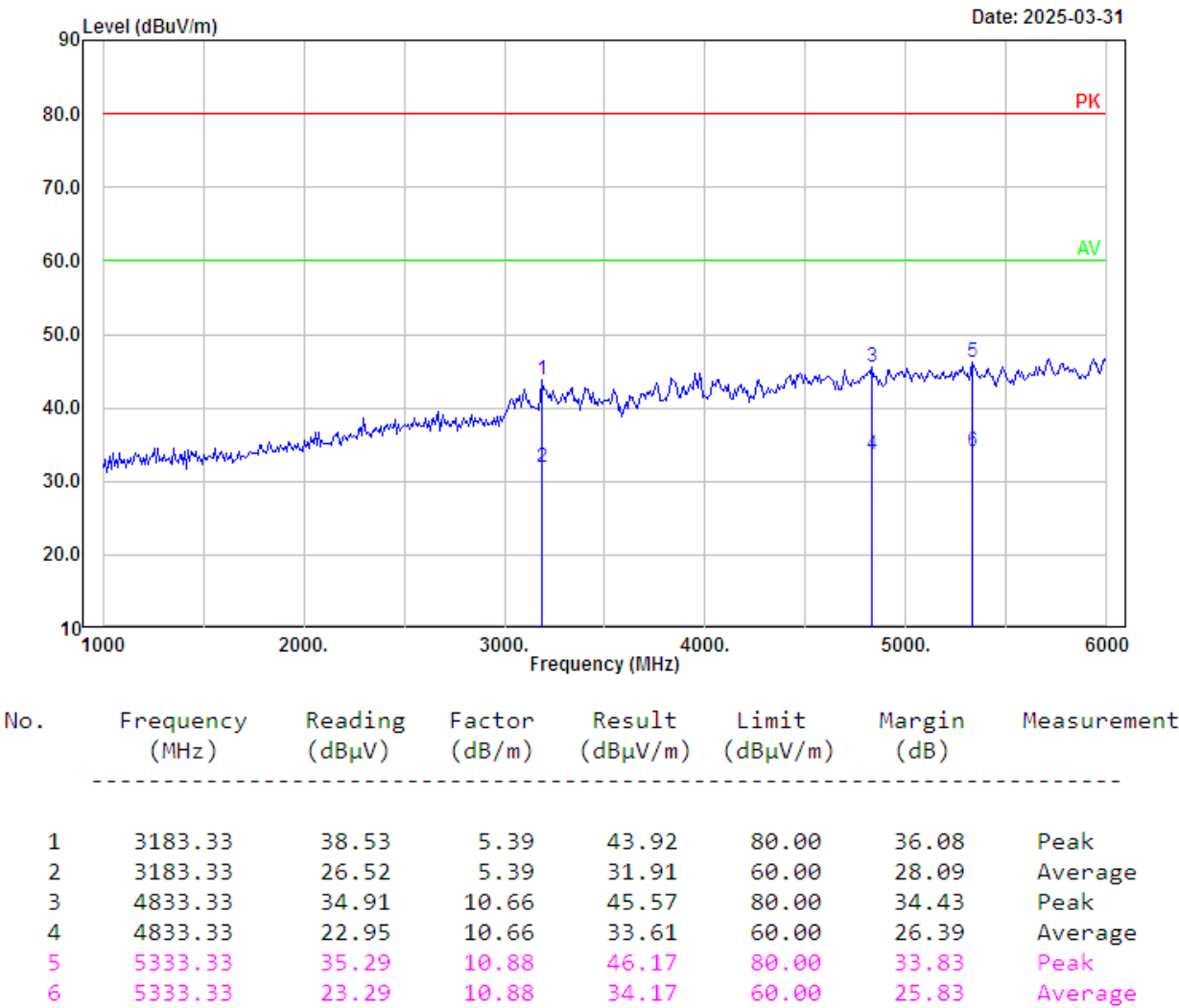
Project No.: 2502R48036E-EM  
Polarization: Vertical  
Test Mode: M1  
Note:  
:

Serial No.: 2ZQT-1  
Tester: Lancer Zhang



Project No.: 2502R48036E-EM  
Polarization: Horizontal  
Test Mode: M2  
Note:  
:

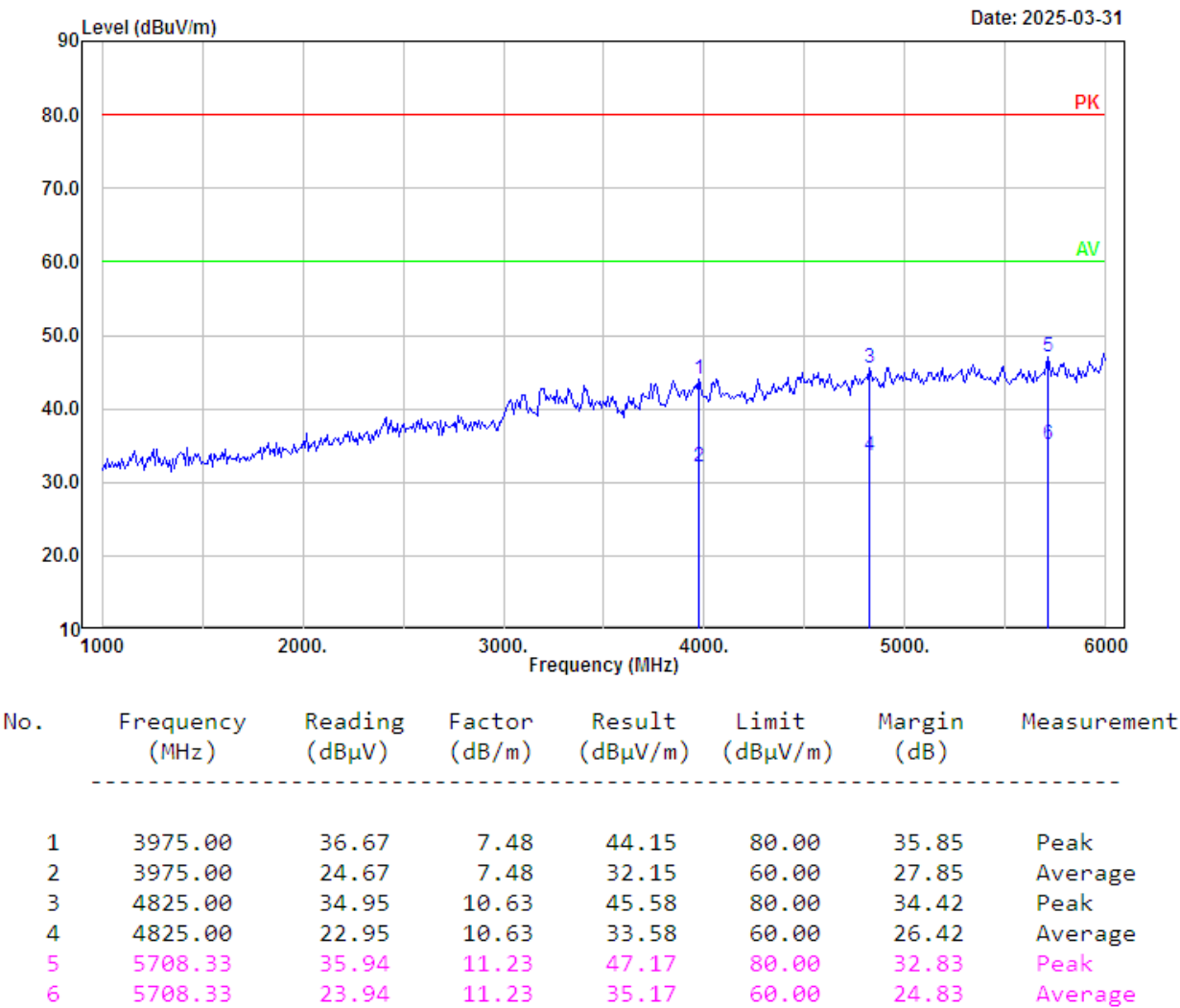
Serial No.: 2ZQT-1  
Tester: Lancer Zhang





Project No.: 2502R48036E-EM  
Polarization: Vertical  
Test Mode: M2  
Note:  
:

Serial No.: 2ZQT-1  
Tester: Lancer Zhang



### 3 - ELECTROSTATIC DISCHARGES IEC 61000-4-2

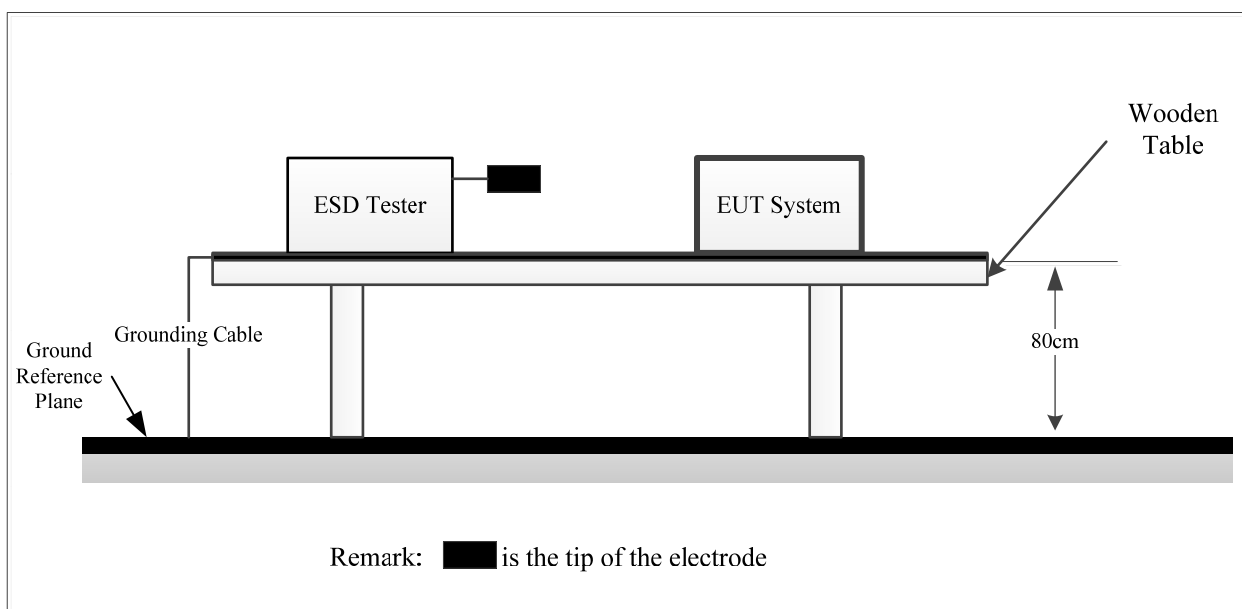
#### Measurement Uncertainty

$U_{lab}$  (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 $I_p$	$\leq 7\%$	6.3%
Current at 30 ns	$\leq 7\%$	6.3%
Current at 60 ns	$\leq 7\%$	6.3%

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



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

Test level 3 for Air Discharge at  $\pm 8$  kV

Test level 2 for Contact Discharge at  $\pm 4$  kV

**Test Level**

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

**Performance 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 10 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 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

## Test Data

Please refer to following tables:

**Test Mode:** M1, M2

**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	/	/
Camera	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/
DC Port	A	A	A	A	A	A	/	/
RJ45 Port	A	A	A	A	A	A	/	/
Required Performance Criteria: B Description of Performance reduction: N/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
Metal shell	A	A	A	A	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

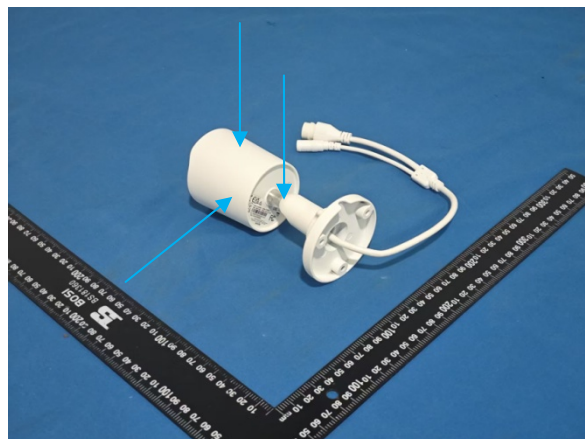
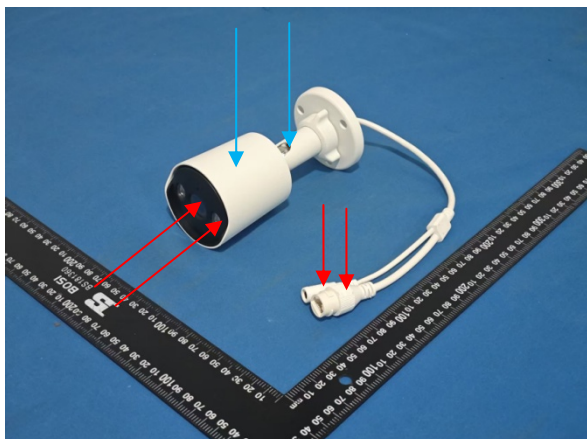
**Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)**


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	/	/	/	/
Top Side	A	A	A	A	/	/	/	/
Bottom Side	A	A	A	A	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/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	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

### ESD Location Photo



Air Discharge: 

Direct Contact: 

4 - CONTINUOUS RADIATED DISTURBANCES IEC 61000-4-3

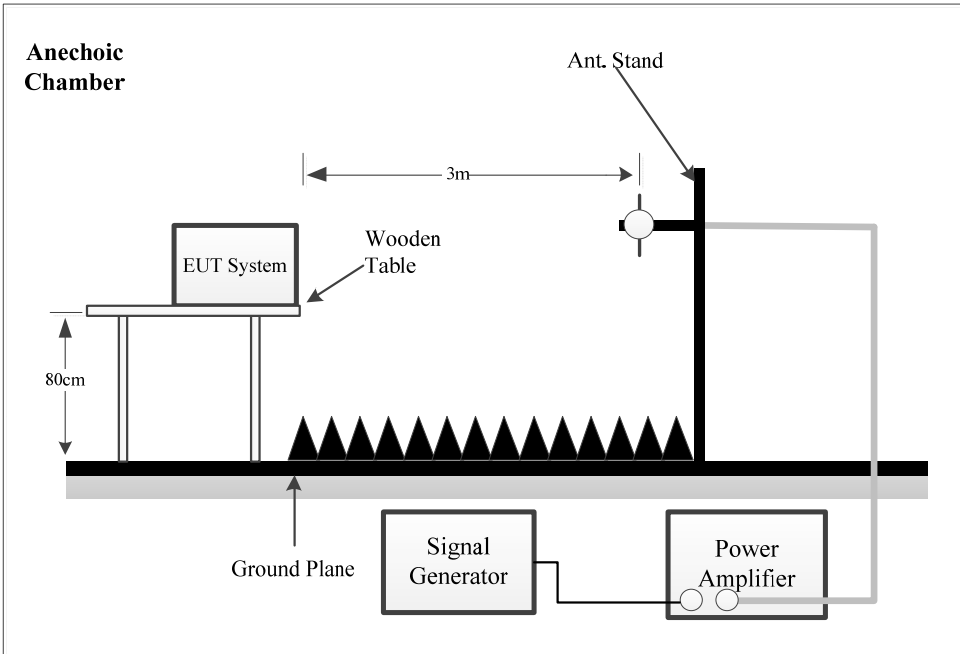
Measurement Uncertainty

$U_{lab}$  (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 and BS EN 55035:2017+A11:2020  
(IEC 61000-4-3:2006+A1:2007+A2:2010\*)  
Test level 2 at 3V/ m (80MHz to 1GHz)  
Test level 2 at 3V/ m (1.8GHz, 2.6GHz, 3.5GHz, 5GHz)

**Test Level**

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

**Performance criteria: A**

- 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 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 was used to monitor the EUT.

**Test Data**

Please refer to following tables:

**Test Mode:** M1, M2

**Note:**

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

**Table 1: Radiated RF-Electromagnetic Field Immunity, Swept Test**

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side		Top Side		Bottom Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A	A	A	A	A
Required Performance Criteria: A Description of Performance reduction: N/A												

**Table 2: Radiated RF-Electromagnetic Field Immunity, Spot Test**

Spot Test Frequency (MHz)	Front Side		Rear Side		Left Side		Right Side		Top Side		Bottom Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
1800, 2600, 3500, 5000	A	A	A	A	A	A	A	A	A	A	A	A
Required Performance Criteria: A Description of Performance reduction: N/A												



## 5 - CONTINUOUS CONDUCTED DISTURBANCES IEC 61000-4-6

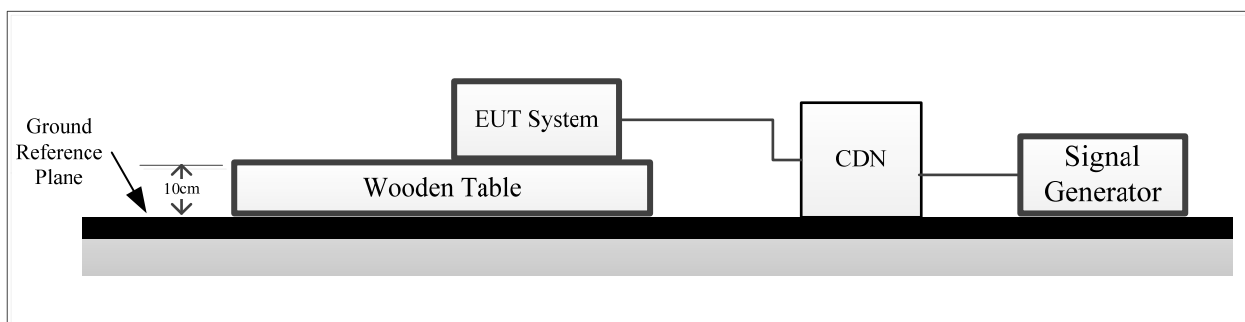
### Measurement Uncertainty

$U_{lab}$  (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 and BS EN 55035:2017+A11:2020 (IEC 61000-4-6:2008\*)

Test level 2 at 3 V (r.m.s.), 0.15MHz ~ 10MHz,

Test level 3-1 V (r.m.s.), 10MHz ~ 30MHz,

Test level 1 at 1 V (r.m.s.), 30MHz ~ 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:** M1, M2

**Note:**

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

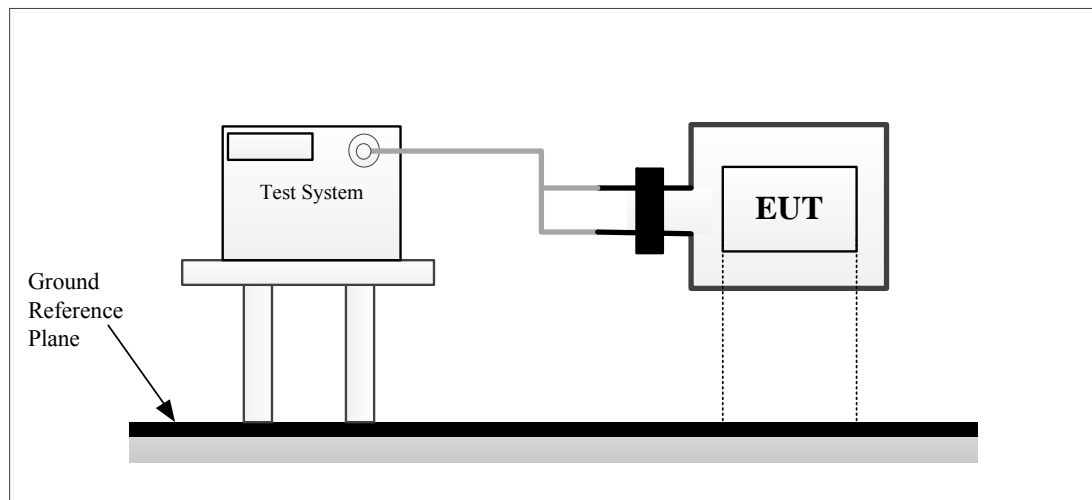
Signal Type	Frequency Range (MHz)	Voltage Level (r.m.s.)	Perform Criterion
Modulation: Amplitude 80%, 1kHz sine wave Dwell Time 1 Sec	0.15-10	3V	A
	10-30	3V-1V	A
	30-80	1V	A
Required Performance Criteria: A Description of Performance reduction: N/A			

**Table 2: Signal Port :PoE**

Signal Type	Frequency Range (MHz)	Voltage Level (r.m.s.)	Perform Criterion
Modulation: Amplitude 80%, 1kHz sine wave Dwell Time 1 Sec	0.15-10	3V	A
	10-30	3V-1V	A
	30-80	1V	A
Required Performance Criteria: A Description of Performance reduction: N/A			

## 6 - POWER FREQUENCY MAGNETIC FIELDS IEC 61000-4-8

### Test Setup



### Test Standard

EN 55035:2017+A11:2020 and BS EN 55035:2017+A11:2020 (IEC 61000-4-8:2009)  
Test level 1 at 1A/ m

### 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: M1, M2  
Note:

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	/	/	/
Required Performance Criteria: A Description of Performance reduction: N/A				

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

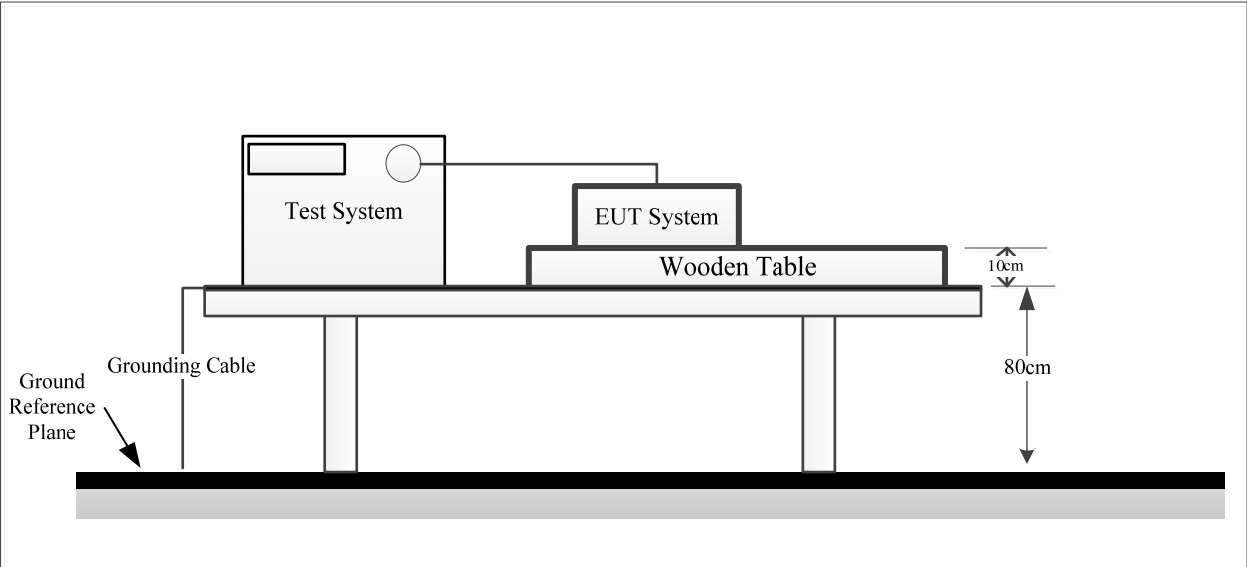
Measurement Uncertainty

$U_{lab}$  (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 and BS EN 55035:2017+A11:2020 (IEC 61000-4-4:2012)  
AC mains: Test level 2 at 1 kV  
Signal port: Test level 2 at 0.5 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:** M1

**Note:**

**AC Mains Power Input Ports**

Test Line	Test Level (kV)							
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
L	A	A	A	A	/	/	/	/
N	A	A	A	A	/	/	/	/
Earth	/	/	/	/	/	/	/	/
L+N	A	A	A	A	/	/	/	/
L + Earth	/	/	/	/	/	/	/	/
N + Earth	/	/	/	/	/	/	/	/
L+N+Earth	/	/	/	/	/	/	/	/
Required Performance Criteria: B								
Description of Performance reduction: N/A								

**Signal Ports:**

Test Ports	Test Level (kV)							
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
RJ45	A	A	/	/	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

Test Mode: M2

Note:

**AC Mains Power Input Ports**

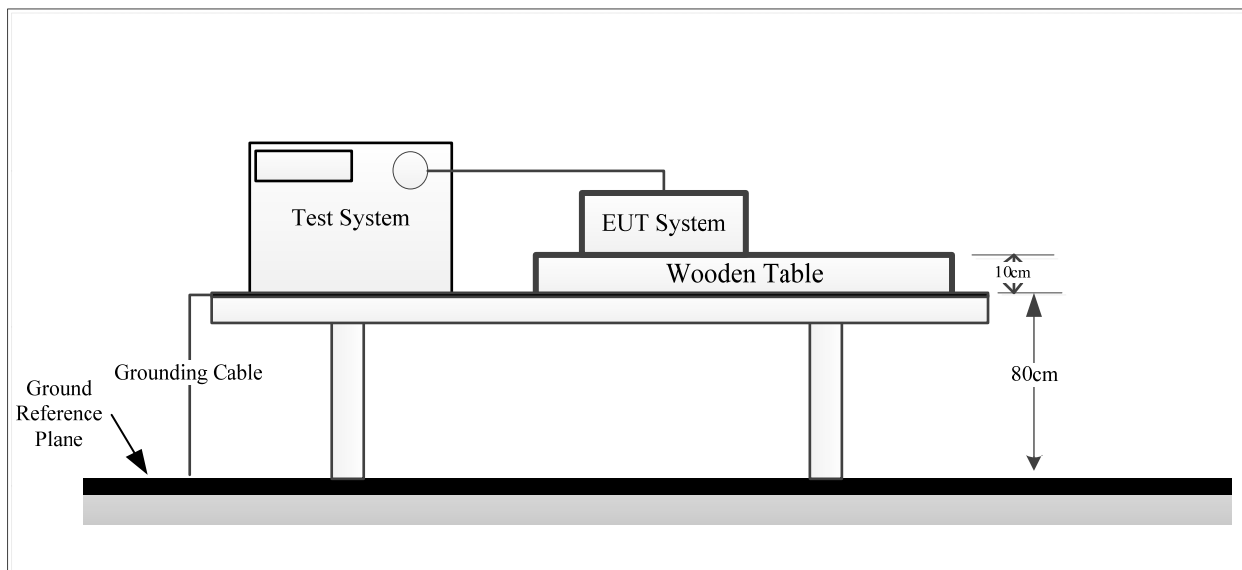
Test Line	Test Level (kV)							
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
L	A	A	A	A	/	/	/	/
N	A	A	A	A	/	/	/	/
Earth	A	A	A	A	/	/	/	/
L+N	A	A	A	A	/	/	/	/
L + Earth	A	A	A	A	/	/	/	/
N + Earth	A	A	A	A	/	/	/	/
L+N+Earth	A	A	A	A	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

**Signal Ports:**

Test Ports	Test Level (kV)							
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
PoE	A	A	/	/	/	/	/	/
Required Performance Criteria: B Description of Performance reduction: N/A								

## 8 - SURGES IEC 61000-4-5

### Test System Setup



### Test Standard

EN 55035:2017+A11:2020 and BS EN 55035:2017+A11:2020 (IEC 61000-4-5:2005\*)

AC Mains: L-N: Test level 3 at 1kV, Line-Ground : Test level 3 at 2kV

Signal port: Test level 2 at 1kV

### Test Level

Level	Open-circuit test voltage $\pm 10\%$ kV	
	Line-to-line	Line-to-ground
1	N/A	0.5
2	0.5	1
3	1	2
4	2	4
X	Special	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:** M1

**Note:**

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

No.	Voltage	Poll	Path	Phase Angle	Perform Criterion
1	0.5kV	+	L- N	90	A
1	0.5kV	-	L- N	270	A
2	1kV	+	L- N	90	A
2	1kV	-	L- N	270	A
Required Performance Criteria: B					
Description of Performance reduction: N/A					

**Table 2: PoE I/O Circuit and Lines**

No.	Voltage	Poll	Path	Perform Criterion
1	0.5kV	±	Line-Ground	A
2	1kV	±	Line-Ground	A
Required Performance Criteria: C				
Description of Performance reduction: N/A				

Test Mode: M2

Note:

Table 1: AC mains power input port

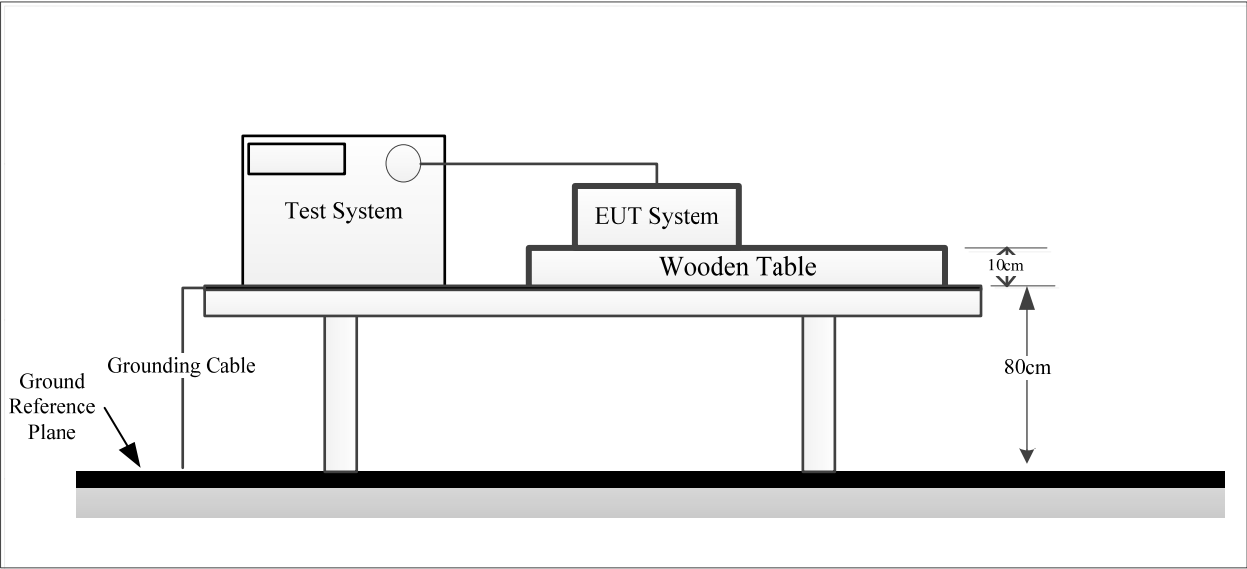
No.	Voltage	Poll	Path	Phase Angle	Perform Criterion
1	0.5kV	+	L- N, L-G	90	A
1	0.5kV	-	L- N, L-G	270	A
1	0.5kV	-	N-G	90	A
1	0.5kV	+	N-G	270	A
2	1kV	+	L- N, L-G	90	A
2	1kV	-	L- N, L-G	270	A
2	1kV	-	N-G	90	A
2	1kV	+	N-G	270	A
3	2kV	+	L-G	90	A
3	2kV	-	L-G	270	A
3	2kV	-	N-G	90	A
3	2kV	+	N-G	270	A
Required Performance Criteria: B					
Description of Performance reduction: N/A					

Table 2: PoE I/O Circuit and Lines

No.	Voltage	Poll	Path	Perform Criterion
1	0.5kV	±	Line-Ground	A
2	1kV	±	Line-Ground	A
Required Performance Criteria: C				
Description of Performance reduction: N/A				

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

Test Setup



Test Standard

EN 55035:2017+A11:2020 and BS 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:** M1, M2

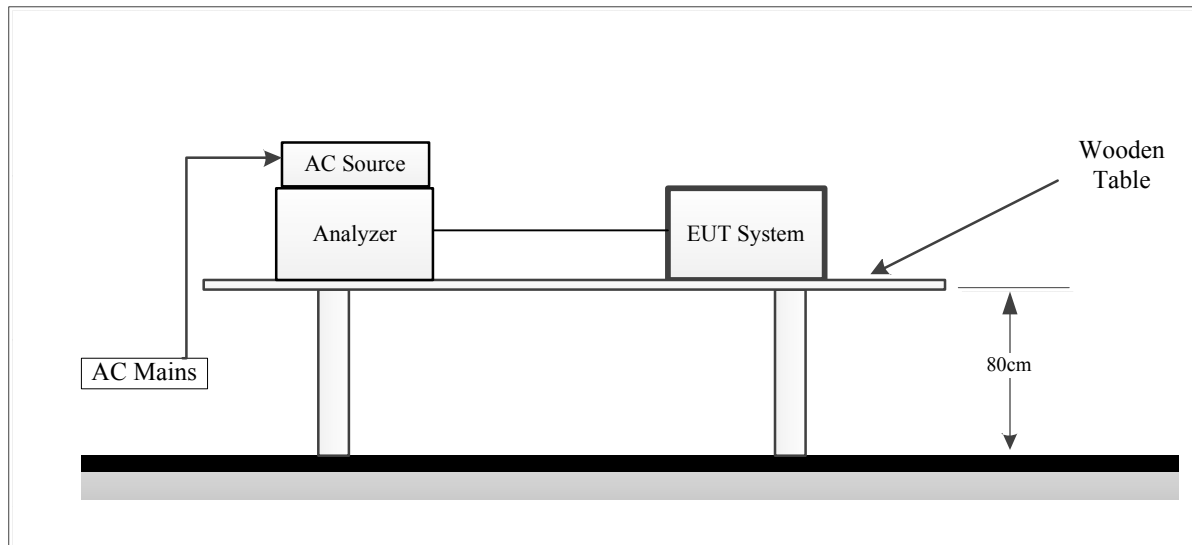
**Table 1: Voltage Dips/Interruptions Test**

Residual Voltage (%)	Td (Number of cycles)	Phase Angle (°)	N	Result	Required Performance Criteria
<5	0.5	0/90/180/270	3	A	B
70	25	0/90/180/270	3	A	C
<5	250	0/90/180/270	3	B	C

Description of Performance reduction:  
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.

## 11 -VOLTAGE FLUCTUATIONS AND FLICKER

### Test System Setup



### Test Standard

EN 61000-3-3:2013+A1:2019+A2:2021 and BS EN 61000-3-3:2013+A2:2021

### Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed
  - a) 4 % without additional conditions;
  - b) 6 % for equipment which is:
    - Switched manually, or
    - Switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

- c) 7 % for equipment which is
  - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
  - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic

switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

## Test Data

*Please refer to following tables:*

Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurement)
Test Mode:	M1, M2
Power Source:	AC 230V/50Hz
Test Result	PASS

## Maximum Flicker results (M1)

	EUT values	Limit	Result
Pst	0.017	1.00	PASS
Plt	0.008	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.000	4.00	PASS
dt [s]	0.000	0.50	PASS

## Maximum Flicker results (M2)

	EUT values	Limit	Result
Pst	0.014	1.00	PASS
Plt	0.006	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.000	4.00	PASS
dt [s]	0.000	0.50	PASS

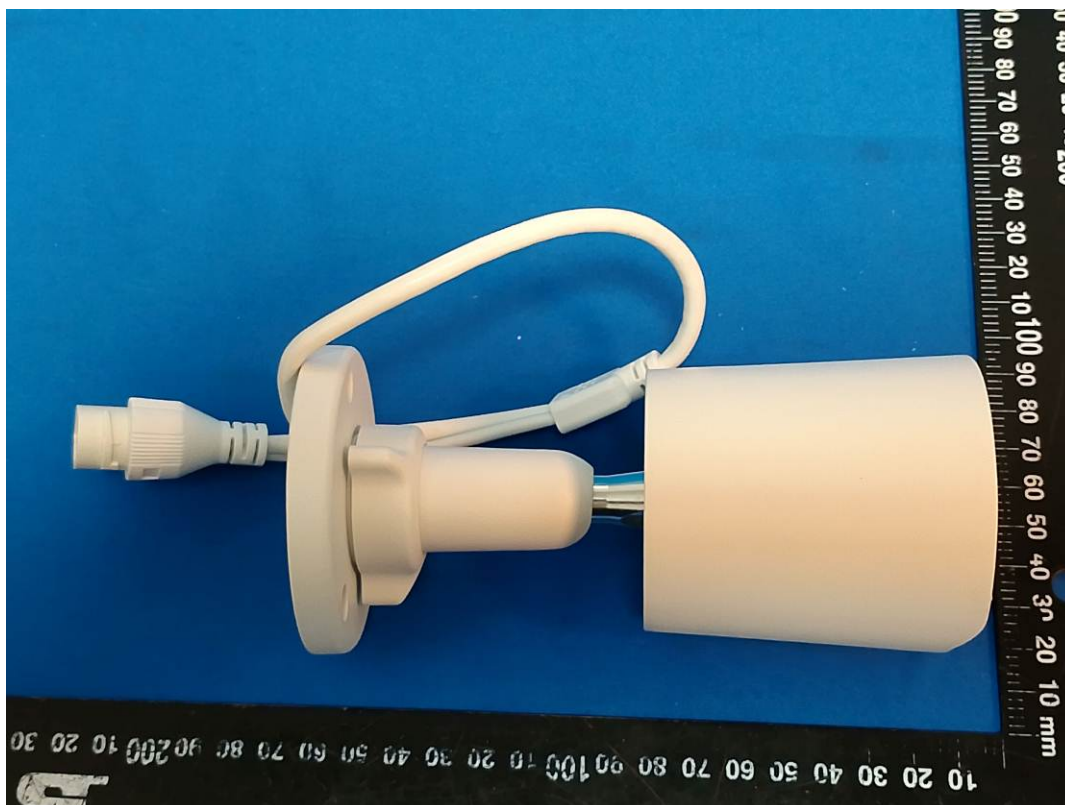
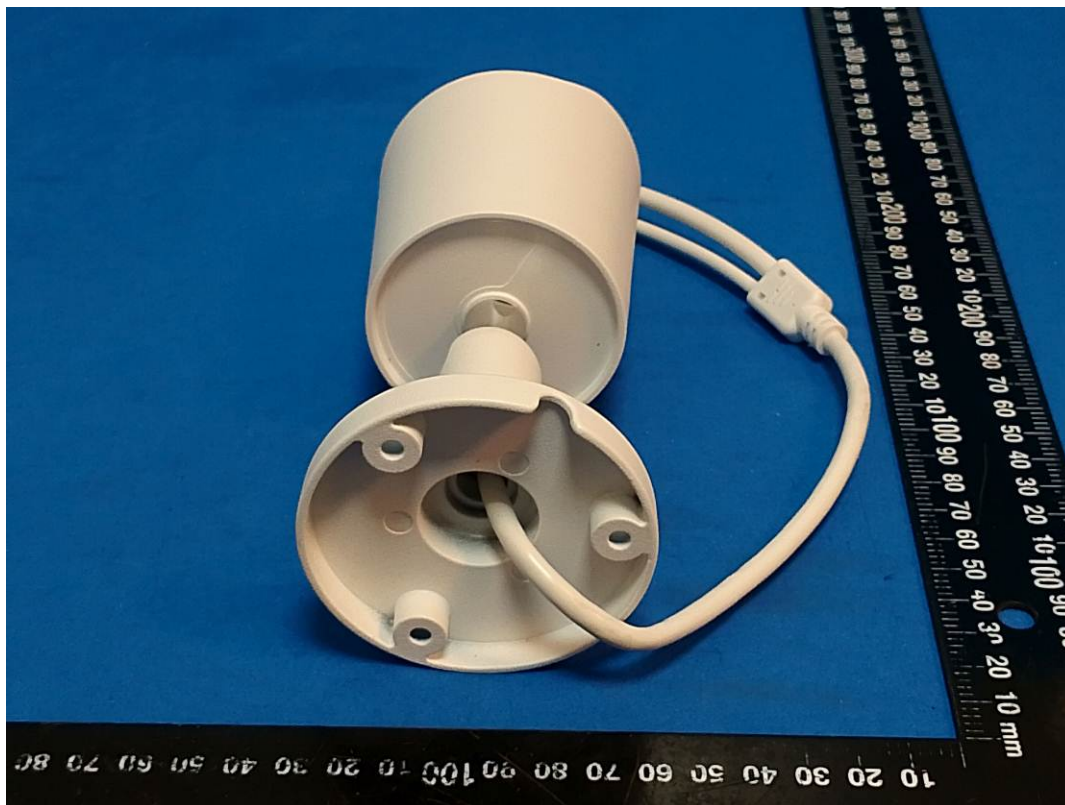
## EXHIBIT A - EUT PHOTOGRAPHS

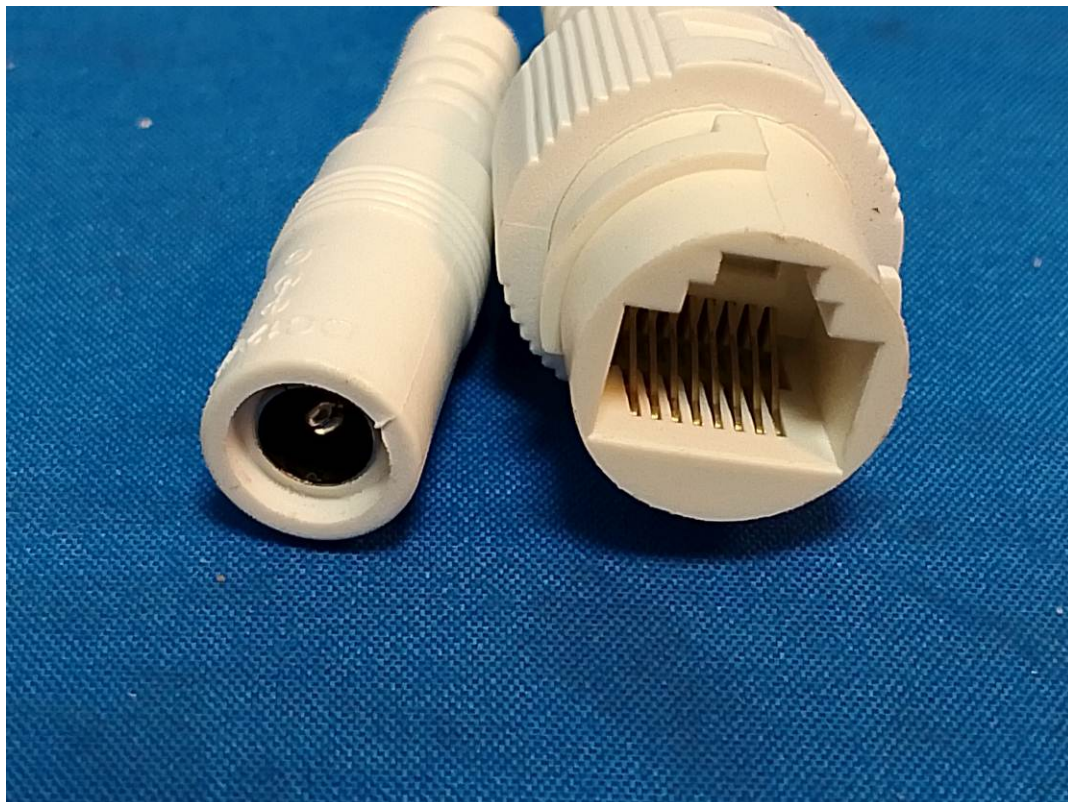






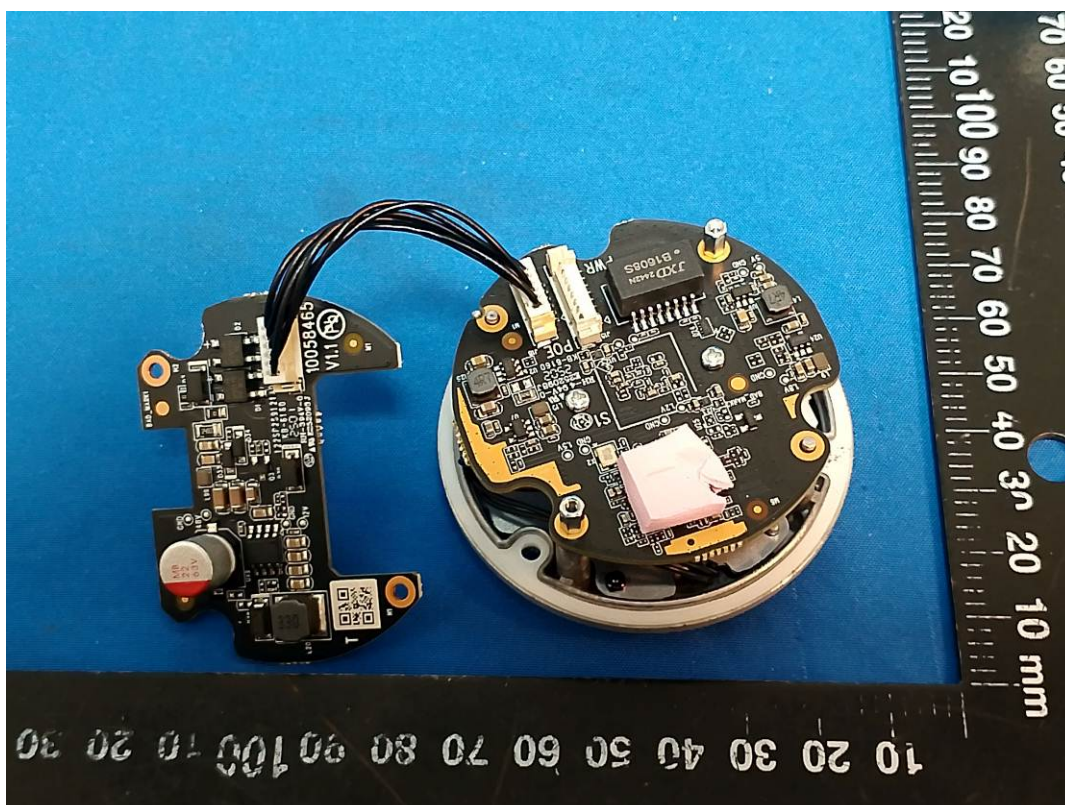
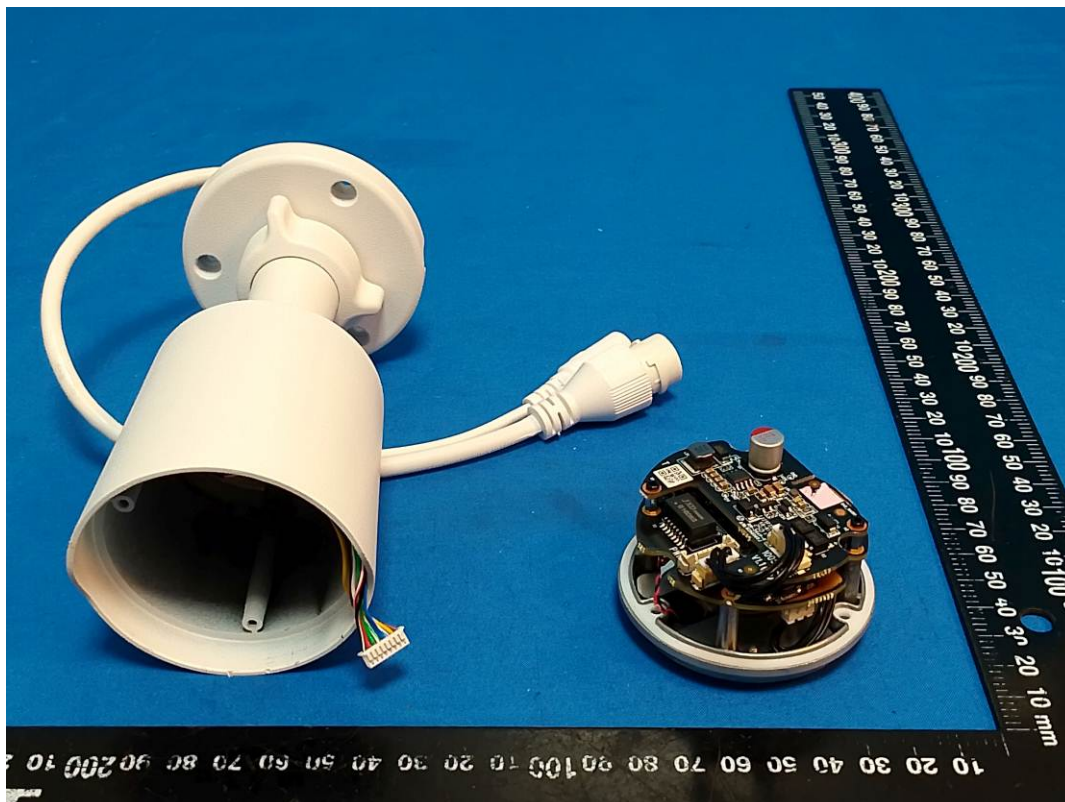




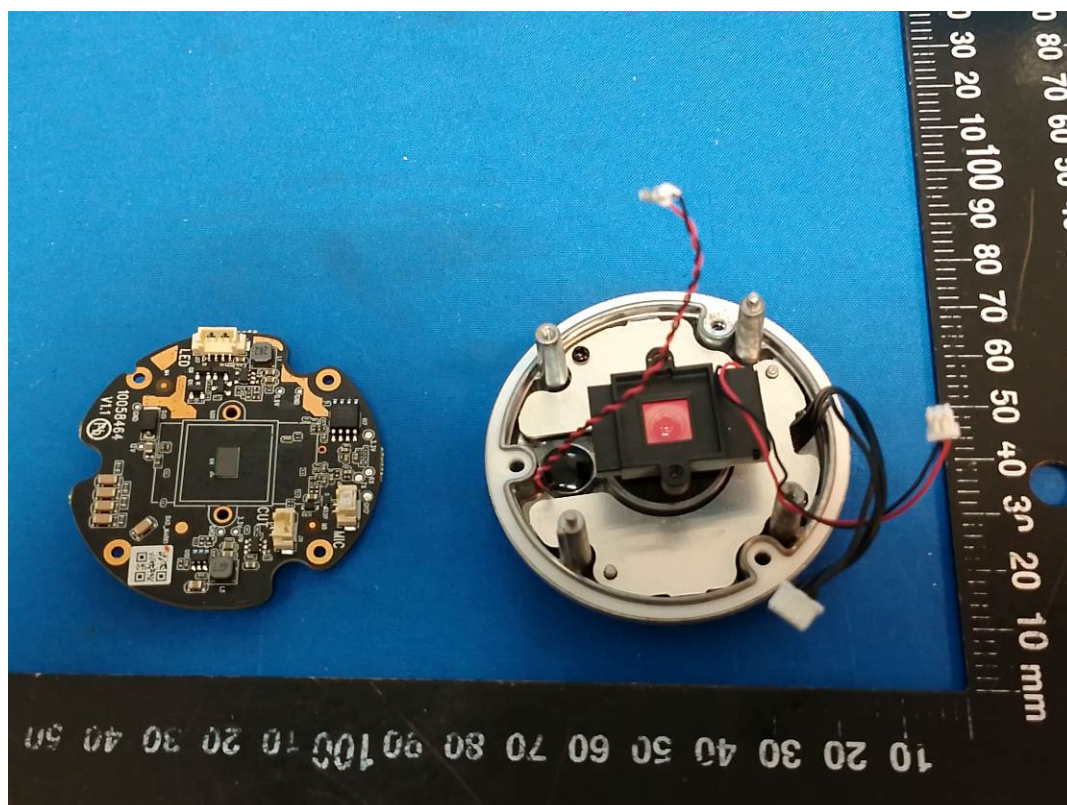
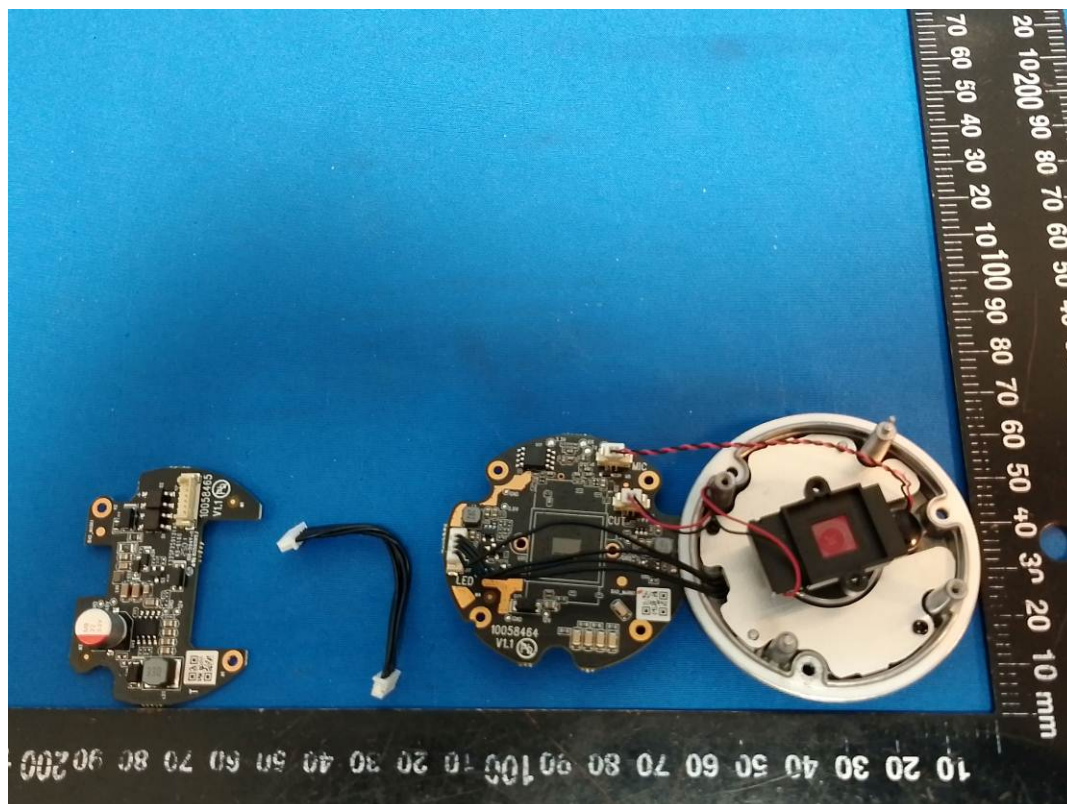




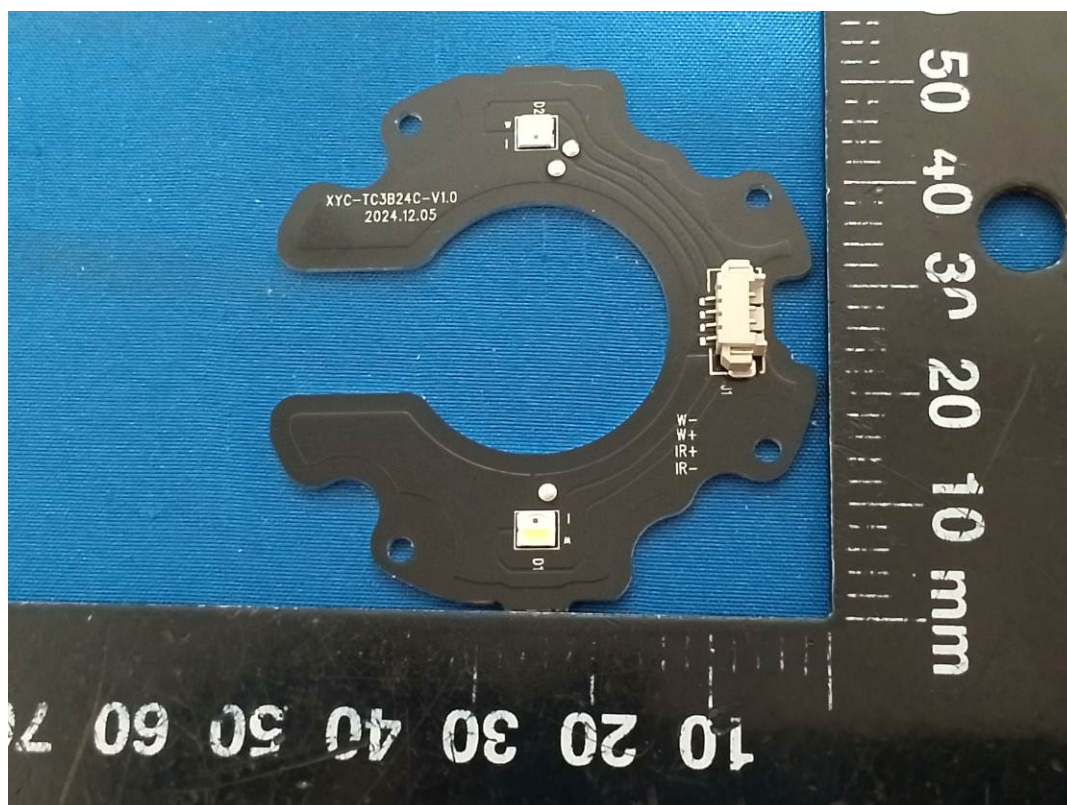
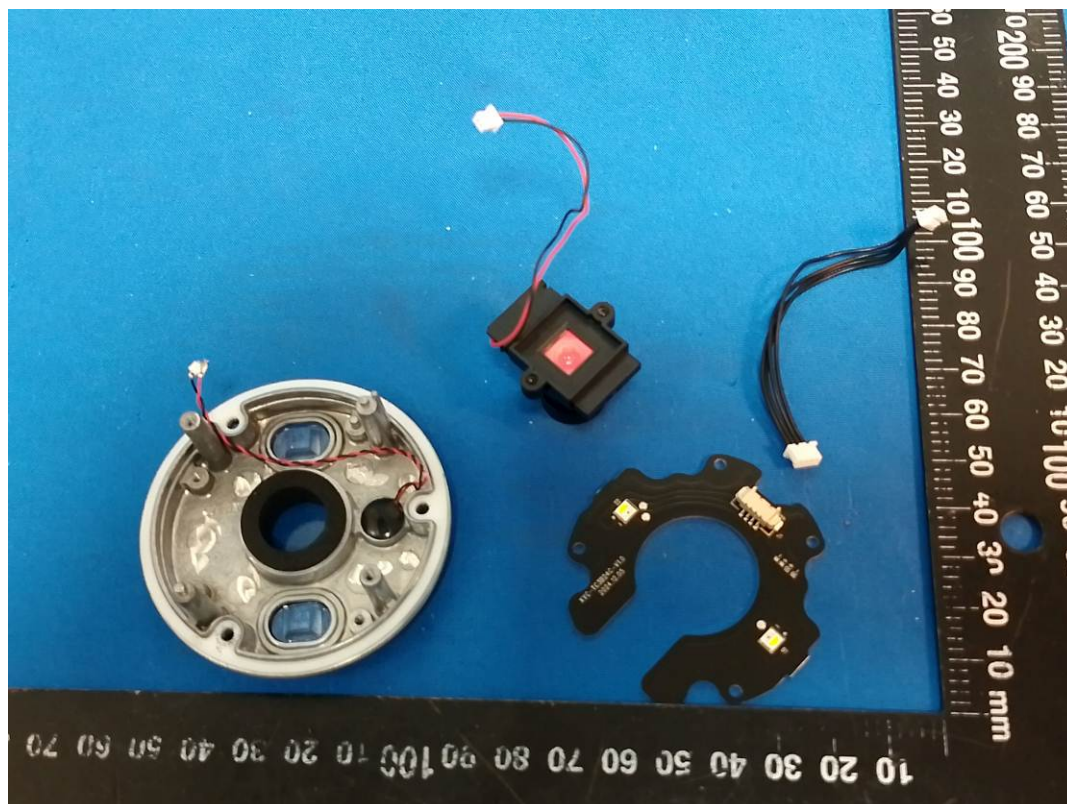


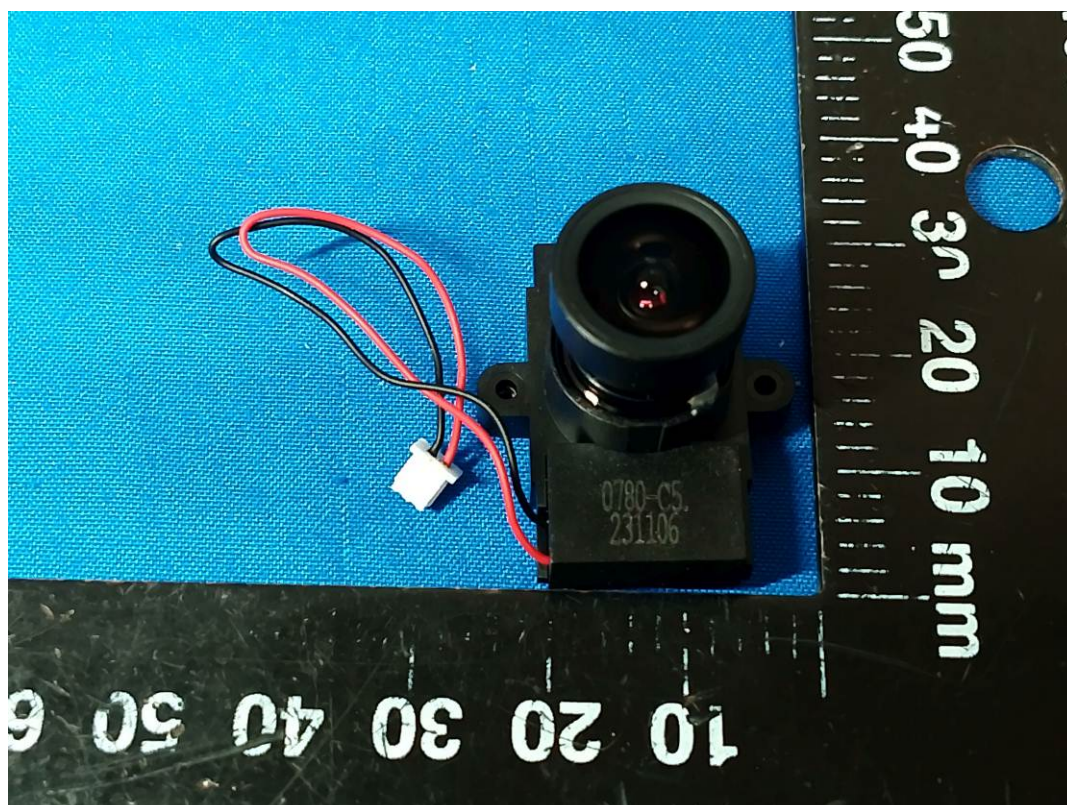
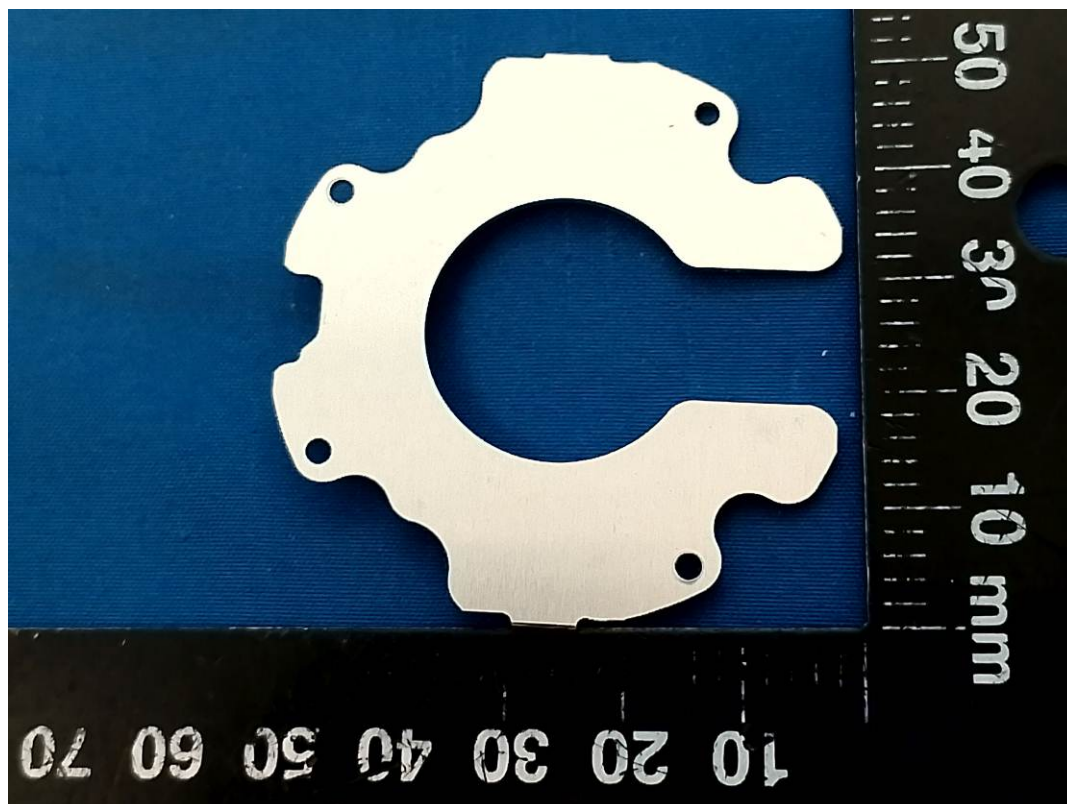




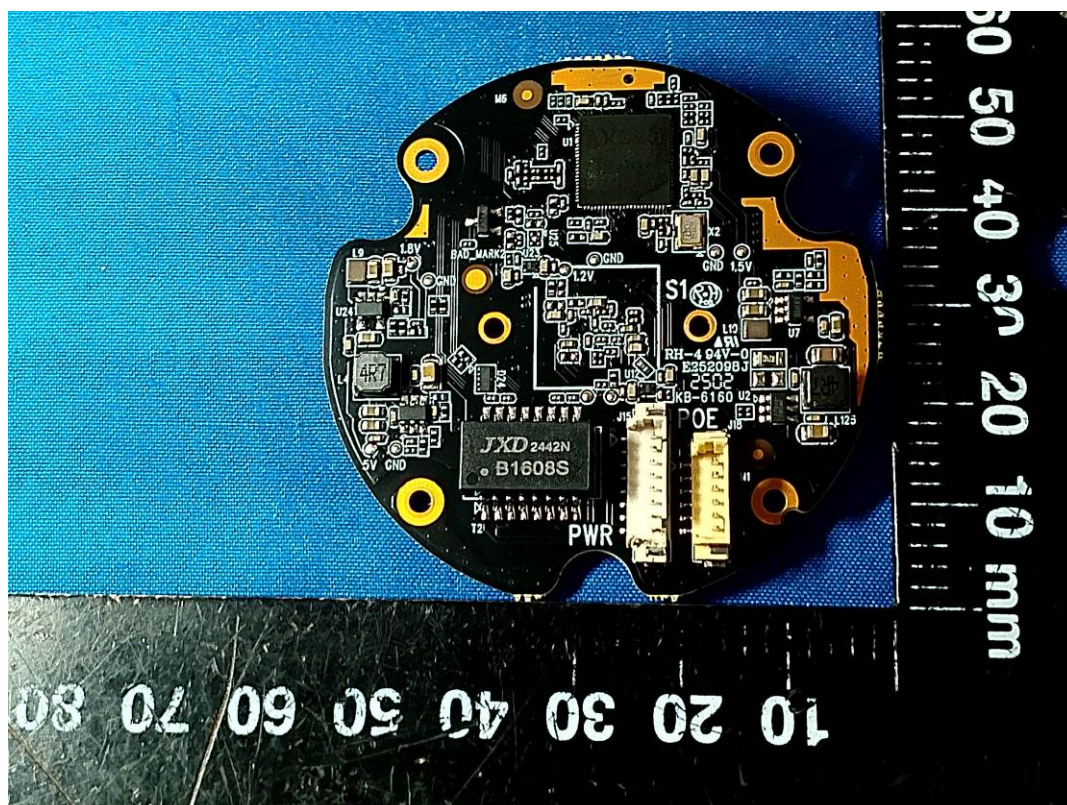
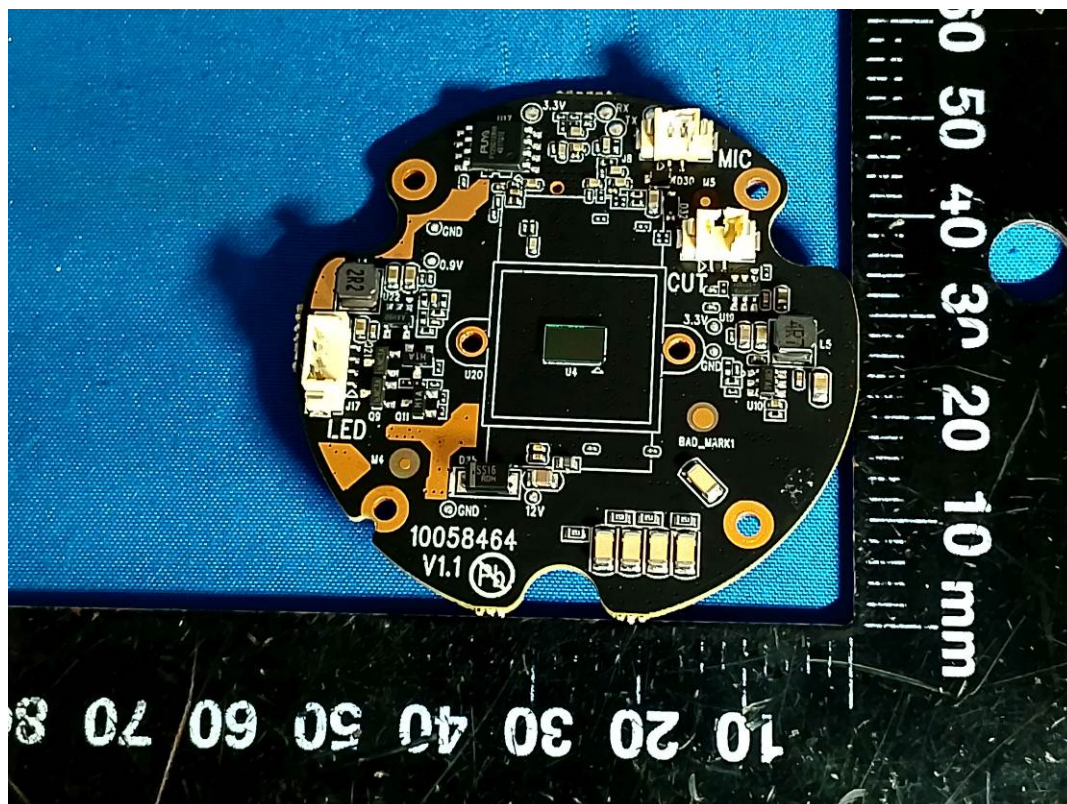




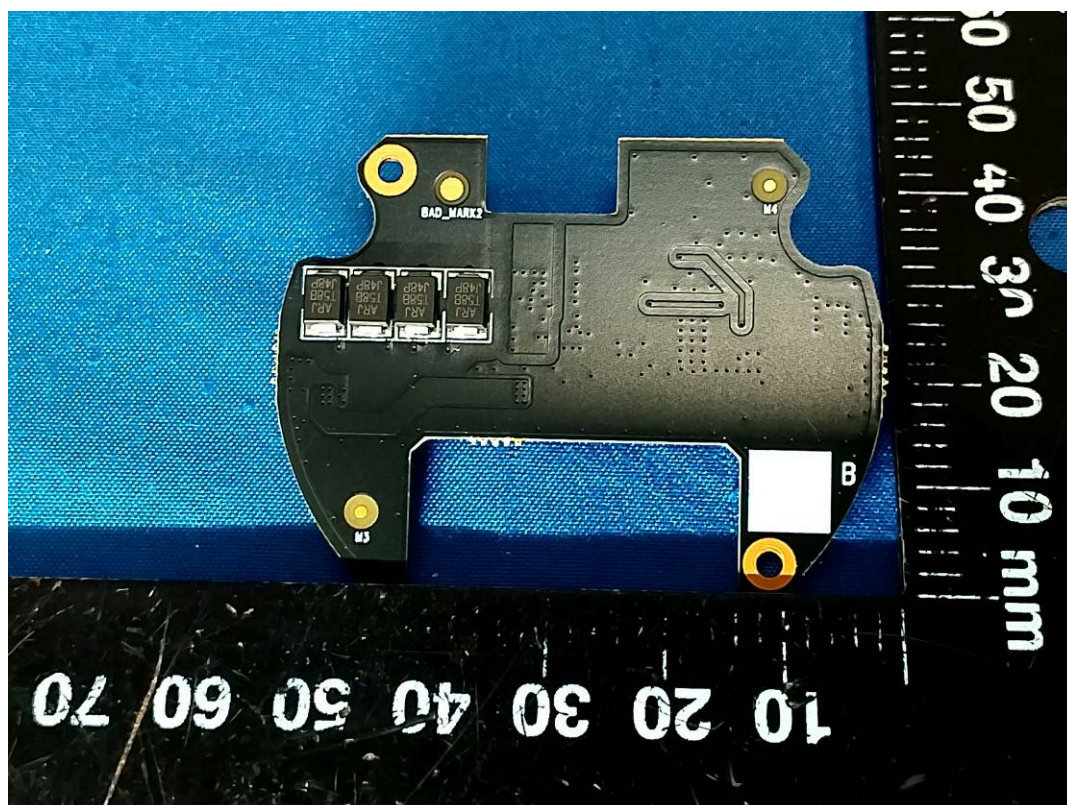
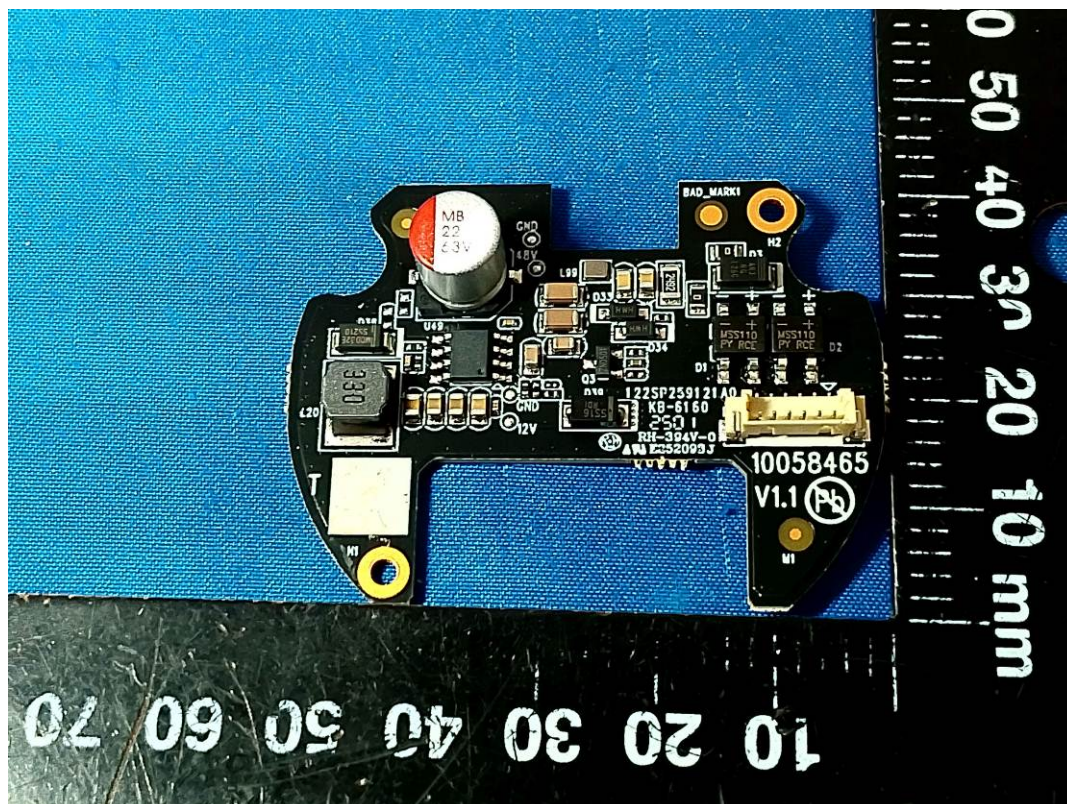














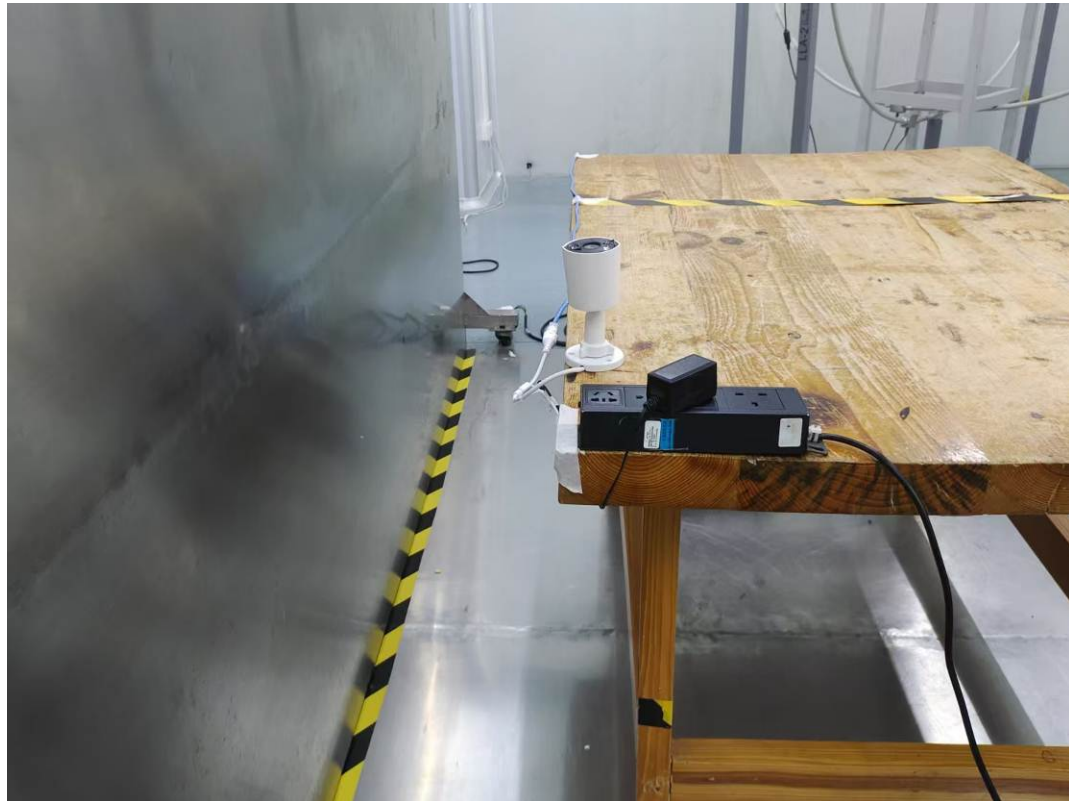
## EXHIBIT B - TEST SETUP PHOTOGRAPHS

### Conducted emissions

Conducted emissions front View-Test Mode 1



Conducted emissions side View-Test Mode 1



Conducted emissions front View-Test Mode 2



Conducted emissions side View-Test Mode 2

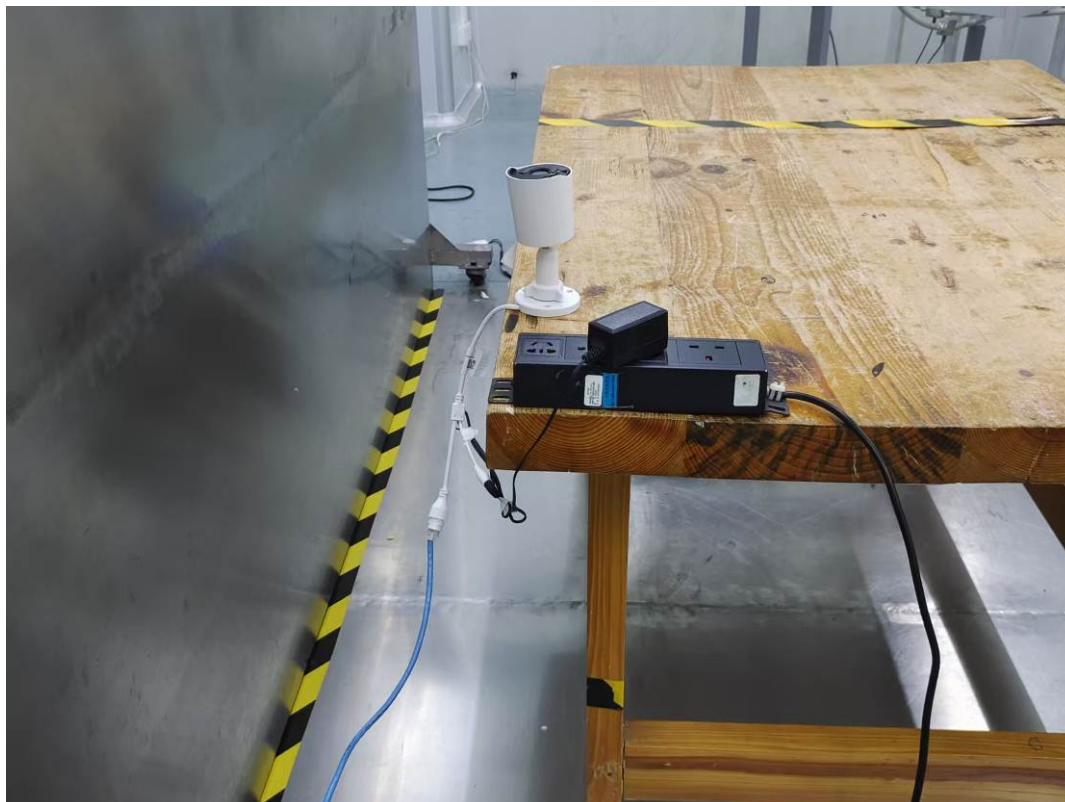




ISN Conducted emissions front View-Test Mode 1



ISN Conducted emissions side View-Test Mode 1



ISN Conducted emissions front View-Test Mode 2



ISN Conducted emissions side View-Test Mode 2





## Radiated Emissions

Radiated Emissions Below 1GHz front View-Test Mode 1



Radiated Emissions Below 1GHz rear View-Test Mode 1



Radiated Emissions Below 1GHz front View-Test Mode 2



Radiated Emissions Below 1GHz rear View-Test Mode 2

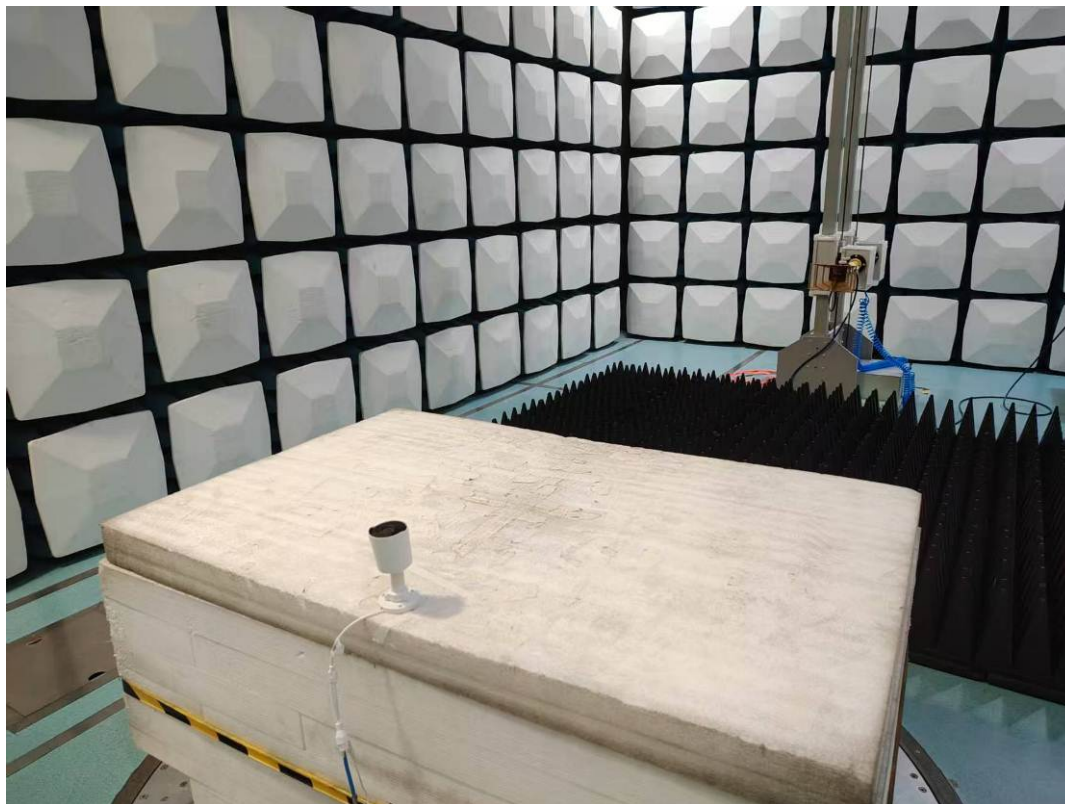




Radiated Emissions Above 1GHz front View-Test Mode 1



Radiated Emissions Above 1GHz rear View-Test Mode 1





Radiated Emissions Above 1GHz front View-Test Mode 2



Radiated Emissions Above 1GHz rear View-Test Mode 2

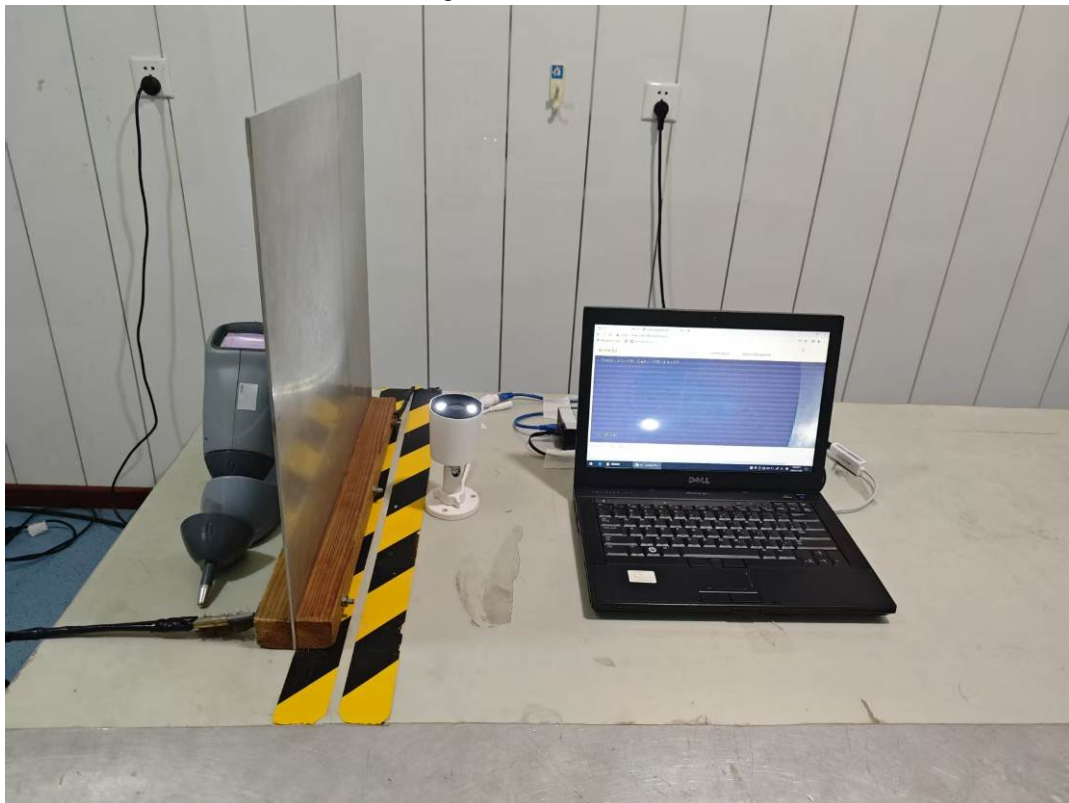


## ESD

Test Setup Photo View-Test Mode 1



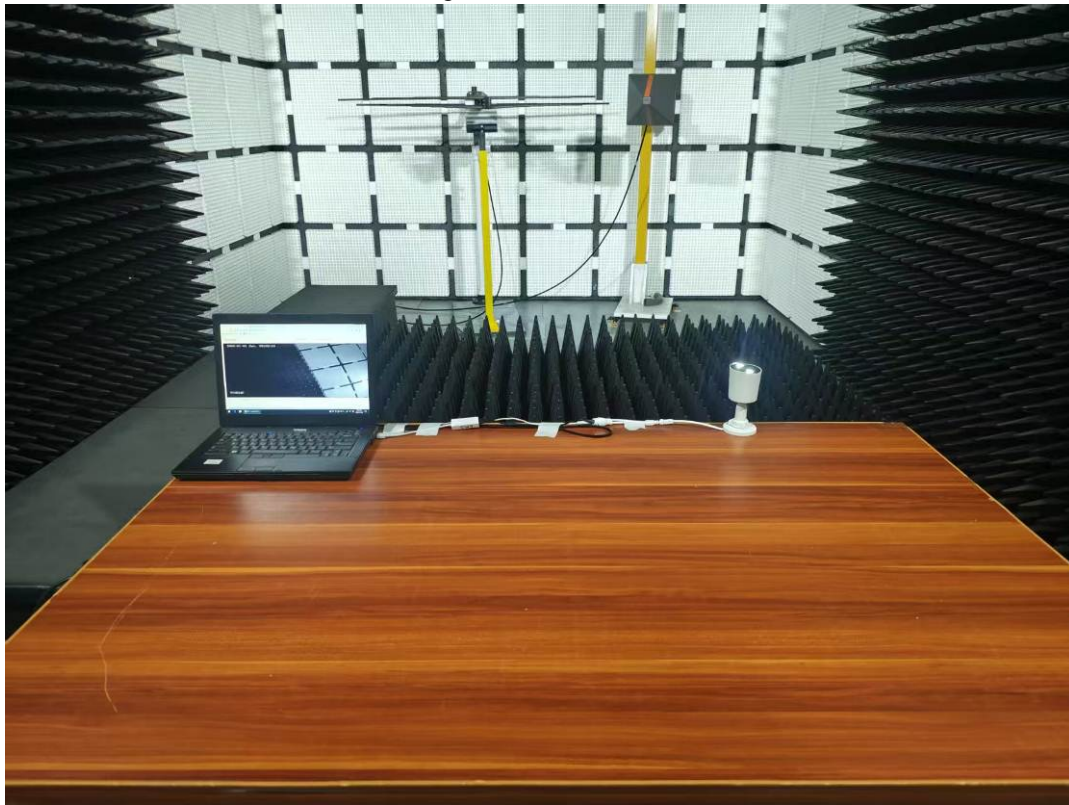
Test Setup Photo View-Test Mode 2



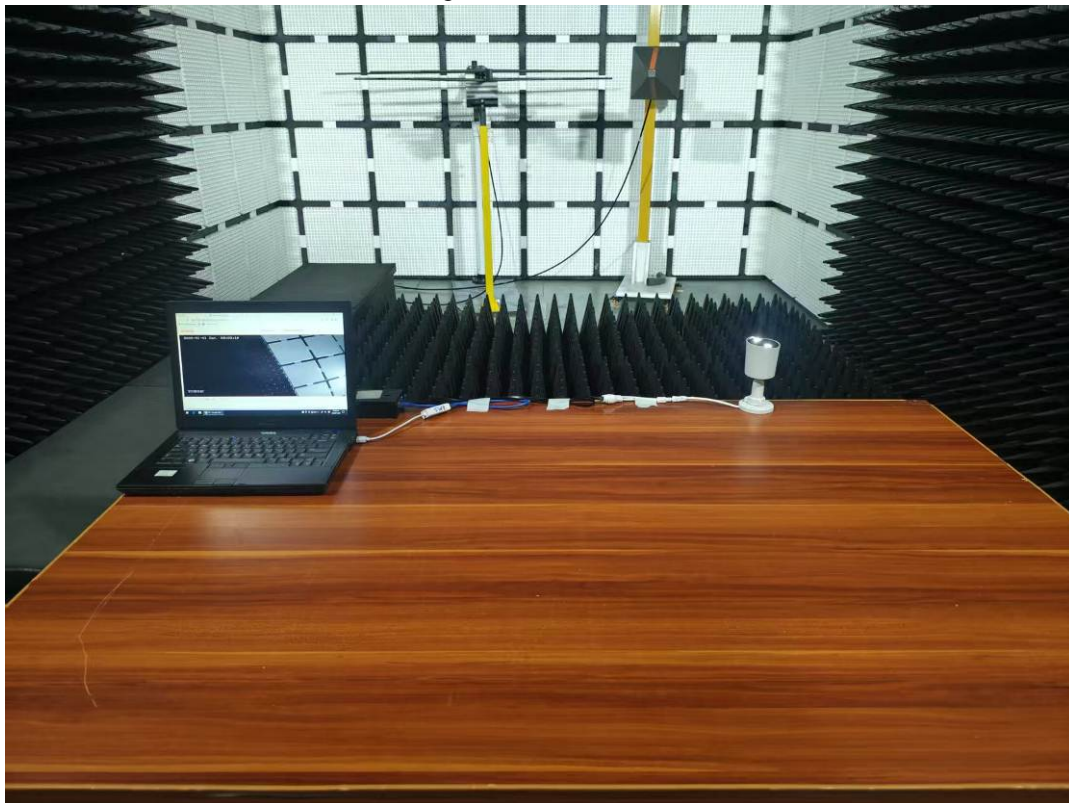


RS

Test Setup Photo View-Test Mode 1



Test Setup Photo View-Test Mode 2

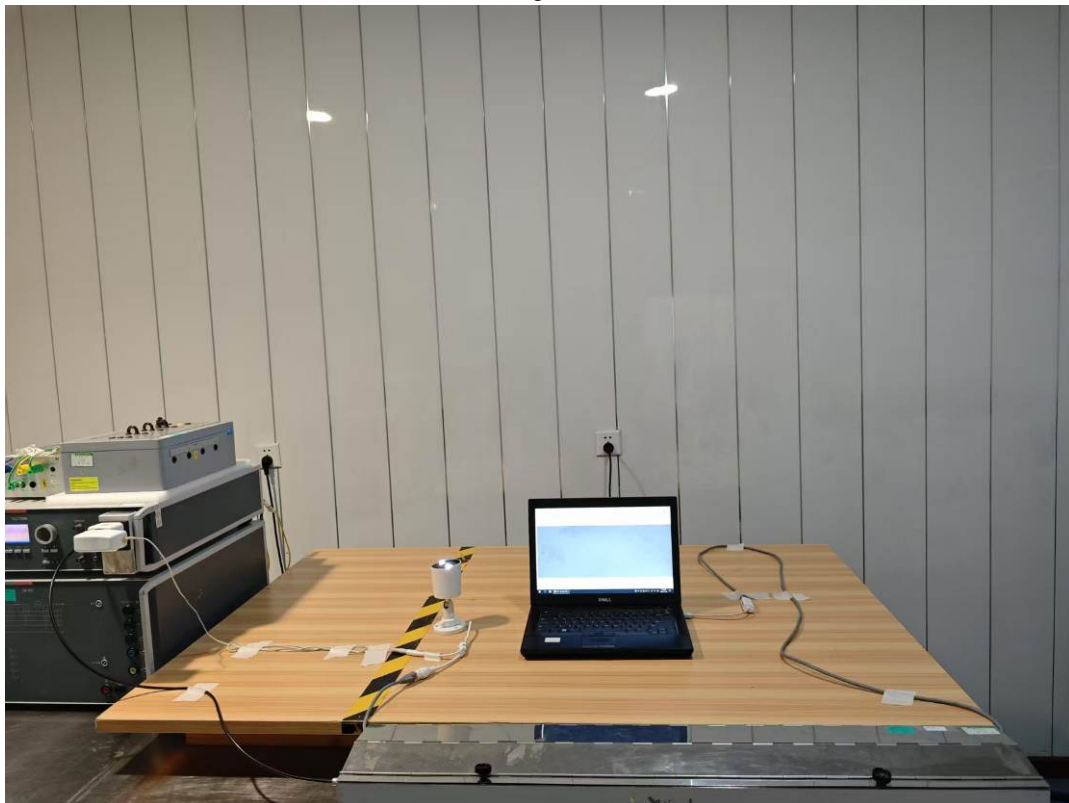


## EFT

Test Setup Photo View-Test Mode 1



RJ45 Port Test Setup Photo Test Mode 1



Test Setup Photo View-Test Mode 2



RJ45 Port Test Setup Photo Test Mode 2





## Dips

Test Setup Photo View-Test Mode 1

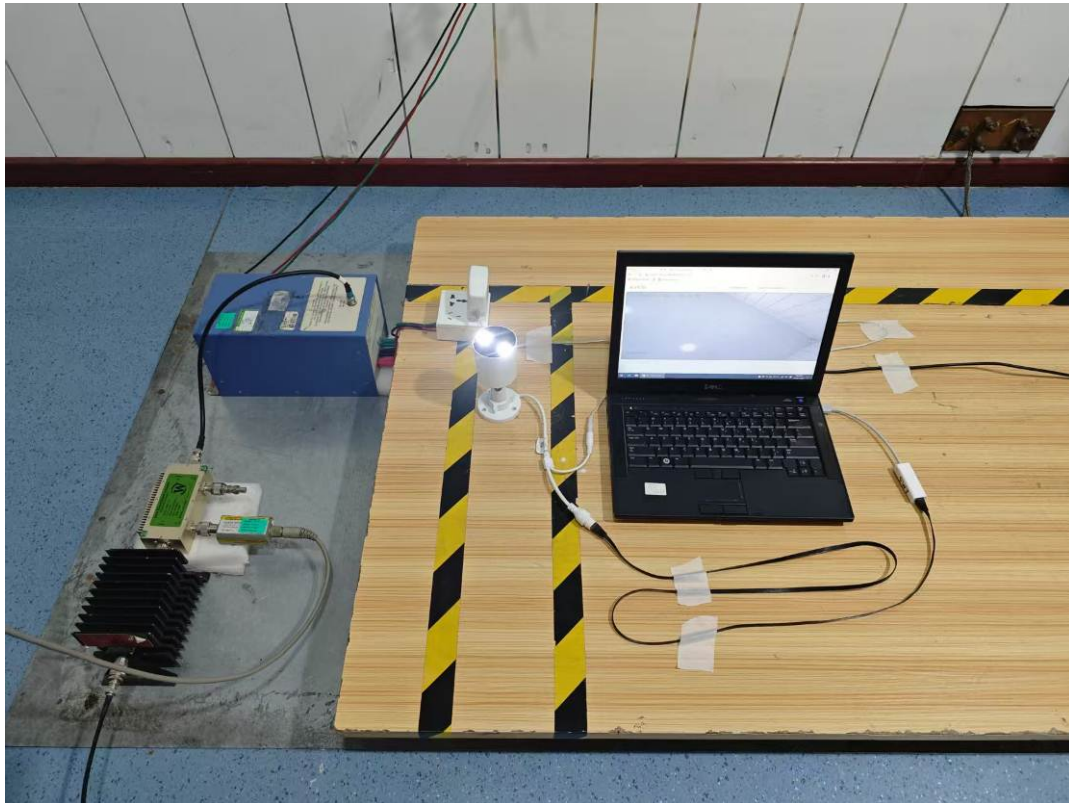


Test Setup Photo View-Test Mode 2

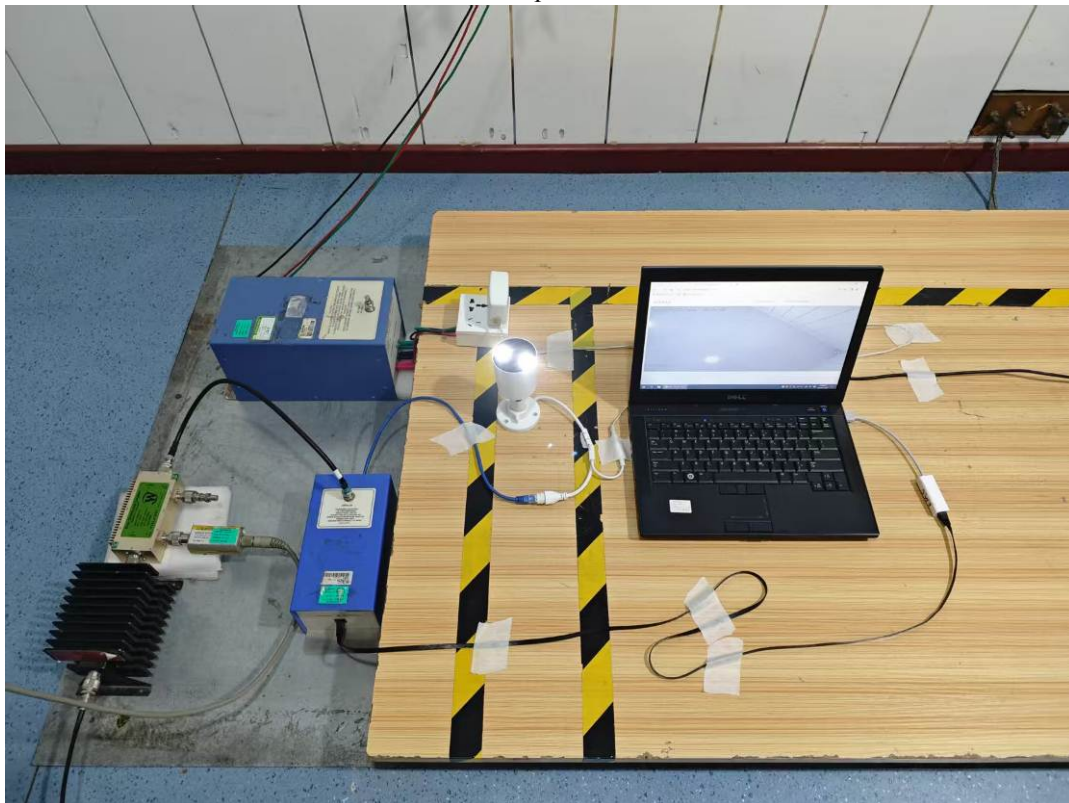


CS

Test Setup Photo View-Test Mode 1

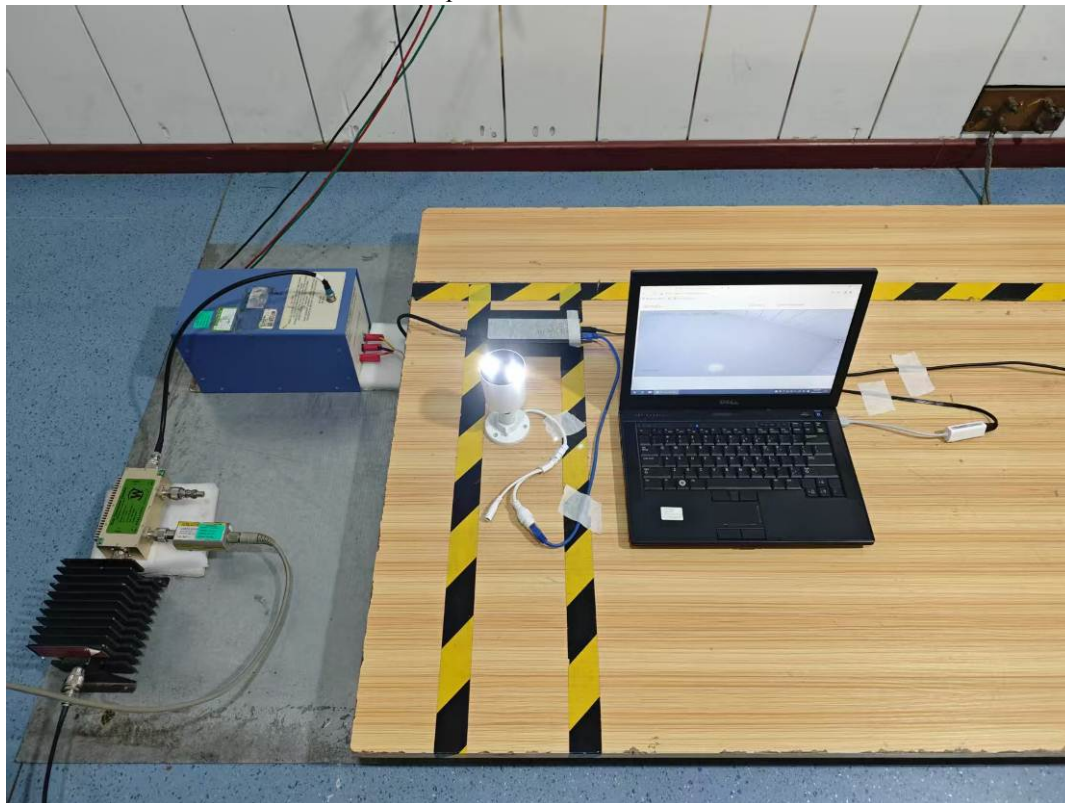


RJ45 Port Test Setup Photo Test Mode 1





Test Setup Photo View-Test Mode 2



RJ45 Port Test Setup Photo Test Mode 2



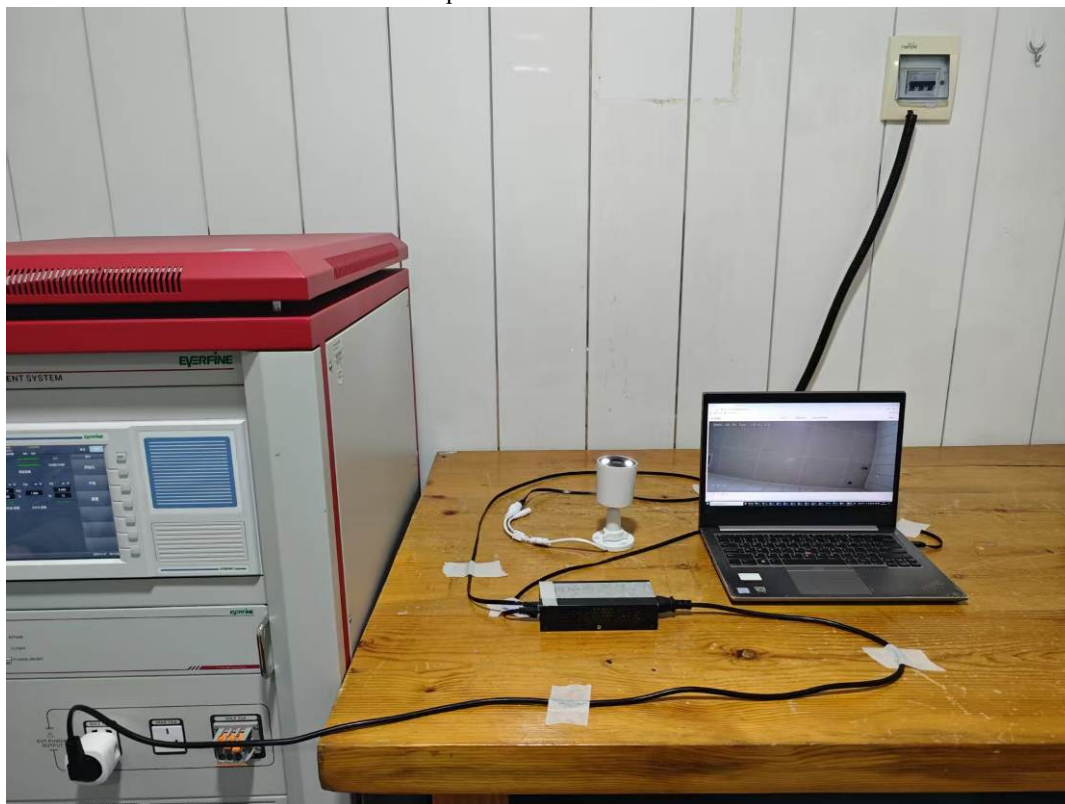


## Flicker

Test Setup Photo View-Test Mode 1



Test Setup Photo View-Test Mode 2



## Surge

Test Setup Photo View-Test Mode 1



RJ45 Port Test Setup Photo Test Mode 1



Test Setup Photo View-Test Mode 2



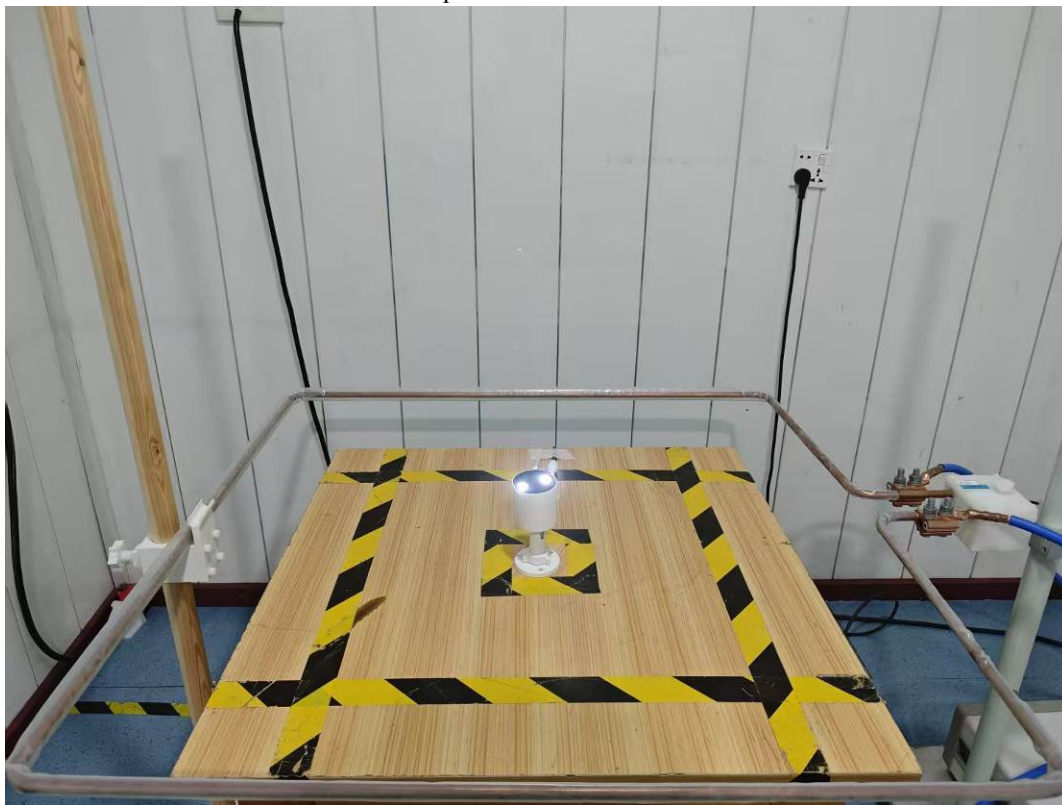
RJ45 Port Test Setup Photo Test Mode 2





**PFMF**

Test Setup Photo View-Test Mode 1



Test Setup Photo View-Test Mode 2



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