



| | |
|----------------------------------|--------------------------------------|
| Product Name: Smart Phone | Report No: CE2022-06453E |
| Product Model: V Max | Security Classification: Open |
| Version: A0 | Total Page: 68 |

TIRT Testing Report

| | | | |
|---------------------|--------------------|---------------------|--|
| Prepared By: | Checked By: | Approved By: | |
| Stone Tang | Randy Lv | Daniel Chen | |
| | | | |

EMC TEST REPORT

| | |
|-------------------------|---|
| Product No: | 20221220021903 |
| Product Name: | Smart Phone |
| Product Model: | V Max , S100Pro All models are with same schematic, The only differences are model no. V Max is main test model, S100Pro, is the adding model. No other differences. |
| Date of Receipt: | 12.12.2022 |
| Date of Test: | 12.12.2022~ 12.26.2022 |
| Issued Date: | 12.27.2022 |
| Testing Lab: | TIRT |

Note: This report shall not be reproduced except in full, without the written approval of Shenzhen Branch of Beijing TIRT Technology Service Co.,Ltd. Laboratory. This document may be altered or revised by Shenzhen Branch of Beijing TIRT Technology Service Co.,Ltd. Laboratory . Personnel only, and shall be noted in the revision section of the document. The test results of this report relate only to the tested sample identified in this report.

Table of Contents

| | |
|---|-----------|
| 1. General information | 6 |
| 1.1. Basic information of EUT | 6 |
| 1.2. Applicable standard..... | 7 |
| 2. Measured equipment list | 8 |
| 2.1. Test facility | 8 |
| 2.2. Test instruments list..... | 8 |
| 2.3. Measurement uncertainty | 11 |
| 3. Test system information | 12 |
| 3.1. Test result summary | 12 |
| 3.2. Description of test mode | 13 |
| 3.3. Configure of system under test..... | 15 |
| 5.1. Description of support units | 16 |
| 6. Emission test | 17 |
| 6.1. Conduction emission test..... | 17 |
| 6.1.1. <i>Limit</i> | 17 |
| 6.1.2. <i>Test procedures</i> | 17 |
| 6.1.3. <i>Test set-up</i> | 18 |
| 6.1.4. <i>Test results</i> | 19 |
| 6.2. Radiated emission test | 21 |
| 6.2.1. <i>Limit</i> | 21 |
| 6.2.2. <i>Test procedures</i> | 22 |
| 6.2.3. <i>Test set-up</i> | 23 |
| 6.2.4. <i>Test results</i> | 25 |
| 6.3. Harmonics current measurement | 29 |
| 6.3.1. <i>Limit</i> | 29 |
| 6.3.2. <i>Test procedures</i> | 30 |
| 6.3.3. <i>Test set-up</i> | 30 |
| 6.3.4. <i>Test results</i> | 31 |
| 6.4. Voltage fluctuation and flicker measurement..... | 32 |
| 6.4.1. <i>Limit</i> | 32 |
| 6.4.2. <i>Test procedures</i> | 32 |
| 6.4.3. <i>Test set-up</i> | 32 |
| 6.4.4. <i>Test results</i> | 33 |
| 7. Immunity test | 34 |
| 7.1. General description | 34 |
| 7.2. Performance of criteria | 36 |
| 7.3. Electrostatic discharge immunity test(ESD)..... | 37 |
| 7.3.1. <i>Test specification</i> | 37 |
| 7.3.2. <i>Test procedures</i> | 37 |
| 7.3.3. <i>Test set-up</i> | 38 |

| | |
|--|----|
| 7.3.4. Test results | 39 |
| 7.4. Radio frequency electromagnetic immunity test(RS) | 40 |
| 7.4.1. Test specification | 40 |
| 7.4.2. Test procedures | 40 |
| 7.4.3. Test set-up | 41 |
| 7.4.4. Test results | 42 |
| 7.5. Electrical fast transient(EFT) | 43 |
| 7.5.1. Test specification | 43 |
| 7.5.2. Test procedures | 43 |
| 7.5.3. Test set-up | 44 |
| 7.5.4. Test results | 45 |
| 7.6. Surge immunity test | 46 |
| 7.6.1. Test specification | 46 |
| 7.6.2. Test procedures | 46 |
| 7.6.3. Test set-up | 48 |
| 7.6.4. Test Results | 49 |
| 7.7. Conducted radio frequency disturbances (CS) | 50 |
| 7.7.1. Test specification | 50 |
| 7.7.2. Test procedures | 50 |
| 7.7.3. Test set-up | 53 |
| 7.7.4. Test results | 54 |
| 7.8. Voltage dips and Voltage interruption | 55 |
| 7.8.1. Test specification | 55 |
| 7.8.2. Test procedures | 55 |
| 7.8.3. Test set-up | 55 |
| 7.8.4. Test results | 56 |
| 8. Appendix-A Test photographs | 57 |
| 9. Appendix-B Photographs of EUT | 62 |

History of the test report

Original Report Issue Date: 2022/12/21

No additional attachment

Additional attachments were issued following record

| Attachment No. | Issue Date | Description |
|----------------|------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

1. General information

1.1. Basic information of EUT

| | |
|------------------------------------|---|
| Product Name/ Model | V Max |
| Brand Name | DOOGEE |
| Product Description | Bluetooth (BR+EDR+LE), WiFi 2.4G, WiFi 5G, GNSS, 2G, 3G, 4G, FM |
| Adapter /Model /Description | HJ-PD20W-EU INPUT:100-240V~50/60Hz 0.6A MAX OUTPUT:5Vdc 3A, 9Vdc 2.22A, 12Vdc 1.67A, |
| Hardware Version | M105-MUB-V1 |
| Software Version | DOOGEE-V-MAX-EEA-Android12.0-20221130 |
| Name of Application | Shenzhen DOOGEE Hengtong Technology CO.,LTD |
| Address | B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District, Shenzhen, China |
| Name of Manufacturer | Shenzhen DOOGEE Hengtong Technology CO.,LTD |
| Manufacturer | B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District, Shenzhen, China |
| Name of Factory | Shenzhen DOOGEE Hengtong Technology CO.,LTD |
| Address | B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District, Shenzhen, China |

Note:

1. For more detailed features description, please refer to the manufacturer's or the User's manual of the EUT.
2. The EUT's highest operating frequency is $\geq 108\text{MHz}$

1.2. Applicable standard

| Applicable Standard |
|--------------------------------------|
| EN 55032:2015+A1:2020 |
| EN IEC 61000-3-2:2019+A1:2021 |
| EN 61000-3-3:2013+A2:2021 |
| EN 55035:2017+A11:2020 |
| EN 301 489-1 V2.2.3 |
| EN 301 489-3 V2.1.1 |
| EN 301 489-17 V3.2.4 |
| EN 301 489-19 V2.1.1 |
| EN 301 489-52 V1.2.1 |
| EN 61000-4-2:2009 |
| EN 61000-4-3: 2006+A1: 2008+A2: 2010 |
| EN 61000-4-4:2012 |
| EN 61000-4-5:2014 +A1:2017 |
| EN 61000-4-6:2013 +AC:2015 |
| EN 61000-4-11:2004 +A1:2017 |

2. Measured equipment list

2.1. Test facility

All measurement facilities used to collect the measurement data are located at Plant 3, Gongjindianzi, Shatian, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China

2.2. Test instruments list

| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
|---------------------------|---------------|----------------|----------------------------|------------------|-----------------|
| Radiated Emission | | | | | |
| EMI Receiver | Rohde&Schwarz | ESR7 | 102013 | 2022/11/10 | 2023/11/09 |
| Integral Antenna | Schwarzbeck | VULB 9163 | VULB 9163-1151 | 2022/11/21 | 2023/11/20 |
| Integral Antenna | Schwarzbeck | BBHA 9120D | BBHA 9120D 1201 | 2022/11/21 | 2023/11/20 |
| Preamplifier | CHENYI | EMC012645SE | 980417 | 2022/03/17 | 2023/03/16 |
| ECSI RF IN RF Cable | Rohde&Schwarz | AP-X1 | \ | 2022/11/10 | 2023/11/09 |
| Conducted Emission | | | | | |
| EMI Receiver | Rohde&Schwarz | ESR3 | 1316.3003K03-1 02081-Ev | 2022/11/10 | 2023/11/09 |
| AMN | Rohde&Schwarz | ENV216 | 3560.6550.05 | 2022/11/21 | 2023/11/20 |
| AMN | Schwarzbeck | NSLK8127 | #829 | 2022/11/21 | 2023/11/20 |
| AAN | TESEQ | T200A | 25702 | 2022/03/17 | 2023/03/16 |
| AAN | TESEQ | T400A | 24848 | 2022/11/10 | 2023/11/09 |
| AAN | TESEQ | T800 | 24819 | 2022/11/10 | 2023/11/09 |
| AAN | Schwarzbeck | CATE5 8158 | #171 | 2022/11/21 | 2023/11/20 |
| AAN | Schwarzbeck | CATE6 NTFM8158 | #128 | 2022/11/21 | 2023/11/20 |
| ECSI RF IN RF Cable | Rohde&Schwarz | RP-X1 | \ | 2022/03/17 | 2023/03/16 |

| | | | | | |
|-----------------------------------|---------------|-------------------|------------------|------------|------------|
| ECSI RF IN RF Cable | Rohde&Schwarz | Sapre sm | \ | 2021/11/10 | 2022/11/09 |
| ESD | | | | | |
| ESD Generator | 3ctest | ESD-20 | E17000105 | 2022/11/10 | 2023/11/09 |
| ESD Generator | emtest | dito | E0138118302 | 2022/11/10 | 2023/11/09 |
| Temp&Humidity Recorder | Lime | CGG1 | JL248 | 2022/07/23 | 2023/07/22 |
| Digital air pressure gauge | Leeruo | BY-2003P | \ | 2022/11/03 | 2023/11/02 |
| RS | | | | | |
| Signal generator | DARE | CTR1009B/RGN6000B | 16100025SN020 | 2022/11/10 | 2023/11/09 |
| Power meter | DARE | RPR2006C | 18100006SNO03 | 2022/11/10 | 2023/11/09 |
| Power meter | DARE | RPR2006C | 18100006SNO04 | 2022/11/10 | 2023/11/09 |
| Power amplifier | Bonn | BLWA0820-200/100 | 1811690 | 2022/11/10 | 2023/11/09 |
| Integral Antenna& Power amplifier | DARE | RFS2006B | 16100025SNO20 | \ | \ |
| Integral Antenna | Rohde&Schwarz | STLP 9128D | STLP 9128 DN#119 | \ | \ |
| EFT | | | | | |
| Ultra-compact Simulator | Emtest | UCS 500N7 | E17000205 | 2022/11/10 | 2023/11/09 |
| Ultra-compact Simulator | 3ctest | CCS500 | ES0851809 | 2022/11/10 | 2023/11/09 |
| Coupling clamp | 3ctest | \ | EC0440829 | 2022/11/10 | 2023/11/09 |
| Coupling clamp | Emtest | HFK | 0610-100 | 2022/11/10 | 2023/11/09 |
| Surge | | | | | |
| Lightning Surge Generator | 3ctest | SG-5010G | EC5531109 | 2022/11/10 | 2023/11/09 |
| Ultra-compact Simulator | Emtest | UCS 500N7 | ES0823806 | 2022/11/10 | 2023/11/09 |
| Lightning Surge Generator | 3ctest | CWS1000CM | ES3561801 | 2022/11/10 | 2023/11/09 |
| CDN | Emtest | SNV 508N1 | V1047108029 | 2022/11/10 | 2023/11/09 |

| | | | | | |
|---------------------------------|-----------|----------------|-------------|------------|------------|
| CDN | 3ctest | CDN405T8A1 | ES2731802 | 2022/11/10 | 2023/11/09 |
| CS | | | | | |
| Conducted Immunity Test System | Frankonia | CIT-10 | E6701078605 | 2022/11/10 | 2023/11/09 |
| Conducted Immunity Test System | Emtest | CWS 500N | 46271 | 2022/11/10 | 2023/11/09 |
| CDN | Luthi | L-801 M2/M3 | 2607 | 2022/11/10 | 2023/11/09 |
| CDN | TESEQ | T800 | 36200 | 2022/11/10 | 2023/11/09 |
| CDN | TESEQ | T200 | 53140 | 2022/11/10 | 2023/11/09 |
| Clamp | Luthi | EM101 | 35978 | 2022/11/10 | 2023/11/09 |
| PFMF | | | | | |
| MFO/Magnetic Field Option | 3ctest | CCS500 | ES0851809 | 2022/11/10 | 2023/11/09 |
| Magnetic Field Coils | 3ctest | TCXS111 | ES4621820 | 2022/11/03 | 2023/11/02 |
| DIP | | | | | |
| Ultra-compact Simulator | Emtest | UCS 500N7 | E0401223005 | 2022/11/10 | 2023/11/09 |
| Ultra-compact Simulator | 3ctest | CCS500 | ES0851809 | 2022/11/10 | 2023/11/09 |
| Tapped transformer | Emtest | V4780 S2 | E0401223006 | 2022/11/10 | 2023/11/09 |
| Harmonics & Flickers | | | | | |
| Harmonics and Flicker Analyzer | Ametek | PACS-1 | 1708A01119 | 2022/09/13 | 2023/09/12 |
| Power Source | Ametek | 5001IX-CTS-400 | 1708A4718 | 2022/09/13 | 2023/09/12 |

2.3. Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

| Measurement uncertainty levels of TIRT Lab | | |
|--|-----------------------------|-------|
| Measurement | Measurement Frequency Range | U(dB) |
| Radiated Emission (3m) | 30MHz~1GHz | 4.6 |
| Radiated Emission (3m) | 1GHz~6GHz | 4.9 |
| Conduction Emissions | 150kHz~30MHz | 3.1 |

3. Test system information

3.1. Test result summary

Test procedures according to the technical standard(s):

| Emission | | | | |
|--------------|--------------------------------|--------|---------|---------------|
| Standard | Item | Result | Remarks | Tested in Lab |
| EN55032 | Conducted (Main Port) | PASS | Class B | TIRT |
| | Conducted (Telecom Port) | NA | Class B | NA |
| | Radiated | PASS | Class B | TIRT |
| EN 61000-3-2 | Harmonic current emissions | NA | Class A | NA |
| EN 61000-3-3 | Voltage fluctuations & flicker | PASS | / | TIRT |

| Immunity | | | | |
|---------------|-----------------------------------|--------|-------------------|---------------|
| Standard | Item | Result | Remarks | Tested in Lab |
| EN 61000-4-2 | ESD | PASS | Criterion B | TIRT |
| EN 61000-4-3 | RS | PASS | Criterion A | TIRT |
| EN 61000-4-4 | EFT | PASS | Criterion B | TIRT |
| EN 61000-4-5 | Surge | PASS | Criterion B | TIRT |
| EN 61000-4-6 | CS | PASS | Criterion A | TIRT |
| EN 61000-4-11 | Voltage dips & voltage variations | PASS | Criterion B/B/C/C | TIRT |

Note:

- (1) "N/A" denotes test is not applicable in this test report.
- (2) The power consumption of EUT is less than 75W and no limits apply.
- (3) Voltage dip: 0% residual voltage for 0.5 cycle – Performance Criteria B
 Voltage dip: 0% residual voltage for 1 cycle – Performance Criteria B
 Voltage dip: 70% residual voltage for 25 cycle (at 50Hz) – Performance Criteria C
 Voltage Interruption: 0% residual voltage for 250 cycle (at 50Hz) – Performance Criteria C
- (4) TIRT: Lab. Shenzhen Branch of Beijing TIRT Technology Service Co.,Ltd.

3.2. Description of test mode

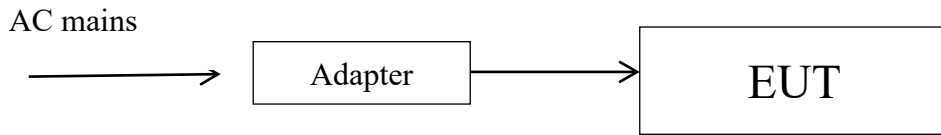
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively. The test data reflect the worst model.

| For Radiated Test | |
|-------------------|--------------------------------|
| Final Test Mode | Description |
| 1 | Charging and Camera Shooting |
| 2 | Charging and Memory Playing |
| 3 | Charging and FM Playing |
| 4 | Charging and Data Transmitting |
| 5 | 2G+WiFi+BT+Charging |
| 6 | 3G+BT+Charging |
| 7 | 4G+BT+Charging |
| 8 | Charging+GNSS |
| 9 | Charging+5.8G SRD |

| For Conducted Test | |
|--------------------|--------------------------------|
| Final Test Mode | Description |
| 1 | Charging and Camera Shooting |
| 2 | Charging and Memory Playing |
| 3 | Charging and FM Playing |
| 4 | Charging and Data Transmitting |
| 5 | 2G+WiFi+BT+Charging |
| 6 | 3G+BT+Charging |
| 7 | 4G+BT+Charging |
| 8 | Charging+GNSS |
| 9 | Charging+5.8G SRD |

| For EMS Test | |
|-----------------|-------------|
| Final Test Mode | Description |
| 1 | Full SYSTEM |

3.3. Configure of system under test



Test topology

5.1. Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Equipment | Model | Brand | FCC ID | Series No |
|-----|-----------------|-------|-------|--------|-----------|
| 1 | Mobile notebook | L450 | Think | Doc | / |

6. Emission test

6.1. Conduction emission test

6.1.1. Limit

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | |
|-----------------|----------------|---------|----------------|---------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

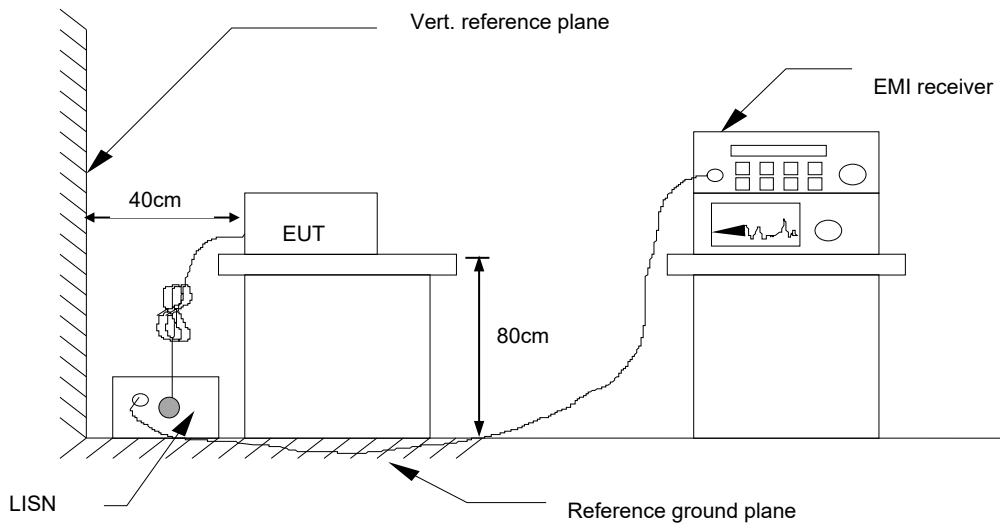
Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.1.2. Test procedures

1. Test limits and test methods reference EN 55032 Appendix A and FCC Part 15b.
2. The EUT was placed 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (AMN). All other support equipment powered from additional AMN. The AMN provide 50 Ohm/ 50 uH of coupling impedance for the measuring instrument.
3. Interconnecting cables that hang closer than 0.4 m to the ground plane shall be folded back and forth in the center forming a bundle 0.3 m to 0.4 m long.
4. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance.
5. The frequency range from 150 kHz to 30 MHz was searched.
6. Actual test configuration, please refer to the related Item – EUT Test Photos.
7. AAN, CP or CVP at least 0.8 m from nearest part of EUT chassis.
8. The thickness of the insulation shall not be more than 150 mm.

6.1.3. Test set-up



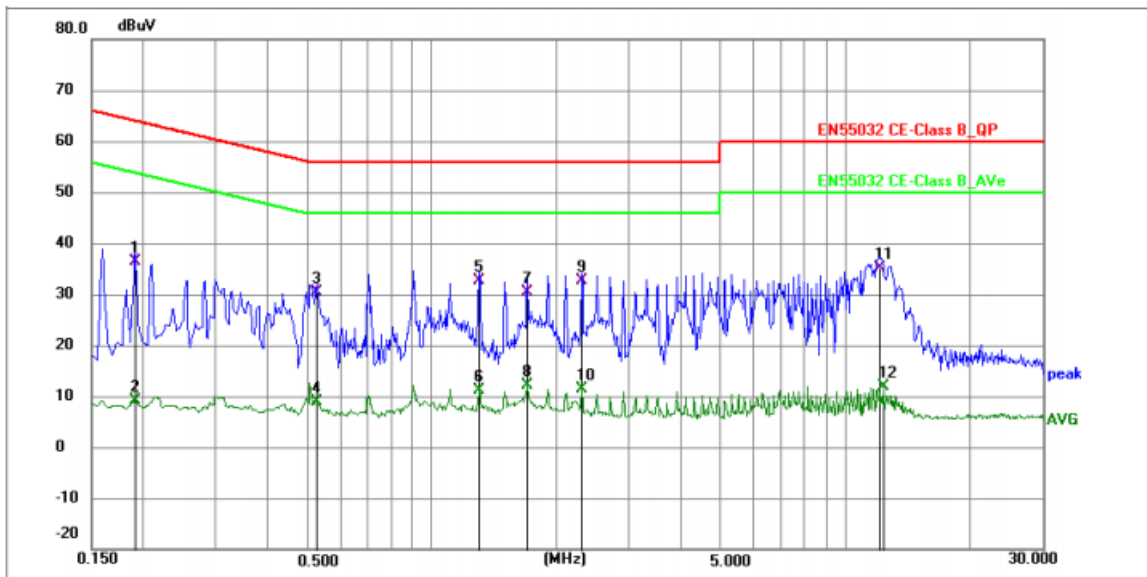
For the actual test configuration, please refer to the related item – Photographs of the test configuration

6.1.4. Test results

| | | | |
|--------------------------|--------------|--------------|--------|
| Product Model: | V30Pro | RBW | 9 kHz |
| Environmental Conditions | 25° C,45% RH | Test Mode | Mode 1 |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-13 | | |

Note: 230V/50Hz

Line



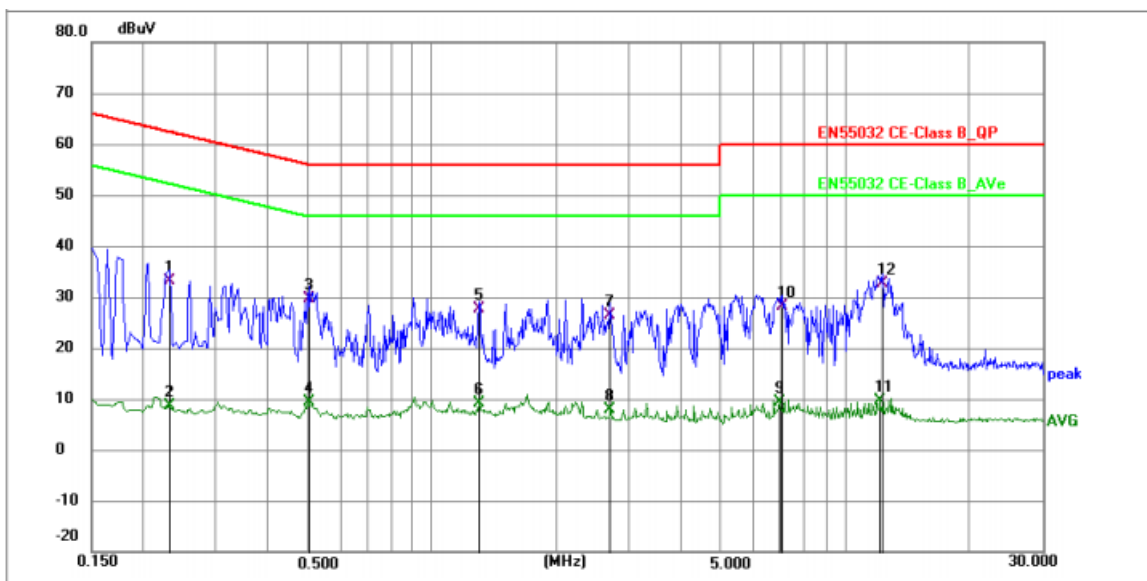
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.1905 | 26.26 | 10.18 | 36.44 | 64.01 | -27.57 | QP | P | |
| 2 | 0.1905 | -0.93 | 10.18 | 9.25 | 54.01 | -44.76 | AVG | P | |
| 3 | 0.5233 | 20.19 | 10.26 | 30.45 | 56.00 | -25.55 | QP | P | |
| 4 | 0.5233 | -1.49 | 10.26 | 8.77 | 46.00 | -37.23 | AVG | P | |
| 5 | 1.3020 | 22.25 | 10.27 | 32.52 | 56.00 | -23.48 | QP | P | |
| 6 | 1.3020 | 0.74 | 10.27 | 11.01 | 46.00 | -34.99 | AVG | P | |
| 7 | 1.7023 | 20.15 | 10.29 | 30.44 | 56.00 | -25.56 | QP | P | |
| 8 | 1.7023 | 1.86 | 10.29 | 12.15 | 46.00 | -33.85 | AVG | P | |
| 9 * | 2.3054 | 22.46 | 10.28 | 32.74 | 56.00 | -23.26 | QP | P | |
| 10 | 2.3054 | 1.10 | 10.28 | 11.38 | 46.00 | -34.62 | AVG | P | |
| 11 | 12.1200 | 24.94 | 10.20 | 35.14 | 60.00 | -24.86 | QP | P | |
| 12 | 12.3315 | 1.68 | 10.18 | 11.86 | 50.00 | -38.14 | AVG | P | |

Note: The other emission levels were very low against the limit.

| | | | |
|--------------------------|--------------|--------------|--------|
| Product Model: | V30Pro | RBW | 9 kHz |
| Environmental Conditions | 25° C,45% RH | Test Mode | Mode 1 |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-13 | | |

Note: 230V/50Hz

Neutral



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.2310 | 22.92 | 10.20 | 33.12 | 62.41 | -29.29 | QP | P | |
| 2 | 0.2310 | -1.65 | 10.20 | 8.55 | 52.41 | -43.86 | AVG | P | |
| 3 * | 0.5010 | 19.39 | 10.26 | 29.65 | 56.00 | -26.35 | QP | P | |
| 4 | 0.5010 | -0.89 | 10.26 | 9.37 | 46.00 | -36.63 | AVG | P | |
| 5 | 1.3020 | 17.27 | 10.25 | 27.52 | 56.00 | -28.48 | QP | P | |
| 6 | 1.3020 | -1.11 | 10.25 | 9.14 | 46.00 | -36.86 | AVG | P | |
| 7 | 2.7014 | 16.17 | 10.27 | 26.44 | 56.00 | -29.56 | QP | P | |
| 8 | 2.7014 | -2.38 | 10.27 | 7.89 | 46.00 | -38.11 | AVG | P | |
| 9 | 6.9180 | -0.96 | 10.27 | 9.31 | 50.00 | -40.69 | AVG | P | |
| 10 | 7.0484 | 17.85 | 10.28 | 28.13 | 60.00 | -31.87 | QP | P | |
| 11 | 12.1290 | -0.47 | 10.19 | 9.72 | 50.00 | -40.28 | AVG | P | |
| 12 | 12.3180 | 22.57 | 10.17 | 32.74 | 60.00 | -27.26 | QP | P | |

Note: The other emission levels were very low against the limit.

6.2. Radiated emission test

6.2.1. Limit

Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment

EN55032

| Frequency Range MHz | Measurement | | | Class B limits dB(μV/m) |
|------------------------|--------------|---------------|------------------------------|----------------------------|
| | Facility | Distance m | Detector type / bandwidth | |
| 30 to 230 | OATS/SA C | 3 | Quasi Peak / | 40 |
| 230 to 1 000 | | | 120 kHz | 47 |

Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

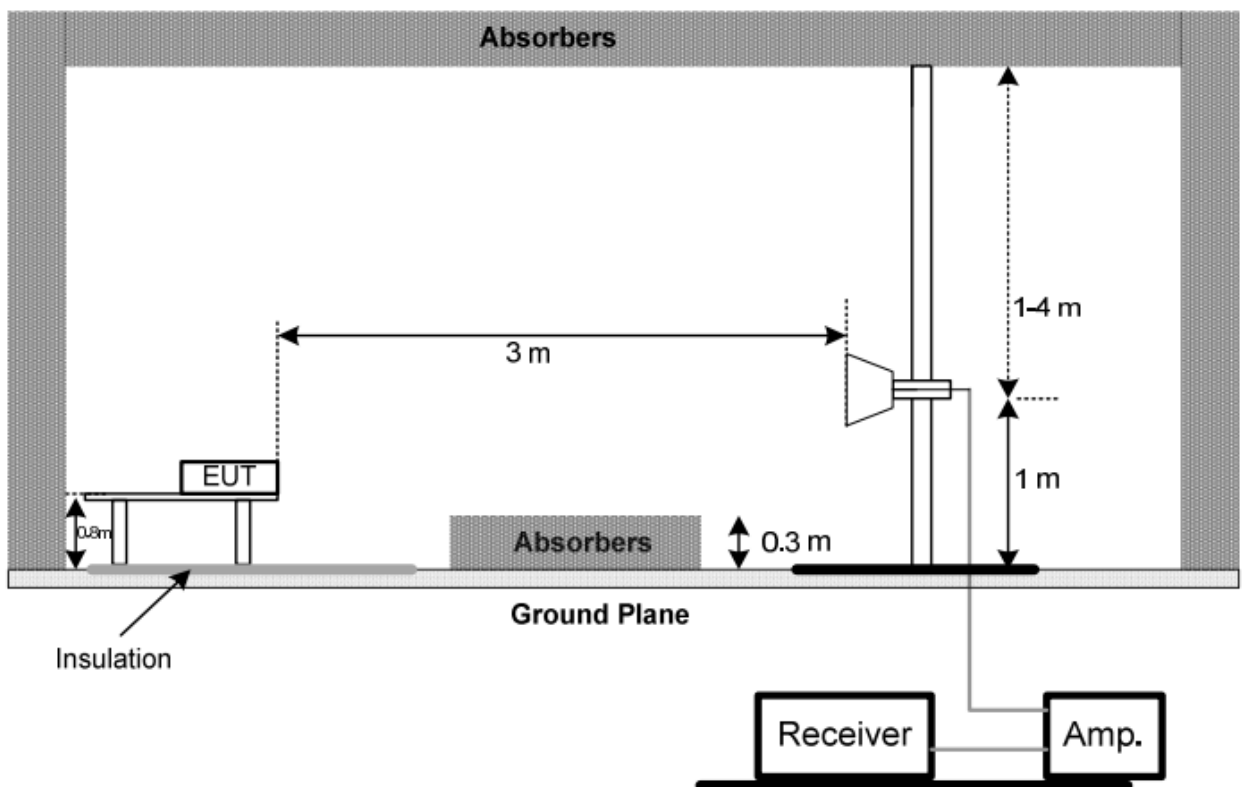
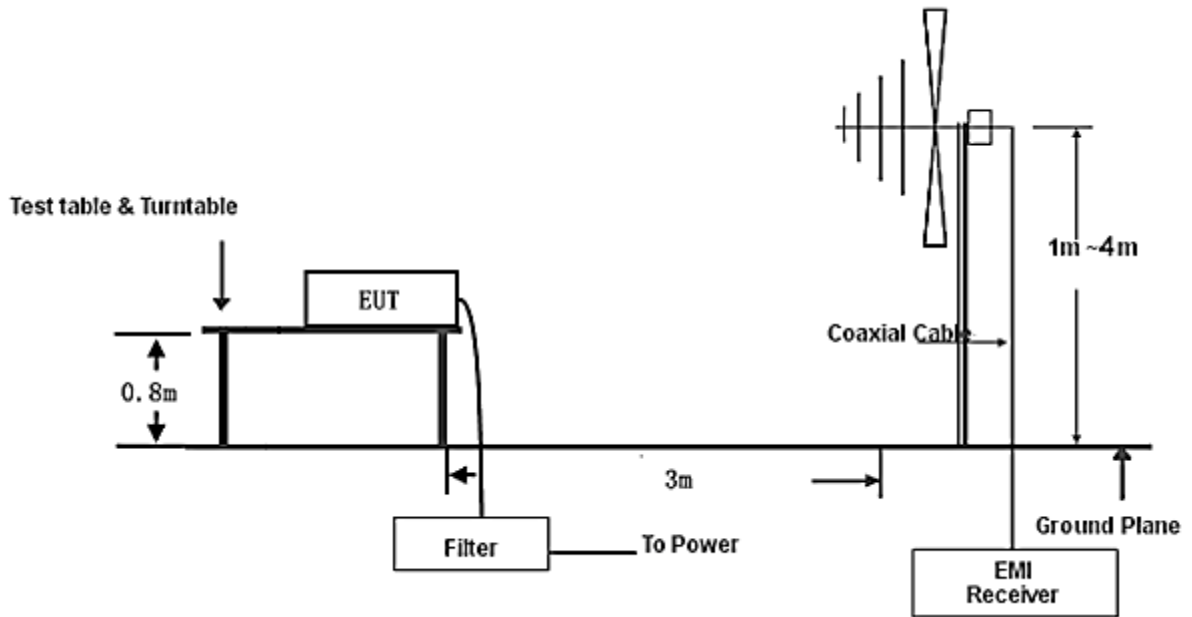
EN55032

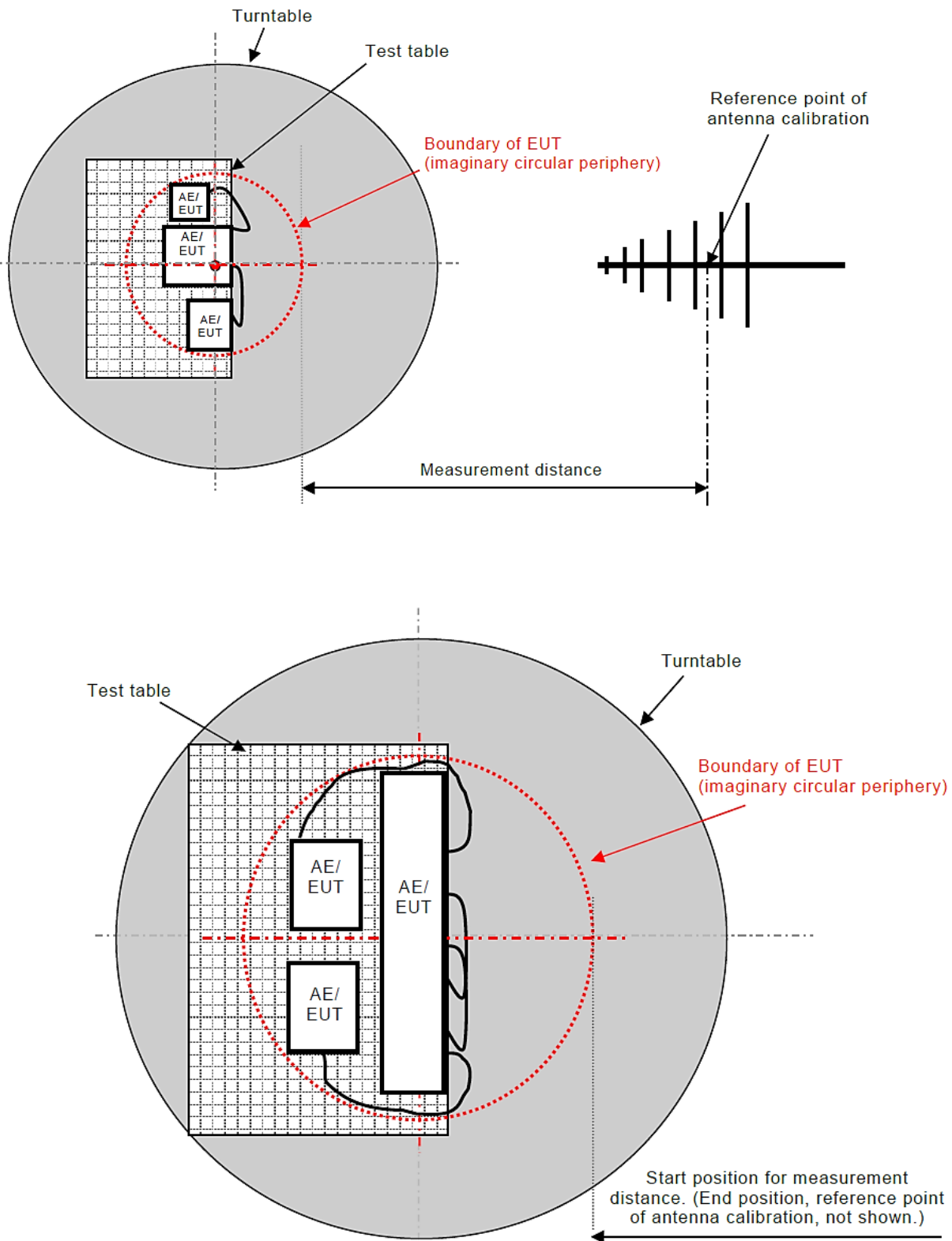
| Frequency Range MHz | Measurement | | | Class B limits dB(μV/m) |
|------------------------|-------------|---------------|------------------------------|----------------------------|
| | Facility | Distance m | Detector type / bandwidth | |
| 1 000 to 3 000 | FSOATS | 3 | Average/1 MHz | 54 |
| 3 000 to 6 000 | | | | |
| 1 000 to 3 000 | | | Peak/1 MHz | 74 |
| 3 000 to 6 000 | | | | |

6.2.2. Test procedures

1. Test limits and test methods reference EN 55032 Appendix A and FCC Part 15b.
2. Below 1GHz, the measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
3. Above 1GHz, the measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
5. The initial step in collecting radiated emission data is a receiver peak detector mode.
6. Pre - scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
7. For above 1GHz, If the emission level of the EUT In “Peak Detection” mode is 20 dB lower than the “Average” limit (means that the emission level in “Peak Detection” mode also complies with the limit in “Average Mode”), testing will be stopped and “Peak” values of the EUT will be reported, otherwise, the emissions of the EUT will be measured in “Average Mode” again and then reported.
8. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz).
9. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform.(above 1GHz).

6.2.3. Test set-up





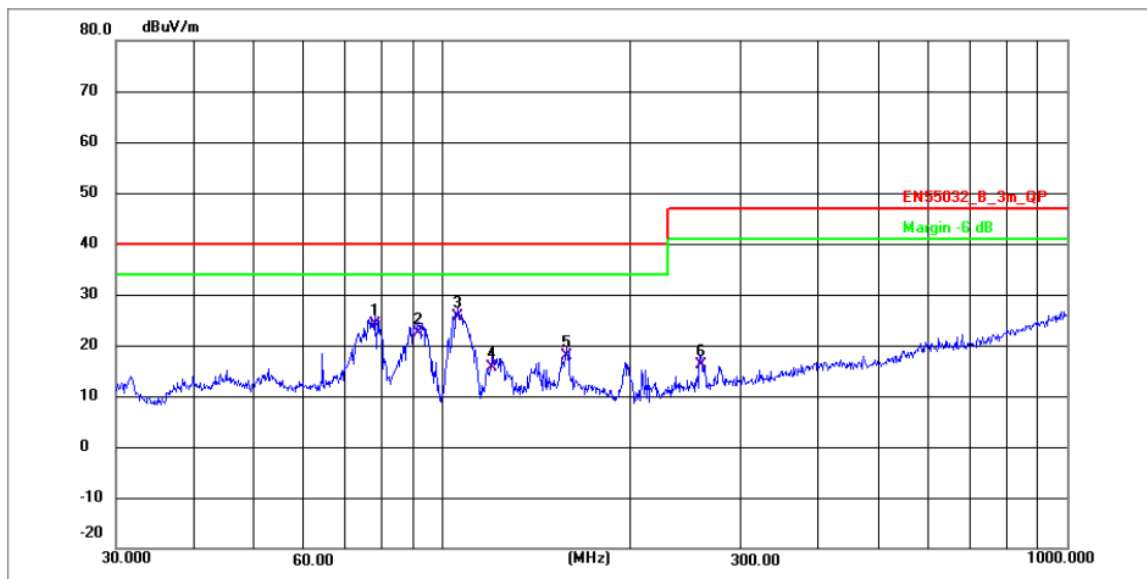
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

6.2.4. Test results

Below 1GHz

| | | | |
|--------------------------|-------------|--------------|------------|
| Product Model | V30Pro | Location | 3m chamber |
| Environmental Conditions | 22°C,45% RH | Test Mode | Mode 1 |
| Antenna Pole | Vertical | RBW | 120 kHz |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-16 | | |

Note:



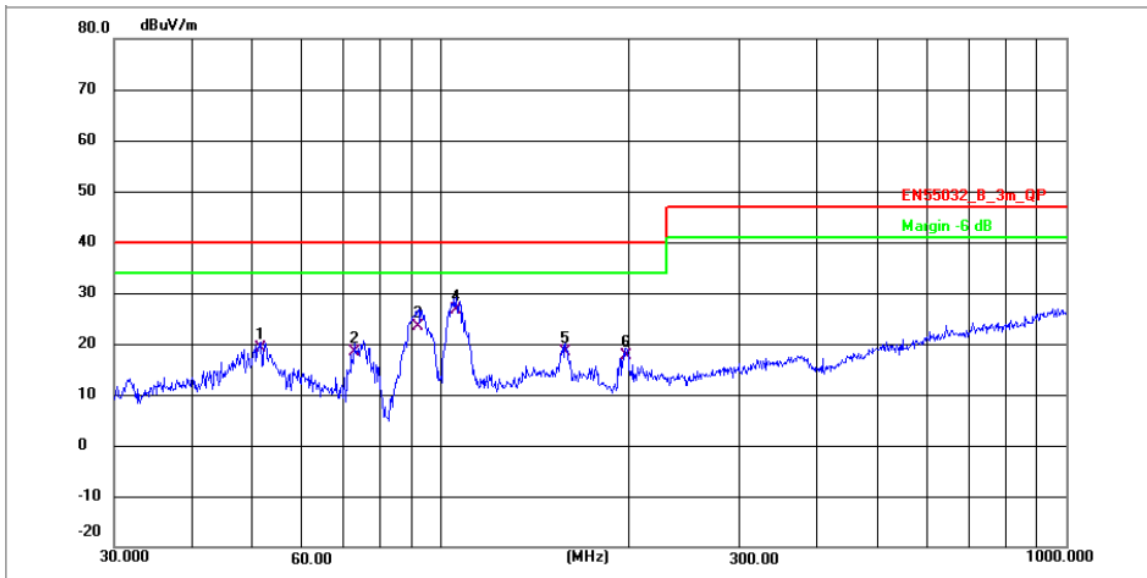
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 | 78.1388 | 52.10 | -27.89 | 24.21 | 40.00 | -15.79 | QP | P |
| 2 | 91.4947 | 50.24 | -27.82 | 22.42 | 40.00 | -17.58 | QP | P |
| 3 * | 105.6414 | 53.41 | -27.67 | 25.74 | 40.00 | -14.26 | QP | P |
| 4 | 119.8555 | 43.24 | -27.50 | 15.74 | 40.00 | -24.26 | QP | P |
| 5 | 158.1123 | 45.16 | -27.21 | 17.95 | 40.00 | -22.05 | QP | P |
| 6 | 259.2337 | 42.87 | -26.64 | 16.23 | 47.00 | -30.77 | QP | P |

Note:

1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit.

| | | | |
|--------------------------|-------------|--------------|------------|
| Product Model | V30Pro | Location | 3m chamber |
| Environmental Conditions | 22°C,45% RH | Test Mode | Mode 1 |
| Antenna Pole | Vertical | RBW | 120 kHz |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-16 | | |

Note:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 | 51.4806 | 47.26 | -28.03 | 19.23 | 40.00 | -20.77 | QP | P |
| 2 | 72.5915 | 46.35 | -27.91 | 18.44 | 40.00 | -21.56 | QP | P |
| 3 | 92.1386 | 51.26 | -27.81 | 23.45 | 40.00 | -16.55 | QP | P |
| 4 * | 105.6414 | 54.42 | -27.67 | 26.75 | 40.00 | -13.25 | QP | P |
| 5 | 158.1123 | 45.66 | -27.21 | 18.45 | 40.00 | -21.55 | QP | P |
| 6 | 197.8926 | 44.75 | -27.01 | 17.74 | 40.00 | -22.26 | QP | P |

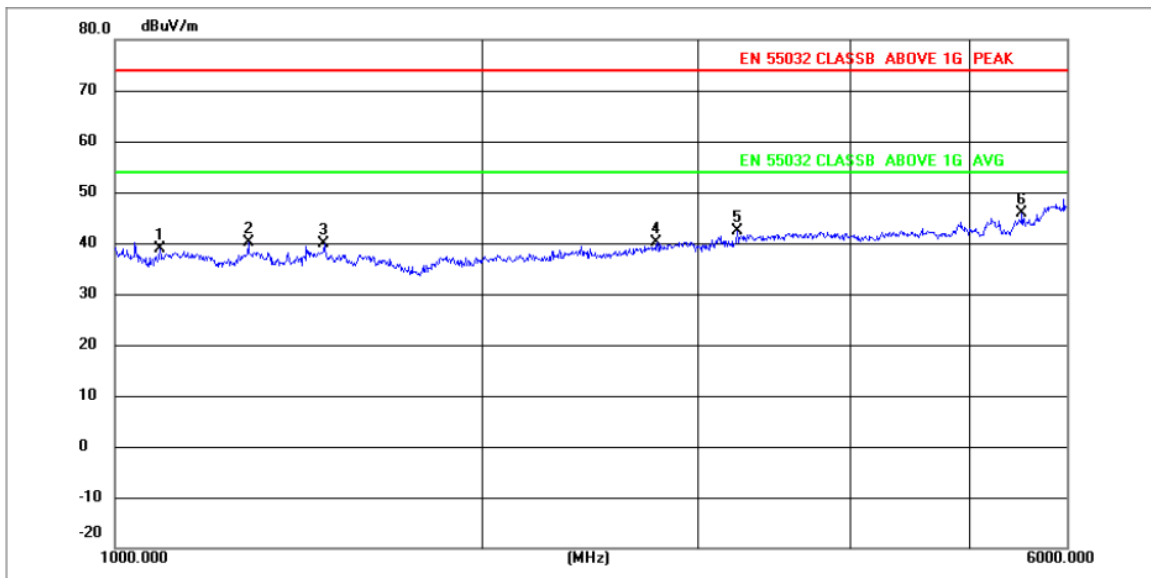
Note:

1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit.

Above 1GHz

| | | | |
|--------------------------|-------------|--------------|------------|
| Product Model | V30Pro | Location | 3m chamber |
| Environmental Conditions | 22°C,45% RH | Test Mode | Mode 1 |
| Antenna Pole | Vertical | RBW | 1 MHz |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-16 | | |

Note: Full SYSTEM

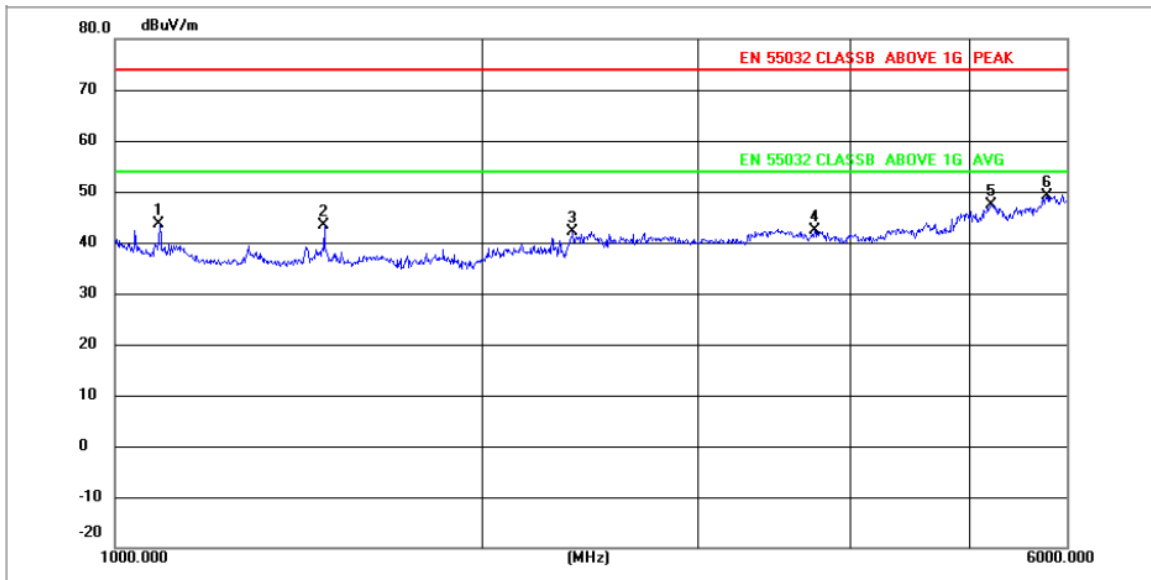


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 | 1089.226 | 68.85 | -29.88 | 38.97 | 74.00 | -35.03 | peak | P |
| 2 | 1286.956 | 71.21 | -31.00 | 40.21 | 74.00 | -33.79 | peak | P |
| 3 | 1484.773 | 72.09 | -32.12 | 39.97 | 74.00 | -34.03 | peak | P |
| 4 | 2778.801 | 70.62 | -30.41 | 40.21 | 74.00 | -33.79 | peak | P |
| 5 | 3232.462 | 72.26 | -29.89 | 42.37 | 74.00 | -31.63 | peak | P |
| 6 * | 5523.326 | 73.52 | -27.58 | 45.94 | 74.00 | -28.06 | peak | P |

Note: /

| | | | |
|--------------------------|-------------|--------------|------------|
| Product Model | V30Pro | Location | 3m chamber |
| Environmental Conditions | 22°C,45% RH | Test Mode | Mode 1 |
| Antenna Pole | Vertical | RBW | 1 MHz |
| Tested by | Su Dang | Test Results | PASS |
| Test Date | 2022-12-16 | | |

Note: Full SYSTEM



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 | 1088.835 | 73.56 | -29.88 | 43.68 | 74.00 | -30.32 | peak | P |
| 2 | 1484.507 | 75.57 | -32.12 | 43.45 | 74.00 | -30.55 | peak | P |
| 3 | 2370.051 | 73.29 | -31.19 | 42.10 | 74.00 | -31.90 | peak | P |
| 4 | 3738.689 | 72.59 | -30.21 | 42.38 | 74.00 | -31.62 | peak | P |
| 5 | 5206.210 | 75.49 | -28.09 | 47.40 | 74.00 | -26.60 | peak | P |
| 6 * | 5787.759 | 76.21 | -27.08 | 49.13 | 74.00 | -24.87 | peak | P |

Note: /

6.3. Harmonics current measurement

6.3.1. Limit

| Limits for Class A equipment | | Limits for Class D equipment | | |
|------------------------------|---|------------------------------|--|---|
| Harmonics Order n | Max. permissible harmonics current A | Harmonics Order n | Max. permissible harmonics current per watt mA/W | Max. permissible harmonics current A |
| Odd harmonics | | Odd Harmonics only | | |
| 3 | 2.30 | 3 | 3.4 | 2.30 |
| 5 | 1.14 | 5 | 1.9 | 1.14 |
| 7 | 0.77 | 7 | 1.0 | 0.77 |
| 9 | 0.40 | 9 | 0.5 | 0.40 |
| 11 | 0.33 | 11 | 0.35 | 0.33 |
| 13 | 0.21 | 13 | 0.30 | 0.21 |
| 15<=n<=39 | 0.15x15/n | 15<=n<=39 | 3.85/n | 0.15x15/n |
| Even harmonics | | | | |
| 2 | 1.08 | | | |
| 4 | 0.43 | | | |
| 6 | 0.30 | | | |
| 8<=n<=40 | 0.23x8/n | | | |

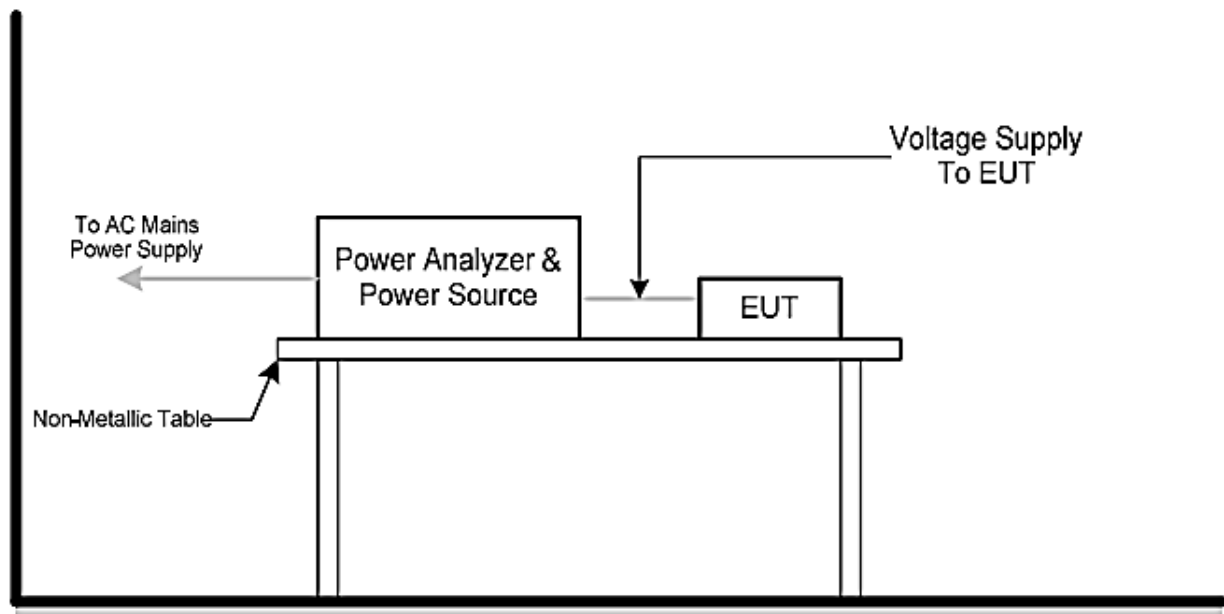
Note:

1. Class A and Class D are classified according to item 7.4.3.
2. According to section 7 of EN 61000-3-2, the above limits for all equipment except for Lightning equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

6.3.2. Test procedures

1. The EUT was placed on the top of a wooden table 0.8 m above the ground and operated to produce the maximum harmonic components under normal operating conditions.
2. The classification of EUT is according to of EN 61000-3-2. The EUT is classified as follows:
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
Class B: Portable tools; Arc welding equipment which is not professional equipment.
Class C: Lightning equipment.
Class D: Equipment having a specified power less than or equal to 600 W of the following types:
Personal computers and personal computer monitors and television receivers.
3. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

6.3.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the test configuration.

6.3.4. Test results

The power consumption of EUT is less than 75W and no limits apply.

6.4. Voltage fluctuation and flicker measurement

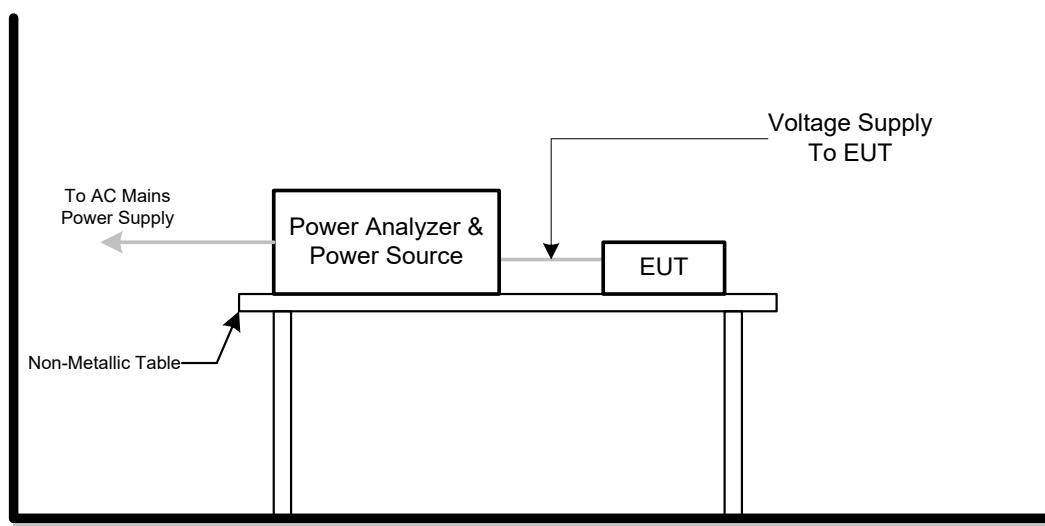
6.4.1. Limit

| TEST ITEM | LIMIT | REMARK |
|---------------|-------|--|
| P_{st} | 1.0 | P_{st} means short-term flicker indicator. |
| P_{lt} | 0.65 | P_{lt} means long-term flicker indicator. |
| T_{dt} (ms) | 500 | T_{dt} means maximum time that dt exceeds 3.3 %. |
| d_{max} (%) | 4% | d_{max} means maximum relative voltage change. |
| dc (%) | 3.3% | dc means relative steady-state voltage change |

6.4.2. Test procedures

1. Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in EN 61000-3-3 depend on which standard adopted for compliance measurement.
2. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

6.4.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.4.4. Test results

| | | | |
|--------------------------|--------------|--------------|---------|
| Product Model: | V30Pro | Test Results | PASS |
| Observation Period (Tp) | 10mins | Test Mode | Mode 1 |
| Environmental Conditions | 26° C,46% RH | Tested by | Su Dang |
| Test Date | 2022/12/14 | | |

| TEST PARAMETER | MEASUREMENT VALUE | LIMIT | RESULT |
|----------------|-------------------|-------|--------|
| Pst | 0.703 | 1.00 | PASS |
| Plt | 0.0305 | 0.65 | PASS |
| Tdt (ms) | 0 | 500 | PASS |
| dmax (%) | 0 | 4% | PASS |
| dc (%) | 0 | 3.3% | PASS |
| dc (%) | 0 | 3.3% | PASS |

7. Immunity test

7.1. General description

| Product Standard | EN301489-1/3/17/19/52 EN55035 | |
|---|---|--|
| | Test Type | Minimum Requirement |
| Basic Standard, Specification, and Performance Criterion required | EN61000-4-2 Electrostatic Discharge – ESD: | $\pm 2,4,8$ kV Air discharge, $\pm 2,4$ kV Contact discharge, $\pm 2,4$ kV HCP/VCP discharge Performance Criterion A |
| | EN 61000-4-3: Radio frequency Electromagnetic Immunity Test | 80MHz~6000MHz: 3V/m, 80% AM 1800MHz($\pm 1\%$) 2600MHz($\pm 1\%$) 3500MHz($\pm 1\%$) 5000MHz($\pm 1\%$) Modulated. Performance Criterion B |
| | EN 61000-4-4 Electrical Fast Transient/Burst – EFT: | Power Port: ± 1 kV I/O Port: ± 0.5 kV 5/50ns Tr/Th, 5KHz Repetition Freq Performance Criterion B |
| | EN 61000-4-5 Surge immunity test | Power port: Line to Line: ± 1 kV Communication port: LAN port: Line to ground: ± 0.5 kV Performance Criterion A |
| | EN 61000-4-6 Conducted Radio Frequency Disturbances Test –CS: | 0.15MHz ~ 80MHz, 3V(r.m.s), 80% AM Modulated, Performance Criterion A |
| | EN55035/ EN 61000-4-6 Conducted Radio Frequency Disturbances Test –CS: | 0.15~10MHz, 3V (r.m.s), 80% AM 10 ~30MHz, 3V to 1 V (r.m.s), 80% AM 30~80MHz 1V 80% AM Modulated, Performance Criterion A |

| | | |
|--|---|--|
| | <p>EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity test– Voltage Interruption/Dips:</p> | <p>Voltage Dips: i) >95% reduction for 0.5 cycle Performance Criterion B ii) >95% reduction for 1 cycle Performance Criterion B iii) 30% reduction for 25 cycles Performance Criterion C Voltage Interruptions: >95% reduction for 250 cycles Performance Criterion C</p> |
|--|---|--|

7.2. Performance of criteria

The performance of criteria about EN55035&EN301489-1/3/17/19/52

| | |
|---------------------------|--|
| <p>Criteria A:</p> | <p>The apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p> |
| <p>Criteria B:</p> | <p>After test, the apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is however allowed. However, no change of operating state if stored data is allowed to persist after the test. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p> |
| <p>Criteria C:</p> | <p>Temporary loss of function is allowed, provided the functions is self-recoverable or can be restored by the operation of controls by the user in accordance with the manufacturer instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p> |

7.3. Electrostatic discharge immunity test(ESD)

7.3.1. Test specification

| | |
|----------------------------|---|
| Basic Standard | EN 61000-4-2 |
| Discharge Impedance | 330 ohm / 150 Pf |
| Discharge Voltage | Air Discharge: 2,4,8kV (Direct) Contact Discharge: 2,4kV (Direct/Indirect) |
| Polarity | Positive & Negative |
| Number of Discharge | Minimum 25 times at each test point |
| Discharge Mode | Single Discharge 1 second minimum |

7.3.2. Test procedures

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

1. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.

During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

2. Vertical Coupling Plane (VCP):

3. The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a

4. Distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

5. The four faces of the EUT will be performed with electrostatic discharge.

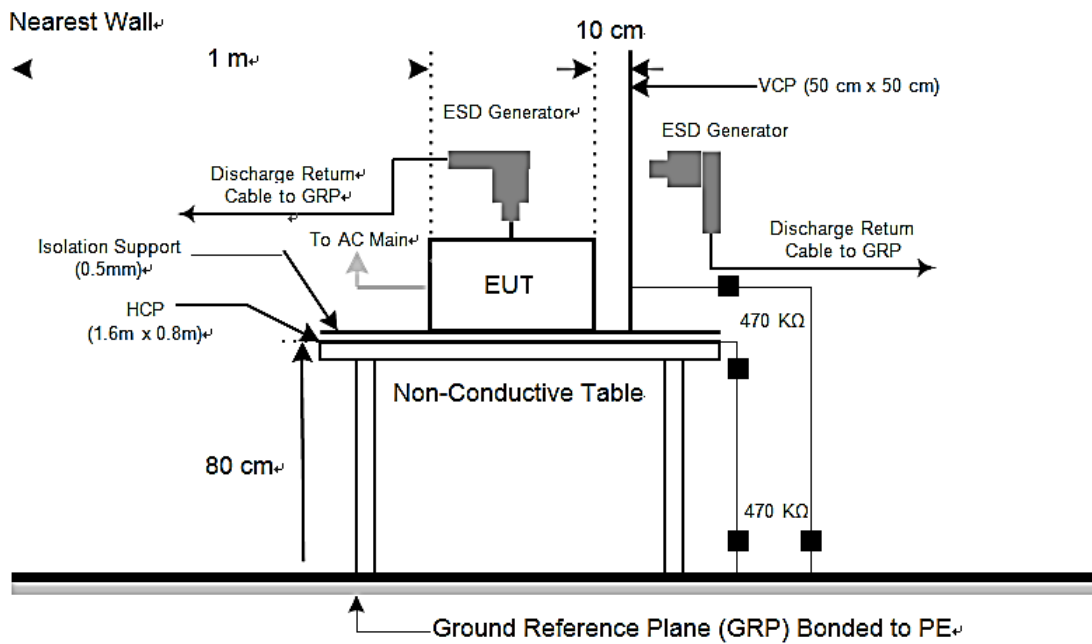
6. Horizontal Coupling Plane (HCP):

7. The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four

faces of the EUT will be performed with electrostatic discharge.

8. Air discharges at insulation surfaces of the EUT.
9. It was at least ten single discharges with positive and negative at the same selected point.
10. For the actual test configuration, please refer to the related Item –EUT Test Photos

7.3.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.3.4. Test results

| | | | |
|-------------|------------|------------------------------|-------------|
| Temperature | 25.2°C | Humidity | 46.6% RH |
| Pressure | 101.01 kPa | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion A |
| Test Date | 2022-01-18 | | |

| Air Discharge | | | | | |
|---------------|-------------|--------|--------|---------|------------|
| Test Points | Test Levels | | | | Results |
| | ± 2 kV | ± 4 kV | ± 8 kV | ± 10 kV | PASS/ FAIL |
| port | B | B | B | / | PASS |
| LED | B | B | B | / | PASS |
| gap | B | B | B | / | PASS |
| Button | B | B | B | / | PASS |

| Discharge To Horizontal/Vertical Coupling Plane | | | | |
|---|-------------|--------|--------|------------|
| Side of EUT | Test Levels | | | Results |
| | ± 2 kV | ± 4 kV | ± 6 kV | PASS/ FAIL |
| Front | B | B | / | PASS |
| Back | B | B | / | PASS |
| Left | B | B | / | PASS |
| Right | B | B | / | PASS |

Note: /.

7.4. Radio frequency electromagnetic immunity test(RS)

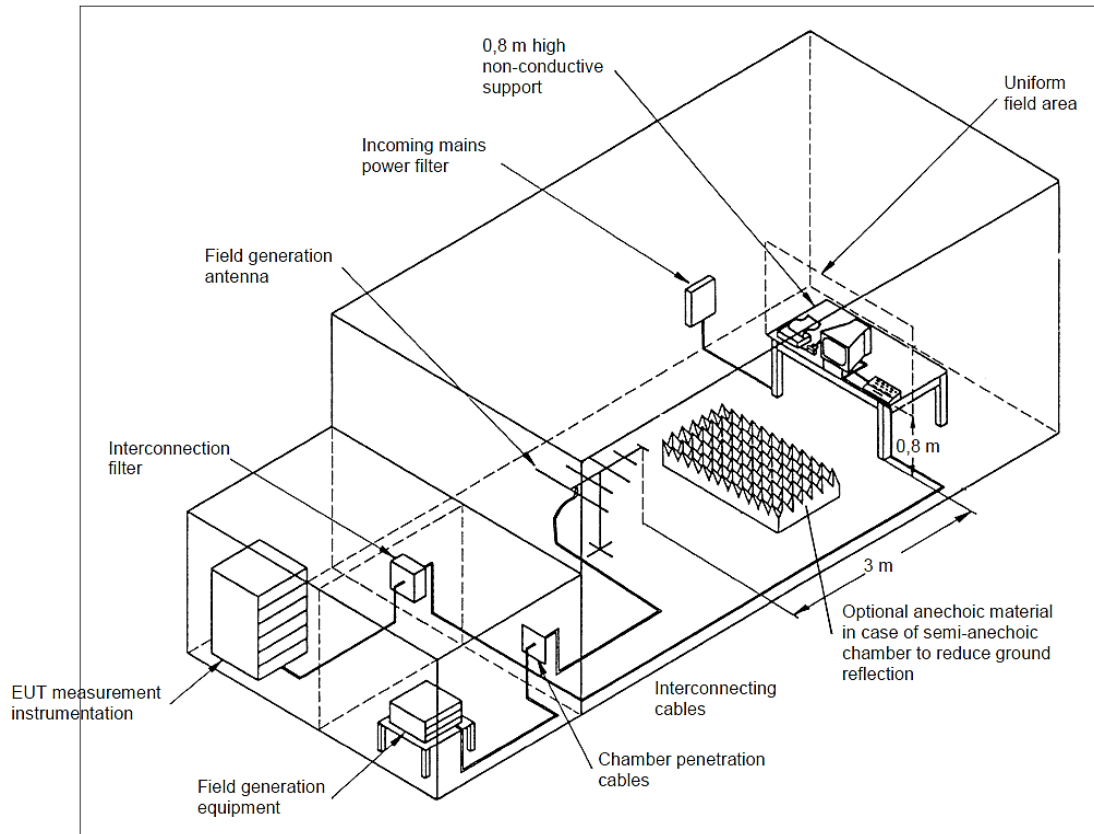
7.4.1. Test specification

| | |
|--------------------------------|---|
| Basic Standard | EN 61000-4-3 |
| Frequency Range | 80 MHz ~ 6 GHz (EN301489-1/3/17/19/52) 1.8 GHz,2.6 GHz,3.5 GHz, 5GHz for (EN55035) |
| | 80 MHz ~ 6 GHz for EN 301489-1/3/17/19/52 |
| Field Strength | 3 V/m |
| Modulation | 1kHz Sine Wave, 80%, AM Modulation |
| Polarization of antenna | Horizontal and Vertical |
| Frequency Step | 1 % of preceding frequency value |
| Dwell Time | at least 3 seconds |

7.4.2. Test procedures

1. Test Level Refer to EN 55035 test method reference IEC/EN 61000-4-3 Section 8.
2. The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 m in height. The system under test was connected to the power and signal wire according to relevant installation instructions.
3. The testing was performed in a modified semi-anechoic chamber.
4. The frequency range is swept from 80 MHz to 6000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave(For EN301489-1/-3/-17/-19/-52& EN55024).
5. The frequency range is swept from 1800 MHz, 2600 MHz, 3500 MHz and 5000 MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave (For EN55035).
6. The field strength level was 3 V/m.
7. The test was performed with the EUT exposed to the vertical and horizontal polarization fields on the Back side.
8. For 2.4GHz the exclusion band is 2280MHz ~2603.5MHz, for 5GHz the exclusion band is 4830MHz ~ 6000MHz.

7.4.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.4.4. Test results

| | | | |
|--------------------|------------|-------------------------------------|-------------|
| Temperature | 25.7°C | Humidity | 45.1% RH |
| Pressure | / | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion A |
| Test Date | 2022-12-15 | | |

| Frequency Band | Field Strength V/m | Observation Criterion | Result |
|----------------|--------------------|-----------------------|--------|
| 80MHz-1GHz | 3 | A | PASS |
| 1GHz-6GHz | 3 | A | PASS |
| 1.8GHz | 3 | A | PASS |
| 2.6GHz | 3 | A | PASS |
| 3.5GHz | 3 | A | PASS |
| 5GHz | 3 | A | PASS |

Note: No performance degradation.

7.5. Electrical fast transient(EFT)

7.5.1. Test specification

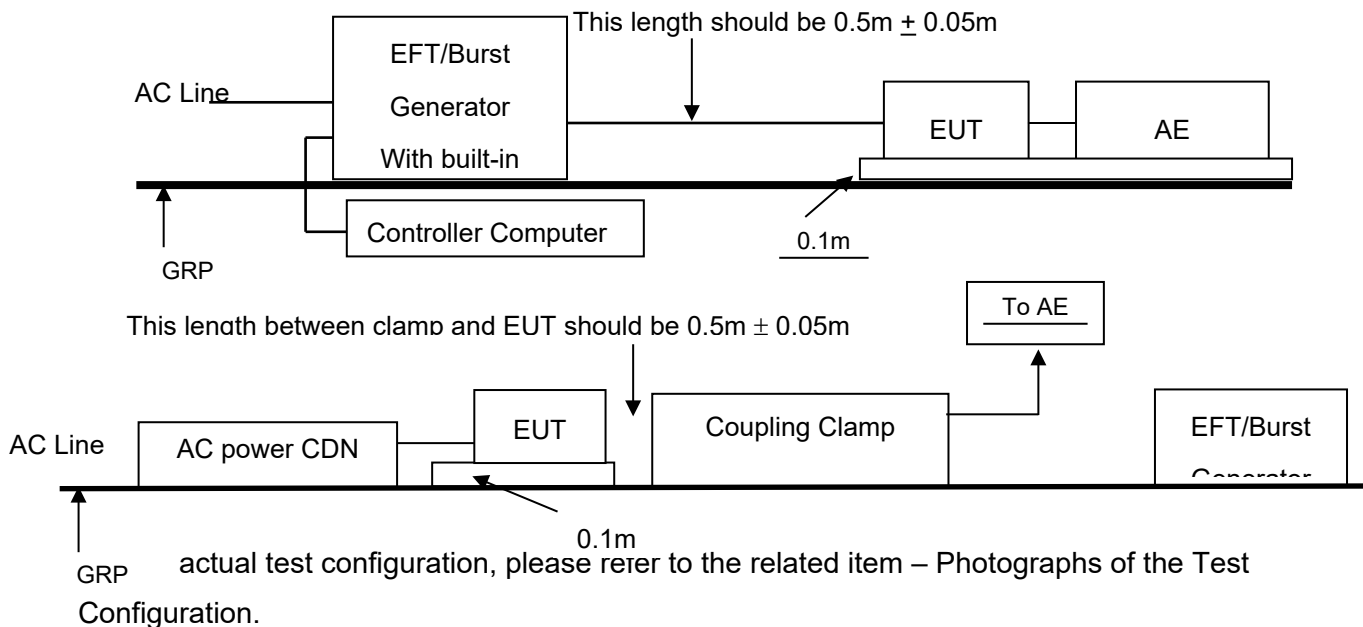
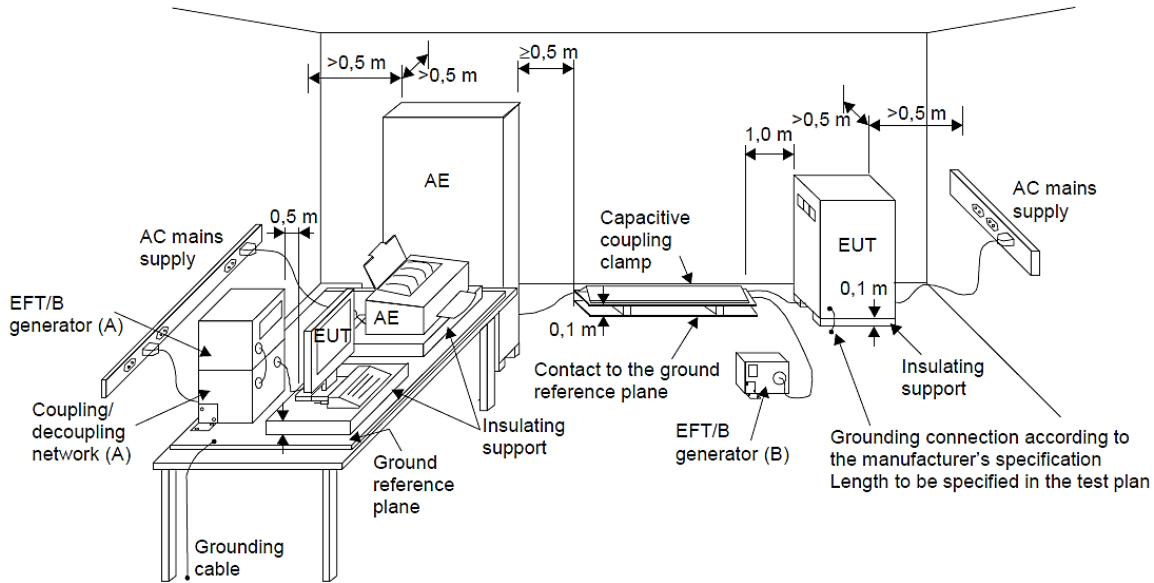
| | |
|---------------------------|---|
| Basic Standard | EN 61000-4-4 |
| Test Voltage | AC Power Port: ± 1 kV I/O Port: ± 0.5 kV |
| Polarity | Positive & Negative |
| Impulse Frequency | 5 kHz/100kHz |
| Impulse Wave-shape | 5/50 ns |
| Burst Duration | 15 ms/0.75ms |
| Burst Period | 300 ms |
| Test Duration | Not less than 1 min. |

7.5.2. Test procedures

1. Test method reference IEC/EN 61000-4-4 Section 8.
2. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
 - Ambient temperature: 15 °C to 35 °C.
 - Relative humidity: 45 % to 75 %.
 - Atmospheric pressure: 86 kPa (860 mbar) to 106 kPa (1060 mbar).
3. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
4. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
5. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria:
 - Normal performance within the specification limits.
 - Temporary degradation or loss of function or performance which is self-recoverable.

- Temporary degradation or loss of function or performance which requires operator intervention or system reset.
- Degradation or loss of function which is not recoverable due to damage of equipment (components).

7.5.3. Test set-up



7.5.4. Test results

| | | | |
|--------------------|------------|-------------------------------------|-------------|
| Temperature | 26°C | Humidity | 46% RH |
| Pressure | 101.2 kPa | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion B |
| Test Date | 2022-12-15 | | |

| Test Point | Test Level (Kv) | Observation Criterion | Result |
|-------------------|------------------------|------------------------------|---------------|
| L | ±1 | B | PASS |
| N | ±1 | B | PASS |
| L-N | ±1 | B | PASS |

7.6. Surge immunity test

7.6.1. Test specification

| | |
|-----------------------------------|--|
| Basic Standard | EN 61000-4-5 |
| Wave-Shape | Combination Wave 1.2/50 μ s Open Circuit Voltage 8/20 μ s Short Circuit Current |
| Test Voltage | Power port: Line to line: ± 1 kV, Communication port: LAN port: Line to ground: ± 0.5 kV Performance Criterion B |
| Generator Source Impedance | Power Line: 2 ohm between networks 12 ohm between network and ground Signal port: 40 ohm between network and ground |
| Polarity | Positive/Negative |
| Phase Angle | 0° / 90° / 180° / 270° |
| Pulse Repetition Rate | 1 time / min. (maximum) |
| Number of Tests | 5 positive and 5 negative at selected points |

7.6.2. Test procedures

1. Test method reference IEC/EN 61000-4-5 Section 8
2. Climatic conditions

The climatic conditions shall comply with the following requirements:

- Ambient temperature : 15 °C to 35 °C
- Relative humidity: 10 % to 75 %
- Atmospheric pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar)

3. Electromagnetic conditions

– The electromagnetic environment of the laboratory shall not influence the test results.

4. The test shall be performed according the test plan that shall specify the test set-up with.

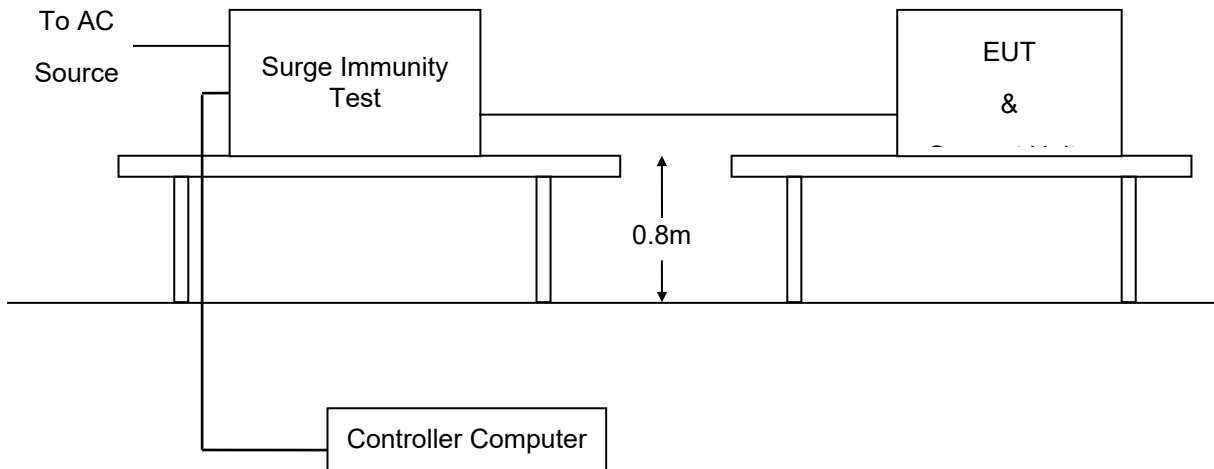
If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

5. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no

other specification.

6. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
7. If the actual operating signal sources are not available, they may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.
8. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

7.6.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.6.4. Test Results

| | | | |
|--------------------|------------|-------------------------------------|-------------|
| Temperature | 26°C | Humidity | 45% RH |
| Pressure | 101.2 kPa | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion B |
| Test Date | 2022-12-16 | | |

| AC Port(1.2/50 us+8/20 us) | | | | | |
|----------------------------|------------------------|------------------------|-----------------|----|--------|
| Test Point | Coupling Network (Ohm) | Phase Angle | Test Level (kV) | | Result |
| | | | ±1 | ±4 | |
| L-N | 2 | 0° / 90° / 180° / 270° | B | / | PASS |

7.7. Conducted radio frequency disturbances (CS)

7.7.1. Test specification

| | |
|------------------------|-------------------------------------|
| Basic Standard | IEC 61000-4-6/EN301489-1/3/17/19/52 |
| Frequency Range | 0.15 MHz ~ 80 MHz |
| Field Strength | 3 V(r.m.s) |
| Modulation | 1kHz Sine Wave, 80%, AM Modulation |
| Frequency Step | 1 % of preceding frequency value |
| Dwell Time | at least 3 seconds |

| | |
|------------------------|---|
| Basic Standard | IEC 61000-4-6/EN55035 |
| Frequency Range | 0.15 MHz ~ 80 MHz |
| Field Strength | 0.15MHz ~ 80MHz 3V 10 MHz ~ 30MHz 3V to 1V 30MHz ~ 80MHz 1V |
| Modulation | 1kHz Sine Wave, 80%, AM Modulation |
| Frequency Step | 1 % of preceding frequency value |
| Dwell Time | at least 3 seconds |

7.7.2. Test procedures

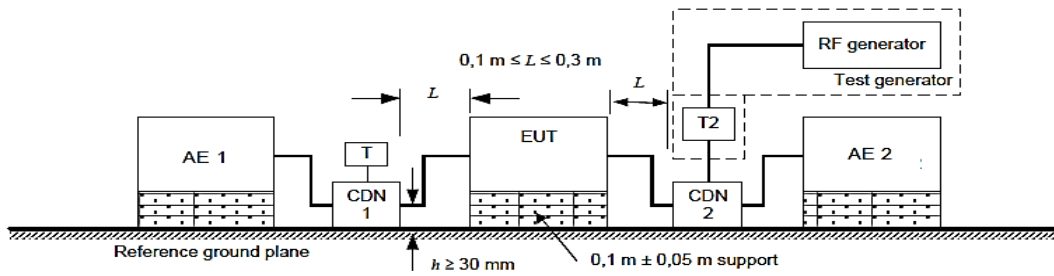
- 1 Test Level Refer to EN 55035, EN 301489-1, test method reference IEC/EN 61000-4-6 Section 8.
- 2 The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- 3 The test shall be performed with the test generator connected to each of the coupling and decoupling.
- 4 Devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- 5 The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch

coupling devices as necessary. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

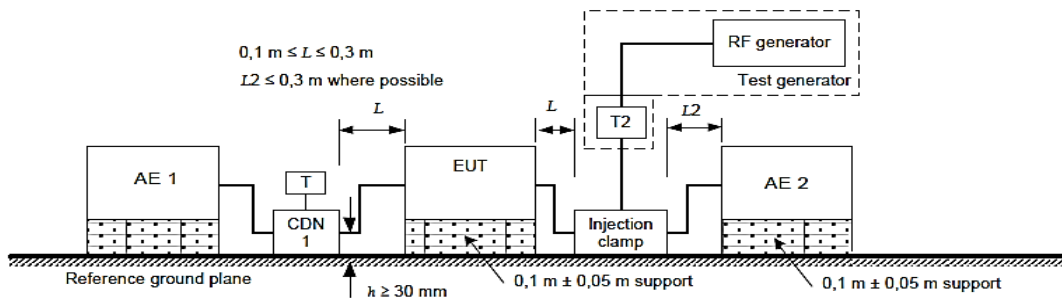
- 6 The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- 7 In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- 8 Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- 9 The use of special exercising programs is recommended.
- 10 Testing shall be performed according to a Test Plan, which shall be included in the test report.
- 11 It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.
- 12 For xDSL network function test During the swept frequency test, the established connection shall be maintained throughout the testing and the information transferred without any additional reproducible errors or loss of synchronisation. If degradation in performance is observed and the system is adaptive, for example has the capability to automatically retrain in the presence of an interfering signal, then perform the following procedure:
 - a) For each range of interfering frequencies in which degradation in performance is observed, three frequencies (beginning, middle and end) shall be identified.
 - b) At each of the frequencies identified in step a), the interfering signal shall be applied and the system shall be allowed to retrain.
 - c) If the system is able to retrain and then functions correctly for a dwell time of at least 60 s
Without any additional reproducible errors or loss of synchronisation, then the performance level of the system is considered acceptable.

- d) The frequencies identified in step a) and the data rates achieved in step b) shall be recorded in the test report.

7.7.3. Test set-up



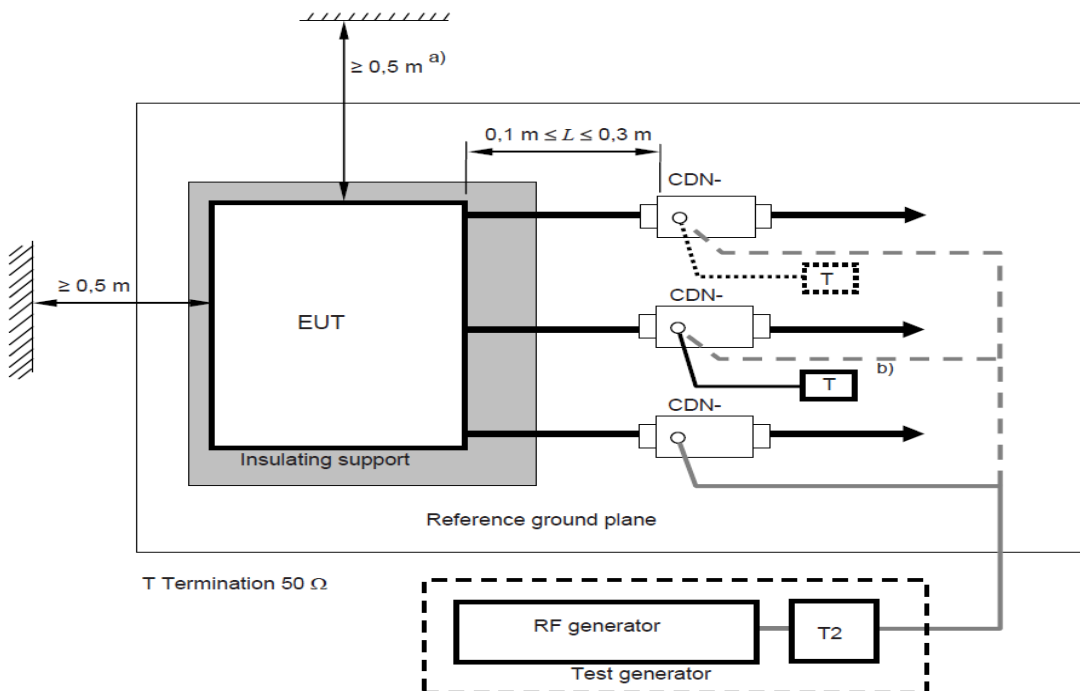
Schematic setup for immunity test used for CDN



Schematic setup for immunity test used for injection clamp

- T Termination 50 Ω
- T2 Power attenuator (6 dB)
- CDN Coupling and decoupling network
- Injection clamp: Current clamp or EM clamp

Schematic setup for immunity test to RF conducted disturbances



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.7.4. Test results

| | | | |
|--------------------|------------|-------------------------------------|-------------|
| Temperature | 25.6°C | Humidity | 46% RH |
| Pressure | / | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion A |
| Test Date | 2022-12-16 | | |

| Frequency Band (MHz) | Field Strength V | Cable | Observation Criterion | Result |
|----------------------|------------------|---------|-----------------------|--------|
| 0.15~80 | 3 | AC Port | A | PASS |

Note: No performance degradation.

| | | | |
|--------------------|------------|-------------------------------------|-------------|
| Temperature | 25.6°C | Humidity | 56.7% RH |
| Pressure | / | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion A |
| Test Date | 2022-12-16 | | |

| Frequency Band (MHz) | Field Strength V(r.m.s) | Cable | Observation Criterion | Result |
|----------------------|-------------------------|---------|-----------------------|--------|
| 0.15~10 | 3 | AC Port | A | PASS |
| 10~30 | 3~1 | | | |
| 30~80 | 1 | | | |

Note: No performance degradation.

7.8. Voltage dips and Voltage interruption

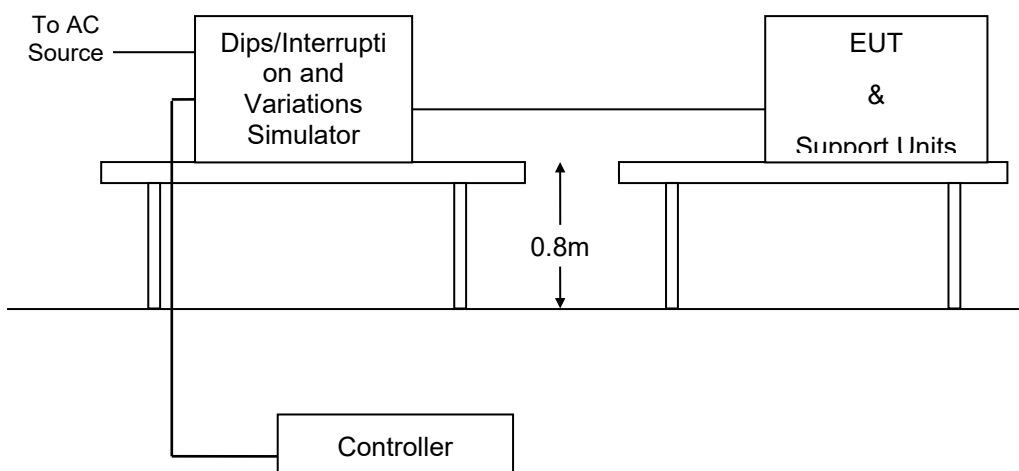
7.8.1. Test specification

| | |
|--------------------------------|---------------------------------------|
| Basic Standard: | IEC 61000-4-11/EN301489-1/3/17/19/52 |
| Test duration time: | Minimum three test events in sequence |
| Interval between event: | Minimum 10 seconds |
| Phase Angle: | 0° / 180° |
| Test cycle: | 3 times |

7.8.2. Test procedures

1. Test Level Refer to EN 55035, EN 55024 test method reference IEC/EN 61000-4-11 Section 8.
2. Source voltage and frequency: 230V/50 Hz, Single phase.
3. Test of interval: 10 secs.
4. Level and duration: Sequency of 3 dips/interrupts.
5. Voltage rise (and fall) time: 1~5 μ s.

7.8.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

7.8.4. Test results

| | | | |
|--------------------|------------|-------------------------------------|-------------------|
| Temperature | 25.6°C | Humidity | 44% RH |
| Pressure | / | Tested By | Su Dang |
| Test Mode | Mode 1 | Required Passing Performance | Criterion B/B/B/C |
| Test Date | 2022-12-19 | | |

| Test Voltage; 230V,50Hz | | | |
|-------------------------|-------------------|-----------------------|--------|
| Voltage (%Residual) | Duration (Period) | Observation Criterion | Result |
| 0 | 0.5 Cycle | A | PASS |
| 0 | 1 Cycle | A | PASS |
| 70 | 25 Cycles | C | PASS |
| 0 | 250 Cycles | C | PASS |

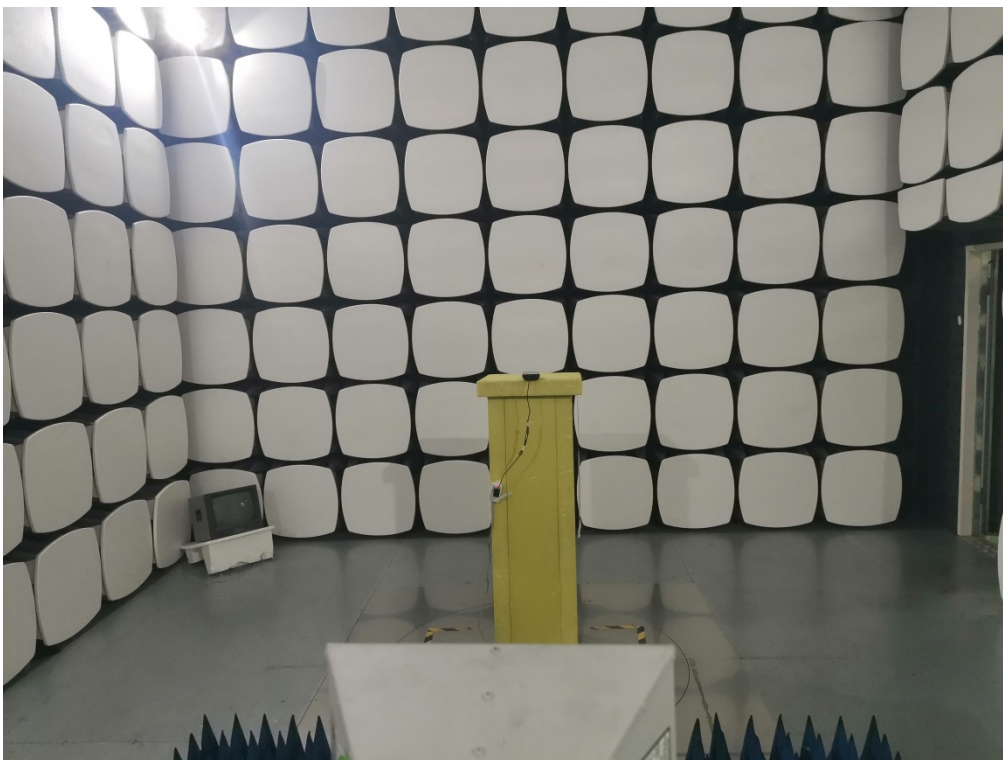
Note:

1. Performance criterion B Test a small amount of packet loss, returned to normal after the test.
2. Performance criterion C Restart during the test and resume normal work after the test.

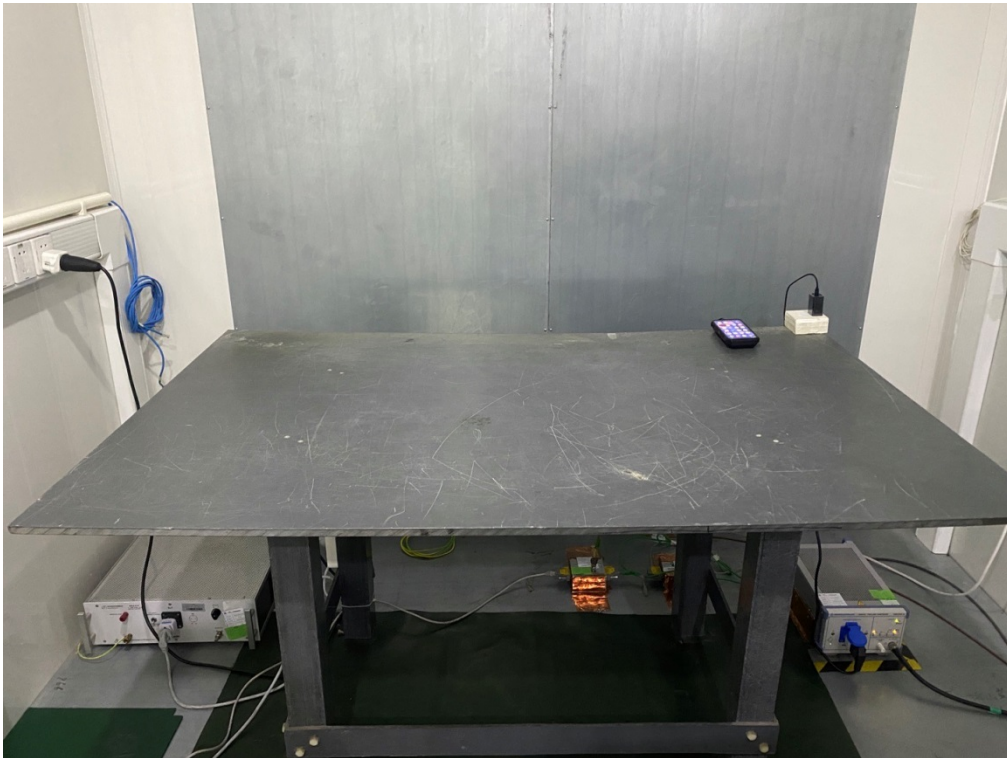
8. Appendix-A Test photographs



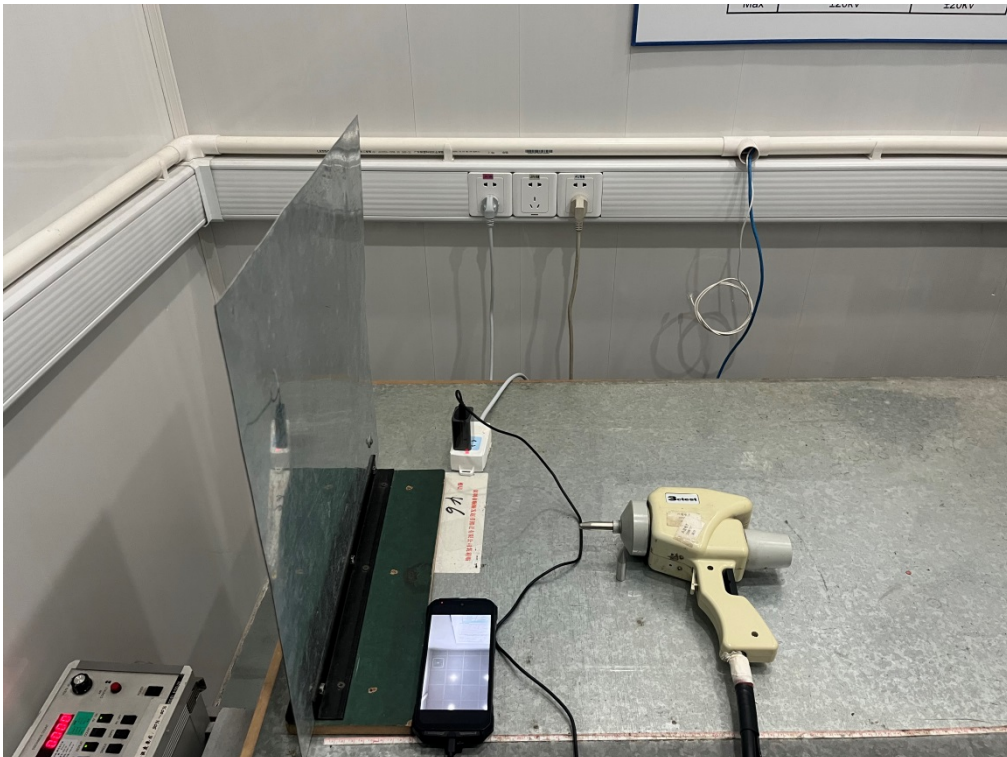
RE Below 1GHz



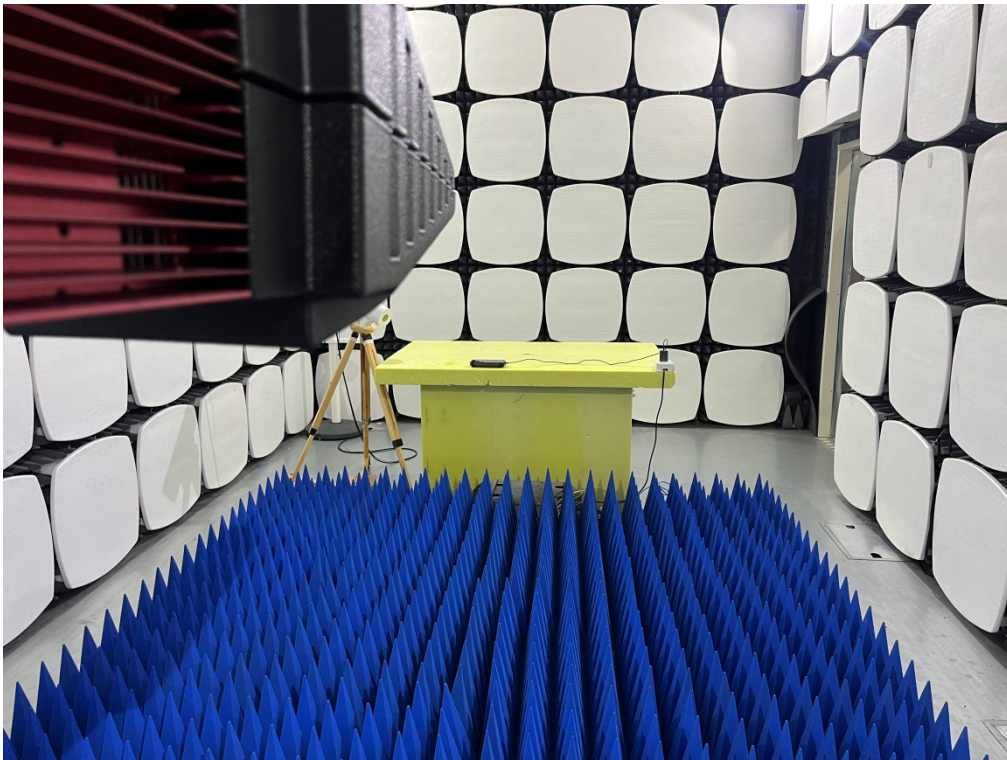
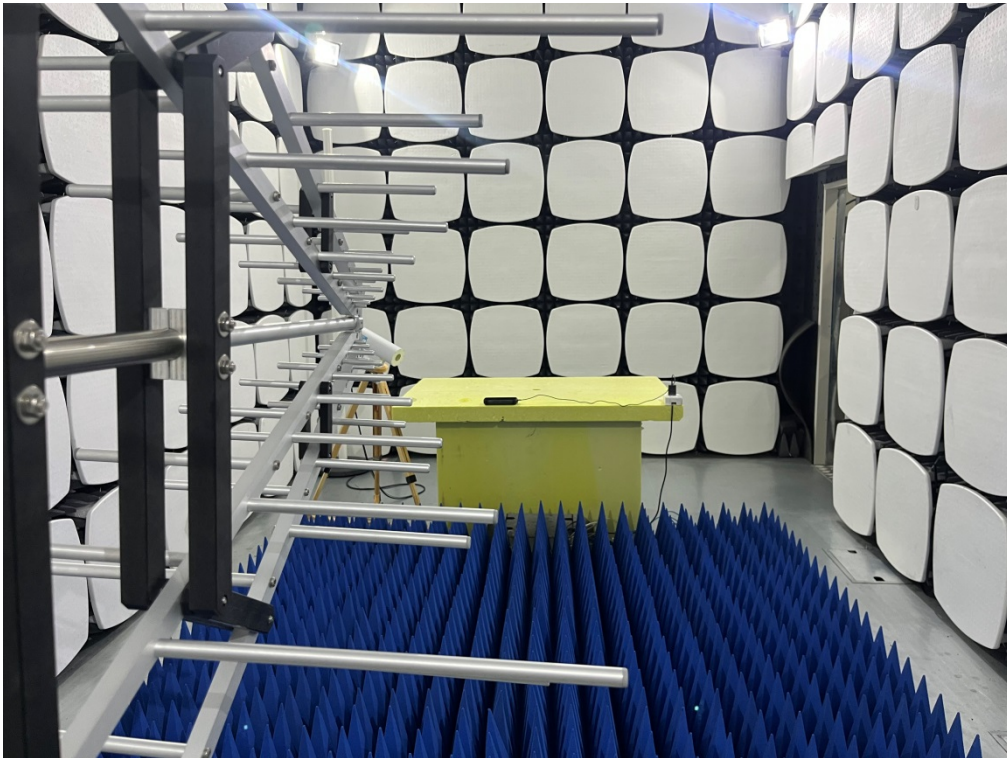
RE Above 1GHz



CE



ESD



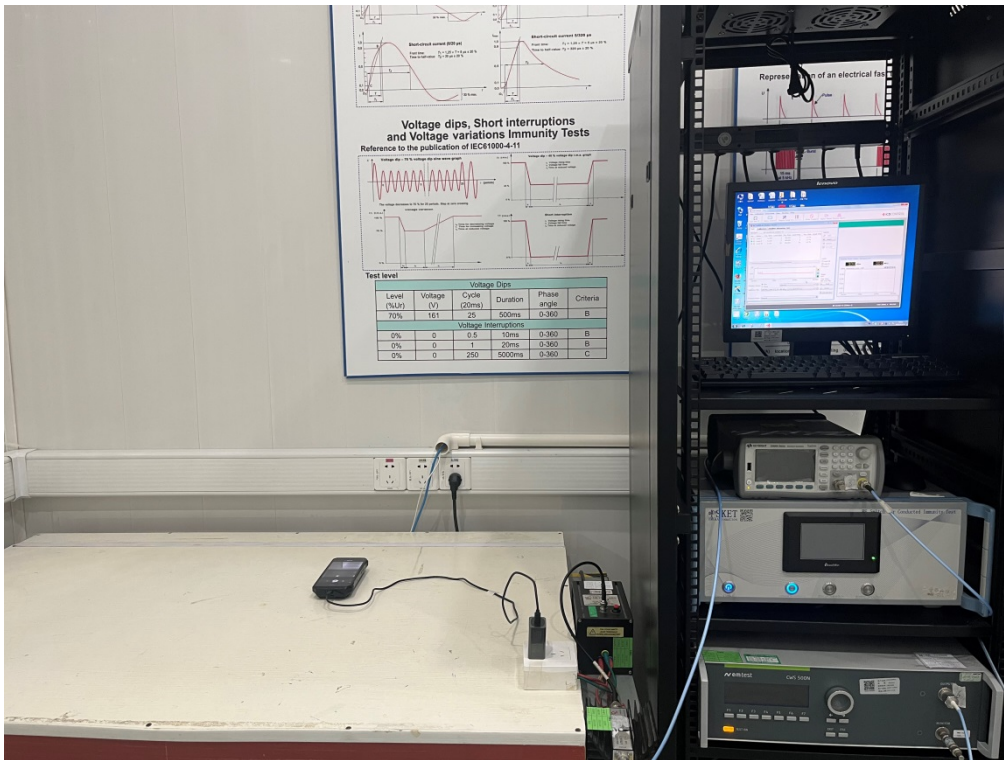
RS



EFT



SURGE

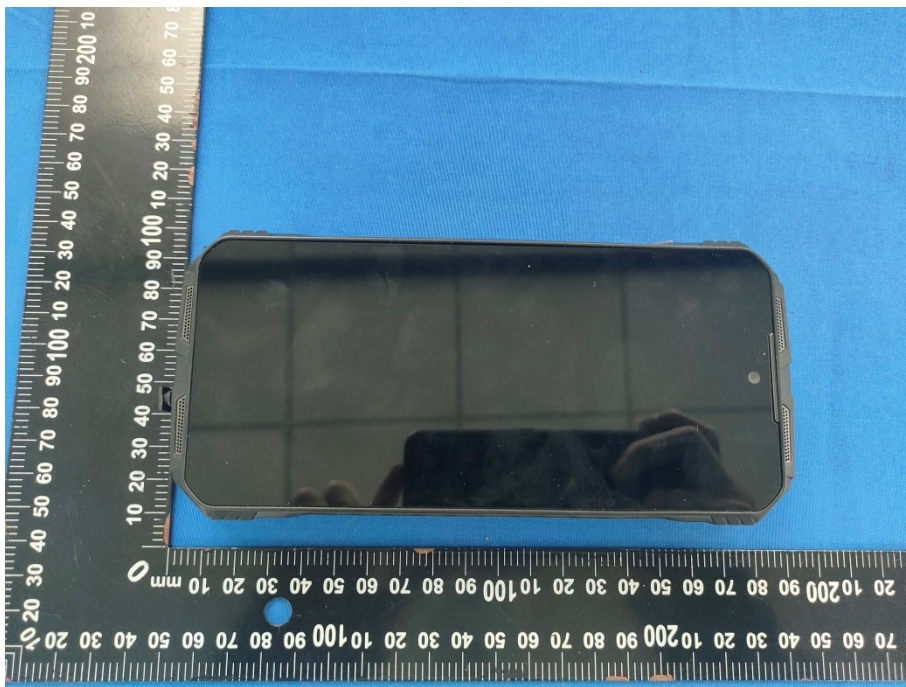


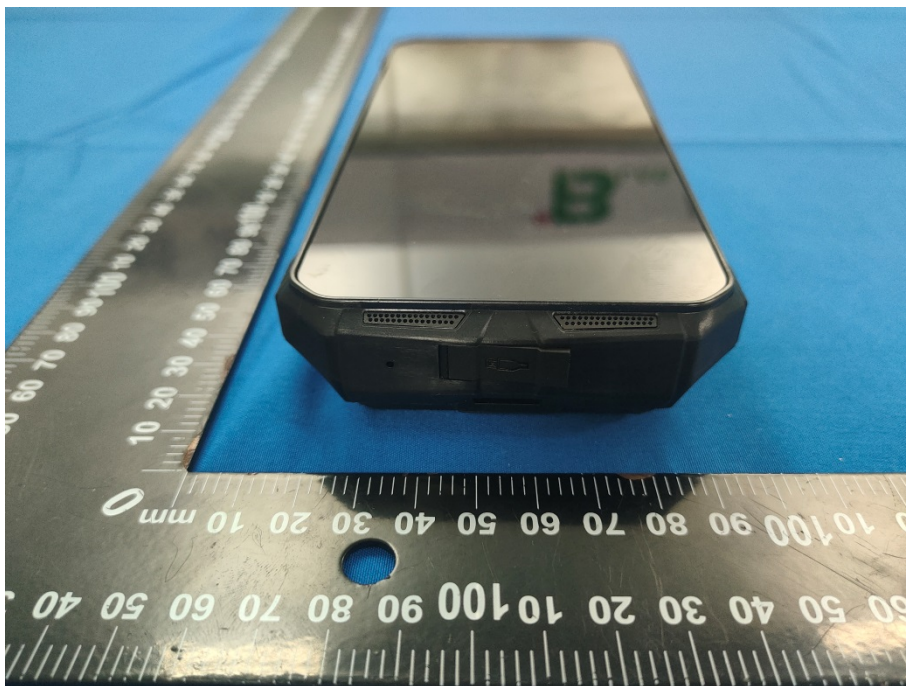
CS

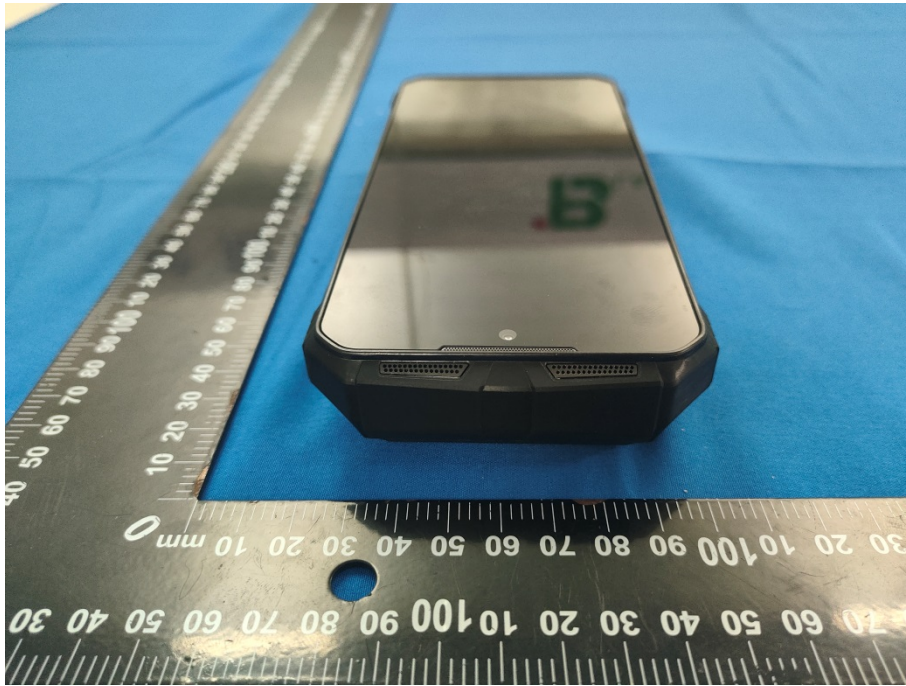


DIPS

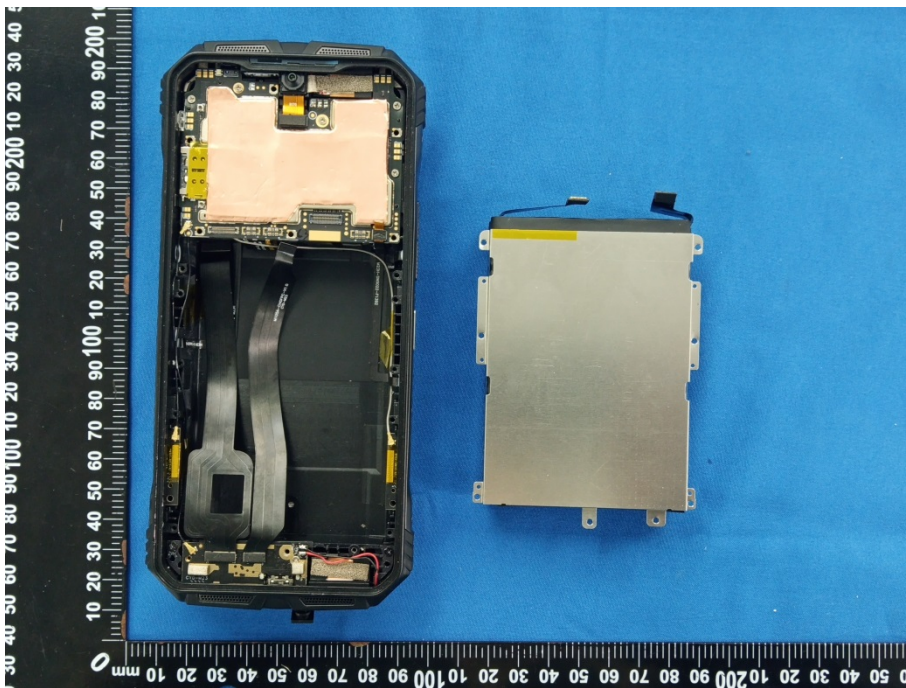
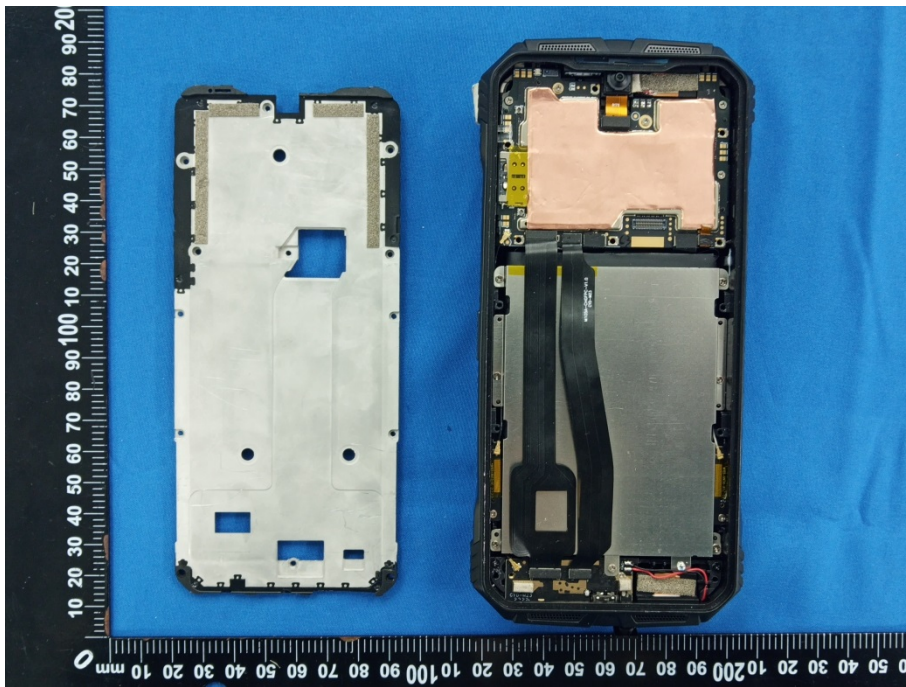
9. Appendix-B Photographs of EUT

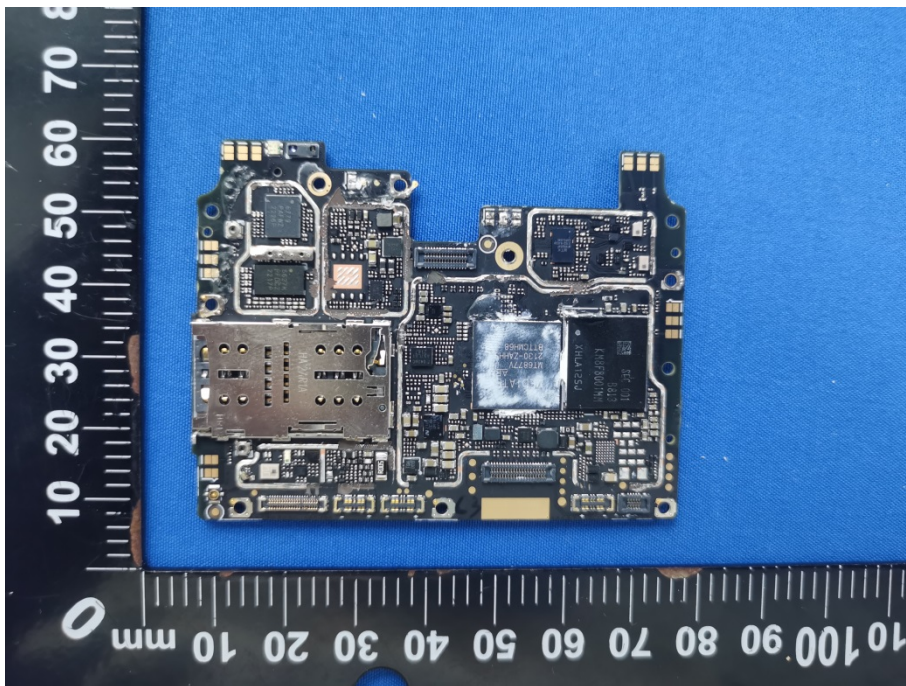
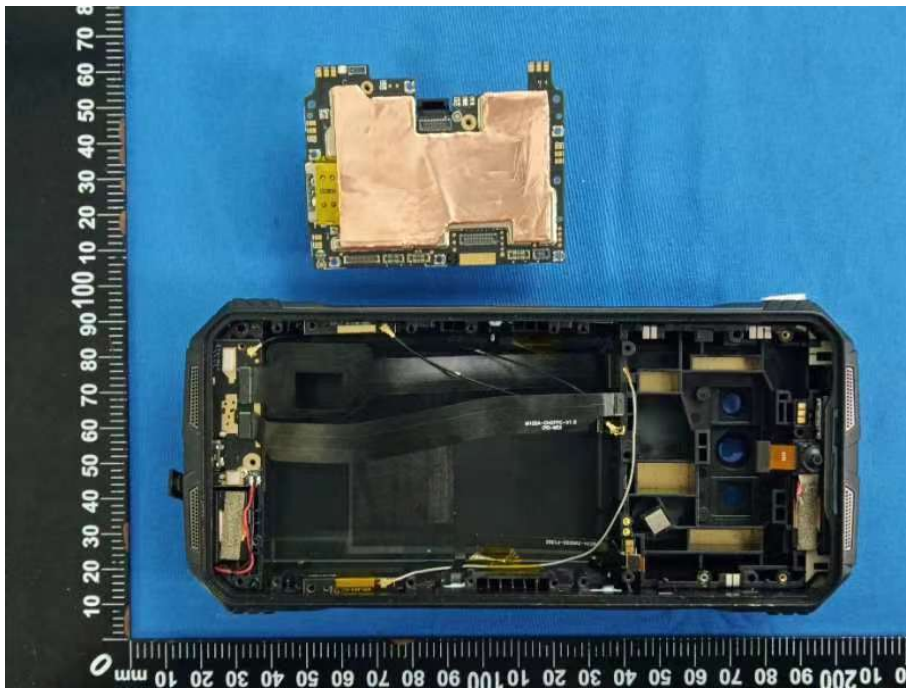


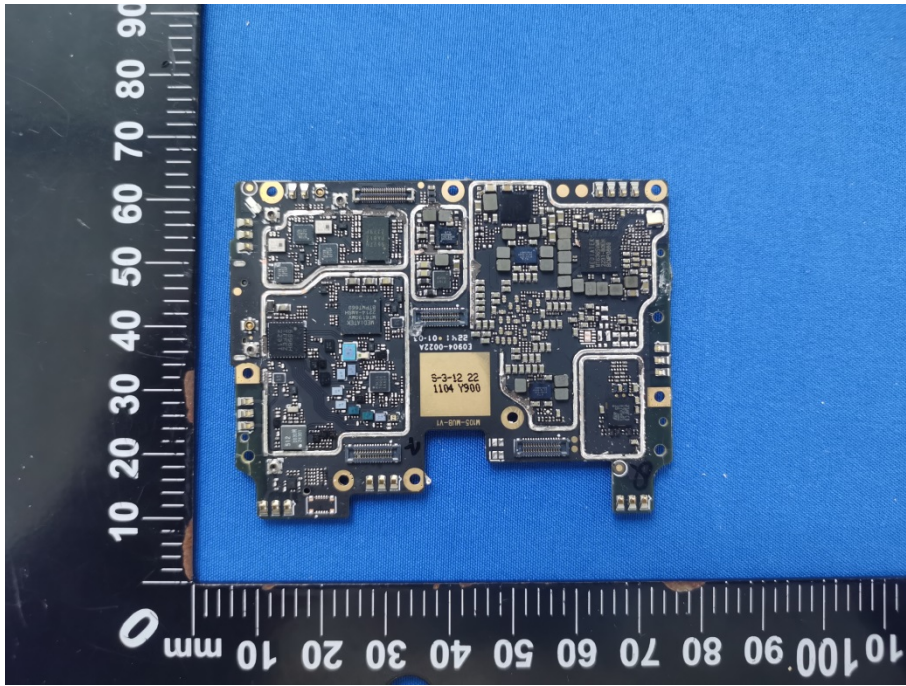












STATEMENT

1. It is invalid if the report has no Inspection Seal.
2. It is invalid that the copy one is not sealed again.
3. It is invalid if the report has no signature or seal of tester, auditor, or approver.
4. It is invalid if the report is altered.
5. Objections to this report should be submitted to the inspection organization in 15 days of receipting the report. It is not accepted if overdue.
6. The test report is valid for above tested sample only.
7. Partial replica is prohibited without permission.
8. ☆ is indicated that the item is without the scope of CNAS,CMA,CAL Accredited Testing.
9. Forge, tamper the report, the organization will be liable for any legal liability incurred here from.

Address: 101, 3 # Factory Building, Gongjin Electronics, Shatin Community, Kengzi Street, Pingshan District, Shenzhen City, Guangdong province China

Tel: 0755-27087573

Fax: 0755-27087573

ZipCode:518118

E-mail: liuhaitao@tirt.com.cn

Web Sites: <http://www.tirt.com.cn>

(END OF REPORT)