# EMC TEST REPORT

For

ENG HOUSE COMPANY SHPK FIS.NR.600311592

Electric Storage Water Heater

Test Model: OS-Smart100L

Additional Model No.: OS-Smart80L, OS-WH30L, OS-WH50L, OS-WH80L, OS-WH100L

| | | |
|---|---|---|
| Prepared for | : | ENG HOUSE COMPANY SHPK FIS.NR.600311592 |
| Address | : | "Rruga Nebih Gashi"Blloku 1, lokali nr 3, Kalabria Prishtina 10.000 Republika e Kosovës |
| Prepared by | : | Shenzhen AOCE Electronic Technology Service Co., Ltd |
| Address | : | Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China |
| Tel | : | (86)755-85277785 |
| Fax | : | (86)755-23705230 |
| Web | : | Http://www.aoc-cert.com |
| Mail | : | postmaster@aoc-cert.com |
| Date of receipt of test sample | : | July 18, 2025 |
| Number of tested samples | : | 1 |
| Serial number | : | Prototype |
| Date of Test | : | July 18, 2025~July 29, 2025 |
| Date of Report | : | July 29, 2025 |

| **EMC TEST REPORT**<br>**ETSI EN 301 489-17 V3.2.4 (2020-09)** | | |
|---|---|---|
| **Report Reference No. .....** | **:** | **AOC250729113E** |
| Date Of Issue..... | : | July 29, 2025 |
| **Testing Laboratory Name ....** | **:** | **Shenzhen AOCE Electronic Technology Service Co., Ltd** |
| Address ..... | : | Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China |
| Testing Location/ Procedure... | : | Full application of Harmonised standards■<br>Partial application of Harmonised standards□<br>Other standard testing method□ |
| **Applicant's Name.....** | **:** | **ENG HOUSE COMPANY SHPK FIS.NR.600311592** |
| Address ..... | : | "Rruga Nebih Gashi"Blloku 1, lokali nr 3, Kalabria Prishtina 10.000 Republika e Kosovës |
| **Test Specification** | | |
| Standard ..... | : | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55032:2015+A1:2020<br>EN 55035:2017+A11:2020<br>EN IEC 55014-1:2021<br>EN IEC 55014-2:2021 |
| Test Report Form No. ..... | : | AOCEMC-1.0 |
| TRF Originator..... | : | Shenzhen AOCE Electronic Technology Service Co., Ltd |
| Master TRF..... | : | Dated 2017-09 |



| | | |
|---|---|---|
| **Test Item Description. .....** | **:** | **Electric Storage Water Heater** |
| Trade Mark ..... | : | COMPASO |
| Test Model..... | : | OS-Smart100L |
| Ratings ..... | : | AC 220-240V, 50/60Hz, Max.2000W |
| **Result .....** | **:** | **Positive** |

| **Compiled by:** | **Supervised by:** | **Approved by:** |
|---|---|---|
| Johnson Wang/ Administrators | Joey Liu/ Technique principal | Murry Yu/ Manager |

# EMC -- TEST REPORT

| | |
|---|---|
| **Test Report No. : AOC250729113E** | July 29, 2025<br>Date of issue |

| | |
|---|---|
| Test Model..... | : OS-Smart100L |
| EUT..... | : Electric Storage Water Heater |
| **Applicant.....** | **: ENG HOUSE COMPANY SHPK FIS.NR.600311592** |
| Address..... | : "Rruga Nebih Gashi"Blloku 1, lokali nr 3, Kalabria Prishtina 10.000 Republika e Kosovës |
| Telephone..... | : / |
| Fax..... | : / |
| **Manufacturer.....** | **: Guangdong Well-born Electric Appliance Co., Ltd.** |
| Address..... | : No. 15 HuaTian Road, South First Road, Ronggui, Shunde, Foshan, Guangdong, China |
| Telephone..... | : / |
| Fax..... | : / |
| **Factory.....** | **: Guangdong Well-born Electric Appliance Co., Ltd.** |
| Address..... | : No. 15 HuaTian Road, South First Road, Ronggui, Shunde, Foshan, Guangdong, China |
| Telephone..... | : / |
| Fax..... | : / |

| | |
|---|---|
| **Test Result** | **Positive** |

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## Test Report Description

## Page

# 1. GENERAL INFORMATION

## 1.1. Product Description for Equipment Under Test (EUT)

| | | |
|---|---|---|
| EUT | : | Electric Storage Water Heater |
| Test Model | : | OS-Smart100L |
| Model No. List | | OS-Smart100L, OS-Smart80L, OS-WH30L, OS-WH50L, OS-WH80L, OS-WH100L |
| Hardware Version | : | V1.2 |
| Software Version | : | V1.2 |
| WIFI(2.4G Band) | : | |
| Frequency Range | : | 2412MHz ~ 2472MHz |
| Channel Spacing | : | 5MHz |
| Channel Number | : | 13 Channel for 20MHz bandwidth(2412~2472MHz)<br>9 channels for 40MHz bandwidth(2422~2462MHz) |
| Modulation Type | : | 802.11b: DSSS; 802.11g/n: OFDM |
| Antenna Type | : | PCB Antenna |
| Antenna Gain | : | 1.0 dBi |

## 1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

## 1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09), EN 55032:2015 and EN 55035: 2017.

## 1.6. Support Equipment List

| Manufacturer | Description | Model | Serial Number | Certificate |
|---|---|---|---|---|
| -- | -- | -- | -- | -- |

## 1.7. External I/O

| I/O Port Description | Quantity | Cable |
|---|---|---|
| -- | -- | -- |

## 1.8. List Of Measuring Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | X-series USB Peak and Average Power Sensor Aglient | Agilent | U2021XA | MY54080022 | 2024-10-26 | 2025-10-25 |
| 2 | 4 CH. Simultaneous Sampling 14 Bits 2MS/s | Agilent | U2531A | MY54080016 | 2024-10-26 | 2025-10-25 |
| 3 | Test Software | Ascentest | AT890-SW | 20160630 | N/A | N/A |
| 4 | RF Control Unit | Ascentest | AT890-RFB | N/A | 2024-10-26 | 2025-10-25 |
| 5 | ESA-E SERIES SPECTRUM ANALYZER | Agilent | E4407B | MY41440754 | 2024-10-26 | 2025-10-25 |
| 6 | MXA Signal Analyzer | Agilent | N9020A | MY49100040 | 2024-10-26 | 2025-10-25 |
| 7 | SPECTRUM ANALYZER | R&S | FSP | 100503 | 2024-10-26 | 2025-10-25 |
| 8 | MXG Vector Signal Generator | Agilent | N5182A | MY47071151 | 2024-10-26 | 2025-10-25 |
| 9 | ESG VECTOR SIGNAL GENERATOR | Agilent | E4438C | MY42081396 | 2024-10-26 | 2025-10-25 |
| 10 | PSG Analog Signal Generator | Agilent | E8257D | MY4520521 | 2024-10-26 | 2025-10-25 |
| 11 | Universal Radio Communication Tester | R&S | CMU 200 | 105788 | 2024-10-26 | 2025-10-25 |
| 12 | WIDEBAND RADIO COMMUNICATION TESTER | R&S | CMW 500 | 103818 | 2024-10-26 | 2025-10-25 |
| 13 | RF Control Unit | Tonscend | JS0806-1 | N/A | 2024-10-26 | 2025-10-25 |
| 14 | DC Power Supply | Agilent | E3642A | N/A | 2024-10-26 | 2025-10-25 |
| 15 | LTE Test Software | Tonscend | JS1120-1 | N/A | N/A | N/A |
| 16 | Temperature & Humidity Chamber | GUANGZHOU GOGNWEN | GDS-100 | 70932 | 2024-10-26 | 2025-10-25 |
| 17 | DC Source | CHROMA | 62012P-80-60 | 34782951 | 2024-10-26 | 2025-10-25 |
| 18 | RF Filter | Micro-Tronics | BRC50718 | S/N-017 | 2024-10-26 | 2025-10-25 |
| 19 | RF Filter | Micro-Tronics | BRC50719 | S/N-011 | 2024-10-26 | 2025-10-25 |
| 20 | RF Filter | Micro-Tronics | BRC50720 | S/N-011 | 2024-10-26 | 2025-10-25 |
| 21 | RF Filter | Micro-Tronics | BRC50721 | S/N-013 | 2024-10-26 | 2025-10-25 |
| 22 | RF Filter | Micro-Tronics | BRM50702 | S/N-195 | 2024-10-26 | 2025-10-25 |
| 23 | Splitter/Combiner | Micro-Tronics | PS2-15 | CB11-20 | 2024-10-26 | 2025-10-25 |
| 24 | Splitter/Combiner | Micro-Tronics | CB11-20 | N/A | 2024-10-26 | 2025-10-25 |
| 25 | Attenuator | Micro-Tronics | PAS-8-10 | S/N23466 | 2024-10-26 | 2025-10-25 |
| 26 | Exposure Level Tester | Narda | ELT-400 | N-0713 | 2024-10-26 | 2025-10-25 |
| 27 | B-Field Probe | Narda | ELT-400 | M-1154 | 2024-10-26 | 2025-10-25 |
| 28 | 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 2024-10-26 | 2025-10-25 |
| 29 | Positioning Controller | MF | MF-7082 | / | 2024-10-26 | 2025-10-25 |
| 30 | EMI Test Software | AUDIX | E3 | N/A | 2024-10-26 | 2025-10-25 |
| 31 | EMI Test Receiver | R&S | ESR 7 | 101181 | 2024-10-26 | 2025-10-25 |
| 32 | AMPLIFIER | QuieTek | QTK-A2525G | CHM10809065 | 2024-10-26 | 2025-10-25 |
| 33 | Active Loop Antenna | SCHWARZBECK | FMZB 1519B | 00005 | 2024-10-26 | 2025-10-25 |
| 34 | By-log Antenna | SCHWARZBECK | VULB9163 | 9163-470 | 2024-10-26 | 2025-10-25 |
| 35 | Horn Antenna | SCHWARZBECK | BBHA 9120 D | 9120D-1925 | 2024-10-26 | 2025-10-25 |
| 36 | Broadband Horn Antenna | SCHWARZBECK | BBHA 9170 | 791 | 2024-10-26 | 2025-10-25 |
| 37 | Broadband Preamplifier | SCHWARZBECK | BBV 9719 | 9719-025 | 2024-10-26 | 2025-10-25 |
| 38 | RF Cable-R03m | Jye Bao | RG142 | CB021 | 2024-10-26 | 2025-10-25 |
| 39 | RF Cable-HIGH | SUHNER | SUCOFLEX 106 | 03CH03-HY | 2024-10-26 | 2025-10-25 |

| Item | Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 40 | Artificial Mains | R&S | ENV216 | 101288 | 2024-10-26 | 2025-10-25 |
| 41 | Power Analyzer Test System | Voltech | PM6000 | 20000670053 | 2024-10-26 | 2025-10-25 |
| 42 | ESD Simulator | SCHLODER | SESD 230 | 604035 | 2024-10-26 | 2025-10-25 |
| 43 | RF POWER AMPLIFIER | OPHIR | 5225R | 1052 | N/A | N/A |
| 44 | RF POWER AMPLIFIER | OPHIR | 5273F | 1019 | N/A | N/A |
| 45 | Stacked Broadband Log Periodic Antenna | SCHWARZBECK | STLP 9128 | 9128ES-145 | N/A | N/A |
| 46 | Stacked Mikrowellen Log.-Per Antenna | SCHWARZBECK | STLP 9149 | 9149-482 | N/A | N/A |
| 47 | Electric field probe | Narda S.TS /PMM | EP601 | 611WX80208 | 2024-10-26 | 2025-10-25 |
| 48 | Power Meter | Agilent | E4419B | MY45104493 | 2024-10-26 | 2025-10-25 |
| 49 | Power Sensor | Agilent | E9301H | MY41495234 | 2024-10-26 | 2025-10-25 |
| 50 | Power Sensor | Agilent | E4412A | MY41500229 | 2024-10-26 | 2025-10-25 |
| 51 | Sound Level meter | BK Precision | 735 | 73500873100 | 2024-10-26 | 2025-10-25 |
| 52 | Audio Analyzer | R&S | UPV | 1146.2003K0 | 2024-10-26 | 2025-10-25 |
| 53 | Mouse Simulation | Bruel & Kjaer | 4227 | A0304216 | 2024-10-26 | 2025-10-25 |
| 54 | Ear Simulation and supply | Bruel & Kjaer | 2669.4182.5935 | A0305284 | 2024-10-26 | 2025-10-25 |
| 55 | Acoustical Calibrators | Bruel & Kjaer | 4231 | A0304215 | 2024-10-26 | 2025-10-25 |
| 56 | Immunity Simulative Generator | EM TEST | UCS500-M4 | 0101-34 | 2024-10-26 | 2025-10-25 |
| 57 | Simulator | FRANKONIA | CIT-10 | A126A1195 | 2024-10-26 | 2025-10-25 |
| 58 | CDN | FRANKONIA | CDN-M2 | 5100100100 | 2024-10-26 | 2025-10-25 |
| 59 | CDN | FRANKONIA | CDN-M3 | 0900-11 | 2024-10-26 | 2025-10-25 |
| 60 | Attenuator | FRANKONIA | ATT6 | 0010222A | 2024-10-26 | 2025-10-25 |
| 61 | Infuse tongs | EM TEST | EM-Clamp | 0513A031201 | 2024-10-26 | 2025-10-25 |
| 62 | Voltage dips and up generator | 3CTEST | VDG-1105G | EC0171014 | 2024-10-26 | 2025-10-25 |

## 1.9. Measurement Uncertainty

| Item | MU | Remark |
|---|---|---|
| Uncertainty for Power point Conducted Emissions Test | 2.42dB | |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.54dB | Polarize: V |
| | 4.1dB | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz) | 2.08dB | Polarize: H |
| | 2.56dB | Polarize: V |
| Uncertainty for radio frequency | 0.01ppm | |
| Uncertainty for conducted RF Power | 0.65dB | |
| Uncertainty for temperature | 0.2℃ | |
| Uncertainty for humidity | 1% | |
| Uncertainty for DC and low frequency voltages | 0.06% | |

## 1.10. Description Of Test Modes

There was 3 test Modes. TM1 to TM3 were shown below:

**TM1** **:** Operate in WIFI mode;
**TM2** Heating normal operation mode;
**TM3** **:** Idle mode

***Note:
1. All test modes were tested, but we only recorded the worst case in this report.

# 2. SUMMARY OF TEST RESULTS

| Rule | Description of Test Items | Result |
|---|---|---|
| §7.1 | Reference to clause 8.4 of ETSI EN 301 489-1<br>Conducted Emission (AC mains input/output port) | Compliant |
| §7.1 | Reference to clause 8.3 of ETSI EN 301 489-1<br>Conducted Emission (DC power input/output port) | N/A* |
| §7.1 | Reference to clause 8.7 of ETSI EN 301 489-1<br>Conducted Emission (Wired network port) | N/A* |
| §7.1 | Reference to clause 8.2 of ETSI EN 301 489-1<br>Radiated Emission (Enclosure of ancillary equipment) | Compliant |
| §7.1 | Reference to clause 8.5 of ETSI EN 301 489-1<br>Harmonic current emissions (AC mains input port) | Compliant |
| §7.1 | Reference to clause 8.6 of ETSI EN 301 489-1<br>Voltage fluctuations and flicker (AC mains input port) | Compliant |
| §7.2 | Reference to clause 9.3 of ETSI EN 301 489-1<br>Electrostatic discharge (Enclosure port)<br>(EN 61000-4-2) | Compliant |
| §7.2 | Reference to clause 9.2 of ETSI EN 301 489-1<br>RF electromagnetic field (80MHz to 6000MHz) (Enclosure port)<br>(EN 61000-4-3) | Compliant |
| §7.2 | Reference to clause 9.4 of ETSI EN 301 489-1<br>Fast transients common mode (signal, wired network and control ports, DC and AC power ports)<br>(EN 61000-4-4) | Compliant |
| §7.2 | Reference to clause 9.8 of ETSI EN 301 489-1<br>Surges, line to line and line to ground (AC mains power input ports, wired network ports)<br>(EN 61000-4-5) | Compliant |
| §7.2 | Reference to clause 9.5 of ETSI EN 301 489-1<br>RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports)<br>(EN 61000-4-6) | Compliant |
| §7.2 | Reference to clause 9.6 of ETSI EN 301 489-1<br>Transients and surges in the vehicular environment<br>(ISO 7637-2) | N/A* |
| §7.2 | Reference to clause 9.7 of ETSI EN 301 489-1<br>Voltage dips and interruptions (AC mains power input ports)<br>(EN 61000-4-11) | Compliant |

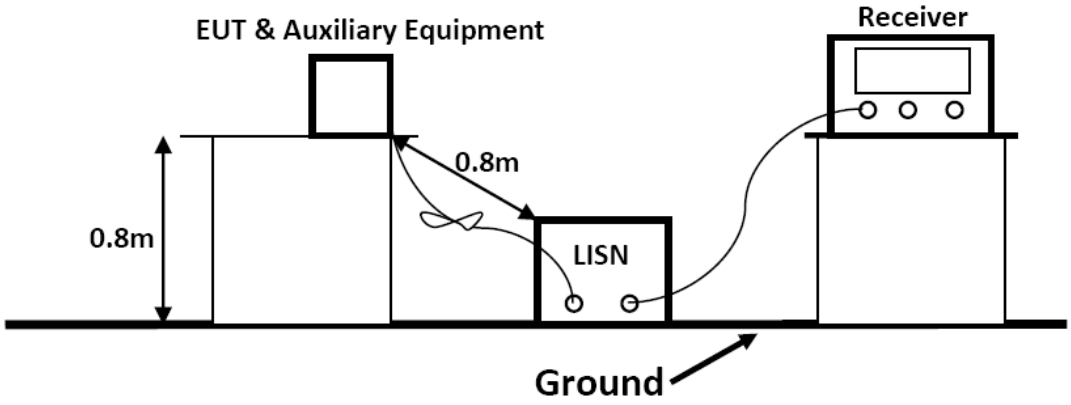
# 3. LINE CONDUCTED EMISSION

## 3.1. Conducted Emission Limit

**Relevant Standard(s):** ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032: 2015 Class B

| Limits for Line Conducted Emission | | |
|---|---|---|
| Frequency (MHz) | Limit (dBμV) | |
| | Quasi-peak Level | Average Level |
| 0.15 ~ 0.50 | 66.0 ~ 56.0 * | 56.0 ~ 46.0 * |
| 0.50 ~ 5.00 | 56.0 | 46.0 |
| 5.00 ~ 30.00 | 60.0 | 50.0 |
| NOTE1-The lower limit shall apply at the transition frequencies.<br>NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz. | | |

## 3.2. Test Configuration




The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

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

The EUT received charging power from the Adapter which received power through a LISN supplying power of AC 230V/50Hz.

## 3.3. EMI Test Receiver Setup

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

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 150KHz ~ 30MHz |
| (IF)RBW | 9kHz |

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

## 3.4. Test Procedure

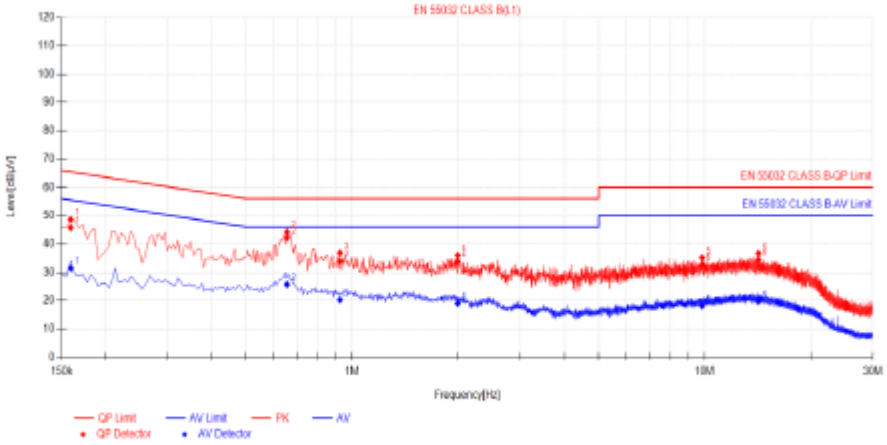
Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

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

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

## 3.5. Test Data

***Note: For pre-scan, the worst case is TM1, and the test data was shown as follow:

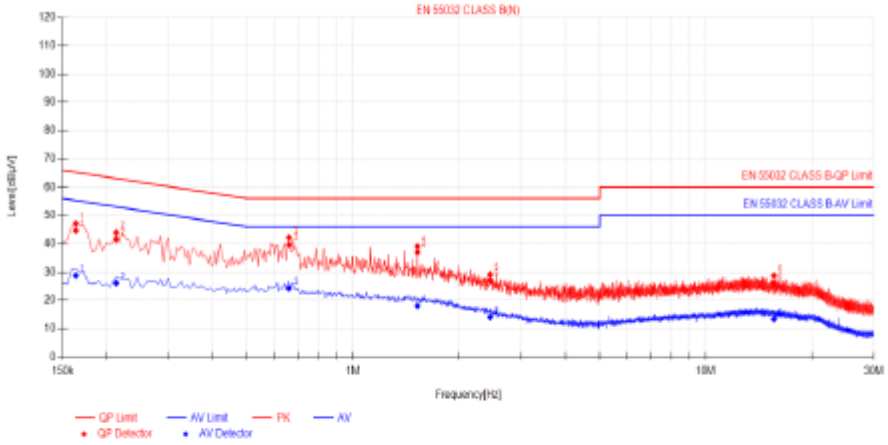



Suspected List

| NO. | Freq. [MHz] | Reading [dBµV] | Level [dBµV] | Factor [dB] | Limit [dBµV] | Margin [dB] | Detector | Type | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.159 | 38.76 | 48.67 | 9.91 | 65.52 | 16.85 | PK | L1 | PASS |
| 2 | 0.654 | 34.32 | 44.29 | 9.97 | 56.00 | 11.71 | PK | L1 | PASS |
| 3 | 0.924 | 26.84 | 36.84 | 10.00 | 56.00 | 19.16 | PK | L1 | PASS |
| 4 | 1.995 | 26.07 | 35.99 | 9.92 | 56.00 | 20.01 | PK | L1 | PASS |
| 5 | 9.8385 | 24.91 | 35.16 | 10.25 | 60.00 | 24.84 | PK | L1 | PASS |
| 6 | 14.2125 | 26.36 | 36.66 | 10.30 | 60.00 | 23.34 | PK | L1 | PASS |

Final Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Reading[dBµV] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Reading [dBµV] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.159 | 9.91 | 35.89 | 45.80 | 65.52 | 19.72 | 21.53 | 31.44 | 55.52 | 24.08 | PASS |
| 2 | 0.654 | 9.97 | 32.15 | 42.12 | 56.00 | 13.88 | 15.73 | 25.70 | 46.00 | 20.30 | PASS |
| 3 | 0.924 | 10.00 | 23.97 | 33.97 | 56.00 | 22.03 | 10.25 | 20.25 | 46.00 | 25.75 | PASS |
| 4 | 1.995 | 9.92 | 23.90 | 33.82 | 56.00 | 22.18 | 9.17 | 19.09 | 46.00 | 26.91 | PASS |
| 5 | 9.8385 | 10.25 | 22.53 | 32.78 | 60.00 | 27.22 | 7.90 | 18.15 | 50.00 | 31.85 | PASS |
| 6 | 14.2125 | 10.30 | 24.17 | 34.47 | 60.00 | 25.53 | 9.47 | 19.77 | 50.00 | 30.23 | PASS |




Suspected List

| NO. | Freq. [MHz] | Reading [dBµV] | Level [dBµV] | Factor [dB] | Limit [dBµV] | Margin [dB] | Detector | Type | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1635 | 37.13 | 47.18 | 10.05 | 65.28 | 18.10 | PK | N | PASS |
| 2 | 0.213 | 34.04 | 44.01 | 9.97 | 63.09 | 19.08 | PK | N | PASS |
| 3 | 0.6585 | 32.06 | 42.16 | 10.10 | 56.00 | 13.84 | PK | N | PASS |
| 4 | 1.5225 | 28.96 | 39.09 | 10.13 | 56.00 | 16.91 | PK | N | PASS |
| 5 | 2.445 | 19.04 | 29.16 | 10.12 | 56.00 | 26.84 | PK | N | PASS |
| 6 | 15.612 | 18.34 | 28.78 | 10.44 | 60.00 | 31.22 | PK | N | PASS |

Final Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Reading[dBµV] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Reading [dBµV] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1635 | 10.05 | 34.67 | 44.72 | 65.28 | 20.56 | 18.76 | 28.81 | 55.28 | 26.47 | PASS |
| 2 | 0.213 | 9.97 | 31.58 | 41.55 | 63.09 | 21.54 | 16.12 | 26.09 | 53.09 | 27.00 | PASS |
| 3 | 0.6585 | 10.10 | 29.60 | 39.70 | 56.00 | 16.30 | 14.13 | 24.23 | 46.00 | 21.77 | PASS |
| 4 | 1.5225 | 10.13 | 26.90 | 37.03 | 56.00 | 18.97 | 7.94 | 18.07 | 46.00 | 27.93 | PASS |
| 5 | 2.445 | 10.12 | 16.98 | 27.10 | 56.00 | 28.90 | 4.01 | 14.13 | 46.00 | 31.87 | PASS |
| 6 | 15.612 | 10.44 | 15.46 | 25.90 | 60.00 | 34.10 | 2.95 | 13.39 | 50.00 | 36.61 | PASS |

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

# 4. RADIATED DISTURBANCE

## 4.1. Radiated Emission Limit

**Relevant Standard(s):** ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032: 2015 Class B

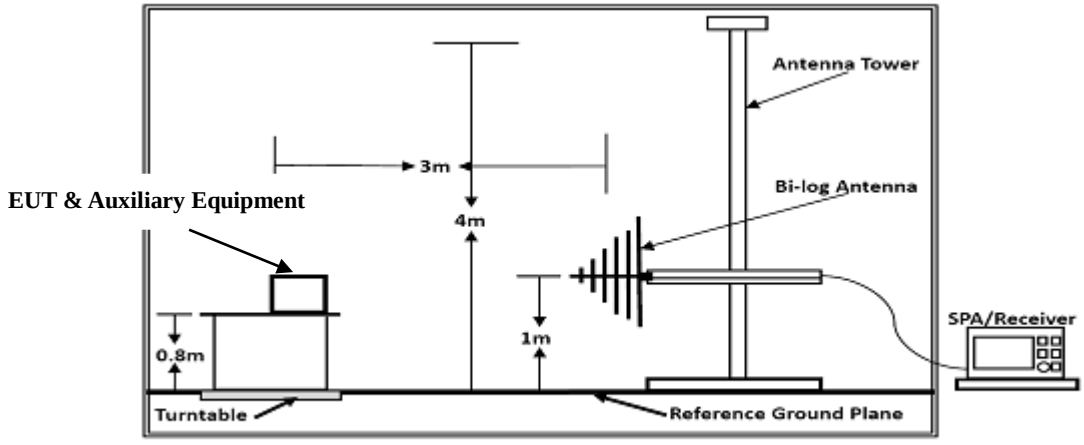
| Limits for Radiated Disturbance Below 1GHz | | |
|---|---|---|
| Frequency (MHz) | Distance (Meters) | Field Strengths Limit (dBμV/m) |
| 30 ~ 230 | 3 | 40 |
| 230 ~ 1000 | 3 | 47 |
| ***Note:<br>(1) The smaller limit shall apply at the combination point between two frequency bands.<br>(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT. | | |

| Limits for Radiated Disturbance Above 1GHz | | | |
|---|---|---|---|
| Frequency (MHz) | Distance (Meters) | Peak Limit (dBμV/m) | Average Limit (dBμV/m) |
| 1000 ~ 3000 | 3 | 70 | 50 |
| 3000 ~ 6000 | 3 | 74 | 54 |
| ***Note: The lower limit applies at the transition frequency. | | | |

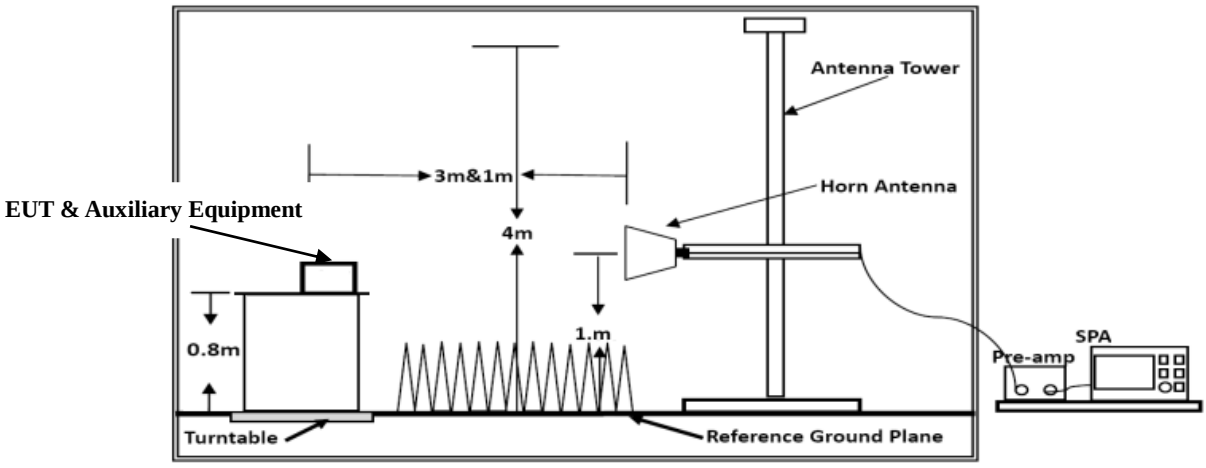
| Limits for Radiated Disturbance Below 1GHz (For FM Receivers) | | | |
|---|---|---|---|
| Frequency (MHz) | Distance (Meters) | Class B Limit (dBμV/m) | |
| | | Fundamental | Harmonics |
| 30 ~ 230 | 3 | 60 | 52 |
| 230 ~ 300 | 3 | | 52 |
| 300 ~ 1000 | 3 | | 56 |
| ***Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO.<br>Signals at all other frequencies shall be compliant with the limits given in above Table. | | | |

| Limits for Radiated Disturbance Above 1GHz (For FM Receivers) | | | |
|---|---|---|---|
| 1000 ~ 3000 | 3 | 70 | 50 |
| 3000 ~ 6000 | 3 | 74 | 54 |
| ***Note: The lower limit applies at the transition frequency. | | | |

## 4.2. Test Configuration




Below 1GHz




Above 1GHz

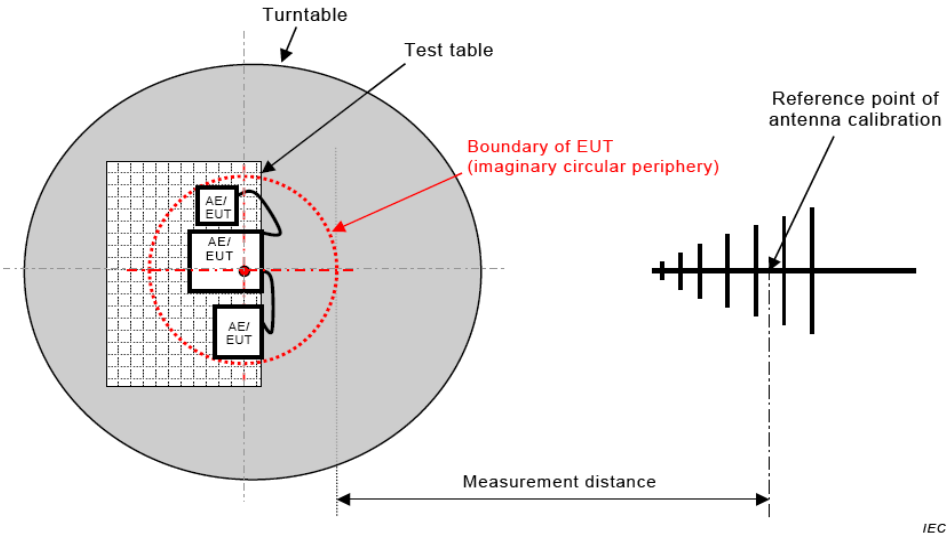



**Figure C.1 – Measurement distance**

**Test Setup for FM Receiver**

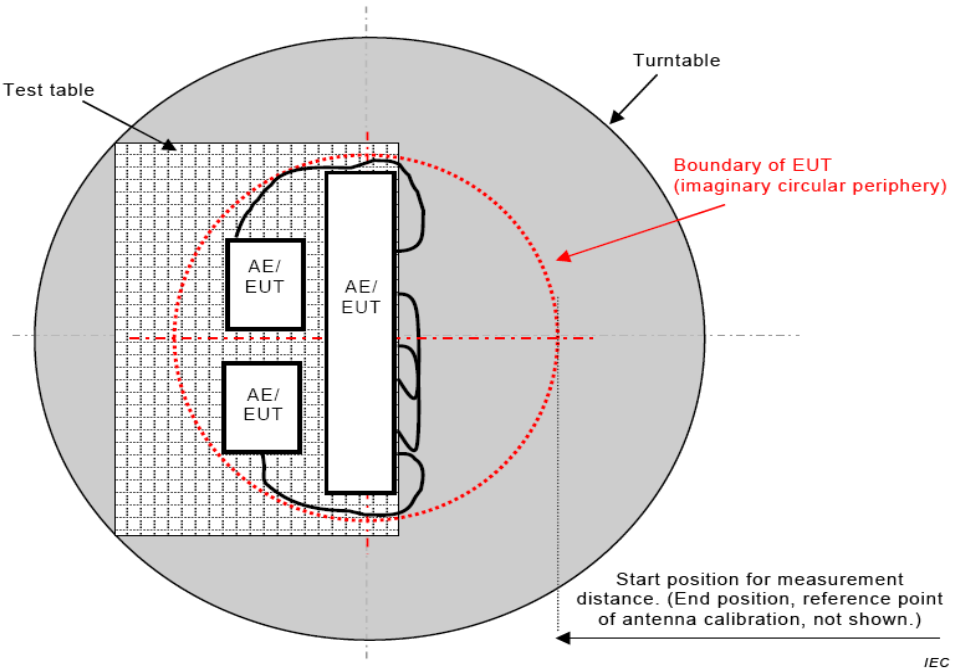



**Figure C.2 – Boundary of EUT, Local AE and associated cabling**

**Test Setup for FM Receiver**

## 4.3. Test Procedure

**1) Sequence of testing 30 MHz to 1 GHz**
**Setup:**
--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.
**Pre-measurement:**
--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 4 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.
Final measurement:
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with

the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

**2) Sequence of testing 1 GHz to 6 GHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

**Pre-measurement:**

--- The turntable rotates from 0° to 315° using 45° steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height scan range is 1 meter to 4 meter.
--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

**Final measurement:**

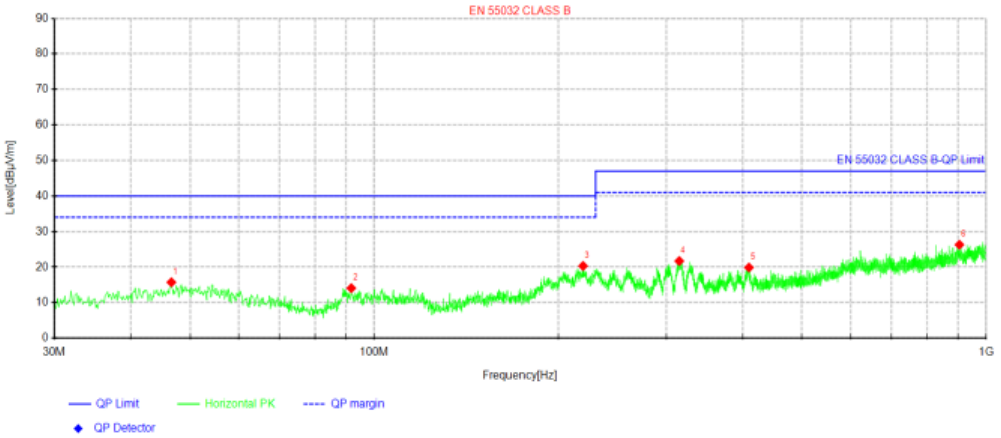
--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of pre-measurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 30MHz~1000MHz / RBW 100kHz for QP |

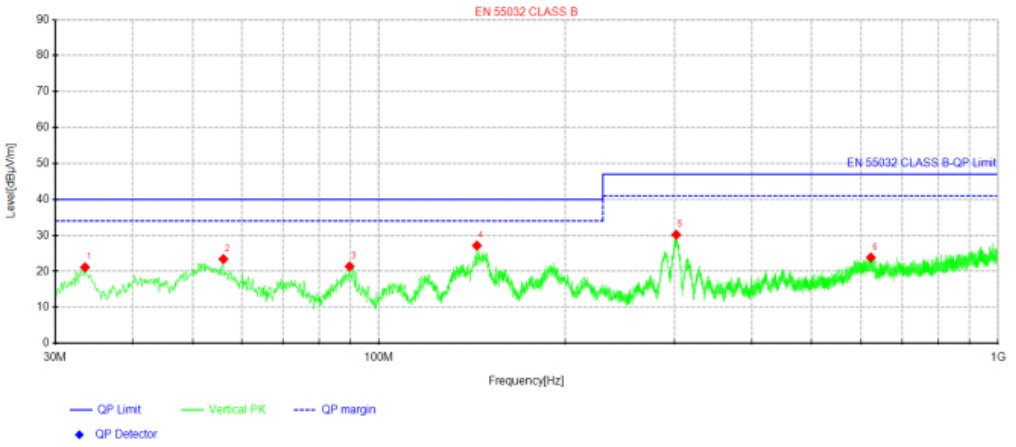
| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 6000 MHz |
| RBW / VBW | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |

## 4.4. Test Data

The worst test mode of the EUT was TM1, and its test data was showed as the follow:




| Suspected Data List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading [dBµV] | Level [dBµV/m] | Factor [dB/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 46.6112 | 27.37 | 15.73 | -11.64 | 40.00 | 24.27 | 100 | 30 | Horizontal |
| 2 | 91.7162 | 29.04 | 14.07 | -14.97 | 40.00 | 25.93 | 100 | 360 | Horizontal |
| 3 | 219.392 | 33.39 | 20.31 | -13.08 | 40.00 | 19.69 | 100 | 170 | Horizontal |
| 4 | 315.058 | 33.06 | 21.70 | -11.36 | 47.00 | 25.30 | 100 | 230 | Horizontal |
| 5 | 409.512 | 30.25 | 19.87 | -10.38 | 47.00 | 27.13 | 100 | 30 | Horizontal |
| 6 | 904.212 | 28.56 | 26.30 | -2.26 | 47.00 | 20.70 | 100 | 290 | Horizontal |



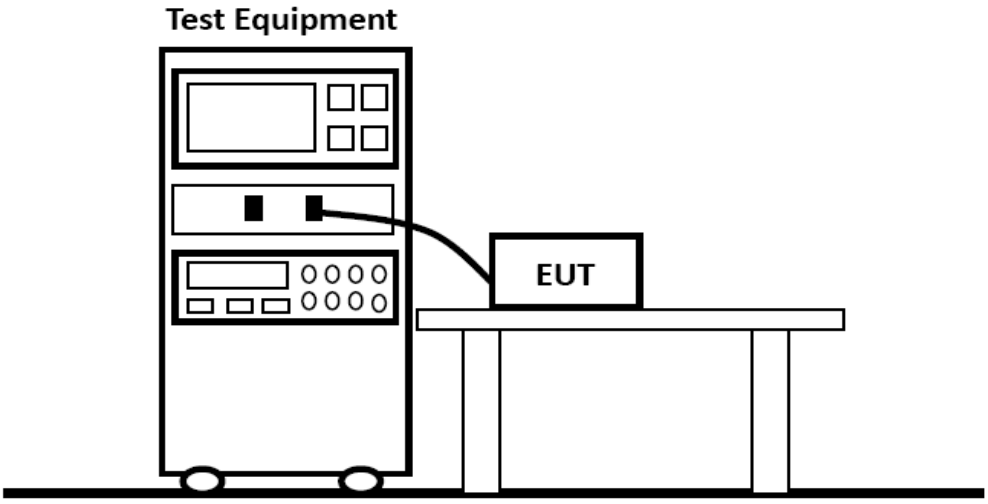

| Suspected Data List | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading [dBµV] | Level [dBµV/m] | Factor [dB/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 33.5162 | 35.30 | 21.13 | -14.17 | 40.00 | 18.87 | 100 | 280 | Vertical |
| 2 | 56.0688 | 35.62 | 23.41 | -12.21 | 40.00 | 16.59 | 100 | 280 | Vertical |
| 3 | 89.655 | 36.73 | 21.37 | -15.36 | 40.00 | 18.63 | 100 | 90 | Vertical |
| 4 | 143.975 | 43.25 | 27.16 | -16.09 | 40.00 | 12.84 | 100 | 310 | Vertical |
| 5 | 302.085 | 41.53 | 30.17 | -11.36 | 47.00 | 16.83 | 100 | 270 | Vertical |
| 6 | 623.033 | 29.11 | 23.85 | -5.26 | 47.00 | 23.15 | 100 | 190 | Vertical |

| **Test Mode:** TM1 (Above 1GHz) | | | | **Test Distance:** 3m | | | |
|---|---|---|---|---|---|---|---|
| **Test Voltage:** AC 230V/50Hz | | | | **Test Results:** Passed | | | |
| **Detector Function**: Peak + AV | | | | | | | |
| Polarization | Frequency (MHz) | Emission Level (dBμV/m) | | Limit (dBμV/m) | | Margin (dB) | |
| Horizontal | 1351.15 | 49.90 | 37.82 | 70 | 50 | -20.10 | -12.18 |
| | 1885.10 | 48.04 | 36.03 | 70 | 50 | -21.96 | -13.97 |
| | 2186.95 | 48.83 | 31.42 | 74 | 54 | -25.17 | -22.58 |
| | 3290.35 | 56.30 | 31.40 | 74 | 54 | -17.70 | -22.60 |
| | 4331.18 | 51.19 | 34.18 | 74 | 54 | -22.81 | -19.82 |
| | 5887.04 | 53.81 | 36.44 | 74 | 54 | -20.19 | -17.56 |
| Vertical | 1348.98 | 49.88 | 36.83 | 70 | 50 | -20.12 | -13.17 |
| | 1884.72 | 47.82 | 36.06 | 70 | 50 | -22.18 | -13.94 |
| | 2194.27 | 48.29 | 30.66 | 74 | 54 | -25.71 | -23.34 |
| | 3296.08 | 57.35 | 33.19 | 74 | 54 | -16.65 | -20.81 |
| | 4330.84 | 51.12 | 34.78 | 74 | 54 | -22.88 | -19.22 |
| | 5881.01 | 55.06 | 36.65 | 74 | 54 | -18.94 | -17.35 |

1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
2. Measurements above show only up to 6 maximum emissions noted.
3. Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

# 5. HARMONIC CURRENT EMISSIONS

## 5.1. Test Configuration




## 5.2. Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-2: 2014

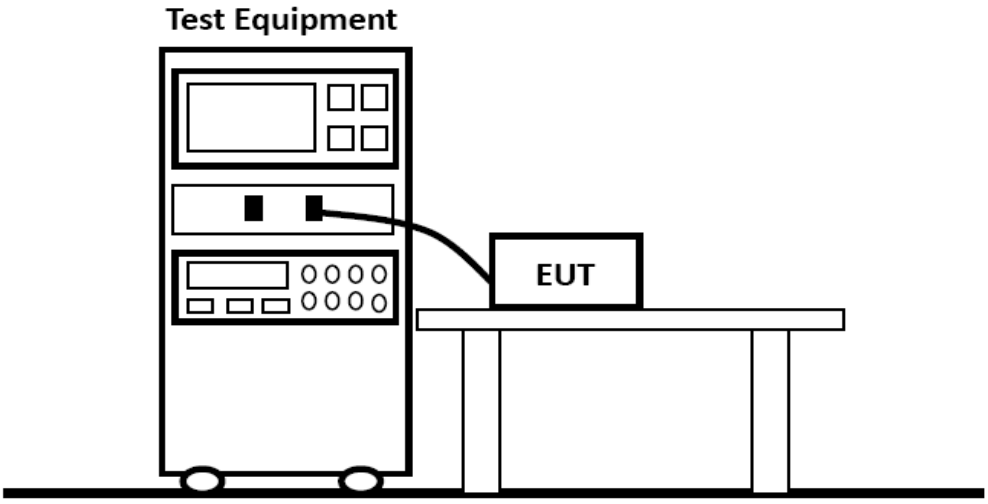
## 5.3. Test Data

| | | | |
|---|---|---|---|
| **Test Model** | Electric Storage Water Heater | **Test Engineer** | Jason Li |
| **Environmental Conditions** | 24.6℃, 52.6% RH | **Test Voltage** | AC 230V/50Hz |

Pass.

# 6. VOLTAGE FLUCTUATION AND FLICKER

## 6.1. Test Configuration




## 6.2. Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-3: 2013

## 6.3. Test Data

PASS.

# 7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

## 7.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

## 7.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

## 7.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

## 7.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

**Performance criteria for ETSI EN 301 489-17 V3.2.4 (2020-09)**

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

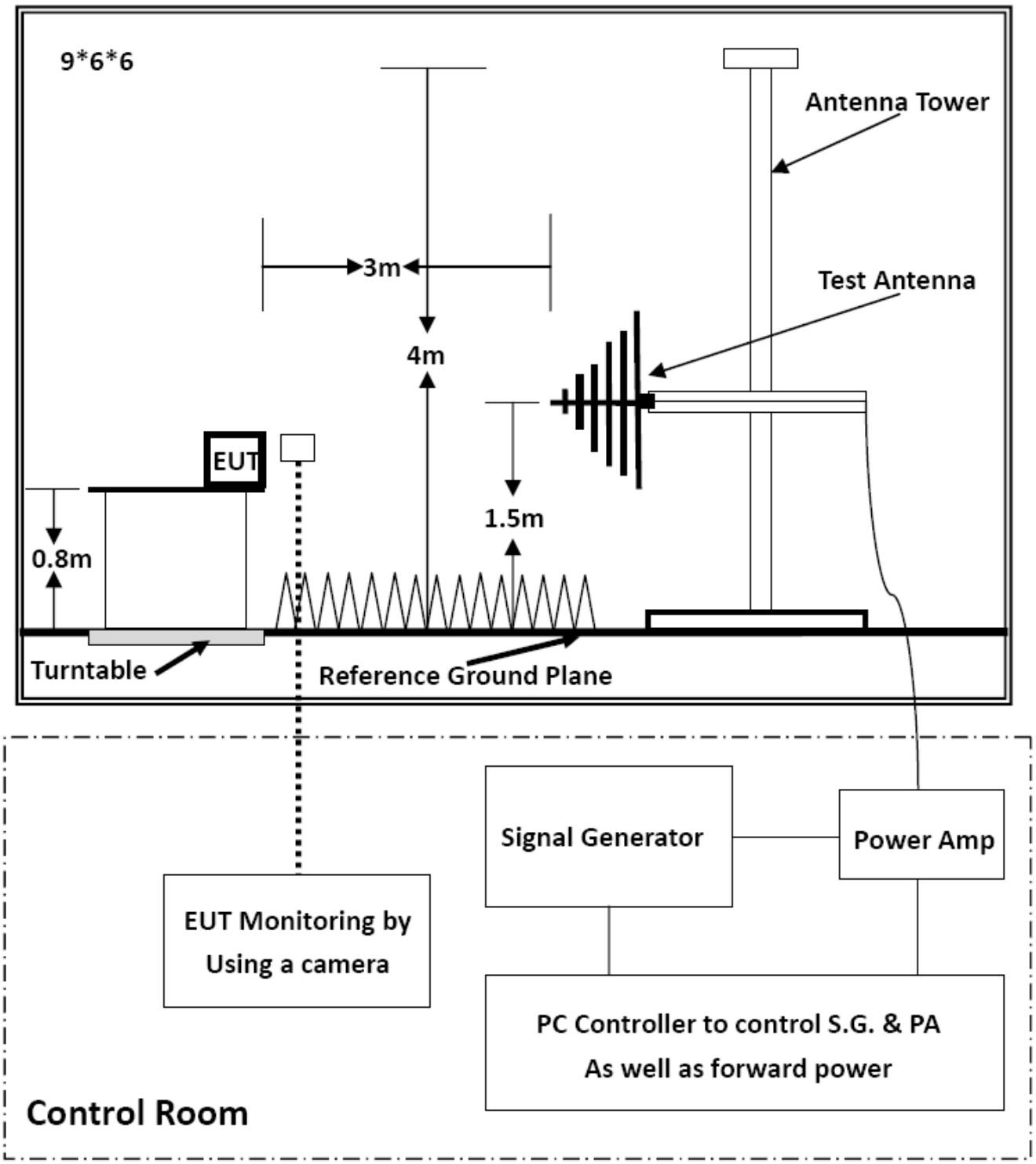
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If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

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

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

# 8. RF ELECTROMAGNETIC FIELD (80 MHz - 6000 MHz)

## 8.1. Test Configuration



## 8.2. Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-3, ETSI EN 301 489-17, ETSI EN 301489-19 & ETSI EN 301 489-52 / (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

## 8.3. Severity Level

| Level | Field Strength (V/m) |
|---|---|
| 1 | 1 |
| 2 | 3 |
| 3 | 10 |
| X | Special |
| Performance Criterion: **A** | |

## 8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

| Condition of Test | Remark |
|---|---|
| Fielded Strength | 3 V/m (Severity Level 2) |
| Radiated Signal | Unmodulated |
| Scanning Frequency | 80-6000MHz |
| Dwell time of radiated | 0.0015 decade/s |
| Waiting Time | 3 Sec. |

## 8.5. Test Result

| **Test Model** | Electric Storage Water Heater | **Test Engineer** | Jason Li |
|---|---|---|---|
| **Environmental Conditions** | 23.5℃, 53.2% RH | **Test Voltage** | AC 230V/50Hz |

**WIFI Test Result:**

| EUT Working Mode | Antenna Polarity | Frequency (MHz) | Fielded Strength (V/m) | Observation | Position | Conclusion |
|---|---|---|---|---|---|---|
| Operating Mode | Vertical | 80-6000 | 3 | CT, CR | Front, Right, Left, Back | Pass |
| | Horizontal | 80-6000 | 3 | CT, CR | Front, Right, Left, Back | Pass |
| Idle | Vertical | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |
| | Horizontal | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |

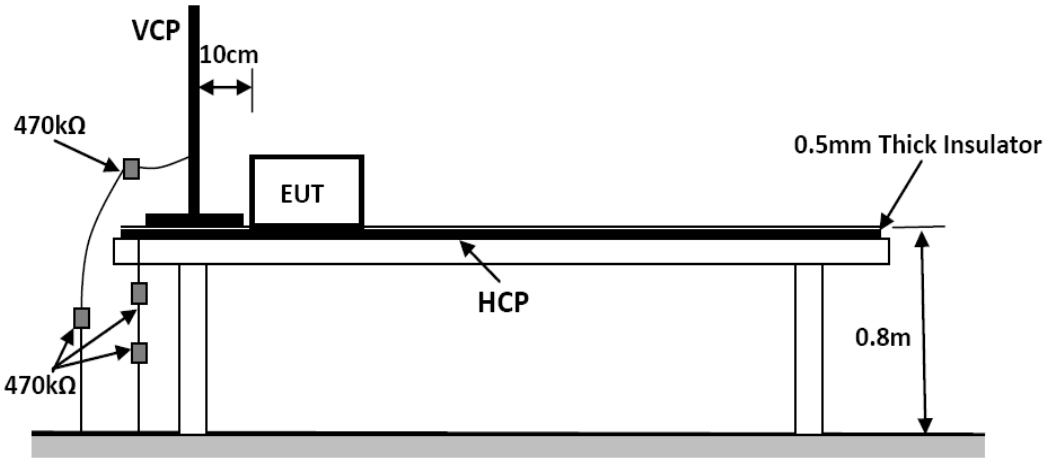
**TM2-TM3 Test Result:**

| EUT Working Mode | Antenna Polarity | Frequency (MHz) | Fielded Strength (V/m) | Observation | Position | Conclusion |
|---|---|---|---|---|---|---|
| Operating Mode | Vertical | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |
| | Horizontal | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |
| Idle | Vertical | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |
| | Horizontal | 80-6000 | 3 | See Note | Front, Right, Left, Back | Pass |

# 9. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 and EN 61000-4-2.

## 9.1. Test Configuration




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

For tabletop equipment, a 1.5 by 1.0-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.

## 9.2. Test Procedure

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2: 2009
Test level 3 for Air Discharge at ±8 kV
Test level 2 for Contact Discharge at ±4 kV

9.2.1. 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.

9.2.2. Contact Discharge

All the procedure shall be same as Section 9.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

9.2.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

9.2.4. Indirect Discharge For Vertical Coupling Plane

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

## 9.3. Test Data

**PASS.**

# Electrostatic Discharge Test Results

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-2 ☑ EN 61000-4-2 | | |
| **Applicant** | ENG HOUSE COMPANY SHPK FIS.NR.600311592 | | |
| **EUT** | Electric Storage Water Heater | **Temperature** | 23.5℃ |
| **M/N** | OS-Smart100L | **Humidity** | 53.1％ |
| **Criterion** | B | **Pressure** | 1021mbar |
| **Test Mode** | TM1-TM3 | **Test Date** | |
| **Test Engineer** | Jason Li | | |

**TEST RESULT OF WIFI**

| Test Voltage | Coupling | Observation | Result (Pass/Fail) |
|---|---|---|---|
| ±2KV, ±4kV | Contact Discharge | CT, CR | Pass |
| ±2KV, ±4kV, ±8kV | Air Discharge | CT, CR | Pass |
| ±2KV, ±4kV | Indirect Discharge HCP | CT, CR | Pass |
| ±2KV, ±4kV | Indirect Discharge VCP | CT, CR | Pass |

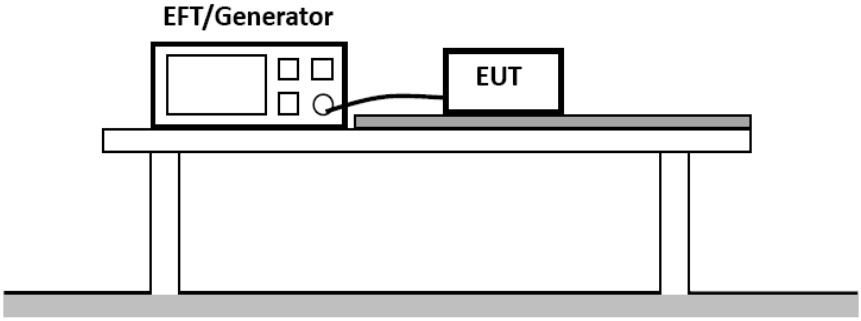
**TEST RESULT OF TM2-TM3**

| Test Voltage | Coupling | Result (Pass/Fail) |
|---|---|---|
| ±2KV, ±4kV | Contact Discharge | Pass |
| ±2KV, ±4kV, ±8kV | Air Discharge | Pass |
| ±2KV, ±4kV | Indirect Discharge HCP | Pass |
| ±2KV, ±4kV | Indirect Discharge VCP | Pass |

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.

# 10. ELECTRICAL FAST TRANSIENT IMMUNITY

## 10.1. Test Configuration




## 10.2. Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN61000-4-4: 2012
Test level 2 at 1 kV

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

## 10.3. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

10.3.1.For input and output AC power ports:
The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.3.2.For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

10.3.3.For DC output line ports: It's unnecessary to test.

## 10.4. Test Data

**PASS.**

Please refer to the following page.

# Electrical Fast Transient/Burst Test Results

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-4 ☑ EN 61000-4-4 | | |
| **Applicant** | ENG HOUSE COMPANY SHPK FIS.NR.600311592 | | |
| **EUT** | Electric Storage Water Heater | **Temperature** | 24.6℃ |
| **M/N** | OS-Smart100L | **Humidity** | 52.6％ |
| **Test Mode** | TM1-TM3 | **Criterion** | B |
| **Test Engineer** | Jason Li | | |

**TEST RESULT OF WIFI**

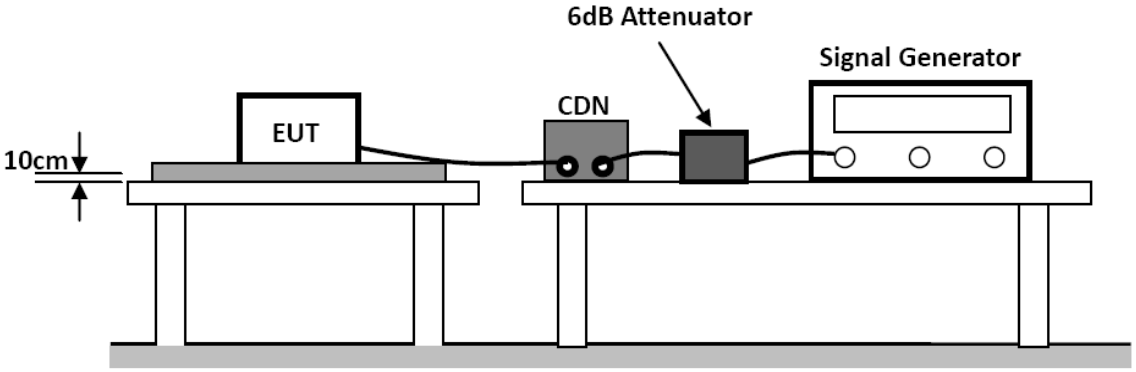
| Line | Test Voltage | Polarity | Observation | Result (Pass/Fail) |
|---|---|---|---|---|
| L | 1KV | +/- | CT, CR | Pass |
| N | 1KV | +/- | CT, CR | Pass |
| L-N | 1KV | +/- | CT, CR | Pass |

**TEST RESULT OF TM2-TM3**

| Line | Test Voltage | Polarity | Result (Pass/Fail) |
|---|---|---|---|
| L | 1KV | +/- | Pass |
| N | 1KV | +/- | Pass |
| L-N | 1KV | +/- | Pass |

# 11. RF COMMON MODE

## 11.1. Test Configuration




## 11.2. Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-6: 2014
Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,
Modulation type: AM
Modulation depth: 80%
Modulation signal: 1 kHz

| **Test Level** | |
|---|---|
| Level | Voltage Level (r.m.s..) (V) |
| 1 | 1 |
| 2 | 3 |
| 3 | 10 |
| X | Special |
| Performance Criterion: A | |

## 11.3. Test Procedure

11.3.1. Let the EUT work in test mode and test it.

11.3.2. 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 50mm (where possible).

11.3.3. The disturbance signal described below is injected to EUT through CDN.

11.3.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

11.3.5. The frequency range is swept from 150kHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

11.3.6. The rate of sweep shall not exceed 1.5*10-3 decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

11.3.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

## 11.4. Test Data

**PASS.**

Please refer to the following page.

# Injected Currents Susceptibility Test Results

| | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-6 ☑ EN 61000-4-6 | | |
| **Applicant** | ENG HOUSE COMPANY SHPK FIS.NR.600311592 | | |
| **EUT** | Electric Storage Water Heater | **Temperature** | 22.6℃ |
| **M/N** | OS-Smart100L | **Humidity** | 52.3％ |
| **Test Mode** | TM1-TM3 | **Criterion** | A |
| **Test Engineer** | Jason Li | | |

**TEST RESULT OF WIFI**

| Frequency Range (MHz) | Injected Position | Strength (Unmodulated) | Observation | Result (Pass/Fail) |
|---|---|---|---|---|
| 0.15 ~ 80 | AC Mains | 3V | CT, CR | Pass |

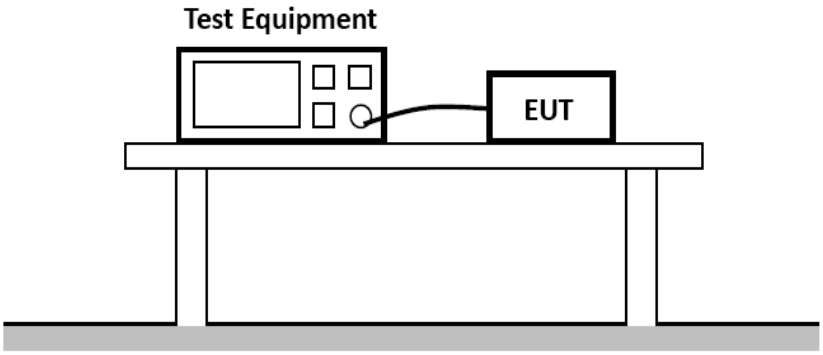
**TEST RESULT OF TM2-TM3**

| Frequency Range (MHz) | Injected Position | Strength (Unmodulated) | Result (Pass/Fail) |
|---|---|---|---|
| 0.15 ~ 80 | AC Mains | 3V | Pass |

Remark:
1. Modulation Signal:1kHz 80% AM
2. Measurement Equipment :
Simulator: CIT-10 (FRANKONIA)
CDN : ☑CDN-M2 (FRANKONIA)
☐CDN-M3 (FRANKONIA)

# 12. SURGES, LINE TO LINE AND LINE TO GROUND

## 12.1. Test Configuration




## 12.2. Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2014
L-N: Test level 2 at 1 kV
L-PE, N-PE Test Level 3 at 2kV

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

## 12.3. Test Procedure

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

### 12.4. Test Data

| Surge Immunity Test Result | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-5 ☑ EN 61000-4-5 | | |
| **Applicant** | ENG HOUSE COMPANY SHPK FIS.NR.600311592 | | |
| **EUT** | Electric Storage Water Heater | **Temperature** | 24.6℃ |
| **M/N** | OS-Smart100L | **Humidity** | 52.6% |
| **Test Mode** | TM1-TM3 | **Criterion** | A |
| **Test Engineer** | Jason Li | | |

**TEST RESULT OF WIFI**

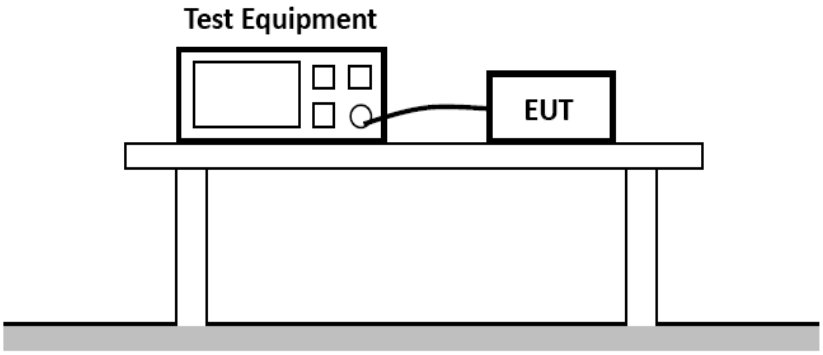
| Location | Polarity | Phase Angle | Number of Pulse | Pulse Voltage (KV) | Observation | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| L-N | + | 0º, 90º, 180º, 270º | 5 | 1.0 | CT, CR | Pass |
| | - | 0º, 90º, 180º, 270º | 5 | 1.0 | CT, CR | Pass |
| | | | | | | |
| | | | | | | |

**TEST RESULT OF TM2-TM3**

| Location | Polarity | Phase Angle | Number of Pulse | Pulse Voltage (KV) | Result (Pass/Fail) |
|---|---|---|---|---|---|
| L-N | + | 0º, 90º, 180º, 270º | 5 | 1.0 | Pass |
| | - | 0º, 90º, 180º, 270º | 5 | 1.0 | Pass |
| | | | | | |
| | | | | | |

# 13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

## 13.1. Test Configuration




## 13.2. Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-11: 2004
Test levels and Performance Criterion

| Test Level | | |
|---|---|---|
| Voltage Reduction $\%U_T$ | Voltage Dips $\%U_T$ | Duration (in Period) |
| 100 | 0 | 0.5 |
| 100 | 0 | 1 |
| 30 | 70 | 5 |
| Voltage Reduction $\%U_T$ | Voltage Dips $\%U_T$ | Duration (in Period) |
| 100 | 0 | 250 |
| Performance Criterion: B&C | | |

## 13.3. Test Procedure

13.3.1. The interruption is introduced at selected phase angles with specified duration.

13.3.2. Record any degradation of performance.

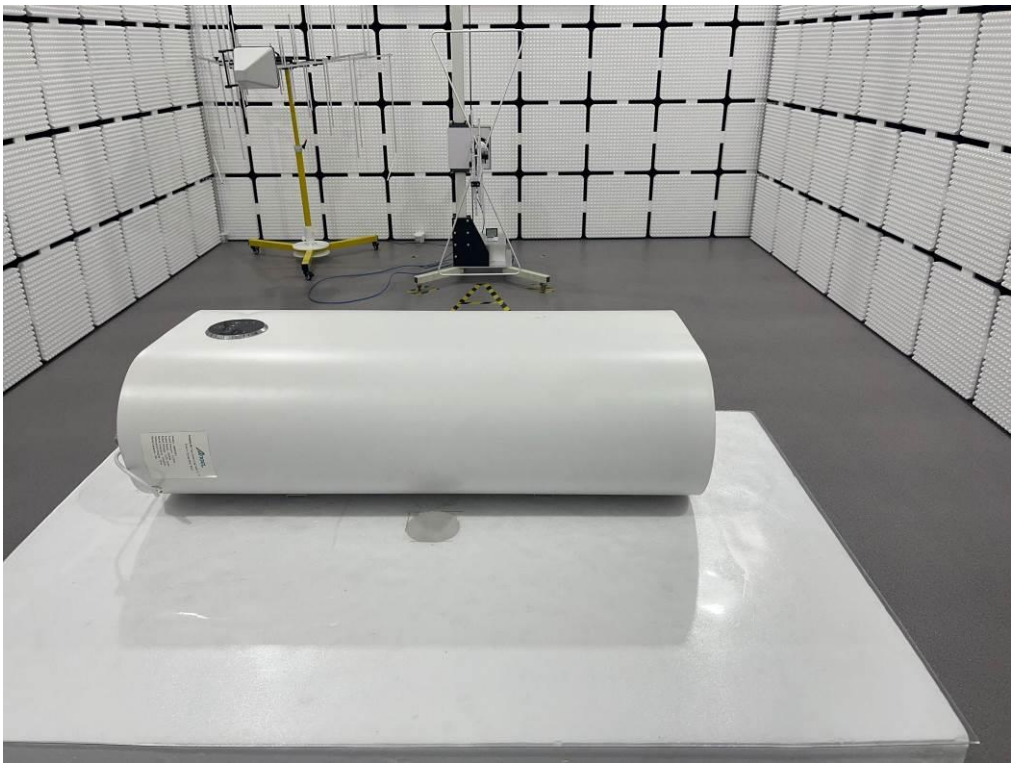
**13.4. Test Data**

| Voltage Dips And Interruptions Test Results | | | |
|---|---|---|---|
| **Standard** | ☐ IEC 61000-4-11 ☑ EN 61000-4-11 | | |
| **Applicant** | ENG HOUSE COMPANY SHPK FIS.NR.600311592 | | |
| **EUT** | Electric Storage Water Heater | **Temperature** | 24.6℃ |
| **M/N** | OS-Smart100L | **Humidity** | 52.6％ |
| **Test Mode** | TM1-TM3 | **Criterion** | A |
| **Test Engineer** | Jason Li | | |

| **TEST RESULT OF WIFI** | | | | |
|---|---|---|---|---|
| **Test Level % $U_T$** | **Voltage Dips & Short Interruptions % $U_T$** | **Duration (in periods)** | **Observation** | **Result (Pass/Fail)** |
| 0 | 100 | 0.5P | CT, CR | Pass |
| 0 | 100 | 1P | CT, CR | Pass |
| 70 | 30 | 25P | CT, CR | Pass |
| 0 | 100 | 250P | CT, CR | Pass |

| **TEST RESULT OF TM2-TM3** | | | |
|---|---|---|---|
| **Test Level % $U_T$** | **Voltage Dips & Short Interruptions % $U_T$** | **Duration (in periods)** | **Result (Pass/Fail)** |
| 0 | 100 | 0.5P | Pass |
| 0 | 100 | 1P | Pass |
| 70 | 30 | 25P | Pass |
| 0 | 100 | 250P | Pass |

# 14. Setup Photographs



# 15. EUT Photographs

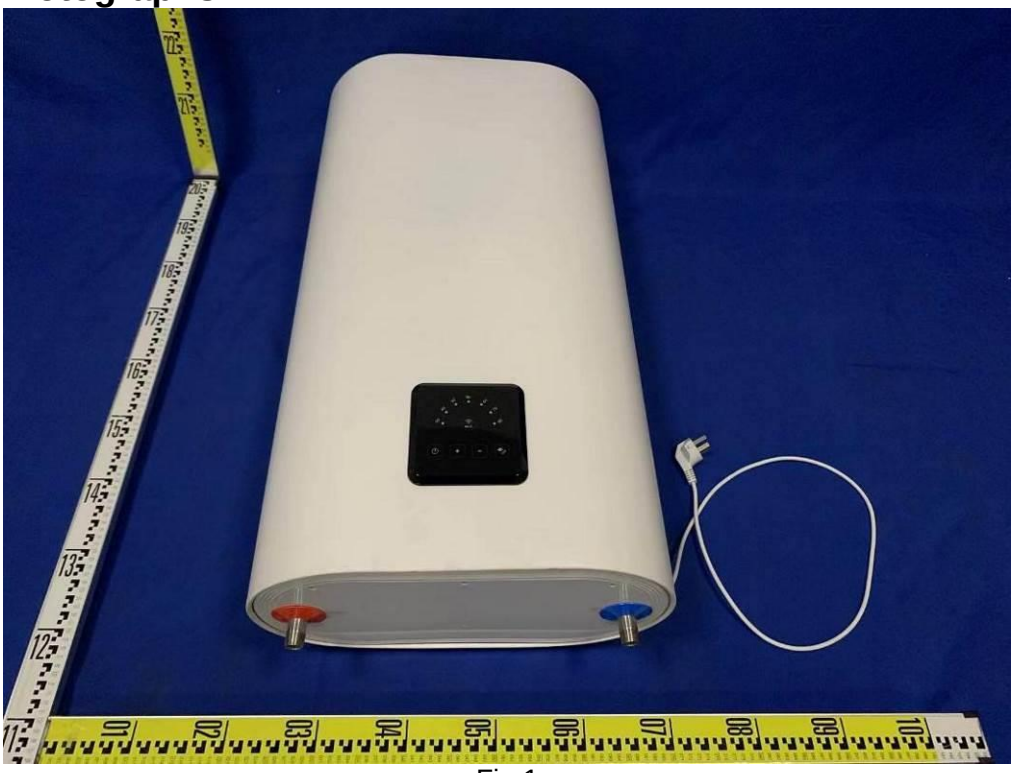


Fig.1

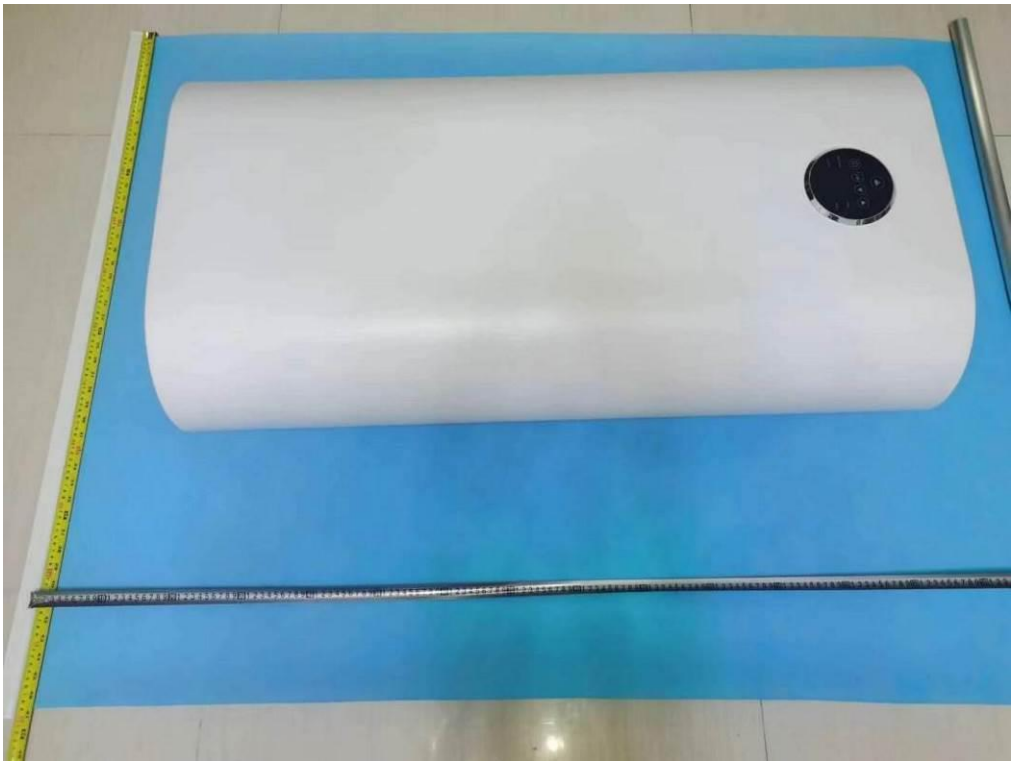


Fig.2


Fig.3

Fig.4


Fig.5

----------THE END OF REPORT----------