


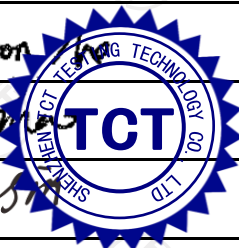


Test Report

| | | |
|---------------------------------------|---|---|
| Test Report No.: | TCT240815E032 | |
| Date of issue | Sep. 14, 2024 | |
| Testing laboratory | Shenzhen TCT Testing Technology Co., Ltd. | |
| Testing location/ address: | 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China | |
| Applicant's name | Shenzhen Huafurui Technology Co., Ltd. | |
| Address | Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China | |
| Manufacturer's name.....: | Shenzhen Huafurui Technology Co., Ltd. | |
| Address | Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China | |
| Standard(s).....: | ETSI EN 301 489-52 V1.2.1 (2021-11) ETSI EN 301 489-19 V2.2.1 (2022-09) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 301 489-3 V2.3.2 (2023-01) ETSI EN 301 489-1 V2.2.3 (2019-11) | |
| Product Name | Smartphone | |
| Trade Mark.....: | CUBOT | |
| Model/Type reference | A30 | |
| Rating(s) | Refer to EUT description of page 3 | |
| Date of receipt of test item | Aug. 15, 2024 | |
| Date (s) of performance of test | Aug. 15, 2024 ~ Sep. 14, 2024 | |
| Tested by (+signature).....: | Aaron MO |  |
| Check by (+signature) | Beryl ZHAO |  |
| Approved by (+signature): | Tomsin |  |

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1. General Product Information

1.1. EUT description

| | |
|-----------------------------------|--|
| Product Name | Smartphone |
| Model/Type reference | A30 |
| Hardware Version | G3320G-UF-Y1.1 |
| Software Version..... | CUBOT_E093C_A30_V01 |
| Operation Frequency..... | <p>For BT/BLE: 2402MHz~2480MHz</p> <p>For 2.4G WIFI:</p> <p>2412MHz~2472MHz (802.11b/802.11g/802.11n(HT20))</p> <p>2422MHz~2462MHz (802.11n(HT40))</p> <p>For 5G WIFI:</p> <p>5150MHz~5350MHz, 5470MHz~5725MHz,</p> <p>5725MHz~5875MHz</p> <p>For GNSS:</p> <p>GPS: 1.57542GHz</p> <p>Galileo: 1.561098 GHz</p> <p>GLONASS: 1.602GHz</p> <p>For GSM:</p> <p>E-GSM 900/GPRS 900:</p> <p>TX: 880MHz~915MHz; RX: 925MHz~960MHz</p> <p>GSM 1800/GPRS 1800:</p> <p>TX: 1710MHz~1785MHz; RX: 1805MHz~1880MHz</p> <p>For WCDMA:</p> <p>UTRA Band I: TX:1920MHz~1980MHz;</p> <p>RX: 2110MHz~2170MHz</p> <p>UTRA Band VIII: TX: 880MHz~915MHz;</p> <p>RX: 925MHz~960MHz</p> <p>For LTE:</p> <p>LTE Band 1: (UL)1920MHz~1980MHz,</p> <p>(DL)2110MHz~2170MHz</p> <p>LTE Band 3: (UL)1710MHz~1785MHz,</p> <p>(DL)1805MHz~1880MHz</p> <p>LTE Band 7: (UL)2500MHz~2570MHz,</p> <p>(DL)2620MHz~2690MHz</p> <p>LTE Band 8: (UL)880MHz~915MHz,</p> <p>(DL)925MHz~960MHz</p> <p>LTE Band 20: (UL)832MHz~862MHz,</p> <p>(DL)791MHz~821MHz</p> <p>LTE Band 28: (UL)703MHz~748MHz,</p> <p>(DL)758MHz~803MHz</p> |
| Modulation Type | <p>For BT: GFSK, $\pi/4$-DQPSK, 8DPSK</p> <p>For BLE: GFSK</p> <p>For 2.4G WIFI: DSSS(802.11b), OFDM (802.11g/802.11n)</p> |

| | |
|---------------------------|--|
| | <p>For 5G WIFI: 256QAM, 64QAM, 16QAM, BPSK, QPSK</p> <p>For GNSS:</p> <p>GPS: BPSK</p> <p>Galileo: BPSK</p> <p>GLONASS: FDMA</p> <p>For GSM:</p> <p>GSM/GPRS: GMSK</p> <p>For WCDMA: 16QAM for HSDPA and HSUPA</p> <p>For LTE: QPSK, 16-QAM</p> |
| Antenna Type | PIFA Antenna |
| Antenna Gain | <p>BT/BLE: 1.85dBi</p> <p>2.4G WIFI: 1.85dBi</p> <p>5G WIFI: -1.31dBi</p> <p>GNSS: 2.78dBi</p> <p>E-GSM 900/GPRS 900: -3.19dBi</p> <p>DCS-1800/GPRS 1800: -1.02dBi</p> <p>WCDMA Band I: -3.29dBi</p> <p>WCDMA Band VIII: -3.19dBi</p> <p>LTE band 1: -3.29dBi LTE band 3: -1.02dBi</p> <p>LTE band 7: -2.61dBi LTE band 8: -3.19dBi</p> <p>LTE band 20: -2.63dBi LTE band 28: -2.58Bi</p> |
| Rating(s) | <p>Adapter 1 Information:</p> <p>Model: HJ-0502000W2-EU</p> <p>Input: AC 100-240V, 50/60Hz, 0.3A</p> <p>Output: DC 5.0V, 2.0A, 10.0W</p> <p>Adapter 2 Information:</p> <p>Model: QZ-01001EA00</p> <p>Input: AC 100-240V, 50/60Hz, 0.3A</p> <p>Output: DC 5.0V, 2.0A, 10.0W</p> <p>Rechargeable Li-polymer Battery DC 3.87V</p> |

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

None.

2. Test Result Summary

| EMI Test | | | | |
|--|-------------------------------|---------------|-------------|--------|
| Test Item | Test Requirement | Test Method | Application | Result |
| Radiated Emission | ETSI EN301 489-1; EN 55032 | EN 55032 | Enclosure | PASS |
| Conducted Emission | ETSI EN301 489-1; EN 55032 | EN 55032 | AC port | PASS |
| Harmonic Current Emissions | ETSI EN301 489-1 | EN 61000-3-2 | AC port | N/A |
| Voltage Fluctuations and Flicker | ETSI EN301 489-1 | EN 61000-3-3 | AC port | PASS |
| EMS Test | | | | |
| ESD (Electrostatic Discharge) | ETSI EN301 489-1 | EN 61000-4-2 | Enclosure | PASS |
| Radiated Immunity | ETSI EN301 489-1 | EN 61000-4-3 | Enclosure | PASS |
| EFT (Electrical Fast Transients) | ETSI EN301 489-1 | EN 61000-4-4 | AC port | PASS |
| Surge Immunity | ETSI EN301 489-1 | EN 61000-4-5 | AC port | PASS |
| Injected Currents | ETSI EN301 489-1 | EN 61000-4-6 | AC port | PASS |
| Voltage Dips and Interruptions | ETSI EN301 489-1 | EN 61000-4-11 | AC port | PASS |
| transients and surges | ETSI EN301 489-1 | ISO 7637-2 | DC port | N/A |
| Note: 1. PASS: Test item meets the requirement. 2. N/A: Test case does not apply to the test object. 3. The test result judgment is decided by the limit of test standard. | | | | |

3. General Information

3.1. Test environment and mode

| Item | Normal condition |
|-----------------------|--|
| Temperature | +25°C |
| Voltage | AC 230V/50Hz |
| Humidity | 56% |
| Atmospheric Pressure: | 1008 mbar |
| Test Mode: | |
| TM1 | GSM 900 Link + BT + WIFI + GNSS + Charging |
| TM2 | GSM 1800 Link + BT + WIFI + GNSS + Charging |
| TM3 | GSM 900 Idle + BT + UNII + GNSS + Charging |
| TM4 | GSM 1800 Idle + BT + UNII + GNSS + Charging |
| TM5 | WCDMA I Link + BT + WIFI + GNSS + Charging |
| TM6 | WCDMA VIII Link + BT + WIFI + GNSS + Charging |
| TM7 | WCDMA I Idle + BT + UNII + GNSS + Charging |
| TM8 | WCDMA VIII Idle + BT + UNII + GNSS + Charging |
| TM9 | LTE 1 Link + BT + WIFI + GNSS + Charging |
| TM10 | LTE 3 Link + BT + WIFI + GNSS + Charging |
| TM11 | LTE 7 Link + BT + WIFI + GNSS + Charging |
| TM12 | LTE 8 Link + BT + WIFI + GNSS + Charging |
| TM13 | LTE 20 Link + BT + WIFI + GNSS + Charging |
| TM14 | LTE 28 Link + BT + WIFI + GNSS + Charging |
| TM15 | LTE 1 Idle + BT + UNII + GNSS + Charging |
| TM16 | LTE 3 Idle + BT + UNII + GNSS + Charging |
| TM17 | LTE 7 Idle + BT + UNII + GNSS + Charging |
| TM18 | LTE 8 Idle + BT + UNII + GNSS + Charging |
| TM19 | LTE 20 Idle + BT + UNII + GNSS + Charging |
| TM20 | LTE 28 Idle + BT + UNII + GNSS + Charging |
| Remark | The worst mode (Mode 3) reported only for Conducted emission test; |

The worst mode (Mode 1) reported only for Radiated emission
(30MHz-1GHz) test;

The worst mode (Mode 1) reported only for Radiated emission
(30MHz-1GHz) test.

The test data in this report is power supplied by adapter 1 which is in the
worse case.

3.2. 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.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| / | / | / | / | / |

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3.3. Test Instruments List

| Equipment | Manufacturer | Model No. | Serial No. | Cal. Due |
|---|--------------|---------------|--------------|------------|
| Disturbance voltage at mains terminals | | | | |
| EMI Test Receiver | R&S | ESCI3 | 100898 | 2025/06/26 |
| Line Impedance Stabilisation Newtork(LISN) | Schwarzbeck | NSLK 8126 | 8126453 | 2025/01/31 |
| Attenuator | N/A | 10dB | 164080 | 2025/06/26 |
| 844 Shielded room | SKET | 8m*4m*4m | CR4 | 2027/06/26 |
| Test software | EZ_EMCC | EMEC-3A1 | 1.1.4.2 | / |
| Disturbance voltage at telecommunication terminals | | | | |
| EMI Test Receiver | R&S | ESCI3 | 100898 | 2025/06/26 |
| Line Impedance Stabilisation Newtork(LISN) | Schwarzbeck | NSLK 8126 | 8126453 | 2025/01/31 |
| ISN | Schwarzbeck | CAT5 8158 | 151 | 2025/01/31 |
| ISN | Schwarzbeck | CAT3 8158 | 00191 | 2025/06/26 |
| ISN | Schwarzbeck | NTFM 8158 | 00334 | 2025/06/26 |
| 844 Shielded room | SKET | 8m*4m*4m | CR4 | 2027/06/26 |
| Test software | EZ_EMCC | EMEC-3A1 | 1.1.4.2 | / |
| Radiated emission (30 MHz to 1 GHz) | | | | |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | 2025/06/26 |
| EMI Test Receiver | R&S | ESIB7 | 100197 | 2025/06/26 |
| Pre-amplifier | HP | 8447D | 2727A05017 | 2025/06/26 |
| #3 3m Anechoic Chamber | SKET | 9m*6m*6m | SA03 | 2027/05/29 |
| Test software | EZ_EMCC | FA-03A2 RE+ | 1.1.4.2 | / |
| Radiated emission (1 GHz to 6 GHz) | | | | |
| Horn Antenna | Schwarzbeck | BBHA 9120 D | 02372 | 2025/02/02 |
| Signal Analyzer | R&S | FSQ40 | 200061 | 2025/06/26 |
| Pre-amplifier | SKET | LNPA_0118G-45 | SK2021012102 | 2025/01/31 |
| #3 3m Anechoic Chamber | SKET | 9m*6m*6m | SA03 | 2027/05/29 |
| Test software | EZ_EMCC | FA-03A2 RE+ | 1.1.4.2 | / |

Harmonic current emissions & Voltage Fluctuations and Flicker

| | | | | |
|---------------------------|---------|--------------|-----------|------------|
| AC Power Supply | KIKUSUI | PCR4000M | UC002552 | 2025/01/31 |
| Harmonic/Flicker Analyzer | KIKUSUI | KHA1000 | UD002324 | 2025/06/26 |
| Line Impedance Network | KIKUSUI | LIN1020JF | UC001738 | 2025/06/26 |
| Test software | KIKUSUI | HarmoCapture | V3.9.1.00 | / |

Electrostatic discharge immunity (ESD)

| | | | | |
|-----------------------------------|--------|---------|--------------------|------------|
| Electrostatic Discharge Generator | 3ctest | EDS 30T | ES031000122 077 | 2025/07/02 |
|-----------------------------------|--------|---------|--------------------|------------|

Radiated, radio-frequency, electromagnetic field immunity (RS)

| | | | | |
|----------------------|---------|---------------------|------------|------------|
| Antenna | SKET | STLP 9129_Plus | / | / |
| Signal Generator | Agilent | N5181A | MY50141997 | 2025/01/31 |
| Amplifier | SKET | HAP_80M01G -250W | 202105183 | 2025/06/26 |
| Amplifier | SKET | HAP_01G06G -80W | 202305501 | 2025/06/26 |
| Field Probe | Narda | EP-601 | 811ZX01057 | 2025/06/28 |
| USB Power Sensor | Agilent | U2000A | MY53410013 | 2025/01/31 |
| USB Power Sensor | Agilent | U2001A | MZ54330012 | 2025/01/31 |
| 743 Anechoic Chamber | SKET | 7m*4m*3m | SA04 | 2025/03/02 |
| Test software | SKET | EMC-S | 3.1.3.2 | / |

Electrical fast transient/burst immunity (EFT/B)

| | | | | |
|--------------------------------|-------|------------|------------|------------|
| Fast Transient Burst Simulator | Prima | EFT61004BG | PR12074375 | 2025/06/26 |
| Capacitive Coupling folder | Prima | EFT-CLAMP | / | 2025/06/26 |

Surge immunity

| | | | | |
|---------------------------|-------|------------|------------|------------|
| Lightning Surge Generator | Prima | SUG61005BG | PR12125534 | 2025/06/26 |
|---------------------------|-------|------------|------------|------------|

Immunity to conducted disturbances, induced by radio-frequency fields (CS)

| | | | | |
|--------------------------------|----------|-------------------|-------------------|------------|
| Conducted Immunity Test System | Schloder | CDG-6000-75 | 126B1290/201 4 | 2025/06/26 |
| CDN | Schloder | CDN M2+M3-16 | A2210281/201 4 | 2025/06/26 |
| CDN | Prima | CRF-CDN-TR J45 | PR230681112 | 2025/06/26 |
| EM-Clamp | Schloder | EMCL-20 | 132A1194/201 4 | 2025/06/26 |

| | | | | |
|---|--------|-----------------|------------|------------|
| RF Attenuator | PE | 75W 6dB | N/A | 2025/06/26 |
| Test software | HUBERT | IEC/EN61000-4-6 | V 1.5 | / |
| Voltage dips, short interruptions and voltage variations immunity (DIPS) | | | | |
| Cycle Sag Simulator | Prima | DRP61011AG | PR12106201 | 2025/06/26 |
| Other | | | | |
| Wideband Radio Communication Tester | CMW500 | R&S | 165017 | 2025/01/31 |

4. Facilities and Accreditations

4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Innovation, Science and Economic Development Canada for radio equipment testing.

4.2. Location

Shenzhen TCT Testing Technology Co., Ltd.

Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

4.3. Measurement Uncertainty

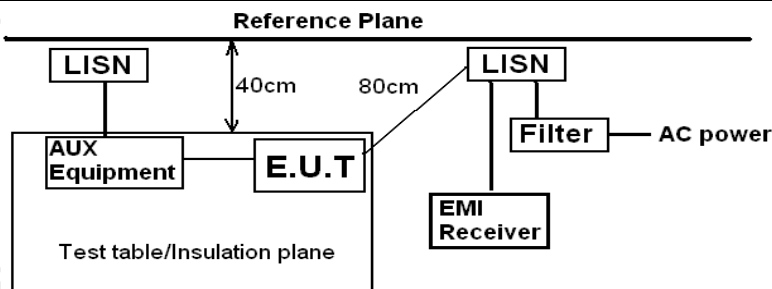
The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

| No. | Item | MU |
|-----|---|---------------------------|
| 1 | Temperature | $\pm 0.1^{\circ}\text{C}$ |
| 2 | Humidity | $\pm 1.0 \%$ |
| 3 | Spurious Emissions, Conducted | $\pm 3.10 \text{ dB}$ |
| 4 | All Emissions, Radiated (30 MHz to 1 GHz) | $\pm 4.56 \text{ dB}$ |
| 5 | All Emissions, Radiated (1 GHz to 6 GHz) | $\pm 4.22 \text{ dB}$ |

5. Emission Test

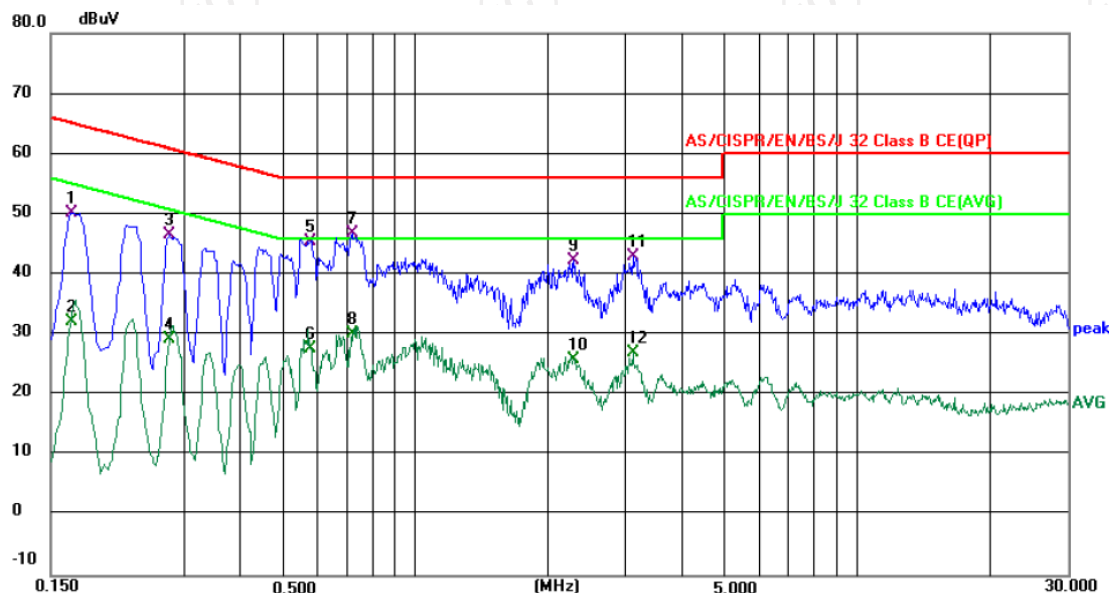
5.1. Conducted Emission

5.1.1. Test Specification

| | | | |
|--|---|--------------|-----------|
| Test Requirement: | ETSI EN 301 489-1; EN 55032 | | |
| Test Method: | EN 55032 | | |
| Test Frequency Range: | 150kHz to 30MHz | | |
| Class / Severity: Class B | Class B | | |
| Receiver Setup: | RBW=9kHz, VBW=30kHz | | |
| Limit: | Frequency range (MHz) | Limit (dBuV) | |
| | | Quasi-peak | Average |
| | 0.15-0.5 | 66 to 56* | 56 to 46* |
| | 0.5-5 | 56 | 46 |
| | 5-30 | 60 | 50 |
| * Decreases with the logarithm of the frequency. | | | |
| Test Setup: |  <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p> | | |
| Test Procedure | <p>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.</p> | | |
| Test Instrument: | Refer to section 3.3 for details | | |
| Test Mode: | Refer to section 3.1 for details | | |
| Test Results: | PASS | | |

5.1.2. Test Data

Please refer to following diagram for individual
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room

Phase: L1

Temperature: 25.3 (°C)

Humidity: 52 %

Limit: AS/CISPR/EN/BS/J 32 Class B CE(QP)

Power: AC 230 V/50 Hz

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | | |
|-----|-----|--------|---------------|----------------|-------------|-------|--------|----------|---------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1660 | 40.58 | 9.66 | 50.24 | 65.16 | -14.92 | QP | |
| 2 | | 0.1660 | 22.42 | 9.66 | 32.08 | 55.16 | -23.08 | AVG | |
| 3 | | 0.2779 | 36.95 | 9.66 | 46.61 | 60.88 | -14.27 | QP | |
| 4 | | 0.2779 | 19.65 | 9.66 | 29.31 | 50.88 | -21.57 | AVG | |
| 5 | | 0.5792 | 35.15 | 10.26 | 45.41 | 56.00 | -10.59 | QP | |
| 6 | | 0.5792 | 17.53 | 10.26 | 27.79 | 46.00 | -18.21 | AVG | |
| 7 | * | 0.7217 | 36.44 | 10.41 | 46.85 | 56.00 | -9.15 | QP | |
| 8 | | 0.7217 | 19.69 | 10.41 | 30.10 | 46.00 | -15.90 | AVG | |
| 9 | | 2.2940 | 32.44 | 9.88 | 42.32 | 56.00 | -13.68 | QP | |
| 10 | | 2.2940 | 16.08 | 9.88 | 25.96 | 46.00 | -20.04 | AVG | |
| 11 | | 3.1218 | 33.03 | 9.98 | 43.01 | 56.00 | -12.99 | QP | |
| 12 | | 3.1218 | 17.01 | 9.98 | 26.99 | 46.00 | -19.01 | AVG | |

Note:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

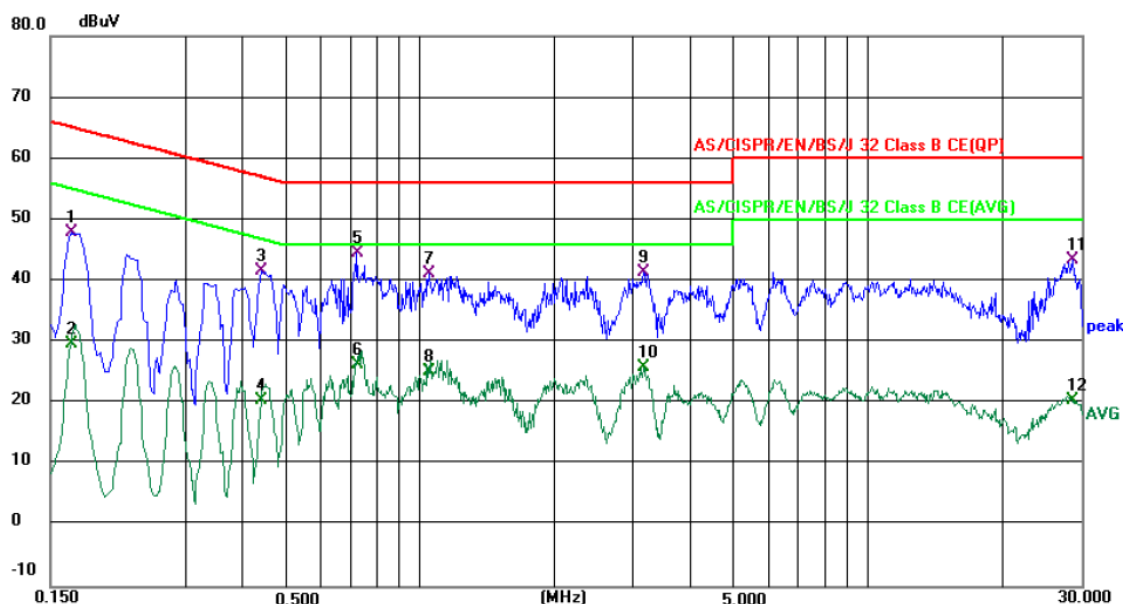
Margin (dB) = Measurement (dBuV) – Limits (dBuV)

Q.P. =Quasi-Peak

AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room

Phase: L1

Temperature: 25.3 (°C)

Humidity: 52 %

Limit: AS/CISPR/EN/BS/J 32 Class B CE(QP)

Power: AC 230 V/50 Hz

| No. Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|---------|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | 0.1660 | 38.18 | 9.66 | 47.84 | 65.16 | -17.32 | QP | |
| 2 | 0.1660 | 20.11 | 9.66 | 29.77 | 55.16 | -25.39 | AVG | |
| 3 | 0.4420 | 31.54 | 10.10 | 41.64 | 57.02 | -15.38 | QP | |
| 4 | 0.4420 | 10.35 | 10.10 | 20.45 | 47.02 | -26.57 | AVG | |
| 5 * | 0.7259 | 34.13 | 10.42 | 44.55 | 56.00 | -11.45 | QP | |
| 6 | 0.7259 | 15.96 | 10.42 | 26.38 | 46.00 | -19.62 | AVG | |
| 7 | 1.0540 | 30.43 | 10.79 | 41.22 | 56.00 | -14.78 | QP | |
| 8 | 1.0540 | 14.38 | 10.79 | 25.17 | 46.00 | -20.83 | AVG | |
| 9 | 3.1700 | 31.47 | 9.99 | 41.46 | 56.00 | -14.54 | QP | |
| 10 | 3.1700 | 15.86 | 9.99 | 25.85 | 46.00 | -20.15 | AVG | |
| 11 | 28.7100 | 32.61 | 10.80 | 43.41 | 60.00 | -16.59 | QP | |
| 12 | 28.7100 | 9.73 | 10.80 | 20.53 | 50.00 | -29.47 | AVG | |

Note:

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV)

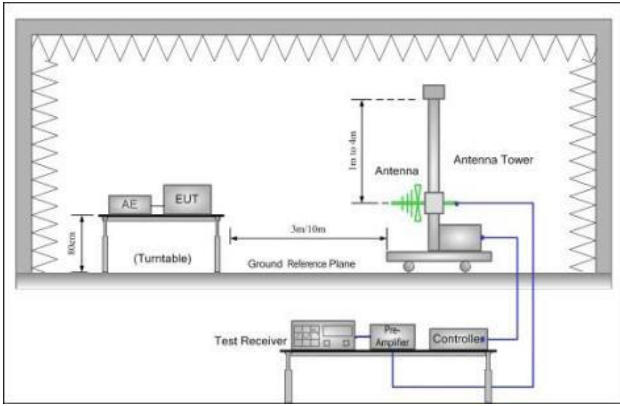
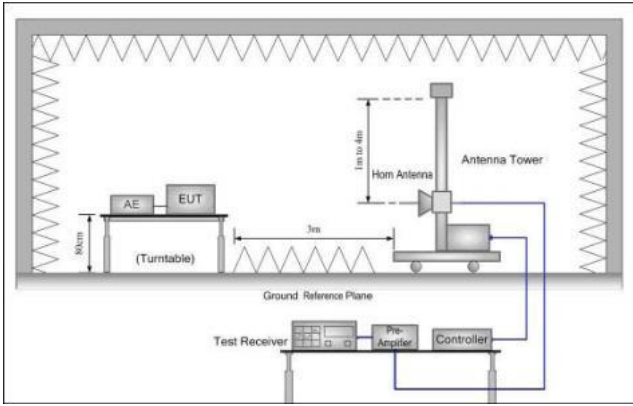
Q.P. =Quasi-Peak

AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

5.2. Radiated Emission

5.2.1. Test Specification

| | | | | | |
|-----------------------|--|-----------------|--------------------|--------------|-----------------------------|
| Test Requirement: | ETSI EN 301 489-1; EN 55032 | | | | |
| Test Method: | EN 55032 | | | | |
| Test Frequency Range: | 30MHz to 6GHz | | | | |
| Test Site: | Measurement Distance: 3m | | | | |
| Receiver Setup: | Frequency | Detector | RBW | VBW | Remark |
| | 30MHz-1GHz | Quasi-peak | 120KHz | 300KHz | Quasi-peak Value |
| | Above 1GHz | Peak Average | 1MHz 1MHz | 3MHz 10Hz | Peak Value Average Value |
| Limit: | Frequency | | Limit (dBuV/m @3m) | | Remark |
| | 30MHz-230MHz | | 40.0 | | Quasi-peak Value |
| | 230MHz-1GHz | | 47.0 | | Quasi-peak Value |
| | 1GHz-6GHz | | 54.0 74.0 | | Average Value Peak Value |
| Test Setup: | Below 1GHz | | | | |
| |  | | | | |
| | Above 1GHz | | | | |
| Test Setup: |  | | | | |
| | For 3m distance description: | | | | |

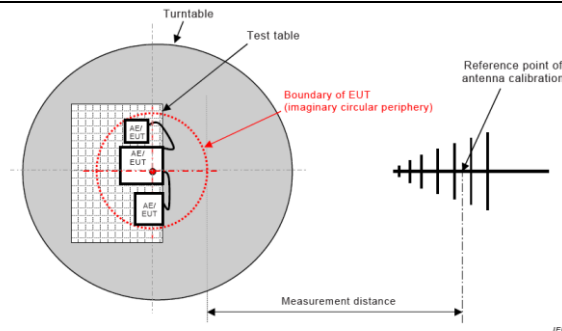


Figure C.1 – Measurement distance

Test Procedure:

From 30MHz to 1GHz:

1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

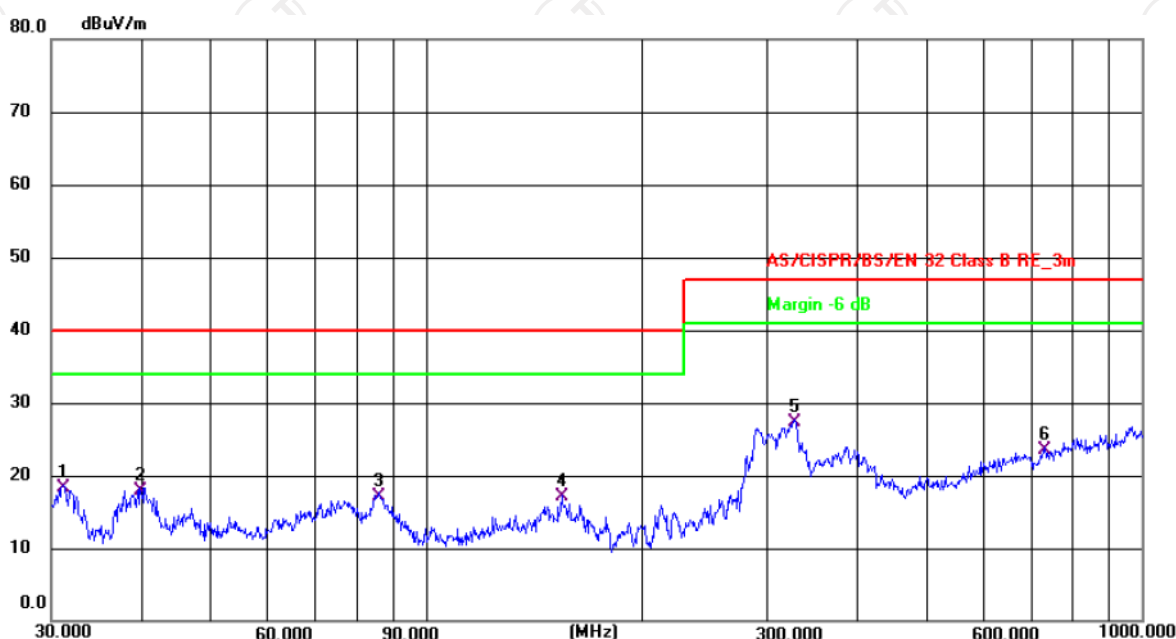
Above 1GHz:

1. The radiated emissions test was conducted in a fully-anechoic chamber.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT.
4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

| | |
|------------------|----------------------------------|
| Test Instrument: | Refer to section 3.3 for details |
| Test Mode: | Refer to section 3.1 for details |
| Test Results: | PASS |

5.2.2. Test Data

Radiated Emission In Horizontal (30MHz----1000MHz)



Site 3m Anechoic Chamber2

Polarization: **Horizontal**

Temperature: 24.8(C)

Humidity: 52 %

Limit: AS/CISPR/BS/EN 32 Class B RE_3m

Power: AC 230 V/50 Hz

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1 | 31.1797 | 37.69 | -19.48 | 18.21 | 40.00 | -21.79 | QP | P | |
| 2 | 39.8542 | 36.22 | -18.37 | 17.85 | 40.00 | -22.15 | QP | P | |
| 3 | 85.8983 | 39.66 | -22.53 | 17.13 | 40.00 | -22.87 | QP | P | |
| 4 | 154.8204 | 34.01 | -16.99 | 17.02 | 40.00 | -22.98 | QP | P | |
| 5 * | 327.8872 | 44.82 | -17.48 | 27.34 | 47.00 | -19.66 | QP | P | |
| 6 | 731.9202 | 31.48 | -8.07 | 23.41 | 47.00 | -23.59 | QP | P | |

Note:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

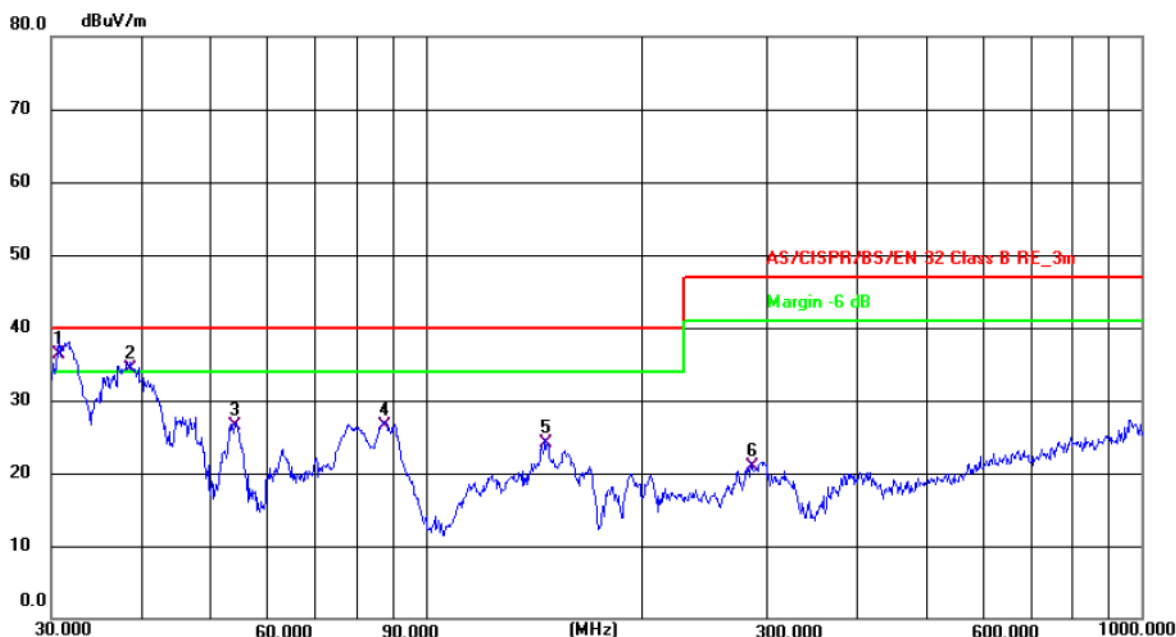
Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) – Limits (dBuV)

* is meaning the worst frequency has been tested in the test frequency range

Radiated Emission In Vertical (30MHz----1000MHz)



Site 3m Anechoic Chamber2

Polarization: **Vertical**

Temperature: 24.8(C) Humidity: 52 %

Limit: AS/CISPR/BS/EN 32 Class B RE_3m

Power: AC 230 V/50 Hz

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1 * | 30.7454 | 55.84 | -19.54 | 36.30 | 40.00 | -3.70 | QP | P | |
| 2 ! | 38.6160 | 52.82 | -18.56 | 34.26 | 40.00 | -5.74 | QP | P | |
| 3 | 54.0710 | 45.40 | -18.99 | 26.41 | 40.00 | -13.59 | QP | P | |
| 4 | 87.4176 | 48.85 | -22.30 | 26.55 | 40.00 | -13.45 | QP | P | |
| 5 | 146.8876 | 41.71 | -17.53 | 24.18 | 40.00 | -15.82 | QP | P | |
| 6 | 284.9767 | 38.56 | -17.62 | 20.94 | 47.00 | -26.06 | QP | P | |

Note:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

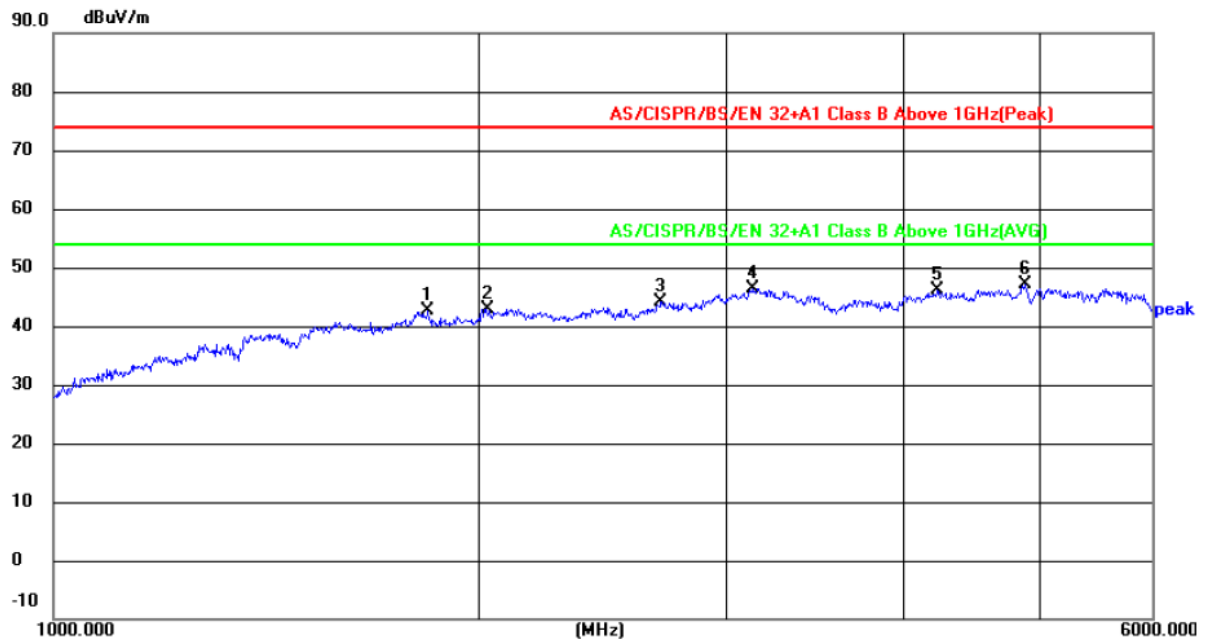
Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) - Limits (dBuV)

* is meaning the worst frequency has been tested in the test frequency range

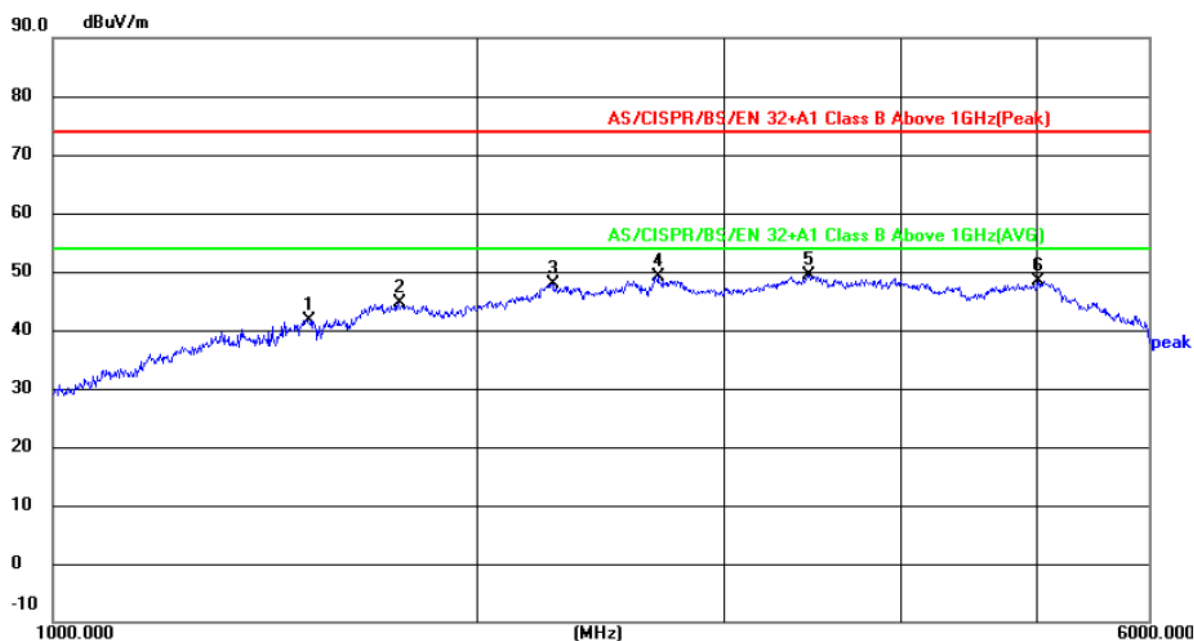
Radiated Emission In Horizontal (1000MHz----6000MHz)



Site: 3m Anechoic Chamber Polarization: **Horizontal** Temperature: 25.3(°C) Humidity: 50 %
 Limit: AS/CISPR/BS/EN 32+A1 Class B Above 1GHz(Peak) Power: AC 230 V/50 Hz

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1 | 1845.447 | 62.14 | -19.58 | 42.56 | 74.00 | -31.44 | peak | P | |
| 2 | 2025.898 | 61.20 | -18.22 | 42.98 | 74.00 | -31.02 | peak | P | |
| 3 | 2696.240 | 60.00 | -15.92 | 44.08 | 74.00 | -29.92 | peak | P | |
| 4 | 3132.491 | 61.98 | -15.56 | 46.42 | 74.00 | -27.58 | peak | P | |
| 5 | 4233.981 | 58.41 | -12.36 | 46.05 | 74.00 | -27.95 | peak | P | |
| 6 * | 4886.243 | 57.25 | -10.13 | 47.12 | 74.00 | -26.88 | peak | P | |

Radiated Emission In Vertical (1000MHz----6000MHz)



Site: 3m Anechoic Chamber Polarization: **Vertical** Temperature: 25.3(°C) Humidity: 50 %

Limit: AS/CISPR/BS/EN 32+A1 Class B Above 1GHz(Peak)

Power: AC 230 V/50 Hz

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1 | 1520.672 | 61.81 | -20.06 | 41.75 | 74.00 | -32.25 | peak | P | |
| 2 | 1758.505 | 64.29 | -19.71 | 44.58 | 74.00 | -29.42 | peak | P | |
| 3 | 2267.312 | 64.49 | -16.66 | 47.83 | 74.00 | -26.17 | peak | P | |
| 4 | 2689.807 | 65.13 | -15.99 | 49.14 | 74.00 | -24.86 | peak | P | |
| 5 * | 3447.838 | 64.60 | -15.27 | 49.33 | 74.00 | -24.67 | peak | P | |
| 6 | 5007.970 | 58.07 | -9.73 | 48.34 | 74.00 | -25.66 | peak | P | |

Note:

Any value more than 10dB below limit have not been specifically reported.

5.3. Harmonic Current Emissions

| | |
|---------------------|--|
| Test Result: | Not applicable (The Max rated power of EUT is less than 75W) |
|---------------------|--|

5.4. Flicker and Voltage Fluctuation

5.4.1. Test Specification

| | |
|--------------------------|----------------------------------|
| Test Requirement: | ETSI EN 301 489-1 |
| Test Method: | EN 61000-3-3 |
| Test Mode: | Refer to Section 3.3 for Details |
| Test conclusion: | Refer to Section 3.1 for Details |
| Test result: | PASS |

Test Plot as Following:

Test Data of Voltage Fluctuation and Flicker

| | |
|----------------------|-------|
| Final Test Result | Pass |
| Nominal Voltage | 230 V |
| Nominal Frequency | 50 Hz |
| Plt Test Duration | 600 s |
| Flicker Margin | 100 % |
| d Measurement Margin | 100 % |

| Segment | Pst | dmax(%) | dc(%) | Tmax(ms) | Judge |
|---------|-------|---------|-------|----------|-------|
| Limit | 1.000 | 4.000 | 3.300 | 500 | |
| Seg. 1 | 0.007 | 0.035 | 0.004 | 0 | Pass |

| Plt | Value | Judge |
|-------------|-------|-------|
| Limit | 0.650 | |
| Measurement | 0.003 | Pass |

6. Immunity Test

6.1. Performance Criteria

Performance Criteria of ETSI EN 301 489-1, sub clause 6

| Criteria | Performance Criteria |
|----------|---|
| CT/CR | During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. |
| TT/TR | After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. |

Performance Criteria of ETSI EN 301 489-3, sub clause 6

| Criteria | Performance Criteria |
|----------|--|
| CT/CR | <p>For equipment with primary function type I or II including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable device type as given in clause 6.3 shall apply. For equipment with primary function 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.</p> <p>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.</p> <p>Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.</p> |
| TT/TR | <p>For equipment with primary function type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable device type as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.</p> <p>For equipment with primary function type II or 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.</p> <p>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.</p> <p>Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.</p> |

Performance Criteria of ETSI EN 301 489-17, sub clause 6

| Criteria | Performance Criteria |
|----------|---|
| CT/CR | The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or Not acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted. |
| TT/TR | The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted. |

Performance Criteria of ETSI EN 301 489-19, sub clause 6

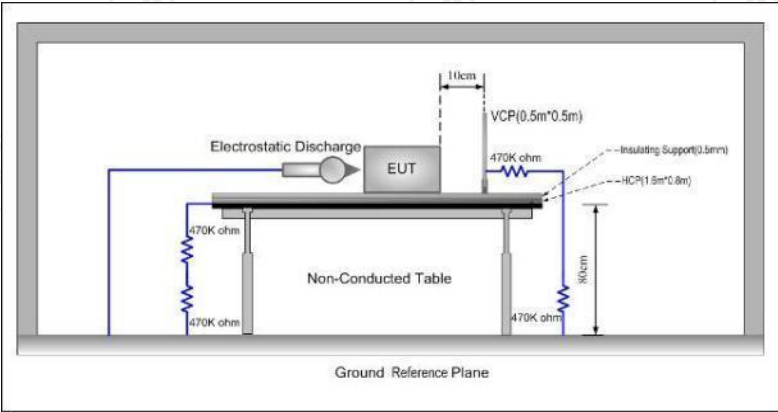
| Criteria | Performance Criteria |
|----------|---|
| CT/CR | The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or Not acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted. |
| TT/TR | The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted. |

Performance Criteria of ETSI EN 301 489-52, sub clause 6

| Criteria | Performance Criteria |
|----------|--|
| CT/CR | <p>A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.2 to 4.2.5. During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).</p> <p>NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.</p> <p>At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.</p> |
| TT/TR | <p>A communications link shall be established at the start of the test, see clauses 4.2.2 to 4.2.5.</p> <p>At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.</p> <p>At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.</p> <p>In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.</p> |

6.2. Electrostatic Discharge

6.2.1. Test Specification

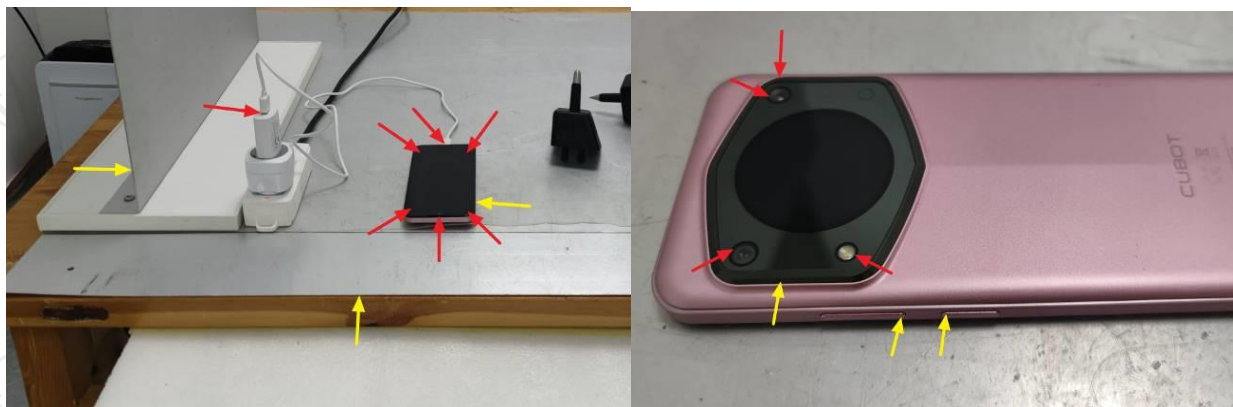
| | |
|-----------------------------|---|
| Test Requirement: | ETSI EN 301489-1 |
| Test Method: | EN 61000-4-2 |
| Discharge Voltage: | Contract Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$ Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ HCP/VCP: $\pm 2\text{kV}$, $\pm 4\text{kV}$ |
| Polarity: | Positive & Negative |
| Number of Discharge: | Contact Discharge: Minimum 25 times at each test point, Air Discharge: Minimum 10 times at each test point. |
| Discharge Mode: | Single Discharge |
| Discharge Period: | 1 second minimum |
| Test Setup: |  |
| Test Procedure: | <p>1) Air discharge: The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed</p> <p>2) Contact Discharge: The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.</p> <p>3) Indirect discharge for horizontal coupling plane At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit 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. Consideration should be given to exposing all sides of the EUT.</p> |

| | |
|-------------------------|--|
| | 4) Indirect discharge for vertical coupling plane At least 10 single discharges were applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated. |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Results: | PASS |

6.2.2. Test data

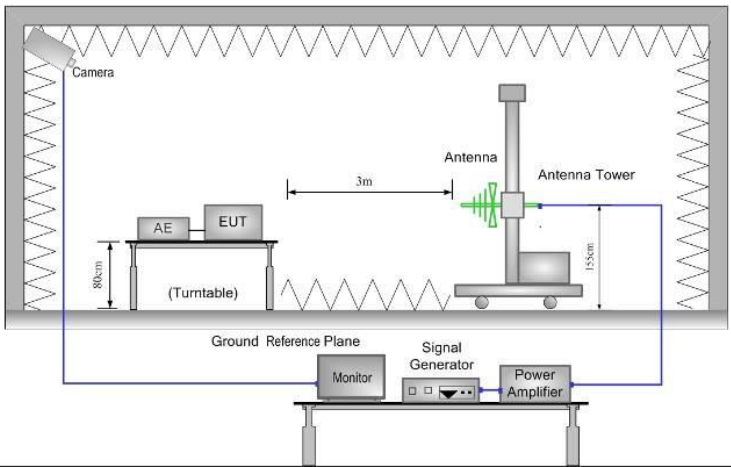
| | | | | |
|------------------------|--|-------------------|-----------------------|--------|
| Test points: | I: Please refer to red arrows as below plots | | | |
| | II: Please refer to yellow arrows as below plots | | | |
| Air Discharge | | | | |
| Discharge Voltage (KV) | Type of discharge | Test points | Observation Criterion | Result |
| $\pm 2, \pm 4$ | Contact | II | A | PASS |
| $\pm 2, \pm 4, \pm 8$ | Air | I | A | PASS |
| Indirect Discharge | | | | |
| Discharge Voltage (KV) | Type of discharge | Test points | Observation Criterion | Result |
| $\pm 2, \pm 4$ | HCP-Bottom/Top/ Front/Back/Left/ Right | Edge of the HCP | A | PASS |
| $\pm 2, \pm 4$ | VCP-Front/Back/ Left/Right | Centre of the VCP | A | PASS |

Test point as follows:



6.3. Radio-frequency Electromagnetic Field Amplitude Modulated (RS)

6.3.1. Test Specification

| | |
|--------------------------|--|
| Test Requirement: | ETSI EN 301 489-1 |
| Test Method: | EN 61000-4-3 |
| Frequency Range: | 80MHz to 6.0GHz |
| Test Level: | 3V/m |
| Modulation: | 80%, 1kHz Amplitude Modulation |
| Test Setup: |  |
| Test Procedure: | <ol style="list-style-type: none"> 1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate centre of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceeding 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. |

| | |
|-------------------------|---|
| | <p>6. The test normally was performed with the generating antenna facing each side of the EUT.</p> <p>7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.</p> <p>The EUT was performed in a configuration to actual installation conditions, a video camera and/or audio monitor were used to monitor the performance of the EUT.</p> |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Result: | PASS |

6.3.2. Test data

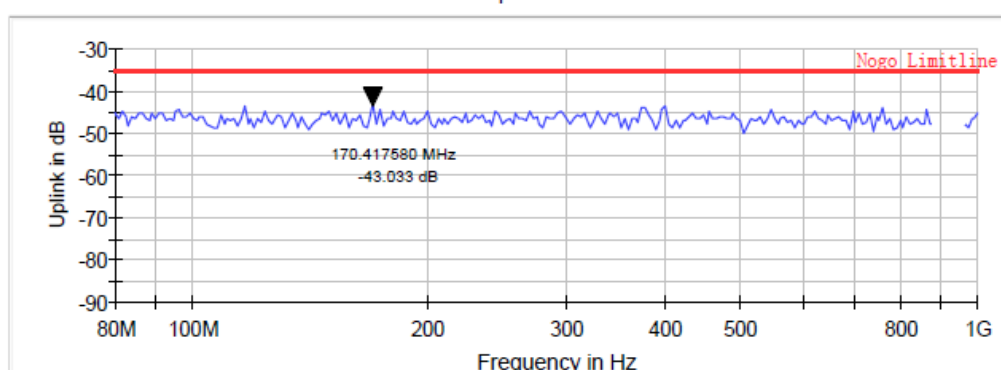
| Frequency | Level | Modulation | Antenna Polarization | EUT Face | Observation Criterion |
|--------------|-------|--|----------------------|----------|-----------------------|
| 80MHz-6.0GHz | 3 V/m | 1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3 seconds | V | Front | A |
| | | | H | | |
| | | | V | Rear | |
| | | | H | | |
| | | | V | Left | |
| | | | H | | |
| | | | V | Right | |
| | | | H | | |
| | | | V | Top | |
| | | | H | | |
| | | | V | Bottom | |
| | | | H | | |

Remark: Only the worst mode plots are shown and the PER for BT and WIFI has been monitored is 0.26% and 0.43%.

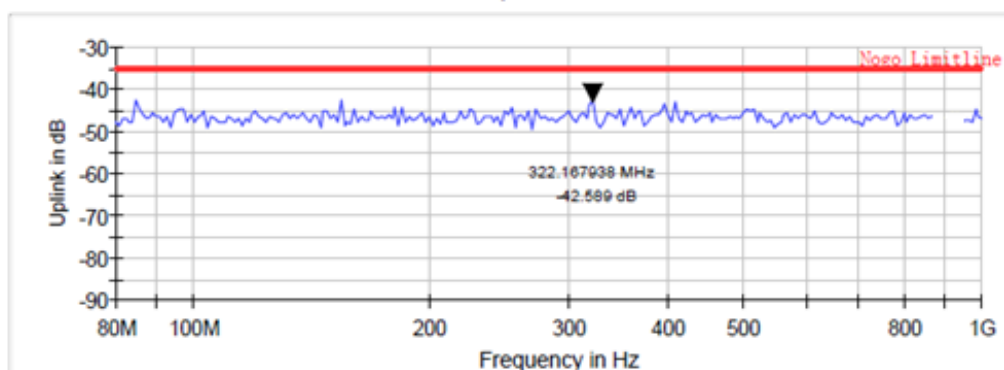
Data of below 1G:

| EUT operating Mode | | Polarity | Max. value | Frequency (MHz) | Result |
|--------------------|------------|----------|------------|-----------------|--------|
| GSM 900 | Uplink | H | -43.03 | 170.42 | PASS |
| | | V | -42.59 | 322.17 | |
| | Downlink | H | -66.67 | 509.17 | |
| | | V | -67.36 | 345.41 | |
| | RX Quality | H | 0 | 1000 | |
| | | V | 0 | 1000 | |

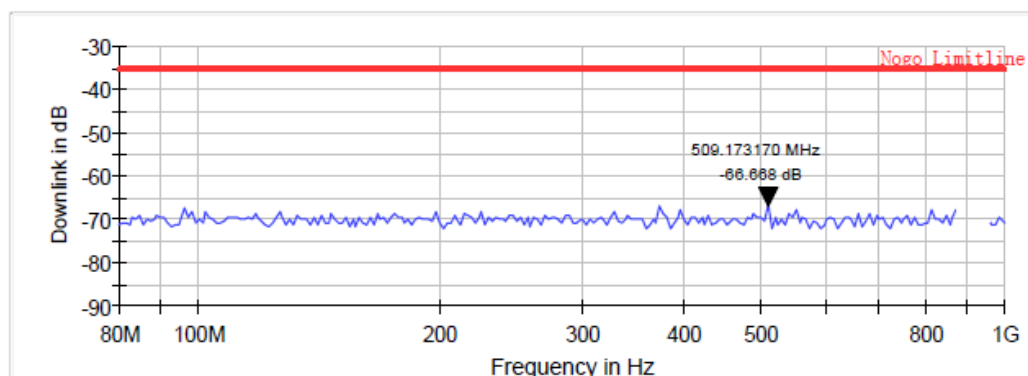
Uplink



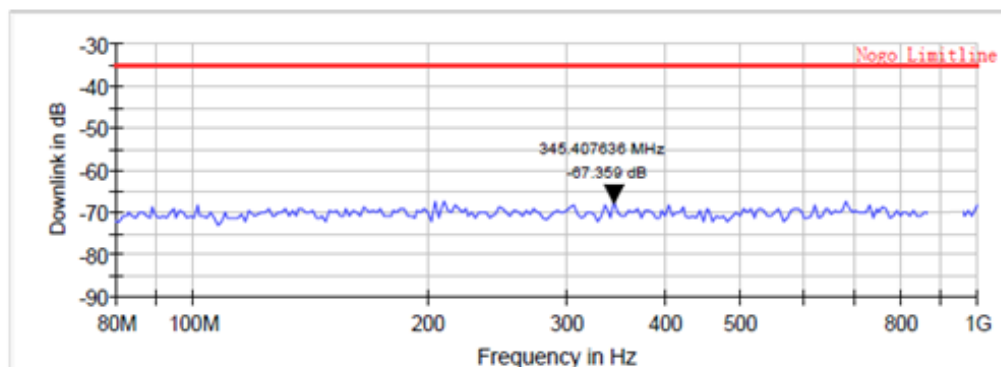
Uplink



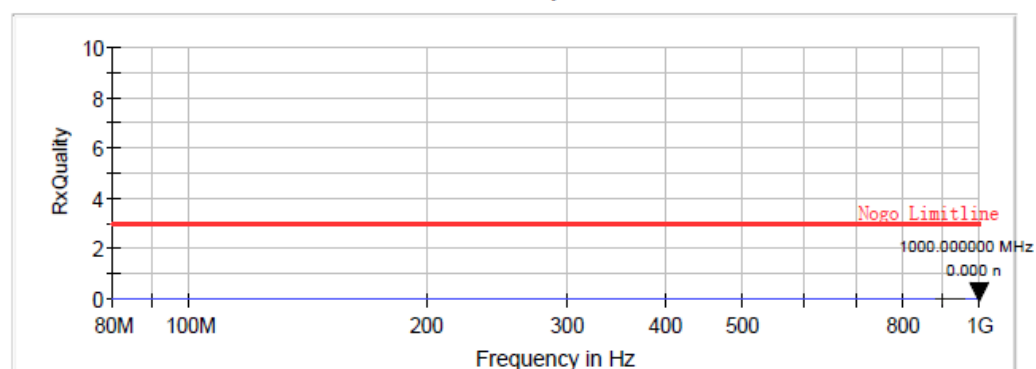
Downlink



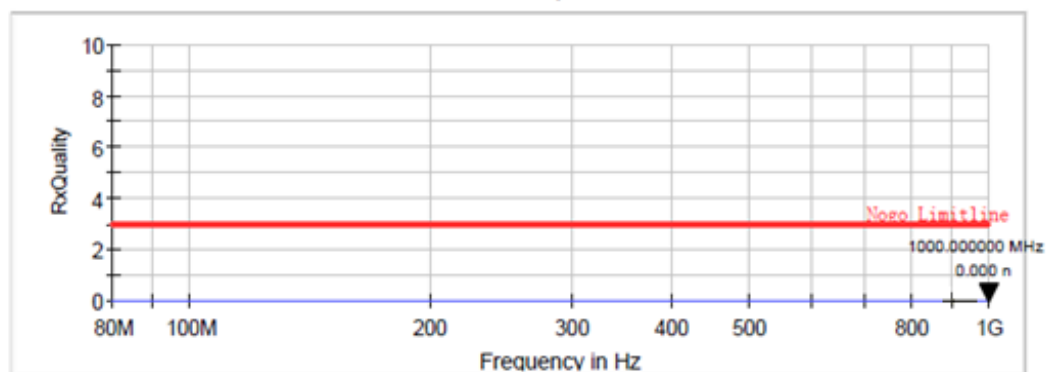
Downlink



RxQuality



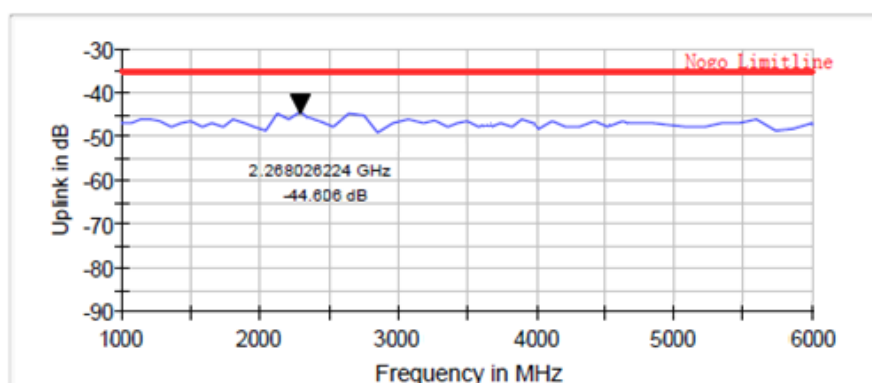
RxQuality



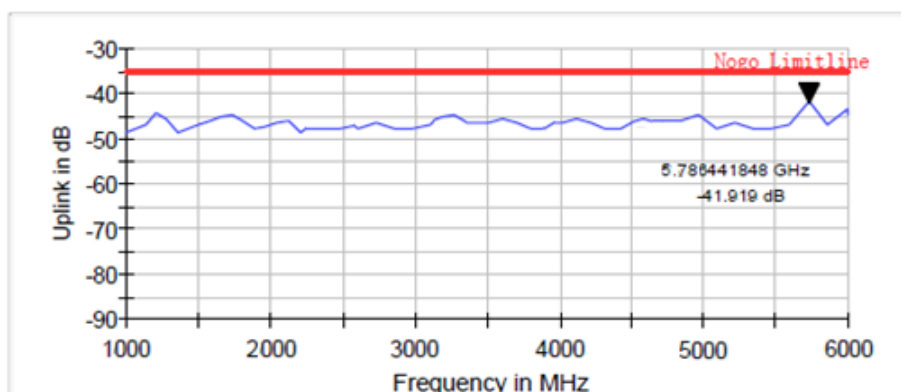
Data of above 1G:

| EUT operating Mode | | Polarity | Max. value | Frequency (MHz) | Result |
|--------------------|------------|----------|------------|-----------------|--------|
| GSM 900 | Uplink | H | -44.61 | 2268.03 | PASS |
| | | V | -41.92 | 5786.44 | |
| | Downlink | H | -66.72 | 2904.41 | |
| | | V | -65.67 | 1819.93 | |
| | RX Quality | H | 0 | 6000 | |
| | | V | 0 | 6000 | |

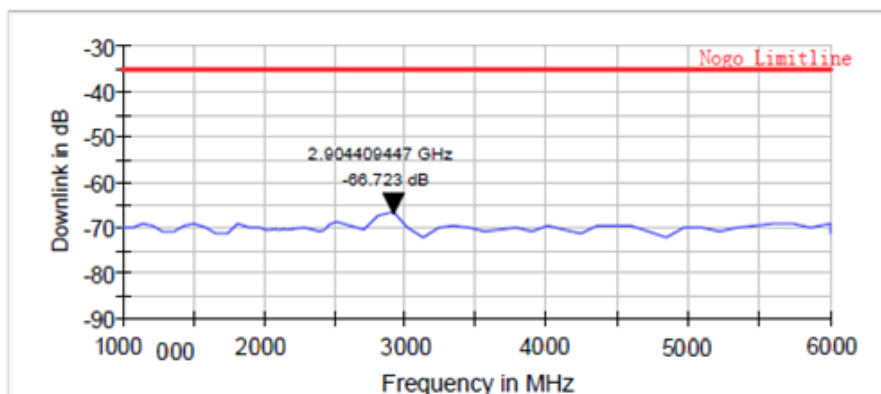
Uplink



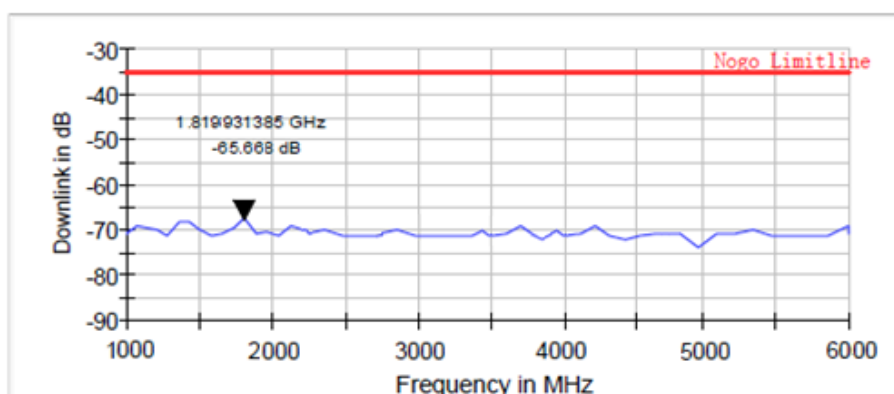
Uplink



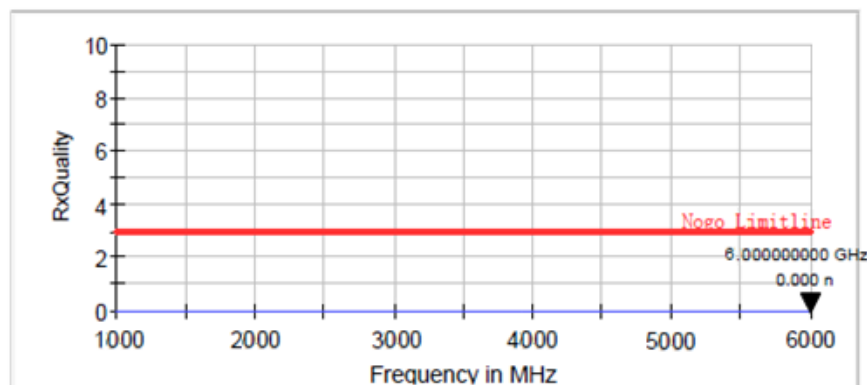
Downlink



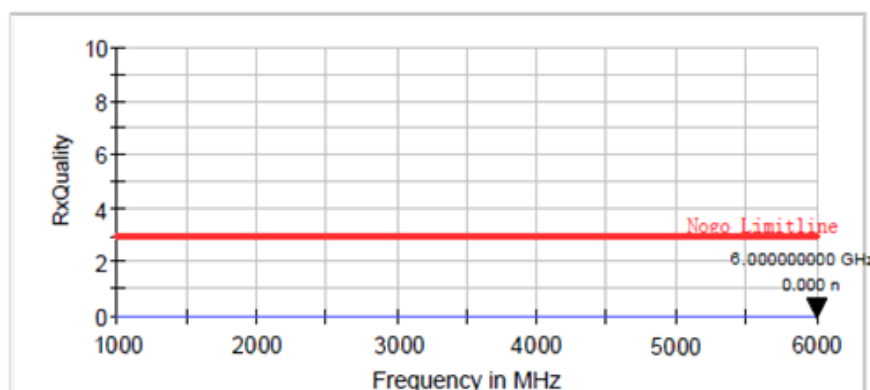
Downlink



RxQuality



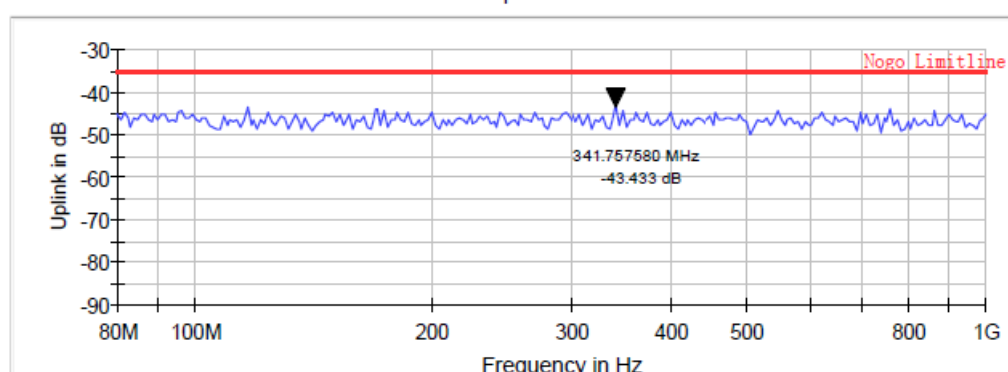
RxQuality



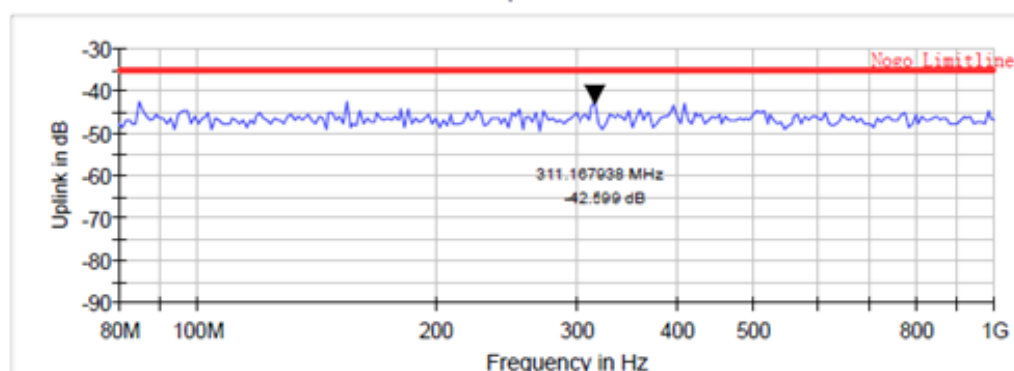
Data of below 1G:

| EUT operating Mode | | Polarity | Max. value | Frequency (MHz) | Result |
|--------------------|------------|----------|------------|-----------------|--------|
| WCDMA I | Uplink | V | -43.43 | 341.76 | PASS |
| | | H | -42.60 | 311.17 | |
| | Downlink | V | -66.87 | 307.37 | |
| | | H | -67.96 | 365.41 | |
| | RX Quality | V | 0 | 1000 | |
| | | H | 0 | 1000 | |

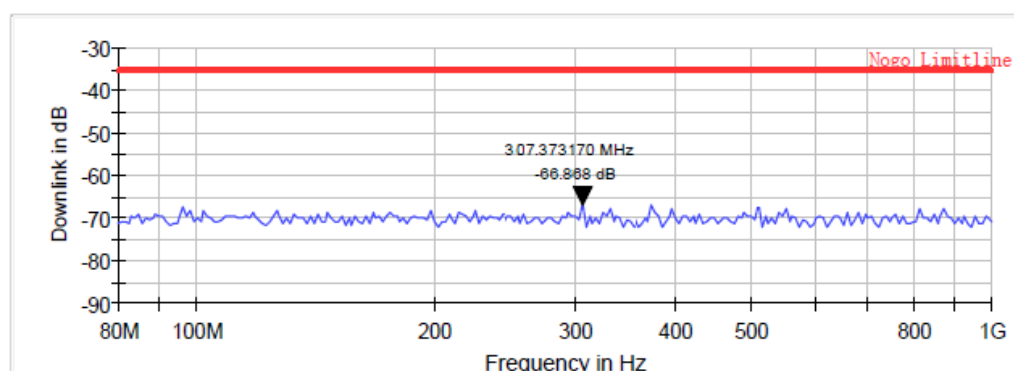
Uplink



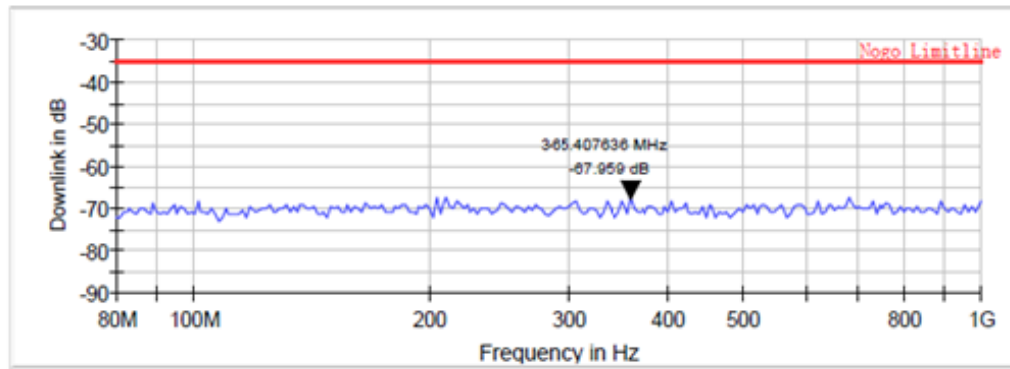
Uplink



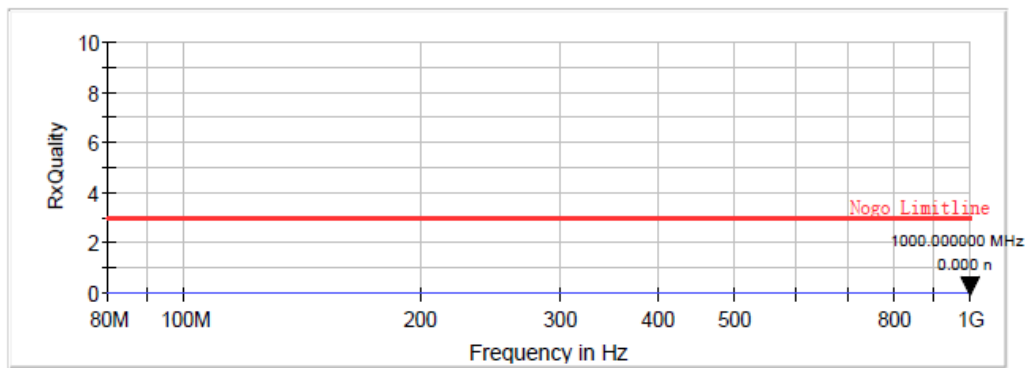
Downlink



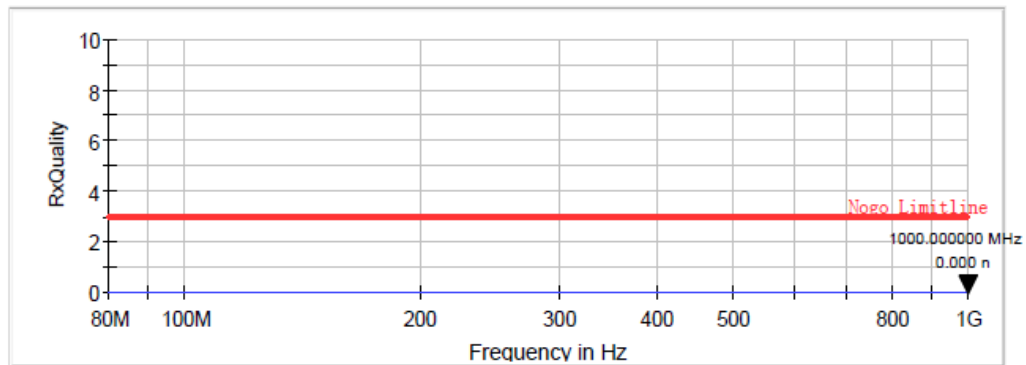
Downlink



RxQuality



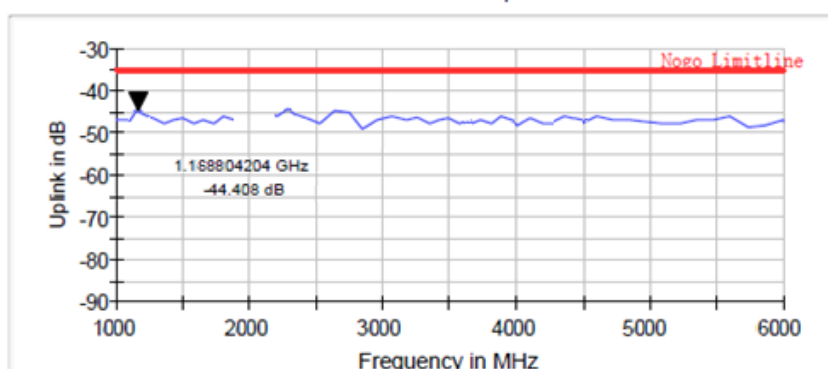
RxQuality



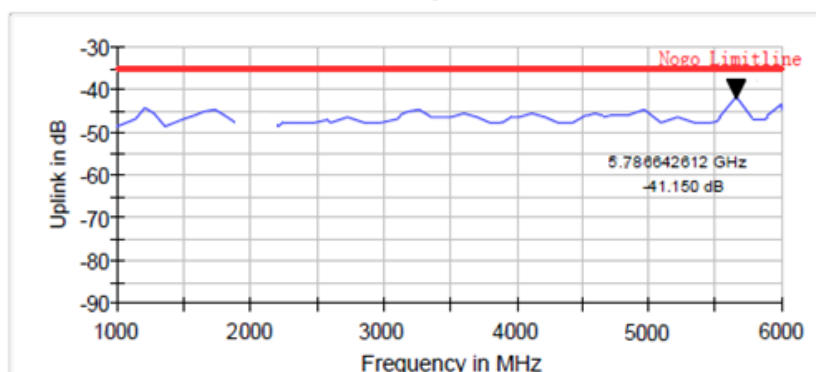
Data of above 1G:

| EUT operating Mode | | Polarity | Max. value | Frequency (MHz) | Result |
|--------------------|------------|----------|------------|-----------------|--------|
| WCDMA I | Uplink | V | -44.41 | 1168.80 | PASS |
| | | H | -41.15 | 5786.64 | |
| | Downlink | V | -66.77 | 4472.21 | |
| | | H | -67.77 | 1539.64 | |
| | RX Quality | V | 0 | 6000 | |
| | | H | 0 | 6000 | |

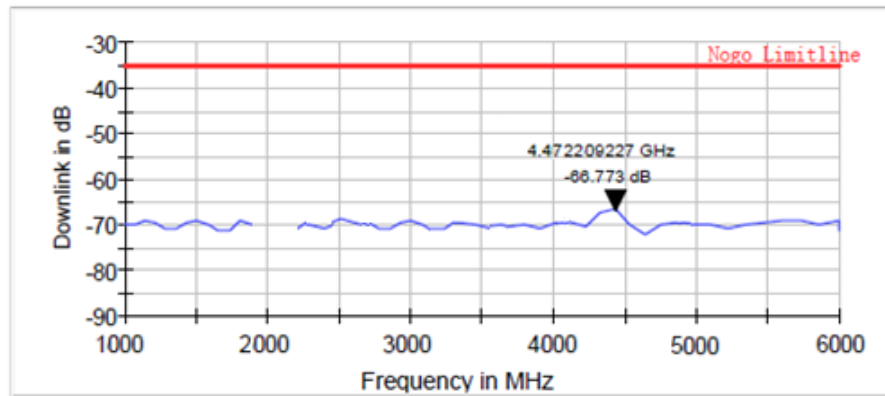
Uplink



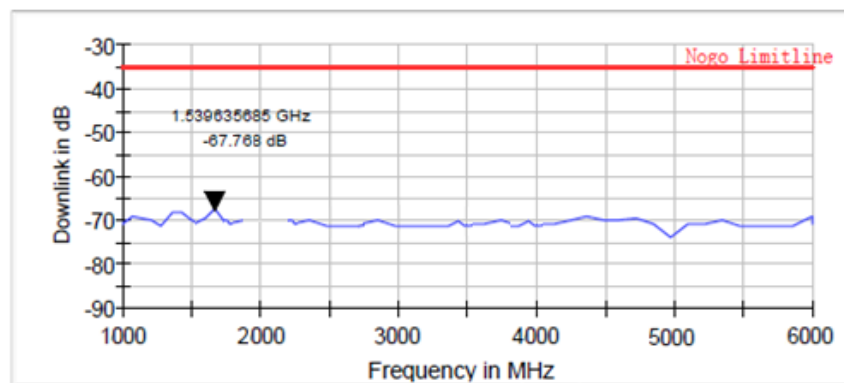
Uplink



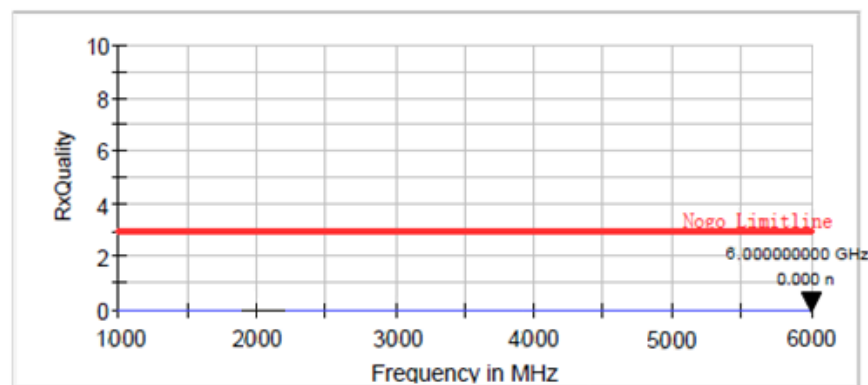
Downlink



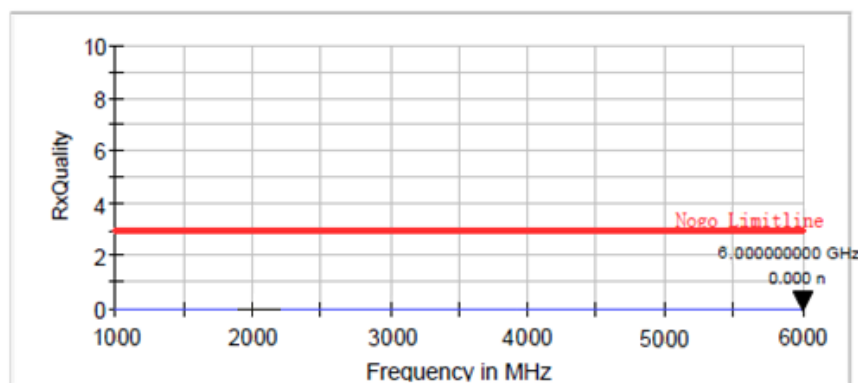
Downlink



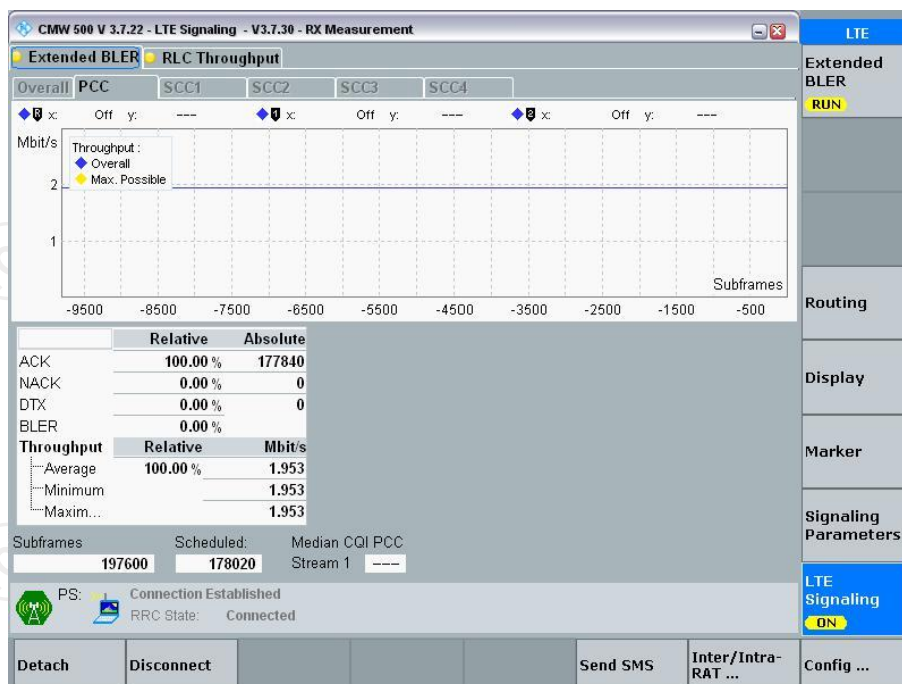
RxQuality



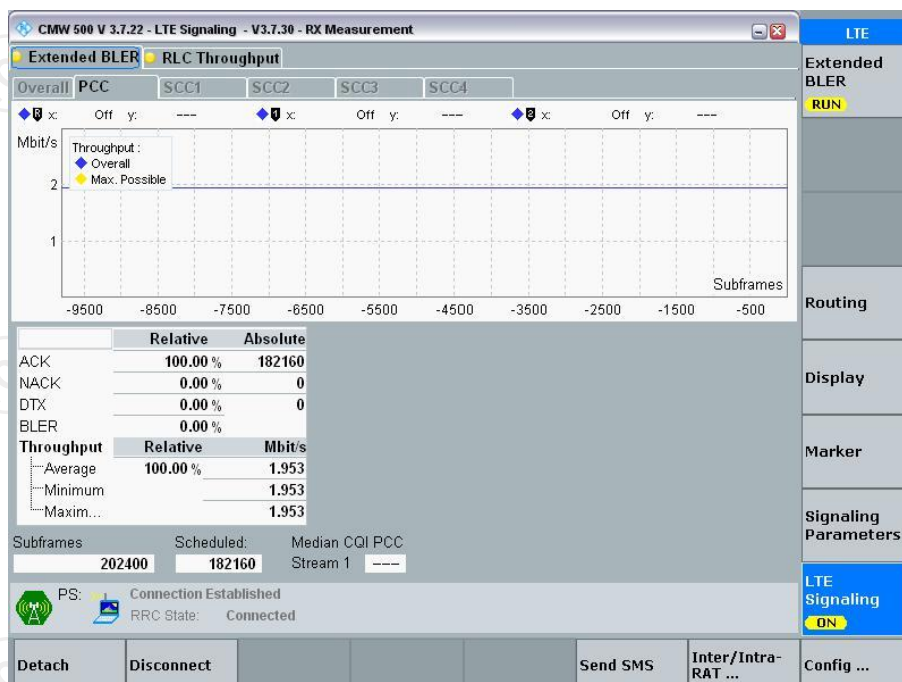
RxQuality



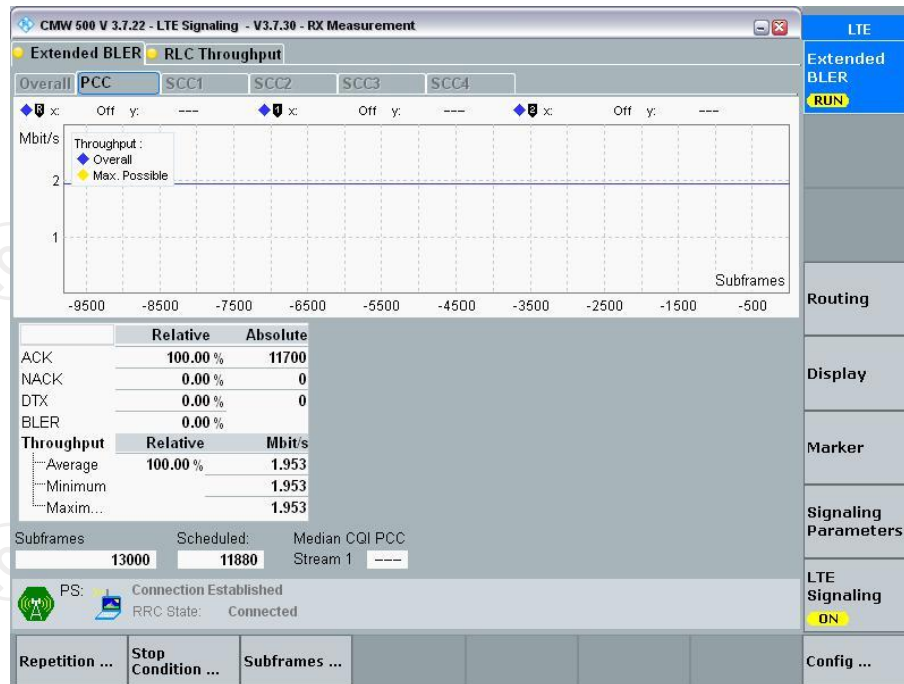
LTE Band 1



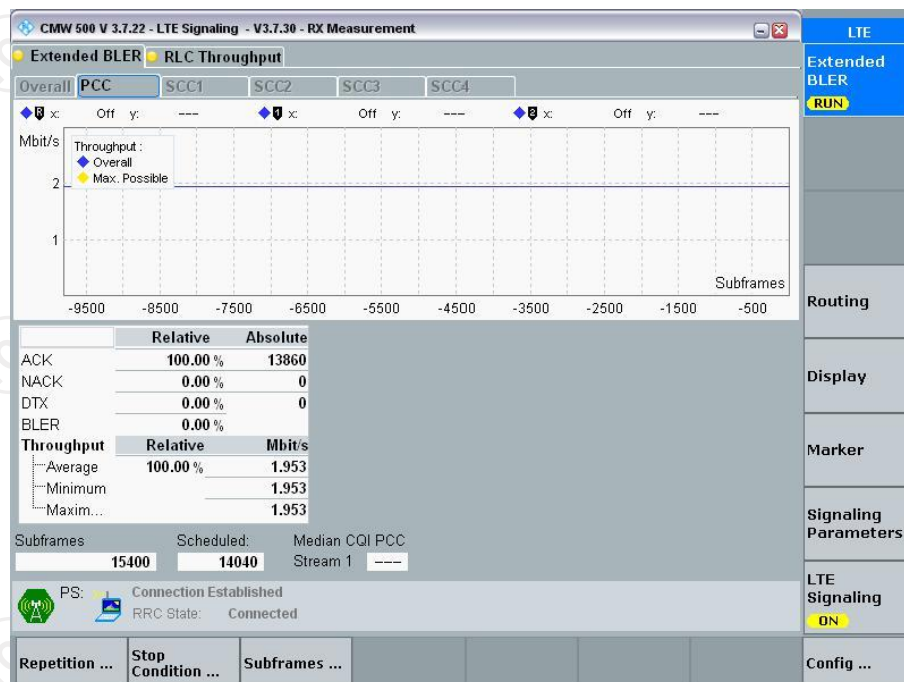
LTE Band 3

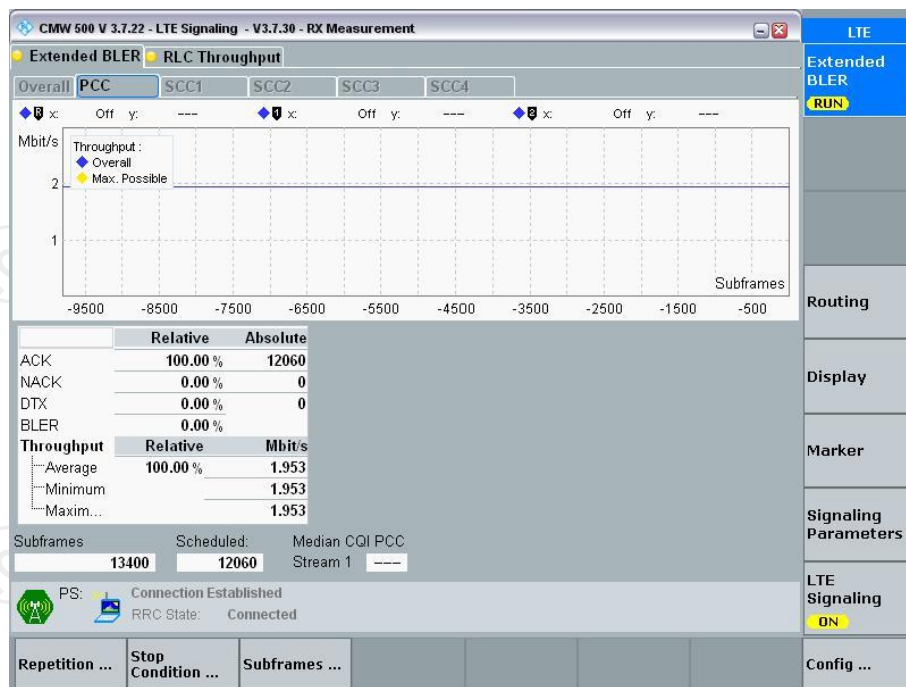


LTE Band 7

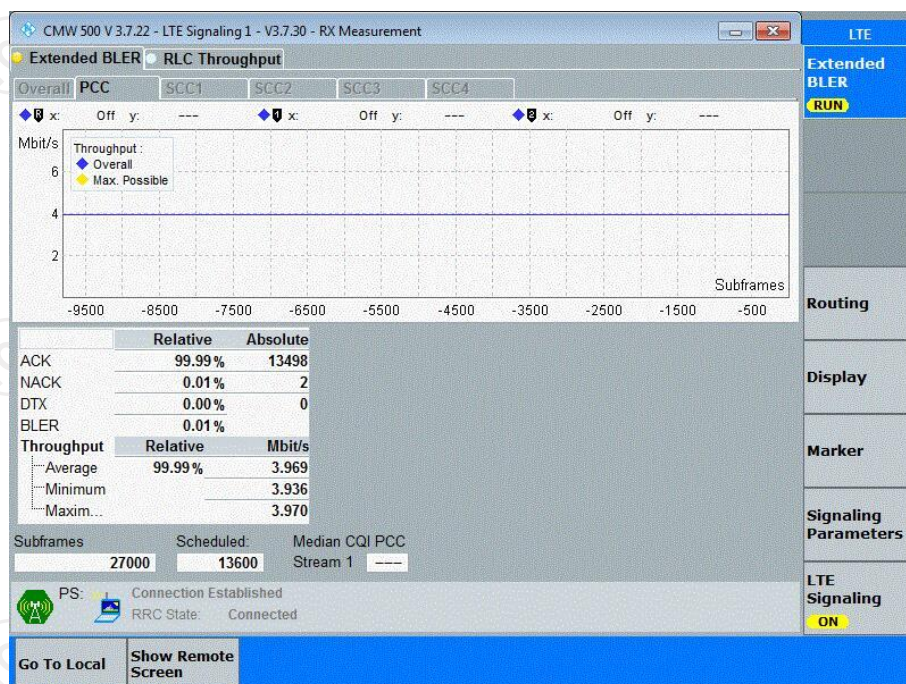


LTE Band 8



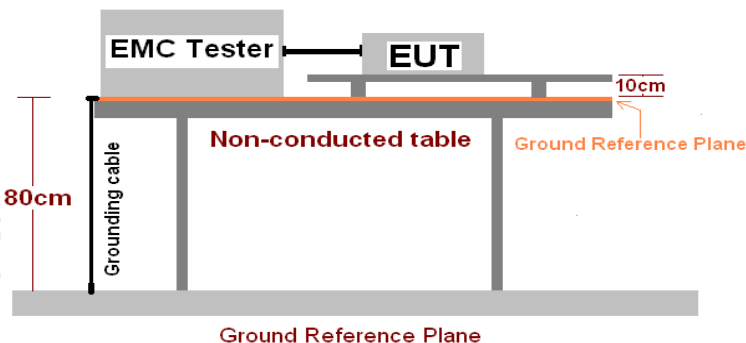


LTE Band 28



6.4. Surges

6.4.1. Test Specification

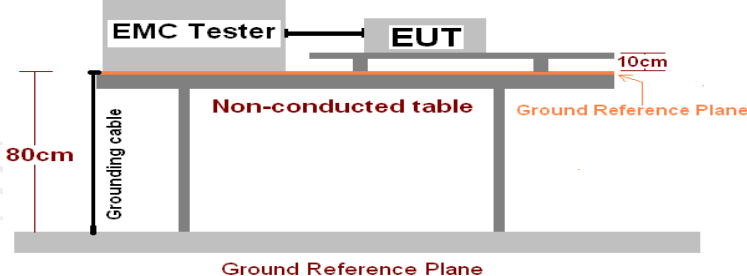
| | |
|-------------------------------|---|
| Test Requirement: | ETSI EN 301 489-1 |
| Test Method: | EN 61000-4-5 |
| Test Level: | ±1kV Live to Neutral: Differential mode ±2kV Live to Earth or Neutral to Earth: Common mode |
| Test Setup: | 60s between each surge |
| No. of surges: | 5 positive, 5 negative at 0°, 90°, 180°, 270°. |
| Performance Criterion: | B |
| Test Setup: |  <p>The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. Both are placed on a non-conducted table that is 80cm high. A grounding cable is connected to the table. A ground reference plane is indicated at 10cm from the table surface.</p> |
| Test Procedure: | <ol style="list-style-type: none"> 1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. 2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test. 3. Different phase angles are done individually. <p>Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.</p> |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Result: | PASS |

6.4.2. Test Data

| Location | Level(kV) | Pulse No | Surge Interval | Phase(deg) | Observation Criterion | Result |
|----------|-----------|----------|----------------|------------|-----------------------|--------|
| L-N | ± 1 | 5 | 60s | 0° | A | PASS |
| | | | | 90° | | |
| | | | | 180° | | |
| | | | | 270° | | |

6.5. Electrical Fast Transient (EFT)

6.5.1. Test Specification

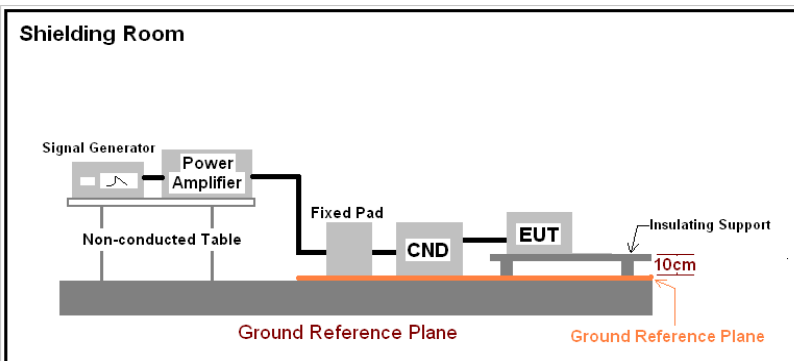
| | |
|------------------------------|---|
| Test Requirement: | ETSI EN 301 489-1 |
| Test Method: | EN 61000-4-4 |
| Test Level: | 1.0kV on AC port |
| Polarity: | Positive & Negative |
| Repetition Frequency: | 5kHz |
| Burst Duration: | 15ms |
| Burst Period: | 300ms |
| Test Duration: | 2 minute per level & polarity |
| Test setup: |  <p>The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. Both are placed on a non-conducted table. The table is 80cm high. A grounding cable is connected to the table. The EUT is positioned 10cm above the ground reference plane. The ground reference plane is a metallic sheet that extends beyond the EUT by at least 0.1m on all sides.</p> |
| Test Procedure: | <p>The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was 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 was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.</p> <p>Test on Signal Ports, Telecommunication Ports and Control Ports: The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes. Test on power supply ports: The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes. The length of the signal and power lines between the coupling device and the EUT is 0.5m</p> |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Result: | PASS |

6.5.2. Test Data

| Lead under Test | Level (\pm kV) | Coupling Direct/Clamp | Observation Criterion | Result |
|-----------------|-------------------|-----------------------|-----------------------|--------|
| L | ± 1.0 | Direct | A | PASS |
| N | ± 1.0 | Direct | A | PASS |
| L-N | ± 1.0 | Direct | A | PASS |

6.6. Radio-frequency Continuous Conducted (CS)

6.6.1. Test Specification

| | |
|--------------------------|---|
| Test Requirement: | ETSI EN 301489-1 |
| Test Method: | EN 61000-4-6 |
| Frequency Range: | 0.15MHz to 80MHz |
| Test Level: | 3V rms on AC Ports (unmodulated emf into 150 Ω) |
| Modulation | 80%, 1kHz Amplitude Modulation |
| Test setup: |  |
| Test Procedure: | <ol style="list-style-type: none"> 1. Let the EUT work in test mode and test it. 2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 3. The disturbance signal described below is injected to EUT through CDN. 4. The EUT operates within its operational mode(s) under intended climatic conditions after power on. 5. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 Hz sine wave. 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. <p>Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.</p> |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Result: | PASS |

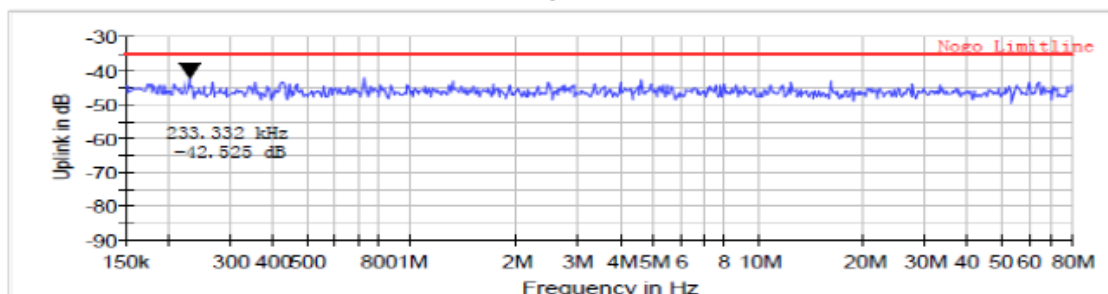
6.6.2. Test Data

| Frequency | Injected Position | Test Level | Modulation | Step Size | Dwell Time | Observation Criterion | Result |
|-----------------|-------------------|------------|---------------------|-----------|------------|-----------------------|--------|
| 150kHz to 80MHz | AC Main | 3Vrms | 80%, 1kHz Amp. Mod. | 1% | 2s | A | PASS |

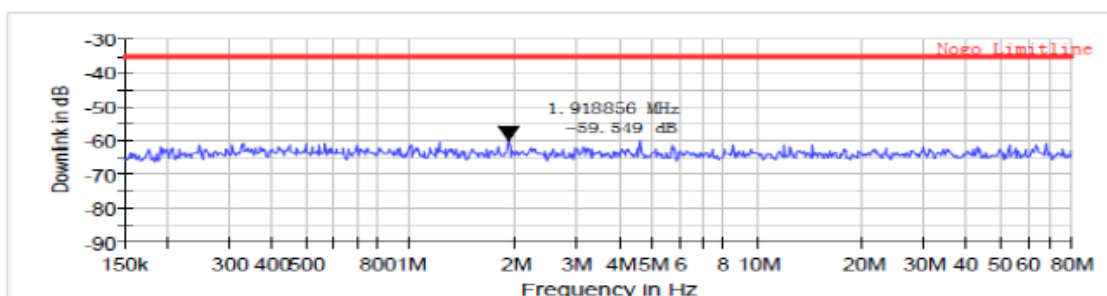
Remark: Only the worst mode plots are shown

| EUT operating Mode | | Max. value | Frequency (MHz) | Result |
|--------------------|------------|------------|-----------------|--------|
| GSM 900 | Uplink | -42.53 | 0.23 | PASS |
| | Downlink | -59.55 | 1.92 | |
| | RX Quality | 0 | 80 | |

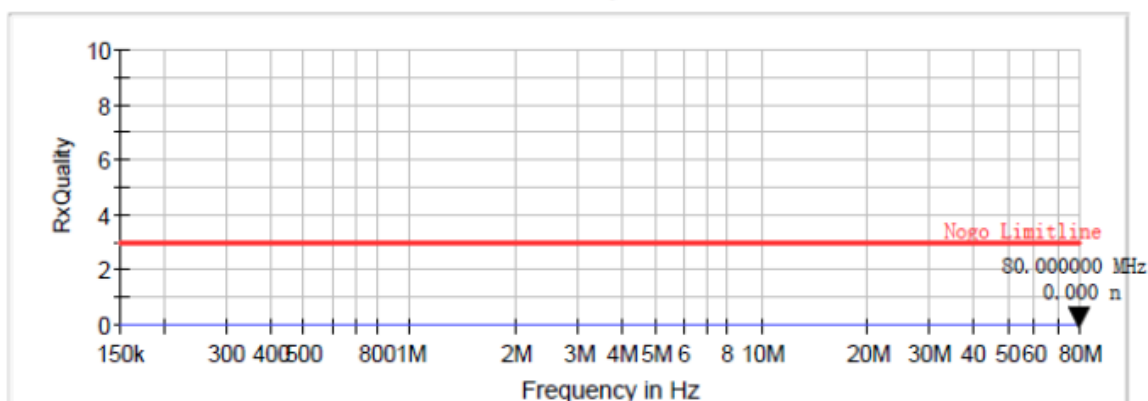
Uplink



Downlink

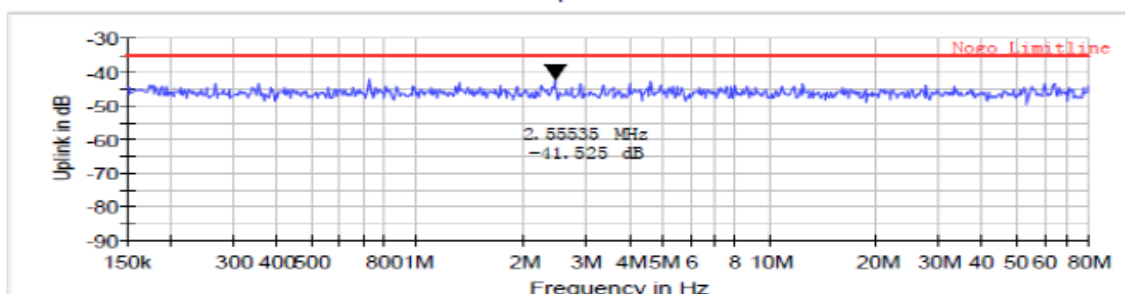


RxQuality

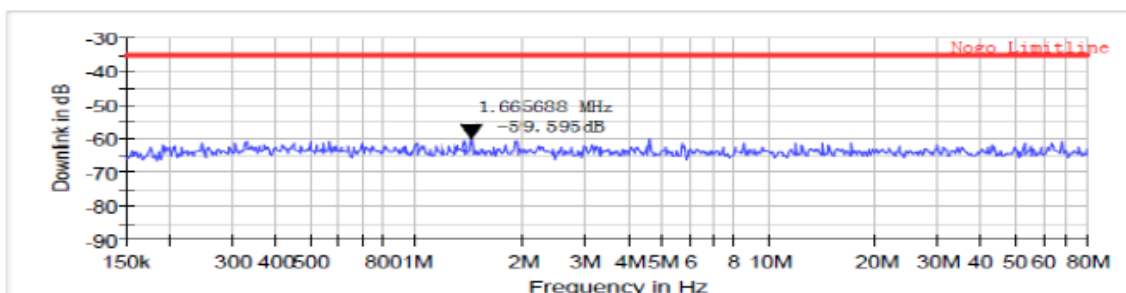


| EUT operating Mode | | Max. value | Frequency (MHz) | Result |
|--------------------|------------|------------|-----------------|--------|
| WCDMA I | Uplink | -41.53 | 2.56 | PASS |
| | Downlink | -59.60 | 1.67 | |
| | RX Quality | 0 | 80 | |

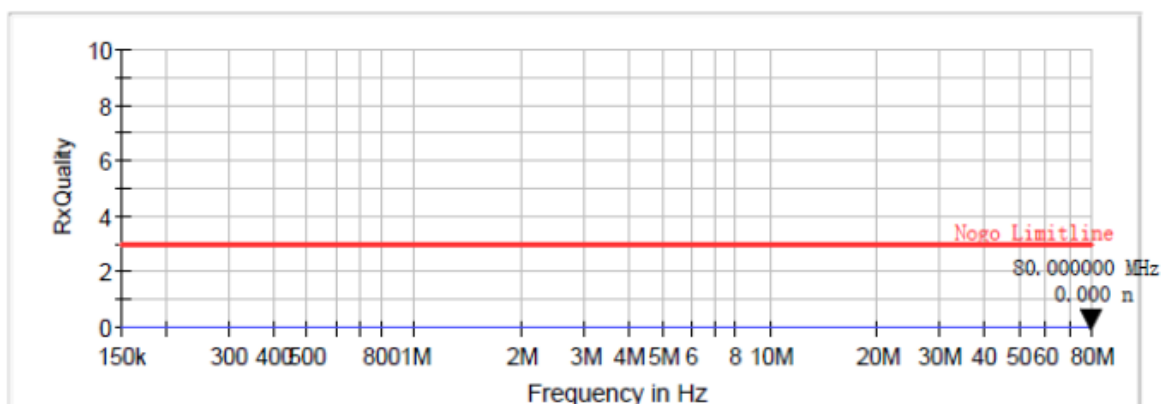
Uplink

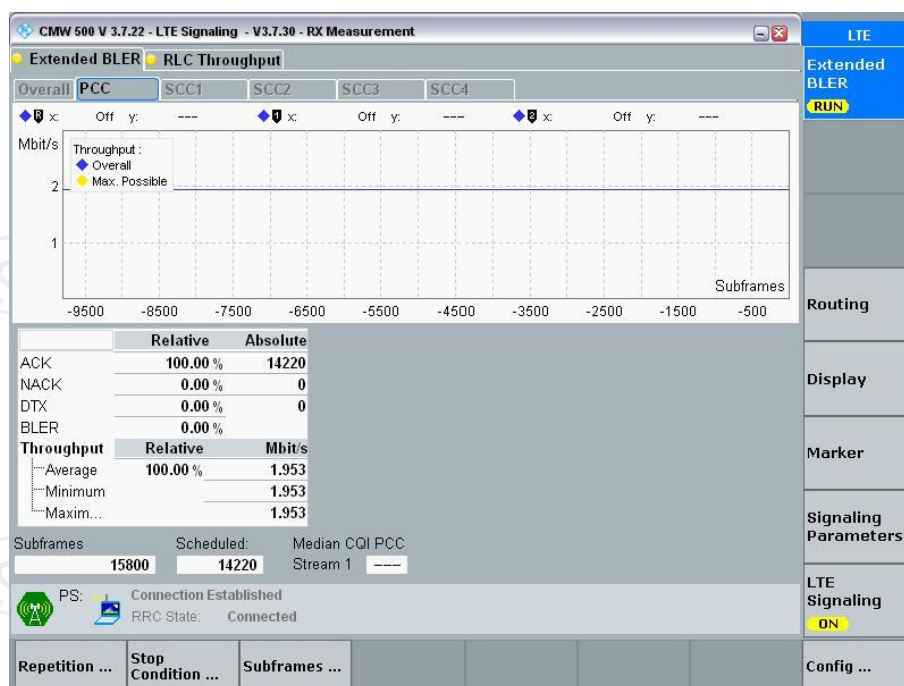


Downlink

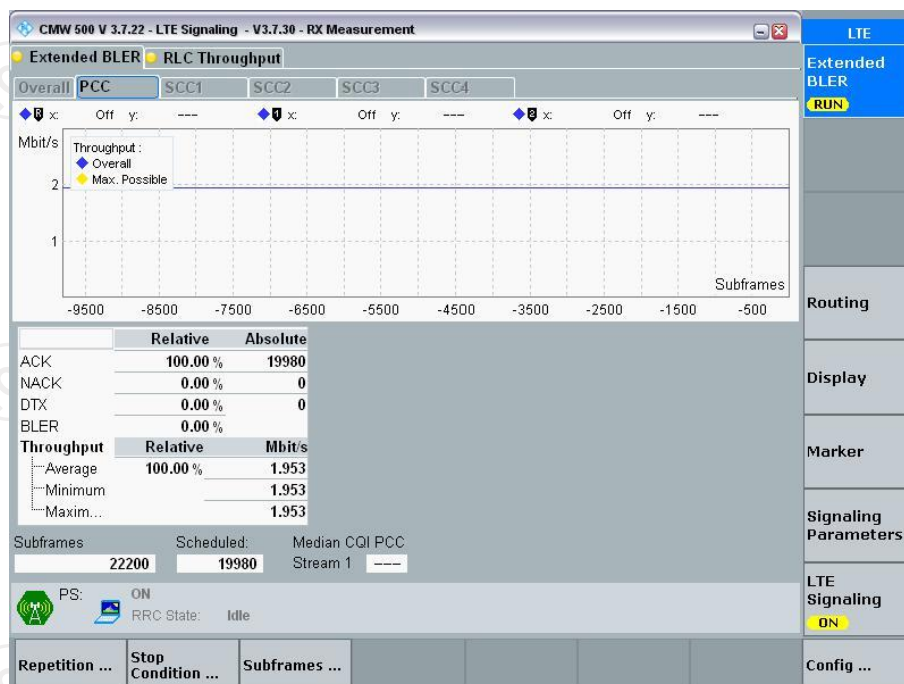


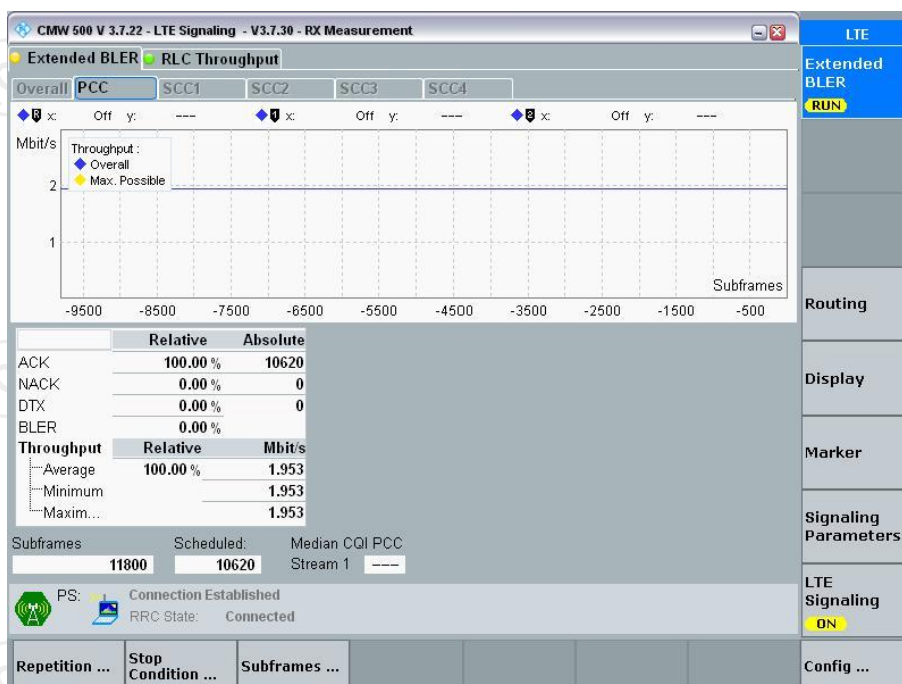
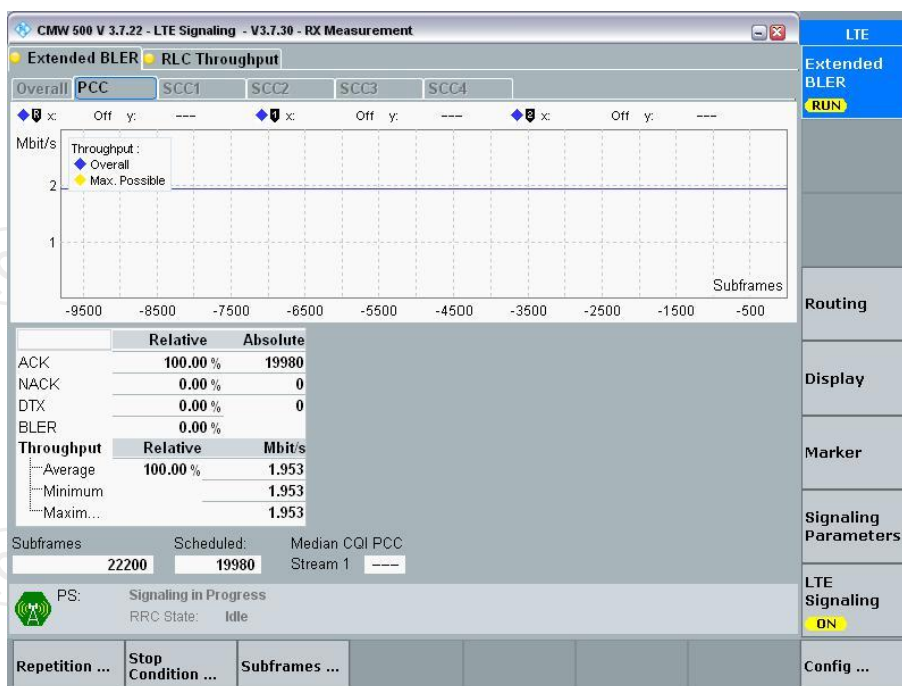
RxQuality

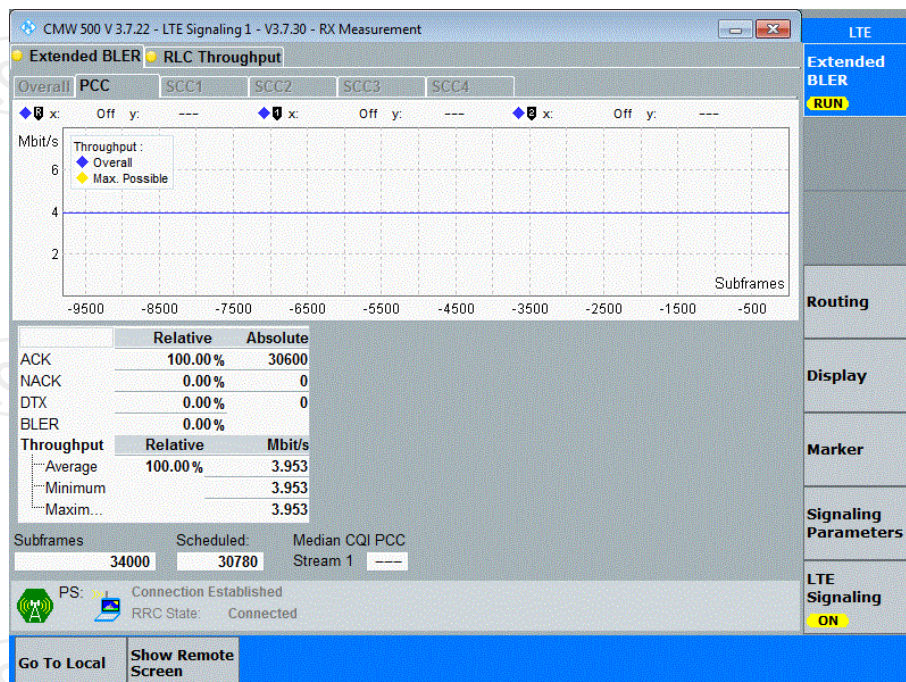
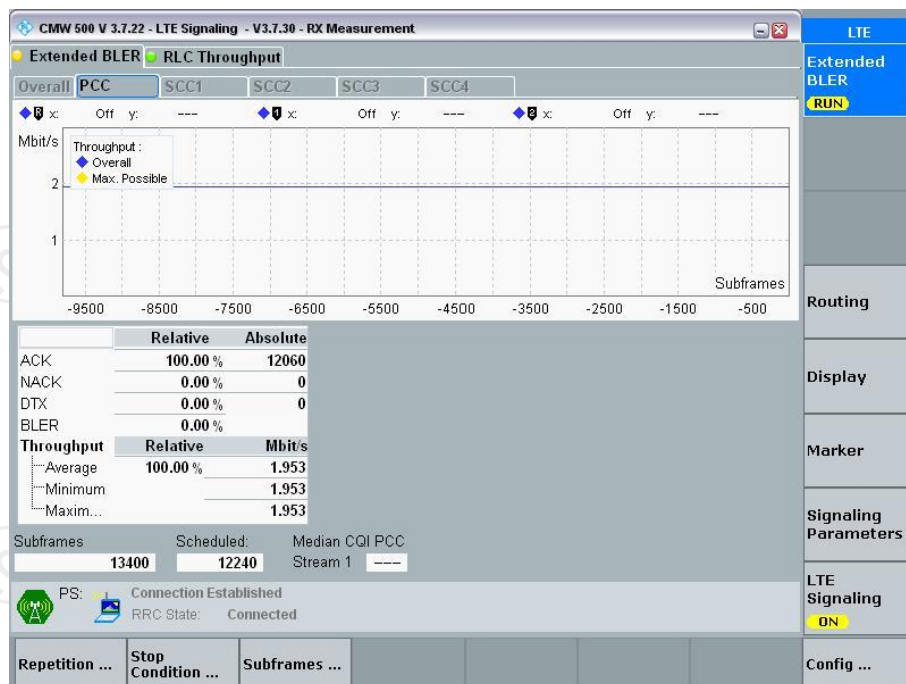




LTE Band 3

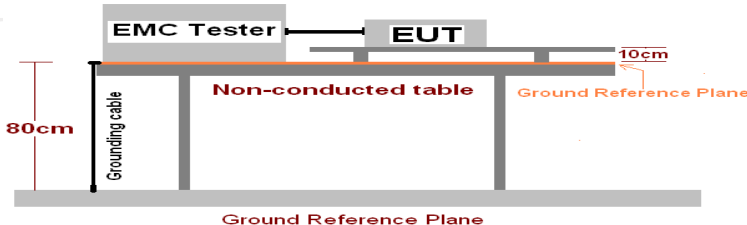






6.7. Voltage Dips and Voltage Interruption

6.7.1. Test Specification

| | |
|-------------------------------------|--|
| Test Requirement: | ETSI EN 301489-1 |
| Test Method: | EN 61000-4-11 |
| Test Level: | 0% of VT(Supply Voltage) for 0.5 period 0% of VT(Supply Voltage) for 1.0 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period |
| No. of Dips / Interruptions: | 3 per Level |
| Test setup: |  <p>The diagram illustrates the test setup. An EMC Tester is connected to an EUT (Equipment Under Test) via a cable. Both are placed on a non-conducted table that is 80cm high. A grounding cable is connected to the table. A ground reference plane is indicated at the bottom of the table and 10cm above the EUT.</p> |
| Test Procedure: | <ol style="list-style-type: none"> 1. The EUT and test generator were setup as shown on above setup photo. 2. The interruptions are introduced at selected phase angles with specified duration. 3. Record any degradation of performance. |
| Test Instrument: | Refer to Section 3.3 for Details |
| Test Mode: | Refer to Section 3.1 for Details |
| Test Result: | PASS |

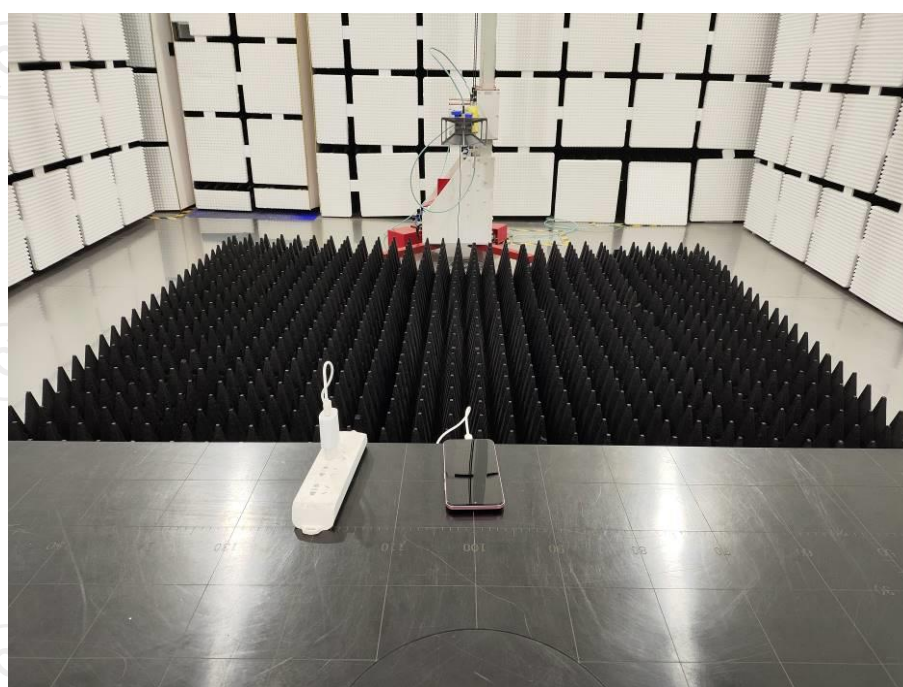
6.7.2. Test Data

| Test Level % U_T | Duration (Periods) | Phase angle | No of dropout | Time between dropout | Observation Criterion | Result |
|-----------------------|-----------------------|---------------------|---------------|----------------------|-----------------------|--------|
| 0 | 0.5 | 0°, 90°, 180°, 270° | 3 | 10s | B | PASS |
| 0 | 1 | 0°, 90°, 180°, 270° | 3 | 10s | | |
| 70 | 25 | 0°, 90°, 180°, 270° | 3 | 10s | | |
| 0 | 250 | 0°, 90°, 180°, 270° | 3 | 10s | | |

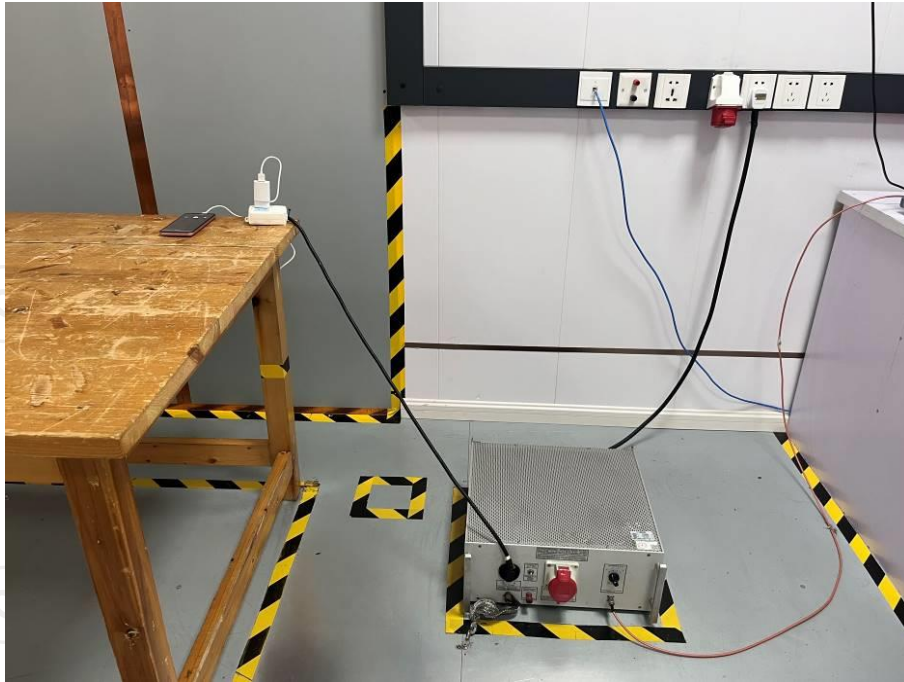
Note: When testing, the charging function had been interrupted. After testing, this function recovered automatically.

7. Photographs of Test Configuration

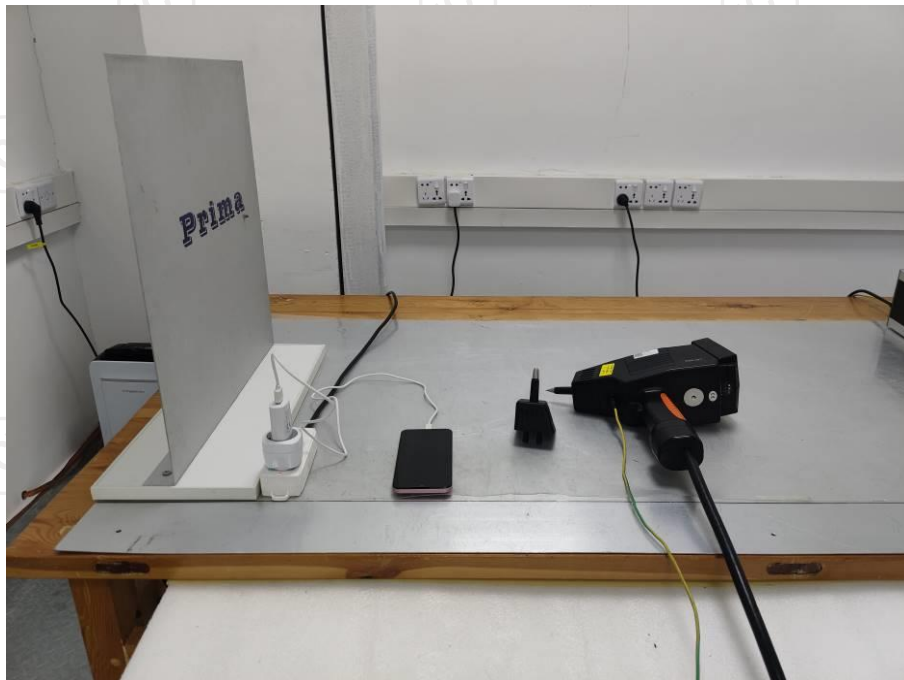
Radiated Emission



CE



ESD



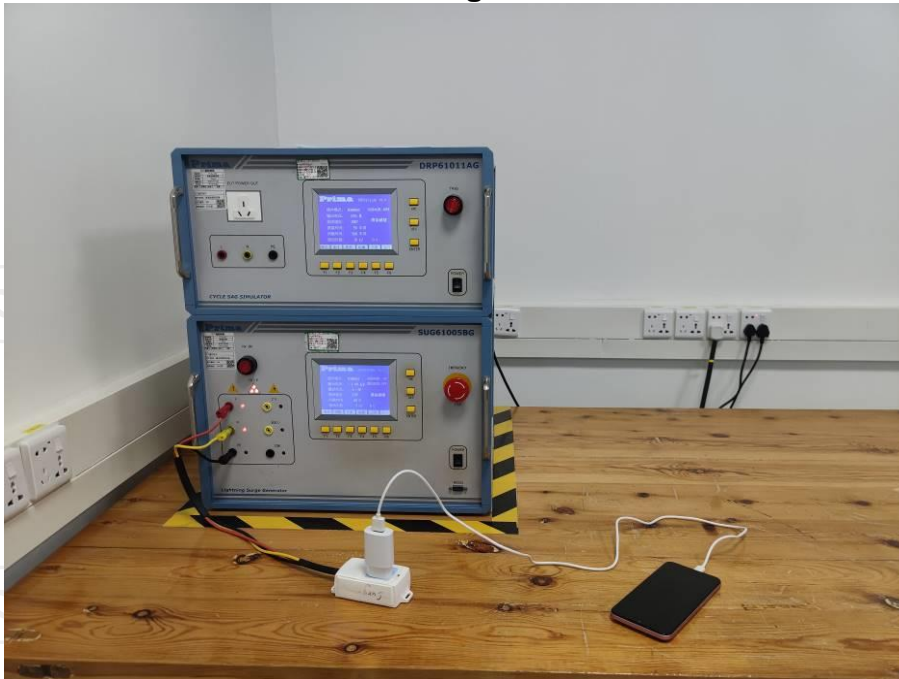
Flicker



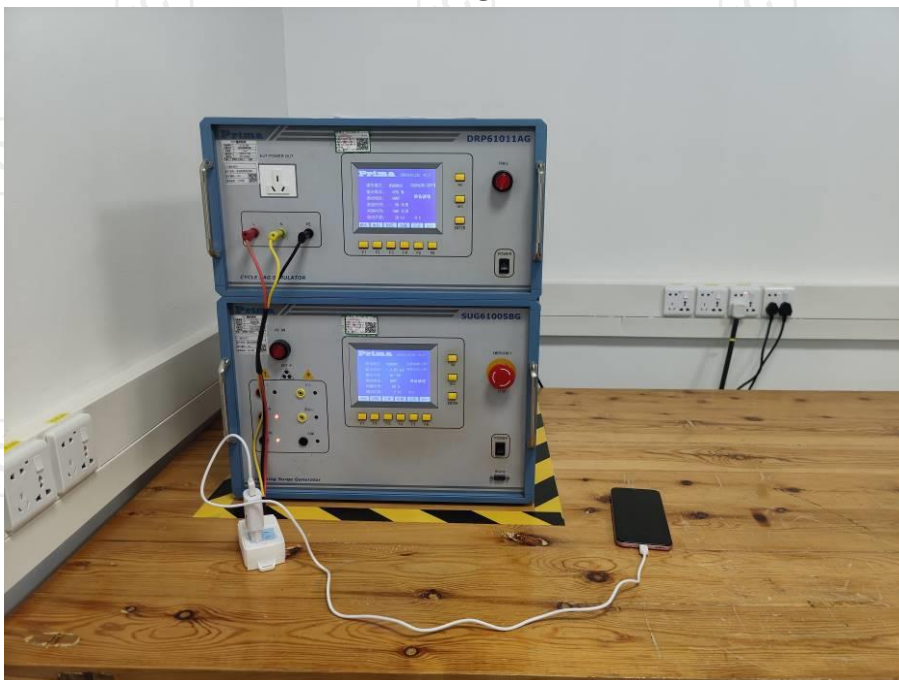
CS



Surge



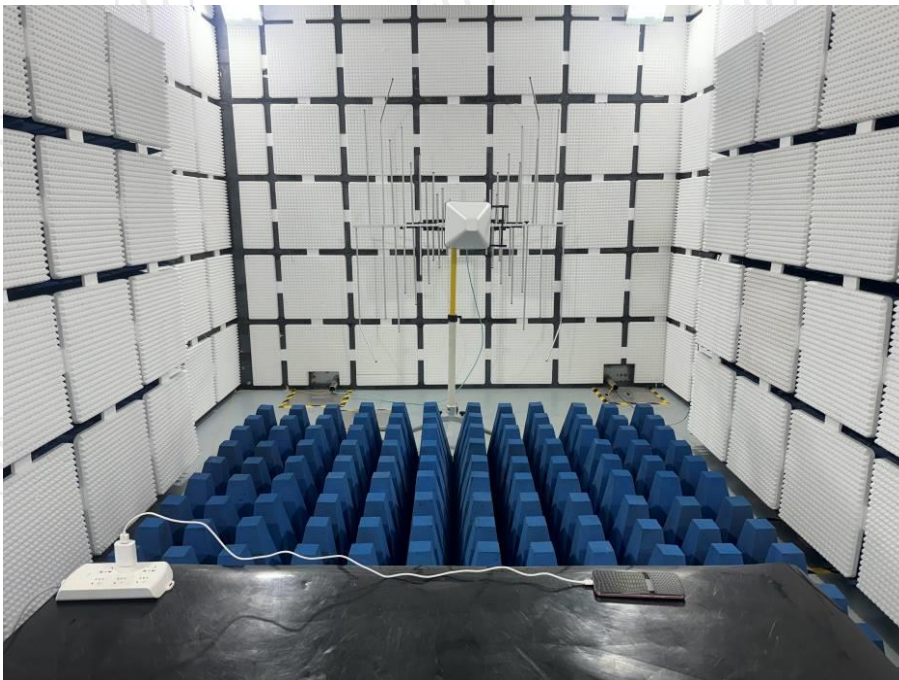
DIPS



EFT



RS



8. Photographs of EUT

Please refer to document Appendix No.: TCT240815E021-B & TCT240815E021-C

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