# Shenzhen Omni Intelligent Technology Co., LTD.

# TEST REPORT

**SCOPE OF WORK**
FCC Testing – G3-EB-OM-NA-P

**REPORT NUMBER**
220328043SZN-001

**ISSUE DATE**
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**DOCUMENT CONTROL NUMBER**
FCC ID 22/24/27/90_a


# FCC
# RF Test Report

***For***

**Shenzhen Omni Intelligent Technology Co., LTD.**

**Product Name: IoT device**

**Model Number: G3-EB-OM-NA-P**

**FCC ID: 2AI2O-NEBEIOT**

**Report No: 220328043SZN-001**

Tested and Prepared by:

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*Project Engineer*

Approved by:

*Peter Kang*
*Sr. Technical Supervisor*
*Date: 20 April 2022*

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# 1. Summary of Test Result

| | |
|---|---|
| Applicant: | Shenzhen Omni Intelligent Technology Co., LTD. |
| Address: | 11th Floor, Building 31, Phase III, Lianchuang Technology Park, Nanwan street, Longgang District, Shenzhen, Guang Dong, China |
| Product name: | IoT device |
| Model Number: | G3-EB-OM-NA-P |
| FCC ID: | 2AI2O-NEBEIOT |
| Report number: | 220328043SZN-001 |
| Date of Test | 20 April 2022 |

The above equipment was tested by Intertek Testing Services Shenzhen Ltd. Longhua Branch. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI 63.26-2015 and KDB 971168 D01. This device is in compliance with FCC rules as following:

47 CFR FCC Part 02:2020
47 CFR FCC Part 22:2020
47 CFR FCC Part 24:2020
47 CFR FCC Part 27:2020

The test results of this report relate only to the tested sample identified in this report.

## 1.1 Cellular Band (824-849MHz paired with 869-894MHz)

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict (Note1) |
|---|---|---|---|---|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §22.913 | FCC: ERP ≤ 7 W. | Appendix A | Pass |
| Peak-Average Ratio | -- | -- | Appendix B | Pass |
| Bandwidth | §2.1049 | OBW: No limit.<br>EBW: No limit. | Appendix C | Pass |
| Band Edges Compliance | §2.1051, §22.917 | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Appendix D | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §22.917 | FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10$^{th}$ harmonics but outside authorized operating frequency ranges. | Appendix E | Pass |
| Frequency Stability | §2.1055, §22.355 | ≤ ±2.5ppm. | Appendix F | Pass |
| Modulation Characteristics | §2.1047 | Digital modulation | Appendix G | Pass |
| Note1: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested". | | | | |

## 1.2 PCS Band (1850-1910MHz paired with 1930-1990MHz)

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict (Note1) |
|---|---|---|---|---|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §24.232 | EIRP ≤ 2 W | Appendix A | Pass |
| Peak-Average Ratio | §2.1046, §24.232 | Limit≤13 dB | Appendix B | Pass |
| Bandwidth | §2.1049 | OBW: No limit.<br>EBW: No limit. | Appendix C | Pass |
| Band Edges Compliance | §2.1051, §24.238 | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Appendix D | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §24.238 | ≤ -13 dBm/1 MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. | Appendix E | Pass |
| Frequency Stability | §2.1055, §24.235 | within the authorized frequency block | Appendix F | Pass |
| Modulation Characteristics | §2.1047 | Digital modulation | Appendix G | Pass |
| Note1: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested". | | | | |

## 1.3 AWS Band (1710-1755MHz paired with 2110-2155MHz)

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict (Note1) |
|---|---|---|---|---|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(d) | EIRP ≤ 1 W | Appendix A | Pass |
| Peak-Average Ratio | §2.1046, §27.50(d) | Limit≤13 dB | Appendix B | Pass |
| Bandwidth | §2.1049 | OBW: No limit.<br>EBW: No limit. | Appendix C | Pass |
| Band Edges Compliance | §2.1051, §27.53(h) | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Appendix D | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(h) | ≤ -13 dBm/1 MHz, from 9 kHz to 10$^{th}$ harmonics but outside authorized operating frequency ranges. | Appendix E | Pass |
| Frequency Stability | §2.1055, §27.54 | within the authorized frequency block | Appendix F | Pass |
| Modulation Characteristics | §2.1047 | Digital modulation | Appendix G | Pass |
| Note1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” denotes “not tested”. | | | | |

## 1.4 Band12 (699-716MHz paired with 729-746 MHz)

| Test Item | FCC Rule No | Requirements | Test Result | Verdict (Note1) |
|---|---|---|---|---|
| Effective (Isotropic) Radiated Power Output Data | §27.50(c) | FCC: ERP ≤ 3 W. | Appendix A | Pass |
| Peak-Average Ratio | -- | -- | Appendix B | Pass |
| Bandwidth | §2.1047 | OBW: No limit.<br>EBW: No limit. | Appendix C | Pass |
| Band Edges Compliance | §2.1049, | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Appendix D | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(g) | FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. | Appendix E | Pass |
| Frequency Stability | §2.1053, §27.53(g) | within the authorized frequency block | Appendix F | Pass |
| Modulation Characteristics | §2.1047 | Digital modulation | Appendix G | Pass |
| Note1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” denotes “not tested”. | | | | |

# 2. General Description

## 2.1 Product Description

G3-KS-OM-NA-P is Engineering control equipment in the UMTS/LTE system. The UMTS frequency band are band II / V. The LTE frequency band is Band II / IV / XII test data included in this report. The Engineering control equipment implements such functions as RF signal receiving/transmitting, LTE/UMTS protocol. Internally it provides SIM card interface. The EUT is powered by DC 3.7V from inner battery which can be charged by DC36V from E-Scooter or E-Bike. For more detailed features description, please refer to the user's manual.

## 2.2 Test Facility

| | |
|---|---|
| Company Name: | Intertek Testing Service Shenzhen Ltd. Longhua Branch |
| Address: | 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen, P.R. China. |
| FCC Registration Number: | CN1188 |
| ISED CAB ID | CN0038 |

## 2.3 Test Environment Condition

| | |
|---|---|
| Ambient Temperature: | 19.5 to 25 °C |
| Ambient Relative Humidity: | 40 to 55 % |
| Atmospheric Pressure: | Not applicable |

## 2.4 Sub-Assembly

N/A

## 2.5 Technical Specification

| Characteristics | Description | | |
|---|---|---|---|
| Radio System Type | WCDMA<br>LTE | | |
| Supported Frequency Range | WCDMA850 | Transmission (TX): | 824 to 849 MHz |
| | | Receiving (RX): | 869 to 894 MHz |
| | WCDMA1900 | Transmission (TX): | 1850 to 1910 MHz |
| | | Receiving (RX): | 1930 to 1990 MHz |
| | LTE BAND2 | Transmission (TX): | 1850 to 1910 MHz |
| | | Receiving (RX): | 1930 to 1990 MHz |
| | LTE BAND4 | Transmission (TX): | 1710 to 1755 MHz |
| | | Receiving (RX): | 2110 to 2155 MHz |
| | LTE BAND12 | Transmission (TX): | 699 to 716 MHz |
| | | Receiving (RX): | 729 to 746 MHz |
| TX and RX Antenna Ports | TX & RX port: | 1 | |
| | TX-only port: | 0 | |
| | RX-only port: | 0 | |
| Target TX Output Power | UMTS 850: 26dBm<br>UMTS 1900: 23dBm<br>LTE BAND2: 23dBm<br>LTE BAND4: 24dBm<br>LTE BAND12: 24dBm | | |
| Antenna Gain: | UMTS 850: 0.83dBi<br>UMTS 1900: 2.07dBi<br>LTE BAND2: 2.07dBi<br>LTE BAND4: 2.14dBi<br>LTE BAND12: 0.83dBi | | |
| Supported Channel Bandwidth: | UMTS system: | 5 MHz | |
| | LTE band 2 | 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz | |
| | LTE band 4 | 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz | |
| | LTE band 12 | 1.4 MHz, 3 MHz, 5 MHz, 10 MHz | |
| (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.) | UMTS1900: | 4M19F9W | |
| | UMTS850: | 4M23F9W | |
| | LTE BAND2:<br>Designation of Emissions | 1M09G7D (1.4 MHz QPSK modulation),<br>1M09W7D (1.4 MHz 16QAM modulation)<br>2M70G7D (3 MHz QPSK modulation),<br>2M70W7D (3 MHz 16QAM modulation)<br>4M50G7D (5 MHz QPSK modulation),<br>4M51W7D (5 MHz 16QAM modulation)<br>8M99G7D (10 MHz QPSK modulation),<br>4M56W7D (10 MHz 16QAM modulation)<br>13M5G7D (15 MHz QPSK modulation),<br>13M5W7D (15 MHz 16QAM modulation)<br>18MG7D (20 MHz QPSK modulation),<br>1M20W7D (20 MHz 16QAM modulation) | |
| | LTE BAND4: | 1M09G7D (1.4 MHz QPSK modulation),<br>1M09W7D (1.4 MHz 16QAM modulation)<br>2M70G7D (3 MHz QPSK modulation),<br>2M70W7D (3 MHz 16QAM modulation)<br>4M51G7D (5 MHz QPSK modulation),<br>4M51W7D (5 MHz 16QAM modulation)<br>8M99G7D (10 MHz QPSK modulation),<br>4M56W7D (10 MHz 16QAM modulation)<br>13M5G7D (15 MHz QPSK modulation),<br>13M4W7D (15 MHz 16QAM modulation)<br>18MG7D (20 MHz QPSK modulation),<br>1M20W7D (20 MHz 16QAM modulation) | |

| Characteristics | Description | |
|---|---|---|
| | LTE BAND12: | 1M09G7D (1.4 MHz QPSK modulation),<br>1M09W7D (1.4 MHz 16QAM modulation)<br>2M71G7D (3 MHz QPSK modulation),<br>2M70W7D (3 MHz 16QAM modulation)<br>4M51G7D (5 MHz QPSK modulation),<br>4M52W7D (5 MHz 16QAM modulation)<br>8M99G7D (10 MHz QPSK modulation),<br>4M56W7D (10 MHz 16QAM modulation) |

# 3. General Test Conditions/Configuration

## 3.1 Test Modes

| Test Mode | Test Modes Description |
|---|---|
| UMTS/TM1 | WCDMA system, QPSK modulation |
| UMTS/TM2 | HSDPA system, QPSK modulation |
| UMTS/TM3 | HSUPA system, QPSK modulation |
| LTE/TM1 | LTE system, QPSK modulation |
| LTE/TM2 | LTE system, 16QAM modulation |

## 3.2 Test Environment

| Environment Parameter | Selected Values During Tests | |
|---|---|---|
| Relative Humidity | Ambient | |
| Temperature | TN | Ambient |
| Voltage | VL | 3.3V |
| | VN | 3.7V |
| | VH | 4.1V |

NOTE: VL= lower extreme test voltage, VN= nominal voltage, VH= upper extreme test voltage
TN= normal temperature

## 3.3 Test Frequency

| Test Mode | TX / RX | RF Channel | | |
|---|---|---|---|---|
| | | Low (L) | Middle (M) | High (H) |
| WCDMA850 | TX | Channel 4132 | Channel 4182 | Channel 4233 |
| | | 826.4MHz | 836.4MHz | 846.6MHz |
| | RX | Channel 4357 | Channel 4407 | Channel 4458 |
| | | 871.4MHz | 881.4MHz | 891.6MHz |
| Test Mode | TX / RX | RF Channel | | |
| | | Low (L) | Middle (M) | High (H) |
| WCDMA1900 | TX | Channel 9262 | Channel9400 | Channel9538 |
| | | 1852.4MHz | 1880.0MHz | 1907.6MHz |
| | RX | Channel 9662 | Channel 9800 | Channel 9938 |
| | | 1932.4 MHz | 1960.0 MHz | 1987.6 MHz |
| Test Mode | TX / RX | RF Channel | | |
| | | Low (B) | Middle (M) | High (T) |
| LTE Band 2 | TX(1.4M) | Channel 18607 | Channel 18900 | Channel 19193 |
| | | 1850.7 MHz | 1880 MHz | 1909.3 MHz |
| | TX(3M) | Channel 18615 | Channel 18900 | Channel 19185 |
| | | 1851.5 MHz | 1880 MHz | 1908.5 MHz |
| | TX(5M) | Channel 18625 | Channel 18900 | Channel 19175 |
| | | 1852.5 MHz | 1880 MHz | 1907.5 MHz |
| | TX(10M) | Channel 18650 | Channel 18900 | Channel 19150 |
| | | 1855 MHz | 1880 MHz | 1905 MHz |

| | | | | |
|---|---|---|---|---|
| | TX(15M) | Channel 18675 | Channel 18900 | Channel 19125 |
| | | 1857.5 MHz | 1880 MHz | 1902.5 MHz |
| | TX(20M) | Channel 18700 | Channel 18900 | Channel 19100 |
| | | 1860 MHz | 1880 MHz | 1900 MHz |
| | RX(1.4M) | Channel 607 | Channel 900 | Channel 1193 |
| | | 1930.7 MHz | 1960 MHz | 1989.3 MHz |
| | RX(3M) | Channel 615 | Channel 900 | Channel 1185 |
| | | 1931.5 MHz | 1960 MHz | 1988.5 MHz |
| | RX(5M) | Channel 625 | Channel 900 | Channel 1175 |
| | | 1932.5 MHz | 1960 MHz | 1987.5 MHz |
| | RX(10M) | Channel 650 | Channel 900 | Channel 1150 |
| | | 1935 MHz | 1960 MHz | 1985 MHz |
| | RX(15M) | Channel 675 | Channel 900 | Channel 1125 |
| | | 1937.5 MHz | 1960 MHz | 1982.5 MHz |
| | RX(20M) | Channel 700 | Channel 900 | Channel 1100 |
| | | 1940 MHz | 1960 MHz | 1980 MHz |
| Test Mode | TX / RX | RF Channel | | |
| | | Low (B) | Middle (M) | High (T) |
| LTE Band 4 | TX(1.4M) | Channel 19957 | Channel 20175 | Channel 20393 |
| | | 1710.7 MHz | 1732.5 MHz | 1754.3 MHz |
| | TX(3M) | Channel 19965 | Channel 20175 | Channel 20385 |
| | | 1711.5 MHz | 1732.5 MHz | 1753.5 MHz |
| | TX(5M) | Channel 19975 | Channel 20175 | Channel 20375 |
| | | 1712.5 MHz | 1732.5 MHz | 1752.5 MHz |
| | TX(10M) | Channel 20000 | Channel 20175 | Channel 20350 |
| | | 1715 MHz | 1732.5 MHz | 1750 MHz |
| | TX(15M) | Channel 20025 | Channel 20175 | Channel 20325 |
| | | 1717.5 MHz | 1732.5 MHz | 1747.5 MHz |
| | TX(20M) | Channel 20050 | Channel 20175 | Channel 20300 |
| | | 1720 MHz | 1732.5 MHz | 1745 MHz |
| | RX(1.4M) | Channel 1975 | Channel 2175 | Channel 2375 |
| | | 2112.5 MHz | 2132.5MHz | 2152.5 MHz |
| | RX(3M) | Channel 2000 | Channel 2175 | Channel 2350 |
| | | 2115 MHz | 2132.5MHz | 2150 MHz |
| | RX(5M) | Channel 1975 | Channel 2175 | Channel 2375 |
| | | 2112.5 MHz | 2132.5MHz | 2152.5 MHz |
| | RX(10M) | Channel 2000 | Channel 2175 | Channel 2350 |
| | | 2115 MHz | 2132.5MHz | 2150 MHz |
| | RX(15M) | Channel 2025 | Channel 2175 | Channel 2325 |
| | | 2117.5 MHz | 2132.5MHz | 2147.5 MHz |
| | RX(20M) | Channel 2050 | Channel 2175 | Channel 2300 |
| | | 2120 MHz | 2132.5MHz | 2145 MHz |

| Test Mode | TX / RX | RF Channel | | |
|---|---|---|---|---|
| | | Low (B) | Middle (M) | High (T) |
| LTE Band 12 | TX(1.4M) | Channel 23017 | Channel 23095 | Channel 23173 |
| | | 699.7 MHz | 707.5 MHz | 715.3 MHz |
| | TX(3M) | Channel 23025 | Channel 23095 | Channel 23165 |
| | | 700.5 MHz | 707.5 MHz | 714.5 MHz |
| | TX(5M) | Channel 23035 | Channel 23095 | Channel 23155 |
| | | 701.5 MHz | 707.5 MHz | 713.5 MHz |
| | TX(10M) | Channel 23060 | Channel 23095 | Channel 23130 |
| | | 704 MHz | 707.5 MHz | 711 MHz |
| | RX(1.4M) | Channel 5017 | Channel 5095 | Channel 5173 |
| | | 729.7 MHz | 737.5 MHz | 745.3 MHz |
| | RX (3M) | Channel 5025 | Channel 5095 | Channel 5165 |
| | | 730.5 MHz | 737.5 MHz | 744.5 MHz |
| | RX(5M) | Channel 5035 | Channel 5095 | Channel 5155 |
| | | 731.5 MHz | 737.5 MHz | 743.5 MHz |
| | RX (10M) | Channel 5060 | Channel 5095 | Channel 5130 |
| | | 734 MHz | 737.5 MHz | 741 MHz |

# 4. DESCRIPTION OF TESTS

## 4.1 Radiated Power and Radiated Spurious Emissions

Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI C63.26. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized.
A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.
A half-wave dipole is then substituted in place of the EUT. For emissions above 3GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT.

The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]}$$

Where, Pd is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB].
The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power}_{[\text{Watts}]})$.

**Test Procedures Used**

971168 D01 v03r01 -Section 5.2 / 971168 D01 v03r01 -Section 5.8

ANSI C63.26 §5.2 / ANSI C63.26 §5.5/ ANSI C63.26 §6.4

Note: Reference test setup 3

## 4.2 Peak-Average Ratio

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

**Test Procedures Used**

971168 D01 v03r01 -Section 5.7

ANSI C63.26 §5.2

**Test Settings**

1. The signal analyzer's CCDF measurement profile enabled
2. Frequency= carrier center frequency
3. Measurement BW > EBW of signal
4. for continuous transmissions, set to 1ms
5. Record the maximum PAPR level associated with a probability of 0.1%. Note: Reference test setup 1

## 4.3 Occupied Bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

**Test Procedures Used**

971168 D01 v03r01 -Section 4.3
ANSI C63.26 §5.4

**Test Settings**

1. SET RBW=1-5% of OBW
2. SET VBW ≥ 3*RBW
3. Detector: Peak
4. Trace mode= max hold.
5. Sweep= auto couple
6. Steps 1-5 were repeated after it is stable

Note: Reference test setup 1.

## 4.4 Band Edge Compliance

the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission power must be attenuated below the transmitting power (P) by a factor of at least $43+10\log_{10}P$ dB.

**Test Procedures Used**

971168 D01 v03r01 -Section 6
ANSI C63.26 §5.7/ ANSI C63.26 §6.4

**Test Settings**

1. SET RBW ≥ 1% of Emission BW.
2. SET VBW about three times of RBW
3. Detector: RMS
4. Trace mode= max hold.
5. Span= 2MHz

Note: Reference test setup 1.

Spurious and Harmonic Emissions at Antenna Terminal
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its $10^{th}$ harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least
43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

**Test Procedures Used**
KDB 971168 v03r01-Section 6.0

**Test Settings**
1. 9kHz~150kHz, RBW = 1KHz, VBW ≥ 3×RBW,
   150kHz~30MHz, RBW = 10KHz, VBW ≥ 3×RBW,
   30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz.
   Above 1GHz, RBW = 1 MHz, VBW = 3 MHz.
2. Detector: Peak
3. Trace mode= max hold.

Note: Reference test setup 1.

## 4.5 Frequency Stability / Temperature Variation

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26. The frequency stability of the transmitter is measured by:

a.) **Temperature**: The temperature is varied from -30°C to +60°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage**: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm ) of the center frequency.

**Time Period and Procedure:**

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +60°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

**Test Procedures Used**

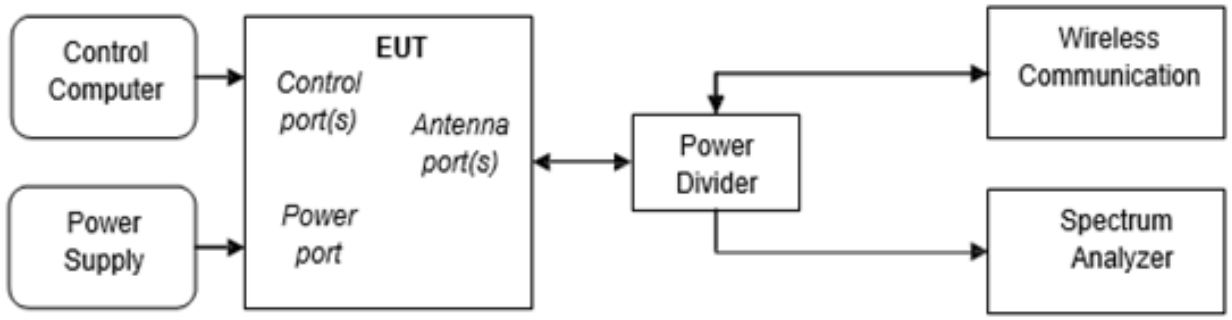
971168 D01 v03r01 -Section 9
ANSI C63.26 §5.6

**Notes:**

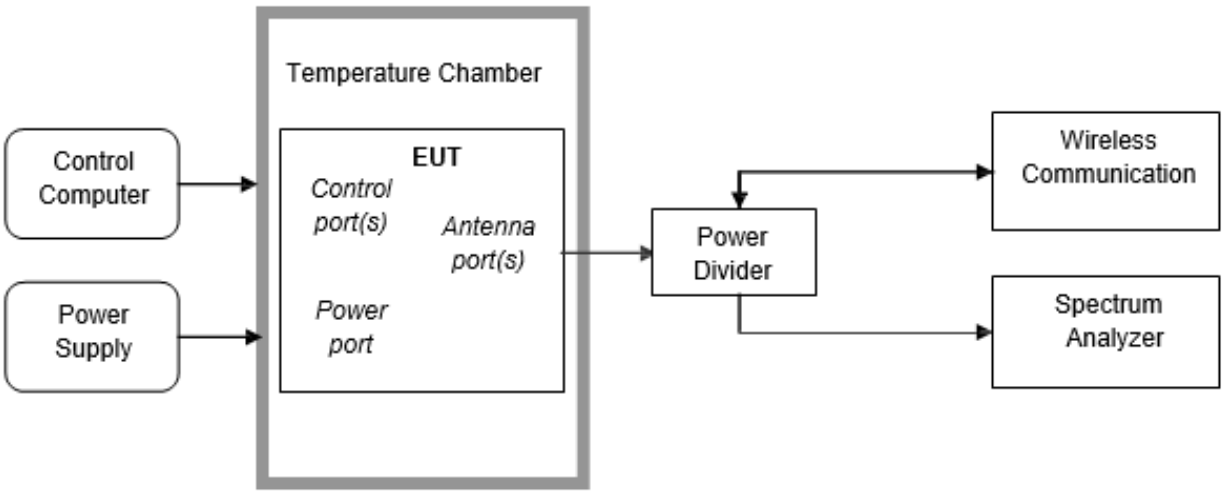
There is no transmission when the EUT operating at the test temperature condition: -30°C.

# 5. Test Setups

## 5.1 Test Setup 1



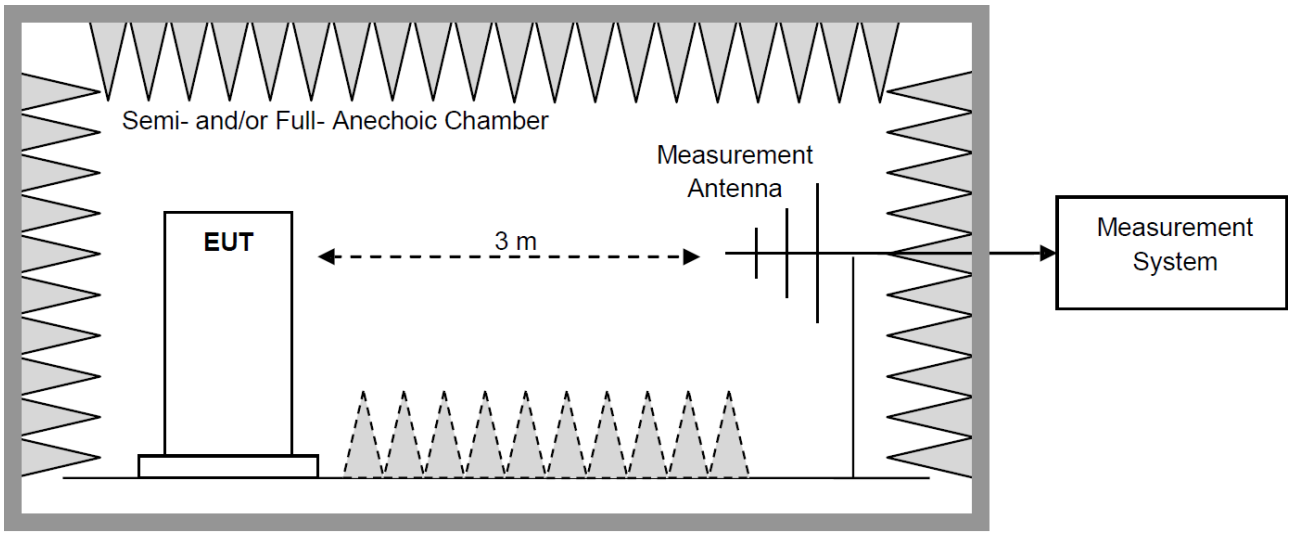

## 5.2 Test Setup 2



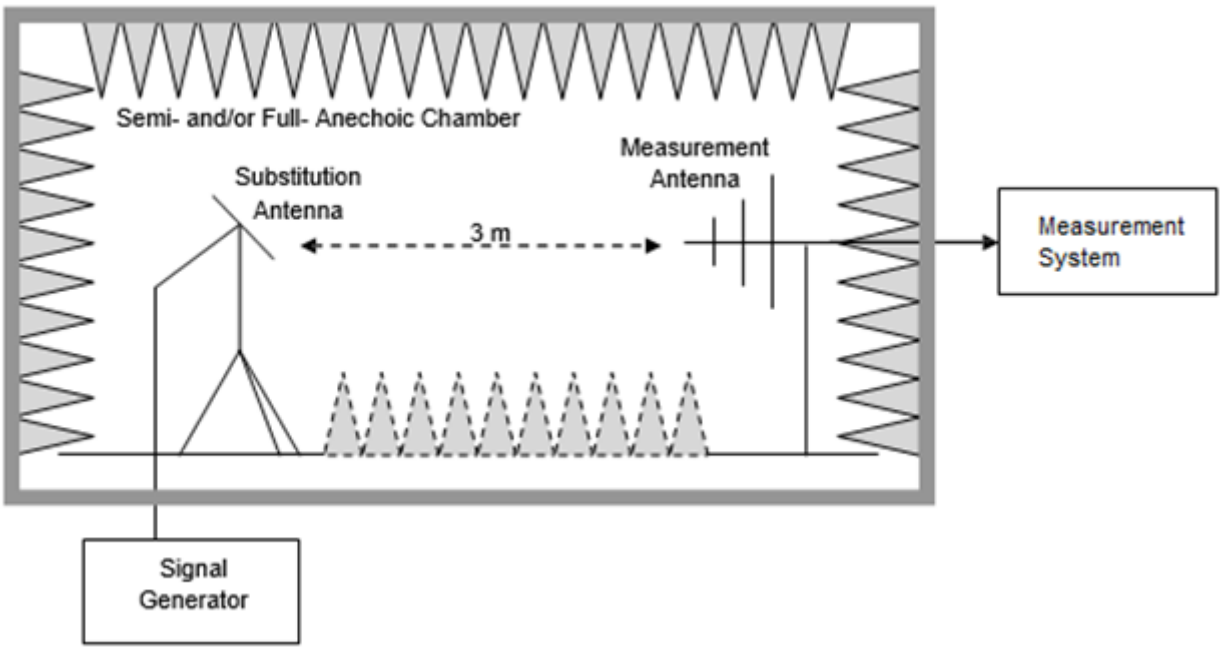
## 5.3 Test Setup 3

NOTE: Effective radiated power (ERP) and Equivalent Isotropic Radiated Power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

### 5.3.1 Step 1: Pre-test




### 5.3.2 Step 2: Substitution method to verify the maximum ERP/EIRP



## 5.4 Test Conditions

| Test Case | | Test Conditions | |
|---|---|---|---|
| Transmit Output Power Data | Average Power, Total | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| | Average Power, Spectral Density (if required) | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| Peak-to-Average Ratio (if required) | | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| Modulation Characteristics | | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | M (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| Bandwidth | Occupied Bandwidth | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| | Emission Bandwidth (if required) | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| Band Edges Compliance | | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |
| Spurious Emission at Antenna Terminals | | Test Env. | Ambient Climate & Rated Voltage |
| | | Test Setup | Test Setup 1 |
| | | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |

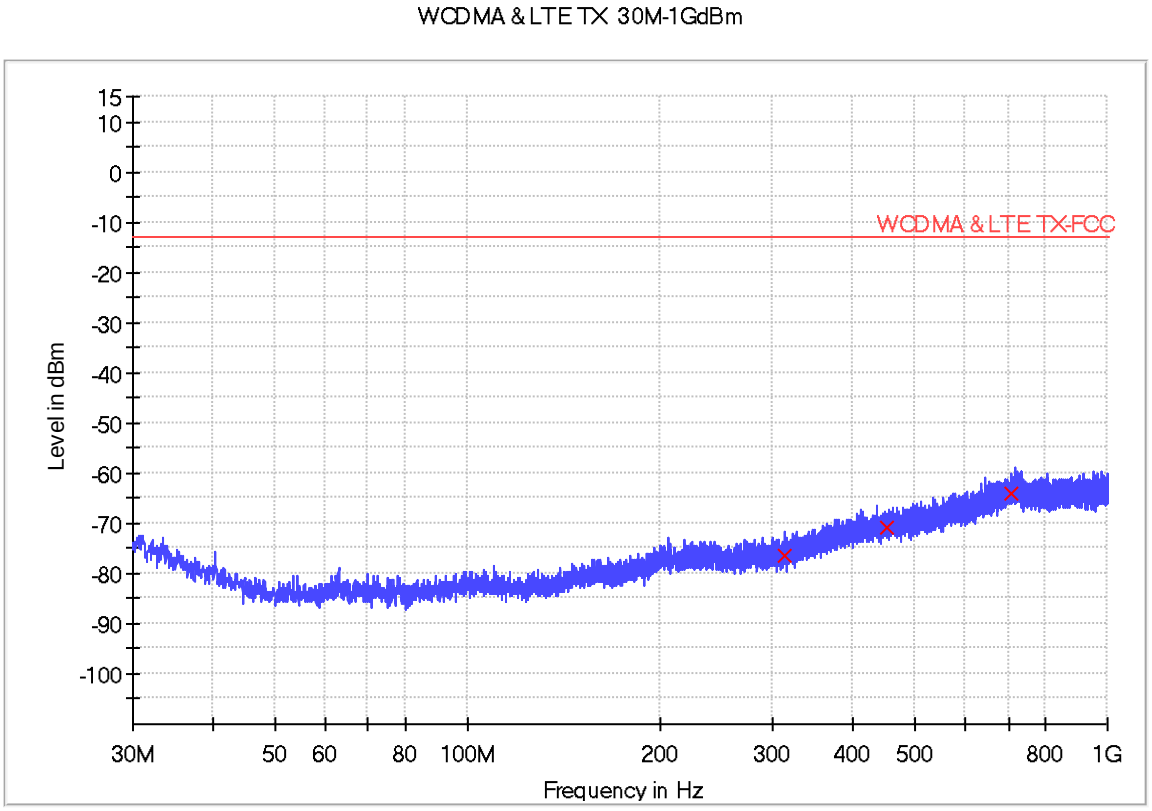
| Test Case | Test Conditions | |
|---|---|---|
| Field Strength of Spurious Radiation | Test Env. | Ambient Climate & Rated Voltage |
| | Test Setup | Test Setup 3 |
| | Test Mode | UMTS/TM1/TM2/TM3, LTE/TM1, LTE/TM2<br>NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected. |
| | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Frequency Stability | Test Env. | (1) -30 °C to +60 °C with step 10 °C at Rated Voltage;<br>(2) VL, VN and VH of Rated Voltage at Ambient Climate. |
| | Test Setup | Test Setup 2 |
| | RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| | Test Mode | UMTS/TM1, LTE/TM1, LTE/TM2 |

# 6. Test Results

## 6.1 Field Strength of Spurious

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (UMTS/TM1 WCDMA1900)

Worst-case ANT Polarity: Horizontal

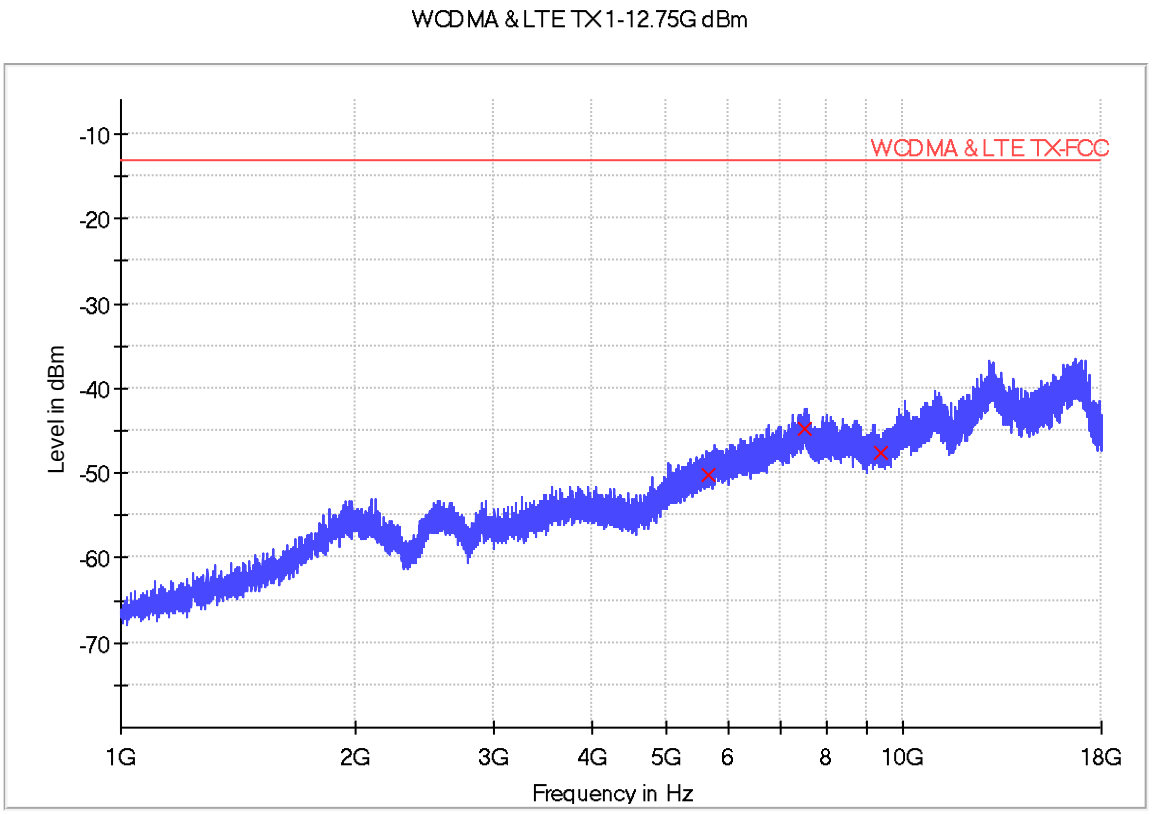



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 313.369333 | -76.6 | 1000.0 | 1000.000 | H | -76.4 | 63.6 | -13.0 |
| 453.372667 | -71.1 | 1000.0 | 1000.000 | H | -71.4 | 58.1 | -13.0 |
| 706.251667 | -64.1 | 1000.0 | 1000.000 | H | -65.4 | 51.1 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (UMTS/TM1 WCDMA1900)

Worst-case ANT Polarity: Horizontal

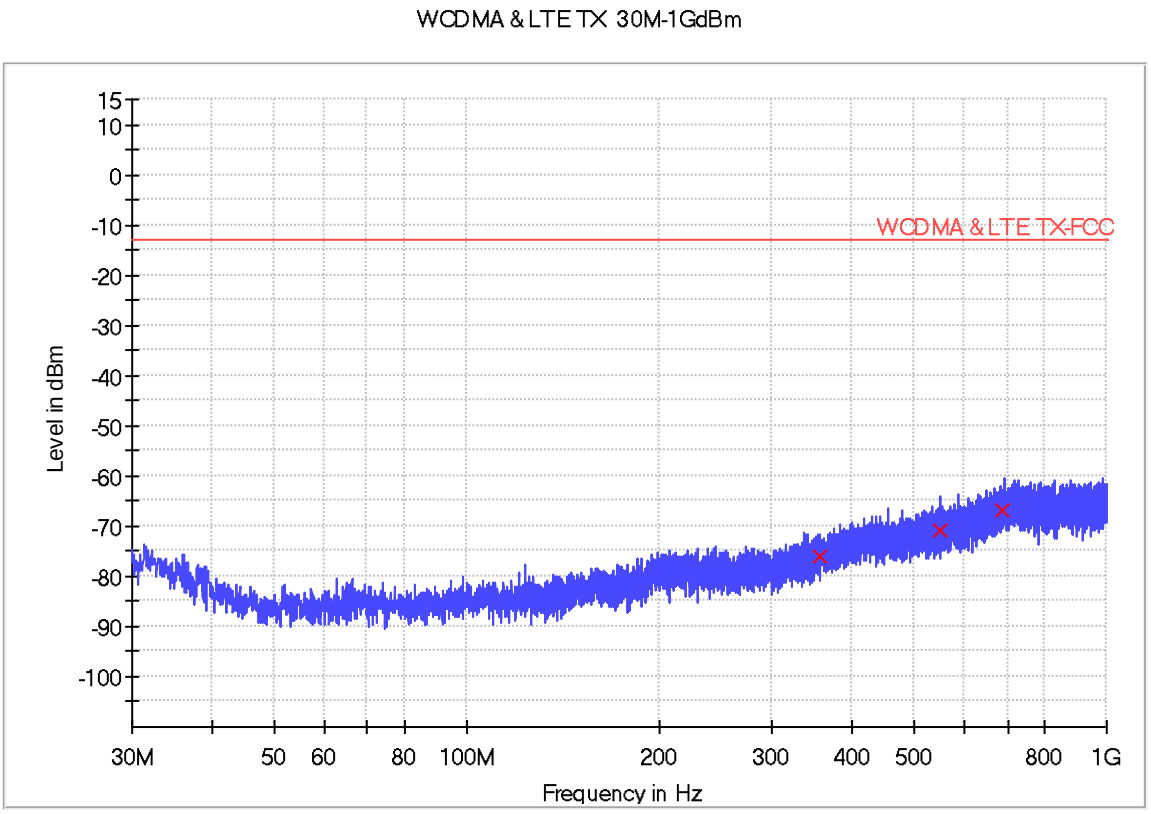



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 5640.366667 | -50.2 | 1000.0 | 1000.000 | H | -81.3 | 37.2 | -13.0 |
| 7520.766667 | -44.8 | 1000.0 | 1000.000 | H | -81.2 | 31.8 | -13.0 |
| 9400.166667 | -47.5 | 1000.0 | 1000.000 | H | -76.4 | 34.5 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (UMTS/TM1 WCDMA850)

Worst-case ANT Polarity: Horizontal

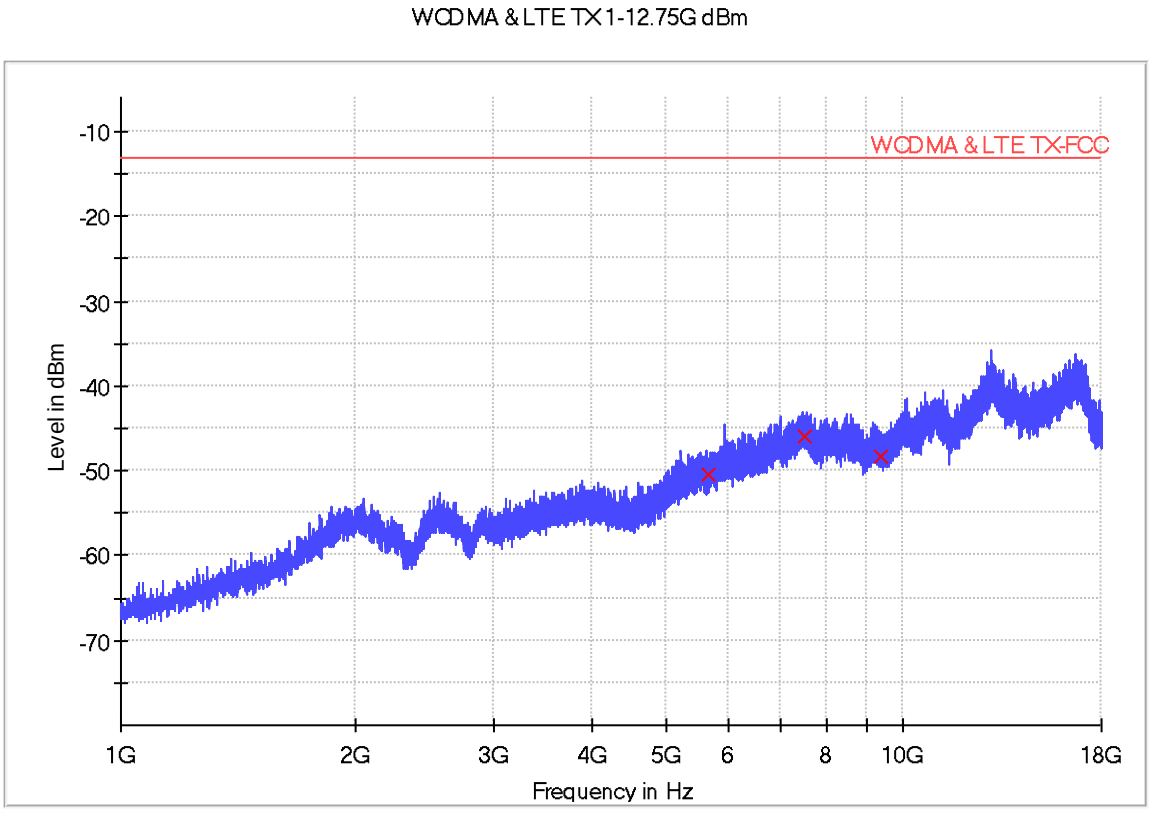



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 355.984667 | -76.1 | 1000.0 | 1000.000 | H | -74.2 | 63.1 | -13.0 |
| 549.467333 | -71.0 | 1000.0 | 1000.000 | H | -69.8 | 58 | -13.0 |
| 687.692333 | -66.7 | 1000.0 | 1000.000 | H | -65.8 | 53.7 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (UMTS/TM1 WCDMA850)

Worst-case ANT Polarity: Vertical

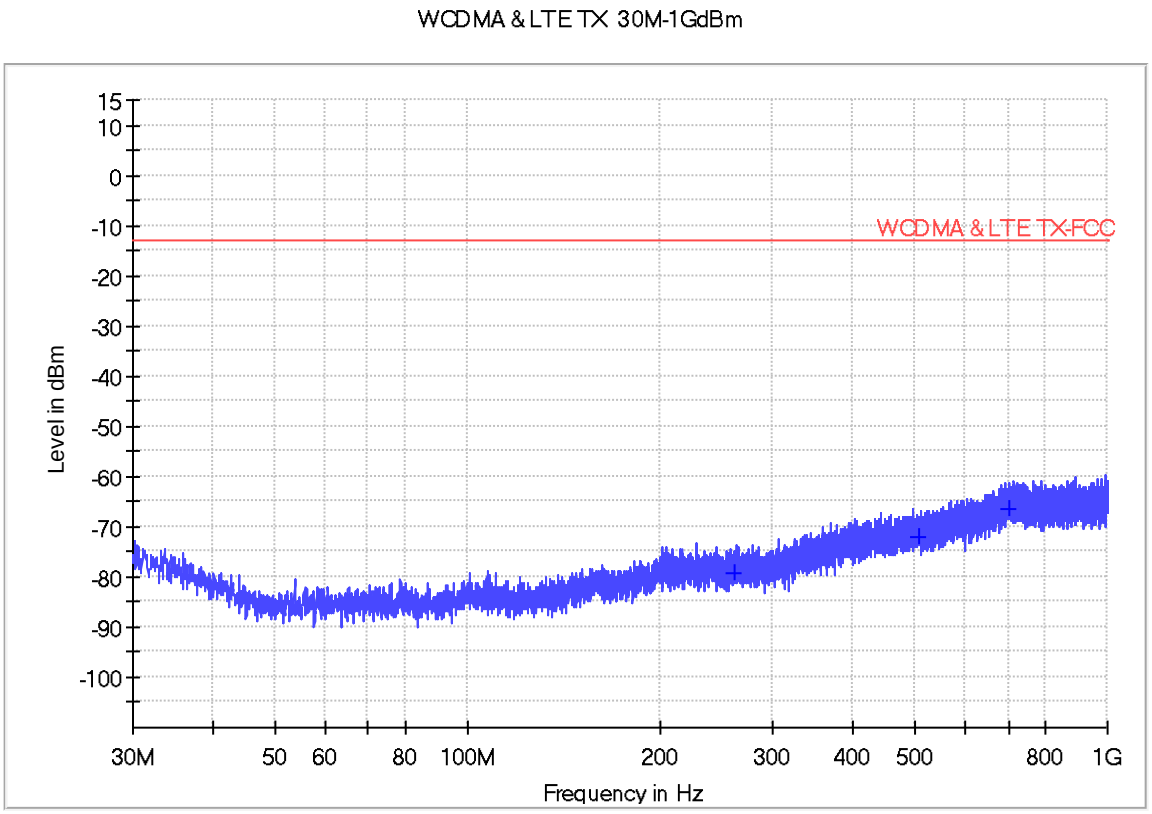



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 5640.033333 | -50.5 | 1000.0 | 1000.000 | V | -81.4 | 37.5 | -13.0 |
| 7520.700000 | -45.9 | 1000.0 | 1000.000 | V | -81.2 | 32.9 | -13.0 |
| 9400.800000 | -48.3 | 1000.0 | 1000.000 | V | -76.1 | 35.3 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 2, 15MHz)

Worst-case ANT Polarity: Horizontal

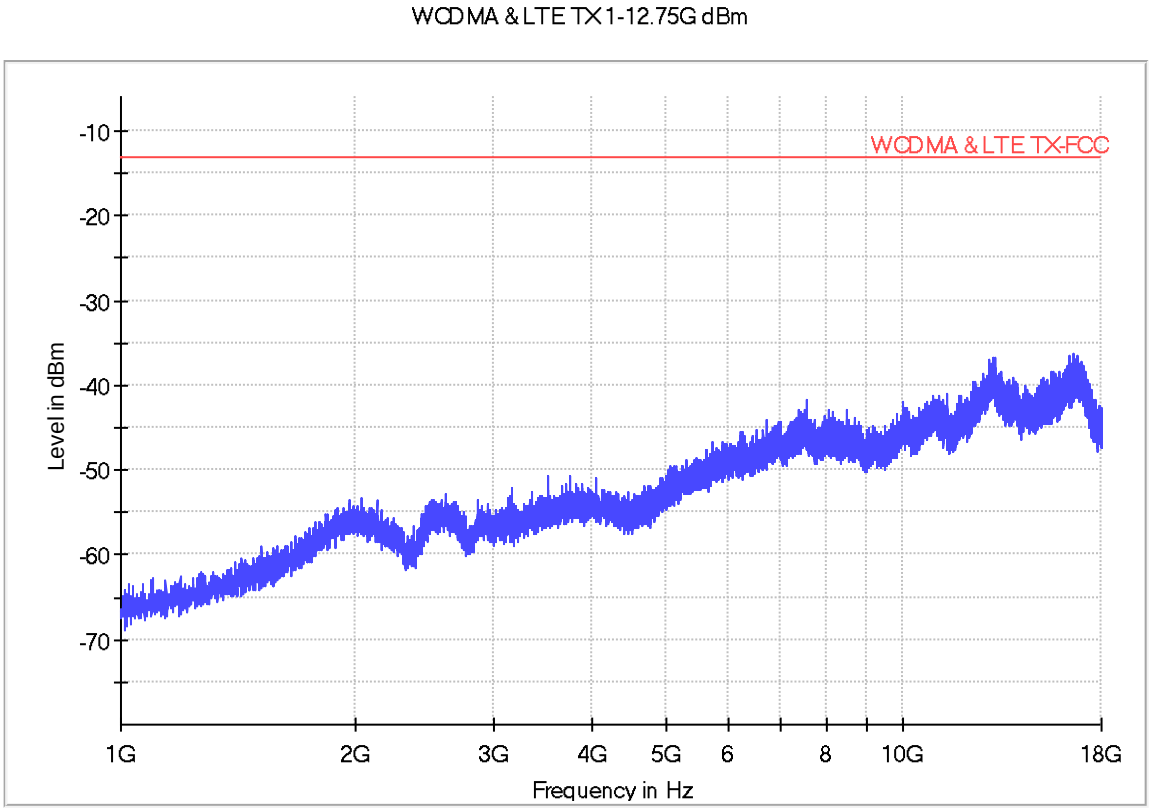



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 573.458667 | -70.3 | 1000.0 | 1000.000 | H | -69.3 | 57.3 | -13.0 |
| 712.977000 | -66.0 | 1000.0 | 1000.000 | H | -65.4 | 53.0 | -13.0 |
| 845.349667 | -67.0 | 1000.0 | 1000.000 | H | -65.4 | 54.0 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 2, 15MHz)

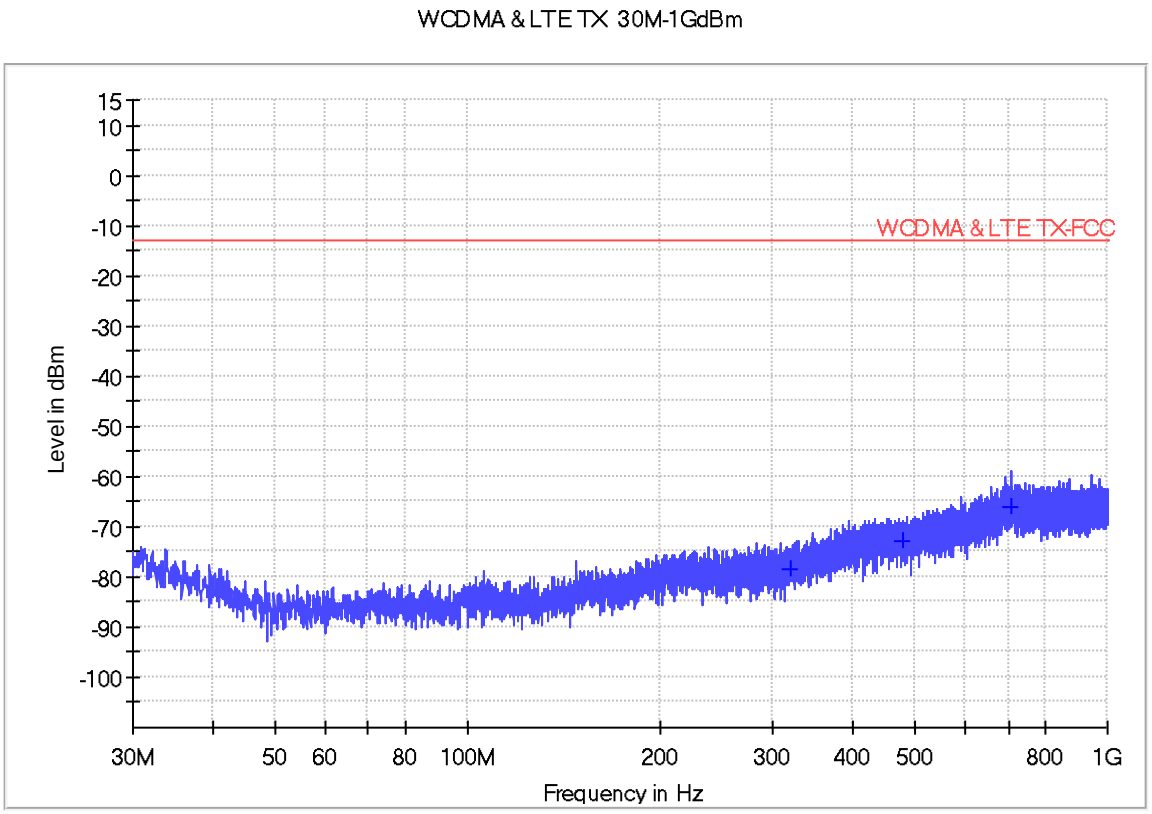
Worst-case ANT Polarity: Horizontal




Remark: The emissions were very low against the limit in the frequency above 1 GHz.

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 4, 15MHz)

Worst-case ANT Polarity: Horizontal

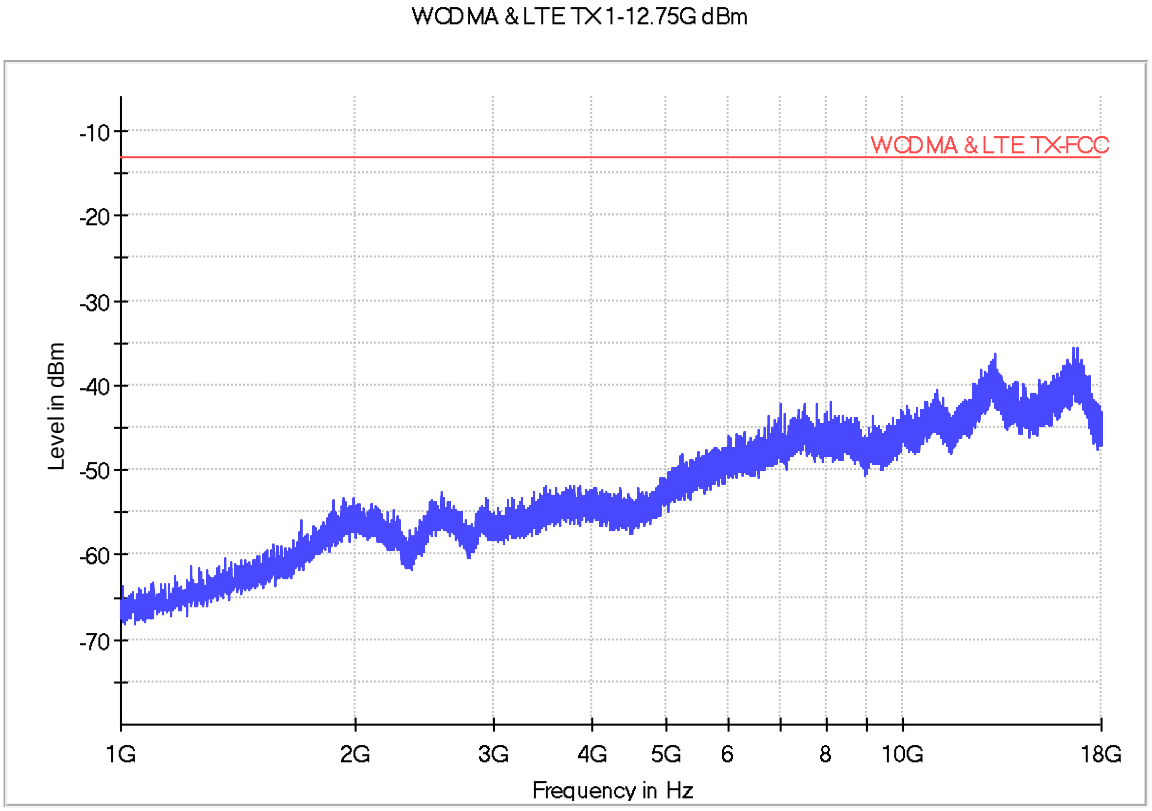



| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 318.898333 | -78.4 | 1000.0 | 1000.000 | H | -69.3 | 57.3 | -13.0 |
| 479.853667 | -72.7 | 1000.0 | 1000.000 | H | -65.4 | 53.0 | -13.0 |
| 709.097000 | -66.2 | 1000.0 | 1000.000 | H | -65.4 | 54.0 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 4, 15MHz)

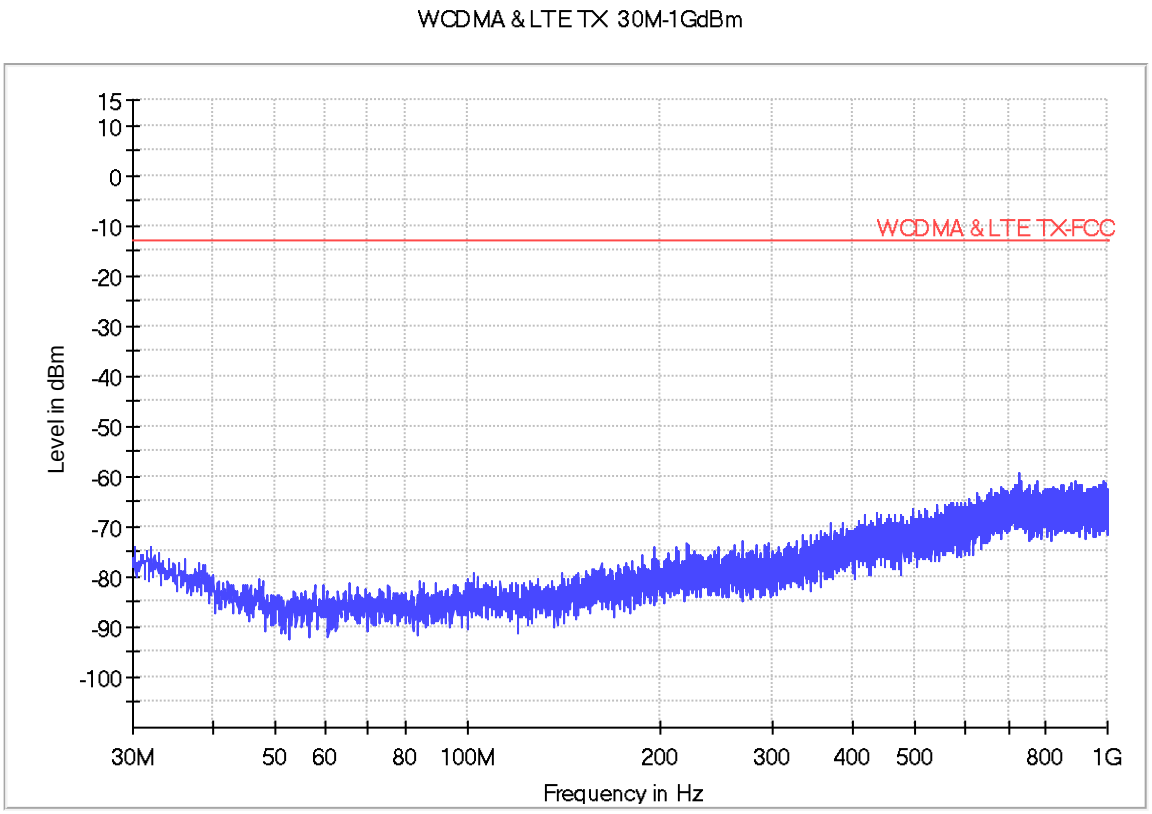
Worst-case ANT Polarity: Horizontal




Remark: The emissions were very low against the limit in the frequency above 1 GHz.

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 12, 10MHz)

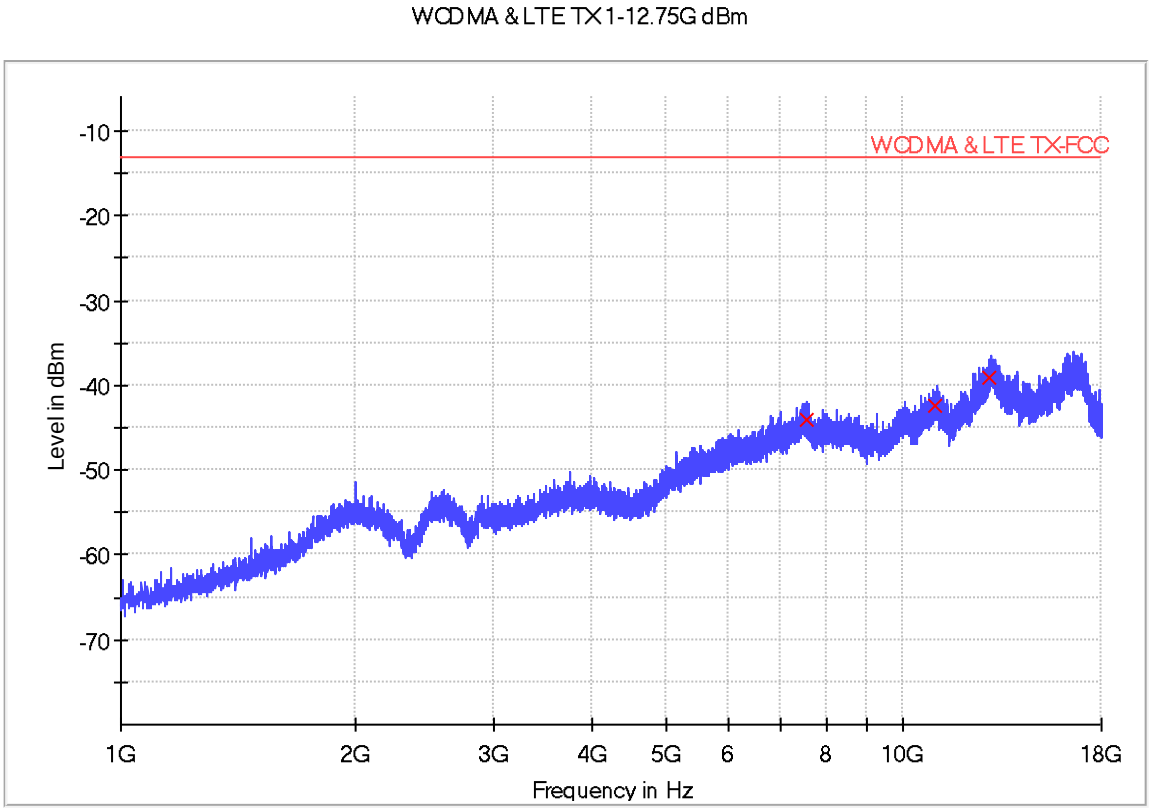
Worst-case ANT Polarity: Horizontal




Remark: The emissions were very low against the limit in the frequency range 30 MHz ~ 1 GHz.

Applicant: Shenzhen Omni Intelligent Technology Co., LTD.
Date of Test: 09 April 2022 Model: G3-EB-OM-NA-P
Worst Case Operating Mode: Transmitting (Band 12, 10MHz)

Worst-case ANT Polarity: Horizontal




| Frequency (MHz) | RMS (dBm) | Meas. Time (ms) | Bandwidth (kHz) | Pol | Corr. (dB) | Margin - RMS (dB) | Limit - RMS (dBm) |
|---|---|---|---|---|---|---|---|
| 7534.233333 | -44.0 | 1000.0 | 1000.000 | H | -69.3 | 57.3 | -13.0 |
| 11050.400000 | -42.5 | 1000.0 | 1000.000 | H | -65.4 | 53.0 | -13.0 |
| 12904.533333 | -39.2 | 1000.0 | 1000.000 | H | -65.4 | 54.0 | -13.0 |

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Limit (dBm/m) – RMS (dBm/m)

# 7. Main Test Instruments

| Main Test Equipment | | | | | |
|---|---|---|---|---|---|
| **Equip No.** | **Equipment Name** | **Manufacturer** | **Model** | **Cal Date** | **Cal- Due** |
| SZ006-27 | DC Power Supply | Keysight | E3648A | 2021-12-21 | 2022-12-21 |
| SZ065-08 | Wideband Radio Communication Tester | R & S | CMW 500 | 2021-05-10 | 2022-05-10 |
| SZ065-07 | Wideband Radio Communication Tester | R & S | CMW 500 | 2021-05-11 | 2022-05-11 |
| SZ056-07 | Signal Analyzer | R&S | FSV40 | 2021-10-25 | 2022-10-25 |
| SZ016-12 | Programmable Temperature & Humidity Chamber | TaiLi | MHK-120NK | 2022-01-05 | 2023-01-05 |
| SZ047-35 | Digital Temperature-Humidity Recorder | YiJie | RS210 | 2021-07-29 | 2022-07-29 |
| SZ061-12 | Biconilog Antenna | ETS | 3142E | 2021-08-04 | 2024-08-04 |
| SZ061-06 | Active Loop Antenna | Electro-Metrics | EM-6876 | 2021-05-18 | 2023-05-18 |
| SZ061-08 | Horn Antenna | ETS | 3115 | 2021-09-05 | 2024-09-05 |
| SZ061-07 | Pyramidal Horn Antenna | ETS | 3160-09 | 2019-08-13 | 2022-08-13 |
| SZ056-03 | Spectrum Analyzer | R&S | FSP30 | 2021-05-10 | 2022-05-10 |
| SZ185-01 | EMI Receiver | R & S | ESCI | 2021-12-20 | 2022-12-20 |
| SZ181-04 | Preamplifier | Agilent | 8449B | 2021-05-10 | 2022-05-10 |
| SZ188-01 | Anechoic Chamber | ETS | RFD-F/A-100 | 2021-12-12 | 2024-12-12 |
| SZ062-02 | RF Cable | RADIALL | RG 213U | 2021-11-26 | 2022-05-26 |
| SZ062-05 | RF Cable | RADIALL | 0.04-26.5GHz | 2021-11-26 | 2022-05-26 |
| SZ062-12 | RF Cable | RADIALL | 0.04-26.5GHz | 2021-11-26 | 2022-05-26 |
| SZ067-04 | Notch Filter | Micro-Tronics | BRM50702-02 | 2021-05-11 | 2022-05-11 |

| Software Information | | | |
|---|---|---|---|
| **Test Item** | **Software Name** | **Manufacturer** | **Version** |
| RSE | EMC32 | R&S | V8.40.0 |
| Conducted RF | JS1120 RF Test System | Shenzhen JS tonscend co., Ltd | 2.6.9.0518 |

# 8. Measurement Uncertainty

For a 95% confidence level (k = 2), the measurement expanded uncertainties for defined systems, in accordance with

the recommendations of ISO 17025 as following:

| Test Item | | Extended Uncertainty |
|---|---|---|
| Transmit Output Power Data | Power [dBm] | U = 0.42 dB |
| Peak-Average | Power [dBm] | U = 0.42 dB |
| Bandwidth | Magnitude [%] | U = 0.2% |
| Band Edge Compliance | Disturbance Power [dBm] | U = 1.24 dB |
| Spurious Emissions, Conducted | Disturbance Power [dBm] | U = 1.62 dB |
| Field Strength of Spurious Radiation | ERP [dBm] | For 3 m Chamber:<br>U = 4.9 dB (30 MHz to 26.5GHz) |
| Frequency Stability | Frequency Accuracy [ppm] | U = 0.017 ppm |

# 9. Appendixes

| Appendix No. | Description |
|---|---|
| Appendix of 220328043SZN-3G | Appendix for WCDMA |
| Appendix of 220328043SZN-4G | Appendix for LTE B2, B4, B12 |

**********End of Report**********