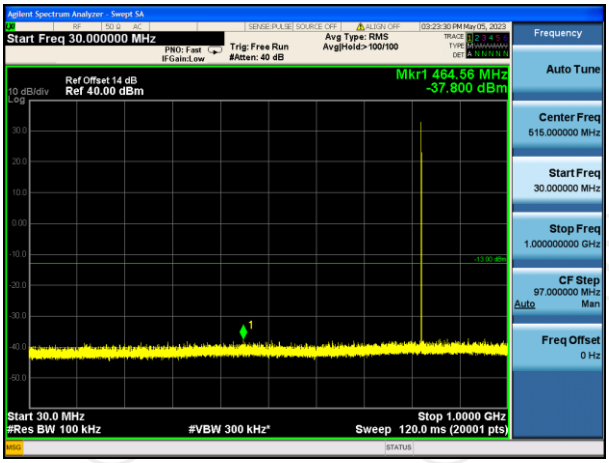
| Band: | WCDMA Band II | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|---|---|---|---|

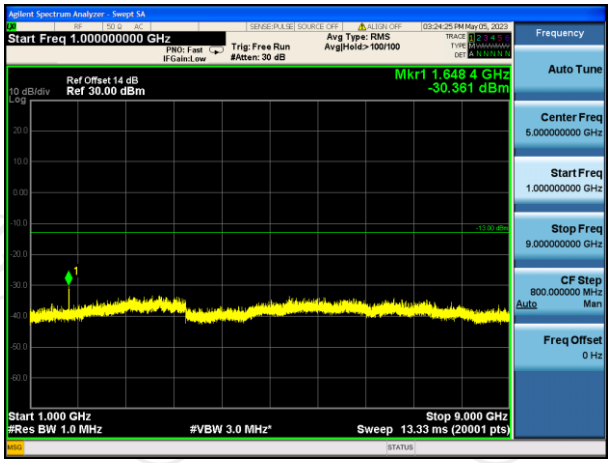
Lower Band Edge Plot on Channel 9262

Higher Band Edge Plot on Channel 9538

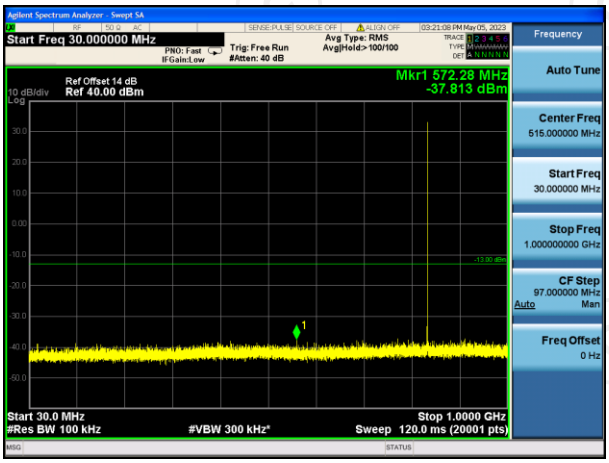
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|---|---|---|---|

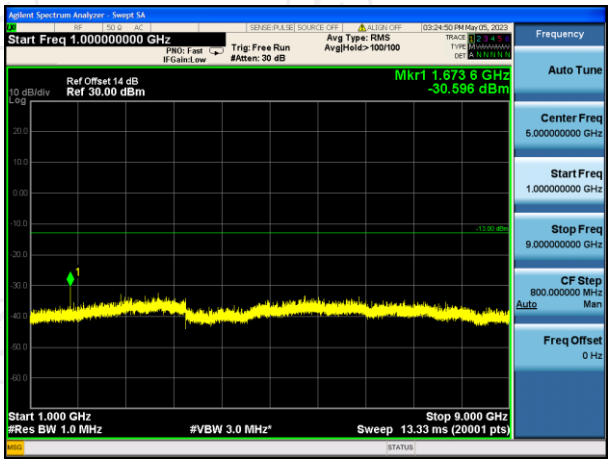
Conducted Spurious Emission on Channel 128



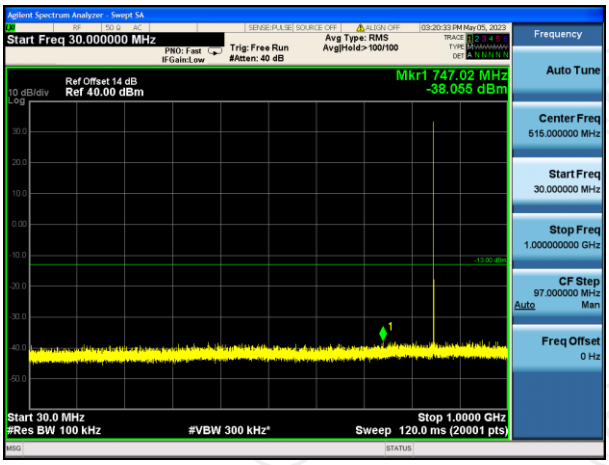



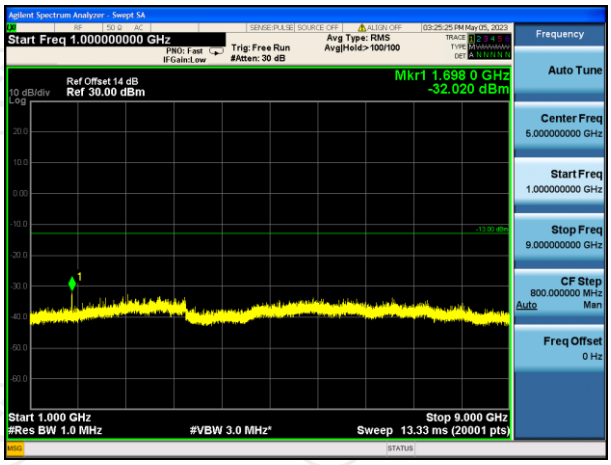

Conducted Spurious Emission on Channel 190



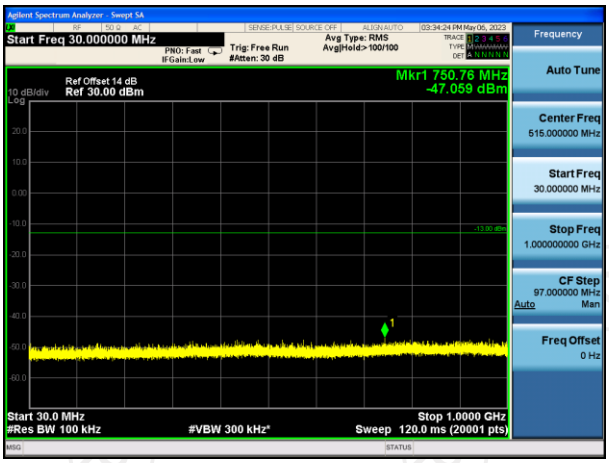

Conducted Spurious Emission on Channel 251

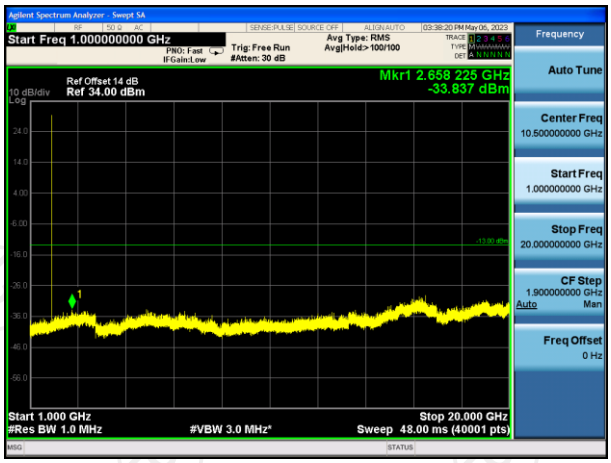


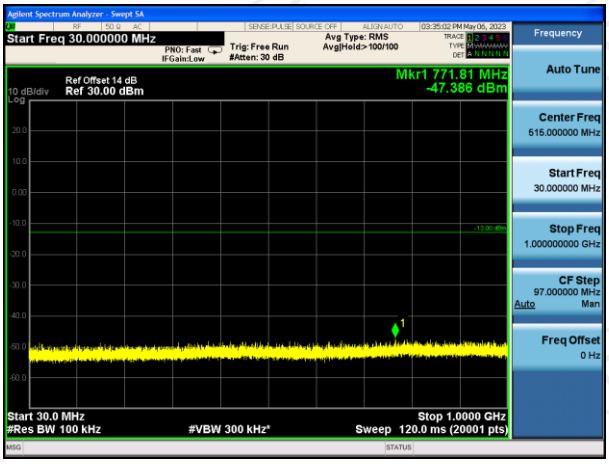
| Band: | GSM 1900 | Test Mode: | GSM Link (GMSK) |
|---|---|---|---|

Conducted Spurious Emission on Channel 512

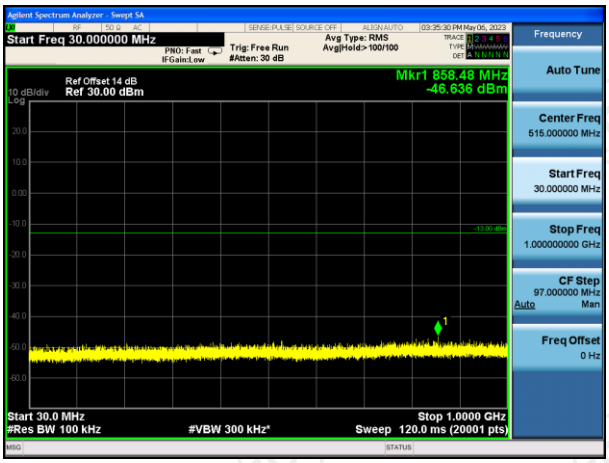



Conducted Spurious Emission on Channel 661

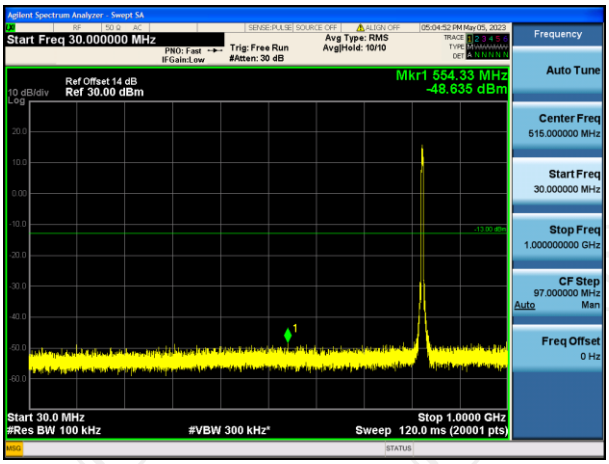


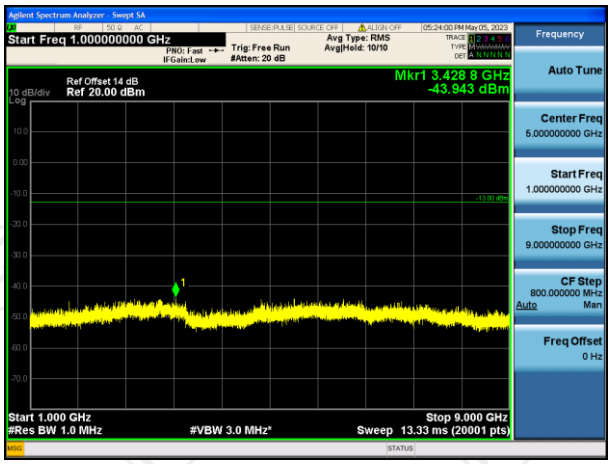
Conducted Spurious Emission on Channel 810



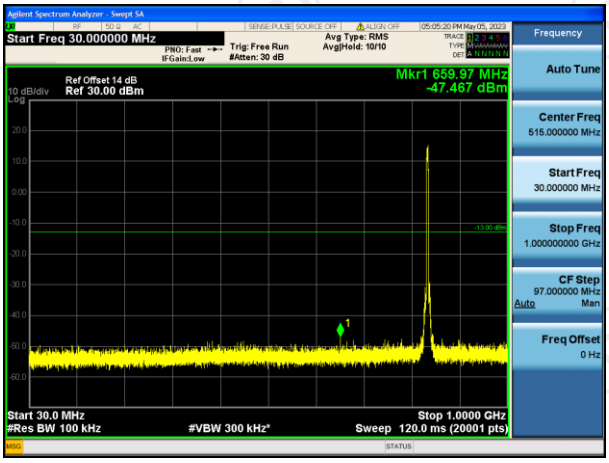
| Band: | WCDMA Band V | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|---|---|---|---|

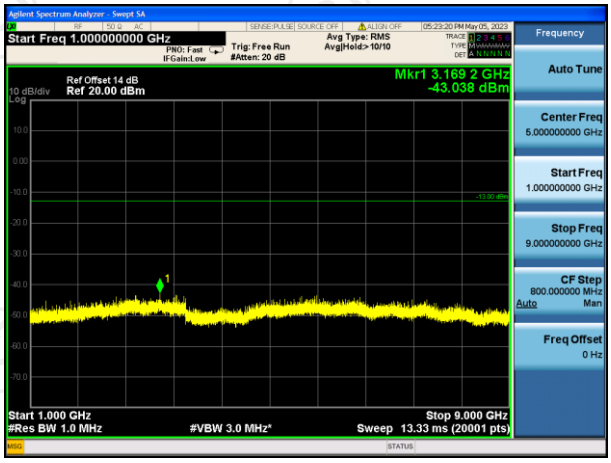
Conducted Spurious Emission on Channel 4132



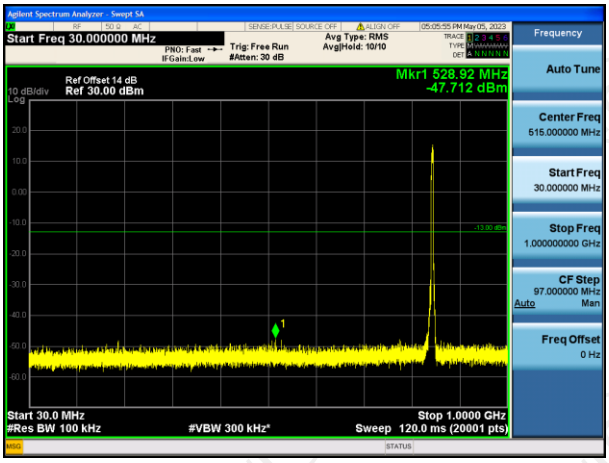



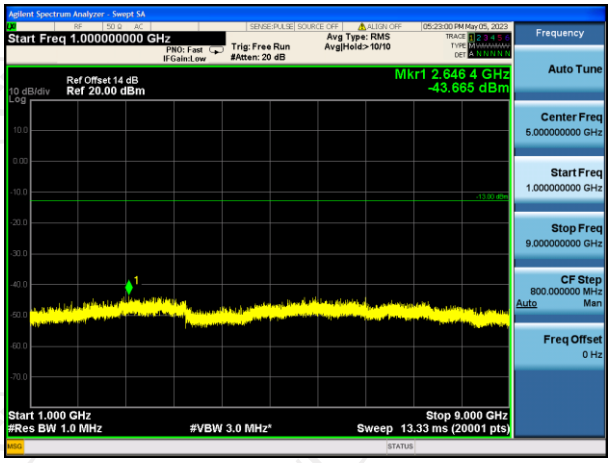

Conducted Spurious Emission on Channel 4183



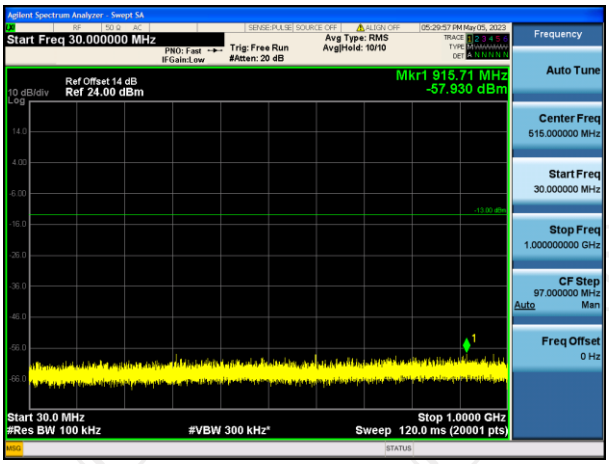

Conducted Spurious Emission on Channel 4233

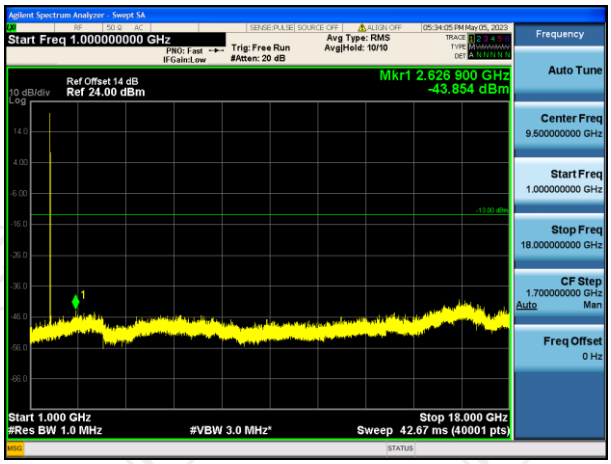


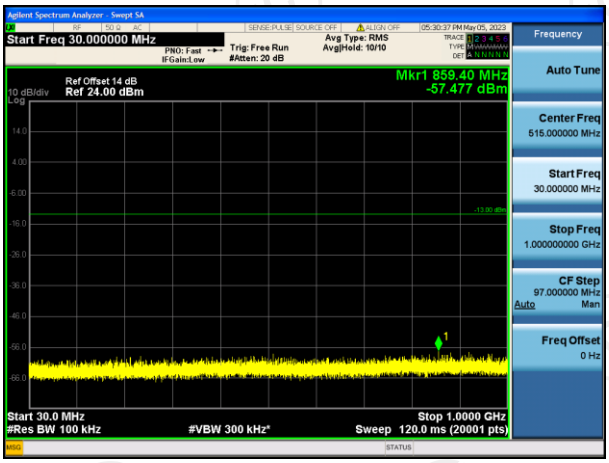
| Band: | WCDMA Band IV | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|---|---|---|---|

Conducted Spurious Emission on Channel 1312

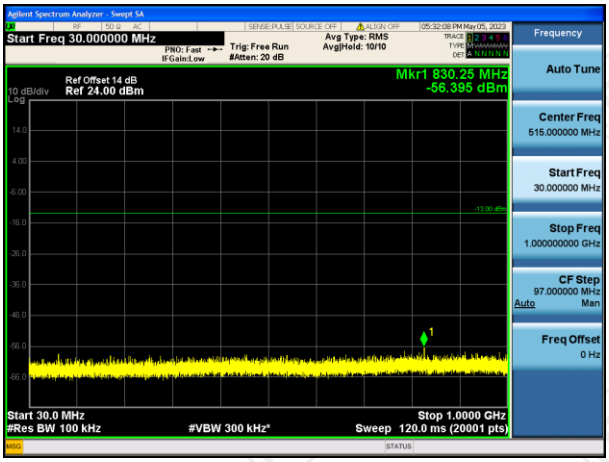



Conducted Spurious Emission on Channel 1413

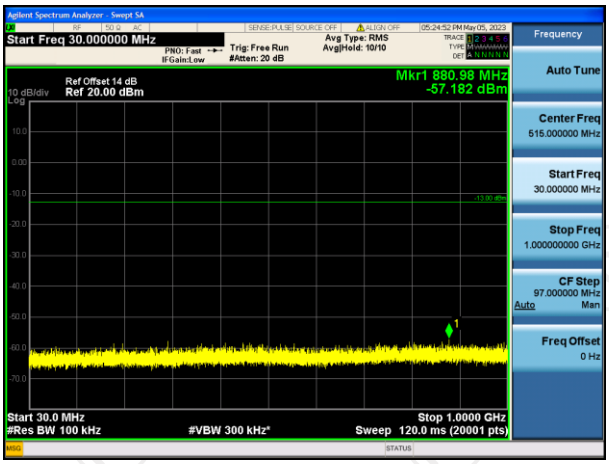


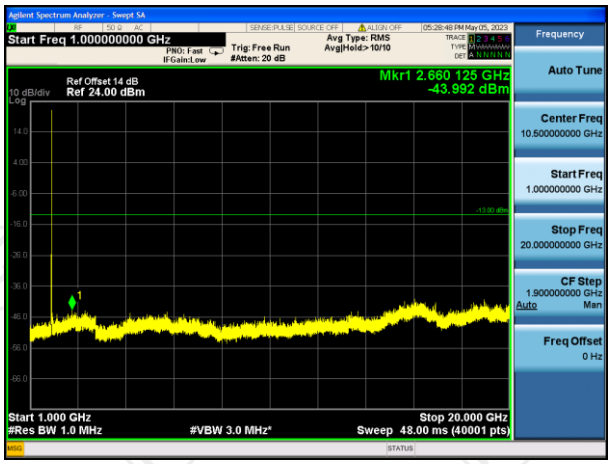
Conducted Spurious Emission on Channel 1513



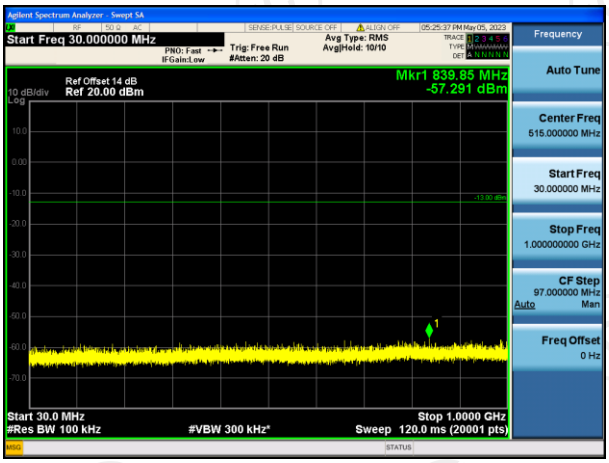
| Band: | WCDMA Band II | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|---|---|---|---|

Conducted Spurious Emission on Channel 9262

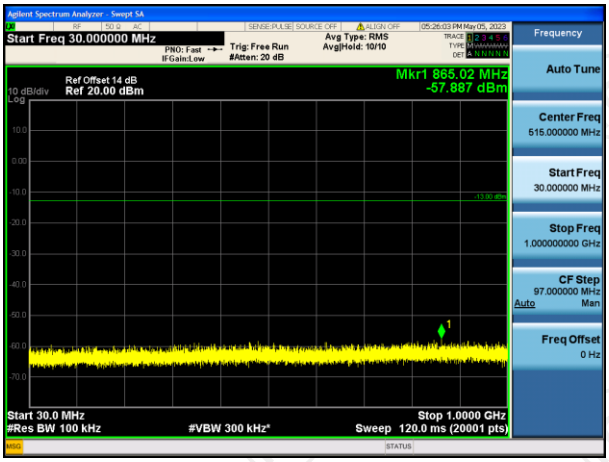



Conducted Spurious Emission on Channel 9400



Conducted Spurious Emission on Channel 9538



| GSM1900(GSM) Conducted Spurious Emission for Below 1G | | | | | |
|---|---|---|---|---|---|
| **Channel** | **RBW (KHz)** | **Test result (dBm)** | **RBW (MHz)** | **Calculate result (dBm)** | **Limit (-13dBm)** |
| 512 | 100 | -47.06 | 1 | -37.06 | Pass |
| 661 | 100 | -47.39 | 1 | -37.39 | Pass |
| 810 | 100 | -46.64 | 1 | -36.64 | Pass |
| WCDMA Band II(RMC 12.2Kbps) Conducted Spurious Emission for Below 1G | | | | | |
| **Channel** | **RBW (KHz)** | **Test result (dBm)** | **RBW (MHz)** | **Calculate result (dBm)** | **Limit (-13dBm)** |
| 9262 | 100 | -57.18 | 1 | -47.18 | Pass |
| 9400 | 100 | -57.29 | 1 | -47.29 | Pass |
| 9538 | 100 | -57.89 | 1 | -47.89 | Pass |
| WCDMA Band IV(RMC 12.2Kbps) Conducted Spurious Emission for Below 1G | | | | | |
| **Channel** | **RBW (KHz)** | **Test result (dBm)** | **RBW (MHz)** | **Calculate result (dBm)** | **Limit (-13dBm)** |
| 1312 | 100 | -57.93 | 1 | -47.93 | Pass |
| 1413 | 100 | -57.48 | 1 | -47.48 | Pass |
| 1513 | 100 | -56.40 | 1 | -46.40 | Pass |
| *Compensate 10dB is for Exchange rate of RBW*<br>*Exchange rate of RBW = 10*log10(Reference bandwidth/RBW at measurement) =10[dB]*<br>*where Reference bandwidth = 1 MHz* | | | | | |

***Note:*** *Measurements were conducted in all GMSK modulation (GSM/GPRS/EGPRS) and the worst case Mode (GSM) was submitted only.*

## 5.5. Effective Radiated Power and Effective Isotropic Radiated Power Measurement

### 5.5.1. Test Specification

**Test Requirement:**

FCC part 22.913(a) and FCC part 24.232(c)
FCC part 27.50(d)

**Test Method:**

FCC KDB 971168 D01v03r01

**Receiver Setup:**

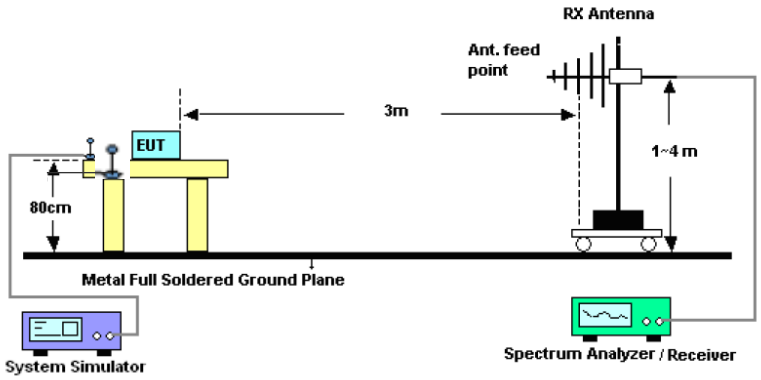
| | GSM/GPRS/EDGE | WCDMA/HSPA |
|---|---|---|
| SPAN | 500kHz | 10MHz |
| RBW | 10kHz | 100kHz |
| VBW | 30kHz | 300kHz |
| Detector | RMS | RMS |
| Trace | Average | Average |
| Average Type | Power | Power |
| Sweep Count | 100 | 100 |

**Limit:**

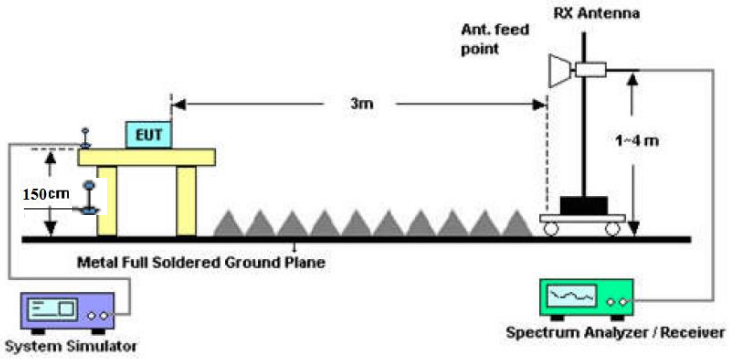
GSM850: 7W ERP
PCS1900: 2W EIRP
WCDMA Band V: 7W ERP
WCDMA Band II: 2W EIRP
WCDMA Band IV: 1W EIRP

**Test Setup:**

From 30MHz to 1GHz




Above 1GHz



| | |
|---|---|
| **Test Procedure:** | 1. The testing follows FCC KDB 971168 D01v03r01 Section 5.8. and ANSI / TIA-603-D-2010 Section 2.2.17.<br>2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01v03.<br>3. Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment.<br>4. Replace the transmitter under test with a substitution antenna. The center of the antenna should be at the same location as the center of the antenna under test.<br>5. Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.<br>LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)<br>6. Determine the effective radiated output power at each angular position from the readings in steps 3) and 5) using the following equation:<br>ERP (dBm) = LVL (dBm) + LOSS (dB)<br>7. The maximum ERP is the maximum value determined in the preceding step.<br>8. Calculating ERP:<br>ERP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBd)<br>Antenna Gain (dBd) = Antenna Gain (dBi) - 2.15<br>EIRP = ERP + 2.15 |
| **Test results:** | PASS |

### 5.5.2. Test Instruments

| Radiated Emission Test Site (966) | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Universal Radio Communication Tester | R&S | CMU200 | 110188 | Jul. 04, 2023 |
| Spectrum Analyzer | R&S | FSQ40 | 200061 | Jul. 03, 2023 |
| Signal Generator | HP | 83623B | 3614A00396 | Feb. 24, 2024 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Jul. 05, 2023 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 412 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 1201 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | 00956 | Feb. 24, 2024 |
| Coaxial cable | SKET | RC-18G-N-M | / | Feb. 24, 2024 |
| Coaxial cable | SKET | RC_40G-K-M | / | Feb. 24, 2024 |
| Antenna Mast | Keleto | RE-AM | / | / |
| EMI Test Software | Shurple Technology | EZ-EMC | / | / |

### 5.5.3. Test Data

**Test Result of ERP**

| GSM850 (GSM) Radiated Power ERP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 10.47 | 21.66 | 29.98 | 1.00 |
| 836.6 | H | 10.55 | 21.54 | 29.94 | 0.99 |
| 848.8 | H | 10.82 | 21.46 | 30.13 | 1.03 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 10.39 | 21.66 | 29.90 | 0.98 |
| 836.6 | H | 10.59 | 21.54 | 29.98 | 1.00 |
| 848.8 | H | 10.71 | 21.46 | 30.02 | 1.00 |

| GPRS 850 (1-solt) Radiated Power ERP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 10.56 | 21.66 | 30.07 | 1.02 |
| 836.6 | H | 10.74 | 21.54 | 30.13 | 1.03 |
| 848.8 | H | 10.98 | 21.46 | 30.29 | 1.07 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 10.49 | 21.66 | 30.00 | 1.00 |
| 836.6 | H | 10.67 | 21.54 | 30.06 | 1.01 |
| 848.8 | H | 11.02 | 21.46 | 30.33 | 1.08 |

| EGPRS 850 (1-solt) Radiated Power ERP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 4.47 | 21.66 | 23.98 | 0.25 |
| 836.6 | H | 4.68 | 21.54 | 24.07 | 0.26 |
| 848.8 | H | 4.92 | 21.46 | 24.23 | 0.26 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 824.2 | H | 4.58 | 21.66 | 24.09 | 0.26 |
| 836.6 | H | 4.81 | 21.54 | 24.20 | 0.26 |
| 848.8 | H | 5.05 | 21.46 | 24.36 | 0.27 |

***Note**: All GPRS slot have been tested, but only the worst GPRS 1-slot show in this test item.*
***Note**: All EGPRS slot have been tested, but only the worst EGPRS 1-slot show in this test item.*

| WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 826.4 | H | 1.03 | 21.66 | 20.54 | 0.11 |
| 836.6 | H | 1.27 | 21.54 | 20.66 | 0.12 |
| 846.6 | H | 1.55 | 21.46 | 20.86 | 0.12 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **ERP (dBm)** | **ERP (W)** |
| 826.4 | H | 1.08 | 21.66 | 20.59 | 0.11 |
| 836.6 | H | 1.15 | 21.54 | 20.54 | 0.11 |
| 846.6 | H | 1.37 | 21.46 | 20.68 | 0.12 |

***Note**: * ERP = LVL (dBm) + Correction Factor (dB) - 2.15*
*Correction Factor= S.G. Power - Cable loss + Antenna Gain- SPA. Reading*

**Test Result of EIRP**

| GSM1900 (GSM) Radiated Power EIRP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 7.51 | 21.66 | 29.17 | 0.83 |
| 1880.0 | H | 7.74 | 21.54 | 29.28 | 0.85 |
| 1909.8 | H | 7.93 | 21.46 | 29.39 | 0.87 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 7.42 | 21.66 | 29.08 | 0.81 |
| 1880.0 | H | 7.78 | 21.54 | 29.32 | 0.86 |
| 1909.8 | H | 8.01 | 21.46 | 29.47 | 0.89 |

| GPRS1900 (1-solt) Radiated Power EIRP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 7.39 | 21.66 | 29.05 | 0.80 |
| 1880.0 | H | 7.58 | 21.54 | 29.12 | 0.82 |
| 1909.8 | H | 7.86 | 21.46 | 29.32 | 0.86 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 7.51 | 21.66 | 29.17 | 0.83 |
| 1880.0 | H | 7.74 | 21.54 | 29.28 | 0.85 |
| 1909.8 | H | 8.02 | 21.46 | 29.48 | 0.89 |

| EGPRS1900 (1-solt) Radiated Power EIRP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 3.61 | 21.66 | 25.27 | 0.34 |
| 1880.0 | H | 3.87 | 21.54 | 25.41 | 0.35 |
| 1909.8 | H | 4.02 | 21.46 | 25.48 | 0.35 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.2 | H | 3.72 | 21.66 | 25.38 | 0.35 |
| 1880.0 | H | 3.81 | 21.54 | 25.35 | 0.34 |
| 1909.8 | H | 4.06 | 21.46 | 25.52 | 0.36 |

***Note**: All GPRS slot have been tested, but only the worst GPRS 1-slot show in this test item*
***Note**: All EGPRS slot have been tested, but only the worst EGPRS 1-slot show in this test item*

| WCDMA Band IV (RMC 12.2Kbps) Radiated Power EIRP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1712.4 | H | 1.02 | 21.66 | 22.68 | 0.19 |
| 1732.6 | H | 1.17 | 21.54 | 22.71 | 0.19 |
| 1752.6 | H | 1.45 | 21.46 | 22.91 | 0.20 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1712.4 | H | 1.05 | 21.66 | 22.71 | 0.19 |
| 1732.6 | H | 1.24 | 21.54 | 22.78 | 0.19 |
| 1752.6 | H | 1.41 | 21.46 | 22.87 | 0.19 |

** EIRP = LVL (dBm) + Correction Factor (dB)*
*Correction Factor= S.G. Power - Cable loss + Antenna Gain- SPA. Reading*

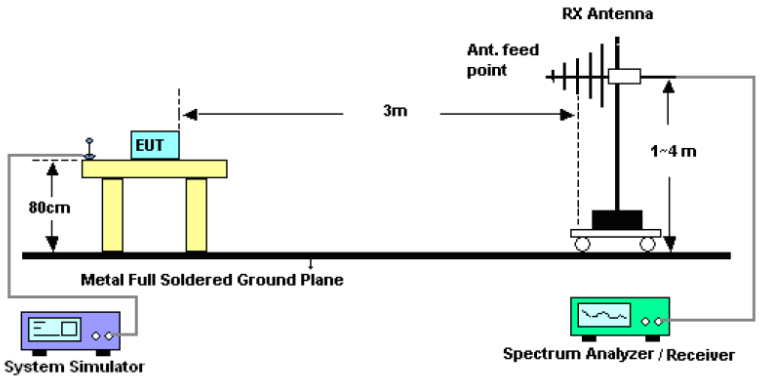
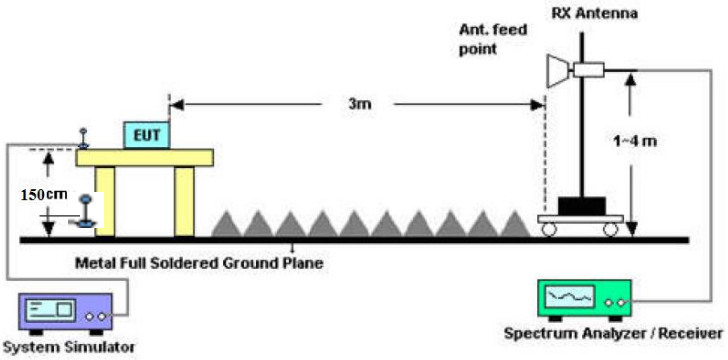
| WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP | | | | | |
|---|---|---|---|---|---|
| Horizontal Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1852.4 | H | 2.05 | 21.66 | 23.71 | 0.23 |
| 1880.0 | H | 2.27 | 21.54 | 23.81 | 0.24 |
| 1907.6 | H | 2.41 | 21.46 | 23.87 | 0.24 |
| Vertical Polarization (Antenna Pol.) | | | | | |
| **Frequency (MHz)** | **(EUT Pol.)** | **LVL (dBm)** | **Correction Factor (dB)** | **EIRP (dBm)** | **EIRP (W)** |
| 1852.4 | H | 2.09 | 21.66 | 23.75 | 0.24 |
| 1880.0 | H | 2.17 | 21.54 | 23.71 | 0.23 |
| 1907.6 | H | 2.43 | 21.46 | 23.89 | 0.24 |

***Note***：** EIRP = LVL (dBm) + Correction Factor (dB)*
*Correction Factor= S.G. Power - Cable loss + Substitution Antenna Gain- SPA. Reading*


Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

## 5.6. Field Strength of Spurious Radiation Measurement

### 5.6.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC part 22.917(a) and FCC part 24.238(a)<br>FCC part 27.53(g) |
| **Test Method:** | FCC KDB 971168 D01v03r01 |
| **Operation mode:** | Refer to item 3.1 |
| **Limit:** | -13dBm |
| **Test setup:** | For 30MHz~1GHz<br>  <br><br>Above 1GHz<br>  <br> |
| **Test Procedure:** | 1. The testing follows FCC KDB 971168 D01v03r01 Section 6 and ANSI / TIA-603-D-2010 Section 2.2.12.<br>2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.<br>3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.<br>4. The table was rotated 360 degrees to determine the position of the highest spurious emission.<br>5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.<br>6. Make the measurement with the spectrum analyzer's |

| | |
|---|---|
| | RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.<br>7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.<br>8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.<br>9. Taking the record of output power at antenna port.<br>10. Repeat step 7 to step 8 for another polarization.<br>11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain<br>12. ERP (dBm) = EIRP - 2.15<br>13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.<br>14. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)<br>= P(W) - [43 + 10log(P)] (dB)<br>= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)<br>= -13dBm. |
| **Test results:** | PASS |
| **Remark:** | All modulations have been tested, but only the worst modulation show in this test item. |

### 5.6.2. Test Instruments

| Radiated Emission Test Site (966) | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Universal Radio Communication Tester | R&S | CMU200 | 110188 | Jul. 04, 2023 |
| Spectrum Analyzer | R&S | FSQ40 | 200061 | Jul. 03, 2023 |
| Signal Generator | HP | 83623B | 3614A00396 | Feb. 24, 2024 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Jul. 05, 2023 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 412 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 1201 | Jul. 05, 2023 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | 00956 | Feb. 24, 2024 |
| Coaxial cable | SKET | RC-18G-N-M | / | Feb. 24, 2024 |
| Coaxial cable | SKET | RC_40G-K-M | / | Feb. 24, 2024 |
| Antenna Mast | Keleto | RE-AM | / | / |
| EMI Test Software | Shurple Technology | EZ-EMC | / | / |

### 5.6.3. Test Data

**Frequency Range (9 kHz-30MHz)**

| Frequency (MHz) | Level@3m (dBμV/m) | Limit@3m (dBμV/m) |
|---|---|---|
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

***Note:*** *1. Emission Level=Reading+ Cable loss+Antenna factor-Amp factor*

*2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement*

| Band | GSM 850 | Test channel: | Lowest |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1648.4 | Vertical | -59.15 | 23.12 | -36.03 | -13.00 | PASS |
| 2472.6 | V | -67.07 | 23.20 | -43.87 | | |
| 3296.8 | V | -79.39 | 23.28 | -56.11 | | |
| 1648.4 | Horizontal | -58.97 | 23.12 | -35.85 | | |
| 2472.6 | H | -65.51 | 23.20 | -42.31 | | |
| 3296.8 | H | -78.76 | 23.28 | -55.48 | | |

| Band | GSM 850 | Test channel: | Middle |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1673.2 | Vertical | -59.98 | 23.17 | -36.81 | -13.00 | PASS |
| 2509.8 | V | -70.60 | 23.26 | -47.34 | | |
| 3346.4 | V | -79.46 | 23.38 | -56.08 | | |
| 1673.2 | Horizontal | -58.94 | 23.17 | -35.77 | | |
| 2509.8 | H | -67.43 | 23.26 | -44.17 | | |
| 3346.4 | H | -80.37 | 23.38 | -56.99 | | |

| Band | GSM 850 | Test channel: | Highest |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1697.6 | Vertical | -61.51 | 23.23 | -38.28 | -13.00 | PASS |
| 2546.4 | V | -71.86 | 23.32 | -48.54 | | |
| 3395.2 | V | -78.78 | 23.44 | -55.34 | | |
| 1697.6 | Horizontal | -57.33 | 23.23 | -34.10 | | |
| 2546.4 | H | -66.44 | 23.32 | -43.12 | | |
| 3395.2 | H | -81.83 | 23.44 | -58.39 | | |

| Band | PCS 1900 | Test channel: | Lowest |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3700.4 | Vertical | -66.25 | 23.49 | -42.76 | -13.00 | PASS |
| 5550.6 | V | -75.80 | 23.75 | -52.05 | | |
| 7400.8 | V | -82.18 | 23.89 | -58.29 | | |
| 3700.4 | Horizontal | -63.33 | 23.49 | -39.84 | | |
| 5550.6 | H | -69.12 | 23.75 | -45.37 | | |
| 7400.8 | H | -79.04 | 23.89 | -55.15 | | |

| Band | PCS 1900 | Test channel: | Middle |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3760.0 | Vertical | -66.71 | 23.58 | -43.13 | -13.00 | PASS |
| 5640.0 | V | -76.63 | 23.85 | -52.78 | | |
| 7520.0 | V | -75.52 | 23.99 | -51.53 | | |
| 3760.0 | Horizontal | -63.24 | 23.58 | -39.66 | | |
| 5640.0 | H | -75.87 | 23.85 | -52.02 | | |
| 7520.0 | H | -81.28 | 23.99 | -57.29 | | |

| Band | PCS 1900 | Test channel: | Highest |
|---|---|---|---|
| Test mode: | | Temperature : | 25°C |
| | | Relative Humidity: | 56% |

**Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3819.6 | Vertical | -64.75 | 23.64 | -41.11 | -13.00 | PASS |
| 5729.4 | V | -74.26 | 23.93 | -50.33 | | |
| 7639.2 | V | -81.04 | 24.08 | -56.96 | | |
| 3819.6 | Horizontal | -63.24 | 23.64 | -39.60 | | |
| 5729.4 | H | -69.49 | 23.93 | -45.56 | | |
| 7639.2 | H | -81.05 | 24.08 | -56.97 | | |

| Band | WCDMA Band V | | | | Test channel: | Lowest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1652.8 | Vertical | -72.32 | 23.14 | -49.18 | -13.00 | PASS |
| 2479.2 | V | -80.12 | 23.23 | -56.89 | | |
| 3305.6 | V | -78.14 | 23.34 | -54.80 | | |
| 1652.8 | Horizontal | -69.77 | 23.14 | -46.63 | | |
| 2479.2 | H | -79.55 | 23.23 | -56.32 | | |
| 3305.6 | H | -80.38 | 23.34 | -57.04 | | |

| Band | WCDMA Band V | | | | Test channel: | Middle |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1673.2 | Vertical | -69.82 | 23.17 | -46.65 | -13.00 | PASS |
| 2509.8 | V | -79.56 | 23.26 | -56.30 | | |
| 3346.4 | V | -80.10 | 23.38 | -56.72 | | |
| 1673.2 | Horizontal | -68.71 | 23.17 | -45.54 | | |
| 2509.8 | H | -82.06 | 23.26 | -58.80 | | |
| 3346.4 | H | -79.51 | 23.38 | -56.13 | | |

| Band | WCDMA Band V | | | | Test channel: | Highest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 1693.2 | Vertical | -74.47 | 23.20 | -51.27 | -13.00 | PASS |
| 2539.8 | V | -80.83 | 23.29 | -57.54 | | |
| 3386.4 | V | -83.56 | 23.42 | -60.14 | | |
| 1693.2 | Horizontal | -70.72 | 23.20 | -47.52 | | |
| 2539.8 | H | -79.58 | 23.29 | -56.29 | | |
| 3386.4 | H | -84.10 | 23.42 | -60.68 | | |

| Band | WCDMA Band IV | | | | Test channel: | Lowest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 2452.3 | Vertical | -81.95 | 23.16 | -58.79 | -13.00 | PASS |
| 3424.8 | V | -80.59 | 23.37 | -57.22 | | |
| 5137.2 | V | -81.41 | 23.65 | -57.76 | | |
| 2452.3 | Horizontal | -79.74 | 23.16 | -56.58 | | |
| 3424.8 | H | -80.36 | 23.37 | -56.99 | | |
| 5137.2 | H | -78.81 | 23.65 | -55.16 | | |

| Band | WCDMA Band IV | | | | Test channel: | Middle |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 2641.3 | Vertical | -81.75 | 23.30 | -58.45 | -13.00 | PASS |
| 3465.2 | V | -78.18 | 23.42 | -54.76 | | |
| 5197.8 | V | -83.76 | 23.73 | -60.03 | | |
| 2641.3 | Horizontal | -79.56 | 23.30 | -56.26 | | |
| 3465.2 | H | -81.74 | 23.42 | -58.32 | | |
| 5197.8 | H | -81.81 | 23.73 | -58.08 | | |

| Band | WCDMA Band IV | | | | Test channel: | Highest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3102.2 | Vertical | -81.30 | 23.35 | -57.95 | -13.00 | PASS |
| 3505.2 | V | -81.18 | 23.45 | -57.73 | | |
| 5257.8 | V | -78.42 | 23.82 | -54.60 | | |
| 3102.2 | Horizontal | -81.24 | 23.35 | -57.89 | | |
| 3505.2 | H | -80.66 | 23.45 | -57.21 | | |
| 5257.8 | H | -84.27 | 23.82 | -60.45 | | |

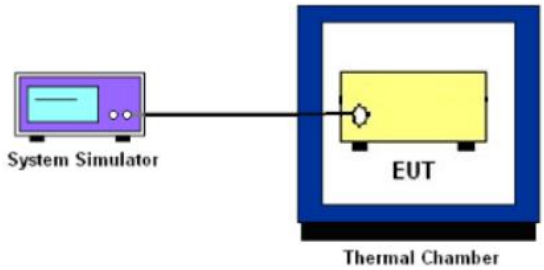
| Band | WCDMA Band II | | | | Test channel: | Lowest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3704.8 | Vertical | -69.77 | 23.53 | -46.24 | -13.00 | PASS |
| 5557.2 | V | -82.04 | 23.78 | -58.26 | | |
| 7409.6 | V | -83.88 | 23.92 | -59.96 | | |
| 3704.8 | Horizontal | -72.31 | 23.53 | -48.78 | | |
| 5557.2 | H | -79.33 | 23.78 | -55.55 | | |
| 7409.6 | H | -84.08 | 23.92 | -60.16 | | |

| Band | WCDMA Band II | | | | Test channel: | Middle |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3760.0 | Vertical | -80.34 | 23.58 | -56.76 | -13.00 | PASS |
| 5640.0 | V | -83.76 | 23.85 | -59.91 | | |
| 7520.0 | V | -73.01 | 23.99 | -49.02 | | |
| 3760.0 | Horizontal | -78.39 | 23.58 | -54.81 | | |
| 5640.0 | H | -83.30 | 23.85 | -59.45 | | |
| 7520.0 | H | -80.96 | 23.99 | -56.97 | | |

| Band | WCDMA Band II | | | | Test channel: | Highest |
|---|---|---|---|---|---|---|
| Test mode: | RMC 12.2Kbps Link (QPSK) | | | | Temperature : | 25°C |
| | | | | | Relative Humidity: | 56% |
| **Note:** Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | | | | | |
| Frequency (MHz) | Spurious Emission | | | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | Correction Factor (dB) | Spurious emissions (dBm) | | |
| 3815.2 | Vertical | -73.67 | 23.62 | -50.05 | -13.00 | PASS |
| 5722.8 | V | -84.29 | 23.90 | -60.39 | | |
| 7630.4 | V | -84.93 | 24.05 | -60.88 | | |
| 3815.2 | Horizontal | -72.46 | 23.62 | -48.84 | | |
| 5722.8 | H | -80.16 | 23.90 | -56.26 | | |
| 7630.4 | H | -84.12 | 24.05 | -60.07 | | |

## 5.7. Frequency Stability Measurement

### 5.7.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part 2.1055 ; FCC Part 22.355 ; FCC Part 24.235<br>FCC Part 27.54 |
| **Test Method:** | FCC KDB 971168 D01v03r01 |
| **Operation mode:** | Refer to item 3.1 |
| **Limit:** | FCC Part 22.355 : ±2.5 ppm<br>FCC Part 24.235 :<br>The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. |
| **Test Setup:** |  |
| **Test Procedure:** | **Test Procedures for Temperature Variation**<br>1. The testing follows FCC KDB 971168 D01v03r01 Section 9.0.<br>2. The EUT was set up in the thermal chamber and connected with the system simulator.<br>3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.<br>4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.<br>**Test Procedures for Voltage Variation**<br>1. The testing follows FCC KDB 971168 D01v03r01 Section 9.0.<br>2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.<br>3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.<br>4. The variation in frequency was measured for the worst case. |
| **Test Result:** | PASS |
| **Remark:** | All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item. |

### 5.7.2. Test Instruments

| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Universal Radio Communication Tester | R&S | CMU200 | 110188 | Jul. 04, 2023 |
| Programable tempratuce and humidity chamber | JQ | JQ-2000 | / | Jul. 04, 2023 |
| DC power supply | Kingrang | KR3005K | / | Jul. 04, 2023 |
| Combiner Box | AT890-RFB | Ascentest | / | / |

### 5.7.3. Test Data

**Test Result of Temperature Variation**

| Band: | GSM 850 | Channel: | 190 |
|---|---|---|---|
| Limit (ppm): | 2.5 | Frequency: | 836.6MHz |
| Temperature (°C) | Deviation (ppm) | | Result |
| 50 | 0.017 | | PASS |
| 40 | 0.012 | | |
| 30 | 0.011 | | |
| 20 | 0.016 | | |
| 10 | 0.014 | | |
| 0 | 0.018 | | |
| -10 | 0.013 | | |
| -20 | 0.015 | | |
| -30 | 0.017 | | |

| Band: | GSM 1900 | Channel: | 661 |
|---|---|---|---|
| Limit (ppm): | Note | Frequency: | 1880MHz |
| Temperature (°C) | Deviation (ppm) | | Result |
| 50 | 0.019 | | PASS |
| 40 | 0.016 | | |
| 30 | 0.014 | | |
| 20 | 0.015 | | |
| 10 | 0.018 | | |
| 0 | 0.020 | | |
| -10 | 0.018 | | |
| -20 | 0.017 | | |
| -30 | 0.021 | | |

***Note:*** *The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.*

| Band: | WCDMA Band V | Channel: | 4183 |
|---|---|---|---|
| Limit (ppm): | 2.5 | Frequency: | 836.6MHz |

| Temperature (°C) | RMC 12.2Kbps Deviation (ppm) | Result |
|---|---|---|
| 50 | 0.018 | PASS |
| 40 | 0.017 | |
| 30 | 0.011 | |
| 20 | 0.012 | |
| 10 | 0.019 | |
| 0 | 0.017 | |
| -10 | 0.015 | |
| -20 | 0.013 | |
| -30 | 0.014 | |

| Band: | WCDMA Band IV | Channel: | 1413 |
|---|---|---|---|
| Limit (ppm): | Note | Frequency: | 1732.6 |

| Temperature (°C) | HSUPA Deviation (ppm) | Result |
|---|---|---|
| 50 | 0.022 | PASS |
| 40 | 0.020 | |
| 30 | 0.019 | |
| 20 | 0.017 | |
| 10 | 0.016 | |
| 0 | 0.015 | |
| -10 | 0.014 | |
| -20 | 0.021 | |
| -30 | 0.023 | |

| Band: | WCDMA Band II | Channel: | 9400 |
|---|---|---|---|
| Limit (ppm): | Note | Frequency: | 1880MHz |

| Temperature (°C) | RMC 12.2Kbps Deviation (ppm) | Result |
|---|---|---|
| 50 | 0.018 | PASS |
| 40 | 0.015 | |
| 30 | 0.014 | |
| 20 | 0.017 | |
| 10 | 0.020 | |
| 0 | 0.022 | |
| -10 | 0.016 | |
| -20 | 0.020 | |
| -30 | 0.021 | |

***Note:*** *The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.*

## Test Result of Voltage Variation

| Band & Channel | Mode | Voltage (Volt) | Deviation (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|---|
| GSM 850 CH190 | GSM | 4.2 | +0.018 | 2.5 | PASS |
| | | 3.7 | +0.014 | | |
| | | BEP | +0.012 | | |
| GSM 1900 CH661 | GSM | 4.2 | +0.017 | (Note 3.) | |
| | | 3.7 | +0.020 | | |
| | | BEP | +0.015 | | |
| WCDMA Band V CH4183 | RMC 12.2Kbps | 4.2 | -0.012 | 2.5 | |
| | | 3.7 | -0.016 | | |
| | | BEP | -0.019 | | |
| WCDMA Band IV CH1413 | RMC 12.2Kbps | 4.2 | -0.017 | | |
| | | 3.7 | -0.019 | | |
| | | BEP | -0.021 | | |
| WCDMA Band II CH9400 | RMC 12.2Kbps | 4.2 | -0.018 | (Note 3.) | |
| | | 3.7 | -0.016 | | |
| | | BEP | -0.015 | | |

***Note:***

*1. Normal Voltage = 3.7V.*
*2. Battery End Point (BEP) = 3.4V.*
*3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.*

## Appendix B: Photographs of Test Setup

Refer to the test report No. TCT230426E001

## Appendix C: Photographs of EUT

Refer to the test report No. TCT230426E001

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