# TEST REPORT

| | | |
|---|---|---|
| **Reference No.** | : | WTS15S0730784-3E |
| **FCC ID** | : | 2AFJXA4REVOLUTION |
| **Applicant** | : | Ocean Coast Resources(HongKong) Limited |
| **Address** | : | Room 1501, 15/F, SPA Centre, 53-55 Lockhart Road, Wanchai, Hong Kong |
| **Manufacturer** | : | Uwin Innovation (Hongkong) Limited |
| **Address** | : | 206A, 2nd floor of No. 30 building, Wisdomland Business Park, 2nd road, Nantou Gate, NanShanDistrict, ShenZhen P.R.C. |
| **Product Name** | : | Mobile Phone |
| **Model No.** | : | A4 REVOLUTION, NOW QS50, UW5003K |
| **Brand** | : | AUDINAC(A4 REVOLUTION), I-modo(NOW QS50) |
| **Standards** | : | FCC CFR47 Part 22 Subpart H:2014<br>FCC CFR47 Part 24 Subpart E:2014 |
| **Date of Receipt sample** | : | Jul, 28, 2015 |
| **Date of Test** | : | Jul, 29 – Aug. 04, 2015 |
| **Date of Issue** | : | Aug. 04, 2015 |
| **Test Result** | : | **Pass** |

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.


**Prepared By:**
**Waltek Services (Shenzhen) Co., Ltd.**
Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China
Tel :+86-755-83551033
Fax:+86-755-83552400


Compiled by:

Zero Zhou / Project Engineer

Approved by:

Philo Zhong / Manager

# 2 Test Summary

| Test Items | Test Requirement | Result |
|---|---|---|
| RF Output Power | 2.1046<br>22.913 (a)<br>24.232 (c) | PASS |
| Peak-to-Average Ratio | 24.232 (d) | PASS |
| Bandwidth | 2.1049<br>22.905<br>22.917<br>24.238 | PASS |
| Spurious Emissions at Antenna Terminal | 2.1051<br>22.917 (a)<br>24.238 (a) | PASS |
| Field Strength of Spurious Radiation | 2.1053<br>22.917 (a)<br>24.238 (a) | PASS |
| Out of band emission | 22.917 (a)<br>24.238 (a) | PASS |
| Frequency Stability | 2.1055<br>22.355<br>24.235 | PASS |
| Maximum Permissible Exposure (SAR) | 1.1307<br>2.1093 | PASS |

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# 4 General Information

## 4.1 General Description of E.U.T.

| | |
|---|---|
| Product Name | :Mobile Phone |
| Model No. | :A4 REVOLUTION, NOW QS50, UW5003K |
| Model Description | : Only the brand and model name are different. |
| GSM Band(s) | : GSM 850/900/1800/1900MHz |
| GPRS/EGPRS Class | : 12 |
| WCDMA Band(s) | : FDD Band I/V |
| LTE Bnad(s) | : N/A |
| Wi-Fi Specification | : 802.11b/g/n HT20/n HT40 |
| Bluetooth Version | : Bluetooth v4.0 with BLE |
| GPS | : Support |
| NFC | : N/A |
| Hardware Version | : YK850_MB_v0.1 |
| Software Version | : ALPS.KK1.MP1.V2.11 |

## 4.2 Details of E.U.T.

| | |
|---|---|
| Operation Frequency | : GSM/GPRS/EGPRS 850: 824~849MHz<br>PCS/GPRS/EGPRS1900: 1850~1910MHz<br>WCDMA Band V: 824~849MHz<br>WiFi:<br>802.11b/g/n HT20: 2412-2462MHz<br>802.11n HT40: 2422-2452MHz<br>Bluetooth: 2402-2480MHz |
| Max. RF output power | : GSM 850: 32.20dBm<br>EGPRS 850: 27.99dBm<br>PCS1900:30.08dBm<br>EGPRS 1900:25.55dBm<br>WCDMA Band V: 22.43dBm<br>WiFi: 9.41dBm<br>Bluetooth: 5.50dBm |
| Type of Modulation | : GSM,GPRS: GMSK<br>EGPRS: GMSK, 8PSK<br>WCDMA: BPSK<br>WiFi: CCK, OFDM<br>Bluetooth: GFSK, Pi/4 DQPSK,8DPSK |
| Antenna installation | : GSM/WCDMA: internal permanent antenna<br>WiFi/Bluetooth: internal permanent antenna |

| | |
|---|---|
| Antenna Gain | : GSM 850: -3.1dBi<br>PCS1900: -2.5dBi<br>WCDMA Band V: -3.1dBi<br>WiFi: -1.37dBi<br>Bluetooth:-1.37 0dBi |
| Technical Data | :Battery DC 3.7V, 1800mAh<br>DC 5V,1A, Charging form adapter<br>Adapter Input: 100-240V, 50/60Hz, 0.3A |
| Adapter | :Manufacture:<br>Shenzhen Changyuanxin Electronic Technology Co., Ltd.<br>Model No.: BY120501000 |
| Type of Emission | : GSM850: 249KGXW, PCS1900: 246KGXW<br>EGPRS850:250KG7W,EGPRS1900:250KG7W<br>WCDMA850: 4M18F9W, |

## 4.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Support Band | Test Mode | Channel Frequency | Channel Number |
|---|---|---|---|
| GSM 850 | GSM/GPRS/EGPRS | 824.2 MHz | 128 |
| | | 836.6 MHz | 190 |
| | | 848.8 MHz | 251 |
| PCS 1900 | GSM/GPRS/EGPRS | 1850.2 MHz | 512 |
| | | 1880.0 MHz | 661 |
| | | 1909.8 MHz | 810 |
| WCDMA Band V | WCDMA/HSUPA/HSDPA | 826.4 MHz | 4132 |
| | | 836.6 MHz | 4183 |
| | | 846.6 MHz | 4233 |
| Remark: All mode(s) were tested and the worst data was recorded. | | | |

## 4.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A**

  Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, July 12, 2012.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

# 5 Equipment Used during Test

## 5.1 Equipments List

| RF Conducted Test | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1. | EMC Analyzer (9k~26.5GHz) | Agilent | E7405A | MY45114943 | Aug.15,2014 | Aug.14,2015 |
| 2. | Spectrum Analyzer (9k-6GHz) | R&S | FSL6 | 100959 | Aug.15,2014 | Aug.14,2015 |
| 3. | Humidity Chamber | GF | GTH-225-40-1P | IAA061213 | Aug.15,2014 | Aug.14,2015 |
| 4. | Universal Radio Communication Tester | R&S | CMU 200 | 112461 | Apr.10,2015 | Apr.09,2016 |
| **3m Semi-anechoic Chamber for Radiated Emissions** | | | | | | |
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1 | EMC Analyzer | Agilent | E7405A | MY45114943 | Sep.15,2014 | Sep.14,2015 |
| 2 | Active Loop Antenna | Beijing Dazhi | ZN30900A | - | Sep.15,2014 | Sep.14,2015 |
| 3 | Trilog Broadband Antenna | SCHWARZBECK | VULB9163 | 336 | Apr.18,2015 | Apr.17,2016 |
| 4 | Coaxial Cable (below 1GHz) | Top | TYPE16(13M) | - | Sep.15,2014 | Sep.14,2015 |
| 5 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9120 D | 667 | Apr.18,2015 | Apr.17,2016 |
| 6 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9120 D | 669 | Apr.18,2015 | Apr.17,2016 |
| 7 | Broadband Preamplifier | COMPLIANCE DIRECTION | PAP-1G18 | 2004 | Mar.17,2015 | Mar.16,2016 |
| 8 | Coaxial Cable (above 1GHz) | Top | 1000MHz-25GHz | EW02014-7 | Apr.09,2015 | Apr.08,2016 |
| 9 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9170 | 335 | Sep.15,2014 | Sep.14,2015 |
| 10 | Universal Radio Communication Tester | R&S | CMU 200 | 112461 | Apr.10,2015 | Apr.09,2016 |
| 11 | Signal Generator | R&S | SMR20 | 100046 | Sep.15,2014 | Sep.14,2015 |

## 5.2 Measurement Uncertainty

| Parameter | Uncertainty |
|---|---|
| Radio Frequency | ± 1 x $10^{-6}$ |
| RF Power | ± 1.0 dB |
| RF Power Density | ± 2.2 dB |
| Radiated Spurious Emissions test | ± 5.03 dB (Bilog antenna 30M~1000MHz) |
| | ± 5.47 dB (Horn antenna 1000M~25000MHz) |
| Conducted Spurious Emissions test | ± 3.64 dB (AC mains 150KHz~30MHz) |

## 5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

# 6 RF OUTPUT POWER

| | |
|---|---|
| Test Requirement: | FCC Part 2.1046,22.913 (a),24.232 (c) |
| Test Method: | ANSI C63.4:2009, TIA/EIA-603-D:2010 |
| Test Mode: | Transmitting |

## 6.1 EUT Operation

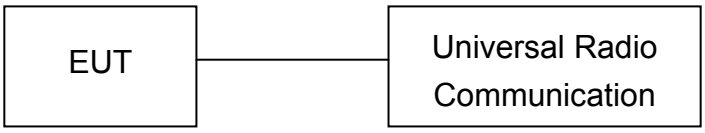
Operating Environment **:**

| | |
|---|---|
| Temperature: | 22.5 °C |
| Humidity: | 52.1 % RH |
| Atmospheric Pressure: | 101.2kPa |

## 6.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.




Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D and ANSI C63.4 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

## 6.3 Test Result

**Conducted Power**

| GSM - Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Band | GSM850 | | | PCS1900 | | |
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| GSM | 32.08 | 32.14 | 32.20 | 30.08 | 29.71 | 29.21 |
| GPRS (1 slot) | 32.02 | 32.11 | 32.20 | 30.01 | 29.68 | 29.17 |
| GPRS (2 slots) | 31.20 | 31.27 | 31.34 | 29.22 | 28.84 | 28.29 |
| GPRS (3 slots) | 29.26 | 29.33 | 29.36 | 27.32 | 26.88 | 26.30 |
| GPRS (4 slots) | 27.93 | 27.98 | 28.04 | 26.06 | 25.59 | 25.01 |
| EGPRS (1 slot) | 27.99 | 27.85 | 27.60 | 25.55 | 24.96 | 24.24 |
| EGPRS (2 slots) | 26.75 | 26.61 | 26.52 | 24.17 | 23.54 | 22.82 |
| EGPRS (3 slots) | 24.51 | 24.26 | 23.99 | 21.75 | 20.98 | 20.15 |
| EGPRS (4 slots) | 22.83 | 22.70 | 22.56 | 20.05 | 19.44 | 18.66 |

| Band | WCDMA Band V | | |
|---|---|---|---|
| Channel | 4132 | 4183 | 4233 |
| Frequency (MHz) | 826.4 | 836.6 | 846.6 |
| RMC 12.2k | 22.33 | 22.28 | 22.43 |
| HSDPA Subtest-1 | 21.38 | 21.25 | 21.35 |
| HSDPA Subtest-2 | 21.29 | 21.22 | 21.12 |
| HSDPA Subtest-3 | 21.34 | 21.29 | 21.33 |
| HSDPA Subtest-4 | 20.91 | 21.23 | 21.24 |
| HSUPA Subtest-1 | 21.37 | 21.26 | 21.29 |
| HSUPA Subtest-2 | 20.18 | 19.61 | 21.18 |
| HSUPA Subtest-3 | 21.31 | 21.02 | 19.89 |
| HSUPA Subtest-4 | 21.33 | 21.22 | 21.11 |
| HSUPA Subtest-5 | 21.38 | 21.25 | 21.35 |

**Radiated Power(Measured at max. conducted power channel)**

ERP and EIRP

Cellular Band (Part 22H)

| Frequency | Receiver Reading | Turn table Angle | RX Antenna | | Substituted | | | Absolute Level | Part 22H Part 24E | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | SG Level | Cable | Antenna Gain | | Limit | Margin |
| (MHz) | (dBμV) | Degree | (m) | (H/V) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) |
| GSM 850 Channel 251 | | | | | | | | | | |
| 848.80 | 92.33 | 124 | 2.3 | H | 25.30 | 0.20 | 0.00 | 25.10 | 38.45 | -13.35 |
| 848.80 | 97.03 | 24 | 1.5 | V | 29.93 | 0.20 | 0.00 | 29.73 | 38.45 | -8.72 |
| GPRS 850 Channel 251 | | | | | | | | | | |
| 848.80 | 92.75 | 210 | 1.5 | H | 25.72 | 0.20 | 0.00 | 25.52 | 38.45 | -12.93 |
| 848.80 | 97.36 | 11 | 2.4 | V | 30.26 | 0.20 | 0.00 | 30.06 | 38.45 | -8.39 |
| EDGE 850 Channel 128 | | | | | | | | | | |
| 824.20 | 88.54 | 206 | 1.0 | H | 21.51 | 0.20 | 0.00 | 21.31 | 38.45 | -17.14 |
| 824.20 | 92.05 | 253 | 1.6 | V | 24.95 | 0.20 | 0.00 | 24.75 | 38.45 | -13.70 |

| Frequency | Receiver Reading | Turn table Angle | RX Antenna | | Substituted | | | Absolute Level | Part 22H Part 24E | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | SG Level | Cable | Antenna Gain | | Limit | Margin |
| (MHz) | (dBμV) | Degree | (m) | (H/V) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) |
| WCDMA Band V Channel 4233 | | | | | | | | | | |
| 846.40 | 78.69 | 69 | 2.0 | H | 11.66 | 0.20 | 0.00 | 11.46 | 38.45 | -26.99 |
| 846.40 | 84.07 | 284 | 1.4 | V | 16.97 | 0.20 | 0.00 | 16.77 | 38.45 | -21.68 |
| WCDMA Band V HSDPA Channel 4132 | | | | | | | | | | |
| 826.40 | 76.42 | 338 | 2.3 | H | 9.39 | 0.20 | 0.00 | 9.19 | 38.45 | -29.26 |
| 826.40 | 84.58 | 141 | 1.1 | V | 17.48 | 0.20 | 0.00 | 17.28 | 38.45 | -21.17 |
| WCDMA Band V HSUPA Channel 4132 | | | | | | | | | | |
| 826.40 | 76.08 | 235 | 1.0 | H | 9.05 | 0.20 | 0.00 | 8.85 | 38.45 | -29.60 |
| 826.40 | 84.77 | 4 | 1.6 | V | 17.67 | 0.20 | 0.00 | 17.47 | 38.45 | -20.98 |

Cellular Band (Part 24E)

| Frequency | Receiver Reading | Turn table Angle | RX Antenna | | Substituted | | | Absolute Level | Part 22H Part 24E | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | SG Level | Cable | Antenna Gain | | Limit | Margin |
| (MHz) | (dBμV) | Degree | (m) | (H/V) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) |
| PCS 1900 Channel 512 | | | | | | | | | | |
| 1850.20 | 84.17 | 173 | 2.4 | H | 10.20 | 0.31 | 10.40 | 20.29 | 33 | -12.71 |
| 1850.20 | 92.00 | 270 | 2.3 | V | 18.72 | 0.31 | 10.40 | 28.81 | 33 | -4.19 |
| GPRS 1900 Channel 512 | | | | | | | | | | |
| 1850.20 | 87.06 | 327 | 1.2 | H | 13.09 | 0.31 | 10.40 | 23.18 | 33 | -9.82 |
| 1850.20 | 92.07 | 150 | 1.2 | V | 18.79 | 0.31 | 10.40 | 28.88 | 33 | -4.12 |
| EDGE 1900 Channel 512 | | | | | | | | | | |
| 1850.20 | 83.64 | 331 | 1.7 | H | 9.67 | 0.31 | 10.40 | 19.76 | 33 | -13.24 |
| 1850.20 | 88.59 | 111 | 2.2 | V | 15.31 | 0.31 | 10.40 | 25.40 | 33 | -7.6 |

# 7 Peak-to-Average Ratio

Test Requirement: 24.232 (d)

Test Method: N/A

Test Mode: Transmitting

## 7.1 EUT Operation

Operating Environment **:**

Temperature: 22.5 °C

Humidity: 52.3% RH

Atmospheric Pressure: 101.2kPa

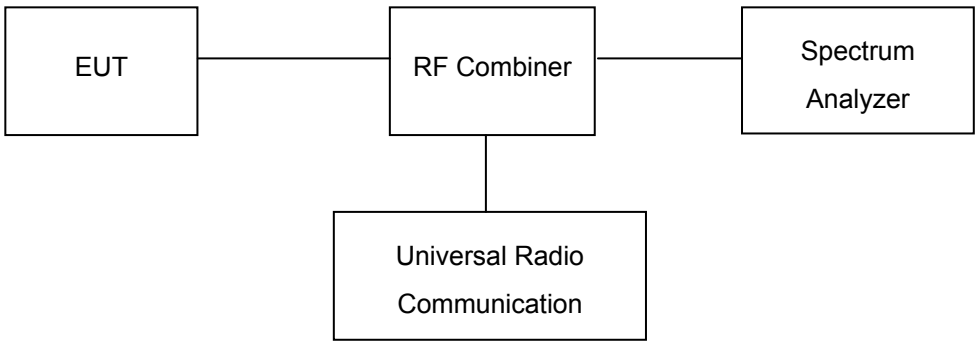
## 7.2 Test Procedure

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.

2. Set EUT to transmit at maximum output power.

3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.

4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.



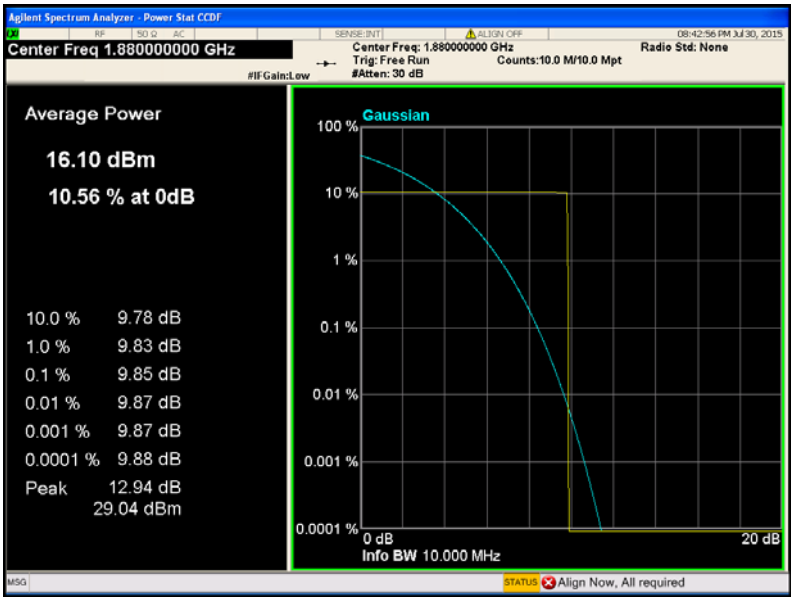
## 7.3 Test Result

Cellular Band (Part 24E)

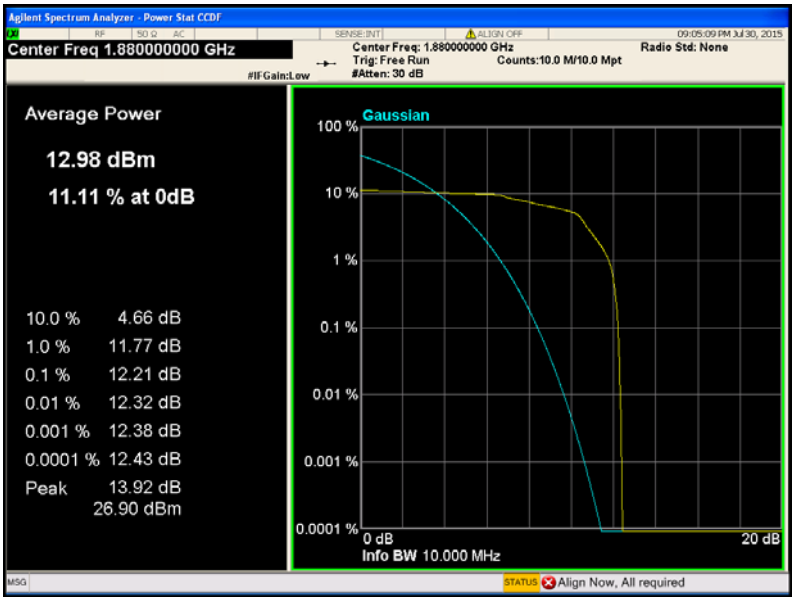
| Mode | PCS 1900 | | | EGPRS 1900 | | | Limit (dB) |
|---|---|---|---|---|---|---|---|
| Channel | 512 | 661 | 810 | 512 | 661 | 810 | |
| Frequency (MHz) | 1850.2 | 1880.0 | 1909.8 | 1850.2 | 1880.0 | 1909.8 | |
| Peak-to-Average Ratio (dB) | 9.89 | 9.85 | 9.81 | 12.26 | 12.21 | 12.25 | 13 |

Test Plots (Part 24E)

PCS1900 Middle Channel



EGPRS1900 Middle Channel



# 8 BANDWIDTH

| | |
|---|---|
| Test Requirement: | FCC Part 2.1049,22.917,22.905,24.238 |
| Test Method: | ANSI C63.4:2009, TIA/EIA-603-D:2010 |
| Test Mode: | Transmitting |

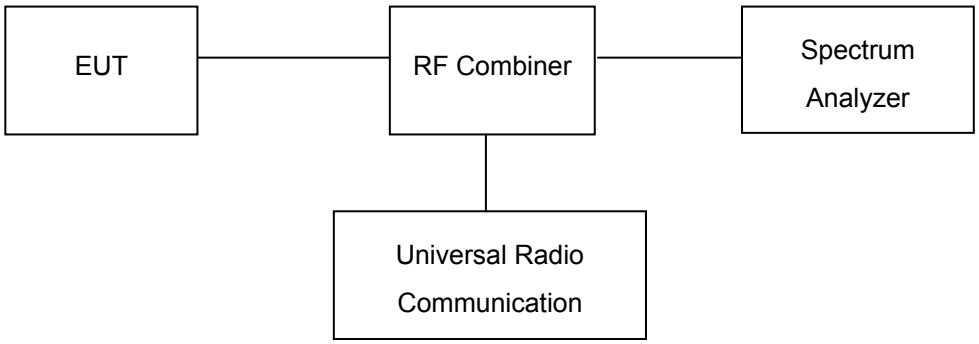
## 8.1 EUT Operation

Operating Environment **:**

| | |
|---|---|
| Temperature: | 22.5 °C |
| Humidity: | 52.3% RH |
| Atmospheric Pressure: | 101.2kPa |

## 8.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.
The resolution bandwidth of the spectrum analyzer was set at 3 kHz (Cellular /PCS) and the 26 dB & 99%bandwidth was recorded.



## 8.3 Test Result

Cellular Band (Part 22H)

| Test Mode | Channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) | 26 dB Emission Bandwidth(kHz) |
|---|---|---|---|---|
| GSM 850 | 128 | 824.2 | 246.82 | 309.86 |
| | 190 | 836.6 | 246.83 | 309.83 |
| | 251 | 848.8 | 246.84 | 309.87 |
| GPRS 850 | 128 | 824.2 | 248.55 | 320.50 |
| | 190 | 836.6 | 248.50 | 320.50 |
| | 251 | 848.8 | 248.45 | 320.44 |
| EGPRS 850 | 128 | 824.2 | 249.87 | 314.20 |
| | 190 | 836.6 | 249.94 | 314.20 |
| | 251 | 848.8 | 250.00 | 314.26 |

| Test Mode | | Channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) | 26 dB Emission Bandwidth(MHz) |
|---|---|---|---|---|---|
| WCDMA Band V | RMC12.2k | 4132 | 826.4 | 4.14 | 4.66 |
| | | 4183 | 836.6 | 4.15 | 4.64 |
| | | 4233 | 846.6 | 4.18 | 4.67 |
| | HSDPA(16QAM) | 4132 | 826.4 | 4.12 | 4.58 |
| | | 4183 | 836.6 | 4.15 | 4.64 |
| | | 4233 | 846.6 | 4.18 | 4.70 |
| | HSUPA(BPSK) | 4132 | 826.4 | 4.13 | 4.68 |
| | | 4183 | 836.6 | 4.14 | 4.65 |
| | | 4233 | 846.6 | 4.15 | 4.71 |

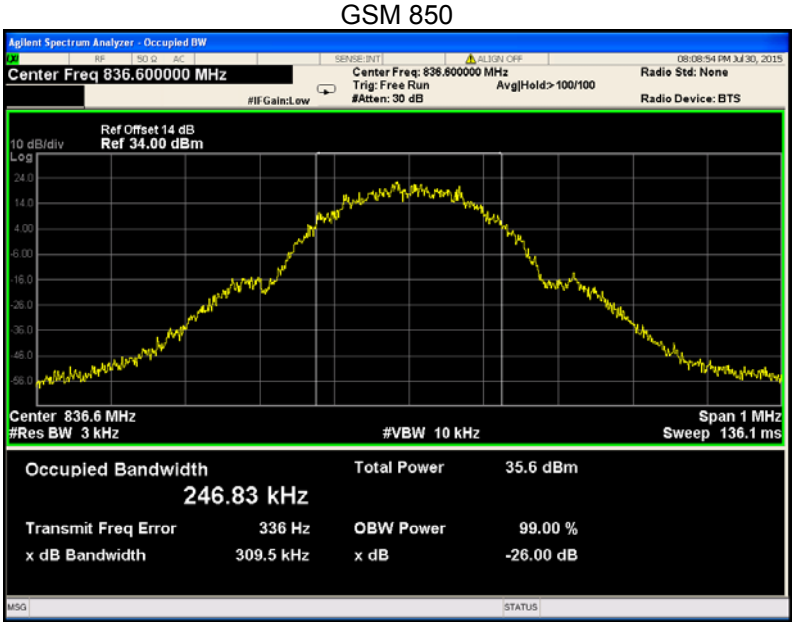
Cellular Band (Part 24E)

| Test Mode | Channel | Frequency (MHz) | 99% Occupied Bandwidth(kHz) | 26 dB Emission Bandwidth(kHz) |
|---|---|---|---|---|
| PCS 1900 | 512 | 1850.20 | 246.11 | 312.55 |
| | 661 | 1880.00 | 246.17 | 312.50 |
| | 810 | 1909.80 | 246.20 | 312.49 |
| GPRS 1900 | 512 | 1850.20 | 245.54 | 317.26 |
| | 661 | 1880.00 | 245.54 | 317.20 |
| | 810 | 1909.80 | 245.61 | 317.22 |
| EGPRS 1900 | 512 | 1850.20 | 250.14 | 313.06 |
| | 661 | 1880.00 | 250.17 | 313.00 |
| | 810 | 1909.80 | 250.21 | 312.95 |

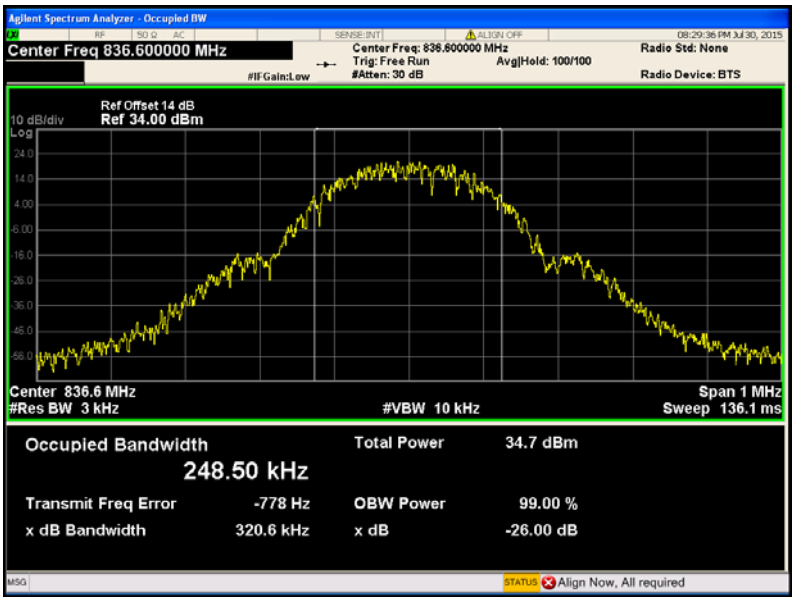
Test Plots

Cellular Band (Part 22H)

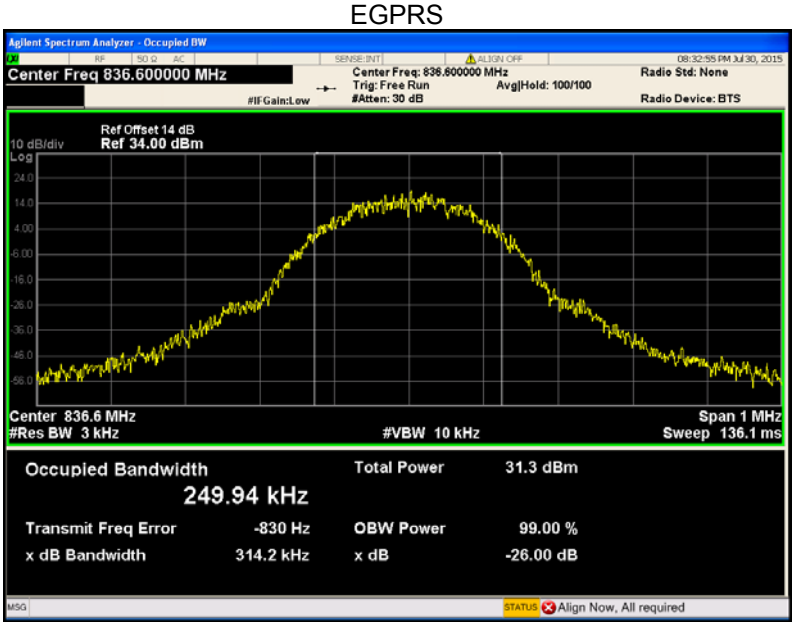
GSM 850




GPRS

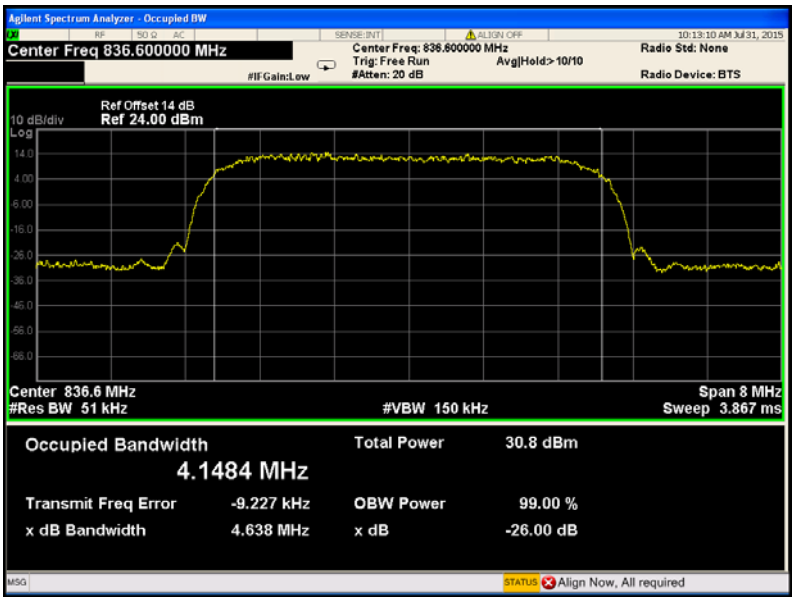


EGPRS

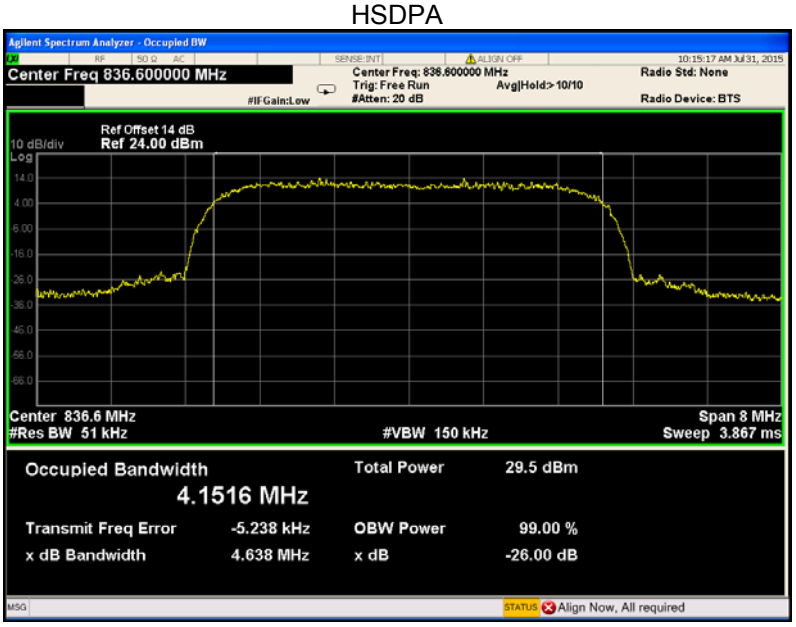



WCDMA band V

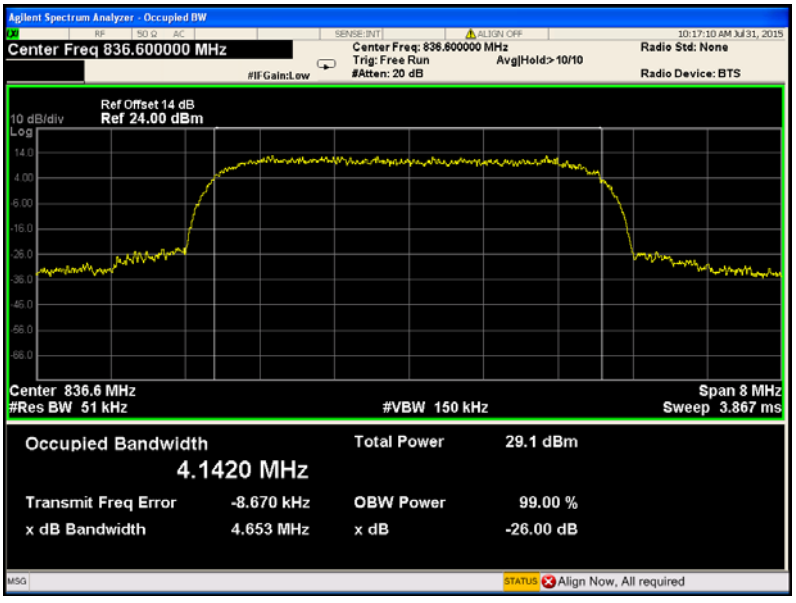
RMC12.2k



HSDPA

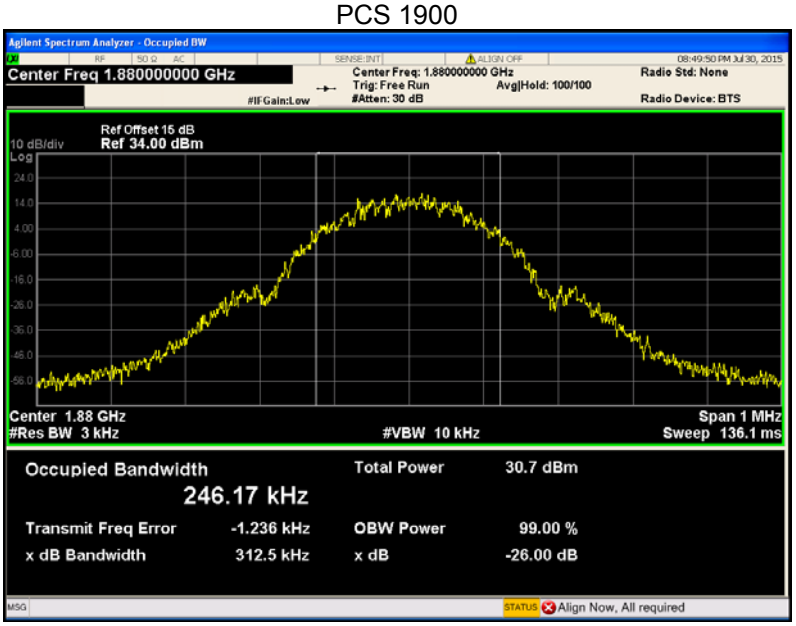

Agilent Spectrum Analyzer - Occupied BW
Center Freq 836.600000 MHz
Center Freq: 836.600000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 14 dB
10 dB/div
Ref 24.00 dBm
Log
Center 836.6 MHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.1516 MHz
Total Power
29.5 dBm
Transmit Freq Error
-5.238 kHz
OBW Power
99.00 %
x dB Bandwidth
4.638 MHz
x dB
-26.00 dB
MSG
STATUS
Align Now, All required

HSUPA

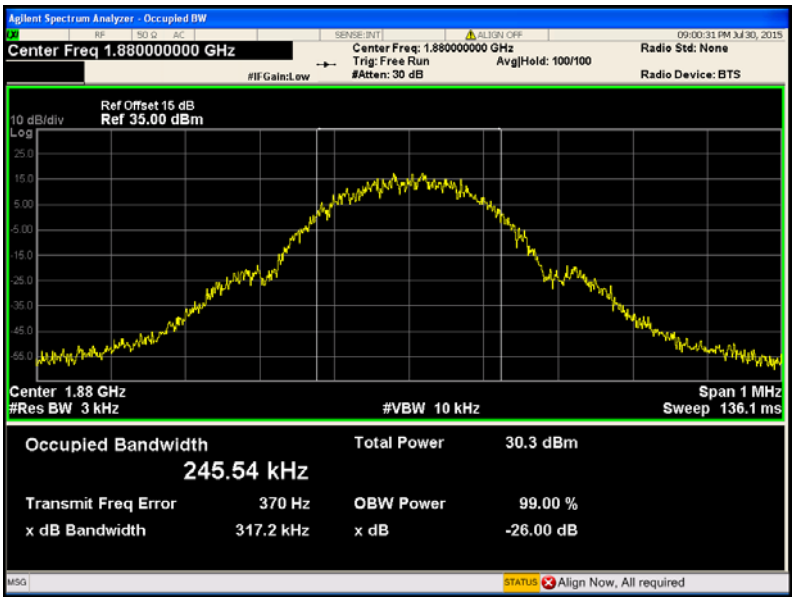

Agilent Spectrum Analyzer - Occupied BW
Center Freq 836.600000 MHz
Center Freq: 836.600000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 14 dB
10 dB/div
Ref 24.00 dBm
Log
Center 836.6 MHz
#Res BW 51 kHz
#VBW 150 kHz
Span 8 MHz
Sweep 3.867 ms
Occupied Bandwidth
4.1420 MHz
Total Power
29.1 dBm
Transmit Freq Error
-8.670 kHz
OBW Power
99.00 %
x dB Bandwidth
4.653 MHz
x dB
-26.00 dB
MSG
STATUS
Align Now, All required

Cellular Band (Part 24E)

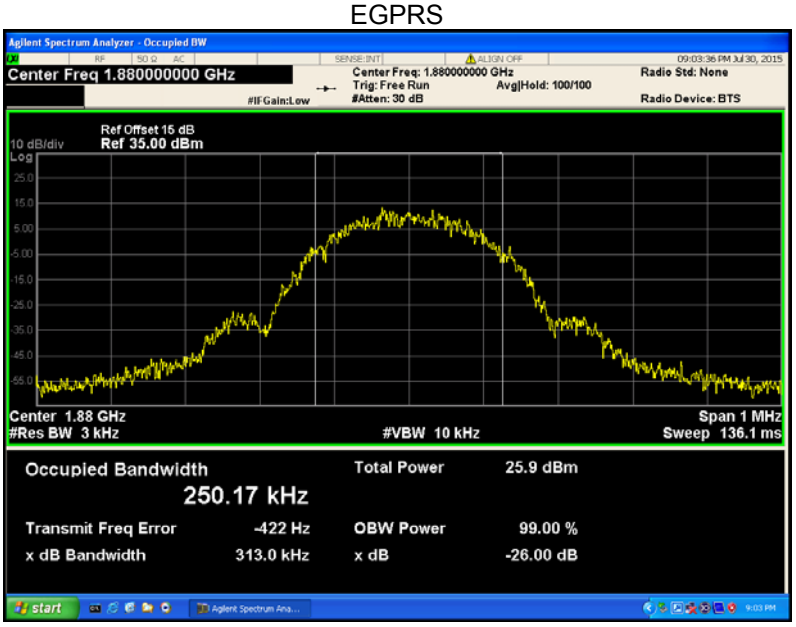
PCS 1900




GPRS



EGPRS


Agilent Spectrum Analyzer - Occupied BW
Center Freq 1.880000000 GHz
Center Freq: 1.880000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Ref Offset 15 dB
10 dB/div
Ref 35.00 dBm
Log
Center 1.88 GHz
#Res BW 3 kHz
#VBW 10 kHz
Span 1 MHz
Sweep 136.1 ms
Occupied Bandwidth
250.17 kHz
Total Power
25.9 dBm
Transmit Freq Error
-422 Hz
OBW Power
99.00 %
x dB Bandwidth
313.0 kHz
x dB
-26.00 dB

# 9 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

| | |
|---|---|
| Test Requirement: | FCC Part 2.1051,22.917(a),24.238(a) |
| Test Method: | ANSI C63.4:2009, TIA/EIA-603-D:2010 |
| Test Mode: | Transmitting |

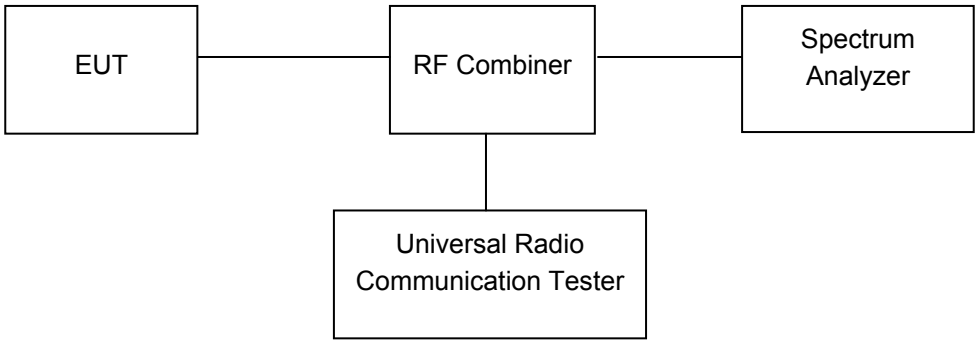
## 9.1 EUT Operation

Operating Environment **:**

| | |
|---|---|
| Temperature: | 23.5 °C |
| Humidity: | 52.1 % RH |
| Atmospheric Pressure: | 101.3kPa |

## 9.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.



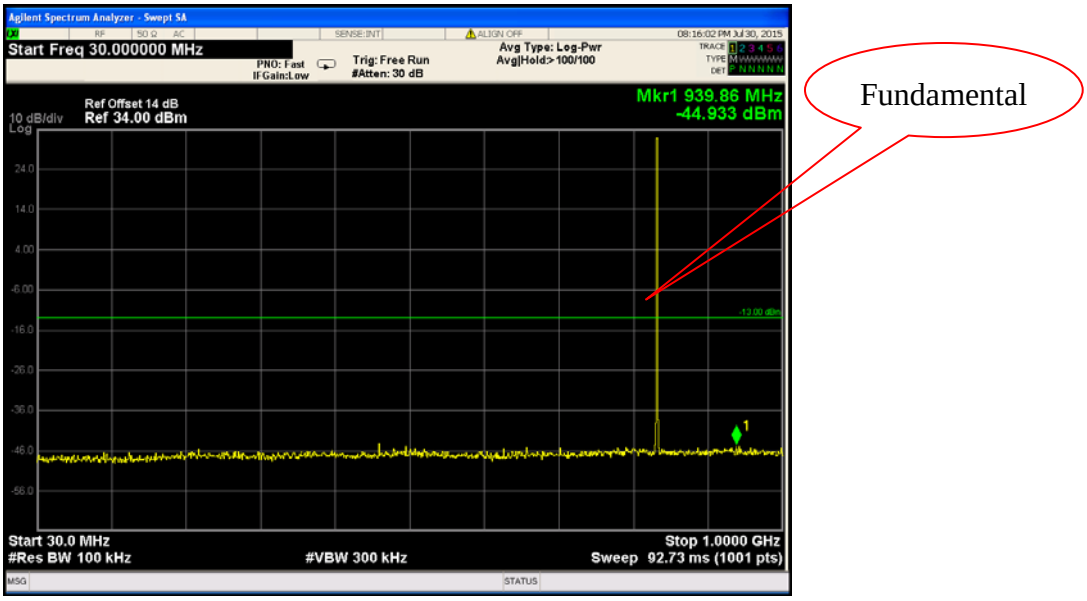
## 9.3 Test Result

Remark: only the worst data were recorded.

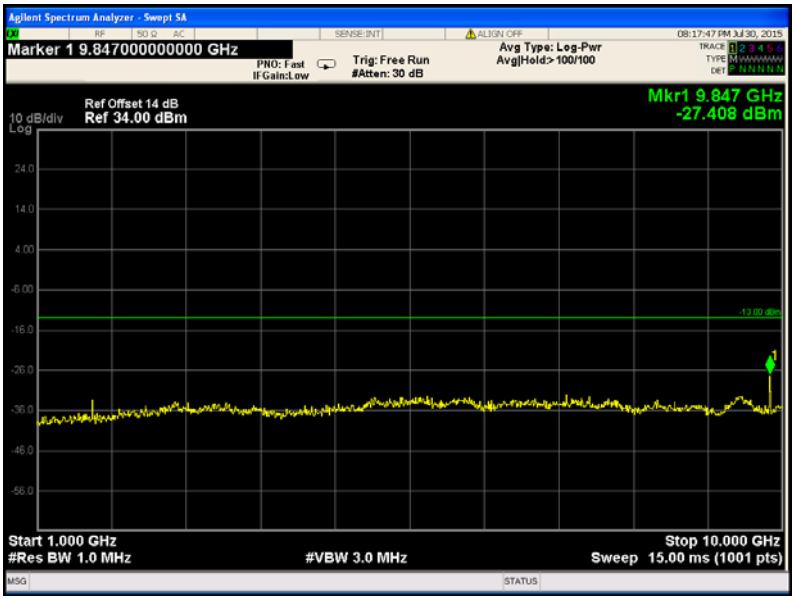
Cellular Band (Part 22H)

GSM 850

30MHz-1GHz

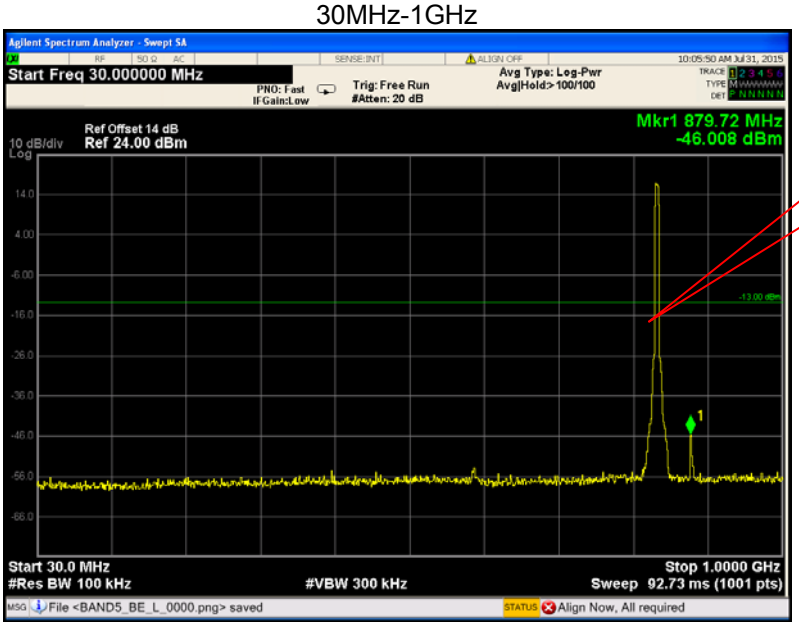



Above 1GHz

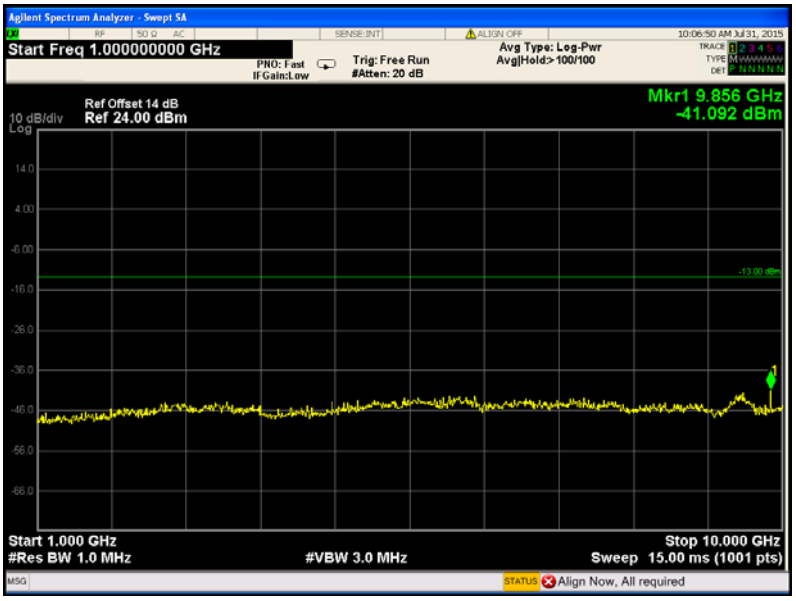


WCDMA band V

30MHz-1GHz



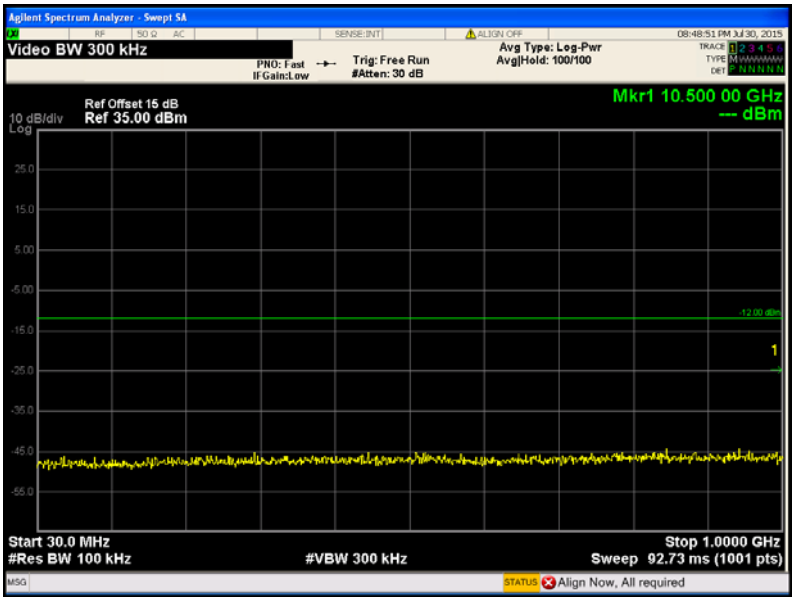

Above 1GHz



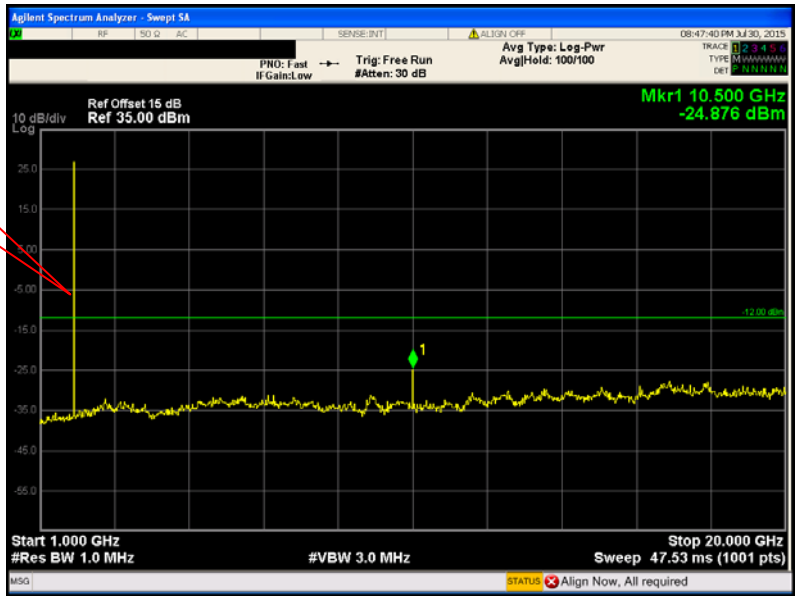
Cellular Band (Part 24E)

PCS 1900

30MHz-1GHz




Above 1GHz




Fundamental

# 10 SPURIOUS RADIATED EMISSIONS

| | |
|---|---|
| Test Requirement: | FCC Part 2.1053,22.917,24.238. |
| Test Method: | ANSI C63.4:2009, TIA/EIA-603-D:2010 |
| Test Mode: | Transmitting |

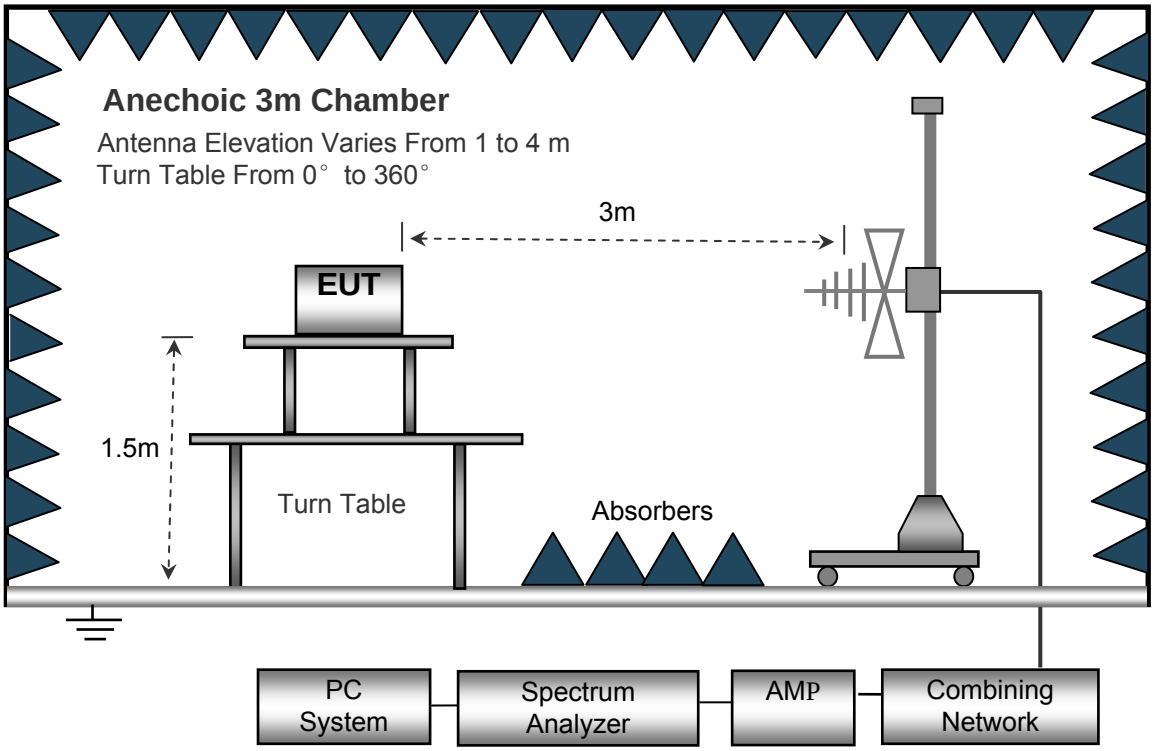
## 10.1 EUT Operation

Operating Environment **:**

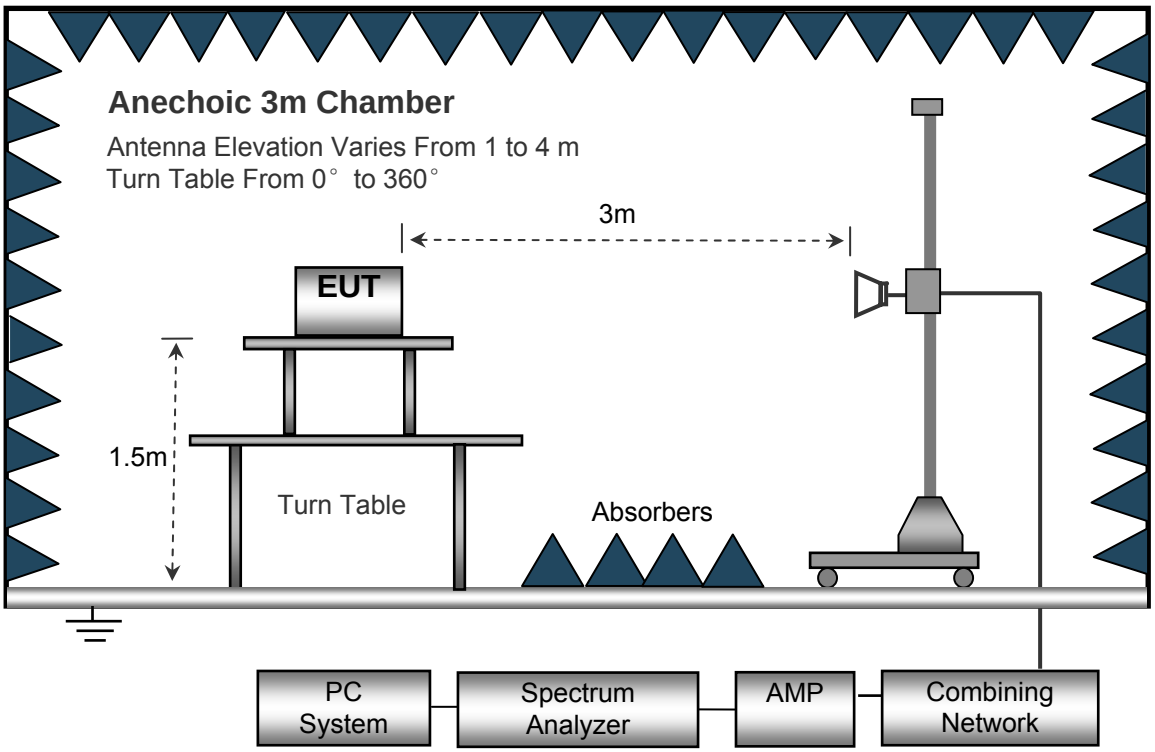
| | |
|---|---|
| Temperature: | 23.5 °C |
| Humidity: | 52.1 % RH |
| Atmospheric Pressure: | 101.2kPa |

## 10.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.
The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.




## 10.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

| | |
|---|---|
| Sweep Speed | Auto |
| Detector | PK |
| Resolution Bandwidth | 100kHz |
| Video Bandwidth | 300kHz |

Above 1GHz

| | |
|---|---|
| Sweep Speed | Auto |
| Detector | PK |
| Resolution Bandwidth | 1MHz |
| Video Bandwidth | 3MHz |
| Detector | Ave. |
| Resolution Bandwidth | 1MHz |
| Video Bandwidth | 10Hz |

## 10.4 Test Procedure

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
   Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level
   Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)
8. Repeat above procedures until the measurements for all frequencies are completed.

## 10.5 Summary of Test Results

Remark: Test performed from 30MHz to 10th harmonics with low/middle/high channels, only the worst data were recorded.

Cellular Band (Part 22H)

| Frequency | Receiver Reading | Turn table Angle | RX Antenna | | Substituted | | | Absolute Level | Result | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | SG Level | Cable | Antenna Gain | | Limit | Margin |
| (MHz) | (dBμV) | Degree | (m) | (H/V) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) |
| GSM 850 Channel 251 | | | | | | | | | | |
| 199.57 | 43.18 | 107 | 1.5 | H | -67.33 | 0.15 | 0.00 | -67.48 | -13.00 | -54.48 |
| 199.57 | 45.12 | 264 | 2.0 | V | -62.47 | 0.15 | 0.00 | -62.62 | -13.00 | -49.62 |
| 1697.60 | 72.71 | 353 | 2.0 | H | -41.26 | 0.30 | 9.40 | -32.16 | -13.00 | -19.16 |
| 1673.20 | 56.25 | 349 | 1.2 | V | -57.28 | 0.30 | 9.40 | -48.18 | -13.00 | -35.18 |
| 2546.40 | 55.60 | 68 | 2.0 | H | -58.40 | 0.43 | 10.60 | -48.23 | -13.00 | -35.23 |
| 2509.80 | 48.46 | 246 | 1.0 | V | -61.82 | 0.43 | 10.60 | -51.65 | -13.00 | -38.65 |
| WCDMA Band V Channel 4233 | | | | | | | | | | |
| 199.57 | 43.08 | 245 | 1.5 | H | -67.43 | 0.15 | 0.00 | -67.58 | -13.00 | -54.58 |
| 199.57 | 44.40 | 114 | 1.8 | V | -63.19 | 0.15 | 0.00 | -63.34 | -13.00 | -50.34 |
| 1693.20 | 63.50 | 280 | 1.2 | H | -50.47 | 0.30 | 9.40 | -41.37 | -13.00 | -28.37 |
| 1693.20 | 46.98 | 28 | 1.1 | V | -66.55 | 0.30 | 9.40 | -57.45 | -13.00 | -44.45 |
| 2539.80 | 46.39 | 208 | 1.6 | H | -67.61 | 0.43 | 10.60 | -57.44 | -13.00 | -44.44 |
| 2539.80 | 39.85 | 259 | 1.7 | V | -70.43 | 0.43 | 10.60 | -60.26 | -13.00 | -47.26 |

Cellular Band (Part 24E)

| Frequency | Receiver Reading | Turn table Angle | RX Antenna | | Substituted | | | Absolute Level | Result | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | SG Level | Cable | Antenna Gain | | Limit | Margin |
| (MHz) | (dBμV) | Degree | (m) | (H/V) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) |
| PCS 1900 Channel 512 | | | | | | | | | | |
| 199.57 | 46.62 | 248 | 2.0 | H | -63.89 | 0.15 | 0.00 | -64.04 | -13.00 | -51.04 |
| 199.57 | 39.26 | 125 | 1.9 | V | -68.33 | 0.15 | 0.00 | -68.48 | -13.00 | -55.48 |
| 3760.00 | 65.95 | 323 | 1.1 | H | -45.59 | 2.37 | 12.50 | -35.46 | -13.00 | -22.46 |
| 3760.00 | 59.98 | 222 | 1.5 | V | -49.83 | 2.37 | 12.50 | -39.70 | -13.00 | -26.70 |
| 5640.00 | 53.58 | 195 | 1.7 | H | -56.03 | 2.86 | 12.90 | -45.99 | -13.00 | -32.99 |
| 5640.00 | 44.73 | 202 | 1.6 | V | -64.15 | 2.86 | 12.90 | -54.11 | -13.00 | -41.11 |

Note: 1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

# 11 Band Edge Measurement

| | |
|---|---|
| Test Requirement: | FCC Part 2.1051,22.917(a),24.238(a) |
| Test Method: | ANSI C63.4:2009, TIA/EIA-603-D:2010 |
| Test Mode: | Transmitting |

## 11.1 EUT Operation

Operating Environment **:**

| | |
|---|---|
| Temperature: | 23.5 °C |
| Humidity: | 52.3 % RH |
| Atmospheric Pressure: | 101.3kPa |

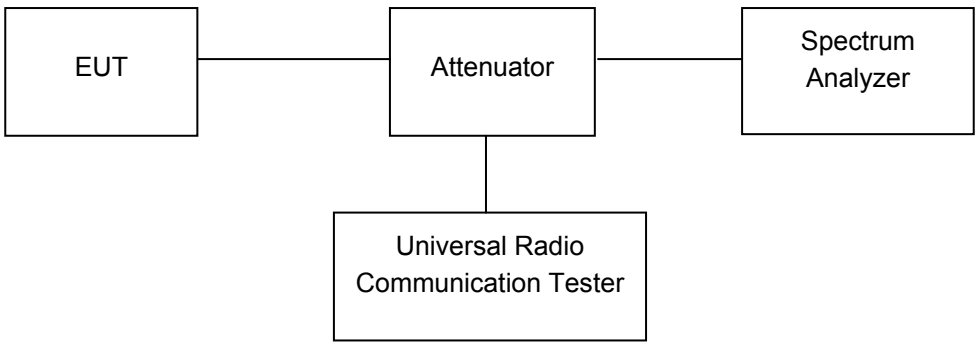
## 11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

According to FCC Part 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC Part 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The center of the spectrum analyzer was set to block edge frequency

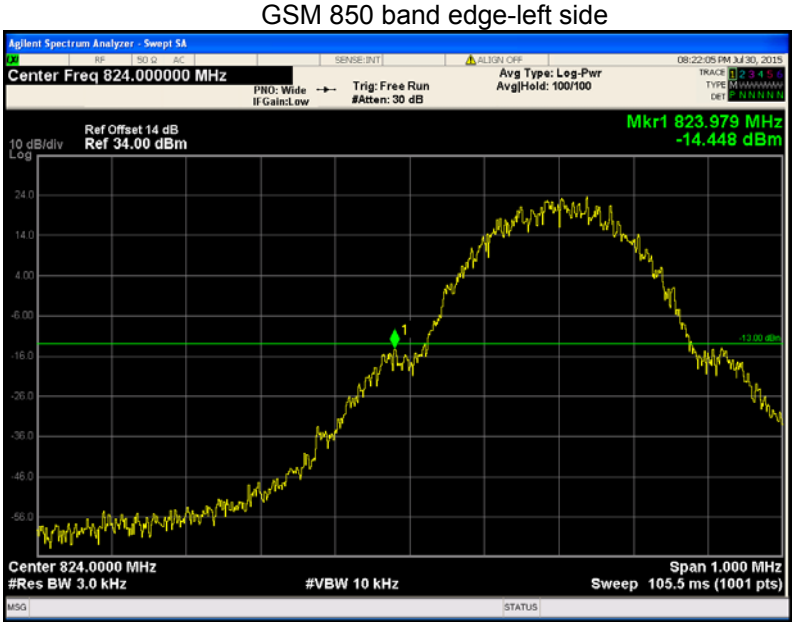


## 11.3 Test Result

Test plots

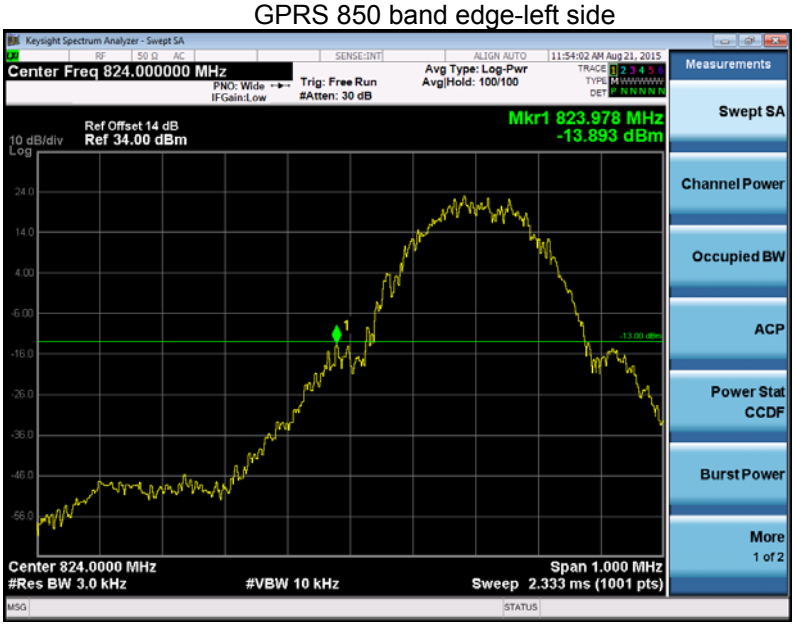
Cellular Band (Part 22H)

GSM 850 band edge-left side

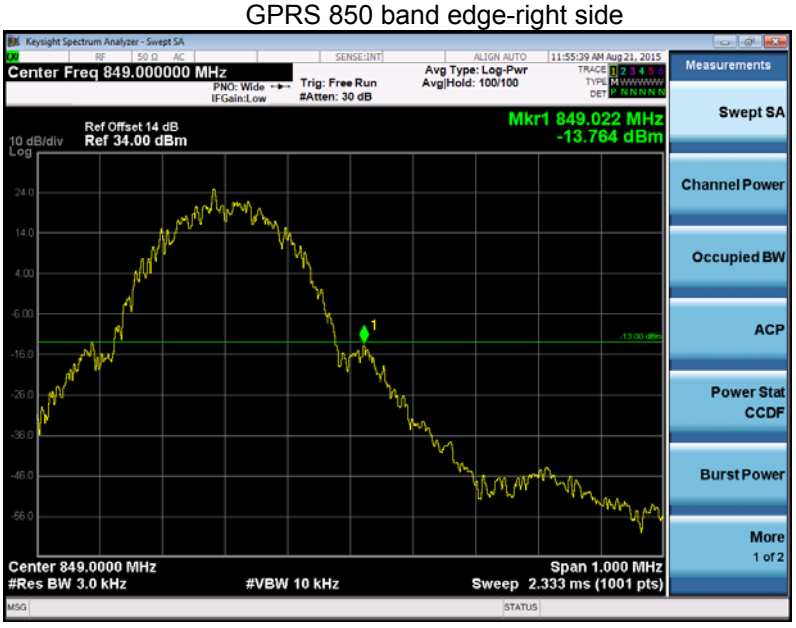



GSM 850 band edge-right side

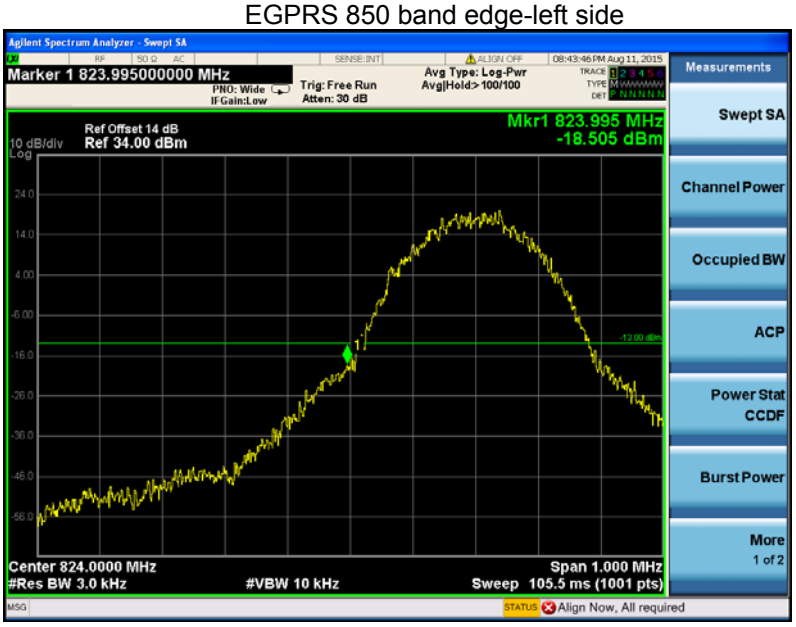
GPRS 850 band edge-left side



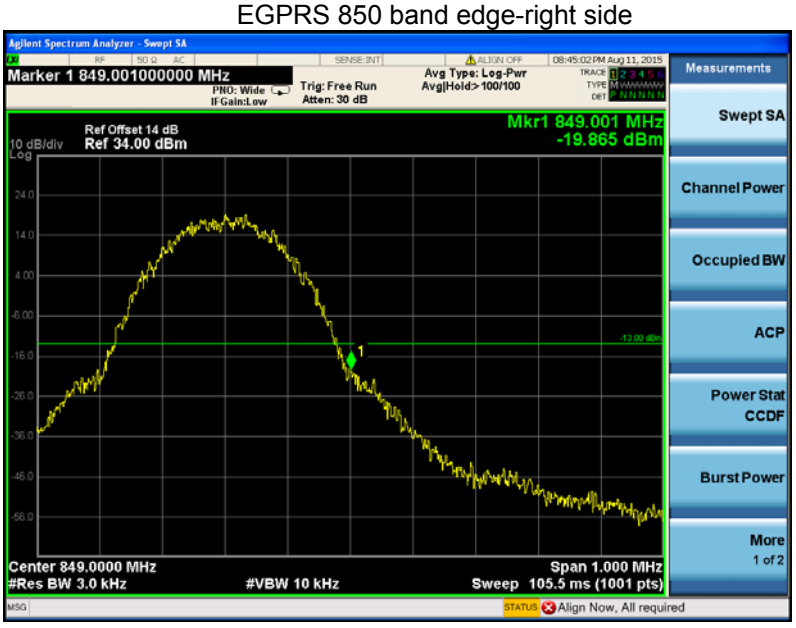

GPRS 850 band edge-right side



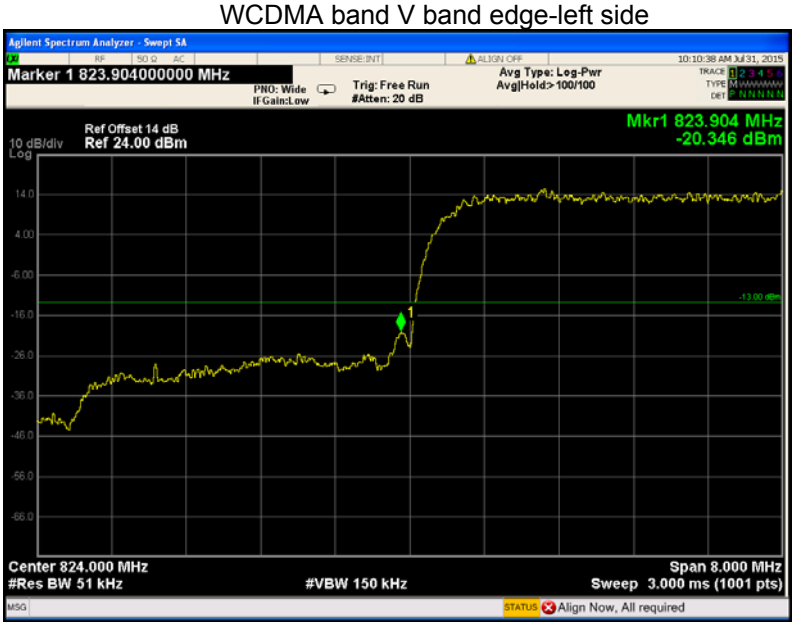
EGPRS 850 band edge-left side



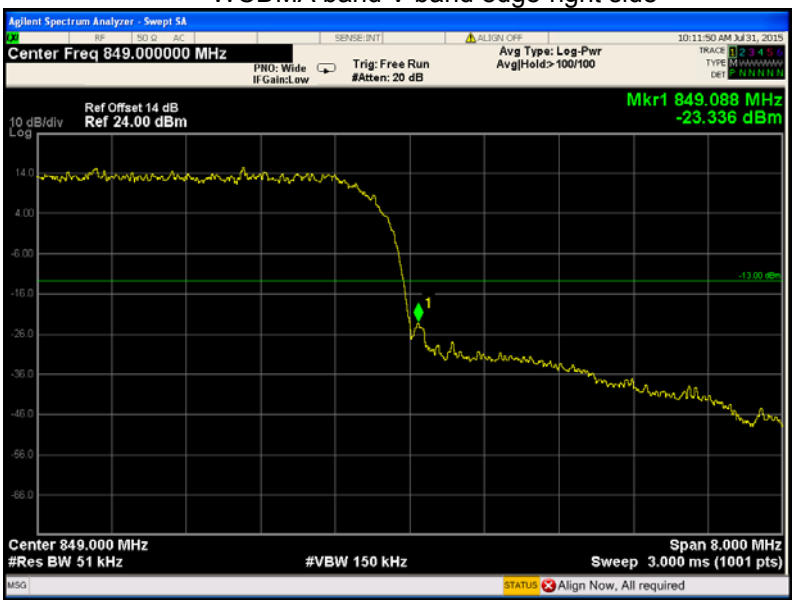

EGPRS 850 band edge-right side



WCDMA band V band edge-left side

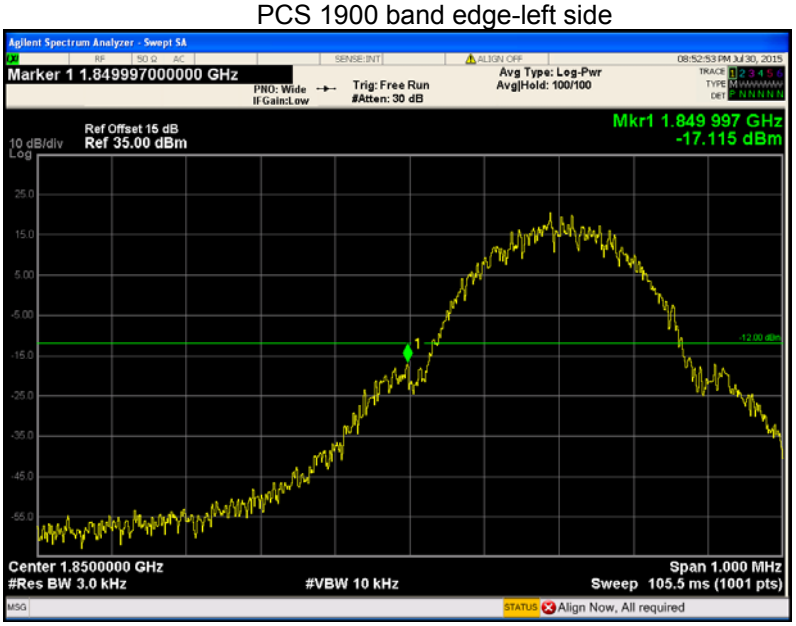



WCDMA band V band edge-right side



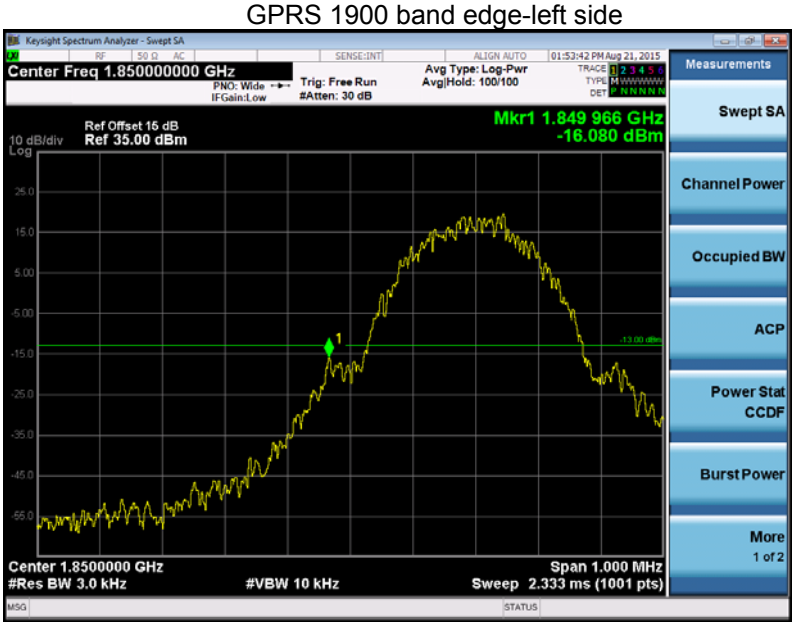
Cellular Band (Part 24E)

PCS 1900 band edge-left side

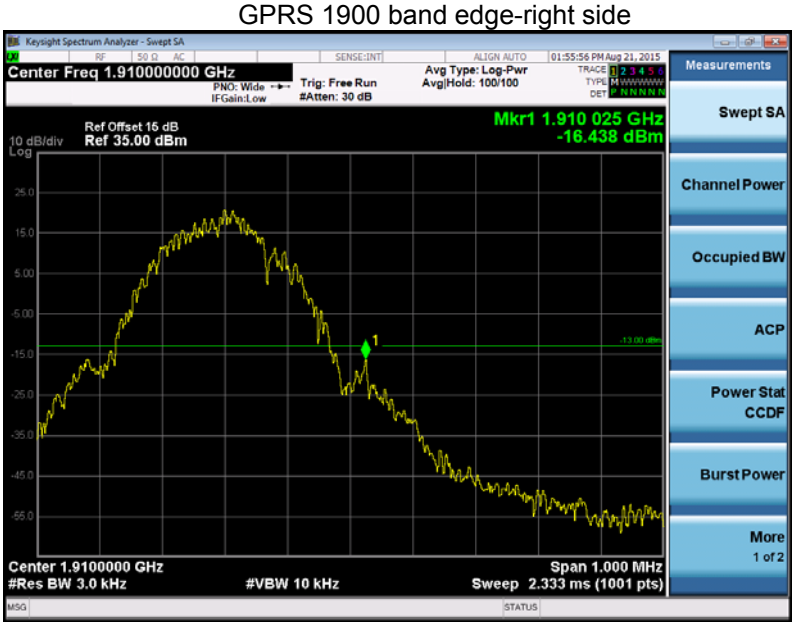



PCS 1900 band edge-right side

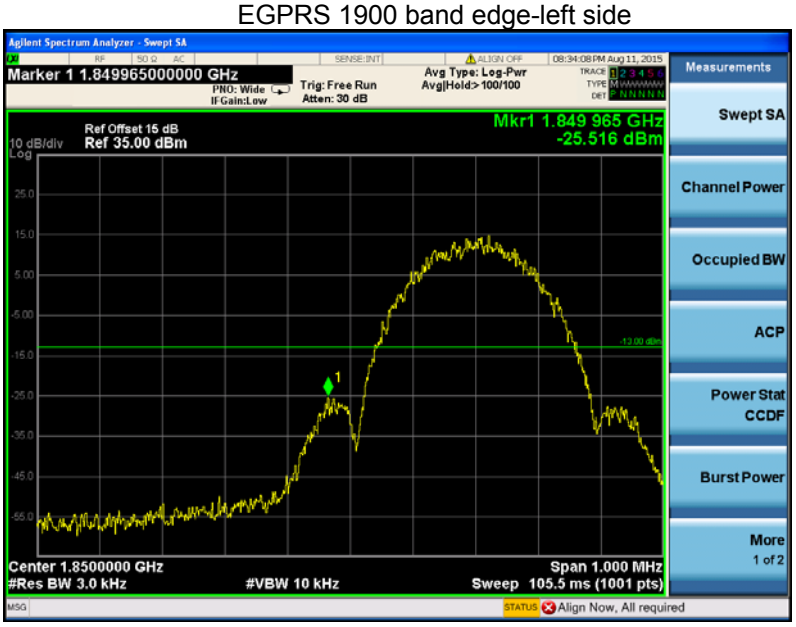
GPRS 1900 band edge-left side



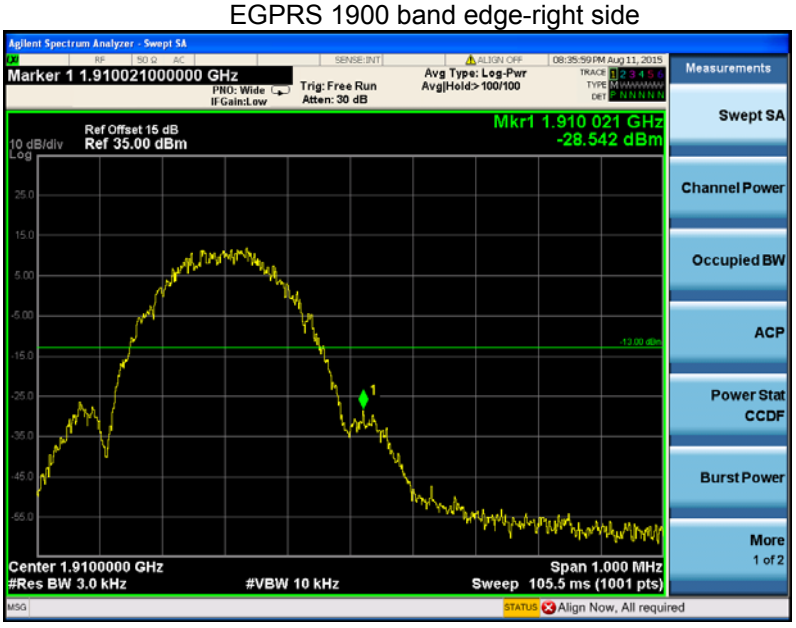

GPRS 1900 band edge-right side



EGPRS 1900 band edge-left side




EGPRS 1900 band edge-right side



# 12 FREQUENCY STABILITY

Test Requirement: FCC Part 2.1055,22.355,24.235

Test Method: ANSI C63.4:2009, TIA/EIA-603-D:2010

Test Mode: Transmitting

## 12.1 EUT Operation

Operating Environment **:**

Temperature: 22.9 °C

Humidity: 52.0 % RH

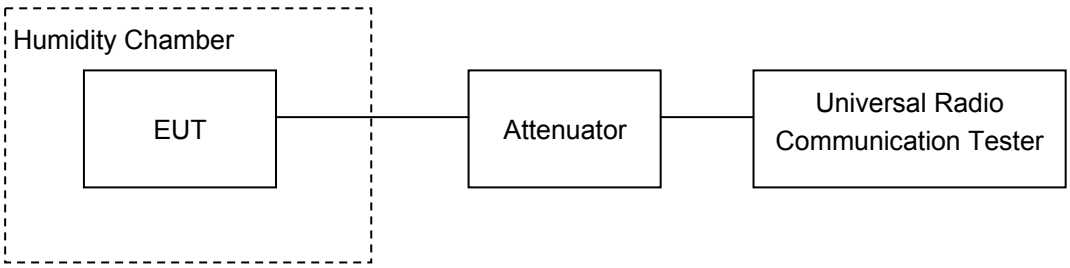
Atmospheric Pressure: 101.3kPa

## 12.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



## 12.3 Test Result

Cellular Band (Part 22H)

| GSM 850 Test Frequency:836.6MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 26 | 0.0311 | 2.5 |
| 40 | | 24 | 0.0287 | 2.5 |
| 30 | | 21 | 0.0251 | 2.5 |
| 20 | | 18 | 0.0215 | 2.5 |
| 10 | | 22 | 0.0263 | 2.5 |
| 0 | | 15 | 0.0179 | 2.5 |
| -10 | | 26 | 0.0311 | 2.5 |
| -20 | | 12 | 0.0143 | 2.5 |
| -30 | | 21 | 0.0251 | 2.5 |
| 20 | 3.3 | 23 | 0.0275 | 2.5 |
| 20 | 4.2 | 16 | 0.0191 | 2.5 |

| GPRS 850 Test Frequency:836.6MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 13 | 0.0155 | 2.5 |
| 40 | | 15 | 0.0179 | 2.5 |
| 30 | | 24 | 0.0287 | 2.5 |
| 20 | | 17 | 0.0203 | 2.5 |
| 10 | | 15 | 0.0179 | 2.5 |
| 0 | | 24 | 0.0287 | 2.5 |
| -10 | | 20 | 0.0239 | 2.5 |
| -20 | | 8 | 0.0096 | 2.5 |
| -30 | | 10 | 0.0120 | 2.5 |
| 20 | 3.3 | 19 | 0.0227 | 2.5 |
| 20 | 4.2 | 23 | 0.0275 | 2.5 |

| EGPRS 850 Test Frequency:836.6MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 25 | 0.0299 | 2.5 |
| 40 | | 27 | 0.0323 | 2.5 |
| 30 | | 20 | 0.0239 | 2.5 |
| 20 | | 23 | 0.0275 | 2.5 |
| 10 | | 15 | 0.0179 | 2.5 |
| 0 | | 29 | 0.0347 | 2.5 |
| -10 | | 15 | 0.0179 | 2.5 |
| -20 | | 21 | 0.0251 | 2.5 |
| -30 | | 25 | 0.0299 | 2.5 |
| 20 | 3.3 | 15 | 0.0179 | 2.5 |
| 20 | 4.2 | 15 | 0.0179 | 2.5 |

| WCDMA Band V Test Frequency:836.6MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 4 | 0.0048 | 2.5 |
| 40 | | 6 | 0.0072 | 2.5 |
| 30 | | 9 | 0.0108 | 2.5 |
| 20 | | 2 | 0.0024 | 2.5 |
| 10 | | 1 | 0.0012 | 2.5 |
| 0 | | 9 | 0.0108 | 2.5 |
| -10 | | -2 | -0.0024 | 2.5 |
| -20 | | 5 | 0.0060 | 2.5 |
| -30 | | 11 | 0.0131 | 2.5 |
| 20 | 3.3 | 7 | 0.0084 | 2.5 |
| 20 | 4.2 | 2 | 0.0024 | 2.5 |

PCS Band (Part 24E)

| PCS 1900 Test Frequency:1880.0MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 49 | 0.0261 | 2.5 |
| 40 | | 51 | 0.0271 | 2.5 |
| 30 | | 43 | 0.0229 | 2.5 |
| 20 | | 46 | 0.0245 | 2.5 |
| 10 | | 47 | 0.0250 | 2.5 |
| 0 | | 45 | 0.0239 | 2.5 |
| -10 | | 39 | 0.0207 | 2.5 |
| -20 | | 49 | 0.0261 | 2.5 |
| -30 | | 55 | 0.0293 | 2.5 |
| 20 | 3.3 | 46 | 0.0245 | 2.5 |
| 20 | 4.2 | 51 | 0.0271 | 2.5 |

| GPRS 1900 Test Frequency:1880.0MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 46 | 0.0245 | 2.5 |
| 40 | | 52 | 0.0277 | 2.5 |
| 30 | | 37 | 0.0197 | 2.5 |
| 20 | | 43 | 0.0229 | 2.5 |
| 10 | | 50 | 0.0266 | 2.5 |
| 0 | | 40 | 0.0213 | 2.5 |
| -10 | | 51 | 0.0271 | 2.5 |
| -20 | | 41 | 0.0218 | 2.5 |
| -30 | | 43 | 0.0229 | 2.5 |
| 20 | 3.3 | 51 | 0.0271 | 2.5 |
| 20 | 4.2 | 38 | 0.0202 | 2.5 |

| EGPRS 1900 Test Frequency:1880.0MHz | | | | |
|---|---|---|---|---|
| Temperature (℃) | Power Supply (VDC) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| 50 | 3.7 | 48 | 0.0255 | 2.5 |
| 40 | | 41 | 0.0218 | 2.5 |
| 30 | | 44 | 0.0234 | 2.5 |
| 20 | | 45 | 0.0239 | 2.5 |
| 10 | | 44 | 0.0234 | 2.5 |
| 0 | | 48 | 0.0255 | 2.5 |
| -10 | | 46 | 0.0245 | 2.5 |
| -20 | | 43 | 0.0229 | 2.5 |
| -30 | | 49 | 0.0261 | 2.5 |
| 20 | 3.3 | 45 | 0.0239 | 2.5 |
| 20 | 4.2 | 39 | 0.0207 | 2.5 |

# 13 RF Exposure

Remark: refer to SAR test report: WTS15S0730783E

====== End of Report ======