# FCC REPORT

## (GSM)

| | |
|---|---|
| **Applicant:** | SHENZHEN COOTEL FONE TECHNOLOGY CO., LTD |
| **Address of Applicant:** | No.311, 3rd Floor, Langfeng Building, No.2, Kefa Road, Central Area of Science and Technology Park, Nanshan District, Shenzhen, China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | Feature phone |
| Model No.: | M32 |
| **FCC ID:** | 2AHS2-M32 |
| **Applicable standards:** | FCC CFR Title 47 Part 2<br>FCC CFR Title 47 Part 22 Subpart H<br>FCC CFR Title 47 Part 24 Subpart E |
| **Date of sample receipt:** | 12 June, 2017 |
| **Date of Test:** | 12 June, to 11 July, 2017 |
| **Date of report issued:** | 11 July, 2017 |
| **Test Result:** | PASS* |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

## 2. Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *11 July, 2017* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Tested by:*** Casey Chen ***Date:*** *11 July, 2017*

***Test Engineer***

***Reviewed by:*** Winner Zhang ***Date:*** *11 July, 2017*

***Project Engineer***

# 3. Contents

# 4. Test Summary

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| RF Exposure (SAR) | Part 1.1307<br>Part 2.1093 | Pass<br>(Please refer to SAR Report) |
| RF Output Power | Part 2.1046<br>Part 22.913 (a)(2)<br>Part 24.232 (c) | Pass |
| Peak-to-Average Power Ratio | Part 24.232 (d) | Pass |
| Modulation Characteristics | Part 2.1047 | Pass |
| 99% & -26 dB Occupied Bandwidth | Part 2.1049<br>Part 22.917(b)<br>Part 24.238(b) | Pass |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Field Strength of Spurious Radiation | Part 2.1053<br>Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Out of band emission, Band Edge | Part 22.917 (a)<br>Part 24.238 (a) | Pass |
| Frequency stability vs. temperature | Part 22.355<br>Part 24.235<br>Part 2.1055(a)(1)(b) | Pass |
| Frequency stability vs. voltage | Part 22.355<br>Part 24.235<br>Part 2.1055(d)(2) | Pass |

*Pass: The EUT complies with the essential requirements in the standard.*

# 5. General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | SHENZHEN COOTEL FONE TECHNOLOGY CO., LTD |
| Address of Applicant: | No.311, 3rd Floor, Langfeng Building, No.2, Kefa Road, Central Area of Science and Technology Park, Nanshan District, Shenzhen, China |
| Manufacturer: | SHENZHEN COOTEL FONE TECHNOLOGY CO., LTD |
| Address of Manufacturer: | No.311, 3rd Floor, Langfeng Building, No.2, Kefa Road, Central Area of Science and Technology Park, Nanshan District, Shenzhen, China |

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

| | |
|---|---|
| Product Name: | Feature phone |
| Model No.: | M32 |
| Operation Frequency range: | GSM 850: 824.20MHz-848.80MHz<br>PCS1900: 1850.20MHz-1909.80MHz |
| Modulation type: | GSM:GMSK, UMTS:QPSK |
| Antenna type: | Internal Antenna |
| Antenna gain: | GSM 850: 0.35dBi<br>PCS 1900: 0.65dBi |
| Power supply: | Rechargeable Li-ion Battery DC3.7V-2550mAh |
| AC adapter: | Model: UOB2DOA50070<br>Input: AC100-240V 50/60Hz 120mA<br>Output: DC 5.0V, 700mA |

**Operation Frequency List:**

| GSM 850 | | PCS1900 | |
|---|---|---|---|
| Channel: | Frequency (MHz) | Channel: | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 |
| 129 | 824.40 | 513 | 1850.40 |
| …. | …. | …. | …. |
| 189 | 836.40 | 660 | 1879.80 |
| 190 | 836.60 | 661 | 1880.00 |
| 191 | 836.80 | 662 | 1880.20 |
| … | … | … | … |
| 250 | 848.60 | 809 | 1909.60 |
| 251 | 848.80 | 810 | 1909.80 |

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| GSM850 | | | PCS1900 | | |
|---|---|---|---|---|---|
| Channel | | Frequency(MHz) | Channel | | Frequency(MHz) |
| Lowest channel | 128 | 824.20 | Lowest channel | 512 | 1850.20 |
| Middle channel | 190 | 836.60 | Middle channel | 661 | 1880.00 |
| Highest channel | 251 | 848.80 | Highest channel | 810 | 1909.80 |

## 5.3 Test modes

| | |
|---|---|
| Voice mode | Keep the EUT in voice mode on GSM 850 and PCS 1900 respectively. |

## 5.4 Measurement Uncertainty

| Items | Expanded Uncertainty (Confidence of 95%) |
|---|---|
| Conducted Emission (9kHz ~ 30MHz) | 2.14 dB (k=2) |
| Radiated Emission (9kHz ~ 30MHz) | 4.24 dB (k=2) |
| Radiated Emission (30MHz ~ 1000MHz) | 4.35 dB (k=2) |
| Radiated Emission (1GHz ~ 18GHz) | 4.44 dB (k=2) |
| Radiated Emission (18GHz ~ 26.5GHz) | 4.56 dB (k=2) |

## 5.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

## 5.6 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

## 5.7 Laboratory Facility

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

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing 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 out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

## 5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Website: http://www.ccis-cb.com
Tel: +86-755-23118282
Fax:+86-755-23116366
Email: info@ccis-cb.com

## 5.9 Test Instruments list

| Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
|---|---|---|---|---|---|
| 3m Semi- Anechoic Chamber | SAEMC | 9(L)*6(W)* 6(H) | CCIS0001 | 08-23-2014 | 08-22-2017 |
| BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | CCIS0005 | 02-25-2017 | 02-24-2018 |
| Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA9120D | CCIS0006 | 02-25-2017 | 02-24-2018 |
| EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| Amplifier (10kHz-1.3GHz) | HP | 8447D | CCIS0003 | 02-25-2017 | 02-24-2018 |
| Amplifier (1GHz-18GHz) | Compliance Direction Systems Inc. | PAP-1G18 | CCIS0011 | 02-25-2017 | 02-24-2018 |
| Pre-amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | 02-25-2017 | 02-24-2018 |
| Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | 02-25-2017 | 02-24-2018 |
| Printer | HP | HP LaserJet P1007 | N/A | N/A | N/A |
| Positioning Controller | UC | UC3000 | CCIS0015 | N/A | N/A |
| Spectrum analyzer 9k-30GHz | Rohde & Schwarz | FSP 30 | CCIS0023 | 02-25-2017 | 02-24-2018 |
| EMI Test Receiver | Rohde & Schwarz | ESPI | CCIS0022 | 02-25-2017 | 02-24-2018 |
| EMI Test Receiver | Rohde & Schwarz | ESRP7 | CCIS0167 | 02-25-2017 | 02-24-2018 |
| Loop antenna | Laplace instrument | RF300 | EMC0701 | 02-25-2017 | 02-24-2018 |
| Universal radio communication tester | Rhode & Schwarz | CMU200 | CCIS0069 | 02-25-2017 | 02-24-2018 |
| Signal Analyzer | Rohde & Schwarz | FSIQ3 | CCIS0088 | 02-25-2017 | 02-24-2018 |
| DC Power Supply | Shenzhen XinNuoEr Technologies Co., Ltd. | WYK-10020K | CCIS0201 | 10-31-2016 | 10-30-2017 |
| Temperature Humidity Chamber | Fo Shan Heng Pu Electronics Co., Ltd. | HPGDS-500 | CCIS0240 | 11-18-2016 | 11-27-2017 |
| Coaxial Cable | N/A | N/A | CCIS0018 | 02-25-2017 | 02-24-2018 |
| Coaxial Cable | N/A | N/A | CCIS0020 | 02-25-2017 | 02-24-2018 |

# 6. System test configuration

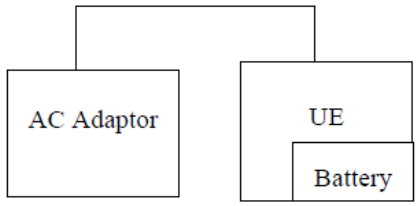
## 6.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

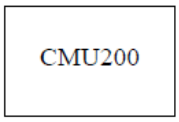
## 6.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

## 6.3 Configuration of Tested System



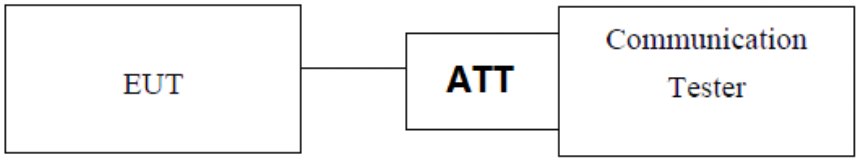

**Remote Side**




## 6.4 Description of Test Modes

The EUT has been tested under operating condition.
EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes (GSM850, PCS1900.) with power adaptor, earphone and Data cable. The worst-case H mode for GSM850, PCS1900.

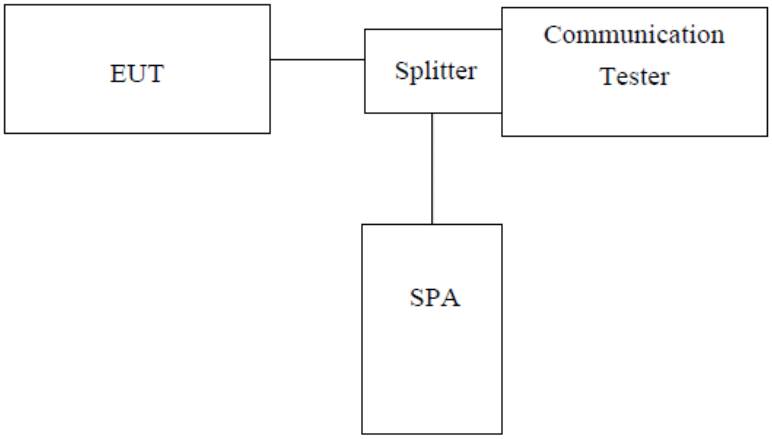
## 6.5 Conducted Output Power

| | |
|---|---|
| Test Requirement: | FCC part 22.913(a)(2), FCC part 24.232(c) |
| Test Method: | FCC part 2.1046 |
| Limit: | GSM 850: 7W<br>PCS 1900: 2W |
| Test setup: |  <br>*Note: Measurement setup for testing on Antenna connector* |
| Test Procedure: | The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the simulated station. Transmitter output power was read off in dBm. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed |

**Measurement Data:**

| EUT Mode | Burst Average power (dBm) | | | Limit(dBm) |
|---|---|---|---|---|
| | 128 | 190 | 251 | |
| | 824.20MHz | 836.60MHz | 848.80MHz | |
| GSM 850 | 31.93 | 31.96 | 31.93 | 38.45 |
| EUT Mode | Burst Average power (dBm) | | | Limit(dBm) |
| | 512 | 661 | 810 | |
| | 1850.20MHz | 1880.00MHz | 1909.80MHz | |
| PCS 1900 | 30.88 | 30.85 | 30.93 | 33.00 |

## 6.6 Occupy Bandwidth

| | |
|---|---|
| Test Requirement: | FCC part 22.917(b), FCC part 24.238(b) |
| Test Method: | FCC part 2.1049 |
| Test setup: |  *Note: Measurement setup for testing on Antenna connector* |
| Test Procedure: | 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer<br>2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.<br>3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed |

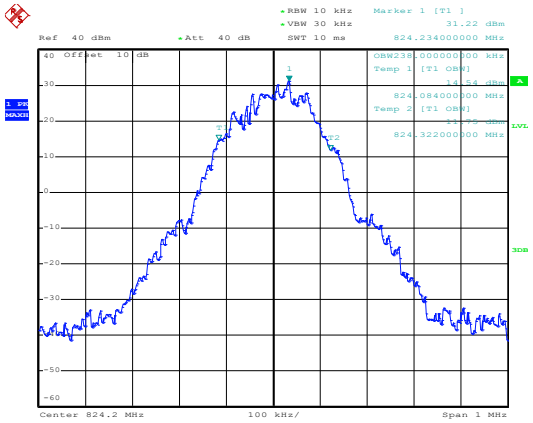
**Measurement Data:**

| EUT Mode | Channel | Frequency (MHz) | 99% Occupy bandwidth (kHz) | -26dB bandwidth (kHz) |
|---|---|---|---|---|
| GSM 850 | 128 | 824.2 | 238 | 306 |
| | 190 | 836.6 | 246 | 302 |
| | 251 | 848.8 | 236 | 288 |
| PCS 1900 | 512 | 1850.2 | 238 | 314 |
| | 661 | 1880.0 | 242 | 306 |
| | 810 | 1909.8 | 240 | 308 |

**Test plot as follows:**

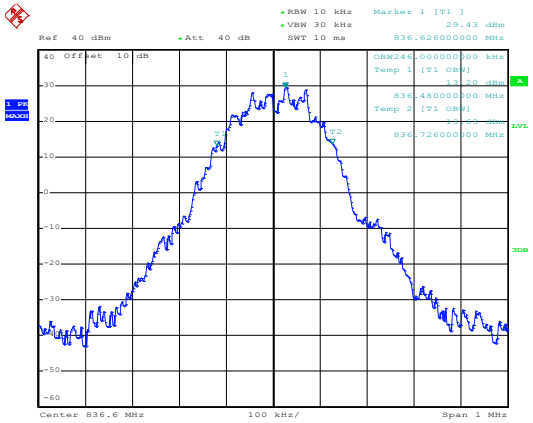
**99% Occupy bandwidth**

GSM850



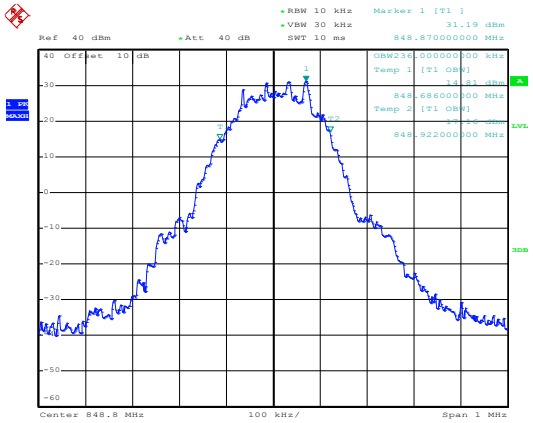

Date: 2.JUL.2017 23:29:19

Lowest channel




Date: 2.JUL.2017 23:29:11

Middle channel

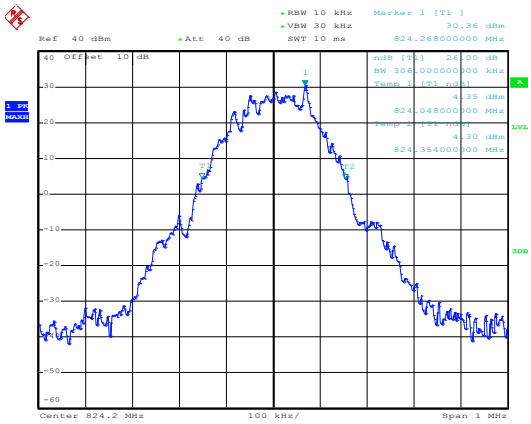



Date: 2.JUL.2017 23:28:48

Highest channel

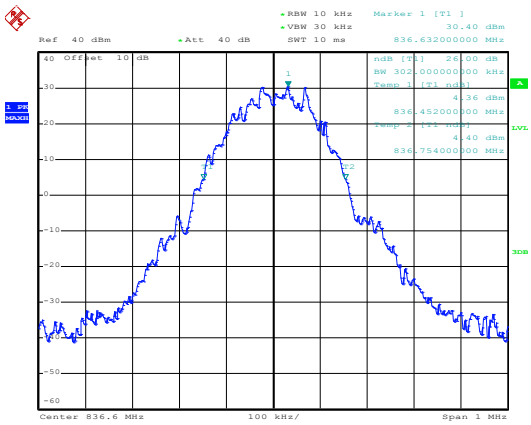
## 26dB Emission Bandwidth

GSM850



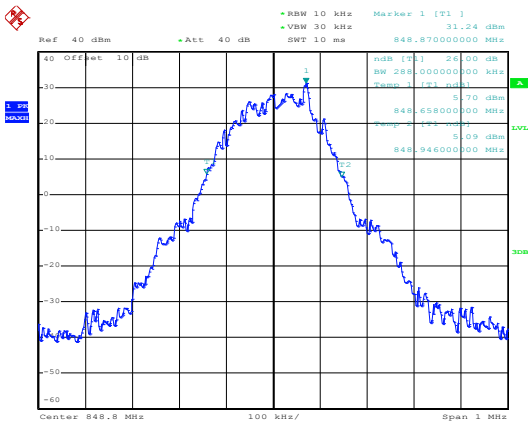

Date: 2.JUL.2017 23:29:25

Lowest channel




Date: 2.JUL.2017 23:29:04

Middle channel

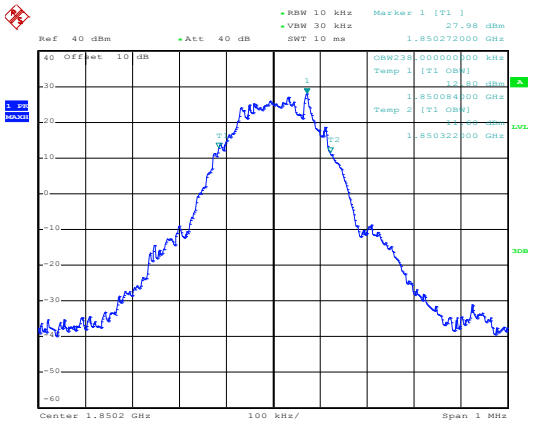



Date: 2.JUL.2017 23:28:53

Highest channel

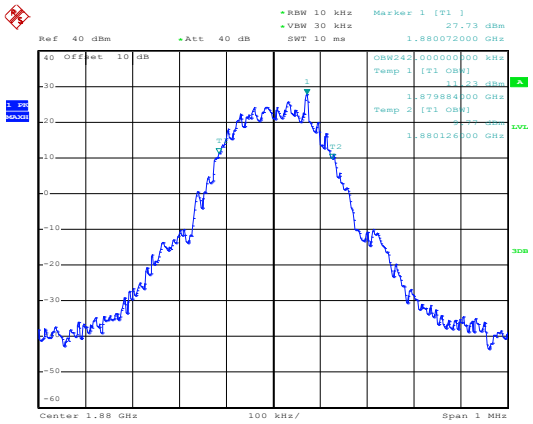
**99% Occupy bandwidth**

PCS 1900



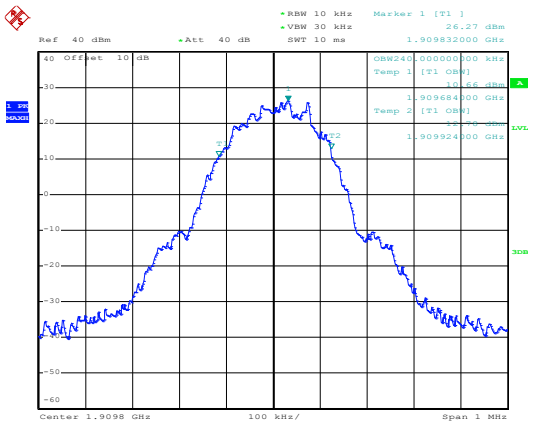

Date: 2.JUL.2017 23:25:22

Lowest channel




Date: 2.JUL.2017 23:25:46

Middle channel

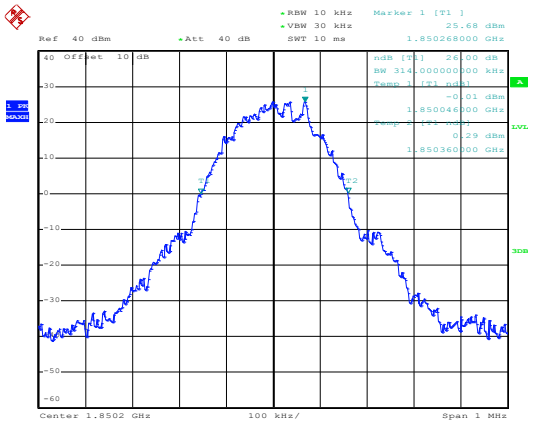



Date: 2.JUL.2017 23:26:04

Highest channel

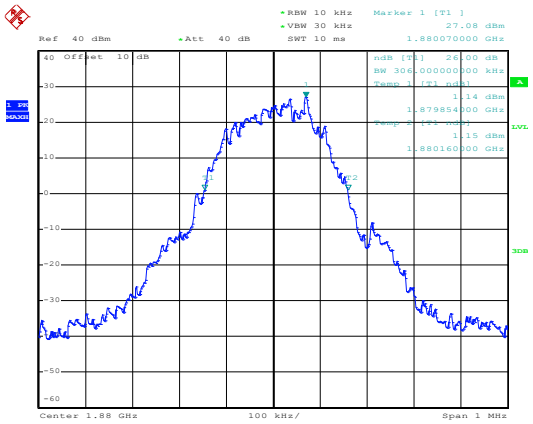
## 26dB Emission Bandwidth

PCS 1900



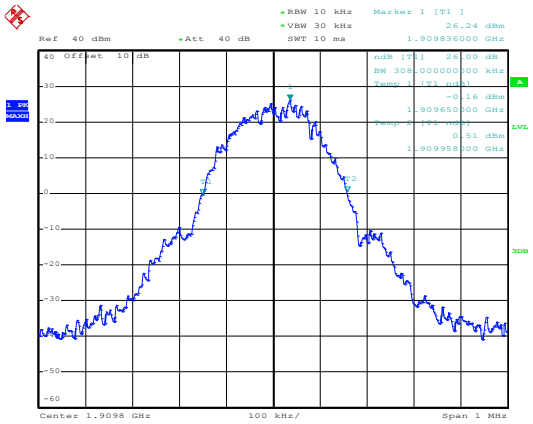

Date: 2.JUL.2017 23:25:28

Lowest channel




Date: 2.JUL.2017 23:25:40

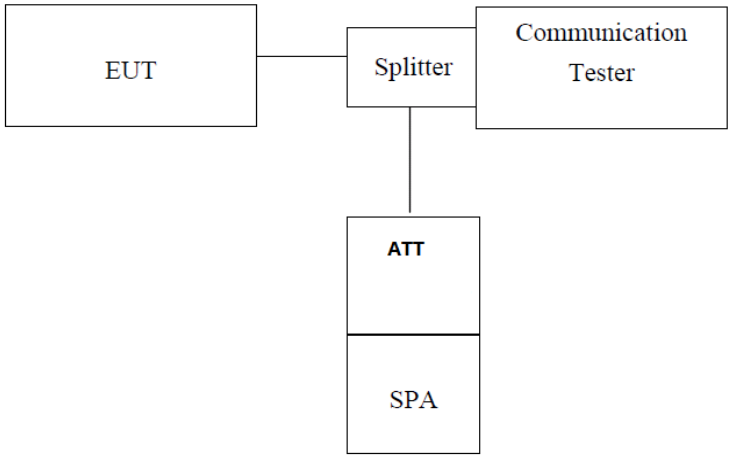
Middle channel




Date: 2.JUL.2017 23:26:11

Highest channel

## 6.7 Peak-to-Average Power Ratio

| | |
|---|---|
| Test Requirement: | FCC part 24.232(d) |
| Limit: | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB. |
| Test setup: |  *Note: Measurement setup for testing on Antenna connector* |
| Test Procedure: | 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.<br>2 Set the CCDF option in spectrum analyzer, RBW ≥ OBW,<br>3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.<br>4 Repeat step 1~3 at other frequency and modulations. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed |

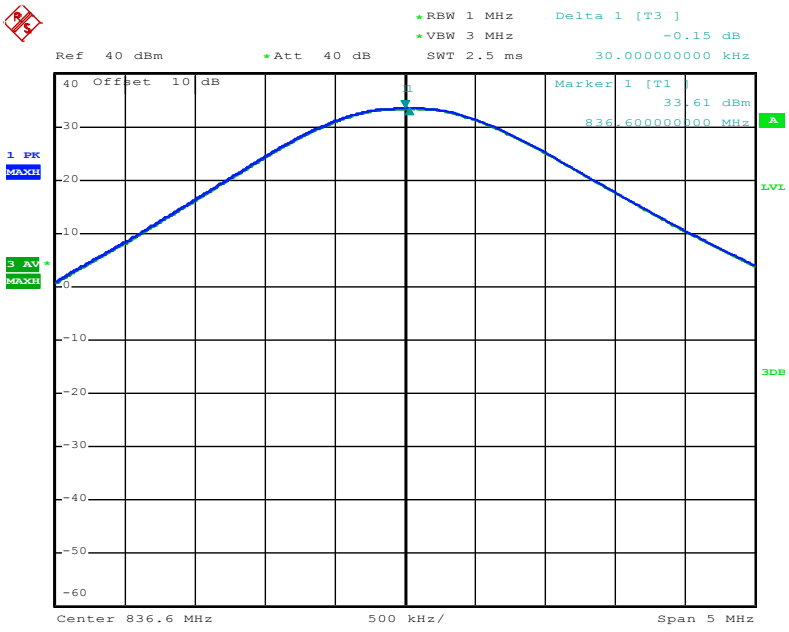
**Measurement Data (worst case):**

| Modulation | Test channel | PAPR |
|---|---|---|
| GSM 850 | 190 | 0.15 |
| PCS 1900 | 661 | 0.10 |

**Test plots as below:**

Middle channel

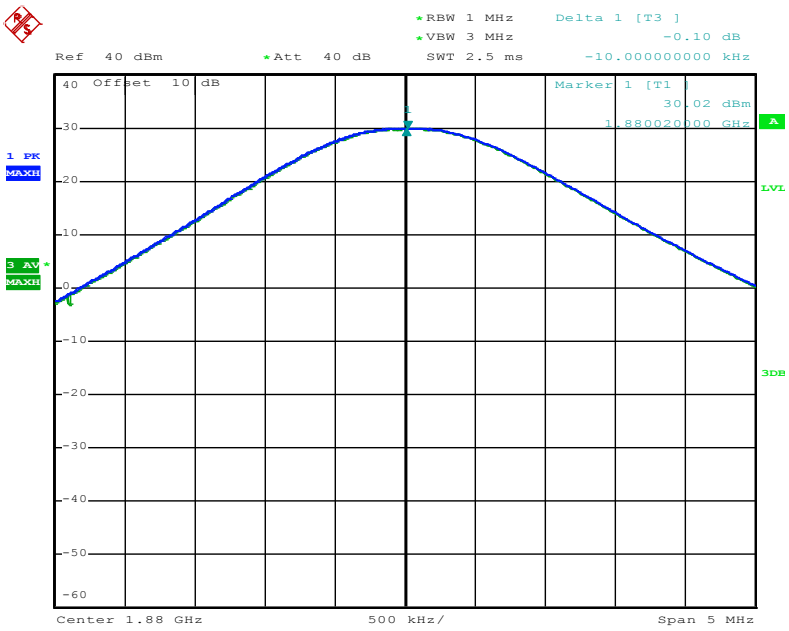
Modulation: GSM 850




Date: 2.JUL.2017 23:31:01

Middle channel

Modulation: PCS 1900

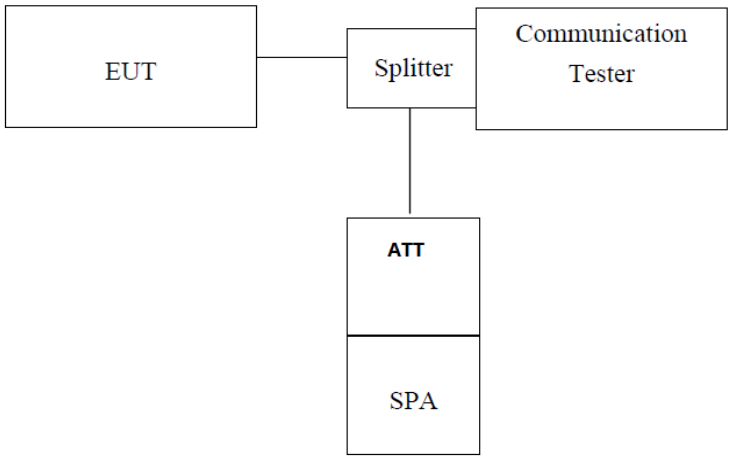



Date: 2.JUL.2017 23:31:23

## 6.8 Modulation Characteristic

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## 6.9 Out of band emission at antenna terminals

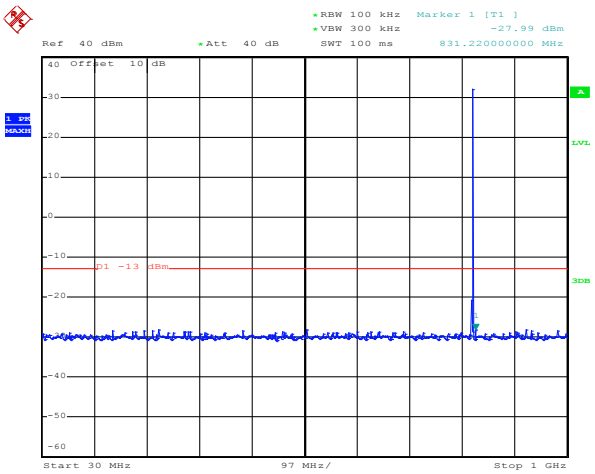
| | |
|---|---|
| Test Requirement: | FCC part 22.917(a), FCC part 24.238(a) |
| Test Method: | FCC part 2.1051 |
| Limit: | -13dBm |
| Test setup: |  *Note: Measurement setup for testing on Antenna connector* |
| Test Procedure: | 5 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.<br>6 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.<br>7 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic.<br>8 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed |

**Test plots as follows:**

**Spurious emission:**

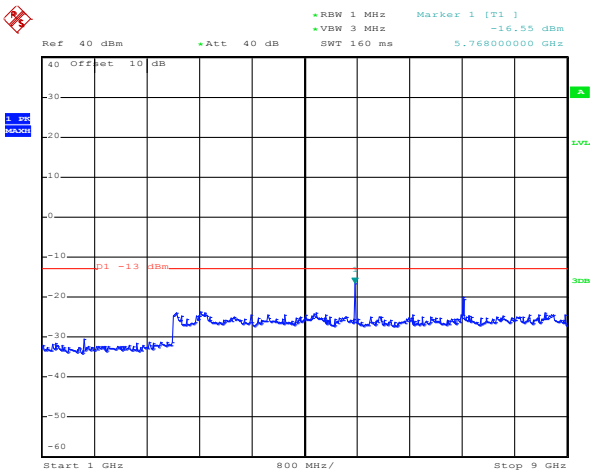
**GSM 850**

Lowest Channel




Date: 2.JUL.2017 22:46:06

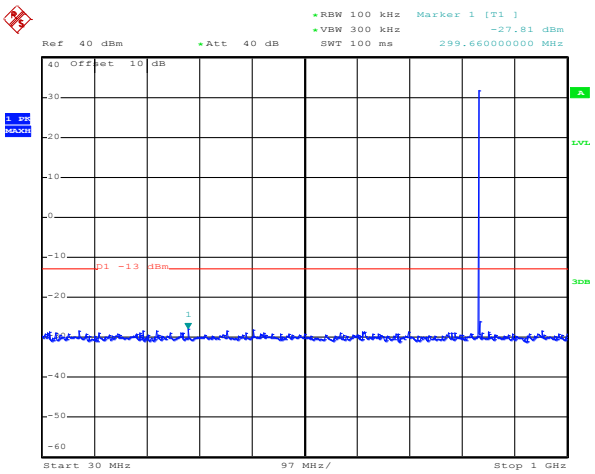
30MHz~1GHz




Date: 2.JUL.2017 23:08:20

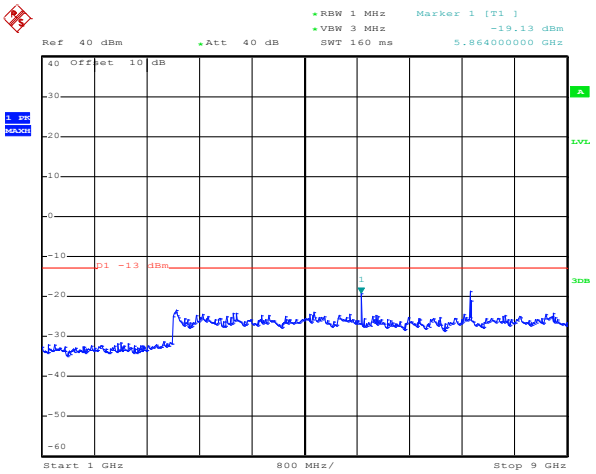
1GHz~9GHz

Middle channel




Date: 2.JUL.2017 22:46:59

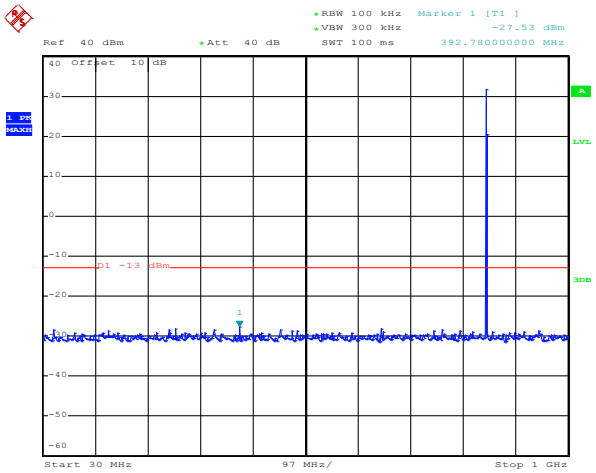
30MHz~1GHz




Date: 2.JUL.2017 23:02:57

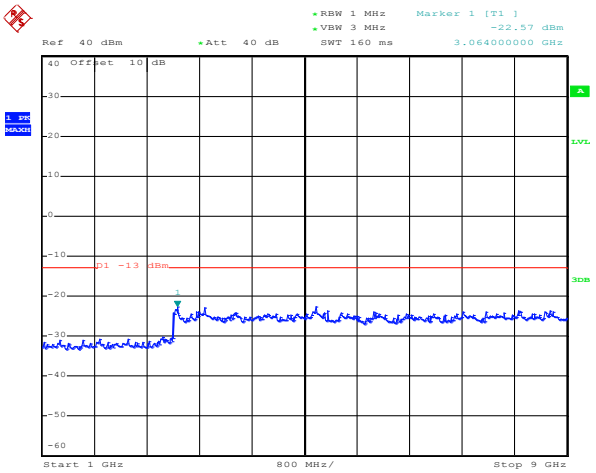
1GHz~9GHz

Highest Channel




Date: 2.JUL.2017 22:47:30

30MHz~1GHz

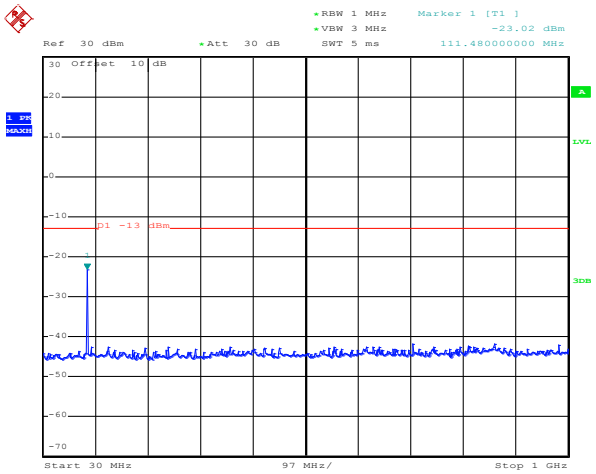



Date: 2.JUL.2017 23:13:58

1GHz~9GHz

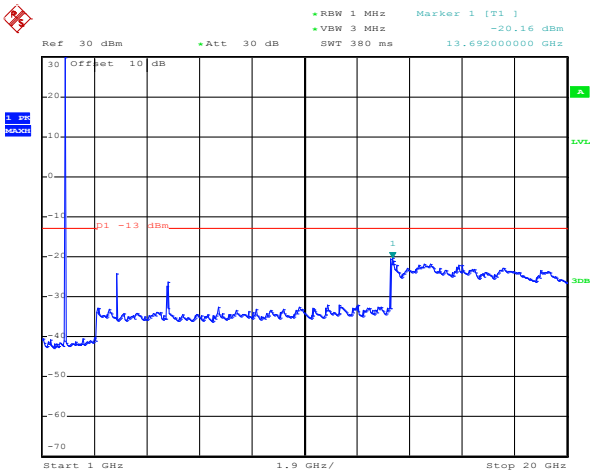
**PCS 1900**

Lowest Channel




Date: 2.JUL.2017 23:24:00

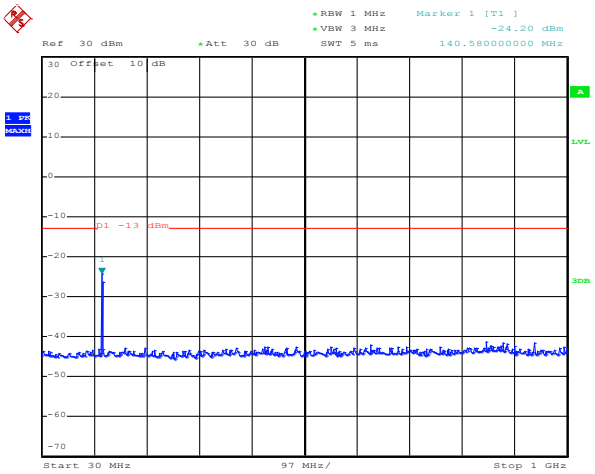
30MHz~1GHz




Date: 2.JUL.2017 23:20:28

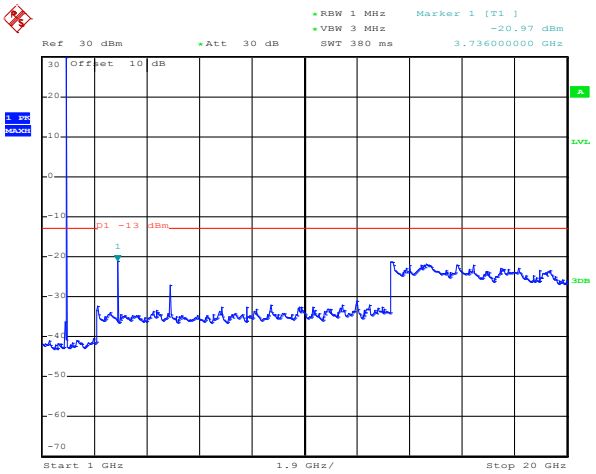
1GHz~20GHz

Middle Channel




Date: 2.JUL.2017 23:23:43

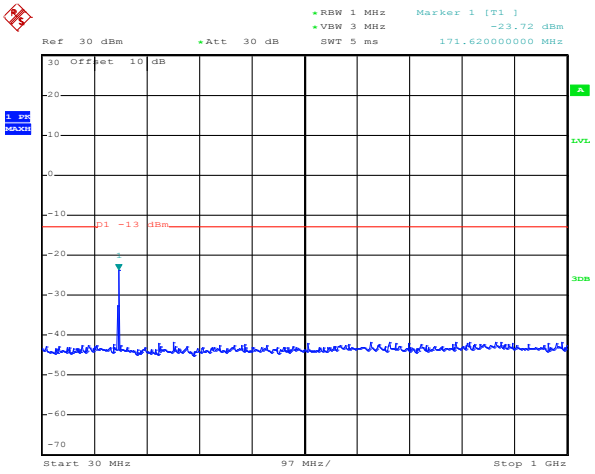
30MHz~1GHz




Date: 2.JUL.2017 23:21:19

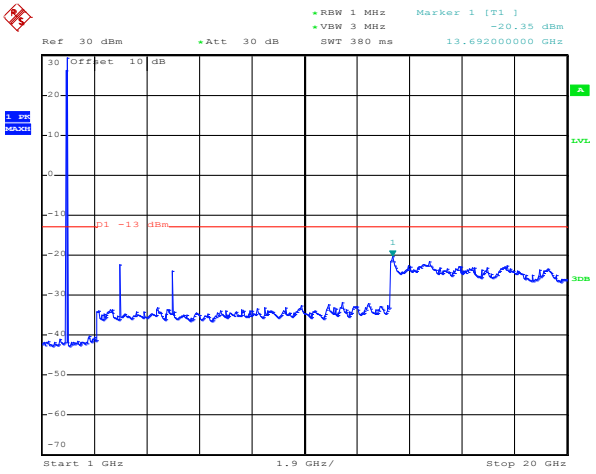
1GHz~20GHz

Highest Channel




Date: 2.JUL.2017 23:23:19

30MHz~1GHz

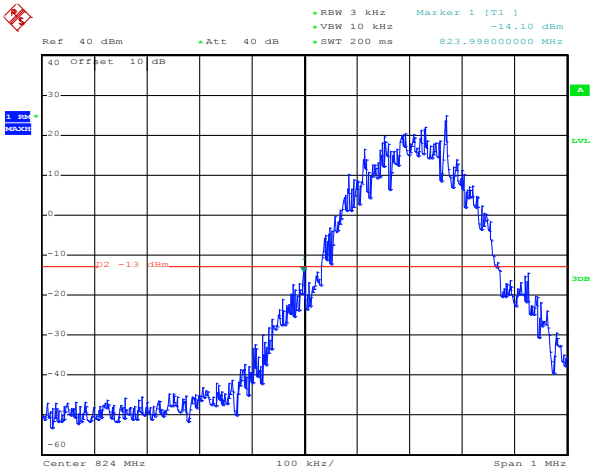



Date: 2.JUL.2017 23:22:09

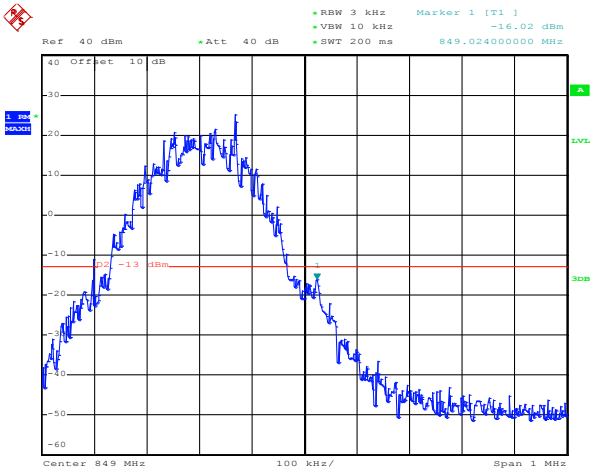
1GHz~20GHz

**Band edge emission:**

**GSM850**

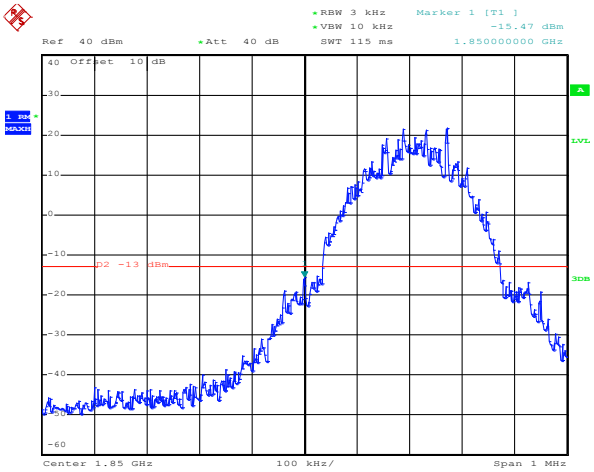



Lowest channel

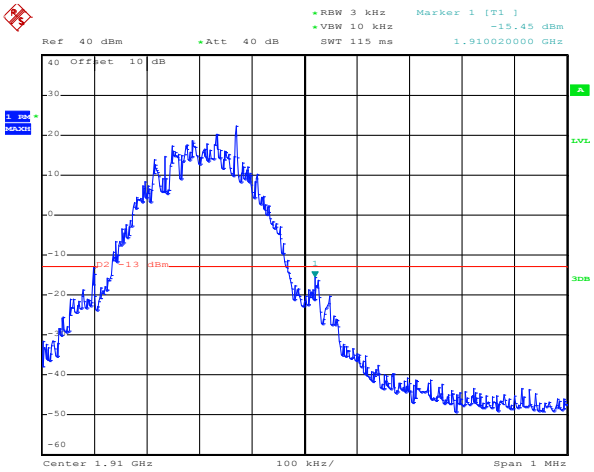



Highest channel

**PCS1900**

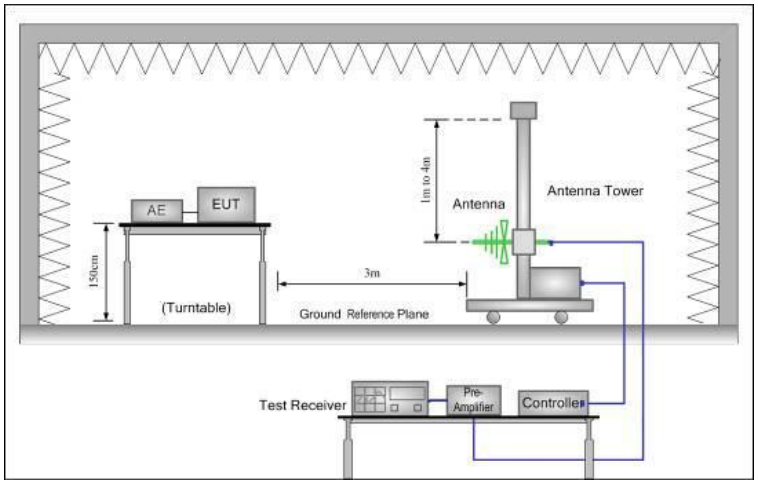
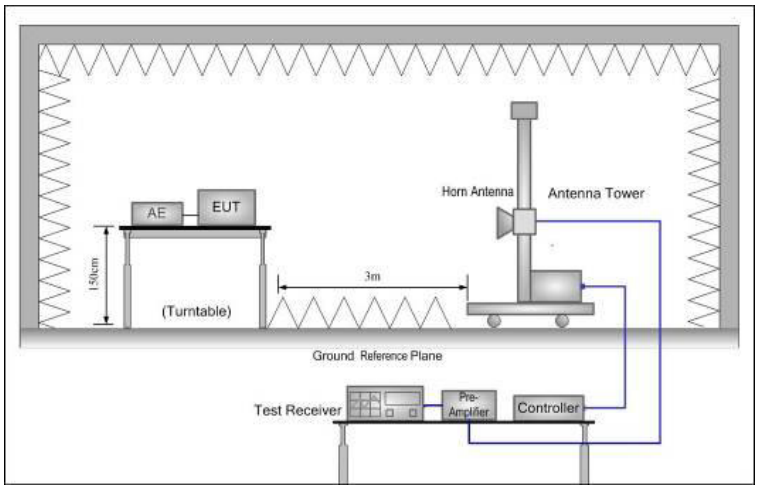



Lowest channel




Highest channel

## 6.10 ERP, EIRP Measurement

| | |
|---|---|
| Test Requirement: | FCC part 22.913(a)(2), FCC part 24.232(c) |
| Test Method: | FCC part 2.1046 |
| Limit: | GSM850 7W: ERP<br>PCS1900 2W: EIRP |
| Test setup: | Below 1GHz<br>  <br><br>Above 1GHz<br>  <br> |

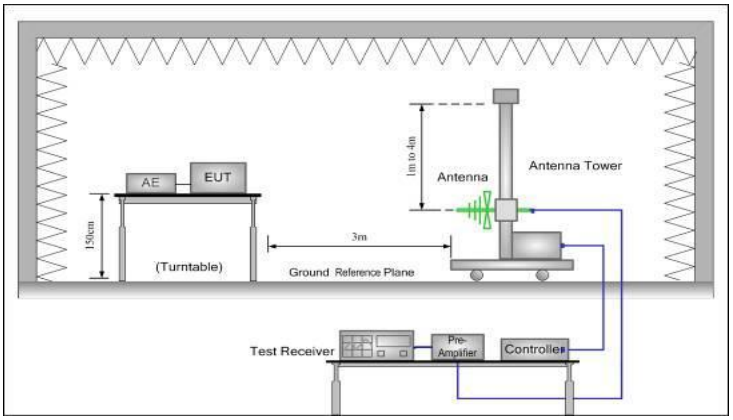
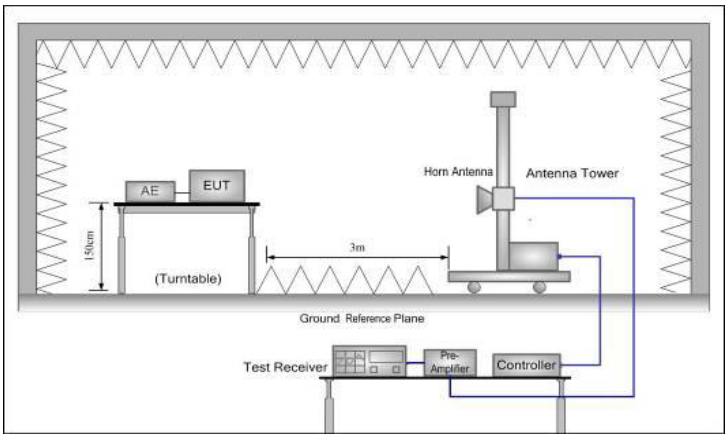
| | |
|---|---|
| Test Procedure: | 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.<br>2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.<br>3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:<br>ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)<br>4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:<br>EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)<br>5. The worse case was relating to the conducted output power. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed (All three channels were tested, and just the worst case data were shown in the report.) |

**Measurement Data (worst case)**:

| EUT mode | Channel | EUT Pol. | Antenna Pol. | ERP(dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| GSM850 | 251 | H | V | 30.20 | 38.45 | Pass |
| | | | H | 20.42 | | |

| EUT mode | Channel | EUT Pol. | Antenna Pol. | EIRP(dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| PCS1900 | 810 | H | V | 22.00 | 33 | Pass |
| | | | H | 15.69 | | |

## 6.11 Field strength of spurious radiation measurement

| | |
|---|---|
| Test Requirement: | FCC part 22.917(a), FCC part 24.238(a) |
| Test Method: | FCC part 2.1053 |
| Limit: | -13dBm |
| Test setup: | Below 1GHz<br>  <br><br>Above 1GHz<br>  <br> |
| Test Procedure: | 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.<br>2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.<br>3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.<br>4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.<br>ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB) |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details. |
| Test results: | Passed |

**Measurement Data (worst case):**

| Test mode: | GSM850 | | Test channel: | Lowest |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1648.40 | Vertical | -34.65 | -13.00 | Pass |
| 2472.60 | V | -35.79 | | |
| 3296.80 | V | -48.51 | | |
| 4121.00 | V | -37.10 | | |
| 1648.40 | Horizontal | -36.72 | -13.00 | Pass |
| 2472.60 | H | -35.88 | | |
| 3296.80 | H | -58.58 | | |
| 4121.00 | H | -42.99 | | |
| **Test mode:** | **GSM850** | | **Test channel:** | **Middle** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1673.20 | Vertical | -33.11 | -13.00 | Pass |
| 2509.80 | V | -33.38 | | |
| 3346.40 | V | -46.14 | | |
| 4183.00 | V | -38.59 | | |
| 1673.20 | Horizontal | -35.23 | -13.00 | Pass |
| 2509.80 | H | -36.79 | | |
| 3346.40 | H | -49.90 | | |
| 4183.00 | H | -43.20 | | |
| **Test mode:** | **GSM850** | | **Test channel:** | **Highest** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1697.60 | Vertical | -30.72 | -13.00 | Pass |
| 2546.40 | V | -26.17 | | |
| 3395.20 | V | -46.68 | | |
| 4244.00 | V | -40.27 | | |
| 1697.60 | Horizontal | -33.12 | -13.00 | Pass |
| 2546.40 | H | -35.24 | | |
| 3395.20 | H | -48.43 | | |
| 4244.00 | H | -44.00 | | |

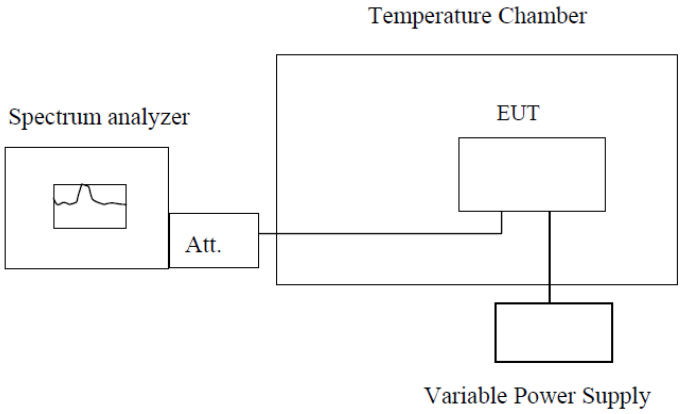
*Remark:*

*1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.*

| Test mode: | PCS1900 | | Test channel: | Lowest |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3700.40 | Vertical | -22.41 | -13.00 | Pass |
| 5550.60 | V | -21.21 | | |
| 3700.40 | Horizontal | -22.40 | -13.00 | Pass |
| 5550.60 | H | -18.78 | | |
| **Test mode:** | **PCS1900** | | **Test channel:** | **Middle** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3760.00 | Vertical | -25.15 | -13.00 | Pass |
| 5640.00 | V | -20.29 | | |
| 3760.00 | Horizontal | -25.15 | -13.00 | Pass |
| 5640.00 | H | -15.45 | | |
| **Test mode:** | **PCS1900** | | **Test channel:** | **Highest** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3819.60 | Vertical | -25.53 | -13.00 | Pass |
| 5729.40 | V | -16.69 | | |
| 3819.60 | Horizontal | -28.44 | -13.00 | Pass |
| 5729.40 | H | -18.80 | | |

*Remark:*
*1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.*

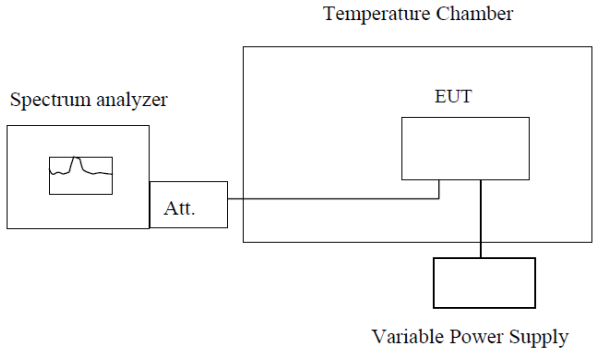
## 6.12 Frequency stability V.S. Temperature measurement

| | |
|---|---|
| Test Requirement: | FCC Part 22.355, FCC Part 24.235, FCC Part 2.1055(a)(1)(b) |
| Test Method: | FCC Part 2.1055(a)(1)(b) |
| Limit: | ±2.5 ppm |
| Test setup: |  <br>**Note :** Measurement setup for testing on Antenna connector |
| Test procedure: | 1. The equipment under test was connected to an external DC power supply and input rated voltage.<br>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.<br>3. The EUT was placed inside the temperature chamber.<br>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency.<br>5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.<br>6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Passed |
| Remark: | All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item. |

**Measurement Data (the worst channel):**

| Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz | | | | | |
|---|---|---|---|---|---|
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 179 | 0.213961 | ±2.5 | Pass |
| | -20 | 163 | 0.194836 | | |
| | -10 | 172 | 0.205594 | | |
| | 0 | 154 | 0.184078 | | |
| | 10 | 139 | 0.166149 | | |
| | 20 | 107 | 0.127899 | | |
| | 30 | 129 | 0.154196 | | |
| | 40 | 144 | 0.172125 | | |
| | 50 | 163 | 0.194836 | | |
| Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 183 | 0.097340 | ±2.5 | Pass |
| | -20 | 162 | 0.086170 | | |
| | -10 | 178 | 0.094681 | | |
| | 0 | 102 | 0.054255 | | |
| | 10 | 159 | 0.084574 | | |
| | 20 | 142 | 0.075532 | | |
| | 30 | 175 | 0.093085 | | |
| | 40 | 165 | 0.087766 | | |
| | 50 | 152 | 0.080851 | | |

## 6.13 Frequency stability V.S. Voltage measurement

| | |
|---|---|
| Test Requirement: | FCC Part 22.355, FCC Part 24.235, FCC Part 2.1055(d)(2) |
| Test Method: | FCC Part 2.1055(d)(1)(2) |
| Limit: | ±2.5ppm |
| Test setup: |  <br>**Note :** Measurement setup for testing on Antenna connector |
| Test procedure: | 1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage.<br>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.<br>3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change. |
| Test Instruments: | Refer to section 5.9 for details |
| Test mode: | Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report. |
| Test results: | Passed |

**Measurement Data (the worst channel):**

| Reference Frequency: GSM850 Middle channel=190 channel=836.6MHz | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.20 | 83 | 0.099211 | ±2.5 | Pass |
| | 3.70 | 92 | 0.109969 | | |
| | 3.50 | 96 | 0.114750 | | |
| Reference Frequency: PCS1900 Middle channel=661 channel=1880MHz | | | | | |
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.20 | 91 | 0.048404 | ±2.5 | Pass |
| | 3.70 | 75 | 0.039894 | | |
| | 3.50 | 82 | 0.043617 | | |