



**TEST REPORT  
FROM  
RFI GLOBAL SERVICES LTD**

Test of: GC864-QUAD V2

To: FCC Part 22: 2009 Subpart H, FCC Part 24: 2009 Subpart E,  
RSS 132 Issue 2 September 2005 and RSS-133 Issue 5 February 2009

**Test Report Serial No:**  
RFI/RPT2/RP76921JD03A

**Supersedes Test Report Serial No:**  
RFI/RPT1/RP76921JD03A

|   |  |
|---|--|
| <b>This Test Report Is Issued Under The Authority<br/>Of Brian Watson, Operations Director:</b> |  |
|   |  |
| <b>Checked By:</b>  | Nigel Davison  |
| <b>Signature:</b>   |  |
| <b>Date of Issue:</b>   | 31 March 2010  |

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**1. Customer Information**











|                      |   |
|----------------------|---|
| <b>Company Name:</b> | Telit Communications S.p.A.                                   |
| <b>Address:</b>      | Via Stazione di Prosecco, 5/B<br>Sgonico<br>TS 34010<br>Italy |

## 2. Summary of Testing

### 2.1. General Information – FCC Part 22

|                                 |  |
|---------------------------------|--|
| <b>Specification Reference:</b> | 47CFR22  |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications) 2009:<br>Part 22 Subpart H (Public Mobile Services)       |
| <b>Specification Reference:</b> | RSS-GEN Issue 2 June 2007  |
| <b>Specification Title:</b>     | General Requirements and Information for the Certification of<br>Radiocommunication Equipment                        |
| <b>Specification Reference:</b> | RSS-132 Issue 2 Sep 2005   |
| <b>Specification Title:</b>     | Cellular Telephones Employing New Technologies Operating in the Bands<br>824-849 MHz and 869-894 MHz                 |
| <b>Specification Reference:</b> | RSS-133 Issue 5 Feb 2009   |
| <b>Specification Title:</b>     | GHz Personal Communications Services   |
| <b>Specification Reference:</b> | SRSP-510 Issue 4 Feb 2008  |
| <b>Specification Title:</b>     | Technical Requirements for Personal Communications Services in the Bands<br>1850-1915 MHz and 1930-1995 MHz          |
| <b>Specification Reference:</b> | SRSP-503 Issue 6 Jun 2003  |
| <b>Specification Title:</b>     | Technical Requirements for Cellular Radiotelephone Systems Operating in the<br>Bands 824 – 849 MHz and 869 – 894 MHz |
| <b>Site Registration:</b>       | FCC: 209735<br>Industry Canada: 3245B-2  |
| <b>Location of Testing:</b>     | RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.  |
| <b>Test Dates:</b>              | 02 March 2010 to 19 March 2010   |










**2.2. Summary of Test Results – FCC Part 22**

| FCC Reference (47CFR )  | IC Reference                    | Measurement   | Result   |
|---|---------------------------------|---|--|
| FCC Part 15.109   | RSS-Gen 4.10/6.0<br>RSS-132 4.6 | Receiver/Idle Mode Radiated Spurious Emissions                      |   |
| FCC Part 22.913(a)  | RSS-132 4.4<br>SRSP-503 5.1.3   | Transmitter Carrier Output Power and Effective Radiated Power (ERP) |   |
| FCC Part 22.355   | RSS-132 4.3<br>RSS Gen 4.7      | Transmitter Frequency Stability (Temperature Variation)             |   |
| FCC Part 22.355   | RSS-132 4.3<br>RSS Gen 4.7      | Transmitter Frequency Stability (Voltage Variation)                 |   |
| FCC Part 2.1049   | RSS-Gen 4.6.1                   | Transmitter Occupied Bandwidth                                      |   |
| FCC Part 2.1051/22.917  | RSS-132 4.5                     | Transmitter Out of Band Conducted Emissions                         |   |
| FCC Part 2.1051/22.917  | RSS-132 4.5                     | Transmitter Conducted Emissions at Band Edges                       |   |
| FCC Part 2.1053/22.917  | RSS-132 4.5                     | Transmitter Out of Band Radiated Emissions                          |  |
| <b>Key to Results</b>   |                                 |   |  |
|  = Complied  = Did not comply |                                 |   |  |

**2.3. General Information – FCC Part 24**

|                                 |  |
|---------------------------------|--|
| <b>Specification Reference:</b> | 47CFR24  |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 24 Subpart E (Personal Communication Services) |
| <b>Specification Reference:</b> | RSS-GEN Issue 2 June 2007  |
| <b>Specification Title:</b>     | General Requirements and Information for the Certification of Radiocommunication Equipment                           |
| <b>Specification Reference:</b> | RSS-133 Issue 5 Feb 2009   |
| <b>Specification Title:</b>     | GHz Personal Communications Services   |
| <b>Specification Reference:</b> | SRSP-510 Issue 4 Feb 2008  |
| <b>Specification Title:</b>     | Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz       |
| <b>Site Registration:</b>       | FCC: 209735<br>Industry Canada: 3245B-2  |
| <b>Location of Testing:</b>     | RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.  |
| <b>Test Dates:</b>              | 02 March to 19 March 2010  |

**2.4. Summary of Test Results – FCC Part 24**

| FCC Reference (47CFR)   | IC Reference                    | Measurement  | Result  |
|---|---------------------------------|--|---|
| FCC Part 15.109   | RSS-Gen 4.10/6.0<br>RSS-133 6.6 | Receiver/Idle Mode Radiated Spurious Emissions                                 |  |
| FCC Part 24.232   | RSS-133 6.4<br>SRSP-510 5.1.2   | Transmitter Carrier Output Power and Effective Isotropic Radiated Power (EIRP) |  |
| FCC Part 24.235   | RSS-133 6.3<br>RSS Gen 4.7      | Transmitter Frequency Stability (Temperature & Voltage Variation)              |  |
| FCC Part 2.1049/24.238  | RSS-Gen 4.6.1                   | Transmitter Occupied Bandwidth   |  |
| FCC Part 2.1051/24.238  | RSS-133 6.5                     | Transmitter Out of Band Conducted Emissions                                    |  |
| FCC Part 2.1051/24.238  | RSS-133 6.5                     | Transmitter Conducted Emissions at Band Edges                                  |  |
| FCC Part 2.1053/24.238  | RSS-133 6.5                     | Transmitter Out of Band Radiated Emissions                                     |  |
| <b>Key to Results</b>   |                                 |  |   |
|  = Complied  = Did not comply |                                 |  |   |

**Methods and Procedures**

|                   |  |
|-------------------|--|
| <b>Reference:</b> | ANSI/TIA-603-C-2004  |
| <b>Title:</b>     | Land Mobile Communications Equipment, Measurements and performance Standards   |
| <b>Reference:</b> | ANSI C63.4 (2003)  |
| <b>Title:</b>     | American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |

**2.5. Deviations from the Test Specification**

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.



### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

|                                   |                                 |
|-----------------------------------|---------------------------------|
| <b>Brand Name:</b>                | Telit                           |
| <b>Model Name or Number:</b>      | GC864-QUAD-V2                   |
| <b>IMEI Number:</b>               | TAC:35955103<br>359551039000657 |
| <b>Hardware Version Number:</b>   | 0                               |
| <b>Software Version Number:</b>   | 10.00.05 3<br>SVN = 03          |
| <b>Industry Canada ID Number:</b> | 5131A-GC864Q2                   |
| <b>FCC ID Number:</b>             | RI7GC864Q2                      |

#### **3.2. Description of EUT**

The equipment under test was a quad band GSM/GPRS modem mounted on a Telit development board. The EUT was mounted to the development board on four support posts and connected by two 40 pin connectors.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

|                                     |                          |                       |                                |          |         |       |
|-------------------------------------|--------------------------|-----------------------|--------------------------------|----------|---------|-------|
| <b>Technology Tested:</b>           | <b>GSM 850 (Part 22)</b> |                       |                                |          |         |       |
| <b>Type of Radio Device:</b>        | Transceiver              |                       |                                |          |         |       |
| <b>Power Supply Requirement(s):</b> | Nominal                  | 3.8 V                 | Minimum                        | 3.2 V    | Maximum | 4.4 V |
| <b>Mode:</b>                        | GSM/GPRS                 |                       |                                |          |         |       |
| <b>Modulation Type:</b>             | GMSK                     |                       |                                |          |         |       |
| <b>Channel Spacing:</b>             | 200 kHz                  |                       |                                |          |         |       |
| <b>Maximum Output Power (ERP):</b>  | GSM                      | 34.5 dBm              | GPRS                           | 34.4 dBm |         |       |
| <b>Transmit Frequency Range:</b>    | 824 to 849 MHz           |                       |                                |          |         |       |
| <b>Transmit Channels Tested:</b>    | <b>Channel ID</b>        | <b>Channel Number</b> | <b>Channel Frequency (MHz)</b> |          |         |       |
|                                     | Bottom                   | 128                   | 824.2                          |          |         |       |
|                                     | Middle                   | 190                   | 836.6                          |          |         |       |
|                                     | Top                      | 251                   | 848.8                          |          |         |       |
| <b>Receive Frequency Range:</b>     | 869 to 894 MHz           |                       |                                |          |         |       |
| <b>Receive Channels Tested:</b>     | <b>Channel ID</b>        | <b>Channel Number</b> | <b>Channel Frequency (MHz)</b> |          |         |       |
|                                     | Bottom                   | 128                   | 869.2                          |          |         |       |
|                                     | Middle                   | 190                   | 881.6                          |          |         |       |
|                                     | Top                      | 251                   | 893.8                          |          |         |       |
| <b>Technology Tested:</b>           | <b>PCS1900 (Part 24)</b> |                       |                                |          |         |       |
| <b>Maximum Output Power (EIRP):</b> | GSM                      | 32.0 dBm              | GPRS                           | 32.0 dBm |         |       |
| <b>Transmit Frequency Range:</b>    | 1850 to 1910 MHz         |                       |                                |          |         |       |
| <b>Transmit Channels Tested:</b>    | <b>Channel ID</b>        | <b>Channel Number</b> | <b>Channel Frequency (MHz)</b> |          |         |       |
|                                     | Bottom                   | 512                   | 1850.2                         |          |         |       |
|                                     | Middle                   | 660                   | 1879.8                         |          |         |       |
|                                     | Top                      | 810                   | 1909.8                         |          |         |       |
| <b>Receive Frequency Range:</b>     | 1930 to 1990 MHz         |                       |                                |          |         |       |
| <b>Receive Channels Tested:</b>     | <b>Channel ID</b>        | <b>Channel Number</b> | <b>Channel Frequency (MHz)</b> |          |         |       |
|                                     | Bottom                   | 512                   | 1930.2                         |          |         |       |
|                                     | Middle                   | 660                   | 1959.8                         |          |         |       |
|                                     | Top                      | 810                   | 1989.8                         |          |         |       |

**3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

|                       |                   |
|-----------------------|-------------------|
| <b>Description:</b>   | Development Board |
| <b>Brand Name:</b>    | Telit             |
| <b>Serial Number:</b> | 113920002441      |

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Receiver/Idle mode.
- Constantly transmitting at full power on bottom, centre and top channels as required.
- Occupied bandwidth, output power and band edge tests were performed with the EUT in GSM single timeslot circuit switched and GPRS Multislot Class 10 with the unit transmitting on two timeslots in the uplink.
- Transmitter radiated spurious emissions were checked in all modes during prescans. Circuit switched voice was found to be the worst case and all final measurements were performed with the EUT in this mode.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- EUT RF port (SMA connector) was connected to a GSM/GPRS system simulator via conducted link, operating in transceiver mode.
- Powered from a bench power supply connected to the 3.8V IN port on the development board.
- There is no integral antenna on the EUT.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

**5.2. Test Results – FCC Part 22****5.2.1. Receiver/Idle Mode Radiated Spurious Emissions****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 15.109   |
| <b>Frequency Range:</b>  | 30 MHz to 1000 MHz                                       |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 8 and relevant annexes |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 22 |
| <b>Relative Humidity (%):</b> | 25 |

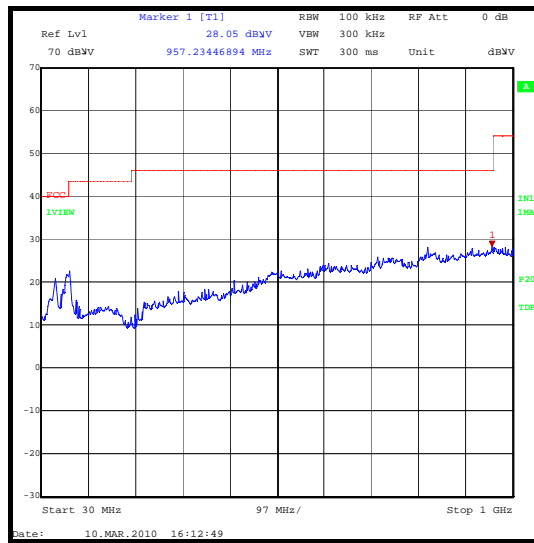
**Results:**

| <b>Frequency (MHz)</b> | <b>Antenna Polarity</b> | <b>Level (dB<math>\mu</math>V/m)</b> | <b>Limit (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> | <b>Result</b> |
|------------------------|-------------------------|--------------------------------------|--------------------------------------|--------------------|---------------|
| 957.234                | Vertical                | 28.1                                 | 46.0                                 | 17.9               | Complied      |

**Note(s):**

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.

**Receiver/Idle Mode Radiated Spurious Emissions (continued)**



*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.*

**Receiver/Idle Mode Radiated Spurious Emissions (continued)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 15.109   |
| <b>Frequency Range:</b>  | 1 GHz to 5 GHz   |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 8 and relevant annexes |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 22 |
| <b>Relative Humidity (%):</b> | 25 |

**Results: Highest Peak Level**

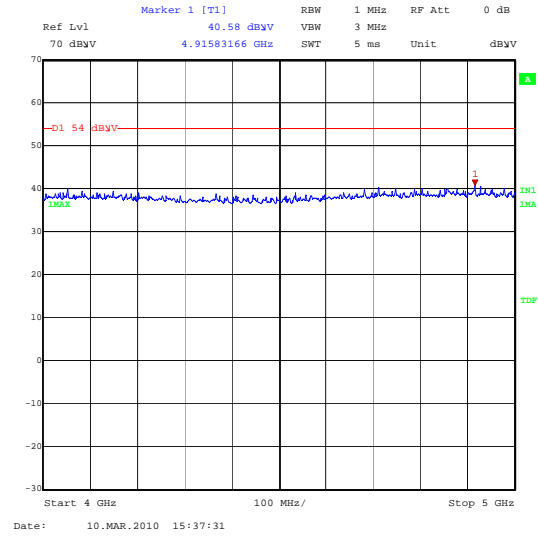
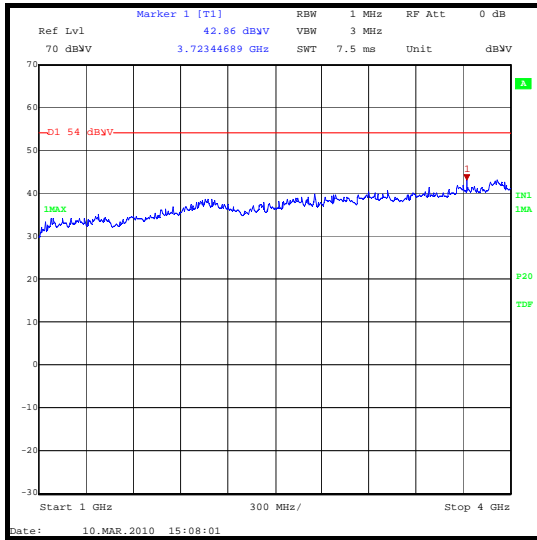
| <b>Frequency (GHz)</b> | <b>Antenna Polarity</b> | <b>Detector Level (dB<math>\mu</math>V/m)</b> | <b>Transducer Factor (dB)</b> | <b>Peak Level (dB<math>\mu</math>V/m)</b> | <b>Average Limit (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> | <b>Result</b> |
|------------------------|-------------------------|---|-------------------------------|---|--|--------------------|---------------|
| 3.723                  | Vertical                | 38.4  | 4.5                           | 42.9                                      | 54.0   | 11.1               | Complied      |

**Note(s):**

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.



**Receiver/Idle Mode Radiated Spurious Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.2.2. Transmitter Conducted Output Power and Effective Radiated Power (ERP)****Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 22.913(a)   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 21 |

**Results: GSM**

| Channel | Measured Frequency (MHz) | Conducted RF Output Power (dBm) | Antenna Gain (dB) | Calculated ERP (dBm) | Limit (dBm) | Margin (dB) | Result   |
|---------|--------------------------|---------------------------------|-------------------|----------------------|-------------|-------------|----------|
| Bottom  | 824.2                    | 31.5                            | 3.0               | 34.5                 | 38.5        | 4.0         | Complied |
| Middle  | 836.6                    | 31.4                            | 3.0               | 34.4                 | 38.5        | 4.1         | Complied |
| Top     | 848.8                    | 31.4                            | 3.0               | 34.4                 | 38.5        | 4.1         | Complied |

**Results: GPRS**

| Channel | Measured Frequency (MHz) | Conducted RF Output Power (dBm) | Antenna Gain (dB) | Calculated ERP (dBm) | Limit (dBm) | Margin (dB) | Result   |
|---------|--------------------------|---------------------------------|-------------------|----------------------|-------------|-------------|----------|
| Bottom  | 824.2                    | 31.4                            | 3.0               | 34.4                 | 38.5        | 4.1         | Complied |
| Middle  | 836.6                    | 31.4                            | 3.0               | 34.4                 | 38.5        | 4.1         | Complied |
| Top     | 848.8                    | 31.4                            | 3.0               | 34.4                 | 38.5        | 4.1         | Complied |

**Note(s):**

1. All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.

**5.2.3. Transmitter Frequency Stability (Temperature Variation)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 22.355   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 24 |

**Results: Middle Channel (836.6 MHz)**

| Temperature (°C) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Margin (ppm) | Result   |
|------------------|--------------------------|----------------------|-----------------------|-------------|--------------|----------|
| -30              | 836.600059               | 59                   | 0.07                  | 2.5         | 2.43         | Complied |
| -20              | 836.600089               | 89                   | 0.11                  | 2.5         | 2.39         | Complied |
| -10              | 836.600060               | 60                   | 0.07                  | 2.5         | 2.43         | Complied |
| 0                | 836.600015               | 15                   | 0.02                  | 2.5         | 2.48         | Complied |
| 10               | 836.600014               | 14                   | 0.02                  | 2.5         | 2.48         | Complied |
| 20               | 836.600013               | 13                   | 0.02                  | 2.5         | 2.48         | Complied |
| 30               | 836.600026               | 26                   | 0.03                  | 2.5         | 2.47         | Complied |
| 40               | 836.600016               | 16                   | 0.02                  | 2.5         | 2.48         | Complied |
| 50               | 836.600018               | 18                   | 0.02                  | 2.5         | 2.48         | Complied |

**5.2.4. Transmitter Frequency Stability (Voltage Variation)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 22.355   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 24 |

**Results: Middle Channel (836.6 MHz)**

| <b>Supply Voltage (V)</b> | <b>Measured Frequency (MHz)</b> | <b>Frequency Error (Hz)</b> | <b>Frequency Error (ppm)</b> | <b>Limit (ppm)</b> | <b>Margin (ppm)</b> | <b>Result</b> |
|---------------------------|---------------------------------|-----------------------------|------------------------------|--------------------|---------------------|---------------|
| 3.2                       | 836.600018                      | 18                          | 0.02                         | 2.5                | 2.48                | Complied      |
| 4.4                       | 836.600020                      | 20                          | 0.02                         | 2.5                | 2.48                | Complied      |

**5.2.5. Transmitter Occupied Bandwidth**

**Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 2.1049  |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 |

**Environmental Conditions:**

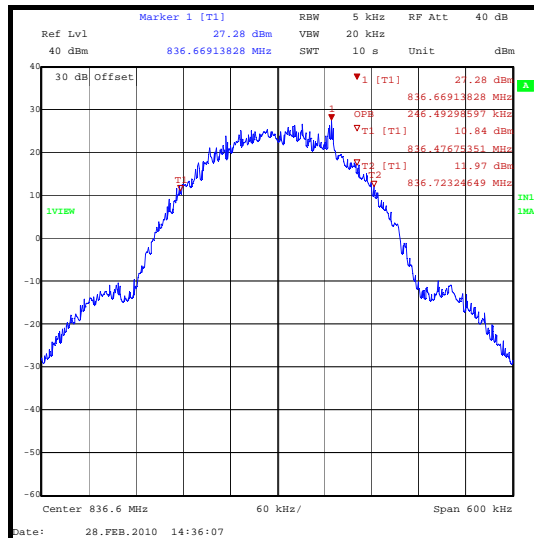
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 22 |

**Results: GSM**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 246.493                  |

**Note(s):**

- Occupied bandwidth was measured using the spectrum analyser Occupied Bandwidth function.



**Transmitter Occupied Bandwidth (continued)**

**Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 2.1049  |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 |

**Environmental Conditions:**

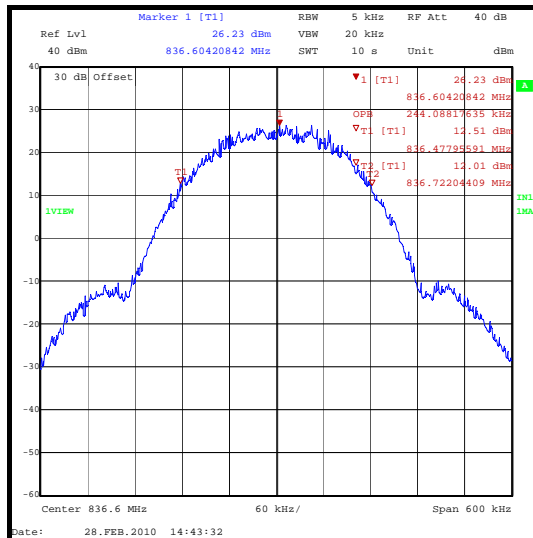
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 22 |

**Results: GPRS**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 836.6           | 244.088                  |

**Note(s):**

- Occupied bandwidth was measured using the spectrum analyser Occupied Bandwidth function.



**5.2.6. Transmitter Out of Band Conducted Emissions****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 2.1051 and 22.917  |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 22 |
| <b>Relative Humidity Variation (%):</b> | 25 |

**Results: Bottom Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6593.923        | -33.3                     | -13.0       | 20.3        | Complied |

**Results: Middle Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6693.364        | -32.5                     | -13.0       | 19.5        | Complied |

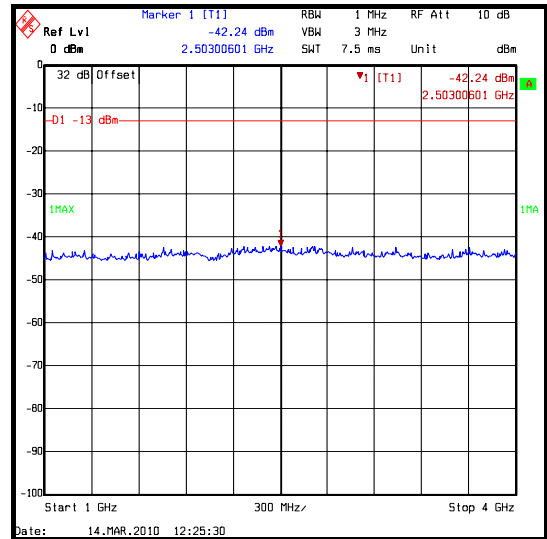
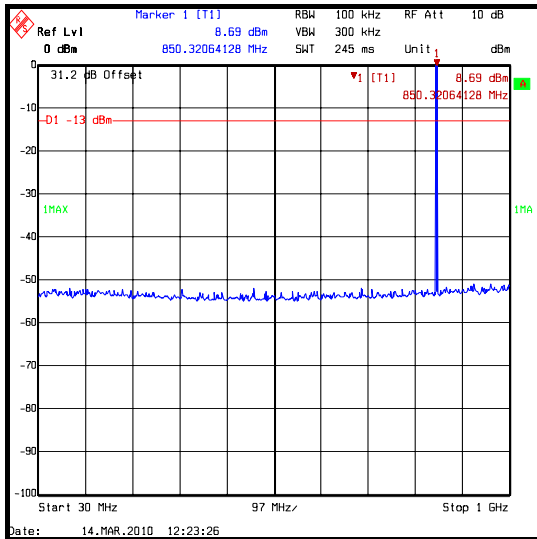
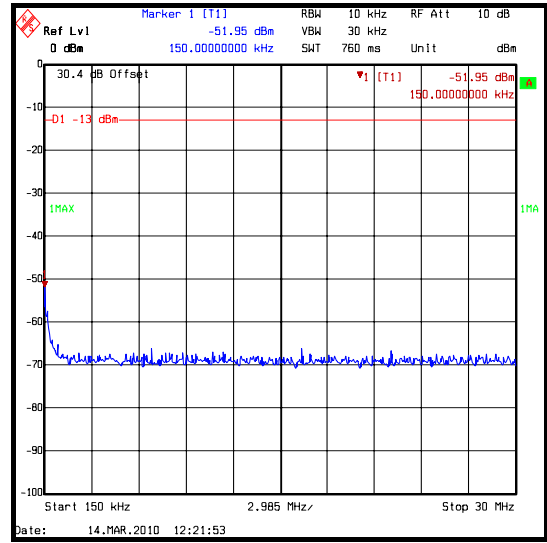
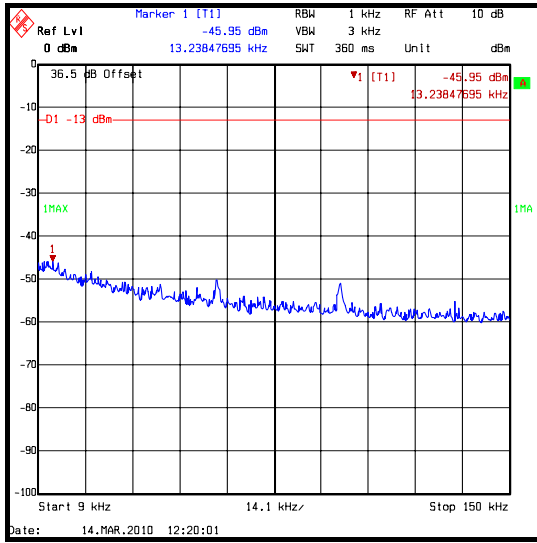
**Results: Top Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6790.834        | -32.5                     | -13.0       | 19.5        | Complied |

**Note(s):**

1. Final measurements were made using appropriate attenuation and filters where required.
2. The emissions shown at approximately 850.321 MHz on the 30 MHz to 1 GHz plot is the carrier

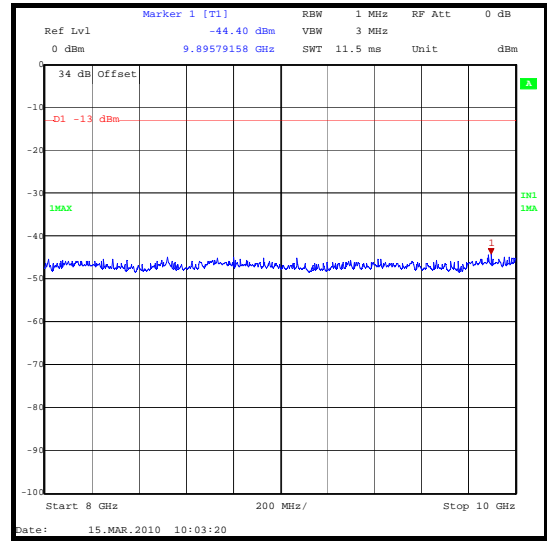
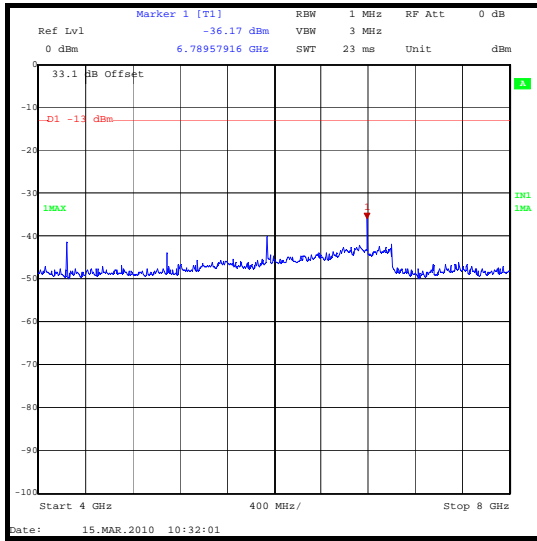
**Transmitter Out of Band Conducted Emissions (continued)**



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.



**Transmitter Out of Band Conducted Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.2.7. Transmitter Conducted Emissions at Band Edges**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 2.1051 and 22.917  |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

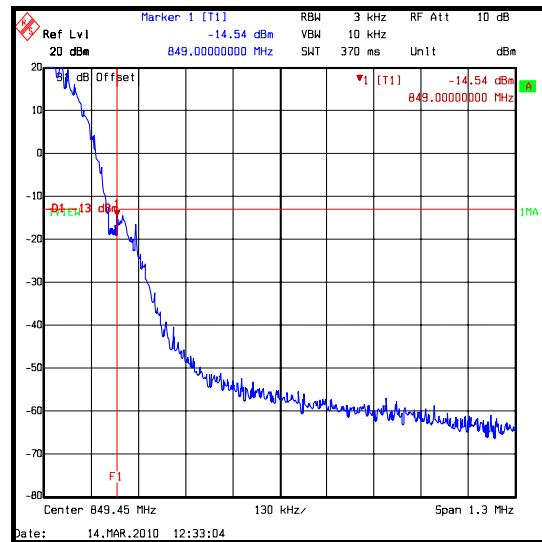
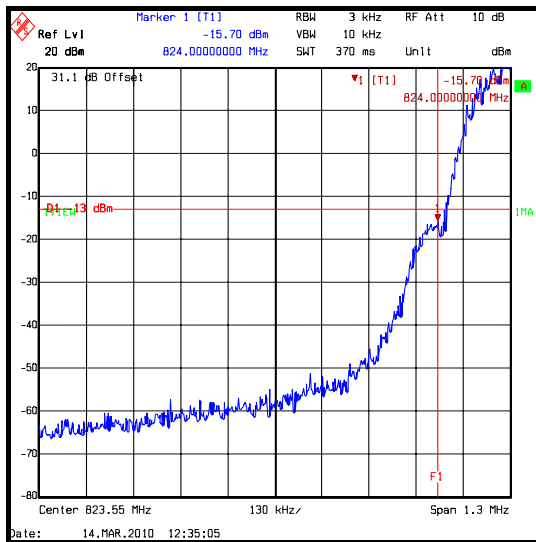
|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 24 |
| <b>Relative Humidity Variation (%):</b> | 26 |

**Results: GSM Lower Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 824             | -15.7                     | -13.0                 | 2.7         | Complied |

**Results: GSM Upper Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 849             | -14.5                     | -13.0                 | 1.5         | Complied |



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Transmitter Conducted Emissions at Band Edges (continued)**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 2.1051 and 22.917  |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

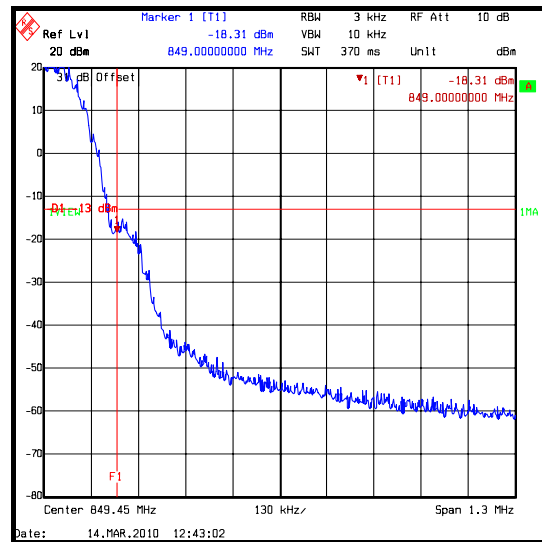
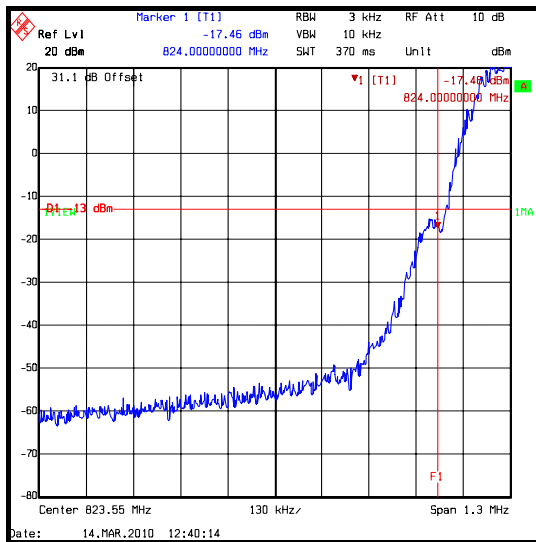
|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 24 |
| <b>Relative Humidity Variation (%):</b> | 26 |

**Results: GPRS Lower Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 824             | -17.5                     | -13.0                 | 4.5         | Complied |

**Results: GPRS Upper Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 849             | -18.3                     | -13.0                 | 5.3         | Complied |



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.2.8. Transmitter Out of Band Radiated Emissions****Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 2.1053 & 22.917   |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section8 and relevant annexes referencing FCC CFR Part 2.1049 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 28 |

**Results: Bottom Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6593.729        | -33.6                     | -13.0       | 20.6        | Complied |

**Results: Middle Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6693.284        | -32.6                     | -13.0       | 19.6        | Complied |

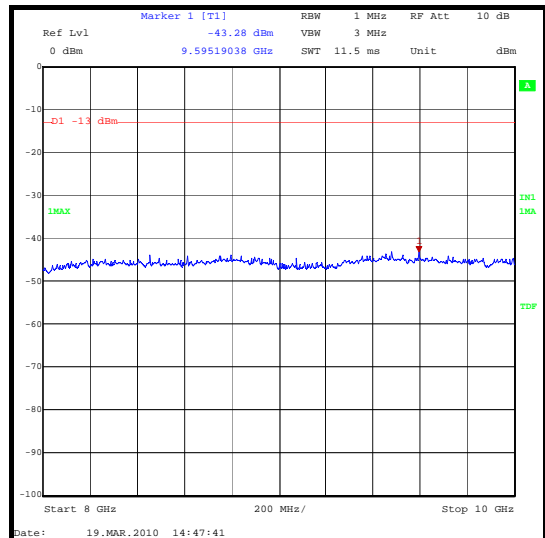
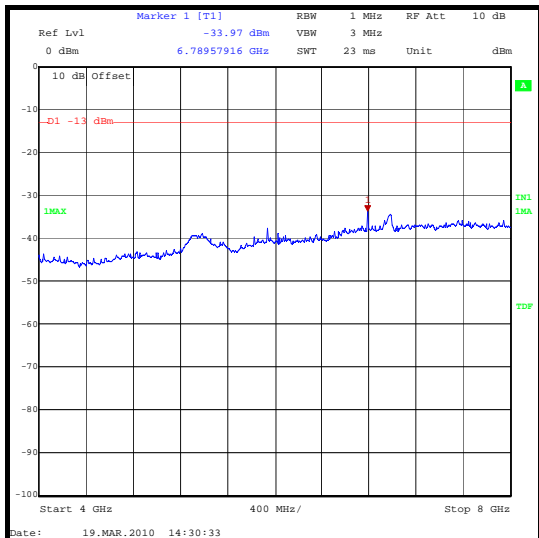
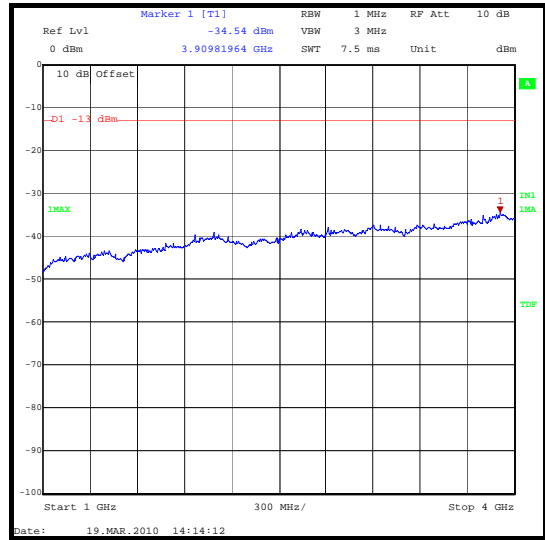
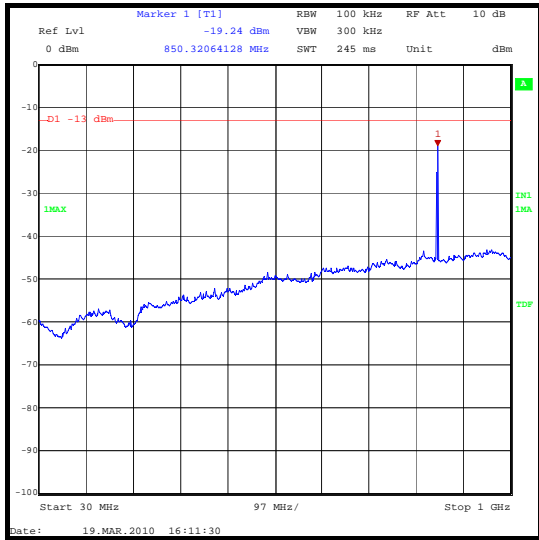
**Results: Top Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 6790.995        | -31.5                     | -13.0       | 18.5        | Complied |

**Note(s):**

1. Final measurements were made using appropriate attenuation and filters where required.
2. The emissions shown at approximately 850.320 MHz on the 30 MHz to 1 GHz plot is the carrier.

**Transmitter Out of Band Radiated Emissions (continued)**



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

**5.3. Test Results – FCC Part 24****5.3.1. Receiver/Idle Mode Radiated Spurious Emissions****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 15.109   |
| <b>Frequency Range:</b>  | 30 MHz to 1000 MHz                                       |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 8 and relevant annexes |

**Environmental Conditions:**

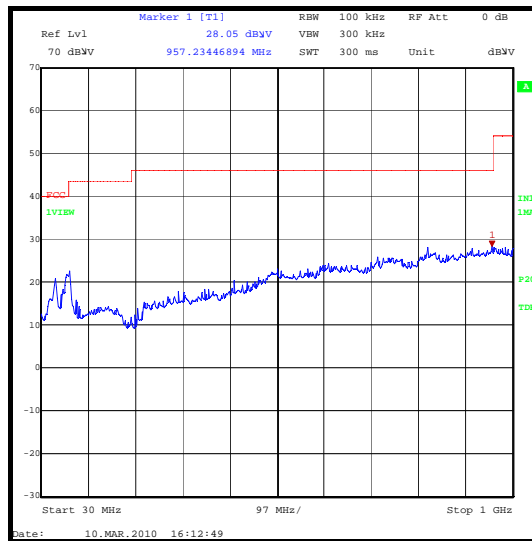
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 23 |
| <b>Relative Humidity (%):</b> | 25 |

**Results:**

| <b>Frequency (MHz)</b> | <b>Antenna Polarity</b> | <b>Level (dB<math>\mu</math>V/m)</b> | <b>Limit (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> | <b>Result</b> |
|------------------------|-------------------------|--------------------------------------|--------------------------------------|--------------------|---------------|
| 957.234                | Vertical                | 28.1                                 | 46.0                                 | 17.9               | Complied      |

**Note(s):**

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.

**Receiver/Idle Mode Radiated Spurious Emissions (continued)**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.*

**Receiver/Idle Mode Radiated Spurious Emissions (continued)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 15.109   |
| <b>Frequency Range:</b>  | 1 GHz to 10 GHz  |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 8 and relevant annexes |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 23 |
| <b>Relative Humidity (%):</b> | 25 |

**Results:**

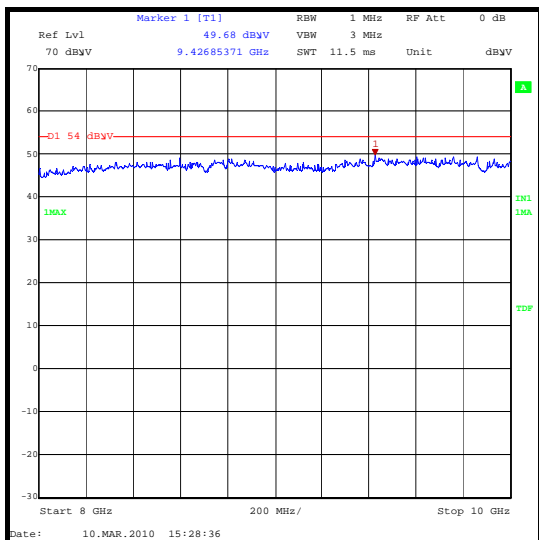
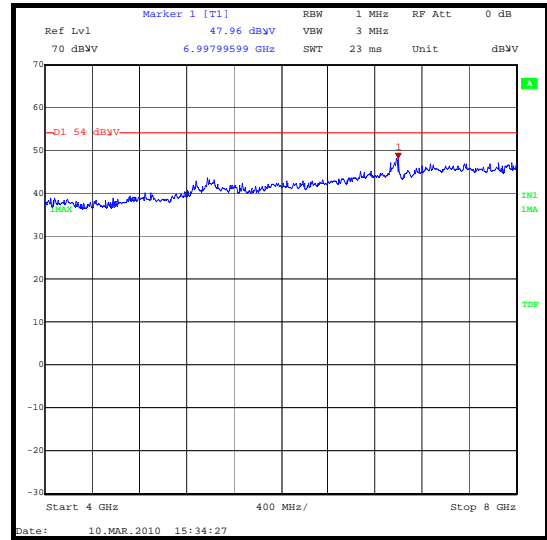
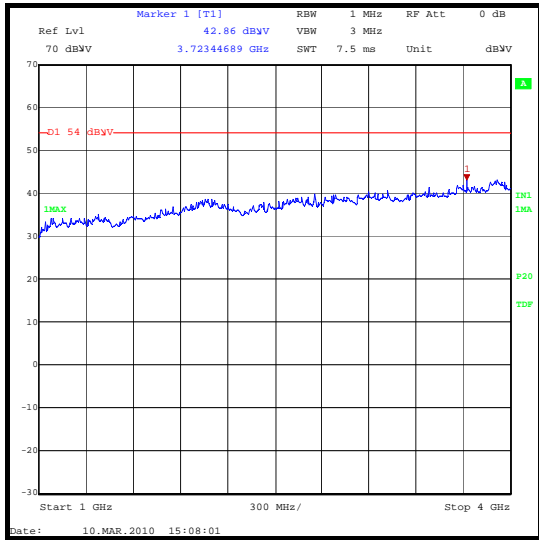
| <b>Frequency (MHz)</b> | <b>Antenna Polarity</b> | <b>Detector Level (dB<math>\mu</math>V/m)</b> | <b>Transducer Factor (dB)</b> | <b>Peak Level (dB<math>\mu</math>V/m)</b> | <b>Average Limit (dB<math>\mu</math>V/m)</b> | <b>Margin (dB)</b> | <b>Result</b> |
|------------------------|-------------------------|---|-------------------------------|---|--|--------------------|---------------|
| 9425.854               | Vertical                | 41.0  | 8.7                           | 49.7                                      | 54.0   | 4.3                | Complied      |

**Note(s):**

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.



**Receiver/Idle Mode Radiated Spurious Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.3.2. Transmitter Conducted Output Power and Equivalent Isotropic Radiated Power (EIRP)****Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 24.232  |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 23 |
| <b>Relative Humidity (%):</b> | 26 |

**Results: GSM**

| Channel | Measured Frequency (MHz) | Conducted RF Output Power (dBm) | Antenna Gain (dB) | Calculated EIRP (dBm) | Limit (dBm) | Margin (dB) | Result   |
|---------|--------------------------|---------------------------------|-------------------|-----------------------|-------------|-------------|----------|
| Bottom  | 1850.2                   | 29.0                            | 3.0               | 32.0                  | 33.0        | 1.0         | Complied |
| Middle  | 1879.8                   | 28.8                            | 3.0               | 31.8                  | 33.0        | 1.2         | Complied |
| Top     | 1909.8                   | 28.9                            | 3.0               | 31.9                  | 33.0        | 1.1         | Complied |

**Results: GPRS**

| Channel | Measured Frequency (MHz) | Conducted RF Output Power (dBm) | Antenna Gain (dB) | Calculated EIRP (dBm) | Limit (dBm) | Margin (dB) | Result   |
|---------|--------------------------|---------------------------------|-------------------|-----------------------|-------------|-------------|----------|
| Bottom  | 1850.2                   | 29.0                            | 3.0               | 32.0                  | 33.0        | 1.0         | Complied |
| Middle  | 1879.8                   | 28.8                            | 3.0               | 31.8                  | 33.0        | 1.2         | Complied |
| Top     | 1909.8                   | 28.9                            | 3.0               | 31.9                  | 33.0        | 1.1         | Complied |

**5.3.3. Transmitter Frequency Stability (Temperature Variation)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 24.235   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 24 |

**Results: Bottom Channel (1850.2 MHz)**

| Temperature (°C) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Margin (ppm) | Result   |
|------------------|--------------------------|----------------------|-----------------------|-------------|--------------|----------|
| -30              | 1850.200127              | 127                  | 0.07                  | 2.5         | 2.43         | Complied |
| -20              | 1850.200128              | 128                  | 0.07                  | 2.5         | 2.43         | Complied |
| -10              | 1850.200093              | 93                   | 0.05                  | 2.5         | 2.45         | Complied |
| 0                | 1850.200059              | 59                   | 0.03                  | 2.5         | 2.47         | Complied |
| 10               | 1850.200055              | 55                   | 0.03                  | 2.5         | 2.47         | Complied |
| 20               | 1850.200047              | 47                   | 0.03                  | 2.5         | 2.47         | Complied |
| 30               | 1850.200052              | 52                   | 0.03                  | 2.5         | 2.47         | Complied |
| 40               | 1850.200045              | 45                   | 0.02                  | 2.5         | 2.48         | Complied |
| 50               | 1850.200062              | 62                   | 0.03                  | 2.5         | 2.47         | Complied |

**Results: Top Channel (1909.8 MHz)**

| Temperature (°C) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Margin (ppm) | Result   |
|------------------|--------------------------|----------------------|-----------------------|-------------|--------------|----------|
| -30              | 1909.800120              | 120                  | 0.06                  | 2.5         | 2.44         | Complied |
| -20              | 1909.800116              | 116                  | 0.06                  | 2.5         | 2.44         | Complied |
| -10              | 1909.800096              | 96                   | 0.05                  | 2.5         | 2.45         | Complied |
| 0                | 1909.800055              | 55                   | 0.03                  | 2.5         | 2.47         | Complied |
| 10               | 1909.800059              | 59                   | 0.03                  | 2.5         | 2.47         | Complied |
| 20               | 1909.800054              | 54                   | 0.03                  | 2.5         | 2.47         | Complied |
| 30               | 1909.800061              | 61                   | 0.03                  | 2.5         | 2.47         | Complied |
| 40               | 1909.800042              | 42                   | 0.02                  | 2.5         | 2.48         | Complied |
| 50               | 1909.800056              | 56                   | 0.03                  | 2.5         | 2.47         | Complied |

**5.3.4. Transmitter Frequency Stability (Voltage Variation)****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 24.235   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 24 |

**Results: Bottom Channel (1850.2 MHz)**

| Supply Voltage (V) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Margin (ppm) | Result   |
|--------------------|--------------------------|----------------------|-----------------------|-------------|--------------|----------|
| 3.2                | 1850.200059              | 59                   | 0.03                  | 2.5         | 2.47         | Complied |
| 4.4                | 1850.200061              | 61                   | 0.03                  | 2.5         | 2.47         | Complied |

**Results: Top Channel (1909.8 MHz)**

| Supply Voltage (V) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Margin (ppm) | Result   |
|--------------------|--------------------------|----------------------|-----------------------|-------------|--------------|----------|
| 3.2                | 1909.800055              | 55                   | 0.03                  | 2.5         | 2.47         | Complied |
| 4.4                | 1909.800064              | 64                   | 0.03                  | 2.5         | 2.47         | Complied |

Note: that the limit shown is an Industry Canada Limit only. The margin from band edge for FCC compliance was greater then 100kHz.

**5.3.5. Transmitter Occupied Bandwidth**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 24.238   |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below) |

**Environmental Conditions:**

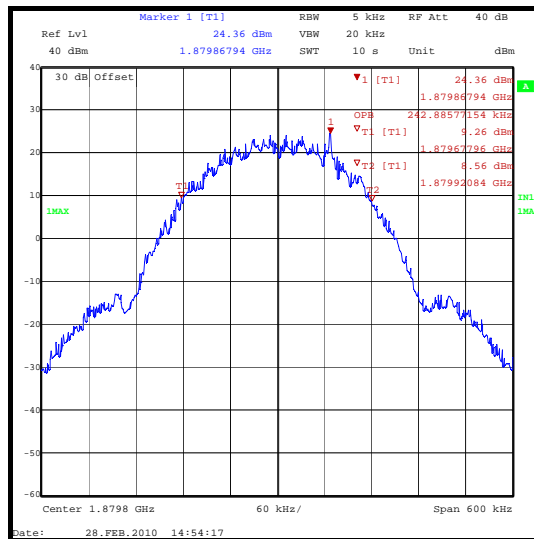
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 22 |

**Results: GSM**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 1879.8          | 242.886                  |

**Note(s):**

- In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.



**Transmitter Occupied Bandwidth (continued)**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 24.238   |
| <b>Test Method Used:</b> | As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below) |

**Environmental Conditions:**

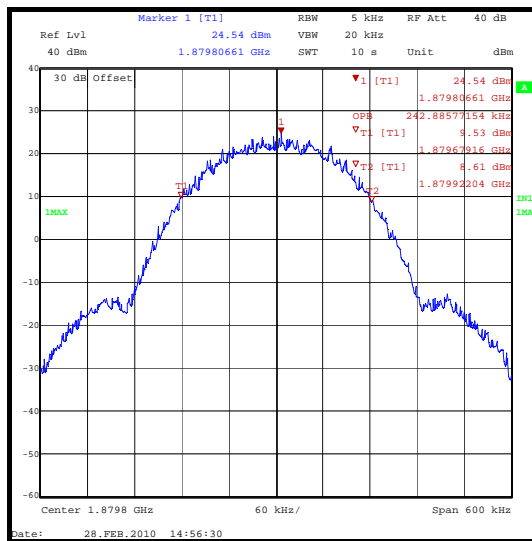
|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 22 |

**Results: GPRS**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle  | 1879.8          | 242.886                  |

**Note(s):**

- In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.



**5.3.6. Transmitter Out of Band Conducted Emissions****Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 22.917   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 22 |
| <b>Relative Humidity Variation (%):</b> | 26 |

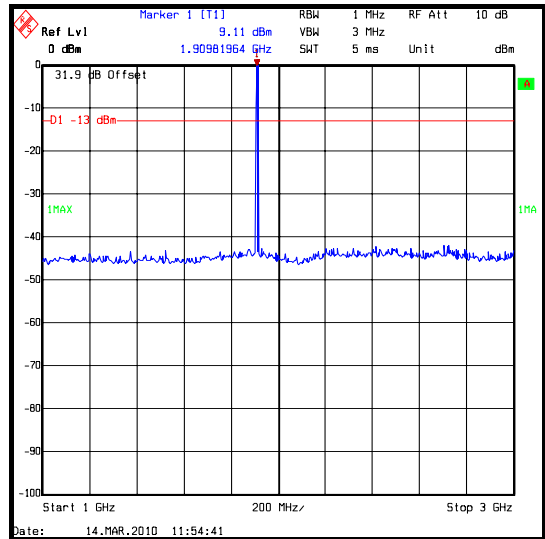
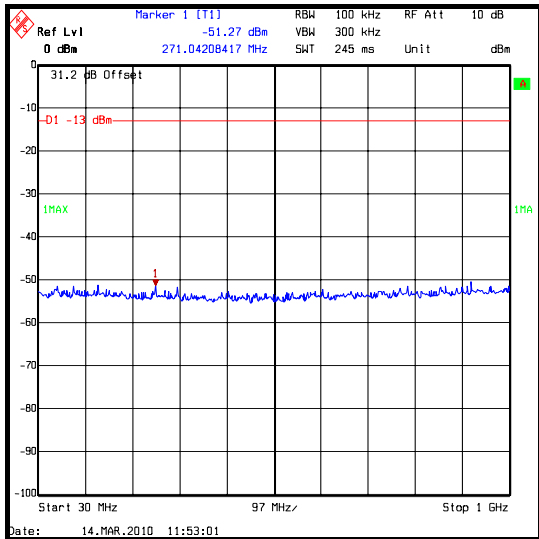
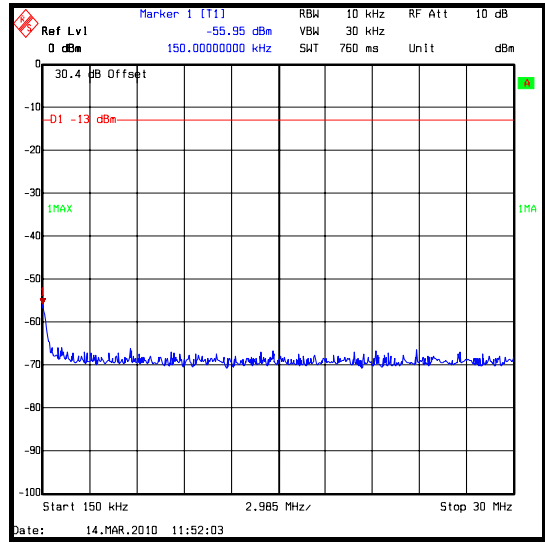
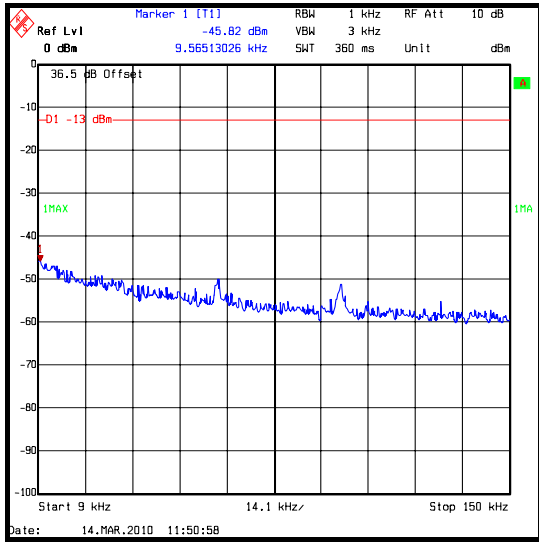
**Results: Top Channel**

| <b>Frequency (MHz)</b> | <b>Peak Emission Level (dBm)</b> | <b>Limit (dBm)</b> | <b>Margin (dB)</b> | <b>Result</b> |
|------------------------|----------------------------------|--------------------|--------------------|---------------|
| 3819.639               | -36.7                            | -13.0              | 23.7               | Complied      |

**Note(s):**

1. All emissions were investigated and found to be at least 20 dB below the specified limit; therefore the highest emission level was recorded as shown in the table above.
2. Final measurements were made using appropriate attenuation and filters where required.
3. The emissions shown at approximately 1909.8 MHz on the 30 MHz to 1 GHz plot is the carrier.

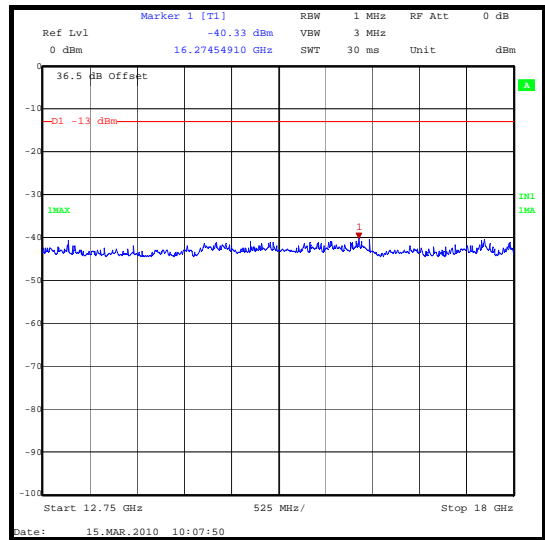
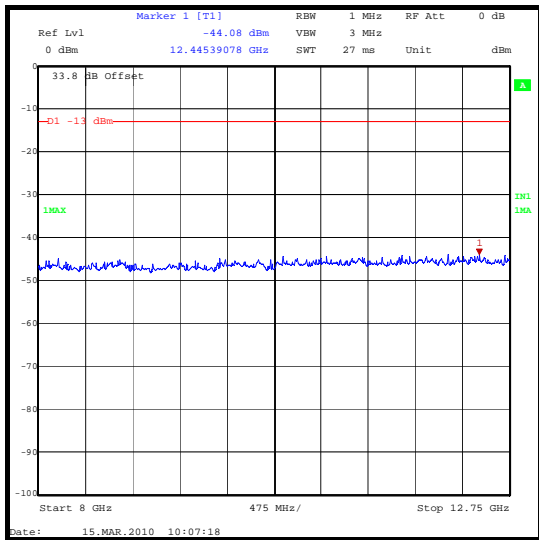
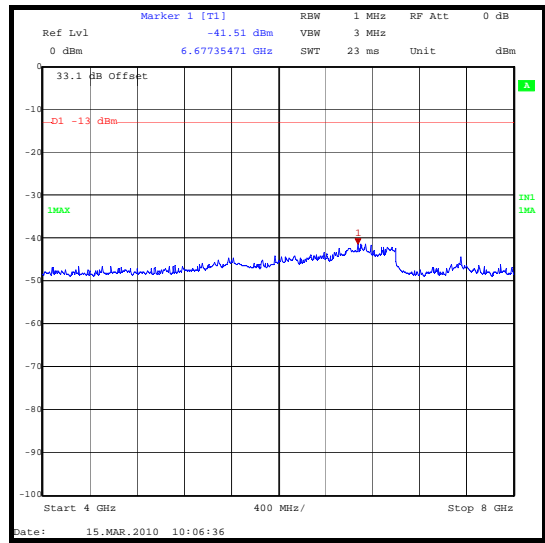
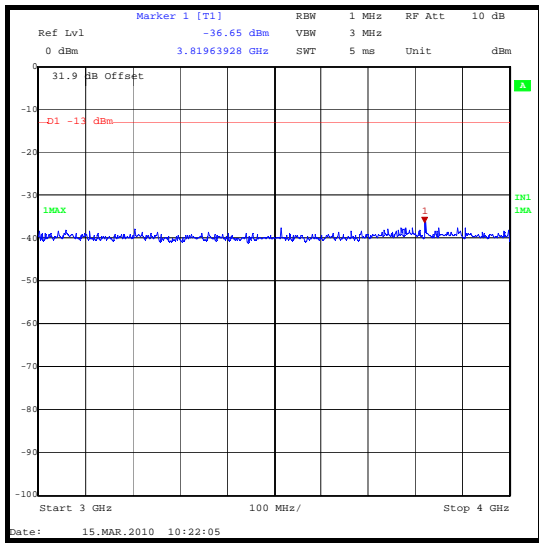
**Transmitter Out of Band Conducted Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

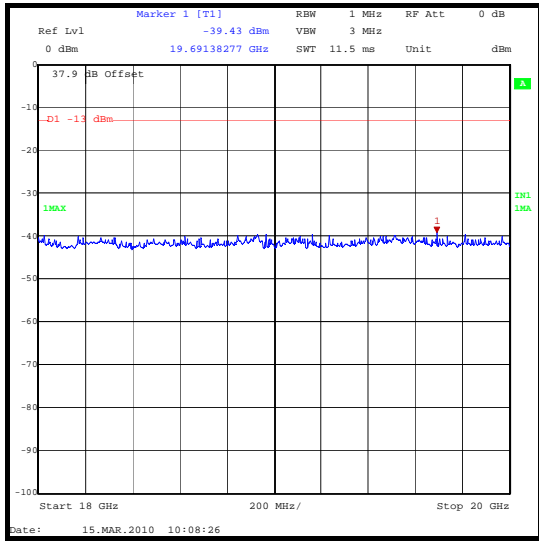


### Transmitter Out of Band Conducted Emissions (continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

**Transmitter Out of Band Conducted Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.3.7. Transmitter Conducted Emissions at Band Edges**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 22.917   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

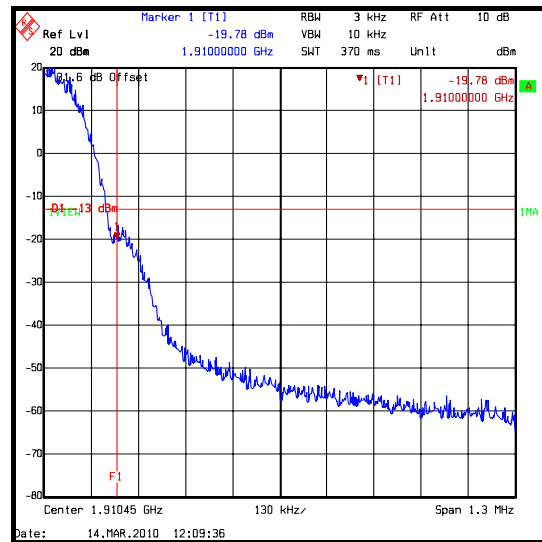
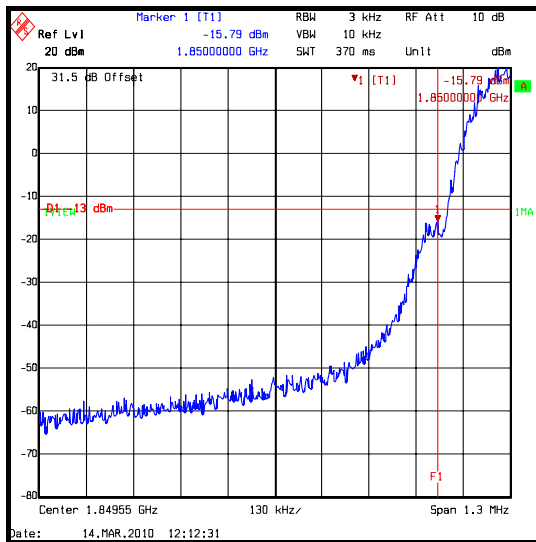
|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 24 |
| <b>Relative Humidity Variation (%):</b> | 26 |

**Results: GSM Lower Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 1850            | -15.8                     | -13.0                 | 2.8         | Complied |

**Results: GSM Upper Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 1910            | -19.8                     | -13.0                 | 6.8         | Complied |



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Transmitter Conducted Emissions at Band Edges (continued)**

**Test Summary:**

|                          |  |
|--------------------------|--|
| <b>FCC Part:</b>         | 22.917   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603.C-2004 referencing FCC Part 2.1051 |

**Environmental Conditions:**

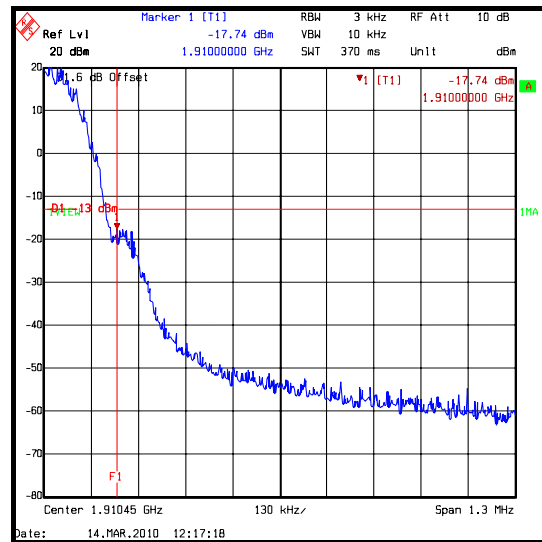
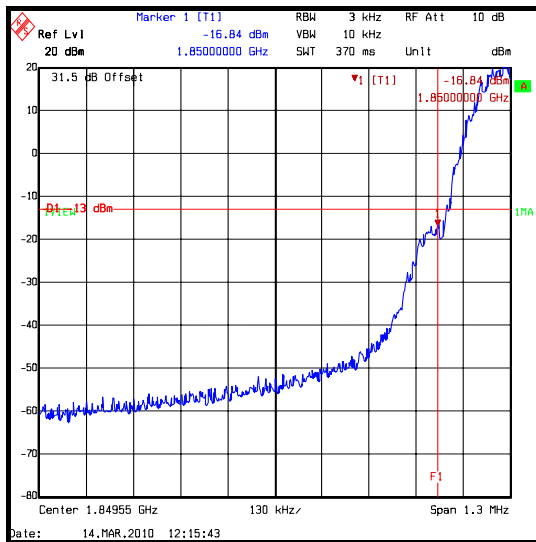
|   |    |
|---|----|
| <b>Temperature Variation (°C):</b>      | 24 |
| <b>Relative Humidity Variation (%):</b> | 26 |

**Results: GPRS Lower Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 1850            | -16.8                     | -13.0                 | 3.8         | Complied |

**Results: GPRS Upper Band Edge**

| Frequency (MHz) | Peak Emission Level (dBm) | Band edge limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-----------------------|-------------|----------|
| 1910            | -17.7                     | -13.0                 | 4.7         | Complied |



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**5.3.8. Transmitter Out of Band Radiated Emissions****Test Summary:**

|                          |   |
|--------------------------|---|
| <b>FCC Part:</b>         | 2.1053 & 24.238   |
| <b>Test Method Used:</b> | As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238 |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 25 |
| <b>Relative Humidity (%):</b> | 28 |

**Results: Bottom Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 12951.065       | -34.1                     | -13.0       | 21.1        | Complied |

**Results: Middle Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 13158.253       | -34.2                     | -13.0       | 21.2        | Complied |

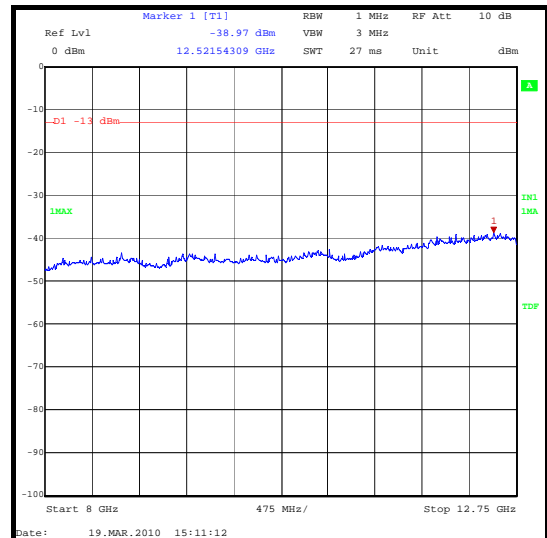
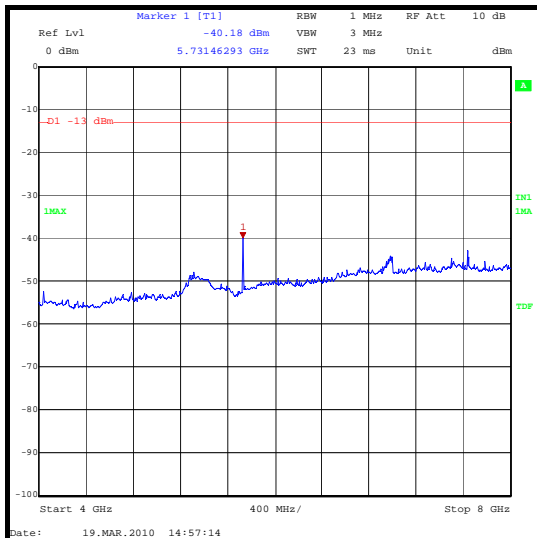
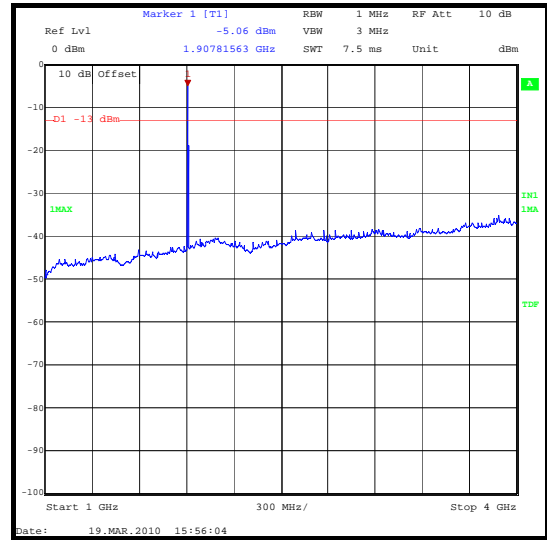
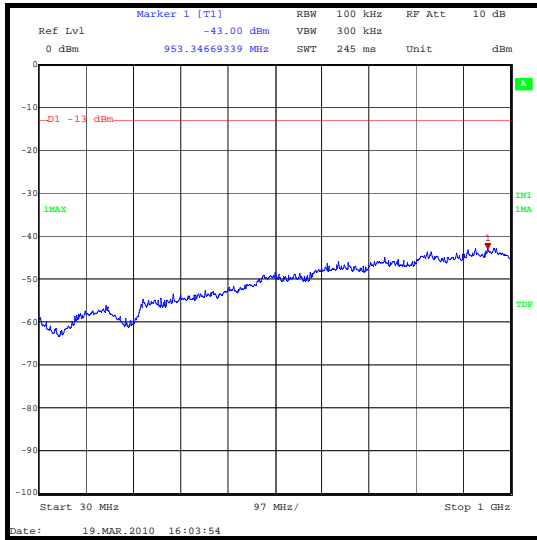
**Results: Top Channel**

| Frequency (MHz) | Peak Emission Level (dBm) | Limit (dBm) | Margin (dB) | Result   |
|-----------------|---------------------------|-------------|-------------|----------|
| 13368.470       | -32.0                     | -13.0       | 19.0        | Complied |

**Note(s):**

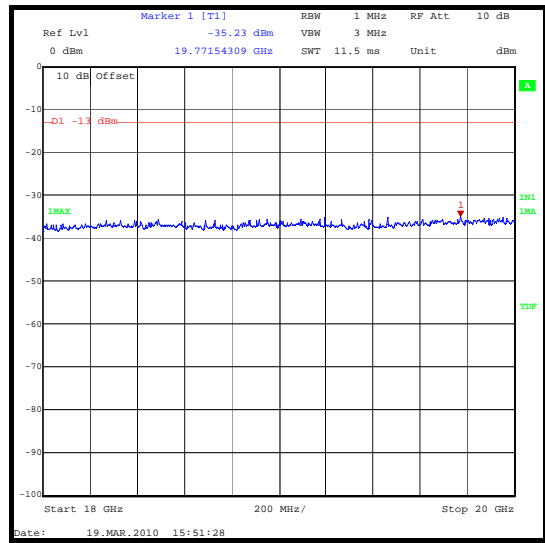
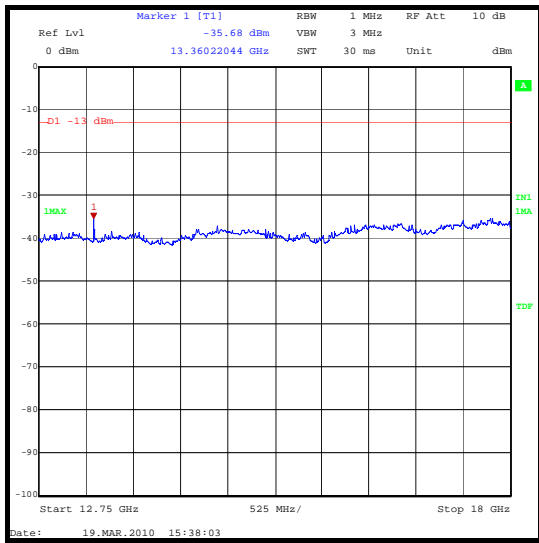
1. Final measurements were made using appropriate attenuation and filter where required.
2. The transmitter fundamental is shown on the 1 GHz to 4 GHz plot at 1907.816 MHz.
3. All other emissions were investigated and found to be at least 20 dB below the specified limit.

**Transmitter Out of Band Radiated Emissions (continued)**



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

**Transmitter Out of Band Radiated Emissions (continued)**



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

| <b>Measurement Type</b>                    | <b>Range</b>       | <b>Confidence Level (%)</b> | <b>Calculated Uncertainty</b> |
|--|--------------------|-----------------------------|-------------------------------|
| AC Conducted Spurious Emissions            | 0.15 MHz to 30 MHz | 95%                         | ±3.72 dB                      |
| Effective Radiated Power (ERP)             | Not applicable     | 95%                         | ±2.94 dB                      |
| Equivalent Isotropic Radiated Power (EIRP) | Not applicable     | 95%                         | ±2.94 dB                      |
| Frequency Stability                        | Not applicable     | 95%                         | ±0.92 ppm                     |
| Occupied Bandwidth                         | 824 to 849 MHz     | 95%                         | ±0.92 ppm                     |
| Radiated Spurious Emissions                | 30 MHz to 1000 MHz | 95%                         | ±4.64 dB                      |
| Radiated Spurious Emissions                | 1 GHz to 20 GHz    | 95%                         | ±2.94 dB                      |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.



**Appendix 1. Test Equipment Used**

| RFI No. | Instrument                    | Manufacturer            | Type No.              | Serial No.  | Date Last Calibrated     | Cal. Interval (Months) |
|---------|-------------------------------|-------------------------|-----------------------|-------------|--------------------------|------------------------|
| A057    | High Pass Filter              | AERIAL FACILITIES LTD   | HP-950-5N             | 4389B       | Calibration not required | -                      |
| A1391   | Attenuator                    | HUBER + SUHNER AG       | 757987                | 6810.17.B   | Calibrated before use    | -                      |
| A1393   | Attenuator                    | HUBER + SUHNER AG       | 757456                | 6820.17.B   | Calibrated before use    | -                      |
| A1396   | Attenuator                    | HUBER + SUHNER AG       | 757987                | 6810.17.B   | Calibrated before use    | -                      |
| A1428   | Directional Coupler           | Narda                   | 3292-1                | 02439       | Calibrated before use    | -                      |
| A1534   | Pre Amplifier                 | Hewlett Packard         | 8449B OPT H02         | 3008A00405  | Calibrated before use    | -                      |
| A1818   | Antenna                       | EMCO                    | 3115                  | 00075692    | 27 Nov 2009              | 12                     |
| A1975   | High Pass Filter              | AtlanTecRF              | AFH-03000             | 090424010   | Calibrated before use    | -                      |
| A288    | Antenna                       | Chase                   | CBL6111A              | 1589        | 16 Mar 2010              | 12                     |
| A308    | High Pass Filter              | Aerial Facilities Ltd   | HP-1517-6N            | 34278B      | Calibrated before use    | -                      |
| G013    | Signal Generator              | Rohde & Schwarz         | SMHU                  | 894 055/003 | 30 Apr 2009              | 12                     |
| K0002   | 3m RSE Chamber                | Rainford EMC            | N/A                   | N/A         | 01 Sep 2009              | 12                     |
| K0004   | Bench Test Site               | RFI Global Services Ltd | N/A                   | N/A         | Calibration not required | -                      |
| M037    | Power Meter                   | Rohde & Schwarz         | URY                   | 891.259/053 | 19 Aug 2009              | 12                     |
| M1068   | Thermometer                   | Iso-Tech                | RS55                  | 93102884    | 01 Oct 2009              | 12                     |
| M1124   | Spectrum Analyser             | Rohde & Schwarz         | ESIB26                | 100046K     | 09 Mar 2009              | 12                     |
| M1138   | CMU 200                       | Rohde & Schwarz         | CMU200 - 1100.0008.02 | 836202/093  | Calibration not required | -                      |
| M1140   | Radio Communications Analyser | Anritsu                 | MT8820A               | 6K0000647   | Calibration not required | 12                     |
| M122    | Digital Voltmeter             | Fluke                   | 77                    | 64910017    | 23 Jun 2009              | 12                     |

| RFI No. | Instrument           | Manufacturer    | Type No.       | Serial No.     | Date Last Calibrated  | Cal. Interval (Months) |
|---------|----------------------|-----------------|----------------|----------------|-----------------------|------------------------|
| M1223   | Votsch VT4002        | Votsch          | VT4002         | 58566072720010 | 11 Dec 2007           | 12                     |
| M127    | Spectrum Analyser    | Rohde & Schwarz | FSEB 30        | 842 659/016    | 10 Jul 2009           | 12                     |
| M1273   | Test Receiver        | Rhode & Schwarz | ESIB 26        | 100275         | 01 Apr 2009           | 12                     |
| M1565   | Agilent 8960         | Agilent         | 8960 Series 10 | GB46311280     | 11 Jul 2009           | 12                     |
| S0520   | DC Power Supply Unit | GW instek       | GPC-3030       | E835141        | Calibrated before use | -                      |

Note that assets A288 and M1124 indicate they went out of calibration during testing. It shall be noted however that the assets were in calibration for the tests for which they were used.

**NB** In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.