



TEST REPORT

Test Report No. : UL-RPT-RP10014948JD21A V2.0

Manufacturer : Sony Mobile Communications AB
Type No. : PM-0450-BV
FCC ID : PY7PM-0450
Technology : UMTS1700 Band IV
Test Standard(s) : FCC Part 27 Subpart C

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 17 July 2013

Checked by:

Sarah Williams
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Issued by :

pp
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Table of Contents

| | |
|--|-----------|
| 1. Customer Information..... | 4 |
| 2. Summary of Testing..... | 5 |
| 2.1. General Information | 5 |
| 2.2. Summary of Test Results | 5 |
| 2.3. Methods and Procedures | 5 |
| 2.4. Deviations from the Test Specification | 5 |
| 3. Equipment Under Test (EUT) | 6 |
| 3.1. Identification of Equipment Under Test (EUT) | 6 |
| 3.2. Description of EUT | 7 |
| 3.3. Modifications Incorporated in the EUT | 7 |
| 3.4. Additional Information Related to Testing | 8 |
| 3.5. Support Equipment | 9 |
| 4. Operation and Monitoring of the EUT during Testing | 10 |
| 4.1. Operating Modes | 10 |
| 4.2. Configuration and Peripherals | 10 |
| 5. Measurements, Examinations and Derived Results | 11 |
| 5.1. General Comments | 11 |
| 5.2. Test Results | 12 |
| 5.2.1. Transmitter Output Power (EIRP) | 12 |
| 5.2.2. Transmitter Occupied Bandwidth | 16 |
| 5.2.3. Transmitter Out of Band Radiated Emissions | 27 |
| 5.2.4. Transmitter Radiated Emissions at Band Edges | 31 |
| 5.2.5. Transmitter Frequency Stability (Temperature Variation) | 41 |
| 5.2.6. Transmitter Frequency Stability (Voltage Variation) | 44 |
| 6. Measurement Uncertainty | 46 |
| 7. Report Revision History | 47 |

1. Customer Information

| | |
|----------------------|---|
| Company Name: | Sony Mobile Communications AB |
| Address: | Nya Vattentornet Lund SE-221 88 Sweden |

2. Summary of Testing

2.1. General Information

| | |
|---------------------------------|--|
| Specification Reference: | 47CFR27 |
| Specification Title: | Code of Federal Regulations Volume 47 (Telecommunications): Part 27 Subpart C (Miscellaneous Wireless Communication Services) |
| Site Registration: | 209735 |
| Location of Testing: | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom |
| Test Dates: | 24 June 2013 to 05 July 2013 |

2.2. Summary of Test Results

| FCC Part (47CFR) | Measurement | Result |
|--------------------|--|--------|
| 2.1046/27.50(d)(4) | Transmitter Output Power (EIRP) | ✓ |
| 2.1049 | Transmitter Occupied Bandwidth | ✓ |
| 2.1053/27.53(h)(1) | Transmitter Out of Band Radiated Emissions | ✓ |
| 2.1053/27.53(h)(1) | Transmitter Band Edge Radiated Emissions | ✓ |
| 2.1055/27.54 | Transmitter Frequency Stability (Temperature and Voltage Variation) | ✓ |

Key to Results

✓ = Complied ✘ = Did not comply

2.3. Methods and Procedures

| | |
|-------------------|--|
| Reference: | ANSI/TIA-603-C-2004 |
| Title: | Land Mobile Communications Equipment, Measurements and performance Standards |
| Reference: | ANSI C63.4 (2009) |
| Title: | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
| Title: | FCC KDB 971168 D01 v02r01, 7 June 2013 |
| Reference: | Measurement Guidance for Certification of Licensed Digital Transmitters |

2.4. 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)

| | |
|---------------------------------|--|
| Brand Name: | Sony |
| IMEI: | 004402451217222 (<i>Radiated sample</i>) |
| Serial Number: | CB5124TU35 |
| Hardware Version Number: | AP2 |
| Software Version Number: | 14.1.G.1.241 |
| FCC ID: | PY7PM-0450 |

| | |
|---------------------------------|--|
| Brand Name: | Sony |
| IMEI: | 004402451215481 (<i>Conducted sample #1</i>) |
| Serial Number: | CB5124TU0Y |
| Hardware Version Number: | AP2 |
| Software Version Number: | 14.1.G.1.241 |
| FCC ID: | PY7PM-0450 |

| | |
|---------------------------------|--|
| Brand Name: | Sony |
| IMEI: | 004402451215416 (<i>Conducted sample #2</i>) |
| Serial Number: | CB5124TU1E |
| Hardware Version Number: | AP2 |
| Software Version Number: | 14.1.G.1.241 |
| FCC ID: | PY7PM-0450 |

| | |
|------------------------------|------------|
| Brand Name: | Sony |
| Description: | AC Charger |
| Model Name or Number: | EP880 |

| | |
|------------------------------|----------------------|
| Brand Name: | Generic |
| Description: | MHL Cable |
| Model Name or Number: | Not marked or stated |

| | |
|------------------------------|-------------|
| Brand Name: | Sony |
| Description: | MHL Adaptor |
| Model Name or Number: | IM750 |

Identification of Equipment Under Test (EUT) (continued)

| | |
|------------------------------|---------------|
| Brand Name: | Sony |
| Description: | Magnetic Plug |
| Model Name or Number: | EC801 |

| | |
|------------------------------|-----------|
| Brand Name: | Sony |
| Description: | USB cable |
| Model Name or Number: | EC21 |

| | |
|------------------------------|-------|
| Brand Name: | Sony |
| Description: | PHF |
| Model Name or Number: | MH750 |

3.2. Description of EUT

The equipment under test (EUT) is a model of GSM/UMTS/LTE mobile phone with integrated antenna and inbuilt Li-Polymer battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD bands 1/2/4/5/8 and LTE FDD bands 1/2/3/4/5/7/8/20. It also supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33 too. The HSDPA and HSUPA features are also supported. It has MP3, camera, FM radio, USB memory, GPS receiver, NFC, Mobile High-Definition Link (MHL), Bluetooth (EDR and Bluetooth 4.0), WLAN (802.11 a/b/g/n/ac) and Wi-Fi hotspot functions.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

| Technology Tested: | UMTS1700 | | |
|-------------------------------------|----------------------|----------------|-------------------------|
| Type of Radio Device: | Transceiver | | |
| Mode: | UMTS FDD IV | | |
| Modulation Type: | QPSK / 8PSK | | |
| Channel Spacing: | 5 MHz | | |
| Power Supply Requirement(s): | Nominal | 3.8 V | |
| | Minimum | 3.6 V | |
| | Maximum | 4.2 V | |
| Maximum Output Power (EIRP): | Voice (12.2 kbps) | 26.9 dBm | |
| | HSDPA Sub-Test 4 | 28.0 dBm | |
| | HSUPA Sub-Test 3 | 27.5 dBm | |
| Transmit Frequency Range: | 1710 MHz to 1755 MHz | | |
| Transmit Channels Tested: | Channel ID | Channel Number | Channel Frequency (MHz) |
| | Bottom | 1312 | 1712.4 |
| | Middle | 1412 | 1732.4 |
| | Top | 1513 | 1752.6 |

3.5. Support Equipment

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

| | |
|------------------------------|----------------------|
| Brand Name: | Generic |
| Description: | 2 GB Micro SD Card |
| Model Name or Number: | Not marked or stated |

| | |
|------------------------------|--------------------------------|
| Brand Name: | Logik |
| Description: | 22" High Definition Television |
| Model Name or Number: | L22FE12A |
| Serial Number: | 1309020661 |

| | |
|------------------------------|-----------------------|
| Brand Name: | Not marked or stated |
| Description: | Voltage variation jig |
| Model Name or Number: | Not marked or stated |
| Serial Number: | 310119 |

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Constantly transmitting at full power on bottom, middle and top channels as required.
- Occupied bandwidth, EIRP and band edge tests were performed with the EUT in Voice (12.2 kbps), HSDPA (Sub-tests 1 to 4) or HSUPA (Sub-tests 1 to 5) modes.
- Transmitter radiated spurious emissions were checked in all modes during pre-scans. Voice (12.2 kbps) 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):

- Connected to a Rohde & Schwarz CMW 500 Wideband Radio Communications Tester, operating in UMTS Band IV mode.
- Transmitter radiated spurious emission tests were performed with the following configurations, employing all available accessories:
 - Configuration 1 – Handset with the AC charger, USB Cable, MHL cable (terminated in to a television), MHL adaptor and PHF
 - Configuration 2 – Handset with the AC charger, Magnetic plug and PHF

Pre-scans below 1 GHz were performed in both configurations 1 and 2, with final measurements limited to the configuration which provided worst case results. Pre-scans above 1 GHz were performed in the configuration that employed the most accessories (Configuration 1), with any final measurements being performed in both configurations.

- Testing at temperature and voltage extremes was performed using a voltage variation jig and adaptor supplied by the Customer. The adaptor plugs onto the handset in place of the battery connector.
- The voltage variation jig and adaptor were used for conducted measurements set at the nominal voltage.
- The conducted sample with IMEI 004402451215416 was used for frequency stability.
- The conducted sample with IMEI 004402451215481 was used for conducted power and occupied bandwidth measurements.
- The radiated sample with IMEI 004402451217222 was used for all other measurements.

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.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter Output Power (EIRP)

Test Summary:

| | | | |
|--------------------------|-----------------|-------------------|--------------|
| Test Engineer: | David Doyle | Test Date: | 29 June 2013 |
| Test Sample IMEI: | 004402451215481 | | |

| | |
|--------------------------|---|
| FCC Reference: | Parts 2.1046 & 27.50(d)(4) |
| Test Method Used: | As detailed in FCC KDB 971168 D01 Section 5.1.1 and 5.2.1 |

Environmental Conditions:

| | |
|-------------------------------|----|
| Temperature (°C): | 24 |
| Relative Humidity (%): | 44 |

Note(s):

1. All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
3. The Customer stated a maximum antenna gain of -0.8 dBi
4. The antenna gain was added to the conducted output power to obtain the EIRP.

Transmitter Effective Radiated Power (EIRP) (Continued)**Results: Peak EIRP / HSDPA and Voice**

| Modes | | HSDPA | | | | Voice | | | |
|-------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test | | 1 | 2 | 3 | 4 | 12.2 kbps | | | |
| Band | Channel | Power (dBm) | Limit (dBm) | Margin (dB) | Result |
| 1700 | 1312 | 26.7 | 27.6 | 27.8 | 27.8 | 26.8 | 30.0 | 2.2 | Complied |
| | 1412 | 26.9 | 27.8 | 28.0 | 28.0 | 26.9 | 30.0 | 2.0 | Complied |
| | 1513 | 26.4 | 27.2 | 27.2 | 27.3 | 26.4 | 30.0 | 2.7 | Complied |
| βc | | 2 | 12 | 15 | 15 | | | | |
| βd | | 15 | 15 | 8 | 4 | | | | |
| ΔACK, ΔNACK, ΔCQI | | 8 | 8 | 8 | 8 | | | | |

Results: Peak EIRP / HSUPA

| Modes | | HSUPA | | | | | | | |
|-------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test | | 1 | 2 | 3 | 4 | 5 | | | |
| Band | Channel | Power (dBm) | Limit (dBm) | Margin (dB) | Result |
| 1700 | 1312 | 27.0 | 26.7 | 27.4 | 25.9 | 27.2 | 30.0 | 2.6 | Complied |
| | 1412 | 27.2 | 26.8 | 27.5 | 26.1 | 27.4 | 30.0 | 2.5 | Complied |
| | 1513 | 26.7 | 26.5 | 26.9 | 25.7 | 26.8 | 30.0 | 3.1 | Complied |
| βc | | 11 | 6 | 15 | 2 | 15 | | | |
| βd | | 15 | 15 | 9 | 15 | 15 | | | |
| ΔACK, ΔNACK, ΔCQI | | 8 | 8 | 8 | 8 | 8 | | | |

Transmitter Effective Radiated Power (EIRP) (Continued)**Results: RMS EIRP / HSDPA and Voice**

| Modes | | HSDPA | | | | Voice | | | |
|-------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test | | 1 | 2 | 3 | 4 | 12.2 kbps | | | |
| Band | Channel | Power (dBm) | Limit (dBm) | Margin (dB) | Result |
| 1700 | 1312 | 21.5 | 20.6 | 20.2 | 20.0 | 21.5 | 30.0 | 8.5 | Complied |
| | 1412 | 21.7 | 20.5 | 20.3 | 20.0 | 21.6 | 30.0 | 8.3 | Complied |
| | 1513 | 21.5 | 20.3 | 20.1 | 19.9 | 21.4 | 30.0 | 8.5 | Complied |
| βc | | 2 | 12 | 15 | 15 | | | | |
| βd | | 15 | 15 | 8 | 4 | | | | |
| ΔACK, ΔNACK, ΔCQI | | 8 | 8 | 8 | 8 | | | | |

Results: RMS EIRP / HSUPA

| Modes | | HSUPA | | | | | | | |
|-------------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Sub-test | | 1 | 2 | 3 | 4 | 5 | | | |
| Band | Channel | Power (dBm) | Limit (dBm) | Margin (dB) | Result |
| 1700 | 1312 | 21.5 | 21.4 | 21.5 | 21.5 | 21.5 | 30.0 | 8.5 | Complied |
| | 1412 | 21.5 | 21.6 | 21.8 | 21.7 | 21.8 | 30.0 | 8.2 | Complied |
| | 1513 | 21.3 | 21.2 | 21.5 | 21.5 | 21.5 | 30.0 | 8.5 | Complied |
| βc | | 11 | 6 | 15 | 2 | 15 | | | |
| βd | | 15 | 15 | 9 | 15 | 15 | | | |
| ΔACK, ΔNACK, ΔCQI | | 8 | 8 | 8 | 8 | 8 | | | |

Transmitter Effective Radiated Power (EIRP) (Continued)**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|------------|-------------|-----------------------|------------------------|
| M1659 | Thermometer / Hygrometer station | JM Handelspunkt | 30.5015.13 | None stated | 24 May 2014 | 12 |
| A1100 | Directional Coupler | Hewlett Packard | HP87300C | 3239A01058 | Calibrated before use | - |
| A2140 | Attenuator | Atlan TecRF | AN18-10 | 090918-14 | Calibrated before use | - |
| L1028 | Signal Analyser | Rohde & Schwarz | FSV30 | 100854 | 23 May 2014 | 12 |
| M1269 | Multimeter | Fluke | 179 | 90250210 | 30 Jul 2013 | 12 |
| S0537 | DC Power Supply | TTI | EL302D | 249928 | Calibrated before use | - |

5.2.2. Transmitter Occupied Bandwidth**Test Summary:**

| | | | |
|--------------------------|-----------------|-------------------|--------------|
| Test Engineer: | David Doyle | Test Date: | 05 July 2013 |
| Test Sample IMEI: | 004402451215481 | | |

| | |
|--------------------------|---|
| FCC Reference: | Part 2.1049 |
| Test Method Used: | As detailed in KBD 971168 D01 Section 4.2 |

Environmental Conditions:

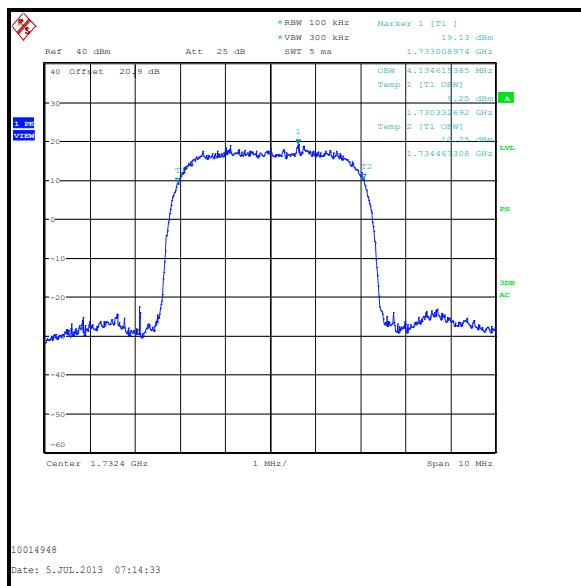
| | |
|-------------------------------|----|
| Temperature (°C): | 22 |
| Relative Humidity (%): | 41 |

Note(s):

1. Occupied bandwidth (99% bandwidth) was measured using a signal analyser occupied bandwidth function.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

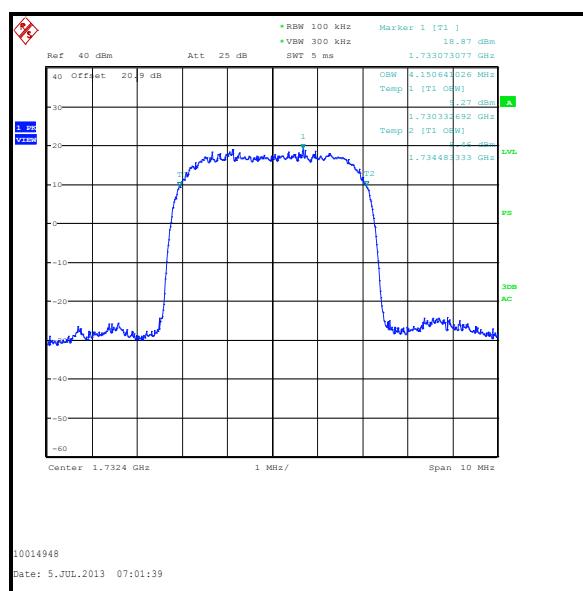
Transmitter Occupied Bandwidth (continued)**Results: Voice / 12.2 kbps**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



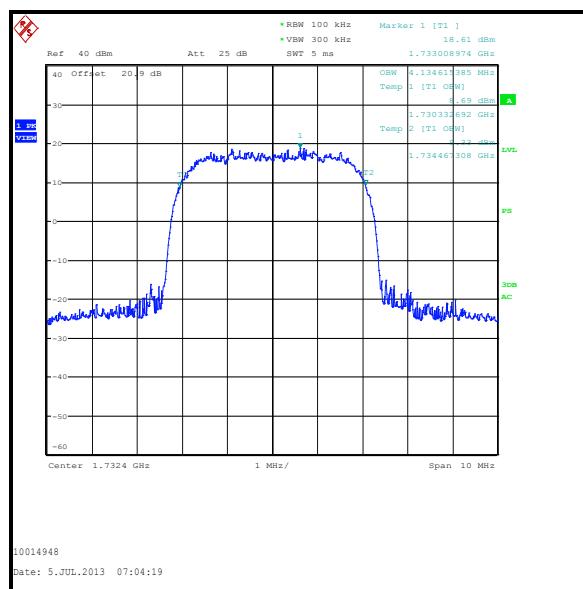
Transmitter Occupied Bandwidth (continued)**Results: HSDPA Sub-Test 1**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4150.641 |



Transmitter Occupied Bandwidth (continued)**Results: HSDPA Sub-Test 2**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



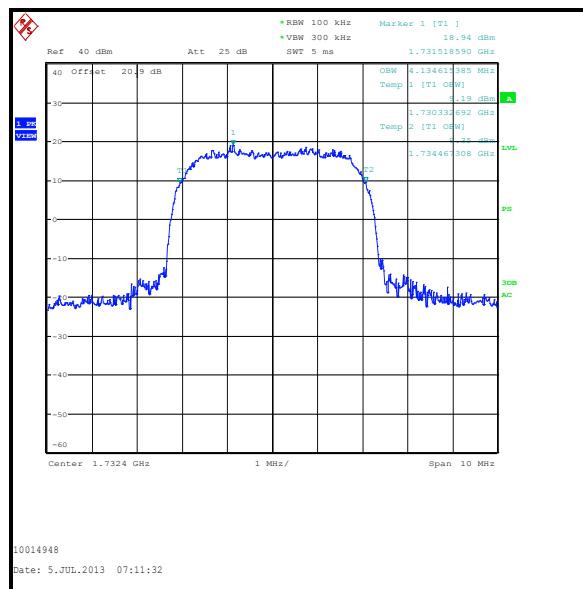
Transmitter Occupied Bandwidth (continued)**Results: HSDPA Sub-Test 3**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4166.667 |



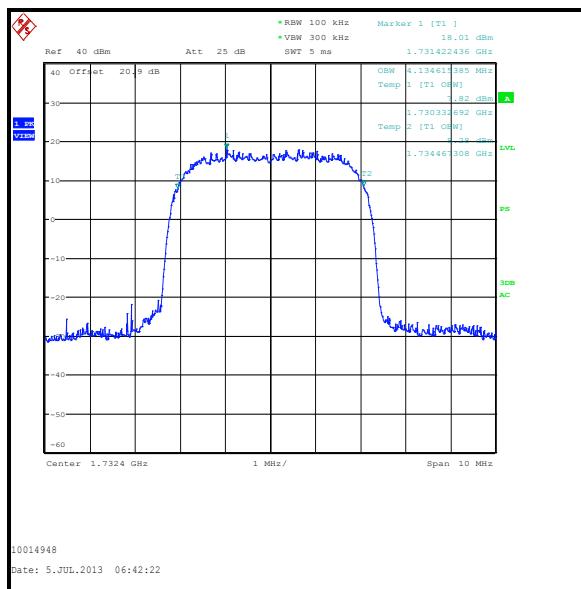
Transmitter Occupied Bandwidth (continued)**Results: HSDPA Sub-Test 4**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



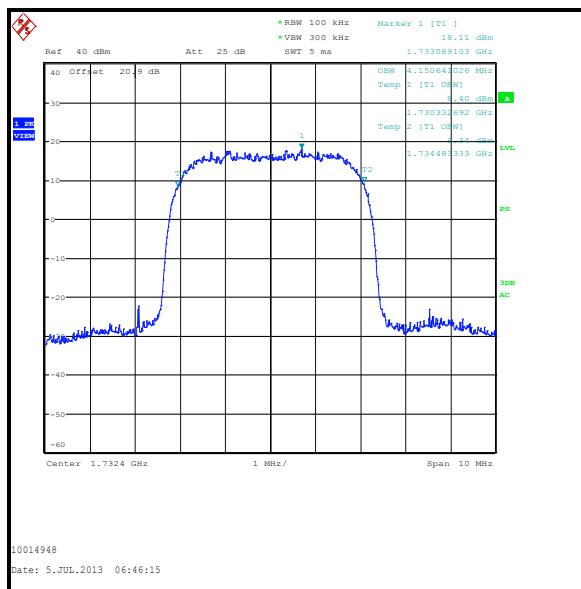
Transmitter Occupied Bandwidth (continued)**Results: HSUPA Sub-Test 1**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



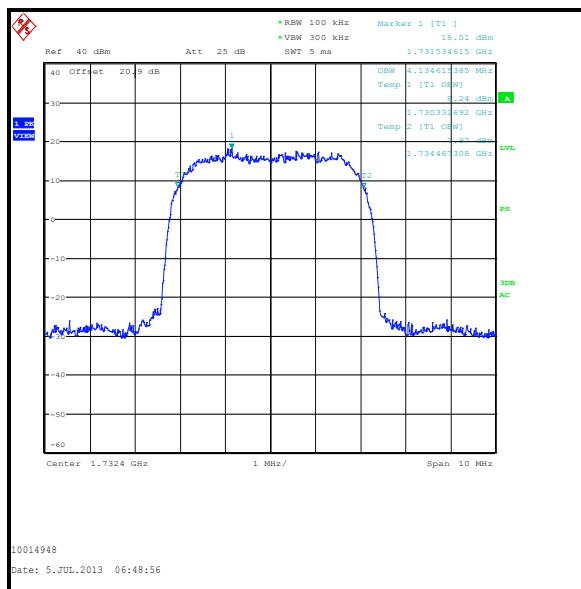
Transmitter Occupied Bandwidth (continued)**Results: HSUPA Sub-Test 2**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4150.641 |



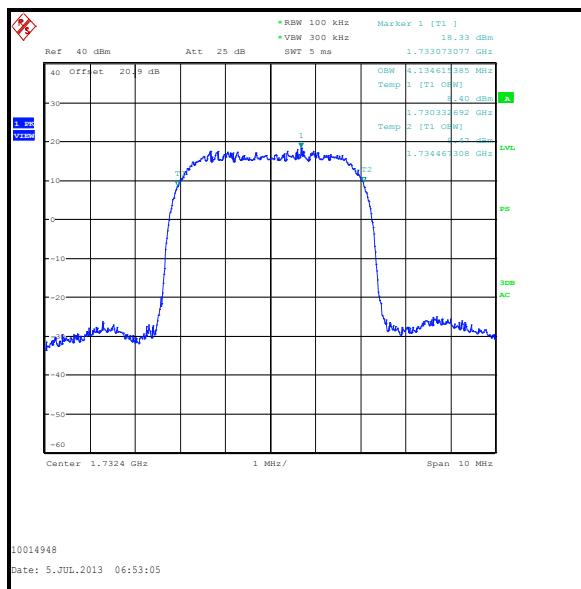
Transmitter Occupied Bandwidth (continued)**Results: HSUPA Sub-Test 3**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



Transmitter Occupied Bandwidth (continued)**Results: HSUPA Sub-Test 4**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |



Transmitter Occupied Bandwidth (continued)**Results: HSUPA Sub-Test 5**

| Channel | Frequency (MHz) | Occupied Bandwidth (kHz) |
|---------|-----------------|--------------------------|
| Middle | 1732.4 | 4134.615 |

**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|------------|-------------|-----------------------|------------------------|
| M1659 | Thermometer / Hygrometer station | JM Handelspunkt | 30.5015.13 | None stated | 24 May 2014 | 12 |
| A1100 | Directional Coupler | Hewlett Packard | HP87300C | 3239A01058 | Calibrated before use | - |
| A2140 | Attenuator | Atlan TecRF | AN18-10 | 090918-14 | Calibrated before use | - |
| M1630 | Signal Analyzer | Rohde & Schwarz | ESU40 | 100233 | 07 Feb 2014 | 12 |
| M1269 | Multimeter | Fluke | 179 | 90250210 | 30 Jul 2013 | 12 |
| S0537 | DC Power Supply | TTI | EL302D | 249928 | Calibrated before use | - |

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

| | | | |
|--------------------------|----------------------------|--------------------|-----------------------------|
| Test Engineers: | Ahmed Ali & Andrew Edwards | Test Dates: | 24 June 2013 & 26 June 2013 |
| Test Sample IMEI: | 004402451217222 | | |

| | |
|--------------------------|--|
| FCC Reference: | Parts 2.1053 & 27.53(h)(1) |
| Test Method Used: | As detailed in ANSI TIA-603-C-2004 Section 2.2.12. referencing FCC Part 2.1053 |
| Frequency Range: | 30 MHz to 18 GHz |
| Configuration: | Voice / 12.2 kbps |

Environmental Conditions:

| | |
|-------------------------------|----------|
| Temperature (°C): | 22 to 25 |
| Relative Humidity (%): | 33 to 41 |

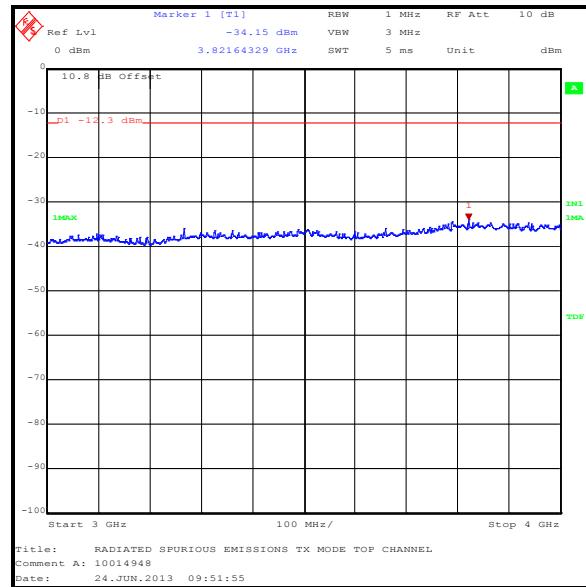
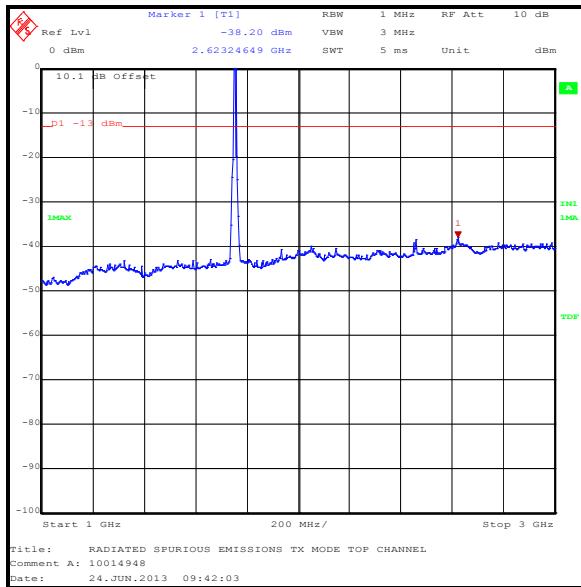
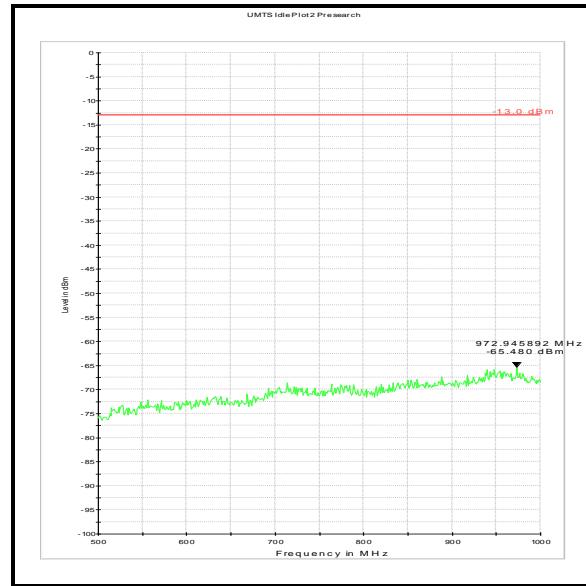
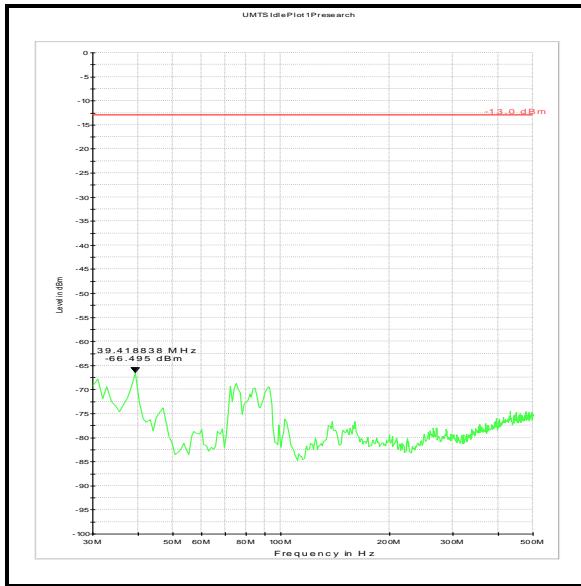
Note(s):

1. All emissions shown on the pre-scan plots were investigated and found to be ambient, or >20 dB below the applicable limit or below the measurement system noise floor. Therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
2. The uplink traffic channel is shown on the 1 GHz to 3 GHz plot.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

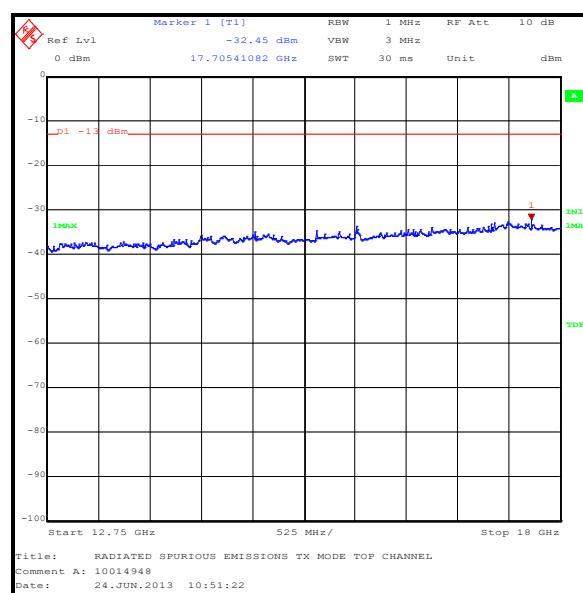
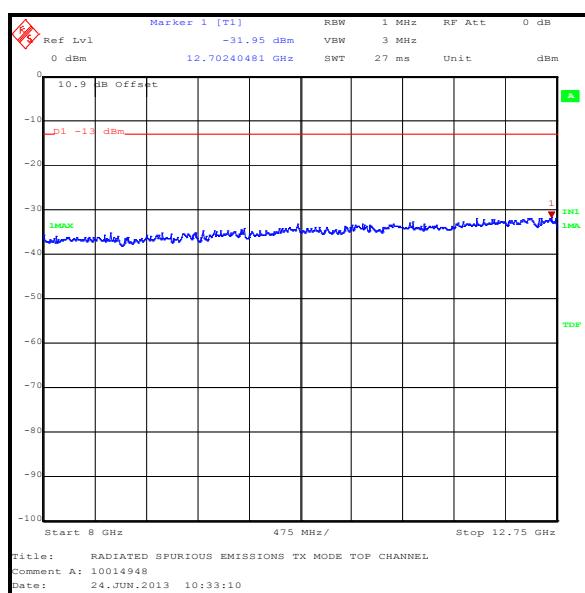
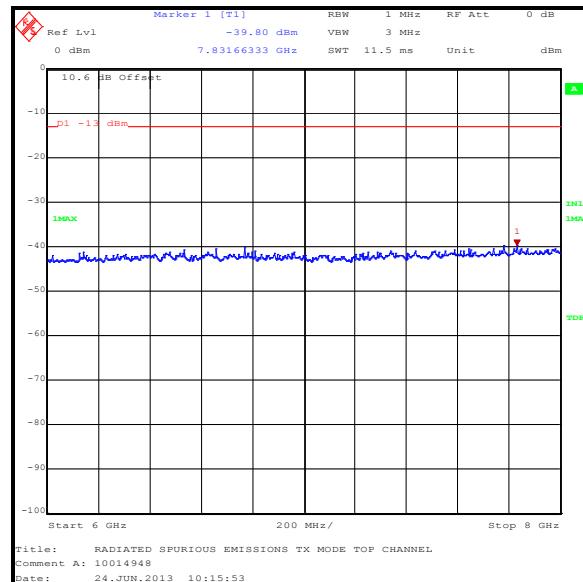
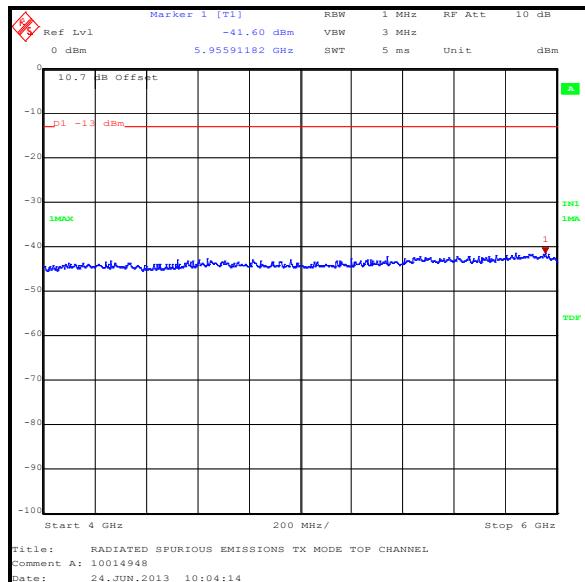
Results: Voice / 12.2 kbps / Top Channel

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 12702.405 | -32.0 | -13.0 | 19.0 | Complied |

Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|------------|-------------|----------------------|------------------------|
| A490 | Antenna | Chase | CBL6111A | 1590 | 18 Apr 2014 | 12 |
| A1393 | Attenuator | Huber & Suhner | 6820.17.B | 757456 | 10 May 2014 | 12 |
| A1834 | Attenuator | Hewlett Packard | 8491B | 10444 | 27 Jan 2014 | 12 |
| G0543 | Amplifier | Sonoma | 310N | 230801 | 04 Jul 2013 | 3 |
| K0001 | 5m RSE Chamber | Rainford EMC | N/A | N/A | 24 Oct 2013 | 12 |
| M1273 | Test Receiver | Rohde & Schwarz | ESIB 26 | 100275 | 07 Feb 2014 | 12 |
| M1622 | Thermometer / Hygrometer station | JM Handelpunkt | 30.5015.13 | Not stated | 24 May 2014 | 12 |
| K0002 | 3m RSE Chamber | Rainford EMC | N/A | N/A | 04 Nov 2013 | 12 |
| M1124 | Test Receiver | Rohde & Schwarz | ESIB 26 | 100046K | 14 Aug 2013 | 12 |
| A1534 | Pre-Amplifier | Hewlett Packard | 8449B | 3008A00405 | 04 Nov 2013 | 12 |
| A1818 | Antenna | EMCO | 3115 | 00075692 | 04 Nov 2013 | 12 |
| A253 | Antenna | Flann Microwave | 12240-20 | 128 | 04 Nov 2013 | 12 |
| A254 | Antenna | Flann Microwave | 14240-20 | 139 | 04 Nov 2013 | 12 |
| A255 | Antenna | Flann Microwave | 16240-20 | 519 | 04 Nov 2013 | 12 |
| A256 | Antenna | Flann Microwave | 18240-20 | 400 | 04 Nov 2013 | 12 |
| A1975 | High Pass Filter | AtlanTecRF | AFH-03000 | 090424010 | 19 Apr 2014 | 12 |
| A1396 | Attenuator | Huber & Suhner | 6810.17.B | 757987 | 10 May 2014 | 12 |
| M1656 | Thermometer / Hygrometer station | JM Handelpunkt | 30.5015.13 | None stated | 24 May 2014 | 12 |

5.2.4. Transmitter Radiated Emissions at Band Edges

Test Summary:

| | | | |
|--------------------------|-----------------|-------------------|--------------|
| Test Engineer: | David Doyle | Test Date: | 26 June 2013 |
| Test Sample IMEI: | 004402451217222 | | |

| | |
|--------------------------|--|
| FCC Reference: | Parts 2.1053 & 27.53(h)(1) |
| Test Method Used: | As detailed in ANSI TIA-603-C-2004 Section 2.2.12. referencing FCC Part 2.1053 |

Environmental Conditions:

| | |
|-------------------------------|----|
| Temperature (°C): | 25 |
| Relative Humidity (%): | 38 |

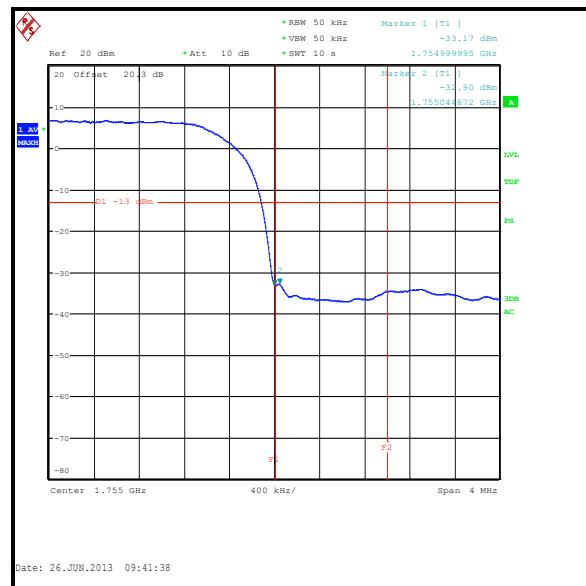
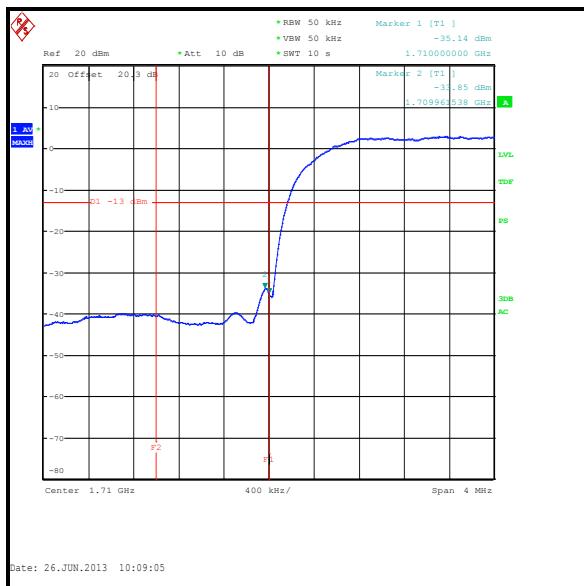
Results: Voice / 12.2 kbps

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.962 | -35.2 | -13.0 | 22.2 | Complied |
| 1710 | -36.2 | -13.0 | 23.2 | Complied |
| 1755 | -32.6 | -13.0 | 19.6 | Complied |
| 1755.038 | -32.3 | -13.0 | 19.3 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)**Results: HSDPA Sub-Test 1**

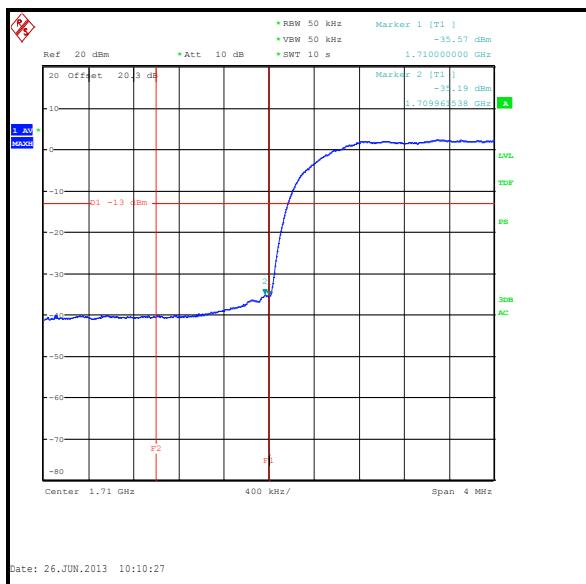
| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.962 | -33.9 | -13.0 | 20.9 | Complied |
| 1710 | -35.1 | -13.0 | 22.1 | Complied |
| 1755 | -33.2 | -13.0 | 20.2 | Complied |
| 1755.045 | -32.9 | -13.0 | 19.9 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 2

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.962 | -35.2 | -13.0 | 22.2 | Complied |
| 1710 | -35.6 | -13.0 | 22.6 | Complied |
| 1755 | -31.8 | -13.0 | 18.8 | Complied |
| 1755.340 | -30.4 | -13.0 | 17.4 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)

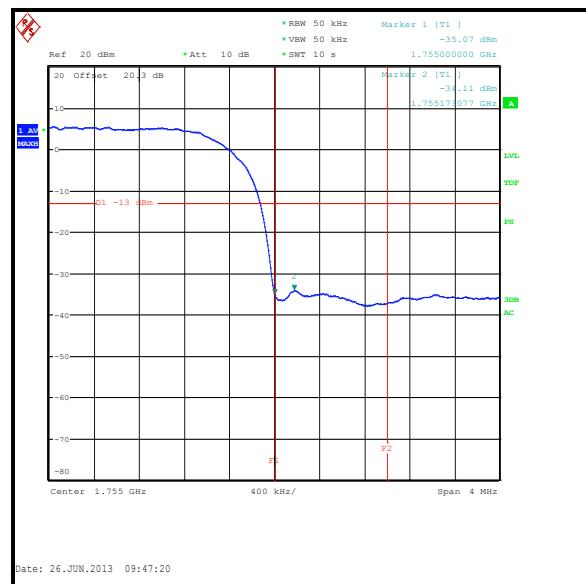
Results: HSDPA Sub-Test 3

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.827 | -34.4 | -13.0 | 21.4 | Complied |
| 1710 | -35.2 | -13.0 | 22.2 | Complied |
| 1755 | -35.2 | -13.0 | 22.2 | Complied |
| 1755.186 | -34.3 | -13.0 | 21.3 | Complied |



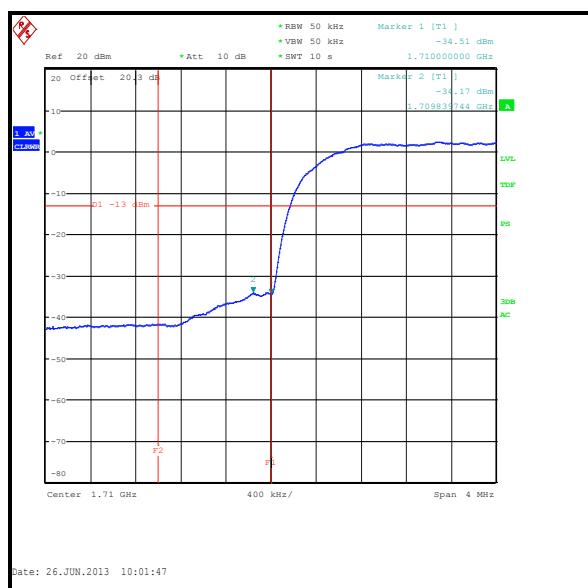
Transmitter Radiated Emissions at Band Edges (continued)**Results: HSDPA Sub-Test 4**

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.853 | -34.0 | -13.0 | 21.0 | Complied |
| 1710 | -35.0 | -13.0 | 22.0 | Complied |
| 1755 | -35.1 | -13.0 | 22.1 | Complied |
| 1755.173 | -34.1 | -13.0 | 21.1 | Complied |



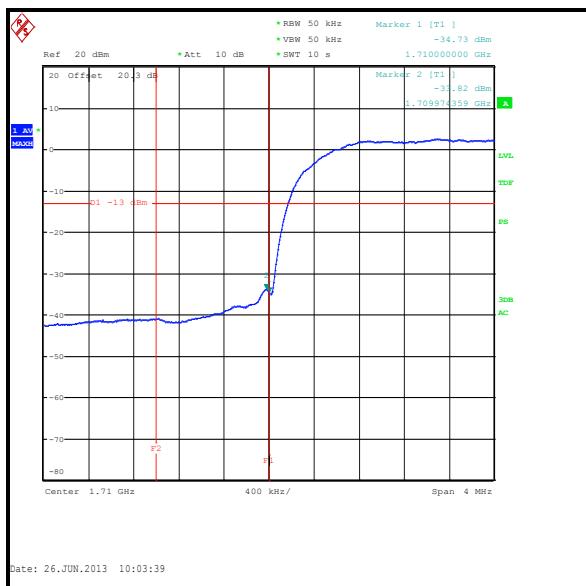
Transmitter Radiated Emissions at Band Edges (continued)**Results: HSUPA Sub-Test 1**

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.840 | -34.2 | -13.0 | 21.2 | Complied |
| 1710 | -34.5 | -13.0 | 21.5 | Complied |
| 1755 | -34.4 | -13.0 | 21.4 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)**Results: HSUPA Sub-Test 2**

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.974 | -33.8 | -13.0 | 20.8 | Complied |
| 1710 | -34.7 | -13.0 | 21.7 | Complied |
| 1755 | -33.5 | -13.0 | 20.5 | Complied |
| 1755.032 | -32.5 | -13.0 | 19.5 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 3

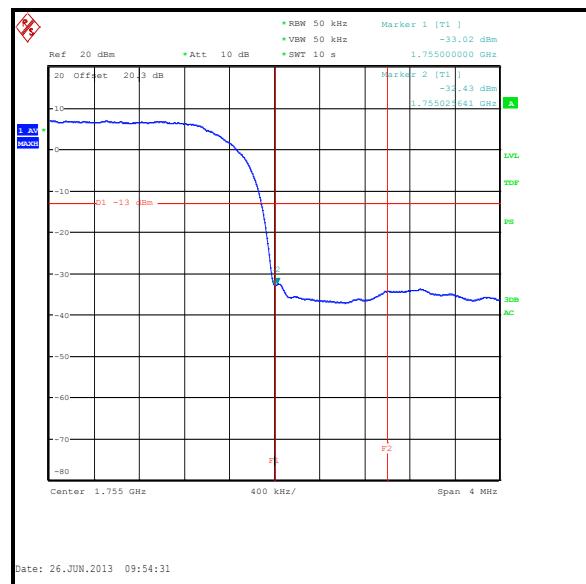
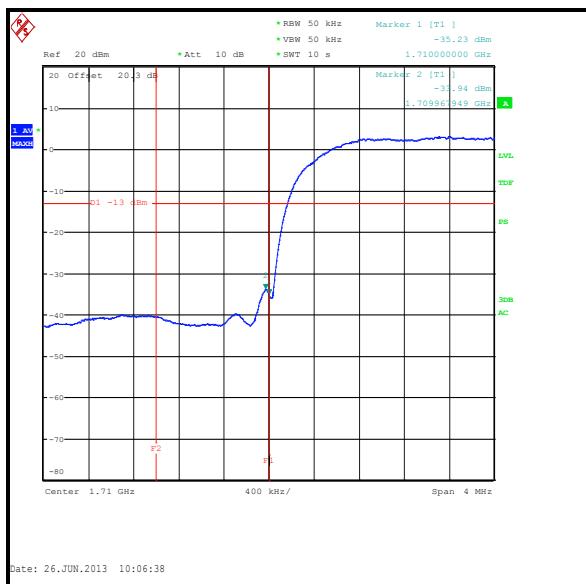
| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.853 | -33.5 | -13.0 | 20.5 | Complied |
| 1710 | -34.4 | -13.0 | 21.4 | Complied |
| 1755 | -30.3 | -13.0 | 17.3 | Complied |
| 1755.346 | -27.7 | -13.0 | 14.7 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)

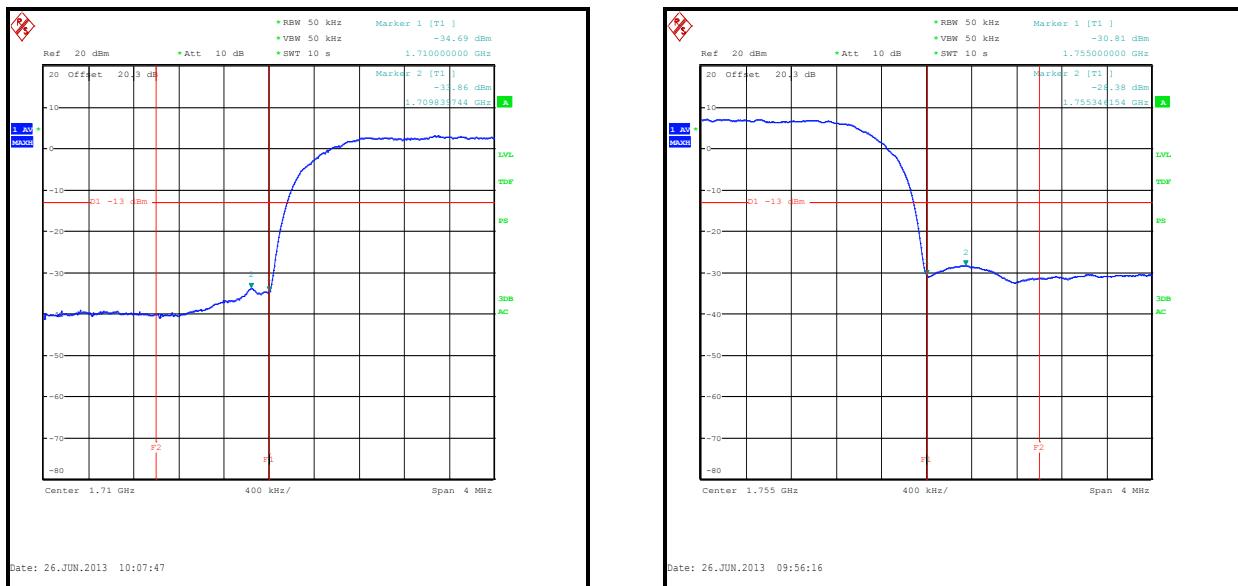
Results: HSUPA Sub-Test 4

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.968 | -33.9 | -13.0 | 20.9 | Complied |
| 1710 | -35.2 | -13.0 | 22.2 | Complied |
| 1755 | -33.0 | -13.0 | 20.0 | Complied |
| 1755.026 | -32.4 | -13.0 | 19.4 | Complied |



Transmitter Radiated Emissions at Band Edges (continued)**Results: HSUPA Sub-Test 5**

| Frequency (MHz) | Peak Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|-----------------|------------------|-------------|-------------|----------|
| 1709.840 | -33.9 | -13.0 | 20.9 | Complied |
| 1710 | -34.7 | -13.0 | 21.7 | Complied |
| 1755 | -30.8 | -13.0 | 17.8 | Complied |
| 1755.346 | -28.4 | -13.0 | 15.4 | Complied |

**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|-------------|-------------|----------------------|------------------------|
| M1656 | Thermometer / Hygrometer station | JM Handelspunkt | 30.5015.1 3 | None stated | 24 May 2014 | 12 |
| K0002 | 3m RSE Chamber | Rainford | N/A | N/A | 04 Nov 2013 | 12 |
| L1076 | Test Receiver | Rohde & Schwarz | FSU8 | 101349 | 29 May 2014 | 12 |
| A1534 | Pre Amplifier | Hewlett Packard | 8449B | 3008A00405 | 04 Nov 2013 | 12 |
| A1818 | Antenna | EMCO | 3115 | 00075692 | 04 Nov 2013 | 12 |
| A1393 | Attenuator | Huber & Suhner | 6820.17.B | 757456 | 10 May 2014 | 12 |

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

| | | | |
|--------------------------|-----------------|-------------------|--------------|
| Test Engineer: | Nick Steele | Test Date: | 25 June 2013 |
| Test Sample IMEI: | 004402451215416 | | |

| | |
|--------------------------|--|
| FCC Reference: | Parts 2.1055 & 27.54 |
| Test Method Used: | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

Environmental Conditions:

| | |
|---------------------------------------|----|
| Ambient Temperature (°C): | 26 |
| Ambient Relative Humidity (%): | 34 |

Note(s):

1. A voltage variation jig was connected to the EUT which was powered via a bench power supply.
2. Frequency error was measured using a calibrated Rohde & Schwarz CMW 500 Wideband Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bidirectional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

Transmitter Frequency Stability (Temperature Variation) (continued)**Results: Bottom Channel (1712.4 MHz)**

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30 | 10 | 1712.400010 | 1710 | 2.400010 | Complied |
| -20 | 17 | 1712.399983 | 1710 | 2.399983 | Complied |
| -10 | 17 | 1712.399983 | 1710 | 2.399983 | Complied |
| 0 | 18 | 1712.399982 | 1710 | 2.399982 | Complied |
| 10 | 15 | 1712.399985 | 1710 | 2.399985 | Complied |
| 20 | 6 | 1712.400006 | 1710 | 2.400006 | Complied |
| 30 | 8 | 1712.400008 | 1710 | 2.400008 | Complied |
| 40 | 17 | 1712.400017 | 1710 | 2.400017 | Complied |
| 50 | 26 | 1712.400026 | 1710 | 2.400026 | Complied |

Results: Top Channel (1752.6 MHz)

| Temperature (°C) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| -30 | 15 | 1752.599985 | 1755 | 2.400015 | Complied |
| -20 | 8 | 1752.600008 | 1755 | 2.399992 | Complied |
| -10 | 18 | 1752.600018 | 1755 | 2.399982 | Complied |
| 0 | 11 | 1752.600011 | 1755 | 2.399989 | Complied |
| 10 | 11 | 1752.600011 | 1755 | 2.399989 | Complied |
| 20 | 10 | 1752.599990 | 1755 | 2.400010 | Complied |
| 30 | 13 | 1752.599987 | 1755 | 2.400013 | Complied |
| 40 | 24 | 1752.600024 | 1755 | 2.399976 | Complied |
| 50 | 32 | 1752.599968 | 1755 | 2.400032 | Complied |

Transmitter Frequency Stability (Temperature Variation) (continued)**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|----------------|-------------|-----------------------|------------------------|
| M1659 | Thermometer / Hygrometer station | JM Handelspunkt | 30.5015.13 | None stated | 24 May 2014 | 12 |
| M1752 | Radio Comms Tester | Rohde & Schwarz | CMW 500 | 139551 | 19 Jun 2014 | 12 |
| E0513 | Environmental Chamber | TAS | LT600 Series 3 | 23900506 | Calibrated before use | - |
| M1642 | Thermometer | Fluke | 52II | 18890119 | 19 Mar 2014 | 12 |
| S0557 | DC power supply | TTI | EL303R | 395819 | Calibrated before use | - |
| M1269 | Multimeter | Fluke | 179 | 90250210 | 30 Jul 2013 | 12 |

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

| | | | |
|--------------------------|-----------------|-------------------|--------------|
| Test Engineer: | Nick Steele | Test Date: | 26 June 2013 |
| Test Sample IMEI: | 004402451215416 | | |

| | |
|--------------------------|--|
| FCC Reference: | Parts 2.1055 & 27.54 |
| Test Method Used: | As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055 |

Environmental Conditions:

| | |
|-------------------------------|----|
| Temperature (°C): | 23 |
| Relative Humidity (%): | 38 |

Note(s):

1. A voltage variation jig was connected to the EUT which was powered via a bench power supply.
2. Frequency error was measured using a calibrated Rohde & Schwarz CMW 500 Wideband Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bidirectional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

Results: Bottom Channel (1712.4 MHz)

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 3.6 | 5 | 1712.400005 | 1710 | 2.400005 | Complied |
| 4.2 | 7 | 1712.400007 | 1710 | 2.400007 | Complied |

Results: Top Channel (1752.6 MHz)

| Supply Voltage (V) | Frequency Error (Hz) | Measured Frequency (MHz) | Lower Band Edge Limit (MHz) | Margin (MHz) | Result |
|--------------------|----------------------|--------------------------|-----------------------------|--------------|----------|
| 3.6 | 9 | 1752.599991 | 1755 | 2.400009 | Complied |
| 4.2 | 12 | 1752.599988 | 1755 | 2.400012 | Complied |

Transmitter Frequency Stability (Voltage Variation)**Test Equipment Used:**

| Asset No. | Instrument | Manufacturer | Type No. | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|----------------------------------|-----------------|------------|-------------|-----------------------|------------------------|
| M1659 | Thermometer / Hygrometer station | JM Handelspunkt | 30.5015.13 | None stated | 24 May 2014 | 12 |
| M1752 | Radio Comms Tester | Rohde & Schwarz | CMW 500 | 139551 | 19 Jun 2014 | 12 |
| S0557 | DC power supply | TTI | EL303R | 395819 | Calibrated before use | - |
| M1269 | Multimeter | Fluke | 179 | 90250210 | 30 Jul 2013 | 12 |

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".

| Measurement Type | Range | Confidence Level (%) | Calculated Uncertainty |
|-----------------------------|------------------|----------------------|------------------------|
| Conducted Output Power | 1710 to 1755 MHz | 95% | ± 1.13 dB |
| Occupied Bandwidth | 1710 to 1755 MHz | 95% | ± 0.92 ppm |
| Radiated Spurious Emissions | 30 MHz to 1 GHz | 95% | ± 5.65 dB |
| Radiated Spurious Emissions | 1 GHz to 18 GHz | 95% | ± 2.94 dB |
| Frequency Stability | 1710 to 1755 MHz | 95% | ± 0.92 ppm |

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.

7. Report Revision History

| Version Number | Revision Details | | |
|-----------------------|-------------------------|---------------|-------------------|
| | Page No(s) | Clause | Details |
| 1.0 | - | - | Initial Version |
| 2.0 | - | - | Model No. removed |