



# TEST REPORT

**Test Report No. : UL-RPT-RP10014948JD18A V3.0**

**Manufacturer** : Sony Mobile Communications AB  
**Type No.** : PM-0450-BV  
**FCC ID** : PY7PM-0450  
**Technology** : UMTS1900 Band II  
**Test Standard(s)** : FCC Part 24

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
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 3.0 supersedes all previous versions.

**Date of Issue:** 17 July 2013

**Checked by:**

Sarah Williams  
WiSE Laboratory Engineer

**Issued by :**

pp  
John Newell  
Group Quality Manager, WiSE  
Basingstoke,  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
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**UL VS LTD**

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## **1. Customer Information**

<b>Company Name:</b>	Sony Mobile Communications AB
<b>Address:</b>	Nya Vattentornet Lund SE-221 88 Sweden

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR24
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 24 Subpart E (Personal Communication Services)
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	24 June 2013 to 04 July 2013

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 24.232	Transmitter Output Power (EIRP)	✓
Part 2.1049	Transmitter Occupied Bandwidth	✓
Part 2.1053/24.238	Transmitter Out of Band Radiated Emissions	✓
Part 2.1053/24.238	Transmitter Band Edge Radiated Emissions	✓
Part 2.1055/24.235	Transmitter Frequency Stability (Temperature and Voltage Variation)	✓

**Key to Results**

✓ = Complied ✘ = Did not comply

### 2.3. 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 (2009)
<b>Title:</b>	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.
<b>Title:</b>	FCC KDB 971168 D01 v02r01, 7 June 2013
<b>Reference:</b>	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)

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

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

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

<b>Brand Name:</b>	Sony
<b>Description:</b>	AC Charger
<b>Model Name or Number:</b>	EP880

<b>Brand Name:</b>	Generic
<b>Description:</b>	MHL Cable
<b>Model Name or Number:</b>	Not marked or stated

<b>Brand Name:</b>	Sony
<b>Description:</b>	MHL Adaptor
<b>Model Name or Number:</b>	IM750

**Identification of Equipment Under Test (EUT) (continued)**

<b>Brand Name:</b>	Sony
<b>Description:</b>	Magnetic Plug
<b>Model Name or Number:</b>	EC801

<b>Brand Name:</b>	Sony
<b>Description:</b>	USB cable
<b>Model Name or Number:</b>	EC21

<b>Brand Name:</b>	Sony
<b>Description:</b>	PHF
<b>Model Name or Number:</b>	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 1/3/4/5/7/8/20. 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

<b>Technology Tested:</b>	UMTS1900		
<b>Type of Radio Device:</b>	Transceiver		
<b>Mode:</b>	UMTS FDD II		
<b>Modulation Type:</b>	QPSK / 8PSK		
<b>Channel Spacing:</b>	5 MHz		
<b>Power Supply Requirement(s):</b>	Nominal	3.8 V	
	Minimum	3.6 V	
	Maximum	4.2 V	
<b>Technology Tested:</b>	PCS1900		
<b>Maximum Output Power (EIRP):</b>	Voice (12.2 kbps)	25.5 dBm	
	HSDPA Sub-Test 3	26.6 dBm	
	HSUPA Sub-Test 3	26.6 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	9262	1852.4
	Middle	9400	1880.0
	Top	9538	1907.6

### 3.5. Support Equipment

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

<b>Brand Name:</b>	Generic
<b>Description:</b>	2 GB Micro SD Card
<b>Model Name or Number:</b>	Not marked or stated

<b>Brand Name:</b>	Logik
<b>Description:</b>	22" High Definition Television
<b>Model Name or Number:</b>	L22FE12A
<b>Serial Number:</b>	1309020661

<b>Brand Name:</b>	Not marked or stated
<b>Description:</b>	Voltage variation jig
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	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 II 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:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	28 June 2013
<b>Test Sample IMEI:</b>	004402451215481		

<b>FCC Reference:</b>	Part 24.232
<b>Test Method Used:</b>	As detailed in FCC KDB 971168 D01 Section 5.1.1 and 5.2.1

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	40

#### **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 -0.6 dB
4. The antenna gain was added to the conducted output power to obtain the EIRP.

**Transmitter Output 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				
1900	9262	25.7	26.3	26.5	26.4	25.5	33.0	6.5	Complied
	9400	25.5	26.3	26.6	26.5	25.5	33.0	6.4	Complied
	9538	24.9	25.5	25.7	25.8	24.8	33.0	7.2	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				
1900	9262	26.2	26.0	26.5	25.3	26.3	33.0	6.5	Complied
	9400	25.3	25.8	26.6	25.4	26.5	33.0	6.4	Complied
	9538	24.8	25.3	25.7	24.9	25.6	33.0	7.3	Complied
βc		11	6	15	2	15			
βd		15	15	9	15	15			
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8			

**Transmitter Output Power (EIRP) (Continued)****Results: RMS EIRP / HSUPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1900	9262	20.2	18.8	18.5	18.3	20.3	33.0	12.7	Complied
	9400	20.2	18.8	18.5	18.5	20.2	33.0	12.8	Complied
	9538	20.1	18.9	18.3	18.3	20.3	33.0	12.7	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				
1900	9262	19.8	19.8	19.9	20.0	19.9	33.0	13.0	Complied
	9400	19.8	19.9	20.0	19.8	19.9	33.0	13.0	Complied
	9538	19.9	19.7	19.9	19.9	20.0	33.0	13.0	Complied
βc		11	6	15	2	15			
βd		15	15	9	15	15			
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8			

**Transmitter Output 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 Handelpunkt	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:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	04 July 2013
<b>Test Sample IMEI:</b>	004402451215481		

<b>FCC Reference:</b>	Part 2.1049
<b>Test Method Used:</b>	As detailed in KBD 971168 D01 Section 4.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	40

**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.

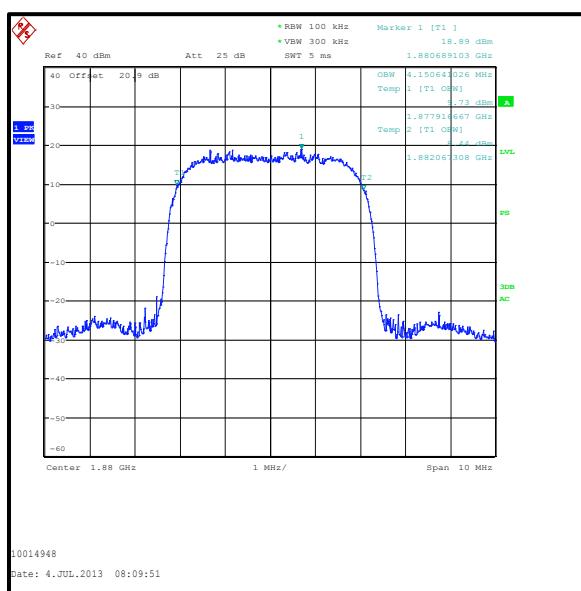
**Transmitter Occupied Bandwidth (continued)****Results: Voice / 12.2 kbps**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4134.615

**Middle Channel**

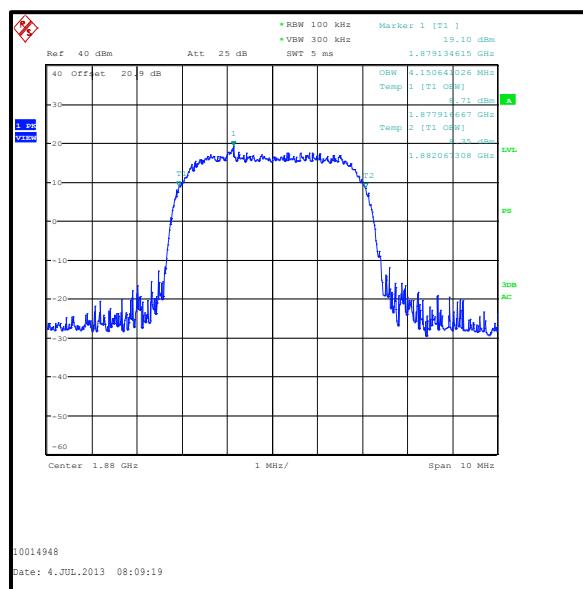
**Transmitter Occupied Bandwidth (continued)****Results: HSDPA Sub-Test 1**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4150.641

**Middle Channel**

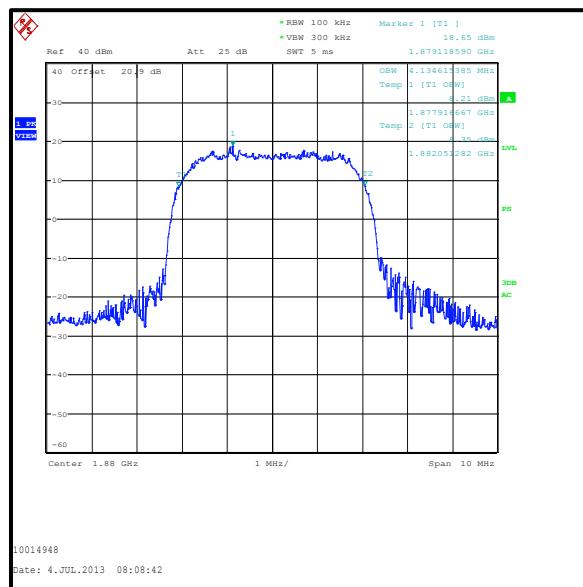
**Transmitter Occupied Bandwidth (continued)****Results: HSDPA Sub-Test 2**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4150.641

**Middle Channel**

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

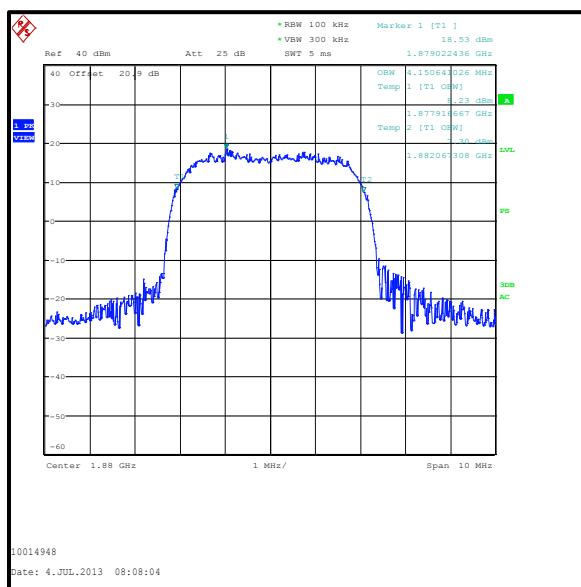
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4134.615

**Middle Channel**

## **Transmitter Occupied Bandwidth (continued)**

## Results: HSDPA Sub-Test 4

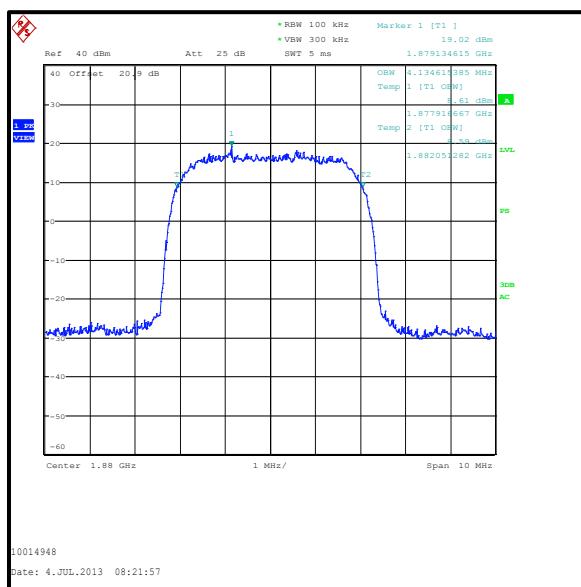
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4150.641



## Middle Channel

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

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4134.615

**Middle Channel**

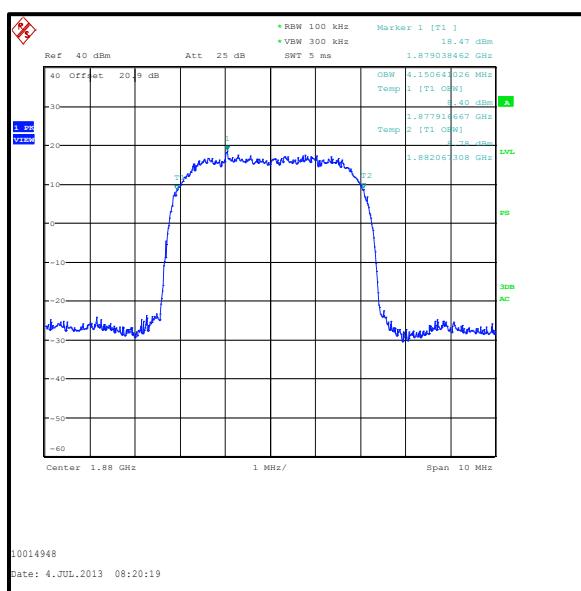
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 2**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4118.590

**Middle Channel**

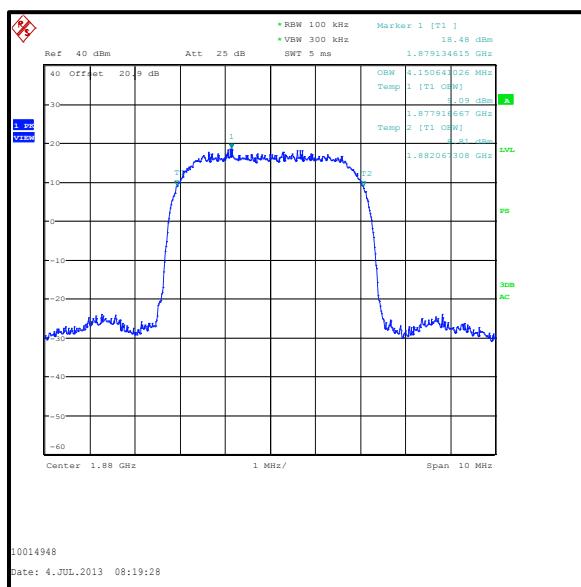
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 3**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4150.641

**Middle Channel**

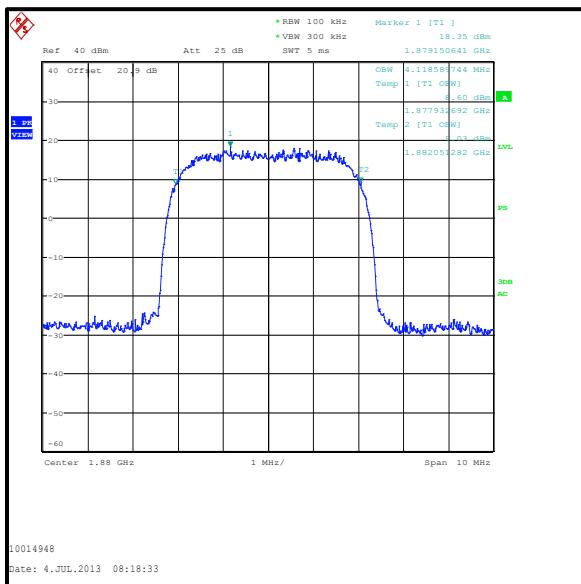
**Transmitter Occupied Bandwidth (continued)****Results: HSUPA Sub-Test 4**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4150.641

**Middle Channel**

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

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1880.0	4118.590

**Middle Channel****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermometer / Hygrometer station	JM Handelpunkt	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:**

<b>Test Engineers:</b>	Ahmed Ali, Mark Percival & Andrew Edwards	<b>Test Dates:</b>	24 June 2013 & 26 June 2013
<b>Test Sample IMEI:</b>	004402451217222		

<b>FCC Reference:</b>	Parts 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
<b>Frequency Range:</b>	30 MHz to 20 GHz
<b>Configuration:</b>	Voice / 12.2 kbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 26
<b>Relative Humidity (%):</b>	33 to 38

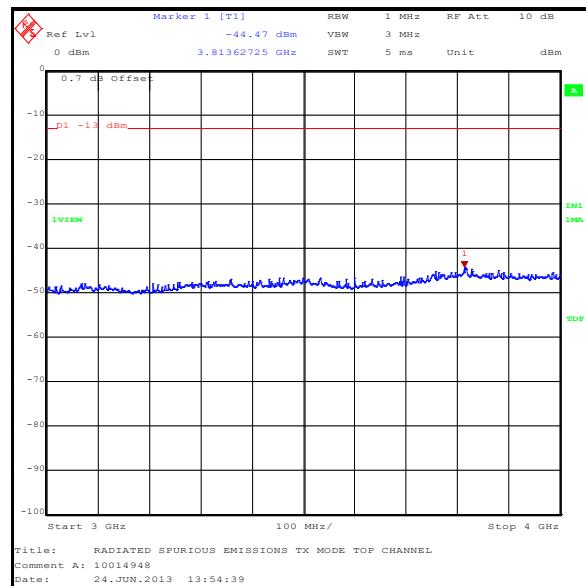
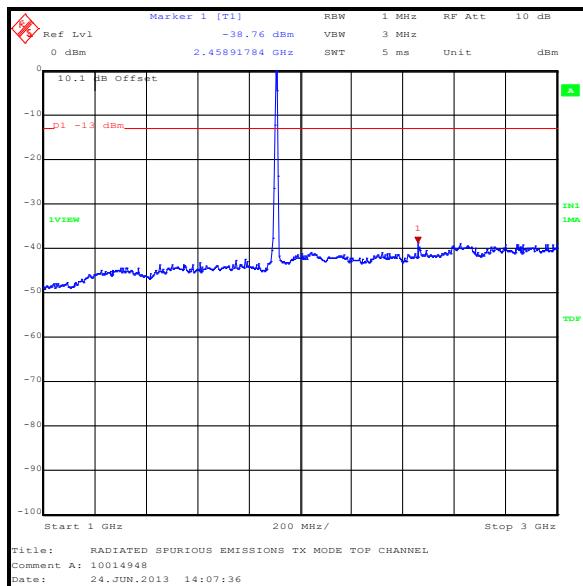
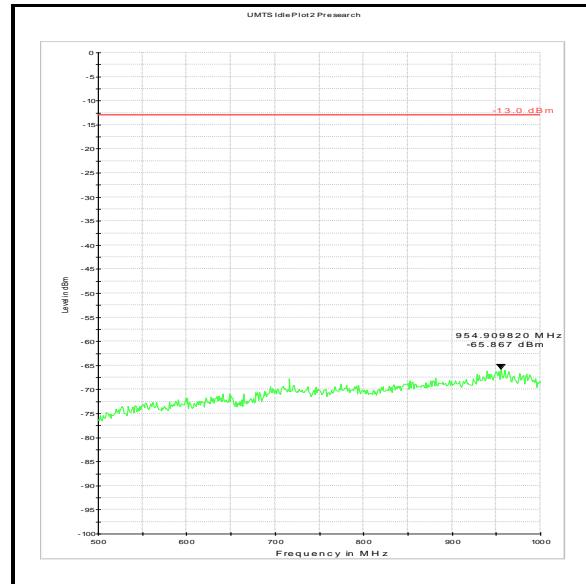
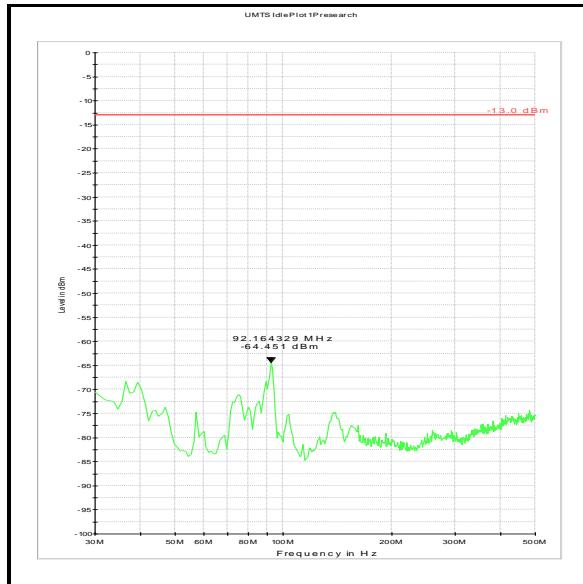
**Note(s):**

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.

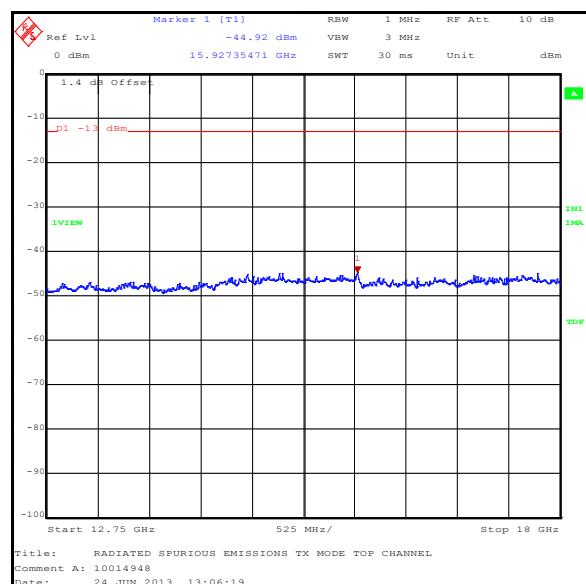
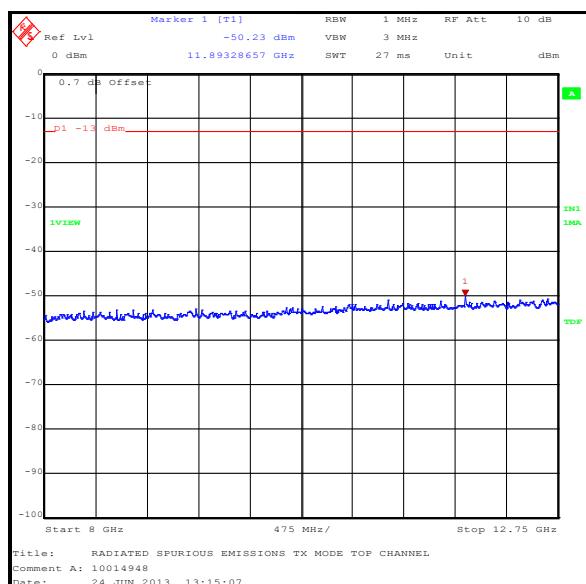
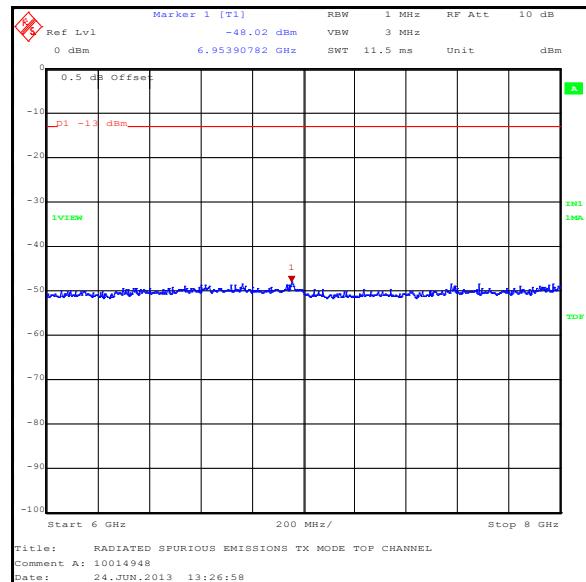
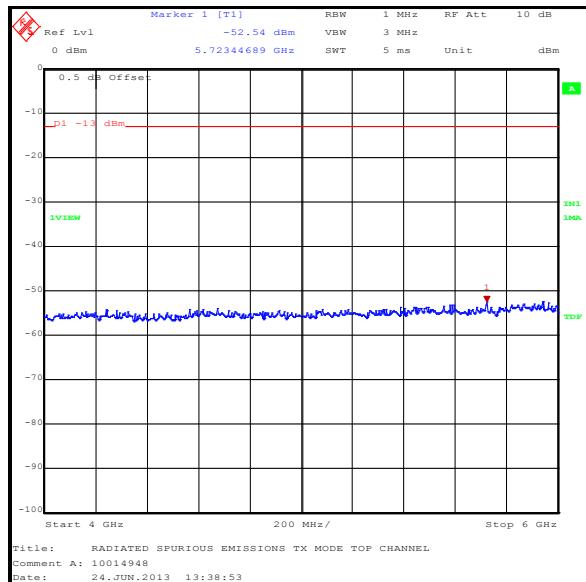
**Results: Voice / 12.2 kbps / Top Channel**

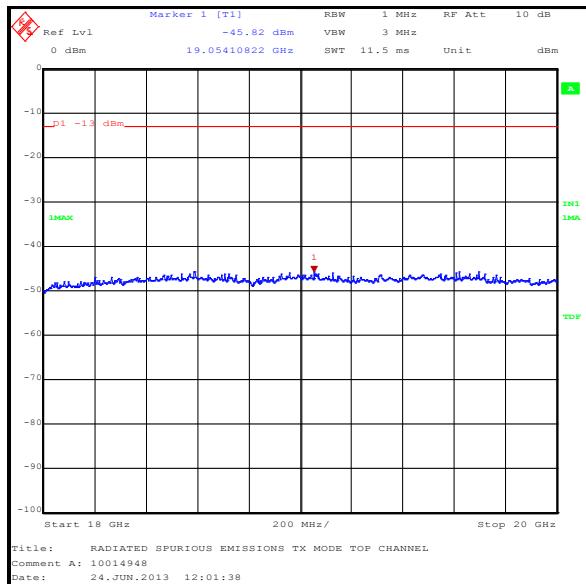
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
2458.918	-38.8	-13.0	25.8	Complied

## 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
A1834	Attenuator	Hewlett Packard	8491B	10444	27 Jan 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
G0543	Amplifier	Sonoma	310N	230801	04 Jul 2013	3
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
A436	Antenna	Flann Microwave	20240-20	330	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

### 5.2.4. Transmitter Band Edge Radiated Emissions

#### Test Summary:

Test Engineer:	David Doyle	Test Date:	25 June 2013
Test Sample IMEI:	004402451217222		

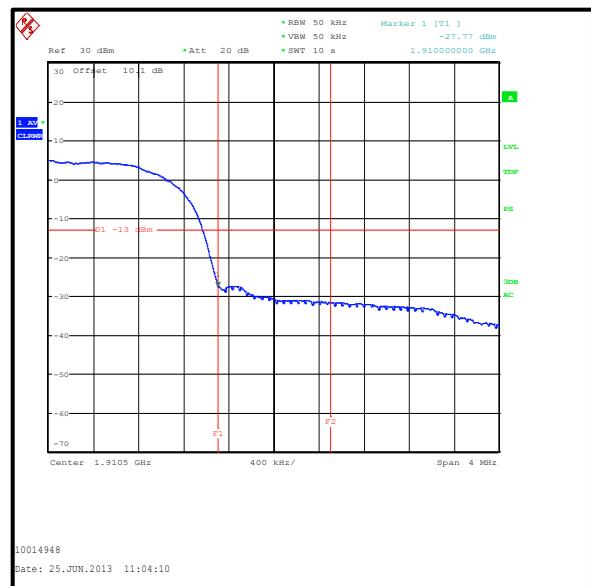
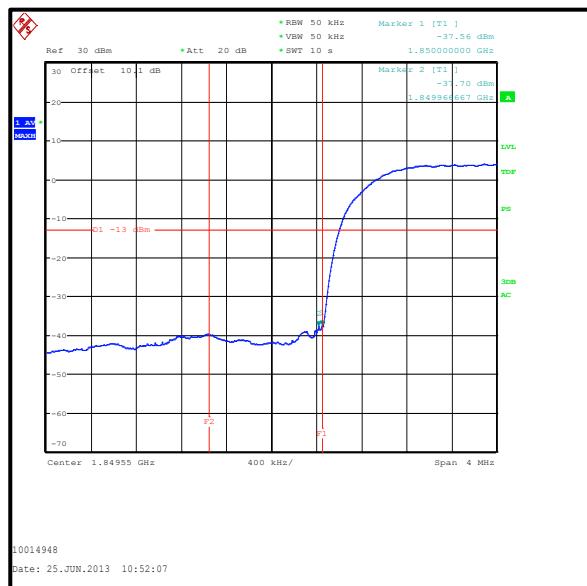
FCC Reference:	Parts 2.1053 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238

#### Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40

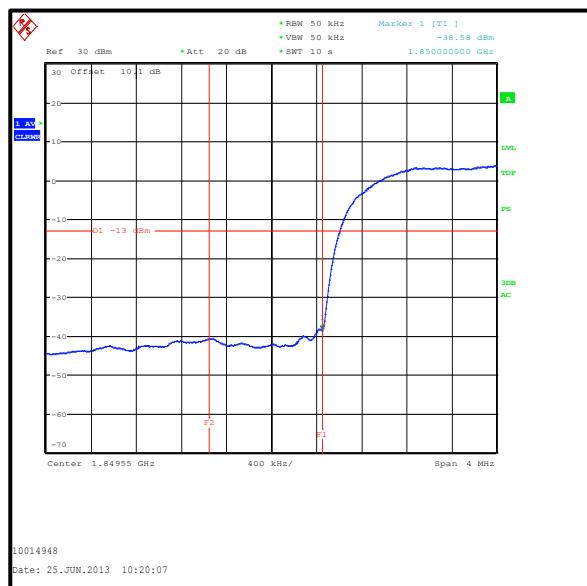
#### Results: Voice / 12.2 kbps

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850.000	-37.6	-13.0	24.6	Complied
1910.000	-27.8	-13.0	14.8	Complied



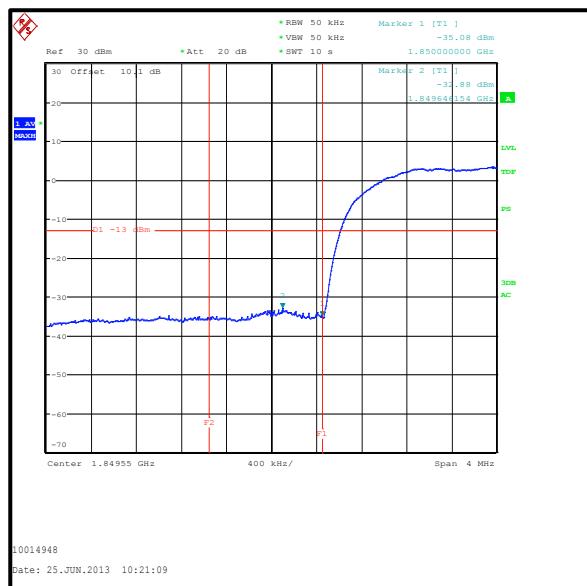
**Transmitter Band Edge Radiated Emissions (continued)****Results: HSDPA Sub-Test 1**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850.000	-38.6	-13.0	25.6	Complied
1910.000	-27.8	-13.0	14.8	Complied
1910.154	-28.0	-13.0	15.0	Complied



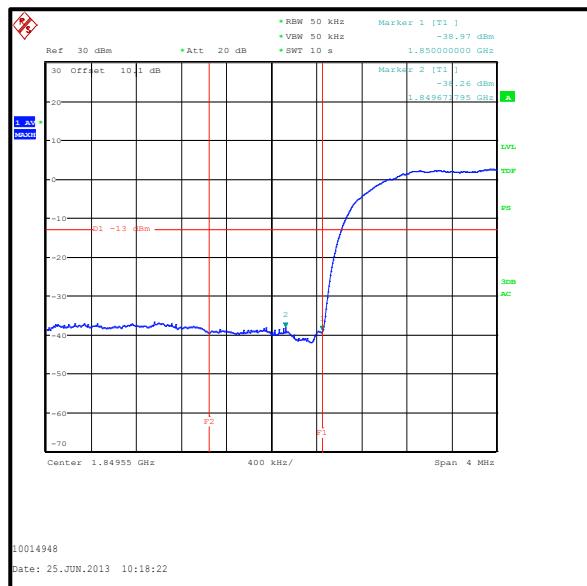
**Transmitter Band Edge Radiated Emissions (continued)****Results: HSDPA Sub-Test 2**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.646	-32.9	-13.0	19.9	Complied
1850	-35.1	-13.0	22.1	Complied
1910	-23.6	-13.0	10.6	Complied
1910.186	-22.7	-13.0	9.7	Complied



**Transmitter Band Edge Radiated Emissions (continued)****Results: HSDPA Sub-Test 3**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.672	-38.3	-13.0	25.3	Complied
1850	-39.0	-13.0	26.0	Complied
1910	-25.8	-13.0	12.8	Complied
1910.321	-24.3	-13.0	11.3	Complied



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

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.473	-37.5	-13.0	24.5	Complied
1850	-39.5	-13.0	26.5	Complied
1910	-25.1	-13.0	12.1	Complied
1910.340	-23.8	-13.0	10.8	Complied



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

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.967	-39.0	-13.0	26.0	Complied
1850	-39.4	-13.0	26.4	Complied
1910	-27.7	-13.0	14.7	Complied
1910.340	-25.9	-13.0	12.9	Complied



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

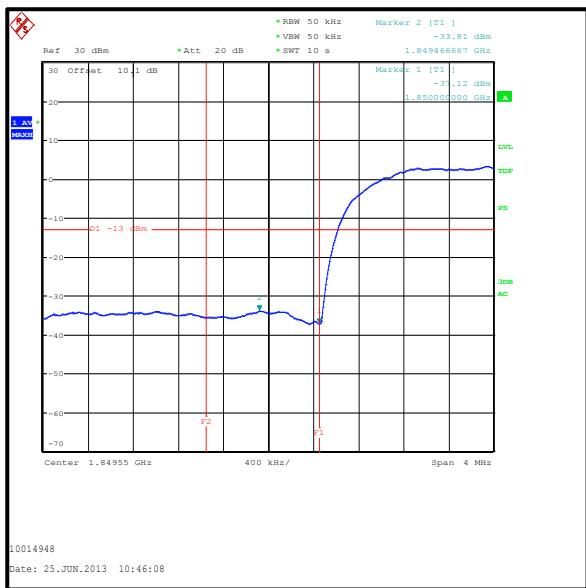
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.960	-37.9	-13.0	24.9	Complied
1850	-38.7	-13.0	25.7	Complied
1910	-30.1	-13.0	17.1	Complied
1910.192	-28.3	-13.0	15.3	Complied



## **Transmitter Band Edge Radiated Emissions (continued)**

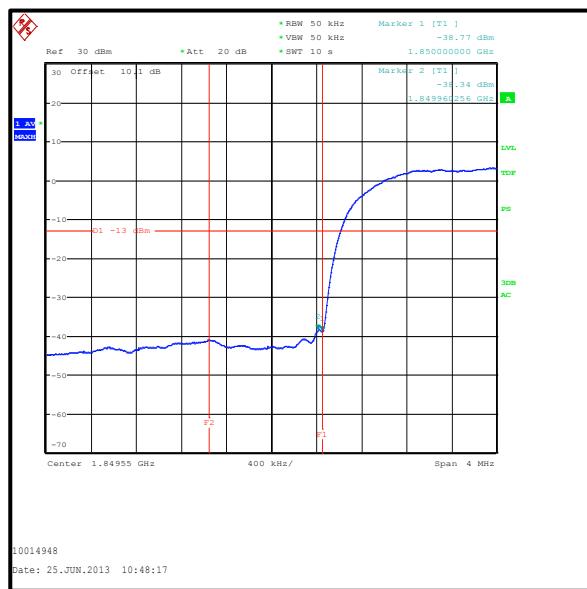
## **Results: HSUPA Sub-Test 3**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.467	-33.8	-13.0	20.8	Complied
1850	-37.1	-13.0	24.1	Complied
1910	-21.1	-13.0	8.1	Complied
1910.327	-19.6	-13.0	6.6	Complied



**Transmitter Band Edge Radiated Emissions (continued)****Results: HSUPA Sub-Test 4**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.960	-38.3	-13.0	25.3	Complied
1850	-38.8	-13.0	25.8	Complied
1910	-27.5	-13.0	14.5	Complied



## **Transmitter Band Edge Radiated Emissions (continued)**

## **Results: HSUPA Sub-Test 5**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.473	-35.0	-13.0	22.0	Complied
1850	-37.6	-13.0	24.6	Complied
1910	-22.4	-13.0	9.4	Complied
1910.327	-20.9	-13.0	7.9	Complied



### Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermometer / Hygrometer station	JM Handelpunkt	30.5015.13	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
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12

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

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	25 June 2013
<b>Test Sample IMEI:</b>	004402451215416		

<b>FCC Reference:</b>	Parts 2.1055 & 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>Ambient Temperature (°C):</b>	26
<b>Ambient Relative Humidity (%):</b>	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 (1852.4 MHz)**

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	8	1852.399992	1850.0	2.399992	Complied
-20	7	1852.399993	1850.0	2.399993	Complied
-10	11	1852.399989	1850.0	2.399989	Complied
0	13	1852.399987	1850.0	2.399987	Complied
10	11	1852.399989	1850.0	2.399989	Complied
20	9	1852.399991	1850.0	2.399991	Complied
30	7	1852.399993	1850.0	2.399993	Complied
40	5	1852.399995	1850.0	2.399995	Complied
50	5	1852.400005	1850.0	2.400005	Complied

**Results: Top Channel (1907.6 MHz)**

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	14	1907.599986	1910.0	2.400014	Complied
-20	8	1907.599992	1910.0	2.400008	Complied
-10	7	1907.599993	1910.0	2.400007	Complied
0	5	1907.599995	1910.0	2.400005	Complied
10	7	1907.599993	1910.0	2.400007	Complied
20	10	1907.599990	1910.0	2.400010	Complied
30	11	1907.599989	1910.0	2.400011	Complied
40	15	1907.599985	1910.0	2.400015	Complied
50	16	1907.599984	1910.0	2.400016	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:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	26 June 2013
<b>Test Sample IMEI:</b>	004402451215416		

<b>FCC Reference:</b>	Parts 2.1055 & 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>	23
<b>Relative Humidity (%):</b>	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 (1852.4 MHz)**

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.6	8	1852.399992	1850.0	2.399992	Complied
4.2	7	1852.399993	1850.0	2.399993	Complied

**Results: Top Channel (1907.6 MHz)**

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.6	10	1907.599990	1910.0	2.400010	Complied
4.2	10	1907.599990	1910.0	2.400010	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	1850 to 1910 MHz	95%	$\pm 1.13$ dB
Frequency Stability	1850 to 1910 MHz	95%	$\pm 0.92$ ppm
Occupied Bandwidth	1850 to 1910 MHz	95%	$\pm 0.92$ ppm
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	$\pm 5.65$ dB
Radiated Spurious Emissions	1 GHz to 20 GHz	95%	$\pm 2.94$ 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.

## **7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Update to frequency stability
3.0	-	-	Model No. removed