



# TEST REPORT

**Test Report No. : UL-RPT-RP10295122JD04A V3.0**

**Manufacturer** : Sony Mobile Communications Inc.

**FCC ID** : PY7PM-0801

**Technology** : UMTS1700 Band IV

**Test Standard(s)** : FCC Part 27 Subpart C

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:** 31 July 2014

**Checked by:**

Sarah Williams  
Engineer, Radio Laboratory

**Issued by :**

pp

John Newell  
Group Quality Manager,  
Basingstoke,  
UL VS LTD



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

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG, UK  
Telephone: +44 (0)1256 312000  
Facsimile: +44 (0)1256 312001

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**1. Customer Information**








<b>Company Name:</b>	Sony Mobile Communications Inc.
<b>Address:</b>	Nya Vattentornet Mobilvägen 10 Lund 22188 Sweden

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR27
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 27 Subpart C (Miscellaneous Wireless 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>	29 May 2014 to 03 June 2014

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 2.1046/27.50(d)(4)	Transmitter Output Power (EIRP)	
Part 2.1049	Transmitter Occupied Bandwidth	
Part 2.1053/27.53(g)(1)	Transmitter Out of Band Radiated Emissions	
Part 2.1053/27.53(g)(1)	Transmitter Band Edge Radiated Emissions	
Part 2.1055/27.54	Transmitter Frequency Stability (Temperature and Voltage Variation)	
<b>Key to Results</b>		
 = 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>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>	004402452750601 ( <i>Radiated sample</i> )
<b>Test Sample Serial Number:</b>	CB5A1Z1S11
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0801

<b>Brand Name:</b>	Sony
<b>IMEI:</b>	004402452752664 ( <i>Conducted sample with RF port #1</i> )
<b>Test Sample Serial Number:</b>	CB5A1Z1S0N
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0801

<b>Brand Name:</b>	Sony
<b>IMEI:</b>	004402452752649 ( <i>Conducted sample with RF port #2</i> )
<b>Test Sample Serial Number:</b>	CB5A1Z1S1P
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0801

<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

<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>	USB Cable
<b>Model Name or Number:</b>	EC803

<b>Brand Name:</b>	Sony
<b>Description:</b>	Deskstand
<b>Model Name or Number:</b>	DK43

<b>Brand Name:</b>	Sony
<b>Description:</b>	PHF
<b>Model Name or Number:</b>	MH410c

**3.2. Description of EUT**

The equipment under test (EUT) was a GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac + NFC & ANT+.

**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>	UMTS1700		
<b>Type of Radio Device:</b>	Transceiver		
<b>Mode:</b>	UMTS FDD IV		
<b>Modulation Type:</b>	QPSK / 8PSK		
<b>Channel Spacing:</b>	5 MHz		
<b>Power Supply Requirement(s):</b>	Nominal	3.8 V	
	Minimum	3.42 V	
	Maximum	4.18 V	
<b>Maximum Output Power (EIRP):</b>	Voice (12.2 kbps)	27.5 dBm	
	HSDPA Sub-Test 3	28.7 dBm	
	HSUPA Sub-Test 5	28.7 dBm	
<b>Transmit Frequency Range:</b>	1710 MHz to 1755 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	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:

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

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

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



## **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, USB Cable, Deskstand 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 004402452752664 was used for frequency stability measurements.
- The conducted sample with IMEI 004402452752649 was used for conducted power and occupied bandwidth measurements.
- The radiated sample with IMEI 004402452750601 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>	02 June 2014
<b>Test Sample IMEI:</b>	004402452752649		

<b>FCC Reference:</b>	Parts 2.1046 & 27.50(d)(4)
<b>Test Method Used:</b>	As detailed in FCC KDB 971168 Section 5.1.1 and 5.2.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39

**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 0.85 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)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Limit (dBm)	Margin (dB)	Result
1700	1312	27.0	28.4	28.7	28.6	27.5	30.0	1.3	Complied
	1412	26.9	28.3	28.4	28.5	27.4	30.0	1.5	Complied
	1513	26.7	28.2	28.4	28.4	27.4	30.0	1.6	Complied
$\beta_c$		2	11	15	15				
$\beta_d$		15	15	8	4				
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8				

**Results: Peak EIRP / HSUPA**

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Limit (dBm)	Margin (dB)	Result
1700	1312	28.4	27.9	28.6	27.0	28.7	30.0	1.3	Complied
	1412	28.2	27.8	28.4	26.8	28.5	30.0	1.5	Complied
	1513	28.2	27.7	28.4	26.8	28.6	30.0	1.4	Complied
$\beta_c$		10	6	15	2	15			
$\beta_d$		15	15	9	15	1			
$\Delta ACK, \Delta NACK, \Delta CQI$		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)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Limit (dBm)	Margin (dB)	Result
1700	1312	20.5	20.5	20.6	21.2	21.5	30.0	8.5	Complied
	1412	20.4	20.4	20.5	20.9	21.5	30.0	8.5	Complied
	1513	20.5	20.6	20.8	20.8	21.5	30.0	8.5	Complied
$\beta_c$		2	12	15	15				
$\beta_d$		15	15	8	4				
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8				

**Results: RMS EIRP / HSUPA**

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Limit (dBm)	Margin (dB)	Result
1700	1312	21.0	21.1	20.5	20.5	22.9	30.0	7.1	Complied
	1412	21.1	21.3	20.5	20.5	22.3	30.0	7.7	Complied
	1513	21.1	21.3	20.4	22.5	22.8	30.0	7.2	Complied
$\beta_c$		11	6	15	2	15			
$\beta_d$		15	15	9	15	15			
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8	8			

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
A2533	Directional Coupler	Atlan TecRF	CDC-003060-20	14041701717	Calibrated before use	-
A2525	Attenuator	Atlan TecRF	AN18W5-10	832827#3	Calibrated before use	-
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12
M1269	Multimeter	Fluke	179	90250210	19 May 2015	12
S0523	DC Power Supply	TTI	PL320	224235	Calibrated before use	-

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

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	02 June 2014
<b>Test Sample IMEI:</b>	004402452752649		

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

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39

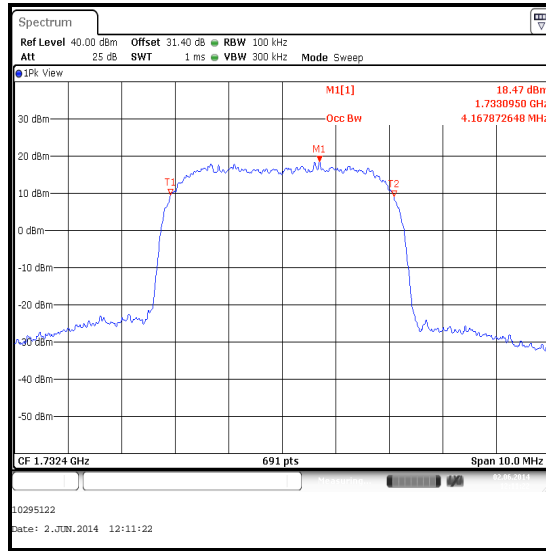
**Note(s):**

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	4167.873

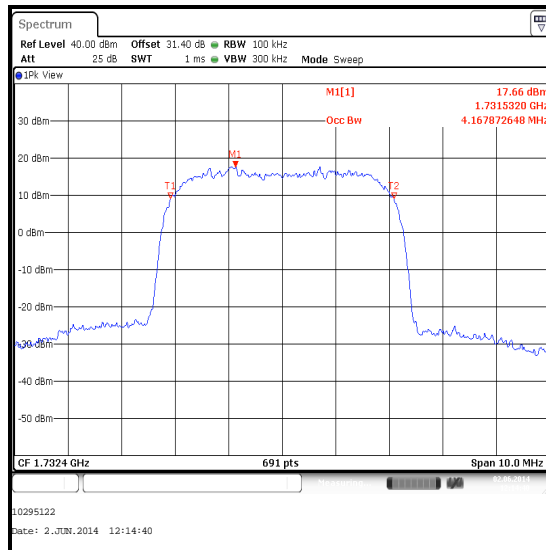


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSDPA Sub-Test 1**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4167.873



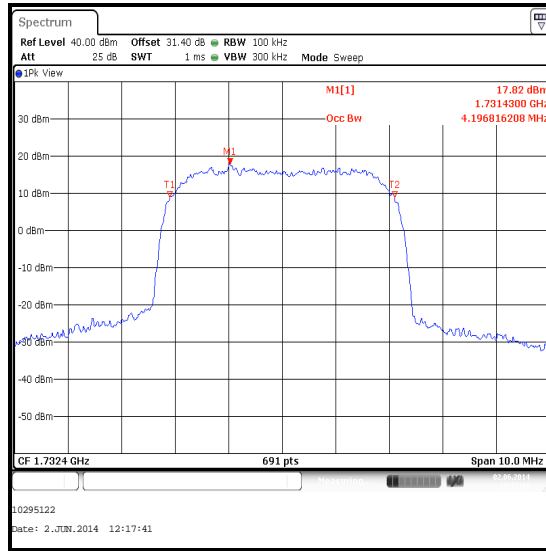
**Middle Channel**



**Transmitter Occupied Bandwidth (continued)**

**Results: HSDPA Sub-Test 2**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4196.816

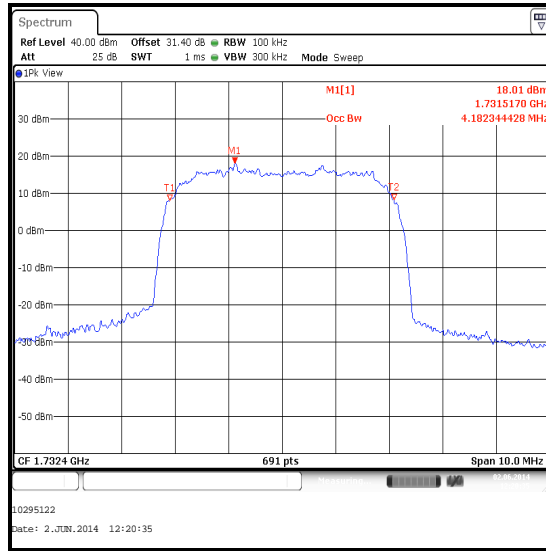


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSDPA Sub-Test 3**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4182.344

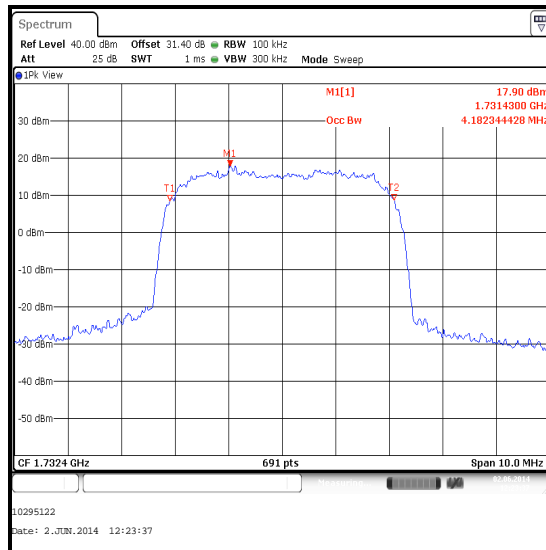


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSDPA Sub-Test 4**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4182.344

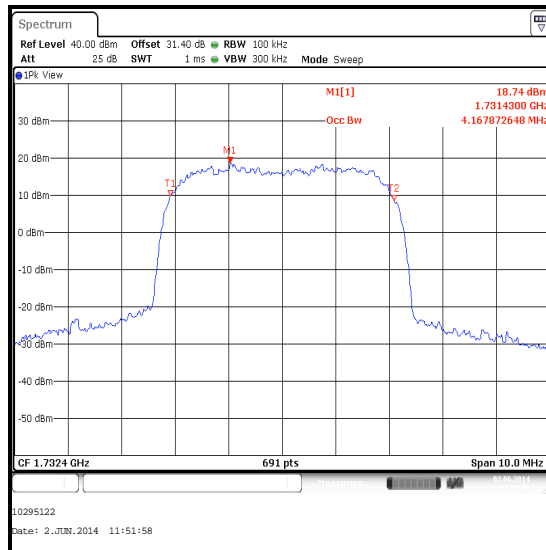


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSUPA Sub-Test 1**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4167.873

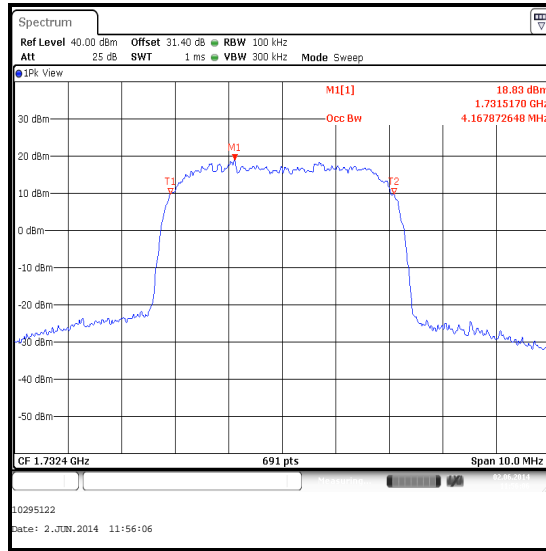


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSUPA Sub-Test 2**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4167.873

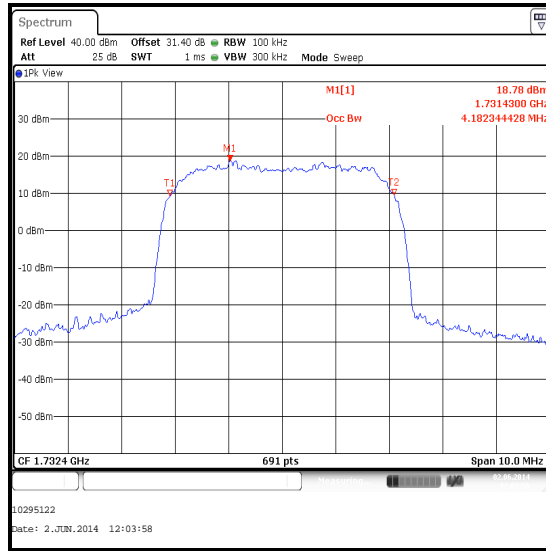


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSUPA Sub-Test 3**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4182.344

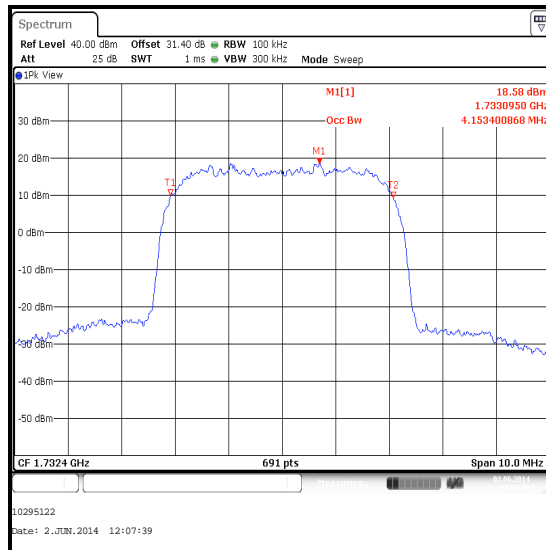


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSUPA Sub-Test 4**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4153.401

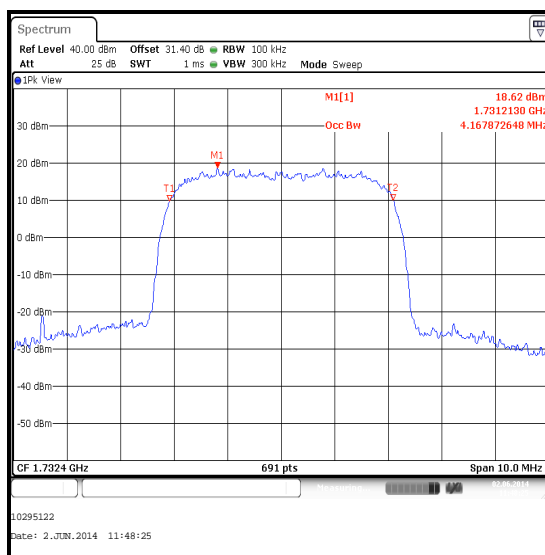


**Middle Channel**

**Transmitter Occupied Bandwidth (continued)**

**Results: HSUPA Sub-Test 5**

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1732.4	4167.873



Middle Channel

**Test Equipment Used**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
A2533	Directional Coupler	Atlan TecRF	CDC-003060-20	14041701717	Calibrated before use	-
A2525	Attenuator	Atlan TecRF	AN18W5-10	832827#3	Calibrated before use	-
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12
M1269	Multimeter	Fluke	179	90250210	19 May 2015	12
S0523	DC Power Supply	TTI	PL320	224235	Calibrated before use	-



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

<b>Test Engineers:</b>	Andrew Edwards & David Doyle	<b>Test Dates:</b>	30 May 2014 & 03 June 2014
<b>Test Sample IMEI:</b>	004402452750601		

<b>FCC Reference:</b>	Parts 2.1053 & 27.53(g)(1)
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053
<b>Frequency Range:</b>	30 MHz to 18 GHz
<b>Configuration:</b>	Voice / 12.2 kbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25 to 28
<b>Relative Humidity (%):</b>	33 to 34

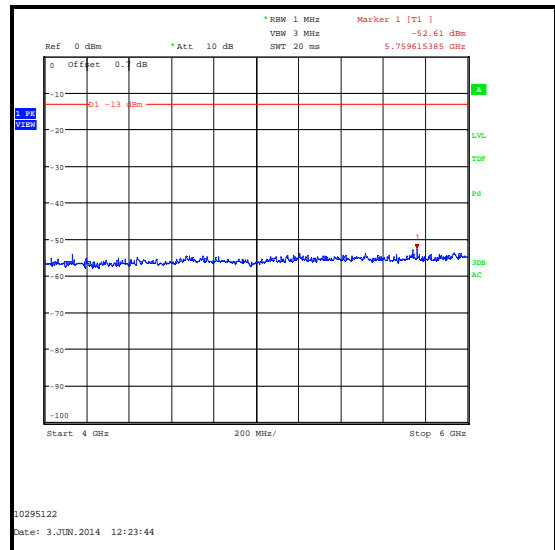
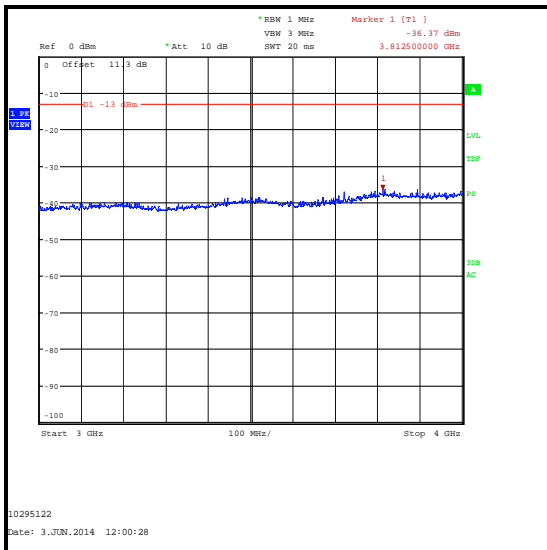
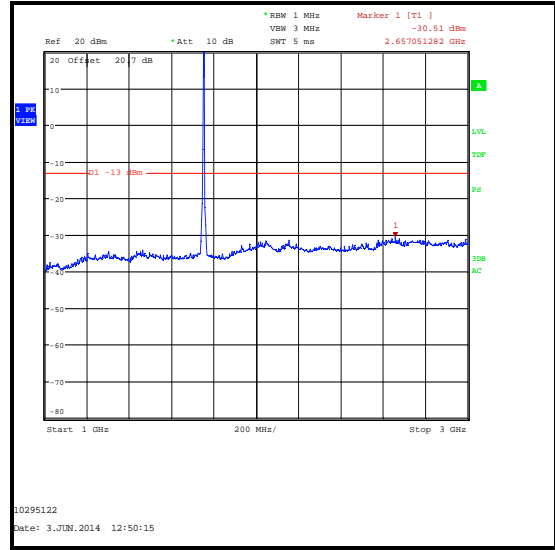
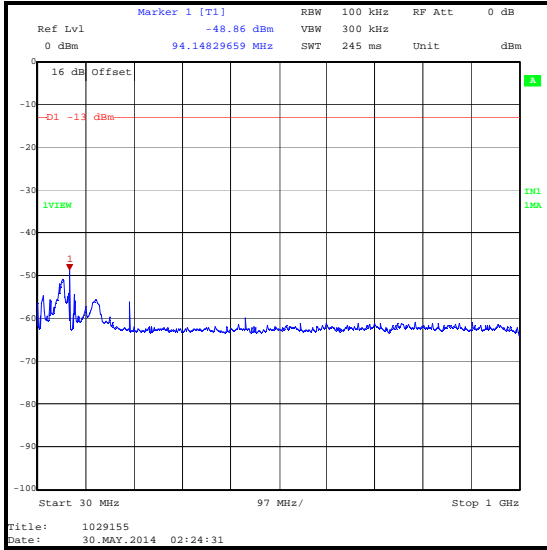
**Note(s):**

1. The uplink traffic channel is shown on the 1 GHz to 3 GHz plot.
2. All emissions shown on the pre-scan plots were investigated. Final measurements were made using appropriate RF filters and attenuators where required. All emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
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.

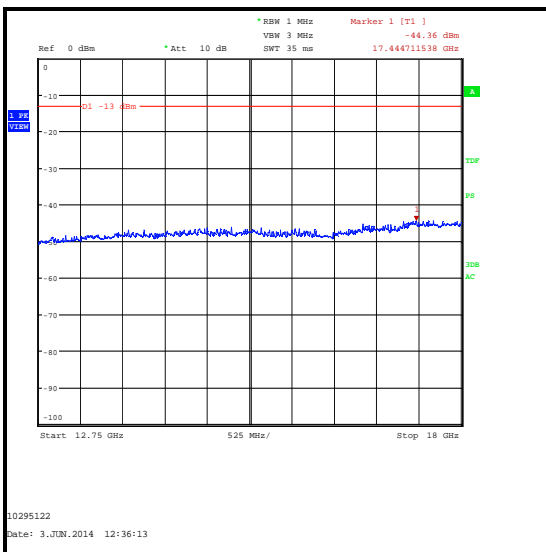
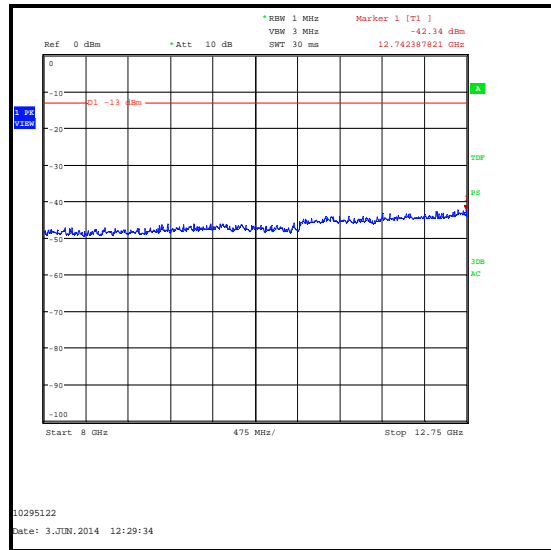
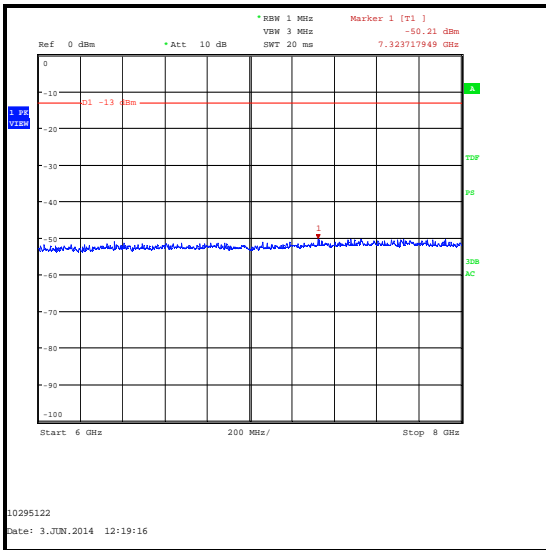
**Results: Voice / 12.2 kbps - Top Channel**

<b>Frequency (MHz)</b>	<b>Peak Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
2657.051	-30.5	-13.0	17.5	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	29 Apr 2015	12
A1834	Attenuator	Hewlett Packard	8491B	10444	15 Nov 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Nov 2014	12
G0543	Amplifier	Sonoma	310N	230801	19 Aug 2014	3
M1622	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	15 Feb 2015	12
A253	Antenna	Flann Microwave	12240-20	128	14 Nov 2014	12
A254	Antenna	Flann Microwave	14240-20	139	14 Nov 2014	12
A255	Antenna	Flann Microwave	16240-20	519	14 Nov 2014	12
A256	Antenna	Flann Microwave	18240-20	400	14 Nov 2014	12
A436	Antenna	Flann Microwave	20240-20	330	14 Nov 2014	12
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	02 May 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	12 Apr 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12

**5.2.4. Transmitter Radiated Emissions at Band Edges**

**Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	03 June 2014
<b>Test Sample IMEI:</b>	004402452750601		

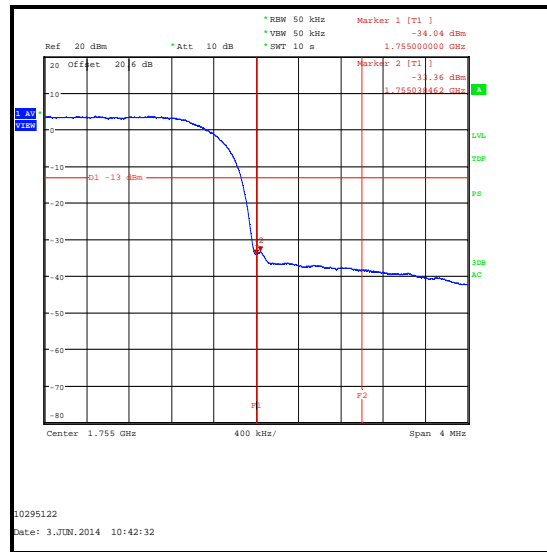
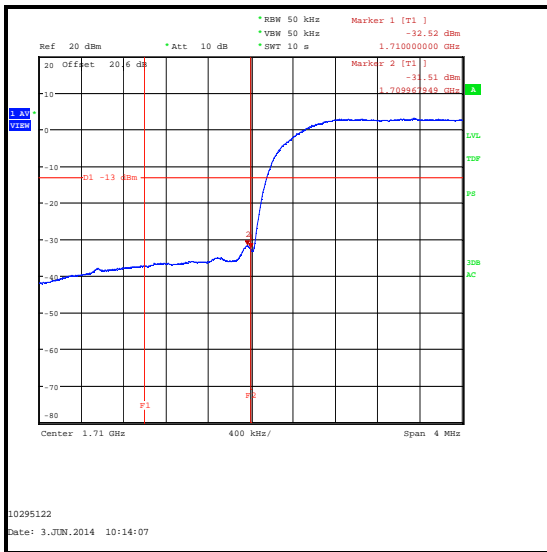
<b>FCC Reference:</b>	Parts 2.1053 & 27.53(g)(1)
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 27.53

**Environmental Conditions:**

<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	39

**Results: Voice / 12.2 kbps**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.968	-31.5	-13.0	18.5	Complied
1710	-32.5	-13.0	19.5	Complied
1755	-34.0	-13.0	21.0	Complied
1755.038	-33.4	-13.0	20.4	Complied



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

**Results: HSDPA Sub-Test 1**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.968	-32.4	-13.0	19.4	Complied
1710	-33.2	-13.0	20.2	Complied
1755	-34.6	-13.0	21.6	Complied
1755.038	-33.9	-13.0	20.9	Complied



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

**Results: HSDPA Sub-Test 2**

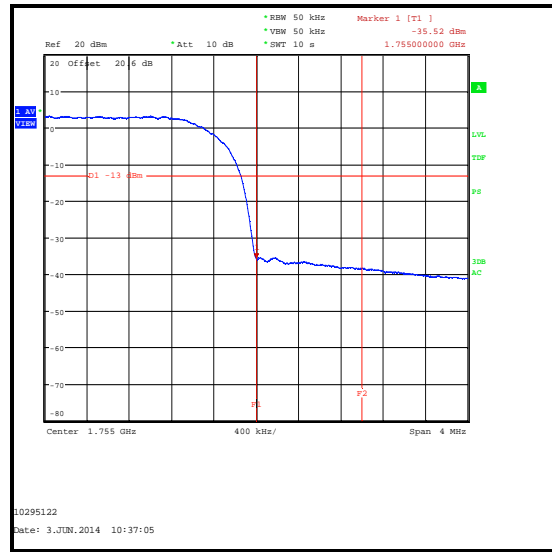
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1710	-31.8	-13.0	18.8	Complied
1755	-35.4	-13.0	22.4	Complied



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

**Results: HSDPA Sub-Test 3**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.840	-30.5	-13.0	17.5	Complied
1710	-32.0	-13.0	19.0	Complied
1755	-35.5	-13.0	22.5	Complied

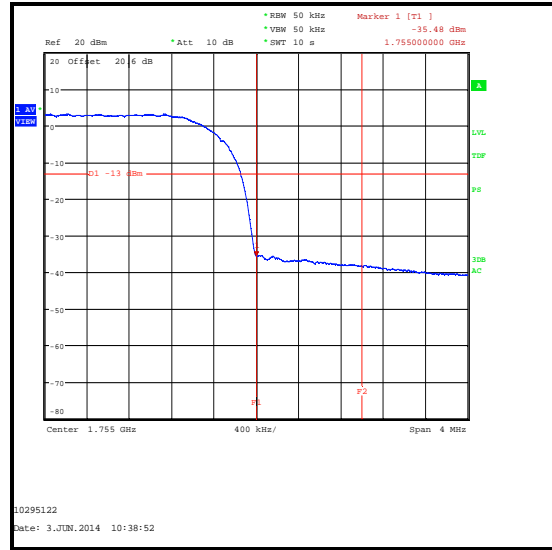




**Transmitter Radiated Emissions at Band Edges (continued)**

**Results: HSDPA Sub-Test 4**

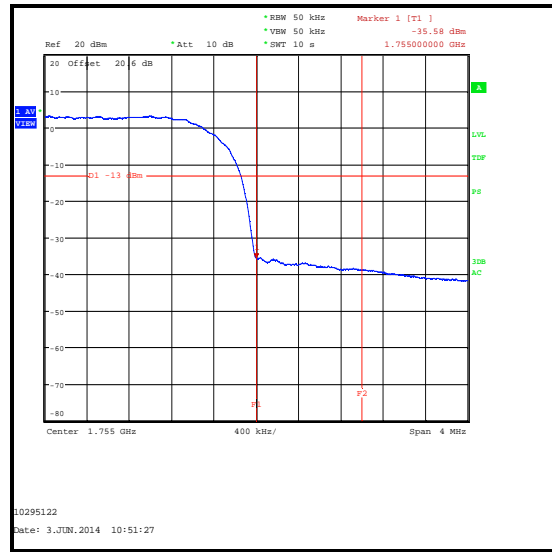
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.833	-30.4	-13.0	17.4	Complied
1710	-31.9	-13.0	18.9	Complied
1755	-35.5	-13.0	22.5	Complied



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

**Results: HSUPA Sub-Test 1**

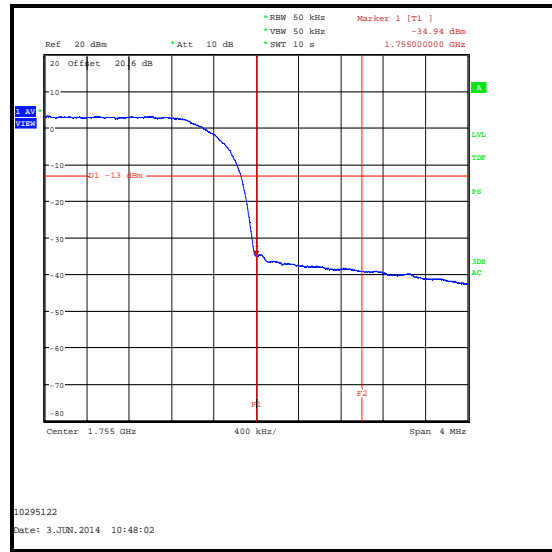
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.846	-32.1	-13.0	19.1	Complied
1710	-32.6	-13.0	19.6	Complied
1755	-35.6	-13.0	22.6	Complied



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

**Results: HSUPA Sub-Test 2**

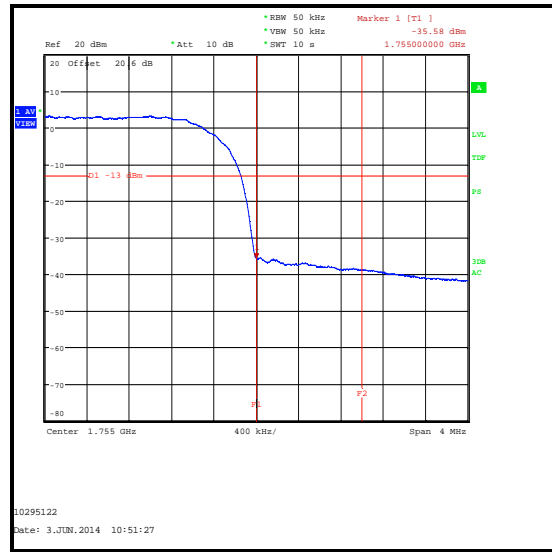
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.962	-32.2	-13.0	19.2	Complied
1710	-32.8	-13.0	19.8	Complied
1755	-34.9	-13.0	21.9	Complied



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

**Results: HSUPA Sub-Test 3**

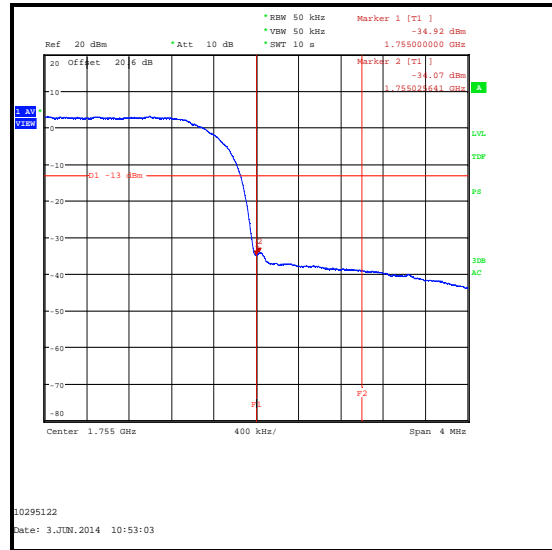
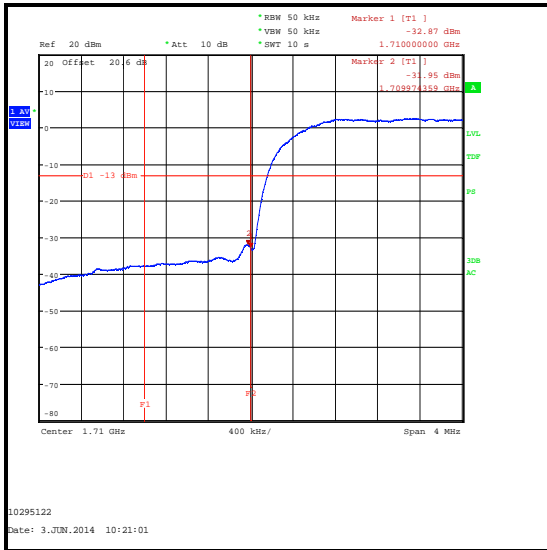
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.846	-30.5	-13.0	17.5	Complied
1710	-31.9	-13.0	18.9	Complied
1755	-35.6	-13.0	22.6	Complied



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

**Results: HSUPA Sub-Test 4**

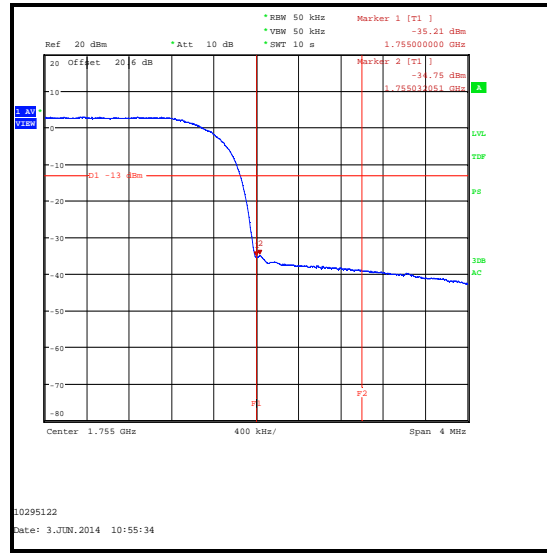
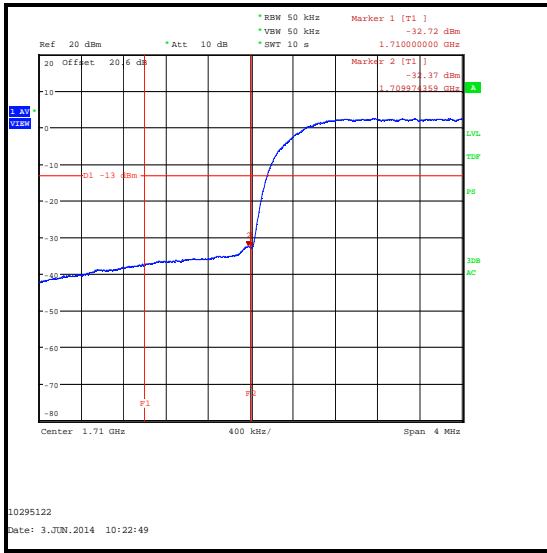
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.974	-32.0	-13.0	19.0	Complied
1710	-32.9	-13.0	19.9	Complied
1755	-34.9	-13.0	21.9	Complied
1755.026	-34.1	-13.0	21.1	Complied



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

**Results: HSUPA Sub-Test 5**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1709.974	-32.4	-13.0	19.4	Complied
1710	-32.7	-13.0	19.7	Complied
1755	-35.2	-13.0	22.2	Complied
1755.032	-34.8	-13.0	21.8	Complied



**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A1393	Attenuator	Huber & Suhner	6820.17B	757456	02 May 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
M1656	Thermohygrometer	JM Handlungspunkt	30.5015.13	Not stated	14 Mar 2015	12

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

<b>Test Engineer:</b>	Ben Mercer	<b>Test Dates:</b>	29 May 2014 & 30 May 2014
<b>Test Sample IMEI:</b>	004402452752664		

<b>FCC Reference:</b>	Parts 2.1055 & 27.54
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 9.0 referencing ANSI TIA-603-C-2004 Section 2.2.2 and FCC Part 2.1055

**Environmental Conditions:**

<b>Ambient Temperature (°C):</b>	24 to 25
<b>Ambient Relative Humidity (%):</b>	36 to 37

**Note(s):**

1. A voltage variation jig was connected to the EUT which was powered via a bench power supply at the nominal voltage of 3.8V.
2. Frequency error was measured using a calibrated Rohde & Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional 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	14	1712.400014	1710	2.400014	Complied
-20	10	1712.399990	1710	2.399990	Complied
-10	24	1712.399976	1710	2.399976	Complied
0	28	1712.399972	1710	2.399972	Complied
10	20	1712.399980	1710	2.399980	Complied
20	16	1712.399984	1710	2.399984	Complied
30	6	1712.399994	1710	2.399994	Complied
40	10	1712.400010	1710	2.400010	Complied
50	17	1712.400017	1710	2.400017	Complied

**Results: Top Channel (1752.6 MHz)**

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	12	1752.599988	1755	2.400012	Complied
-20	17	1752.600017	1755	2.399983	Complied
-10	29	1752.600029	1755	2.399971	Complied
0	28	1752.600028	1755	2.399972	Complied
10	26	1752.600026	1755	2.399974	Complied
20	19	1752.600019	1755	2.399981	Complied
30	7	1752.600007	1755	2.399993	Complied
40	7	1752.599993	1755	2.400007	Complied
50	14	1752.599986	1755	2.400014	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelpunkt	30.5015.13	None stated	14 Mar 2015	12
M1870	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145919	05 May 2015	12
E0513	Environmental Chamber	TAS	LT600 Series 3	23900506	Calibrated before use	-
M1249	Thermometer	Fluke	52II	88800049	02 May 2015	12
S021	Dual DC power supply	TTi	CPX200	061034	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12



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

<b>Test Engineer:</b>	Ben Mercer	<b>Test Date:</b>	29 May 2014
<b>Test Sample IMEI:</b>	004402452752664		

<b>FCC Reference:</b>	Parts 2.1055 & 27.54
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 9.0 referencing ANSI TIA-603-C-2004 Section 2.2.2 and FCC Part 2.1055

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	37

**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 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional 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
3.42	15	1712.399985	1710	2.399985	Complied
4.18	18	1712.399982	1710	2.399982	Complied

**Results: Top Channel (1752.6 MHz)**

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.42	17	1752.600017	1755	2.399983	Complied
4.18	18	1752.600018	1755	2.399982	Complied

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

<b>Asset No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Calibration Due</b>	<b>Cal. Interval (Months)</b>
M1659	Thermohygrometer	JM Handlungspunkt	30.5015.13	None stated	14 Mar 2015	12
M1870	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145919	05 May 2015	12
S021	Dual DC power supply	TTi	CPX200	061034	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	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".

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
Conducted Output Power	1710 to 1755 MHz	95%	±1.13 dB
Occupied Bandwidth	1710 to 1755 MHz	95%	±3.92 %
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%	±23 Hz

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 Section 1 Section 5.2.5 Note 1 amended Section 6 Frequency stability MU updated
3.0	-	-	EUT Description update

--- END OF REPORT ---