TEST REPORT

Test Report No. : UL-RPT-RP10014945JD06A V2.0

Manufacturer	:	Sony Mobile Communications AB
Type No.	:	PM-0460-BV
FCC ID	:	PY7PM-0460
Technology	:	UMTS850 Band V
Test Standard(s)	:	FCC Part 22

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 2.0 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

ilac-MRA UKAS TESTING 0644

This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its' terms of accreditation.

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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:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 22 Subpart H (Public Mobile 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:	28 June 2013 to 10 July 2013

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
22.913(a)(2)	Transmitter Effective Radiated Power (ERP)	✓
2.1049	Transmitter Occupied Bandwidth	✓
2.1053/22.917	Transmitter Out of Band Radiated Emissions	✓
2.1053/22.917	Transmitter Band Edge Radiated Emissions	✓
2.1055/22.355	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.
Reference:	FCC KDB 971168 D01 v02r01, 7 June 2013
Title:	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:	004402451263820 *(Radiated sample)*
Serial Number:	CB5124U6EF
Hardware Version Number:	AP2
Software Version Number:	14.1.G.1.241
FCC ID:	PY7PM-0460

Brand Name:	Sony
IMEI:	004402451256097 *(Conducted sample #1)*
Serial Number:	CB5124TWQ9
Hardware Version Number:	AP2
Software Version Number:	14.1.G.1.241
FCC ID:	PY7PM-0460

Brand Name:	Sony
IMEI:	004402451254886 *(Conducted sample #2)*
Serial Number:	CB5124TWLF
Hardware Version Number:	AP2
Software Version Number:	14.1.G.1.241
FCC ID:	PY7PM-0460

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 1/2/3/4/5/7/8/17. 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:	UMTS850		
Type of Radio Device:	Transceiver		
Mode:	UMTS FDD V		
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 (ERP):	Voice (12.2 kbps)	21.4 dBm	
	HSDPA Sub-Test 3	21.6 dBm	
	HSUPA Sub-Test 3	21.0 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	4132	826.4
	Middle	4183	836.6
	Top	4233	846.6

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, ERP 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 V 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 004402451256097 was used for conducted power and occupied bandwidth measurements.
- The conducted sample with IMEI 004402451254886 was used for frequency stability measurements.
- The radiated sample with IMEI 004402451263820 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 Effective Radiated Power (ERP)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	07 July 2013
Test Sample IMEI:	004402451256097		

FCC Reference:	Part 22.913(a)(2)
Test Method Used:	As detailed in FCC KDB 971168 D01 Section 5.1.1 and 5.2.1

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	43

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 -4.03 dBi. As the limit is an ERP limit, the gain in dBi has been converted to dBd. The dBd was calculated as:

   -4.03 dBi – 2.15 dB = -6.18 dBd.
4. The antenna gain was added to the conducted output power to obtain the ERP.

Results: Peak ERP / 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**
850	4132	20.4	21.5	21.6	21.6	20.7	38.5	16.9	Complied
	4183	20.2	20.8	20.8	20.8	20.5	38.5	17.7	Complied
	4233	20.5	21.3	21.4	21.4	21.4	38.5	17.1	Complied
ßc		**2**	**12**	**15**	**15**				
ßd		**15**	**15**	**8**	**4**				
ΔACK, ΔNACK, ΔCQI		8	8	8	8				

Transmitter Effective Radiated Power (ERP) (Continued)

Results: RMS ERP / 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
850	4132	15.3	13.9	13.6	13.4	15.3	38.5	23.2	Complied
	4183	15.4	14.2	13.7	13.6	15.5	38.5	23.0	Complied
	4233	15.4	14.1	13.8	13.5	15.5	38.5	23.0	Complied
ßc		**2**	**12**	**15**	**15**				
ßd		**15**	**15**	**8**	**4**				
ΔACK, ΔNACK, ΔCQI		8	8	8	8				

Results: Peak ERP / 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
850	4132	20.8	20.4	21.0	19.6	20.9	38.5	17.5	Complied
	4183	20.5	20.1	20.6	19.5	20.5	38.5	17.9	Complied
	4233	20.9	20.5	20.1	19.8	21.0	38.5	17.5	Complied
ßc		**11**	**6**	**15**	**2**	**15**			
ßd		**15**	**15**	**9**	**15**	**15**			
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8			

Results: RMS ERP / 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
850	4132	14.3	14.3	14.4	14.3	14.4	38.5	24.1	Complied
	4183	14.5	14.4	14.5	14.4	14.5	38.5	24.0	Complied
	4233	14.4	14.3	14.5	14.2	14.5	38.5	24.0	Complied
ßc		**11**	**6**	**15**	**2**	**15**			
ßd		**15**	**15**	**9**	**15**	**15**			
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8			

Transmitter Effective Radiated Power (ERP) (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:	004402451256097		

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

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	39

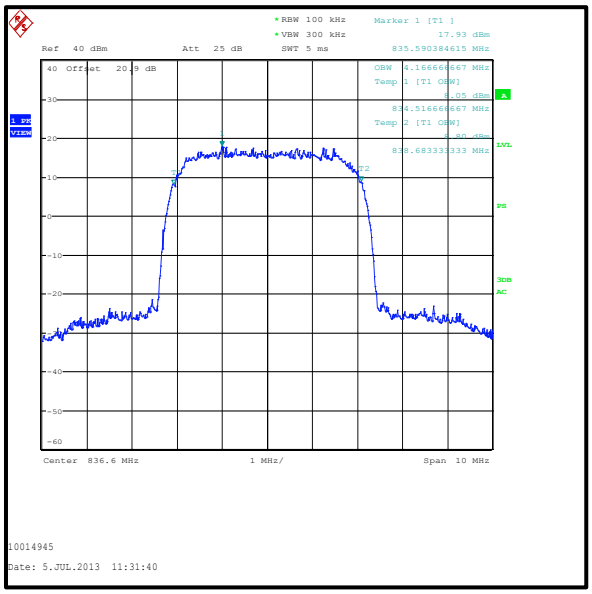
Note(s):

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

Transmitter Occupied Bandwidth (continued)

Results: Voice / 12.2 kbps

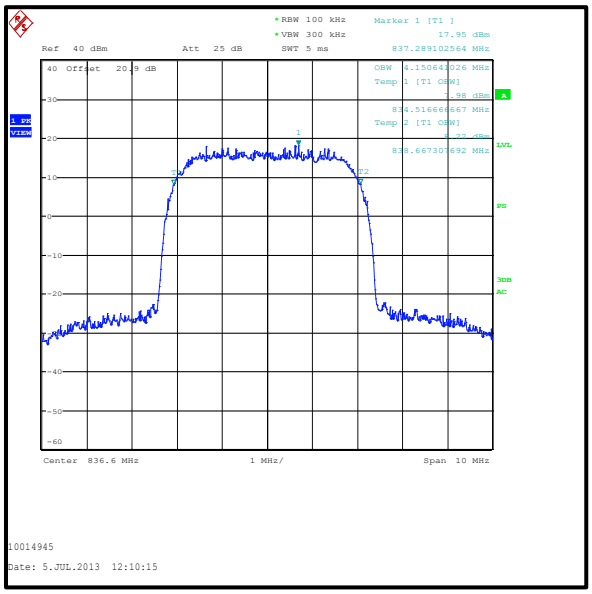
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4166.667



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 1

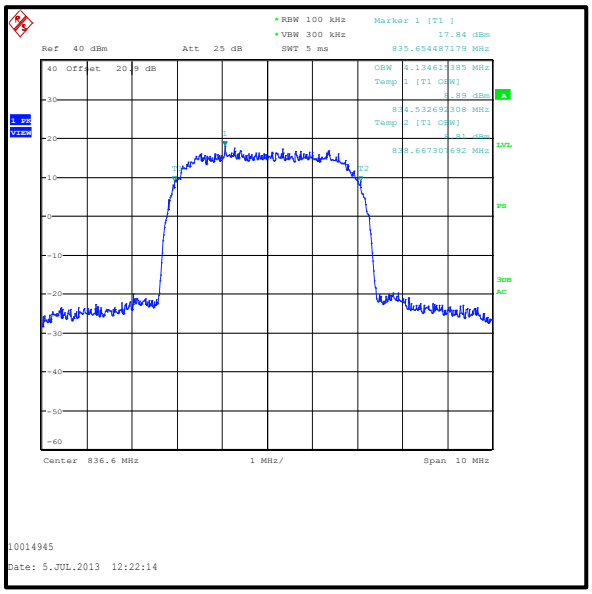
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4150.641



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 2

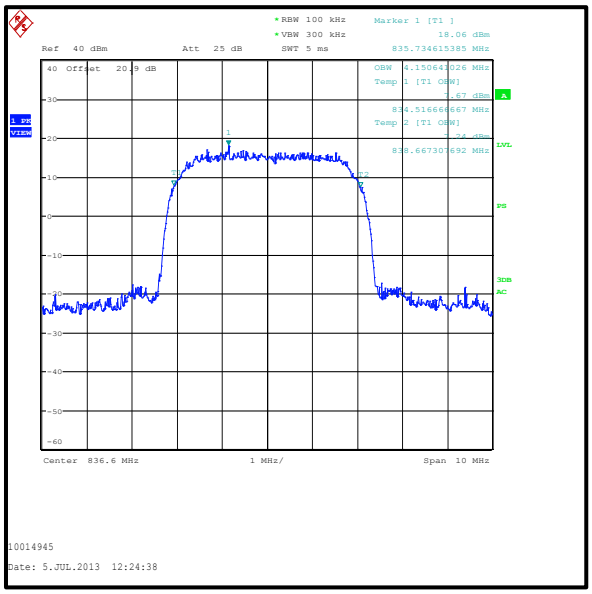
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4134.615



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 3

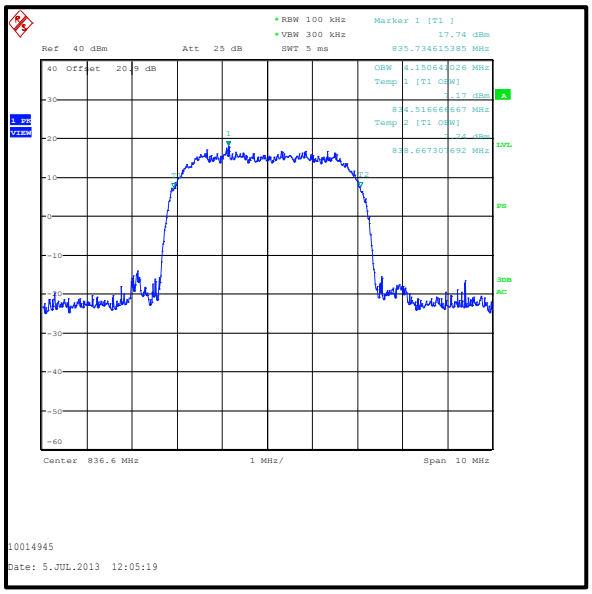
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4150.641



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 4

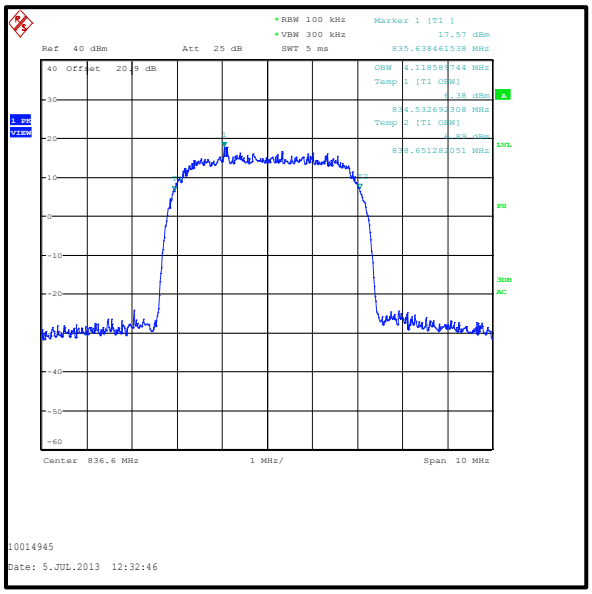
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4150.641



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 1

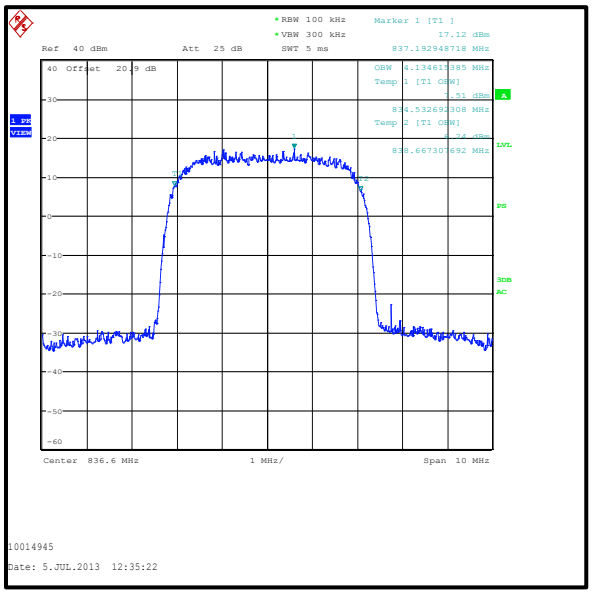
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4118.590



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 2

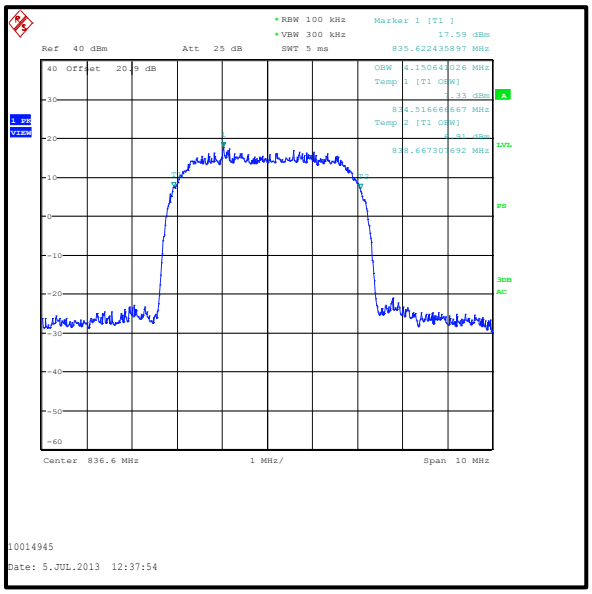
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4134.615



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 3

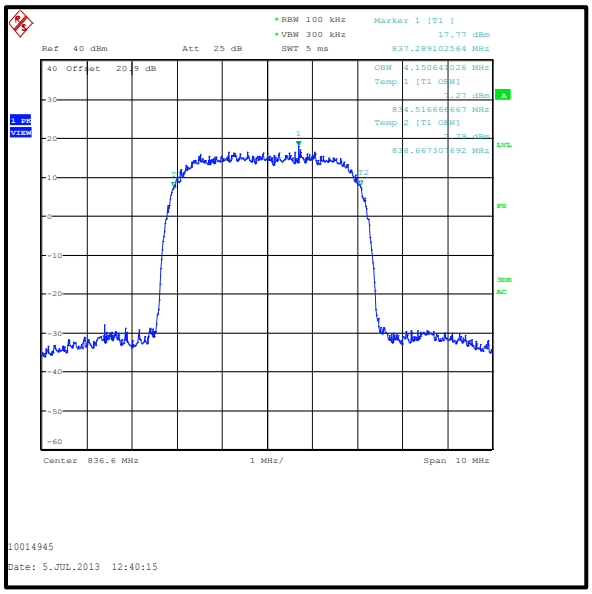
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4150.641



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 4

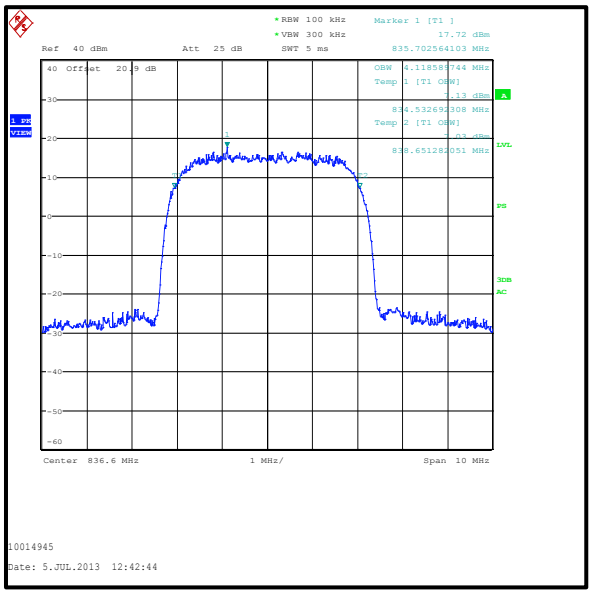
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4150.641



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 5

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4118.590



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	Test Receiver	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:	EikPei Hu, Nick Steele, Ahmed Ali & Mark Percival	**Test Date:**	08 July 2013
Test Sample IMEI:	004402451263820		

FCC Reference:	Parts 2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 2.1053
Frequency Range:	30 MHz to 9 GHz
Configuration:	Voice / 12.2 kbps

Environmental Conditions:

Temperature (°C):	22 to 24
Relative Humidity (%):	47 to 50

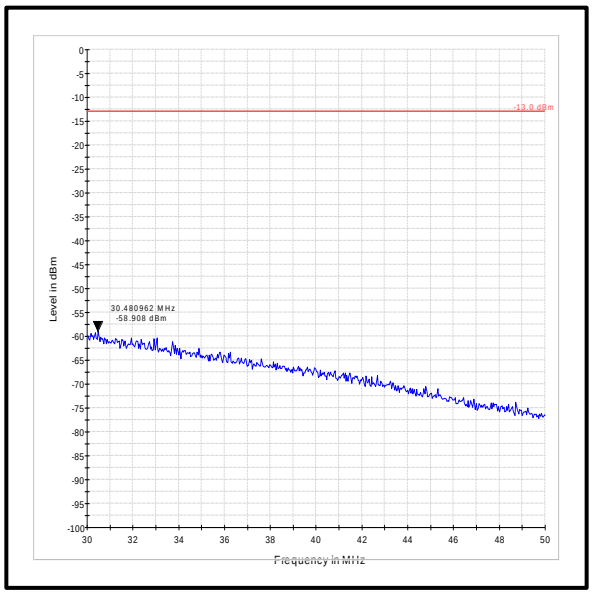
Note(s):

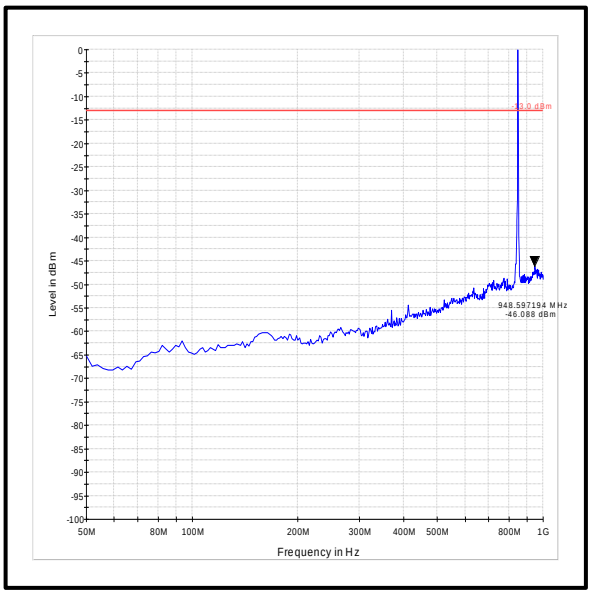
1. No spurious emissions were detected above the measurement system noise floor therefore the highest peak noise floor reading of the measuring receiver was recorded.
2. The uplink traffic channel is shown on the 50 MHz to 1 GHz plot.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (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.

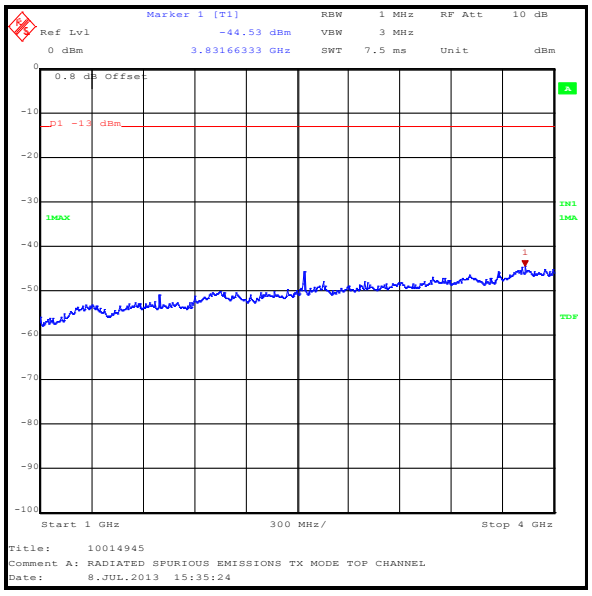
Results: Voice / 12.2 kbps

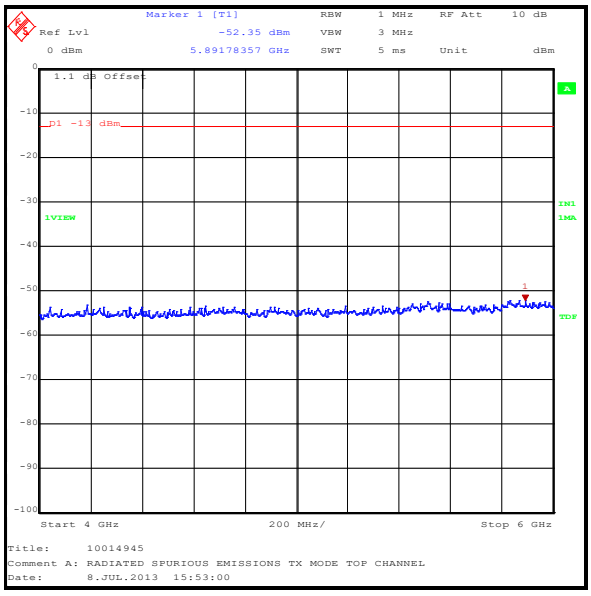
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3831.663	-44.5	-13.0	31.5	Complied

Transmitter Out of Band Radiated Emissions (continued)

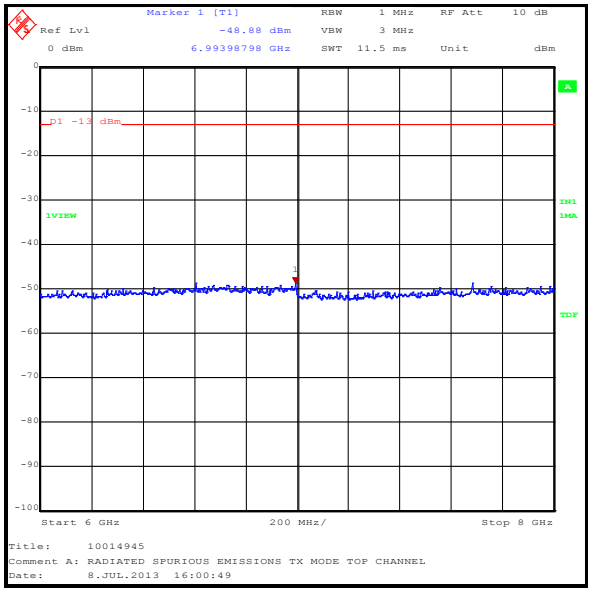


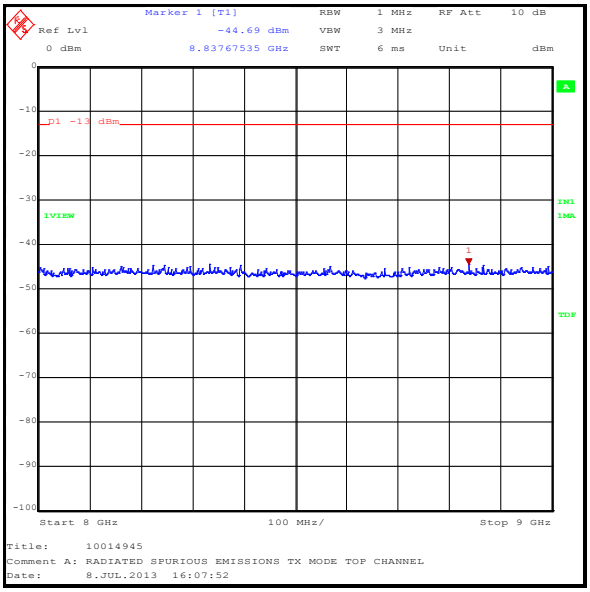






Transmitter Out of Band Radiated Emissions (continued)





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
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
G0543	Amplifier	Sonoma	310N	230801	05 Oct 2013	3
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1622	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1656	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	14 Aug 2013	12
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12
A1974	High Pass Filter	AtlanTecRF	AFH-01000	090000283	19 Apr 2014	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
A253	Antenna	Flann	12240-20	128	04 Nov 2013	12
A254	Antenna	Flann	14240-20	139	04 Nov 2013	12
A255	Antenna	Flann	16240-20	519	04 Nov 2013	12

5.2.4. Transmitter Radiated Emissions at Band Edges

Test Summary:

Test Engineer:	David Doyle	**Test Dates:**	28 June 2013 & 08 July 2013
Test Sample IMEI:	004402451263820		

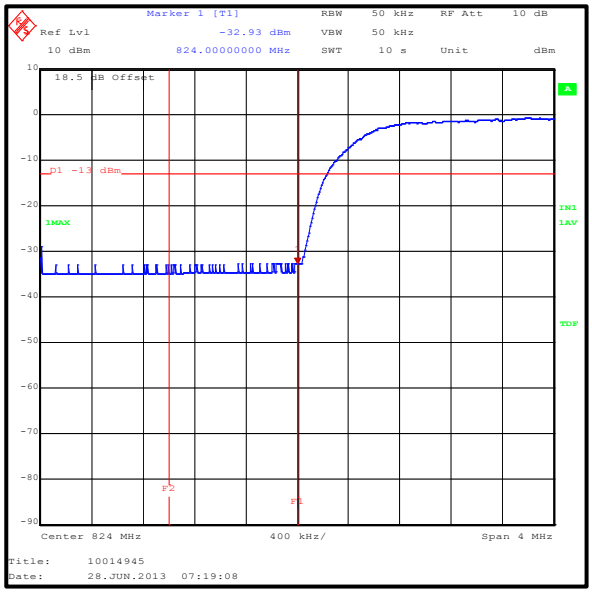
FCC Reference:	Parts 2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 22.917

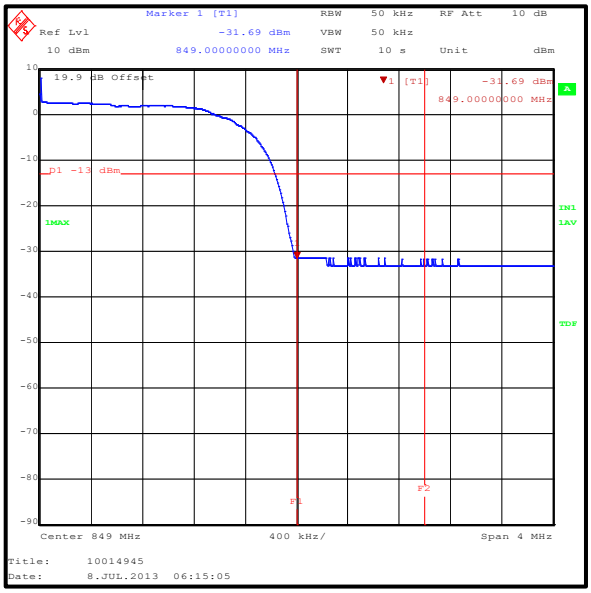
Environmental Conditions:

Temperature (°C):	25 to 26
Relative Humidity (%):	44 to 46

Results: Voice / 12.2 kbps

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-31.7	-13.0	18.7	Complied

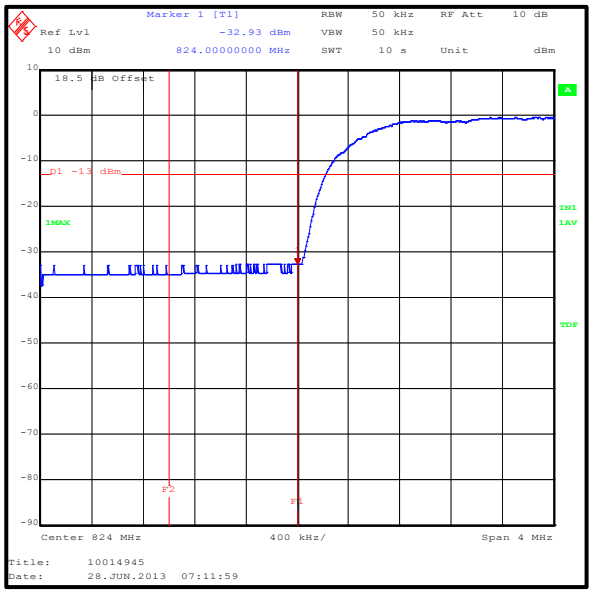


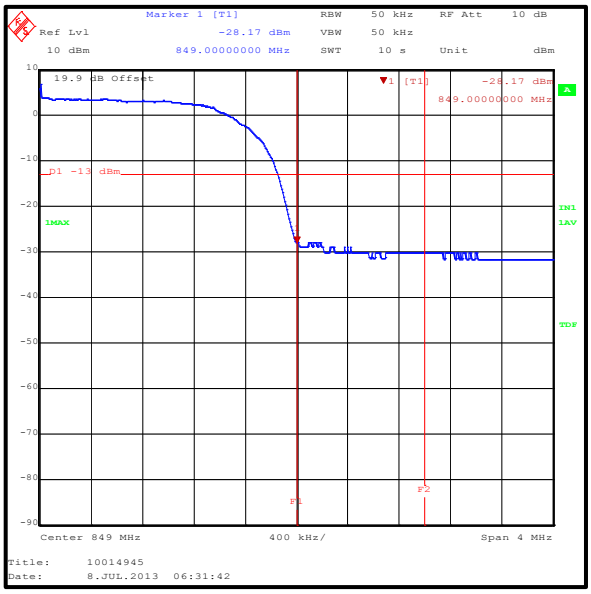


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 1

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-28.2	-13.0	15.2	Complied

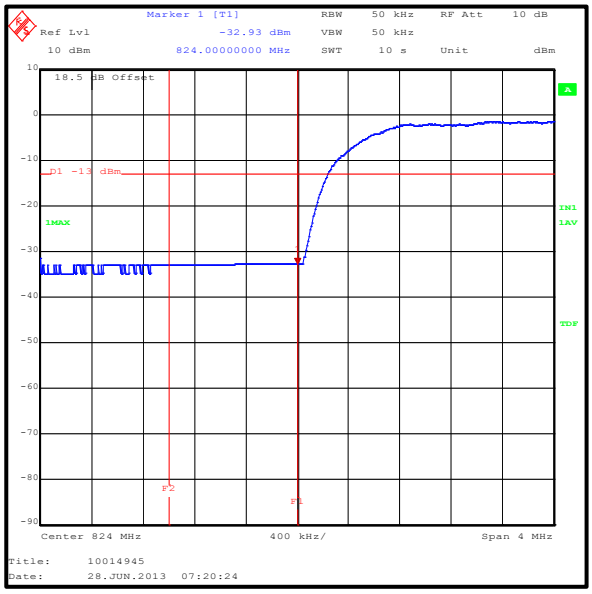


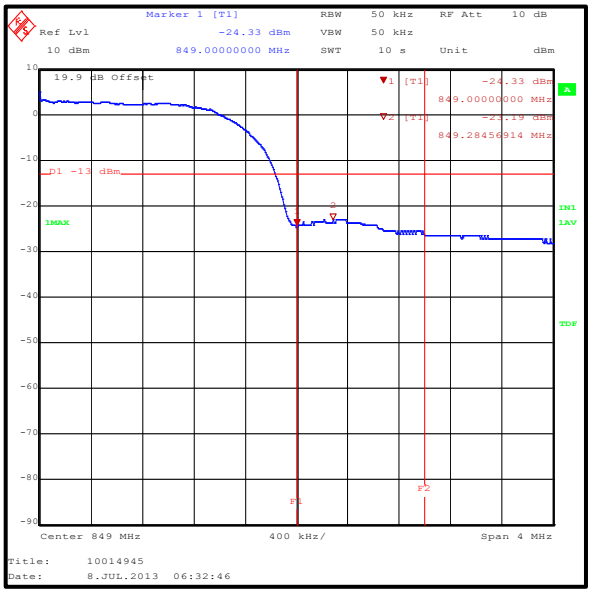


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 2

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-24.3	-13.0	11.3	Complied
849.285	-23.2	-13.0	10.2	Complied

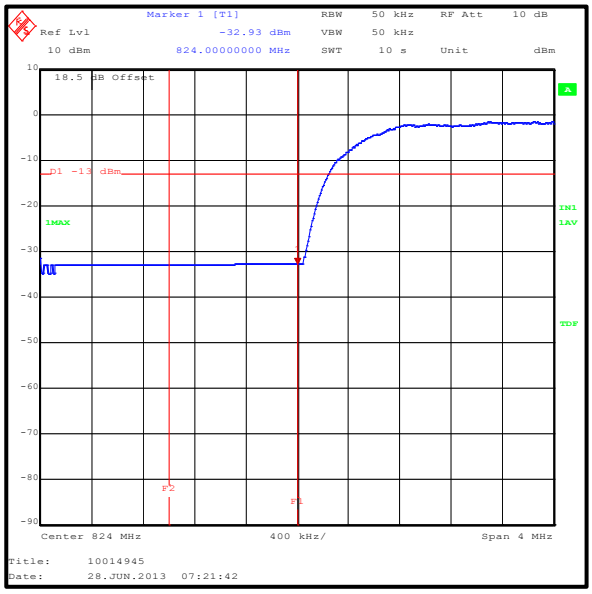


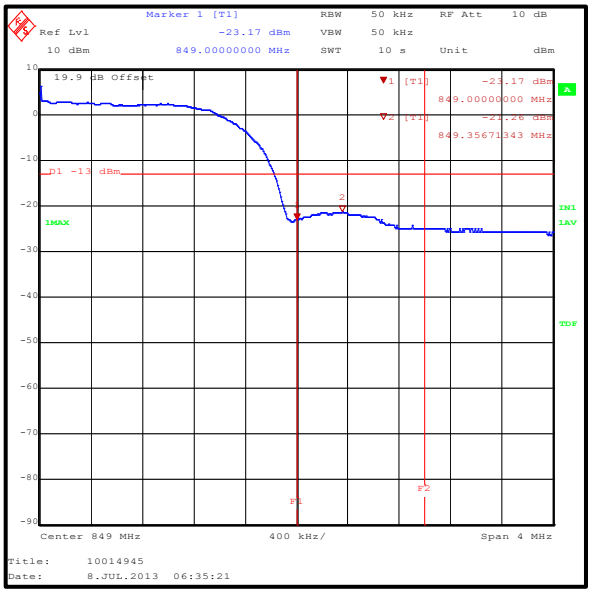


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 3

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-23.2	-13.0	10.2	Complied
849.357	-21.3	-13.0	8.3	Complied

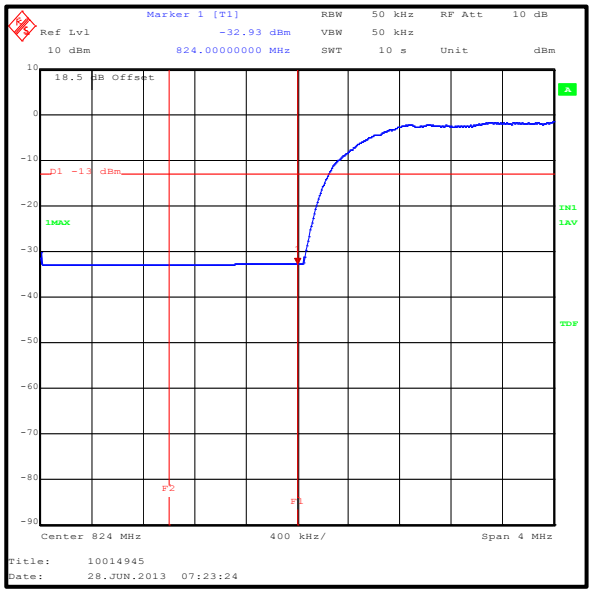


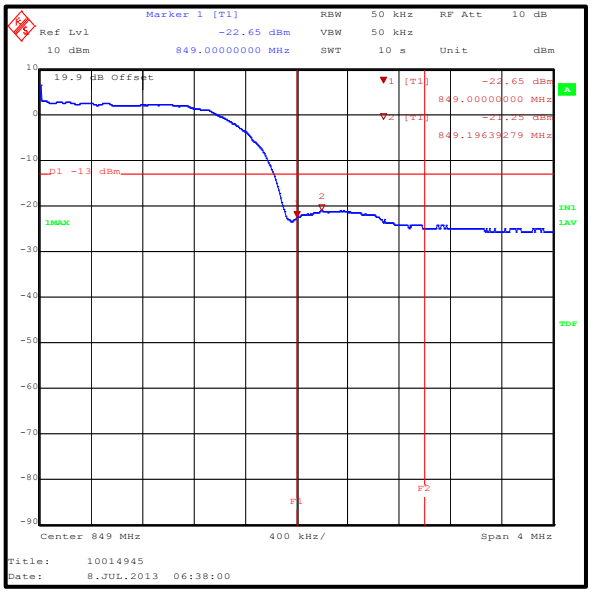


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 4

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-22.7	-13.0	9.7	Complied
849.196	-21.3	-13.0	8.3	Complied

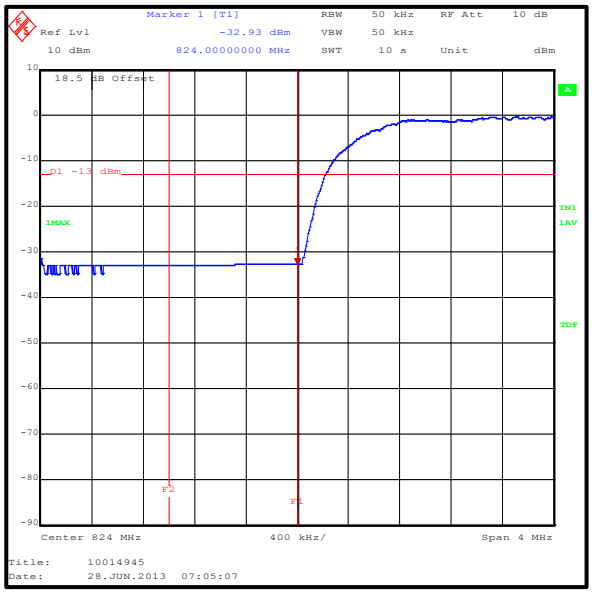


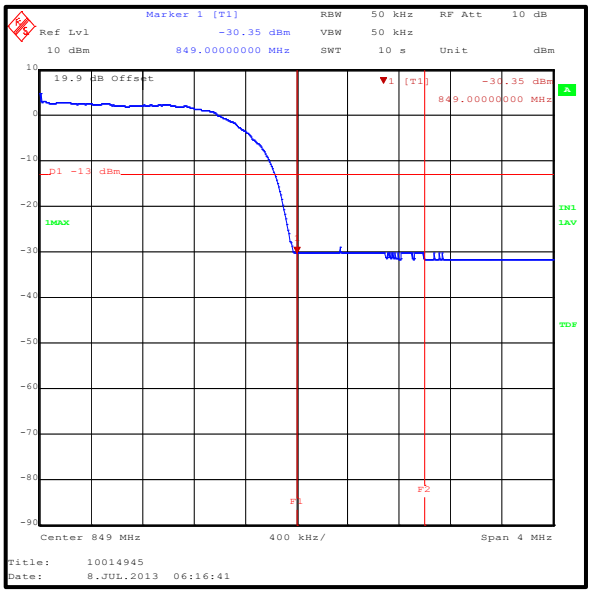


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 1

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-30.4	-13.0	17.4	Complied

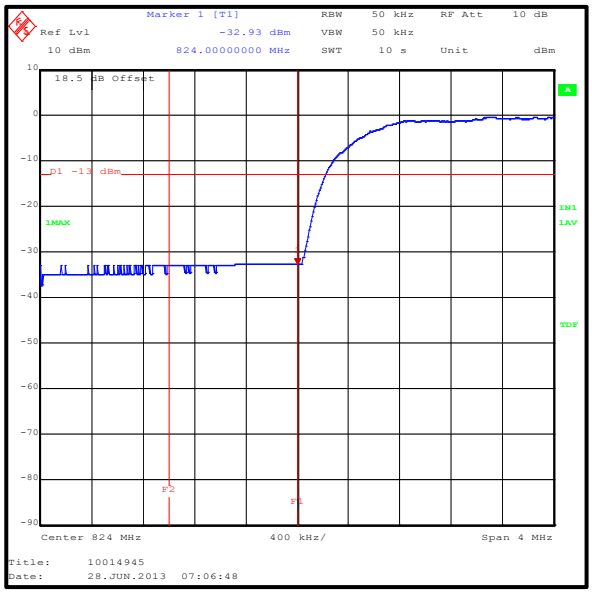


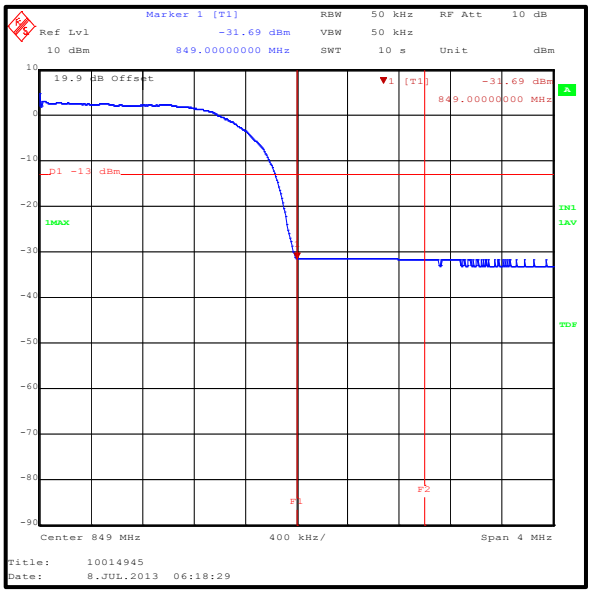


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 2

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-31.7	-13.0	18.7	Complied

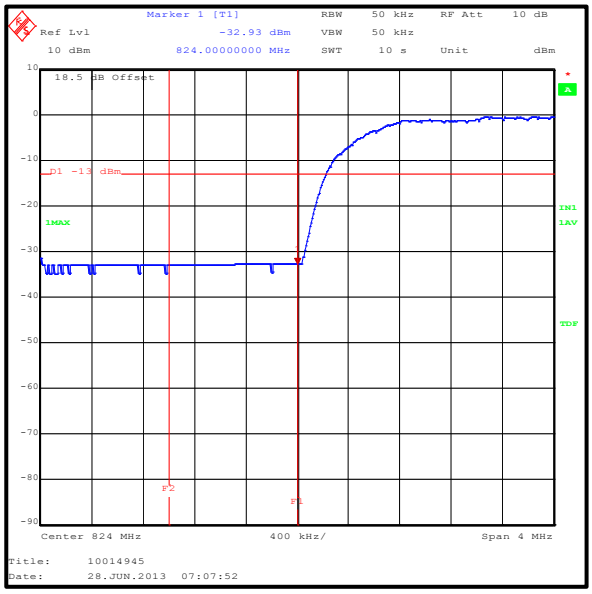


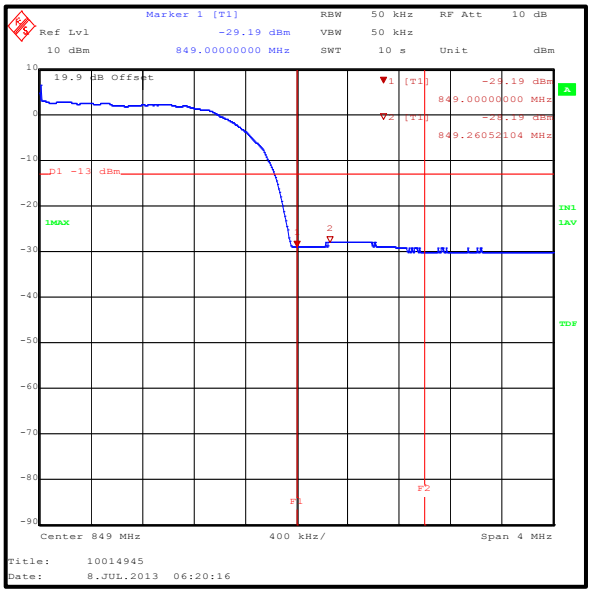


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 3

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-29.2	-13.0	16.2	Complied
849.261	-28.2	-13.0	15.2	Complied

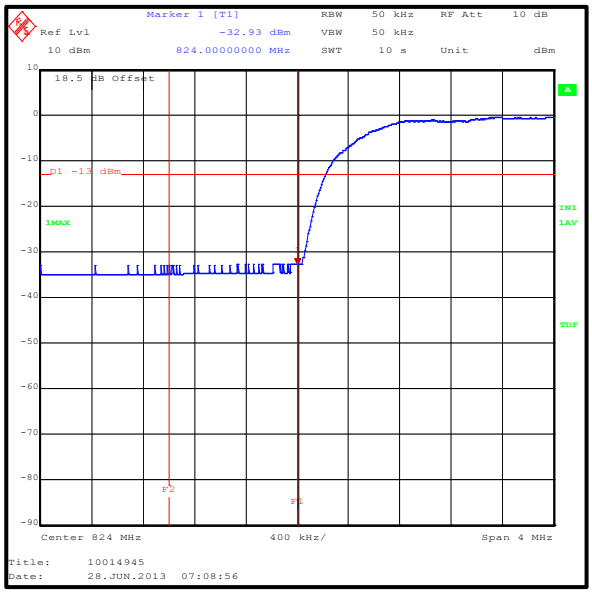


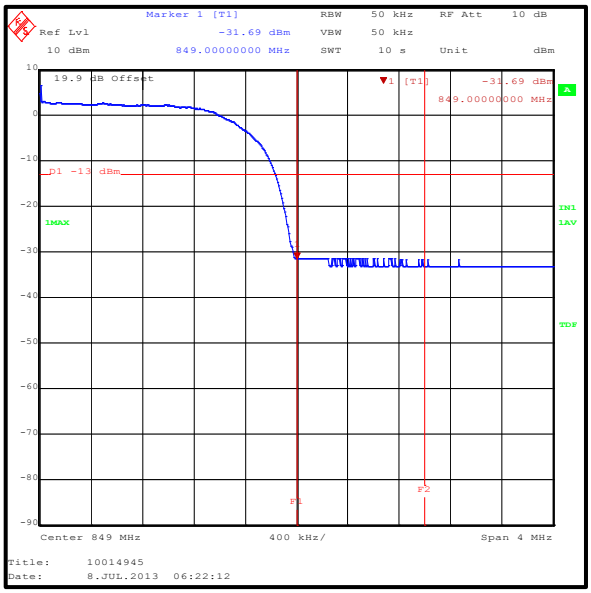


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 4

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-31.7	-13.0	18.7	Complied

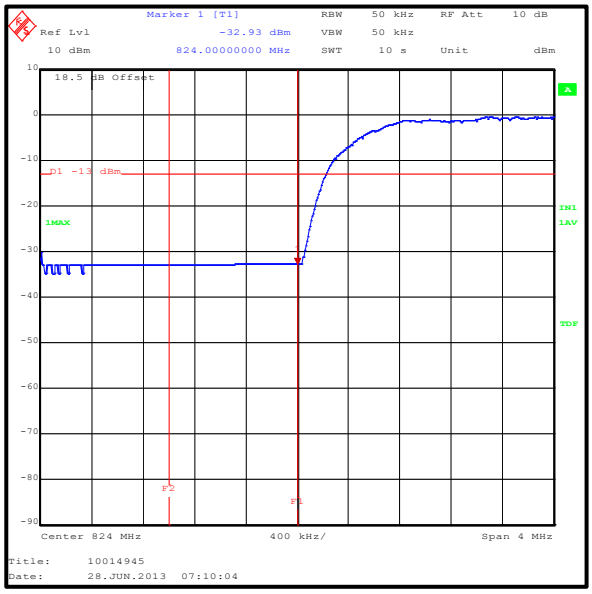


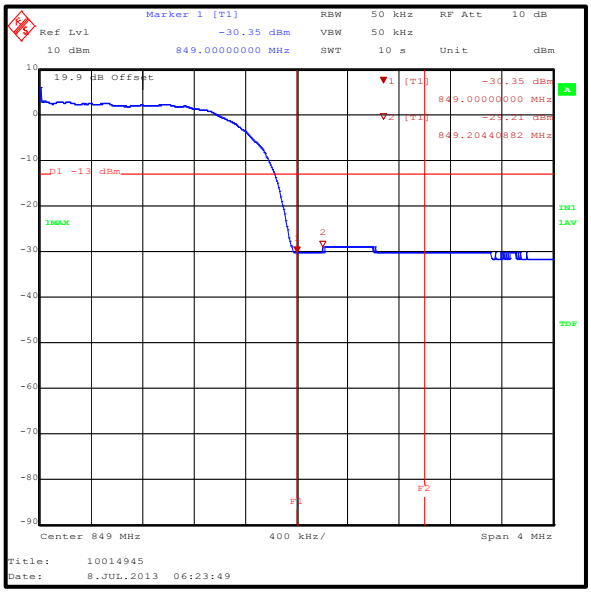


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 5

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-32.9	-13.0	19.9	Complied
849	-30.4	-13.0	17.4	Complied
849.204	-29.2	-13.0	16.2	Complied





Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	12
K0002	3m RSE Chamber	Rainford	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
A288	Antenna	Chase	CBL6111A	1589	15 Aug 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 Engineers:	Ahmed Ali & Nick Steele	**Test Dates:**	09 July 2013 & 10 July 2013
Test Sample IMEI:	004402451254886		

FCC Reference:	Parts 2.1055 & 22.355
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):	23 to 24
Ambient Relative Humidity (%):	41 to 44

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 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.

Results: Middle Channel (836.6 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	836.599998	2	0.0024	2.5	2.4976	Complied
-20	836.599998	2	0.0024	2.5	2.4976	Complied
-10	836.600002	2	0.0024	2.5	2.4976	Complied
0	836.599998	2	0.0024	2.5	2.4976	Complied
10	836.600002	2	0.0024	2.5	2.4976	Complied
20	836.599998	2	0.0024	2.5	2.4976	Complied
30	836.600003	3	0.0036	2.5	2.4964	Complied
40	836.600002	2	0.0024	2.5	2.4976	Complied
50	836.599998	2	0.0024	2.5	2.4976	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	-
M1643	Thermometer	Fluke	52II	18890136	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 Engineers:	Ahmed Ali & Nick Steele	**Test Dates:**	09 July 2013 & 10 July 2013
Test Sample IMEI:	004402451254886		

FCC Part:	2.1055 & 22.355
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 to 24
Relative Humidity (%):	41 to 44

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 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: Middle Channel (836.6 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.6	836.599998	2	0.0024	2.5	2.4976	Complied
4.2	836.600003	3	0.0036	2.5	2.4964	Complied

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
Effective Radiated Power (ERP)	824 to 849 MHz	95%	±2.94 dB
Frequency Stability	824 to 849 MHz	95%	±0.92 ppm
Occupied Bandwidth	824 to 849 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 9 GHz	95%	±2.94 dB

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

7. Report Revision History

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