TEST REPORT

Test Report No. : UL-RPT-RP10036246JD02A

Manufacturer	:	Panasonic Mobile Communications Development of Europe Ltd
Model No.	:	NTT docomo D32CS1
FCC ID	:	UCE113059A
Technology	:	UMTS850 Band V
Test Standard(s)	:	FCC Parts 15.107, 15.109 & 22

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0.

Date of Issue: 20 August 2013

Checked by:

Sarah Williams
WiSE Engineer

Issued by :

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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:	Panasonic Mobile Communications Development of Europe Ltd
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

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)
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
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:	13 August 2013 to 16 August 2013

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	✓
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	✓
Part 22.913(a)(2)	Transmitter Effective Radiated Power (ERP)	✓
Part 2.1055/22.355	Transmitter Frequency Stability (Temperature and Voltage Variation)	✓
Part 2.1049	Transmitter Occupied Bandwidth	✓
Part 2.1053/22.917	Transmitter Out of Band Radiated Emissions	✓
Part 2.1053/22.917	Transmitter Band Edge Radiated Emissions	✓

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:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices
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:	NTT docomo
Model Name or Number:	D32CS1
IMEI:	357544050009519 *(Radiated sample)*
Hardware Version Number:	Revision C
Software Version Number:	ACPU: B-D32CS1-01.04.001 CCPU:D32CS1_Cv18112102
FCC ID:	UCE113059A

Brand Name:	NTT docomo
Model Name or Number:	D32CS1
IMEI:	357544050009469 *(Conducted RF port sample)*
Hardware Version Number:	Revision C
Software Version Number:	ACPU: B-D32CS1-01.04.001 CCPU:D32CS1_Cv18112102
FCC ID:	UCE113059A

Brand Name:	NTT docomo
Description:	AC Charger
Model Number:	MAS-0008-A002
Serial Number:	#07

Brand Name:	NTT docomo
Description:	Charge/USB Data cable
Model Name or Number:	USB Cable with Charger Function 02
Serial Number:	#63

Brand Name:	NTT docomo
Description:	Personal Hands-Free
Model Number:	P001
Serial Number:	#26

Brand Name:	NTT docomo
Description:	Battery
Model Number:	P23

3.2. Description of EUT

The equipment under test was a Single Mode UMTS Mobile Phone with *Bluetooth.*

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 and 3GPP Rel. 5 HSDPA / Rel. 6 HSUPA		
Modulation Type:	QPSK / 8PSK		
Channel Spacing:	5 MHz		
Power Supply Requirement(s):	Nominal	3.7 V	
	Minimum	3.4 V	
	Maximum	4.2 V	
Maximum Output Power (ERP):	Voice (12.2 kbps)	24.9 dBm	
	HSDPA Sub-Test 4	26.7 dBm	
	HSUPA Sub-Test 5	26.1 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
Receive Frequency Range:	869 to 894 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	4357	871.4
	Middle	4407	881.6
	Top	4458	891.6

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:	Belkin
Description:	USB Hub
Model Name or Number:	Not marked or stated

Brand Name:	Not marked or stated
Description:	Dummy Battery
Model Name or Number:	Not marked or stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receiver/Idle mode.
- Constantly transmitting at full power on bottom, 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 CMU 200 Universal Radio Communications Tester or CMW 500 Wideband Radio Communications Tester, operating in UMTS Band V mode.
- Idle mode and transmitter radiated spurious emissions tests were performed with the AC Charger connected to the EUT as this was found to be the worst case during pre-scans. All the accessories were individually connected and measurements made during the pre-scans to determine the worst case combination. The micro SD card was fitted during all tests
- AC conducted emissions tests were performed with the EUT connected to the AC charger. The AC charger was connected to a 120 VAC 60 Hz single phase supply via a LISN.
- The dummy battery was fitted for all conducted measurements.
- The conducted sample with IMEI 357544050009469 was used for frequency stability and conducted power measurements.
- The radiated sample with IMEI 357544050009519 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. Receiver/Idle Mode AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	14 August 2013
Test Sample IMEI:	357544050009519		

FCC Reference:	Part 15.107
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	49

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.190	Live	47.7	64.0	16.3	Complied
0.393	Live	30.8	58.0	27.2	Complied
1.333	Live	31.5	56.0	24.5	Complied
3.736	Live	19.4	56.0	36.6	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.190	Live	33.2	54.0	20.8	Complied
0.492	Live	26.3	46.1	19.8	Complied
1.401	Live	26.6	46.0	19.4	Complied
3.777	Live	10.7	46.0	35.3	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

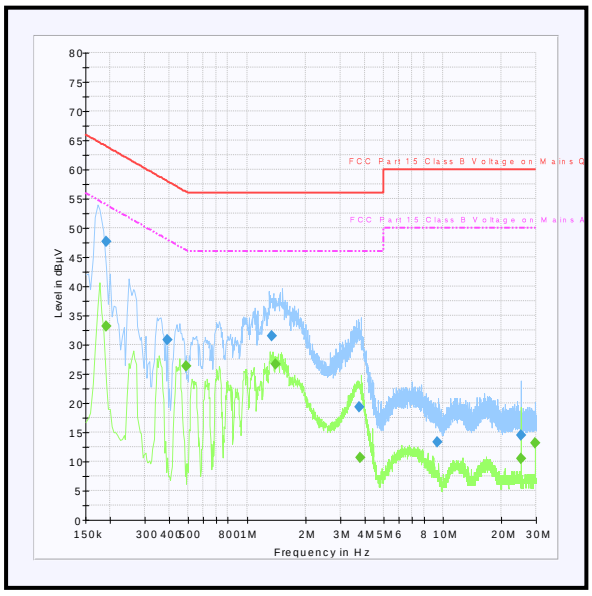
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.618	Neutral	22.7	56.0	33.3	Complied
1.518	Neutral	23.6	56.0	32.4	Complied
3.673	Neutral	15.8	56.0	40.2	Complied
25.057	Neutral	12.5	60.0	47.5	Complied

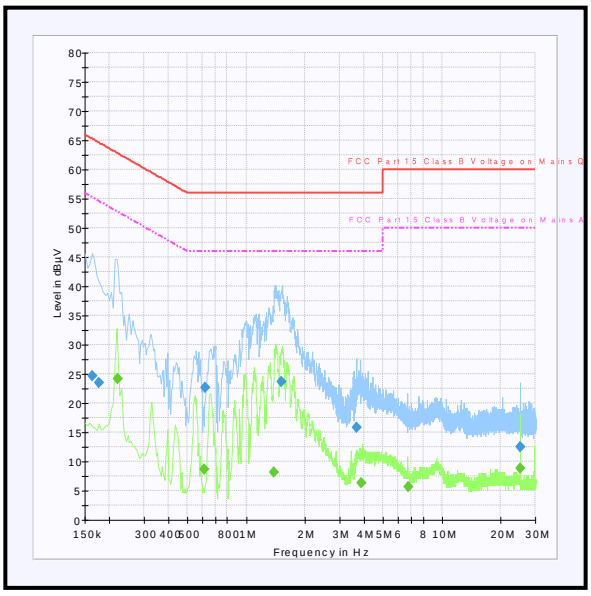
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.222	Neutral	24.2	52.7	28.5	Complied
0.609	Neutral	8.7	46.0	37.3	Complied
1.387	Neutral	8.1	46.0	37.9	Complied
3.862	Neutral	6.3	46.0	39.7	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)



Live



Neutral

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1625	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	09 Jan 2014	12
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	30 Oct 2013	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	19 Feb 2014	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	15 Oct 2013	12

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	13 August 2013
Test Sample IMEI:	357544050009519		

FCC Reference:	Part 15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	39

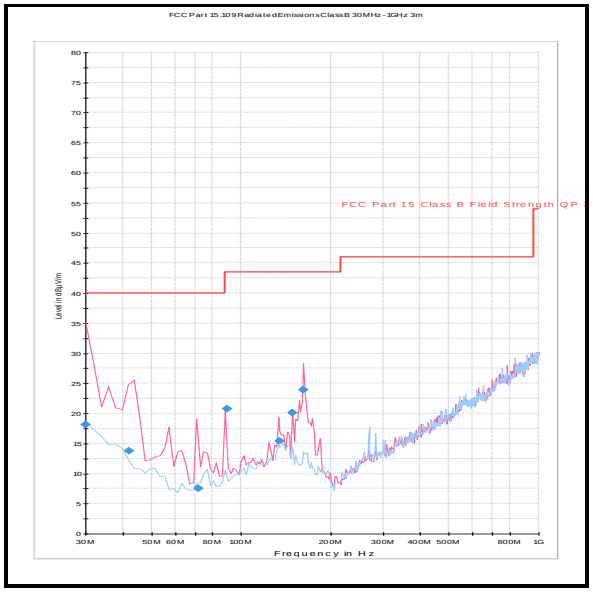
Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI 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: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
30.048	Vertical	18.2	40.00	21.8	Complied
161.987	Vertical	23.9	43.5	19.6	Complied

Receiver/Idle Mode Radiated Spurious Emissions (continued)



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A490	Antenna	Chase	CBL6111A	1590	09 Aug 2014	12
G0543	Pre Amplifier	Sonoma	310N	230801	05 Oct 2013	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1622	Thermometer Hygrometer Station	JM handelspunkt	30.5015.06	Not Stated	24 May 2014	12

Receiver/Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	14 August 2012
Test Sample IMEI:	357544050009519		

FCC Reference:	Part 15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 5 GHz

Environmental Conditions:

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

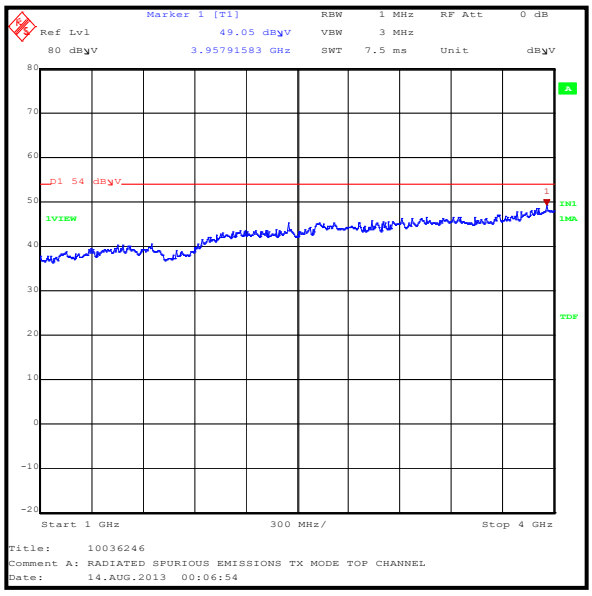
Note(s):

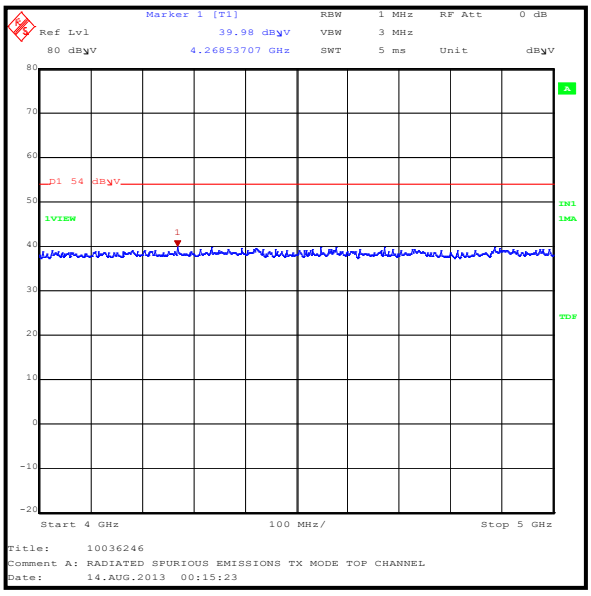
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. 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:

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3957.916	Vertical	49.1	54.0	4.9	Complied

Receiver/Idle Mode Radiated Spurious Emissions (continued)





Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A253	Antenna	Flann Microwave	12240-20	128	04 Nov 2013	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	20 Sep 2013	12
M1656	Thermometer Hygrometer Station	JM handelspunkt	30.5015.06	Not Stated	24 May 2014	12

5.2.3. Transmitter Effective Radiated Power (ERP)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	15 August 2013
Test Sample IMEI:	357544050009469		

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):	23
Relative Humidity (%):	58

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

   2.5 dBi – 2.15 dBi = 0.35 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	25.2	26.1	26.3	26.0	24.6	38.5	12.2	Complied
	4183	25.4	26.3	26.4	26.5	24.8	38.5	12.0	Complied
	4233	25.8	26.5	26.6	26.7	24.9	38.5	11.8	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	20.0	18.5	17.8	17.9	20.0	38.5	18.5	Complied
	4183	20.5	18.5	18.3	18.5	20.5	38.5	18.0	Complied
	4233	20.8	19.3	18.5	18.8	20.5	38.5	17.7	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	25.2	24.7	25.4	24.4	25.6	38.5	12.9	Complied
	4183	25.4	25.0	25.8	24.4	25.8	38.5	12.7	Complied
	4233	25.8	25.5	26.0	24.7	26.1	38.5	12.4	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	18.7	18.9	18.8	19.0	19.0	38.5	19.5	Complied
	4183	19.1	19.2	19.1	19.2	19.3	38.5	19.2	Complied
	4233	19.6	19.7	19.6	19.6	19.8	38.5	18.7	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	Pasternack Enterproses	PE2214-10	None stated	Calibrated before use	-
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	Calibrated before use	-
L1028	Signal Analyser	Rohde & Schwarz	FSV30	100854	23 May 2014	12
M1229	Multimeter	Fluke	179	87640015	26 Jun 2014	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	-

5.2.4. Transmitter Frequency Stability (Temperature Variation)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	16 August 2013
Test Sample IMEI:	357544050009469		

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
Ambient Relative Humidity (%):	39

Note(s):

1. A dummy battery was placed on the EUT and the dummy battery cables connected to 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 placed in a temperature chamber and connected by suitable RF cables to the CMW 500 outside the chamber. A bidirectional communications link was established on the centre channel between the EUT and the 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	836.600021	21	0.0251	2.5	2.4749	Complied
-20	836.600027	27	0.0323	2.5	2.4677	Complied
-10	836.600025	25	0.0299	2.5	2.4701	Complied
0	836.600023	23	0.0275	2.5	2.4725	Complied
10	836.599979	21	0.0251	2.5	2.4749	Complied
20	836.599977	23	0.0275	2.5	2.4725	Complied
30	836.600022	22	0.0263	2.5	2.4737	Complied
40	836.600017	17	0.0203	2.5	2.4797	Complied
50	836.599982	18	0.0215	2.5	2.4785	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	-
M1249	Thermometer	Fluke	52II	88800049	24 May 2014	12
S0523	DC power supply	TTI	PL320	224235	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	26 Jun 2014	12

5.2.5. Transmitter Frequency Stability (Voltage Variation)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	16 August 2013
Test Sample IMEI:	357544050009469		

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
Relative Humidity (%):	39

Note(s):

1. A dummy battery was placed on the EUT and the dummy battery cables connected to 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 placed in a temperature chamber and connected by suitable RF cables to the CMW 500 outside the chamber. A bidirectional communications link was established on the centre channel between the EUT and the 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
3.4	836.600023	23	0.0275	2.5	2.4725	Complied
4.2	836.600019	19	0.0227	2.5	2.4773	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
E0513	Environmental Chamber	TAS	LT600 Series 3	23900506	Calibrated before use	-
M1249	Thermometer	Fluke	52II	88800049	24 May 2014	12
S0523	DC power supply	TTI	PL320	224235	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	26 Jun 2014	12

5.2.6. Transmitter Occupied Bandwidth

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	15 August 2013
Test Sample IMEI:	357544050009469		

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

Environmental Conditions:

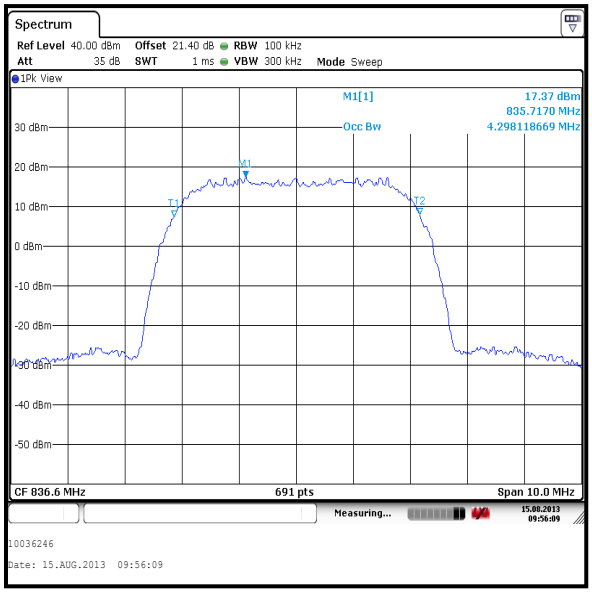
Temperature (°C):	23
Relative Humidity (%):	58

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

Results: Voice / 12.2 kbps

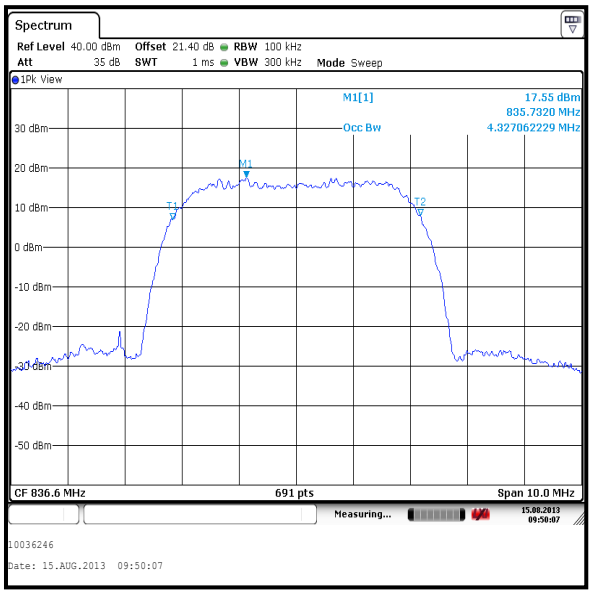
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4298.119



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 1

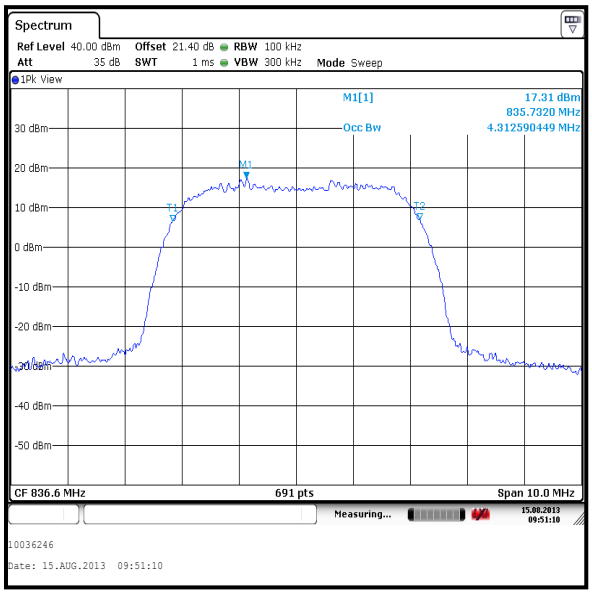
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4327.062



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 2

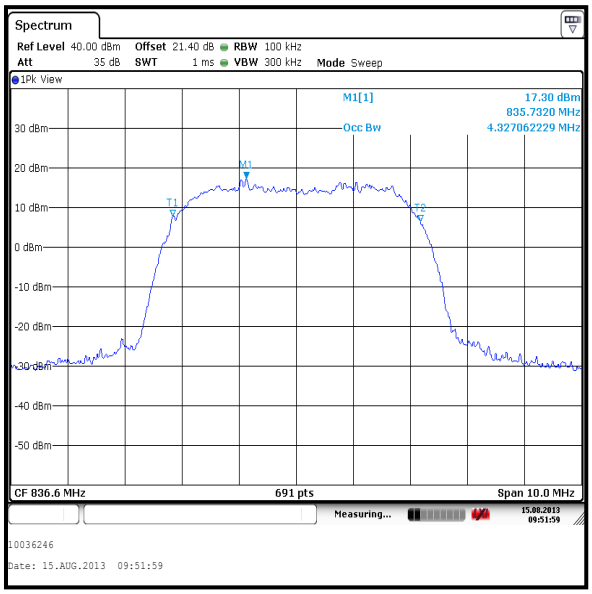
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4312.590



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 3

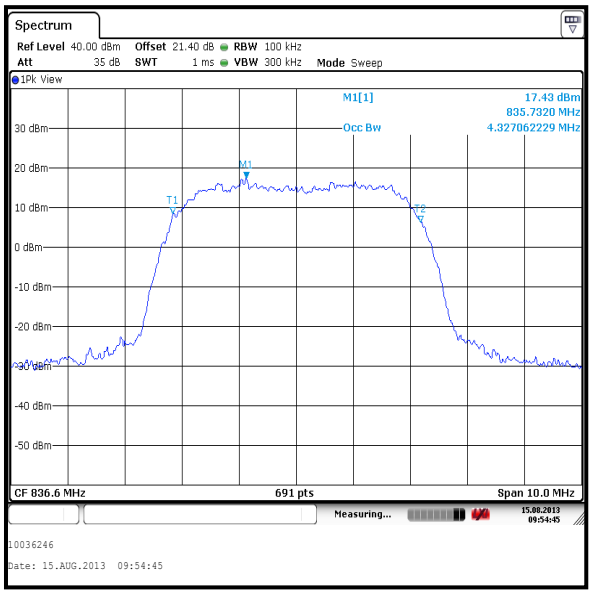
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4327.062



Transmitter Occupied Bandwidth (continued)

Results: HSDPA Sub-Test 4

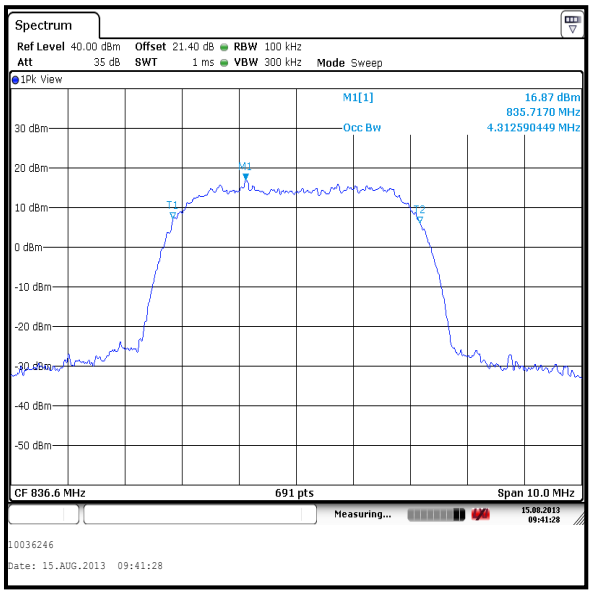
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4327.062



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 1

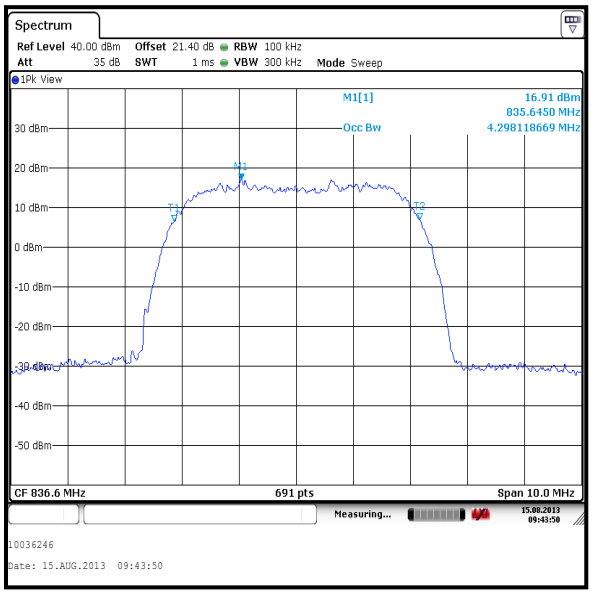
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4312.590



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 2

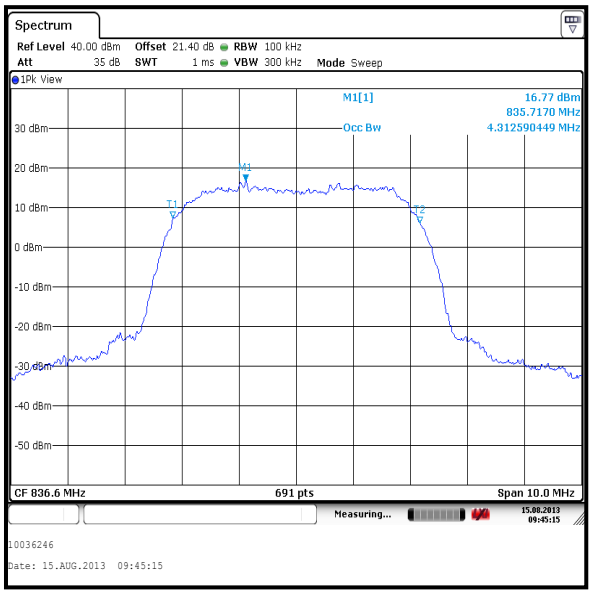
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4298.119



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 3

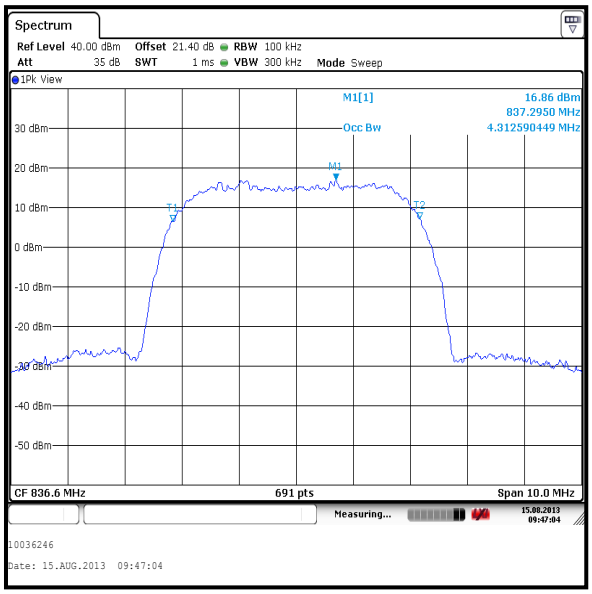
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4312.590



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 4

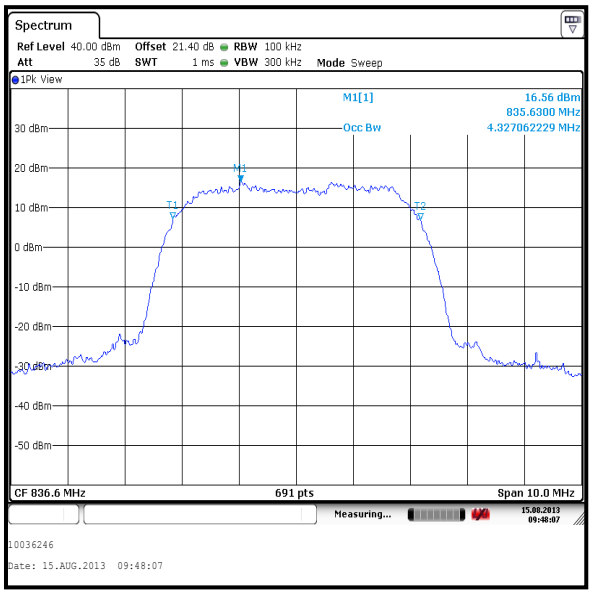
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4312.590



Transmitter Occupied Bandwidth (continued)

Results: HSUPA Sub-Test 5

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.6	4327.062



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	Pasternack Enterproses	PE2214-10	None stated	Calibrated before use	-
A2141	Attenuator	Atlan TecRF	AN18-10	090918-04	Calibrated before use	-
L1028	Signal Analyser	Rohde & Schwarz	FSV30	100854	23 May 2014	12
M1229	Multimeter	Fluke	179	87640015	26 Jun 2014	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	-

5.2.7. Transmitter Out of Band Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	13 August 2013
Test Sample IMEI:	357544050009519		

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):	23 to 24
Relative Humidity (%):	39 to 42

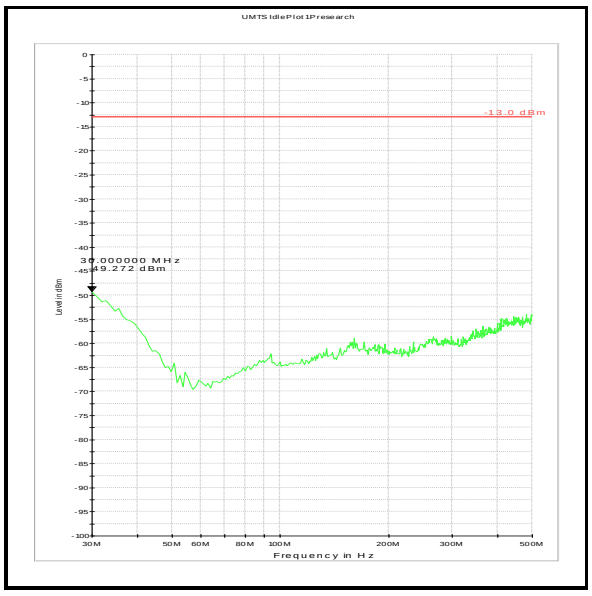
Note(s):

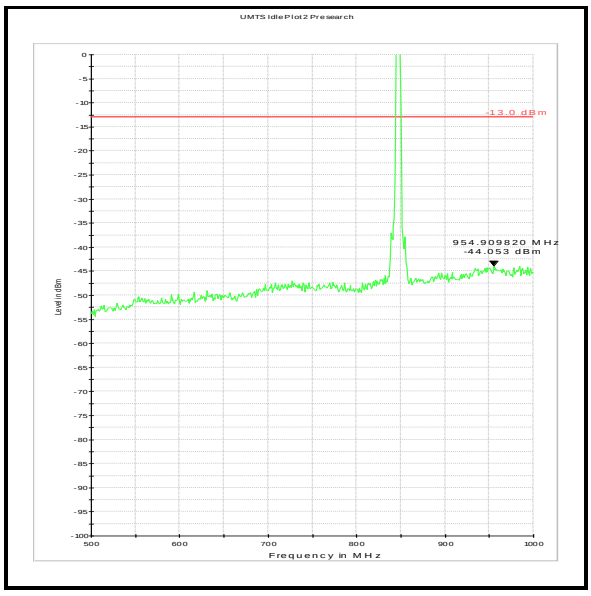
1. No spurious emissions were detected above the noise floor of the measuring receiver; the highest peak noise floor reading of the measuring receiver was recorded.
2. The uplink traffic channels are shown on the 500 MHz to 1 GHz plot.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (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.

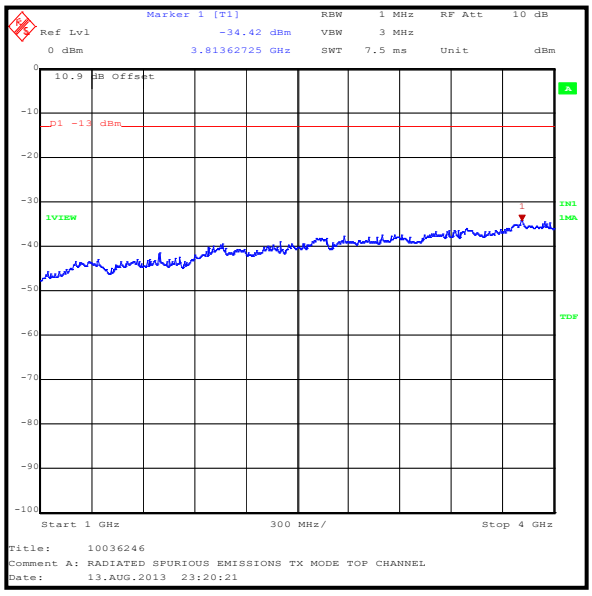
Results: Voice / 12.2 kbps - Top Channel

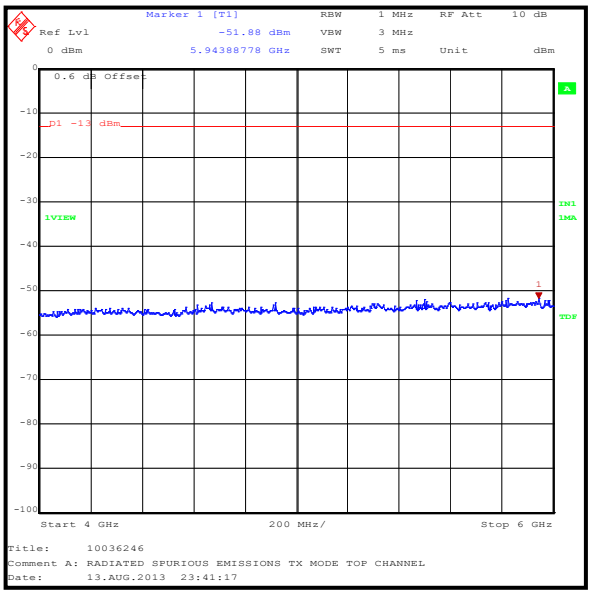
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3813.627	-34.4	-13.0	21.4	Complied

Transmitter Out of Band Radiated Emissions (continued)

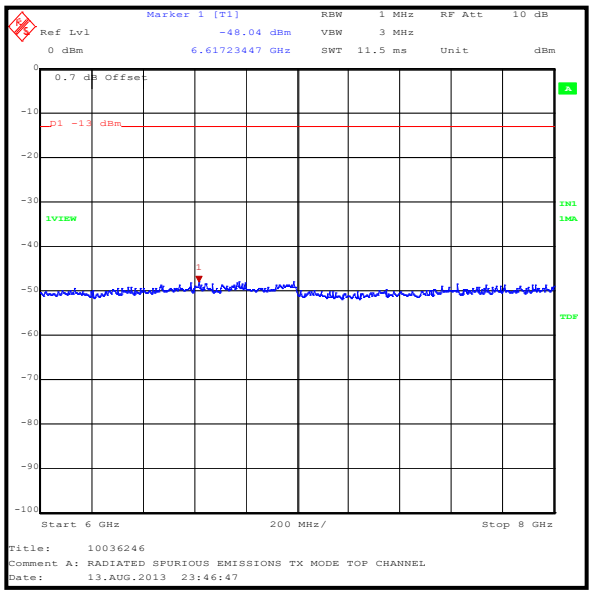


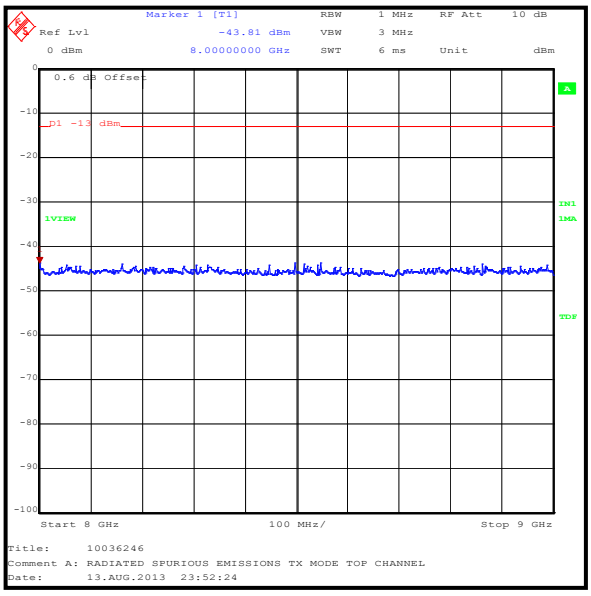






Transmitter Out of Band Radiated Emissions (continued)





Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A490	Antenna	Chase	CBL6111A	1590	09 Apr 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	27 Jan 2014	12
A1393	Attenuator	Huber & Suhner	6810.17.B	757456	10 May 2014	12
G0543	Pre-Amplifier	Sonoma	310N	230801	05 Oct 2013	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1622	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	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
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
A1974	High Pass Filter	Atlan TecRF	AFH-01000	090000283	19 Apr 2014	12
A1932	High Pass Filter	AtlanTecRF	AFH-02000	20r-JFBD04-002	19 Apr 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
M1656	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

5.2.8. Transmitter Radiated Emissions at Band Edges

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	14 August 2013
Test Sample IMEI:	357544050009519		

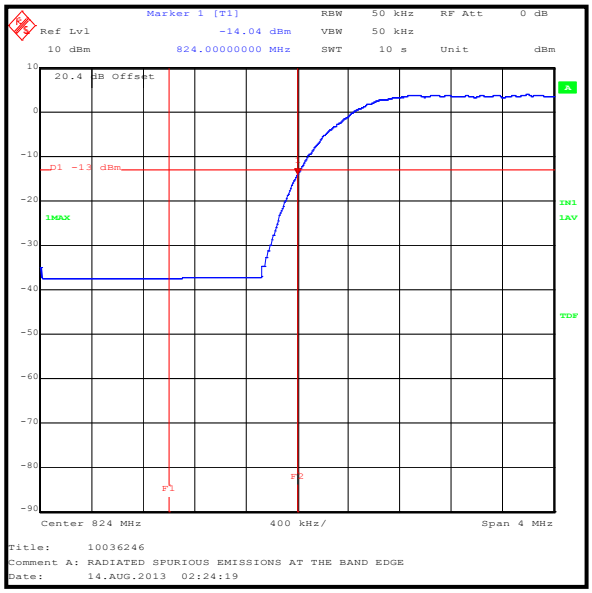
FCC Reference:	Parts 2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 22.917

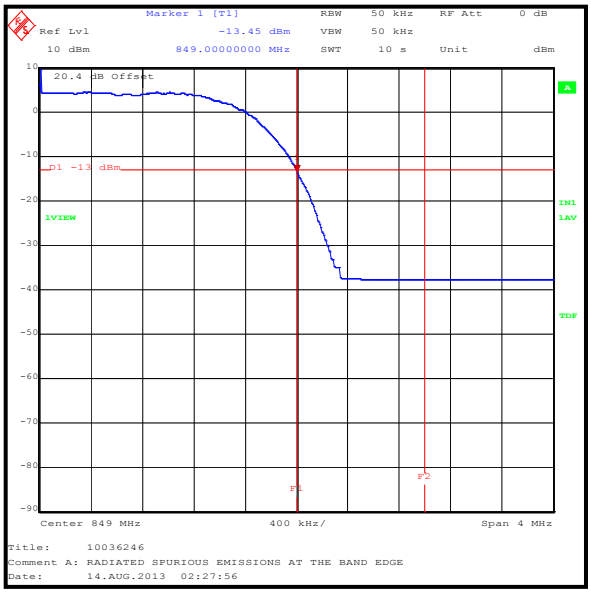
Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	41

Results: Voice / 12.2 kbps

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.0	-13.0	1.0	Complied
849	-13.5	-13.0	0.5	Complied

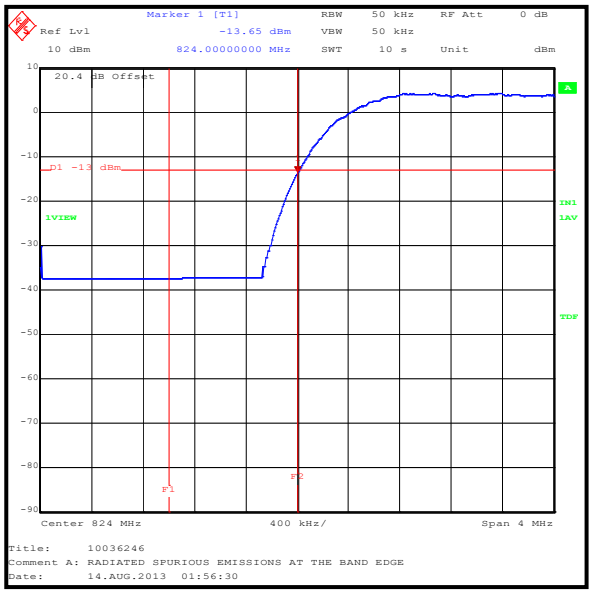


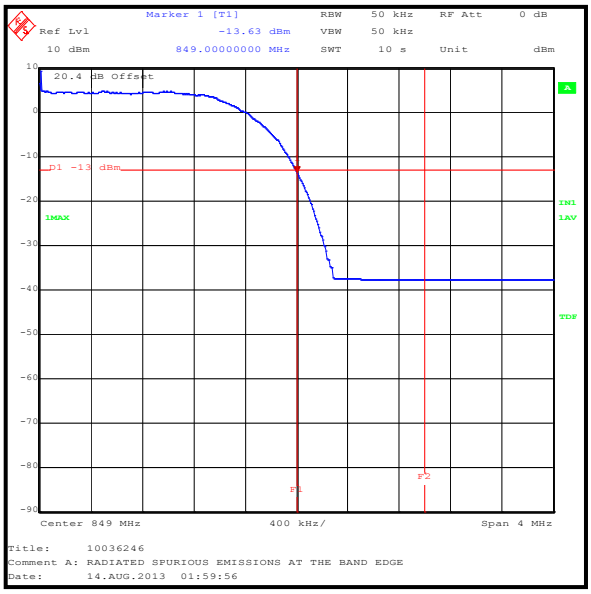


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 1

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-13.7	-13.0	0.7	Complied
849	-13.6	-13.0	0.6	Complied

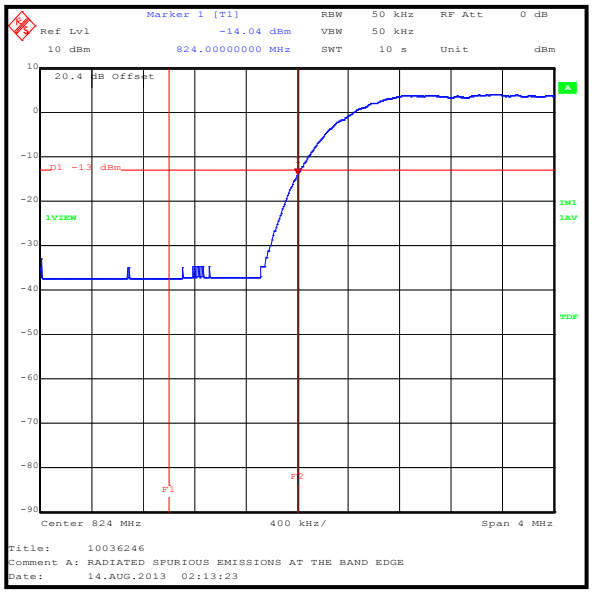


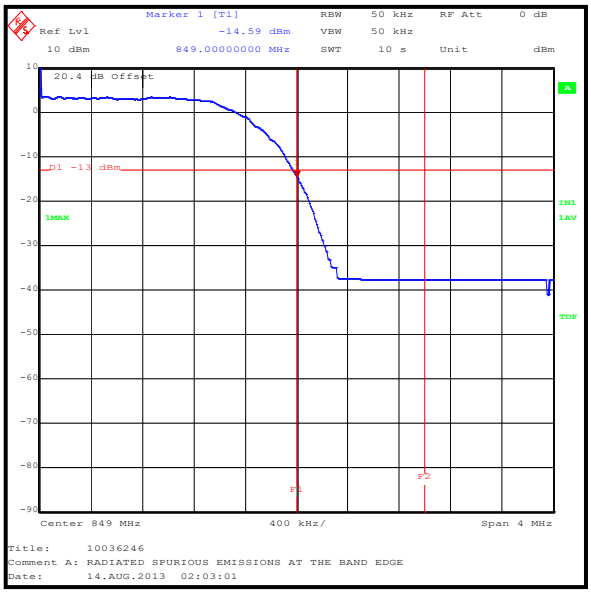


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 2

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.0	-13.0	1.0	Complied
849	-14.6	-13.0	1.6	Complied

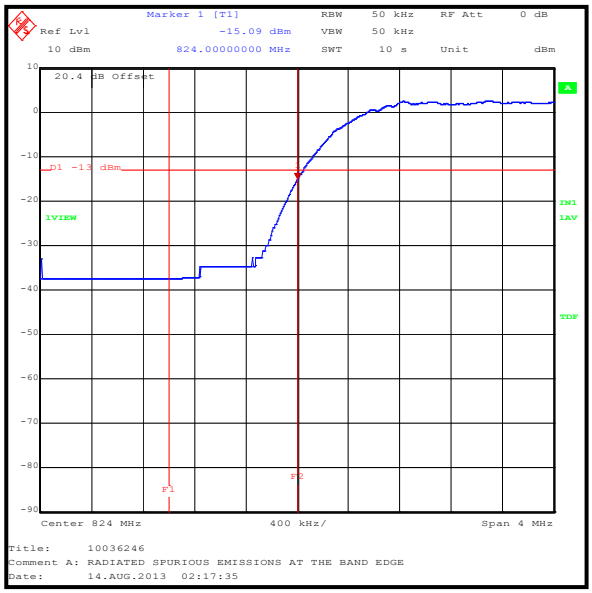


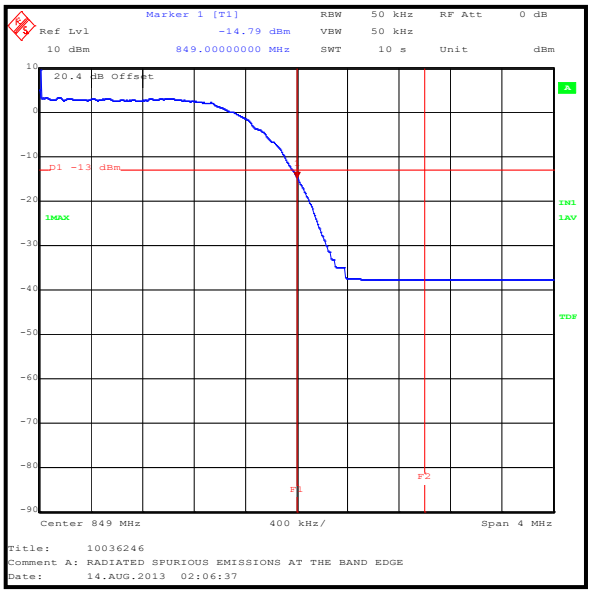


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 3

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-15.1	-13.0	2.1	Complied
849	-14.8	-13.0	1.8	Complied

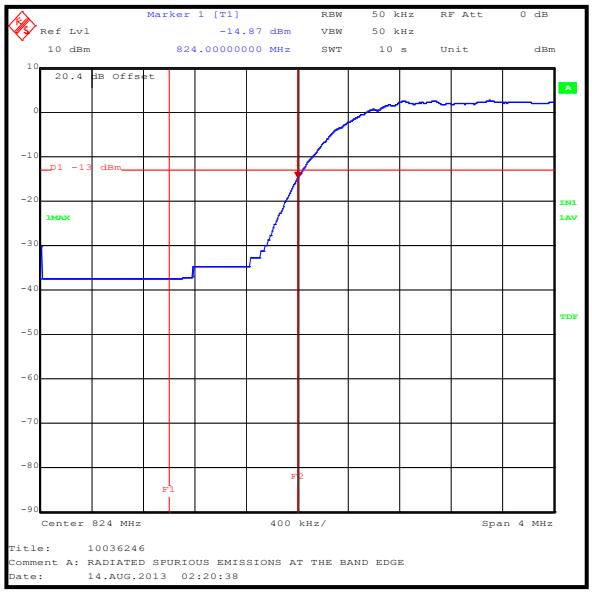


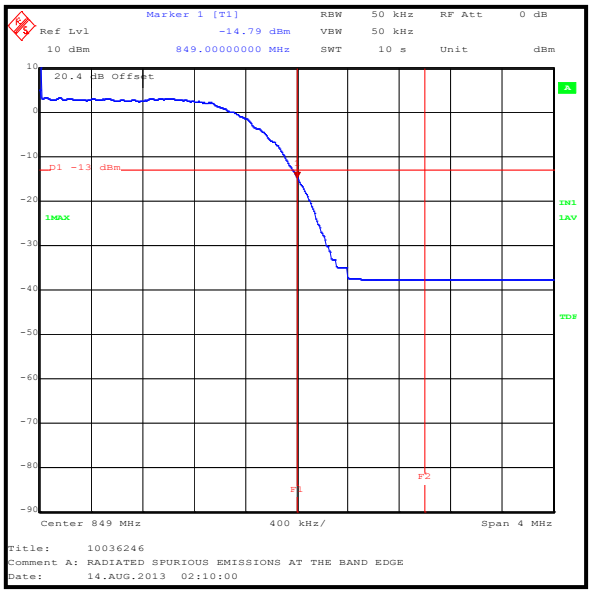


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSDPA Sub-Test 4

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.9	-13.0	1.9	Complied
849	-14.8	-13.0	1.8	Complied

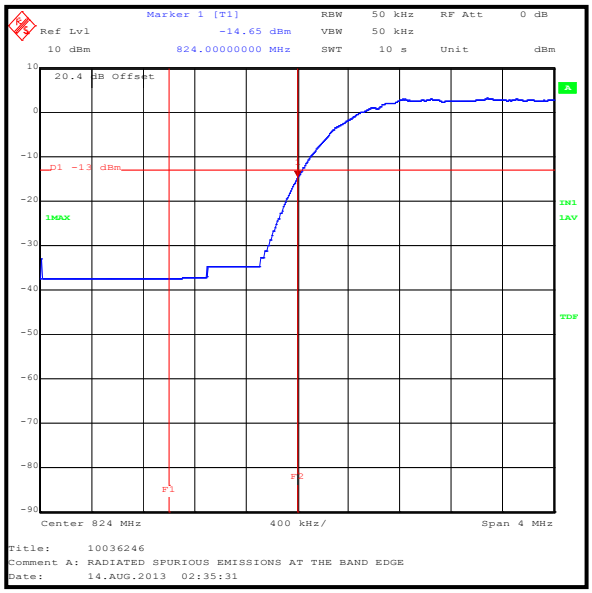


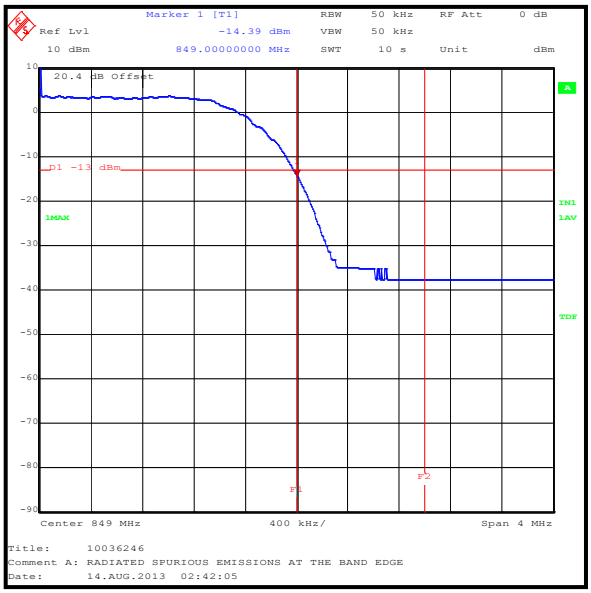


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 1

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.7	-13.0	1.7	Complied
849	-14.4	-13.0	1.4	Complied

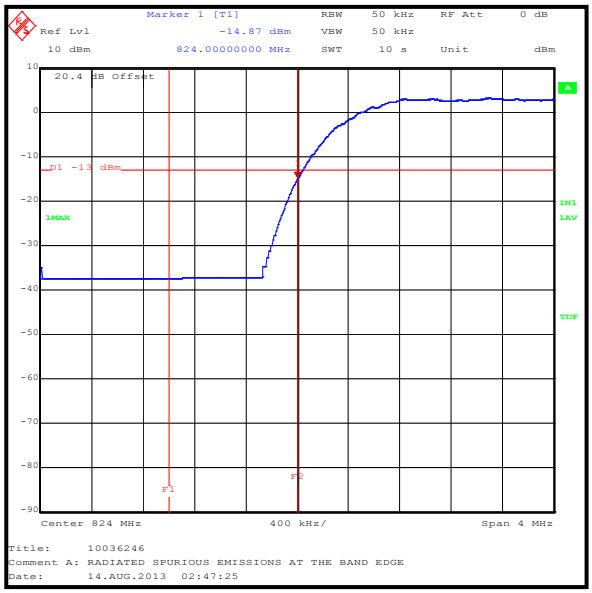


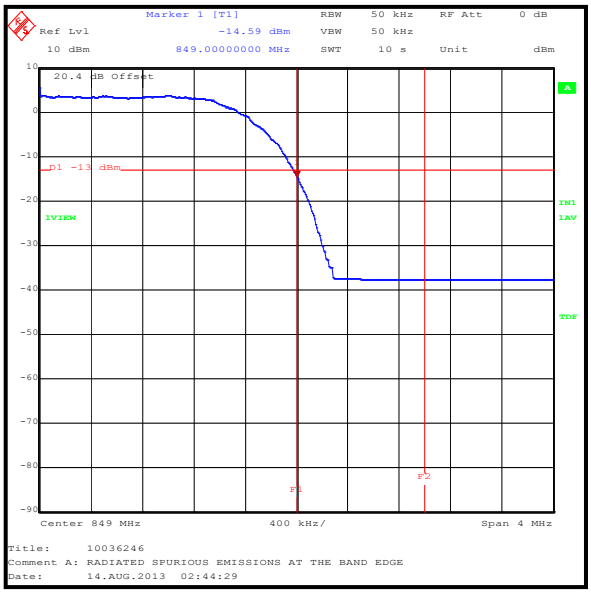


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 2

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.9	-13.0	1.9	Complied
849	-14.6	-13.0	1.6	Complied

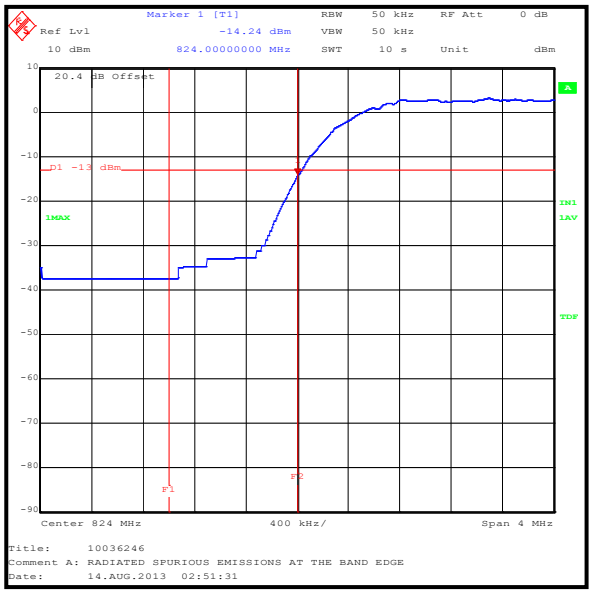


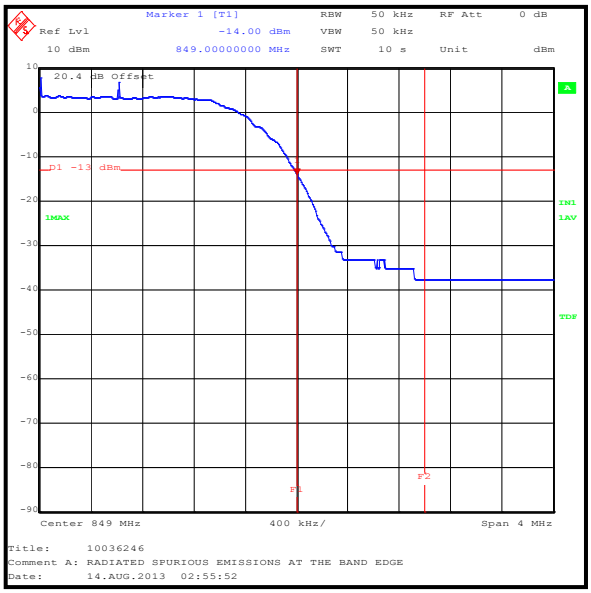


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 3

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.2	-13.0	1.2	Complied
849	-14.0	-13.0	1.0	Complied

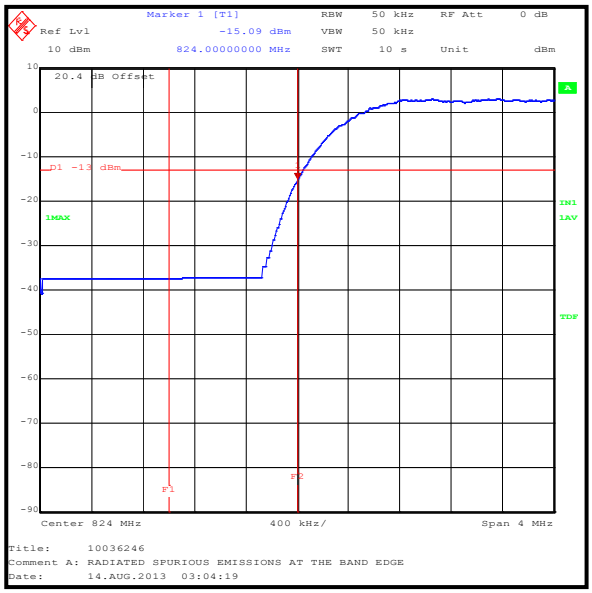


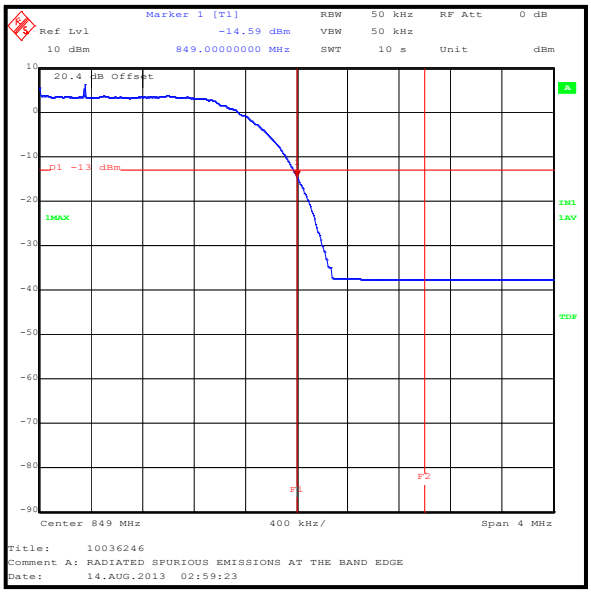


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 4

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-15.1	-13.0	2.1	Complied
849	-14.6	-13.0	1.6	Complied

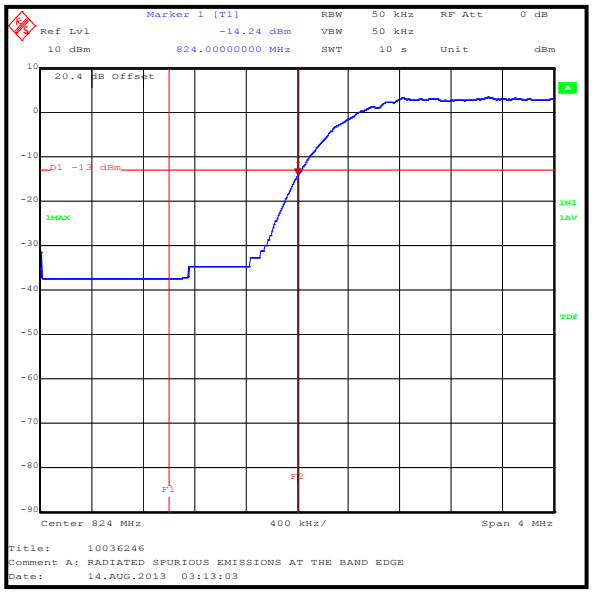


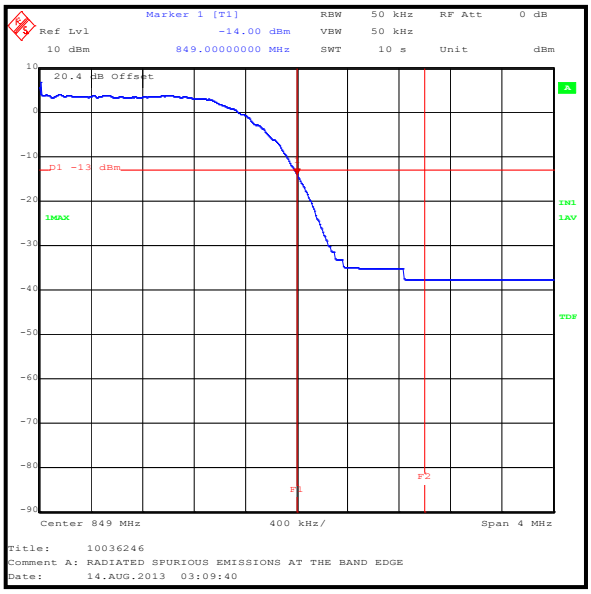


Transmitter Radiated Emissions at Band Edges (continued)

Results: HSUPA Sub-Test 5

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.2	-13.0	1.2	Complied
849	-14.0	-13.0	1.0	Complied





Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A288	Antenna	Chase	CBL6111A	1589	15 Aug 2013	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	10 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	20 Sep 2013	12
M1656	Thermometer Hygrometer Station	JM handelspunkt	30.5015.06	Not Stated	24 May 2014	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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Conducted Output Power	824 to 849 MHz	95%	±1.13 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%	±5.64dB
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