



TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: NTT docomo EB-4056

FCC ID: UCE212054A

To: FCC Part 22: 2011 Subpart H, Part 24: 2011 Subpart E

Test Report Serial No.:
RFI-RPT-RP87471JD13A V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:		
Checked By:	Ian Watch	
Signature:		
Date of Issue:	11 June 2012	

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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) 2011: Part 22 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 24 Subpart E (Personal Communication Services)
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd., Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	01 May 2012 to 17 May 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 22		
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	
Part 22.913(a)	Transmitter Output 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	
Part 24		
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	
Part 24.232	Transmitter Output Power (EIRP)	
Part 2.1055/24.235	Transmitter Frequency Stability (Temperature and Voltage Variation)	
Part 2.1049	Transmitter Occupied Bandwidth	
Part 2.1053/24.238	Transmitter Out of Band Radiated Emissions	
Part 2.1053/24.238	Transmitter Band Edge Radiated Emissions	
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

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:	EB-4056
IMEI:	351808050018796 (<i>Radiated sample #1</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0433 CCPU: R1C_0_EC10_00_D00
FCC ID:	UCE212054A

Brand Name:	NTT docomo
Model Name or Number:	EB-4056
IMEI:	351808050018796 (<i>Radiated sample #1</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0507 CCPU: R1C_0_EC12_00_D00
FCC ID:	UCE212054A

Brand Name:	NTT docomo
Model Name or Number:	EB-4056
IMEI:	351808050018804 (<i>Radiated sample #2</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0433 CCPU: R1C_0_EC10_00_D00
FCC ID:	UCE212054A

Brand Name:	NTT docomo
Model Name or Number:	EB-4056
IMEI:	351808050018804 (<i>Radiated sample #2</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0507 CCPU: R1C_0_EC12_00_D00
FCC ID:	UCE212054A

Identification of Equipment Under Test (EUT) (continued)

Brand Name:	NTT docomo
Model Name or Number:	EB-4056
IMEI:	351808050018994 (<i>Conducted RF port sample #1</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0433 CCPU: R1C_0_EC10_00_D00
FCC ID:	UCE212054A

Brand Name:	NTT docomo
Model Name or Number:	EB-4056
IMEI:	351808050018994 (<i>Conducted RF port sample #1</i>)
Hardware Version Number:	Rev C
Software Version Number:	ACPU: nemo-ics-09-0507 CCPU: R1C_0_EC12_00_D00
FCC ID:	UCE212054A

Brand Name:	NTT docomo
Description:	AC Charger (with USB Data/Charge Cable)
Model Name or Number:	03

Brand Name:	NTT docomo
Description:	Charge/USB Data cable
Model Name or Number:	Not marked or stated

Brand Name:	NTT docomo
Description:	Personal Hands-Free
Model Name or Number:	Part Number 549266

3.2. Description of EUT

The equipment under test was a Dual Mode UMTS/GSM Mobile Phone with WLAN, *Bluetooth* and RFID.

3.3. Modifications Incorporated in the EUT

The Customer changed the Software Version on all samples from
ACPU: nemo-ics-09-0433 CCPU: R1C_0_EC10_00_D00 to
ACPU: nemo-ics-09-0507 CCPU: R1C_0_EC12_00_D00 on 10 May 2012.

The Customer declared that the software update was to fix GPRS/EGPRS connectivity problems only and the software change did not affect any other parameters.

3.4. Additional Information Related to Testing

Type of Radio Device:	Transceiver		
Mode:	GSM/GPRS/EGPRS		
Modulation Type:	GMSK / 8PSK		
Channel Spacing:	200 kHz		
Power Supply Requirement(s):	Nominal	3.8 V	
	Minimum	3.4 V	
	Maximum	4.35 V	
Technology Tested:	GSM850		
Maximum Output Power (ERP):	GSM	28.1 dBm	
	GPRS	29.6 dBm	
	EGPRS	29.8 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	824.2
	Middle	190	836.6
	Top	251	848.8
Receive Frequency Range:	869 to 894 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	869.2
	Middle	190	881.6
	Top	251	893.8

Additional Information Related to Testing (continued)

Technology Tested:	PCS1900		
Maximum Output Power (EIRP):	GSM	28.9 dBm	
	GPRS	28.9 dBm	
	EGPRS	28.5 dBm	
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1850.2
	Middle	660	1879.8
	Top	810	1909.8
Receive Frequency Range:	1930 to 1990 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1930.2
	Middle	660	1959.8
	Top	810	1989.8

3.5. Support Equipment

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

Description:	2 GB Micro SD Card
Brand Name:	Not marked or stated
Model Name or Number:	MMAGR02GUECA

Description:	USB Hub
Brand Name:	Buffalo
Model Name or Number:	BSH3U01

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/EIRP and band edge tests were performed with the EUT in GSM single timeslot circuit switched and GPRS/EGPRS Multislot Class 12 with the unit transmitting on one timeslot in the uplink. The EUT output power was initially checked when transmitting at maximum power on one, two, three and four timeslots. The highest power was observed when transmitting on one timeslot.
- EGPRS tests were performed with the EUT using MCS5 (8PSK modulation).
- Transmitter radiated spurious emissions were checked in all modes during pre-scans. Circuit switched voice 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):

- The conducted sample with IMEI 351808050018994 was used for occupied bandwidth and frequency stability measurements.
- The radiated sample with IMEI 351808050018796 was used for idle mode radiated measurements and the radiated sample with IMEI 351808050018804 was used for transmitter radiated measurements.
- Receiver/idle mode and transmitter radiated spurious emissions tests were performed with the PHF and USB cable connected to the EUT as this was found to be the worst case during pre-scans. All the supplied 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.
- The dummy battery was fitted for frequency stability measurements.
- 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.
- Connected to a GSM/GPRS/EGPRS system simulator, operating in transceiver mode.

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.

5.2. Test Results - Part 22**5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions**

Test Engineer:	Mark Percival	Test Date:	15 May 2012
Test Sample IMEI:	351808050018796		

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

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	39

Note(s):

1. Live / Average emission results were all >30 dB below the applicable limits and therefore not recorded.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.636000	Live	29.2	56.0	26.8	Complied
0.744000	Live	26.2	56.0	29.8	Complied
1.252500	Live	33.2	56.0	22.8	Complied
1.333500	Live	31.6	56.0	24.4	Complied
1.743000	Live	36.2	56.0	19.8	Complied
13.920000	Live	17.0	60.0	43.0	Complied

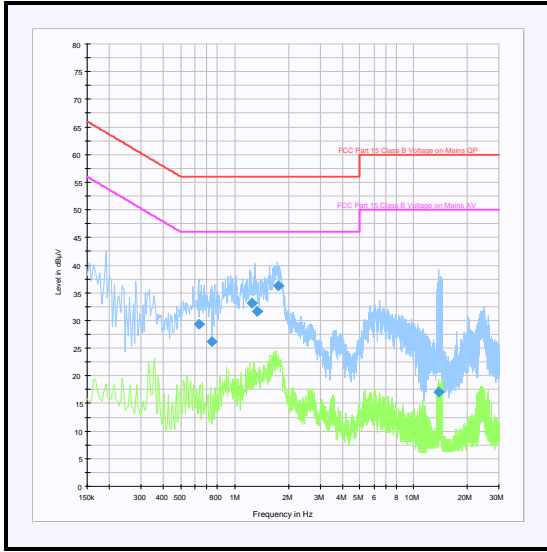
Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.240000	Neutral	36.3	62.1	25.8	Complied
0.348000	Neutral	36.0	59.0	23.0	Complied
0.505500	Neutral	30.1	56.0	25.9	Complied
1.225500	Neutral	35.8	56.0	20.2	Complied
1.725000	Neutral	48.8	56.0	7.2	Complied
2.188500	Neutral	32.6	56.0	23.4	Complied

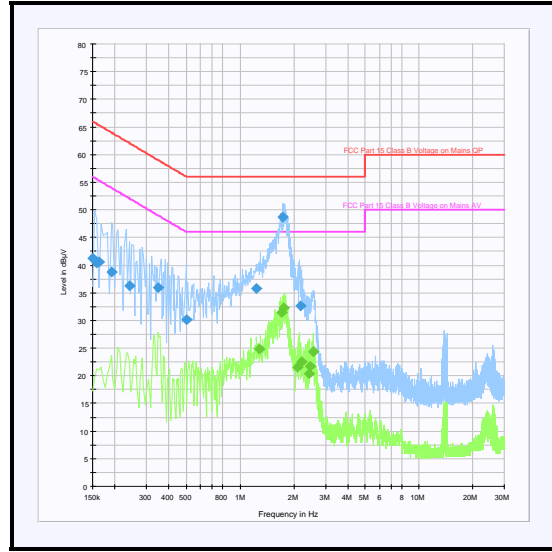
Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.752000	Neutral	32.3	46.0	13.7	Complied
2.103000	Neutral	21.5	46.0	24.5	Complied
2.197500	Neutral	22.5	46.0	23.5	Complied
2.427000	Neutral	20.3	46.0	25.7	Complied
2.454000	Neutral	21.7	46.0	24.3	Complied
2.571000	Neutral	24.4	46.0	21.6	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.

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	03 May 2012
Test Sample Serial No:	351808050018796		

FCC 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 (%):	33

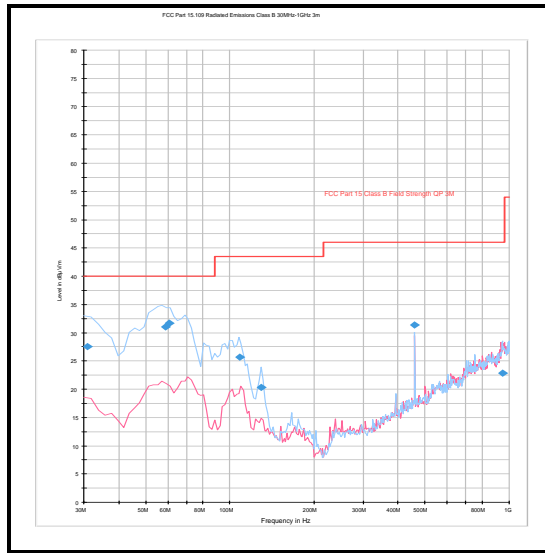
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
30.909	Horizontal	27.6	40.0	12.4	Complied
58.672	Horizontal	31.1	40.0	8.9	Complied
60.895	Horizontal	31.7	40.0	8.3	Complied
108.424	Horizontal	25.6	43.5	17.9	Complied
129.576	Horizontal	20.4	43.5	23.1	Complied
458.806	Horizontal	31.3	46.0	14.7	Complied
944.903	Horizontal	22.8	46.0	23.2	Complied

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.

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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	01 May 2012
Test Sample IMEI:	351808050018796		

FCC 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):	23
Relative Humidity (%):	25

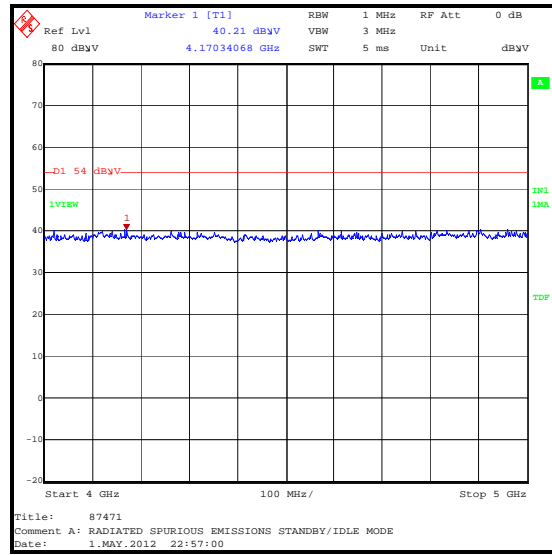
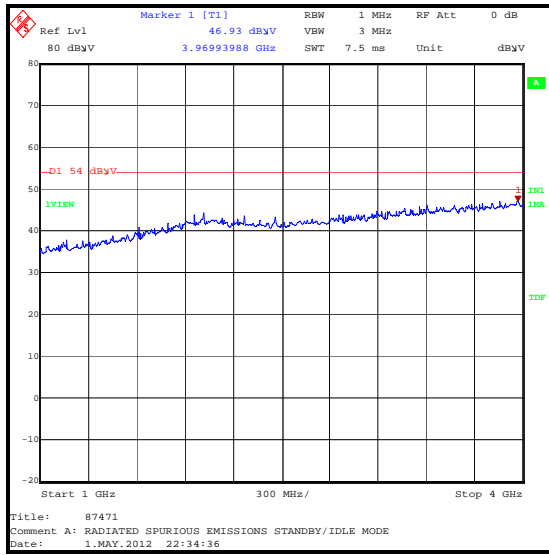
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3969.940	Vertical	46.9	54.0	7.1	Complied

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.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.2.3. Transmitter Output Power (ERP)**Test Summary:**

Test Engineer:	David Doyle	Test Date:	17 May 2012
Test Sample IMEI:	351808050018804		

FCC Part:	22.913(a)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	34

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	28.1	38.45	10.35	Complied
Middle	836.6	Horizontal	27.3	38.45	11.15	Complied
Top	848.8	Horizontal	26.2	38.45	12.25	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	28.7	38.45	9.75	Complied
Middle	836.6	Horizontal	29.6	38.45	8.85	Complied
Top	848.8	Horizontal	28.9	38.45	9.55	Complied

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	28.9	38.45	9.55	Complied
Middle	836.6	Horizontal	29.8	38.45	8.65	Complied
Top	848.8	Horizontal	28.5	38.45	9.95	Complied

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

Test Engineer:	Patrick Jones	Test Date:	08 May 2012
Test Sample IMEI:	351808050018994		

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:

Ambient Temperature (°C):	24
Ambient Relative Humidity (%):	37

Results: Middle Channel (836.6 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	836.599960	40	0.0478	2.5	2.4522	Complied
-20	836.599963	37	0.0442	2.5	2.4558	Complied
-10	836.599958	42	0.0502	2.5	2.4498	Complied
0	836.599977	23	0.0275	2.5	2.4725	Complied
10	836.599961	39	0.0466	2.5	2.4534	Complied
20	836.599969	31	0.0371	2.5	2.4629	Complied
30	836.599971	29	0.0347	2.5	2.4653	Complied
40	836.599969	31	0.0371	2.5	2.4629	Complied
50	836.599964	36	0.0430	2.5	2.4570	Complied

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 CMU 200 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMU 200. A bi-directional communications link was established between the EUT and CMU 200. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

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

Test Engineer:	Patrick Jones	Test Date:	08 May 2012
Test Sample IMEI:	351808050018994		

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):	24
Relative Humidity (%):	37

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	836.600033	33	0.0394	2.5	2.4606	Complied
4.35	836.600019	19	0.0227	2.5	2.4773	Complied

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 CMU 200 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMU 200. A bi-directional communications link was established between the EUT and CMU 200. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

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

Test Engineer:	Patrick Jones & David Doyle	Test Date:	10 May 2012 & 16 May 2012
Test Sample IMEI:	351808050018994		

FCC Part:	2.1049
Test Method Used:	The 99% occupied bandwidth was measured using the Occupied Bandwidth function of a spectrum analyser

Environmental Conditions:

Temperature (°C):	24 to 28
Relative Humidity (%):	27 to 52

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	242.485
Middle	836.6	242.485
Top	848.8	242.485

Results: GPRS

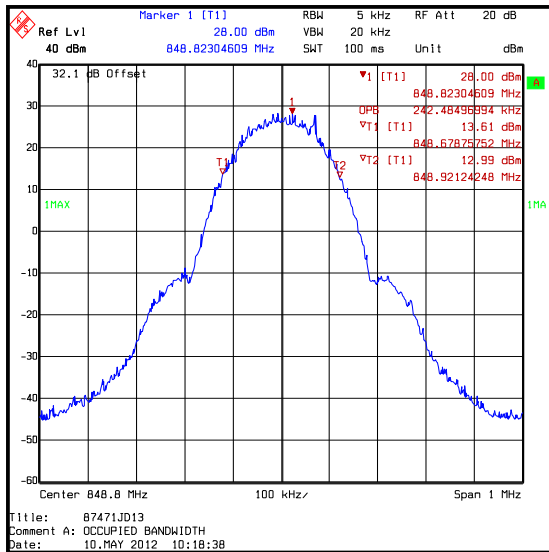
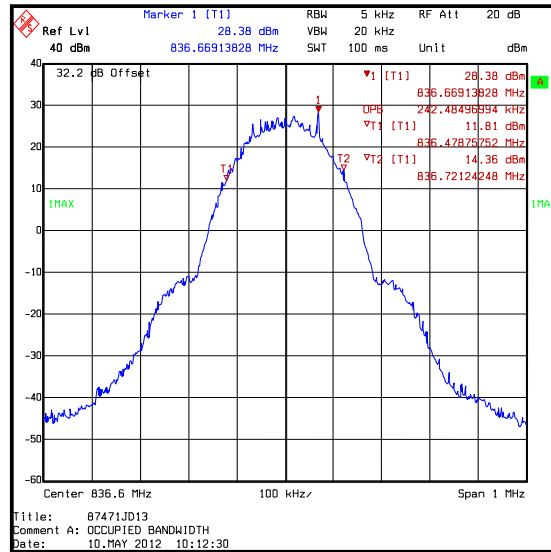
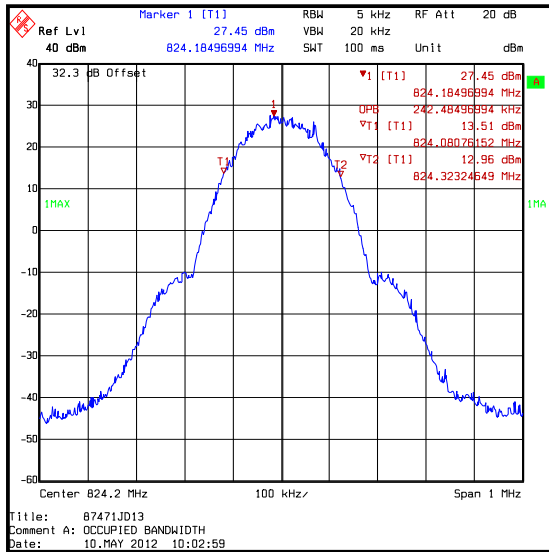
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	241.683
Middle	836.6	241.683
Top	848.8	241.683

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	241.683
Middle	836.6	239.279
Top	848.8	240.481

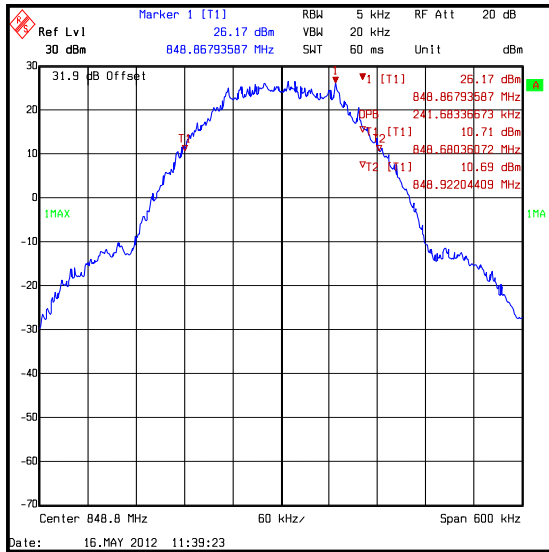
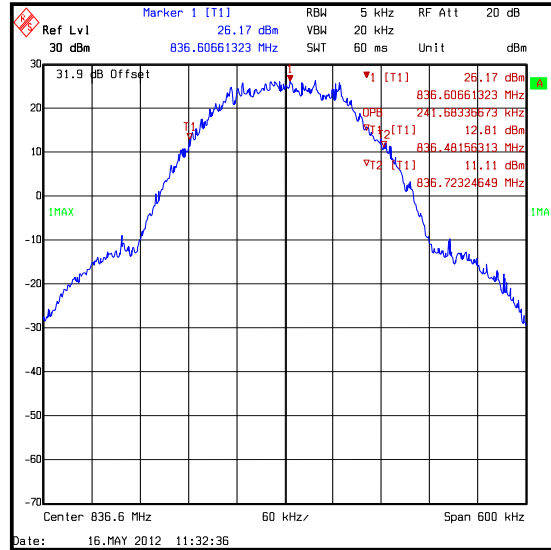
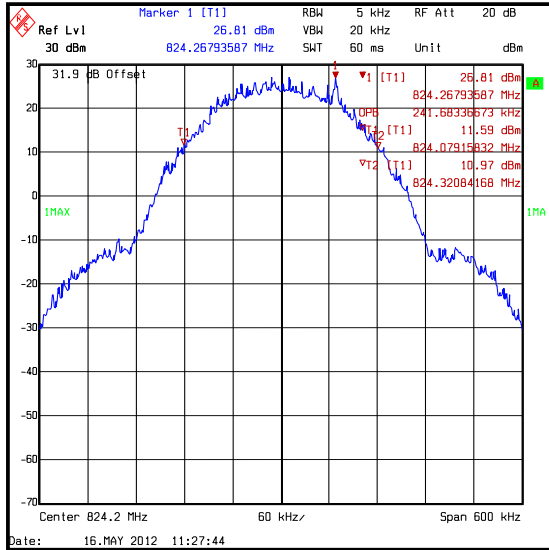
Transmitter Occupied Bandwidth (continued)

GSM Circuit Switched



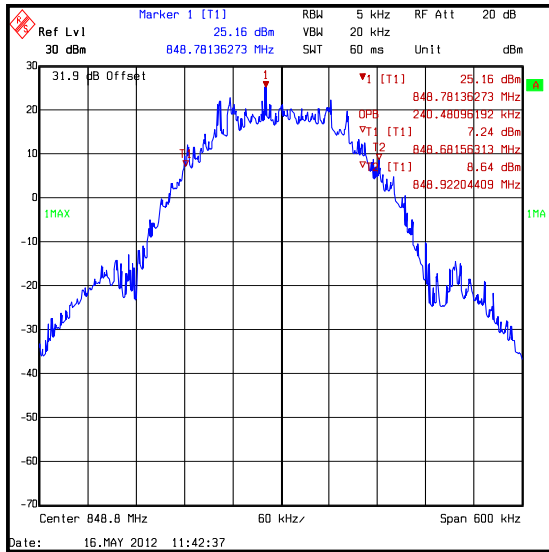
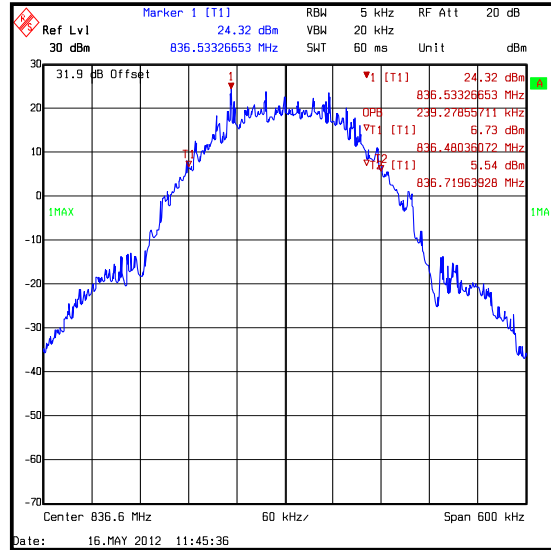
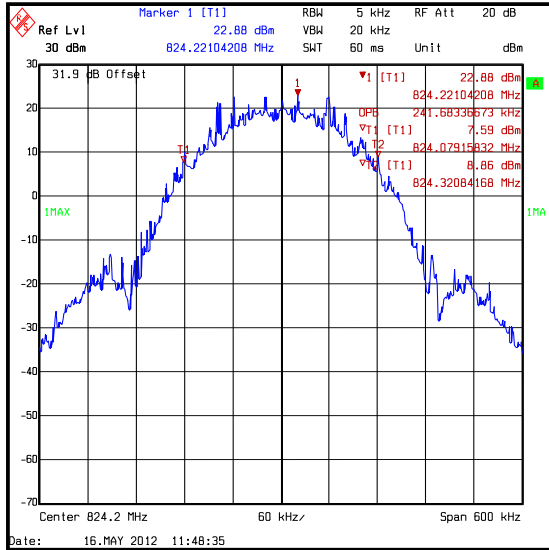
Transmitter Occupied Bandwidth (continued)

GPRS



Transmitter Occupied Bandwidth (continued)

EGPRS / MCS5



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

Test Engineer:	Nick Steele	Test Date:	02 May 2012 & 04 May 2012
Test Sample IMEI:	351808050018804		

FCC Part:	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:	GSM Circuit Switched

Environmental Conditions:

Temperature (°C):	22 to 24
Relative Humidity (%):	26 to 33

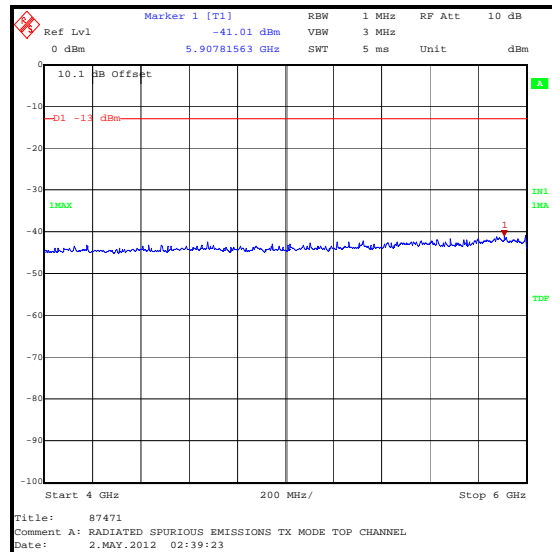
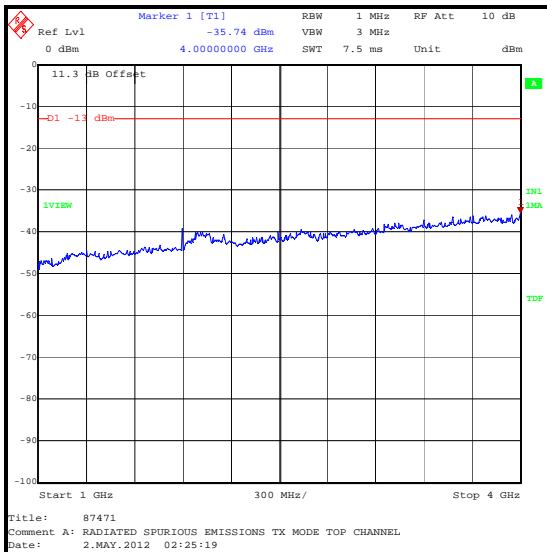
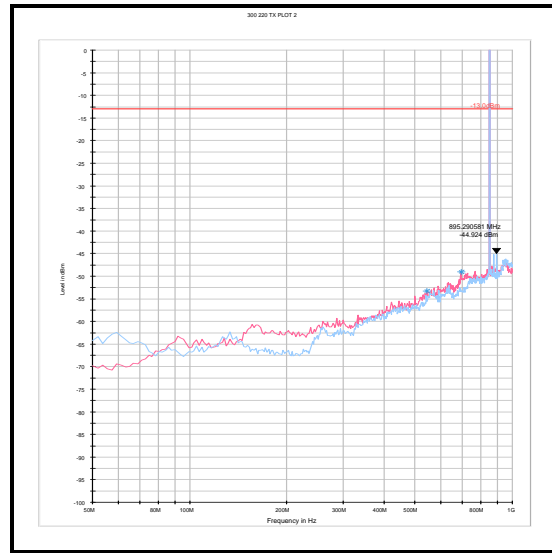
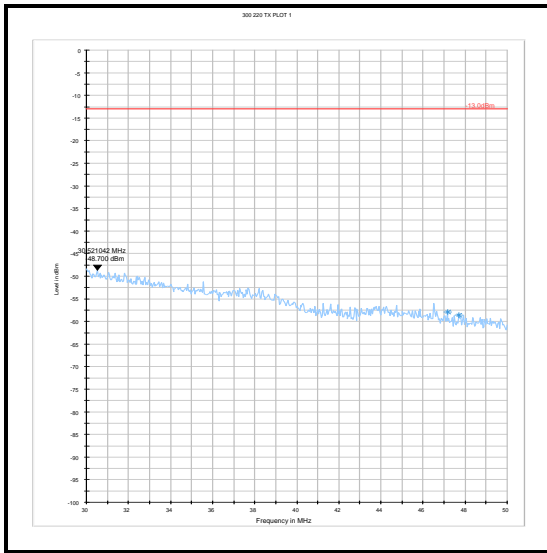
Results:

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4000.000	-35.7	-13.0	22.7	Complied

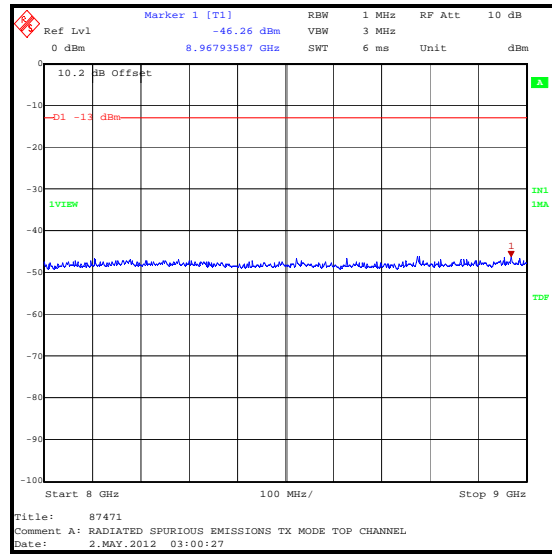
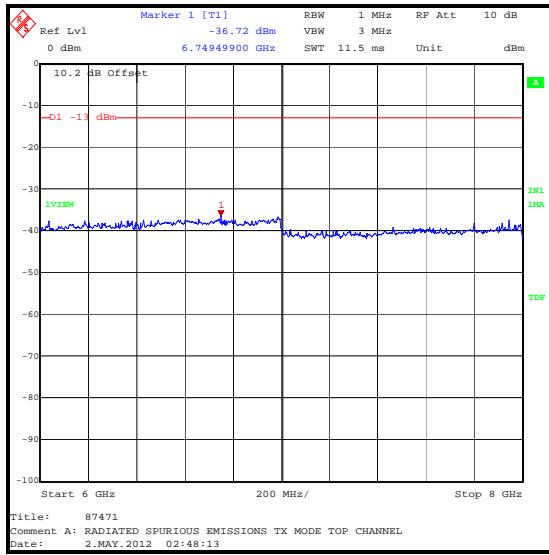
Note(s):

1. The uplink and downlink traffic channels are shown on the 30 MHz to 1 GHz plot.
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.
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.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (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.

Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



5.2.8. Transmitter Radiated Emissions at Band Edges

Test Summary:

Test Engineer:	David Doyle	Test Date:	17 May 2012
Test Sample IMEI:	351808050018804		

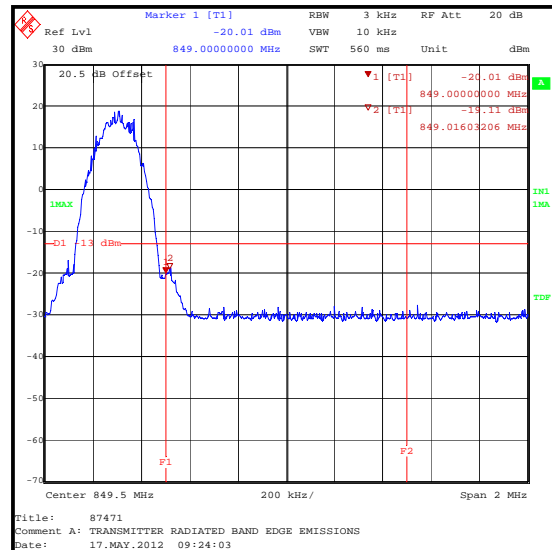
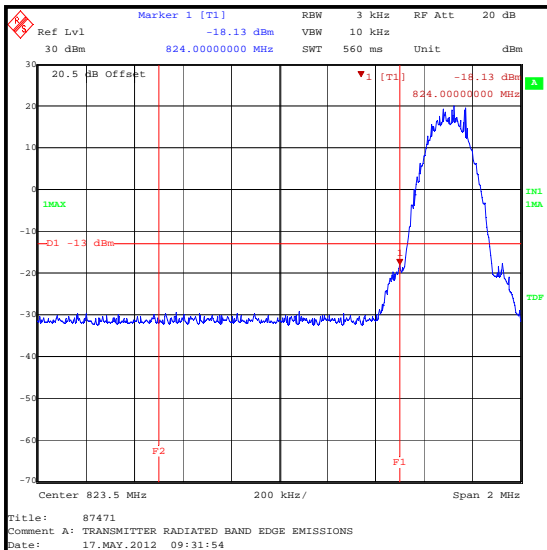
FCC Part:	2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 22.917

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	34

Results: GSM Circuit Switched

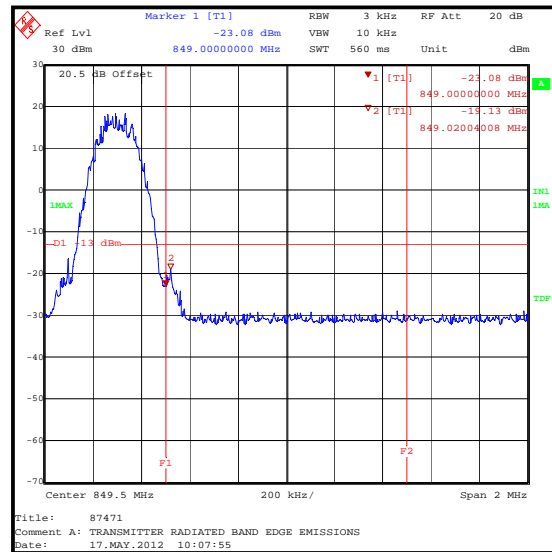
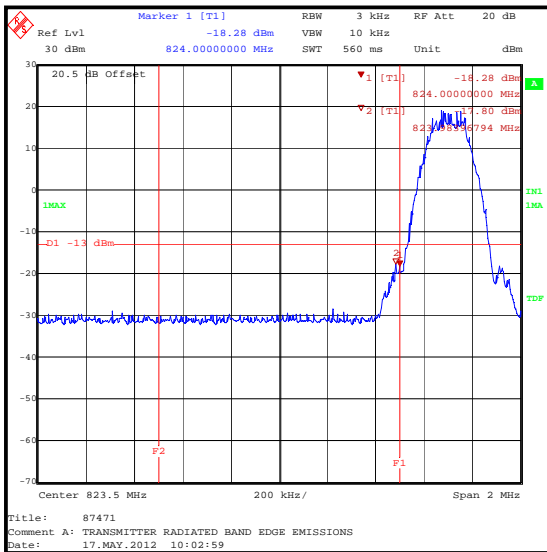
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-18.1	-13.0	5.1	Complied
849	-20.0	-13.0	7.0	Complied
849.016	-19.1	-13.0	6.1	Complied



Transmitter Band Edge Radiated Emissions (continued)

Results: GPRS

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
823.984	-17.8	-13.0	4.8	Complied
824	-18.3	-13.0	5.3	Complied
849	-23.1	-13.0	10.1	Complied
849.020	-19.1	-13.0	6.1	Complied



5.3. Test Results - Part 24**5.3.1. Receiver/Idle Mode AC Conducted Spurious Emissions**

Test Engineer:	Mark Percival	Test Date:	15 May 2012
Test Sample IMEI:	351808050018796		

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

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	39

Note(s):

2. Live / Average emission results were all >30 dB below the applicable limits and therefore not recorded.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.636000	Live	29.2	56.0	26.8	Complied
0.744000	Live	26.2	56.0	29.8	Complied
1.252500	Live	33.2	56.0	22.8	Complied
1.333500	Live	31.6	56.0	24.4	Complied
1.743000	Live	36.2	56.0	19.8	Complied
13.920000	Live	17.0	60.0	43.0	Complied

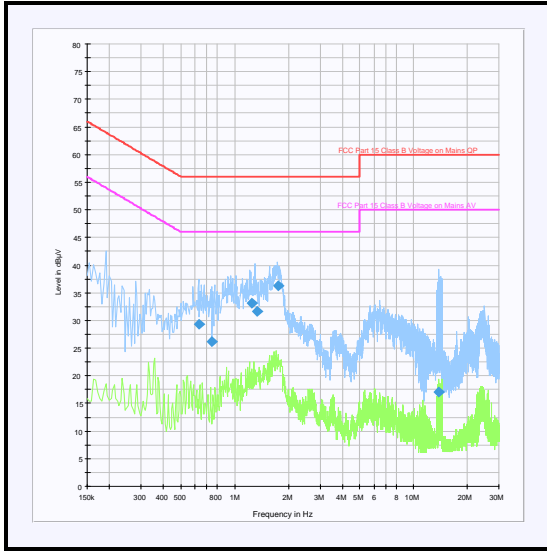
Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.240000	Neutral	36.3	62.1	25.8	Complied
0.348000	Neutral	36.0	59.0	23.0	Complied
0.505500	Neutral	30.1	56.0	25.9	Complied
1.225500	Neutral	35.8	56.0	20.2	Complied
1.725000	Neutral	48.8	56.0	7.2	Complied
2.188500	Neutral	32.6	56.0	23.4	Complied

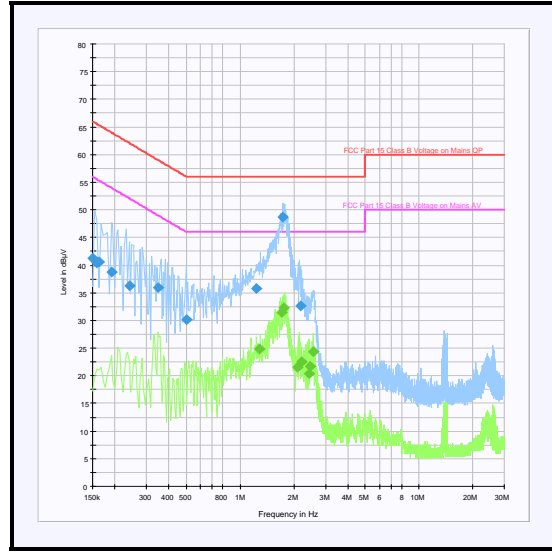
Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.752000	Neutral	32.3	46.0	13.7	Complied
2.103000	Neutral	21.5	46.0	24.5	Complied
2.197500	Neutral	22.5	46.0	23.5	Complied
2.427000	Neutral	20.3	46.0	25.7	Complied
2.454000	Neutral	21.7	46.0	24.3	Complied
2.571000	Neutral	24.4	46.0	21.6	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.

5.3.2. Receiver/Idle Mode Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	03 May 2012
Test Sample Serial No:	351808050018796		

FCC 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 (%):	33

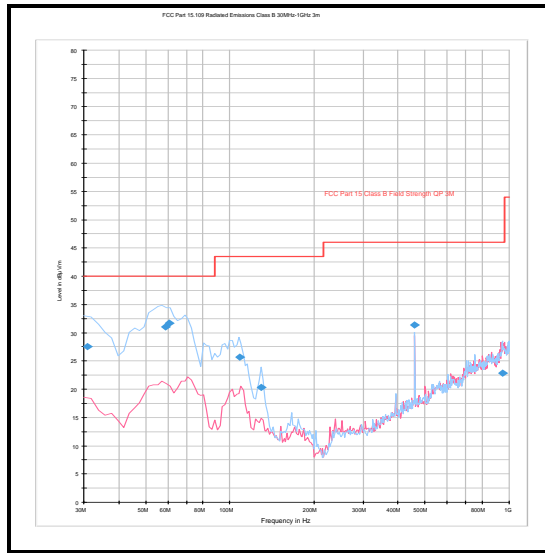
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
30.909	Horizontal	27.6	40.0	12.4	Complied
58.672	Horizontal	31.1	40.0	8.9	Complied
60.895	Horizontal	31.7	40.0	8.3	Complied
108.424	Horizontal	25.6	43.5	17.9	Complied
129.576	Horizontal	20.4	43.5	23.1	Complied
458.806	Horizontal	31.3	46.0	14.7	Complied
944.903	Horizontal	22.8	46.0	23.2	Complied

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.

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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	01 May 2012
Test Sample IMEI:	351808050018796		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 10 GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	25

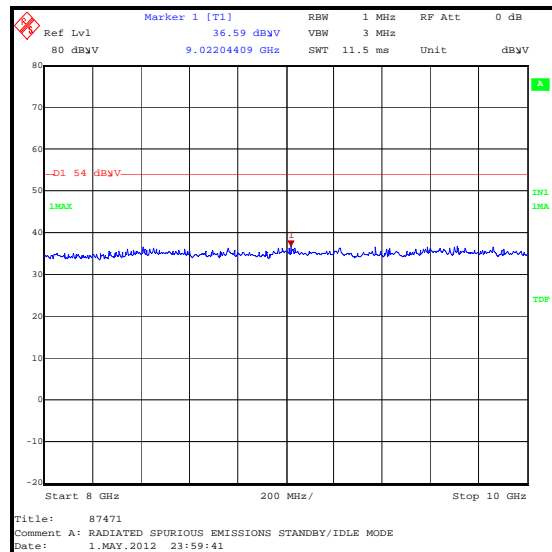
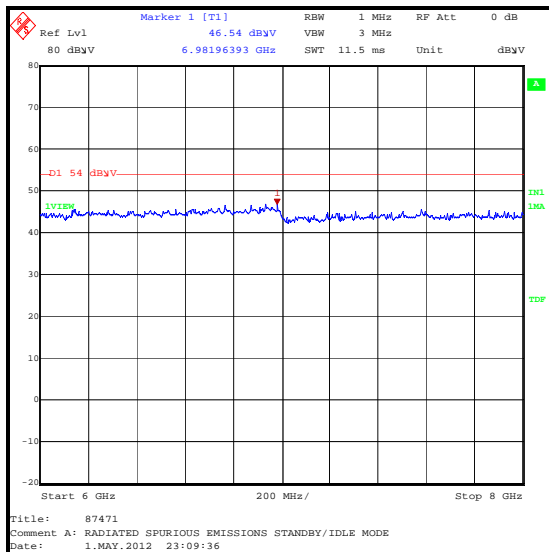
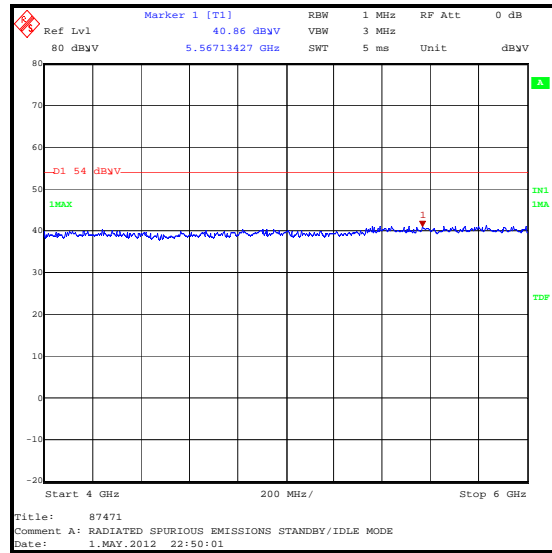
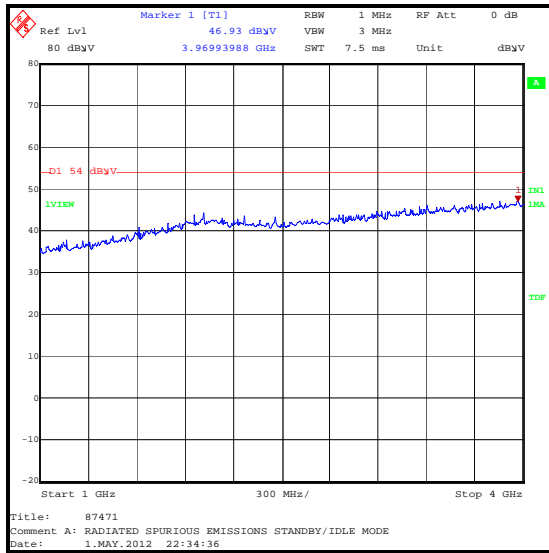
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3969.940	Vertical	46.9	54.0	7.1	Complied

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.
3. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.3.3. Transmitter Output Power (EIRP)**Test Summary:**

Test Engineer:	David Doyle	Test Date:	11 May 2012
Test Sample IMEI:	351808050018804		

FCC Part:	24.232
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

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

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	26.7	33.0	6.3	Complied
Middle	1879.8	Horizontal	26.7	33.0	6.3	Complied
Top	1909.8	Vertical	28.9	33.0	4.1	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	26.4	33.0	6.6	Complied
Middle	1879.8	Vertical	26.4	33.0	6.6	Complied
Top	1909.8	Vertical	28.9	33.0	4.1	Complied

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	25.5	33.0	7.5	Complied
Middle	1879.8	Vertical	27.1	33.0	5.9	Complied
Top	1909.8	Vertical	28.5	33.0	4.5	Complied

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

Test Engineer:	Patrick Jones	Test Date:	08 May 2012
Test Sample IMEI:	351808050018994		

FCC Part:	2.1055 & 24.235
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):	24
Ambient Relative Humidity (%):	32

Results: Bottom Channel (1850.2 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	76	1850.199924	1850.0	0.199924	Complied
-20	85	1850.199915	1850.0	0.199915	Complied
-10	71	1850.199929	1850.0	0.199929	Complied
0	80	1850.199920	1850.0	0.199920	Complied
10	62	1850.199938	1850.0	0.199938	Complied
20	60	1850.200060	1850.0	0.200060	Complied
30	72	1850.199928	1850.0	0.199928	Complied
40	69	1850.200069	1850.0	0.200069	Complied
50	71	1850.199929	1850.0	0.199929	Complied

Results: Top Channel (1909.8 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	94	1909.799906	1910.0	0.200094	Complied
-20	89	1909.799911	1910.0	0.200089	Complied
-10	73	1909.799927	1910.0	0.200073	Complied
0	65	1909.799935	1910.0	0.200065	Complied
10	75	1909.800075	1910.0	0.199925	Complied
20	80	1909.799920	1910.0	0.200080	Complied
30	62	1909.799938	1910.0	0.200062	Complied
40	60	1909.799940	1910.0	0.200060	Complied
50	69	1909.799931	1910.0	0.200069	Complied

Transmitter Frequency Stability (Temperature Variation) (continued)**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 CMU 200 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMU 200. A bidirectional communications link was established between the EUT and CMU 200. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

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

Test Engineer:	Patrick Jones	Test Date:	08 May 2012
Test Sample IMEI:	351808050018994		

FCC Part:	2.1055 & 24.235
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):	24
Relative Humidity (%):	37

Results: Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.4	32	1850.200032	1850.0	0.200032	Complied
4.35	35	1850.200035	1850.0	0.200035	Complied

Results: Top Channel (1909.8 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.4	76	1909.800076	1910.0	0.199924	Complied
4.35	81	1909.800081	1910.0	0.199919	Complied

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 CMU 200 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was connected by suitable RF cables to the CMU 200. A bidirectional communications link was established between the EUT and CMU 200. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

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

Test Engineer:	Patrick Jones & David Doyle	Test Dates:	10 May 2012 & 16 May 2012
Test Sample IMEI:	351808050018994		

FCC Part:	2.1049
Test Method Used:	The 99% occupied bandwidth was measured using the Occupied Bandwidth function of a spectrum analyser

Environmental Conditions:

Temperature (°C):	24 to 27
Relative Humidity (%):	28 to 51

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	240.481
Middle	1879.8	240.481
Top	1909.8	242.485

Results: GPRS

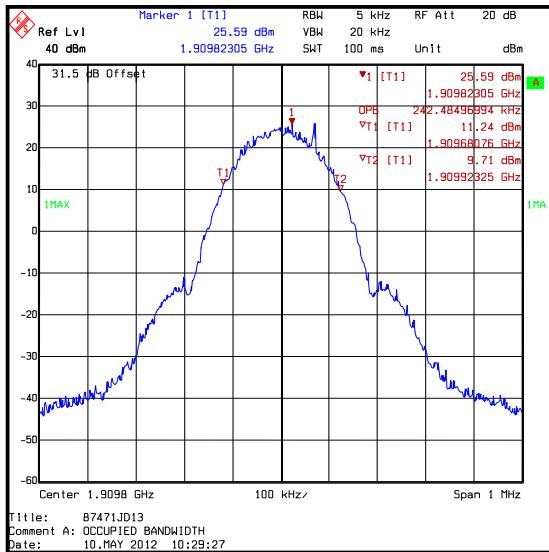
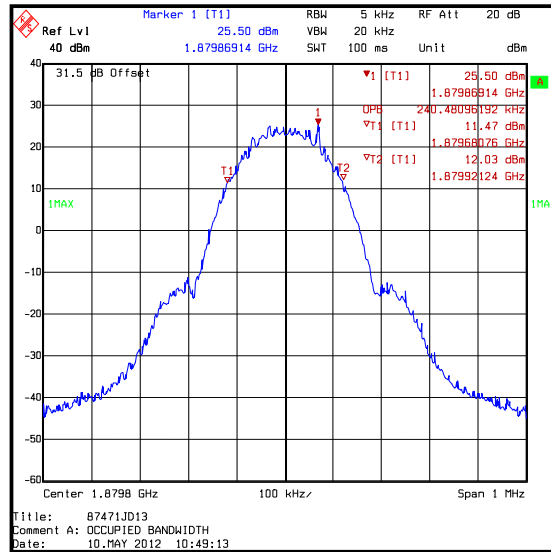
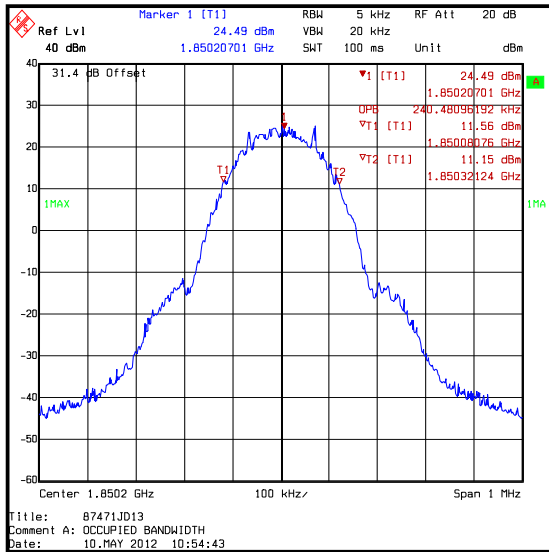
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	242.886
Middle	1879.8	242.886
Top	1909.8	244.088

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	239.279
Middle	1879.8	242.886
Top	1909.8	240.481

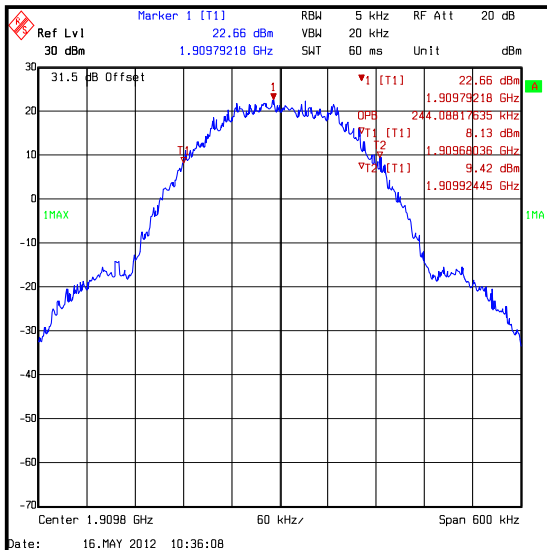
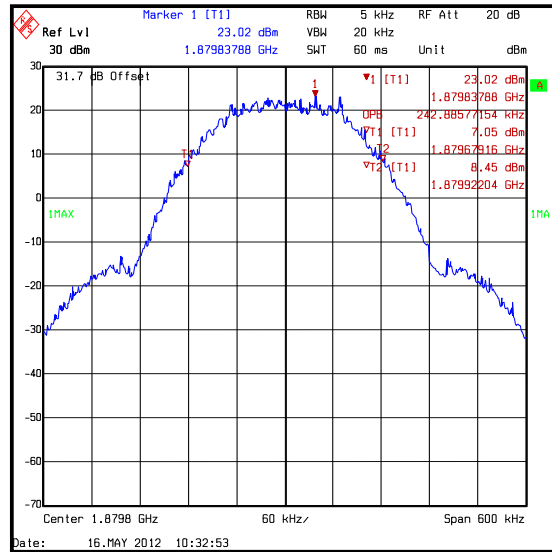
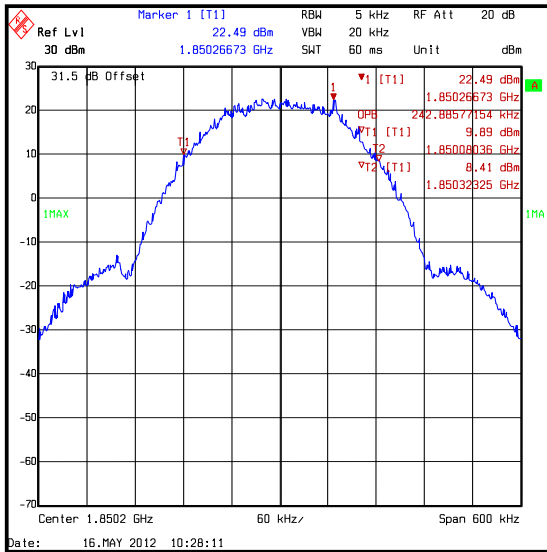
Transmitter Occupied Bandwidth (continued)

GSM Circuit Switched



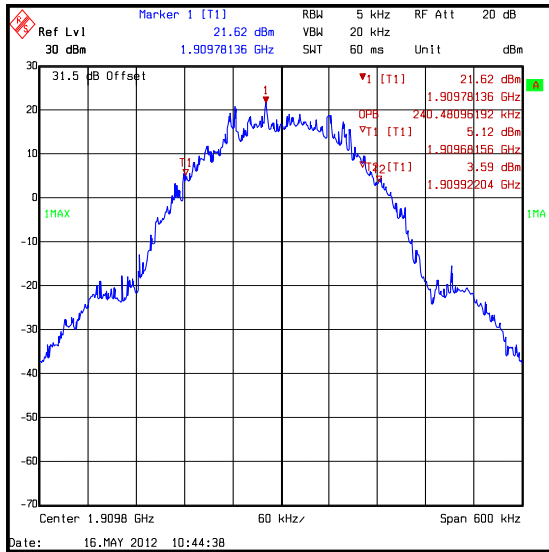
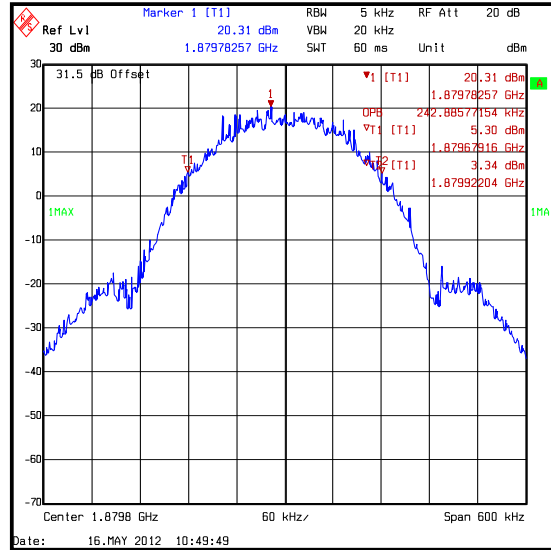
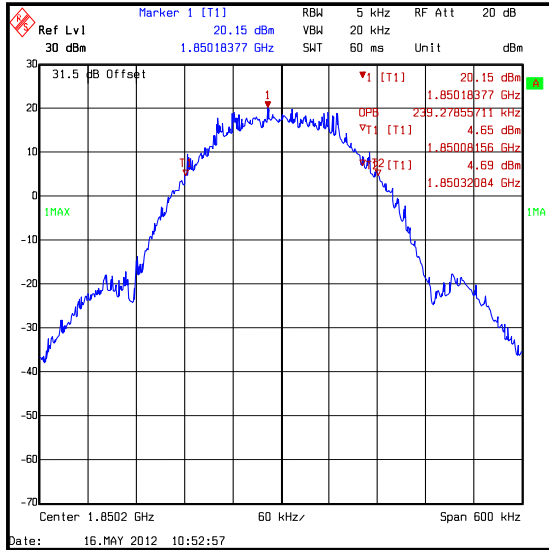
Transmitter Occupied Bandwidth (continued)

GPRS



Transmitter Occupied Bandwidth (continued)

EGPRS / MCS5



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

Test Engineers:	Nick Steele	Test Dates:	01 May 2012 & 02 May 2012
Test Sample IMEI:	351808050018804		

FCC Part:	2.1053 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238
Frequency Range:	30 MHz to 20 GHz
Configuration:	GSM Circuit Switched

Environmental Conditions:

Temperature (°C):	22 to 24
Relative Humidity (%):	26 to 33

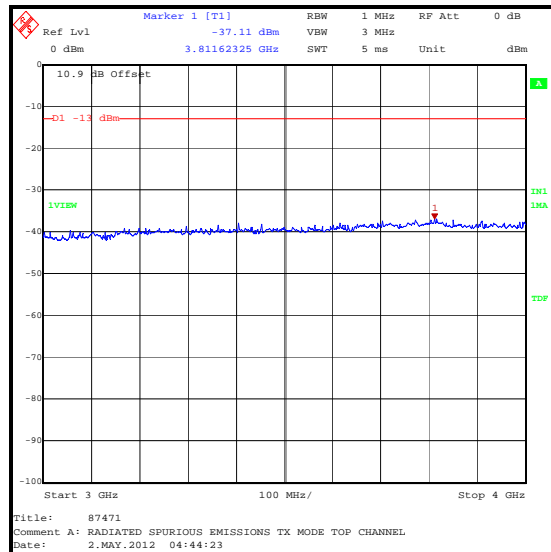
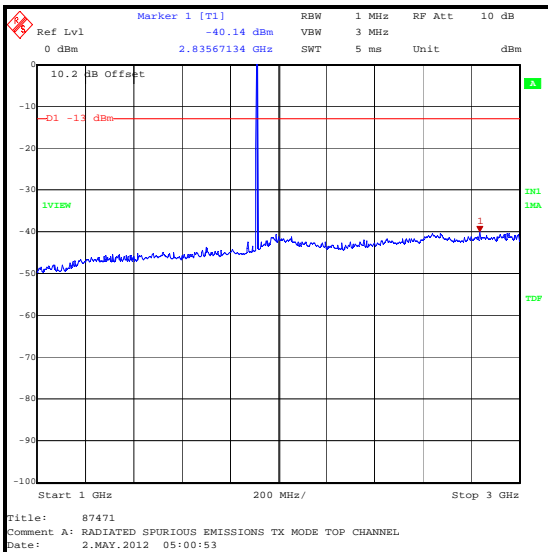
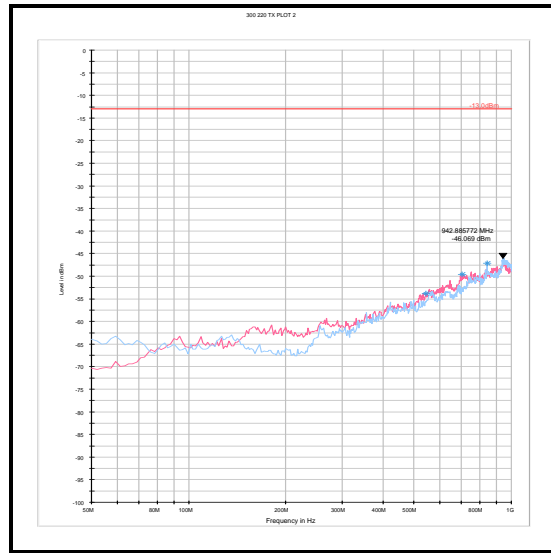
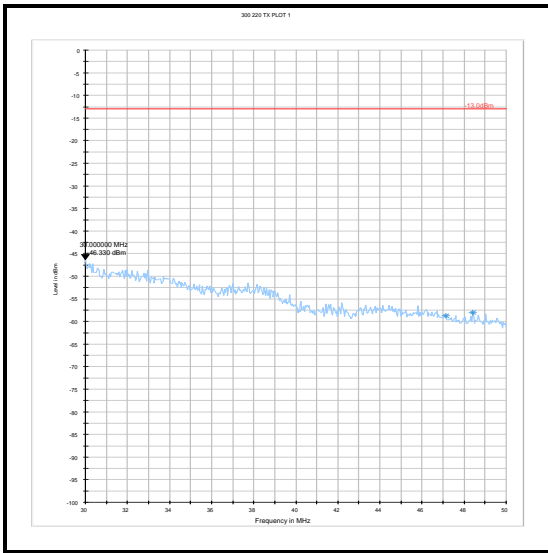
Results: Bottom Channel

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
17684.369	-35.4	-13.0	22.4	Complied

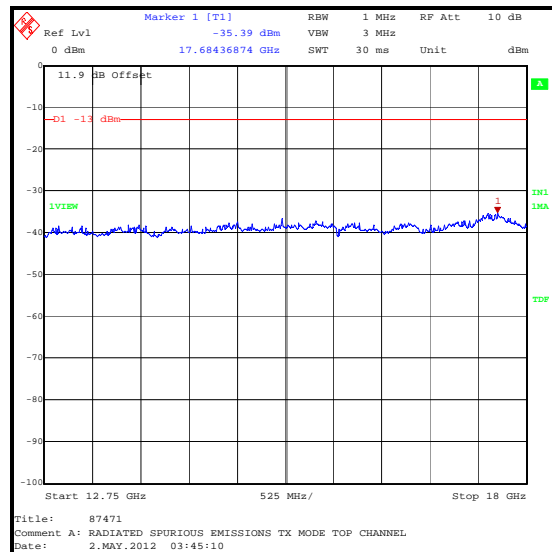
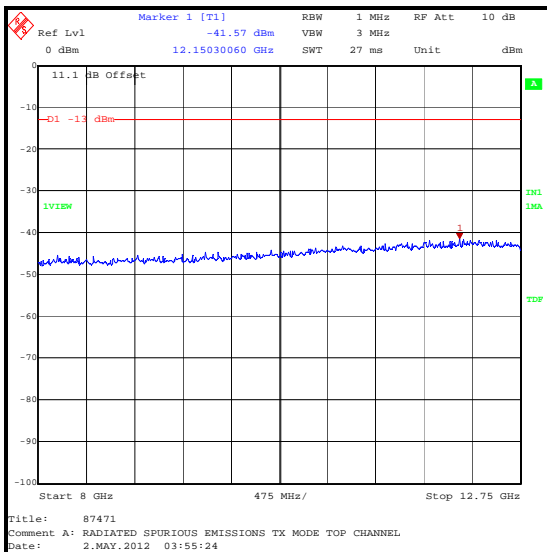
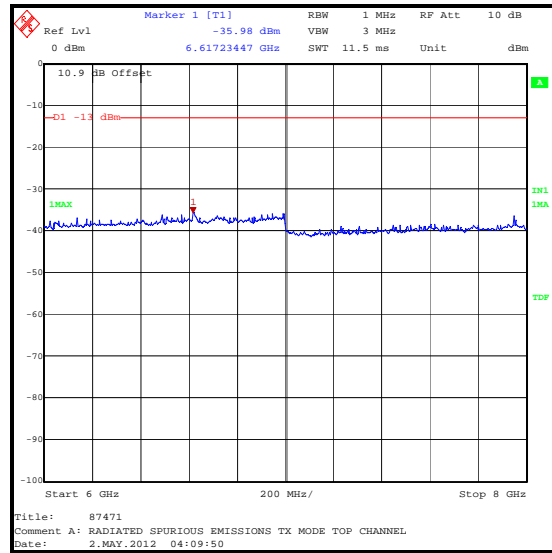
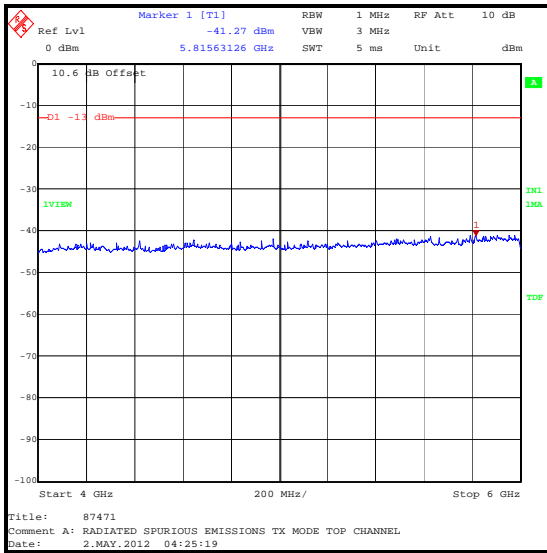
Note(s):

1. 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.
2. The uplink traffic channel is shown on the 1 GHz to 4 GHz plot.
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.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI 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 (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.

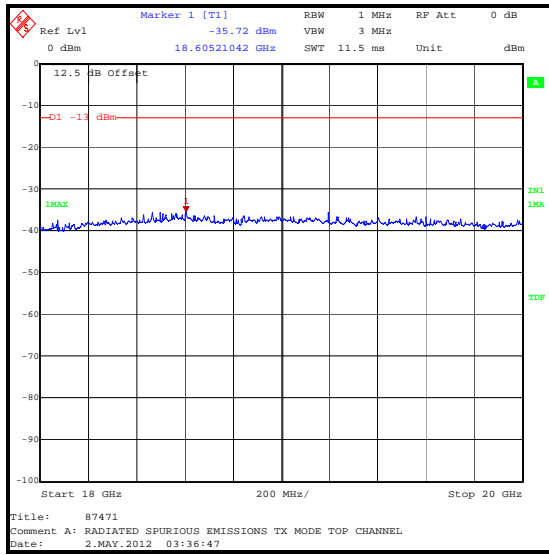
Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



Transmitter Out of Band Radiated Emissions (continued)



5.3.8. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	David Doyle	Test Dates:	02 May 2012 & 11 May 2012
Test Sample IMEI:	351808050018804		

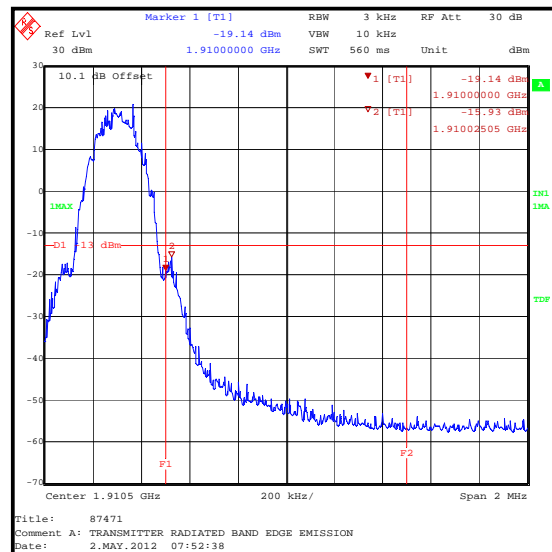
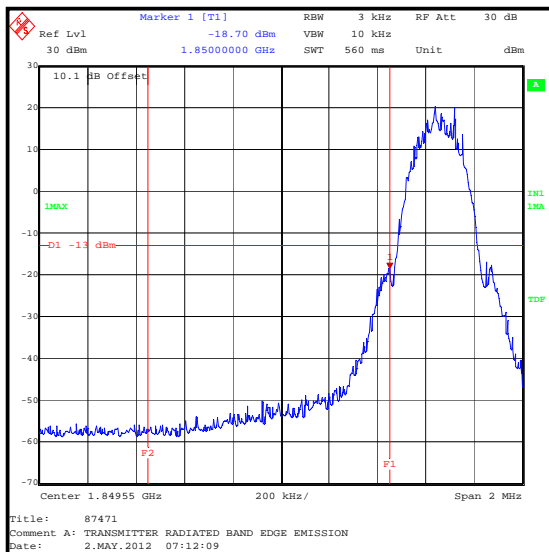
FCC Part:	2.1053 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238

Environmental Conditions:

Temperature (°C):	23 to 24
Relative Humidity (%):	23 to 39

Results: GSM Circuit Switched

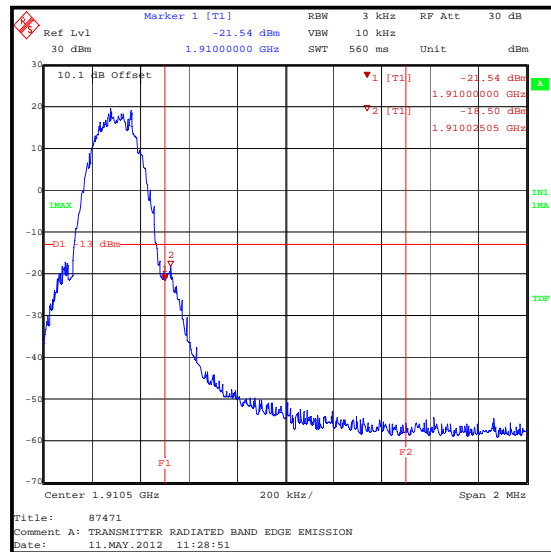
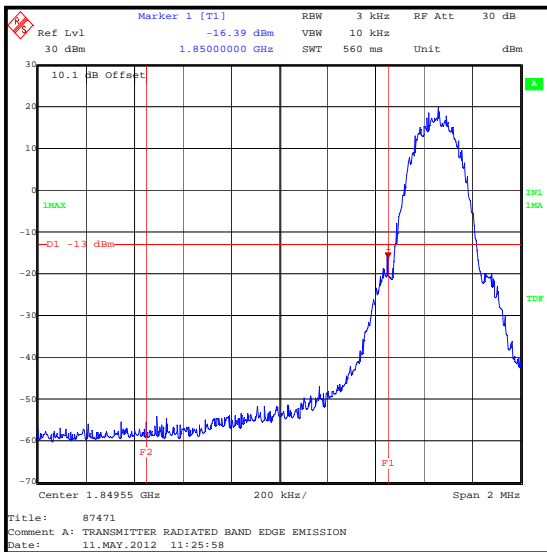
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850.000	-18.7	-13.0	5.7	Complied
1910.000	-19.1	-13.0	6.1	Complied
1910.025	-15.9	-13.0	2.9	Complied



Transmitter Band Edge Radiated Emissions (continued)

Results: GPRS

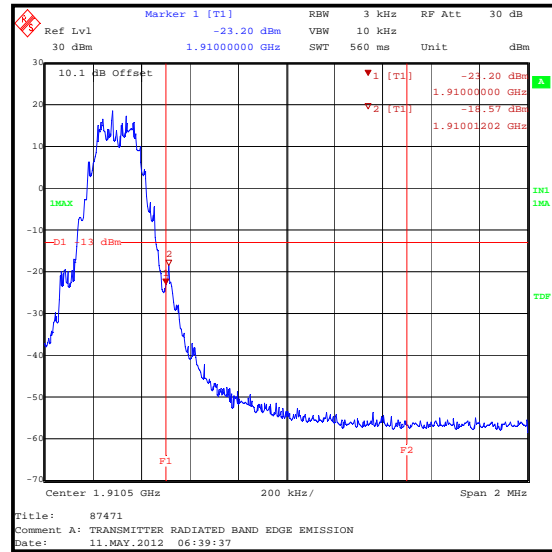
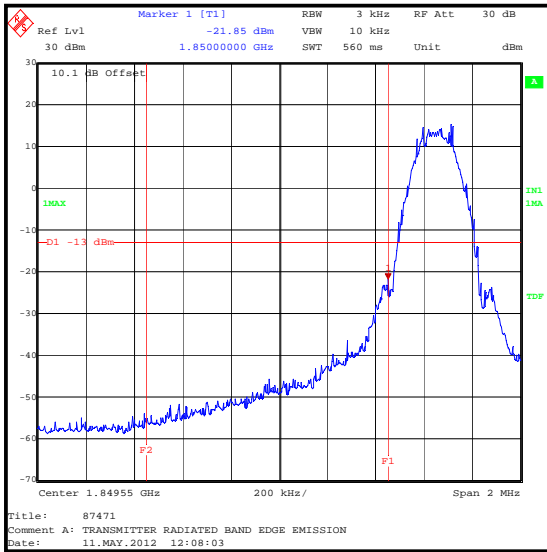
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850.000	-16.4	-13.0	3.4	Complied
1910.000	-21.5	-13.0	8.5	Complied
1910.025	-18.5	-13.0	5.5	Complied



Transmitter Band Edge Radiated Emissions (continued)

Results: EGPRS / MCS5

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-21.9	-13.0	8.9	Complied
1910	-23.2	-13.0	10.2	Complied
1910.012	-18.6	-13.0	5.6	Complied



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%	±3.25 dB
Effective Radiated Power	824 to 849 MHz	95%	±2.94 dB
Effective Isotropic Radiated Power	1850 to 1910 MHz	95%	±2.94 dB
Frequency Stability	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Occupied Bandwidth	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 20 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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (month)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1255	Power Supply Unit	Farnell	11E302BT	000263	Calibrated before use	-
A1368	Directional Coupler	Pasternack	PE2214-10	None	Calibrated before use	-
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A1974	High Pass Filter	AtlanTecRF	AFH-01000	090000283	15 Mar 2013	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	15 Mar 2013	12
A244	Attenuator	Schaffner	6820-17-B	None	03 Apr 2013	12
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A288	Antenna	Chase	CBL6111A	1589	19 Aug 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
E0513	Environmental Chamber	TAS	LT600 Series 3	23900506	Calibrated before use	-
G0543	Amplifier	Sonoma	310N	230801	13 Jul 2012	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
L1021	Comms Test Set	Rohde & Schwarz	CMU 200	111379	31 May 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M122	Digital Voltmeter	Fluke	77	64910017	29 Jun 2012	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	12 Dec 2012	12
M1249	Thermometer	Fluke	52II	88800049	30 Mar 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Sep 2012	12
M1449	Signal Generator	Rohde & Schwarz	SMIQ03B	100176	07 Mar 2013	12

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.