TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: NTT docomo EB-4058

FCC ID: UCE212051A

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

Test Report Serial No.:
RFI-RPT-RP87473JD11A 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:	Steven White
Signature:	
Date of Issue:	04 July 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 RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	21 May 2012 to 12 June 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-4058
IMEI:	351807050017170 (Radiated sample #1)
Hardware Version Number:	Rev E
Software Version Number:	ACPU: fujiko-ics-09-0316 CCPU: HY11-N5119_ALL_00.20.31
FCC ID:	UCE212051A

Brand Name:	NTT docomo
Model Name or Number:	EB-4058
IMEI:	351807050017162 (Radiated sample #2)
Hardware Version Number:	Rev E
Software Version Number:	ACPU: fujiko-ics-09-0316 CCPU: HY11-N5119_ALL_00.20.31
FCC ID:	UCE212051A

Brand Name:	NTT docomo
Model Name or Number:	EB-4058
IMEI:	351807050017188 (Conducted RF port sample #1)
Hardware Version Number:	Rev E
Software Version Number:	ACPU: fujiko-ics-09-0316 CCPU: HY11-N5119_ALL_00.20.31
FCC ID:	UCE212051A

Equipment Under Test (EUT) (continued)

Brand Name:	NTT docomo
Model Name or Number:	EB-4058
IMEI:	351807050017253 (Conducted RF port sample #1)
Hardware Version Number:	Rev E
Software Version Number:	ACPU: fujiko-ics-09-0316 CCPU: HY11-N5119_ALL_00.20.31
FCC ID:	UCE212051A

Brand Name:	NTT docomo
Description:	AC Charger
Model Name or Number:	Type P01

Brand Name:	NTT docomo
Description:	USB Data cable
Model Name or Number:	Type 01

Brand Name:	NTT docomo
Description:	Personal Hands-Free
Model Name or Number:	Type 02

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

No modifications were applied to the EUT during testing.

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	31.5 dBm	
	GPRS	31.4 dBm	
	EGPRS	28.6 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	28.2 dBm	
	GPRS	28.3 dBm	
	EGPRS	26.7 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:

Brand Name:	Generic
Description:	Micro SD Memory Card
Model Name or Number:	Not Stated

Brand Name:	Not Stated
Description:	Dummy Battery
Model Name or Number:	Not 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/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):

- Connected to a Rohde & Schwarz CMU 200 Universal Radio Communications Tester, operating in GSM 850 & PCS 1900 mode.
- The conducted samples with IMEI 351807050017188 and 351807050017253 was used for frequency stability and occupied bandwidth measurements
- The radiated samples with IMEI 351807050017170 and 351807050017162 was used for all radiated measurements
- Receiver/idle mode and transmitter radiated spurious emissions tests were performed with the PHF and AC charger 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.
- The EUT was 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 Summary:

Test Engineer:	Nick Steele	**Test Date:**	12 June 2012
Test Sample Serial No:	351807050017170		

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

Environmental Conditions:

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

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Live	48.2	66.0	17.8	Complied
0.303	Live	38.5	60.2	21.7	Complied
1.167	Live	36.2	56.0	19.8	Complied
1.333	Live	33.8	56.0	22.2	Complied
1.585	Live	35.8	56.0	20.2	Complied
3.489	Live	36.3	56.0	19.7	Complied
3.813	Live	35.5	56.0	20.5	Complied
4.861	Live	33.1	56.0	22.9	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.550	Live	27.9	46.0	18.1	Complied
1.014	Live	28.1	46.0	17.9	Complied
1.113	Live	27.5	46.0	18.5	Complied
1.176	Live	27.5	46.0	18.5	Complied
1.630	Live	28.0	46.0	18.0	Complied
2.436	Live	31.0	46.0	15.0	Complied
3.606	Live	29.1	46.0	16.9	Complied
16.026	Live	33.7	50.0	16.3	Complied
16.152	Live	34.2	50.0	15.8	Complied
16.260	Live	32.3	50.0	17.7	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

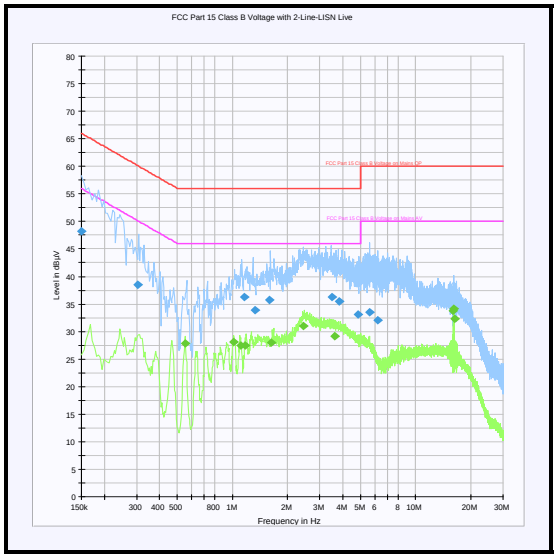
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Neutral	55.6	66.0	10.4	Complied
0.163	Neutral	54.7	65.3	10.6	Complied
0.208	Neutral	51.6	63.3	11.7	Complied
0.240	Neutral	48.8	62.1	13.3	Complied
0.411	Neutral	39.4	57.6	18.2	Complied
0.465	Neutral	37.9	56.6	18.7	Complied
4.969	Neutral	35.4	56.0	20.6	Complied

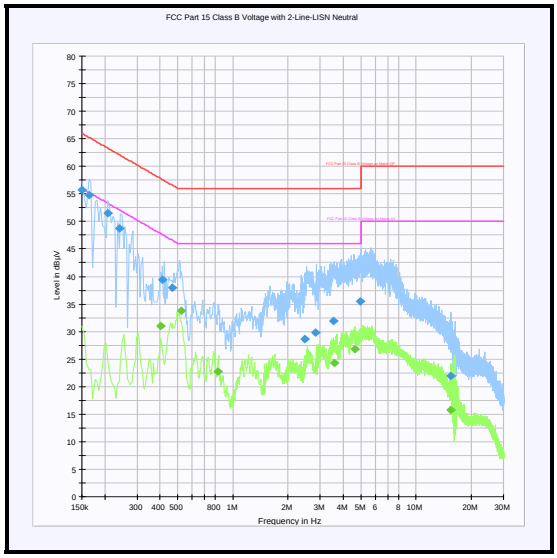
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.402	Neutral	31.0	47.8	16.8	Complied
0.523	Neutral	33.7	46.0	12.3	Complied
0.829	Neutral	22.7	46.0	23.3	Complied
3.579	Neutral	24.3	46.0	21.7	Complied
4.654	Neutral	26.9	46.0	19.1	Complied
15.481	Neutral	15.7	50.0	34.3	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.

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5.2.2. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	29 May 2012
Test Sample IMEI:	351807050017170		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	35

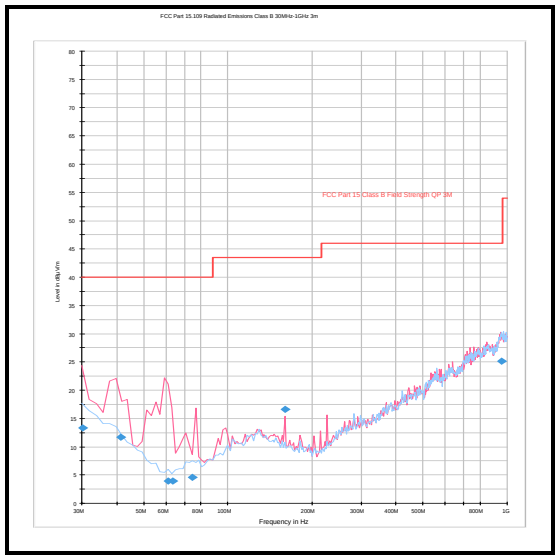
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
30.284	Vertical	13.3	40.0	26.7	Complied
41.436	Vertical	11.6	40.0	28.4	Complied
63.387	Vertical	4.0	40.0	36.0	Complied
74.600	Vertical	4.6	40.0	35.4	Complied
160.005	Vertical	16.6	43.5	26.9	Complied
954.842	Horizontal	25.2	46.0	20.8	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:	Mark Percival & Andrew Edwards	**Test Date:**	21 May 2012 & 29 May 2012
Test Sample IMEI:	351807050017170		

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):	26
Relative Humidity (%):	44

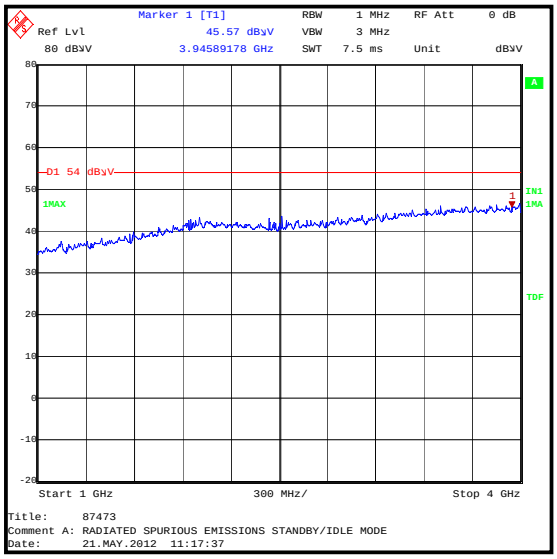
Results:

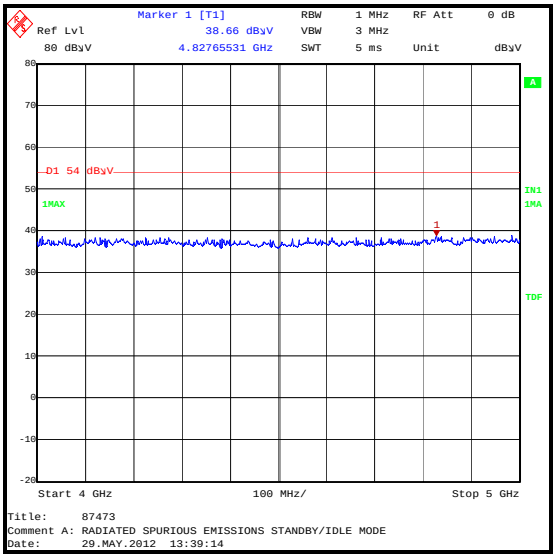
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3945.892	Vertical	45.6	54.0	8.4	Complied

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. 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.
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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)





5.2.3. Transmitter Output Power (ERP)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	22 May 2012
Test Sample IMEI:	351807050017162		

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 (%):	44

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	29.6	38.45	8.85	Complied
Middle	836.6	Horizontal	31.3	38.45	7.15	Complied
Top	848.8	Horizontal	31.5	38.45	6.95	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	29.7	38.45	8.75	Complied
Middle	836.6	Horizontal	30.5	38.45	7.95	Complied
Top	848.8	Horizontal	31.4	38.45	7.05	Complied

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	26.9	38.45	11.55	Complied
Middle	836.6	Horizontal	27.8	38.45	10.65	Complied
Top	848.8	Horizontal	28.6	38.45	9.85	Complied

5.2.4. Transmitter Frequency Stability (Temperature Variation)

Test Summary:

Test Engineer:	Mark Percival & David Doyle	**Test Date:**	21 May 2012 & 22 May 2012
Test Sample IMEI:	351807050017188 & 351807050017253		

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):	25
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	836.599987	13	0.0155	2.5	2.4845	Complied
-20	836.600024	24	0.0287	2.5	2.4713	Complied
-10	836.600021	21	0.0251	2.5	2.4749	Complied
0	836.600015	15	0.0179	2.5	2.4821	Complied
10	836.600018	18	0.0215	2.5	2.4785	Complied
20	836.599980	20	0.0239	2.5	2.4761	Complied
30	836.599983	17	0.0203	2.5	2.4797	Complied
40	836.599986	14	0.0167	2.5	2.4833	Complied
50	836.599984	16	0.0191	2.5	2.4809	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:	David Doyle	**Test Date:**	22 May 2012
Test Sample IMEI:	351807050017253		

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):	20
Relative Humidity (%):	41

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	836.599975	25	0.0299	2.5	2.4701	Complied
4.34	836.599973	27	0.0323	2.5	2.4677	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:	Mark Percival	**Test Date:**	21 May 2012
Test Sample IMEI:	351807050017188		

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):	26
Relative Humidity (%):	36

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	244.489
Middle	836.6	246.493
Top	848.8	244.489

Results: GPRS

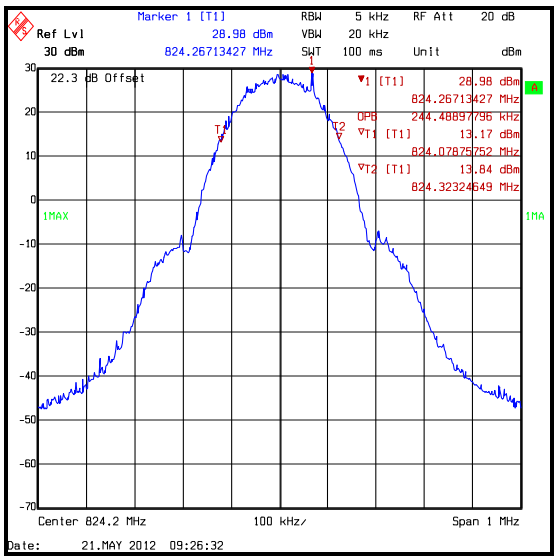
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	244.489
Middle	836.6	242.485
Top	848.8	242.485

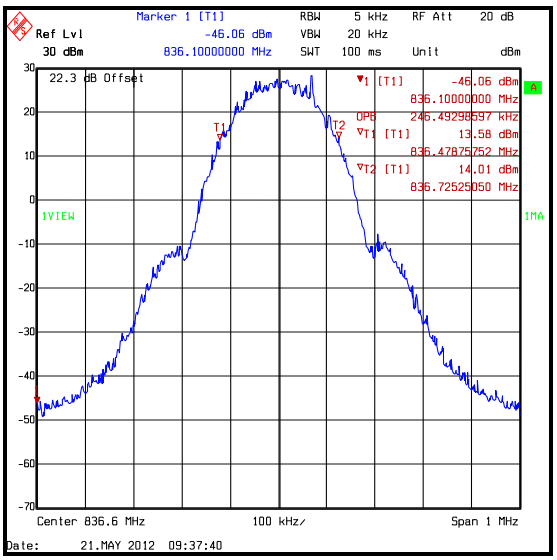
Results: EGPRS / MCS5

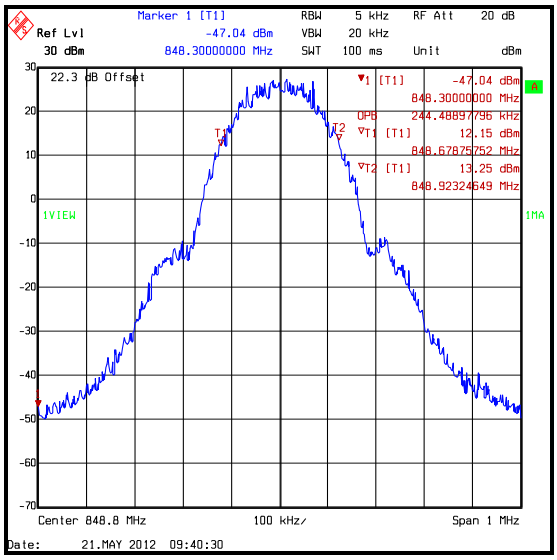
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	244.489
Middle	836.6	242.495
Top	848.8	246.493

Transmitter Occupied Bandwidth (continued)

GSM Circuit Switched

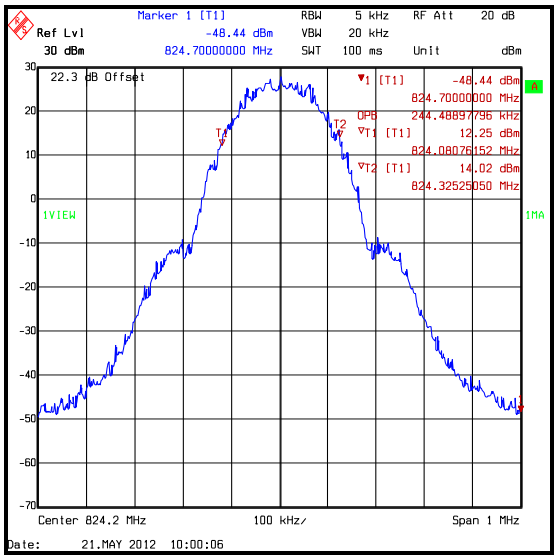


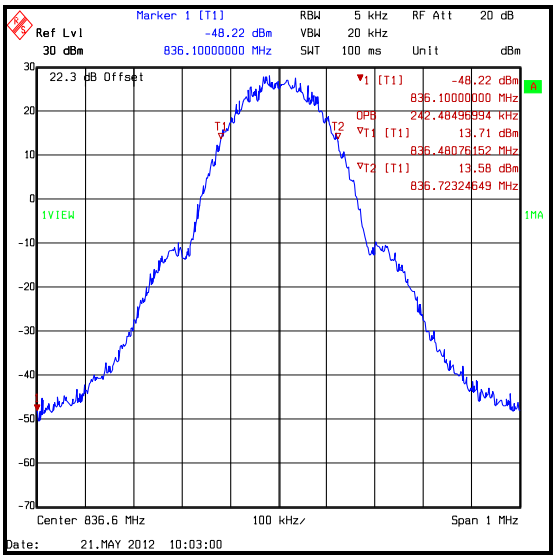


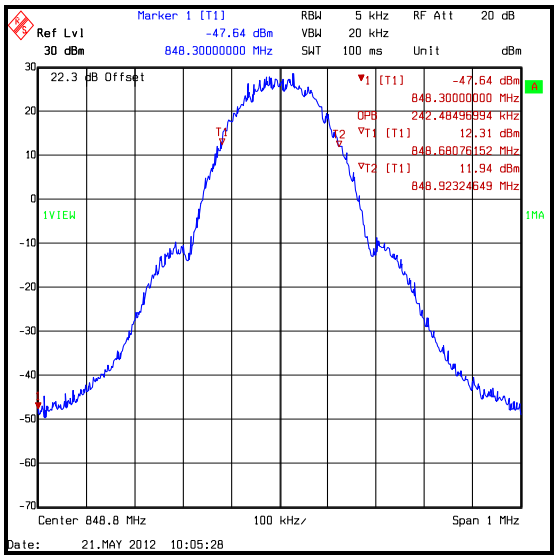


Transmitter Occupied Bandwidth (continued)

GPRS

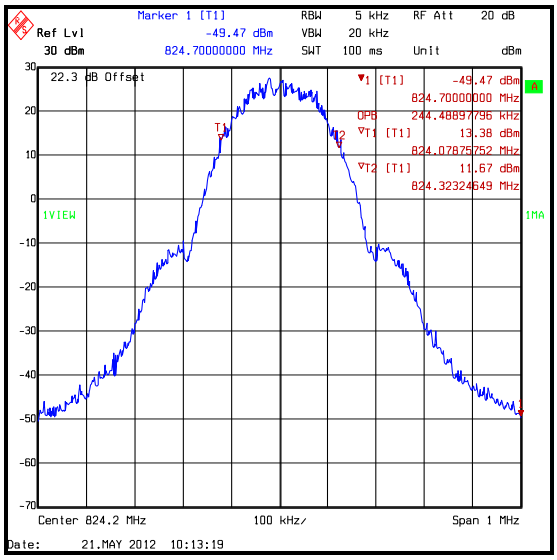


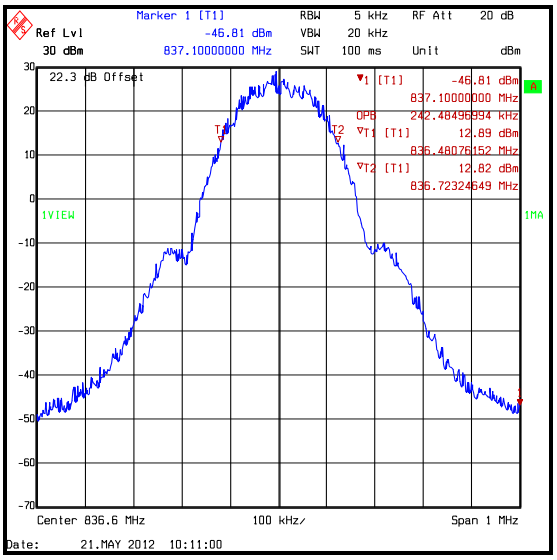


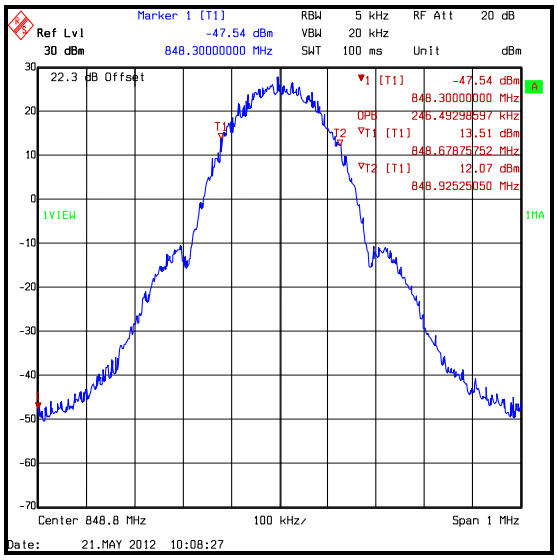


Transmitter Occupied Bandwidth (continued)

EGPRS / MCS5







5.2.7. Transmitter Out of Band Radiated Emissions

Test Summary:

Test Engineer:	Nick Steele & David Doyle	**Test Date:**	24 May 2012 & 29 May 2012
Test Sample IMEI:	351807050017170		

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):	25 to 28
Relative Humidity (%):	38 to 45

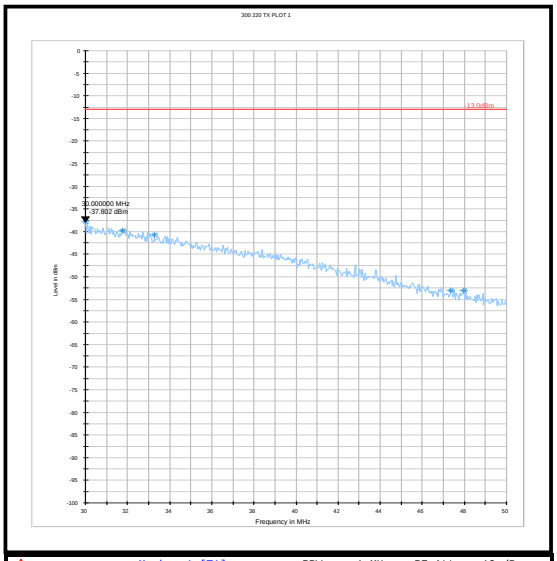
Results:

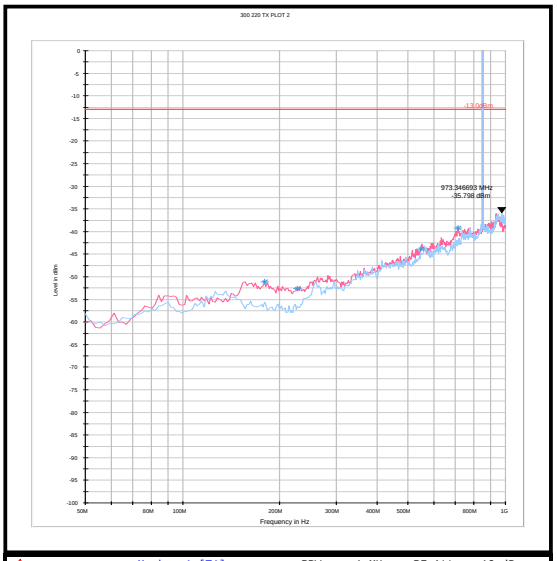
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
973.347	-35.8	-13.0	22.8	Complied

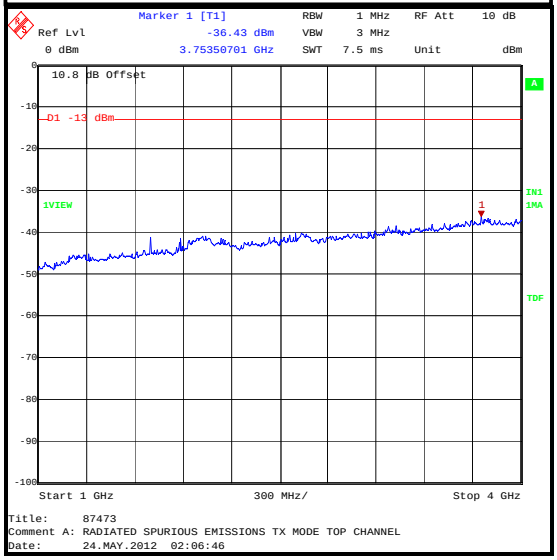
Note(s):

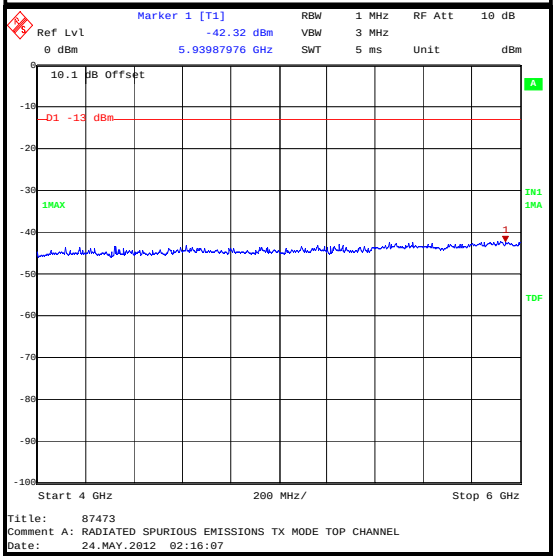
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. The uplink and downlink traffic channels are shown on the 30 MHz to 1 GHz plot.
4. 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.

Transmitter Out of Band Radiated Emissions (continued)

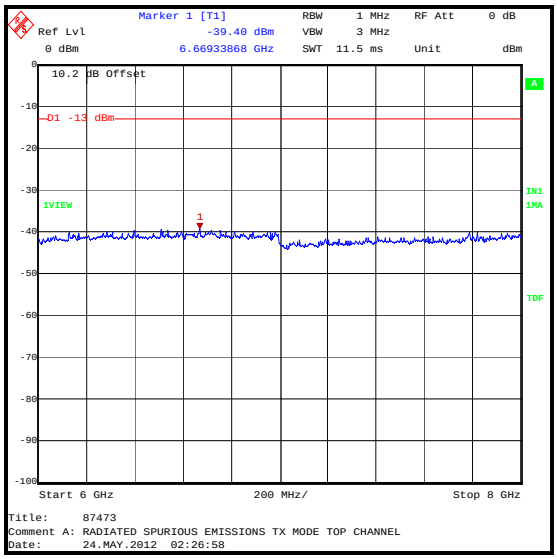


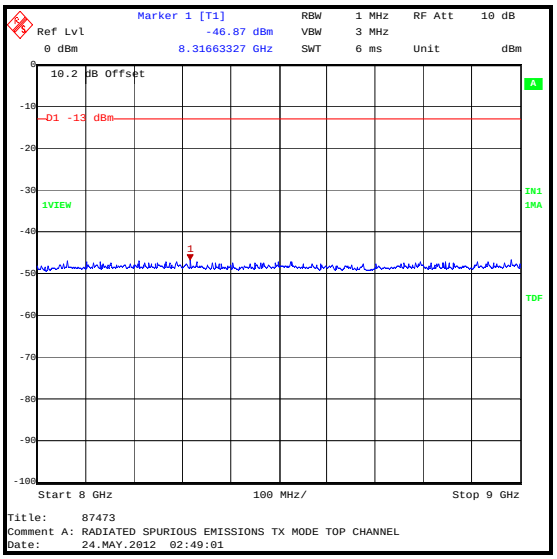






Transmitter Out of Band Radiated Emissions (continued)





5.2.8. Transmitter Radiated Emissions at Band Edges

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	29 May 2012
Test Sample IMEI:	351807050017170		

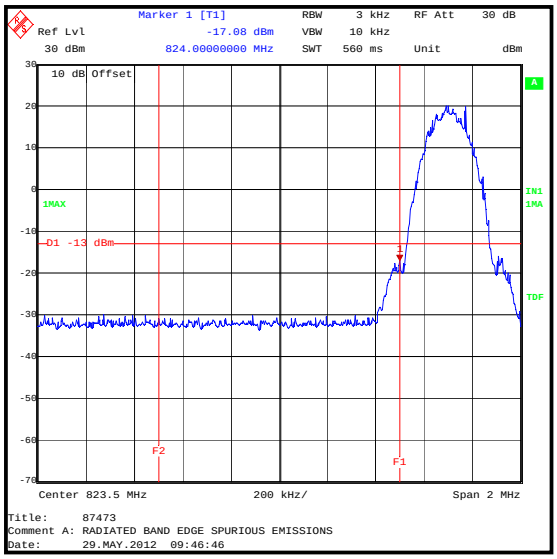
FCC Part:	2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 22.917

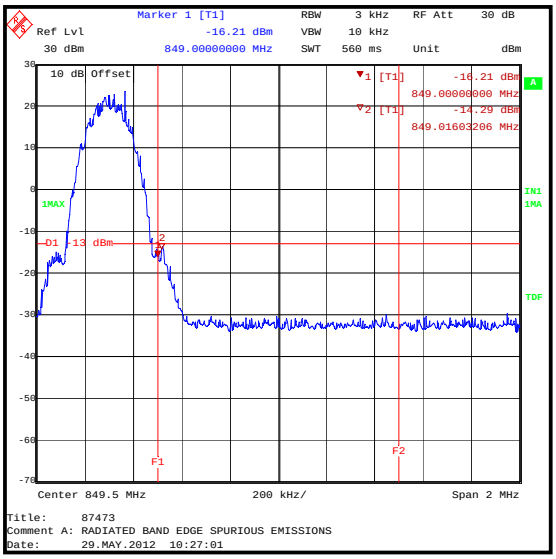
Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	42

Results: GSM Circuit Switched

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-17.1	-13.0	4.1	Complied
849	-16.2	-13.0	3.2	Complied
849.020	-14.3	-13.0	1.3	Complied

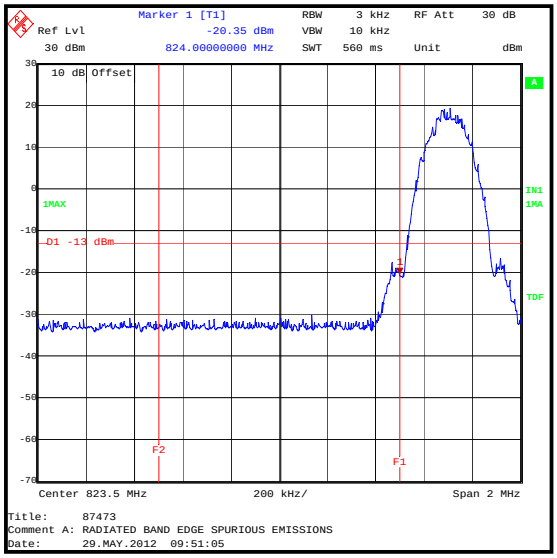


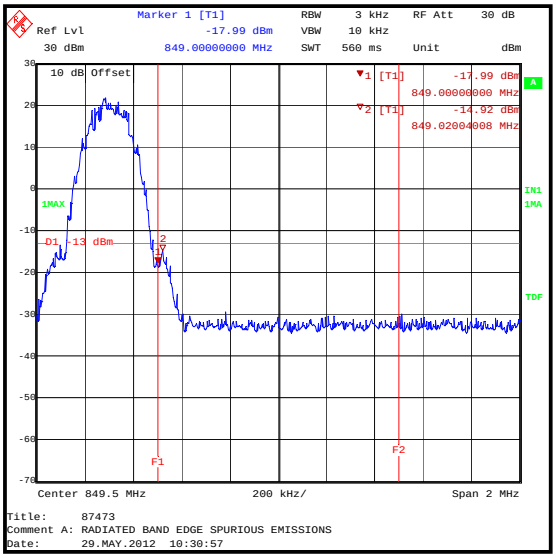


Transmitter Band Edge Radiated Emissions (continued)

Results: GPRS

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-20.4	-13.0	7.4	Complied
849	-18.0	-13.0	5.0	Complied
849.020	-14.9	-13.0	1.9	Complied

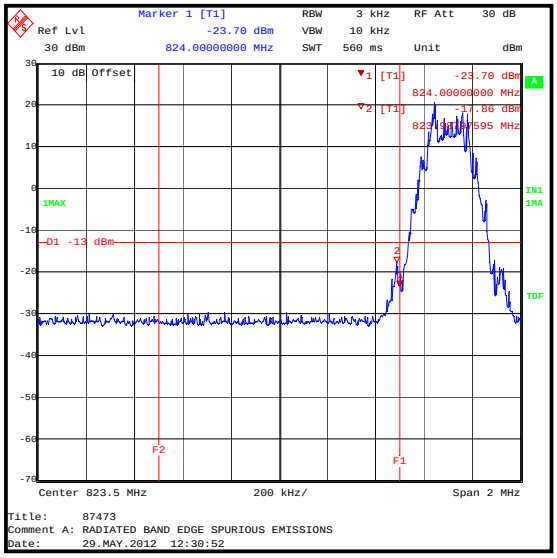


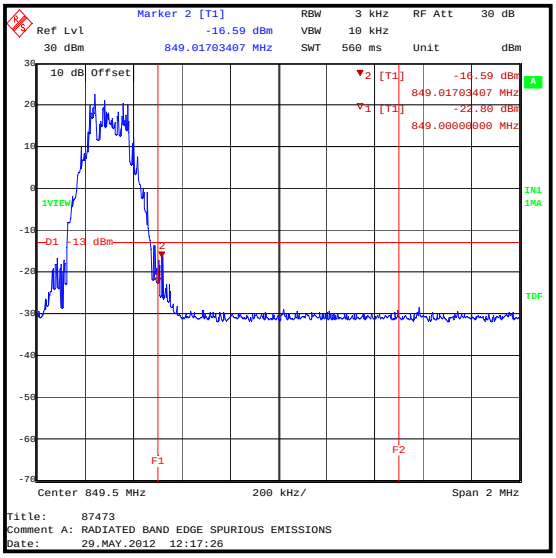


Transmitter Band Edge Radiated Emissions (continued)

Results: EGPRS / MCS5

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
823.988	-17.9	-13.0	4.9	Complied
824	-23.7	-13.0	10.7	Complied
849	-22.8	-13.0	9.8	Complied
849.017	-16.6	-13.0	3.6	Complied





5.3. Test Results - Part 24

5.3.1. Receiver/Idle Mode AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	12 June 2012
Test Sample Serial No:	351807050017170		

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

Environmental Conditions:

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

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Live	48.2	66.0	17.8	Complied
0.303	Live	38.5	60.2	21.7	Complied
1.167	Live	36.2	56.0	19.8	Complied
1.333	Live	33.8	56.0	22.2	Complied
1.585	Live	35.8	56.0	20.2	Complied
3.489	Live	36.3	56.0	19.7	Complied
3.813	Live	35.5	56.0	20.5	Complied
4.861	Live	33.1	56.0	22.9	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.550	Live	27.9	46.0	18.1	Complied
1.014	Live	28.1	46.0	17.9	Complied
1.113	Live	27.5	46.0	18.5	Complied
1.176	Live	27.5	46.0	18.5	Complied
1.630	Live	28.0	46.0	18.0	Complied
2.436	Live	31.0	46.0	15.0	Complied
3.606	Live	29.1	46.0	16.9	Complied
16.026	Live	33.7	50.0	16.3	Complied
16.152	Live	34.2	50.0	15.8	Complied
16.260	Live	32.3	50.0	17.7	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

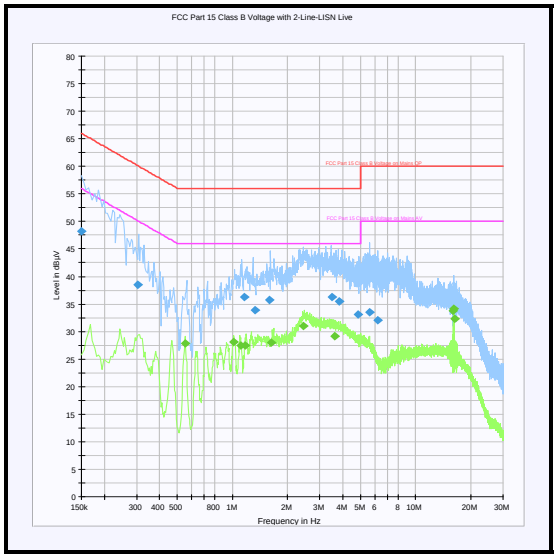
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Neutral	55.6	66.0	10.4	Complied
0.163	Neutral	54.7	65.3	10.6	Complied
0.208	Neutral	51.6	63.3	11.7	Complied
0.240	Neutral	48.8	62.1	13.3	Complied
0.411	Neutral	39.4	57.6	18.2	Complied
0.465	Neutral	37.9	56.6	18.7	Complied
4.969	Neutral	35.4	56.0	20.6	Complied

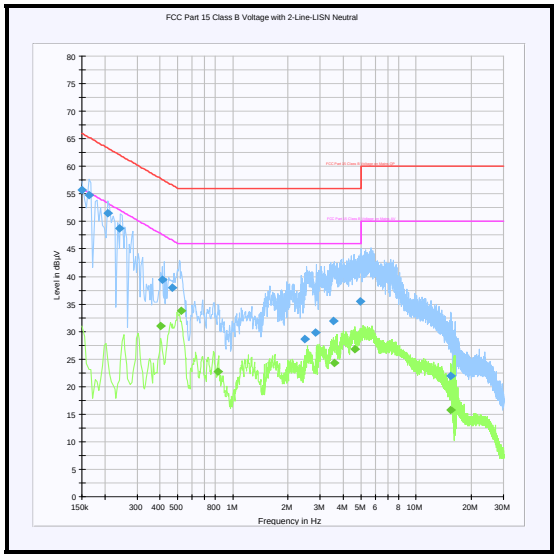
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.402	Neutral	31.0	47.8	16.8	Complied
0.523	Neutral	33.7	46.0	12.3	Complied
0.829	Neutral	22.7	46.0	23.3	Complied
3.579	Neutral	24.3	46.0	21.7	Complied
4.654	Neutral	26.9	46.0	19.1	Complied
15.481	Neutral	15.7	50.0	34.3	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.

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5.3.2. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	29 May 2012
Test Sample IMEI:	351807050017170		

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):	28
Relative Humidity (%):	35

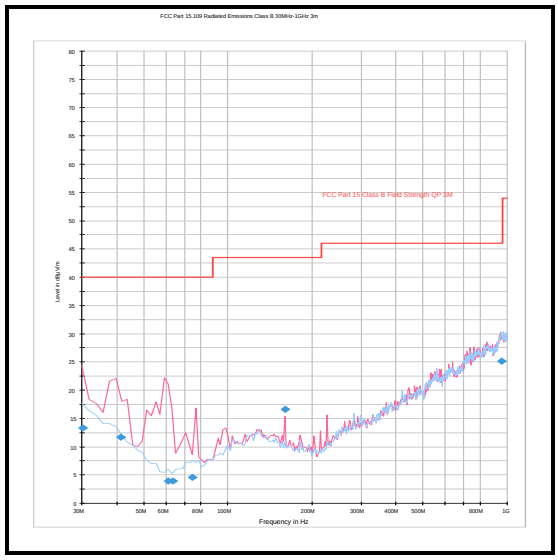
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
30.284	Vertical	13.3	40.0	26.7	Complied
41.436	Vertical	11.6	40.0	28.4	Complied
63.387	Vertical	4.0	40.0	36.0	Complied
74.600	Vertical	4.6	40.0	35.4	Complied
160.005	Vertical	16.6	43.5	26.9	Complied
954.842	Horizontal	25.2	46.0	20.8	Complied

Note(s):

4. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
5. 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.
6. 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:	Mark Percival & Andrew Edwards	**Test Date:**	21 May 2012 & 29 May 2012
Test Sample IMEI:	351807050017170		

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):	26
Relative Humidity (%):	43

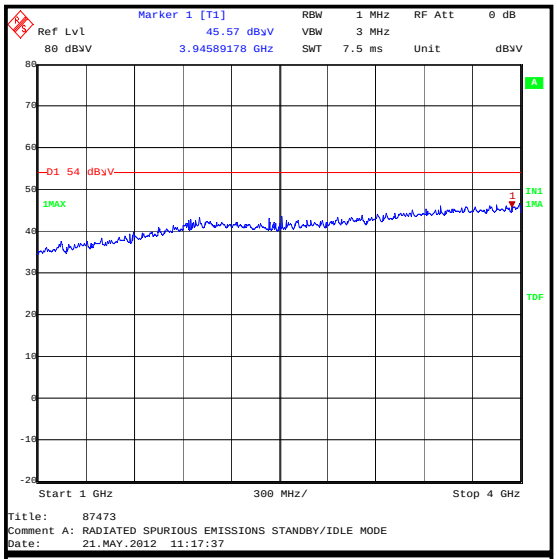
Results:

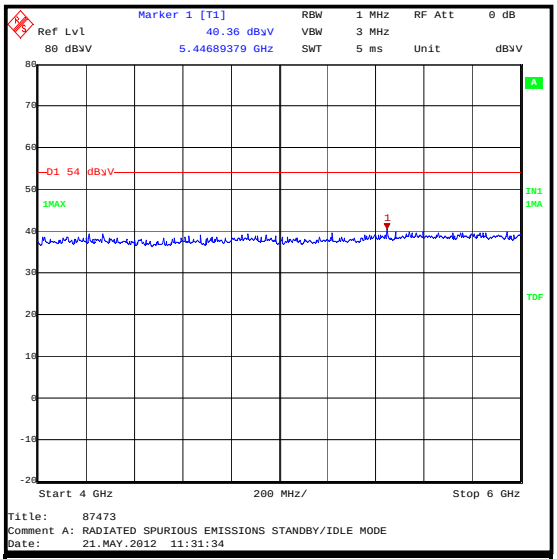
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3945.892	Vertical	45.6	54.0	8.4	Complied

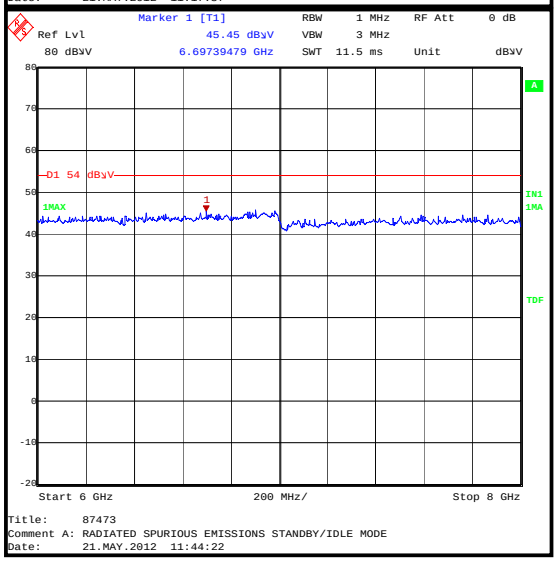
Note(s):

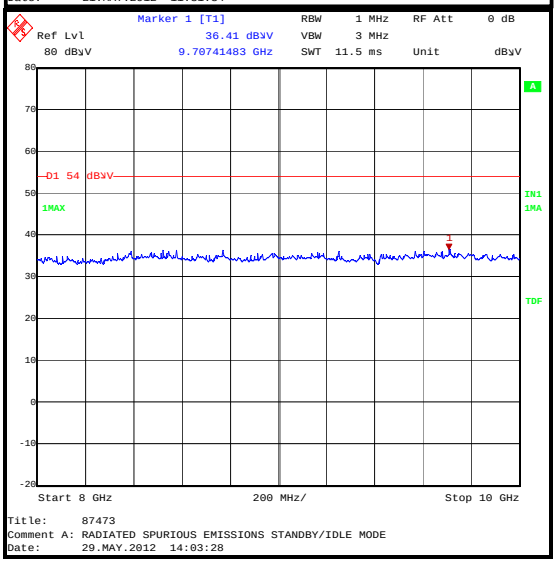
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded 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. 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.
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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)









5.3.3. Transmitter Output Power (EIRP)

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	28 May 2012
Test Sample IMEI:	351807050017170		

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

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	43

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	25.9	33.0	7.1	Complied
Middle	1879.8	Vertical	26.7	33.0	6.3	Complied
Top	1909.8	Vertical	28.2	33.0	4.8	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	25.9	33.0	7.1	Complied
Middle	1879.8	Vertical	26.5	33.0	6.5	Complied
Top	1909.8	Vertical	28.3	33.0	4.7	Complied

Results: EGPRS / MCS5

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Vertical	25.2	33.0	7.8	Complied
Middle	1879.8	Vertical	25.2	33.0	7.8	Complied
Top	1909.8	Vertical	26.7	33.0	6.3	Complied

5.3.4. Transmitter Frequency Stability (Temperature Variation)

Test Summary:

Test Engineer:	Mark Percival & David Doyle	**Test Date:**	21 May 2012 & 22 May 2012
Test Sample IMEI:	351807050017188 & 351807050017253		

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):	25
Ambient Relative Humidity (%):	37

Results: Bottom Channel (1850.2 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	71	1850.200071	1850.0	0.200071	Complied
-20	49	1850.200049	1850.0	0.200049	Complied
-10	48	1850.200048	1850.0	0.200048	Complied
0	48	1850.200048	1850.0	0.200048	Complied
10	47	1850.200047	1850.0	0.200047	Complied
20	25	1850.200025	1850.0	0.200025	Complied
30	26	1850.200026	1850.0	0.200026	Complied
40	22	1850.199978	1850.0	0.199978	Complied
50	25	1850.200026	1850.0	0.200025	Complied

Transmitter Frequency Stability (Temperature Variation) (Continued)

Results: Top Channel (1909.8 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	51	1909.800051	1910.0	0.199949	Complied
-20	54	1909.800054	1910.0	0.199946	Complied
-10	53	1909.800053	1910.0	0.199947	Complied
0	68	1909.800068	1910.0	0.199932	Complied
10	42	1909.800042	1910.0	0.199958	Complied
20	19	1909.800019	1910.0	0.199981	Complied
30	25	1909.800025	1910.0	0.199975	Complied
40	26	1909.800026	1910.0	0.199974	Complied
50	26	1909.800026	1910.0	0.199974	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. Temperature was monitored throughout the test with a calibrated digital thermometer.

5.3.5. Transmitter Frequency Stability (Voltage Variation)

Test Summary:

Test Engineer:	David Doyle	**Test Date:**	22 May 2012
Test Sample IMEI:	351807050017253		

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):	20
Relative Humidity (%):	41

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	28	1850.200028	1850.0	0.200028	Complied
4.34	21	1850.200021	1850.0	0.200021	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	19	1909.800019	1910.0	0.199981	Complied
4.34	9	1909.800009	1910.0	0.199991	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:	Mark Percival	**Test Date:**	21 May 2012
Test Sample IMEI:	351807050017188		

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):	26
Relative Humidity (%):	33

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	244.489
Middle	1879.8	242.485
Top	1909.8	244.489

Results: GPRS

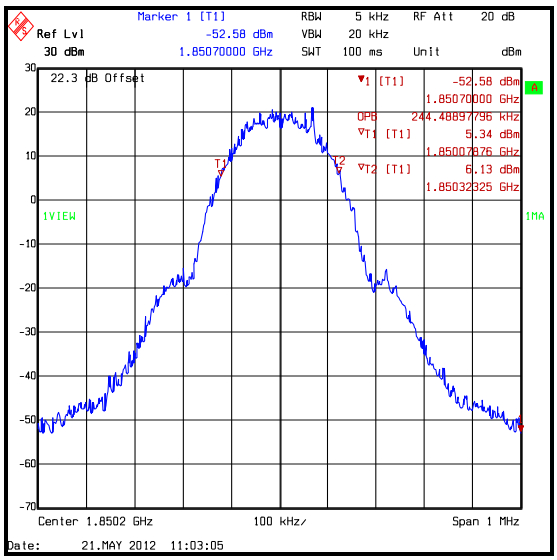
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	244.489
Middle	1879.8	246.493
Top	1909.8	244.489

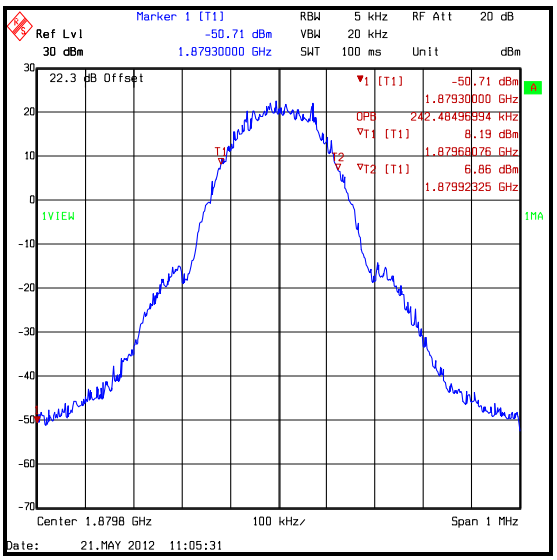
Results: EGPRS / MCS5

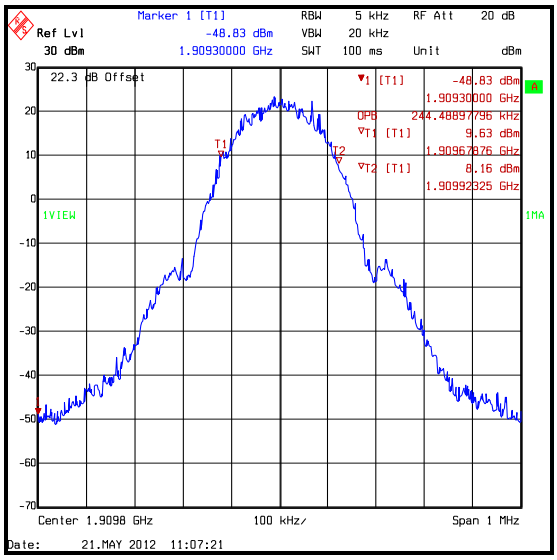
Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	244.489
Middle	1879.8	242.485
Top	1909.8	238.477

Transmitter Occupied Bandwidth (continued)

GSM Circuit Switched

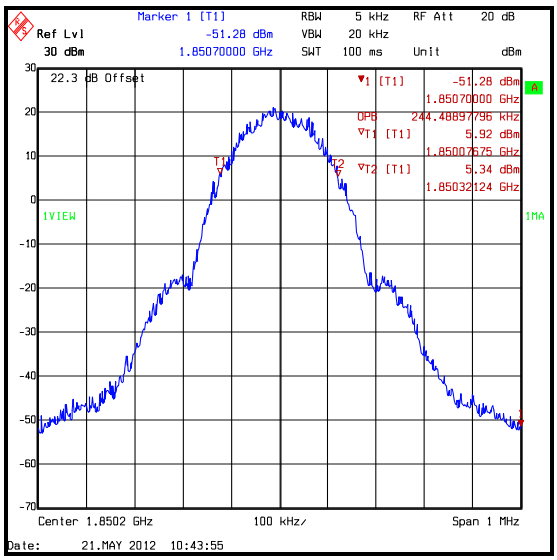


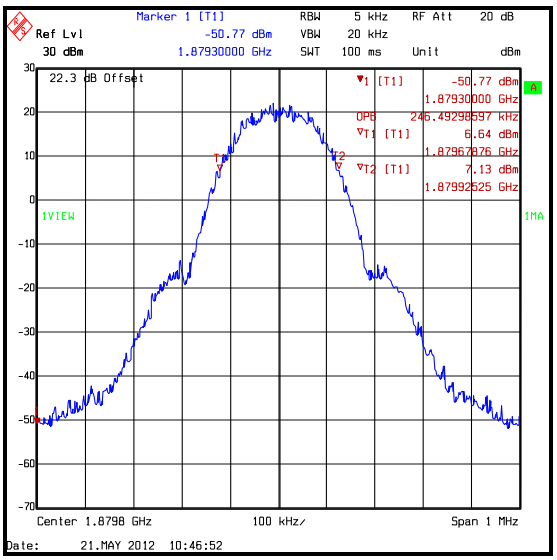


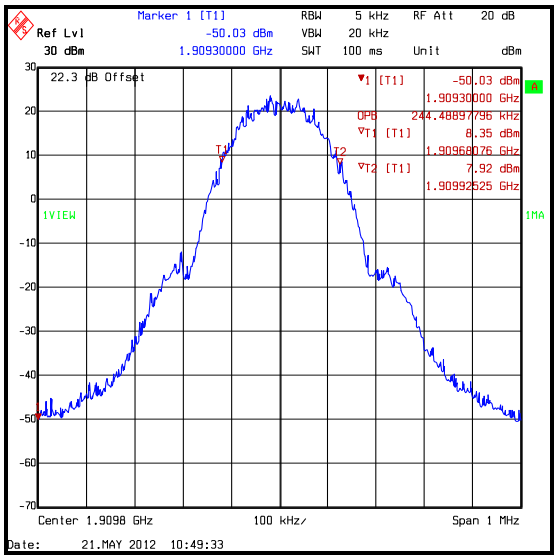


Transmitter Occupied Bandwidth (continued)

GPRS

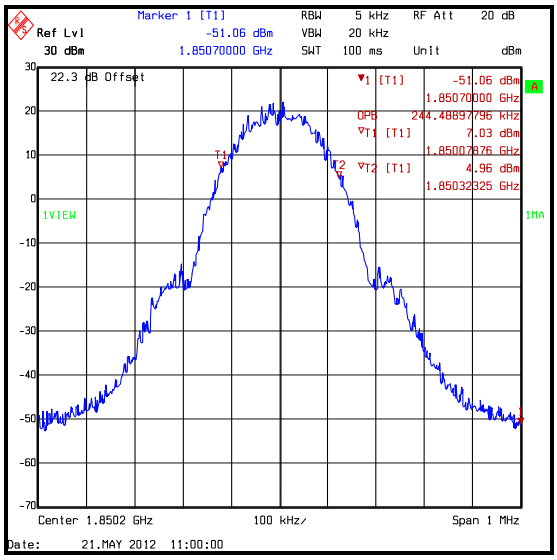


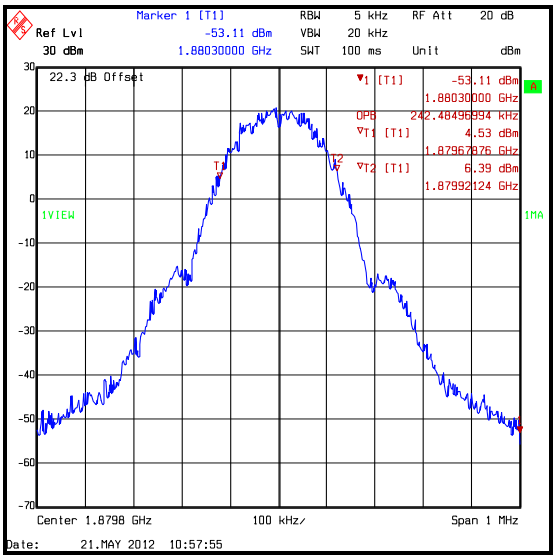


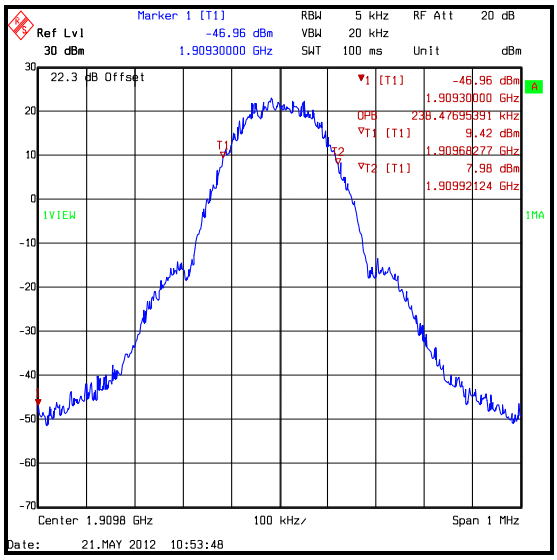


Transmitter Occupied Bandwidth (continued)

EGPRS / MCS5







5.3.7. Transmitter Out of Band Radiated Emissions

Test Summary:

Test Engineers:	Nick Steele & David Doyle	**Test Dates:**	24 May 2012 & 29 May 2012
Test Sample IMEI:	351807050017170		

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):	25
Relative Humidity (%):	45

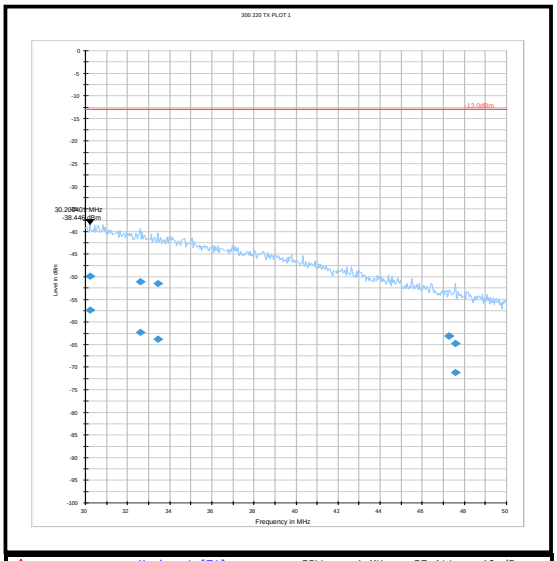
Results:

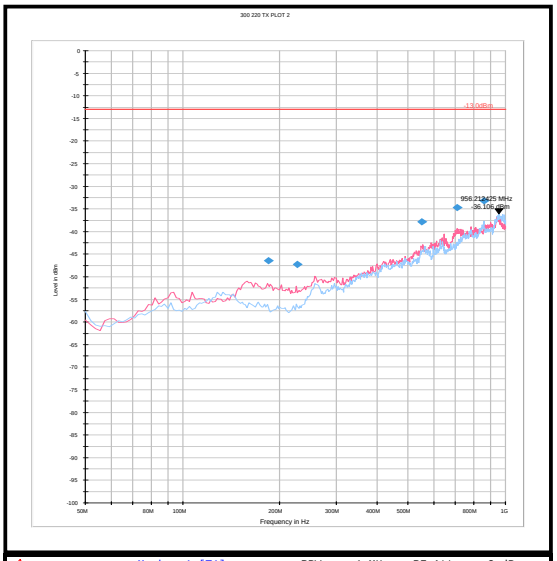
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
956.212	-36.1	-13.0	23.1	Complied

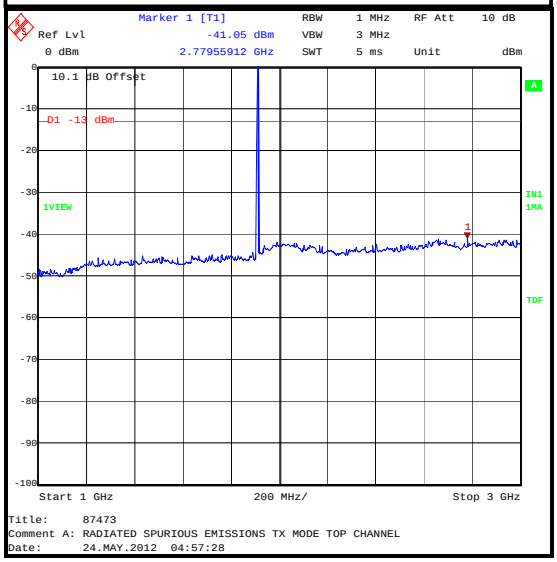
Note(s):

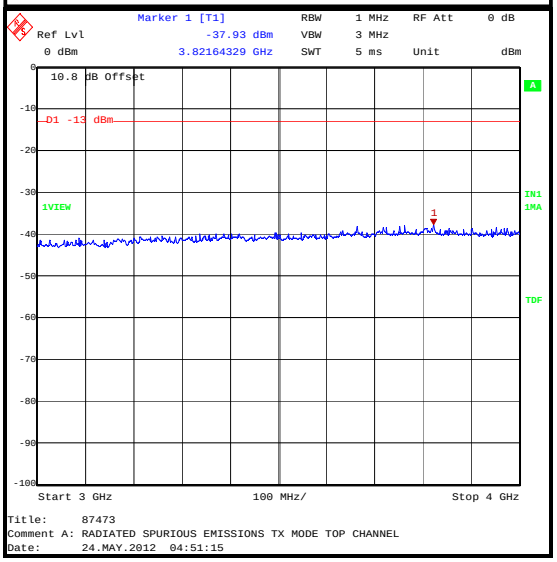
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded 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. The uplink traffic channel is shown on the 1 GHz to 4 GHz plot.
4. 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.
5. 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)

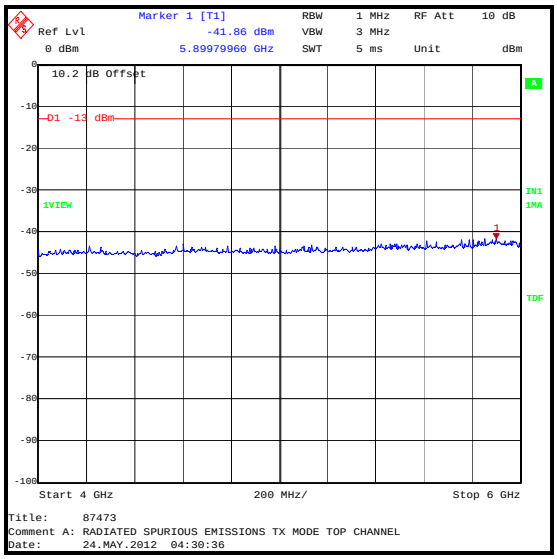


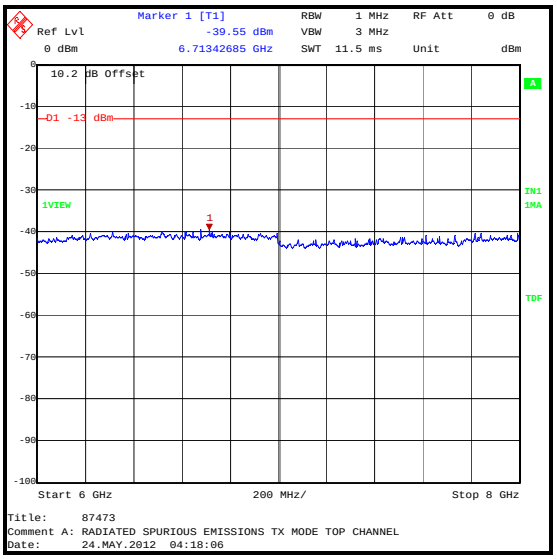


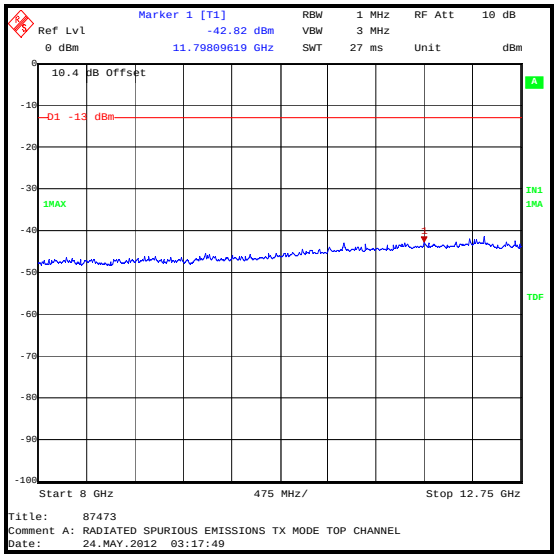


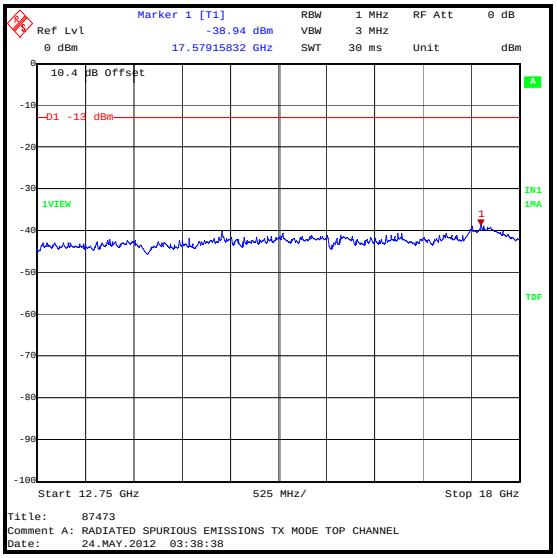


Transmitter Out of Band Radiated Emissions (continued)

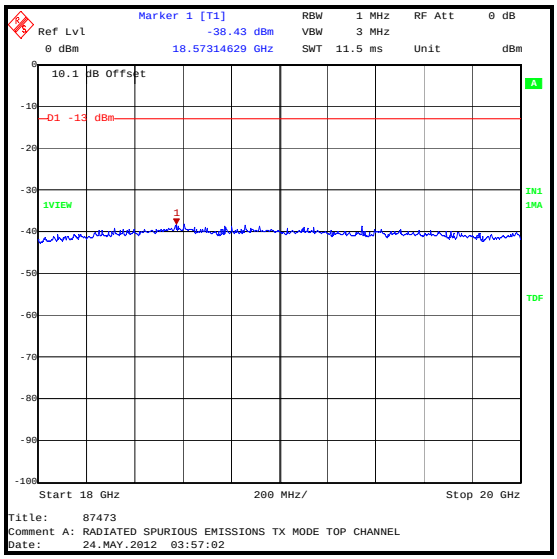








Transmitter Out of Band Radiated Emissions (continued)



5.3.8. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	29 May 2012
Test Sample IMEI:	351807050017170		

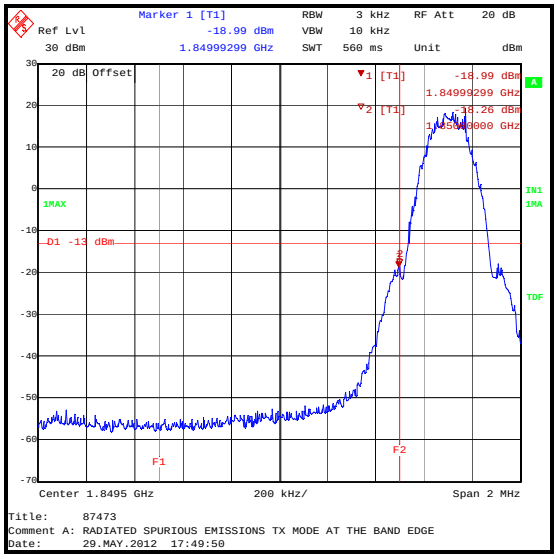
FCC Part:	2.1053 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238

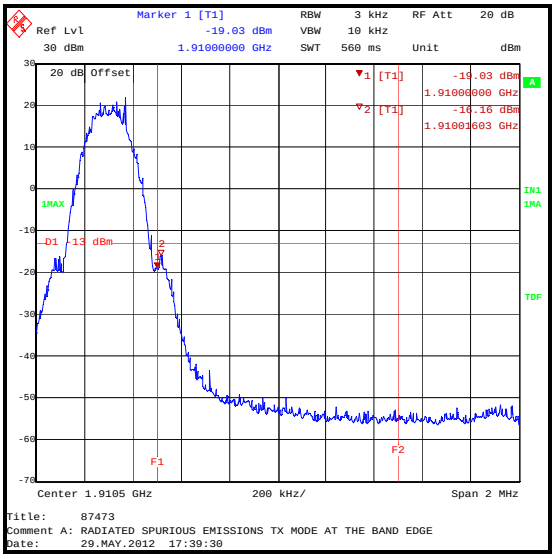
Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	42

Results: GSM Circuit Switched

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.999	-18.3	-13.0	5.7	Complied
1850.000	-19.0	-13.0	6.0	Complied
1910.000	-19.0	-13.0	6.0	Complied
1910.002	-16.2	-13.0	3.2	Complied

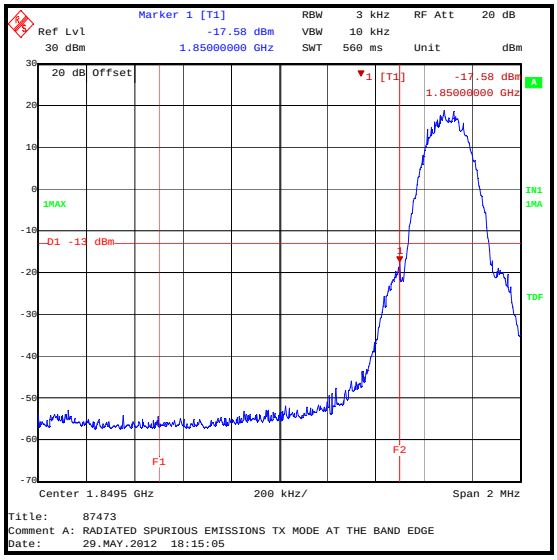


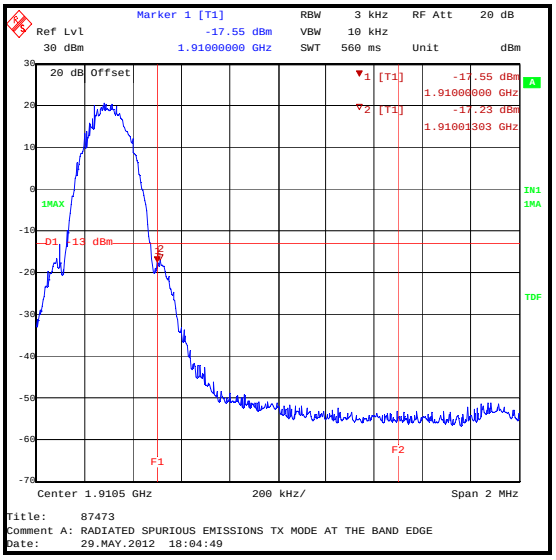


Transmitter Band Edge Radiated Emissions (continued)

Results: GPRS

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850.000	-17.6	-13.0	4.6	Complied
1910.000	-17.6	-13.0	4.6	Complied
1910.013	-17.2	-13.0	4.2	Complied

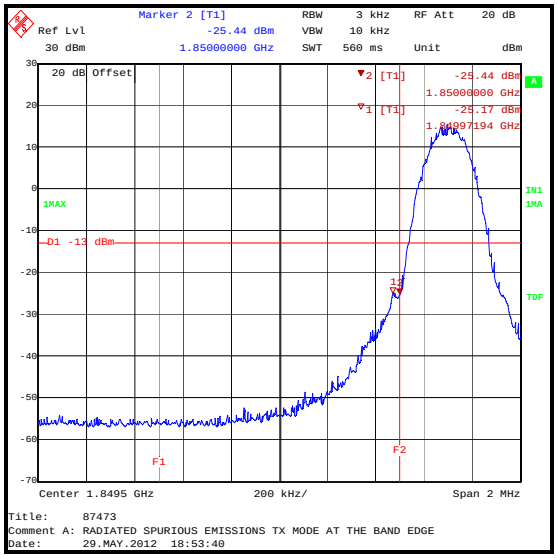


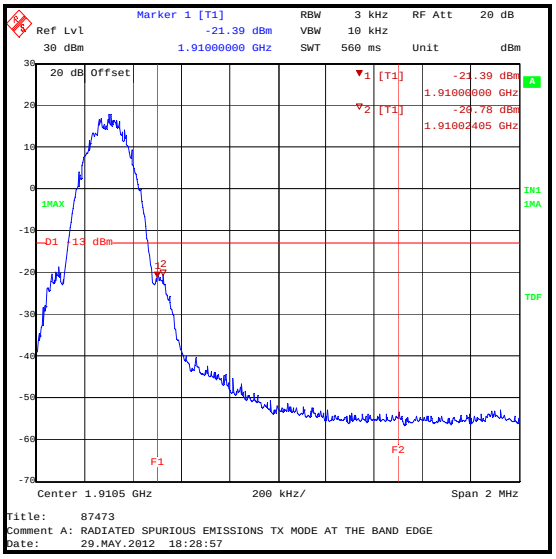


Transmitter Band Edge Radiated Emissions (continued)

Results: EGPRS / MCS5

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.	-25.2	-13.0	12.2	Complied
1850	-25.4	-13.0	12.4	Complied
1910	-21.4	-13.0	8.4	Complied
1910.002	-20.8	-13.0	7.8	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 (ERP)	824 to 849 MHz	95%	±2.94 dB
Effective Isotropic Radiated Power (EIRP)	1850 to 1910 MHz	95%	±2.94 dB
Conducted Output Power	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.27 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 (months)
A1374	Attenuator	Pasternack Enterprises	PE7013-10	None	Calibrated before use	-
A1391	Attenuator	HUBER + SUHNER AG	757987	6810.17.B	03 Apr 2013	12
A1393	Attenuator	HUBER + SUHNER AG	757456	6820.17.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
A2000	Attenuator	Huber + Suhner AG	6830.17.B	301623	03 Apr 2013	12
A2072	1-3.5GHz Directional Coupler	Narda	4242B	03549	Calibrated before use	-
A2142	20dB Attenuator	Atlan TecRF	AN18-20	081120-23	25 May 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
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Apr 2013	12
E013	Environmental Chamber	Sanyo	MTH-4200PR	None	10 Aug 2012	12
G0543	Amplifier	Sonoma Instrument Co.	310N	230801	13 Jul 2012	3
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	31 Aug 2012	12

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
L1021	CMU 200	Rohde and Schwarz	CMU 200	111379	29 May 2012	12
L1058	CMU 200	Rohde & Schwarz	CMU200	1100.0008k02-107252-gy	20 Feb 2013	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1229	Digital Multimeter	Fluke	179	87640015	18 Jun 2013	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	08 Nov 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	20 Sep 2012	12
M1642	Fluke 52II Thermometer	Fluke	52II	18890119	16 Mar 2013	12
M1662	CMU 200	Rohde & Schwarz	CMU 200	109374	21 May 2013	12
S011	DC Power Supply Unit	INSTEK	PR-3010H	9401270	Calibration not required	-

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All test equipment used was in calibration at the time of testing.