



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Softbank 941P
To: FCC Part 24: 2008 Subpart E

Test Report Serial No:
RFI/RPT3/RP76421JD09A
Supersedes Test Report Serial No:
RFI/RPT2/RP76421JD09A

This Test Report Is Issued Under The Authority Of Chris Guy, Operations Manager - Cellular & Wireless: 	
Checked By:	Tony Henriques
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Date of Issue:	31 December 2009

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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:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 24 Subpart E (Personal Communication Services)
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	26 November 2009 to 10 December 2009

2.2. Summary of Test Results

FCC Reference (CFR 47)	Measurement	Port Type	Result
Part 15.107	Idle Mode AC Conducted Spurious Emissions	AC Mains	
Part 15.109	Idle Mode Radiated Spurious Emissions	Enclosure	
Part 15.207	Transmitter AC Conducted Spurious Emissions	AC Mains	
Part 24.232	Transmitter Effective Isotropic Radiated Power (EIRP)	Antenna	
Part 24.235	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	
Part 2.1049/24.238	Transmitter Occupied Bandwidth	Antenna	
Part 2.1053/24.238	Transmitter Out of Band Radiated Emissions	Antenna	
Part 2.1053/24.238	Transmitter Band Edge Radiated Emissions	Antenna	
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 (2003)
Title:	American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

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:	SoftBank
Model Name or Number:	941P
IMEI Number:	004401220894337
Hardware Version Number:	Rev C
Software Version Number:	941PVA16
FCC ID Number:	UCE209023A

Description:	AC Charger
Brand Name:	SoftBank
Model Name or Number:	ZTDAA1

Description:	DC Charger
Brand Name:	SoftBank
Model Name or Number:	PMJAA1

Description:	USB Data Cable
Brand Name:	SoftBank
Model Name or Number:	ZTFE01

Description:	Personal Hands-free
Brand Name:	SoftBank
Model Name or Number:	ZTCK01

Description:	Personal Hands-free Converter
Brand Name:	SoftBank
Model Name or Number:	PMLAJ1

Description:	Battery
Brand Name:	SoftBank
Model Name or Number:	PMBAS1

Description:	Micro SD memory card
Brand Name:	Not Stated
Model Name or Number:	Not Stated

3.2. Description of EUT

The Equipment Under Test was a dual mode (W-CDMA FDDI/GSM900/1800/1900MHz) cellular mobile telephone with Bluetooth, WLAN 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

Technology Tested:	PCS1900		
Type of Radio Device:	Transceiver		
Mode:	GSM/GPRS		
Modulation Type:	GMSK		
Channel Spacing:	200 kHz		
Power Supply Requirement(s):	Nominal	3.7 V	
	Minimum	3.4 V	
	Maximum	4.2 V	
Maximum Output Power (EIRP):	GSM	28.8 dBm	
	GPRS	27.3 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:	Universal Radio Communications Tester
Brand Name:	Rhode & Schwarz
Model Name or Number:	CMU200
Serial Number:	835687/011

Description:	Dummy battery
Model Name or Number:	Not stated
Serial 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):

- Idle mode.
- Constantly transmitting at full power on bottom, centre and top channels as required.
- Occupied bandwidth, EIRP and band edge tests were performed with the EUT in GSM single timeslot circuit switched and GPRS Multislot Class 10 with the unit transmitting on two timeslots in the uplink.
- Transmitter radiated spurious emissions were checked in all modes during prescans. 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 GSM/GPRS system simulator, operating in transceiver mode
- Idle mode and transmitter mode radiated spurious emissions tests were performed with the USB charger cable connected to the EUT and to the support laptop, with the TV antenna extended as this was found to be the worst case during prescans. All accessories were individually connected with the TV antenna extended and retracted during prescan measurements to determine the worst case combination.

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

5.2.1. Idle Mode AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.107(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

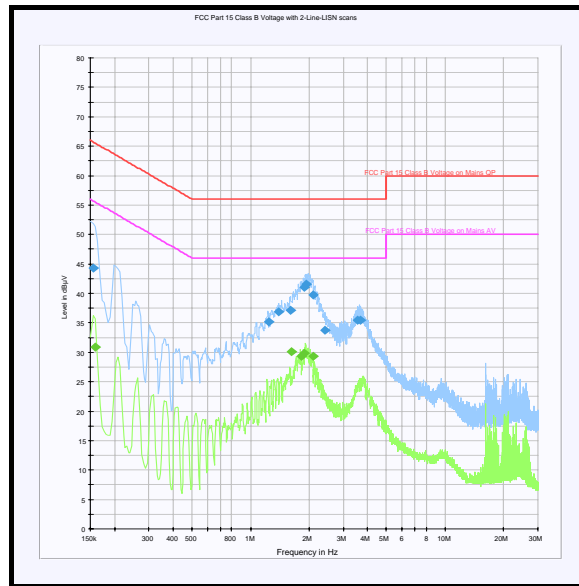
Temperature (°C):	23
Relative Humidity (%):	32

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.154500	Live	44.3	65.8	21.5	Complied
1.234500	Neutral	35.2	56.0	20.8	Complied
1.396500	Neutral	36.9	56.0	19.1	Complied
1.608000	Live	37.2	56.0	18.8	Complied
1.878000	Live	41.1	56.0	14.9	Complied
1.932000	Neutral	41.5	56.0	14.5	Complied
2.098500	Neutral	39.7	56.0	16.3	Complied
2.413500	Neutral	33.7	56.0	22.3	Complied
3.547500	Neutral	35.5	56.0	20.5	Complied
3.660000	Neutral	35.5	56.0	20.5	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159000	Live	30.8	55.5	24.7	Complied
1.630500	Live	30.1	46.0	15.9	Complied
1.824000	Live	29.3	46.0	16.7	Complied
1.878000	Live	29.8	46.0	16.2	Complied
2.085000	Neutral	29.3	46.0	16.7	Complied

Idle Mode AC Conducted Spurious Emissions (continued)

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

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

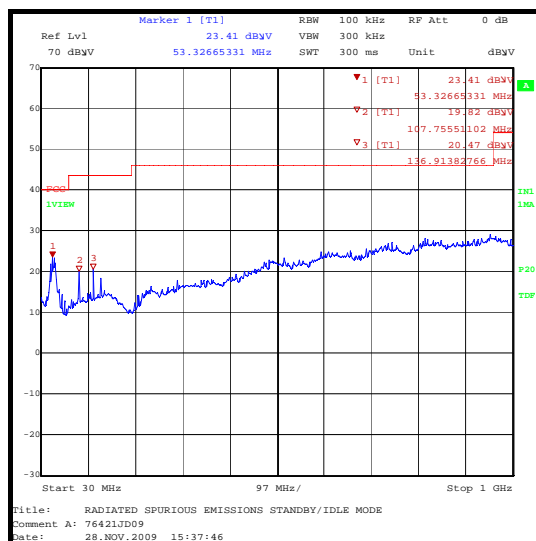
FCC Part:	15.109
Frequency Range:	30 MHz to 1000 MHz
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	26

Results:

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
53.326	Horizontal	21.6	40.0	18.4	Complied
107.755	Vertical	24.7	43.5	18.8	Complied
138.001	Horizontal	26.8	43.5	16.7	Complied



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

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

FCC Part:	15.109
Frequency Range:	1 GHz to 12.75 GHz
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

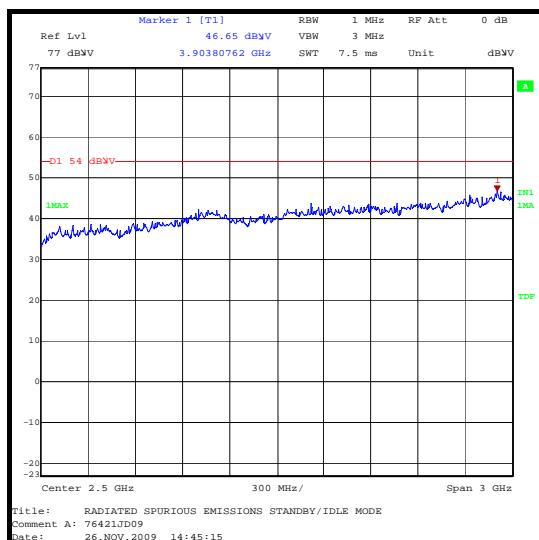
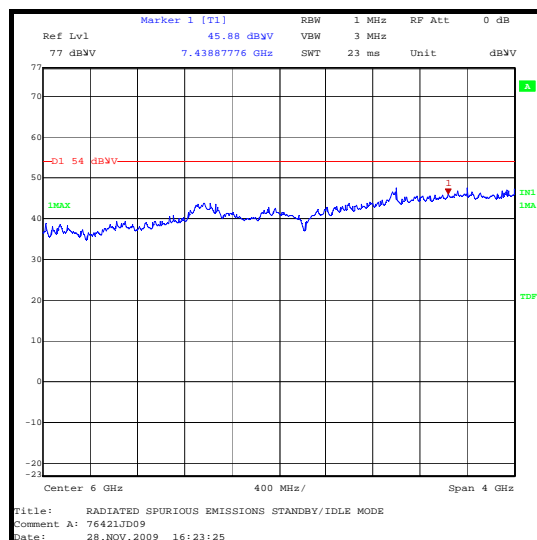
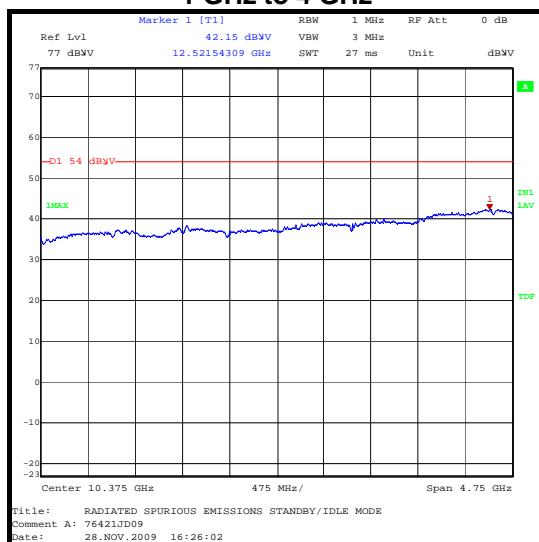
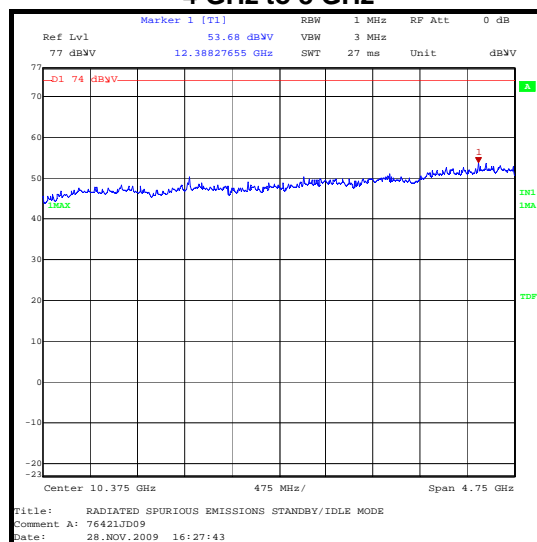
Temperature (°C):	23
Relative Humidity (%):	31

Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
3903.808	Horizontal	46.7	54.0	7.3	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. 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.
2. All pre-scan were performed with the peak detector against average limits apart from measurement made in the range of 8 GHz to 12.75 GHz where pre-scans were performed with peak and average detector and the applicable limit apply. This was due to the noise floor exceeding the average limit when using the peak detector.

Idle Mode Radiated Spurious Emissions (continued)**1 GHz to 4 GHz****4 GHz to 8 GHz****8 GHz to 12.75 GHz Average****8 GHz to 12.75 GHz Peak**

5.2.3. Transmitter AC Conducted Spurious Emissions**Test Summary:**

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

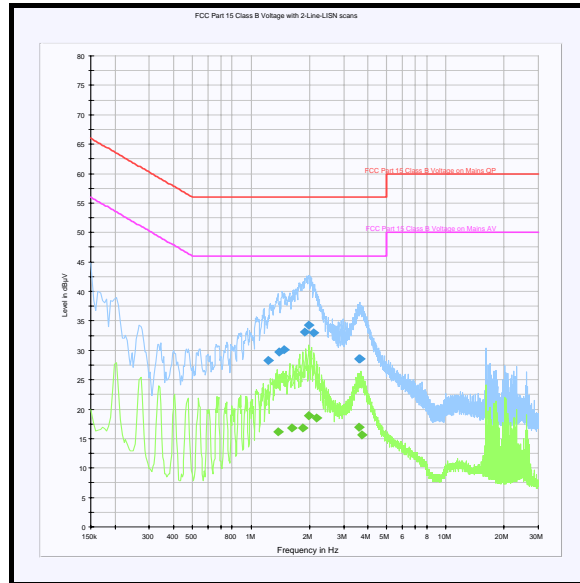
Temperature (°C):	23
Relative Humidity (%):	32

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.230000	Neutral	28.3	56.0	27.7	Complied
1.401000	Neutral	29.8	56.0	26.2	Complied
1.473000	Neutral	30.0	56.0	26.0	Complied
1.878000	Neutral	33.1	56.0	22.9	Complied
1.968000	Neutral	34.3	56.0	21.7	Complied
2.103000	Neutral	32.9	56.0	23.1	Complied
3.601500	Neutral	28.5	56.0	27.5	Complied
3.633000	Neutral	28.6	56.0	27.4	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.374000	Neutral	16.2	46.0	29.8	Complied
1.621500	Live	16.9	46.0	29.1	Complied
1.842000	Live	16.9	46.0	29.1	Complied
1.981500	Neutral	18.8	46.0	27.2	Complied
2.170500	Neutral	18.5	46.0	27.5	Complied
3.606000	Neutral	16.9	46.0	29.1	Complied
3.727500	Neutral	15.6	46.0	30.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)

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

5.2.4. Transmitter Effective Isotropic Radiated Power (EIRP)**Test Summary:**

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

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	31

Results: GSM

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Horizontal	27.1	33.0	5.9	Complied
Middle	1879.8	Horizontal	27.3	33.0	5.7	Complied
Top	1909.8	Horizontal	28.8	33.0	5.0	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Horizontal	24.9	33.0	8.1	Complied
Middle	1879.8	Horizontal	24.7	33.0	8.3	Complied
Top	1909.8	Horizontal	27.3	33.0	5.7	Complied

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

FCC Part:	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):	26
Relative Humidity (%):	31

Results: Bottom Channel (1850.2 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	-20	1850.199980	1850.0	0.199980	Complied
-20	-22	1850.199978	1850.0	0.199978	Complied
-10	-25	1850.199975	1850.0	0.199975	Complied
0	-24	1850.199976	1850.0	0.199976	Complied
10	20	1850.200020	1850.0	0.200020	Complied
20	23	1850.200023	1850.0	0.200023	Complied
30	-32	1850.199968	1850.0	0.199968	Complied
40	-40	1850.199960	1850.0	0.199960	Complied
50	-31	1850.199969	1850.0	0.199969	Complied

Results: Top Channel (1909.8 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	-22	1909.799978	1910.0	0.200022	Complied
-20	-16	1909.799984	1910.0	0.200016	Complied
-10	-38	1909.799962	1910.0	0.200038	Complied
0	-30	1909.799970	1910.0	0.200300	Complied
10	22	1909.800022	1910.0	0.199978	Complied
20	25	1909.800025	1910.0	0.199975	Complied
30	-38	1909.799962	1910.0	0.200038	Complied
40	-38	1909.799962	1910.0	0.200038	Complied
50	-29	1909.799971	1910.0	0.200029	Complied

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

FCC Part:	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):	27
Relative Humidity (%):	32

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	-34	1850.199966	1850.0	0.199966	Complied
4.2	-24	1850.199760	1850.0	0.199976	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	-36	1909.799964	1910.0	0.200036	Complied
4.2	-26	1909.799974	1910.0	0.200026	Complied

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

FCC Part:	24.238
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)

Environmental Conditions:

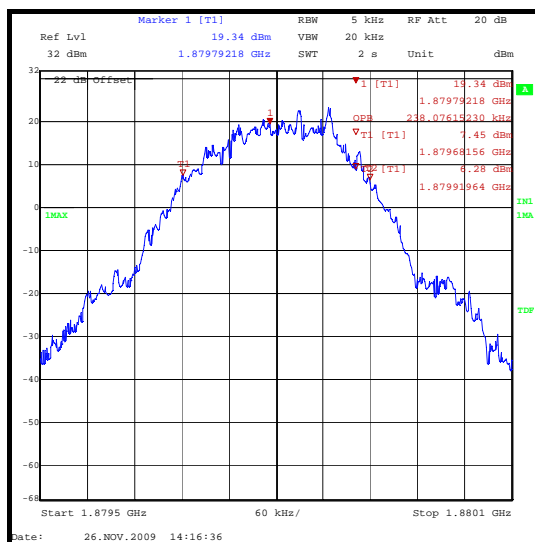
Temperature (°C):	23
Relative Humidity (%):	32

Results: GSM

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	238.076

Note(s):

- In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.



Transmitter Occupied Bandwidth (continued)**Test Summary:**

FCC Part:	24.238
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)

Environmental Conditions:

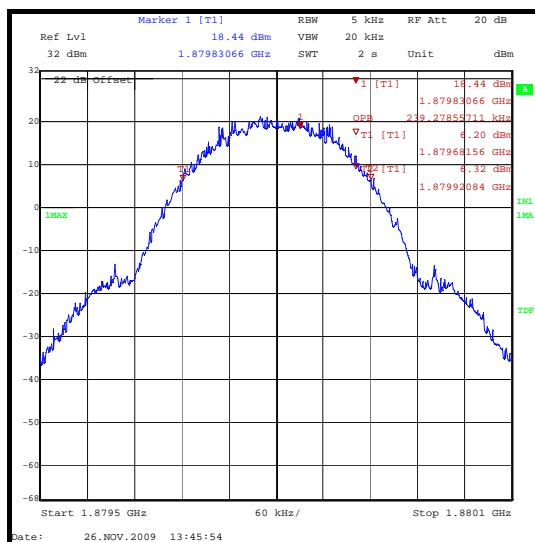
Temperature (°C):	23
Relative Humidity (%):	31

Results: GPRS

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	239.279

Note(s):

- In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser



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

FCC Part:	2.1053 & 24.238
Frequency Range:	30 MHz to 20 GHz
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):	24
Relative Humidity (%):	31

Results: Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3700.494	-23.2	-13.0	10.2	Complied
5550.720	-16.3	-13.0	3.3	Complied
7401.189	-23.8	-13.0	10.8	Complied
9251.074	-20.3	-13.0	7.3	Complied

Results: Middle Channel

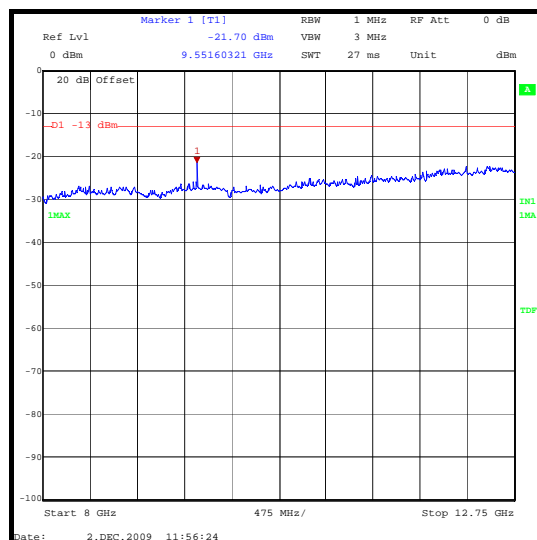
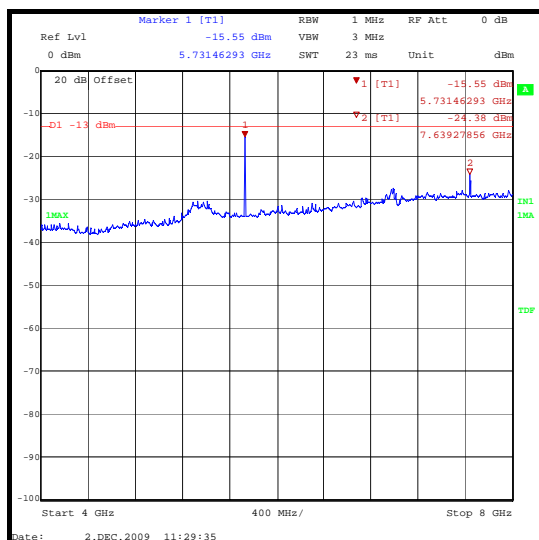
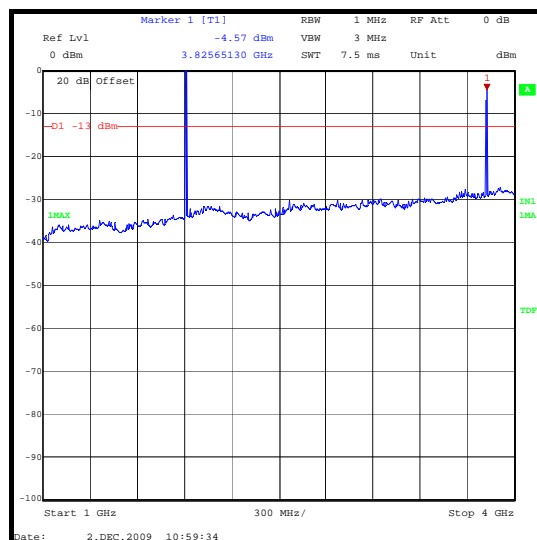
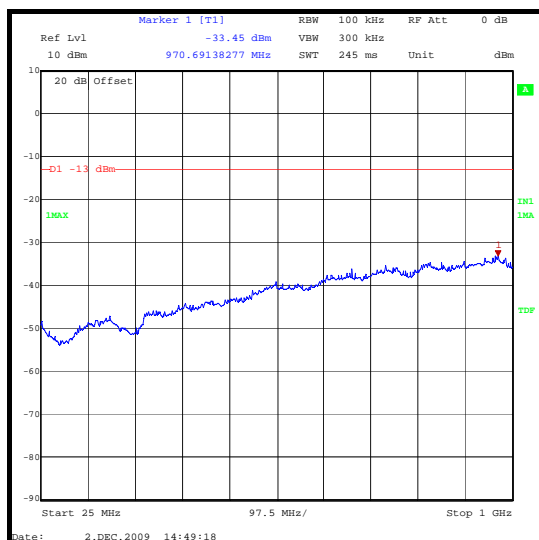
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3759.443	-23.8	-13.0	10.8	Complied
5639.552	-15.3	-13.0	2.3	Complied
7519.215	-25.4	-13.0	12.4	Complied
9399.074	-19.2	-13.0	6.2	Complied

Results: Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3820.109	-24.5	-13.0	11.5	Complied
5729.334	-14.4	-13.0	1.4	Complied
7638.840	-23.6	-13.0	10.6	Complied
9549.149	-18.1	-13.0	5.1	Complied

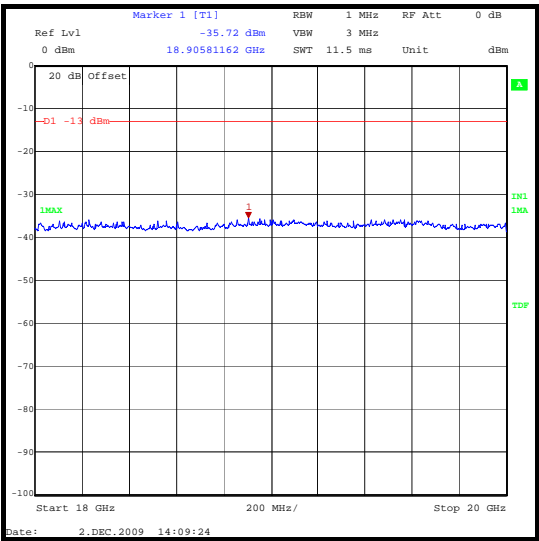
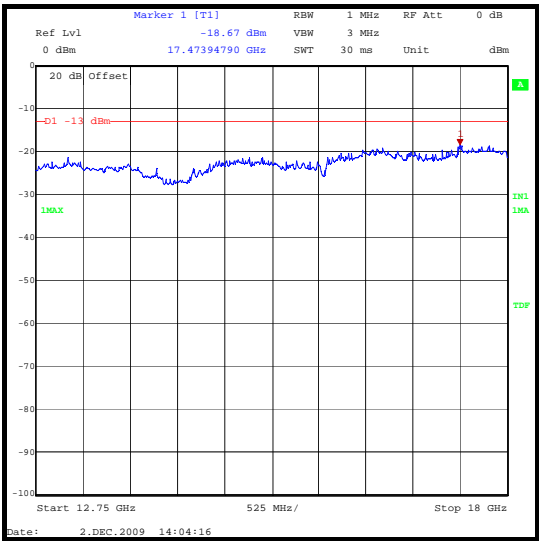
Note(s):

1. The transmitter fundamental is shown on the 1 GHz to 4 GHz plot at approximately 1909 MHz.
2. The high level of the 2nd harmonic (at 3.8256 GHz on the 1 GHz to 4 GHz plot) is caused by distortion in the preamplifier used during pre-scans. The final measurement of this harmonic emission was measured using an appropriate filter.
3. Final measurements were performed using appropriate RF filters and attenuators where required.

Transmitter Out of Band Radiated Emissions (continued)

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

Transmitter Out of Band Radiated Emissions (continued)



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

5.2.9. Transmitter Radiated Emissions at Band Edges**Test Summary:**

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:

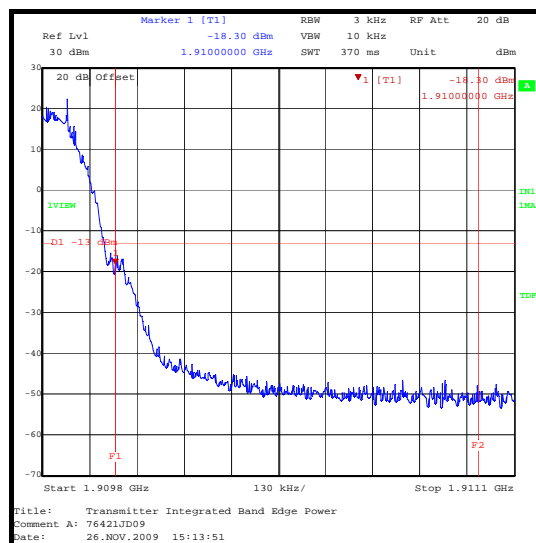
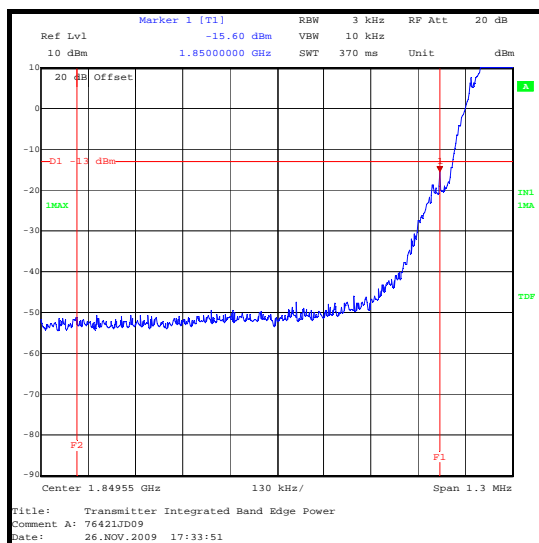
Temperature (°C):	24
Relative Humidity (%):	31

Results: GSM - Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-15.6	-13.0	2.6	Complied

Results: GSM - Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1910	-18.3	-13.0	5.3	Complied



Transmitter Radiated Emissions at Band Edges (continued)**Test Summary:**

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:

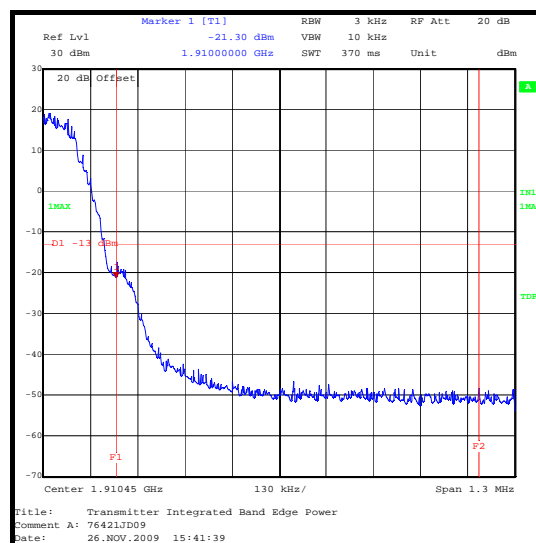
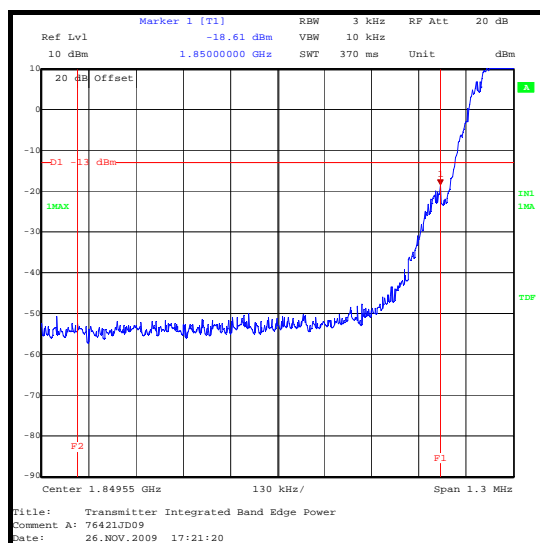
Temperature (°C):	23
Relative Humidity (%):	34

Results: GPRS - Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-18.6	-13.0	5.6	Complied

Results: GPRS - Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1910	-20.5	-13.0	7.5	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%	±3.72 dB
Effective Isotropic Radiated Power (EIRP)	Not applicable	95%	±2.94 dB
Frequency Stability	Not applicable	95%	±0.92 ppm
Occupied Bandwidth	824 to 849 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 26 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 Last Calibrated	Cal. Interval (Months)
A1391	Attenuator	Huber + Suhner	757987	6810.17.B	Calibrated before use	-
A1393	Attenuator	Huber + Suhner	757456	6820.17.B	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A436	Antenna	Flann	20240-20	330	24 Apr 2009	36
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A1832	Attenuator	Huber + Suhner	6806.17.B	753459	05 Nov 2009	12
A1975	High Pass Filter	Atlantec RF	AFH-03000	090424010	Calibrated before use	-
A279	6 dB Attenuator	Narda	771-6	None	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	13 Mar 2009	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Mar 2009	12
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibrated before use	-
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1138	Comms Test Set	Rohde & Schwarz	CMU200	836202/093	Calibration not required	-
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	22 Apr 2009	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Aug 2009	12
M1068	Thermometer	Iso-tech	RS55	93102884	10 Oct 2009	12
M1269	Multimeter	Fluke	179	90250210	23 Jun 2009	12
S021	DC Power Supply	Thurlby Thandar	CPX200	061034	Calibrated before use	-

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