TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: SoftBank 840P

To: FCC Part 24: 2008 Subpart E

Test Report Serial No:
RFI/RPT1/RP76125JD03A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director: 	
Checked By:	Tony Henriques
Signature: 	
Date of Issue:	21 October 2009

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1. Customer Information

Company Name:	Panasonic Mobile Comms Dev of Europe Ltd
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP

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:	10 October 2009 to 13 October 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 840P
Model Name or Number:	EB-3220
Serial Number:	004401220834101
Hardware Version Number:	Rev C
Software Version Number:	840PVA14
FCC ID Number:	UCE209019A

Description:	Battery
Brand Name:	SoftBank
Model Name or Number:	PMBAT1

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

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

Description:	Personal Hands Free
Brand Name:	Softbank
Model Name or Number:	ZTCK01

Description:	Personal Hands Free Converter
Brand Name:	Softbank
Model Name or Number:	PMLAJI

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

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.

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	32.8 dBm	
	GPRS	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:	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 mains charger connected to the EUT and 120 V AC supply as this was found to be the worst case during prescans. All accessories were individually connected and measurements made during prescans 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):	25
Relative Humidity (%):	30

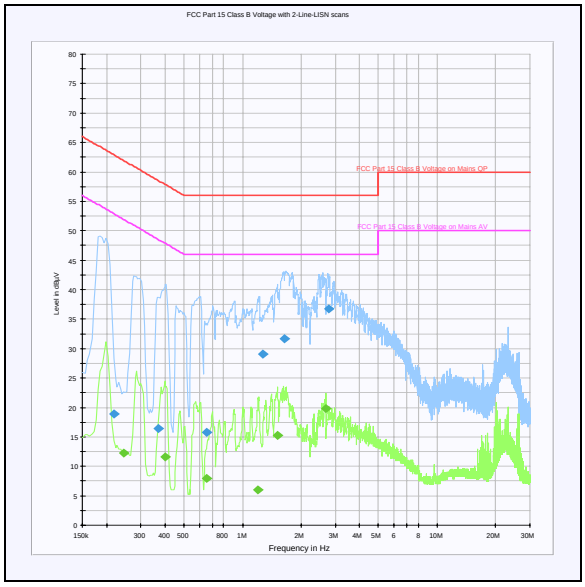
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.217500	Live	18.9	62.9	44.0	Complied
0.370500	Live	16.4	58.5	42.1	Complied
0.649500	Live	15.7	56.0	40.3	Complied
1.266000	Live	29.1	56.0	26.9	Complied
1.644000	Live	31.6	56.0	24.4	Complied
2.787000	Neutral	36.8	56.0	19.2	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.244500	Live	12.2	51.9	39.7	Complied
0.397500	Live	11.6	47.9	36.3	Complied
0.654000	Live	7.9	46.0	38.1	Complied
1.203000	Live	6.0	46.0	40.0	Complied
1.504500	Live	15.3	46.0	30.7	Complied
2.665500	Neutral	19.8	46.0	26.2	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:

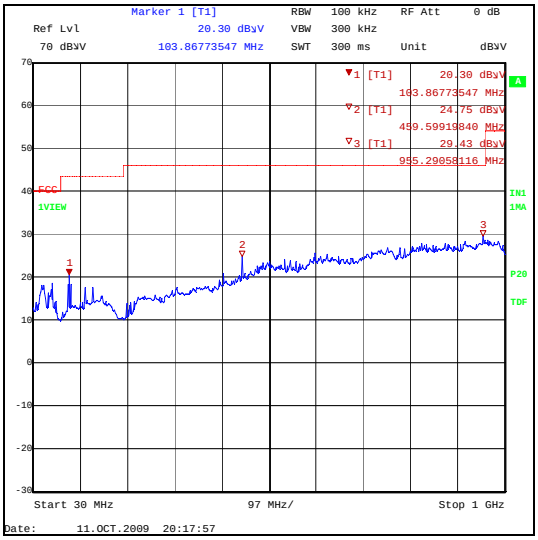
FCC Part:	15.109
Frequency Range:	30 MHz to 1000 MHz
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	32

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
104.076	Horizontal	21.5	43.5	22.0	Complied
458.795	Horizontal	27.0	46.0	19.0	Complied
954.750	Horizontal	30.4	46.0	15.6	Complied



Note: 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):	25
Relative Humidity (%):	32

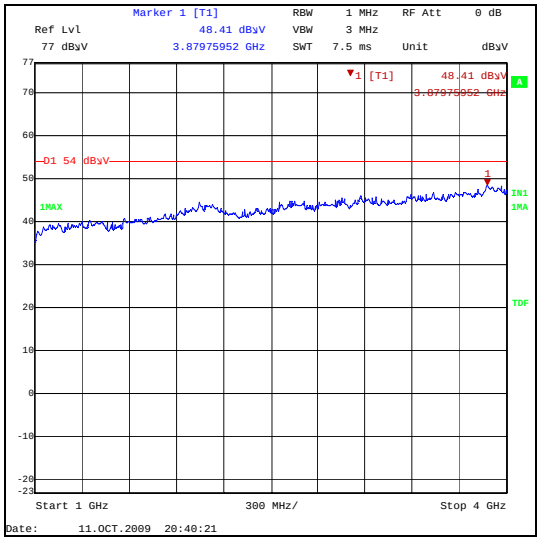
Results:

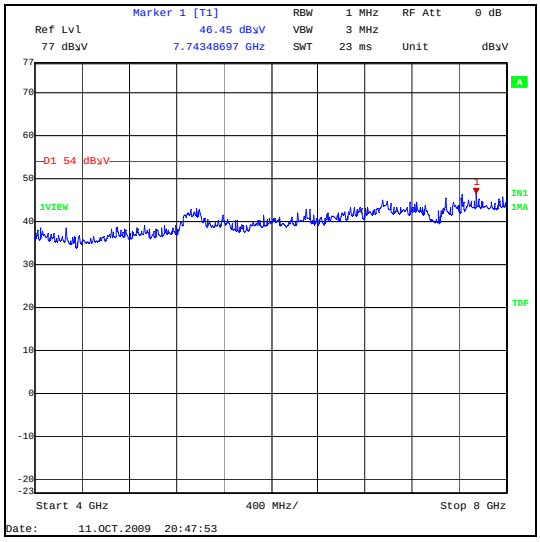
Frequency (MHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
12635.772	Vertical	29.6	13.1	42.7	54.0	11.3	Complied

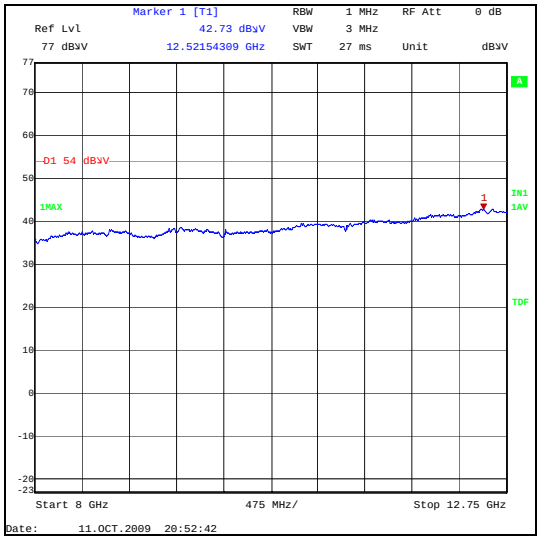
Note(s):

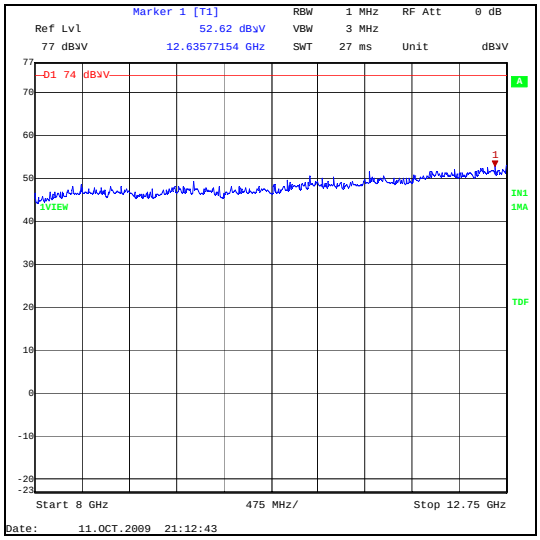
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
2. All pre-scans were performed with a peak detector against average limits apart from measurements made in the range of 8 to 12.75 GHz where pre-scans were performed with peak and average detectors and the applicable limit applied. This was due to the noise floor exceeding the average limit when using a peak detector.

Idle Mode Radiated Spurious Emissions (continued)









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):	26
Relative Humidity (%):	40

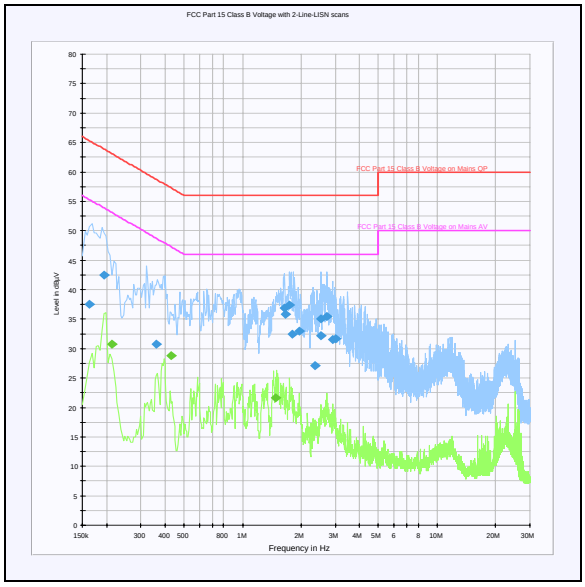
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.163500	Neutral	37.5	65.3	27.8	Complied
0.195000	Live	42.5	63.8	21.3	Complied
0.361500	Neutral	30.8	58.7	27.9	Complied
1.648500	Live	36.8	56.0	19.2	Complied
1.657500	Live	35.8	56.0	20.2	Complied
1.747500	Neutral	37.4	56.0	18.6	Complied
1.792500	Neutral	32.4	56.0	23.6	Complied
1.945500	Neutral	32.9	56.0	23.1	Complied
2.346000	Live	27.1	56.0	28.9	Complied
2.526000	Neutral	35.1	56.0	20.9	Complied
2.539500	Neutral	32.2	56.0	23.8	Complied
2.715000	Neutral	35.4	56.0	20.6	Complied
2.917500	Neutral	31.5	56.0	24.5	Complied
3.025500	Neutral	31.7	56.0	24.3	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.213000	Neutral	30.7	53.1	22.4	Complied
0.429000	Neutral	28.7	47.3	18.6	Complied
1.482000	Live	21.7	46.0	24.3	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):	24
Relative Humidity (%):	35

Results: GSM

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dBm)	Result
Bottom	1850.2	Horizontal	30.7	33.0	2.3	Complied
Middle	1879.8	Horizontal	32.8	33.0	0.2	Complied
Top	1909.8	Horizontal	31.2	33.0	1.8	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dBm)	Result
Bottom	1850.2	Horizontal	26.5	33.0	6.5	Complied
Middle	1879.8	Horizontal	28.5	33.0	4.5	Complied
Top	1909.8	Horizontal	28.4	33.0	4.6	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):	27
Relative Humidity (%):	27

Results: Bottom Channel (1850.2 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	23	1850.200023	1850.0	0.200023	Complied
-20	25	1850.200020	1850.0	0.200020	Complied
-10	22	1850.200022	1850.0	0.200022	Complied
0	24	1850.200024	1850.0	0.200024	Complied
10	37	1850.200037	1850.0	0.200037	Complied
20	25	1850.200025	1850.0	0.200025	Complied
30	44	1850.200044	1850.0	0.200044	Complied
40	40	1850.200040	1850.0	0.200040	Complied
50	49	1850.200049	1850.0	0.200049	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	1909.800022	1910.0	0.199978	Complied
-20	17	1909.800017	1910.0	0.199923	Complied
-10	24	1909.800024	1910.0	0.199976	Complied
0	26	1909.800026	1910.0	0.199974	Complied
10	42	1909.800042	1910.0	0.199958	Complied
20	28	1909.800028	1910.0	0.199972	Complied
30	37	1909.800037	1910.0	0.199963	Complied
40	44	1909.800044	1910.0	0.199956	Complied
50	47	1909.800047	1910.0	0.199953	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 (%):	29

Results: Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.145	-26	1850.199974	1850.0	0.199974	Complied
4.255	-34	1850.199966	1850.0	0.199966	Complied

Results: Top Channel (1909.8 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.145	-44	1909.799956	1910.0	0.200044	Complied
4.255	-51	1909.799949	1910.0	0.200051	Complied

5.2.7. Transmitter Occupied Bandwidth

Test Summary:

FCC Part:	24.238
Test Method Used:	As detailed in ANSI C63.4 Section13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)
Modulation:	GSM Circuit Switched

Environmental Conditions:

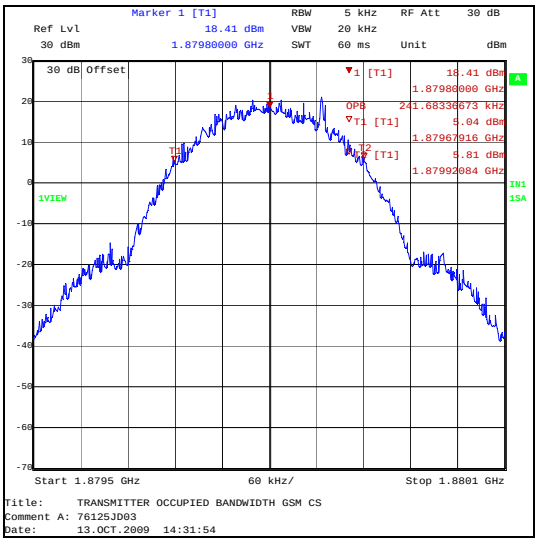
Temperature (°C):	25
Relative Humidity (%):	28

Results

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	241.683

Note(s):

1. 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 Section13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)
Modulation:	GPRS

Environmental Conditions:

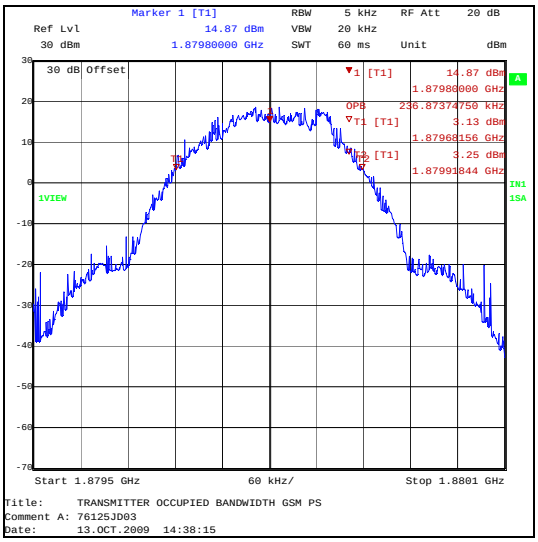
Temperature (°C):	25
Relative Humidity (%):	28

Results:

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	236.874

Note(s):

1. 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 (%):	35

Results: Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3698.966	-41.6	-13.0	28.6	Complied
5550.926	-44.1	-13.0	31.1	Complied
7400.575	-50.3	-13.0	37.3	Complied
9251.041	-38.3	-13.0	25.3	Complied
11101.744	-43.4	-13.0	30.4	Complied

Results: Middle Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3759.094	-41.2	-13.0	28.2	Complied
5639.525	-43.6	-13.0	30.6	Complied
7518.724	-48.9	-13.0	35.9	Complied
9398.851	-39.0	-13.0	26.0	Complied
11279.160	-43.4	-13.0	30.4	Complied

Results: Top Channel

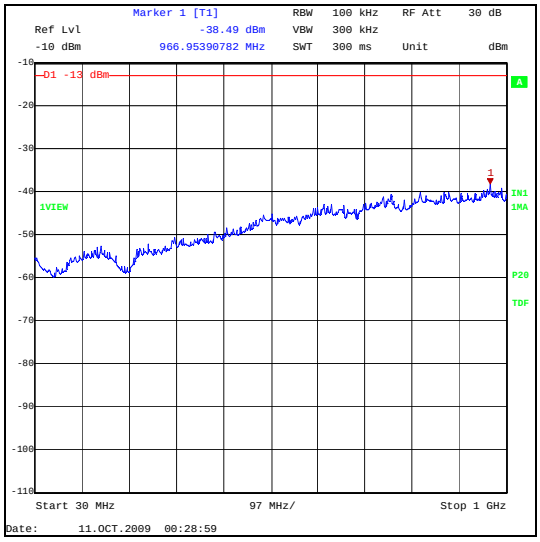
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3819.827	-40.1	-13.0	27.1	Complied
5729.646	-42.2	-13.0	29.2	Complied
7639.654	-46.9	-13.0	33.9	Complied
9549.149	-40.4	-13.0	27.4	Complied
11459.341	-43.8	-13.0	30.8	Complied

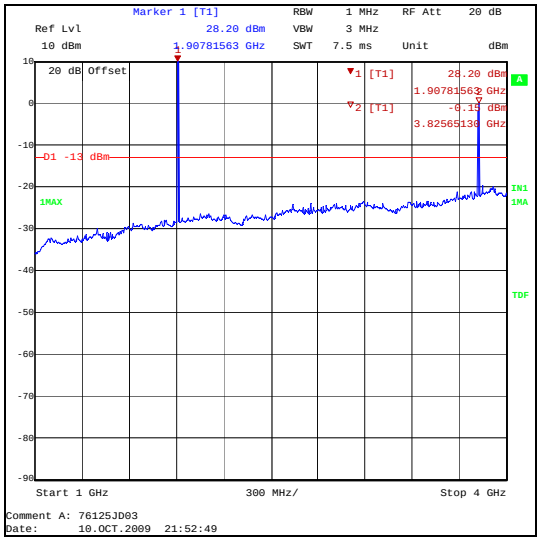
Transmitter Out of Band Radiated Emissions (continued)

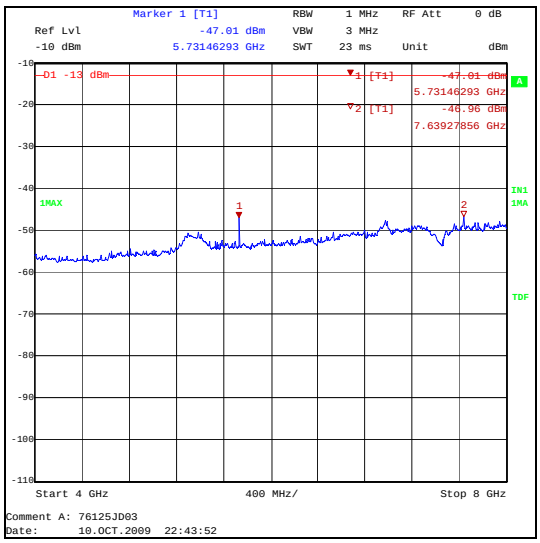
Note(s):

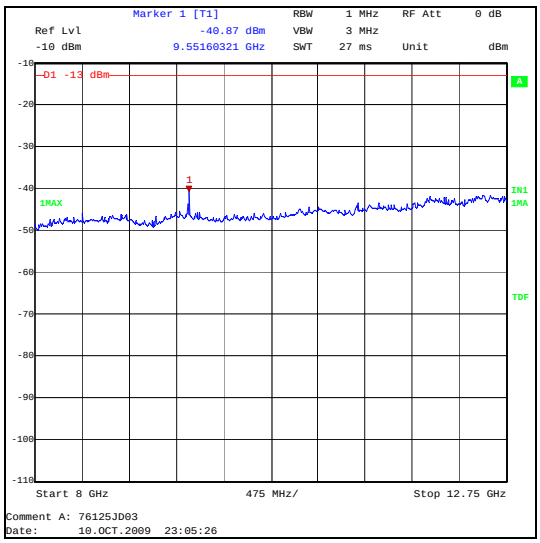
1. The transmitter fundamental is shown on the 1 GHz to 4 GHz plot at approximately 1908 MHz.
2. The high level of the 2nd harmonic (at 3.8256 GHz on the 1 GHz to 4 GHz plot) is caused by distortion in the preamplifier used during pre-scans. The final measurement of this harmonic emission was measured using an appropriate filter.

Transmitter Out of Band Radiated Emissions (continued)

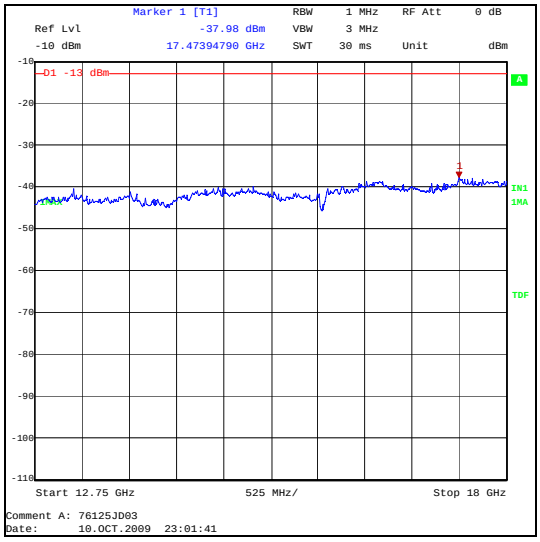


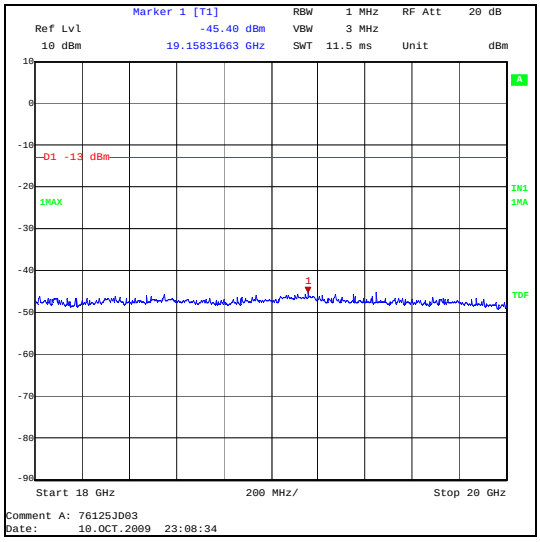






Transmitter Out of Band Radiated Emissions (continued)





Note: 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
Modulation:	GSM

Environmental Conditions:

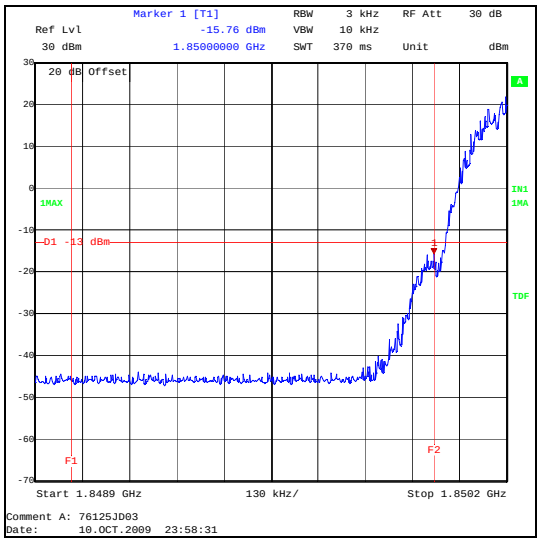
Temperature (°C):	24
Relative Humidity (%):	35

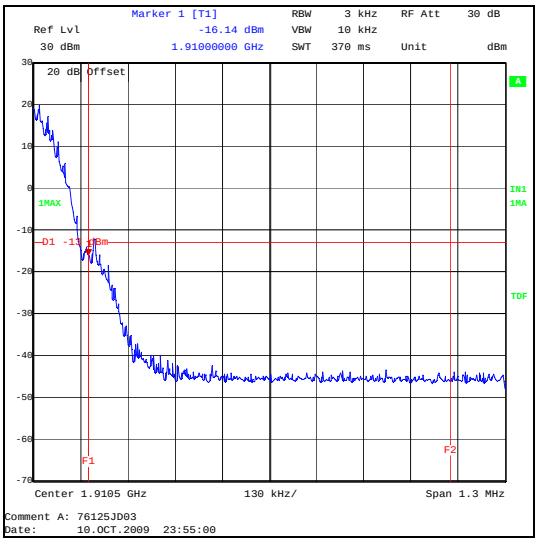
Results: Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850	-15.8	-13.0	2.8	Complied

Results: Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910	-16.1	-13.0	3.1	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
Modulation:	GPRS

Environmental Conditions:

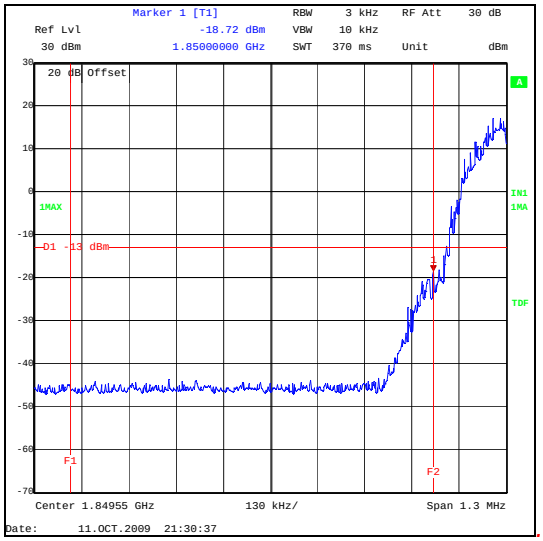
Temperature (°C):	24
Relative Humidity (%):	35

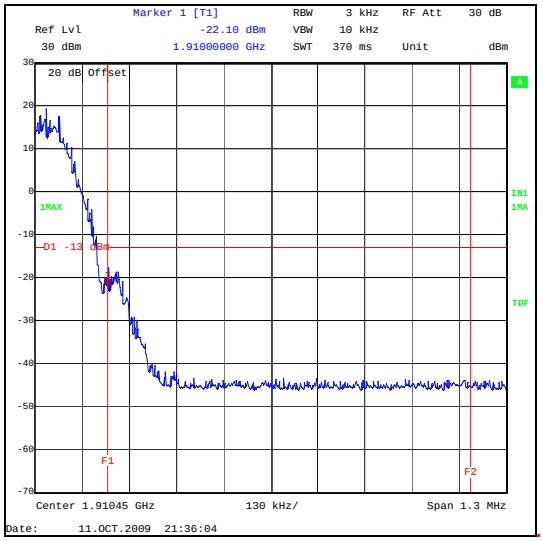
Results: Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850.0	-18.7	-13.0	5.7	Complied

Results: Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910.0	-22.1	-13.0	9.1	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	Not applicable	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz 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)
A1141	Directional Coupler	Hewlett Packard	11691D	1212A02494	Calibrated before use	-
A1392	Attenuator	Huber + Suhner	757456	6820.17.B	Calibrated before use	-
A1516	Comms Test Set	Rohde & Schwarz	CMU200	835687/011	Calibration not required	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	13 Mar 2009	12
A390	Attenuator	Suhner	6830.17.B	None	Calibrated before use	-
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
M1229	Digital Multimeter	Fluke	179	87640015	23 Jun 2009	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	22 Apr 2009	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Aug 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.