



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: NTT docomo P-01C

To: FCC Part 24: 2009 Subpart E

Test Report Serial No:
RFI-RPT-RP78574JD09B

This Test Report Is Issued Under The Authority Of Scott D'Adamo, Operations Manager Global Approvals:	
	
Checked By:	Ian Watch
Signature:	
Date of Issue:	24 August 2010

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Table of Contents

1. Customer Information..... 4

2. Summary of Testing..... 5

3. Equipment Under Test (EUT) 6

4. Operation and Monitoring of the EUT during Testing 9

5. Measurements, Examinations and Derived Results10

6. Measurement Uncertainty30

Appendix 1. Test Equipment Used31

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) 2009: Part 24 Subpart E (Personal Communication Services)
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	11 August 2010 to 20 August 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107	Idle Mode AC Conducted Spurious Emissions	
Part 15.109	Idle Mode Radiated Spurious Emissions	
Part 24.232	Transmitter Equivalent Isotropic Radiated Power (EIRP)	
Part 24.235	Transmitter Frequency Stability (Temperature & Voltage Variation)	
Part 2.1049 / 24.238	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.

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:	P-01C
IMEI Number:	351965040007097 (<i>Radiated sample</i>) 351965040007105 (<i>Conducted RF port sample</i>)
Hardware Version Number:	Rev C
Software Version Number:	B-D02CS1-00.01.012 D02CS1_Cv20092804
FCC ID Number:	UCE210032A

Description:	Battery
Brand Name:	NTT docomo
Model Name or Number:	P17

Description:	AC Charger
Brand Name:	NTT docomo
Model Name or Number:	FOMA AC Adapter 01 for Global use / MAS-BH0008-A 002

Description:	DC Charger
Brand Name:	NTT docomo
Model Name or Number:	FOMA DC Adapter 02

Description:	Charge/USB Data cable
Brand Name:	NTT docomo
Model Name or Number:	FOMA USB Cable with Charge Function 01

Description:	Personal Hands-Free
Brand Name:	NTT docomo
Model Name or Number:	Stereo Earphone Set 01

3.2. Description of EUT

The equipment under test was a dual mode UMTS/GSM cellular handset with 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	3.7V	
	Minimum	3.4V	
	Maximum	4.2V	
Maximum Output Power (EIRP):	GSM	27.8 dBm	
	GPRS	25.6 dBm	
Maximum Output Power (Conducted)::	GSM	29.3 dBm	
	GPRS	27.4 dBm	
Transmit Frequency Range:	1850 MHz 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 MHz 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:	Micro SD memory card
Brand Name:	Not stated
Model Name or Number:	Not stated

Description:	Dummy battery
Brand Name:	Not Stated
Serial Number:	Not Stated

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

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- 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 mode and also in GPRS Multislot Class 10 mode with the unit transmitting on two timeslots in the uplink.
- 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 GSM/GPRS system simulator operating in transceiver mode.
- The sample with IMEI 351965040007105 was used for frequency stability and conducted power measurements. The sample with IMEI 351965040007097 was used for all other measurements.
- The SDRAM card was present in the EUT during all testing.
- The dummy battery was fitted for frequency stability measurements.
- Radiated emissions were performed with the Personal Hands Free connected to the EUT. All supplied accessories were initially tested and the EUT was found to radiate the highest level emissions with the Personal Hands Free connected.

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:**

Test Engineer:	Gareth Bragg	Test Date:	20 August 2010
Test Sample Serial No:	351965040007097		

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 (%):	38

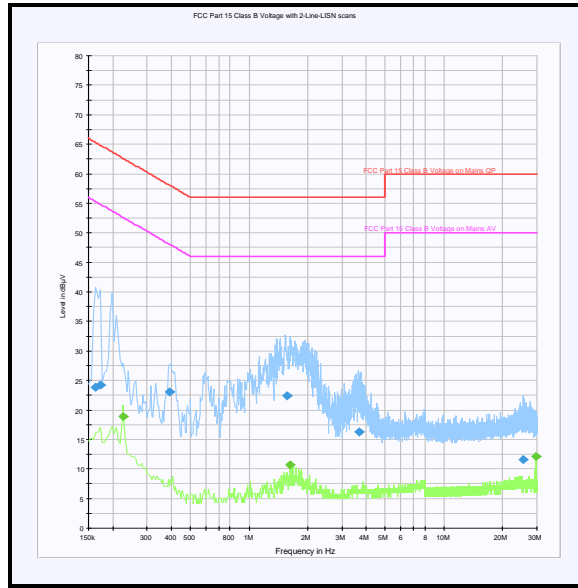
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.163500	Live	23.9	65.3	41.4	Complied
0.172500	Live	24.2	64.8	40.6	Complied
0.388500	Neutral	23.1	58.1	35.0	Complied
1.563000	Live	22.3	56.0	33.7	Complied
3.655500	Neutral	16.3	56.0	39.7	Complied
25.584000	Neutral	11.6	60.0	48.4	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.226500	Live	18.9	52.6	33.7	Complied
1.630500	Live	10.7	46.0	35.3	Complied
29.616000	Live	12.1	50.0	37.9	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:

Test Engineer:	Grant Mason	Test Date:	12 August 2010
Test Sample Serial No:	351965040007097		

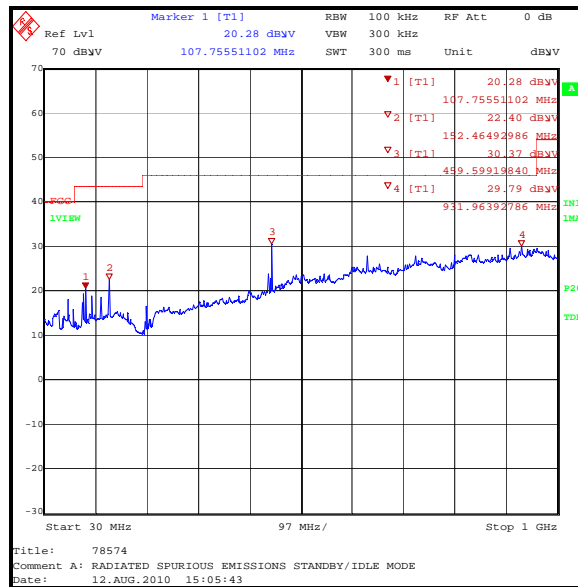
FCC Part:	15.109
Frequency Range:	30 MHz to 1000 MHz
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

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

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
458.787	Vertical	31.1	46.0	14.9	Complied
639.223	Horizontal	29.6	46.0	16.4	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):	28
Relative Humidity (%):	27

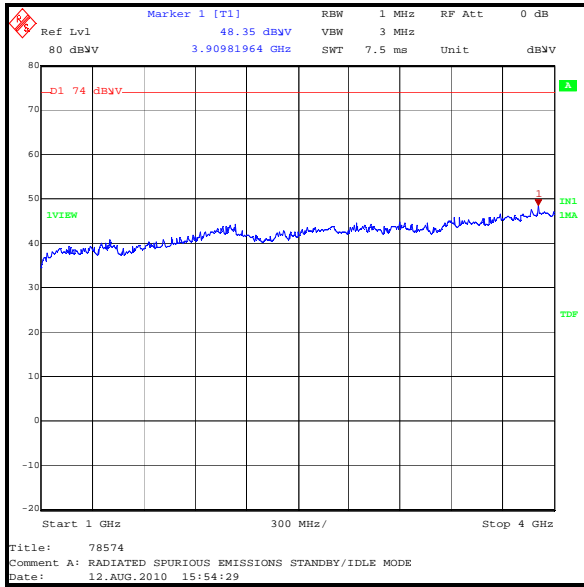
Results:

Frequency (GHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
9454.910	Vertical	49.7	54.0	4.3	Complied

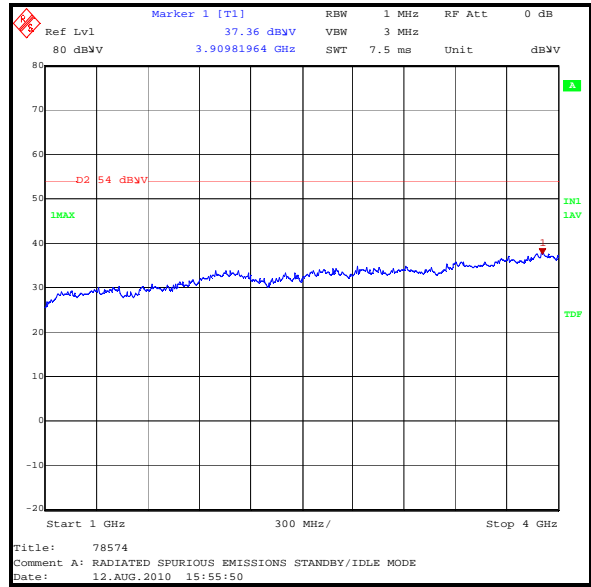
Note(s):

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. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.

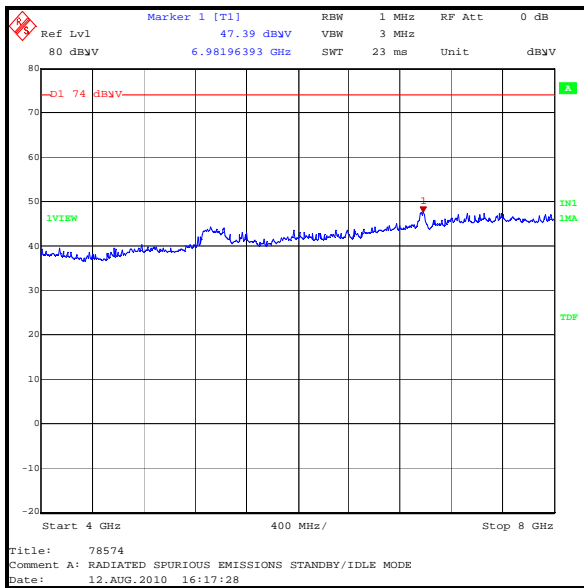
Idle Mode Radiated Spurious Emissions (continued)



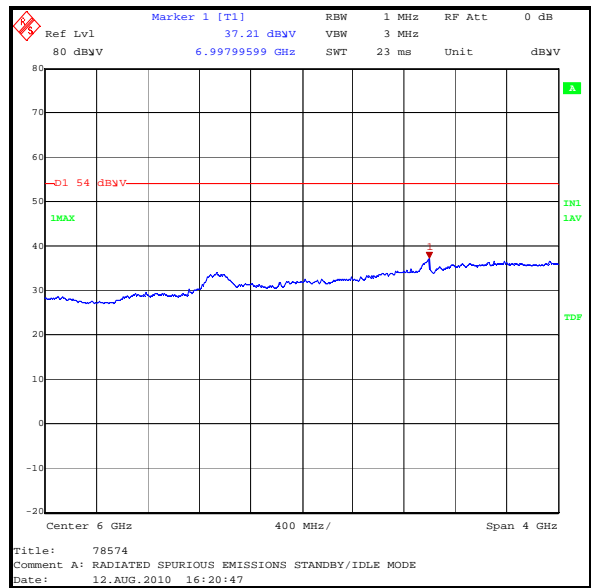
Peak Detector



Average Detector

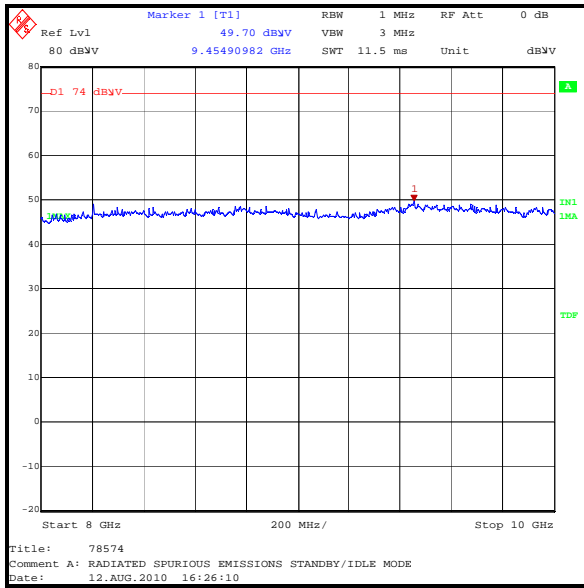


Peak Detector

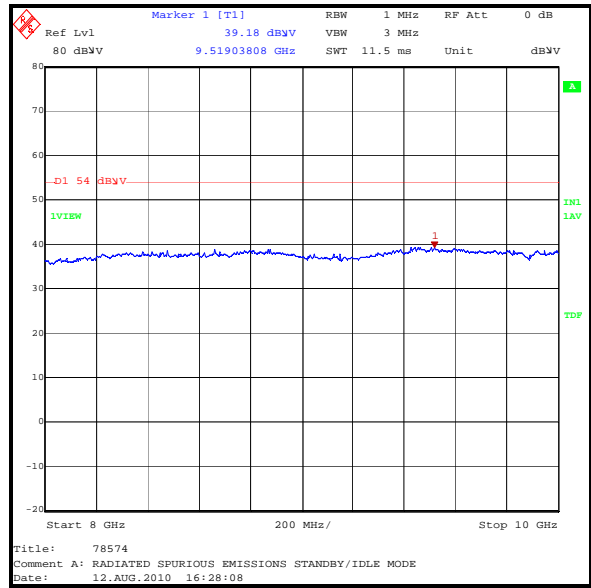


Average Detector

Idle Mode Radiated Spurious Emissions (continued)



Peak Detector



Average Detector

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

Test Engineer:	Grant Mason	Test Date:	13 August 2010
Test Sample Serial No:	351965040007097		

FCC Part:	24.232 and 2.1046
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	28

Results: GSM

Channel	Measured Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dBm)	Result
Bottom	1850.2	Vertical	27.2	33.0	5.8	Complied
Middle	1879.8	Vertical	27.6	33.0	5.4	Complied
Top	1909.8	Vertical	27.8	33.0	5.2	Complied

Results: GPRS

Channel	Measured Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dBm)	Result
Bottom	1850.2	Vertical	25.0	33.0	8.0	Complied
Middle	1879.8	Vertical	25.4	33.0	7.6	Complied
Top	1909.8	Vertical	25.6	33.0	7.4	Complied

Note(s):

1. EIRP Measurement results include the EUT antenna gain.

Transmitter Conducted Average Power

Test Engineer:	Richelieu Quoi	Test Date:	13 August 2010
Test Sample Serial No:	351965040007105		

Results: GSM

Channel	Frequency (MHz)	Conducted Average Output Power (dBm)
Bottom	1850.2	29.3
Middle	1879.8	29.1
Top	1909.8	28.8

Results: GPRS

Channel	Frequency (MHz)	Conducted Average Output Power (dBm)
Bottom	1850.2	27.4
Middle	1879.8	27.1
Top	1909.8	26.8

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

Test Engineer:	Nick Steele	Test Date:	12 August 2010
Test Sample Serial No:	351965040007105		

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:

Ambient Temperature (°C):	27
Ambient Relative Humidity (%):	33

Results: Bottom Channel (1850.2 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	1850.200012	12	0.01	2.5	2.49	Complied
-20	1850.199973	27	0.01	2.5	2.49	Complied
-10	1850.199973	27	0.01	2.5	2.49	Complied
0	1850.199987	13	0.01	2.5	2.49	Complied
10	1850.199990	10	0.01	2.5	2.49	Complied
20	1850.199964	36	0.02	2.5	2.48	Complied
30	1850.199970	30	0.02	2.5	2.48	Complied
40	1850.199964	36	0.02	2.5	2.48	Complied
50	1850.199958	42	0.02	2.5	2.48	Complied

Results: Top Channel (1909.8 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	1909.799981	19	0.01	2.5	2.49	Complied
-20	1909.799996	4	0.00	2.5	2.50	Complied
-10	1909.799983	17	0.01	2.5	2.49	Complied
0	1909.799986	14	0.01	2.5	2.49	Complied
10	1909.800003	3	0.00	2.5	2.50	Complied
20	1909.799974	26	0.01	2.5	2.49	Complied
30	1909.799978	22	0.01	2.5	2.49	Complied
40	1909.799972	28	0.01	2.5	2.49	Complied
50	1909.799964	36	0.02	2.5	2.48	Complied

Transmitter Frequency Stability (Temperature Variation) (continued)**Note(s):**

1. Frequency error was measured using the PCS 1900 modulation test on a calibrated Rohde & Schwarz CMU 200 Universal Radio Communications Tester in accordance with current Rohde & Schwarz application notes. The EUT was placed in a temperature chamber and connected by suitable RF cables to the CMU 200 outside the chamber. A bidirectional communications link was established on the centre channel between the EUT and the CMU 200. The frequency meter value was recorded.
2. Temperature was monitored throughout the test with a calibrated digital thermometer
3. A dummy battery was placed on the EUT and the dummy battery cables connected to a bench power supply.

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

Test Engineer:	Nick Steele	Test Date:	12 August 2010
Test Sample Serial No:	351965040007105		

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:

Ambient Temperature (°C):	27
Ambient Relative Humidity (%):	33

Results: Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.4	1850.199975	25	0.01	2.5	2.49	Complied
4.2	1850.199982	18	0.01	2.5	2.49	Complied

Results: Top Channel (1909.8 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.4	1909.799967	33	0.02	2.5	2.48	Complied
4.2	1909.799976	24	0.01	2.5	2.49	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 the PCS 1900 modulation test on 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 on the centre channel between the EUT and the CMU 200. The frequency meter value was recorded.
1. Voltage was monitored throughout the test with a calibrated digital voltmeter.

5.2.6. Transmitter Occupied Bandwidth

Test Summary:

Test Engineer:	Nick Steele	Test Date:	13 August 2010
Test Sample Serial No:	351965040007097		

FCC Part:	24.238
Test Method Used:	As detailed in ANSI C63.4 Section 13.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)

Environmental Conditions:

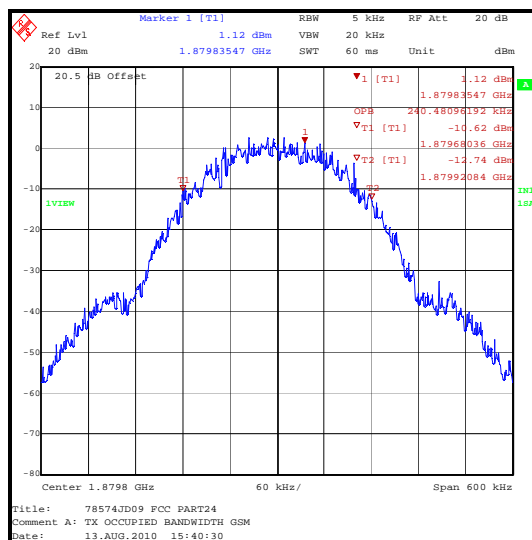
Temperature (°C):	27
Relative Humidity (%):	30

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	240.481

Note(s):

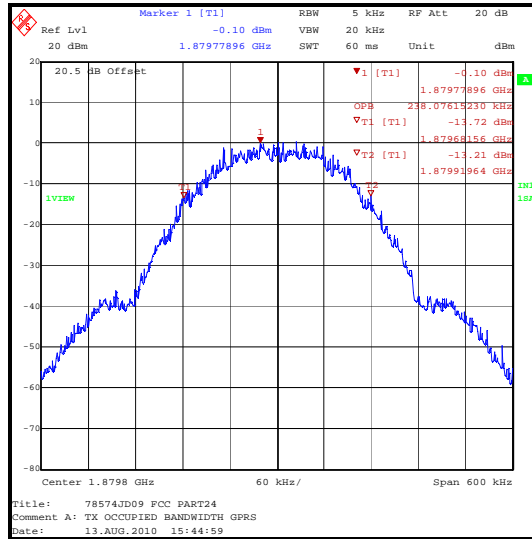
- In lieu of the test method detailed in ANSI C63.4 Section 13.7, the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.



Transmitter Occupied Bandwidth (continued)

Results: GPRS

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



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

Test Engineer:	Grant Mason	Test Dates:	12 August 2010 to 13 August 2010
Test Sample Serial No:	351965040007097		

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):	27
Relative Humidity (%):	27

Results Bottom Channel:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
7400.451	-36.2	-13.0	23.2	Complied
9251.210	-22.5	-13.0	9.5	Complied
18501.699	-29.9	-13.0	16.9	Complied

Results Middle Channel:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
7519.447	-34.2	-13.0	21.2	Complied
9398.878	-21.0	-13.0	8.0	Complied
18797.178	-33.8	-13.0	20.8	Complied

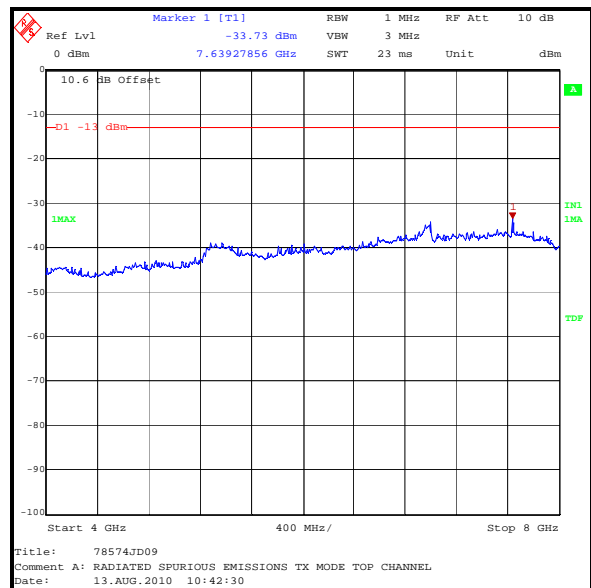
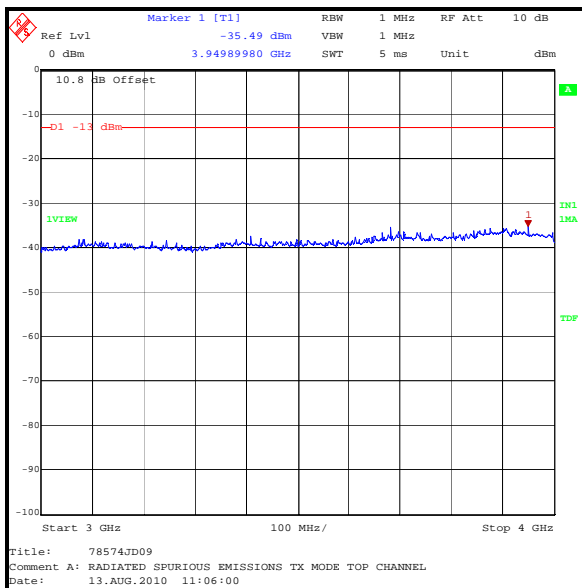
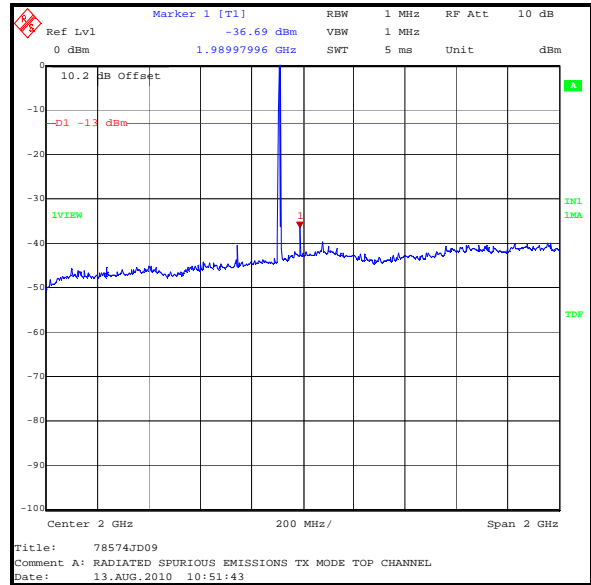
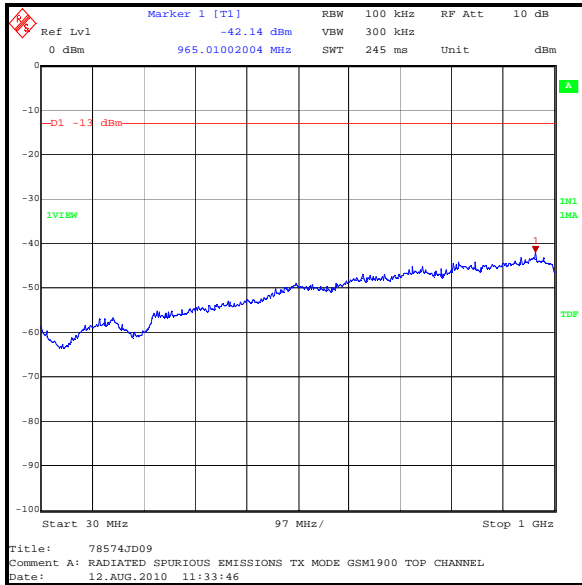
Results Top Channel:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
7639.439	-31.0	-13.0	18.0	Complied
9549.459	-19.7	-13.0	6.7	Complied
19097.335	-33.4	-13.0	20.4	Complied

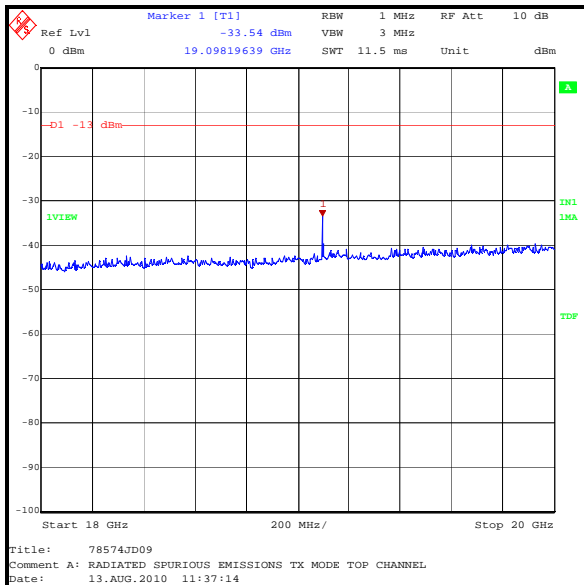
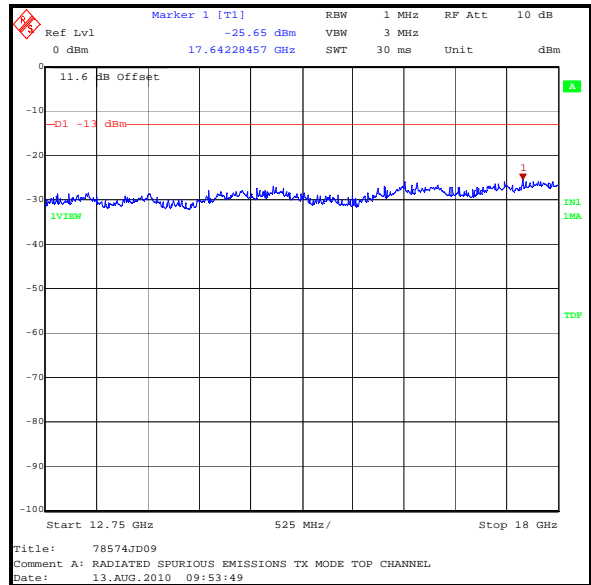
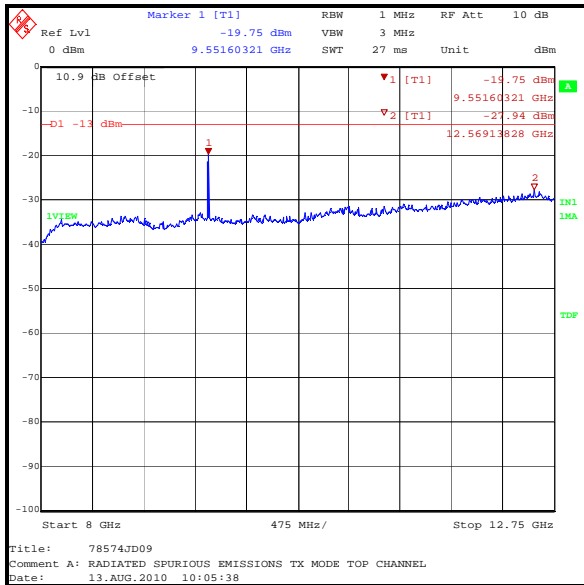
Transmitter Out of Band Radiated Emissions (continued)**Note(s):**

1. Pre-scans were performed with the EUT in circuit switched and GPRS modes with the EUT transmitting at maximum power on the top channel. The highest level emissions were observed in circuit switched mode. All final measurements were performed in circuit switched mode.
2. Pre-scans were performed on the top channel, final measurements were performed on the bottom, middle and top channels using appropriate RF attenuators and filters where required.
3. The transmitter fundamental is shown on the 1 GHz to 3 GHz plot at approximately 1909.8 MHz.
4. The emission at approximately 1989.8 MHz was identified as the downlink signal from the support equipment.
5. All other emissions were investigated and found to be >20 dB below the applicable limit.

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:	Grant Mason	Test Date:	18 August 2010
Test Sample Serial No:	351965040007097		

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:

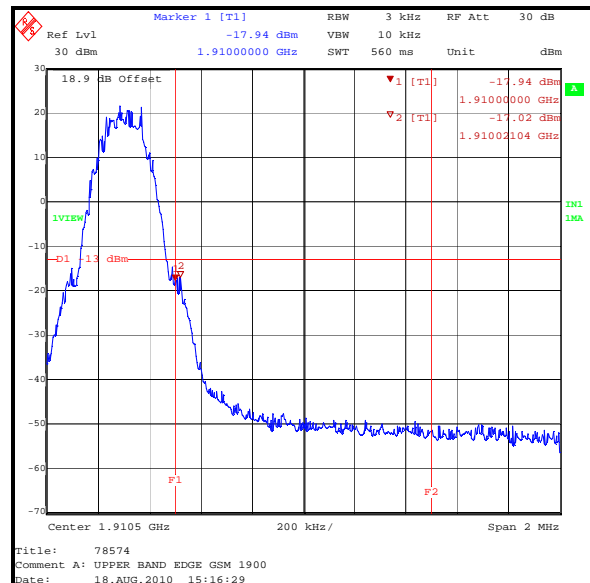
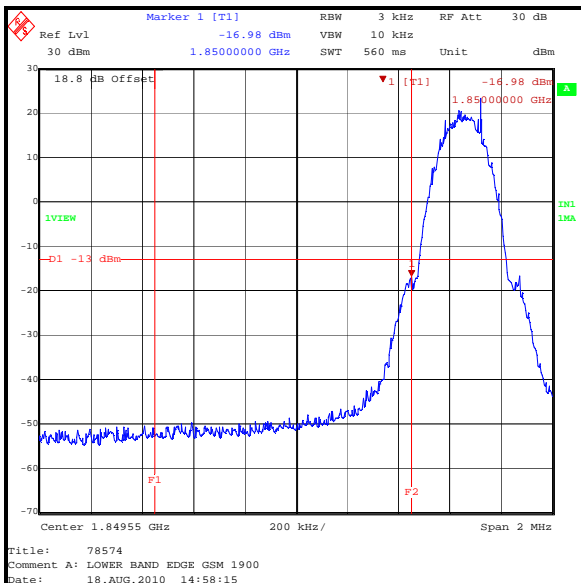
Temperature (°C):	26
Relative Humidity (%):	27

Results: GSM Circuit Switched - Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850.000	-17.0	-13.0	4.0	Complied

Results: GSM Circuit Switched - Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910.000	-17.9	-13.0	4.9	Complied
1910.021	-17.0	-13.0	4.0	Complied



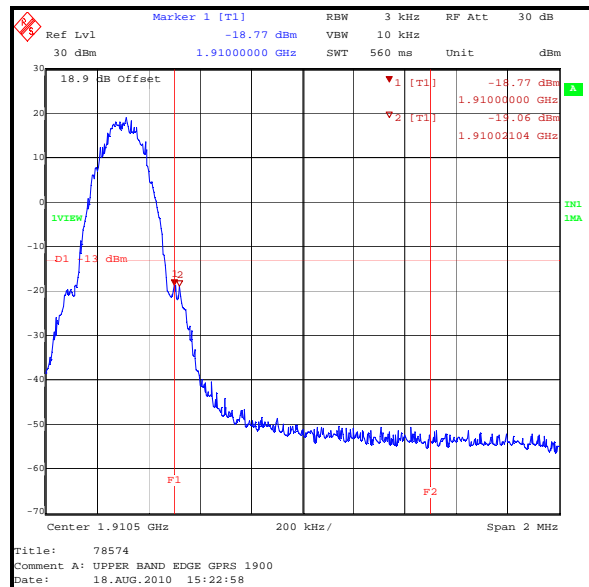
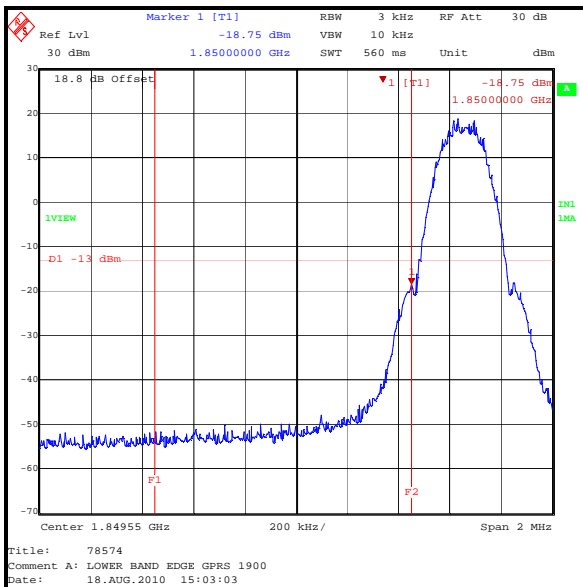
Transmitter Radiated Emissions at Band Edges (continued)

Results: GPRS - Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850.000	-18.8	-13.0	5.8	Complied

Results: GPRS - Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910.000	-18.8	-13.0	5.5	Complied
1910.021	-19.1	-13.0	6.1	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%	±3.25 dB
Effective Isotropic Radiated Power (EIRP)	1850 to 1910 MHz	95%	±2.94 dB
Frequency Stability	1850 to 1910 MHz	95%	±0.92 ppm
Occupied Bandwidth	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)
A1069	LISN	Rohde & Schwarz	ESH3-Z5	837469/012	13 Apr 2011	12
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	Calibrated before use	-
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 June 2011	12
A1818	Antenna	EMCO	3115	00075692	27 Nov 2010	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	01 Mar 2011	12
A1975	RF Filter	AtlanTecRF	AFH-03000	090424010	22 Jan 2011	12
A1980	RF Filter	Atlan TecRF	AFH-06000	09110900303	22 Jan 2011	12
A288	Antenna	Chase	CBL6111A	1589	16 Mar 2011	12
A436	Antenna	Flann	20240-20	330	05 Jun 2013	36
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibration not required	-
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2010	12
L1005	Comms Tester	Rhode & Schwarz	CMU200	116284	29 Jan 2011	12
M1068	Thermometer	Iso-Tech	RS55	93102884	01 Oct 2010	12
M1124	Spec. Analyser	Rohde & Schwarz	ESI26	100046K	22 Apr 2011	12
M1229	Multimeter	Fluke	179	87640015	15 Jul 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	28 Jun 2011	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	08 Apr 2011	12
S0525	PSU	Farnell	AP60-50	00141	Calibrated before use	-

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