

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: GE864-QUAD Automotive V2

To: FCC Part 22: 2008 Subpart H, FCC Part 24: 2008 Subpart E,
RSS 132 Issue 2 September 2005 and RSS-133 Issue 5 February 2009

Test Report Serial No:
RFI/RPT2/RP74325JD01A

Supersedes Test Report Serial No:
RFI/RPT1/RP74325JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	pp 
Checked By:	Robert Graham
Signature:	
Date of Issue:	26 November 2009

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number:2117901

This page has been left intentionally blank.

Table of Contents

1. Customer Information	4
2. Summary of Testing	5
3. Equipment Under Test (EUT)	8
4. Operation and Monitoring of the EUT during Testing	11
5. Measurements, Examinations and Derived Results	12
6. Measurement Uncertainty	37
Appendix 1. Test Equipment Used	38

1. Customer Information

Company Name:	Telit Communications S.p.A.
Address:	Via Stazione di Prosecco, 5/B Sgonico TS 34010 Trieste Italy

2. Summary of Testing

2.1. General Information – FCC Part 22

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 22 Subpart H (Public Mobile Services)
Specification Reference:	RSS-GEN Issue 2 June 2007
Specification Title:	General Requirements and Information for the Certification of Radiocommunication Equipment
Specification Reference:	RSS-132 Issue 2 Sep 2005
Specification Title:	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
Specification Reference:	RSS-133 Issue 5 Feb 2009
Specification Title:	GHz Personal Communications Services
Specification Reference:	SRSP-510 Issue 4 Feb 2008
Specification Title:	Technical Requirements for Personal Communications Services in the Bands 1850-1915 MHz and 1930-1995 MHz
Specification Reference:	SRSP-503 Issue 6 Jun 2003
Specification Title:	Technical Requirements for Cellular Radiotelephone Systems Operating in the Bands 824 – 849 MHz and 869 – 894 MHz
Site Registration:	FCC: 209735 Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	10 August 2009 to 17 September 2009

2.2. Summary of Test Results – FCC Part 22

FCC Reference (47CFR)	IC Reference	Measurement	Port Type	Result
Part 15.109	RSS-Gen 4.10/6.0 RSS-132 4.6	Receiver/Idle Mode Radiated Spurious Emissions	Enclosure	
Part 22.913(a)	RSS-132 4.4 SRSP-503 5.1.3	Transmitter Carrier Output Power	Antenna Terminals	
Part 22.355	RSS-132 4.3 RSS Gen 4.7	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	
Part 2.1049	RSS-Gen 4.6.1	Transmitter Occupied Bandwidth	Antenna	
Part 2.1053/22.917	RSS-132 4.5	Transmitter Out of Band Radiated Emissions	Antenna	
Part 2.1053/22.917	RSS-132 4.5	Transmitter Band Edge Radiated Emissions	Antenna	
Key to Results  = Complied  = Did not comply				

2.3. General Information – FCC Part 24

Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 24 Subpart E (Personal Communication Services)
Specification Reference:	RSS-GEN Issue 2 June 2007
Specification Title:	General Requirements and Information for the Certification of Radiocommunication Equipment
Specification Reference:	RSS-133 Issue 5 Feb 2009
Specification Title:	GHz Personal Communications Services
Specification Reference:	SRSP-510 Issue 4 Feb 2008
Specification Title:	Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz
Site Registration:	FCC: 209735 Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	10 August 2009 to 17 September 2009

2.4. Summary of Test Results – FCC Part 24

FCC Reference (47CFR)	IC Reference	Measurement	Port Type	Result
Part 15.109	RSS-Gen 4.10/6.0 RSS-133 6.6	Receiver/Idle Mode Radiated Spurious Emissions	Enclosure	
Part 24.232	RSS-133 6.4 SRSP-510 5.1.2	Transmitter Carrier Output Power	Antenna Terminals	
Part 24.235	RSS-133 6.3 RSS Gen 4.7	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna	
Part 24.238	RSS-Gen 4.6.1	Transmitter Occupied Bandwidth	Antenna	
Part 2.1053/24.238	RSS-133 6.5	Transmitter Out of Band Radiated Emissions	Antenna	
Part 2.1053/24.238	RSS-133 6.5	Transmitter Band Edge Radiated Emissions	Antenna	
Key to Results  = Complied  = Did not comply				

2.5. 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.

2.6. 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:	Telit
Model Name or Number:	GE864-QUAD Automotive V2
IMEI Number:	004401910142039
Hardware Version Number:	1
Software Version Number:	10.000.032
FCC ID Number:	RI7GE864QA2
Industry Canada Certification Number:	5131A-GE864QA2

3.2. Description of EUT

The equipment under test is a quad band GSM/GPRS modem mounted on a Telit EVK2 development board. The EUT is mounted to the development board on four support posts and connected by two 40 pin connectors.

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:	GSM 850 (Part 22)					
Type of Radio Device:	Transceiver					
Power Supply Requirement(s):	Nominal	3.8 V	Minimum	3.23 V	Maximum	4.37 V
Mode:	GSM/GPRS					
Modulation Type:	GMSK					
Channel Spacing:	200 kHz					
Maximum Output Power (ERP):	GSM	35.4 dBm		GPRS	35.2 dBm	
Transmit Frequency Range:	824 to 849 MHz					
Transmit Channels Tested:	Channel ID		Channel Number		Channel Frequency (MHz)	
	Bottom		128		824.2	
	Middle		190		836.4	
	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		881.4	
	Top		251		893.8	
Technology Tested:	PCS1900 (Part 24)					
Maximum Output Power (EIRP):	GSM	32.7 dBm		GPRS	32.6 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:	Development board
Model Name or Number:	EVK2
Serial Number:	113920002257

Description:	Monopole antenna with magnetic base
Model Name or Number:	Not stated
Serial Number:	Not stated
Cable Length and Type:	2.5 metres / RG174 coaxial terminated with SMA male
Connected to Port:	RF on EUT

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, centre and top channels as required.
- Occupied bandwidth, output power 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.
- Powered from a bench power supply connected to the 3.8V IN port on the development board.
- A $\frac{1}{4}$ wave antenna on a magnetic base was supplied by the client. The coaxial cable from the antenna was connected to the EUT RF port (SMA connector). The antenna and associated magnetic base were placed onto a flat metal plate measuring 150mm x 150mm, all radiated tests were performed in this configuration. Tests were performed with the antenna mounted vertically and horizontally to maximise radiated emissions.
- There is no integral antenna on the EUT.

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 – FCC Part 22

5.2.1. Receiver/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:

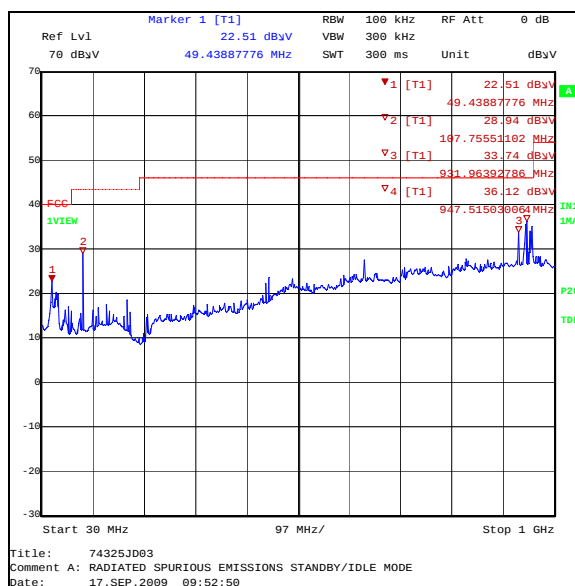
Temperature (°C):	25
Relative Humidity (%):	30

Results:

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
970.560	Horizontal	28.4	54.0	25.6	Complied

Note(s):

1. All emissions shown on the prescan plot were investigated and found to be ambients.
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.



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

FCC Part:	15.109
Frequency Range:	1 GHz to 5 GHz
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

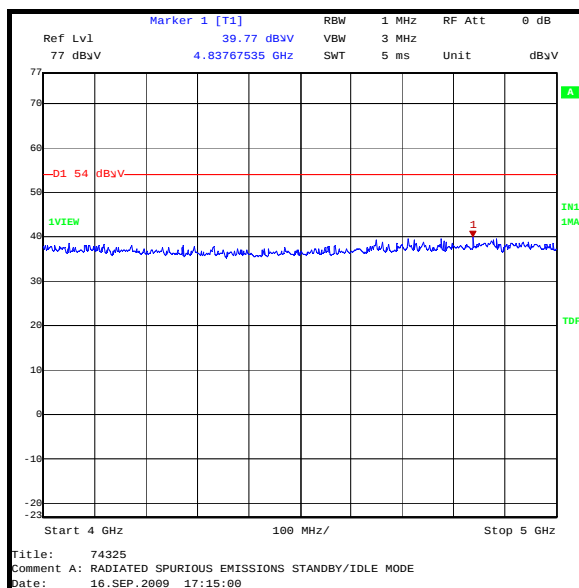
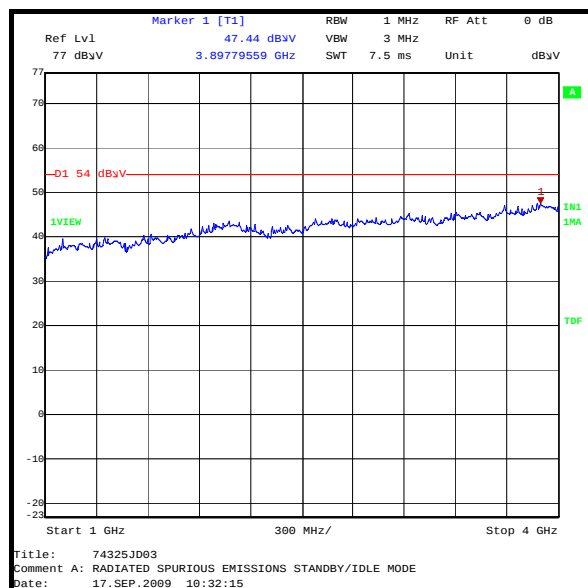
Temperature (°C):	25
Relative Humidity (%):	26

Results: Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V/m)	Transducer Factor (dB)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
3897.796	Vertical	41.8	5.6	47.4	54.0	6.6	Complied

Note(s):

- 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.



5.2.2. Transmitter Carrier Output Power**Test Summary:**

FCC Part:	22.913(a)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 referencing FCC CFR Part 22.913(a)

Environmental Conditions:

Temperature (°C):	30
Relative Humidity (%):	39

Results: GSM Circuit Switched

Channel	Measured Frequency (MHz)	Antenna Gain (dB)	Conducted RF O/P Power (dBm)	Calculated ERP (dBm)	Limit ERP (dBm)	Margin (dB)	Result
Bottom	824.2	3.0	32.1	35.1	38.5	3.4	Complied
Middle	836.4	3.0	32.4	35.4	38.5	3.1	Complied
Top	848.8	3.0	32.3	35.3	38.5	3.2	Complied

Results: GPRS

Channel	Measured Frequency (MHz)	Antenna Gain (dB)	Conducted RF O/P Power (dBm)	Calculated ERP (dBm)	Limit ERP (dBm)	Margin (dB)	Result
Bottom	824.2	3.0	32.0	35.0	38.5	3.5	Complied
Middle	836.4	3.0	32.2	35.2	38.5	3.3	Complied
Top	848.8	3.0	32.1	35.1	38.5	3.4	Complied

Note(s):

1. The conducted output power was added to the maximum allowable antenna gain stated by the client and compared against the Part 22 ERP limit.

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

FCC Part:	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):	30
Relative Humidity (%):	34

Results: Middle Channel (836.4 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	836.400022	22	0.0263	2.5	2.47	Complied
-20	836.400027	27	0.0323	2.5	2.47	Complied
-10	836.400020	20	0.0239	2.5	2.48	Complied
0	836.400018	18	0.0215	2.5	2.48	Complied
10	836.400018	18	0.0215	2.5	2.48	Complied
20	836.400016	16	0.0191	2.5	2.48	Complied
30	836.400017	17	0.0203	2.5	2.48	Complied
40	836.400018	18	0.0215	2.5	2.48	Complied
50	836.400024	24	0.0287	2.5	2.47	Complied

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

FCC Part:	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):	30
Relative Humidity (%):	39

Results: Middle Channel (836.4 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
3.23	836.400019	19	0.0227	2.5	2.48	Complied
4.37	836.400026	26	0.0311	2.5	2.47	Complied

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

FCC Part:	2.1049
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:

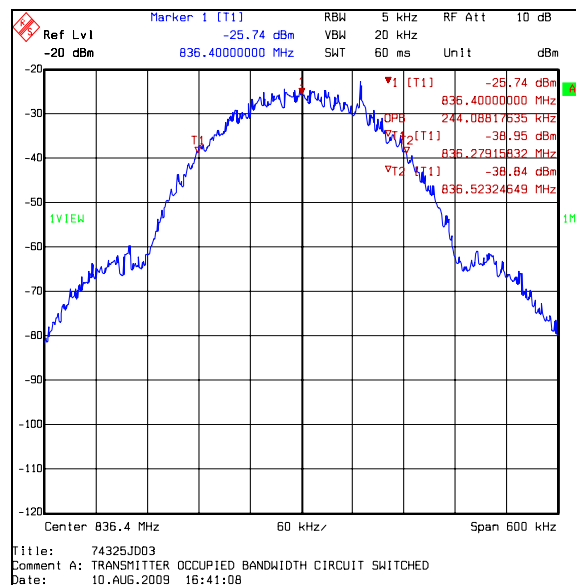
Temperature (°C):	31
Relative Humidity (%):	39

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.4	244.088

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:	2.1049
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:

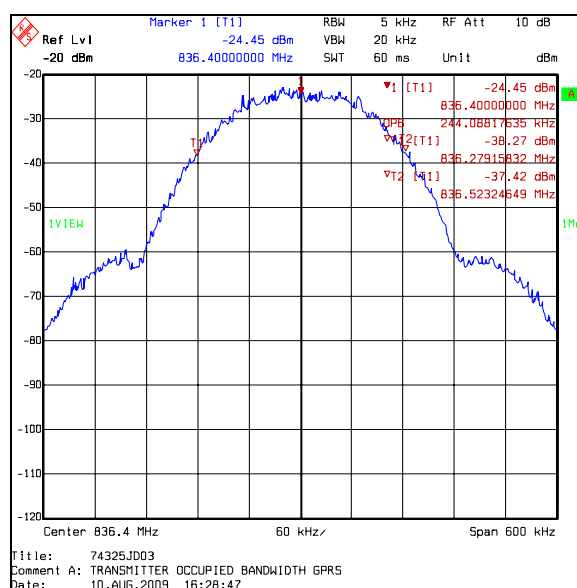
Temperature (°C):	31
Relative Humidity (%):	39

Results: GPRS

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	836.4	244.088

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.



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

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

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	31

Results: Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1648.430	-27.3	-13.0	14.3	Complied

Results: Middle Channel

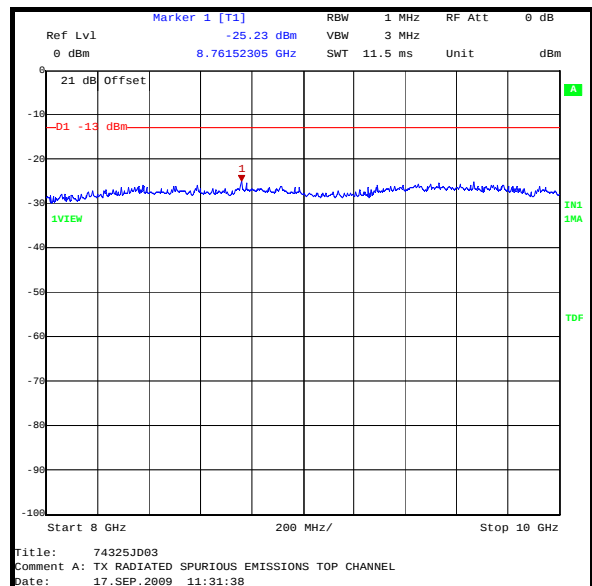
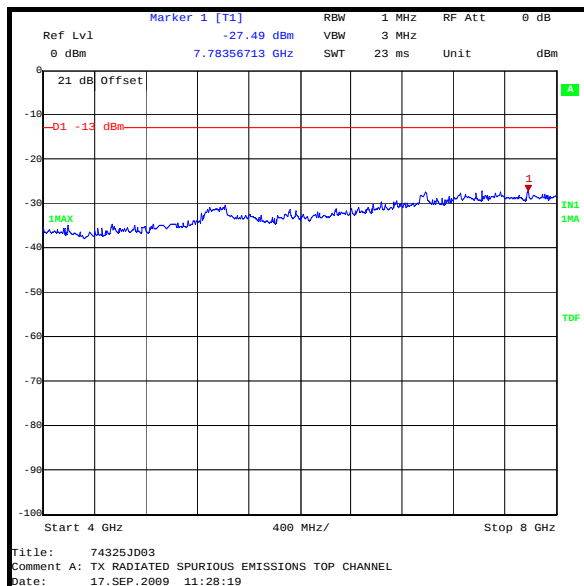
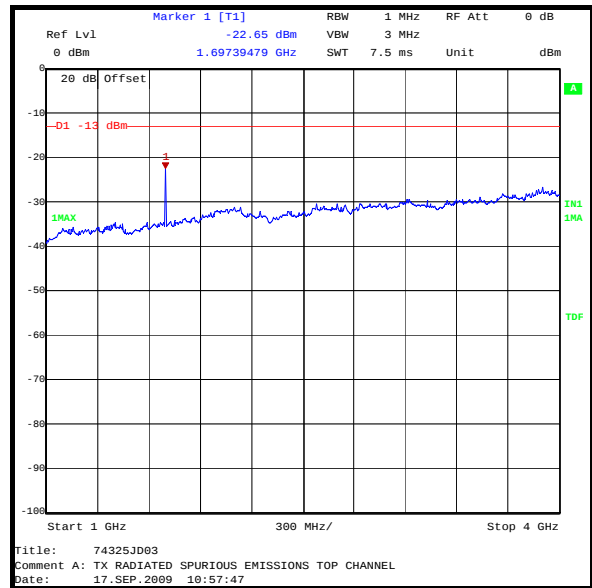
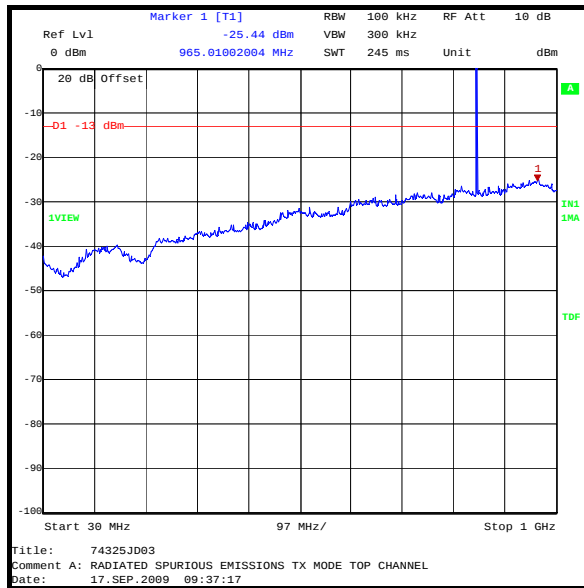
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1672.770	-29.0	-13.0	16.0	Complied

Results: Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1697.405	-31.5	-13.0	18.5	Complied

Note(s):

1. Final measurements were made using appropriate attenuation and filters where required.
2. The carrier is present on the 30 MHz to 1 GHz plot at approximately 849 MHz.

Transmitter Out of Band Radiated Emissions (continued)

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

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

Environmental Conditions:

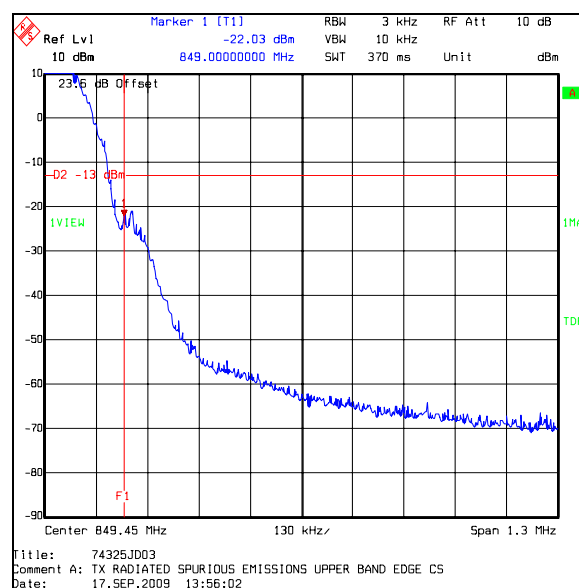
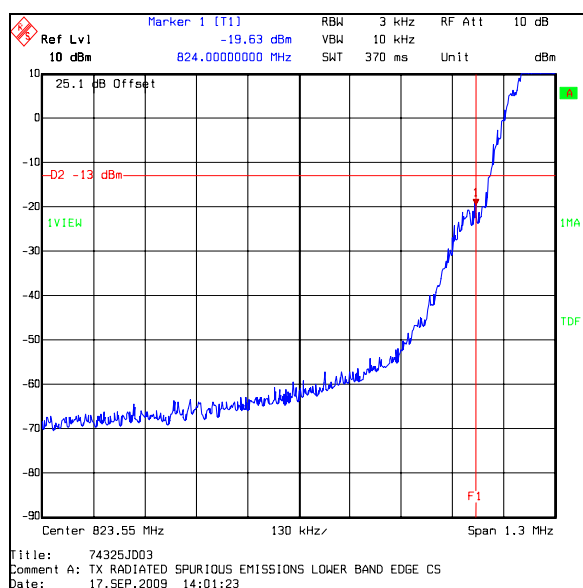
Temperature (°C):	29
Relative Humidity (%):	30

Results: GSM - Lower Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
824	-19.6	-13.0	6.6	Complied

Results: GSM - Upper Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
849	-22.0	-13.0	9.0	Complied



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

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

Environmental Conditions:

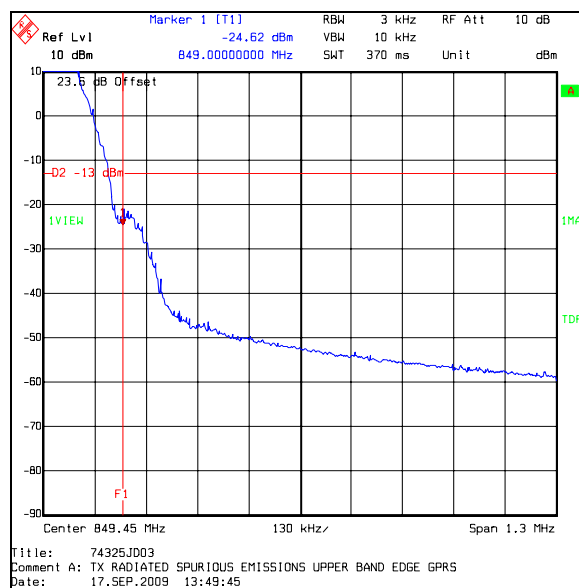
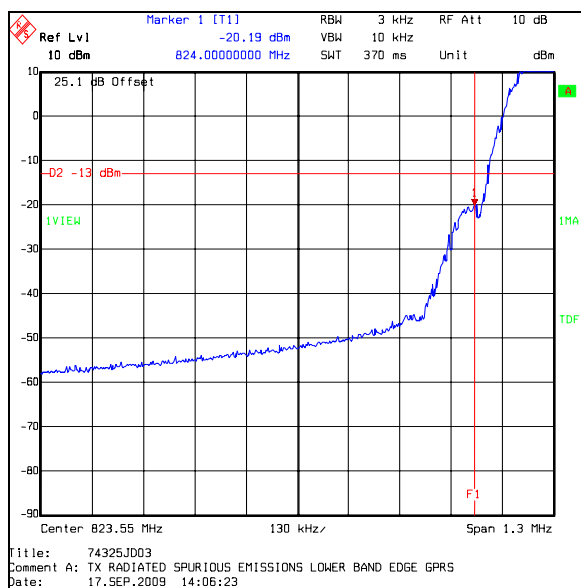
Temperature (°C):	29
Relative Humidity (%):	30

Results: GPRS - Lower Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
824	-20.2	-13.0	7.2	Complied

Results: GPRS - Upper Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
849	-24.6	-13.0	11.6	Complied



5.3. Test Results – FCC Part 24

5.3.1. Receiver/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:

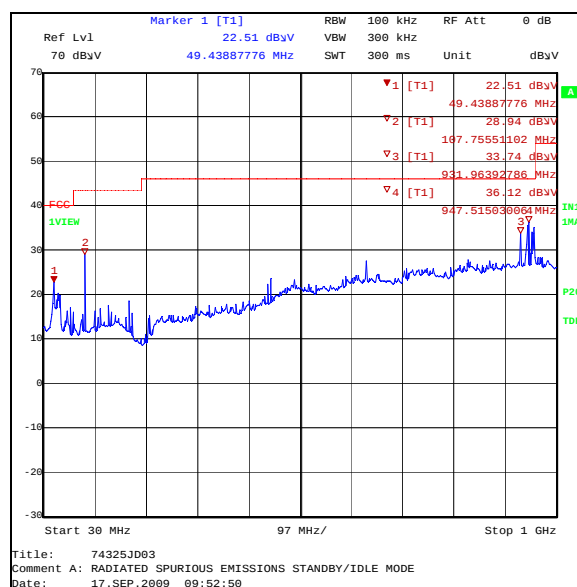
Temperature (°C):	25
Relative Humidity (%):	30

Results:

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
970.560	Horizontal	28.4	54.0	25.6	Complied

Note(s):

1. All emissions shown on the prescan plot were investigated and found to be ambients
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.



Receiver/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 (%):	26

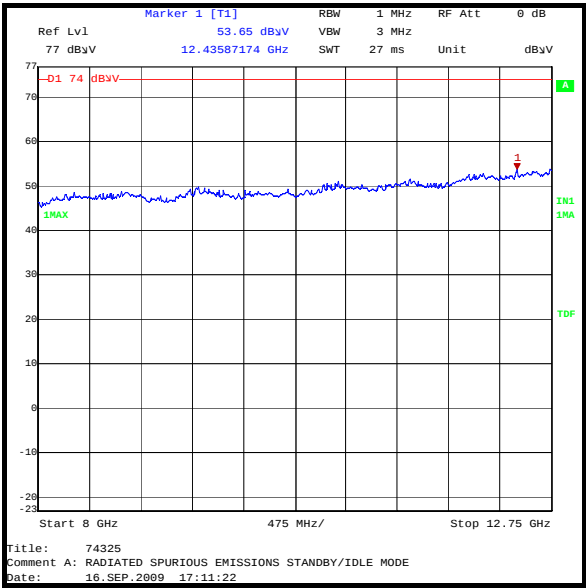
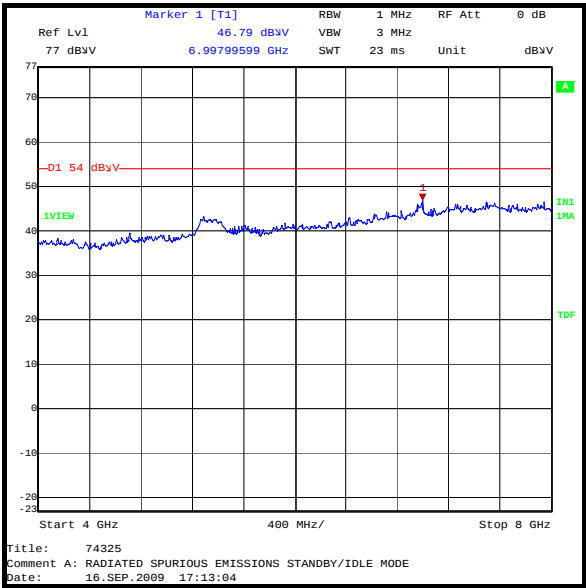
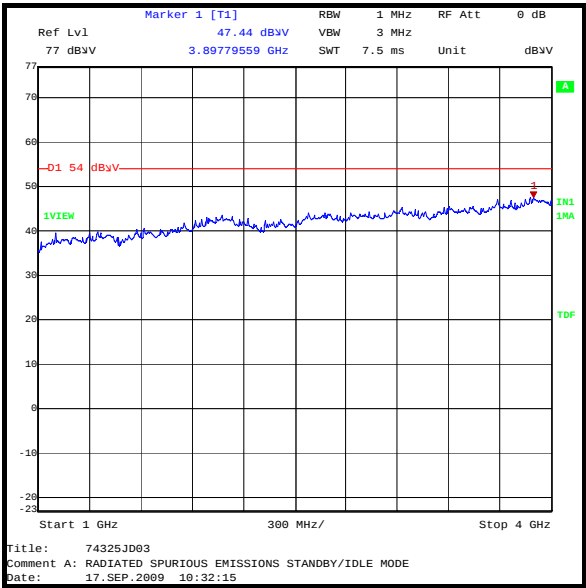
Results: Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV/m)	Transducer Factor (dB)	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
12435.871	Vertical	41.4	12.3	53.7	54.0	0.3	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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.3.2. Transmitter Carrier Output Power**Test Summary:**

FCC Part:	24.232
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 referencing FCC CFR Part 24.232

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	41

Results: GSM Circuit Switched

Channel	Measured Frequency (MHz)	Antenna Gain (dB)	Conducted RF O/P Power (dBm)	Calculated EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	1850.2	3.0	29.5	32.5	33.0	0.5	Complied
Middle	1879.8	3.0	29.6	32.6	33.0	0.4	Complied
Top	1909.8	3.0	29.7	32.7	33.0	0.3	Complied

Results: GPRS

Channel	Measured Frequency (MHz)	Antenna Gain (dB)	Conducted RF O/P Power (dBm)	Calculated EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	1850.2	3.0	29.4	32.4	33.0	0.6	Complied
Middle	1879.8	3.0	29.6	32.6	33.0	0.4	Complied
Top	1909.8	3.0	29.6	32.6	33.0	0.4	Complied

Note(s):

1. The conducted output power was added to the maximum allowable antenna gain stated by the client and compared against the Part 24 EIRP limit.

5.3.3. 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:

Ambient Temperature (°C):	30
Relative Humidity (%):	34

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	62	1850.200062	1850.0	0.200062	Complied
-10	62	1850.200062	1850.0	0.200062	Complied
0	58	1850.200058	1850.0	0.200058	Complied
10	50	1850.200050	1850.0	0.200050	Complied
20	49	1850.200049	1850.0	0.200049	Complied
30	47	1850.200047	1850.0	0.200047	Complied
40	69	1850.200069	1850.0	0.200069	Complied
50	46	1850.200046	1850.0	0.200046	Complied

Results: Top Channel (1909.8 MHz)

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	65	1909.800065	1910.0	0.199935	Complied
-20	62	1909.800062	1910.0	0.199938	Complied
-10	57	1909.800057	1910.0	0.199943	Complied
0	52	1909.800052	1910.0	0.199948	Complied
10	59	1909.800059	1910.0	0.199941	Complied
20	57	1909.800057	1910.0	0.199943	Complied
30	53	1909.800053	1910.0	0.199947	Complied
40	61	1909.800061	1910.0	0.199939	Complied
50	64	1909.800064	1910.0	0.199936	Complied

5.3.4. 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):	29
Relative Humidity (%):	40

Results: Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.23	44	1850.200044	1850.0	0.200044	Complied
4.37	41	1850.200041	1850.0	0.200041	Complied

Results: Top Channel (1909.8 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.23	59	1909.800059	1910.0	0.199941	Complied
4.37	54	1909.800054	1910.0	0.199946	Complied

5.3.5. 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:

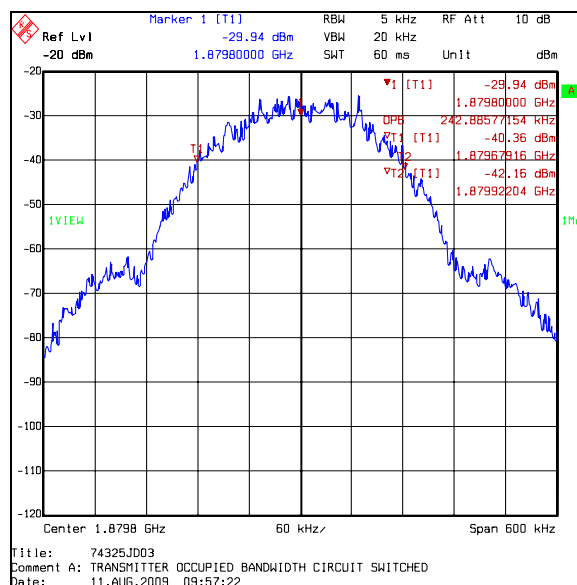
Temperature (°C):	28
Relative Humidity (%):	41

Results: GSM

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	242.886

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:

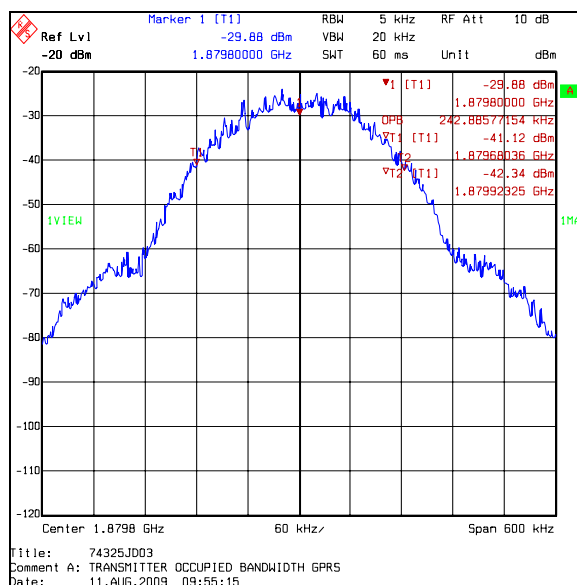
Temperature (°C):	29
Relative Humidity (%):	41

Results: GPRS

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Middle	1879.8	242.886

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.



5.3.6. Transmitter Out of Band Radiated Emissions**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):	26
Relative Humidity (%):	30

Results: Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3700.369	-44.0	-13.0	31.0	Complied

Results: Middle Channel

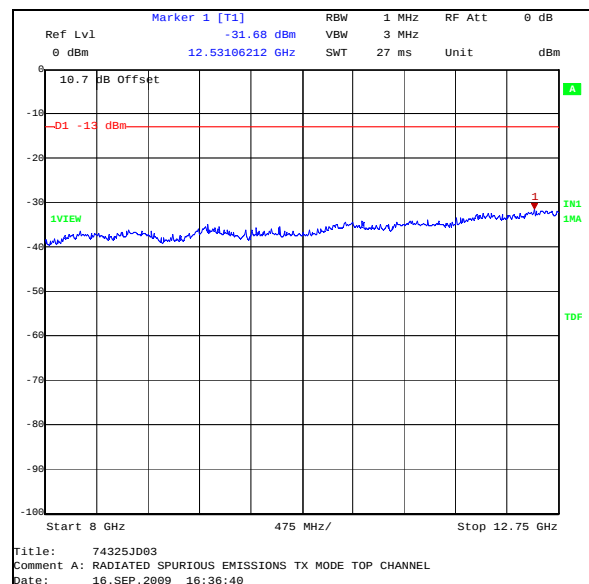
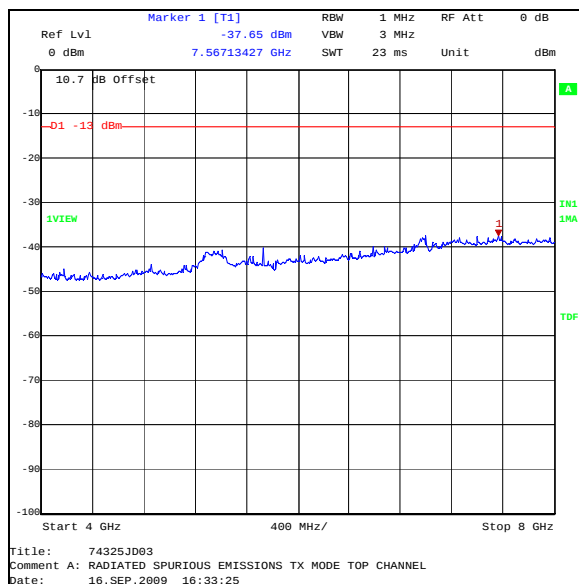
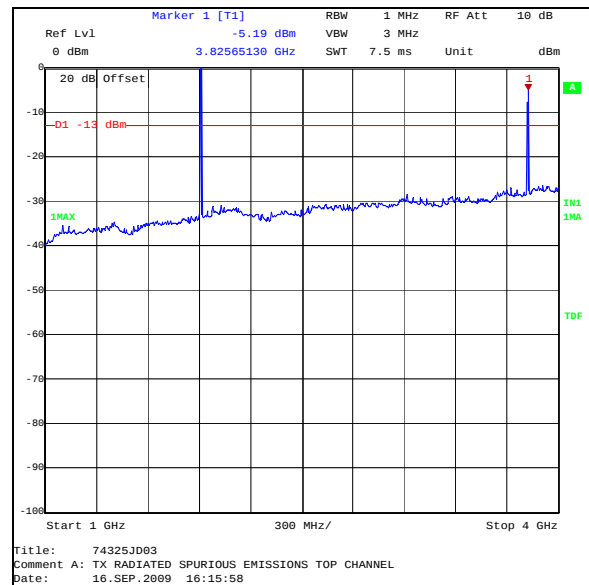
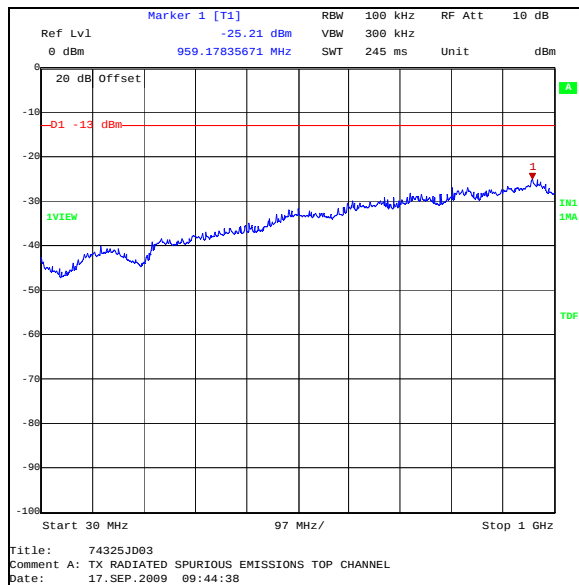
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3759.590	-44.0	-13.0	31.0	Complied

Results: Top Channel

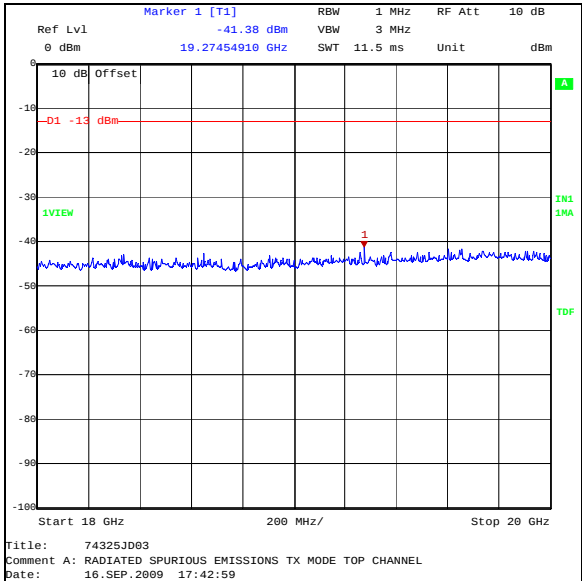
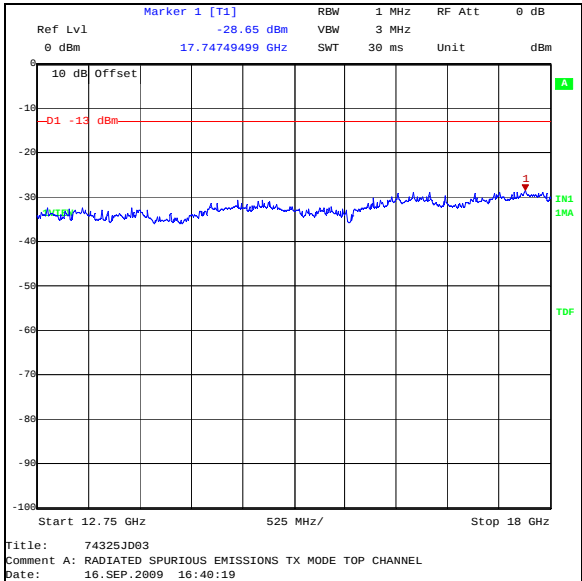
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
3819.760	-45.6	-13.0	32.6	Complied

Note(s):

1. Final measurements were made using appropriate attenuation and filters where required.
2. The transmitter fundamental is shown on the 1 GHz to 4 GHz plot at approximately 1909 MHz.

Transmitter Out of Band Radiated Emissions (continued)

Transmitter Out of Band Radiated Emissions (continued)



5.3.7. 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:

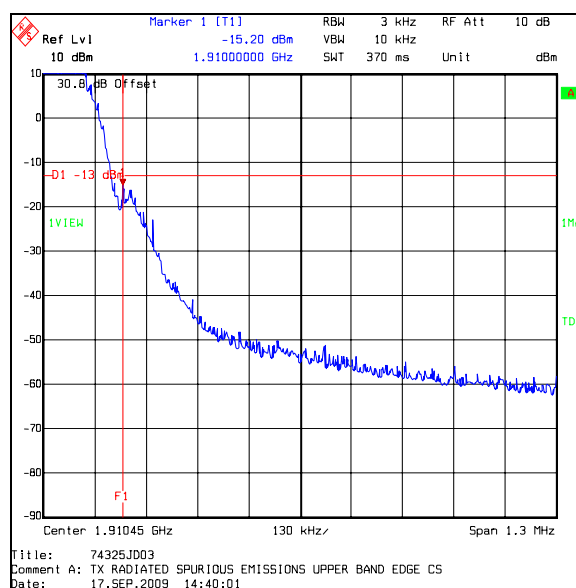
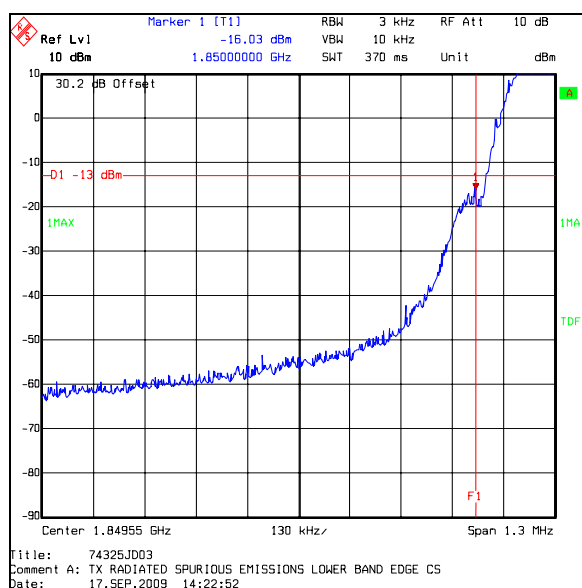
Temperature (°C):	29
Relative Humidity (%):	30

Results: GSM - Lower Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850	-16.0	-13.0	3.0	Complied

Results: GSM - Upper Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910	-15.2	-13.0	2.2	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:

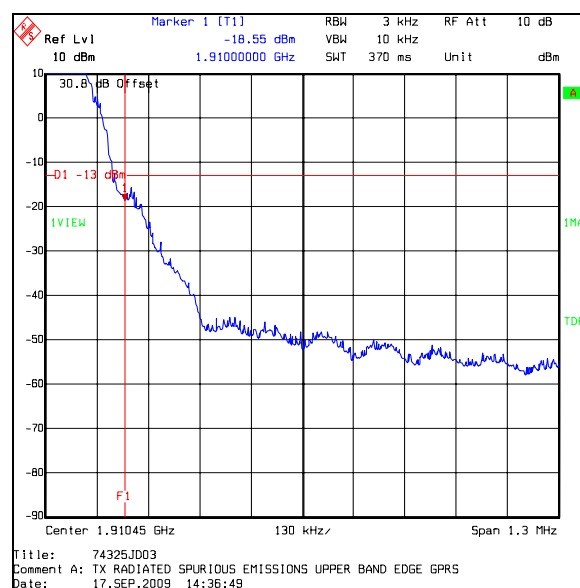
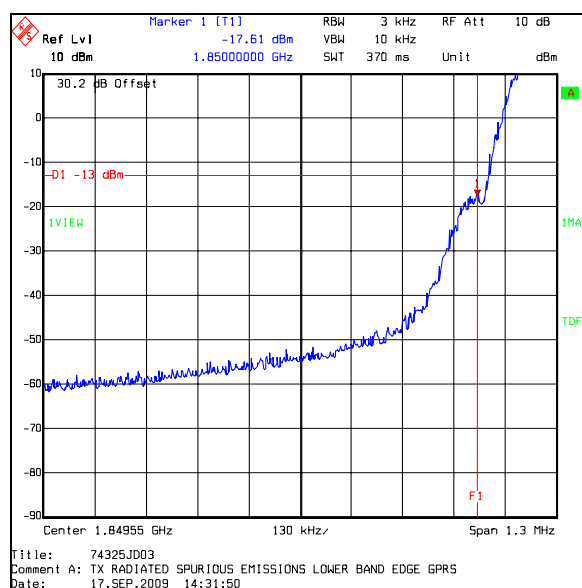
Temperature (°C):	29
Relative Humidity (%):	30

Results: GPRS - Lower Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1850	-17.6	-13.0	4.6	Complied

Results: GPRS - Upper Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dBm)	Result
1910	-18.6	-13.0	5.6	Complied



6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Output Power	Not applicable	95%	±0.28 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 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
A1096	Directional Coupler	MIDISCO	MDC6223W20	None	Calibrated before use	-
A1391	Attenuator	Huber + Suhner	757987	6810.17.B	Calibrated before use	-
A1392	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 OPT H02	3008A00405	Calibrated before use	-
A1537	Directional Coupler	Hewlett Packard	778D	1144A05122	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1932	High Pass Filter	AtlanTecRF	AFH-02000	20r-JFBD04-002	Calibrated before use	-
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	13 Mar 2009	12
E0516	Environmental Chamber	TAS	LT1000	23880706	Calibrated before use	-
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
L0990	Comms Test Set	R&S	CMU 200	S220447	18 Feb 2009	12
M1068	Thermometer	Iso-Tech	RS55	93102884	09 Jul 2009	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M122	Digital Voltmeter	Fluke	77	64910017	23 Jun 2009	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	09 Dec 2008	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB30	842 659/016	21 Aug 2009	12
S0520	DC Power Supply	GW Instek	GPC-3030	E835141	Calibrated before use	-

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