TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: DataSend900-GPRS

FCC ID: MS8C9G

To: FCC Parts 15.107, 15.109, 15.247(d), 15.209, 22.917 and 24.238

Test Report Serial No:
RFI-RPT-RP79172JD01A

This Test Report Is Issued Under The Authority Of Scott D'Adamo, Operations Manager Global Approvals: 	
Checked By:	A. Henriques
Signature: 	
Date of Issue:	06 October 2010

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1. Customer Information

Company Name:	Kenure Developments Ltd
Address:	Springlakes Deadbrook Lane Aldershot Hampshire GU12 4UH United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart C (Intentional Radiators) - Section 15.247(d)
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart C (Intentional Radiators) - Section 15.209
Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 22 Subpart H (Public Mobile Services) - Section 22.917
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 24 Subpart E (Personal Communication Services) - Section 24.238
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	23 September 2010 to 28 September 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107	Receiver/Idle Mode AC Conducted Emissions	✓
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	✓
Parts 15.247(d)/15.209/22.917	Transmitter Radiated Spurious Emissions (Coexistence)	✓
Parts 15.247(d)/15.209/24.238	Transmitter Radiated Spurious Emissions (Coexistence)	✓
Part 15.35(c)	Transmitter Duty Cycle	Note 1

Key to Results

✓ = Complied ✗ = Did not comply

Note 1: The measurement was performed to assist in the calculation of the level of average emissions as the 915 MHz radio employs pulsed operation. This was only used where the emissions were not produced by the GSM module and where an average measurement as per 15.209 was required i.e. in a restricted band as detailed in 15.205.

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

Only the measurement of receive/idle mode AC mains conducted emissions and radiated emissions and transmitter radiated emissions were performed.

Transmitter radiated spurious emissions (coexistence) were performed with the 902 - 928 MHz band ISM band FHSS Fixed Radio Network transmitter operating simultaneously with the GSM 850 GPRS transmitter and then operating simultaneously with the PCS1900 GPRS transmitter in order to determine the intermodulation product emissions levels of these transmitters which are co-located within the EUT.

Receive/idle mode AC mains conducted emissions and radiated emissions were performed with all the technologies enabled but not transmitting i.e. 902 - 928 MHz band ISM band FHSS Fixed Radio Network, GSM850 and PCS1900.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	DataSend900-GPRS
Model Name or Number:	DS-C900G
Serial Number:	0001
IMEI Number:	012000000016424
Hardware Version Number:	7327/0 iss A
Software Version Number:	1.0
FCC ID Number:	MS8C9G

Description:	2.2 dBi gain half-wave dipole antenna with SMA connector
Brand Name:	Antenna Factor
Model Name or Number:	ANT-916-CW-HWR-SMA
Serial Number:	None

Description:	2.0 dBi gain 850/900/1800/1900 MHz half-wave dipole antenna with SMA connector
Brand Name:	Multi-Tech Systems
Model Name or Number:	C0081-ANG002
Serial Number:	None

3.2. Description of EUT

The equipment under test was a Wireless Data Concentrator operating over the 902 MHz to 928 MHz band with GSM 850/900/1800/1900 GPRS modem. The EUT uses total 51 channels for communications where the 36th channel (919.8976MHz) is a receive-only channel and the rest are bi-directional (transmit/receive) channels

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	902 to 928 MHz ISM band FHSS Fixed Radio Network		
Transmit Frequency Range:	902 MHz to 928 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	51	927.3976
Receive Frequency Range:	902 MHz to 928 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	51	927.3976
Tested Technology:	GSM850		
Mode:	GPRS		
Transmit Frequency Range:	824 to 850 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	251	848.8
Receive Frequency Range:	869 to 894 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	251	893.8
Tested Technology:	PCS1900		
Mode:	GPRS		
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	810	1909.8
Receive Frequency Range:	1930 to 1990 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	810	1989.8

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	AC/DC 5V adapter
Brand Name:	Power Pax
Model Name or Number:	5V 15W Model PA1024-1I
Serial Number:	2K9S0770

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Inspiron 1900
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):

- Receiver/Idle tests were performed with the 902 - 928 MHz band radio part in receive mode and GSM GPRS module enabled (not connected to a network but scanning all supported bands).
- 902 - 928 MHz band radio part transmitting at maximum power simultaneously with GPRS module transmitting in the GSM850 band at maximum power in GPRS Multislot Class 10 mode with the unit transmitting on two timeslots in the uplink.
- 902 - 928 MHz band radio part transmitting at maximum power simultaneously with GPRS module transmitting in the PCS1900 band at maximum power in GPRS Multislot Class 10 mode with the unit transmitting on two timeslots in the uplink.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- All tests were performed with the EUT powered from an AC/DC adapter with 120 VAC and 5 VDC output.
- The dipole antennas were fitted for all tests.

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.*

5.2. Test Results

5.2.1. Receiver/Idle Mode AC Conducted Emissions

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	24 September 2010
Test Sample Serial Number:	0001		

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.4 Section 7

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	36

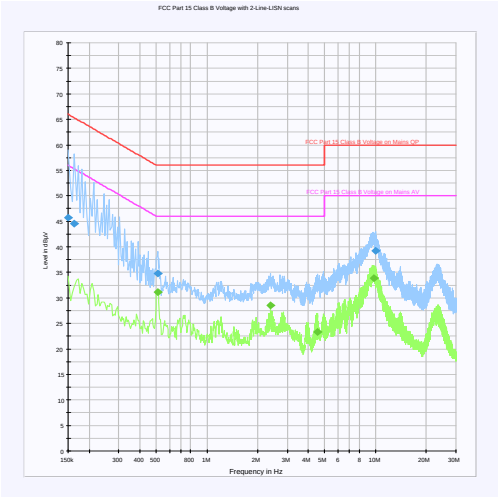
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150000	Neutral	45.7	66.0	20.3	Complied
0.163500	Live	44.6	65.3	20.7	Complied
0.510000	Live	34.8	56.0	21.2	Complied
10.014000	Live	39.3	60.0	20.7	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.510000	Live	31.2	46.0	14.8	Complied
2.386500	Live	28.5	46.0	17.5	Complied
4.542000	Live	23.3	46.0	22.7	Complied
9.771000	Live	33.9	50.0	16.1	Complied

Receiver/Idle Mode AC Conducted Emissions (continued)



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

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	23 September 2010
Test Sample Serial Number:	0001		

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

Environmental Conditions:

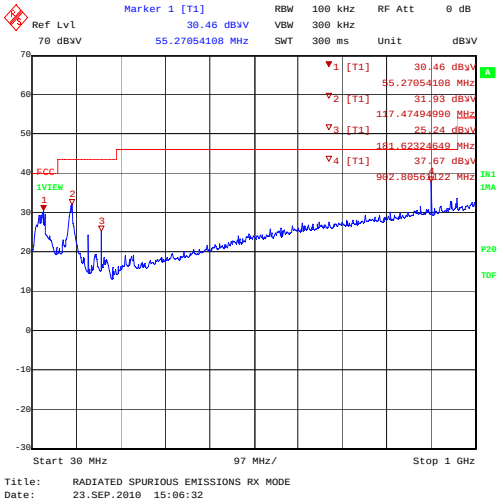
Temperature (°C):	26
Relative Humidity (%):	34

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
54.784	Vertical	24.4	40.0	15.6	Complied
117.276	Vertical	26.6	43.5	16.9	Complied
153.284	Vertical	22.2	43.5	21.3	Complied
181.985	Horizontal	25.9	43.5	17.6	Complied
902.806	Vertical	34.5	46.0	11.5	Complied

Note(s):

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



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

Receiver/Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	23 September 2010
Test Sample Serial Number:	0001		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 10 GHz

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

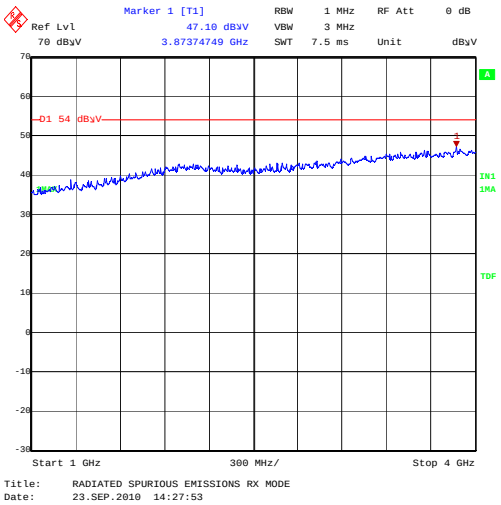
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
9747.495	Vertical	47.2	54.0	6.8	Complied

Note(s):

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

Receiver/Idle Mode Radiated Spurious Emissions (continued)



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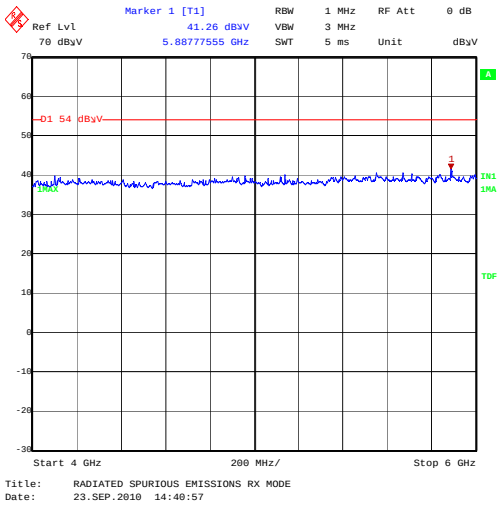

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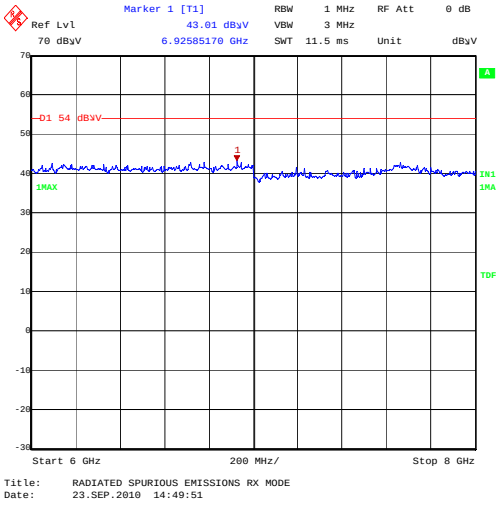

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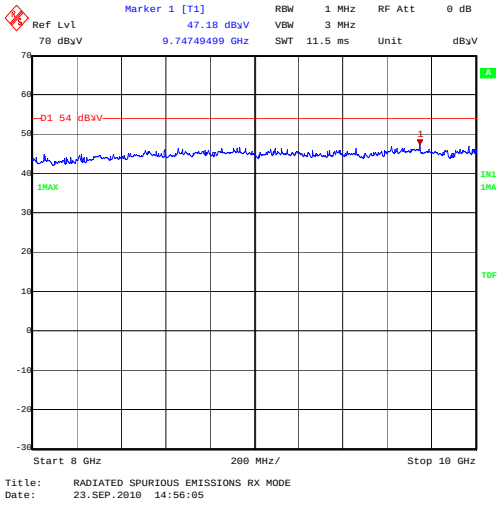

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5.2.3. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	23/24 September 2010
Test Sample Serial Number:	0001		

FCC Part:	15.247(d), 15.209 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12
Frequency Range:	30 MHz to 10 GHz
Operating Mode:	902 - 928 MHz band & GSM850 GPRS radios transmitting simultaneously

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

Results: Peak

Frequency (MHz)	Antenna Polarity	Level	Applicable FCC Limit	Margin (dB)	Result
1006.188	Horizontal	-17.8 dBm	-13.0 dBm	4.8	Complied
1697.618	Vertical	-44.5 dBm	-13.0 dBm	31.5	Complied
1776.217	Vertical	-30.3 dBm	-13.0 dBm	17.3	Complied
1854.912	Horizontal	74.9 dBµV/m	*98.1 dBµV/m	23.2	Complied
2546.652	Horizontal	-29.9 dBm	-13.0 dBm	16.9	Complied
2625.028	Vertical	-47.6 dBm	-13.0 dBm	34.6	Complied
2703.640	Vertical	-41.3 dBm	-13.0 dBm	28.3	Complied
3709.857	Vertical	69.3 dBµV/m	74.0 dBµV/m	5.7	Complied
4558.698	Vertical	-45.6 dBm	-13.0 dBm	32.6	Complied
4637.380	Vertical	56.6 dBµV/m	74.0 dBµV/m	17.4	Complied
4715.935	Horizontal	-48.2 dBm	-13.0 dBm	35.2	Complied
5486.143	Horizontal	-41.9 dBm	-13.0 dBm	28.9	Complied
5564.867	Vertical	61.1 dBµV/m	*98.1 dBµV/m	37.0	Complied
5643.339	Vertical	-45.1 dBm	-13.0 dBm	32.1	Complied
6492.475	Horizontal	57.7 dBµV/m	*98.1 dBµV/m	40.4	Complied
7262.556	Vertical	-42.2 dBm	-13.0 dBm	29.2	Complied
7341.335	Vertical	-34.2 dBm	-13.0 dBm	21.2	Complied
7419.883	Vertical	61.0 dBµV/m	74.0 dBµV/m	13.0	Complied
7498.400	Vertical	-41.8 dBm	-13.0 dBm	28.8	Complied

Transmitter Radiated Emissions (continued

Results: Peak (continued)

Frequency (MHz)	Antenna Polarity	Level	Applicable FCC Limit	Margin (dB)	Result
8268.657	Horizontal	-39.0 dBm	-13.0 dBm	26.0	Complied
8347.365	Vertical	62.1 dBµV/m	74.0 dBµV/m	11.9	Complied
8425.979	Horizontal	-42.2 dBm	-13.0 dBm	29.2	Complied
9196.234	Vertical	-39.2 dBm	-13.0 dBm	26.2	Complied
9274.746	Vertical	59.8 dBµV/m	*98.1 dBµV/m	38.3	Complied

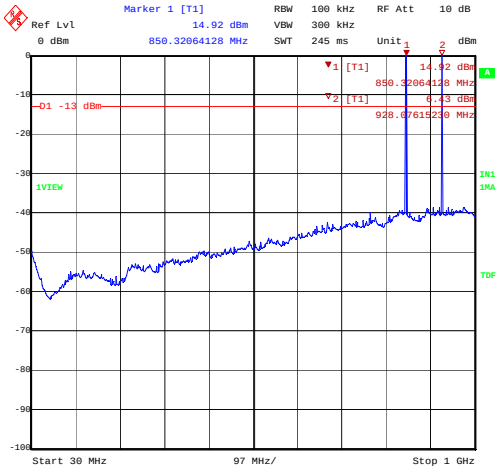
Results: Average

Frequency (MHz)	Antenna Polarity	Level	Applicable FCC Limit	Margin (dB)	Result
3709.857	Vertical	37.2 dBµV/m	54.0 dBµV/m	16.8	Complied
4637.380	Vertical	24.5 dBµV/m	54.0 dBµV/m	29.5	Complied
7419.883	Vertical	28.9 dBµV/m	54.0 dBµV/m	25.1	Complied
8347.365	Vertical	30.0 dBµV/m	54.0 dBµV/m	24.0	Complied

Note(s):

1. * -20 dBc limit
2. The 902 - 928 MHz band & GSM850 GPRS transmitter fundamentals are shown on the 30 MHz to 1 GHz plot.
3. Emissions shown in the plots may be at a much higher level than those shown in the tables due to the amplification of the carriers by the system preamp. The final measurements were made with the preamp removed and the use of filters and attenuation.
4. If the spurious emission was a product of the GSM device the Part 22 limit of -13 dBm (43 + 10 log P) applies, otherwise the 74 dBµV/m/54 dBµV/m (peak/average) limit specified in Part 15.209 applies.
5. The average level was obtained by subtracting the duty cycle correction (32.1 dB) from the peak level measured with the EUT constantly transmitting. The duty cycle was calculated using 20 log (2.477ms/100ms).

Transmitter Radiated Emissions (continued)



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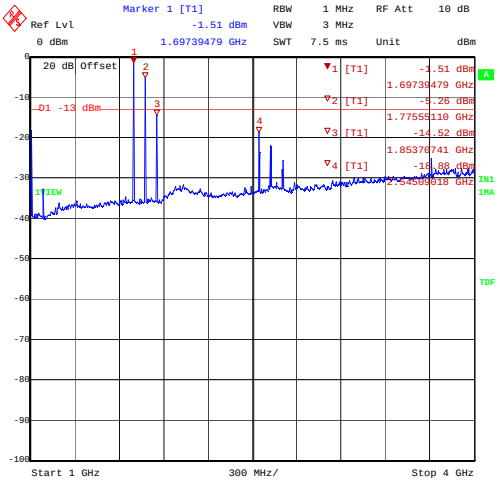

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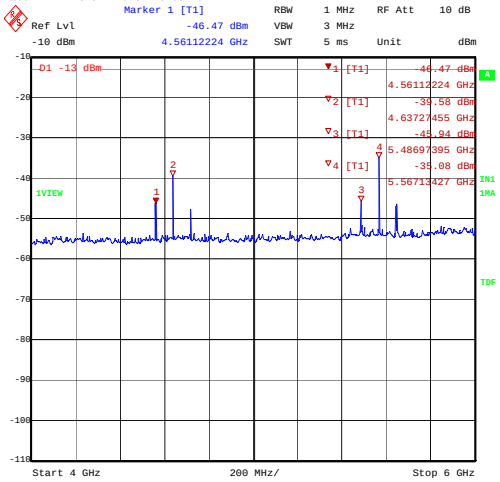

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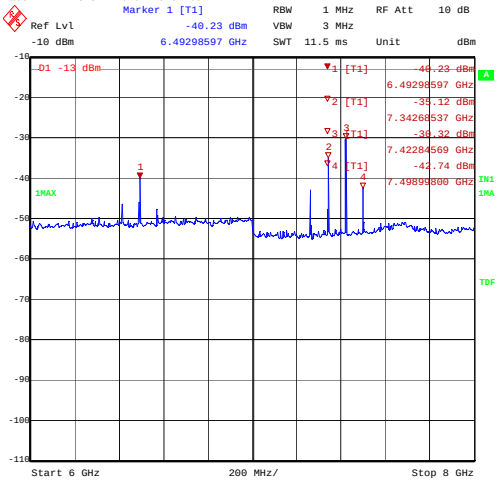

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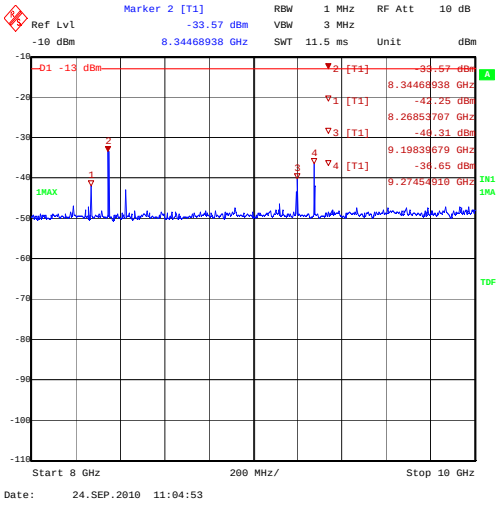
Transmitter Radiated Emissions (continued)



5.2.4. Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	24 September 2010
Test Sample Serial Number:	0001		

FCC Part:	15.247(d), 15.209 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12
Frequency Range:	30 MHz to 20 GHz
Operating Mode:	902 - 928 MHz band & PCS1900 GPRS radios transmitting simultaneously

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

Results: Peak

Frequency (MHz)	Antenna Polarity	Level	Applicable FCC Limit	Margin (dB)	Result
1854.707	Horizontal	74.7 dBµV/m	*98.1 dBµV/m	23.4	Complied
2837.488	Horizontal	-42.9 dBm	-13.0 dBm	29.9	Complied
3709.993	Vertical	69.3 dBµV/m	74.0 dBµV/m	4.7	Complied
3819.485	Horizontal	-43.0 dBm	-13.0 dBm	30.0	Complied
4637.559	Vertical	56.4 dBµV/m	74.0 dBµV/m	17.6	Complied
5564.896	Vertical	61.1 dBµV/m	*98.1 dBµV/m	37.0	Complied
5729.602	Horizontal	-37.1 dBm	-13.0 dBm	24.1	Complied
6492.488	Vertical	55.2 dBµV/m	*98.1 dBµV/m	42.9	Complied
7419.792	Vertical	65.1 dBµV/m	74.0 dBµV/m	8.9	Complied
8347.412	Vertical	62.8 dBµV/m	74.0 dBµV/m	11.2	Complied
9274.654	Vertical	59.9 dBµV/m	*98.1 dBµV/m	38.2	Complied
9549.049	Vertical	-37.4 dBm	-13.0 dBm	24.4	Complied
11459.033	Vertical	-36.5 dBm	-13.0 dBm	23.5	Complied

Transmitter Radiated Emissions (continued

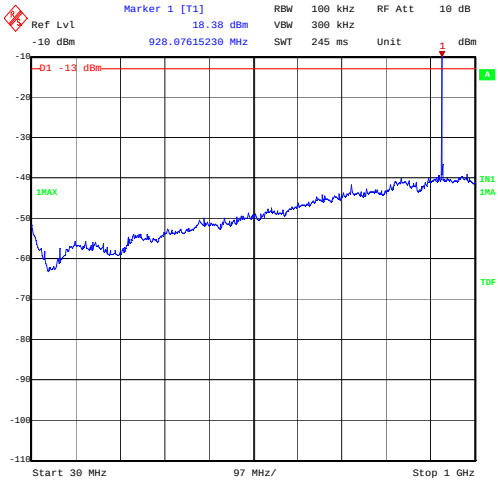
Results: Average

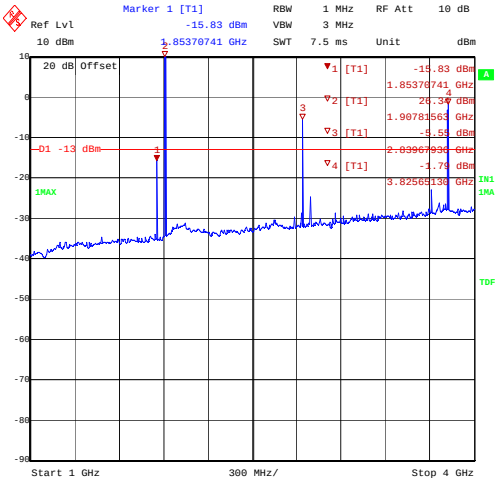
Frequency (MHz)	Antenna Polarity	Level	Applicable FCC Limit	Margin (dB)	Result
3709.993	Vertical	37.2 dBµV/m	54.0 dBµV/m	16.8	Complied
4637.559	Vertical	24.3 dBµV/m	54.0 dBµV/m	29.7	Complied
7419.792	Vertical	33.0 dBµV/m	54.0 dBµV/m	21.0	Complied
8347.412	Vertical	30.7 dBµV/m	54.0 dBµV/m	23.3	Complied

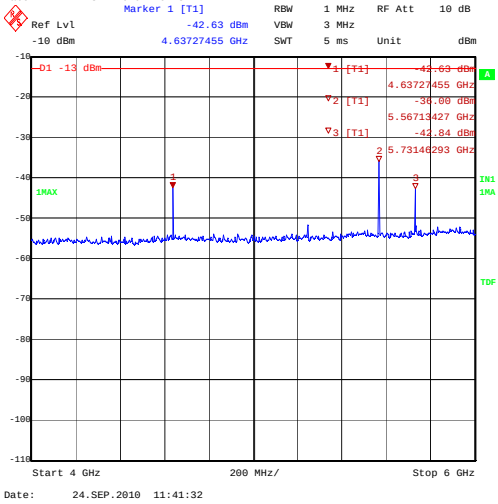
Note(s):

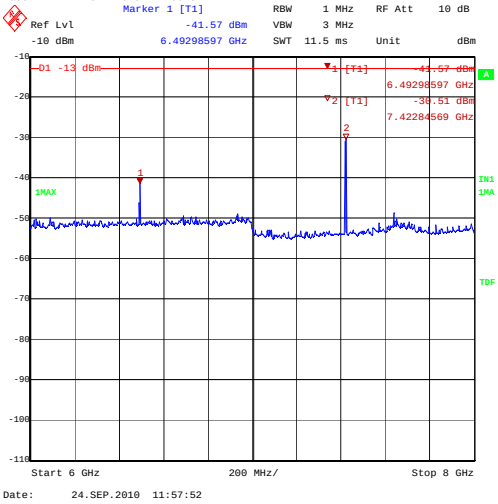
1. * -20 dBc limit
2. The 902 - 928 MHz band fundamental is shown on the 30 MHz to 1 GHz plot.
3. The PCS1900 GPRS fundamental is shown on the 1 GHz to 4 GHz plot.
4. Emissions shown in the plots may be at a much higher level than those shown in the tables due to the amplification of the carriers by the system preamp. The final measurements were made with the preamp removed and the use of filters and attenuation.
5. If the spurious emission was a product of the GSM device the Part 22 limit of -13 dBm (43 + 10 log P) applies, otherwise the 74 dBµV/m/54 dBµV/m (peak/average) limit specified in Part 15.209 applies.
6. The average level was obtained by subtracting the duty cycle correction (32.1 dB) from the peak level measured with the EUT constantly transmitting. The duty cycle was calculated using 20 log (2.477ms/100ms).
7. The emissions at approximately 10.20 GHz, 14.84 GHz and 15.77 GHz are the eleventh, sixteenth and seventeenth harmonics of the 902 - 928 MHz band radio transmitter (927.3976 MHz) respectively and, as these are not within the required test frequency range of up to the tenth harmonic of the fundamental (Part 15.33 refers), no levels have been listed in the results tables above. However all emissions were greater than 10 dB below the appropriate 15.209 limits in all cases.

Transmitter Radiated Emissions (continued)

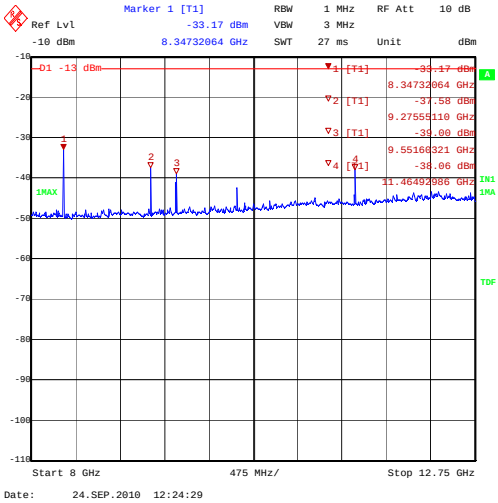


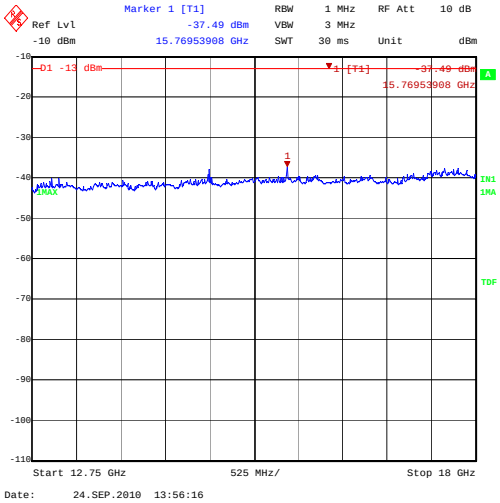


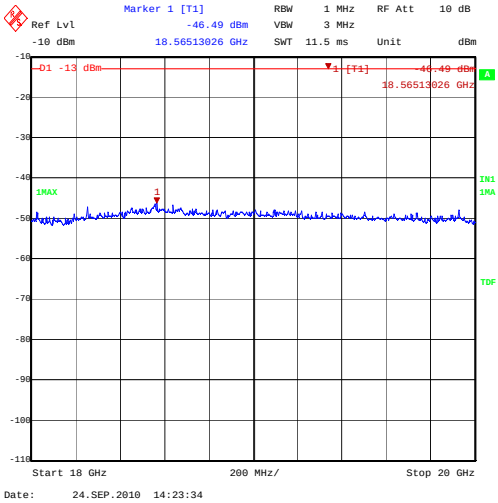




Transmitter Radiated Emissions (continued)







5.2.5. Transmitter Duty Cycle

Test Summary:

Test Engineer:	Fara Razally	**Test Date:**	28 September 2010
Test Sample Serial Number:	0001		

FCC Part:	15.35(c)
Test Method Used:	As detailed in FCC Public Notice DA 00-705

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	37

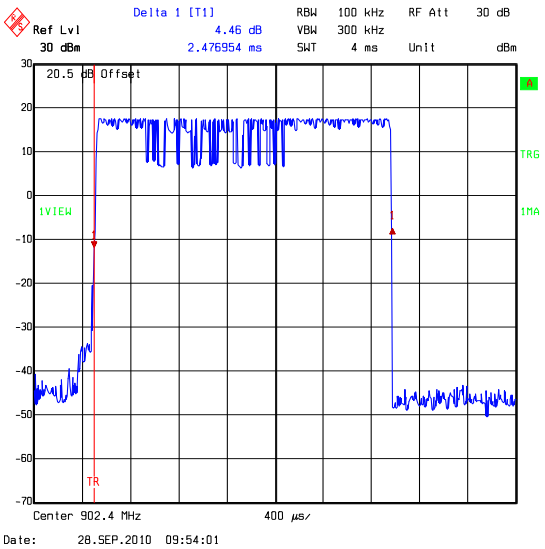
Results:

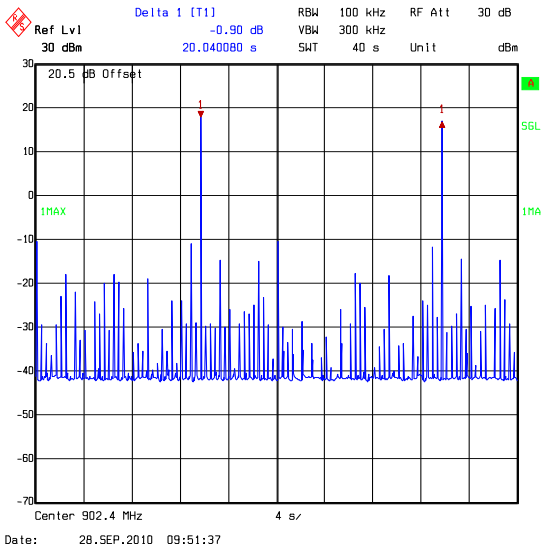
Pulse Duration (mS)	Duty Cycle (dB)
2.477	32.1

Silent Period (seconds)
20.040

Note(s):

1. In order to assist with the determination of the average level of non GSM related spurious emissions field strengths, measurements were made of duty cycle to determine the transmission duration and the silent period time of the 915 MHz transmitter. The transmitter duty cycle was measured using a spectrum analyser and calculated by 20 log(On Time /100mS)





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
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)
A057	High Pass Filter	Aerial Facilities	HP-950-5N	4389B	14 Sep 2011	12
A1393	Attenuator	Huber + Suhner	757456	6820.17.B	06 Jul 2011	12
A1396	Attenuator	Huber + Suhner	757987	6810.17.B	06 Jul 2011	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 Jun 2011	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1932	High Pass Filter	AtlanTecRF	AFH-02000	20r-JFBD04-002	22 Jan 2011	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	22 Jan 2011	12
A1980	High Pass Filter	Atlan TecRF	AFH-06000	09110900303	22 Jan 2011	12
A1981	High Pass Filter	AtlanTecRF	AFH-05000	09110200090	22 Jan 2011	12
A253	Antenna	Flann	12240-20	128	05 Sep 2011	12
A254	Antenna	Flann	14240-20	139	05 Sep 2011	12
A256	Antenna	Flann	18240-20	400	05 Sep 2011	12
A288	Antenna	Chase	CBL6111A	1589	05 Sep 2011	12
A436	Antenna	Flann	20240-20	330	05 Sep 2011	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	22 Apr 2011	12

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