



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: DL-SKORPIO

To: FCC Part 15.247: 2009 Subpart C, RSS-210 Issue 7 June 2007 and RSS-Gen Issue 2 June 2007

Test Report Serial No: RFI/RPT1/RP77022JD02A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	Mich
Checked By:	Tony Henriques
Signature:	dicie
Date of Issue:	23 March 2010

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RFI Global Services Ltd

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ISSUE DATE: 23 MARCH 2010

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1. Customer Information

Company Name:	Datalogic Mobile SRL
Address:	Via S.Vitalino, 13 – 40012
	Calderara di Reno,
	Bologna
	Italy

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2. Summary of Testing

2.1. General Information

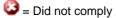
Specification Reference:	47CFR15.247	
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart C (Radio Frequency Devices) - Section 15.247	
Specification Reference:	47CFR15.107 and 47CFR15.109	
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109	
Specification Reference:	RSS-210 Issue 7 June 2007	
Specification Title:	Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment.	
Specification Reference:	RSS-GEN Issue 2 June 2007	
Specification Title:	General Requirements and Information for the Certification of Radio communication Equipment	
Site Registration:	FCC: 209735; Industry Canada: 3245B-2	
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.	
Test Dates:	15 February to 17 February 2010	

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2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Port Type	Result
Part 15.107	RSS-Gen 7.2.2	Idle Mode AC Conducted Emissions	AC Mains	(
Part 15.109	RSS-Gen 4.10/6	Idle Mode Radiated Spurious Emissions	Enclosure	(
Part 15.207	RSS-Gen 7.2.2	Transmitter AC Conducted Emissions	AC Mains	(
Part 15.247(a)(1)	RSS-Gen 4.6.1 RSS-210 A8.1(a)	Transmitter 20 dB Bandwidth	Antenna	②
Part 15.247(a)(1)	RSS-210 A8.1(b)	Transmitter Carrier Frequency Separation	Antenna	(
Part 15.247(a)(1)(iii)	RSS-210 A8.1(d)	Transmitter Average Time of Occupancy	Antenna	②
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(2)	Transmitter Maximum Peak Output Power	Antenna	②
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	Antenna	②
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Radiated Emissions	Antenna	②
Key to Results	_			





2.3. Methods and Procedures

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.	
Reference:	DA00-705 (2000)	
Title:	Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.	

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.

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3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Datalogic
Model Name or Number:	DL-SKORPIO
Serial Number:	D10A02477
IC Number:	3862E-M1120
FCC ID:	U4G0053

3.2. Description of EUT

The equipment under test was a mobile computer.

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:	Bluetooth			
Power Supply Requirement:	4.2 V			
Type of Unit:	Transceiver			
Channel Spacing:	1 MHz	1 MHz		
Mode:	Basic Rate			
Modulation:	GFSK			
Packet Type: (Maximum Payload)	DH5			
Data Rate (Mbit/s):	1	1		
Maximum Transmit EIRP:	-4.8 dBm			
Transmit Frequency Range:	2402 MHz to 2480 MHz			
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)	
	Bottom	0	2402	
	Middle	39	2441	
	Тор	78	2480	
Receive Frequency Range:	2402 MHz to 2480 MHz			
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)	
	Bottom	0	2402	
	Middle	39	2441	
	Тор	78	2480	

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3.5. Support Equipment

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

Description:	Charging Unit
Brand Name:	Datalogic mobile s.r.l.
Model Name or Number:	No stated
Serial Number:	D07N0184

Description:	AC mains adapter
Brand Name:	Power-win technology Corp
Model Name or Number:	PW-060A-01Y140
Serial Number:	72769778

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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
- Transmit Mode. Set to transmit on bottom, centre and top channels and hopping on all frequencies as necessary with the longest data packet size.

4.2. Configuration and Peripherals

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

- For transmit tests: connected via the serial port using CSR BlueTest in order to place the EUT into Bluetooth test mode.
- For Receive/Idle mode tests: Bluetooth mode active but not transmitting.
- The EUT was configured sat in the charger with the communication/charger port connected to a laptop PC via the serial port and to an external 110V AC supply via an AC charger.
- CSR BlueTest Power (Ext,Int) was set to 255/63 following the client's instructions.
- CSR BlueTest Power CFG PKT Packet type was set to 15 and packet Size set to 339

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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 Uncertainties for details.

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5.2. Test Results

5.2.1. Idle Mode AC Conducted Spurious Emissions

Test Summary:

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

Environmental Conditions:

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

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dΒμV)	Margin (dB)	Result
0.159000	Neutral	42.7	65.5	22.8	Complied
0.163500	Live	43.6	65.3	21.7	Complied
0.195000	Live	42.9	63.8	20.9	Complied
8.601000	Neutral	36.0	60.0	24.0	Complied
9.208500	Live	37.4	60.0	22.6	Complied
9.825000	Live	35.0	60.0	25.0	Complied
10.441500	Neutral	28.7	60.0	31.3	Complied
11.049000	Live	23.3	60.0	36.7	Complied
12.592500	Neutral	29.4	60.0	30.6	Complied
13.200000	Live	28.8	60.0	31.2	Complied
13.519500	Live	36.2	60.0	23.8	Complied
13.780500	Live	24.1	60.0	35.9	Complied
14.136000	Live	33.6	60.0	26.4	Complied
14.442000	Live	32.4	60.0	27.6	Complied
15.364500	Live	27.8	60.0	32.2	Complied

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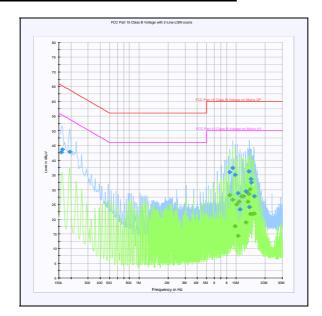
Idle Mode AC Conducted Spurious Emissions (continued)

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
8.601000	Neutral	28.1	50.0	21.9	Complied
9.222000	Live	26.5	50.0	23.5	Complied
9.838500	Live	17.6	50.0	32.4	Complied
10.135500	Neutral	25.0	50.0	25.0	Complied
10.455000	Live	14.4	50.0	35.6	Complied
10.752000	Neutral	25.9	50.0	24.1	Complied
11.373000	Live	27.7	50.0	22.3	Complied
11.985000	Live	27.8	50.0	22.2	Complied
12.588000	Live	18.9	50.0	31.1	Complied
13.209000	Live	25.9	50.0	24.1	Complied
13.515000	Live	28.5	50.0	21.5	Complied
13.825500	Live	30.1	50.0	19.9	Complied
14.131500	Neutral	21.7	50.0	28.3	Complied
14.743500	Live	21.8	50.0	28.2	Complied
15.360000	Live	21.9	50.0	28.1	Complied

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Idle Mode AC Conducted Spurious Emissions (continued)



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

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5.2.2. Idle Mode Radiated Spurious Emissions

Test Summary:

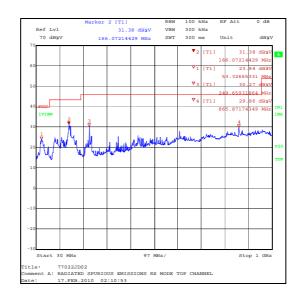
FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	22

Results:

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
49.770	Vertical	24.0	40.0	16.0	Complied
170.411	Horizontal	33.7	43.5	9.8	Complied
249.990	Vertical	31.8	46.0	14.2	Complied
367.225	Vertical	36.4	46.0	9.6	Complied
490.751	Vertical	26.6	46.0	19.4	Complied
863.878	Horizontal	30.4	46.0	15.6	Complied



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Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

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

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	22

Results:

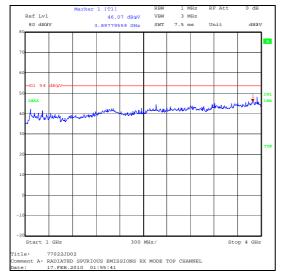
Frequency (GHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dΒμV/m)	Margin (dB)	Result
6.998	Vertical	46.3	54.0	7.7	Complied

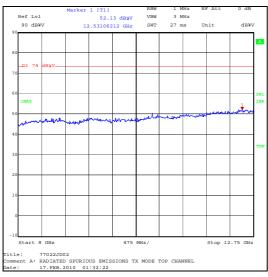
Note(s):

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

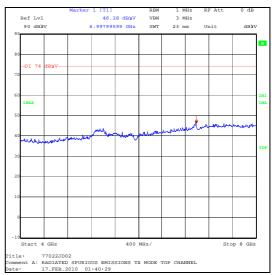
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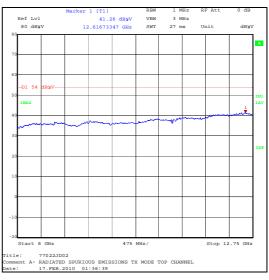
Idle Mode Radiated Spurious Emissions (continued)





Peak Measurement





Average Measurement

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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):	25
Relative Humidity (%):	28

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dΒμV)	Margin (dB)	Result
0.159000	Live	48.3	65.5	17.2	Complied
0.190500	Live	45.2	64.0	18.8	Complied
0.258000	Live	38.3	61.5	23.2	Complied
4.294500	Live	15.4	56.0	40.6	Complied
7.669500	Neutral	20.0	60.0	40.0	Complied
7.980000	Neutral	22.5	60.0	37.5	Complied
8.587500	Live	22.8	60.0	37.2	Complied
8.893500	Neutral	26.6	60.0	33.4	Complied
9.204000	Neutral	25.9	60.0	34.1	Complied
9.811500	Live	27.4	60.0	32.6	Complied
10.131000	Neutral	36.0	60.0	24.0	Complied
10.405500	Live	20.8	60.0	39.2	Complied
10.428000	Live	25.2	60.0	34.8	Complied
10.432500	Neutral	31.0	60.0	29.0	Complied

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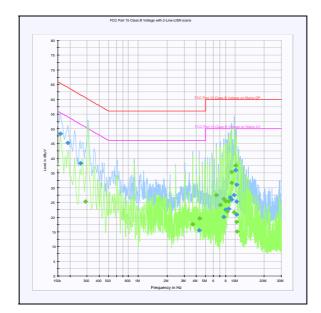
Transmitter AC Conducted Spurious Emissions (continued)

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.289500	Live	25.3	50.5	25.2	Complied
3.682500	Live	17.6	46.0	28.4	Complied
4.299000	Live	19.5	46.0	26.5	Complied
6.450000	Live	27.5	50.0	22.5	Complied
7.062000	Live	24.1	50.0	25.9	Complied
7.678500	Live	26.3	50.0	23.8	Complied
7.984500	Neutral	25.3	50.0	24.7	Complied
8.290500	Live	21.8	50.0	28.2	Complied
8.596500	Live	25.4	50.0	24.6	Complied
9.213000	Live	31.7	50.0	18.3	Complied
9.217500	Neutral	35.3	50.0	14.7	Complied
9.825000	Live	21.7	50.0	28.3	Complied
10.135500	Neutral	37.6	50.0	12.4	Complied
10.419000	Live	18.4	50.0	31.6	Complied
10.446000	Neutral	15.1	50.0	34.9	Complied

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Transmitter AC Conducted Spurious Emissions (continued)



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

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5.2.4.Transmitter 20 dB Bandwidth

Test Summary:

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000) and ANSI C63.4 Section 13.1.7 and relevant annexes

Environmental Conditions:

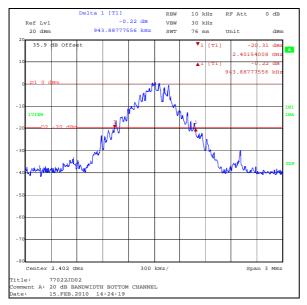
Temperature (°C):	21
Relative Humidity (%):	23

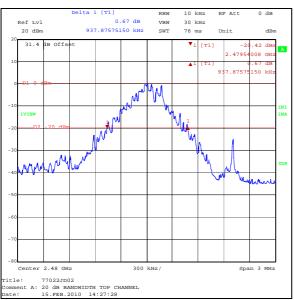
Results:

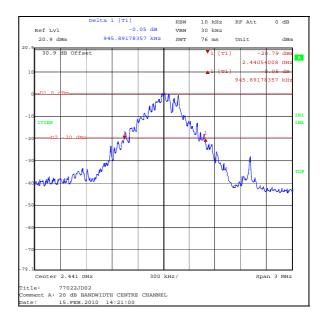
Channel	20 dB Bandwidth (kHz)
Bottom	943.888
Middle	945.892
Тор	937.876

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Transmitter 20 dB Bandwidth (continued)







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5.2.5. Transmitter Carrier Frequency Separation

Test Summary:

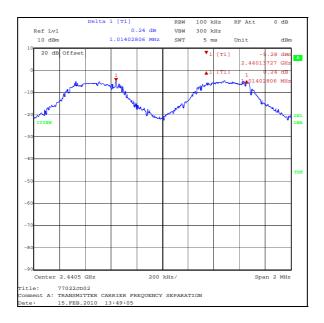
FCC Part:	15.247(a)(1)	
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)	

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results:

Transmitter Carrier Frequency Separation (kHz)	Limit (²/ ₃ of 20 dB BW) (kHz)	Margin (kHz)	Result
1014.028	630.595	379.433	Complied



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5.2.6. Transmitter Average Time of Occupancy

Test Summary:

FCC Part:	15.247(a)(1)(iii)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

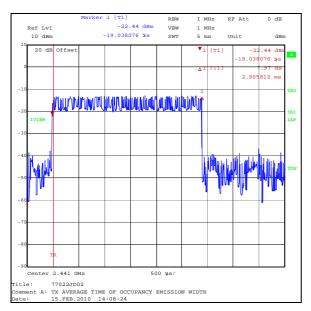
Temperature (°C):	21
Relative Humidity (%):	23

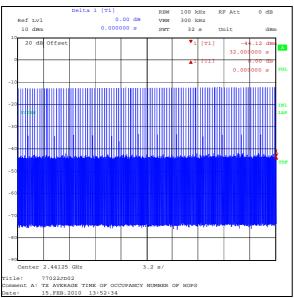
Results:

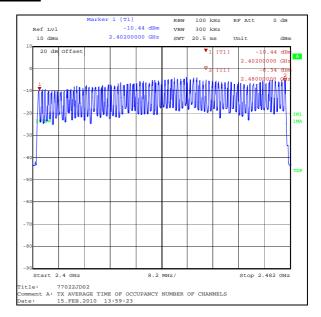
Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2905.8	111	0.323	0.4	0.077	Complied

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Transmitter Average Time of Occupancy (continued)







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5.2.7. Transmitter Maximum Peak Output Power (EIRP)

Test Summary:

FCC Part:	15.247(b)(3)	
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)	

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results: Battery Powered Devices

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	-5.8	30.0	35.8	Complied
Middle	-4.8	30.0	34.8	Complied
Тор	-5.5	30.0	35.5	Complied

Note(s):

1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

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5.2.8. Transmitter Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	30 MHz to 1 GHz

Environmental Conditions:

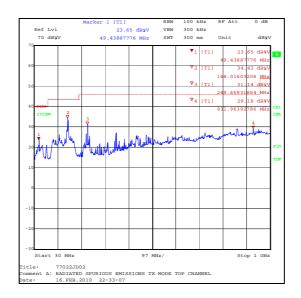
Temperature (°C):	25
Relative Humidity (%):	21

Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
49.770	Vertical	24.0	40.0	16.0	Complied
170.411	Horizontal	33.7	43.5	9.8	Complied
249.990	Vertical	31.8	46.0	14.2	Complied
367.225	Vertical	36.4	46.0	9.6	Complied
490.751	Vertical	26.6	46.0	19.4	Complied
863.878	Horizontal	30.4	46.0	15.6	Complied
932.555	Horizontal	29.9	46.0	16.1	Complied

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.



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

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Transmitter Radiated Emissions (continued)

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	1 GHz to 26.5 GHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	21

Results: Top Channel

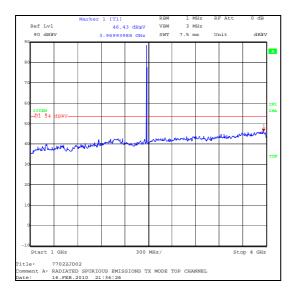
Frequency (GHz)	Antenna Polarity	Polarity (dB _μ V/m) (dB _μ V/m)		Margin (dB)	Result
7.503	Vertical	46.4	54.0	7.6	Complied

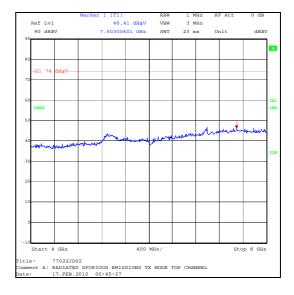
Note(s):

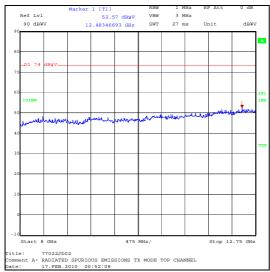
- 1. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because 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 26.5 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.
- 3. The emissions at 2480 MHz shown on the 1 GHz to 4 GHz plot is the transmitter fundamental.

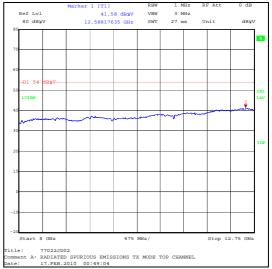
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Transmitter Radiated Emissions (continued)







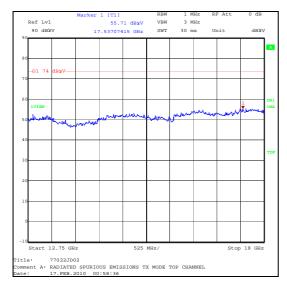


Peak Measurement

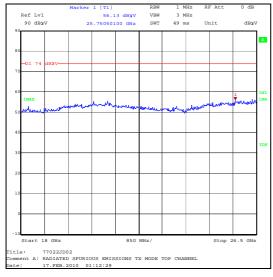
Average Measurement

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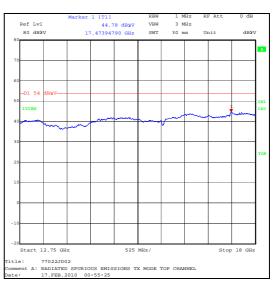
Transmitter Radiated Emissions (continued)



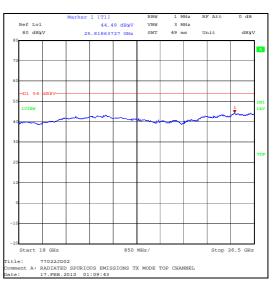
Peak Measurement



Peak Measurement



Average Measurement



Average Measurement

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5.2.9. Transmitter Band Edge Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	23

Results: Peak Power Level Hopping Mode

Frequency (MHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dB _µ V/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	Horizontal	39.5	-0.2	39.3	69.8*	30.5	Complied
2483.5	Horizontal	50.1	-0.3	49.8	74.0	24.2	Complied

Results: Average Power Level Static Mode

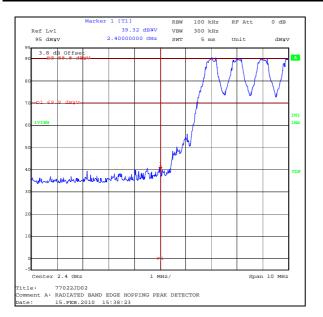
Frequency (MHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	Horizontal	32.7	-0.3	32.4	54.0	21.6	Complied

Note(s):

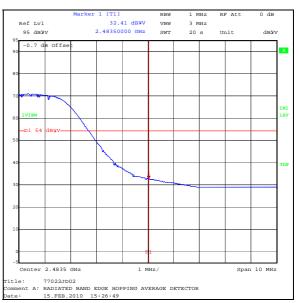
1. * -20 dBc limit

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Transmitter Band Edge Radiated Emissions (continued)







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Transmitter Band Edge Radiated Emissions (continued)

Results: Peak Power Level Static Mode

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dB _µ V/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	Horizontal	41.5	-0.2	41.3	69.8*	28.5	Complied
2483.5	Horizontal	51.3	-0.3	51.0	74.0	23.0	Complied

Results: Average Power Level Static Mode

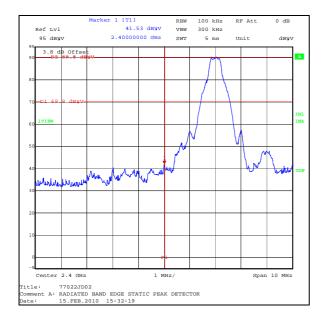
Frequency (MHz)	Antenna Polarity	Detector Level (dB _µ V)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	Horizontal	41.8	-0.3	41.5	54.0	12.5	Complied

Note(s):

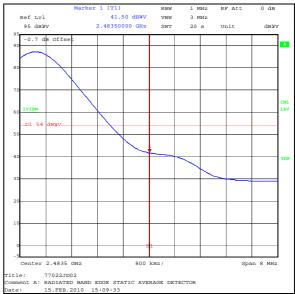
1. * -20 dBc limit

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Transmitter Band Edge Radiated Emissions (continued)







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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
Transmitter Maximum Peak Output Power	2400 to 2483.5 MHz	95%	±2.94 dB
Transmitter Carrier Frequency Separation	2400 to 2483.5 MHz	95%	±0.92 ppm
Transmitter Average Time of Occupancy	2400 to 2483.5 MHz	95%	±0.3 ns
20 dB Bandwidth	2400 to 2483.5 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±3.53 dB
Radiated Spurious Emissions	1 GHz to 25 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.

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1393	Attenuator	Huber + Suhner	757456	6820.17.B	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2010	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	13 Mar 2009	12
A436	Antenna	Flann	20240-20	330	24 Apr 2009	36
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Mar 2009	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Aug 2009	12

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

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