TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Datalogic S.p.A
Skorpio

To: OET Bulletin 65 supplement C

Test Report Serial No:
RFI/SARE2/RP48655JD09A

Supersedes Test Report Serial No:
RFI/SARE1/RP48655JD09A

This Test Report Is Issued Under The Authority Of Michael Derby, Wireless Radio Performance Group Leader: 	
Tested By: Nirav Modi 	**Checked By: Richelieu Quoi** 
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1. Customer Information

Company Name:	Datalogic S.p.A
Address:	Via Candini, 2 Lippo di Calderara di Reno Bologna Italy 40012
Contact Name:	Mr P Guerzoni

2. Equipment Under Test (EUT)

The following information (with the exception of the date of receipt) has been supplied by the customer:

2.1. Description of EUT

The equipment under test is a SKORPIO 701-902 module with Wi-Fi 802.11b/g and *Bluetooth* capabilities.

2.2. Identification of Equipment Under Test (EUT)

Description:	*Bluetooth* and Wi-Fi mobile station (PDA)
Brand Name:	DATALOGIC MOBILE s.r.l.
Model Name or Number:	DL-SKORPIO 701-902
Serial Number:	D07P00000
Hardware Version Number:	D07P00000
Software Version Number:	D07P00000
Hardware Revision of GSM Module:	Not Applicable
Software Revision of GSM Module:	Not Applicable
FCC ID Number:	U4G0020
Country of Manufacture:	Italy
Date of Receipt:	04 April 2007

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Accessories

No accessories were supplied with the EUT during testing:

2.5. Support Equipment

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

Description:	F-Colour Single Cradle
Brand Name:	Datalogic
Model Name or Number:	F-Colour Single Cradle
Serial Number:	D06F060472
Cable Length and Type:	Not Applicable
Connected to Port:	Not Applicable

Description:	Laptop
Brand Name:	Dell Latitude
Model Name or Number:	PP01X Latitude C840
Serial Number:	CN-03J010-12961-38Q-2231
Cable Length and Type:	Not Applicable
Connected to Port:	Serial Port on Cradle

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2.6. Additional Information Related to Testing

Equipment Category	Wi-Fi 802.11b/g and *Bluetooth.*		
Type of Unit	Portable (Standalone battery powered device)		
Intended Operating Environment:	Within Wi-Fi and *Bluetooth* coverage		
Transmitter Maximum Output Power Characteristics:	Wi-Fi	20dB	
	Bluetooth	0dB	
Transmitter Frequency Range:	Wi-Fi	2412 to 2462 MHz	
Transmitter Frequency Allocation of EUT When Under Test:	**Channel Number**	**Channel Description**	**Frequency (MHz)**
	1	Low	2412
	6	Middle	2437
	11	High	2462
Modulation(s):	0Hz		
Modulation Scheme (Crest Factor):	1		
Antenna Type:	Internal		
Antenna Length:	Unknown		
Number of Antenna Positions:	2 Fixed		
Power Supply Requirement:	Internal Battery Supply 7.4 V / 1070 mAh		
Battery Type(s):	Lithium-ion		

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

EN 62209-1: 2006
Title: Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz).

ANSI/IEEE C95.1: 1999
IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz.

Federal Communications Commission, “Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields”, OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques,
Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with know precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

At the customers request the EUT was tested in Wi-Fi 802.11b/g modes using the main and auxiliary antenna with *Bluetooth* active.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

Tx Main: Wi-Fi 802.11b (11MBps) / 802.11g (54 MBps) data allocated test mode with *Bluetooth* active.

Tx Aux: Wi-Fi 802.11b (11MBps) / 802.11g (54MBps) data allocated test mode with *Bluetooth* active.

The software used to exercise the EUT in test mode was SDCFCC Version SCU V1.02.09. This software was installed and provided by the manufacturer. The software enabled the EUT to transmit continuously.

The software used to activate *Bluetooth* was CSR Bluetest. It was installed on a laptop and communicated to the EUT via the cradle serial port.

The reason for choosing this configuration was that it has been defined by the customer as being typical of normal use and likely to be worst case.

5.2. Configuration and Peripherals

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

Standalone *Bluetooth* and Wi-Fi mobile station without any accessories.

Body Configuration

a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.

b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.

c) For the touch-safe position the handset was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.

d) For position(s) greater then 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test.

g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the handset and its antenna.

h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charge battery.

6. Summary of Test Results

Test Name	Specification Reference	Compliancy Status
Specific Absorption Rate (SAR) WiFi 802.11b – Body Configuration	OET Bulletin 65 supplement C: 2001-01	Complied
Specific Absorption Rate (SAR) WiFi 802.11g – Body Configuration	OET Bulletin 65 supplement C: 2001-01	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ.

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

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 8 for details of measurement uncertainties.

7.2. Test Results

7.2.1. Specific Absorption Rate – WiFi 802.11b – Body Configuration

Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.412

Environmental Conditions:

Temperature Variation in Lab (°C):	23 to 23
Temperature Variation in Liquid (°C):	22.5 to 22.0

Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	6	0.015	1.600	1.585	1,3	Complied
Front of EUT Facing Phantom	Flat (SAM)	6	0.015	1.600	1.585	2,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	6	0.273	1.600	1.327	1,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	1	0.412	1.600	1.188	1,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	11	0.235	1.600	1.365	1,3	Complied

Note(s):

1. *802.11b Main Antenna.*
2. *802.11b Auxiliary Antenna*
3. *SAR measurements were performed with the EUT at a separation distance of 0mm from the SAM phantom flat section.*

7.2.2. Specific Absorption Rate – WiFi 802.11g – Body Configuration

Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.077

Environmental Conditions:

Temperature Variation in Lab (°C):	23 to 23
Temperature Variation in Liquid (°C):	22.5 to 22.0

Results:

EUT Position	Phantom Configuration	Channel Number	Level (W/kg)	Limit (W/kg)	Margin (W/kg)	Note(s)	Result
Front of EUT Facing Phantom	Flat (SAM)	6	0.003	1.600	1.597	1,3	Complied
Front of EUT Facing Phantom	Flat (SAM)	6	0.002	1.600	1.598	2,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	6	0.066	1.600	1.534	1,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	1	0.077	1.600	1.523	1,3	Complied
Rear of EUT Facing Phantom	Flat (SAM)	11	0.055	1.600	1.545	1,3	Complied

Note(s):

1. *802.11g Main Antenna.*
2. *802.11g Auxiliary Antenna*
3. *SAR measurements were performed with the EUT at a separation distance of 0mm from the SAM phantom flat section.*

7.2.3. EIRP Measurement 802.11b (Aux Antenna)

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2412	19.7
Middle	2437	17.9
High	2462	18.3

7.2.4. EIRP Measurement 802.11b (Main Antenna)

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2412	21.2
Middle	2437	20.3
High	2462	21.2

7.2.5. EIRP Measurement 802.11g (Aux Antenna)

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2412	17.5
Middle	2437	17.8
High	2462	16.0

7.2.6. EIRP Measurement 802.11g (Main Antenna)

Channel	Frequency (MHz)	TX Power before Test (dBm)
Low	2412	19.2
Middle	2437	19.0
High	2462	18.5

8. 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”.

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate Uncertainty at 2450 MHz Body 1g, WiFi Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528	95%	±19.33%

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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Measurement Uncertainty (Continued)

8.1. WiFi – Body Configuration

Specific Absorption Rate Uncertainty at 2450 MHz Body 1g, WiFi Modulation Scheme calculated in accordance with IEC 62209-1 & IEEE 1528

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	11.800	11.800	normal (k=2)	2.0000	1.0000	5.900	5.900	∞
B	Axial Isotropy	0.500	0.500	normal (k=2)	2.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	2.600	2.600	normal (k=2)	2.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.560	0.560	normal (k=2)	2.0000	1.0000	0.280	0.280	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration/ Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.920	2.920	normal (k=1)	1.0000	1.0000	2.920	2.920	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	3.930	3.930	normal (k=1)	1.0000	0.6400	2.515	2.515	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	3.940	3.940	normal (k=1)	1.0000	0.6000	2.364	2.364	5
	Combined standard uncertainty			t-distribution			9.86	9.86	>400
	Expanded uncertainty			k = 1.96			19.33	19.33	>400

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Month(s))
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	0
A1094	Digital Camera	Sony	MVC - FD81	125805	None	0
A1097	SMA Directional Coupler	MiDISCO	MDC622 3-30	None	Calibrated as part of system	0
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	0
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrate Before Use	0
A1184	Data Acquisition Electronics	Schmid & Partner	DAE3	394	19 May 2006	12
A1238	SAM Phantom	Schmid & Partners	001	001	Calibrate Before Use	0
A1322	D2450V2	Schmid & Partner Engineering AG	D2450V 2	725	17 Jan 2007	24
A1378	EX3DV3	Schmid & Partner	EX3DV3	3508	16 Nov 2006	12
A1410	DC-4.0GHz 3dB	Omni Spectra	FSC 16179	20510-3	Calibrated as part of system	0
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	0
A1531	Antenna	AARONIA AG	7025	02458	None	0
A215	20 dB Attenuator to 4GHz 20W	Narda	766-20	9402	Calibrated as part of system	0
C1092	Cable	RS	293-334	1087200-3 3402	Internal Calibration	12
C1144	155 mm UTIFLEX Cable	Rosenberger MICRO-COAX	FA147A F001503 030	41842-1	Calibrated as part of system	0
C1145	300 mm UTIFLEX Cable	Rosenberger MICRO-COAX	FA147A F003003 030	41843-1	Calibrated as part of system	0

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Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Month(s))
C1146	3 m UTIFLEX Cable	Rosenberger MICRO-COAX	FA147A F030003 030	41752-1	Calibrated as part of system	0
G051	10 MHz to 20.1 GHz	Gigatronics	7100/.01 -20	749472	06 Nov 2006	12
G0528	Robot Power Supply	Schmid & Partner	DASY	None	Calibrate Before Use	0
G087	Dual 35V 10A	Thurlby Thandar	CPX200	100701	None	0
M010	NRV Power Meter	Rohde & Schwarz	NRV	882 317/065	19 Jun 2006	12
M1001	Spectrum Analyser 8594A	Hewlett Packard	8594A	3212U0033B	25 Apr 2006	12
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	19 Sep 2006	12
M1047	Robot Arm	Staubli	RX908 L	F00/SD89A1/ A/01	Calibrate Before Use	0
M1069	Power Head	Rohde & Schwarz	NRV-Z2	838824/010	05 Apr 2006	12
M1144	Testo 110 Immersion Probe & Thermometer	Testo	Testo 110	03100047	23 Feb 2007	12
S256	SAR Laboratory	RFI	Site 56	N/A	Calibrate Before Use	0

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