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Report On

EMC Testing of the
Loc8tor Ltd
Loc8tor Lite

COMMERCIAL-IN-CONFIDENCE

FCC ID: TUW-SYC1
IC ID: 6444A-SYC1

Document 75902529 Report 06 Issue 5 **February 2008**

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REPORT ON

EMC Testing of the
Loc8tor Ltd
Loc8tor Lite

Document 75902529 Report 06 Issue 5

February 2008

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DATED

27 February 2008

27 February 2008

This report has been up-issued to Issue 5 to include the manufacturer and emission designator details.

UKAS TESTING
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SECTION 1

REPORT SUMMARY

EMC Testing of the
Loc8tor Ltd
Loc8tor Lite

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Loc8tor Ltd Loc8tor Lite to the requirements of FCC Part 15B: 2006, FCC Part 15C: 2006, RSS-Gen: 2005 and RSS-210: 2005.

Objective	To perform Electromagnetic Compatibility (EMC) Qualification Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Kingtronics Ltd Kingtronics Science & Industrial Park North Section of Hu-Bin East Road Kingtronics Road Xiamen, Fijian CHINA
Model Number(s)	Loc8tor Lite
Serial Number(s)	P4
Software Version	Loc8tor Lite: V1.0
Hardware Version	Loc8tor Lite: Iss D
Emission Designator	5M0G1D
Number of Samples Tested	One
Test Specification/Issue/Date	FCC Part 15B: 2006 FCC Part 15C: 2006 RSS-Gen: Issue 1: 2005 RSS-210: Issue 6: 2005
Incoming Release Date	Not Formally Released 16 November 2007
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	ASH088 08 November 2007
Start of Test	18 November 2007
Finish of Test	30 November 2007
Name of Engineer(s)	S C Hartley G Lawler J Holcombe
Related Document(s)	ANSI C63.4: 2001 RSS-212, Issue 1: 1999 SRSP-503, Issue 6: 2003 SRSP-510, Issue 3: 2003

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC Part 15B and 15C 2006, is shown below.

Section	Spec Clause FCC	Spec Clause Industry Canada	Test Description	Mode	Result
2.1	15.109 (a)	RSS-Gen, 6	Radiated Emissions (Enclosure Port)	Receive	Pass
2.2	15.205	RSS-Gen, A8.5	Measurements at Band Edge	Transmit	Pass
2.3	15.247 (a)(2)	RSS-210 A8.2 (1)	6dB Bandwidth	Transmit	Pass
2.4	15.247 (b)(3)	RSS-Gen A8.4(1)	Maximum Peak Output Power (Radiated)	Transmit	Pass
2.5	15.209, 15.247(d), 15.205	RSS-Gen A8.5	Radiated Emissions (Enclosure Port)	Transmit	Pass
2.6	15.247(e)	RSS-210 A8.2 (2)	Peak Power Spectral Density	Transmit	Pass

Product Service

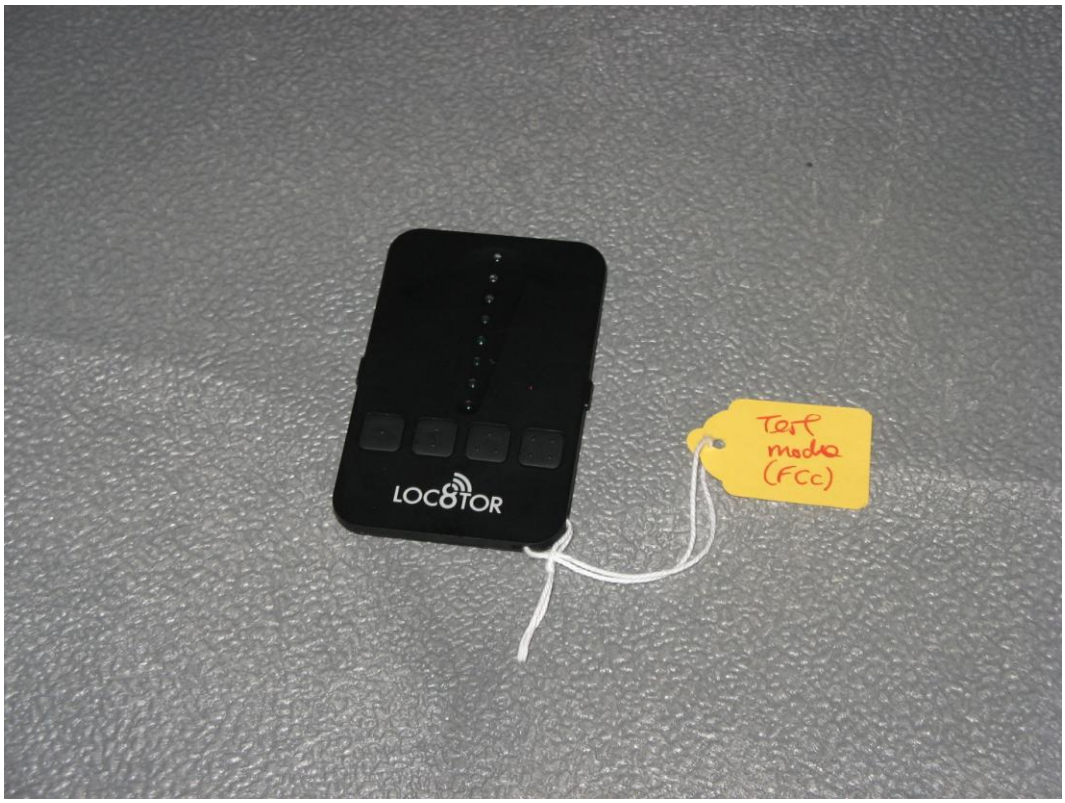
1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	2.4GHz Transceiver
MANUFACTURER	Loc8tor Ltd
TYPE	Electronics
PART NUMBER	Loc8tor Lite
SERIAL NUMBER	P4
HARDWARE VERSION	Iss D
SOFTWARE VERSION	V1.0
TRANSMITTER OPERATING RANGE	2.445 GHz single frequency (5 MHz bw)
RECEIVER OPERATING RANGE	2.445 GHz single frequency (5 MHz bw)
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	2 MHz (Rx only)
ITU DESIGNATION OF EMISSION	5M0G1D
HIGHEST INTERNALLY GENERATED FREQUENCY IN TRANSMIT	2.445 GHz
HIGHEST CLOCK FREQUENCY	13 MHz
OUTPUT POWER (W or dBm)	3 dBm (conducted), 10 dBm radiated
FCC ID	TUW-SYC1
INDUSTRY CANADA ID	6444A-SYC1
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Handheld unit for asset location – Loc8tor Lites are placed on various assets (eg keys, wallet, pets) and the handheld helps locate the asset.
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	Lithium battery – off the shelf
MANUFACTURER	Various
TYPE	Lithium
PART NUMBER	CR2032
VOLLOC8TOR LITEE	3V
COUNTRY OF ORIGIN	Various

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Loc8tor Ltd Loc8tor Lite as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test

Product Service

1.4.2 Test Configuration

Configuration 1 : Loc8tor Lite

The EUT was configured in accordance with FCC Part 15B: 2006, FCC Part 15C: 2006, RSS-Gen: 2005 and RSS-210: 2005.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 - Transmit.

Mode 2 - Receive.

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate. The testing was carried out at the Octagon House facility.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC4270 Octagon House, Fareham Test Laboratory

The Loc8tor Lite was powered from a 3V battery.

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

EMC Testing of the
Loc8tor Ltd
Loc8tor Lite

Product Service

2.1 RADIATED EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

FCC Part 15B: 2006, Clause 15.109 (a)
RSS-Gen; 6

2.1.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.1.3 Date of Test and Modification State

18 November 2007 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15B: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.1.6 Environmental Conditions

	18 November 2007
Ambient Temperature	17°C
Relative Humidity	31%
Atmospheric Pressure	1001mbar

Product Service

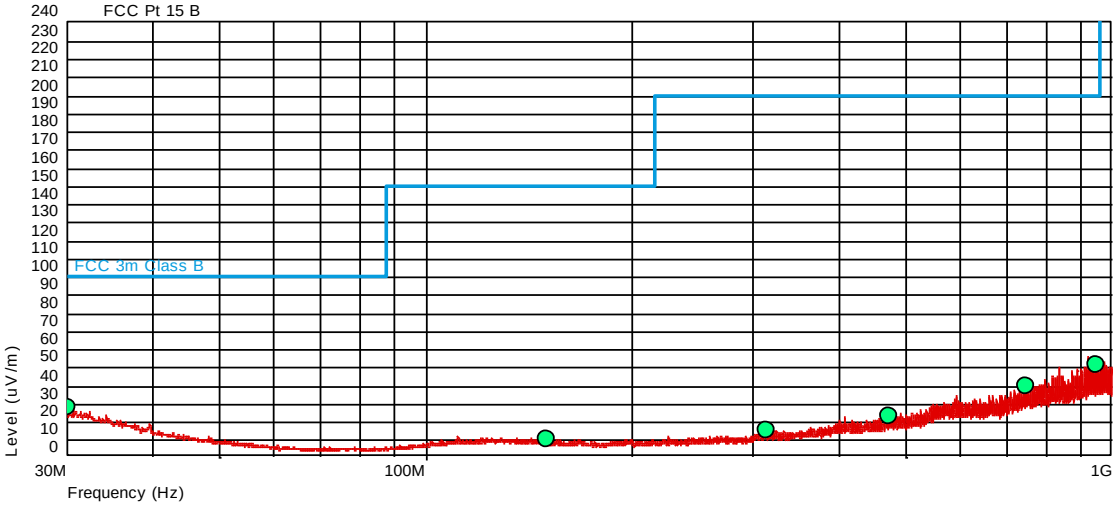
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC Part 15B: 2006, Clause 15.109 (a) and Industry Canada RSS-Gen; 6 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 Loc8tor Lite - Mode 2

30MHz to 1GHz



No EUT emissions were detected above the measurement system's Noise Floor, therefore see System Noise Floor measurements below.

Frequency (MHz)	QP Level (uV/m)	QP Limit (uV/m)	QP Margin (uV/m)	Angle(Deg)	Height(m)	Polarity
30.000	29.2	100.0	-70.8	143.80	1.05	Vertical
150.000	10.2	150.0	-139.8	322.20	1.00	Horizontal
315.000	15.1	200.0	-184.9	63.30	1.00	Horizontal
475.000	22.6	200.0	-177.4	150.90	2.16	Vertical
750.000	39.8	200.0	-160.2	82.60	1.62	Vertical
950.000	51.2	200.0	-148.8	342.40	1.00	Horizontal

Product Service

1GHz – 12.5GHz

Frequency GHz	Antenna Polarisation	Antenna Height cm	EUT Arc Degrees	Final Peak µV/m	Final Average µV/m	Peak Limit µV/m	Average Limit µV/m
2.442	Horizontal	290	290	95.4	60.2	5000	500
4.887	Horizontal	100	330	229.0	118.8	5000	500

No other emissions were detected within 20dB of the specification limit.

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Product Service

2.2 MEASUREMENT AT THE BAND EDGE

2.2.1 Specification Reference

FCC Part 15C: 2006, Clause 15.205
RSS-Gen, A8.5

2.2.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.2.3 Date of Test and Modification State

18 November 2007 - Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15C: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

	18 November 2007
Ambient Temperature	17°C
Relative Humidity	31%
Atmospheric Pressure	1001mbar

Product Service

2.2.7 Test Results

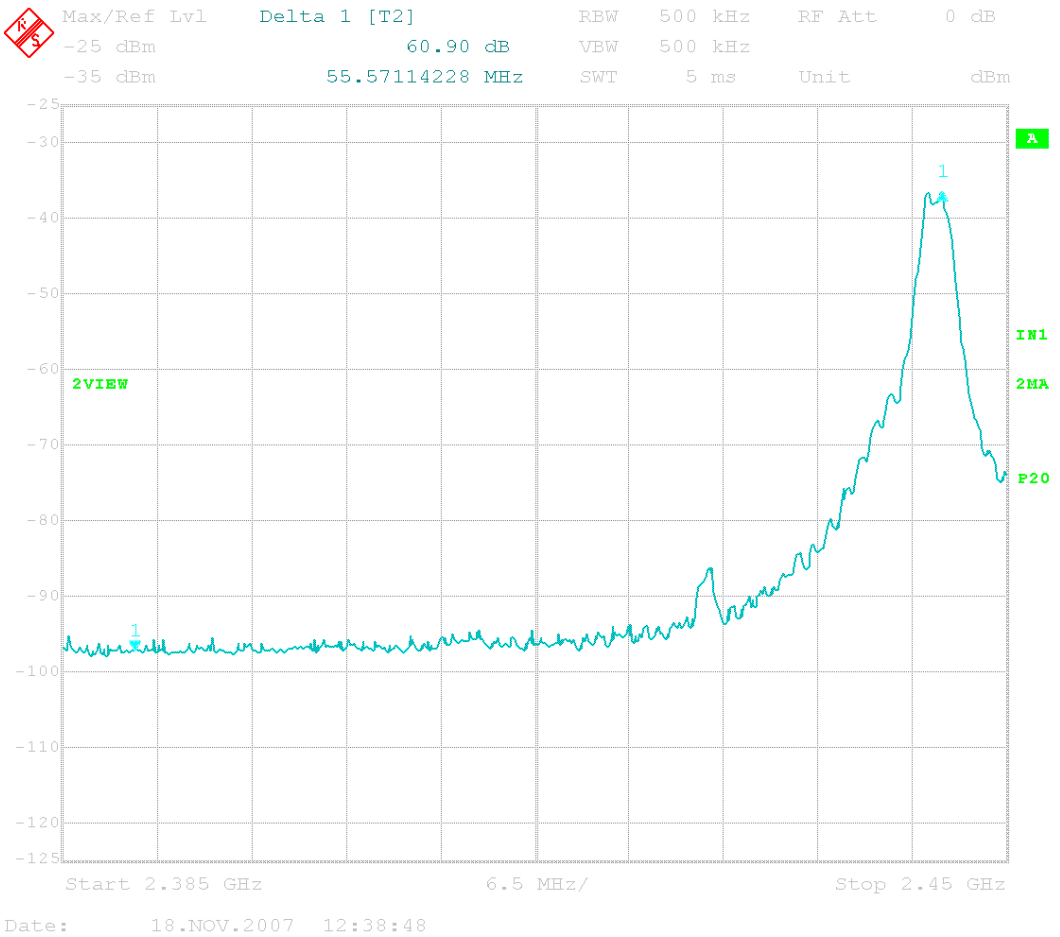
For the period of test the EUT met the requirements of FCC Part 15C: 2006, Clause 15.205 and Industry Canada RSS-Gen A8.5 for Measurements at the Band Edge.

The test results are shown below.

Configuration 1 Mode 1 Measurement at band edge result

2.390 GHz Band Edge

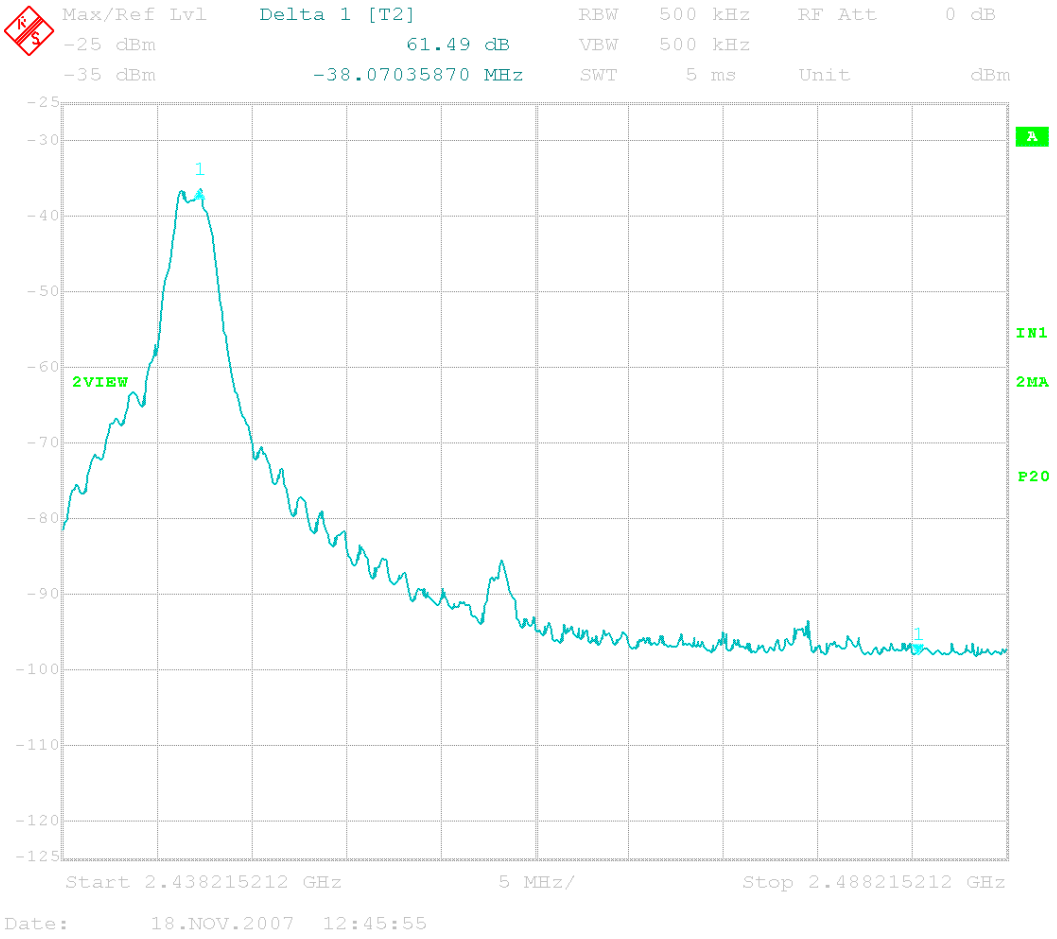
Frequency GHz	Peak Result (µV/m)	Peak Limit (µV/m)	Average Result (µV/m)	Average Limit (µV/m)
2.445	288.4	5000.0	101.5	500.0



Product Service

2.4835 GHz Band Edge

Frequency GHz	Peak Result (µV/m)	Peak Limit (µV/m)	Average Result (µV/m)	Average Limit (µV/m)
2.445	269.1	5000.0	94.4	500.0



Product Service

2.3 6DB BANDWIDTH

2.3.1 Specification Reference

FCC Part 15C: 2006, Clause 15.247 (a) (2)
RSS-210 A8.2 (1)

2.3.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.3.3 Date of Test and Modification State

30 November 2007 - Modification State 0

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15C: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.3.6 Environmental Conditions

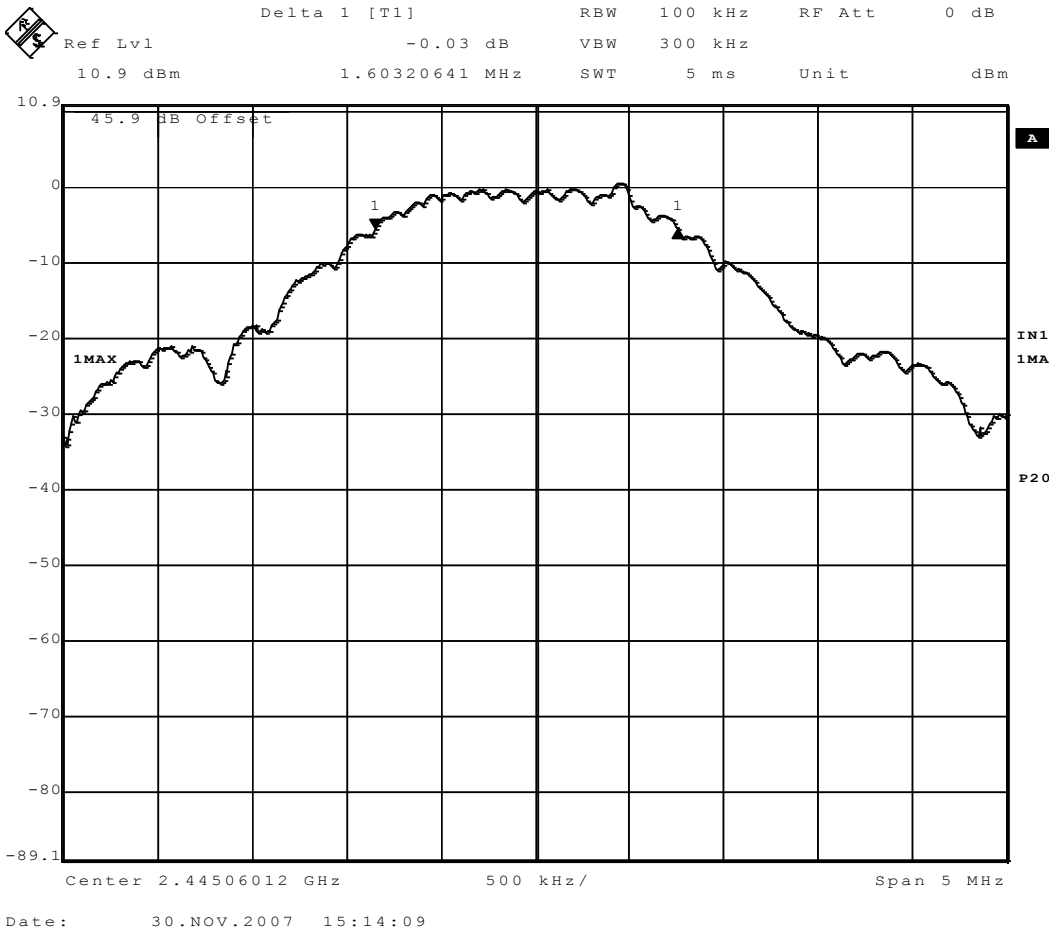
	30 November 2007
Ambient Temperature	18.1°C
Relative Humidity	50%
Atmospheric Pressure	1001mbar

Product Service

2.3.7 Test Results

For the period of test the EUT met the requirements of FCC Part 15C: 2006, Clause 15.247 (a)(2) and Industry Canada RSS-210 A8.2 (1) for 6dB Bandwidth.

Frequency (MHz)	Data Rate kbps	6dB Bandwidth (MHz)
2445	250	1.60320641
Limit	>500kHz	



Product Service

2.4 MAXIMUM PEAK OUTPUT POWER (RADIATED METHOD) EIRP

2.4.1 Specification Reference

FCC Part 15C: 2006, Clause 15.247 (b) (3)
RSS-Gen A8.4 (1)

2.4.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.4.3 Date of Test and Modification State

18 November 2007 - Modification State 0

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15C: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.4.6 Environmental Conditions

	18 November 2007
Ambient Temperature	17°C
Relative Humidity	31%
Atmospheric Pressure	1001mbar

Product Service

2.4.7 Test Results

For the period of test the EUT met the requirements of FCC Part 15C: 2006, Clause 15.247 (b)(3) and Industry Canada RSS-Gen A8.4(1) for Maximum Peak Output Power (Radiated).

Frequency (MHz)	Result dBm	Limit dBm	Result W	Limit W
2.445	+9.9	36.0	0.010	4.000

Product Service

2.5 RADIATED EMISSIONS (ENCLOSURE PORT)

2.5.1 Specification Reference

FCC Part 15C: 2006, Clause 15.209, 15.247(d), 15.205
RSS-Gen A8.5

2.5.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.5.3 Date of Test and Modification State

18th November 2007 - Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15C: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.5.6 Environmental Conditions

	18 November 2007
Ambient Temperature	17.1°C
Relative Humidity	43%
Atmospheric Pressure	997mbar

Product Service

2.5.7 Test Results

For the period of test the EUT met the requirements of FCC Part 15C: 2006, Clause 15.209, 15.247(d), 15.205 and Industry Canada GSS-Gen A8.5 for Radiated Emissions (Enclosure Port).

The test results are shown below.

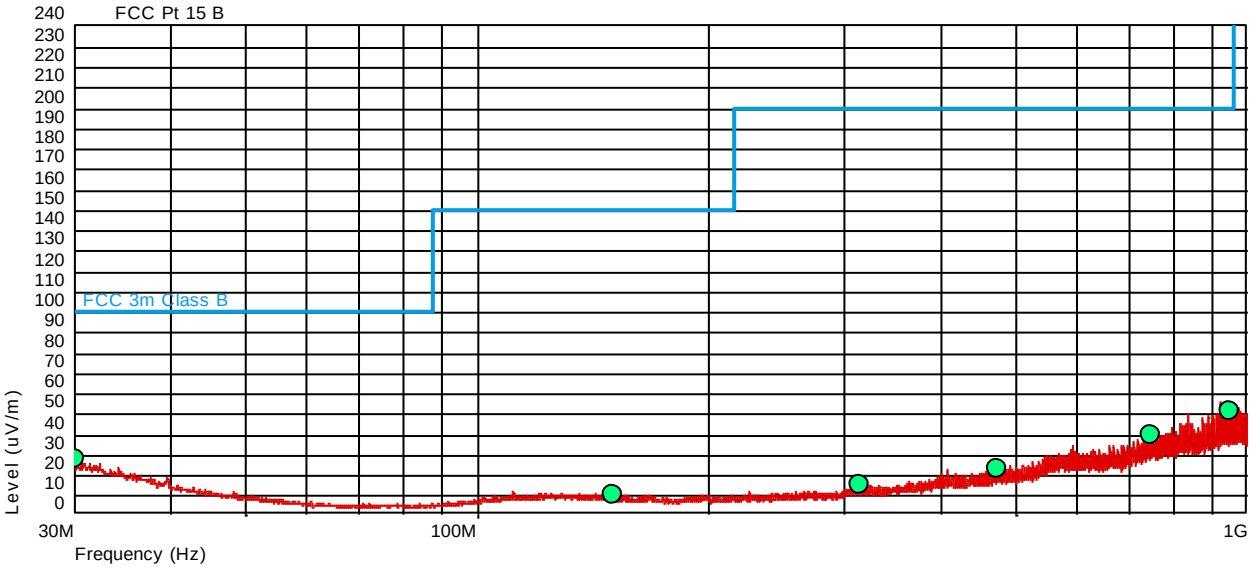
Calculation of Out of Band Limit

Frequency GHz	Antenna Polarisation	Antenna Height cm	EUT Arc Degrees	Final Peak µV/m	Restricted Band Limit µV/m	Restricted Band Limit µV/m
2.445	Horizontal	116	157	167,880.0	16,780.0	16,788.0

Product Service

Configuration 1 - Transmit (2.445GHz only)

30MHz to 1GHz



No EUT emissions were detected above the measurement system's Noise Floor, therefore see System Noise Floor measurements are shown below.

Final Result

Frequency (MHz)	QP Level (uV/m)	QP Limit (uV/m)	QP Margin (uV/m)	Angle(Deg)	Height(m)	Polarity
30.000	28.2	100.0	-71.8	143.80	1.05	Vertical
150.000	10.2	150.0	-139.8	322.20	1.00	Horizontal
315.000	15.1	200.0	-184.9	63.30	1.00	Horizontal
475.000	22.6	200.0	-177.4	150.90	2.16	Vertical
750.000	39.8	200.0	-160.2	82.60	1.62	Vertical
950.000	51.2	200.0	-148.8	342.40	1.00	Horizontal

1GHz to 25GHz

Frequency GHz	Antenna Polarisation	Antenna Height cm	EUT Arc Degrees	Final Peak dBµV/m	Final Average dBµV/m	Peak Limit dBµV/m	Average Limit dBµV/m
4.891	Horizontal	100	325	1135.0	334.9	5000.0	500.0
7.336	Horizontal	100	061	2041.7	489.8	5000.0	500.0
9.783	Vertical	100	095	1148.2	N/A	16788.0	N/A

No other emissions were detected within 20dB of the specification limit.

N/A Not Applicable as within restriced band.

Product Service

2.6 PEAK POWER SPECTRAL DENSITY

2.6.1 Specification Reference

FCC Part 15C: 2006, Clause 15.247 (e)
RSS-210 A8.2 (2)

2.6.2 Equipment Under Test

Loc8tor Lite, Serial Number: P4

2.6.3 Date of Test and Modification State

30 November 2007 - Modification State 0

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC Part 15C: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.6.6 Environmental Conditions

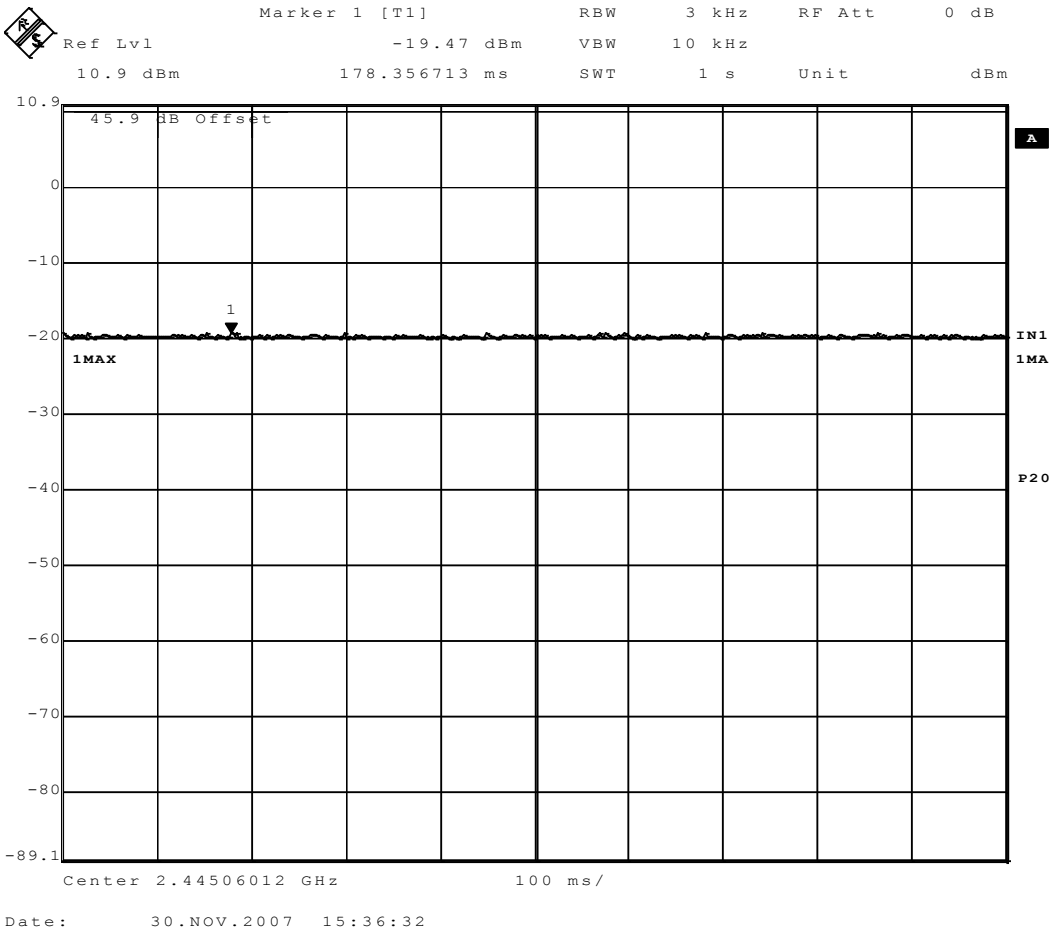
	30 November 2007
Ambient Temperature	18.1°C
Relative Humidity	50%
Atmospheric Pressure	1005mbar

Product Service

2.6.7 Test Results

For the period of test the EUT met the requirements of FCC Part 15C: 2006, Clause 15.247 (e) and Industry Canada GSS-210 A8.2 (2) for Peak Power Spectral Density.

Frequency (MHz)	Data Rate kbps	6dB Bandwidth (MHz)
2445	250	-19.47
Limit	+8dBm/3kHz	



Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.4 EMC - Maximum Output Power				
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	29-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	29-Jun-2008
Screened Room (5)	Rainford	Rainford	1545	1-Mar-2008
Mast Controller	Inn-Co GmbH	CO 1000	1606	TU
Turntable/Mast Controller	EMCO	2090	1607	TU
Signal Generator	Marconi	2031	1845	16-Oct-2008
EMI Test Receiver	Rohde & Schwarz	ESIB26	2028	25-Jun-2008
Sections 2.1, 2.2 and 2.5 EMC - Radiated Emissions				
Signal Generator	Hewlett Packard	8672A	223	22-Feb-2008
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	22-Jun-2008
Amplifier	Miteq Corp	AMF-3D-001080-18-13P	231	TU
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	29-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	29-Jun-2008
Antenna (Bilog)	Schaffner	CBL6143	287	13-Jan-2008
Dual Power Supply Unit	Thurlby	PL320	288	TU
Test Receiver	Rohde & Schwarz	ESIB40	1006	21-Apr-2008
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	TU
Pre-Amplifier	Phase One	PS04-0086	1533	TU
Pre-Amplifier	Phase One	PSO4-0087	1534	TU
Screened Room (5)	Rainford	Rainford	1545	1-Mar-2008
Mast Controller	Inn-Co GmbH	CO 1000	1606	TU
Turntable/Mast Controller	EMCO	2090	1607	TU
Signal Generator	Marconi	2031	1845	16-Oct-2008
EMI Test Receiver	Rohde & Schwarz	ESIB26	2028	25-Jun-2008
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	13-Apr-2008

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.3 Radio (Tx) - 6dB Bandwidth				
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	29-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	29-Jun-2008
Test Receiver	Rohde & Schwarz	ESIB40	1006	21-Apr-2008
Screened Room (5)	Rainford	Rainford	1545	1-Mar-2008
Mast Controller	Inn-Co GmbH	CO 1000	1606	TU
Turntable/Mast Controller	EMCO	2090	1607	TU
Signal Generator	Marconi	2031	1845	16-Oct-2008
Section 2.6 Radio (Tx) - Peak Power Density				
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	29-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	29-Jun-2008
Test Receiver	Rohde & Schwarz	ESIB40	1006	21-Apr-2008
Mast Controller	Inn-Co GmbH	CO 1000	1606	TU
Turntable/Mast Controller	EMCO	2090	1607	TU
Signal Generator	Marconi	2031	1845	16-Oct-2008

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
6dB Bandwidth	2245MHz	212kHz
Maximum Peak Output Power (Radiated)	1GHz to 40GHz Amplitude	6.3dB*
Peak Power Spectral Density	2245MHz	1.8dB

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).