TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: MaxID Ltd
iDL3ID

To: Transmitter Spurious Intermodulation Products

Test Report Serial No:
RFI/RPTE1/RP73402JD05A

This Test Report Is Issued Under The Authority Of Steve Flooks, Radio Performance Group Service Leader: **pp** 	
Checked By: Nigel Davison 	**Report Copy No: PDF01**
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Test of: **MaxID Ltd**
iDL3ID
To: **Transmitter Spurious Intermodulation Products**

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1. Client Information

Company Name:	MaxID Ltd
Address:	Hillswood Business Park 3000 Hillswood Drive Chertsey Surrey KT16 ORS
Contact Name:	Mr R Biggs

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Description:	Rugged Mobile Computer
Brand Name:	iDL
Model Name or Number:	iDL3ID FCC test unit 1
Serial Number:	505159
FCC ID Number:	TFTIDL3ID01
Country of Manufacture:	None Stated
Date of Receipt:	05 March 2008

2.2. Description of EUT

The equipment under test is a Rugged Mobile Computer.

2.3. Accessories

The following accessories were supplied with the EUT:

Description:	Docking station for Mobile computer
Brand Name:	iDL docking station
Model Name or Number:	IDL doc
Serial Number:	CHN00002
Cable Length and Type:	Not Applicable
Connected to Port:	Not Applicable

Description:	AC-DC adaptor
Brand Name:	Netgear
Model Name or Number:	DV-1280-3UK
Serial Number:	330-10102-01
Cable Length and Type:	2 meteres / multicore
Connected to Port:	Docking station charger

2.4. Support Equipment

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

Description:	Laptop
Model Name or Number:	Dell Latitude 110L
Serial Number:	(01)07898349890528
Cable Length and Type:	Not Applicable
Connected to Port:	Serial

Description:	RS-232 extender cable
Model Name or Number:	None Stated
Serial Number:	None Stated
Cable Length and Type:	2 metres 9way male to 9way fem D-type
Connected to Port:	Serial

2.5. Modifications Incorporated in EUT

The EUT was modified by the manufacturer before submission for testing. An external serial and USB cable including connections were fitted and passed though the bottom of the casing. Both cables were approximately 100mm long. One cable was used to control 802.11 functions during testing via the serial port. The USB cable was not used.

2.6. Additional Information Related to Testing

Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply Internal battery supply of 3.4 V
Intended Operating Environment:	Commercial, Light Industry, Heavy Industry, Within GSM Coverage
Equipment Category:	GSM/GPRS/EGPRS, HF RFID, GPS
Type of Unit:	Portable (Standalone battery powered device) Transceiver
Data Rate:	WIFI:variable, HF RFID:424kbaud, GSM: Variable
Bandwidth:	WIFI:22MHz, HF RFID:tbd GSM: 200 kHz
Modulation Type:	WIFI:OFDM, HF RFID:ASK, GSM: GMSK / 8PSK
Channel Spacing:	WIFI:27MHz, HF RFID:na
Duty Cycle:	WIFI:na, HFRFID:tbd
Highest Fundamental Frequency:	WIFI:2462MHz, HFRFID:13.56MHz
Antenna Type:	PIFA dielectric, HF RFID:inductive loop
Antenna Gain:	WIFI:-0.5dBi
Antenna Connection:	All antennas are Internal.

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GSM 850 Device

Transmit Frequency Range:	824.0 MHz to 849.0 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top	251	848.8
Maximum Power Output (ERP):	21.9 dBm		

GSM 1900 Device

Transmit Frequency Range:	1850.0 MHz to 1910.0 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top Refer to RFI TP73052JD01	810	1909.8
Maximum Power Output (EIRP):	23.9 dBm		

RFID Device

Transmitter Frequency for RFID Module:	(Single channel device) 13.56 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Single Channel	1	13.56

WIFI Device

Transmitter Frequency for 802.11 module:	2400 MHz to 2483.5 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Top Refer to RFI TP73052JD01	11	2462

2.7. Port Identification

Port	Description	Type/Length
1	Not Applicable	Not Applicable

3. Test Specification, Methods and Procedures

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

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.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.2. 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

There were no deviations from the test specification.

5. Operation of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

Transmitter tests – Intermodulation testing was performed in accordance with RFI Test Plan TP73052JD01 apart from the Bluetooth module which is permanently disabled.

The EUT was configured to transmit three signals transmitting at highest output power (one GSM carrier signal allocated at the top channel of the GSM 850 band, one 802.11b/g carrier signal allocated at the top channel and the 13.56 MHz RFID carrier signal).

The transmit channels and/or frequencies are listed below:

GSM 850 – ARFCN 251 / 848.8 MHz

802.11 – Channel 11 / 2462 MHz

RFID – 13.56 MHz

5.2. Configuration and Peripherals

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

GSM – A link was established to a GSM System Simulator and the EUT mode, power and frequency was controlled by the System Simulator. The EUT was initially tested in GSM and EGPRS modes on the top channel to establish the worst case (highest power and most emissions). Both modes produced near identical power and emissions, therefore the remainder of the testing was completed in GSM only mode unless otherwise stated. The EUT was set to transmit at the maximum power.

802.11 – The EUT was set to transmit on the top channel at maximum power using a bespoke application on the laptop PC used as support equipment. 802.11b power was found to be greater than 802.11g, therefore the remainder of the testing was completed in 802.11b mode. The laptop PC was disconnected from the EUT before testing commenced.

RFID – The EUT was set to continuously transmit using a bespoke application available on the EUT user interface.

6. Summary of Test Results

GSM 850 Active

Range of Measurements	Port Type	Compliancy Status
Transmitter Out of Band Radiated Emissions (Intermodulation Products)	Antenna	Complied

PCS 1900 Active

Range of Measurements	Port Type	Compliancy Status
Transmitter Out of Band Radiated Emissions (Intermodulation Products)	Enclosure	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.

6.2. Site Registration Numbers

FCC: 90895
IC: 3485

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.

This report was produced to show that the EUT would meet the general GSM transmit limits of -13 dBm with all transceivers operating simultaneously. The data is presented twice, once with the GSM 850 MHz transmitter active and again with the PCS 1900 MHz transmitter active. It was performed this was as it was not possible to have both 850 MHz and 1900 MHz transceivers operating simultaneously.

7.2. Test Results GSM 850 MHz Active

7.2.1. Transmitter Out of Band Radiated Emissions

Ambient Temperature: 14ºC to 17ºC Relative Humidity: 30 % to 52 %

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2.

Results:

Highest Peak Level:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1697.589	-20.6	-13.0	7.6	Complied
4923.943	-40.6	-13.0	27.6	Complied
5092.586	-51.1	-13.0	38.1	Complied
7388.014	-43.5	-13.0	30.5	Complied
7639.180	-37.2	-13.0	24.2	Complied

Note(s):

1. *Emissions at 848.817 and 894.829 MHz are the uplink and downlink GSM850 TCH.*
2. *The emission at 2464.929 MHz is the WLAN carrier.*
3. *All other emissions were attenuated more than 20 dB below the permissible limit. Prescans were made against the FCC general limits for radiated emissions. Further investigation was made on each emission noted during the prescans and the appropriate limit applied during the final measurements.*

7.3. Test Results PCS 1900 MHz Active

7.3.1. Transmitter Out of Band Radiated Emissions

Ambient Temperature: 14ºC to 17ºC Relative Humidity: 30 % to 52 %

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238.

Results:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
5729.267	-24.6	-13.0	11.6	Complied
7639.237	-31.4	-13.0	18.4	Complied
11458.875	-32.0	-13.0	19.0	Complied
15278.644	-30.8	-13.0	17.8	Complied
17188.396	-28.8	-13.0	15.8	Complied

Note(s):

1. *Emissions at 1909.8 and 1989.8 MHz are the uplink and downlink GSM1900 TCH.*

2. *The emission at 2464.929 MHz is the WLAN carrier.*

3. *All other emissions were attenuated more than 20 dB below the permissible limit. Prescans were made against the FCC general limits for radiated emissions. Further investigation was made on each emission noted during the prescans and the appropriate limit applied during the final measurements.*

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”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz 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 (Months)
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A059	Antenna	EMCO	3146	8902-2378	25 Feb 2008	12
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A253	Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	Antenna	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A259	Antenna	Chase	CBL6111	1513	13 Mar 2007	18
C1065	Cable	Rosenberger	UFA210-1-7872	0985	Calibrated before use	-
C1265	Cable	Rosenberger	FA210A1020007070	49317-01	Calibrated before use	-
C341	Cable	Andrews	None	None	Calibrated before use	-
C461	Cable	Rosenberger	UFA210A-1-1182-704704	98H0305	Calibrated before use	-
C468	Cable	Rosenberger	UFA210A-1-3937-504504	98L0440	Calibrated before use	-
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	28 May 2008	12
M024	Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Calibrated before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	02 Aug 2007	12
S201	Open Area Test Site	RFI	1	None	09 May 2008	12
S202	Site 2	RFI	2	S202-15011990	28 Jan 2008	12
S209	Anechoic Chamber	RFI	9	None	Verified before use	-

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

Appendix 2. Test Configuration Drawing

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\73402JD05\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: MaxID Ltd
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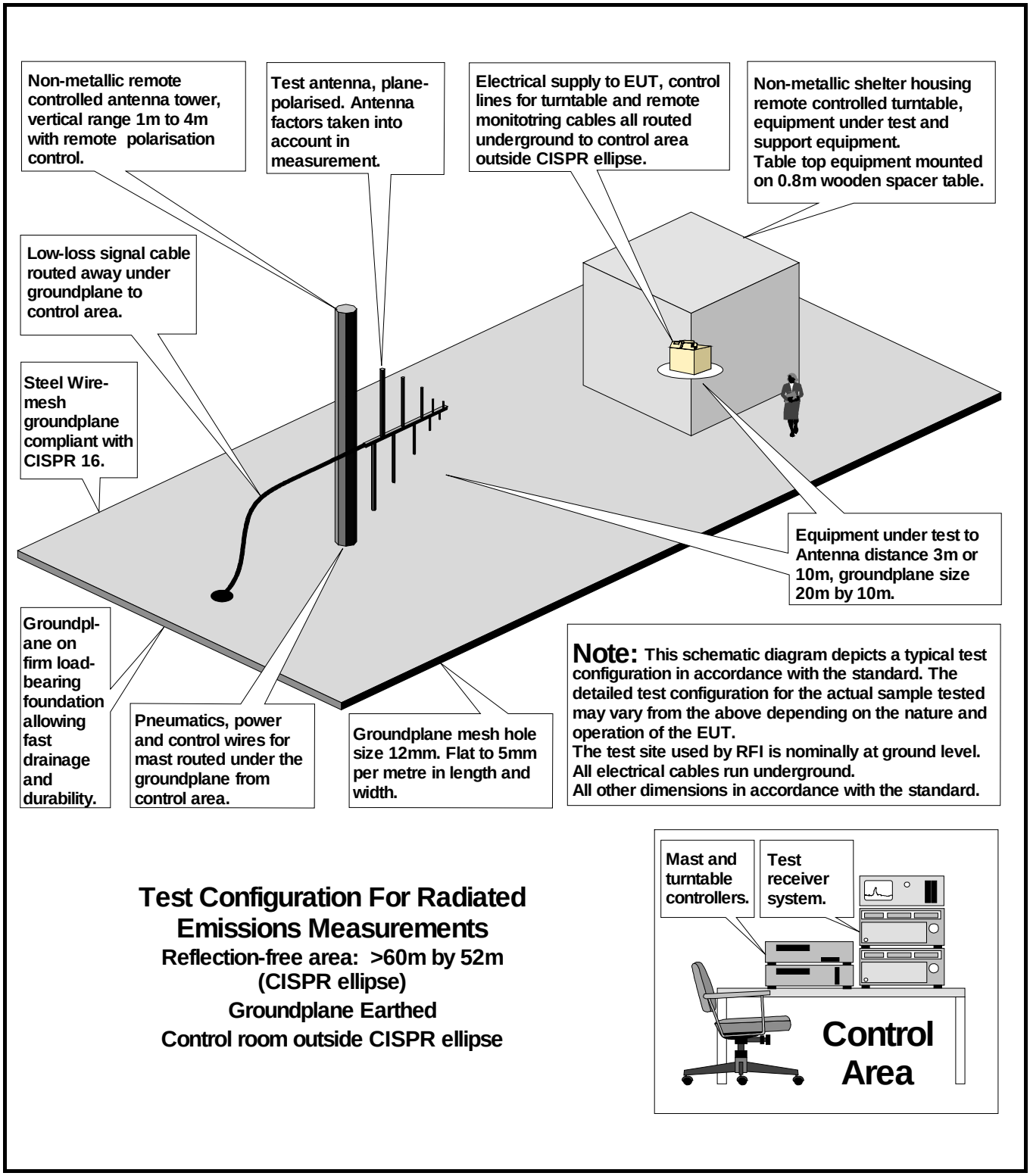
DRG\73402JD05\EMIRAD



Test Configuration For Radiated Emissions Measurements

Reflection-free area: >60m by 52m (CISPR ellipse)

Groundplane Earthed

Control room outside CISPR ellipse