Excellence in Compliance Testing

Certification Test Report

FCC ID: TFT-IDL300

FCC Rule Part: 15.225
IC Radio Standards Specification: RSS-210

ACS Report Number: 11-0217.W03.13.A

Manufacturer: MaxID Corp.
Model: iDL300

Test Begin Date: June 28, 2011
Test End Date: July 20, 2011

Report Issue Date: October 21, 2011

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Prepared by: _____

Kirby Munroe
Director, Wireless Certifications
ACS, Inc.

This report contains 20 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 Product description

The iDL300 is a Multifunctional Mobile Computer. The iDL300 contains an 802.11b/g and Bluetooth composite module, a GSM/UMTS module, a GPS receiver and 13.56MHz RFID / smartcard reader. This report applies to the 13.56MHz RFID / smartcard reader under FCC Rule Part 15.225 and RSS-210. All other radio devices are covered under separate equipment authorizations.

Frequency Range: 13.56 MHz
Operating channels: 1
Modulation: AM
Battery Operating Voltage: 3.5Vdc to 4.2Vdc
AC/DC Adaptor Operating Voltage: 12Vdc

Applicant Information:
MaxID Corp.
4445 Corporation Lane
Suite 233
Virginia Beach, VA. 23462

Test Sample Serial Number(s):
IDT00022

Test Sample Condition:
The test sample was provided in working order with no visible defects.

1.3 Test Methodology and Considerations

The iDL300 can also be used in multiple orientations therefore radiated emissions were evaluated with the device positioned in the x, y, and z planes with worst case data presented in this report. All iDL300 input and output ports were declared as diagnostic ports and not populated for emissions testing.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 200612-0. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment.

FCC Registration Number: 511277
Industry Canada Lab Code: IC 4175A-1
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

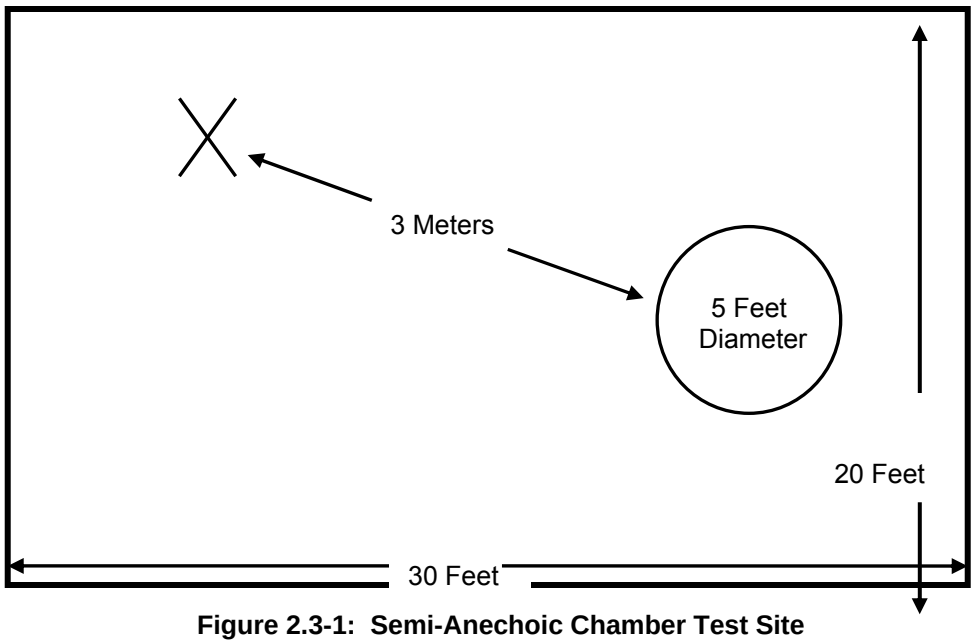

Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

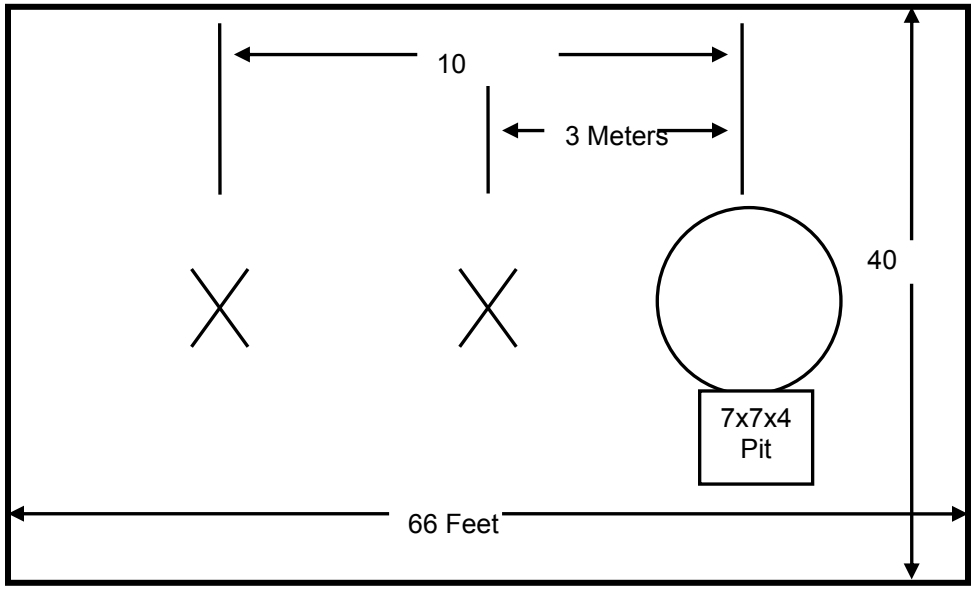

Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 4.1.3-1:

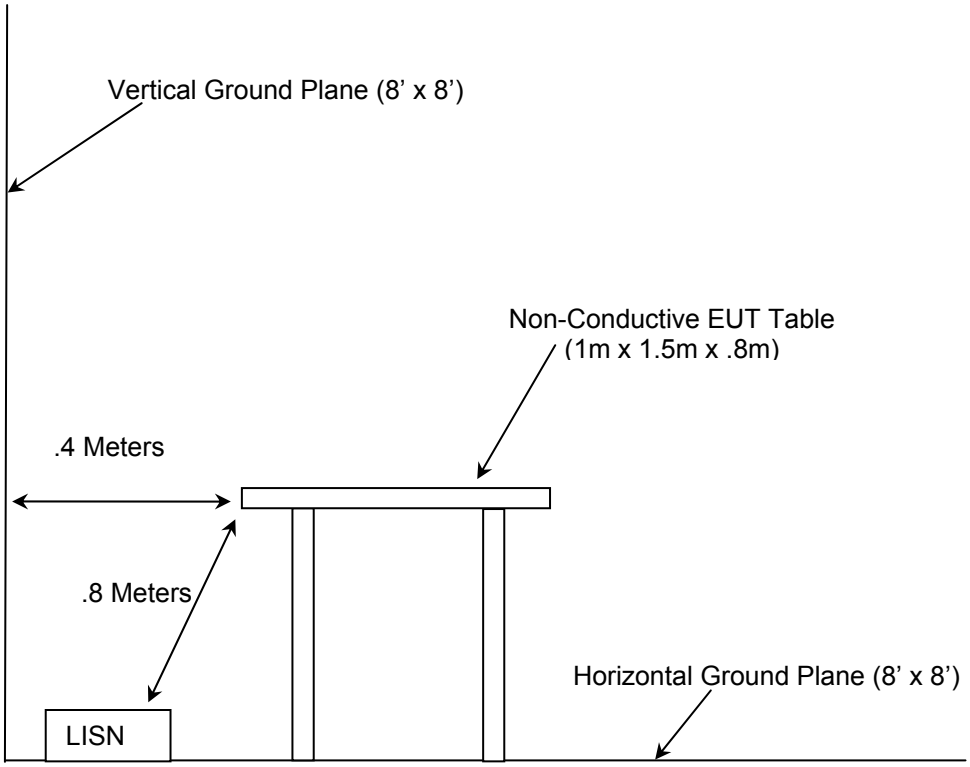

Figure 2.4-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2011
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2011
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8, Dec 2010
- Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 3, Dec 2010.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
1	Rohde & Schwarz	ESM - Display	Spectrum Analyzers	833771/007	9/23/2010	9/23/2012
2	Rohde & Schwarz	ESM-Receiver	Spectrum Analyzers	839587/003	9/23/2010	9/23/2012
3	Rohde & Schwarz	ESM - Display	Spectrum Analyzers	839379/011	5/26/2011	5/26/2013
4	Rohde & Schwarz	ESM-Receiver	Spectrum Analyzers	833827/003	5/26/2011	5/26/2013
25	Chase	CBL6111	Antennas	1043	9/13/2010	9/13/2012
73	Agilent	8447D	Amplifiers	2727A05624	3/21/2011	3/21/2012
78	EMCO	6502	Antennas	9104-2608	1/31/2011	1/31/2013
140	Thermotron	SM-16C	Environmental Chamber	19639	8/31/2010	8/30/2011
152	EMCO	3825/2	LISN	9111-1905	11/2/2010	11/2/2012
167	ACS	Chamber EMI Cable Set	Cable Set	167	1/26/2011	1/26/2012
168	Hewlett Packard	11947A	Attenuators	44829	2/4/2011	2/4/2012
193	ACS	OATS Cable Set	Cable Set	193	1/6/2011	1/6/2012
277	EMCO	93146	Antennas	9904-5199	8/25/2010	8/25/2012
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	8/31/2010	8/31/2011
324	ACS	Belden	Cables	8214	7/9/2010	7/9/2011
324	ACS	Belden	Cables	8214	7/6/2011	7/6/2012
RE 40	Agilent Technologies	E7405A	Spectrum Analyzers	US39150132	7/20/2010	7/20/2011

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	Power Supply	CUI Inc	3A-621DN15	N/A

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

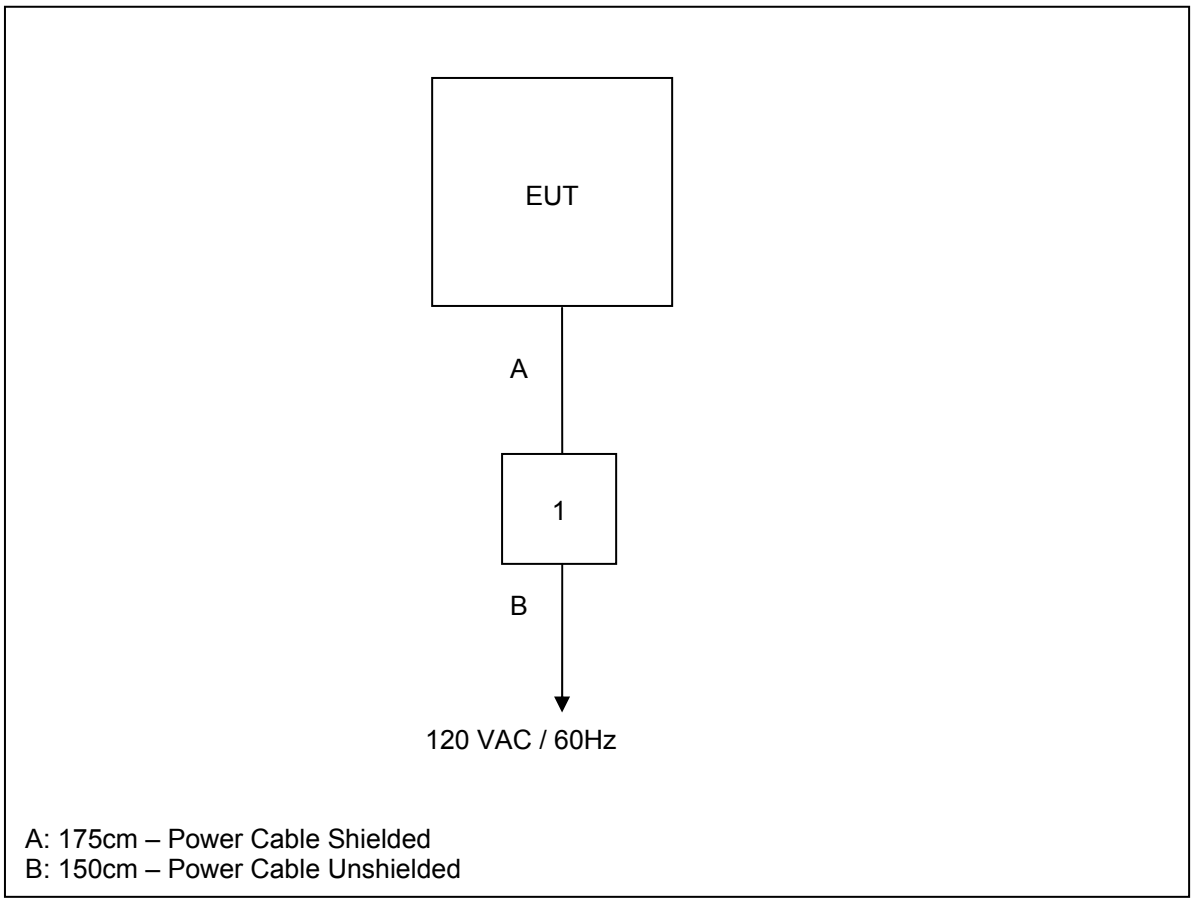

Figure 6-1: EUT Test Setup

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: CFR 47 Part 15.203

The EUT utilizes an integral loop antenna which cannot be removed or modified without damaging or destroying the device therefore meeting the requirements of 15.203.

7.2 Power Line Conducted Emissions – FCC: CFR 47 Part 15.207/ IC RSS-GEN 7.2.4

7.2.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Measurement Results

Results of the test are shown below in and Table 7.2.2-1 to 7.2.2.2.

Table 7.2.2-1: Line 1 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.192	42.90	9.9	64	21.0	L1	FLO	QP
0.36	21.40	10	59	37.3	L1	FLO	QP
0.636	30.70	10	56	25.3	L1	FLO	QP
1.992	21.80	10	56	34.2	L1	FLO	QP
2.37	21.20	10	56	34.8	L1	FLO	QP
4.41	21.60	10	56	34.4	L1	FLO	QP
4.452	21.70	10	56	34.3	L1	FLO	QP
4.8	20.90	10	56	35.1	L1	FLO	QP
13.428	19.50	9.9	60	40.5	L1	FLO	QP
13.56*	60.20	9.9	60	-0.2	L1	FLO	QP
0.222	21.60	9.9	53	31.1	L1	FLO	AVG
0.36	12.30	10	49	36.4	L1	FLO	AVG
0.63	24.4	10	46	21.6	L1	FLO	AVG
1.98	14.80	10	46	31.2	L1	FLO	AVG
2.382	14.60	10	46	31.4	L1	FLO	AVG
4.32	14.90	9.9	46	31.1	L1	FLO	AVG
4.50	15.70	10	46	30.3	L1	FLO	AVG
4.824	15.40	10	46	30.6	L1	FLO	AVG
13.332	11.30	9.9	50	38.7	L1	FLO	AVG
13.56*	59	9.9	50	-9.0	L1	FLO	AVG

* Integral Antenna. Emission was below the noise floor of the measurement system when antenna was replaced with non-radiating load of equivalent impedance.

Table 7.2.2-2: Line 2 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.192	42.90	9.9	64	21.1	L2	FLO	QP
0.294	30.60	10	60	29.8	L2	FLO	QP
0.636	31.6	10	56	24.4	L2	FLO	QP
4.41	22	10	56	34	L2	FLO	QP
8.334	24.5	9.9	60	35.5	L2	FLO	QP
8.646	24.90	9.9	60	35.1	L2	FLO	QP
8.898	25.10	9.9	60	35	L2	FLO	QP
9.132	24.80	9.9	60	35.2	L2	FLO	QP
9.438	25.2	9.9	60	34.8	L2	FLO	QP
13.56*	61.70	9.9	60	-1.7	L2	FLO	QP
0.228	21.40	9.9	53	31.2	L2	FLO	AVG
0.294	21.90	10	50	28.6	L2	FLO	AVG
0.660	22.60	10	46	23.4	L2	FLO	AVG
4.458	15.60	10	46	30.4	L2	FLO	AVG
8.346	19.20	9.9	50	30.8	L2	FLO	AVG
8.670	19.40	9.9	50	30.6	L2	FLO	AVG
8.958	20	9.9	50	30	L2	FLO	AVG
9.066	19.70	9.9	50	30.3	L2	FLO	AVG
9.426	20.30	9.9	50	29.7	L2	FLO	AVG
13.56*	60.50	9.9	50	-10.5	L2	FLO	AVG

* Integral Antenna. Emission was below the noise floor of the measurement system when antenna was replaced with non-radiating load of equivalent impedance.

7.3 Radiated Emissions – Intentional Radiation

7.3.1 In-Band Emissions Limitations – FCC Part 15.225(a),(b),(c) / IC RSS-210 A2.6

7.3.1.1 Measurement Procedure

Measurements below 30MHz were performed in a semi-anechoic chamber with a 3 meter separation distance between the EUT and measurement antenna. The EUT was rotated 360º and the loop antenna rotated about the vertical axis to maximize each emission. The magnetic loop receiving antenna was positioned with its center 1 meter above the ground.

The spectrum analyzer's resolution and video bandwidths were set to 9 kHz and 30 kHz respectively. A peak detector was used which shows worst case. The measurements were corrected by a distance correction factor, antenna correction factors, and cable loss for comparison to the limits. Sample correction factors and calculations can be found section 7.3.2.2 and 7.3.2.4.

7.3.1.2 Measurement Results

Compliance with the emissions levels are shown in figures 7.3.1.2-1 to 7.3.1.2-3 below.

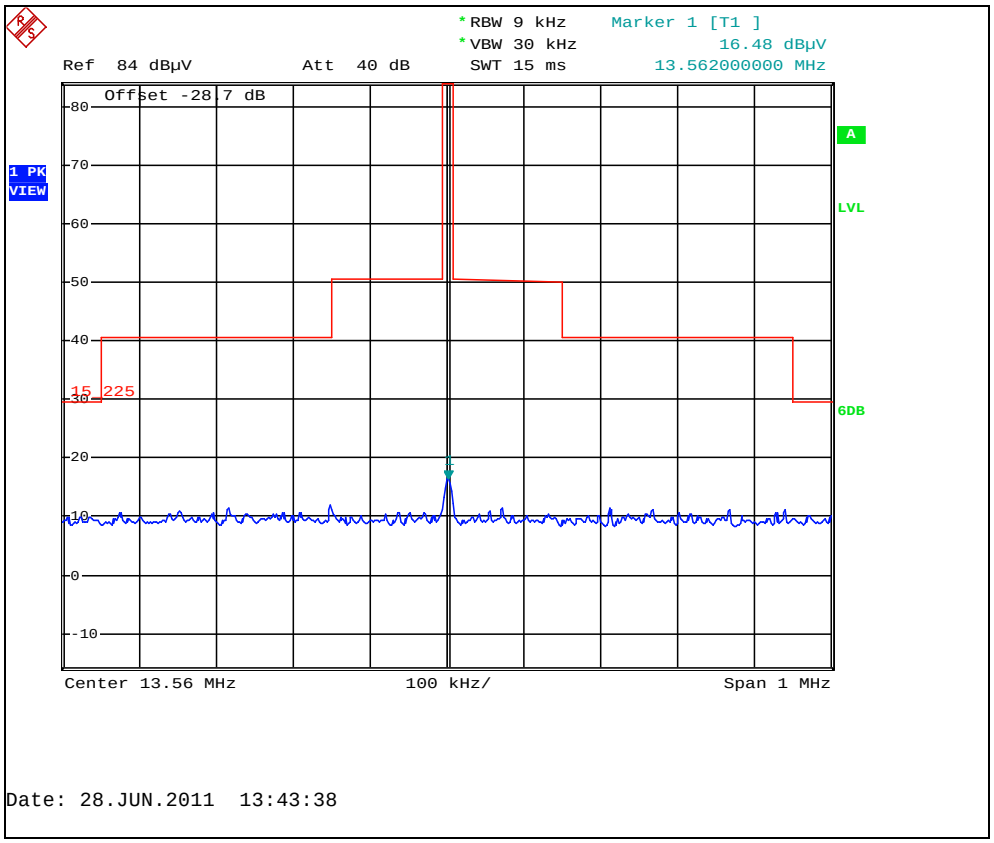

Figure 7.3.1.2-1: Emission Mask Plot – X Orientation

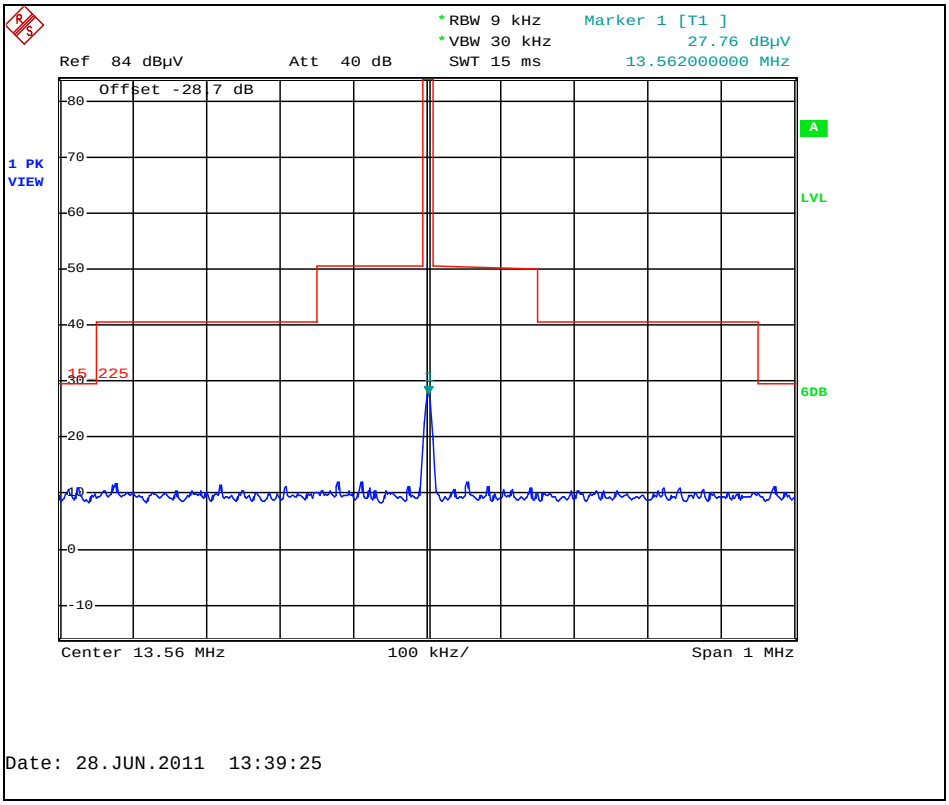

Figure 7.3.1.2-2: Emission Mask Plot – Y Orientation

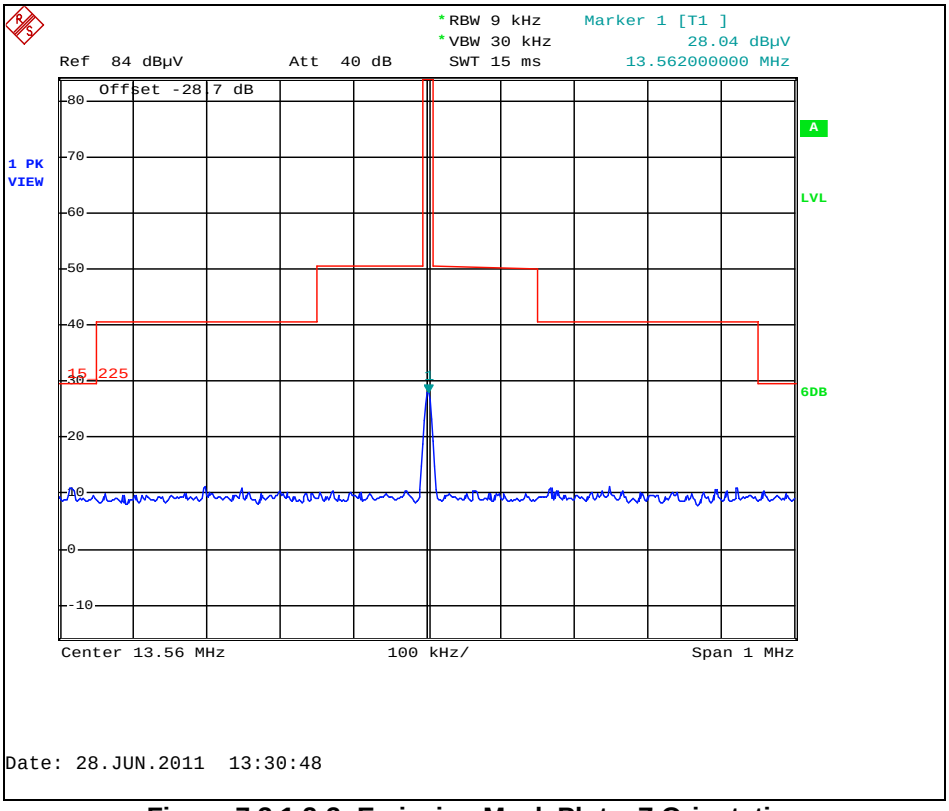

Figure 7.3.1.2-3: Emission Mask Plot – Z Orientation

7.3.2 Out-of-Band Emissions – FCC Part 15.225(d), 15.209, 15.109 / IC RSS-210 2.5

7.3.2.1 Measurement Procedure

Section 15.33(a)(4) specifies, if the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to frequency specified in 15.33(b)(1) for unintentional radiators. The upper frequency range for the digital device is 1000MHz which greater than the 10th harmonic of the fundamental frequency. The upper frequency range measured was 1000MHz.

Measurements below 30MHz were performed in a semi-anechoic chamber with a 3 meter separation distance between the EUT and measurement antenna. The EUT was rotated 360º and the loop antenna rotated about the vertical axis to maximize each emission. The magnetic loop receiving antenna was positioned with its center 1 meter above the ground.

For measurements in the frequency bands 9-90 kHz and 110-490 kHz, an average detector was used. When average measurements are specified, the peak emissions were also compared to a limit corresponding to 20 dB above the maximum permitted average limit according to Part 15.35. All other emissions were measured using a Quasi-peak detector. The final measurements were then corrected by a distance correction factor, antenna correction factors, and cable loss for comparison to the limits.

Measurements above 30MHz were performed in a semi-anechoic chamber with a 3 meter separation distance between the EUT and measurement antenna. The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made.

The spectrum analyzer's resolution bandwidth was set to equal to or greater than 100 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz, 120 kHz from 30 MHz to 1000 MHz, and 1 MHz from 1 GHz to 40 GHz.

7.3.2.2 Distance Correction for Measurements Below 30 MHz – Part 15.31

Radiated measurements were performed at a distance closer than 30m as required according to Part 15.209. Therefore a correction factor was applied to account for propagation loss at the specified distance. The propagation loss was determined by using the square of an inverse linear distance extrapolation factor (40dB/decade) according to 15.31. A sample calculation of the distance correction factor is shown below for limits expressed at a 30m measurement distance.

Distance correction factor (30m Specified Test Distance) = 40*Log (Test Distance/30)
= 40*Log (3/30)
= - 40 dB

7.3.2.3 Measurement Results

Radiated spurious emissions found are reported in Table 7.3.2.3-1.

Table 7.3.2.3-1: Radiated Spurious Emissions

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
146.81	---------	39.60	H	-13.84	---------	25.76	--------	43.5	---------	17.7
384.07	---------	49.53	H	-7.76	---------	41.77	--------	46.0	---------	4.2
519.98*	---------	36.70	V	-4.20	---------	32.50	--------	35.5	---------	3.0
728.4	---------	41.51	H	-0.47	---------	41.04	--------	46.0	---------	5.0
831.87	---------	30.67	V	1.77	---------	32.44	--------	46.0	---------	13.6
843.72	---------	25.38	H	1.20	---------	26.58	--------	46.0	---------	19.4

* Spurious emission associated with the digital device is above the 10th harmonic of the fundamental emission was measured at 10m and compared to the Part 15.109 Class A emission limits.

7.3.2.4 Sample Calculation

Limit < 30MHz

Limit (dBuV/m) = 20*log(30) - Distance Correction Factor (Section 7.3.2.2)
Limit (dBuV/m) = 29.5 + 40
Limit (dBuV/m) = 69.5

Field Strength

$R_C = R_U + CF_T$

Where:
CF_T = Total Correction Factor (AF+CA+AG)
R_U = Uncorrected Reading
R_C = Corrected Level
AF = Antenna Factor
CA = Cable Attenuation
AG = Amplifier Gain

Corrected Level: 39.60 - 13.84 = 25.76dBuV
Margin: 43.5dBuV – 25.76dBuV = 17.7dB

7.4 Occupied Bandwidth – FCC Part 15.215(c) / IC RSS-Gen 4.6.1

7.4.1 Measurement Procedure

The spectrum analyzer span was set to 2 to 5 times the estimated bandwidth of the emission. The RBW was to ≥ 1% of the estimated bandwidth. The trace was set to max hold with a peak detector active. The measurement function of the analyzer was utilized to determine the 99% occupied bandwidth.

7.4.2 Measurement Results

The results are shown in Figure 7.4.2-1 and 7.4.2-2.

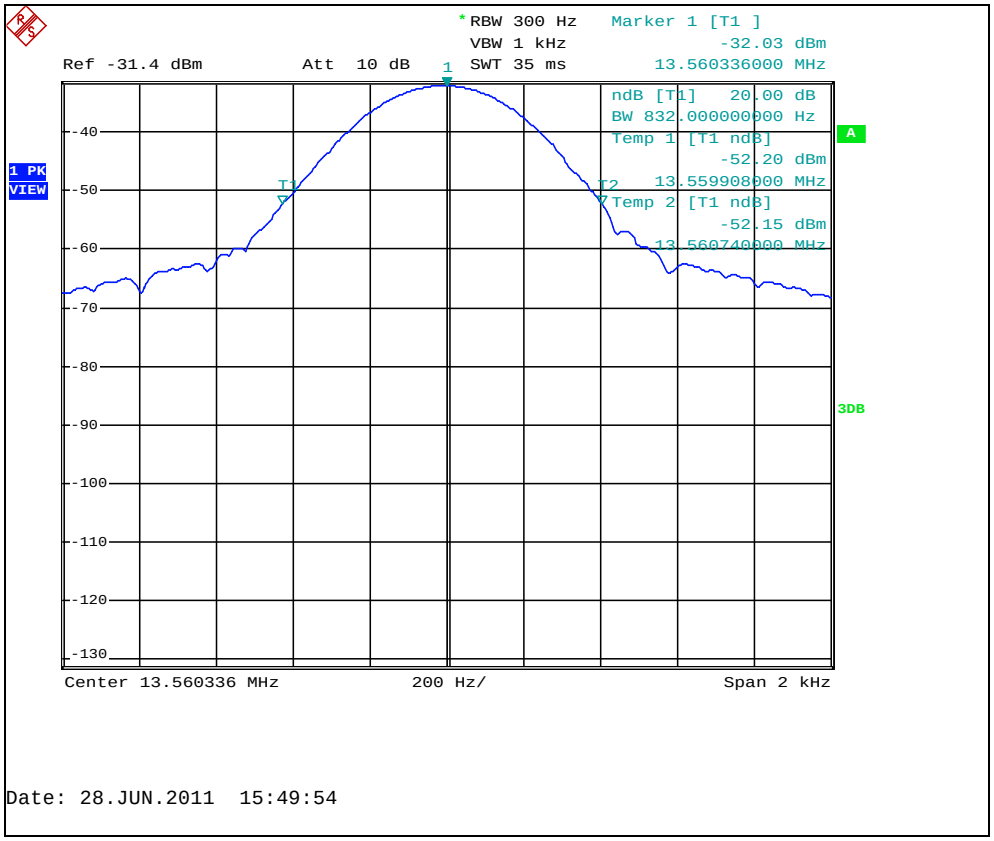

Figure 7.4.2-1: Occupied Bandwidth – 20dB

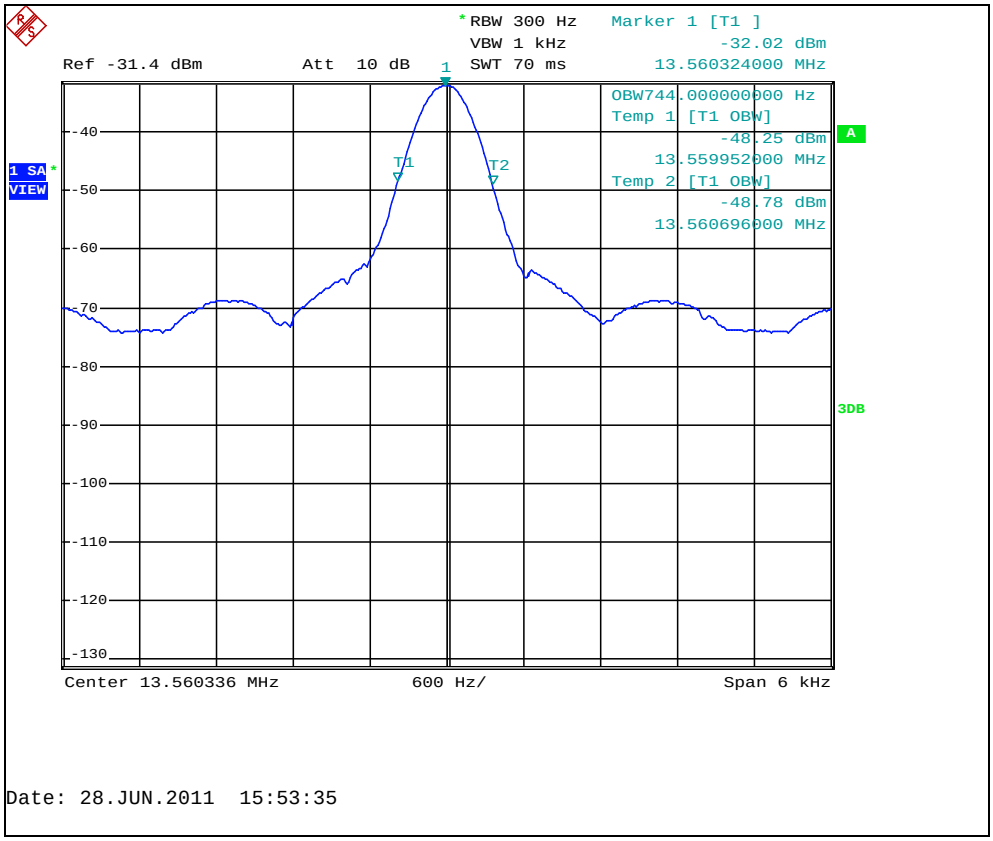

Figure 7.4.2-2: Occupied Bandwidth – 99%

7.5 Frequency Stability – FCC CFR 47 Part 15.225(e) / IC RSS-210 A2.6

7.5.1 Measurement Procedure

The equipment under test is placed inside an environmental chamber. The RF output is coupled to the input of the measurement equipment via a near field probe.

Frequency measurements were made at the extremes of the of temperature range -20º C to +50º C and at intervals of 10º C at normal supply voltage. A period of time sufficient to stabilize all components of the equipment was allowed at each frequency measurement. The maximum variation of frequency was recorded. The limit from rule part 15.225 is 0.01% or 100ppm.

The EUT can be battery operated or operated using a 15VDC power supply. Measurements were made at nominal and endpoint battery voltages as well as variations of 85% and 115% of the power supply voltage.

7.5.2 Measurement Results

Results of the test are shown below in Table 7.5.2-1 and Figure 7.5.2-1.

Table 7.5.2-1: Frequency Stability

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-20 C	**13.560372**	**27.434**	100%	3.6 (Nom Battery)
-10 C	**13.560367**	**27.065**	100%	3.6 (Nom Battery)
0 C	**13.560363**	**26.770**	100%	3.6 (Nom Battery)
10 C	**13.560355**	**26.180**	100%	3.6 (Nom Battery)
20 C	**13.560341**	**25.147**	100%	3.6 (Nom Battery)
30 C	**13.560316**	**23.304**	100%	3.6 (Nom Battery)
40 C	**13.560299**	**22.050**	100%	3.6 (Nom Battery)
50 C	**13.560293**	**21.608**	100%	3.6 (Nom Battery)
20 C	**13.560340**	**25.074**	85%	10.2 (Power Supply)
20 C	**13.560341**	**25.147**	115%	13.8 (Power Supply)
20 C	**13.560340**	**25.074**	67%	3.5 (Endpoint Battery)

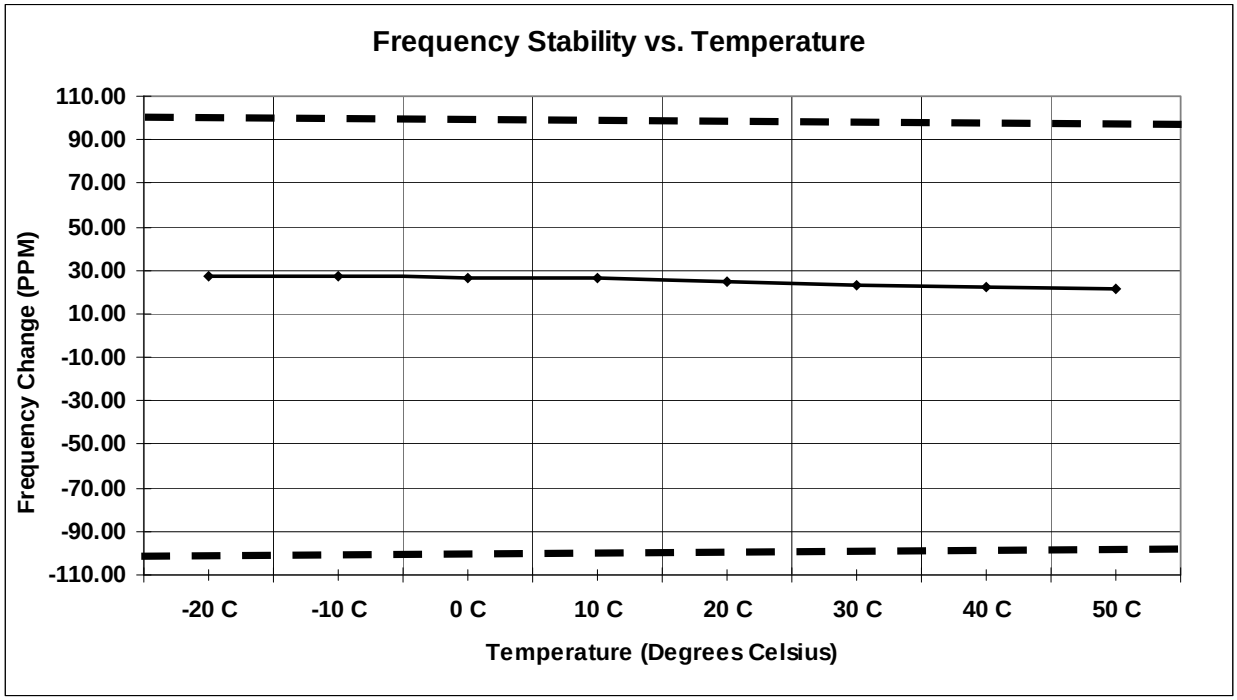

Figure 7.5.2-1: Frequency Stability

8 CONCLUSION

In the opinion of ACS, Inc. the iDL300 manufactured by MaxID Corp. met the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT