

FCC ID: N74-OMNIGTW

IC: 10336A-OMNIGTW



Report No.:

31253104.005 OMNI-ID Gateway.doc

Page 1 of 35

Electromagnetic Compatibility Test Report

Prepared in accordance with

FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10

On

OMNI-ID Gateway

OMNI-GTW

OMNI-ID
1200 Ridgeway Avenue
Rochester, NY 14615

Prepared by:

TUV Rheinland of North America, Inc.

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TUV Rheinland of North America, Inc., 336 Initiative Drive, Rochester NY 14624. Tel: 585-426-5555, Fax: 585-568-8338

MS-0005239

Version 3.0

MANUFACTURERS STATEMENT

**Manufacturer's statement - attestation**

The manufacturer; Omni-ID, as the responsible party for the equipment tested, hereby affirms:

- a) That he has reviewed and concurs that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;
- b) That the device in this test report will be representative of production units;
- c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.
- d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.

Ed Nabrotzky

Printed name of official

1200 Ridgeway Ave
Suite 106
Rochester, NY 14615

Address

(585) 697-9913

Telephone number


Signature of official

16 MAY 2013

Date

ed.nabrotzky@omni-id.com

Email address of official

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Client:	OMNI-ID 1200 Ridgeway Avenue Rochester, NY 14615	Contact: Len Desmond Tel: 585-713-1021 Fax: 585- e-mail len.desmond@omni-id.com					
Identification:	OMNI-ID Gateway	Serial No.: TS-1					
Test item:	Model OMNI-GTW	Date Test Completed: 5/10/2014					
Testing location:	TUV Rheinland of North America 336 Initiative Drive Rochester, NY 14624-6217 U.S.A.	Tel: (585) 426-5555 Fax: 585-568-8338					
Test specification:	Emissions: FCC Part 15.231 Radiated Emissions Std FCC Part 15.209 and RSS - 210 Issue 8, FCC Part 15.231(b) and RSS - 210 Issue 8, FCC Part 15.231(c) and RSS - 210 Issue 8						
Test Result:	The above product was found to be Compliant to the above test standard(s)						
tested by: Randall Masline	reviewed by: Cecil Gittens						
<u>11 August 2014</u>	<u>Date</u>	<u>Name</u>	<u>Signature</u>	<u>11 August 2014</u>	<u>Date</u>	<u>Name</u>	<u>Signature</u>
Other Aspects:	None						
Abbreviations:	OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable						
US5253	  Testing Cert.# 3331.04	Industry Canada 3466C-1	VCCI A-0037	BSMI SL2-IN-E-050R			

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1 General Information

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10 based on the results of testing performed on 5/10/2014 on the OMNI-ID Gateway, Model Number. OMNI-GTW, manufactured by OMNI-ID. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Additional Antenna's tested with EUT

The 3 antennas provided for testing and certification were all used in field strength measurements, and the Patch antenna was used for the remainder of the emissions testing.

The Patch antenna had the highest Field Strength

An MTI Wireless Edge, MT – 182018/NLH 4 dBi Patch antenna

Taoglas Dipole antenna, peak gain of -4.7 dBi gain

Antenna Factor ANT-433-MHW-xxx-x Dipole (x's indicate type of connector and length of cable)

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FCC ID: N74-OMNIGTW**IC: 10336A-OMNIGTW****Report No.:****31253104.005 OMNI-ID Gateway.doc****Page 6 of 35****1.4 Summary of Test Results**

Applicant	OMNI-ID 1200 Ridgeway Avenue Rochester, NY 14615	Tel	585-713-1021	Contact	Len Desmond
		Fax	585-	e-mail	len.desmond@omni-id.com
Description	OMNI-ID Gateway	Model Number	OMNI-GTW		
Serial Number	TS-1	Test Voltage/Freq.	120VAC/60Hz		
Test Date Completed:	5/10/2014	Test Engineer	Randall Masline		
Standards	Description	Severity Level or Limit		Measured	Test Result
FCC Part 15 subpart C Standard	Radio Frequency Devices - Subpart C: Intentional Radiators	See called out parts below		See Below	Complies
RSS-210 Issue 8 Standard	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment	See called out parts below		See Below	Complies
FCC Part 15.231	Periodic operation in the band 260 Mhz to 470 Mhz	See Basic Standards Below		See Below	Complies
FCC Part 15.209 and RSS - 210 Issue 8	Radiated Emissions	Class B, 30 - 1000 MHz Spurious up to 2500 Mhz		Limit	Complies
FCC Part 15.231(a)	Deactivation of Transmitter	5 Seconds, 433 MHz		No Manual Switch	NA
FCC Part 15.231(b) and RSS - 210 Issue 8	Field Strength of Fundamental and Spurious Emissions	15.231(b) Table Limit is 80.8 dBuV at 433 MHz without Duty Cycle		103.58 dBuV Field Strength of Fundamental	Complies
FCC Part 15.231(c) and RSS - 210 Issue 8	Bandwidth	Part 15.231(c) RSS - 210	1082.5 kHz 99% BW	470.9 kHz 390.78 kHz	Complies

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2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at, 336 Initiative Drive, Rochester, NY 14624-6217 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90575). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.2 A2LA

This is a program which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code: 134287). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 VCCI

VCCI Accredited test lab. Registration numbers A-0037, R-3673, C-4113, C-4114, C-4115, T-1158, T-1159 G429.

2.1.4 Industry Canada

(Registration No.: 3466C-1) The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2009.

2.1.5 BSMI

Registration No.: SL2-IN-E-050R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

2.1.6 Korea

Recognized by Radio Research Agency as an accredited Conformity Assessment Body (CAB) under the terms of Phase I of the APEC TEL.

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2.1.7 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB μ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

2.2 Measurement Uncertainty Emissions

	U_{lab}	U_{cispr}
Radiated Disturbance @ 10m		
30 MHz – 1,000 MHz	4.57 dB	5.2 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	2.62 dB	3.6 dB
Disturbance Power		
30 MHz – 300 MHz	3.88 dB	4.5 dB

2.3 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

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2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Ref.	Serial #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Radiated Emissions							
Horn	EMCO	3115	C025	9512-4630	20-Jul-12	20-Jul-13	RE
Horn	EMCO	3115	C031	9812-5635	23-Mar 12	23-Mar 14	RE
BiLog	Chase	CBL6111	C041	1170	12-Sept-12	12-Sept-14	RE
Analyzer w RF Filter Section 85460A	HP	8546A		3325A00134	11-Sept-12	11-Sept-13	RE
Receiver (20Hz-40GHz)	Rohde & Schwarz	ESI(B) 40	C320	839283/005	13-Sept-12	13-Sept-13	RE
Multimeter	Fluke	83	C437	48162892	13-Sept-12	13-Sept-13	RE
Amplifier (1-26.5 GHz.)	Agilent	8449B	C438	3008A01842	7-Nov-11	7-Nov-13	RE
BiLog	Chase	CBL6111B	C448	2081	22-Feb-12	22-Feb-14	RE
Receiver	Agilent	N9038A	C325	MY52130004	1-May-12	1-May 13	RE
Pressure/Temperature/RH	Extech	SD700	C482	Q668892	3-Oct-12	3-Oct-13	RE
General Laboratory Equipment							
Multimeter	Fluke	87	C445	59890224	13-Sept-12	13-Sept-13	
Multimeter	Fluke	8062A	C452	4715199	13-Sept-12	13-Sept-13	
Pressure/Temperature/RH	Extech	SD700	C481	Q668884	3-Oct-12	3-Oct-13	

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3 Product Information

3.1 Equipment Modifications

No modifications were needed to bring product into compliance.

3.2 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report.

The Interrogator operates on 110VAC/60Hz external power supply.

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Figure 1 – External Photo of EUT - Interrogator

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4 Emissions

4.1 Radiated Emissions

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

4.1.1 Over View of Test

Results	Complies (as tested per this report)				Date	5/1/2013		
Standard	FCC Part 15.209 and RSS - 210 Issue 8							
Product Model	OMNI-GTW			Serial#	TS-1			
Configuration	See test plan for details							
Test Set-up	Tested at 10m O.A.T.S. placed on turn-table at 3 meters, see test plans for details							
EUT Powered By	120VAC/60Hz	Temp	24°C	Humidity	52%	Pressure	1013mbar	
Frequency Range	30 - 1000 MHz @ 3m Spurious emissions to 2500 Mhz							
Perf. Criteria	Class B. (Below Limit)		Perf. Verification	Readings Under Limit				
Mod. to EUT	None		Test Performed By	Randall Masline				

4.1.2 Test Procedure

Radiated FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration. Further radiated emission tests were performed per the procedures stated in the other emissions standards listed in this report.

The frequency range from 30 - 1000 MHz was investigated for radiated emissions.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 10 m OATS, at a distance of 3 meters.

4.1.3 Deviations

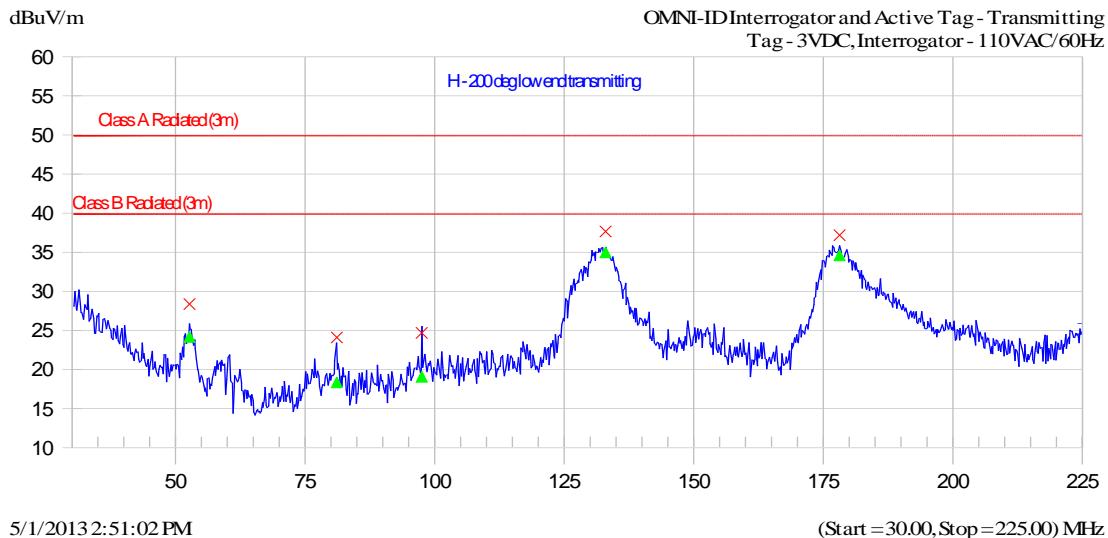
There were no deviations from the test methodology listed in the test plan for the radiated emission test.

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4.1.1 Prescan Graphs

NOTES:

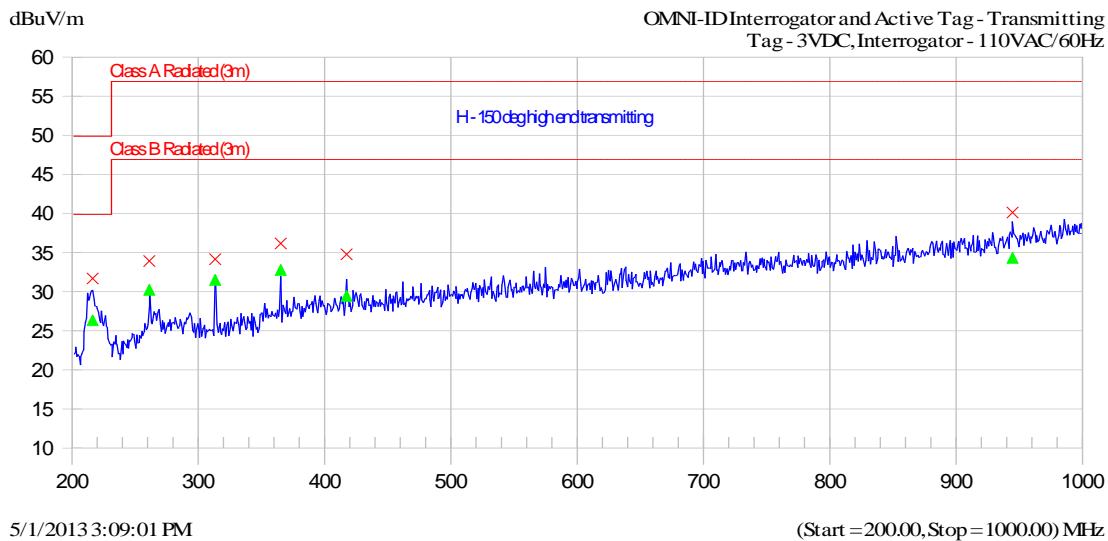
Radiated Emissions Prescan
 Vertical / Horizontal

H - 200 deg low end transmitting


Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
52.351	28.5	24.3	-15.7	-25.7	H - 200 deg low end transmitting
80.776	24.2	18.5	-21.5	-31.5	H - 200 deg low end transmitting
97.182	24.8	19.2	-20.8	-30.8	H - 200 deg low end transmitting
132.625	37.8	35.1	-4.9	-14.9	H - 200 deg low end transmitting
177.794	37.3	34.7	-5.3	-15.3	H - 200 deg low end transmitting

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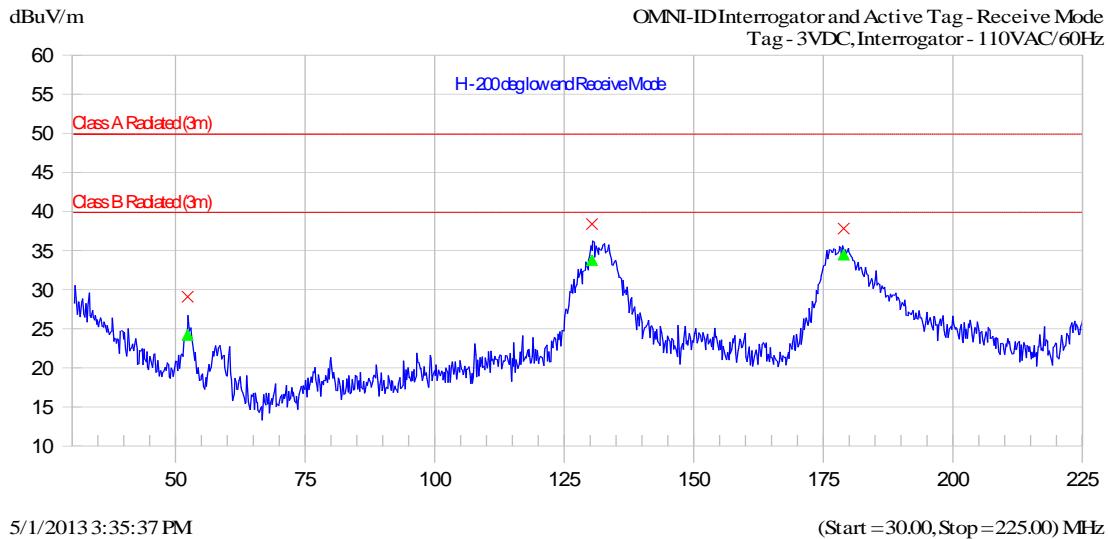
NOTES:

Radiated Emissions Prescan
 Vertical / Horizontal
H - 150 deg high end transmitting

Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
214.999	31.8	26.4	-13.6	-23.6	H - 150 deg high end transmitting
260.004	34.0	30.3	-16.7	-26.7	H - 150 deg high end transmitting
311.993	34.2	31.6	-15.4	-25.4	H - 150 deg high end transmitting
364.010	36.3	32.9	-14.1	-24.1	H - 150 deg high end transmitting
416.033	34.9	29.6	-17.4	-27.4	H - 150 deg high end transmitting
943.260	40.2	34.4	-12.6	-22.6	H - 150 deg high end transmitting

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NOTES:

Radiated Emissions Prescan
 Vertical / Horizontal
H - 200 deg low end Receive Mode

Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
52.026	29.2	24.3	-15.7	-25.7	H - 200 deg low end Receive Mode
130.014	38.5	33.9	-6.1	-16.1	H - 200 deg low end Receive Mode
178.606	37.9	34.6	-5.4	-15.4	H - 200 deg low end Receive Mode

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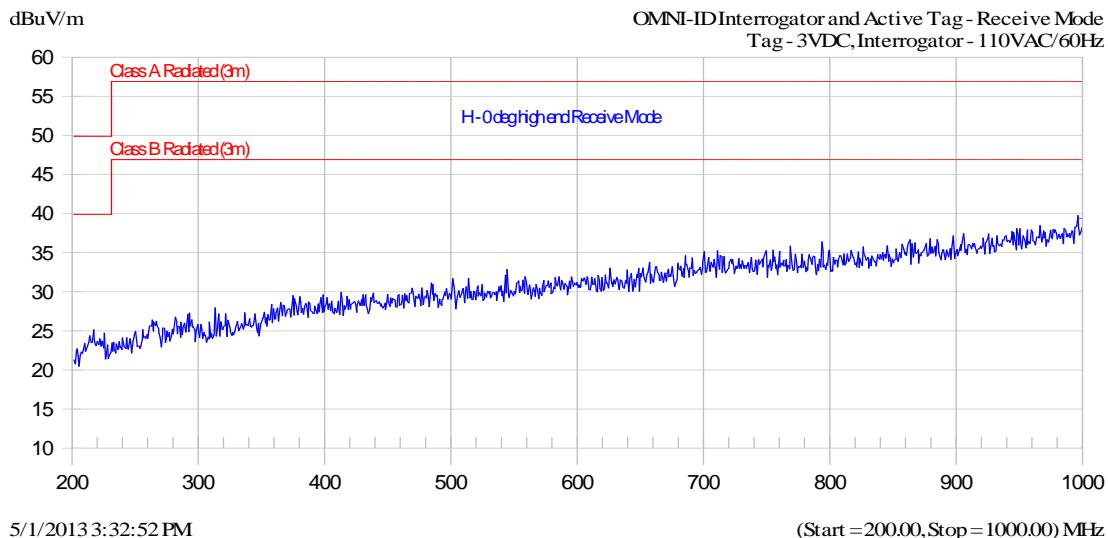
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NOTES:

Radiated Emissions Prescan
Vertical / Horizontal

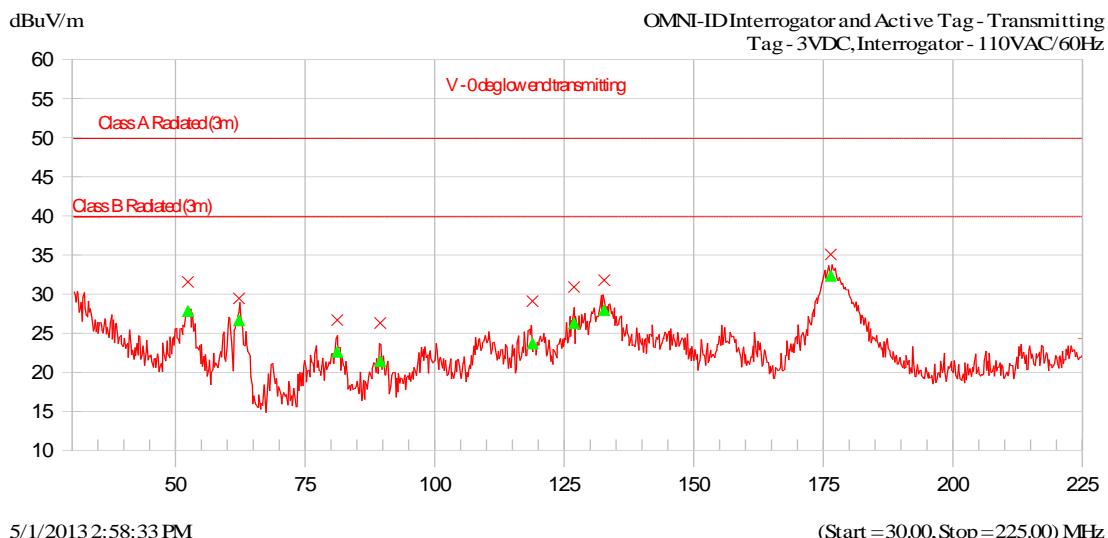
H - 0 deg high end Receive Mode



Frequency	Peak	QP	Class B-QP	Class A-QP	Trace Name
MHz	dBuV/m	dBuV/m	dB	dB	

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NOTES:

Radiated Emissions Prescan
 Vertical / Horizontal
V - 0 deg low end transmitting

Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
52.051	31.7	27.9	-12.1	-22.1	V - 0 deg low end transmitting
61.887	29.5	26.7	-13.3	-23.3	V - 0 deg low end transmitting
80.856	26.8	22.7	-17.3	-27.3	V - 0 deg low end transmitting
89.156	26.4	21.5	-18.5	-28.5	V - 0 deg low end transmitting
118.543	29.2	23.8	-16.2	-26.2	V - 0 deg low end transmitting
126.549	31.0	26.4	-13.6	-23.6	V - 0 deg low end transmitting
132.364	31.9	28.0	-12.0	-22.0	V - 0 deg low end transmitting
176.099	35.2	32.4	-7.6	-17.6	V - 0 deg low end transmitting

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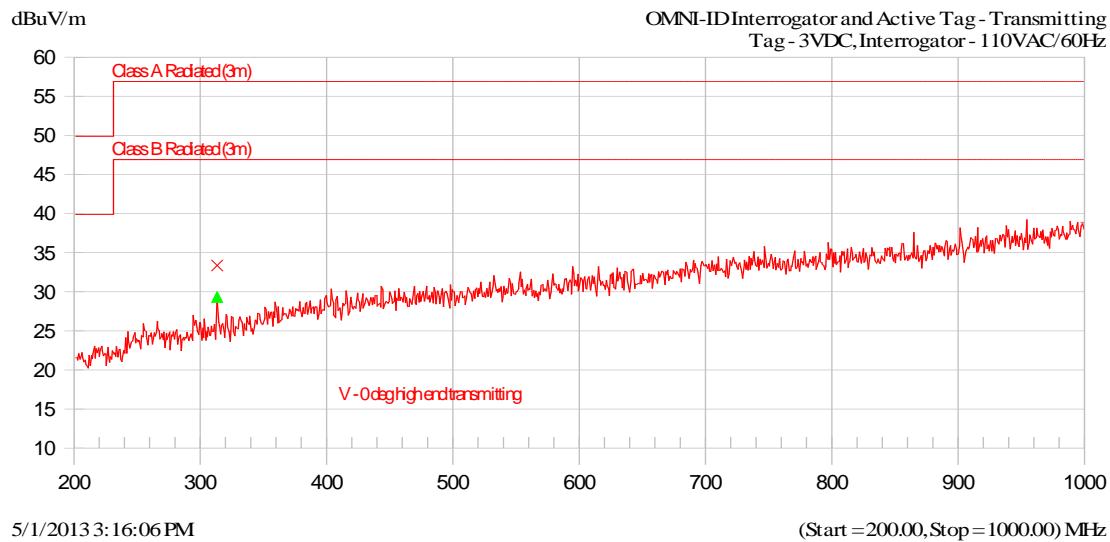
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NOTES:

Radiated Emissions Prescan

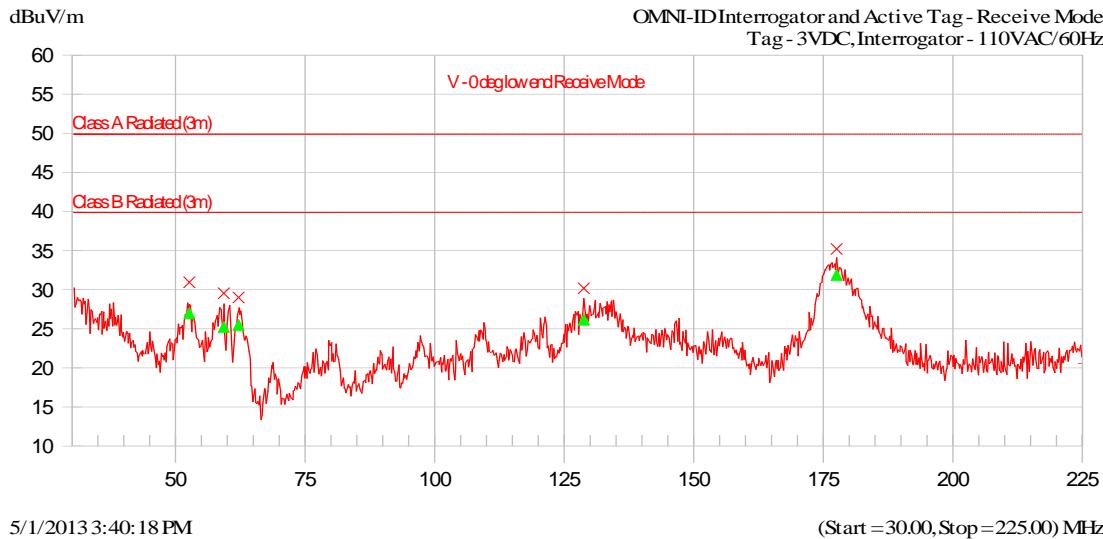
V - 0 deg high end transmitting



Frequency	Peak	QP	Class B-QP	Class A-QP	Trace Name
MHz	dBuV/m	dBuV/m	dB	dB	
312.023	33.5	29.4	-17.6	-27.6	V - 0 deg high end transmitting

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NOTES:

Radiated Emissions Prescan
Vertical / Horizontal
V - 0 deg low end Receive Mode

Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
52.313	31.1	27.1	-12.9	-22.9	V - 0 deg low end Receive Mode
58.980	29.6	25.3	-14.7	-24.7	V - 0 deg low end Receive Mode
61.818	29.1	25.6	-14.4	-24.4	V - 0 deg low end Receive Mode
128.435	30.3	26.2	-13.8	-23.8	V - 0 deg low end Receive Mode
177.233	35.3	32.0	-8.0	-18.0	V - 0 deg low end Receive Mode

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Report No.:

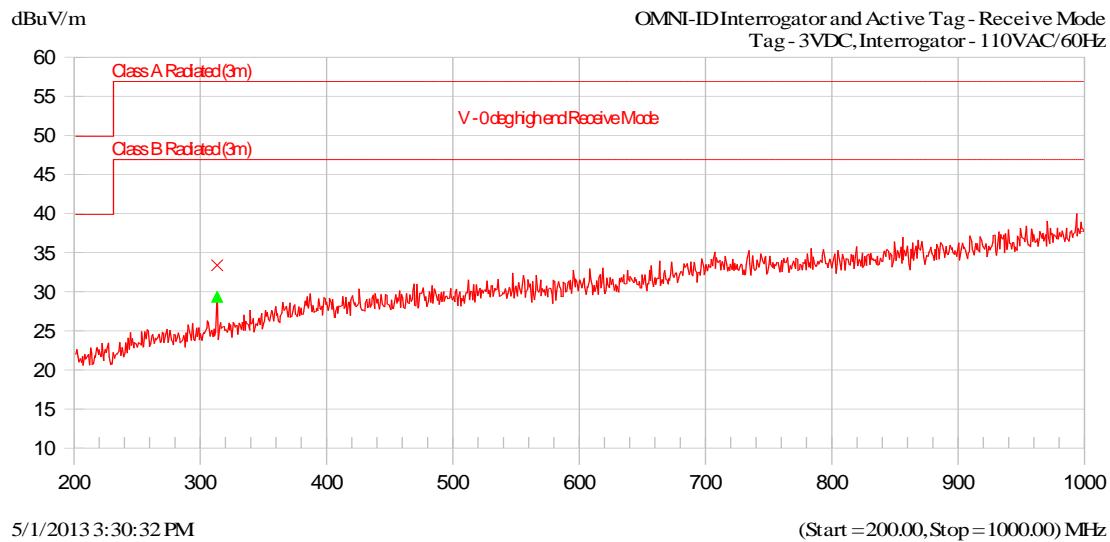
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NOTES:

Radiated Emissions Prescan
Vertical / Horizontal

V - 0 deg high end Receive Mode



Frequency MHz	Peak dBuV/m	QP dBuV/m	Class B-QP dB	Class A-QP dB	Trace Name
312.022	33.5	29.4	-17.6	-27.6	V - 0 deg high end Receive Mode

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4.1.1 Final Test

Standard:	Class B/FCC Part 15.209			final		Date:	6/18/2013		
Device Tested:	OMNI-ID			3		File .xls:			
	Measured Level								
Meas #	Freq (MHz)	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Δ	Result	Antenna Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	48.4570	26.50	40.00	-13.50	Complied	Vertical	270	1.00	
2	69.6950	35.50	40.00	-4.50	Complied	Vertical	270	1.00	Maximum Emissions
3	124.9920	23.30	40.00	-16.70	Complied	Vertical	270	1.00	
4	175.9450	20.40	40.00	-19.60	Complied	Vertical	270	1.00	
5	260.0040	27.50	47.00	-19.50	Complied	Horizontal	150	3.00	
6	311.9930	30.42	47.00	-16.58	Complied	Horizontal	150	3.00	

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4.2 Deactivation of Transmitter

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

4.2.1 Over View of Test

Results	NA (as tested per this report)			Date						
Standard	FCC Part 15.231(a)									
Product Model	OMNI-GTW		Serial#	TS-1						
Configuration	See test plan for details									
Test Set-up	Tested in anechoic chamber		EUT placed on table		see test plans for details					
EUT Powered By	120VAC/60Hz	Temp	°C	Humidity	%	Pressure	mbar			
Frequency Range	433 MHz									
Perf. Criteria	5 Seconds (Below Limit)	Perf. Verification								
Mod. to EUT	None	Test Performed By		Randall Masline						

4.2.2 Test Procedure

Testing was not performed. The EUT does not employ a manual switch – in normal operation of the device the active tag transmits once every 6 hours for a duration of 1.7ms for each transmission.

4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emission test.

4.2.4 Final Test

All final measurements were below (in compliance) the limits.

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4.3 Fundamental Field Strength and Harmonic Emissions

This test evaluates the field strength of the fundamental and field strength of the spurious emissions.

4.3.1 Test Over View

Results	Complies (as tested per this report)				Date	5/2/2013						
Standard	FCC Part 15.231(b) and RSS - 210 Issue 8											
Product Model	OMNI-GTW			Serial#	TS-1							
Configuration	See test plan for details											
Test Set-up	Tested in anechoic chamber		EUT placed on table	See test plan for details								
EUT Powered By	120VAC/60Hz	Temp	21° C	Humidity	48%	Pressure	1021mbar					
Perf. Criteria	15.231(b) Table (Below Limit)		Perf. Verification	Readings under Limit								
Mod to EUT	None		Test Performed By	Randall Masline								

4.3.2 Test Procedure

The EUT was placed on a table 3 meters from the antenna and all 3 orthogonal positions were investigated for highest field strength and highest spurious emissions. The fundamental frequency of the EUT is 433 MHz, therefore in addition to the requirements of 15.205 the EUT was tested to meet the following requirements in 15.231(b)

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70.....	2,250.....	225
70-130.....	1,250.....	125
130-174.....	\1\ 1,250 to 3,750	\1\ 125 to 375
174-260.....	3,750.....	375
260-470.....	\1\ 3,750 to 12,500.	\1\ 375 to 1,250
Above 470.....	12,500.....	1,250

4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the harmonic current emissions test.

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4.3.4 Final Test

All final measurements were below (in compliance) the limits.

4.3.5 Final Data

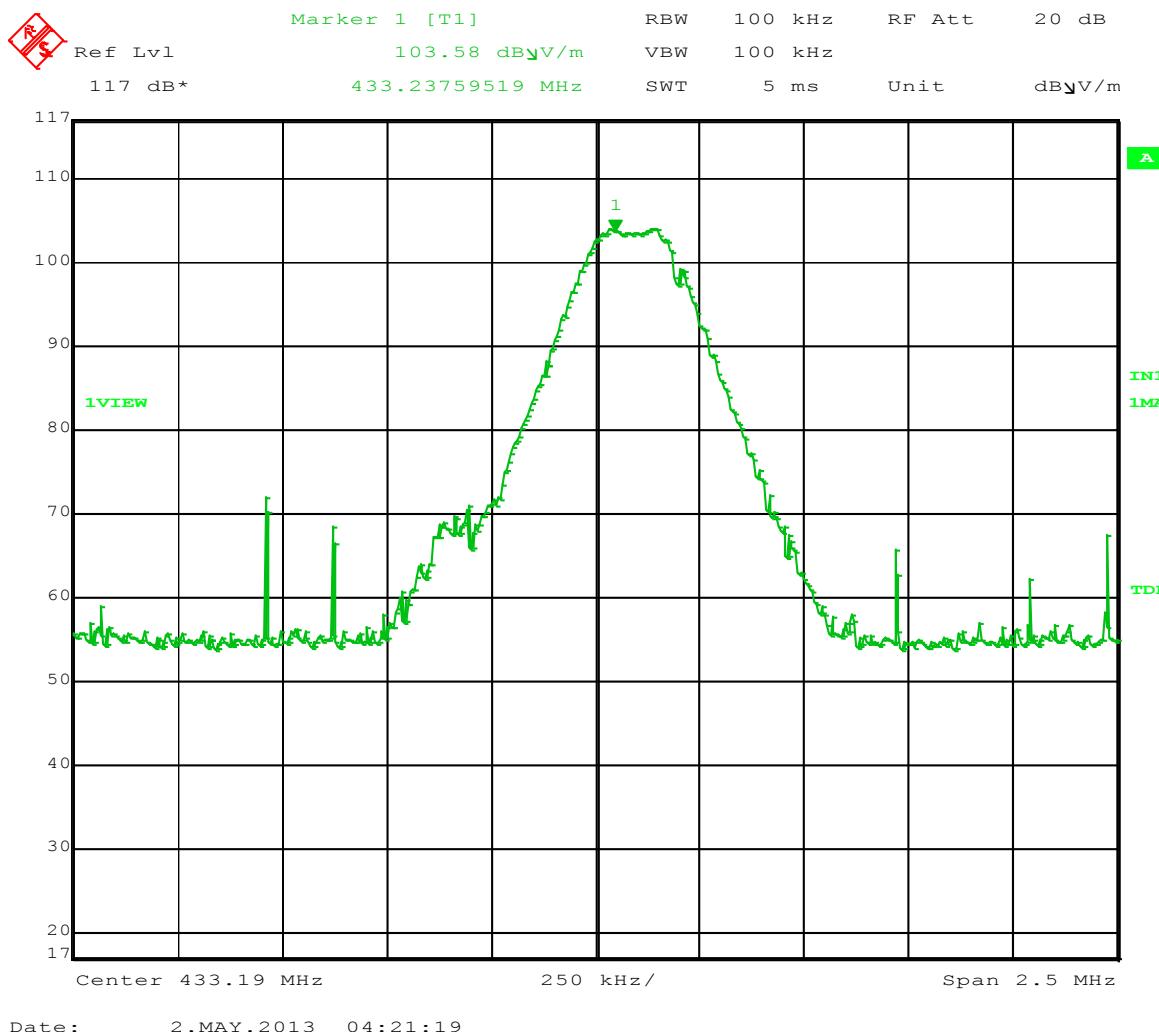


Figure 2 – Peak Field Strength is 103.58 dBuV at 3 meters, limit is 80.8 dBuV at 433 MHz

The Duty Cycle is < 0.1% therefore the duty cycle correction factor is as follows

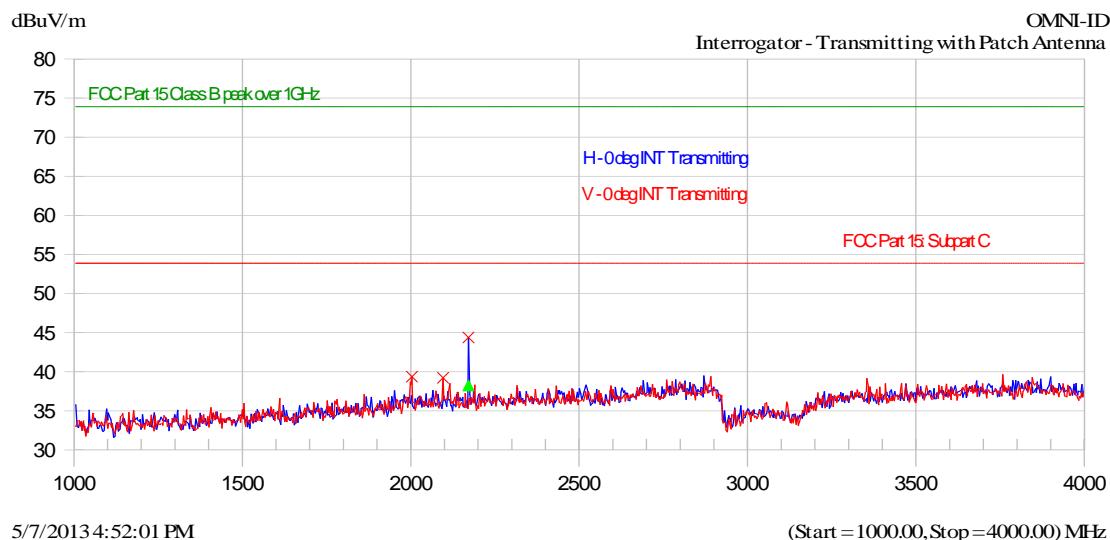
$$20 \log(0.017) = -35.09 \text{ dB}$$

Increasing the Peak limit from 80.8 dBuV + 35.09 = 115.89 dBuV

The Average Field Strength is 78.6 dBuV

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NOTES:

Radiated Emissions Prescan
Vertical / Horizontal
H/V - 0 deg INT Transmitting

Frequency	Peak	QP	Avg	Trace Name
MHz	dBuV/m	dBuV/m	dBuV/m	
2166.231	44.5	38.3		H - 0 deg INT Transmitting
1998.399	39.5	29.6		V - 0 deg INT Transmitting
2090.898	39.3	28.7		V - 0 deg INT Transmitting

Figure 3 – Spurious Emissions (Horizontal & Vertical) 1 to 4 GHz

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Frequency (MHz)	AVG Field Strength (dBuV)	Antenna Height (M)	Antenna Position (H/V)	Limit (dBuV)	Result
2166.231	39.8	1.5	H	61.93	Complies
1998.399	31.5	1.5	V	61.93	Complies
2090.898	30.7	1.5	V	61.93	Complies

Table 1 – Spurious Emissions taken with EUT in worst case position

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4.4 Bandwidth

This test measures the Bandwidth of the fundamental emission.

4.4.1 Test Over View

Results	Complies (as tested per this report)				Date	5/1/2013						
Standard	FCC Part 15.231(c) and RSS - 210 Issue 8											
Product Model	OMNI-GTW			Serial#	TS-1							
Configuration	See test plan for details											
Test Set-up	Tested in an anechoic chamber EUT placed on table See test plan for details											
EUT Powered By	120VAC/60Hz	Temp	21° C	Humidity	48%	Pressure	1021mbar					
Perf. Criteria	Part 15.231(c) (Below Limit)		Perf. Verification	Readings under Limit								
Mod to EUT	None		Test Performed By	Randall Masline								

4.4.2 Test Procedure

Bandwidth measurements were made according to FCC part 15.31 and FCC part 15.231(c). For Industry Canada the bandwidth measurements were made in accordance with RSS – 210 Issue 7

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

The Fundamental Frequency is 433 MHz therefore 0.25% of 433 MHz is 1082.5 Mhz

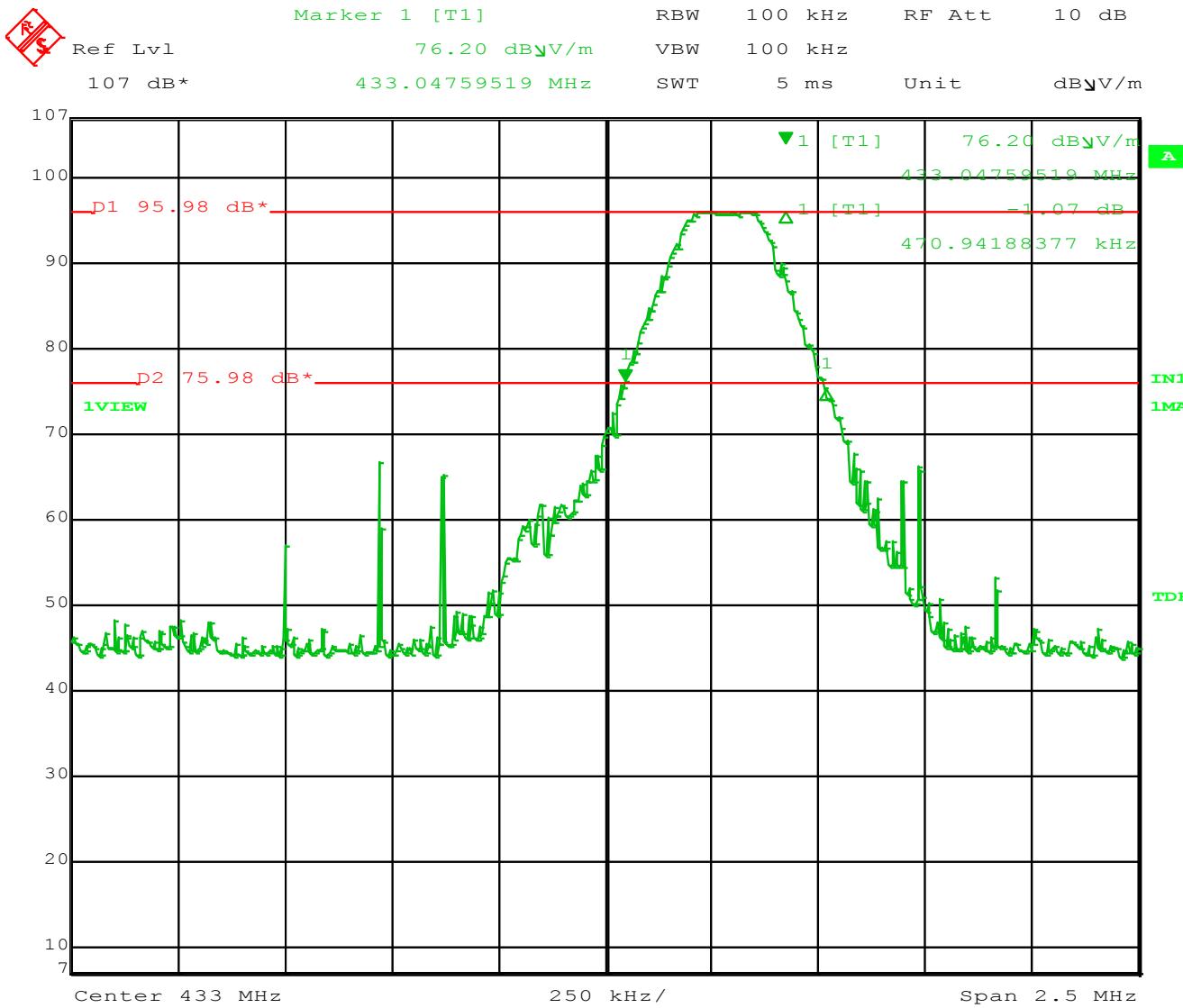
4.4.3 Deviations

There were no deviations from the test methodology.

4.4.4 Final Test

All final measurements were within (in compliance) the limits.

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Date: 7.MAY.2013 02:50:27

Figure 4 – 20 dB Bandwidth is 470.9 kHz

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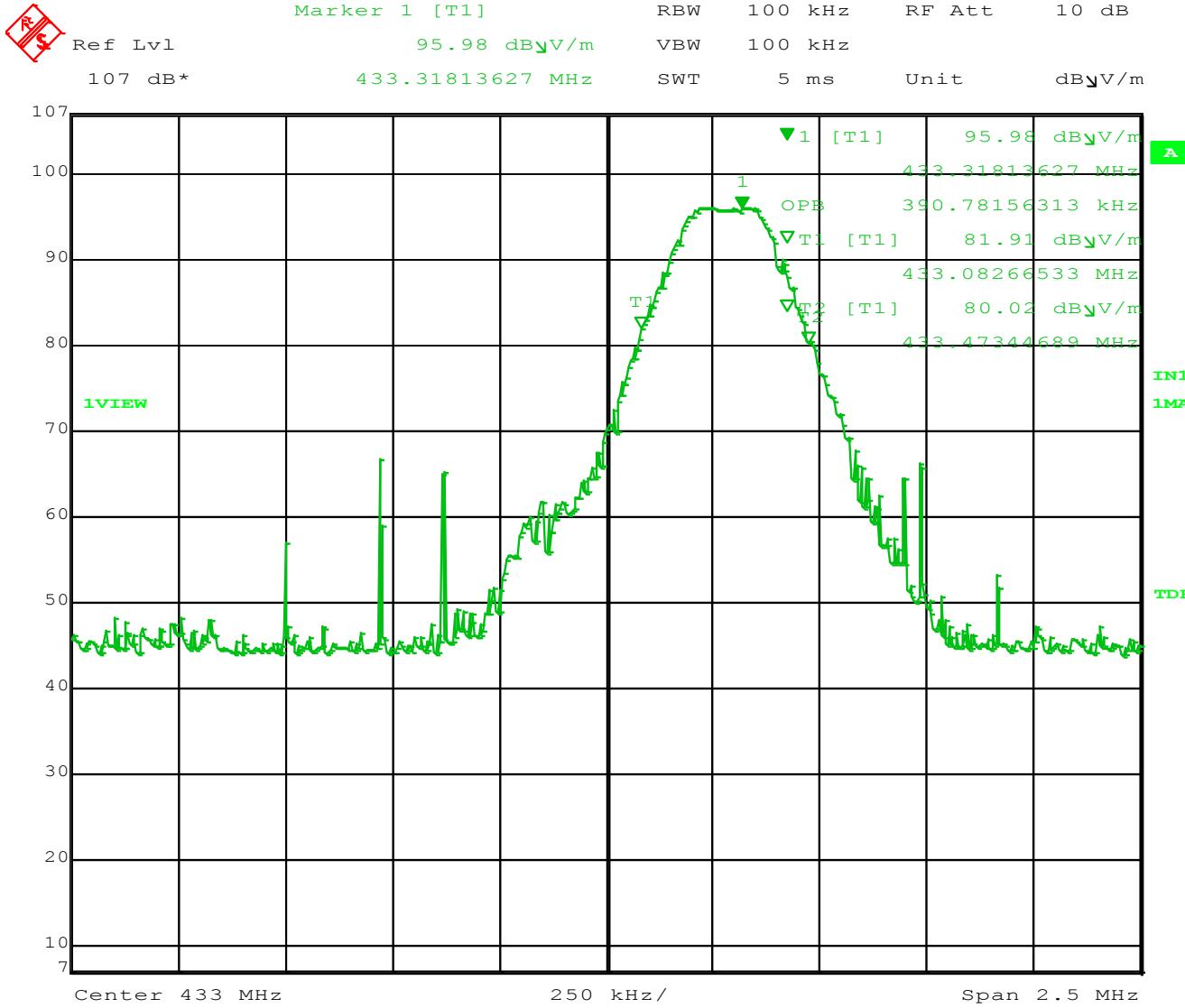


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Date: 7.MAY.2013 02:51:09

Figure 5 – 99% BW is 390.78 kHz

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4.5 RF Exposure Measurement (Mobile Device)

4.5.1 Test Methodology

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Semi-Anechoic Chamber, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula (see section 4.9.6) and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

4.5.2 RF Exposure Limit

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842f	4.89f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500	f/300	6
1500–100,000	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824f	2.19f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	f/1500	30

F = Frequency in MHz

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4.5.3 EUT Operating condition

The software provided by Manufacturer enabled the EUT to transmit data at highest channel.

4.5.4 Classification

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. Therefore, this device is classified as a **Mobile Device**.

4.5.5 Test Results

4.5.5.1 Antenna Gain

The maximum Gain measured in Semi-Anechoic Chamber is 4 dBi or 2.51 (numeric).

4.5.5.2 Output Power into Antenna & RF Exposure value at distance 20cm:

Calculations for this report are based on highest power measurement and the highest gain of the antenna. Limit for MPE (from FCC part 1.1310 table 1) is $f(\text{MHz}) / 1500 = 0.288 \text{ mW/cm}^2$

Highest Pout is 2.72mW, highest antenna gain (in linear scale) is 2.51, and R is 20cm.

$P_d = (2.72 * 2.51) / (4 * \pi * 20^2) = 0.013 \text{ mW/cm}^2$, which is 0.275 mW/cm² below to the limit.

0.013 mW/cm² is equivalent to 0.13 W/m² (for Industry Canada)

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.5.6 Sample Calculation

The Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where;

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$\pi \approx 3.1416$

R = distance between observation point and center of the radiator in cm

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

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Appendix A

5 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

5.1 General Information

Client	OMNI-ID
Address 1	21200 Ridgeway Avenue
Address 2	Rochester, NY 14615
Contact Person	Len Desmond
Telephone	585-713-1021
Fax	585-
e-mail	len.desmond@omni-id.com

5.2 Model(s) Name

OMNI-GTW

5.3 Type of Product

OMNI-ID Gateway

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5.4 Equipment Under Test (EUT) Description

The gateway communicates with tags, peripheral devices and sensors to enable the relay of key data points back to the central server.

5.5 Modifications

No modifications were necessary to meet the requirements.

5.6 Product Environment

<input checked="" type="checkbox"/>	Residential	<input type="checkbox"/>	Hospital
<input checked="" type="checkbox"/>	Light Industrial	<input type="checkbox"/>	Small Clinic
<input type="checkbox"/>	Industrial	<input type="checkbox"/>	Doctor's office
<input type="checkbox"/>	Other		

*Check all that apply

5.7 Countries

<input checked="" type="checkbox"/>	USA
<input checked="" type="checkbox"/>	Canada

*Check all that apply

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5.8 Applicable Documents

Standards	Description
FCC Part 15.231	Periodic operation in the band 260 Mhz to 470 Mhz
FCC Part 15.209 and RSS - 210 Issue 8	Radiated Emissions
FCC Part 15.231(a)	Deactivation of Transmitter
FCC Part 15.231(b) and RSS - 210 Issue 8	Field Strength of Fundamental and Sourious Emissions
FCC Part 15.231(c) and RSS - 210 Issue 8	Bandwidth

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5.9 General Product Information

Size	H	4.2cm	W	15.2cm	L	17.5cm
Weight	<1kg		Fork-Lift Needed		No	
Notes						

5.10 EUT Electrical Powered Information

5.10.1 Electrical Power Type

<input checked="" type="checkbox"/>	AC	<input type="checkbox"/>	DC	<input checked="" type="checkbox"/>	Batteries	<input type="checkbox"/>	Host -
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5.10.2 Electrical Power Information

Name	Type	Voltage		Frequency	Current	Notes
		min	max			
AC Input	AC	100	240	50/60		
Notes						

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