

# Electromagnetic Compatibility Test Report

*Prepared in accordance with*

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

C63.10:2009 and C63.10:2013 Versions were both used

On

**Active RFID Tag**

**CP8564**

OMNI-ID

1200 Ridgeway Avenue

Rochester, NY 14615

Prepared by:

**TUV Rheinland of North America, Inc.**

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## Manufacturer's statement - attestation

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

- a) That they have 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



Signature of official

**1200 Ridgeway Avenue  
Rochester, NY 14615**

Address

**3/27/2015**




Date

**585-713-1000**

Telephone number

**ed.nabrotzky@omni-id.com**

Email address of official

<b>Client:</b>	OMNI-ID 1200 Ridgeway Avenue Rochester, NY 14615	Contact: Len Desmond Tel: 585-713-1021 Fax: e-mail len.desmond@omni-id.com		
<b>Identification:</b>	Active RFID Tag	<b>Serial No.:</b>	TS-1	
<b>Test item:</b>	Model CP8564	<b>Date Test Completed:</b>		3/23/2015
<b>Testing location:</b>	TUV Rheinland of North America 710 Resende Road Webster, NY 14580 U.S.A.		Tel: (585) 645-0125	
<b>Test specification:</b>	Emissions: FCC Part 15.231 Radiated Emissions Std FCC Part 15.209 and RSS - 210 Issue 8, FCC Part 15.231 and RSS - 210 Issue 8, FCC Part 15.231 and RSS - 210 Issue 8			
<b>Test Result:</b>	The above product was found to be Compliant to the above test standard(s)			
<b>tested by:</b> Randall Masline		<b>reviewed by:</b> Cecil Gittens		
<u>20 May 2015</u> <i>Date</i>		<u>20 May 2015</u> <i>Date</i>		
<i>Name</i>		<i>Name</i>		
<i>Signature</i>		<i>Signature</i>		
<b>Other Aspects:</b>	None			
Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable				
			<b>Industry Canada</b>	<b>VCCI</b>
<b>US5253</b>	<b>Testing Cert.# 3331.08</b>		<b>482B-1</b>	<b>A-0203</b>
				<b>BSMI</b>
				<b>SL2-IN-E-050R</b>

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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 3/23/2015 on the Active RFID Tag, Model Number. CP8564, 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.

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### 1.3 Summary of Test Results

<b>Applicant</b>	OMNI-ID 1200 Ridgeway Avenue Rochester, NY 14615	<b>Tel</b>	585-713-1021	<b>Contact</b>	Len Desmond
		<b>Fax</b>		<b>e-mail</b>	len.desmond@omni-id.com
<b>Description</b>	Active RFID Tag	<b>Model Number</b>	CP8564		
<b>Serial Number</b>	TS-1	<b>Test Voltage/Freq.</b>	3 VDC		
<b>Test Date Completed:</b>	3/23/2015	<b>Test Engineer</b>	Randall Masline		
<b>Standards</b>	<b>Description</b>	<b>Severity Level or Limit</b>		<b>Measured</b>	<b>Test Result</b>
FCC Part 15 subpart C Standard	Radio Frequency Devices - Subpart C: Intentional Radiators	See called out parts below		See Below	<b>Complies</b>
RSS-210 Issue 8 Standard	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment	See called out parts below		See Below	<b>Complies</b>
FCC Part 15.231	Operation in the band 433.5 - 434.5 MHz	See Basic Standards Below		See Below	<b>Complies</b>
FCC Part 15.209 and RSS - 210 Issue 8	Radiated Emissions	Class B, 30 - 1000 MHz Spurious up to 2500 Mhz		Limit	<b>Complies</b>
FCC Part 15.231 and RSS - 210 Issue 8	Field Strength of Fundamental and Spurious Emissions	15.240 Limit is 100.8 dBuV at 433.27 MHz with Duty Cycle		Field Strength of Fundamental	<b>Complies</b>
FCC Part 15.231 and RSS - 210 Issue 8	Bandwidth	Part 15.231 1082.5 kHz RSS - 210 99% BW		511.02 kHz 433.03 kHz	<b>Complies</b>
FCC Part 15.231(a)	Deactivation of Transmitter	5 Seconds, 433.27 MHz		Within 5 seconds	<b>Complies</b>

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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, 710 Resende Road, Webster, NY 14580 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: 3331.08). 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-0203

#### 2.1.4 Industry Canada

(Registration No.: 482B-1) The 10m Semi-Anechoic Chamber has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2013.

#### 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 $\mu$ 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 <sub>lab</sub>	U <sub>cispr</sub>
<b>Radiated Disturbance @ 10m</b>		
30 MHz – 1,000 MHz	4.57 dB	5.2 dB
<b>Conducted Disturbance @ Mains Terminals</b>		
150 kHz – 30 MHz	2.62 dB	3.6 dB
<b>Disturbance Power</b>		
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							
Analyzer w RF Filter Section 85460A	HP	8546A		3325A00134	12-Aug-14	12-Aug-15	RE
Multimeter	Fluke	83	C437	48162892	12-Aug-14	12-Aug-15	RE
BiLog	Chase	CBL6111	C017	1169	22 Aug 13	22 Aug 15	RE
Receiver (20Hz-40GHz)	Rohde & Schwarz	ESI(B) 40		100274	15-Aug-14	15-Aug-15	RE
Horn (1-18 GHz)	ETS	3117			16-Jan-14	16-Jan-16	RE
Loop Antenna	EMCO	6502		8901-2302	10-Mar-15	10-Mar-17	RE
General Laboratory Equipment							
Multimeter	Fluke	87	C405	49050672	12-Aug-14	12-Aug-15	
Multimeter	Fluke	8062A	C452	4715199	12-Aug-14	12-Aug-15	
Pressure/Temperature/RH	Extech	SD700	C480	Q668876	12-Aug-14	12-Aug-15	

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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.

Duty Cycle:

Ton = 10mS

Toff = 15 Seconds

So Duty Cycle =  $100 * (10\text{mS}) / (10\text{mS} + 15 \text{ Seconds}) = .067\%$

Antenna Information:

Center Freq.: 433MHz Recom.

Freq. Range: 429–437MHz

Wavelength:  $\frac{1}{4}$ -wave

VSWR:  $\leq 1.9$  typ. at center

Peak Gain: –6.4dBi Impedance:

50-ohms

Oper. Temp. Range: –40°C to +130°C

Connection: Surface-mount

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Figure 1 – External Photo of EUT (front)



Figure 2 – External Photo of EUT (back)

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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	3/23/2015
Standard	FCC Part 15.209 and RSS - 210 Issue 8						
Product Model	CP8564			Serial#	TS-1		
Configuration	Tested in 10m Semi-Anechoic Chamber						
Test Set-up	placed on turn-table at 3 meters, see test plans for details						
EUT Powered By	3 VDC	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 C63.10:2013 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 Final Graphs

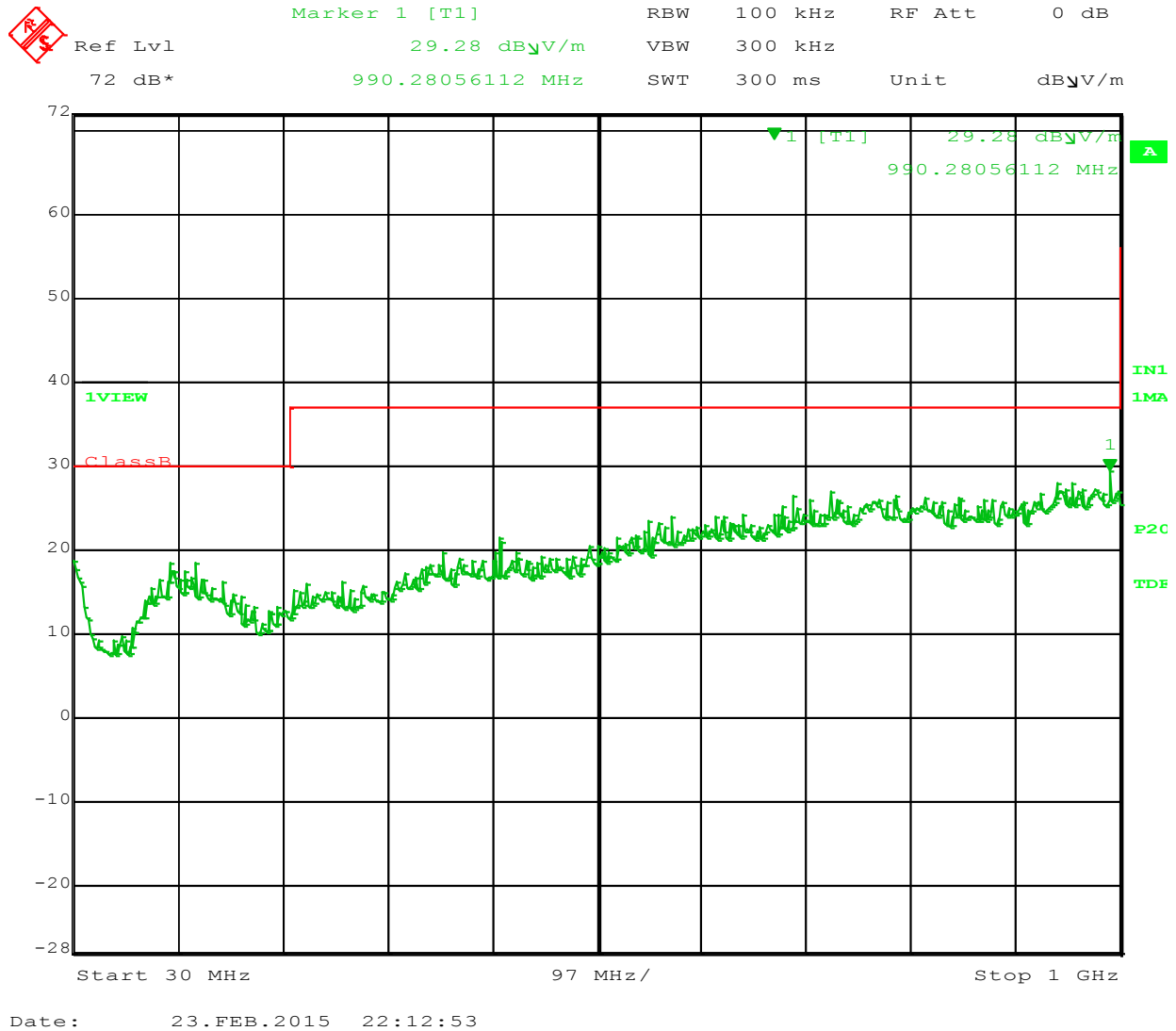
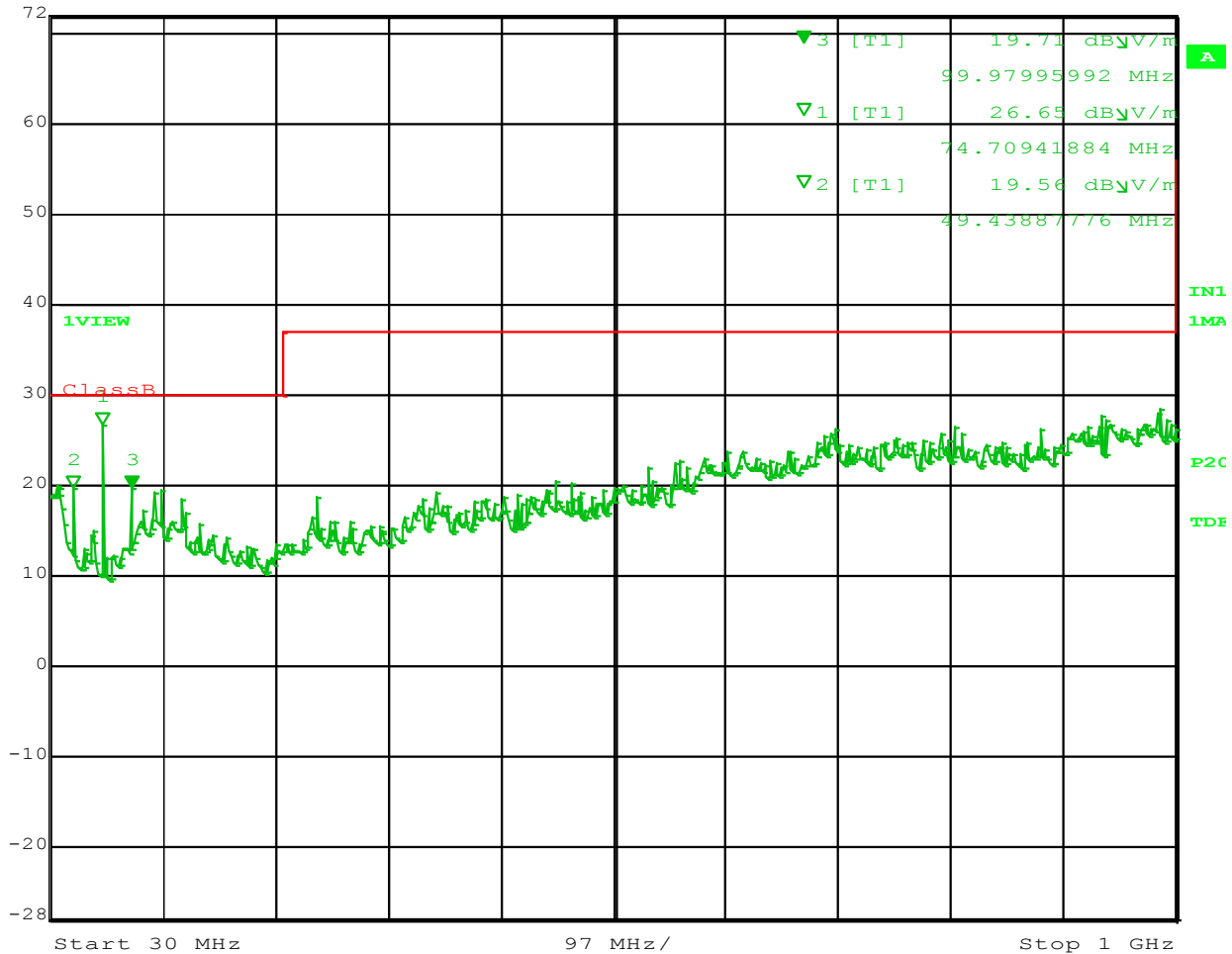


Figure 3 – Horizontal 30 – 1000 MHz

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Marker 3 [T1] RBW 100 kHz RF Att 0 dB  
 Ref Lvl 19.71 dB $\mu$ V/m VBW 300 kHz  
 72 dB\* 99.97995992 MHz SWT 300 ms Unit dB $\mu$ V/m



Date: 23.FEB.2015 22:12:09

Figure 4 – Vertical 30 – 1000 MHz

Frequency (MHz)	Peak	QP	Result
59.9799	19.71	17.31	Complies
74.709	26.65	22.53	Complies
49.438	19.56	17.22	Complies

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## 4.2 Fundamental Field Strength and Harmonic Emissions

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

### 4.2.1 Test Over View

Results	Complies (as tested per this report)					Date	3/12/2015	
Standard	FCC Part 15.231 and RSS - 210 Issue 8							
Product Model	CP8564				Serial#	TS-1		
Configuration	Tested in 10m Semi-Anechoic Chamber							
Test Set-up	EUT placed on table      Tested in 10m Semi-Anechoic Chamber							
EUT Powered By	3 VDC	Temp	21° C	Humidity	48%	Pressure	1021mbar	
Perf. Criteria	15.240 (Below Limit)		Perf. Verification		Readings under Limit			
Mod to EUT	None		Test Performed By		Randall Masline			

### 4.2.2 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

### 4.2.3 Deviations

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

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#### 4.2.4 Final Test

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

#### 4.2.5 Final Data

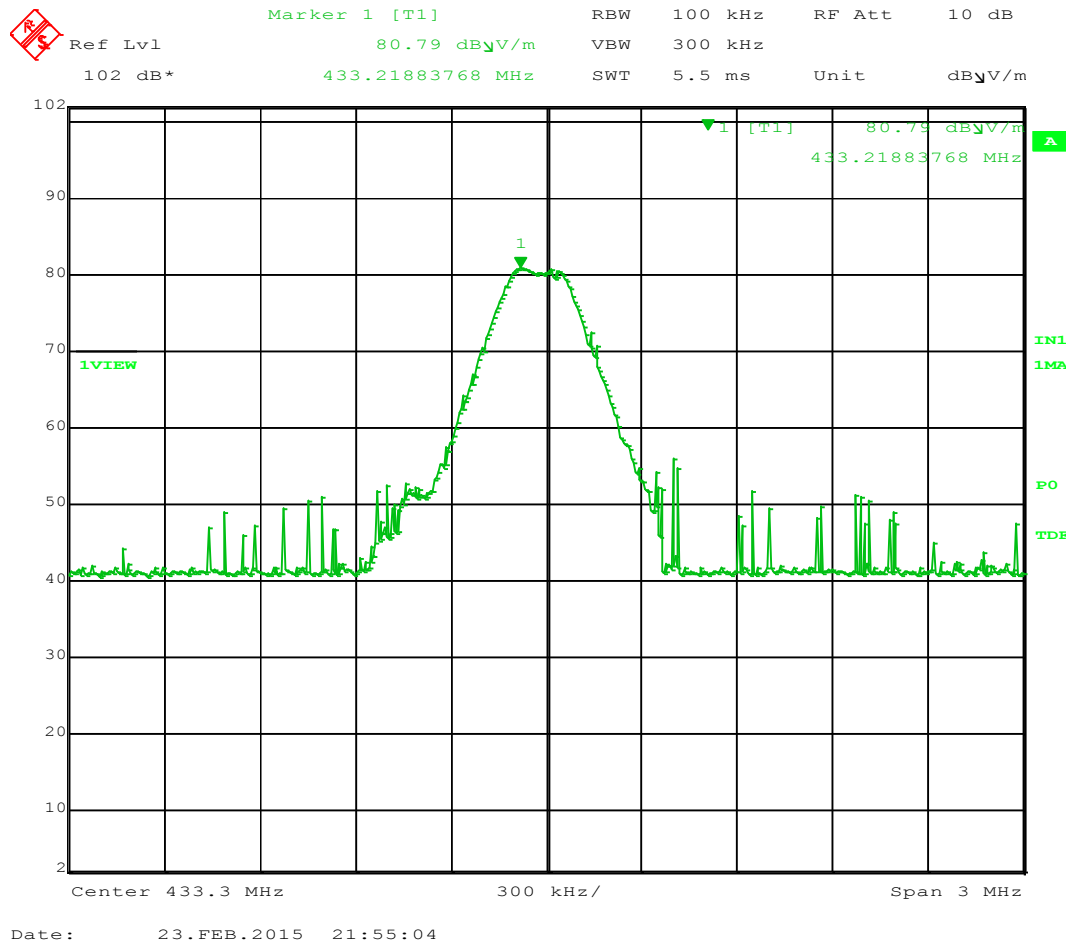


Figure 5 – Peak Field Strength Horizontal Polarity is 80.79 dBuV

Ton = 10mS

Toff = 15 Seconds

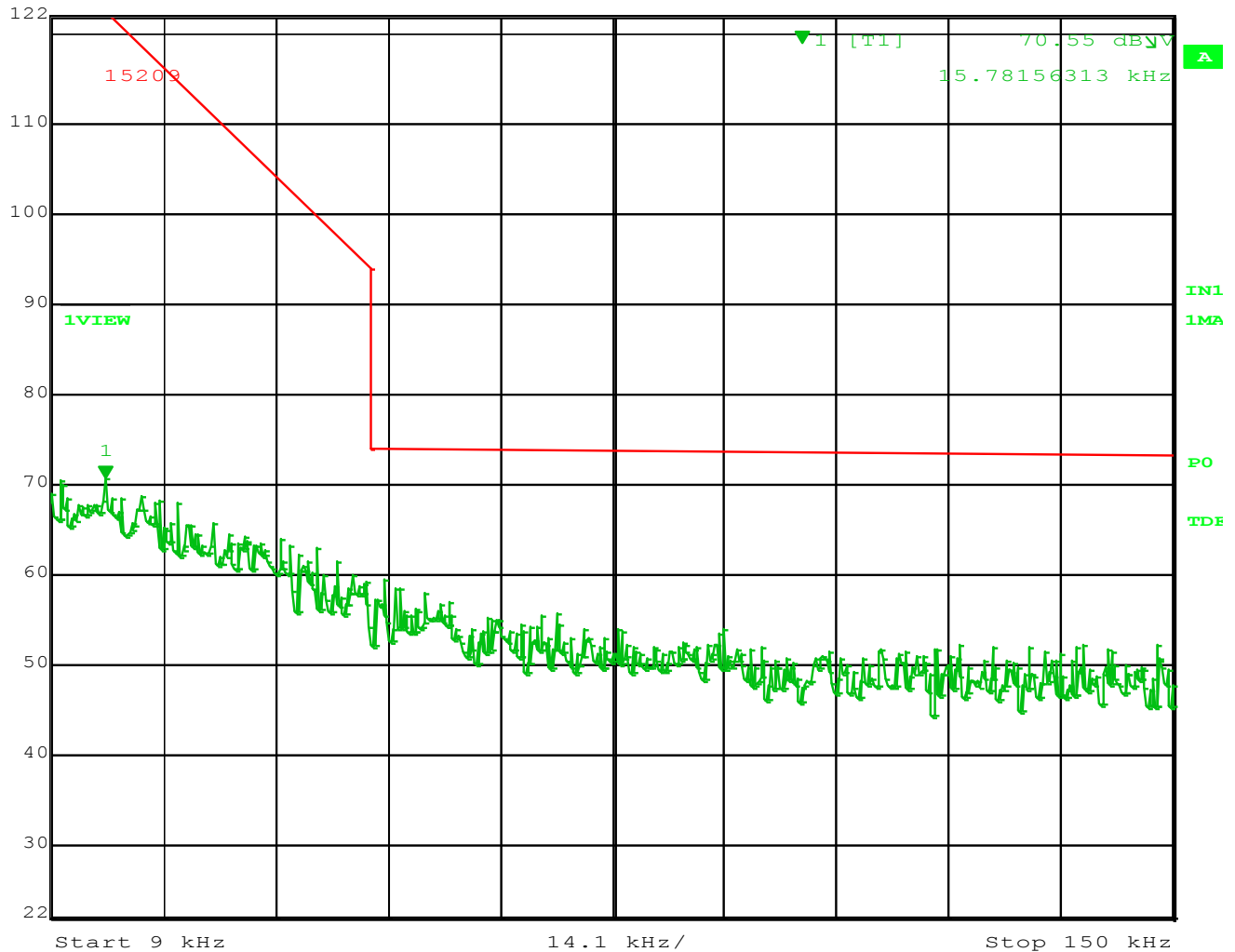
So Duty Cycle =  $100 * (10\text{mS}) / (10\text{mS} + 15 \text{ Seconds}) = .067\%$  Limit is then raised by 20db to 100.82 dBuV/m

Per FCC Section 15.35 for a peak emission

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Marker 1 [T1] RBW 200 Hz RF Att 30 dB  
Ref Lvl 70.55 dBμV VBW 200 Hz  
122 dBμV 15.78156313 kHz SWT 18 s Unit dBμV



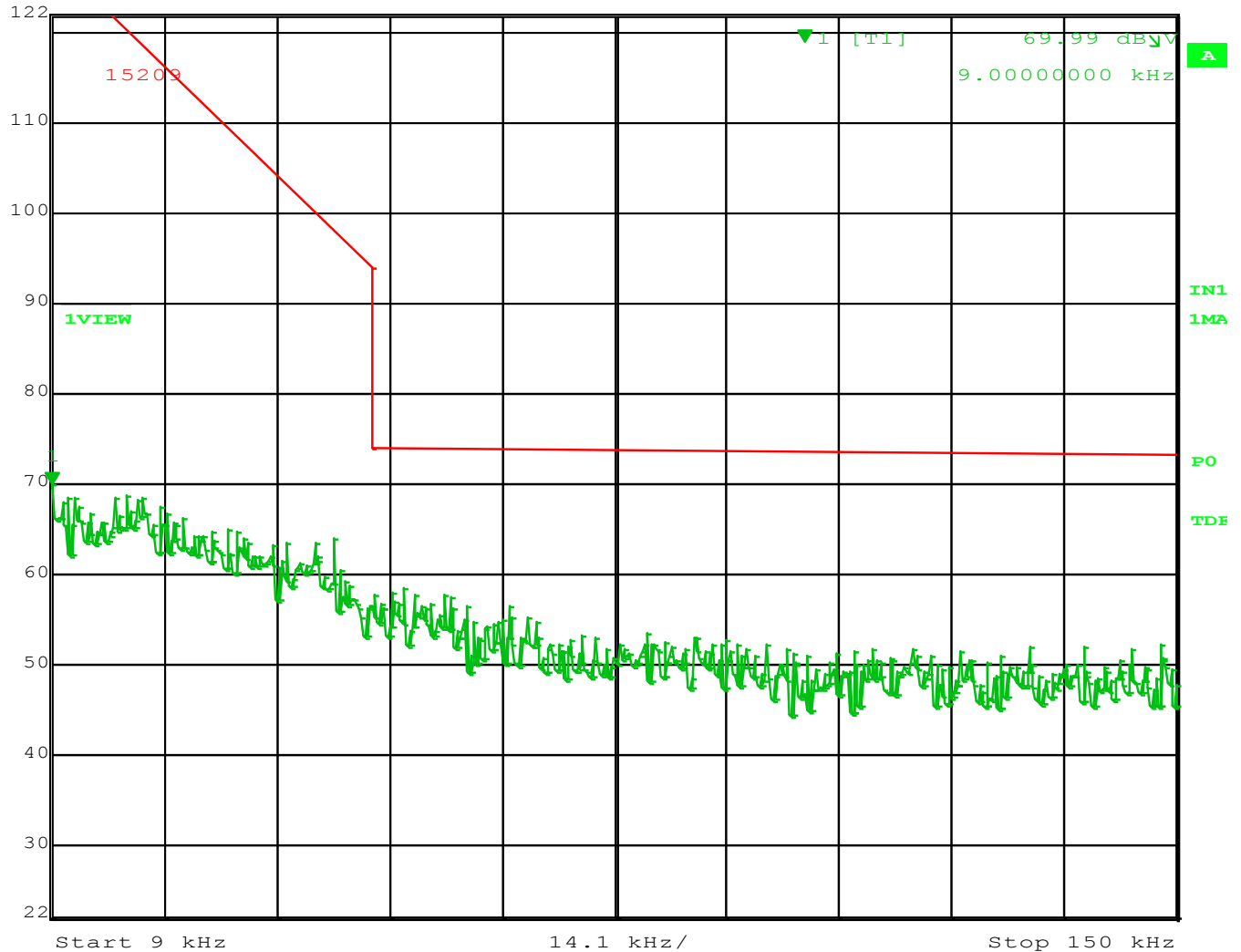
Date: 23.MAR.2015 10:12:38

Figure 6 – Spurious Emissions (Parallel) 9 kHz to 150 kHz

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Marker 1 [T1] RBW 200 Hz RF Att 30 dB  
Ref Lvl 69.99 dBμV VBW 200 Hz  
122 dBμV 9.00000000 kHz SWT 18 s Unit dBμV



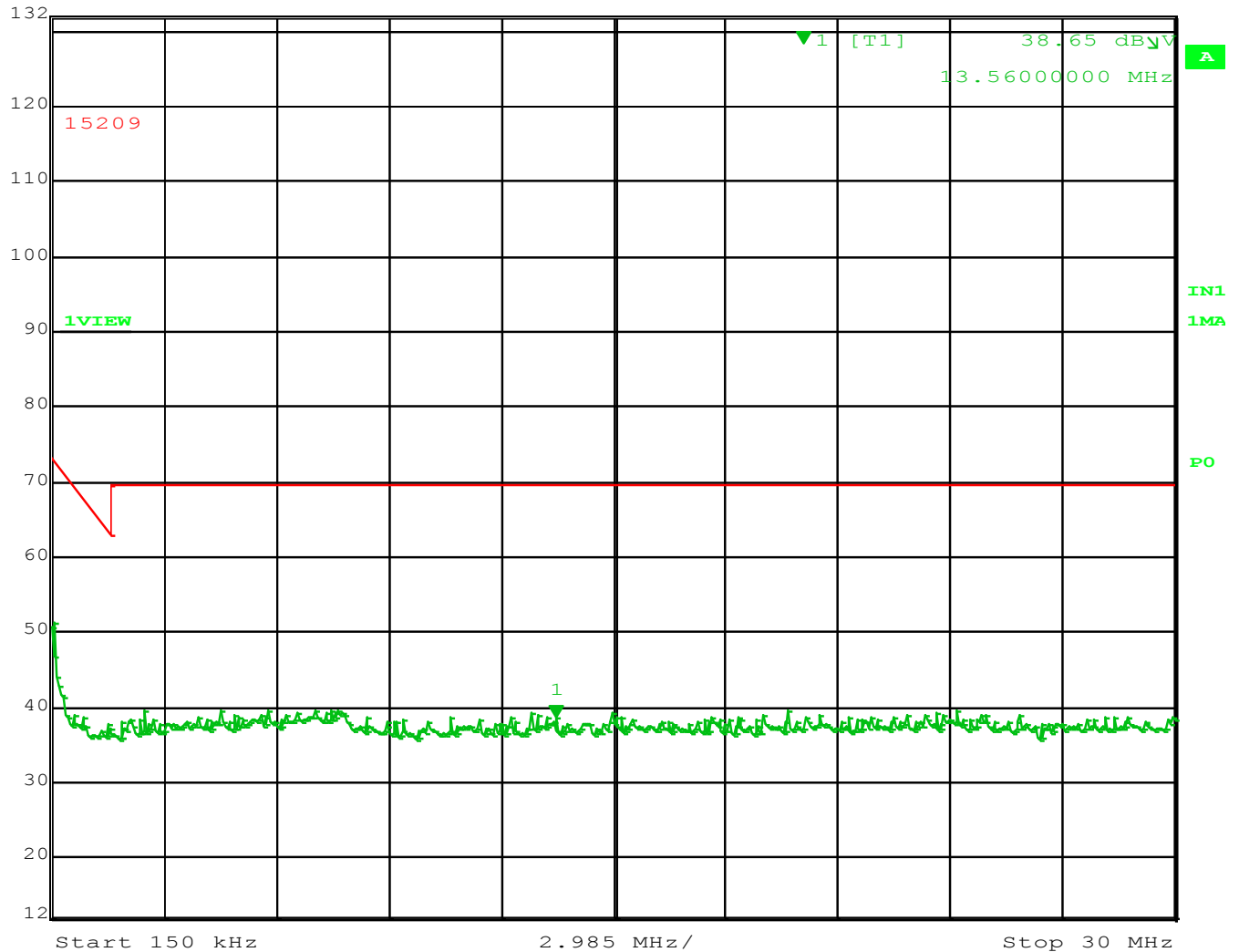
Date: 23.MAR.2015 10:13:40

Figure 7 – Spurious Emissions (Perpendicular) 9 kHz to 150 kHz

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Marker 1 [T1] RBW 10 kHz RF Att 40 dB  
Ref Lvl 38.65 dBμV VBW 10 kHz  
132 dBμV 13.56000000 MHz SWT 1.15 s Unit dBμV



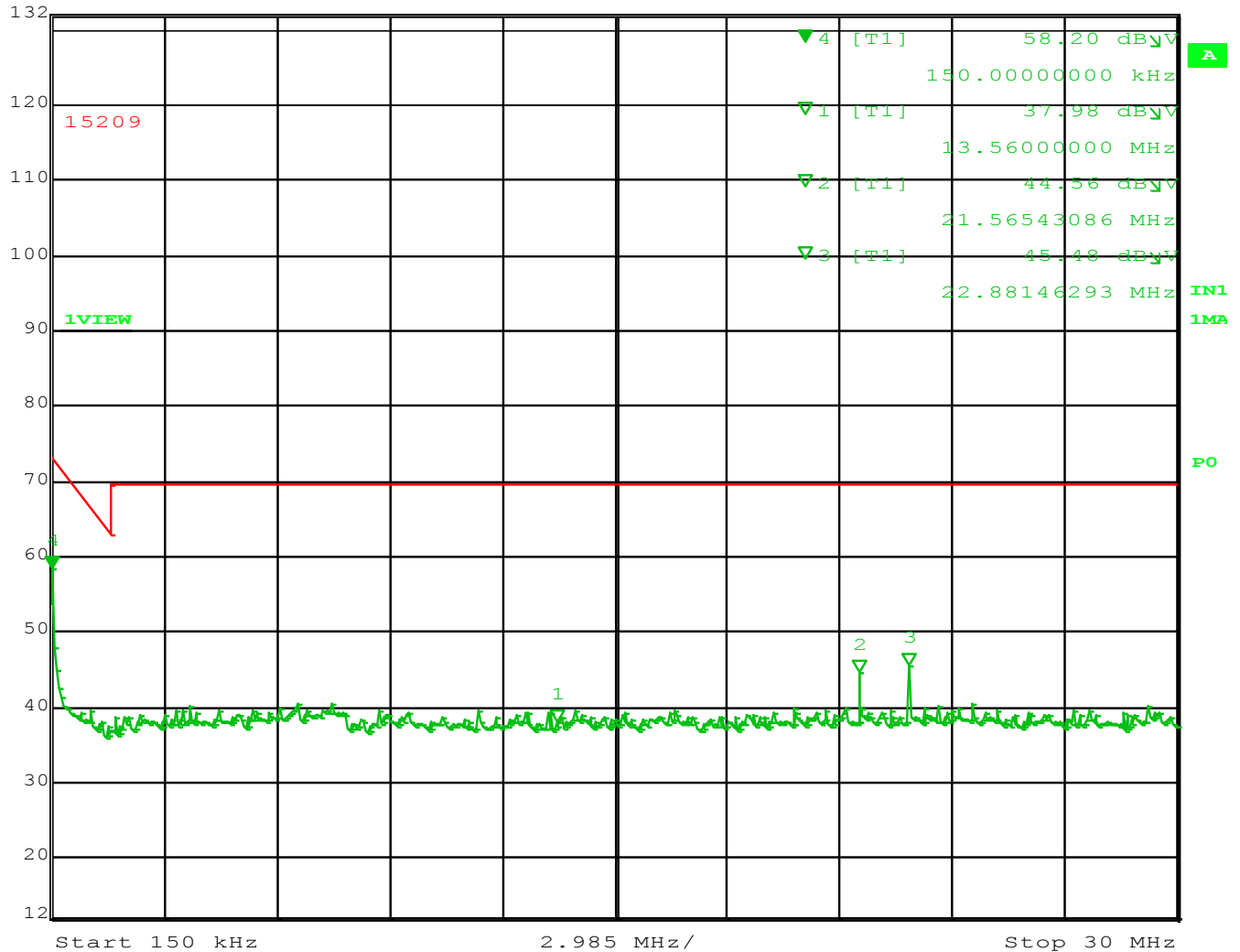
Date: 20.MAR.2015 14:04:00

Figure 8 – Spurious Emissions (Parallel) 150 kHz to 30 MHz

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Marker 4 [T1] RBW 10 kHz RF Att 40 dB  
Ref Lvl 58.20 dBμV VBW 10 kHz  
132 dBμV 150.00000000 kHz SWT 1.15 s Unit dBμV



Date: 20.MAR.2015 14:07:04

Figure 9 – Spurious Emissions (Perpendicular) 150 kHz to 30 MHz

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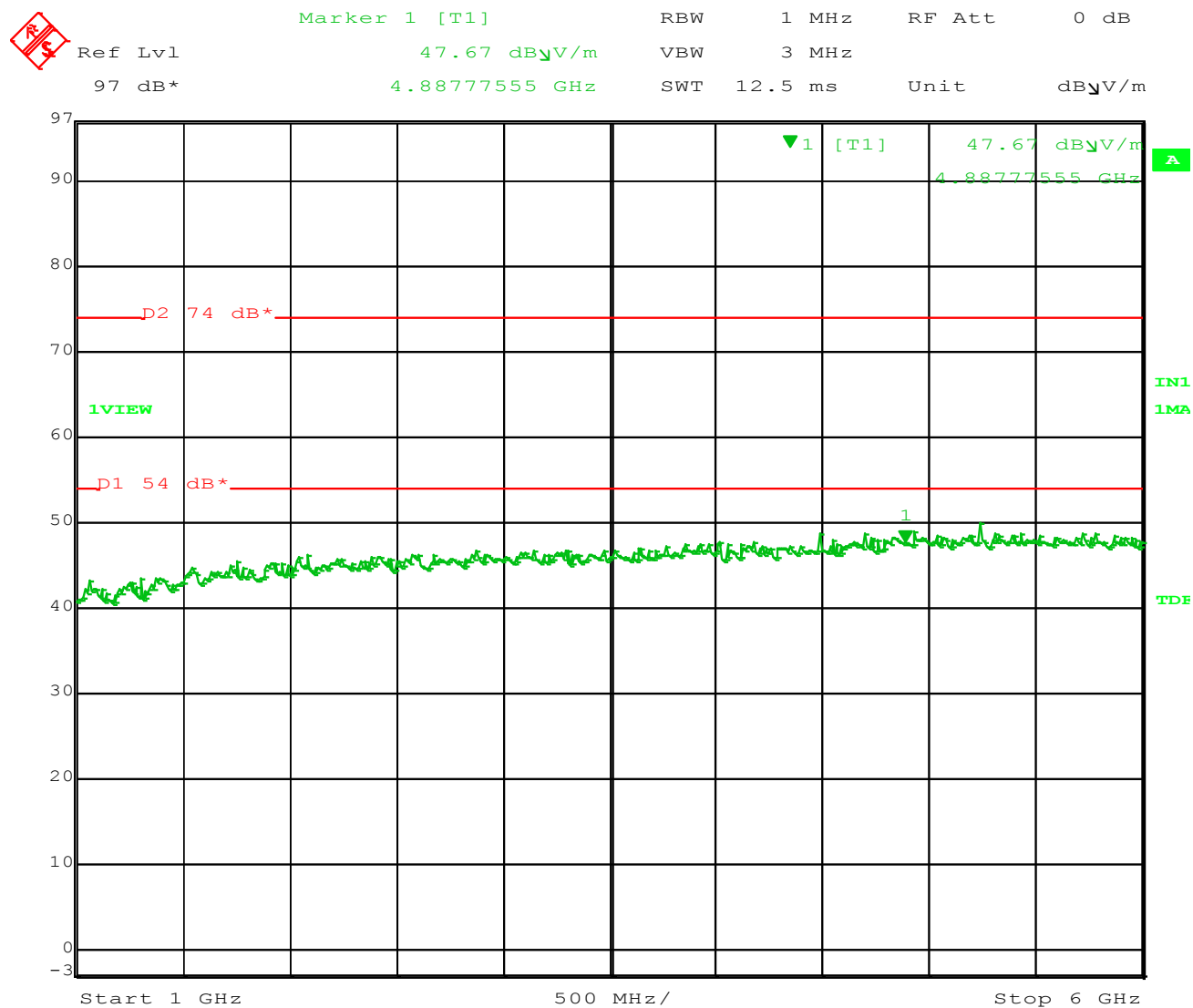
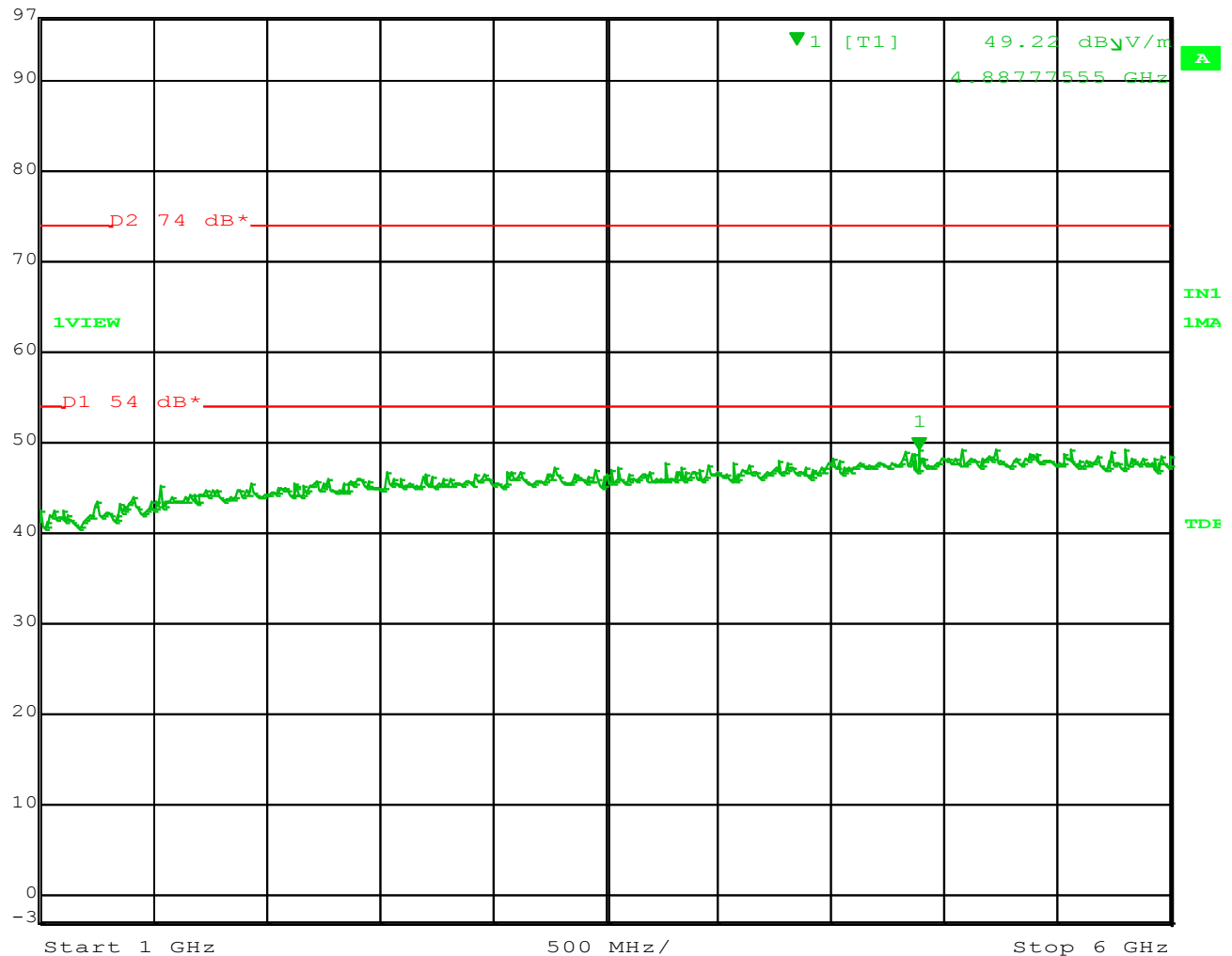


Figure 10 – Spurious Emissions (Horizontal) 1 to 6 GHz

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Marker 1 [T1] RBW 1 MHz RF Att 0 dB  
Ref Lvl 49.22 dB $\mu$ V/m VBW 3 MHz  
97 dB\* 4.88777555 GHz SWT 12.5 ms Unit dB $\mu$ V/m



Date: 12.MAR.2015 10:15:47

Figure 11 – Spurious Emissions (Vertical) 1 to 6 GHz

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### 4.3 Bandwidth

This test measures the Bandwidth of the fundamental emission.

#### 4.3.1 Test Over View

Results	Complies (as tested per this report)					Date	3/23/2015	
Standard	FCC Part 15.231 and RSS - 210 Issue 8							
Product Model	CP8564				Serial#	TS-1		
Configuration	Tested in 10m Semi-Anechoic Chamber							
Test Set-up	EUT placed on table							
EUT Powered By	3 VDC	Temp	21° C	Humidity	48%	Pressure	1021mbar	
Perf. Criteria	Part 15.231 (Below Limit)			Perf. Verification		Readings under Limit		
Mod to EUT	None			Test Performed By		Randall Masline		

#### 4.3.2 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 8

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

#### 4.3.3 Deviations

There were no deviations from the test methodology.

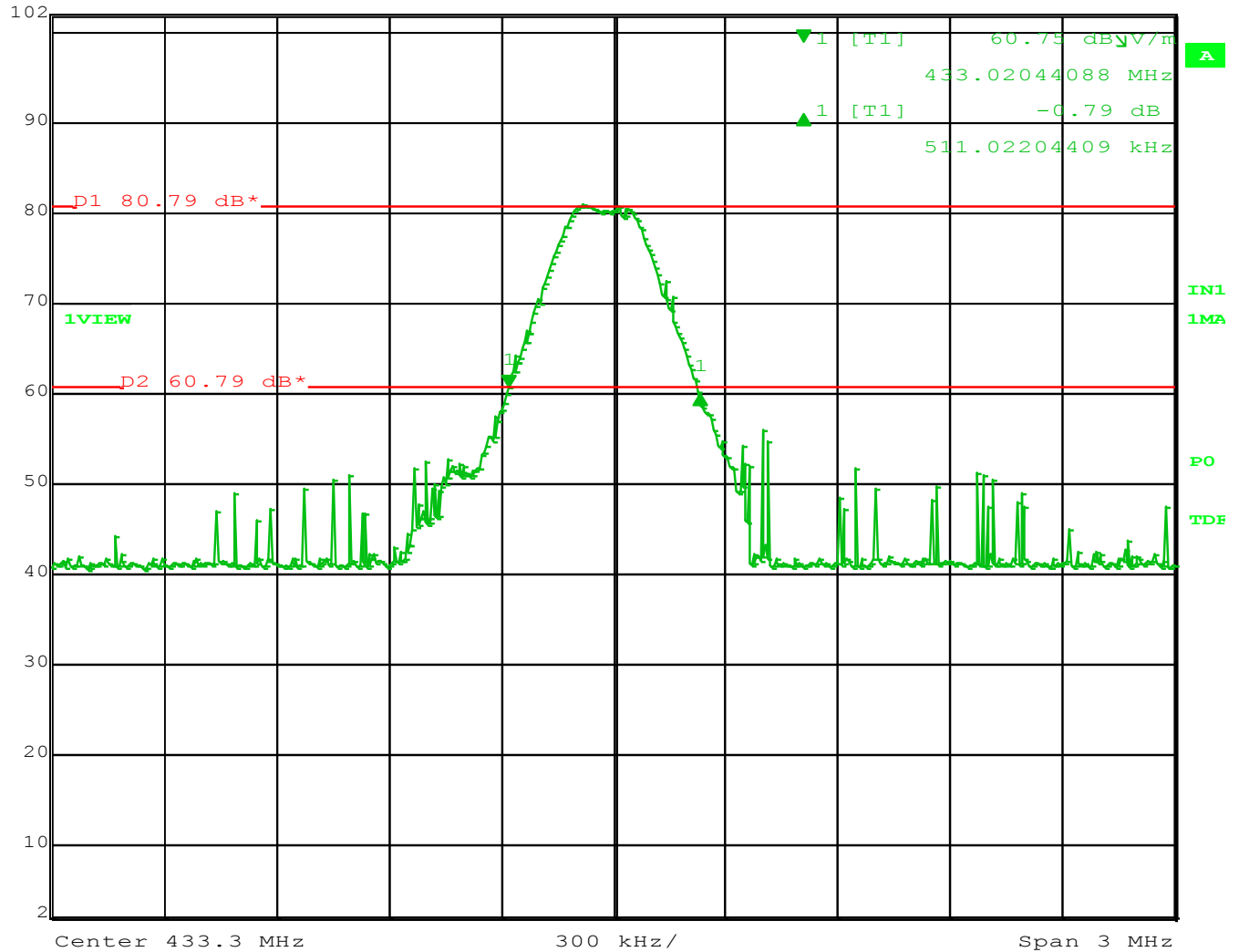
#### 4.3.4 Final Test

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

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Delta 1 [T1] RBW 100 kHz RF Att 10 dB  
Ref Lvl -0.79 dB VBW 300 kHz  
102 dB\* 511.02204409 kHz SWT 5.5 ms Unit dBμV/m



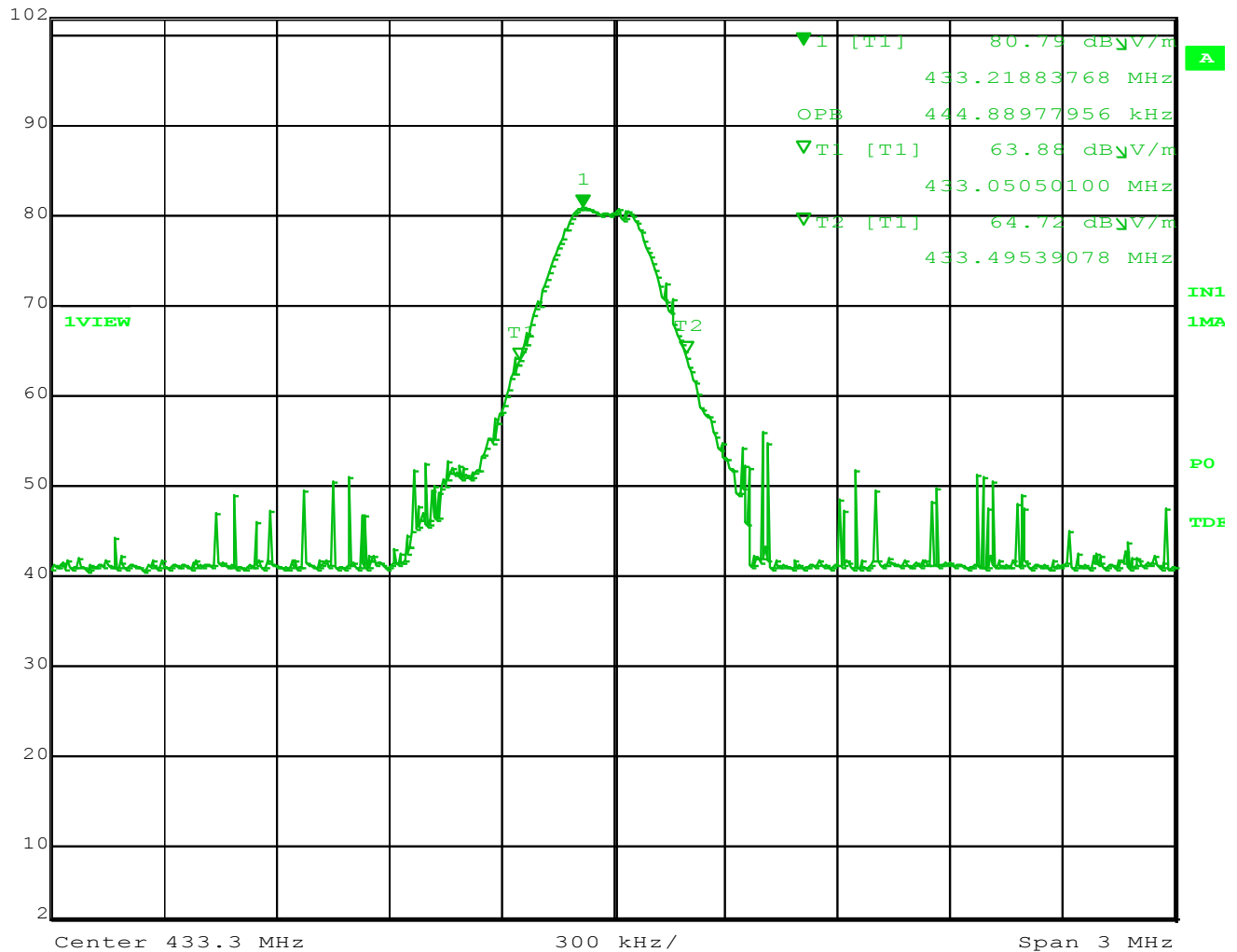
Date: 23.FEB.2015 21:56:26

Figure 12 – 20 dB Bandwidth is 511.02 kHz

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Marker 1 [T1] RBW 100 kHz RF Att 10 dB  
Ref Lvl 80.79 dB $\mu$ V/m VBW 300 kHz  
102 dB\* 433.21883768 MHz SWT 5.5 ms Unit dB $\mu$ V/m



Date: 23.FEB.2015 21:55:35

Figure 13 – 99% BW is 433.03 kHz

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#### 4.4 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.

##### 4.4.1 Over View of Test

Results	Complies (as tested per this report)					Date	5/19/2015	
Standard	FCC Part 15.231(a)							
Product Model	CP8563				Serial#	TS-1		
Configuration	See test plan for details							
Test Set-up	EUT placed on table see test plans for details							
EUT Powered By	3.0 VDC Battery	Temp	22° C	Humidity	37%	Pressure	1004mbar	
Frequency Range	433.27 MHz							
Perf. Criteria	5 Seconds (Below Limit )		Perf. Verification					
Mod. to EUT	None		Test Performed By		Randall Masline			

##### 4.4.2 Test Procedure

Testing was performed by sweeping the fundamental frequency for 30 seconds and manually operating the transmitter. The EUT does 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.

##### 4.4.3 Deviations

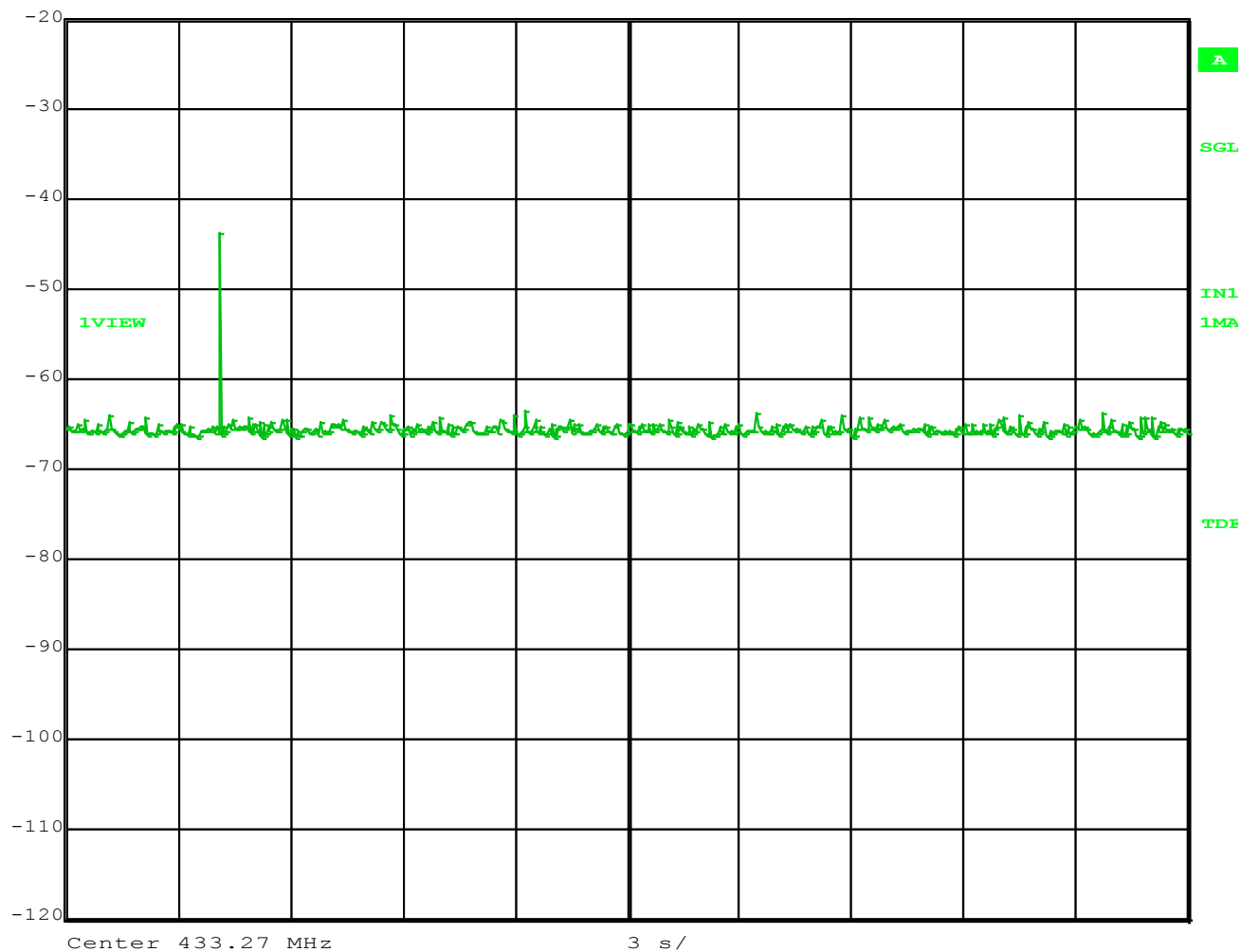
There were no deviations from the test methodology listed in the test plan for the conducted emission test.

##### 4.4.4 Final Test

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

NOTE: In normal operation of the device the active tag transmits once every 6 hours for a duration of 1.7ms for each transmission.

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Ref Lvl  
-20 dBmRBW 100 kHz RF Att 10 dB  
VBW 300 kHz  
SWT 30 s Unit dBm

Date: 19.MAY.2015 05:15:22

Figure 14 – 30 second sweep of before and after manually operating transmitter

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**FCC ID: N74-CP8564**



**IC: 10336A-CP8564**

**Report No.:**

**31550218.003 CP8564.doc**

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## 5 MPE Evaluation

Model 8564

FCC:

Controlled Exposures - Limit =	1.443333333	mW/cm <sup>2</sup>
Uncontrolled Exposures - Limit =	0.288666667	mW/cm <sup>2</sup>
Pd =	0.0000072	mW/cm <sup>2</sup>
Controlled Margin to Limit =	1.4433	mW/cm <sup>2</sup>
Uncontrolled Margin to Limit =	0.2887	mW/cm <sup>2</sup>

Limit for 300-1500 MHz:  $f / 300 \text{ mW/cm}^2$

Limit for 300-1500 MHz:  $f / 1500 \text{ mW/cm}^2$

$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

IC:

Controlled Exposures to Limit =	13.4319849	W/m <sup>2</sup>
Uncontrolled Exposures Limit =	1.659248092	W/m <sup>2</sup>
Pd =	0.000016	W/m <sup>2</sup>
Controlled Margin to Limit =	13.4320	W/m <sup>2</sup>
Uncontrolled Margin to Limit =	1.6592	W/m <sup>2</sup>

Limit for 100-6000 MHz:  $0.6455 \cdot f^{0.5} \text{ W/m}^2$

Limit for 300-6000 MHz:  $0.02619 \cdot f^{0.6834} \text{ W/m}^2$

$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

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## Appendix A

### 6 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.

#### 6.1 General Information

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

#### 6.2 Model(s) Name

CP8564

#### 6.3 Type of Product

Active RFID Tag

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#### 6.4 Equipment Under Test (EUT) Description

The 8564 is an active RFID tag that operates at 433 MHz

#### 6.5 Modifications

No modifications were necessary to meet the requirements.

#### 6.6 Product Environment

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

\*Check all that apply

#### 6.7 Countries

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

\*Check all that apply

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## 6.8 General Product Information

Size	H	1.5cm	W	14.5cm	L	10cm
Weight	<1kg		Fork-Lift Needed		No	
Notes						

## 6.9 EUT Electrical Powered Information

### 6.9.1 Electrical Power Type

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

Name	Type	Voltage		Frequency	Current	Notes
		min	max			
3.0 VDC Battery		1.5	3.5	DC		
<b>Notes</b>						

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