

# Global EMC Inc. Labs EMC & RF Test Report

As per

**RSS 210 Issue 8**

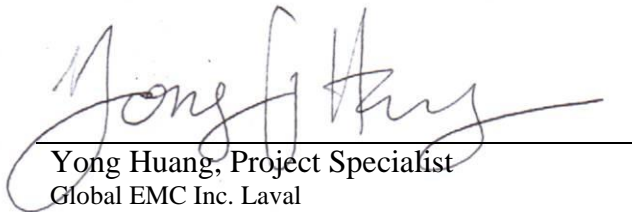
**&**

**FCC Part 15 Subpart C**

**Unlicensed Intentional Radiators**

on the

**TAG\_X\_MINI(Model C001)**




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Testing produced for




See Appendix A for full customer & EUT details.



Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

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Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

## Report Scope

This report addresses the EMC verification testing and test results of the TAG\_X\_MINI(MODEL C001), herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was tested for compliance against the following standards:


RSS 210 Issue 8/ FCC Part 15 Subpart C 15

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.


Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

Client	<b>Tag Tracking Inc.</b>	
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Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

## Summary

The results contained in this report relate only to the item(s) tested.

EUT FCC Certification #, FCC ID:	T9RC001
EUT Industry Canada Certification #, IC:	6519A-C001
EUT Passed all tests performed.	Yes (see test results summary)
Tests conducted by	Yong Huang


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## Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203 RSS 210 Annex 8	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS 210 Annex 8	Restricted Bands for intentional operation	None within chart	Pass See description
FCC 15.207 RSS 210 Annex 8	Power line conducted emissions	QuasiPeak Average	Pass See Justification
FCC 15.209 RSS 210 Annex 8	Radiated emissions	QuasiPeak Average	Pass
FCC 15.249(b) RSS 210 Annex 8	Fundamental	< 50mV/m	Pass
FCC 15.249(b) RSS 210 Annex 8	Harmonics	< 500uV/m	Pass
FCC 15.247(i) IC Safety code 6	Maximum Permissible Exposure	> 20 cm separation.	Pass See justification and calculations
<b>Overall Result</b>			<b>PASS</b>

All tests were performed by Yong Huang.

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '\*'.

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### ***Justifications, Descriptions, or Deviations***

The following justifications for tests not performed or deviations from the above listed specifications apply:

As per client's instruction, the EUT is capable to switch between 15.249 operation mode and 15.247 operation mode. For the scope of this test report, it only covers the 15.249 operation mode, when frequency hopping is off and transmission at a reduced power.

For the Antenna requirement specified in FCC 15.203 (RSS 210 section 5.5), this device is designed with an integral antenna or proprietary antenna connector which meets the requirements of FCC 15.203.

For the Restricted Bands of operation, the EUT is designed to only operate between 902 to 928 MHz.


For the scope of this test report, radiated testing of the EUT was pre-scanned in three orthogonal axis to maximize emissions. Maximum emissions were found in the vertical EUT polarization. This setup was used for all testing in this report.

For the power line conducted emissions requirements, the EUT is DC powered via battery, with no provisions for direct or indirect connection to mains and this test does not apply.

For the Antenna gain, the radiated measurement of the fundamental compared to the conducted measurement of the fundamental show a gain of less than 6 dB.


For maximum permissible exposure, this device operates at less than 1 Watt at 902-928 MHz and is designed to operate greater than 20 cm from personnel during normal operation. No testing is required.

A later revision of the standard may have been substituted in place of the previous dated referenced revision. The year of the specification used are listed under applicable standards. Using the later revision accomplishes the goal of ensuring compliance to the intent of the previous specification, while allowing the laboratory to incorporate the extensions and clarifications made available by a later revision.

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### ***Applicable Standards, Specifications and Methods***

- ANSI C63.4:2014 - Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
- ANSI C63.10:2013 - American national standard for testing unlicensed wireless devices
- CFR 47 FCC 15 - Code of Federal Regulations – Radio Frequency Devices
- CISPR 22:2008 - Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
- ICES-003:2012 - Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
- ISO 17025:2005 - General Requirements for the competence of testing and calibration laboratories
- RSS 210:2010 - Issue 8: Spectrum Management and Telecommunications Policy. Radio Standards Specification Low Power Licence-Exempt Radiocommunication Devices

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### ***Sample calculation(s)***

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)


Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)

Margin = 8.5 dB

### ***Document Revision Status***

Revision 1 - Released on the 8<sup>th</sup> of July. 2015

Revision 2 - Revised on the 24<sup>th</sup> of Sep.2015. as per TCB's request.

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## Definitions and Acronyms

The following definitions and acronyms are applicable in this report.  
See also ANSI C63.14.

**AE** – Auxillary Equipment.

**BW** – Bandwidth. Unless otherwise stated, this is refers to the 6 dB bandwidth.

**EMC** – Electro-Magnetic Compatibility

**EMI** – Electro-Magnetic Immunity

**EUT** – Equipment Under Test

**ITE** – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

**LISN** – Line impedance stabilization network

**NCR** – No Calibration Required

**RF** – Radio Frequency


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## **Testing Facility**

Testing for EMC on the EUT was carried out at Global EMC labs in Montréal, Québec, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

### ***Calibrations and Accreditations***


The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The semi-anechoic chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test. Global EMC’s is accredited by A2LA with a scope of accreditation listed under certificate number 2555.01.

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### ***Testing Environmental Conditions and Dates***

Following were the environmental conditions in the facility during time of testing –

<b>Date</b>	<b>Test</b>	<b>Init.</b>	<b>Temperature (°C)</b>	<b>Humidity (%)</b>	<b>Pressure (kPa)</b>
Feb. 16.2015	All	YH	20-25°C	30-45%	100 -103kPa

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**Detailed Test Results Section**

Client	<b>Tag Tracking Inc.</b>	
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## ***Radiated Emissions***

### **Purpose**

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

### **Limit(s) and Method**

The method is as defined in ANSI C63.4:2014 for tests below 1GHz, and ANSI C63.10:2013 for tests above 1GHz.

The limits, as defined in 15.247(d) for unintentional radiated emissions apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).

All unintentional emissions (including band edge) must also meet the requirements of -20 dBc or greater


0.009 MHz – 0.490 MHz, 2400/F(kHz) uV/m at 300 m<sup>4</sup>  
0.490 MHz – 1.705 MHz, 24000/F(kHz) uV/m at 30 m<sup>4</sup>  
1.705 MHz – 30 MHz, 30 uV/m at 30 m<sup>4</sup>  
30 MHz – 88 MHz, 100 uV/m (40.0 dBuV/m<sup>1</sup>) at 3 m  
88 MHz – 216 MHz, 150 uV/m (43.5 dBuV/m<sup>1</sup>) at 3 m  
216 MHz – 960 MHz, 200 uV/m (46.0 dBuV/m<sup>1</sup>) at 3 m  
Above 960 MHz, 500 uV/m (54.0 dBuV/m<sup>1</sup>) at 3 m  
Above 1000 MHz, 500 uV/m (54 dBuV/m<sup>2</sup>) at 3m  
Above 1000 MHz, 5000 uV/m (74 dBuV/m<sup>3</sup>) at 3m

<sup>1</sup>Limit is with 120 kHz measurement bandwidth and a using a Quasi Peak detector.

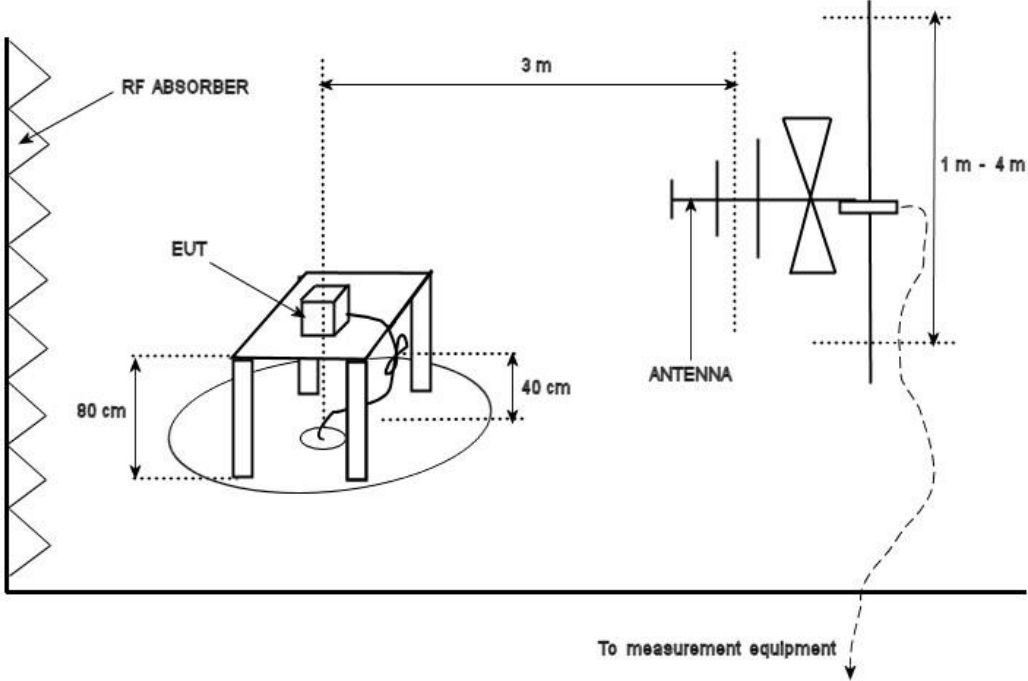
<sup>2</sup>Limit is with 1 MHz measurement bandwidth and using an Average detector


<sup>3</sup>Limit is with 1 MHz measurement bandwidth and using an Peak detector

<sup>4</sup>Limit is with using a Quasi-peak detector with a bandwidth as defined in CISPR 16-1-1

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**Typical Radiated Emissions Setup**



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## Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a 'k=2' coverage factor and a 95% confidence level.

## Results


The EUT passed the limits. Low, middle and high band was measured. The worst case for each mode is presented as a graph for the spectrum.

## Preliminary Graphs

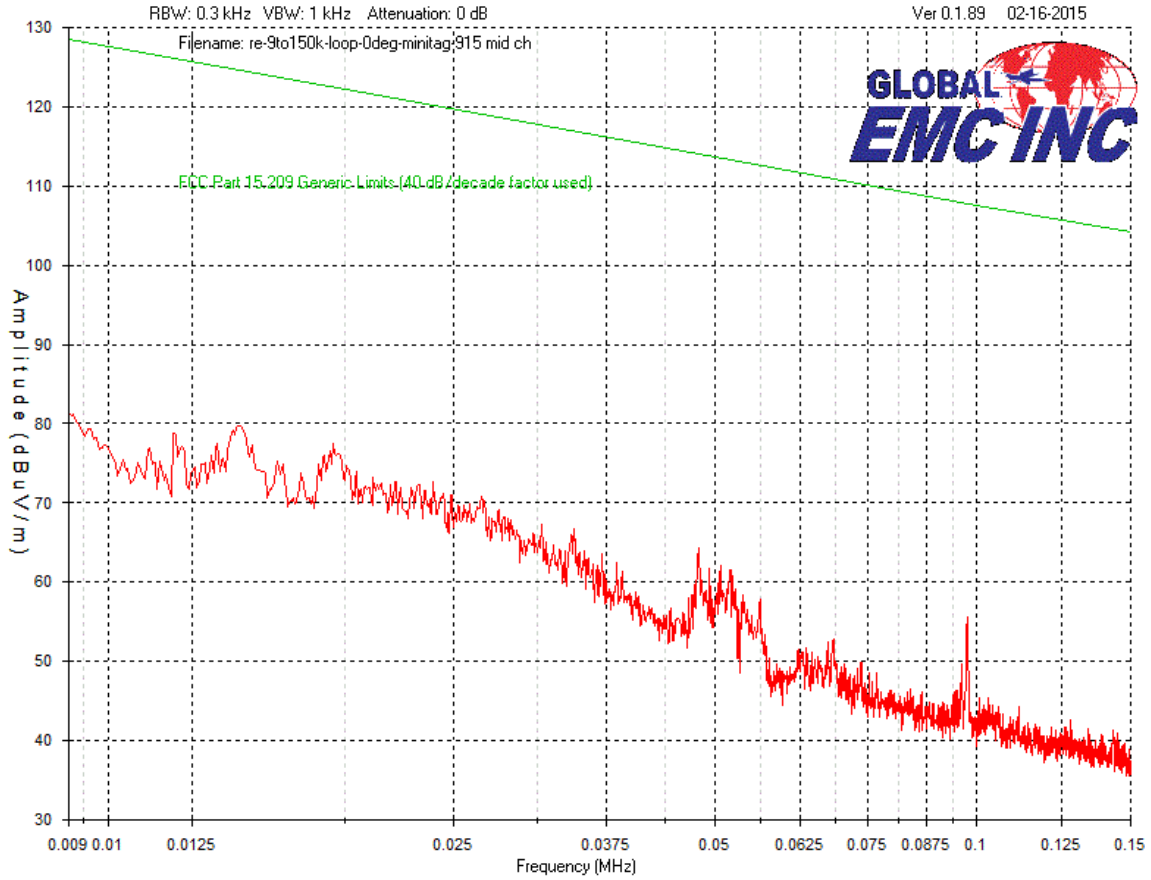
Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graph shown below is a maximized peak measurement graph, measured with a resolution bandwidth greater than the final required detector and over a full 0-360 rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings. Final measurements are performed over a full 0-360 degrees rotation and 1 – 4 meter height of measurement antenna.


In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10<sup>th</sup> harmonic ( a minimum of a 10 GHz).

Devices scanned above 1GHz may be scanned at a closer test distance, and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz, and 40 dB/decade below 30 MHz.

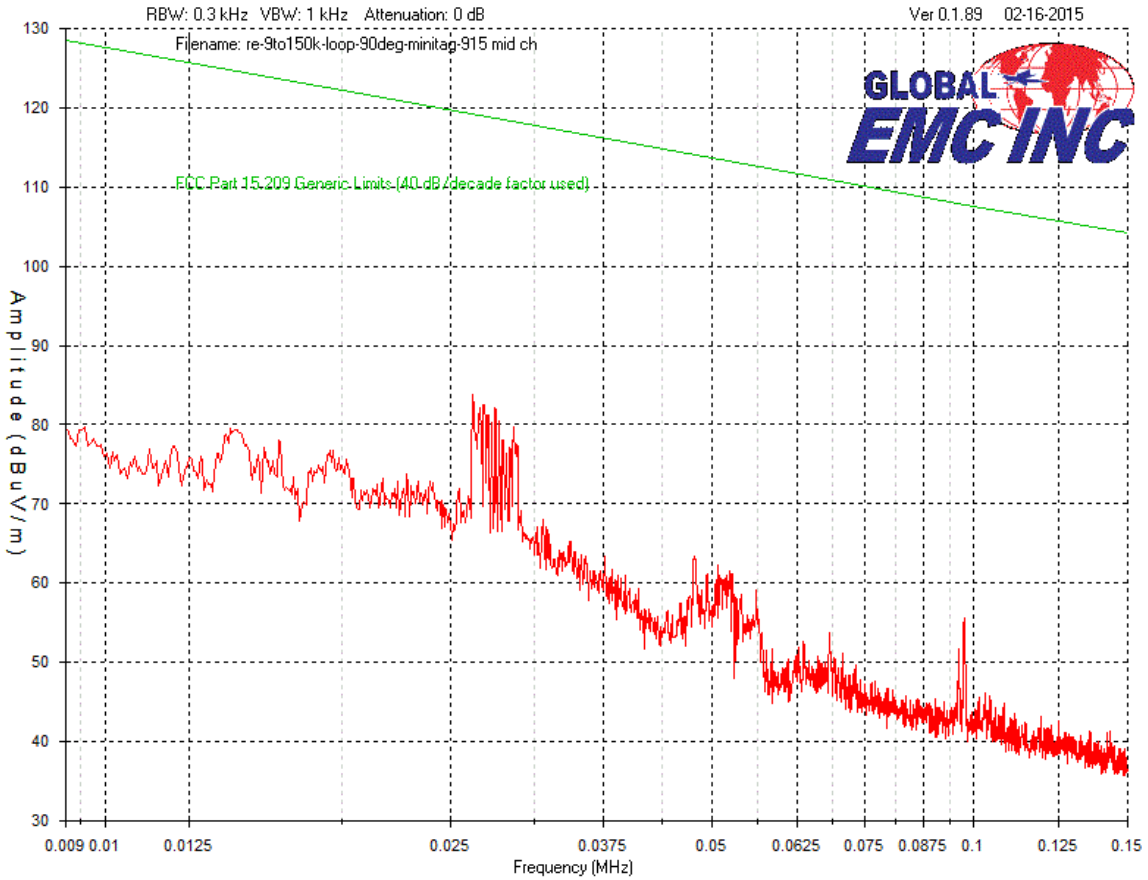
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9 kHz to 150 kHz – Loop @ 0 degree



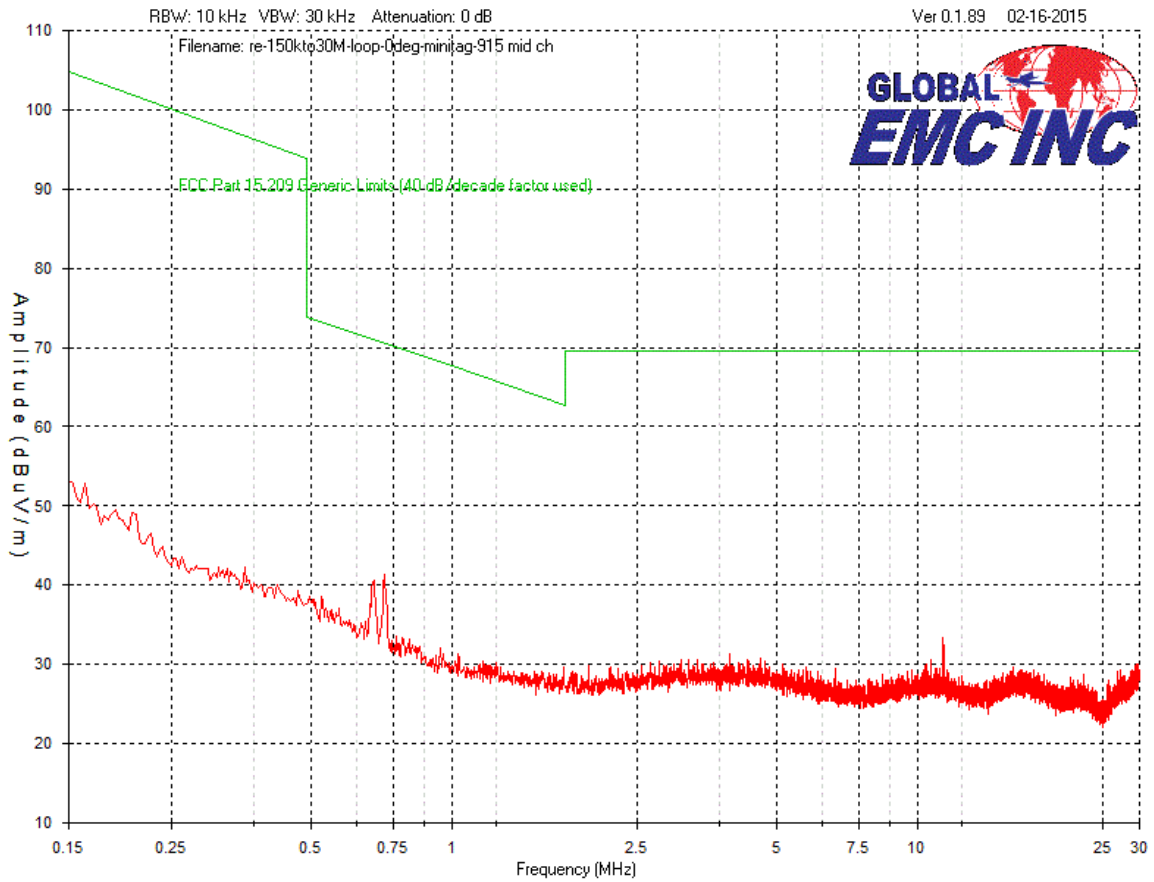
Client	<b>Tag Tracking Inc.</b>	
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9 kHz to 150 kHz – Loop @ 90 degree



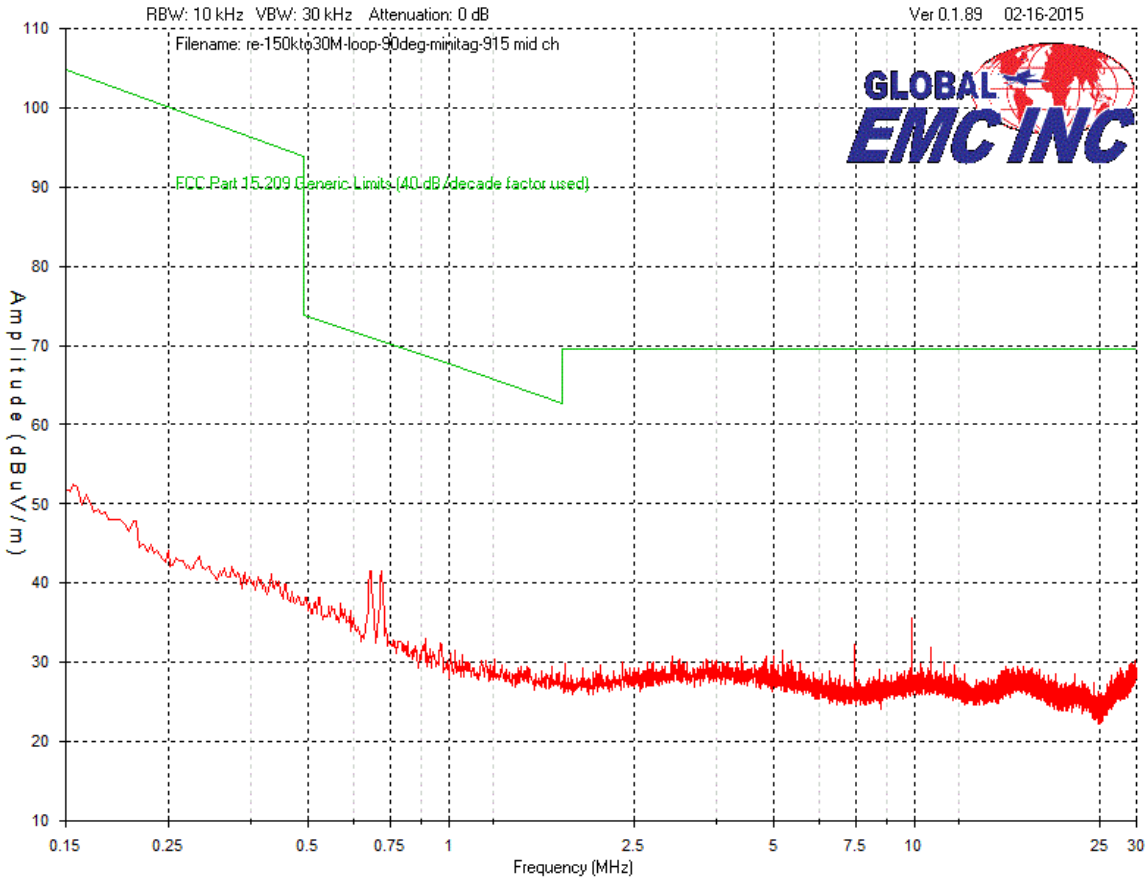
Client	<b>Tag Tracking Inc.</b>	
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150 kHz to 30 MHz - Loop @ 0 degree



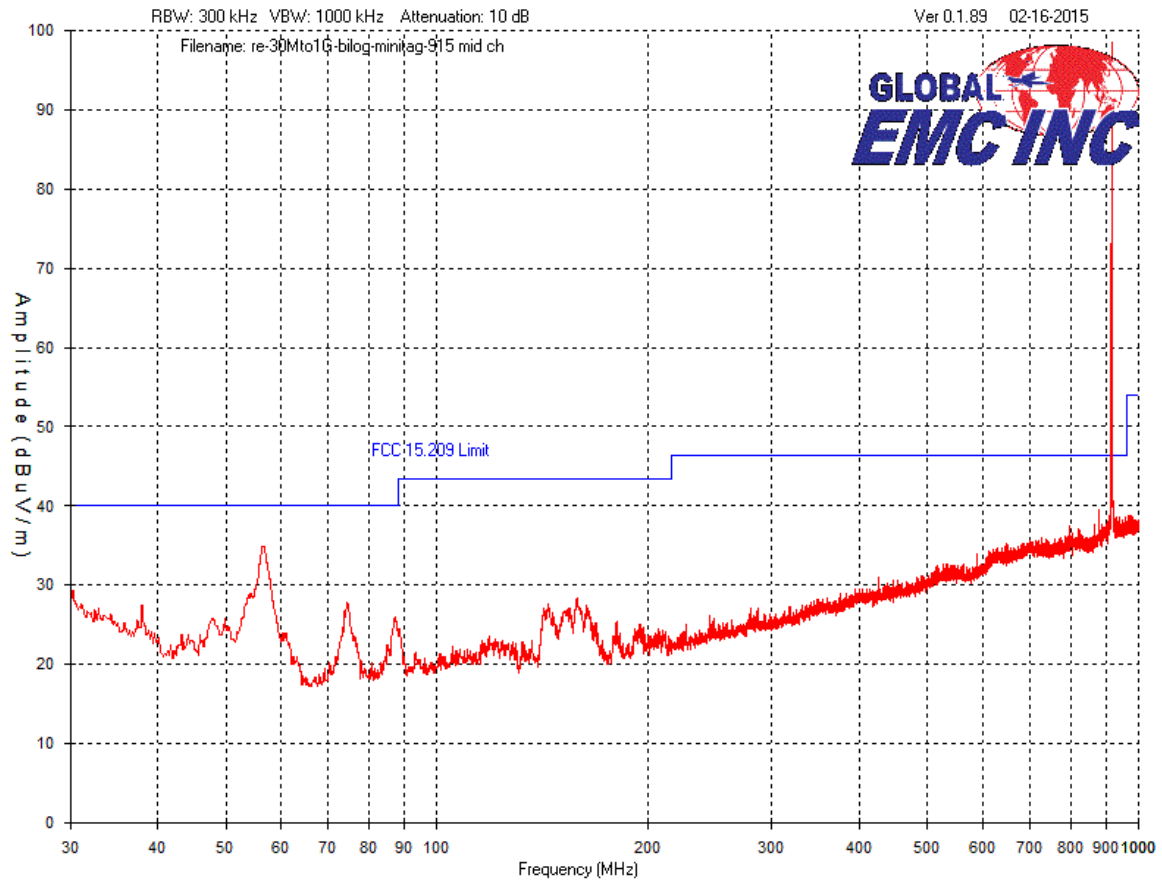
Client	<b>Tag Tracking Inc.</b>	
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150 kHz to 30 MHz - Loop @ 90 degree

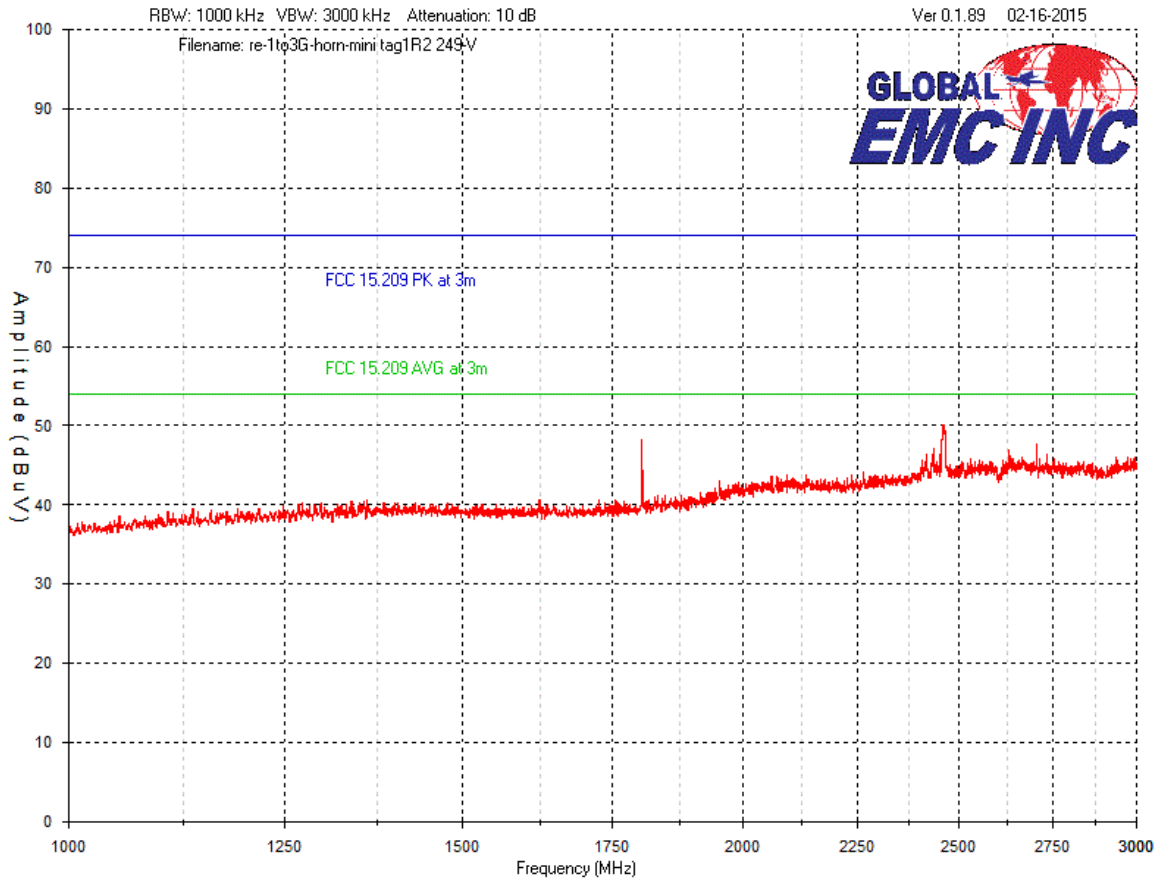



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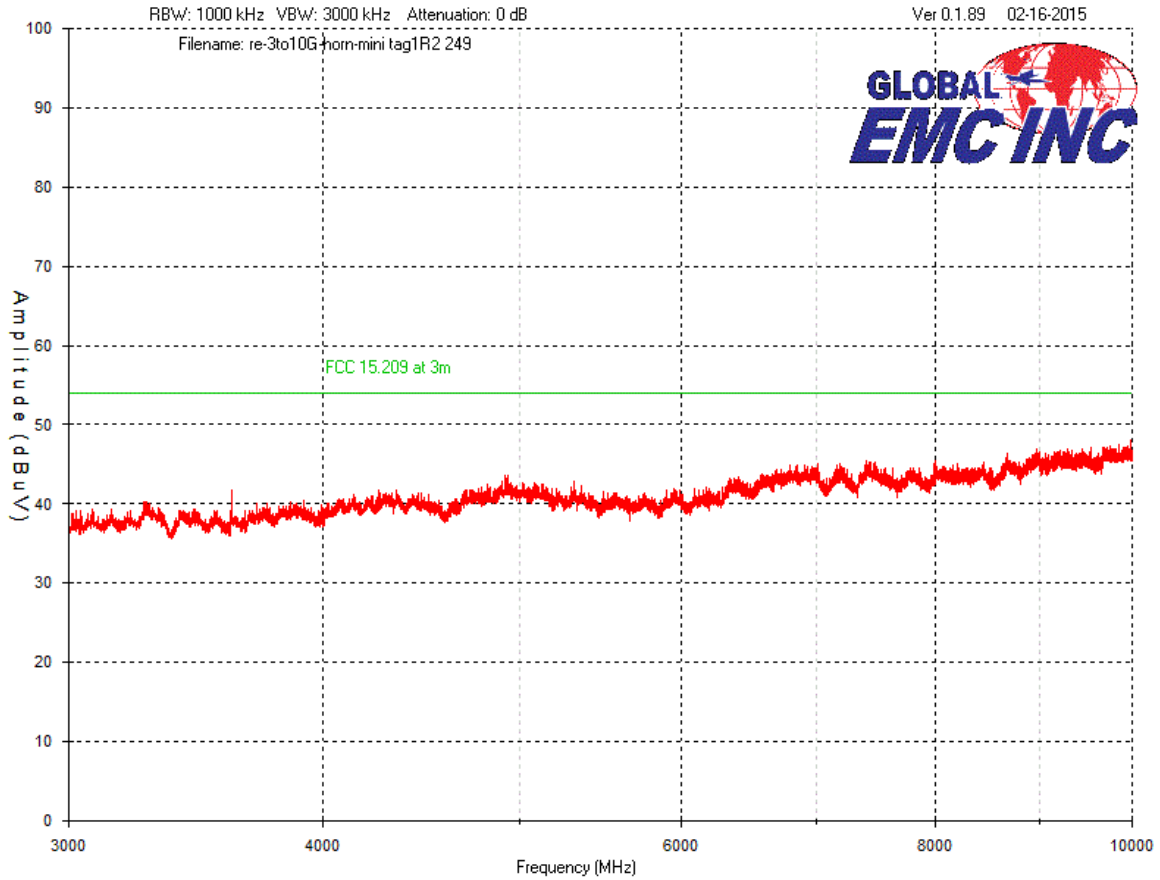
### Vertical – Peak Emissions Graph




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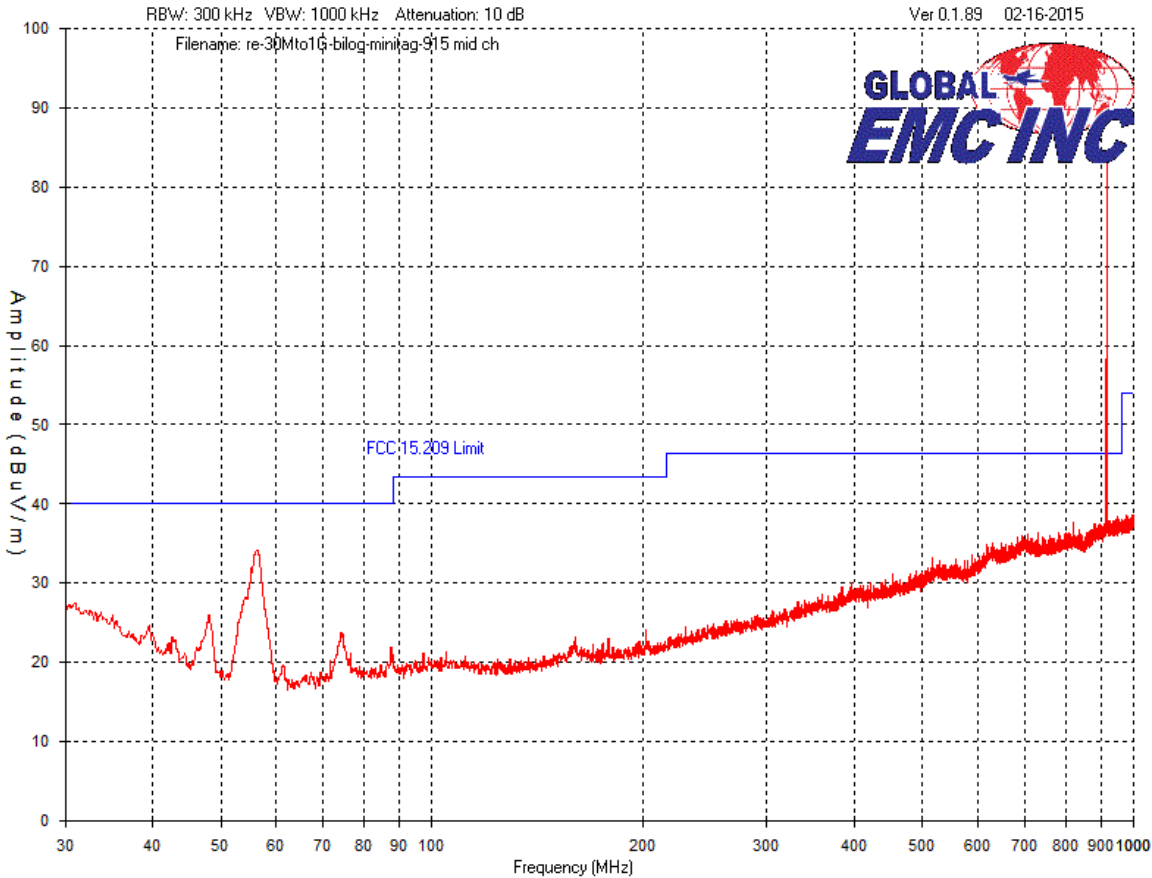



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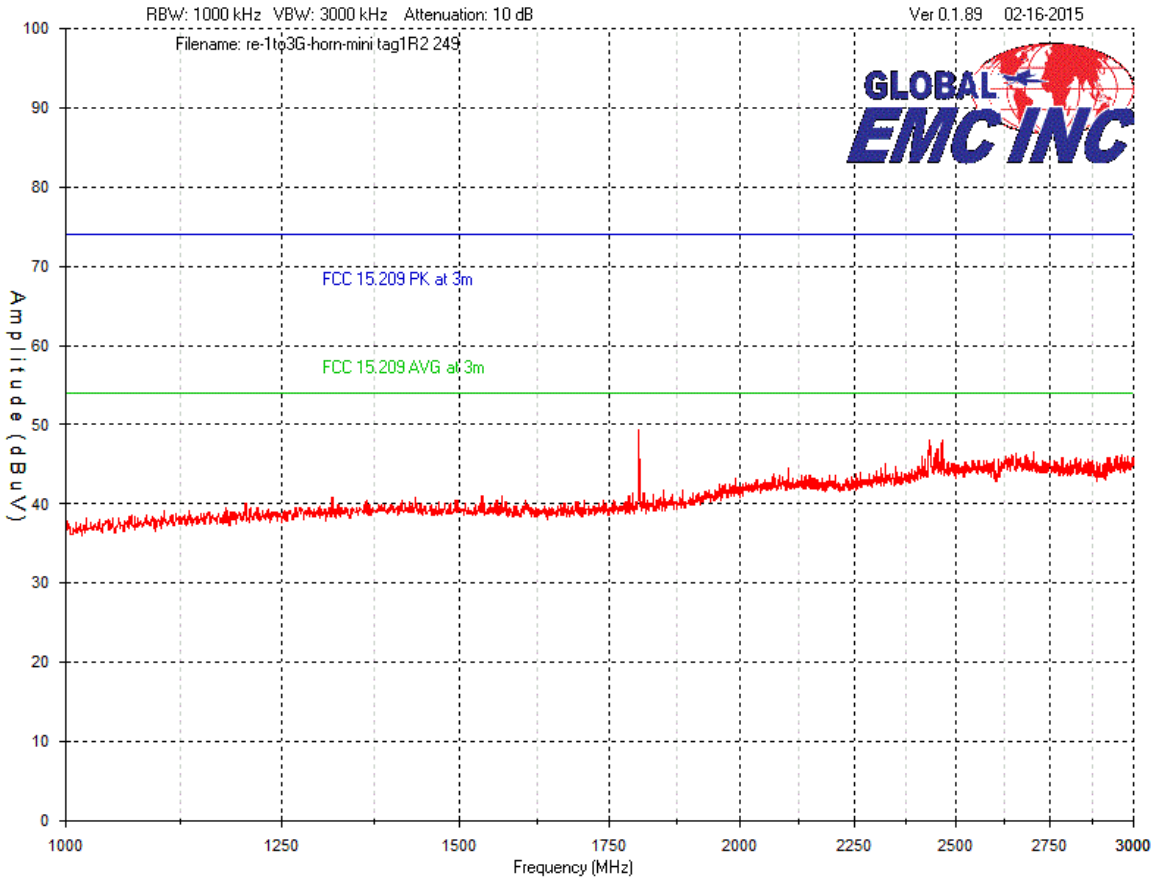



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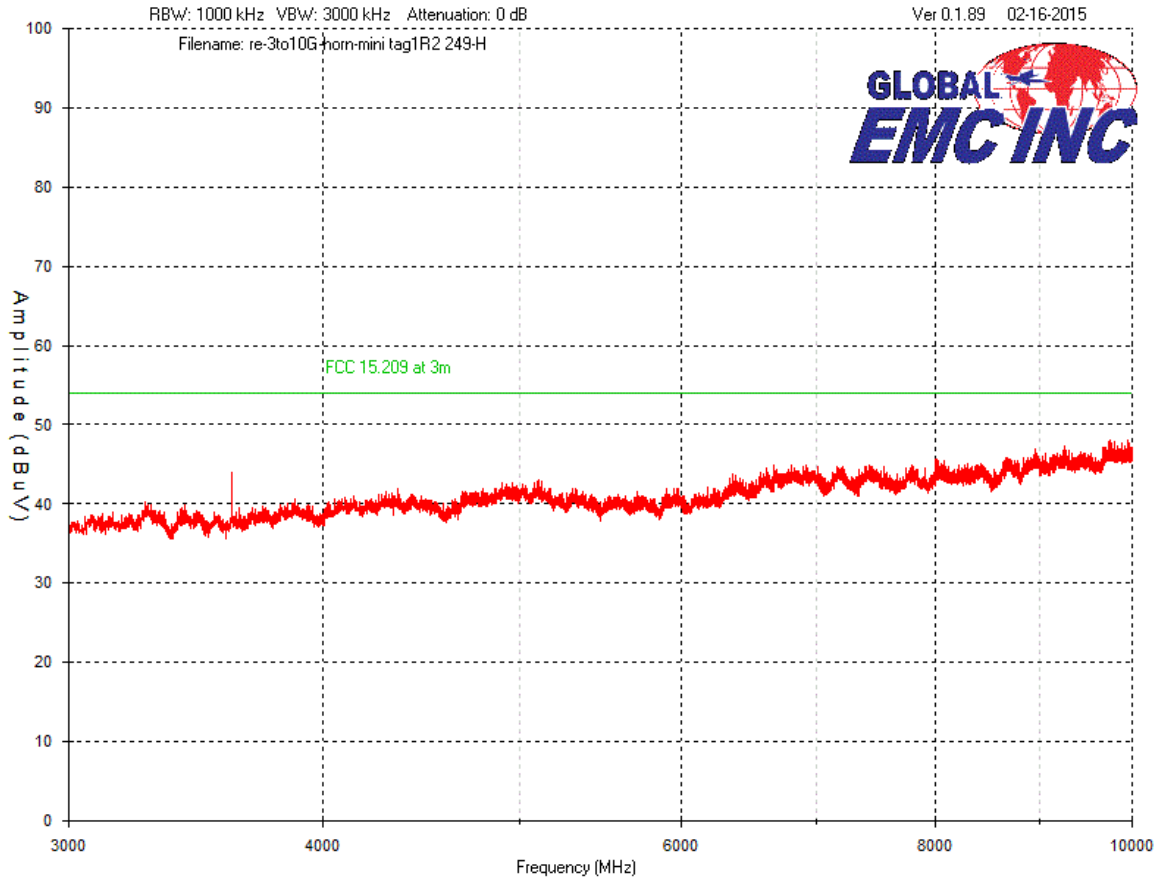
Horizontal – Peak Emissions Graph




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## Final Measurements

The following measurements were made at the harmonics.

Test Freq. (MHz)	Det. mode	Ant. Pol. (H/V)	Raw signal dB( $\mu$ V)	Ant. factor dB	Cable loss dB	Pre-Amp Gain dB	Pre-sel /atten. dB	Received signal dB( $\mu$ V/m)	Emission limit dB( $\mu$ V/m)	Margin dB( $\mu$ V)	Result
<b>Low Channel</b>											
902.6	Peak	H	77.9	24	2.8	-28.4	3	79.3	94.0	14.7	PASS
902.6	Peak	V	91.6	24	2.8	-28.4	3	93	94.0	1.0	PASS
1805.2	Peak	H	55.1	25.2	4.1	-33.1	0	51.3	74.0	22.7	PASS
2707.8	Peak	H	47.7	28.9	5.3	-33.1	0	48.8	74.0	25.2	PASS
3610.4	Peak	H	49.8	30.2	6.6	-32.9	0	53.7	74.0	20.3	PASS
4513.0	Peak	H	43.7	32.1	6.9	-32.9	0	49.8	74.0	24.2	PASS
5415.6	Peak	H	43.1	33.3	7.5	-32.7	0	51.2	74.0	22.8	PASS
6318.2	Peak	H	47.5	35.6	8.3	-32.8	0	58.6	74.0	15.4	PASS
7220.8	Peak	H	48.2	37.8	8.7	-33.0	0	61.7	74.0	12.3	PASS
1805.2	Peak	V	53.8	25.2	4.1	-33.1	0	50.0	74.0	24.0	PASS
2707.8	Peak	V	49.1	28.9	5.3	-33.1	0	50.2	74.0	23.8	PASS
3610.4	Peak	V	49.5	30.2	6.6	-32.9	0	53.4	74.0	20.6	PASS
4513.0	Peak	V	42.7	32.1	6.9	-32.9	0	48.8	74.0	25.2	PASS
5415.6	Peak	V	43.5	33.3	7.5	-32.7	0	51.6	74.0	22.4	PASS
6318.2	Peak	V	46.8	35.6	8.3	-32.8	0	57.9	74.0	16.1	PASS
7220.8	Peak	V	46.5	37.8	8.7	-33.0	0	60.0	74.0	14.0	PASS
1805.2	Avg	H	54.3	25.2	4.1	-33.1	0	50.5	54.0	3.5	PASS
2707.8	Avg	H	37.5	28.9	5.3	-33.1	0	38.6	54.0	15.4	PASS
3610.4	Avg	H	43.6	30.2	6.6	-32.9	0	47.5	54.0	6.5	PASS
4513.0	Avg	H	28.9	32.1	6.9	-32.9	0	35.0	54.0	19.0	PASS
5415.6	Avg	H	29.7	33.3	7.5	-32.7	0	37.8	54.0	16.2	PASS
6318.2	Avg	H	34.5	35.6	8.3	-32.8	0	45.6	54.0	8.4	PASS
7220.8	Avg	H	34.6	37.8	8.7	-33.0	0	48.1	54.0	5.9	PASS
1805.2	Avg	V	50.2	25.2	4.1	-33.1	0	46.4	54.0	7.6	PASS
2707.8	Avg	V	42.5	28.9	5.3	-33.1	0	43.6	54.0	10.4	PASS
3610.4	Avg	V	38.5	30.2	6.6	-32.9	0	42.4	54.0	11.6	PASS
4513.0	Avg	V	32.4	32.1	6.9	-32.9	0	38.5	54.0	15.5	PASS

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5415.6	Avg	V	28.9	33.3	7.5	-32.7	0	37.0	54.0	17.0	PASS
6318.2	Avg	V	34.1	35.6	8.3	-32.8	0	45.2	54.0	8.8	PASS
7220.8	Avg	V	33.8	37.8	8.7	-33.0	0	47.3	54.0	6.7	PASS
<b>Mid channel</b>											
915	Peak	H	77.7	24	2.8	-28.4	3	79.1	94.0	14.9	PASS
915	Peak	V	90.7	24	2.8	-28.4	3	92.1	94.0	1.9	PASS
1830.0	Peak	H	56.4	25.2	4.1	-33.1	0	52.6	74.0	21.4	PASS
2745.0	Peak	H	48.9	28.9	5.3	-33.1	0	50.0	74.0	24.0	PASS
3660.0	Peak	H	48.5	30.2	6.6	-32.9	0	52.4	74.0	21.6	PASS
4575.0	Peak	H	46.5	32.1	6.9	-32.9	0	52.6	74.0	21.4	PASS
5490.0	Peak	H	44.9	33.3	7.5	-32.7	0	53.0	74.0	21.0	PASS
6405.0	Peak	H	49.9	35.6	8.3	-32.8	0	61.0	74.0	13.0	PASS
7320.0	Peak	H	48.5	37.8	8.7	-33.0	0	62.0	74.0	12.0	PASS
1830.0	Peak	V	53.5	25.2	4.1	-33.1	0	49.7	74.0	24.3	PASS
2745.0	Peak	V	49.6	28.9	5.3	-33.1	0	50.7	74.0	23.3	PASS
3660.0	Peak	V	49.8	30.2	6.6	-32.9	0	53.7	74.0	20.3	PASS
4575.0	Peak	V	46.8	32.1	6.9	-32.9	0	52.9	74.0	21.1	PASS
5490.0	Peak	V	55.5	33.3	7.5	-32.7	0	63.6	74.0	10.4	PASS
6405.0	Peak	V	48.1	35.6	8.3	-32.8	0	59.2	74.0	14.8	PASS
7320.0	Peak	V	47.2	37.8	8.7	-33.0	0	60.7	74.0	13.3	PASS
1830.0	Avg	H	53.6	25.2	4.1	-33.1	0	49.8	54.0	4.2	PASS
2745.0	Avg	H	40.5	28.9	5.3	-33.1	0	41.6	54.0	12.4	PASS
3660.0	Avg	H	43.5	30.2	6.6	-32.9	0	47.4	54.0	6.6	PASS
4575.0	Avg	H	31.1	32.1	6.9	-32.9	0	37.2	54.0	16.8	PASS
5490.0	Avg	H	29.8	33.3	7.5	-32.7	0	37.9	54.0	16.1	PASS
6405.0	Avg	H	35.1	35.6	8.3	-32.8	0	46.2	54.0	7.8	PASS
7320.0	Avg	H	34.5	37.8	8.7	-33.0	0	48.0	54.0	6.0	PASS
1830.0	Avg	V	49.5	25.2	4.1	-33.1	0	45.7	54.0	8.3	PASS
2745.0	Avg	V	42.5	28.9	5.3	-33.1	0	43.6	54.0	10.4	PASS
3660.0	Avg	V	39.5	30.2	6.6	-32.9	0	43.4	54.0	10.6	PASS
4575.0	Avg	V	33.8	32.1	6.9	-32.9	0	39.9	54.0	14.1	PASS
5490.0	Avg	V	29.8	33.3	7.5	-32.7	0	37.9	54.0	16.1	PASS
6405.0	Avg	V	34.1	35.6	8.3	-32.8	0	45.2	54.0	8.8	PASS
7320.0	Avg	V	33.9	37.8	8.7	-33.0	0	47.4	54.0	6.6	PASS
<b>High channel</b>											
927.4	Peak	H	78.2	24	2.8	-28.4	3	79.6	94.0	14.4	PASS
927.4	Peak	V	90.6	24	2.8	-28.4	3	92.0	94.0	2.0	PASS
1854.8	Peak	H	47.8	28.9	5.3	-33.1	0	48.9	74.0	25.1	PASS
2782.2	Peak	H	52.1	30.2	6.6	-32.9	0	56.0	74.0	18.0	PASS


Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

3709.6	Peak	H	43.5	32.1	6.9	-32.9	0	49.6	74.0	24.4	PASS
4637.0	Peak	H	43.1	33.3	7.5	-32.7	0	51.2	74.0	22.8	PASS
5564.4	Peak	H	48.1	35.6	8.3	-32.8	0	59.2	74.0	14.8	PASS
6491.8	Peak	H	49.5	37.8	8.7	-33.0	0	63.0	74.0	11.0	PASS
7419.2	Peak	H	47.8	28.9	5.3	-33.1	0	48.9	74.0	25.1	PASS
1854.8	Peak	V	53.1	25.2	4.1	-33.1	0	49.3	74.0	24.7	PASS
2782.2	Peak	V	49.1	28.9	5.3	-33.1	0	50.2	74.0	23.8	PASS
3709.6	Peak	V	48.5	30.2	6.6	-32.9	0	52.4	74.0	21.6	PASS
4637.0	Peak	V	45.2	32.1	6.9	-32.9	0	51.3	74.0	22.7	PASS
5564.4	Peak	V	43.5	33.3	7.5	-32.7	0	51.6	74.0	22.4	PASS
6491.8	Peak	V	47.6	35.6	8.3	-32.8	0	58.7	74.0	15.3	PASS
7419.2	Peak	V	47.6	37.8	8.7	-33.0	0	61.1	74.0	12.9	PASS
1854.8	Avg	H	46.3	25.2	4.1	-33.1	0	42.5	54.0	11.5	PASS
2782.2	Avg	H	38.5	28.9	5.3	-33.1	0	39.6	54.0	14.4	PASS
3709.6	Avg	H	38.6	30.2	6.6	-32.9	0	42.5	54.0	11.5	PASS
4637.0	Avg	H	29.8	32.1	6.9	-32.9	0	35.9	54.0	18.1	PASS
5564.4	Avg	H	31.1	33.3	7.5	-32.7	0	39.2	54.0	14.8	PASS
6491.8	Avg	H	33.1	35.6	8.3	-32.8	0	44.2	54.0	9.8	PASS
7419.2	Avg	H	35.9	37.8	8.7	-33.0	0	49.4	54.0	4.6	PASS
1854.8	Avg	V	49.5	25.2	4.1	-33.1	0	45.7	54.0	8.3	PASS
2782.2	Avg	V	42.1	28.9	5.3	-33.1	0	43.2	54.0	10.8	PASS
3709.6	Avg	V	39.8	30.2	6.6	-32.9	0	43.7	54.0	10.3	PASS
4637.0	Avg	V	29.1	32.1	6.9	-32.9	0	35.2	54.0	18.8	PASS
5564.4	Avg	V	29.3	33.3	7.5	-32.7	0	37.4	54.0	16.6	PASS
6491.8	Avg	V	33.9	35.6	8.3	-32.8	0	45.0	54.0	9.0	PASS
7419.2	Avg	V	33.8	37.8	8.7	-33.0	0	47.3	54.0	6.7	PASS

Note: Up to the 10<sup>th</sup> harmonics were measured on all three channels, no emissions were detected above the 8<sup>th</sup> harmonic at 3 meter. The noise floor is lower than the limits.

None of the unintentional radiated emissions that fall outside of the restricted bands exceeded the -50dBc requirement.


Note: During the tests, EUT was operating in a continuous transmit mode in which it is transmitting at a 100% duty cycle.

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

## Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Spectrum Analyzer	8566B	HP	1-28-15	1-28-17	4169
Quasi Peak Adapter	85650A	HP	1-28-15	1-28-17	4170
Loop Antenna	EM 6879	Electro-Metrics	10-11-13	10-11-15	4040
BiLog Antenna	3142-C	ETS	4/25/13	4/25/15	4002
Attenuator 3 dB	FP-50-3	Trilithic	1-28-15	1-28-17	4028
9kHz-1GHz, 28dB preamp	LNA 6901	Teseq	8-6-13	8-6-15	4036
Horn Antenna	ATH1G18G	AR	4/3/13	4/3/15	4003
1GHz-26.5GHz preamp	HP 8449B	HP	4/25/13	4/25/15	4006
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	1-28-15	1-28-17	4026
RF Cable 1M	LMR-400-1M-50OHM-MN-MN	LexTec	1-28-15	1-28-17	4039
RF Cable 10m	LMR-400-10M-50OHM-MN-MN	LexTec	1-28-15	1-28-17	4025
Hewlett Packard Preselector	8445B	HP	1-28-15	1-28-17	6364
Notch Filter	BRC50722	MICRO-TRONICS	2013-04-02	2015-04-02	186
Emission software	0.1.87	Global EMC	NCR	NCR	58

1: For cables and attenuators, verification dates apply.

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

### ***Channel Carrier Bandwidth***

#### **Purpose**


The purpose of this test is to allow for results that is used to help establish other limits. Although there is not specific limit for this requirement, the derived limits dependant on this information helps allow for other spread spectrum devices to co-exist in the same frequency spectrum.. This also helps prevent corruption of data by ensuring adequate channel separation to distinguish the reception of the intended information.

#### **Limits**

There is no specified limit.

#### **Results**

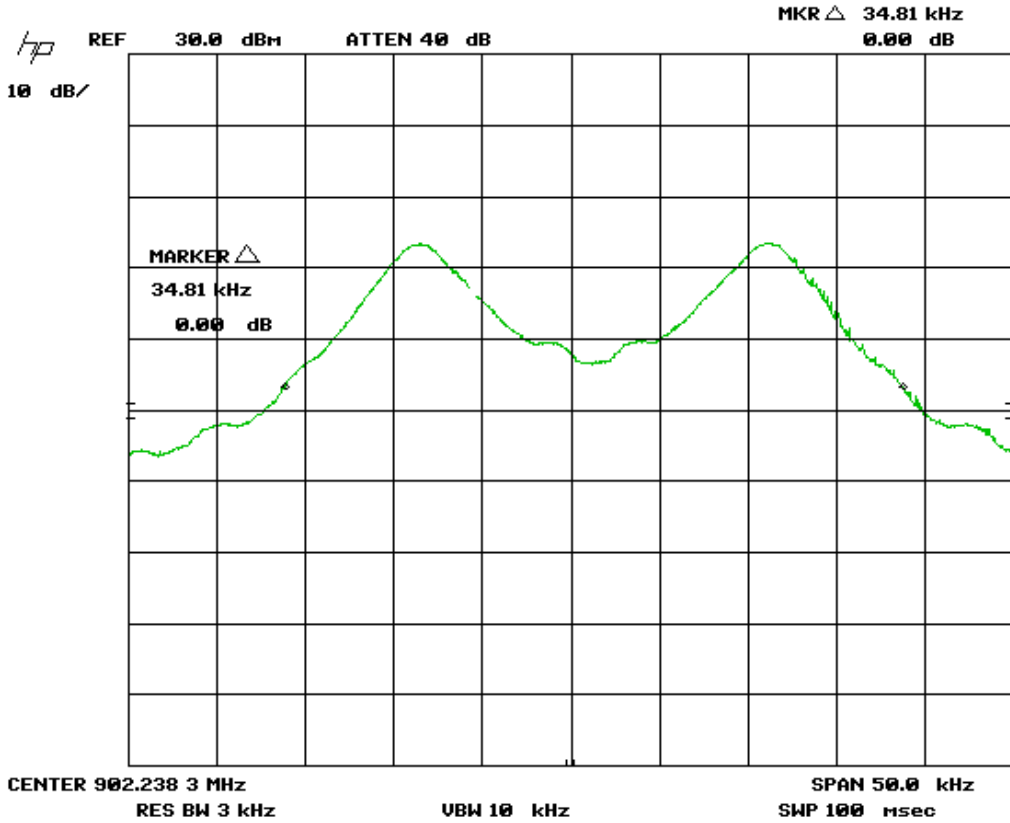
The EUT passed. The 20 dB BW measured was 35.2 kHz.


Client	Tag Tracking Inc.	
Product	TAG_X_MINI(Model C001)	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

**Graph(s)**

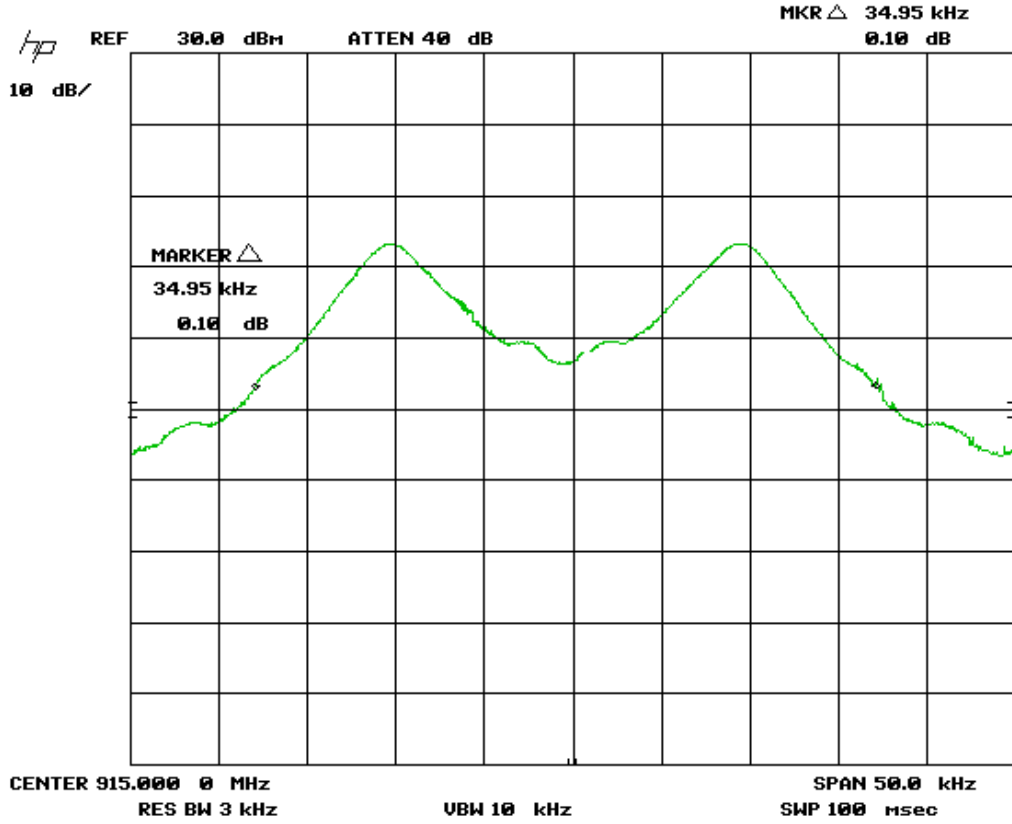
The graphs shown below shows the channel spacing during the operation of the device. This is measured by a max hold on the spectrum analyzer and the highest resolution bandwidth that is sufficiently low to exhibit the 20 dB bandwidth of a channel during operation of the EUT. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute.


Low channel



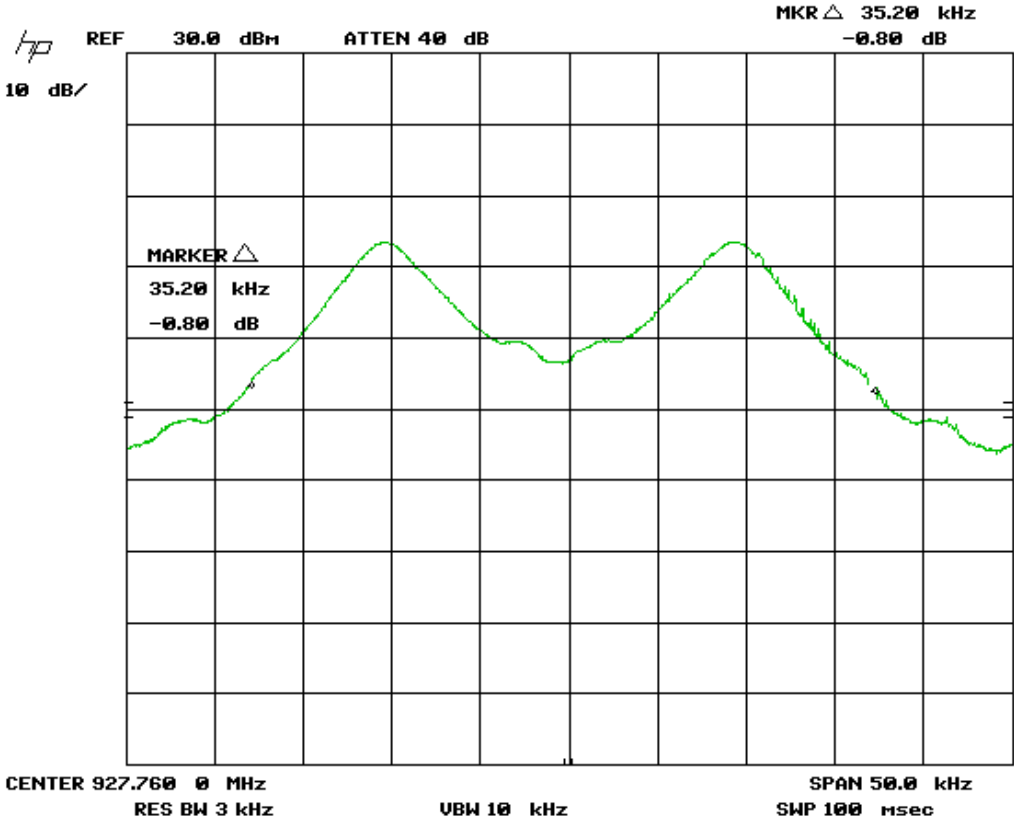
Client	Tag Tracking Inc.	
Product	TAG_X_MINI(Model C001)	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

Mid channel




Client	Tag Tracking Inc.	
Product	TAG_X_MINI(Model C001)	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

High channel




Note: See ‘Appendix B – EUT & Test Setup Photographs’ for photos showing the test set-up.

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

## Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Attenuator 20 dB	FP-50-20	Trilithic	1-28-15	1-28-17	4038
Power Attenuator 6 dB	100-A- MFN-06	Bird	1-28-15	1-28-17	4010
Spectrum Analyzer Display	8566B	HP	1-28-15	1-28-17	4168
Spectrum Analyzer	8566B	HP	1-28-15	1-28-17	4169
RF Cable 0.5M	LMR-400- 0.5M- 50OHM- MN-MN	LexTec	1-28-15	1-28-17	4029
Screen Capture software	Version 1.3.1	John Miles, KE5FX	NCR	NCR	59

1: For cables and attenuators, verification dates apply.


Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

## Appendix A – EUT Summary

For further details for filing purposes, refer to filing package.


### General EUT Description

Client Details	
Organization / Address	Tag Tracking Inc. 9280 Lacadie Boulevard, Montreal, QC. Canada H4N 3C5
Contact	Jason M Gallovich - President
Phone	P: 514-745-8241 F: 514-745-8630
Email	jmgallovich@tagtracking.ca
EUT (Equipment Under Test) Details	
EUT Name (for report title)	TAG_X_MINI(MODEL C001)
EUT Model / SN (if known)	C001
EUT revision	1R2
Software version	2R0
Equipment category	Transceiver tag
EUT is powered using	Battery
Input voltage range(s) (V)	3.6V
Frequency range(s) (Hz)	902-928 MHz ISM
Rated input current (A)	35mA
Nominal power consumption (W)	180mW
Number of power supplies in EUT	1 Battery
Transmits RF energy? (describe)	-2dBm
Basic EUT functionality description	Automated asset management, identification & tracking
High level block diagram of EUT	

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	


(attachment)	Project_X_MINI_1R2
Modes of operation	Digital
Frequency of all clocks present in EUT	8MHz, 19.68MHz
Dimensions of product	L 140mm W 34mm H 35mm

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT & Test Setup Photographs’.

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	


## Appendix B – EUT and Test Setup Photographs

Note: These photos are for information purposes only. Also refer to PDF files that are separate from this test report.

Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	


**Radiated Emission Test Setup Photo#1:**



Client	<b>Tag Tracking Inc.</b>	
Product	<b>TAG_X_MINI(Model C001)</b>	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

**Radiated Emission Test Setup Photo#2:**



Client	Tag Tracking Inc.	
Product	TAG_X_MINI(Model C001)	
Standard(s)	RSS 210 Issue 8/ FCC Part 15 Subpart C 15	

**Radiated Emission Test Setup Photo#3:**

