



W66 N220 Commerce Court • Cedarburg, WI 53012  
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[www.lsr.com](http://www.lsr.com)

**ENGINEERING TEST REPORT #: 315371**  
**LSR JOB #: C-2372**

Compliance Testing of:

SPPM (Signal Performance Power Magazine)

Test Date(s):

2/22/16 – 5/27/16

Prepared For:

TASER  
Attn: Teri Michaels  
17800 N 85<sup>th</sup> Street  
Scottsdale, AZ 58255

**This Test Report is issued under the Authority of:**

Michael Hintzke, EMC Engineer III

Signature:

Date: 6/6/16

**Reviewed by:**

Adam Alger, Quality Systems Engineer – Test Services

Signature:

Date: 6/6/16

**Project Engineer:**

Michael Hintzke, EMC Engineer III

Signature:

Date: 6/6/16

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## LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

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A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation  
A2LA Certificate Number: 1255.01

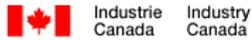
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Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948  
FCC Registration Number: 90756

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**Canada**

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4  
File Number: IC 3088-2

On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4  
File Number: IC 3088-3

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Prepared For: TASER	Name: SPPM
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## Summary of Test Report

Between February 2016 and May 2016 the EUT, SPPM, as provided by TASER, was tested and MEETS the following requirements:

<b>FCC and IC Paragraph</b>	<b>Test Requirements</b>	<b>Compliance (Yes/No)</b>
FCC: 15.247 (a)(2) IC: RSS-247 sect. 5.2 (1) IC: RSS-Gen sect. 6.6	Minimum 6 dB Bandwidth / Occupied Bandwidth	Yes
FCC: 15.247 (b)(3) & 1.1310 IC: RSS-247 sect. 5.4 (4)	Maximum Output Power	Yes
FCC: 15.247 (e) IC: RSS-247 sect. 5.2 (2)	Power Spectral Density of a Digitally Modulated System	Yes
FCC: 15.247(d) IC: RSS-247 sect. 5.5	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
FCC: 15.209 & 15.205 IC: RSS-Gen sect 6.13	Transmitter Radiated Emissions	Yes
FCC: 15.109 IC: RSS-Gen sect 7.1	Receive Mode (Digital Device) Radiated Emissions	Yes
FCC: 2.1055 (d) IC: RSS Gen sect. 6.11	Frequency Stability	Yes
FCC : 15.207 IC : RSS Gen sect. 8.8	AC Power Line Conducted Emissions	N/A <sup>1</sup>

Note 1: Device is only powered from battery.

### Test Facilities

All testing was performed at:

LS Research, LLC  
W66 N220 Commerce Court  
Cedarburg, Wisconsin, 53012 USA

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to the requirements of ISO/IEC 17025, 2005 “General Requirements for the Competence of Calibration and Testing Laboratories”.

LS Research, LLC’s scope of accreditation includes all test methods listed herein, unless otherwise noted.

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### 3.0 Client Information

<b>Manufacturer Name:</b>	TASER
<b>Address:</b>	17800 N 85 <sup>th</sup> Street, Scottsdale AZ 58255
<b>Contact Person:</b>	Teri Michaels

### 3.1 Equipment Under Test (EUT) Information

*The following information has been supplied by the applicant.*

<b>Product Name:</b>	SPPM (Signal Performance Power Magazine)
<b>Model Number:</b>	T00074 T00075 T00076
<b>Serial Number:</b>	Engineering Samples
<b>FCC ID</b>	X4GS00833
<b>IC ID</b>	8803A-S00833

### 3.2 Product Information

The SPPM (Signal Performance Power Magazine) contains a BLE system-in-package module for BLE applications that enable wireless RF interfaces for video products, mobile phones, or other Bluetooth® Smart Ready devices.

### 3.3 Modifications Incorporated In the EUT for Compliance Purposes

None

### 3.4 Deviations & Exclusions from Test Specifications

None noted at time of test

### 3.5 Additional Information

EUT programmed for continuous transmit or receive via UART to USB cable connected to a laptop computer running Broadcom BlueTool Version 1.8.4.6.. Test channels; Low Channel (2402 MHz), Mid Channel (2440 MHz), and High Channel (2480 MHz).

The data represented within the following test report was obtained testing the following SPPM model number:

T00074

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#### 4.0 Conditions of Test

Environmental:

Temperature: 20-25° C  
Relative Humidity: 30-60%  
Atmospheric Pressure: 86-106 kPa

#### 5.0 Test Equipment

All test equipment is calibrated by a calibration laboratory accredited by A2LA to the requirements of ISO 17025. For a complete list of test equipment and calibration dates, see Appendix A. Unless otherwise noted, resolution bandwidth of measuring instrument used during testing for given frequency range, see below.

Frequency Range	Resolution Bandwidth
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz
30 MHz – 1000 MHz	120 kHz
Above 1000 MHz	1 MHz

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## 6.0 Conformance Summary

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Part 15.247, 15.109, Industry Canada RSS-247, Issue 1 (2015) and RSS-Gen Issue 4 (2014).

If some emissions are seen to be within 3 dB of their respective limits:

As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

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# Appendix A – Test Equipment



Date : 22-Feb-2016 Type Test : BLE bandwidths Job # : C-2372  
 Prepared By : Mike Hintzke Customer : TASER Quote # : 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration

Project Engineer: *Mike Hintzke* Quality Assurance: *John*



Date : 22-Feb-2016 Type Test : BLE conducted output power Job # : C-2372  
 Prepared By : Mike Hintzke Customer : TASER Quote # : 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration

Project Engineer: *Mike Hintzke* Quality Assurance: *John*



Date : 22-Feb-2016 Type Test : BLE PSD Job # : C-2372  
 Prepared By : Mike Hintzke Customer : TASER Quote # : 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration

Project Engineer: *Mike Hintzke* Quality Assurance: *John*



Date : 22-Feb-2016 Type Test : BLE 100kHz Spurs Job # : C-2372  
 Prepared By : Mike Hintzke Customer : TASER Quote # : 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration

Project Engineer: *Mike Hintzke* Quality Assurance: *John*



Date : 22-Feb-2016 Type Test : BLE frequency stability Job # : C-2372  
 Prepared By : Mike Hintzke Customer : TASER Quote # : 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration

Project Engineer: *Mike Hintzke* Quality Assurance: *John*

Prepared For: TASER	Name: SPPM
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Date : 22-Feb-2016 Type Test : BLE radiated bandedge Job # : C-2372

Prepared By: Mike Hintzke Customer : TASER Quote #: 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	8GHz M×E Spectrum Analyzer	Agilent	N9038A	MY51210138	2/24/2016	2/24/2017	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration

Project Engineer: Quality Assurance:



Date : 22-Feb-2016 Type Test : BLE radiated tx spurs Job # : C-2372

Prepared By: Mike Hintzke Customer : TASER Quote #: 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
2	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	2VA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration
3	EE 960085	N9038A M×E 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
4	AA 960174	Small Horn Antenna 18-40 GHz	ETS-Lindgren	3116C-PA	00206880	4/23/2016	4/23/2017	Active Calibration
5	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	Verification	Verification	System
6	AA 960150	Biconical Antenna	ETS	3110B	0003-3346	2/12/2016	2/12/2017	Active Calibration
7	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	3/31/2016	3/31/2017	Active Calibration

Project Engineer: Quality Assurance:



Date : 22-Feb-2016 Type Test : BLE radiated rx spurs Job # : C-2372

Prepared By: Mike Hintzke Customer : TASER Quote #: 315371

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A M×E 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
3	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	2VA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration
4	AA 960174	Small Horn Antenna 18-40 GHz	ETS-Lindgren	3116C-PA	00206880	4/23/2016	4/23/2017	Active Calibration
5	AA 960144	Phaseflex	Gore	EKD01D010720	5800373	Verification	Verification	System
6	AA 960150	Biconical Antenna	ETS	3110B	0003-3346	2/12/2016	2/12/2017	Active Calibration
7	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	3/31/2016	3/31/2017	Active Calibration

Project Engineer: Quality Assurance:

Prepared For: TASER	Name: SPPM
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## Appendix B – Test Data

### B.1 – RF Conducted Emissions

<b>Manufacturer</b>	TASER
<b>Test Location</b>	LS Research, LLC
<b>Rule Part</b>	FCC Part 15.247 / RSS-247
<b>General Measurement Procedure</b>	FCC KDB 558074 D01 DTS Meas Guidance v03r05 ANSI C63.10-2013
<b>General Description of Measurement</b>	A direct measurement of the transmitted signal was performed at the antenna port of the EUT via a cable connection to a spectrum analyzer. An attenuator was placed in series with the cable to protect the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements, without the need for any further corrections. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source.

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### B.1.1 – RF Conducted – Fundamental Bandwidth

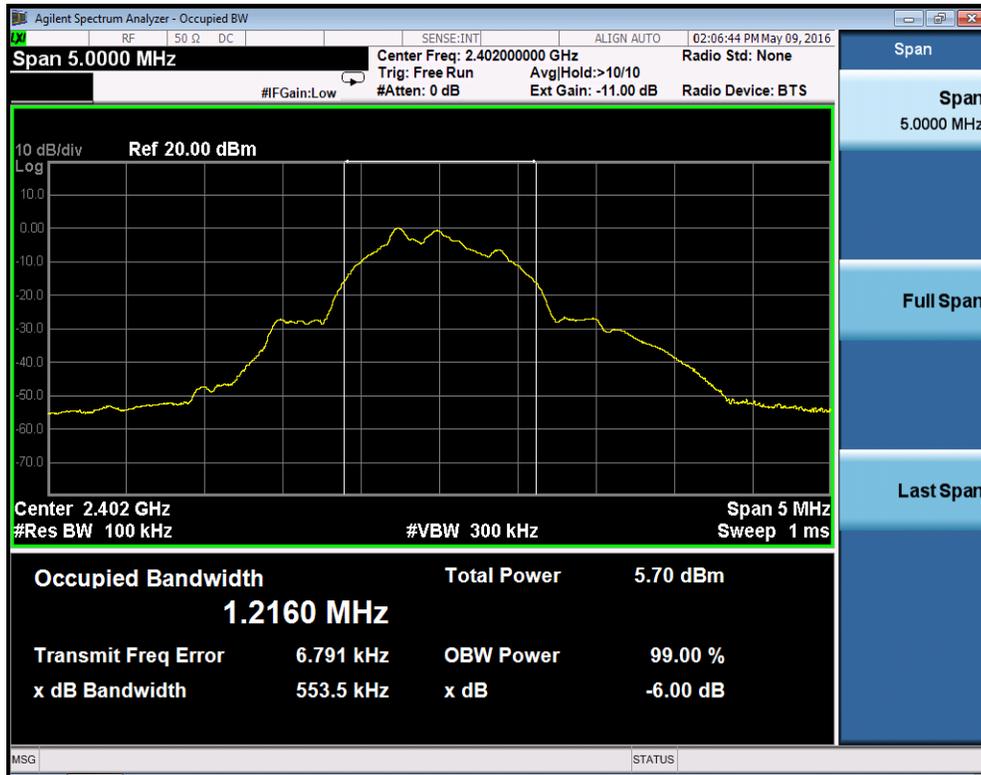
<b>Manufacturer</b>	TASER
<b>Date</b>	5/9/16
<b>Operator</b>	Michael Hintzke
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.
<b>Rule Part</b>	FCC Part 15.247 (a)(2) / RSS-247 sect. 5.2 (1)
<b>Specific Measurement Procedure</b>	FCC KDB 558074 Section 8.0 DTS bandwidth ANSI C63.10 2013 RSS-GEN Section 6.6
<b>Additional Description of Measurement</b>	Peak detector used
<b>Additional Notes</b>	1. Continuous transmit modulated used for this test.

**Table**

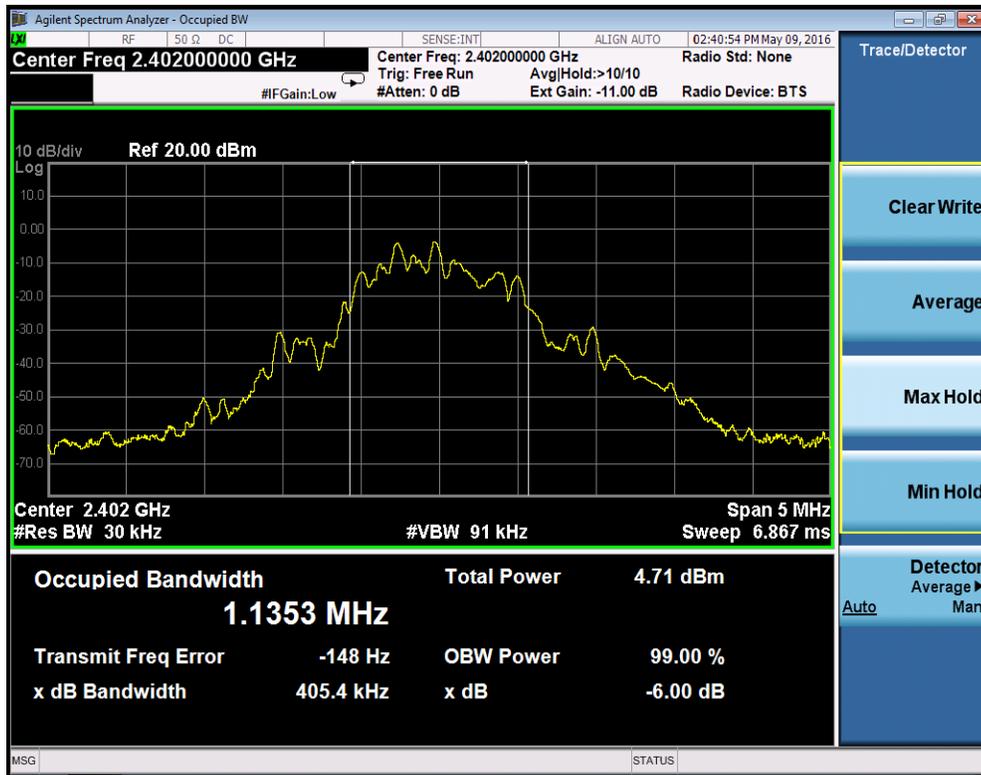
<b>Frequency (MHz)</b>	<b>6 dB DTS BW (MHz)</b>	<b>99% OBW (MHz)</b>
2402	0.554	1.135
2440	0.552	1.107
2480	0.553	1.092

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# Plots



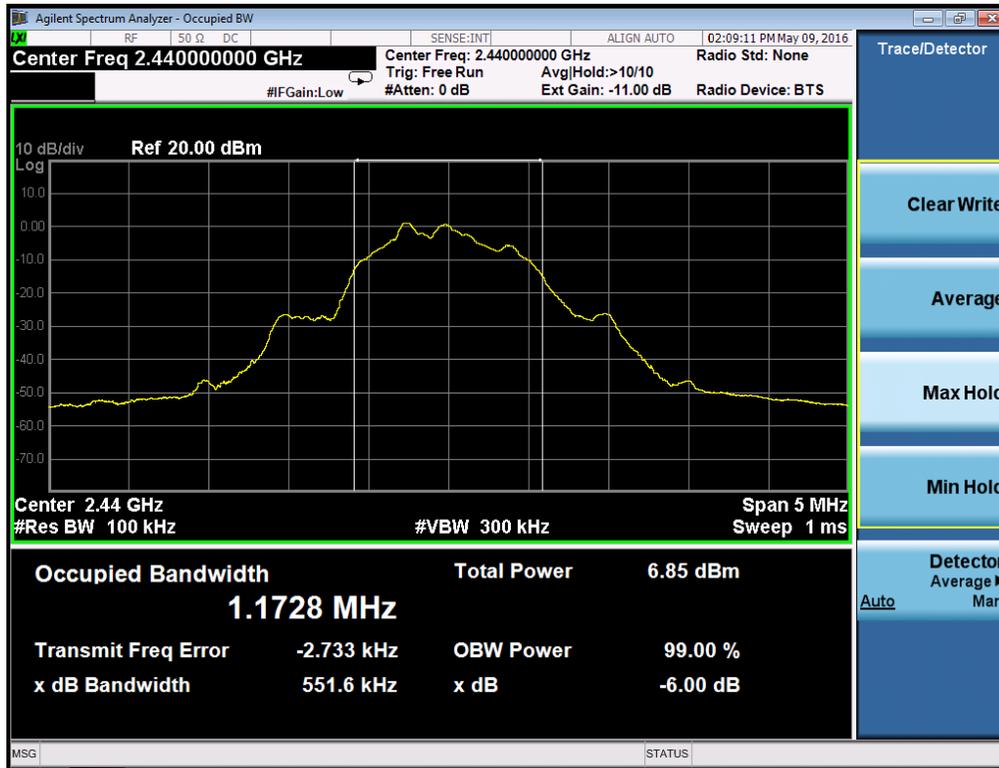
Low Channel - DTS BW



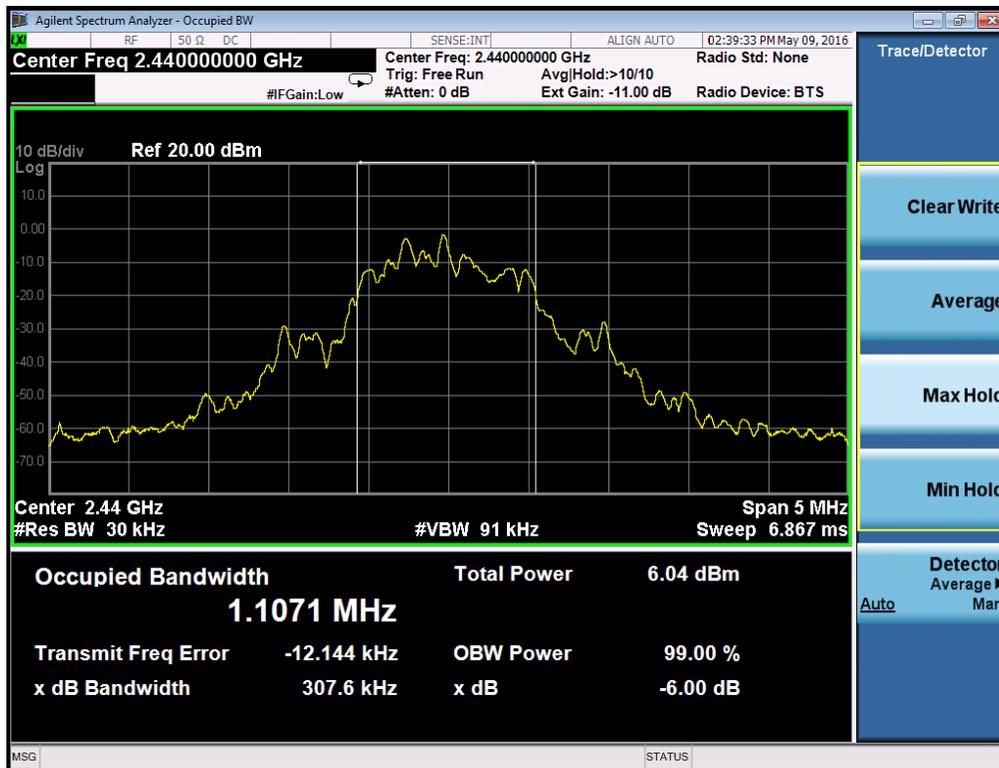
Low Channel - 99% OBW

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



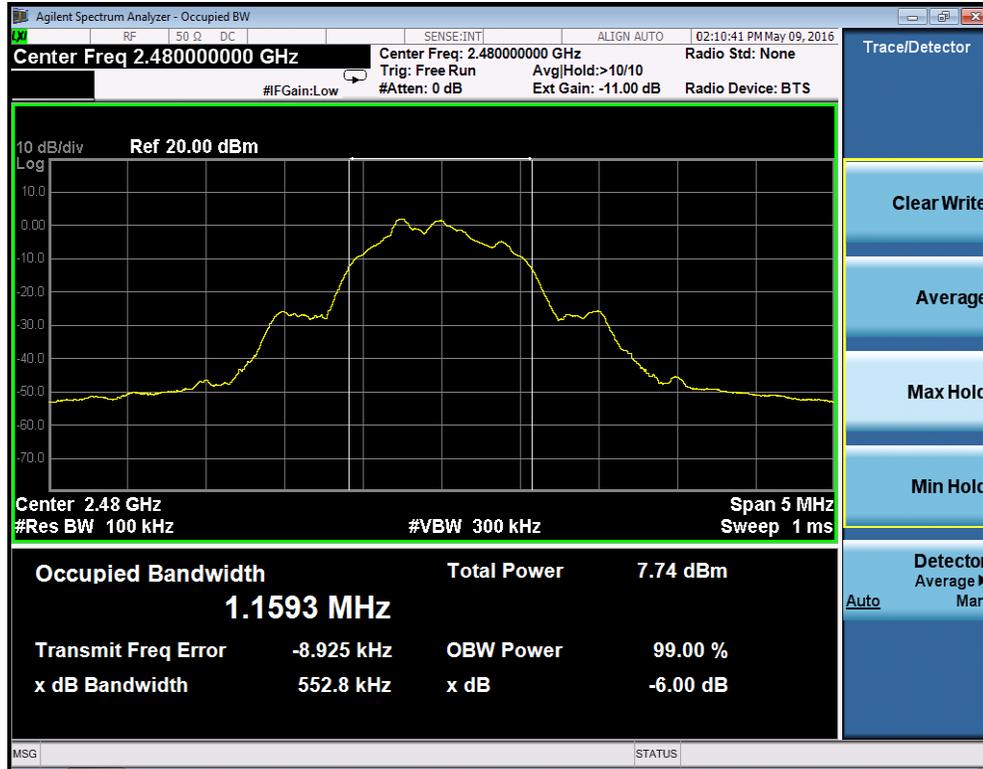
Mid Channel - DTS BW



Mid Channel -99% BW

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



High Channel - DTS BW



High Channel - 99% BW

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

## B.1.2 – RF Conducted – Fundamental Power and Spectral Density

<b>Manufacturer</b>	TASER
<b>Date</b>	5/9/16
<b>Operator</b>	Michael Hintzke
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.
<b>Rule Part</b>	FCC 15.247 / RSS-247
<b>Specific Measurement Procedure</b>	FCC KDB 558074 Section 9.1.1 (Power) / 10.2 (PSD)
<b>Additional Description of Measurement</b>	Peak Output Power and Peak PSD methods utilized for measurement 100 kHz resolution bandwidth used for Peak Power Spectral Density measurement
<b>Additional Notes</b>	1. Continuous transmit modulated used for this test. Sample Calculation: Margin (dB) = Limit – Measured Level

**Table**

Frequency (MHz)	100 kHz PSD (dBm)	PSD Limit (dBm / 3 kHz)	PSD Margin (dB)	Max Peak Output Power (dBm)	Max Output Power Limit (dBm)	Max Output Power Margin (dB)
2402	0.2	8.0	7.8	0.3	30.0	29.7
2440	1.3	8.0	6.7	1.5	30.0	28.6
2480	2.1	8.0	5.9	2.2	30.0	27.8

Prepared For: TASER	Name: SPPM
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# Plots



Low Channel – Peak Output Power



Low Channel – Peak Power Spectral Density

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# Plots



Mid Channel – Peak Output Power



Mid Channel – Peak Power Spectral Density

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



High Channel – Peak Output Power



High Channel – Peak Power Spectral Density

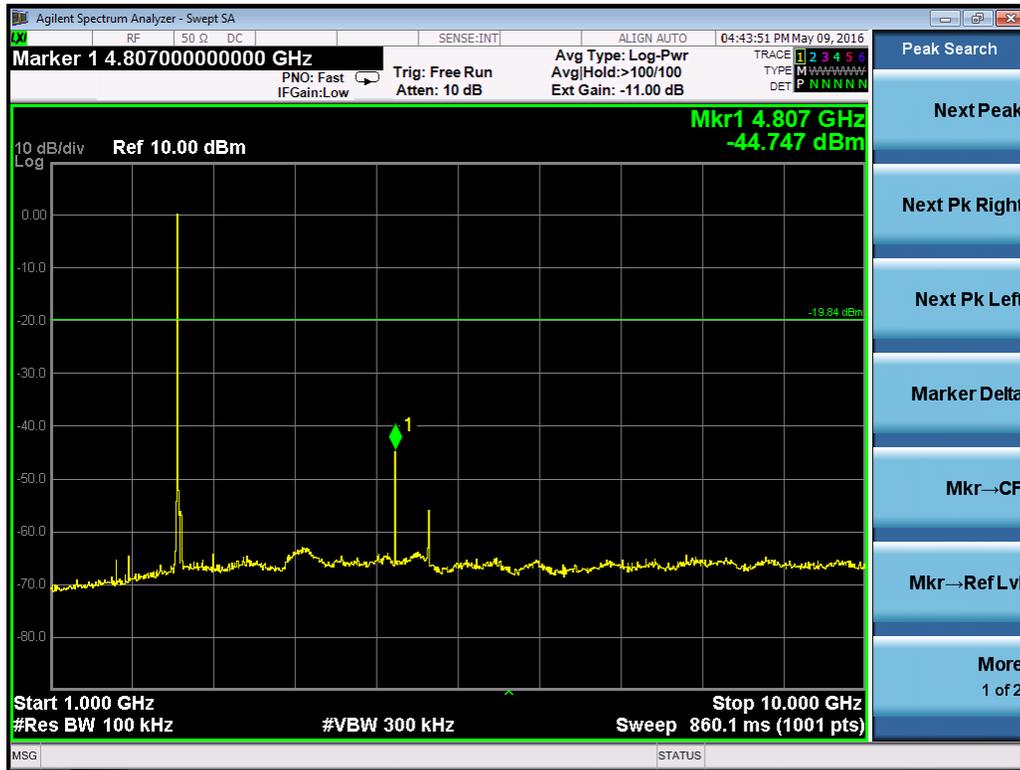
Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
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### B.1.3 – RF Conducted – Spurious Emissions

<b>Manufacturer</b>	TASER
<b>Date</b>	6/9/16
<b>Operator</b>	Michael Hintzke
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.
<b>Rule Part</b>	FCC 15.247 (d) / RSS-247 sect. 5.5
<b>Specific Measurement Procedure</b>	FCC KDB 558074 Section 11.0 – Emissions in non-restricted frequency bands
<b>Additional Description of Measurement</b>	Peak output power measured in any 100 kHz band outside the authorized frequency band shall be attenuated by at least 20 dBc.
<b>Additional Notes</b>	1. Continuous transmit modulated used for this test. 2. See DTS BW plots for 100 kHz reference 3. NF = measurement of system Noise Floor

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# Plots



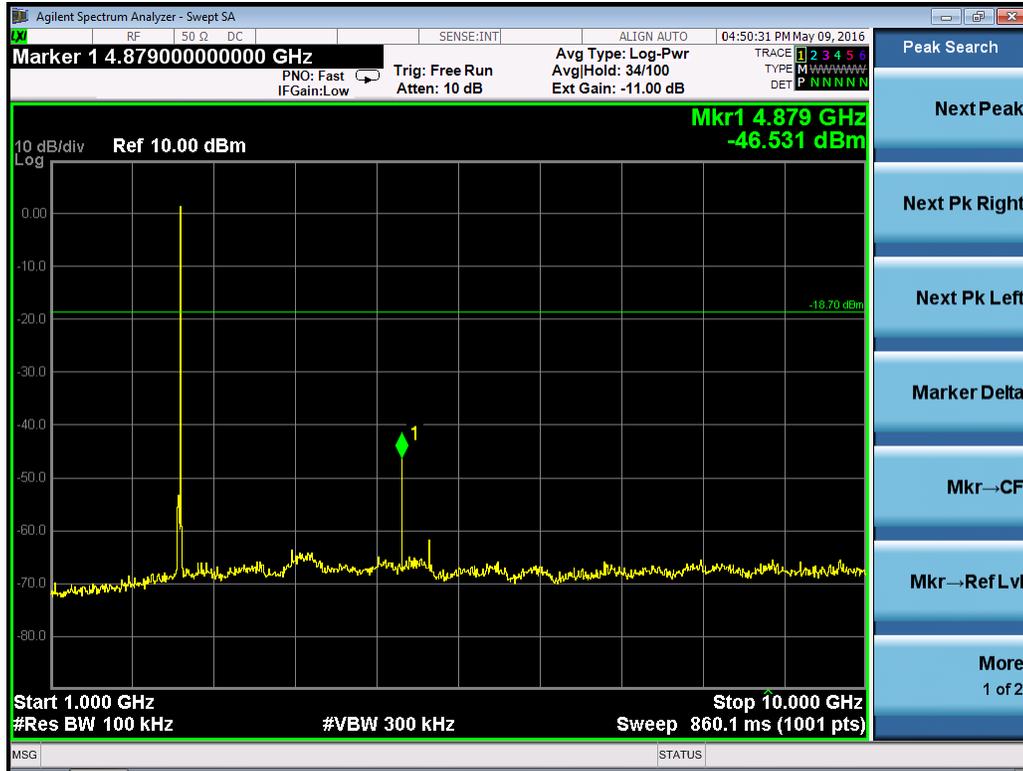
Low Channel: 1 GHz – 10 GHz



Low Channel: 10 GHz – 25 GHz

Prepared For: TASER	Name: SPPM
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# Plots



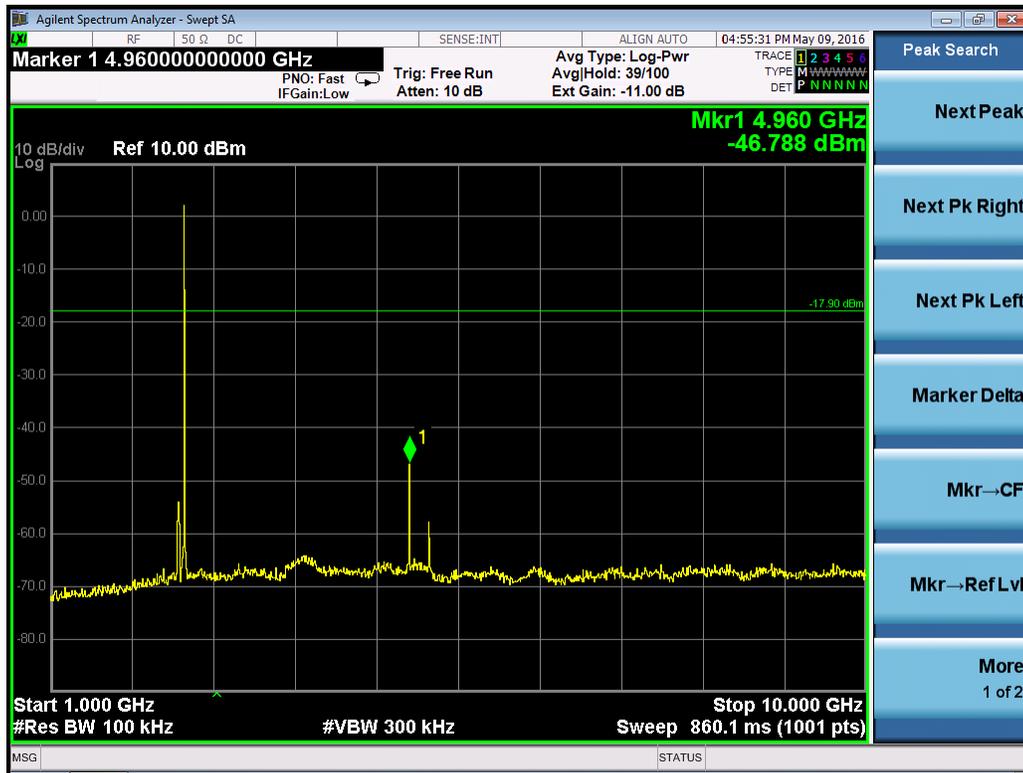
Mid Channel: 1 GHz – 10 GHz



Mid Channel: 10 GHz – 25 GHz

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



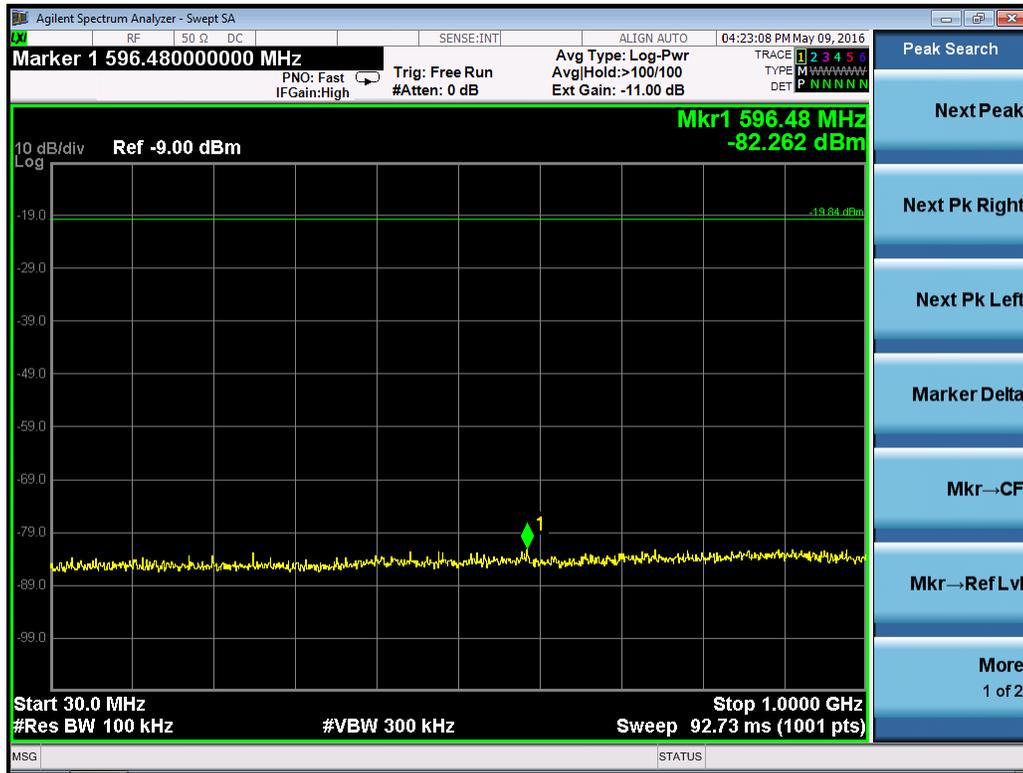
High Channel: 1 GHz – 10 GHz



High Channel – 10 GHz – 25 GHz

Prepared For: TASER	Name: SPPM
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# Plots



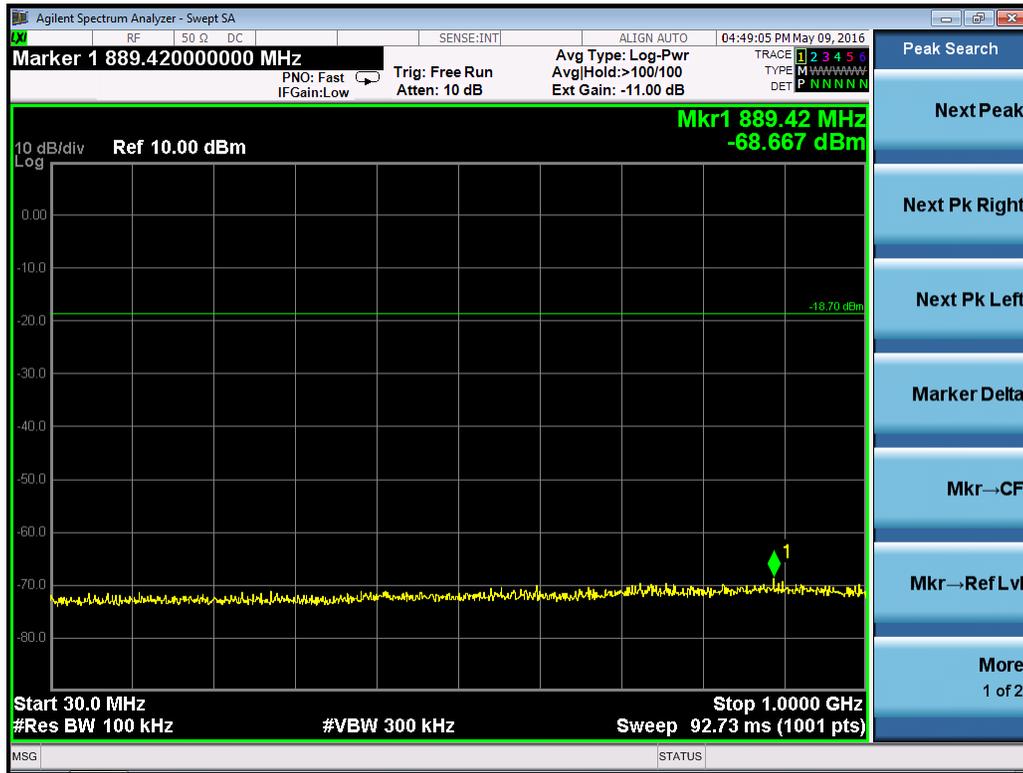
Low Channel: 30 MHz – 1000 MHz



Low Channel – Bandedge

Prepared For: TASER	Name: SPPM
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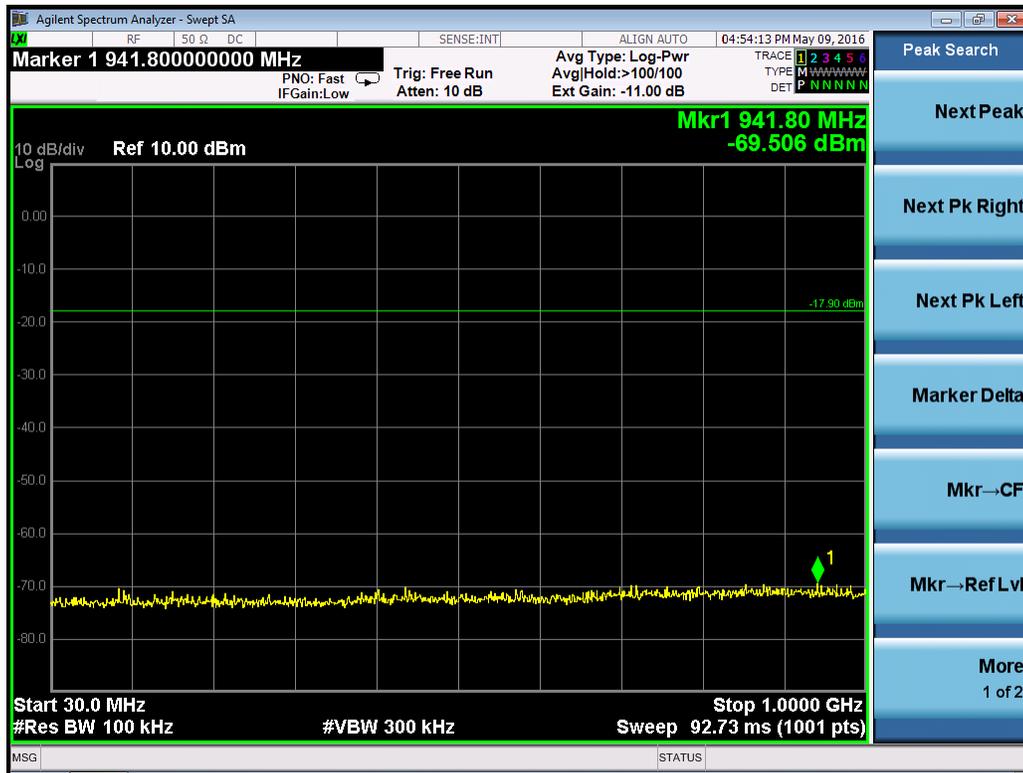
# Plots



Mid Channel: 30 MHz - 1000 MHz

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# Plots



High Channel: 30 MHz – 1000 MHz



High Channel - Bandedge

Prepared For: TASER	Name: SPPM
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### B.1.4 – RF Conducted – Frequency Stability

<b>Manufacturer</b>	TASER
<b>Date</b>	5/27/16
<b>Operator</b>	Michael Hintzke
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.
<b>Rule Part</b>	15.247 / RSS-247
<b>Specific Measurement Procedure</b>	FCC KDB 558074
<b>Additional Description of Measurement</b>	RF Conducted Measurement
<b>Additional Notes</b>	1. Continuous transmit modulated used for this test.

### Tables

Frequency Stability f = 2402 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
3.0	2402000000	2401997382	240200	237582
3.3	2402000000	2401997350	240200	237550
3.6	2402000000	2401997118	240200	237318

Low Channel

Frequency Stability f = 2440 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
3.0	2440000000	2439998887	244000	242887
3.3	2440000000	2439998791	244000	242791
3.6	2440000000	2439998630	244000	242630

Mid Channel

Frequency Stability f = 2480 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
3.0	2480000000	2480003648	248000	251648
3.3	2480000000	2480003528	248000	251528
3.6	2480000000	2480003478	248000	251478

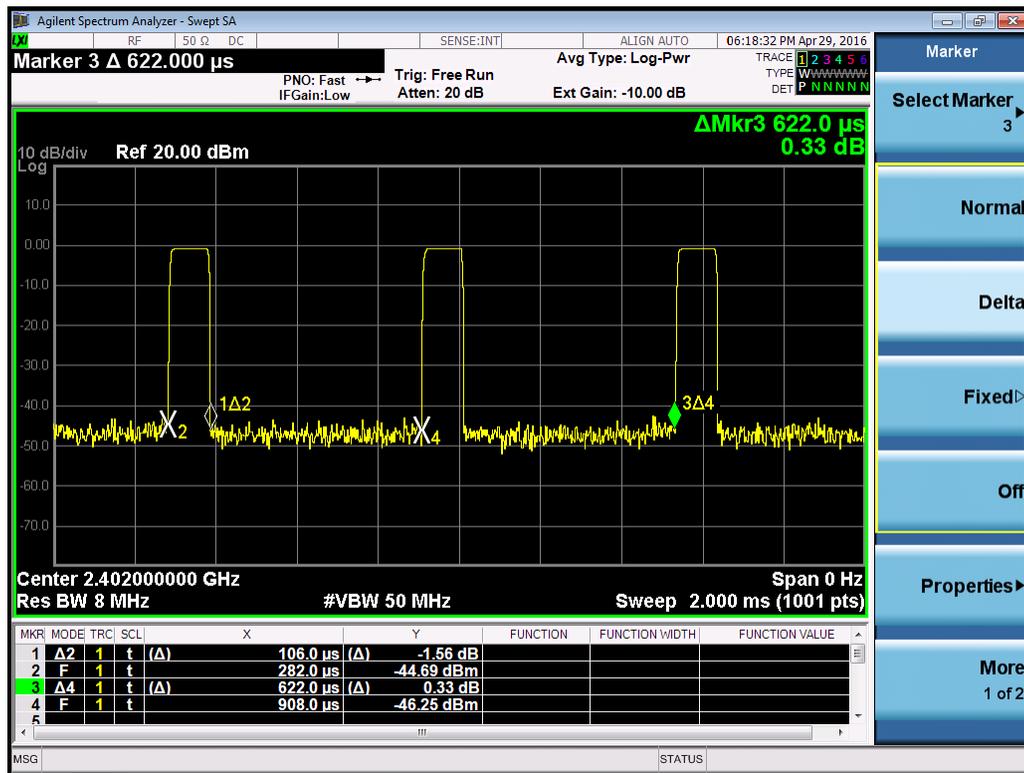
High Channel

Prepared For: TASER	Name: SPPM
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### B.1.4 – RF Conducted – Duty Cycle

<b>Manufacturer</b>	TASER
<b>Date</b>	4/29/16
<b>Operator</b>	Michael Hintzke
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.
<b>Rule Part</b>	15.247 / RSS-247
<b>Specific Measurement Procedure</b>	FCC KDB 558074
<b>Additional Description of Measurement</b>	RF Conducted Measurement
<b>Additional Notes</b>	<ol style="list-style-type: none"> <li>1. Continuous transmit modulated used for this test.</li> <li>2. Measurement used to determine VBW for transmitter radiated measurements</li> </ol>

### Plots



Note: The duty cycle in the above screen capture is representative of all channels.

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## B.2 – Radiated Emissions

<b>Rule Part(s)</b>	FCC: 15.247 / 15.205 / 15.209 IC: RSS-247 / RSS-Gen			
<b>Measurement Procedure</b>	ANSI C63.4 2014 ANSI C63.10 2013 FCC KDB 558074 D01 DTS Meas Guidance v03r05			
<b>Test Location</b>	LS Research, LLC - FCC Listed 3 meter Semi-Anechoic Chamber			
<b>Test Distance</b>	3 meters			
<b>EUT Placement</b>	Transmitter: Below 1 GHz: 80 cm height Above 1 GHz: 150 cm height		Receiver: 80 cm height	
<b>Frequency Range of Measurement</b>	Biconical: 30-300 MHz	Log Periodic Dipole Array: 300-1000 MHz	Double-Ridged Waveguide Horn: 1-18 GHz	Standard Gain Horn: 18-26GHz
<b>Measurement Detectors</b>	30-1000MHz RBW: 120 kHz VBW: ≥ 300 kHz		1 – 25 GHz: RBW : 1MHz VBW: 10 kHz (Transmitter Emissions) VBW: ≥ 3 MHz (Receiver Emissions)	
<b>Measurement Description</b>	<p>The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed. The data is gathered and reported as the corrected values.</p> <p>The EUT is placed on a non-conductive pedestal <u>made of expanded polyethylene foam</u> centered on a turn-table in the test location with the antenna at the test distance from the EUT</p> <p>Maximum radiated RF emissions are determined by rotation of azimuth and scanning the sense antenna between 1 and 4 meters in height using both horizontal and vertical antenna polarities. Maximized levels are manually noted at degree values of azimuth and at sense antenna height.</p>			
<b>Example Calculations</b>	Reported Measurement data = Raw receiver measurement + Antenna Correction Factor + Cable factor (dB) - amplification factor (when applicable) + Additional factor (when applicable)			

Prepared For: TASER	Name: SPPM
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LSR: C-2372	Serial: Engineering Sample

**FCC Part 15.209 / IC RSS-247 sect 8.9 limits:**

Frequency (MHz)	3 m Limit ( $\mu\text{V/m}$ )	3 m Limit ( $\text{dB}\mu\text{V/m}$ )	Detector Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	Quasi-Peak
216-960	200	46.0	Quasi-Peak
Above 960	500	54.0	Average (>1 GHz)

**B.2.1 – Transmitter Band-Edge Restricted Band**

<b>Manufacturer</b>	TASER	
<b>Date</b>	5/10/16	
<b>Operator</b>	Michael Hintzke	
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.	
<b>Rule Part</b>	15.247/ 15.205 / 15.209	
<b>Measurement Procedure</b>	ANSI C63.4 - 2014 ANSI C63.10 - 2013	
<b>Test Distance</b>	3 meters	
<b>EUT Placement</b>	150 cm height non-conductive table centered on turn-table	
<b>Detectors</b>	Peak: RBW = 1 MHz VBW $\geq$ 3 MHz	Average: RBW = 1 MHz VBW : 10 kHz
<b>Additional Notes</b>	1) Tested in continuous transmit modulated mode with EUT rotated in three orientations. 2) EUT maximized in azimuth and antenna height with maximum results reported. 3) Video bandwidth greater than [1/(minimum transmitter on time)]	

**Example Calculations:**

**Radiated Emissions Limits:**

FCC 15.209 Average Limit @ 3 meter ( $\text{dB}\mu\text{V/m}$ ) – Average Reading ( $\text{dB}\mu\text{V/m}$ ) = Margin

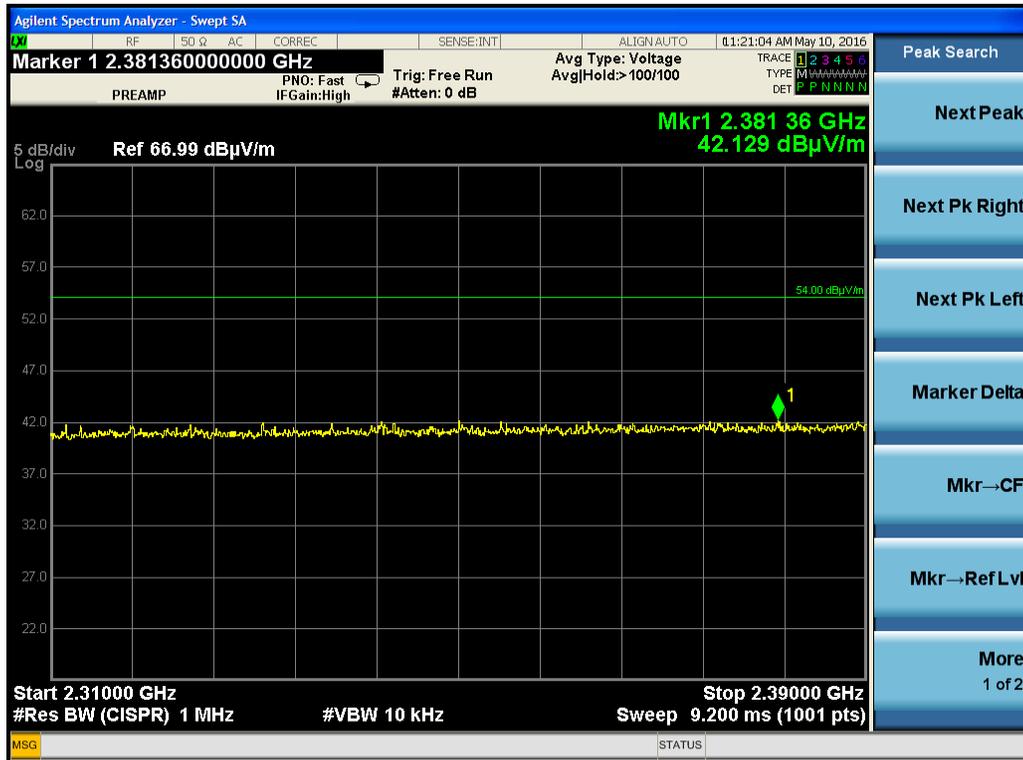
FCC 15.209 Peak Limit @ 3 meter ( $\text{dB}\mu\text{V/m}$ ) – Peak Reading ( $\text{dB}\mu\text{V/m}$ ) = Margin

**Video Bandwidth:**

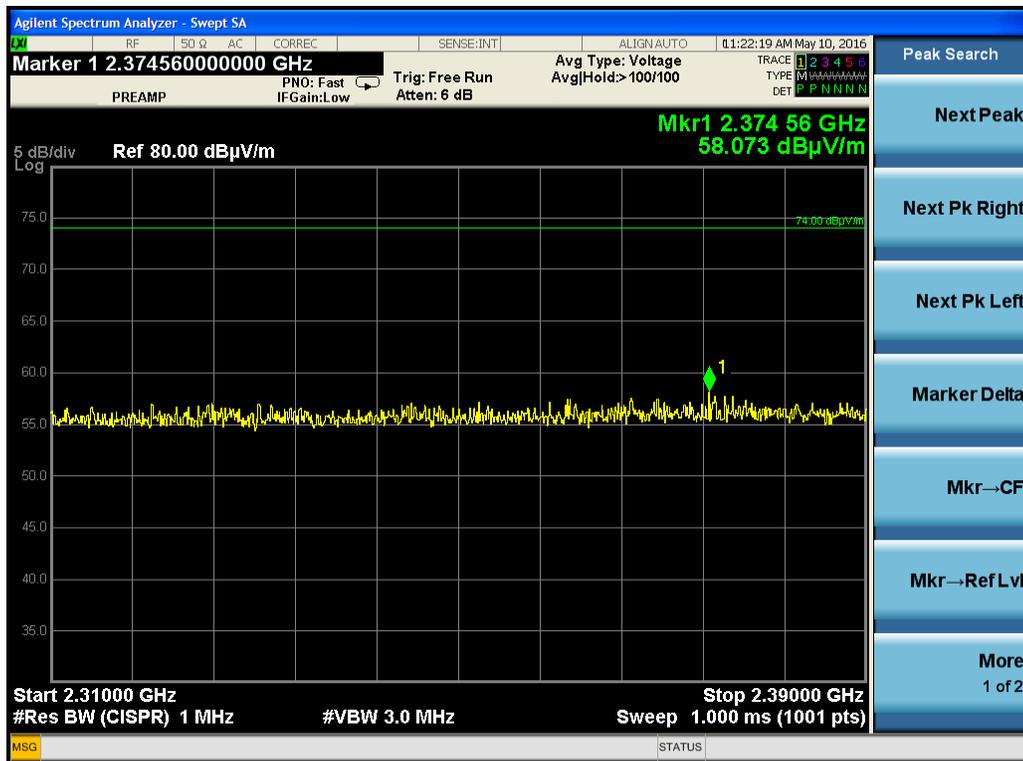
$$1/106 \mu\text{s} = 9.434 \text{ kHz}$$

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# Plots



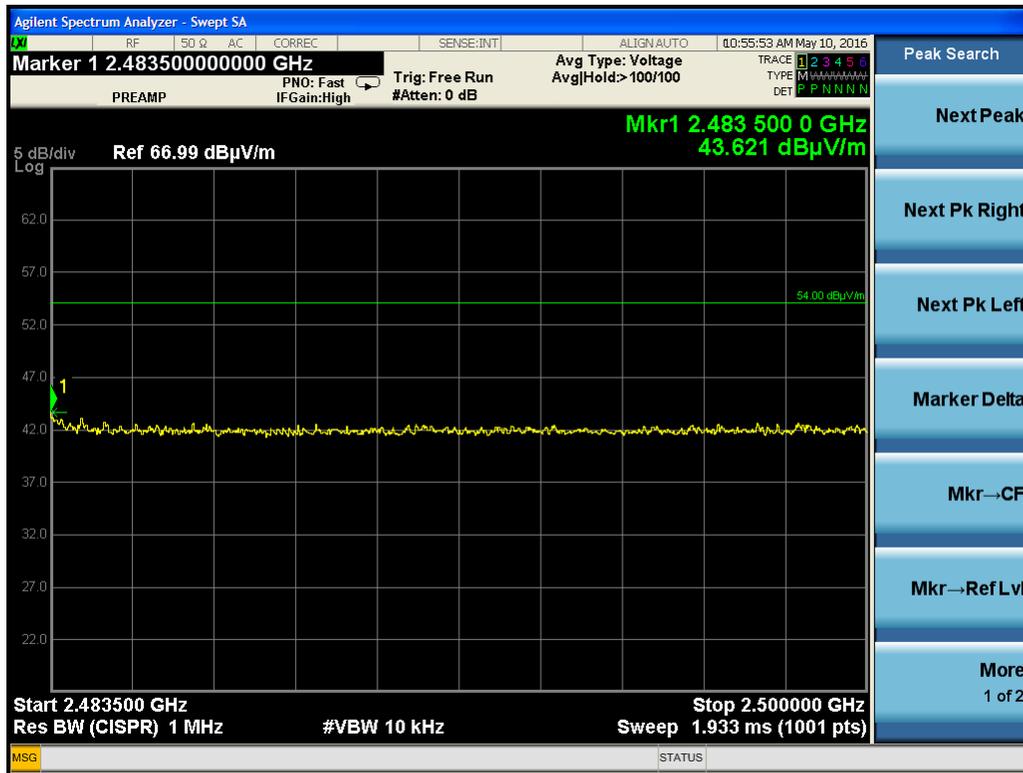
Low Channel – Bandedge Average



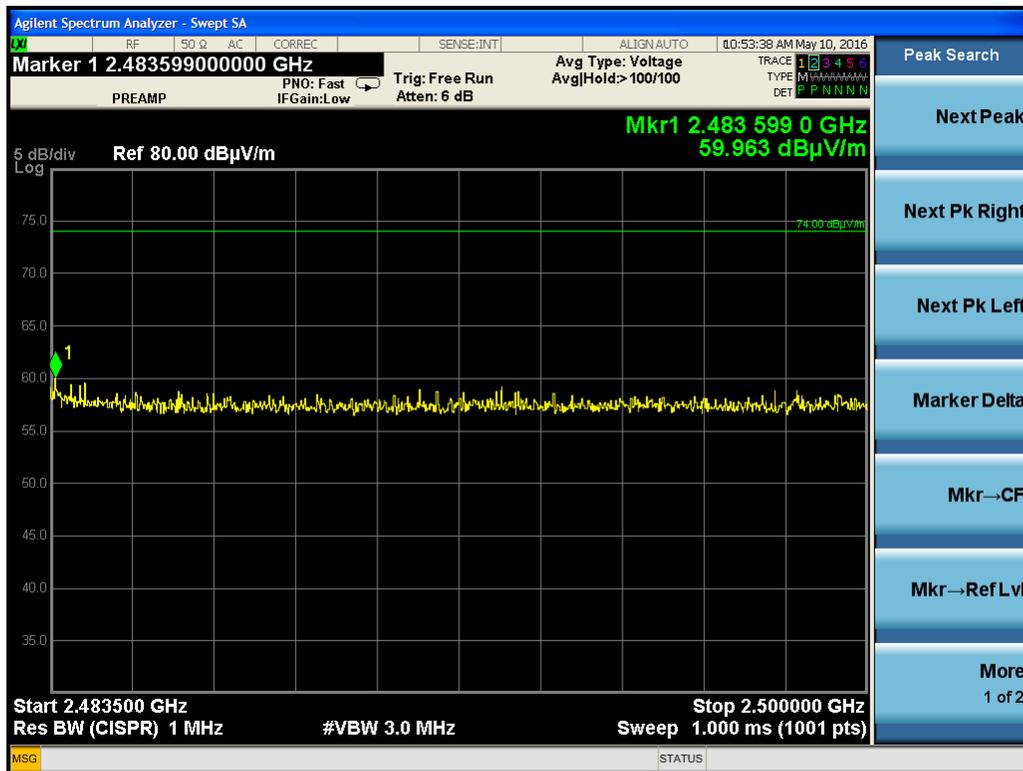
Low Channel – Bandedge Peak

Prepared For: TASER	Name: SPPM
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# Plots



High Channel – Bandedge Average



High Channel – Bandedge Peak

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Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

## B.2.2 – Transmitter Radiated Spurious Emissions in Restricted Bands

<b>Manufacturer</b>	TASER	
<b>Date</b>	5/20/16	
<b>Operator</b>	Michael Hintzke	
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.	
<b>Rule Part</b>	15.247/ 15.205 / 15.209	
<b>Measurement Procedure</b>	ANSI C63.4 - 2014 ANSI C63.10 - 2013 FCC KDB 558074 v03r05 Section 12.2.7 Radiated spurious emission test	
<b>Test Distance</b>	3 meters	
<b>EUT Placement</b>	Below 1 GHz: 80 cm height non-conductive table centered on turn-table Above 1 GHz: 150 cm height non-conductive table centered on turn-table	
<b>Detectors</b>	Peak: RBW = 1 MHz VBW ≥ 3 MHz	Average: RBW = 1 MHz VBW : 10 kHz
<b>Additional Notes</b>	1) Tested in continuous transmit modulated mode on three channels in three orientations. 2) EUT maximized in azimuth and antenna height with maximum results reported. 3) Video bandwidth greater than [1/(minimum transmitter on time)]	

### Example Calculation:

FCC 15.209 Quasi-Peak Limit @ 3 meter (dBμV/m) – Peak Reading (dBμV/m) = Margin  
 FCC 15.209 Average Limit @ 3 meter (dBμV/m) – Average Reading (dBμV/m) = Margin  
 FCC 15.209 Peak Limit @ 3 meter (dBμV/m) – Peak Reading (dBμV/m) = Margin

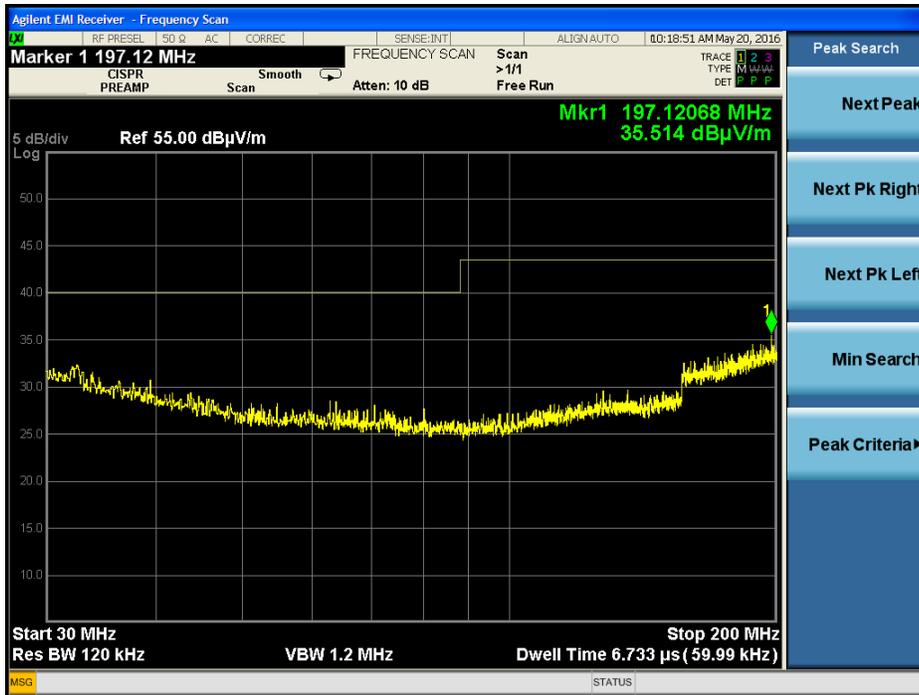
### Tables

Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dBμV/m)	Quasi Peak Limit (dBμV/m)	Margin (dB)	Antenna Polarity	EUT orientation
344.7	1.00	0	24.39	46.0	21.6	H	V
375.0	1.86	0	27.03	46.0	19.0	H	S
312.4	3.57	0	21.16	46.0	24.8	H	S
335.1	1.00	161	28.29	46.0	17.7	H	F
375.0	1.00	0	29.09	46.0	16.9	V	F
375.0	1.00	168	28.02	46.0	18.0	V	S

Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dBμV/m)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Margin (dB)	Antenna Polarity	EUT orientation	Channel
4804	1.70	324	48.16	44.4	54	9.6	Vertical	Flat	Low
4880	1.87	287	51.9	46.4	54	7.6	Horizontal	Side	Mid
4960	1.88	0	49.1	41.4	54	12.6	Vertical	Flat	High

### Plots

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Report: TR 315371	Model: T00074
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30 MHz – 200 MHz Horizontal Polarity

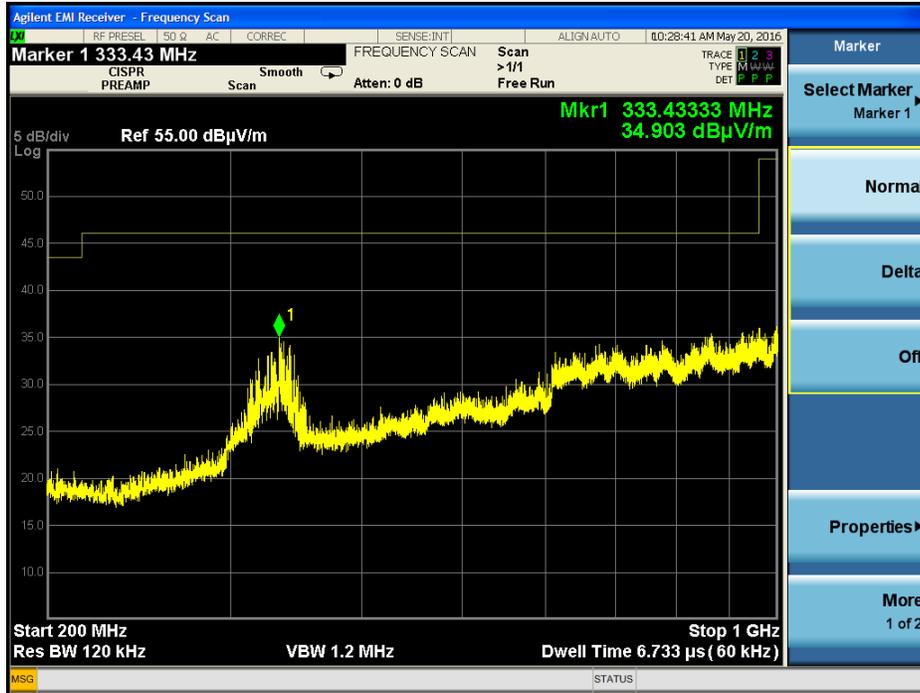


30 MHz – 200 MHz Vertical Polarity

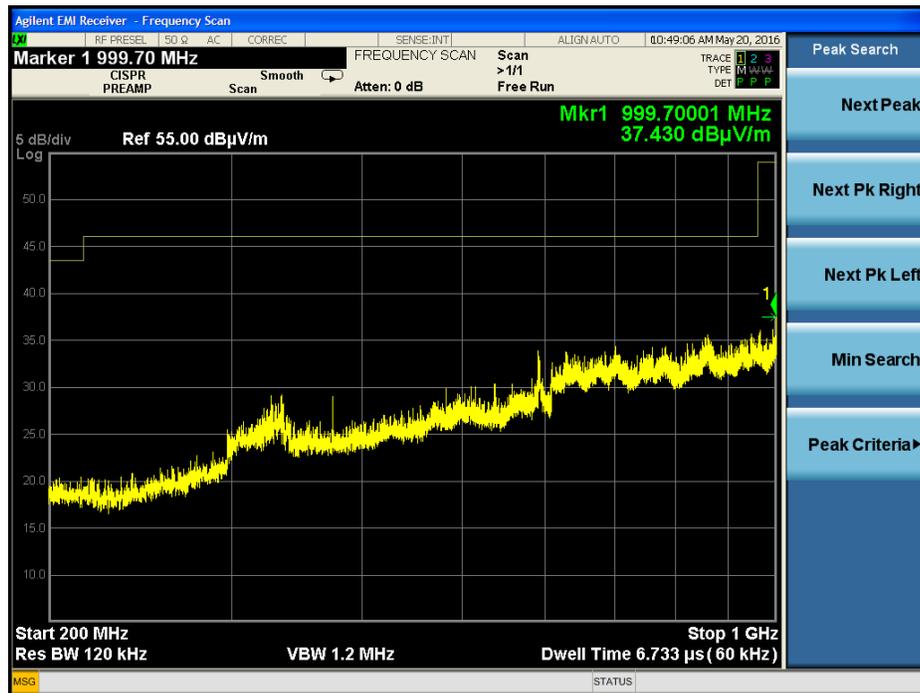
Note: The above screen captures are representative of all channels and all EUT orientations

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LSR: C-2372	Serial: Engineering Sample

# Plots



200 MHz – 1000 MHz Horizontal Polarity



200 MHz – 1000 MHz Vertical Polarity

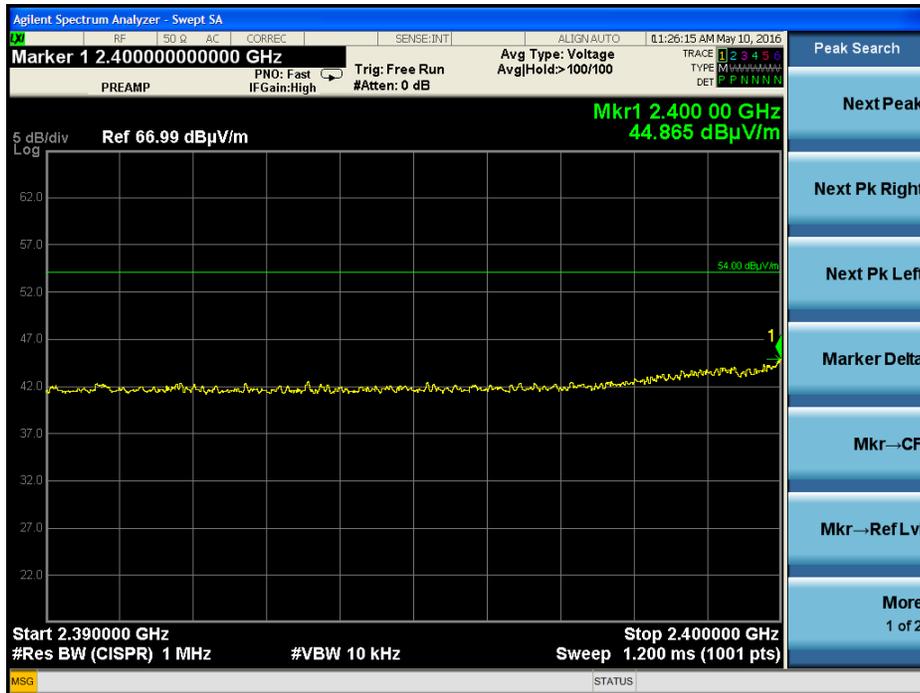
Note: The above screen captures are representative of all channels and all EUT orientations

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



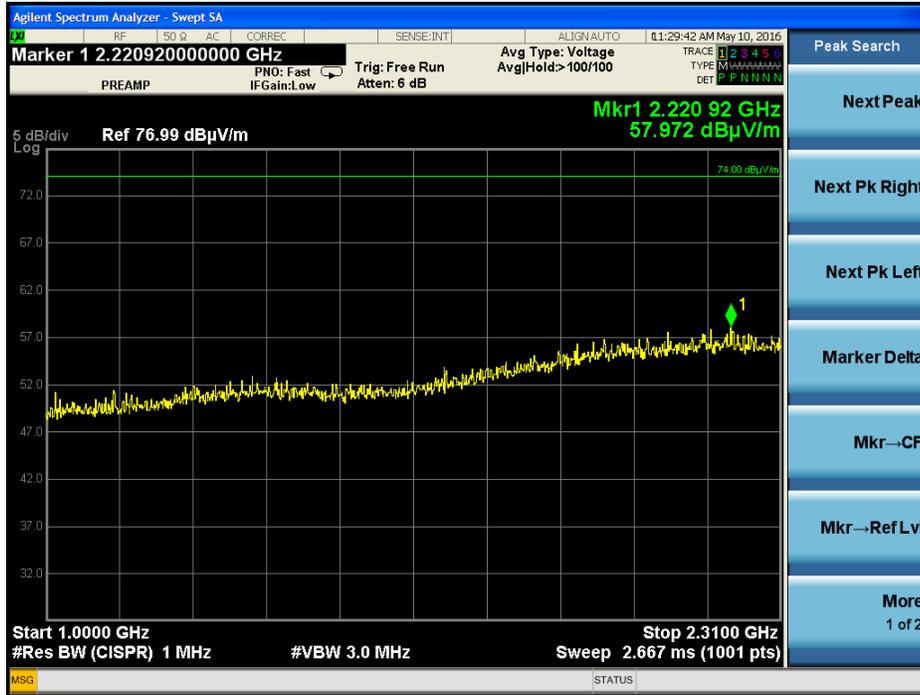
1000 MHz – 2310 MHz Peak, Horizontal Polarity



1000 MHz – 2310 MHz Average, Horizontal Polarity

Prepared For: TASER	Name: SPPM
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LSR: C-2372	Serial: Engineering Sample

# Plots



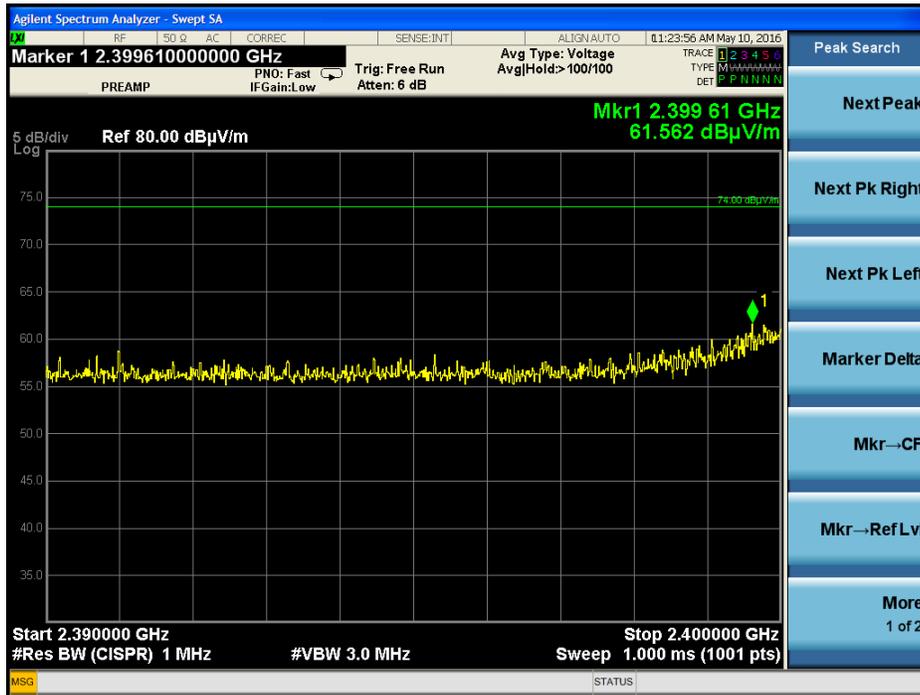
1000 MHz – 2310 MHz Peak, Vertical Polarity



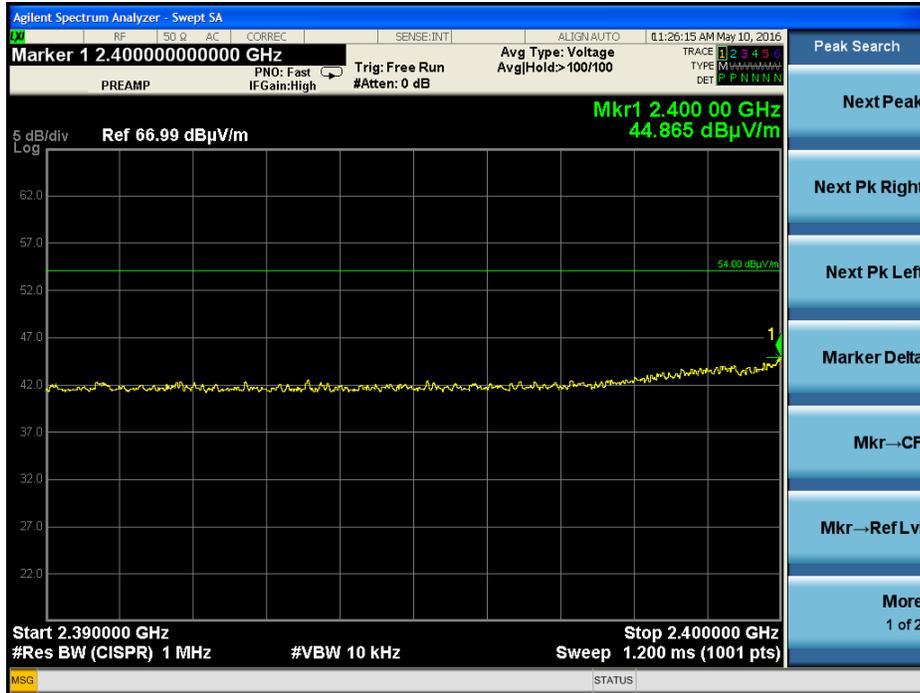
1000 MHz – 2310 MHz Average, Vertical Polarity

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LSR: C-2372	Serial: Engineering Sample

# Plots



2390 MHz – 2400 MHz Peak

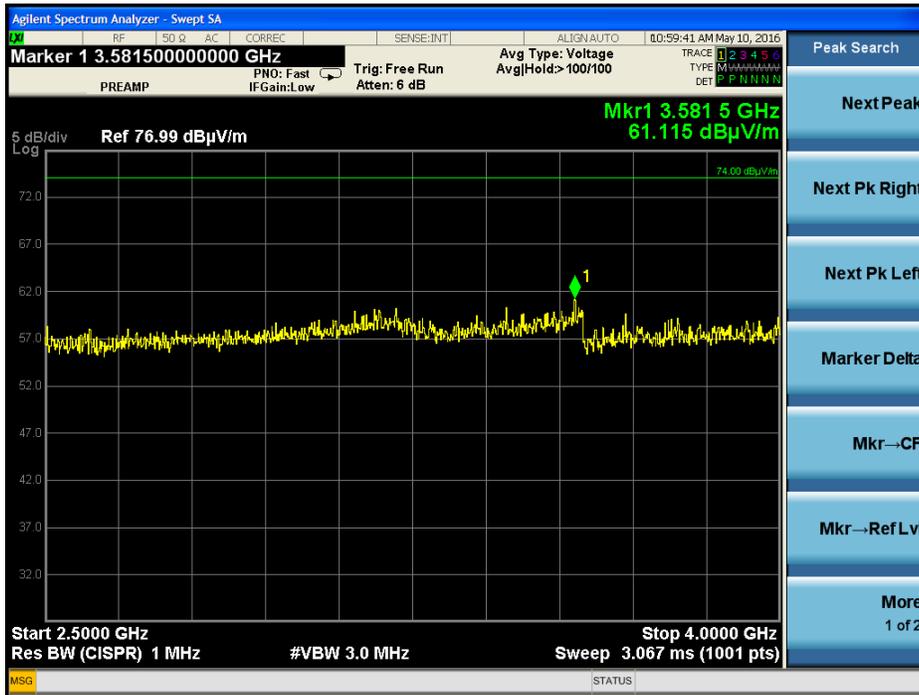


2390 MHz – 2400 MHz Reduced VBW

Note: The above screen captures are representative of both antenna polarities and all EUT orientations

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



2500 MHz – 4000 MHz Peak



2500 MHz – 4000 MHz Reduced VBW

Note: The above screen captures are representative of both antenna polarities and all EUT orientations

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
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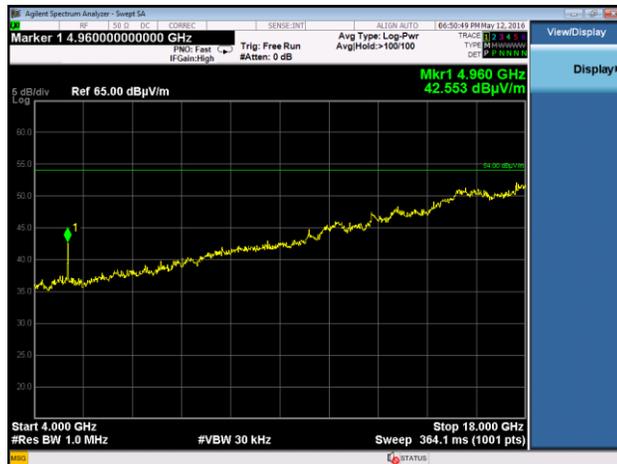
# Plots



4 GHz – 18 GHz Reduced VBW, Low Channel



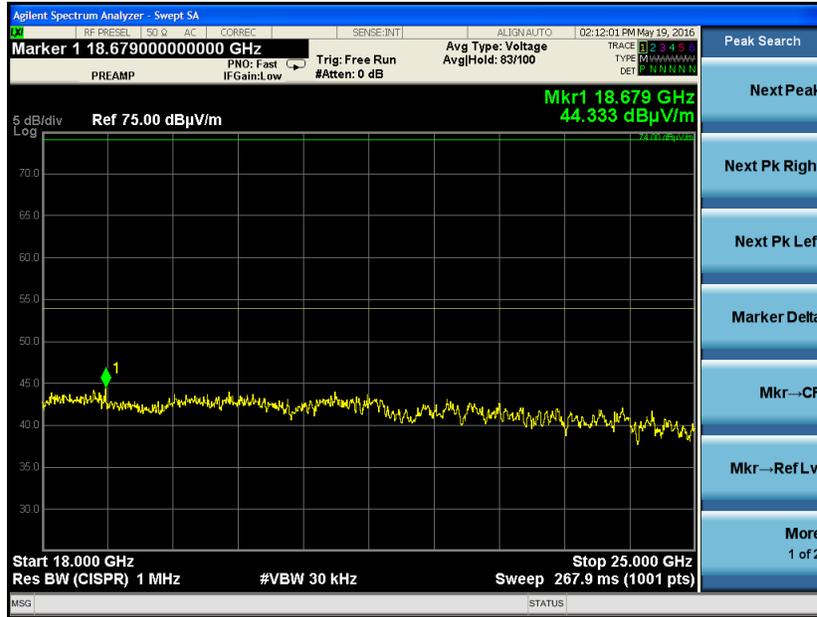
4 GHz – 18 GHz Reduced VBW, Mid Channel



4 GHz – 18 GHz Reduced VBW, High Channel

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LSR: C-2372	Serial: Engineering Sample

# Plots



18 GHz – 25 GHz Reduced VBW

Note: The above screen capture is representative of both antenna polarities and all EUT orientations

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LSR: C-2372	Serial: Engineering Sample

### B.2.3 – Radiated Emissions Receive Mode

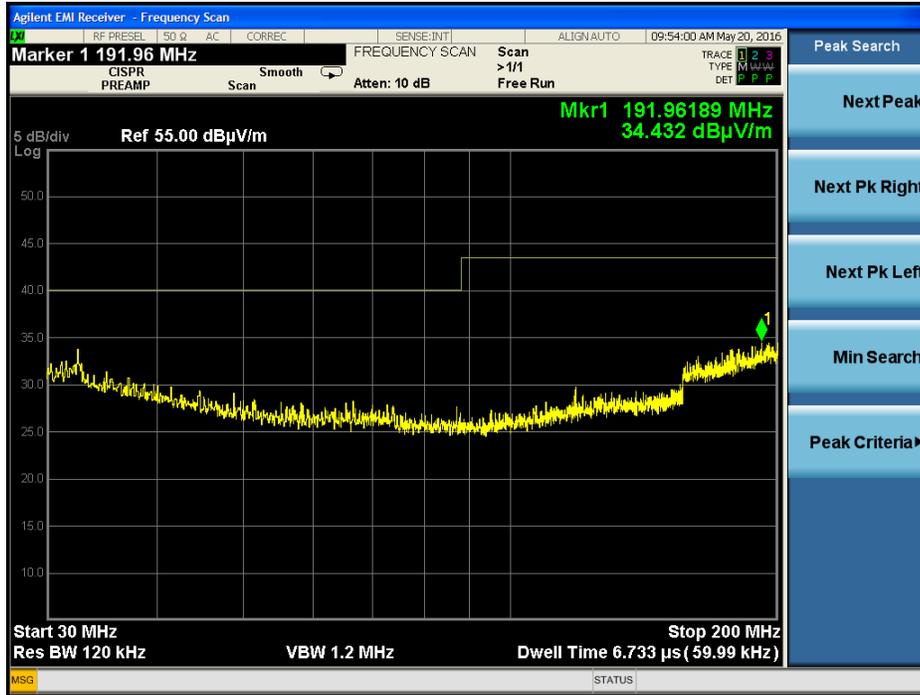
<b>Manufacturer</b>	TASER	
<b>Date</b>	5/19/16, 5/20/16	
<b>Operator</b>	Michael Hintzke	
<b>Temp. / R.H.</b>	20 - 25° C / 30-60% R.H.	
<b>Rule Part</b>	15.109 / RSS-Gen	
<b>Measurement Procedure</b>	ANSI C63.4 - 2014 ANSI C63.10 - 2013	
<b>Test Distance</b>	3 meters	
<b>EUT Placement</b>	80 cm height non-conductive table centered on turn-table	
<b>Detectors</b>	<u>30-1000 MHz</u> Quasi Peak RBW = 120 kHz VBW ≥ 300 kHz	<u>1 – 25 GHz</u> Peak RBW = 1 MHz VBW ≥ 3 MHz (peak) / 10 Hz (average)
<b>Additional Notes</b>	1) Tested in continuous receive mode on three channels in three orientations. 2) No emissions found above system noise floor.	

### Table

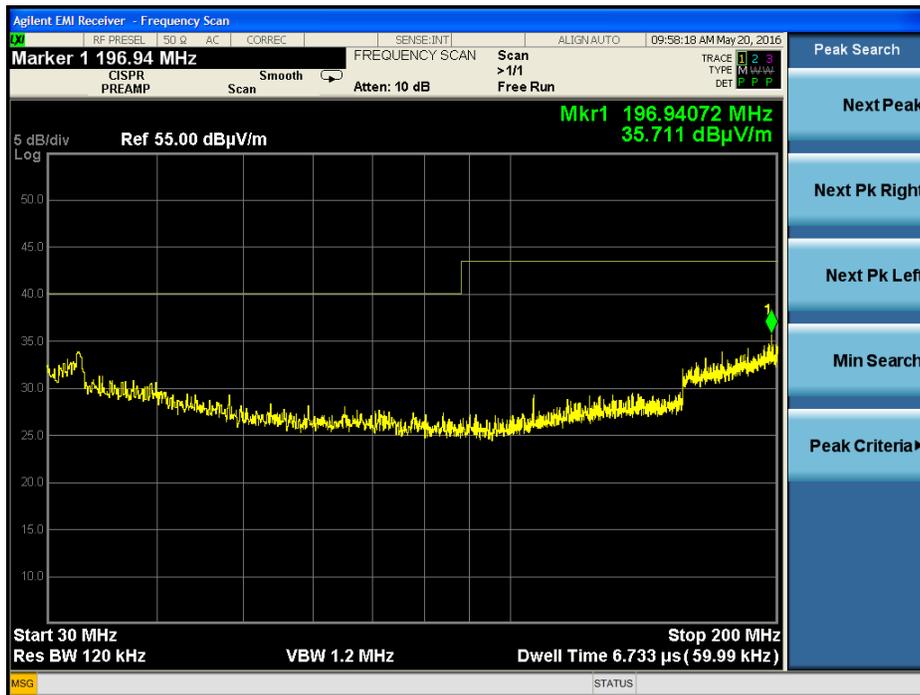
Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dBμV/m)	Quasi Peak Limit (dBμV/m)	Margin (dB)	Antenna Polarity	EUT orientation
336.4	1.00	0	27.71	46.0	18.3	H	S
314.3	1.00	187	26.03	46.0	20.0	H	F
313.2	1.00	207	25.34	46.0	20.7	H	V
375.0	1.00	62	31.22	46.0	14.8	V	V
375.0	1.00	0	29.09	46.0	16.9	V	S
375.0	1.00	0	30.7	46.0	15.3	V	F

Prepared For: TASER	Name: SPPM
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# Plots



30 MHz – 200 MHz Horizontal Polarity

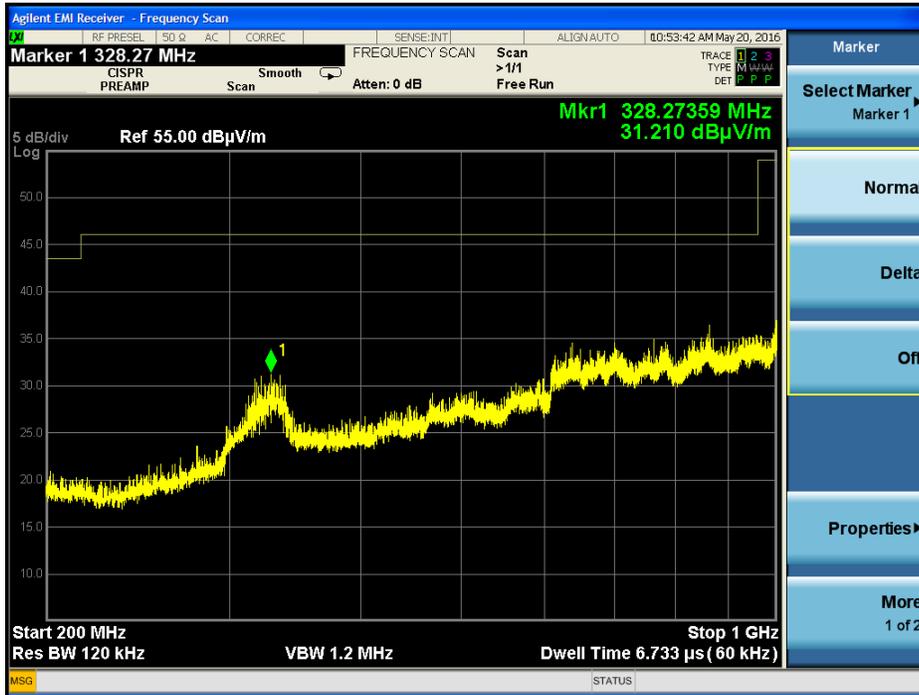


30 MHz – 200 MHz Vertical Polarity

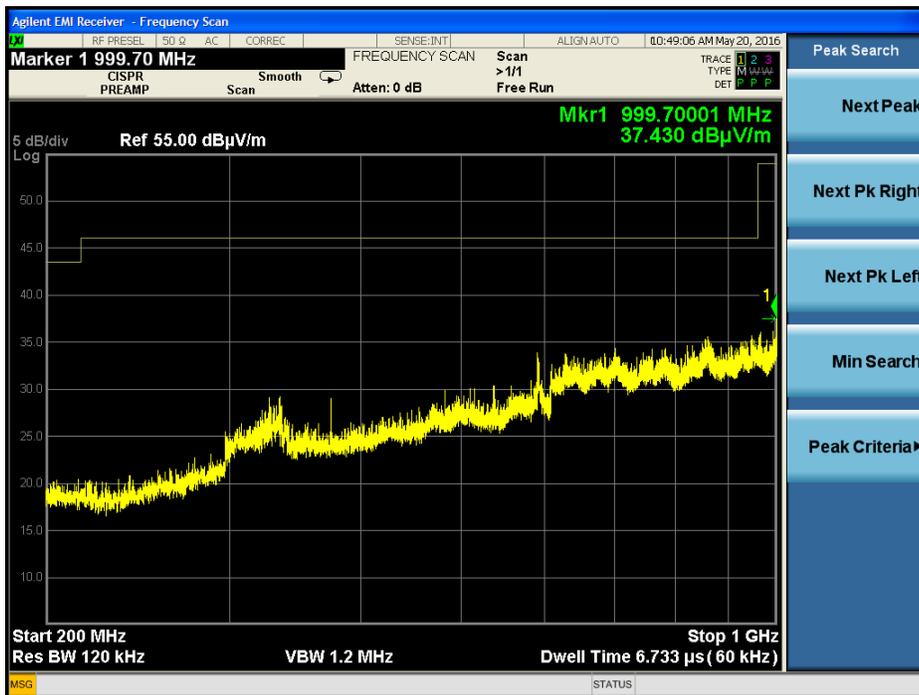
Note: The above screen captures are representative of all channels and EUT orientations

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# Plots



200 MHz – 1000 MHz Horizontal Polarity



200 MHz – 1000 MHz Vertical Polarity

Note: The above screen captures are representative of all channels and EUT orientations

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Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



1000 MHz – 4000 MHz Peak, Horizontal Polarity



1000 MHz – 4000 MHz Peak, Vertical Polarity

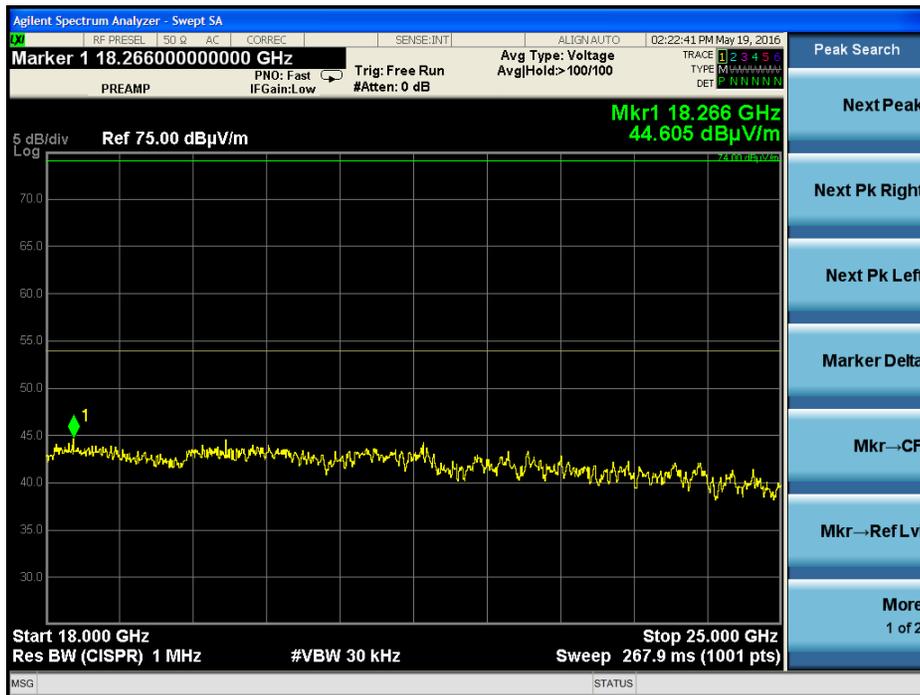
Note: The above screen captures are representative of all channels and EUT orientations

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Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

# Plots



4 GHz – 18 GHz Reduced VBW



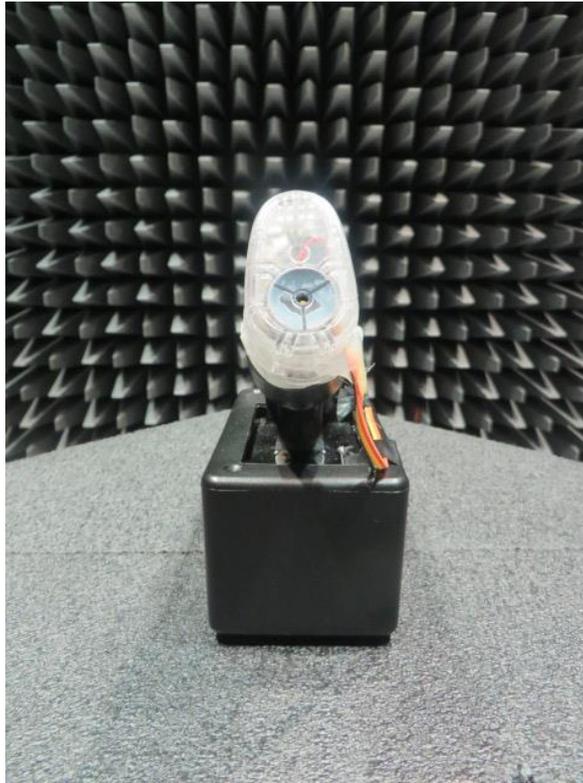
18 GHz – 25 GHz Reduced VBW

Note: The above screen captures are representative of all channels and EUT orientations

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Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample

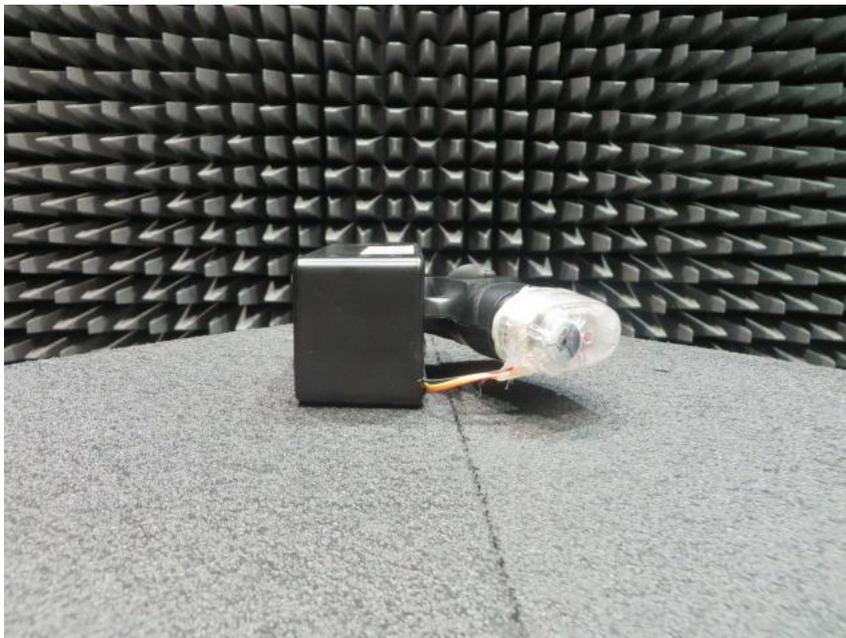
**Photos**

**EUT Flat Orientation**



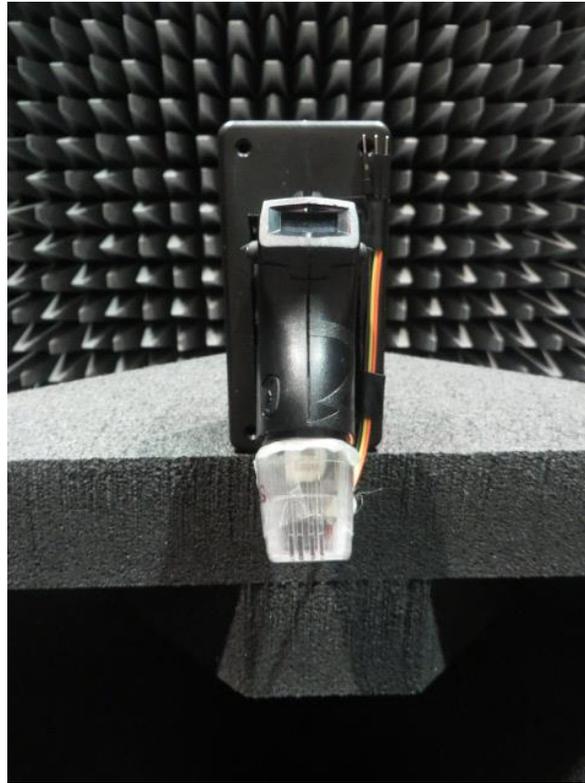
Prepared For: TASER	Name: SPPM
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LSR: C-2372	Serial: Engineering Sample

## EUT Side Orientation



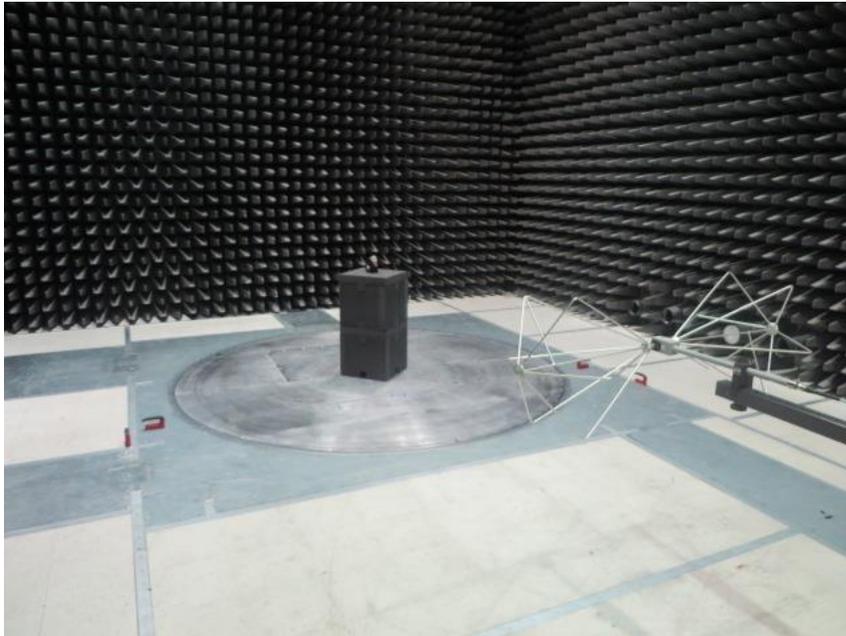
Prepared For: TASER	Name: SPPM
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LSR: C-2372	Serial: Engineering Sample

## EUT Vertical Orientation

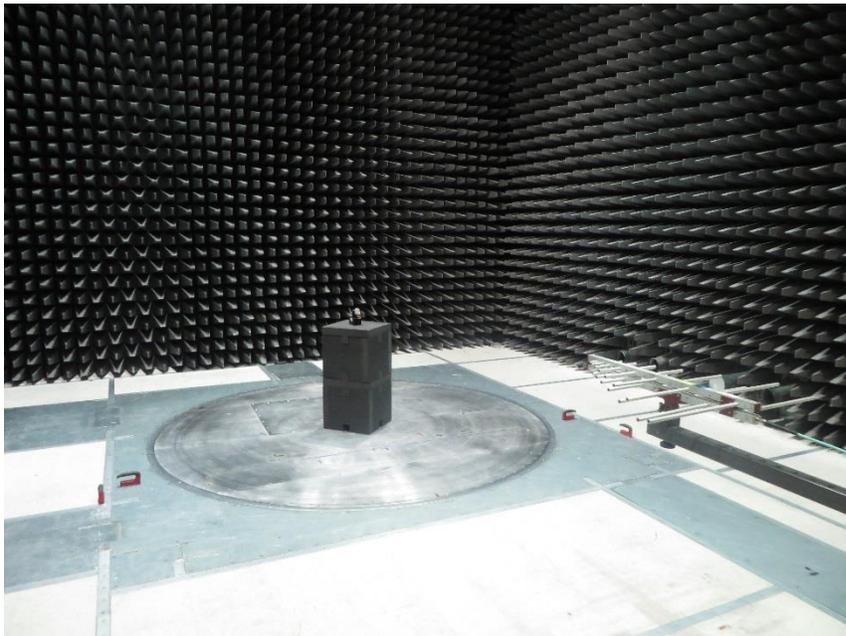


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## Transmitter Radiated Emissions

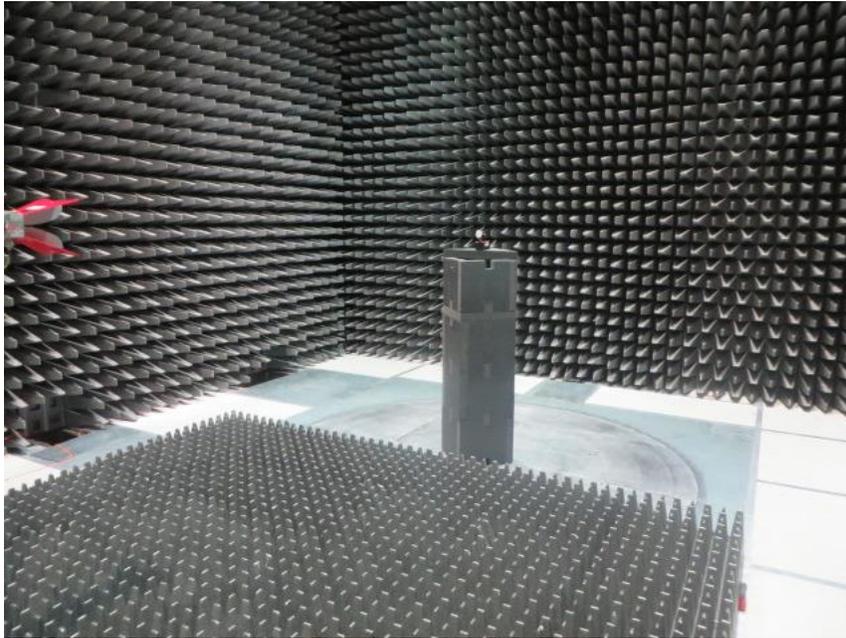


**30 MHz – 200 MHz**

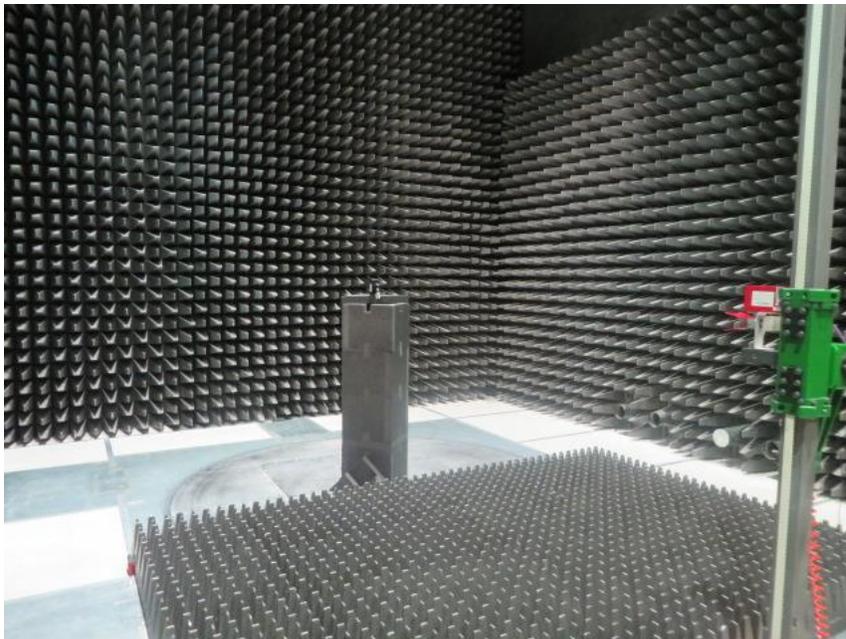


**200 MHz – 1000 MHz**

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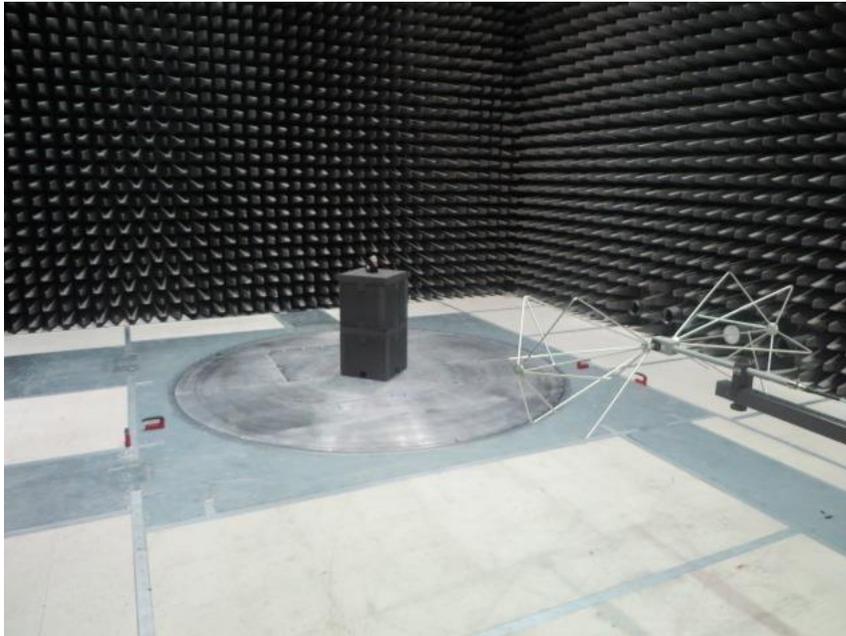
**1 GHz – 18 GHz**



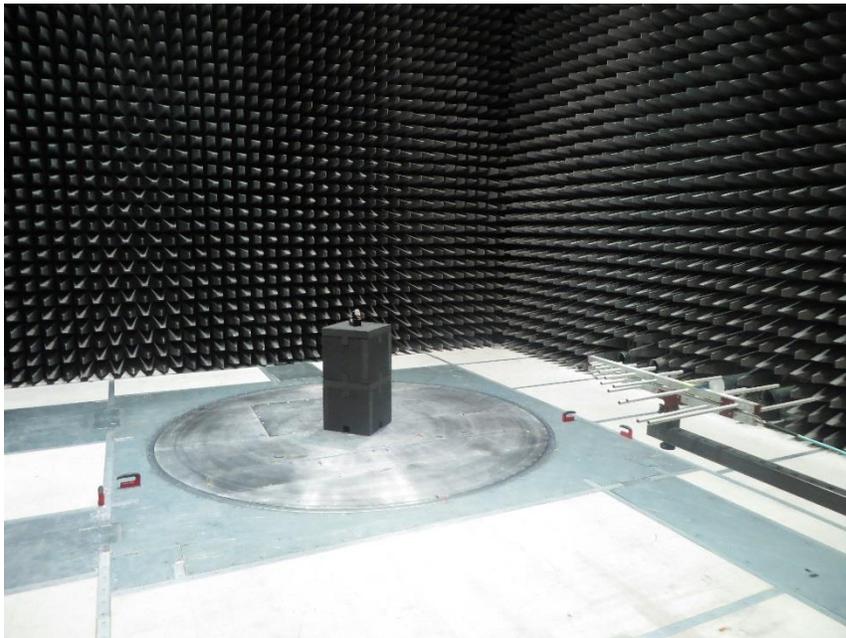
**18 GHz – 25 GHz**

Prepared For: TASER	Name: SPPM
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LSR: C-2372	Serial: Engineering Sample

## Receiver Radiated Emissions

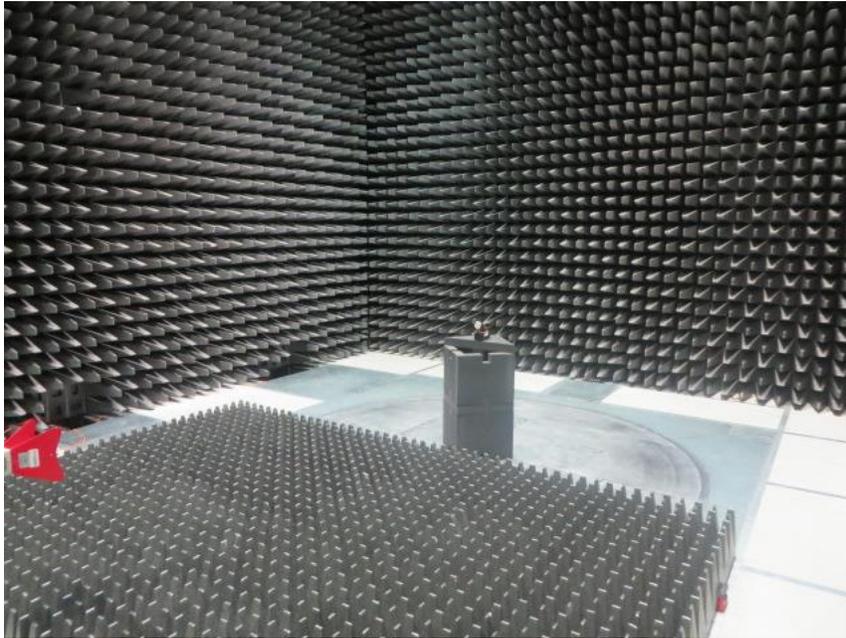


**30 MHz – 200 MHz**

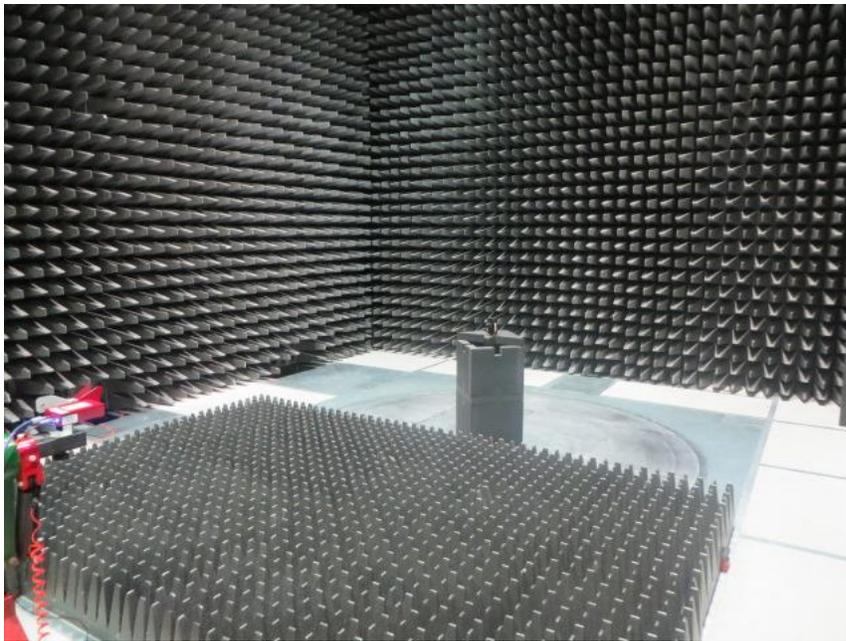


**200 MHz - 1000 MHz**

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**1 GHz – 18 GHz**



**18 GHz – 25 GHz**

Prepared For: TASER	Name: SPPM
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## Appendix C - Uncertainty Summary

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of  $k=2$ .

*Table of Expanded Uncertainty Values, (K=2) for Specified Measurements*

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.82 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.88 dB
Radiated Emissions	3-Meter Chamber, Horn Antenna	4.85 dB
Absolute Conducted Emissions	Agilent PSA/ESA Series	1.38 dB
AC Line Conducted Emissions	Shielded Room/EMCO LISN	3.20 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	2.05 Volts/Meter
Conducted Immunity	3 Volts level	2.33 V
EFT Burst, Surge, VDI	230 VAC	54.4 V
ESD Immunity	Discharge at 15kV	3200 V
Temperature/Humidity	Thermo-hygrometer	0.64° / 2.88 %RH

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## Appendix D - References

Publication	Year	Title
FCC CFR Parts 0-15	2016	Code of Federal Regulations – Telecommunications
ANSI C63.4	2014	American National Standard for 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
RSS-247 Issue 1	2015	Digital Transmission System (DTSs), Frequency Hopping System (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
RSS-Gen Issue 4	2014	General Requirements and Information for the Certification of Radio Apparatus
FCC KDB 558074 D01 DTS Meas Guidance v03r05	2016	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

Prepared For: TASER	Name: SPPM
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## END OF REPORT

Date	Version	Comments	Person
6/4/16	V0	Original Draft	MH
6-4-16	V0	Review	AA
6/6/16	V1	Final Draft	MH

Prepared For: TASER	Name: SPPM
Report: TR 315371	Model: T00074
LSR: C-2372	Serial: Engineering Sample