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December 20, 2018

Alteros
1221 Commerce Dr
Stow, OH 44224

Dear Jackie Green,

Enclosed is the EMC Wireless test report for compliance testing of the Alteros, GTX Series Wireless Microphone as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart F and RSS-220 Issue 1 March 2009 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Michelle Tawmging

Michelle Tawmging
Documentation Department

Reference: (\Alteros\EMC101115-FCC519 Rev. 4)

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Electromagnetic Compatibility Criteria
Test Report

for the

Alteros
GTX Series Wireless Microphone

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Part 15.519 Subpart F
& RSS-220 Issue 1 March 2009
for Intentional Radiators

MET Report: EMC101115-FCC519 Rev. 4

December 20, 2018

Prepared For:

Alteros
1221 Commerce Dr
Stow, OH 44224

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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Electromagnetic Compatibility Criteria
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Title 47 of the CFR, Part 15.519 Subpart F
& RSS-220 Issue 1 March 2009
for Intentional Radiators

Donald Salguero
Project Engineer

Michelle Tawmging
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rule Part 15.519 and Industry Canada standard RSS-220 under normal use and maintenance.

John Mason,
Director, Electromagnetic Compatibility Lab

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Report Status Sheet

Revision	Report Date	Reason for Revision
∅	November 9, 2018	Initial Issue
1	November 28, 2018	Implemented Requested Changes
2	December 11, 2018	Added§ 15.519(a) Operational Limitations Section
3	December 20, 2018	Operational Limitations Updated
4	January 2, 2019	‘GPS Bands’ Section Updated

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

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I. Executive Summary

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A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Alteros GTX Series Wireless Microphone, with the requirements of Part 15, §15.519. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Studio Broadcast System (GTX Series Wireless Microphone). Alteros should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the GTX Series Wireless Microphone, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.247, in accordance with Alteros, purchase order number 4500012197. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference 47 CFR Part 15.519	IC Reference RSS-220 Issue 1, amendment 1, July 2018	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	N/A	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-Gen	Conducted Emission Limits	Not Applicable
Title 47 of the CFR, Part 15 §15.519 (a)(1)	RSS-220 Section 5.3.1	Transmission Requirements	See External Exhibit for compliance of this section.
Title 47 of the CFR, Part 15 §15.519(b)	RSS-220 Section 5.1(a)	UWB Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.519(c)	RSS-220 Section 5.3.1	Radiated Emissions	Compliant
Title 47 of the CFR, Part 15 §15.519(d)	RSS-220 Section 5.3.1	Radiated Emissions – GPS Bands	Compliant
Title 47 of the CFR, Part 15 §15.519(e)	RSS-220 Section 5.3.1	Peak Emissions	Compliant
Title 47 of the CFR, Part 1 §1.1310	RSS-102	MPE – RF Exposure Calculation	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

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II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Alteros to perform testing on the GTX Series Wireless Microphone, under Alteros's purchase order number 4500012197.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Alteros, GTX Series Wireless Microphone.

The results obtained relate only to the item(s) tested.

Model Tested:	GTX24HH	
Model Covered:	GTX24HH	
EUT Specifications:	**Primary Power:**	3VDC
	FCC ID:	2AJX8GTX24HH
	Type of Modulations:	OFDM
	Equipment Code:	UWB
	Peak RF Output Power:	-29.03 dBm
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	**Temperature:**	15-35º C
	Relative Humidity:	30-60%
	Barometric Pressure:	860-1060 mbar
Evaluated by:	Donald Salguero	
Report Date:	December 20, 2018	

Table 2. EUT Summary Table

B. References

CFR 47, Part 15, Subpart F	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: Radio Frequency Devices
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
RSS-220 Issue 1, amendment 1, July 2018	Devices Using Ultra-Wideband (UWB) Technology
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

C. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

D. Description of Test Sample

The GTX Series Wireless Microphone is a handheld wireless transmitter being added to the previously approved “studio broadcast system,” a wireless microphone system intended for use in a broadcast environment, typically in a studio. The system consists of a Main Control Unit, which offers system control, processing and user interface and outputs to broadcast audio equipment, operating up to 24 beltpack transmitters intended to be worn for real-time on air transmission of the broadcast “talent,” and 32 individual remote receive points which function as mutli-way diversity receive for the signals from the talent beltpack transmitters and also as transmitters for control data to the talent backpacks. The system now includes a handheld microphone which operates in same manner as the previously-approved beltpack transmitter. Up to 24 handheld microphone transmitters can be used for real-time on air transmission of “talent.” The handheld is slightly different in that it contains 2 antennas, but like the GTX24 beltpack, only one antenna is functioning at any given point in time. Frequency range, output power, timing, control and all other aspects of the system are identical to previously approved transmitter performance and requirements.

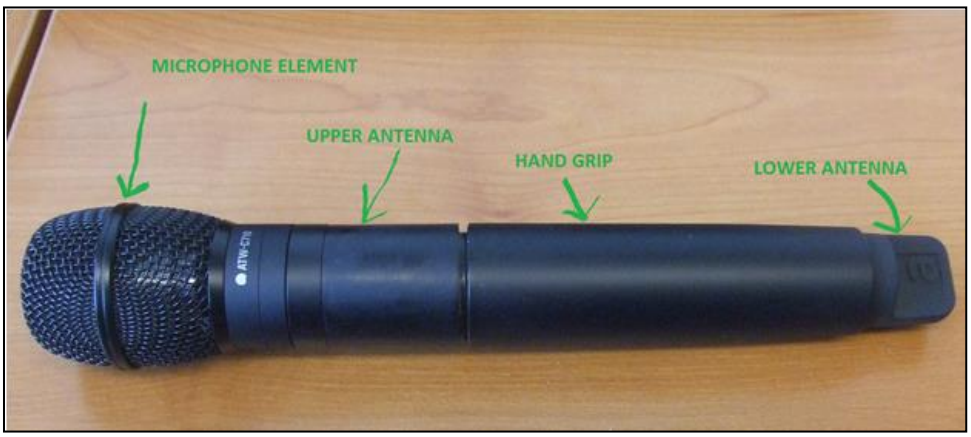

Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

Ref. ID	Name / Description	Model Number	Serial Number	Rev. #
1	Handheld transmitter w test code	GTX24HH	N/A	N/A

Table 4. Equipment Configuration

F. Support Equipment

No support equipment was necessary for the operation and testing of the EUT.

G. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	Daa	RG59 Coax	1	15	Yes	B. TX
2	AC Input	3 conductor, 18 awg	1	2	No	(230v/50hz)

Table 5. Ports and Cabling Information

H. Mode of Operation

The unit has been configured with custom firmware in order to allow the transmitter to turn on and function per normal operating conditions that would exist if it were used with the corresponding Main Control Unit and remote receive points. There are 4 operating modes which are selectable per included instructions. Mode 1 will not work without the Main Control Unit and corresponding remote receive point, and should not be used. Mode 2 allows full system operation without direct transmission. This allows testing of unintended radiation. Mode 3 allows full system operation and transmission from the bottom antenna. Mode 4 allows full system operation and transmission from the top conformal antenna. Both antennas should be tested individually since during normal system operation, only 1 antenna at a time is transmitting.

I. Monitoring Method

The internal display will show the mode of operation selected on the segmented display.

J. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Alteros upon completion of testing.

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III. Electromagnetic Compatibility Criteria for Intentional Radiators

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Test Results: The EUT was **compliant** with the Antenna Requirement limits of §15.203. EUT has an integral antenna.

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.519(a) Operational Limitations

Test Requirements:

§ 15.519(a): UWB devices operating under the provisions of this section must be hand held, i.e., they are relatively small devices that are primarily hand held while being operated and do not employ a fixed infrastructure.

(1) A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

(2) The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device .

(3) UWB devices operating under the provisions of this section may operate indoors or outdoors.

§ 15.521(a): UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

Test Procedure: The EUT was set up to operate on Normal Mode (associated to receiver), it was verified with a horn antenna that the EUT transmits when associated to receiver. At t_0, the receiver was powered off to stop acknowledgements from being sent to EUT. The EUT ceased transmission within 1.1s

Test Results: The EUT was compliant with §15.519 (a).

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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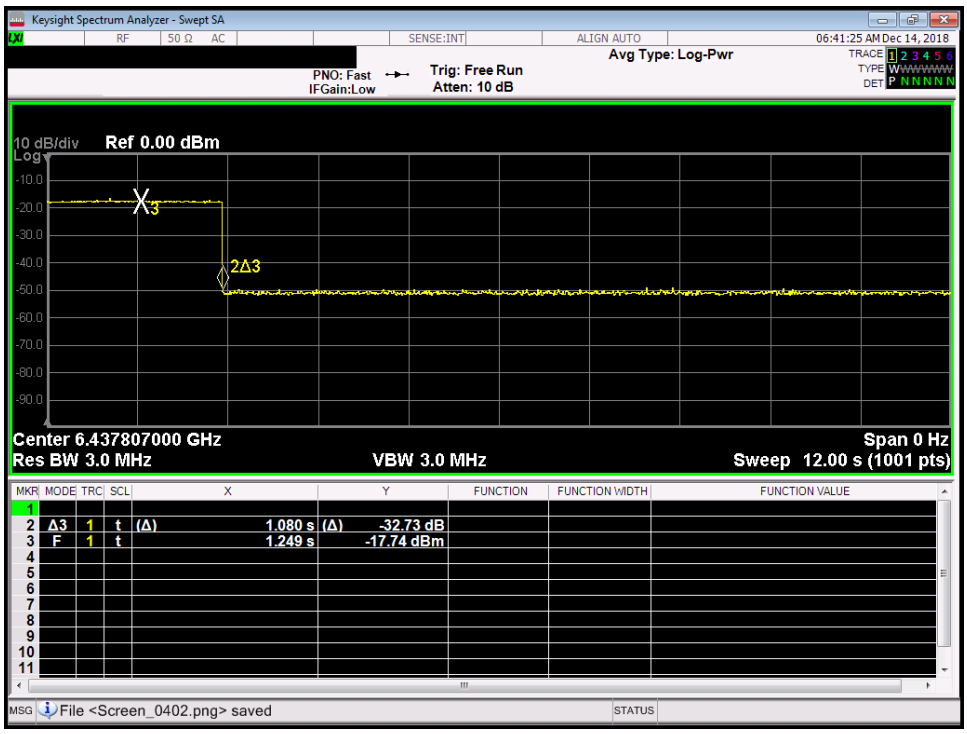

Chart 1. Operational Limitations, 15.519 (a)(i)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.519(b) UWB Bandwidth

Test Requirements: **§ 15.519(b):** The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

§ 15.503(d): *Ultra-wideband (UWB) transmitter.* An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

Test Procedure: A horn antenna was placed 2m away from the EUT. A preamp was used for making measurements. The antenna correction factors, cable loss and preamp factors were programmed into spectrum analyzer.

Test Results The EUT was **compliant** with the UWB Bandwidth limits of § 15.519 (b).

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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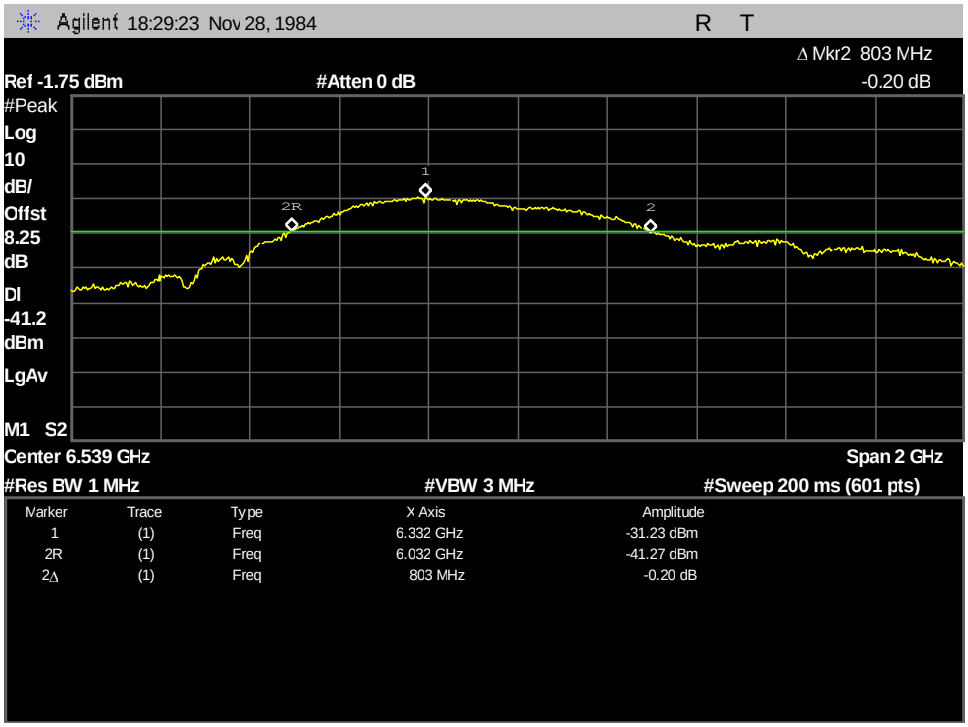

Chart 2. UWB Bandwidth, Mode 3, Vertical, 2m, UWB 10dB BW

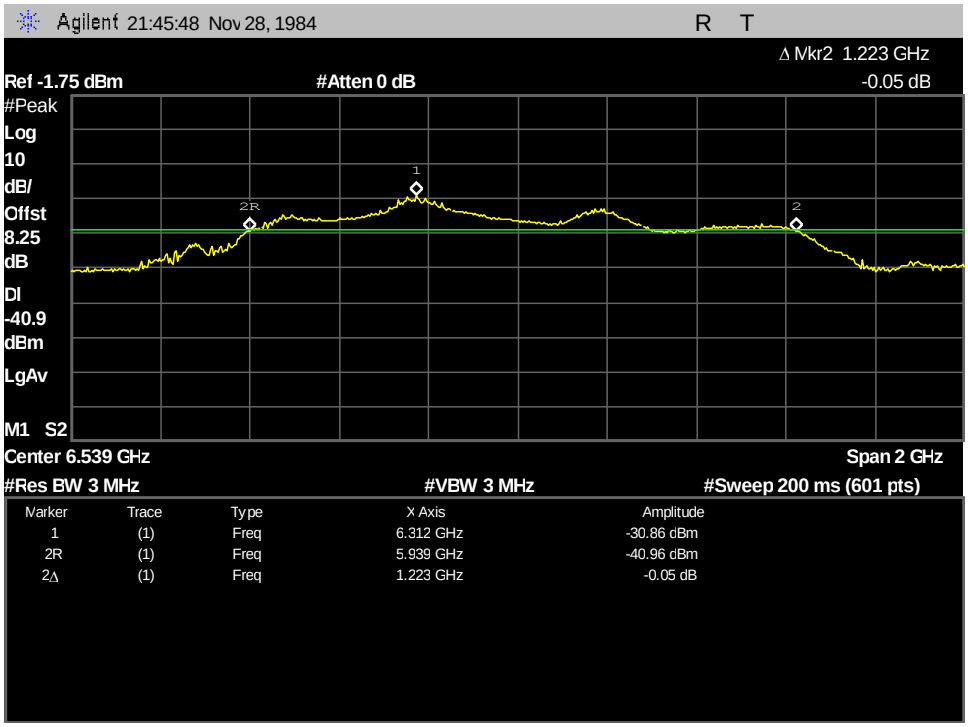

Chart 3. UWB Bandwidth, Mode 4, Vertical, 2m, UWB 10dB BW

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.519(c) Radiated Emissions

Test Requirements: **§15.519(c):** The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency in MHz	EIRP in dBm
960 – 1610	-75.3
1610 – 1990	-63.3
1990 -3100	-61.3
3100 – 10600	-41.3
Above 10600	-61.3

Test Procedure: A preamp was used for making measurements. Antenna correction factors, cable loss and Preamp factors were programmed in to spectrum analyzer. The following formula was used for converting a EIRP limit into a field strength limit based on the measurement distance:

Field Strength (dBuV/m) = EIRP (dBm) + 104.8 – 20log (D)

Most measurements were made at 0.5m and 2m to meet noise floor requirements.

Only noise floor observed above 18GHz.

Test Results: The EUT was **compliant** with the Radiated Spurious Emission limits of **§ 15.519(c)**.

Emissions that appear over the limit on the frequency range 960-1610MHz are caused by the digital circuitry. Therefore, they are not subject to UWB spurious emissions limit.

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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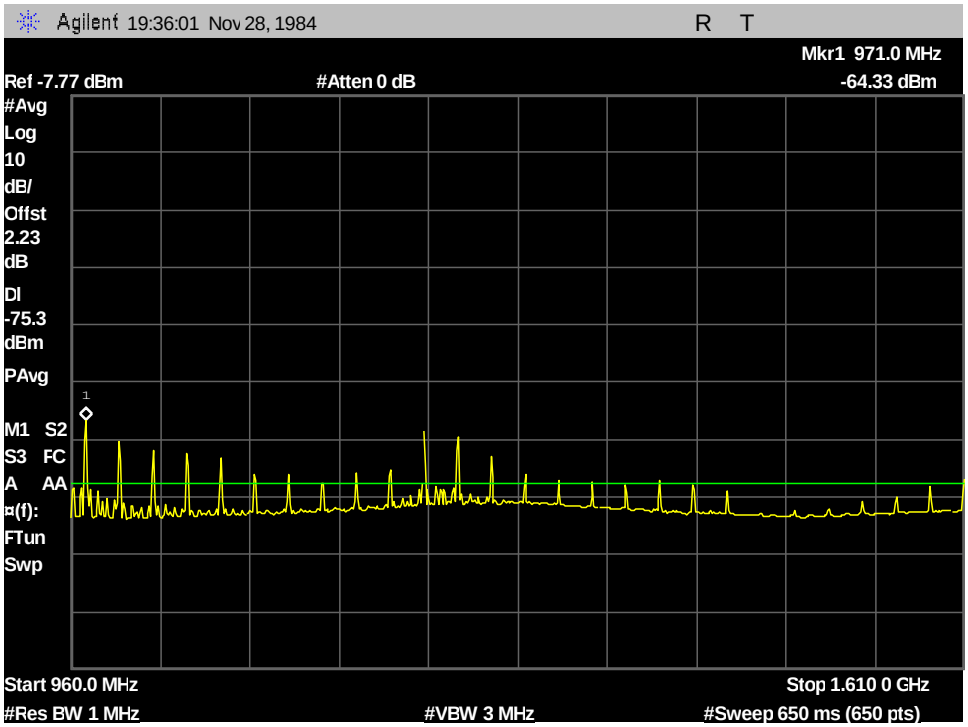

Chart 4. Radiated Emissions, Mode 2, Vertical, 1m, AVG Emissions, 960-1610 MHz, Tx OFF

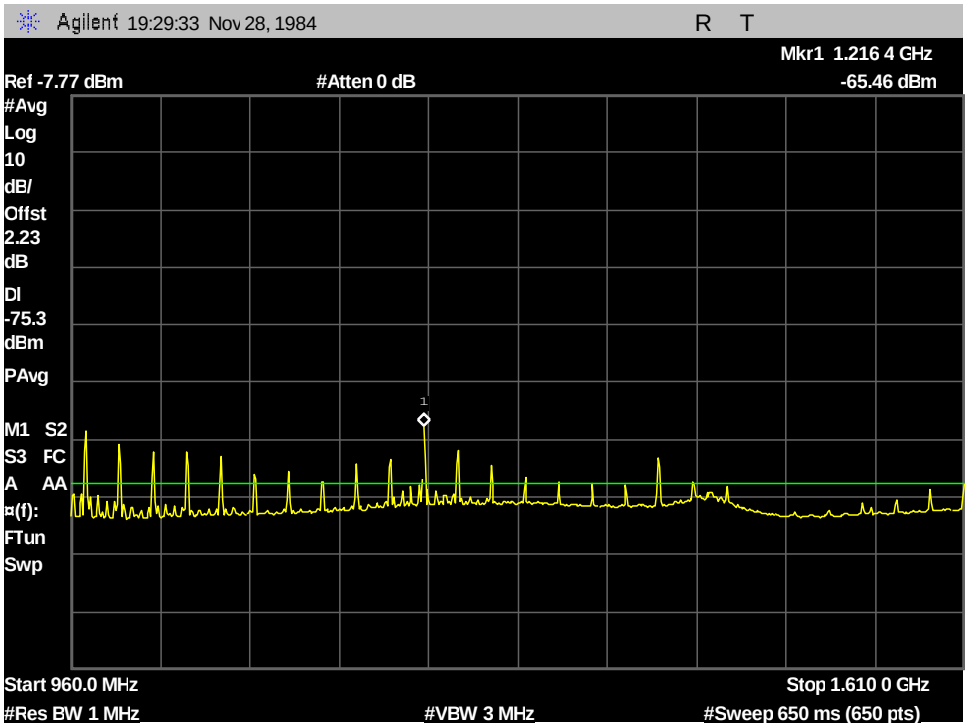

Chart 5. Radiated Emissions, Mode 3, Vertical, 1m, AVG Emissions, 960-1610 MHz, Tx ON

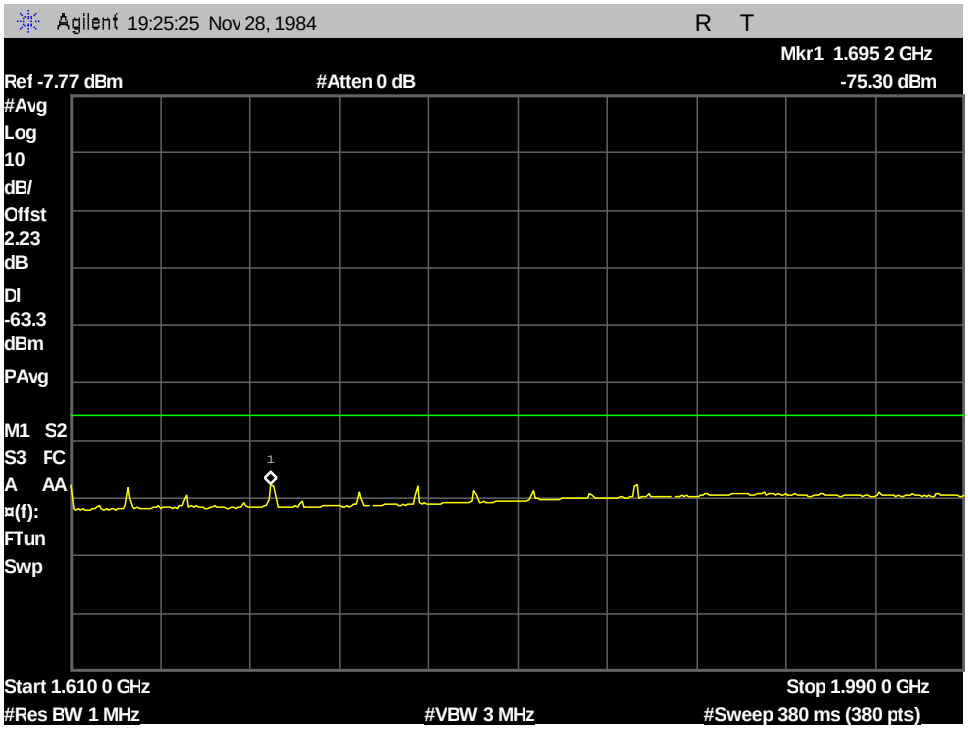

Chart 6. Radiated Emissions, Mode 3, Vertical, 1m, AVG Emissions, 1610-1990 MHz

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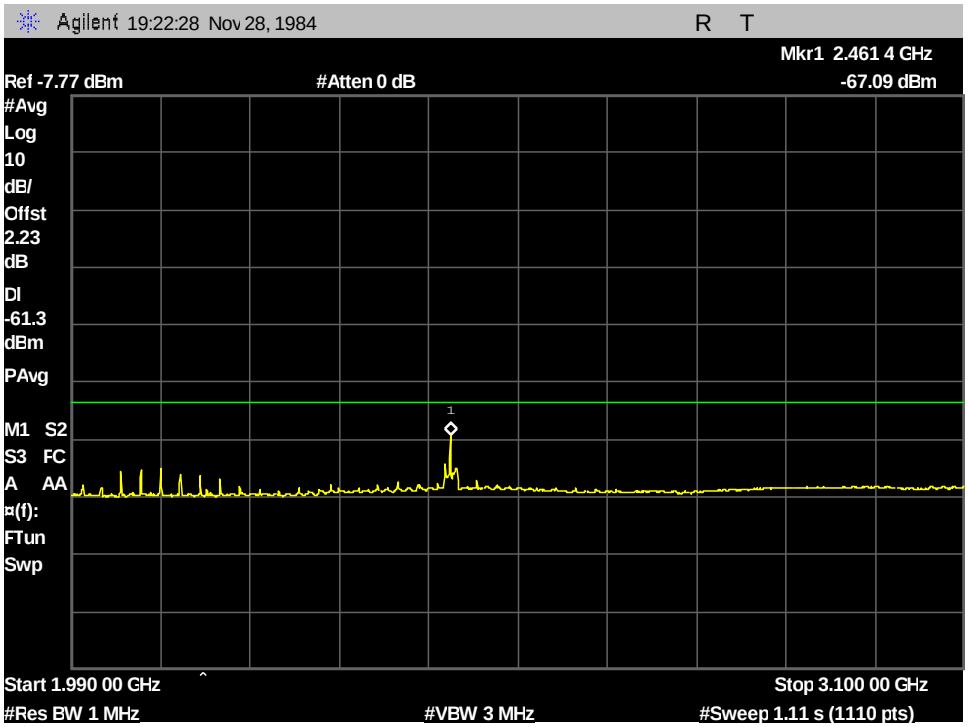

Chart 7. Radiated Emissions, Mode 3, Vertical, 1m, AVG Emissions, 1990-3100 MHz

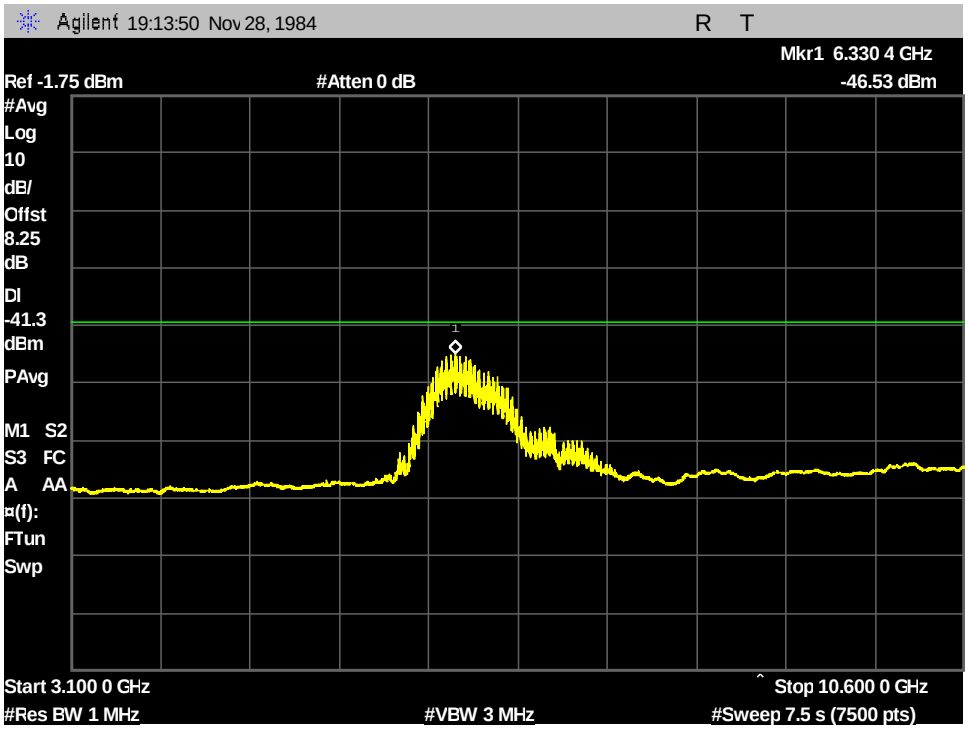

Chart 8. Radiated Emissions, Mode 3, Vertical, 2m, AVG Emissions, 3100-10600 MHz

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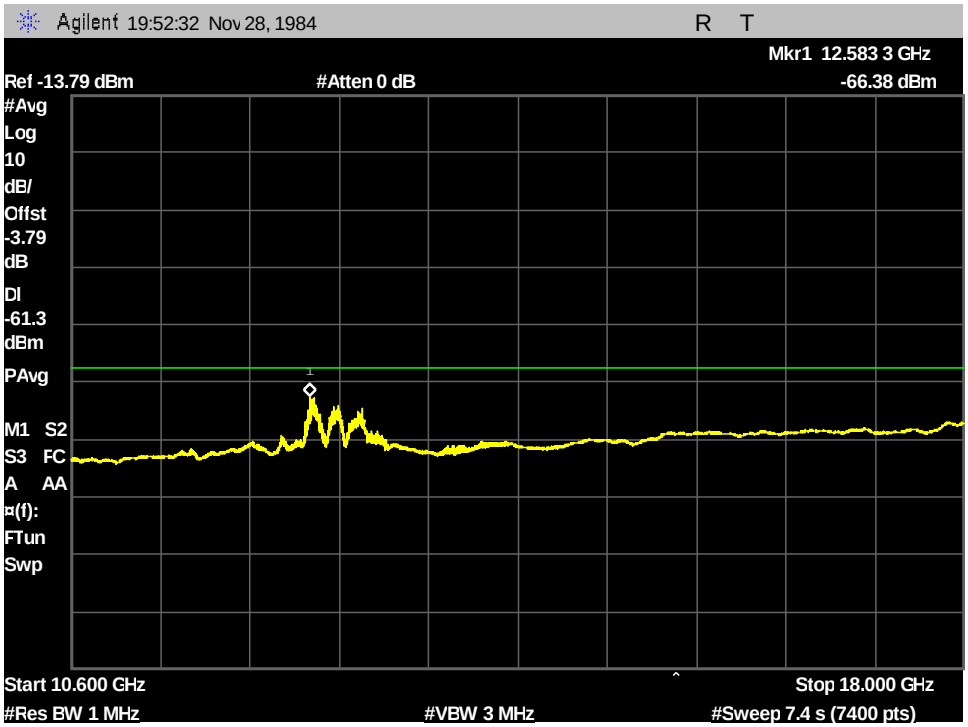

Chart 9. Radiated Emissions, Mode 3, Vertical, 0.5m, AVG Emissions, 10600-18000 MHz

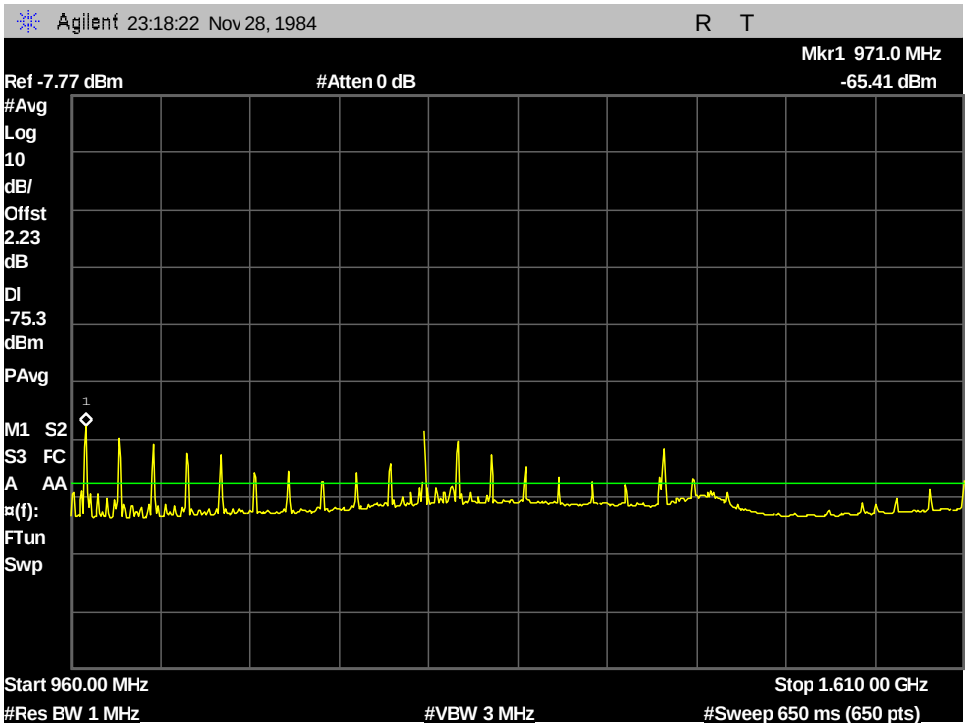

Chart 10. Radiated Emissions, Mode 4, Vertical, 1m, AVG Emissions, 960-1610 MHz, Tx ON

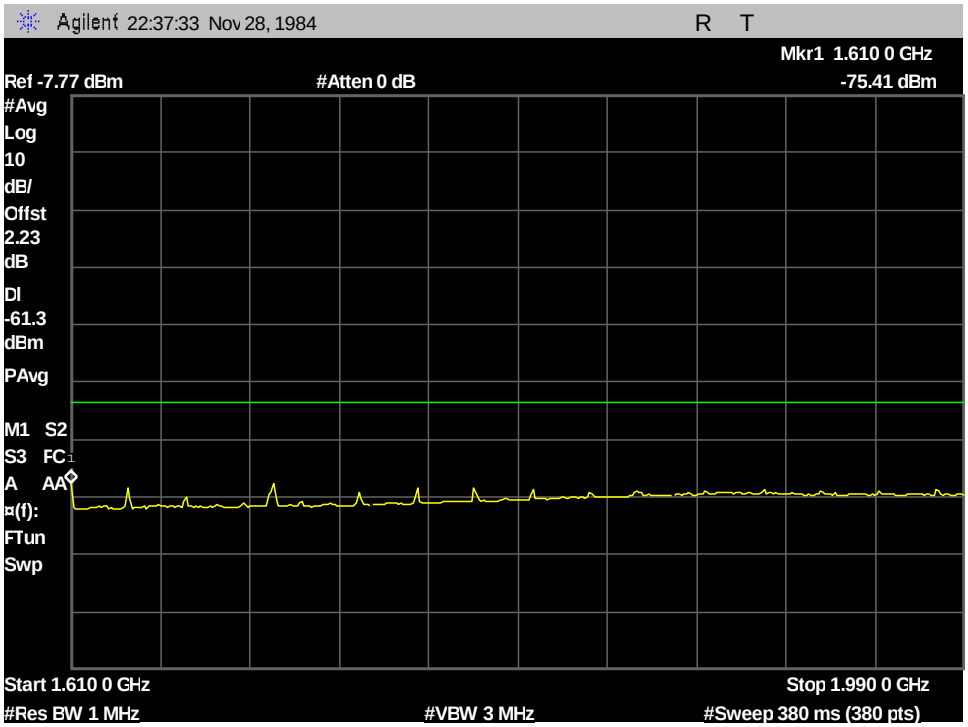

Chart 11. Radiated Emissions, Mode 4, Vertical, 1m, AVG Emissions, 1610-1990 MHz

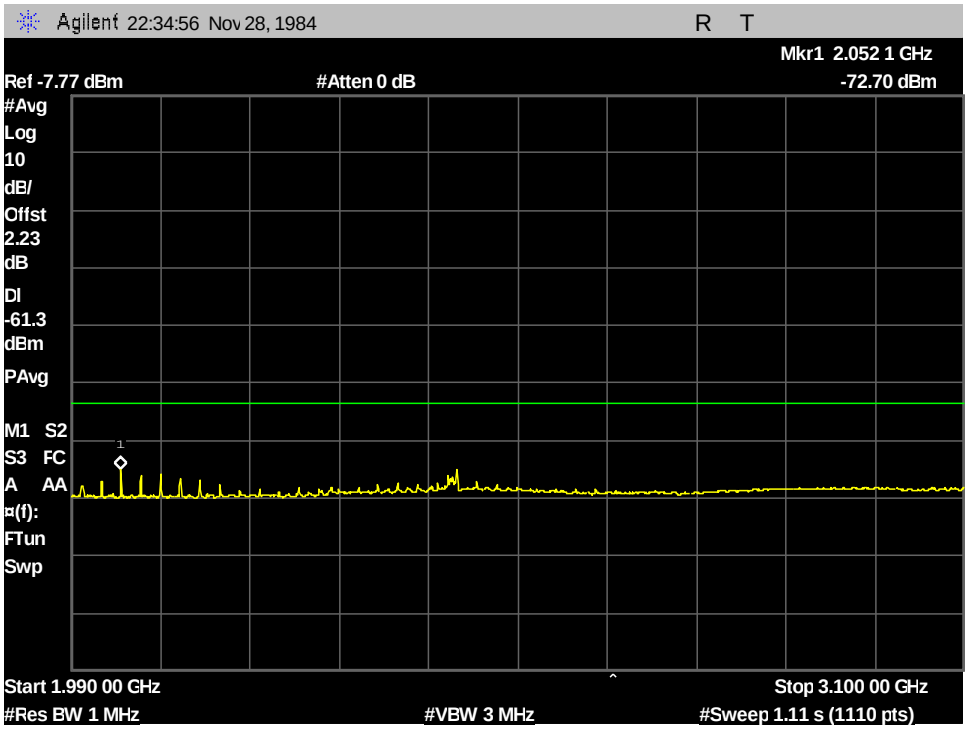

Chart 12. Radiated Emissions, Mode 4, Vertical, 1m, AVG Emissions, 1990-3100 MHz

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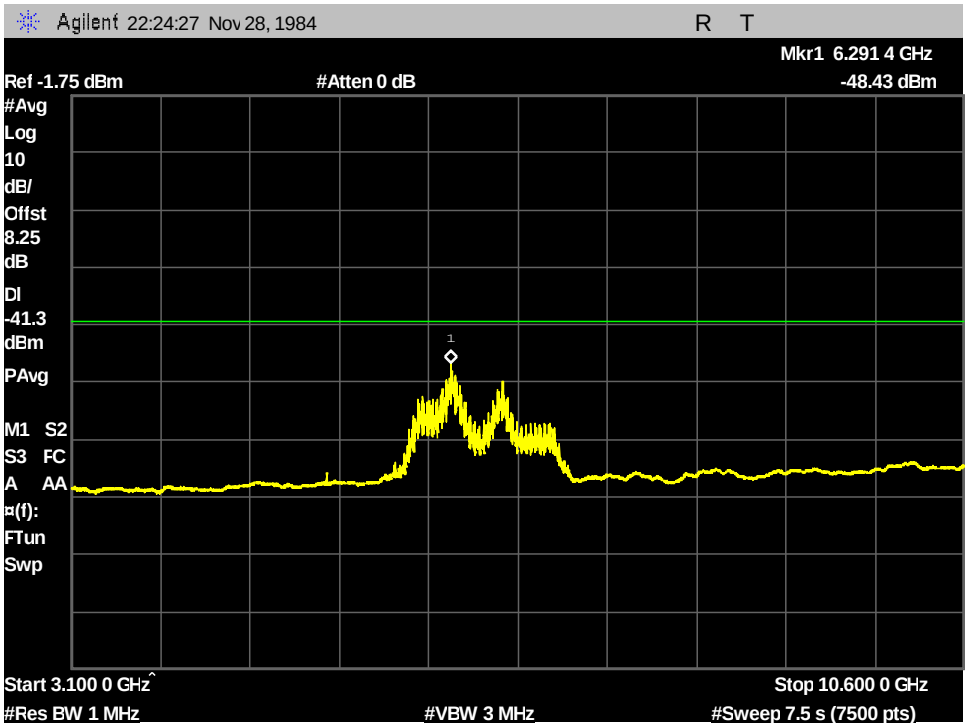


Chart 13. Radiated Emissions, Mode 4, Vertical, 2m, AVG Emissions, 3100-10600 MHz

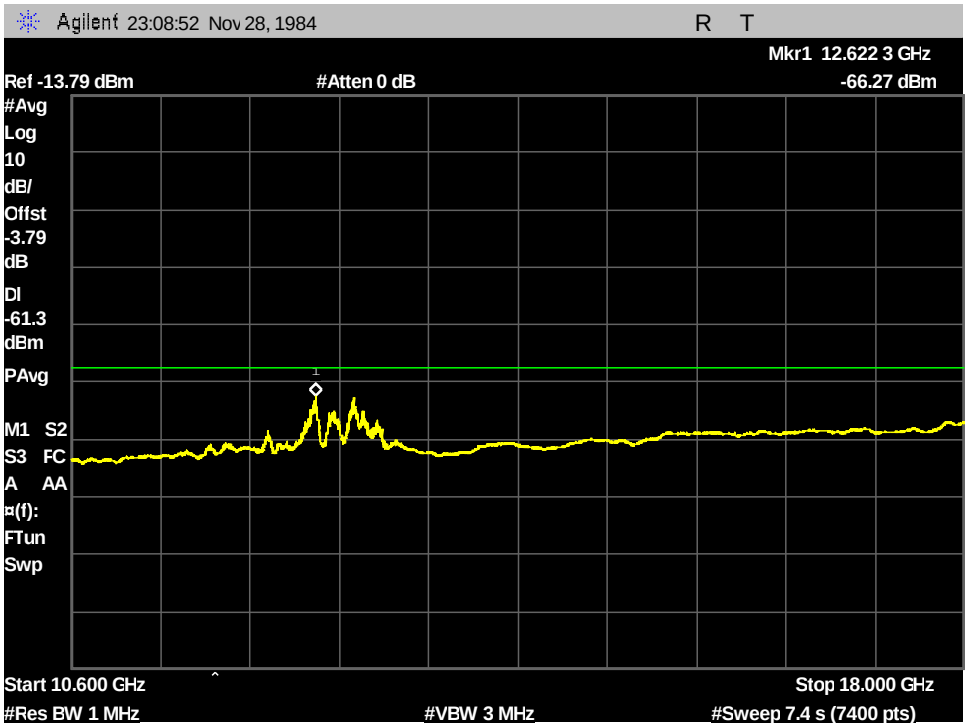
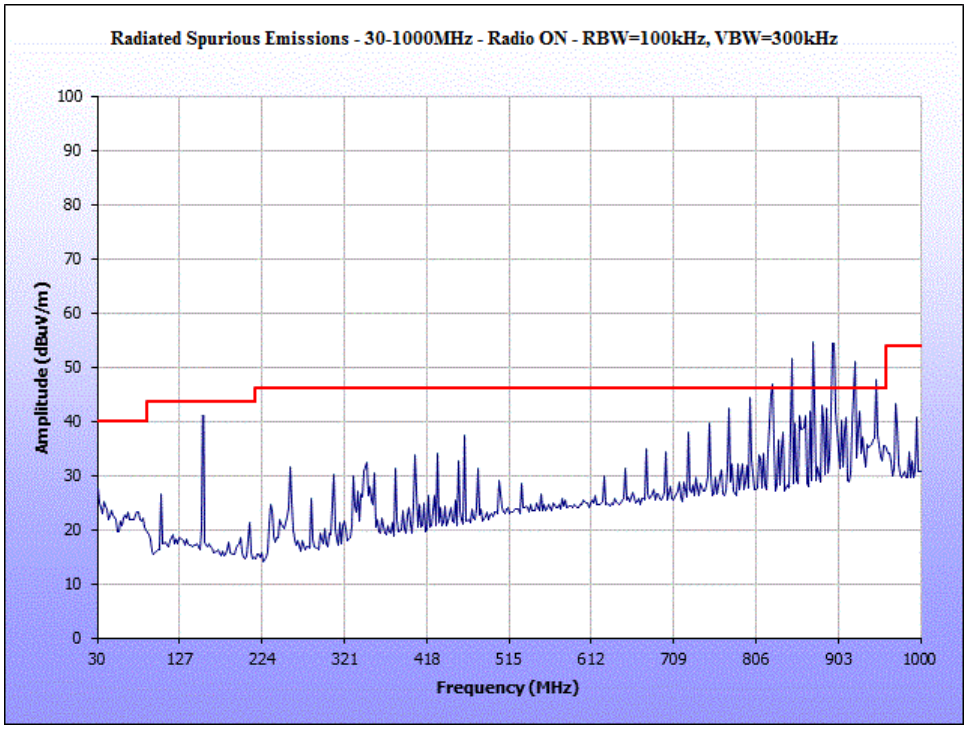


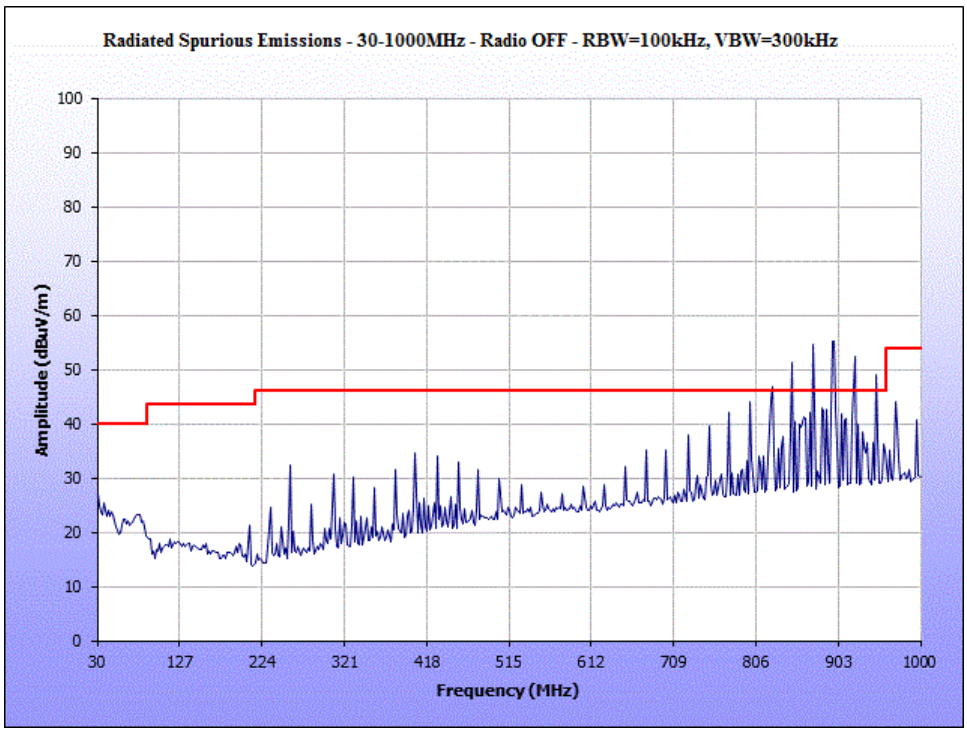
Chart 14. Radiated Emissions, Mode 4, Vertical, 0.5m, AVG Emissions, 10600-18000 MHz

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected Amplitude (dBuv)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
847.9008	84	H	0.9782	28.62	22.56	4.37	10.46	45.09	46.4	-1.31
847.9008	146	V	1.5634	20.17	22.56	4.37	10.46	36.64	46.4	-9.76
823.30862	84	H	0.9773	27.63	22.40	4.30	10.46	43.87	46.4	-2.53
823.30862	147	V	1.613	16.45	22.40	4.30	10.46	32.69	46.4	-13.71
872.46493	82	H	0.9778	28.81	22.70	4.38	10.46	45.43	46.4	-0.97
872.46493	146	V	1.5356	19.07	22.70	4.38	10.46	35.69	46.4	-10.71
897.03407	92	H	0.9778	26.31	23.06	4.47	10.46	43.38	46.4	-3.02
897.03407	149	V	1.3786	18.24	23.06	4.47	10.46	35.31	46.4	-11.09
921.61323	85	H	0.9778	24.33	23.20	4.54	10.46	41.61	46.4	-4.79
921.61323	147	V	1.39	17.8	23.20	4.54	10.46	35.08	46.4	-11.32
946.19038	94	H	0.9773	22.12	23.40	4.64	10.46	39.70	46.4	-6.70
946.19038	164	V	1.25	15.56	23.40	4.64	10.46	33.14	46.4	-13.26

Table 6. Radiated Emissions, Test Results – Class A



Plot 1. Radiated Emissions, 30-960 MHz, Radio ON



Plot 2. Radiated Emissions, 30-960 MHz, Radio OFF

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.519(d) Radiated Emissions – GPS Bands

Test Requirements: **§15.519(d):** In addition to the radiated emission limits specified I the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm
1164 – 1240	-85.3
1559 – 1610	-85.3

Test Procedure: A preamp was used for making measurements. Antenna correction factors, cable loss and Preamp factors were programmed in to spectrum analyzer. The following formula was used for converting a EIRP limit into a field strength limit based on the measurement distance:

Field Strength (dBuV/m) = EIRP (dBm) + 104.8 – 20log (D)

Test Results: The EUT was **compliant** with the Radiated Spurious Emission limits of **§ 15.519(d)**. Emissions which exceed the limit of 15.519(d) are generated by the device's digital circuitry, not the transmitter itself, and meet the Class A limit of 15.109. For the band 1164-1240 MHz: "Chart 16" shows a comparable emissions footprint with the transmitter disabled, as compared to "Charts 15 and 19," (with the transmitter operational); for the band 1559-1610 MHz: "Chart 18" shows a comparable emissions footprint with the transmitter disabled, as compared to "Charts 17 and 20," (with the transmitter operational).

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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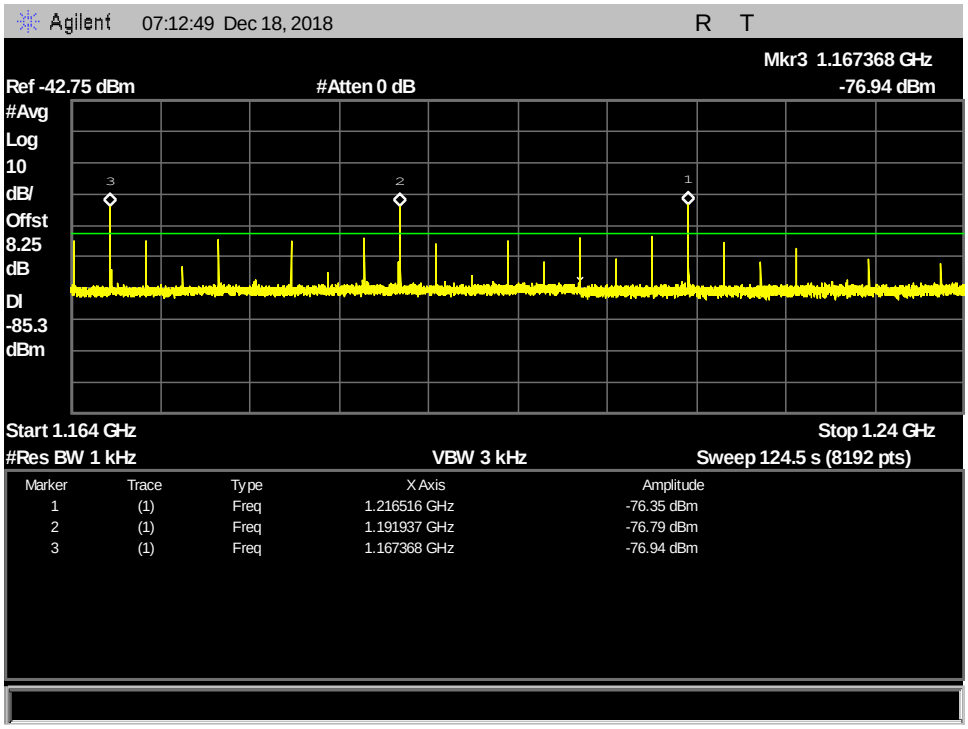

Chart 15. GPS Bands, Mode3, 2m, Vertical, GPS Band 1 (TX On)

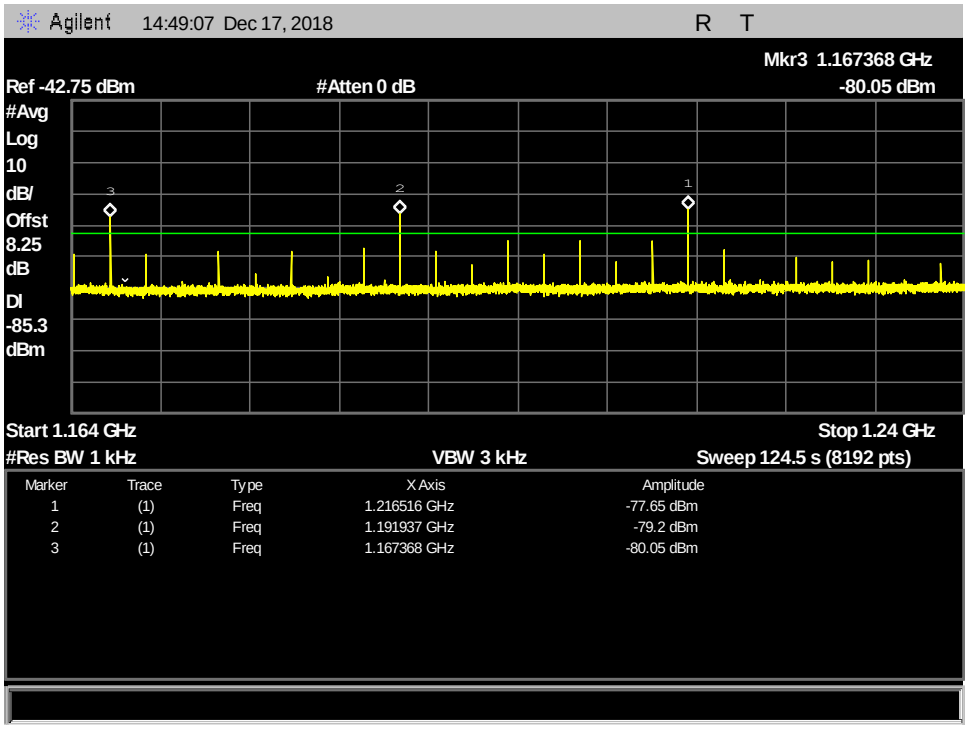

Chart 16. GPS Bands, Mode3, 2m, Vertical, GPS Band 1, (TX Off)

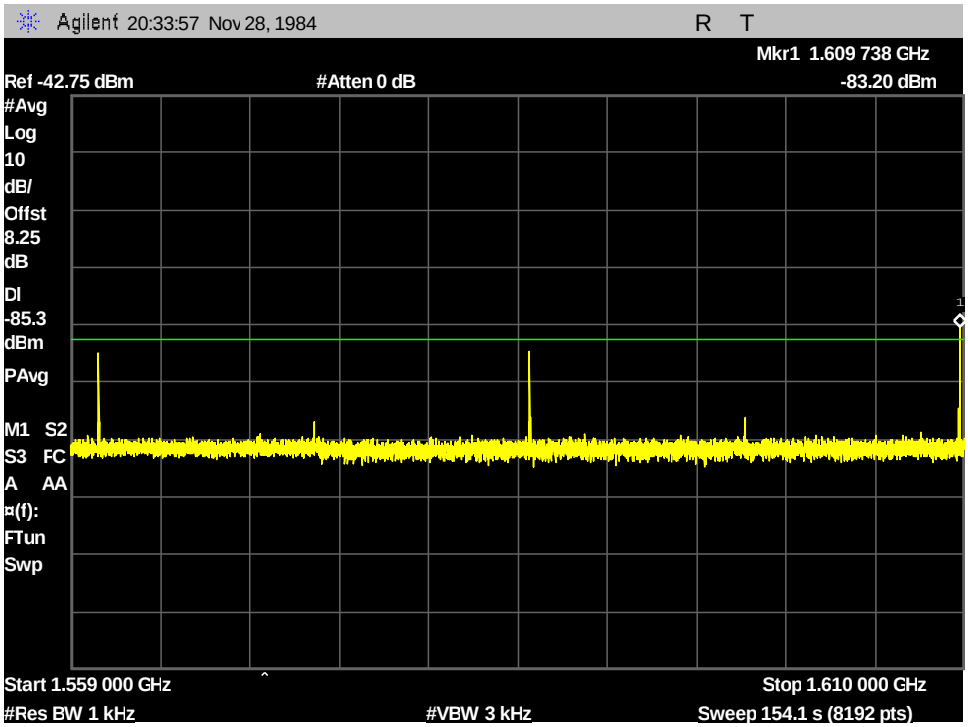

Chart 17. GPS Bands, Mode3, 2m, Vertical, GPS Band 2 (TX On)

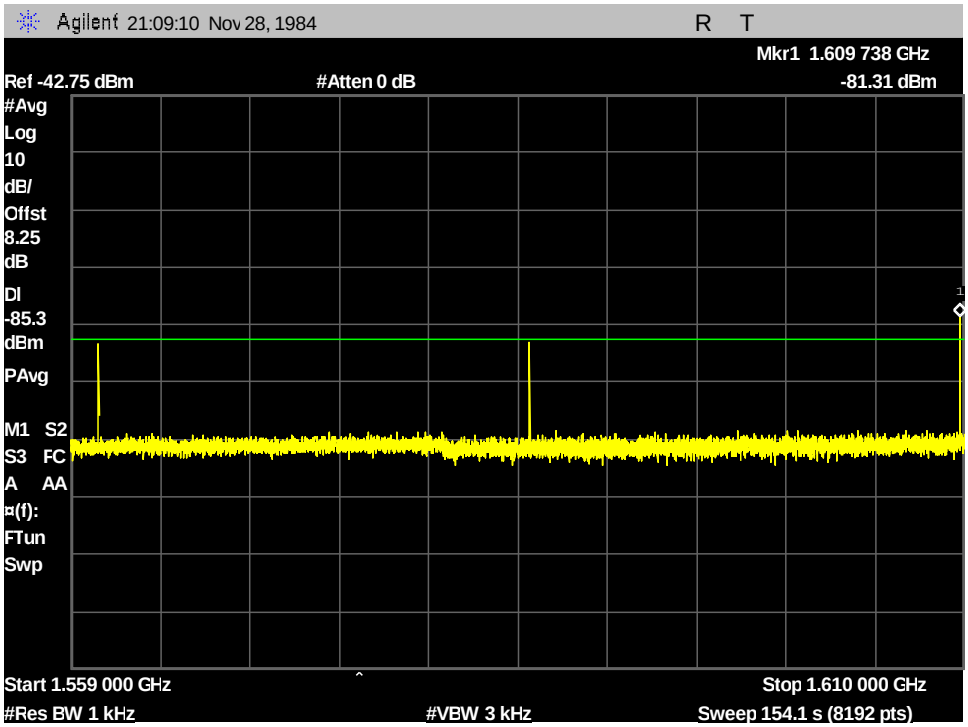

Chart 18. GPS Bands, Mode3, 2m, Vertical, GPS Band 2, (TX Off)

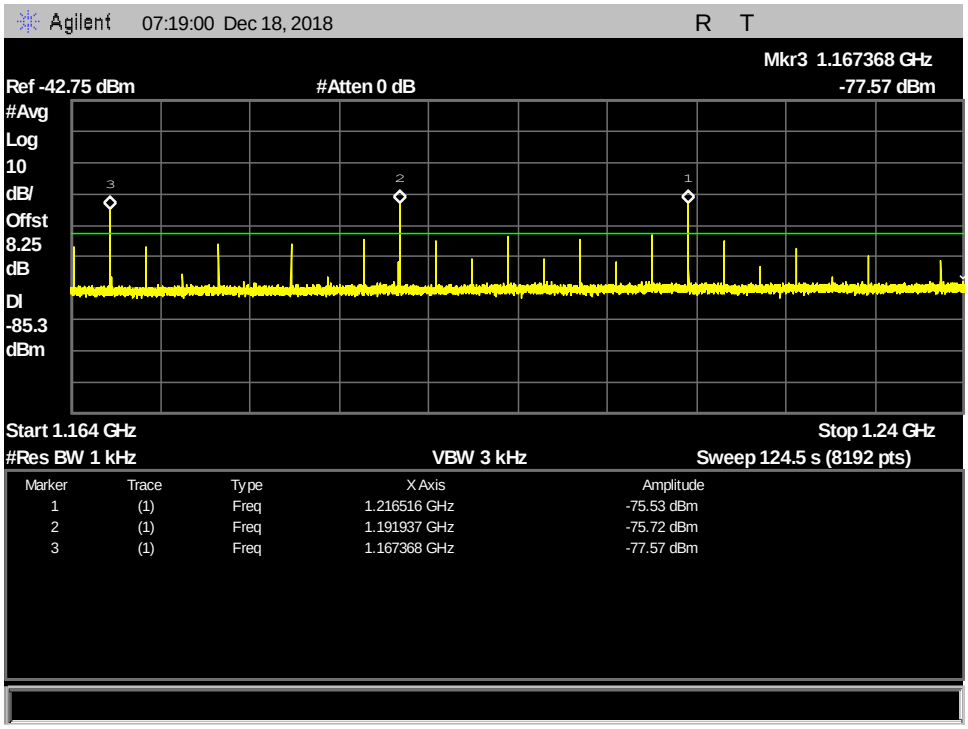

Chart 19. GPS Bands, Mode4, 1m, Vertical, GPS Band 1 (TX On)

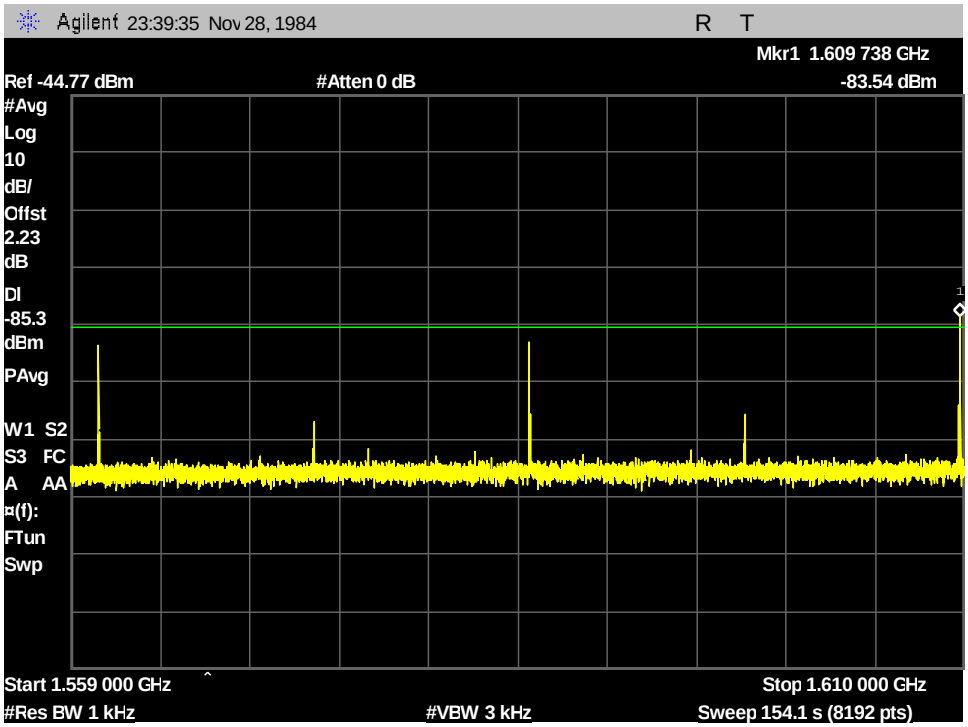

Chart 20. GPS Bands, Mode4, 1m, Vertical, GPS Band 2 (TX On)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.519(e) Peak Emissions

Test Requirements: **§15.519(e):** There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f[M]. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in §15.521.

Test Procedure: A preamp was used for making measurements. Antenna correction factors, cable loss and Preamp factors were programmed in to spectrum analyzer. Measurements were made at 1m.

Measurements were made with PEAK detector activated to the spectrum analyzer and having the resolution bandwidth set to 3 MHz and video bandwidth set to 3 MHz.

Therefore, the limit calculated is 20 log (3/50) = -24.4 dBm.

Test Results: The EUT was **compliant** with the Peak Power Output limits of **§15.519(e)**.

Test Engineer: Donald Salguero

Test Date: October 24, 2018

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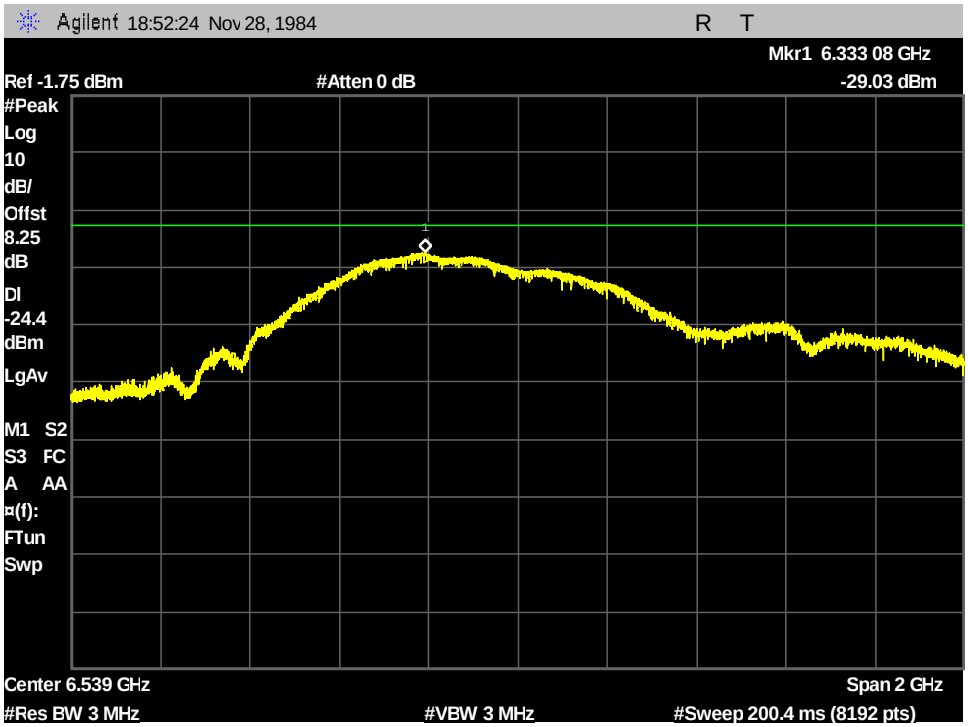

Chart 21. Peak Emissions, Mode 3, Vertical, 2m, Peak Fundamental

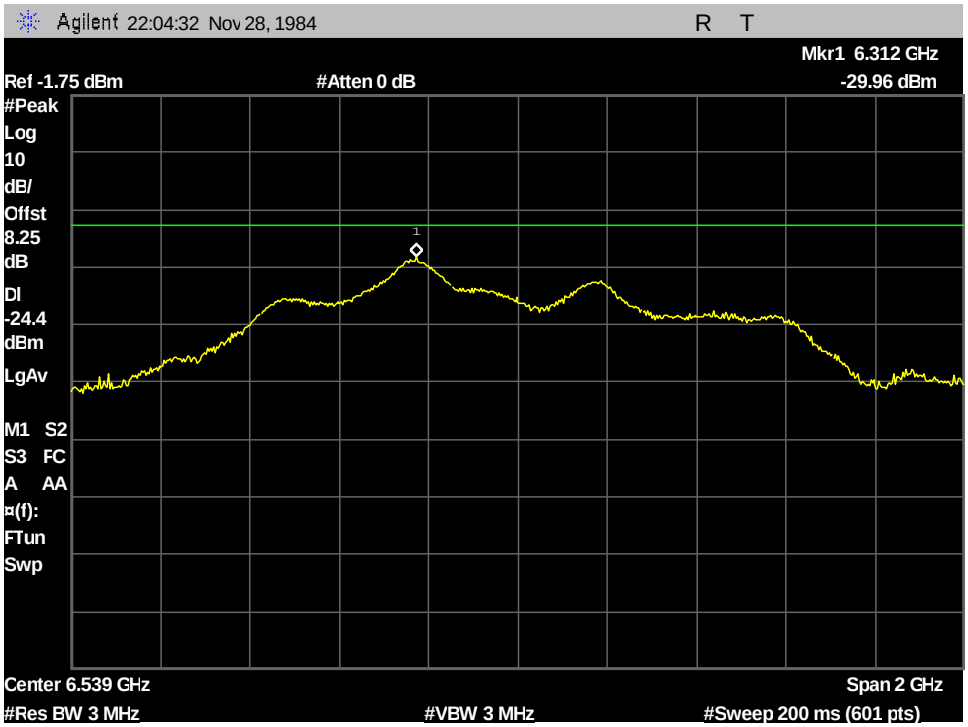

Chart 22. Peak Emissions, Mode 4, Vertical, 2m, Peak Fundamental

Electromagnetic Compatibility Criteria for Intentional Radiators

MPE

Test Requirement: Part 2.1093(d), Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

MPE Limit: EUT's operating frequencies @ 3100-10600MHz; **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4pR^2$ or $R = \sqrt{(PG / 4pS)}$

where, S = Power Density (mW/cm^2)
P = Power Input to antenna (mW)
G = Antenna Gain (numeric value)
R = Distance (cm)

Test Results: The EUT was **compliant** with MPE limits..

Test Engineer: Donald Salguero

Test Date: October 26, 2018

Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Ant. Gain (dBi)	Pwr. Density (mW/cm^2)	Limit (mW/cm^2)	Margin	Distance (cm)	Result
6333.08	-29.03	0.0013	4	0.000004	1	-0.999996	5	Pass

Table 7. MPE, Test Results

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IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

MET Asset #	Equipment	Manufacturer	Model	Last Cal	Cal Due
1T4753	ANTENNA - BILOG	SUNOL SCIENCES	JB6	08/30/18	08/30/19
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	12/07/16	12/07/18
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	01/31/16	01/31/19
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	4/19/2017	11/19/2018
1T8743	PREAMPLIFIER	A.H. SYSTEMS, INC.	PAM-0118P	FUNC. VERIFY	
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	5/16/2018	11/16/2019
1T8831	SIGNAL ANALYZER (CXA)	KEYSIGHT TECHNOLOGIES	N9000A	1/29/2018	1/29/2019
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY PROOF	81	NOT REQUIRED	

Table 8. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

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V. Certification & User's Manual Information

Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

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(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

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Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

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Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

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Certification & User's Manual Information

1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver.

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

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End of Report

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