



MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

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November 14, 2016

Audio-Technica
1221 Commerce Dr.
Stow, OH 44224-1760

Dear Lynn VanLowe,

Enclosed is the EMC Wireless test report for compliance testing of the Audio-Technica, RP32 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.

Jennifer Warnell
Documentation Department

Reference: (\Audio-Technica\EMC86463A-FCC519 Rev. 3)

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Electromagnetic Compatibility Criteria Test Report

for the

**Audio-Technica
RP32**

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: EMC86463A-FCC519 Rev. 3

November 14, 2016

Prepared For:

**Audio-Technica
1221 Commerce Dr.
Stow, OH 44224-1760**

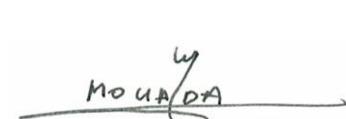
Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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for Intentional Radiators



Djed Mouada
Project Engineer, Electromagnetic Compatibility Lab



Jennifer Warnell
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.



Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	September 29, 2015	Initial Issue.
1	October 13, 2015	Engineer corrections.
2	November 10, 2016	Added statement to direct attention to Timing Diagram.
3	November 14, 2016	Added MPE.

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List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dB_μA	Decibels above one microamp
dB_μV	Decibels above one microvolt
dB_μA/m	Decibels above one microamp per meter
dB_μV/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μH	microhenry
μ	microfarad
μs	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Audio-Technica RP32, 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 (RP32). Audio-Technica should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the RP32, 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 Audio-Technica, purchase order number 4500008023. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference 47 CFR Part 15.519	IC Reference RSS-220 Issue 1 March 2009	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 – The EUT is DC powered.
Title 47 of the CFR, Part 15 §15.519(a) & §15.521(a)	N/A	Operational Limitations	See the attached 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 5.2	Radiated Emissions	Compliant
Title 47 of the CFR, Part 15 §15.519(d)	RSS-220 Section 5.2	Radiated Emissions – GPS Bands	Compliant
Title 47 of the CFR, Part 15 §15.519(e)	RSS-220 Section 5.2	Peak Emissions	Compliant

Table 1. Executive Summary of EMC Part 15.247 Compliance Testing

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Audio-Technica to perform testing on the RP32, under Audio-Technica's purchase order number 4500008023.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Audio-Technica, RP32.

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

Model(s) Tested:	RP32
Model(s) Covered:	RP32
EUT Specifications:	Primary Power: 3V/24V
	FCC ID: JFZRP32
	Type of Modulations: OFDM
	Equipment Code: UWB
	Peak RF Output Power: -25.94 dBm
Analysis:	The results obtained relate only to the item(s) tested.
Environmental Test Conditions:	Temperature: 15-35° C
	Relative Humidity: 30-60%
	Barometric Pressure: 860-1060 mbar
Evaluated by:	Djed Mouada
Report Date(s):	November 14, 2016

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 March 2009	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 Studio Broadcast is 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 (RP32) which function as multi-way diversity receive for the signals from the talent beltpack transmitters and also as transmitters for control data to the talent backpacks.

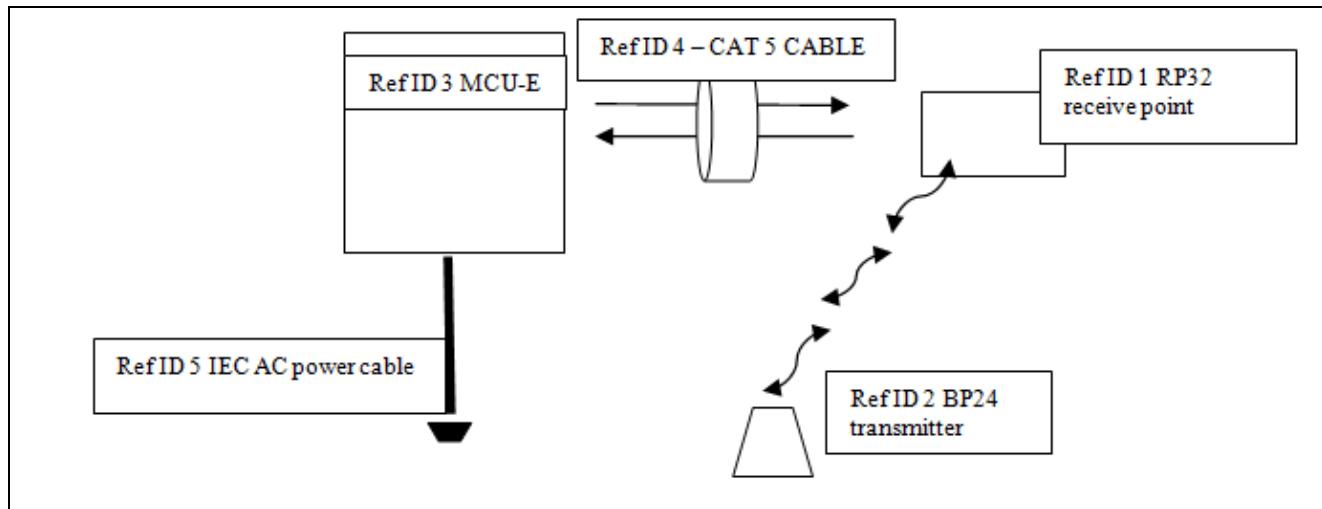


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
1	N/A	Receiver point	RP32	N/A	N/A	N/A

Table 4. Equipment Configuration

F. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	Customer Supplied Calibration Data
3	MCU emulator	Audio-Technica	MCU-E	N/A

Table 5. Support Equipment

G. Mode of Operation

The equipment sent for testing will include an MCU “emulator” which will continuously and fully exercise the Remote receiver connection, and also control the communications with the separate beltpack transmitter. Normal operation of the RP32 receive point takes place when powered via the MCU “emulator.” As long as power is supplied to the MCU-E emulator and the RP32 is connected via the CAT 5 cable, the RP32 will be on and operating normally. Normal operation of the BP24 transmitter occurs upon installation of 2 x AA batteries and power switch on. The BP24 must receive a “sync” signal from the RP32 in order to establish a round-trip link. Once this is established, the system performs in normal operation unless an interfering source or distance removes the BP24 link round trip from the RP32 and BER approaches a level which is too high. Loss of link results in cessation of system operation. If desired, to ensure operation is in progress, the tester may utilize a headphone monitor jack/level control via the front panel of the MCU-E and listen to a system test tone. The operation or connection of headphones for the purpose of monitoring a signal does not affect the operation or performance of the system and is strictly for convenience.

H. Monitoring Method

Correct operation will result in a signal output which from the RP32 can be observed via high frequency scope/analyzer and amplifier. Operation from the BP24 observed via a high frequency scope/analyzer and amplifier. If the system is not performing in its intended function, no signals will be present or observable, as link will not be established. Additional monitoring is available via a headphone jack and level control on the front of the MCU-E box. When the system is linked and transmitting/receiving, a 1KHz tone will be present.

I. 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.

J. Disposition of EUT

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

III. Electromagnetic Compatibility Criteria for Intentional Radiators

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.

Results: The EUT as tested is compliant the criteria of §15.203. The EUT has an integral antenna.

Test Engineer(s): Djed Mouada

Test Date(s): 09/21/15

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Σ line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB μ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 6. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Results: The EUT was not applicable with this requirement. The EUT is DC powered.

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 acknowledgement 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 Results The EUT was compliant with §15.519 (a). See the external exhibit for compliance of this section.

Test Engineer(s): Djed Mouada

Test Date(s): 08/31/15 – 09/18/15

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 1m 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

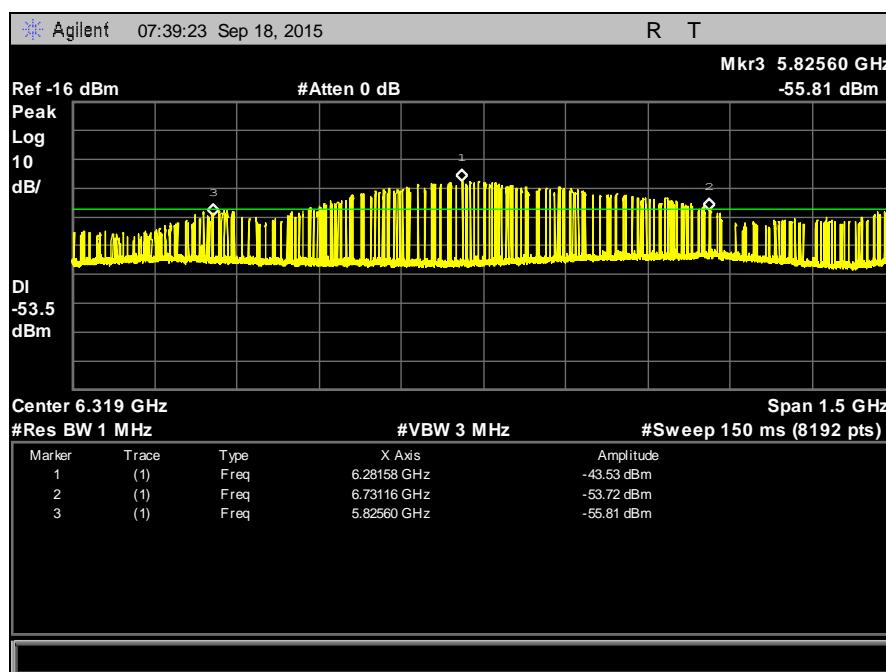
The EUT was compliant with § 15.519 (b).

Test Engineer(s):

Djed Mouada

Test Date(s):

08/31/15 – 09/18/15



Plot 1. UWB Bandwidth, -10 dB Occupied bandwidth

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:

$$\text{Field Strength (dBuV/m)} = \text{EIRP (dBm)} + 104.8 - 20\log(D)$$

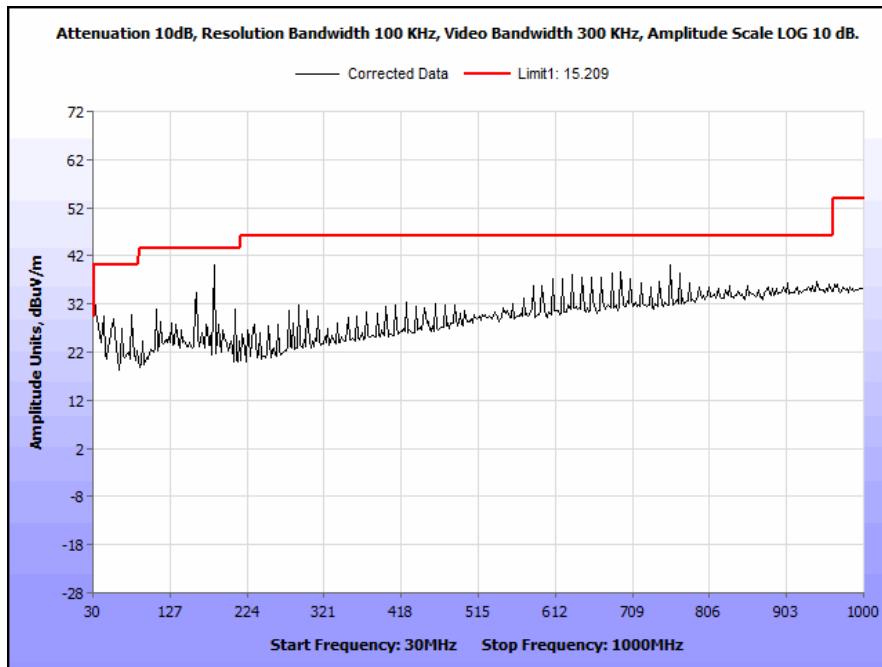
Most measurements were made at 0.5m and 2m to meet noise floor requirements.

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

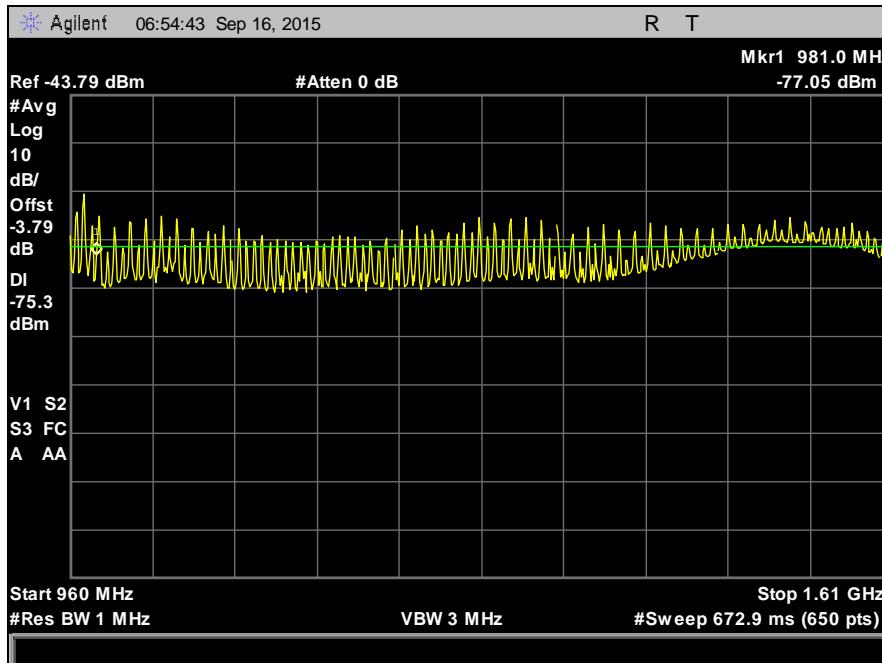
Test Engineer(s): Djed Mouada

Test Date(s): 09/16/15

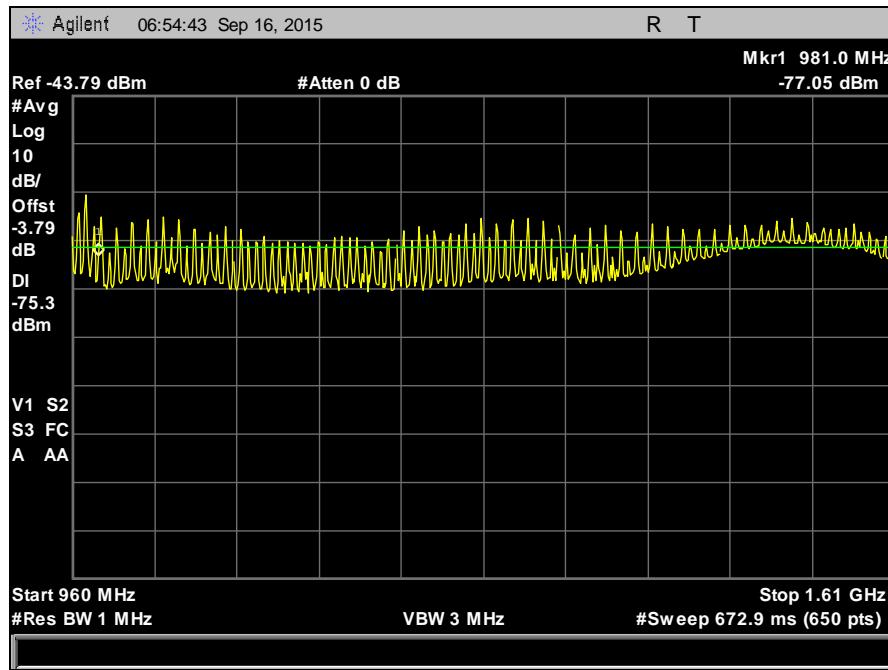
Radiated Emissions Test Results



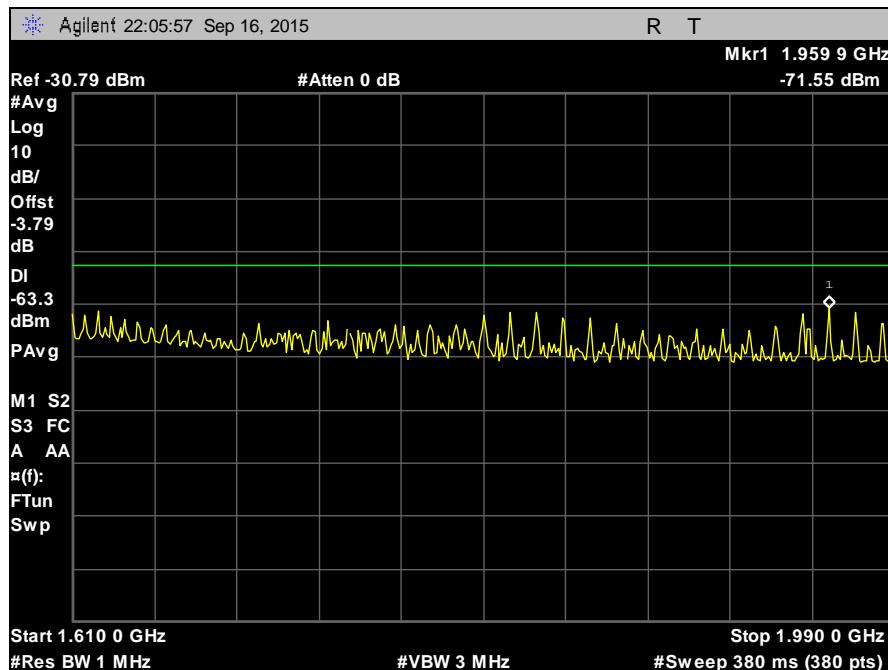
Plot 2. Radiated Emissions



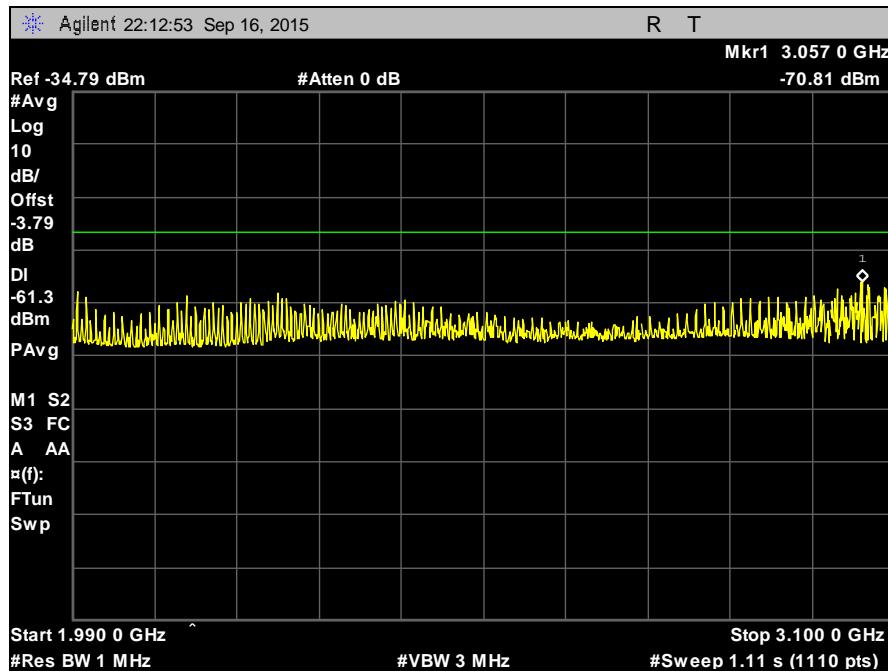
Plot 3. Radiated Spurious Emissions, 960 MHz – 1616 MHz, Tx Off



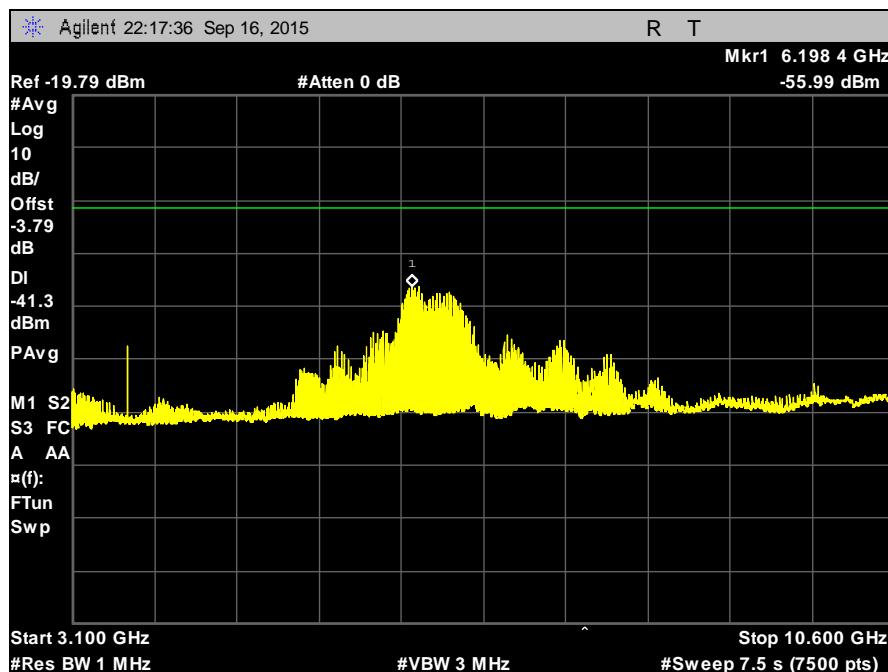
Plot 4. Radiated Spurious Emissions, 960 MHz – 1616 MHz, Tx On



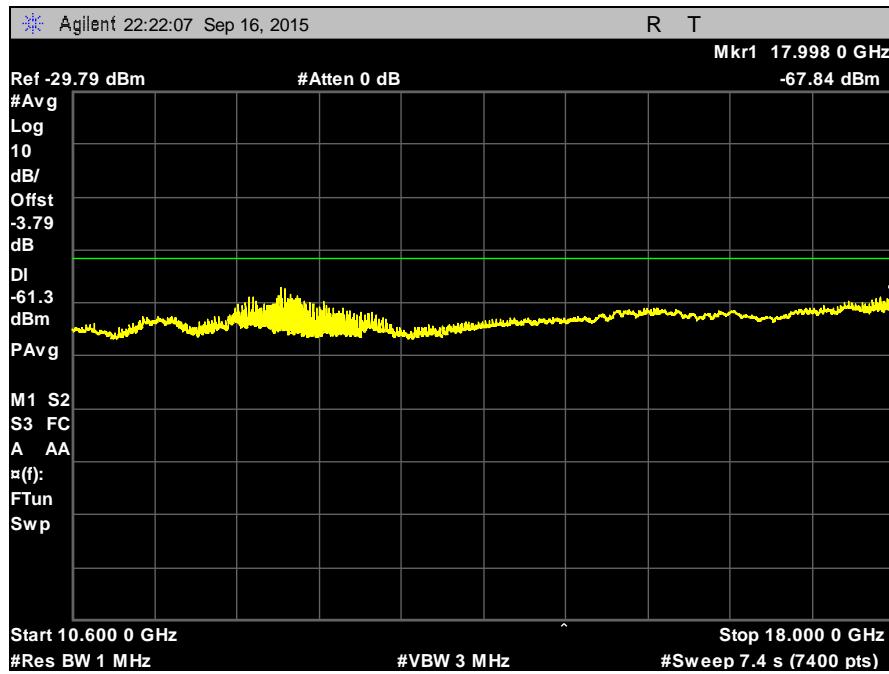
Plot 5. Radiated Spurious Emissions, 1610 MHz – 1990 MHz



Plot 6. Radiated Spurious Emissions, 1990 MHz – 3100 MHz

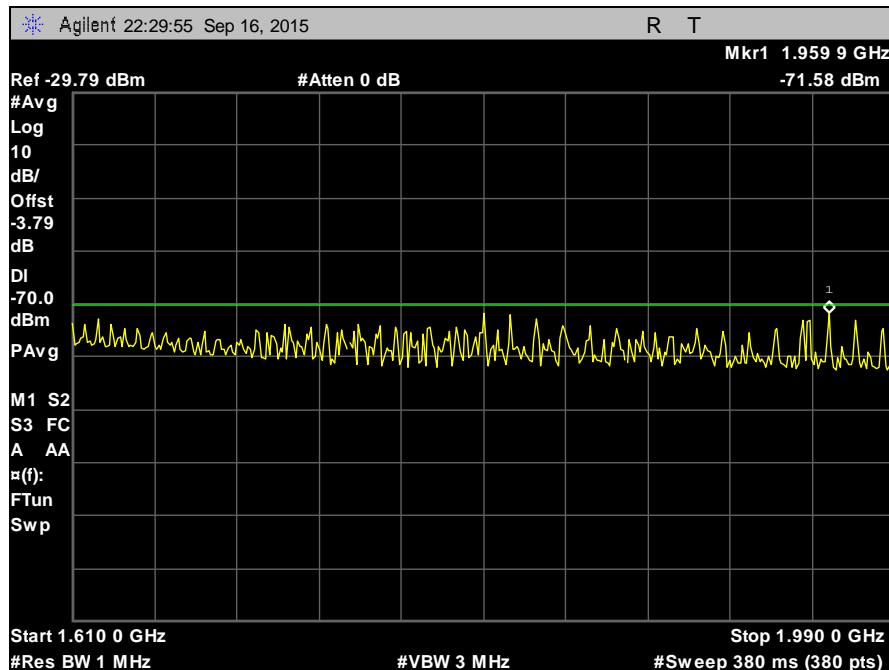


Plot 7. Radiated Spurious Emissions, 3100 MHz – 10600 MHz

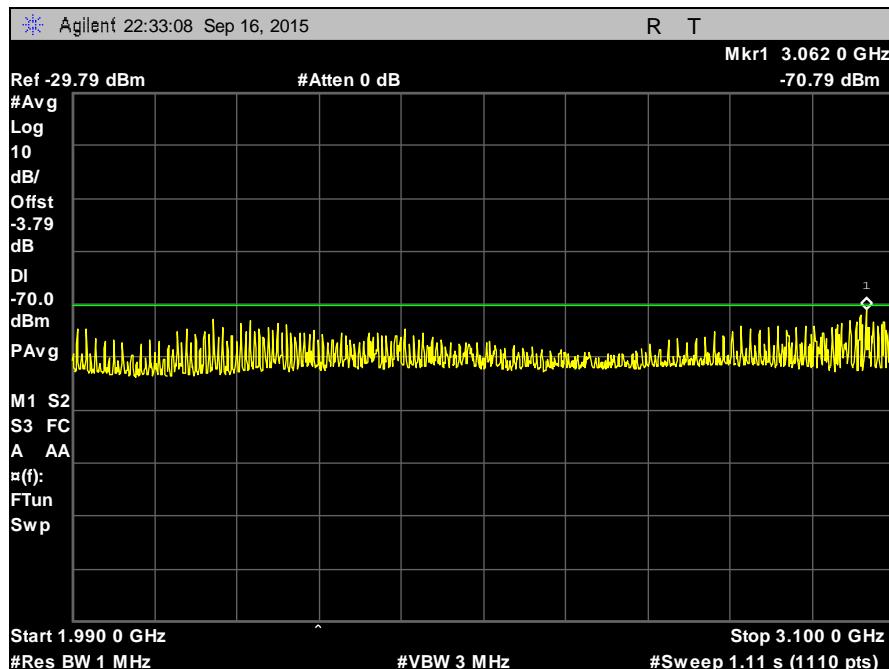


Plot 8. Radiated Spurious Emissions, 10600 MHz – 18000 MHz

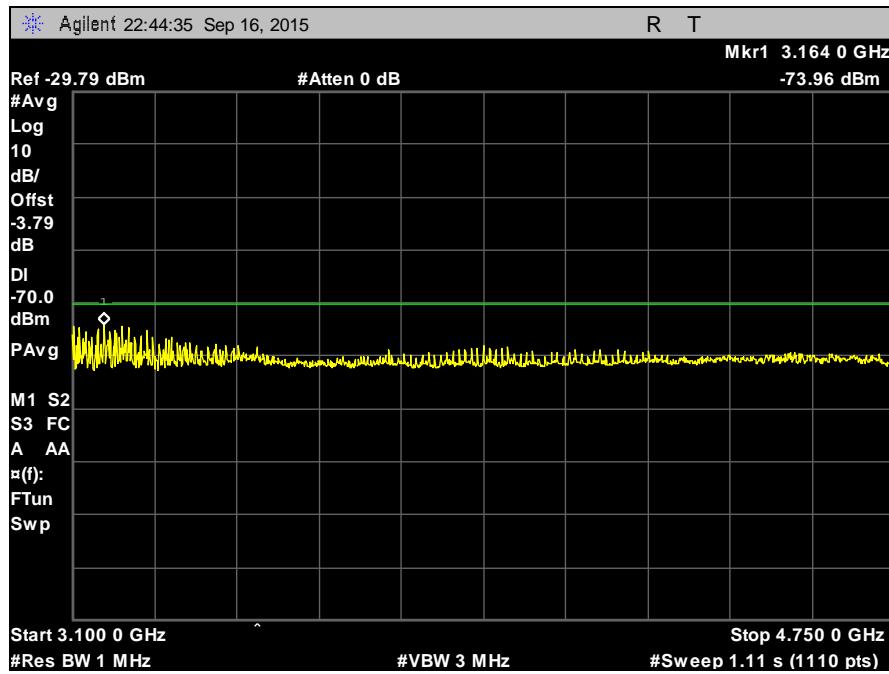
Radiated Emissions Test Results, IC Limits



Plot 9. Radiated Spurious Emissions, 1610 MHz – 1990 MHz, IC Limit



Plot 10. Radiated Spurious Emissions, 1900 MHz – 3100 MHz, IC Limit



Plot 11. Radiated Spurious Emissions, 3100 MHz – 4750 MHz, IC Limit

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 in 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 into the spectrum analyzer. The following formula was used for converting a EIRP limit into a field strength limit based on the measurement distance:

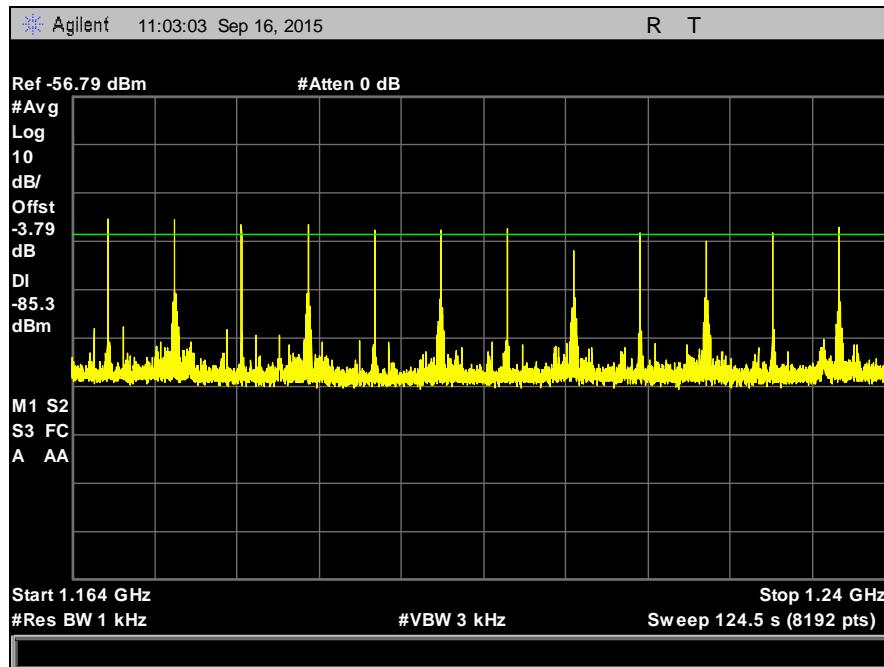
$$\text{Field Strength (dBuV/m)} = \text{EIRP (dBm)} + 104.8 - 20\log(D)$$

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.

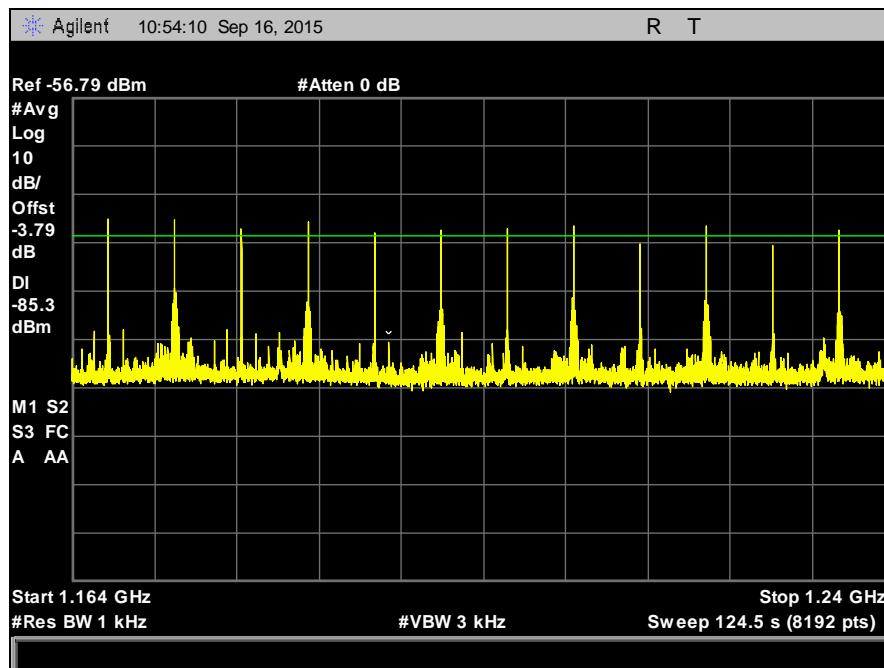
Test Engineer(s): Djed Mouada

Test Date(s): 09/16/15

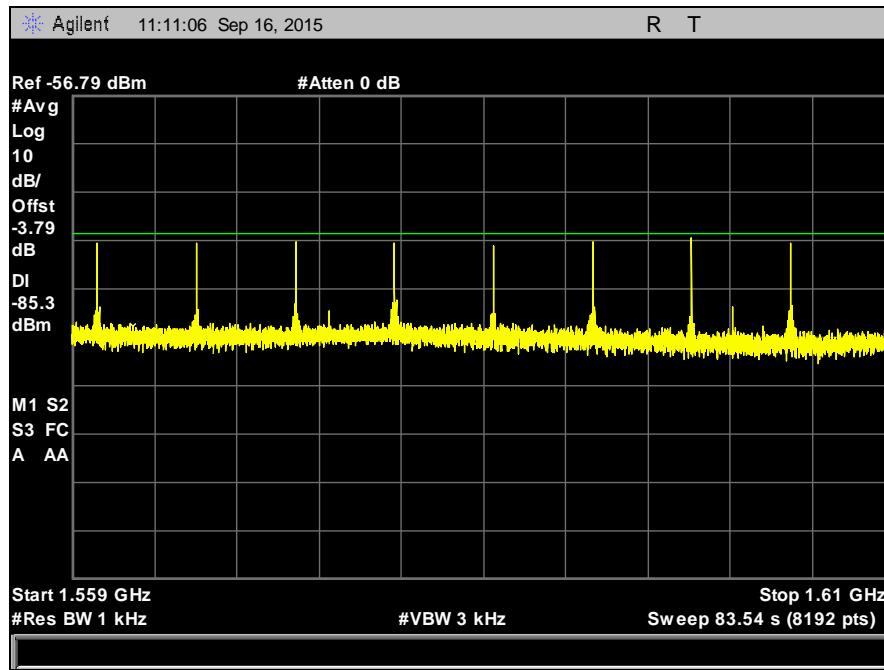
Radiated Emissions Test Results, GPS Band



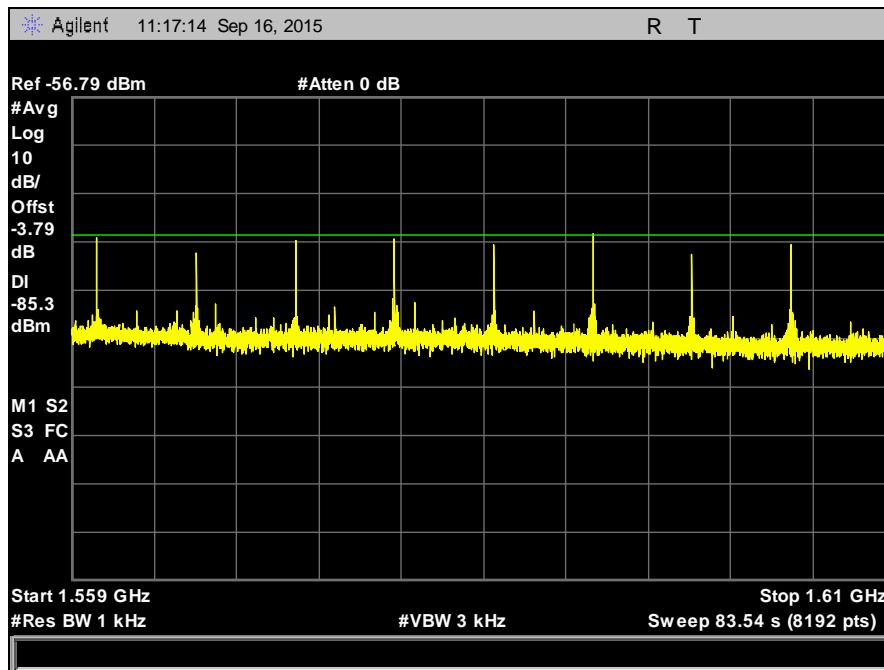
Plot 12. Radiated Spurious Emissions, 1164 MHz – 1240 MHz, GPS Band, Tx Off, LPF, 1 kHz RBW



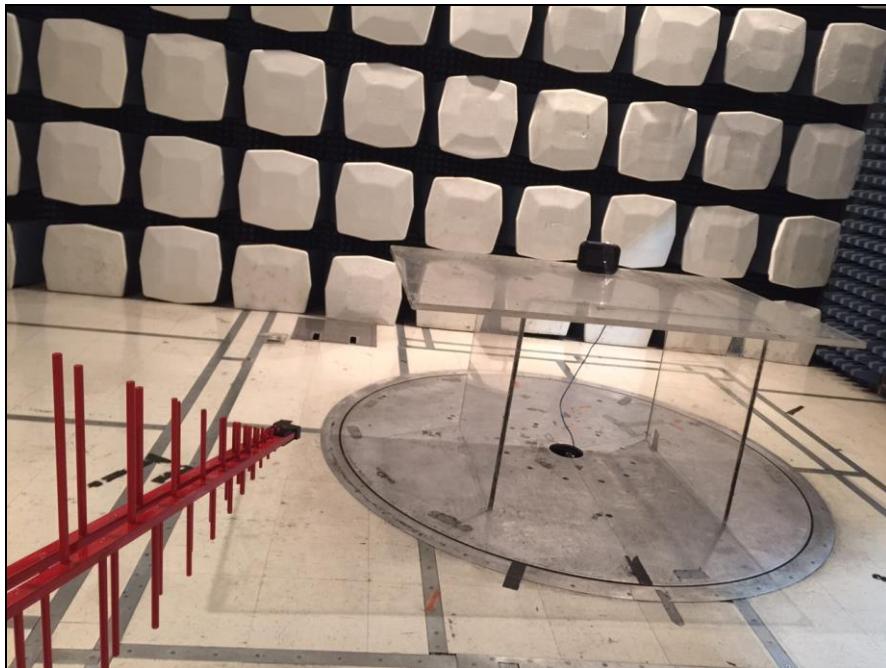
Plot 13. Radiated Spurious Emissions, 1164 MHz – 1240 MHz, GPS Band, Tx On, LPF, 1 kHz RBW



Plot 14. Radiated Spurious Emissions, 1559 MHz – 1610 MHz, GPS Band, Tx Off, LPF, 1 kHz RBW



Plot 15. Radiated Spurious Emissions, 1559 MHz – 1610 MHz, GPS Band, Tx On, LPF, 1 kHz RBW



Photograph 1. Radiated Emissions, Test Setup, Below 1 GHz



Photograph 2. Radiated Emissions, Test Setup, Above 1 GHz

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.

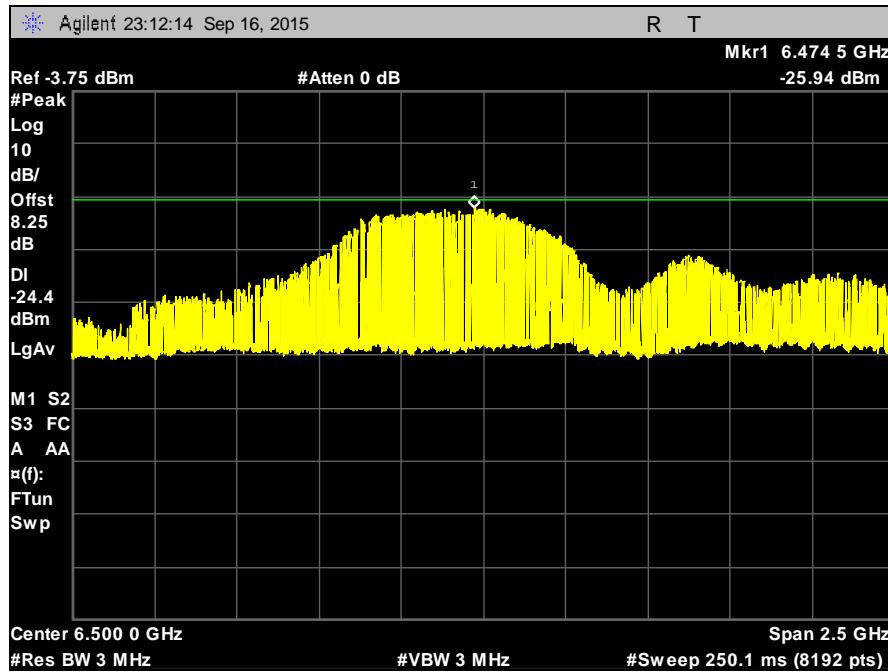
Measurements were made with PEAK detector activated to the spectrum analyzer and having the resolution bandwidth set to 3 MHz and video bandwidth set to 3 MHz.

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(s): Djed Mouada

Test Date(s): 09/16/15



Plot 16. Peak Emissions, Fundamental Peak, 3 MHz RBW

Electromagnetic Compatibility Criteria for Intentional Radiators

MPE

MPE Limit: EUT's operating frequencies @ 3100-10600MHz; **Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²**

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

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

where, S = Power Density (mW/cm²)
 P = Power Input to antenna (mW)
 G = Antenna Gain (numeric value)
 R = Distance (cm)

FCC-RP									
Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm ²)	Limit (mW/cm ²)	Margin	Distance (cm)	Result
6474.5	-25.94	0.003	6.1	4.074	0.0008	1	-0.9992	1	Pass

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 DATE	CAL DUE DATE
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	1/31/2015	1/31/2017
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	7/29/2014	1/29/2016
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	11/25/2014	5/25/2016
1T4442	PRE-AMPLIFIER, MICROWAVE	MITEQ	AFS42-01001800-30-10P	SEE NOTE	
1T4505	TEMPERATURE CHAMBER	TEST EQUITY	115	2/11/2015	2/11/2016
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	2/28/2014	9/28/2015

Table 7. Test Equipment List

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

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.

(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 stages; 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.

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.

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.

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.

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.

End of Report