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

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372
13501 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

November 17, 2017

Olibra LLC
45 Legion Dr
Cresskill, NJ 07626

Dear Dipak Patel,

Enclosed is the EMC Wireless test report for compliance testing of the Olibra LLC, Bond as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15 Subpart C 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.

Joel Huna
Documentation Department

Reference: (\Olibra LLC\EMC94974-FCC247)

Electromagnetic Compatibility Criteria
Test Report

for the

Olibra LLC
Bond

Tested under
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

MET Report: EMC94974-FCC247

November 17, 2017

Prepared For:

Olibra LLC
45 Legion Dr
Cresskill, NJ 07626

Prepared By:
MET Laboratories, Inc.
914 West Patapsco Avenue, Baltimore, MD 21230

Electromagnetic Compatibility Criteria
Test Report

for the

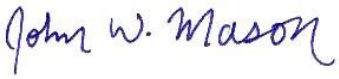
Olibra LLC
Bond

Tested under
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

Deepak Giri, Project Engineer
Electromagnetic Compatibility Lab

Joel Huna
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 Rules Part 15.247 under normal use and maintenance.



John Mason,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	November 17, 2017	Initial Issue.

Table of Contents

List of Tables

List of Plots

List of Figures

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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Olibra LLC Bond, with the requirements of Part 15, §15.247. 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 Bond. Olibra LLC should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Bond, 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 Olibra LLC, purchase order number 300. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference 47 CFR Part 15.247:2005	Description	Compliance
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	Maximum Permissible Exposure (MPE)	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Olibra LLC to perform testing on the Bond, under Olibra LLC's purchase order number 300.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Olibra LLC, Bond.

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

Model(s) Tested:	Bond	
Model(s) Covered:	Bond	
EUT Specifications:	Primary Power: 5 VDC, BOND uses external power brick and requires 5V DC at 1 A.	
	FCC ID: 2AME8BOND-01, 2ADWC-A17688H	
	Type of Modulations:	QAM
	Equipment Code:	DTS
	Peak RF Output Power:	199.99 mW
	EUT Frequency Ranges:	2412 MHz – 2462 MHz
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:	Deepak Giri	
Report Date(s):	November 17, 2017	

Table 2. EUT Summary Table

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
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
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 West Patapsco Avenue, 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 Olibra LLC Bond, Equipment Under Test (EUT), is a table-top or a wall mount device for the automation of home appliances such as ceiling fans, shades, air conditioners, and garage doors. The Bond can be controlled by a user via 2.4GHz WiFi or Bluetooth from a mobile device. The user trains the Bond using the appliance's factory remote while the Bond records the control signal, which may be radio or infrared. Then, at times determined by the user, the Bond transmits the learned control signals to actuate the appliances. The user does not directly power, frequency, or content of transmissions; rather, these are computed by the Bond. In addition to the RF and IR transmit and receive functions, the Bond has a number of LEDs for displaying its mode, and internal storage for appliance information. The Bond is intended to be used by consumers in their own dwelling, indoor use only.

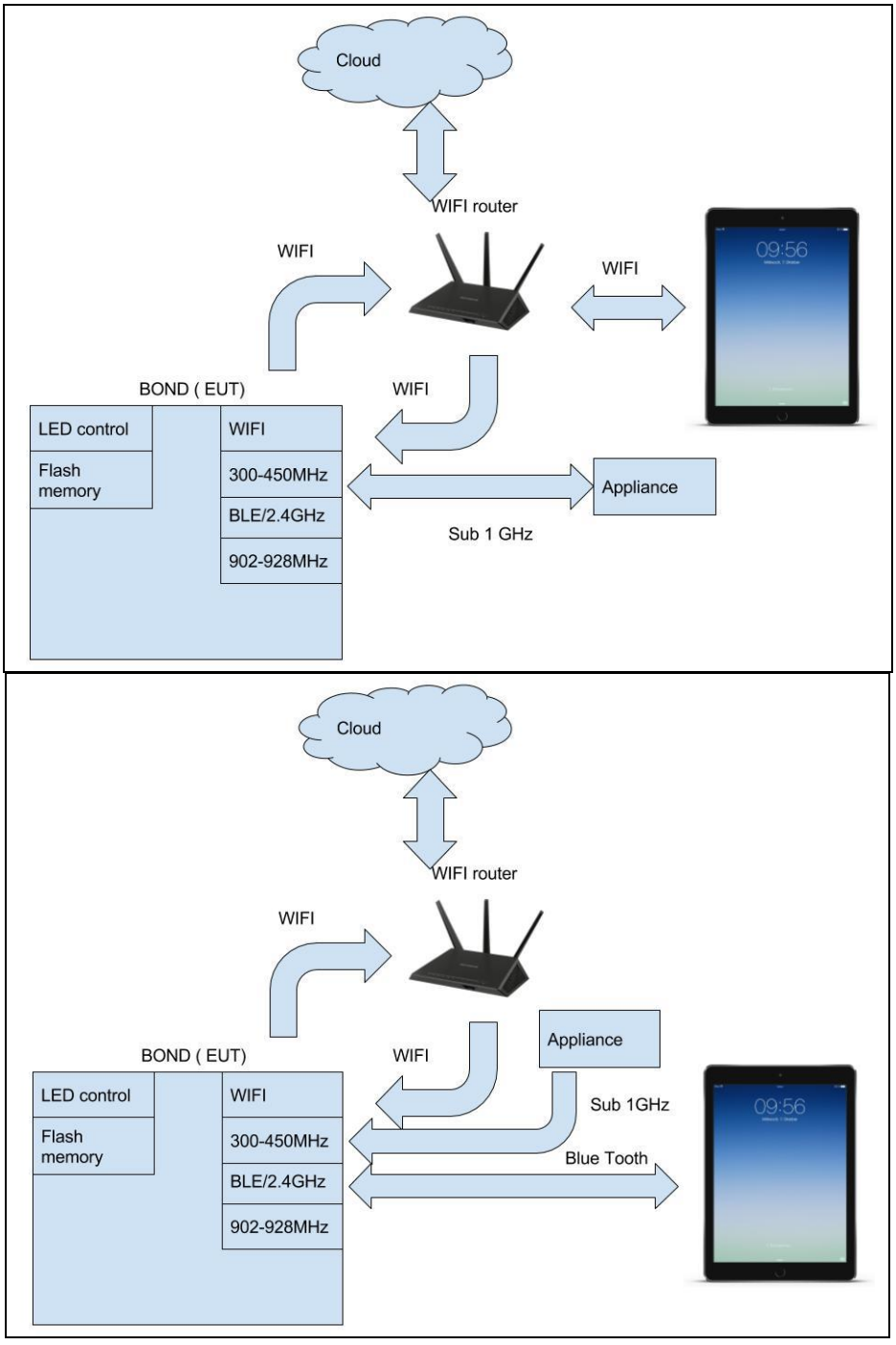


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
1	BD-1000 – Test Unit for 902-928 MHz Conducted Testing	NA	NA	NA	NA
2	BD-1000 – Test Unit for UL	NA	NA	NA	NA
3	BD-1000 – Test Unit for FCC Non-Conducted Testing	NA	NA	NA	NA

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
NA	Macbook pro + charger + mouse / Driving the Bond Units	Apple	NA
NA	Power Supply +USB Cable	NA	NA
NA	Printed Manual	NA	NA

Table 5. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)	Termination Point
NA	NA	Serial Cable	1	30 ft.		NA

Table 6. Ports and Cabling Information

H. Mode of Operation

The EUT supports a number of test modes which simulate normal operation. The operation mode is selected by sending commands on a serial cable from a PC control program. However, once a mode is selected, the EUT will remain in that mode without further interaction, until instructed to enter a different mode.
(0) Idle: EUT is neither receiving or transmitting. This is the typical and primary mode of operation for BOND.
(1) Receive Mode (All Bands): EUT scans all supported frequencies while operating LEDs and IR emitters.
(2-16) Modulated Transmit (All Bands): EUT transmits a chain of control signals at one of 15 test frequencies. These frequencies are chosen to be the Low, Mid, and High frequencies for each antenna. An option controls whether the transmission is continuous (C) or whether only a single control signal is sent (S). For 300-450MHz, OOK modulation is used. For 902-928MHz, GFSK modulation is used. For all frequencies, the transmit power can be adjusted from 1-100% (arbitrary units) and for 300-450MHz, the 100ms-windowed duty-cycle can be adjusted from 0.1-1 in increments of 0.01 (17-21) Unused.

(22) Frequency Hopping (Band 5): EUT makes unending FHSS transmissions between 50 channels in 902-928MHz band.
(23) Frequency Hopping (All Bands): EUT cycles between modes 2-16, spending 100ms in each mode.

Furthermore: The WiFi+Bluetooth functionality of the EUT may be enabled or disabled, concurrently with all of the above modes. These are indicated by WiFi ON and WiFi OFF. Any of the test mode numbers above may be appended with “W” to indicate “WiFi ON”. For example, “1W” is the Receive Mode with WiFi also active.

I. Method of Monitoring EUT Operation

For the purposes of EMC testing, the EUT is both controlled and monitored via a serial cable driven by a PC program. (1) After a command is sent to the EUT to enter a particular mode, the program receives positive confirmation that the EUT has received the command. (2) If the confirmation is not received by the PC program, and error is displayed and the technician is instructed to restart the PC program and re-attempt setting the mode. In mode 1 (Receive Mode), the EUT flashes its LEDs. In other modes, a spectrum analyzer will clearly show a fundamental emission in the range 300-928MHz).
See section 7 in set up guide for LED indicators.

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 Olibra LLC upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

Test Requirements: **§15.247(d); §15.205:** Emissions outside the frequency band.

§15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905----------	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128----------	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775----------	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775----------	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218----------	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825----------	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225----------	123–138	2200–2300	14.47–14.5
8.291–8.294----------	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475----------	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293----------	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025----------	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725----------	322–335.4	3600–4400	([2])

Table 7. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 8.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 8. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

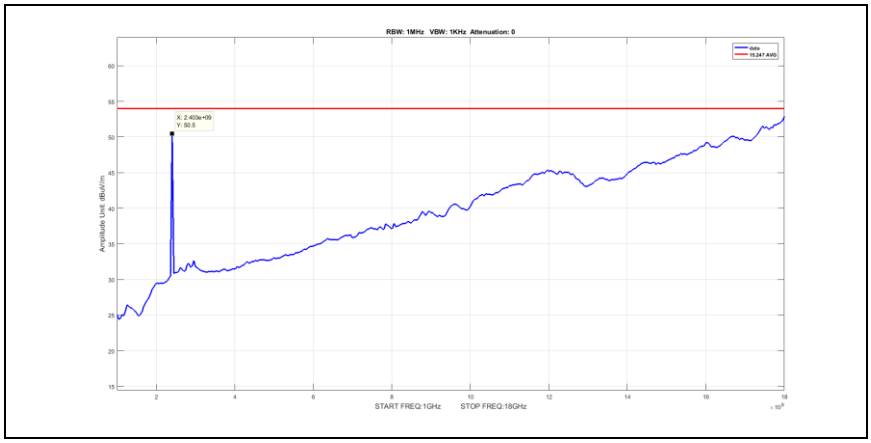
Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d)**. Emissions were investigated up to 10th harmonics. Only noise was observed above 18 GHz and below 1 GHz. 2.4 GHz – 2.5 GHz notch filter was used for radiated spurious emissions. Emissions close to limit line by 20dB were investigated. No anomalies detected.

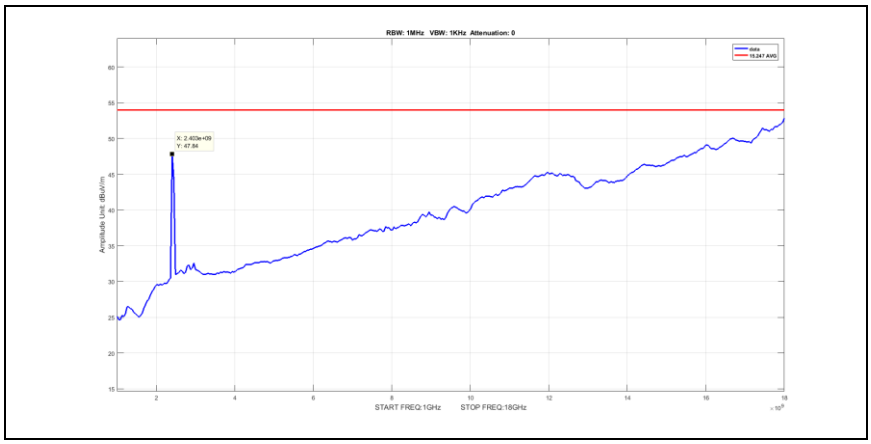
Test Engineer(s): Deepak Giri

Test Date(s): 10/30/2017

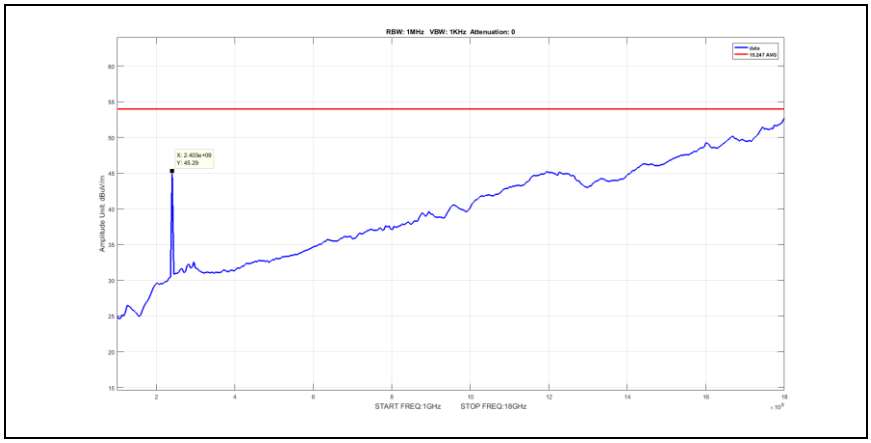
Radiated Spurious Emissions Test Results



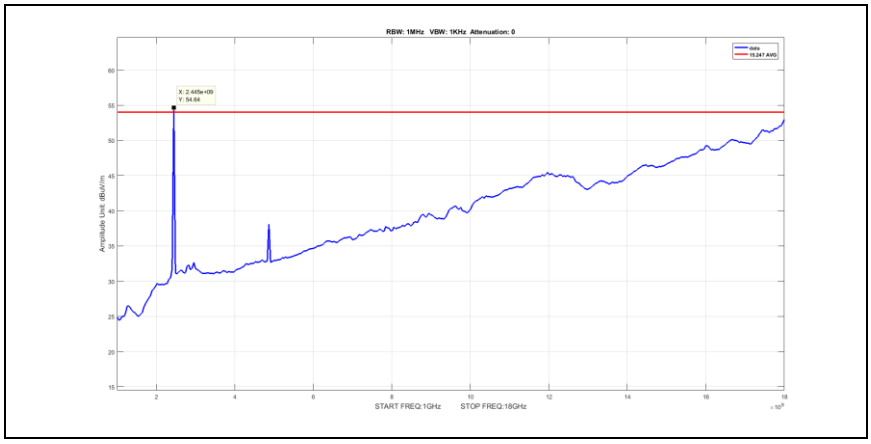
Plot 1. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, B mode



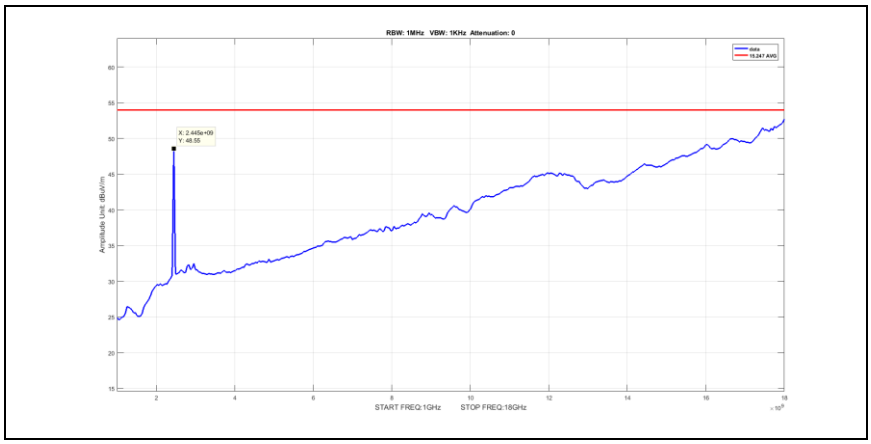
Plot 2. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, G mode



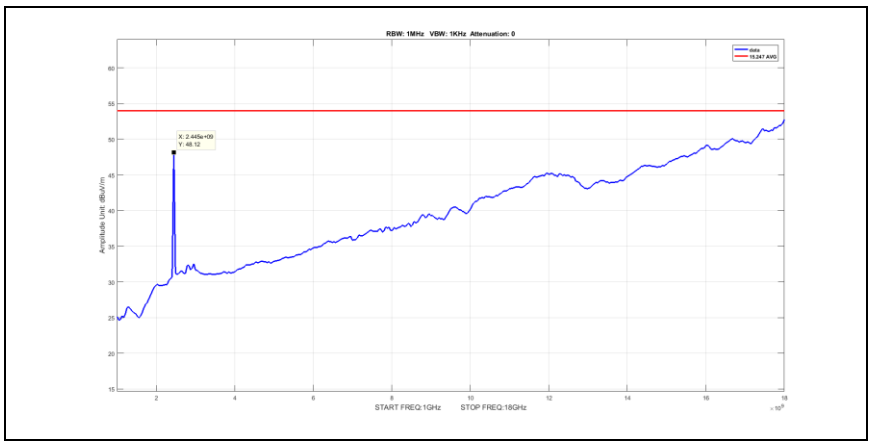
Plot 3. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, N mode



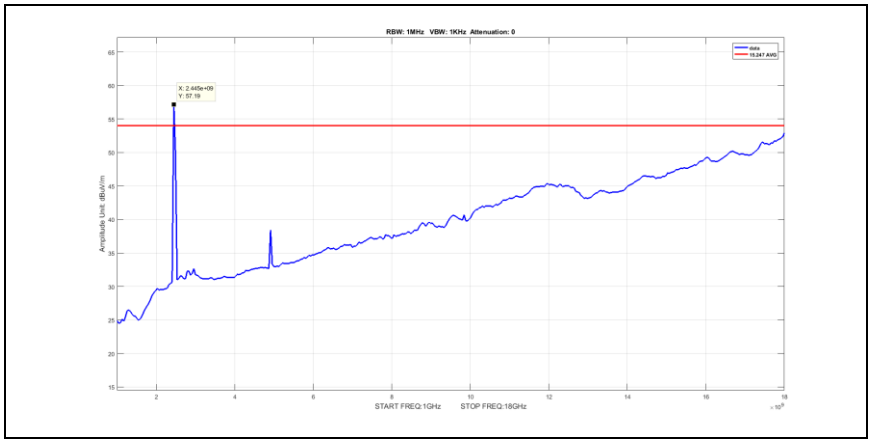
Plot 4. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, B mode



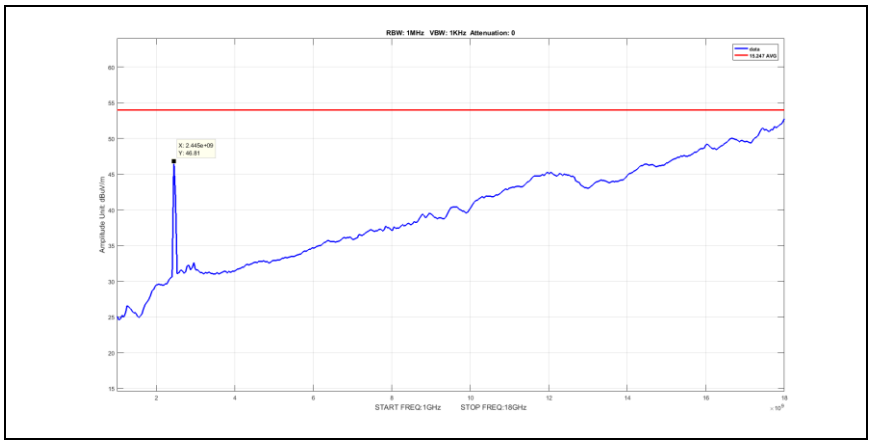
Plot 5. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, G mode



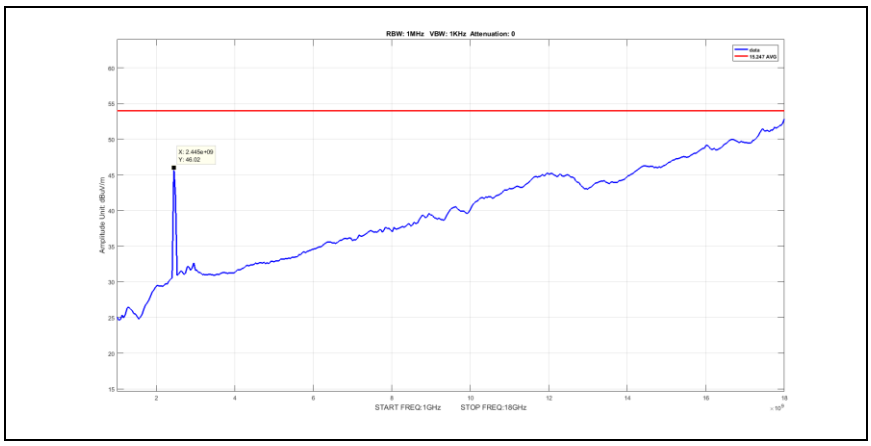
Plot 6. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, N mode



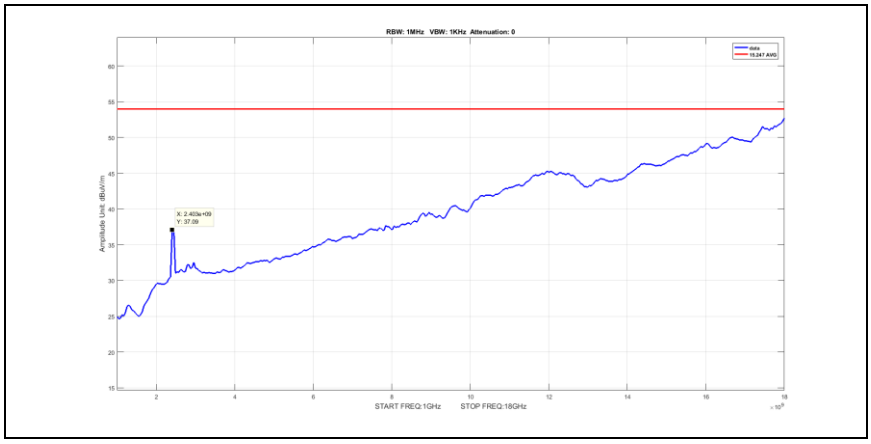
Plot 7. Average Radiated Spurious Emissions, 1- 18 GHz, BW 20M, Ch. 2462 M, B mode



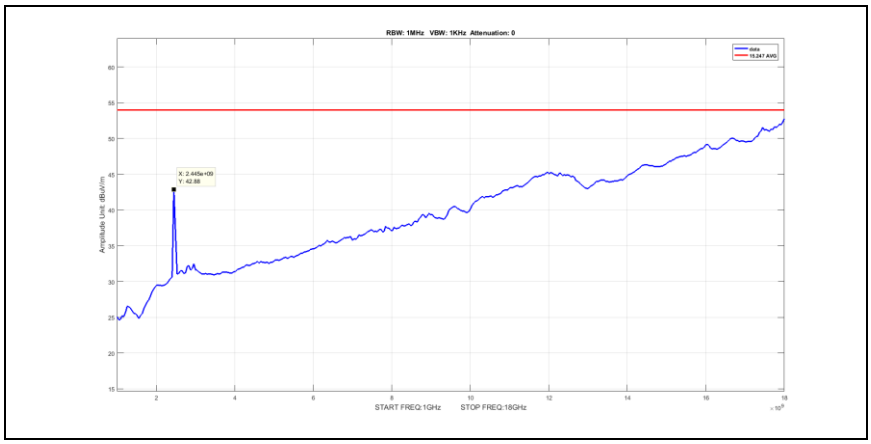
Plot 8. Average Radiated Spurious Emissions, 1 -18GHz, BW 20M, Ch. 2462 M, G mode



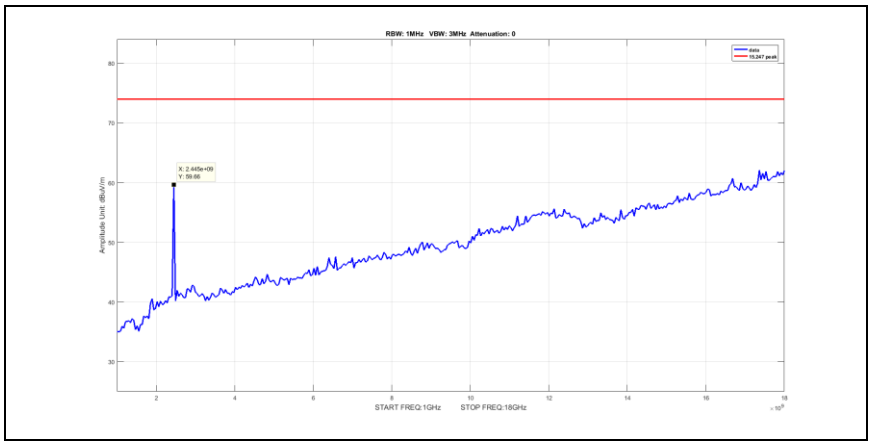
Plot 9. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2462 M, N mode



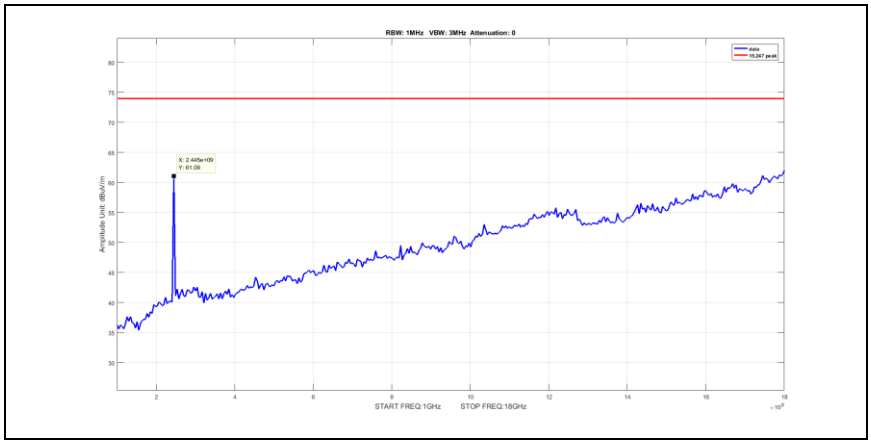
Plot 10. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 40M, Ch. 2422 M, N mode



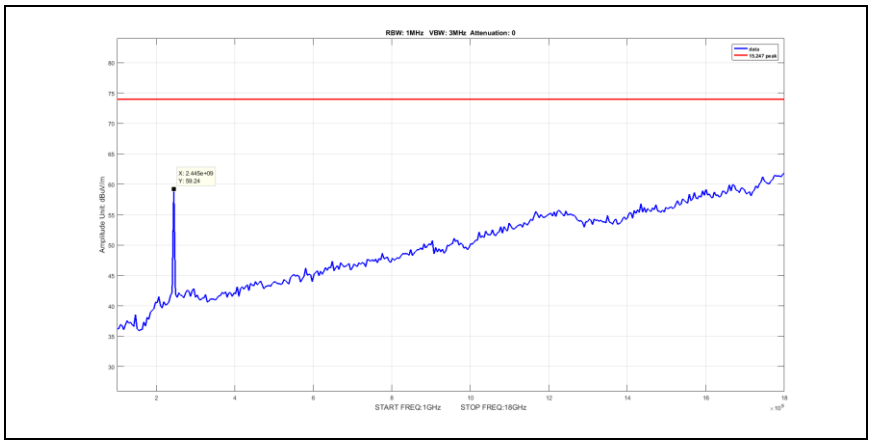
Plot 11. Average Radiated Spurious Emissions, 1 – 18 GHz, BW 40M, Ch. 2452 M, N mode



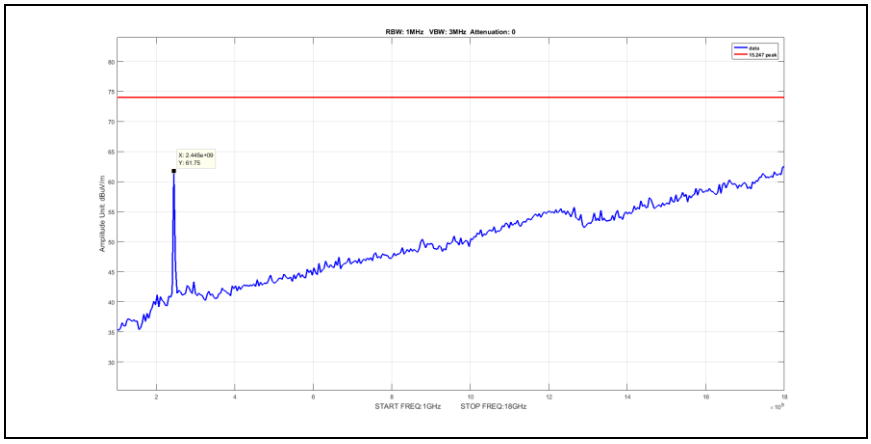
Plot 12. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, B mode



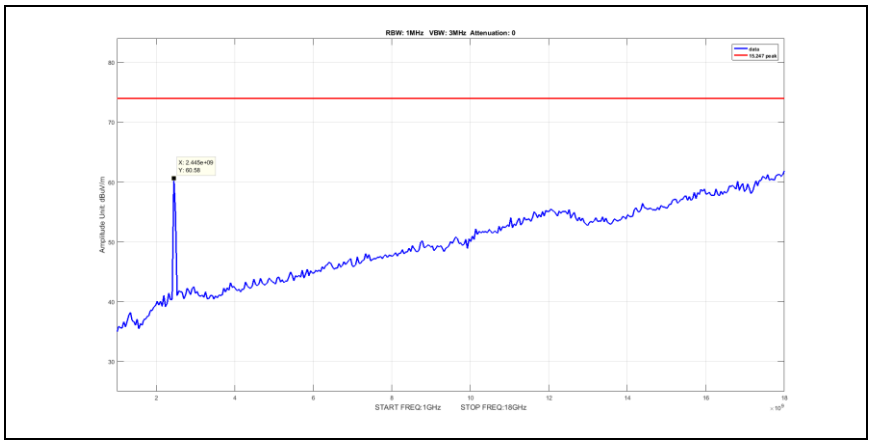
Plot 13. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, G mode



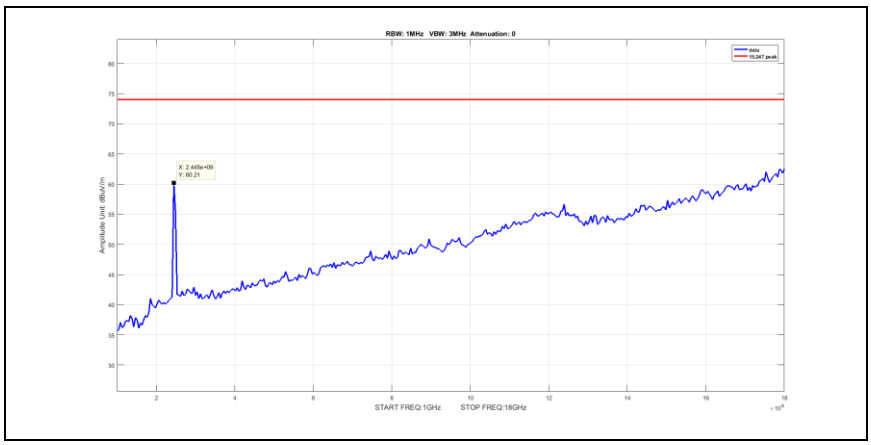
Plot 14. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2412 M, N mode



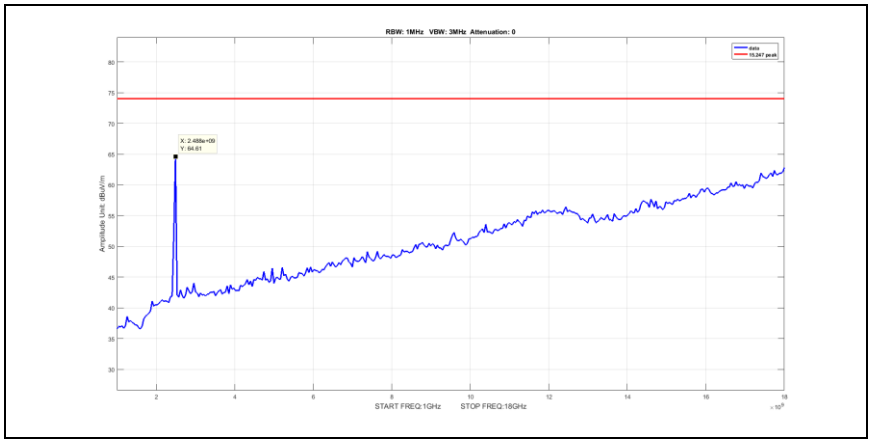
Plot 15. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, B mode



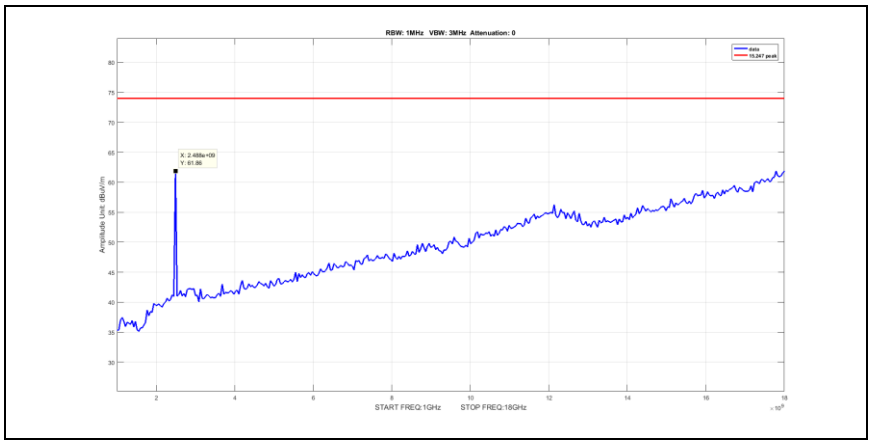
Plot 16. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, G mode



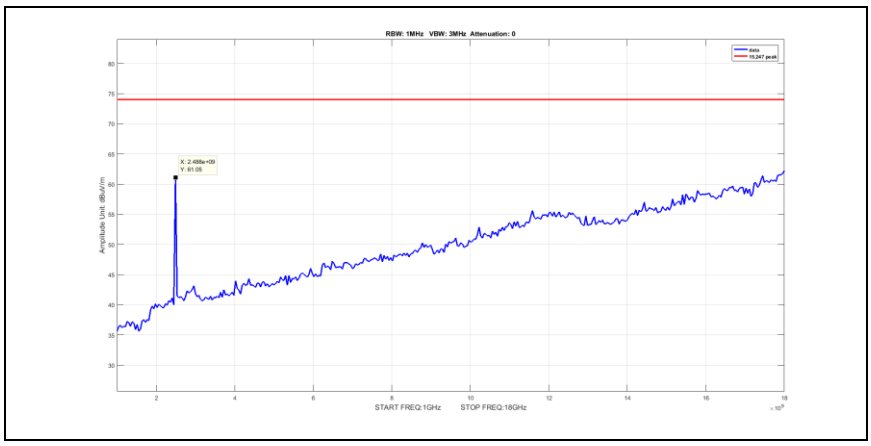
Plot 17. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2437 M, N mode



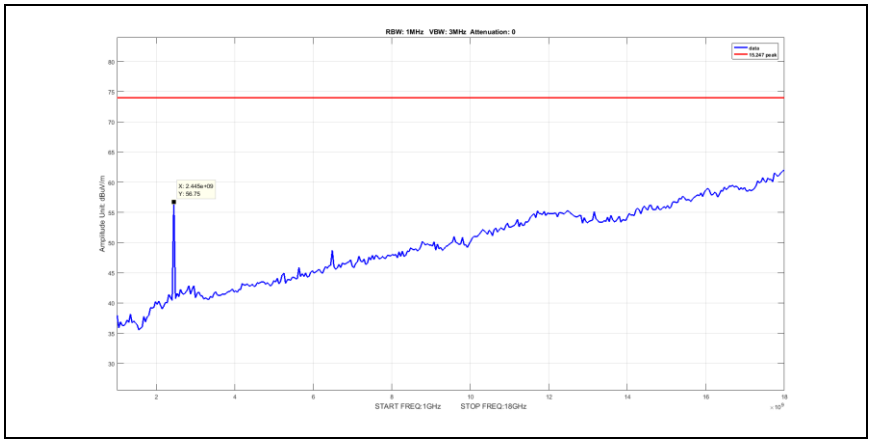
Plot 18. Peak Radiated Spurious Emissions, 1- 18 GHz, BW 20M, Ch. 2462 M, B mode



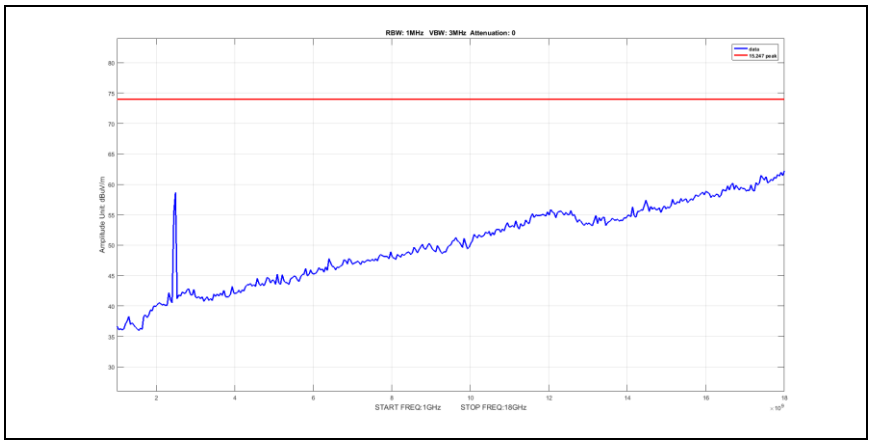
Plot 19. Peak Radiated Spurious Emissions, 1 -18GHz, BW 20M, Ch. 2462 M, G mode



Plot 20. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 20M, Ch. 2462 M, N mode



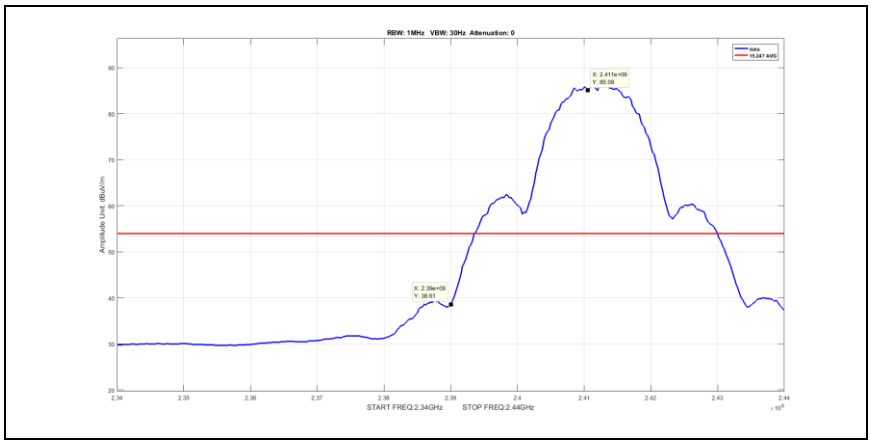
Plot 21. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 40M, Ch. 2422 M, N mode



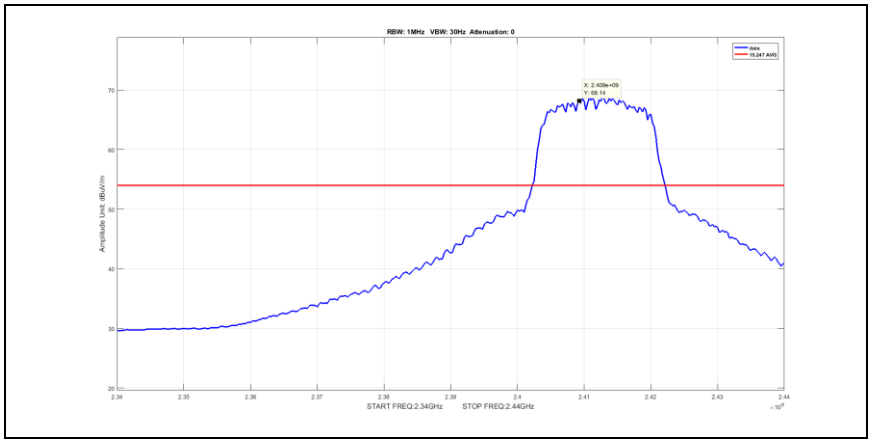
Plot 22. Peak Radiated Spurious Emissions, 1 – 18 GHz, BW 40M, Ch. 2452 M, N mode

Radiated Band Edge Measurements

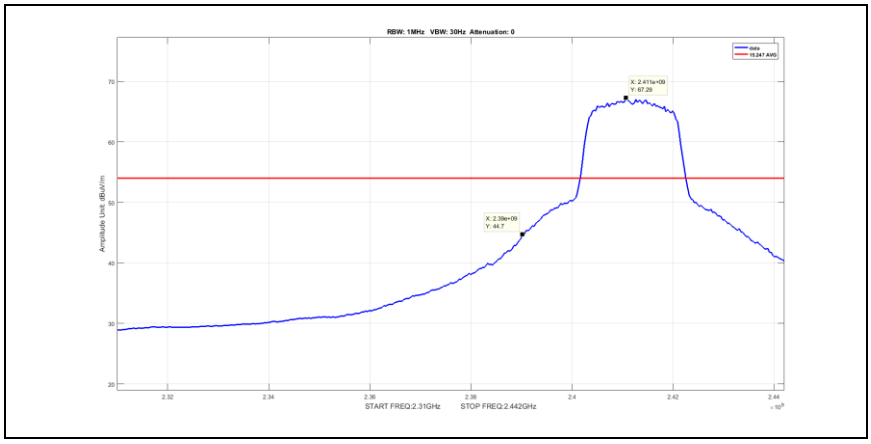
Test Procedures: The transmitter was turned on. Measurements were performed of the low and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Emission close to limit line were investigated. No anomalies detected.



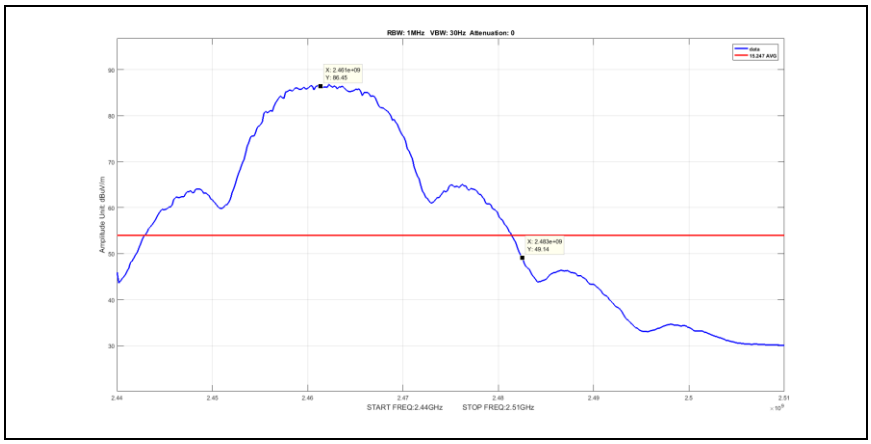
Plot 23. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2412M, B mode



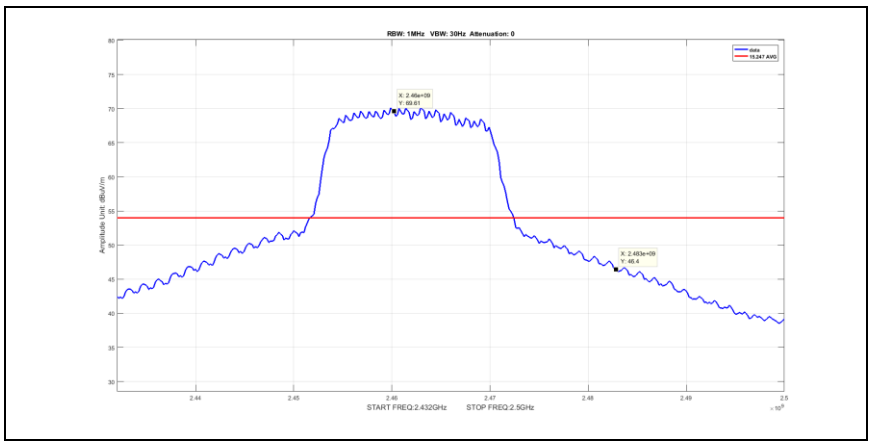
Plot 24. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2412M, G mode



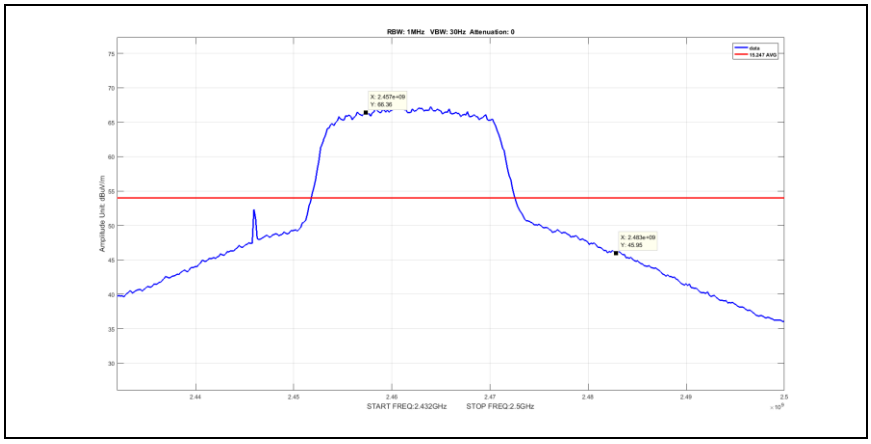
Plot 25. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2412M, N mode



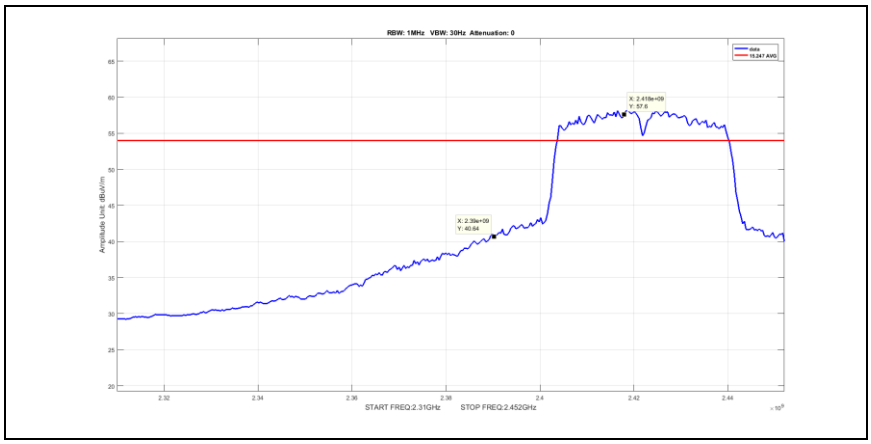
Plot 26. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2462M, B mode



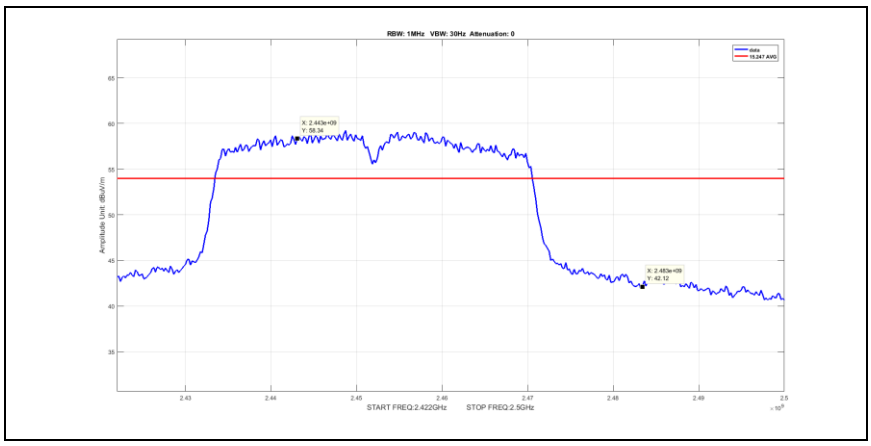
Plot 27. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2462M, G mode



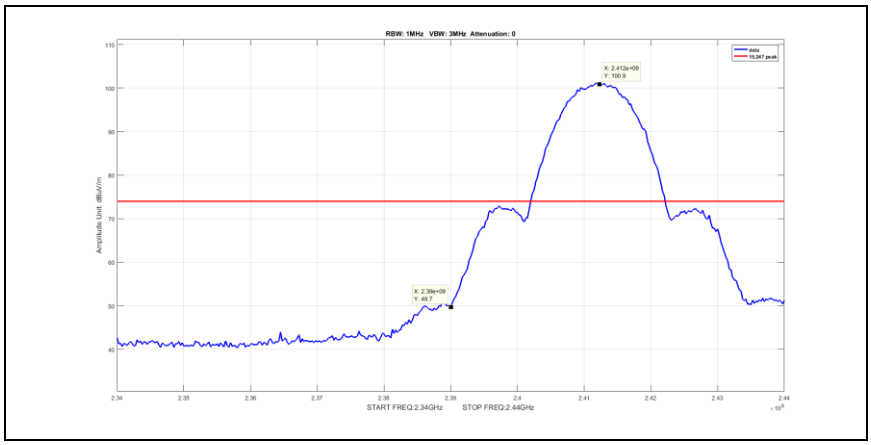
Plot 28. Radiated Restricted Band Edge, Average, BW 20M, Ch. 2462M, N mode



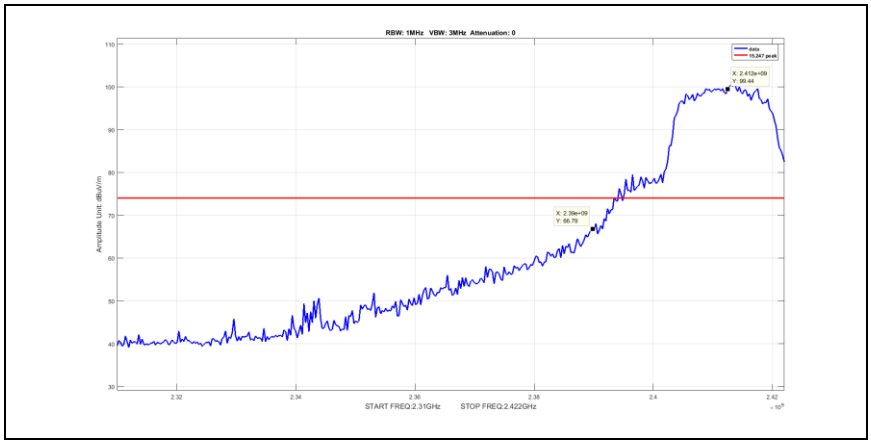
Plot 29. Radiated Restricted Band Edge, Average, BW 40M, Ch. 2422M, N mode



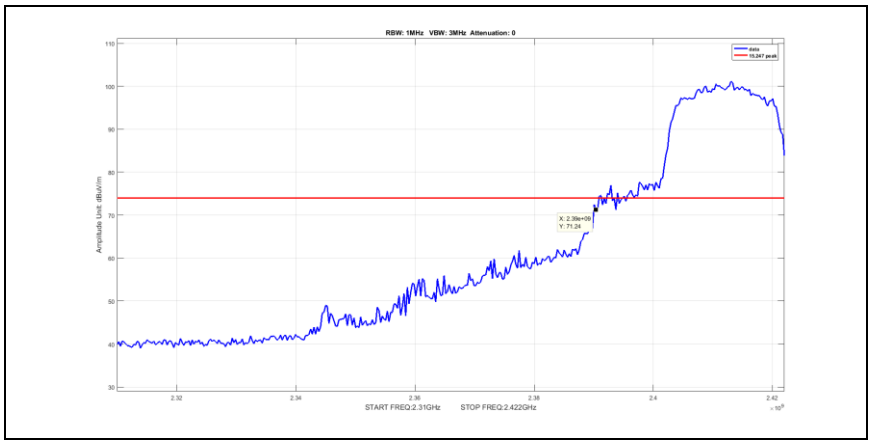
Plot 30. Radiated Restricted Band Edge, Average, BW 40M, Ch. 2452M, N mode



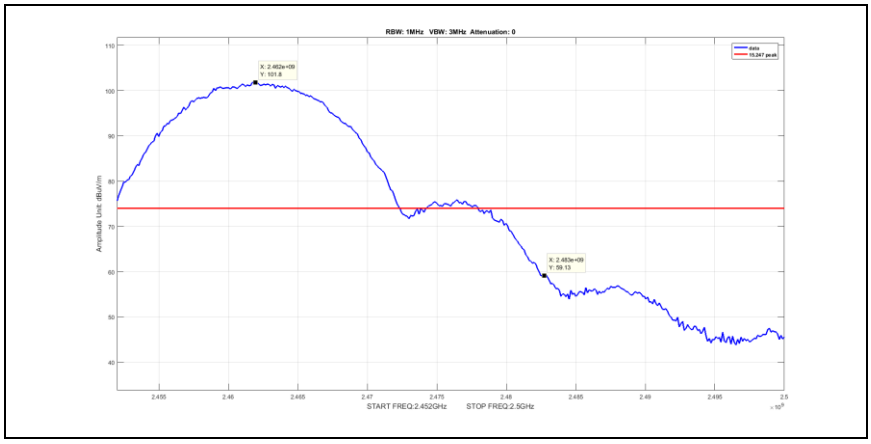
Plot 31. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2412M, B mode



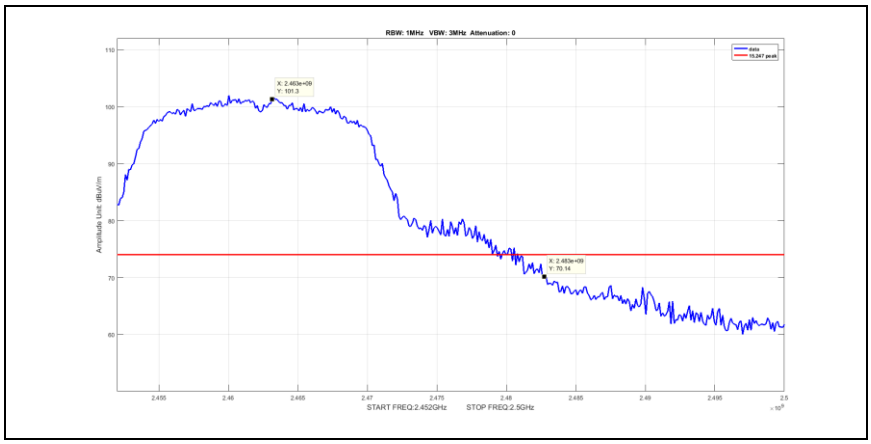
Plot 32. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2412M, G mode



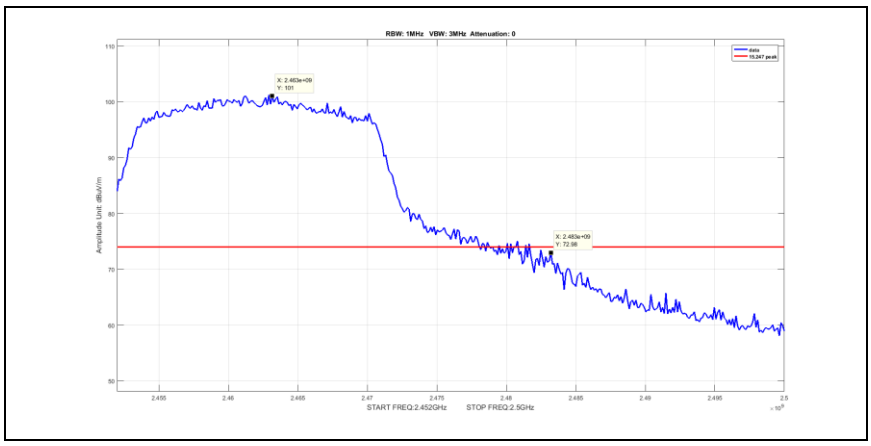
Plot 33. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2412M, N mode



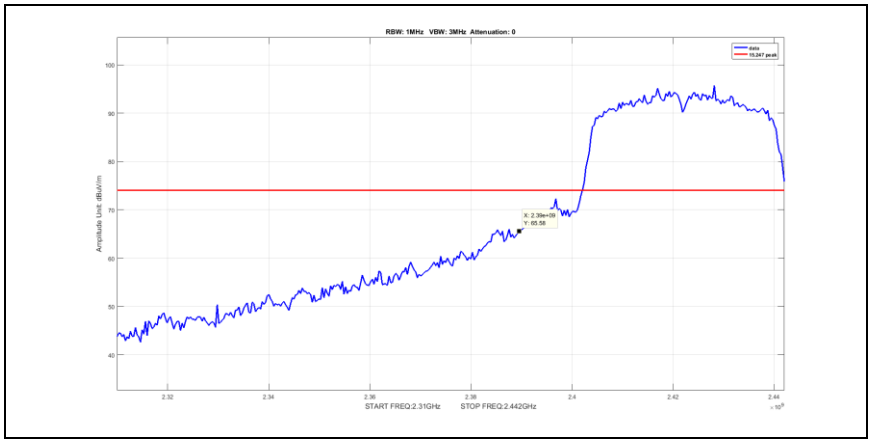
Plot 34. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2462M, B mode



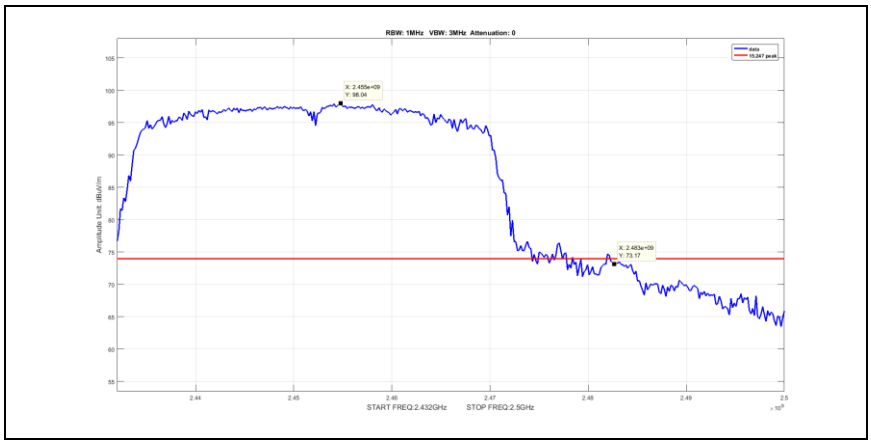
Plot 35. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2462M, G mode



Plot 36. Radiated Restricted Band Edge, Peak, BW 20M, Ch. 2462M, N mode



Plot 37. Radiated Restricted Band Edge, Peak, BW 40M, Ch. 2422M, N mode



Plot 38. Radiated Restricted Band Edge, Peak, BW 40M, Ch. 2452M, N mode

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(i) Maximum Permissible Exposure

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

Note: 2.4 GHz Wi-Fi can operate simultaneously only with either 900 MHz hopper or (300-321MHz,336-399.5 MHz, 410 – 450MHz) radio. MPE for 300MHz – 321 MHz is presented as worst case.

Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2

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

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

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

Test Results:

FCC									
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**
2437	23.01	199.986	-1.5	0.708	0.02817	1	0.97183	20	Pass
902.5	3.616	2.299	-4	0.398	0.00018	1	0.99982	20	Pass

Table 9. MPE, 900 MHz and 2.4 GHz WiFi

FCC									
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**
2437	23.01	199.986	-1.5	0.708	0.02817	1	0.97183	20	Pass
321.5	4.35	2.723	-6	0.251	0.00014	1	0.99986	20	Pass

Table 10. Simultaneous MPE, 300-321 MHz and 2.4 GHz WiFi

The safe distance where Power Density is less than the MPE Limit listed above was found to be 20 cm.

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.

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date	Calibration Type
1T4771	PSA Spectrum Analyzer	Agilent Technologies	E4446A	8/10/2016	2/10/2018	Standard
1T4612	Spectrum Analyzer	Agilent Technologies	E4407B	3/30/2017	9/30/2018	Standard
1T4409	EMI Receiver	Rohde & Schwarz	ESIB7	12/7/2016	12/7/2018	Standard
1T4753	Antenna - Bilog	Sunol Sciences	JB6	10/24/2016	4/24/2018	Special
1T4483	Antenna; Horn	ETS-Lindgren	3117	4/19/2017	10/19/2018	Special
1T4442	Pre-amplifier, Microwave	Miteq	AFS42-01001800-30-10P	See Note		Func Verify
1T4300C	SEMI-ANECHOIC 3m CHAMBER # 1 (VCCI)	EMC TEST SYSTEMS	NONE	10/31/2012	10/31/2015	Special
1T4149	High-Frequency Anechoic Chamber	Ray Proof	81	8/23/2001	8/23/2002	Not Required
1T4910	Digital Barometer, Hygrometer, Thermometer	Control Company	06-662-4	1/15/2016	1/15/2018	Standard
1T4745	Antenna, Horn	ETS-Lindgren	3116	1/21/2017	7/21/2018	Special
1T4752	Pre-Amplifier	Miteq	JS44-18004000-35-8P	See Note		Func Verify

Table 11. 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 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.

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

