HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

May 14, 2021

Nexxiot
Prime Tower
Hardstrasse 201
Zurich, Switzerland 8005

Dear Dominik Dumancic,

Enclosed is the EMC Wireless test report for compliance testing of the Nexxiot, Loadtracker 1.0 EX 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 Eurofins E&E North America. If you have any questions regarding these results or if we can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS E&E NORTH AMERICA

Michelle Tawmging

Michelle Tawmging
Documentation Department

Reference: (\Nexxiot\WIRS111879-FCC-247 ZigBee Rev.2)

ACCREDITED
TESTING CERT #0591.02

HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

Electromagnetic Compatibility Criteria Test Report

for the

Nexxiot
Loadtracker 1.0 EX

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

Report: WIRS111879-FCC-247 ZigBee Rev. 2

May 14, 2021

Prepared For:

Nexxiot
Prime Tower
Hardstrasse 201
Zurich, Switzerland 8005

Prepared By:
Eurofins E&E North America
3162 Belick Street
Santa Clara, CA 95054

Electromagnetic Compatibility Criteria
Test Report

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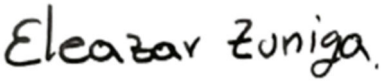
the FCC Certification Rules
contained in
15.247 Subpart C for Intentional Radiators

Arsalan Hasan
Manager, Wireless Laboratory

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.



Eleazar Zuniga, PhD.
Director, Wireless Technologies

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	April 22, 2021	Initial Issue.
1	May 11, 2021	TCB Updates.
2	May 14, 2021	TCB Updates.

Table of Contents

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	**micro**henry
µ	**micro**farad
µs	**micro**seconds
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

1.1 Purpose of Test

An EMC Wireless evaluation was performed to determine compliance of the Nexxiot Loadtracker 1.0 EX, 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 Loadtracker 1.0 EX. Nexxiot should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Loadtracker 1.0 EX, has been **permanently** discontinued.

1.2 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 Nexxiot, purchase order number PO00539. 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 §15.203	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	Conducted Emission Limits	Not Applicable
Title 47 of the CFR, Part 15 §15.247(a)(2)	6dB Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	Peak Power Output	Compliant
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(d)	RF Conducted Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RF Conducted Band Edge	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	Peak Power Spectral Density	Compliant

Executive Summary of EMC Part 15.247 ComplianceTesting

II. Equipment Configuration

2.1 Overview

Eurofins MET Laboratories, Inc. was contracted by Nexxiot to perform testing on the Loadtracker 1.0 EX, under Nexxiot's purchase order number PO00539.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Nexxiot, Loadtracker 1.0 EX.

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

Model(s) Tested:	Loadtracker 1.0 EX	
Model(s) Covered:	Loadtracker 1.0 EX	
EUT Specifications:	Primary Power: 3VDC	
	FCC ID: 2AXRX-ASL1A	
	Type of Modulations:	GFSK
	Equipment Code:	DTS
	Peak RF Output Power:	4.749 dBm
	EUT Frequency Ranges:	2405 MHz - 2480 MHz
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:	Arsalan Hasan	
Report Date(s):	May 14, 2021	

EUT Summary Table

2.2 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

References

2.3 Test Site

All testing was performed at Eurofins MET Laboratories, Inc., 3162 Belick Street, Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology. Eurofins MET Labs is an ISO/IEC 17025 accredited site by A2LA, #0591.02.

Eurofins MET Laboratories Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

2.4 Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Measurement Uncertainty

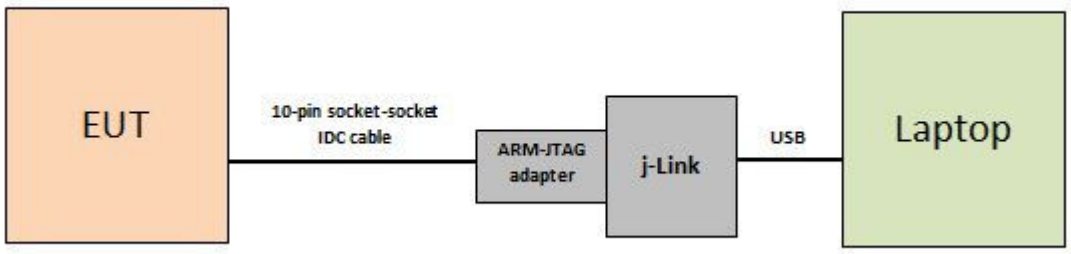
2.5 Description of Test Sample

The EUT is a zero-maintenance hardware unit for enabling real-time monitoring of load status for non-powered rail cars. Contain ZigBee radio. Also there is NFC capability which is receive only.

2.6 Equipment Configuration

Ref. ID	Slot#	Name/Description	Model Number	Part Number	Serial Number	Rev. #
NA	NA	LOADTRACKER 1.0 EX	ASL.1A	NA	2021/100029602	NA

EUT List



EUT Configuration

2.7 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
NA	Laptop	Dell	NA	NA
NA	j-link	Segger	NA	NA
NA	10-pin socket-socket IDC cable	Diligent, Inc	NA	NA
NA	ARM-JTAG adapter	Olimex LTD	NA	NA

Support Equipment

2.8 Ports and Cabling Information

N/A

2.9 Mode of Operation During Testing

Normal operation mode: Acquiring data through ultrasound sensors and transmitting data through 2.4 GHz IEEE 802.15.4. Test mode: 2.4 GHz IEEE 802.15.4 signal, pure carried and modulated, emission. The EUT modes can be set through an interface and commands.

2.10 Method of Monitoring EUT Operation

The selected operation mode simulates the used communication mode.

2.11 Modifications

2.11.1 Modifications to EUT

No modifications were made to the EUT.

2.11.2 Modifications to Test Standard

No modifications were made to the test standard.

2.12 Disposition of EUT

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

Conformance: The EUT **conformed** to the requirements of this section.

Test Engineer(s): Arsalan Hasan

Test Date(s): April 8, 2021

Manufacturer	Name / Model	Peak Gain	Frequency Range	Type	Polarization	Impedance
Antenova	Serica / SR4W035	3.50 dBi	2.4 – 2.5 GHz	SMD	Linear	50 Ω

Antenna Requirement

"Note: Antenna specs are referenced from antenna datasheet provided by the antenna manufacturer. This antenna data sheet is available for review along with this test report and other exhibits in the submitted TCB package"

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 µH/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 (dBµV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

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

Test Procedure: The EUT was placed on a 0.8 m-high wooden table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 µH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2014 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 µH LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

Test Result: This test was not applicable. EUT is battery-powered.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(2) 6 dB Bandwidth

Test Requirements: **§ 15.247(a)(2):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

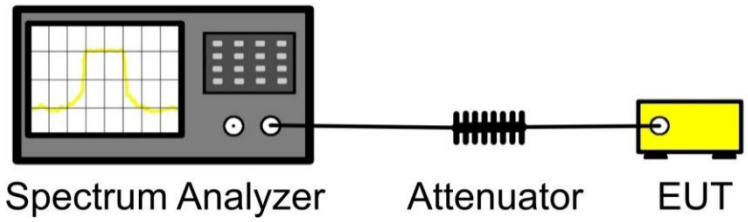
Test Procedure: The transmitter was on and transmitting at the highest output power. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using an RBW approximately 1% of the total emission bandwidth, VBW > RBW. The 6 dB Bandwidth was measured and recorded. The measurements were performed on the low, mid and high channels.

Test Results The EUT **completed testing** to the requirements of § 15.247 (a)(2). No anomalies noted.

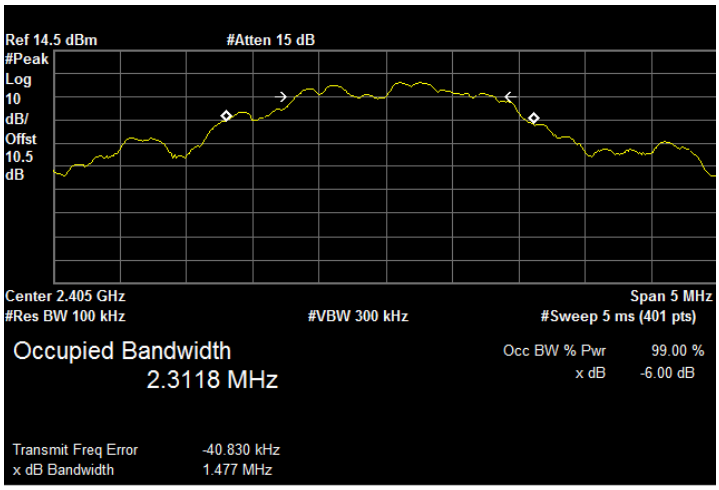
The 6 dB Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Arsalan Hasan

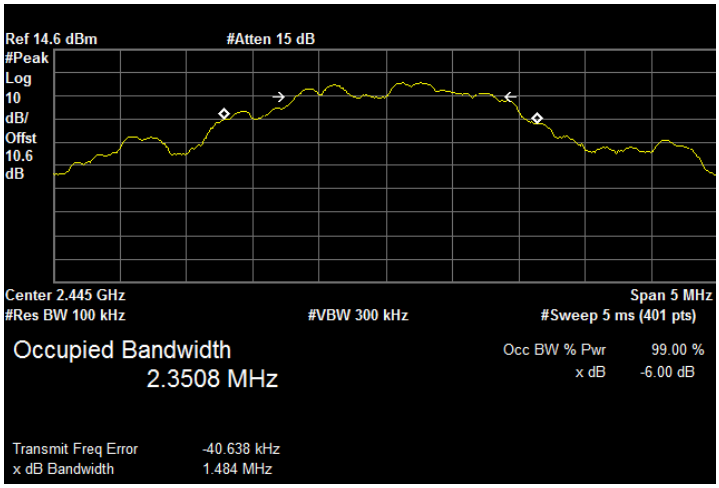
Test Date(s): April 8, 2021



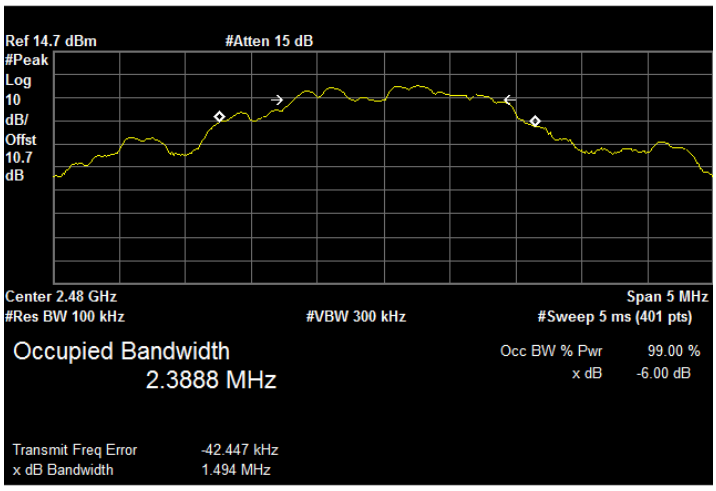
Occupied Bandwidth Test Setup



Occupied Bandwidth, Low Channel, 2405MHz



Occupied Bandwidth, Mid Channel, 2445MHz



Occupied Bandwidth, High Channel, 2480MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

Test Requirements: **§15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400–2483.5	1.000
5725– 5850	1.000

Output Power Requirements from §15.247(b)

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the Table 14, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band and using a point to point application may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

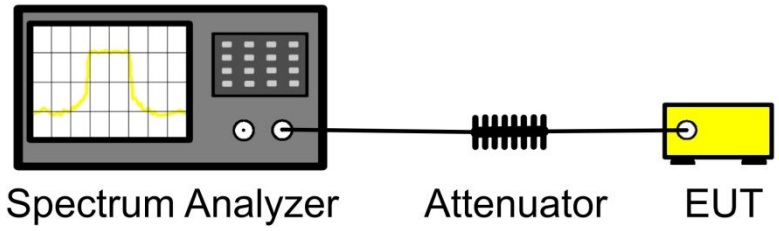
Fixed, point-to-point operation excludes the use of point-to-multipoint systems, Omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The EUT was measured at the low, mid and high channels of each band at the maximum power level.

Test Results: The EUT **completed testing** to the requirements of **§15.247(b)**. No anomalies noted.

Test Engineer(s): Arsalan Hasan

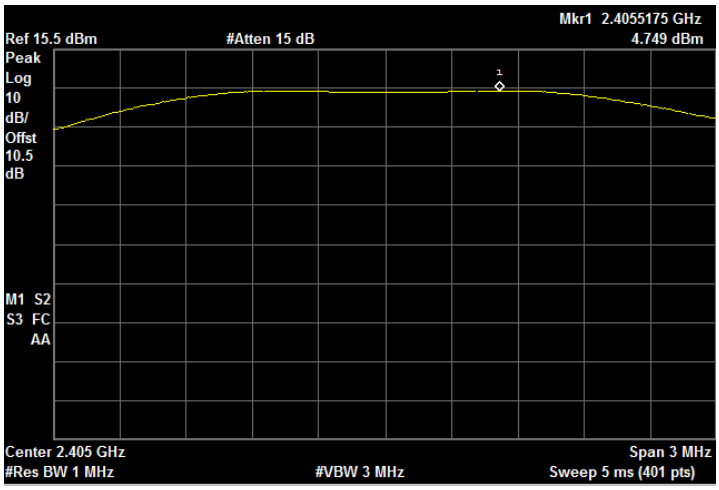
Test Date(s): April 8, 2021



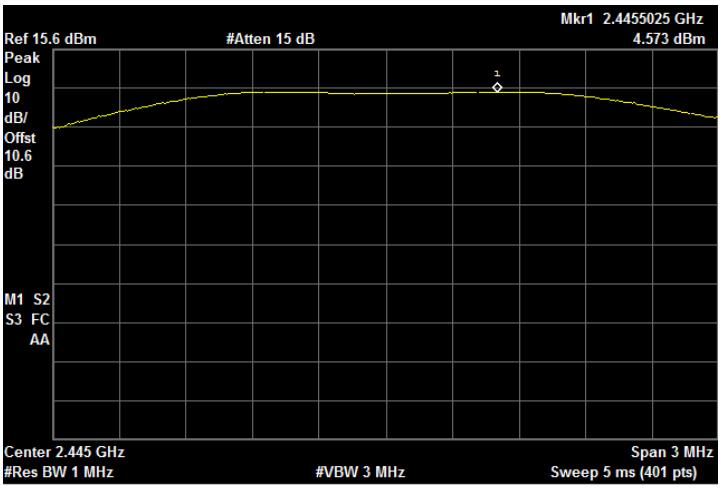
Peak Power Output Test Setup

Output Power			
Carrier Channel	**Frequency (MHz)**	**Measured Conducted Power (dBm)**	**Limit (dBm)**
Low	2405	4.749	30
Mid	2445	4.573	30
High	2480	4.455	30

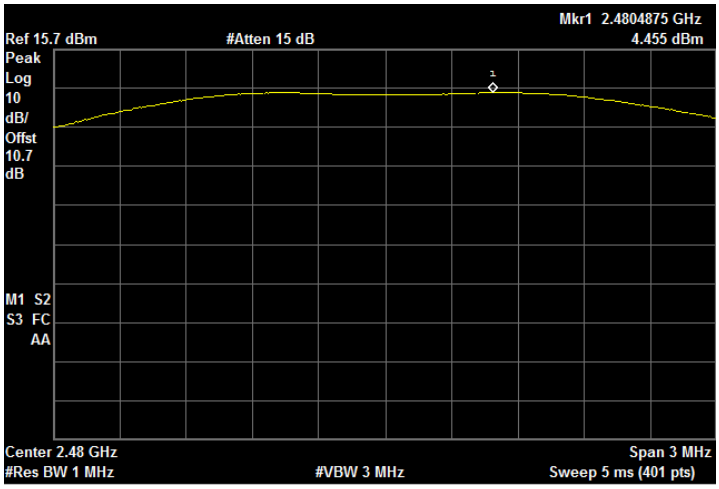
Peak Power Output, Test Data



Peak Power Output, Low Channel, 2405MHz



Peak Power Output, Mid Channel, 2445MHz



Peak Power Output, High Channel, 2480MHz

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])

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 17:

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

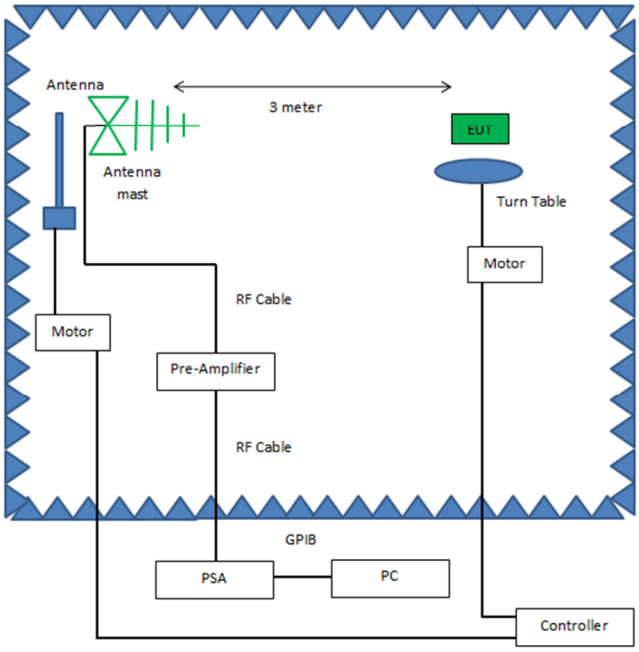
Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

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 below 30 MHz and above 18 GHz.

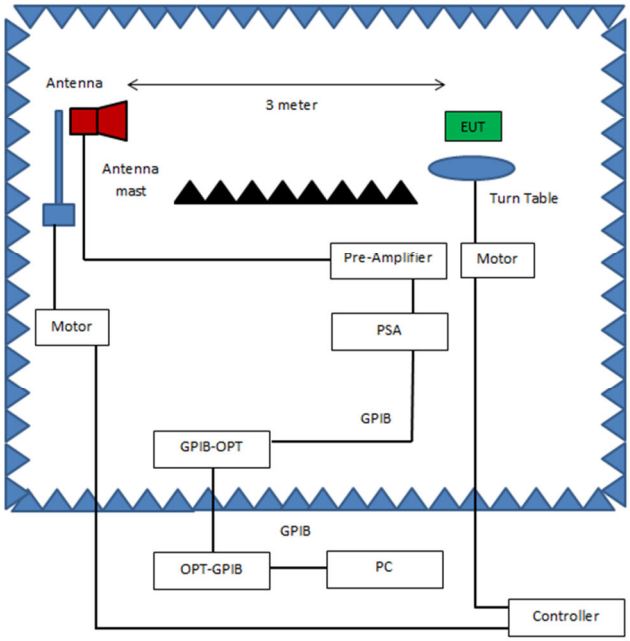
Test Results: The EUT **completed testing** to the requirements of **§ 15.247(d)**. No anomalies noted.

Test Engineer(s): Arsalan Hasan

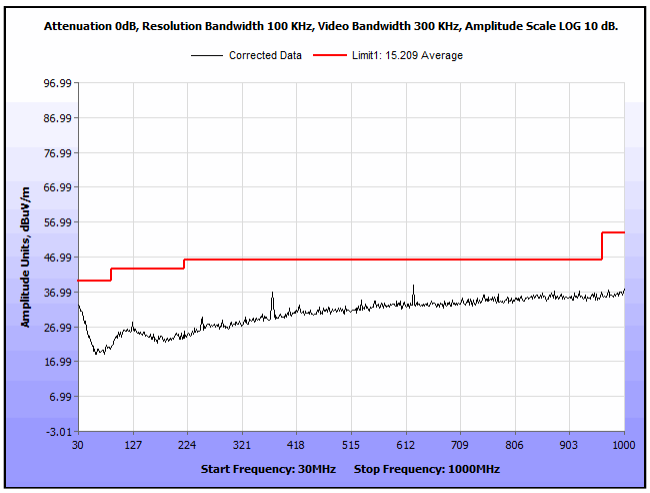
Test Date(s): April 8, 2021; May 9, 2021



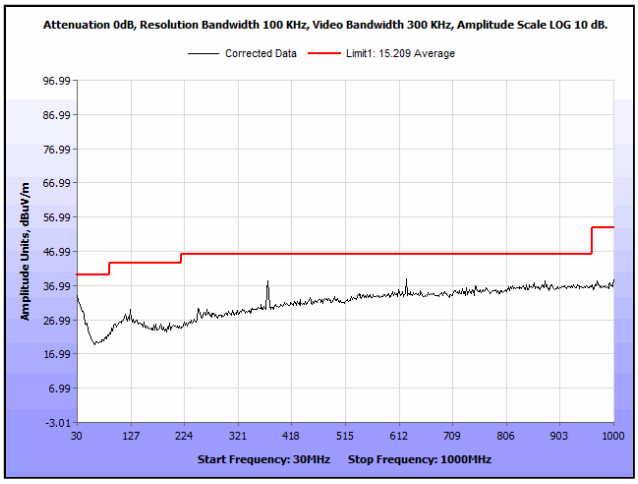
Radiated Emissions, Below 1GHz, Test Setup



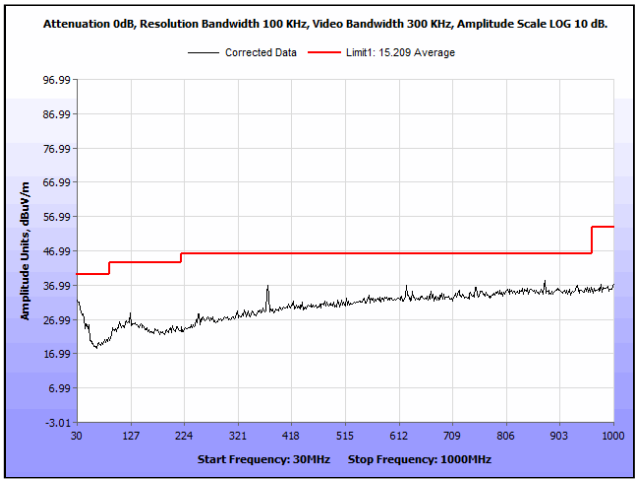
Radiated Emissions, Above 1GHz, Test Setup



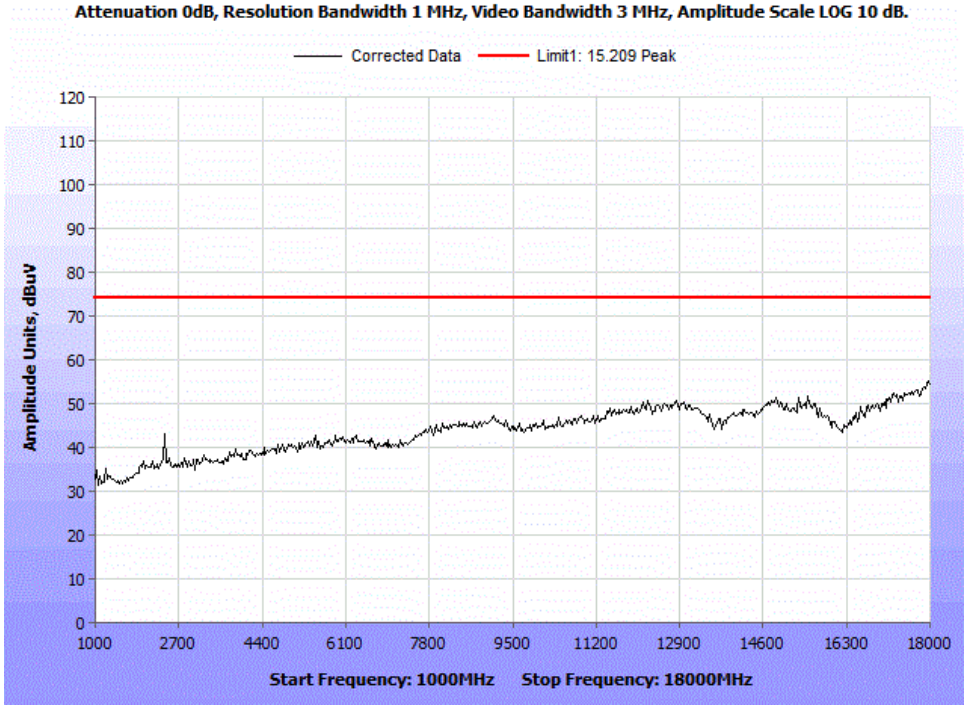
Radiated Spurious Emissions, Low Channel, 2405MHz, (Worst Case)



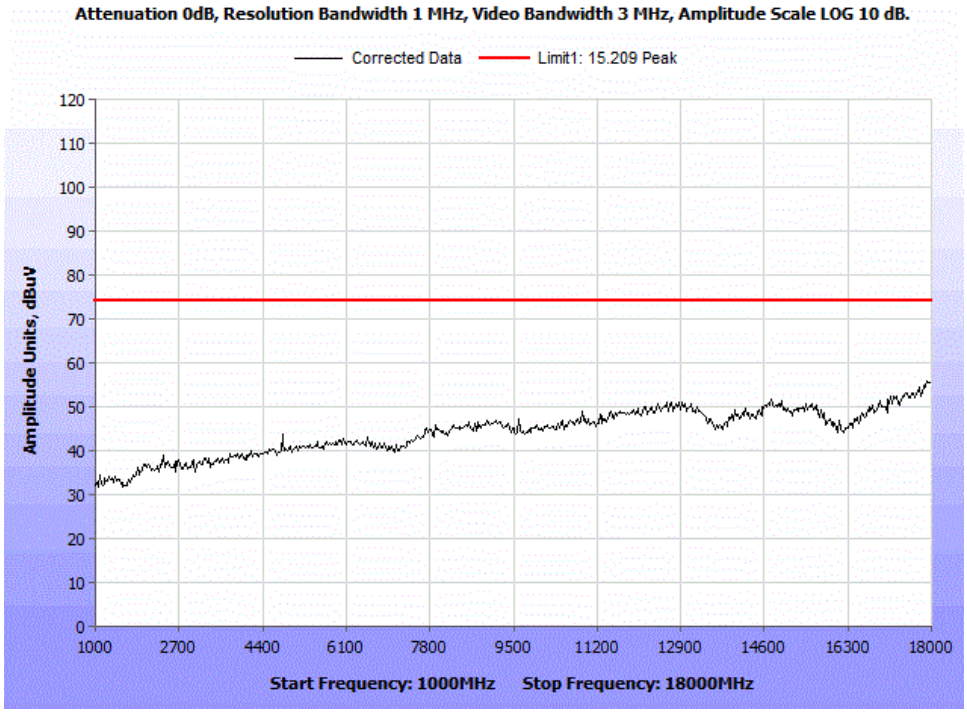
Radiated Spurious Emissions, Mid Channel, 2445MHz, (Worst Case)



Radiated Spurious Emissions, High Channel, 2480MHz, (Worst Case)

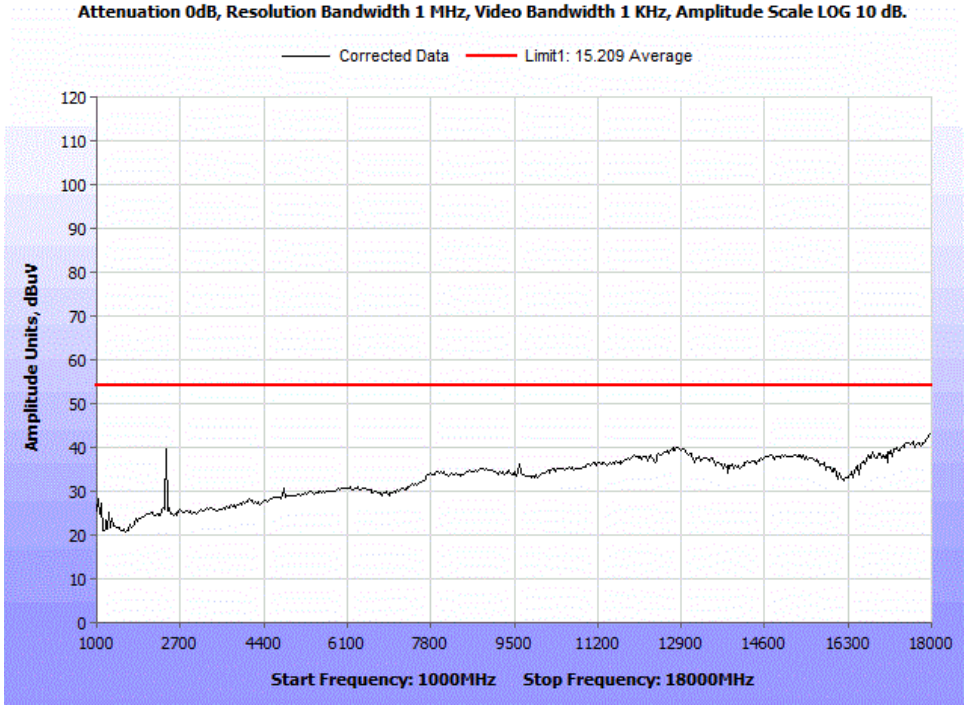


Radiated Spurious Emissions, Low Channel, 2405MHz, Peak, H

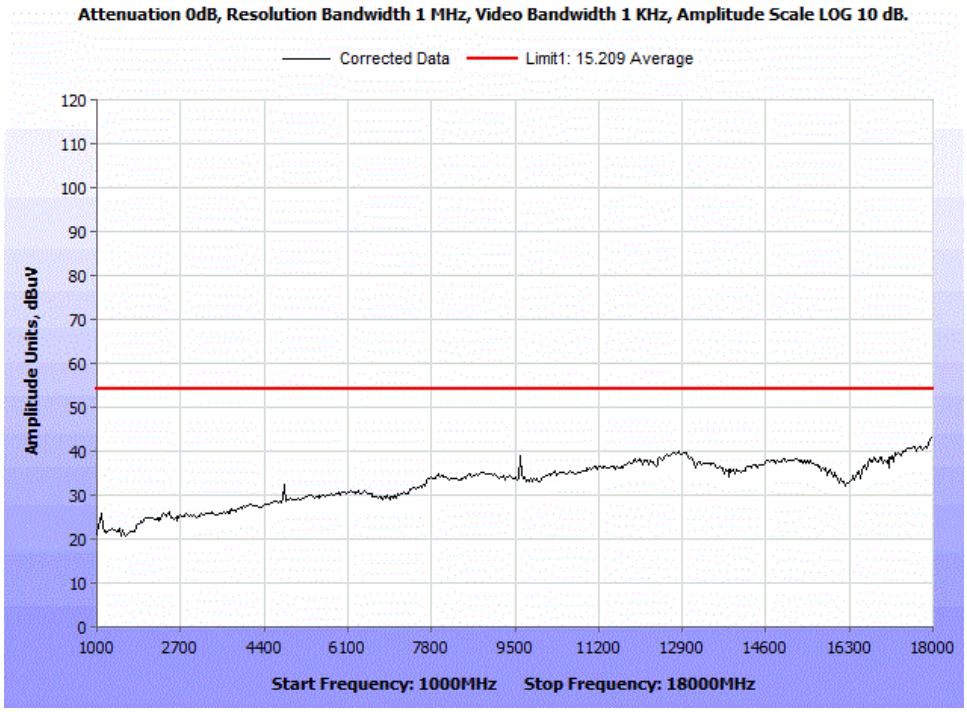


Radiated Spurious Emissions, Low Channel, 2405MHz, Peak, V

Note: A notch filter was used to notch out the fundamental.

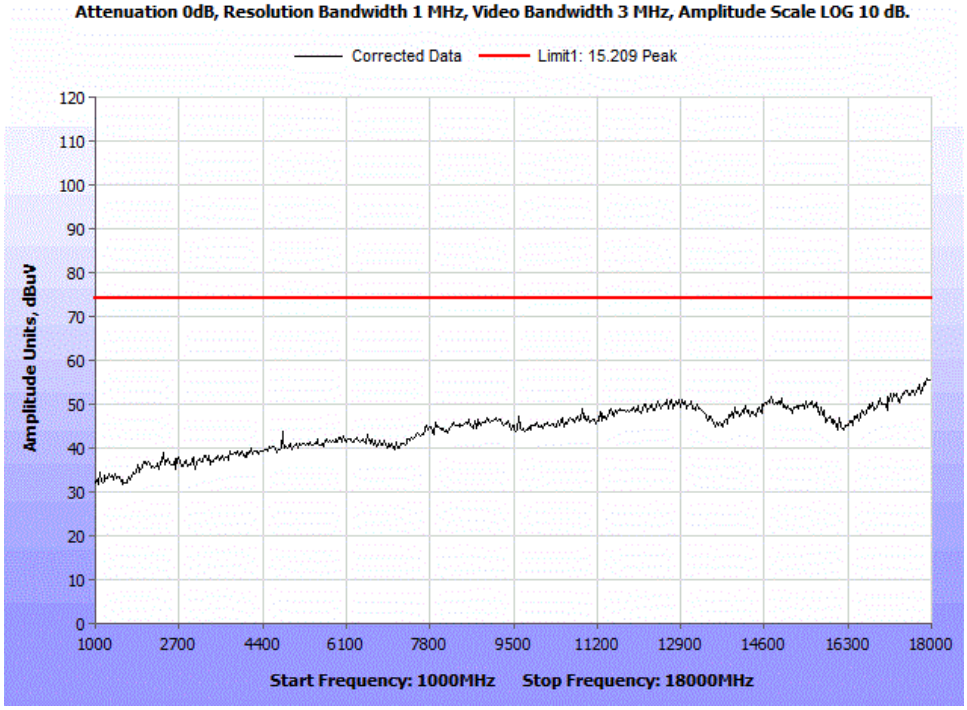


Radiated Spurious Emissions, Low Channel, 2405MHz, Average, H

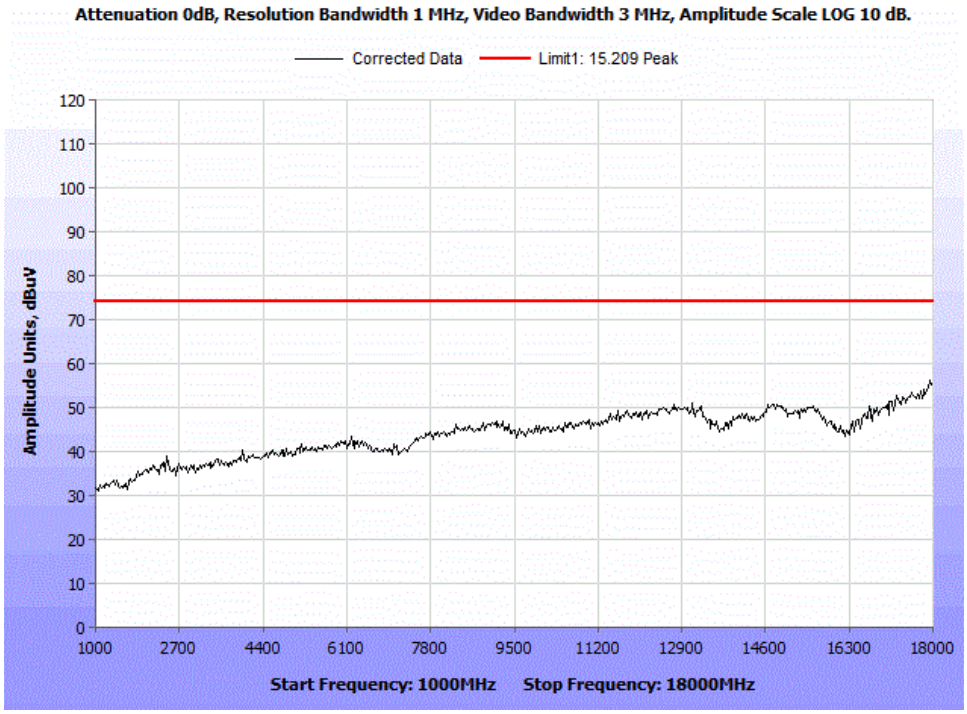


Radiated Spurious Emissions, Low Channel, 2405MHz, Average, V

Note: A notch filter was used to notch out the fundamental.

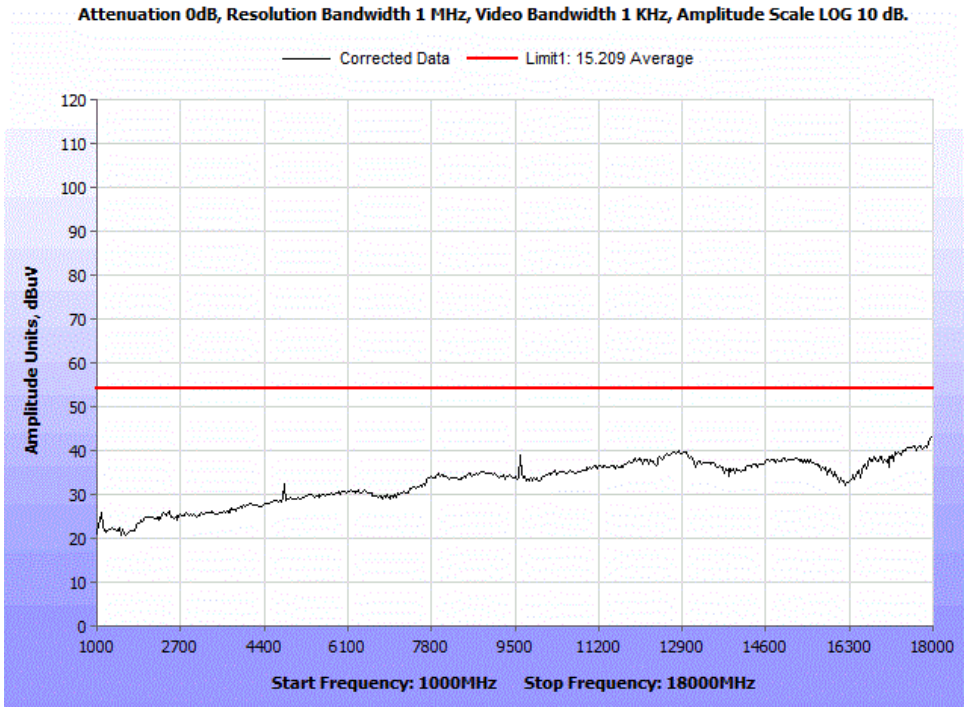


Radiated Spurious Emissions, Mid Channel, 2445MHz, Peak, H

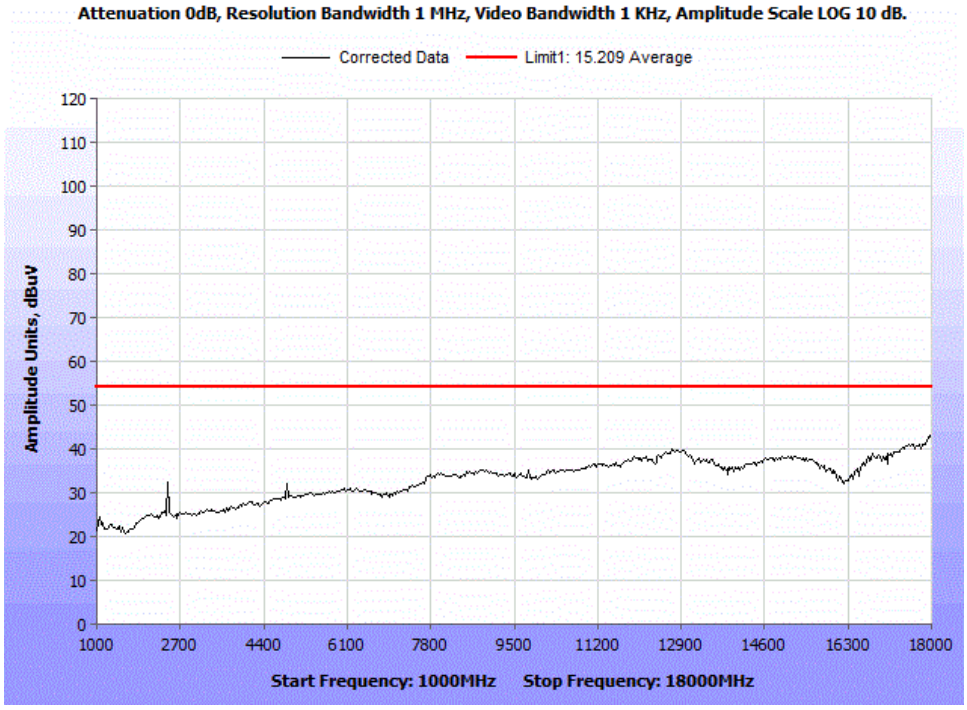


Radiated Spurious Emissions, Mid Channel, 2445MHz, Peak, V

Note: A notch filter was used to notch out the fundamental.

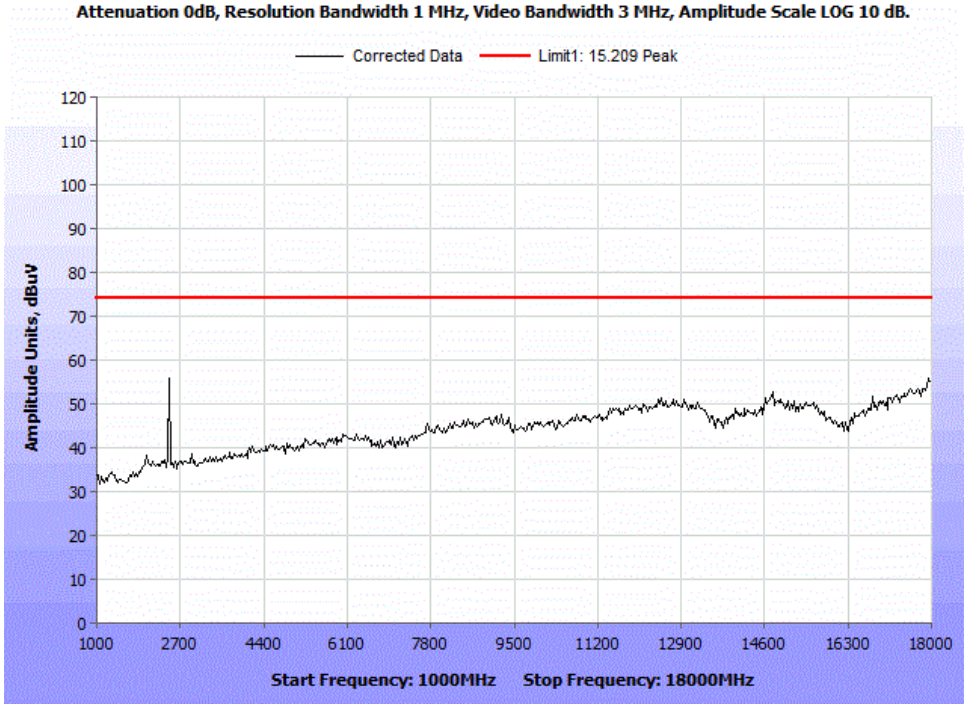


Radiated Spurious Emissions, Mid Channel, 2445MHz, Average, H

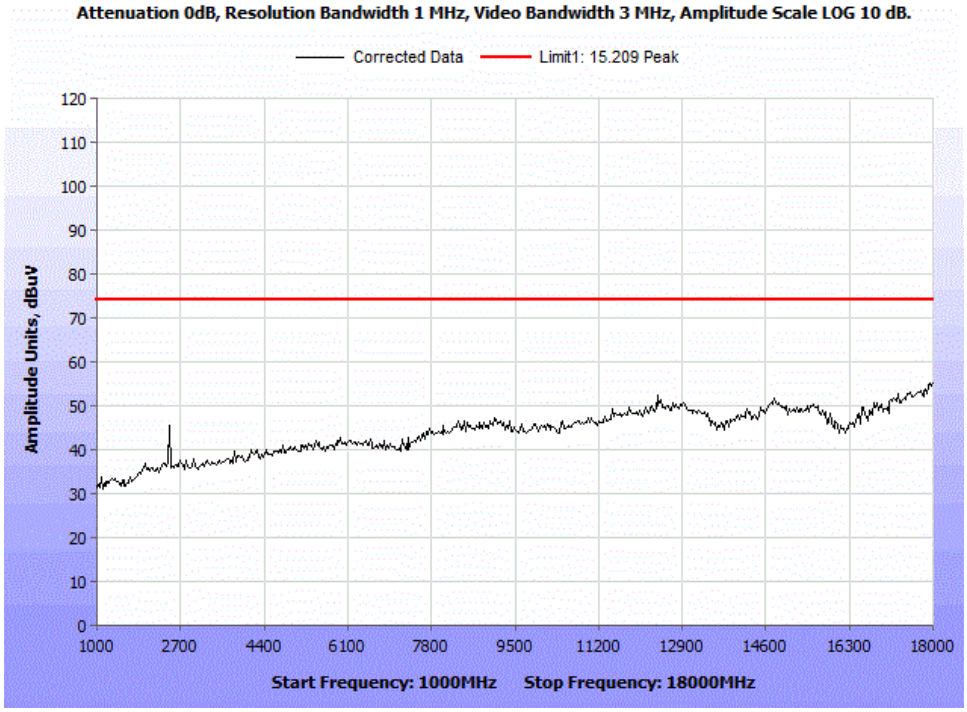


Radiated Spurious Emissions, Mid Channel, 2445MHz, Average, V

Note: A notch filter was used to notch out the fundamental.

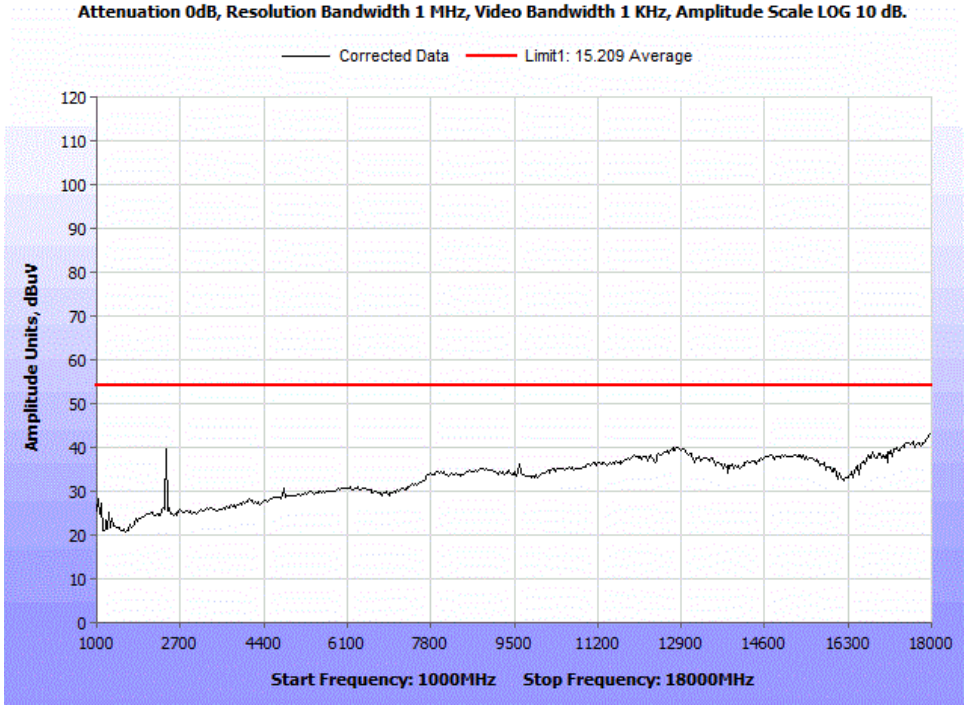


Radiated Spurious Emissions, High Channel, 2480MHz, Peak, H

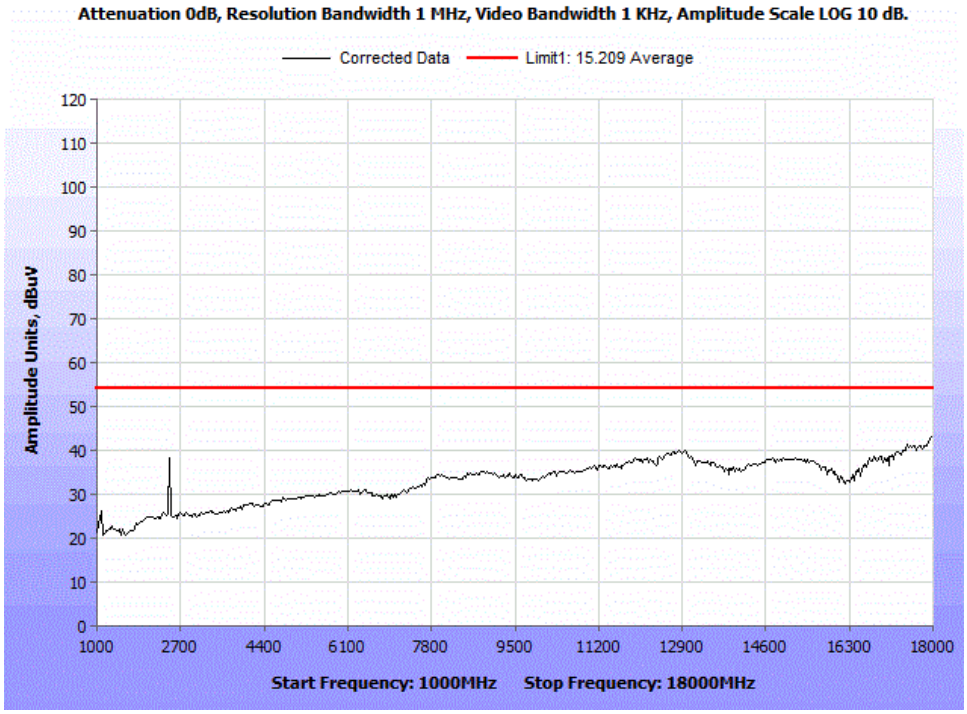


Radiated Spurious Emissions, High Channel, 2480MHz, Peak, V

Note: A notch filter was used to notch out the fundamental.

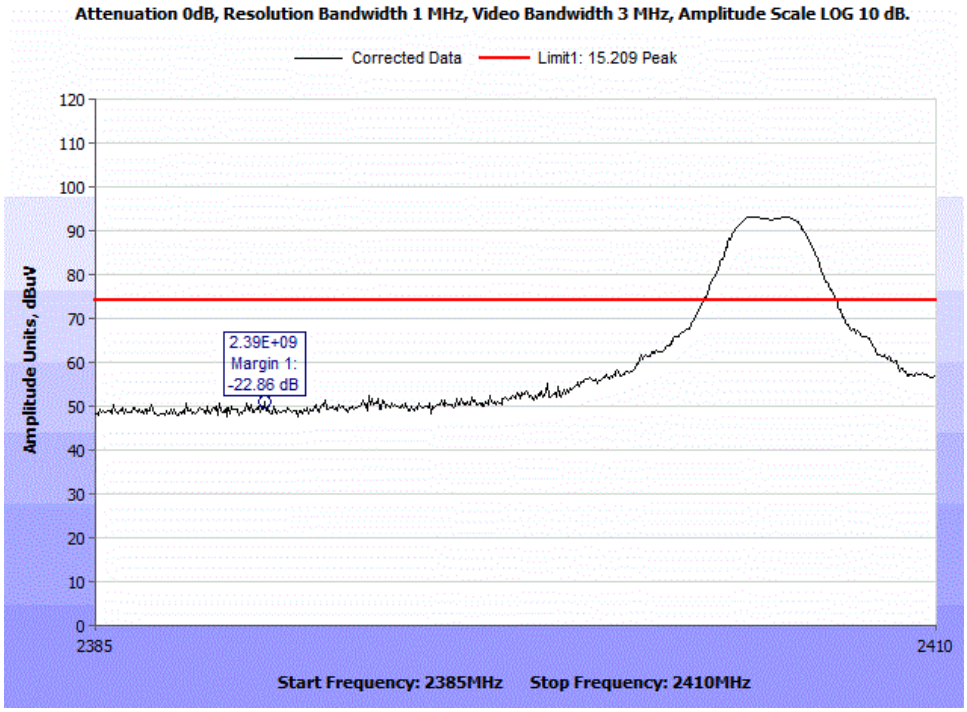


Radiated Spurious Emissions, High Channel, 2480MHz, Average, H

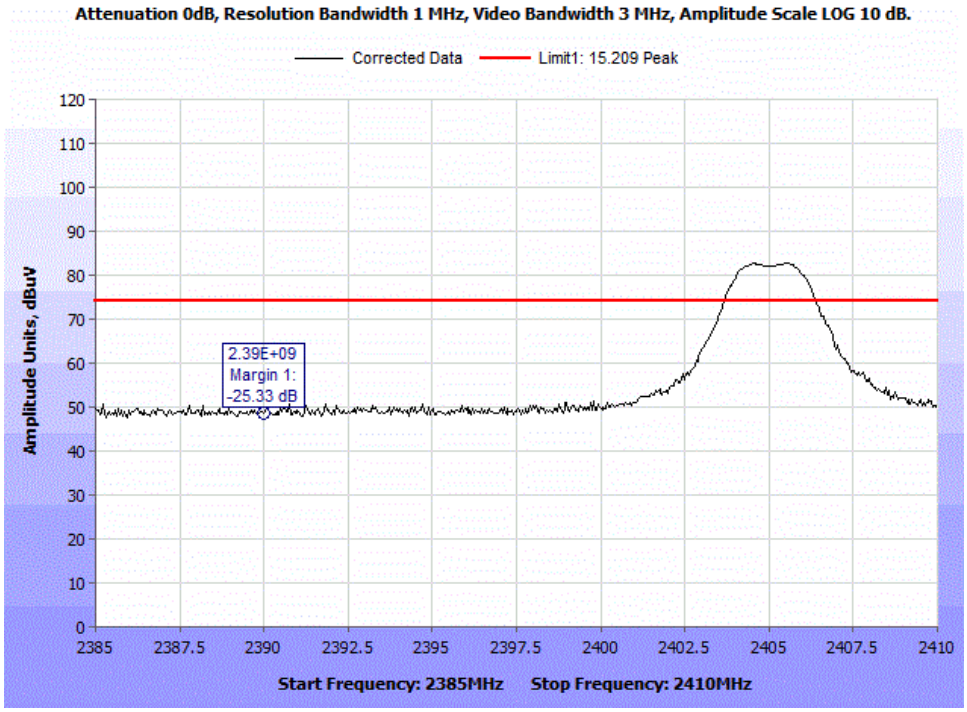


Radiated Spurious Emissions, High Channel, 2480MHz, Average, V

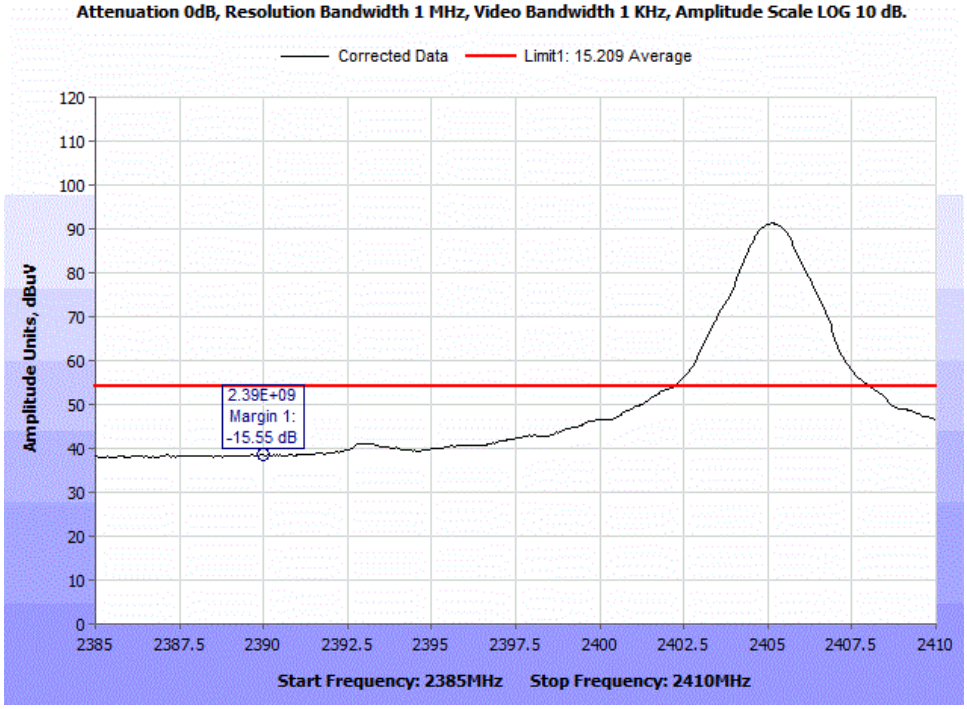
Note: A notch filter was used to notch out the fundamental.



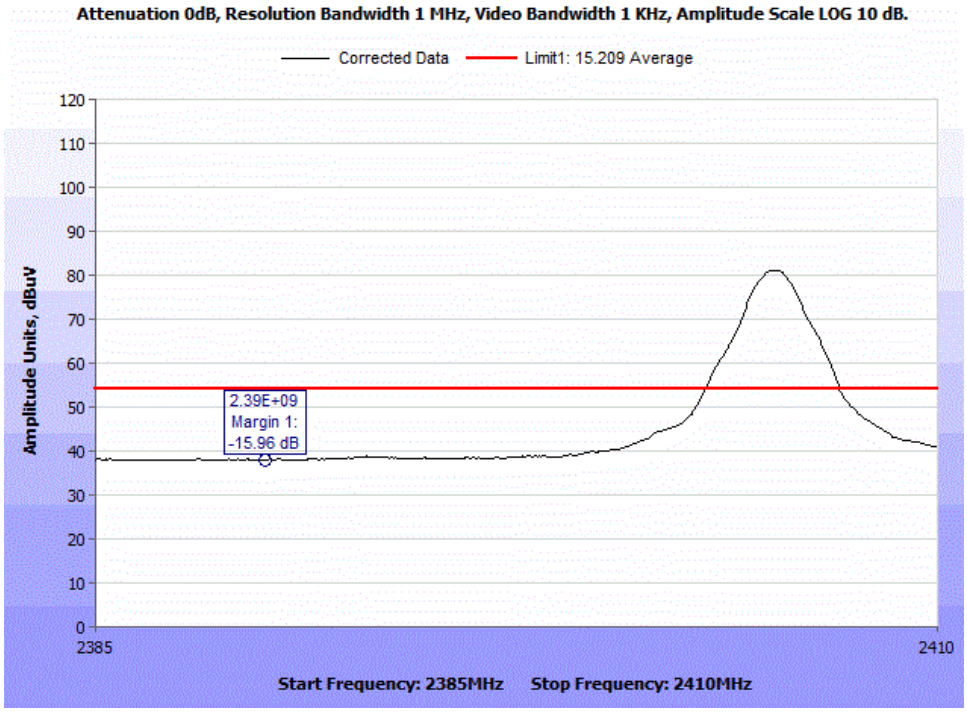
Radiated BandEdge, Low Channel, 2405MHz, Peak, H



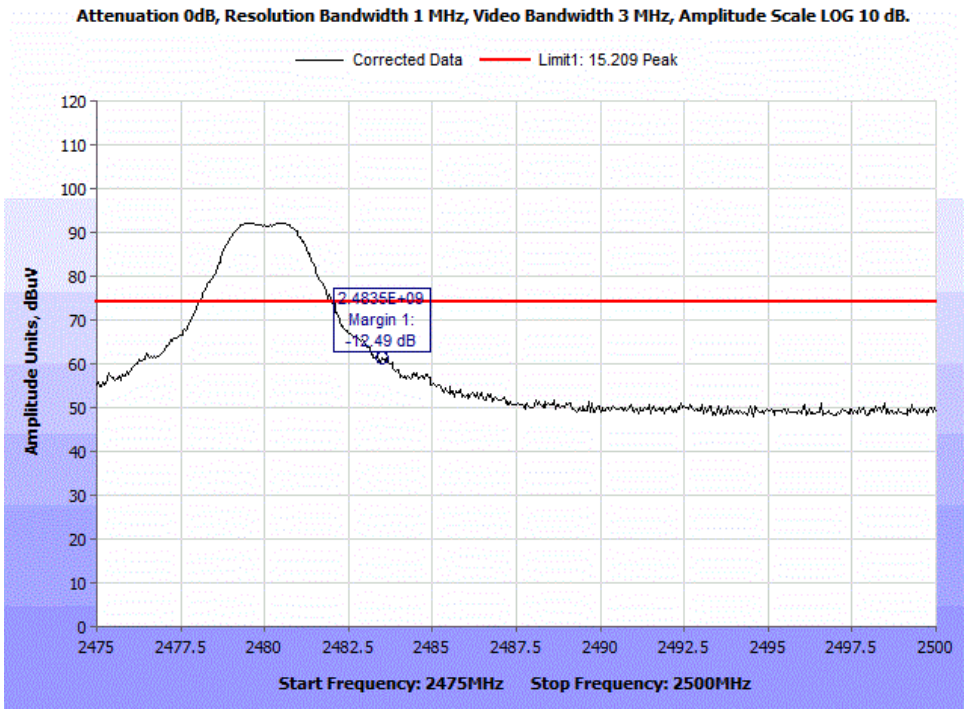
Radiated BandEdge, Low Channel, 2405MHz, Peak, V



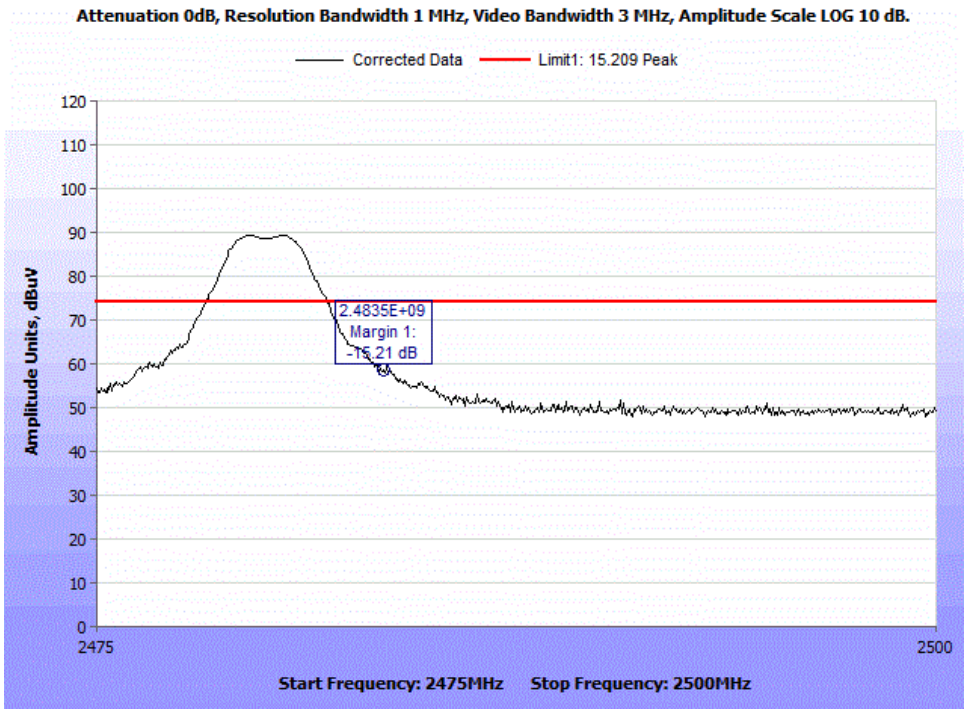
Radiated BandEdge, Low Channel, 2405MHz, Average, H



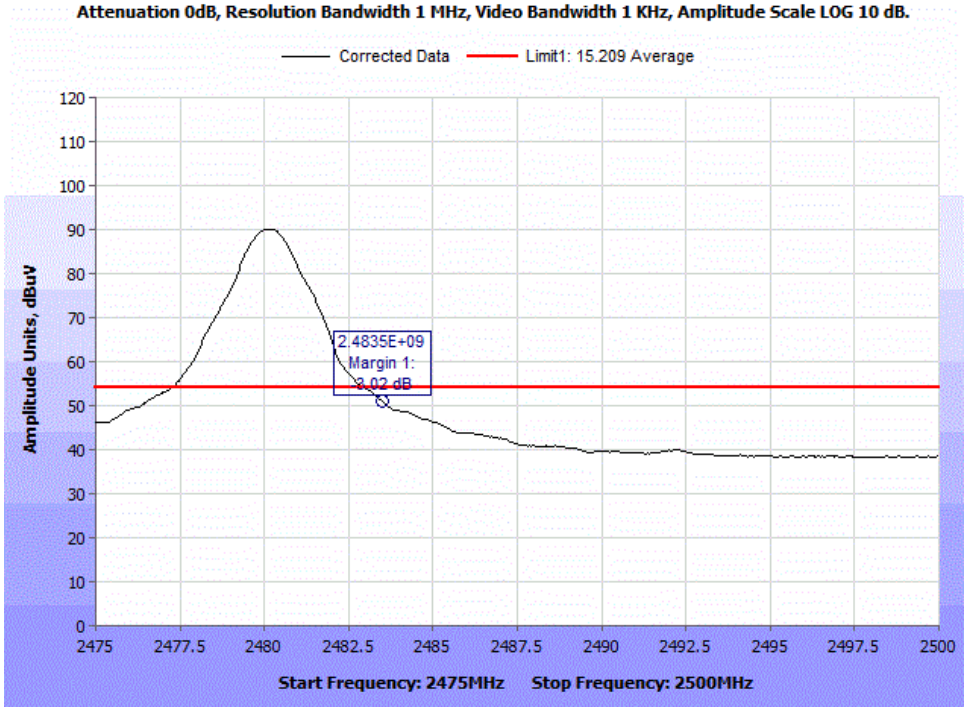
Radiated BandEdge, Low Channel, 2405MHz, Average, V



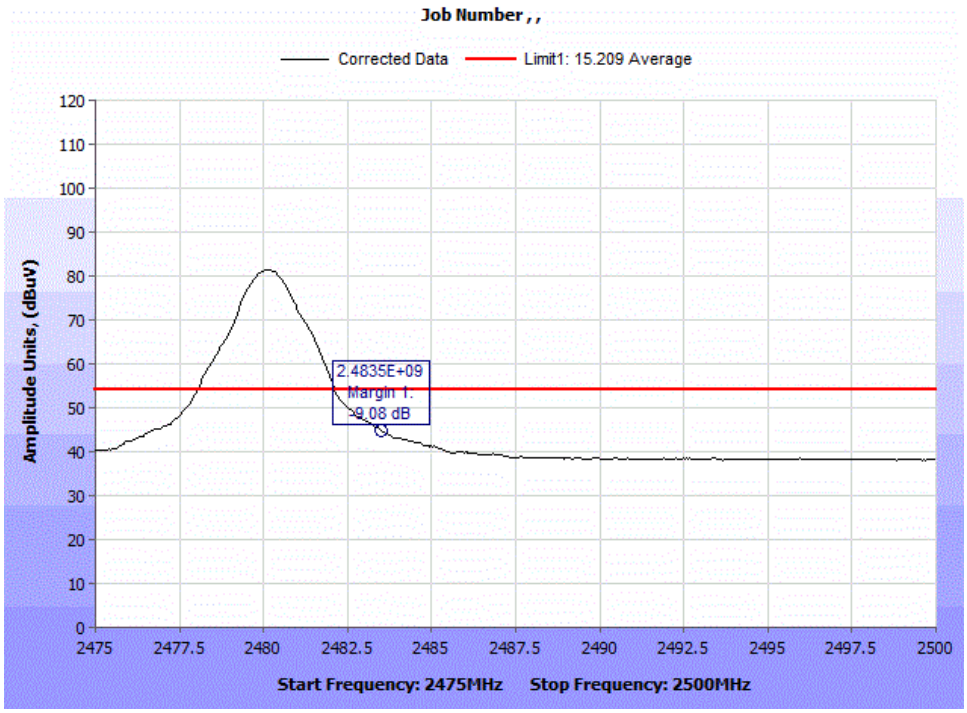
Radiated BandEdge, High Channel, 2480MHz, Peak, H



Radiated BandEdge, High Channel, 2480MHz, Peak, V



Radiated BandEdge, High Channel, 2480MHz, Average, H



Radiated BandEdge, High Channel, 2480MHz, Average, V

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements and Band Edge

Test Requirement: **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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Procedure: For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

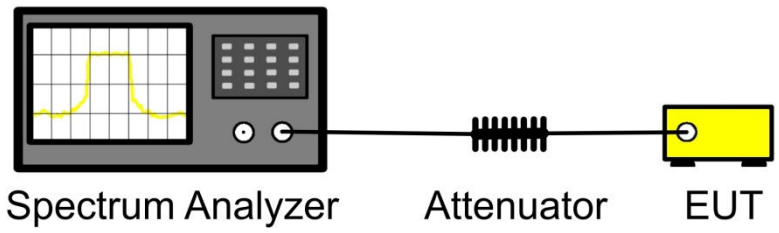
Since the EUT had an integral antenna, conducted measurements could not be performed. Measurements needed to be taken radiated. An antenna was located 3 m away from the EUT and plots were taken. The EUT was rotated through all three orthogonal axes. The plots were corrected for both antenna correction factor and cable lost.

See following pages for detailed test results with RF Conducted Spurious Emissions.

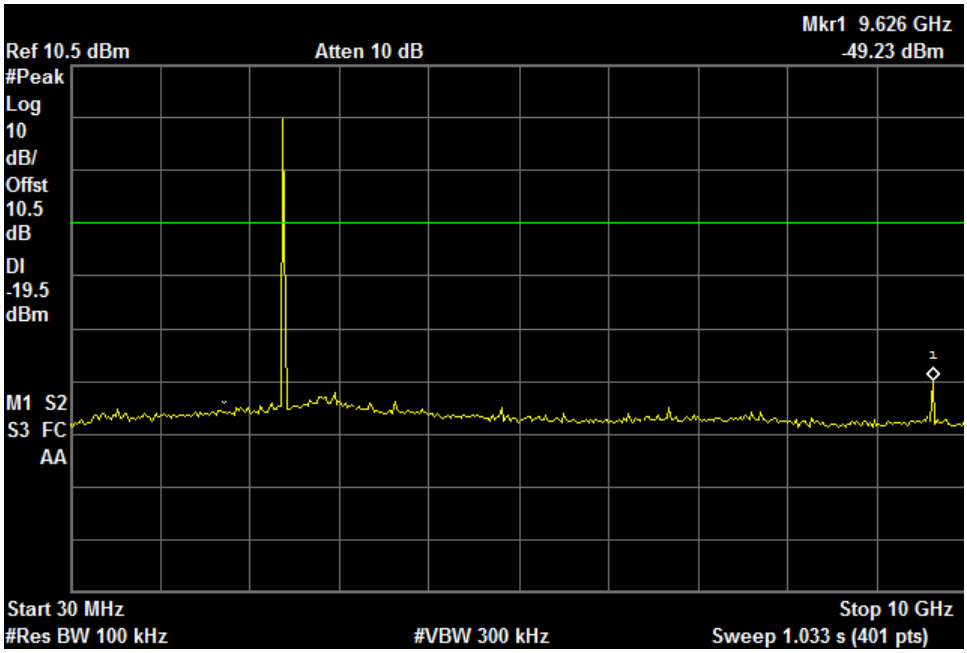
Test Results: The EUT **completed testing** to the requirements of **§15.247(d)**. No anomalies noted.

Test Engineer(s): Arsalan Hasan

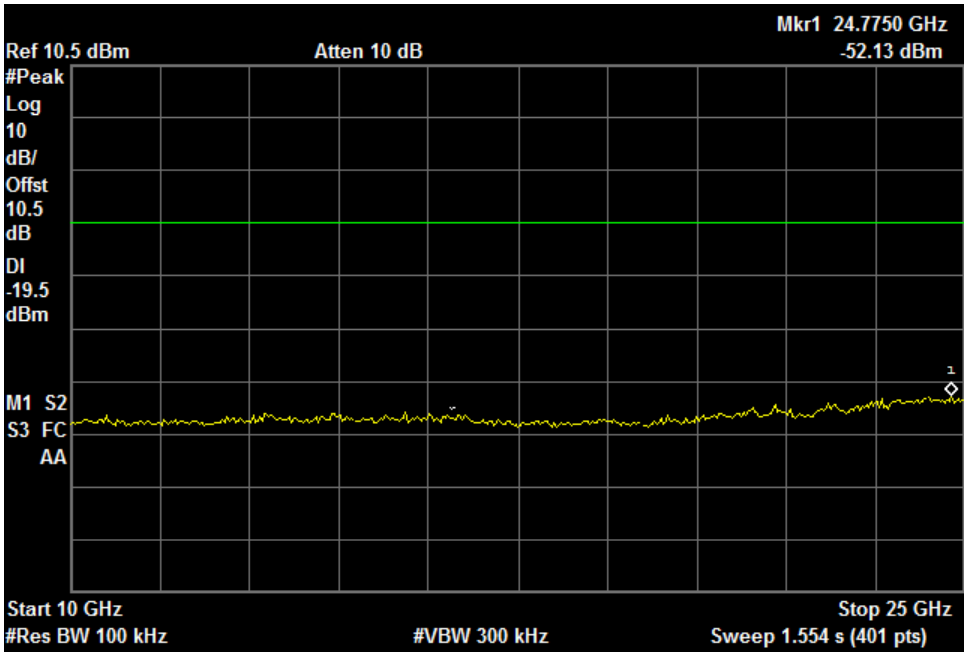
Test Date(s): April 8, 2021



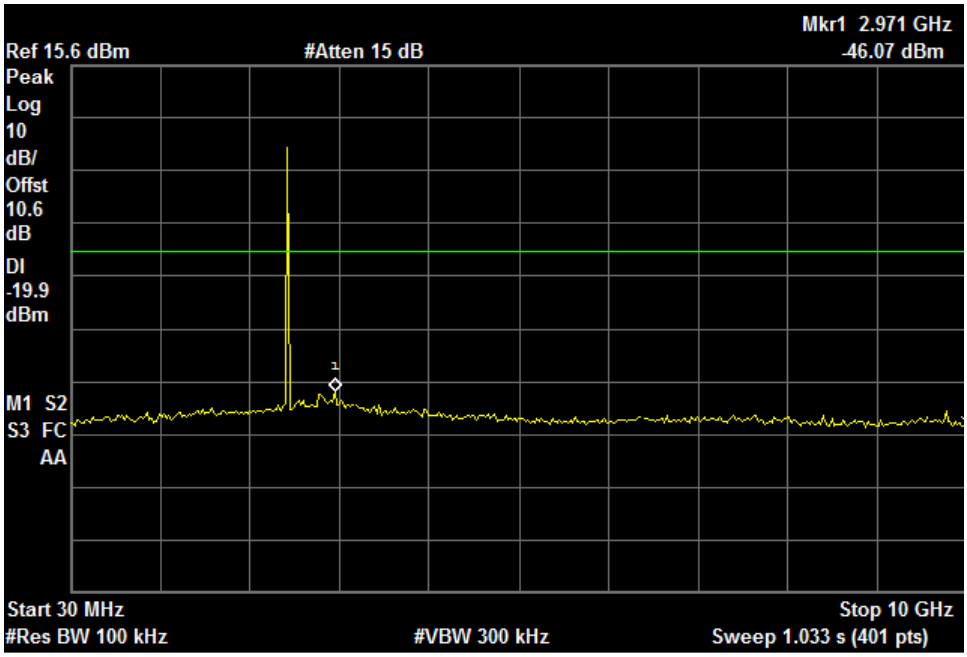
Conducted Spurious Emissions Test Setup



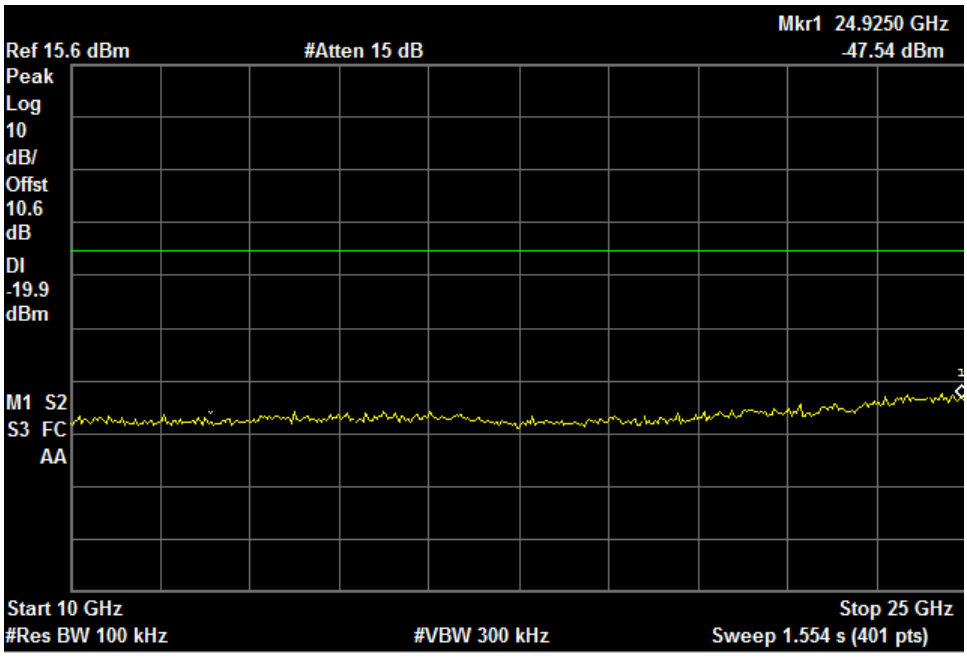
Spurious Conducted Emissions, Low Channel, 2405MHz, 30MHz-10GHz



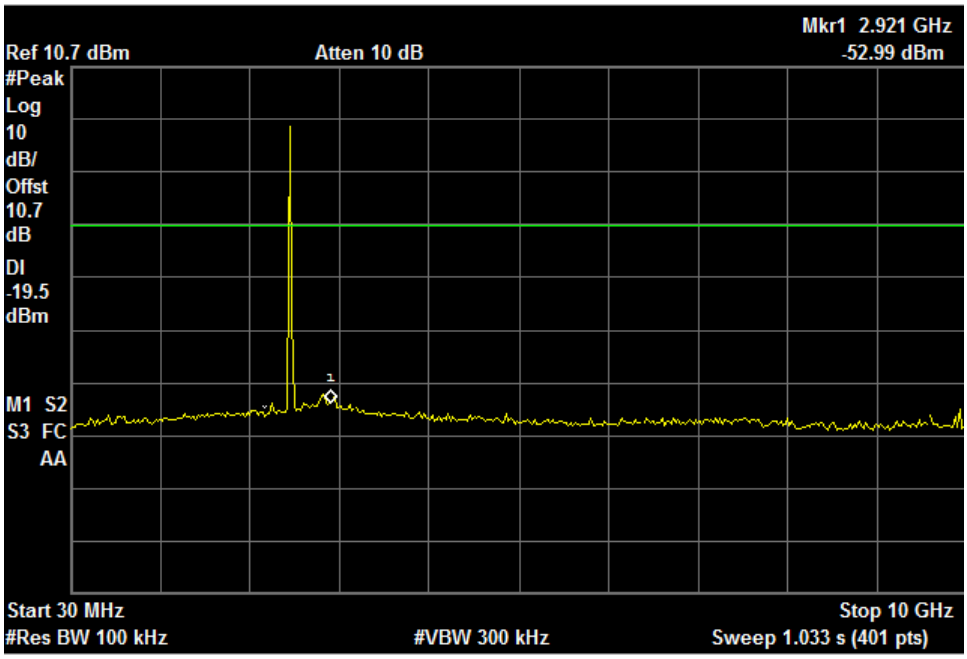
Spurious Conducted Emissions, Low Channel, 2405 MHz, 10GHz-25GHz



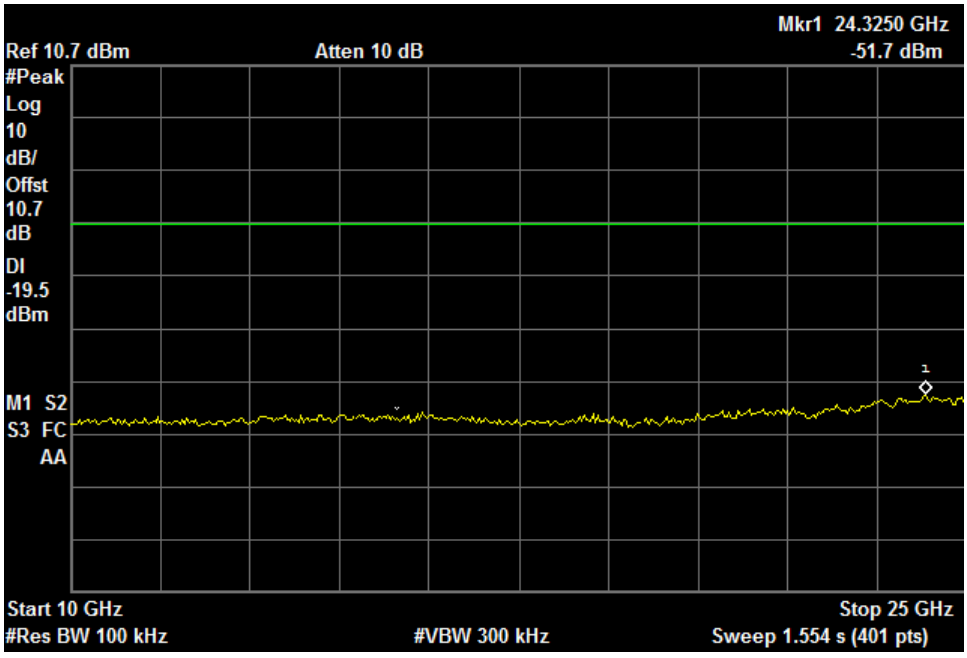
Spurious Conducted Emissions, Mid Channel, 2445MHz, 30MHz-10GHz



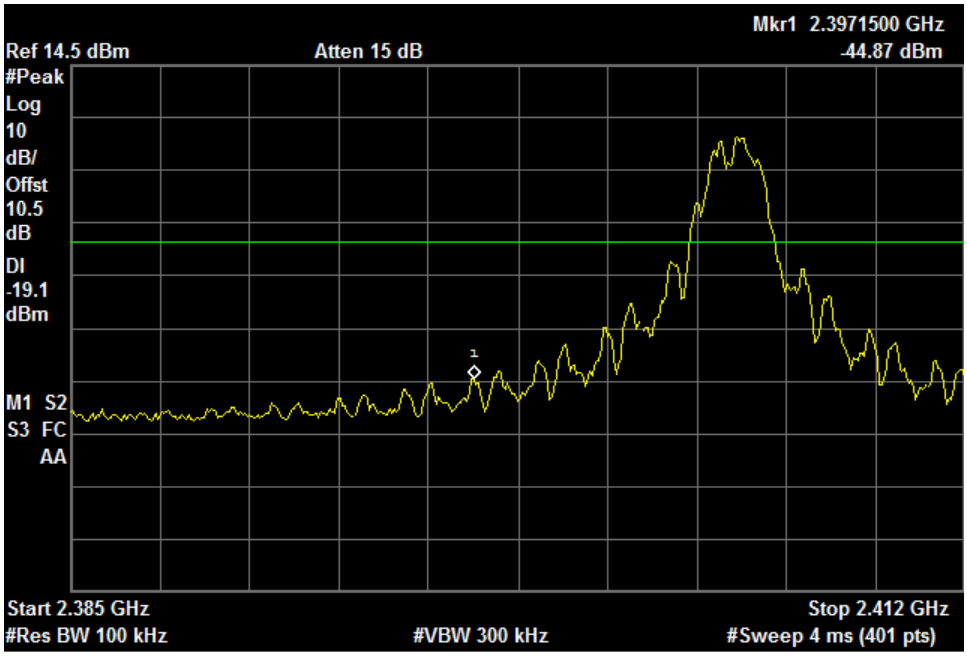
Spurious Conducted Emissions, Mid Channel, 2445MHz, 10GHz-25GHz



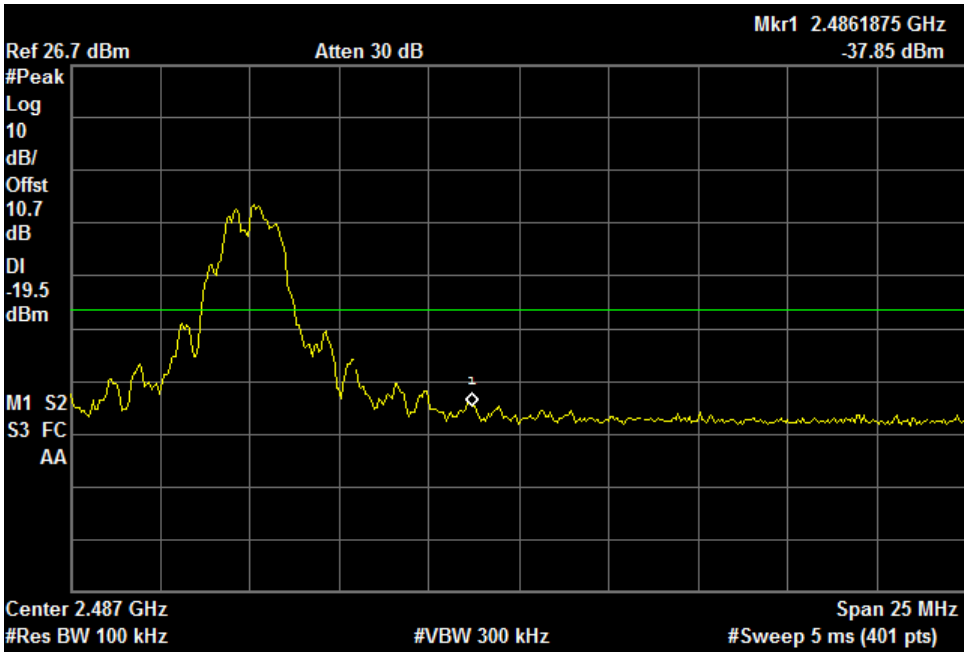
Spurious Conducted Emissions, High Channel, 2480MHz, 30MHz-10GHz



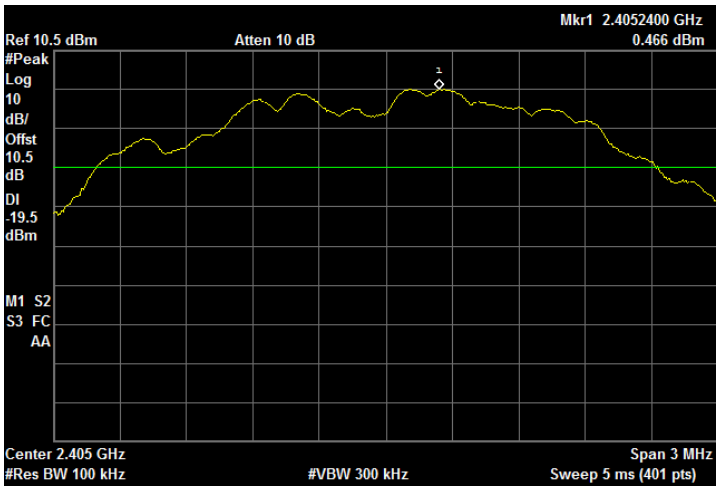
Spurious Conducted Emissions, High Channel, 2480MHz, 10GHz-25GHz



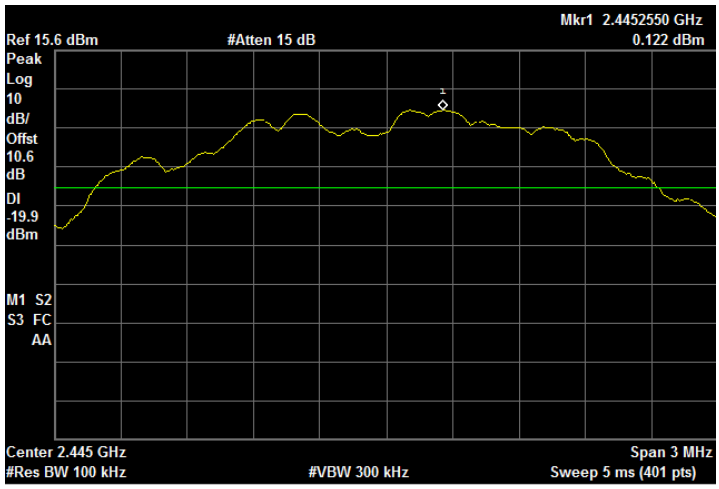
Conducted BandEdge, Low Channel, 2405MHz



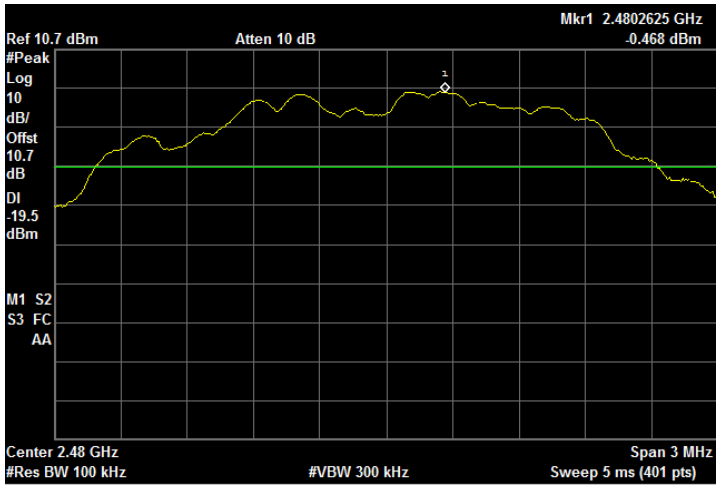
Conducted BandEdge, High Channel, 2480MHz



Spurious Conducted Emissions, Low Channel, 2405MHz, Reference



Spurious Conducted Emissions, Mid Channel, 2445MHz, Reference



Spurious Conducted Emissions, High Channel, 2480MHz, Reference

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(e) Peak Power Spectral Density

Test Requirements: **§15.247(e):** For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

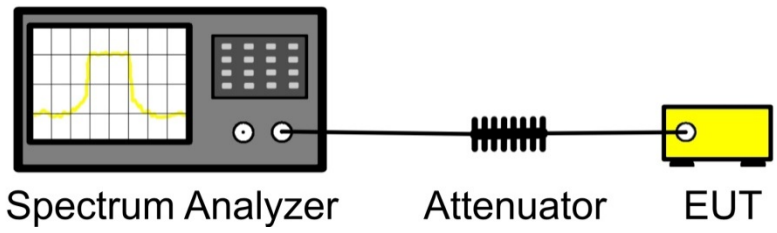
Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level throughout each of the 100 sweeps of power averaging. The RBW was set to 3 kHz and a VBW set to 9 kHz or greater. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels.

Test Results: The EUT **completed testing** to the requirements of **§ 15.247 (e)**. No anomalies noted.

The peak power spectral density was determined from plots on the following page(s).

Test Engineer(s): Arsalan Hasan

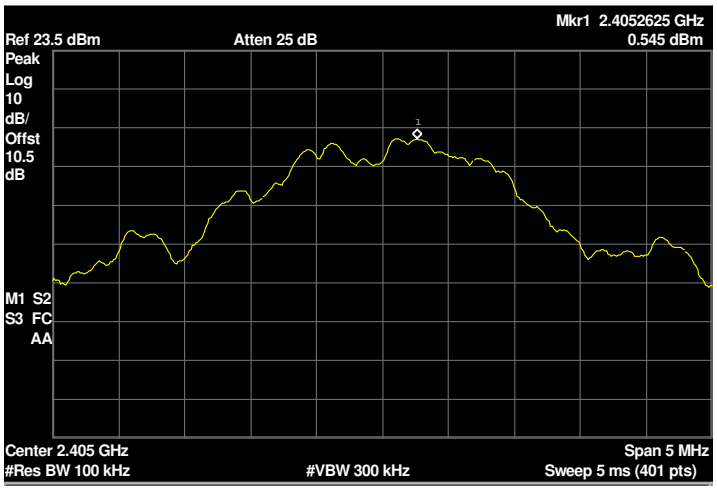
Test Date(s): April 8, 2021; May 9, 2021



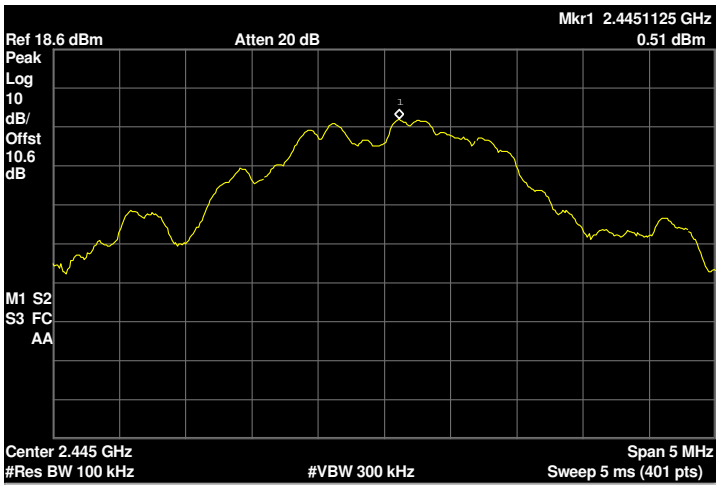
Block Diagram, Power Spectral Density Test Setup

Power Spectral Density			
Carrier Channel	**Frequency (MHz)**	**Measured Conducted Power (dBm)**	**Limit (dBm)**
Low	2405	0.545	8
Mid	2445	0.510	8
High	2480	0.096	8

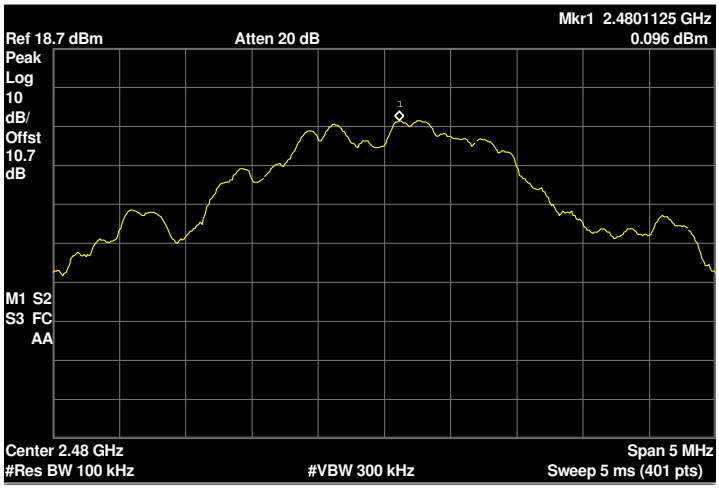
Peak Power Spectral Density, Test Data



Power Spectral Density, Low Channel, 2405MHz



Power Spectral Density, Mid Channel, 2445MHz



Power Spectral Density, High Channel, 2480MHz

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 17025:2017.

ASSET #	NOMENCLATURE	MANUFACTURER	MODEL	LAST CAL	CAL DUE
1S4075	RADIO COMMUNICATION TESTER	ROHDE & SCHWARZ	CMW500	09/20/2020	09/20/2022
1S2399	TURNTABLE/MAST CONTROLLER	SUNOL SCIENCES	SC99V	SEE NOTE 1	
1S2600	BILOG ANTENNA	TESEQ	CBL6112D	03/19/2021	06/19/2022
1S2733	BILOG ANTENNA	TESEQ	CBL6112D	06/05/2019	06/05/2021
1S3826	DRG HORN ANTENNA	ETS-LINDGREN	3117	12/03/2020	12/03/2022
1S2198	DRG HORN ANTENNA	ETS-LINDGREN	3117	10/07/2019	10/07/2021
1S2003	PXA SIGNAL ANALYZER	KEYSIGHT	N9030B	09/15/2020	09/15/2021
1S2587	PRE AMPLIFIER	AML COMMUNICATIONS	AML0126L3801	SEE NOTE 1	
1S2653	AMPLIFIER	SONOMA INSTRUMENT	310 N	SEE NOTE 1	
1S2486	5 METER CHAMBER	PANASHIELD - ETS	5M	SEE NOTE 2	
1S3824	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMA100B	11/06/2019	05/06/2021

Test Equipment List

Note 1: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.
Note 2: Latest NSA and VSWR data available upon request.

End of Report