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May 05, 2020

GridPlus, Inc.
100 Congress Avenue, Suite 2025
Austin, Texas 78701

Dear Karl Kreder,

Enclosed is the EMC Wireless test report for compliance testing of the GridPlus, Inc., Lattice1 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 MET Labs, 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,
EUROFINS MET LABS, INC.

Angela D. Kekovski
Documentation Department

Reference: (\GridPlus, Inc.\EMCA102875A-FCC247 Rev. 3)

Electromagnetic Compatibility Criteria
Test Report

for the

GridPlus, Inc.
Lattice1

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

MET Report: EMCA102875A-FCC247 Rev. 3

May 05, 2020

Prepared For:

GridPlus, Inc.
100 Congress Avenue, Suite 2025
Austin, Texas 78701

Prepared By:
Eurofins MET Labs, Inc.
13501 McCallen Pass
Austin, TX 78753

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Jonathan Tavira, Project Engineer
Electromagnetic Compatibility Lab

Angela D. Kekovski
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.

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	December 1, 2019	Initial Issue.
1	January 2, 2020	TCB Corrections.
2	March 13, 2020	TCB Corrections.
3	May 5, 2020	TCB Corrections.

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
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 GridPlus, Inc. Lattice1, 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 Lattice1. GridPlus, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Lattice1, 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 GridPlus, Inc., purchase order number 00123. All tests were conducted using measurement procedure ANSI C63.10:2013.

FCC Reference 47 CFR Part 15.247	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	Compliant
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(c)	Spurious Emissions in Non-restricted Bands	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(e)	Peak Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	RF Human Exposure, SAR Exclusion	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

II. Equipment Configuration

A. Overview

Eurofins MET Labs, Inc. was contracted by GridPlus, Inc. to perform testing on the Lattice1, under GridPlus, Inc.'s purchase order number 00123.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the GridPlus, Inc., Lattice1.

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

Model(s) Tested:	Lattice1	
Model(s) Covered:	Lattice1	
EUT Specifications:	Primary Power: 12 VDC	
	FCC ID: 2AT2CBRINKOFBAILOUT	
	Type of Modulations:	IEEE 802.15.4
	Equipment Code:	DTS
	Peak RF Output Power:	-15.11 dBm
	EUT Frequency Ranges:	2405-2480 MHz
	Antenna Type:	PCB Etched – Invert F Type
	Antenna Gain:	3.3 dBi
	Firmware Version:	k8x_firmware_production, safe-card, gpd
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:	Jonathan Tavira	
Report Date(s):	May 05, 2020	

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 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 v04	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247

Table 3. References

C. Test Site

All testing was performed at Eurofins MET Labs, Inc., 13501 McCallen Pass, Austin, TX 78753. 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. 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%

Table 4. Uncertainty Calculations Summary

E. Description of Test Sample

The GridPlus, Inc. Lattice1, Equipment Under Test (EUT), is an anti-tamper consumer electronic security device which is used for verifying and signing cryptographic messages usually related to blockchains. While waiting for either an external signature request or locally initiated request (via onboard screen input) the device generally sits idle. The device saves signing privileges on an internal flash chip, checks signing requests against those privileges, and then uses a smart card chip for signing the requested message. The Lattice1 can receive requests via WiFi, ZigBee, Ethernet, or the touch screen interface. The Lattice1 is intended to be used by consumers in residences as well as IT and finance professionals in an office building.

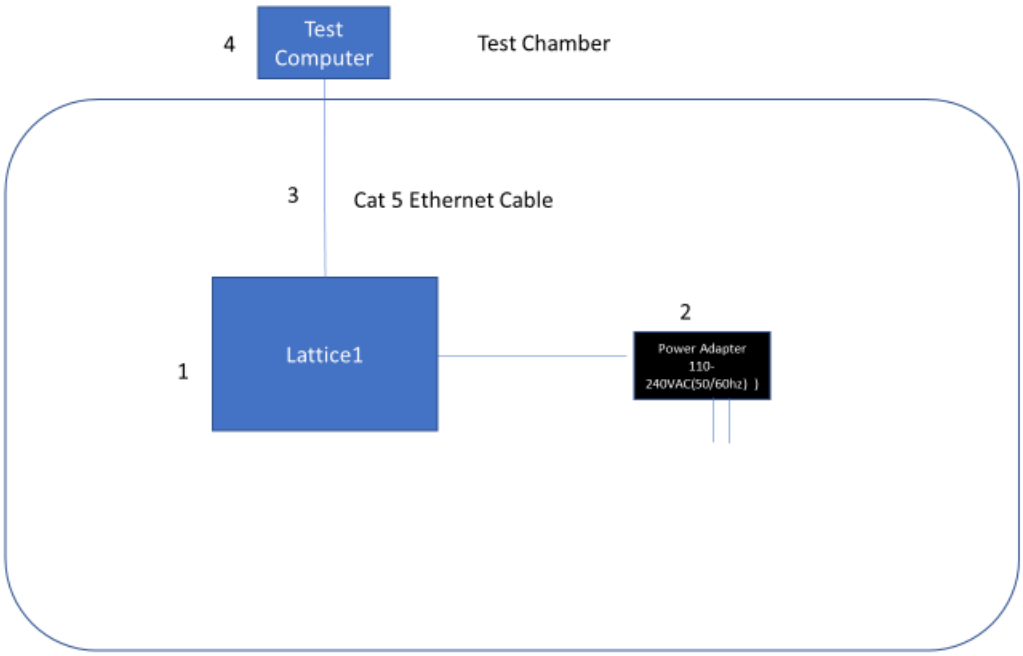


Figure 1. Block Diagram of Test Configuration

F. 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	Slot #	Name / Description	Model Number	Serial Number	Revision
1	Lattice1	GridPlus Inc.	GPLattice100		

Table 5. Equipment Configuration

G. 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
2	110-240VAC (50/60hz) Power Adapter	Shenzhen Teng Da Xing Electronic Co., Ltd	NA	
3	Cat5 Ethernet Cord	Ningbo Lucktech Electronics Co.,Ltd	TDK1201000	
4	Test Computer	HP	N/A	
The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.				

Table 6. Support Equipment

H. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	AC Input	2m AC/DC power adapter	1	2	2	No	
2	Ethernet Port	2m Ethernet Cable	1	2	2	No	

Table 7. Ports and Cabling Information

I. Mode of Operation

Operation Test Mode – The Lattice1 will monitor both the WiFi, ZigBee, and Ethernet for requests. The Lattice1 will internally generate events emulating both external requests and direct user interactions once every 10 seconds. These events will cause the Lattice1 to behave in a manner similar to if the requests were received via user interaction. The requests will include processes which cause all of the subsystems to be exercised as if a user event was received, including the SPI buses, internal memory, the user interface, the smart card interface, the graphics processor, the Linux environment, the ethernet interface, and the SD card. This is level of event generation is 100 times more frequent than typical operation by a user.

Radio Test Mode – The Lattice1 will operate normally except for the operation of the WiFi and ZigBee interfaces. The radios will be controllable via the ethernet connection and an external computer. All channels, power levels, frequency and modulation will be set by the external computer.

J. Method of Monitoring EUT Operation

The Lattice1 will be in Operation test mode when:

1. The screen changes without user interaction approximately once every 10 seconds.

The Lattice1 will be in Radio Test Mode when:

1. The WiFi test tool is running on connected computer and responsive to inputs.

The ZigBee test tool is running on connected computer and responsive to inputs.

K. 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.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to GridPlus, Inc. 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 utilizes an etched PCB antenna, which is to be considered permanently attached to the EUT.

Test Engineer(s): Jonathan Tavira

Test Date(s): July 16, 2019

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 Ω 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- 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

Table 8. 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 Results: The EUT was compliant with this requirement. Emissions were below applicable limits.

Test Engineer(s): Jonathan Tavira

Test Date(s): 8/26/19

Sample Calculation:

Rr – S = M

where:

Rr = Receiver Reading in dBµV
S = Specification Limit in dBµV
M = Margin to Specification in +/- dB

Sample formula for calculating the Corrected Data for the Conducted Emissions Measurements:

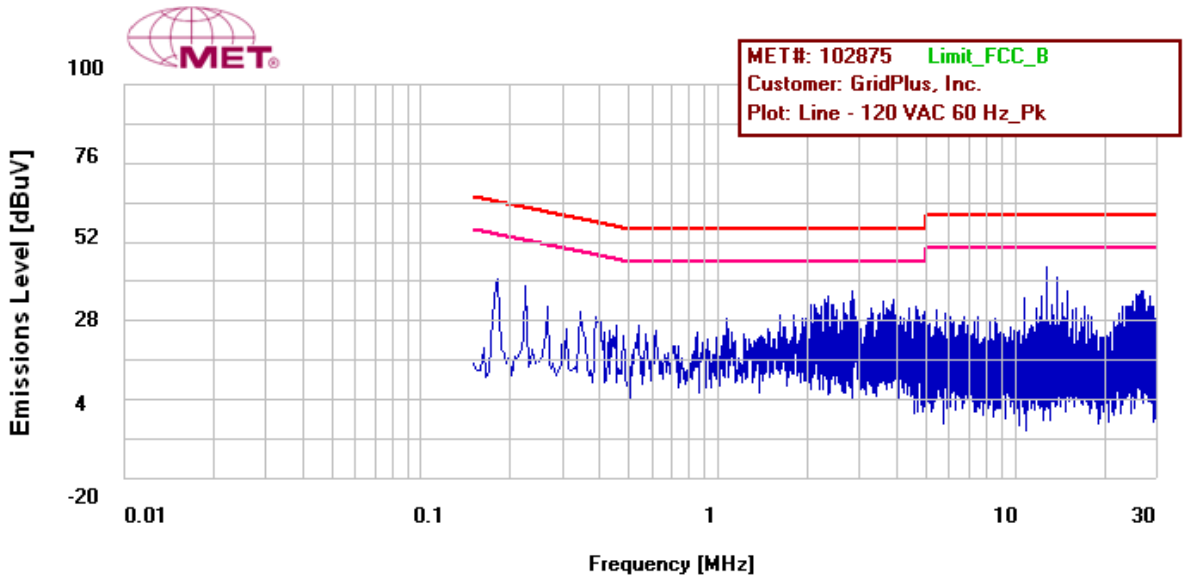
Line	Freq (MHz)	Uncorrected QP** Amplitude (dBµV)	LISN IL (dB)	CBL (dB)	Corrected QP** Amplitude (dBµV)	QP** Limit (dBµV)	Delta (dB)	Results
XYZ	0.18	42.65	10	0.58	53.23	79	-25.77	Pass

*Corrected QP** Amplitude (dBµV) = Uncorrected Amplitude (dBµV) +LISN IL (dB) + CBL (dB)=42.65+10+0.58=53.23*
*** Same Calculation applies to Corrected Avg. amplitude as well.*

15.207(a) Conducted Emissions Test Results

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Result	Average Amplitude	Average Limit	Delta	Result
Line - 120VAC 60Hz	4.478	29.04	56	-26.96	Pass	15.6	46	-30.4	Pass
Line - 120VAC 60Hz	12.902	43.94	60	-16.06	Pass	37.47	50	-12.53	Pass
Line - 120VAC 60Hz	13.978	41.51	60	-18.49	Pass	37.39	50	-12.61	Pass
Line - 120VAC 60Hz	0.182	39.98	64.398	-24.418	Pass	21.47	54.398	-32.928	Pass
Line - 120VAC 60Hz	0.226	36.45	62.605	-26.155	Pass	20.08	52.605	-32.525	Pass
Line - 120VAC 60Hz	15.054	38.71	60	-21.29	Pass	36.13	50	-13.87	Pass

Table 9. Conducted Emissions, 15.207(a), Phase Line, Test Results

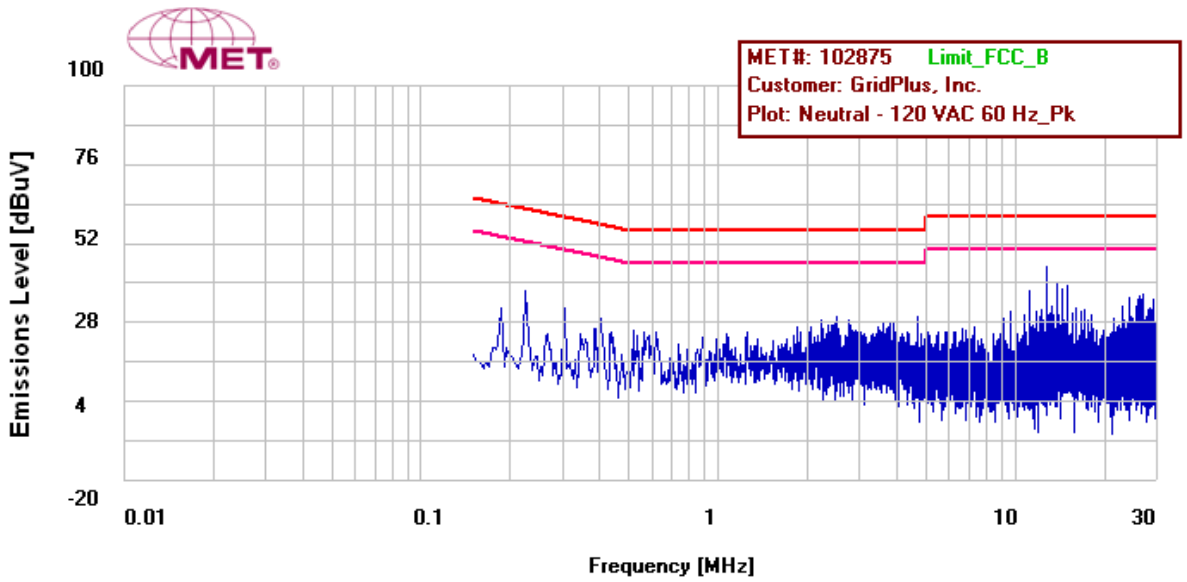


Plot 1. Conducted Emissions, 15.207(a), Phase Line

15.207(a) Conducted Emissions Test Results

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Result	Average Amplitude	Average Limit	Delta	Result
Neutral - 120VAC 60Hz	12.906	43.75	60	-16.25	Pass	36.29	50	-13.71	Pass
Neutral - 120VAC 60Hz	13.982	41.15	60	-18.85	Pass	35.72	50	-14.28	Pass
Neutral - 120VAC 60Hz	15.054	39.49	60	-20.51	Pass	37.02	50	-12.98	Pass
Neutral - 120VAC 60Hz	14.514	40.03	60	-19.97	Pass	35.05	50	-14.95	Pass
Neutral - 120VAC 60Hz	0.226	36.31	62.605	-26.295	Pass	21.26	52.605	-31.345	Pass
Neutral - 120VAC 60Hz	11.290	37.95	60	-22.05	Pass	30.82	50	-19.18	Pass

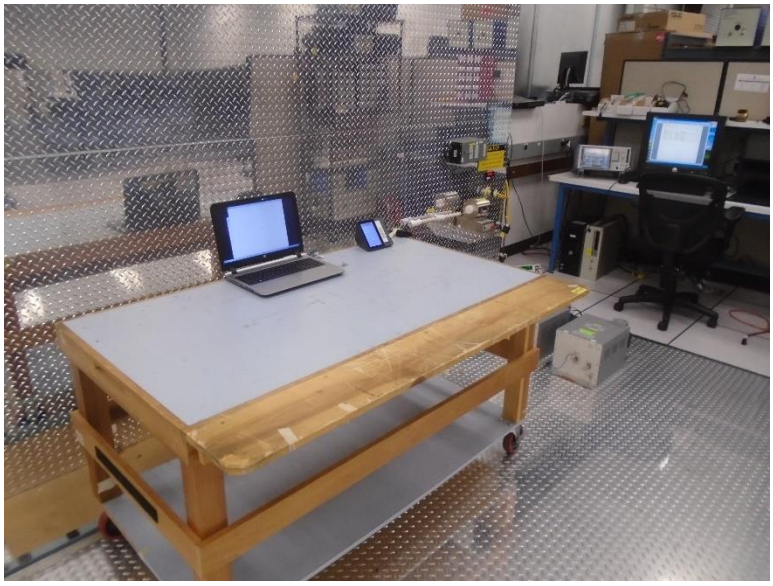
Table 10. Conducted Emissions, 15.207(a), Neutral Line, Test Results



Plot 2. Conducted Emissions, 15.207(a), Neutral Line

15.207(a) Conducted Emissions Test Setup Photo

Photograph 1. Conducted Emissions, 15.207(a), Test Setup, Rear View



Photograph 2. Conducted Emissions, 15.207(a), Test Setup, Front View

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 EUT was connected to a spectrum analyzer through a cable and an attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels for all its bandwidths. The 6 dB bandwidth was measured according to measurement method 11.8.2 Option 2 of ANSI C63.10-2013.

Test Results The EUT was compliant with § 15.247 (a)(2).

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

Test Engineer(s): Jonathan Tavira

Test Date(s): 7/15/19

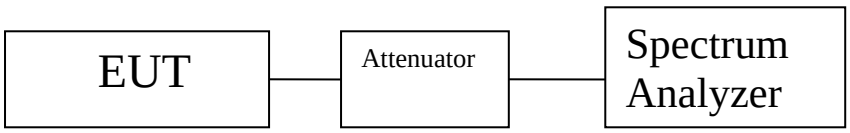


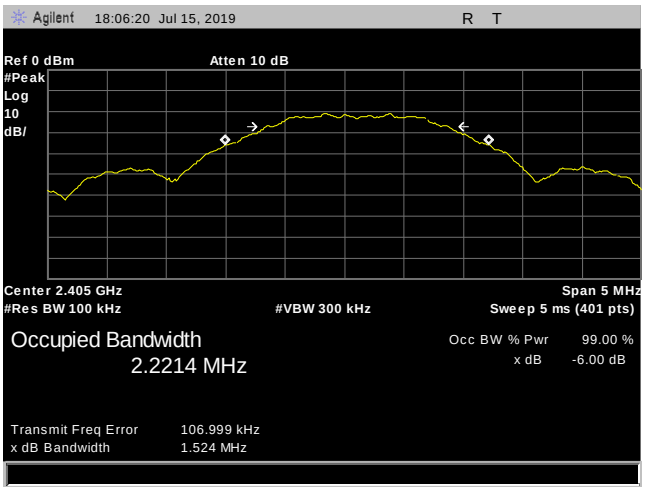
Figure 2. Block Diagram, Occupied Bandwidth Test Setup

Occupied Bandwidth Test Results

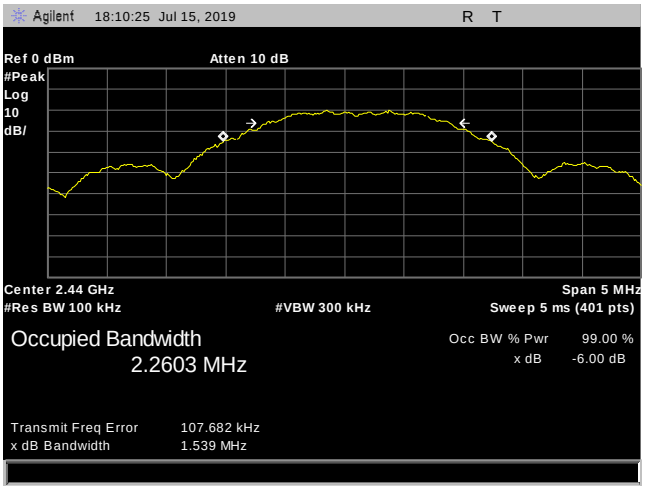
Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Low	2405	1.524
Mid	2440	1.539
High	2480	1.577

Table 11. 6 dB Occupied Bandwidth, Test Results

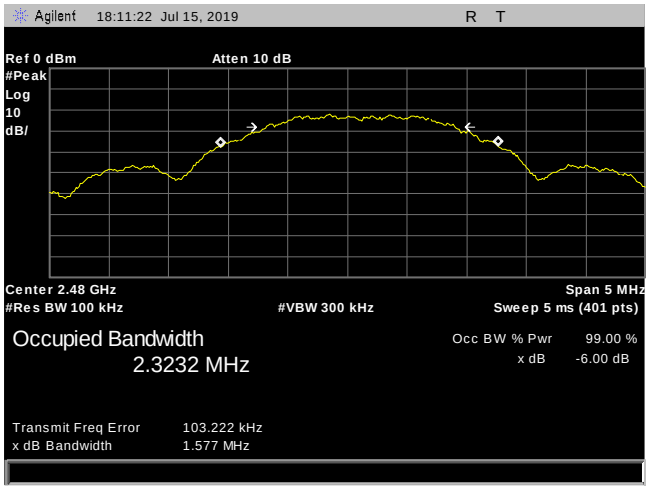
6 dB Occupied Bandwidth Test Results



Plot 3. 6 dB Occupied Bandwidth, 2405 MHz, 1.524 MHz



Plot 4. 6 dB Occupied Bandwidth, 2440 MHz, 1.539 MHz



Plot 5. 6 dB Occupied Bandwidth, 2480 MHz, 1.577 MHz

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)
2400–2483.5	1.000

Table 12. 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 9, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Procedure: The EUT was connected to a spectrum analyzer through a cable and an attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels for all its bandwidths at maximum power. Power was measured according to measurement method of maximum peak conducted output power, as described in ANSI C63.10-2013, section 11.9.1.2. Attenuator and cable loss were programmed into the spectrum analyzer.

Test Results: The EUT was compliant with the Peak Power Output limits of **§15.247(b)**.

Test Engineer(s): Jonathan Tavira

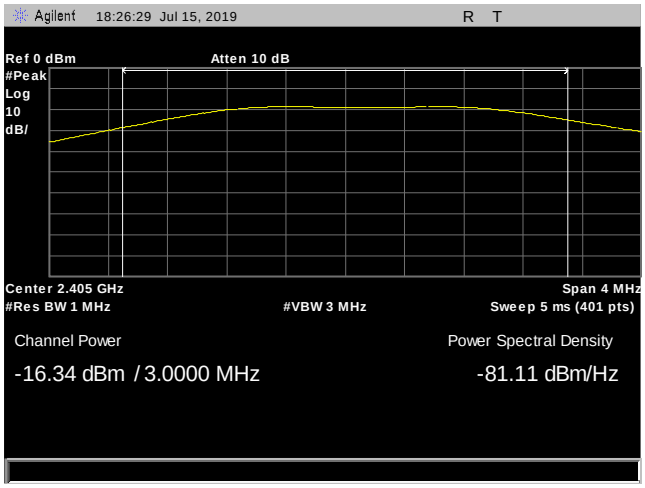
Test Date(s): 7/15/19

Peak Power Output Test Results

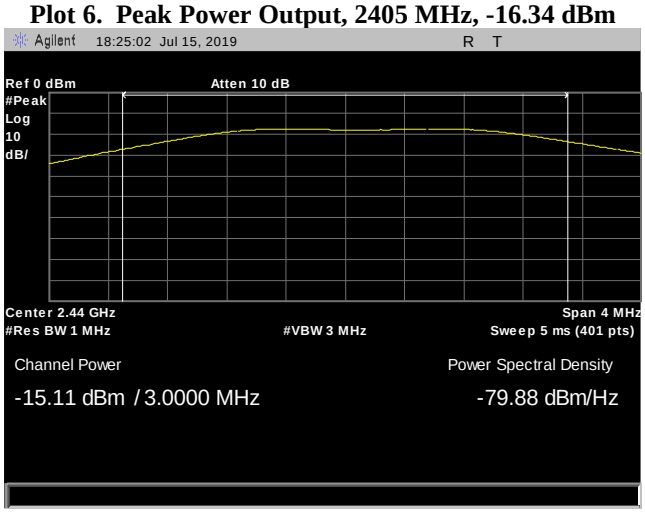
Carrier Channel	Frequency (MHz)	Peak Output Power (dBm)
Low	2405	-16.43
Mid	2440	-15.11
High	2480	-16.43

Table 13. Peak Power Output, Test Results

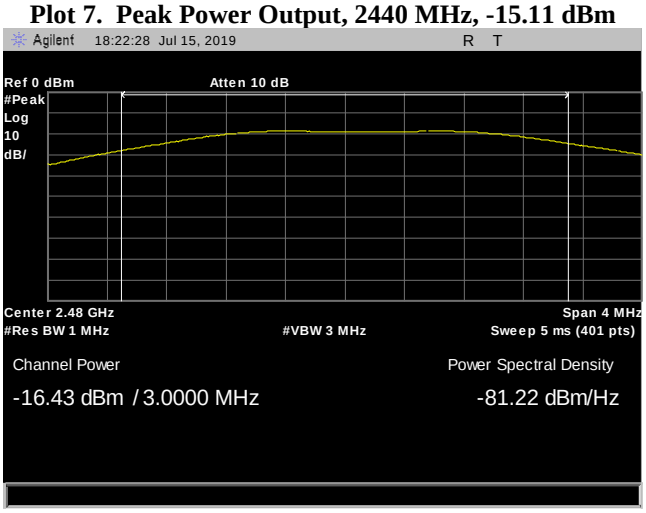
Peak Power Output Test Results



Plot 6. Peak Power Output, 2405 MHz, -16.34 dBm



Plot 7. Peak Power Output, 2440 MHz, -15.11 dBm



Plot 8. Peak Power Output, 2480 MHz, -16.43 dBm

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.209 Radiated Spurious Emissions Requirements and Band Edge

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

§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 14. 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 15.

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 15. 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. A band-reject filter was used to attenuate the fundamental frequency in order to avoid reflections in the pre-amplifier.

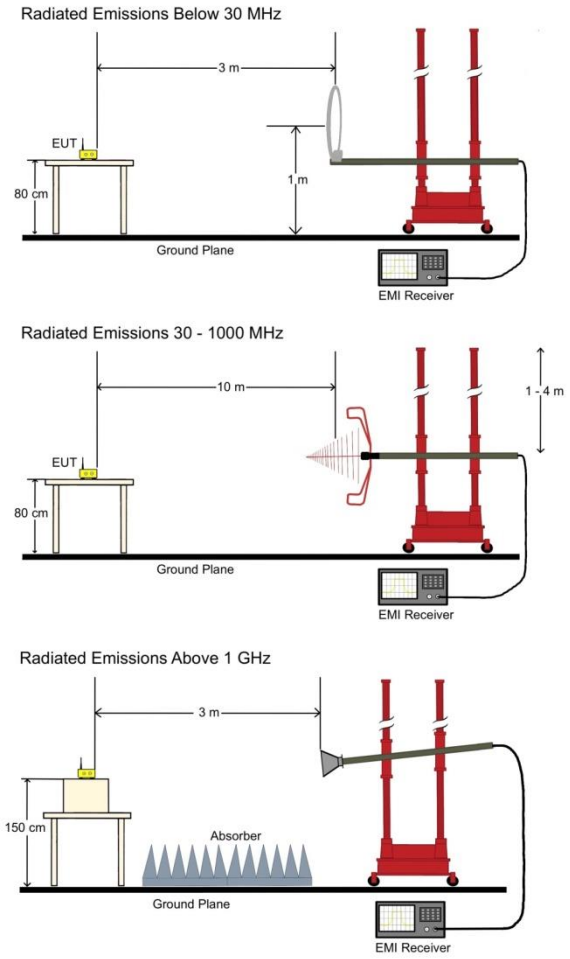


Figure 3. Radiated Emissions Test Setup

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d) and § 15.209**. Emissions were within applicable limits.

Test Engineer(s): Jonathan Tavira

Test Date(s): 7/10/2019

Sample Calculation for Distance Correction factor (DCF) measurement:

$F_d = 20*LOG_{10}(D_m/D_s)$

where:

F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

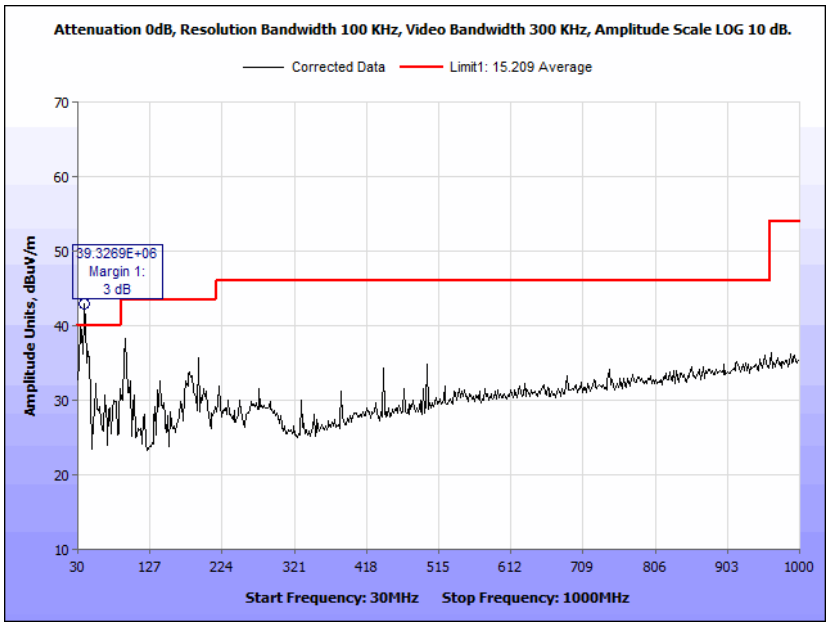
Sample formula for calculating the Corrected Data for the Radiated Emissions Measurements:

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV/m)	ACF (dB/m) (+)	Pre Amp Gain + CBL (dB)(-)	DCF (dB) (+)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
249.99	V	359.9	240.7	55.46	11.4	28.335	10.46	***38.525***	47	-8.475

*Corrected Amplitude (dBµV/m) = Uncorrected Amplitude (dBµV/m) +ACF (dB/m) – (Preamp Gain (dB) + CBL (dB) +DCF (dB) ** = 55.46 + 11.4 – 28.355 + 10.46 =* ***38.525***

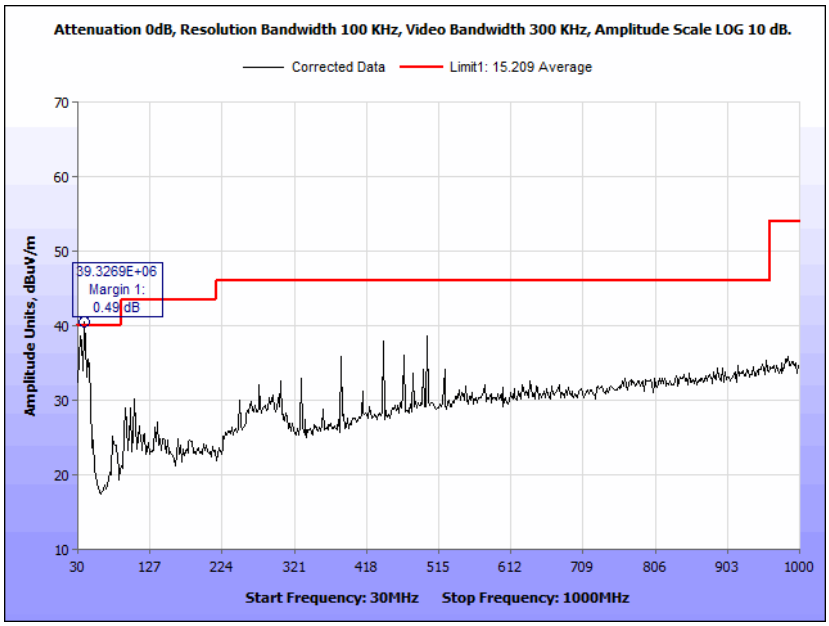
*** DCF Column represents the appropriate correction factor used when the measurement distance differs from the specification distance.*

Radiated Spurious Emissions, Test Results



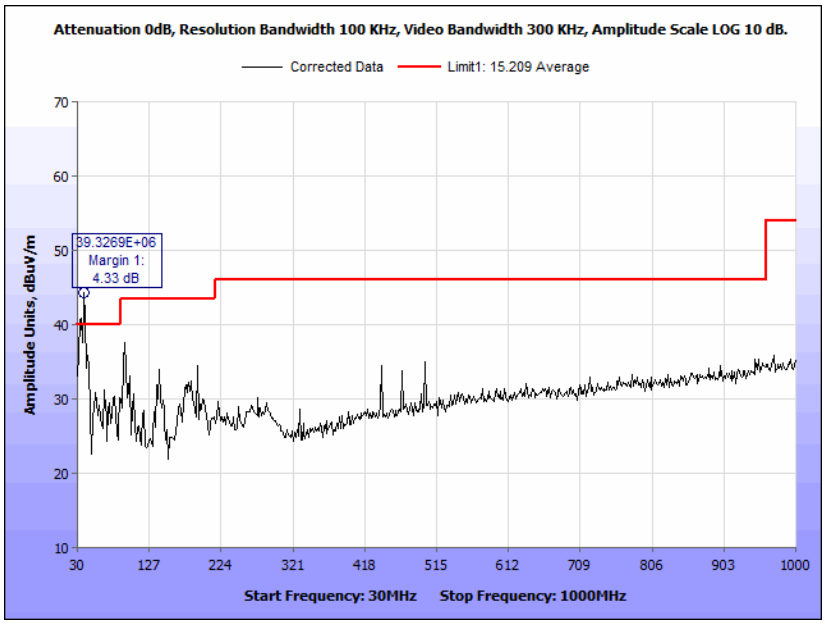
*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

Plot 9. Radiated Emissions, 2405 MHz, 30 – 1000 MHz, Vertical



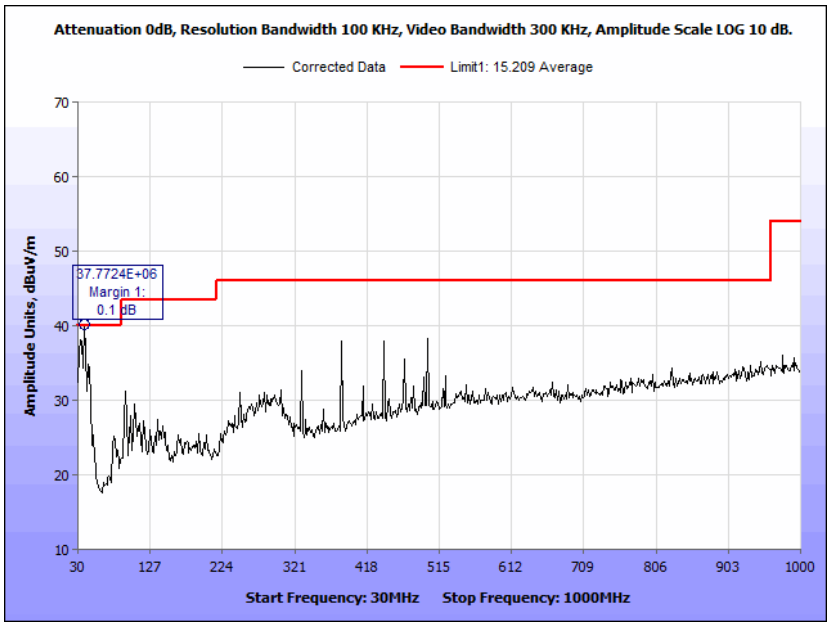
*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

Plot 10. Radiated Emissions, 2405 MHz, 30 – 1000 MHz, Horizontal



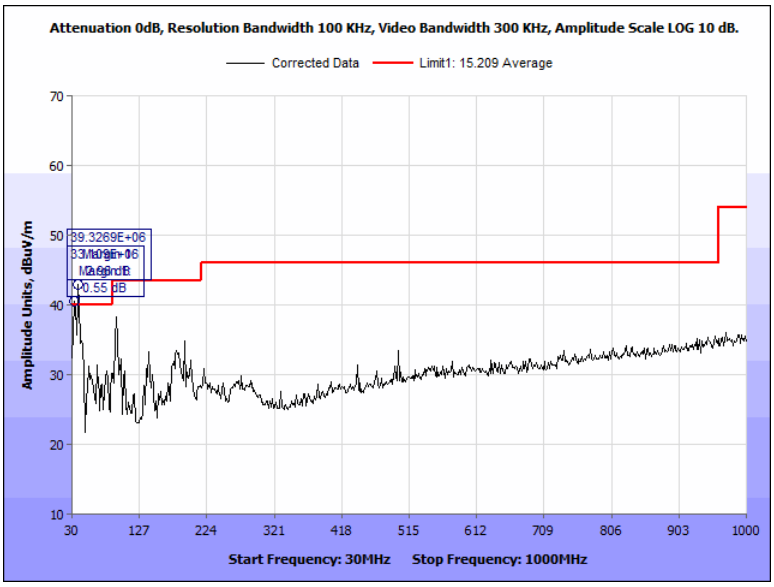
*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

Plot 11. Radiated Emissions, 2440 MHz, 30 – 1000 MHz, Vertical



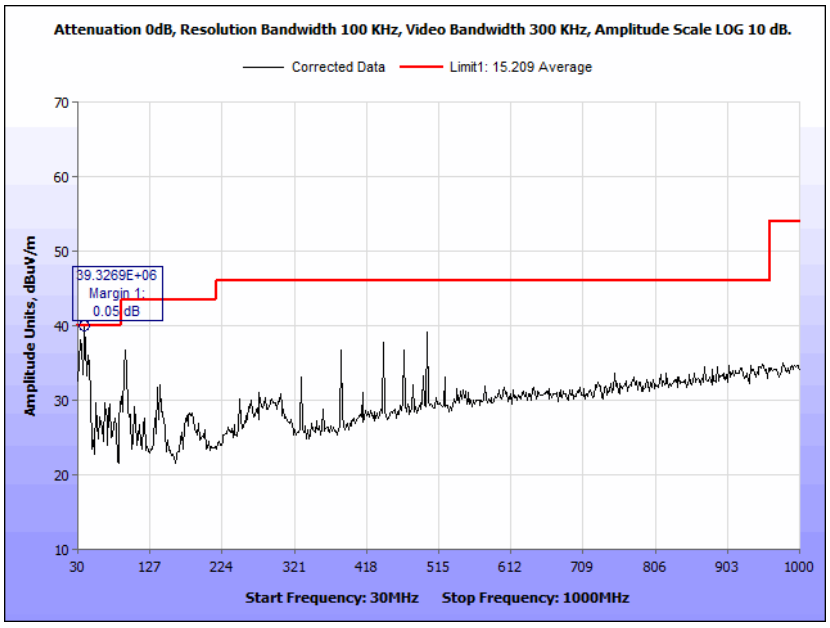
*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

Plot 12. Radiated Emissions, 2440 MHz, 30 – 1000 MHz, Horizontal



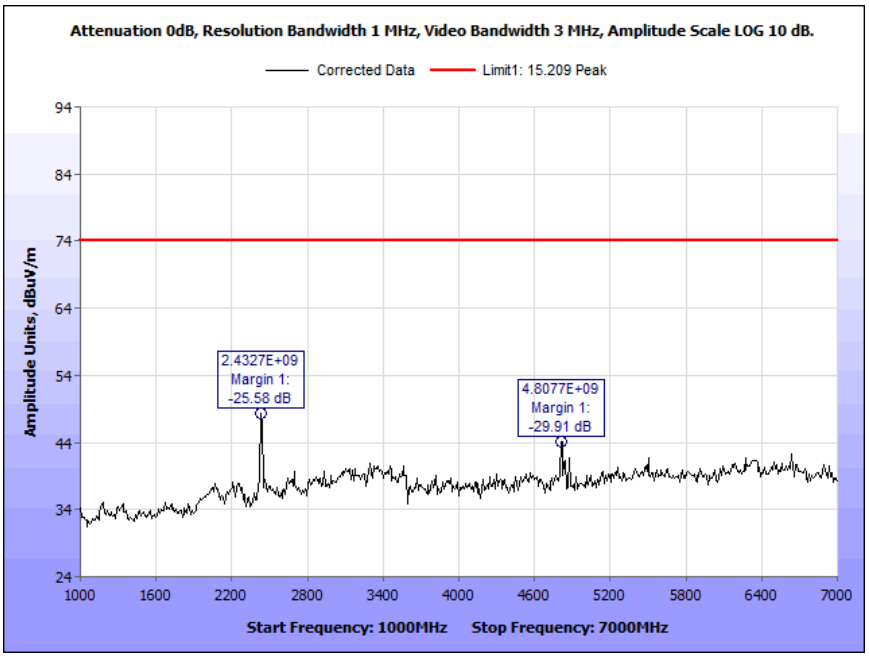
*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

Plot 13. Radiated Emissions, 2480 MHz, 30 – 1000 MHz, Vertical

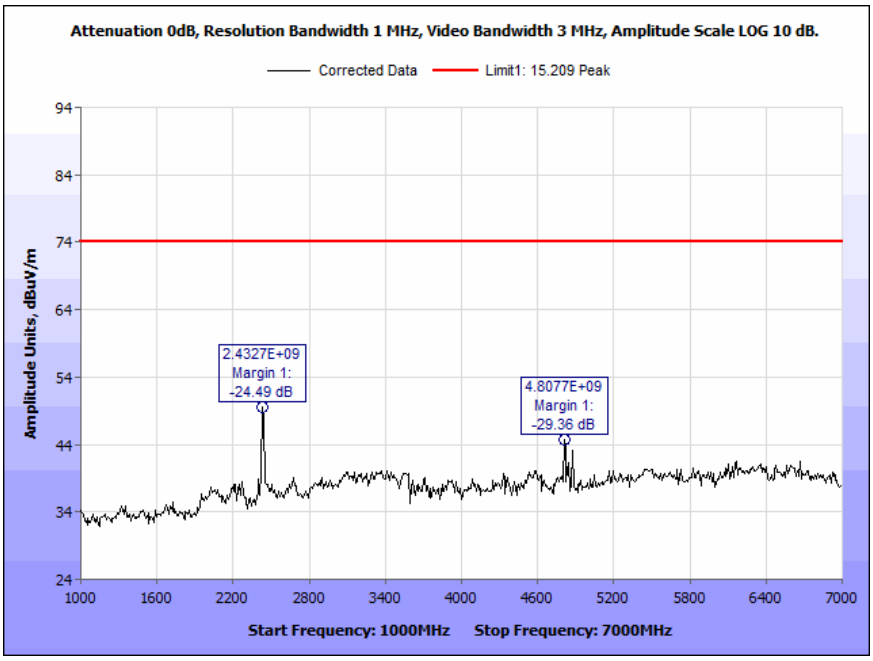


*Note: Peak Emissions that appear over the 15.209 spurious limits were determined to be sourced from digital devices unrelated to the transmitter

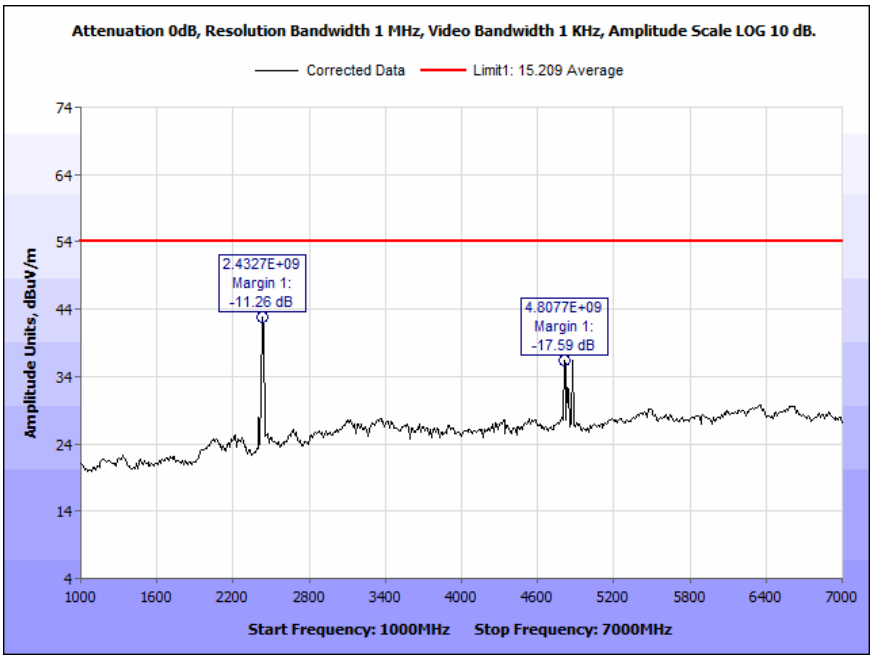
Plot 14. Radiated Emissions, 2480 MHz, 30 – 1000 MHz, Horizontal



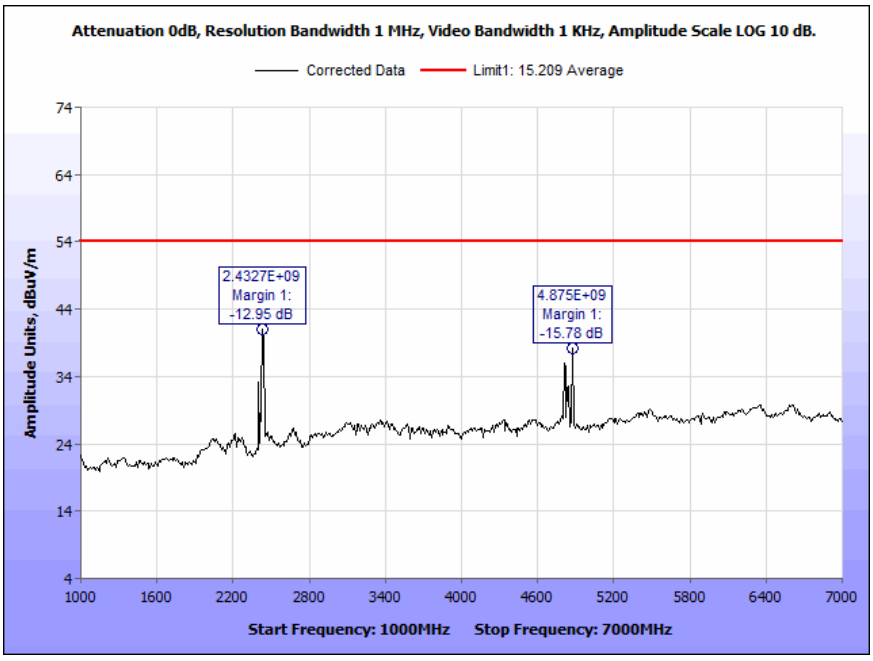
Plot 15. Radiated Emissions, 2405 MHz, 1 – 7 GHz, Peak, Vertical



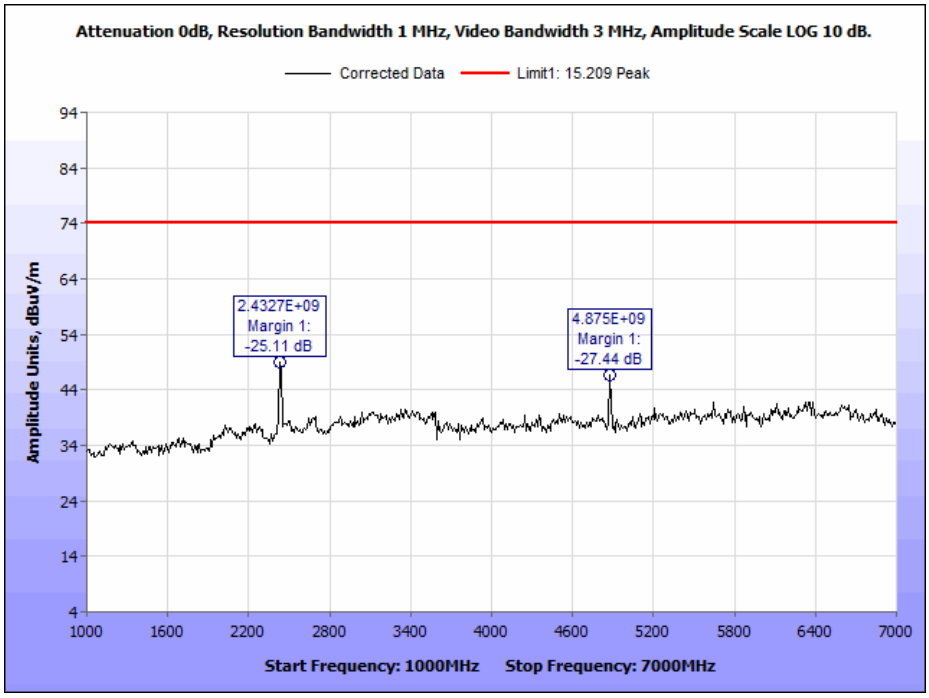
Plot 16. Radiated Emissions, 2405 MHz, 1 – 7 GHz, Peak, Horizontal



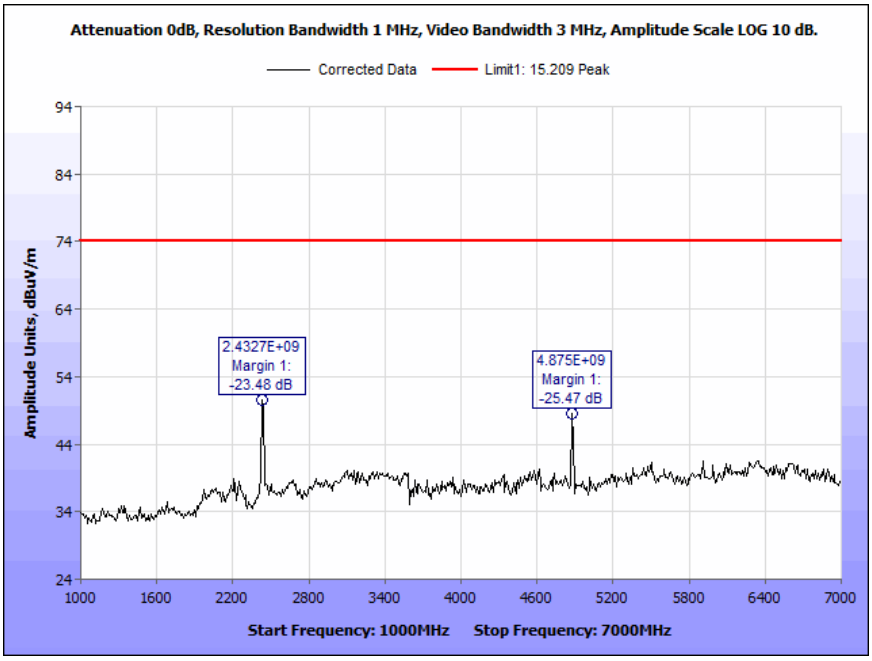
Plot 17. Radiated Emissions, 2405 MHz, 1 – 7 GHz, Average, Vertical



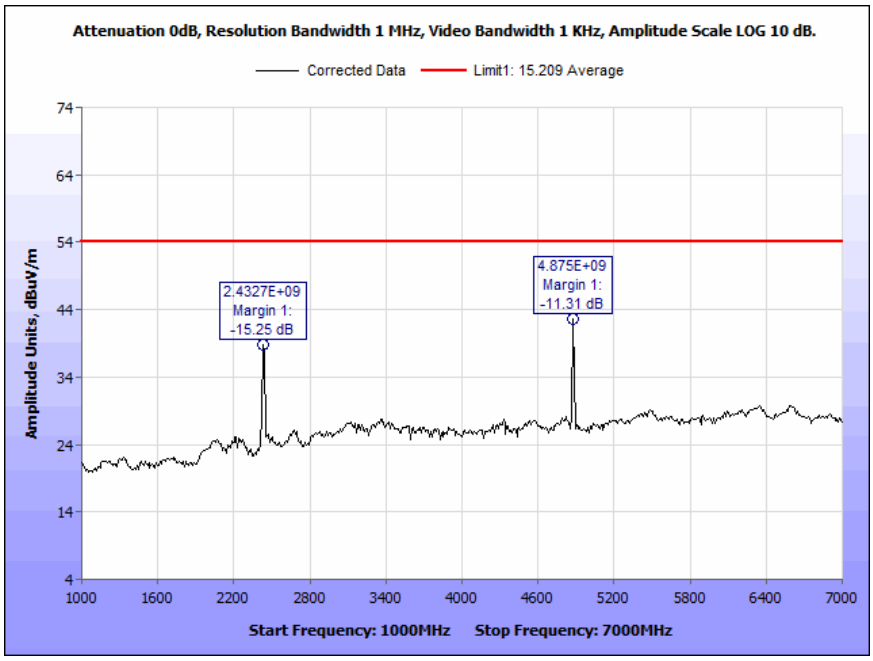
Plot 18. Radiated Emissions, 2405 MHz, 1 – 7 GHz, Average, Horizontal



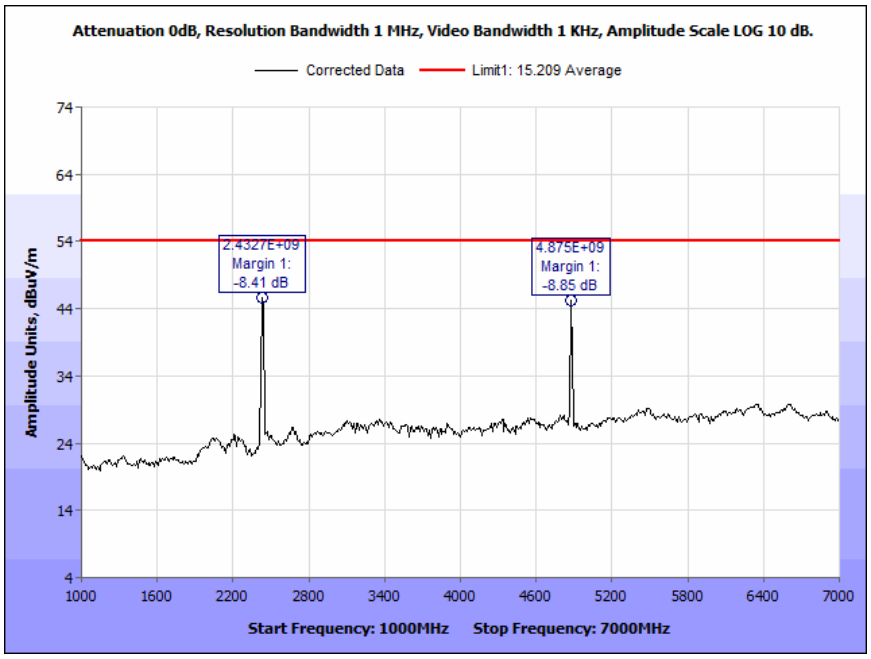
Plot 19. Radiated Emissions, 2440 MHz, 1 – 7 GHz, Peak, Vertical



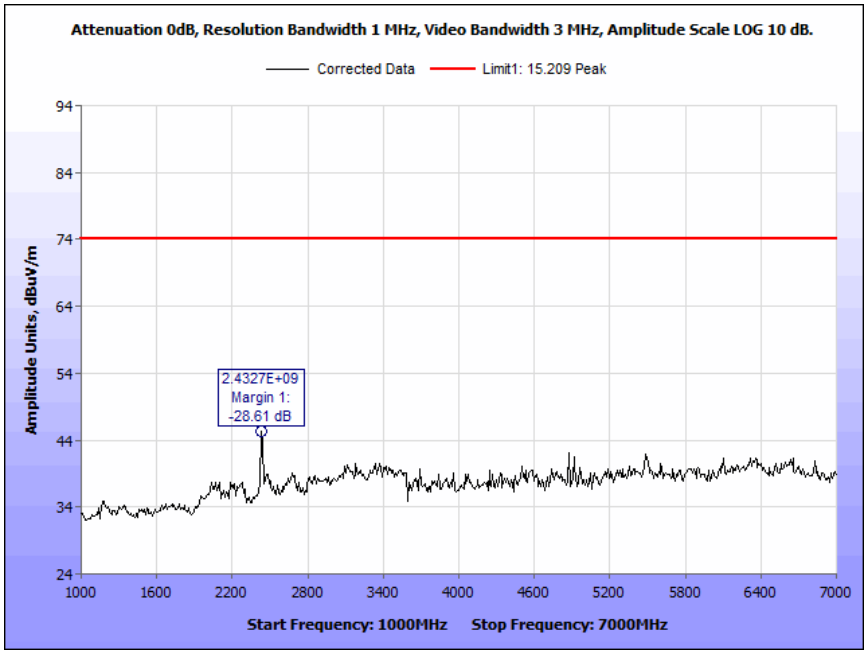
Plot 20. Radiated Emissions, 2440 MHz, 1 – 7 GHz, Peak, Horizontal



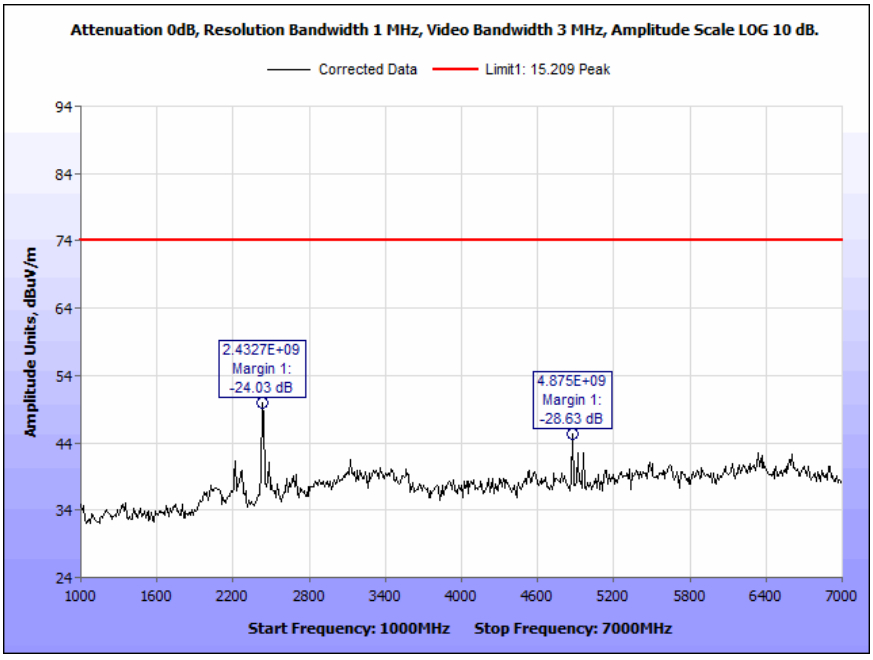
Plot 21. Radiated Emissions, 2440 MHz, 1 – 7 GHz, Average, Vertical



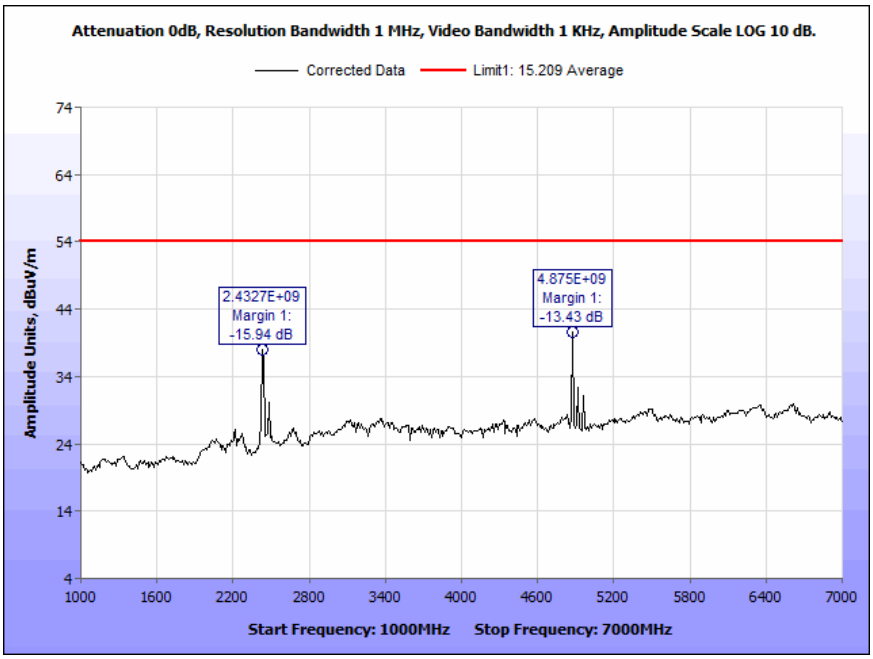
Plot 22. Radiated Emissions, 2440 MHz, 1 – 7 GHz, Average, Horizontal



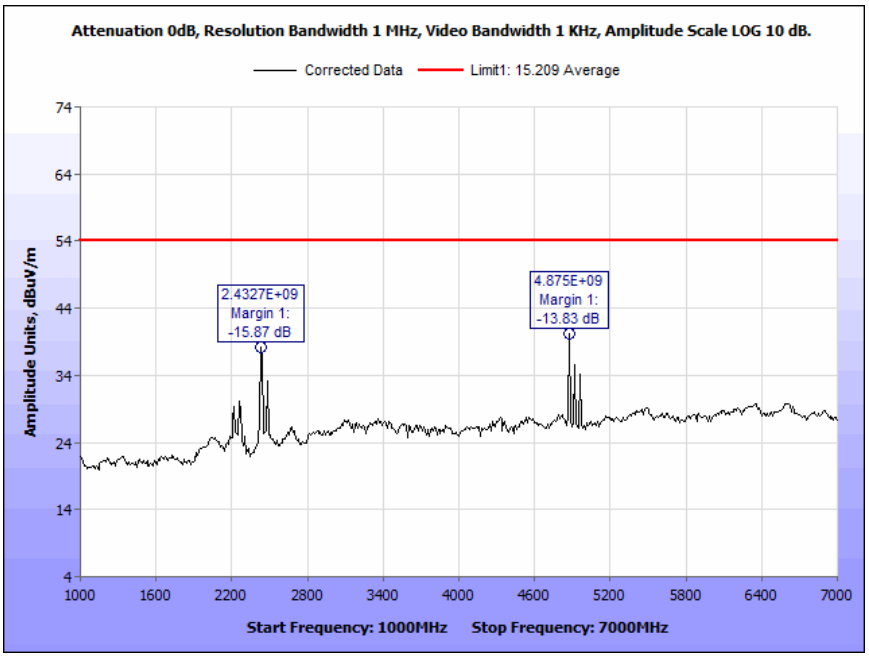
Plot 23. Radiated Emissions, 2480 MHz, 1 – 7 GHz, Peak, Vertical



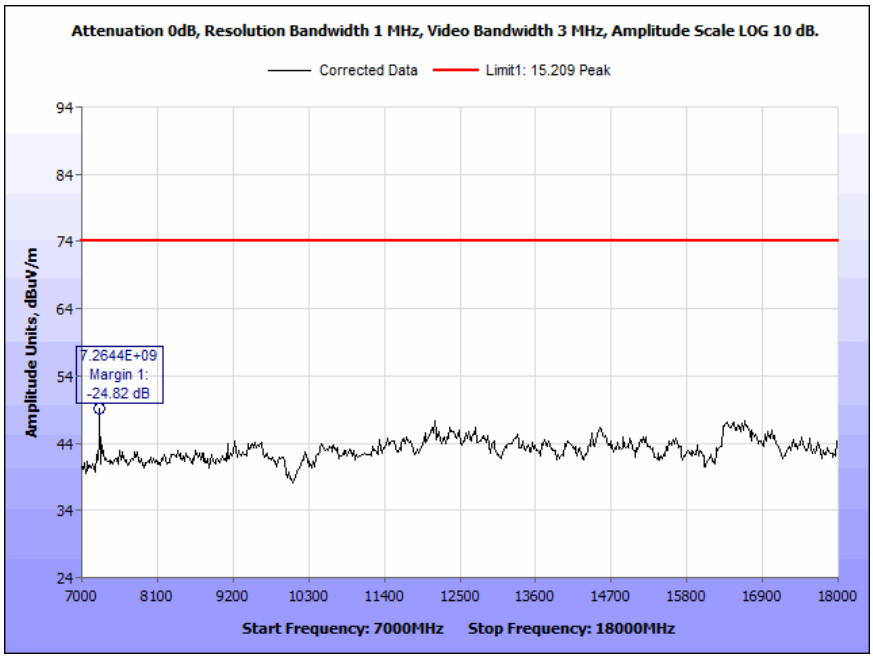
Plot 24. Radiated Emissions, 2480 MHz, 1 – 7 GHz, Peak, Horizontal



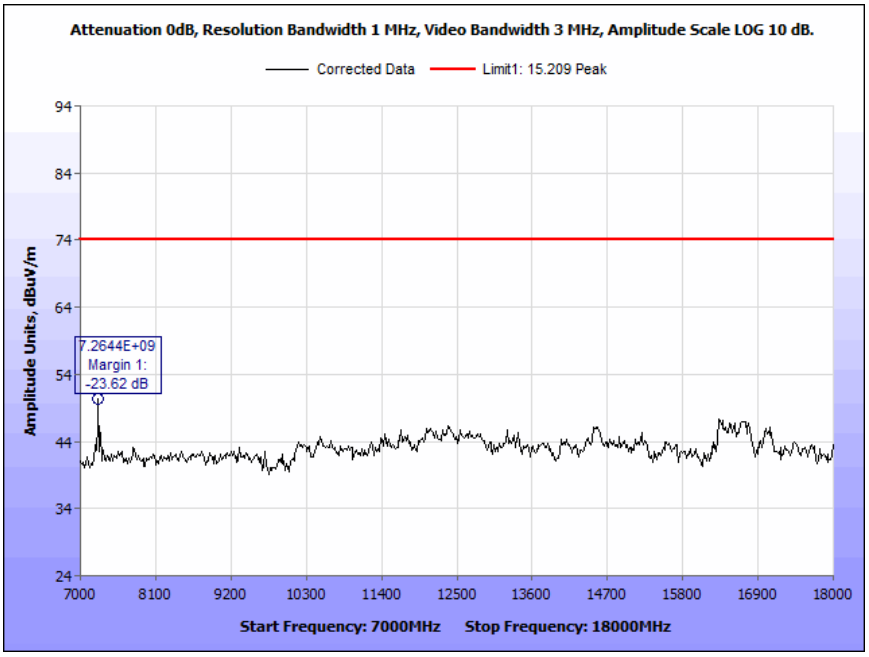
Plot 25. Radiated Emissions, 2480 MHz, 1 – 7 GHz, Average, Vertical



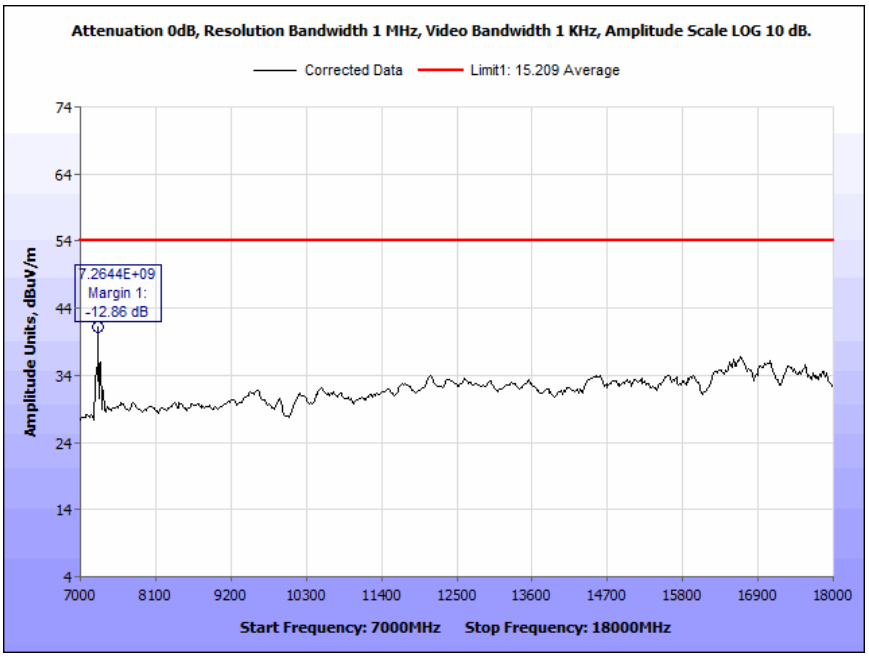
Plot 26. Radiated Emissions, 2480 MHz, 1 – 7 GHz, Average, Horizontal



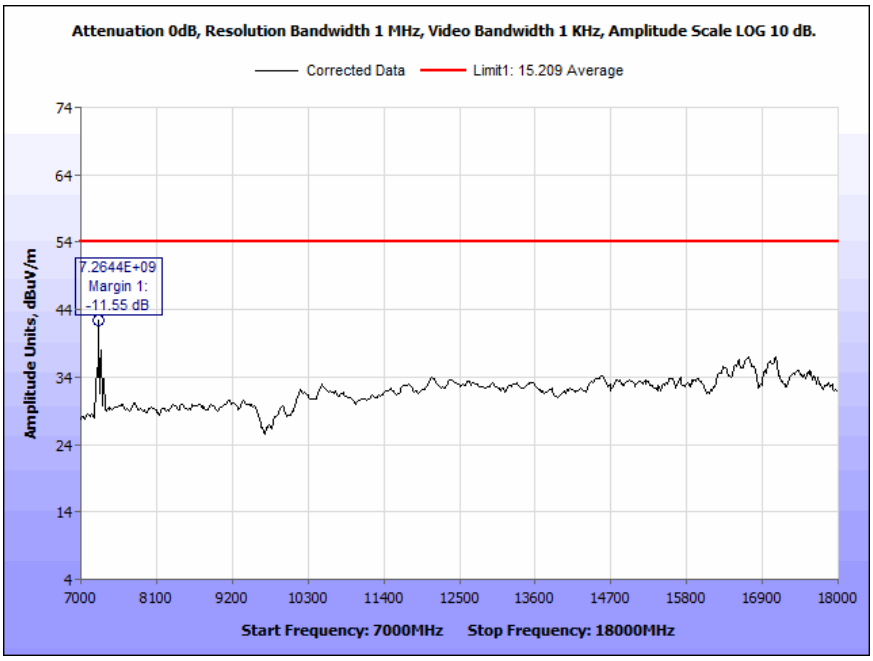
Plot 27. Radiated Emissions, 2405 MHz, 7 - 18 GHz, Peak, Vertical



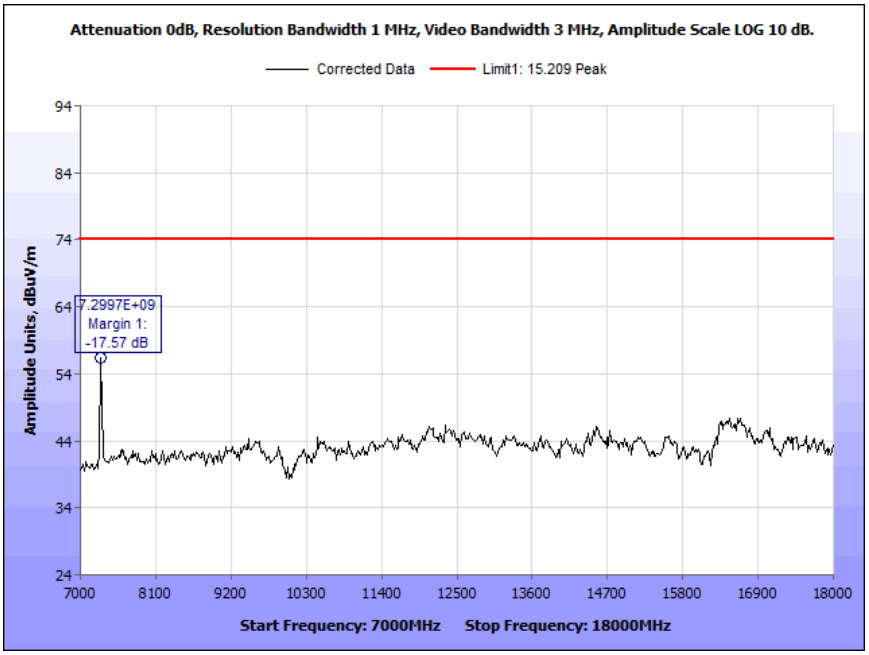
Plot 28. Radiated Emissions, 2405 MHz, 7 - 18 GHz, Peak, Horizontal



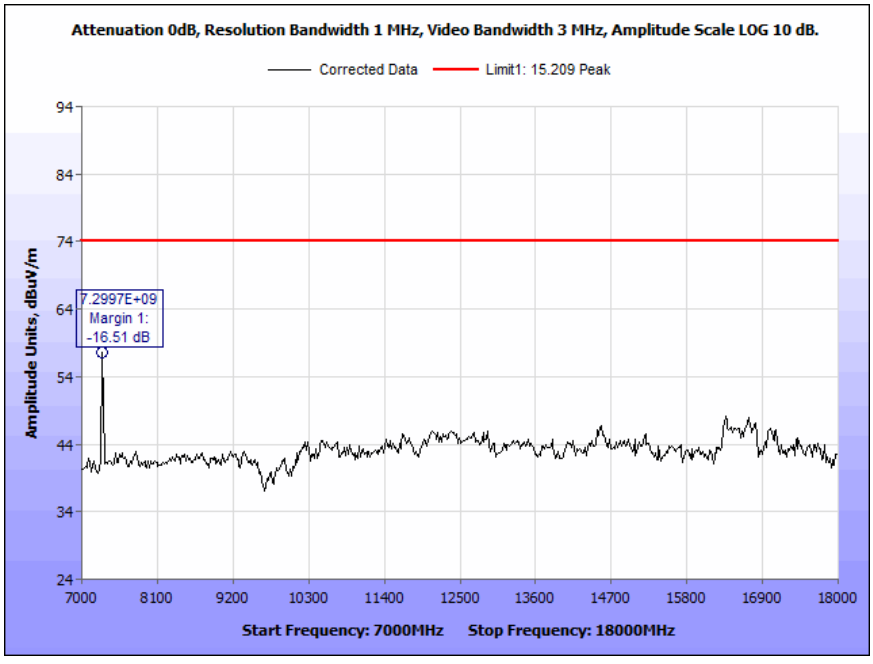
Plot 29. Radiated Emissions, 2405 MHz, 7 - 18 GHz, Average, Vertical



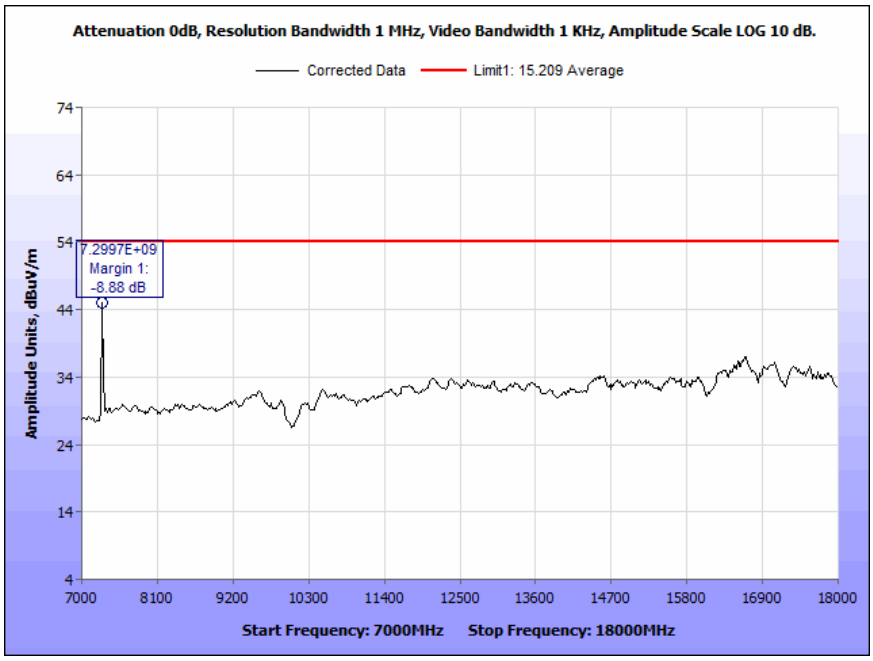
Plot 30. Radiated Emissions, 2405 MHz, 7 - 18 GHz, Average, Horizontal



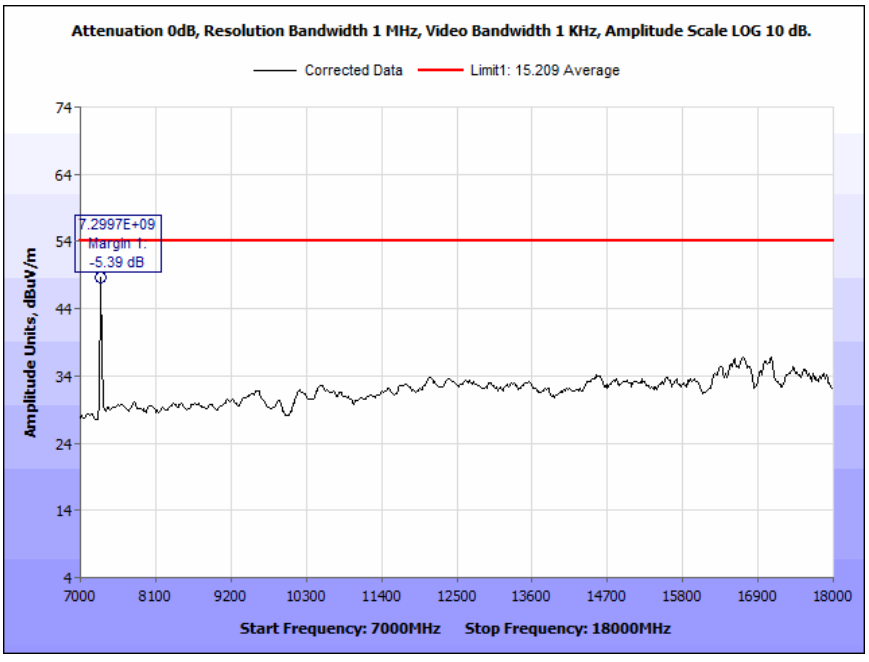
Plot 31. Radiated Emissions, 2440 MHz, 7 - 18 GHz, Peak, Vertical



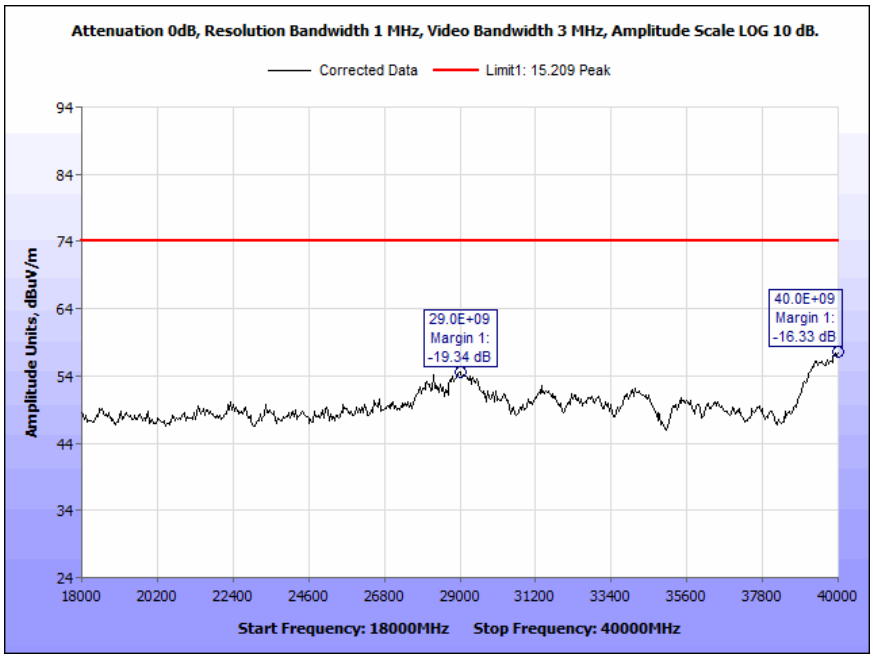
Plot 32. Radiated Emissions, 2440 MHz, 7 – 18 GHz, Peak, Horizontal



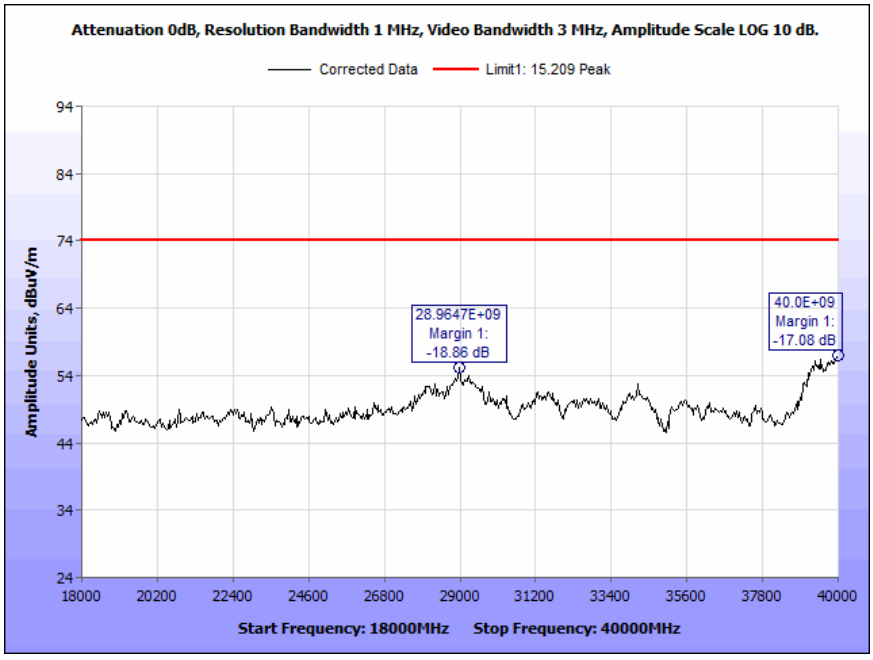
Plot 33. Radiated Emissions, 2440 MHz, 7 - 18 GHz, Average, Vertical



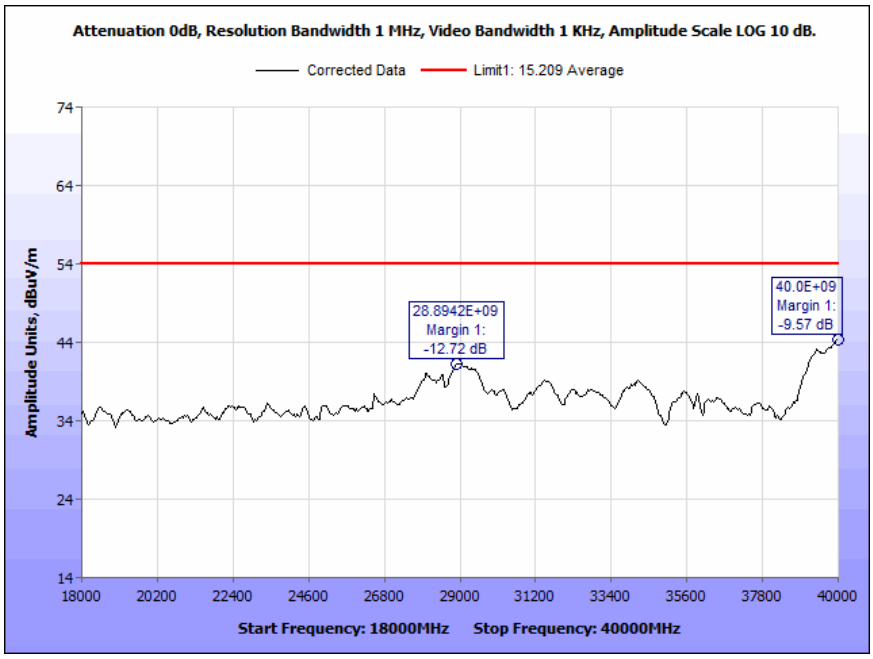
Plot 34. Radiated Emissions, 2440 MHz, 7 - 18 GHz, Average, Horizontal



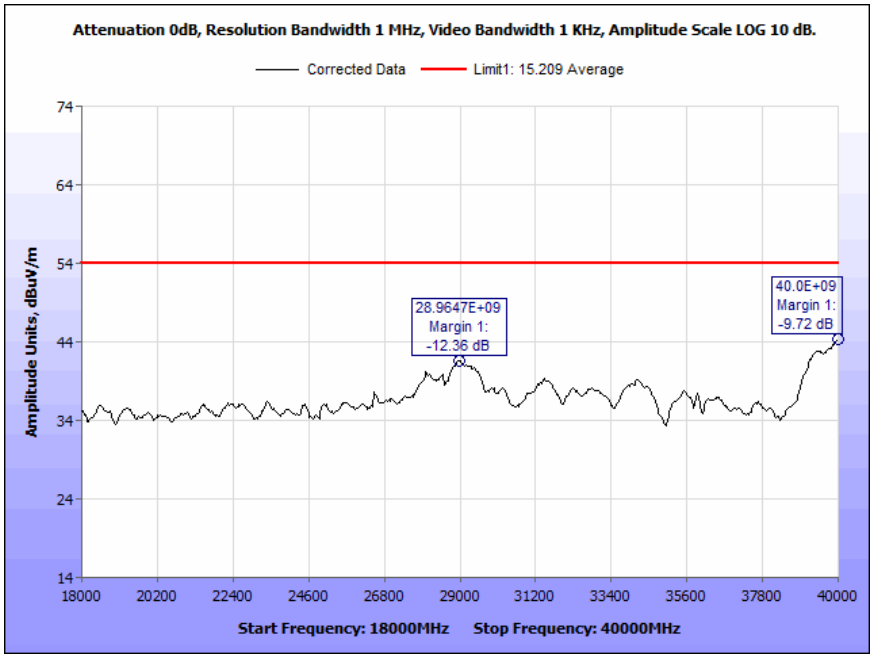
Plot 35. Radiated Emissions, 2440 MHz, 18-40 GHz, Peak , Vertical



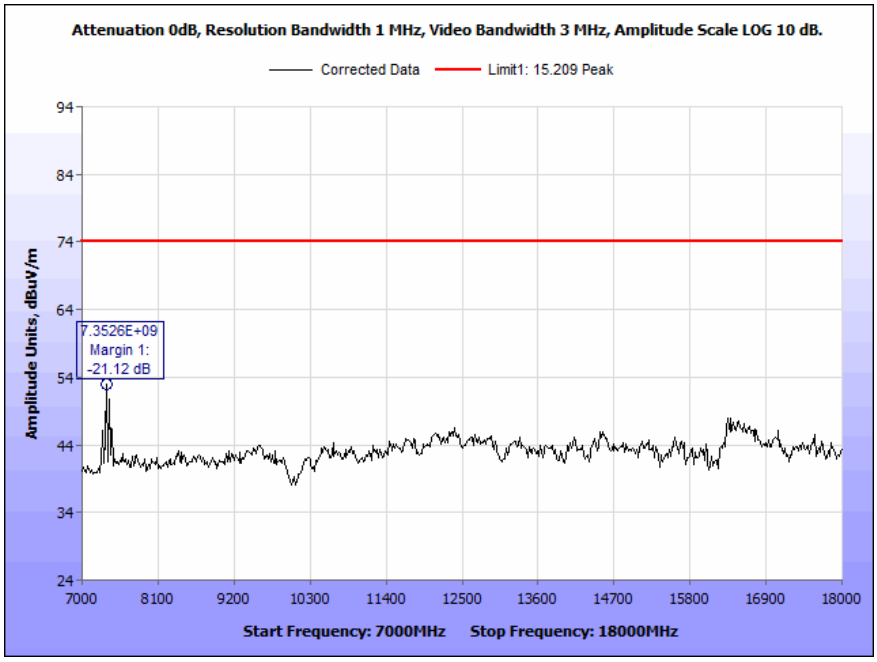
Plot 36. Radiated Emissions, 2440 MHz, 18-40 GHz, Peak , Horizontal



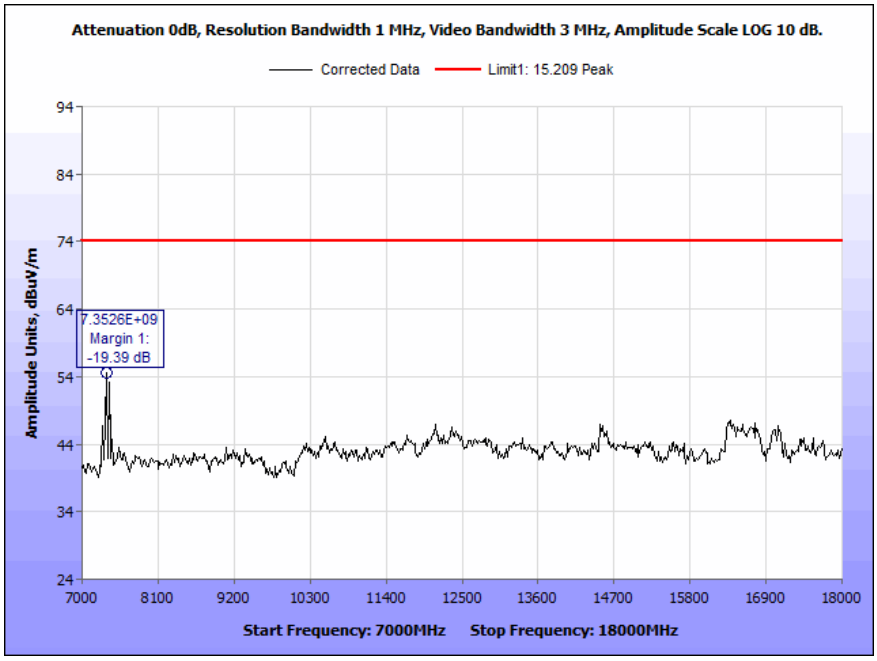
Plot 37. Radiated Emissions, 2440 MHz, 18-40 GHz, Average , Vertical



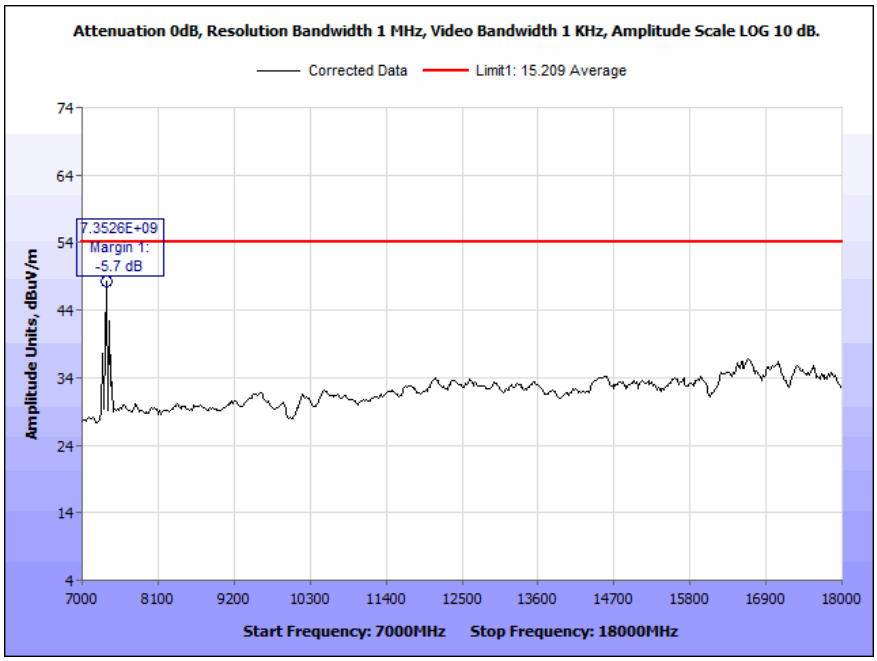
Plot 38. Radiated Emissions, 2440 MHz, 18-40 GHz, Average , Horizontal



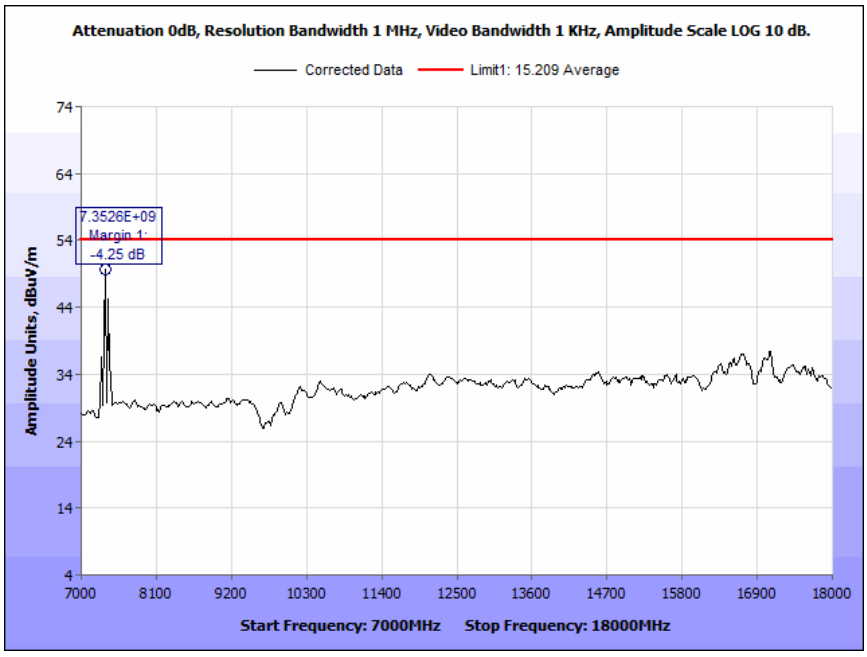
Plot 39. Radiated Emissions, 2480 MHz, 7 - 18 GHz, Peak, Vertical



Plot 40. Radiated Emissions, 2480 MHz, 7 – 18 GHz, Peak, Horizontal



Plot 41. Radiated Emissions, 2480 MHz, 7 – 18 GHz, Average, Vertical



Plot 42. Radiated Emissions, 2480 MHz, 7 – 18 GHz, Average, Horizontal

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
39.3269	180.60	V	1.52	30.30	17.14	-24.52	10.46	33.38	40	-6.62
39.3269	181.20	H	1.52	27.10	17.54	-24.52	10.46	30.58	40	-9.42
39.3269	180.60	V	1.53	29.80	17.14	-24.52	10.46	29.80	40	-10.20
37.7724	180.50	H	1.67	28.00	18.44	-24.58	10.46	32.32	40	-7.68
39.3269	180.50	V	1.52	29.90	17.14	-24.52	10.46	32.98	40	-7.02
33.1090	180.60	V	1.49	22.50	20.17	-24.70	10.46	28.43	40	-11.57
39.3269	180.50	H	1.53	26.40	17.54	-24.52	10.46	29.88	40	-10.12

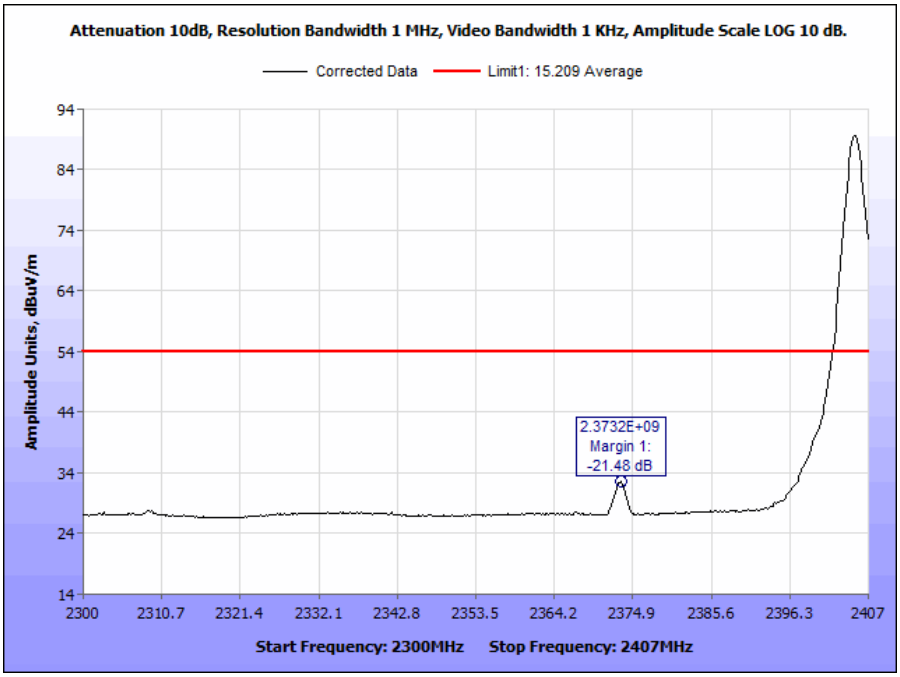
Table 16. Radiated Spurious Emissions, Quasi-Peak Test Results

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2432.700	180.60	H	1.86	48.67	31.98	-35.06	0.00	45.59	54	-8.41
2432.700	180.60	V	1.86	45.95	31.85	-35.06	0.00	42.74	54	-11.26
4875.000	181.20	H	1.86	50.11	33.73	-38.69	0.00	45.15	54	-8.85
7264.400	180.20	V	1.86	45.73	35.43	-40.03	0.00	41.14	54	-12.86
7299.700	180.60	H	1.86	53.30	35.37	-40.05	0.00	48.61	54	-5.39
7352.600	180.60	H	1.86	54.07	35.41	-39.73	0.00	49.75	54	-4.25

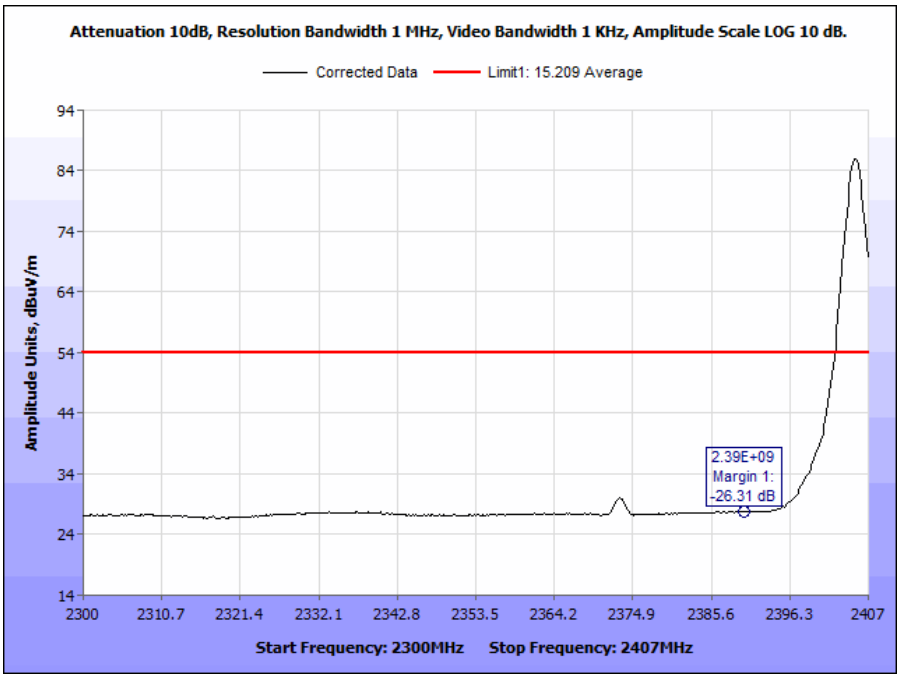
Table 17. Radiated Spurious Emissions, Average Test Results

Radiated Band Edge Measurements

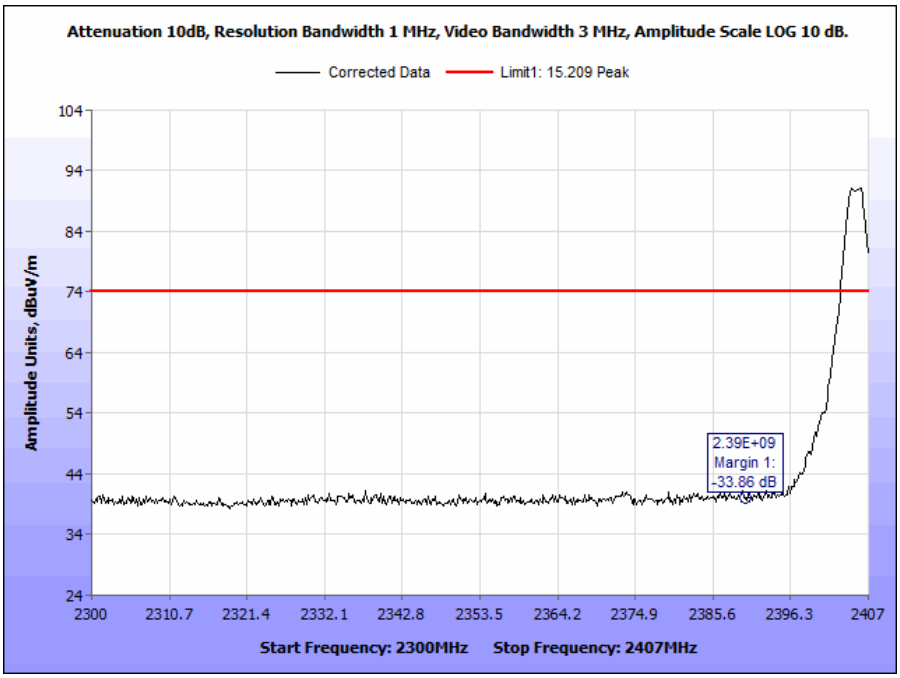
Test Procedures: The transmitter was turned on. Measurements were performed of the low and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.



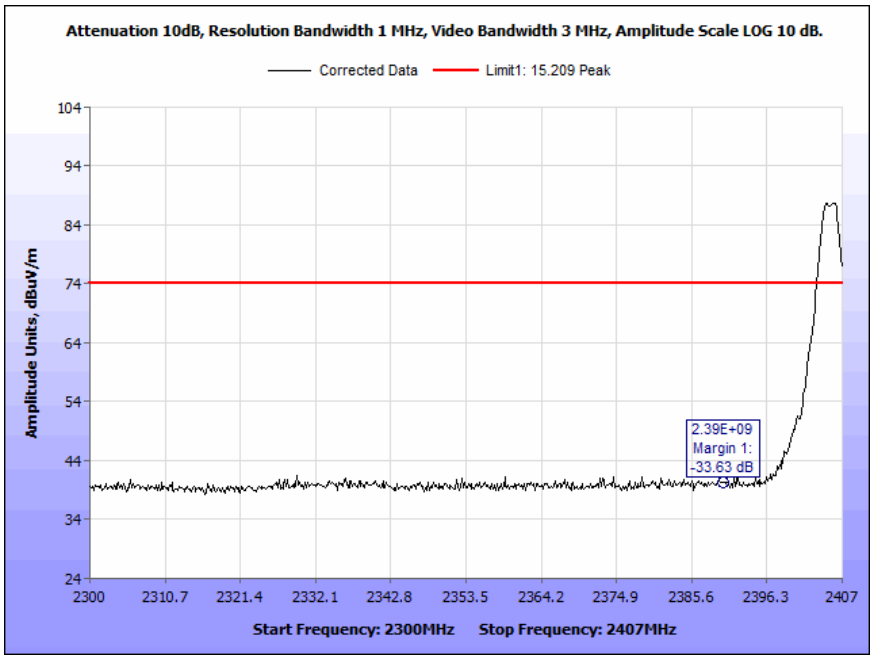
Plot 43. Radiated Restricted Bandedge, 2405 MHz, Average, Horizontal



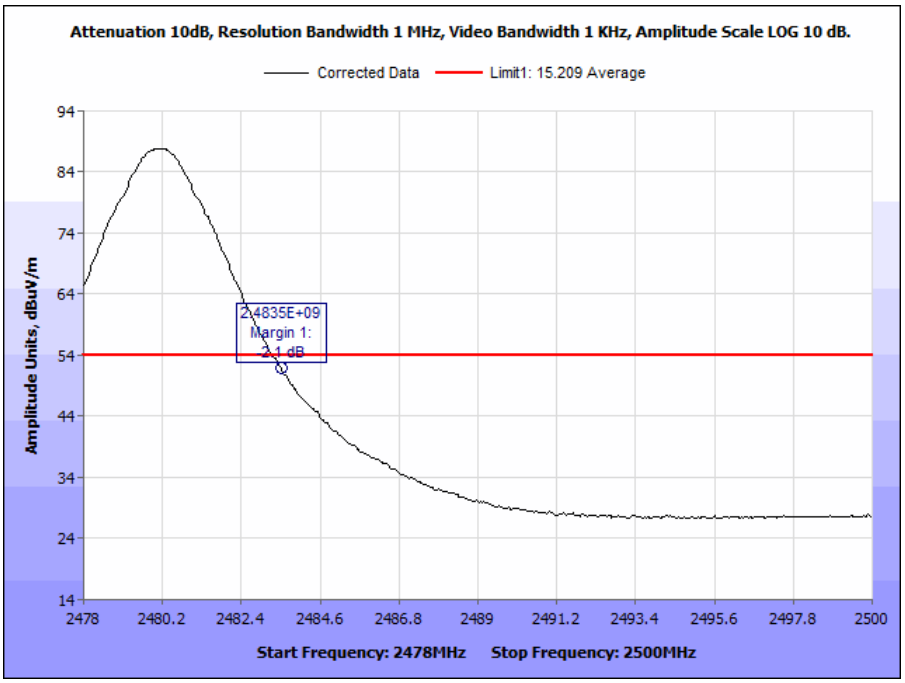
Plot 44. Radiated Restricted Bandedge, 2405 MHz, Average, Vertical



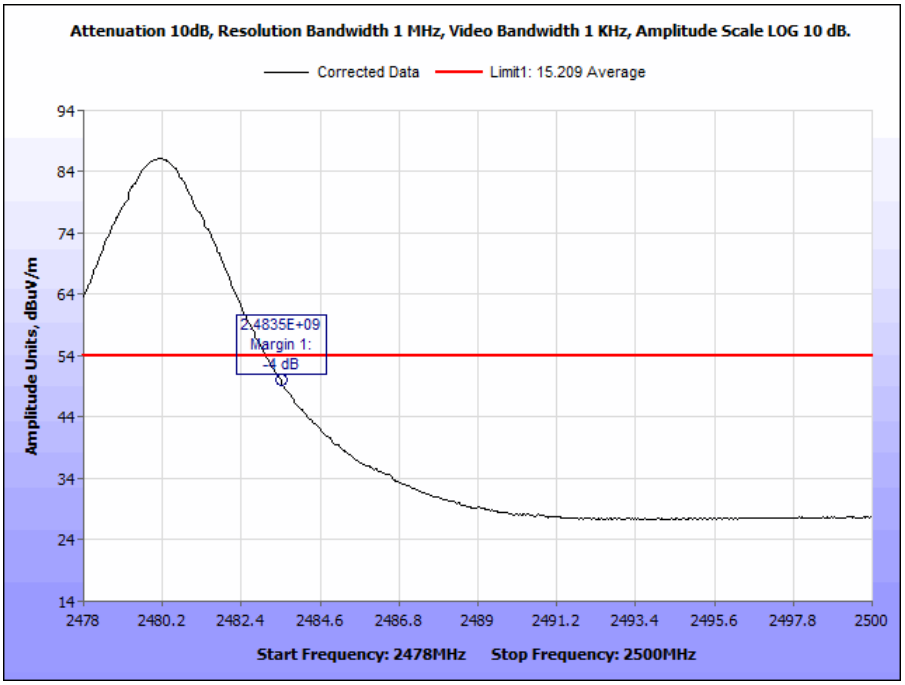
Plot 45. Radiated Restricted Bandedge, 2405 MHz, Peak, Horizontal



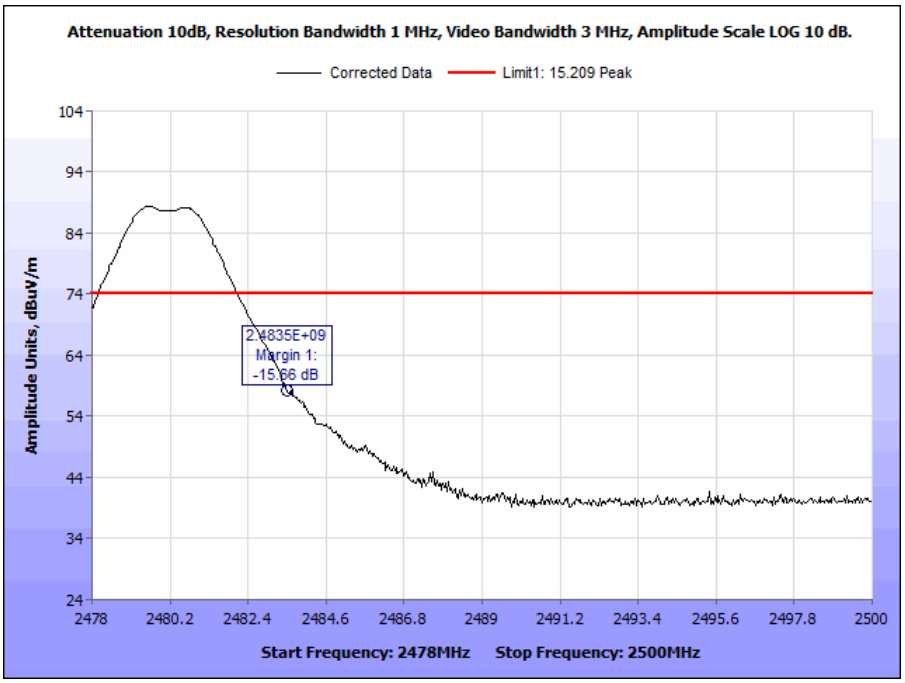
Plot 46. Radiated Restricted Bandedge, 2405 MHz, Peak, Vertical



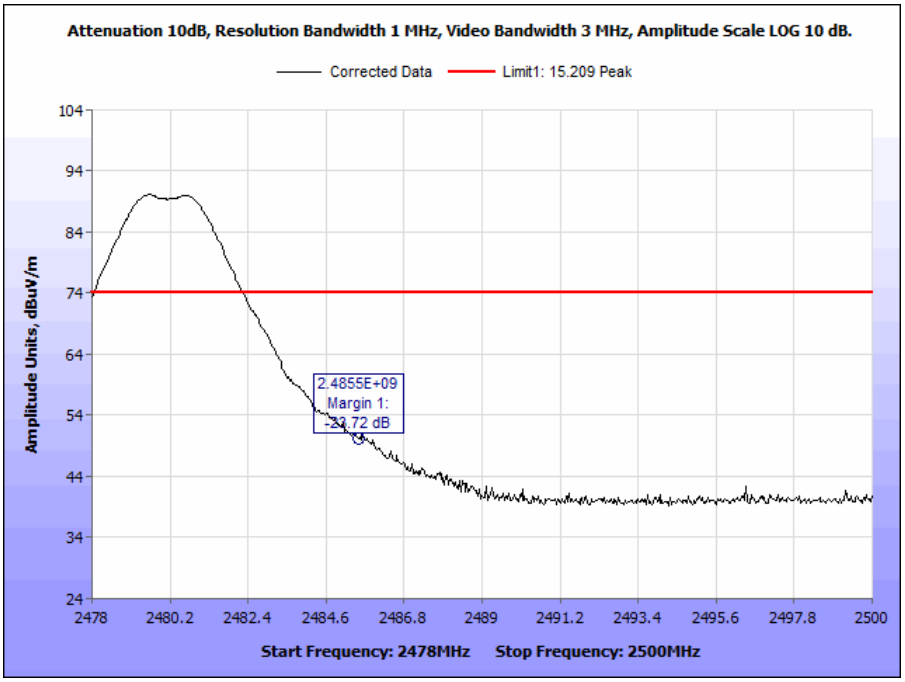
Plot 47. Radiated Restricted Bandedge, 2480 MHz, Average, Horizontal



Plot 48. Radiated Restricted Bandedge, 2480 MHz, Average, Vertical

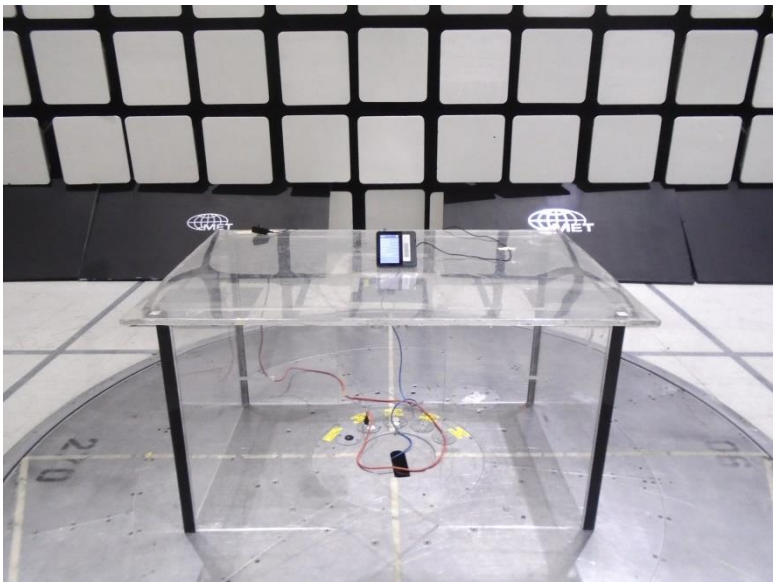


Plot 49. Radiated Restricted Bandedge, 2480 MHz, Peak, Horizontal

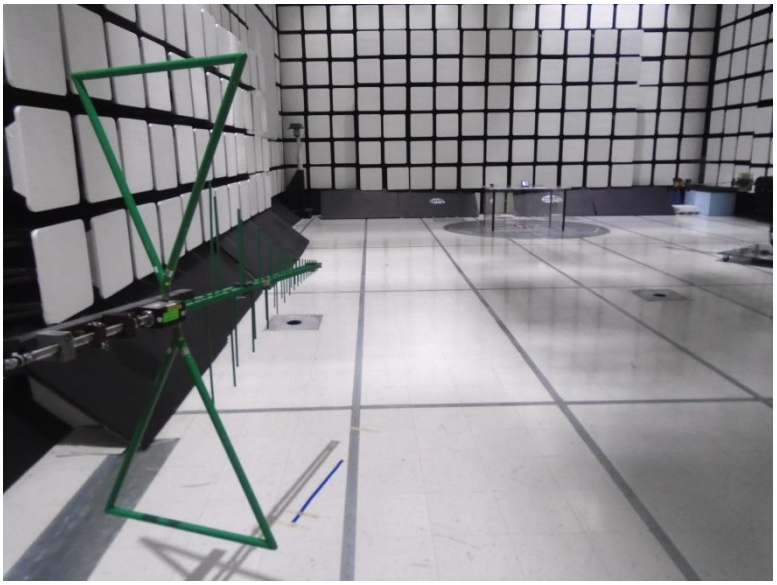


Plot 50. Radiated Restricted Bandedge, 2480 MHz, Peak, Vertical

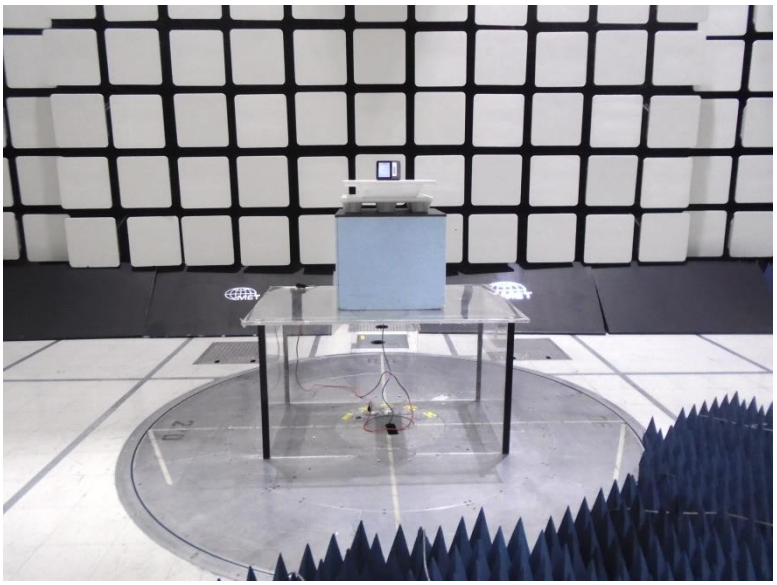
Radiated Spurious Emissions Test Setup



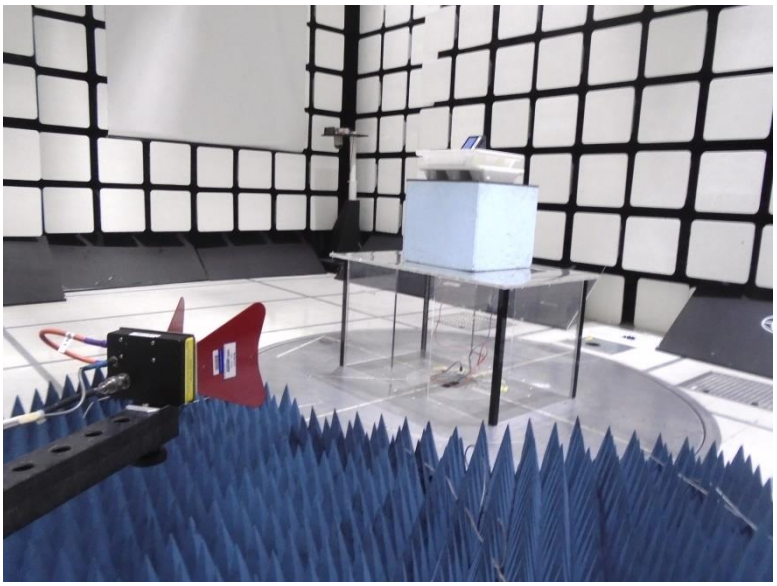
Photograph 3. Radiated Emissions, 30MHz – 1 GHz, Test Setup, Front View



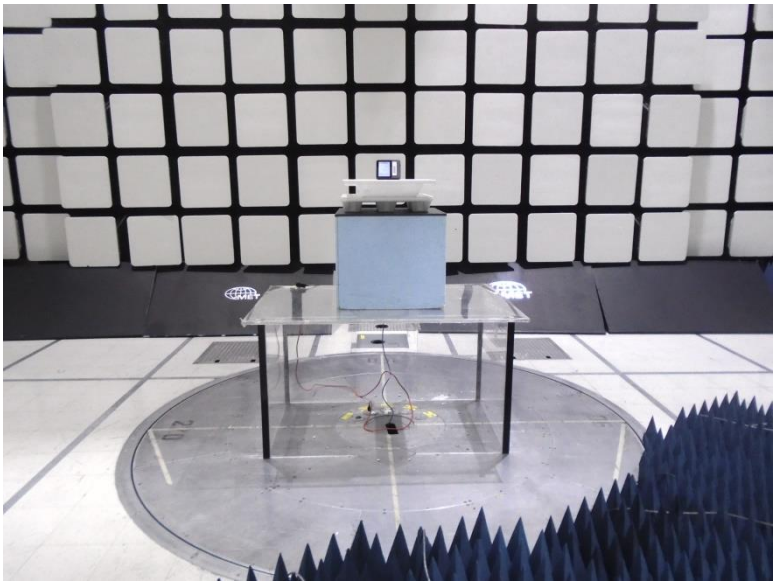
Photograph 4. Radiated Emissions, 30MHz – 1 GHz, Test Setup, Antenna View



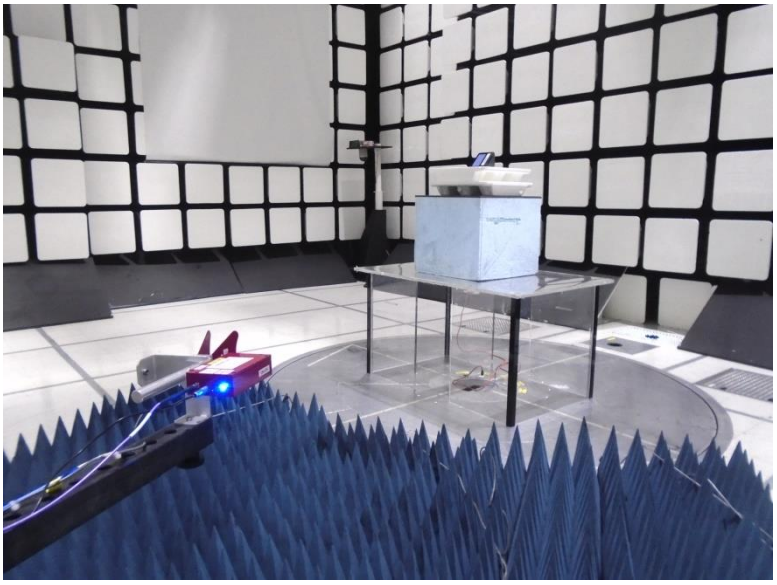
Photograph 5. Radiated Emissions, 1-18 GHz, Test Setup, Front View



Photograph 6. Radiated Emissions, 1-18 GHz, Test Setup, Antenna View



Photograph 7. Radiated Emissions, 18 – 40 GHz, Test Setup, Front View



Photograph 8. Radiated Emissions, 18 - 40 GHz, Test Setup, Antenna View

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Spurious Emissions in Non-restricted Bands

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.

The EUT was connected to a spectrum analyzer through a cable and an attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels for all its bandwidths at maximum power. Conducted spurious emissions were measured according to sections 11.11.2 and 11.11.3 of ANSI C63.10-2013.

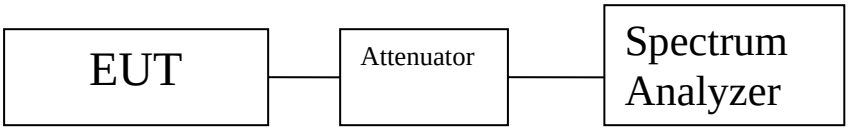


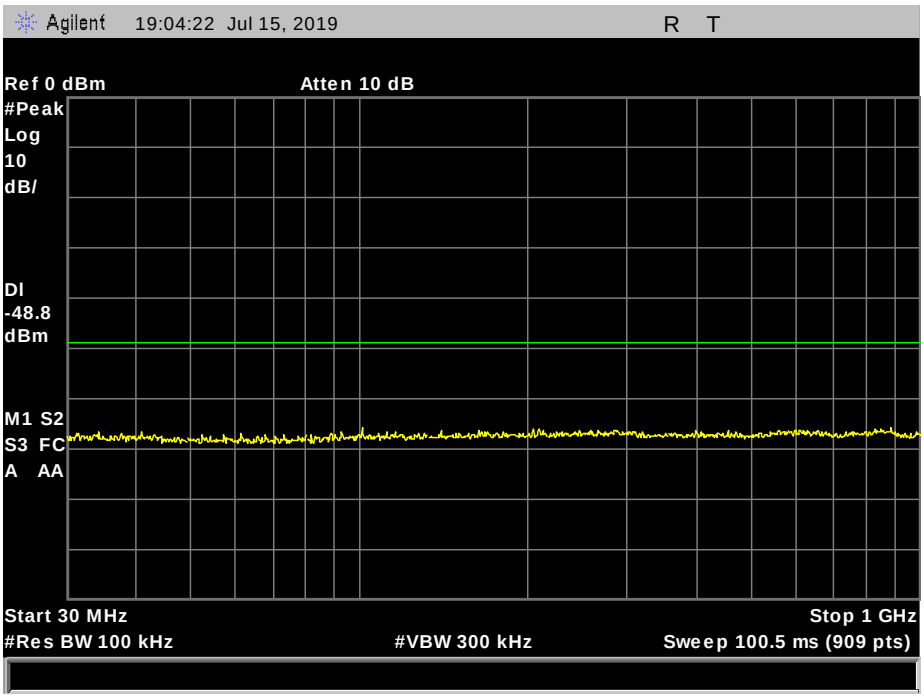
Figure 4. Radiated Emissions Test Setup

Test Results: The EUT was compliant with the Spurious Emission limits of **§15.247(d)**. Emissions were within applicable limits

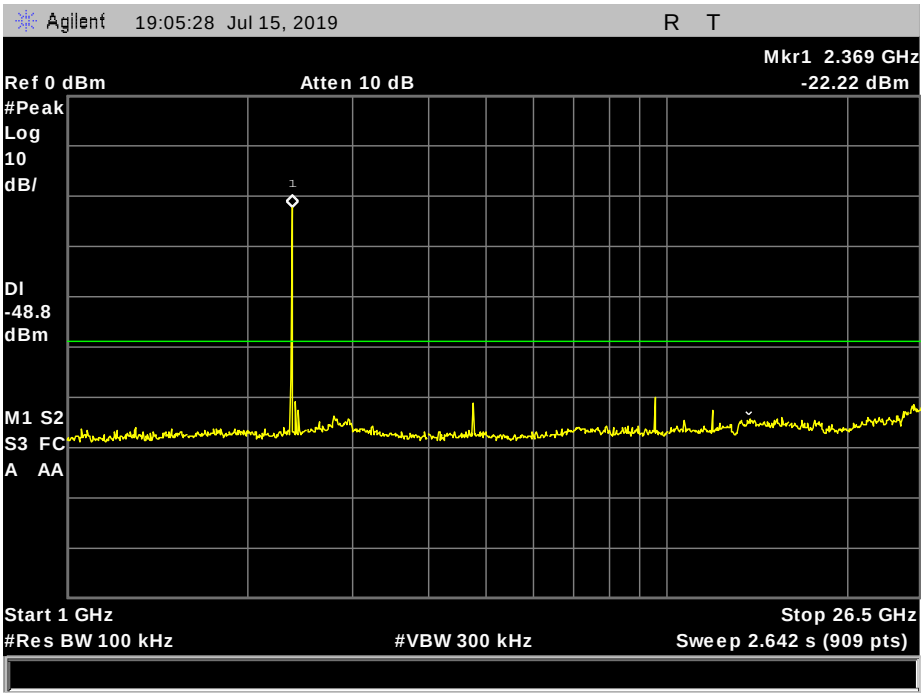
Test Engineer(s): Jonathan Tavira

Test Date(s): July 15, 2019

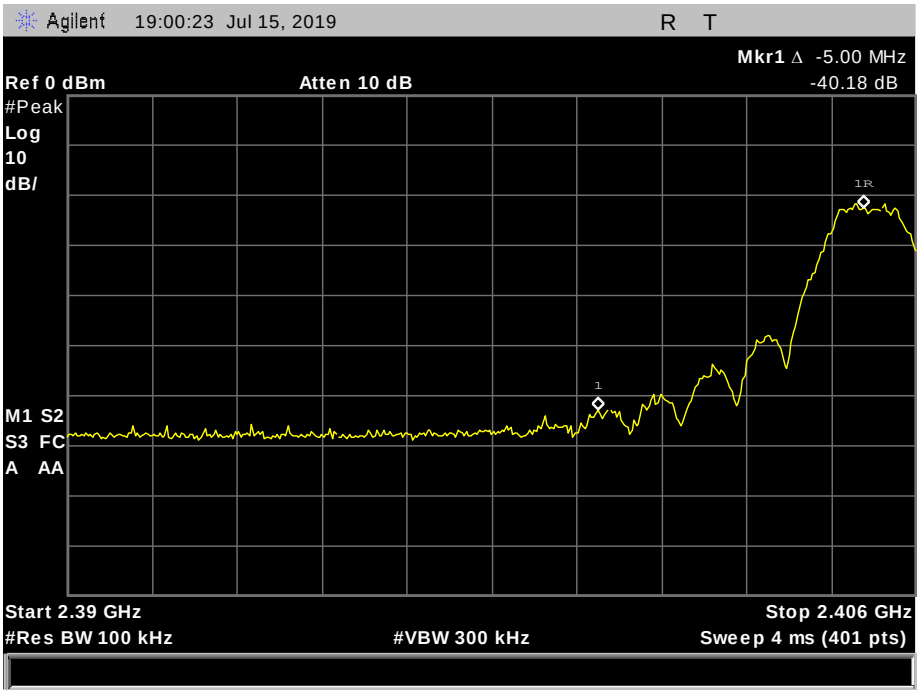
Spurious Emissions in Non-restricted Bands, Test Results



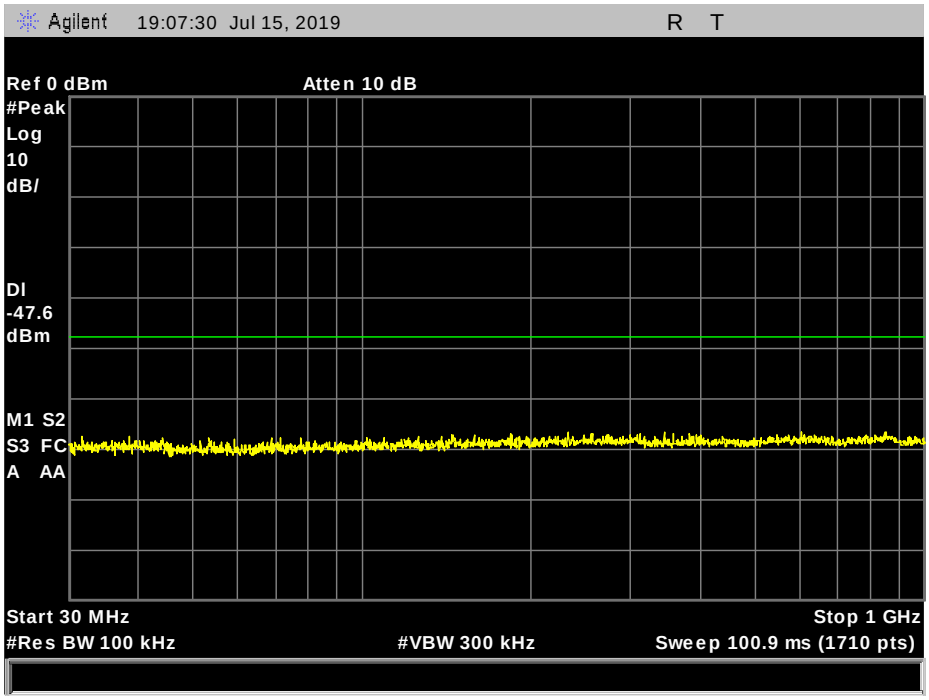
Plot 51. 100 kHz Spurious Emissions, 2405 MHz, 30 – 1000 MHz



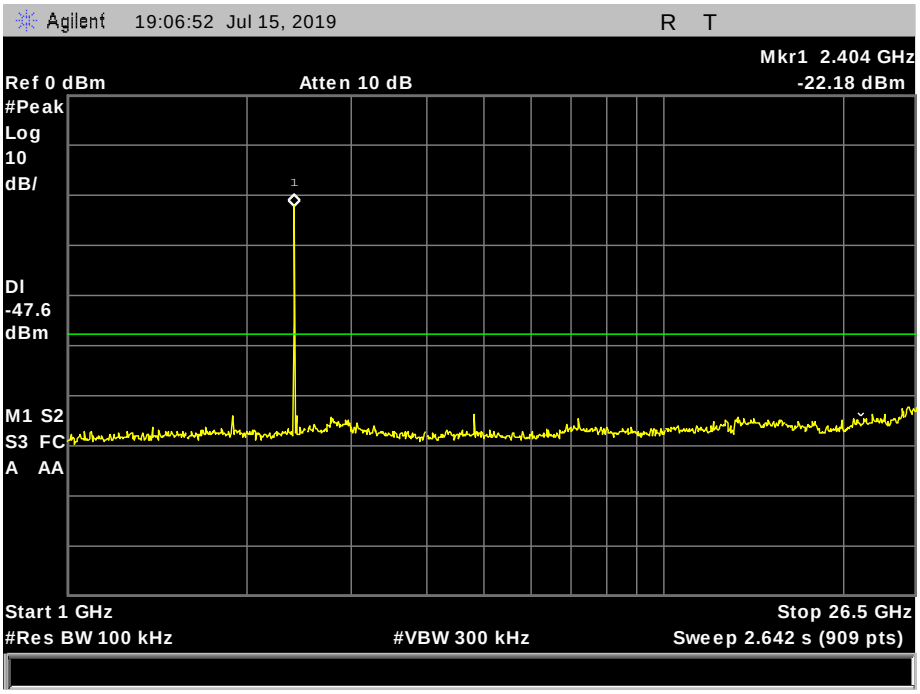
Plot 52. 100 kHz Spurious Emissions, 2405 MHz, 1 – 26.5 GHz



Plot 53. 100 kHz Spurious Emissions, 2405 MHz, bandedge

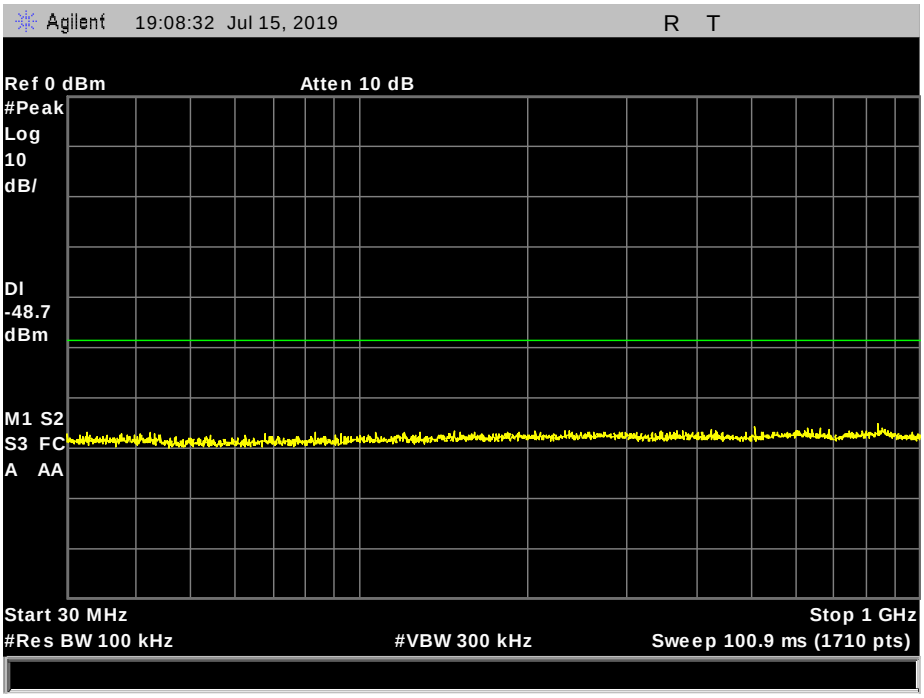


Plot 54. 100 kHz Spurious Emissions, 2440 MHz, 30 – 1000 MHz

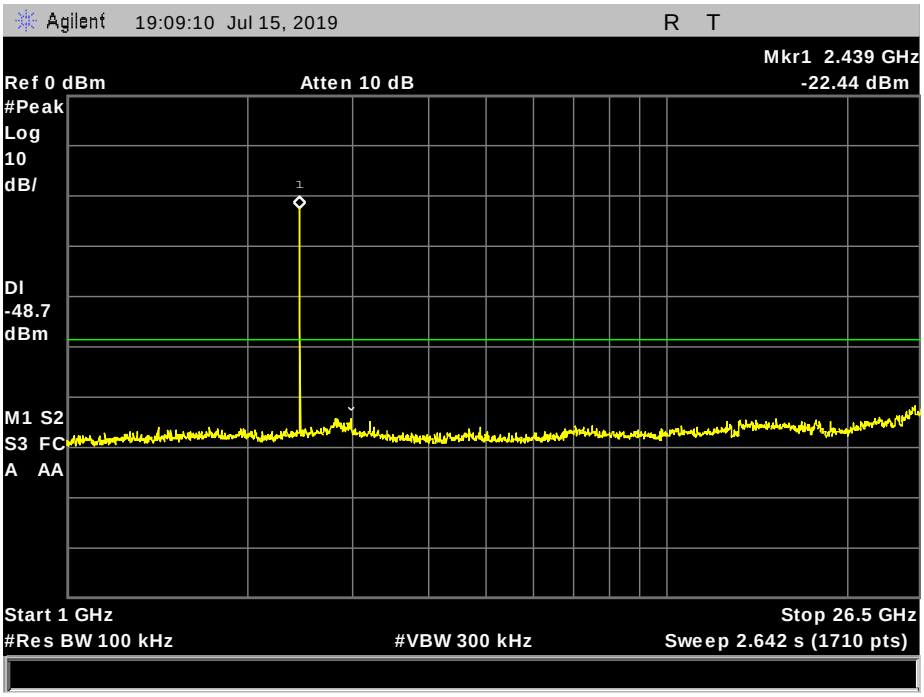


Plot 55. 100 kHz Spurious Emissions, 2440 MHz, 1 – 26.5 MHz

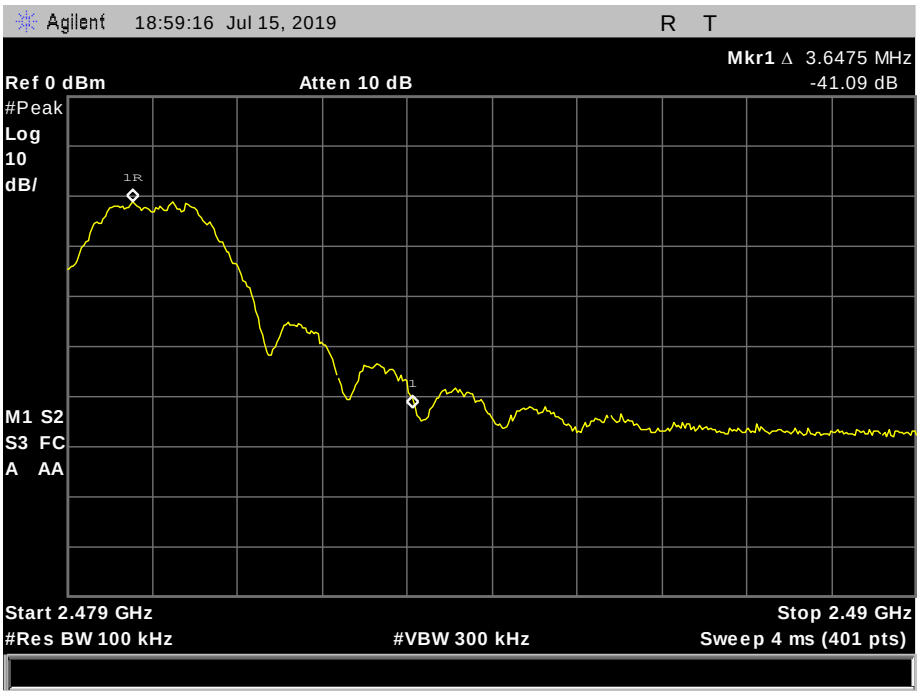
Plot 56. 100 kHz Spurious Emissions, 2440 MHz, bandedge



Plot 57. 100 kHz Spurious Emissions, 2480 MHz, 30 – 1000 MHz



Plot 58. 100 kHz Spurious Emissions, 2480 MHz, 1 – 26.5 MHz



Plot 59. 100 kHz Spurious Emissions, 2480 MHz, bandedge

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 EUT was connected to a spectrum analyzer through a cable and an attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels for all its bandwidths at maximum power. Power spectral density was measured according to measurement method PKPSD, as described in ANSI C63.10-2013, section 11.10.2. Attenuator, and cable loss factor were programmed into the spectrum analyzer.

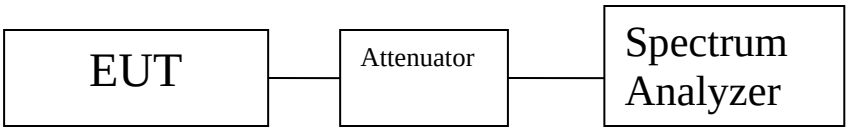


Figure 5. Radiated Emissions Test Setup

Test Results: The EUT was compliant with the peak power spectral density limits of **§ 15.247 (e)**.

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

Test Engineer: Jonathan Tavira

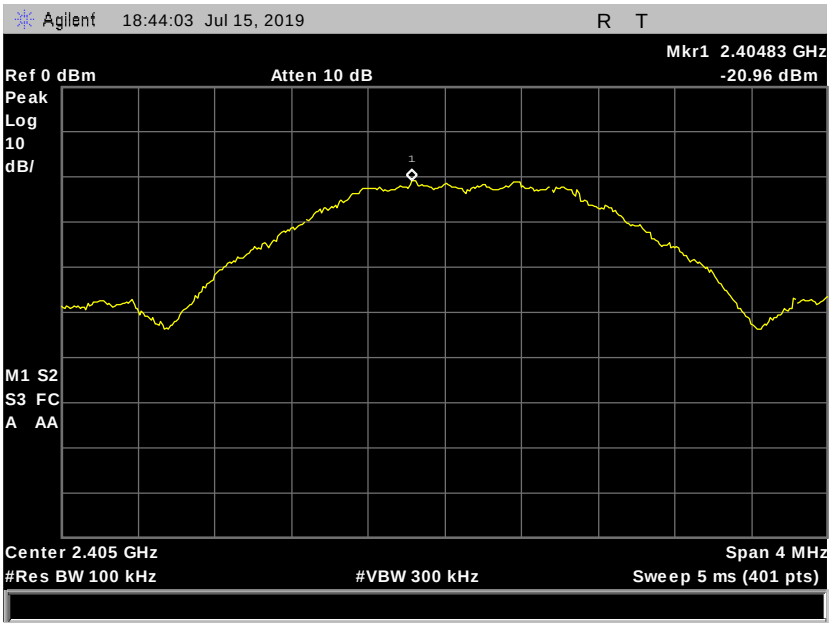
Test Date: July 15, 2019

Peak Power Spectral Density Test Results

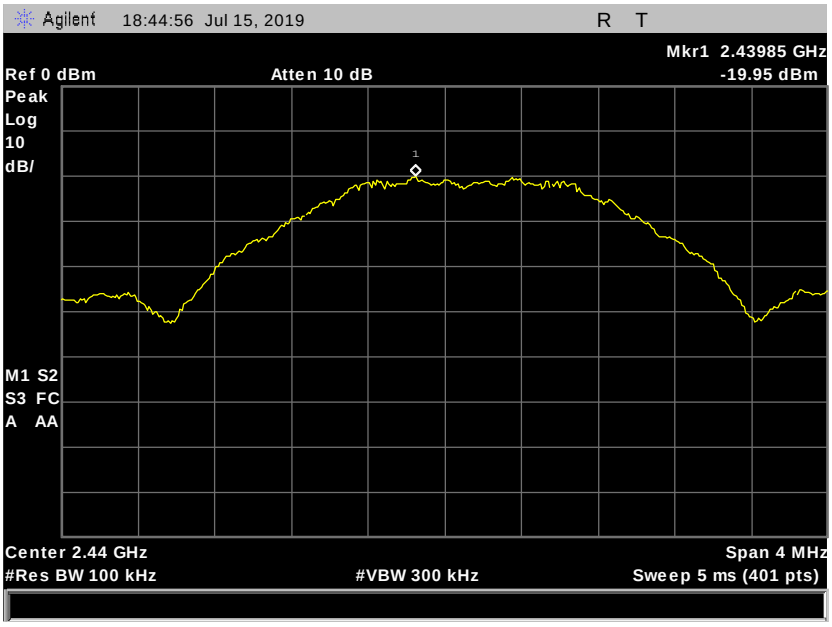
Carrier Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)
Low	2405	-20.96
Mid	2440	-19.95
High	2480	-21.77

Table 18. Peak Power Spectral Density, Test Results

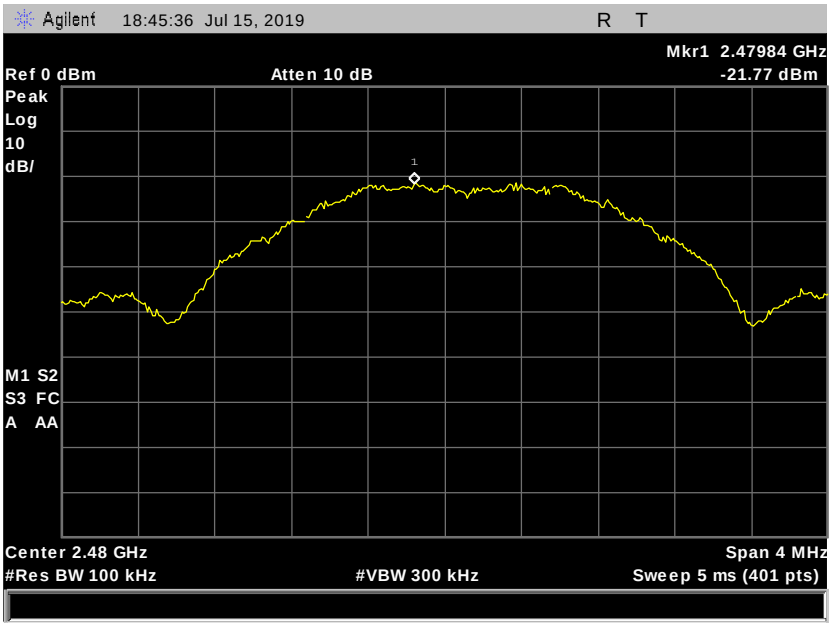
Peak Power Spectral Density



Plot 60. Power Density, 2405 MHz, -20.96 dBm



Plot 61. Power Density, 2440 MHz, -19.95 dBm



Plot 62. Power Density, 2480 MHz, -21.77 dBm

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(i) RF Human 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: **§2.1093:** As specified in this section, a portable device is defined as a transmitting device designed to be used so that the radiated structure(s) of the device is within 20 centimeters of the body of the user. Calculations below are in accordance with KDB 447498 D01 General RF Exposure Guidance v06, Section 4.3 General SAR test exclusion guidance.
The SAR test exclusion thresholds are 3.0 for 1-g SAR and 7.5 for 10-g extremity SAR.

Test Results: The separation distance was determined by measuring the distance from the transmitter to the edge of the touch screen on the EUT. That distance was measured to be 25 mm.

Frequency (MHz)	Con. Pwr. (dBm)	Tuneup tolerance (dB)	Total Pwr. (mW)	Calculated SAR Threshold	10.0-g SAR Limit	Margin	Separation Distance Declared (mm)	Result
2440	-15.11	1	0.03882	0.002425	7.5	7.49758	25	Exempt

Per KDB 447498, Section 4.3.1 (a), applicable for 100 MHz to 6 GHz and test separation distances ≤ 50 mm:

$$\frac{max.power\ of\ channel, including\ tuneup\ tolerance\ [mW]}{min.test\ separation\ distance\ [mm]} * \sqrt{f\ [GHz]} \leq 7.5\ (10 - g\ SAR\ Limit)$$

$$\frac{0.03882\ mW}{25\ mm} * \sqrt{2.440} = 0.000242 \leq 7.5\ (10 - g\ SAR)$$

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.

MET ASSET #	EQUIPMENT	MANUFACTURER	MODEL	LAST CAL DATE	CAL DUE DATE
1A1065	EMI RECEIVER	ROHDE & SCHWARZ	ESCI	05/01/2019	05/01/2020
1A1177	ATTENUATOR	ROHDE & SCHWARZ	ESH3Z2	11/30/2018	11/30/2019
1A1123	LISN	TESEQ	NNB 51	07/18/2019	08/18/2019
1A1076	VARIABLE AC TRANSFORMER	POWERSTAT	N/A	SEE NOTE	
1A1119	TEST AREA	CUSTOM MADE	N/A	SEE NOTE	
1A1184	SPECTRUM ANALYZER	AGILENT	E4407B	06/25/2019	06/25/2020
1A1083	EMI RECIVER	ROHDE & SCHWARZ	ESU40	10/10/2019	10/10/2020
1A1050	HYBRID ANTENNA	SCHAFFNER	CBL 6112D	08/29/2018	02/29/2020
1A1183	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	10/10/2018	04/10/2020
1A1088	PRE-AMP	ROHDE & SCHWARZ	TS-PR1	SEE NOTE	
1A1080	MULTI-DEVICE CONTROLLER	ETS-EMCO	2090	SEE NOTE	
1A1180	PRE-AMP	MITEQ	AMF-7D-01001800-22-10P	SEE NOTE	
1A1106	10M SEMI-ANECHOIC CHAMBER	LINDGREN	N/a	SEE NOTE	

Table 19. 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

