October 9, 2021

OnAsset Intelligence, Inc.
8407 Sterling St.
Irving, TX 75063

Dear Dennis Key,

Enclosed is the EMC Wireless test report for compliance testing of the OnAsset Intelligence, Inc., SENTRY 600 FLIGHTSAFE 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

Joel Huna
Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: (\OnAsset Intelligence, Inc.\WIRS111980-FCC247 (LoRa) Rev 1)

ACCREDITED
TESTING CERT #0591.02

Electromagnetic Compatibility Criteria
Test Report

for the

OnAsset Intelligence, Inc.
SENTRY 600 FLIGHTSAFE

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

Report: WIRS111980-FCC247 (LoRa) Rev 1

Prepared For:

OnAsset Intelligence, Inc.
8407 Sterling St,
Irvine, TX 75063

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

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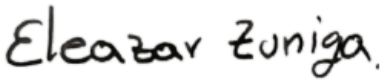
15.247 Subpart C for Intentional Radiators

Arsalan Hasan
Project Engineer, Electromagnetic Compatibility Lab

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
∅	June 10, 2021	Initial Issue
1	October 9, 2021	TCB Review 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**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**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

1.1 Purpose of Test

An EMC Wireless evaluation was performed to determine compliance of the OnAsset Intelligence, Inc., SENTRY 600 FLIGHTSAFE, 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 SENTRY 600 FLIGHTSAFE OnAsset Intelligence, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the SENTRY 600 FLIGHTSAFE, 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 OnAsset Intelligence, Inc., purchase order number 6296. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference 47 CFR Part 15.247:2005	Description	Compliance
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conducted Emission Limits	Compliant
§15.247(a)(1)	20dB Occupied Bandwidth	Compliant
§15.247(a)(1)	Average Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)	Number of RF Channels	Compliant
§15.247(a)(1)	RF Channel Separation	Compliant
§15.247(b)	Peak Power Output	Compliant
§15.247(d); §15.209; §15.205	Radiated Spurious Emissions Requirements	Compliant
§15.247(d)	RF Conducted Spurious Emissions Requirements & Band Edge	Compliant

Executive Summary of EMC Part 15.247 ComplianceTesting

II. Equipment Configuration

A. Overview

Eurofins MET Laboratories, Inc. was contracted by OnAsset Intelligence, Inc. to perform testing on the SENTRY 600 FLIGHTSAFE, under OnAsset Intelligence, Inc. purchase order number 6296.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the OnAsset Intelligence, Inc., SENTRY 600 FLIGHTSAFE.

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

Model(s) Tested:	SENTRY 600 FLIGHTSAFE	
Model(s) Covered:	SENTRY 600 FLIGHTSAFE	
EUT Specifications:	Primary Power: 3.8 VDC (Battery Powered)	
	Type of Modulations:	GFSK
	Equipment Code:	DSS
	Technology	TX Frequency Range
	LoRa:	902 MHz – 928 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	
Duty Cycle for Testing:	100%	
Evaluated by:	Arsalan Hasan	
Report Date(s):	October 9, 2021	

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
RSS-247	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 v05r02	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247

References

C. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 3162 Belick St., 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.

Radiated Emissions measurements were performed in a 5 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 Eurofins Electrical and Electronic Testing NA, Inc.

Eurofins Electrical and Electronics Testing NA, Inc. is an ISO/IEC 17025 accredited site by A2LA, California #0591.02.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.24	2	95%
Radiated Emissions, (1 GHz – 6 GHz)	±3.92	2	95%
Conducted Emission Voltage	±2.44	2	95%
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%

Uncertainty Calculations Summary

E. Description of Test Sample

Name of EUT/Model:	SENTRY 600 FLIGHTSAFE
Description of EUT and its intended use:	SENTRY 600 is a non-installed PED (personal electronic device) that is placed inside the cargo packaging or container and is used for monitoring the condition of the cargo during transit. SENTRY 600 units can be charged via a USB wall charger. Contains the following sensors: Temperature, humidity, light, pressure, Accelerometer, Camera and Speaker.
Selected Operation Mode(s):	The EUT radio is control by external software via a laptop.
Rationale for the selection of the Operation Mode(s):	This is the preferred mode of controlling the radio.
Monitoring Method(s):	Signals are displayed on a spectrum analyzer.
Emissions Class Declaration:	Class A
Configuration(s):	NA
EUT Power Requirement	
Voltage:	3.6 V
AC or DC:	DC
Voltage Frequency:	NA
Number of Phases:	NA
Current:	0.1 A
Physical Description	
EUT Arrangement:	Table Top
System with Multiple Chassis?	NA
Size (HxWxD - inches):	122.05mm x 93.50mm x 22mm
Weight (lbs):	0.5 lbs
Other Info	
EUT Software (internal to EUT):	Rev 1
Support Software (used by support PC to exercise EUT):	NA
Firmware:	Rev 1
Transmitter Parameters	
LoRa	BLE
Modulation Type:	GFSK
Number of Channels:	NA
Frequency range (MHz):	902 – 928 MHz
Antenna Type:	SMD Helical
Antenna Gain (dBi):	-2.5 dBi
PMN:	NA
HVIN:	NA
FVIN:	NA
HMN:	NA
Data Rates:	NA
Expected Power Level:	19 dBm (Conducted)
Number of Antenna:	1

EUT List

Ref. ID	Slot #	Name/Description	Model Number	Part Number	Serial Number	Rev. #
M8		SENTRY 600 FlightSafe	SENTRY 600 FlightSafe	11-5100-003	M8	NA
4		AC/DC WALL MOUNT ADAPTER	AC/DC WALL MOUNT ADAPTER	L6R12-050U	NA	NA

Ports and Cabling

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
NA	NA	USB Cable	1	0.9144	1	Yes	NA

Support Equipment

Ref. ID	Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
Test Laptop	5CG7153NYP OAILT-11	HP	HP ProBook 640 G2 14" Laptop Computer	NA

F. 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.

G. Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to OnAsset Intelligence, 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 **completed testing** to the criteria of §15.203.

Test Engineer: Arsalan Hasan

Test Date: June 3, 2020

Antenna Type:	Manufacturer	Gain (dBi):	Impedance	Polarization
Pulse Larsen Antennas	W3139	-2.5 dBi	SMD Helical	Linear

Antenna Requirement, Antenna List

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

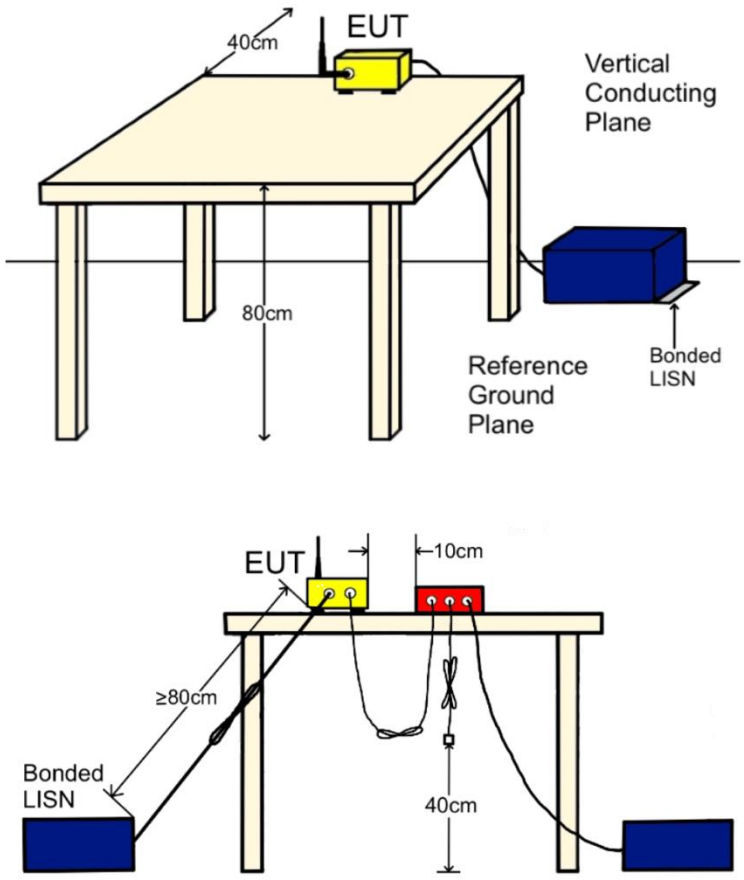
Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

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 Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

Test Date: June 3, 2020

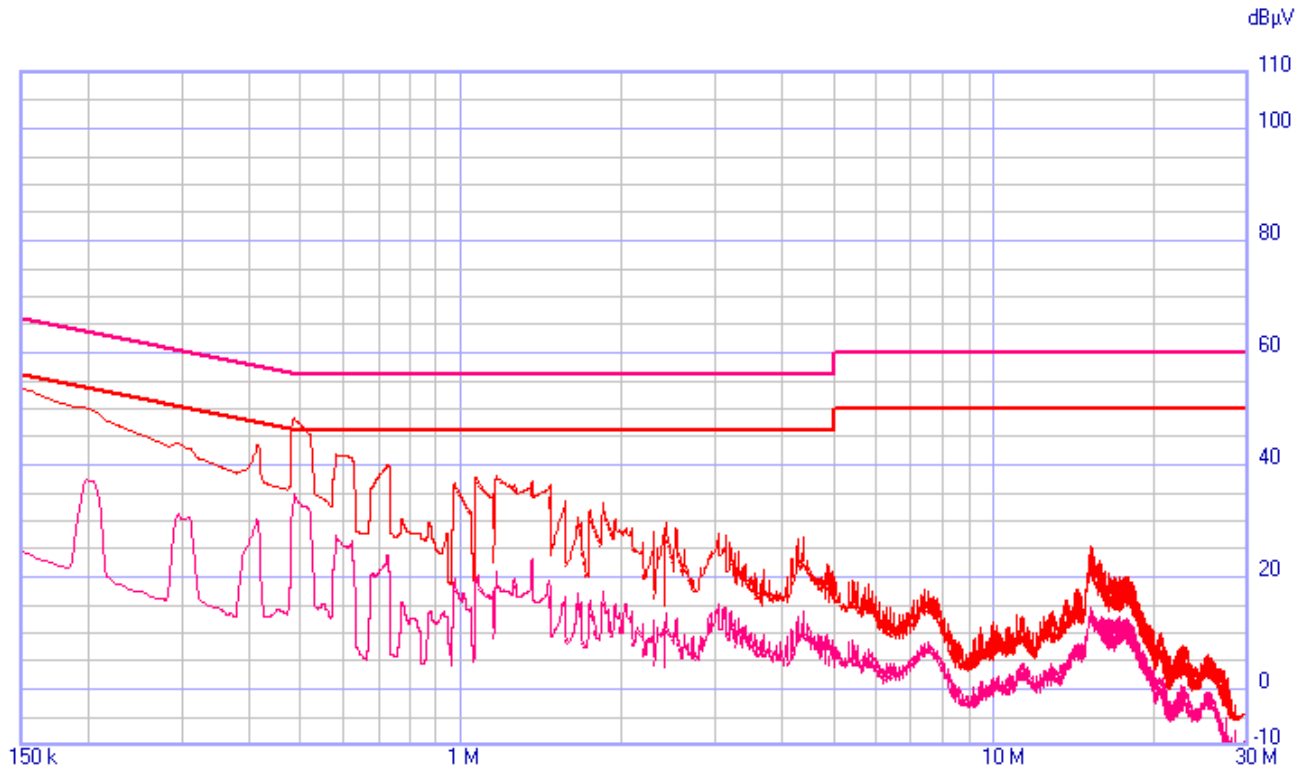


Conducted Emissions Voltage, Test Setup

Conducted Emissions - Voltage, AC Power, Line (120 VAC)

	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line	0.4862	48.51	56.35	-7.84	Pass	34.79	46.35	-11.56	Pass
Line	0.1534	54.82	66	-11.18	Pass	24.87	56	-31.13	Pass
Line	0.5816	42.69	56	-13.31	Pass	26.79	46	-19.21	Pass
Line	0.7296	40.72	56	-15.28	Pass	22.82	46	-23.18	Pass
Line	1.198	38.48	56	-17.52	Pass	20.85	46	-25.15	Pass
Line	0.979	37.43	56	-18.57	Pass	20.23	46	-25.77	Pass

Conducted Emissions - Voltage, AC Power, Line (120 VAC)

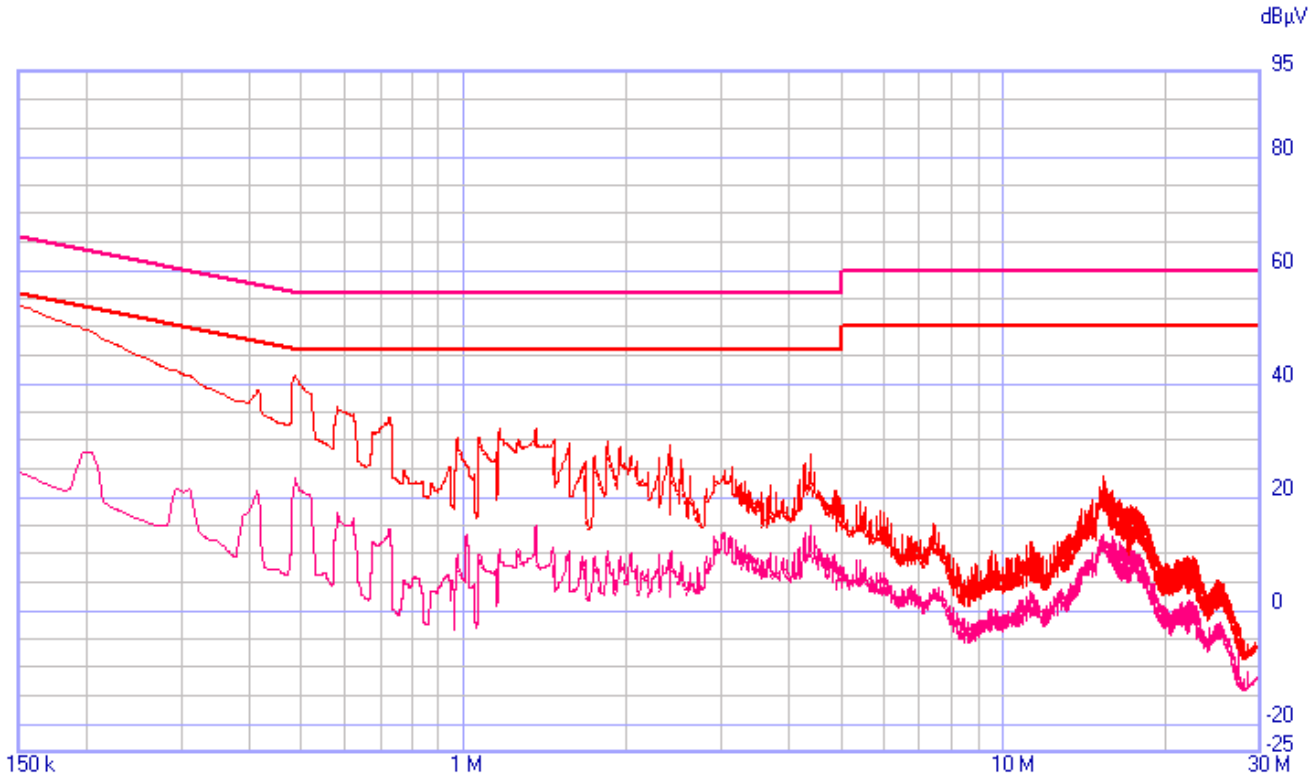


Conducted Emission, Line Plot

Conducted Emissions - Voltage, AC Power, Neutral (120 VAC)

	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Neutral	0.492	42.24	56.21	-13.97	Pass	22.65	46.21	-23.56	Pass
Neutral	0.589	36.76	56	-19.24	Pass	17.53	46	-28.47	Pass
Neutral	0.736	34.81	56	-21.19	Pass	14.42	46	-31.58	Pass
Neutral	0.969	31.14	56	-24.86	Pass	10.25	46	-35.75	Pass
Neutral	1.046	31.23	56	-24.77	Pass	10.41	46	-35.59	Pass
Neutral	1.386	33.31	56	-22.69	Pass	15.57	46	-30.43	Pass

Conducted Emissions - Voltage, AC Power, Neutral (120 VAC)



Conducted Emission, Neutral Plot

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(1) 20 dB Occupied Bandwidth

Test Requirements: **§ 15.247(a):** 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. For DTS, the minimum 6 dB bandwidth shall be at least 500 kHz. For frequency hopping systems, the EUT shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Procedure: The bandwidth of the fundamental frequency was measured radiated using the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth. The 20 dB bandwidth was measured and recorded.

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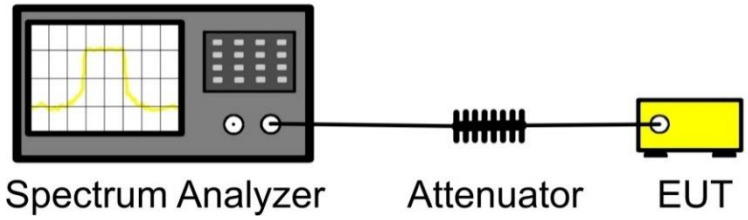
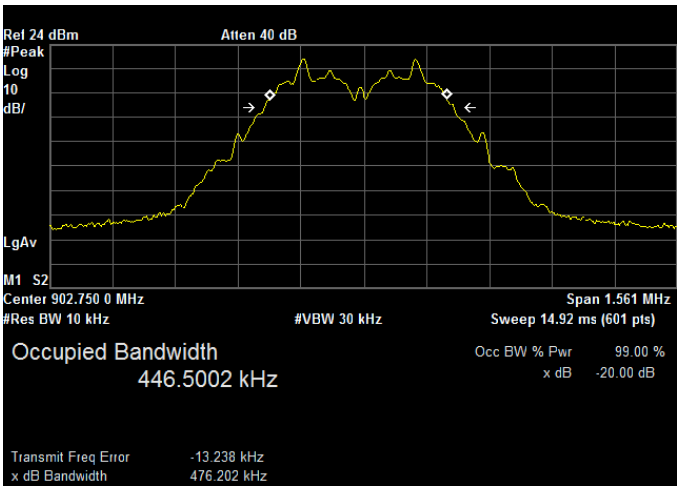
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

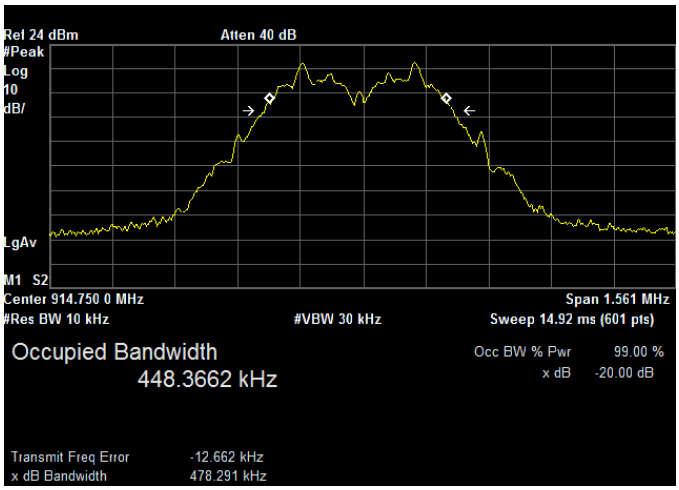
Test Date: June 3, 2020



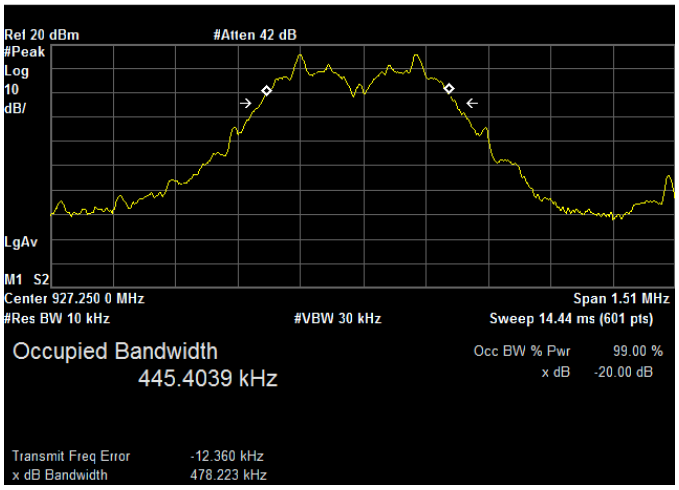
Block Diagram, Occupied Bandwidth Test Setup



20 dB Bandwidth, Low Channel



20 dB Bandwidth, Mid Channel



20 dB Bandwidth, High Channel

Electromagnetic Compatibility Criteria for Intentional Radiators

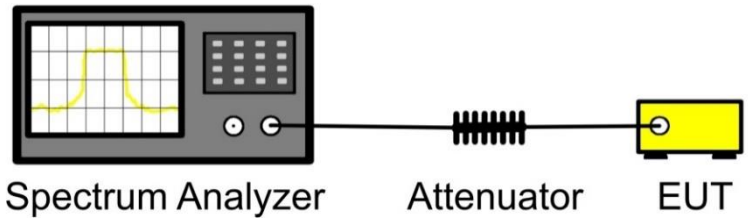
§ 15.247(a)(1) Number of RF Channels

Requirements: If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

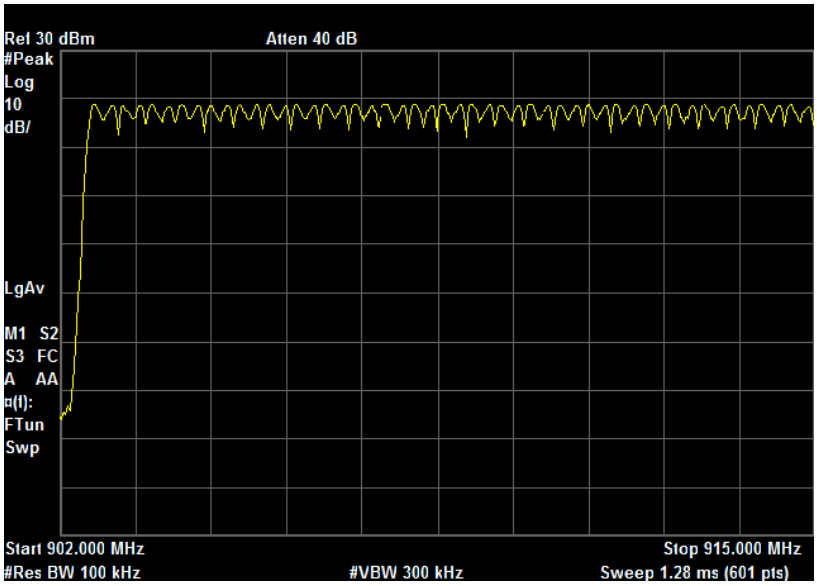
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

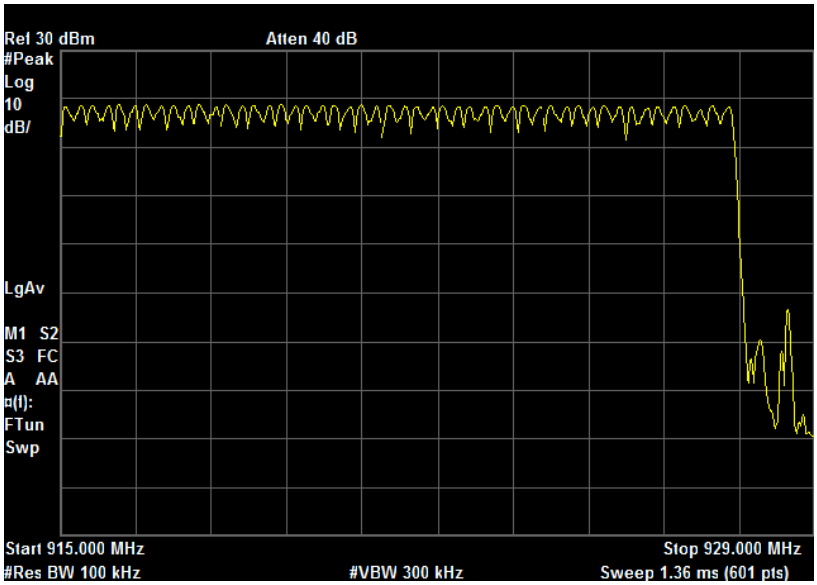
Test Date: June 3, 2020



Block Diagram, Number of RF Channels Test Setup



Number of Channels



Number of Channels

Electromagnetic Compatibility Criteria for Intentional Radiators

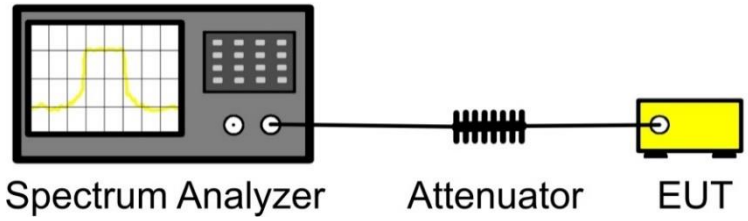
§ 15.247(a)(1) RF Channel Separation

Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

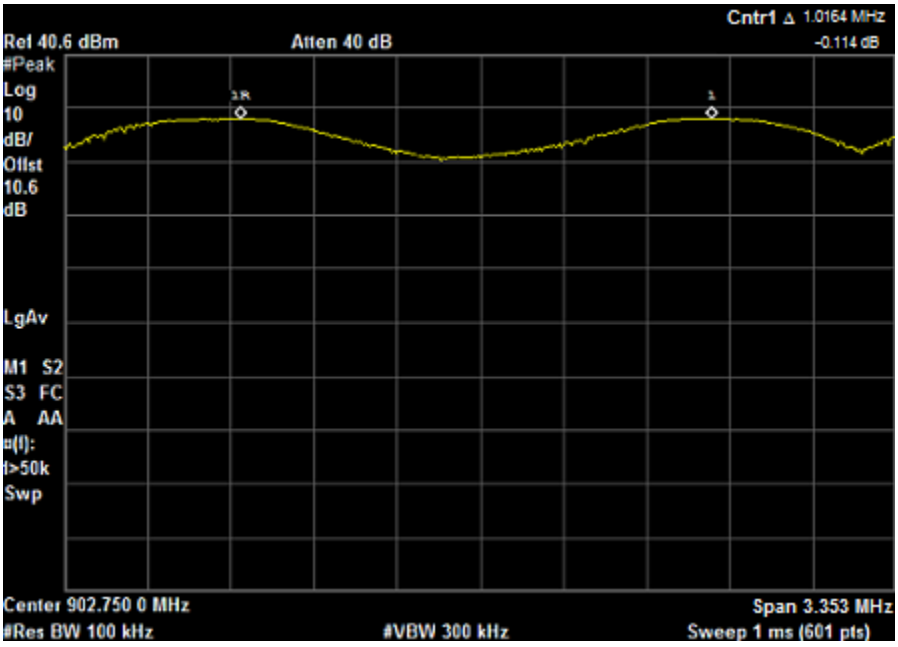
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

Test Date: June 3, 2020



Block Diagram, RF Channel Separation Test Setup



Channel Separation

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

Test Requirements: **§15.247(b)(1):** The maximum peak output power of the intentional radiator shall not exceed the following: For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

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

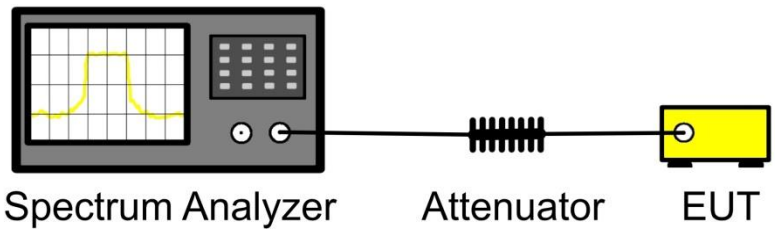
Output Power Requirements from §15.247(b)

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.

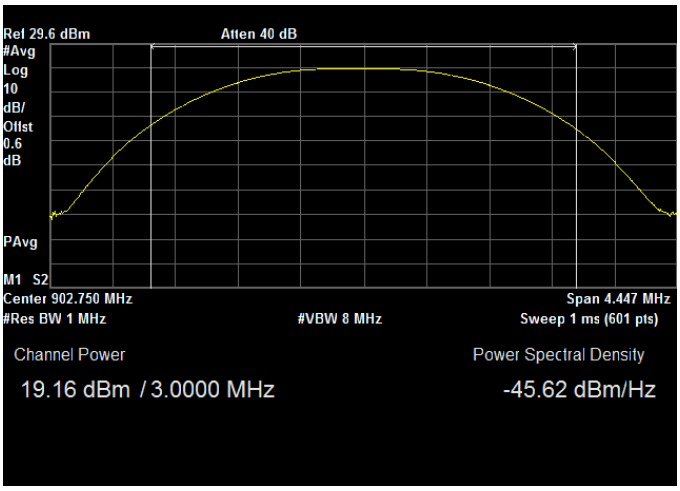
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

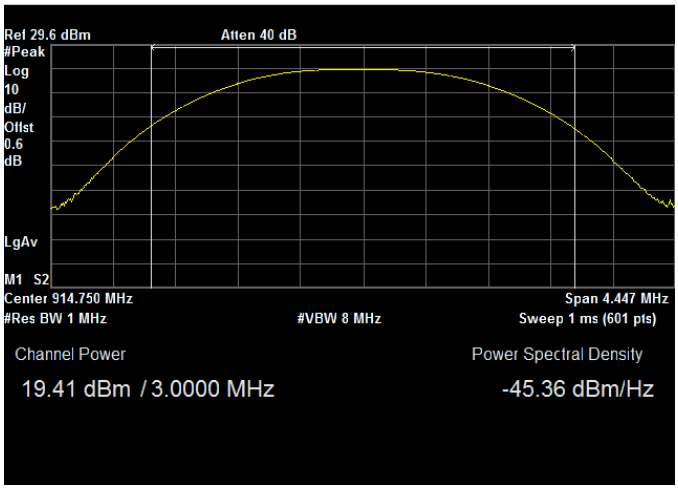
Test Date: June 3, 2020



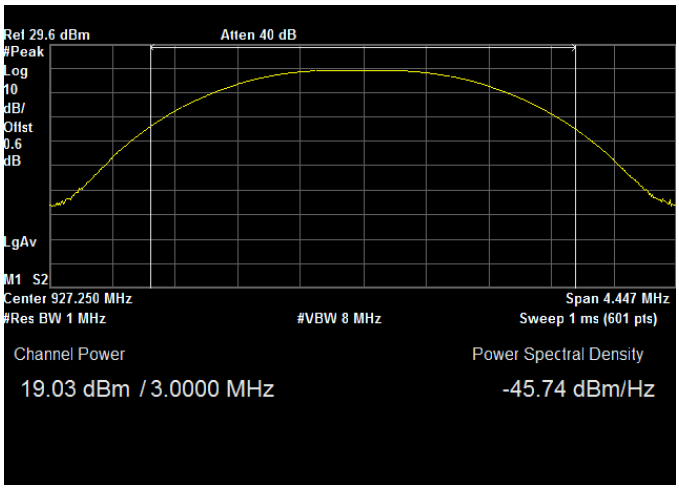
Peak Power Output Test Setup



Peak Power Output, Low Channel



Peak Power Output, Mid Channel



Peak Power Output, High Channel

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements

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

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

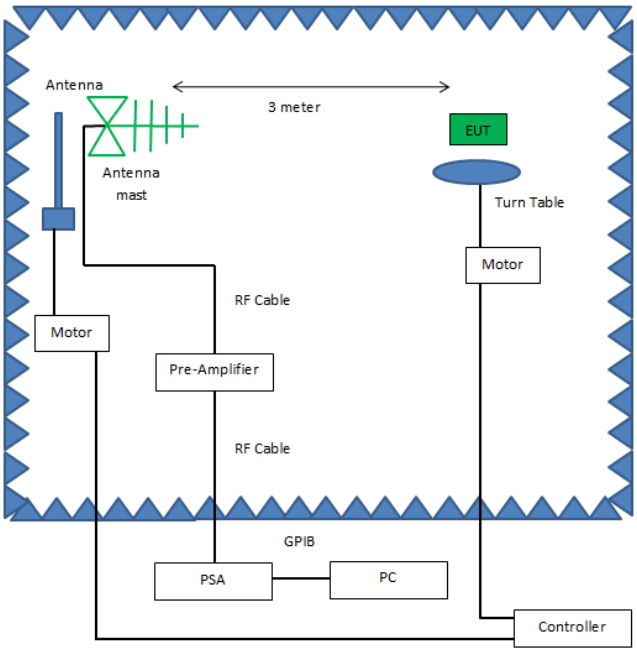
Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

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.

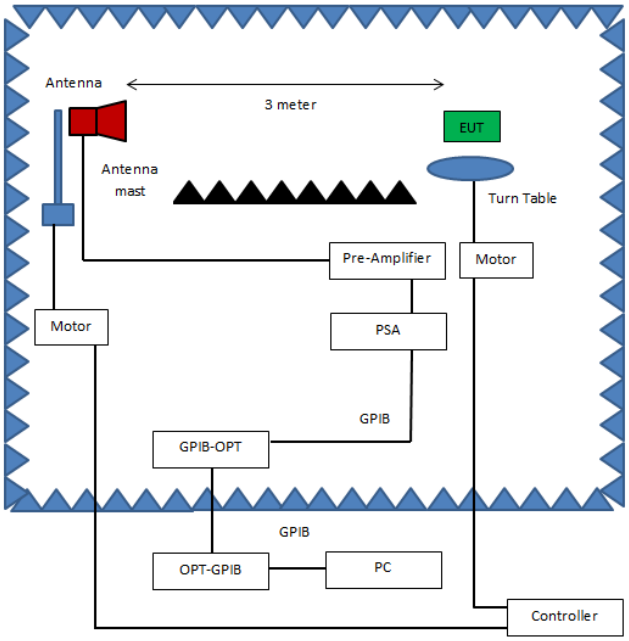
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

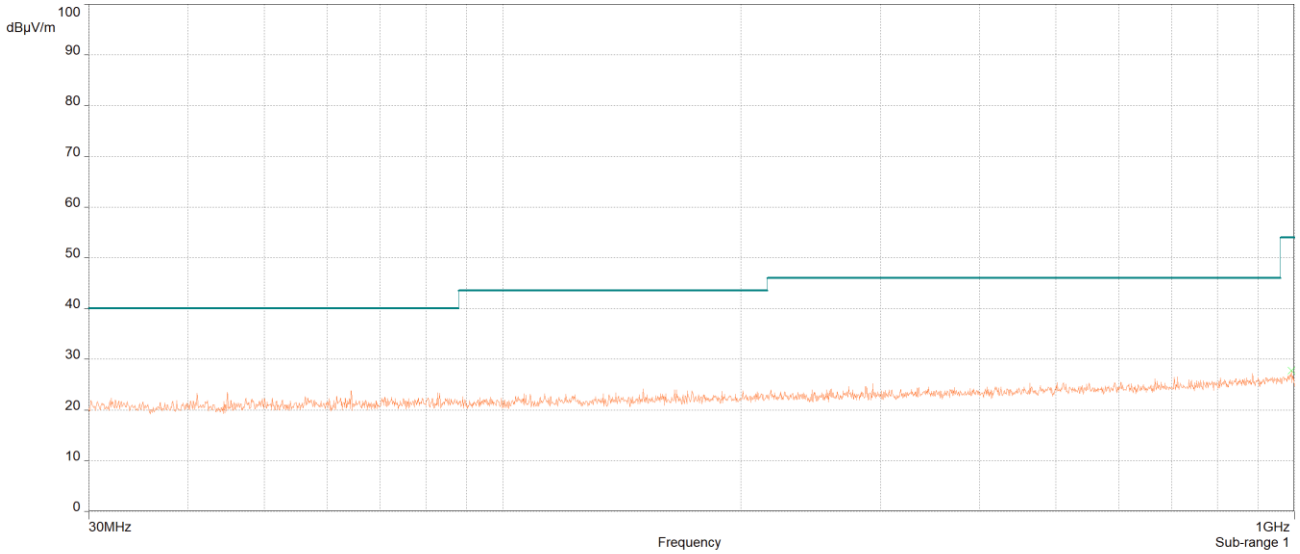
Test Date: June 4, 2020



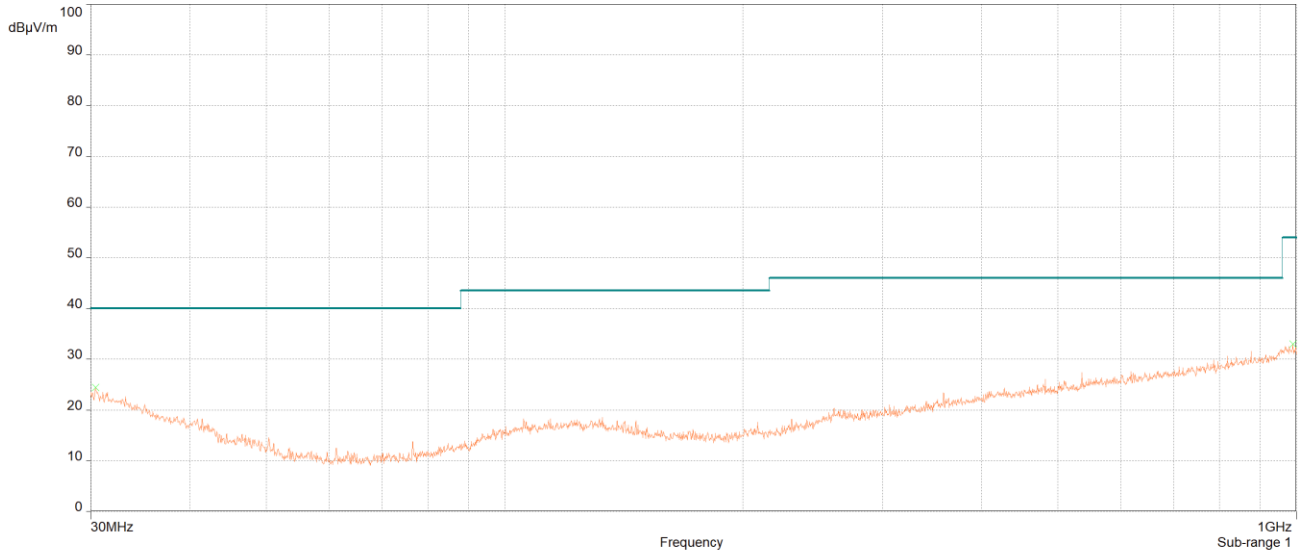
Radiated Emissions, Below 1GHz, Test Setup



Radiated Emissions, Above 1GHz, Test Setup

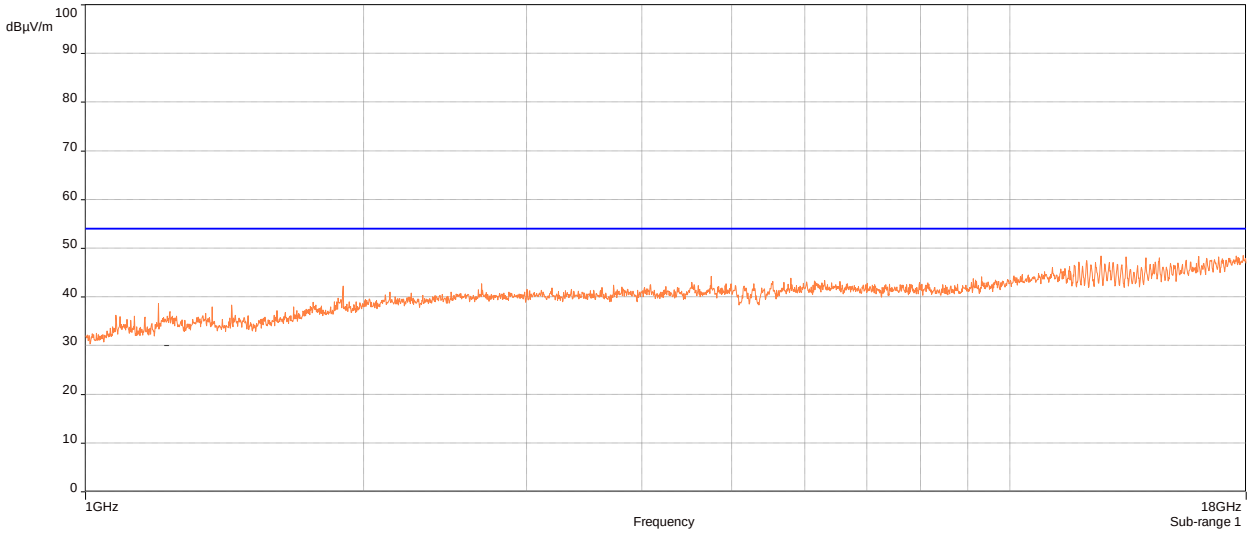


Vertical

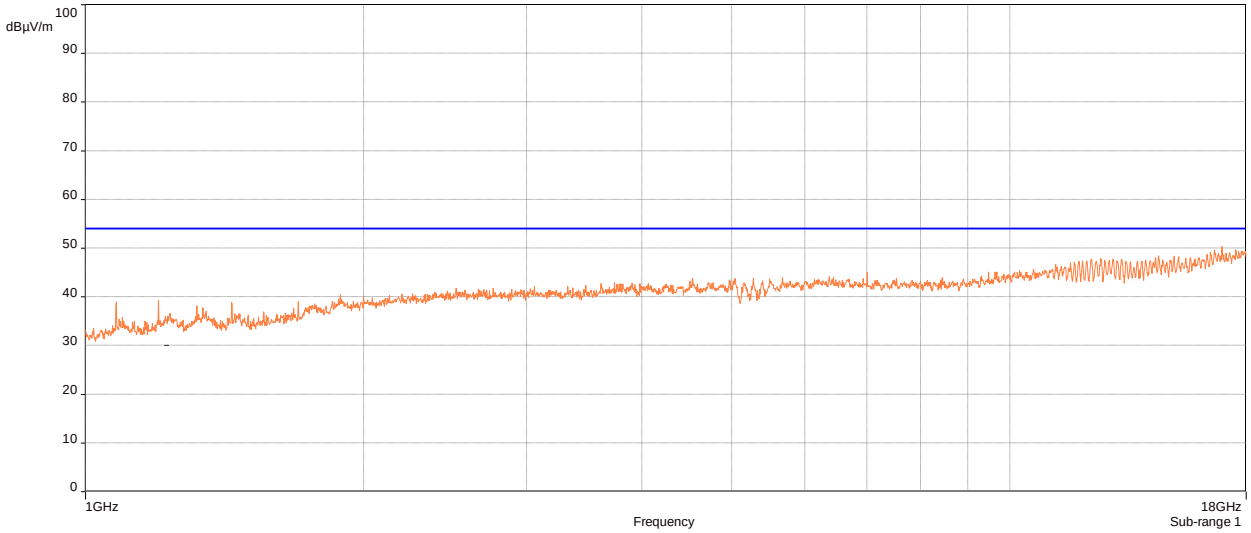


Horizontal

Radiated Emissions, 30 MHz - 1 GHz, (worst case)

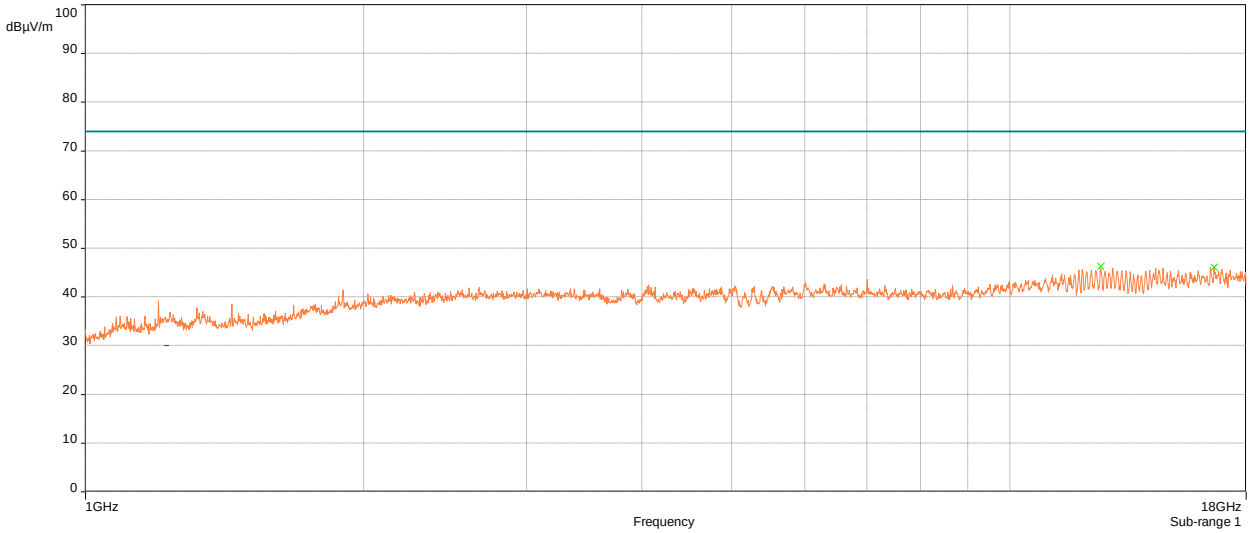


Vertical

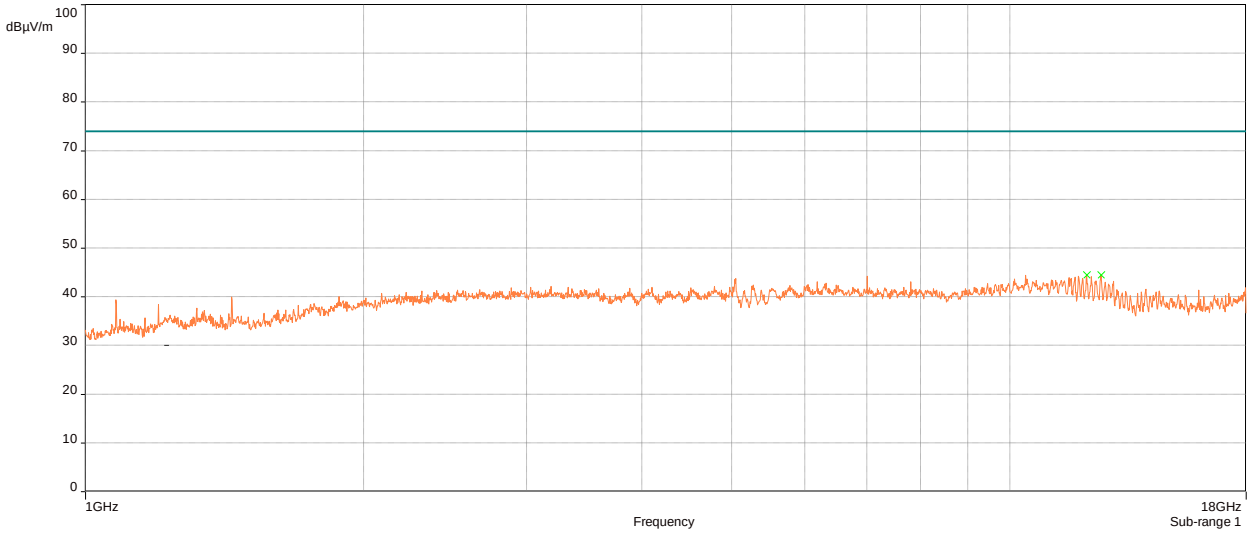


Horizontal

Radiated Spurious Emissions Requirements, Low Channel, Average

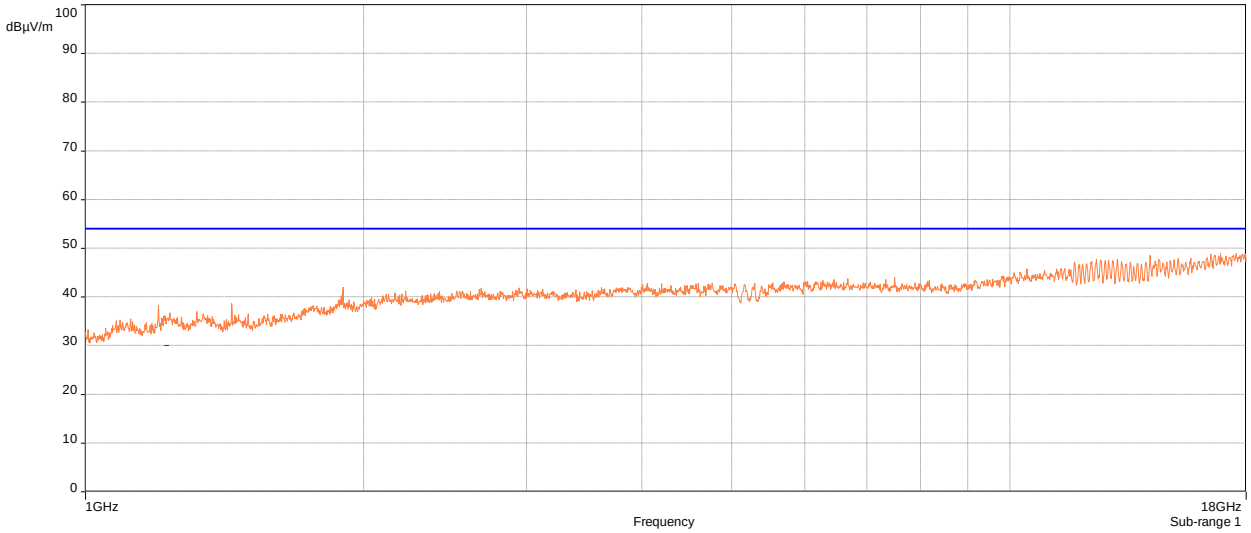


Vertical

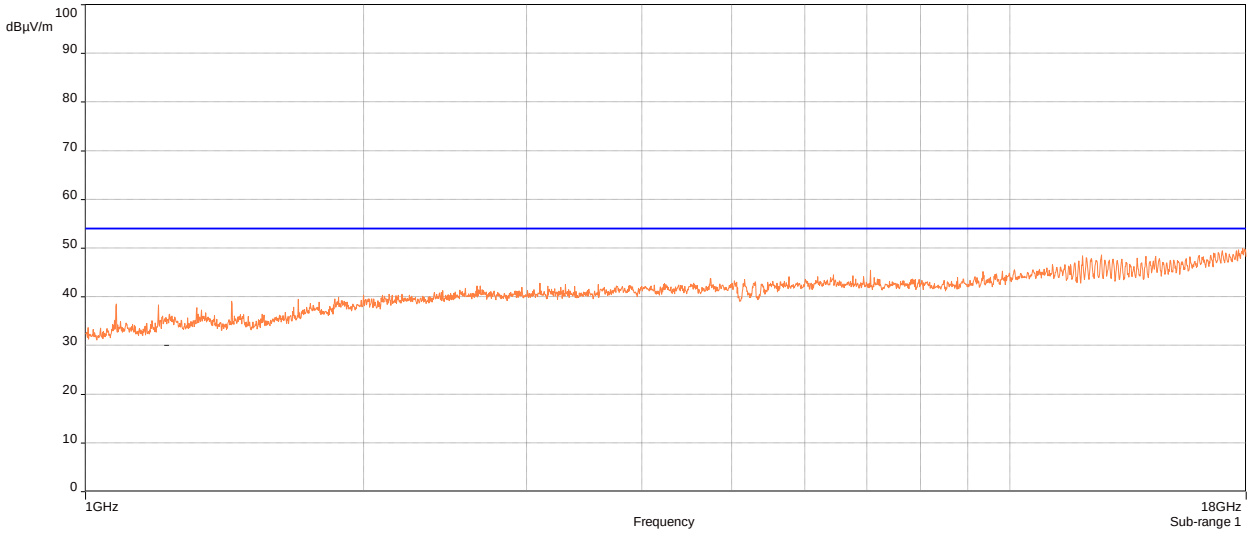


Horizontal

Radiated Spurious Emissions Requirements, Low Channel, Peak

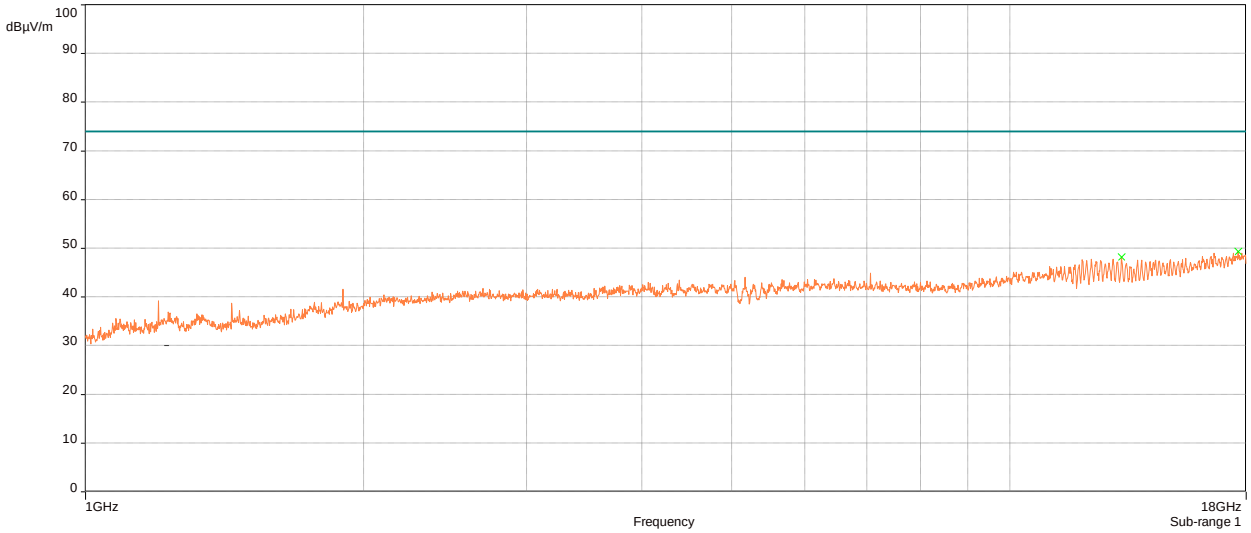


Vertical

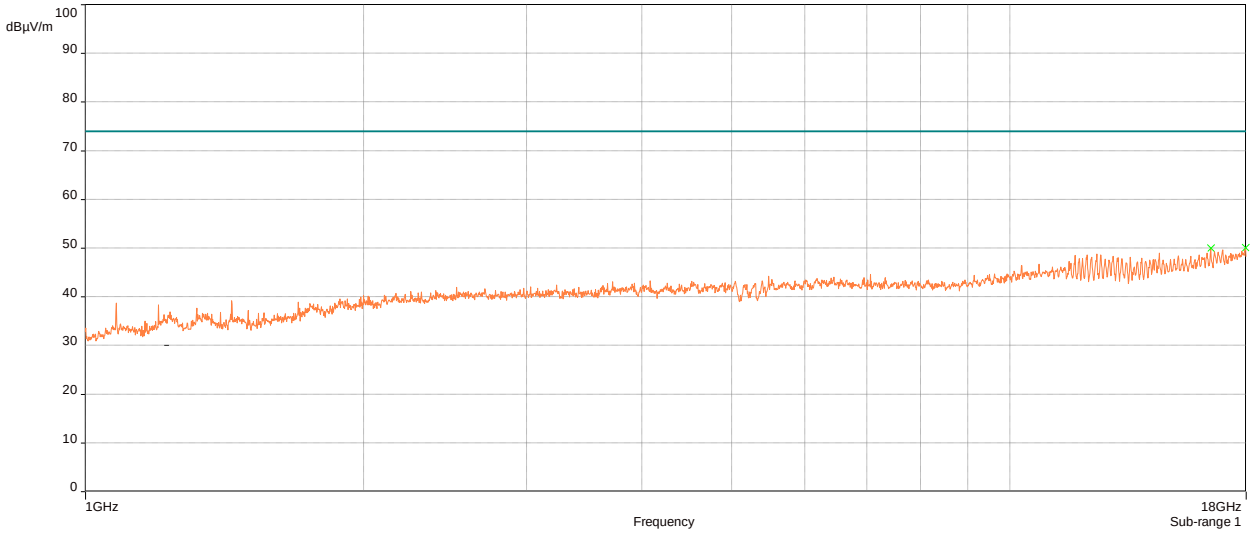


Horizontal

Radiated Spurious Emissions Requirements, Mid Channel, Average

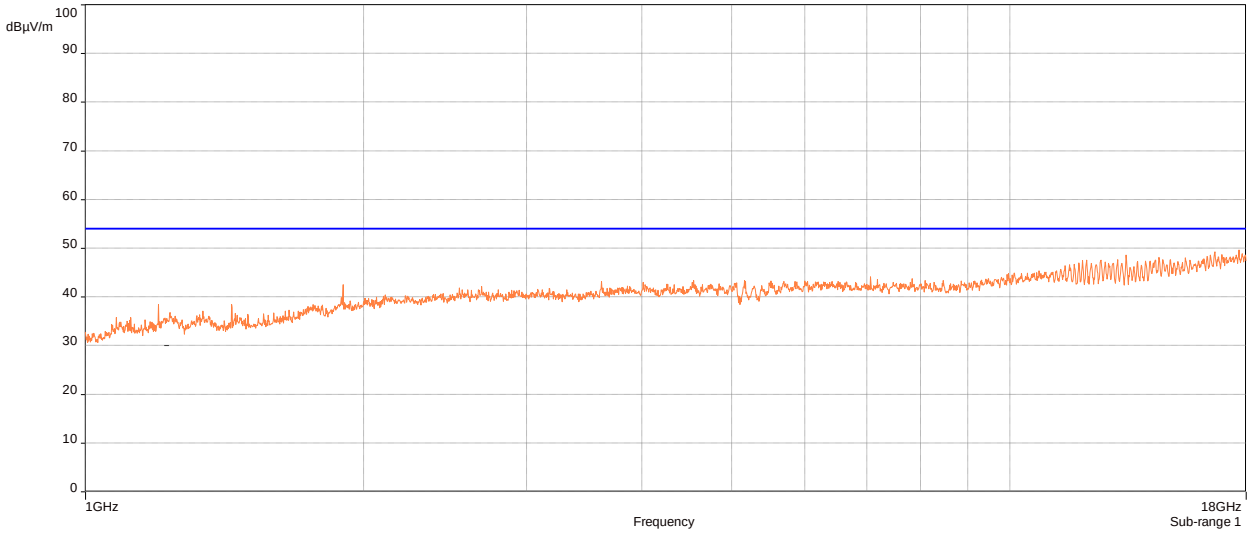


Vertical

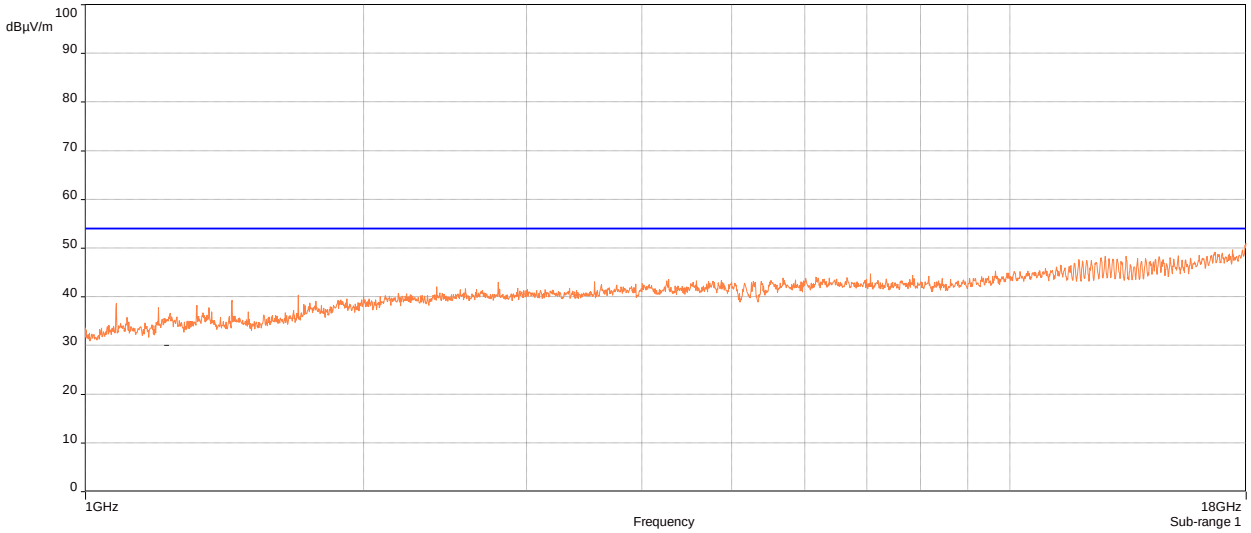


Horizontal

Radiated Spurious Emissions Requirements, Mid Channel, Peak

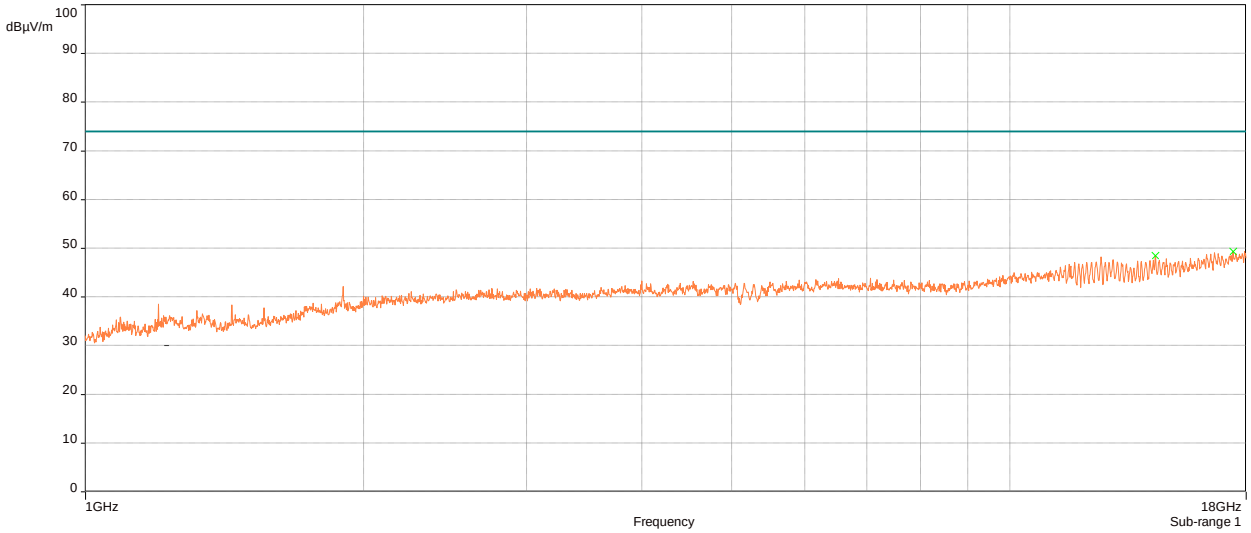


Vertical

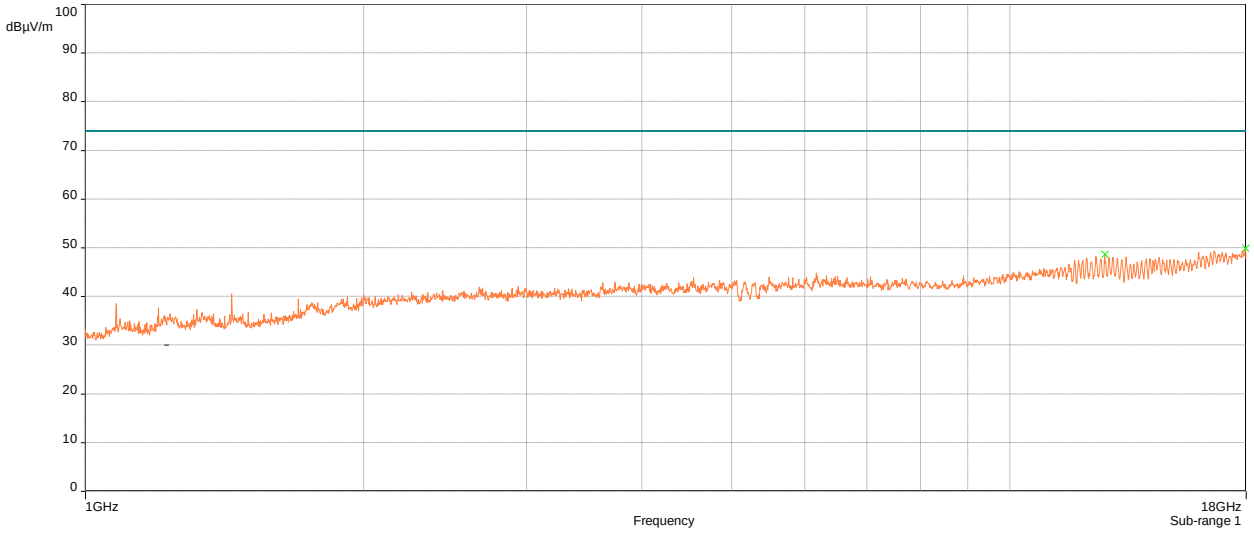


Horizontal

Radiated Spurious Emissions Requirements, High Channel, Average

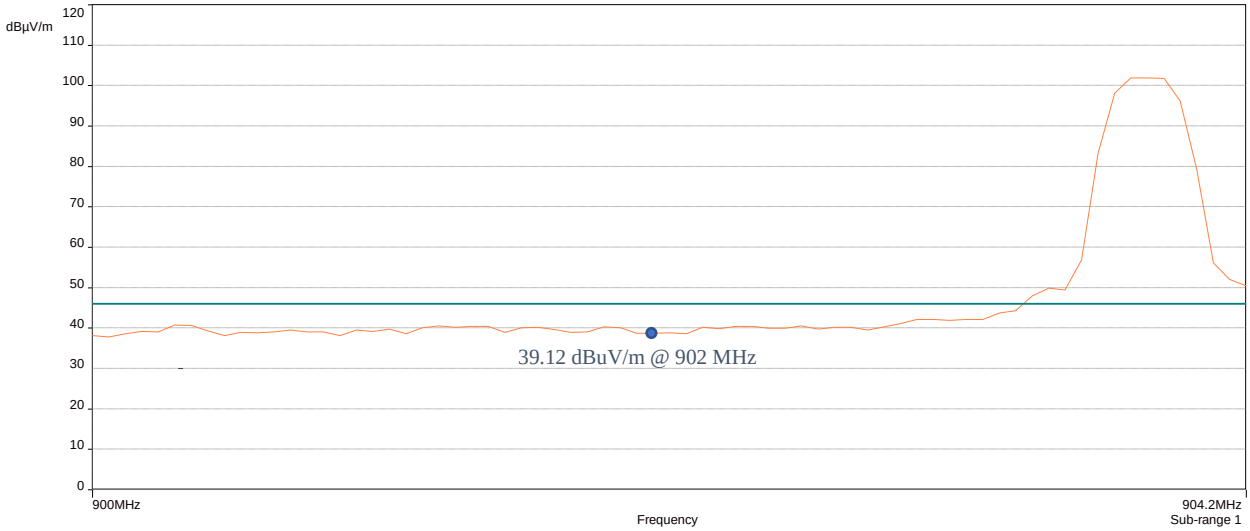


Vertical

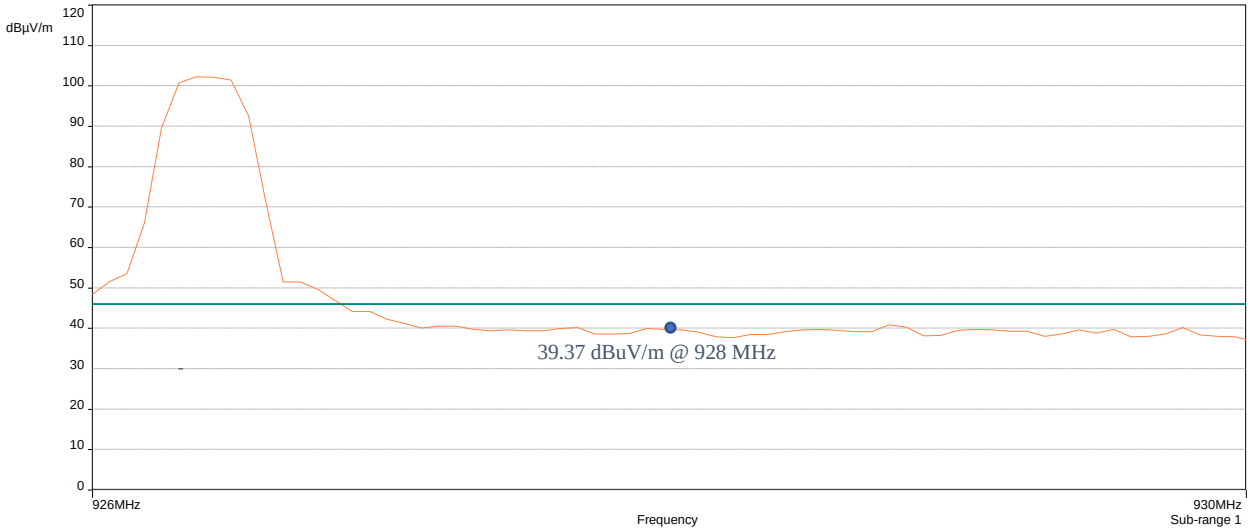


Horizontal

Radiated Spurious Emissions Requirements, High Channel, Peak



Radiated Band Edge, Low Channel, Worst Case



Radiated Band Edge, High Channel, Worst Case

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.

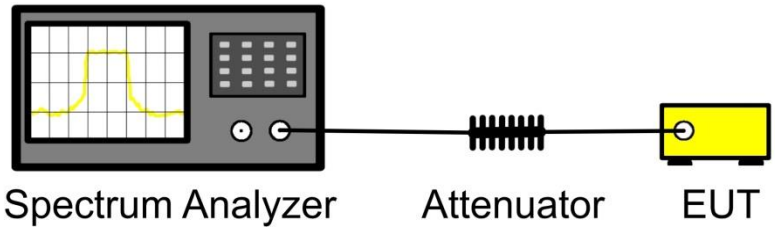
Since the EUT had an integral antenna, conducted measurements could not be performed. Measurements needed to be taken radiated. An antenna was located 3 m away from the EUT and plots were taken. The EUT was rotated through all three orthogonal axes. The plots were corrected for both antenna correction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

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

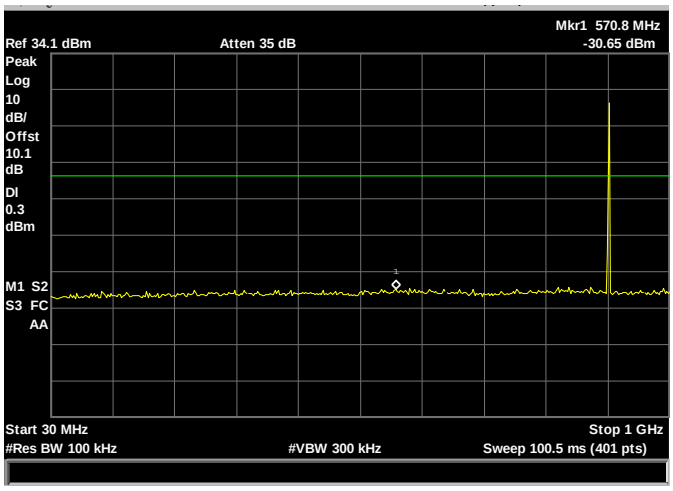
Test Results: The EUT was compliant with this requirement.

Test Engineer: Arsalan Hasan

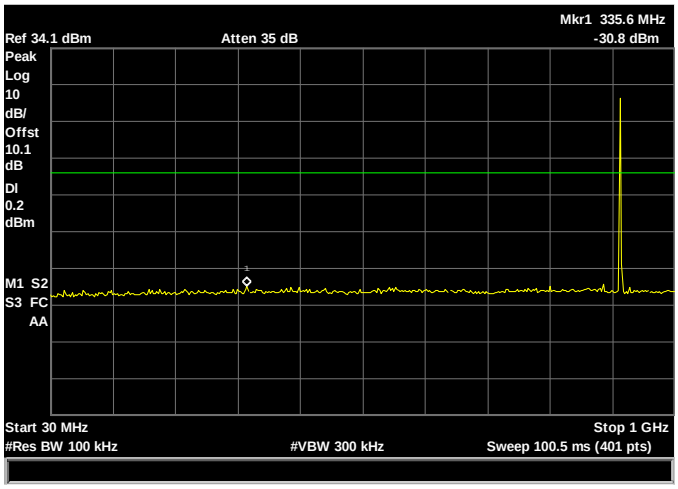
Test Date: June 4, 2020



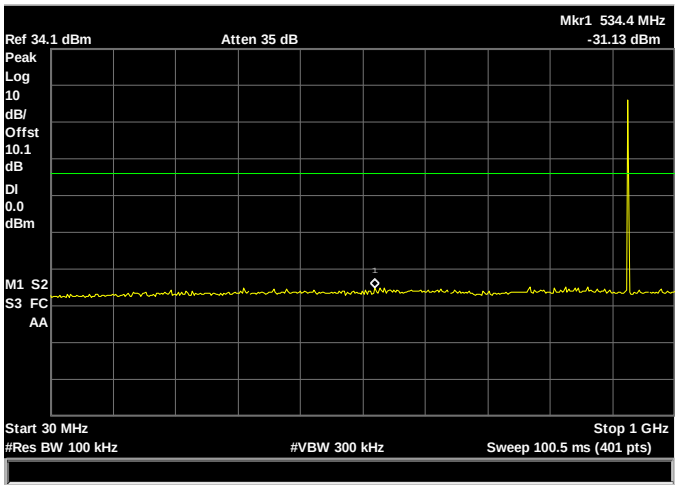
Block Diagram, Conducted Spurious Emissions Test Setup



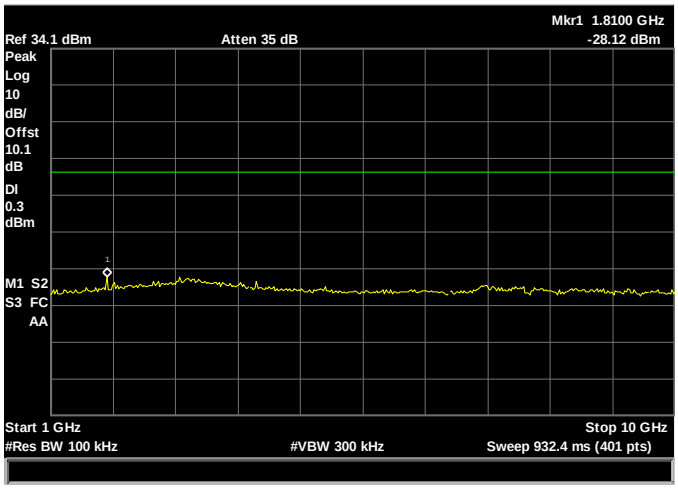
RF Conducted Spurious Emissions Requirements, 30MHz-1GHz Low Channel



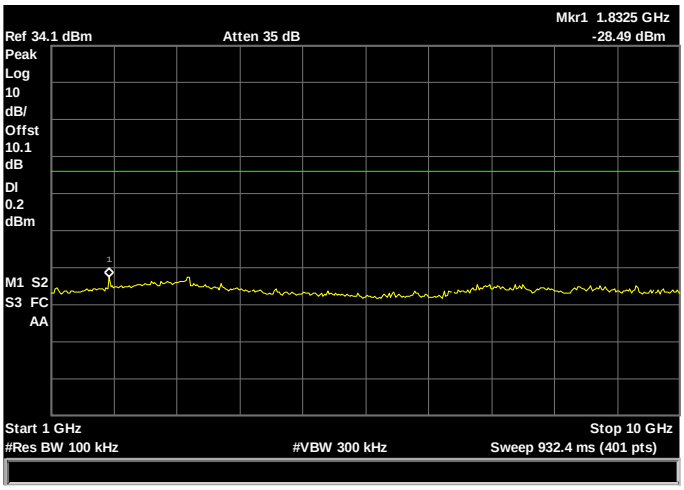
RF Conducted Spurious Emissions Requirements, 30MHz-1GHz Mid Channel



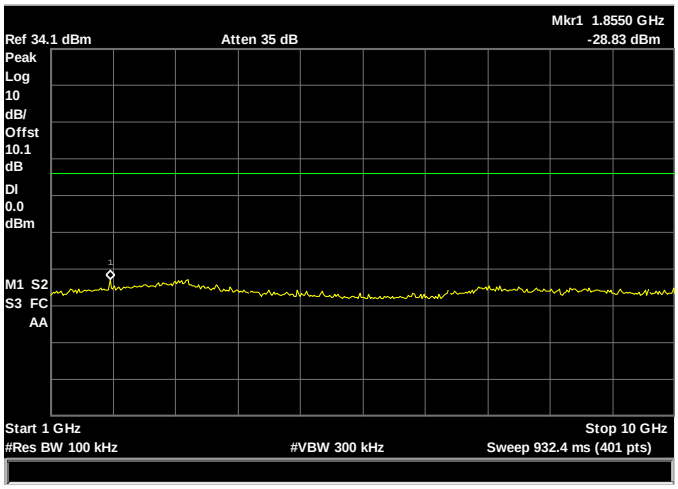
RF Conducted Spurious Emissions Requirements, 30MHz-1GHz High Channel



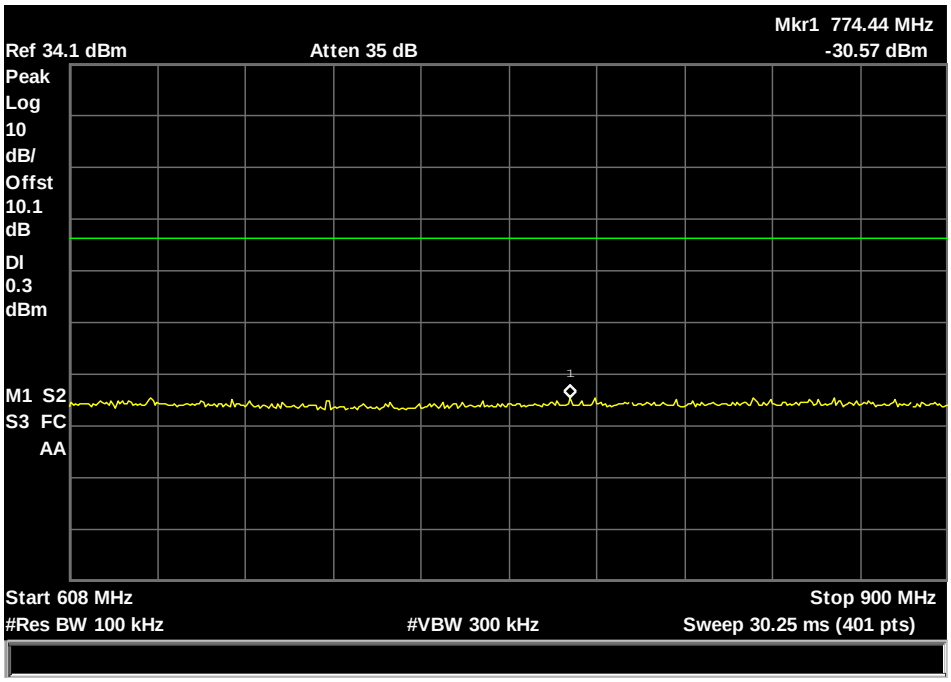
RF Conducted Spurious Emissions Requirements, 1GHz-10GHz Low Channel



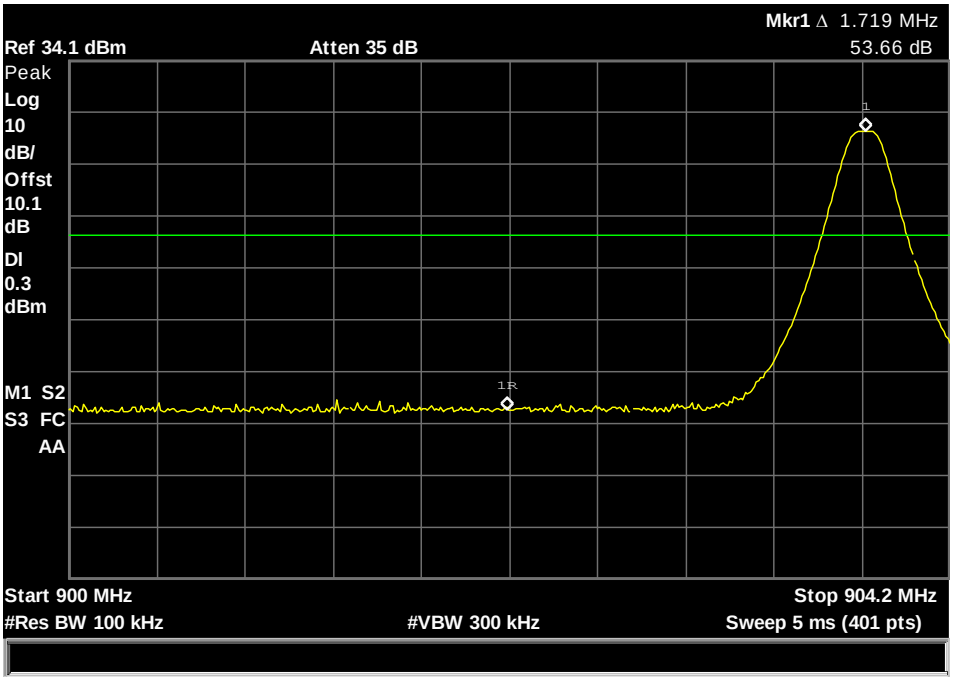
RF Conducted Spurious Emissions Requirements, 1GHz-10GHz Mid Channel



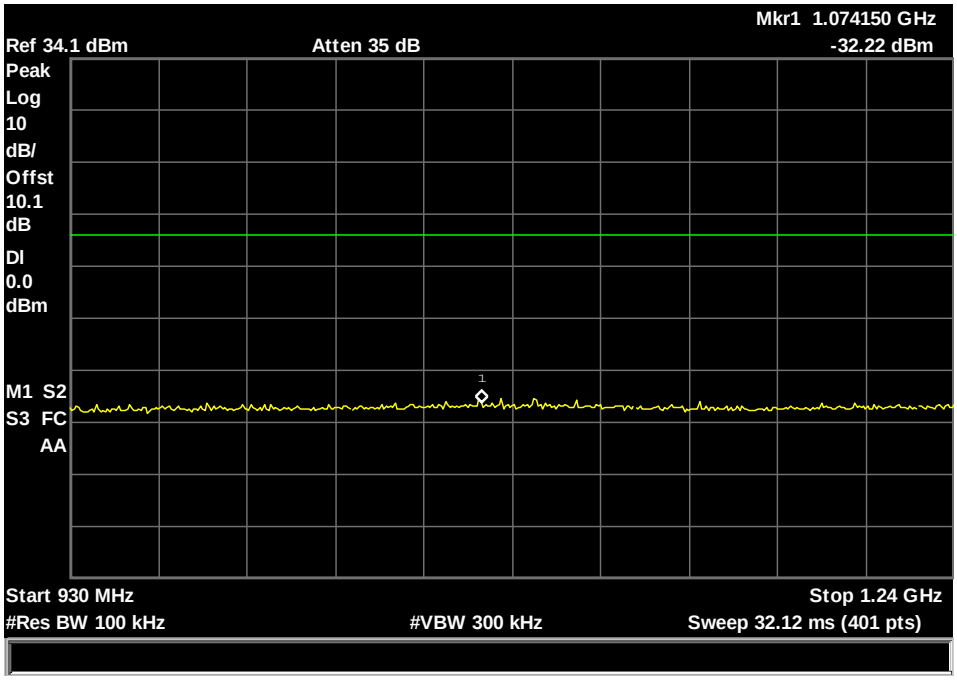
RF Conducted Spurious Emissions Requirements, 1GHz-10GHz High Channel



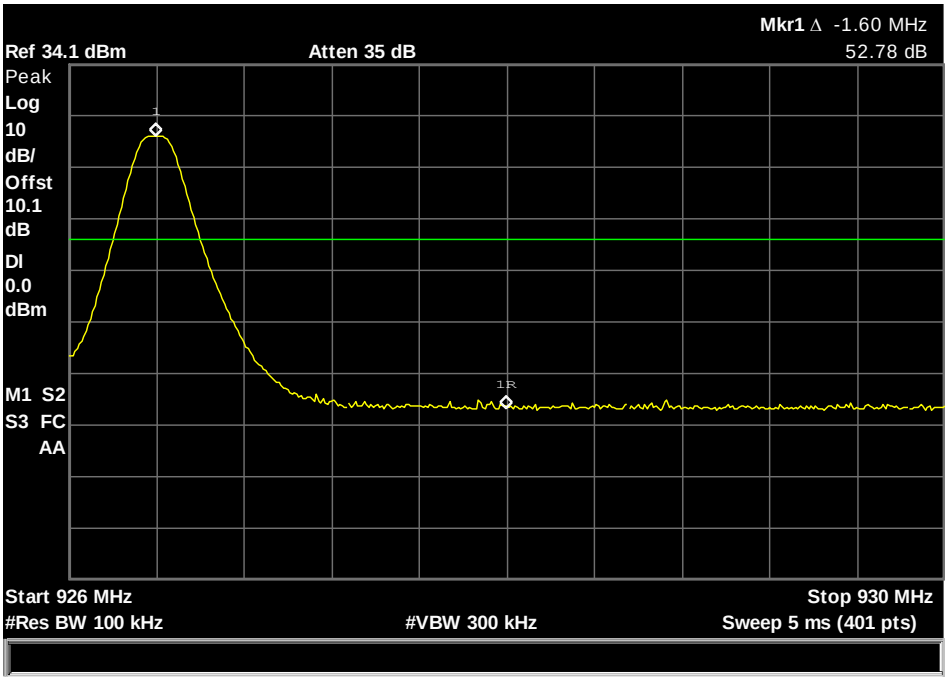
RF Conducted Band Edge, 608MHz-614MHz Restricted Band, Low Channel



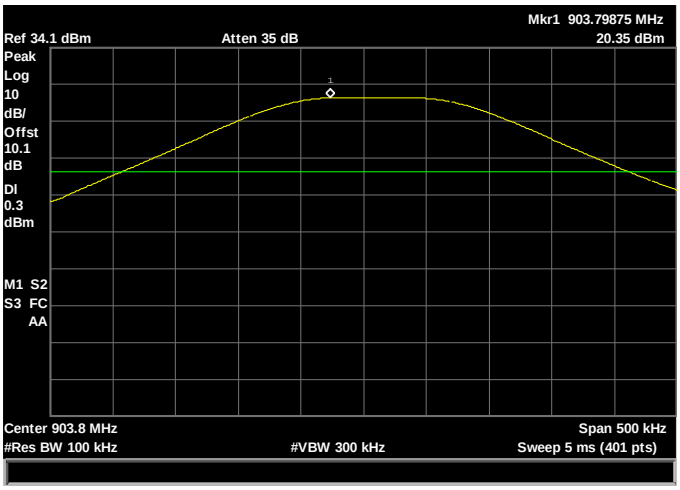
RF Conducted Band Edge, Low Channel



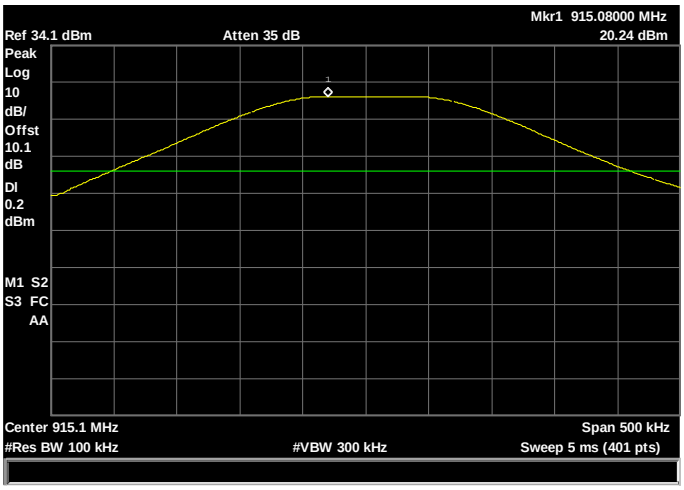
RF Conducted Band Edge, 960MHz-1240MHz Restricted Band, High Channel



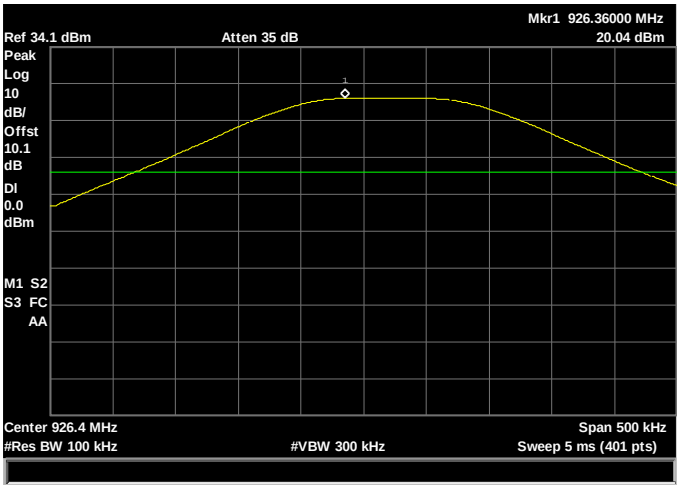
RF Conducted Band Edge, High Channel



RF Conducted Band Edge, Reference Level Low Channel



RF Conducted Band Edge, Reference Level Mid Channel



RF Conducted Band Edge, Reference Level High Channel

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
1S2399	TURNTABLE/MAST CONTROLLER	SUNOL SCIENCES	SC99V	SEE NOTE 1	SEE NOTE 1
1S2600	BILOG ANTENNA	TESEQ	CBL6112D	03/19/2021	03/19/2022
1S3826	DRG HORN ANTENNA	ETS-LINDGREN	3117	12/03/2020	12/03/2022
1S2003	PXA Signal Analyzer	Keysight	N9030B	09/15/2020	09/15/2021
1S2587	PRE AMPLIFIER	AML COMMUNICATIONS	AML0126L3801	SEE NOTE 1	SEE NOTE 1
1S2653	AMPLIFIER	SONOMA INSTRUMENT	310 N	SEE NOTE 1	SEE NOTE 1
1S2486	5 METER CHAMBER	PANASHIELD - ETS	5M	SEE NOTE 2	SEE NOTE 2

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.

Test Equipment

End of Report