

RF Test Report

Project Number: 5387191 **Offer Number:** SUW-202508008725

Report Number: SUW5387191EMC05R1 **Revision Level:** 1

Client: UTEC, Inc. (c/o Carrier Corporation)

111 E. Wayne St., Suite 800

Fort Wayne, Indiana 46802, USA

UTEC, Inc. and Carrier Corporation are affiliated to Carrier Global Corporation

Equipment Under Test: Refrigerated Shipping Container Controller
(Carrier Container Refrigeration Unit Controller)

Product Name: Micro-Link 5 Controller

Model: ML5

FCC ID: 2AK6N-MICROLINK5

IC: 703A-MICROLINK5

Applicable Standards: FCC Part 15 Subpart C, § 15.247

RSS-247 Issue 4; RSS-GEN Issue 5

ANSI C63.10-2020

ANSI C63.10-2020+Cor.1-2023+C63.10a-2024 + Errata to C63.10a-2024

Report issued on: 05 May 2026

Test Result: Compliant



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

Prepared by:

A handwritten signature in blue ink, appearing to read 'Martin Taylor'.

Martin Taylor, Project Engineer

Reviewed by:

A handwritten signature in black ink, appearing to read 'Brandon E. Osborn'.

Brandon Osborn, Project Engineer

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Bandwidth	15.247(a)(2)	RSS-247 S6.3.1(a) RSS-GEN S6.7	Compliant
Output Power	15.247(b)(3)	RSS-247 S6.3.2	Compliant
Power Spectral Density	15.247(e)	RSS-247 S6.3.1(b)	Compliant
Conducted Spurious Emissions / Band Edge	15.247(d)	RSS-247 S6.6	Compliant
Emissions in Restricted Frequency Bands	15.247(d) 15.205, 15.209	RSS-GEN S8.9, S8.10	Compliant
Band Edge Emissions in Restricted Frequency Bands	15.205, 15.209	RSS-GEN S8.9, S8.10	Compliant
AC Powerline Conducted Emissions	15.207	RSS-GEN S8.8	Compliant
Antenna Requirement	15.203	RSS-GEN S6.8	Compliant ⁽¹⁾

(1) The device uses a PCB trace PIFA antenna which cannot be replaced by the end user.

1.1 Modifications Required for Compliance

None.

2 General Information

2.1 Client Information

Company Name: UTEC, Inc. (c/o Carrier Corporation)
Address: 111 E. Wayne St., Suite 800
City, State, Zip, Country: Fort Wayne, Indiana 46802, USA
UTEC, Inc. and Carrier Corporation are affiliated to Carrier Global Corporation

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01
CAB ID: US0186

2.3 General Information of EUT

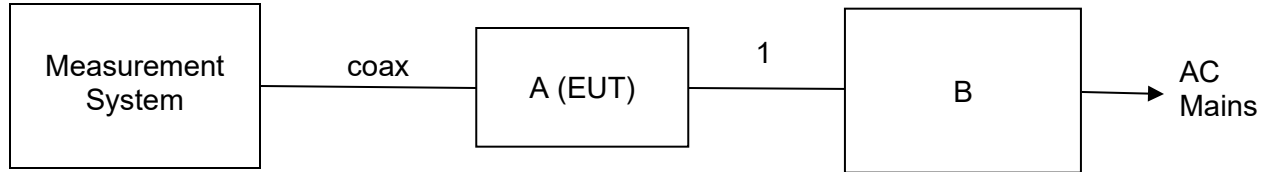
Equipment Under Test: Refrigerated Shipping Container Controller
(Carrier Container Refrigeration Unit Controller)
Product Name: Micro-Link 5 Controller
Model: ML5
Firmware Version (FVIN): 8.9.0.0.79
Serial Numbers: 4120W008381 (Conducted Sample)
3821W039479 (Radiated Sample for AC Powerline Conducted Emissions)
3525W280709 (Radiated Sample for Radiated Spurious Emissions)
FCC ID: 2AK6N-MICROLINK5
IC: 703A-MICROLINK5
Frequency Range: 2402 – 2480 MHz
Data Modes: Bluetooth Low Energy (BLE) – GFSK
Antenna: PCB Trace PIFA (4.54dBi gain – per antenna datasheet)
Rated Voltage: 5V_{DC} to Micro Board USB port or
Dual phase 18V_{AC} to IO Board
Test Voltage: 5V_{DC} to Micro Board USB port (for Conducted Measurements)
Dual phase 18V_{AC} to IO Board (for Radiated Measurements)
Sample Received Date: 03 February 2023
17 February 2026 (S/N: 3525W280709)
Dates of testing: 15 March to 13 April 2023 and 11-18 March 2026

2.4 Operating Modes and Conditions

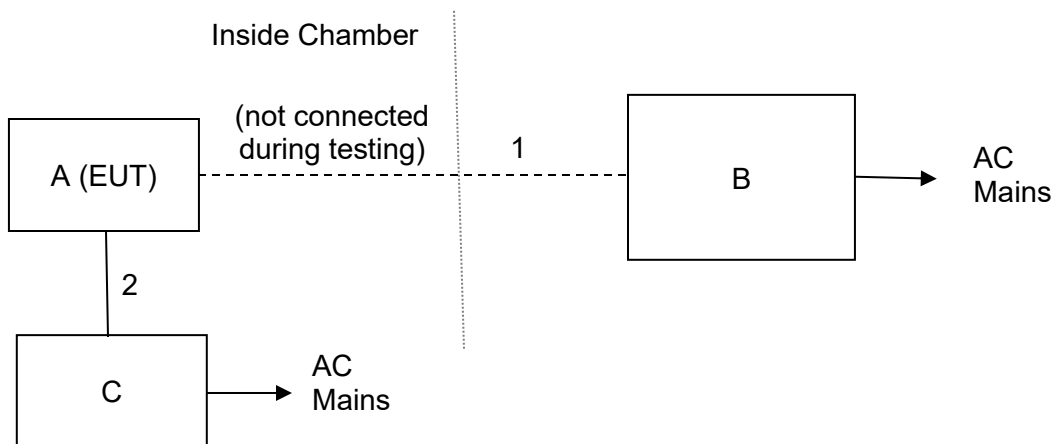
The EUT was running test mode firmware with TI tools which allowed the following:

- 1) selecting low, middle and high BLE channels;
- 2) selecting the modulation scheme as used in normal operation, but with 100% duty cycle;
- 3) setting the power level. [The maximum power setting of 7 was used for all tests.]

2.5 EUT Connection Block Diagram – Conducted Measurements



2.6 EUT Connection Block Diagram – Radiated Measurements



2.7 System Configurations

Device Reference	Manufacturer	Description	Model Number	Serial Number
A	UTEC, Inc.	Micro-Link 5 Controller (EUT)	ML5	4120W008381 3821W039479 3525W280709
B	Lenovo	Laptop Computer	T420	R8-X9XFV
C	UTEC, Inc.	Transformer Box	(none)	(none)

2.8 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	USB	EUT	Laptop Computer	1.0	N	N
2	AC Power (5-wire harness)	EUT	Transformer Box	0.7	N	N

3 Bandwidth

3.1 Test Result

Test Description	Test Specification		Test Result
DTS Bandwidth (6dB)	15.247(a)(2)	RSS-247 S6.3.1(a)	Compliant
Occupied Bandwidth (99%)	2.1049	RSS-GEN S6.7	Reported

3.2 Test Methods

The DTS 6dB bandwidth measurements were performed using the procedure from ANSI C63.10 clause 11.8, and the 99% occupied bandwidth measurements were performed using the procedure from ANSI C63.10 clause 6.9.3. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for these tests.

Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 19.2 °C
 Relative Humidity: 51.2 %
 Atmospheric Pressure: 98.2 kPa

3.4 Test Equipment

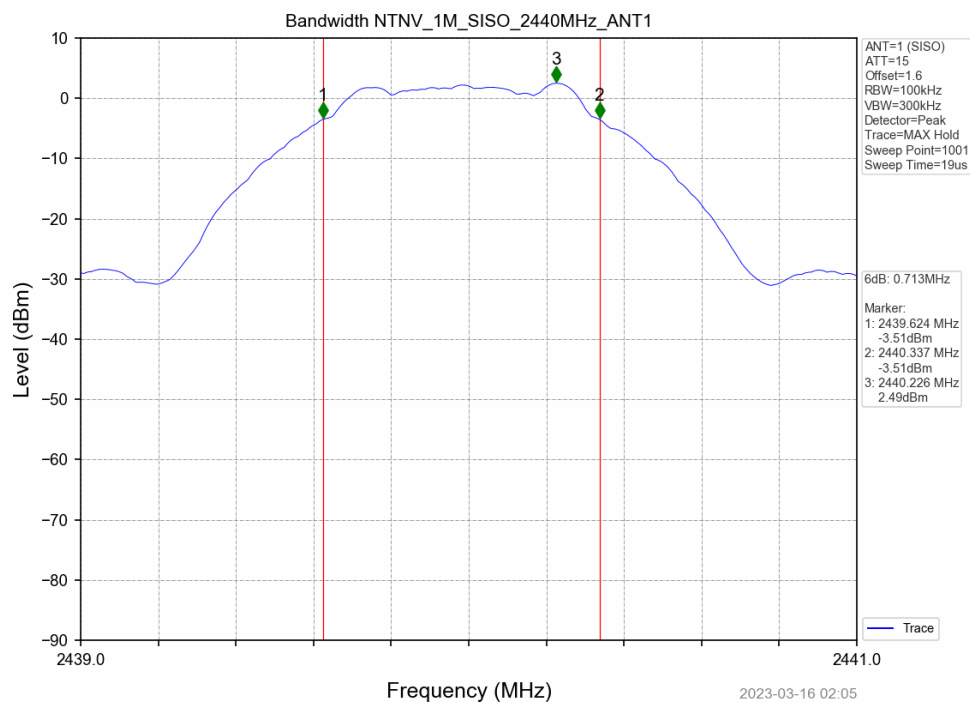
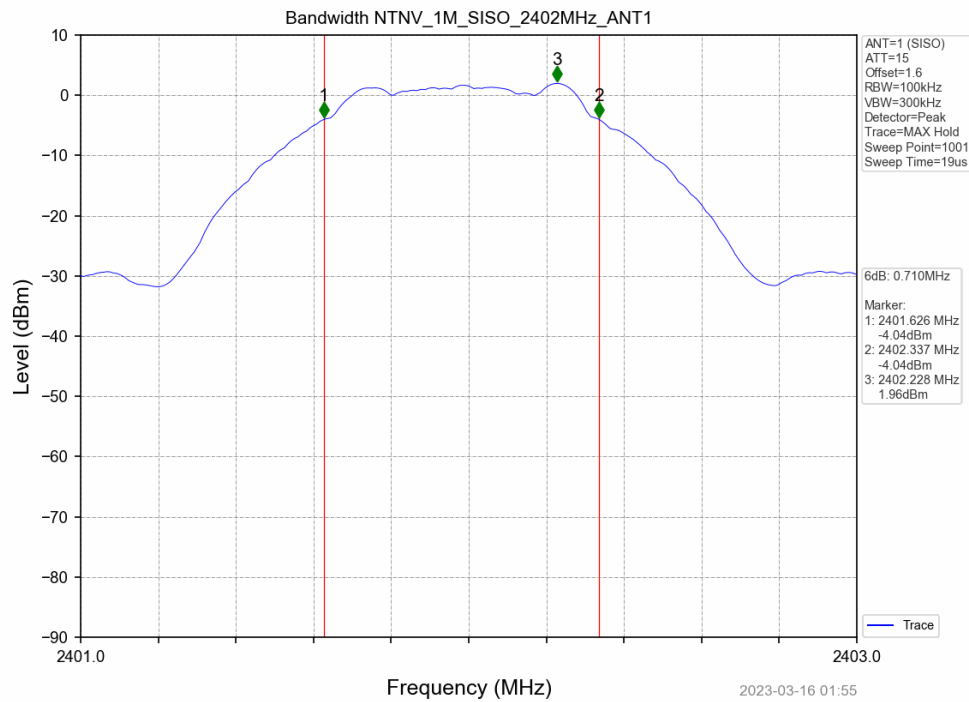
Test End Date: 15-Mar-2023

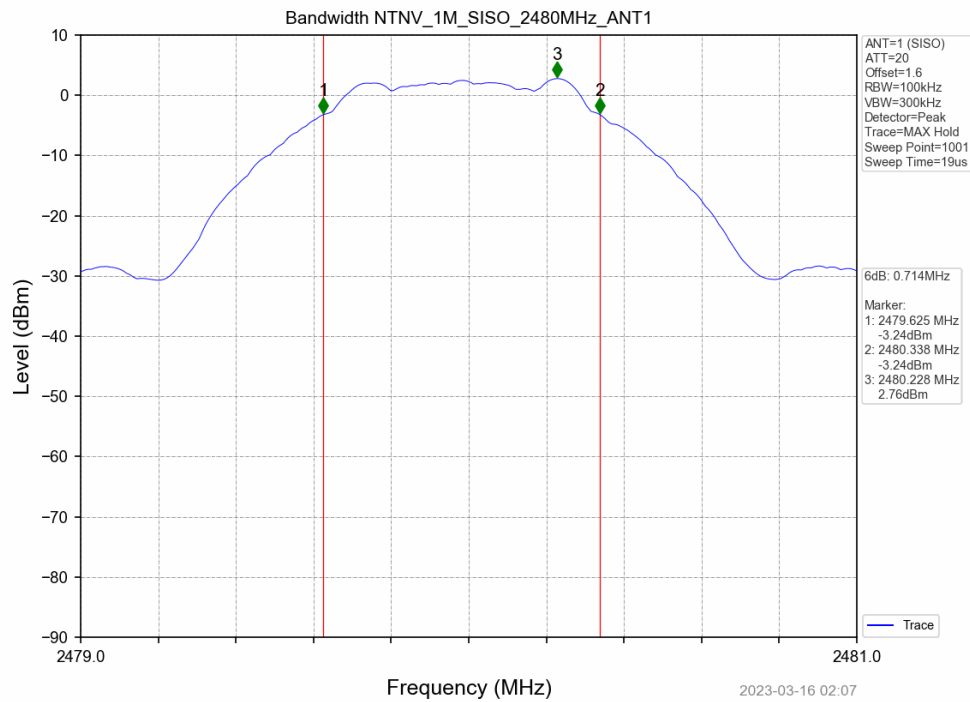
Tester: DA

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	7-Dec-2022	7-Dec-2023
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
TSTPASS SWITCHBOX	SB1	TSTPASS	20168	CNR	CNR
USB WIDEBAND POWER SENSOR	U2021XA	TSTPASS (KEYSIGHT TECHNOLOGIES)	20168C	24-Aug-2022	24-Aug-2023

3.5 Test Data – DTS Bandwidth (6dB)

Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth	Verdict
				Test Result (MHz)	
1M	2402	SISO	1	0.710	PASS
	2440	SISO	1	0.713	PASS
	2480	SISO	1	0.714	PASS

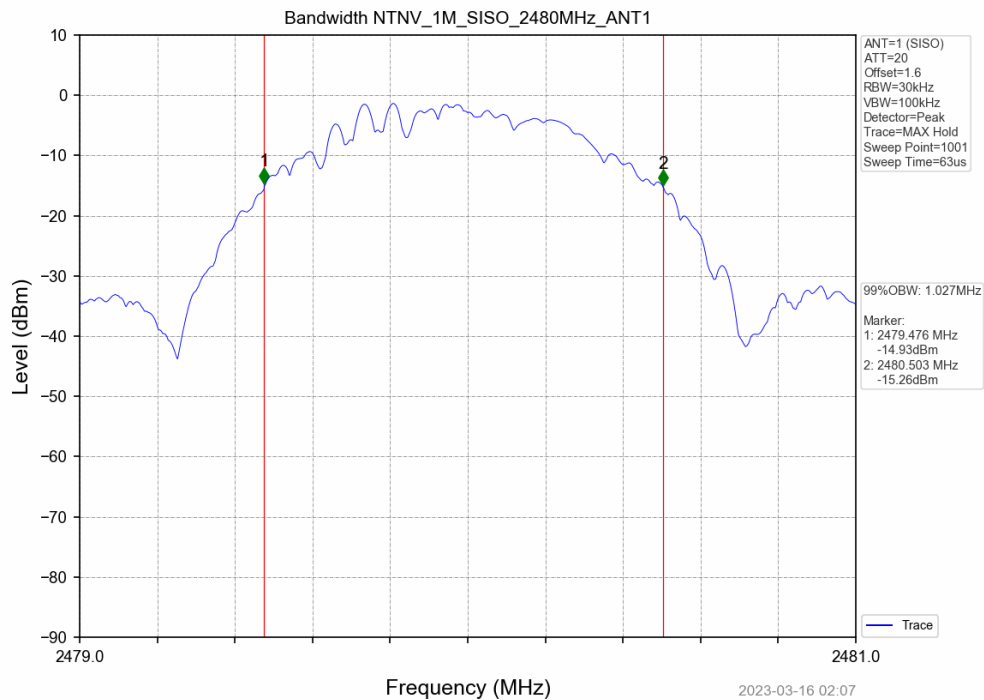




3.6 Test Data – 99% Occupied Bandwidth

Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth	
				Test Result (MHz)	
1M	2402	SISO	1	1.027	Only for Report Use
	2440	SISO	1	1.029	Only for Report Use
	2480	SISO	1	1.027	Only for Report Use

Sample Plot



4 Output Power

4.1 Test Result

Test Description	Test Specification		Test Result
Fundamental Emission Output Power	15.247(b)(3)	RSS-247 S6.3.2	Compliant

4.2 Test Method

Fundamental maximum peak conducted output power measurements were performed using the method described in ANSI C63.10-2020 clause 11.9.1.1. This procedure is referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for this test.

Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. For using antennas with greater than 6dBi of gain, the limit is reduced in dB by the amount the gain exceeds 6dBi (e.g. for a 7.4dBi antenna, the limit is reduced from 30dBm to 28.6dBm). Also, the e.i.r.p. shall not exceed 4 Watts (36 dBm) based on RSS-247 S5.4 (d).

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 19.2 °C
 Relative Humidity: 51.2 %
 Atmospheric Pressure: 98.2 kPa

4.4 Test Equipment

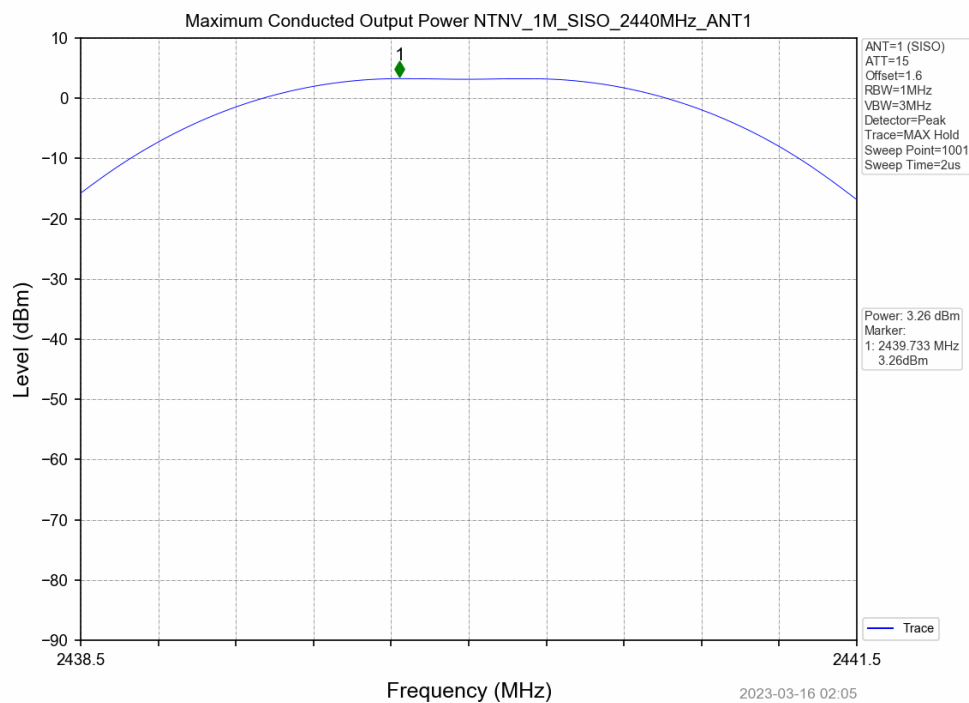
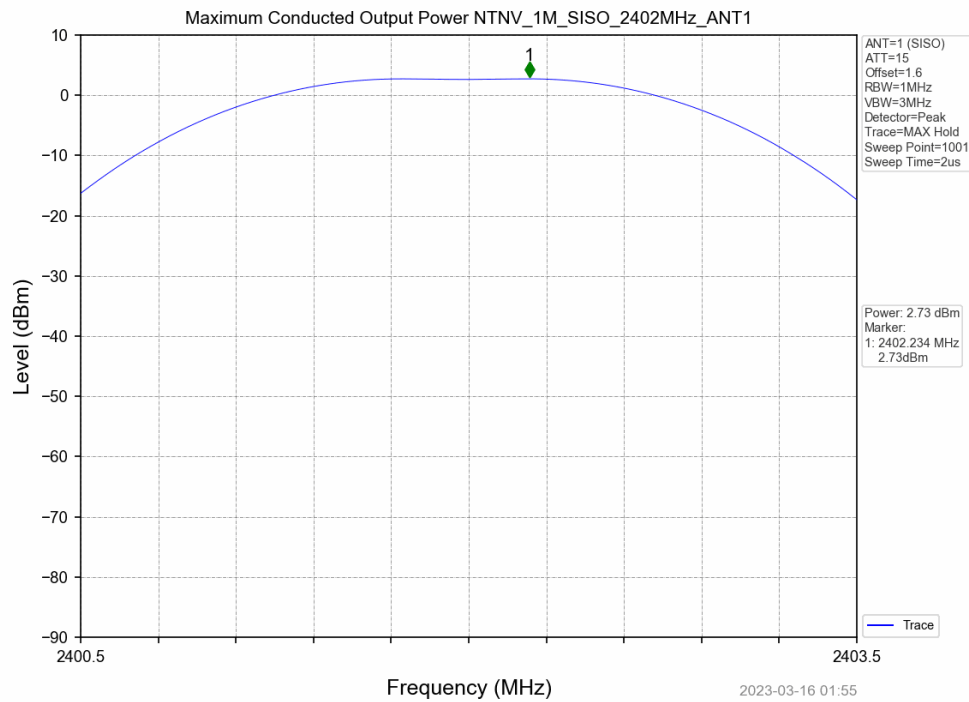
Test End Date: 15-Mar-2023

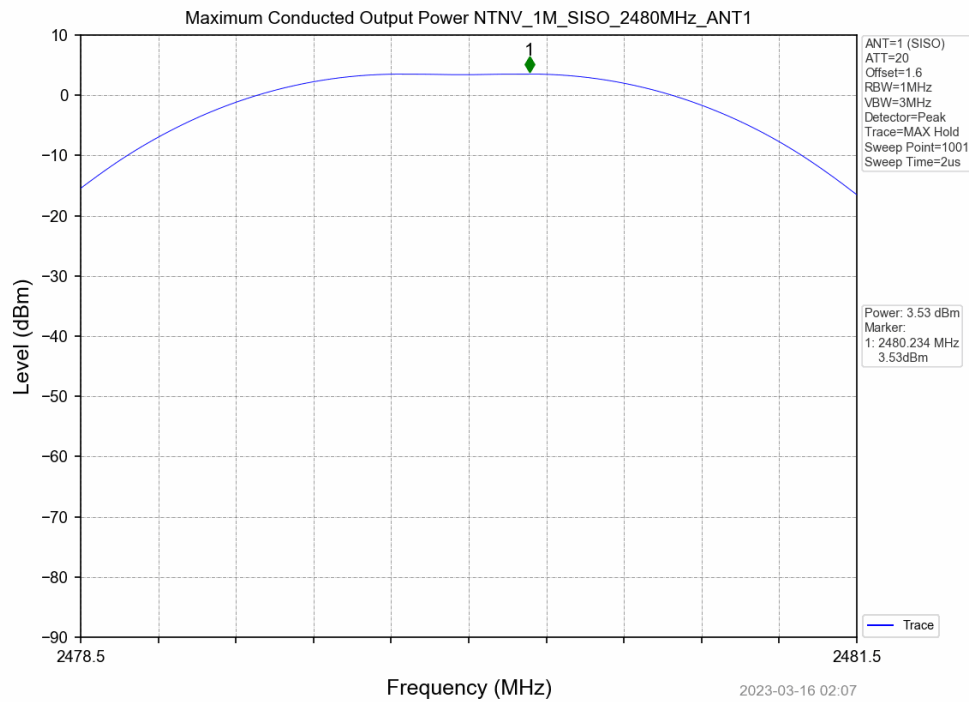
Tester: DA

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	7-Dec-2022	7-Dec-2023
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
TSTPASS SWITCHBOX	SB1	TSTPASS	20168	CNR	CNR
USB WIDEBAND POWER SENSOR	U2021XA	TSTPASS (KEYSIGHT TECHNOLOGIES)	20168C	24-Aug-2022	24-Aug-2023

4.5 Test Data

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
1M	2402	SISO	2.73	30	PASS
	2440	SISO	3.26	30	PASS
	2480	SISO	3.53	30	PASS





5 Power Spectral Density

5.1 Test Result

Test Description	Test Specification		Test Result
Power Spectral Density	15.247(e)	RSS-247 S6.3.1(b)	Compliant

5.2 Test Method

Peak power spectral density measurements were performed using the procedures from ANSI C63.10-2020 clause 11.10.2. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for this test.

Limit

The maximum limit is 8 dBm / 3 kHz.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 19.2 °C
 Relative Humidity: 51.2 %
 Atmospheric Pressure: 98.2 kPa

5.4 Test Equipment

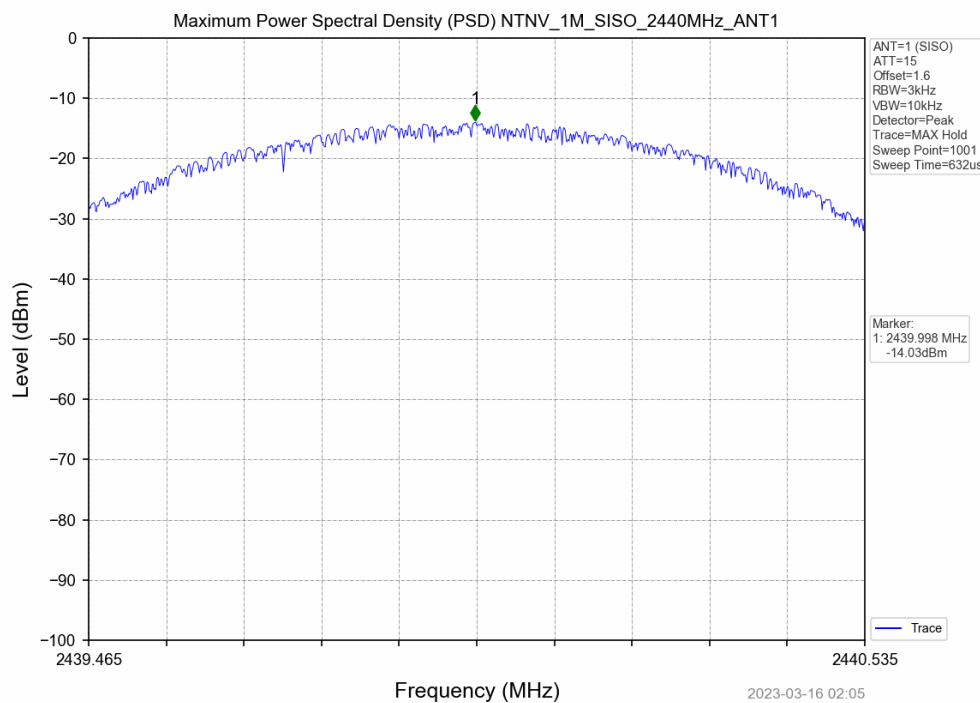
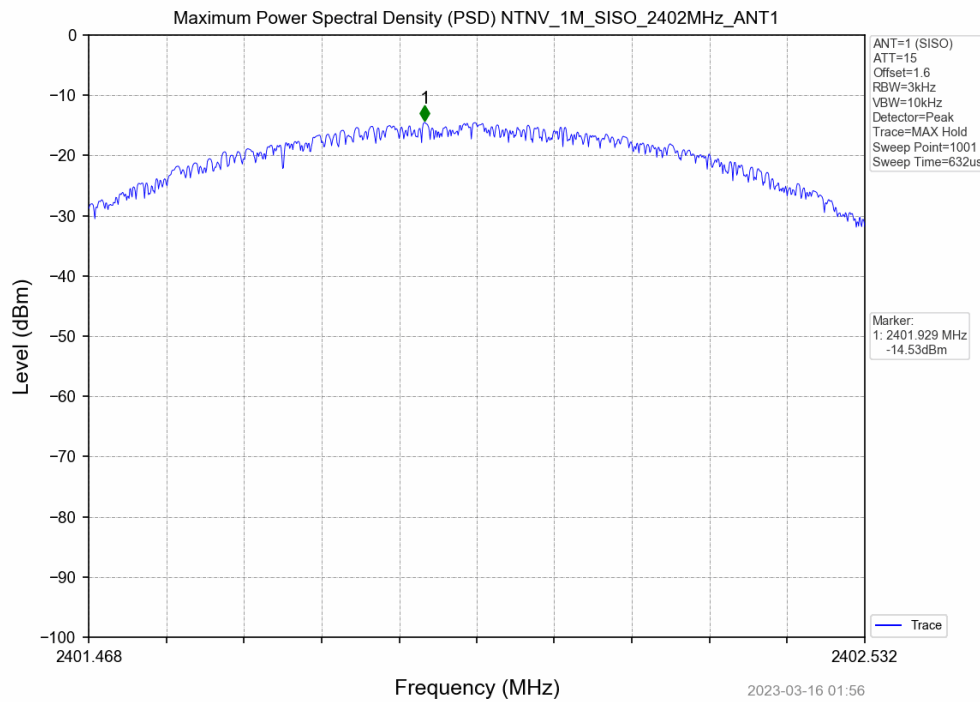
Test End Date: 15-Mar-2023

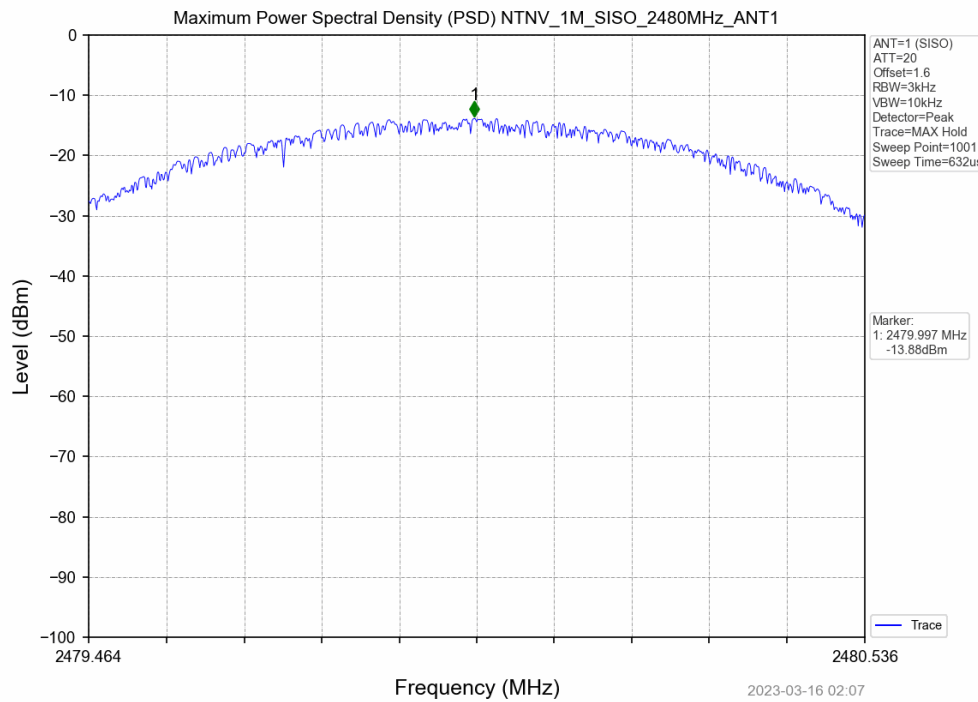
Tester: DA

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	7-Dec-2022	7-Dec-2023
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
TSTPASS SWITCHBOX	SB1	TSTPASS	20168	CNR	CNR
USB WIDEBAND POWER SENSOR	U2021XA	TSTPASS (KEYSIGHT TECHNOLOGIES)	20168C	24-Aug-2022	24-Aug-2023

5.5 Test Data

Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
1M	2402	SISO	-14.53	≤8	PASS
	2440	SISO	-14.03	≤8	PASS
	2480	SISO	-13.88	≤8	PASS





6 Conducted Spurious Emissions / Band Edge

6.1 Test Result

Test Description	Test Specification		Test Result
Conducted Spurious and Band Edge Emissions	15.247(d)	RSS-247 S6.6	Compliant

6.2 Test Method

Conducted band edge and spurious band emissions in non-restricted frequency bands were measured using the method defined in ANSI C63.10 clause 11.11. This procedure is referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The device does not utilize BLE 2Mbps data mode, so only BLE 1Mbps mode was tested.

Limit

Because the maximum peak conducted output power was used to determine compliance with the output power limits, the limit in any 100 kHz band outside of the authorized band is 20 dB below the maximum in-band peak level.

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 19.2 °C
 Relative Humidity: 51.2 %
 Atmospheric Pressure: 98.2 kPa

6.4 Test Equipment

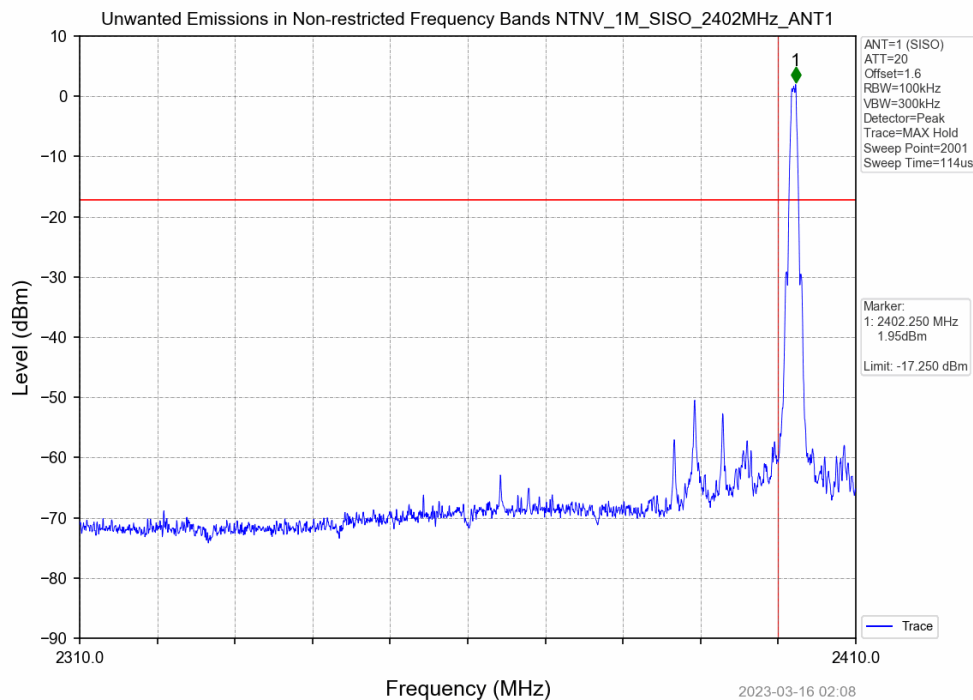
Test End Date: 15-Mar-2023

Tester: DA

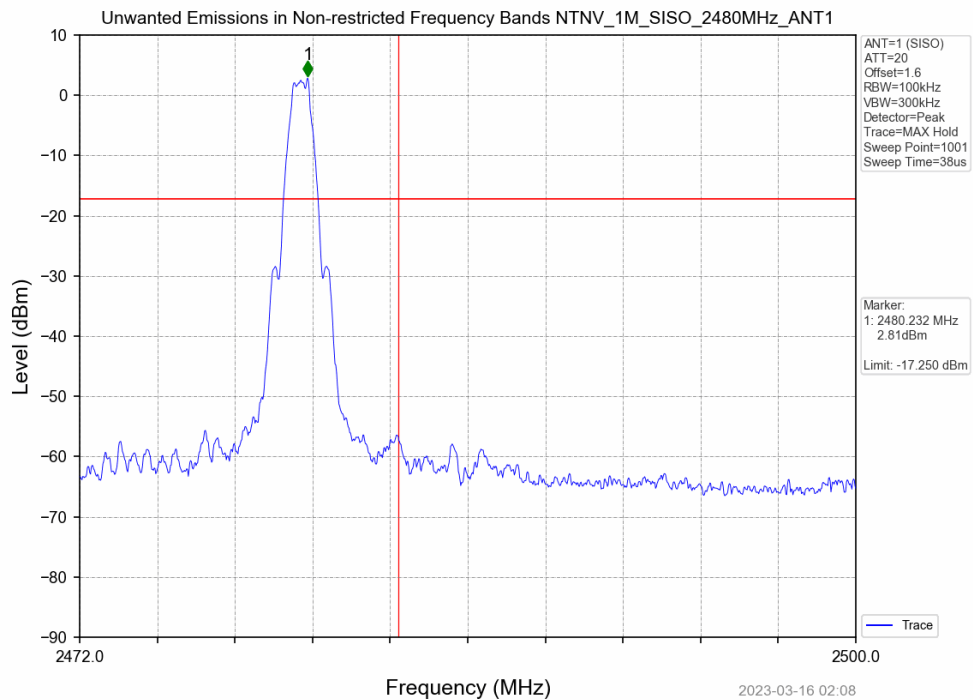
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	7-Dec-2022	7-Dec-2023
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
TSTPASS SWITCHBOX	SB1	TSTPASS	20168	CNR	CNR
USB WIDEBAND POWER SENSOR	U2021XA	TSTPASS (KEYSIGHT TECHNOLOGIES)	20168C	24-Aug-2022	24-Aug-2023

6.5 Test Data – DTS Band Edge

BLE - Lower band edge

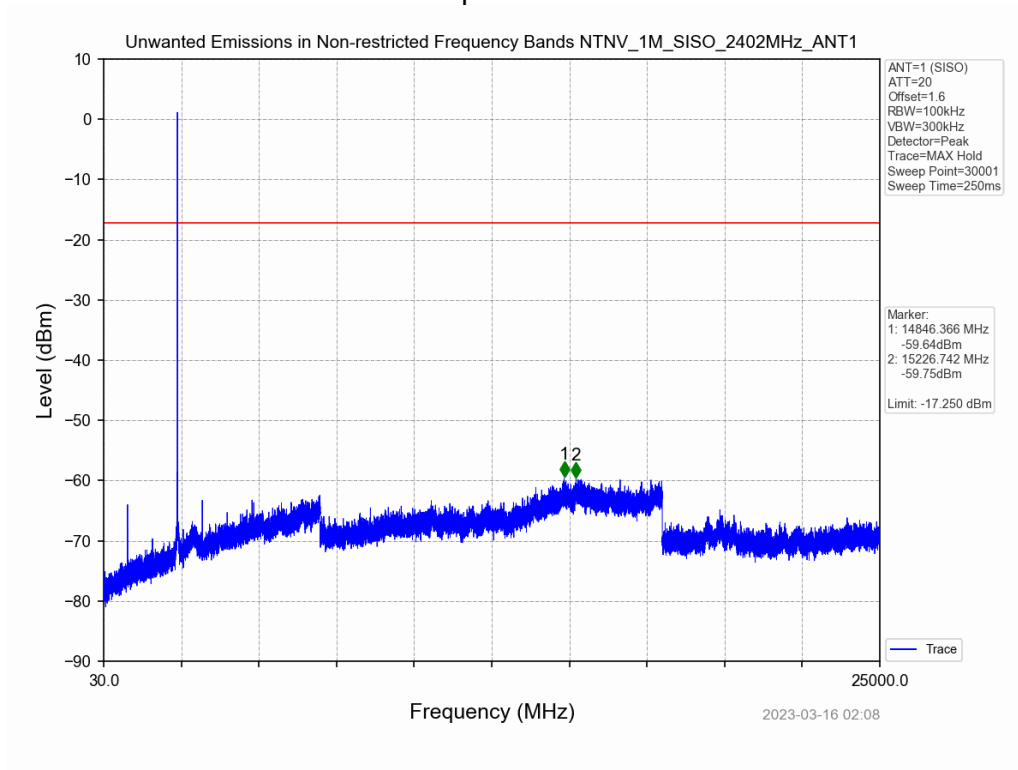


BLE - Upper band edge

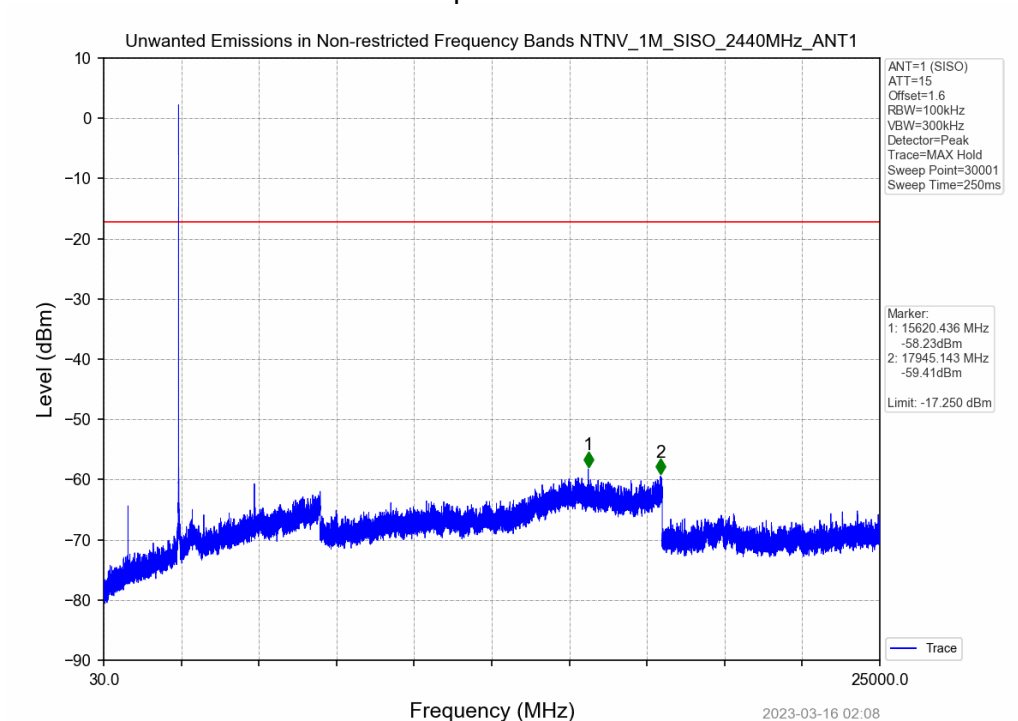


6.6 Test Data – DTS Conducted Spurious Emissions

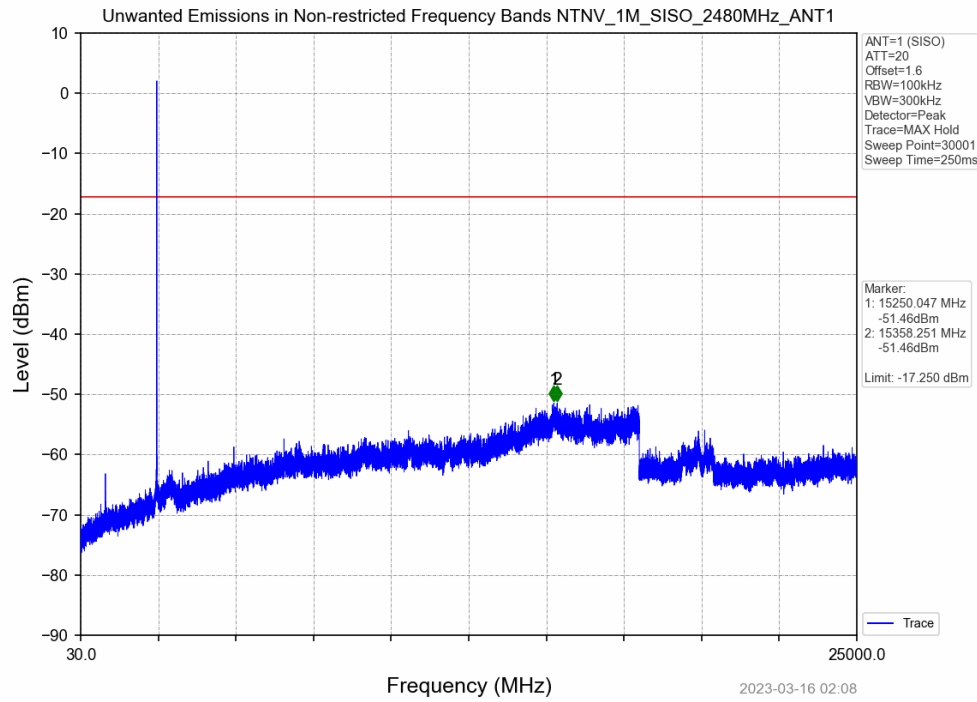
Conducted Spurs – BLE Channel 0



Conducted Spurs – BLE Channel 19



Conducted Spurs – BLE Channel 39



7 Emissions in Restricted Frequency Bands

7.1 Test Result

Test Description	Test Specification		Test Result
Emissions in Restricted Frequency Bands	15.247(d) 15.205, 15.209	RSS-GEN S8.9, S8.10	Compliant

7.2 Test Method

Radiated emissions in restricted frequency bands were measured using methods defined in ANSI C63.10 clause 11.12. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

Lowest, middle and highest channels were investigated – the device was commanded to continuously transmit on channels 0, 19 and 39.

Test distances for radiated tests:

- 9kHz to 30 MHz – The EUT to measurement antenna distance was 3 meters
- 30 to 1000 MHz – The EUT to measurement antenna distance was 3 meters
- 1 to 18 GHz – The EUT to measurement antenna distance was 3 meters
- 18 to 26 GHz – The EUT to measurement antenna distance was 1 meter

Limits within restricted bands of operation:

Frequency	Limits ⁽¹⁾		Peak Limits dBuV/m
	Microvolts/m	dBuV/m	
30 - 88 MHz	100	40 ⁽²⁾	--
88 - 216 MHz	150	43.5 ⁽²⁾	--
216 - 960 MHz	200	46 ⁽²⁾	--
960 - 1000 MHz	500	54 ⁽²⁾	--
1 - 40 GHz	500	54 ⁽³⁾	74

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

7.3 Test Site

10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions	9kHz-30MHz	30-1000MHz	1-18GHz	18-26GHz
Temperature:	22.51°C	24.48 °C	22.63 °C	24.16 °C
Relative Humidity:	25.3%	52.7 %	40.6 %	20.8 %
Atmospheric Pressure:	98.7kPa	98.1 kPa	98 kPa	98.9 kPa

7.4 Test Equipment

9kHz-30MHz

Test End Date: 17-Mar-2026

Tester: PL

Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
ANTENNA, LOOP, ACTIVE	6502	ETS LINDGREN	B085752	24-Mar-2024	24-Mar-2026
N to N RF Cable	EM-B810NM-276	ECHOLON	24022	13-Nov-2025	13-Nov-2026
N-FEMALE TO N-MALE RF CABLE	EM-B810NMNF-118	ECHOLON	23010	4-Apr-2025	4-Apr-2026
RF CABLE NM TO NM, 0.01-18GHZ	90-195-118	TELEDYNE STORM MICROWAVE	20126	10-Feb-2026	10-Feb-2027
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	14-Nov-2025	14-Nov-2026

30-1000 MHz

Test End Date: 11-Mar-2026

Tester: SGM

Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
ANTENNA, BILOG	JB6	SUNOL	B079690	19-Apr-2024	19-Apr-2026
N to N RF Cable	EM-B810NM-276PA	ECHOLON	25012	19-Sep-2025	19-Sep-2026
N to N RF Cable	EM-B810NM-276	ECHOLON	25013	19-Sep-2025	19-Sep-2026
RF CABLE	104PE	HUBER & SUHNER	B079793	8-Aug-2025	8-Aug-2026
N to N RF Cable	RF280-06SP-06SP-2000	SAMTEC	23013	5-May-2025	5-May-2026
LOW NOISE AMPLIFIER	ZKL-2+	MINI-CIRCUITS	B079817	6-Aug-2025	6-Aug-2026
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22032	18-Mar-2025	18-Mar-2026

1-18GHz

Test End Date: 12-Mar-2026

Tester: SGM

Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079699	23-Jul-2024	23-Jul-2026
N to N RF Cable	EM-B810NM-276PA	ECHOLON	25012	19-Sep-2025	19-Sep-2026
RF CABLE	SF106	HUBER & SUHNER	B085895	6-Aug-2025	6-Aug-2026
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	3-Jul-2025	3-Jul-2026
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22032	18-Mar-2025	18-Mar-2026

18-26GHz

Test End Date: 18-Mar-2026

Tester: SGM

Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
ANTENNA, DRG HORN (SMALL)	3116B	ETS LINDGREN	B079697	2-Jul-2024	2-Jul-2026
SMA to SMA RF Cable	NC12-K1K1-138	MEGAPHASE	22002	3-Apr-2025	3-Apr-2026
RF CABLE SMA	HULL150A-29P-29P-36	HASCO COMPONENTS	19101	3-Apr-2025	3-Apr-2026
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	10-Oct-2025	10-Oct-2026
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22032	18-Mar-2025	18-Mar-2026

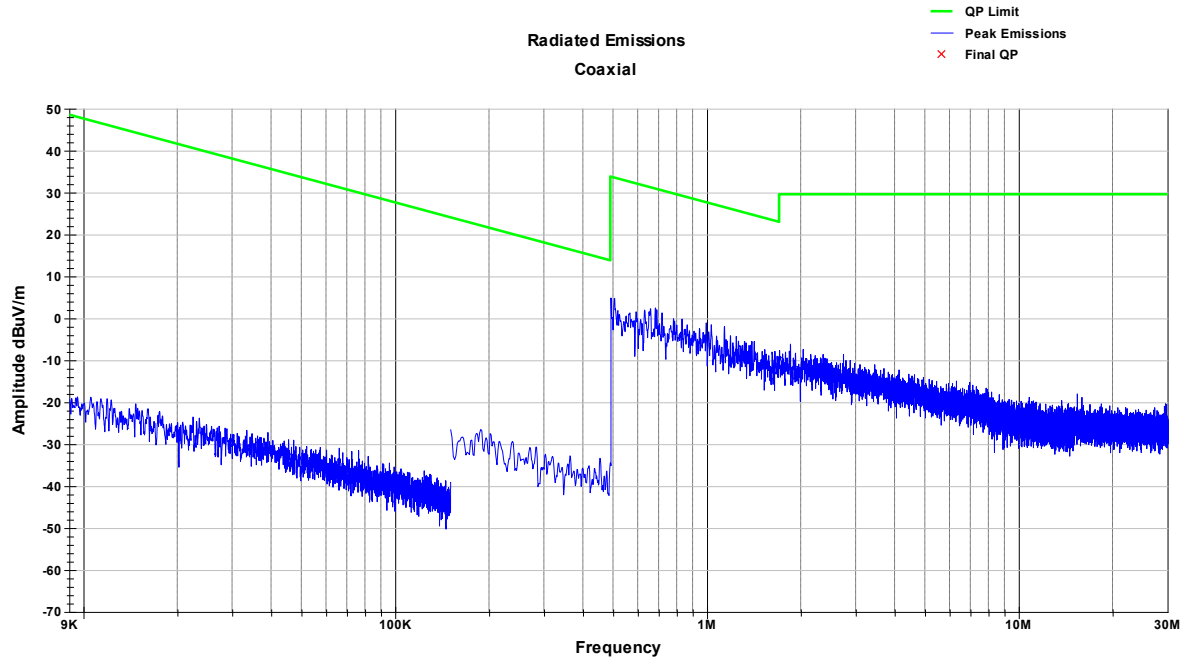
Software Profile: "RSE 30-1000 MHz 260302 Maturo" TILE! profile dated 2 March 2022
 "RSE 1-26GHz 260302_Maturo" TILE! profile dated 2 March 2026

7.5 Test Data

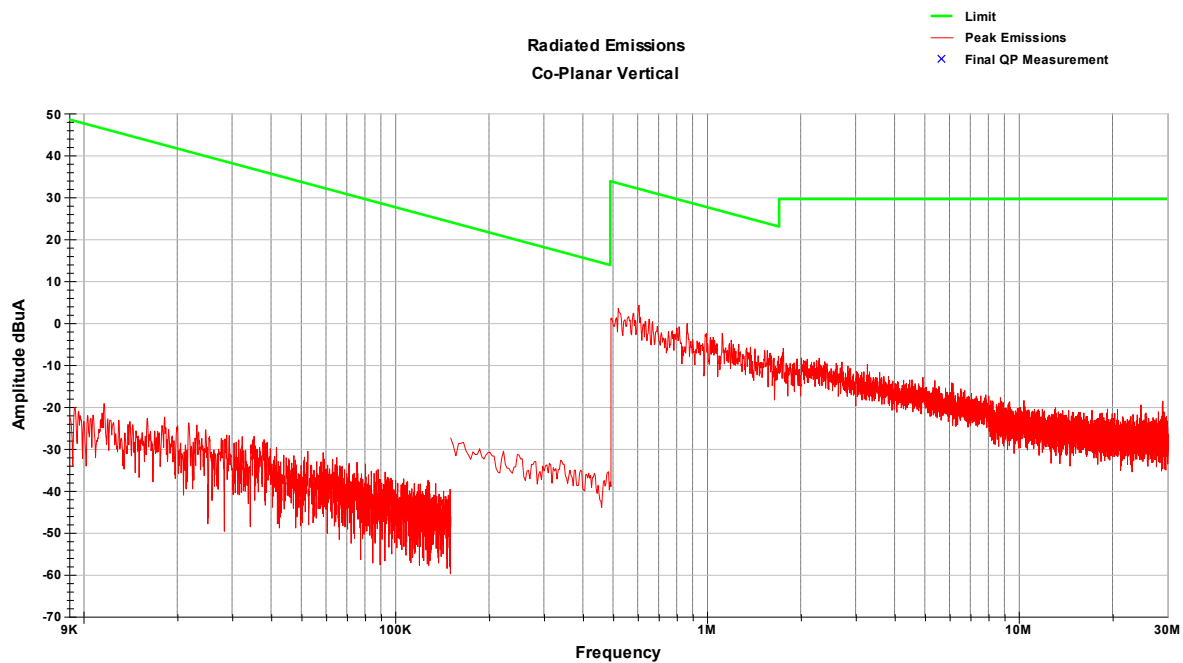
7.5.1 9 kHz - 30 MHz

There was no significant deviation based on axis or channel in the 9kHz-30MHz frequency range.

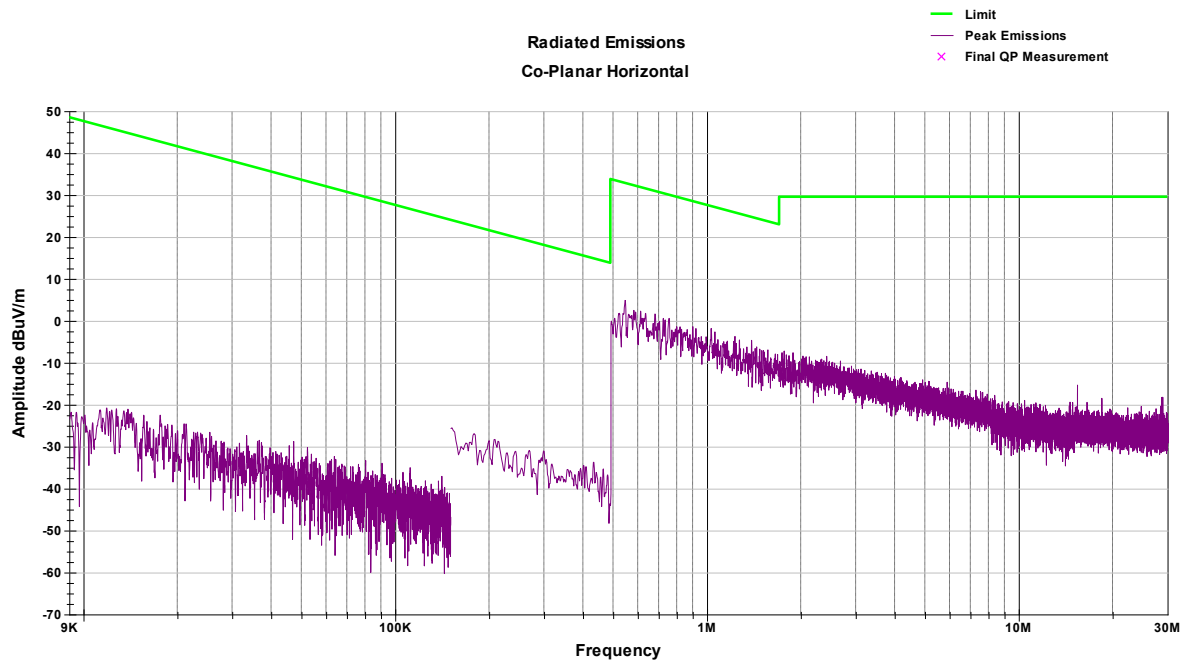
Coaxial Plot



Co-planar Vertical Plot



Co-planar Horizontal Plot

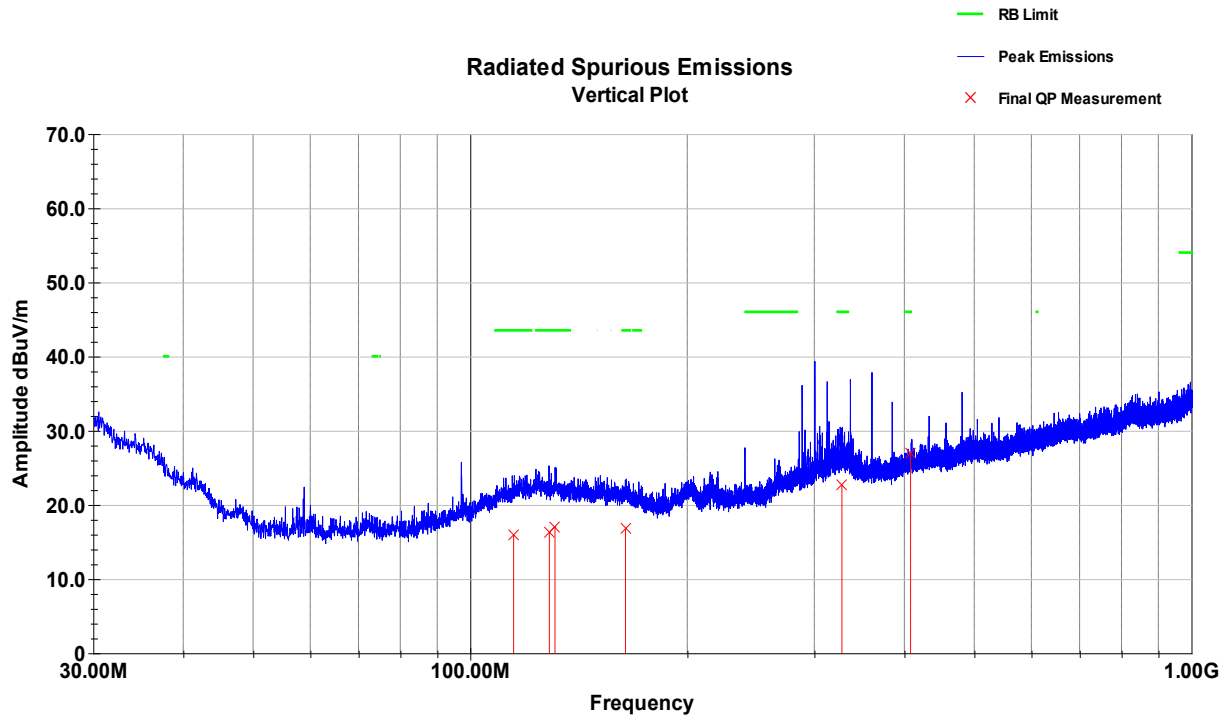


No emissions within 20dB of the limit

7.5.2 30-1000 MHz

There was no significant deviation based on axis or channel in the 30-1000MHz frequency range.

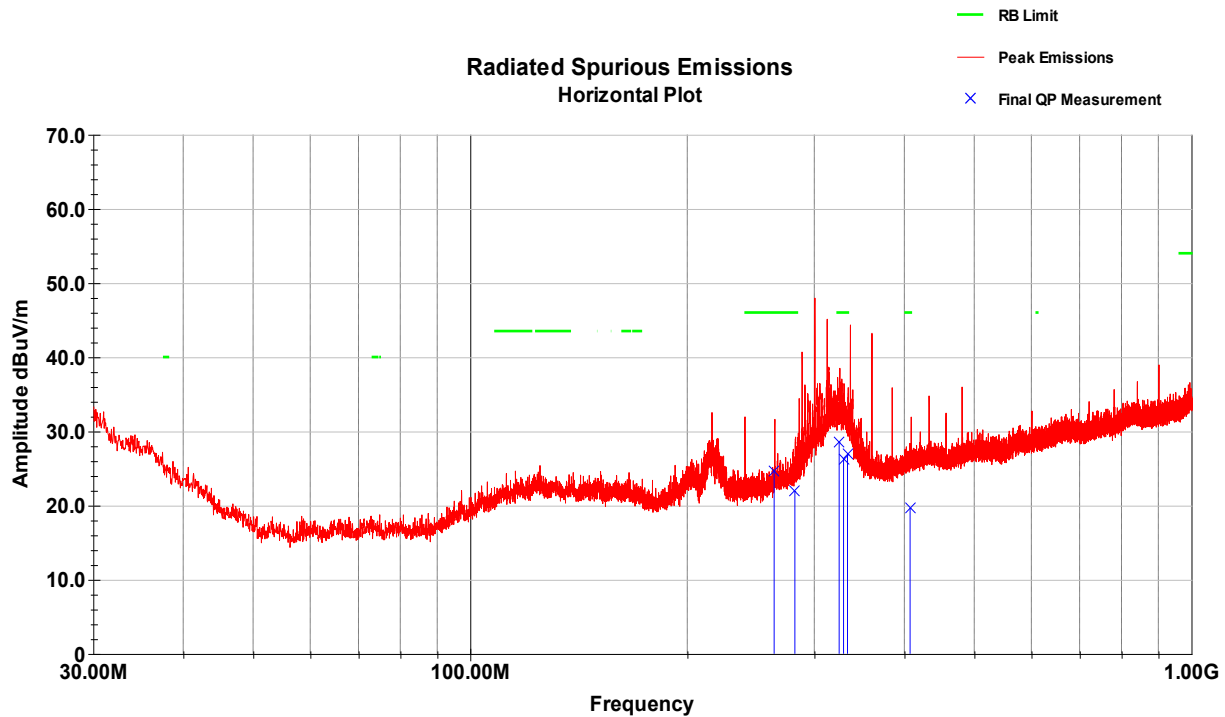
Vertical Polarity Plot



Vertical Polarity Data

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw QP dBuV/m	AF dB/m	Loss dB	DCF dB	Amp dB	Final QP dBuV/m	Limit dBuV/m	Margin dB
114.88	V	128.0	195.0	28.1	17.3	1.0	0.0	30.5	15.9	43.5	-27.6
128.74	V	138.0	267.0	28.0	17.8	1.0	0.0	30.5	16.3	43.5	-27.2
131.09	V	47.0	144.0	28.7	17.8	1.0	0.0	30.5	17.1	43.5	-26.5
164.18	V	68.0	263.0	29.5	16.6	1.3	0.0	30.4	16.9	43.5	-26.6
327.75	V	98.0	237.0	32.3	18.7	1.7	0.0	30.2	22.6	46.0	-23.4
408.00	V	87.0	218.0	34.0	20.5	2.2	0.0	30.0	26.9	46.0	-19.2
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Horizontal Polarity Plot

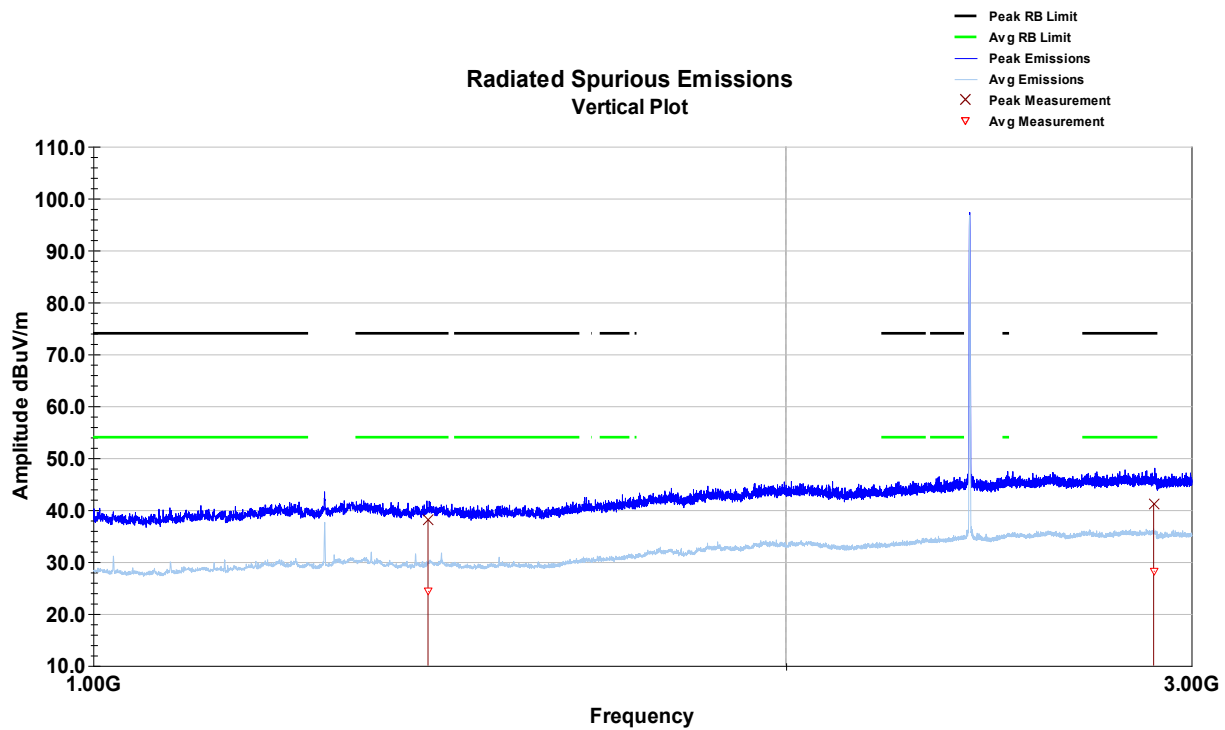


Horizontal Polarity Data

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw QP dBuV/m	AF dB/m	Loss dB	DCF dB	Amp dB	Final QP dBuV/m	Limit dBuV/m	Margin dB
263.95	H	0.0	100.0	35.9	17.4	1.6	0.0	30.3	24.7	46.0	-21.4
282.02	H	0.0	105.0	32.6	17.9	1.6	0.0	30.2	22.0	46.0	-24.1
324.78	H	0.0	105.0	38.2	18.7	1.7	0.0	30.2	28.5	46.0	-17.5
329.45	H	0.0	100.0	35.8	18.7	1.7	0.0	30.2	26.3	46.0	-19.8
333.64	H	0.0	100.0	36.5	18.8	1.8	0.0	30.2	27.0	46.0	-19.0
407.36	H	0.0	218.0	26.8	20.5	2.2	0.0	30.0	19.7	46.0	-26.4
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

7.5.3 1-3 GHz

Vertical Polarity Plot – Low Channel (2402MHz)



Vertical Polarity Data – Low Channel (2402MHz)

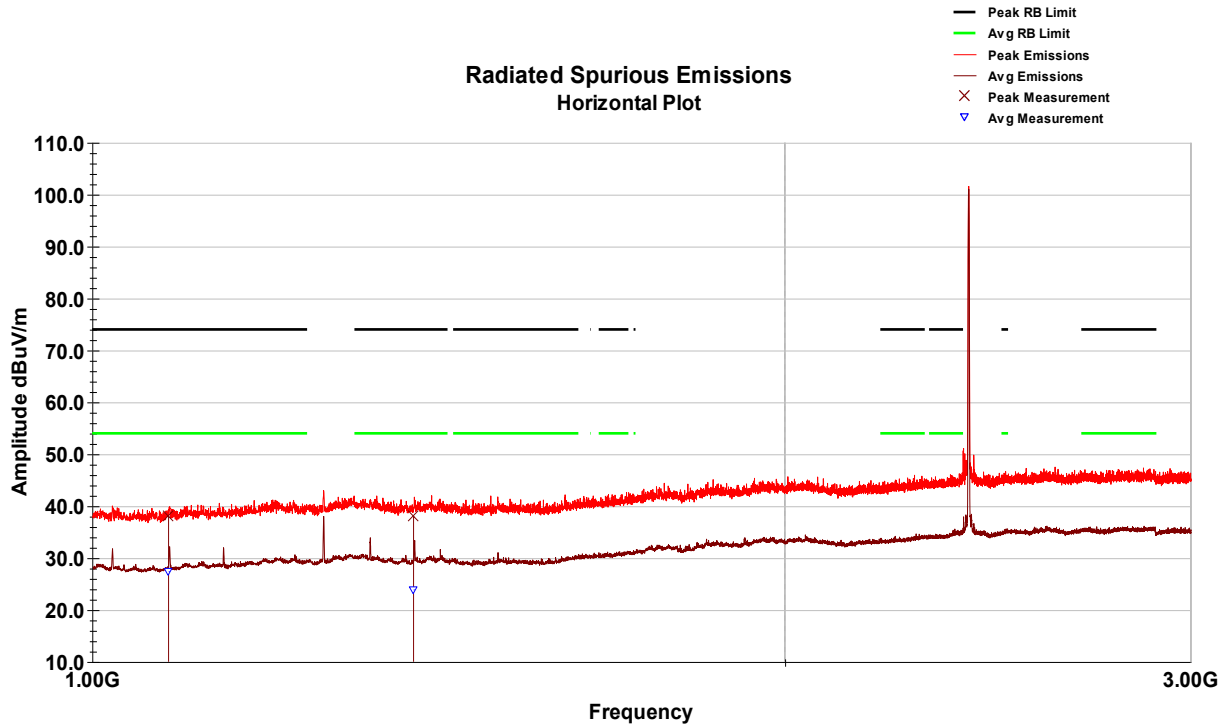
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1397.89	V	37.0	285.0	42.8	28.2	1.3	0.0	34.3	38.0	74.0	-36.0
2889.08	V	189.0	325.0	41.5	32.2	1.8	0.0	34.4	41.2	74.0	-32.8
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1397.89	V	37.0	285.0	29.2	28.2	1.3	0.0	34.3	24.4	54.0	-29.6
2889.08	V	189.0	325.0	28.6	32.2	1.8	0.0	34.4	28.3	54.0	-25.7
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – Low Channel (2402MHz)



Horizontal Polarity Data – Low Channel (2402MHz)

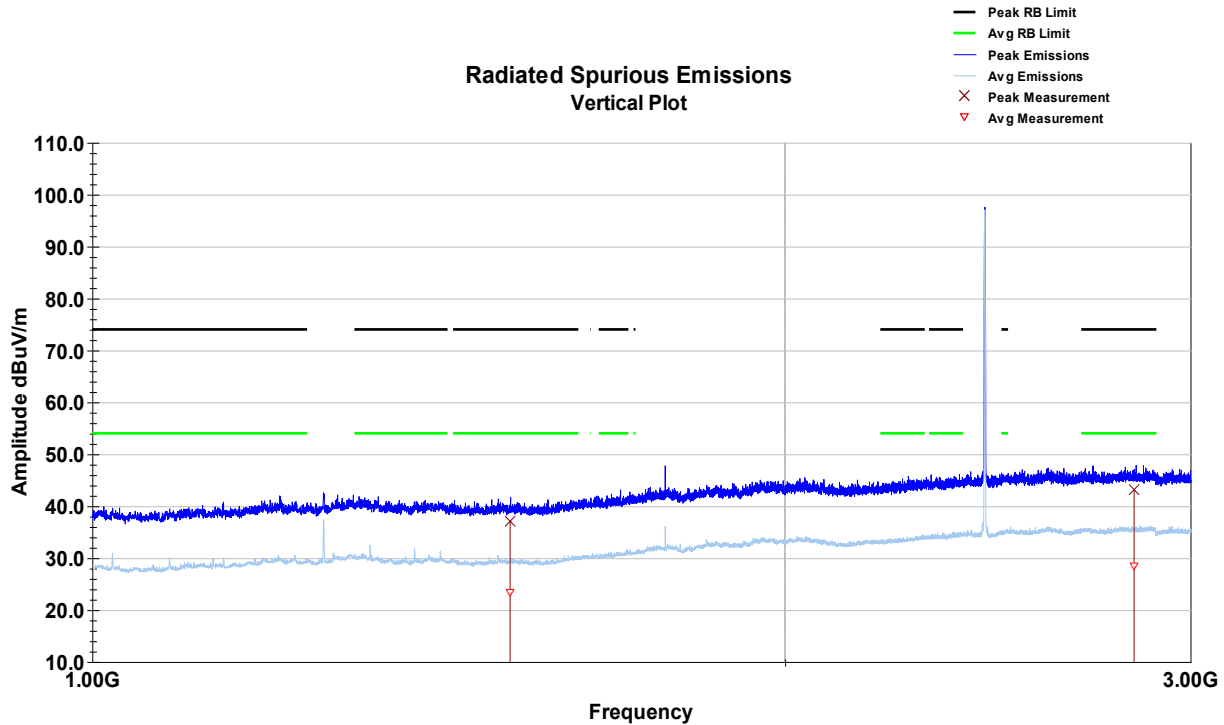
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1079.51	H	46.0	214.0	44.4	27.1	1.1	0.0	34.6	38.0	74.0	-36.0
1379.26	H	0.0	286.0	43.0	28.3	1.3	0.0	34.5	38.0	74.0	-36.0
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1079.51	H	46.0	214.0	33.9	27.1	1.1	0.0	34.6	27.5	54.0	-26.5
1379.26	H	0.0	286.0	29.0	28.3	1.3	0.0	34.5	24.0	54.0	-30.0
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Vertical Polarity Plot – Middle Channel (2440MHz)



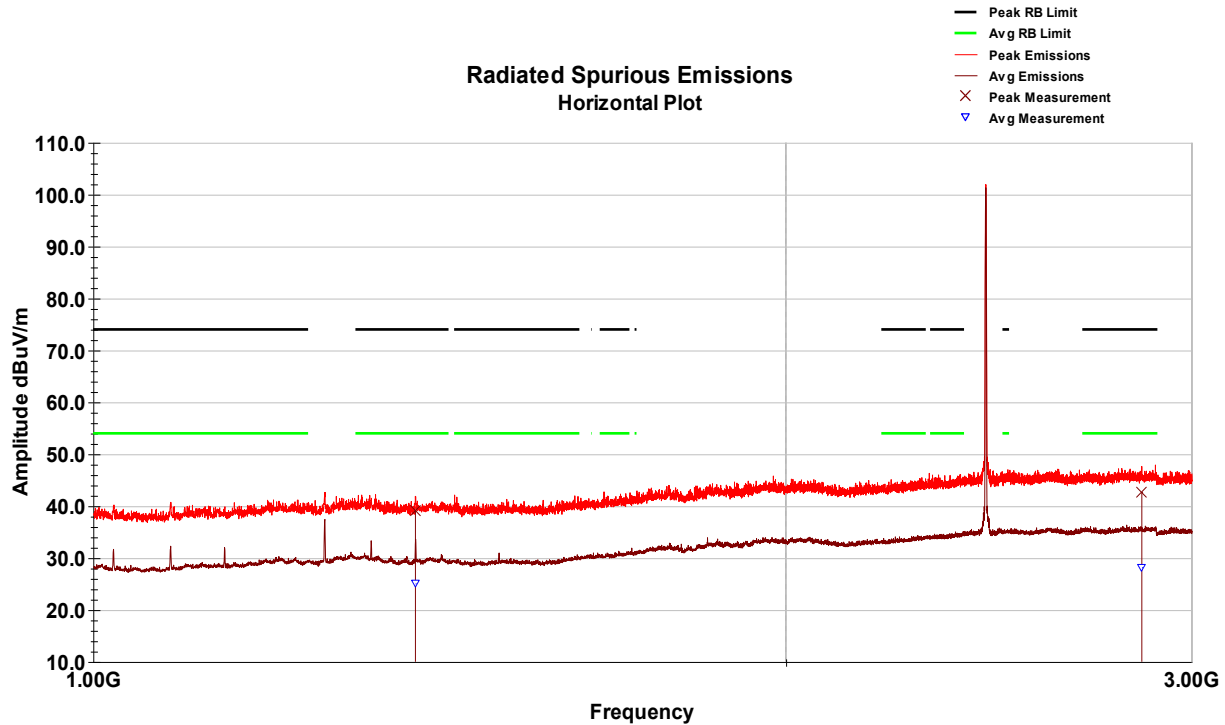
Vertical Polarity Data – Middle Channel (2440MHz) Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1519.25	V	336.0	285.0	42.5	27.8	1.3	0.0	34.4	37.1	74.0	-36.9
2836.09	V	128.0	305.0	43.3	32.2	1.9	0.0	34.3	43.0	74.0	-31.0
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1519.25	V	336.0	285.0	28.7	27.8	1.3	0.0	34.4	23.4	54.0	-30.6
2836.09	V	128.0	305.0	28.7	32.2	1.9	0.0	34.3	28.4	54.0	-25.6
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – Middle Channel (2440MHz)



Horizontal Polarity Data – Middle Channel (2440MHz)

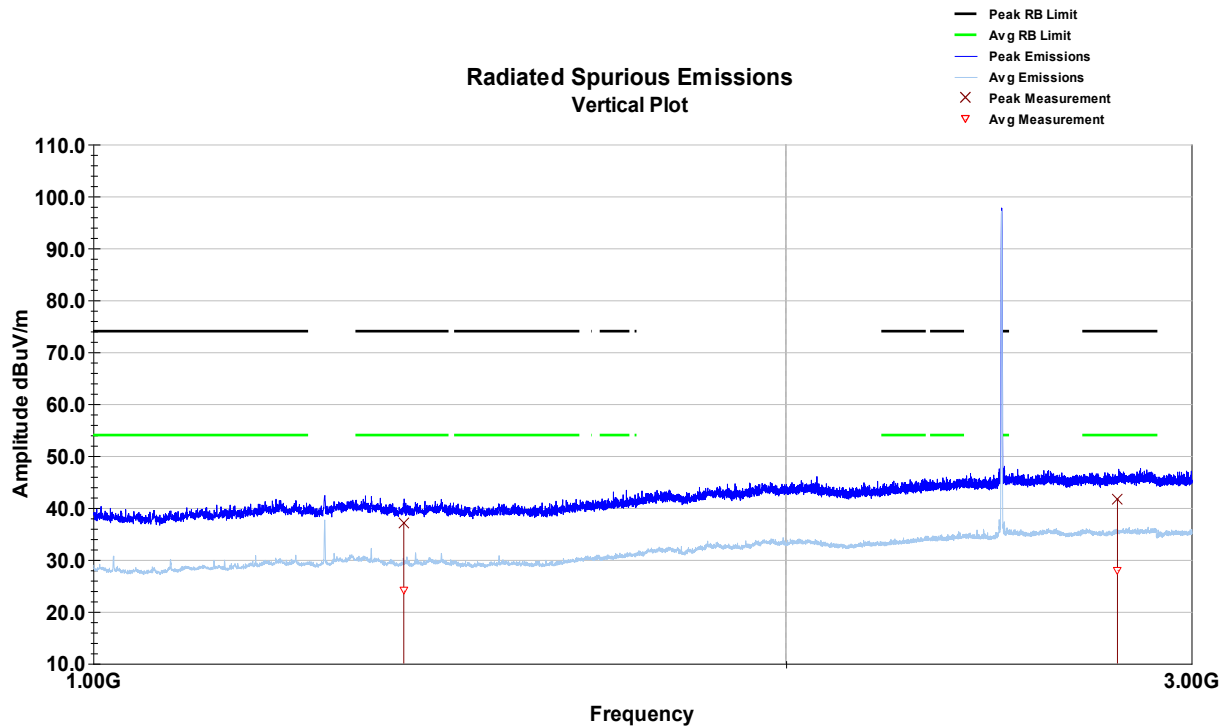
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1380.42	H	0.0	100.0	44.1	28.3	1.3	0.0	34.5	39.1	74.0	-34.9
2855.08	H	0.0	175.0	43.1	32.2	1.8	0.0	34.4	42.7	74.0	-31.3
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1380.42	H	0.0	100.0	30.1	28.3	1.3	0.0	34.5	25.1	54.0	-28.9
2855.08	H	0.0	175.0	28.6	32.2	1.8	0.0	34.4	28.2	54.0	-25.7
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Vertical Polarity Plot – High Channel (2480MHz)



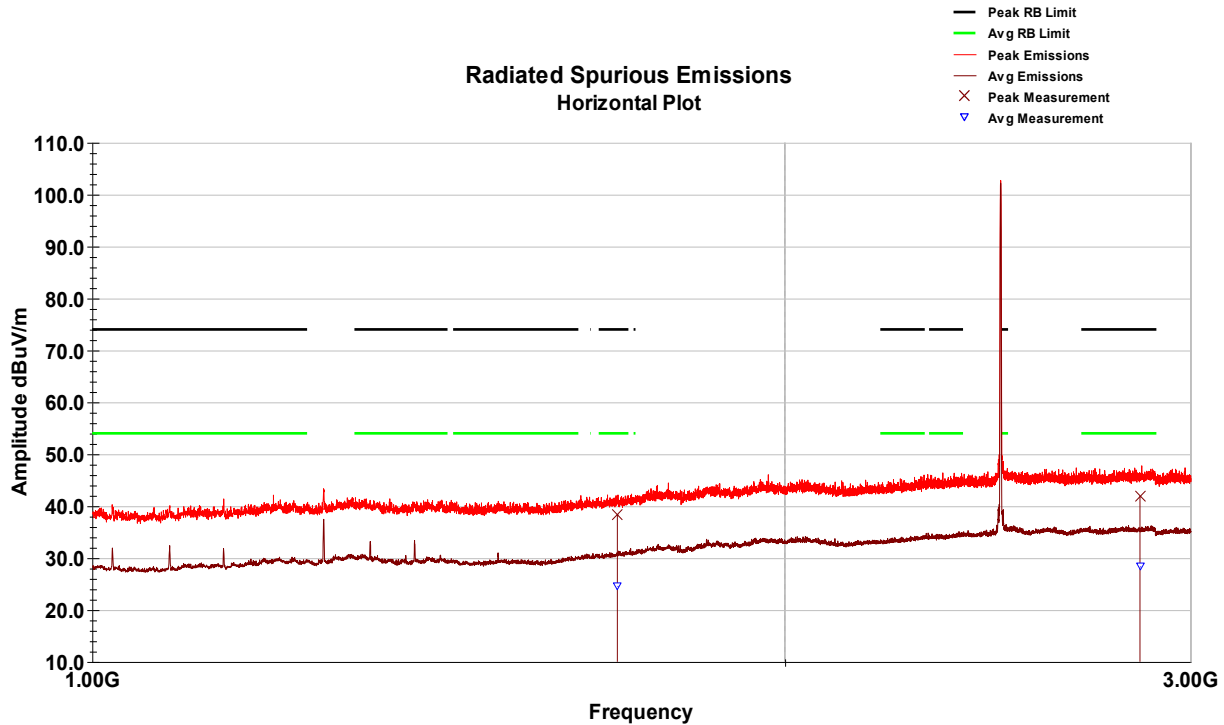
Vertical Polarity Data – High Channel (2480MHz) Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1364.54	V	105.0	133.0	42.1	28.6	1.2	0.0	34.8	37.2	74.0	-36.8
2786.43	V	278.0	246.0	41.9	32.2	1.9	0.0	34.2	41.7	74.0	-32.3
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1364.54	V	105.0	133.0	29.0	28.6	1.2	0.0	34.8	24.0	54.0	-29.9
2786.43	V	278.0	246.0	28.2	32.2	1.9	0.0	34.2	28.1	54.0	-25.9
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – High Channel (2480MHz)



Horizontal Polarity Data – High Channel (2480MHz) Peak

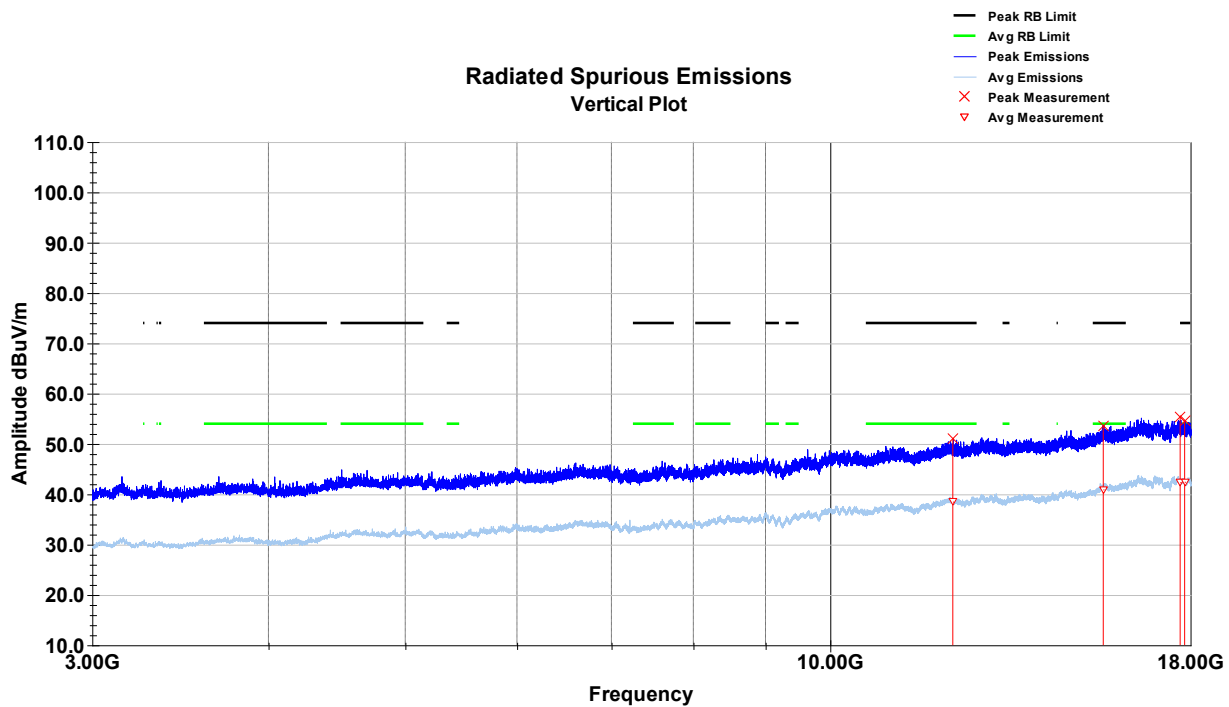
Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
1691.24	H	271.0	175.0	42.5	29.1	1.4	0.0	34.6	38.4	74.0	-35.6
2852.69	H	202.0	205.0	42.3	32.2	1.8	0.0	34.4	41.9	74.0	-32.1
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
1691.24	H	271.0	175.0	28.7	29.1	1.4	0.0	34.6	24.6	54.0	-29.4
2852.69	H	202.0	205.0	28.7	32.2	1.8	0.0	34.4	28.4	54.0	-25.6
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

7.5.4 3-18 GHz

Vertical Polarity Plot – Low Channel (2402MHz)



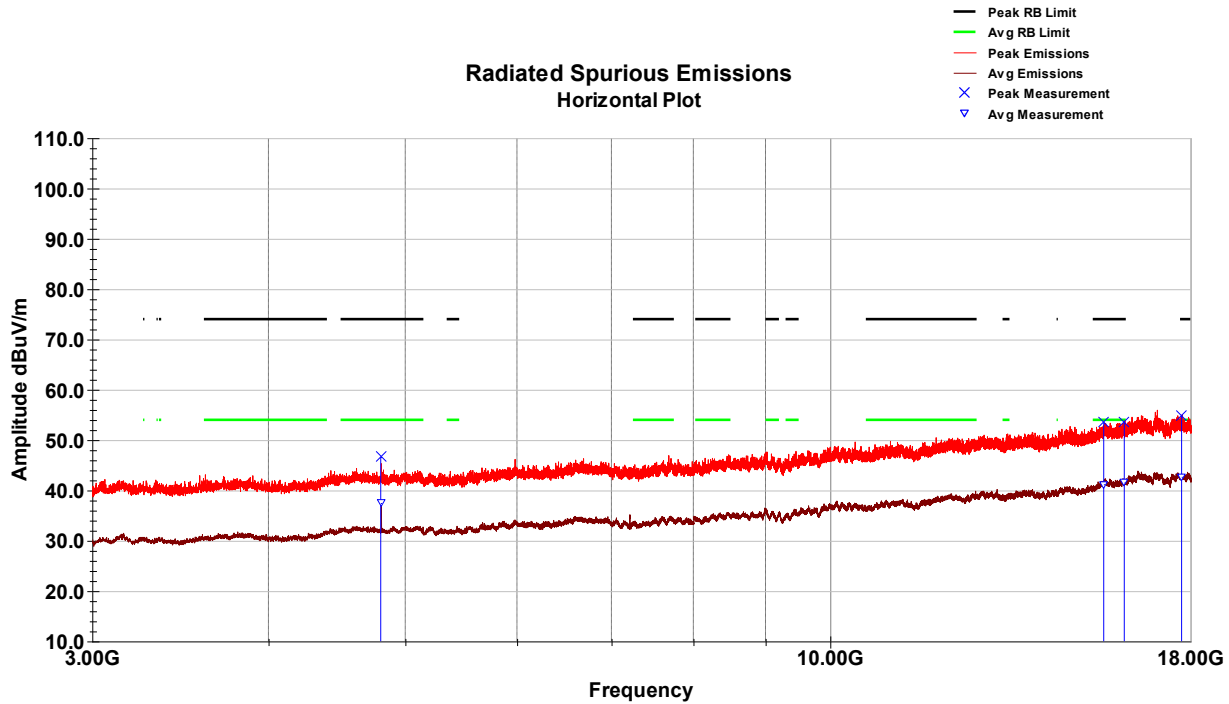
Vertical Polarity Data – Low Channel (2402MHz) Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
12217.00	V	345.0	154.0	44.3	39.1	3.7	0.0	35.9	51.1	74.0	-22.9
15614.33	V	181.0	125.0	45.1	40.4	4.4	0.0	36.3	53.6	74.0	-20.4
17703.22	V	214.0	400.0	45.7	41.3	4.8	0.0	36.5	55.3	74.0	-18.7
17833.22	V	51.0	295.0	45.1	41.3	4.8	0.0	36.7	54.6	74.0	-19.4
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
12217.00	V	345.0	154.0	31.7	39.1	3.7	0.0	35.9	38.5	54.0	-15.4
15614.33	V	181.0	125.0	32.4	40.4	4.4	0.0	36.3	41.0	54.0	-13.0
17703.22	V	214.0	400.0	32.8	41.3	4.8	0.0	36.5	42.4	54.0	-11.6
17833.22	V	51.0	295.0	33.0	41.3	4.8	0.0	36.7	42.5	54.0	-11.5
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – Low Channel (2402MHz)



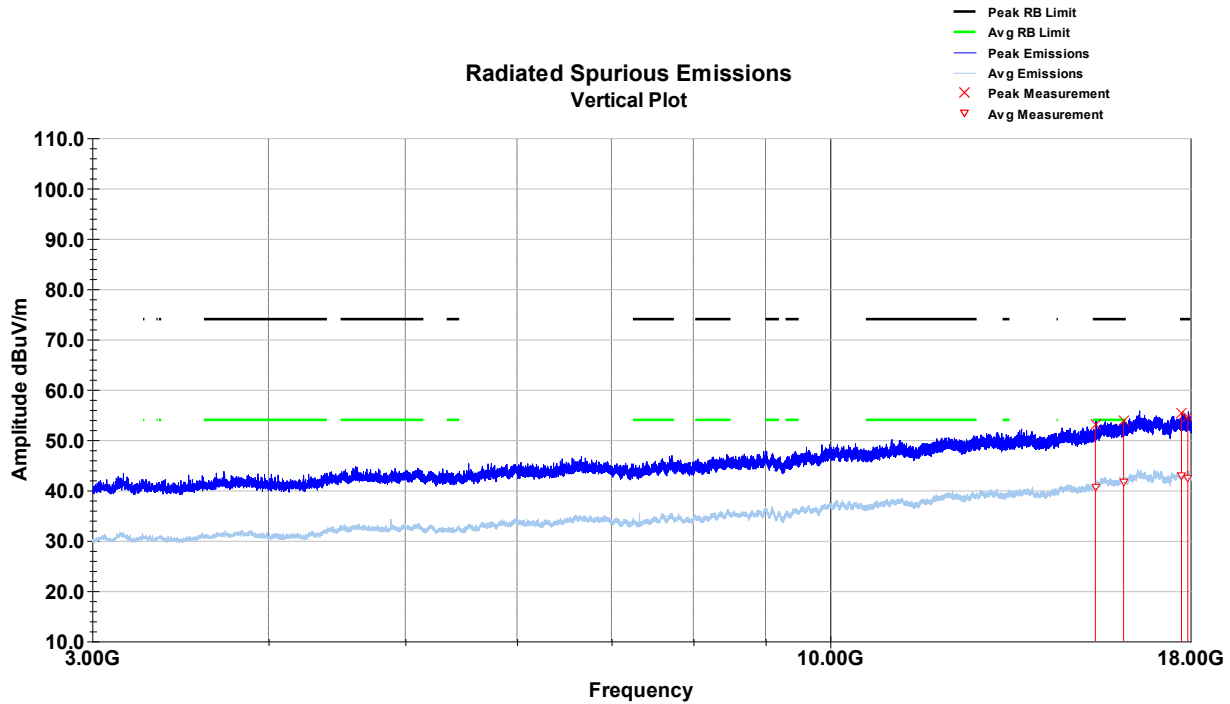
Horizontal Polarity Data – Low Channel (2402MHz) Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
4803.89	H	0.0	275.0	44.1	34.4	2.2	0.0	34.1	46.6	74.0	-27.4
15628.19	H	0.0	234.0	44.8	40.4	4.4	0.0	36.2	53.4	74.0	-20.6
16159.34	H	0.0	326.0	44.1	40.9	4.4	0.0	36.0	53.5	74.0	-20.5
17742.89	H	0.0	123.0	45.4	41.3	4.8	0.0	36.7	54.9	74.0	-19.1
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
4803.89	H	0.0	275.0	35.0	34.4	2.2	0.0	34.1	37.5	54.0	-16.5
15628.19	H	0.0	234.0	32.6	40.4	4.4	0.0	36.2	41.2	54.0	-12.8
16159.34	H	0.0	326.0	32.2	40.9	4.4	0.0	36.0	41.6	54.0	-12.4
17742.89	H	0.0	123.0	33.3	41.3	4.8	0.0	36.7	42.7	54.0	-11.3
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Vertical Polarity Plot – Mid Channel (2440MHz)



Vertical Polarity Data – Mid Channel (2440MHz)

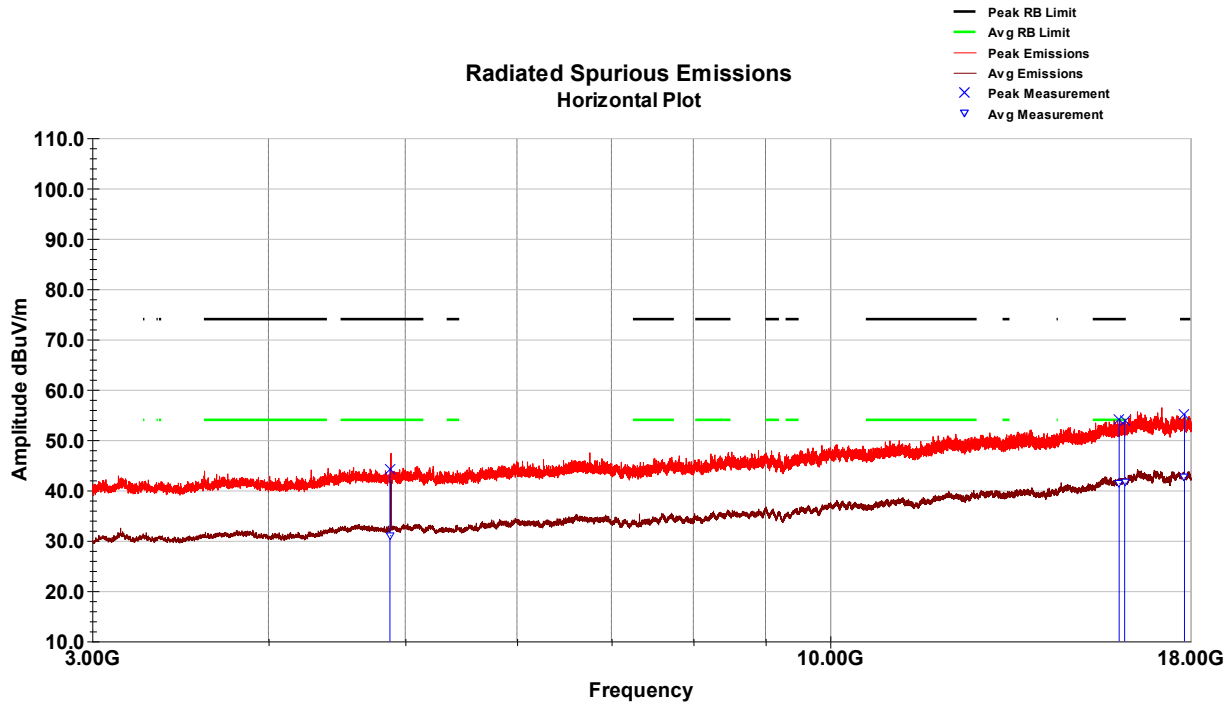
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
15416.70	V	294.0	313.0	44.7	40.1	4.3	0.0	36.3	53.0	74.0	-21.0
16143.34	V	150.0	232.0	44.6	40.9	4.4	0.0	36.0	53.9	74.0	-20.1
17742.43	V	322.0	298.0	45.9	41.3	4.8	0.0	36.7	55.3	74.0	-18.7
17924.10	V	47.0	293.0	45.2	41.3	4.9	0.0	36.8	54.6	74.0	-19.4
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
15416.70	V	294.0	313.0	32.3	40.1	4.3	0.0	36.3	40.5	54.0	-13.5
16143.34	V	150.0	232.0	32.3	40.9	4.4	0.0	36.0	41.6	54.0	-12.3
17742.43	V	322.0	298.0	33.4	41.3	4.8	0.0	36.7	42.8	54.0	-11.1
17924.10	V	47.0	293.0	33.0	41.3	4.9	0.0	36.8	42.4	54.0	-11.6
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – Mid Channel (2440MHz)



Horizontal Polarity Data – Mid Channel (2440MHz)

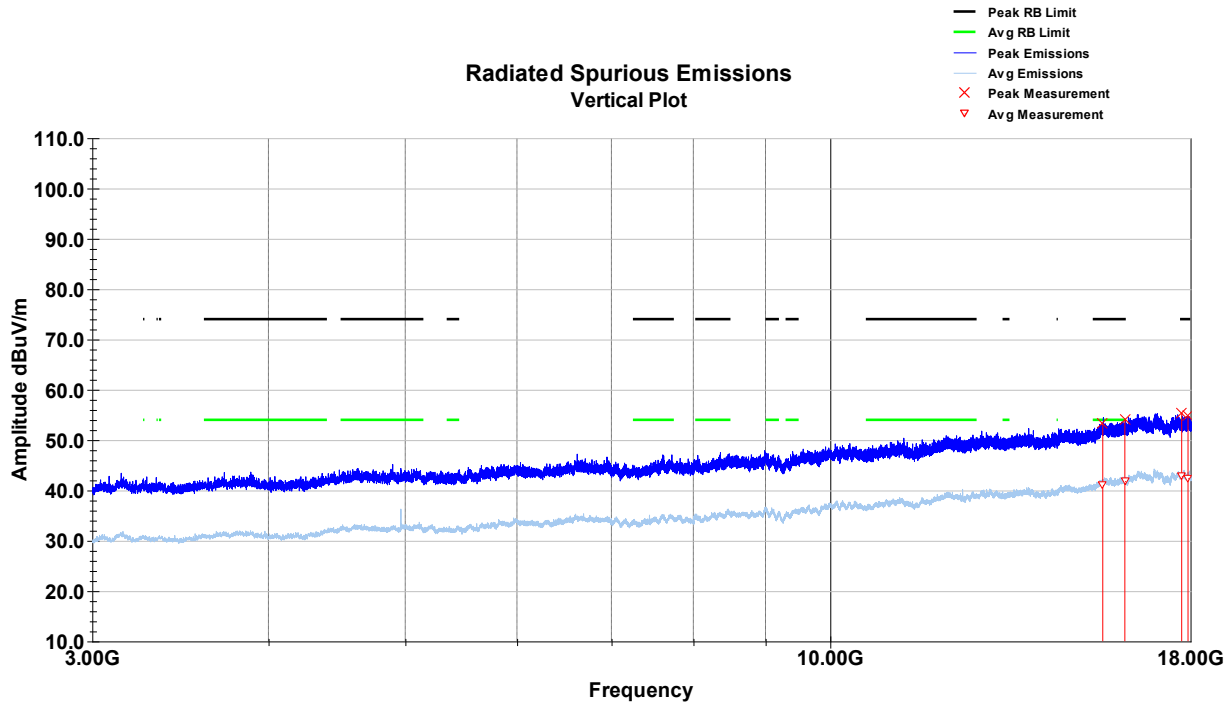
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
4877.17	H	0.0	234.0	41.9	34.4	2.1	0.0	34.1	44.2	74.0	-29.8
16026.34	H	0.0	346.0	44.6	40.8	4.5	0.0	35.9	54.1	74.0	-19.9
16168.89	H	0.0	265.0	44.5	40.9	4.5	0.0	36.0	53.9	74.0	-20.1
17827.13	H	0.0	315.0	45.6	41.3	4.9	0.0	36.6	55.1	74.0	-18.9
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
4877.17	H	0.0	234.0	28.8	34.4	2.1	0.0	34.1	31.1	54.0	-22.9
16026.34	H	0.0	346.0	32.0	40.8	4.5	0.0	35.9	41.4	54.0	-12.5
16168.89	H	0.0	265.0	32.2	40.9	4.5	0.0	36.0	41.5	54.0	-12.4
17827.13	H	0.0	315.0	33.1	41.3	4.9	0.0	36.6	42.7	54.0	-11.3
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Vertical Polarity Plot – High Channel (2480MHz)



Vertical Polarity Data – High Channel (2480MHz)

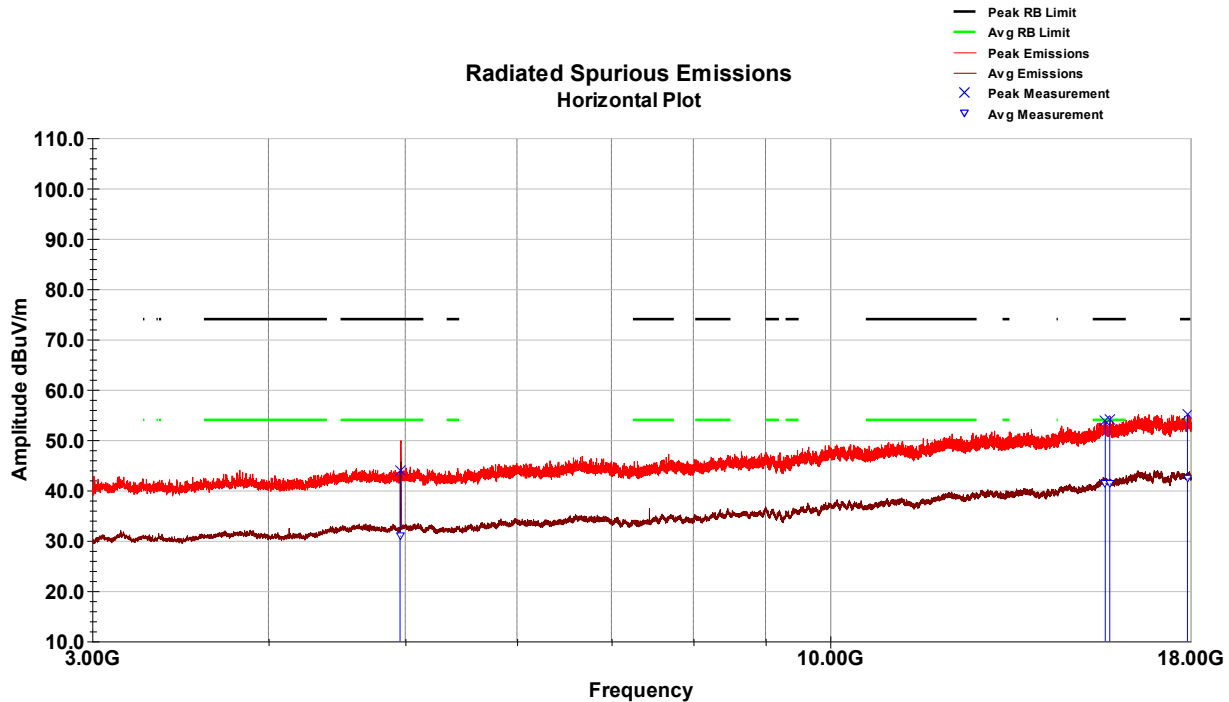
Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
15603.37	V	190.0	375.0	44.7	40.4	4.4	0.0	36.3	53.2	74.0	-20.8
16176.23	V	97.0	105.0	44.6	40.9	4.5	0.0	36.0	54.0	74.0	-20.0
17746.33	V	318.0	346.0	45.9	41.3	4.8	0.0	36.7	55.3	74.0	-18.7
17931.26	V	236.0	224.0	45.3	41.3	4.9	0.0	36.8	54.7	74.0	-19.3
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
15603.37	V	190.0	375.0	32.5	40.4	4.4	0.0	36.3	41.0	54.0	-12.9
16176.23	V	97.0	105.0	32.4	40.9	4.5	0.0	36.0	41.8	54.0	-12.2
17746.33	V	318.0	346.0	33.4	41.3	4.8	0.0	36.7	42.8	54.0	-11.2
17931.26	V	236.0	224.0	33.0	41.3	4.9	0.0	36.8	42.4	54.0	-11.6
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

Horizontal Polarity Plot – High Channel (2480MHz)



Horizontal Polarity Data – High Channel (2480MHz)

Peak

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Pk dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Pk dBuV/m	Limit dBuV/m	Margin dB
4957.82	H	199.0	235.0	41.6	34.2	2.3	0.0	34.3	43.8	74.0	-30.2
15666.52	H	73.0	185.0	45.0	40.5	4.5	0.0	36.2	53.8	74.0	-20.2
15781.46	H	0.0	135.0	45.1	40.7	4.4	0.0	36.1	54.1	74.0	-19.9
17913.35	H	0.0	377.0	45.7	41.3	4.9	0.0	36.8	55.1	74.0	-18.9
Final Pk = Raw Pk + AF + Loss + DCF - Amp											
Margin = Final Pk - Limit											

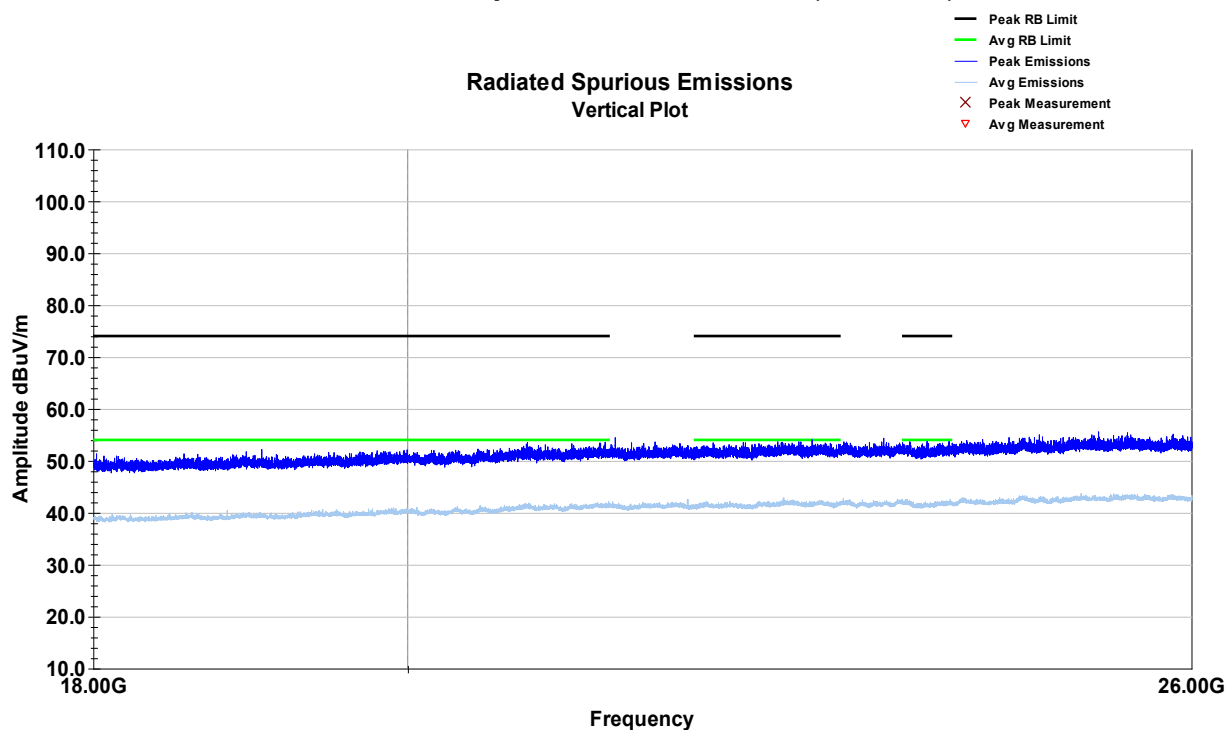
Average

Frequency MHz	Polarity V/H	Azimuth degrees	Height cm	Raw Avg dBuV	AF dB/m	Loss dB	DCF dB	Amp dB	Final Avg dBuV/m	Limit dBuV/m	Margin dB
4957.82	H	199.0	235.0	28.8	34.2	2.3	0.0	34.3	31.0	54.0	-23.0
15666.52	H	73.0	185.0	32.7	40.5	4.5	0.0	36.2	41.5	54.0	-12.5
15781.46	H	0.0	135.0	32.4	40.7	4.4	0.0	36.1	41.4	54.0	-12.6
17913.35	H	0.0	377.0	32.9	41.3	4.9	0.0	36.8	42.4	54.0	-11.6
Final Avg = Raw Avg + AF + Loss + DCF - Amp											
Margin = Final Avg - Limit											

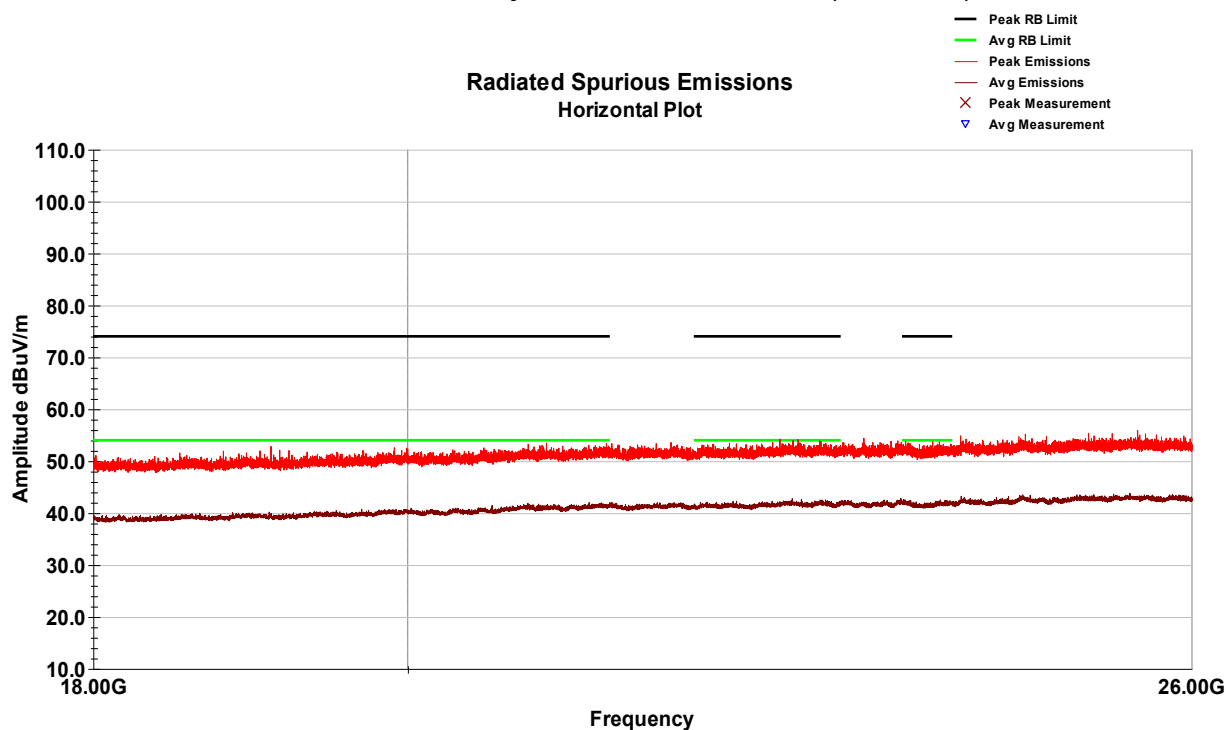
7.5.5 18-26 GHz

There was no significant deviation based on axis or channel in the 18-26GHz frequency range.

Vertical Polarity Plot – Middle Channel (2440MHz)



Horizontal Polarity Plot – Middle Channel (2440MHz)



8 Band Edge Emissions in Restricted Frequency Bands

8.1 Test Result

Test Description	Test Specification		Test Result
Band Edge Emissions in Restricted Frequency Bands	15.205, 15.209	RSS-GEN S8.9, 8.10	Compliant

8.2 Test Method

Field strength measurements were performed at the restricted band edges of 2390MHz and 2483.5MHz. Measurements were made using the conducted methods defined in ANSI C63.10-2020 clause 11.12.2. The measurements were converted to a radiated field strength equivalent using the equations defined in that section. Both peak and average measurements were performed at the antenna port. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

A reference level offset was applied to the spectrum analyzer so that conducted measurements represent field strength measurements in dBμV/m.

The device does not utilize BLE 2Mbps data mode, so only BLE 1Mbps mode was tested.

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.6 °C

Relative Humidity: 45.4 %

Atmospheric Pressure: 97.9 kPa

8.4 Test Equipment

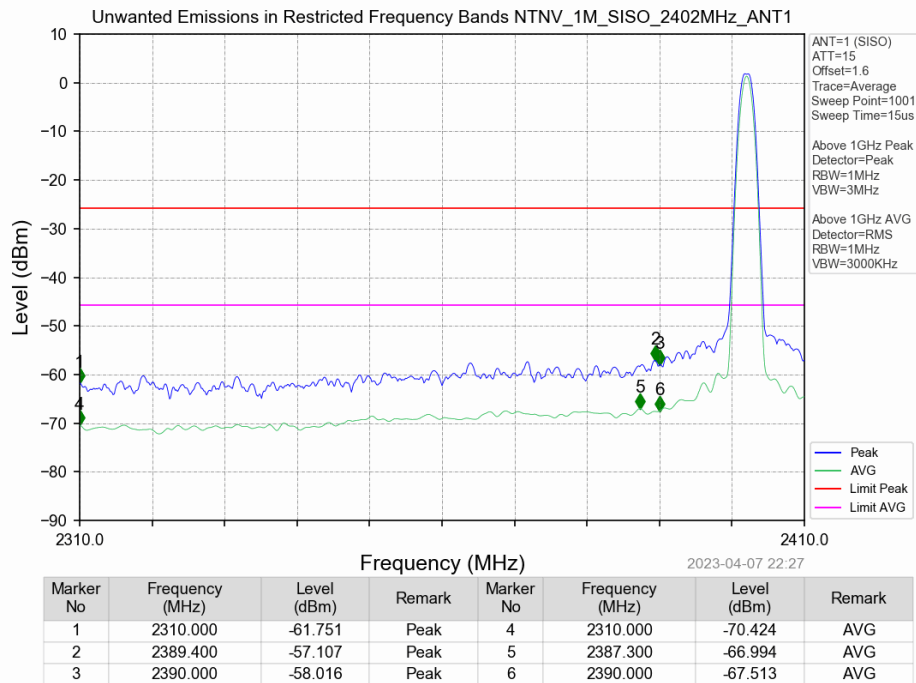
Test End Date: 7-Apr-2023

Tester: DA

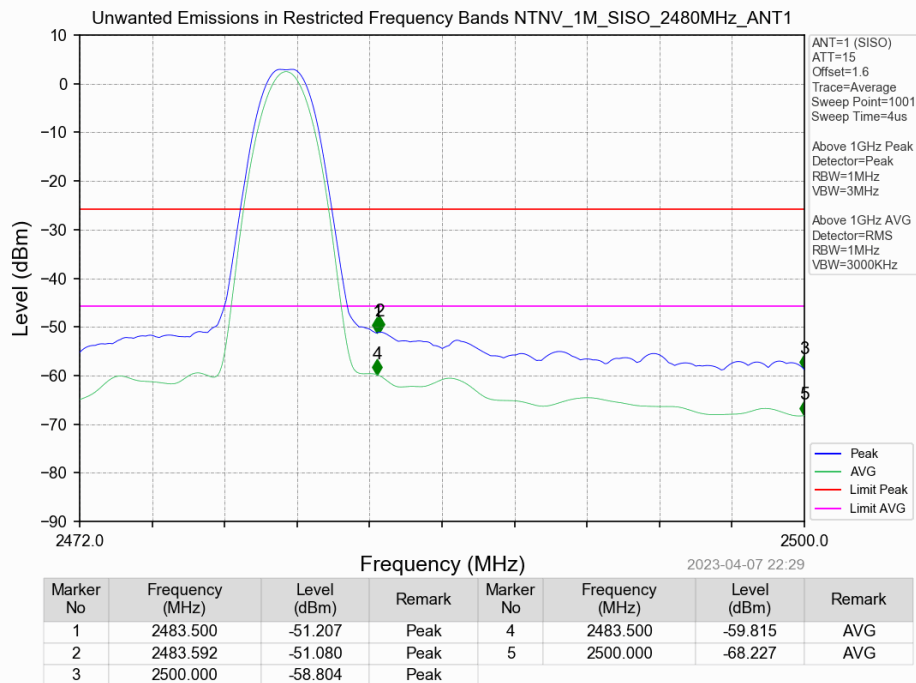
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	7-Dec-2022	7-Dec-2023
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
TSTPASS SWITCHBOX	SB1	TSTPASS	20168	CNR	CNR
USB WIDEBAND POWER SENSOR	U2021XA	TSTPASS (KEYSIGHT TECHNOLOGIES)	20168C	24-Aug-2022	24-Aug-2023

8.5 Test Data

BLE – Low Channel – Plot



BLE – High Channel – Plot



9 AC Powerline Conducted Emissions

9.1 Test Result

Test Description	Test Specification		Test Result
AC Powerline Conducted Emissions	15.207	RSS-GEN S8.8	Compliant

9.2 Test Method

With the receiver's resolution bandwidth was set to 9 kHz, exploratory scans were performed over the measuring frequency range (0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Limits (dBuV)
0.15 to 0.5 MHz	Avg 56 to 46 QP 66 to 56
0.5 to 5 MHz	Avg 46 Pk 56
5 to 30 MHz	Avg 50 Pk 60

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions:

Temperature: 22.7 °C
 Relative Humidity: 38.8 %
 Atmospheric Pressure 97.8 kPa

9.4 Test Equipment

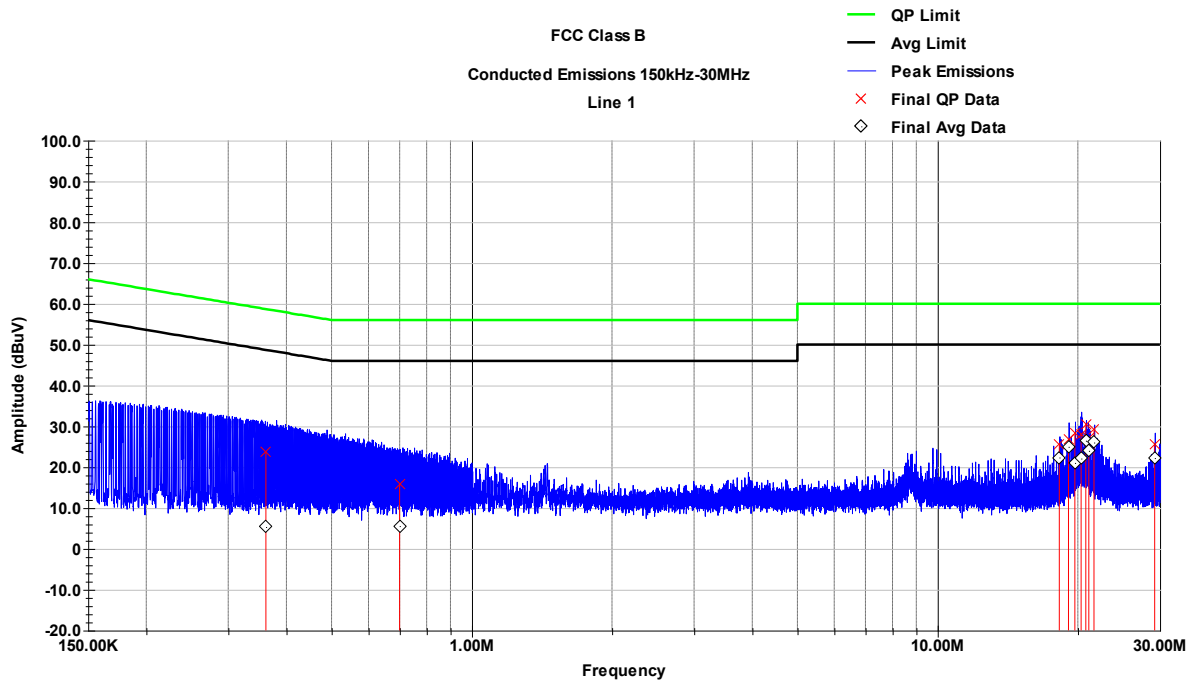
Test End Date: 13-Apr-2023

Tester: EW

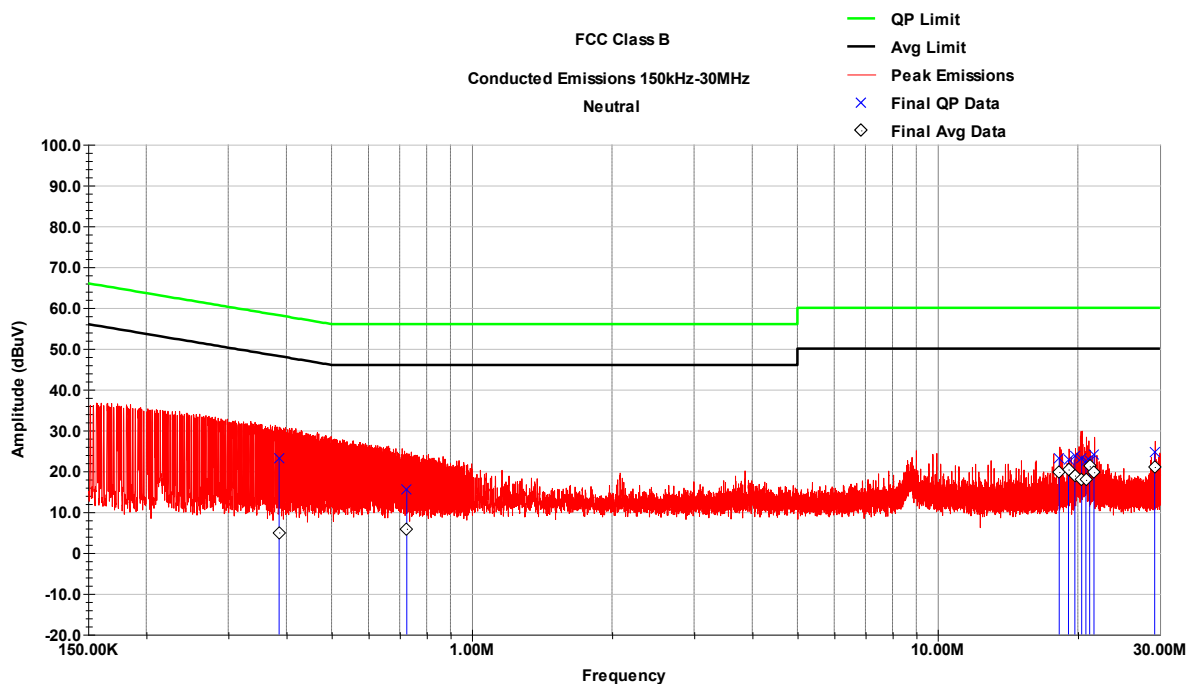
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B085882	15-Apr-2022	15-Apr-2023
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17017	25-Aug-2022	25-Aug-2023
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22032	24-Nov-2022	24-Nov-2023

Software: Conducted Emissions 230206.til

9.5 Test Data



Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.361	23.7	58.7	-34.9	5.3	48.7	-43.3
0.700	15.9	56.0	-40.1	5.6	46.0	-40.4
18.244	25.7	60.0	-34.3	22.4	50.0	-27.6
19.098	26.8	60.0	-33.2	25.0	50.0	-25.0
19.708	28.2	60.0	-31.8	21.0	50.0	-29.0
20.323	27.9	60.0	-32.1	22.1	50.0	-27.9
20.808	30.5	60.0	-29.5	26.5	50.0	-23.5
21.113	27.2	60.0	-32.8	24.0	50.0	-26.0
21.663	29.4	60.0	-30.6	26.0	50.0	-24.0
29.235	25.6	60.0	-34.4	22.2	50.0	-27.8



Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.386	23.2	58.2	-34.9	5.0	48.2	-43.2
0.725	15.5	56.0	-40.5	5.9	46.0	-40.1
18.243	23.1	60.0	-36.9	19.8	50.0	-30.2
19.097	22.7	60.0	-37.3	20.4	50.0	-29.6
19.707	23.7	60.0	-36.3	18.9	50.0	-31.1
20.384	23.3	60.0	-36.7	18.1	50.0	-31.9
20.812	22.5	60.0	-37.5	17.9	50.0	-32.1
21.199	22.5	60.0	-37.5	21.2	50.0	-28.8
21.662	24.2	60.0	-35.8	19.8	50.0	-30.2
29.236	24.8	60.0	-35.2	21.0	50.0	-29.0

10 Measurement Uncertainty

The measurement uncertainty figures are calculated in accordance with TR 100 028-1 [2] and correspond to an expansion factor (coverage factor) $k = 2$ (which provides confidence levels of 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Measurement uncertainty is not used to adjust the measurements to determine compliance.

Parameter	Expanded Uncertainty for Normal k factor equal to 2	
	Required	Laboratory Actual
Radio Frequency	$\pm 1 \times 10^{-5}$	$\pm 9.8 \times 10^{-8}$
total RF power, conducted	± 1.5 dB	± 1.2 dB
RF power density, conducted	± 3 dB	± 0.7 dB
spurious emissions, conducted	± 3 dB	± 2.1 dB
all emissions, radiated	± 6 dB	± 4.8 dB
temperature	$\pm 1^{\circ}\text{C}$	$\pm 0.5^{\circ}\text{C}$
humidity	± 5 %	$\pm 3.5\%$
DC and low frequency voltages	± 3 %	$\pm 0.4\%$
Conducted disturbance at mains port using AMN	± 3.4 dB	± 2.5 dB

11 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	30 March 2026
1	- Added reference to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 on title page - Updated RSS-247 section references for Issue 4 in section 1 - Added EUT firmware version (FVIN) in section 2.3 - Deleted incorrect 99% bandwidth plots in section 3.6	05 May 2026