

RF Test Report

Project Number: 5243539**Offer Number: SUW-202309005248****Report Number: 5243539EMC02****Revision Level: 0****Client: Orpyx Medical Technologies Inc.****Equipment Under Test: Orpyx® Hub (for Orpyx)****mcGateLTE (for McThings)****Model Number: OH000010 (for Orpyx)****mcGateLTE (for McThings)****FCC ID: 2AAH8-OH000010 and 2AGBO-MCGATELTE****IC: 10789A-OH000010 and 21078-MCGATELTE****Applicable Standards: FCC Part 15 Subpart C, § 15.247****RSS-247, Issue 3, August 2023****RSS-GEN, Issue 5, February 2021, Amendment 2****ANSI C63.10:2020****Report issued on: 29 May 2025****Test Result: Compliant**

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Bandwidth	15.247(a)(2)	RSS-247 S5.2 (a) RSS-GEN S6.7	Compliant
Output Power	15.247(b)(3)	RSS-247 S5.4 (d)	Compliant
Power Spectral Density	15.247(e)	RSS-247 S5.2 (b)	Compliant
Conducted Spurious Emissions / Band Edge	15.247(d)	RSS-247 S5.5	Compliant
Emissions in Restricted Frequency Bands	15.247(d) 15.205, 15.209	RSS-247 S5.5 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 stamped metal surface mount 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: Orpyx Medical Technologies Inc.
Address: 1240 20th Ave SE, Suite 205
City, State, Zip, Country: Calgary, Alberta T2G 1M8, Canada

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: Orpyx® Hub (for Orpyx)
mcGateLTE (for McThings)
Model Number: OH000010 (for Orpyx)
mcGateLTE (for McThings)
Serial Numbers: 000161B8 (1Mbps Conducted/Radiated Sample)
000161B9 (2Mbps Conducted/Radiated Sample)
FCC ID: 2AAH8-OH000010 and 2AGBO-MCGATELTE
IC: 10789A-OH000010 and 21078-MCGATELTE

Frequency Range: 2402 – 2480 MHz
Data Modes: Bluetooth Low Energy (BLE) – GFSK – 1Mbps & 2Mbps
Antenna Type/Gain*: Stamped metal surface mount antenna (1.94dBi peak gain)

Rated Voltage: 120Vac
Test Voltage: 120Vac

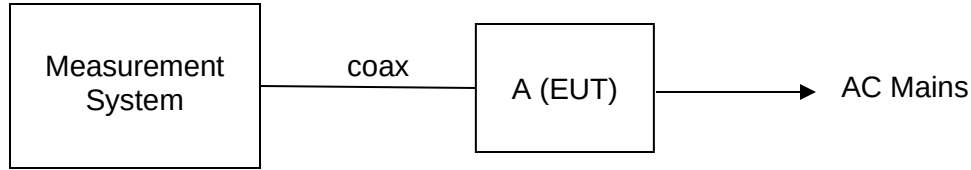
Sample Received Date: 09 January 2025
Dates of testing: 23-31 January 2025

*Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous filing or other.

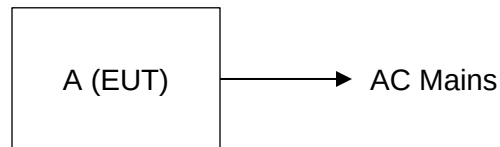
2.4 Operating Modes and Conditions

The client provided two EUT samples with test mode firmware installed. One was programmed to transmit BLE channels at the 1Mbps data rate, and the other one was programmed to transmit BLE channels at the 2Mbps data rate. A number of button presses were used to set each EUT to transmit at low, middle or high BLE channels. These channels were centered at 2402, 2440 and 2480 MHz for the 1Mbps unit, and at 2404, 2440 and 2478 MHz for the 2Mbps unit. On both units, the output power was set to -8dBm with the amplifier set to high.

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	Orpyx Medical Technologies Inc.	Orpyx® Hub / mcGateLTE (EUT)	OH000010 / mcGateLTE	000161B8 000161B9

3 Bandwidth

3.1 Test Result

Test Description	Test Specification		Test Result
DTS Bandwidth (6dB)	15.247(a)(2)	RSS-247 S5.2 (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 11.8.1, 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.

Limit

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

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	23 Jan 2025	30 Jan 2025
Temperature:	21.98 °C	22.54 °C
Relative Humidity:	16.1 %	22.1 %
Atmospheric Pressure:	99.33 kPa	98.94 kPa

3.4 Test Equipment

Test End Date: 23-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 30-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Software Profile:

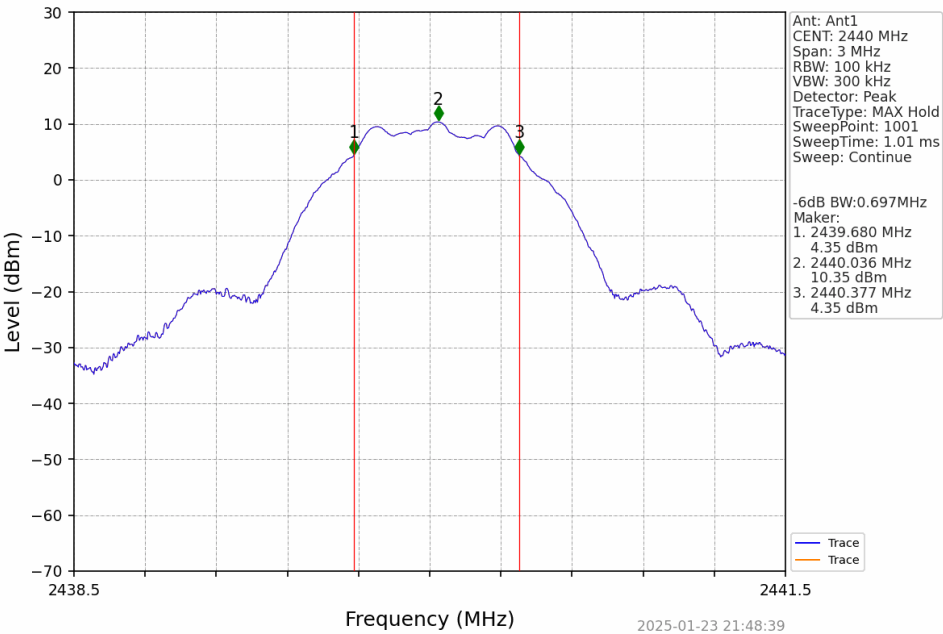
TSTPASS Version: 2.0 (2024.12.23_11.05.24)

3.5 Test Data – DTS Bandwidth (6dB)

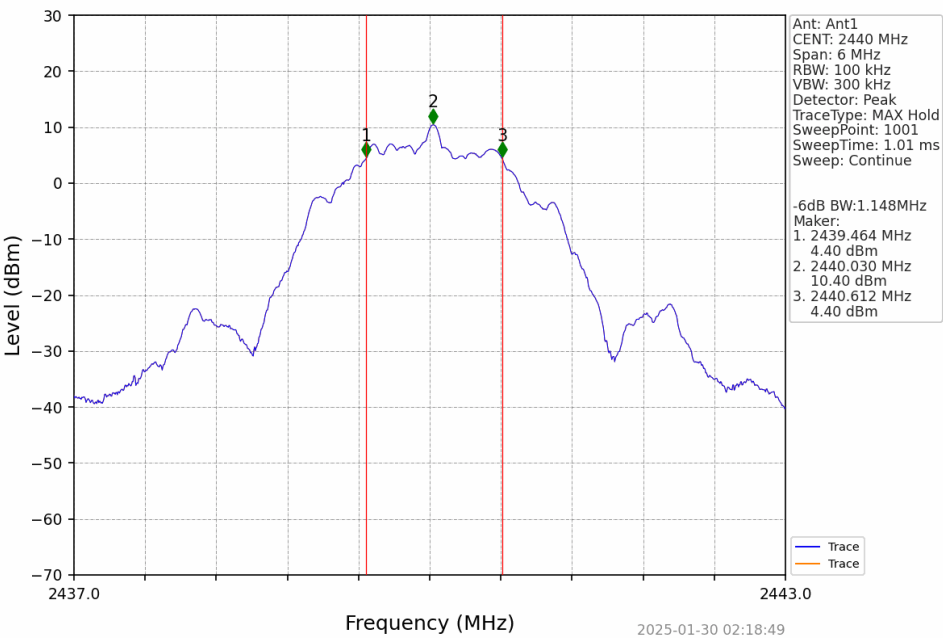
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.693	≥ 0.5	Pass
		2440	1	0.697	≥ 0.5	Pass
		2480	1	0.698	≥ 0.5	Pass
2M	SISO	2404	1	1.143	≥ 0.5	Pass
		2440	1	1.148	≥ 0.5	Pass
		2478	1	1.147	≥ 0.5	Pass

Representative Plots

1M_MCH_2440MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV

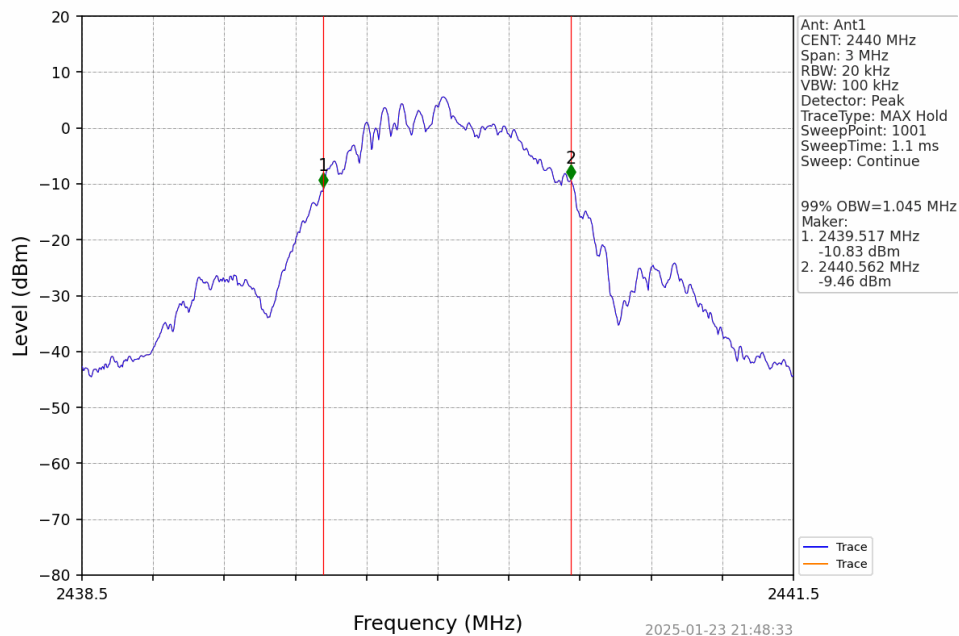


3.6 Test Data – 99% Occupied Bandwidth

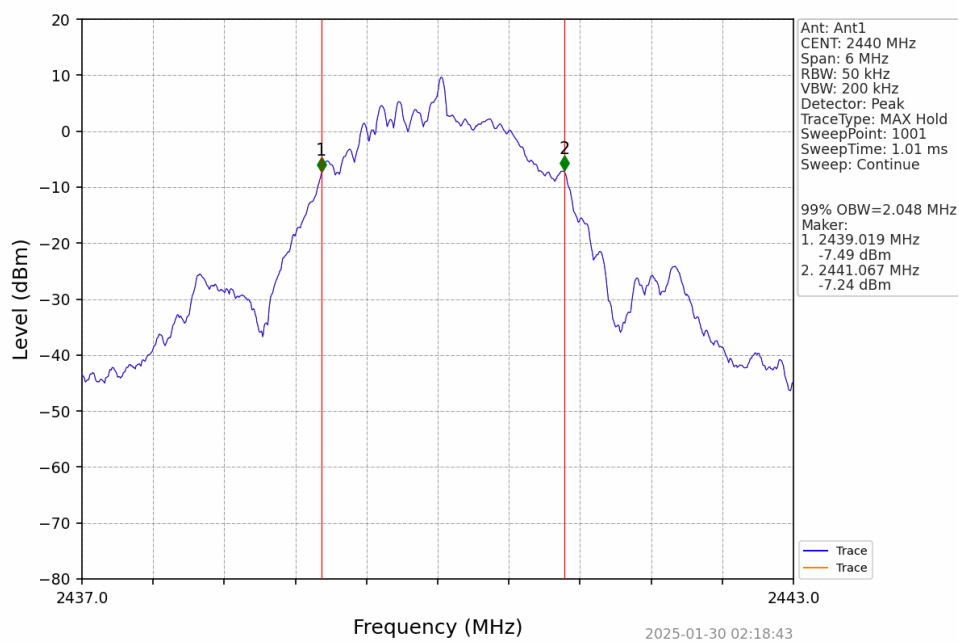
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.043	/	Pass
		2440	1	1.045	/	Pass
		2480	1	1.050	/	Pass
2M	SISO	2404	1	2.046	/	Pass
		2440	1	2.048	/	Pass
		2478	1	2.049	/	Pass

Representative Plots

1M_MCH_2440MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



4 Output Power

4.1 Test Result

Test Description	Test Specification		Test Result
Fundamental Emission Output Power	15.247(b)(3)	RSS-247 S5.4 (d)	Compliant

4.2 Test Method

Fundamental maximum peak conducted output power measurements were performed using the method described in ANSI C63.10:2013 clause 11.9.1.1. This procedure is referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

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	23 Jan 2025	30 Jan 2025
Temperature:	21.98 °C	22.54 °C
Relative Humidity:	16.1 %	22.1 %
Atmospheric Pressure:	99.33 kPa	98.94 kPa

4.4 Test Equipment

Test End Date: 23-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 30-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Software Profile:

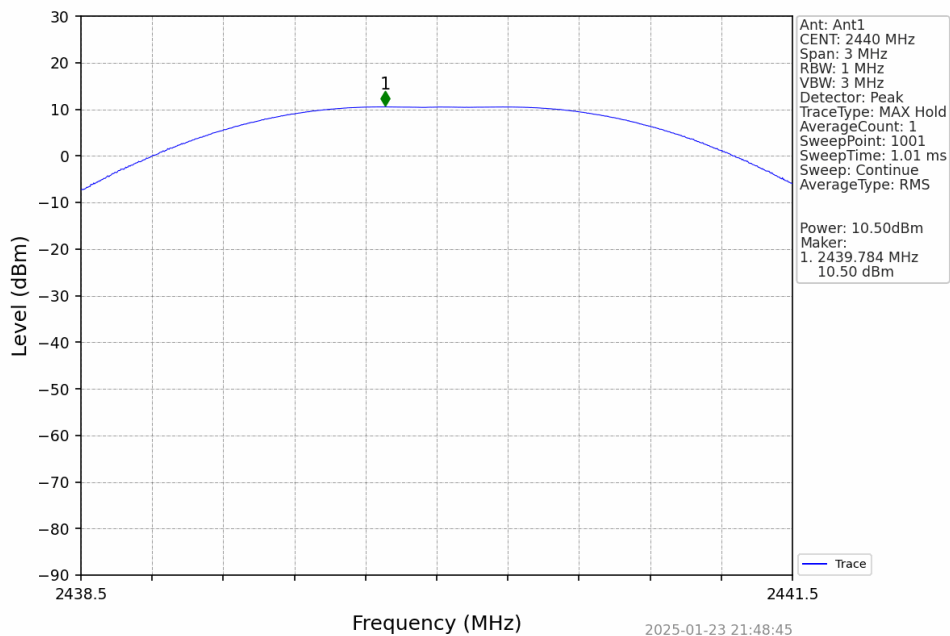
TSTPASS Version: 2.0 (2024.12.23_11.05.24)

4.5 Test Data

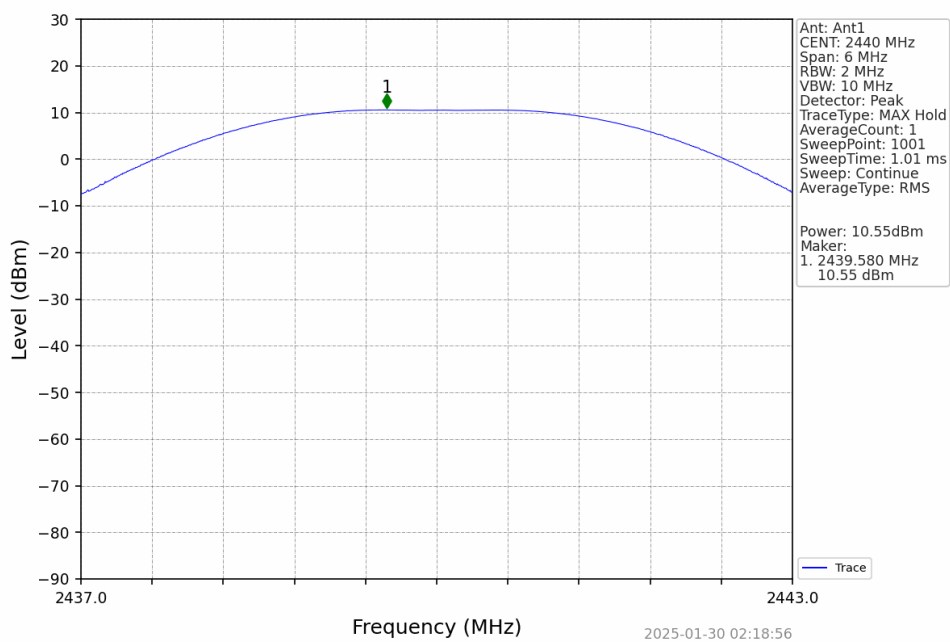
Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	10.92	<=30	Pass
		2440	10.50	<=30	Pass
		2480	8.91	<=30	Pass
2M	SISO	2404	10.70	<=30	Pass
		2440	10.55	<=30	Pass
		2478	9.27	<=30	Pass
Note1: Antenna Gain: Ant1: 1.94dBi;					

Representative Plots

1M_MCH_2440MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



5 Power Spectral Density

5.1 Test Result

Test Description	Test Specification		Test Result
Power Spectral Density	15.247(e)	RSS-247 S5.2 (b)	Compliant

5.2 Test Method

Peak power spectral density measurements were performed using the procedures from ANSI C63.10: 2013 clause 11.10.2. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

Limit

The maximum limit is 8 dBm / 3 kHz.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	23 Jan 2025	30 Jan 2025
Temperature:	21.98 °C	22.54 °C
Relative Humidity:	16.1 %	22.1 %
Atmospheric Pressure:	99.33 kPa	98.94 kPa

5.4 Test Equipment

Test End Date: 23-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 30-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Software Profile:

TSTPASS Version: 2.0 (2024.12.23_11.05.24)

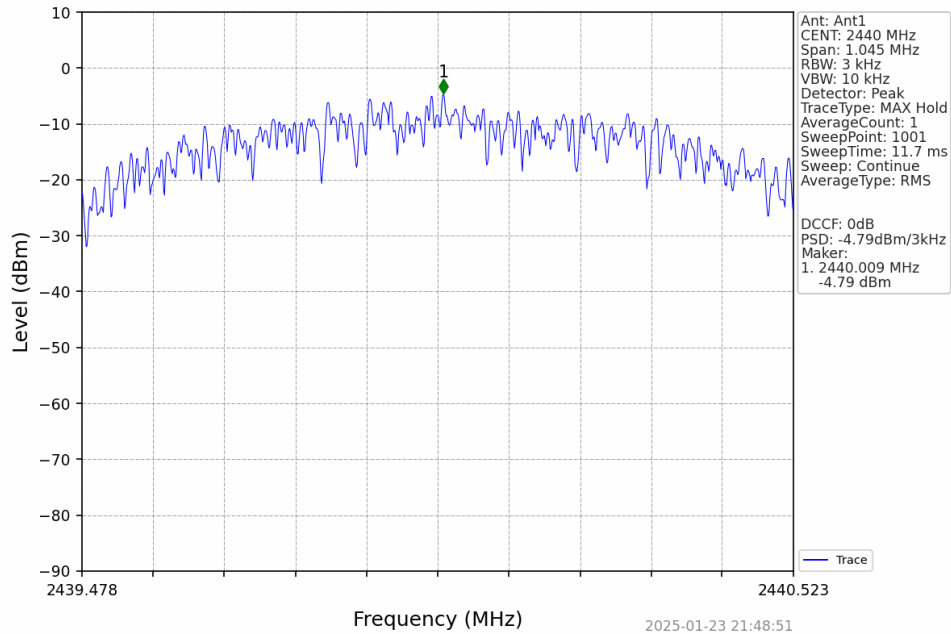
5.5 Test Data

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-4.35	<=8	Pass
		2440	-4.79	<=8	Pass
		2480	-6.46	<=8	Pass
2M	SISO	2404	-7.43	<=8	Pass
		2440	-7.53	<=8	Pass
		2478	-8.83	<=8	Pass

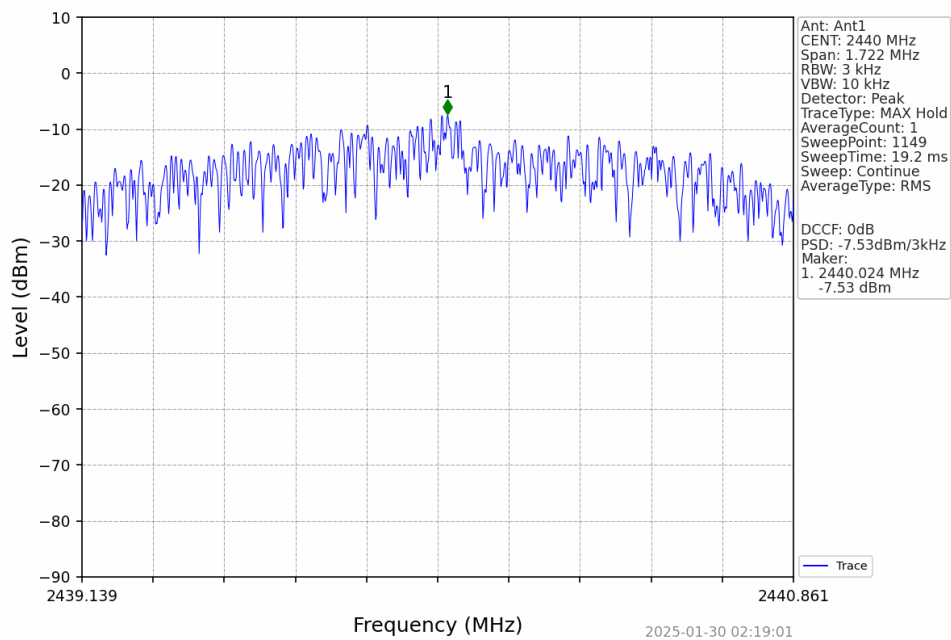
Note1: Antenna Gain: Ant1: 1.94dBi;

Representative Plots

1M_MCH_2440MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



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 S5.5	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.

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	23 Jan 2025	30 Jan 2025
Temperature:	21.98 °C	22.54 °C
Relative Humidity:	16.1 %	22.1 %
Atmospheric Pressure:	99.33 kPa	98.94 kPa

6.4 Test Equipment

Test End Date: 23-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 30-Jan-2025

Tester: SGM

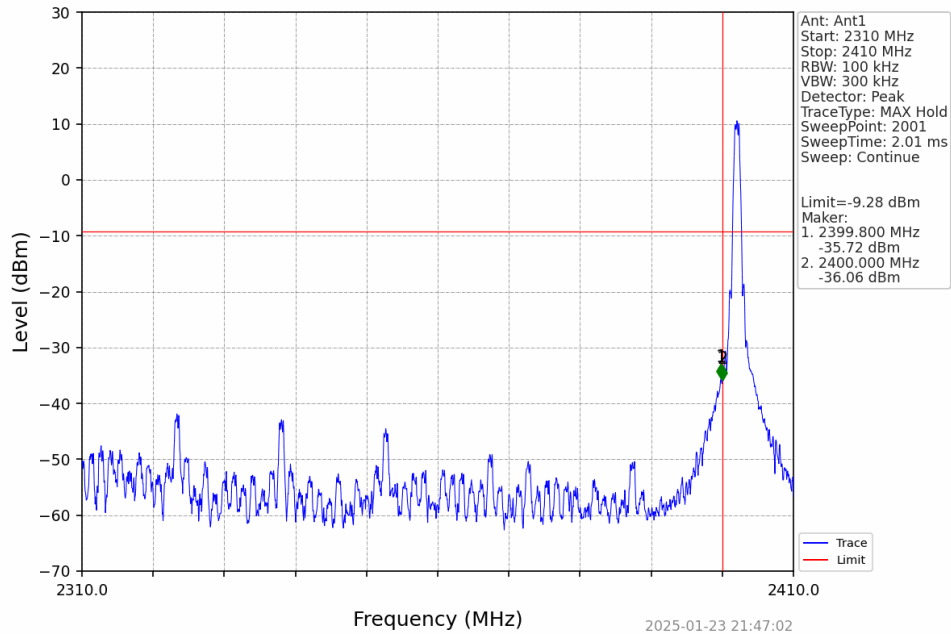
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Software Profile:

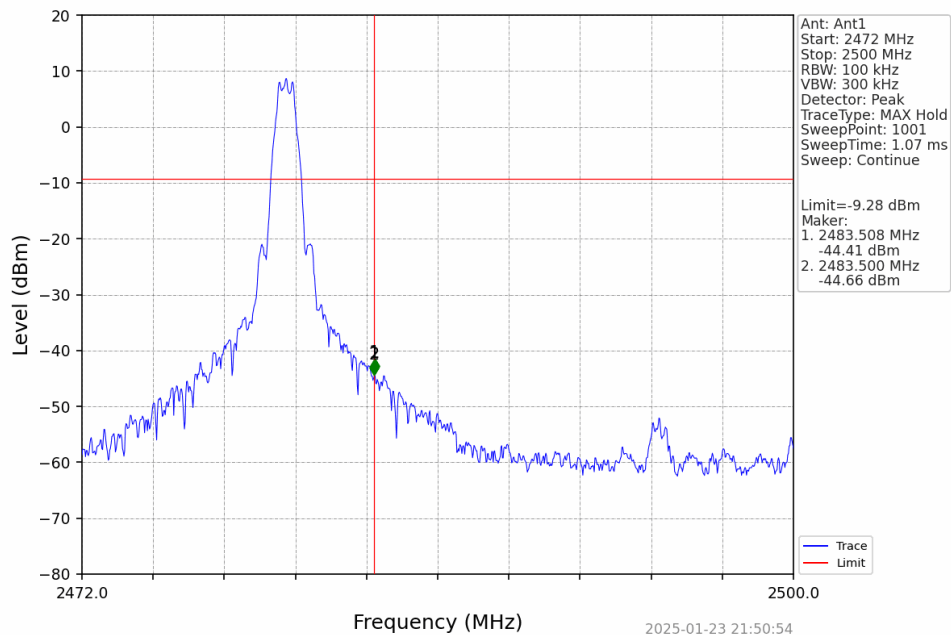
TSTPASS Version: 2.0 (2024.12.23_11.05.24)

6.5 Test Data – DTS Band Edge

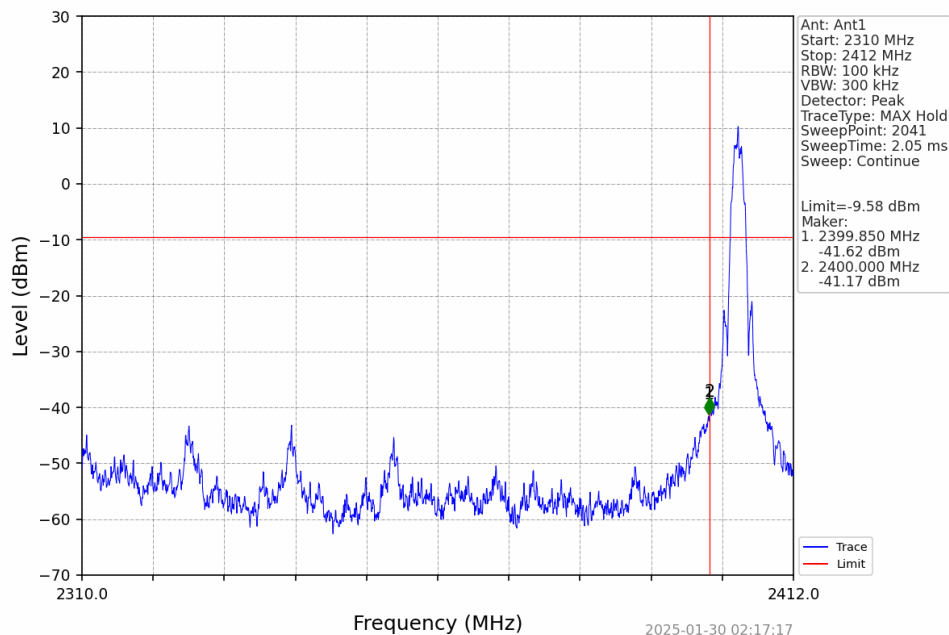
BLE 1M - Lower band edge



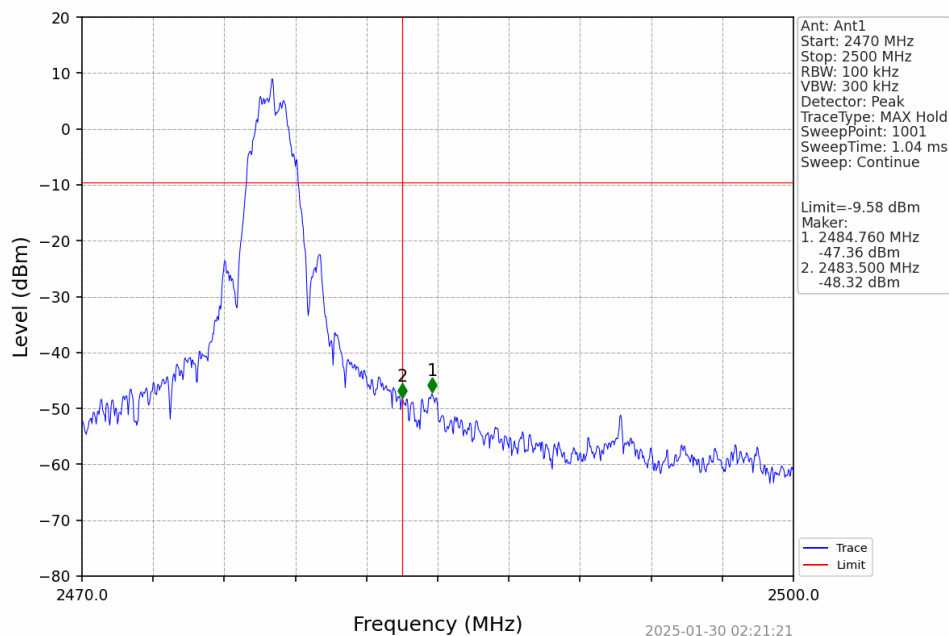
BLE 1M - Upper band edge



BLE 2M - Lower band edge



BLE 2M - Upper band edge



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-247 S5.5 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.

Measurements were made using the 1Mbps data rate since that produced the highest power spectral density. 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:

- 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

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions

- Temperature: 22.0 – 23.8 °C
- Relative Humidity: 16.1 – 25.8 %
- Atmospheric Pressure: 97.5 – 99.3 kPa

7.4 Test Equipment

30-1000MHz

Test End Date: 31-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
ANTENNA, BILOG	SUNOL	JB6	B079689	16-May-2024	16-May-2026
N-FEMALE TO N-MALE RF CABLE	ECHELON	EM-B810NMNF-118	23010	17-Apr-2024	17-Apr-2025
N to N RF Cable	ECHELON	EM-B810NM-276	24022	15-Nov-2024	15-Nov-2025
RF CABLE, NM TO NM.	TELEDYNE STORM MICROWAVE	90-195-157	21019	20-Mar-2024	20-Mar-2025
RF CABLE	HUBER & SUHNER	SF106	B085888	7-Aug-2024	7-Aug-2025
LOW NOISE AMPLIFIER	MINI-CIRCUITS	ZKL-2+	B079817	7-Aug-2024	7-Aug-2025
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	22027	14-Nov-2024	14-Nov-2025

1-18GHz

Test End Date: 29-30 Jan-2025

Tester: ZH

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	2-Aug-2024	2-Aug-2026
RF CABLE, NM TO NM.	90-195-157	TELEDYNE STORM MICROWAVE	21019	20-Mar-2024	20-Mar-2025
RF CABLE	SF106	HUBER & SUHNER	B085888	7-Aug-2024	7-Aug-2025
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	8-Oct-2024	8-Oct-2025
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22027	14-Nov-2024	14-Nov-2025
FILTER, HIGH PASS, >2800MHZ	HPM50111	MICRO-TRONICS	22017	14-Jun-2024	14-Jun-2025

18-26GHz

Test End Date: 30-Jan-2025

Tester: ZH

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
ANTENNA, DRG HORN (SMALL)	3116B	ETS LINDGREN	B079695	2-Aug-2024	2-Aug-2026
SMA to SMA RF Cable	NC12-K1K1-138	MEGAPHASE	22002	6-Feb-2024	6-Feb-2025
2.92MM MALE TO 2.92MM MALE RF CABLE	HULL140A-29P-29P-60	HASCO COMPONENTS	18033	20-Mar-2024	20-Mar-2025
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	21-Oct-2024	21-Oct-2025
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22027	14-Nov-2024	14-Nov-2025

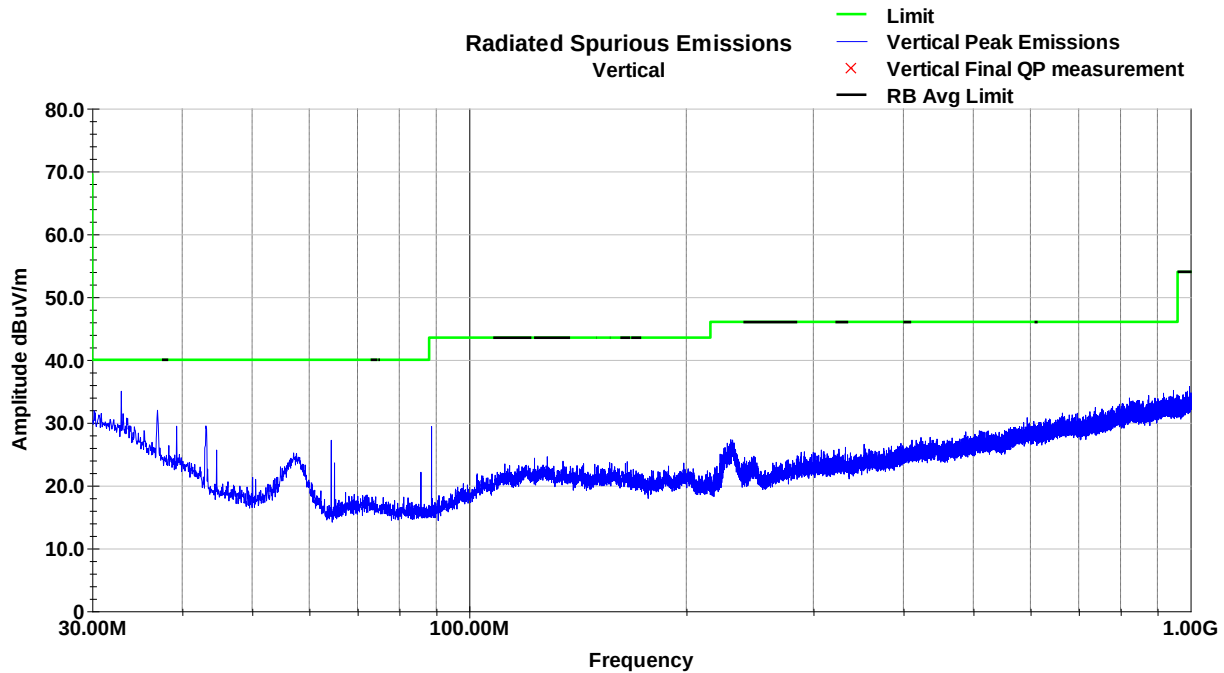
Software: "RSE 30-1000 MHz T7 220318" TILE 7 profile dated 18 Mar 2022
"RSE 1-18 GHz T7 210212" TILE 7 profile dated 12 Feb 2021
"RSE 18-26 GHz T7 210212" TILE 7 profile dated 12 Feb 2021

7.5 Test Data

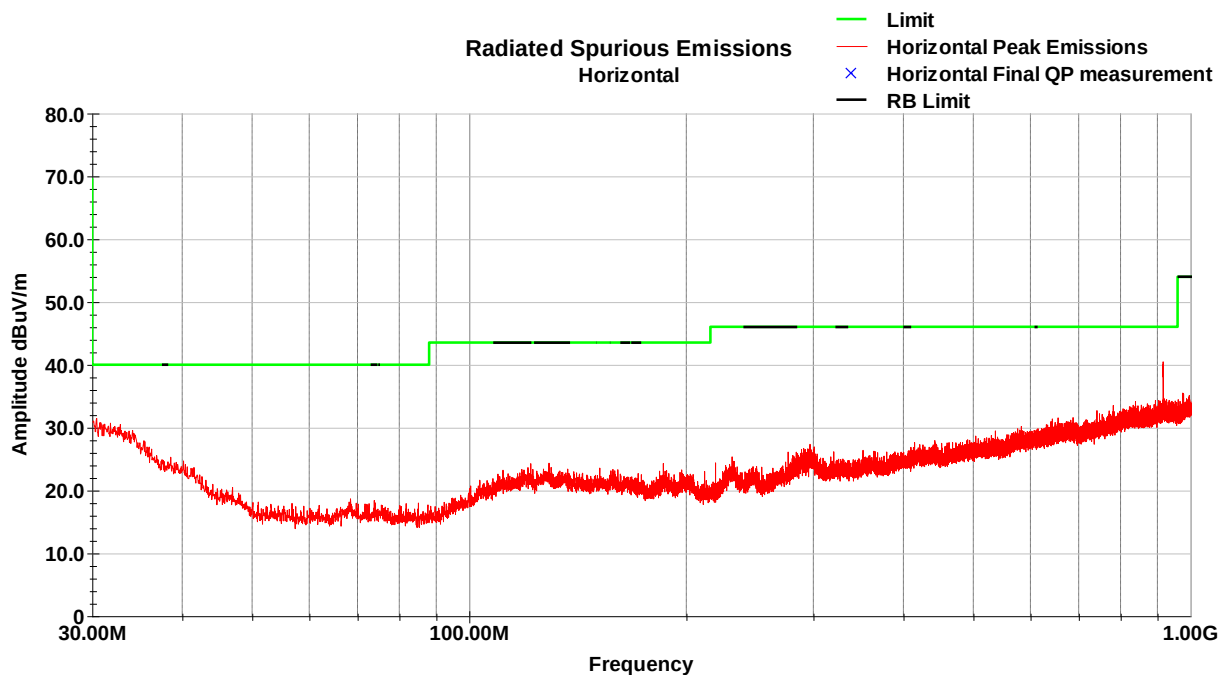
7.5.1 30-1000 MHz

No significant deviation based on axis or channel in the 30-1000MHz range – worst case shown.

30-1000 MHz Vertical Low Channel - Plot

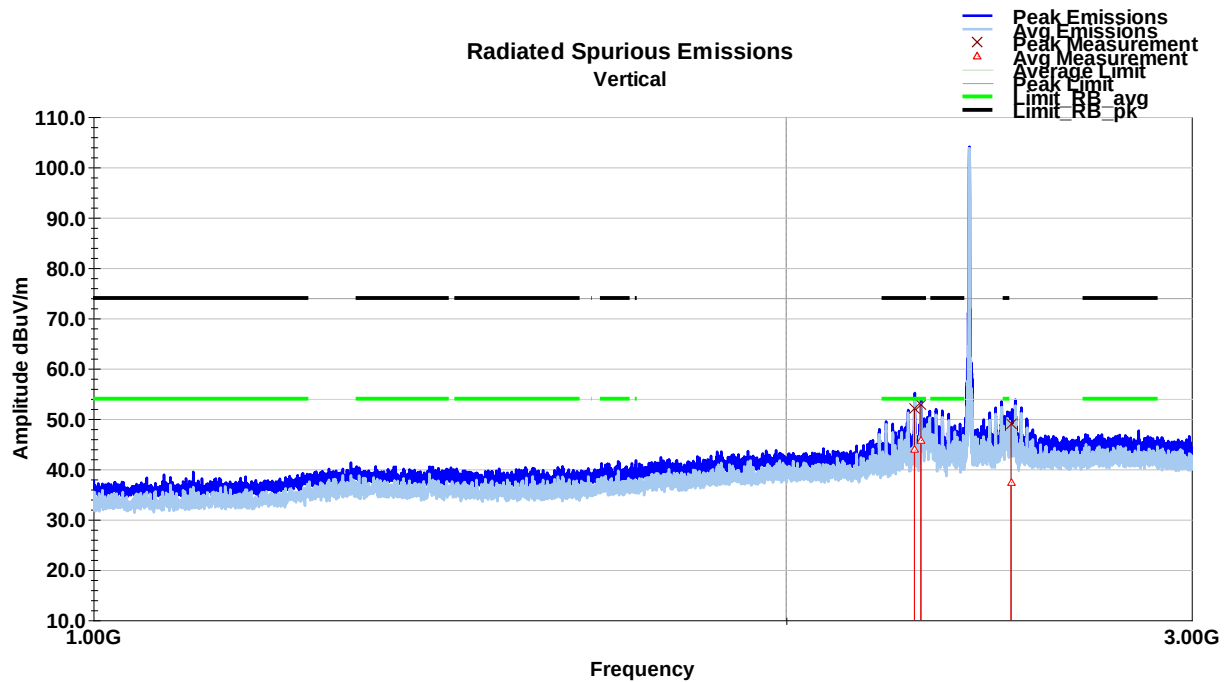


30-1000 MHz Horizontal Low Channel - Plot



7.5.2 1-18 GHz

1-3GHz Vertical Low Channel - Plot

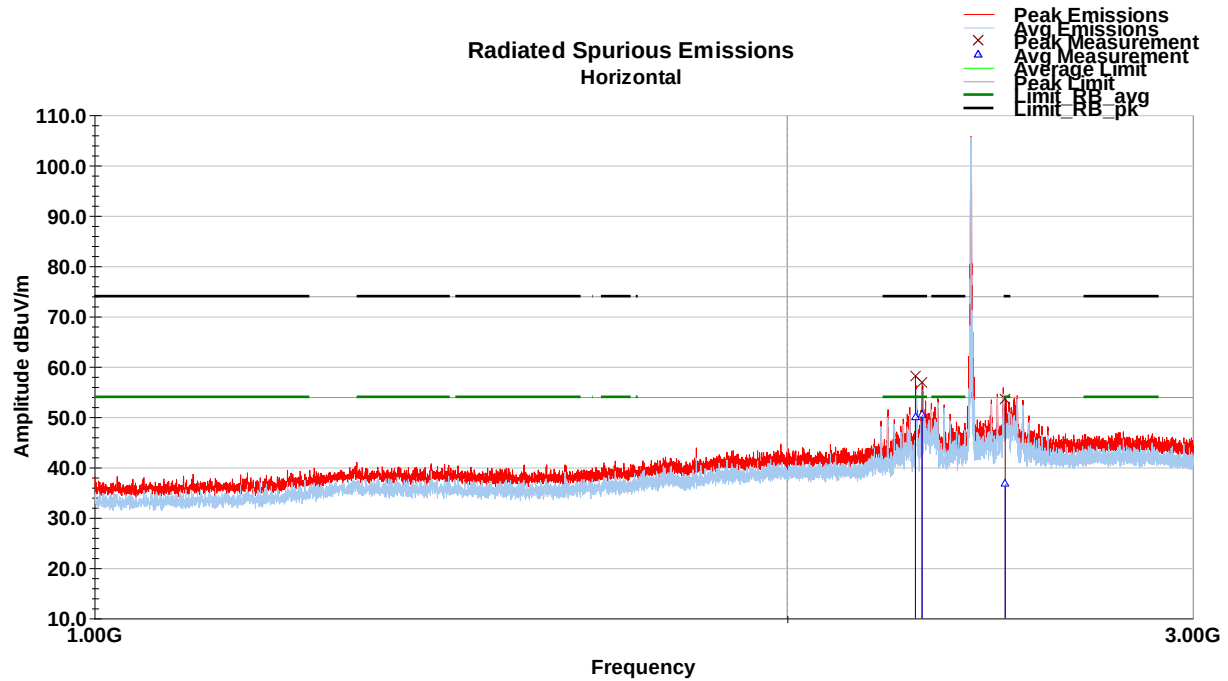


1- 3GHz Vertical Low Channel – Data

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2273.76	53.9	V	51.0	161.0	31.1	1.5	42.6	43.9	54.0	-10.1
2288.48	55.8	V	273.0	186.0	31.2	1.5	42.6	45.8	54.0	-8.2
2504.36	46.5	V	63.0	183.0	32.0	1.7	42.7	37.4	54.0	-16.5
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2273.76	62.0	V	51.0	161.0	31.1	1.5	42.6	52.0	74.0	-22.0
2288.48	62.7	V	273.0	186.0	31.2	1.5	42.6	52.8	74.0	-21.2
2504.36	58.0	V	63.0	183.0	32.0	1.7	42.7	49.0	74.0	-25.0
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

1-3GHz Horizontal Low Channel - Plot

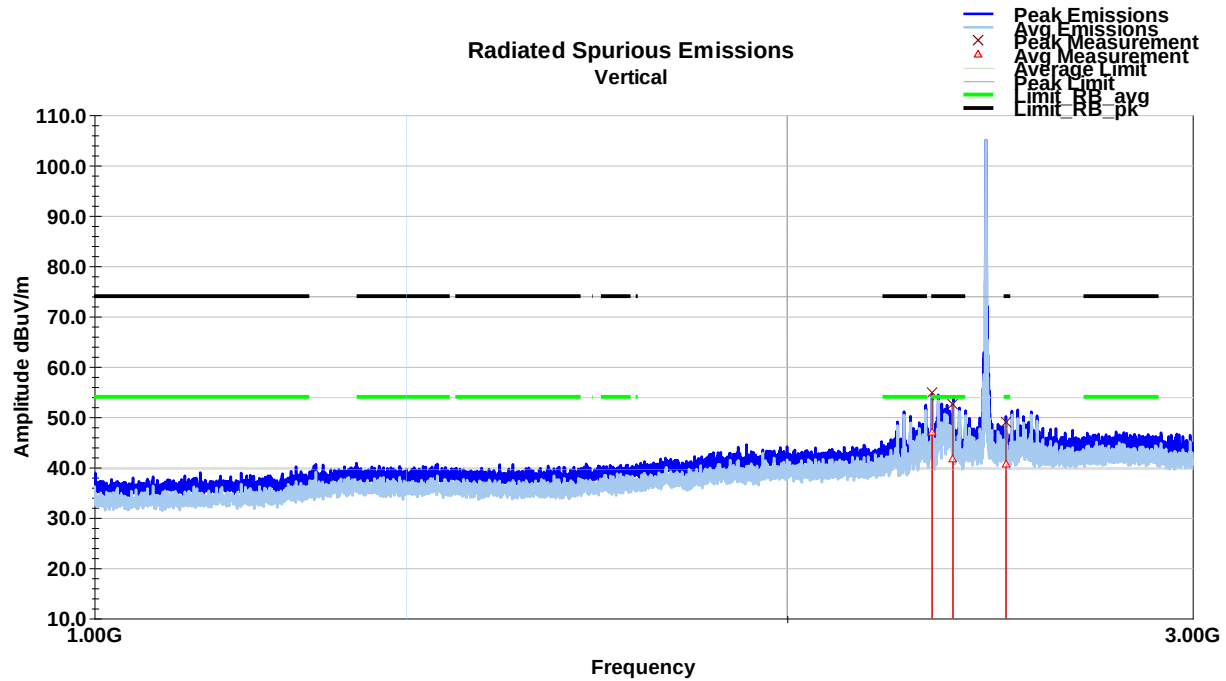


1- 3GHz Horizontal Low Channel – Data

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2273.76	59.9	H	165.0	249.0	31.1	1.5	42.6	49.9	54.0	-4.1
2288.84	60.4	H	164.0	248.0	31.2	1.5	42.6	50.5	54.0	-3.5
2487.28	45.7	H	23.0	223.0	32.0	1.6	42.6	36.7	54.0	-17.3
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2273.76	68.0	H	165.0	249.0	31.1	1.5	42.6	58.1	74.0	-15.9
2288.84	66.9	H	164.0	248.0	31.2	1.5	42.6	56.9	74.0	-17.1
2487.28	62.6	H	23.0	223.0	32.0	1.6	42.6	53.6	74.0	-20.4
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

1-3GHz Vertical Mid Channel - Plot

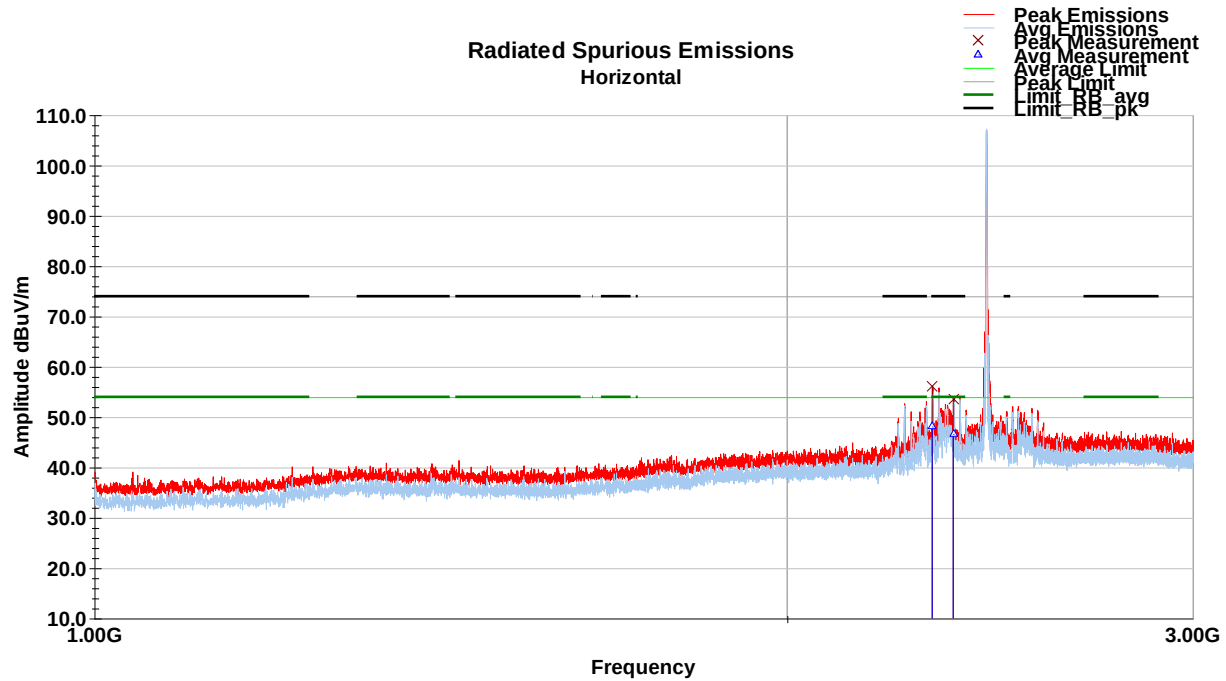


1- 3GHz Vertical Mid Channel – Data

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2311.96	56.8	V	44.0	137.0	31.2	1.5	42.6	47.0	54.0	-7.0
2360.64	50.9	V	289.0	110.0	31.5	1.5	42.4	41.6	54.0	-12.4
2489.44	49.6	V	73.0	204.0	31.9	1.6	42.6	40.6	54.0	-13.4
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2311.96	64.6	V	44.0	137.0	31.2	1.5	42.6	54.8	74.0	-19.2
2360.64	62.0	V	289.0	110.0	31.5	1.5	42.4	52.7	74.0	-21.3
2489.44	58.0	V	73.0	204.0	31.9	1.6	42.6	48.9	74.0	-25.1
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

1-3GHz Horizontal Mid Channel - Plot

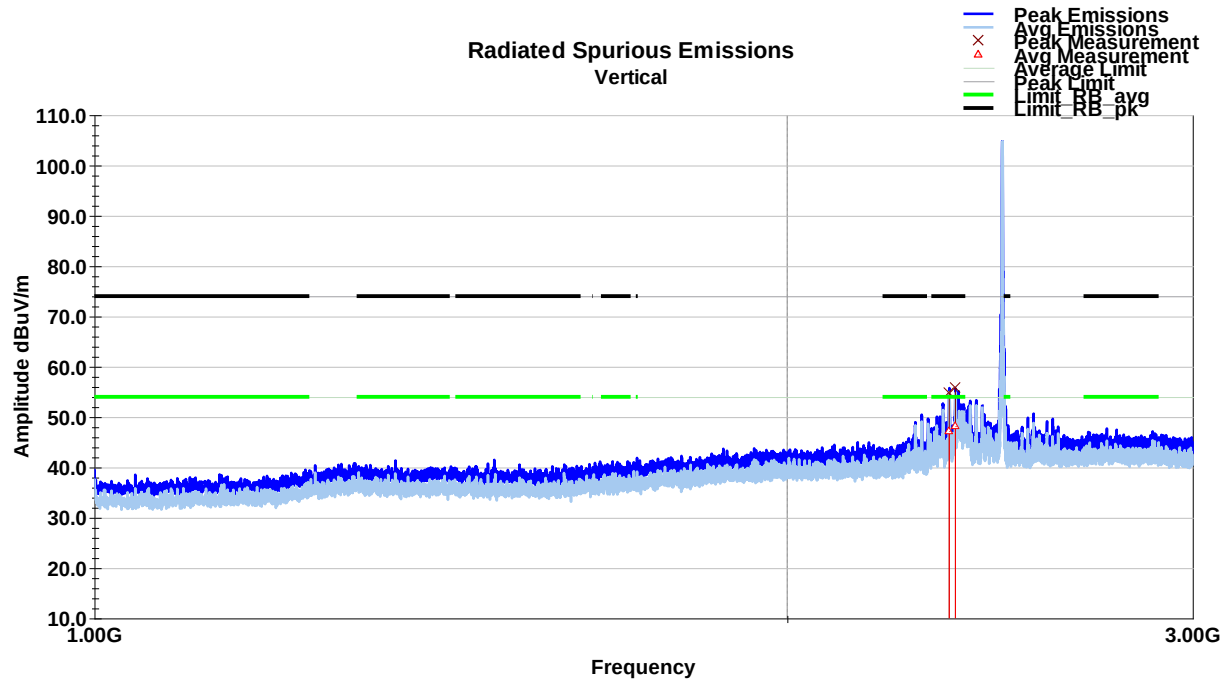


1- 3GHz Horizontal Mid Channel – Data

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2312.20	58.0	H	21.0	167.0	31.2	1.5	42.6	48.1	54.0	-5.8
2361.48	56.0	H	12.0	188.0	31.6	1.5	42.4	46.7	54.0	-7.3
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2312.20	65.9	H	21.0	167.0	31.2	1.5	42.6	56.1	74.0	-17.9
2361.48	62.8	H	12.0	188.0	31.6	1.5	42.4	53.5	74.0	-20.5
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

1-3GHz Vertical High Channel - Plot

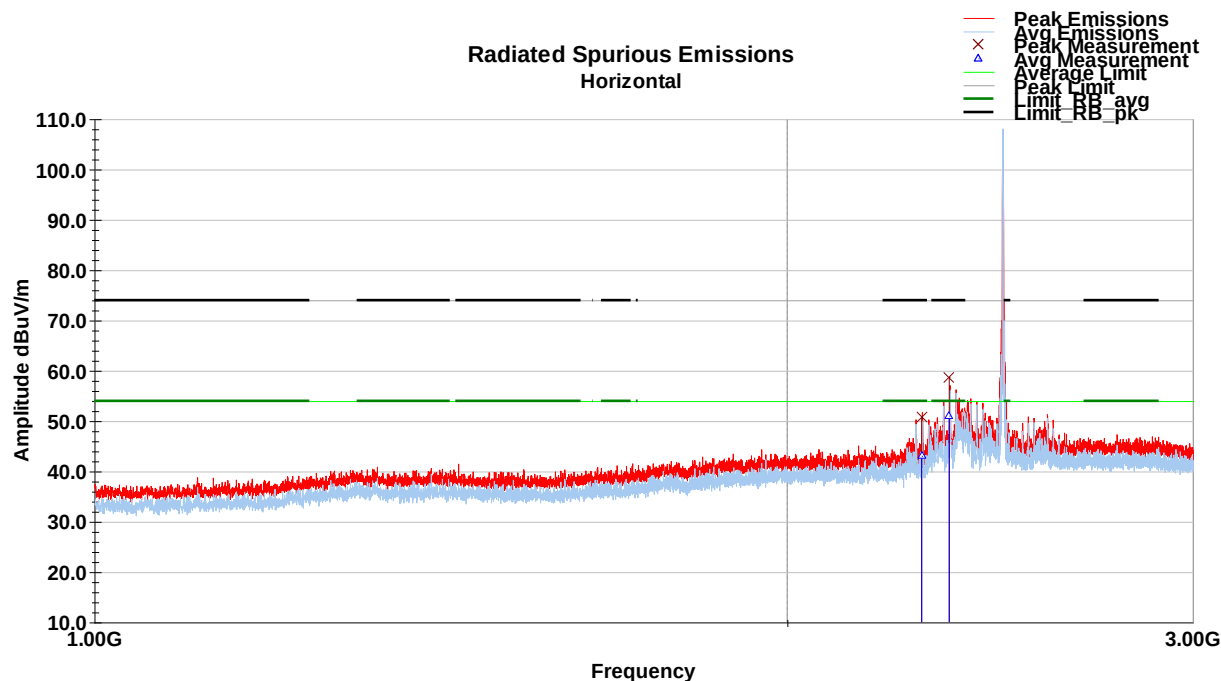


1- 3GHz Vertical High Channel – Data

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2351.96	56.5	V	124.0	176.0	31.5	1.5	42.3	47.2	54.0	-6.7
2366.32	57.5	V	284.0	177.0	31.6	1.5	42.4	48.2	54.0	-5.8
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2351.96	64.0	V	124.0	176.0	31.5	1.5	42.3	54.7	74.0	-19.3
2366.32	65.0	V	284.0	177.0	31.6	1.5	42.4	55.8	74.0	-18.2
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

1-3GHz Horizontal High Channel - Plot

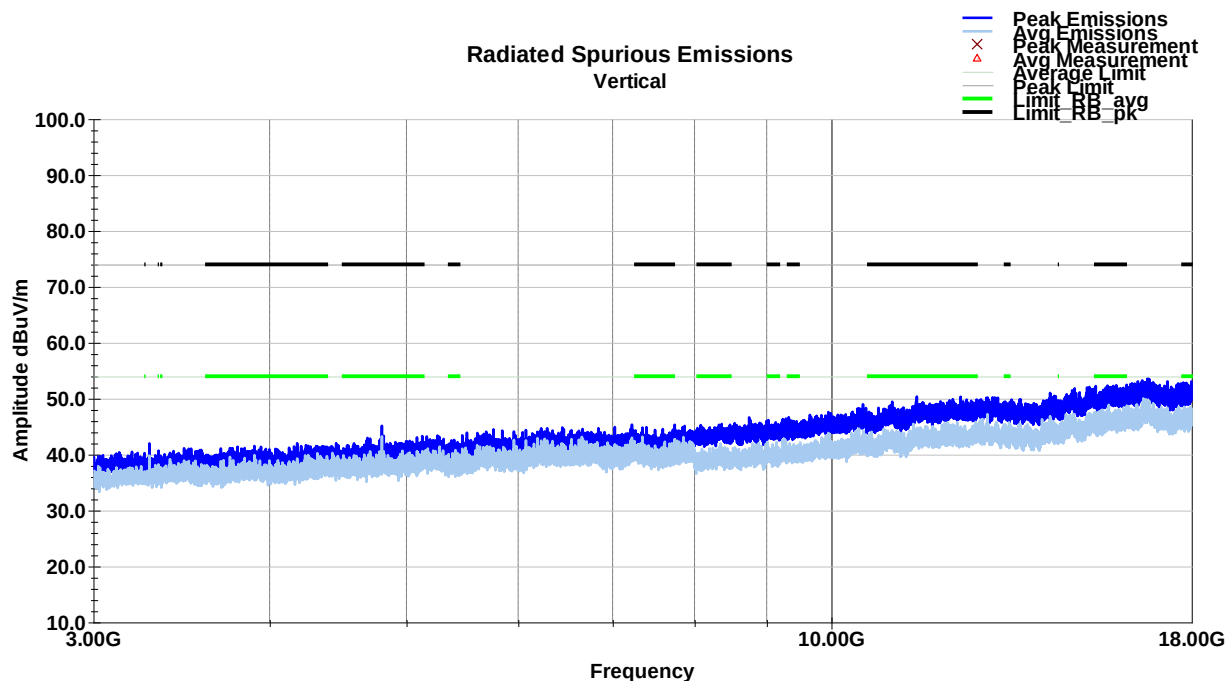


1- 3GHz Horizontal High Channel – Data

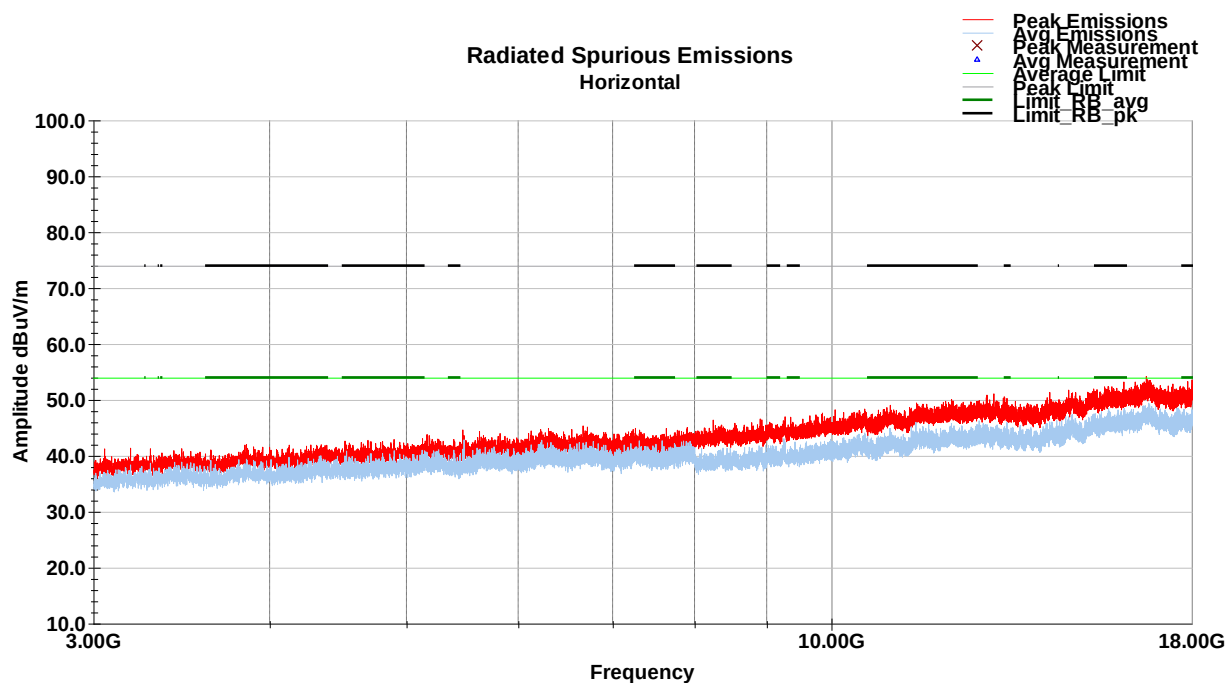
Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2288.00	53.1	H	159.0	187.0	31.2	1.5	42.6	43.1	54.0	-10.9
2351.96	60.4	H	17.0	228.0	31.5	1.5	42.3	51.1	54.0	-2.9
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2288.00	60.6	H	159.0	187.0	31.2	1.5	42.6	50.7	74.0	-23.3
2351.96	68.0	H	17.0	228.0	31.5	1.5	42.3	58.7	74.0	-15.3
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

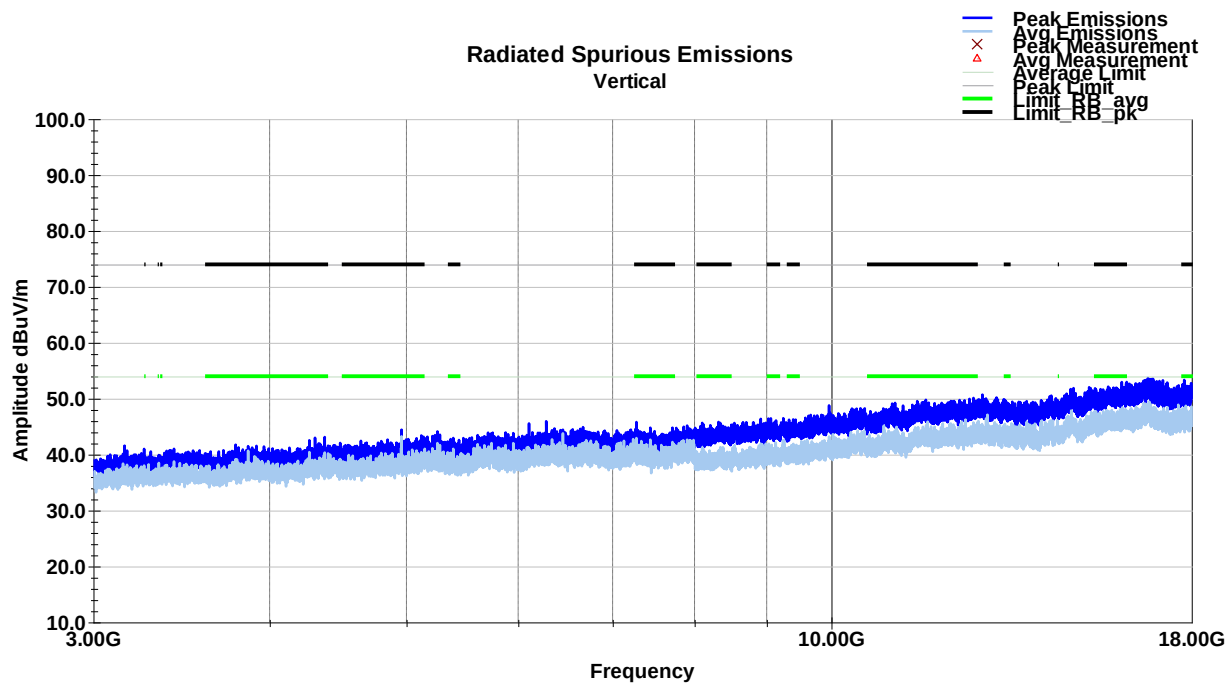
3-18GHz Vertical Low Channel - Plot



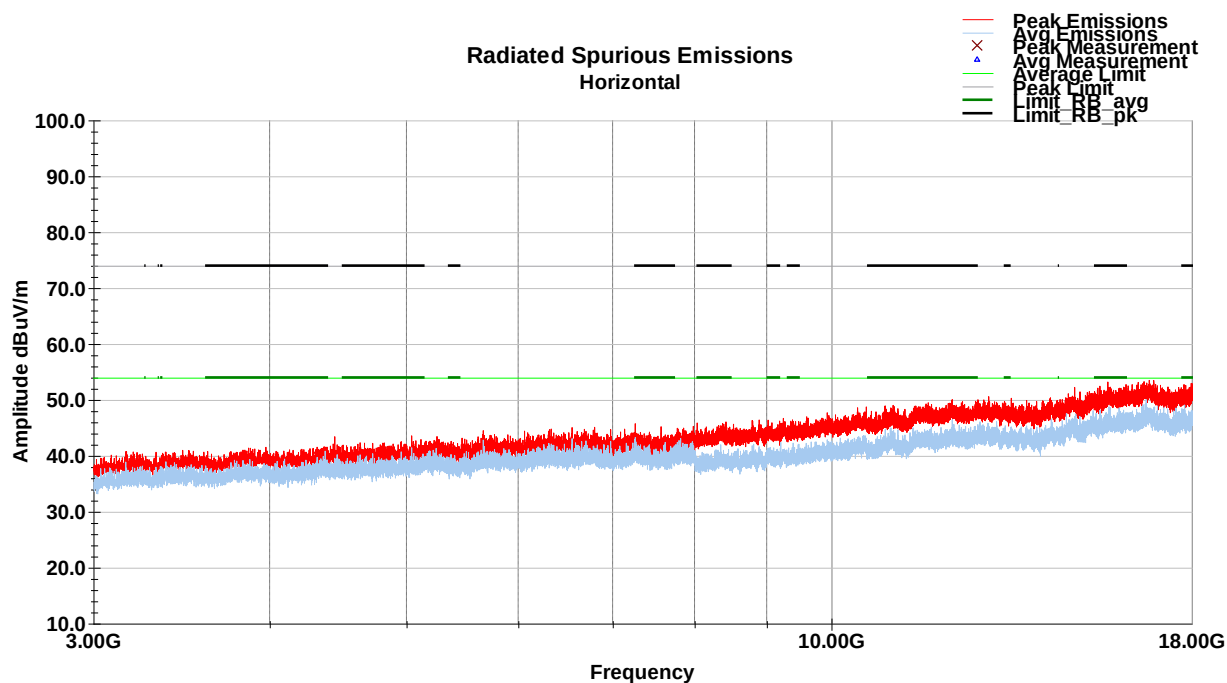
3-18GHz Horizontal Low Channel - Plot



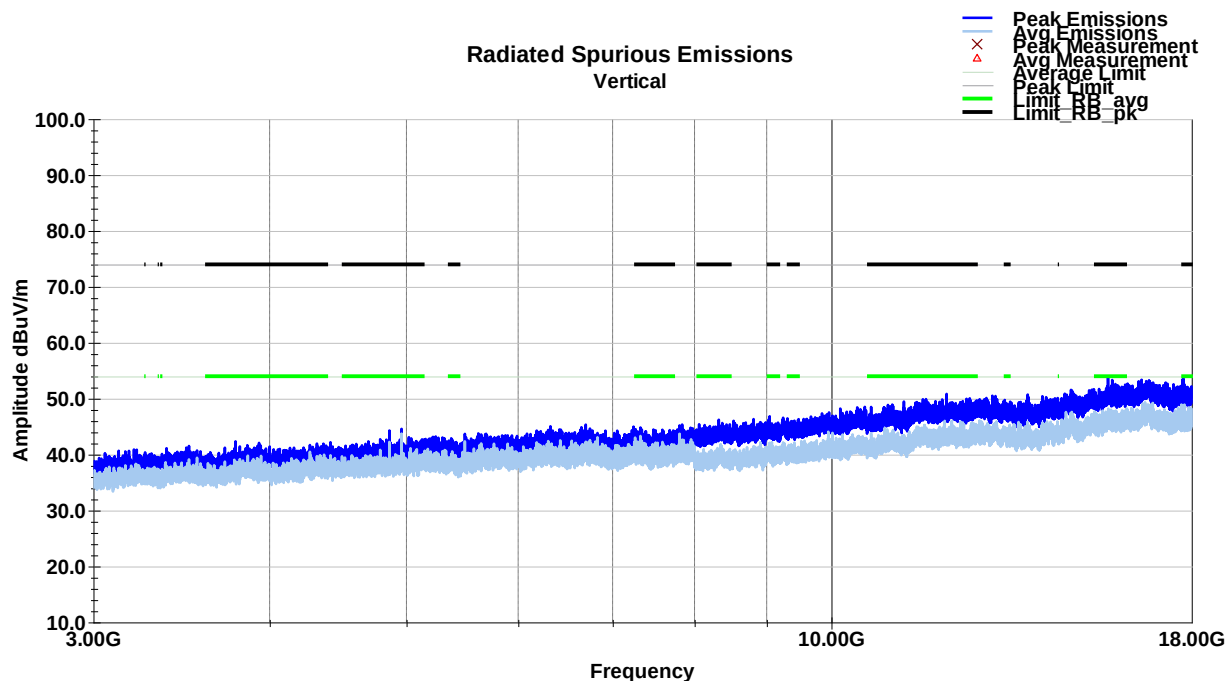
3-18GHz Vertical Mid Channel - Plot



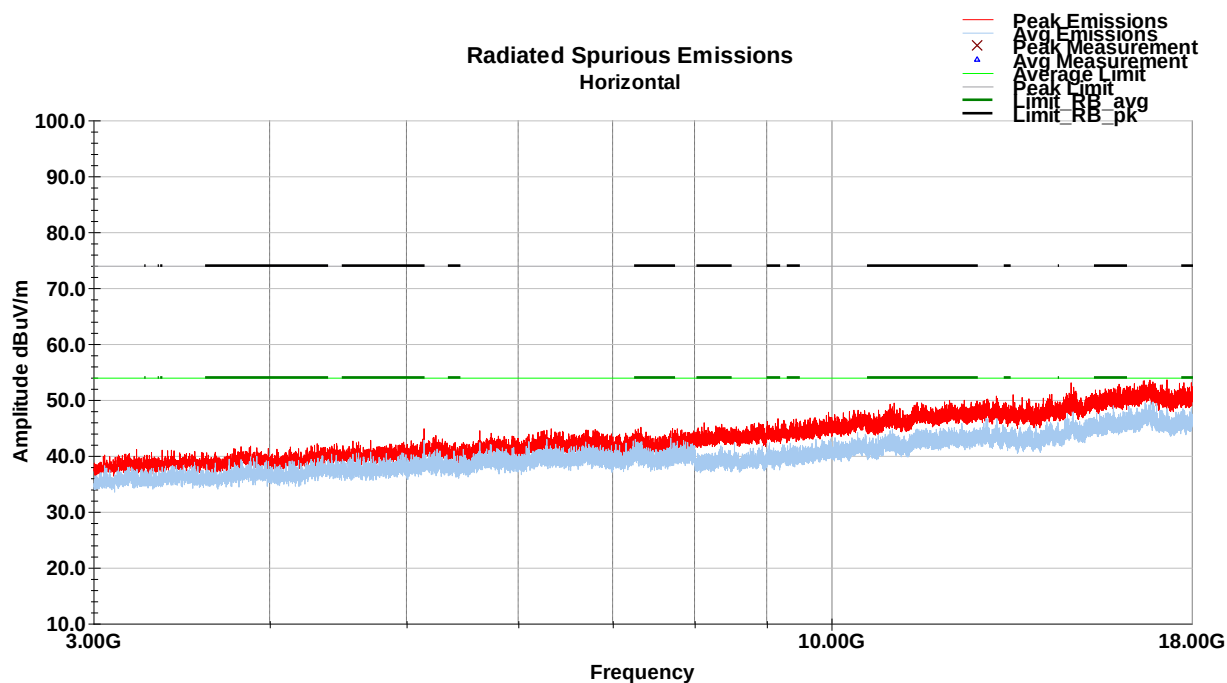
3-18GHz Horizontal Mid Channel - Plot



3-18GHz Vertical High Channel - Plot



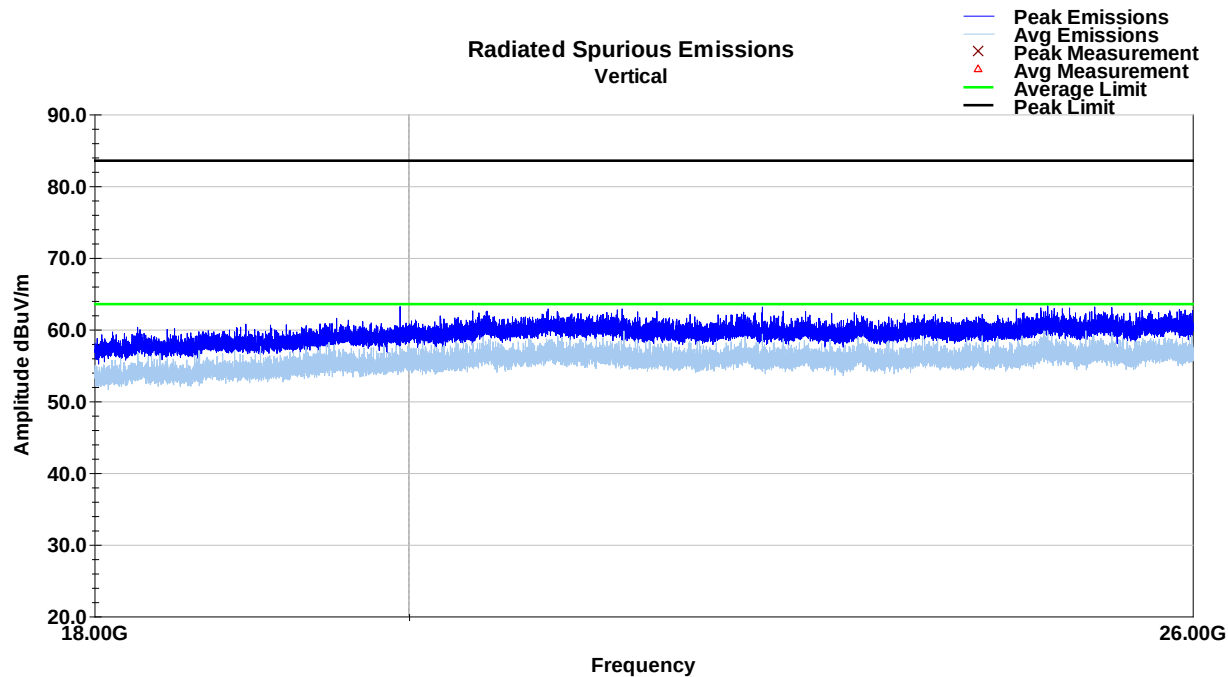
3-18GHz Horizontal High Channel - Plot



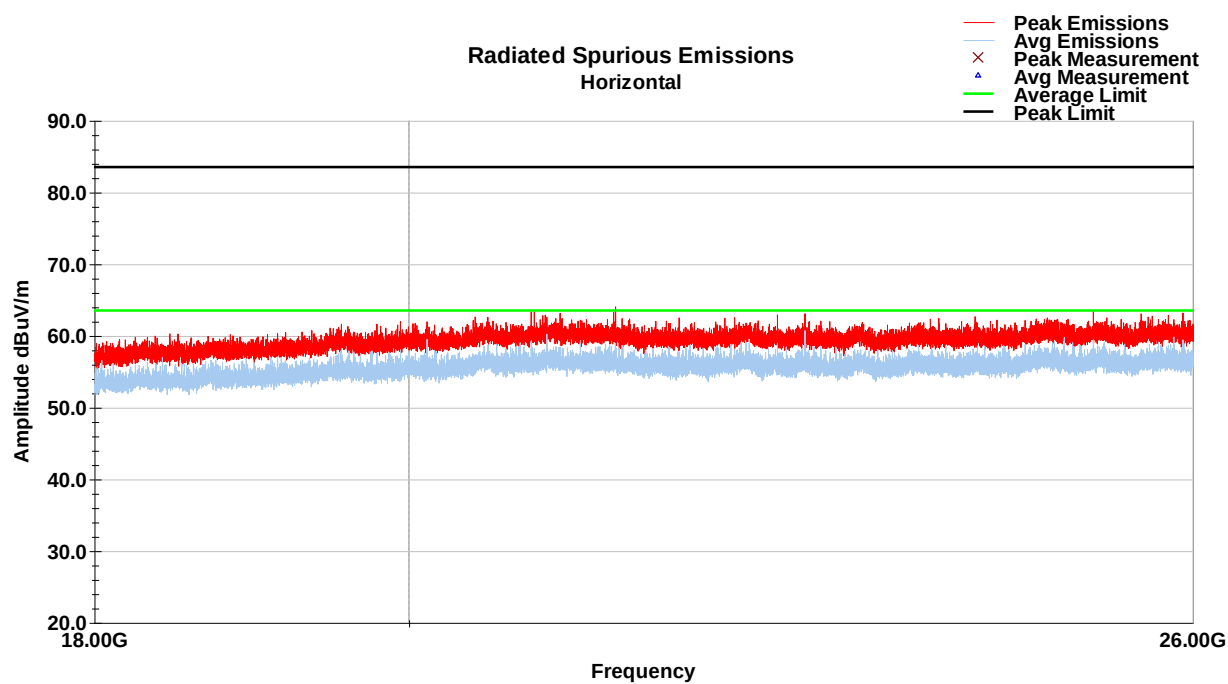
7.5.3 18-26 GHz

No significant deviation based on axis or channel in the 18-26GHz range.

18-26 GHz Vertical Mid Channel - Plot



18-26 GHz Horizontal Mid Channel - Plot



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: 2013 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.

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	23 Jan 2025	30 Jan 2025
Temperature:	21.98 °C	22.54 °C
Relative Humidity:	16.1 %	22.1 %
Atmospheric Pressure:	99.33 kPa	98.94 kPa

8.4 Test Equipment

Test End Date: 23-Jan-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 30-Jan-2025

Tester: SGM

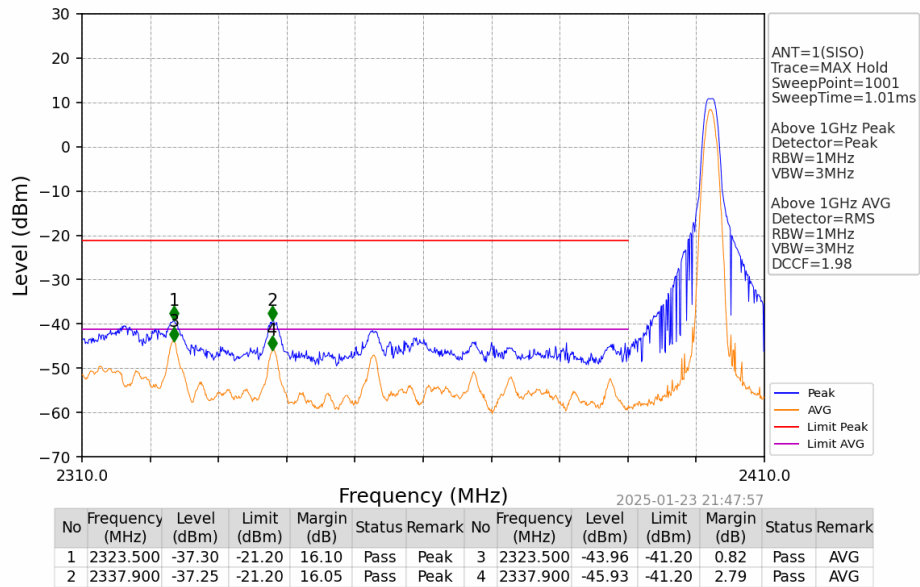
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Software Profile:

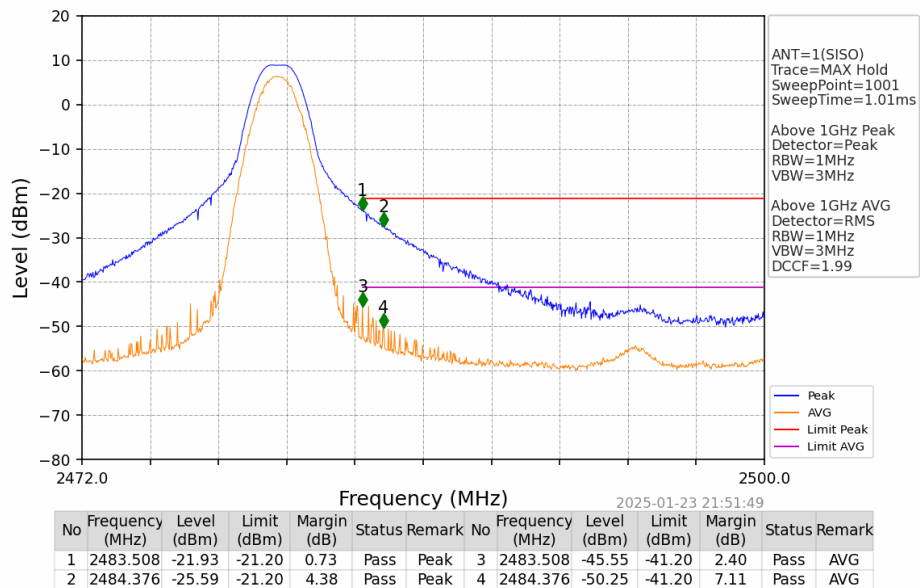
TSTPASS Version: 2.0 (2024.12.23_11.05.24)

8.5 Test Data

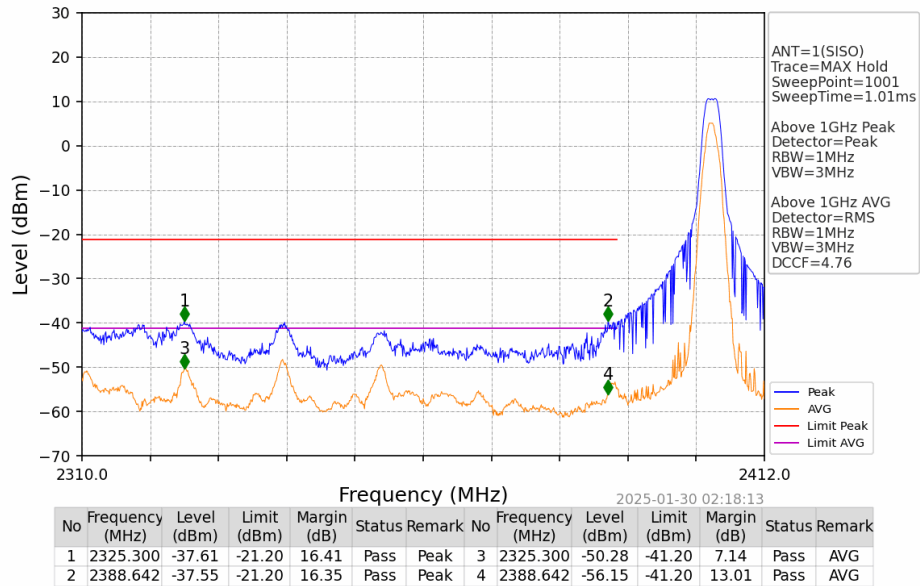
BLE 1M – Low Channel – Plot



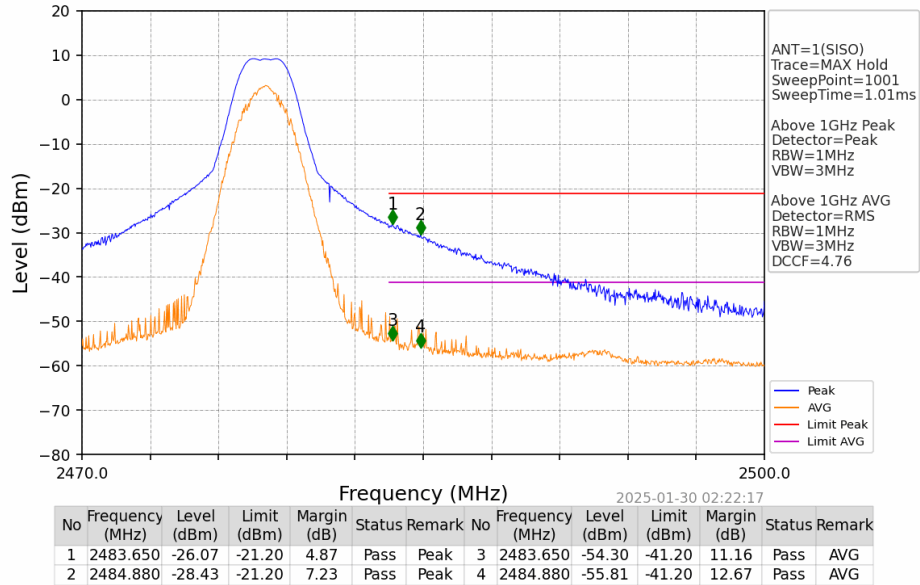
BLE 1M – High Channel – Plot



BLE 2M – Low Channel – Plot



BLE 2M – 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: 22.8 °C

Relative Humidity: 43.3 %

Atmospheric Pressure: 97.8 kPa

9.4 Test Equipment

Test End Date: 31-Jan-2025

Tester: SGM

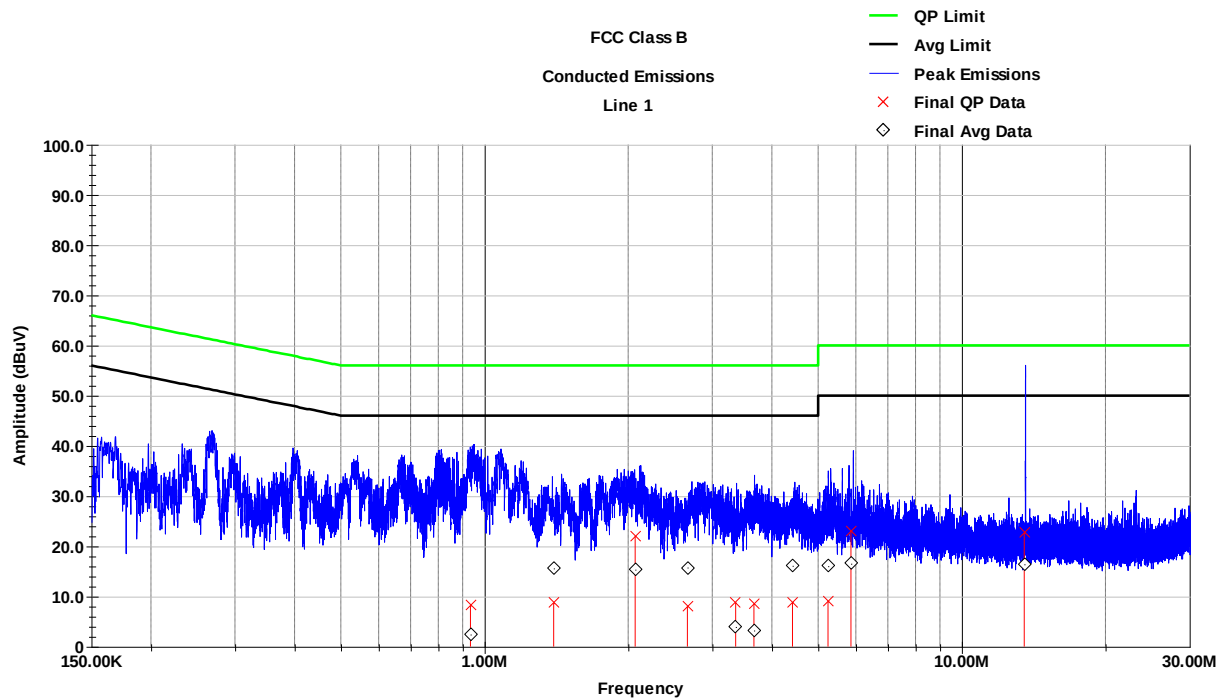
Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B085882	22-Apr-2024	22-Apr-2025
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17017	7-Aug-2024	7-Aug-2025
EMI TEST RECEIVER	ESW44	ROHDE & SCHWARZ	22032	2-Jan-2025	2-Jan-2026

Software:

TILE! software profile "Conducted Emissions Tile7 210216.til" dated 16 02 2021

9.5 Test Data

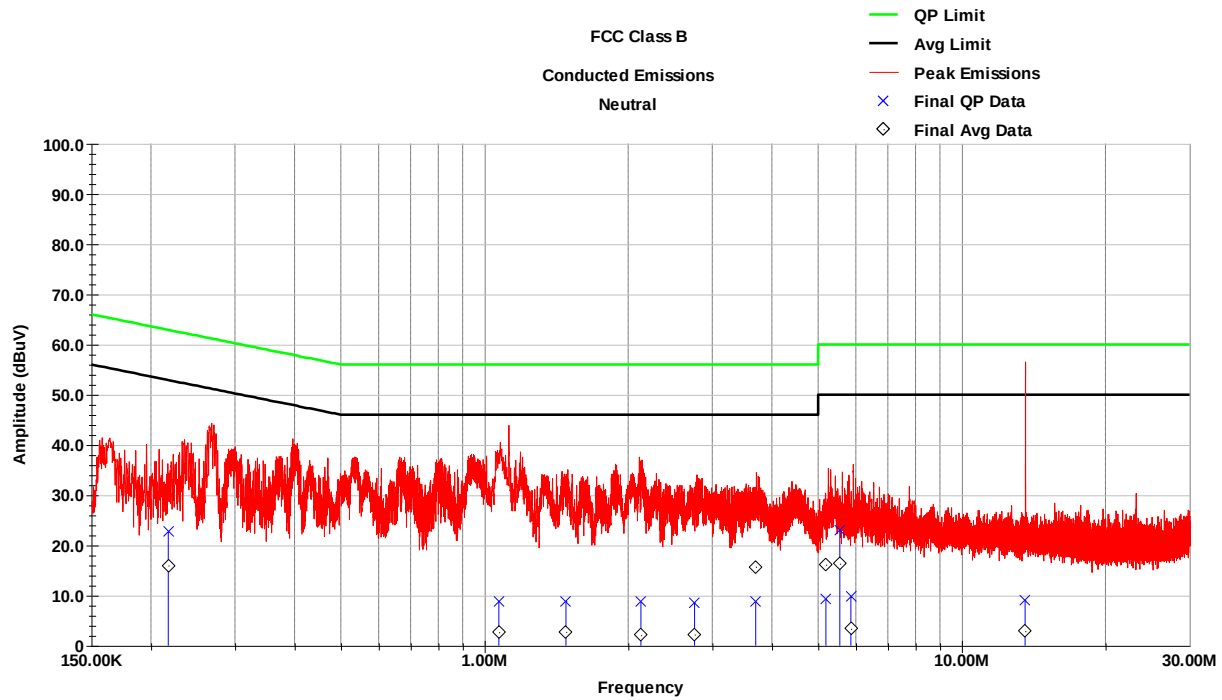
Line 1 Conducted Emissions – Peak Plot



Line 1 Conducted Emissions – Tabular Data

Frequency MHz	LISN dB	CF dB	TL dB	Raw Avg dBuV	Final Avg dBuV	Avg Limit dBuV	Avg Margin dB	Raw QP dBuV	Final QP dBuV	QP Limit dBuV	QP Margin dB
0.934	9.8	0.00	0.0	-7.4	2.4	46.0	-43.6	-1.6	8.2	56.0	-47.8
1.396	9.8	0.00	0.0	5.8	15.6	46	-30.4	-1.1	8.7	56.0	-47.3
2.069	9.8	0.00	0.0	5.5	15.4	46	-30.6	12.2	22	56.0	-34.0
2.662	9.8	0.00	0.0	5.9	15.8	46	-30.2	-1.8	8	56.0	-48.0
3.359	9.8	0.00	0.0	-5.9	3.9	46.0	-42.1	-1.1	8.8	56.0	-47.2
3.667	9.8	0.00	0.0	-6.6	3.2	46.0	-42.8	-1.3	8.6	56.0	-47.4
4.419	9.8	0.00	0.0	6.3	16.1	46.0	-29.9	-1.0	8.9	56.0	-47.1
5.246	9.8	0.00	0.0	6.2	16.0	50.0	-34.0	-0.8	9.0	60.0	-51.0
5.859	9.8	0.00	0.0	6.7	16.5	50.0	-33.5	13.2	23.1	60.0	-36.9
13.515	9.9	0.10	0.0	6.5	16.4	50.0	-33.6	12.7	22.7	60.0	-37.3
Final QP = Raw QP + LISN + CF + TL											
QP Margin = Final QP - QP Limit											
Final Avg = Raw Avg + LISN + CF + TL											
Avg Margin = Final Avg - Avg Limit											

Neutral Conducted Emissions – Peak Plot



Neutral Conducted Emissions – Tabular Data

Frequency MHz	LISN dB	CF dB	TL dB	Raw Avg dBUV	Final Avg dBUV	Avg Limit dBUV	Avg Margin dB	Raw QP dBUV	Final QP dBUV	QP Limit dBUV	QP Margin dB
0.217	9.8	0.00	0.0	6.2	16.0	52.9	-36.9	13.0	22.7	62.9	-40.2
1.072	9.8	0.00	0.0	-7.1	2.7	46	-43.3	-0.9	8.9	56.0	-47.1
1.481	9.8	0.00	0.0	-7.0	2.8	46	-43.2	-0.9	8.9	56.0	-47.1
2.126	9.8	0.00	0.0	-7.7	2.1	46	-43.9	-1.1	8.7	56.0	-47.3
2.756	9.8	0.00	0.0	-7.6	2.3	46.0	-43.7	-1.2	8.6	56.0	-47.4
3.701	9.8	0.00	0.0	5.9	15.7	46.0	-30.3	-1.1	8.8	56.0	-47.2
5.192	9.8	0.00	0.0	6.3	16.2	50.0	-33.8	-0.6	9.3	60.0	-50.7
5.553	9.8	0.00	0.0	6.5	16.3	50.0	-33.7	13.1	23.0	60.0	-37.0
5.857	9.8	0.00	0.0	-6.5	3.4	50.0	-46.6	-0.2	9.7	60.0	-50.3
13.573	9.9	0.10	0.0	-7.1	2.9	50.0	-47.1	-0.9	9.1	60.0	-50.9
Final QP = Raw QP + LISN + CF + TL											
QP Margin = Final QP - QP Limit											
Final Avg = Raw Avg + LISN + CF + TL											
Avg Margin = Final Avg - Avg Limit											

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	29 May 2025