EMC Test Report

Project Number: 5181325 **Proposal:** SUW-202310005501

Report Number: 5181325EMC01 **Rev:** 1

Client: Marshall Radio Telemetry, Inc

Equipment Under Test: Tracking Device

Model: Atos Tag

Applicable Standards: ANSI C63.26:2015

FCC Rule CFR 47 Part 90

IC Rule RSS-119, Issue 11

Report issued on: 30 July 2024

Report revised on: 03 January 2025

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: Daniel Alvarez, RF/EMC Sr. Staff Engineer

Reviewed by: Martin Taylor, EMC/RF Project Manager

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1. Summary of Test Results

Section in CFR 47	Section in RSS-119, Issue 9	Description	Test Result
90.205 & 2.1046	5.4	Transmitter power (conducted)	PASS
90.209 & 2.1049	5.5	Occupied Bandwidth	PASS
90.210 & 2.1049	5.5	Spectrum Emission Mask	PASS
90.210, 2.1057 & 2.1053	5.8	Spurious Emissions (radiated)	PASS
90.213 & 2.1055	5.3	Frequency Stability	PASS
90.214	5.9	Transient Frequency Behavior	PASS
15.107 (a)	RSS-Gen 7.2.2	Conducted Emissions at Main Ports	N/A(1)

1) Product is Battery Powered. Mains testing is not applicable.

1.1. *Modifications Required for Compliance*

None.

2. General Information

2.1. *Client Information*

Name:	Marshall Radio Telemetry, Inc
Address:	845 W. Center St.
City, State, Zip, Country:	North Salt Lake, UT 84054

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

2.3. *General Information of EUT*

Type of Product:	Tracking Device
Model Number:	Atos Tag
Serial Number:	20016735
Frequency Range:	432-437 MHz
Data Modes:	FSK
Antenna/Gain*:	Linear Antenna (0 dBi gain)
Rated Voltage:	3.3 VDC
Test Voltage:	3.3 VDC
Sample Received Date:	29 May 2024
Dates of testing:	29 May 2024 to 08 July 2024

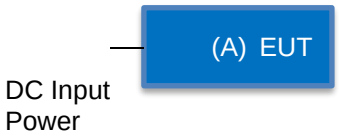
*Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous filing or other.

2.4. *Description of Test Modes*

Manufacturer provided method and commands to put the EUT into the following TX modes for testing transmitter parameters:

a. Analog Mode, 25 kHz - FM modulated carrier with a 1 kHz sine wave tone in a 25 kHz channel.

2.5. *EUT Connection Block Diagram*



2.6. *System Configurations*

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Marshall	Tracking Device	Atos Tag	20016735

2.7. *Support Equipment*

Device reference	Manufacturer	Description	Model Number	Serial Number
	None			

2.8. *Cable List*

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	DC Power	DC Supply	EUT	<40cm	N	N

3. Maximum Peak Conducted Output Power

3.1. *Test Result*

Test Description	Test Specification		Test Result
Maximum Peak Conducted Output Power	90.205 & 2.1046	RSS-119 S5.4	Compliant

3.2. *Test Methods*

According to FCC §90.205(s): The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with § 90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

Requirement RSS-119 section 5.4: The output power shall be within ±1.0dB of the manufacturer's rated power.

Rated power: 0.001W (0dBm)

The power at the antenna terminal is measured by using the spectrum analyzer with peak detector (RBW>2xOBW).

The transmitter was configured at full power to transmit a DMR signal for 25 kHz channel spacing with 1 kHz FM tone modulation.

The RF output of the transmitter was connected to input of the spectrum analyzer through sufficient attenuation. The transmitter was configured at full power to transmit a DMR signal.

3.3. *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	25.27 °C
Relative Humidity:	43.4 %
Atmospheric Pressure:	97.41 kPa

3.4. *Test Equipment*

Test End Date: 30-May-2024 Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Due Date
TEMPERATURE CHAMBER, AC 1 PHASE 220V 60Hz	SANWOOD	SMC-150-CD	24004	1-Mar-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2025

Software Profile:
TSTPASS Version: 2.0

3.5. *Test Results*

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
Band 1	SISO	432.005	-0.53	<=0	Pass
		434.5	-0.37	<=0	Pass
		436.995	-0.54	<=0	Pass
Note1: Antenna Gain: Ant1: 0.00dBi;					

4. Occupied Bandwidth - Conducted

4.1. *Test Result*

Test Description	Test Specification		Test Result
Occupied Bandwidth - Conducted	90.209 & 2.1049	RSS-119 S5.5	Compliant

4.2. *Applicable Standard*

FCC §90.209
Operations using equipment designed to operate with a 25 kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized a 11.25 kHz bandwidth.

4.2. *Test Method*

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The 99% occupied bandwidth of the carrier emission is measured using a spectrum analyzer with Resolution Bandwidth (RBW) set to 1% of the necessary bandwidth of the transmitted carrier.

4.3. *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	25.27 °C
Relative Humidity:	43.4 %
Atmospheric Pressure:	97.41 kPa

4.4. *Test Equipment*

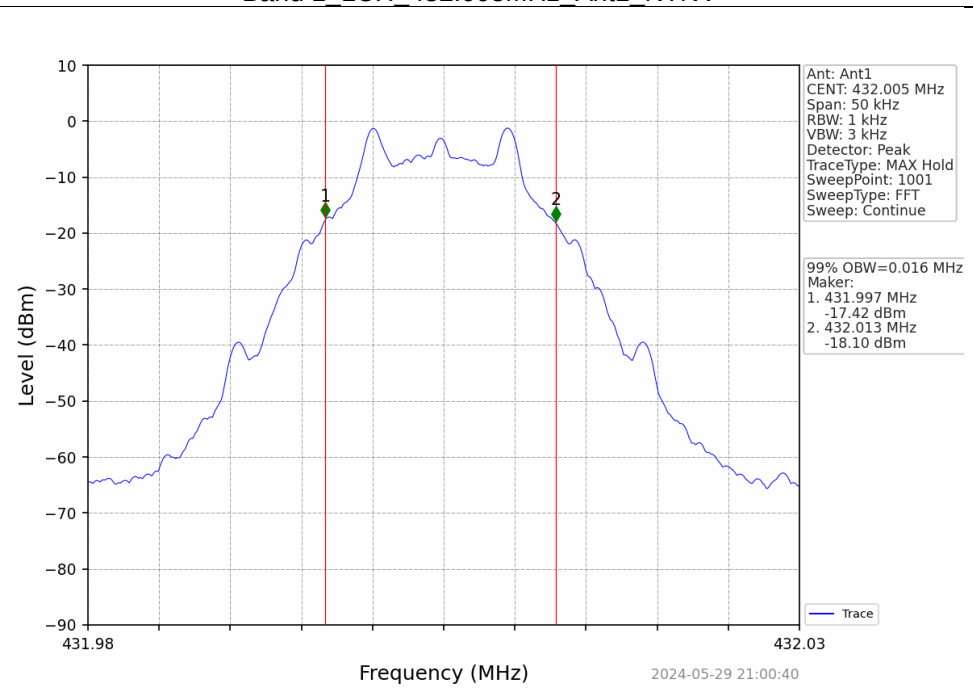
Test End Date: 30-May-2024 Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Due Date
TEMPERATURE CHAMBER, AC 1 PHASE 220V 60Hz	SANWOOD	SMC-150-CD	24004	1-Mar-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2025

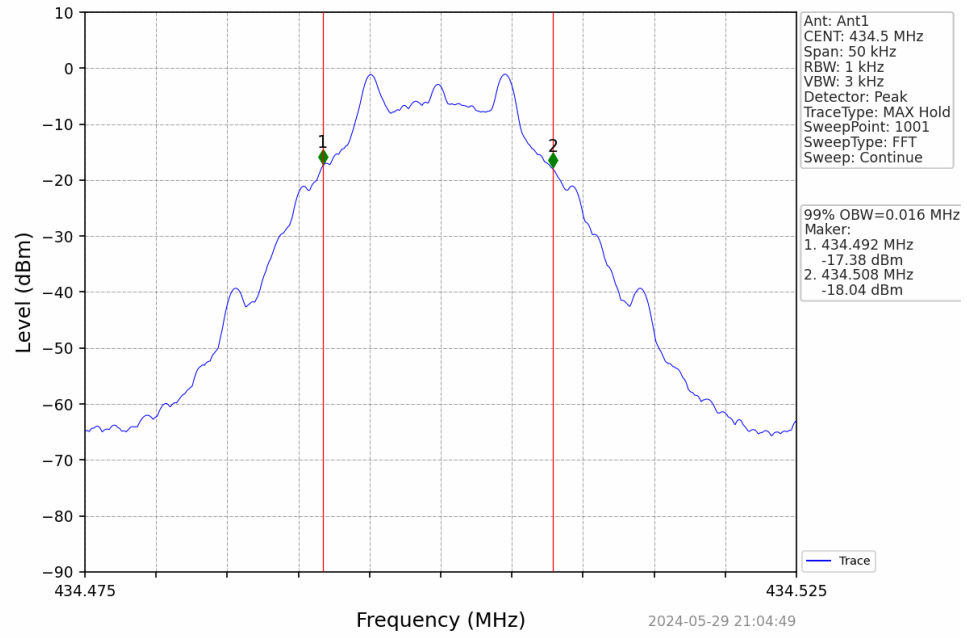
Software Profile:
TSTPASS Version: 2.0

4.5. *Test Data*

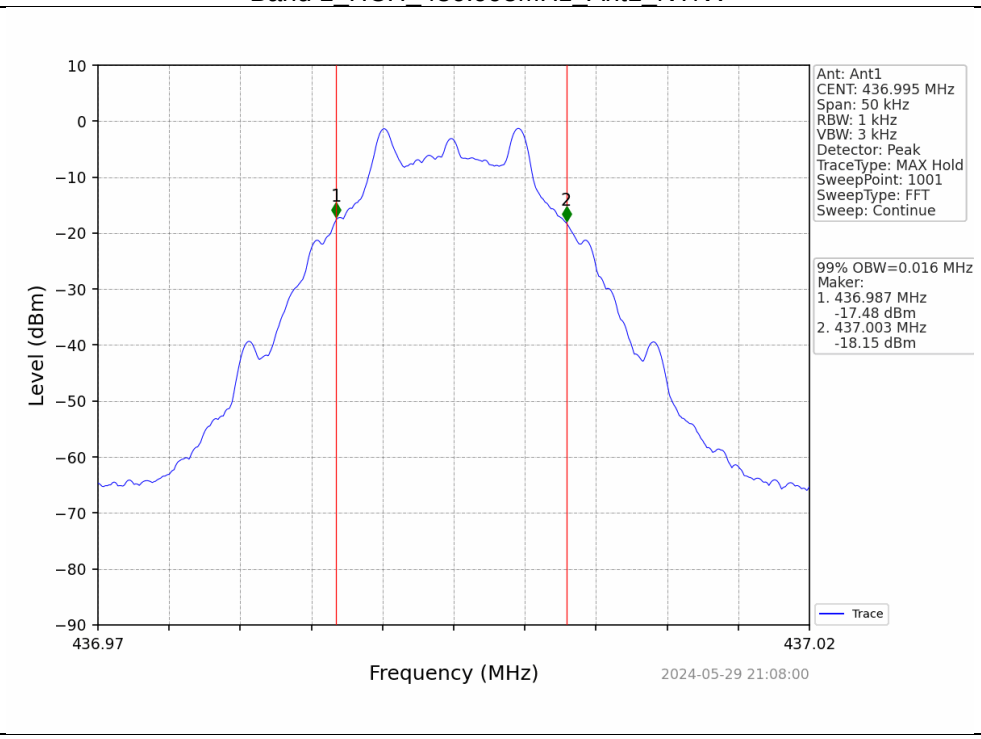
Band 1_LCH_432.005MHz_Ant1_NTNV



Band 1_MCH_434.5MHz_Ant1_NTNV



Band 1_HCH_436.995MHz_Ant1_NTNV



5. Transmit Emissions Mask - Conducted

5.1. *Test Result*

Test Description	Test Specification		Test Result
Transmit Emissions Mask - Conducted	90.210 & 2.1049	RSS-119 S5.5	Compliant

5.2. *Test Methods*

FCC §2.1049, §90.210

Emission Mask C-25 kHz channel bandwidth equipment. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd_{in} kHz) of more than 5 kHz, but not more than 10 kHz: At least 83 log (f_d/5) dB;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd_{in} kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 29 log (f_{d2}/11) dB or 50 dB, whichever is the lesser attenuation;

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

5.3. *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	25.27 °C
Relative Humidity:	43.4 %
Atmospheric Pressure:	97.41 kPa

5.4. *Test Equipment*

Test End Date: 30-May-2024 Tester: SGM

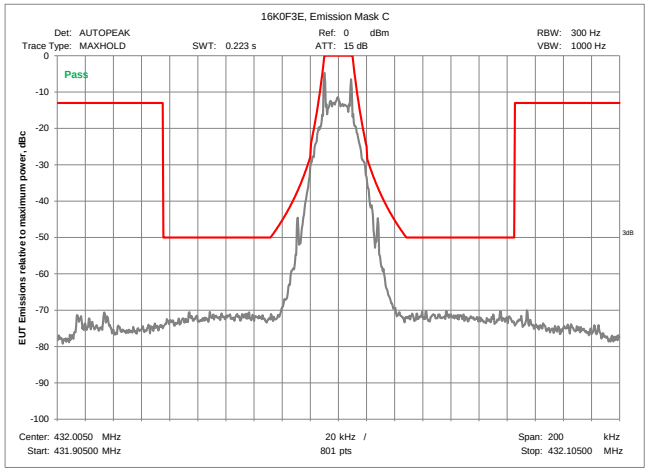
Equipment	Manufacturer	Model	Asset Number	Cal Due Date
TEMPERATURE CHAMBER, AC 1 PHASE 220V 60Hz	SANWOOD	SMC-150-CD	24004	1-Mar-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2025

Software Profile:
TSTPASS Version: 2.0

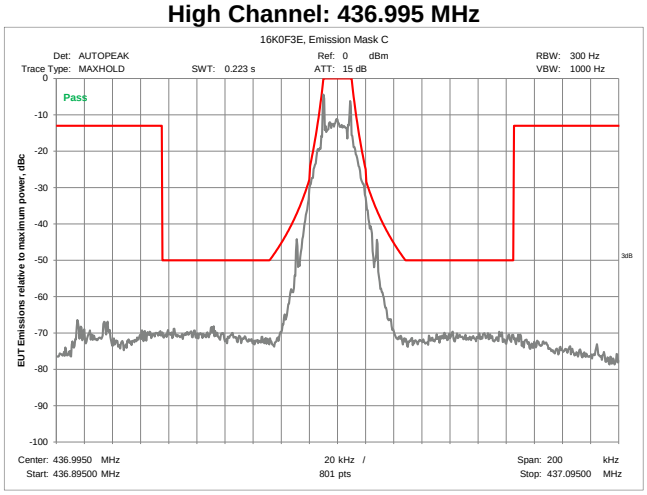
5.5. *Test Data*

Channel Spacing [kHz]	Main TX Channel	Frequency [MHz]	Limit	Result
6.25	Low	432.005	MASK C	PASS
6.25	Mid	434.500000	MASK C	PASS
6.25	High	436.99500	MASK C	PASS

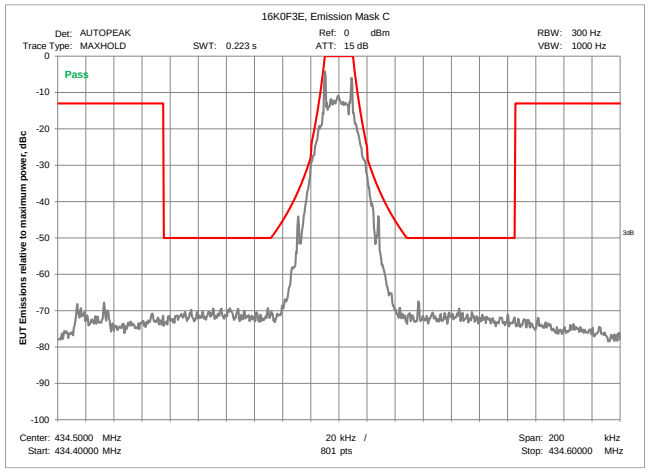
6.25 kHz Channel Spacing
Low Channel: 432.005 MHz



6.25 kHz Channel Spacing
High Channel: 436.995 MHz



6.25 kHz Channel Spacing
Mid Channel: 434.500 MHz



6. Spurious Emissions Radiated Measurements

6.1. *Test Result*

Test Description	Test Specification		Test Result
Emissions in Restricted Frequency Bands	2.1053, 2.1057, 90.210	RSS-Gen, RSS-119 Issue 9 (5.8)	Compliant

6.2. *Test Method*

ANSI/TIA-603 2.2.12 Unwanted Emissions: Radiated Spurious
(Out of Band Emissions from 9 kHz to Tenth Harmonic of Fundamental)

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:

9k to 30 MHz – Near field prescan to determine if there were any emissions
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 3 meters

6.3. *Test Site*

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA
10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

6.4. *Test Setup Photographs*

Located in a separate exhibit.

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA
10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions	30-1000MHz	1-18GHz
Temperature:	23.94 °C	22.90 °C
Relative Humidity:	46.4 %	46.9 %
Atmospheric Pressure:	kPa	kPa

6.5. *Test Equipment*

30-1000MHz

Test End Date: 30-May-2024 Tester:SGM

Equipment	Manufacturer	Model	Asset Number	Cal Due Date
ANTENNA, BILOG	SUNOL	JB6	B079690	19-Apr-2026
N to N RF Cable	ECHELON	EM-B810NM-276	24000	15-Jan-2025
RF CABLE NM TO NM, 0.01-18GHZ	TELEDYNE STORM MICROWAVE	90-195-354	20119	2-Sep-2024
RF CABLE, NM TO NM.	TELEDYNE STORM MICROWAVE	90-195-157	21019	20-Mar-2025
RF CABLE	HUBER & SUHNER	104PE	B079793	7-Aug-2024
LOW NOISE AMPLIFIER	MINI-CIRCUITS	ZKL-2+	B079800	14-Sep-2024
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	22027	3-Oct-2024

1-18GHz

Test End Date: 30-May-2024 Tester: SGM

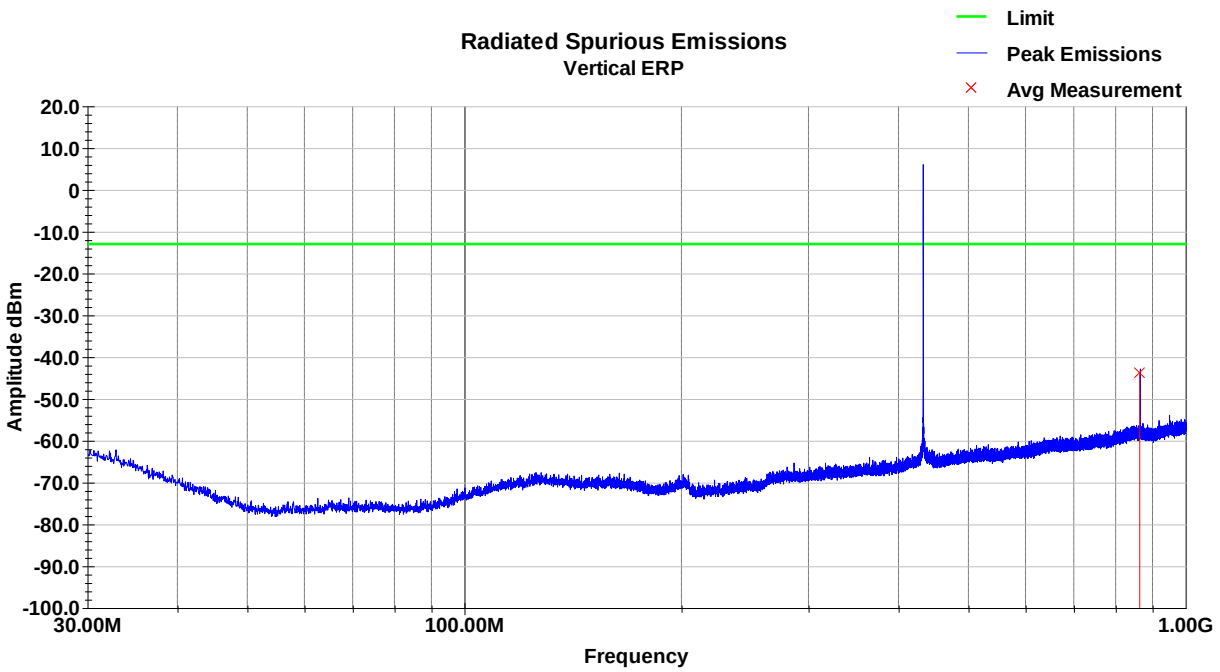
Equipment	Manufacturer	Model	Asset Number	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	ETS LINDGREN	3117	B079699	29-Jul-2024
N to N RF Cable	ECHELON	EM-B810NM-276	24000	15-Jan-2025
RF CABLE	HUBER & SUHNER	104PE	B079793	7-Aug-2024
LOW NOISE AMPLIFIER	ROHDE & SCHWARZ	TS-PR18	15003	10-Oct-2024
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	22027	3-Oct-2024
FILTER, HIGH PASS, >1000MHZ	MICRO-TRONICS	HPM50108	B079802	5-Jul-2025

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

6.6. *Test Data*

6.6.1. 30-1000 MHz

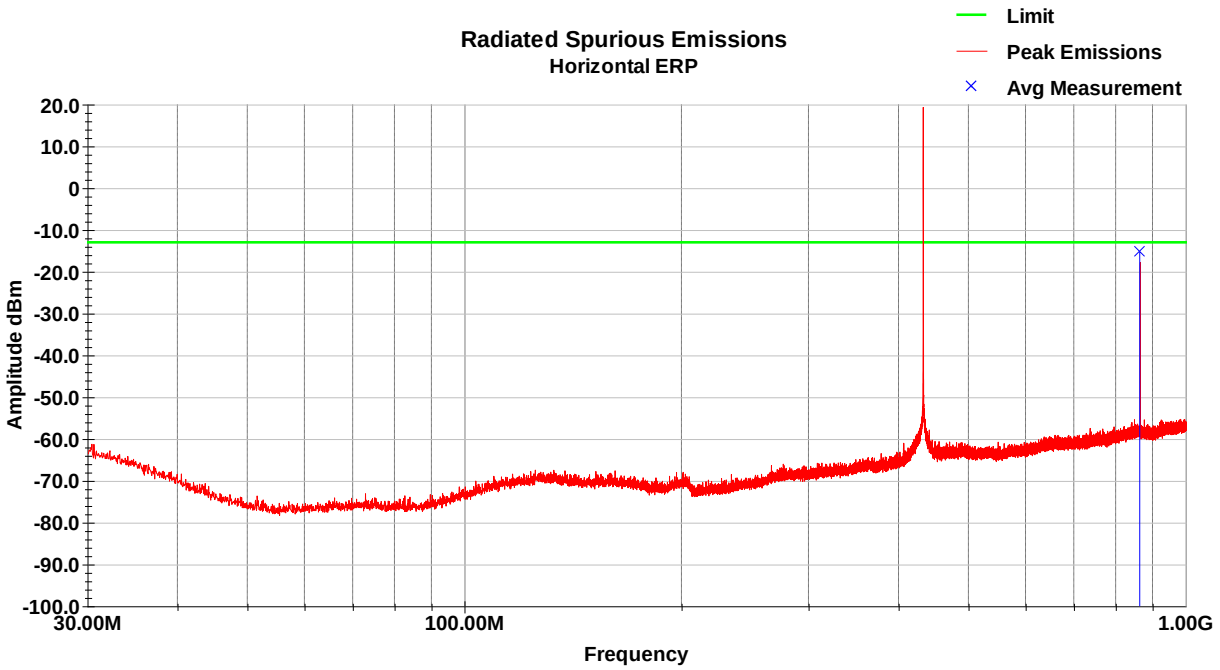
Vertical Radiated Emissions – Plot – Low Channel



Vertical Radiated Emissions – Tabular Data – Low Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
864.03	-42.1	V	84.0	278.0	26.2	3.2	31.1	-43.7	-13.0	-30.7
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

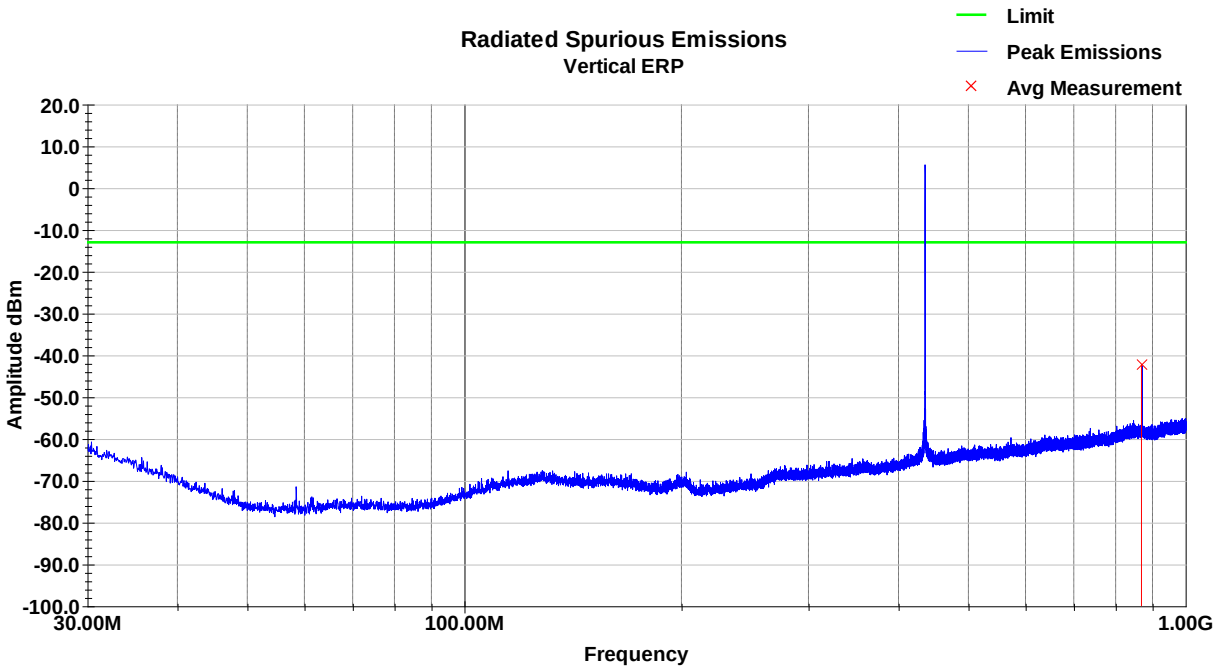
Horizontal Radiated Emissions – Plot – Low Channel



Horizontal Radiated Emissions – Tabular Data – Low Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
864.02	-13.6	H	7.0	202.0	26.2	3.2	31.1	-15.3	-13.0	-2.3
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

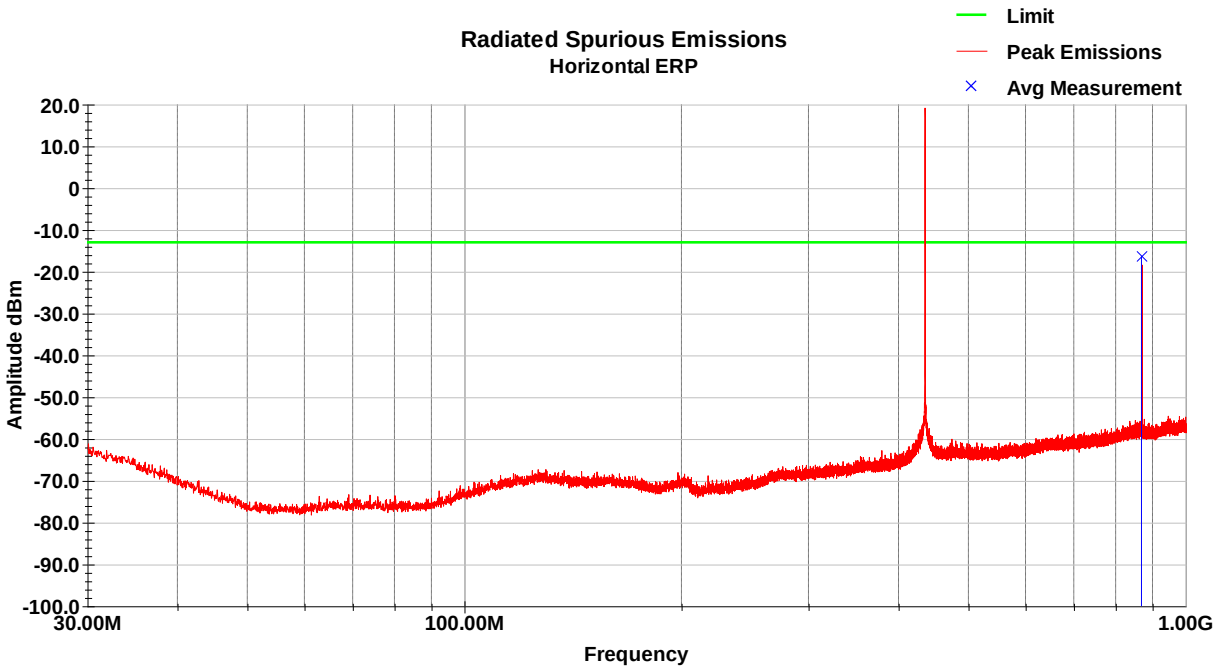
Vertical Radiated Emissions – Plot – Middle Channel



Vertical Radiated Emissions – Tabular Data – Middle Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
868.98	-40.3	V	92.0	296.0	26.1	3.2	31.2	-42.2	-13.0	-29.2
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

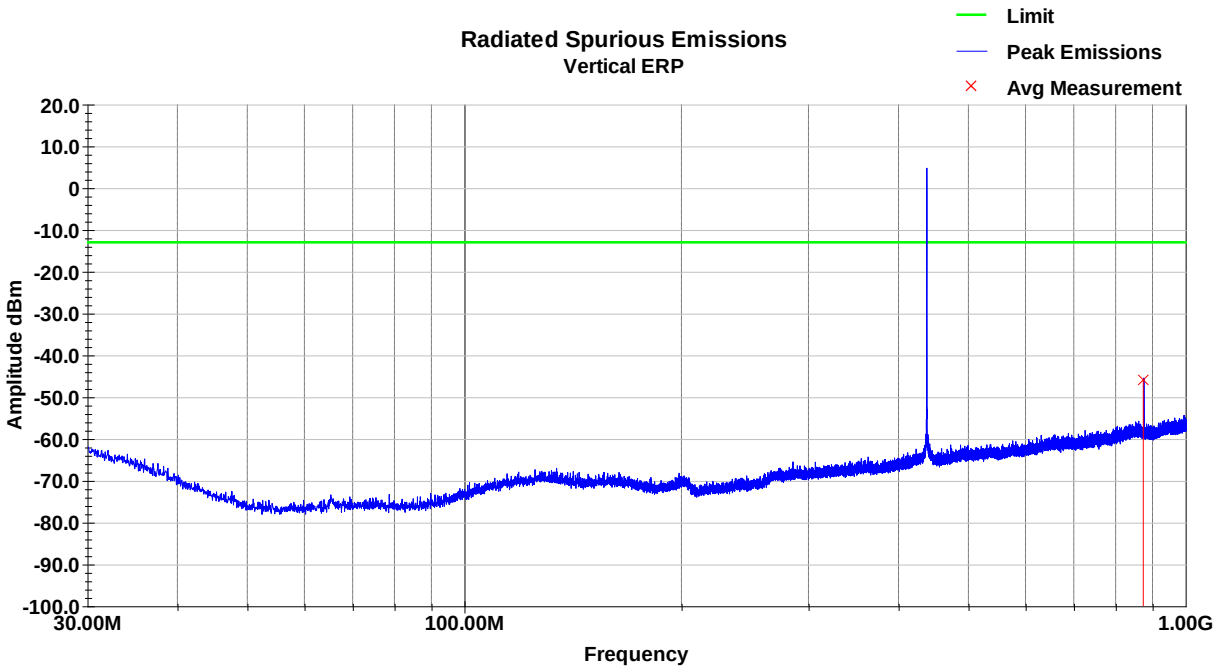
Horizontal Radiated Emissions – Plot – Middle Channel



Horizontal Radiated Emissions – Tabular Data – Middle Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
868.99	-14.4	H	183.0	202.0	26.1	3.2	31.2	-16.2	-13.0	-3.2
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

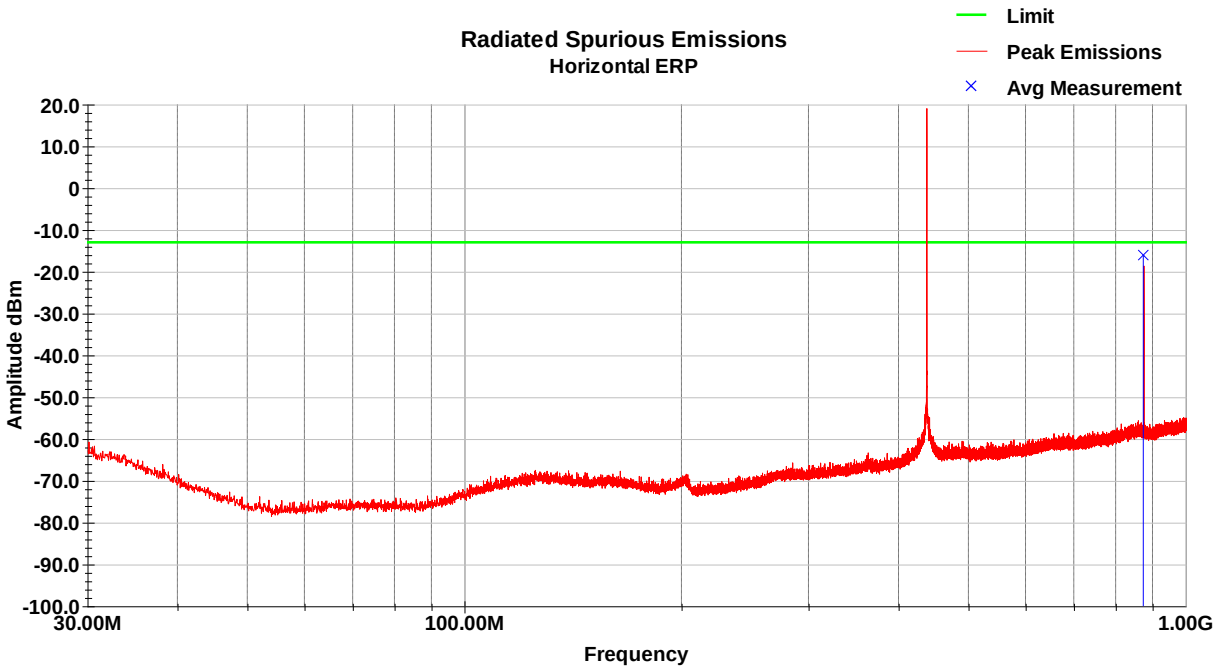
Vertical Radiated Emissions – Plot – High Channel



Vertical Radiated Emissions – Tabular Data – High Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
873.98	-43.9	V	266.0	175.0	26.1	3.2	31.2	-45.8	-57.0	11.2
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

Horizontal Radiated Emissions – Plot – High Channel

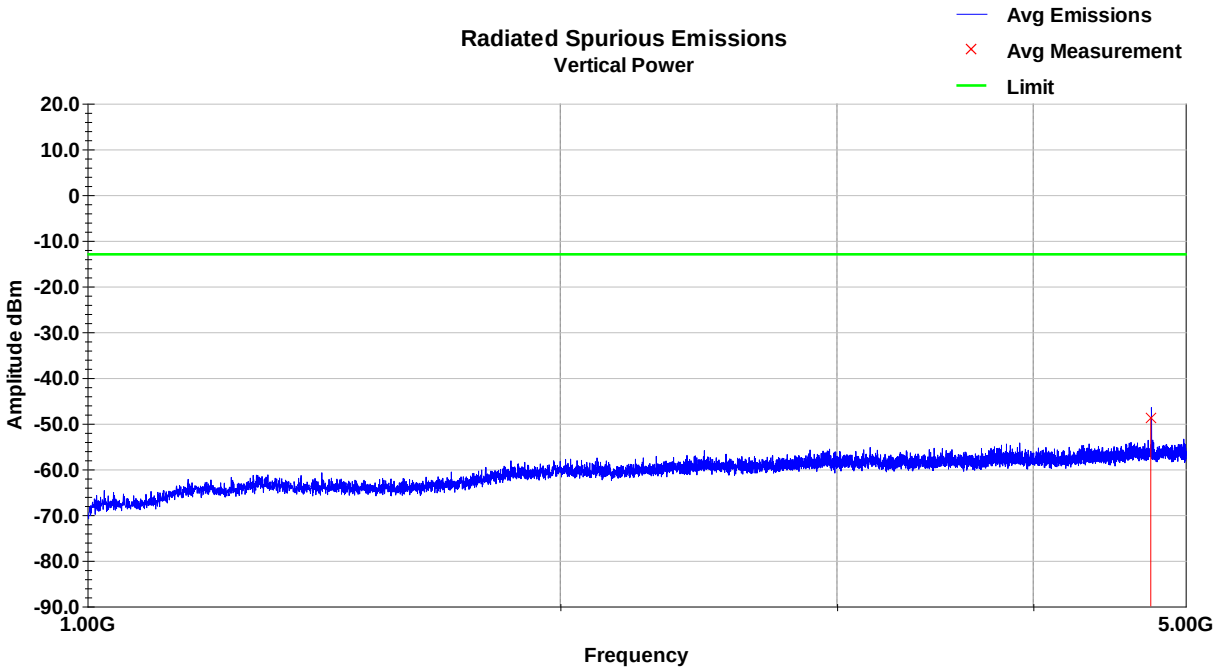


Horizontal Radiated Emissions – Tabular Data – High Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
873.99	-14.2	H	9.0	189.0	26.1	3.2	31.2	-16.1	-57.0	40.9
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

6.6.2. 1-5 GHz

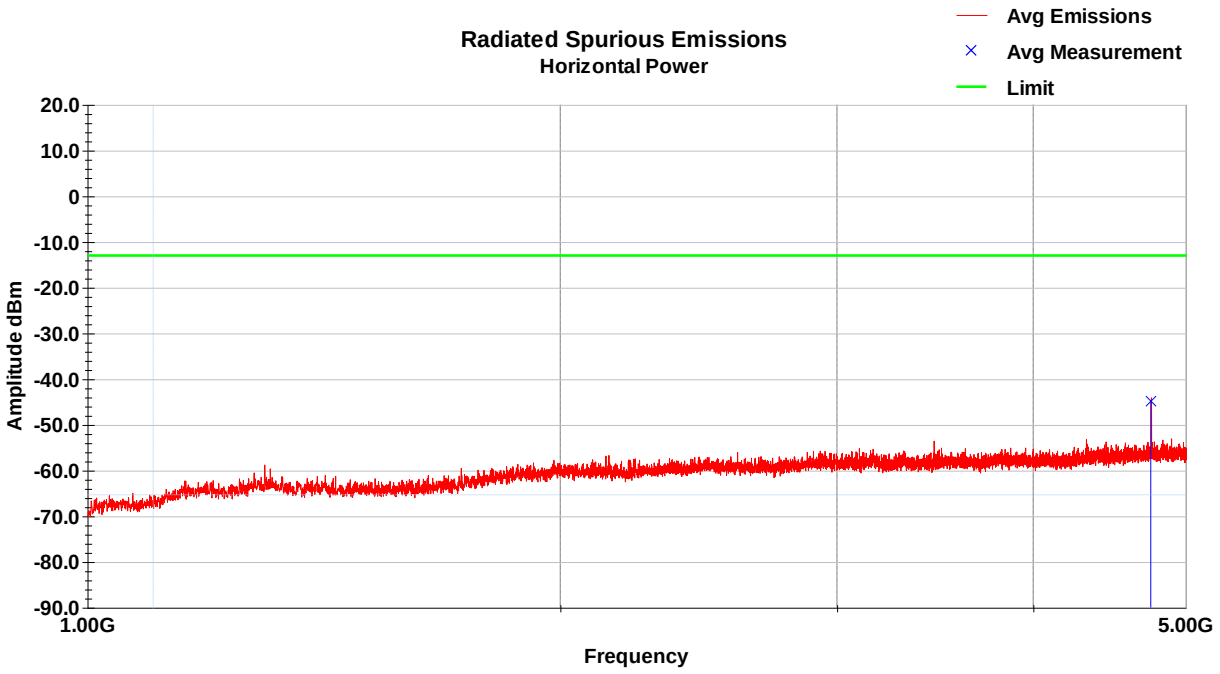
Vertical Radiated Emissions – Plot – Low Channel



Vertical Radiated Emissions – Tabular Data – Low Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4752.13	-44.3	V	84.0	243.0	34.5	3.1	41.9	-48.6	-13.0	-35.6
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

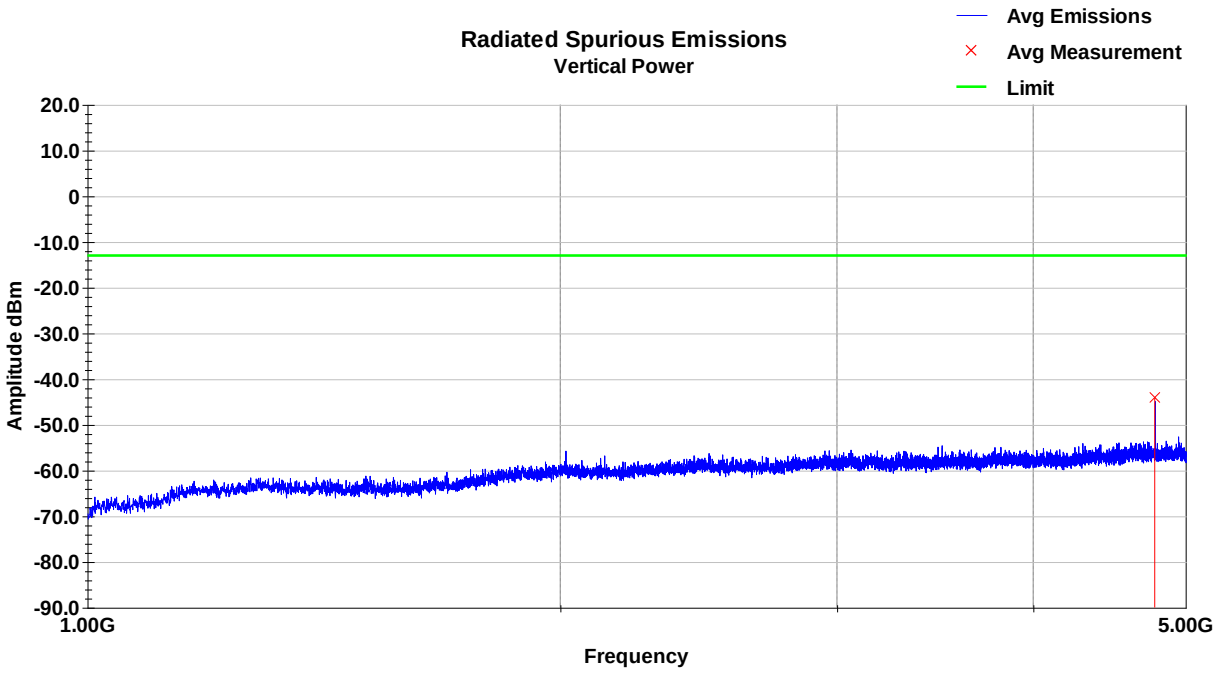
Horizontal Radiated Emissions – Plot – Low Channel



Horizontal Radiated Emissions – Tabular Data – Low Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4752.13	-40.4	H	62.0	173.0	34.5	3.1	41.9	-44.8	-13.0	-31.8
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

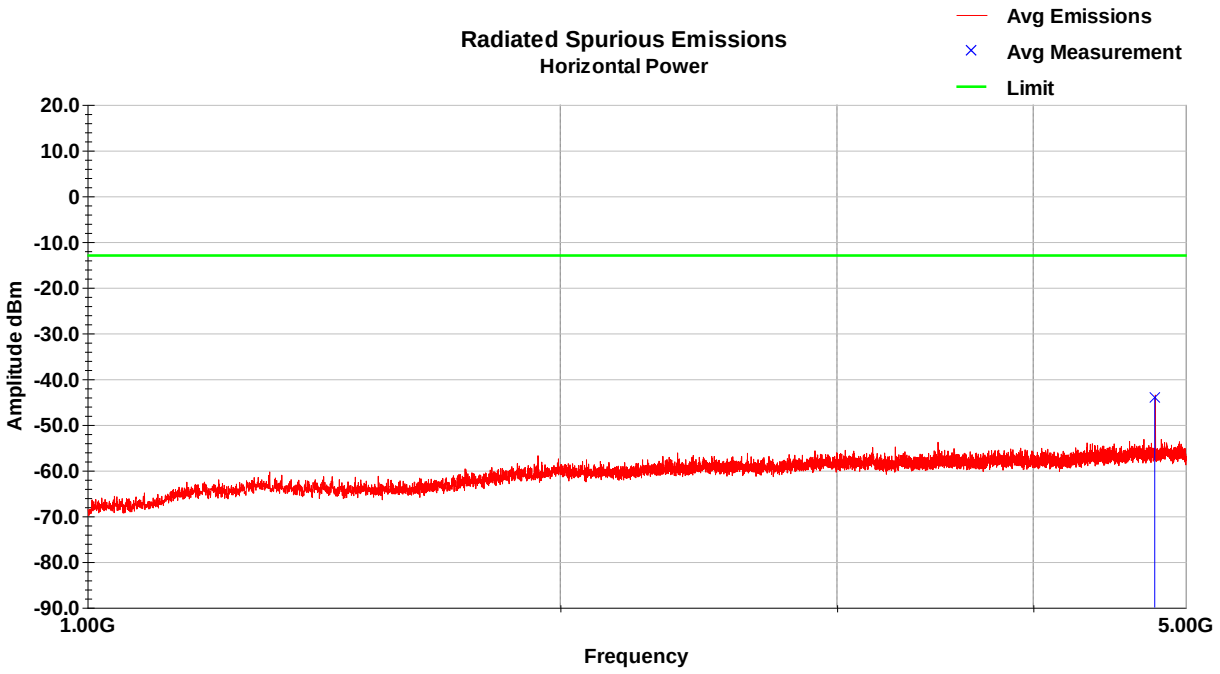
Vertical Radiated Emissions – Plot – Middle Channel



Vertical Radiated Emissions – Tabular Data – Middle Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4779.51	-39.3	V	87.0	228.0	34.6	3.0	42.2	-44.0	-13.0	-31.0
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

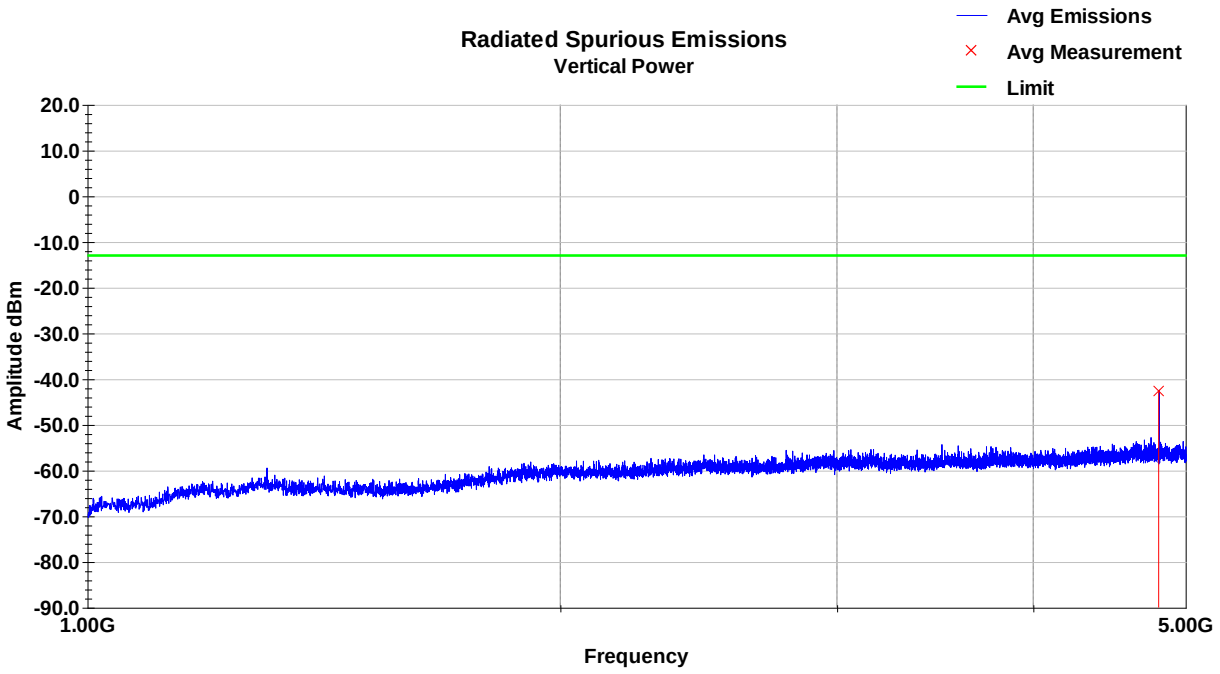
Horizontal Radiated Emissions – Plot – Middle Channel



Horizontal Radiated Emissions – Tabular Data – Middle Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4779.69	-39.3	H	53.0	148.0	34.6	3.0	42.2	-44.0	-13.0	-31.0
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

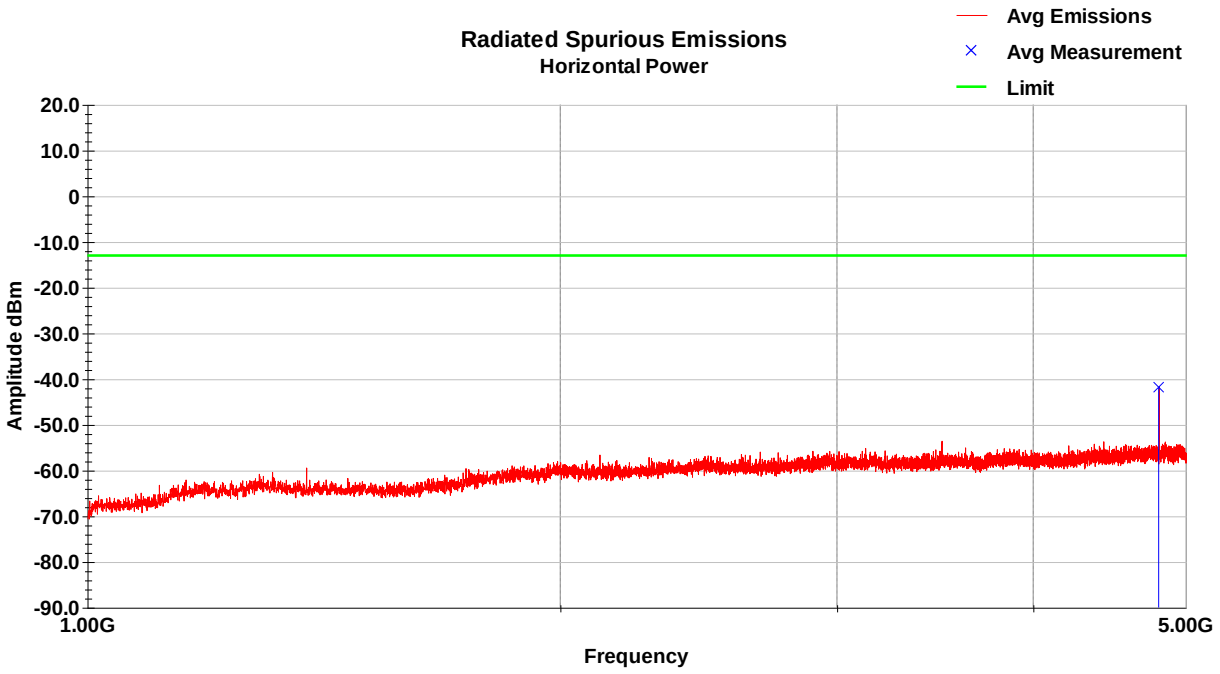
Vertical Radiated Emissions – Plot – High Channel



Vertical Radiated Emissions – Tabular Data – High Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4806.95	-37.7	V	101.0	240.0	34.6	2.9	42.4	-42.5	-13.0	-29.5
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

Horizontal Radiated Emissions – Plot – High Channel



Horizontal Radiated Emissions – Tabular Data – High Channel

Frequency MHz	Raw Avg dBm	Polarity V/H	Azimuth degrees	Height cm	AF dB/m	Loss dB	Amp dB	Avg Value dBm	Limit dBm	Margin dB
4806.95	-37.0	H	116.0	160.0	34.6	2.9	42.4	-41.8	-13.0	-28.8
Avg Value = Raw Avg + AF + Loss - Amp										
Margin = Avg Value - Limit										

7. Frequency Stability

7.1. *Test Result*

Test Description	Test Specification		Test Result
Frequency Stability	90.213 & 2.1055	RSS-Gen, RSS-119 Issue 9 (5.3)	Compliant

7.2. *Test Method*

a) The DUT transmitter output port was connected to the FSV Spectrum Analyzer.
b) Path loss for the measurement was included.
c) Turn on the transmitter in Analog mode (no modulation) and record the CW frequency in MCF_{MHz}.
d) Test in 2 conditions: Different Temperature & Supply Voltage input.
   1) Temperature: Vary voltage per test condition in Clause 5.1
   2) Supply Voltage: Vary temperature per test condition in Clause 5.1.
e) Calculate the ppm frequency error by the following:

$$ppm\ error = (MCF_{MHz}/ACF_{MHZ} - 1) * 10^6$$

where: MCF_{MHz} is the Measured Carrier Frequency in [MHz]
ACF_{MHz} is the Assigned Carrier Frequency in [MHz]

7.3. *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	25.27 °C
Relative Humidity:	43.4 %
Atmospheric Pressure:	97.41 kPa

7.4. *Test Equipment*

Test End Date: 30-May-2024 Tester: SGM

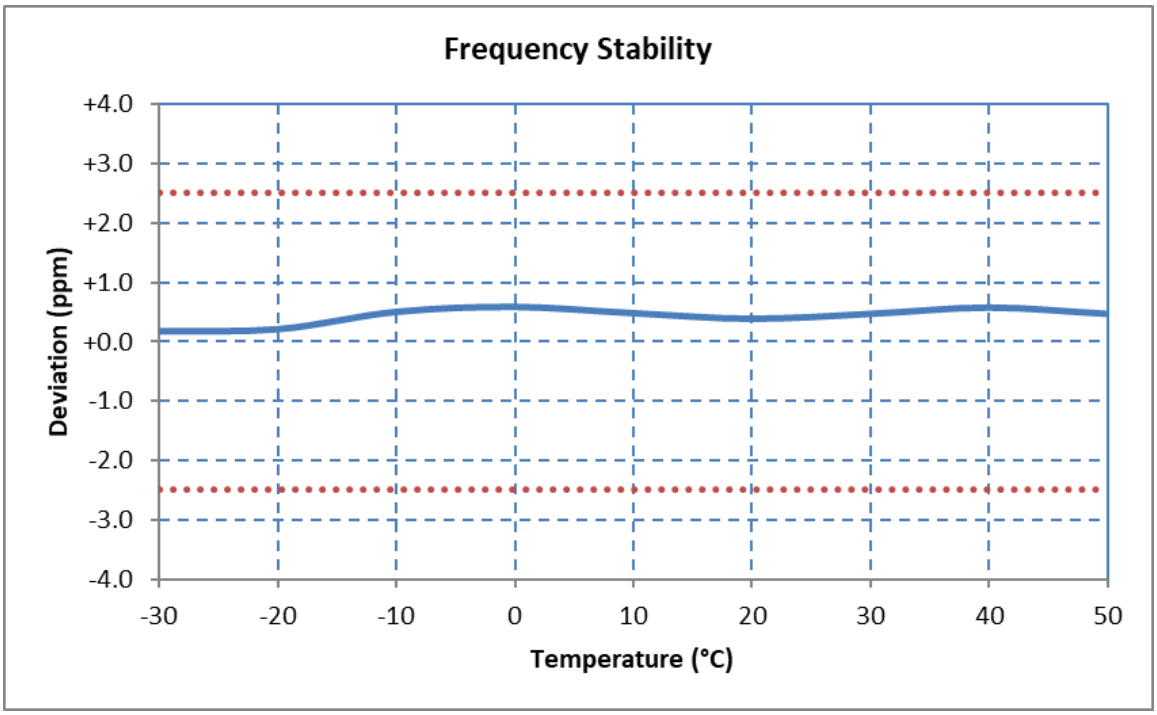
Equipment	Manufacturer	Model	Asset Number	Cal Due Date
TEMPERATURE CHAMBER, AC 1 PHASE 220V 60Hz	SANWOOD	SMC-150-CD	24004	1-Mar-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2025

Software Profile:
TSTPASS Version: 2.0

7.5. *Test Data*

Tabular Data at 434.5MHz

Voltage %	Power V_{DC}	Temp °C	Frequency MHz	Freq Dev Hz	Freq Dev ppm
100%	3.30	+20 (Ref)	434.4998252	+175	+0.40
100%	3.30	-30	434.4999251	+75	+0.17
100%	3.30	-20	434.4999101	+90	+0.21
100%	3.30	-10	434.4997852	+215	+0.49
100%	3.30	0	434.4997502	+250	+0.57
100%	3.30	+10	434.4997952	+205	+0.47
100%	3.30	+20	434.4998352	+165	+0.38
100%	3.30	+30	434.4998002	+200	+0.46
100%	3.30	+40	434.4997552	+245	+0.56
100%	3.30	+50	434.4998002	+200	+0.46
115%	3.80	+20	434.4998002	+200	+0.46
85%	2.81	+20	434.4998000	+200	+0.46



8. Transient Frequency Behavior

8.1. *Test Result*

Test Description	Test Specification		Test Result
Transient Frequency Behavior	90.214	RSS-Gen, RSS-119 Issue 9 (5.9)	Compliant

8.2. *Test Methods*

Transmitters designed to operate in the 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals[1] [2]	Maximum frequency difference[3]	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels		
t_1[4]	±25.0 kHz	10.0 ms
t_2	±12.5 kHz	25.0 ms
t_3[4]	±25.0 kHz	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels		
t_1[4]	±12.5 kHz	10.0 ms
t_2	±6.25 kHz	25.0 ms
t_3[4]	±12.5 kHz	10.0 ms

t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time during phasing.

t_1 is the time period immediately following t_{on}

t_2 is the time period immediately following t_1

t_3 is the time period from the instant when the transmitter is turned off until t_{off}.

t_{off} is the instant when the 1 kHz test signal starts to rise.

[2] During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in §90.213.

[3] Difference between the actual transmitter frequency and the assigned transmitter frequency.

[4] If the transmitter carrier output rating is 6 watts or less, the frequency difference during the time period may exceed the maximum frequency difference for this time period.

1. The RF output of the EUT transmitter was connected to a splitter/combiner along with the output of a signal generator. The output of the combining network was connected to the input of the FSV spectrum analyzer through sufficient attenuation.
2. EUT Power Supply was set to the nominal -48V.
3. The FM Demodulation function of the Spectrum Analyzer was used to determine the transient frequency behavior after the EUT was turned on and the transmitter started to overtake the 1kHz signal from the signal generator. When the EUT was shut off, the output was measured for when the transmitter signal was then overtaken by the 1 kHz signal.

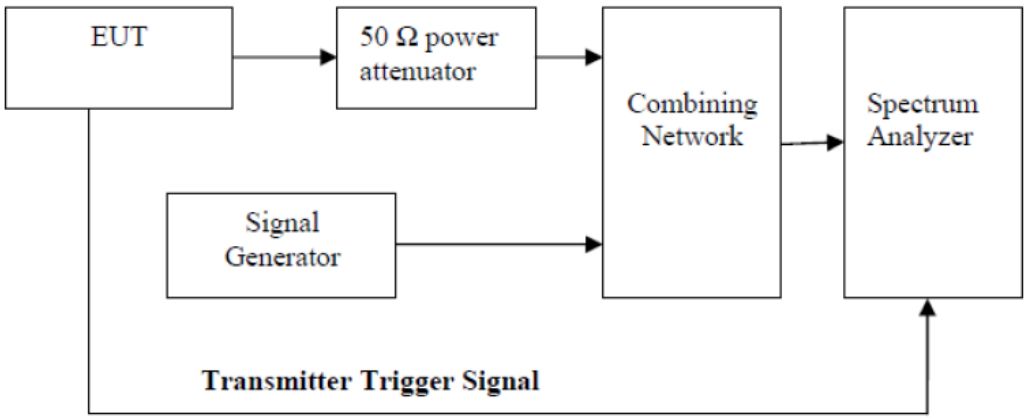


Figure 10 —Test configuration for transient frequency behavior

8.3. *Test Site*

Environmental Conditions

Temperature:	26.2 °C
Relative Humidity:	51.21 %
Atmospheric Pressure:	98.43 kPa

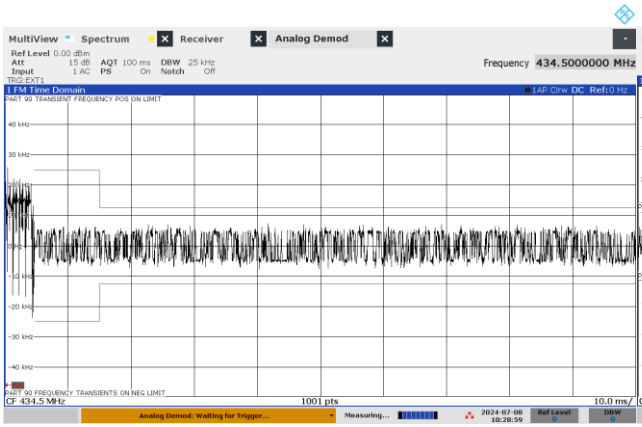
8.4. *Test Equipment*

Test End Date: 8-Jul-2024 Tester: SGM

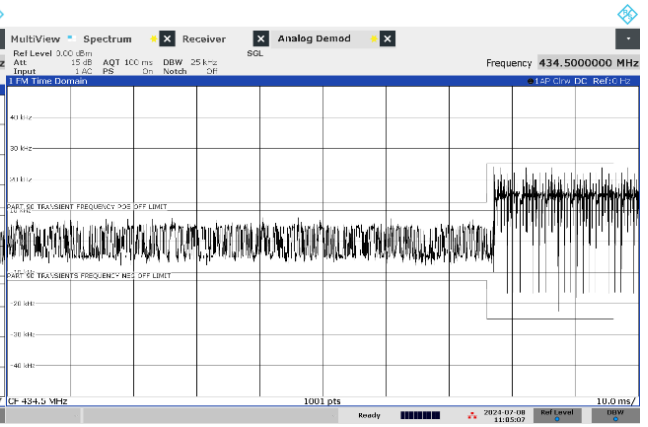
Equipment	Manufacturer	Model	Asset Number	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2025
RF CABLE RIGHT ANGLE NM TO SMAM, 2-18GHZ	TELEDYNE STORM MICROWAVE	90-102-039	20140	20-Mar-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20107	20-Mar-2025
POWER SPLITTER	MINI-CIRCUITS	ZFRSC-183-S+	B101743	7-Jul-2025
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	22032	15-Nov-2024
DC POWER SUPPLY, PROGRAMMABLE	RIGOL	DP711	18027	CNR

434.500 MHz with 25 kHz Channels

Switch On Condition t_{on}, t_1, t_2



Switch Off Condition t_3, t_{off}



9. Revision History

Revision Level	Description of changes	Revision Date
-	Draft Release	12 July 2024
0	Initial Release	30 July 2024
1	Updated standard date to 2015; Updated limit to section 3.5	03 January 2025