Automation Inc. dba RADAR

TEST REPORT FOR

RFID sensor operating in the UHF band
Model: RS510

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(FHSS 902-928MHz)

Report No.: 108261-6

Date of issue: June 2, 2023

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust-based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Test Certificate # 803.01

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Automation Inc. dba RADAR
15150 Avenue of Science, Ste. 200
San Diego, CA 92121

Representative: Mark Easton
Customer Reference Number: 1662-SD1-Test

REPORT PREPARED BY:

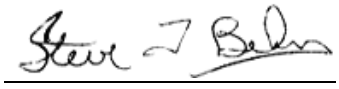
Viviana Prado
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 108261

DATE OF EQUIPMENT RECEIPT: April 28, 2023
DATE(S) OF TESTING: April 28, 2023 and May 1 and 2, 2023

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable, and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Canada	Japan
Canyon Park, Bothell, WA	US0103	US1024	3082C	A-0136
Brea, CA	US0103	US1024	3082D	A-0136
Fremont, CA	US0103	US1024	3082B	A-0136
Mariposa, CA	US0103	US1024	3082A	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(i)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(i)	Average Time of Occupancy	NA	Pass
15.247(b)(2)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

ISO/IEC 17025 Decision Rule
The equipment sample utilized for testing is selected by the manufacturer. The declaration of pass or fail herein is a binary statement for simple acceptance rule (ILAC G8) based upon assessment to the specification(s) listed above, without consideration of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
RFID sensor operating in the UHF band	Automaton Inc dba RADAR	RS510	513

Support Equipment:

Device	Manufacturer	Model #	S/N
Gigabit POE	Trendent	TPE-117G1A	E18H7G2000147
Keyboard	Perixx	Perboard 505 Plus	1906000719
Mouse	DPI	TM176G	20220523000709
Minicomputer	Intel	NUC8HN	BTHN009003HV

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
RFID sensor operating in the UHF band	Automaton Inc dba RADAR	RS510	508

Support Equipment:

Device	Manufacturer	Model #	S/N
Gigabit POE	Trendent	TPE-117G1A	E18H7G2000147
Keyboard	Perixx	Perboard 505 Plus	1906000719
Mouse	DPI	TM176G	20220523000709
Minicomputer	Intel	NUC8HN	BTHN009003HV

Configuration 6

Equipment Tested:

Device	Manufacturer	Model #	S/N
RFID sensor operating in the UHF band	Automaton Inc dba RADAR	RS510	507

Support Equipment:

Device	Manufacturer	Model #	S/N
Gigabit POE	Trendent	TPE-117G1A	E18H7G2000147
Keyboard	Perixx	Perboard 505 Plus	1906000719
Mouse	DPI	TM176G	20220523000709
Minicomputer	Intel	NUC8HN	BTHN009003HV
POE injector	Solis Energy	HPI-2148	PT2144220316

General Product Information:

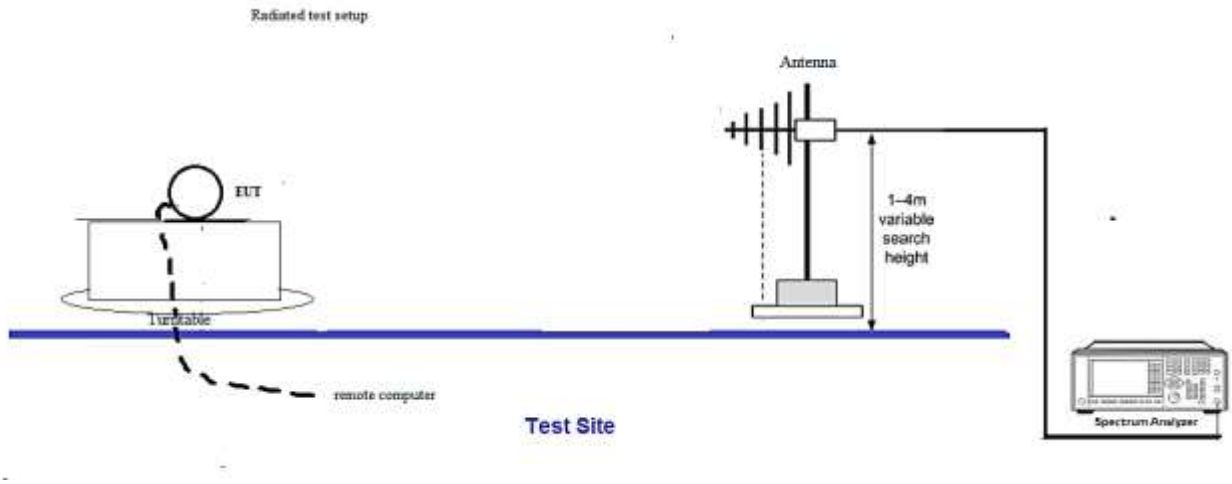
Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	902.75-927.25MHz
Number of Hopping Channels:	50
Receiver Bandwidth and Synchronization:	The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter.
Modulation Type(s):	PR-ASK *
Maximum Duty Cycle:	98% or better
Number of TX Chains:	4
Antenna Type(s) and Gain:	Patch Array 6.12 dBi to 9.28 dBi (Measured ant gain + beamforming gain as provided by the manufacturer)
Beamforming Type:	Digital
Antenna Connection Type:	Integral (External connector provided to facilitate testing)
Nominal Input Voltage:	48VDC from POE
Firmware / Software used for Test:	Test mode firmware version: 0.85.11
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

*Phase reversal ASK., TARI set at 6.25us

EUT Photo(s)

Support Equipment Photo(s)

Block Diagram of Test Setup(s)



FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	E. Wong
Test Method:	ANSI C63.10 (2013)	Test Date(s):	5/2/2023
Configuration:	5		
Test Setup:	The equipment under test (EUT) is set on a test bench. The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT. Frequency Range of EUT: 902.75MHz to 927.25MHz TX 902.75MHz, 914.75MHz, 927.25MHz TARI = 6.25us as intended. Worse case antenna pattern and associated power level evaluated. Lowest Gain: Sector 135, 0 Power setting 29.1dBm		

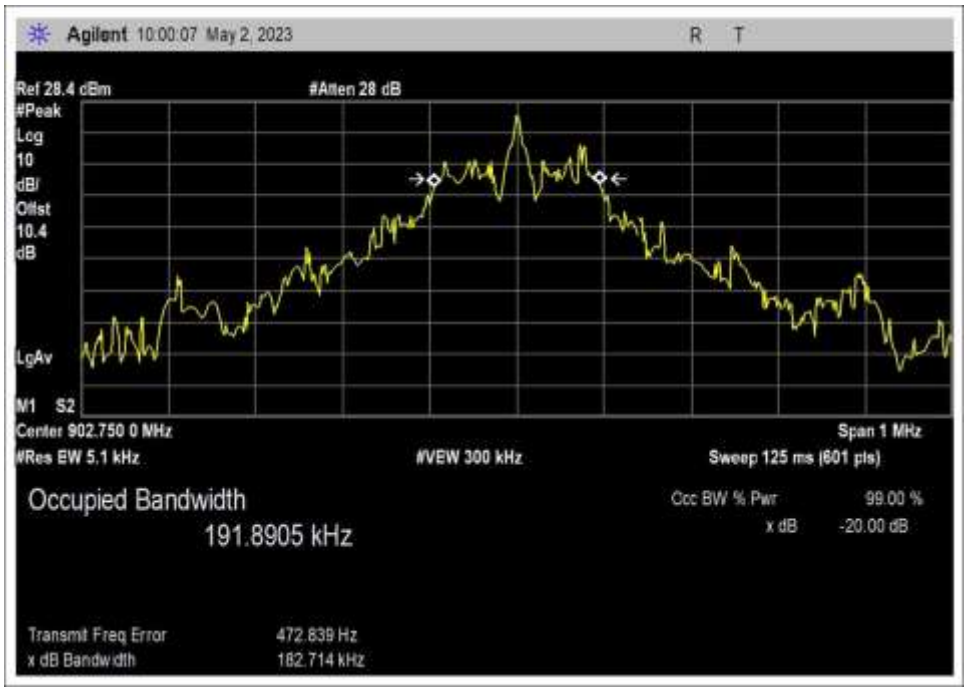
Environmental Conditions			
Temperature (ºC)	22.1	Relative Humidity (%):	46

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	12/13/2022	12/13/2023
03430	Attenuator	Aeroflex/Weinschel	75A-10-12	1/14/2022	1/14/2024
07658	Cable	Astrolab, Inc.	32022-29094K-29094K-24TC	6/22/2022	6/22/2024

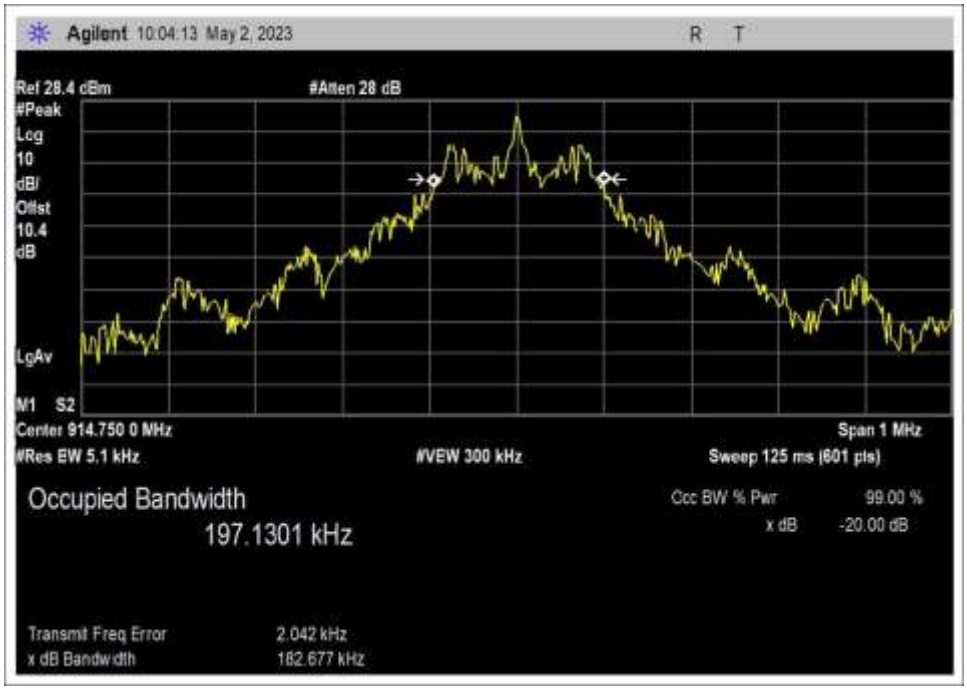
15.247(a)(1)(i) Occupied Bandwidth

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
902.75	1	PR-ASK	182.7	≤500	Pass
914.75	1	PR-ASK	182.7	≤500	Pass
927.25	1	PR-ASK	183.8	≤500	Pass

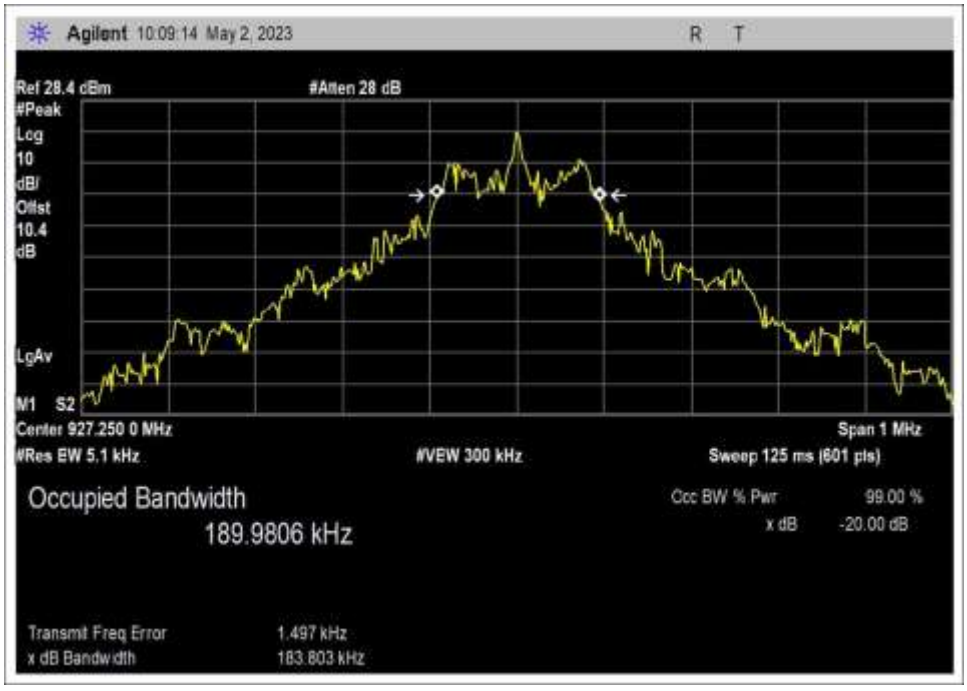
Plot(s)



Low Channel



Middle Channel

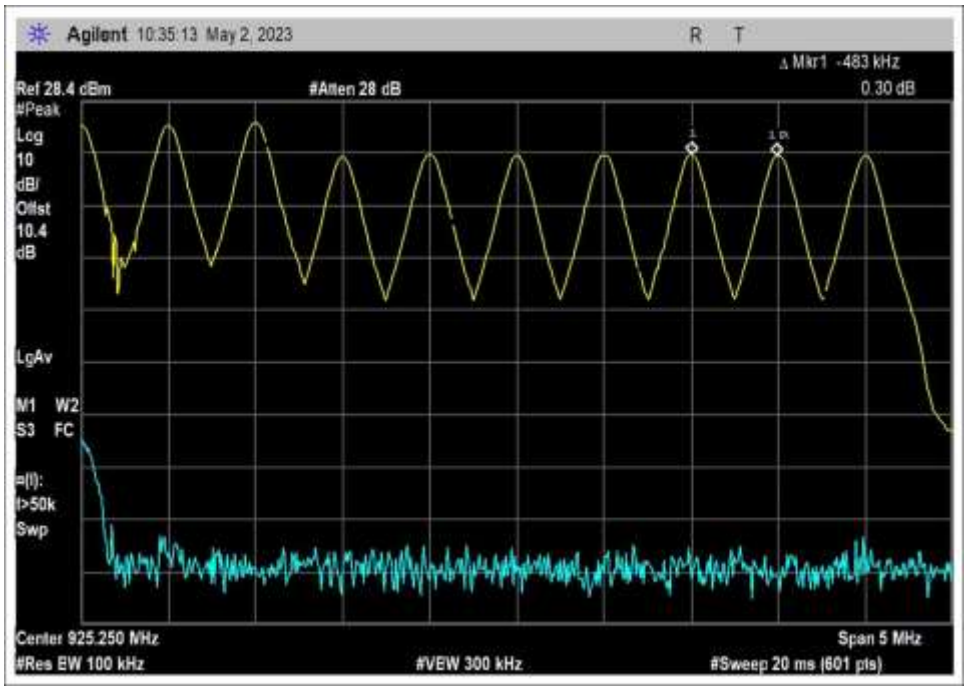


High Channel

15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	Hopping	483	> 183.8	Pass

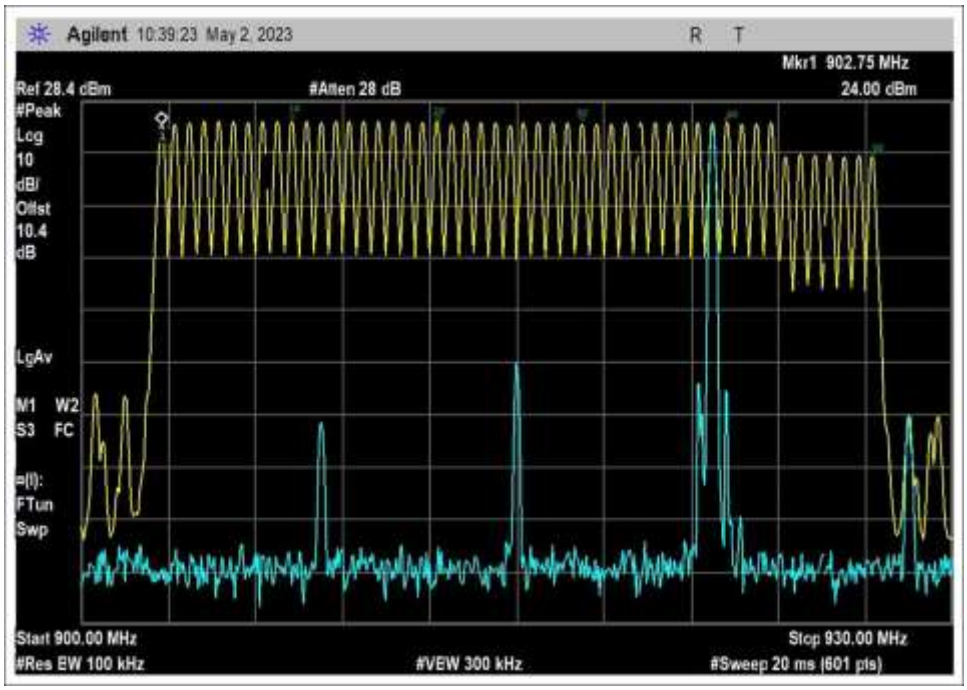
Plot(s)



15.247(a)(1)(i) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
1	Hopping	50	≥50	Pass

Plot(s)



15.247(a)(1)(i) Time of Occupancy

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = \begin{cases} 20\ Seconds \mid 20\ dB\ BW < 250kHz \\ 10\ Seconds \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
1	hopping	391.2	≤400	Pass

Measured results are calculated as follows:

$$Dwell\ time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Big|_{P_{obs}}$$

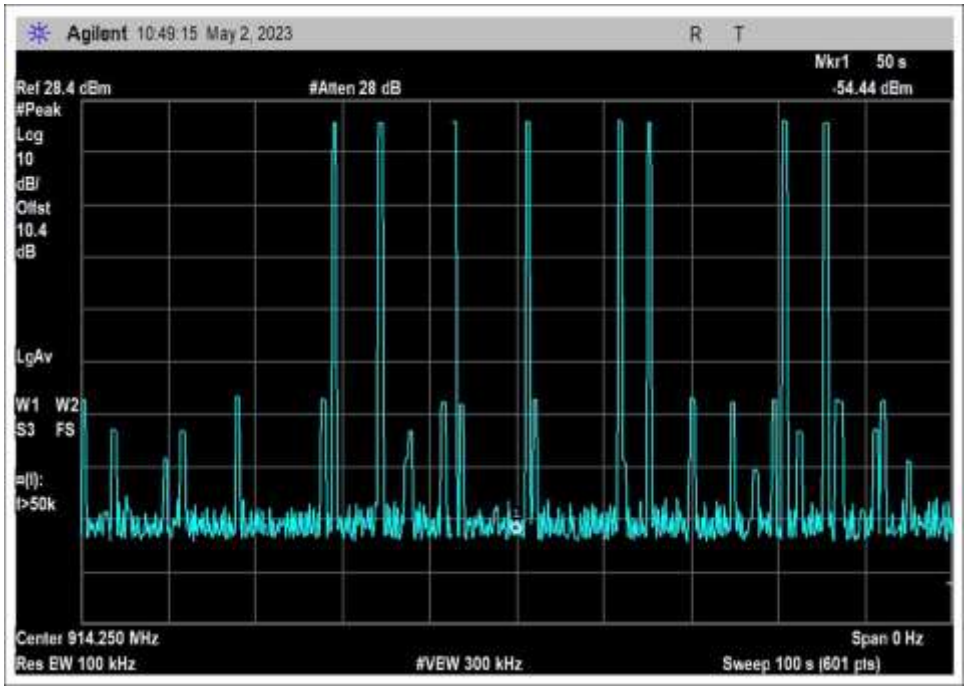
Actual Calculated Values:

Parameter	Value
Observation Period (P_{obs}):	100sec
Number of RF Bursts / P_{obs}:	4.9
On time of RF Burst:	399.2ms
Number of Control or other signals / P_{obs}:	Na
On time of Control or other Signals:	Na
Total Measured on Time:	391.2ms

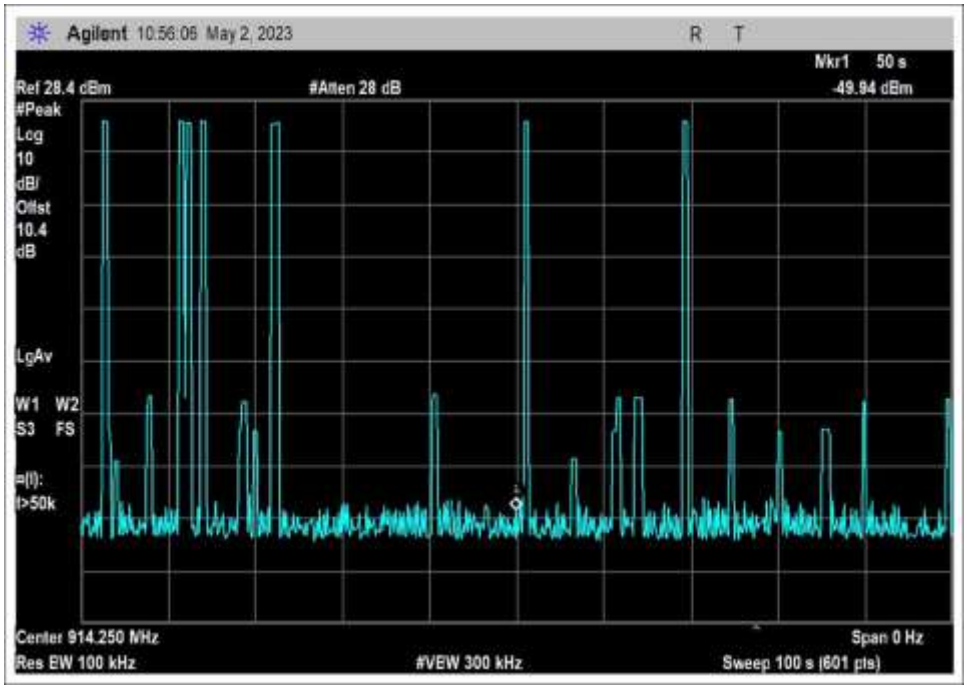
Average of ten 100 second sweep
(4.9 event /100) x 20 sec = 0.98 event/ 20 sec
On time per 20 sec = 0.98 event/20 sec x 399.2ms = 391.2ms

Plot(s)

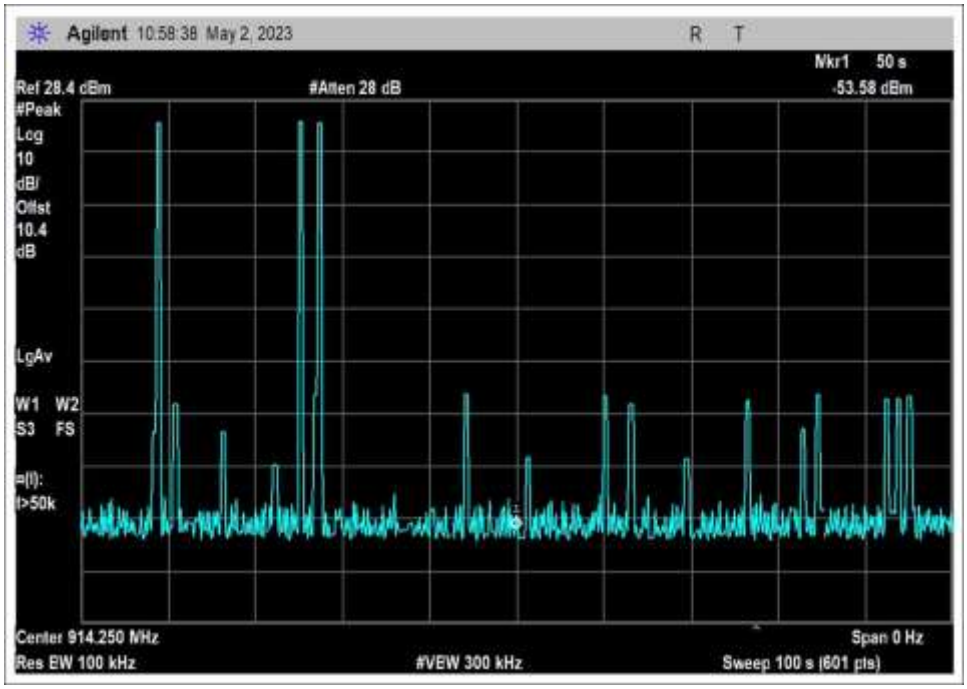
Average Time 100 Second



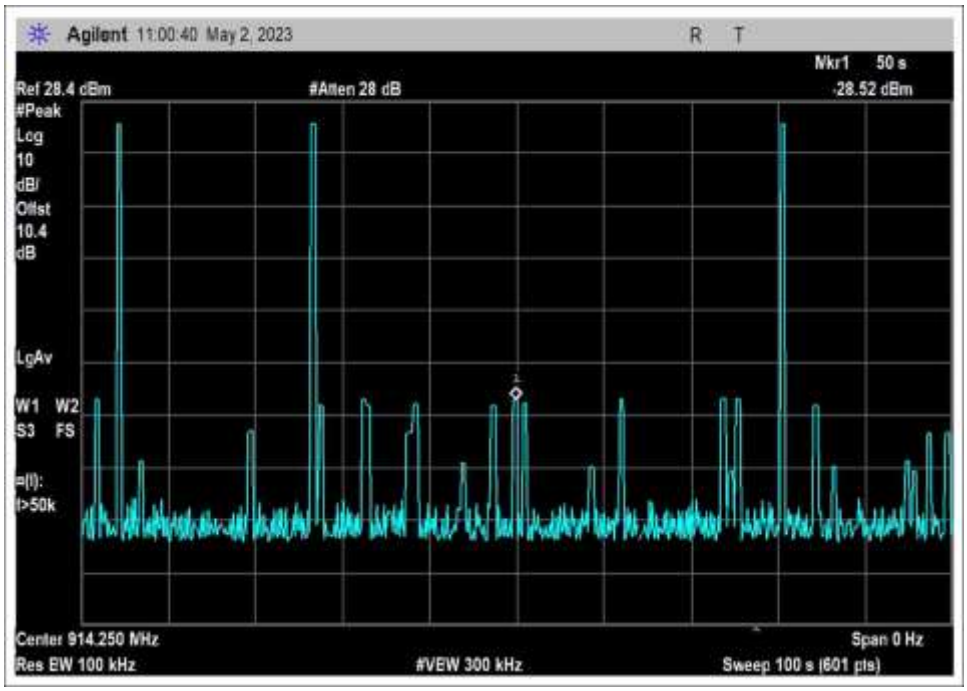
Sweep 1



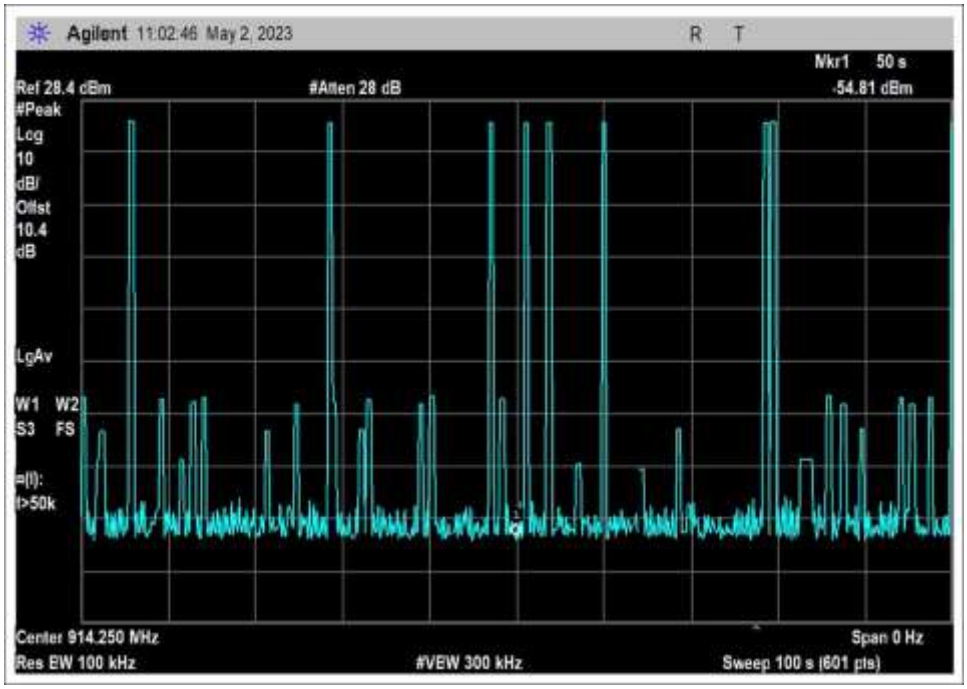
Sweep 2



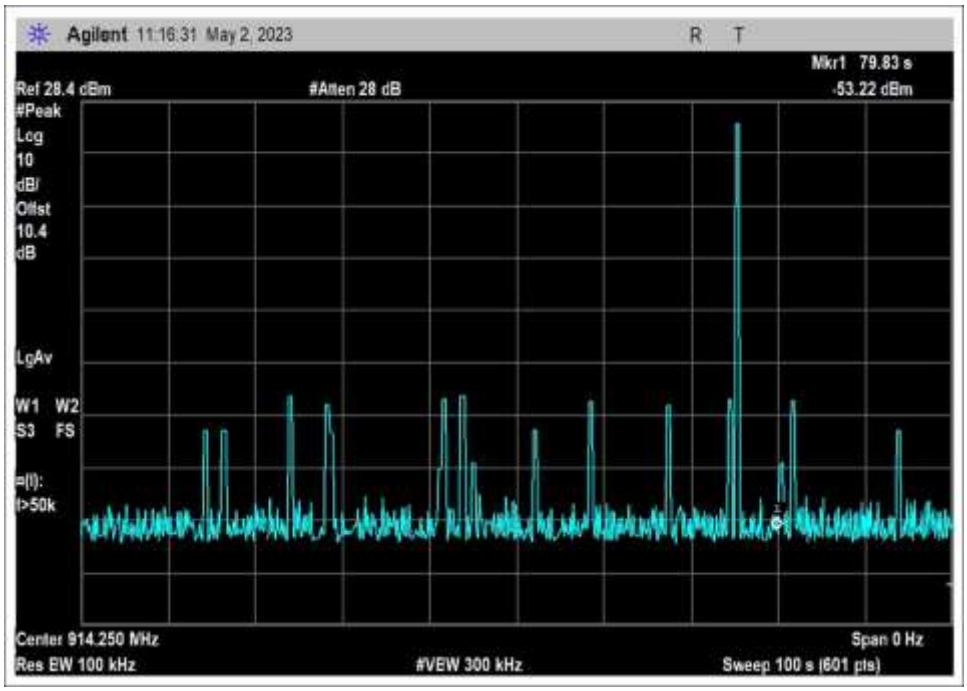
Sweep 3



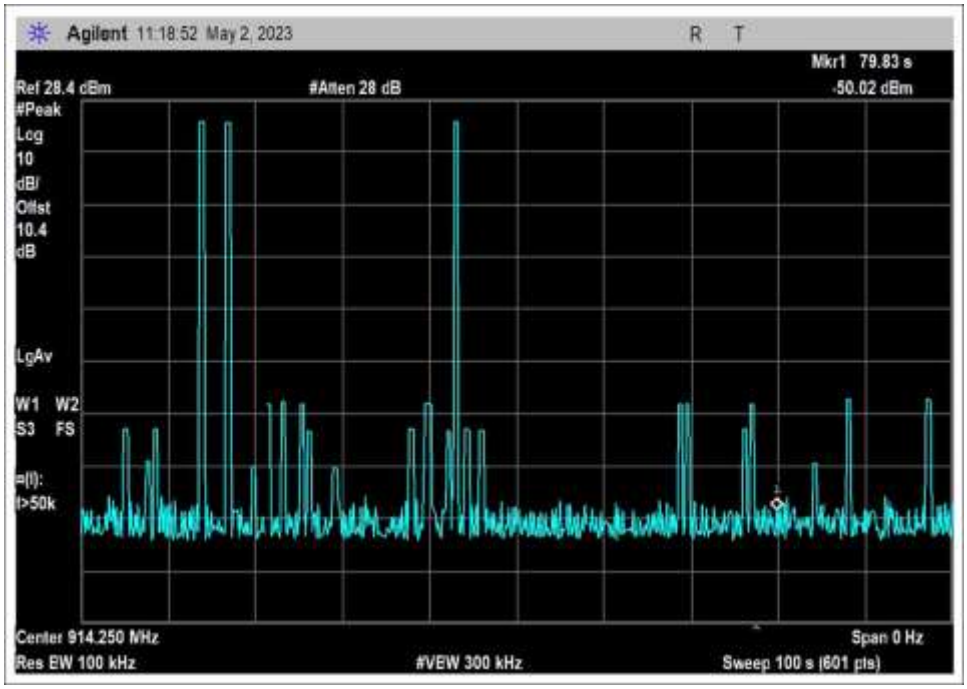
Sweep 4



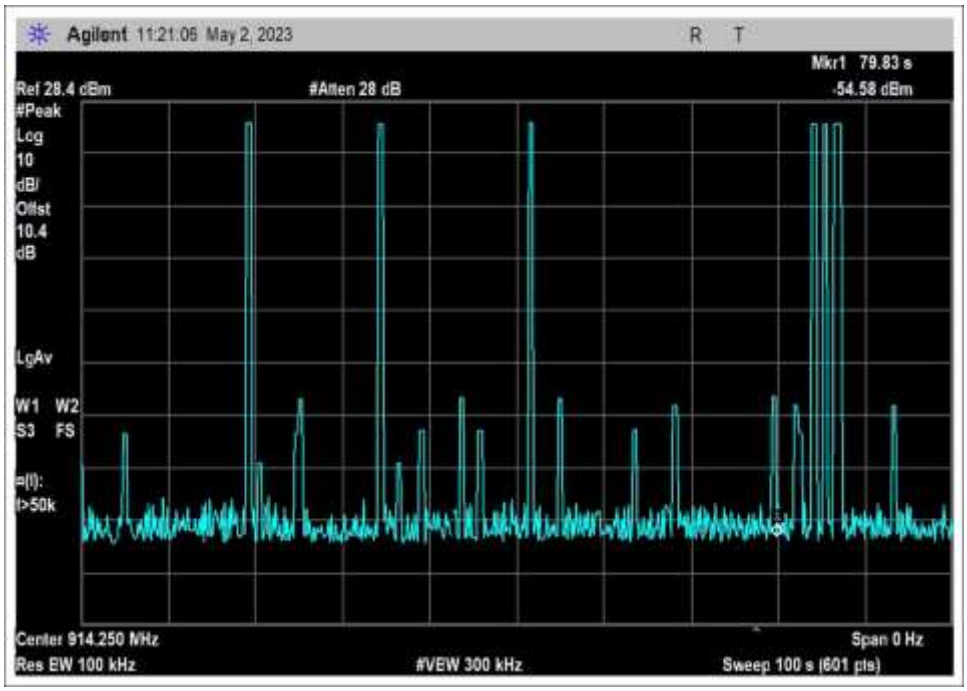
Sweep 5



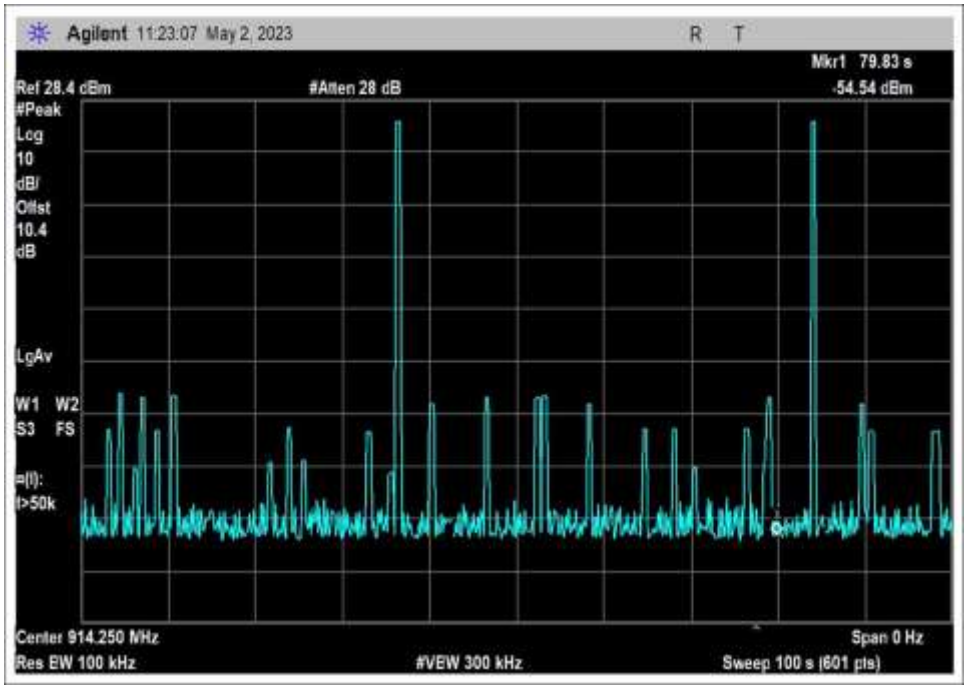
Sweep 6



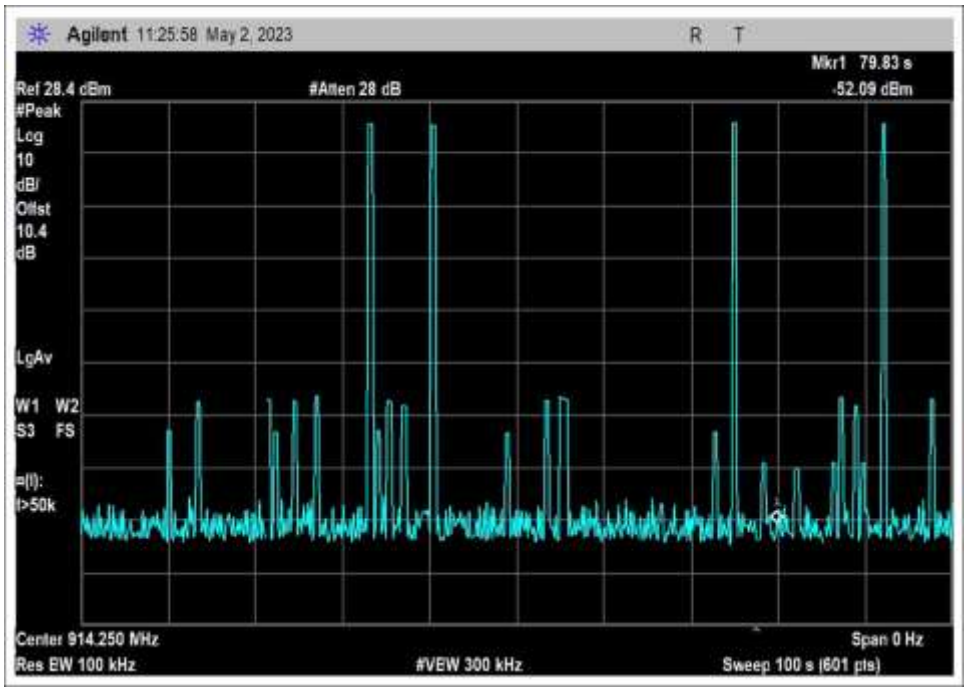
Sweep 7



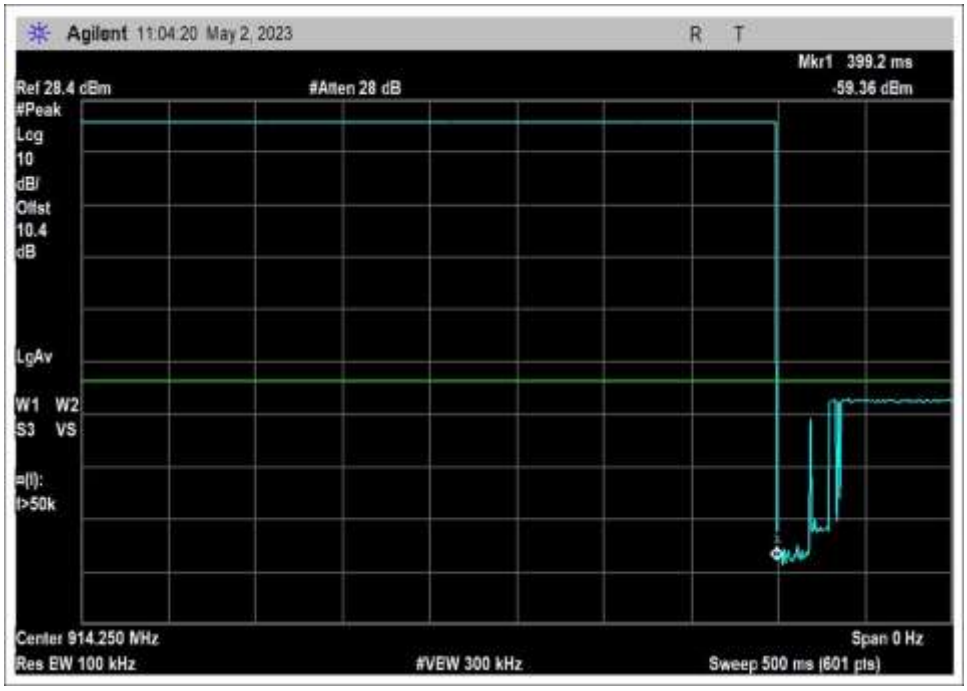
Sweep 8



Sweep 9

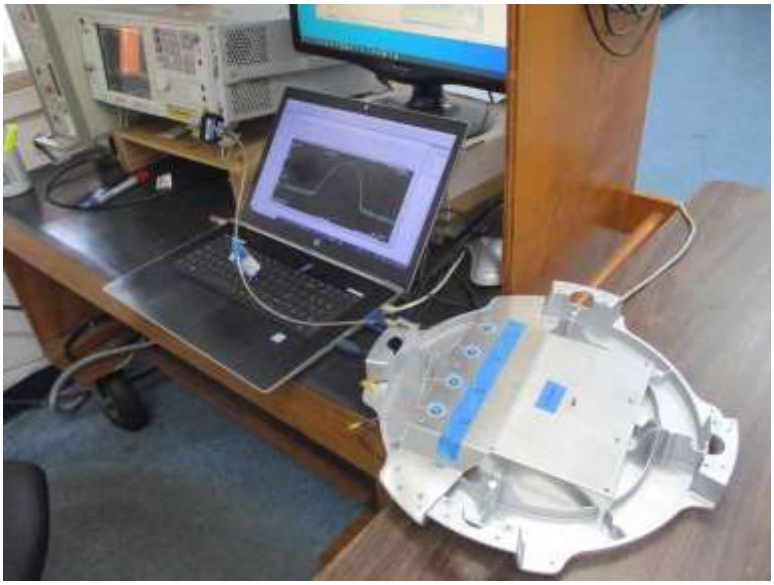


Sweep 10



Occupancy Time Per Event

Test Setup Photo(s)



15.247(b)(2) Output Power

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	E. Wong
Test Method:	ANSI C63.10 (2013)	Test Date(s):	5/2/2023
Configuration:	5 and 6 (power variation)*		
Test Setup:	The equipment under test (EUT) is set on a test bench. The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc), which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT. Frequency Range of EUT: 902.75MHz to 927.25MHz TX 902.75MHz, 914.75MHz, 927.25MHz TARI = 6.25us as intended. Worst case Antenna Pattern and associated power level evaluated. Lowest Gain: Sector 135, 0 Power setting 29.1dBm (Highest power)		

Environmental Conditions			
Temperature (ºC)	22.2	Relative Humidity (%):	24.6

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	12/13/2022	12/13/2023
03430	Attenuator	Aeroflex/Weinschel	75A-10-12	1/14/2022	1/14/2024
07658	Cable	Astrolab, Inc.	32022-29094K-29094K-24TC	6/22/2022	6/22/2024
P07164	Multimeter	Fluke	8845A/G	8/13/2021	8/13/2023
01438	DC Power Supply	Topward	6306D	4/4/2023	4/4/2025

Test Data Summary - Voltage Variations					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
902.75	PR-ASK	35.0	35.0	35.0	0
914.75	PR-ASK	35.1	35.1	35.1	0
927.25	PR-ASK	29.8	29.8	29.8	0

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions:

Measurements performed at input voltage Vnominal +15%. – 8%*

Parameter	Value
$V_{Nominal}$:	55.2
$V_{Minimum}$:	48
$V_{Maximum}$:	44**

*Voltage variation based on result of test sample with identical power regulation circuit tested under Report 107785-08

**Lowest attenable voltage to maintain operation of the EUT ,

Test Data Summary - RF Conducted Measurement

$$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$$

Ant Port	0		1		2		3		Linear sum		Ant gain Beamforming gain	Total EIRP
Freq	dBm	Watts	dBm	Watts	dBm	Watts	dBm	Watts	watt	dBm	dBi	dBm
902.75	23.1	0.2037	23.8	0.2393	22.9	0.1959	22.1	0.1629	0.8018	29.0	6.12	35.2
914.75	23.4	0.2203	23.2	0.2099	22.6	0.1824	22.8	0.1914	0.8040	29.1	6.12	35.2
927.25	18.2	0.0661	18.3	0.0671	17.3	0.0541	17.4	0.0551	0.2424	23.8	6.12	30.0

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured Total EIRP (dBm)	EIRP Limit (dBm)	Results
Lowest antenna gain, highest power setting					
902.75	PR-ASK	Patch Array	35.2	≤ 36	Pass
914.75	PR-ASK	Patch Array	35.2	≤ 36	Pass
927.25	PR-ASK	Patch Array	30.0	≤ 36	Pass

Supplementary Data

The manufacturer provided the following measurement for highest antenna gain and lowest power setting.
Highest Gain: Sector 180, 0, Power setting 21.4 dBm

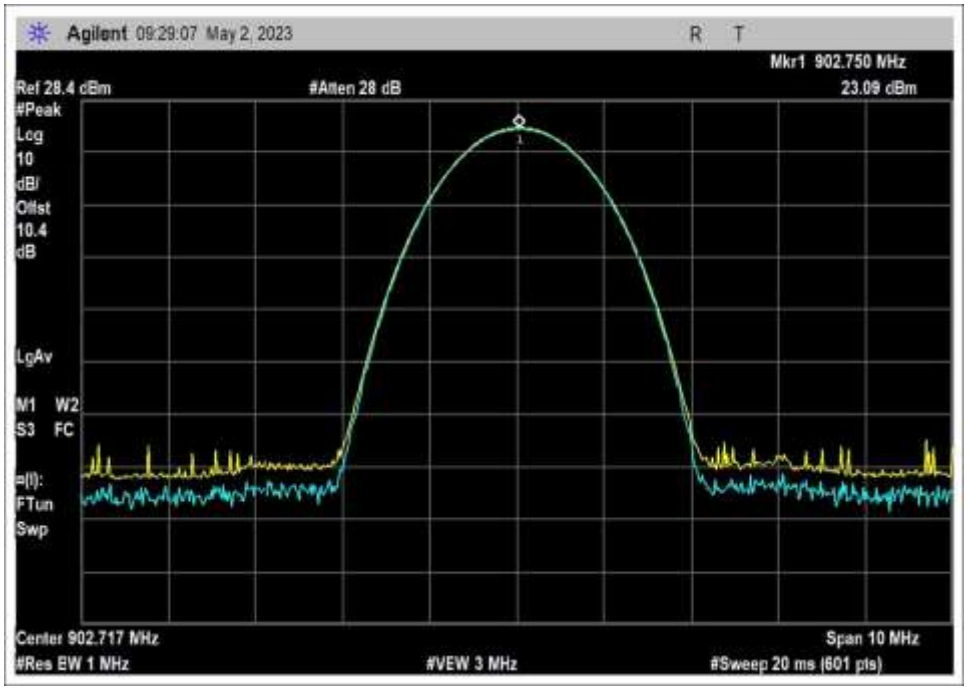
Ant Port	0		1		2		3		Linear sum		Ant gain Beamforming gain	Total EIRP
Freq	dBm	Watts	dBm	Watts	dBm	Watts	dBm	Watts	watt	dBm	dBi	dBm
902.75	20.27	0.1064	21.15	0.1303	20.78	0.1197	19.95	0.0989	0.4553	26.6	9.28	35.9
914.75	20.19	0.1045	20.67	0.1167	21.09	0.1285	20.26	0.1062	0.4559	26.6	9.28	35.9
927.25	16.83	0.0482	18.23	0.0665	18.61	0.0726	17.56	0.0570	0.2443	23.9	9.28	33.2

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured Total EIRP (dBm)	EIRP Limit (dBm)	Results
Highest antenna gain, lowest power setting					
902.75	PR-ASK	Patch Array	35.9	≤ 36	Pass
914.75	PR-ASK	Patch Array	35.9	≤ 36	Pass
927.25	PR-ASK	Patch Array	33.2	≤ 36	Pass

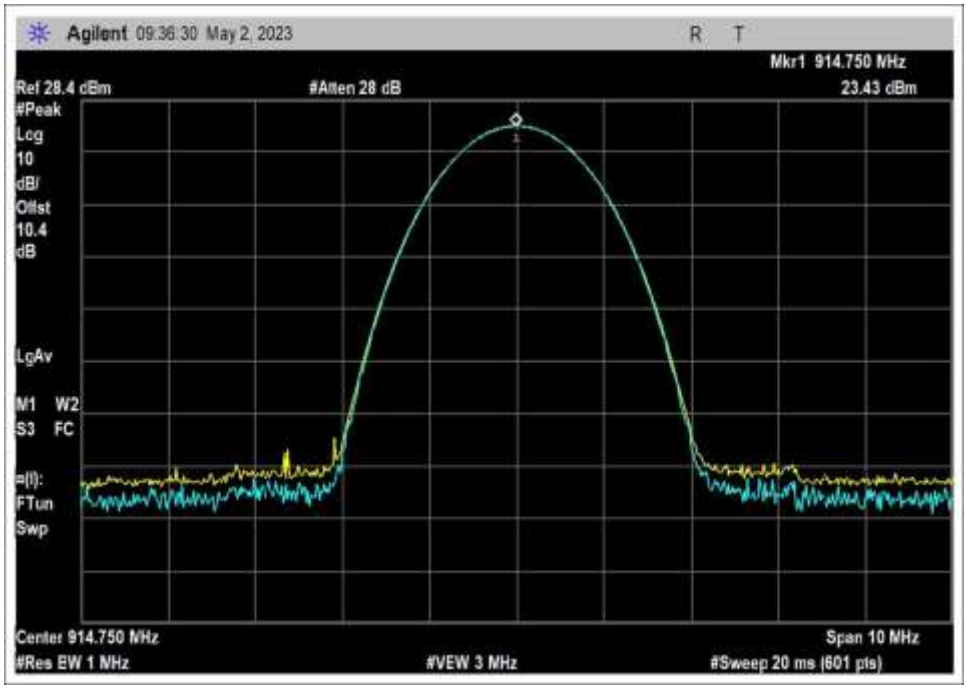
See appendix B for conducted plot data.

Plots

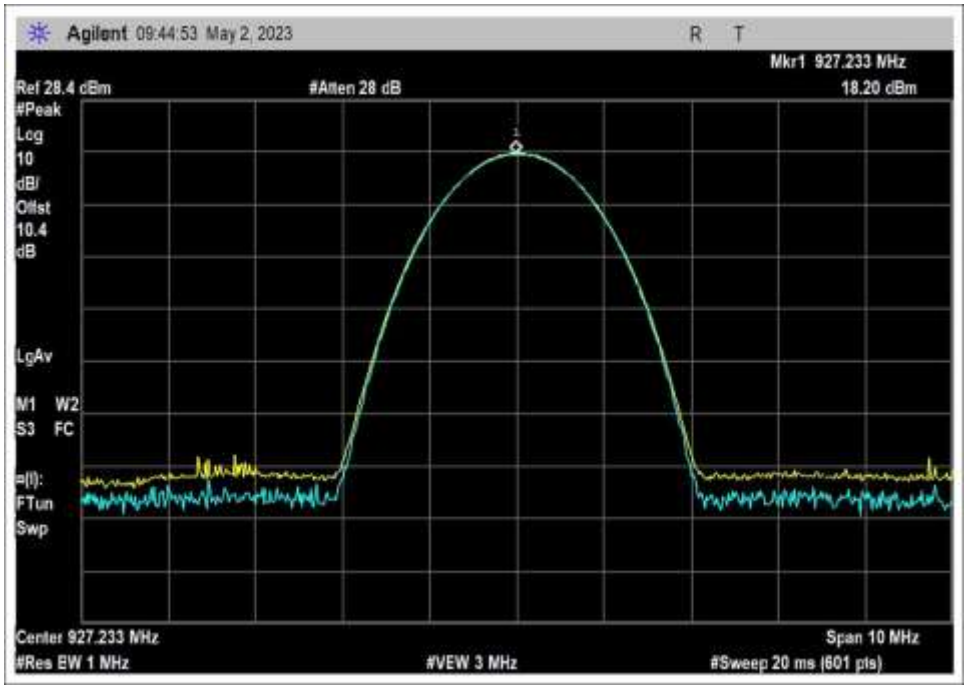
Antenna 0



Low Channel

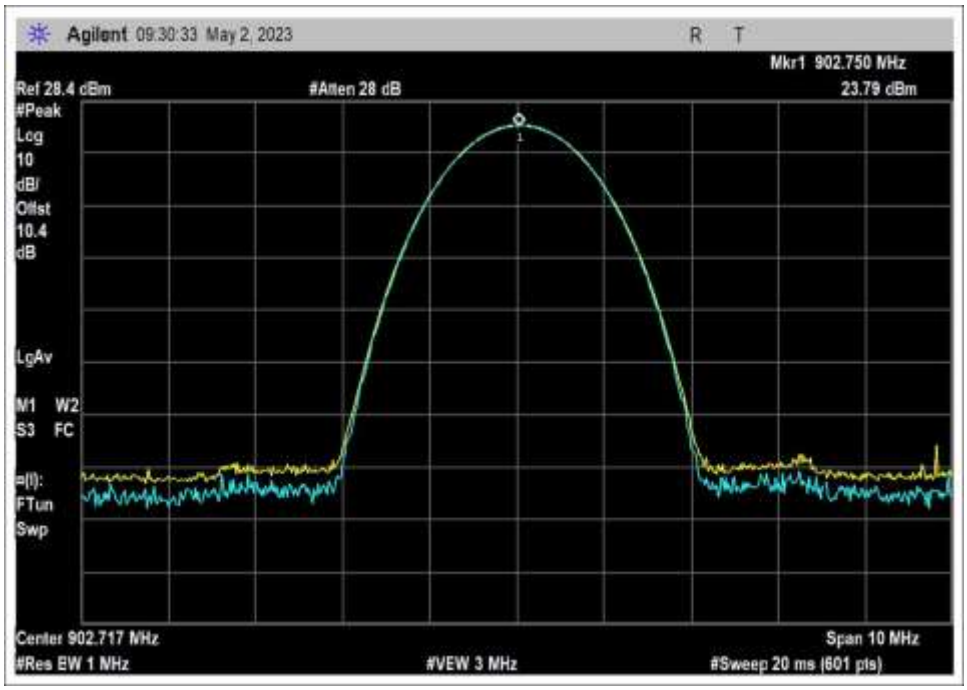


Middle Channel

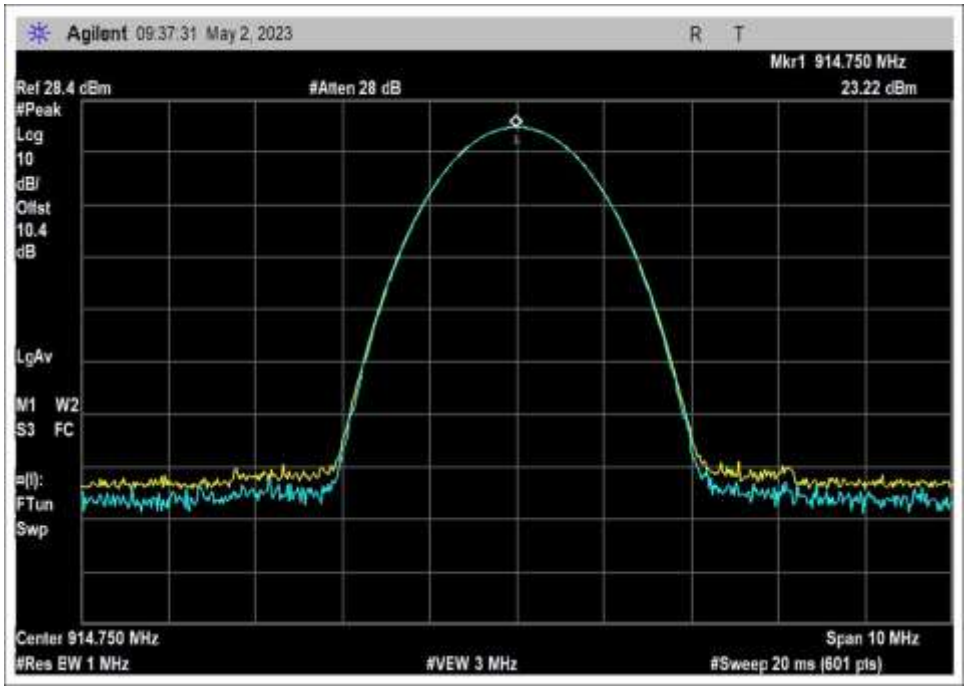


High Channel

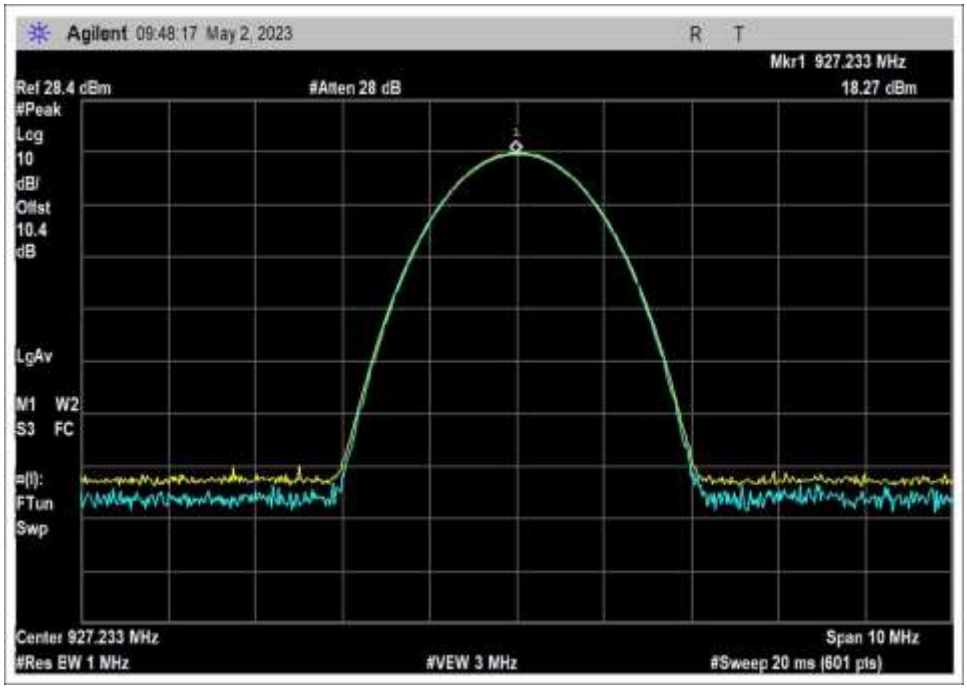
Antenna 1



Low Channel

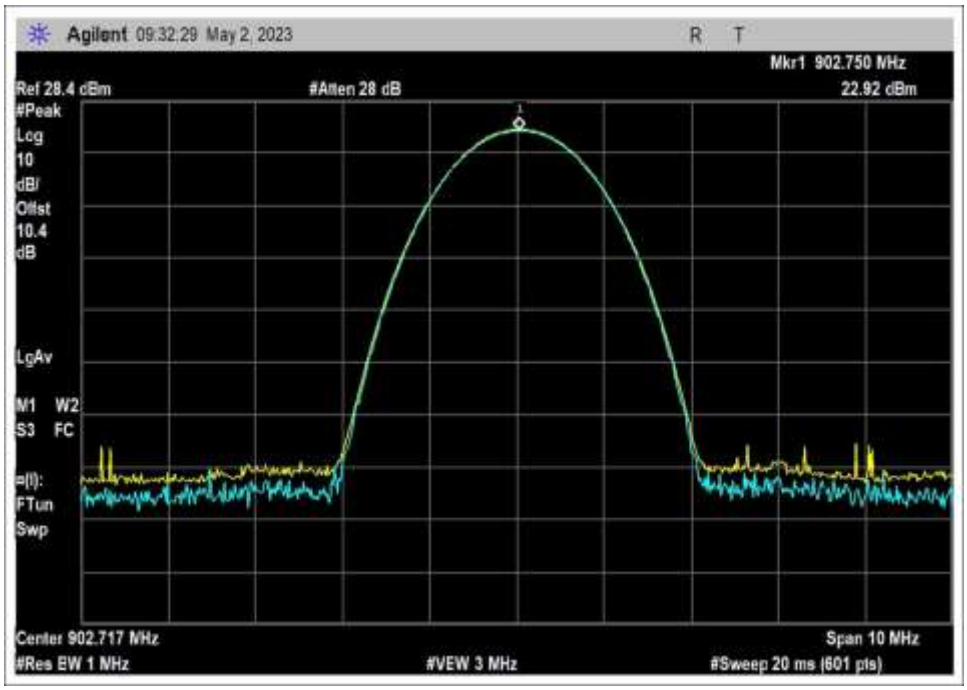


Middle Channel

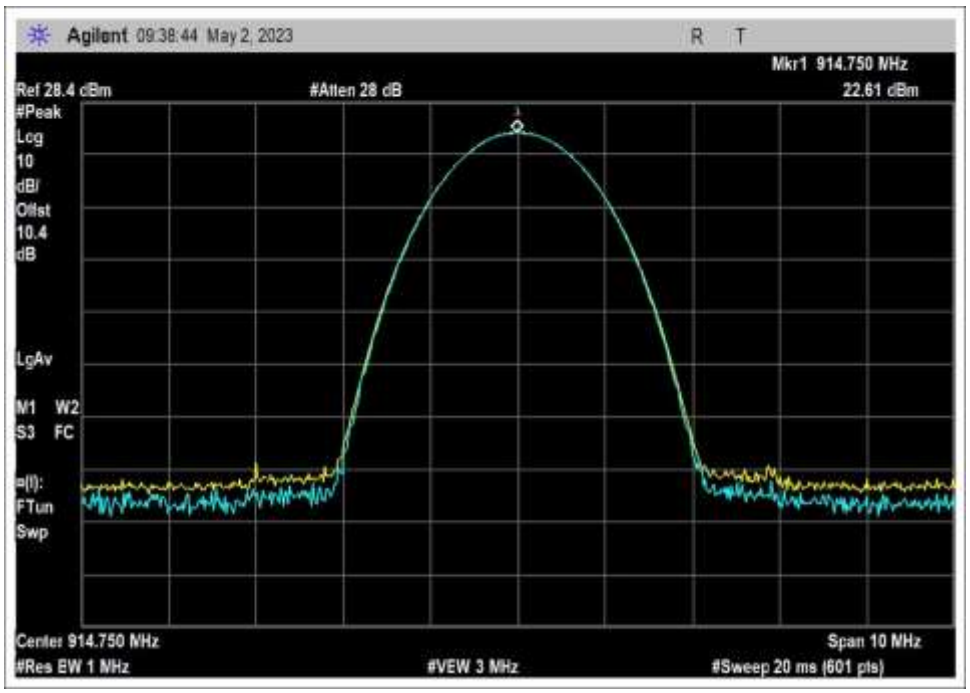


High Channel

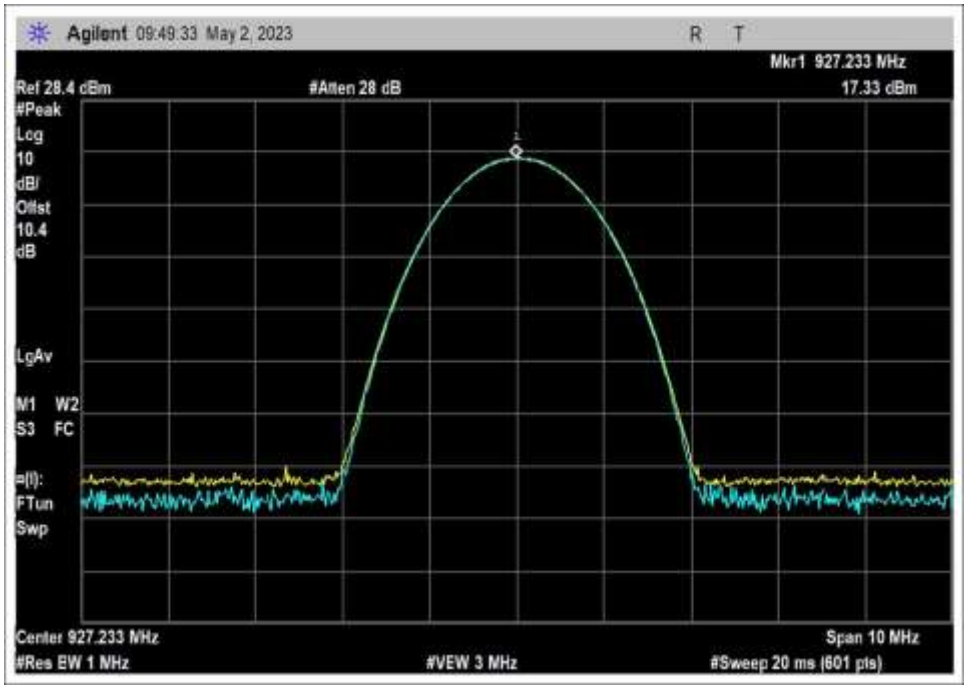
Antenna 2



Low Channel

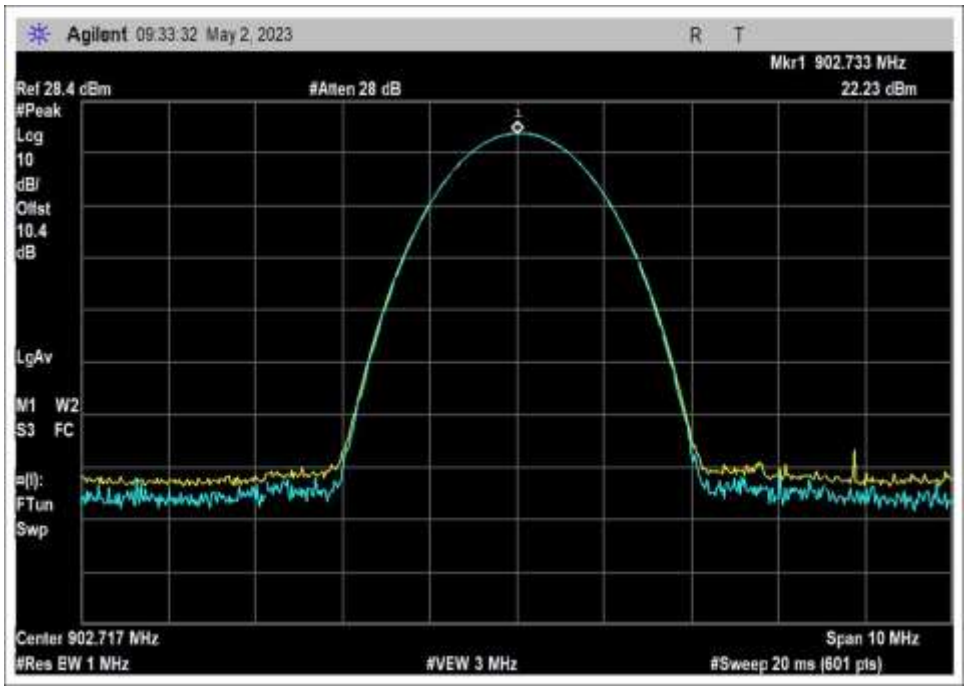


Middle Channel

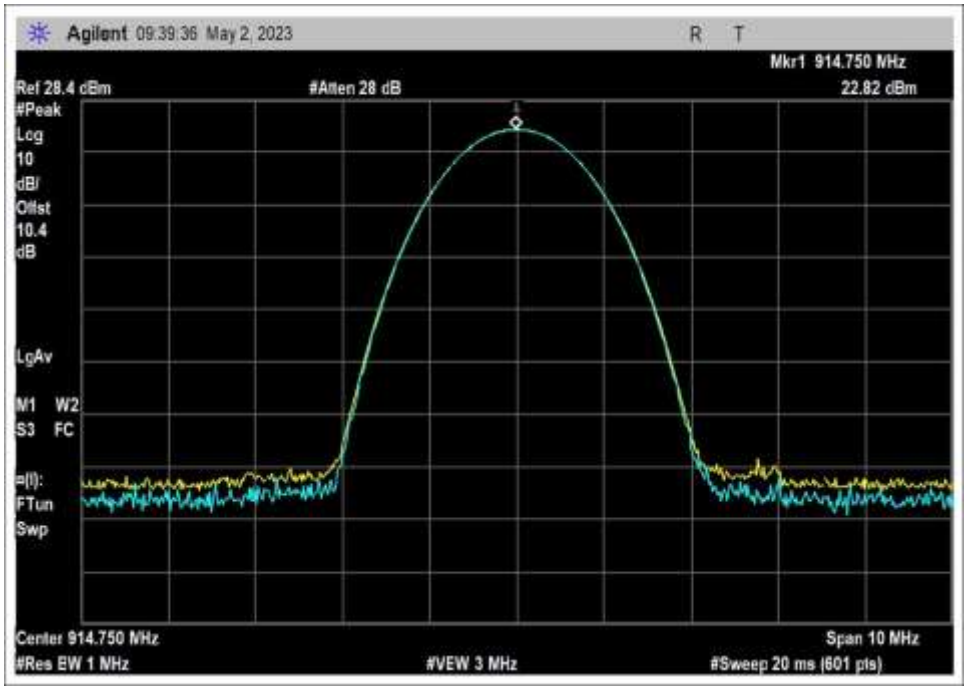


High Channel

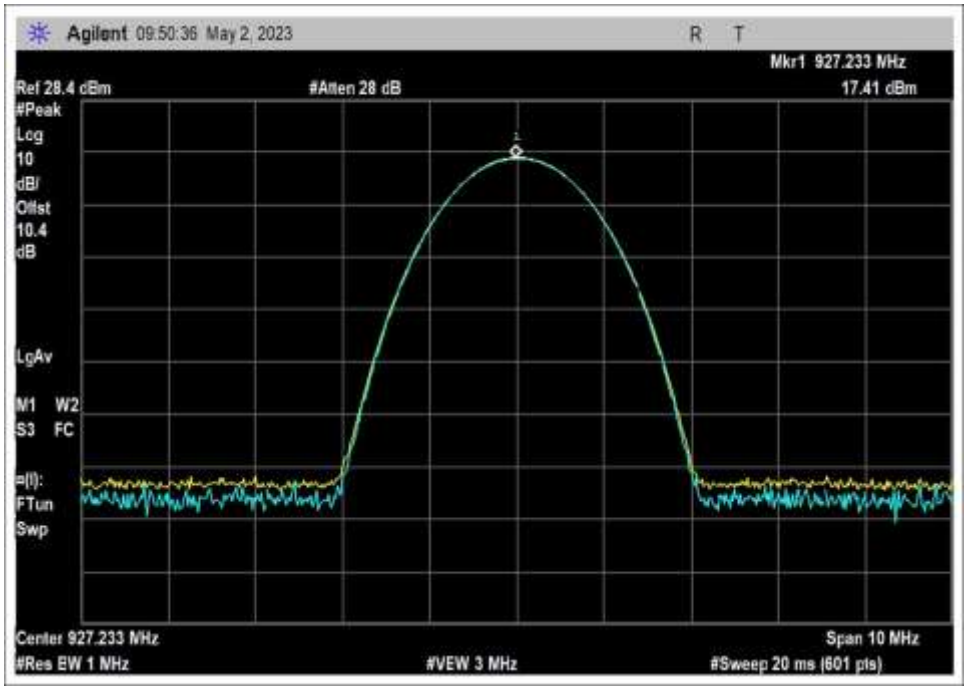
Antenna 3



Low Channel

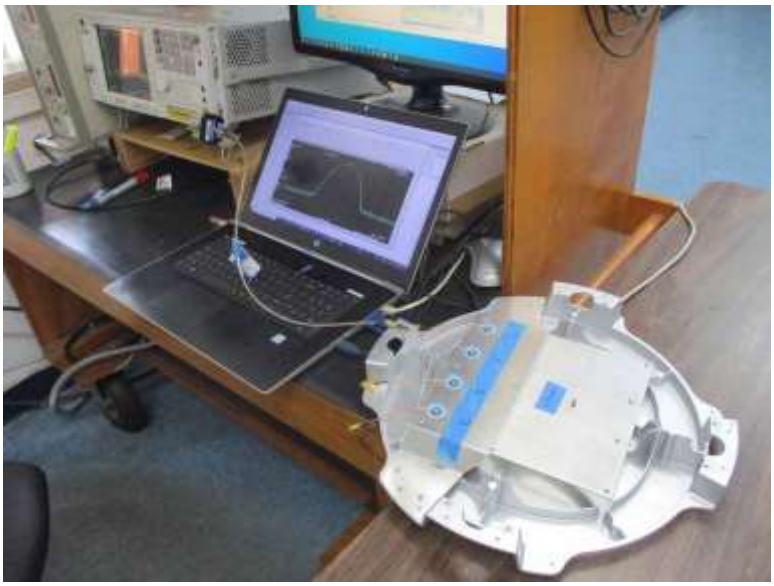


Middle Channel



High Channel

Test Setup Photo(s)



15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**108261**	Date:	5/2/2023
Test Type:	**Conducted Emissions**	Time:	14:14:35
Tested By:	E. Wong	Sequence#:	23
Software:	EMITest 5.03.20		48VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The equipment under test (EUT) is set on a test bench.

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

TX 902.75MHz, 914.75MHz, 927.25MHz

LO Frequency = 915MHz

TARI = 6.25us as intended.

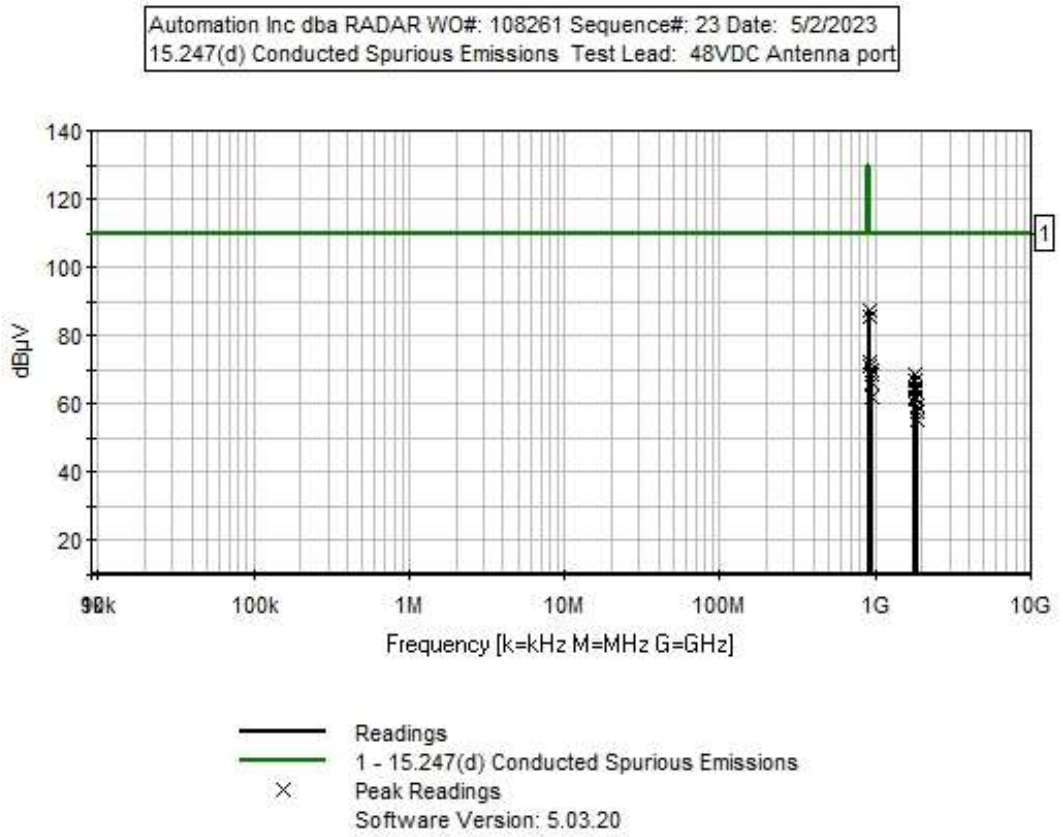
Firmware Version: 0.85.11

Two Antenna Pattern and associated power level evaluated.

Lowest Gain: Sector 135, 0 Power setting 29.1dBm
Highest Gain: Sector 180, 0 Power setting 21.4 dBm

Site A
Test Method: ANSI C63.10 (2013)

Test Environment Conditions:
Temperature: 17°C
Relative Humidity: 47%
Pressure: 99.8kPa



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T2	AN03430	Attenuator	75A-10-12	1/14/2022	1/14/2024
T3	ANP07658	Cable	32022-29094K-29094K-24TC	6/22/2022	6/22/2024

Measurement Data: Reading listed by margin. Test Lead: Antenna port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	939.508M	59.3	+0.0	+10.1	+0.3		+0.0	69.7	105.0 Ant3_H	-35.3	Anten
2	939.470M	58.1	+0.0	+10.1	+0.3		+0.0	68.5	105.0 Ant2_H	-36.5	Anten
3	939.500M	55.6	+0.0	+10.1	+0.3		+0.0	66.0	105.0 Ant1_H	-39.0	Anten
4	1829.200M	57.9	+0.0	+10.1	+0.4		+0.0	68.4	109.4 Ant2_M	-41.0	Anten
5	915.000M	77.1	+0.0	+10.1	+0.3		+0.0	87.5	129.4 Ant3_L	-41.9	Anten
6	1829.300M	56.2	+0.0	+10.1	+0.4		+0.0	66.7	109.4 Ant0_M	-42.7	Anten
7	939.420M	51.5	+0.0	+10.1	+0.3		+0.0	61.9	105.0 Ant0_H	-43.1	Anten
8	914.990M	75.3	+0.0	+10.1	+0.3		+0.0	85.7	130.0 Ant0_L	-44.3	Anten
9	1829.200M	54.3	+0.0	+10.1	+0.4		+0.0	64.8	109.4 Ant1_M	-44.6	Anten
10	915.000M	75.4	+0.0	+10.1	+0.3		+0.0	85.8	130.4 Ant1_L	-44.6	Anten
11	915.000M	75.4	+0.0	+10.1	+0.3		+0.0	85.8	130.4 Ant2_L	-44.6	Anten
12	1805.800M	54.4	+0.0	+10.1	+0.4		+0.0	64.9	110.4 Ant2_L	-45.5	Anten
13	1805.200M	54.2	+0.0	+10.1	+0.4		+0.0	64.7	110.4 Ant1_L	-45.7	Anten
14	1854.200M	48.9	+0.0	+10.1	+0.4		+0.0	59.4	105.1 Ant0_H	-45.7	Anten
15	1805.900M	53.6	+0.0	+10.1	+0.4		+0.0	64.1	110.0 Ant0_L	-45.9	Anten
16	1854.500M	47.5	+0.0	+10.1	+0.4		+0.0	58.0	105.1 Ant2_H	-47.1	Anten
17	1829.500M	51.4	+0.0	+10.1	+0.4		+0.0	61.9	109.4 Ant3_M	-47.5	Anten
18	1805.600M	50.9	+0.0	+10.1	+0.4		+0.0	61.4	109.4 Ant3_L	-48.0	Anten
19	1854.700M	45.0	+0.0	+10.1	+0.4		+0.0	55.5	105.1 Ant3_H	-49.6	Anten
20	915.767M	61.9	+0.0	+10.1	+0.3		+0.0	72.3	129.4 Ant3_M	-57.1	Anten
21	915.730M	61.9	+0.0	+10.1	+0.3		+0.0	72.3	129.4 Ant0_M	-57.1	Anten
22	915.783M	60.5	+0.0	+10.1	+0.3		+0.0	70.9	129.4 Ant1_M	-58.5	Anten
23	915.750M	60.4	+0.0	+10.1	+0.3		+0.0	70.8	129.4 Ant2_M	-58.6	Anten

Band Edge

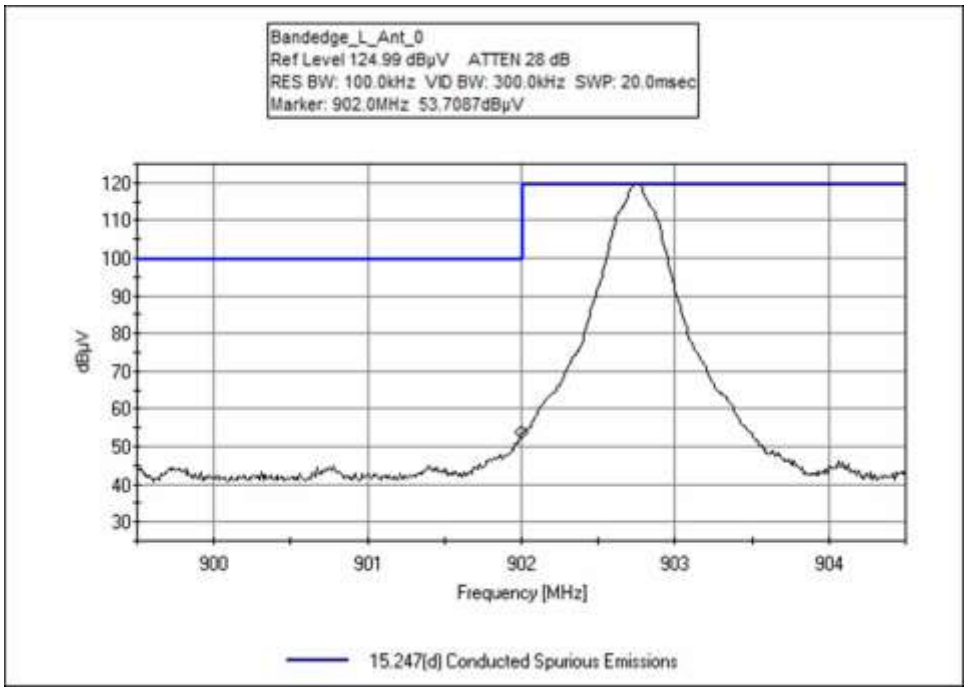
Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Single Channel (Low and High)				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	PR-ASK Ant0	-42.9	< 3.0	Pass
928	PR-ASK Ant0	-51.2	< -2.0	Pass
902	PR-ASK Ant1	-41.7	< 3.4	Pass
928	PR-ASK Ant1	-50.0	< -2.0	Pass
902	PR-ASK Ant2	-43.9	< 3.4	Pass
928	PR-ASK Ant2	-50.0	< -2.0	Pass
902	PR-ASK Ant3	-46.4	< 2.4	Pass
928	PR-ASK Ant3	-52.8	< -2.0	Pass

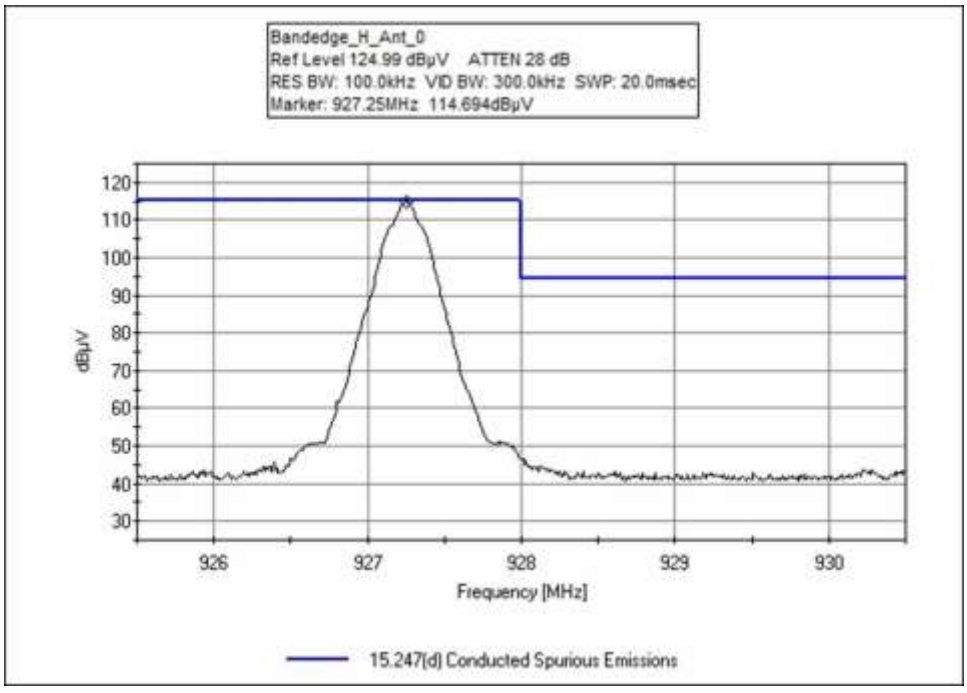
Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Hopping				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	PR-ASK Ant0	-45.8	< 3.0	Pass
928	PR-ASK Ant0	-50.3	< 3.0	Pass
902	PR-ASK Ant1	-45.1	< 3.0	Pass
928	PR-ASK Ant1	-53.1	< 3.0	Pass
902	PR-ASK Ant2	-46.6	< 3.0	Pass
928	PR-ASK Ant2	-51.3	< 3.0	Pass
902	PR-ASK Ant3	-44.6	< 3.0	Pass
928	PR-ASK Ant3	-50.3	< 3.0	Pass

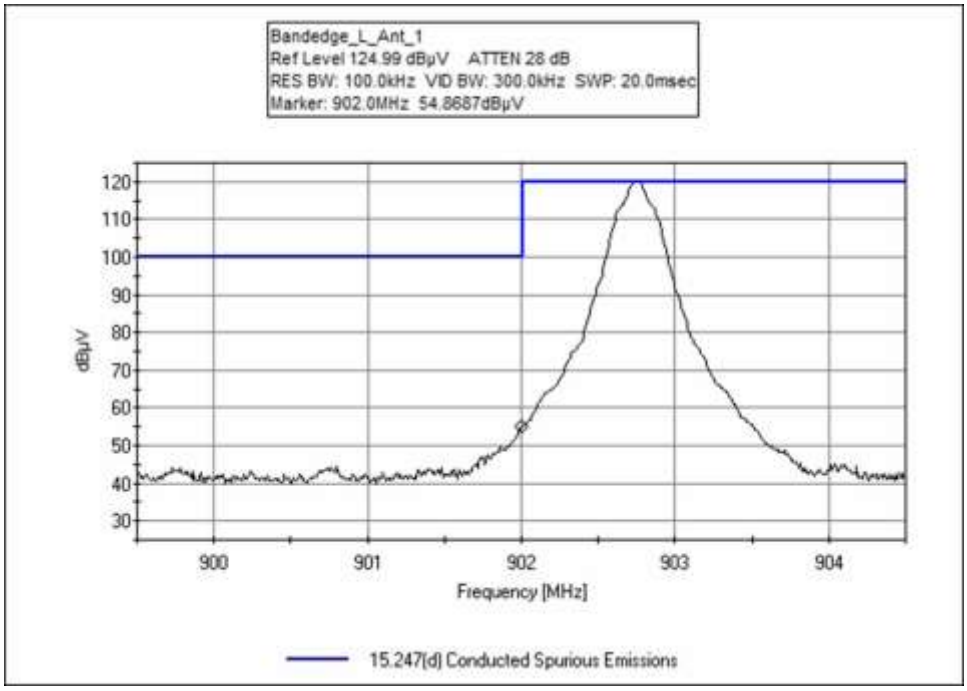
Note: dBm = dBµV- 107

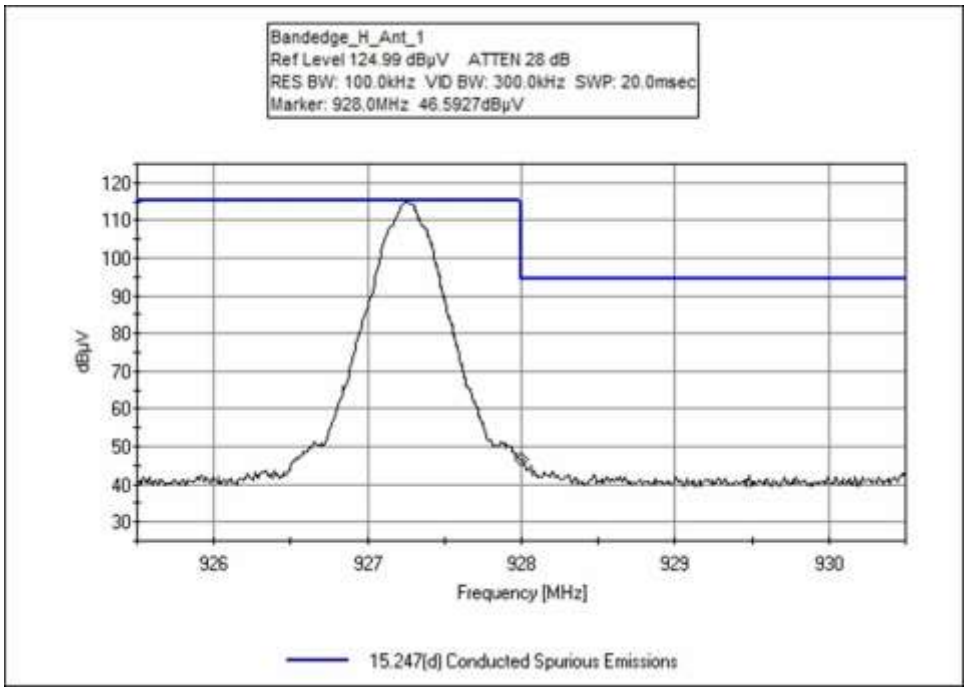
Band Edge Plots

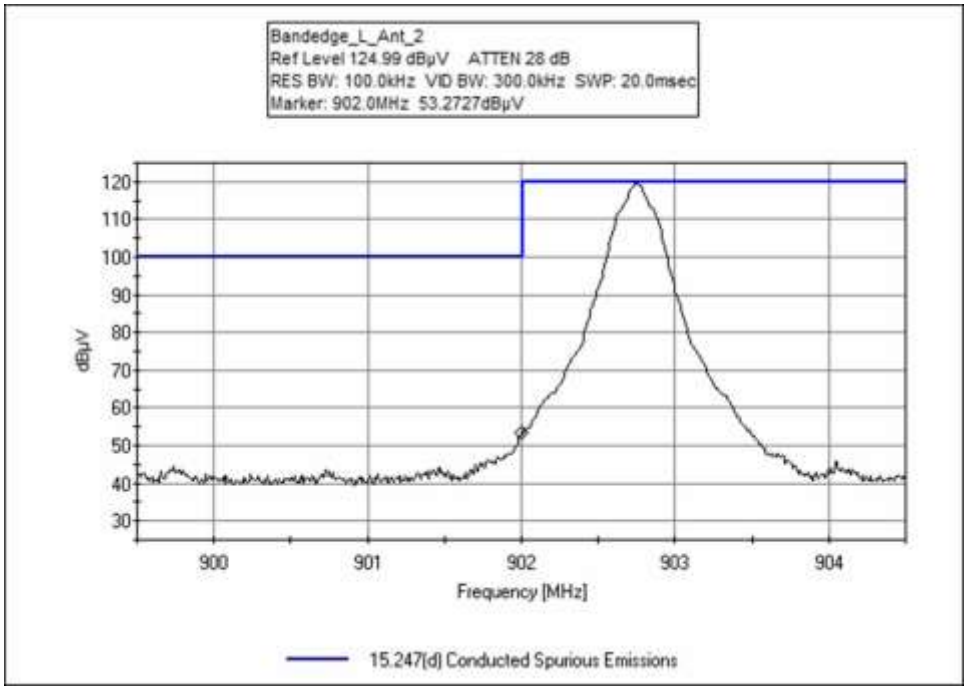
Single Channel

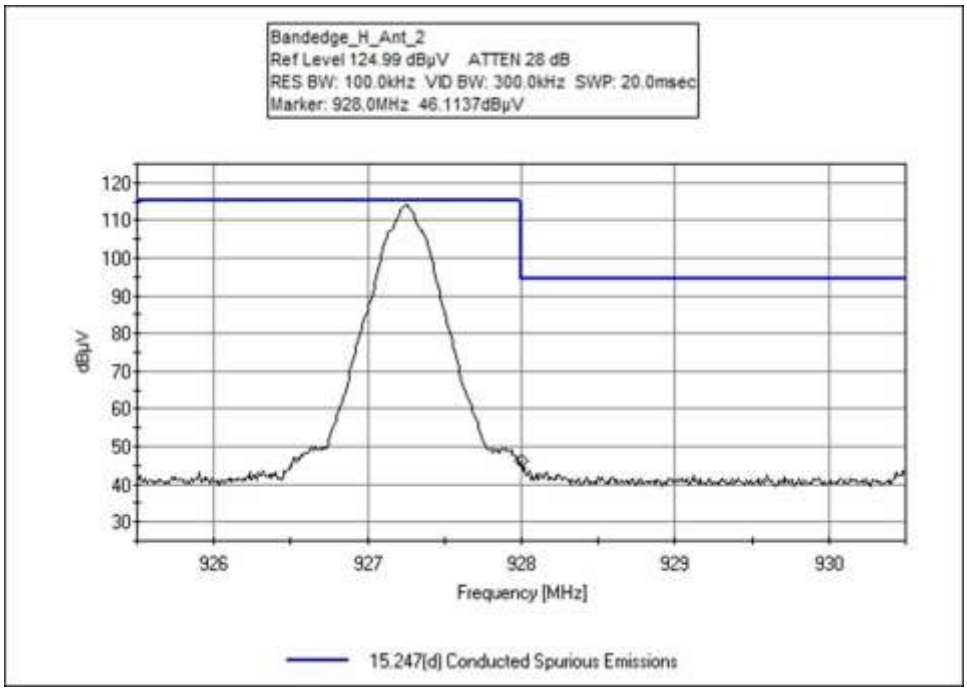


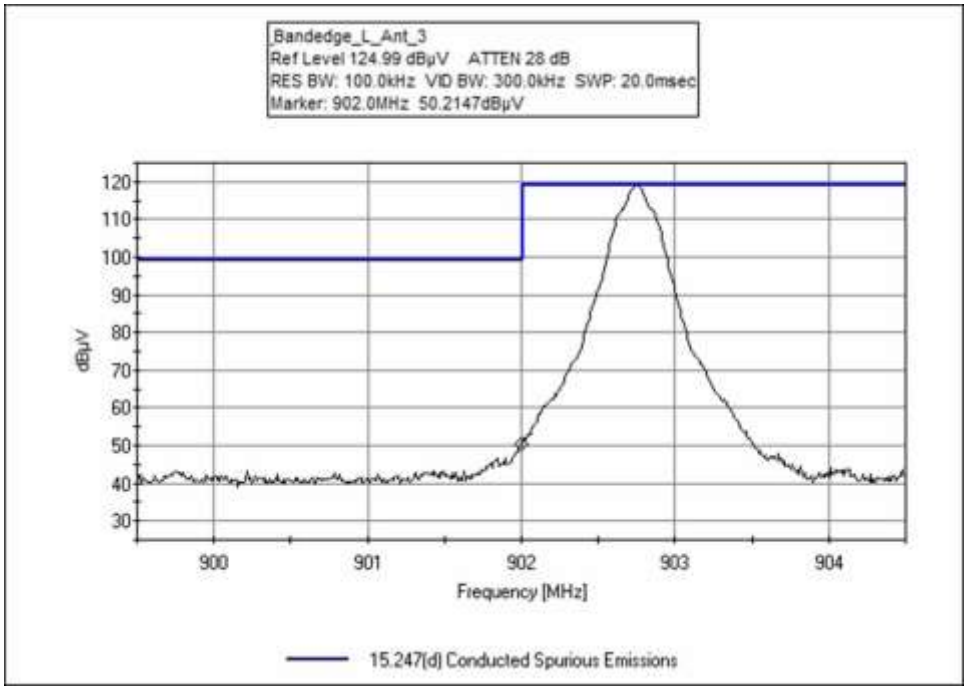


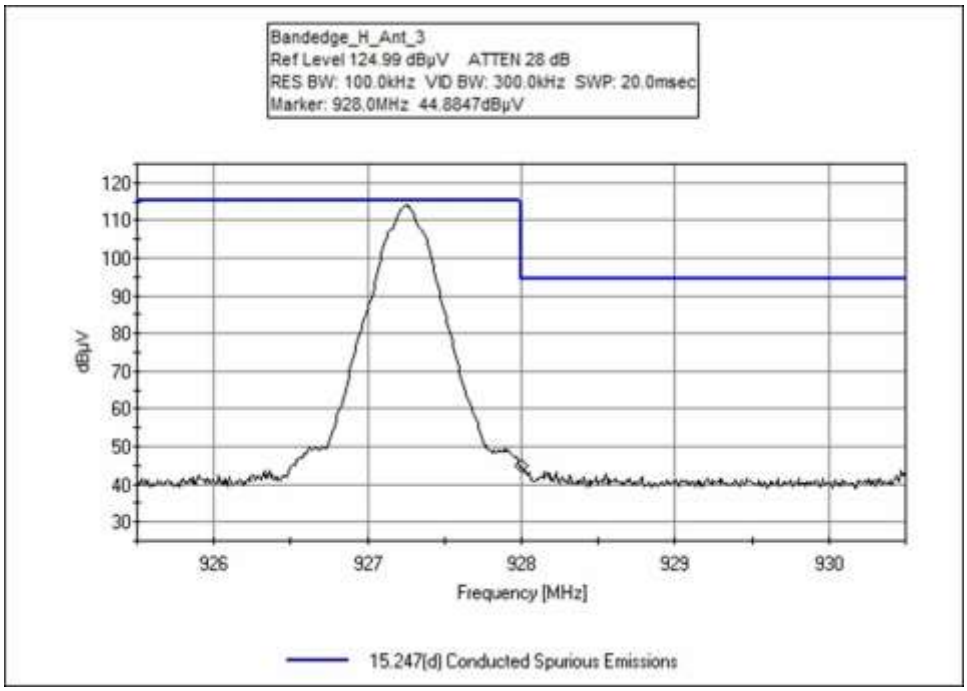

Bandedge_L_Ant_1
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 54.8687dBµV
120
110
100
90
80
70
60
50
40
30
dBµV
900
901
902
903
904
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


Bandedge_H_Ant_1
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 46.5927dBµV
120
110
100
90
80
70
60
50
40
30
dBµV
926
927
928
929
930
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

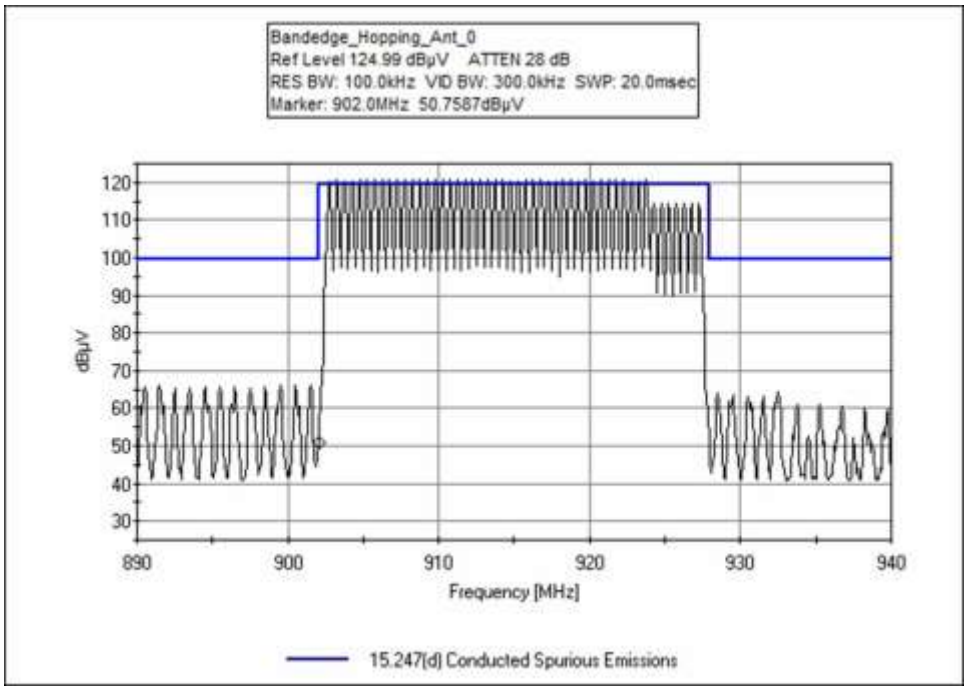

Bandedge_L_Ant_2
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 53.2727dBµV
120
110
100
90
80
70
60
50
40
30
dBµV
900
901
902
903
904
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

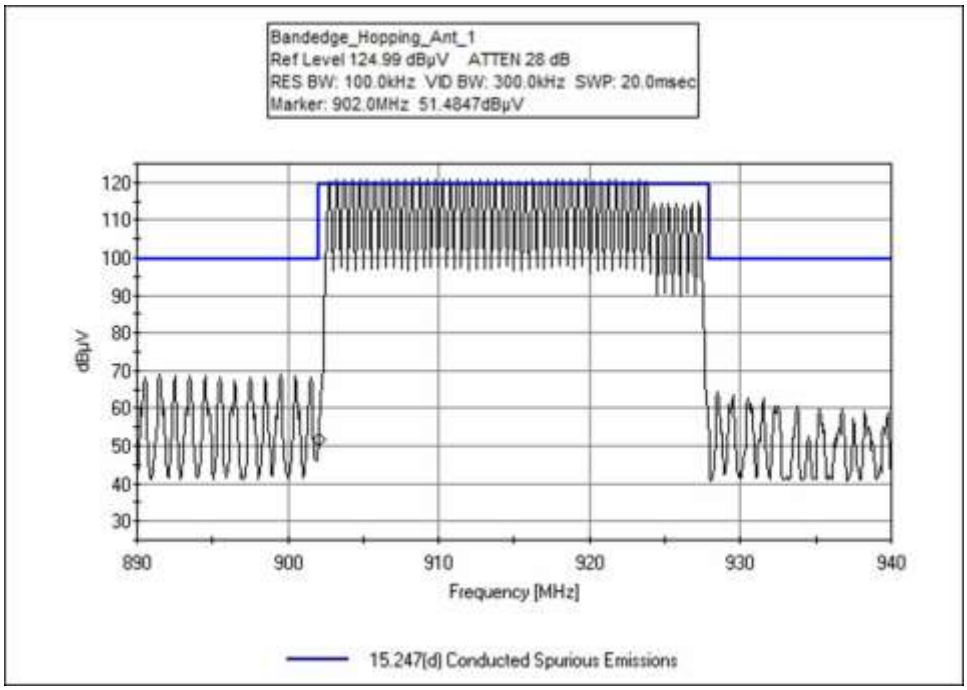

Bandedge_H_Ant_2
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 46.1137dBµV
120
110
100
90
80
70
60
50
40
30
dBµV
926
927
928
929
930
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

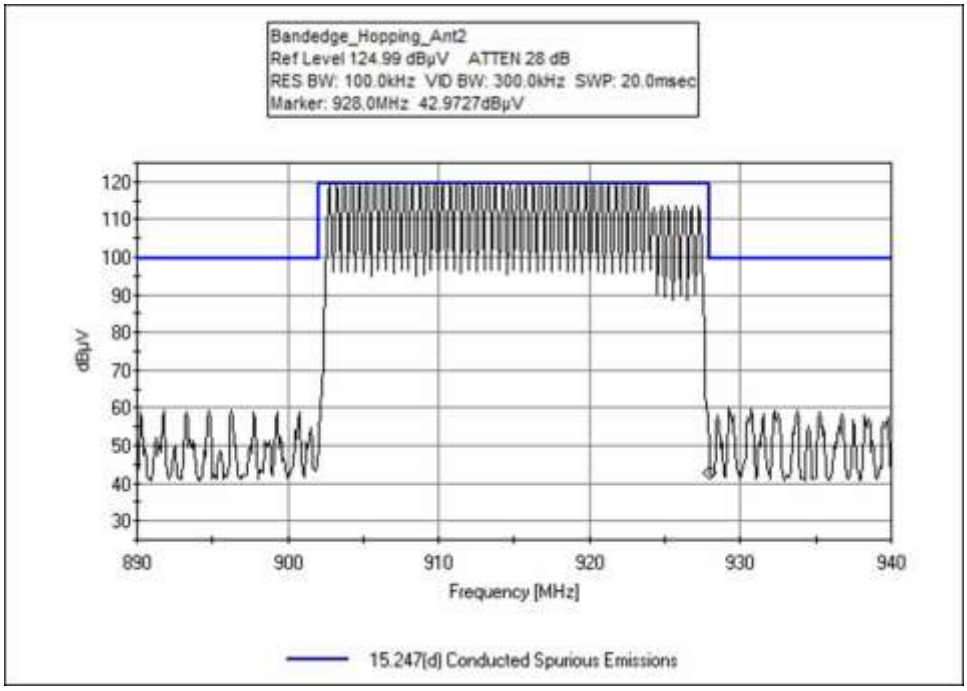

Bandedge_L_Ant_3
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 50.2147dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
900
901
902
903
904
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

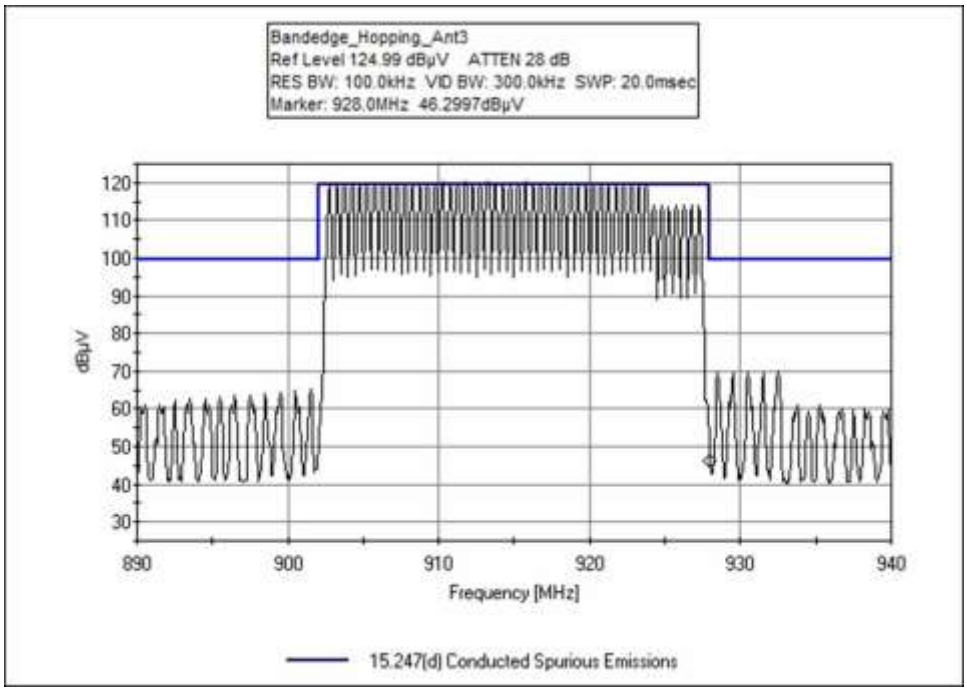

Bandedge_H_Ant_3
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 44.8847dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
926
927
928
929
930
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

Hopping


Bandedge_Hopping_Ant_0
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 50.7587dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
890
900
910
920
930
940
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


Bandedge_Hopping_Ant_1
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 51.4847dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
890
900
910
920
930
940
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


Bandedge_Hopping_Ant2
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 42.9727dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
890
900
910
920
930
940
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


Bandedge_Hopping_Ant3
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 46.2997dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
890
900
910
920
930
940
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**108261**	Date:	5/2/2023
Test Type:	**Conducted Emissions**	Time:	14:22:08
Tested By:	E. Wong	Sequence#:	23
Software:	EMITest 5.03.20		48VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The equipment under test (EUT) is set on a test bench .

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

TX 902.75MHz, 914.75MHz, 927.25MHz

LO Frequency = 915MHz

TARI = 6.25us as intended.

Firmware Version: 0.85.11

Worst case Antenna Pattern and associated power level evaluated.

Lowest Gain: Sector 135, 0 Power setting 29.1dBm

Site A
Test Method: ANSI C63.10 (2013)

Test Environment Conditions:
Temperature: 17°C
Relative Humidity: 47%
Pressure: 99.8kPa

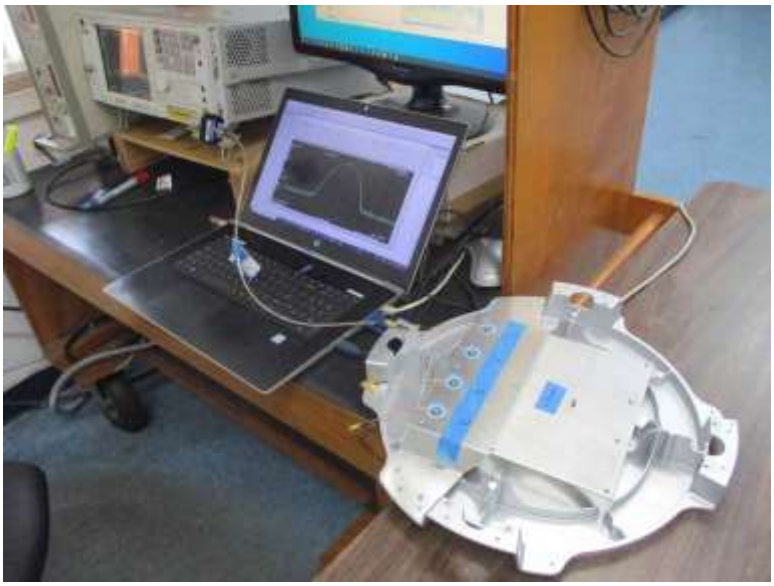
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T2	AN03430	Attenuator	75A-10-12	1/14/2022	1/14/2024
T3	ANP07658	Cable	32022-29094K-29094K-24TC	6/22/2022	6/22/2024

Measurement Data: Reading listed by margin. Test Lead: Antenna port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	54.9	+0.0	+10.1	+0.3		+0.0	65.3	110.4	-45.1	Anten Ant1_Bandedge_L
2	902.000M	53.7	+0.0	+10.1	+0.3		+0.0	64.1	110.0	-45.9	Anten Ant0_Bandedge_L
3	902.000M	52.7	+0.0	+10.1	+0.3		+0.0	63.1	110.4	-47.3	Anten Ant2_Bandedge_L
4	902.000M	52.0	+0.0	+10.1	+0.3		+0.0	62.4	110.0	-47.6	Anten Ant3_Bandedge_Hopping_L
5	928.000M	46.6	+0.0	+10.1	+0.3		+0.0	57.0	105.0	-48.0	Anten Ant1_Bandedge_H
6	902.000M	51.5	+0.0	+10.1	+0.3		+0.0	61.9	110.0	-48.1	Anten Ant1_Bandedge_Hopping_L
7	928.000M	46.1	+0.0	+10.1	+0.3		+0.0	56.5	105.0	-48.5	Anten Ant2_Bandedge_H
8	902.000M	50.8	+0.0	+10.1	+0.3		+0.0	61.2	110.0	-48.8	Anten Ant0_Bandedge_Hopping_L
9	902.000M	50.2	+0.0	+10.1	+0.3		+0.0	60.6	109.4	-48.8	Anten Ant3_Bandedge_L
10	928.000M	45.4	+0.0	+10.1	+0.3		+0.0	55.8	105.0	-49.2	Anten Ant0_Bandedge_H
11	902.000M	50.0	+0.0	+10.1	+0.3		+0.0	60.4	110.0	-49.6	Anten Ant2_Bandedge_Hopping_L
12	928.000M	43.8	+0.0	+10.1	+0.3		+0.0	54.2	105.0	-50.8	Anten An3_Bandedge_H
13	928.000M	46.3	+0.0	+10.1	+0.3		+0.0	56.7	110.0	-53.3	Anten Ant3_Bandedge_Hopping_H
14	928.000M	46.3	+0.0	+10.1	+0.3		+0.0	56.7	110.0	-53.3	Anten Ant0_Bandedge_Hopping_H
15	928.000M	45.3	+0.0	+10.1	+0.3		+0.0	55.7	110.0	-54.3	Anten Ant2_Bandedge_Hopping_H
16	928.000M	43.5	+0.0	+10.1	+0.3		+0.0	53.9	110.0	-56.1	Anten Ant1_Bandedge_Hopping_H

Test Setup Photo(s)



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.247(d) / 15.209/ 15.205 Radiated Spurious Emissions**		
Work Order #:	**108261**	Date:	4/28/2023
Test Type:	**Maximized Emissions**	Time:	16:09:46
Tested By:	E. Wong	Sequence#:	20
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is set on a Styrofoam tabletop in the maximized emission orientation.

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

TX 902.75MHz, 914.75MHz, 927.25MHz

TARI = 6.25us as intended.

Firmware Version: 0.85.11

Frequency Range of Measurement: 9kHz-1GHz.
9 kH -150 kHz; RBW=200 Hz, VBW=600 Hz;
150 kHz-30 MHz; RBW=9 kHz, VBW=27 kHz;
30 MHz-1000 MHz; RBW=120 kHz, VBW=360 kHz,

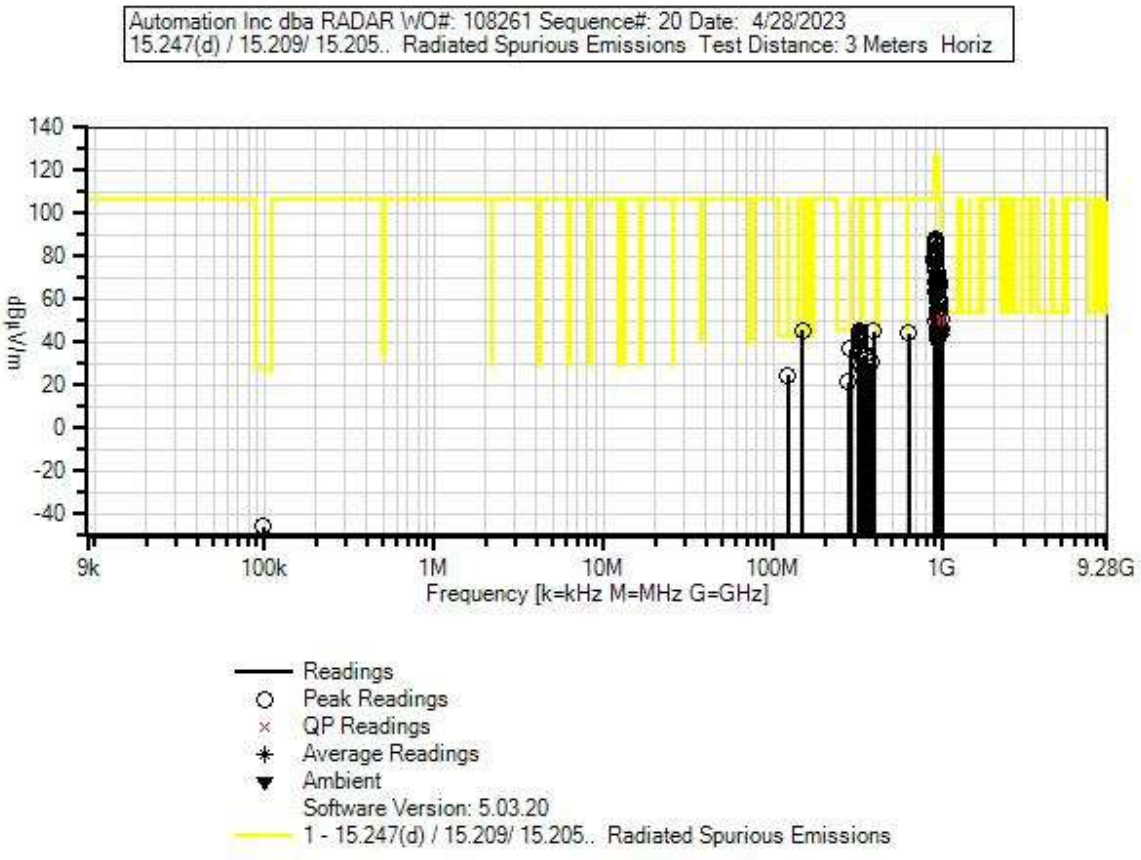
Two Antenna Pattern and associated power level evaluated.

Lowest Gain: Sector 135, 0 Power setting 29.1dBm
Highest Gain: Sector 180, 0 Power setting 21.4 dBm

Site A
Test Method: ANSI C63.10 (2013)

Test Environment Conditions:
Temperature: 20°C
Relative Humidity: 60%
Pressure: 98.9kPa

Additional evaluation performed with the EUT lay flat on the Styrofoam. Worst case emission presented.
No emission detected in the frequency range of 9kHz-30MHz.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T2	AN00851	Biconilog Antenna	CBL6111C	4/21/2022	4/21/2024
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/31/2022	12/31/2024
T4	AN00309	Preamp	8447D	12/13/2021	12/13/2023
T5	ANP05050	Cable	RG223/U	12/31/2022	12/31/2024
T6	AN00314	Loop Antenna	6502	3/29/2022	3/29/2024

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	987.740M QP	14.1	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	51.4	54.0 HighGain_L	-2.6	Vert
2	976.245M QP	13.7	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	51.3	54.0 LowGain_H	-2.7	Horiz
3	976.245M QP	13.3	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	50.9	54.0 LowGain_H	-3.1	Vert
4	976.257M QP	13.2	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	50.8	54.0 HighGain_H	-3.2	Vert
^	976.245M	16.0	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	53.6	54.0 LowGain_H	-0.4	Vert
^	976.257M	15.9	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	53.5	54.0 HighGain_H	-0.5	Vert
^	976.250M	12.0	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	49.6	54.0 Lay_Flat_LowGain_H	-4.4	Vert
^	976.250M	11.8	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	49.4	54.0 Lay_Flat_HighGain_H	-4.6	Vert
9	987.000M	13.4	+0.0 +0.0	+31.2 +0.0	+6.2	+0.0	+0.0	50.8	54.0 Lay_Flat_HighGain_H	-3.2	Vert
10	987.740M QP	13.0	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	50.3	54.0 HighGain_L	-3.7	Horiz
11	987.723M QP	12.8	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	50.1	54.0 LowGain_L	-3.9	Vert
^	987.723M	17.1	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	54.4	54.0 LowGain_L	+0.4	Vert
^	987.740M	16.8	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	54.1	54.0 HighGain_L	+0.1	Vert
^	987.740M	13.3	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	50.6	54.0 Lay_Flat_LowGain_L	-3.4	Vert
15	987.740M QP	9.9	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	47.2	54.0 Lay_Flat_LowGain_L	-6.8	Horiz
16	976.242M Ave	8.4	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	46.0	54.0 HighGain_H	-8.0	Horiz
^	976.245M	17.1	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	54.7	54.0 LowGain_H	+0.7	Horiz
^	976.242M	16.8	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	54.4	54.0 HighGain_H	+0.4	Horiz
^	976.250M	13.4	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	51.0	54.0 Lay_Flat_HighGain_H	-3.0	Horiz
^	976.250M	12.9	+0.0 +0.0	+31.4 +0.0	+6.2	+0.0	+0.0	50.5	54.0 Lay_Flat_LowGain_H	-3.5	Horiz

21	976.420M	35.2	+0.0 +0.5	+31.4 +0.0	+6.2	-27.4	+0.0	45.9	54.0 LowGain_H	-8.1	Horiz
22	281.967M	42.9	+0.0 +0.3	+18.9 +0.0	+3.0	-27.9	+0.0	37.2	46.0 LowGain_L	-8.8	Vert
23	987.753M Ave	6.0	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	43.3	54.0 LowGain_L	-10.7	Horiz
^	987.740M	16.8	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	54.1	54.0 HighGain_L	+0.1	Horiz
^	987.753M	15.9	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	53.2	54.0 LowGain_L	-0.8	Horiz
^	987.740M	14.7	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	52.0	54.0 Lay_Flat_LowGain_L	-2.0	Horiz
^	987.740M	12.7	+0.0 +0.0	+31.1 +0.0	+6.2	+0.0	+0.0	50.0	54.0 Lay_Flat_HighGain_H	-4.0	Horiz
28	334.100M	33.5	+0.0 +0.3	+20.0 +0.0	+3.3	-27.9	+0.0	29.2	46.0 LowGain_L	-16.8	Vert
29	275.020M	27.4	+0.0 +0.3	+18.7 +0.0	+3.0	-27.9	+0.0	21.5	46.0 LowGain_L	-24.5	Vert
30	890.500M	70.9	+0.0 +0.5	+29.4 +0.0	+5.8	-27.3	+0.0	79.3	106.8 HighGain_L	-27.5	Horiz
31	890.480M	69.7	+0.0 +0.5	+29.4 +0.0	+5.8	-27.3	+0.0	78.1	106.8 HighGain_L	-28.7	Vert
32	939.420M	61.1	+0.0 +0.5	+30.8 +0.0	+6.0	-27.3	+0.0	71.1	106.8 LowGain_H	-35.7	Horiz
33	939.300M	59.9	+0.0 +0.5	+30.8 +0.0	+6.0	-27.3	+0.0	69.9	106.8 LayFlat_LowGain_H	-36.9	Horiz
34	952.000M	58.2	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	68.5	106.8 HighGain_H	-38.3	Horiz
35	915.000M	79.4	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	88.4	126.8 LowGain_L	-38.4	Horiz
36	914.980M	79.0	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	88.0	126.8 HighGain_L	-38.8	Vert
37	915.000M	78.8	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	87.8	126.8 HighGain_L	-39.0	Horiz
38	915.000M	78.6	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	87.6	126.8 LowGain_L	-39.2	Vert
39	939.500M	57.1	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	67.2	106.8 HighGain_H	-39.6	Horiz
40	915.000M	78.1	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	87.1	126.8 LayFlat_LowGain_L	-39.7	Horiz
41	939.500M	56.7	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	66.8	106.8 LayFlat_HighGain_H	-40.0	Horiz
42	939.510M	56.5	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	66.6	106.8 HighGain_H	-40.2	Vert
43	951.670M	56.3	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	66.6	106.8 LowGain_L	-40.2	Vert

44	915.000M	77.5	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	86.5	126.8 HighGain_H	-40.3	Horiz
45	939.500M	56.0	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	66.1	106.8 LayFlat_HighGain_H	-40.7	Vert
46	915.000M	76.2	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	85.2	126.8 LayFlat_HighGain_L	-41.6	Horiz
47	915.080M	74.8	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	83.8	126.8 LowGain_H	-43.0	Horiz
48	939.380M	53.2	+0.0 +0.5	+30.8 +0.0	+6.0	-27.3	+0.0	63.2	106.8 LayFlat_LowGain_H	-43.6	Vert
49	915.000M	73.9	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	82.9	126.8 LayFlat_HighGain_H	-43.9	Horiz
50	915.010M	73.9	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	82.9	126.8 HighGain_H	-43.9	Vert
51	915.000M	72.9	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	81.9	126.8 LowGain_H	-44.9	Vert
52	915.000M	72.4	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	81.4	126.8 LayFlat_LowGain_L	-45.4	Vert
53	951.750M	49.6	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	59.9	106.8 LowGain_H	-46.9	Horiz
54	939.500M	49.6	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	59.7	106.8 LowGain_L	-47.1	Vert
55	951.700M	49.1	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	59.4	106.8 LayFlat_HighGain_L	-47.4	Horiz
56	939.500M	48.6	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	58.7	106.8 LowGain_H	-48.1	Horiz
57	915.000M	69.1	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	78.1	126.8 LayFlat_HighGain_L	-48.7	Vert
58	951.670M	46.2	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	56.5	106.8 LayFlat_LowGain_L	-50.3	Vert
59	951.650M	46.2	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	56.5	106.8 HighGain_L	-50.3	Vert
60	951.670M	46.0	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	56.3	106.8 LayFlat_HighGain_L	-50.5	Vert
61	939.500M	45.5	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	55.6	106.8 HighGain_L	-51.2	Horiz
62	915.000M	66.4	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	75.4	126.8 LayFlat_LowGain_H	-51.4	Horiz
63	915.000M	66.4	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	75.4	126.8 LayFlat_HighGain_H	-51.4	Vert

64	951.850M	44.6	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	54.9	106.8 HighGain_H	-51.9	Vert
65	902.830M	65.7	+0.0 +0.5	+29.5 +0.0	+5.8	-27.3	+0.0	74.2	126.8 HighGain_H	-52.6	Horiz
66	915.050M	64.7	+0.0 +0.5	+29.9 +0.0	+5.9	-27.3	+0.0	73.7	126.8 LayFlat_LowGain_H	-53.1	Vert
67	951.670M	43.4	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	53.7	106.8 HighGain_L	-53.1	Horiz
68	902.830M	65.2	+0.0 +0.5	+29.5 +0.0	+5.8	-27.3	+0.0	73.7	126.8 LayFlat_HighGain_H	-53.1	Horiz
69	927.330M	63.5	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	73.0	126.8 LowGain_L	-53.8	Vert
70	939.420M	42.6	+0.0 +0.5	+30.8 +0.0	+6.0	-27.3	+0.0	52.6	106.8 LowGain_L	-54.2	Horiz
71	929.300M	42.4	+0.0 +0.5	+30.6 +0.0	+5.9	-27.3	+0.0	52.1	106.8 LayFlat_HighGain_M	-54.7	Horiz
72	927.300M	61.7	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	71.2	126.8 LayFlat_LowGain_L	-55.6	Horiz
73	927.300M	60.3	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	69.8	126.8 LayFlat_HighGain_L	-57.0	Horiz
74	902.680M	59.9	+0.0 +0.5	+29.5 +0.0	+5.8	-27.3	+0.0	68.4	126.8 HighGain_H	-58.4	Vert
75	927.170M	58.5	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	68.0	126.8 LayFlat_LowGain_L	-58.8	Vert
76	941.000M	36.9	+0.0 +0.5	+30.9 +0.0	+6.0	-27.3	+0.0	47.0	106.8 LayFlat_LowGain_M	-59.8	Vert
77	927.250M	57.1	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	66.6	126.8 LowGain_L	-60.2	Horiz
78	147.820M	54.2	+0.0 +0.2	+17.3 +0.0	+2.1	-28.0	+0.0	45.8	106.8 LowGain_L	-61.0	Vert
79	931.300M	35.8	+0.0 +0.5	+30.6 +0.0	+5.9	-27.3	+0.0	45.5	106.8 LayFlat_HighGain_M	-61.3	Vert
80	320.000M	50.1	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	45.4	106.8 LayFlat_LowGain_H	-61.4	Horiz
81	389.870M	47.6	+0.0 +0.3	+21.4 +0.0	+3.6	-27.9	+0.0	45.0	106.8 LowGain_M	-61.8	Vert
82	320.000M	49.7	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	45.0	106.8 LayFlat_HighGain_M	-61.8	Horiz
83	320.017M	49.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	44.9	106.8 LayFlat_HighGain_H	-61.9	Horiz

84	927.330M	55.4	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	64.9	126.8 HighGain_L	-61.9	Horiz
85	625.000M	39.8	+0.0 +0.4	+26.9 +0.0	+4.7	-27.4	+0.0	44.4	106.8 LowGain_M	-62.4	Horiz
86	949.000M	33.9	+0.0 +0.5	+31.0 +0.0	+6.0	-27.3	+0.0	44.1	106.8 LowGain_M	-62.7	Horiz
87	929.730M	34.3	+0.0 +0.5	+30.6 +0.0	+5.9	-27.3	+0.0	44.0	106.8 LowGain_M	-62.8	Vert
88	949.970M	33.7	+0.0 +0.5	+31.1 +0.0	+6.0	-27.3	+0.0	44.0	106.8 LowGain_M	-62.8	Vert
89	320.000M	48.4	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	43.7	106.8 LayFlat_HighGain_H	-63.1	Vert
90	320.000M	48.2	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	43.5	106.8 LayFlat_HighGain_M	-63.3	Vert
91	934.170M	33.5	+0.0 +0.5	+30.7 +0.0	+5.9	-27.3	+0.0	43.3	106.8 LayFlat_LowGain_M	-63.5	Horiz
92	904.030M	54.8	+0.0 +0.5	+29.5 +0.0	+5.8	-27.3	+0.0	63.3	126.8 LowGain_M	-63.5	Vert
93	320.000M	47.8	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	43.1	106.8 LowGain_M	-63.7	Vert
94	320.000M	47.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	42.9	106.8 LayFlat_LowGain_L	-63.9	Horiz
95	320.000M	47.5	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	42.8	106.8 LayFlat_LowGain_L	-64.0	Vert
96	319.967M	47.3	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	42.6	106.8 LowGain_L	-64.2	Vert
97	319.983M	46.9	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	42.2	106.8 HighGain_L	-64.6	Vert
98	320.000M	46.7	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	42.0	106.8 LayFlat_LowGain_H	-64.8	Vert
99	320.000M	46.5	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	41.8	106.8 LayFlat_LowGain_M	-65.0	Horiz
100	320.000M	46.4	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	41.7	106.8 LayFlat_HighGain_L	-65.1	Vert
101	929.670M	32.0	+0.0 +0.5	+30.6 +0.0	+5.9	-27.3	+0.0	41.7	106.8 LowGain_M	-65.1	Horiz
102	320.000M	45.8	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	41.1	106.8 LayFlat_LowGain_M	-65.7	Vert
103	320.100M	45.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	40.9	106.8 HighGain_H	-65.9	Vert
104	320.000M	45.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	40.9	106.8 HighGain_H	-65.9	Horiz

105	320.000M	44.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	39.9	106.8 HighGain_L	-66.9	Horiz
106	319.920M	42.9	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	38.2	106.8 LowGain_H	-68.6	Horiz
107	320.000M	42.6	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	37.9	106.8 LayFlat_HighGain_L	-68.9	Horiz
108	319.920M	39.7	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	35.0	106.8 HighGain_M	-71.8	Horiz
109	346.500M	38.1	+0.0 +0.3	+20.6 +0.0	+3.4	-27.9	+0.0	34.5	106.8 LowGain_L	-72.3	Vert
110	927.170M	44.5	+0.0 +0.5	+30.4 +0.0	+5.9	-27.3	+0.0	54.0	126.8 HighGain_M	-72.8	Vert
111	98.300k	25.0	+0.0 +0.0	+0.0 +9.4	+0.1	+0.0	-80.0	-45.5	27.8 LowGain_M	-73.3	Paral
112	354.470M	36.3	+0.0 +0.3	+20.7 +0.0	+3.4	-27.9	+0.0	32.8	106.8 LowGain_M	-74.0	Vert
113	320.170M	36.0	+0.0 +0.3	+19.7 +0.0	+3.2	-27.9	+0.0	31.3	106.8 LowGain_H	-75.5	Vert
114	375.070M	33.5	+0.0 +0.3	+21.2 +0.0	+3.6	-27.9	+0.0	30.7	106.8 LowGain_L	-76.1	Vert
115	904.080M	41.6	+0.0 +0.5	+29.5 +0.0	+5.8	-27.3	+0.0	50.1	126.8 HighGain_M	-76.7	Horiz
116	122.183M	33.0	+0.0 +0.1	+17.8 +0.0	+1.9	-28.0	+0.0	24.8	106.8 LowGain_L	-82.0	Vert
117	129.790k	17.3	+0.0 +0.0	+0.0 +9.3	+0.1	+0.0	-80.0	-53.3	106.8 HighGain_M	-160.1	Horiz

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.247(d) / 15.209/ 15.205. Radiated Spurious Emissions**		
Work Order #:	**108261**	Date:	5/1/2023
Test Type:	**Maximized Emissions**	Time:	13:50:43
Tested By:	E. Wong	Sequence#:	22
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is set on a Styrofoam tabletop in the maximized emission orientation.

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

TX 902.75MHz, 914.75MHz, 927.25MHz

LO Frequency = 915MHz

TARI = 6.25us as intended.

Firmware Version: 0.85.11

Frequency Range of Measurement: 1-10GHz.
1000 MHz-10000 MHz; RBW=1MHz,VBW=3 MHz

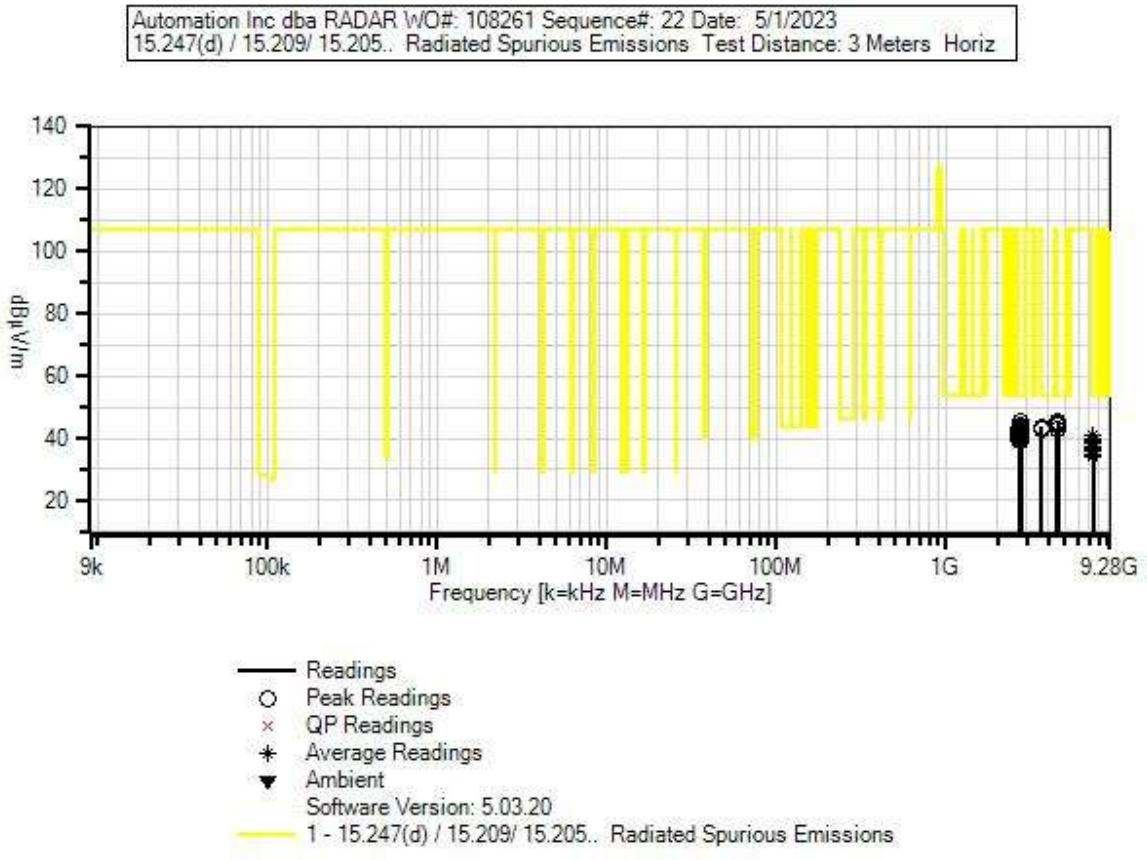
Two Antenna Pattern and associated power level evaluated.

Lowest Gain: Sector 135, 0 Power setting 29.1dBm
Highest Gain: Sector 180, 0 Power setting 21.4dBm

Site A
Test Method: ANSI C63.10 (2013)

Test Environment Conditions:
Temperature: 20°C
Relative Humidity: 60%
Pressure: 98.9kPa

Additional evaluation performed with the EUT lay flat on the Styrofoam. Worst case emission presented.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T2	AN00849	Horn Antenna	3115	3/21/2022	3/21/2024
T3	ANP07658	Cable	32022-29094K-29094K-24TC	6/22/2022	6/22/2024
T4	AN00786	Preamp	83017A	5/23/2022	5/23/2024
T5	ANP06360	Cable	L1-PNMNM-48	9/30/2021	9/30/2023
T6	AN03169	High Pass Filter	HM1155-11SS	5/10/2021	5/10/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4575.000M	45.1	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	45.6	54.0 HiGain_L_Harmonics of LO	-8.4	Horiz
2	4574.950M	44.9	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	45.4	54.0 LayFlat_HiGain_M_Harmonics of LO	-8.6	Vert
3	2745.000M	50.0	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	45.1	54.0 LayFlat_HiGain_M_Harmonics of LO	-8.9	Vert
4	4575.000M	44.4	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	44.9	54.0 LowGain_L_Harmonics of LO	-9.1	Vert
5	4575.000M	44.3	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	44.8	54.0 LayFlat_LowGain_L_Harmonics of LO	-9.2	Vert
6	4575.000M	44.2	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	44.7	54.0 LowGain_L_Harmonics of LO	-9.3	Horiz
7	4575.000M	44.1	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	44.6	54.0 HiGain_M_Harmonics of LO	-9.4	Horiz
8	4575.000M	43.9	+0.0 +4.6	+32.3 +0.3	+0.7	-37.4	+0.0	44.4	54.0 LayFlat_HiGain_L_Harmonics of LO	-9.6	Vert
9	2745.000M	48.8	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.9	54.0 LayFlat_LowGain_M_Harmonics of LO	-10.1	Vert
10	2745.000M	48.8	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.9	54.0 LayFlat_LowGain_M_Harmonics of LO	-10.1	Vert
11	3660.000M	45.1	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	43.7	54.0 HiGain_M_Harmonics of LO	-10.3	Horiz
12	2744.250M	48.5	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.6	54.0 LayFlat_LowGain_M	-10.4	Vert
13	2745.000M	48.4	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.5	54.0 LayFlat_LowGain_L_Harmonics of LO	-10.5	Vert
14	3660.000M	44.8	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	43.4	54.0 HiGain_H_Harmonics of LO	-10.6	Horiz
15	3660.000M	44.6	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	43.2	54.0 LowGain_H_Harmonics of LO	-10.8	Horiz

16	2745.000M	48.0	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.1	54.0	-10.9	Vert LowGain_L_Harmonics of LO
17	3660.000M	44.5	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	43.1	54.0	-10.9	Vert LayFlat_HiGain_H_Harmonics of LO
18	2745.000M	47.9	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.0	54.0	-11.0	Vert LayFlat_HiGain_H_Harmonics of LO
19	3659.950M	44.3	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	42.9	54.0	-11.1	Vert LayFlat_HiGain_M_Harmonics of LO
20	2708.250M	47.9	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	42.9	54.0	-11.1	Horiz LowGain_L
21	3660.000M	44.3	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	42.9	54.0	-11.1	Horiz LowGain_M_Harmonics of LO
22	3660.000M	44.0	+0.0 +4.0	+31.5 +0.4	+0.6	-37.9	+0.0	42.6	54.0	-11.4	Vert LowGain_M_Harmonics of LO
23	4513.583M	42.3	+0.0 +4.5	+32.2 +0.3	+0.7	-37.4	+0.0	42.6	54.0	-11.4	Vert LayFlat_LowGain_L
24	2745.000M	47.4	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.5	54.0	-11.5	Vert LayFlat_HiGain_L_Harmonics of LO
25	2745.000M	47.4	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.5	54.0	-11.5	Vert LowGain_M_Harmonics of LO
26	2745.000M	47.2	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.3	54.0	-11.7	Vert HiGain_M_Harmonics of LO
27	2744.600M	47.2	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.3	54.0	-11.7	Vert LowGain_M
28	2744.300M	47.1	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.2	54.0	-11.8	Vert LayFlat_HiGain_M
29	2745.000M	46.8	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.9	54.0	-12.1	Vert LowGain_H_Harmonics of LO
30	2745.000M	46.7	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.8	54.0	-12.2	Vert HiGain_L_Harmonics of LO
31	2708.250M	46.7	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	41.7	54.0	-12.3	Horiz HiGain_L
32	2781.850M	46.0	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	41.4	54.0	-12.6	Vert HiGain_H
33	2744.100M	46.2	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.3	54.0	-12.7	Horiz HiGain_M
34	2781.650M	45.8	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	41.2	54.0	-12.8	Horiz LayFlat_HiGain_H
35	2708.500M	46.1	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	41.1	54.0	-12.9	Vert LowGain_L

36	2708.150M	46.0	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	41.0	54.0	-13.0	Vert LayFlat_LowGain_L
37	7320.000M Ave	34.2	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	40.8	54.0	-13.2	LayFlat_HiGain_M_Harmonics of LO
38	2744.300M	45.6	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	40.7	54.0	-13.3	Horiz LowGain_M
39	2708.150M	45.7	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	40.7	54.0	-13.3	Vert HiGain_L
40	2781.750M	45.2	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.6	54.0	-13.4	Horiz LowGain_H
41	2781.700M	45.2	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.6	54.0	-13.4	Vert LowGain_H
42	2745.000M	45.5	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	40.6	54.0	-13.4	Vert HiGain_H_Harmonics of LO
43	2708.250M	45.5	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	40.5	54.0	-13.5	Vert LayFlat_HiGain_L
44	2781.700M	45.1	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.5	54.0	-13.5	Horiz LayFlat_LowGain_H
45	2781.850M	45.0	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.4	54.0	-13.6	Vert LayFlat_LowGain_H
46	2781.800M	45.0	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.4	54.0	-13.6	Horiz HiGain_H
47	2708.250M	45.4	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	40.4	54.0	-13.6	Horiz LayFlat_LowGain_L
48	2781.800M	45.0	+0.0 +3.5	+29.5 +0.3	+0.5	-38.4	+0.0	40.4	54.0	-13.6	Vert LayFlat_HiGain_H

49	2745.000M Ave	45.0	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	40.1	54.0	-13.9	Horiz LowGain_H_Harmonics of LO
^	2745.000M	50.9	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	46.0	54.0	-8.0	Horiz LowGain_L_Harmonics of LO
^	2745.000M	50.7	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	45.8	54.0	-8.2	Horiz LowGain_H_Harmonics of LO
^	2745.000M	50.1	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	45.2	54.0	-8.8	Horiz HiGain_H_Harmonics of LO
^	2745.000M	48.9	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	44.0	54.0	-10.0	Horiz HiGain_L_Harmonics of LO
^	2745.000M	48.3	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	43.4	54.0	-10.6	Horiz LowGain_M_Harmonics of LO
^	2745.000M	47.1	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	42.2	54.0	-11.8	Horiz HiGain_M_Harmonics of LO
^	2745.000M	46.4	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.5	54.0	-12.5	Horiz LayFlat_LowGain_M_Harmonics of LO
^	2745.000M	46.2	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.3	54.0	-12.7	Horiz LayFlat_LowGain_H_Harmonics of LO
^	2745.000M	46.0	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.1	54.0	-12.9	Horiz LayFlat_LowGain_L_Harmonics of LO
^	2745.067M	45.9	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	41.0	54.0	-13.0	Horiz LayFlat_HiGain_M_Harmonics of LO
^	2745.000M	45.7	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	40.8	54.0	-13.2	Horiz LayFlat_HiGain_L_Harmonics of LO
^	2745.000M	45.0	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	40.1	54.0	-13.9	Horiz LayFlat_HiGain_H_Harmonics of LO
62	2708.300M	45.0	+0.0 +3.4	+29.2 +0.3	+0.5	-38.4	+0.0	40.0	54.0	-14.0	Horiz LayFlat_HiGain_L
63	2744.250M	44.7	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	39.8	54.0	-14.2	Horiz LayFlat_LowGain_M
64	2744.250M	44.6	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	39.7	54.0	-14.3	Horiz LayFlat_HiGain_M
65	7320.000M Ave	33.0	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	39.6	54.0	-14.4	Vert LayFlat_HiGain_L_Harmonics of LO

66	2744.250M	44.1	+0.0 +3.4	+29.3 +0.3	+0.5	-38.4	+0.0	39.2	54.0	-14.8	Vert HiGain_M
67	7320.000M Ave	32.5	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	39.1	54.0	-14.9	Horiz LowGain_L_Harmonics of LO
68	7320.000M Ave	32.5	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	39.1	54.0	-14.9	Vert LayFlat_LowGain_M_Harmonics of LO
69	7320.000M Ave	32.3	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	38.9	54.0	-15.1	Horiz LowGain_H_Harmonics of LO
70	7320.000M Ave	32.2	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	38.8	54.0	-15.2	Horiz LowGain_M_Harmonics of LO
71	7320.000M Ave	31.9	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	38.5	54.0	-15.5	Horiz HiGain_M_Harmonics of LO
72	7320.000M Ave	30.8	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	37.4	54.0	-16.6	Vert LayFlat_HiGain_H_Harmonics of LO
73	7320.000M Ave	30.7	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	37.3	54.0	-16.7	Horiz HiGain_H_Harmonics of LO
74	7320.000M Ave	30.4	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	37.0	54.0	-17.0	Horiz HiGain_L_Harmonics of LO
75	7319.850M Ave	29.8	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	36.4	54.0	-17.6	Vert LayFlat_LowGain_M_Harmonics of LO
^	7319.850M	42.6	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.2	54.0	-4.8	Vert LayFlat_LowGain_M_Harmonics of LO

77	7320.000M Ave	29.3	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	35.9	54.0	-18.1 LayFlat_LowGain_L_Harmonics of LO	Vert
^	7320.000M	44.1	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	50.7	54.0	-3.3 LayFlat_LowGain_M_Harmonics of LO	Vert
^	7320.000M	43.6	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	50.2	54.0	-3.8 LayFlat_HiGain_M_Harmonics of LO	Vert
^	7320.000M	42.6	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.2	54.0	-4.8 LayFlat_HiGain_H_Harmonics of LO	Vert
^	7320.000M	42.0	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	48.6	54.0	-5.4 LayFlat_HiGain_L_Harmonics of LO	Vert
^	7320.000M	40.7	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	47.3	54.0	-6.7 LayFlat_LowGain_L_Harmonics of LO	Vert
83	7320.000M Ave	28.4	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	35.0	54.0	-19.0 LayFlat_LowGain_M_Harmonics of LO	Horiz
84	7320.000M Ave	27.9	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	34.5	54.0	-19.5 LayFlat_HiGain_M_Harmonics of LO	Horiz
85	7320.000M Ave	27.8	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	34.4	54.0	-19.6 LayFlat_HiGain_H_Harmonics of LO	Horiz

86	7320.000M Ave	27.7	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	34.3	54.0	-19.7	Horiz LayFlat_HiGain_L_ Harmonics of LO
^	7320.000M	43.0	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.6	54.0	-4.4	Horiz LowGain_H_Harm onics of LO
^	7320.000M	42.9	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.5	54.0	-4.5	Horiz HiGain_M_Harmon ics of LO
^	7320.000M	42.9	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.5	54.0	-4.5	Horiz LowGain_L_Harmo nics of LO
^	7320.000M	42.8	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.4	54.0	-4.6	Horiz HiGain_H_Harmon ics of LO
^	7320.000M	42.8	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.4	54.0	-4.6	Horiz LowGain_M_Harm onics of LO
^	7320.000M	42.5	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	49.1	54.0	-4.9	Horiz HiGain_L_Harmoni cs of LO
^	7320.000M	41.6	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	48.2	54.0	-5.8	Horiz LayFlat_LowGain_ M_Harmonics of LO
^	7320.000M	41.3	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	47.9	54.0	-6.1	Horiz LayFlat_HiGain_L_ Harmonics of LO
^	7320.000M	41.2	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	47.8	54.0	-6.2	Horiz LayFlat_HiGain_H _Harmonics of LO
^	7320.000M	41.1	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	47.7	54.0	-6.3	Horiz LayFlat_HiGain_M _Harmonics of LO
^	7320.000M	41.0	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	47.6	54.0	-6.4	Horiz LayFlat_LowGain_ H_Harmonics of LO
^	7320.000M	40.2	+0.0 +6.1	+36.3 +0.2	+0.9	-36.9	+0.0	46.8	54.0	-7.2	Horiz LayFlat_LowGain_ L_Harmonics of LO

Band Edge

Band Edge Summary: Low Gain Sector 135					
Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	PR-ASK	Integral	29.2	<46	Pass
902	PR-ASK	Integral	69.8	<106.8	Pass
928	PR-ASK	Integral	62.8	< 106.8	Pass
960	PR-ASK	Integral	43.1	<54	Pass

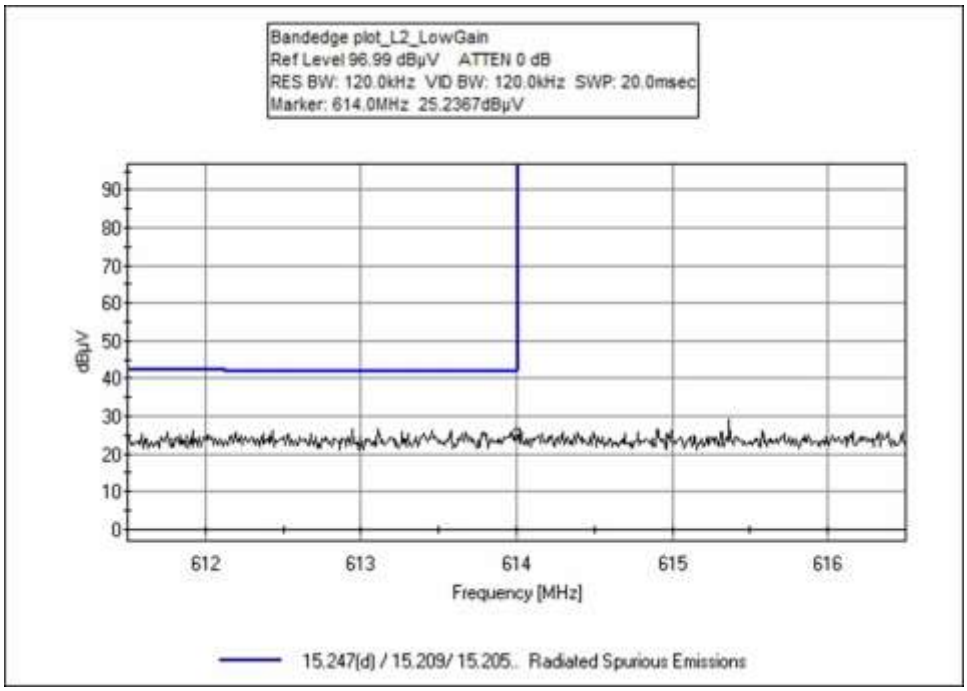
Band Edge Summary : Low Gain Sector 135					
Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	PR-ASK	Integral	32.3	<46	Pass
902	PR-ASK	Integral	69.7	< 106.8	Pass
928	PR-ASK	Integral	62.6	<106.8	Pass
960	PR-ASK	Integral	42.5	<54	Pass

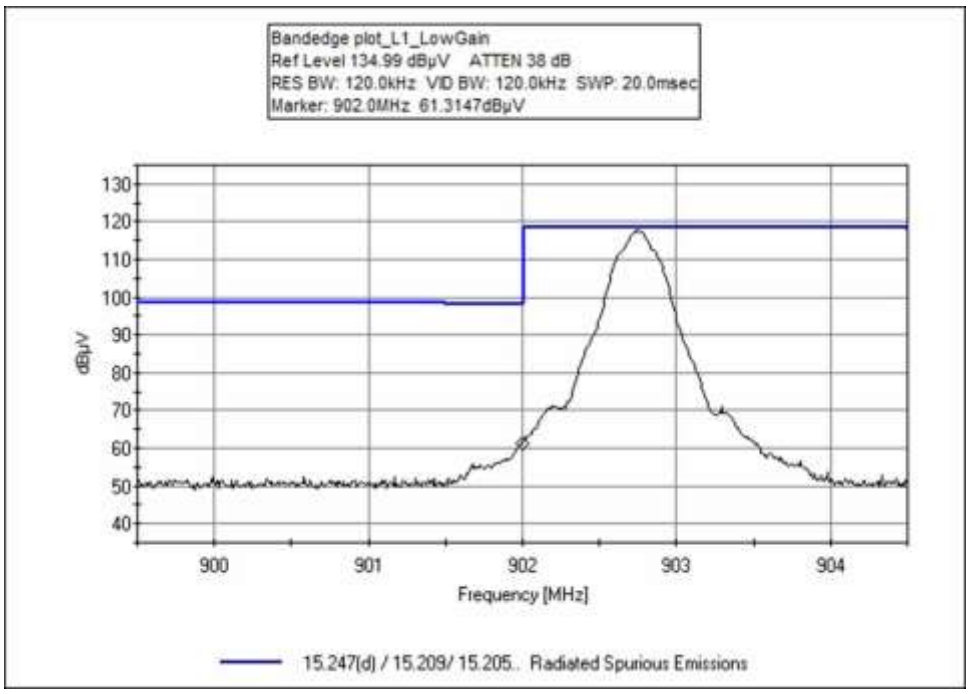
Band Edge Summary: High Gain Sector 180					
Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	PR-ASK	Integral	28.2	<46	Pass
902	PR-ASK	Integral	74.0	<106.8	Pass
928	PR-ASK	Integral	63.4	< 106.8	Pass
960	PR-ASK	Integral	38.2	<54	Pass

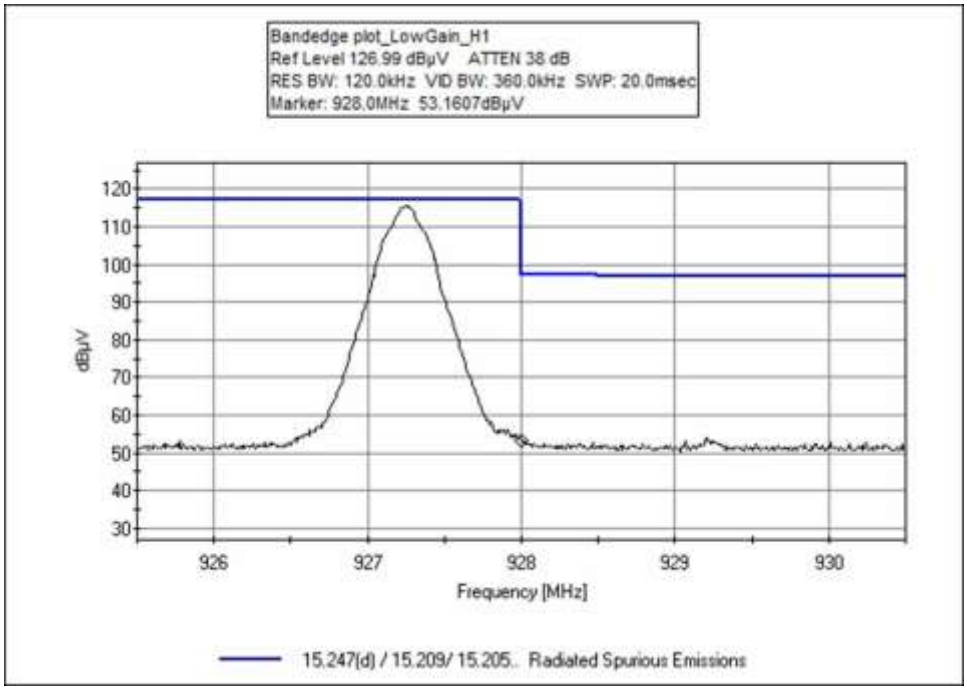
Band Edge Summary: High Gain Sector 180					
Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	PR-ASK	Integral	30.8	<46	Pass
902	PR-ASK	Integral	29.8	< 106.8	Pass
928	PR-ASK	Integral	61.9	<106.8	Pass
960	PR-ASK	Integral	40.9	<54	Pass

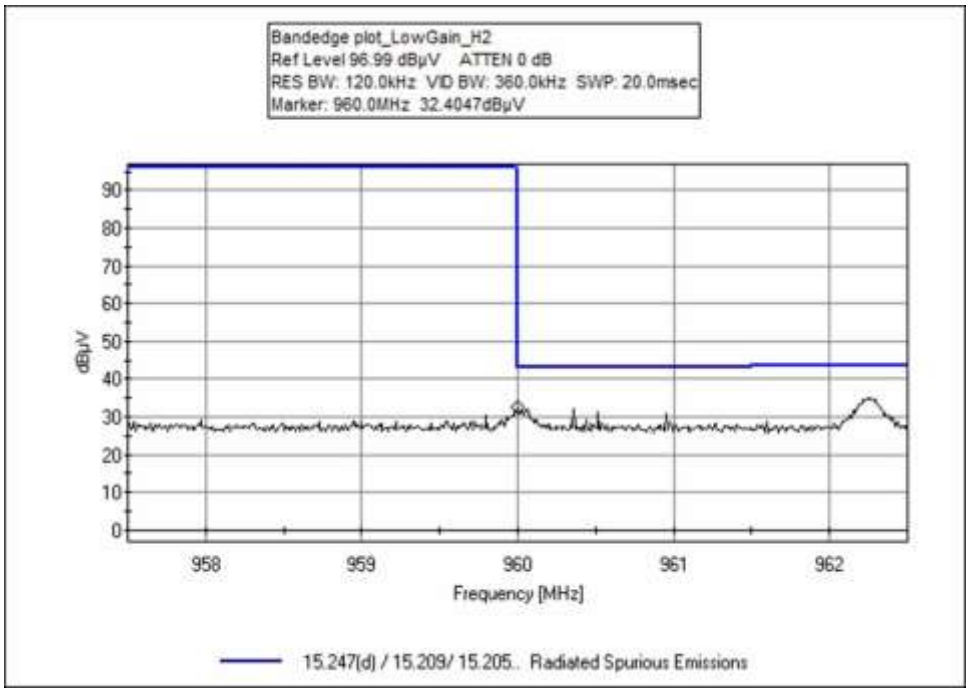
Band Edge Plots

Low Gain; Single Channel

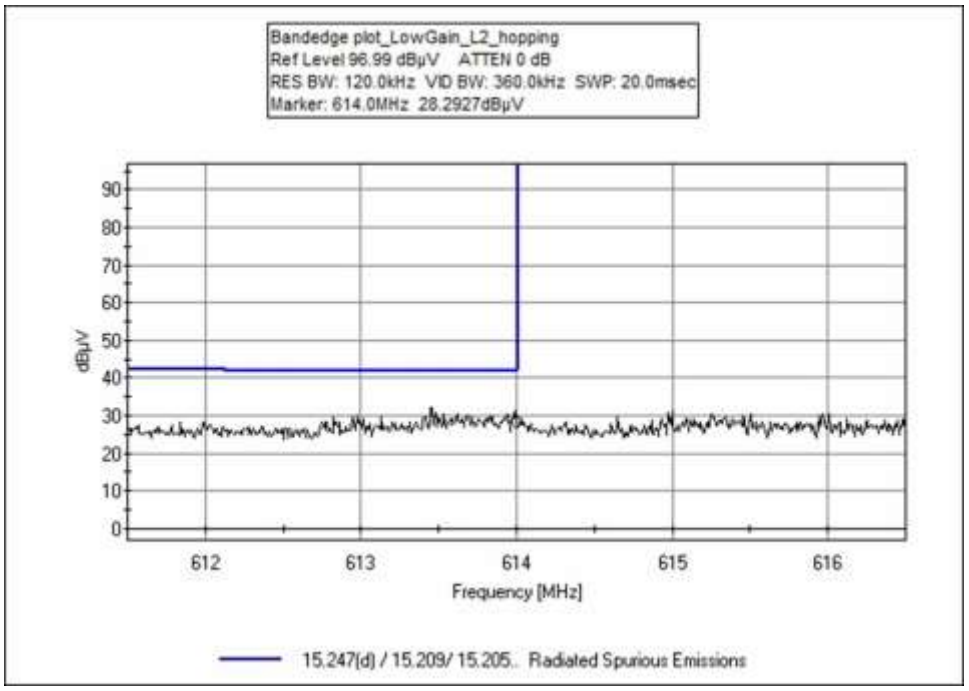


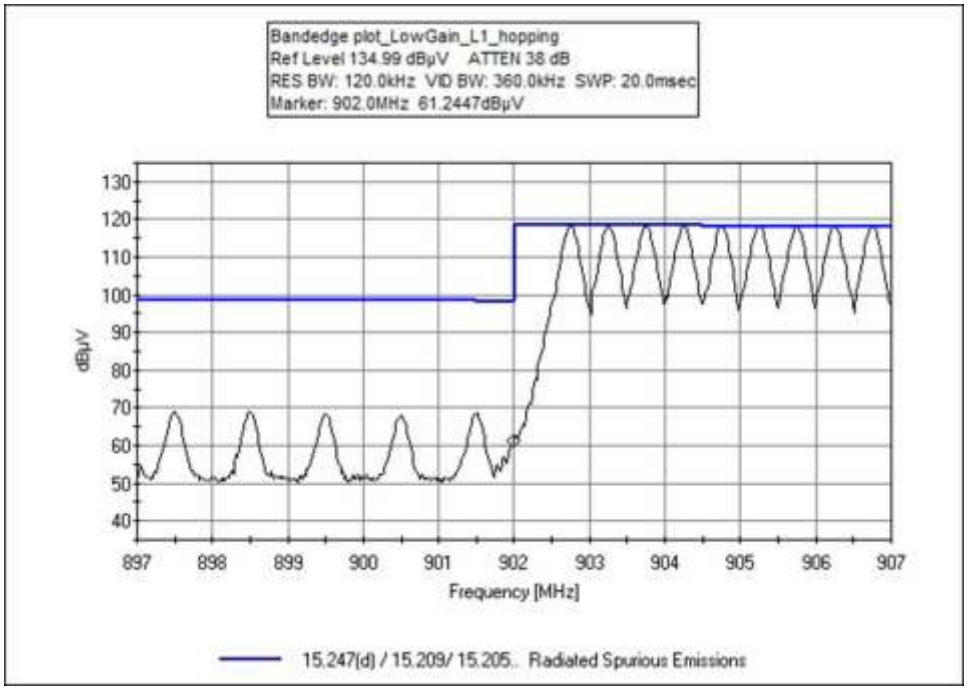


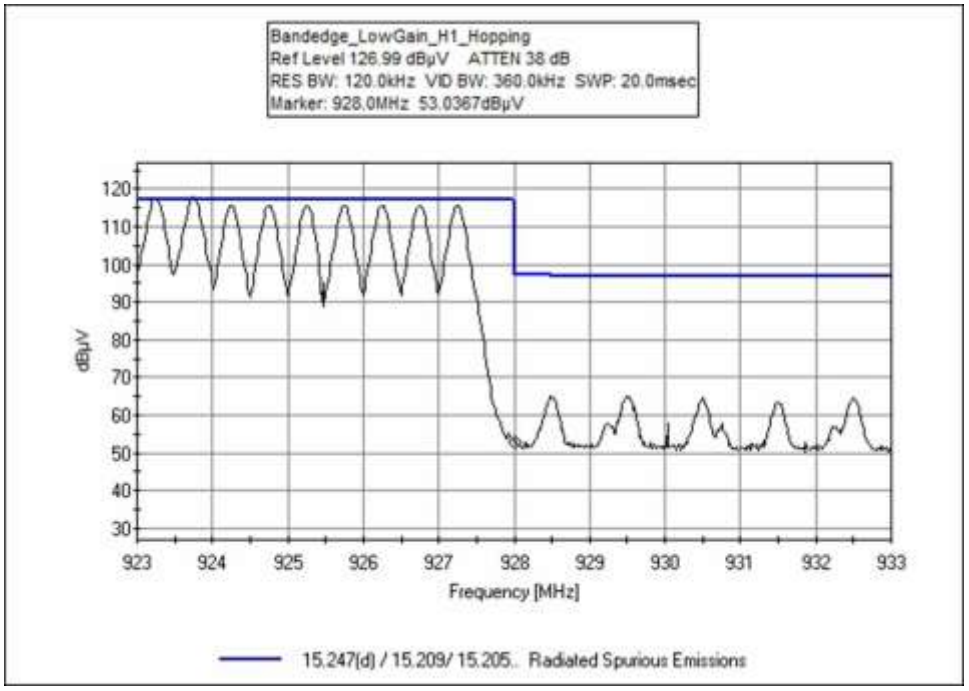

Bandedge plot_LowGain_H1
Ref Level 126.99 dBµV ATTEN 38 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 928.0MHz 53.1607dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
926
927
928
929
930
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

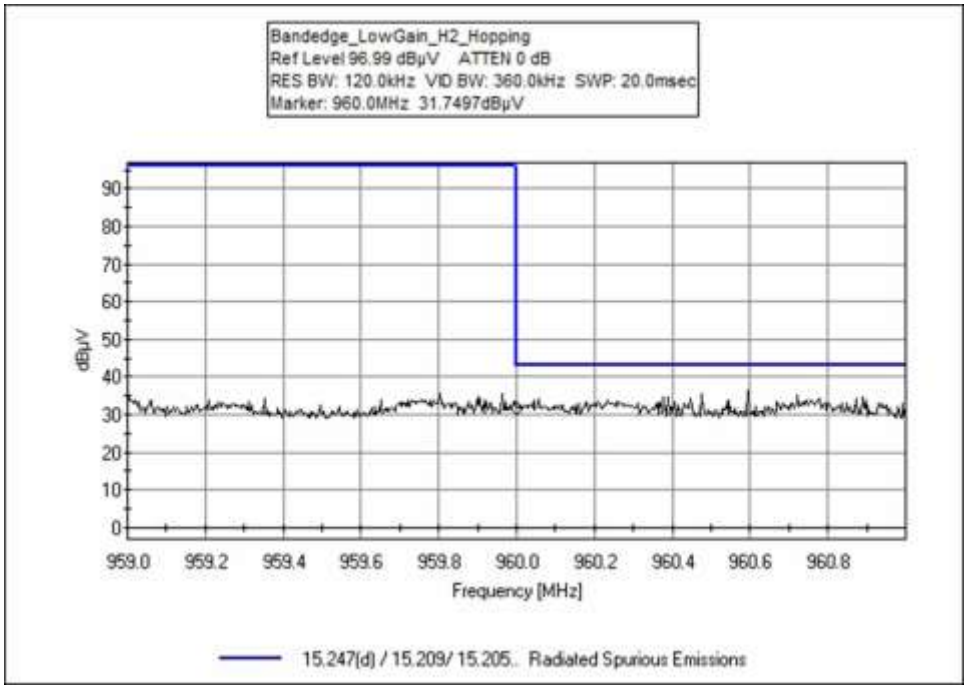

Bandedge plot_LowGain_H2
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 32.4047dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
958
959
960
961
962
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

Low Gain; Hopping

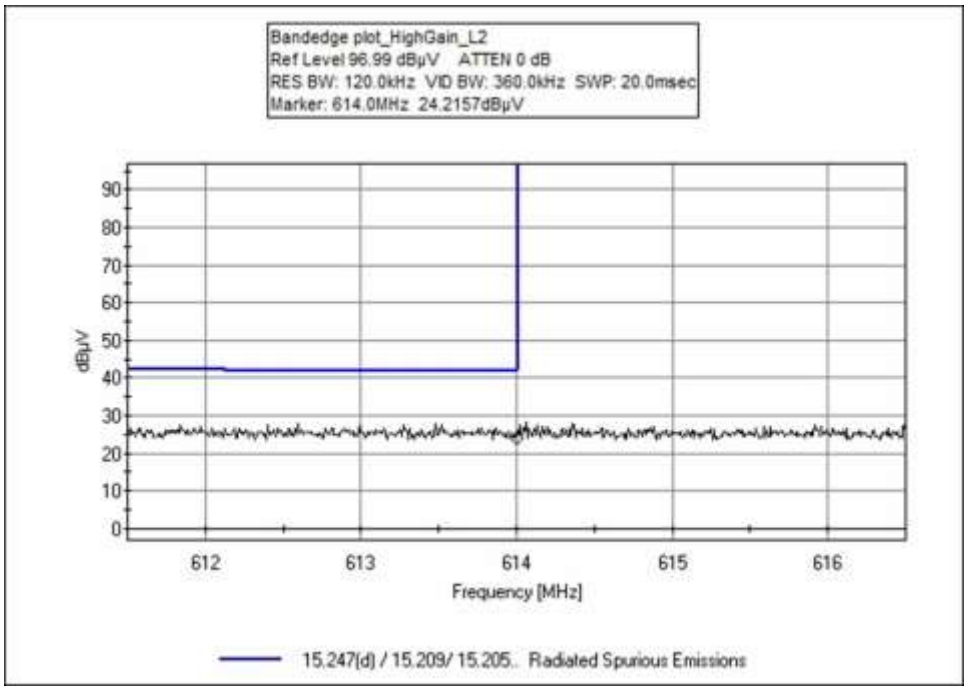


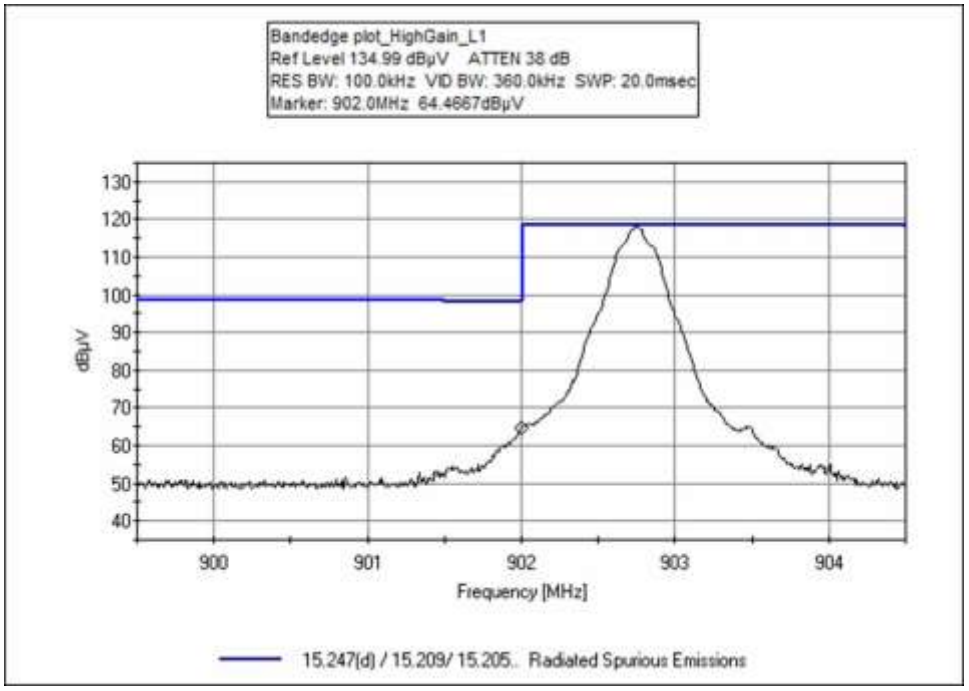


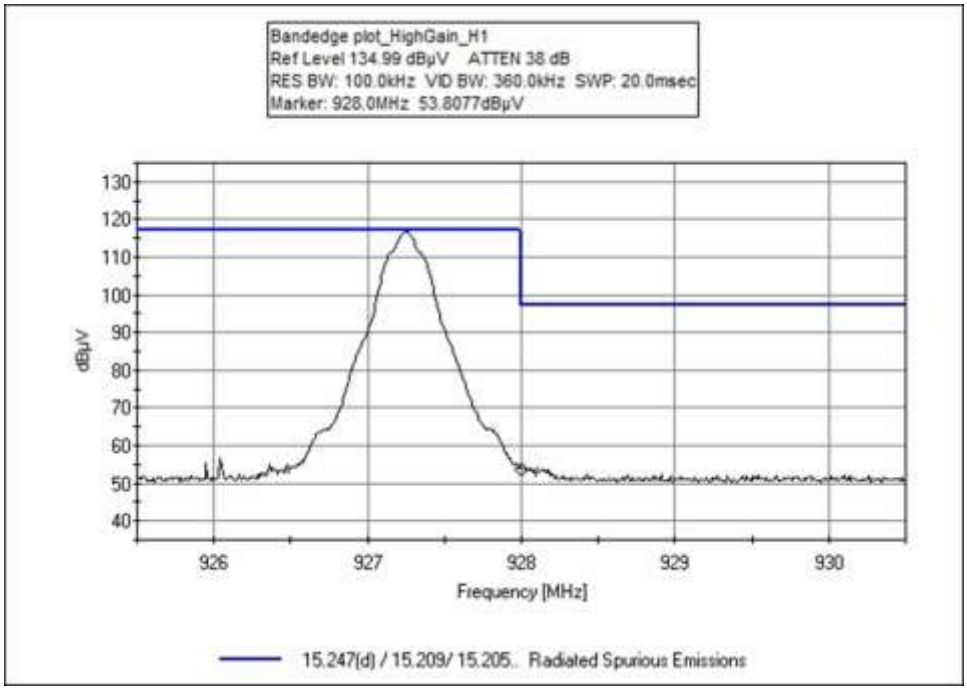

Bandedge_LowGain_H1_Hopping
Ref Level 126.99 dBµV ATTEN 38 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 928.0MHz 53.0367dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
923
924
925
926
927
928
929
930
931
932
933
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

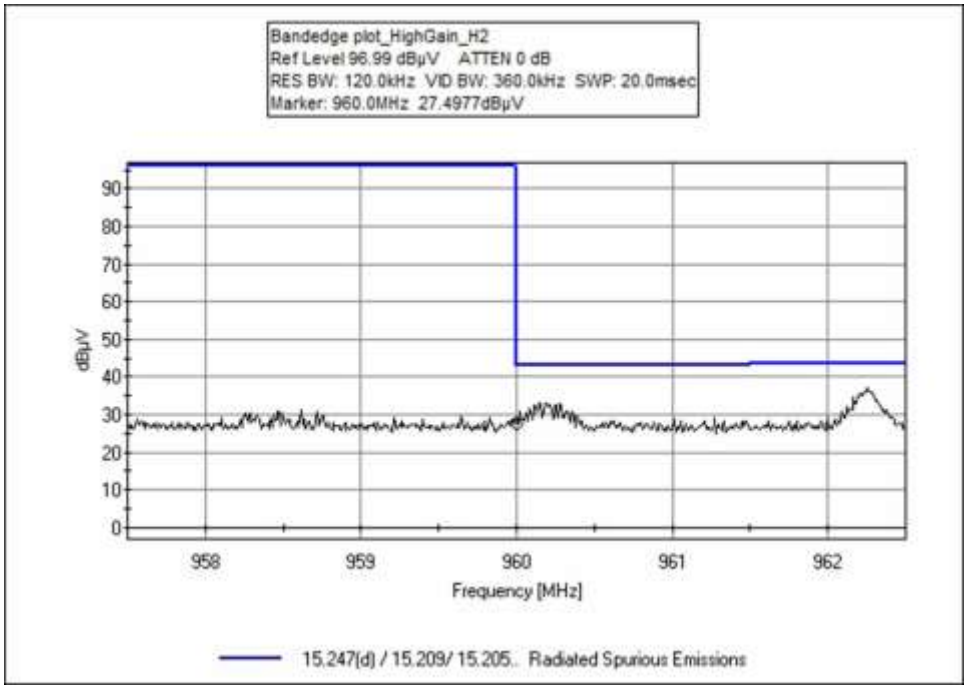

Bandedge_LowGain_H2_Hopping
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 31.7497dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
959.0
959.2
959.4
959.6
959.8
960.0
960.2
960.4
960.6
960.8
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

High Gain; Single Channel

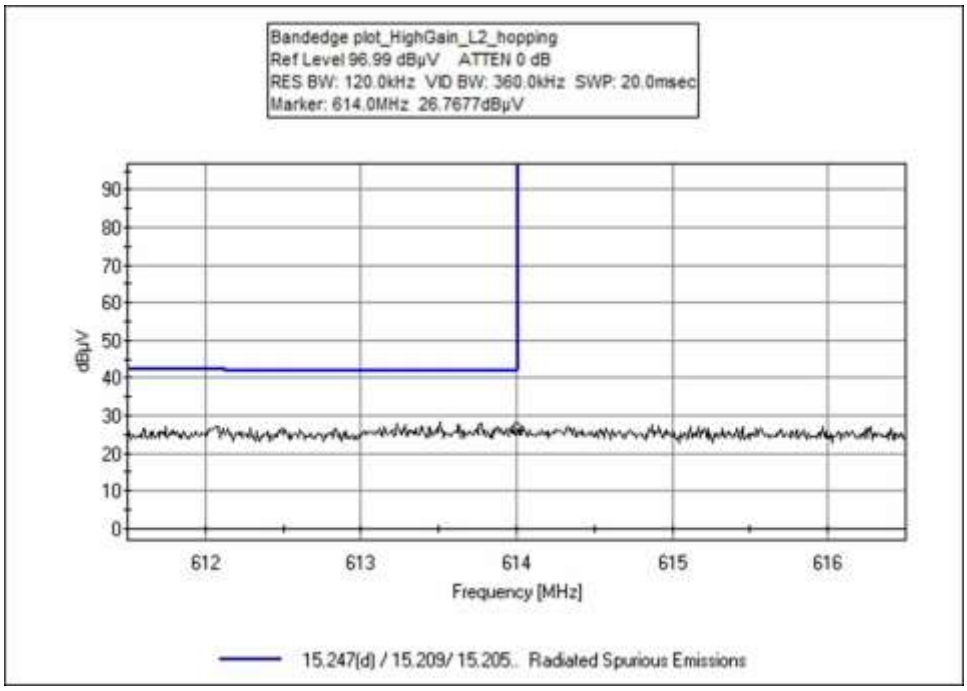


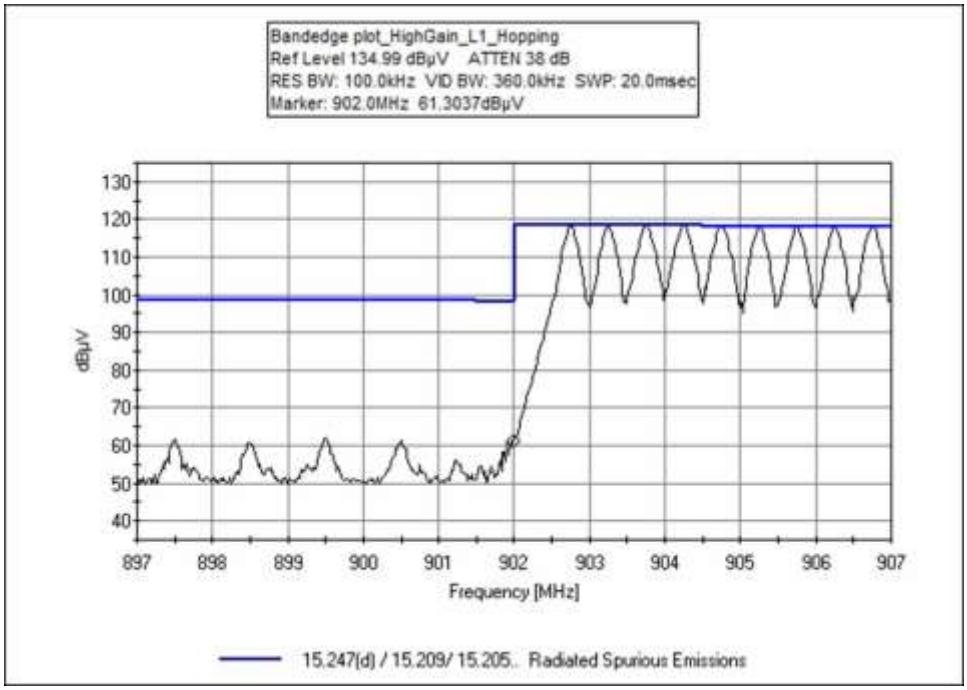


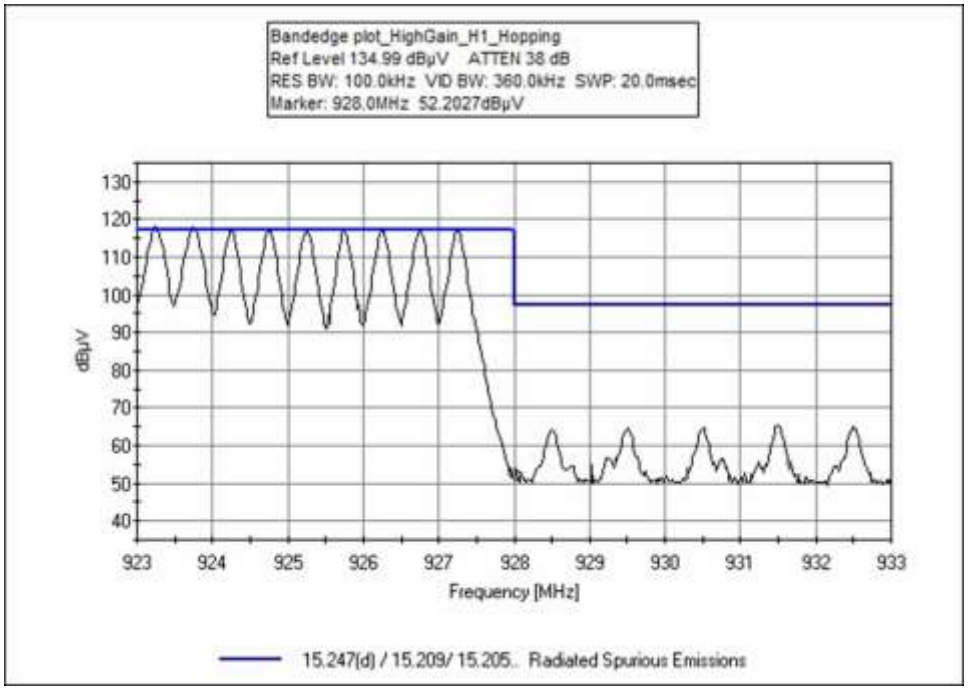

Bandedge plot_HighGain_H1
Ref Level 134.99 dBµV ATTEN 38 dB
RES BW: 100.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 928.0MHz 53.8077dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
926
927
928
929
930
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

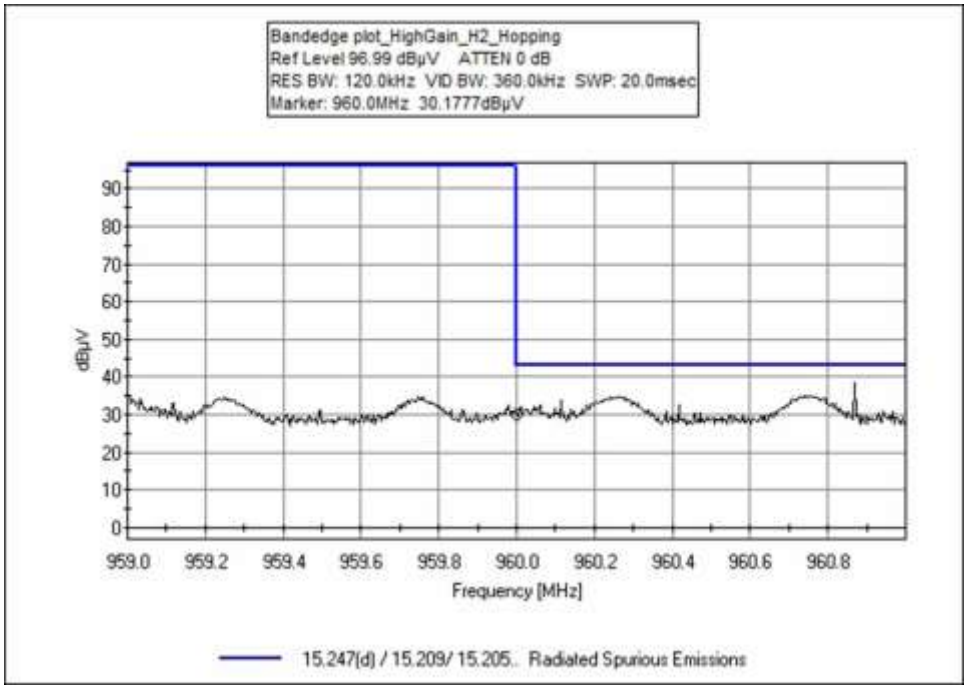

Bandedge plot_HighGain_H2
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 27.4977dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
958
959
960
961
962
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

High Gain; Hopping






Bandedge plot_HighGain_H1_Hopping
Ref Level 134.99 dBµV ATTEN 38 dB
RES BW: 100.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 928.0MHz 52.2027dBµV
dBµV
130
120
110
100
90
80
70
60
50
40
923
924
925
926
927
928
929
930
931
932
933
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions


Bandedge plot_HighGain_H2_Hopping
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 30.1777dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
959.0
959.2
959.4
959.6
959.8
960.0
960.2
960.4
960.6
960.8
Frequency [MHz]
15.247(d) / 15.209/ 15.205.. Radiated Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.247(d) / 15.209/ 15.205 Radiated Spurious Emissions**		
Work Order #:	**108261**	Date:	4/28/2023
Test Type:	**Maximized Emissions**	Time:	12:02:35
Tested By:	E. Wong	Sequence#:	21
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is set on a Styrofoam tabletop in the maximized emission orientation.

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

TX 902.75MHz, 927.25MHz

TARI = 6.25us as intended.

Firmware Version: 0.85.11

RBW=VBW=100kHz
RBW=120kHz, VBW=360kHz restricted band

Two Antenna Pattern and associated power level evaluated.

Lowest Gain: Sector 135, 0 Power setting 29.1dBm
Highest Gain: Sector 180, 0 Power setting 21.4dBm

Site A
Test Method: ANSI C63.10 (2013)

Test Environment Conditions:
Temperature: 21°C
Relative Humidity: 58%
Pressure: 98.9kPa

Additional evaluation performed with the EUT lay flat on the Styrofoam. Worst case emission presented.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T2	AN00851	Biconilog Antenna	CBL6111C	4/21/2022	4/21/2024
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/31/2022	12/31/2024
T4	AN00309	Preamp	8447D	12/13/2021	12/13/2023
T5	ANP05050	Cable	RG223/U	12/31/2022	12/31/2024

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.000M	32.4	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	43.1	54.0 Bandedge_LowGain_H2	-10.9	Horiz
2	960.000M	31.8	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	42.5	54.0 Bandedge_LowGain_H2_Hopping	-11.5	Horiz
3	960.000M	30.2	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	40.9	54.0 Bandedge_HighGain_H2_Hopping	-13.1	Horiz
4	960.000M	29.6	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	40.3	54.0 Bandedge_LayFlat_HighGain_H2	-13.7	Horiz
5	614.000M	28.3	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	32.3	46.0 Bandedge_LowGain_L2_Hopping	-13.7	Horiz
6	960.000M	29.5	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	40.2	54.0 Bandedge_LayFlat_LowGain_H2	-13.8	Horiz
7	614.000M	27.0	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	31.0	46.0 Bandedge_LayFlat_HignGain_L2	-15.0	Horiz
8	614.000M	26.8	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	30.8	46.0 Bandedge_LayFlat_LowGain_L2_	-15.2	Horiz
9	614.000M	26.8	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	30.8	46.0 Bandedge_HighGain_L2_Hopping	-15.2	Horiz
10	960.000M	27.5	+0.0 +0.5	+31.4	+6.1	-27.3	+0.0	38.2	54.0 Bandedge_HighGain_H2	-15.8	Horiz
11	614.000M	25.2	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	29.2	46.0 Bandedge_LowGain_L1	-16.8	Horiz

12	614.000M	24.2	+0.0 +0.4	+26.3	+4.7	-27.4	+0.0	28.2	46.0	-17.8	Horiz Bandedge_HighGain_L2
13	902.000M	65.5	+0.0 +0.5	+29.5	+5.8	-27.3	+0.0	74.0	106.8	-32.8	Horiz Bandedge_HighGain_L1
14	902.000M	61.3	+0.0 +0.5	+29.5	+5.8	-27.3	+0.0	69.8	106.8	-37.0	Horiz Bandedge_LowGain_L2
15	902.000M	61.3	+0.0 +0.5	+29.5	+5.8	-27.3	+0.0	69.8	106.8	-37.0	Horiz Bandedge_HighGain_L1_Hopping
16	902.000M	61.2	+0.0 +0.5	+29.5	+5.8	-27.3	+0.0	69.7	106.8	-37.1	Horiz Bandedge_LowGain_L1_Hopping
17	928.000M	53.8	+0.0 +0.5	+30.5	+5.9	-27.3	+0.0	63.4	106.8	-43.4	Horiz Bandedge_HighGain_H1
18	928.000M	53.2	+0.0 +0.5	+30.5	+5.9	-27.3	+0.0	62.8	106.8	-44.0	Horiz Bandedge_LowGain_H1
19	928.000M	53.0	+0.0 +0.5	+30.5	+5.9	-27.3	+0.0	62.6	106.8	-44.2	Horiz Bandedge_LowGain_H1_Hopping
20	928.000M	52.3	+0.0 +0.5	+30.5	+5.9	-27.3	+0.0	61.9	106.8	-44.9	Horiz Bandedge_HighGain_H1_Hopping

Test Setup Photo(s)

Upright View

Lay Flat View

Above 1GHz; View 1

Above 1GHz; View 2

0.8m

1.5m


H


H

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**108261**	Date:	5/2/2023
Test Type:	**Conducted Emissions**	Time:	15:17:47
Tested By:	E. Wong	Sequence#:	24
Software:	EMITest 5.03.20		120/60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is set on a test bench .

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

Hopping

TARI = 6.25us as intended.

Worst case Antenna Pattern and associated power level evaluated.

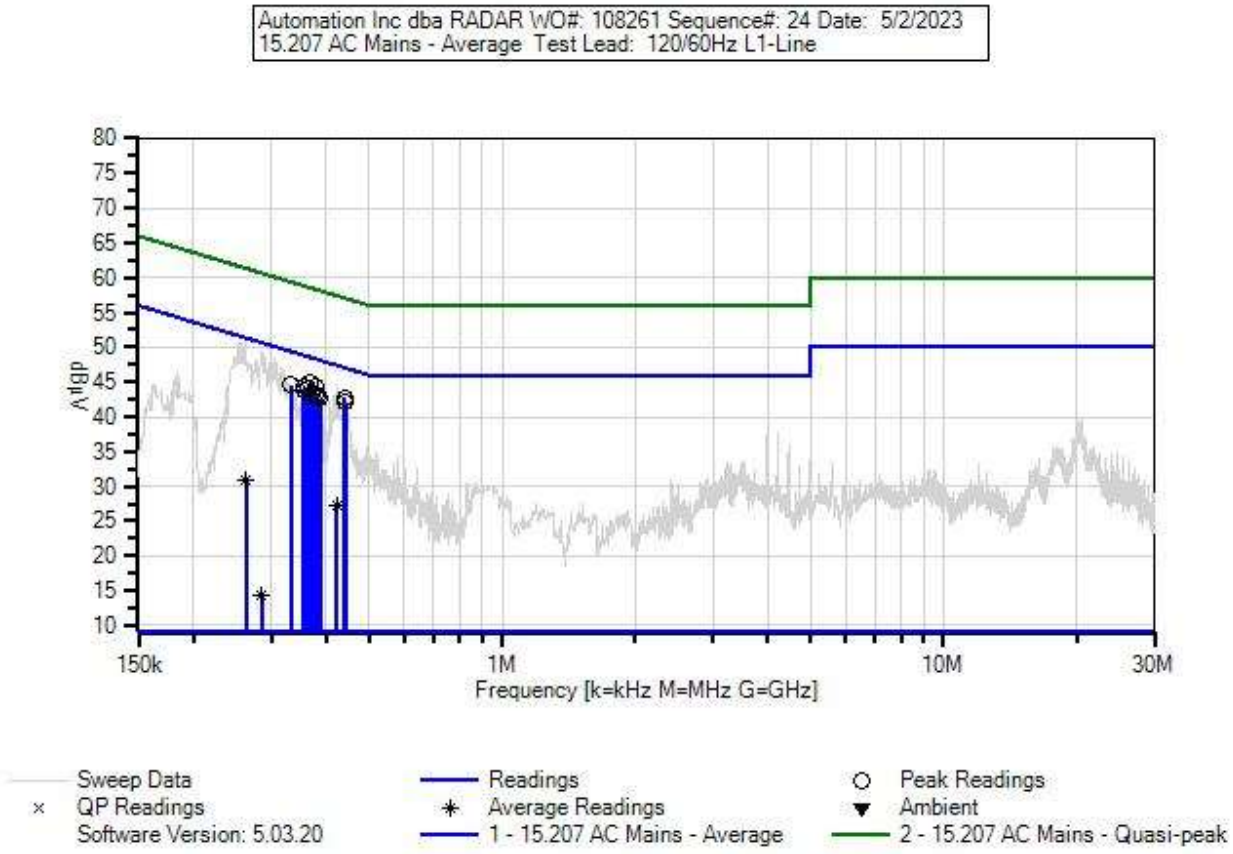
Lowest Gain: Sector 135, 0 Power setting 29.1dBm

Frequency Range of Measurement: 150kHz- 30MHz.
150 kHz-30 MHz;RBW=9 kHz,VBW=30kHz

Test Environment Conditions:
Temperature: 26.5°C
Relative Humidity: 34%
Pressure: 99.8kPa

Site A
Test Method: ANSI C63.10 (2013)

AC conducted emission evaluated at the AC mains of the support POE.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/2/2023	1/2/2025
T2	ANP07338	Cable	2249-Y-240	1/3/2022	1/3/2024
T3	ANP08007	Attenuator	SA18N10W-06	10/24/2022	10/24/2024
T4	AN00969A	50uH LISN-Line (dB)	3816/2NM	10/16/2022	10/16/2024
	AN00969A	50uH LISN-Return (dB)	3816/2NM	10/16/2022	10/16/2024

Measurement Data: Reading listed by margin. Test Lead: L1-Line

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	367.434k	38.8	+0.1	+0.0	+5.8	+0.1	+0.0	44.8	48.6	-3.8	L1-Li
2	376.888k	38.4	+0.1	+0.0	+5.8	+0.1	+0.0	44.4	48.3	-3.9	L1-Li
3	440.155k	36.7	+0.1	+0.0	+5.8	+0.1	+0.0	42.7	47.1	-4.4	L1-Li
4	357.253k	38.3	+0.1	+0.0	+5.8	+0.1	+0.0	44.3	48.8	-4.5	L1-Li
5	362.344k	38.2	+0.1	+0.0	+5.8	+0.1	+0.0	44.2	48.7	-4.5	L1-Li
6	442.336k	36.1	+0.1	+0.0	+5.8	+0.1	+0.0	42.1	47.0	-4.9	L1-Li
7	331.801k	38.5	+0.1	+0.0	+5.8	+0.1	+0.0	44.5	49.4	-4.9	L1-Li
8	355.799k	37.9	+0.1	+0.0	+5.8	+0.1	+0.0	43.9	48.8	-4.9	L1-Li
9	372.525k	37.3	+0.1	+0.0	+5.8	+0.1	+0.0	43.3	48.4	-5.1	L1-Li
10	378.342k	37.2	+0.1	+0.0	+5.8	+0.1	+0.0	43.2	48.3	-5.1	L1-Li
11	381.978k	37.0	+0.1	+0.0	+5.8	+0.1	+0.0	43.0	48.2	-5.2	L1-Li
12	386.341k	36.6	+0.1	+0.0	+5.8	+0.1	+0.0	42.6	48.1	-5.5	L1-Li
13	422.702k Ave	21.3	+0.1	+0.0	+5.8	+0.1	+0.0	27.3	47.4	-20.1	L1-Li
^	422.702k	38.5	+0.1	+0.0	+5.8	+0.1	+0.0	44.5	47.4	-2.9	L1-Li
15	262.717k Ave	24.7	+0.2	+0.0	+5.8	+0.1	+0.0	30.8	51.3	-20.5	L1-Li
^	262.716k	44.9	+0.2	+0.0	+5.8	+0.1	+0.0	51.0	51.3	-0.3	L1-Li
17	285.988k Ave	8.4	+0.1	+0.0	+5.8	+0.1	+0.0	14.4	50.6	-36.2	L1-Li
^	285.987k	43.5	+0.1	+0.0	+5.8	+0.1	+0.0	49.5	50.6	-1.1	L1-Li

Test Location:	CKC Laboratories, Inc • 110 N. Olinda Place • Brea, CA • (714) 993-6112		
Customer:	**Automation Inc dba RADAR**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**108261**	Date:	5/2/2023
Test Type:	**Conducted Emissions**	Time:	15:25:36
Tested By:	E. Wong	Sequence#:	25
Software:	EMITest 5.03.20		120/60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is set on a test bench.

The EUT is powered via a cat 6 network cable (nominal voltage 48Vdc) which is connected to a remotely located POE Injector. Connected to the POE Injector via cat 6 cable is a remotely located computer. The computer is used to set frequency channel, frequency hopping, and modulation of the EUT.

Frequency Range of EUT: 902.75MHz to 927.25MHz

Hopping

TARI = 6.25us as intended.

Worst case Antenna Pattern and associated power level evaluated.

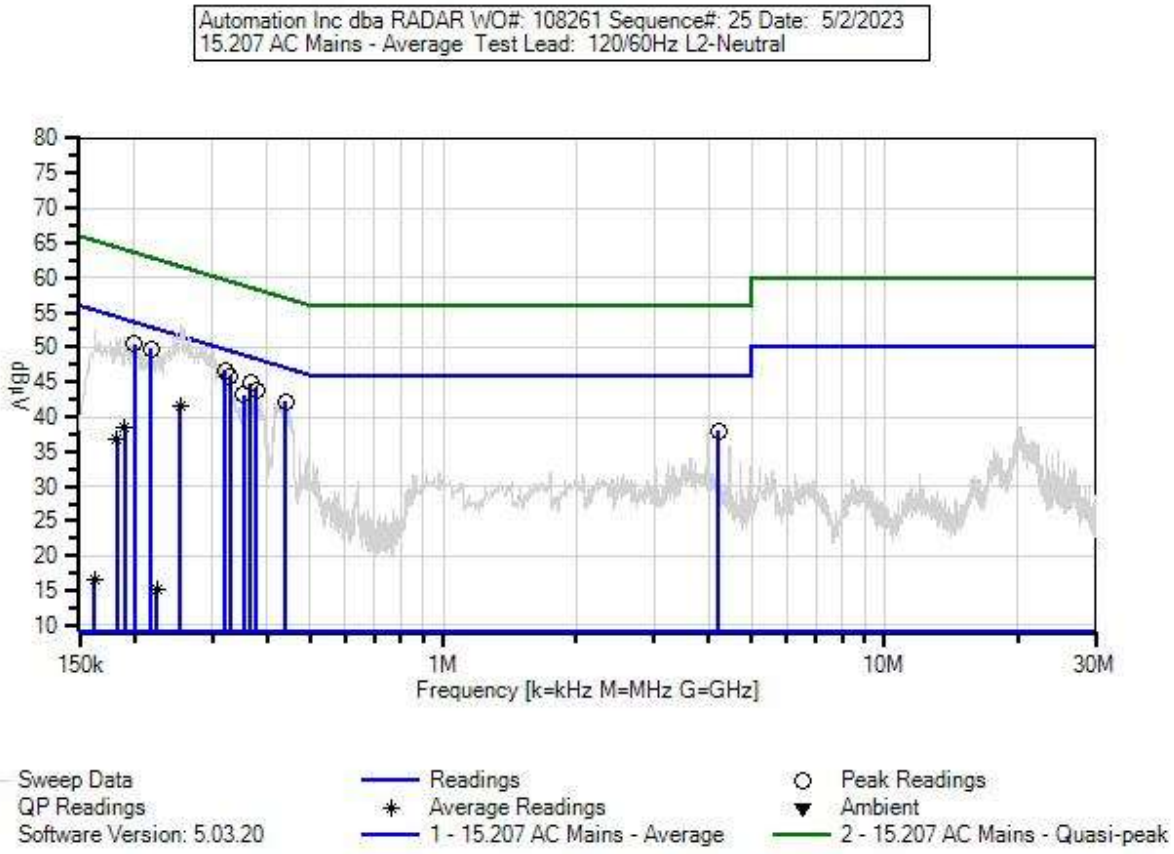
Lowest Gain: Sector 135, 0 Power setting 29.1dBm

Frequency Range of Measurement: 150kHz- 30MHz.
150 kHz-30 MHz;RBW=9 kHz,VBW=30kHz

Test Environment Conditions:
Temperature: 26.5°C
Relative Humidity: 34%
Pressure: 99.8kPa

Site A
Test Method: ANSI C63.10 2013

AC conducted emission evaluated at the AC mains of the support POE.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	12/13/2022	12/13/2023
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/2/2023	1/2/2025
T2	ANP07338	Cable	2249-Y-240	1/3/2022	1/3/2024
T3	ANP08007	Attenuator	SA18N10W-06	10/24/2022	10/24/2024
	AN00969A	50uH LISN-Line (dB)	3816/2NM	10/16/2022	10/16/2024
T4	AN00969A	50uH LISN-Return (dB)	3816/2NM	10/16/2022	10/16/2024

Measurement Data: Reading listed by margin. Test Lead: L2-Neutral

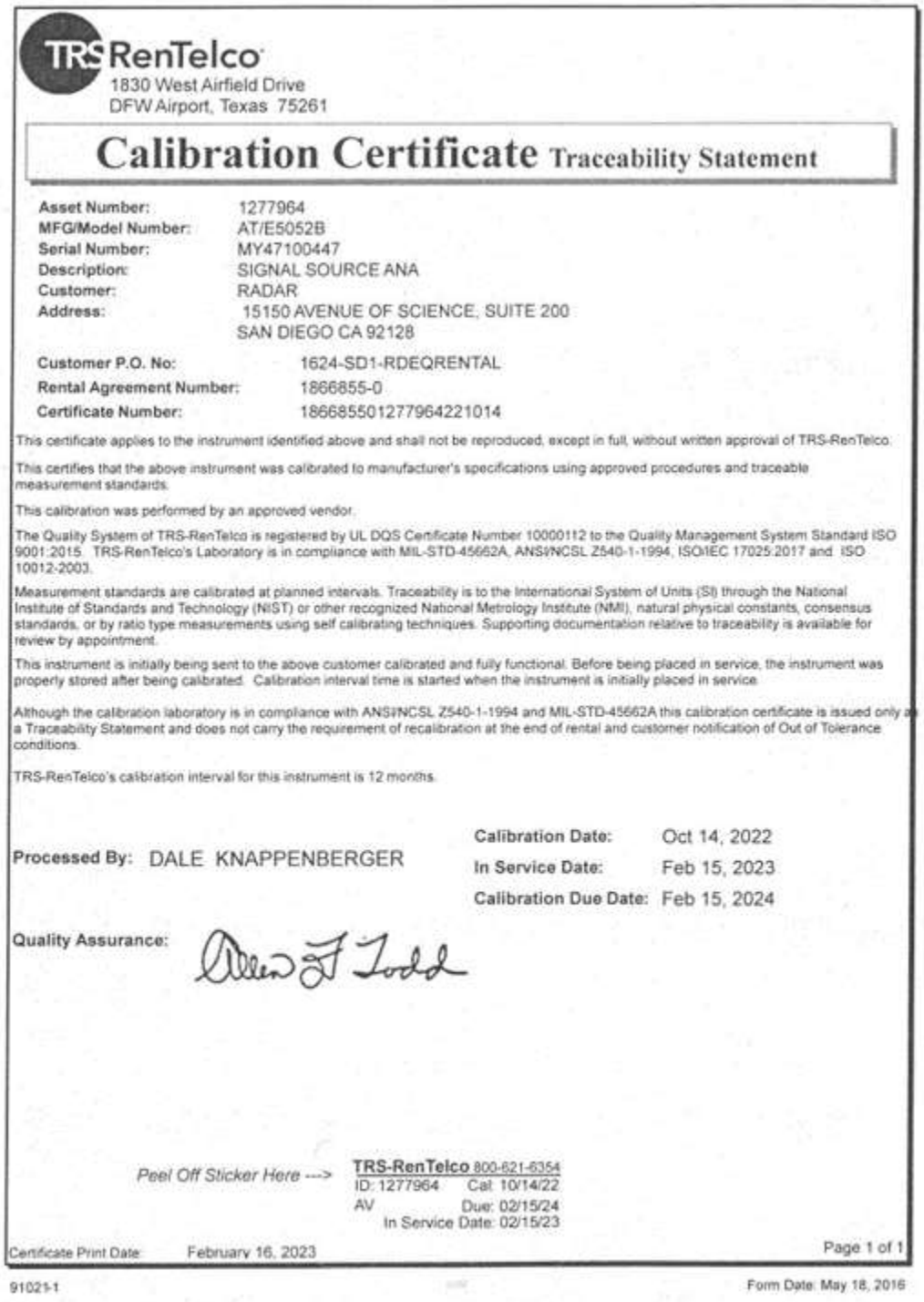
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	320.893k	40.7	+0.1	+0.0	+5.8	+0.1	+0.0	46.7	49.7	-3.0	L2-Ne
2	199.450k	44.5	+0.1	+0.0	+5.8	+0.1	+0.0	50.5	53.6	-3.1	L2-Ne
3	218.357k	43.7	+0.1	+0.0	+5.8	+0.1	+0.0	49.7	52.9	-3.2	L2-Ne
4	328.892k	39.9	+0.1	+0.0	+5.8	+0.1	+0.0	45.9	49.5	-3.6	L2-Ne
5	365.980k	38.9	+0.1	+0.0	+5.8	+0.1	+0.0	44.9	48.6	-3.7	L2-Ne
6	376.888k	37.8	+0.1	+0.0	+5.8	+0.1	+0.0	43.8	48.3	-4.5	L2-Ne
7	438.700k	36.2	+0.1	+0.0	+5.8	+0.1	+0.0	42.2	47.1	-4.9	L2-Ne
8	353.617k	37.2	+0.1	+0.0	+5.8	+0.1	+0.0	43.2	48.9	-5.7	L2-Ne
9	4.211M	31.7	+0.1	+0.2	+5.8	+0.2	+0.0	38.0	46.0	-8.0	L2-Ne
10	253.990k Ave	35.4	+0.2	+0.0	+5.8	+0.1	+0.0	41.5	51.6	-10.1	L2-Ne
^	253.990k	47.0	+0.2	+0.0	+5.8	+0.1	+0.0	53.1	51.6	+1.5	L2-Ne
^	258.353k	46.8	+0.2	+0.0	+5.8	+0.1	+0.0	52.9	51.5	+1.4	L2-Ne
13	189.996k Ave	32.4	+0.2	+0.0	+5.8	+0.1	+0.0	38.5	54.0	-15.5	L2-Ne
^	189.996k	45.5	+0.2	+0.0	+5.8	+0.1	+0.0	51.6	54.0	-2.4	L2-Ne
15	181.997k Ave	30.5	+0.3	+0.0	+5.8	+0.1	+0.0	36.7	54.4	-17.7	L2-Ne
^	181.997k	45.3	+0.3	+0.0	+5.8	+0.1	+0.0	51.5	54.4	-2.9	L2-Ne
17	224.902k Ave	9.2	+0.2	+0.0	+5.8	+0.1	+0.0	15.3	52.6	-37.3	L2-Ne
^	224.902k	43.8	+0.2	+0.0	+5.8	+0.1	+0.0	49.9	52.6	-2.7	L2-Ne
19	162.363k Ave	10.4	+0.4	+0.0	+5.8	+0.1	+0.0	16.7	55.3	-38.6	L2-Ne
^	162.362k	46.2	+0.4	+0.0	+5.8	+0.1	+0.0	52.5	55.3	-2.8	L2-Ne

Test Setup Photo(s)

Front View

Side View

Appendix A: Manufacturer Provided Conducted Power Measurement



TRS RenTelco
1830 West Airfield Drive
DFW Airport, Texas 75261

Calibration Certificate Traceability Statement

Asset Number:	1277964
MFG/Model Number:	AT/E5052B
Serial Number:	MY47100447
Description:	SIGNAL SOURCE ANA
Customer:	RADAR
Address:	15150 AVENUE OF SCIENCE, SUITE 200 SAN DIEGO CA 92128
Customer P.O. No:	1624-SD1-RDEQRENTAL
Rental Agreement Number:	1866855-0
Certificate Number:	186685501277964221014

This certificate applies to the instrument identified above and shall not be reproduced, except in full, without written approval of TRS-RenTelco.

This certifies that the above instrument was calibrated to manufacturer's specifications using approved procedures and traceable measurement standards.

This calibration was performed by an approved vendor.

The Quality System of TRS-RenTelco is registered by UL DQS Certificate Number 10000112 to the Quality Management System Standard ISO 9001:2015. TRS-RenTelco's Laboratory is in compliance with MIL-STD-45662A, ANSI/NCSL Z540-1-1994, ISO/IEC 17025:2017 and ISO 10012-2003.

Measurement standards are calibrated at planned intervals. Traceability is to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or other recognized National Metrology Institute (NMI), natural physical constants, consensus standards, or by ratio type measurements using self calibrating techniques. Supporting documentation relative to traceability is available for review by appointment.

This instrument is initially being sent to the above customer calibrated and fully functional. Before being placed in service, the instrument was properly stored after being calibrated. Calibration interval time is started when the instrument is initially placed in service.

Although the calibration laboratory is in compliance with ANSI/NCSL Z540-1-1994 and MIL-STD-45662A this calibration certificate is issued only as a Traceability Statement and does not carry the requirement of recalibration at the end of rental and customer notification of Out of Tolerance conditions.

TRS-RenTelco's calibration interval for this instrument is 12 months.

Processed By: DALE KNAPPENBERGER

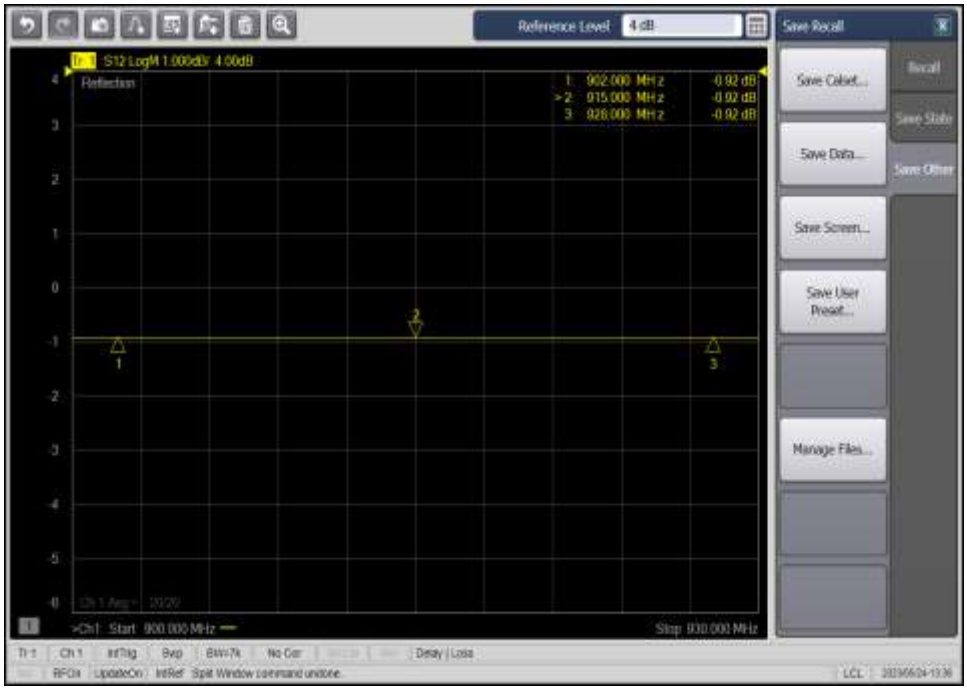
Calibration Date:	Oct 14, 2022
In Service Date:	Feb 15, 2023
Calibration Due Date:	Feb 15, 2024

Quality Assurance: Allen F Todd

Peel Off Sticker Here ---> **TRS-RenTelco** 800-621-6354
ID: 1277964 Cal: 10/14/22
AV Due: 02/15/24
In Service Date: 02/15/23

Certificate Print Date: February 16, 2023 Page 1 of 1

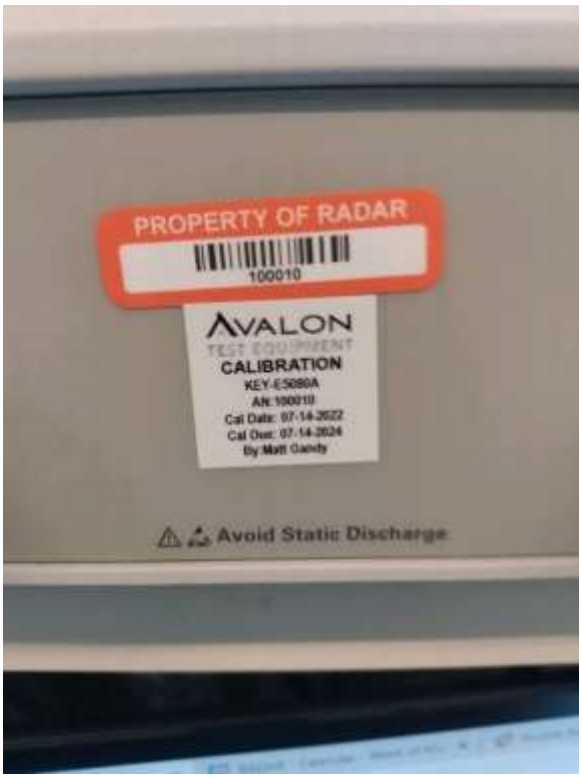
91021-1 Form Date: May 18, 2016



Cable Loss

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
1235088	Spectrum Analyzer	Agilent	E5052B	10/14/2022	2/15/2024
10010	Network Analyzer	Agilent	E5080A	7/14/2022	7/14/2024
None	RF Test Cable	Cinch	415-0536-036	None	None

Test Setup Photo(s)



Network Analyzer

Plots

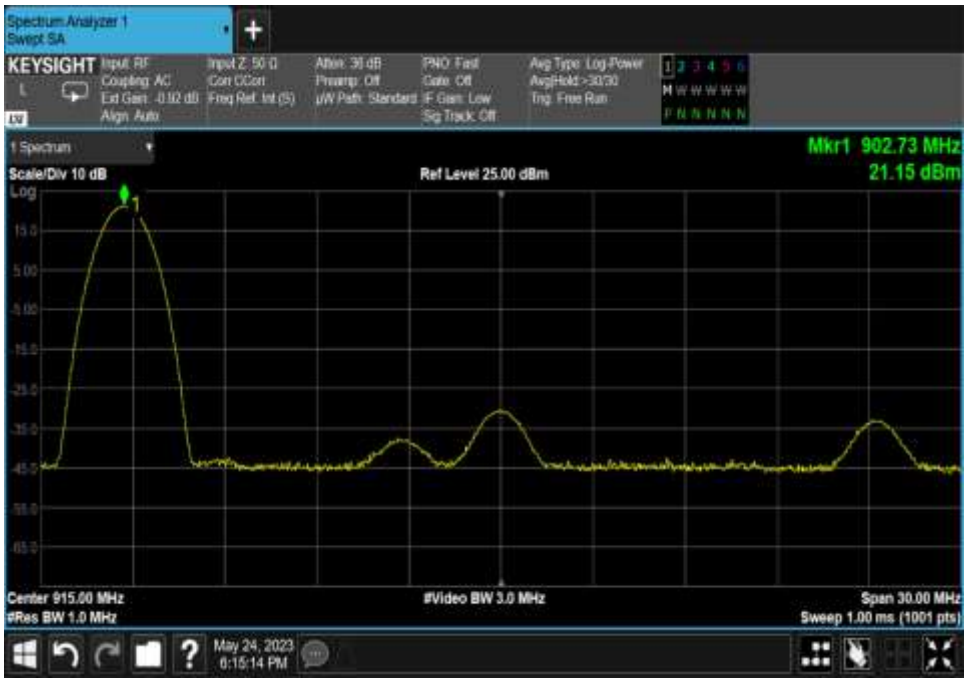
Antenna 0

Low Channel

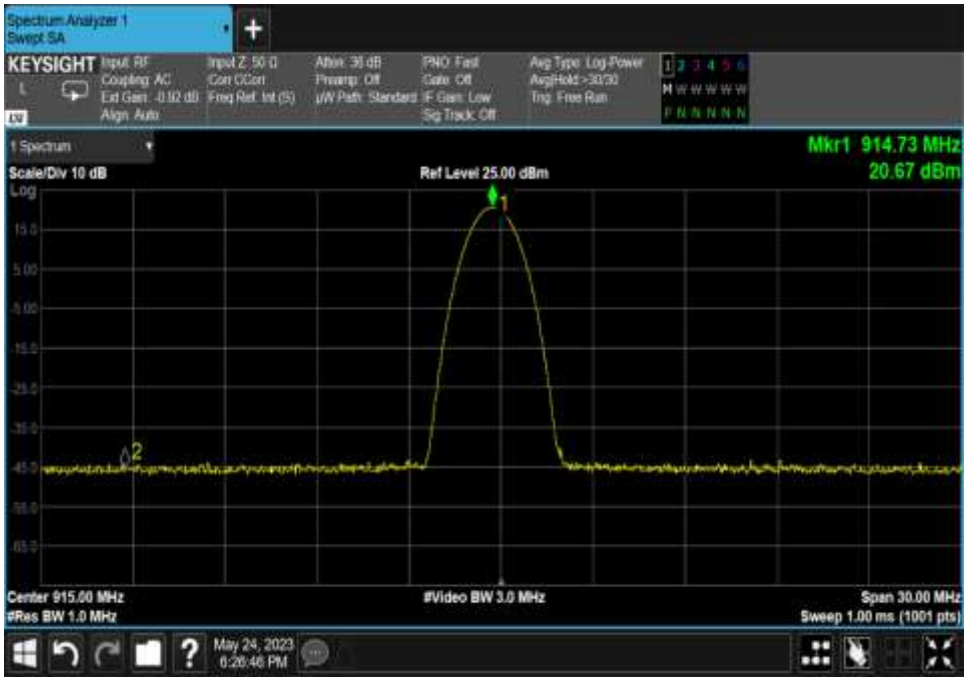
Middle Channel

High Channel

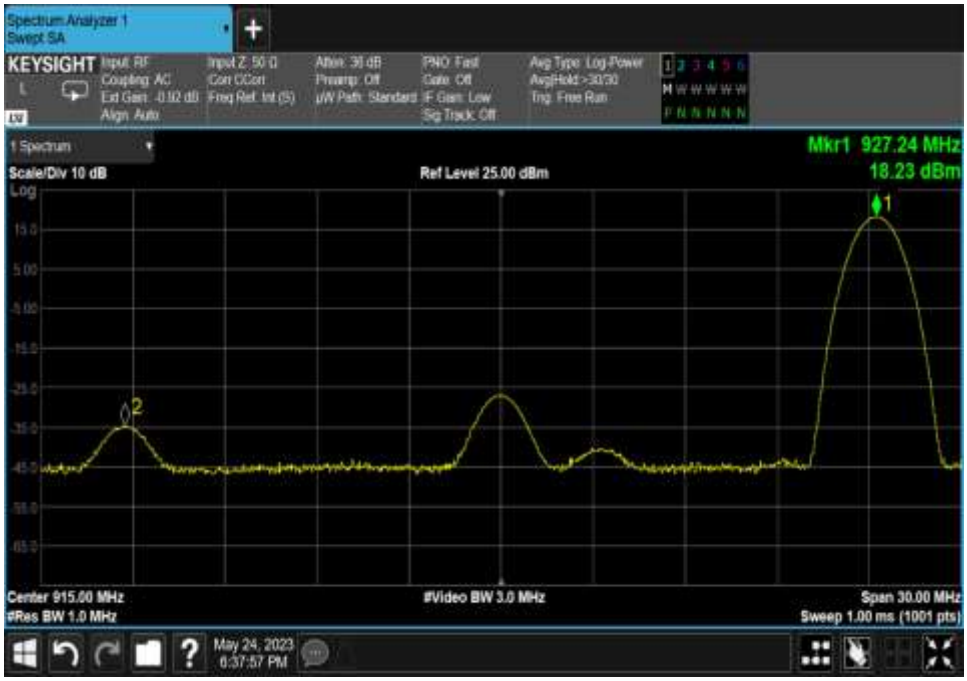
Antenna 1



Low Channel

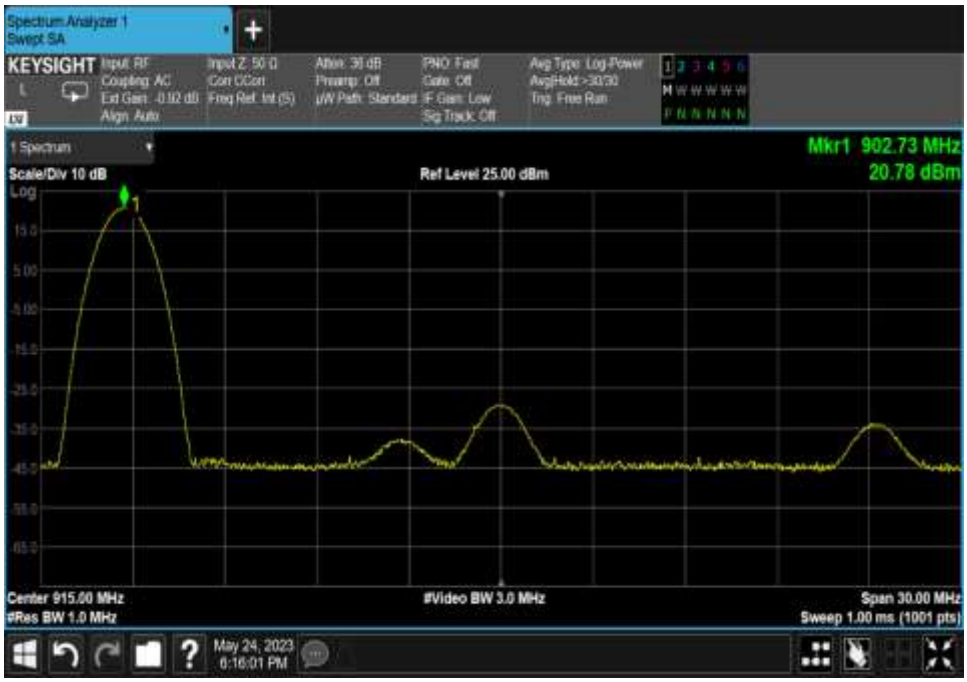


Middle Channel



High Channel

Antenna 2



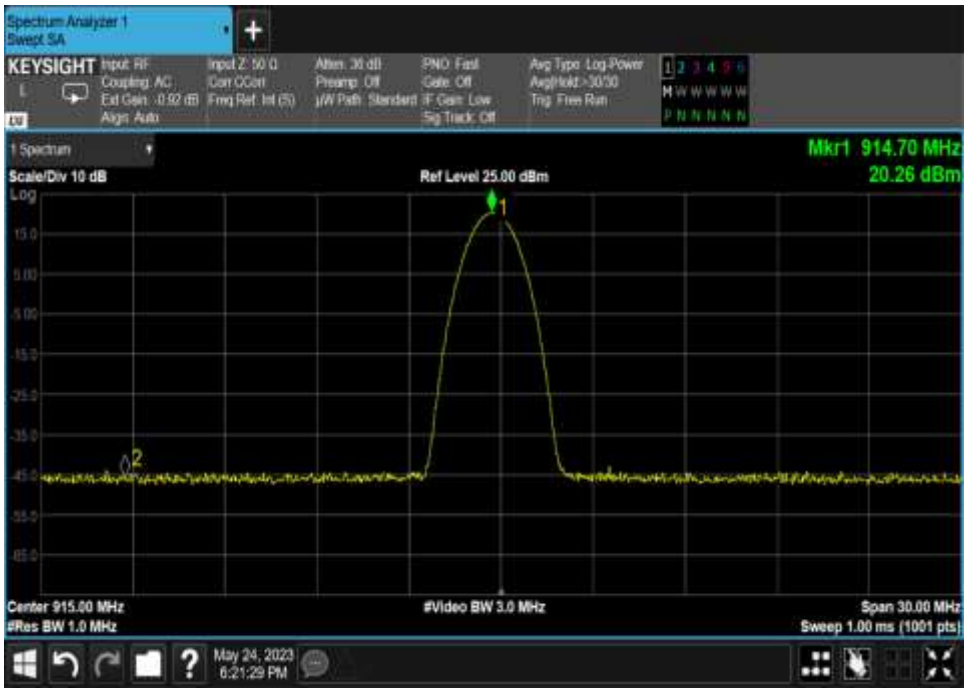
Low Channel

Middle Channel

High Channel

Antenna 3

Low Channel



Middle Channel

High Channel

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret (“^”) was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.