

# Meteorcomm LLC.

## REVISED EMC TEST REPORT TO 111001-6

**ITCR-NG Wayside  
Model: 65010**

**Tested to The Following Standards:**

**FCC Part 80 Subpart E**

**217.6125-219.9875MHz**

**Report No.: 111001-6A**

**Date of issue: April 21, 2025**



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:**

Meteorcomm LLC.  
1201 SW 7th Street  
Renton, WA 98057

Representative: George Stults  
Customer Reference Number: PO32730

**REPORT PREPARED BY:**

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

Project Number: 111001

**DATE OF EQUIPMENT RECEIPT:**

February 13, 2025

**DATE(S) OF TESTING:**

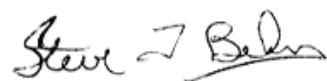
February 13, 2025 to April 7, 2025

### Revision History

**Original:** Testing of the ITCR-NG Wayside, Model: 65010 to FCC Part 80 Subpart E, 217.6125-219.9875MHz.  
**Revision A:** To update the band edge plots with the correct title.

### 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.  
22116 23rd Drive SE, Suite A  
Bothell, WA 98021

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20
EMITest Immunity	5.03.10

## 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 80 Subpart E

Test Procedure	Description	Modifications	Results
80.215 (c)(1), 80215 (h) (5), 2.1046	Power Output	NA	Pass
2.1049	Occupied Bandwidth	NA	Pass
80.209	Frequency Stability	NA	Pass
80.211 (f)	Conducted Spurious Emissions and Mask	NA	Pass
80.211 (f)	Radiated Spurious 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 1

*Equipment Tested:*

Device	Manufacturer	Model #	S/N
ITCR-NG Wayside	Meteorcomm, LLC	65010	65WR002010MC

*Support Equipment:*

Device	Manufacturer	Model #	S/N
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EC08104020
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Laptop	Dell	Latitude	8X7DMH2
USB Thumb Drive	Micro Center	64GB	NA
Support Radio	Meteorcomm, LLC	65010	65WR002008MC
Prosafe 8-Port Gigabit	Netgear	GS108Tv2	29SE4C5302E60

### Configuration 2

*Equipment Tested:*

Device	Manufacturer	Model #	S/N
ITCR-NG Wayside	Meteorcomm, LLC	65010	65WR002010MC

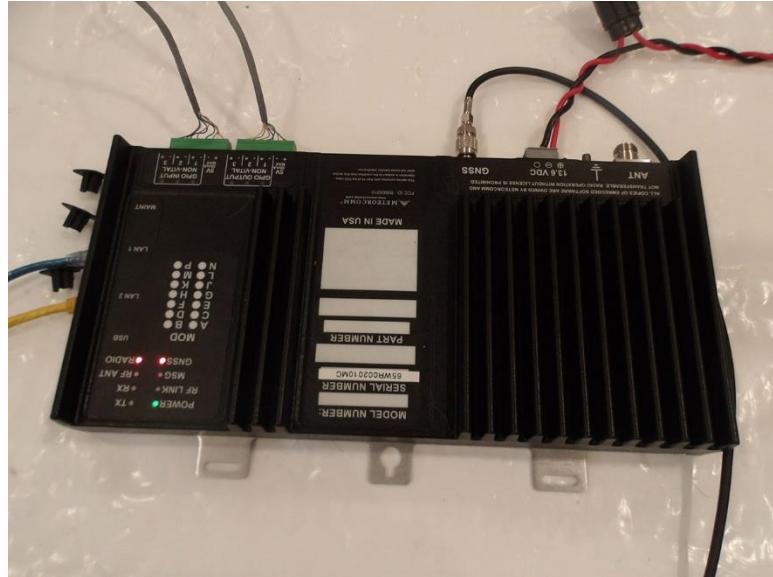
*Support Equipment:*

Device	Manufacturer	Model #	S/N
Programable DC PS	BK Precision	XNL8010	80180058EL1073
Laptop	Dell	Latitude	8X7DMH2

## General Product Information:

<b>Description of EUT</b>	
Railway transceiver	
<b>Product Information</b>	<b>Manufacturer-Provided Details</b>
Equipment Type:	Stand-Alone Equipment
Type of Transmission System:	Proprietary for Locomotive
Operating Frequency Range(s):	217.6125-219.9875MHz
Modulation Type(s):	PI/8 D8PSK 3 bits / symbol PI/8 D16 APSK 4 bits / symbol
Maximum Duty Cycle:	10%, but may be increased for testing
Number of TX Chains:	1
Antenna Type(s) and Gain:	Not specified by manufacturer, but typical railroad antenna 4.55dBi (1/2 wave dipole)
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	13.6VDC
Firmware / Software used for Test:	1.1 Linux 1.1 FPGA MobaXterm v23.2  Attenuator settings PI/8 D8PSK 0 dB PI/8 D16 APSK 0 dB
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

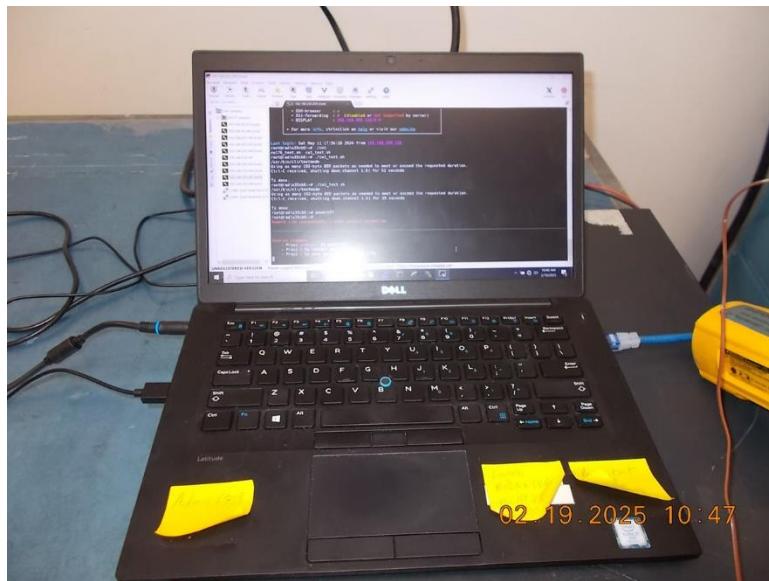
**EUT and Accessory Photo(s)**



### Support Equipment Photo(s)



Attenuators



Laptop



Ethernet Hub

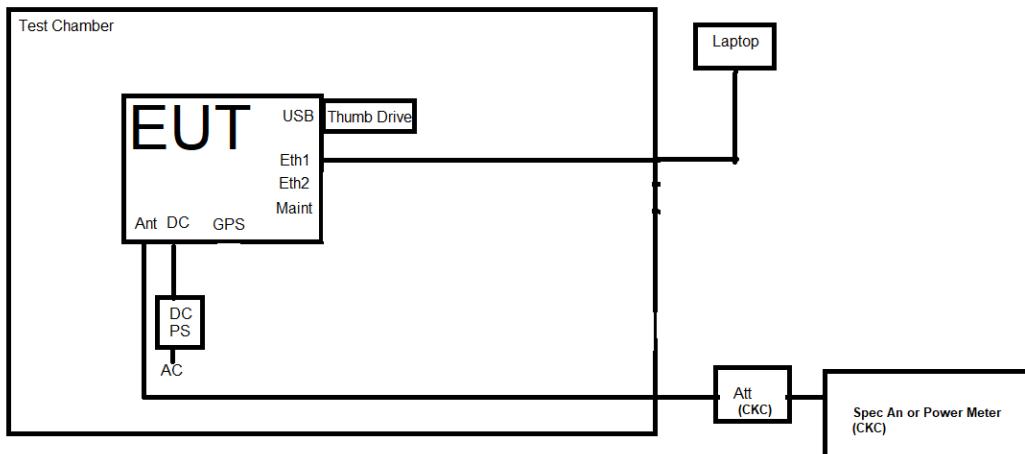


Power Supply

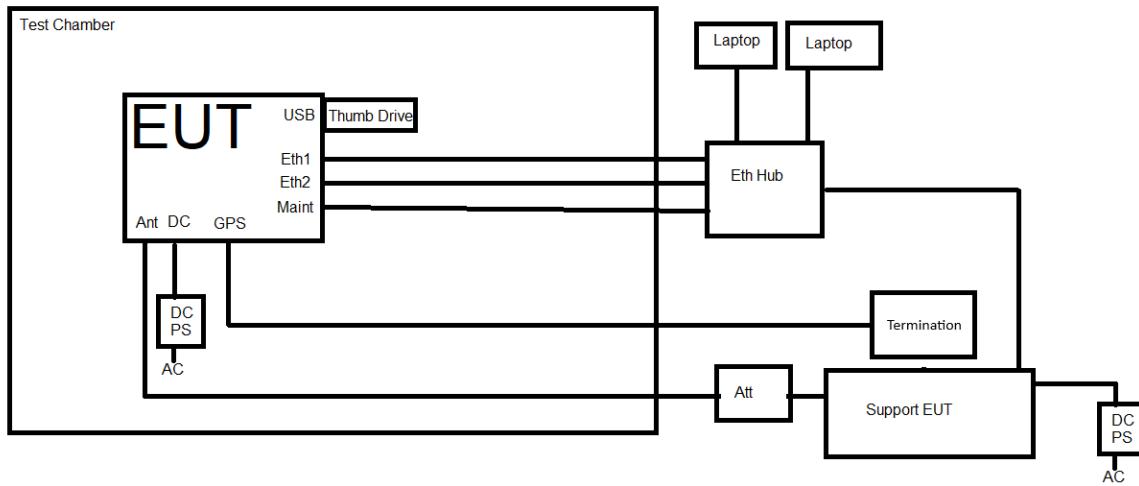
### Block Diagram(s) of Test Setup

Config#	Setup Description of Block Diagram
1 & 2	<p>RF Conducted:</p> <ul style="list-style-type: none"> <li>• EUT USB connected to thumb drive</li> <li>• EUT Eth1 connected to laptop</li> <li>• EUT DC port connect to DCPS connected to AC</li> <li>• EUT ANT connected to attenuator connected to spectrum analyzer</li> </ul> <p>Radiated:</p> <ul style="list-style-type: none"> <li>• EUT USB connected to thumb drive</li> <li>• EUT Eth1 connected to ethernet hub connected to laptop ethernet hub connected to support EUT connected to DCPS connected to AC</li> <li>• EUT Eth2 connected to ethernet hub connected to laptop ethernet hub connected to support EUT connected to DCPS connected to AC</li> <li>• EUT maint connected to ethernet hub connected to laptop ethernet hub connected to support EUT connected to DCPS connected to AC</li> <li>• EUT GPS connected to termination</li> <li>• EUT DC port connect to DCPS connected to AC</li> <li>• EUT ANT connected to attenuator connected to support EUT connected to DCPS connected to AC</li> </ul>

#### Conducted



**Radiated**



## FCC Part 80 Subpart E

### Power Output

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	2/18/2025
Configuration:	2		
Test Setup:	<p>The unit is in a temperature chamber for temperature variation. The EUT's RF port is connected to a spectrum analyzer with appropriate attenuation. The bandwidth settings are low enough to resolve the center frequency of the emission. Once the EUT transmitter is turned on, it is transmitting continuously with its normal duty cycle, <math>\pi/8</math> and <math>\pi/8\text{-}16</math> modulations investigated.</p> <p>Per the manufacturer, the fundamental power limit will change depending on the licensee and installation. For testing purposes, the limit is assumed to be 50W.</p>		

Environmental Conditions			
Temperature (°C)	20-24	Relative Humidity (%):	35-48

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
03803	Spectrum Analyzer	Agilent	E4440A	2/12/2024	2/12/2026
P07486	Cable	Andrews	FSJ1	7/1/2024	7/1/2026
02757	Temperature Chamber	Bemco	F100/350-8	12/8/2022	12/8/2024
C00194	30db Attenuator	Fairview Microwave	SA3N1007-30	9/26/2024	9/26/2026
03029	Thermometer, Digital Infrared	Fluke	566	4/14/2023	4/14/2025

**Test Data Summary - RF Conducted Measurement (Ch1)**

Frequency (MHz)	Temperature (°C)	Voltage	Modulation	Conducted Power (dBm)	Conducted Power (Watts)	Results
217.6125	-30	V <sub>Nom</sub>	Pi/8	44.60	28.8	Pass
217.6125	-20	V <sub>Nom</sub>	Pi/8	44.69	29.4	Pass
217.6125	-10	V <sub>Nom</sub>	Pi/8	44.72	29.6	Pass
217.6125	0	V <sub>Nom</sub>	Pi/8	44.74	29.8	Pass
217.6125	10	V <sub>Nom</sub>	Pi/8	44.75	29.9	Pass
217.6125	20	V <sub>Nom</sub>	Pi/8	44.85	30.5	Pass
217.6125	30	V <sub>Nom</sub>	Pi/8	44.83	30.4	Pass
217.6125	40	V <sub>Nom</sub>	Pi/8	44.86	30.6	Pass
217.6125	50	V <sub>Nom</sub>	Pi/8	44.89	30.8	Pass
217.6125	20	V <sub>Min</sub>	Pi/8	44.83	30.4	Pass
217.6125	20	V <sub>Max</sub>	Pi/8	44.81	30.3	Pass

**Test Data Summary - RF Conducted Measurement (Ch96)**

Frequency (MHz)	Temperature (°C)	Voltage	Modulation	Conducted Power (dBm)	Conducted Power (Watts)	Results
219.9875	-30	V <sub>Nom</sub>	Pi/8	44.58	28.7	Pass
219.9875	-20	V <sub>Nom</sub>	Pi/8	44.66	29.2	Pass
219.9875	-10	V <sub>Nom</sub>	Pi/8	44.69	29.4	Pass
219.9875	0	V <sub>Nom</sub>	Pi/8	44.72	29.6	Pass
219.9875	10	V <sub>Nom</sub>	Pi/8	44.73	29.7	Pass
219.9875	20	V <sub>Nom</sub>	Pi/8	44.82	30.3	Pass
219.9875	30	V <sub>Nom</sub>	Pi/8	44.79	30.1	Pass
219.9875	40	V <sub>Nom</sub>	Pi/8	44.84	30.5	Pass
219.9875	50	V <sub>Nom</sub>	Pi/8	44.85	30.5	Pass
219.9875	20	V <sub>Min</sub>	Pi/8	44.80	30.2	Pass
219.9875	20	V <sub>Max</sub>	Pi/8	44.82	30.3	Pass

### Test Data Summary - RF Conducted Measurement (Ch1)

Frequency (MHz)	Temperature (°C)	Voltage	Modulation	Conducted Power (dBm)	Conducted Power (Watts)	Results
217.6125	-30	V <sub>Nom</sub>	Pi/8-16	44.19	26.2	Pass
217.6125	-20	V <sub>Nom</sub>	Pi/8-16	44.31	27.0	Pass
217.6125	-10	V <sub>Nom</sub>	Pi/8-16	44.43	27.7	Pass
217.6125	0	V <sub>Nom</sub>	Pi/8-16	44.49	28.1	Pass
217.6125	10	V <sub>Nom</sub>	Pi/8-16	44.58	28.7	Pass
217.6125	20	V <sub>Nom</sub>	Pi/8-16	44.64	29.1	Pass
217.6125	30	V <sub>Nom</sub>	Pi/8-16	44.78	30.1	Pass
217.6125	40	V <sub>Nom</sub>	Pi/8-16	44.89	30.8	Pass
217.6125	50	V <sub>Nom</sub>	Pi/8-16	44.94	31.2	Pass
217.6125	20	V <sub>Min</sub>	Pi/8-16	44.70	29.5	Pass
217.6125	20	V <sub>Max</sub>	Pi/8-16	44.73	29.7	Pass

### Test Data Summary - RF Conducted Measurement (Ch96)

Frequency (MHz)	Temperature (°C)	Voltage	Modulation	Conducted Power (dBm)	Conducted Power (Watts)	Results
219.9875	-30	V <sub>Nom</sub>	Pi/8-16	44.13	25.9	Pass
219.9875	-20	V <sub>Nom</sub>	Pi/8-16	44.24	26.5	Pass
219.9875	-10	V <sub>Nom</sub>	Pi/8-16	44.36	27.3	Pass
219.9875	0	V <sub>Nom</sub>	Pi/8-16	44.43	27.7	Pass
219.9875	10	V <sub>Nom</sub>	Pi/8-16	44.51	28.2	Pass
219.9875	20	V <sub>Nom</sub>	Pi/8-16	44.56	28.6	Pass
219.9875	30	V <sub>Nom</sub>	Pi/8-16	44.69	29.4	Pass
219.9875	40	V <sub>Nom</sub>	Pi/8-16	44.82	30.3	Pass
219.9875	50	V <sub>Nom</sub>	Pi/8-16	44.87	30.7	Pass
219.9875	20	V <sub>Min</sub>	Pi/8-16	44.63	29.04	Pass
219.9875	20	V <sub>Max</sub>	Pi/8-16	44.66	29.2	Pass

#### Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
V <sub>Nom</sub> :	10.9VDC
V <sub>Min</sub> :	13.6VDC
V <sub>Max</sub> :	15.5VDC

**Test Setup Photo(s)**



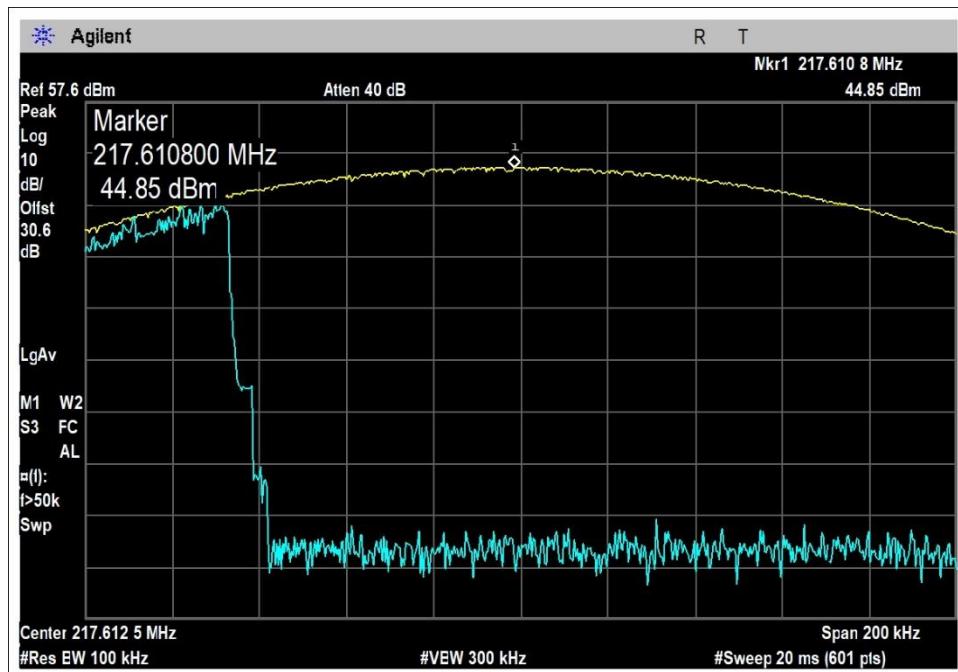
View 1



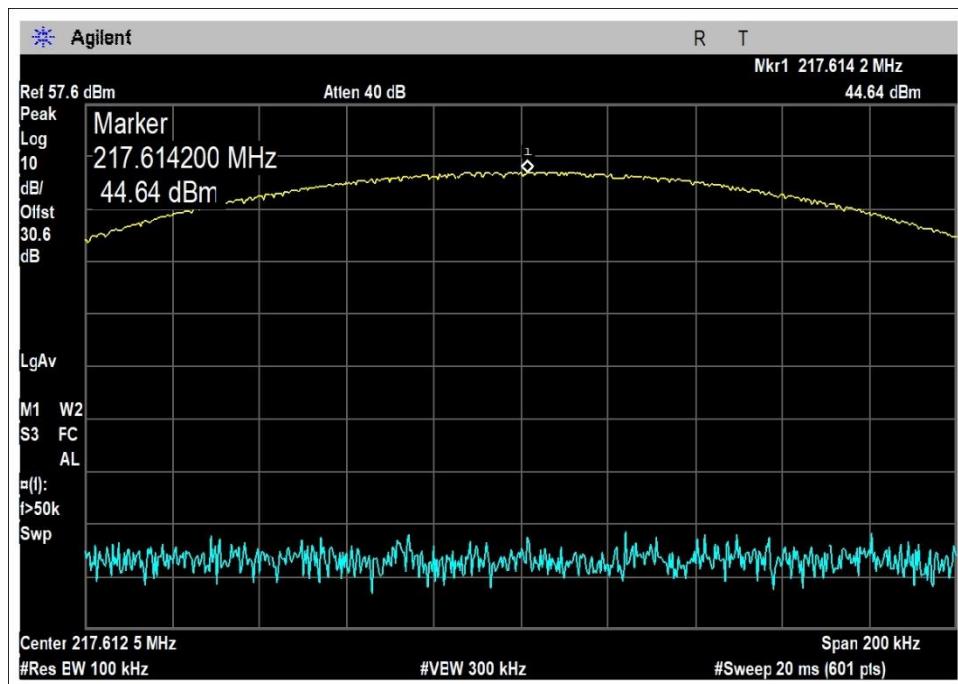
View 2

## Test Plot(s)

### Channel 1

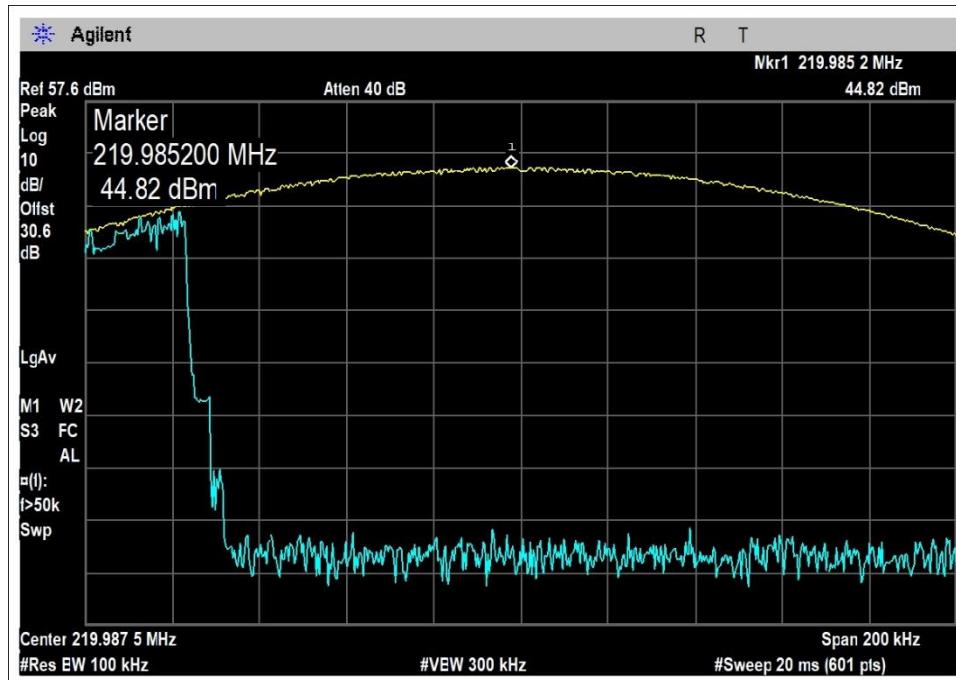


Pi/8

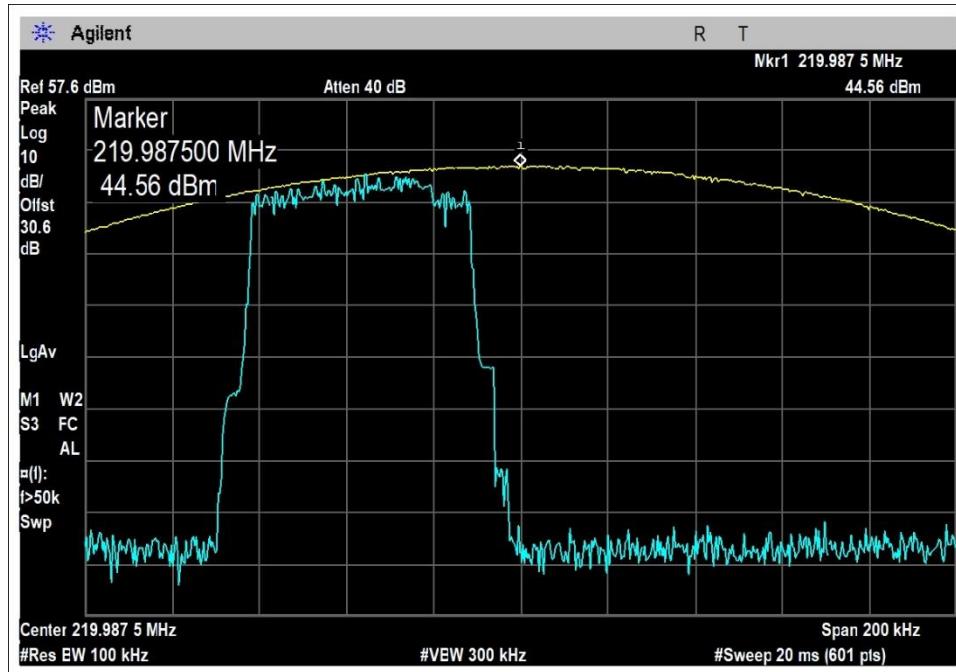


Pi/8-16

## Channel 96



Pi/8



Pi/8-16

## Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	2/13/2025
Configuration:	2		
Test Setup:	<p>The EUT's RF port is connected to a spectrum analyzer directly with appropriate attenuation. The EUT is transmitting continuously with its normal duty cycle, pi/8 and pi/8-16 modulations investigated.</p> <p>Per the manufacturer the manufacturer declares a 20kHz per 80.205, the bandwidth limitations are outside the scope of Part 80 based on the emission designator for this equipment, it will be up to the licensee to ensure the bandwidth/designator is used as appropriately licensed.</p>		

Environmental Conditions			
Temperature (°C)	21.4	Relative Humidity (%):	18

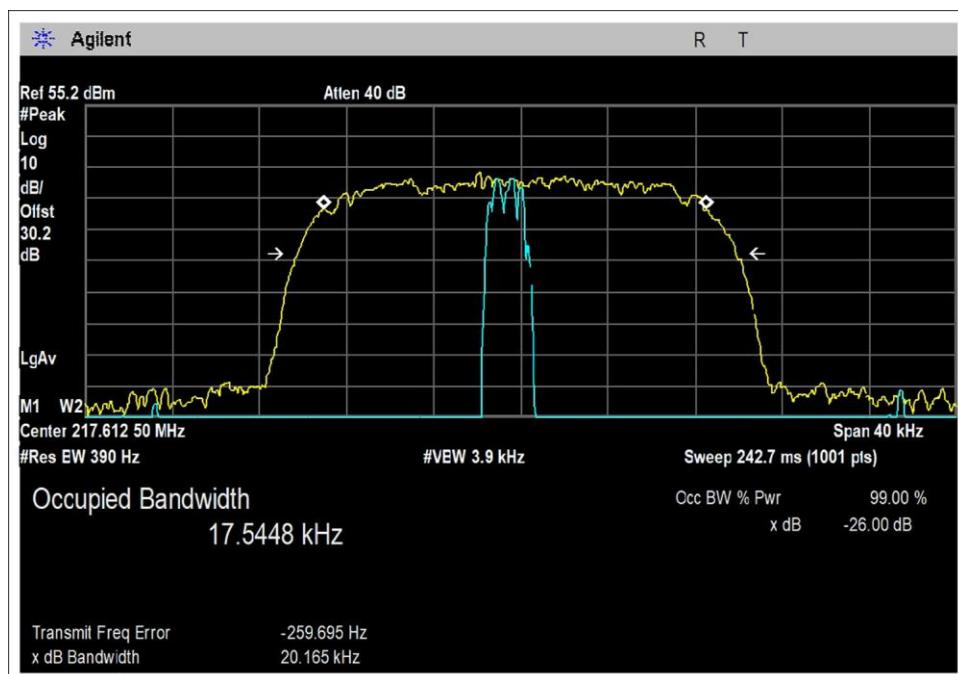
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
03807	Spectrum Analyzer	Agilent	E4440A	10/10/2023	10/10/2025
P06452	Cable	Andrews	Heliax	1/27/2025	1/27/2027
C00194	30db Attenuator	Fairview Microwave	SA3N1007-30	9/26/2024	9/26/2026

### 99% Occupied Bandwidth

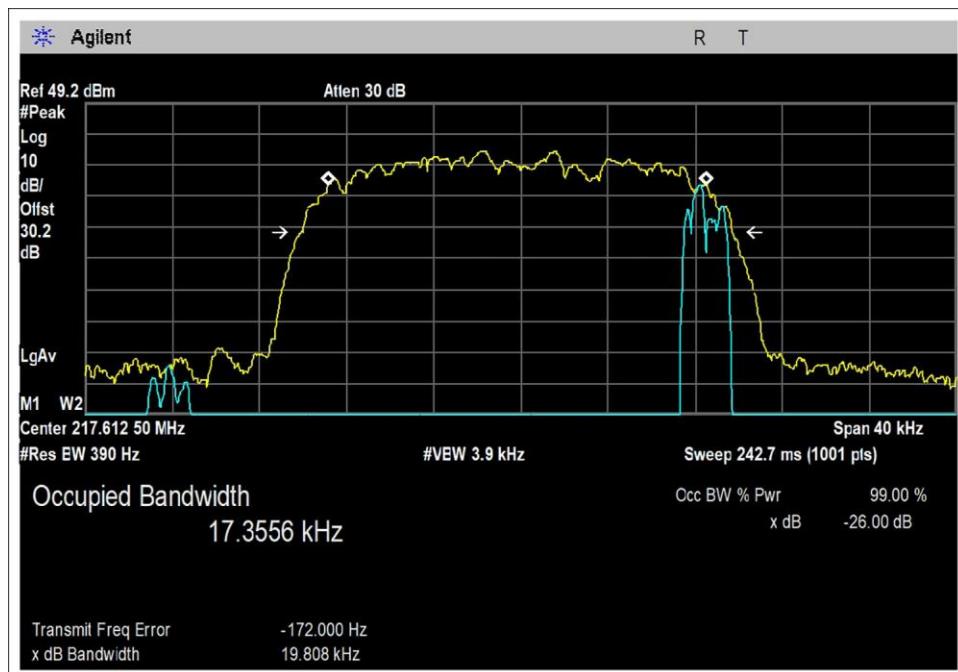
Test Data Summary				
Frequency (MHz)	Modulation	Measured (kHz)	Limit (kHz)	Results
217.6125	Pi/8	17.54	20kHz	Pass
219.9875	Pi/8	17.44	20kHz	Pass
217.6125	Pi/8-16	17.36	20kHz	Pass
219.9875	Pi/8-16	17.37	20kHz	Pass

## Test Plot(s)

### Channel 1

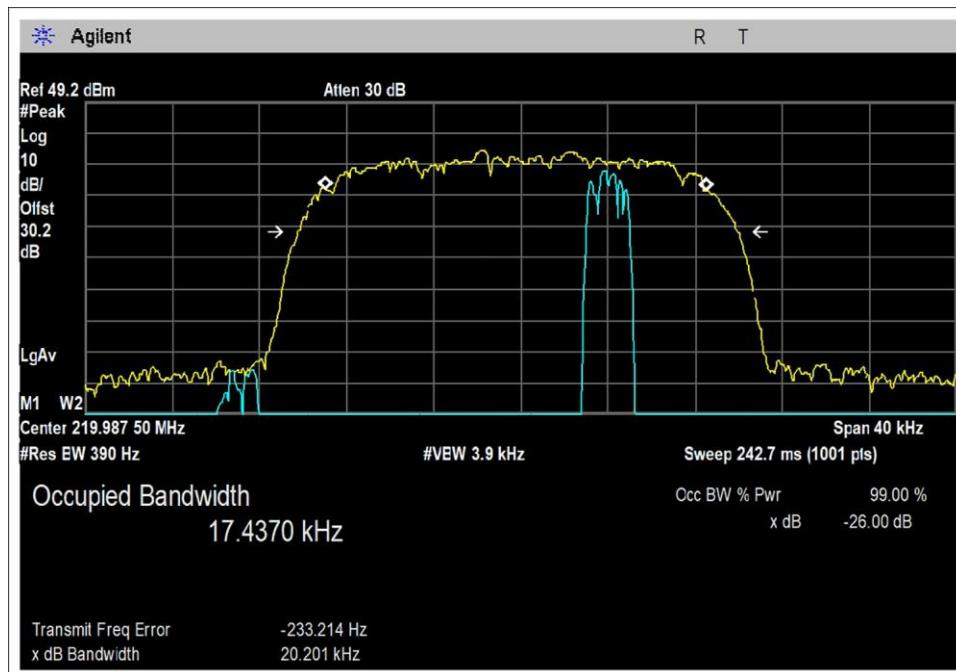


Pi/8

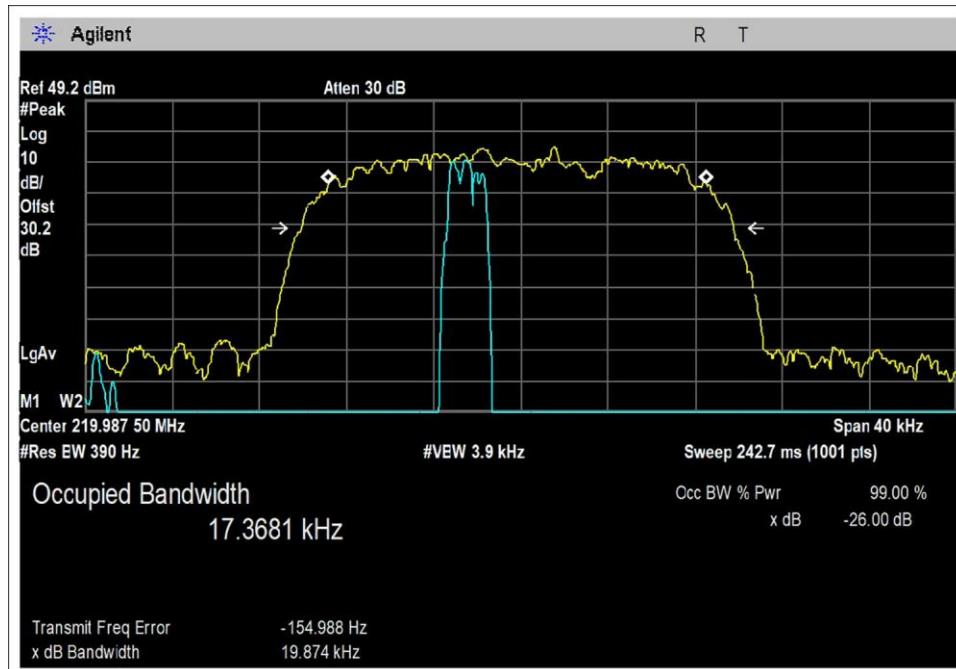


Pi/8-16

### Channel 96



Pi/8



Pi/8-16

**Test Setup Photo(s)**



## Frequency Stability

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	2/18/2025
Configuration:	2		
Test Setup:	The unit is in a temperature chamber for temperature variation. The EUT's RF port is connected to a spectrum analyzer directly with appropriate attenuation. The bandwidth settings are low enough to resolve the center frequency of the emission. Once the EUT transmitter is turned on, it is transmitting continuously with an unmodulated tone.  The limit is 5ppm from 80.209 (6) Band 216-220MHz.		

Environmental Conditions			
Temperature (°C)	21.3	Relative Humidity (%):	37

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
03803	Spectrum Analyzer	Agilent	E4440A	2/12/2024	2/12/2026
P07486	Cable	Andrews	FSJ1	7/1/2024	7/1/2026
02757	Temperature Chamber	Bemco	F100/350-8	12/8/2022	12/8/2024
C00194	30db Attenuator	Fairview Microwave	SA3N1007-30	9/26/2024	9/26/2026
03029	Thermometer, Digital Infrared	Fluke	566	4/14/2023	4/14/2025

### Test Data Summary

Modulation: CW

Temp (°C)	Voltage	Ch 1 (PPM)	Ch 96 (PPM)	Results
-30	$V_{\text{Nom}}$	0.59739	0.60003	Pass
-20	$V_{\text{Nom}}$	0.42737	0.43184	
-10	$V_{\text{Nom}}$	0.28031	0.28183	
0	$V_{\text{Nom}}$	0.21598	0.21819	
10	$V_{\text{Nom}}$	0.21598	0.21819	
20	$V_{\text{Nom}}$	0.34465	0.34547	
30	$V_{\text{Nom}}$	0.40898	0.41366	
40	$V_{\text{Nom}}$	0.59280	0.64095	
50	$V_{\text{Nom}}$	0.84094	0.78641	
20	$V_{\text{Min}}$	0.37222	0.37275	
20	$V_{\text{Max}}$	0.39520	0.40002	
Maximum Deviation		<b>0.84094</b>	<b>0.78641</b>	

#### Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
$V_{\text{Nom}}$ :	10.9VDC
$V_{\text{Min}}$ :	13.6VDC
$V_{\text{Max}}$ :	15.5VDC

**Test Setup Photo(s)**



View 1



View 2

## Conducted Spurious Emissions and Mask

Test Setup/Conditions												
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore									
Test Method:	ANSI C63.26 (2015)	Test Date(s):	2/13/2025									
Configuration:	1											
Test Setup:	<p>The EUT's RF port is connected to a spectrum analyzer directly with appropriate attenuation. The EUT is transmitting continuously with its normal duty cycle, pi/8 and pi/8-16 rate modulations investigated in separate datasheets.</p> <p>The emission mask was built with an RMS Average measurement of the fundamental, with the lowest value selected from an investigation on Ch1 and Ch96.</p> <p>Outside of the span shown in the emission mask plots, the following bandwidths were used:</p> <table> <tbody> <tr> <td>9kHz-150kHz:</td> <td>200Hz RBW</td> </tr> <tr> <td>150kHz-30MHz:</td> <td>9kHz RBW</td> </tr> <tr> <td>30-1000MHz:</td> <td>100kHz RBW</td> </tr> <tr> <td>1000MHz and above:</td> <td>1MHz RBW</td> </tr> </tbody> </table> <p>Average values as indicated on datasheet are RMS.</p> <p>Per the manufacturer the masks are built with 80.211(f), with a 20kHz ABW for pi/8 and pi/8-16, it will be the responsibility of the licensee to ensure mask applicability.</p>				9kHz-150kHz:	200Hz RBW	150kHz-30MHz:	9kHz RBW	30-1000MHz:	100kHz RBW	1000MHz and above:	1MHz RBW
9kHz-150kHz:	200Hz RBW											
150kHz-30MHz:	9kHz RBW											
30-1000MHz:	100kHz RBW											
1000MHz and above:	1MHz RBW											

Environmental Conditions			
Temperature (°C)	22	Relative Humidity (%):	46

### Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Meteorcomm LLC.**  
 Specification: **47 CFR §80 Spurious Emissions**  
 Work Order #: **111001** Date: 4/7/2025  
 Test Type: **Conducted Emissions** Time: 10:15:39  
 Tested By: M. Atkinson Sequence#: 3  
 Software: EMITest 5.03.20 120V 60Hz

***Equipment Tested:***

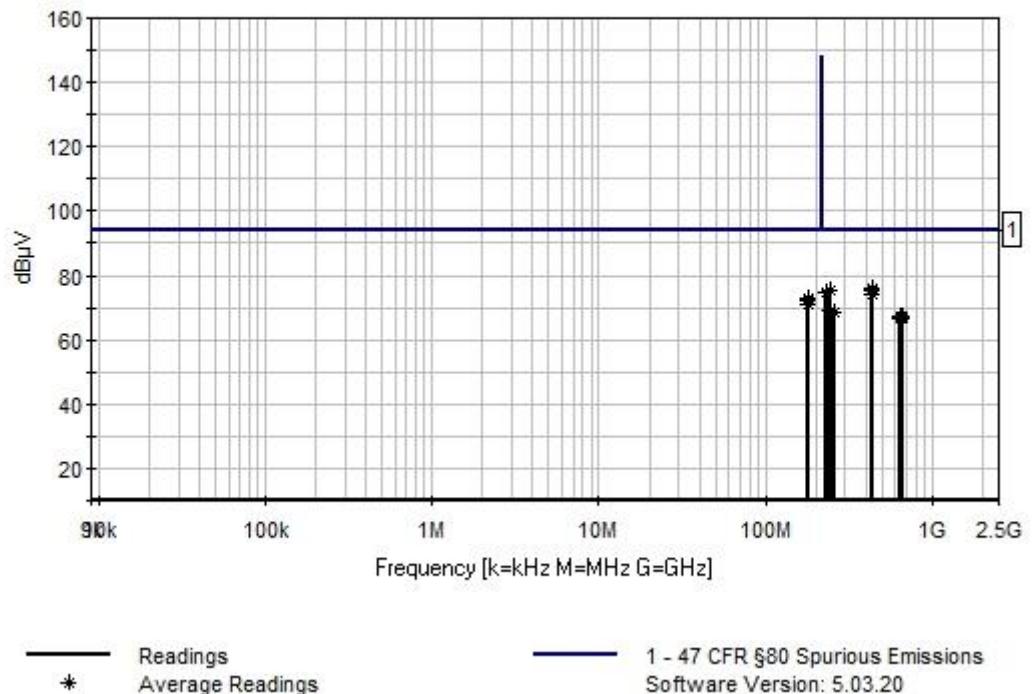
Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions:
Temperature: 21-22°C
Humidity: 40-47%
Pressure: 100.5-101.5kPa
Frequency: 9kHz-2.5GHz
Test Method: ANSI 63.26
Test Setup:
EUT set up on test bench connected directly to spectrum analyzer with 30db attenuator.
EUT running 10% duty cycle.
RMS detector data collected with max hold and 10 second sweep.

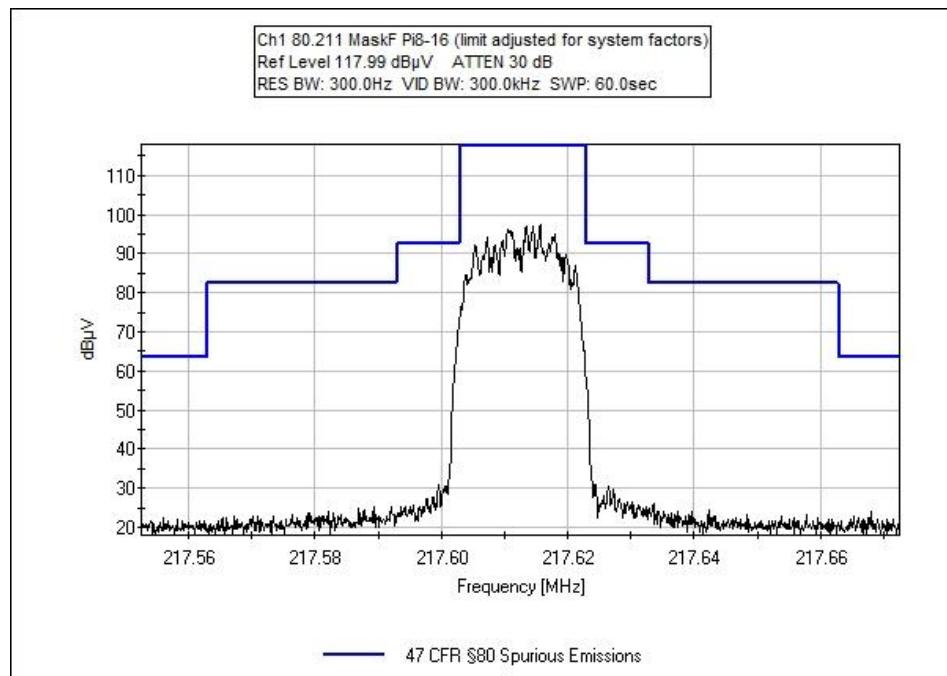
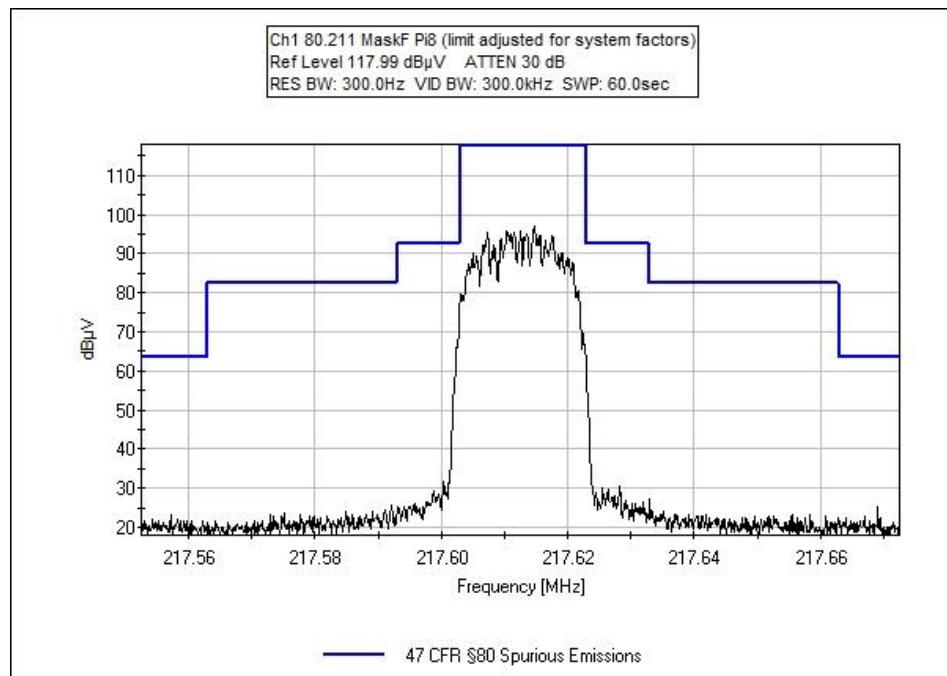
Meteorcomm LLC. WO#: 111001 Sequence#: 3 Date: 4/7/2025  
 47 CFR §80 Spurious Emissions Test Lead: 120V 60Hz ANT

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANC00194	Attenuator	SA3N1007-30	9/26/2024	9/26/2026
T2	ANP05541	Cable	Heliax	4/2/2025	4/2/2027
T3	AN03829	Spectrum Analyzer	E4440A	2/13/2025	2/13/2027

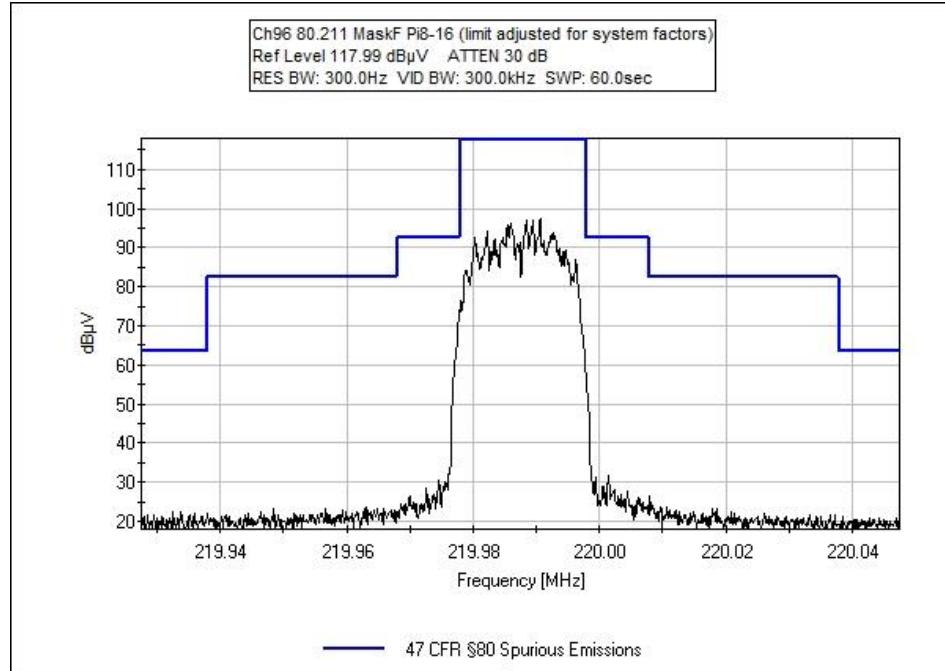
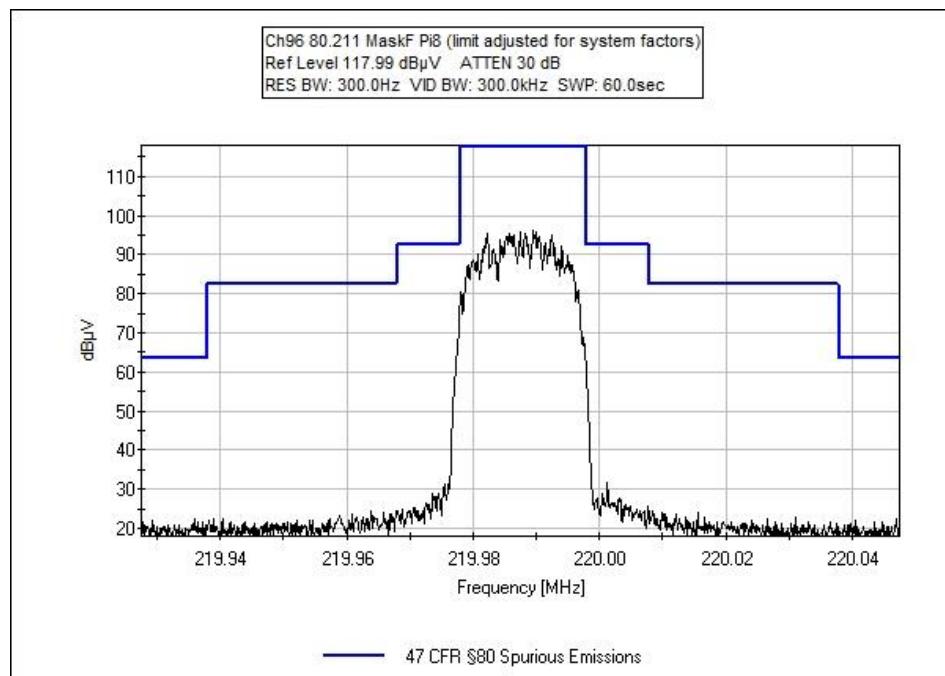
<b>Measurement Data:</b>			Reading listed by margin.				Test Lead: ANT				
#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant	
1	439.973M Ave	45.1	+30.0	+0.6	+0.0	+0.0	75.7	94.0	-18.3	ANT	
							Ch96 Pi8				
2	439.975M Ave	44.8	+30.0	+0.6	+0.0	+0.0	75.4	94.0	-18.6	ANT	
							Ch96 Pi8-16				
3	241.730M Ave	44.8	+29.9	+0.5	+0.0	+0.0	75.2	94.0	-18.8	ANT	
							Ch1 Pi8-16				
4	232.160M Ave	44.1	+29.9	+0.5	+0.0	+0.0	74.5	94.0	-19.5	ANT	
							Ch96 Pi8-16				
5	435.226M Ave	43.5	+30.0	+0.6	+0.0	+0.0	74.1	94.0	-19.9	ANT	
							Ch1 Pi8-16				
6	435.227M Ave	43.3	+30.0	+0.6	+0.0	+0.0	73.9	94.0	-20.1	ANT	
							Ch1 Pi8				
7	182.110M Ave	42.3	+29.9	+0.4	+0.0	+0.0	72.6	94.0	-21.4	ANT	
							Ch96 Pi8-16				
8	179.400M Ave	42.0	+29.9	+0.4	+0.0	+0.0	72.3	94.0	-21.7	ANT	
							Ch96 Pi8				
9	180.900M Ave	40.7	+29.9	+0.4	+0.0	+0.0	71.0	94.0	-23.0	ANT	
							Ch1 Pi8-16				
10	178.200M Ave	40.4	+29.9	+0.4	+0.0	+0.0	70.7	94.0	-23.3	ANT	
							Ch1 Pi8				
11	246.300M Ave	38.7	+29.9	+0.5	+0.0	+0.0	69.1	94.0	-24.9	ANT	
							Ch1 Pi8				
12	256.500M Ave	38.3	+29.9	+0.5	+0.0	+0.0	68.7	94.0	-25.3	ANT	
							Ch96 Pi8				
13	652.833M Ave	36.5	+30.0	+0.8	+0.0	+0.0	67.3	94.0	-26.7	ANT	
							Ch1 Pi8				
14	659.971M Ave	36.2	+30.0	+0.8	+0.0	+0.0	67.0	94.0	-27.0	ANT	
							Ch96 Pi8				
15	652.830M Ave	35.8	+30.0	+0.8	+0.0	+0.0	66.6	94.0	-27.4	ANT	
							Ch1 Pi8-16				
16	659.963M Ave	35.6	+30.0	+0.8	+0.0	+0.0	66.4	94.0	-27.6	ANT	
							Ch96 Pi8-16				

## Test Plot(s)

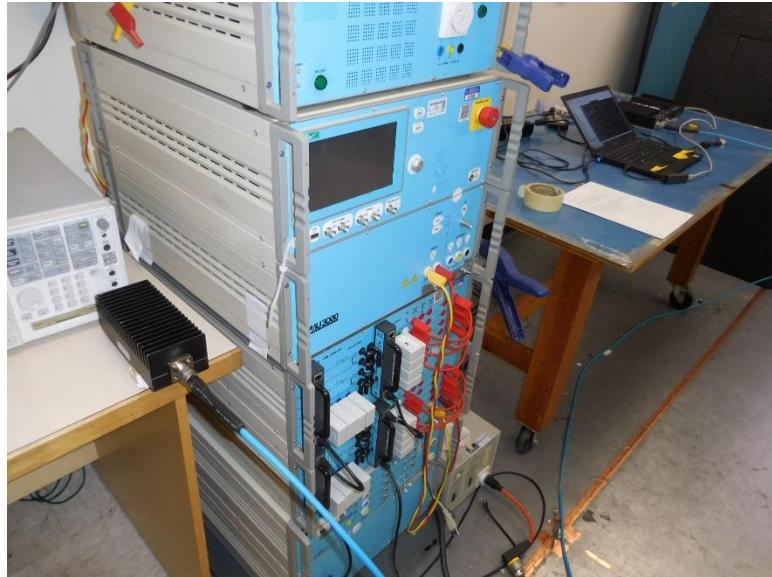
### Channel 1



**Channel 96**



**Test Setup Photo(s)**



## Radiated Spurious Emissions

Test Setup/Conditions												
Test Location:	Bothell Lab C3	Test Engineer:	M. Atkinson									
Test Method:	ANSI C63.26 (2015)	Test Date(s):	2/17/2025									
Configuration:	1											
Test Setup:	<p>The emission mask was built with an RMS Average measurement of the fundamental, with the lowest value selected from an investigation on Ch1 and Ch96 on both modulations investigated in this report. The mask was then converted in terms of field strength for a 3m measurement.</p> <p>All data recorded are peak values as worst case. 3 x orthogonal antenna axes investigated below 30MHz, worst case reported. Horizontal and Vertical antenna polarities investigated above 30MHz, worst case reported.</p> <p>Outside of the span shown in the emission mask plots, the following bandwidths were used:</p> <table> <tr> <td>9kHz-150kHz:</td><td>200Hz RBW</td></tr> <tr> <td>150kHz-30MHz:</td><td>9kHz RBW</td></tr> <tr> <td>30-1000MHz:</td><td>120kHz RBW</td></tr> <tr> <td>1000MHz and above:</td><td>1MHz RBW</td></tr> </table> <p>For the final tabular converted to dBm uses equation (d) from ANSI C63.26 (2015) 5.2.7:</p> <p>EIRP (dBm) = <math>E</math> (dB<math>\mu</math>V/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.</p> <p>Per 80.211f:</p> <ul style="list-style-type: none"> <li>(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;</li> <li>(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and</li> <li>(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log<sub>10</sub> (mean power in watts) dB.</li> </ul> <p>Limit = Power – Required Attenuation  = 10 Log P – (43 +10Log P)  = 10 Log P – 43 – 10Log P  = -43 dBW  = 0.00005W (0.05mW)  = 10 Log 0.00005/0.001  = -13dBm (94dB<math>\mu</math>V) at any power level.</p>				9kHz-150kHz:	200Hz RBW	150kHz-30MHz:	9kHz RBW	30-1000MHz:	120kHz RBW	1000MHz and above:	1MHz RBW
9kHz-150kHz:	200Hz RBW											
150kHz-30MHz:	9kHz RBW											
30-1000MHz:	120kHz RBW											
1000MHz and above:	1MHz RBW											

<b>Environmental Conditions</b>					
Temperature (°C)	21-22	Relative Humidity (%):		35-36	

<b>Test Equipment</b>					
<b>Asset#</b>	<b>Description</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Cal Date</b>	<b>Cal Due</b>
02673	Spectrum Analyzer	Agilent	E4446A	3/8/2024	3/8/2026
P05546	Cable	Andrews	Heliax	5/9/2024	5/9/2026
P05360	Cable	Belden	RG214	1/7/2025	1/7/2027
03824	Biconilog Antenna	ETS-Lindgren	3142E	5/9/2023	5/9/2025
01316	Preamp	HP	8447D2	5/25/2024	5/25/2026
P05333	Cable	Andrews	Heliax	1/8/2025	1/8/2027
P06515	Cable	Andrews	Heliax	1/8/2025	1/8/2027
00052	Loop Antenna	EMCO	6502	4/19/2024	4/19/2026
02374ANSI	Horn Antenna	Electrometrics	RGA-60	1/8/2025	1/8/2027
03540	Preamp	HP	83017A	1/7/2025	1/7/2027
P08205	Flex Cable	Mini-Circuits	CBL-6FT-NMNM+	1/22/2025	1/22/2027

## Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Meteorcomm LLC.**  
 Specification: **47 CFR §80.211(f) Spurious Emissions**  
 Work Order #: **111001** Date: 2/17/2025  
 Test Type: **Maximized Emissions** Time: 12:20:30  
 Tested By: M. Atkinson Sequence#: 4  
 Software: EMITest 5.03.20

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions:

Temperature: 21.5°C

Humidity: 36.0%

Pressure: 102.0kPa:

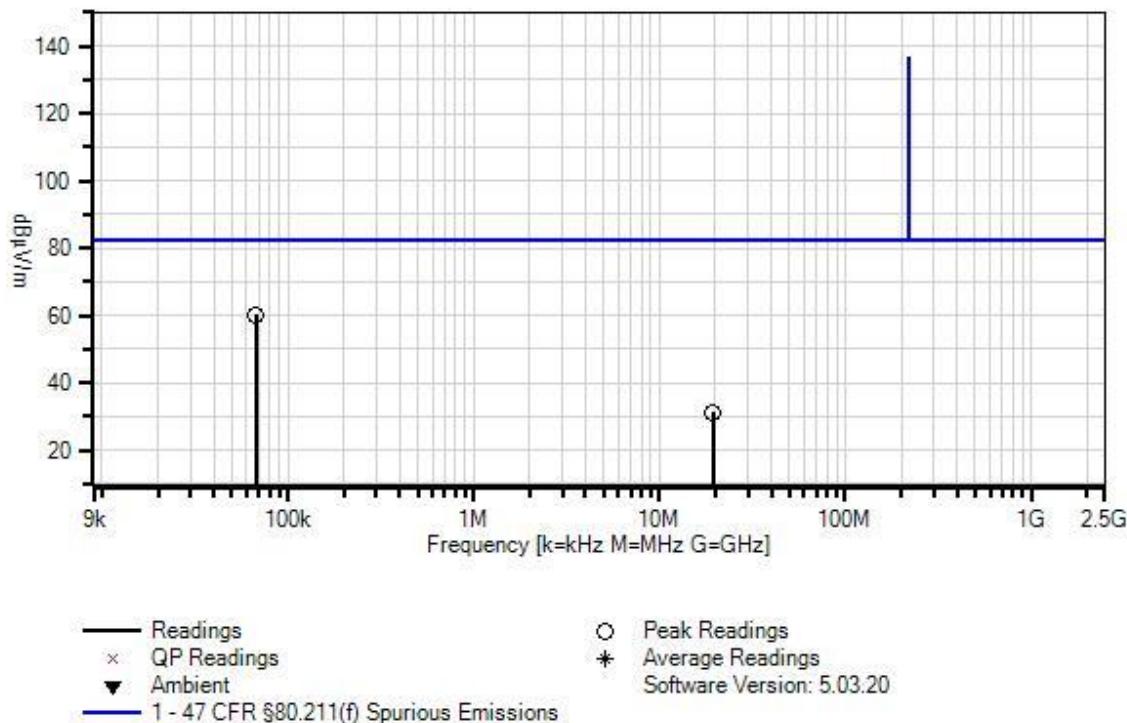
Frequency: 9kHz-30MHz

Test Method: ANSI C63.26(2015)

Test Setup:

Transmit mode, antenna terminated.

Pi/8 Modulation.

Meteorcomm LLC, WO#: 111001 Sequence#: 4 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters Various

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T1	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T2	ANP06515	Cable	Heliax	1/8/2025	1/8/2027
T3	AN00052	Loop Antenna	6502	4/19/2024	4/19/2026

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	67.092k	50.4	+0.0	+0.0	+9.8		+0.0	60.2	82.2	-22.0	Perp
2	19.400M	22.8	+0.1	+0.2	+8.2		+0.0	31.3	82.2	-50.9	GndPe



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
Customer: **Meteorcomm LLC.**  
Specification: **47 CFR §80.211(f) Spurious Emissions**  
Work Order #: **111001** Date: 2/17/2025  
Test Type: **Maximized Emissions** Time: 12:29:01  
Tested By: M. Atkinson Sequence#: 5  
Software: EMITest 5.03.20

***Equipment Tested:***

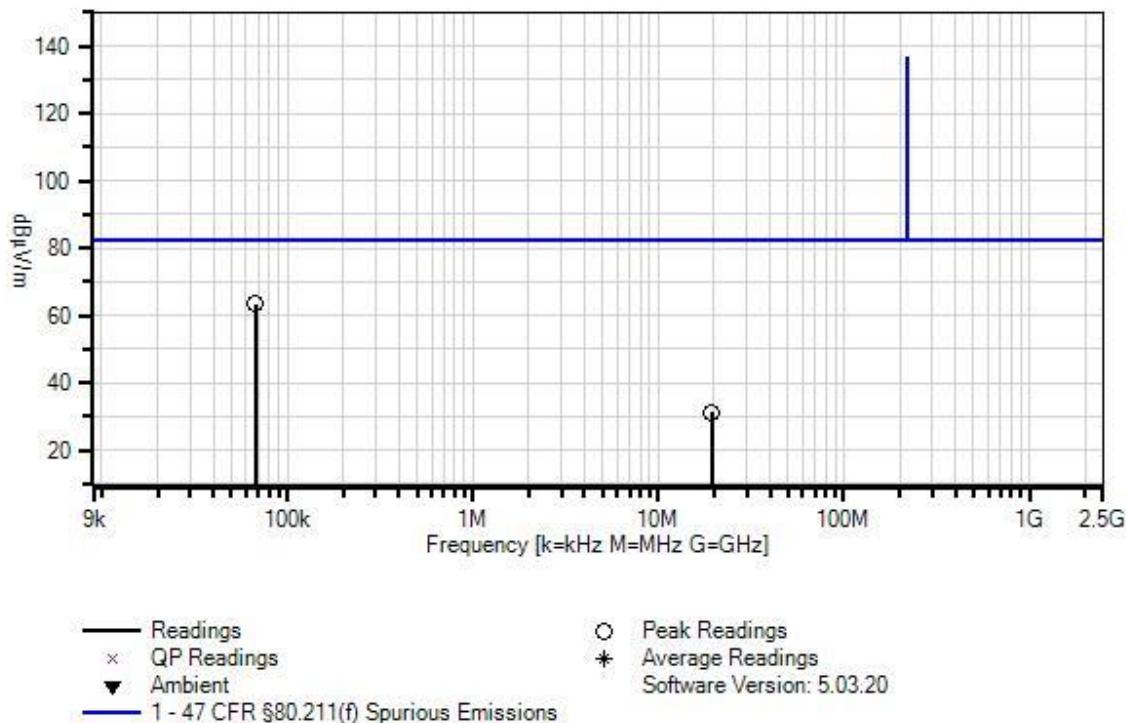
Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions: Temperature: 21.5°C Humidity: 36.0% Pressure: 102.0kPa:  Frequency: 9kHz-30MHz  Test Method: ANSI C63.26(2015)  Test Setup: Transmit mode, antenna terminated.  Pi/8-16 Modulation
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Meteorcomm LLC, WO#: 111001 Sequence#: 5 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters Various

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T1	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T2	ANP06515	Cable	Heliax	1/8/2025	1/8/2027
T3	AN00052	Loop Antenna	6502	4/19/2024	4/19/2026

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	67.233k	53.7	+0.0	+0.0	+9.8		+0.0	63.5	82.2	-18.7	Para
2	19.380M	22.7	+0.1	+0.2	+8.2		+0.0	31.2	82.2	-51.0	GndPe



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
Customer: **Meteorcomm LLC.**  
Specification: **47 CFR §80.211(f) Spurious Emissions**  
Work Order #: **111001** Date: 2/17/2025  
Test Type: **Maximized Emissions** Time: 10:51:16  
Tested By: M. Atkinson Sequence#: 1  
Software: EMITest 5.03.20

***Equipment Tested:***

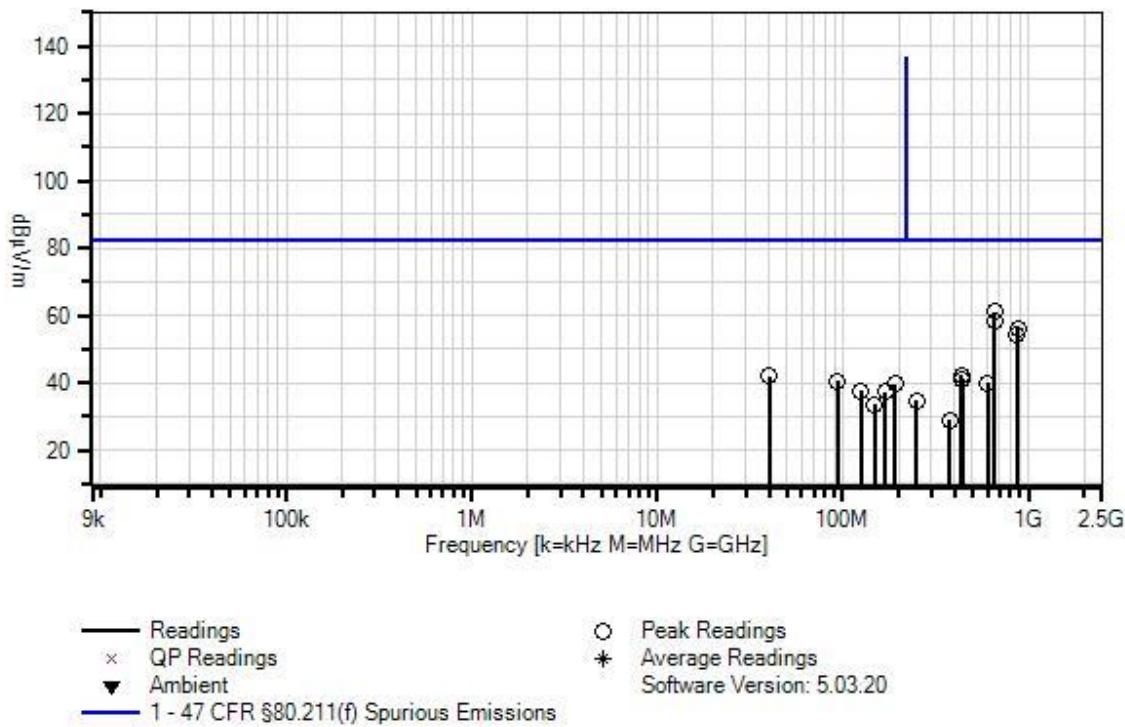
Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions: Temperature: 21.5°C Humidity: 36.0% Pressure: 102.0kPa:  Frequency: 30-1000MHz  Test Method: ANSI C63.26(2015)  Test Setup: Transmit mode, antenna terminated.  Pi/8 Modulation
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Meteorcomm LLC. WO#: 111001 Sequence#: 1 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters H+V

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T2	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T3	ANP05360	Cable	RG214	1/7/2025	1/7/2027
T4	AN03824	Biconilog Antenna	3142E	5/9/2023	5/9/2025
T5	AN01316	Preamp	8447D	5/25/2024	5/25/2026
T6	ANP05333	Cable	Heliax	1/8/2025	1/8/2027

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	659.968M	58.7	+0.0	+0.5	+2.5	+27.7	+0.0	61.0	82.2	-21.2	Vert
			-29.6	+1.2							Ch96
2	652.850M	56.0	+0.0	+0.5	+2.5	+27.6	+0.0	58.2	82.2	-24.0	Vert
			-29.6	+1.2							Ch1
3	879.976M	51.6	+0.0	+0.6	+2.6	+28.9	+0.0	56.2	82.2	-26.0	Vert
			-28.9	+1.4							Ch96
4	870.450M	49.6	+0.0	+0.6	+2.6	+29.0	+0.0	54.3	82.2	-27.9	Horiz
			-28.9	+1.4							Ch1
5	435.200M	45.3	+0.0	+0.4	+1.5	+23.1	+0.0	42.2	82.2	-40.0	Horiz
			-29.1	+1.0							Ch1
6	39.900M	53.9	+0.0	+0.2	+0.3	+16.3	+0.0	41.8	82.2	-40.4	Vert
			-29.2	+0.3							
7	439.981M	44.4	+0.0	+0.4	+1.5	+23.0	+0.0	41.1	82.2	-41.1	Horiz
			-29.2	+1.0							Ch96
8	93.900M	55.2	+0.0	+0.2	+0.6	+13.1	+0.0	40.4	82.2	-41.8	Vert
			-29.2	+0.5							Ch1
9	600.000M	38.5	+0.0	+0.5	+2.2	+26.9	+0.0	39.8	82.2	-42.4	Vert
			-29.5	+1.2							
10	190.740M	51.1	+0.0	+0.3	+0.9	+15.3	+0.0	39.6	82.2	-42.6	Horiz
			-28.7	+0.7							
11	124.940M	52.0	+0.0	+0.3	+0.6	+13.3	+0.0	37.7	82.2	-44.5	Horiz
			-29.0	+0.5							
12	170.100M	49.2	+0.0	+0.3	+0.8	+15.3	+0.0	37.3	82.2	-44.9	Vert
			-28.9	+0.6							
13	249.960M	42.7	+0.0	+0.4	+1.0	+18.2	+0.0	34.7	82.2	-47.5	Horiz
			-28.4	+0.8							
14	148.400M	45.9	+0.0	+0.3	+0.7	+14.8	+0.0	33.4	82.2	-48.8	Vert
			-28.9	+0.6							
15	375.000M	33.3	+0.0	+0.4	+1.3	+21.9	+0.0	29.0	82.2	-53.2	Vert
			-28.9	+1.0							

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Meteorcomm LLC.**  
 Specification: **47 CFR §80.211(f) Spurious Emissions**  
 Work Order #: **111001** Date: **2/17/2025**  
 Test Type: **Maximized Emissions** Time: **11:34:28**  
 Tested By: M. Atkinson Sequence#: **2**  
 Software: EMITest 5.03.20

***Equipment Tested:***

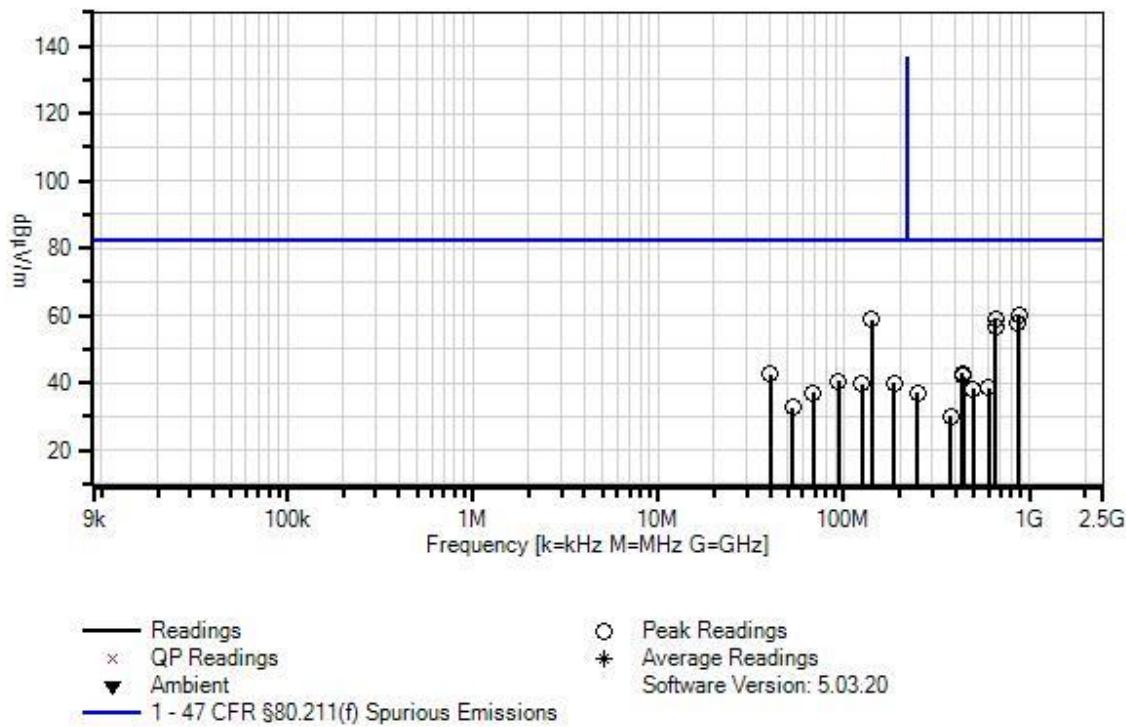
<b>Device</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>S/N</b>
Configuration 1			

***Support Equipment:***

<b>Device</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>S/N</b>
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions:
Temperature: 21.5°C
Humidity: 36.0%
Pressure: 102.0kPa:
Frequency: 30-1000MHz
Test Method: ANSI C63.26(2015)
Test Setup: Transmit mode, antenna terminated.
Pi/8-16 Modulation

Meteorcomm LLC. WO#: 111001 Sequence#: 2 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters H+V

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T2	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T3	ANP05360	Cable	RG214	1/7/2025	1/7/2027
T4	AN03824	Biconilog Antenna	3142E	5/9/2023	5/9/2025
T5	AN01316	Preamp	8447D	5/25/2024	5/25/2026
T6	ANP05333	Cable	Heliax	1/8/2025	1/8/2027

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	879.882M	55.6	+0.0	+0.6	+2.6	+28.9	+0.0	60.2	82.2	-22.0	Vert
			-28.9	+1.4						Ch96	
2	652.856M	56.9	+0.0	+0.5	+2.5	+27.6	+0.0	59.1	82.2	-23.1	Vert
			-29.6	+1.2						Ch1	
3	141.860M	72.3	+0.0	+0.3	+0.7	+13.9	+0.0	58.7	82.2	-23.5	Vert
			-29.0	+0.5							
4	870.448M	52.8	+0.0	+0.6	+2.6	+29.0	+0.0	57.5	82.2	-24.7	Vert
			-28.9	+1.4						Ch1	
5	659.940M	54.3	+0.0	+0.5	+2.5	+27.7	+0.0	56.6	82.2	-25.6	Vert
			-29.6	+1.2						Ch96	
6	435.219M	46.0	+0.0	+0.4	+1.5	+23.1	+0.0	42.9	82.2	-39.3	Horiz
			-29.1	+1.0						Ch1	
7	40.340M	54.8	+0.0	+0.2	+0.3	+16.1	+0.0	42.5	82.2	-39.7	Vert
			-29.2	+0.3							
8	439.967M	45.2	+0.0	+0.4	+1.5	+23.0	+0.0	41.9	82.2	-40.3	Horiz
			-29.2	+1.0						Ch 96	
9	93.920M	55.4	+0.0	+0.2	+0.6	+13.1	+0.0	40.6	82.2	-41.6	Vert
			-29.2	+0.5							
10	186.510M	51.0	+0.0	+0.3	+0.9	+15.6	+0.0	39.8	82.2	-42.4	Horiz
			-28.7	+0.7							
11	124.940M	53.9	+0.0	+0.3	+0.6	+13.3	+0.0	39.6	82.2	-42.6	Vert
			-29.0	+0.5							
12	600.000M	37.2	+0.0	+0.5	+2.2	+26.9	+0.0	38.5	82.2	-43.7	Vert
			-29.5	+1.2							
13	500.000M	39.8	+0.0	+0.5	+1.7	+24.5	+0.0	38.3	82.2	-43.9	Vert
			-29.3	+1.1							
14	68.540M	52.3	+0.0	+0.2	+0.4	+13.0	+0.0	37.0	82.2	-45.2	Vert
			-29.3	+0.4							
15	249.960M	44.9	+0.0	+0.4	+1.0	+18.2	+0.0	36.9	82.2	-45.3	Horiz
			-28.4	+0.8							
16	53.030M	48.7	+0.0	+0.2	+0.4	+12.2	+0.0	32.6	82.2	-49.6	Vert
			-29.2	+0.3							
17	374.980M	34.2	+0.0	+0.4	+1.3	+21.9	+0.0	29.9	82.2	-52.3	Vert
			-28.9	+1.0							

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Meteorcomm LLC.**  
 Specification: **47 CFR §80.211(f) Spurious Emissions**  
 Work Order #: **111001** Date: **2/17/2025**  
 Test Type: **Maximized Emissions** Time: **14:11:52**  
 Tested By: M. Atkinson Sequence#: **7**  
 Software: EMITest 5.03.20

***Equipment Tested:***

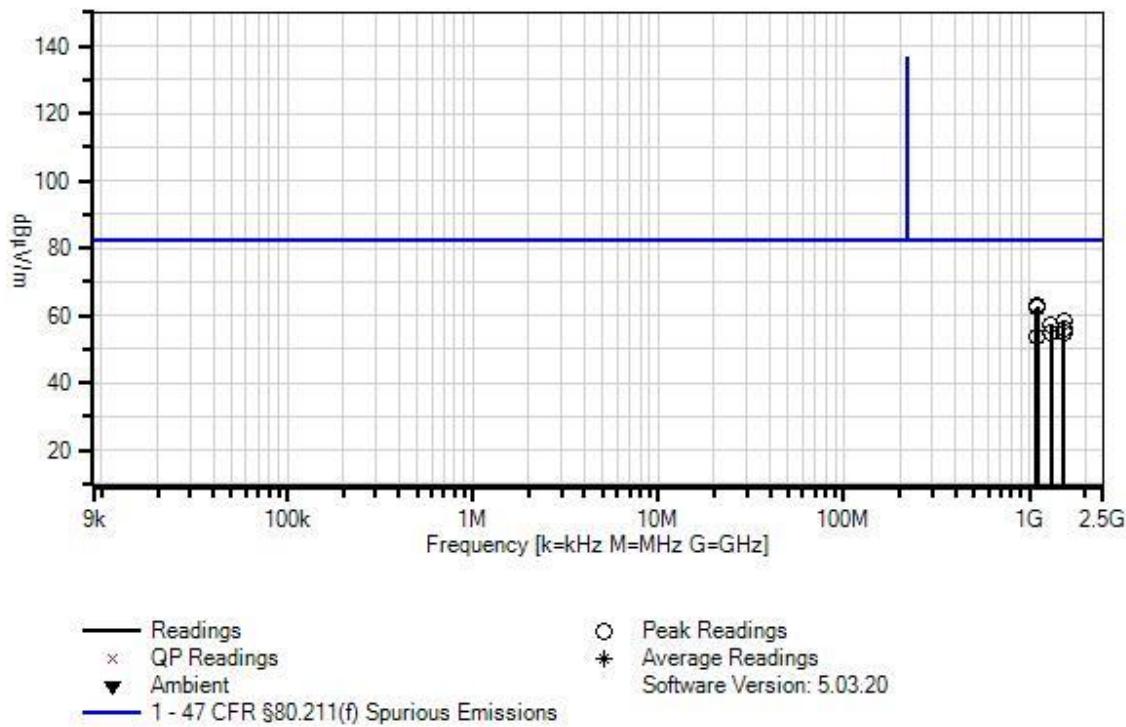
<b>Device</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>S/N</b>
Configuration 1			

***Support Equipment:***

<b>Device</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>S/N</b>
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions:
Temperature: 21.5°C
Humidity: 36.0%
Pressure: 102.0kPa:
Frequency: 1-2.5GHz
Test Method: ANSI C63.26(2015)
Test Setup:
Transmit mode, antenna terminated.
Pi/8 Modulation

Meteorcomm LLC. WO#: 111001 Sequence#: 7 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters H+V

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T2	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T3	ANP05333	Cable	Heliax	1/8/2025	1/8/2027
T4	AN02374ANSI	Horn Antenna	RGA-60	1/8/2025	1/8/2027
T5	AN03540	Preamp	83017A	1/7/2025	1/7/2027
T6	ANP08205	Cable	CBL-6FT-NMNM+	1/22/2025	1/22/2027

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
			MHz	dB $\mu$ V	dB	dB	dB			dB	Ant
1	1099.994M	72.3	+0.0	+0.7	+1.6	+24.5	+0.0	62.7	82.2	-19.5	Vert
			-37.0	+0.6							Ch96
2	1088.076M	72.1	+0.0	+0.7	+1.6	+24.4	+0.0	62.3	82.2	-19.9	Vert
			-37.1	+0.6							Ch1
3	1523.132M	65.0	+0.0	+0.9	+1.9	+25.4	+0.0	58.4	82.2	-23.8	Horiz
			-35.5	+0.7							Ch1
4	1305.723M	64.6	+0.0	+0.8	+1.7	+25.4	+0.0	57.1	82.2	-25.1	Vert
			-36.1	+0.7							Ch1
5	1539.786M	62.3	+0.0	+0.9	+1.9	+25.5	+0.0	55.8	82.2	-26.4	Horiz
			-35.5	+0.7							Ch96
6	1305.000M	62.5	+0.0	+0.8	+1.7	+25.4	+0.0	55.0	82.2	-27.2	Horiz
			-36.1	+0.7							Ch1
7	1540.010M	61.2	+0.0	+0.9	+1.9	+25.5	+0.0	54.7	82.2	-27.5	Vert
			-35.5	+0.7							Ch96
8	1107.340M	63.2	+0.0	+0.7	+1.6	+24.6	+0.0	53.7	82.2	-28.5	Vert
			-37.0	+0.6							Ch1 (not harm)
9	1105.930M	63.2	+0.0	+0.7	+1.6	+24.6	+0.0	53.7	82.2	-28.5	Vert
			-37.0	+0.6							Ch96 (not harm)



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
Customer: **Meteorcomm LLC.**  
Specification: **47 CFR §80.211(f) Spurious Emissions**  
Work Order #: **111001** Date: 2/17/2025  
Test Type: **Maximized Emissions** Time: 14:58:59  
Tested By: M. Atkinson Sequence#: 8  
Software: EMITest 5.03.20

***Equipment Tested:***

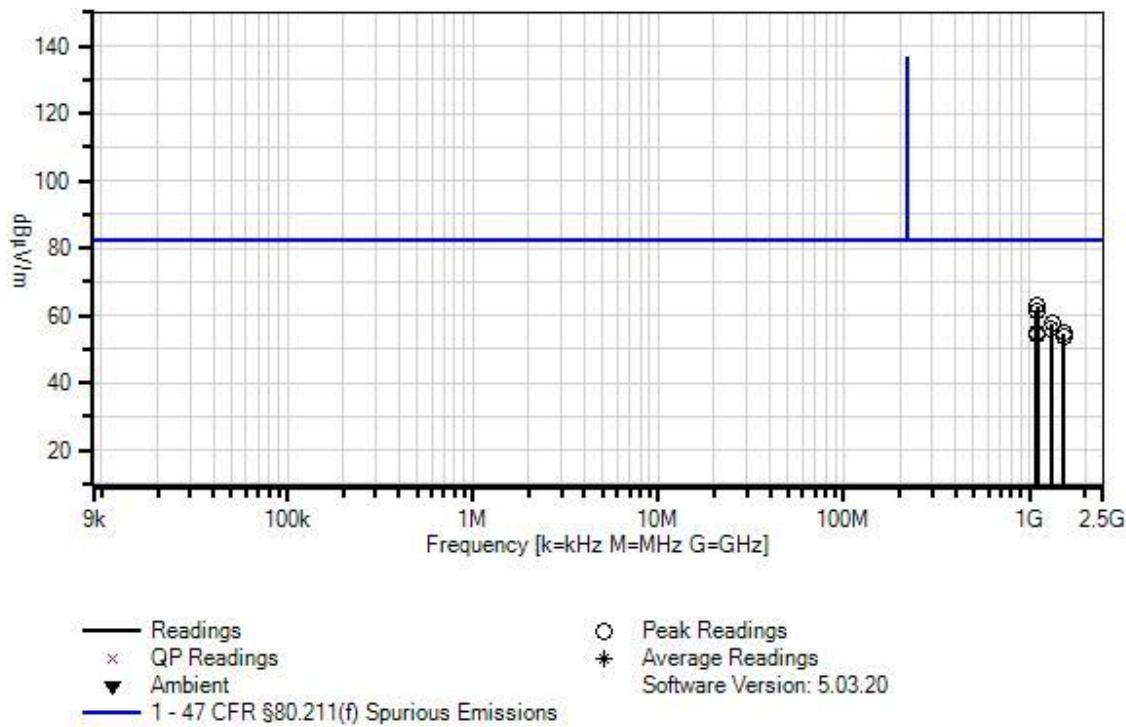
Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions: Temperature: 21.5°C Humidity: 36.0% Pressure: 102.0kPa:  Frequency: 1-2.5GHz
Test Method: ANSI C63.26(2015)
Test Setup: Transmit mode, antenna terminated.  Pi/8-16 Modulation

Meteorcomm LLC. WO#: 111001 Sequence#: 8 Date: 2/17/2025  
 47 CFR §80.211(f) Spurious Emissions Test Distance: 3 Meters H+V

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T2	ANP05546	Cable	Heliax	5/9/2024	5/9/2026
T3	ANP05333	Cable	Heliax	1/8/2025	1/8/2027
T4	AN02374ANSI	Horn Antenna	RGA-60	1/8/2025	1/8/2027
T5	AN03540	Preamp	83017A	1/7/2025	1/7/2027
T6	ANP08205	Cable	CBL-6FT-NMNM+	1/22/2025	1/22/2027

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
			MHz	dB $\mu$ V	dB	dB	dB	Table	dB $\mu$ V/m	dB	Ant
1	1100.140M	72.5	+0.0	+0.7	+1.6	+24.5	+0.0	62.9	82.2	-19.3	Vert
			-37.0	+0.6							Ch96
2	1087.810M	71.2	+0.0	+0.7	+1.6	+24.4	+0.0	61.4	82.2	-20.8	Vert
			-37.1	+0.6							Ch1
3	1319.980M	64.9	+0.0	+0.8	+1.8	+25.5	+0.0	57.6	82.2	-24.6	Vert
			-36.1	+0.7							Ch96
4	1305.620M	63.7	+0.0	+0.8	+1.7	+25.4	+0.0	56.2	82.2	-26.0	Vert
			-36.1	+0.7							Ch1
5	1523.440M	61.3	+0.0	+0.9	+1.9	+25.4	+0.0	54.7	82.2	-27.5	Horiz
			-35.5	+0.7							Ch1
6	1099.900M	64.2	+0.0	+0.7	+1.6	+24.5	+0.0	54.6	82.2	-27.6	Horiz
			-37.0	+0.6							Ch96
7	1103.420M	63.8	+0.0	+0.7	+1.6	+24.5	+0.0	54.2	82.2	-28.0	Vert
			-37.0	+0.6							Ch96 (not harm)
8	1539.570M	60.0	+0.0	+0.9	+1.9	+25.5	+0.0	53.5	82.2	-28.7	Horiz
			-35.5	+0.7							Ch96

**Test Data Summary (9kHz-30MHz) PI/8 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
0.067	60.2	-35.0	-13	Pass
19.4	31.3	-63.9	-13	Pass

**Test Data Summary (30-1000MHz) PI/8 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
39.9	41.8	-53.4	-13	Pass
93.9	40.4	-54.8	-13	Pass
124.94	37.7	-57.5	-13	Pass
148.4	33.4	-61.8	-13	Pass
170.1	37.3	-57.9	-13	Pass
190.74	39.6	-55.6	-13	Pass
249.96	34.7	-60.5	-13	Pass
375.0	29.0	-66.2	-13	Pass
435.2	42.2	-53.0	-13	Pass
439.981	41.1	-54.1	-13	Pass
600.0	39.8	-55.4	-13	Pass
652.85	58.2	-37.0	-13	Pass
659.968	61.0	-34.2	-13	Pass
870.45	54.3	-40.9	-13	Pass
879.976	56.2	-39.0	-13	Pass

**Test Data Summary (Above 1GHz) PI/8 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
1088.076	62.3	-32.9	-13	Pass
1099.994	62.7	-32.5	-13	Pass
1105.93	53.7	-41.5	-13	Pass
1107.34	53.7	-41.5	-13	Pass
1305.0	55.0	-40.2	-13	Pass
1305.723	57.1	-38.1	-13	Pass
1523.132	58.4	-36.8	-13	Pass
1539.786	55.8	-39.4	-13	Pass
1540.01	54.7	-40.5	-13	Pass

**Test Data Summary (9kHz-30MHz) PI/8-16 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
0.067	63.5	-31.7	-13	Pass
19.38	31.2	-64.0	-13	Pass

**Test Data Summary (30-1000MHz) PI/8-16 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
40.34	42.5	-52.7	-13	Pass
53.03	32.6	-62.6	-13	Pass
68.54	37.0	-58.2	-13	Pass
93.92	40.6	-54.6	-13	Pass
124.94	39.6	-55.6	-13	Pass
141.86	58.7	-36.5	-13	Pass
186.51	39.8	-55.4	-13	Pass
249.96	36.9	-58.3	-13	Pass
374.98	29.9	-65.3	-13	Pass
435.219	42.9	-52.3	-13	Pass
439.967	41.9	-53.3	-13	Pass
500.0	38.3	-56.9	-13	Pass
600.0	38.5	-56.7	-13	Pass
652.856	59.1	-36.1	-13	Pass
659.94	56.6	-38.6	-13	Pass
870.448	57.5	-37.7	-13	Pass
879.882	60.2	-35.0	-13	Pass

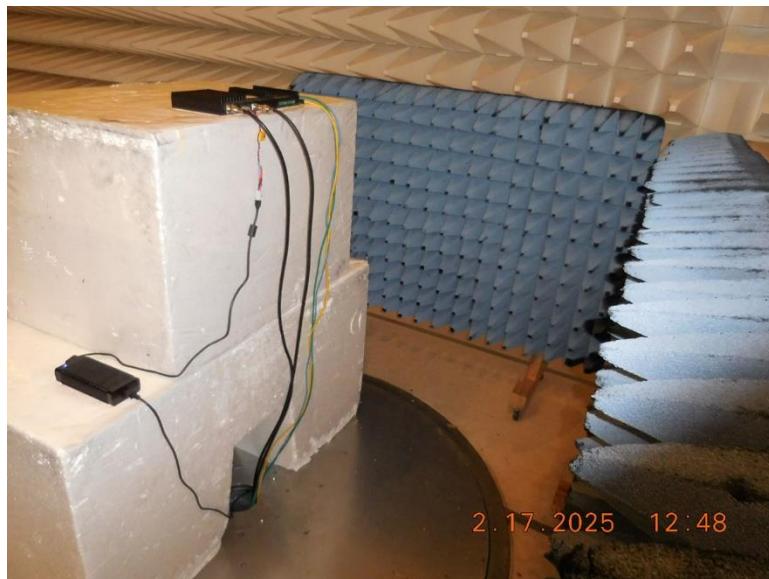
**Test Data Summary (Above 1GHz) PI/8-16 Modulation**

Frequency (MHz)	Measured (dB $\mu$ V/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
1087.81	61.4	-33.8	-13	Pass
1099.9	54.6	-40.6	-13	Pass
1100.14	62.9	-32.3	-13	Pass
1103.42	54.2	-41.0	-13	Pass
1305.62	56.2	-39.0	-13	Pass
1319.98	57.6	-37.6	-13	Pass
1523.44	54.7	-40.5	-13	Pass
1539.57	53.5	-41.7	-13	Pass

**Test Setup Photo(s)**



Below 1GHz



Above 1GHz

## Supplemental Information

### Measurement Uncertainty

Uncertainty Value	Parameter
5.77 dB	Radiated Emissions
0.673 dB	RF Conducted Measurements
$5.77 \times 10^{-10}$	Frequency Deviation
0.00005 s	Time Deviation
3.18 dB	Mains Conducted Emissions

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  $\text{dB}\mu\text{V}/\text{m}$ , the spectrum analyzer reading in  $\text{dB}\mu\text{V}$  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	( $\text{dB}\mu\text{V}$ )
+ Antenna Factor	( $\text{dB}/\text{m}$ )
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	( $\text{dB}\mu\text{V}/\text{m}$ )

## 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.

**\*End of Report\***