Meteorcomm, LLC.

EMC TEST REPORT FOR

ITCR-NG Base
Model: 65030

Tested to The Following Standards:

FCC Part 90 Subpart T and Subpart K

217.6125-219.9875MHz
AND
220.0125-221.9875MHz

Report No.: 109255-4

Date of issue: November 6, 2024

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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TABLE OF CONTENTS

Administrative Information 3

Test Report Information 3

Report Authorization 3

Test Facility Information 4

Software Versions 4

Site Registration & Accreditation Information 4

Summary of Results 5

Standard / Specification: FCC Part 90 Subpart T and Subpart K 5

Modifications During Testing 5

Conditions During Testing 5

Equipment Under Test (EUT) 6

General Product Information: 7

FCC Part 90 Subpart T and K 15

90.205, 90.723, 90.729, 90.259 - Power Output 15

90.209, 90.733 (d) - Occupied Bandwidth 33

90.213 - Frequency Stability 43

90.210 - Conducted Spurious Emissions Mask 45

90.210 - Radiated Emissions 59

Supplemental Information 77

Measurement Uncertainty 77

Emissions Test Details 77

Administrative Information

Test Report Information

REPORT PREPARED FOR:

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Customer Reference Number: PO32132

REPORT PREPARED BY:

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Project Number: 109225

DATE OF EQUIPMENT RECEIPT: September 23, 2024
DATE(S) OF TESTING: September 25-27, 2024 and October 8-10, 2024

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.

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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 90 Subpart T and Subpart K

Test Procedure	Description	Modifications	Results
90.205, 90.723, 90.729, 90.259	Power Output	MOD#1 & 2	Pass
90.209, 90.733 (d)	Bandwidth	MOD#1 & 2	Pass
90.213	Frequency Stability	MOD#1 & 2	Pass
90.210	Conducted Spurious Emissions and Mask	MOD#1 & 2	Pass
90.210	Radiated Spurious Emissions	MOD#1 (Except for testing <1GHz in half and full rate modulations) & MOD#2	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
Modification #1 (MOD#1) = DEV-001273 - 0.47uF caps from power supply input block to chassis. MOD#1 was in place for all unintentional radiated emissions. MOD#1 was in place for all intentional emissions except for radiated spurious emissions less than 1GHz half rate and full rate.
Modification #2 (MOD#2) = DEV-001270 NGR Base PS - Replaces power supply modified by Rad.

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 Under Test:

Device	Manufacturer	Model #	S/N
ITCR-NG Base	Meteorcomm LLC.	65030	65BRF13008MC

Support Equipment:

Device	Manufacturer	Model #	S/N
ITCR-NG Wayside	Meteorcomm LLC.	65010A	65WR002008MC
AC/DC Switching Adaptor	Mean Well	GST280A48-C6P	SC200W0884
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EC08104020
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Vector Signal Generator	Rhode & Schwarz	SMBVIOOB	1423.1003K02-102044-an
Laptop	Panasonic	CF-30	T1260Z
Laptop	Dell	Latitude	8X7DMH2
GPS 4-way Splitter	GPSS	S14-SF	NA
USB Thumb Drive	Micro Center	64GB	NA
Prosafe 8-Port Gigabit	Netgear	GS108Tv2	29SE4C5302E60
Smart Switch	NA	NA	NA

Configuration 2

Equipment Under Test:

Device	Manufacturer	Model #	S/N
ITCR-NG Base	Meteorcomm LLC	65030	65BRF13008MC

Support Equipment:

Device	Manufacturer	Model #	S/N
Programmable DC Power Supply	BK Precision Supply	XLN8018	351EL1073
Laptop	Dell	Latitude	8X7DMH2
Prosafe 8-Port Gigabit	Netgear	GS108Tv2	29SE4C5302E60
Smart Switch	NA	NA	NA

General Product Information:

Description of EUT
Railway Transceiver

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Transmission System:	Proprietary for Locomotive
Operating Frequency Range(s):	217.6125-219.9875MHz AND 220.0125-221.9875MHz
Modulation Type(s):	Full Rate 2 bits / symbol Half Rate 2 bits / symbol PI/8 DQPSK 3 bits / symbol PI/8 16APSK 4 bits /symbol
Maximum Duty Cycle:	50%, but may be increased for testing
Number of TX Chains:	1
Antenna Type(s) and Gain:	Not specified by manufacturer
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	48VDC
Firmware / Software used for Test:	S/W Part Number P65000-A01-0.1.90.01 ITC-ROOT gec12a0f (dev) 2024-05-14 16:16:14 S/W Part Number P65000-M01-0.1.135.01 ITC-APP g4a81412a6 2024-05-14 19:09:07 S/W Part Number P65000-R01-0.0.80.0 Baseband-0 g6da029fdf 2024-05-14 14:04:26 S/W Part Number P65000-R01-0.0.80.0 Baseband-1 g6da029fdf 2024-05-14 14:05:06 S/W Part Number P65000-F01-00.00.48.00 FPGA ge45a0e8f 2024-04-09 12:35:12 S/W Part Number P65000-B01-0.1.92.01 Bootloader g5c50125 2024-06-25 19:24:32 S/W Part Number P65000-S01-0.1.92.01 Failsafe g5c50125 2024-06-25 19:24:32 Attenuator settings used to compensate differences in PAPR HALF_RATE PI/4 DQPSK 0.0dB FULL_RATE PI/4 DQPSK 0.0 dB PI/8-DQPSK -0.4 dB PI/8-16APSK -1.3 dB
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

EUT Photo(s)

EUT

Support Equipment Photo(s)

Support EUT

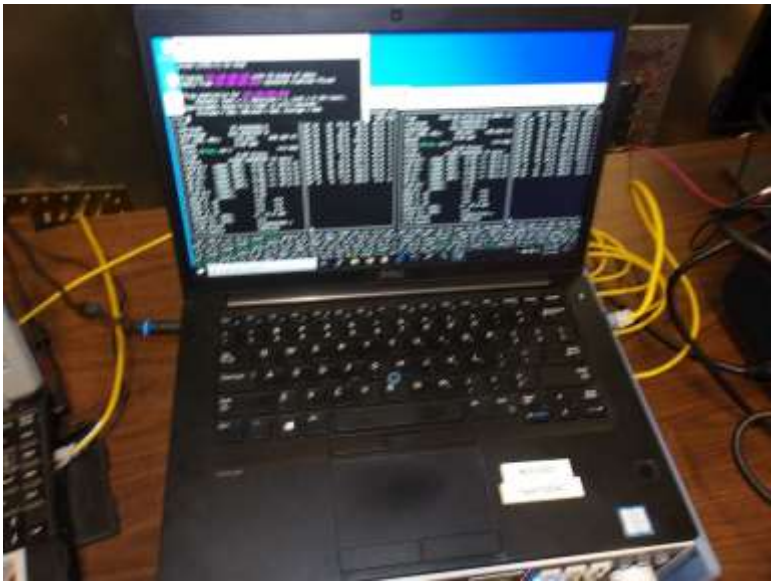
DC Power Supply, #1

DC Power Supply, #2

Support Attenuators

Signal Generator

Laptop, #1



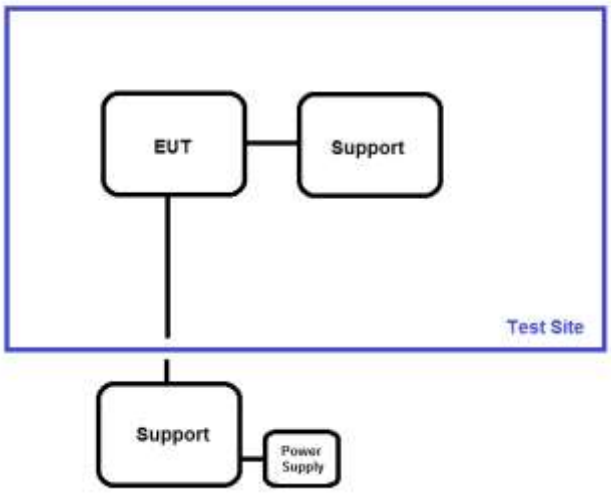
Laptop, #2

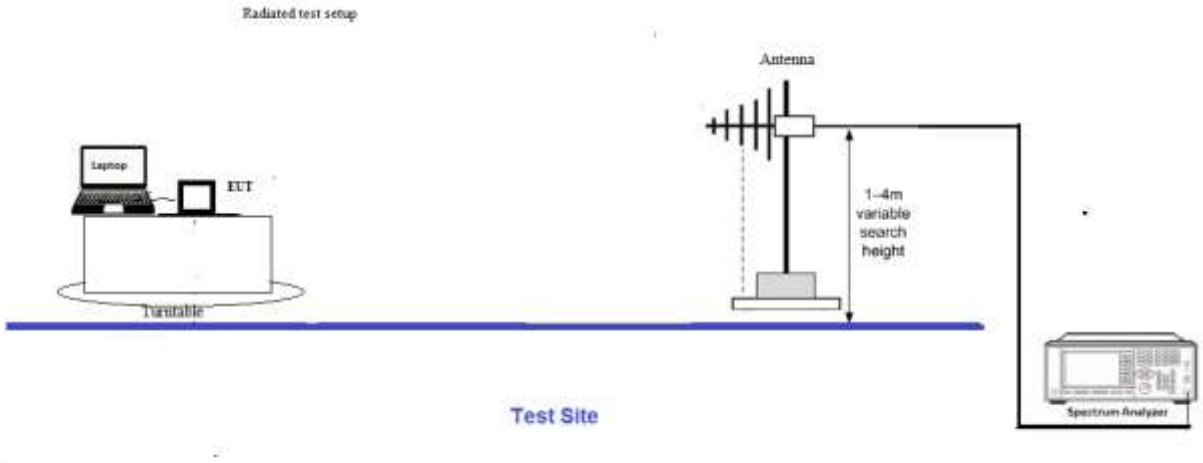
Ethernet Hub

Block Diagram(s) of Test Setup

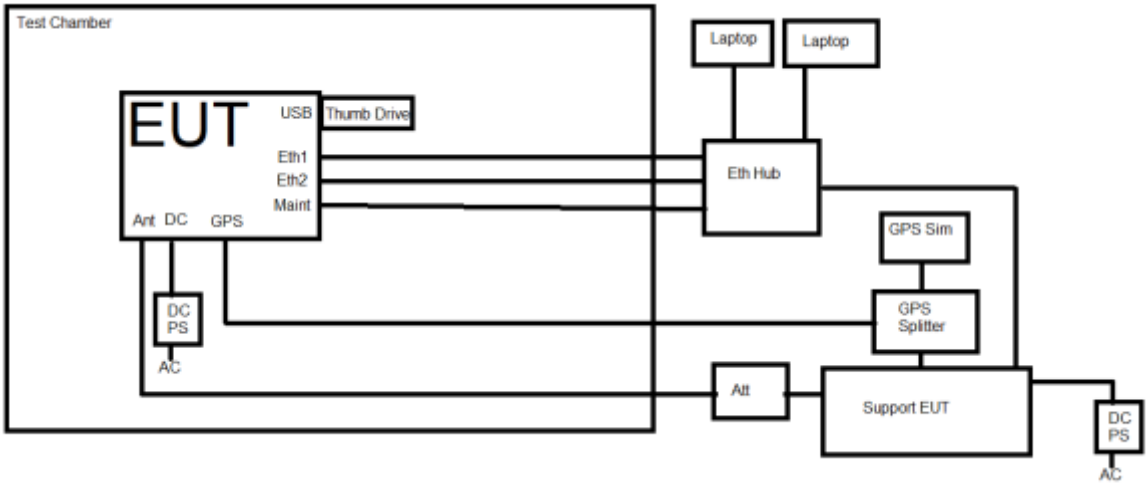
Configuration#	Setup Description of Block Diagram
1, Radiated	Powered by DC powered supply. Ethernet ports connected to Ethernet hub, laptop, and support EUT located outside chamber. GPS port connected to GPS signal located outside chamber. GPIO ports connected to unterminated cables. RX ports terminated into 50Ω. TX port connected to attenuators then Spectrum analyzer for conducted measurements.
1, Conducted	Powered by DC powered supply. Ethernet ports connected to Ethernet hub, laptop, and support EUT. GPS port connected to GPS signal. GPIO ports connected to unterminated cables. RX ports terminated into 50Ω. TX port connected to attenuators then support EUT

Test Setup Block Diagram

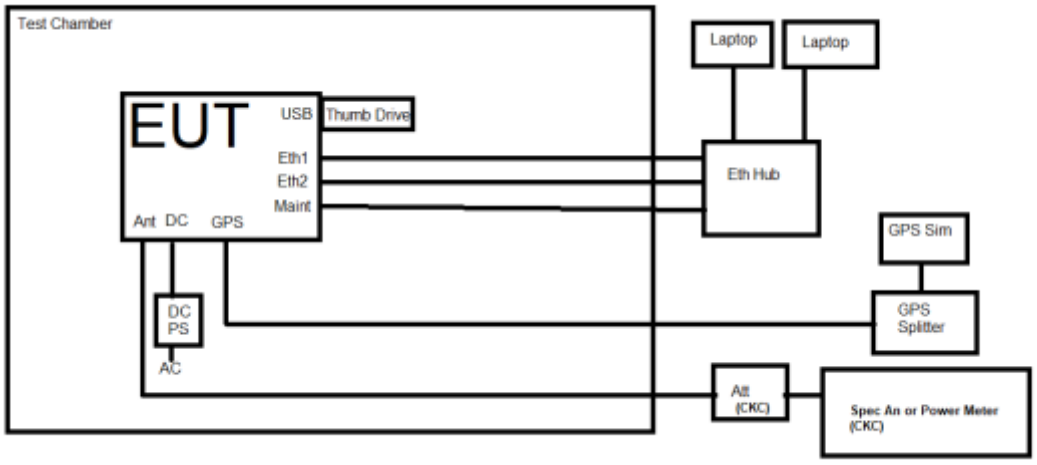




Block Diagram: Radiated



Block Diagram: Conducted



FCC PART 90 SUBPART T AND K

90.205, 90.723, 90.729, 90.259 - Power Output

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	10/09/2024-10/10/2024
Configuration:	2		
Test Setup:	The unit is in a temperature chamber for temperature variation. The voltage is varied. 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, full rate, half rate, pi/8, and pi/8-16 modulations investigated. Per the manufacturer, the applicable limits for testing are under 90.729 for the 220-221 band the limit is assumed to be 125W, for 90.723 for the 221-222 band is assumed to be 500W, for 217-220MHz there is a 2W limit per 90.259. Per the manufacturer, the max power is recorded for all channels tested and the licensee must consider these limitations. **Modification #1 & 2 was in place for testing.**		

Environmental Conditions			
Temperature (ºC)	23.5	Relative Humidity (%):	37

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02872	Spectrum Analyzer	Agilent	E4440A	10/11/2023	10/11/2025
P05748	Attenuator	Pasternack	PE7004-20	2/26/2024	2/26/2026
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_{Nom}	Full Rate	48.74	74.82	Pass
217.6125	-20	V_{Nom}	Full Rate	48.90	77.62	Pass
217.6125	-10	V_{Nom}	Full Rate	48.99	79.25	Pass
217.6125	0	V_{Nom}	Full Rate	48.81	76.03	Pass
217.6125	10	V_{Nom}	Full Rate	49.01	79.62	Pass
217.6125	20	V_{Nom}	Full Rate	49.21	83.37	Pass
217.6125	30	V_{Nom}	Full Rate	48.93	78.16	Pass
217.6125	40	V_{Nom}	Full Rate	49.03	79.98	Pass
217.6125	50	V_{Nom}	Full Rate	49.03	79.98	Pass
217.6125	20	V_{Min}	Full Rate	48.89	77.45	Pass
217.6125	20	V_{Max}	Full Rate	48.86	76.91	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_{Nom}	Full Rate	48.79	75.68	Pass
219.9875	-20	V_{Nom}	Full Rate	48.82	76.21	Pass
219.9875	-10	V_{Nom}	Full Rate	48.75	74.99	Pass
219.9875	0	V_{Nom}	Full Rate	48.88	77.27	Pass
219.9875	10	V_{Nom}	Full Rate	49.05	80.35	Pass
219.9875	20	V_{Nom}	Full Rate	49.24	83.95	Pass
219.9875	30	V_{Nom}	Full Rate	49.00	79.43	Pass
219.9875	40	V_{Nom}	Full Rate	49.05	80.35	Pass
219.9875	50	V_{Nom}	Full Rate	49.08	80.91	Pass
219.9875	20	V_{Min}	Full Rate	48.94	78.34	Pass
219.9875	20	V_{Max}	Full Rate	48.90	77.62	Pass

Test Data Summary - RF Conducted Measurement (Ch97)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Full Rate	48.80	75.86	Pass
220.0125	-20	V_{Nom}	Full Rate	48.83	76.38	Pass
220.0125	-10	V_{Nom}	Full Rate	48.51	70.96	Pass
220.0125	0	V_{Nom}	Full Rate	48.88	77.27	Pass
220.0125	10	V_{Nom}	Full Rate	49.06	80.54	Pass
220.0125	20	V_{Nom}	Full Rate	49.23	83.75	Pass
220.0125	30	V_{Nom}	Full Rate	49.01	79.62	Pass
220.0125	40	V_{Nom}	Full Rate	49.06	80.54	Pass
220.0125	50	V_{Nom}	Full Rate	49.08	80.91	Pass
220.0125	20	V_{Min}	Full Rate	48.96	78.70	Pass
220.0125	20	V_{Max}	Full Rate	48.94	78.34	Pass

Test Data Summary - RF Conducted Measurement (Ch176)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Full Rate	48.83	76.38	Pass
221.9875	-20	V_{Nom}	Full Rate	48.77	75.35	Pass
221.9875	-10	V_{Nom}	Full Rate	48.44	69.82	Pass
221.9875	0	V_{Nom}	Full Rate	48.94	78.34	Pass
221.9875	10	V_{Nom}	Full Rate	49.11	81.47	Pass
221.9875	20	V_{Nom}	Full Rate	49.30	85.11	Pass
221.9875	30	V_{Nom}	Full Rate	49.07	80.72	Pass
221.9875	40	V_{Nom}	Full Rate	49.10	81.28	Pass
221.9875	50	V_{Nom}	Full Rate	49.14	82.04	Pass
221.9875	20	V_{Min}	Full Rate	48.99	79.25	Pass
221.9875	20	V_{Max}	Full Rate	49.00	79.43	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_{Nom}	Half Rate	48.76	75.16	Pass
217.6125	-20	V_{Nom}	Half Rate	48.62	72.78	Pass
217.6125	-10	V_{Nom}	Half Rate	48.82	76.21	Pass
217.6125	0	V_{Nom}	Half Rate	48.86	76.91	Pass
217.6125	10	V_{Nom}	Half Rate	49.08	80.91	Pass
217.6125	20	V_{Nom}	Half Rate	49.25	84.14	Pass
217.6125	30	V_{Nom}	Half Rate	49.00	79.43	Pass
217.6125	40	V_{Nom}	Half Rate	49.03	79.98	Pass
217.6125	50	V_{Nom}	Half Rate	49.07	80.72	Pass
217.6125	20	V_{Min}	Half Rate	48.92	77.98	Pass
217.6125	20	V_{Max}	Half Rate	48.94	78.34	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_{Nom}	Half Rate	48.80	75.86	Pass
219.9875	-20	V_{Nom}	Half Rate	48.68	73.79	Pass
219.9875	-10	V_{Nom}	Half Rate	48.26	66.99	Pass
219.9875	0	V_{Nom}	Half Rate	48.92	77.98	Pass
219.9875	10	V_{Nom}	Half Rate	48.96	78.70	Pass
219.9875	20	V_{Nom}	Half Rate	49.23	83.75	Pass
219.9875	30	V_{Nom}	Half Rate	49.04	80.17	Pass
219.9875	40	V_{Nom}	Half Rate	49.08	80.91	Pass
219.9875	50	V_{Nom}	Half Rate	49.12	81.66	Pass
219.9875	20	V_{Min}	Half Rate	48.98	79.07	Pass
219.9875	20	V_{Max}	Half Rate	48.97	78.89	Pass

Test Data Summary - RF Conducted Measurement (Ch97)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Half Rate	48.79	75.68	Pass
220.0125	-20	V_{Nom}	Half Rate	48.87	77.09	Pass
220.0125	-10	V_{Nom}	Half Rate	48.78	75.51	Pass
220.0125	0	V_{Nom}	Half Rate	48.90	77.62	Pass
220.0125	10	V_{Nom}	Half Rate	48.95	78.52	Pass
220.0125	20	V_{Nom}	Half Rate	49.28	84.72	Pass
220.0125	30	V_{Nom}	Half Rate	49.04	80.17	Pass
220.0125	40	V_{Nom}	Half Rate	49.09	81.09	Pass
220.0125	50	V_{Nom}	Half Rate	49.12	81.66	Pass
220.0125	20	V_{Min}	Half Rate	48.98	79.07	Pass
220.0125	20	V_{Max}	Half Rate	48.97	78.89	Pass

Test Data Summary - RF Conducted Measurement (Ch176)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Half Rate	48.83	76.38	Pass
221.9875	-20	V_{Nom}	Half Rate	48.92	77.98	Pass
221.9875	-10	V_{Nom}	Half Rate	48.78	75.51	Pass
221.9875	0	V_{Nom}	Half Rate	49.11	81.47	Pass
221.9875	10	V_{Nom}	Half Rate	49.01	79.62	Pass
221.9875	20	V_{Nom}	Half Rate	49.34	85.90	Pass
221.9875	30	V_{Nom}	Half Rate	49.10	81.28	Pass
221.9875	40	V_{Nom}	Half Rate	49.13	81.85	Pass
221.9875	50	V_{Nom}	Half Rate	49.15	82.22	Pass
221.9875	20	V_{Min}	Half Rate	49.03	79.98	Pass
221.9875	20	V_{Max}	Half Rate	49.01	79.62	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_{Nom}	Pi/8	48.20	66.07	Pass
217.6125	-20	V_{Nom}	Pi/8	48.10	64.57	Pass
217.6125	-10	V_{Nom}	Pi/8	47.92	61.94	Pass
217.6125	0	V_{Nom}	Pi/8	48.50	70.79	Pass
217.6125	10	V_{Nom}	Pi/8	48.33	68.07	Pass
217.6125	20	V_{Nom}	Pi/8	48.75	74.99	Pass
217.6125	30	V_{Nom}	Pi/8	48.48	70.47	Pass
217.6125	40	V_{Nom}	Pi/8	48.52	71.12	Pass
217.6125	50	V_{Nom}	Pi/8	48.55	71.61	Pass
217.6125	20	V_{Min}	Pi/8	48.41	69.34	Pass
217.6125	20	V_{Max}	Pi/8	48.40	69.18	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_{Nom}	Pi/8	48.24	66.68	Pass
219.9875	-20	V_{Nom}	Pi/8	48.17	65.61	Pass
219.9875	-10	V_{Nom}	Pi/8	48.40	69.18	Pass
219.9875	0	V_{Nom}	Pi/8	48.39	69.02	Pass
219.9875	10	V_{Nom}	Pi/8	48.40	69.18	Pass
219.9875	20	V_{Nom}	Pi/8	48.88	77.27	Pass
219.9875	30	V_{Nom}	Pi/8	48.52	71.12	Pass
219.9875	40	V_{Nom}	Pi/8	48.55	71.61	Pass
219.9875	50	V_{Nom}	Pi/8	48.58	72.11	Pass
219.9875	20	V_{Min}	Pi/8	48.46	70.15	Pass
219.9875	20	V_{Max}	Pi/8	48.40	69.18	Pass

Test Data Summary - RF Conducted Measurement (Ch97)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Pi/8	48.23	66.53	Pass
220.0125	-20	V_{Nom}	Pi/8	48.18	70.47	Pass
220.0125	-10	V_{Nom}	Pi/8	48.40	69.18	Pass
220.0125	0	V_{Nom}	Pi/8	48.39	69.02	Pass
220.0125	10	V_{Nom}	Pi/8	48.41	69.34	Pass
220.0125	20	V_{Nom}	Pi/8	48.87	77.09	Pass
220.0125	30	V_{Nom}	Pi/8	48.52	71.12	Pass
220.0125	40	V_{Nom}	Pi/8	48.57	71.94	Pass
220.0125	50	V_{Nom}	Pi/8	48.59	72.28	Pass
220.0125	20	V_{Min}	Pi/8	48.45	69.98	Pass
220.0125	20	V_{Max}	Pi/8	48.43	69.66	Pass

Test Data Summary - RF Conducted Measurement (Ch176)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Pi/8	48.29	67.45	Pass
221.9875	-20	V_{Nom}	Pi/8	48.12	64.86	Pass
221.9875	-10	V_{Nom}	Pi/8	48.03	63.53	Pass
221.9875	0	V_{Nom}	Pi/8	48.45	69.98	Pass
221.9875	10	V_{Nom}	Pi/8	48.46	70.15	Pass
221.9875	20	V_{Nom}	Pi/8	48.95	78.52	Pass
221.9875	30	V_{Nom}	Pi/8	48.56	71.78	Pass
221.9875	40	V_{Nom}	Pi/8	48.62	72.78	Pass
221.9875	50	V_{Nom}	Pi/8	48.64	73.11	Pass
221.9875	20	V_{Min}	Pi/8	48.49	70.63	Pass
221.9875	20	V_{Max}	Pi/8	48.50	70.79	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_{Nom}	Pi/8-16	48.36	68.55	Pass
217.6125	-20	V_{Nom}	Pi/8-16	48.38	68.87	Pass
217.6125	-10	V_{Nom}	Pi/8-16	48.55	71.61	Pass
217.6125	0	V_{Nom}	Pi/8-16	48.49	70.63	Pass
217.6125	10	V_{Nom}	Pi/8-16	48.51	70.96	Pass
217.6125	20	V_{Nom}	Pi/8-16	48.90	77.62	Pass
217.6125	30	V_{Nom}	Pi/8-16	48.61	72.61	Pass
217.6125	40	V_{Nom}	Pi/8-16	48.66	73.45	Pass
217.6125	50	V_{Nom}	Pi/8-16	48.72	74.47	Pass
217.6125	20	V_{Min}	Pi/8-16	48.52	71.12	Pass
217.6125	20	V_{Max}	Pi/8-16	48.52	71.12	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_{Nom}	Pi/8-16	48.40	69.18	Pass
219.9875	-20	V_{Nom}	Pi/8-16	48.39	69.02	Pass
219.9875	-10	V_{Nom}	Pi/8-16	48.48	70.45	Pass
219.9875	0	V_{Nom}	Pi/8-16	48.53	71.29	Pass
219.9875	10	V_{Nom}	Pi/8-16	48.54	71.45	Pass
219.9875	20	V_{Nom}	Pi/8-16	49.00	79.43	Pass
219.9875	30	V_{Nom}	Pi/8-16	48.64	73.11	Pass
219.9875	40	V_{Nom}	Pi/8-16	48.70	74.13	Pass
219.9875	50	V_{Nom}	Pi/8-16	48.76	75.16	Pass
219.9875	20	V_{Min}	Pi/8-16	48.57	71.94	Pass
219.9875	20	V_{Max}	Pi/8-16	48.56	71.78	Pass

Test Data Summary - RF Conducted Measurement (Ch97)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Pi/8-16	48.40	69.18	Pass
220.0125	-20	V_{Nom}	Pi/8-16	48.48	70.47	Pass
220.0125	-10	V_{Nom}	Pi/8-16	48.48	70.45	Pass
220.0125	0	V_{Nom}	Pi/8-16	48.53	71.29	Pass
220.0125	10	V_{Nom}	Pi/8-16	48.55	71.61	Pass
220.0125	20	V_{Nom}	Pi/8-16	49.01	79.62	Pass
220.0125	30	V_{Nom}	Pi/8-16	48.65	73.28	Pass
220.0125	40	V_{Nom}	Pi/8-16	48.70	74.13	Pass
220.0125	50	V_{Nom}	Pi/8-16	48.75	74.99	Pass
220.0125	20	V_{Min}	Pi/8-16	48.57	71.94	Pass
220.0125	20	V_{Max}	Pi/8-16	48.56	71.78	Pass

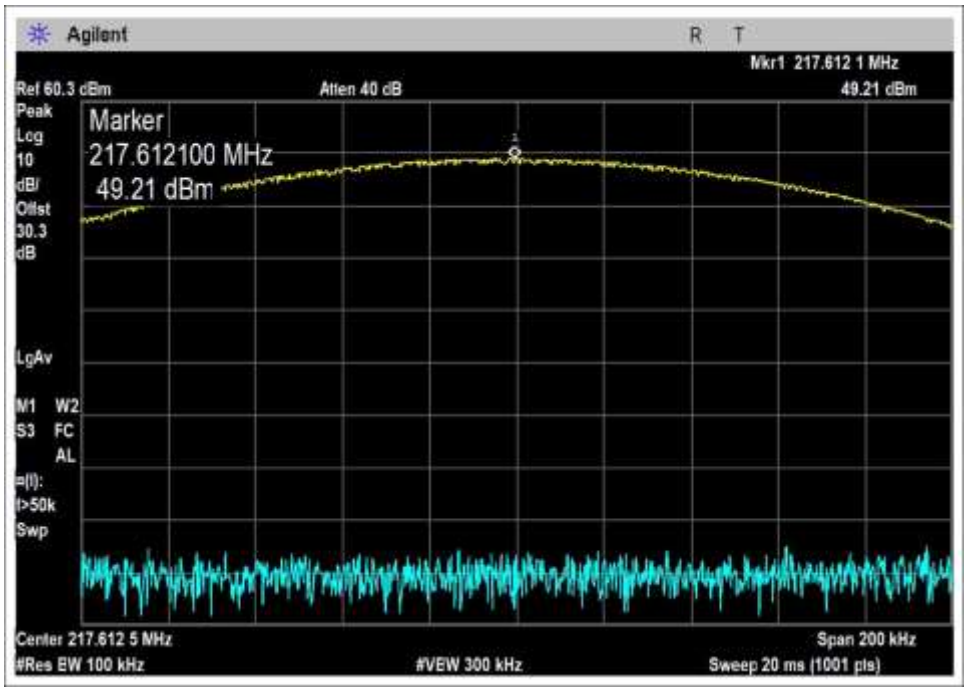
Test Data Summary - RF Conducted Measurement (Ch176)						
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (dBm)**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Pi/8-16	48.43	69.66	Pass
221.9875	-20	V_{Nom}	Pi/8-16	48.30	67.61	Pass
221.9875	-10	V_{Nom}	Pi/8-16	48.54	71.45	Pass
221.9875	0	V_{Nom}	Pi/8-16	48.58	72.11	Pass
221.9875	10	V_{Nom}	Pi/8-16	48.60	72.44	Pass
221.9875	20	V_{Nom}	Pi/8-16	49.08	80.91	Pass
221.9875	30	V_{Nom}	Pi/8-16	48.69	73.96	Pass
221.9875	40	V_{Nom}	Pi/8-16	48.74	74.82	Pass
221.9875	50	V_{Nom}	Pi/8-16	48.80	75.86	Pass
221.9875	20	V_{Min}	Pi/8-16	48.60	72.44	Pass
221.9875	20	V_{Max}	Pi/8-16	48.62	72.78	Pass

Parameter Definitions:

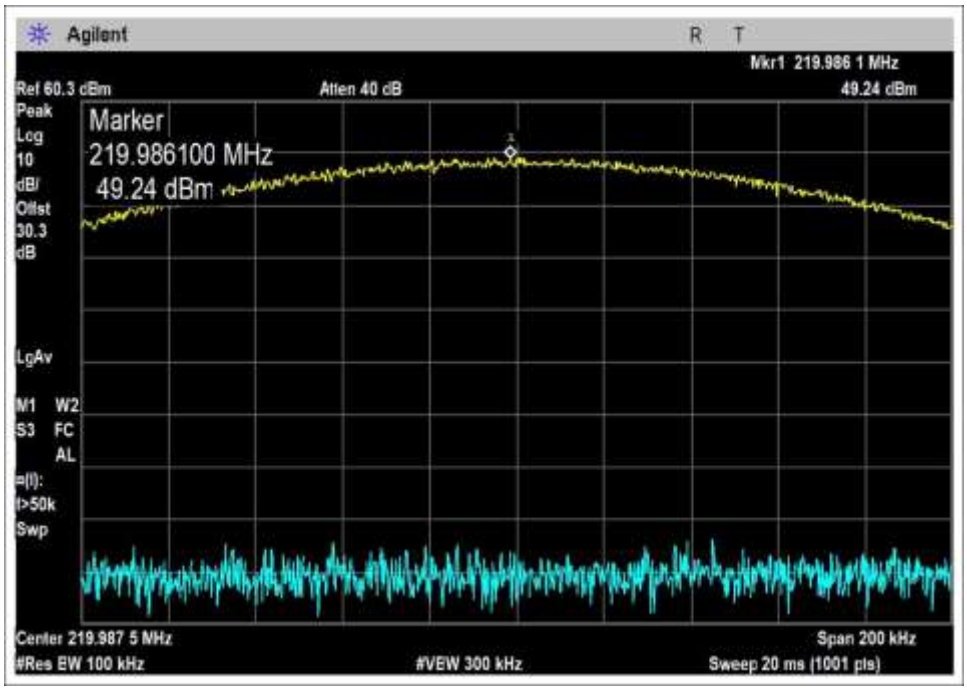
Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
V_{Nom}:	48VDC
V_{Min}:	21VDC
V_{Max}:	61VDC

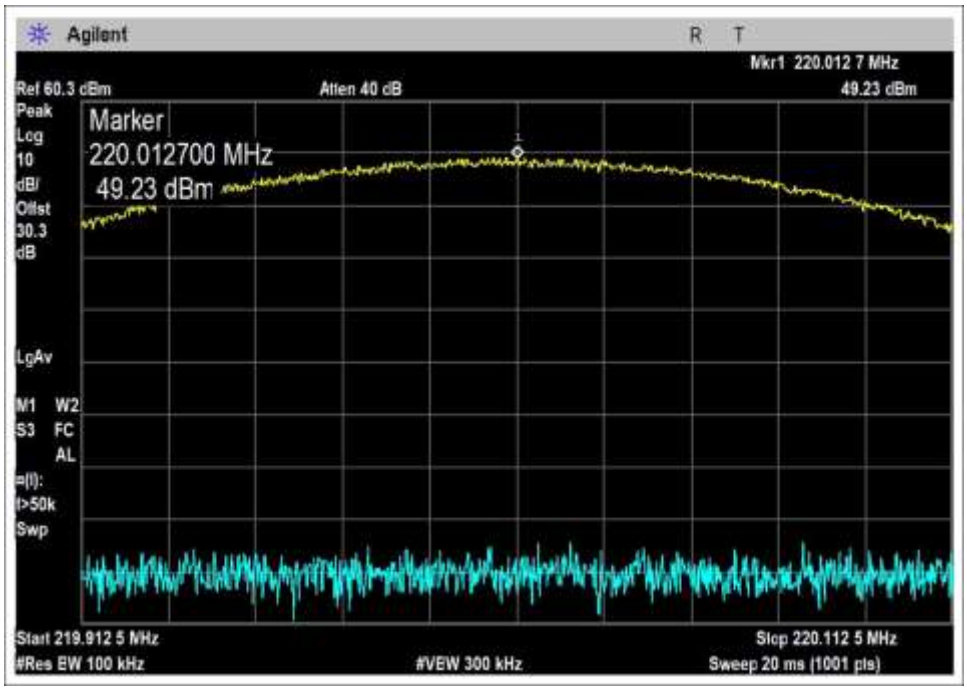
Test Plots



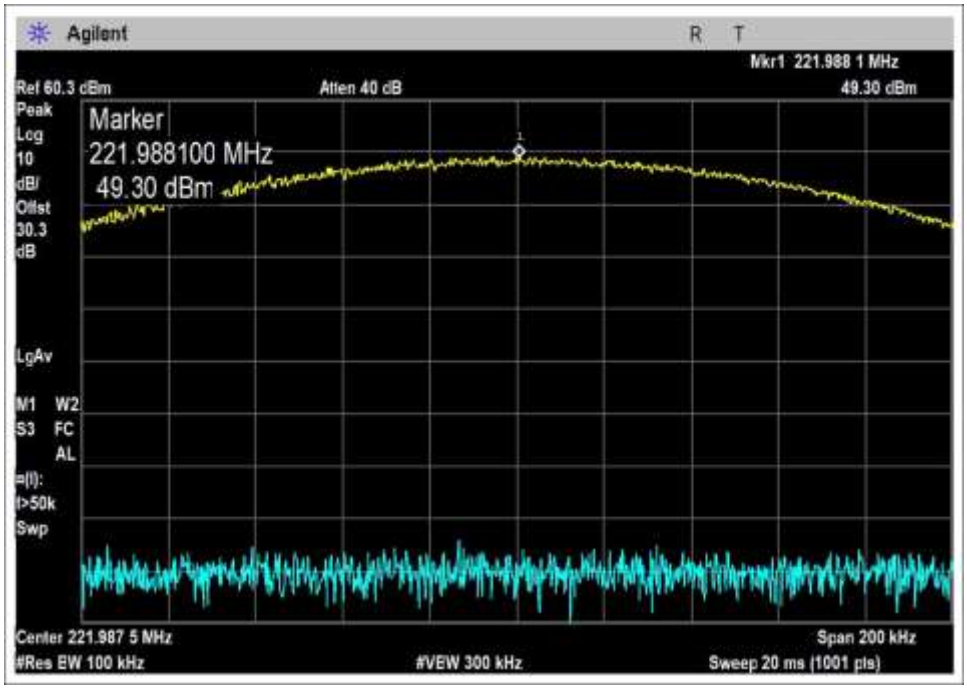
217.6125MHz Full Rate



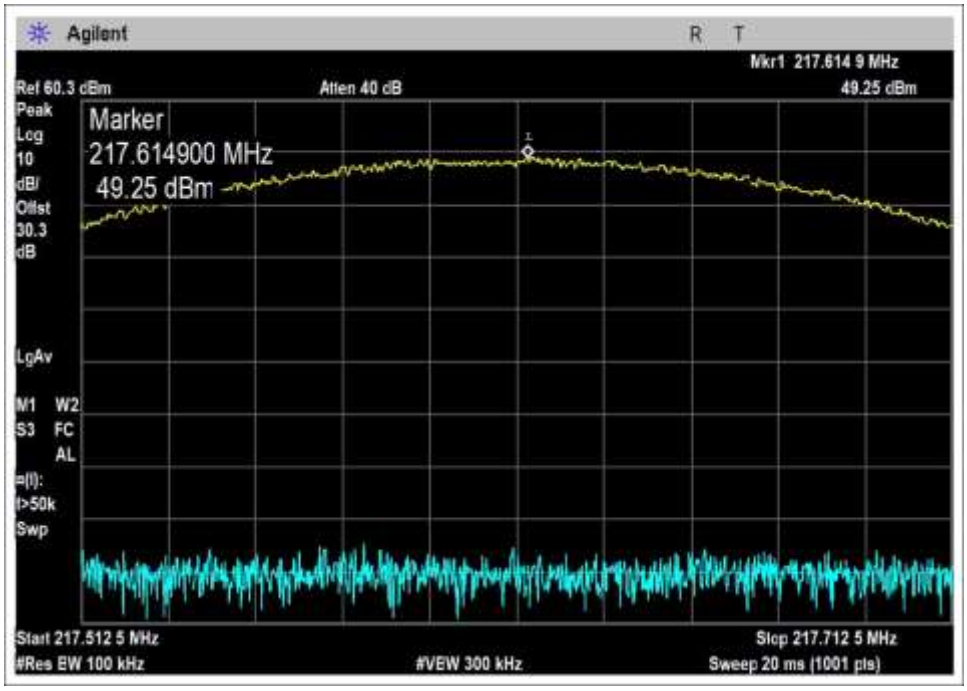
219.9875MHz, Full Rate



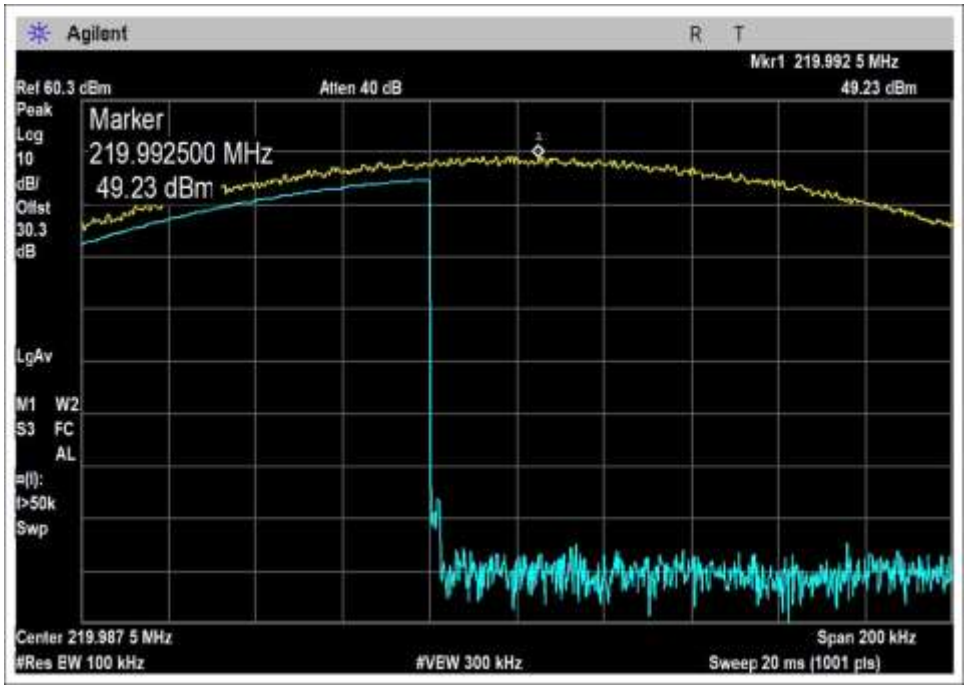
220.0125MHz, Full Rate



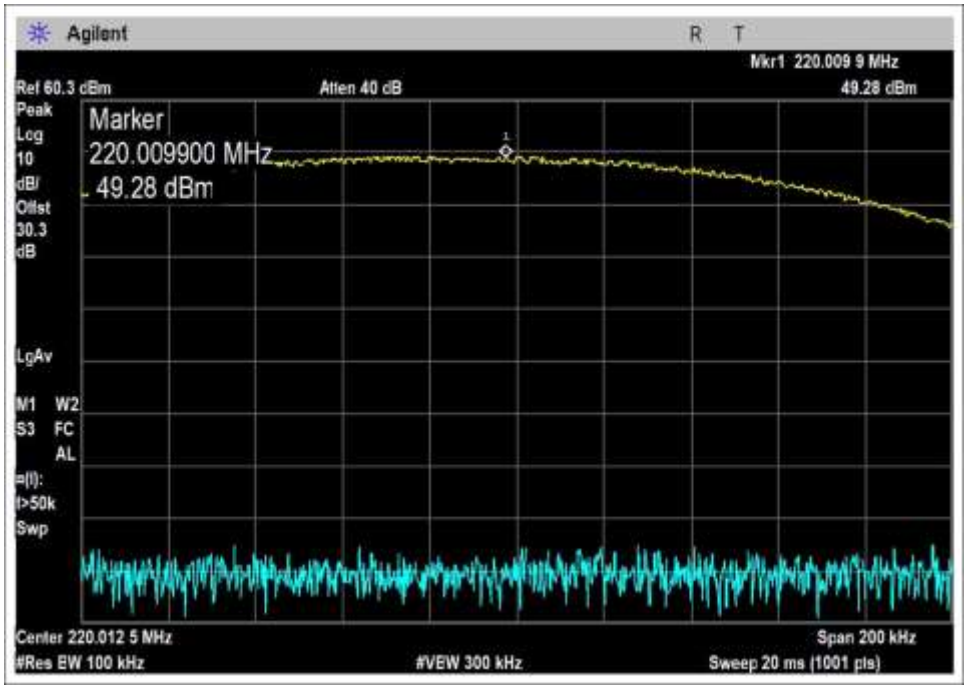
221.9875MHz, Full Rate



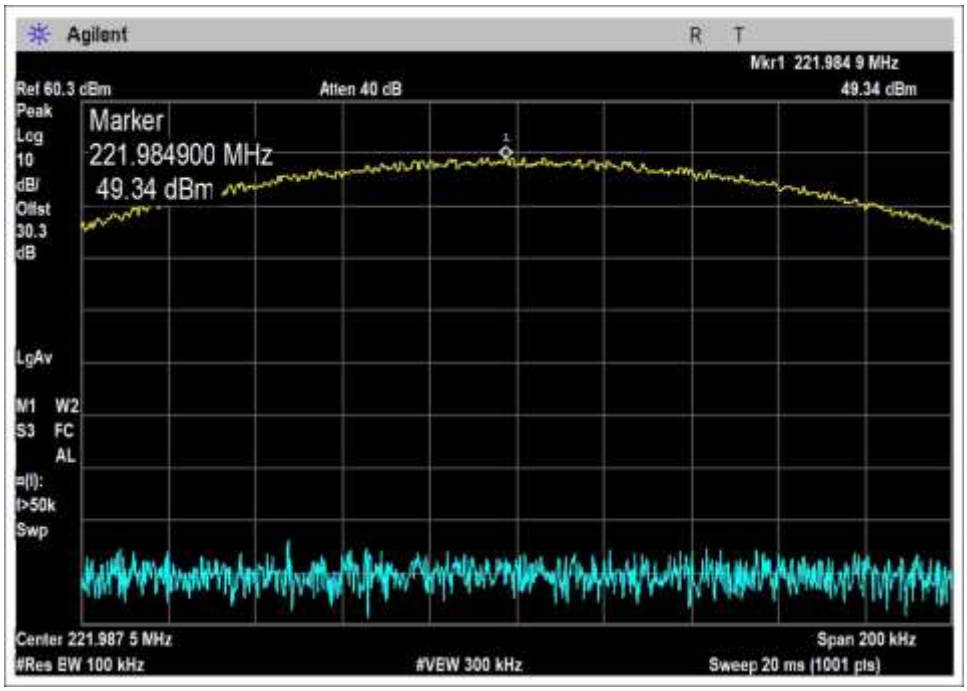
217.6125MHz, Half Rate



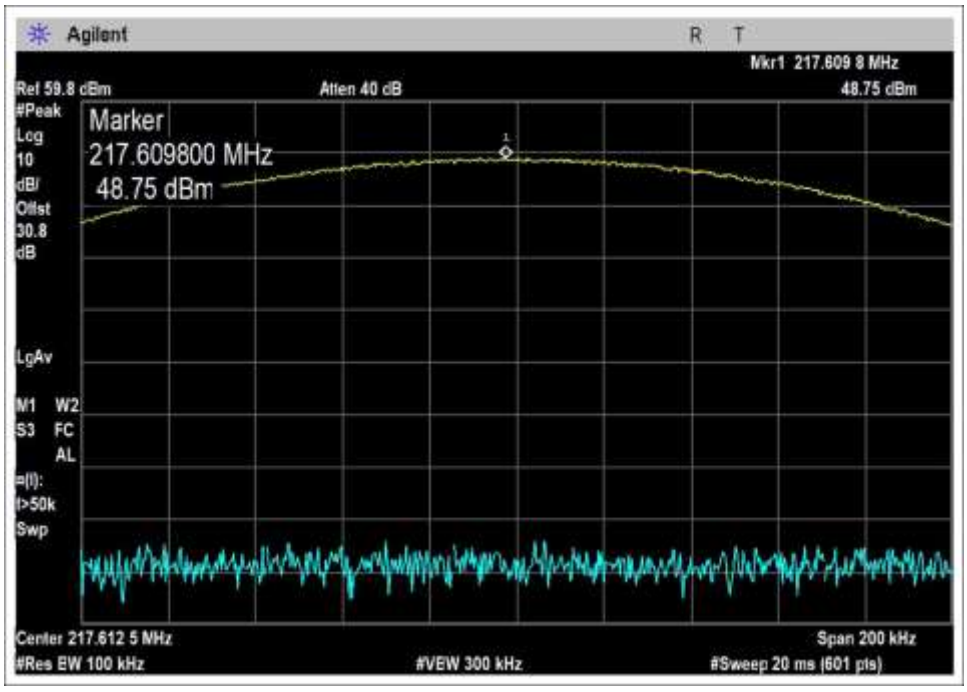
219.9875MHz, Half Rate



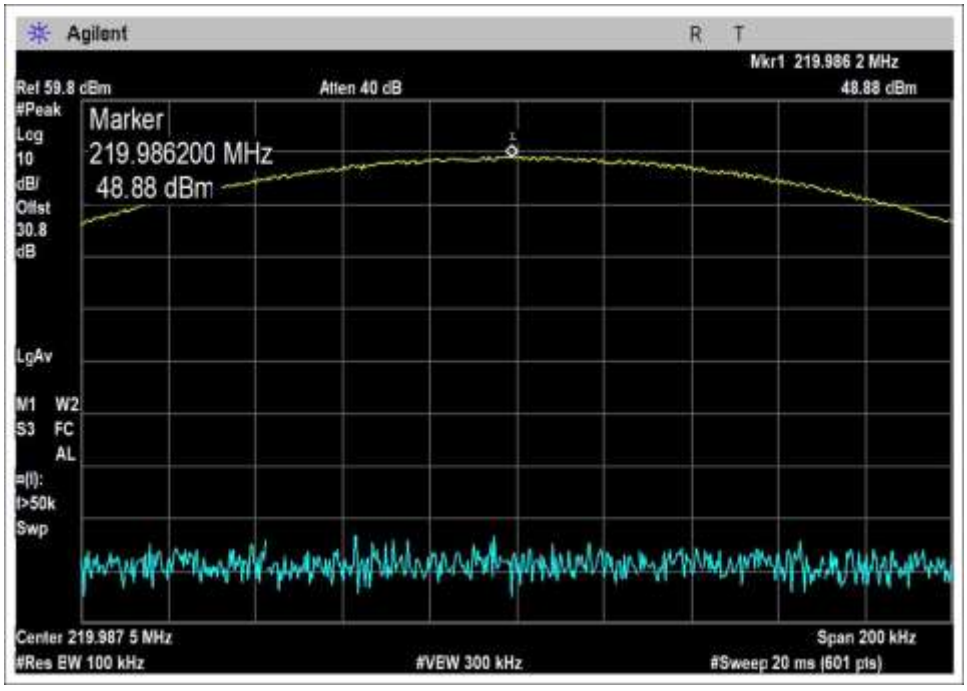
220.0125MHz, Half Rate



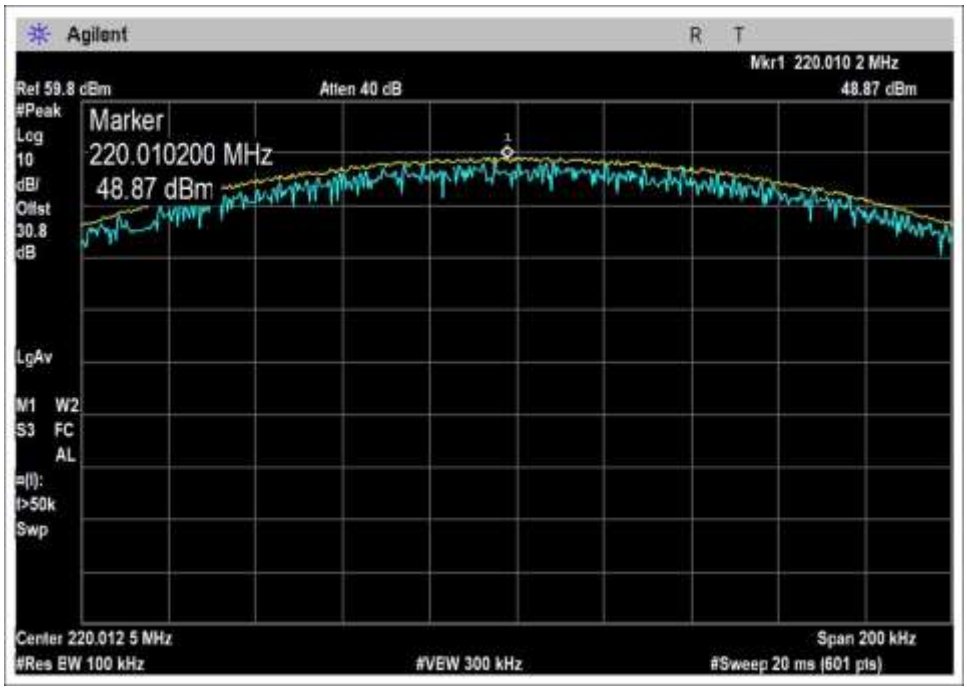
221.9875MHz, Half Rate



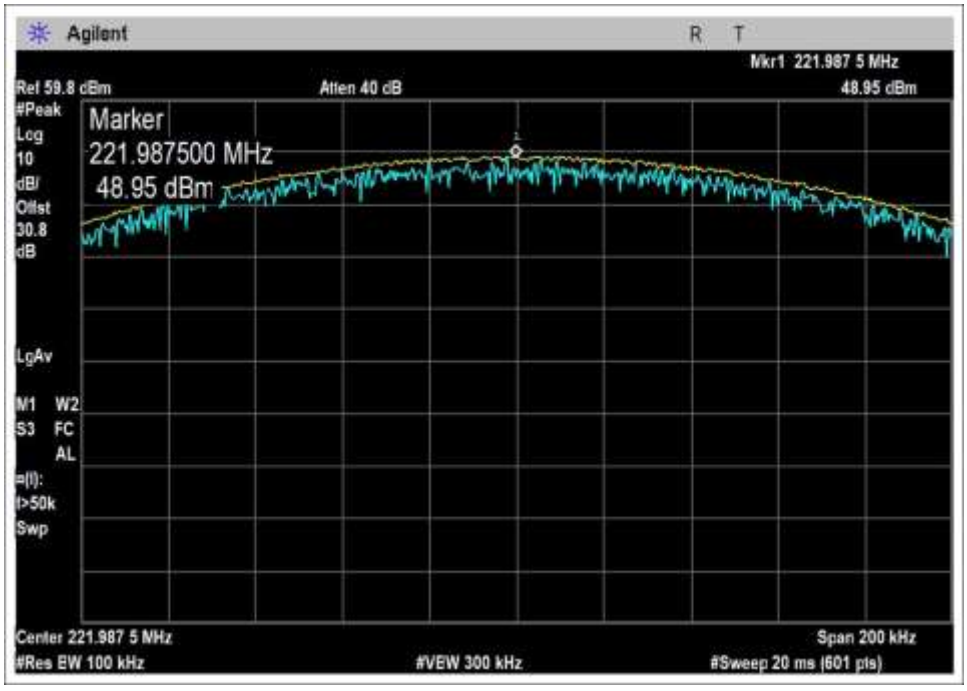
217.6125MHz, Pi/8



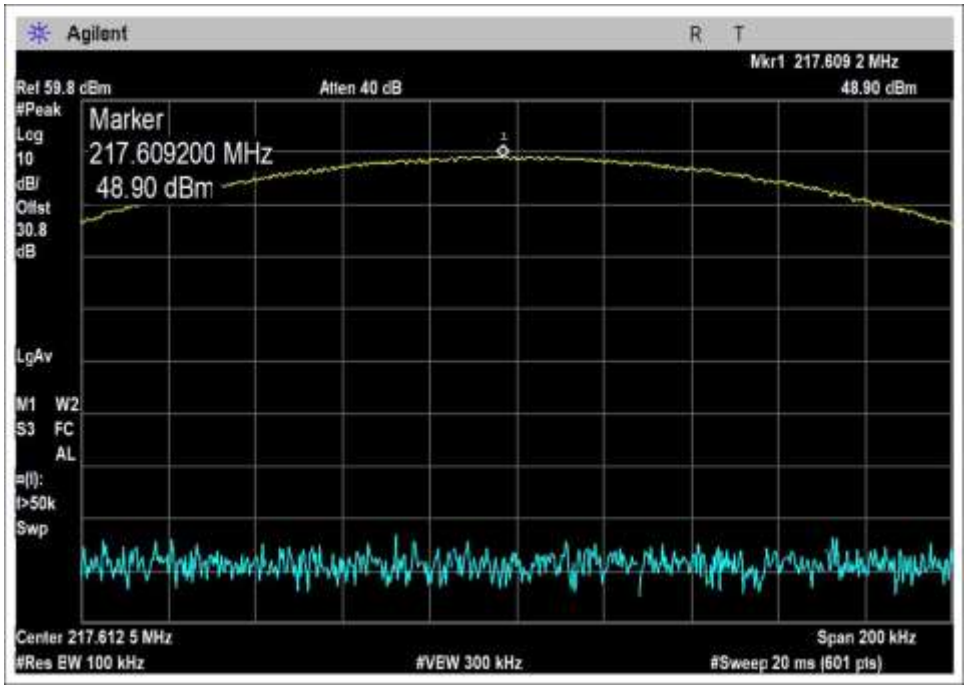
219.9875MHz, Pi/8



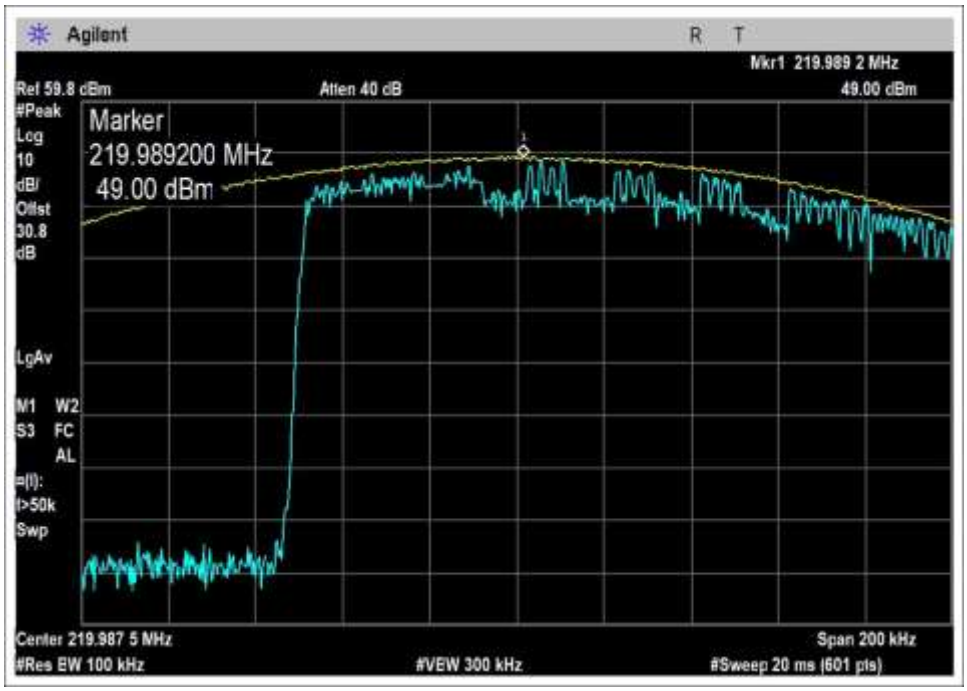
220.0125MHz, Pi/8



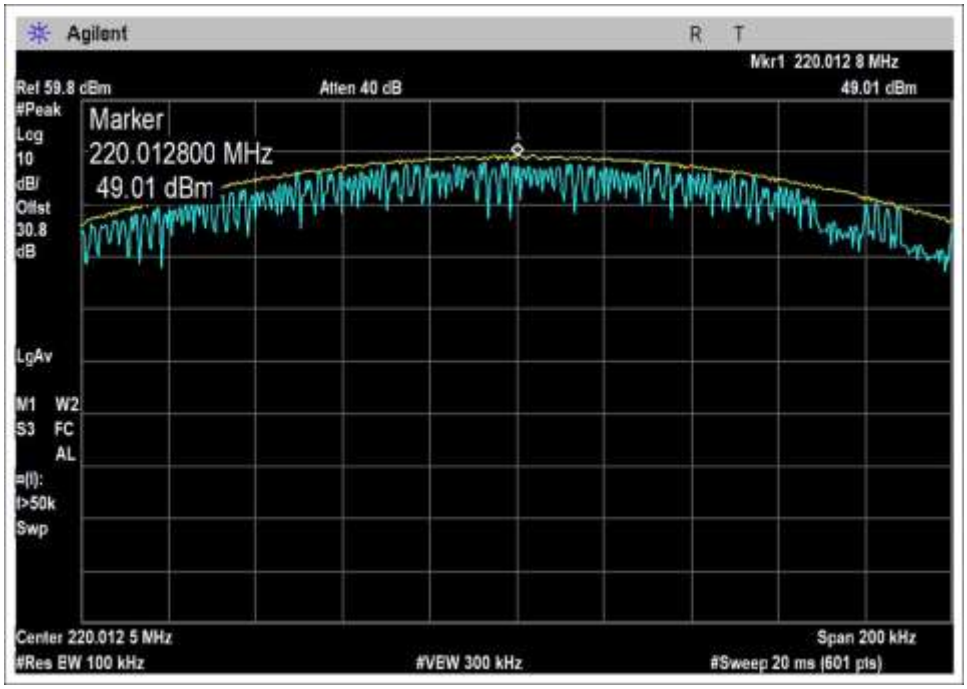
221.9875MHz, Pi/8



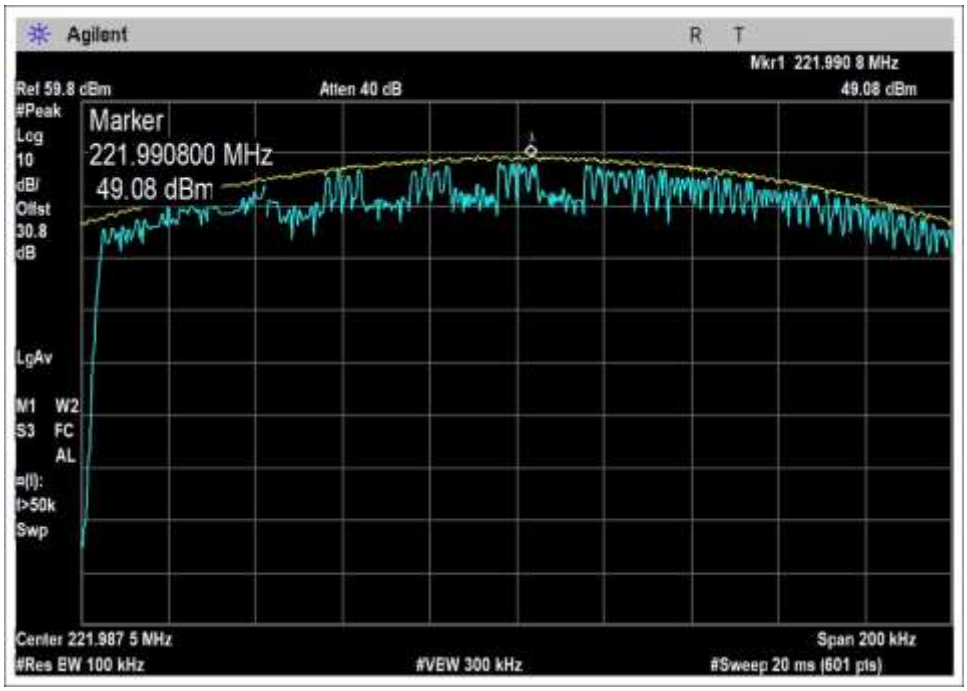
217.6125MHz, Pi/8-16



219.9875MHs, Pi/8-16



220.0125MHz, Pi/8-16



221.9875MHz, Pi/8-16

Test Setup Photo(s)

View 1

View 2

90.209, 90.733 (d) - Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	9/26/2024 and 10/8/2024
Configuration:	1		
Test Setup:	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, full rate, half rate, pi/8, and pi/8-16 modulations investigated. The bandwidth limitations are considered in 90.209 as well as 90.733 where channel aggregation would be used, the authorized bandwidth is assumed to be 20kHz for the Full Rate modulation, pi/8, and pi/8-16 and 11.25kHz for the Half Rate modulation. **Modification #1 & 2 was in place for testing.**		

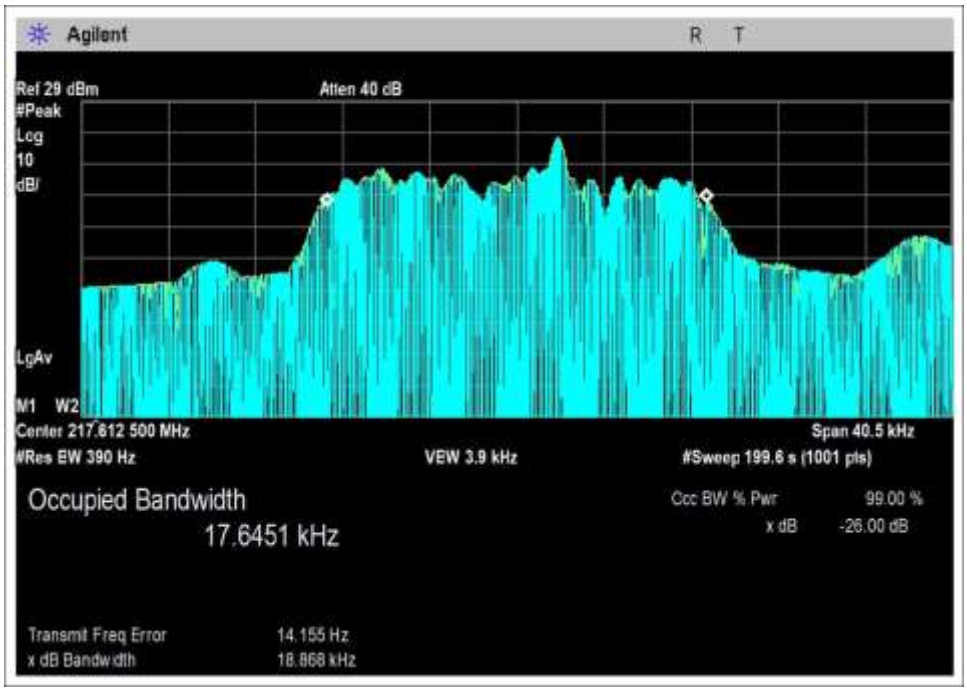
Environmental Conditions			
Temperature (ºC)	25	Relative Humidity (%):	44

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
03807	Spectrum Analyzer	Agilent	E4440A	10/10/2023	10/10/2025
P06452	Cable	Andrews	NA	2/8/2023	2/8/2025
C00194	30db Attenuator	Fairview Microwave	SA3N1007-30	9/26/2024	9/26/2026

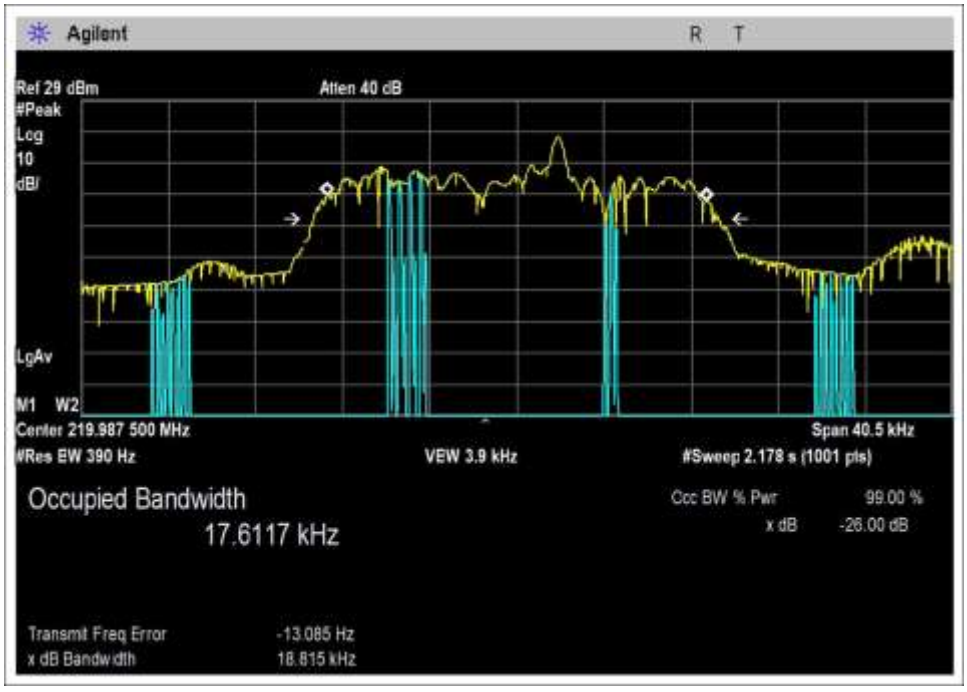
99% Occupied Bandwidth

Test Data Summary				
Frequency (MHz)	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
217.6125	Full Rate	17.6451	20kHz	Pass
219.9875	Full Rate	17.6117	20kHz	Pass
220.0125	Full Rate	17.5918	20kHz	Pass
221.9875	Full Rate	17.5937	20kHz	Pass
217.6125	Half Rate	8.8771	11.25kHz	Pass
219.9875	Half Rate	8.8531	11.25kHz	Pass
220.0125	Half Rate	8.8568	11.25kHz	Pass
221.9875	Half Rate	8.8481	11.25kHz	Pass
217.6125	Pi/8	17.9236	20kHz	Pass
219.9875	Pi/8	17.9044	20kHz	Pass
220.0125	Pi/8	17.8675	20kHz	Pass
221.9875	Pi/8	17.9423	20kHz	Pass
217.6125	Pi/8-16	17.5600	20kHz	Pass
219.9875	Pi/8-16	17.5602	20kHz	Pass
220.0125	Pi/8-16	17.5756	20kHz	Pass
221.9875	Pi/8-16	17.5699	20kHz	Pass

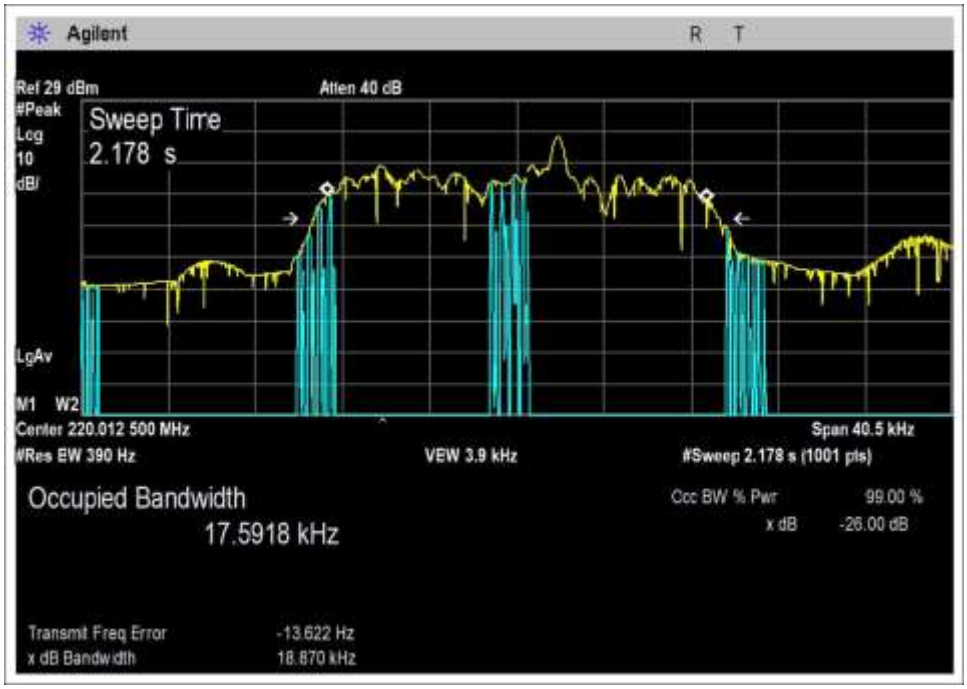
Test Plots



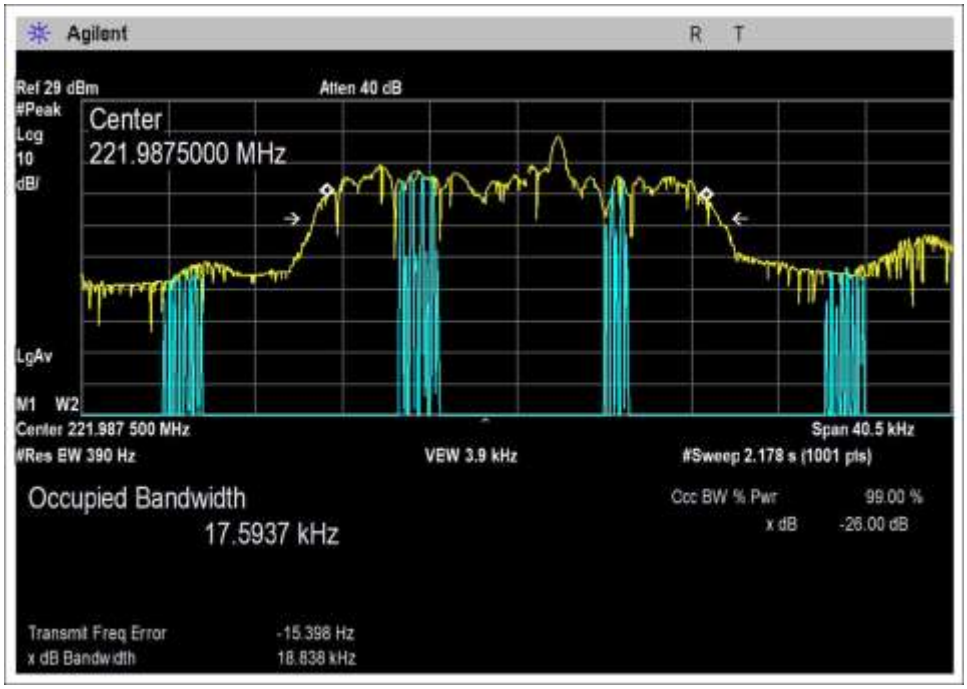
217.6125MHz, Full Rate



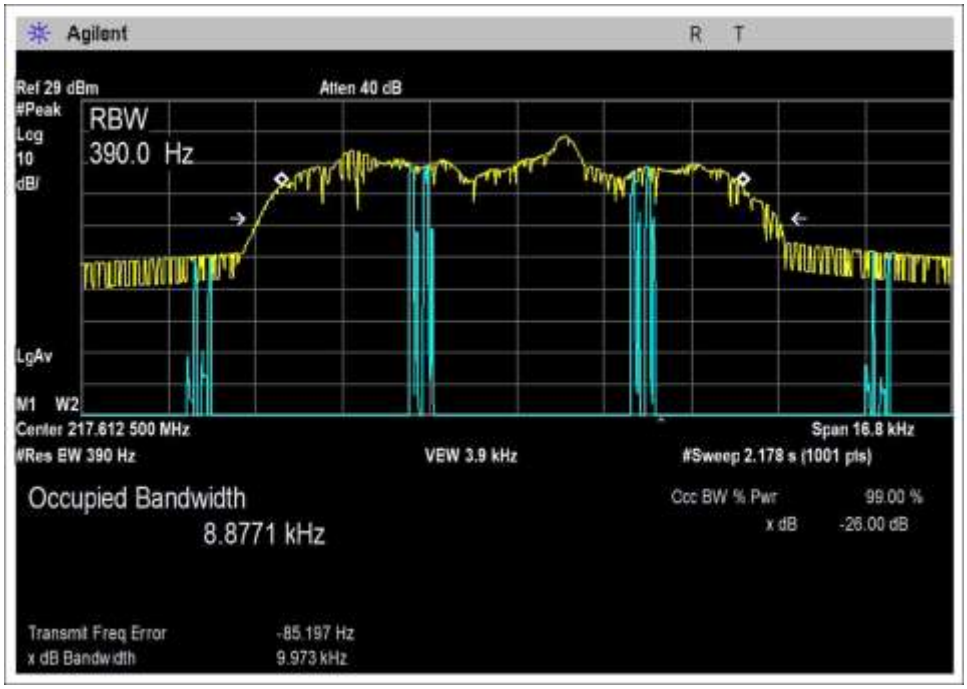
219.9875MHz, Full Rate



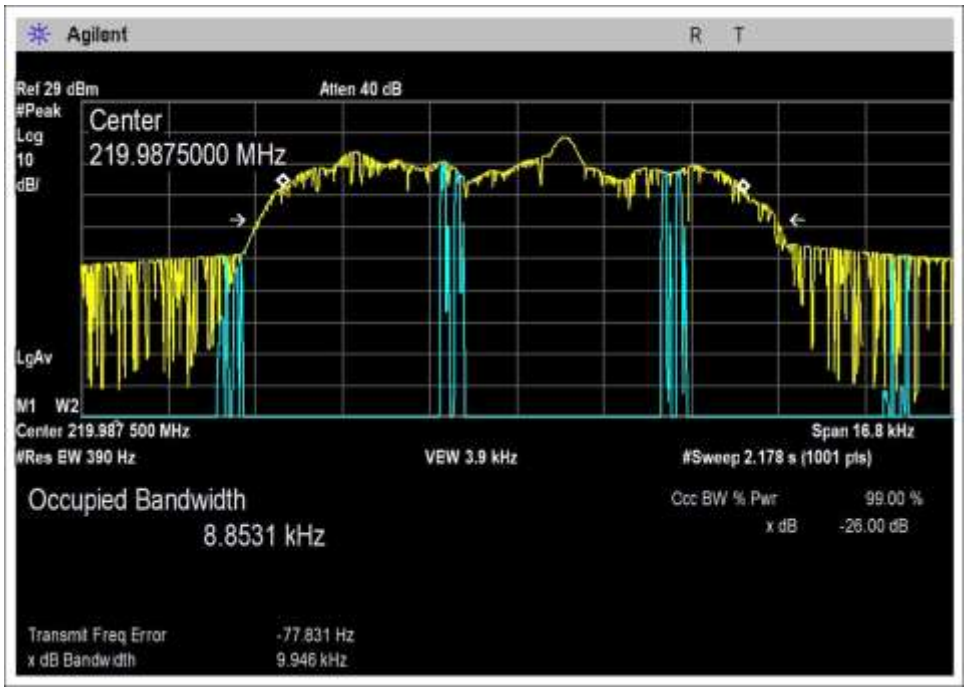
220.0125MHz, Full Rate



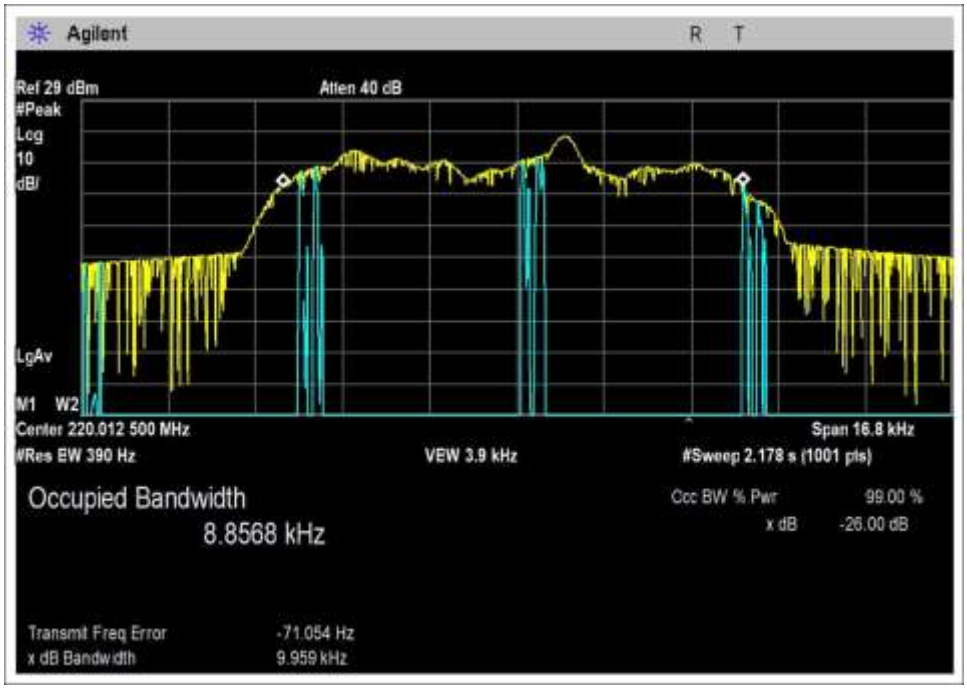
221.9875MHz, Full Rate



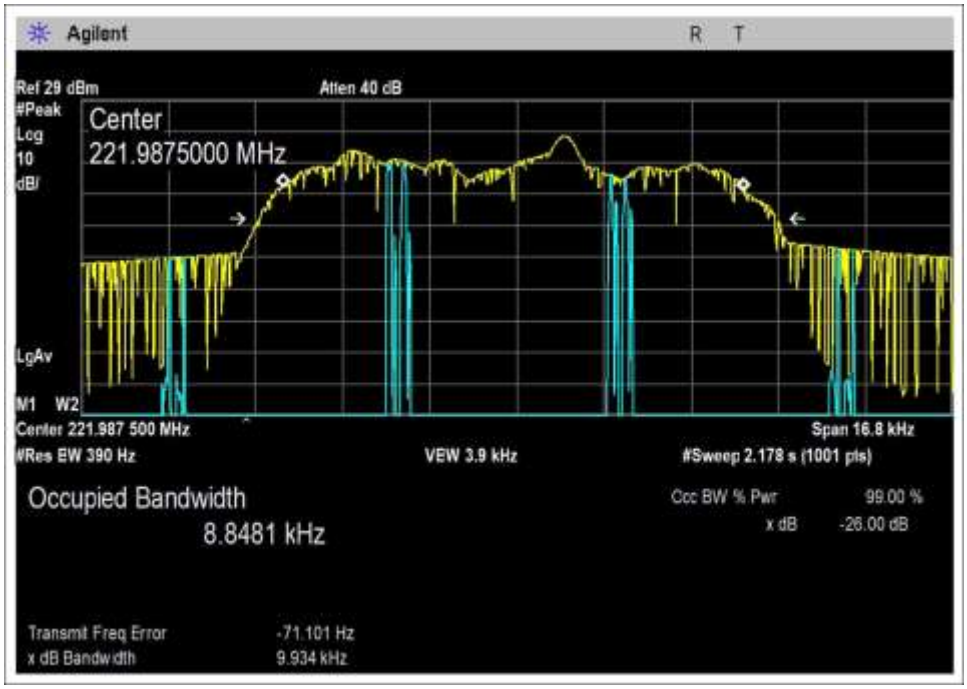
217.6125MHz, Half Rate



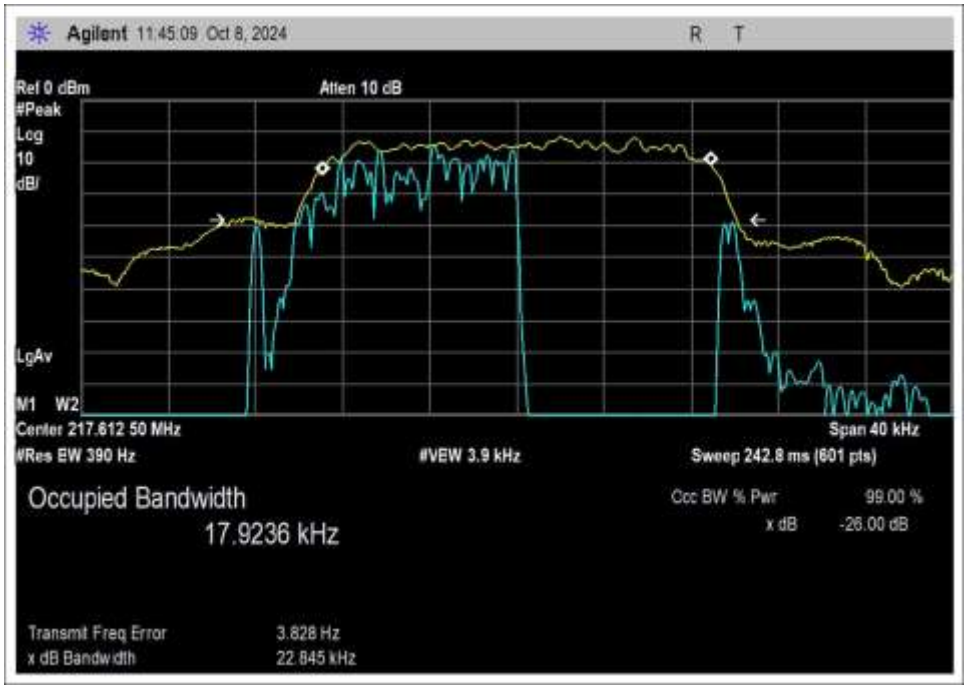
219.9875MHz, Half Rate



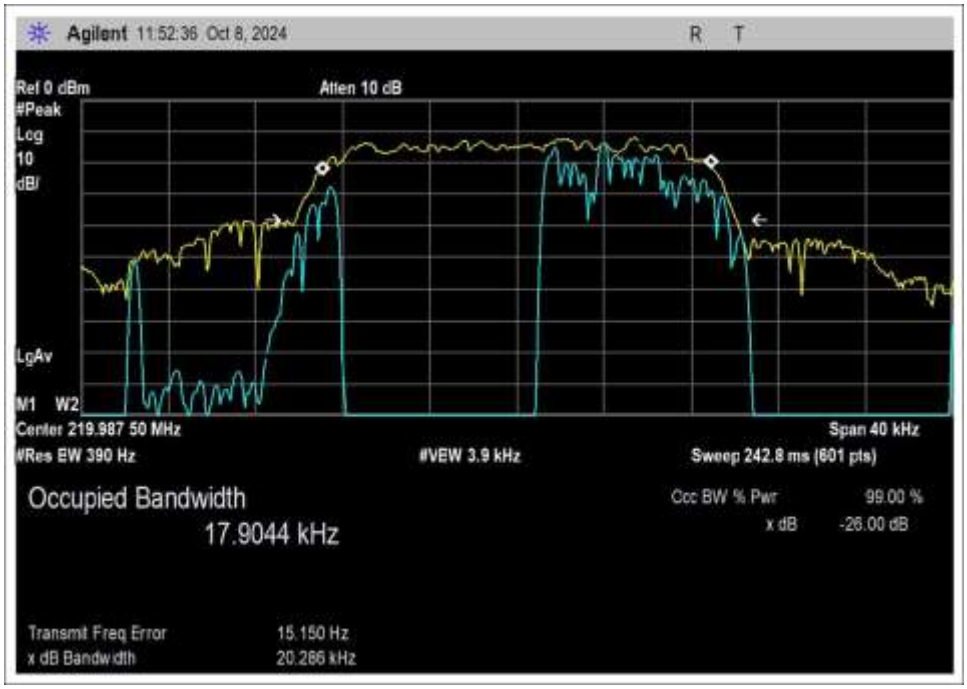
220.0125MHz, Half Rate



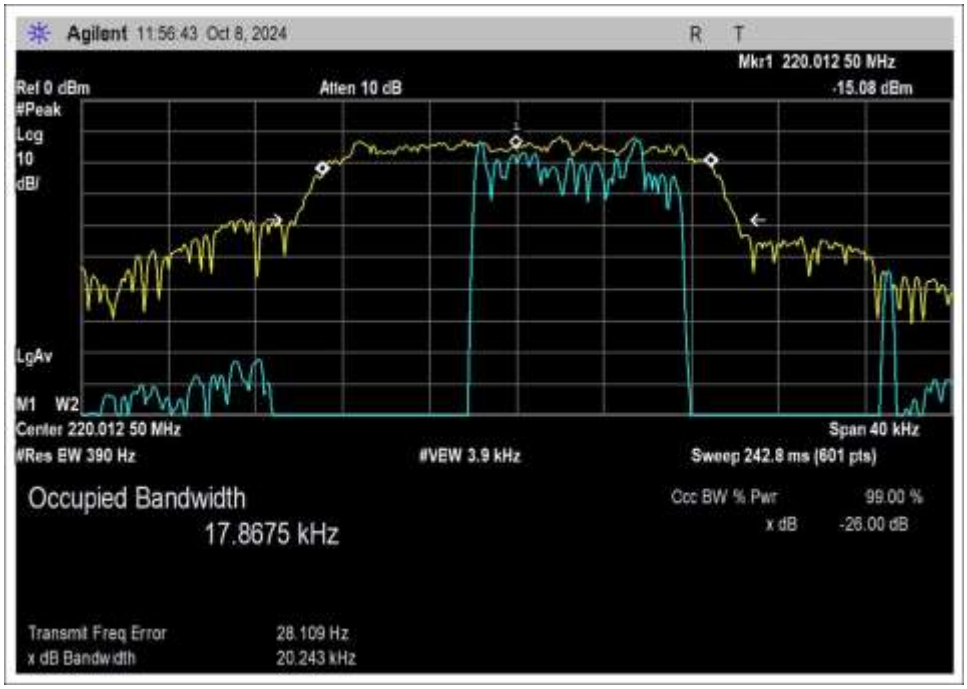
221.9875MHz, Half Rate



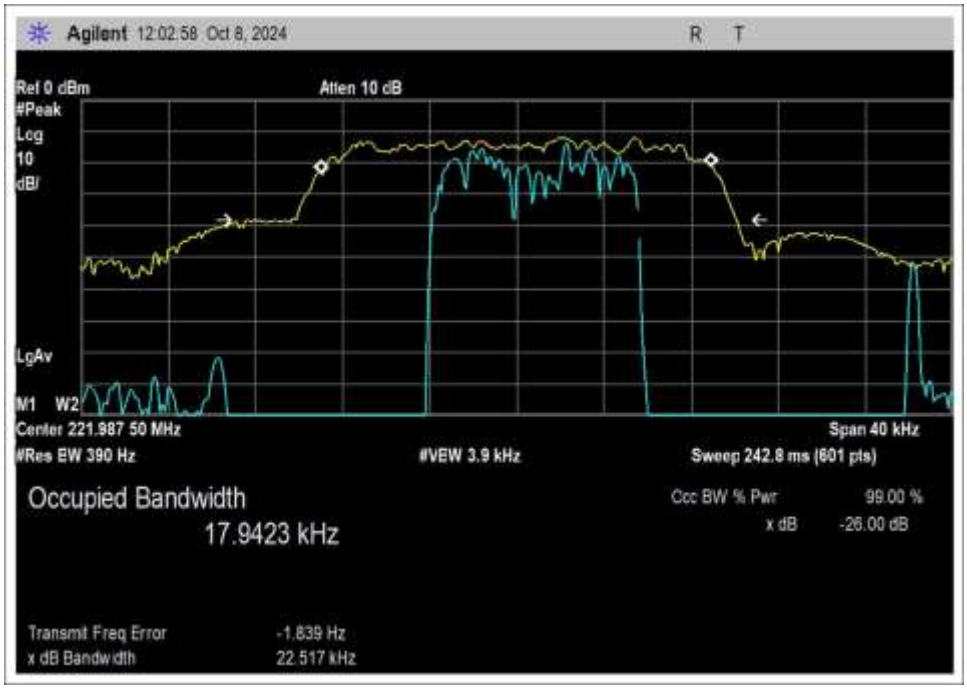
217.6125MHz, Pi/8



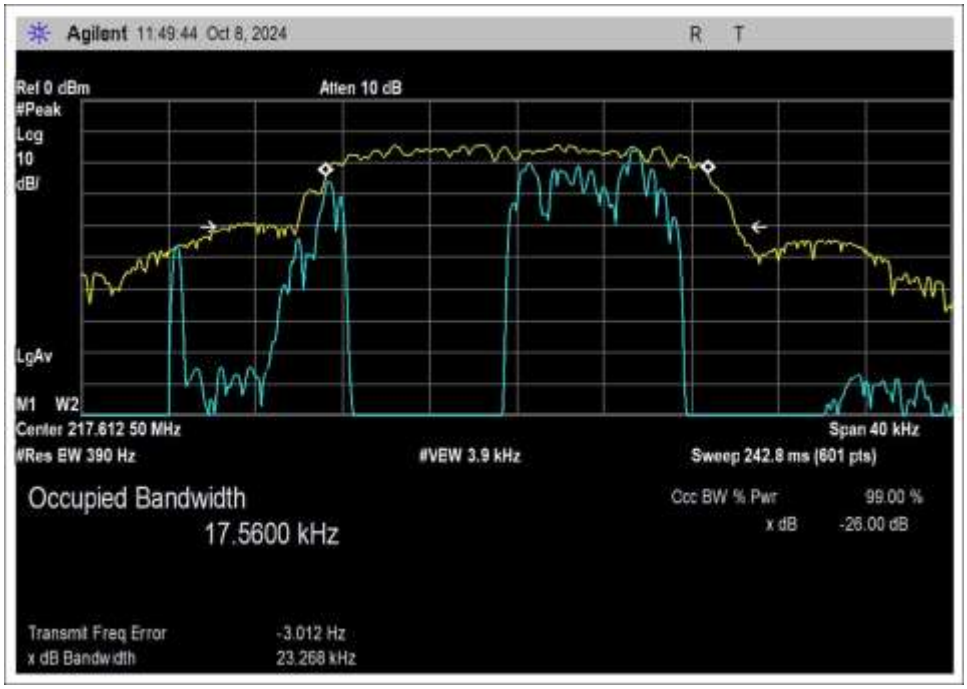
219.9875MHz, Pi/8



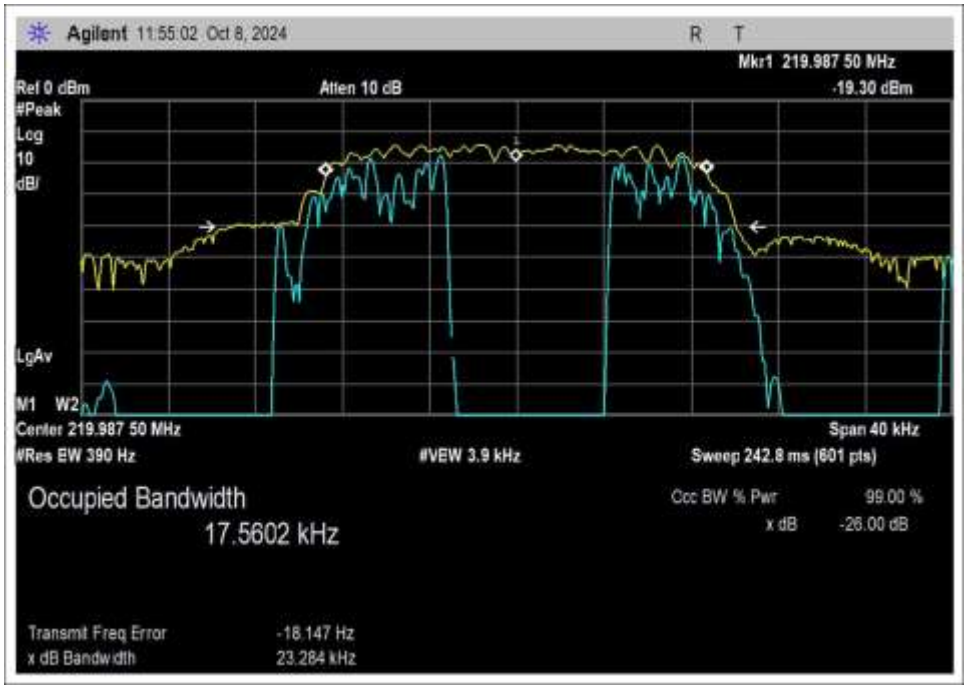
220.0125MHz, Pi/8



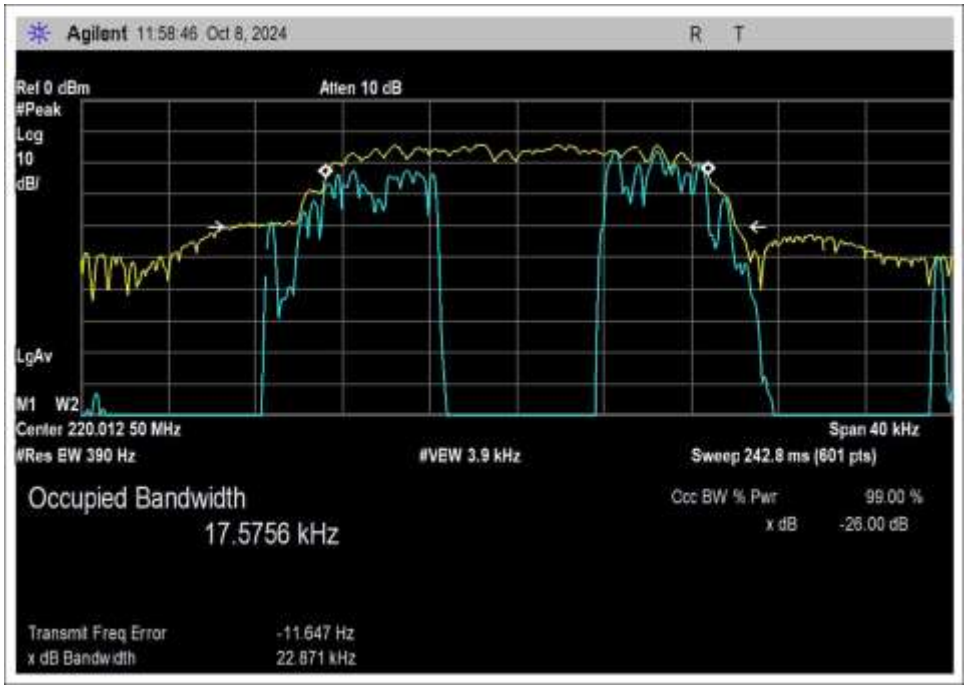
221.9875MHz, Pi/8



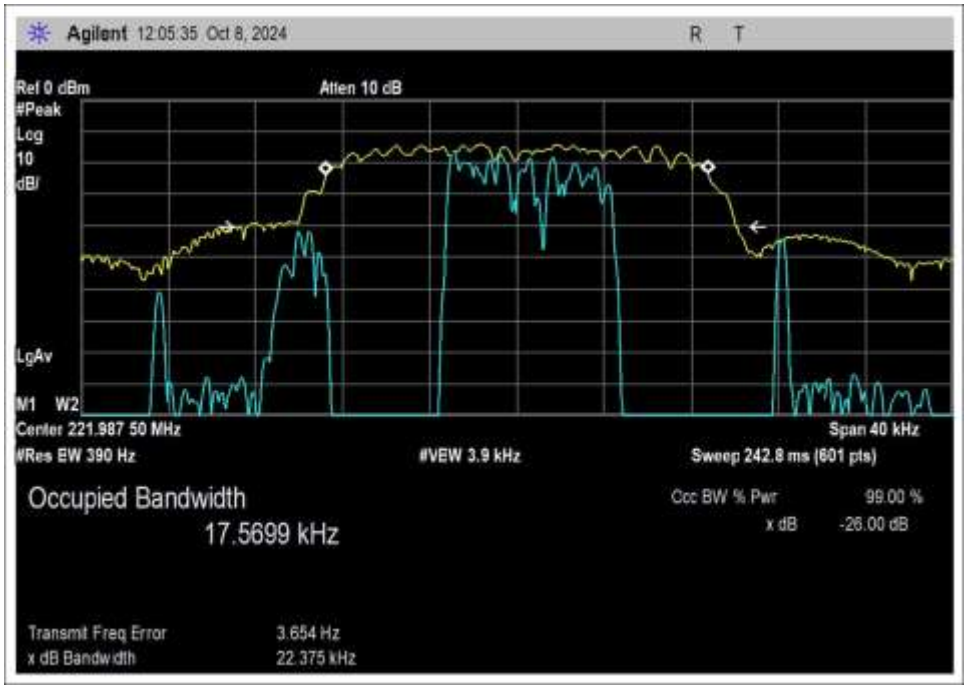
217.6125MHz, Pi/8-16



219.9875MHz, Pi/8-16



220.0125MHz, Pi/8-16



221.9875MHz, Pi/8-16

Test Setup Photo(s)

90.213 - Frequency Stability

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	10/9/2024-10/10/2024
Configuration:	2		
Test Setup:	The unit is in a temperature chamber for temperature variation. The voltage is varied. 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 its normal duty cycle, CW mode investigated. Per 90.213, the manufacturer declares the EUT is a fixed station, the limit in the table for frequencies falling in the band 216-220MHz is 1.0ppm, for band 220-222 MHz the limit is 0.1ppm. **Modification #1 & 2 was in place for testing.**		

Environmental Conditions			
Temperature (ºC)	23.4	Relative Humidity (%):	38

Test Equipment

Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02872	Spectrum Analyzer	Agilent	E4440A	10/11/2023	10/11/2025
P05748	Attenuator	Pasternack	PE7004-20	2/26/2024	2/26/2026
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

Test Data Summary

Modulation: CW

Temp (ºC)	Voltage	Ch 1 (PPM)	Ch 96 (PPM)	Ch 97 (PPM)	Ch176 (PPM)	Results
-30	V_{Nom}	0.00000	0.00000	0.00000	0.00000	Pass
-20	V_{Nom}	0.01379	0.01364	0.01364	0.01351	
-10	V_{Nom}	0.00000	0.01364	0.01364	0.01351	
0	V_{Nom}	0.00460	0.00455	0.00455	0.00450	
10	V_{Nom}	0.00460	0.00455	0.00455	0.00450	
20	V_{Nom}	0.04595	0.04546	0.04545	0.04505	
30	V_{Nom}	0.03217	0.03182	0.03182	0.03153	
40	V_{Nom}	0.04136	0.04091	0.04091	0.04054	
50	V_{Nom}	0.06433	0.06364	0.06363	0.06307	
20	V_{Min}	0.04136	0.04091	0.04091	0.04054	
20	V_{Max}	0.04136	0.04091	0.04091	0.04054	
Maximum Deviation		0.06433	0.06364	0.06363	0.06307	

Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
V_{Nom}:	48VDC
V_{Min}:	21VDC
V_{Max}:	61VDC

Test Setup Photo(s)

Test Setup, View 1

Test Setup, View 2

90.210 - Conducted Spurious Emissions Mask

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	9/27/2024
Configuration:	1		
Test Setup:	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, full rate and half rate, pi/8 and pi/8-16 modulations investigated in separate datasheets. The emission mask was built with an RMS Average measurement of the fundamental. Conducted spurs was run on the 4 channels selected, mask data shown for Ch1,96,97 and Ch176. Outside of the span shown in the emission mask plots, the following bandwidths were used: 9kHz-150kHz: 200Hz RBW 150kHz-30MHz: 9kHz RBW 30-1000MHz: 100kHz RBW 1000MHz and above: 1MHz RBW Average values as indicated on datasheet are RMS. (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; (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 (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus $10\log_{10}$ (mean power in watts) dB. 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 (94dBµV) at any power level conducted. Per the manufacturer, a 20kHz ABW for Full Rate, pi/8, and pi/8-16 and 11.25kHz ABW for Half Rate was used to build 90.210B masks accordingly, it will be up the licensee to ensure the mask applicability. **Modification #1 & 2 was in place for testing.**		

Environmental Conditions			
Temperature (ºC)	22.1	Relative Humidity (%):	48.7

Test Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717		
Customer:	**Meteorcomm LLC.**		
Specification:	**47 CFR §90.210(b) Spurious Emissions**		
Work Order #:	**109225**	Date:	10/8/2024
Test Type:	**Conducted Emissions**	Time:	14:52:16
Tested By:	C. Plumadore	Sequence#:	1
Software:	EMITest 5.03.20		48VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Frequency: 9kHz-2.5GHz

Test Method: ANSI 63.26

Modification #1 & 2 was in place for testing.

Test Equipment:

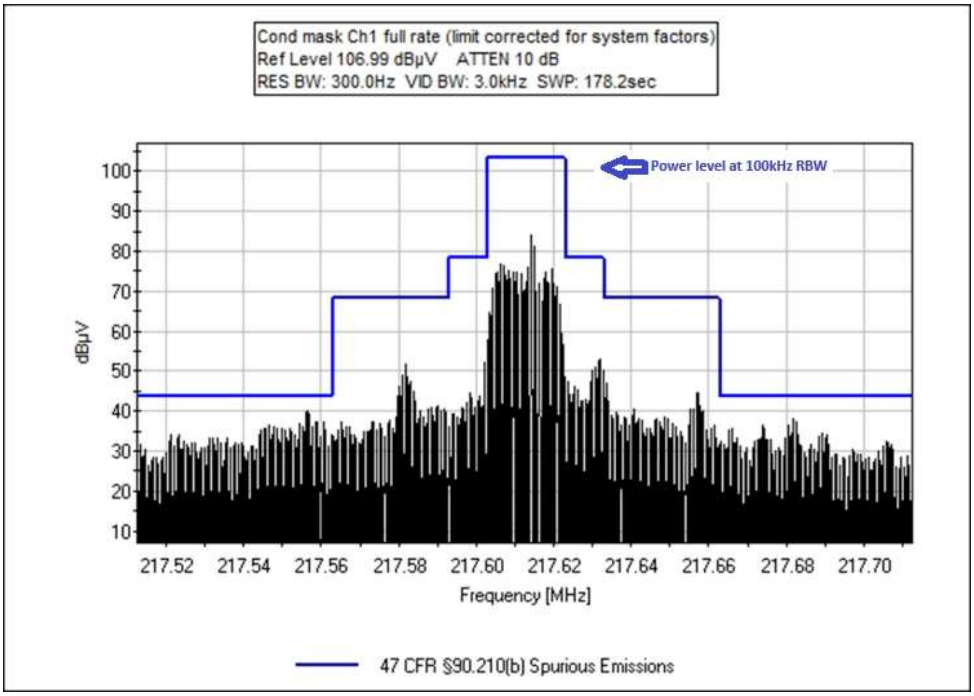
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05748	Attenuator	PE7004-20	2/26/2024	2/26/2026
	AN03807	Spectrum Analyzer	E4440A	10/10/2023	10/10/2025
T2	ANC00194	Attenuator	SA3N1007-30	9/26/2024	9/26/2026
T3	ANP06452	Cable	Heliax	2/8/2023	2/8/2025

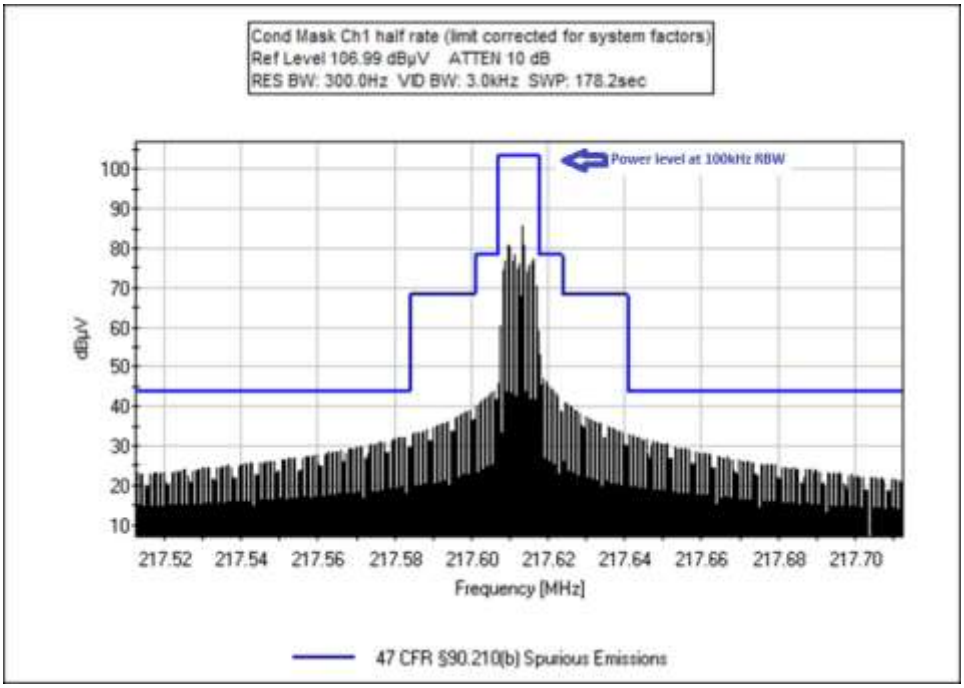
Measurement Data: Reading listed by margin. Test Lead: RF port

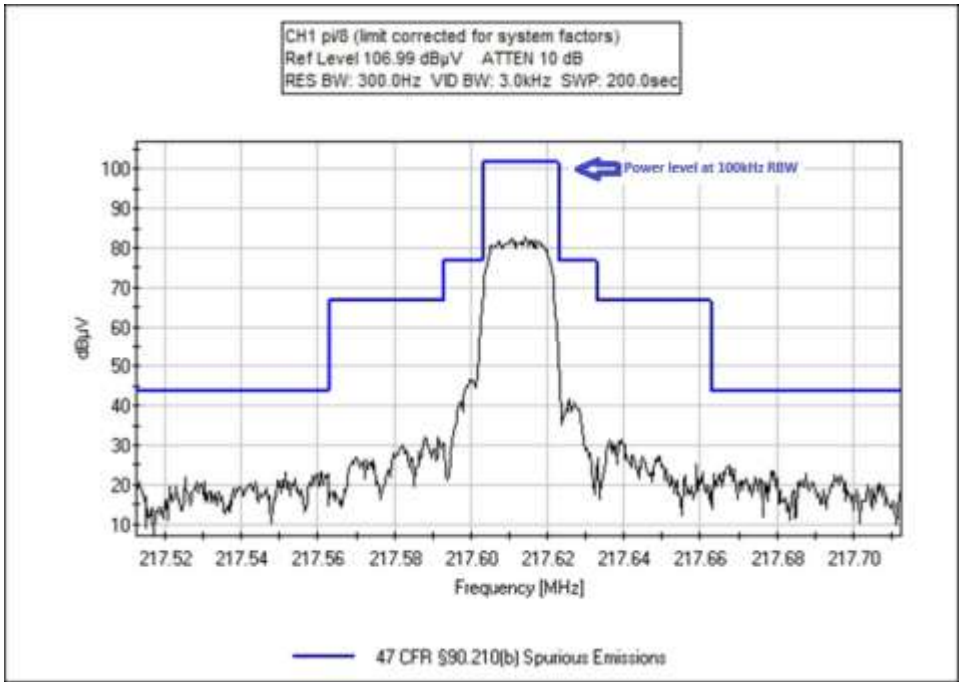
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	435.218M	34.3	+20.0	+30.0	+0.5		+0.0	84.8	94.0	-9.2	RF po
									217.6125 pi/8		
2	435.199M	34.2	+20.0	+30.0	+0.5		+0.0	84.7	94.0	-9.3	RF po
									217.6125Mhz pi/8-16		
3	439.962M	33.7	+20.0	+30.0	+0.5		+0.0	84.2	94.0	-9.8	RF po
									219.9875 pi/8-16		
4	440.019M	33.5	+20.0	+30.0	+0.5		+0.0	84.0	94.0	-10.0	RF po
									220.0125 pi/8		
5	440.030M	33.4	+20.0	+30.0	+0.5		+0.0	83.9	94.0	-10.1	RF po
									220.0125 pi/8-16		
6	443.986M	33.3	+20.0	+30.0	+0.5		+0.0	83.8	94.0	-10.2	RF po
									221.9875 pi/8-16		
7	439.971M	33.1	+20.0	+30.0	+0.5		+0.0	83.6	94.0	-10.4	RF po
									219.9875 pi/8		
8	443.966M	33.1	+20.0	+30.0	+0.5		+0.0	83.6	94.0	-10.4	RF po
									221.9875 pi/8		
9	435.202M	33.1	+20.0	+30.0	+0.5		+0.0	83.6	94.0	-10.4	RF po
									217.6125 full rate		
10	435.224M	32.8	+20.0	+30.0	+0.5		+0.0	83.3	94.0	-10.7	RF po
									217.6125 half rate		
11	439.976M	32.4	+20.0	+30.0	+0.5		+0.0	82.9	94.0	-11.1	RF po
									219.9875 full rate		
12	439.981M	32.2	+20.0	+30.0	+0.5		+0.0	82.7	94.0	-11.3	RF po
									219.9875MHz half rate		
13	443.935M	32.1	+20.0	+30.0	+0.5		+0.0	82.6	94.0	-11.4	RF po
									221.9875 full rate		
14	443.978M	31.9	+20.0	+30.0	+0.5		+0.0	82.4	94.0	-11.6	RF po
									221.9875 half rate		
15	652.812M	31.4	+20.0	+30.0	+0.7		+0.0	82.1	94.0	-11.9	RF po
									217.6125 full rate		
16	659.962M	31.3	+20.0	+30.0	+0.7		+0.0	82.0	94.0	-12.0	RF po
									219.9875 full rate		
17	652.833M	31.2	+20.0	+30.0	+0.7		+0.0	81.9	94.0	-12.1	RF po
									217.6125Mhz pi/8-16		
18	652.816M	31.1	+20.0	+30.0	+0.7		+0.0	81.8	94.0	-12.2	RF po
									217.6125 half rate		
19	659.952M	31.0	+20.0	+30.0	+0.7		+0.0	81.7	94.0	-12.3	RF po
									219.9875MHz half rate		
20	652.840M	31.0	+20.0	+30.0	+0.7		+0.0	81.7	94.0	-12.3	RF po
									217.6125 pi/8		
21	665.976M	31.0	+20.0	+30.0	+0.7		+0.0	81.7	94.0	-12.3	RF po
									221.9875 pi/8-16		
22	660.019M	31.0	+20.0	+30.0	+0.7		+0.0	81.7	94.0	-12.3	RF po
									220.0125 pi/8-16		

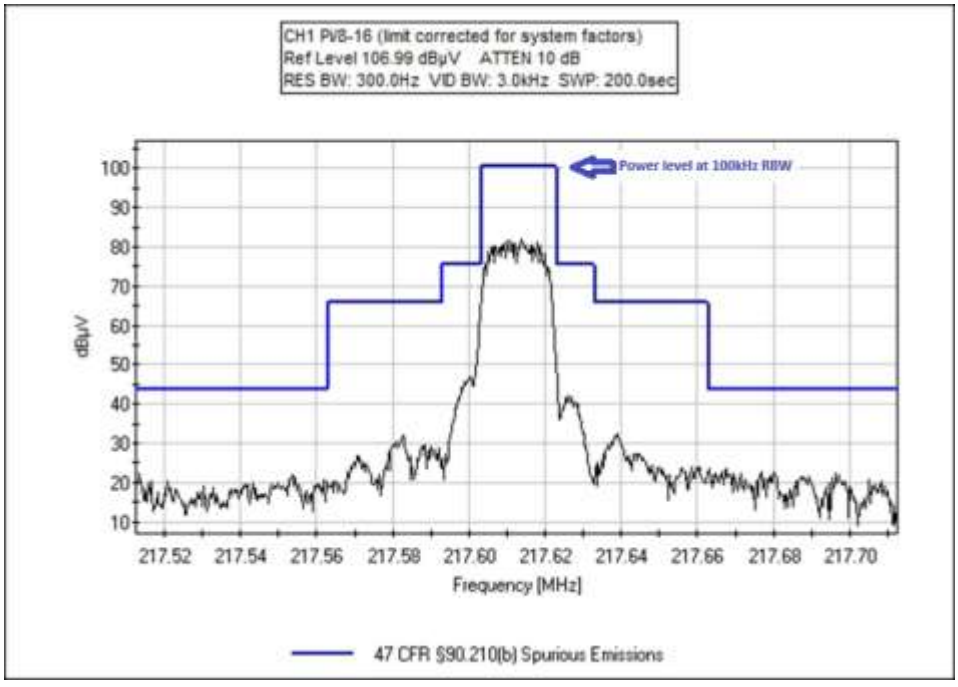
23	665.969M	30.8	+20.0	+30.0	+0.7	+0.0	81.5	94.0	-12.5	RF po 221.9875 half rate
24	659.969M	30.8	+20.0	+30.0	+0.7	+0.0	81.5	94.0	-12.5	RF po 219.9875 pi/8-16
25	660.060M	30.8	+20.0	+30.0	+0.7	+0.0	81.5	94.0	-12.5	RF po 220.0125 pi/8
26	665.964M	30.5	+20.0	+30.0	+0.7	+0.0	81.2	94.0	-12.8	RF po 221.9875 full rate
27	659.952M	30.3	+20.0	+30.0	+0.7	+0.0	81.0	94.0	-13.0	RF po 219.9875 pi/8
28	665.961M	30.2	+20.0	+30.0	+0.7	+0.0	80.9	94.0	-13.1	RF po 221.9875 pi/8
29	879.886M	27.0	+20.0	+30.0	+0.8	+0.0	77.8	94.0	-16.2	RF po 219.9875MHz half rate
30	887.904M	26.4	+20.0	+30.0	+0.8	+0.0	77.2	94.0	-16.8	RF po 221.9875 half rate
31	870.497M	25.9	+20.0	+30.0	+0.8	+0.0	76.7	94.0	-17.3	RF po 217.6125 half rate
32	879.926M	25.8	+20.0	+30.0	+0.8	+0.0	76.6	94.0	-17.4	RF po 219.9875 full rate
33	887.951M	25.8	+20.0	+30.0	+0.8	+0.0	76.6	94.0	-17.4	RF po 221.9875 full rate
34	870.434M	25.4	+20.0	+30.0	+0.8	+0.0	76.2	94.0	-17.8	RF po 217.6125 full rate
35	887.851M	21.6	+20.0	+30.0	+0.8	+0.0	72.4	94.0	-21.6	RF po 221.9875 pi/8
36	1.737M	21.8	+20.0	+29.9	+0.1	+0.0	71.8	94.0	-22.2	RF po
37	880.060M	21.0	+20.0	+30.0	+0.8	+0.0	71.8	94.0	-22.2	RF po 220.0125 pi/8-16
38	870.403M	20.9	+20.0	+30.0	+0.8	+0.0	71.7	94.0	-22.3	RF po 217.6125Mhz pi/8-16
39	880.042M	20.8	+20.0	+30.0	+0.8	+0.0	71.6	94.0	-22.4	RF po 219.9875 pi/8-16
40	870.386M	20.7	+20.0	+30.0	+0.8	+0.0	71.5	94.0	-22.5	RF po 217.6125 pi/8
41	880.045M	20.7	+20.0	+30.0	+0.8	+0.0	71.5	94.0	-22.5	RF po 219.9875 pi/8
42	887.980M	20.7	+20.0	+30.0	+0.8	+0.0	71.5	94.0	-22.5	RF po 221.9875 pi/8-16
43	879.954M	20.6	+20.0	+30.0	+0.8	+0.0	71.4	94.0	-22.6	RF po 220.0125 pi/8

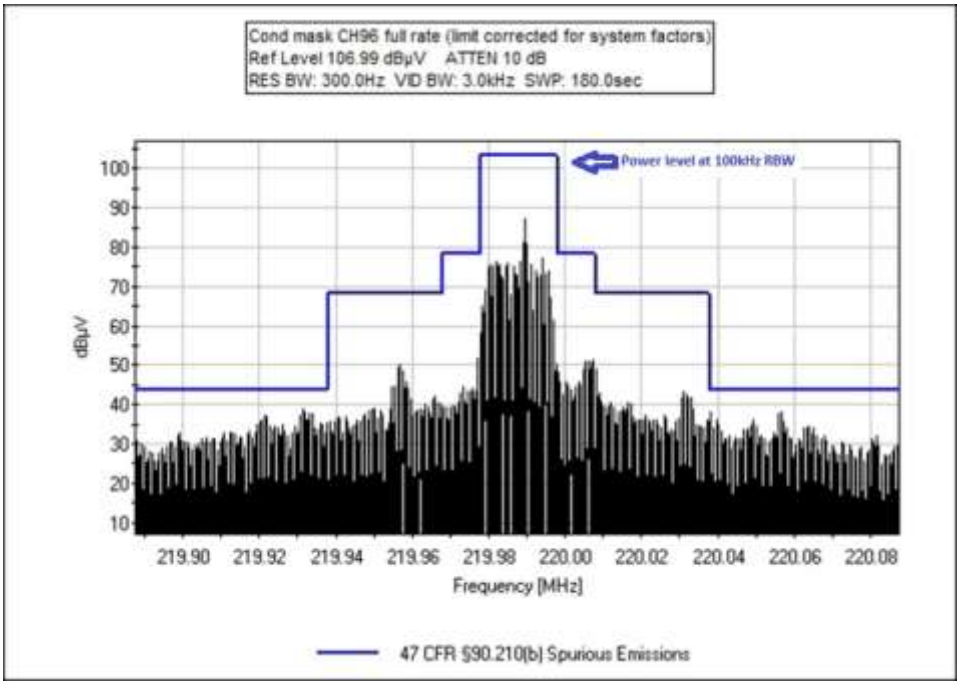
Test Plots

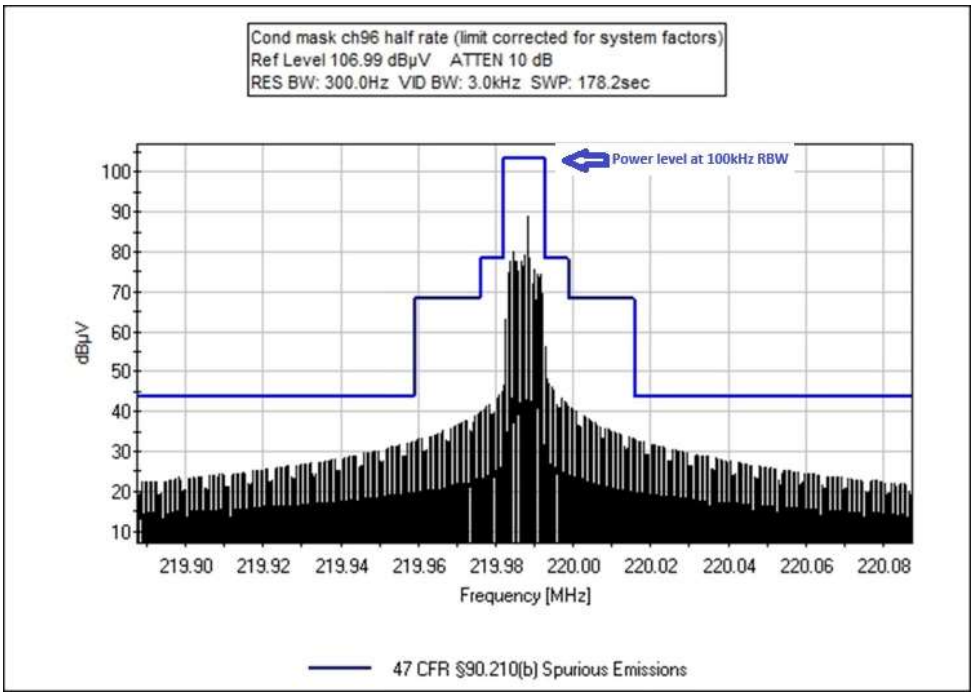

Cond mask Ch1 full rate (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 178.2sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
217.52 217.54 217.56 217.58 217.60 217.62 217.64 217.66 217.68 217.70
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

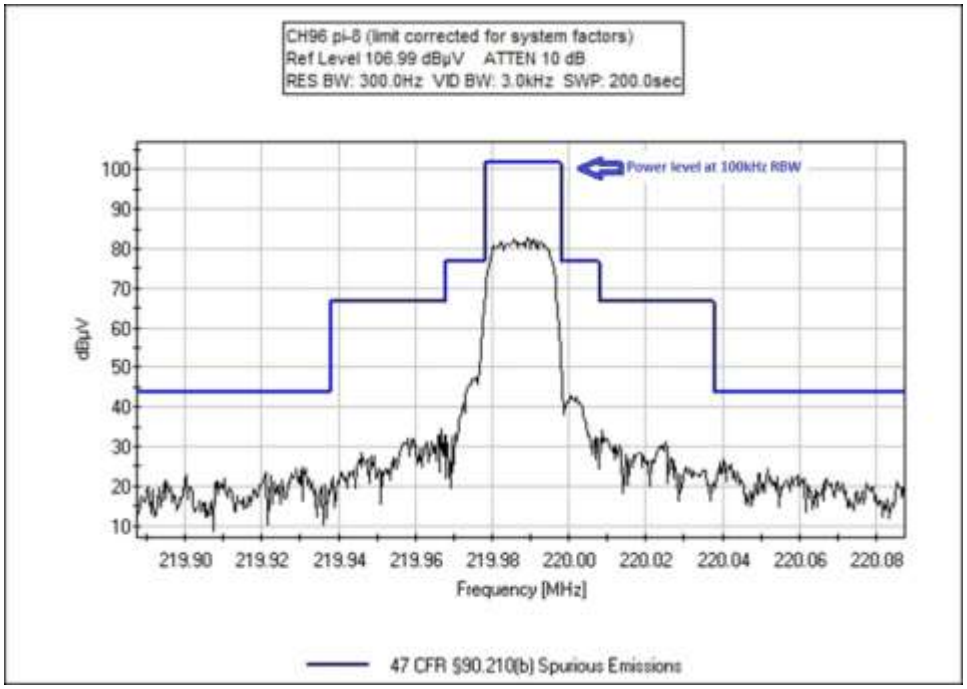

Cond Mask Ch1 half rate (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 178.2sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
217.52 217.54 217.56 217.58 217.60 217.62 217.64 217.66 217.68 217.70
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

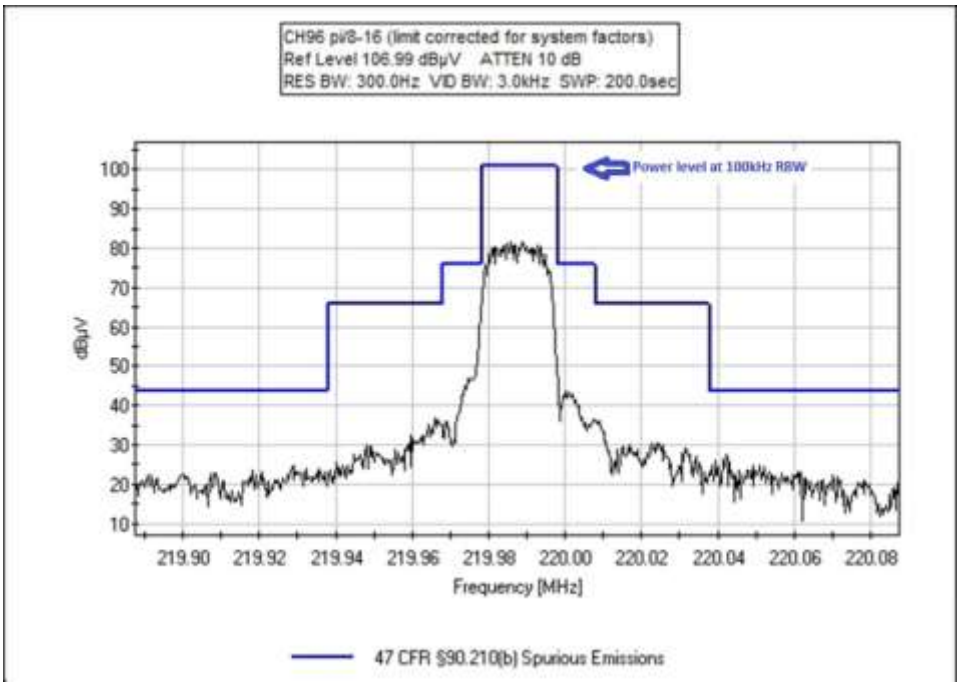

CH1 pi/8 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
217.52 217.54 217.56 217.58 217.60 217.62 217.64 217.66 217.68 217.70
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

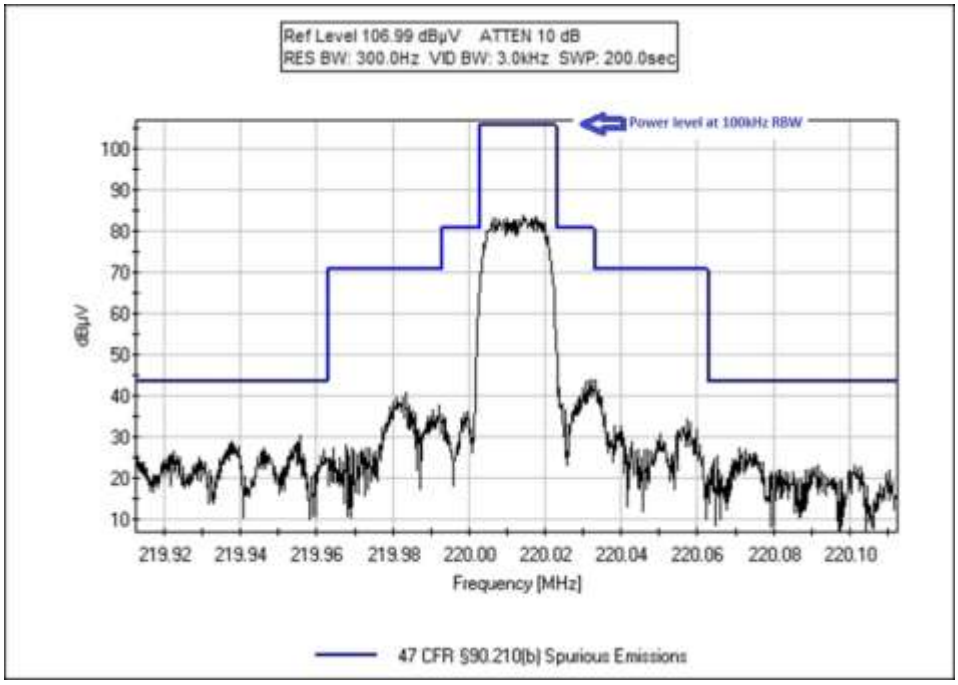

CH1 Pi/8-16 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
217.52 217.54 217.56 217.58 217.60 217.62 217.64 217.66 217.68 217.70
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

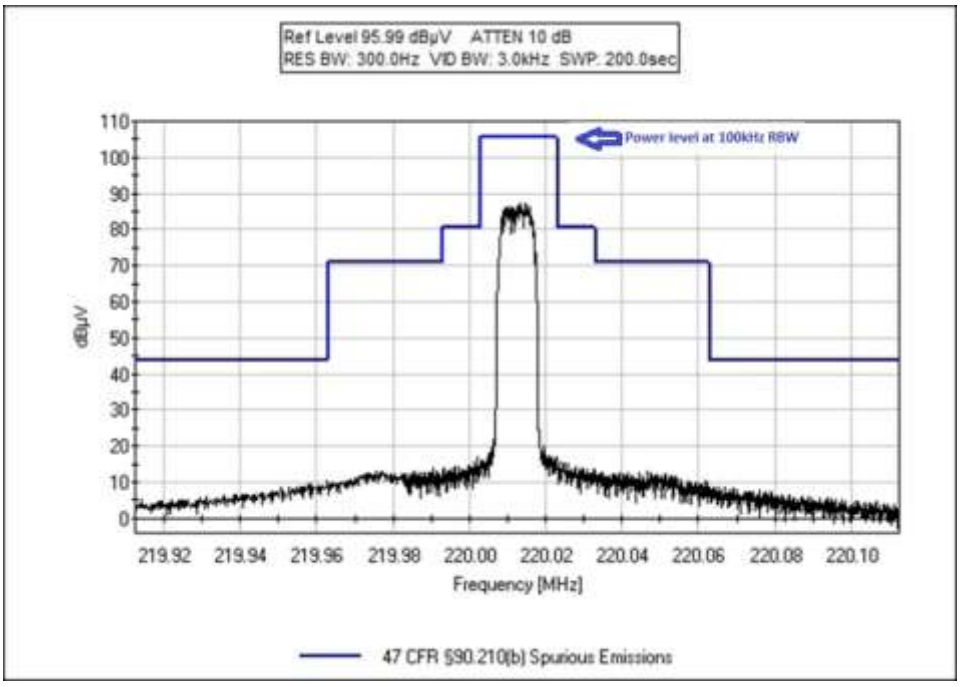

Cond mask CH96 full rate (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 180.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.90 219.92 219.94 219.96 219.98 220.00 220.02 220.04 220.06 220.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

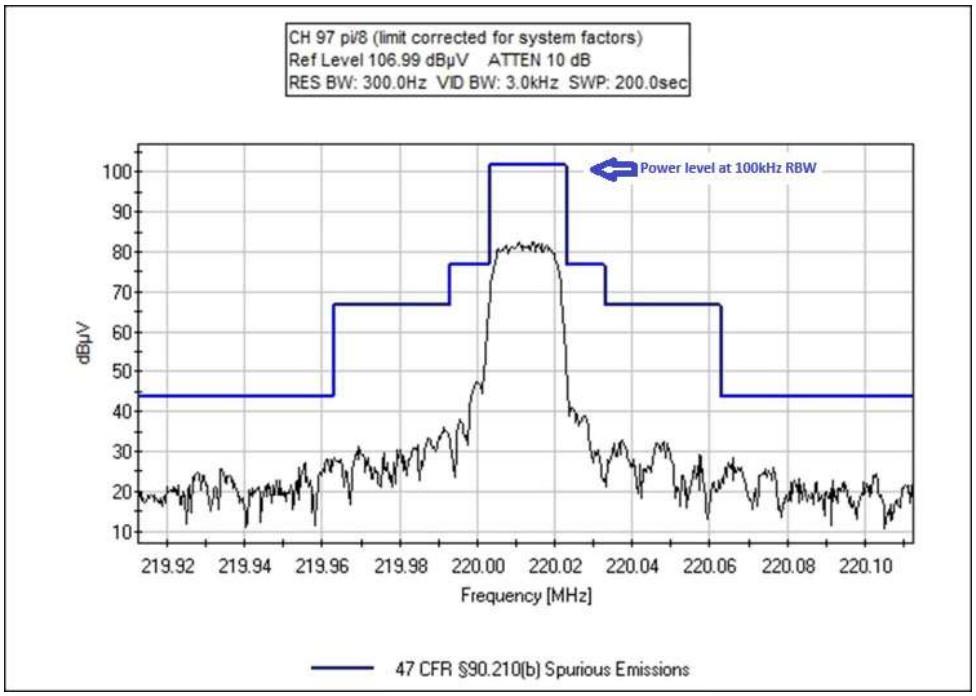

Cond mask ch96 half rate (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 178.2sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.90 219.92 219.94 219.96 219.98 220.00 220.02 220.04 220.06 220.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

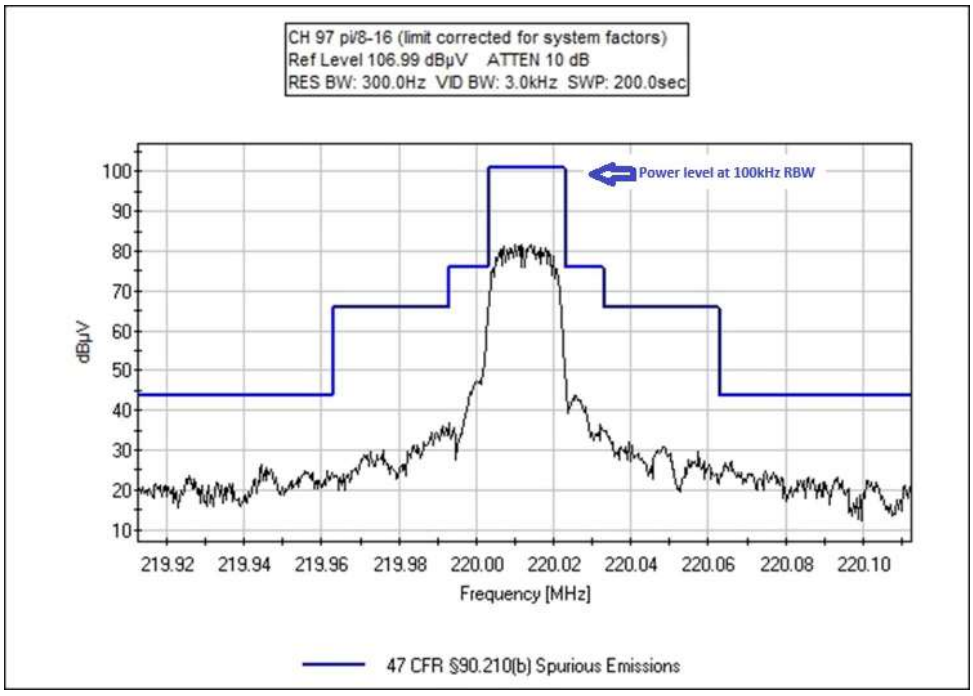

CH96 pi-8 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.90
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

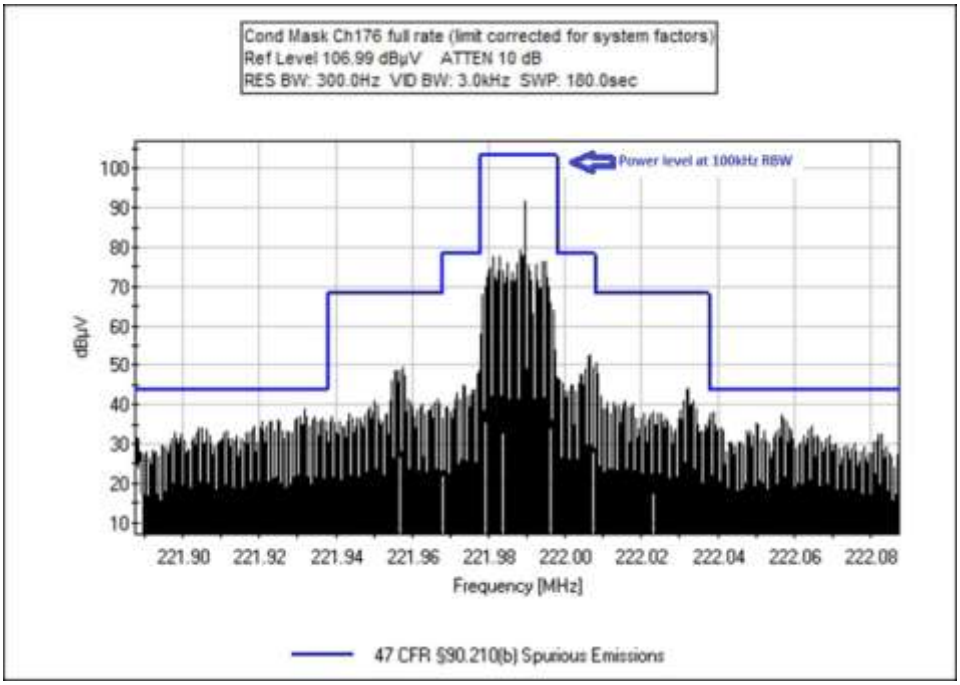

CH96 pi/8-16 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.90
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

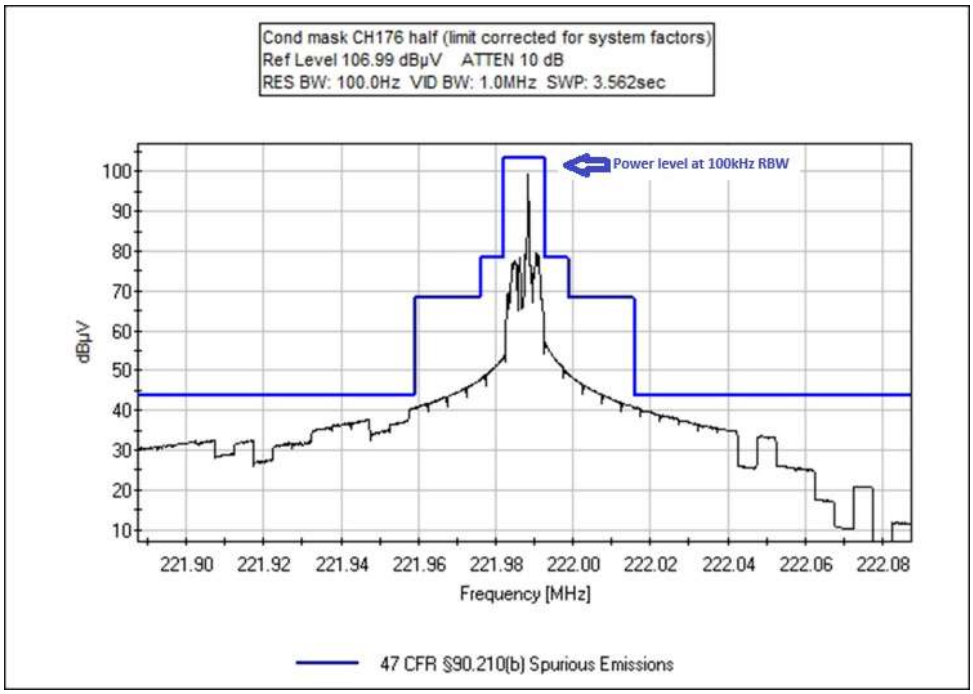

Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
220.10
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

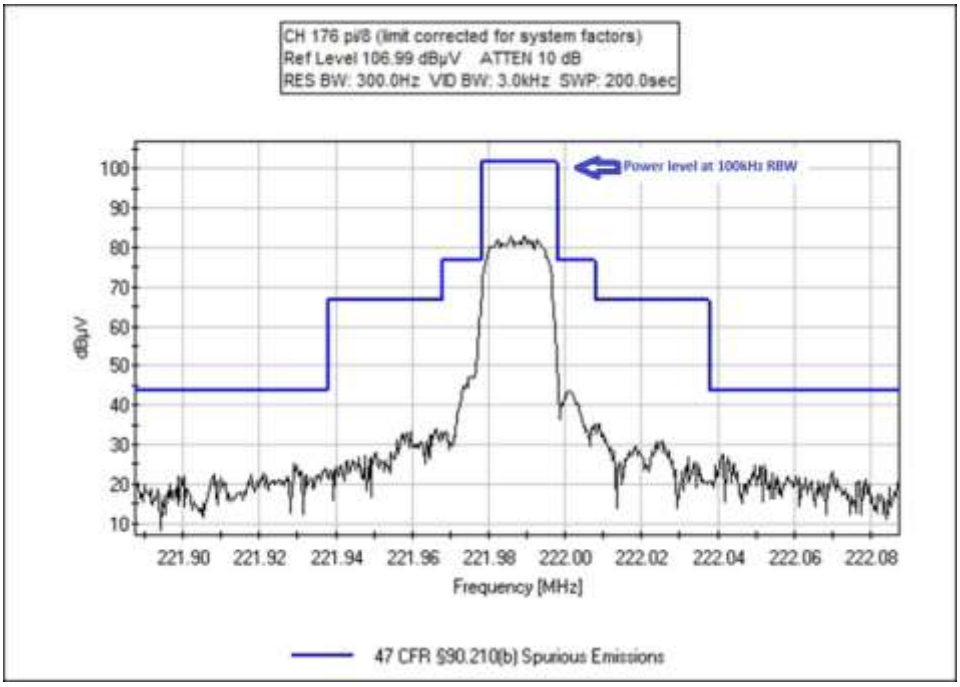

Ref Level 95.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
110
100
90
80
70
60
50
40
30
20
10
0
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
220.10
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

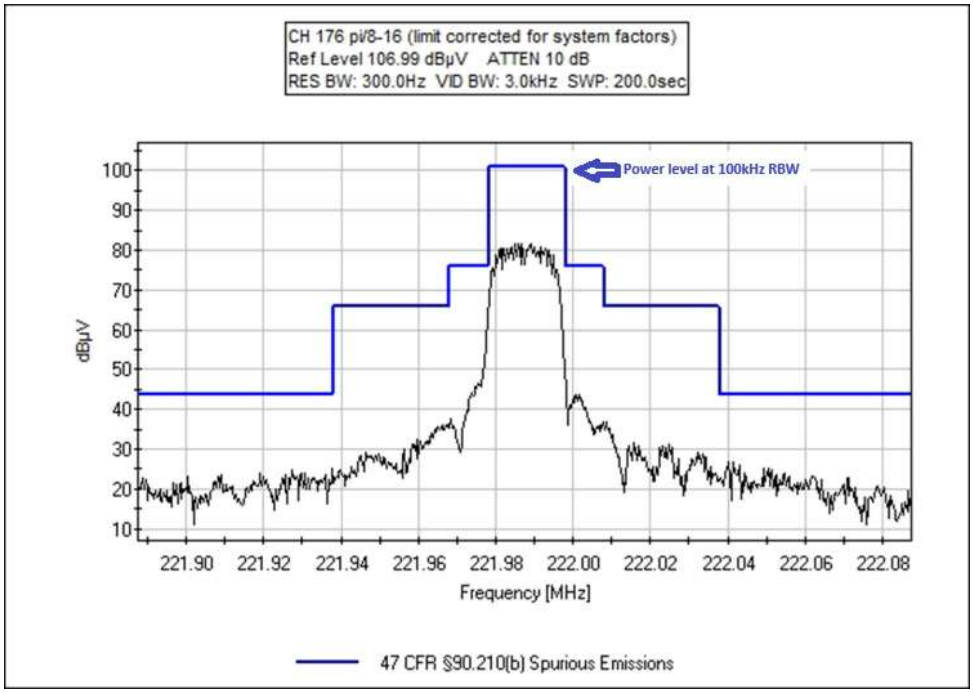

CH 97 pi/8 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
220.10
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


CH 97 pi/8-16 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
219.92
219.94
219.96
219.98
220.00
220.02
220.04
220.06
220.08
220.10
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


Cond Mask Ch176 full rate (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 180.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
221.90 221.92 221.94 221.96 221.98 222.00 222.02 222.04 222.06 222.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


Cond mask CH176 half (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0Hz VID BW: 1.0MHz SWP: 3.562sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
221.90 221.92 221.94 221.96 221.98 222.00 222.02 222.04 222.06 222.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


CH 176 pi/8 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
221.90
221.92
221.94
221.96
221.98
222.00
222.02
222.04
222.06
222.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


CH 176 pi/8-16 (limit corrected for system factors)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 300.0Hz VID BW: 3.0kHz SWP: 200.0sec
Power level at 100kHz RBW
dBµV
100
90
80
70
60
50
40
30
20
10
221.90
221.92
221.94
221.96
221.98
222.00
222.02
222.04
222.06
222.08
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

Test Setup Photo(s)

90.210 - Radiated Emissions

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	C. Plumadore
Test Method:	ANSI C63.26 (2015)	Test Date(s):	9/23/2024-9/26/2024
Configuration:	1		

Test Setup:

The emission mask was built with an RMS Average measurement of the fundamental, with the lowest value selected from an investigation on Ch1, Ch96, Ch97, and Ch176 on both full and half rates. The mask was then converted in terms of field strength for a 3m measurement.

Outside of the span shown in the emission mask plots, the following bandwidths were used:

9kHz-150kHz:	200Hz RBW
150kHz-30MHz:	9kHz RBW
30-1000MHz:	100kHz RBW
1000MHz and above:	1MHz RBW

For the final tabular converted to dBm uses equation (d) from ANSI C63.26 (2015) 5.2.7:

EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

(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;

(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

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus $10\log_{10}$ (mean power in watts) dB.

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 (94dBµV) at any power level conducted.

Converting -13dBm EIRP to field strength at 3 meters.
E (dBµV/m) = EIRP (dBm)-20Log(D)+104.8
E (dBµV/m) = -13-20Log(3)+104.8
E (dBµV/m)=82.2

Modification #1 & 2 was in place for testing.
MOD#1 was in place for all intentional emissions except for radiated spurious emissions less than 1GHz, Half rate and full rate.

Test 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 #:	**109225**	Date:	9/25/2024
Test Type:	**Radiated Scan**	Time:	14:09:43
Tested By:	C. Plumadore	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:

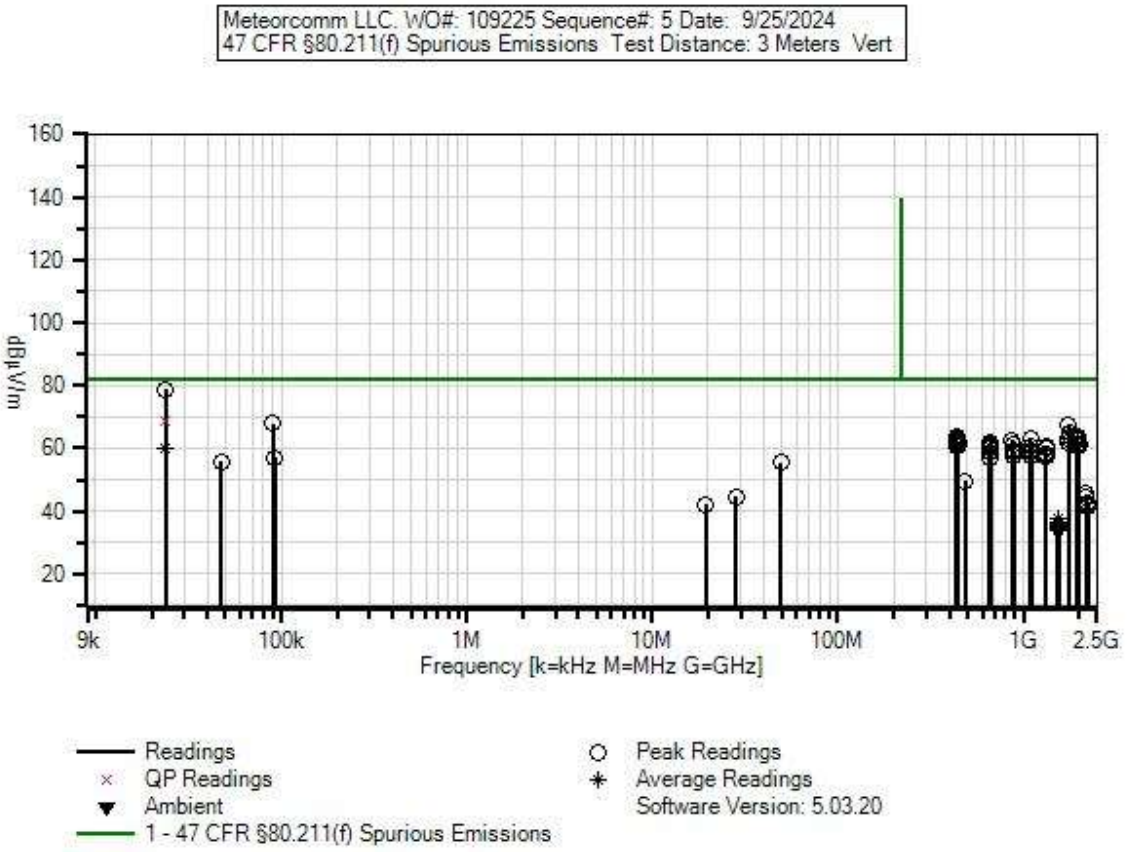
Full Rate & Half Rate
Test Environment Conditions:
Temperature: 22.1°C
Humidity: 48.7%
Pressure: 101.8 kPa

Frequency: 9k-2500MHz

Test set up:
Uploading, downloading files on ethernet
Receiving GNSS
Standby receiver

Test Method: ANSI 63.26

Modification #1 & 2 was in place for testing.
MOD#1 was in place for all intentional emissions except for radiated spurious emissions less than 1GHz, Half rate and full rate.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03824	Biconilog Antenna	3142E	5/9/2023	5/9/2025
T2	ANP05333	Cable	Heliax	8/8/2023	8/8/2025
T3	ANP05360	Cable	RG214	8/8/2023	8/8/2025
T4	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T5	AN02307	Preamp	8447D	8/9/2023	8/9/2025
T6	AN03803	Spectrum Analyzer	E4440A	2/12/2024	2/12/2026
T7	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T8	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T9	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T10	AN00052	Loop Antenna	6502	4/19/2024	4/19/2026

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	23.805k	66.5	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	78.8	82.2	-3.4	Vert
2	23.805k QP	56.5	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	68.8	82.2 221.9875 full rate	-13.4	paral
3	90.357k	58.1	+0.0 +0.0 +0.0	+0.0 +0.0 +9.7	+0.0 +0.0	+0.0 +0.0	+0.0	67.8	82.2	-14.4	paral
4	1740.990M	73.3	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.2	+0.6 +26.5	+0.0	67.7	82.2 217.6125 full rate	-14.5	Vert
5	1741.075M	73.3	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.2	+0.6 +26.5	+0.0	67.7	82.2 217.6125 half rate	-14.5	Vert
6	1775.665M	69.7	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +27.0	+0.0	64.7	82.2 221.9875 full rate	-17.5	Vert
7	1775.700M	68.6	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +27.0	+0.0	63.6	82.2 221.9875 half rate	-18.6	Vert
8	1958.708M	66.8	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.1	+0.0	63.5	82.2 217.6125 full rate	-18.7	Vert
9	435.220M	64.9	+23.1 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	63.4	82.2 217.6125 half rate	-18.8	Horiz
10	1088.048M	73.0	+0.0 +0.0 +0.3	+1.7 +0.0 +0.0	+0.0 -37.0	+0.4 +24.7	+0.0	63.1	82.2 217.6125 full rate	-19.1	Vert
11	1958.278M	66.4	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.1	+0.0	63.1	82.2 217.6125 half rate	-19.1	Vert
12	435.225M	64.5	+23.1 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	63.0	82.2 217.6125Mhz full rate	-19.2	Horiz
13	1760.055M	68.2	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +26.8	+0.0	63.0	82.2 220.0125 full rate	-19.2	Vert
14	1759.860M	68.2	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +26.8	+0.0	63.0	82.2 219.9875 full rate	-19.2	Vert
15	1760.130M	68.0	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +26.8	+0.0	62.8	82.2 220.0125 half rate	-19.4	Vert

16	870.435M	56.3	+29.0 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	62.5	82.2 217.6125 half rate	-19.7	Horiz
17	870.435M	56.2	+29.0 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	62.4	82.2 217.6125Mhz full rate	-19.8	Horiz
18	1979.938M	65.7	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.1	+0.0	62.4	82.2 219.9875 full rate	-19.8	Vert
19	439.970M	63.8	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	62.2	82.2 219.9875 90% rate full rate	-20.0	Horiz
20	665.958M	58.2	+27.8 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	62.1	82.2 221.9875 full rate	-20.1	Vert
21	443.985M	63.6	+23.1 -27.7 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	62.0	82.2 221.9875 full rate	-20.2	Horiz
22	440.035M	63.6	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	62.0	82.2 220.0125 full rate	-20.2	Horiz
23	665.938M	58.1	+27.8 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	62.0	82.2 221.9875 half rate	-20.2	Vert
24	1759.975M	66.7	+0.0 +0.0 +0.4	+2.1 +0.0 +0.0	+0.0 -35.1	+0.6 +26.8	+0.0	61.5	82.2 219.9875 half rate	-20.7	Vert
25	879.955M	55.4	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	61.5	82.2 219.9875 half rate	-20.7	Horiz
26	1980.398M	64.7	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.2	+0.0	61.5	82.2 220.0125 full rate	-20.7	Vert
27	440.025M	63.0	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	61.4	82.2 220.0125 half rate	-20.8	Horiz
28	1997.868M	64.4	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.2	+0.0	61.2	82.2 221.9875 full rate	-21.0	Vert
29	443.955M	62.7	+23.1 -27.7 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	61.1	82.2 221.9875 half rate	-21.1	Horiz
30	1997.902M	64.2	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.2	+0.0	61.0	82.2 221.9875 half rate	-21.2	Vert
31	1979.932M	64.3	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.9	+0.7 +28.1	+0.0	61.0	82.2 219.9875 half rate	-21.2	Vert
32	880.065M	54.9	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	61.0	82.2 220.0125 full rate	-21.2	Horiz

33	880.040M	54.9	+28.9	+1.5	+2.5	+0.4	+0.0	61.0	82.2	-21.2	Horiz
			-27.2	+0.0	+0.0	+0.0			220.0125 half rate		
			+0.0	+0.0							
34	659.962M	57.1	+27.7	+1.3	+2.4	+0.3	+0.0	60.9	82.2	-21.3	Horiz
			-27.9	+0.0	+0.0	+0.0			219.9875 half rate		
			+0.0	+0.0							
35	439.975M	62.4	+23.0	+1.0	+1.7	+0.3	+0.0	60.8	82.2	-21.4	Horiz
			-27.6	+0.0	+0.0	+0.0			219.9875 half rate		
			+0.0	+0.0							
36	1331.730M	68.7	+0.0	+1.8	+0.0	+0.5	+0.0	60.7	82.2	-21.5	Vert
			+0.0	+0.0	-36.0	+25.4			221.9875 full rate		
			+0.3	+0.0							
37	1088.452M	70.5	+0.0	+1.7	+0.0	+0.4	+0.0	60.6	82.2	-21.6	Vert
			+0.0	+0.0	-37.0	+24.7			217.6125 half rate		
			+0.3	+0.0							
38	1109.978M	70.2	+0.0	+1.7	+0.0	+0.4	+0.0	60.5	82.2	-21.7	Vert
			+0.0	+0.0	-36.9	+24.8			221.9875 half rate		
			+0.3	+0.0							
39	1109.958M	70.2	+0.0	+1.7	+0.0	+0.4	+0.0	60.5	82.2	-21.7	Vert
			+0.0	+0.0	-36.9	+24.8			221.9875 full rate		
			+0.3	+0.0							
40	1980.128M	63.6	+0.0	+2.4	+0.0	+0.7	+0.0	60.4	82.2	-21.8	Vert
			+0.0	+0.0	-34.9	+28.2			220.0125 half rate		
			+0.4	+0.0							
41	660.072M	56.5	+27.7	+1.3	+2.4	+0.3	+0.0	60.3	82.2	-21.9	Horiz
			-27.9	+0.0	+0.0	+0.0			220.0125 half rate		
			+0.0	+0.0							
42	1331.850M	68.2	+0.0	+1.8	+0.0	+0.5	+0.0	60.2	82.2	-22.0	Vert
			+0.0	+0.0	-36.0	+25.4			221.9875 half rate		
			+0.3	+0.0							
43	660.018M	56.2	+27.7	+1.3	+2.4	+0.3	+0.0	60.0	82.2	-22.2	Horiz
			-27.9	+0.0	+0.0	+0.0			220.0125 full rate		
			+0.0	+0.0							
44	659.998M	56.0	+27.7	+1.3	+2.4	+0.3	+0.0	59.8	82.2	-22.4	Horiz
			-27.9	+0.0	+0.0	+0.0			219.9875 full rate		
			+0.0	+0.0							
45	23.805k	47.4	+0.0	+0.0	+0.0	+0.0	+0.0	59.7	82.2	-22.5	paral
	Ave		+0.0	+0.0	+0.0	+0.0			221.9875 full rate		
			+0.0	+12.3							
^	23.805k	72.3	+0.0	+0.0	+0.0	+0.0	+0.0	84.6	82.2	+2.4	paral
			+0.0	+0.0	+0.0	+0.0			221.9875 full rate		
			+0.0	+12.3							
^	24.087k	63.0	+0.0	+0.0	+0.0	+0.0	+0.0	75.3	82.2	-6.9	paral
			+0.0	+0.0	+0.0	+0.0			217.6125 half rate		
			+0.0	+12.3							
^	23.805k	60.4	+0.0	+0.0	+0.0	+0.0	+0.0	72.7	82.2	-9.5	paral
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+12.3							
49	1100.218M	69.0	+0.0	+1.7	+0.0	+0.4	+0.0	59.2	82.2	-23.0	Vert
			+0.0	+0.0	-36.9	+24.7			220.0125 full rate		
			+0.3	+0.0							

50	887.950M	53.0	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	59.1	82.2 221.9875 half rate	-23.1	Horiz
51	1100.008M	68.8	+0.0 +0.0 +0.3	+1.7 +0.0 +0.0	+0.0 -36.9	+0.4 +24.7	+0.0	59.0	82.2 219.9875 half rate	-23.2	Vert
52	652.842M	55.1	+27.6 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	58.8	82.2 217.6125 half rate	-23.4	Horiz
53	887.965M	52.6	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	58.7	82.2 221.9875 full rate	-23.5	Horiz
54	1099.858M	68.4	+0.0 +0.0 +0.3	+1.7 +0.0 +0.0	+0.0 -36.9	+0.4 +24.7	+0.0	58.6	82.2 220.0125 half rate	-23.6	Vert
55	1305.620M	66.5	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.1	+0.5 +25.4	+0.0	58.4	82.2 217.6125 full rate	-23.8	Vert
56	1319.980M	65.9	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.0	+0.5 +25.4	+0.0	57.9	82.2 219.9875 half rate	-24.3	Vert
57	1320.150M	65.8	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.0	+0.5 +25.4	+0.0	57.8	82.2 220.0125 full rate	-24.4	Vert
58	1319.950M	65.8	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.0	+0.5 +25.4	+0.0	57.8	82.2 219.9875 full rate	-24.4	Vert
59	1320.150M	65.7	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.0	+0.5 +25.4	+0.0	57.7	82.2 220.0125 half rate	-24.5	Vert
60	1099.948M	67.3	+0.0 +0.0 +0.3	+1.7 +0.0 +0.0	+0.0 -36.9	+0.4 +24.7	+0.0	57.5	82.2 219.9875 full rate	-24.7	Vert
61	1305.615M	65.5	+0.0 +0.0 +0.3	+1.8 +0.0 +0.0	+0.0 -36.1	+0.5 +25.4	+0.0	57.4	82.2 217.6125 half rate	-24.8	Vert
62	879.950M	51.2	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	57.3	82.2 219.9875 full rate	-24.9	Horiz
63	652.812M	53.4	+27.6 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	57.1	82.2 217.6125Mhz full rate	-25.1	Horiz
64	91.908k	47.3	+0.0 +0.0 +0.0	+0.0 +0.0 +9.7	+0.0 +0.0	+0.0 +0.0	+0.0	57.0	82.2	-25.2	perp
65	47.775k	45.5	+0.0 +0.0 +0.0	+0.0 +0.0 +10.3	+0.0 +0.0	+0.0 +0.0	+0.0	55.8	82.2	-26.4	perp
66	49.100M	69.4	+12.7 -27.7 +0.0	+0.3 +0.0 +0.0	+0.5 +0.0	+0.1 +0.0	+0.0	55.3	82.2 217.6125Mhz full rate	-26.9	Vert

67	487.100M	50.0	+24.2 -27.9 +0.0	+1.1 +0.0 +0.0	+1.9 +0.0	+0.3 +0.0	+0.0	49.6	82.2 217.6125Mhz full rate	-32.6	Vert
68	2176.060M	48.8	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.8	+0.7 +28.0	+0.0	45.5	82.2 217.6125 full rate	-36.7	Vert
69	28.239M	37.5	+0.0 +0.0 +0.0	+0.3 +0.0 +6.7	+0.0 +0.0	+0.0 +0.0	+0.0	44.5	82.2	-37.7	perp
70	2176.005M	47.6	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.8	+0.7 +28.0	+0.0	44.3	82.2 217.6125 half rate	-37.9	Vert
71	2220.130M	45.8	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.7	+0.7 +28.2	+0.0	42.8	82.2 221.9875 half rate	-39.4	Vert
72	2219.740M	45.8	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.7	+0.7 +28.1	+0.0	42.7	82.2 221.9875 full rate	-39.5	Vert
73	2200.305M	45.6	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.7	+0.7 +28.1	+0.0	42.5	82.2 220.0125 half rate	-39.7	Vert
74	2200.015M	45.3	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.7	+0.7 +28.1	+0.0	42.2	82.2 220.0125 full rate	-40.0	Vert
75	19.314M	33.6	+0.0 +0.0 +0.0	+0.2 +0.0 +8.2	+0.0 +0.0	+0.0 +0.0	+0.0	42.0	82.2	-40.2	perp
76	2199.950M	44.5	+0.0 +0.0 +0.4	+2.4 +0.0 +0.0	+0.0 -34.7	+0.7 +28.1	+0.0	41.4	82.2 219.9875 full rate	-40.8	Vert
77	1553.913M Ave	44.6	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	37.3	82.2 221.9875 half rate	-44.9	Vert
78	1553.872M Ave	43.6	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	36.3	82.2 221.9875 full rate	-45.9	Vert
^	1553.872M	79.2	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.9	82.2 221.9875 full rate	-10.3	Vert
^	1553.913M	79.0	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.7	82.2 221.9875 half rate	-10.5	Vert
81	1540.070M Ave	43.0	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	35.7	82.2	-46.5	Vert

82	1523.292M Ave	43.0	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	35.7	82.2 217.6125	-46.5 half rate	Vert
83	1539.858M Ave	42.5	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	35.2	82.2 219.9875	-47.0 half rate	Vert
^	1539.858M	78.4	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.1	82.2 219.9875	-11.1 half rate	Vert
85	1540.068M Ave	42.3	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	35.0	82.2 220.0125	-47.2 half rate	Vert
86	1540.042M Ave	41.7	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	34.4	82.2 219.9875	-47.8 full rate	Vert
^	1540.042M	79.7	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	72.4	82.2 219.9875	-9.8 full rate	Vert
^	1540.068M	78.5	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.2	82.2 220.0125	-11.0 full rate	Vert
^	1540.070M	78.3	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.0	82.2 220.0125	-11.2 half rate	Vert
^	1540.068M	68.8	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	61.5	82.2 220.0125	-20.7 full rate	Vert
91	1523.243M Ave	41.1	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	33.8	82.2 217.6125	-48.4 full rate	Vert
^	1523.292M	79.3	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	72.0	82.2 217.6125	-10.2 half rate	Vert
^	1523.243M	78.6	+0.0 +0.0 +0.4	+1.9 +0.0 +0.0	+0.0 -35.5	+0.5 +25.4	+0.0	71.3	82.2 217.6125	-10.9 full rate	Vert

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 #:	**109225**	Date:	10/8/2024
Test Type:	**Radiated Scan**	Time:	09:40:22
Tested By:	C. Plumadore	Sequence#:	31
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:

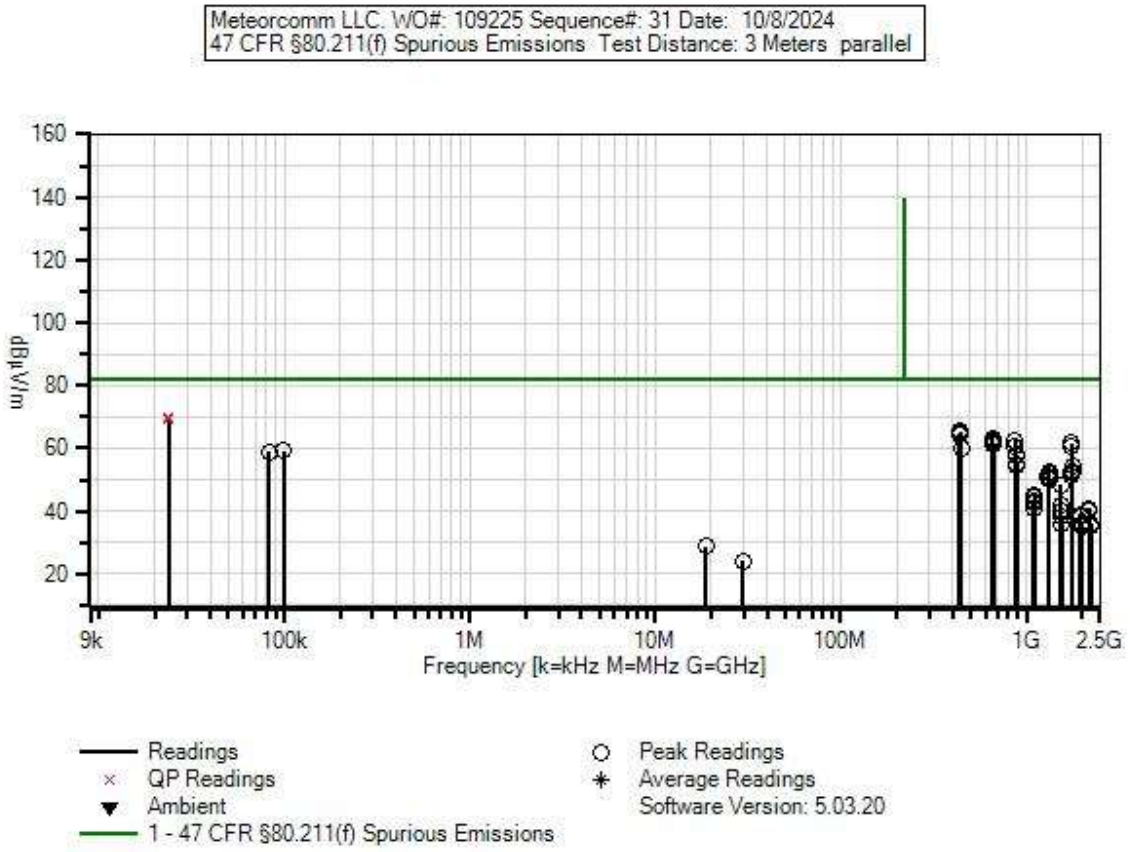
Pi/8 & Pi/8-16
Test Environment Conditions:
Temperature: 22.1°C
Humidity: 48.7%
Pressure: 101.8 kPa

Frequency: 9kHz-2.5GHz

Test set up:
Uploading, downloading files on ethernet
Receiving GNSS

Test Method: ANSI 63.26

Modification #1 & 2 was in place for testing.
MOD#1 was in place for all intentional emissions except for radiated spurious emissions less than 1GHz, Half rate and full rate..



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03824	Biconilog Antenna	3142E	5/9/2023	5/9/2025
T2	ANP05333	Cable	Heliax	8/8/2023	8/8/2025
T3	ANP05360	Cable	RG214	8/8/2023	8/8/2025
T4	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T5	AN02307	Preamp	8447D	8/9/2023	8/9/2025
	AN03803	Spectrum Analyzer	E4440A	2/12/2024	2/12/2026
T6	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T7	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T8	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
T9	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T10	AN00052	Loop Antenna	6502	4/19/2024	4/19/2026

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	23.946k QP	57.3	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	69.6	82.2 217.6125MHz	-12.6 pi/8-16	paral
2	23.805k QP	56.7	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	69.0	82.2 217.6125MHz	-13.2 pi/8	paral
^	23.805k	67.8	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	80.1	82.2 217.6125MHz	-2.1 pi/8	paral
^	23.946k	66.5	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	78.8	82.2 217.6125MHz	-3.4 pi/8-16	paral
^	23.946k	65.1	+0.0 +0.0 +0.0	+0.0 +0.0 +12.3	+0.0 +0.0	+0.0 +0.0	+0.0	77.4	82.2	-4.8	paral
^	23.664k	55.5	+0.0 +0.0 +0.0	+0.0 +0.0 +12.4	+0.0 +0.0	+0.0 +0.0	+0.0	67.9	82.2	-14.3	paral
7	440.025M	67.0	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	65.4	82.2 220.0125MHz	-16.8 pi/8-16	Vert
8	439.969M	66.9	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	65.3	82.2 219.9875MHz	-16.9 pi/8-16	Vert
9	440.026M	66.8	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	65.2	82.2 220.0125MHz	-17.0 pi/8	Vert
10	435.220M	66.2	+23.1 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	64.7	82.2 217.6125MHz	-17.5 pi/8	Vert
11	439.978M	66.2	+23.0 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	64.6	82.2 219.9875Mhz	-17.6 pi/8	Vert
12	435.216M	66.0	+23.1 -27.6 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	64.5	82.2 217.6125MHz	-17.7 pi/8-16	Vert
13	660.019M	59.5	+27.7 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	63.3	82.2 220.0125MHz	-18.9 pi/8-16	Vert
14	659.951M	59.3	+27.7 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	63.1	82.2 219.9875Mhz	-19.1 pi/8	Vert
15	659.940M	59.0	+27.7 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	62.8	82.2 219.9875MHz	-19.4 pi/8-16	Vert

16	652.826M	59.0	+27.6 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	62.7	82.2 217.6125MHz pi/8-16	-19.5	Vert
17	870.451M	56.3	+29.0 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	62.5	82.2 217.6125MHz pi/8-16	-19.7	Vert
18	660.058M	58.3	+27.7 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	62.1	82.2 220.0125MHz pi/8	-20.1	Vert
19	665.948M	57.9	+27.8 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	61.8	82.2 221.9875MHz pi/8	-20.4	Vert
20	1741.050M	67.1	+0.0 +0.0 +0.4	+0.0 -35.2 +0.0	+0.0 +26.5	+0.6 +2.2	+0.0	61.6	82.2 217.6125MHz pi/8-16	-20.6	Vert
21	665.946M	57.4	+27.8 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	61.3	82.2 221.9875Mhz pi/8-16	-20.9	Vert
22	652.850M	57.6	+27.6 -27.9 +0.0	+1.3 +0.0 +0.0	+2.4 +0.0	+0.3 +0.0	+0.0	61.3	82.2 217.6125MHz pi/8	-20.9	Vert
23	870.426M	54.5	+29.0 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	60.7	82.2 217.6125MHz pi/8	-21.5	Vert
24	1740.633M	66.1	+0.0 +0.0 +0.4	+0.0 -35.2 +0.0	+0.0 +26.5	+0.6 +2.2	+0.0	60.6	82.2 217.6125MHz pi/8	-21.6	Vert
25	443.980M	61.8	+23.1 -27.7 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	60.2	82.2 221.9875MHz pi/8	-22.0	Vert
26	443.978M	61.7	+23.1 -27.7 +0.0	+1.0 +0.0 +0.0	+1.7 +0.0	+0.3 +0.0	+0.0	60.1	82.2 221.9875Mhz pi/8-16	-22.1	Vert
27	99.005k	49.6	+0.0 +0.0 +0.0	+0.0 +0.0 +9.7	+0.0 +0.0	+0.0 +0.0	+0.0	59.3	82.2	-22.9	paral
28	82.555k	49.3	+0.0 +0.0 +0.0	+0.0 +0.0 +9.7	+0.0 +0.0	+0.0 +0.0	+0.0	59.0	82.2	-23.2	paral
29	879.953M	52.3	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	58.4	82.2 219.9875MHz pi/8-16	-23.8	Vert
30	880.035M	51.9	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	58.0	82.2 220.0125MHz pi/8-16	-24.2	Vert
31	879.966M	51.5	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	57.6	82.2 219.9875Mhz pi/8	-24.6	Vert
32	880.034M	51.2	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	57.3	82.2 220.0125MHz pi/8	-24.9	Vert

33	887.961M	48.8	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	54.9	82.2 221.9875Mhz pi/8-16	-27.3	Vert
34	1775.925M	59.4	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +27.0	+0.6 +2.2	+0.0	54.5	82.2 221.9875MHz pi/8-16	-27.7	Vert
35	887.948M	48.2	+28.9 -27.2 +0.0	+1.5 +0.0 +0.0	+2.5 +0.0	+0.4 +0.0	+0.0	54.3	82.2 221.9875MHz pi/8	-27.9	Vert
36	1759.825M	57.9	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +26.8	+0.6 +2.2	+0.0	52.8	82.2 219.9875 pi/8	-29.4	Vert
37	1331.800M	60.5	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	52.6	82.2 221.9875MHz pi/8-16	-29.6	Vert
38	1775.883M	57.4	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +27.0	+0.6 +2.2	+0.0	52.5	82.2 221.9875MHz pi/8	-29.7	Vert
39	1760.242M	57.6	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +26.8	+0.6 +2.2	+0.0	52.5	82.2 220.0125MHz pi/8-16	-29.7	Vert
40	1759.833M	57.4	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +26.8	+0.6 +2.2	+0.0	52.3	82.2 219.9875MHz pi/8-16	-29.9	Vert
41	1332.017M	59.5	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	51.6	82.2 221.9875MHz pi/8	-30.6	Vert
42	1760.075M	56.6	+0.0 +0.0 +0.4	+0.0 -35.1 +0.0	+0.0 +26.8	+0.6 +2.2	+0.0	51.5	82.2 220.0125MHz pi/8	-30.7	Vert
43	1305.833M	59.2	+0.0 +0.0 +0.3	+0.0 -36.1 +0.0	+0.0 +25.4	+0.5 +1.8	+0.0	51.1	82.2 217.6125MHz pi/8-16	-31.1	Vert
44	1319.817M	58.7	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	50.8	82.2 219.9875MHz pi/8-16	-31.4	Vert
45	1305.475M	58.5	+0.0 +0.0 +0.3	+0.0 -36.1 +0.0	+0.0 +25.4	+0.5 +1.8	+0.0	50.4	82.2 217.6125MHz pi/8	-31.8	Vert
46	1320.000M	58.3	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	50.4	82.2 220.0125MHz pi/8	-31.8	Vert
47	1320.125M	58.3	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	50.4	82.2 220.0125MHz pi/8-16	-31.8	Vert
48	1320.050M	58.0	+0.0 +0.0 +0.3	+0.0 -36.0 +0.0	+0.0 +25.4	+0.5 +1.9	+0.0	50.1	82.2 219.9875 pi/8	-32.1	Vert
49	1523.346M	55.6	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	48.4	82.2 217.6125MHz pi/8	-33.8	Vert

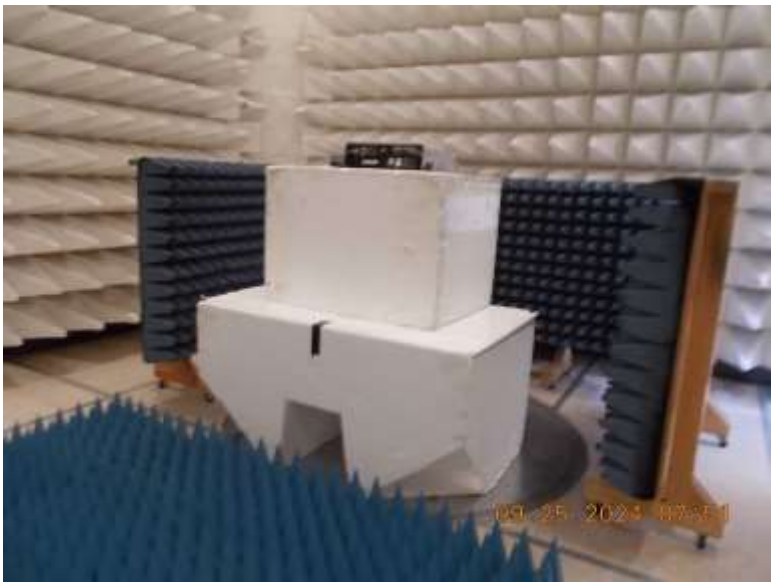
50	1523.062M	55.1	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	47.9	82.2 217.6125MHz	-34.3 pi/8-16	Vert
51	1099.996M	54.7	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	44.9	82.2 220.0125MHz	-37.3 pi/8-16	Vert
52	1099.996M	54.4	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	44.6	82.2 219.9875MHz	-37.6 pi/8-16	Vert
53	1100.012M	52.9	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	43.1	82.2 219.9875	-39.1 pi/8	Vert
54	1109.829M	52.7	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.8	+0.4 +1.7	+0.0	43.0	82.2 221.9875MHz	-39.2 pi/8-16	Vert
55	1088.254M	52.6	+0.0 +0.0 +0.3	+0.0 -37.0 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	42.7	82.2 217.6125MHz	-39.5 pi/8-16	Vert
56	1100.221M	52.5	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	42.7	82.2 220.0125MHz	-39.5 pi/8	Vert
57	1088.062M	52.4	+0.0 +0.0 +0.3	+0.0 -37.0 +0.0	+0.0 +24.7	+0.4 +1.7	+0.0	42.5	82.2 217.6125MHz	-39.7 pi/8	Vert
58	1539.938M	48.9	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	41.7	82.2 219.9875MHz	-40.5 pi/8-16	Vert
59	2176.200M	44.1	+0.0 +0.0 +0.4	+0.0 -34.8 +0.0	+0.0 +28.0	+0.7 +2.5	+0.0	40.9	82.2 217.6125MHz	-41.3 pi/8	Vert
60	1109.638M	50.3	+0.0 +0.0 +0.3	+0.0 -36.9 +0.0	+0.0 +24.8	+0.4 +1.7	+0.0	40.6	82.2 221.9875MHz	-41.6 pi/8	Vert
61	1539.938M	47.5	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	40.3	82.2 219.9875	-41.9 pi/8	Vert
62	2176.133M	43.4	+0.0 +0.0 +0.4	+0.0 -34.8 +0.0	+0.0 +28.0	+0.7 +2.5	+0.0	40.2	82.2 217.6125MHz	-42.0 pi/8-16	Vert
63	1539.871M	47.2	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	40.0	82.2 220.0125MHz	-42.2 pi/8-16	Vert
64	1540.029M	47.0	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	39.8	82.2 220.0125MHz	-42.4 pi/8	Vert
65	1958.396M	42.3	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.1	+0.7 +2.4	+0.0	39.0	82.2 217.6125MHz	-43.2 pi/8	Vert
66	1958.571M	41.8	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.1	+0.7 +2.4	+0.0	38.5	82.2 217.6125MHz	-43.7 pi/8-16	Vert

67	1554.179M	45.2	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	38.0	82.2 221.9875MHz pi/8-16	-44.2	Vert
68	1979.821M	39.3	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.1	+0.7 +2.4	+0.0	36.0	82.2 219.9875 pi/8	-46.2	Vert
69	2219.908M	38.9	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	35.9	82.2 221.9875MHz pi/8-16	-46.3	Vert
70	1979.679M	39.1	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.1	+0.7 +2.4	+0.0	35.8	82.2 219.9875MHz pi/8-16	-46.4	Vert
71	2219.742M	38.8	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	35.8	82.2 221.9875MHz pi/8	-46.4	Vert
72	1980.154M	38.9	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.2	+0.7 +2.4	+0.0	35.7	82.2 220.0125MHz pi/8-16	-46.5	Vert
73	1553.771M	42.8	+0.0 +0.0 +0.4	+0.0 -35.5 +0.0	+0.0 +25.4	+0.5 +2.0	+0.0	35.6	82.2 221.9875MHz pi/8	-46.6	Vert
74	1979.879M	38.8	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.1	+0.7 +2.4	+0.0	35.5	82.2 220.0125MHz pi/8	-46.7	Vert
75	1998.038M	38.7	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.2	+0.7 +2.4	+0.0	35.5	82.2 221.9875MHz pi/8-16	-46.7	Vert
76	2199.817M	38.3	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	35.3	82.2 219.9875 pi/8	-46.9	Vert
77	1997.988M	38.1	+0.0 +0.0 +0.4	+0.0 -34.9 +0.0	+0.0 +28.2	+0.7 +2.4	+0.0	34.9	82.2 221.9875MHz pi/8	-47.3	Vert
78	2200.250M	37.9	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	34.9	82.2 220.0125MHz pi/8	-47.3	Vert
79	2199.717M	37.8	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	34.8	82.2 219.9875MHz pi/8-16	-47.4	Vert
80	2200.225M	37.8	+0.0 +0.0 +0.4	+0.0 -34.7 +0.0	+0.0 +28.1	+0.7 +2.5	+0.0	34.8	82.2 220.0125MHz pi/8-16	-47.4	Vert
81	18.687M	20.2	+0.0 +0.0 +0.0	+0.0 +0.0 +8.4	+0.0 +0.0	+0.0 +0.2	+0.0	28.8	82.2	-53.4	paral
82	29.582M	17.7	+0.0 +0.0 +0.0	+0.0 +0.0 +6.0	+0.0 +0.0	+0.0 +0.3	+0.0	24.0	82.2	-58.2	paral

Test Setup Photo(s)

Below 1Ghz, Front View

Below 1GHz, Back View



Above 1GHz, 1.5m

Supplemental Information

Measurement Uncertainty

Uncertainty Value	Parameter
5.77 dB	Radiated Emissions
0.673 dB	RF Conducted Measurements
5.77×10^{-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 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.

End of Report