Meteorcomm, LLC.

EMC TEST REPORT FOR

ITCR-NG Wayside
Model: 65010

Tested to The Following Standards:

FCC Part 90 Subpart I, Subpart K and Subpart T
217.6125-219.9875MHz
&
220.0125-221.9875MHz

Report No.:109869-2

Date of issue: May 29, 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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Administrative Information

Test Report Information

REPORT PREPARED FOR:

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

Representative: George Stults
Customer Reference Number: PO31447

REPORT PREPARED BY:

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CKC Laboratories, Inc.
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Mariposa, CA 95338

Project Number: 109869

DATE OF EQUIPMENT RECEIPT: May 3, 2024
DATE(S) OF TESTING: May 3, 6, 7, 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 I, Subpart K and Subpart T

Test Procedure	Description	Modifications	Results
90.205, 90.723, 90.729, 90.259	Power Output	NA	Pass
90.209, 90.733 (d)	Bandwidth	NA	Pass
90.213	Frequency Stability	NA	Pass
90.210	Conducted Spurious Emissions and Mask	NA	Pass
90.210	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: Meanwell DC supply

Equipment Under Test:

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

Support Equipment:

Device	Manufacturer	Model #	S/N
ITCR-NG Wayside	Meteorcomm, LLC	65010	65WR000002HW
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EC051B7718
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EB96422312
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Vector Signal Generator	Rhode & Schwarz	SMBV100B	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 Smart Switch	Netgear	GS108Tv2	29SE4C5302E60

Configuration 2: BK DC supply

Equipment Under Test:

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

Support Equipment:

Device	Manufacturer	Model #	S/N
ITCR-NG Wayside	Meteorcomm, LLC	65010	65WR002010MC
Programmable DC Power Supply	BK Precision	XLN8018	351EL1073
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EB96422312
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Attenuator	Fairview Microwave	SA3N1007-30	NA
Vector Signal Generator	Rhode & Schwarz	SMBV100B	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 Smart Switch	Netgear	GS108Tv2	29SE4C5302E60

Configuration 3: BK DC supply, no receiver support unit

Equipment Under Test:

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

Support Equipment:

Device	Manufacturer	Model #	S/N
Programmable DC Power Supply	BK Precision	XLN8018	351EL1073
AC/DC Switching Adaptor	Mean Well	GST280A12-C6P	EB96422312
Vector Signal Generator	Rhode & Schwarz	SMBV100B	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 Smart Switch	Netgear	GS108Tv2	29SE4C5302E60

General Product Information:

Description of EUT
Transmitter for rail applications

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):	DQPSK Full Rate and Half Rate
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
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	13.6VDC
Firmware / Software used for Test:	0.1.76 Linux 0.1.121 FPGA MobaXterm v23.2
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

EUT Photo(s)

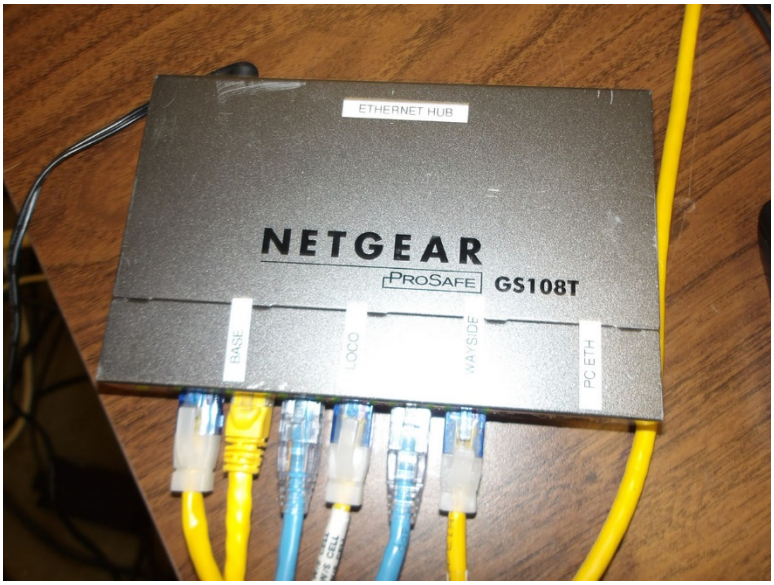
Support Equipment Photo(s)

Support EUT

Support Attenuators

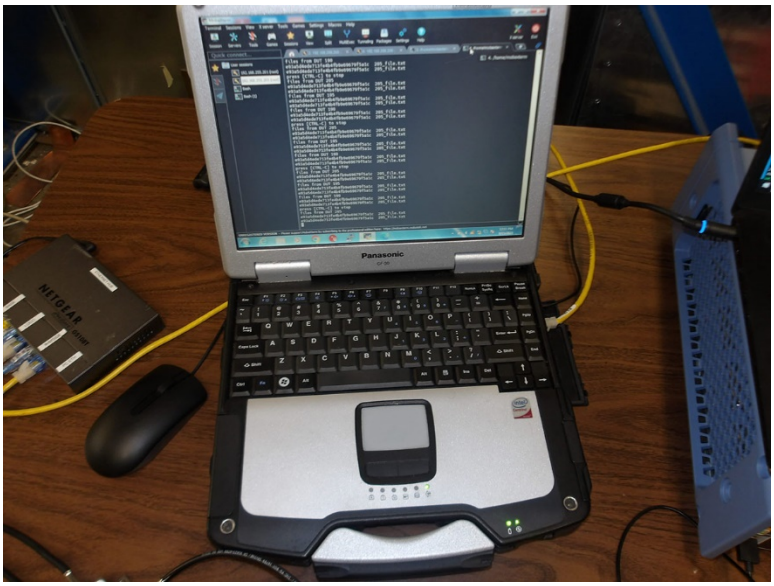
Support DC Power Supply

Support DC Power Supply, View 2

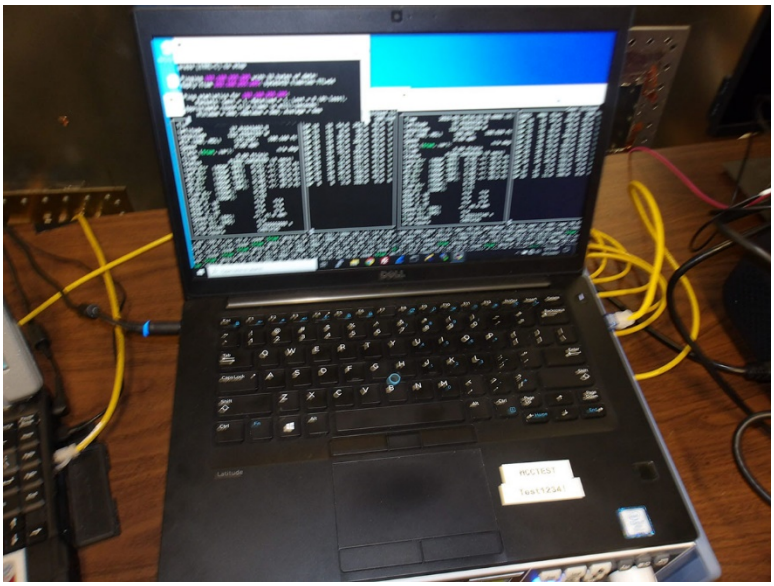


Support Ethernet Hub

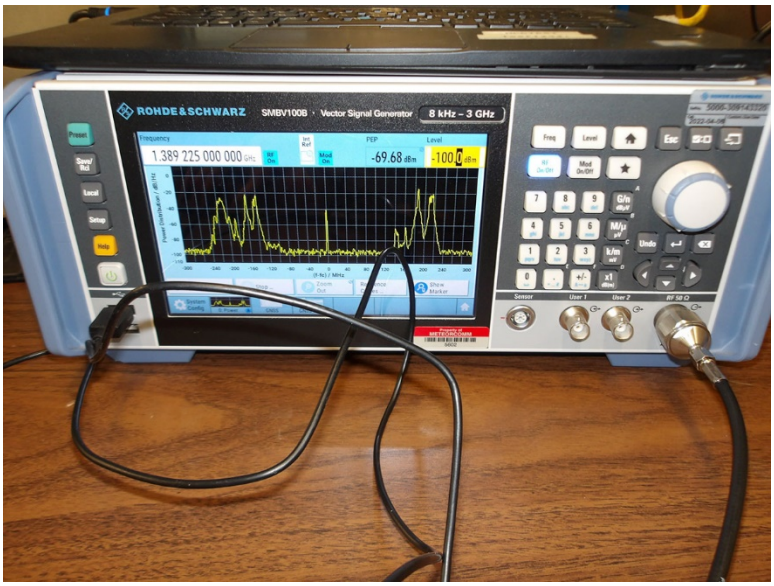
Support GPS Splitter



Support Laptop 1



Support Laptop 2

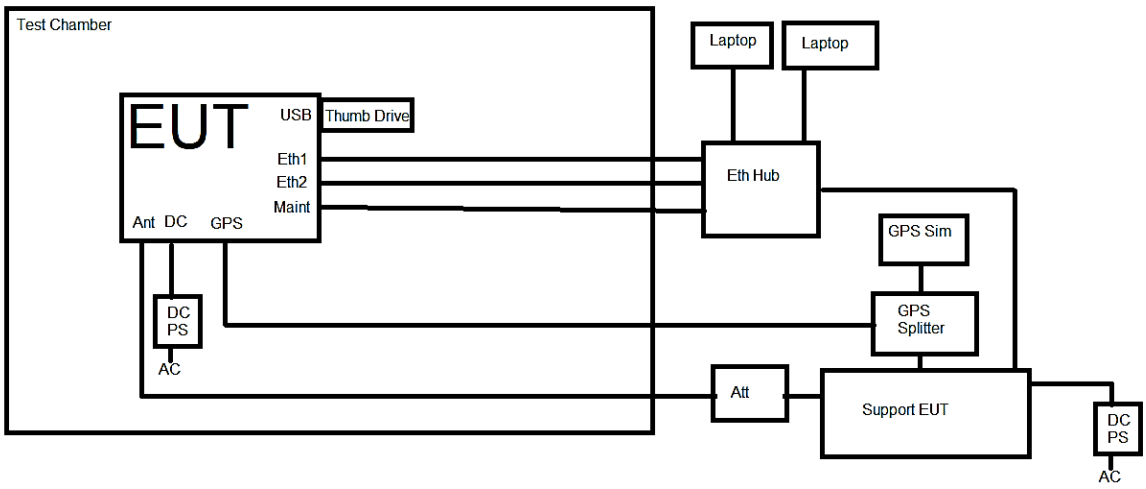


Support Signal Generator

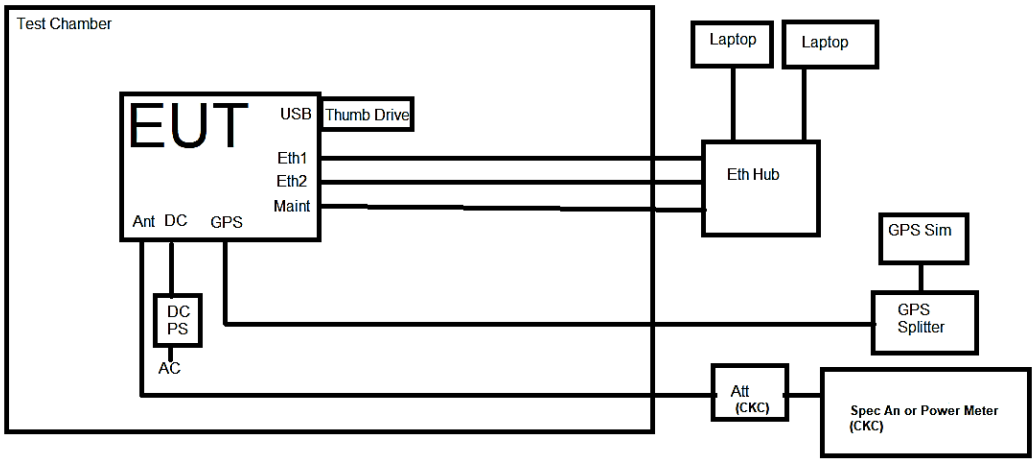
Block Diagram(s) of Test Setup

Config#	Setup Description of Block Diagram
1	EUT is connected to support Ethernet hub, laptops, support EUT and GPS simulator located outside the chamber. EUT is powered by an AC/DC power supply. USB port is populated with at thumb drive.

Radiated Spurious Emissions



Conducted Spurious Emissions and Mask



FCC PART 90 SUBPART I, K AND T

90.205, 90.723, 90.729 & 90.259 - Power Output

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.26 (2015)	Test Date(s):	5/7/2024 -5/8/2024
Configuration:	3		
Test Setup:	The unit is in a temperature chamber for temperature variation. The voltage is varied and measured with a DMM. The EUT's RF port is connected to a peak power meter 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 and half rate modulations investigated. The applicable limits are: 1) 217-220MHz: up to 2W according to 90.259 2) 220-221MHz: up to 50W according to 90.729 3) 221-222MHz: up to 500W according to 90.723 Per the manufacturer, the max power is recorded for all channels tested and the licensee must consider these limitations.		

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

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
03478	Power Sensor	Rohde & Schwarz	NRP-Z81	5/8/2023	5/8/2025
P07623	Attenuator	API Weinschel	47-20-34	3/16/2022	3/16/2024
P07628	Low Pass Filter	Mini-Circuits	NLP-90+	4/27/2022	4/27/2024
P06452	Cable	Andrews	Heliax	2/8/2023	2/8/2025
02757	Temperature Chamber	Bemco	F100/350-8	12/8/2022	12/8/2024
03029	Thermometer, Digital Infrared	Fluke	566	4/14/2023	4/14/2025
03514	Multimeter	Fluke	87	10/20/2022	10/20/2024

Test Data Summary - RF Conducted Measurement (Ch1)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
217.6125	-30	V_{Nom}	Half Rate	27.04	Pass*
217.6125	-20	V_{Nom}	Half Rate	27.04	Pass*
217.6125	-10	V_{Nom}	Half Rate	27.61	Pass*
217.6125	0	V_{Nom}	Half Rate	27.93	Pass*
217.6125	10	V_{Nom}	Half Rate	28.18	Pass*
217.6125	20	V_{Nom}	Half Rate	28.51	Pass*
217.6125	30	V_{Nom}	Half Rate	28.58	Pass*
217.6125	40	V_{Nom}	Half Rate	28.77	Pass*
217.6125	50	V_{Nom}	Half Rate	29.31	Pass*
217.6125	20	V_{Min}	Half Rate	28.44	Pass*
217.6125	20	V_{Max}	Half Rate	28.44	Pass*

* Equipment meets maximum 2W power limit in accordance with 90.259(a)(4), operation at higher power is permitted only when licensee has obtained appropriate spectrum authorization.

Test Data Summary - RF Conducted Measurement (Ch96)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
219.9875	-30	V_{Nom}	Half Rate	27.10	Pass*
219.9875	-20	V_{Nom}	Half Rate	27.29	Pass*
219.9875	-10	V_{Nom}	Half Rate	27.67	Pass*
219.9875	0	V_{Nom}	Half Rate	27.86	Pass*
219.9875	10	V_{Nom}	Half Rate	28.12	Pass*
219.9875	20	V_{Nom}	Half Rate	28.18	Pass*
219.9875	30	V_{Nom}	Half Rate	28.51	Pass*
219.9875	40	V_{Nom}	Half Rate	28.77	Pass*
219.9875	50	V_{Nom}	Half Rate	29.44	Pass*
219.9875	20	V_{Min}	Half Rate	27.80	Pass*
219.9875	20	V_{Max}	Half Rate	28.38	Pass*

* Equipment meets maximum 2W power limit in accordance with 90.259(a)(4), operation at higher power is permitted only when licensee has obtained appropriate spectrum authorization.

Test Data Summary - RF Conducted Measurement (Ch97)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Half Rate	27.04	Pass
220.0125	-20	V_{Nom}	Half Rate	27.35	Pass
220.0125	-10	V_{Nom}	Half Rate	27.61	Pass
220.0125	0	V_{Nom}	Half Rate	27.93	Pass
220.0125	10	V_{Nom}	Half Rate	28.12	Pass
220.0125	20	V_{Nom}	Half Rate	28.38	Pass
220.0125	30	V_{Nom}	Half Rate	28.58	Pass
220.0125	40	V_{Nom}	Half Rate	28.91	Pass
220.0125	50	V_{Nom}	Half Rate	29.58	Pass
220.0125	20	V_{Min}	Half Rate	28.38	Pass
220.0125	20	V_{Max}	Half Rate	28.44	Pass

Test Data Summary - RF Conducted Measurement (Ch176)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Half Rate	26.79	Pass
221.9875	-20	V_{Nom}	Half Rate	27.10	Pass
221.9875	-10	V_{Nom}	Half Rate	27.42	Pass
221.9875	0	V_{Nom}	Half Rate	27.67	Pass
221.9875	10	V_{Nom}	Half Rate	27.93	Pass
221.9875	20	V_{Nom}	Half Rate	28.18	Pass
221.9875	30	V_{Nom}	Half Rate	28.38	Pass
221.9875	40	V_{Nom}	Half Rate	28.77	Pass
221.9875	50	V_{Nom}	Half Rate	29.44	Pass
221.9875	20	V_{Min}	Half Rate	28.12	Pass
221.9875	20	V_{Max}	Half Rate	28.18	Pass

Test Data Summary - RF Conducted Measurement (Ch1)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
217.6125	-30	V_{Nom}	Full Rate	26.55	Pass*
217.6125	-20	V_{Nom}	Full Rate	26.79	Pass*
217.6125	-10	V_{Nom}	Full Rate	27.16	Pass*
217.6125	0	V_{Nom}	Full Rate	27.35	Pass*
217.6125	10	V_{Nom}	Full Rate	27.67	Pass*
217.6125	20	V_{Nom}	Full Rate	27.99	Pass*
217.6125	30	V_{Nom}	Full Rate	27.99	Pass*
217.6125	40	V_{Nom}	Full Rate	28.31	Pass*
217.6125	50	V_{Nom}	Full Rate	28.84	Pass*
217.6125	20	V_{Min}	Full Rate	27.86	Pass*
217.6125	20	V_{Max}	Full Rate	27.93	Pass*

* Equipment meets maximum 2W power limit in accordance with 90.259(a)(4), operation at higher power is permitted only when licensee has obtained appropriate spectrum authorization.

Test Data Summary - RF Conducted Measurement (Ch96)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
219.9875	-30	V_{Nom}	Full Rate	26.67	Pass*
219.9875	-20	V_{Nom}	Full Rate	26.92	Pass*
219.9875	-10	V_{Nom}	Full Rate	27.29	Pass*
219.9875	0	V_{Nom}	Full Rate	27.48	Pass*
219.9875	10	V_{Nom}	Full Rate	27.73	Pass*
219.9875	20	V_{Nom}	Full Rate	27.99	Pass*
219.9875	30	V_{Nom}	Full Rate	28.12	Pass*
219.9875	40	V_{Nom}	Full Rate	28.25	Pass*
219.9875	50	V_{Nom}	Full Rate	28.91	Pass*
219.9875	20	V_{Min}	Full Rate	27.93	Pass*
219.9875	20	V_{Max}	Full Rate	27.99	Pass*

* Equipment meets maximum 2W power limit in accordance with 90.259(a)(4), operation at higher power is permitted only when licensee has obtained appropriate spectrum authorization.

Test Data Summary - RF Conducted Measurement (Ch97)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
220.0125	-30	V_{Nom}	Full Rate	26.67	Pass
220.0125	-20	V_{Nom}	Full Rate	26.92	Pass
220.0125	-10	V_{Nom}	Full Rate	27.29	Pass
220.0125	0	V_{Nom}	Full Rate	27.48	Pass
220.0125	10	V_{Nom}	Full Rate	27.73	Pass
220.0125	20	V_{Nom}	Full Rate	27.99	Pass
220.0125	30	V_{Nom}	Full Rate	28.18	Pass
220.0125	40	V_{Nom}	Full Rate	28.44	Pass
220.0125	50	V_{Nom}	Full Rate	28.64	Pass
220.0125	20	V_{Min}	Full Rate	27.99	Pass
220.0125	20	V_{Max}	Full Rate	27.93	Pass

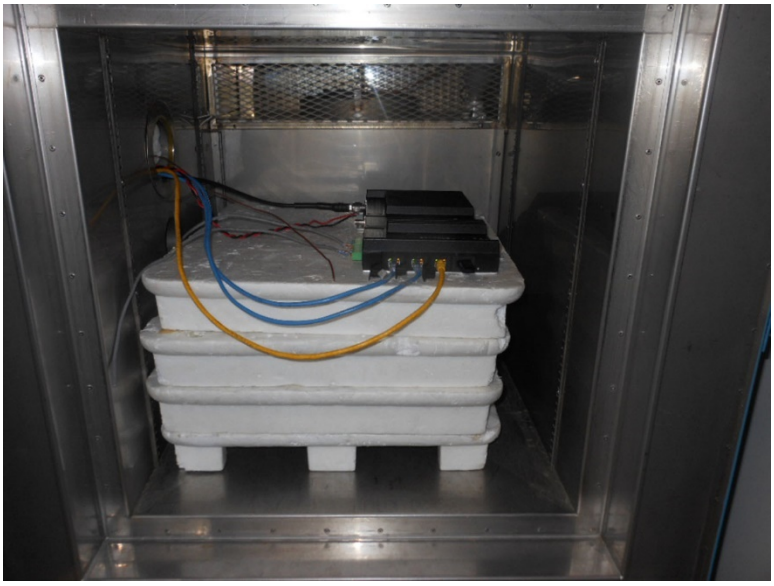
Test Data Summary - RF Conducted Measurement (Ch176)					
Frequency (MHz)	**Temperature (°C)**	**Voltage**	**Modulation**	**Conducted Power (Watts)**	**Results**
221.9875	-30	V_{Nom}	Full Rate	26.49	Pass
221.9875	-20	V_{Nom}	Full Rate	26.79	Pass
221.9875	-10	V_{Nom}	Full Rate	27.04	Pass
221.9875	0	V_{Nom}	Full Rate	27.16	Pass
221.9875	10	V_{Nom}	Full Rate	27.54	Pass
221.9875	20	V_{Nom}	Full Rate	27.73	Pass
221.9875	30	V_{Nom}	Full Rate	27.93	Pass
221.9875	40	V_{Nom}	Full Rate	28.25	Pass
221.9875	50	V_{Nom}	Full Rate	29.04	Pass
221.9875	20	V_{Min}	Full Rate	27.73	Pass
221.9875	20	V_{Max}	Full Rate	27.80	Pass

Parameter Definitions:

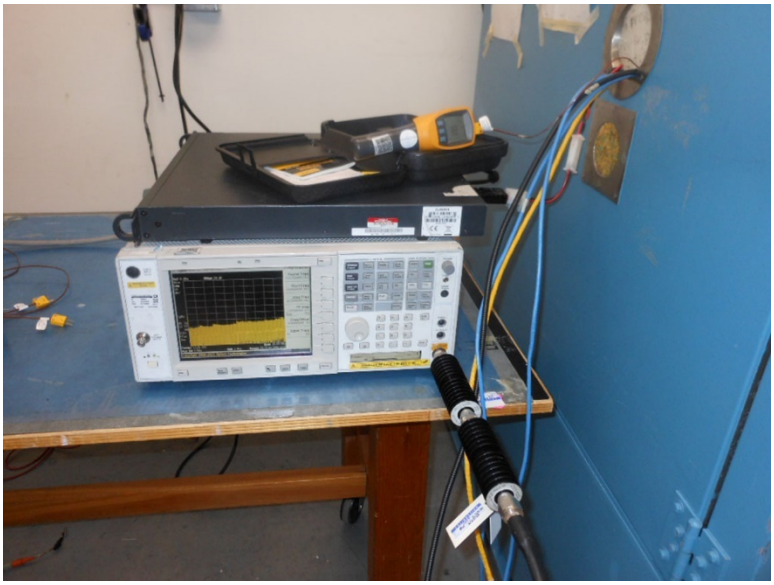
Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
V_{Nom}:	13.6VDC
V_{Min}:	11.56VDC
V_{Max}:	15.64VDC

Test Setup Photo(s)



Test Setup; View 1



Test Setup; View 2

90.209, 90.733 (d) - Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.26 (2015)	Test Date(s):	5/6/2024
Configuration:	3		
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 modulations investigated. The bandwidth limitations are considered in 90.209 as well as 90.733 where channel aggregation is used, the authorized bandwidth is assumed to be 20kHz for the Full Rate modulation and 11.25kHz for the Half Rate modulation.		

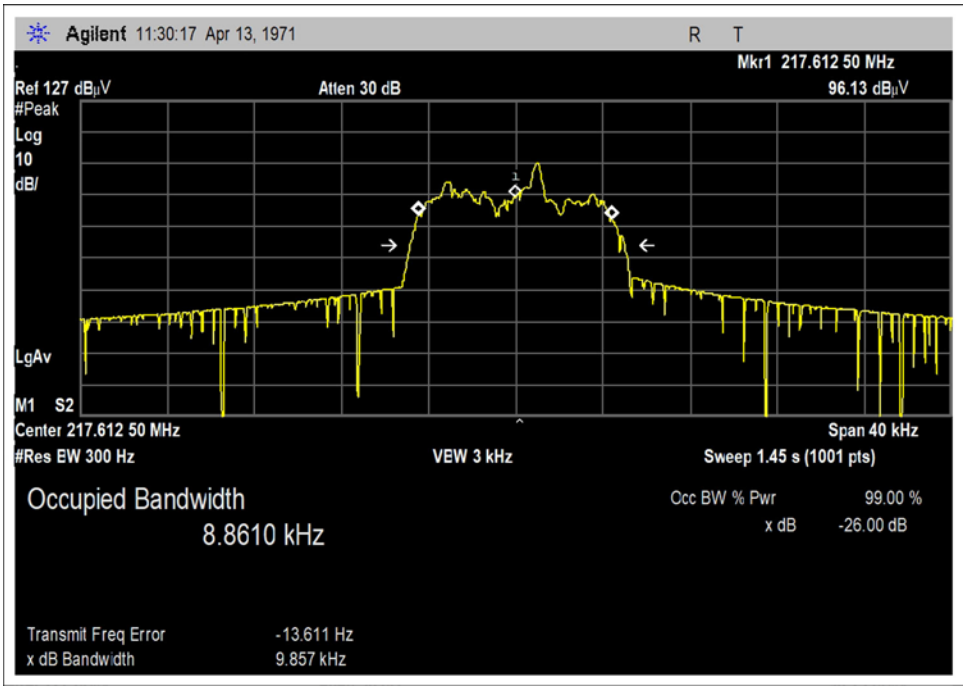
Environmental Conditions			
Temperature (ºC)	22.3	Relative Humidity (%):	39.9

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02673	Spectrum Analyzer	Agilent	E4446A	3/8/2024	3/8/2026
P07623	Attenuator	API Weinschel	47-20-34	2/27/2024	2/27/2026
P07638	Attenuator	API Weinschel	47-20-34	3/26/2024	3/26/2026
P06011	Cable	Andrew	Heliax	11/16/2023	11/16/2025
P06515	Cable	Andrews	Heliax	2/28/2024	2/28/2026

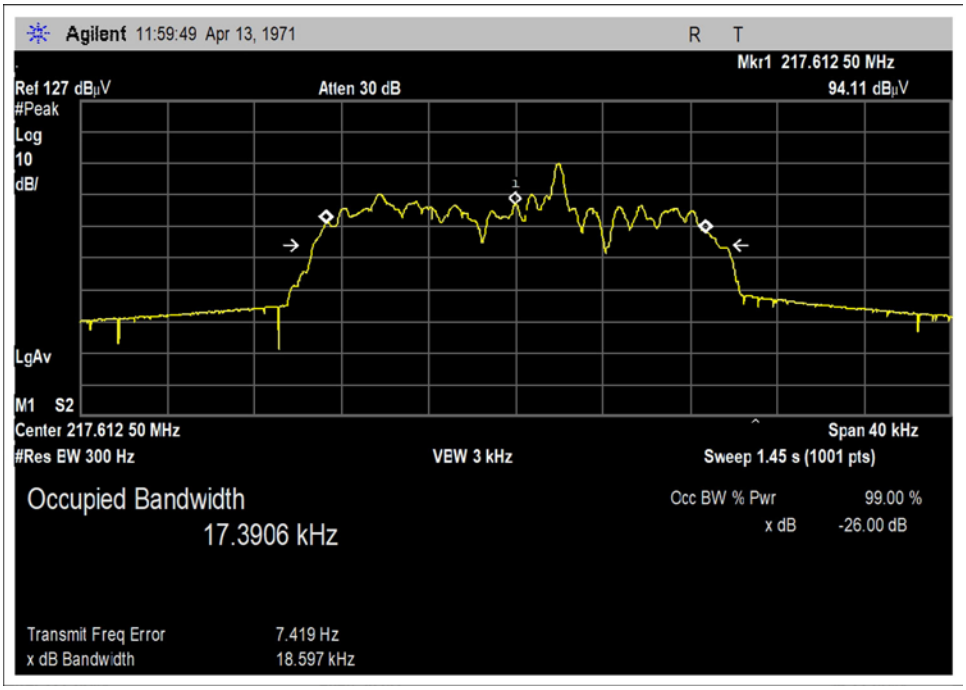
99% Occupied Bandwidth

Test Data Summary				
Frequency (MHz)	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
217.6125	Full Rate	17.3906	20kHz	Pass
219.9875	Full Rate	17.3797	20kHz	Pass
220.0125	Full Rate	17.3910	20kHz	Pass
221.9875	Full Rate	17.3588	20kHz	Pass
217.6125	Half Rate	8.8610	11.25kHz	Pass
219.9875	Half Rate	8.8666	11.25kHz	Pass
220.0125	Half Rate	8.8953	11.25kHz	Pass
221.9875	Half Rate	8.8580	11.25kHz	Pass

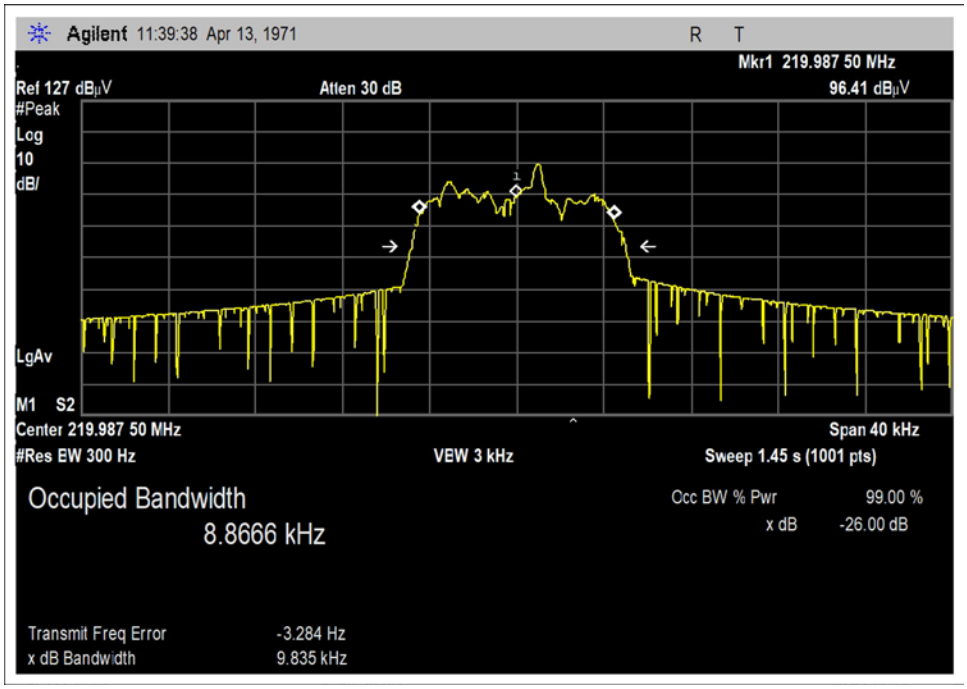
Test Plots



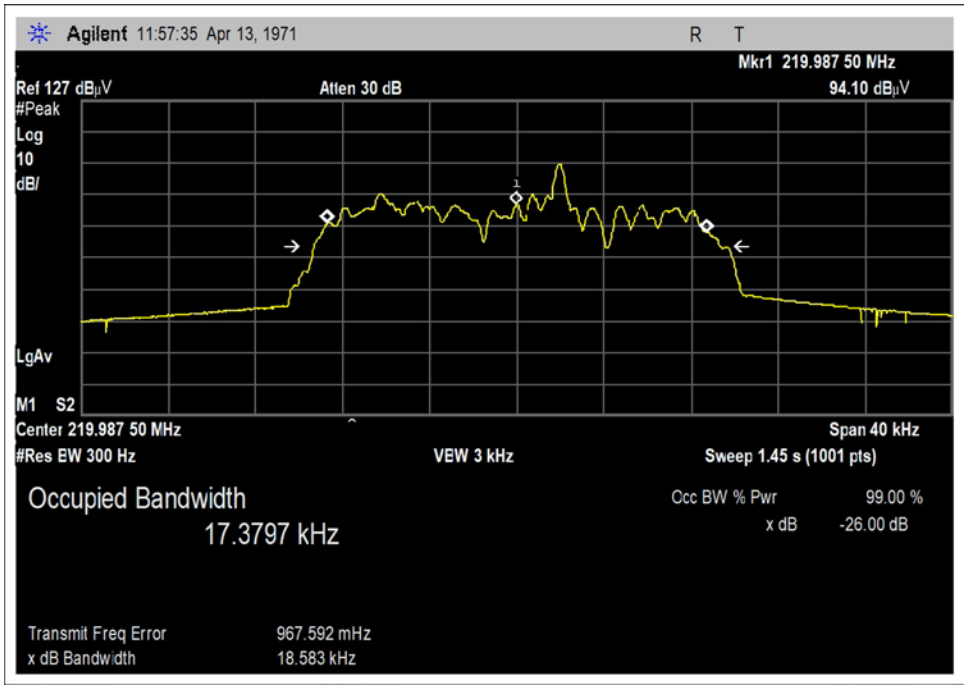
CH1, Half Rate



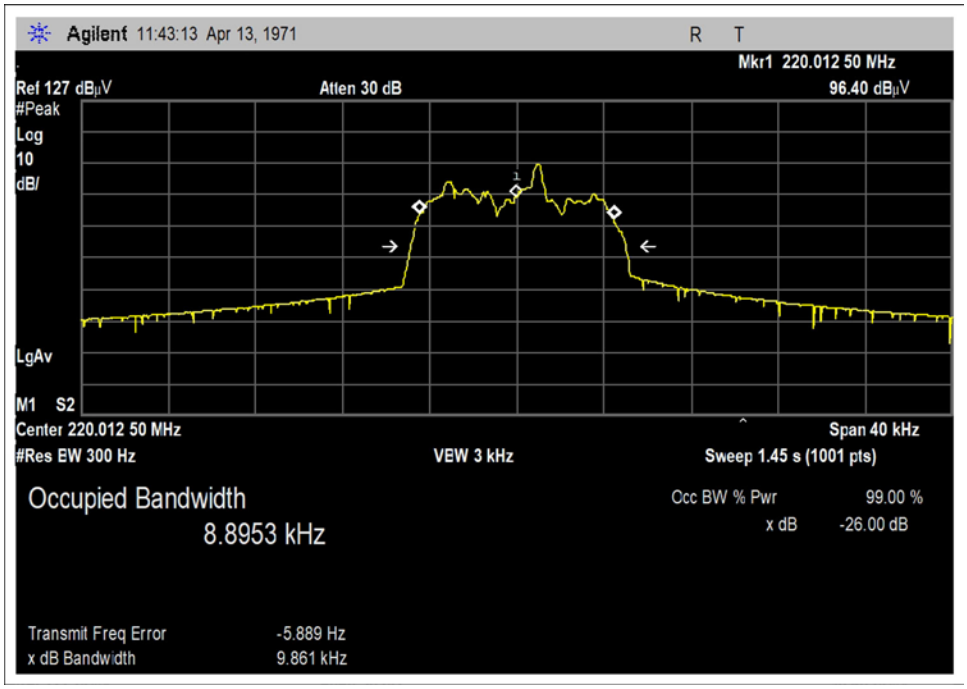
CH1, Full Rate



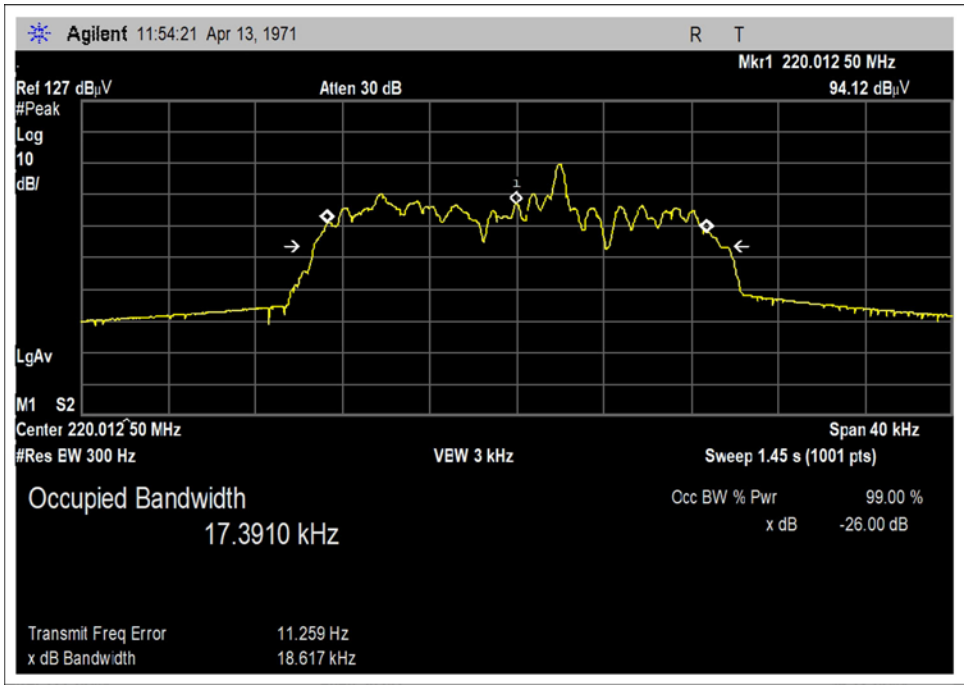
CH96, Half Rate



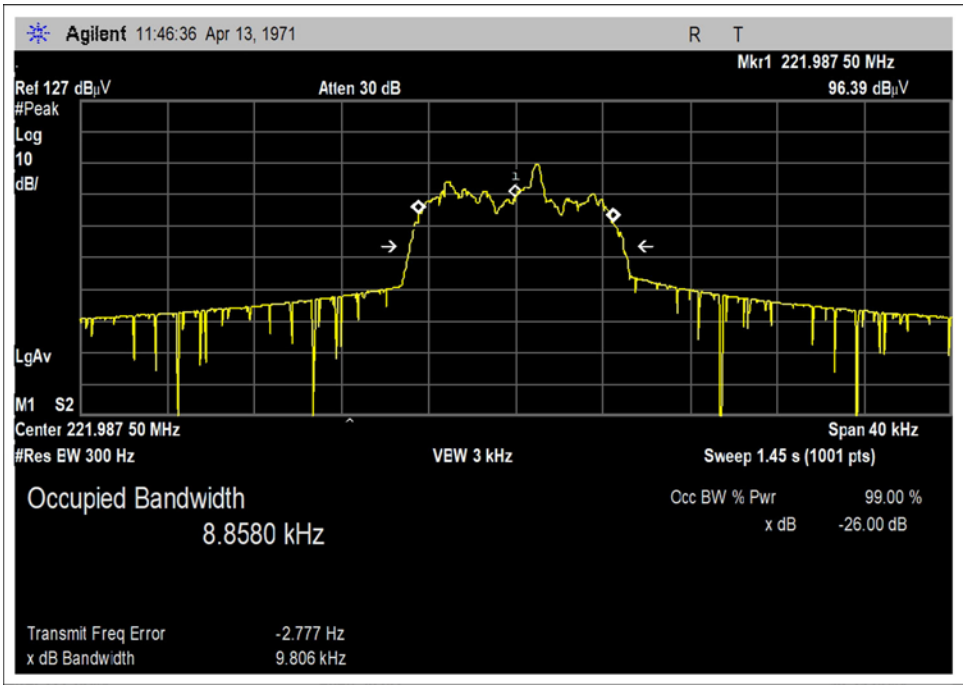
CH96, Full Rate



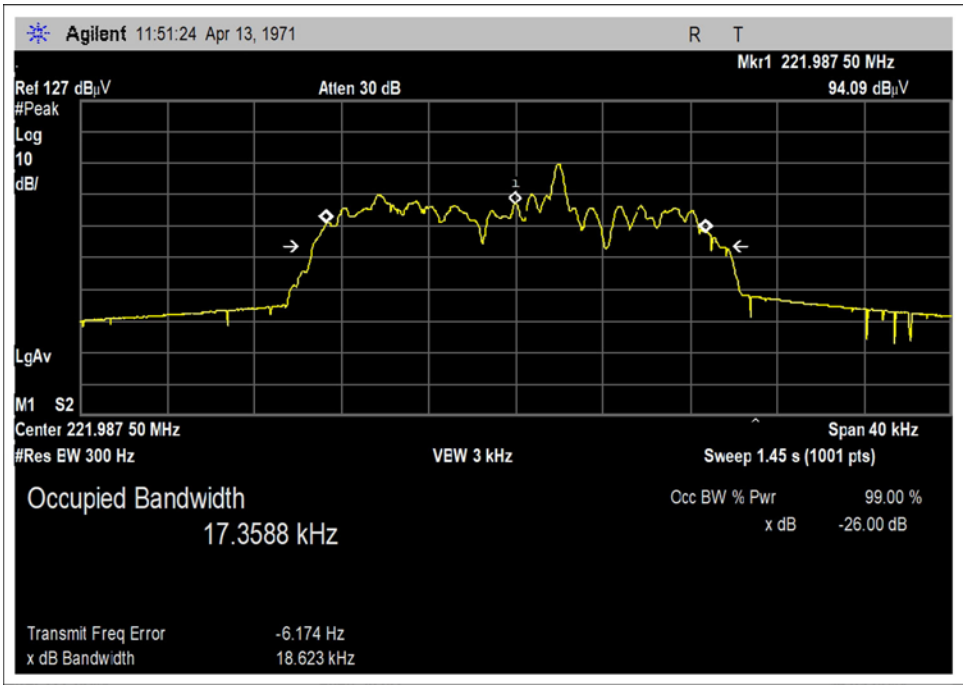
CH97, Half Rate



CH97, Full Rate

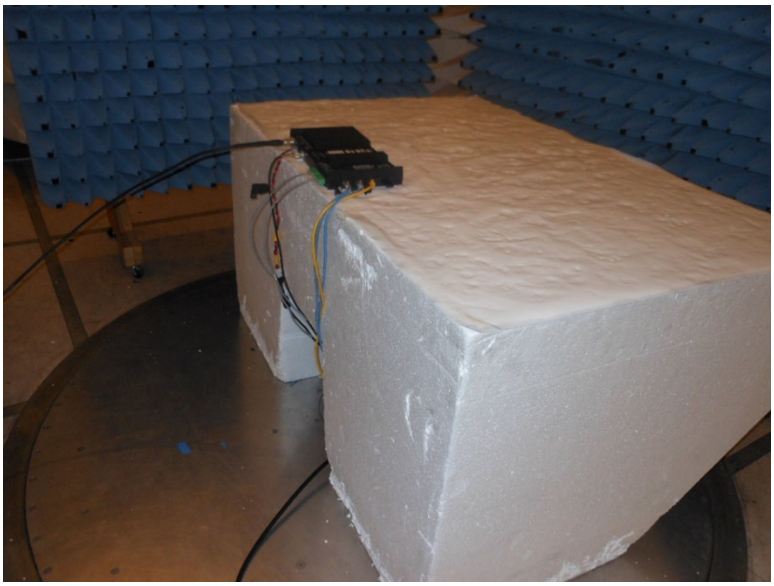


CH176, Half Rate



CH176, Full rate

Test Setup Photo(s)



90.213 - Frequency Stability

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.26 (2015)	Test Date(s):	5/7/2024 -5/8/2024
Configuration:	3		
Test Setup:	The unit is in a temperature chamber for temperature variation. The voltage is varied and measured with a DMM. 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, full rate and half rate modulations investigated. Per 90.213, the manufacturer declares the EUT is a module 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 1.5ppm.		

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
03803	Spectrum Analyzer	Agilent	E4440A	2/23/2022	2/23/2024
P07623	Attenuator	API Weinschel	47-20-34	3/16/2022	3/16/2024
P07628	Low Pass Filter	Mini-Circuits	NLP-90+	4/27/2022	4/27/2024
P06452	Cable	Andrews	Heliax	2/8/2023	2/8/2025
02757	Temperature Chamber	Bemco	F100/350-8	12/8/2022	12/8/2024
03029	Thermometer, Digital Infrared	Fluke	566	4/14/2023	4/14/2025
03514	Multimeter	Fluke	87	10/20/2022	10/20/2024

Test Data Summary						
Modulation: Half Rate						
Temp (ºC)	**Voltage**	**Ch 1 (PPM)**	**Ch 96 (PPM)**	**Ch 97 (PPM)**	**Ch176 (PPM)**	**Results**
-30	V_{Nom}	0.22057	0.16819	0.16817	0.10811	Pass
-20	V_{Nom}	0.02757	0.02727	0.05454	0.02703	
-10	V_{Nom}	0.14245	0.27729	0.19544	0.19370	
0	V_{Nom}	0.31248	0.30456	0.30453	0.27479	
10	V_{Nom}	0.28031	0.33184	0.33180	0.30182	
20	V_{Nom}	0.00000	0.00000	0.00000	0.00000	
30	V_{Nom}	0.05514	0.30456	0.08181	0.22073	
40	V_{Nom}	0.25274	0.19546	0.19544	0.22073	
50	V_{Nom}	0.30789	0.25001	0.22271	0.16668	
20	V_{Min}	0.02757	0.00000	0.00000	0.02703	
20	V_{Max}	0.00020	0.02727	0.02727	0.00000	
Maximum Deviation		0.31248	0.33184	0.33180	0.30182	

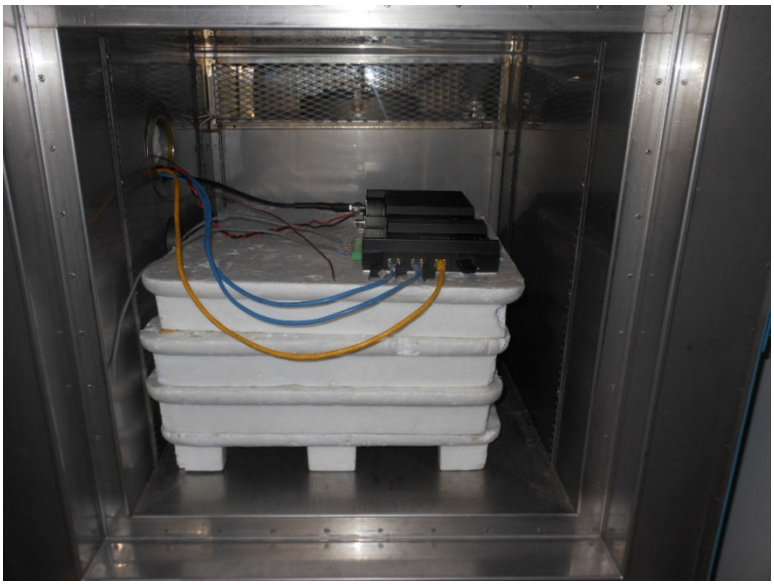
Test Data Summary						
Modulation: Full Rate						
Temp (ºC)	**Voltage**	**Ch 1 (PPM)**	**Ch 96 (PPM)**	**Ch 97 (PPM)**	**Ch176 (PPM)**	**Results**
-30	V_{Nom}	0.08731	0.08637	0.09090	0.08559	Pass
-20	V_{Nom}	0.13786	0.08182	0.13181	0.08108	
-10	V_{Nom}	0.28031	0.30456	0.27271	0.27479	
0	V_{Nom}	0.36303	0.35911	0.35452	0.35587	
10	V_{Nom}	0.33546	0.38638	0.29998	0.27479	
20	V_{Nom}	0.00000	0.00000	0.00000	0.00000	
30	V_{Nom}	0.02757	0.02727	0.11817	0.08559	
40	V_{Nom}	0.19760	0.16819	0.22726	0.22073	
50	V_{Nom}	0.25274	0.19546	0.22726	0.13965	
20	V_{Min}	0.02757	0.00545	0.00227	0.00000	
20	V_{Max}	0.00000	0.00545	0.00045	0.02072	
Maximum Deviation		0.36303	0.38638	0.35452	0.35587	

Parameter Definitions:

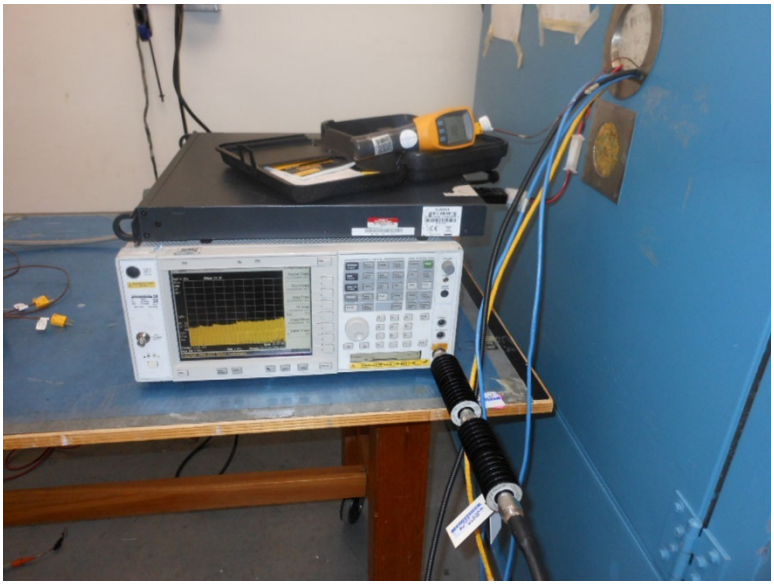
Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
V_{Nom}:	13.6VDC
V_{Min}:	11.56VDC
V_{Max}:	15.64VDC

Test Setup Photo(s)



Test Setup; View 1



Test Setup; View 2

90.210 - Conducted Emissions and Mask

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.26 (2015)	Test Date(s):	5/10/2024
Configuration:	3		
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 modulations investigated in separate datasheets. 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. The worst case low RMS average for full rate was 26.1W, half rate was 26.3W. Conducted spurs was run on the 4 channels selected, mask data shown for Ch1 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. Per the manufacturer, a 20kHz ABW for Full Rate 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.		

Environmental Conditions			
Temperature (ºC)	22.3	Relative Humidity (%):	40.2

Test Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC (4362)		
Customer:	**Meteorcomm LLC**		
Specification:	**47 CFR §90.210(b) Spurious Emissions**		
Work Order #:	**109869**	Date:	5/10/2024
Test Type:	**Conducted Emissions**	Time:	13:34:38
Tested By:	C. Plumadore	Sequence#:	13
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			

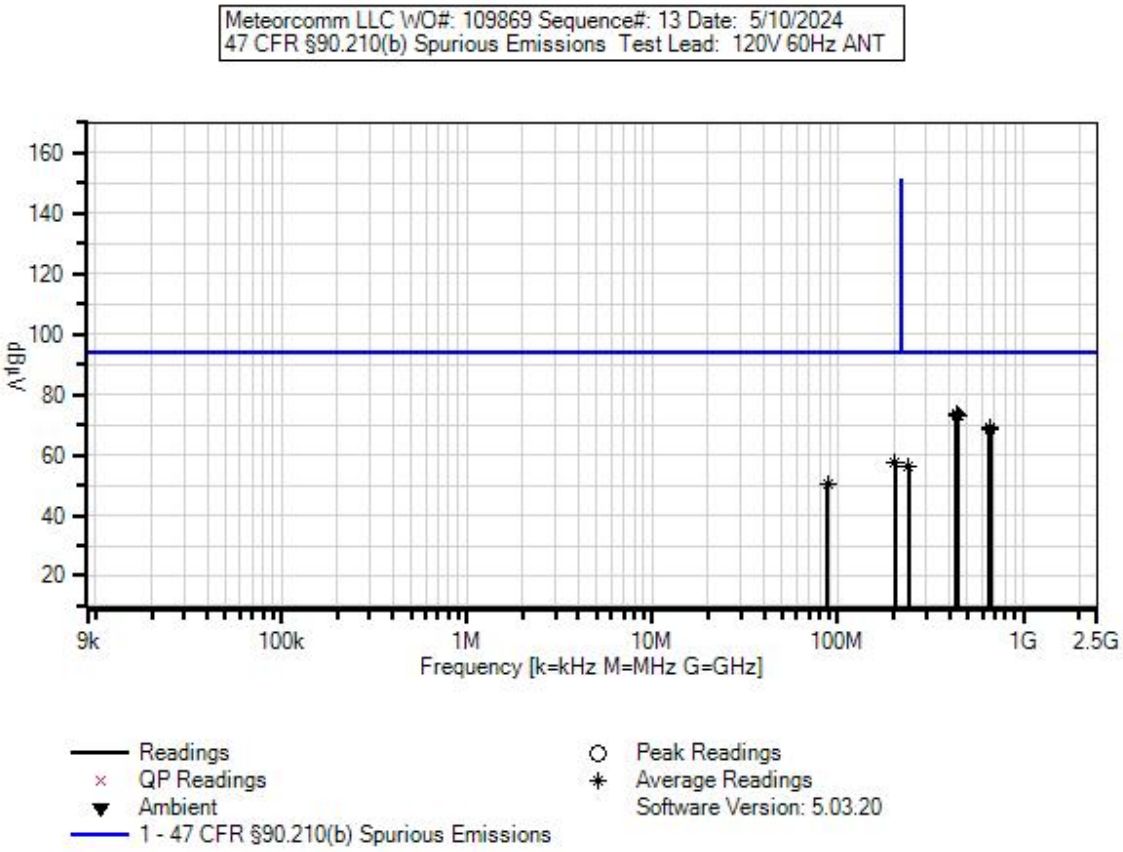
Test Conditions / Notes:

Test Environment Conditions:
Temperature: 21.4°C
Humidity: 40.5%
Pressure: 100.9kPa

Method: ANSI C63.26 (2015)

Frequency: Fundamental

Note: Half Rate



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07623	Attenuator	47-20-34	2/27/2024	2/27/2026
T2	ANP07638	Attenuator	47-20-34	3/26/2024	3/26/2026
T3	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
T5	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026

Measurement Data: Reading listed by margin. Test Lead: ANT

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	439.971M Ave	32.8	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	73.4	94.0 219.9875	-20.6	ANT
2	440.022M Ave	32.8	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	73.4	94.0 220.0125	-20.6	ANT
^	440.022M	51.2	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	91.8	94.0 220.0125	-2.2	ANT
^	439.971M	51.1	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	91.7	94.0 219.9875	-2.3	ANT
5	443.975M Ave	32.7	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	73.3	94.0 221.9875	-20.7	ANT
^	443.975M	50.6	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	91.2	94.0 221.9875	-2.8	ANT
7	435.216M Ave	32.5	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	73.1	94.0 217.6125	-20.9	ANT
^	435.232M	51.1	+19.6 +0.0	+19.7	+0.3	+1.0	+0.0	91.7	94.0 217.6125	-2.3	ANT
9	665.962M Ave	28.1	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	69.0	94.0 221.9875	-25.0	ANT
^	665.958M	46.1	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	87.0	94.0 221.9875	-7.0	ANT
11	660.030M Ave	27.9	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	68.8	94.0 220.0125	-25.2	ANT
12	659.960M Ave	27.9	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	68.8	94.0 219.9875	-25.2	ANT
^	659.960M	46.5	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	87.4	94.0 219.9875	-6.6	ANT
^	660.030M	46.3	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	87.2	94.0 220.0125	-6.8	ANT
15	652.827M Ave	27.9	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	68.8	94.0 217.6125	-25.2	ANT
^	652.834M	46.8	+19.6 +0.0	+19.7	+0.3	+1.3	+0.0	87.7	94.0 217.6125	-6.3	ANT
17	203.562M Ave	17.8	+19.5 +0.0	+19.6	+0.2	+0.7	+0.0	57.8	94.0	-36.2	ANT
^	203.562M	67.3	+19.5 +0.0	+19.6	+0.2	+0.7	+0.0	107.3	94.0	+13.3	ANT
19	239.642M Ave	16.2	+19.5 +0.0	+19.7	+0.2	+0.8	+0.0	56.4	94.0	-37.6	ANT
^	239.642M	63.9	+19.5 +0.0	+19.7	+0.2	+0.8	+0.0	104.1	94.0	+10.1	ANT
21	88.640M Ave	11.1	+19.5 +0.0	+19.6	+0.1	+0.4	+0.0	50.7	94.0	-43.3	ANT
^	88.640M	46.3	+19.5 +0.0	+19.6	+0.1	+0.4	+0.0	85.9	94.0	-8.1	ANT

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC (4362)		
Customer:	**Meteorcomm LLC**		
Specification:	**47 CFR §90.210(b) Spurious Emissions**		
Work Order #:	**109869**	Date:	5/10/2024
Test Type:	**Conducted Emissions**	Time:	13:55:30
Tested By:	C. Plumadore	Sequence#:	12
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			

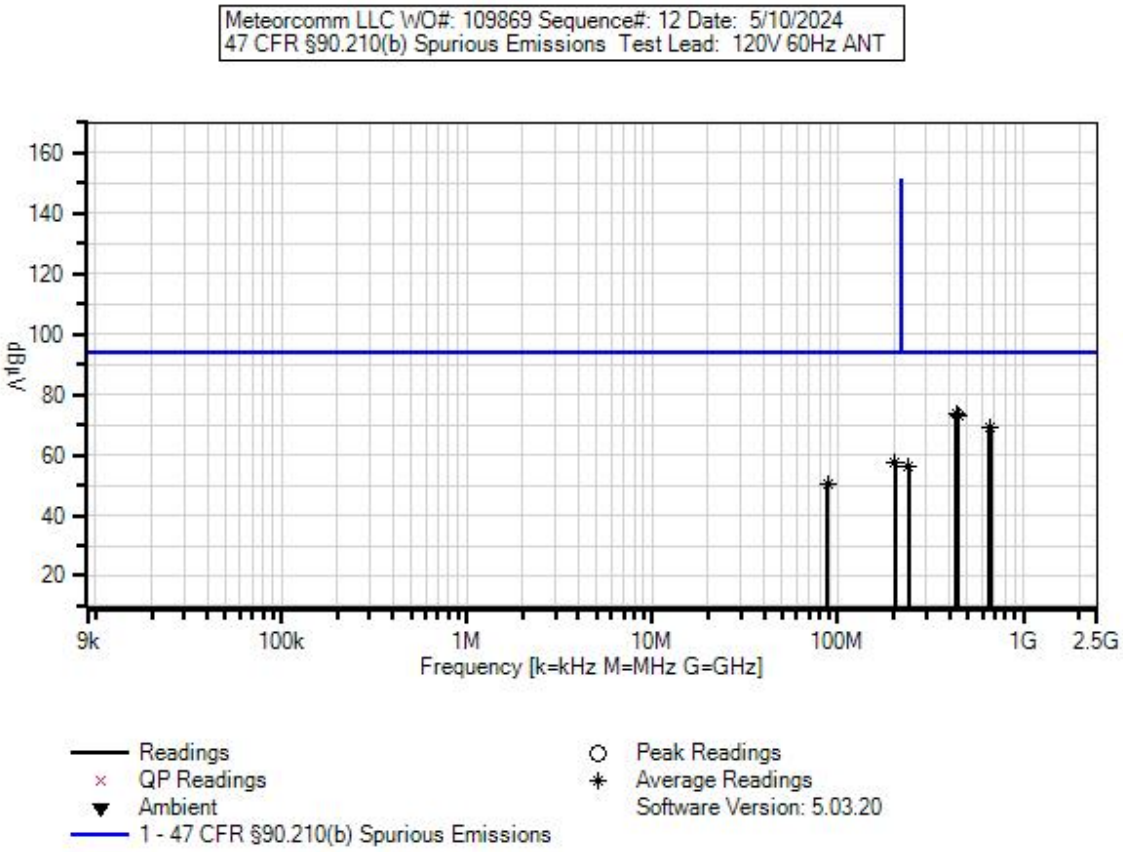
Test Conditions / Notes:

Test Environment Conditions:
Temperature: 21.4°C
Humidity: 40.5%
Pressure: 100.9kPa

Method: ANSI C63.26 (2015)

Frequency: Fundamental

Note:
Full Rate



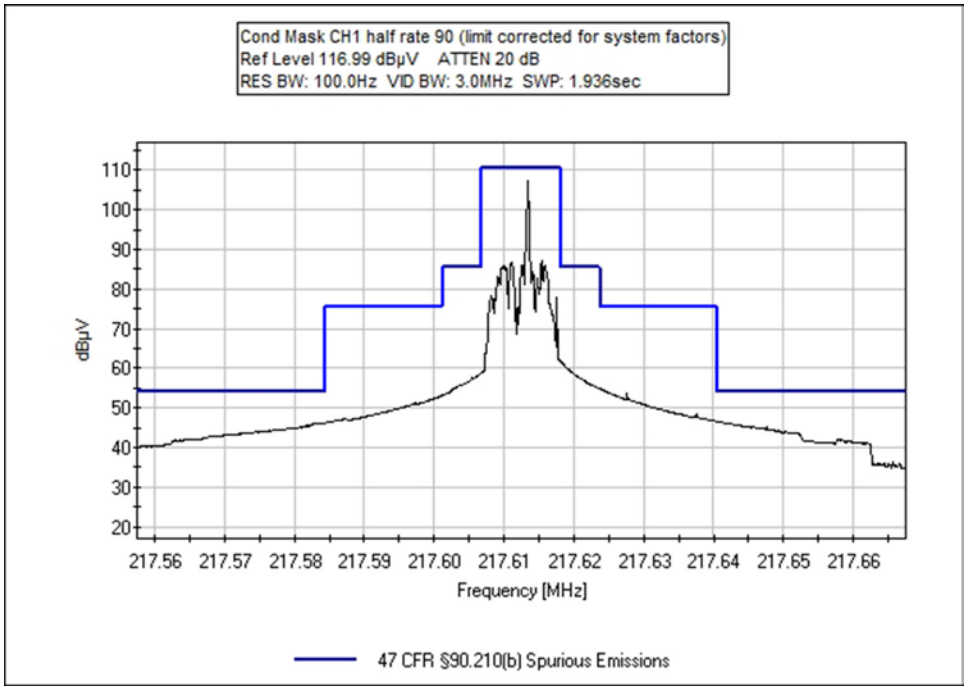
Test Equipment:

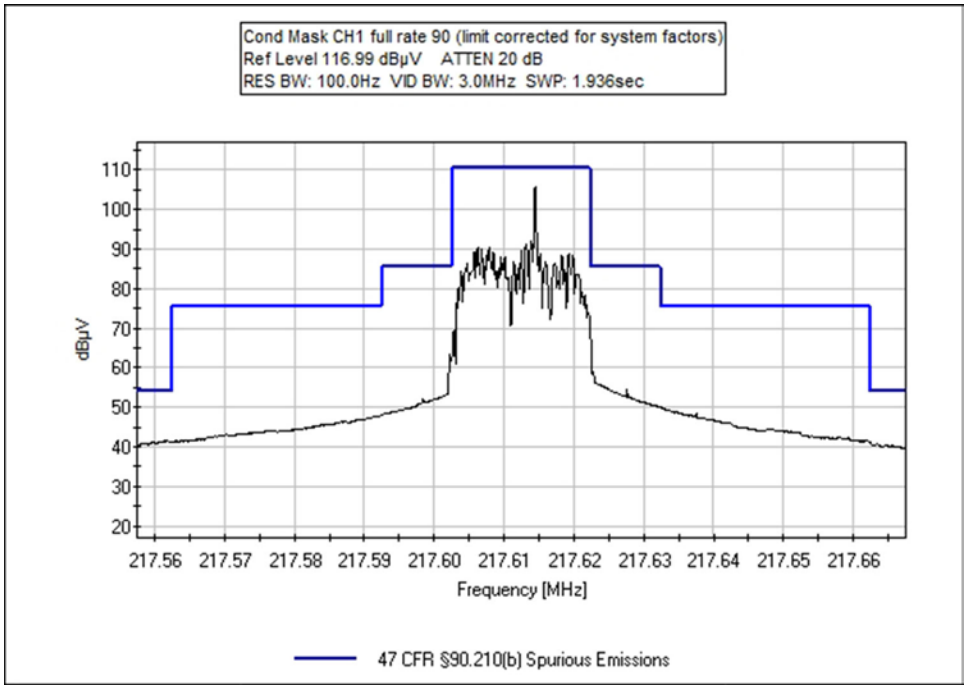
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07623	Attenuator	47-20-34	2/27/2024	2/27/2026
T2	ANP07638	Attenuator	47-20-34	3/26/2024	3/26/2026
T3	ANP06011	Cable	Heliax	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliax	2/28/2024	2/28/2026
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026

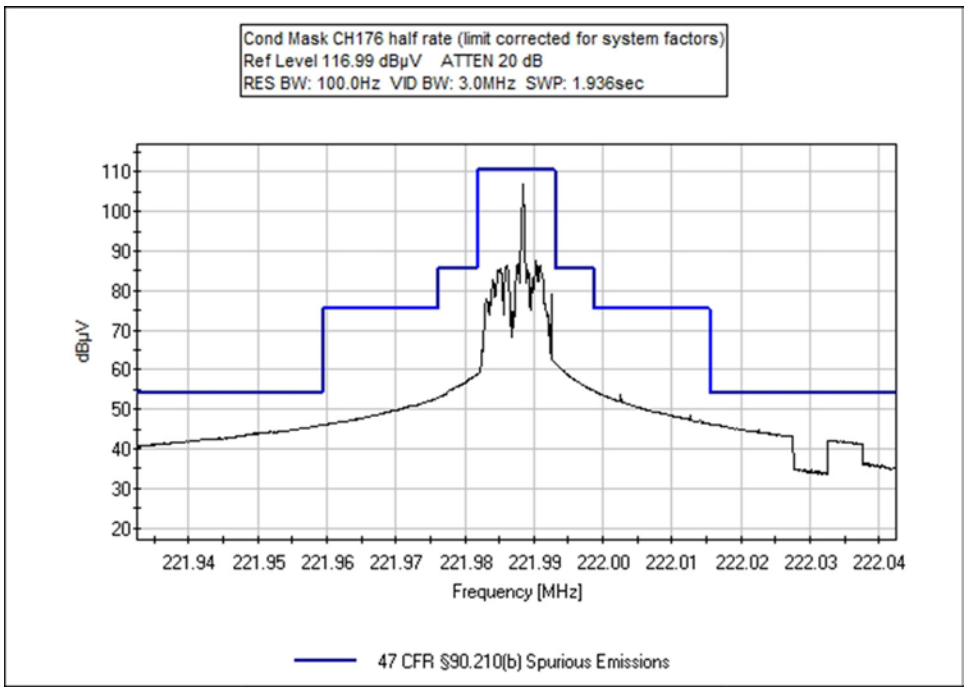
Measurement Data: Reading listed by margin. Test Lead: ANT

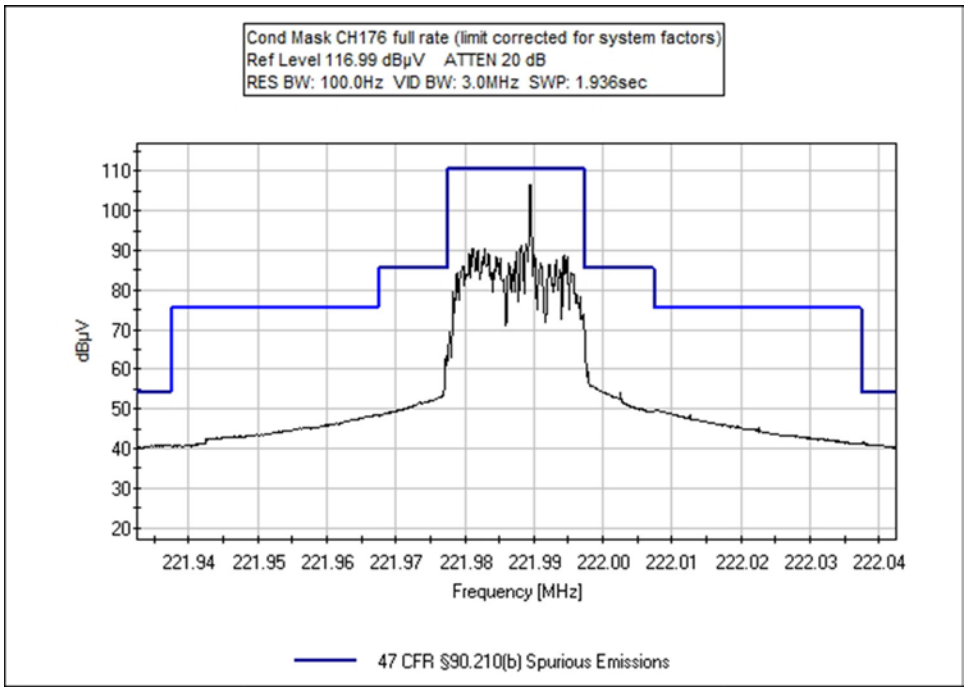
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	435.227M Ave	33.1	+19.6	+19.7	+0.3	+1.0	+0.0	73.7	94.0 217.6125	-20.3	ANT
^	435.227M	51.0	+19.6	+19.7	+0.3	+1.0	+0.0	91.6	94.0 217.6125	-2.4	ANT
3	439.974M Ave	33.0	+19.6	+19.7	+0.3	+1.0	+0.0	73.6	94.0 219.9875	-20.4	ANT
4	440.026M Ave	33.0	+19.6	+19.7	+0.3	+1.0	+0.0	73.6	94.0 220.0125	-20.4	ANT
^	439.974M	51.0	+19.6	+19.7	+0.3	+1.0	+0.0	91.6	94.0 219.9875	-2.4	ANT
^	440.022M	50.9	+19.6	+19.7	+0.3	+1.0	+0.0	91.5	94.0 220.0125	-2.5	ANT
7	443.966M Ave	32.6	+19.6	+19.7	+0.3	+1.0	+0.0	73.2	94.0 221.9875	-20.8	ANT
^	443.966M	50.4	+19.6	+19.7	+0.3	+1.0	+0.0	91.0	94.0 221.9875	-3.0	ANT
9	652.834M Ave	28.3	+19.6	+19.7	+0.3	+1.3	+0.0	69.2	94.0 217.6125	-24.8	ANT
^	652.834M	46.5	+19.6	+19.7	+0.3	+1.3	+0.0	87.4	94.0 217.6125	-6.6	ANT
11	660.042M Ave	28.2	+19.6	+19.7	+0.3	+1.3	+0.0	69.1	94.0 220.0125	-24.9	ANT
12	659.970M Ave	28.2	+19.6	+19.7	+0.3	+1.3	+0.0	69.1	94.0 219.9875	-24.9	ANT
^	659.970M	46.3	+19.6	+19.7	+0.3	+1.3	+0.0	87.2	94.0 219.9875	-6.8	ANT
^	660.030M	46.2	+19.6	+19.7	+0.3	+1.3	+0.0	87.1	94.0 220.0125	-6.9	ANT
15	665.960M Ave	28.0	+19.6	+19.7	+0.3	+1.3	+0.0	68.9	94.0 221.9875	-25.1	ANT
^	665.950M	46.1	+19.6	+19.7	+0.3	+1.3	+0.0	87.0	94.0 221.9875	-7.0	ANT
17	203.562M Ave	17.8	+19.5	+19.6	+0.2	+0.7	+0.0	57.8	94.0	-36.2	ANT
^	203.562M	67.3	+19.5	+19.6	+0.2	+0.7	+0.0	107.3	94.0	+13.3	ANT
19	239.642M Ave	16.2	+19.5	+19.7	+0.2	+0.8	+0.0	56.4	94.0	-37.6	ANT
^	239.642M	63.9	+19.5	+19.7	+0.2	+0.8	+0.0	104.1	94.0	+10.1	ANT
21	88.640M Ave	11.1	+19.5	+19.6	+0.1	+0.4	+0.0	50.7	94.0	-43.3	ANT
^	88.640M	46.3	+19.5	+19.6	+0.1	+0.4	+0.0	85.9	94.0	-8.1	ANT

Test Plots

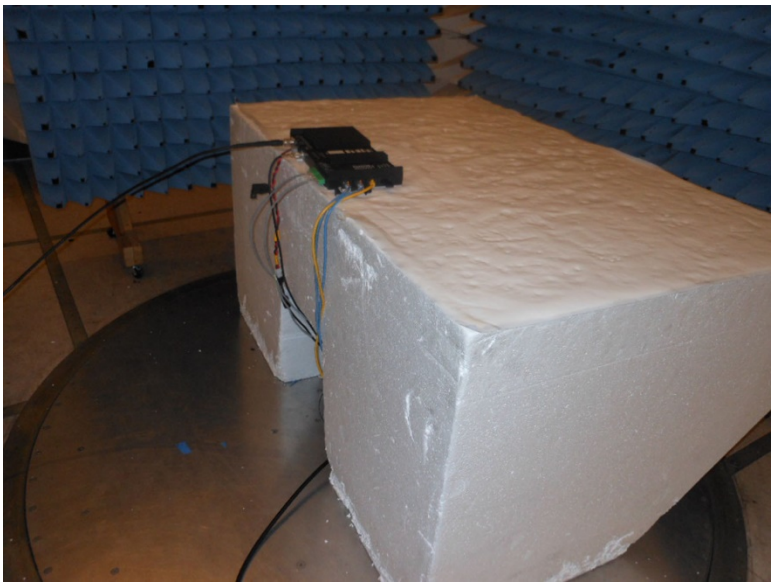

Cond Mask CH1 half rate 90 (limit corrected for system factors)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 100.0Hz VID BW: 3.0MHz SWP: 1.936sec
dBµV
110
100
90
80
70
60
50
40
30
20
217.56 217.57 217.58 217.59 217.60 217.61 217.62 217.63 217.64 217.65 217.66
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


Cond Mask CH1 full rate 90 (limit corrected for system factors)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 100.0Hz VID BW: 3.0MHz SWP: 1.936sec
dBµV
110
100
90
80
70
60
50
40
30
20
217.56 217.57 217.58 217.59 217.60 217.61 217.62 217.63 217.64 217.65 217.66
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


Cond Mask CH176 half rate (limit corrected for system factors)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 100.0Hz VID BW: 3.0MHz SWP: 1.936sec
dBµV
110
100
90
80
70
60
50
40
30
20
221.94 221.95 221.96 221.97 221.98 221.99 222.00 222.01 222.02 222.03 222.04
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions


Cond Mask CH176 full rate (limit corrected for system factors)
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 100.0Hz VID BW: 3.0MHz SWP: 1.936sec
dBµV
110
100
90
80
70
60
50
40
30
20
221.94 221.95 221.96 221.97 221.98 221.99 222.00 222.01 222.02 222.03 222.04
Frequency [MHz]
47 CFR §90.210(b) Spurious Emissions

Test Setup Photo(s)



90.210 - Radiated Spurious Emissions

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.26 (2015)	Test Date(s):	5/10/2024
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. Per 80.211f: (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.		

	EUT is transmitting, full rate and half rate datarate/modulation investigated, worst case reported. Ch1, Ch96, CH97, Ch176 investigated. EUT transmitting at max power and additionally investigated a 20dB lower power setting. Highest power setting data collected is representative of worst case. The unit is terminated into a 50ohm load (attenuators and receiver). 3 unshielded Ethernet cables are run to support ethernet hubs outside the chamber. The antenna out is connected to a support unit via coax cable and attenuators. GPS is run from the unit to a GPS splitter and simulated GPS signal. EUT is DC powered and is powered by a DC supply located under the turntable. USB Port terminated into a USB thumb drive.

Environmental Conditions			
Temperature (ºC)	22	Relative Humidity (%):	46

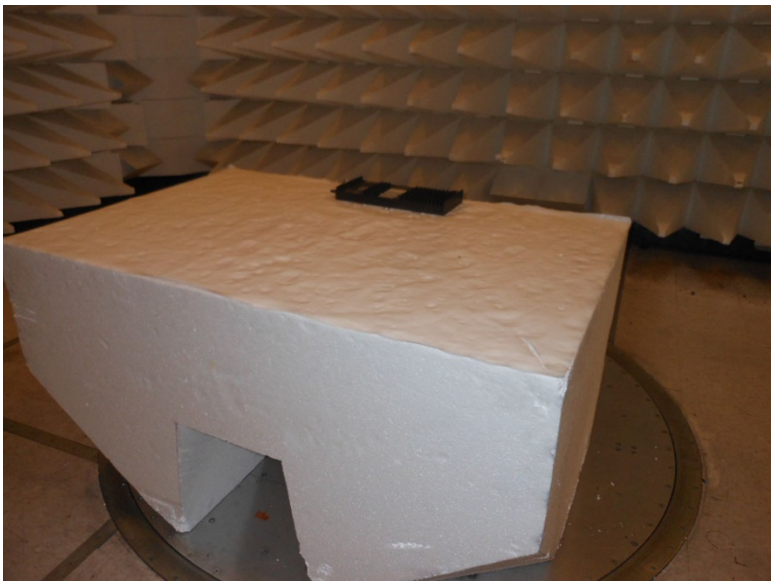
Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02673	Spectrum Analyzer	Agilent	E4446A	3/8/2024	3/8/2026
P06011	Cable	Andrew	Heliax	11/16/2023	11/16/2025
P06515	Cable	Andrews	Heliax	2/28/2024	2/28/2026
03540	Preamp	HP	83017A	3/24/2023	3/24/2025
02374ANSI	Horn Antenna	Electrometrics	RGA-60	5/26/2023	5/26/2025
P07504	Cable	TMS	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
02307	Preamp	HP	8447D	8/9/2023	8/9/2025
03824	Biconilog Antenna	ETS-Lindgren	3142E	5/9/2023	5/9/2025
P05333	Cable	Andrews	Heliax	8/8/2023	8/8/2025
P05360	Cable	Belden	RG214	8/8/2023	8/8/2025
00052	Loop Antenna	EMCO	6502	5/11/2022	5/11/2024

Test Data Summary (9kHz-30MHz)				
Frequency (MHz)	Measured (dBµV/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
0.017	57.9	-37.3	-13	Pass
28.746	28.7	-66.5	-13	Pass
20.508	27.5	-67.7	-13	Pass

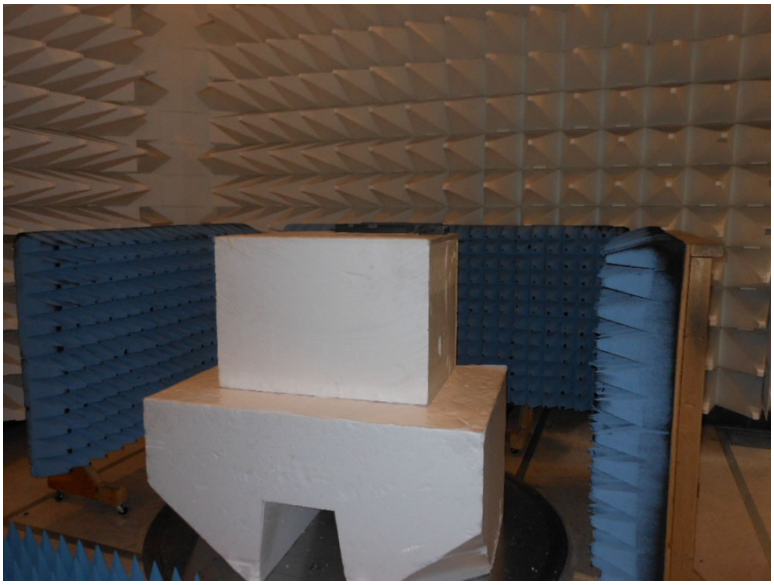
Test Data Summary (30-1000MHz)				
Frequency (MHz)	Measured (dBµV/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
652.785	51.5	-43.7	-13	Pass
660.006	47.8	-47.4	-13	Pass
665.977	46.6	-48.6	-13	Pass
660.031	46.3	-48.9	-13	Pass
880.051	44.3	-50.9	-13	Pass
870.419	42.6	-52.6	-13	Pass
879.936	41.6	-53.6	-13	Pass
887.957	39	-56.2	-13	Pass
443.993	36.1	-59.1	-13	Pass
439.984	35.9	-59.3	-13	Pass
440.026	35.8	-59.4	-13	Pass
435.285	33.4	-61.8	-13	Pass

Test Data Summary (Above 1GHz)				
Frequency (MHz)	Measured (dBµV/m) @ 3m	Convert to EIRP (dBm)	Limit (dBm)	Results
1088.029	63.5	-39.9	-13	Pass
1305.654	55.3	-44.6	-13	Pass
1109.764	50.6	-48	-13	Pass
1523.226	47.2	-50.4	-13	Pass
1100.013	44.8	-50.8	-13	Pass
1099.948	44.4	-52	-13	Pass
1741.318	43.2	-52.7	-13	Pass
1320.073	42.5	-54.3	-13	Pass
1319.935	40.9	-55.7	-13	Pass
1958.597	39.5	-56.3	-13	Pass
1539.856	38.9	-58.3	-13	Pass
1760.079	36.9	-58.3	-13	Pass
1540.111	36.9	-58.9	-13	Pass
1775.851	36.3	-59.1	-13	Pass
2176.12	36.1	-60.4	-13	Pass
2200.119	34.8	-60.5	-13	Pass
2219.871	34.7	-61.1	-13	Pass
1979.894	34.1	-61.3	-13	Pass
1331.975	33.9	-61.3	-13	Pass
2199.869	33.9	-61.6	-13	Pass
1980.109	33.6	-62.2	-13	Pass
1997.478	33	-62.4	-13	Pass
1759.921	32.8	-63.5	-13	Pass
1553.861	31.7	-95.2	-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 x 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