

Divigraph

REVISED TEST REPORT TO 105719-6

Wireless Gateway
Model: 100A1000-01

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247
(DTS 2400-2483.5MHz)

Report No.: 105719-6A

Date of issue: September 17, 2021



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
Revision History	3
Report Authorization	3
Test Facility Information	4
Software Versions	4
Site Registration & Accreditation Information	4
Summary of Results	5
Modifications During Testing	5
Conditions During Testing	5
Equipment Under Test	6
General Product Information	8
FCC Part 15 Subpart C	11
15.247(a)(2) Occupied Bandwidth	11
15.247(b)(3) Output Power	14
15.247(d) RF Conducted Emissions & Band Edge	20
15.247(d) Radiated Emissions & Band Edge	34
15.247(e) Power Spectral Density	72
15.207 AC Conducted Emissions	75
Appendix A: Customer Provided Information	93
Supplemental Information	94
Measurement Uncertainty	94
Emissions Test Details	94

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Divigraph
Divigraph (Pty) Ltd
Prosperity Park
Milnerton
Cape Town
7441
South Africa

Representative: Radek Tanski

REPORT PREPARED BY:

Kim Romero
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 105719

DATE OF EQUIPMENT RECEIPT:

July 14, 2021

DATE(S) OF TESTING:

July 14 – 16, 20 and 21, 2021

Revision History

Original: Testing of Wireless Gateway, Model: 100A1000-01 to FCC 15.247.

Revision A: To add Middle and High Channel data to Radiated Emissions.

To replaced Radiated Band Edge Data sheet.

Report Authorization

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



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

Test Facility Information



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

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.19

Site Registration & Accreditation Information

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

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

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (DTS)

Test Procedure	Description	Modifications	Results
15.247(a)(2)	Occupied Bandwidth	NA	PASS
15.247(b)(3)	Output Power	NA	PASS
15.247(d)	RF Conducted Emissions & Band Edge	NA	PASS
15.247(d)	Radiated Emissions & Band Edge	NA	PASS
15.247(e)	Power Spectral Density	NA	PASS
15.207	AC Conducted Emissions	NA	PASS

NA = Not Applicable

ISO/IEC 17025 Decision Rule

The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment 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

Note: CKC Laboratories performed testing with the HUBER+SUHNER antenna, as it had a higher gain than the Divigraph antenna and was the worst case configuration.

EQUIPMENT UNDER TEST (EUT)

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

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Wireless Gateway	Divigraph	100A1000-01	6EE00061
Rod Antenna	HUBER+SUHNER	1355.17.0002	2496204659
Rod Antenna	Divigraph	100A1002	NA

Note: See appendix A for customer provided information.

Support Equipment:

Device	Manufacturer	Model #	S/N
Computer	Intel	NUC10FNH	G8FN0320071Q
Mouse	Samsung	MOARUOA	1011003262
Keyboard	Microsoft	X8233051-001	76887605440281
PoE Adapter	Tenda	PoE30G-AT	E5192017049000115

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Wireless Gateway	Divigraph	100A1000-01	6EE00061
Rod Antenna	HUBER+SUHNER	1355.17.0002	2496204659
Rod Antenna	Divigraph	100A1002	NA

Note: See appendix A for customer provided information.

Support Equipment:

Device	Manufacturer	Model #	S/N
Computer	Intel	NUC10FNH	G8FN0320071Q
Mouse	Samsung	MOARUOA	1011003262
Keyboard	Microsoft	X8233051-001	76887605440281
PoE Adapter	Shortel	PowerDsine 3001GC	PD-3001C/AC

EQUIPMENT UNDER TEST (EUT) CONTINUED

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
Wireless Gateway	Divigraph	100A1000-01	6EE00061
Rod Antenna	HUBER+SUHNER	1355.17.0002	2496204659
Rod Antenna	Divigraph	100A1002	NA

Note: See appendix A for customer provided information.

Support Equipment:

Device	Manufacturer	Model #	S/N
Computer	Intel	NUC10FNH	G8FN0320071Q
Mouse	Samsung	MOARUOA	1011003262
Keyboard	Microsoft	X8233051-001	76887605440281
DC Power Supply	Protek	3006B	AG4070

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	802.15.4
Operating Frequency Range:	2405 – 2480MHz
Modulation Type(s):	OQPSK, DSSS
Maximum Duty Cycle:	100%
Number of TX Chains:	1
Antenna Type(s) and Gain:	Rod antenna (6dBi and 2dBi) <i>Note: For all testing, the 6dBi antenna was used. The 2dBi antenna will gain compliance by similarity. Customer declares 6dBi antenna worst case.</i>
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	24VDC
Firmware / Software used for Test:	Rutty Ver: 0.63.0.0

EUT and Accessory Photo(s)



Setup



2dB Antenna



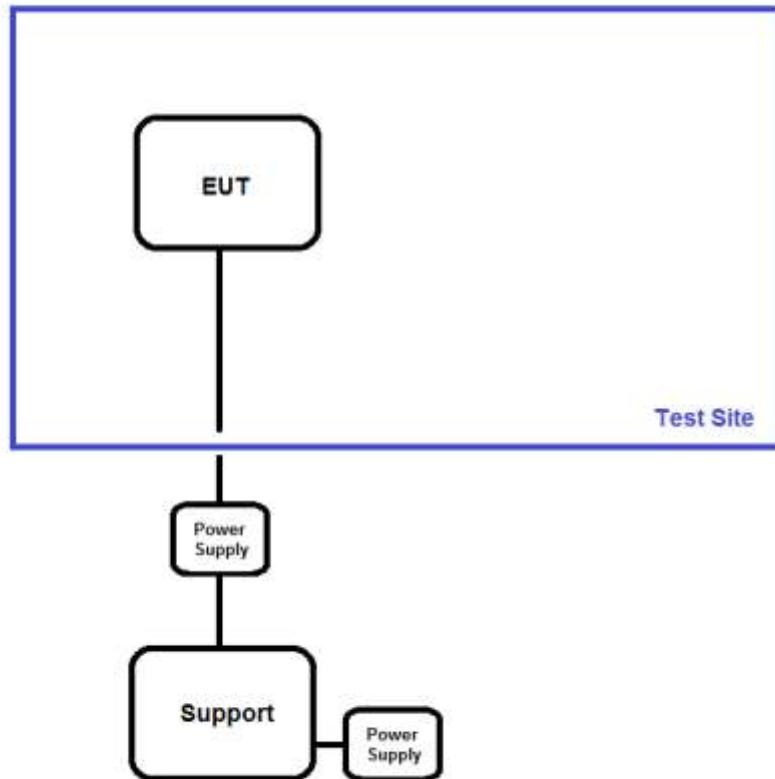
6dB Antenna

Support Equipment Photo(s)



Block Diagram of Test Setup(s)

Test Setup Block Diagram



FCC Part 15 Subpart C

15.247(a)(2) Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Michael Rauch Jr/Jonathan Wharton/Benny Lovan
Test Method:	ANSI C63.10 (2013) KDB 558074 (2019)	Test Date(s):	7/14/2021
Configuration:	1		
Test Setup:	PSA is connected directly to the EUT via an attenuator and cable. A support PC is connected via Ethernet and is using Putty software to program the EUT.		

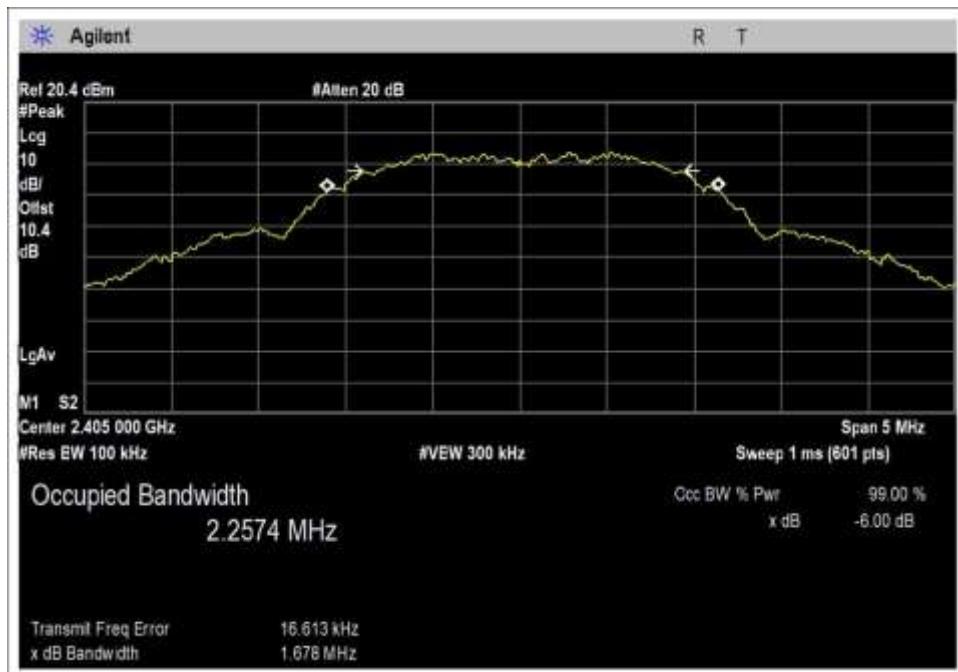
Environmental Conditions			
Temperature (°C)	24.7	Relative Humidity (%):	36.1

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02138	Attenuator	Weinschel	54-10	11/12/2019	11/12/2021
03011	Cable	AstroSteel	32022-2-2909K-24TC	6/15/2020	6/15/2022
02668	Spectrum Analyzer	Agilent	E4446A	4/14/2021	4/14/2022

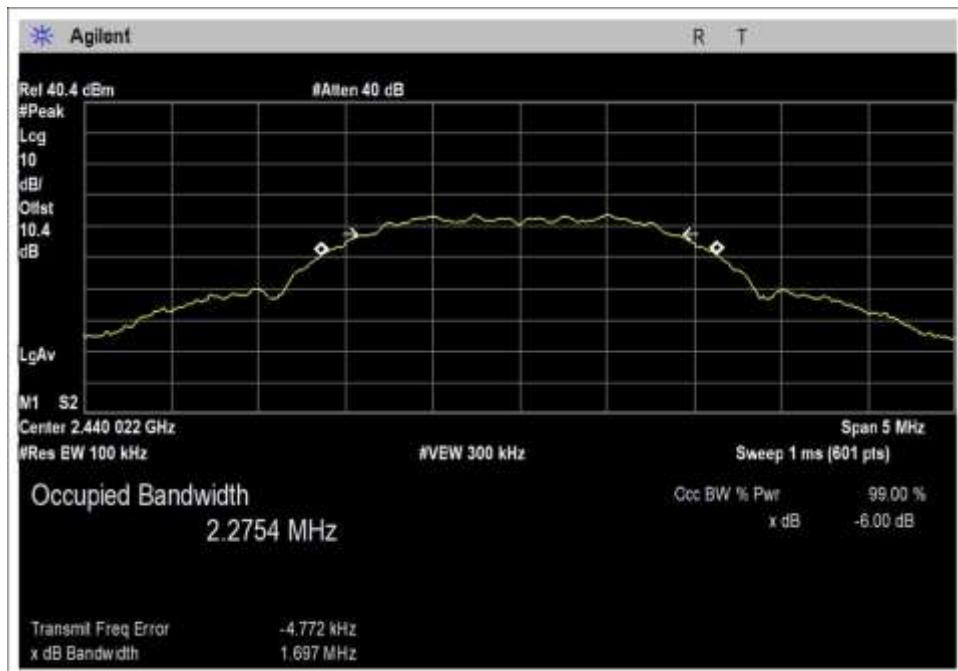
Test Data Summary, 6dB Occupied Bandwidth					
Frequency (MHz)	Antenna Port	Modulation	Measured (MHz)	Limit (kHz)	Results
2404	1	OQPSK, DSSS	1.678	≥500	Pass
2440	1	OQPSK, DSSS	1.697	≥500	Pass
2480	1	OQPSK, DSSS	1.660	≥500	Pass

Test Data Summary, 99% Occupied Bandwidth					
Frequency (MHz)	Antenna Port	Modulation	Measured (MHz)	Limit (kHz)	Results
2404	1	OQPSK, DSSS	2.2574	≥500	Pass
2440	1	OQPSK, DSSS	2.2754	≥500	Pass
2480	1	OQPSK, DSSS	2.2836	≥500	Pass

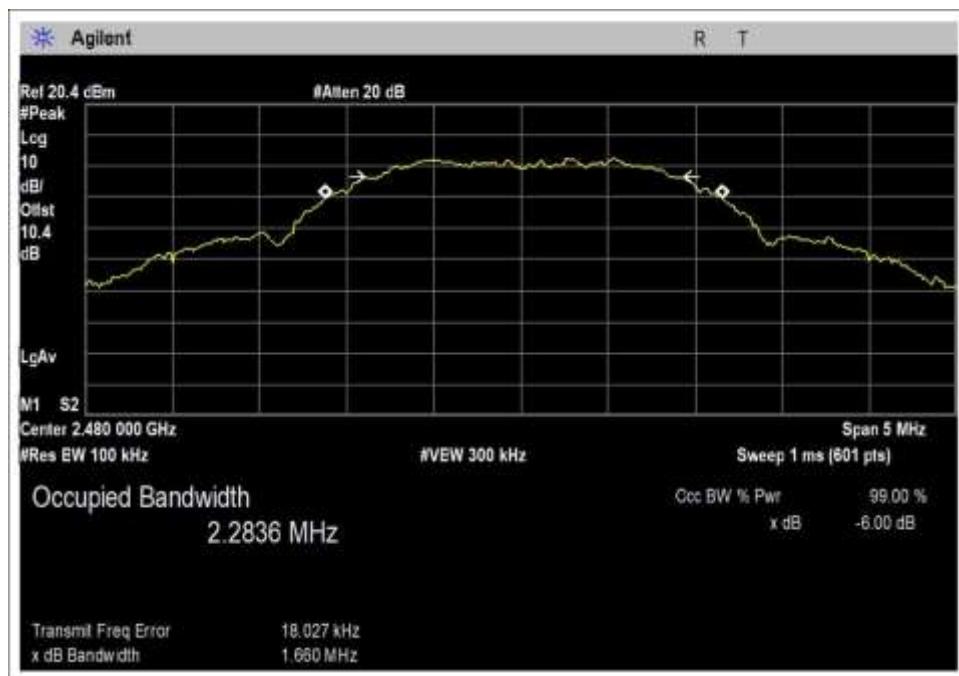
Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)



15.247(b)(3) Output Power

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Michael Rauch Jr/Jonathan Wharton/Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 558074 (2019)	Test Date(s):	7/15/2021
Configuration:	1		
Test Setup:	PSA is connected directly to the EUT via an attenuator and cable. A support PC is connected via Ethernet and is using Ruttly software to program the EUT.		

Environmental Conditions			
Temperature (°C)	25.6	Relative Humidity (%):	34.4

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02138	Attenuator	Weinschel	54-10	11/12/2019	11/12/2021
03011	Cable	AstroSteel	32022-2-2909K-24TC	6/15/2020	6/15/2022
02668	Spectrum Analyzer	Agilent	E4446A	4/14/2021	4/14/2022

Test Data Summary - Voltage Variations (PoE)					
Frequency (MHz)	Modulation / Ant Port	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2404	OQPSK, DSSS/External	8.29	8.3	8.3	0.01
2440	OQPSK, DSSS/External	7.88	7.95	7.92	0.07
2480	OQPSK, DSSS/External	7.04	7.15	7.12	0.11

Test Data Summary - Voltage Variations (M12)					
Frequency (MHz)	Modulation / Ant Port	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
2404	OQPSK, DSSS/External	8.31	8.36	8.35	0.05
2440	OQPSK, DSSS/External	7.93	7.93	7.93	0.00
2480	OQPSK, DSSS/External	7.13	7.10	7.07	0.06

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

Parameter Definitions:

POE Measurement performed at input voltage according to manufacturer specification.

Parameter	Value
V _{Nominal} :	51VDC
V _{Minimum} :	43.65VDC
V _{Maximum} :	57VDC*

*Customer declared that EUT input voltage beyond 57VDC was damaging to the unit.

M12M cable Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
V _{Nominal} :	24.0VDC
V _{Minimum} :	20.4VDC
V _{Maximum} :	27.6VDC

Test Data Summary - RF Conducted Measurement (PoE)

Measurement Option: RBW > DTS Bandwidth

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2404	OQPSK, DSSS	Rod/6dB	8.35	≤30	Pass
2440	OQPSK, DSSS	Rod/6dB	7.93	≤30	Pass
2480	OQPSK, DSSS	Rod/6dB	7.07	≤30	Pass

Test Data Summary - RF Conducted Measurement (M12)

Measurement Option: RBW > DTS Bandwidth

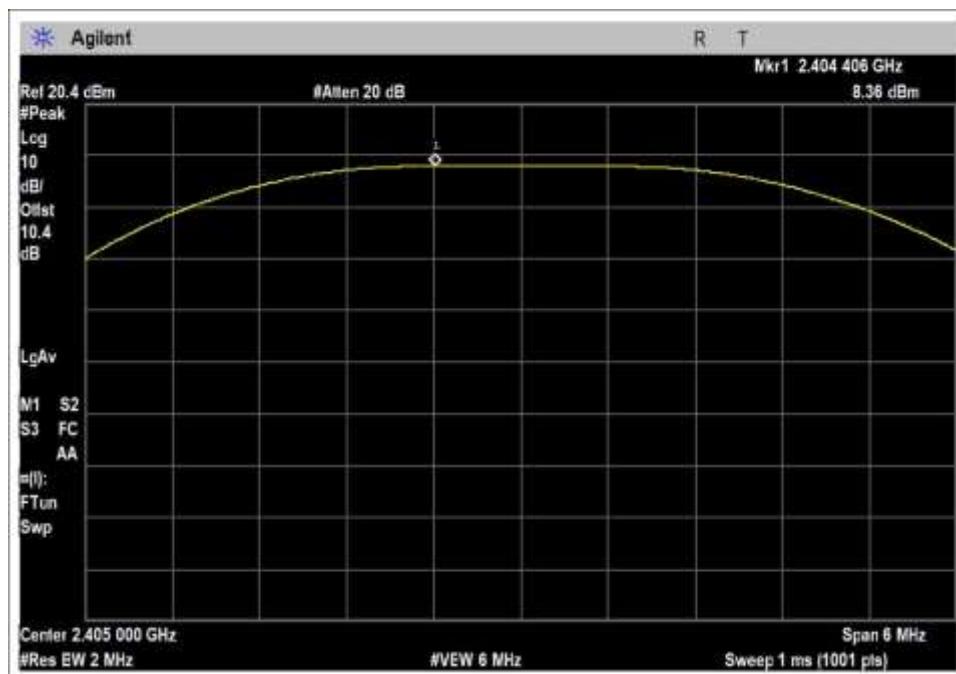
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
2404	OQPSK, DSSS	Rod/6dB	8.32	≤30	Pass
2440	OQPSK, DSSS	Rod/6dB	7.92	≤30	Pass
2480	OQPSK, DSSS	Rod/6dB	7.15	≤30	Pass

For fixed point-to-point antennas, the limit is calculated in accordance with 15.247(c)(1):

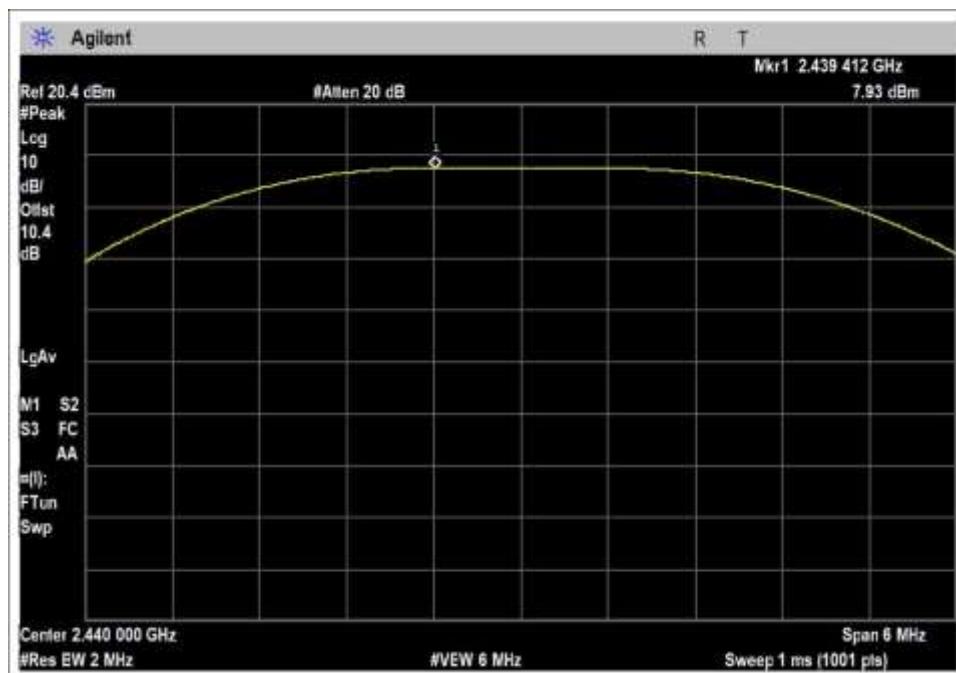
$$Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$$

For directional beamforming antennas, the limit is calculated in accordance with 15.247(c)(2) and KDB 662911.

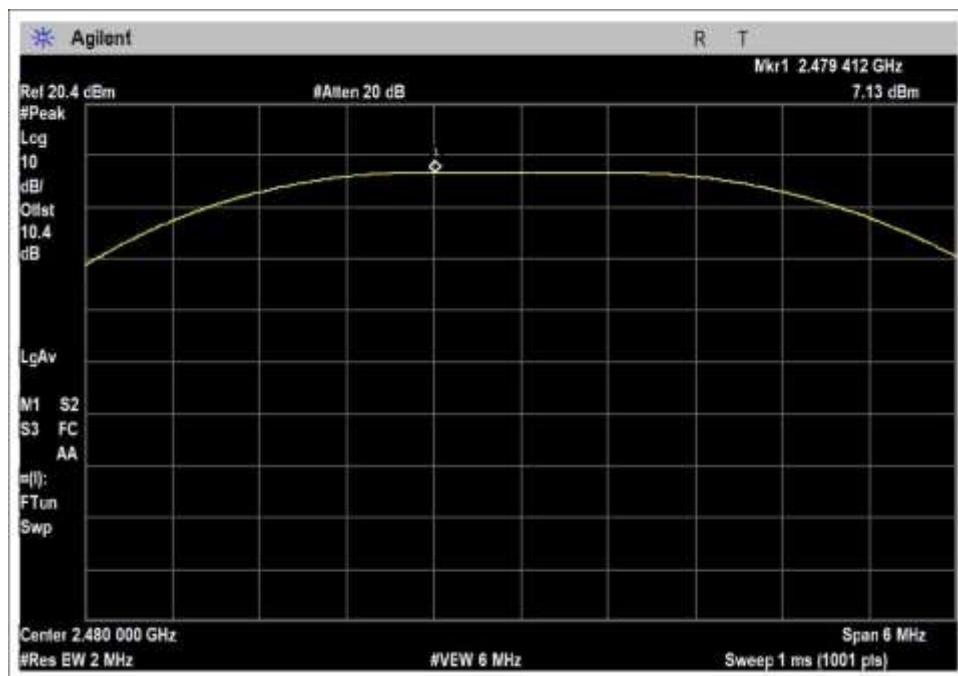
24VDC Plots



Nominal; Low Channel

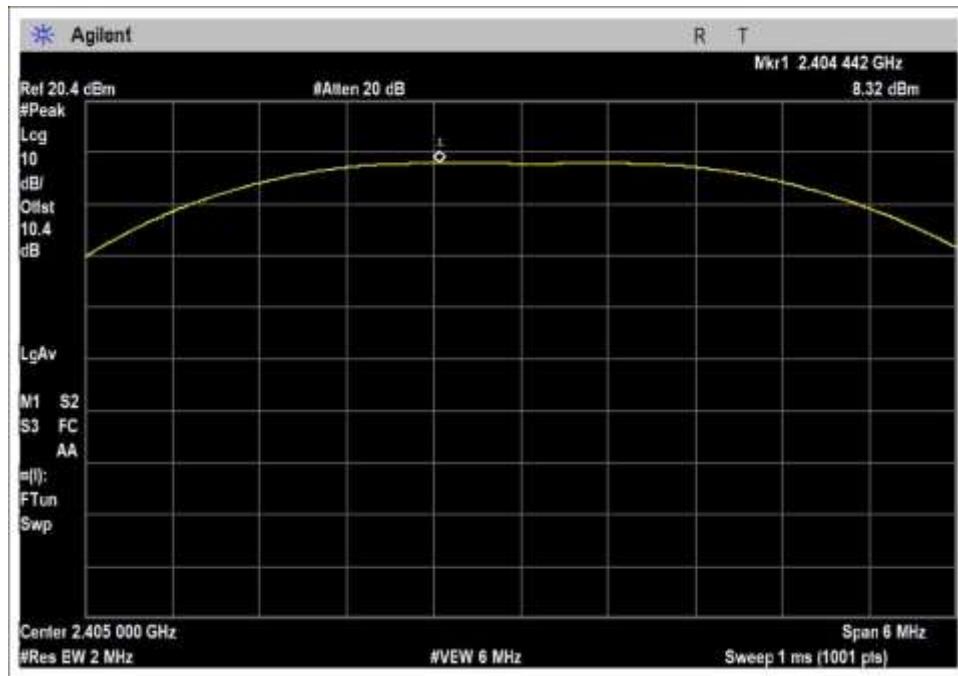


-15%; Middle Channel

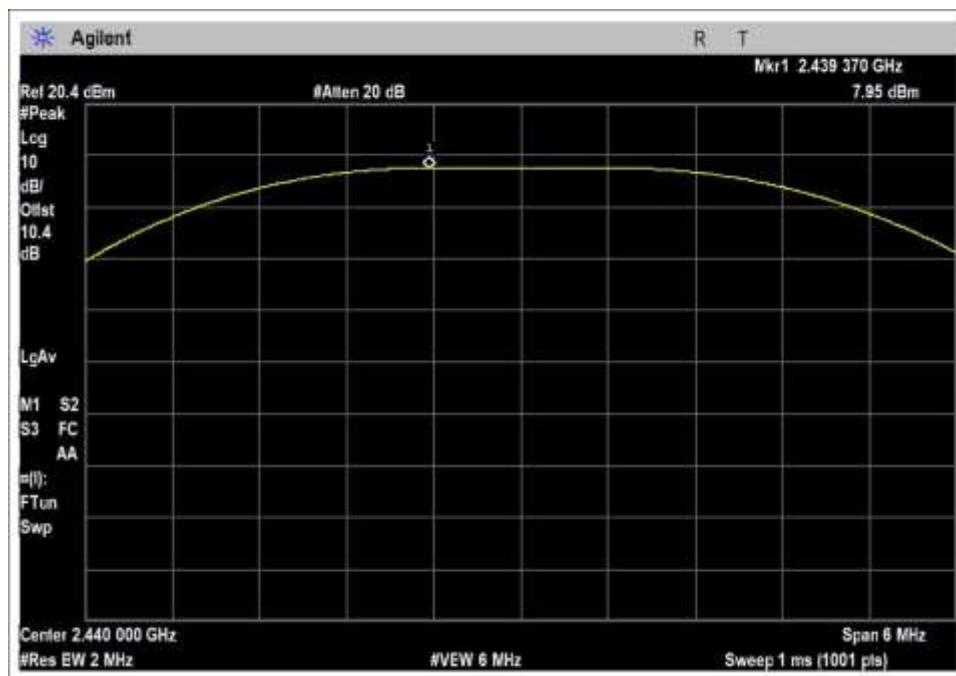


15%; High Channel

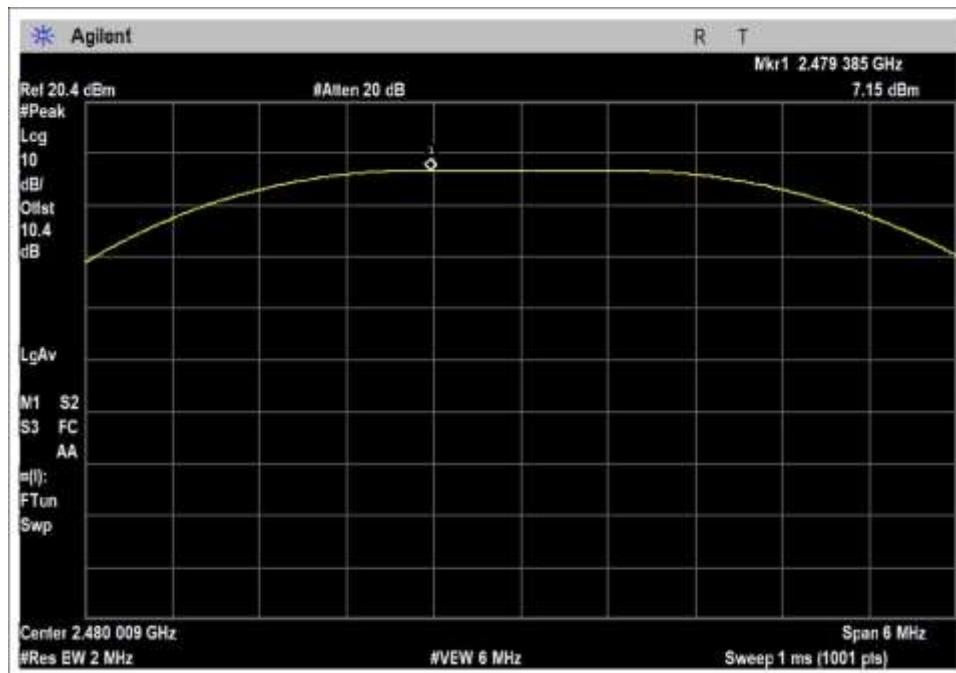
PoE Plots



Nominal; Low Channel



Nominal; Middle Channel



Nominal; High Channel

Test Setup Photo(s)



15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
 Customer: **Divigraph**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **105719** Date: 7/16/2021
 Test Type: **Conducted Emissions** Time: 2:14:37 PM
 Tested By: Jonathan Wharton Sequence#: 2
 Software: EMITest 5.03.19 51V DC POE

Equipment Tested:

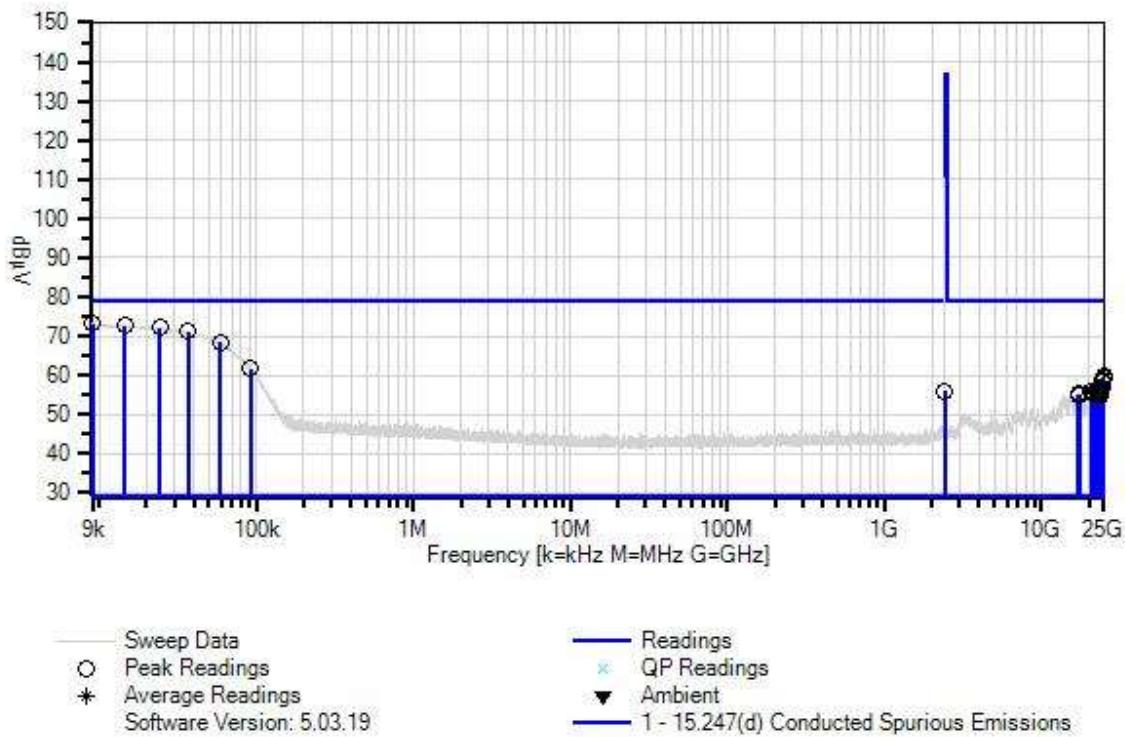
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 9kHz to 25GHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information and power.
Note: Low Channel

Divigraph WO#: 105719 Sequence#: 2 Date: 7/16/2021
 15.247(d) Conducted Spurious Emissions Test Lead: 51V DC POE External Antenna Port

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN02138	Attenuator	54-10	11/12/2019	11/12/2021
T2	AN03011	Cable	32022-2-2909K-24TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Lead: External Antenna Port			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T2 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	9.100k	63.5	+9.8	+0.0		+0.0	73.3	78.9	-5.6	Exter
2	14.536k	63.0	+9.8	+0.0		+0.0	72.8	78.9	-6.1	Exter
3	24.212k	62.4	+9.8	+0.0		+0.0	72.2	78.9	-6.7	Exter
4	36.915k	61.5	+9.8	+0.0		+0.0	71.3	78.9	-7.6	Exter
5	58.658k	58.6	+9.8	+0.0		+0.0	68.4	78.9	-10.5	Exter
6	91.641k	51.9	+9.8	+0.0		+0.0	61.7	78.9	-17.2	Exter
7	24874.734 M	47.7	+10.6	+1.4		+0.0	59.7	78.9	-19.2	Exter
8	24963.464 M	47.4	+10.6	+1.4		+0.0	59.4	78.9	-19.5	Exter
9	24185.770 M	46.8	+10.4	+1.5		+0.0	58.7	78.9	-20.2	Exter
10	24039.626 M	46.7	+10.4	+1.5		+0.0	58.6	78.9	-20.3	Exter
11	24217.086 M	46.5	+10.4	+1.5		+0.0	58.4	78.9	-20.5	Exter
12	24316.255 M	46.4	+10.4	+1.6		+0.0	58.4	78.9	-20.5	Exter
13	24498.935 M	45.0	+10.5	+1.6		+0.0	57.1	78.9	-21.8	Exter
14	23329.784 M	44.6	+10.5	+1.4		+0.0	56.5	78.9	-22.4	Exter
15	23491.586 M	44.7	+10.4	+1.4		+0.0	56.5	78.9	-22.4	Exter
16	23256.712 M	44.4	+10.5	+1.4		+0.0	56.3	78.9	-22.6	Exter
17	23366.320 M	44.4	+10.5	+1.4		+0.0	56.3	78.9	-22.6	Exter
18	22186.730 M	43.8	+10.7	+1.5		+0.0	56.0	78.9	-22.9	Exter

19	23220.176	44.0	+10.5	+1.5	+0.0	56.0	78.9	-22.9	Exter
M									
20	2399.761M	45.5	+10.0	+0.4	+0.0	55.9	78.9	-23.0	Exter
M									
21	20537.392	43.8	+10.6	+1.4	+0.0	55.8	78.9	-23.1	Exter
M									
22	22646.039	43.5	+10.7	+1.4	+0.0	55.6	78.9	-23.3	Exter
M									
23	20761.827	43.5	+10.5	+1.4	+0.0	55.4	78.9	-23.5	Exter
M									
24	17123.836	43.6	+10.4	+1.3	+0.0	55.3	78.9	-23.6	Exter
M									
25	21894.442	43.1	+10.7	+1.5	+0.0	55.3	78.9	-23.6	Exter
M									
26	22886.133	43.2	+10.6	+1.5	+0.0	55.3	78.9	-23.6	Exter
M									
27	21753.518	43.1	+10.6	+1.5	+0.0	55.2	78.9	-23.7	Exter
M									
28	17307.313	43.5	+10.4	+1.2	+0.0	55.1	78.9	-23.8	Exter
M									
29	22693.014	43.0	+10.7	+1.4	+0.0	55.1	78.9	-23.8	Exter
M									
30	23867.385	43.2	+10.4	+1.5	+0.0	55.1	78.9	-23.8	Exter
M									



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240

Customer:

Divigraph

Specification:

15.247(d) Conducted Spurious Emissions

Work Order #:

105719

Date: 7/16/2021

Test Type:

Conducted Emissions

Time: 2:35:35 PM

Tested By:

Jonathan Wharton

Sequence#: 3

Software:

EMITest 5.03.19

51V DC POE

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission

Frequency Range: 9kHz to 25GHz

Test Environment Conditions:

Temperature: 23.9°C

Humidity: 33.3%

Atmospheric Pressure: 101.4kPa

Software: Rutty version 0.63.0.0

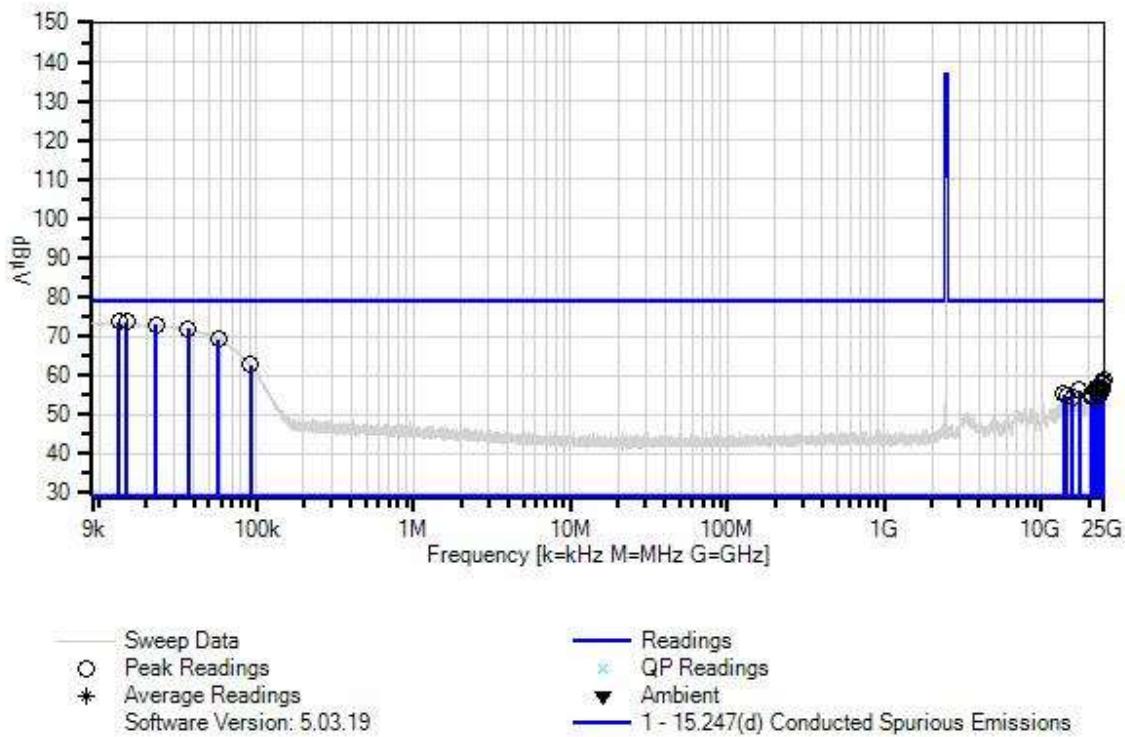
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz

Test Method: ANSI C63.10 2013

The EUT is set up as intended. It is connected via POE to a support computer that provides signal information and power.

Note:

Mid Channel

Divigraph WO#: 105719 Sequence#: 3 Date: 7/16/2021
 15.247(d) Conducted Spurious Emissions Test Lead: 51V DC POE External Antenna Port

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN02138	Attenuator	54-10	11/12/2019	11/12/2021
T2	AN03011	Cable	32022-2-2909K-24TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Lead: External Antenna Port			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T2 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	13.290k	63.9	+9.8	+0.0		+0.0	73.7	78.9	-5.2	Exter
2	14.849k	63.8	+9.8	+0.0		+0.0	73.6	78.9	-5.3	Exter
3	22.790k	63.2	+9.8	+0.0		+0.0	73.0	78.9	-5.9	Exter
4	36.681k	62.1	+9.8	+0.0		+0.0	71.9	78.9	-7.0	Exter
5	57.505k	59.4	+9.8	+0.0		+0.0	69.2	78.9	-9.7	Exter
6	91.695k	52.9	+9.8	+0.0		+0.0	62.7	78.9	-16.2	Exter
7	24911.270 M	47.1	+10.6	+1.4		+0.0	59.1	78.9	-19.8	Exter
8	24822.540 M	46.9	+10.5	+1.5		+0.0	58.9	78.9	-20.0	Exter
9	24253.622 M	46.5	+10.4	+1.6		+0.0	58.5	78.9	-20.4	Exter
10	24488.496 M	45.6	+10.5	+1.6		+0.0	57.7	78.9	-21.2	Exter
11	22118.877 M	44.8	+10.7	+1.5		+0.0	57.0	78.9	-21.9	Exter
12	23533.342 M	45.2	+10.4	+1.4		+0.0	57.0	78.9	-21.9	Exter
13	23418.514 M	44.9	+10.5	+1.4		+0.0	56.8	78.9	-22.1	Exter
14	23549.000 M	45.0	+10.4	+1.4		+0.0	56.8	78.9	-22.1	Exter
15	24509.374 M	44.4	+10.5	+1.6		+0.0	56.5	78.9	-22.4	Exter
16	23282.809 M	44.6	+10.5	+1.4		+0.0	56.5	78.9	-22.4	Exter
17	23298.467 M	44.6	+10.5	+1.4		+0.0	56.5	78.9	-22.4	Exter
18	22035.367 M	44.1	+10.7	+1.5		+0.0	56.3	78.9	-22.6	Exter

19	17270.617	44.6	+10.4	+1.2	+0.0	56.2	78.9	-22.7	Exter
M									
20	23136.665	44.1	+10.6	+1.5	+0.0	56.2	78.9	-22.7	Exter
M									
21	22155.413	43.8	+10.7	+1.5	+0.0	56.0	78.9	-22.9	Exter
M									
22	23783.874	43.7	+10.4	+1.5	+0.0	55.6	78.9	-23.3	Exter
M									
23	23731.680	43.6	+10.4	+1.4	+0.0	55.4	78.9	-23.5	Exter
M									
24	13887.312	43.9	+10.2	+1.2	+0.0	55.3	78.9	-23.6	Exter
M									
25	21012.359	43.2	+10.5	+1.4	+0.0	55.1	78.9	-23.8	Exter
M									
26	20542.611	42.8	+10.6	+1.4	+0.0	54.8	78.9	-24.1	Exter
M									
27	14334.995	43.2	+10.3	+1.2	+0.0	54.7	78.9	-24.2	Exter
M									
28	20704.413	42.7	+10.6	+1.4	+0.0	54.7	78.9	-24.2	Exter
M									
29	15656.025	43.0	+10.3	+1.3	+0.0	54.6	78.9	-24.3	Exter
M									
30	20824.460	42.7	+10.5	+1.4	+0.0	54.6	78.9	-24.3	Exter
M									



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240

Customer:

Divigraph

Specification:

15.247(d) Conducted Spurious Emissions

Work Order #:

105719

Date: 7/16/2021

Test Type:

Conducted Emissions

Time: 2:50:49 PM

Tested By:

Jonathan Wharton

Sequence#: 4

Software:

EMITest 5.03.19

51V DC POE

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Conducted Spurious Emission

Frequency Range: 9kHz to 25GHz

Test Environment Conditions:

Temperature: 23.9°C

Humidity: 33.3%

Atmospheric Pressure: 101.4kPa

Software: Rutty version 0.63.0.0

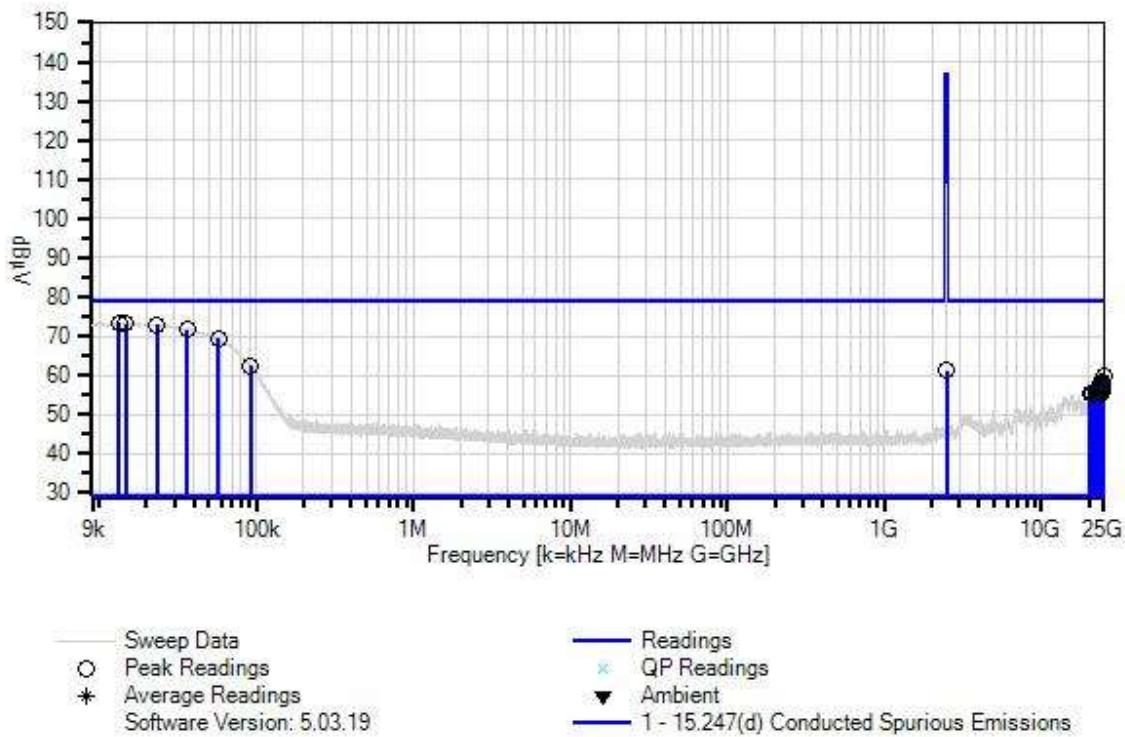
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz

Test Method: ANSI C63.10 2013

The EUT is set up as intended. It is connected via POE to a support computer that provides signal information and power.

Note:

High Channel

Divigraph WO#: 105719 Sequence#: 4 Date: 7/16/2021
 15.247(d) Conducted Spurious Emissions Test Lead: 51V DC POE External Antenna Port

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN02138	Attenuator	54-10	11/12/2019	11/12/2021
T2	AN03011	Cable	32022-2-2909K-24TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Lead: External Antenna Port			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	13.354k	63.6	+9.8	+0.0		+0.0	73.4	78.9	-5.5	Exter
2	14.840k	63.5	+9.8	+0.0		+0.0	73.3	78.9	-5.6	Exter
3	23.233k	63.2	+9.8	+0.0		+0.0	73.0	78.9	-5.9	Exter
4	36.169k	62.0	+9.8	+0.0		+0.0	71.8	78.9	-7.1	Exter
5	57.505k	59.6	+9.8	+0.0		+0.0	69.4	78.9	-9.5	Exter
6	91.479k	52.6	+9.8	+0.0		+0.0	62.4	78.9	-16.5	Exter
7	2483.610M	50.8	+10.0	+0.4		+0.0	61.2	78.9	-17.7	Exter
8	24947.806 M	48.1	+10.6	+1.4		+0.0	60.1	78.9	-18.8	Exter
9	24196.209 M	46.7	+10.4	+1.5		+0.0	58.6	78.9	-20.3	Exter
10	24029.187 M	46.6	+10.4	+1.5		+0.0	58.5	78.9	-20.4	Exter
11	24399.766 M	46.4	+10.4	+1.6		+0.0	58.4	78.9	-20.5	Exter
12	24039.626 M	46.1	+10.4	+1.5		+0.0	58.0	78.9	-20.9	Exter
13	23392.417 M	46.0	+10.5	+1.4		+0.0	57.9	78.9	-21.0	Exter
14	24373.669 M	45.9	+10.4	+1.6		+0.0	57.9	78.9	-21.0	Exter
15	24483.277 M	45.3	+10.5	+1.6		+0.0	57.4	78.9	-21.5	Exter
16	23950.896 M	45.1	+10.4	+1.5		+0.0	57.0	78.9	-21.9	Exter
17	23606.414 M	45.1	+10.4	+1.4		+0.0	56.9	78.9	-22.0	Exter
18	22651.259 M	44.5	+10.7	+1.4		+0.0	56.6	78.9	-22.3	Exter

19	23214.957	44.3	+10.5	+1.5	+0.0	56.3	78.9	-22.6	Exter
	M								
20	22118.877	43.9	+10.7	+1.5	+0.0	56.1	78.9	-22.8	Exter
	M								
21	24639.860	43.8	+10.5	+1.5	+0.0	55.8	78.9	-23.1	Exter
	M								
22	23804.752	43.8	+10.4	+1.5	+0.0	55.7	78.9	-23.2	Exter
	M								
23	20829.679	43.7	+10.5	+1.4	+0.0	55.6	78.9	-23.3	Exter
	M								
24	20521.733	43.6	+10.6	+1.4	+0.0	55.6	78.9	-23.3	Exter
	M								
25	23877.824	43.7	+10.4	+1.5	+0.0	55.6	78.9	-23.3	Exter
	M								
26	22781.744	43.4	+10.7	+1.5	+0.0	55.6	78.9	-23.3	Exter
	M								
27	23115.788	43.4	+10.6	+1.5	+0.0	55.5	78.9	-23.4	Exter
	M								
28	23736.899	43.7	+10.4	+1.4	+0.0	55.5	78.9	-23.4	Exter
	M								
29	23851.726	43.5	+10.4	+1.5	+0.0	55.4	78.9	-23.5	Exter
	M								
30	20318.176	43.2	+10.6	+1.4	+0.0	55.2	78.9	-23.7	Exter
	M								

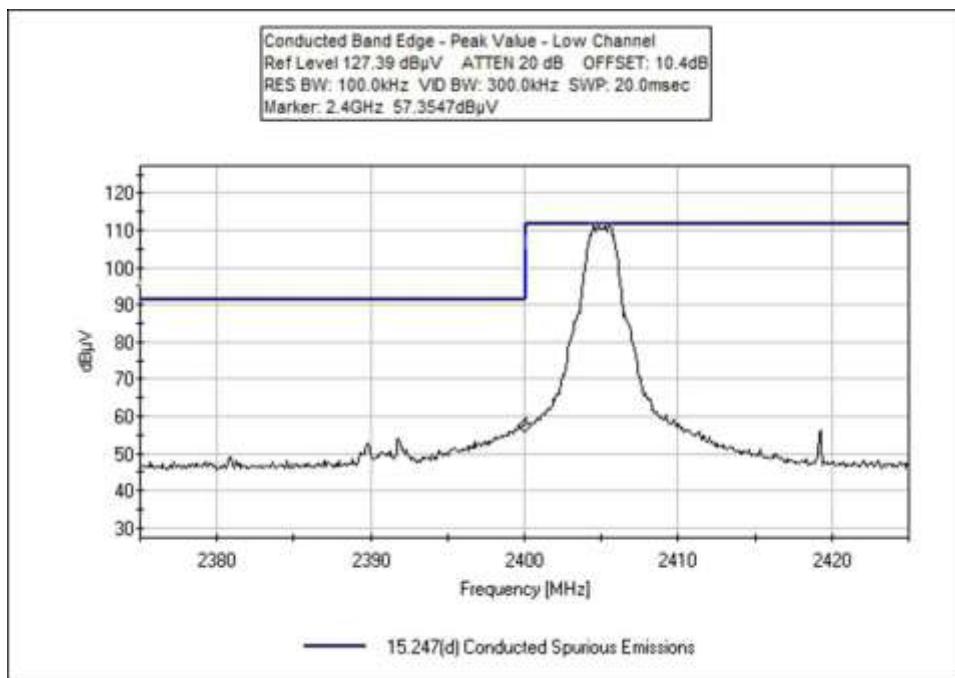
Band Edge

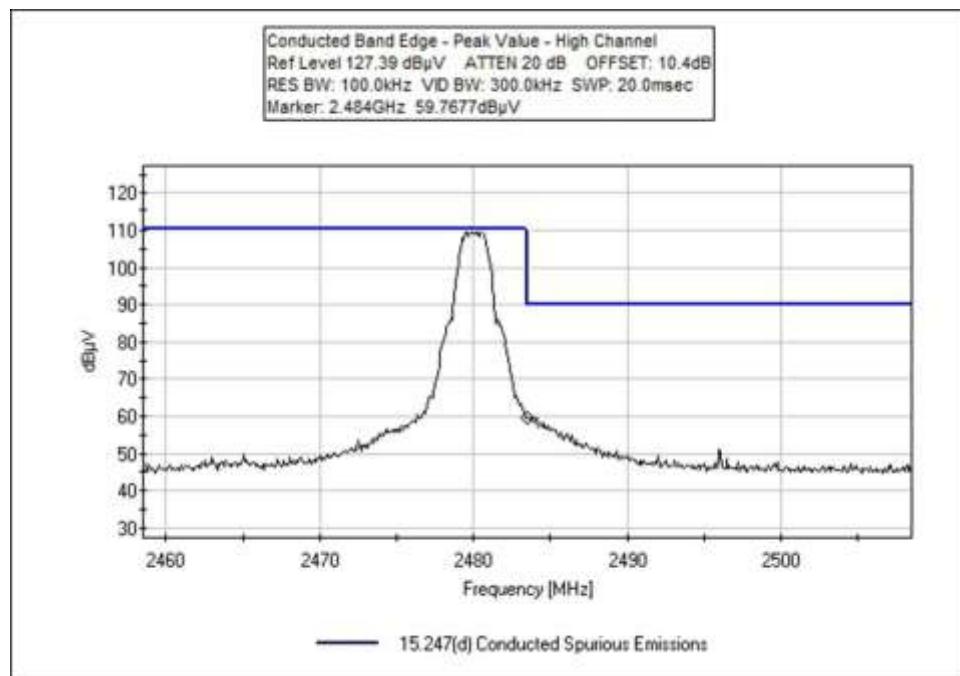
Band Edge Summary

Limit applied: Max Power/100kHz - 20dB.

Frequency (MHz)	Modulation	Measured (dBm)	Limit (dBm)	Results
2400.0	OQPSK, DSSS	57.35	<95.3	Pass
2483.5	OQPSK, DSSS	59.77	<95.3	Pass

Band Edge Plots





Test Setup Photo(s)



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
 Customer: **Divigraph**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **105719** Date: 7/16/2021
 Test Type: **Radiated Scan** Time: 09:00:14
 Tested By: Jonathan Wharton Sequence#: 2
 Software: EMITest 5.03.19

Equipment Tested:

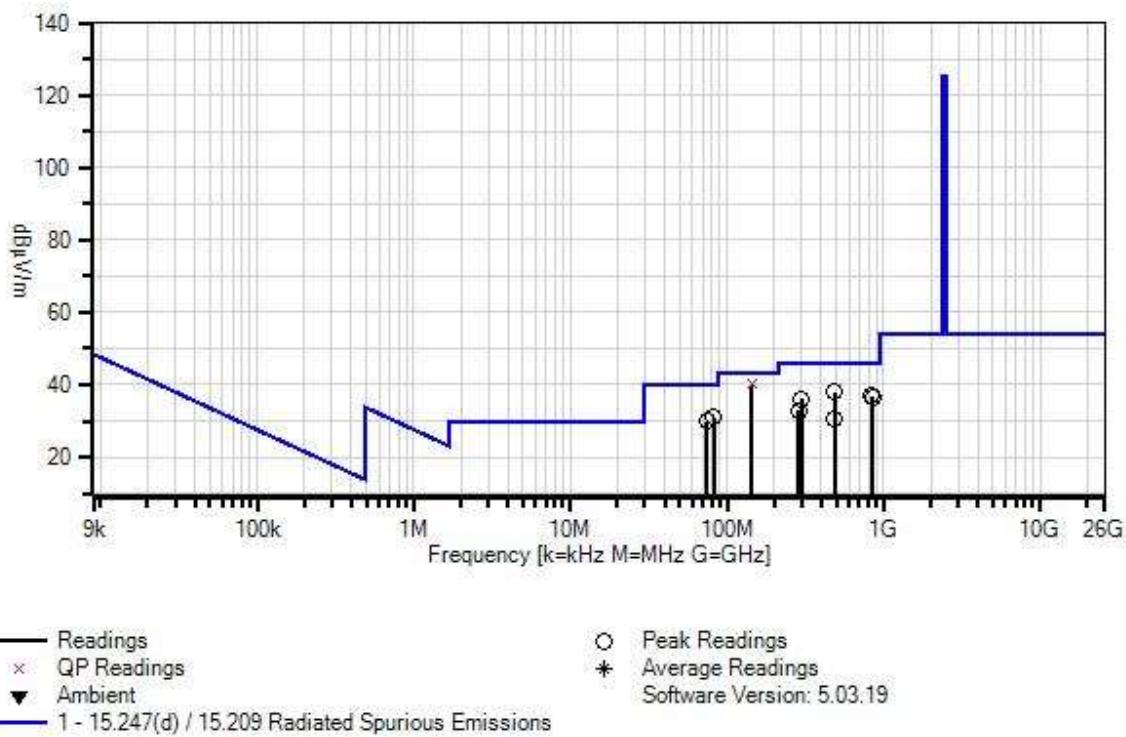
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 30MHz to 1GHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph W/O#: 105719 Sequence#: 2 Date: 7/16/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00449	Preamp-Upper Ports (dB)	8447F	1/13/2020	1/13/2022
T2	ANP07418	Cable	CNT-195-FR	6/18/2020	6/18/2022
T3	ANP06847	Cable	LMR195-FR-6	8/16/2019	8/16/2021
T4	ANP04249	Cable		3/12/2020	3/12/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T7	ANP06229	Cable-Insertion Loss (dB) (+113°F to 32°F)	CXTA04A-50	7/9/2020	7/9/2022

Measurement Data:			Reading listed by margin.				Test Distance: 10 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB μ V/m	dB μ V/m		
			MHz	dB μ V	dB	dB	dB	Table	dB μ V/m	dB	Ant
1	143.350M	35.8	-26.8	+0.2	+0.4	+1.0	+10.5	40.0	43.5	-3.5	Vert
	QP		+11.6	+6.0	+1.3						
^	143.285M	40.3	-26.8	+0.2	+0.4	+1.0	+10.5	44.5	43.5	+1.0	Vert
			+11.6	+6.0	+1.3						
3	488.500M	26.3	-27.8	+0.2	+0.6	+1.8	+10.5	38.0	46.0	-8.0	Vert
			+17.7	+6.1	+2.6						
4	82.500M	31.7	-27.0	+0.1	+0.3	+0.8	+10.5	31.0	40.0	-9.0	Vert
			+7.6	+6.0	+1.0						
5	845.750M	18.0	-27.7	+0.3	+0.8	+2.4	+10.5	36.8	46.0	-9.2	Horiz
			+22.9	+6.1	+3.5						
6	848.250M	17.6	-27.6	+0.3	+0.8	+2.4	+10.5	36.5	46.0	-9.5	Vert
			+22.9	+6.1	+3.5						
7	300.000M	28.4	-26.3	+0.2	+0.5	+1.4	+10.5	36.2	46.0	-9.8	Horiz
			+13.4	+6.1	+2.0						
8	74.500M	31.6	-27.0	+0.1	+0.3	+0.7	+10.5	29.8	40.0	-10.2	Horiz
			+6.7	+6.0	+0.9						
9	285.500M	25.4	-26.3	+0.2	+0.5	+1.4	+10.5	32.9	46.0	-13.1	Vert
			+13.2	+6.1	+1.9						
10	490.250M	18.7	-27.8	+0.2	+0.6	+1.8	+10.5	30.5	46.0	-15.5	Horiz
			+17.8	+6.1	+2.6						



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/16/2021
Test Type: **Radiated Scan** Time: 08:56:16
Tested By: Jonathan Wharton Sequence#: 3
Software: EMITest 5.03.20

Equipment Tested:

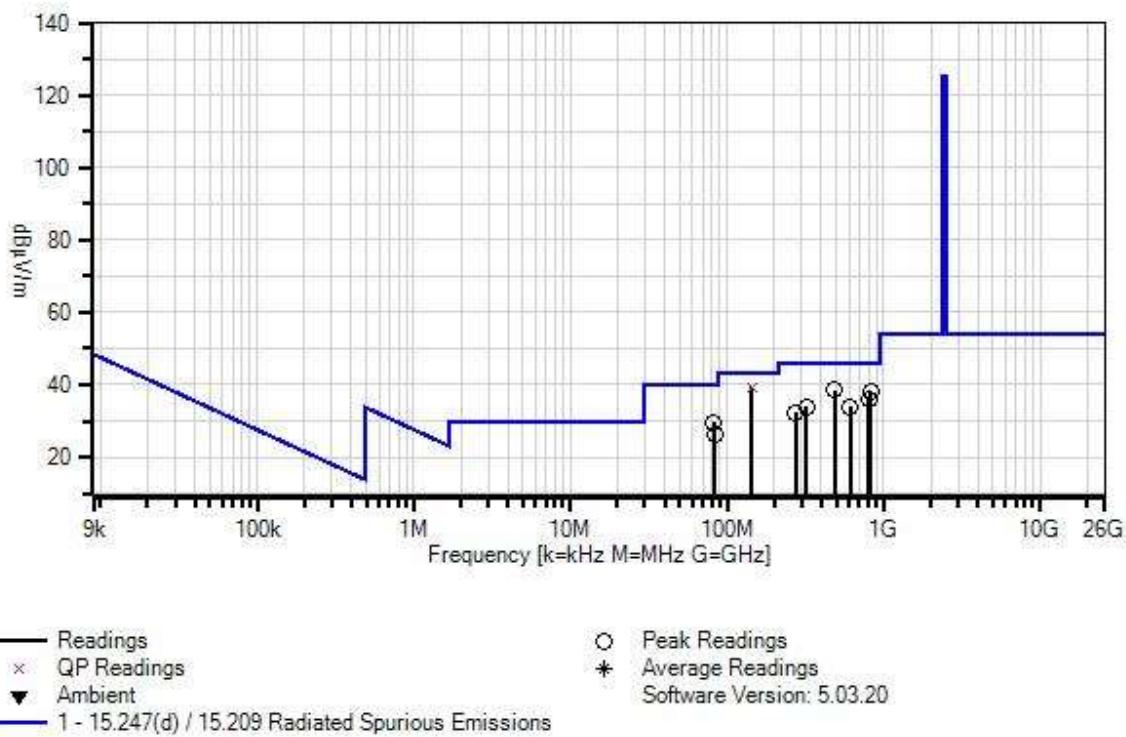
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 30MHz to 1GHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: Middle Channel

Divigraph W/O#: 105719 Sequence#: 3 Date: 7/16/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00449	Preamp-Upper Ports (dB)	8447F	1/13/2020	1/13/2022
T2	ANP07418	Cable	CNT-195-FR	6/18/2020	6/18/2022
T3	ANP06847	Cable	LMR195-FR-6	8/16/2019	8/16/2021
T4	ANP04249	Cable		3/12/2020	3/12/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T7	ANP06229	Cable-Insertion Loss (dB) (+113°F to 32°F)	CXTA04A-50	7/9/2020	7/9/2022

Measurement Data:			Reading listed by margin.				Test Distance: 10 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar	
			T5	T6	T7		Table	dB μ V/m	dB μ V/m			
			MHz	dB μ V	dB	dB	dB					Ant
1	143.375M	35.0	-26.8	+0.2	+0.4	+1.0	+10.5	39.2	43.5	-4.3	Horiz	
	QP		+11.6	+6.0	+1.3							
^	143.310M	38.6	-26.8	+0.2	+0.4	+1.0	+10.5	42.8	43.5	-0.7	Horiz	
			+11.6	+6.0	+1.3							
3	488.800M	26.9	-27.8	+0.2	+0.6	+1.8	+10.5	38.6	46.0	-7.4	Vert	
			+17.7	+6.1	+2.6							
4	824.000M	19.3	-27.7	+0.3	+0.8	+2.4	+10.5	37.9	46.0	-8.1	Horiz	
			+22.7	+6.1	+3.5							
5	808.800M	17.9	-27.8	+0.3	+0.8	+2.4	+10.5	36.2	46.0	-9.8	Vert	
			+22.6	+6.1	+3.4							
6	82.500M	30.4	-27.0	+0.1	+0.3	+0.8	+10.5	29.7	40.0	-10.3	Vert	
			+7.6	+6.0	+1.0							
7	609.000M	19.5	-28.0	+0.3	+0.7	+2.1	+10.5	34.0	46.0	-12.0	Horiz	
			+19.9	+6.1	+2.9							
8	320.600M	25.4	-26.4	+0.2	+0.5	+1.5	+10.5	33.8	46.0	-12.2	Horiz	
			+13.9	+6.1	+2.1							
9	83.050M	26.9	-27.0	+0.1	+0.3	+0.8	+10.5	26.3	40.0	-13.7	Horiz	
			+7.7	+6.0	+1.0							
10	276.400M	24.9	-26.3	+0.2	+0.5	+1.4	+10.5	32.3	46.0	-13.7	Vert	
			+13.1	+6.1	+1.9							



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/16/2021
Test Type: **Radiated Scan** Time: 09:23:35
Tested By: Jonathan Wharton Sequence#: 4
Software: EMITest 5.03.20

Equipment Tested:

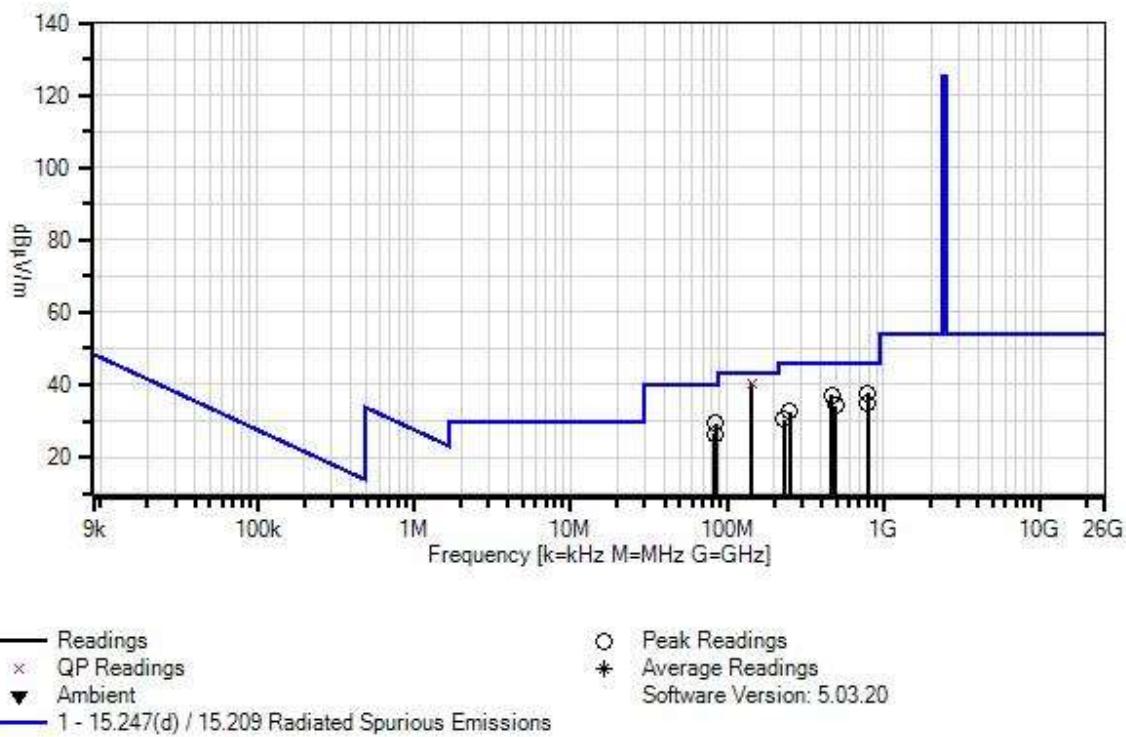
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 30MHz to 1GHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: High Channel

Divigraph W/O#: 105719 Sequence#: 4 Date: 7/16/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00449	Preamp-Upper Ports (dB)	8447F	1/13/2020	1/13/2022
T2	ANP07418	Cable	CNT-195-FR	6/18/2020	6/18/2022
T3	ANP06847	Cable	LMR195-FR-6	8/16/2019	8/16/2021
T4	ANP04249	Cable		3/12/2020	3/12/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T7	ANP06229	Cable-Insertion Loss (dB) (+113°F to 32°F)	CXTA04A-50	7/9/2020	7/9/2022

Measurement Data:			Reading listed by margin.				Test Distance: 10 Meters					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar	
			T5	T6	T7		Table	dB μ V/m	dB μ V/m			
			MHz	dB μ V	dB	dB	dB					Ant
1	143.295M	36.2	-26.8	+0.2	+0.4	+1.0	+10.5	40.4	43.5	-3.1	Vert	QP
			+11.6	+6.0	+1.3							
^	143.297M	39.7	-26.8	+0.2	+0.4	+1.0	+10.5	43.9	43.5	+0.4	Vert	
			+11.6	+6.0	+1.3							
3	788.840M	19.8	-27.8	+0.3	+0.8	+2.4	+10.5	37.8	46.0	-8.2	Vert	
			+22.3	+6.1	+3.4							
4	469.220M	26.0	-27.7	+0.2	+0.6	+1.8	+10.5	37.3	46.0	-8.7	Horiz	
			+17.3	+6.1	+2.5							
5	84.340M	29.8	-27.0	+0.1	+0.3	+0.8	+10.5	29.4	40.0	-10.6	Vert	
			+7.9	+6.0	+1.0							
6	789.720M	16.7	-27.8	+0.3	+0.8	+2.4	+10.5	34.8	46.0	-11.2	Horiz	
			+22.4	+6.1	+3.4							
7	493.600M	22.2	-27.8	+0.2	+0.6	+1.9	+10.5	34.1	46.0	-11.9	Vert	
			+17.8	+6.1	+2.6							
8	252.340M	25.8	-26.3	+0.2	+0.5	+1.3	+10.5	32.6	46.0	-13.4	Vert	
			+12.7	+6.1	+1.8							
9	84.000M	26.9	-27.0	+0.1	+0.3	+0.8	+10.5	26.5	40.0	-13.5	Horiz	
			+7.9	+6.0	+1.0							
10	232.220M	25.1	-26.4	+0.2	+0.5	+1.3	+10.5	30.5	46.0	-15.5	Horiz	
			+11.5	+6.1	+1.7							

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
 Customer: **Divigraph**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **105719** Date: 7/19/2021
 Test Type: **Radiated Scan** Time: 07:44:30
 Tested By: Jonathan Wharton Sequence#: 5
 Software: EMITest 5.03.20

Equipment Tested:

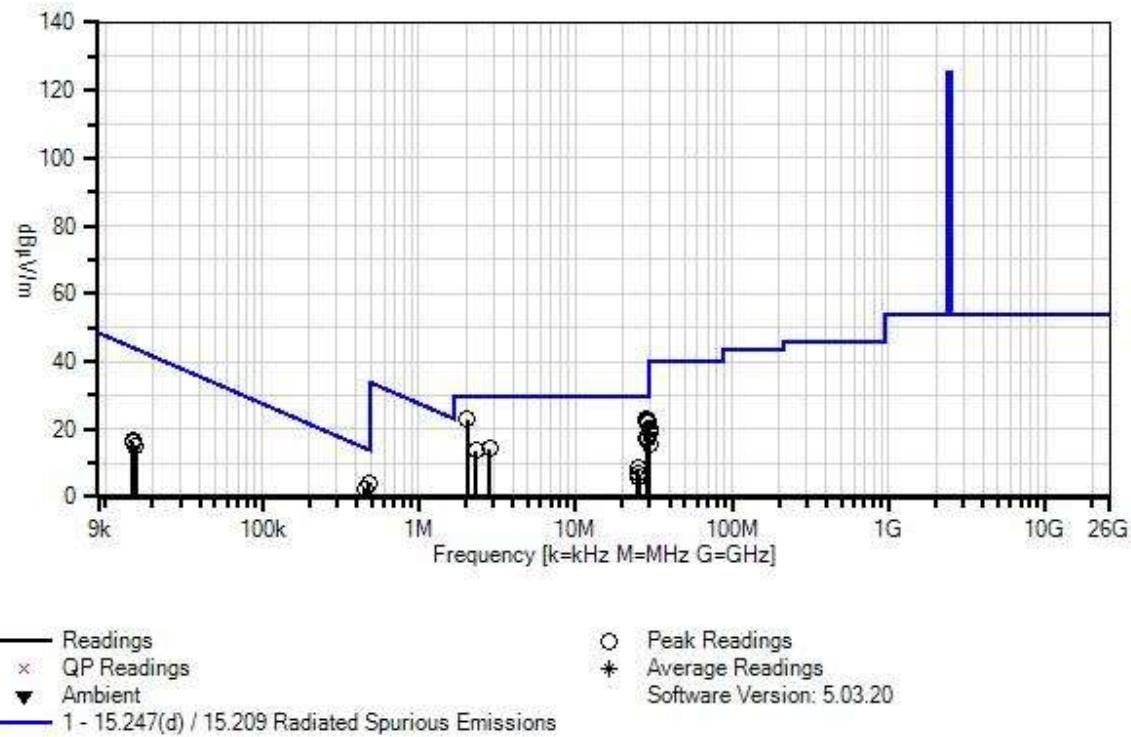
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
Antenna used: 6dBi Omni
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information
Note:
Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph WO#: 105719 Sequence#: 5 Date: 7/19/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00226	Loop Antenna	6502	3/11/2021	3/11/2023
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023

Measurement Data:			Reading listed by margin.			Test Distance: 3 Meters					
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant	
1	2.039M	32.9	+9.9	+0.2		-20.0	23.0	29.5	-6.5	Z	
2	28.685M	35.9	+6.0	+1.0		-20.0	22.9	29.5	-6.6	Y	
3	28.685M	35.6	+6.0	+1.0		-20.0	22.6	29.5	-6.9	X	
4	29.235M	35.6	+5.8	+1.0		-20.0	22.4	29.5	-7.1	X	
5	29.235M	35.3	+5.8	+1.0		-20.0	22.1	29.5	-7.4	Y	
6	29.905M	33.5	+5.7	+1.0		-20.0	20.2	29.5	-9.3	X	
7	479.300k	34.3	+9.9	+0.1		-40.0	4.3	14.0	-9.7	Z	
8	480.000k	33.9	+9.9	+0.1		-40.0	3.9	14.0	-10.1	Y	
9	29.905M	32.2	+5.7	+1.0		-20.0	18.9	29.5	-10.6	Y	
10	29.235M	30.5	+5.8	+1.0		-20.0	17.3	29.5	-12.2	Z	
11	28.685M	30.2	+6.0	+1.0		-20.0	17.2	29.5	-12.3	Z	
12	450.500k	32.1	+9.9	+0.1		-40.0	2.1	14.5	-12.4	X	
13	29.995M	29.0	+5.7	+1.0		-20.0	15.7	29.5	-13.8	Z	
14	2.858M	23.9	+10.0	+0.3		-20.0	14.2	29.5	-15.3	X	
15	2.340M	23.4	+10.0	+0.2		-20.0	13.6	29.5	-15.9	Y	
16	25.018M	20.7	+7.0	+0.9		-20.0	8.6	29.5	-20.9	X	
17	25.324M	19.1	+6.9	+0.9		-20.0	6.9	29.5	-22.6	Z	
18	25.100M	17.7	+6.9	+0.9		-20.0	5.5	29.5	-24.0	Y	
19	15.000k	40.0	+16.6	+0.0		-40.0	16.6	44.1	-27.5	Y	
20	15.000k	39.6	+16.6	+0.0		-40.0	16.2	44.1	-27.9	X	
21	15.600k	38.9	+16.3	+0.0		-40.0	15.2	43.7	-28.5	Z	



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/19/2021
Test Type: **Radiated Scan** Time: 08:01:07
Tested By: Jonathan Wharton Sequence#: 6
Software: EMITest 5.03.20

Equipment Tested:

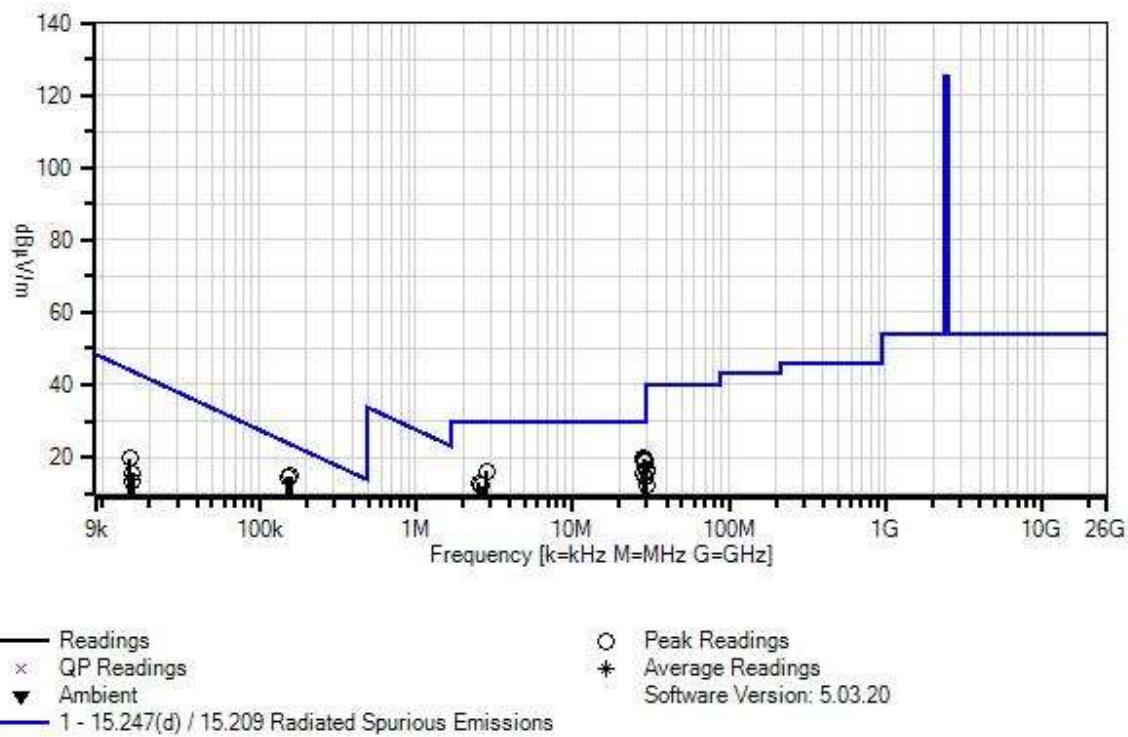
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information
Note: Middle Channel

Divigraph WO#: 105719 Sequence#: 6 Date: 7/19/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00226	Loop Antenna	6502	3/11/2021	3/11/2023
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023

Measurement Data: Reading listed by margin.				Test Distance: 3 Meters						
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T2 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	450.000k	36.8	+9.9	+0.1		-40.0	6.8	14.5	-7.7	Z
2	159.200k	44.3	+10.3	+0.1		-40.0	14.7	23.6	-8.9	X
3	151.600k	44.1	+10.3	+0.1		-40.0	14.5	24.0	-9.5	Y
4	28.689M	32.6	+6.0	+1.0		-20.0	19.6	29.5	-9.9	Z
5	28.685M	32.5	+6.0	+1.0		-20.0	19.5	29.5	-10.0	Y
6	29.235M	32.2	+5.8	+1.0		-20.0	19.0	29.5	-10.5	Y
7	29.234M	32.1	+5.8	+1.0		-20.0	18.9	29.5	-10.6	Z
8	29.905M	29.7	+5.7	+1.0		-20.0	16.4	29.5	-13.1	Y
9	29.994M	29.5	+5.7	+1.0		-20.0	16.2	29.5	-13.3	Z
10	2.830M	25.7	+10.0	+0.3		-20.0	16.0	29.5	-13.5	Z
11	28.685M	28.5	+6.0	+1.0		-20.0	15.5	29.5	-14.0	X
12	29.235M	27.4	+5.8	+1.0		-20.0	14.2	29.5	-15.3	X
13	2.539M	22.7	+10.0	+0.2		-20.0	12.9	29.5	-16.6	X
14	29.965M	25.6	+5.7	+1.0		-20.0	12.3	29.5	-17.2	X
15	2.652M	21.8	+10.0	+0.2		-20.0	12.0	29.5	-17.5	Y
16	25.030M	20.4	+7.0	+0.9		-20.0	8.3	29.5	-21.2	Y
17	25.100M	19.7	+6.9	+0.9		-20.0	7.5	29.5	-22.0	Z
18	25.020M	19.2	+7.0	+0.9		-20.0	7.1	29.5	-22.4	X
19	15.050k	43.0	+16.6	+0.0		-40.0	19.6	44.0	-24.4	X
20	15.550k	38.9	+16.4	+0.0		-40.0	15.3	43.8	-28.5	Z
21	15.450k	36.7	+16.4	+0.0		-40.0	13.1	43.8	-30.7	Z



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/19/2021
Test Type: **Radiated Scan** Time: 08:12:00
Tested By: Jonathan Wharton Sequence#: 7
Software: EMITest 5.03.20

Equipment Tested:

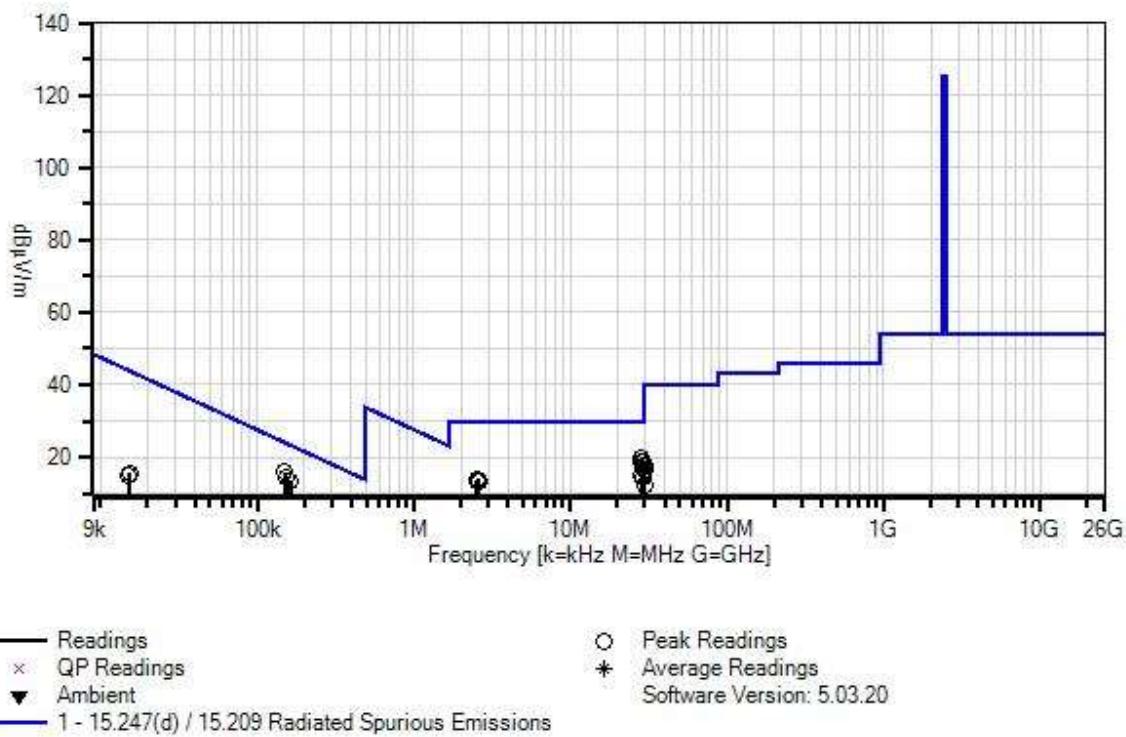
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 9kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information
Note: High Channel

Divigraph WO#: 105719 Sequence#: 7 Date: 7/19/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	AN00226	Loop Antenna	6502	3/11/2021	3/11/2023
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023

Measurement Data: Reading listed by margin.				Test Distance: 3 Meters						
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T2 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	150.000k	45.5	+10.3	+0.1		-40.0	15.9	24.1	-8.2	Y
2	155.000k	43.9	+10.3	+0.1		-40.0	14.3	23.8	-9.5	X
3	165.000k	43.1	+10.3	+0.1		-40.0	13.5	23.2	-9.7	Z
4	28.683M	32.6	+6.0	+1.0		-20.0	19.6	29.5	-9.9	Y
5	29.238M	31.7	+5.8	+1.0		-20.0	18.5	29.5	-11.0	Y
6	28.688M	31.4	+6.0	+1.0		-20.0	18.4	29.5	-11.1	Z
7	29.238M	30.8	+5.8	+1.0		-20.0	17.6	29.5	-11.9	Z
8	29.908M	30.8	+5.7	+1.0		-20.0	17.5	29.5	-12.0	Z
9	29.908M	29.8	+5.7	+1.0		-20.0	16.5	29.5	-13.0	Y
10	28.685M	27.7	+6.0	+1.0		-20.0	14.7	29.5	-14.8	X
11	29.235M	27.5	+5.8	+1.0		-20.0	14.3	29.5	-15.2	X
12	2.570M	23.7	+10.0	+0.2		-20.0	13.9	29.5	-15.6	X
13	2.605M	23.4	+10.0	+0.2		-20.0	13.6	29.5	-15.9	Z
14	2.525M	23.3	+10.0	+0.2		-20.0	13.5	29.5	-16.0	Y
15	29.965M	25.8	+5.7	+1.0		-20.0	12.5	29.5	-17.0	X
16	25.058M	20.6	+7.0	+0.9		-20.0	8.5	29.5	-21.0	Y
17	25.045M	18.4	+7.0	+0.9		-20.0	6.3	29.5	-23.2	Z
18	25.185M	18.2	+6.9	+0.9		-20.0	6.0	29.5	-23.5	X
19	15.450k	39.3	+16.4	+0.0		-40.0	15.7	43.8	-28.1	X
20	15.250k	38.2	+16.5	+0.0		-40.0	14.7	43.9	-29.2	Z



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/21/2021
Test Type: **Radiated Scan** Time: 08:06:17
Tested By: Michael Rauch Jr. Sequence#: 7
Software: EMITest 5.03.19

Equipment Tested:

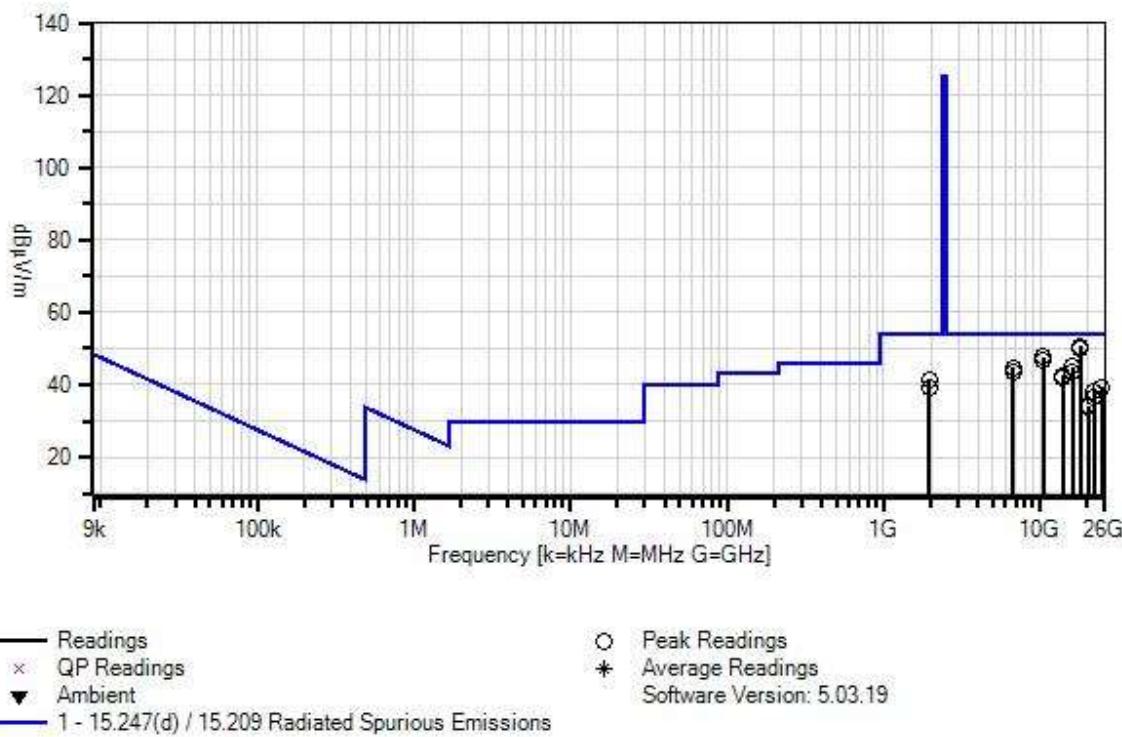
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 1GHz to 25GHz
Test Environment Conditions:
Temperature: 26.0°C
Humidity: 39.3%
Atmospheric Pressure: 101.1kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Notes:
Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph WO#: 105719 Sequence#: 7 Date: 7/21/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	ANP07585	Cable	32026-2-29094K-360TC	8/26/2019	8/26/2021
T2	AN02115	Preamp	83051A	4/2/2021	4/2/2023
T3	AN00327	Horn Antenna	3115	11/24/2020	11/24/2022
T4	AN03011	Cable	32022-2-29094-24TC	6/15/2020	6/15/2022
T5	AN03366	Horn Antenna	GH-62-25	9/1/2020	9/1/2022
T6	AN02046	Horn Antenna	MWH-1826/B	9/2/2020	9/2/2022
T7	AN03361	Cable	32022-2-29094-48TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB μ V/m	dB μ V/m		
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m		Ant
1	17981.500	31.7	+19.0	-32.6	+0.0	+1.3	+0.0	50.7	54.0	-3.3	Horiz
	M		+31.3	+0.0	+0.0						
2	17982.000	30.8	+19.0	-32.6	+0.0	+1.3	+0.0	49.8	54.0	-4.2	Vert
	M		+31.3	+0.0	+0.0						
3	10519.300	28.6	+13.2	-32.5	+37.4	+0.8	+0.0	47.5	54.0	-6.5	Horiz
	M		+0.0	+0.0	+0.0						
4	10519.800	28.0	+13.2	-32.5	+37.4	+0.8	+0.0	46.9	54.0	-7.1	Vert
	M		+0.0	+0.0	+0.0						
5	16086.500	31.0	+17.2	-34.9	+0.0	+1.2	+0.0	45.0	54.0	-9.0	Horiz
	M		+30.5	+0.0	+0.0						
6	6689.270M	32.3	+10.8	-31.9	+33.0	+0.6	+0.0	44.8	54.0	-9.2	Vert
			+0.0	+0.0	+0.0						
7	16087.000	29.6	+17.2	-34.9	+0.0	+1.2	+0.0	43.6	54.0	-10.4	Vert
	M		+30.5	+0.0	+0.0						
8	6688.770M	30.9	+10.8	-31.9	+33.0	+0.6	+0.0	43.4	54.0	-10.6	Horiz
			+0.0	+0.0	+0.0						
9	14011.500	31.2	+15.8	-34.8	+0.0	+1.2	+0.0	42.6	54.0	-11.4	Horiz
	M		+29.2	+0.0	+0.0						
10	14012.000	30.4	+15.8	-34.8	+0.0	+1.2	+0.0	41.8	54.0	-12.2	Vert
	M		+29.2	+0.0	+0.0						
11	1944.003M	42.5	+5.6	-33.9	+27.0	+0.3	+0.0	41.5	54.0	-12.5	Horiz
			+0.0	+0.0	+0.0						
12	24854.500	34.8	+0.0	-34.0	+0.0	+1.5	+0.0	39.4	54.0	-14.6	Horiz
	M		+0.0	+34.2	+2.9						
13	1944.500M	40.1	+5.6	-33.9	+27.0	+0.3	+0.0	39.1	54.0	-14.9	Vert
			+0.0	+0.0	+0.0						
14	24854.000	34.4	+0.0	-34.0	+0.0	+1.5	+0.0	39.0	54.0	-15.0	Vert
	M		+0.0	+34.2	+2.9						

15	22064.500	32.2	+0.0	-32.0	+0.0	+1.5	+0.0	38.1	54.0	-15.9	Horiz
	M		+0.0	+33.5	+2.9						
16	22064.000	30.4	+0.0	-32.0	+0.0	+1.5	+0.0	36.3	54.0	-17.7	Vert
	M		+0.0	+33.5	+2.9						
17	20339.000	29.9	+0.0	-32.8	+0.0	+1.4	+0.0	34.2	54.0	-19.8	Vert
	M		+0.0	+33.1	+2.6						
18	20339.500	29.5	+0.0	-32.8	+0.0	+1.4	+0.0	33.8	54.0	-20.2	Horiz
	M		+0.0	+33.1	+2.6						



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/20/2021
Test Type: **Radiated Scan** Time: 07:49:18
Tested By: Jonathan Wharton Sequence#: 7
Software: EMITest 5.03.20

Equipment Tested:

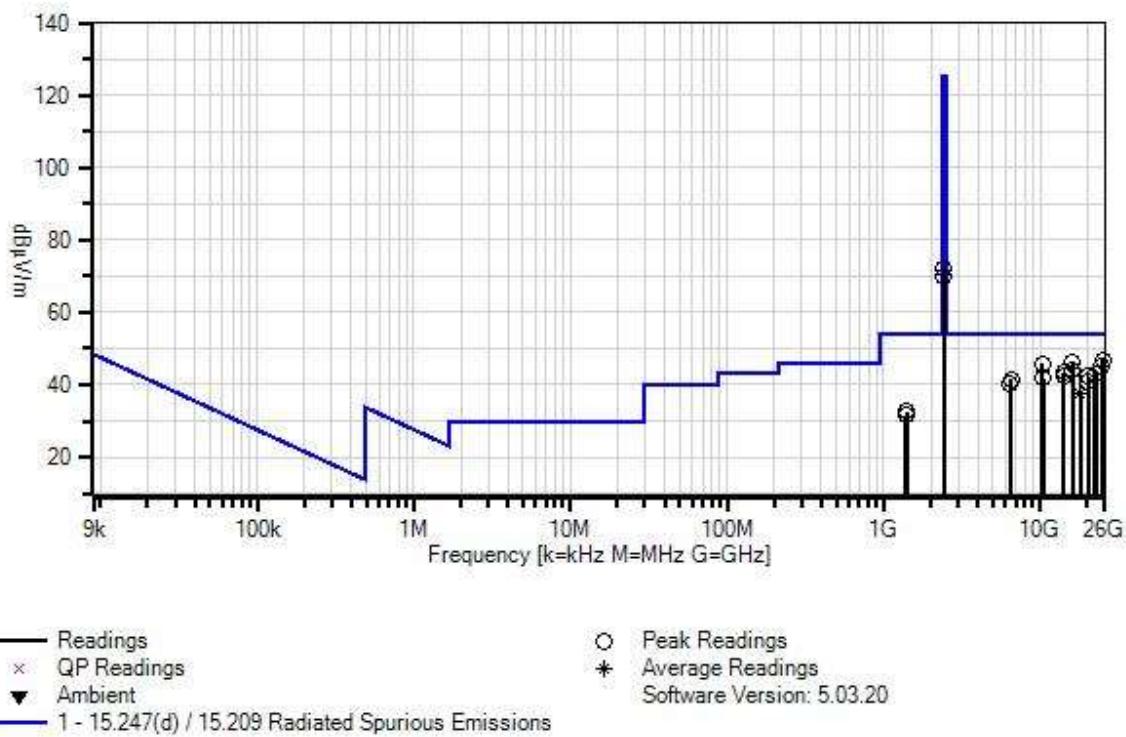
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 1GHz to 25GHz
Test Environment Conditions:
Temperature: 26.0°C
Humidity: 49.6%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: Middle Channel

Divigraph WO#: 105719 Sequence#: 7 Date: 7/20/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T1	ANP07585	Cable	32026-2-29094K-360TC	8/26/2019	8/26/2021
T2	AN02115	Preamp	83051A	4/2/2021	4/2/2023
T3	AN00327	Horn Antenna	3115	11/24/2020	11/24/2022
T4	AN03011	Cable	32022-2-29094-24TC	6/15/2020	6/15/2022
T5	AN03366	Horn Antenna	GH-62-25	9/1/2020	9/1/2022
T6	AN02046	Horn Antenna	MWH-1826/B	9/2/2020	9/2/2022
T7	AN03361	Cable	32022-2-29094-48TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB μ V/m	dB μ V/m		
			MHz	dB μ V	dB	dB	dB	Table	dB μ V/m	dB	Ant
1	24945.000	42.4	+0.0	-34.0	+0.0	+1.4	+0.0	46.8	54.0	-7.2	Vert
	M		+0.0	+34.2	+2.8						
2	16130.000	31.9	+17.2	-34.9	+0.0	+1.2	+0.0	45.9	54.0	-8.1	Vert
	M		+30.5	+0.0	+0.0						
3	10349.500	26.9	+13.3	-32.4	+37.3	+0.8	+0.0	45.9	54.0	-8.1	Vert
	M		+0.0	+0.0	+0.0						
4	24765.000	40.5	+0.0	-33.9	+0.0	+1.5	+0.0	45.2	54.0	-8.8	Horiz
	M		+0.0	+34.1	+3.0						
5	16105.000	30.1	+17.2	-34.9	+0.0	+1.2	+0.0	44.1	54.0	-9.9	Horiz
	M		+30.5	+0.0	+0.0						
6	14190.000	31.9	+15.9	-34.9	+0.0	+1.2	+0.0	43.4	54.0	-10.6	Vert
	M		+29.3	+0.0	+0.0						
7	22275.000	37.3	+0.0	-32.0	+0.0	+1.4	+0.0	43.0	54.0	-11.0	Vert
	M		+0.0	+33.5	+2.8						
8	22560.000	37.4	+0.0	-32.0	+0.0	+1.4	+0.0	43.0	54.0	-11.0	Horiz
	M		+0.0	+33.5	+2.7						
9	14050.000	31.0	+15.8	-34.8	+0.0	+1.2	+0.0	42.4	54.0	-11.6	Horiz
	M		+29.2	+0.0	+0.0						
10	20145.000	38.3	+0.0	-32.9	+0.0	+1.3	+0.0	42.3	54.0	-11.7	Horiz
	M		+0.0	+33.0	+2.6						
11	10504.400	22.7	+13.2	-32.5	+37.4	+0.8	+0.0	41.6	54.0	-12.4	Horiz
	M		+0.0	+0.0	+0.0						
12	6499.400M	30.0	+10.6	-32.2	+32.4	+0.6	+0.0	41.4	54.0	-12.6	Horiz
			+0.0	+0.0	+0.0						
13	20145.000	36.7	+0.0	-32.9	+0.0	+1.3	+0.0	40.7	54.0	-13.3	Vert
	M		+0.0	+33.0	+2.6						
14	6434.500M	28.8	+10.6	-32.2	+32.5	+0.6	+0.0	40.3	54.0	-13.7	Vert
			+0.0	+0.0	+0.0						
15	17950.000	19.1	+18.9	-32.7	+0.0	+1.3	+0.0	37.8	54.0	-16.2	Horiz
	M		+31.2	+0.0	+0.0						
	Ave										
^	17950.000	31.3	+18.9	-32.7	+0.0	+1.3	+0.0	50.0	54.0	-4.0	Horiz
	M		+31.2	+0.0	+0.0						

17	17940.000	19.0	+18.9	-32.7	+0.0	+1.3	+0.0	37.7	54.0	-16.3	Vert
	M		+31.2	+0.0	+0.0						
	Ave										
^	17940.000	30.9	+18.9	-32.7	+0.0	+1.3	+0.0	49.6	54.0	-4.4	Vert
	M		+31.2	+0.0	+0.0						
19	1400.000M	38.6	+4.7	-36.1	+25.1	+0.4	+0.0	32.7	54.0	-21.3	Vert
			+0.0	+0.0	+0.0						
20	1385.000M	37.3	+4.7	-36.1	+25.1	+0.4	+0.0	31.4	54.0	-22.6	Horiz
			+0.0	+0.0	+0.0						
21	2439.430M	70.7	+6.7	-33.8	+28.3	+0.4	+0.0	72.3	125.2	-52.9	Horiz
			+0.0	+0.0	+0.0						
22	2439.470M	68.4	+6.7	-33.8	+28.3	+0.4	+0.0	70.0	125.2	-55.2	Vert
			+0.0	+0.0	+0.0						



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240
Customer: **Divigraph**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **105719** Date: 7/20/2021
Test Type: **Radiated Scan** Time: 07:44:32
Tested By: Jonathan Wharton Sequence#: 8
Software: EMITest 5.03.20

Equipment Tested:

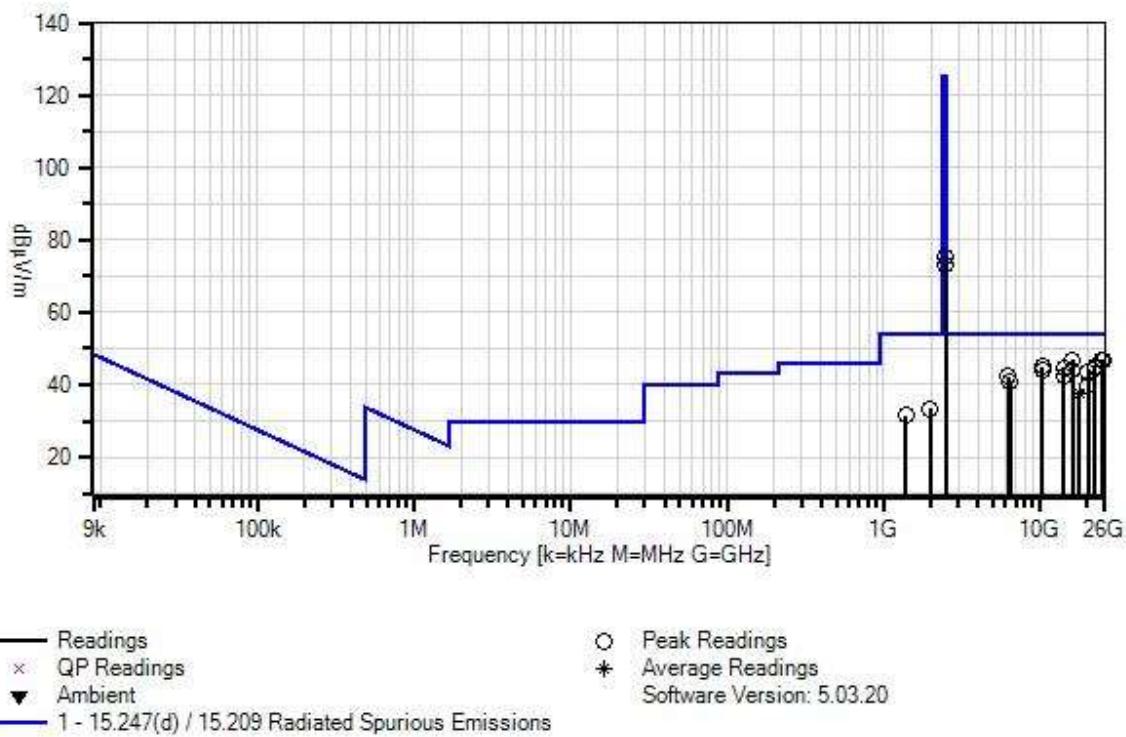
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Spurious Emission
Frequency Range: 1GHz to 25GHz
Test Environment Conditions:
Temperature: 26.0°C
Humidity: 49.6%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: High Channel

Divigraph WO#: 105719 Sequence#: 8 Date: 7/20/2021
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T2	ANP07585	Cable	32026-2-29094K-360TC	8/26/2019	8/26/2021
T3	AN02115	Preamp	83051A	4/2/2021	4/2/2023
T4	AN00327	Horn Antenna	3115	11/24/2020	11/24/2022
T5	AN03011	Cable	32022-2-29094K-24TC	6/15/2020	6/15/2022
T6	AN03366	Horn Antenna	GH-62-25	9/1/2020	9/1/2022
T7	AN02046	Horn Antenna	MWH-1826/B	9/2/2020	9/2/2022
T8	AN03361	Cable	32022-2-29094-48TC	6/15/2020	6/15/2022

Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8	Table	dB μ V/m	dB μ V/m		
			MHz	dB μ V	dB	dB	dB			dB	Ant
1	24825.000	42.2	+0.0	+0.0	-33.9	+0.0	+0.0	46.9	54.0	-7.1	Vert
	M		+1.5	+0.0	+34.2	+2.9					
2	16180.000	32.8	+0.0	+17.2	-34.8	+0.0	+0.0	46.8	54.0	-7.2	Horiz
	M		+1.2	+30.4	+0.0	+0.0					
3	24960.000	42.1	+0.0	+0.0	-34.0	+0.0	+0.0	46.5	54.0	-7.5	Horiz
	M		+1.4	+0.0	+34.2	+2.8					
4	22290.000	39.5	+0.0	+0.0	-32.0	+0.0	+0.0	45.2	54.0	-8.8	Horiz
	M		+1.4	+0.0	+33.5	+2.8					
5	10375.000	26.0	+0.0	+13.3	-32.4	+37.3	+0.0	45.0	54.0	-9.0	Vert
	M		+0.8	+0.0	+0.0	+0.0					
6	22260.000	39.1	+0.0	+0.0	-32.0	+0.0	+0.0	44.8	54.0	-9.2	Vert
	M		+1.4	+0.0	+33.5	+2.8					
7	14105.000	33.1	+0.0	+15.9	-34.8	+0.0	+0.0	44.6	54.0	-9.4	Horiz
	M		+1.2	+29.2	+0.0	+0.0					
8	16020.000	30.6	+0.0	+17.1	-35.0	+0.0	+0.0	44.3	54.0	-9.7	Vert
	M		+1.2	+30.4	+0.0	+0.0					
9	10380.000	25.2	+0.0	+13.3	-32.4	+37.3	+0.0	44.2	54.0	-9.8	Horiz
	M		+0.8	+0.0	+0.0	+0.0					
10	20370.000	39.3	+0.0	+0.0	-32.8	+0.0	+0.0	43.6	54.0	-10.4	Horiz
	M		+1.4	+0.0	+33.1	+2.6					
11	14055.000	31.2	+0.0	+15.8	-34.8	+0.0	+0.0	42.6	54.0	-11.4	Vert
	M		+1.2	+29.2	+0.0	+0.0					
12	6210.000M	30.5	+0.0	+10.5	-32.1	+32.8	+0.0	42.4	54.0	-11.6	Vert
			+0.7	+0.0	+0.0	+0.0					
13	6440.000M	29.4	+0.0	+10.6	-32.2	+32.5	+0.0	40.9	54.0	-13.1	Horiz
			+0.6	+0.0	+0.0	+0.0					
14	20160.000	35.9	+0.0	+0.0	-32.9	+0.0	+0.0	39.9	54.0	-14.1	Vert
	M		+1.3	+0.0	+33.0	+2.6					
15	17875.000	19.0	+0.0	+18.7	-32.7	+0.0	+0.0	37.5	54.0	-16.5	Vert
	M		+1.3	+31.2	+0.0	+0.0					
Ave											
^	17875.000	31.2	+0.0	+18.7	-32.7	+0.0	+0.0	49.7	54.0	-4.3	Vert
	M		+1.3	+31.2	+0.0	+0.0					

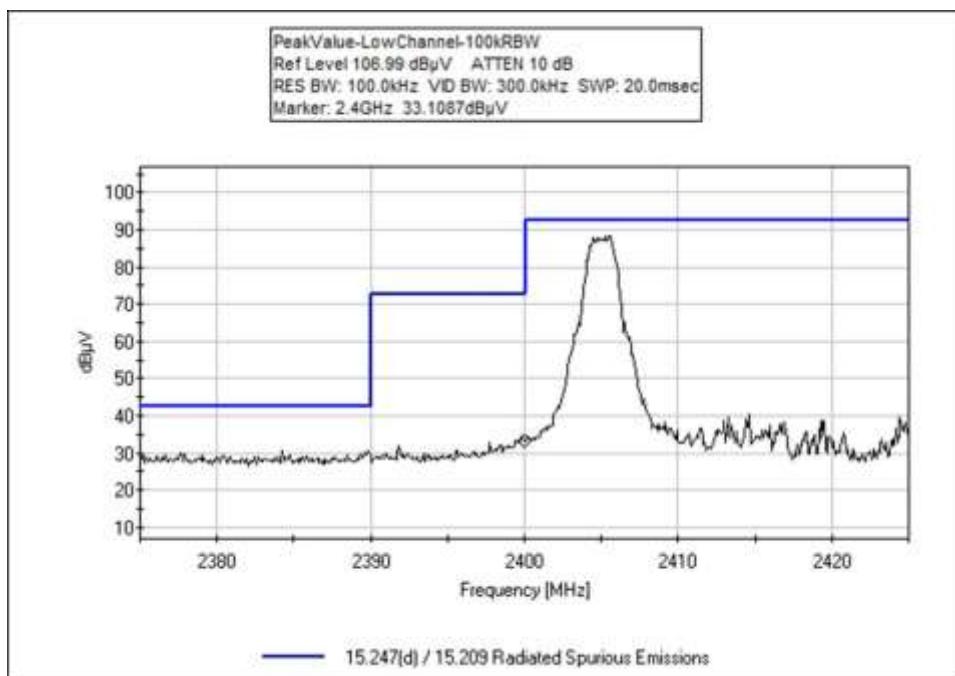
17	17805.000	19.0	+0.0	+18.6	-32.8	+0.0	+0.0	37.4	54.0	-16.6	Horiz
	M		+1.3	+31.3	+0.0	+0.0					
	Ave										
^	17805.000	31.2	+0.0	+18.6	-32.8	+0.0	+0.0	49.6	54.0	-4.4	Horiz
	M		+1.3	+31.3	+0.0	+0.0					
19	1980.000M	34.0	+0.0	+5.7	-33.8	+27.1	+0.0	33.3	54.0	-20.7	Horiz
			+0.3	+0.0	+0.0	+0.0					
20	1390.000M	37.5	+0.0	+4.7	-36.1	+25.1	+0.0	31.6	54.0	-22.4	Vert
			+0.4	+0.0	+0.0	+0.0					
21	2480.600M	73.7	+0.0	+6.7	-33.7	+28.4	+0.0	75.5	125.2	-49.7	Horiz
			+0.4	+0.0	+0.0	+0.0					
22	2480.633M	71.5	+0.0	+6.7	-33.7	+28.4	+0.0	73.3	125.2	-51.9	Vert
			+0.4	+0.0	+0.0	+0.0					

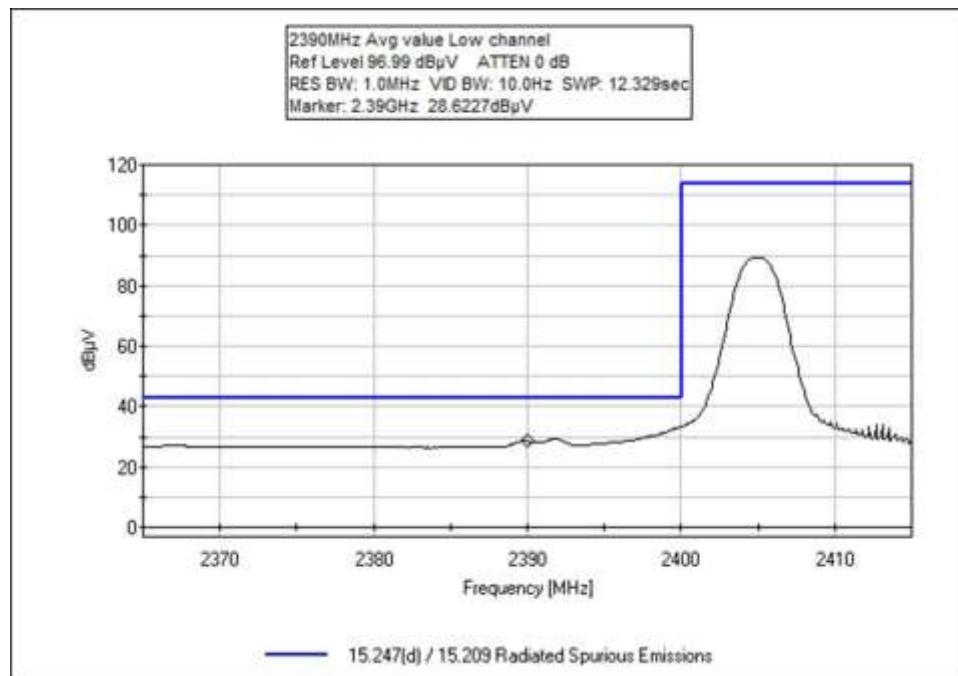
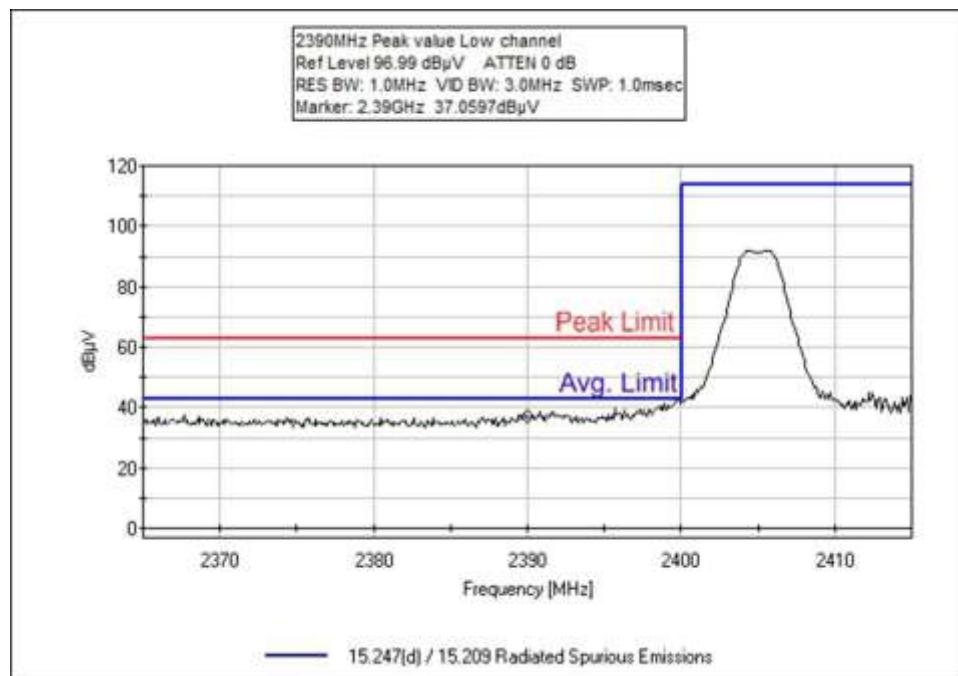
Band Edge

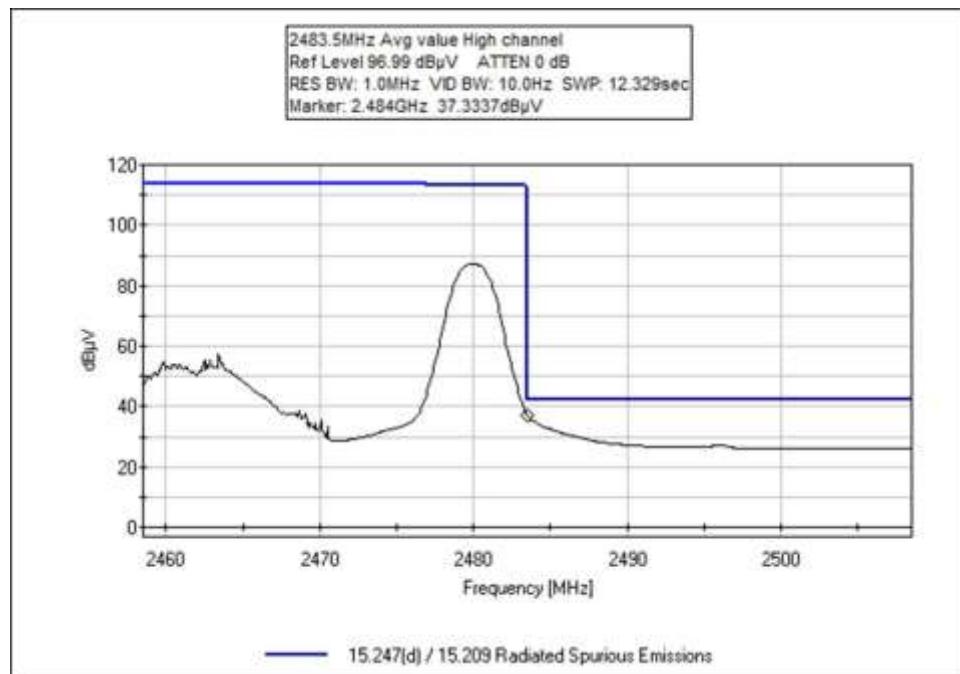
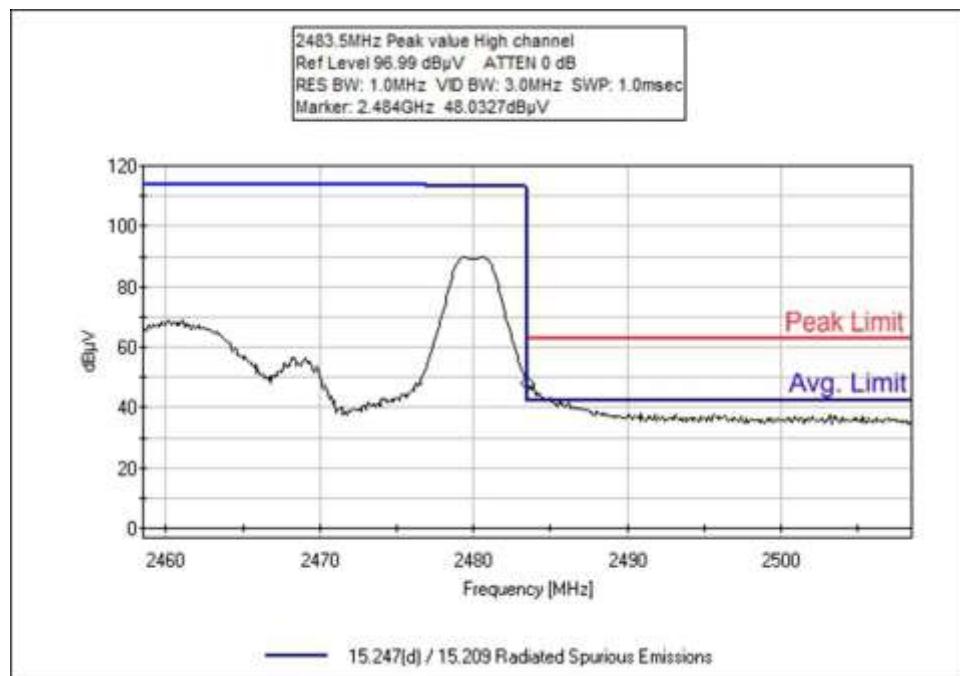
Band Edge Summary

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2390.0	OQPSK, DSSS	Rod/6dB	51.8	<54	Pass
2400.0	OQPSK, DSSS	Rod/6dB	44.5	<84	Pass
2483.5	OQPSK, DSSS	Rod/6dB	49.1	<54	Pass

Band Edge Plots







Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209)-299-5240

Customer: **Divigraph**

Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**

Work Order #: **105719**

Date: 7/20/2021

Test Type: **Radiated Scan**

Time: 11:28:48

Tested By: Jonathan Wharton

Sequence#: 7

Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Radiated Band Edge

Frequency Range: 1GHz to 12GHz

Test Environment Conditions:

Temperature: 26.0°C

Humidity: 49.6%

Atmospheric Pressure: 101.4kPa

Software: Ruttty version 0.63.0.0

Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz

Test Method: ANSI C63.10 2013

The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.

Note:

Low/High Channel

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022
T2	ANP07585	Cable	32026-2-29094K-360TC	8/26/2019	8/26/2021
T3	AN02115	Preamp	83051A	4/2/2021	4/2/2023
T4	AN00327	Horn Antenna	3115	11/24/2020	11/24/2022
T5	AN03011	Cable	32022-2-2909K-24TC	6/15/2020	6/15/2022
	AN03366	Horn Antenna	GH-62-25	9/1/2020	9/1/2022
	AN02046	Horn Antenna	MWH-1826/B	9/2/2020	9/2/2022
	AN03361	Cable	32022-2-29094-48TC	6/15/2020	6/15/2022
	AN03309	High Pass Filter	11SH10-3000/T10000-O/O	3/26/2020	3/26/2022
T6	AN02138	Attenuator	54-10	11/12/2019	11/12/2021

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB μ V/m	dB μ V/m		
	MHz	dB μ V	dB	dB	dB	dB				dB	Ant
1	2483.500M	37.3	+0.0	+6.7	-33.7	+28.4	+0.0	49.1	54.0	-4.9	None
	Ave		+0.4	+10.0							
^	2483.500M	33.0	+0.0	+6.7	-33.7	+28.4	+0.0	44.8	54.0	-9.2	None
			+0.4	+10.0							100kHz RBW
3	2400.000M	33.1	+0.0	+6.7	-33.9	+28.2	+0.0	44.5	54.0	-9.5	None
			+0.4	+10.0							100kHz RBW
4	2390.000M	28.6	+0.0	+6.7	-33.9	+28.2	+0.0	40.0	54.0	-14.0	None
	Ave		+0.4	+10.0							
^	2390.000M	40.4	+0.0	+6.7	-33.9	+28.2	+0.0	51.8	54.0	-2.2	None
			+0.4	+10.0							

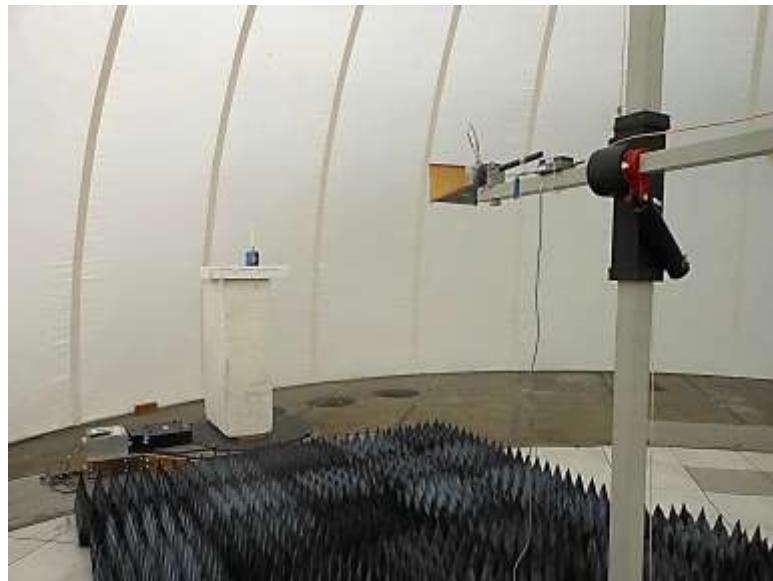
Test Setup Photo(s)



30MHz – 1GHz; Test Setup



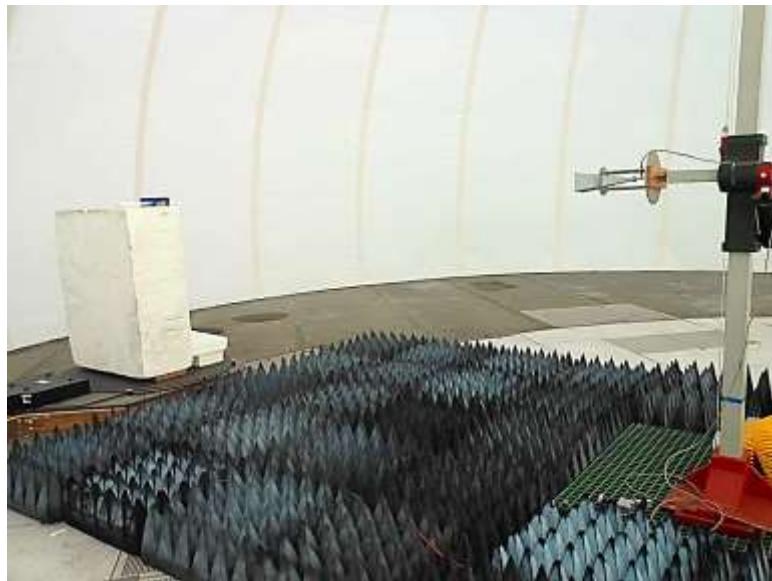
30MHz – 1GHz; Antenna



1 – 12GHz; Front View



12 -18GHz, Side View



18 – 25GHz; Side View

15.247(e) Power Spectral Density

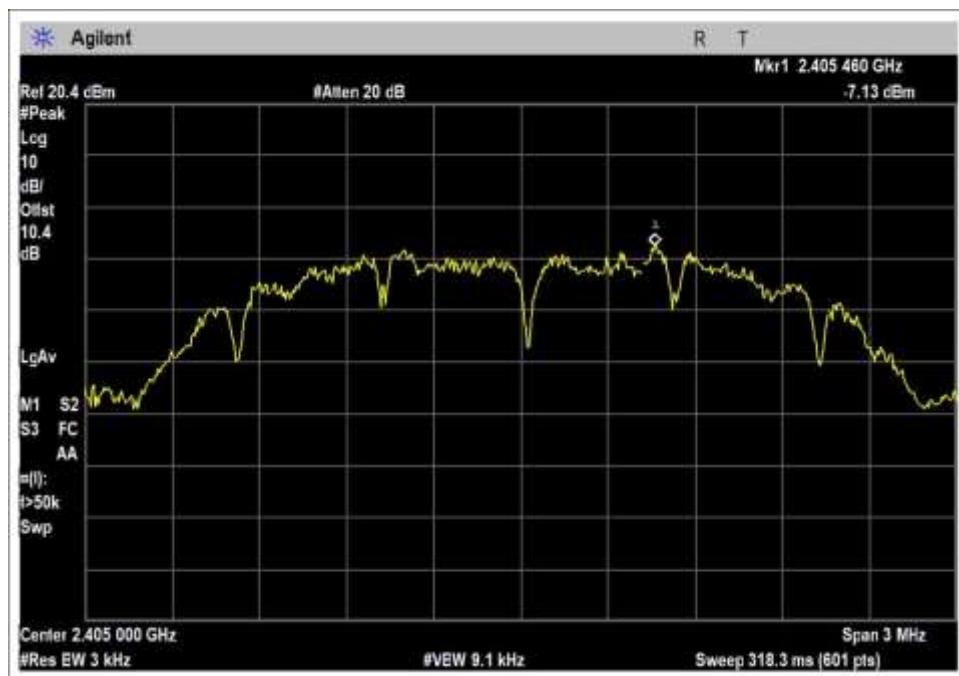
Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Michael Rauch Jr/Jonathan Wharton/Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 558074 (2019)	Test Date(s):	7/14/2021
Configuration:	1		
Test Setup:	PSA is connected directly to the EUT via an attenuator and cable.		

Environmental Conditions			
Temperature (°C)	24.7	Relative Humidity (%):	36.1

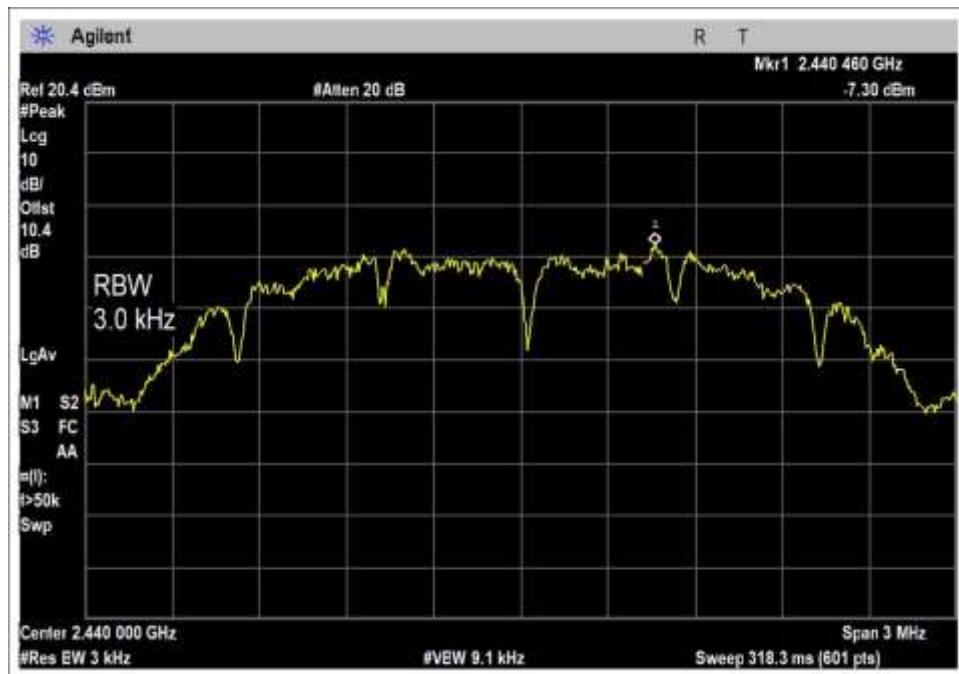
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02138	Attenuator	Weinschel	54-10	11/12/2019	11/12/2021
03011	Cable	AstroSteel	32022-2-2909K-24TC	6/15/2020	6/15/2022
02668	Spectrum Analyzer	Agilent	E4446A	4/14/2021	4/14/2022

Test Data Summary - RF Conducted Measurement				
Measurement Method: PKPSD				
Frequency (MHz)	Modulation	Measured (dBm/3kHz)	Limit (dBm/3kHz)	Results
2405	OQPSK, DSSS	-7.13	≤8	Pass
2440	OQPSK, DSSS	-7.30	≤8	Pass
2480	OQPSK, DSSS	-8.87	≤8	Pass

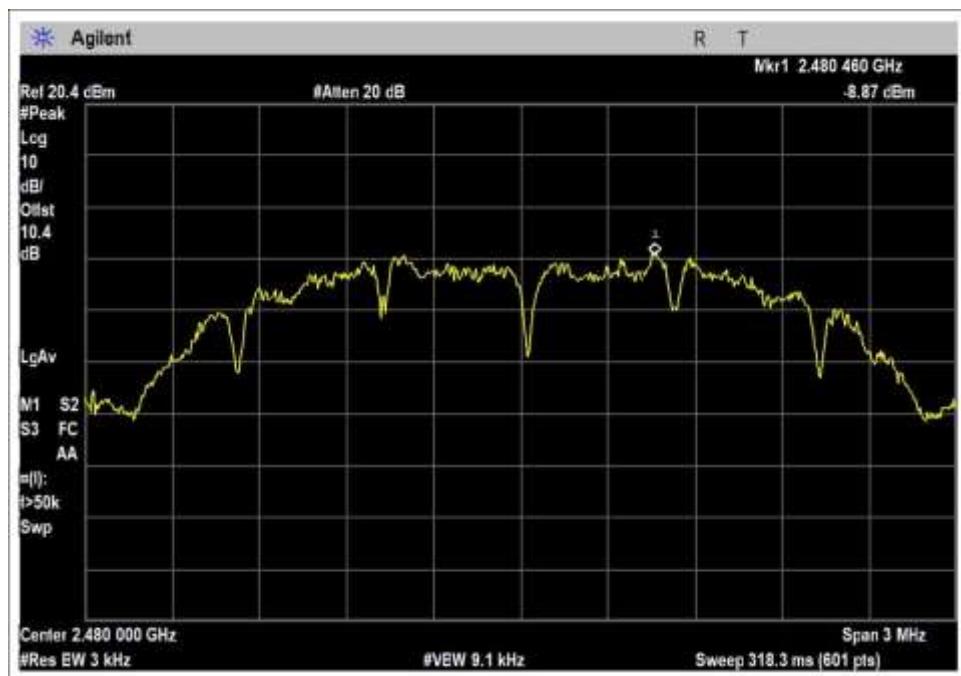
Plots



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)



15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338-9081 • (209) 299-5240
 Customer: **Divigraph**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **105719** Date: 7/21/2021
 Test Type: **Conducted Emissions** Time: 15:16:03
 Tested By: Michael Rauch Jr. Sequence#: 7
 Software: EMITest 5.03.19 120VAC/60Hz

Equipment Tested:

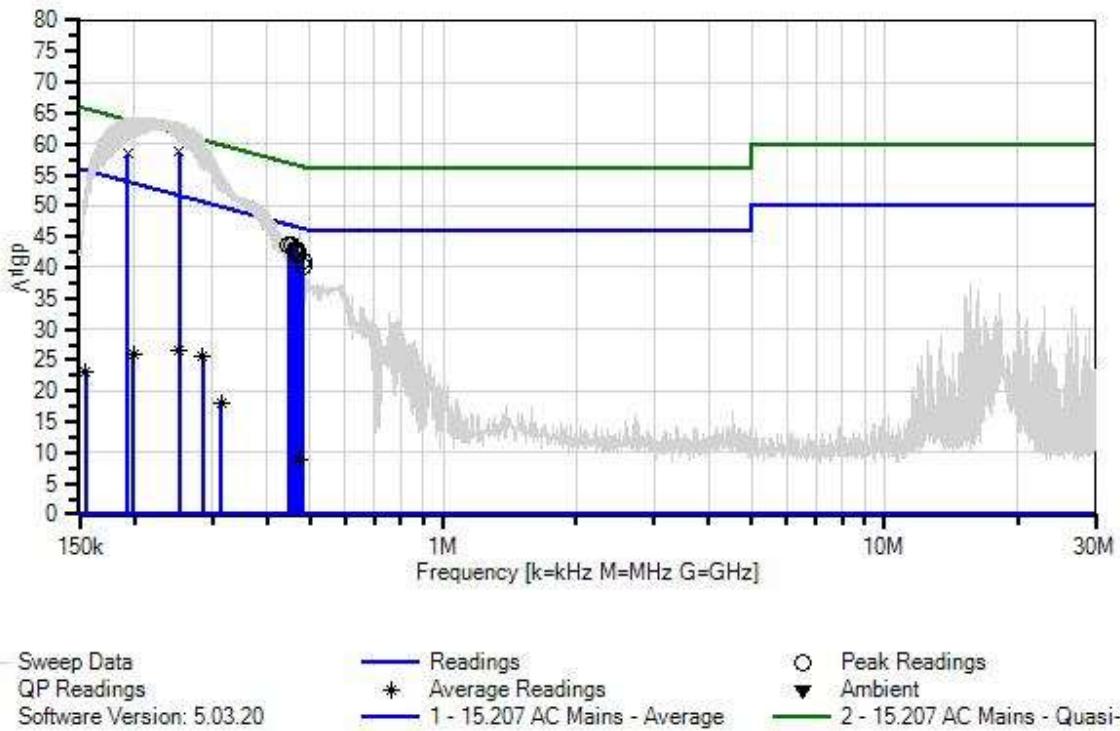
Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 150kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is powered via a DC Power supply and connected via Ethernet to a support computer that provides signal information.
Note: Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph W/O#: 105719 Sequence#: 7 Date: 7/21/2021
 15.207 AC Mains - Average Test Lead: 120VAC/60Hz Positive

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	9/28/2020	9/28/2022
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023
T3	ANP06770	Attenuator	PE7010-10	8/4/2020	8/4/2022
T4	AN00847.1	50uH LISN-(L) Line	3816/2NM 1	4/14/2021	4/14/2022
	AN00847.1	50uH LISN-(N) Line	3816/2NM 2	4/14/2021	4/14/2022
T5	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022

Measurement Data:			Reading listed by margin.				Test Lead: Positive				
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar
1	252.535k QP	48.4 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	58.8	61.7	-2.9	Posit
2	445.972k	33.3 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	43.7	46.9	-3.2	Posit
3	454.699k	33.1 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	43.5	46.8	-3.3	Posit
4	462.698k	32.7 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	43.1	46.6	-3.5	Posit
5	460.516k	32.4 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	42.8	46.7	-3.9	Posit
6	469.970k	32.2 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	42.6	46.5	-3.9	Posit
7	464.152k	32.2 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	42.6	46.6	-4.0	Posit
8	465.607k	32.1 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	42.5	46.6	-4.1	Posit
9	467.789k	31.7 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	42.1	46.6	-4.5	Posit
10	480.878k	30.6 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	41.0	46.3	-5.3	Posit
11	192.905k QP	48.0 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	58.4	63.9	-5.5	Posit
12	482.333k	29.8 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	40.2	46.3	-6.1	Posit
13	252.535k Ave	16.3 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	26.7	51.7	-25.0	Posit
^	252.535k	54.4 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	64.8	51.7	+13.1	Posit
15	285.988k Ave	15.2 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	25.5	50.6	-25.1	Posit
^	285.987k	50.4 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	60.7	50.6	+10.1	Posit
^	287.441k	50.3 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	60.6	50.6	+10.0	Posit
^	289.623k	49.7 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	60.0	50.5	+9.5	Posit
19	198.723k Ave	15.7 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	26.1	53.7	-27.6	Posit
^	198.722k	53.9 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	64.3	53.7	+10.6	Posit
^	197.268k	53.8 +0.0	+0.2	+0.1	+10.1	+0.0	+0.0	64.2	53.7	+10.5	Posit
22	315.076k Ave	7.6 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	17.9	49.8	-31.9	Posit
^	315.075k	45.0 +0.0	+0.1	+0.1	+10.1	+0.0	+0.0	55.3	49.8	+5.5	Posit

24	155.090k	11.5	+1.4 +0.0	+0.1	+10.1	+0.0	+0.0	23.1	55.7	-32.6	Posit
^	155.090k	41.3	+1.4 +0.0	+0.1	+10.1	+0.0	+0.0	52.9	55.7	-2.8	Posit
26	475.061k	-1.6	+0.2 +0.0	+0.1	+10.1	+0.0	+0.0	8.8	46.4	-37.6	Posit
^	475.061k	35.2	+0.2 +0.0	+0.1	+10.1	+0.0	+0.0	45.6	46.4	-0.8	Posit
^	471.425k	31.5	+0.2 +0.0	+0.1	+10.1	+0.0	+0.0	41.9	46.5	-4.6	Posit
^	478.697k	30.0	+0.2 +0.0	+0.1	+10.1	+0.0	+0.0	40.4	46.4	-6.0	Posit



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338-9081 • (209) 299-5240
Customer: **Divigraph**
Specification: **15.207 AC Mains - Average**
Work Order #: **105719** Date: 7/21/2021
Test Type: **Conducted Emissions** Time: 15:04:41
Tested By: Michael Rauch Jr. Sequence#: 8
Software: EMITest 5.03.19 120VAC/60Hz

Equipment Tested:

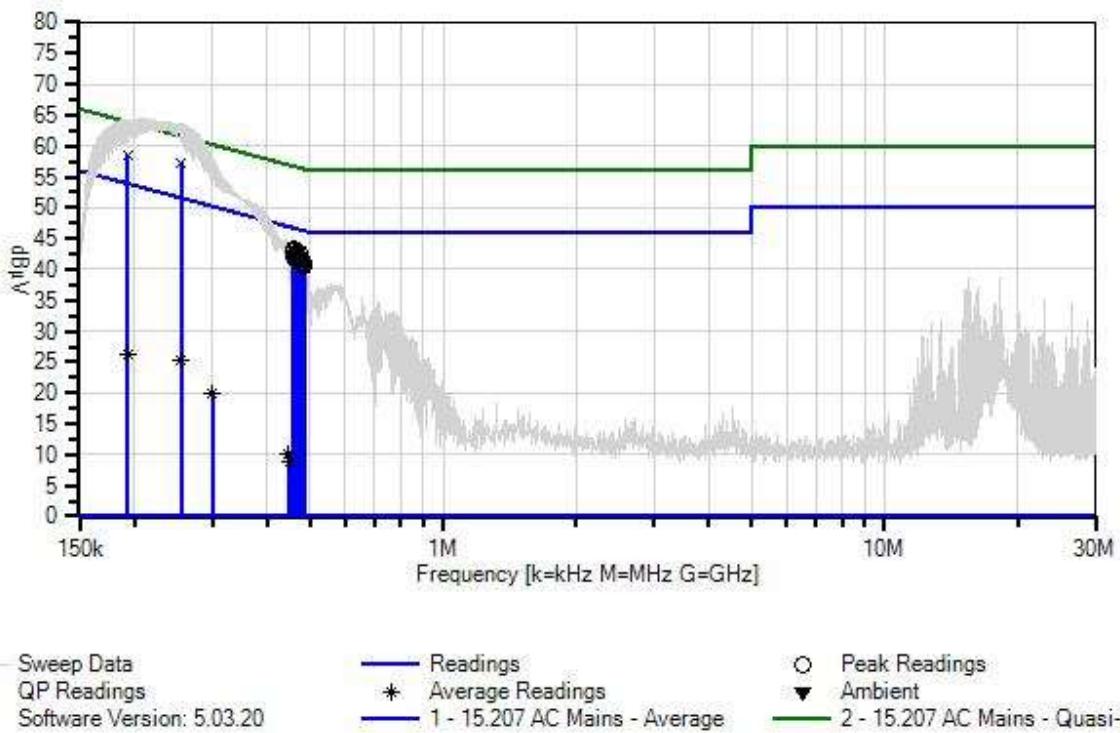
Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 150kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is powered via a DC Power supply and connected via Ethernet to a support computer that provides signal information.
Note: Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph WO#: 105719 Sequence#: 8 Date: 7/21/2021
 15.207 AC Mains - Average Test Lead: 120VAC/60Hz Negative

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	9/28/2020	9/28/2022
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023
T3	ANP06770	Attenuator	PE7010-10	8/4/2020	8/4/2022
T4	AN00847.1	50uH LISN-(L) Line	3816/2NM 1	4/14/2021	4/14/2022
	AN00847.1	50uH LISN-(N) Line	3816/2NM 2	4/14/2021	4/14/2022
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022

Measurement Data:		Reading listed by margin.						Test Lead: Negative			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	458.334k	33.0	+0.2	+0.1	+10.1	+0.0	+0.0	43.4	46.7	-3.3	Negat
2	456.879k	32.6	+0.2	+0.1	+10.1	+0.0	+0.0	43.0	46.7	-3.7	Negat
3	462.697k	32.4	+0.2	+0.1	+10.1	+0.0	+0.0	42.8	46.6	-3.8	Negat
4	473.605k	32.2	+0.2	+0.1	+10.1	+0.0	+0.0	42.6	46.5	-3.9	Negat
5	469.969k	32.1	+0.2	+0.1	+10.1	+0.0	+0.0	42.5	46.5	-4.0	Negat
6	255.444k QP	47.0	+0.2	+0.1	+10.1	+0.0	+0.0	57.4	61.6	-4.2	Negat
7	460.515k	31.8	+0.2	+0.1	+10.1	+0.0	+0.0	42.2	46.7	-4.5	Negat
8	475.060k	31.4	+0.2	+0.1	+10.1	+0.0	+0.0	41.8	46.4	-4.6	Negat
9	466.333k	31.5	+0.2	+0.1	+10.1	+0.0	+0.0	41.9	46.6	-4.7	Negat
10	471.424k	31.4	+0.2	+0.1	+10.1	+0.0	+0.0	41.8	46.5	-4.7	Negat
11	476.514k	31.3	+0.2	+0.1	+10.1	+0.0	+0.0	41.7	46.4	-4.7	Negat
12	467.788k	31.4	+0.2	+0.1	+10.1	+0.0	+0.0	41.8	46.6	-4.8	Negat
13	464.151k	31.3	+0.2	+0.1	+10.1	+0.0	+0.0	41.7	46.6	-4.9	Negat
14	480.877k	30.6	+0.2	+0.1	+10.1	+0.0	+0.0	41.0	46.3	-5.3	Negat
15	192.904k QP	48.2	+0.2	+0.1	+10.1	+0.0	+0.0	58.6	63.9	-5.3	Negat
16	478.696k	30.6	+0.2	+0.1	+10.1	+0.0	+0.0	41.0	46.4	-5.4	Negat
17	484.513k	30.3	+0.2	+0.1	+10.1	+0.0	+0.0	40.7	46.3	-5.6	Negat
18	482.332k	30.1	+0.2	+0.1	+10.1	+0.0	+0.0	40.5	46.3	-5.8	Negat
19	255.444k Ave	14.9	+0.2	+0.1	+10.1	+0.0	+0.0	25.3	51.6	-26.3	Negat
^	255.443k	53.4	+0.2	+0.1	+10.1	+0.0	+0.0	63.8	51.6	+12.2	Negat
21	192.904k Ave	15.7	+0.2	+0.1	+10.1	+0.0	+0.0	26.1	53.9	-27.8	Negat
^	192.904k	53.9	+0.2	+0.1	+10.1	+0.0	+0.0	64.3	53.9	+10.4	Negat
23	300.531k Ave	9.6	+0.1	+0.1	+10.1	+0.0	+0.0	19.9	50.2	-30.3	Negat
^	300.530k	47.8	+0.1	+0.1	+10.1	+0.0	+0.0	58.1	50.2	+7.9	Negat



25	445.972k	-0.4	+0.2	+0.1	+10.1	+0.0	+0.0	10.0	46.9	-36.9	Negat
Ave											
^	445.971k	34.1	+0.2	+0.1	+10.1	+0.0	+0.0	44.5	46.9	-2.4	Negat
27	451.062k	-1.6	+0.2	+0.1	+10.1	+0.0	+0.0	8.8	46.9	-38.1	Negat
Ave											
^	448.153k	33.8	+0.2	+0.1	+10.1	+0.0	+0.0	44.2	46.9	-2.7	Negat
^	449.607k	33.7	+0.2	+0.1	+10.1	+0.0	+0.0	44.1	46.9	-2.8	Negat
^	455.425k	33.4	+0.2	+0.1	+10.1	+0.0	+0.0	43.8	46.8	-3.0	Negat
^	451.062k	33.5	+0.2	+0.1	+10.1	+0.0	+0.0	43.9	46.9	-3.0	Negat
^	453.243k	33.1	+0.2	+0.1	+10.1	+0.0	+0.0	43.5	46.8	-3.3	Negat



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338-9081 • (209) 299-5240
Customer: **Divigraph**
Specification: **15.207 AC Mains - Average**
Work Order #: **105719** Date: 7/21/2021
Test Type: **Conducted Emissions** Time: 10:22:32
Tested By: Michael Rauch Jr. Sequence#: 2
Software: EMITest 5.03.19 120VAC/60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

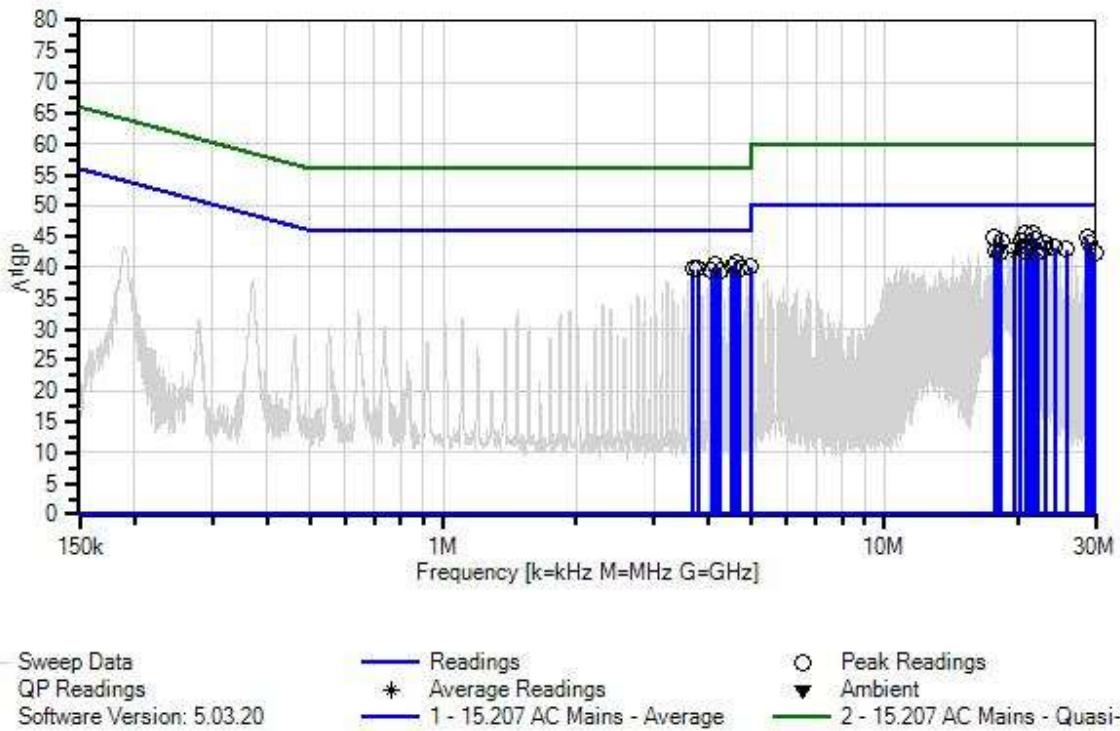
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 150kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph WO#: 105719 Sequence#: 2 Date: 7/21/2021
 15.207 AC Mains - Average Test Lead: 120VAC/60Hz Line



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	9/28/2020	9/28/2022
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023
T3	ANP06770	Attenuator	PE7010-10	8/4/2020	8/4/2022
T4	AN00847.1	50uH LISN-(L) Line	3816/2NM 1	4/14/2021	4/14/2022
	AN00847.1	50uH LISN-(N) Line	3816/2NM 2	4/14/2021	4/14/2022
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022

Measurement Data:		Reading listed by margin.						Test Lead: Line			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	20.806M	34.0	+0.2	+0.8	+10.1	+0.3	+0.0	45.4	50.0	-4.6	Line
2	21.661M	34.1	+0.2	+0.8	+10.1	+0.2	+0.0	45.4	50.0	-4.6	Line
3	4.603M	30.2	+0.1	+0.3	+10.1	+0.1	+0.0	40.8	46.0	-5.2	Line
4	28.684M	33.2	+0.2	+1.0	+10.1	+0.3	+0.0	44.8	50.0	-5.2	Line
5	17.697M	33.6	+0.2	+0.7	+10.1	+0.2	+0.0	44.8	50.0	-5.2	Line
6	4.143M	30.0	+0.1	+0.3	+10.1	+0.1	+0.0	40.6	46.0	-5.4	Line
7	21.905M	33.3	+0.2	+0.8	+10.1	+0.2	+0.0	44.6	50.0	-5.4	Line
8	18.364M	33.2	+0.2	+0.7	+10.1	+0.2	+0.0	44.4	50.0	-5.6	Line
9	20.382M	32.9	+0.2	+0.8	+10.1	+0.3	+0.0	44.3	50.0	-5.7	Line
10	23.130M	32.8	+0.2	+0.8	+10.1	+0.2	+0.0	44.1	50.0	-5.9	Line
11	4.973M	29.4	+0.1	+0.4	+10.1	+0.1	+0.0	40.1	46.0	-5.9	Line
12	29.233M	32.4	+0.2	+1.0	+10.1	+0.3	+0.0	44.0	50.0	-6.0	Line
13	4.513M	29.4	+0.1	+0.3	+10.1	+0.1	+0.0	40.0	46.0	-6.0	Line
14	20.258M Ave	32.6	+0.2	+0.8	+10.1	+0.3	+0.0	44.0	50.0	-6.0	Line
^	20.256M	36.5	+0.2	+0.8	+10.1	+0.3	+0.0	47.9	50.0	-2.1	Line
16	3.684M	29.2	+0.1	+0.3	+10.1	+0.1	+0.0	39.8	46.0	-6.2	Line
17	3.773M	29.2	+0.1	+0.3	+10.1	+0.1	+0.0	39.8	46.0	-6.2	Line
18	4.696M	29.1	+0.1	+0.3	+10.1	+0.1	+0.0	39.7	46.0	-6.3	Line
19	4.237M	29.0	+0.1	+0.3	+10.1	+0.1	+0.0	39.6	46.0	-6.4	Line
20	18.243M Ave	32.4	+0.2	+0.7	+10.1	+0.2	+0.0	43.6	50.0	-6.4	Line
^	18.247M	35.8	+0.2	+0.7	+10.1	+0.2	+0.0	47.0	50.0	-3.0	Line
22	4.050M	28.9	+0.1	+0.3	+10.1	+0.1	+0.0	39.5	46.0	-6.5	Line
23	24.347M	31.7	+0.2	+0.9	+10.1	+0.3	+0.0	43.2	50.0	-6.8	Line
24	21.049M	31.8	+0.2	+0.8	+10.1	+0.3	+0.0	43.2	50.0	-6.8	Line

25	23.067M	31.8	+0.2	+0.8	+10.1	+0.2	+0.0	43.1	50.0	-6.9	Line
26	25.875M	31.4	+0.2	+0.9	+10.1	+0.3	+0.0	42.9	50.0	-7.1	Line
27	17.941M	31.5	+0.2	+0.7	+10.1	+0.2	+0.0	42.7	50.0	-7.3	Line
28	20.869M	31.3	+0.2	+0.8	+10.1	+0.3	+0.0	42.7	50.0	-7.3	Line
29	18.310M	31.3	+0.2	+0.7	+10.1	+0.2	+0.0	42.5	50.0	-7.5	Line
30	29.904M	30.9	+0.2	+1.0	+10.1	+0.3	+0.0	42.5	50.0	-7.5	Line
31	22.211M	31.2	+0.2	+0.8	+10.1	+0.2	+0.0	42.5	50.0	-7.5	Line
32	19.710M	31.0	+0.2	+0.8	+10.1	+0.3	+0.0	42.4	50.0	-7.6	Line
	Ave										
^	19.706M	35.3	+0.2	+0.8	+10.1	+0.3	+0.0	46.7	50.0	-3.3	Line



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338-9081 • (209) 299-5240
Customer: **Divigraph**
Specification: **15.207 AC Mains - Average**
Work Order #: **105719** Date: 7/21/2021
Test Type: **Conducted Emissions** Time: 10:15:21
Tested By: Michael Rauch Jr. Sequence#: 1
Software: EMITest 5.03.19 120VAC/60Hz

Equipment Tested:

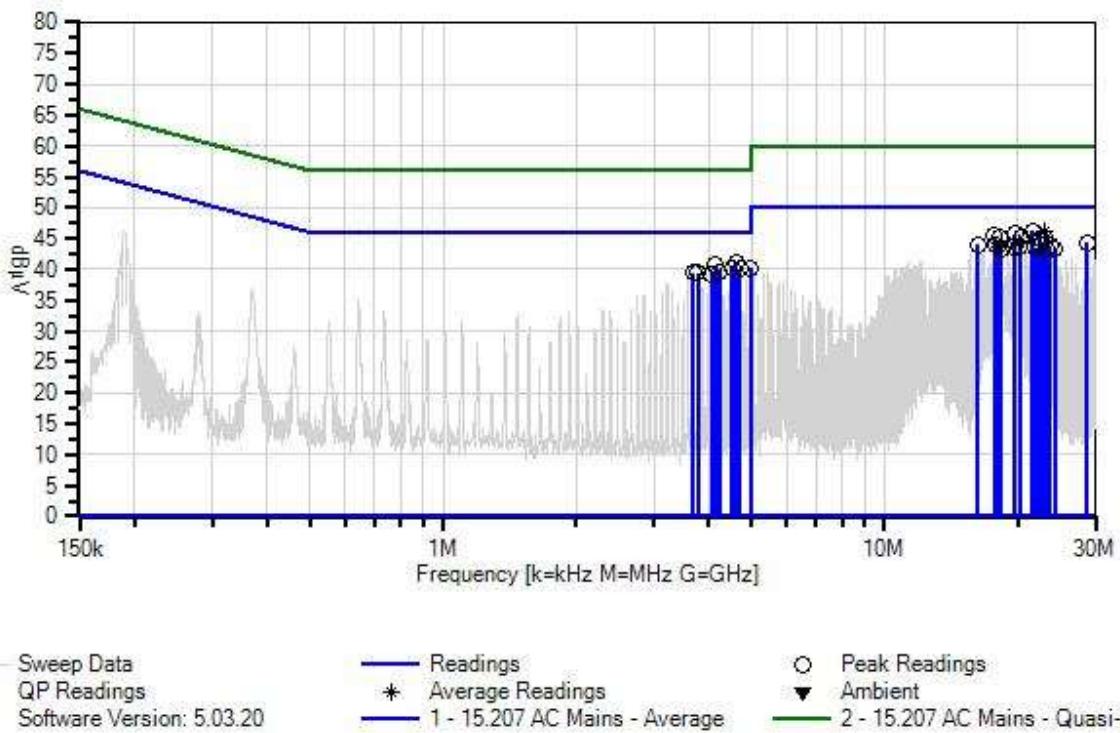
Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Conducted Spurious Emission
Frequency Range: 150kHz to 30MHz
Test Environment Conditions:
Temperature: 23.9°C
Humidity: 33.3%
Atmospheric Pressure: 101.4kPa
Software: Rutty version 0.63.0.0
Internal Generated Frequency: 32kHz, 38.4MHz, 2.48GHz
Test Method: ANSI C63.10 2013
The EUT is set up as intended. It is connected via POE to a support computer that provides signal information.
Note: Low Channel
All measurements were performed/collected in low, mid and high channels for this testing low channel was found to be worst case.

Divigraph WO#: 105719 Sequence#: 1 Date: 7/21/2021
 15.207 AC Mains - Average Test Lead: 120VAC/60Hz Return

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	9/28/2020	9/28/2022
T2	ANP07591	Cable	RG214	7/16/2021	7/16/2023
T3	ANP06770	Attenuator	PE7010-10	8/4/2020	8/4/2022
	AN00847.1	50uH LISN-(L) Line	3816/2NM	4/14/2021	4/14/2022
		1			
T4	AN00847.1	50uH LISN-(N) Line	3816/2NM	4/14/2021	4/14/2022
		2			
	AN02668	Spectrum Analyzer	E4446A	4/14/2021	4/14/2022

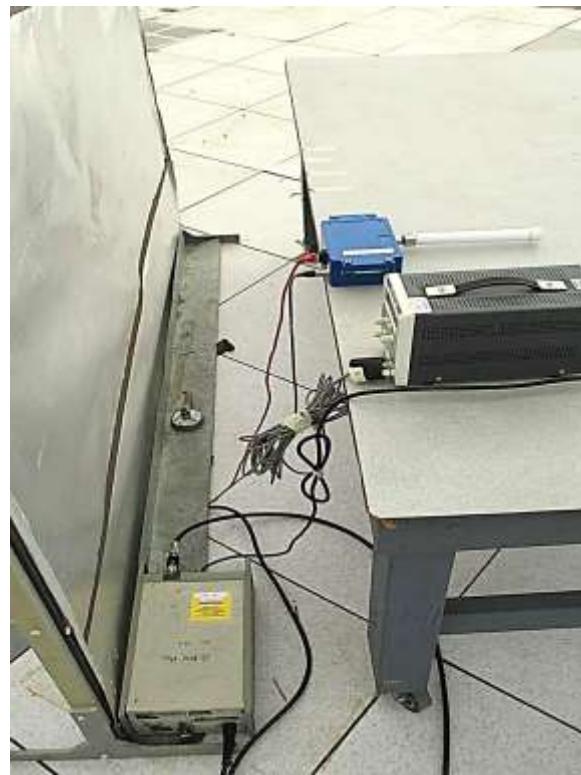
Measurement Data:		Reading listed by margin.					Test Lead: Return				
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	21.661M	34.8	+0.2	+0.8	+10.1	+0.3	+0.0	46.2	50.0	-3.8	Retur
2	23.128M	34.6	+0.2	+0.8	+10.1	+0.4	+0.0	46.1	50.0	-3.9	Retur
	Ave										
^	23.130M	36.4	+0.2	+0.8	+10.1	+0.4	+0.0	47.9	50.0	-2.1	Retur
4	19.706M	34.4	+0.2	+0.8	+10.1	+0.3	+0.0	45.8	50.0	-4.2	Retur
5	17.697M	34.1	+0.2	+0.7	+10.1	+0.3	+0.0	45.4	50.0	-4.6	Retur
6	20.382M	33.8	+0.2	+0.8	+10.1	+0.3	+0.0	45.2	50.0	-4.8	Retur
7	23.067M	33.6	+0.2	+0.8	+10.1	+0.4	+0.0	45.1	50.0	-4.9	Retur
8	18.301M	33.8	+0.2	+0.7	+10.1	+0.3	+0.0	45.1	50.0	-4.9	Retur
9	22.454M	33.6	+0.2	+0.8	+10.1	+0.3	+0.0	45.0	50.0	-5.0	Retur
10	4.598M	30.4	+0.1	+0.3	+10.1	+0.1	+0.0	41.0	46.0	-5.0	Retur
11	4.139M	30.1	+0.1	+0.3	+10.1	+0.1	+0.0	40.7	46.0	-5.3	Retur
12	28.684M	32.7	+0.2	+1.0	+10.1	+0.4	+0.0	44.4	50.0	-5.6	Retur
13	4.968M	29.6	+0.1	+0.4	+10.1	+0.1	+0.0	40.3	46.0	-5.7	Retur
14	20.258M	32.8	+0.2	+0.8	+10.1	+0.3	+0.0	44.2	50.0	-5.8	Retur
	Ave										
^	20.256M	35.4	+0.2	+0.8	+10.1	+0.3	+0.0	46.8	50.0	-3.2	Retur
16	16.229M	33.0	+0.1	+0.7	+10.1	+0.2	+0.0	44.1	50.0	-5.9	Retur
17	4.505M	29.4	+0.1	+0.3	+10.1	+0.1	+0.0	40.0	46.0	-6.0	Retur
18	4.692M	29.4	+0.1	+0.3	+10.1	+0.1	+0.0	40.0	46.0	-6.0	Retur
19	22.580M	32.4	+0.2	+0.8	+10.1	+0.4	+0.0	43.9	50.0	-6.1	Retur
20	23.737M	32.2	+0.2	+0.9	+10.1	+0.4	+0.0	43.8	50.0	-6.2	Retur
21	17.941M	32.5	+0.2	+0.7	+10.1	+0.3	+0.0	43.8	50.0	-6.2	Retur
22	21.905M	32.2	+0.2	+0.8	+10.1	+0.3	+0.0	43.6	50.0	-6.4	Retur
23	4.233M	29.0	+0.1	+0.3	+10.1	+0.1	+0.0	39.6	46.0	-6.4	Retur

24	18.244M	32.2	+0.2	+0.7	+10.1	+0.3	+0.0	43.5	50.0	-6.5	Retur
Ave											
^	18.247M	35.7	+0.2	+0.7	+10.1	+0.3	+0.0	47.0	50.0	-3.0	Retur
26	3.769M	28.9	+0.1	+0.3	+10.1	+0.1	+0.0	39.5	46.0	-6.5	Retur
27	19.589M	32.1	+0.2	+0.8	+10.1	+0.3	+0.0	43.5	50.0	-6.5	Retur
28	3.680M	28.9	+0.1	+0.3	+10.1	+0.1	+0.0	39.5	46.0	-6.5	Retur
29	20.202M	32.1	+0.2	+0.8	+10.1	+0.3	+0.0	43.5	50.0	-6.5	Retur
30	23.374M	31.8	+0.2	+0.9	+10.1	+0.4	+0.0	43.4	50.0	-6.6	Retur
31	24.347M	31.8	+0.2	+0.9	+10.1	+0.4	+0.0	43.4	50.0	-6.6	Retur
32	18.364M	32.1	+0.2	+0.7	+10.1	+0.3	+0.0	43.4	50.0	-6.6	Retur
33	4.050M	28.7	+0.1	+0.3	+10.1	+0.1	+0.0	39.3	46.0	-6.7	Retur

Test Setup Photo(s)



24VDC Test Setup; Front View



24VDC Test Setup; Side View



PoE Test Setup; Front View



PoE Test Setup; Side View



Appendix A: Customer Provided Information

See attached document:

20DD2060 - NG Series Industrial Wireless Gateway - Antenna Declaration of Equivalency

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

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

Emissions Test Details

TESTING PARAMETERS

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

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

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

CORRECTION FACTORS

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

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

To Whom It May Concern

This letter is to inform you that we, Divigraph (Pty) Ltd, re-sell the following antenna products and have allocated part numbers as per the table below.

Divigraph Part Number	Divigraph Description	Manufacturer Name	Manufacturer Part Number	Manufacturer Description
100A10001	2dBi Omnidirectional Antenna	HUBER+SUHNER	1399.17.0224	SEN CITY® Omni-S Thimble
100A10002	6dBi Omnidirectional Antenna	HUBER+SUHNER	1355.17.0002	SEN CITY® Omni-M dual-band WiFi Stick Antenna

We hereby declare that the original product has not been changed or modified in any way. The specifications on for the herein identified products remain unchanged as provided by the manufacturer and continue to represent compliance for the products.

Sincerely,



Radek Tanski
Design Engineer
Divigraph (Pty) Ltd