Nalloy, LLC

TEST REPORT FOR

A2D0US

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(DTS 2400-2483.5 MHz)

Report No.: 106407-31

Date of issue: February 8, 2022

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:

Nalloy, LLC
2301 5th Avenue
Seattle, WA 98108

Representative: Naga Suryadevara
Customer Reference Number: 2D-07350222

REPORT PREPARED BY:

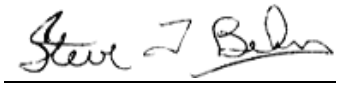
Lisa Bevington
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 106407

DATE OF EQUIPMENT RECEIPT: December 6, 2021
DATE(S) OF TESTING: December 6-10, 16, 21,& 23, 2021
January 5-7, 10-13, 17-21 & 24-28, 2022
Feburary 2, 2022

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.
Canyon Park
22116 23rd Drive S.E., Suite A
Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20

Site Registration & Accreditation Information

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

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

SUMMARY OF RESULTS

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

Test Procedure	Description	Modifications	Results
15.247(a)(2)	6dB Bandwidth	NA	PASS
15.247(b)(3)	Output Power	NA	PASS
15.247(d)	RF Conducted Emissions & Band Edge	NA	NP
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
NP = CKC Laboratories was not contracted to perform to perform test.

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.

Conditions During Testing

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

Summary of Conditions
The Test Setup Photos are incorporated by reference 106407-31_Test Setup_Photos.

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
None	Nalloy, LLC	A2D0US	G3A1VF021386000B

Support Equipment:

Device	Manufacturer	Model #	S/N
Headphones	Poly	C5220T	NA
Laptop	HP	14-fq0032od	5CD12654D3
None	Nalloy, LLC	Gala	XXX
None	Nalloy, LLC	Gala	XXX
USB to Ethernet Adapter	Amazon	Gigabit Ethernet Adapter	0050B6E212BA
AC Adapter	Delta Electronics, Inc.	MDS-030AAC15	NA

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
None	Nalloy, LLC	A2D0US	G3A1VF021386000G

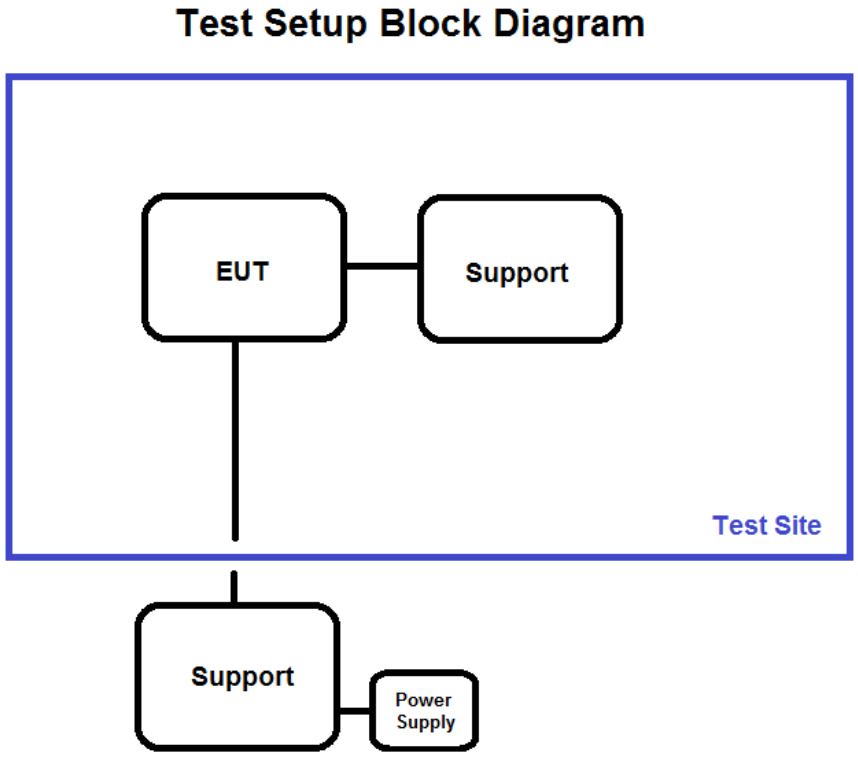
Support Equipment:

Device	Manufacturer	Model #	S/N
Headphones	Sony	WH-1000X M3	NA
Laptop	ASUS	E210M	M9N0CX21R750387
None	Nalloy, LLC	Gala	XXX
None	Nalloy, LLC	Gala	XXX
USB to Ethernet Adapter	Amazon	Gigabit Ethernet Adapter	0050B6E212BA
AC Adapter	Delta Electronics, Inc.	MDS-030AAC15	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	802.11b, 802.11g, 802.11n (20 and 40MHz BW)
Operating Frequency Range:	2412-2462 MHz
Modulation Type(s):	CCK, DBPSK/DQPSK+DSSS, BPSK, QPSK, 16-QAM, 64-QAM
Maximum Duty Cycle:	100% Modulated (tested worst-case)
Number of TX Chains:	1
Antenna Type(s) and Gain:	Omnidirectional / 3dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral (External connector provided to facilitate testing)
Nominal Input Voltage:	120VAC
Firmware / Software used for Test:	mainline-1.0.2137.0 Bin file- Golden 082621 Qualcomm radio control toolkit v4.0
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

Block Diagram of Test Setup(s)



FCC Part 15 Subpart C

15.247(a)(2) 6dB Bandwidth

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013), KDB 558074 (April 2, 2019)	Test Date(s):	1/17/2022
Configuration:	2		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: EUT is transmitting through the temporary antenna port connection via UFL adapter and is attached to the spectrum analyzer. The worst case data rates reported from the following: 802.11b, 802.11g, 802.11n20, 802.11n40.		

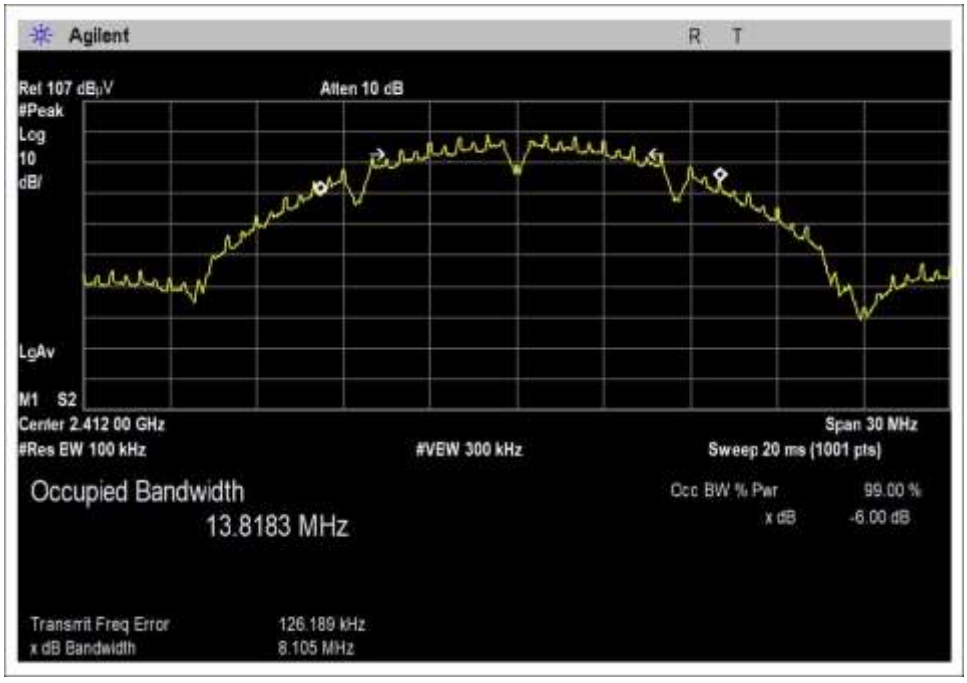
Environmental Conditions			
Temperature (ºC)	19	Relative Humidity (%):	42

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02872	Spectrum Analyzer	Agilent	E4440A	11/29/2021	11/29/2023
P07229	Attenuator	Pasternack	PE7004-20	8/9/2021	8/9/2023
P07796	Cable	Andrews	Heliax	7/7/2021	7/7/2023

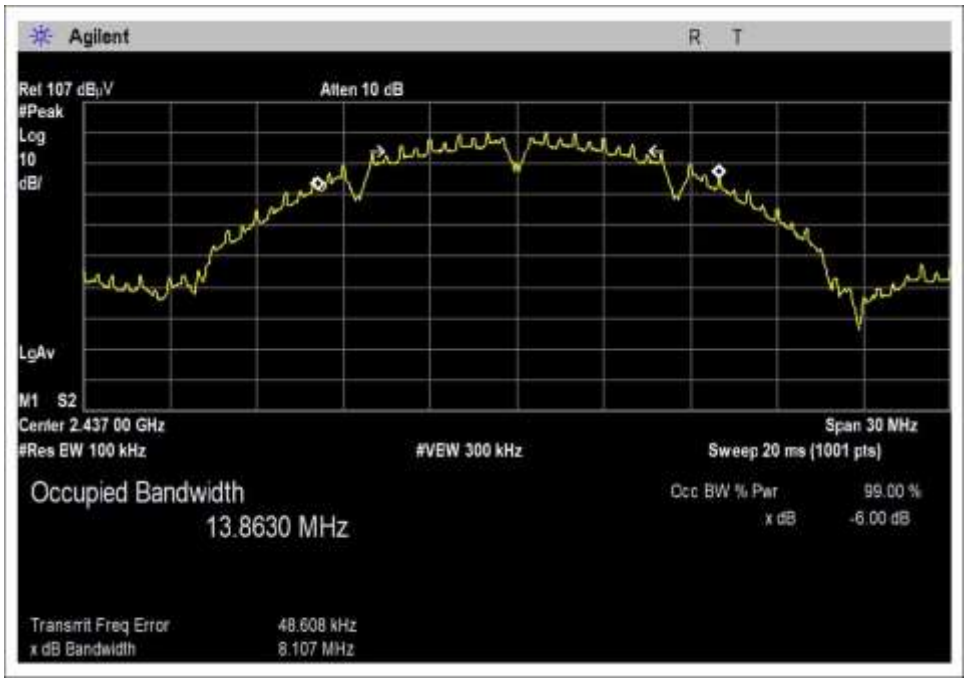
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (MHz)	Limit (kHz)	Results
2412	1	CCK (802.11b)	8.105	≥500	Pass
2437	1	CCK (802.11b)	8.107	≥500	Pass
2462	1	CCK (802.11b)	8.105	≥500	Pass
2412	1	OFDM (802.11g)	15.449	≥500	Pass
2437	1	OFDM (802.11g)	15.355	≥500	Pass
2462	1	OFDM (802.11g)	15.323	≥500	Pass
2412	1	MCS (802.11n20)	15.949	≥500	Pass
2437	1	MCS (802.11n20)	15.952	≥500	Pass
2462	1	MCS (802.11n20)	15.986	≥500	Pass
2422	1	MCS (802.11n40)	35.721	≥500	Pass
2437	1	MCS (802.11n40)	35.167	≥500	Pass
2452	1	MCS (802.11n40)	35.173	≥500	Pass

Plot(s)

6db OBW 802.11b



Channel 2412



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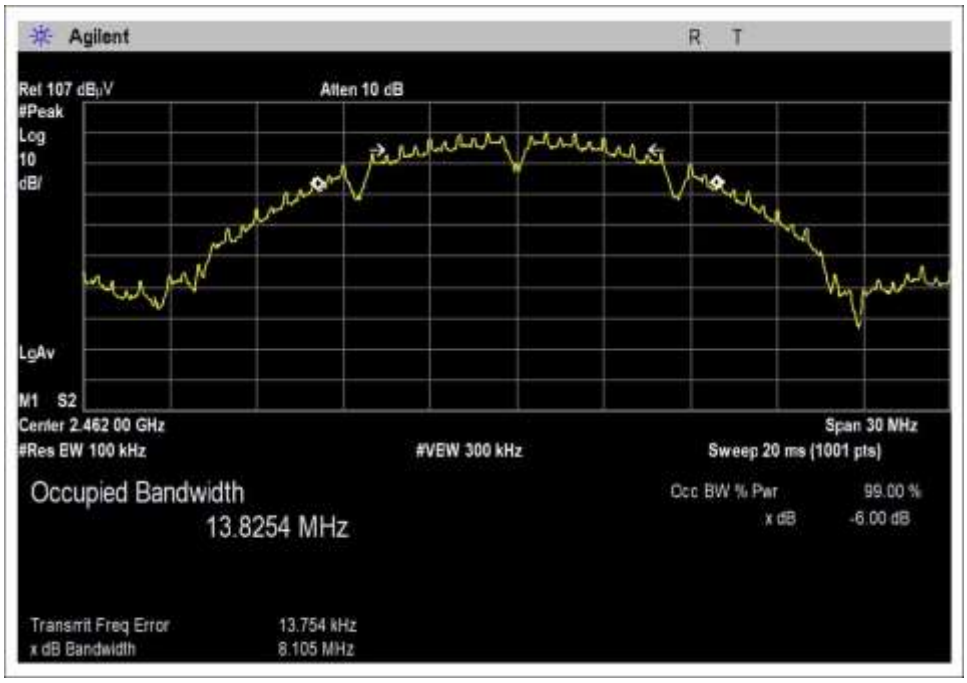
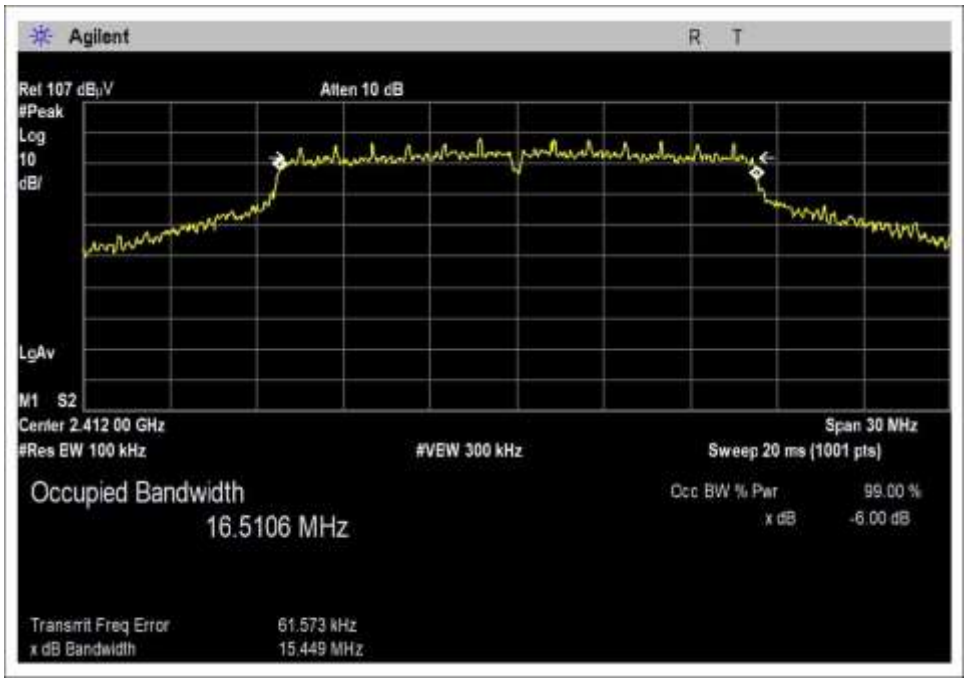
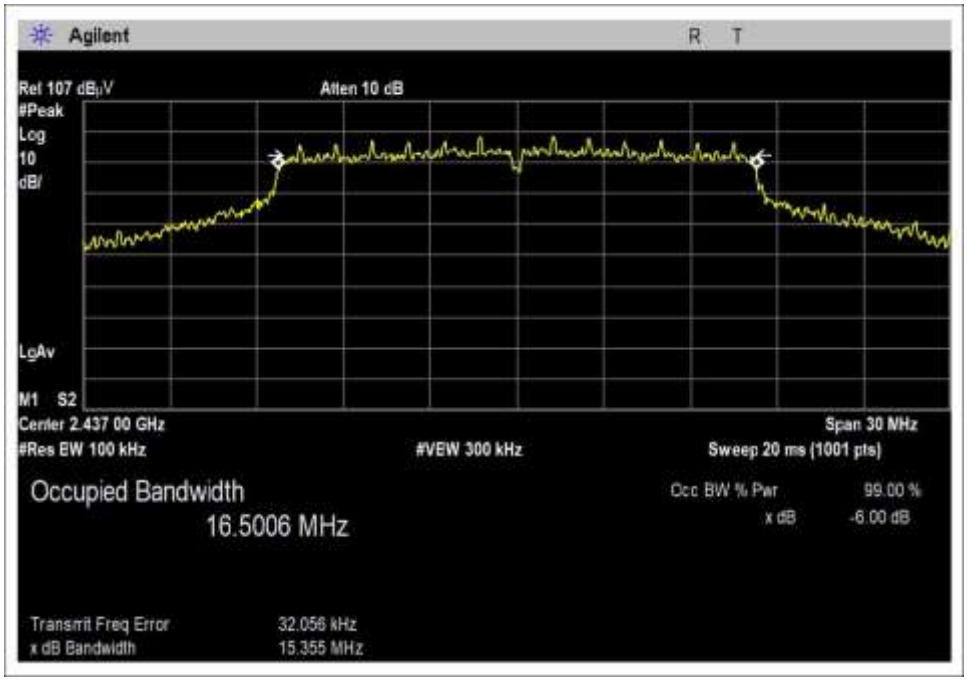


Channel 2462

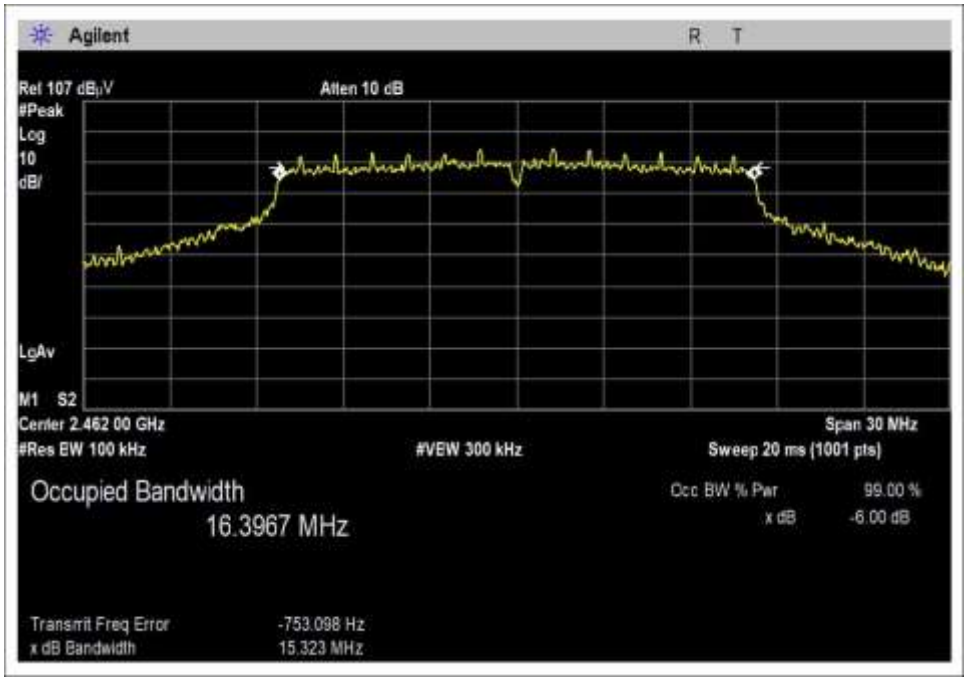
6db OBW 802.11g



Channel 2412

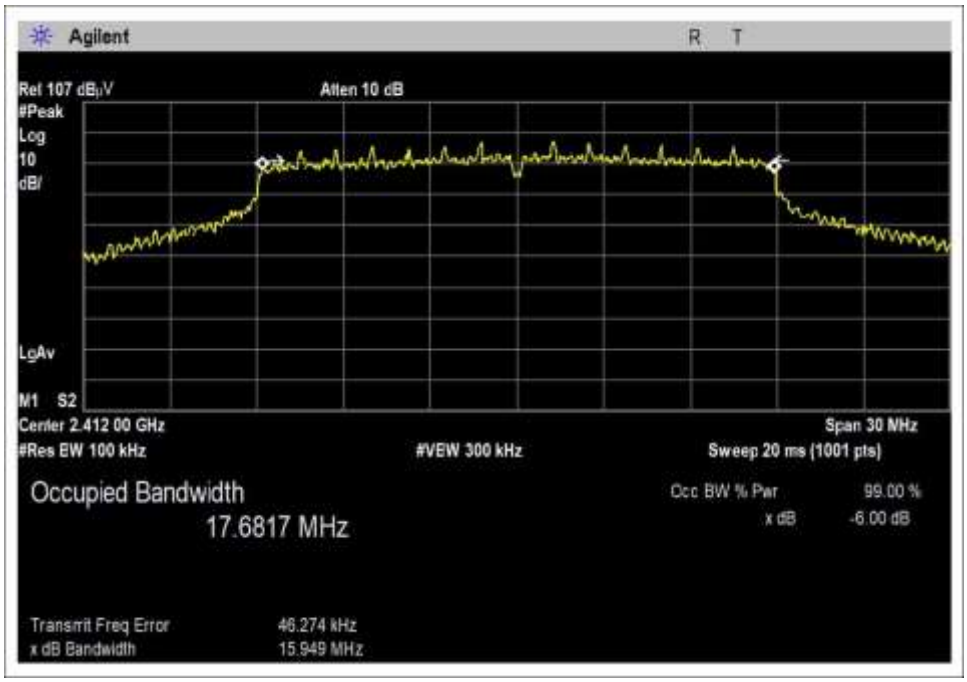


Channel 2437

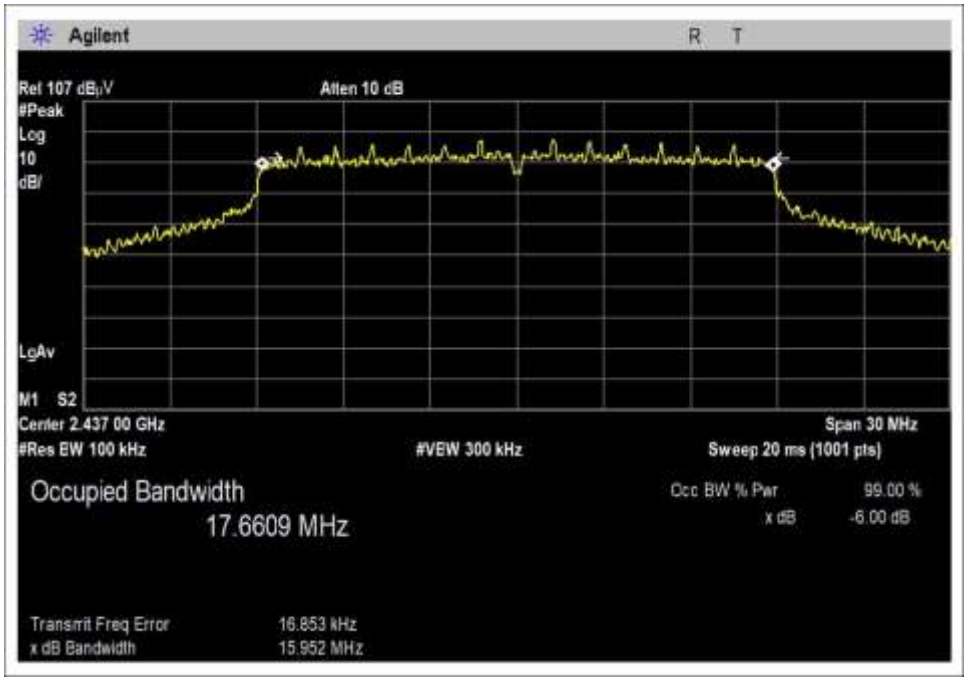


Channel 2462

6db OBW 802.11n20



Channel 2412



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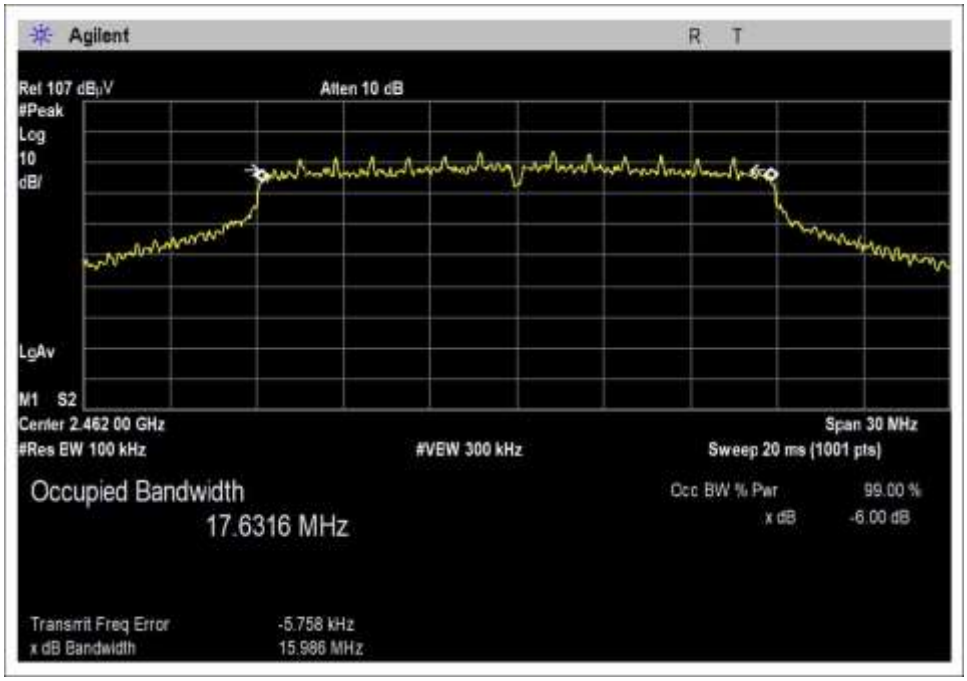
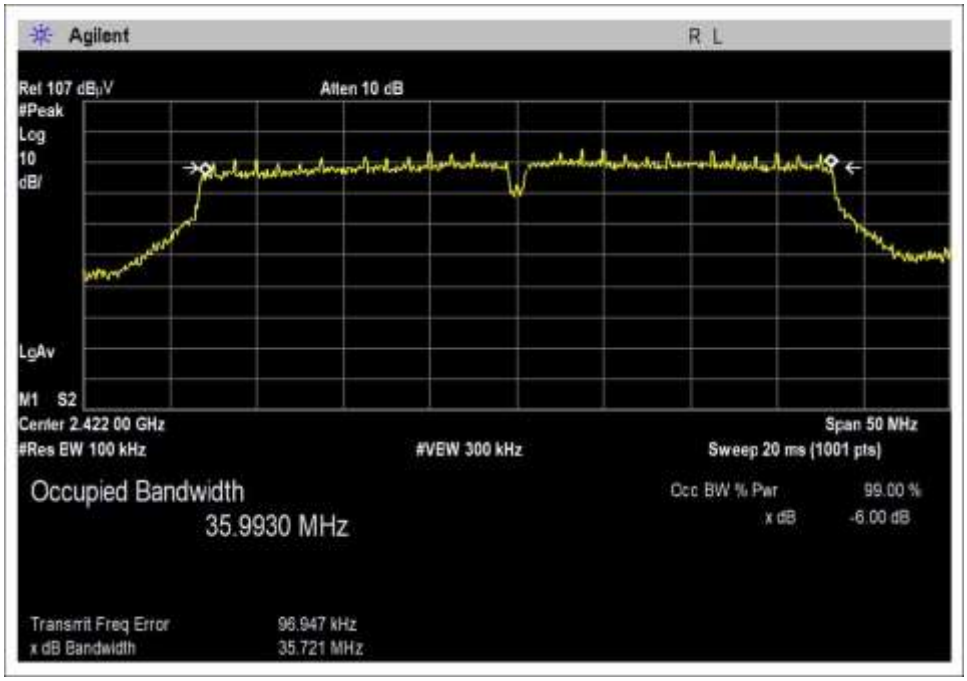


Channel 2462

6db OBW 802.11n40



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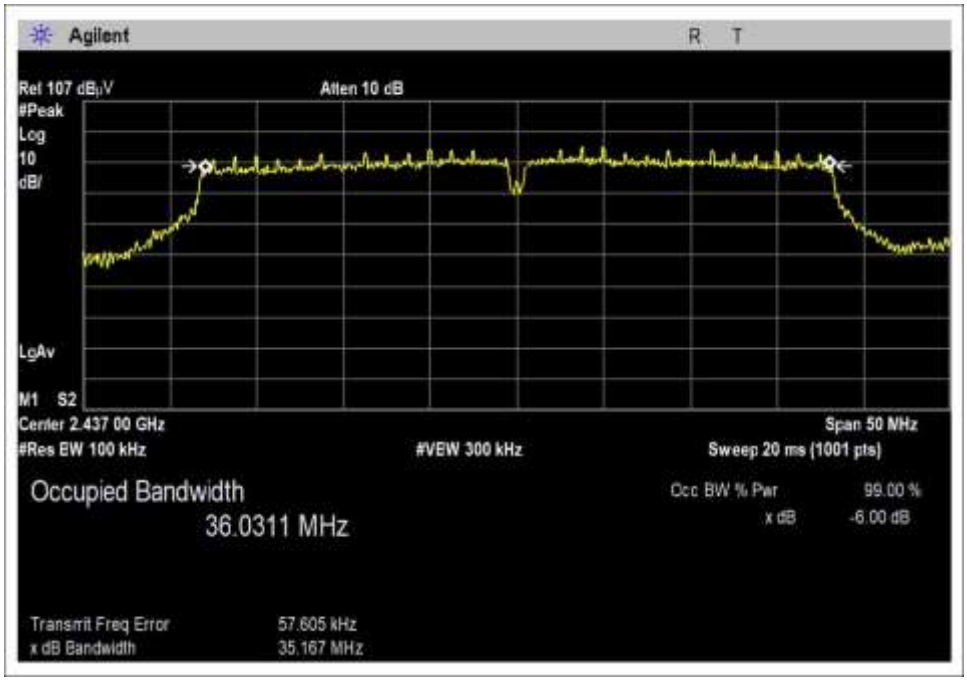
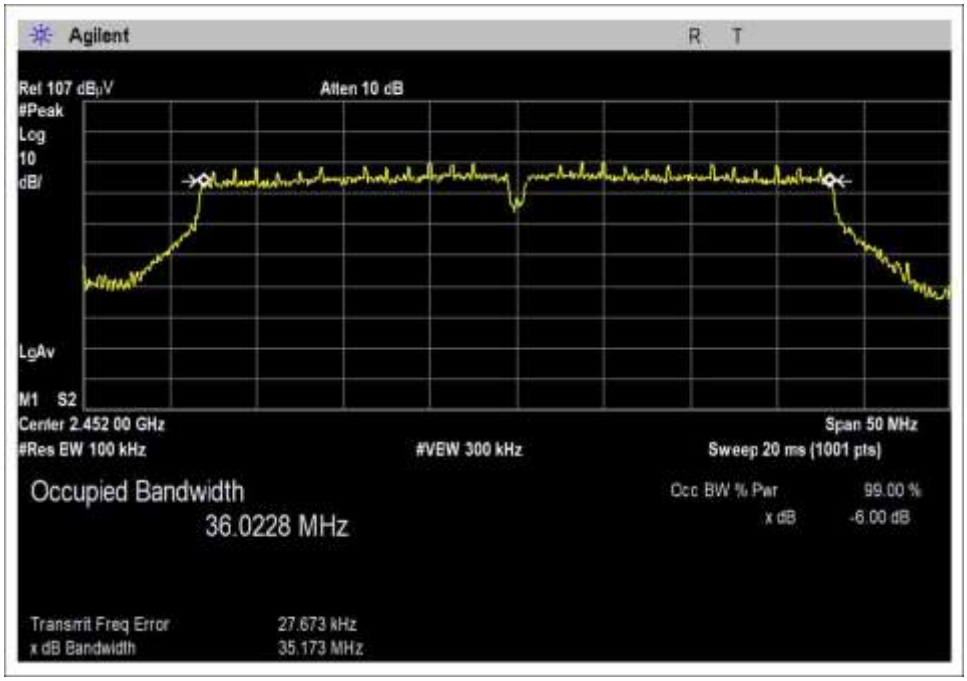


Channel 2437



Channel 2452

15.247(b)(3) Output Power

Test Setup / Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013), KDB 558074 (April 2, 2019)	Test Date(s):	1/26/2022
Configuration:	2		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: EUT is transmitting through a temporary connection to antenna port connector via UFL adapter and is attached to the Power Meter. The UFL adapter has a declared manufacturer loss of 0.5dB and will be accounted for in the measurement.		

Environmental Conditions			
Temperature (ºC)	19	Relative Humidity (%):	42

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
3478	Power Sensor	Rohde & Schwarz	NRP-Z81	2/23/2021	2/23/2023
P05961	Cable	Andrew	Heliax	6/9/2021	6/9/2023
03514	Multimeter	Fluke	87	12/3/2020	12/3/2022
01505B	AC Power Supply	PPS	345AMXT-UPC32	6/15/2021	6/15/2023

Test Data Summary - Voltage Variations					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
2412	CCK (802.11b)	20.3	20.3	20.3	0.0
2437	CCK (802.11b)	21.6	21.6	21.6	0.0
2462	CCK (802.11b)	22.4	22.4	22.4	0.0
2412	OFDM (802.11g)	23.3	23.3	23.3	0.0
2437	OFDM (802.11g)	23.3	23.3	23.3	0.0
2462	OFDM (802.11g)	20.2	20.2	20.2	0.0
2412	MCS (802.11n20)	22.7	22.7	22.7	0.0
2437	MCS (802.11n20)	22.7	22.7	22.7	0.0
2462	MCS (802.11n20)	19.1	19.1	19.1	0.0
2422	MCS (802.11n40)	24.1	24.2	24.2	0.1
2437	MCS (802.11n40)	24.4	24.5	24.5	0.1
2452	MCS (802.11n40)	21.5	21.6	21.6	0.1

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

Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	120
$V_{Minimum}$:	102
$V_{Maximum}$:	138

Test Data Summary - RF Conducted Measurement					
Measurement Option: PKPM1					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
2412	CCK (802.11b)	Omnidirectional / 3dBi	20.3	≤30	Pass
2437	CCK (802.11b)	Omnidirectional / 3dBi	21.6	≤30	Pass
2462	CCK (802.11b)	Omnidirectional / 3dBi	22.4	≤30	Pass
2412	OFDM (802.11g)	Omnidirectional / 3dBi	23.3	≤30	Pass
2437	OFDM (802.11g)	Omnidirectional / 3dBi	23.3	≤30	Pass
2462	OFDM (802.11g)	Omnidirectional / 3dBi	20.2	≤30	Pass
2412	MCS (802.11n20)	Omnidirectional / 3dBi	22.7	≤30	Pass
2437	MCS (802.11n20)	Omnidirectional / 3dBi	22.7	≤30	Pass
2462	MCS (802.11n20)	Omnidirectional / 3dBi	19.1	≤30	Pass
2422	MCS (802.11n40)	Omnidirectional / 3dBi	24.2	≤30	Pass
2437	MCS (802.11n40)	Omnidirectional / 3dBi	24.5	≤30	Pass
2452	MCS (802.11n40)	Omnidirectional / 3dBi	21.6	≤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.

For all other antennas, the limit is calculated according to a maximum of 1W (30 dBm) conducted power with a maximum of 6dBi gain antenna in accordance with 15.247(b)

$$Limit = 30 - Roundup(G - 6)$$

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(b) Power Output (2400-2483.5 MHz DTS)**		
Work Order #:	**106407**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	12:15:58
Tested By:	Michael Atkinson	Sequence#:	1
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

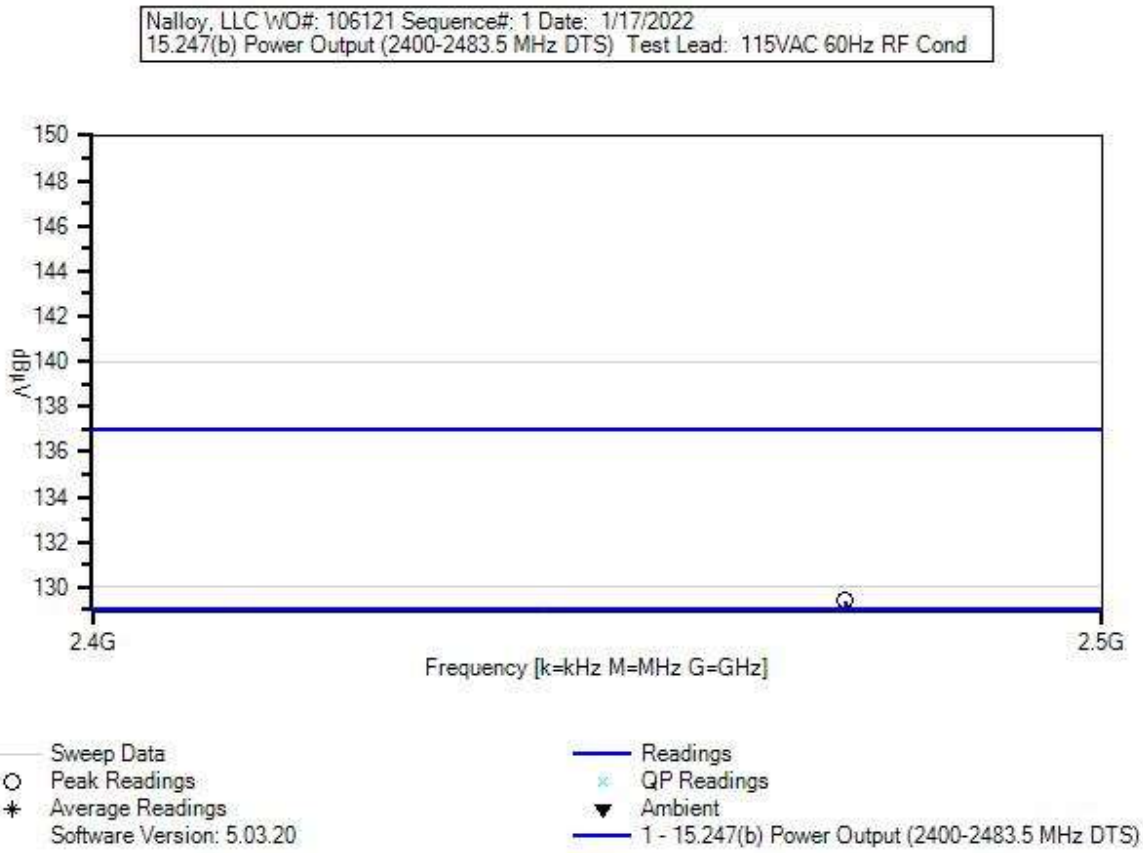
Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Test Method: ANSI C63.10 (2013)

Frequency range: Fundamental

Setup:
802.11b
Rate: 1Mbps
PWR Output Setting: 19dBm for Low Channel, 20dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2462.000M	108.4	+20.2	+0.3	+0.5		+0.0	129.4	137.0	-7.6	RF Co
2	2437.000M	107.6	+20.2	+0.3	+0.5		+0.0	128.6	137.0	-8.4	RF Co
3	2412.000M	106.3	+20.2	+0.3	+0.5		+0.0	127.3	137.0	-9.7	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(b) Power Output (2400-2483.5 MHz DTS)**		
Work Order #:	**106407**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	12:58:57
Tested By:	Michael Atkinson	Sequence#:	2
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

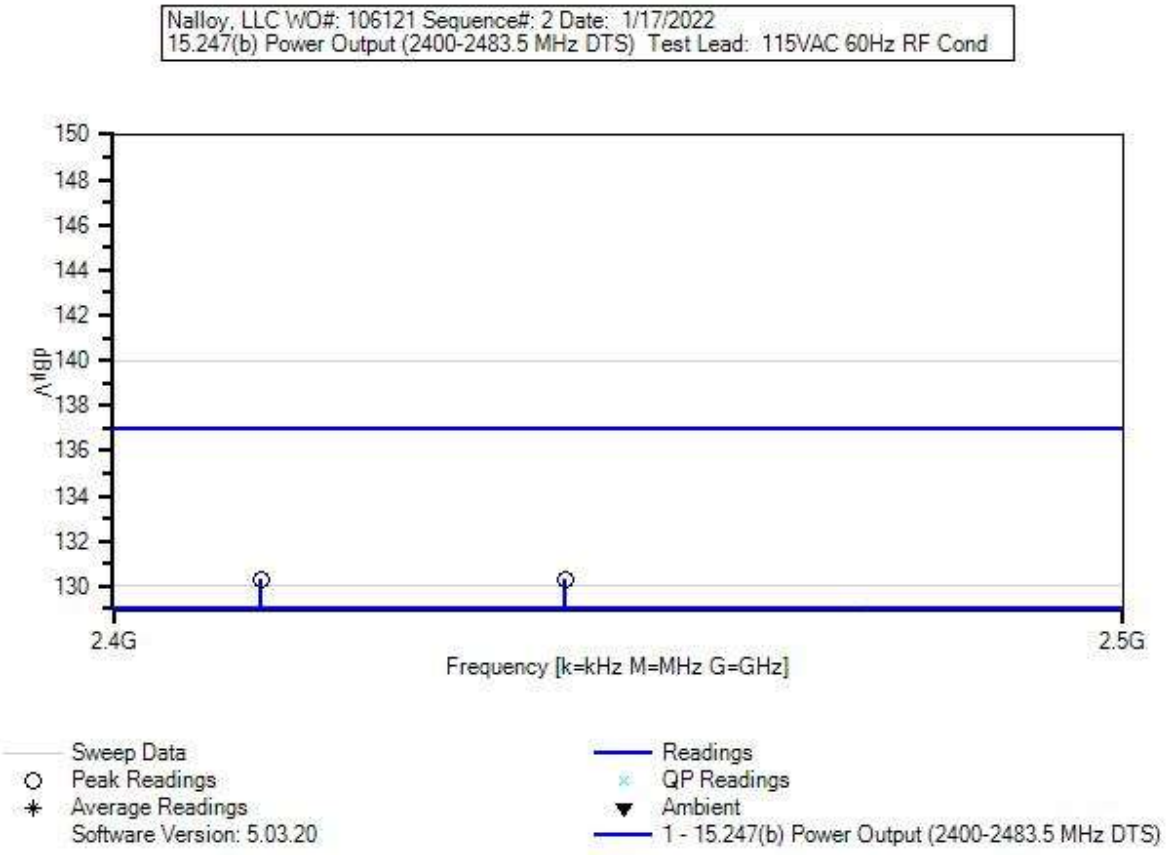
Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Test Method: ANSI C63.10 (2013)

Setup:
802.11g
Rate: 6Mbps
PWR Output Setting: 20 dBm for Low and Mid Channel, 16dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2437.000M	109.3	+20.2	+0.3	+0.5		+0.0	130.3	137.0	-6.7	RF Co
2	2412.000M	109.3	+20.2	+0.3	+0.5		+0.0	130.3	137.0	-6.7	RF Co
3	2462.000M	106.2	+20.2	+0.3	+0.5		+0.0	127.2	137.0	-9.8	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(b) Power Output (2400-2483.5 MHz DTS)**		
Work Order #:	**106407**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	14:16:56
Tested By:	Michael Atkinson	Sequence#:	3
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

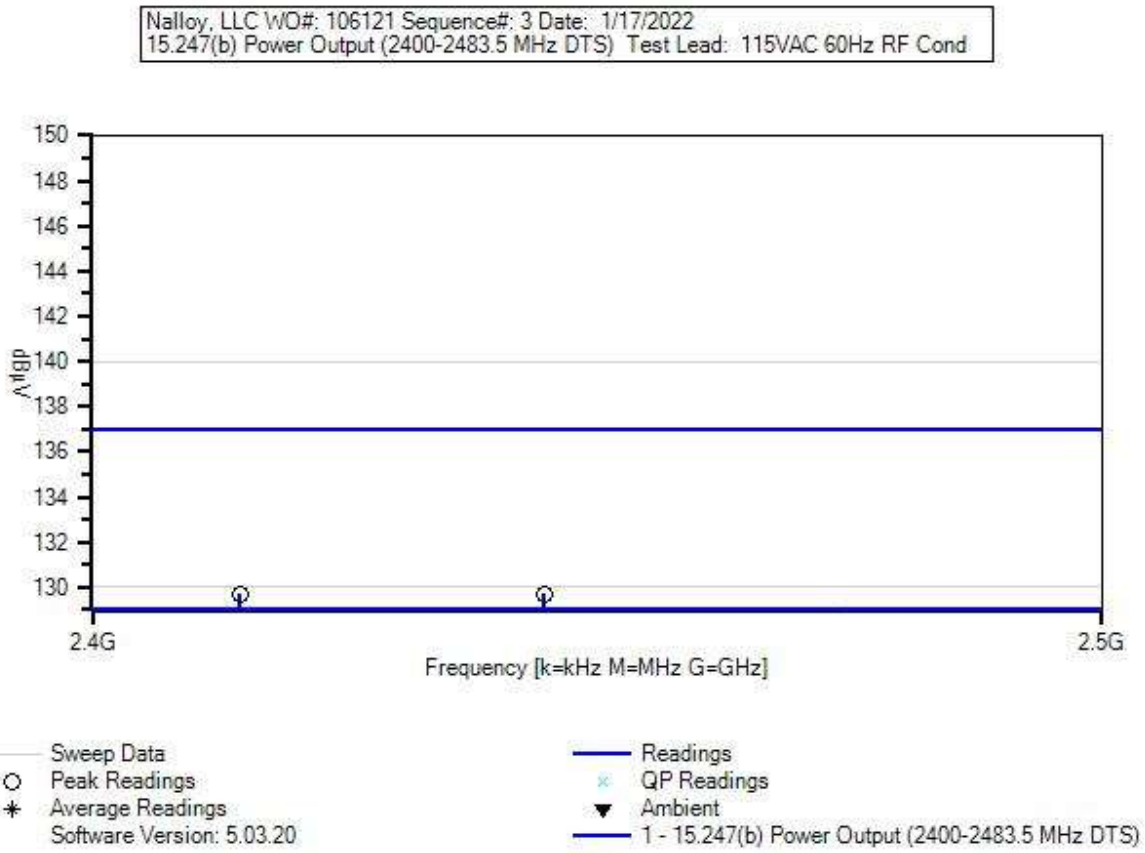
Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Test Method: ANSI C63.10 (2013)

Setup:
802.11n20
Rate: MCS0_20
PWR Output Setting: 19 dBm for Low and Mid Channel, 15dBm for Mid and High Channel
100% Duty Cycle



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T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2437.000M	108.7	+20.2	+0.3	+0.5		+0.0	129.7	137.0	-7.3	RF Co
2	2412.000M	108.7	+20.2	+0.3	+0.5		+0.0	129.7	137.0	-7.3	RF Co
3	2462.000M	105.1	+20.2	+0.3	+0.5		+0.0	126.1	137.0	-10.9	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(b) Power Output (2400-2483.5 MHz DTS)**		
Work Order #:	**106407**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	14:18:33
Tested By:	Michael Atkinson	Sequence#:	4
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

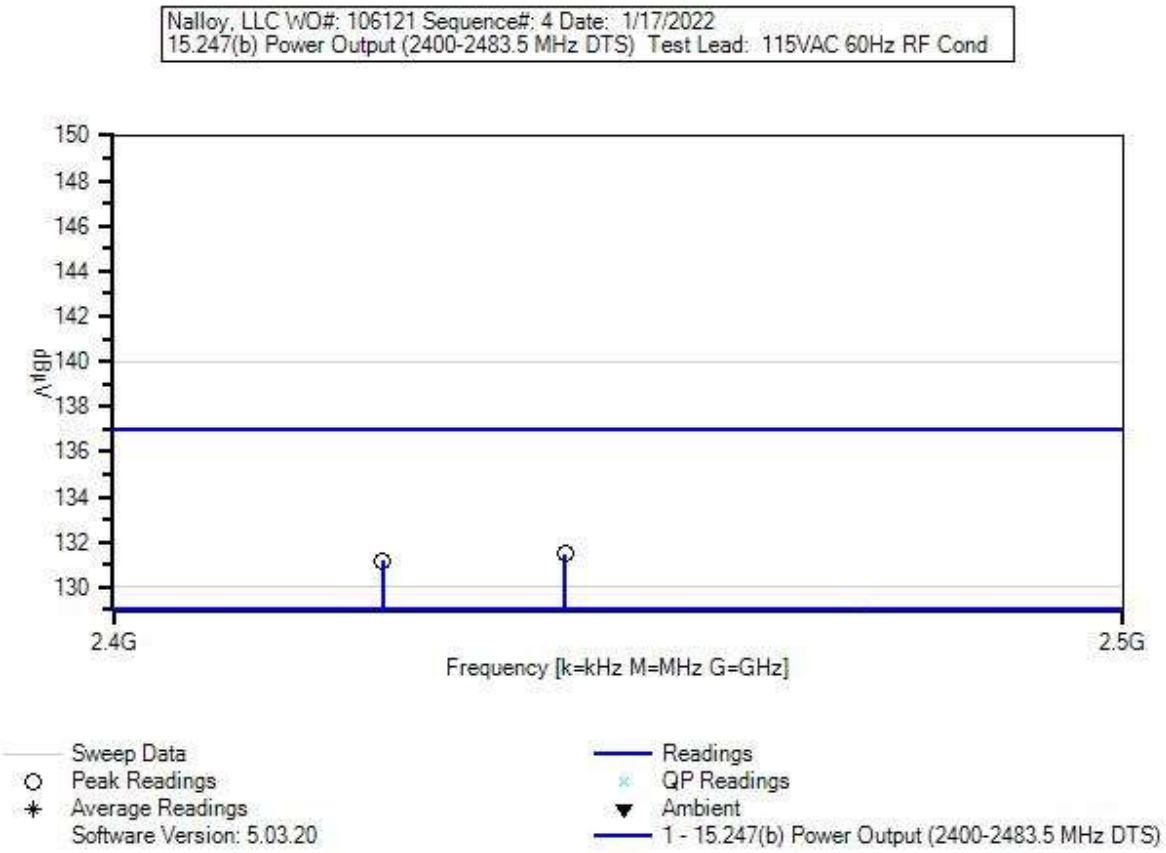
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Setup:
802.11n40
Rate: MCS0_40
PWR Output Setting: 19 dBm for Low and Mid Channel, 15dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2437.000M	110.5	+20.2	+0.3	+0.5		+0.0	131.5	137.0	-5.5	RF Co
2	2422.000M	110.2	+20.2	+0.3	+0.5		+0.0	131.2	137.0	-5.8	RF Co
3	2462.000M	107.6	+20.2	+0.3	+0.5		+0.0	128.6	137.0	-8.4	RF Co

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	1/18/2022
Test Type:	**Maximized Emissions**	Time:	07:27:01
Tested By:	M. Harrison	Sequence#:	52
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:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

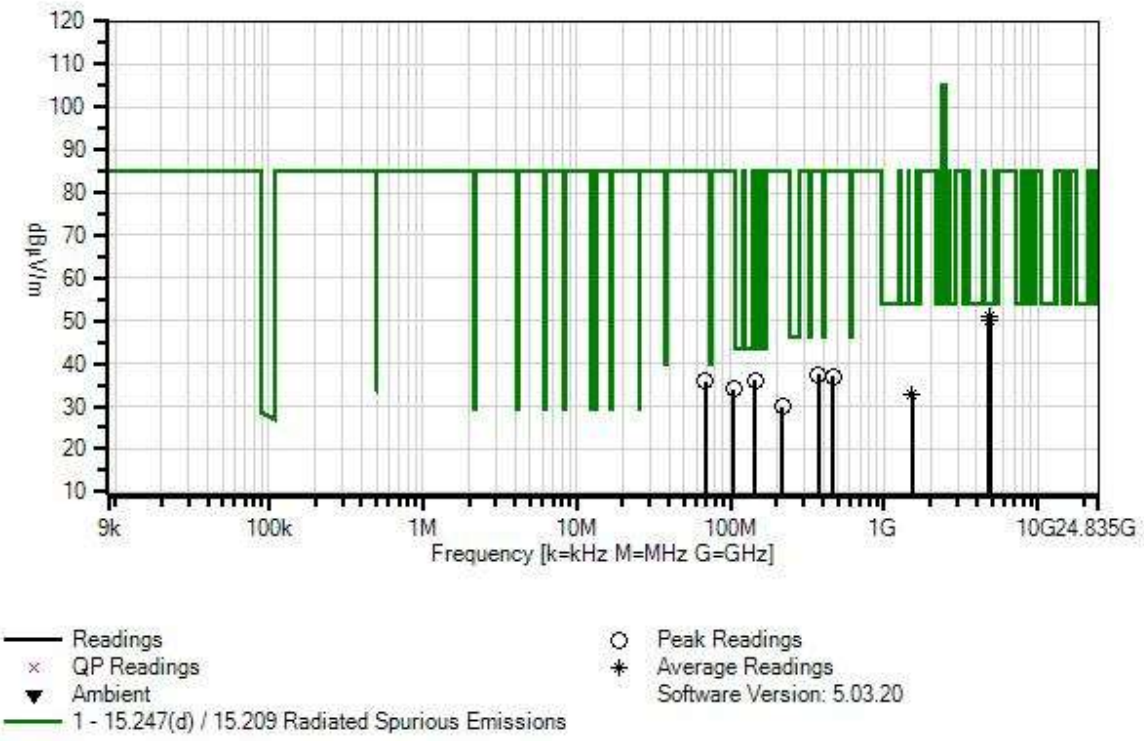
Method: ANSI C63.10: 2013

Frequency range: 9k-40 GHz

Setup:
Antenna 0
Channels: 2412, 2442, 2462 MHz
802.11b
Rate: 1-11MBps
PWR Output: Low: 19 dBm, Mid/High: 20 dBm
100% Duty Cycle

Notes:
No EUT Emissions found within 20 dB of the limit above 10GHz or below 30MHz

Nalloy, LLC WO#: 106121 Sequence#: 52 Date: 1/18/2022
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Perp/Para



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T5	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T6	ANP06242	Attenuator	54A-10	1/27/2020	1/27/2022
T7	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
	AN03727	Band Reject Filter	10NSL33-2441.3/E79.4-O/O	2/6/2020	2/6/2022
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/13/2021	5/13/2023
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/11/2020	11/11/2022
	AN02763-69	Waveguide	Multiple	4/28/2020	4/28/2022
	ANP06678	Cable	32026-29801-29801-144	2/20/2020	2/20/2022
	ANP07211	Cable	32026-29801-29801-18	6/16/2021	6/16/2023
	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T8	AN02307	Preamp	8447D	1/6/2022	1/6/2024
T9	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T10	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T11	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T12	ANP06011	Cable	Heliax	8/7/2020	8/7/2022

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4824.000M	45.2	+0.0	+1.6	+3.9	+33.3	+0.0	50.8	54.0	-3.2	Vert
	Ave		-33.6	+0.0	+0.4	+0.0			19dBm, 1Mbps		
			+0.0	+0.0	+0.0	+0.0					
^	4824.000M	48.5	+0.0	+1.6	+3.9	+33.3	+0.0	54.1	54.0	+0.1	Vert
			-33.6	+0.0	+0.4	+0.0			19dBm, 1Mbps		
			+0.0	+0.0	+0.0	+0.0					
3	4874.000M	44.2	+0.0	+1.7	+3.8	+33.5	+0.0	50.1	54.0	-3.9	Vert
	Ave		-33.5	+0.0	+0.4	+0.0			20dBm, 1Mbps		
			+0.0	+0.0	+0.0	+0.0					
^	4874.000M	47.6	+0.0	+1.7	+3.8	+33.5	+0.0	53.5	54.0	-0.5	Vert
			-33.5	+0.0	+0.4	+0.0			20dBm, 1Mbps		
			+0.0	+0.0	+0.0	+0.0					
5	1507.040M	29.8	+0.0	+0.8	+2.1	+25.5	+0.0	32.9	54.0	-21.1	Vert
	Ave		-35.2	+9.7	+0.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
^	1507.040M	46.4	+0.0	+0.8	+2.1	+25.5	+0.0	49.5	54.0	-4.5	Vert
			-35.2	+9.7	+0.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
7	375.300M	40.5	+0.0	+0.4	+1.0	+0.0	+0.0	37.5	85.0	-47.5	Vert
			+0.0	+0.0	+0.0	-27.4					
			+21.7	+1.3	+0.0	+0.0					
8	466.500M	38.1	+0.0	+0.4	+1.1	+0.0	+0.0	37.0	85.0	-48.0	Horiz
			+0.0	+0.0	+0.0	-28.0					
			+24.0	+1.4	+0.0	+0.0					
9	145.400M	48.1	+0.0	+0.3	+0.6	+0.0	+0.0	36.1	85.0	-48.9	Vert
			+0.0	+0.0	+0.0	-27.6					
			+14.0	+0.7	+0.0	+0.0					
10	68.800M	49.7	+0.0	+0.2	+0.4	+0.0	+0.0	35.9	85.0	-49.1	Vert
			+0.0	+0.0	+0.0	-27.8					
			+12.9	+0.5	+0.0	+0.0					
11	105.700M	46.2	+0.0	+0.2	+0.5	+0.0	+0.0	33.9	85.0	-51.1	Vert
			+0.0	+0.0	+0.0	-27.7					
			+14.1	+0.6	+0.0	+0.0					
12	216.200M	38.6	+0.0	+0.3	+0.8	+0.0	+0.0	29.9	85.0	-55.1	Vert
			+0.0	+0.0	+0.0	-27.2					
			+16.5	+0.9	+0.0	+0.0					

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	1/18/2022
Test Type:	**Maximized Emissions**	Time:	07:39:02
Tested By:	M. Harrison	Sequence#:	53
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:

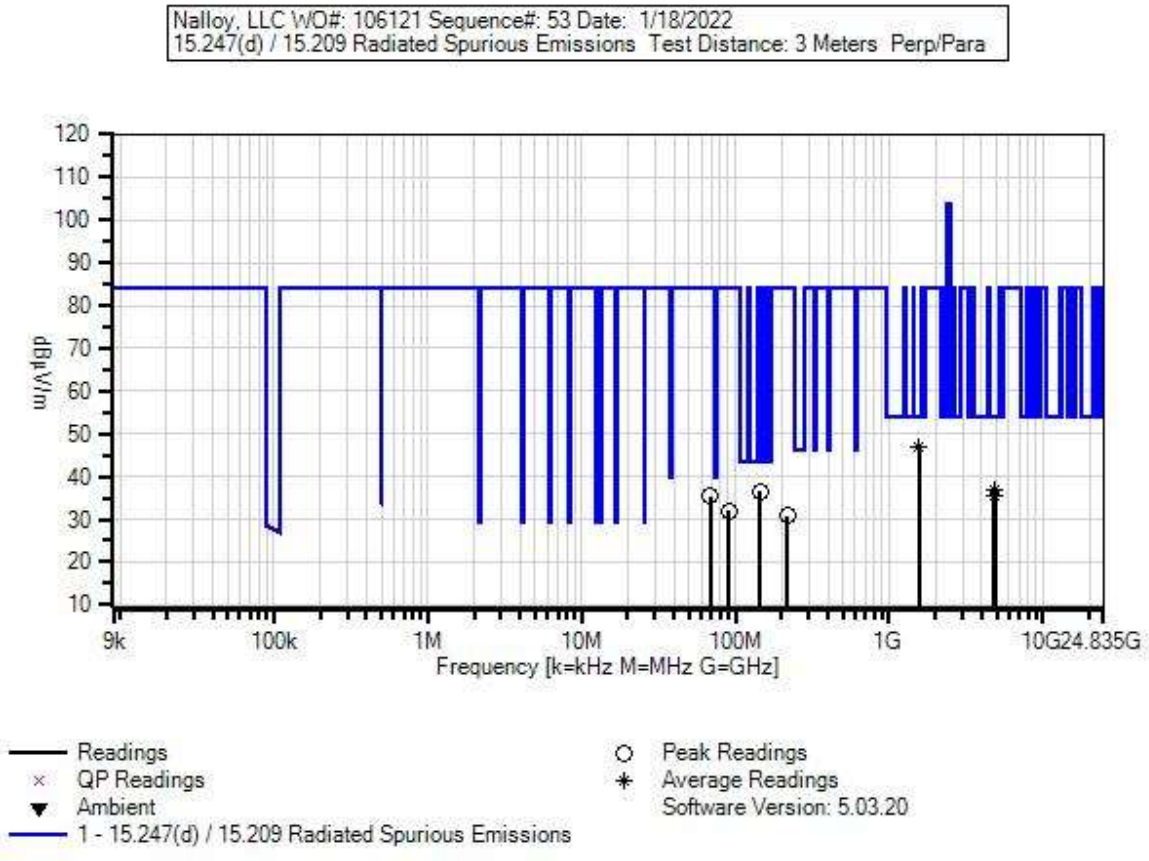
Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 9k-40 GHz

Setup:
Antenna 0
Channels: 2412, 2437, 2462 MHz
802.11g
Rate: 6-54MBps
PWR Output: Low/Mid: 20 dBm, High: 16dBm
100% Duty Cycle

Notes:
No EUT Emissions found within 20 dB of the limit above 10GHz or below 30MHz


Nalloy, LLC WO#: 106121 Sequence#: 53 Date: 1/18/2022
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Perp/Para
120
110
100
90
80
70
60
50
40
30
20
10
dBµV/m
9k
100k
1M
10M
100M
1G
10G24.835G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.20

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
T2	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T3	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP06242	Attenuator	54A-10	1/27/2020	1/27/2022
T6	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
	AN03727	Band Reject Filter	10NSL33-2441.3/E79.4-O/O	2/6/2020	2/6/2022
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/13/2021	5/13/2023
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/11/2020	11/11/2022
	AN02763-69	Waveguide	Multiple	4/28/2020	4/28/2022
	ANP06678	Cable	32026-29801-29801-144	2/20/2020	2/20/2022
	ANP07211	Cable	32026-29801-29801-18	6/16/2021	6/16/2023
	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T7	AN02307	Preamp	8447D	1/6/2022	1/6/2024
T8	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
	ANP06011	Cable	Heliax	8/7/2020	8/7/2022

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

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	1567.600M Ave	43.3	+0.8 +9.7 +0.0	+2.2 +0.2	+25.6 +0.0	-35.1 +0.0	+0.0	46.7	54.0	-7.3	Vert
^	1567.600M	49.4	+0.8 +9.7 +0.0	+2.2 +0.2	+25.6 +0.0	-35.1 +0.0	+0.0	52.8	54.0	-1.2	Vert
3	4827.050M Ave	31.5	+1.6 +0.0 +0.0	+3.9 +0.4	+33.3 +0.0	-33.6 +0.0	+0.0	37.1	54.0	-16.9	Horiz
^	4827.050M	47.6	+1.6 +0.0 +0.0	+3.9 +0.4	+33.3 +0.0	-33.6 +0.0	+0.0	53.2	54.0	-0.8	Horiz
5	4874.750M Ave	29.8	+1.7 +0.0 +0.0	+3.8 +0.4	+33.5 +0.0	-33.5 +0.0	+0.0	35.7	54.0	-18.3	Horiz
^	4874.750M	45.1	+1.7 +0.0 +0.0	+3.8 +0.4	+33.5 +0.0	-33.5 +0.0	+0.0	51.0	54.0	-3.0	Horiz
7	145.400M	48.6	+0.3 +0.0 +0.7	+0.6 +0.0	+0.0 -27.6	+0.0 +14.0	+0.0	36.6	84.0	-47.4	Vert
8	68.800M	49.1	+0.2 +0.0 +0.5	+0.4 +0.0	+0.0 -27.8	+0.0 +12.9	+0.0	35.3	84.0	-48.7	Vert
9	90.100M	46.0	+0.2 +0.0 +0.5	+0.5 +0.0	+0.0 -27.8	+0.0 +12.6	+0.0	32.0	84.0	-52.0	Vert
10	216.200M	39.5	+0.3 +0.0 +0.9	+0.8 +0.0	+0.0 -27.2	+0.0 +16.5	+0.0	30.8	84.0	-53.2	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	1/18/2022
Test Type:	**Maximized Emissions**	Time:	07:43:28
Tested By:	M. Harrison	Sequence#:	54
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:

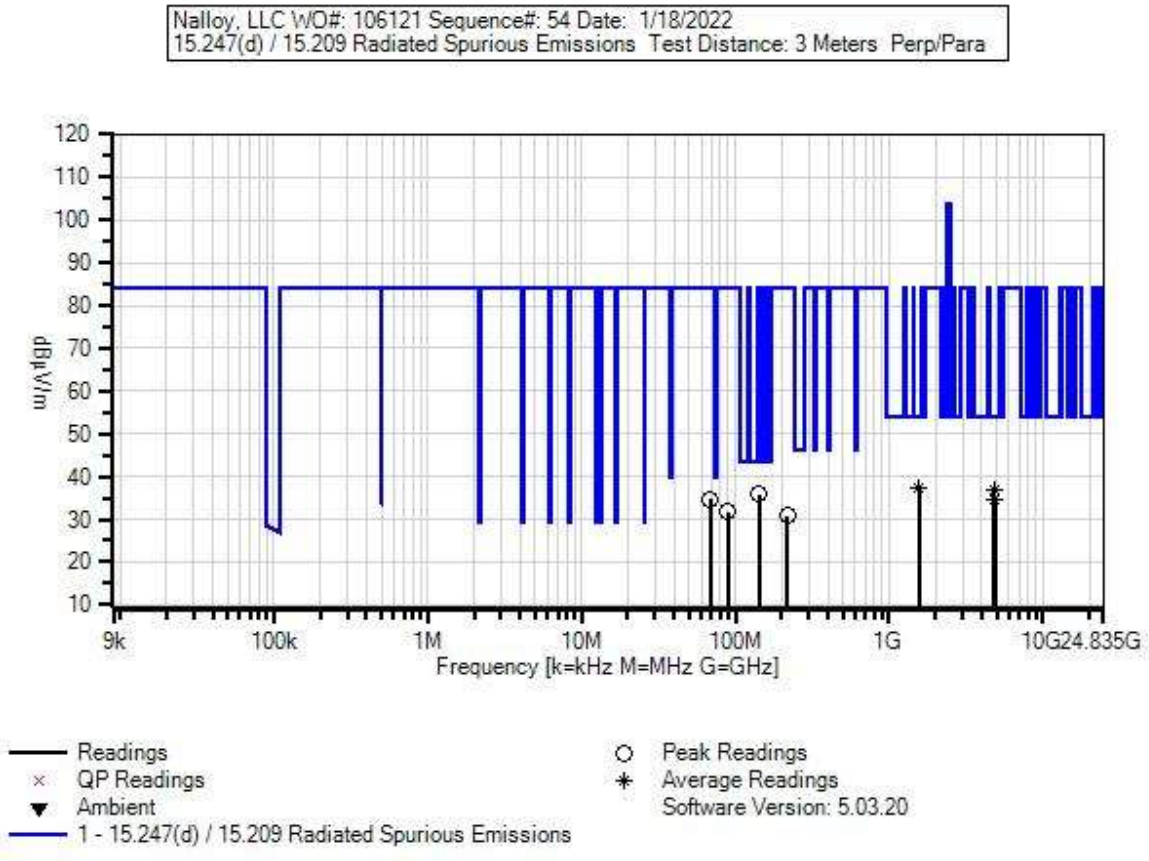
Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 9k-40 GHz

Setup:
Antenna 0
Channels: 2412, 2437, 2462 MHz
802.11n20
Rate: MCS0-7
PWR Output: Low: 19 dBm, Mid: 20 dBm, High: 15dBm
100% Duty Cycle

Notes:
No EUT Emissions found within 20 dB of the limit above 10GHz or 30MHz


Nalloy, LLC WO#: 106121 Sequence#: 54 Date: 1/18/2022
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Perp/Para
dBµV/m
120
110
100
90
80
70
60
50
40
30
20
10
9k
100k
1M
10M
100M
1G
10G24.835G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.20

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
T2	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T3	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP06242	Attenuator	54A-10	1/27/2020	1/27/2022
T6	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
	AN03727	Band Reject Filter	10NSL33-2441.3/E79.4-O/O	2/6/2020	2/6/2022
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/13/2021	5/13/2023
	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/11/2020	11/11/2022
	AN02763-69	Waveguide	Multiple	4/28/2020	4/28/2022
	ANP06678	Cable	32026-29801-29801-144	2/20/2020	2/20/2022
	ANP07211	Cable	32026-29801-29801-18	6/16/2021	6/16/2023
	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T7	AN02307	Preamp	8447D	1/6/2022	1/6/2024
T8	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
	ANP06011	Cable	Heliax	8/7/2020	8/7/2022

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

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	1572.900M Ave	33.8	+0.8 +9.7 +0.0	+2.2 +0.2	+25.6 +0.0	-35.1 +0.0	+0.0	37.2	54.0	-16.8	Vert
^	1572.900M	49.9	+0.8 +9.7 +0.0	+2.2 +0.2	+25.6 +0.0	-35.1 +0.0	+0.0	53.3	54.0	-0.7	Vert
3	4822.150M Ave	31.3	+1.6 +0.0 +0.0	+3.9 +0.4	+33.3 +0.0	-33.6 +0.0	+0.0	36.9	54.0	-17.1	Horiz
^	4822.150M	48.4	+1.6 +0.0 +0.0	+3.9 +0.4	+33.3 +0.0	-33.6 +0.0	+0.0	54.0	54.0	+0.0	Horiz
5	4877.700M Ave	28.6	+1.7 +0.0 +0.0	+3.8 +0.4	+33.6 +0.0	-33.5 +0.0	+0.0	34.6	54.0	-19.4	Horiz
^	4877.700M	43.7	+1.7 +0.0 +0.0	+3.8 +0.4	+33.6 +0.0	-33.5 +0.0	+0.0	49.7	54.0	-4.3	Horiz
7	143.500M	47.9	+0.3 +0.0 +0.7	+0.6 +0.0	+0.0 -27.6	+0.0 +14.0	+0.0	35.9	84.0	-48.1	Vert
8	68.800M	48.4	+0.2 +0.0 +0.5	+0.4 +0.0	+0.0 -27.8	+0.0 +12.9	+0.0	34.6	84.0	-49.4	Vert
9	89.200M	45.7	+0.2 +0.0 +0.5	+0.5 +0.0	+0.0 -27.8	+0.0 +12.6	+0.0	31.7	84.0	-52.3	Vert
10	216.200M	39.4	+0.3 +0.0 +0.9	+0.8 +0.0	+0.0 -27.2	+0.0 +16.5	+0.0	30.7	84.0	-53.3	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	1/18/2022
Test Type:	**Maximized Emissions**	Time:	07:53:02
Tested By:	M. Harrison	Sequence#:	55
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:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

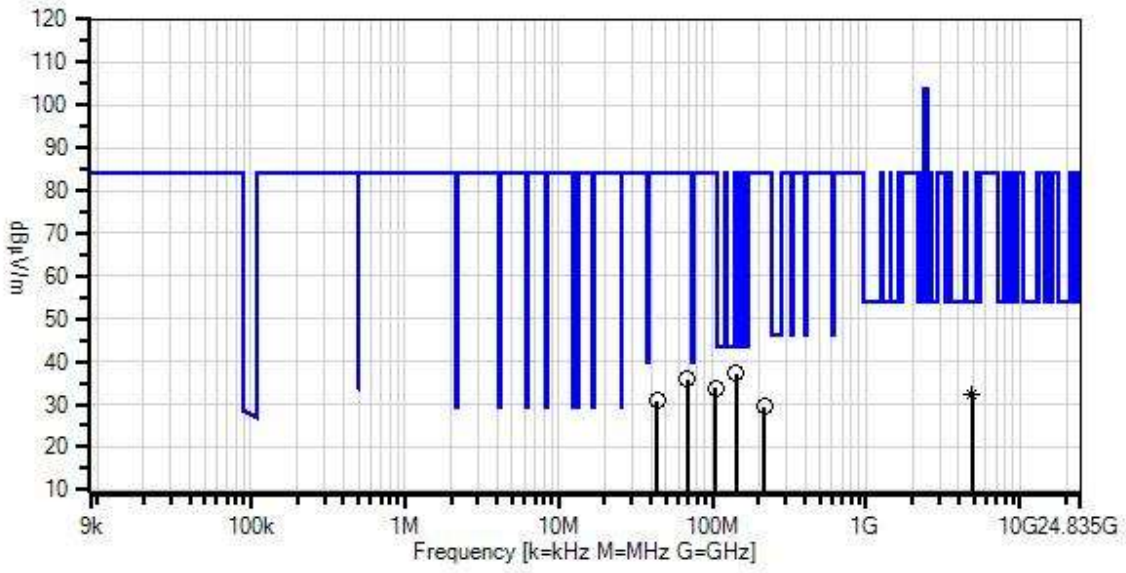
Method: ANSI C63.10: 2013

Frequency range: 9k-40 GHz

Setup:
Antenna 0
Channels: 2422, 2437, 2452 MHz
802.11n40
Rate: MCS0-7
PWR Output: Low: 19dBm, Mid: 20dBm, High: 15dBm
100% Duty Cycle

Notes:
No EUT Emissions found within 20 dB of the limit above 10GHz or below 30MHz

Nalloy, LLC WO#: 106121 Sequence#: 55 Date: 1/18/2022
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Perp/Para



Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.20

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
T2	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T3	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
	ANP06242	Attenuator	54A-10	1/27/2020	1/27/2022
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
	AN03727	Band Reject Filter	10NSL33-2441.3/E79.4-O/O	2/6/2020	2/6/2022
	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/13/2021	5/13/2023
	AN02743	Active Horn Antenna	AMFW-5F-260400-33-8P	5/11/2021	5/11/2023
	AN02763-69	Waveguide	Multiple	4/28/2020	4/28/2022
	ANP06678	Cable	32026-29801-29801-144	2/20/2020	2/20/2022
	ANP07211	Cable	32026-29801-29801-18	6/16/2021	6/16/2023
	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN02307	Preamp	8447D	1/6/2022	1/6/2024
T7	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T8	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
	ANP06011	Cable	Heliax	8/7/2020	8/7/2022

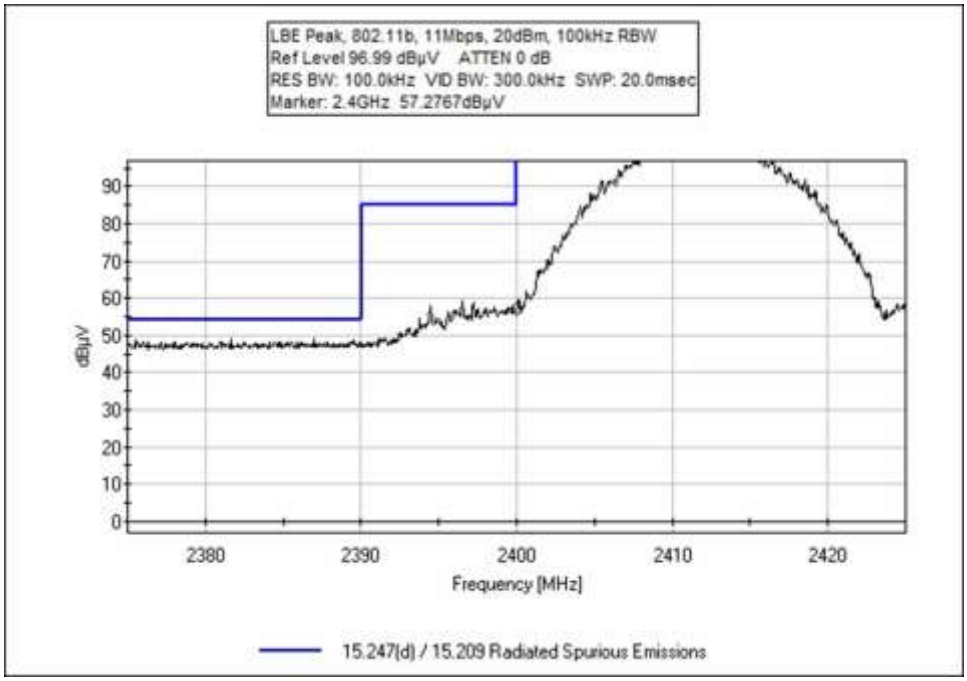
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

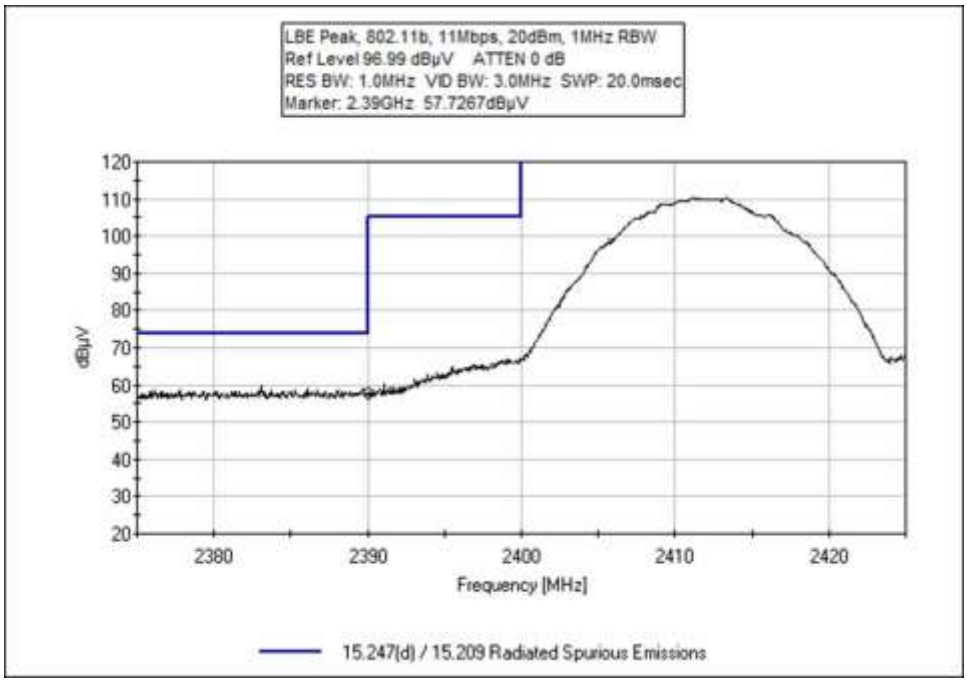
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4857.950M	26.3	+1.6	+3.9	+33.4	-33.5	+0.0	32.1	54.0	-21.9	Vert
	Ave		+0.4	+0.0	+0.0	+0.0					
^	4857.950M	41.6	+1.6	+3.9	+33.4	-33.5	+0.0	47.4	54.0	-6.6	Vert
			+0.4	+0.0	+0.0	+0.0					
3	143.500M	49.3	+0.3	+0.6	+0.0	+0.0	+0.0	37.3	84.0	-46.7	Vert
			+0.0	-27.6	+14.0	+0.7					
4	68.800M	49.7	+0.2	+0.4	+0.0	+0.0	+0.0	35.9	84.0	-48.1	Vert
			+0.0	-27.8	+12.9	+0.5					
5	105.700M	46.1	+0.2	+0.5	+0.0	+0.0	+0.0	33.8	84.0	-50.2	Vert
			+0.0	-27.7	+14.1	+0.6					
6	43.600M	43.6	+0.1	+0.3	+0.0	+0.0	+0.0	30.8	84.0	-53.2	Vert
			+0.0	-27.8	+14.3	+0.3					
7	216.200M	38.2	+0.3	+0.8	+0.0	+0.0	+0.0	29.5	84.0	-54.5	Vert
			+0.0	-27.2	+16.5	+0.9					

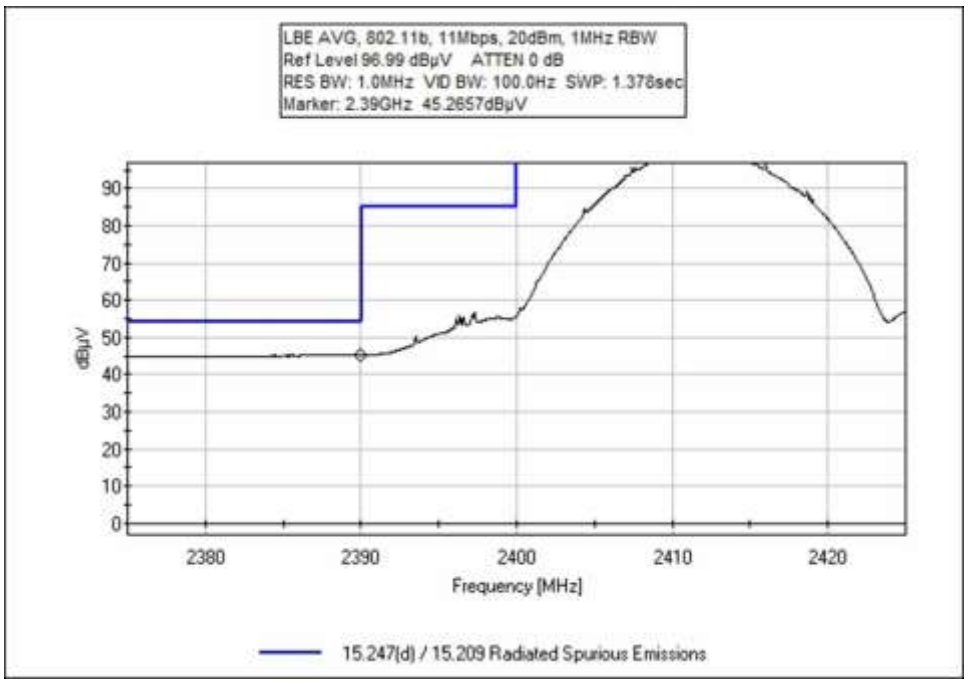
Band Edge

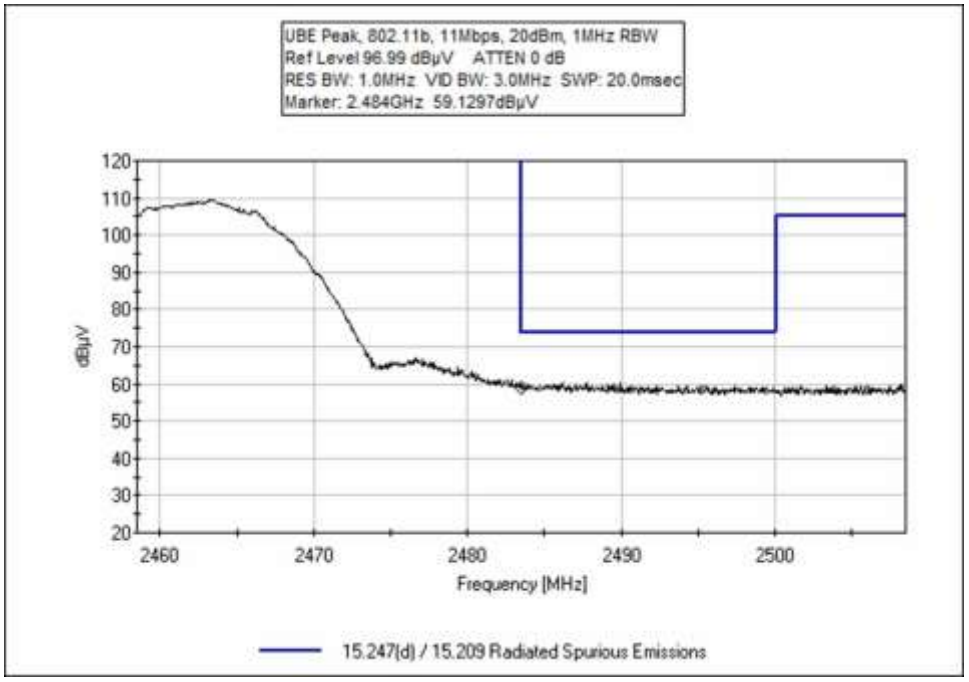
Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
2390.0	CCK	Omnidirectional	45.3	<54.0	Pass
2400.0	CCK	Omnidirectional	57.3	<85.0	Pass
2483.5	CCK	Omnidirectional	47.1	<54.0	Pass
2390.0	OFDM	Omnidirectional	50.1	<84.0	Pass
2400.0	OFDM	Omnidirectional	76.2	<94.0	Pass
2483.5	OFDM	Omnidirectional	48.7	<54.0	Pass
2390.0	MCS7 (20M)	Omnidirectional	48.4	<54.0	Pass
2400.0	MCS7 (20M)	Omnidirectional	67.9	<83.4	Pass
2483.5	MCS7 (20M)	Omnidirectional	47.9	<54.0	Pass
2390.0	MCS7 (40M)	Omnidirectional	51.4	<54.0	Pass
2400.0	MCS7 (40M)	Omnidirectional	66.9	<79.0	Pass
2483.5	MCS7 (40M)	Omnidirectional	48.5	<54.0	Pass

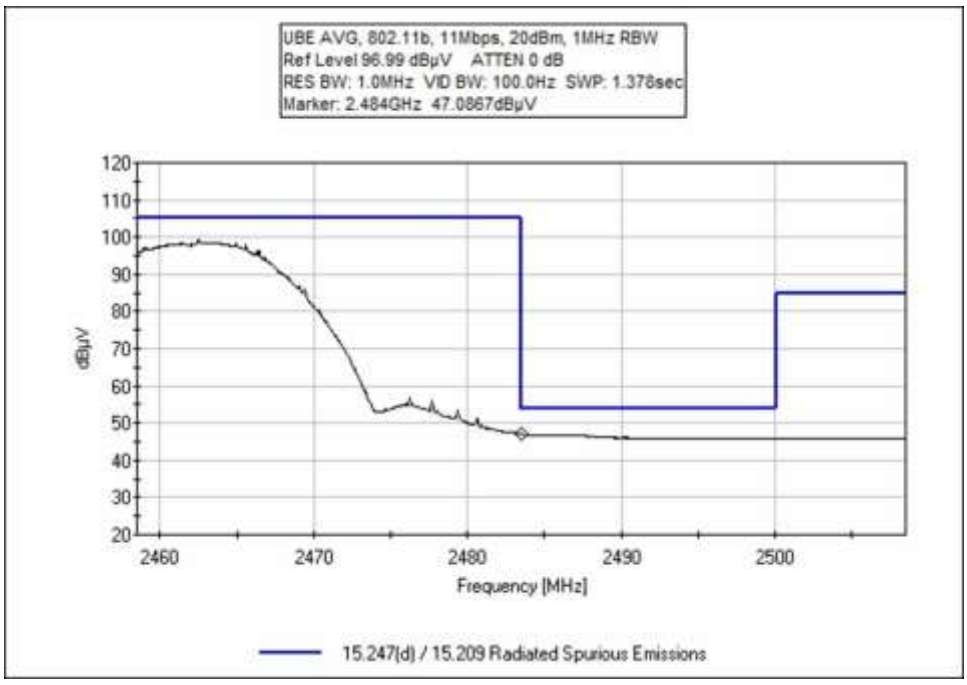
Band Edge Plots

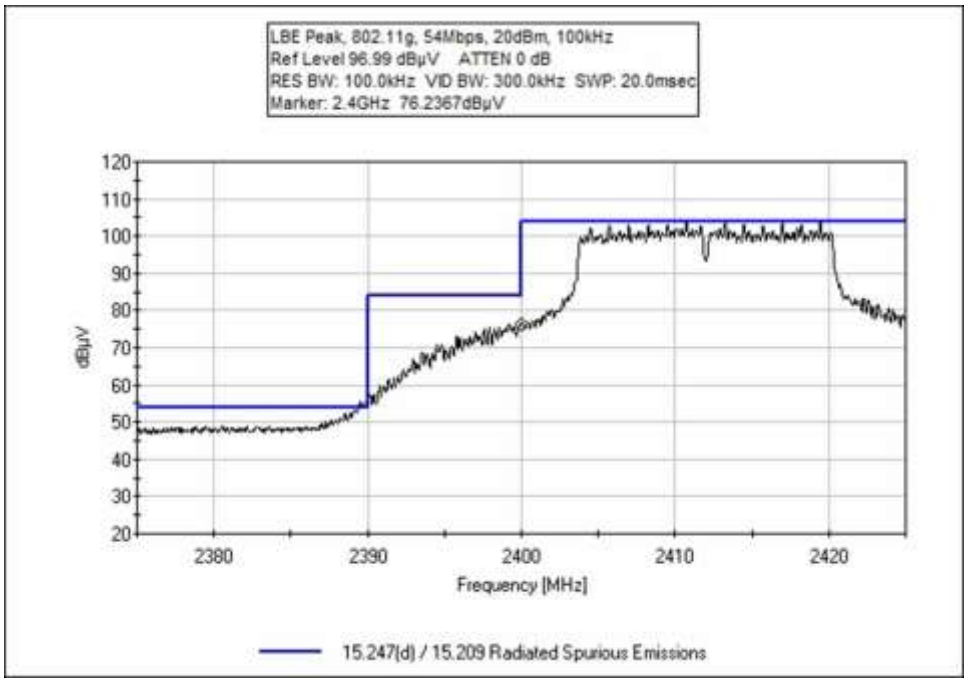


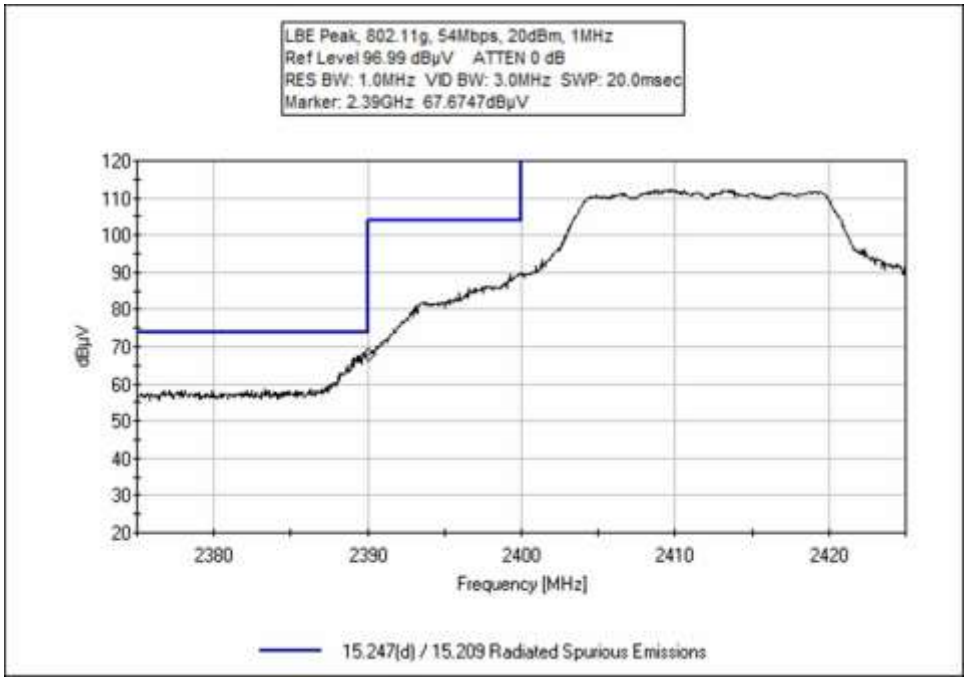


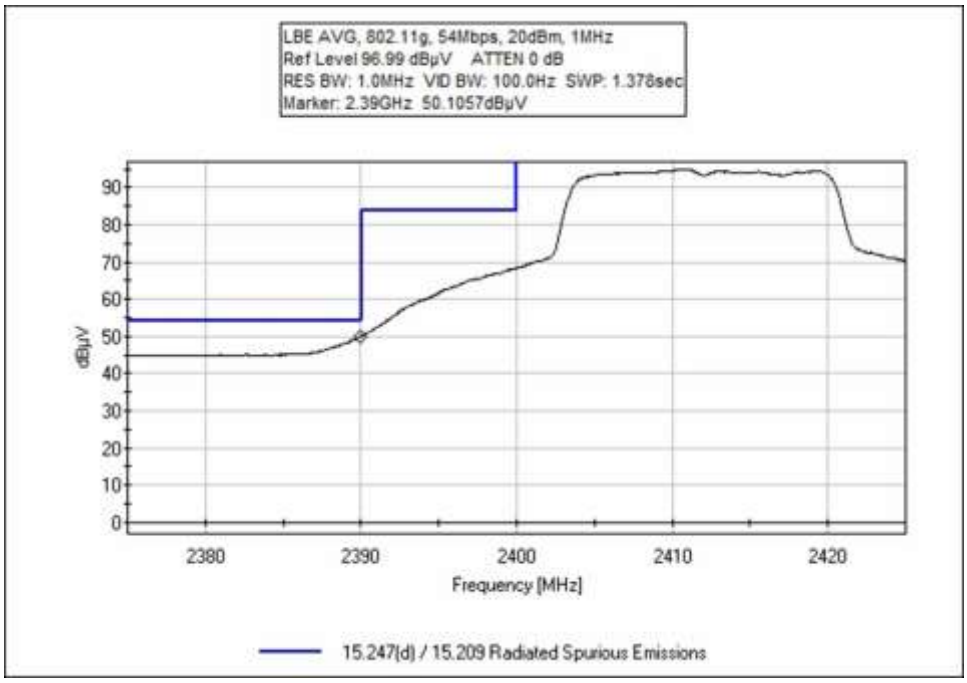

LBE AVG, 802.11b, 11Mbps, 20dBm, 1MHz RBW
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.39GHz 45.2657dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

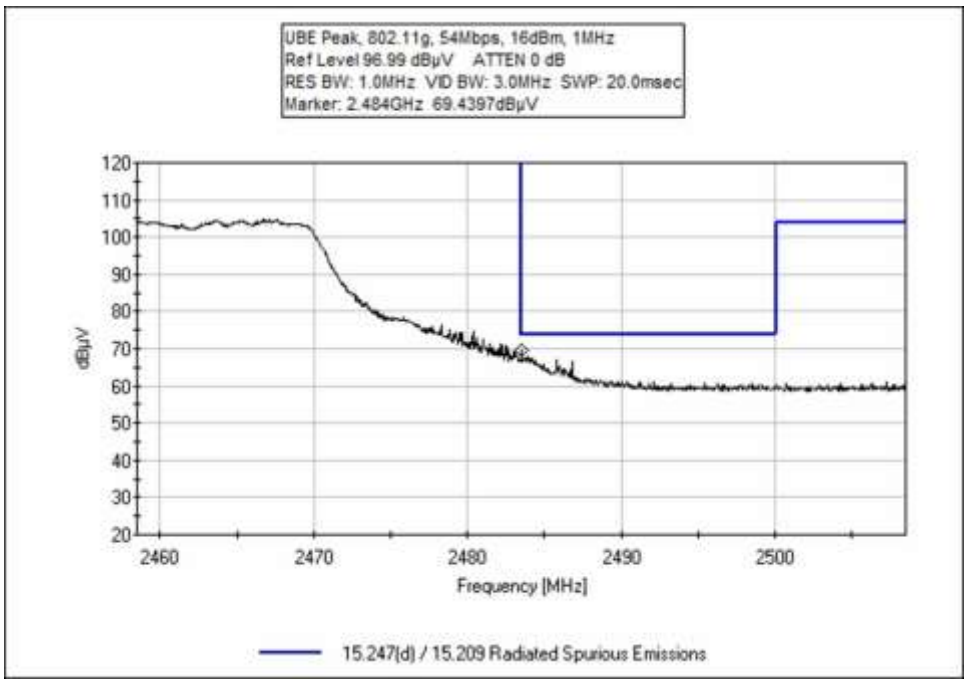

UBE Peak, 802.11b, 11Mbps, 20dBm, 1MHz RBW
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.484GHz 59.1297dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

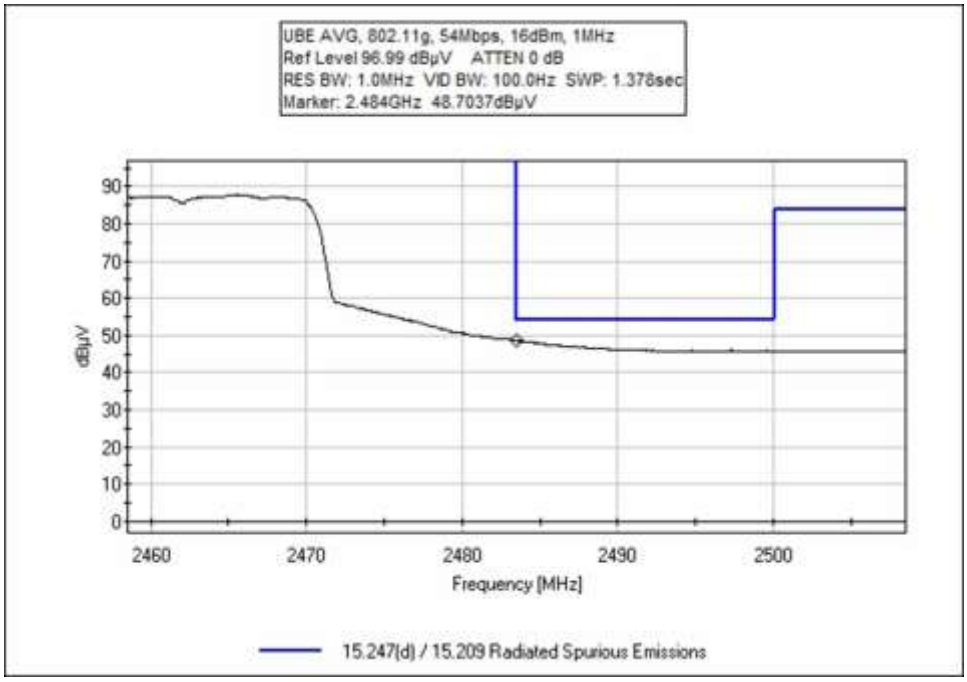

UBE AVG, 802.11b, 11Mbps, 20dBm, 1MHz RBW
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.484GHz 47.0867dBµV
120
110
100
90
80
70
60
50
40
30
20
dBµV
2460
2470
2480
2490
2500
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

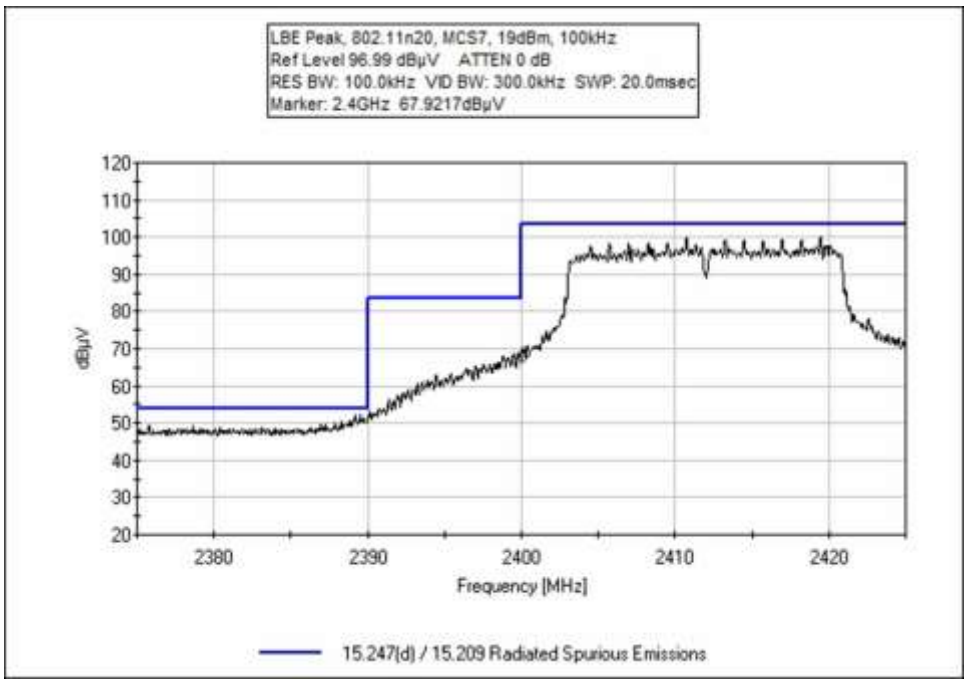

LBE Peak, 802.11g, 54Mbps, 20dBm, 100kHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 2.4GHz 76.2367dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

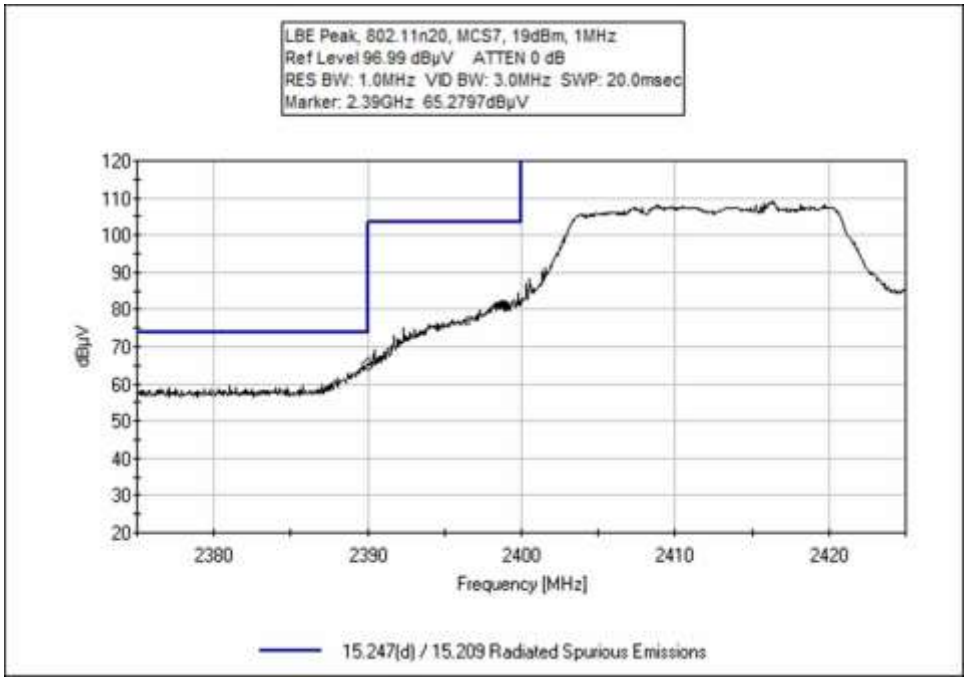

LBE Peak, 802.11g, 54Mbps, 20dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.39GHz 67.6747dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

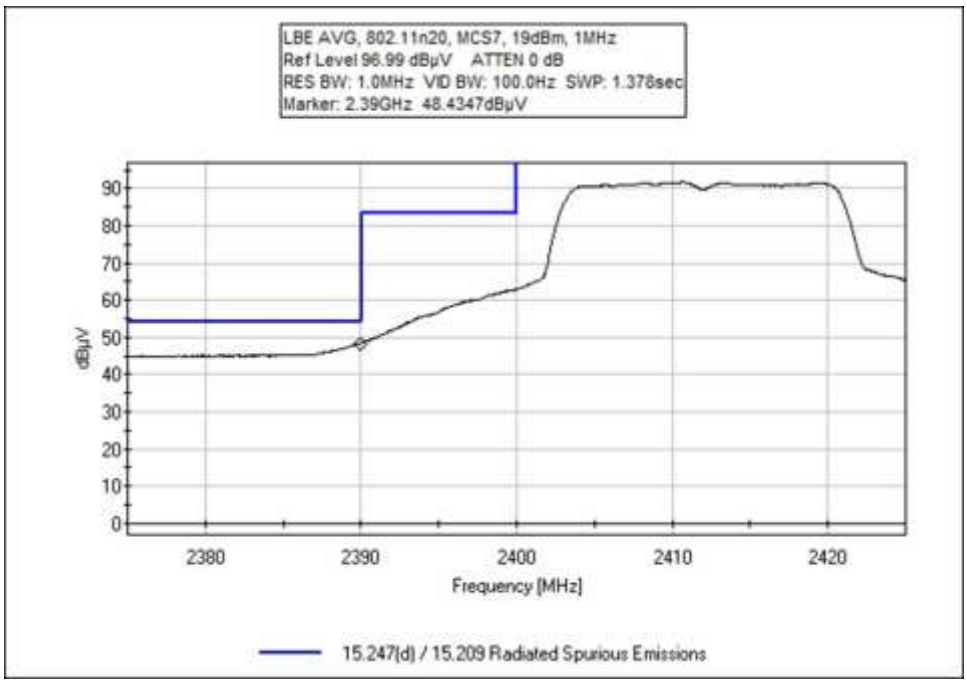

LBE AVG, 802.11g, 54Mbps, 20dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.39GHz 50.1057dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
2380
2390
2400
2410
2420
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

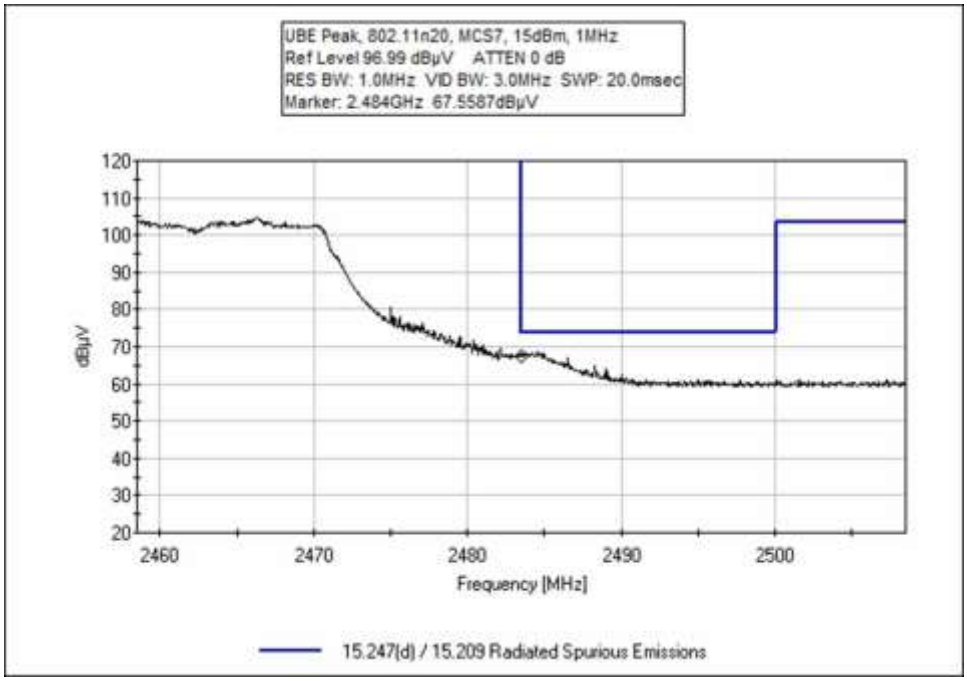

UBE Peak, 802.11g, 54Mbps, 16dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.484GHz 69.4397dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

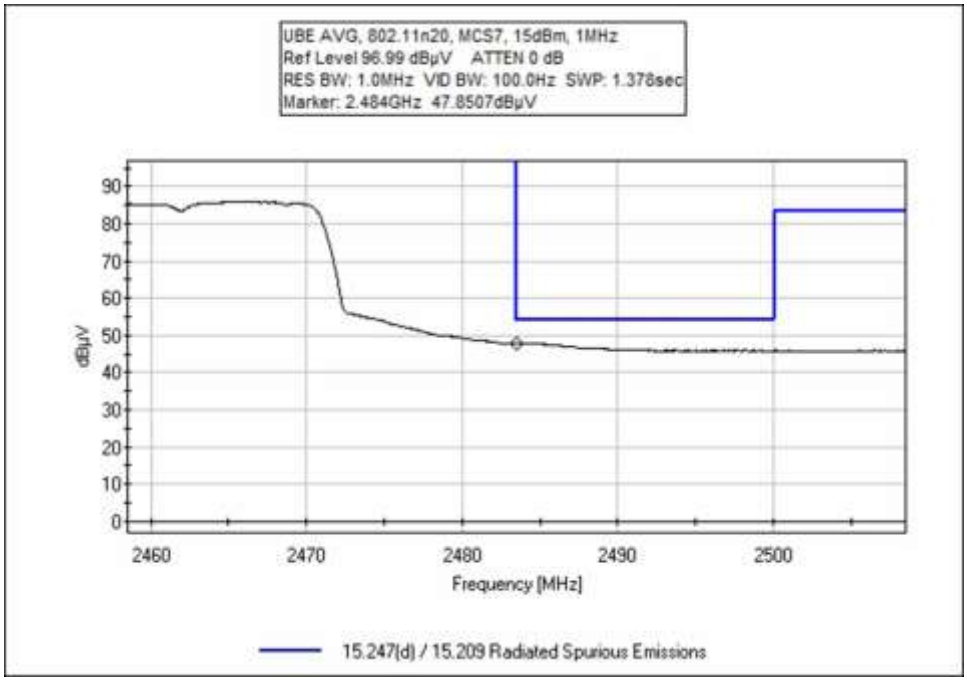

UBE AVG, 802.11g, 54Mbps, 16dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.484GHz 48.7037dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

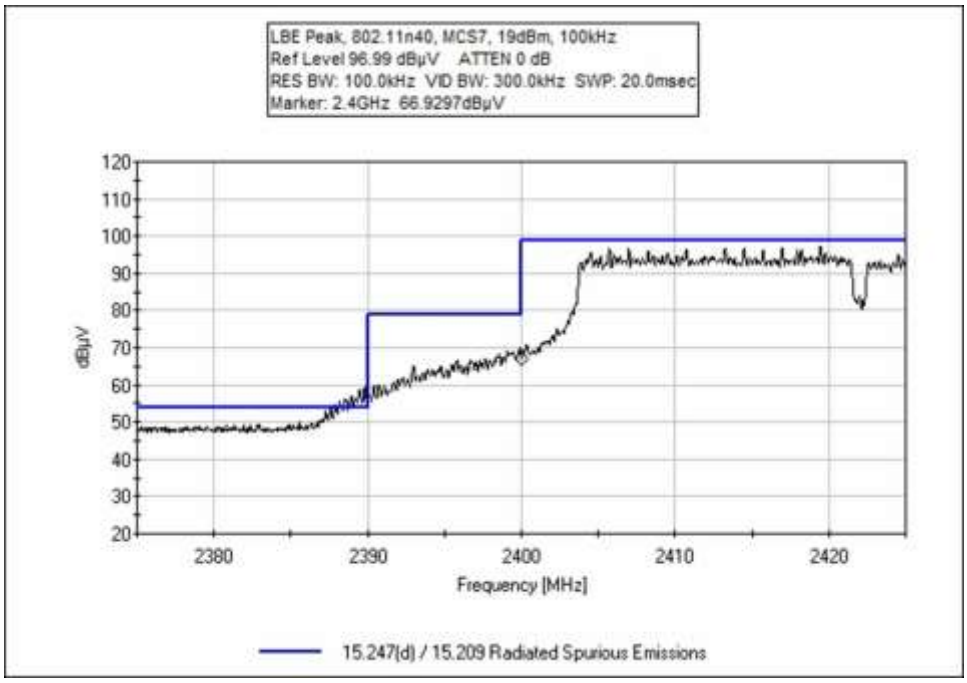

LBE Peak, 802.11n20, MCS7, 19dBm, 100kHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 2.4GHz 67.9217dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

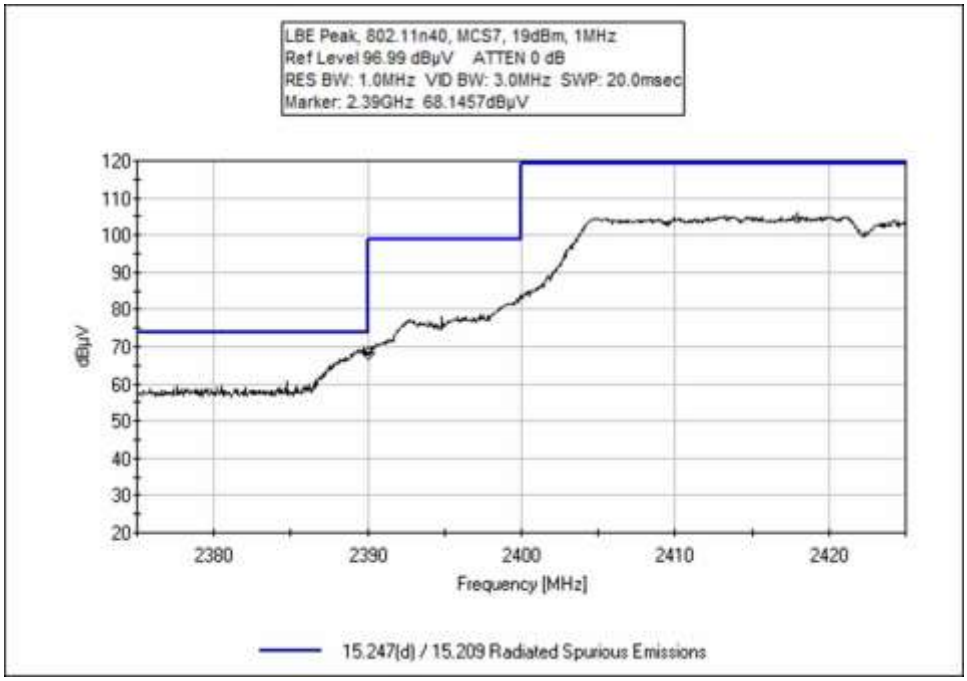

LBE Peak, 802.11n20, MCS7, 19dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.39GHz 65.2797dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

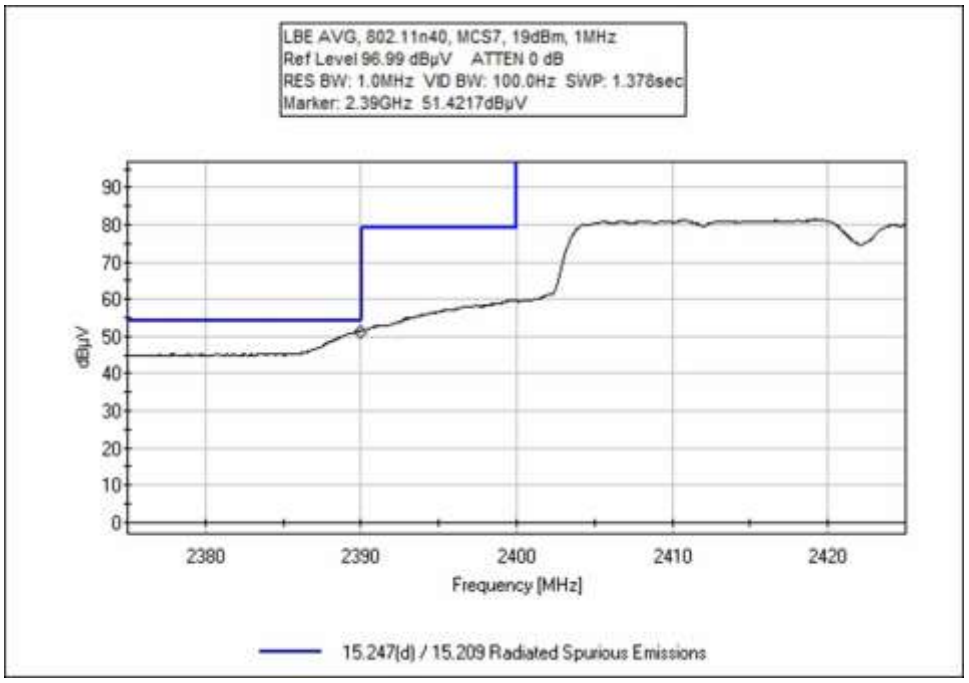

LBE AVG, 802.11n20, MCS7, 19dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.39GHz 48.4347dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

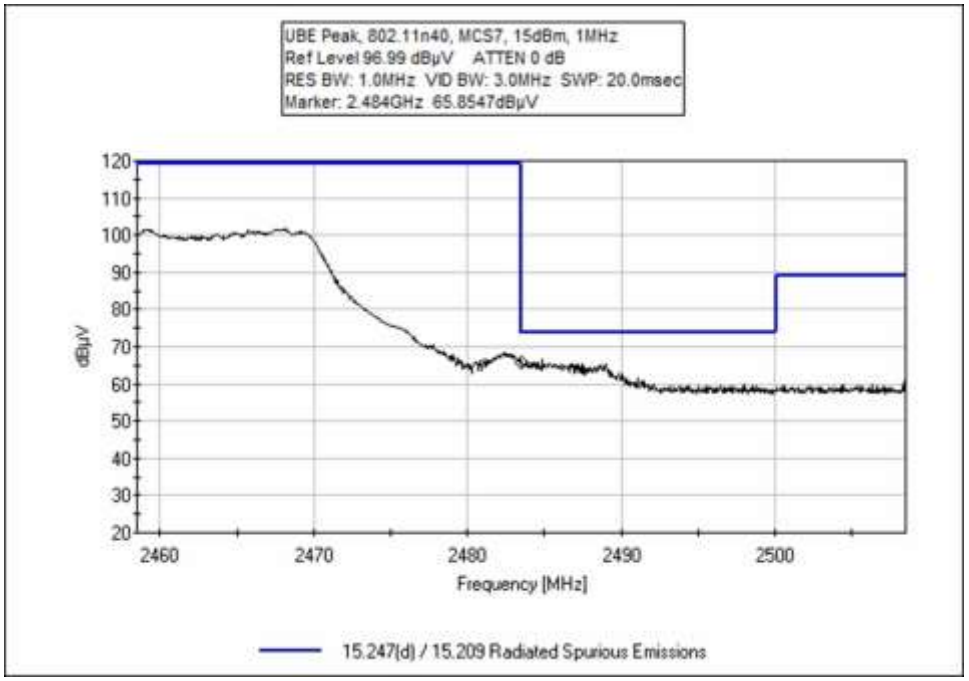

UBE Peak, 802.11n20, MCS7, 15dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.484GHz 67.5587dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

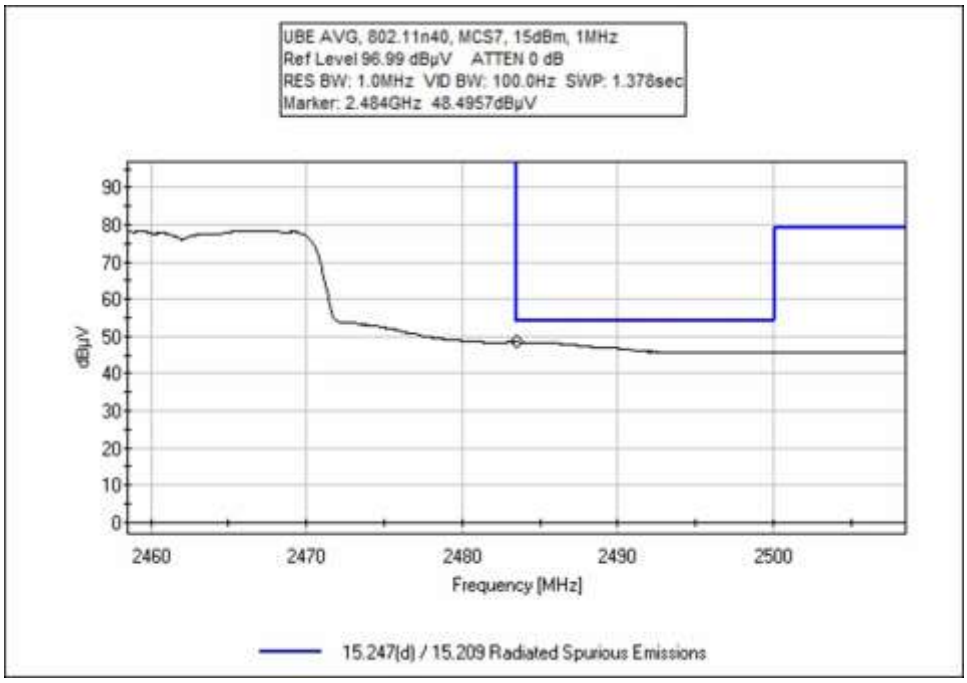

UBE AVG, 802.11n20, MCS7, 15dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.484GHz 47.8507dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
2460
2470
2480
2490
2500
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE Peak, 802.11n40, MCS7, 19dBm, 100kHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 2.4GHz 66.9297dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE Peak, 802.11n40, MCS7, 19dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.39GHz 68.1457dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE AVG, 802.11n40, MCS7, 19dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.39GHz 51.4217dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak, 802.11n40, MCS7, 15dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.484GHz 65.8547dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE AVG, 802.11n40, MCS7, 15dBm, 1MHz
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 1.378sec
Marker: 2.484GHz 48.4957dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
2460
2470
2480
2490
2500
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

Band Edge Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	12/16/2021
Test Type:	**Maximized Emissions**	Time:	10:54:18
Tested By:	M. Harrison	Sequence#:	1
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 2.39-2.4835 GHz

Setup:
Antenna 0
Channels: 2412, 2462 MHz
802.11b
Rate: 1-11MBps
PWR Output: 20 dBm
100% Duty Cycle

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2483.500M Ave	47.1	+0.0				+0.0	47.1	54.0 2462, 11Mbps, 20dBm, 1MHz	-6.9	Horiz
^	2483.500M	59.1	+0.0				+0.0	59.1	74.0 2462, 11Mbps, 20dBm, 1MHz	-14.9	Horiz
3	2390.000M Ave	45.3	+0.0				+0.0	45.3	54.0 2412, 11Mbps, 20dBm, 1MHz	-8.7	Horiz
^	2390.000M	57.7	+0.0				+0.0	57.7	74.0 2412, 11Mbps, 20dBm, 1MHz	-16.3	Horiz
5	2400.000M	57.3	+0.0				+0.0	57.3	75.0 2412, 11Mbps, 20dBm, 100kHz	-17.7	Horiz

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	12/21/2021
Test Type:	**Maximized Emissions**	Time:	08:53:15
Tested By:	M. Harrison	Sequence#:	2
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:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 2.39-2.4835 GHz

Setup:
Antenna 0
Channels: 2412, 2462 MHz
802.11g
Rate: 6-54MBps
PWR Output: Low/Mid: 20 dBm, High: 16dBm
100% Duty Cycle

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2390.000M Ave	50.1	+0.0				+0.0	50.1	54.0	-3.9	Horiz
									2412, 54MBps, 20dBm, 1MHz		
^	2390.000M	67.7	+0.0				+0.0	67.7	74.0	-6.3	Horiz
									2412, 54MBps, 20dBm, 1MHz		
3	2483.500M Ave	48.7	+0.0				+0.0	48.7	54.0	-5.3	Horiz
									2462, 54MBps, 16dBm, 1MHz		
^	2483.500M	69.4	+0.0				+0.0	69.4	74.0	-4.6	Horiz
									2462, 54MBps, 16dBm, 1MHz		
5	2400.000M	76.2	+0.0				+0.0	76.2	84.0	-7.8	Horiz
									2412, 54MBps, 20dBm, 100kHz		

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	12/21/2021
Test Type:	**Maximized Emissions**	Time:	10:30:28
Tested By:	M. Harrison	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:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 2.39-2.4835 GHz

Setup:
Antenna 0
Channels: 2412, 2462 MHz
802.11n20
Rate: MCS0-7
PWR Output: Low/Mid: 19 dBm, High: 15dBm
100% Duty Cycle

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2390.000M Ave	48.4	+0.0				+0.0	48.4	54.0 2412, MCS7, 19dBm, 1MHz	-5.6	Horiz
^	2390.000M	65.3	+0.0				+0.0	65.3	74.0 2412, MCS7, 19dBm, 1MHz	-8.7	Horiz
3	2483.500M Ave	47.9	+0.0				+0.0	47.9	54.0 2462, MCS7, 15dBm, 1MHz	-6.1	Horiz
^	2483.500M	67.6	+0.0				+0.0	67.6	74.0 2462, MCS7, 15dBm, 1MHz	-6.4	Horiz
5	2400.000M	67.9	+0.0				+0.0	67.9	83.4 2412, MCS7, 19dBm, 100kHz	-15.5	Horiz

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**106407**	Date:	12/23/2021
Test Type:	**Maximized Emissions**	Time:	07:06:14
Tested By:	M. Harrison	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:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 2.39-2.4835 GHz

Setup:
Antenna 0
Channels: 2422, 2462 MHz
802.11n40
Rate: MCS0-7
PWR Output: Low/Mid: 19 dBm, High: 15dBm
100% Duty Cycle

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
	ANP05961	Cable	Heliax	6/9/2021	6/9/2023
	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2390.000M Ave	51.4	+0.0				+0.0	51.4	54.0	-2.6	Horiz
									2422, MCS7, 19dBm, 1MHz		
^	2390.000M	68.1	+0.0				+0.0	68.1	74.0	-5.9	Horiz
									2422, MCS7, 19dBm, 1MHz		
3	2483.500M Ave	48.5	+0.0				+0.0	48.5	54.0	-5.5	Horiz
									2452, MCS7, 15dBm, 1MHz		
^	2483.500M	65.9	+0.0				+0.0	65.9	74.0	-8.1	Horiz
									2452, MCS7, 15dBm, 1MHz		
5	2400.000M	66.9	+0.0				+0.0	66.9	79.0	-12.1	Horiz
									2422, MCS7, 19dBm, 100kHz		

15.247(e) Power Spectral Density

Test Setup / Conditions / Data			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013), KDB 558074 (April 2, 2019)	Test Date(s):	1/17/2022
Configuration:	2		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: EUT is transmitting through a temporary connection to antenna port connector via UFL adapter and is attached to the spectrum analyzer. The UFL adapter has a declared manufacturer loss of 0.5dB and will be accounted for in the measurement.		

Environmental Conditions			
Temperature (ºC)	19	Relative Humidity (%):	42

Test Data Summary - RF Conducted Measurement				
Measurement Method: PKPSD				
Frequency (MHz)	**Modulation**	**Measured (dBm/3kHz)**	**Limit (dBm/3kHz)**	**Results**
2412	CCK (802.11b)	-6.8	≤8	Pass
2437	CCK (802.11b)	-4.9	≤8	Pass
2462	CCK (802.11b)	-4.8	≤8	Pass
2412	OFDM (802.11g)	-7.5	≤8	Pass
2437	OFDM (802.11g)	-7.2	≤8	Pass
2462	OFDM (802.11g)	-10.8	≤8	Pass
2412	MCS (802.11n20)	-7.7	≤8	Pass
2437	MCS (802.11n20)	-7.6	≤8	Pass
2462	MCS (802.11n20)	-12.0	≤8	Pass
2422	MCS (802.11n40)	-9.6	≤8	Pass
2437	MCS (802.11n40)	-9.7	≤8	Pass
2452	MCS (802.11n40)	-14.3	≤8	Pass

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**106121**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	14:48:57
Tested By:	Michael Atkinson	Sequence#:	1
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

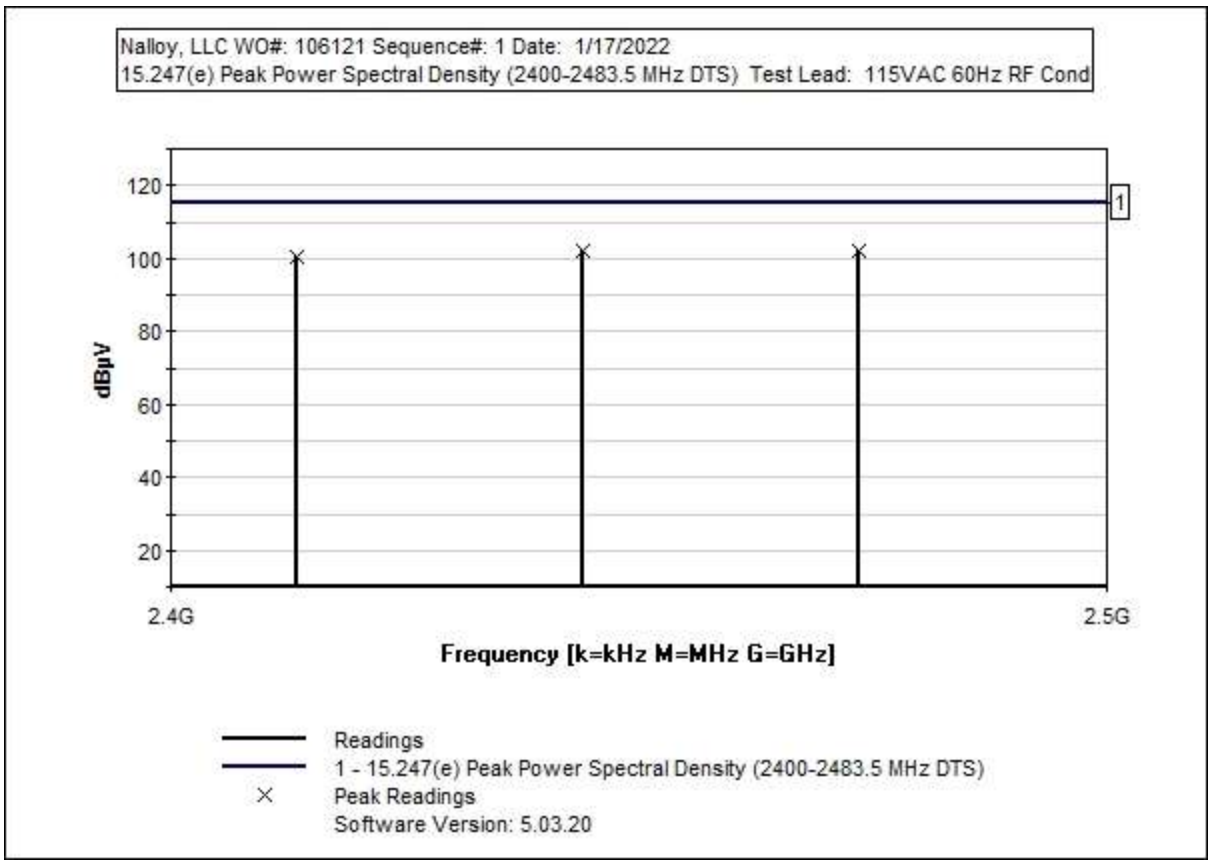
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Setup:
802.11b
Rate: 1Mbps
PWR Output Setting: 19dBm for Low Channel, 20dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2461.160M	81.2	+20.2	+0.3	+0.5		+0.0	102.2	115.0	-12.8	RF Co
2	2436.328M	81.1	+20.2	+0.3	+0.5		+0.0	102.1	115.0	-12.9	RF Co
3	2411.160M	79.2	+20.2	+0.3	+0.5		+0.0	100.2	115.0	-14.8	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**106121**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	14:58:41
Tested By:	Michael Atkinson	Sequence#:	2
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

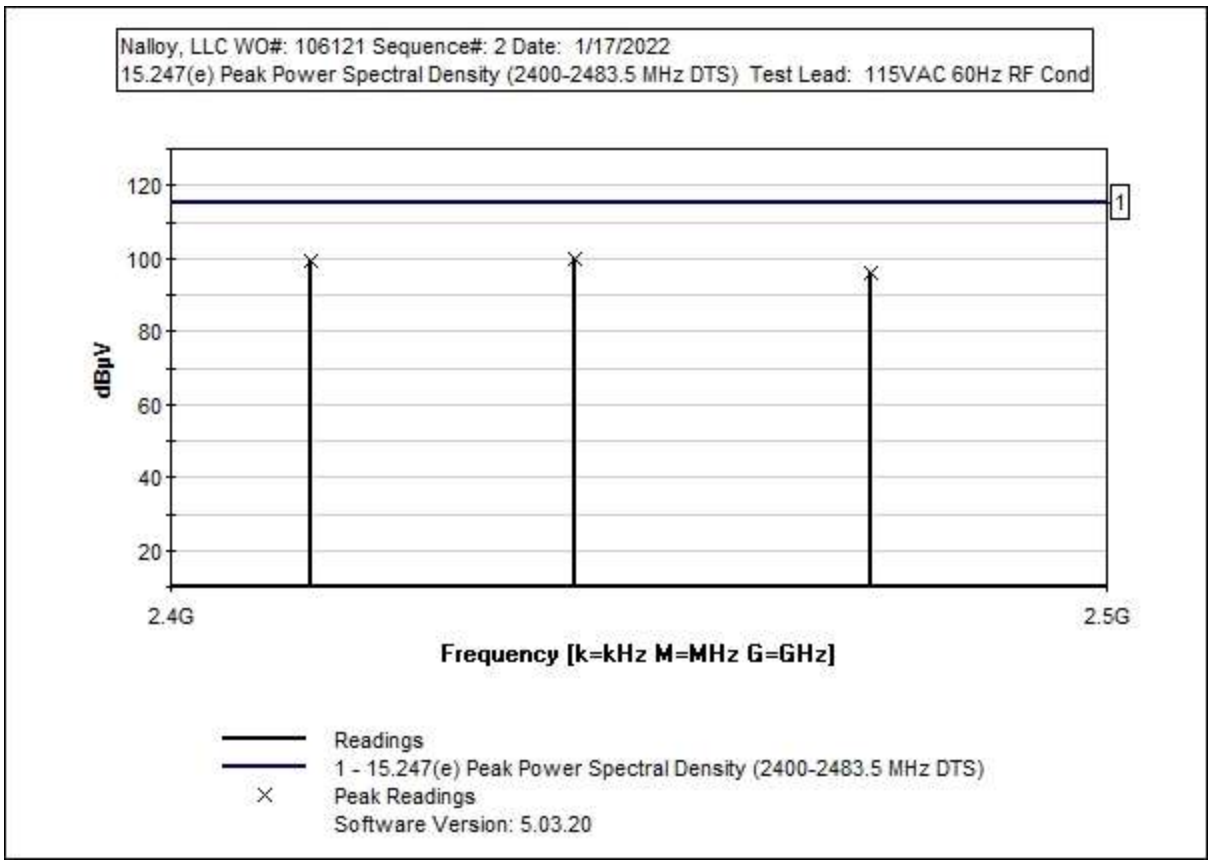
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Setup:
802.11g
Rate: 6Mbps
PWR Output Setting: 20 dBm for Low and Mid Channel, 16dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2435.728M	78.8	+20.2	+0.3	+0.5		+0.0	99.8	115.0	-15.2	RF Co
2	2412.288M	78.5	+20.2	+0.3	+0.5		+0.0	99.5	115.0	-15.5	RF Co
3	2462.264M	75.2	+20.2	+0.3	+0.5		+0.0	96.2	115.0	-18.8	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**106121**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	15:12:28
Tested By:	Michael Atkinson	Sequence#:	3
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

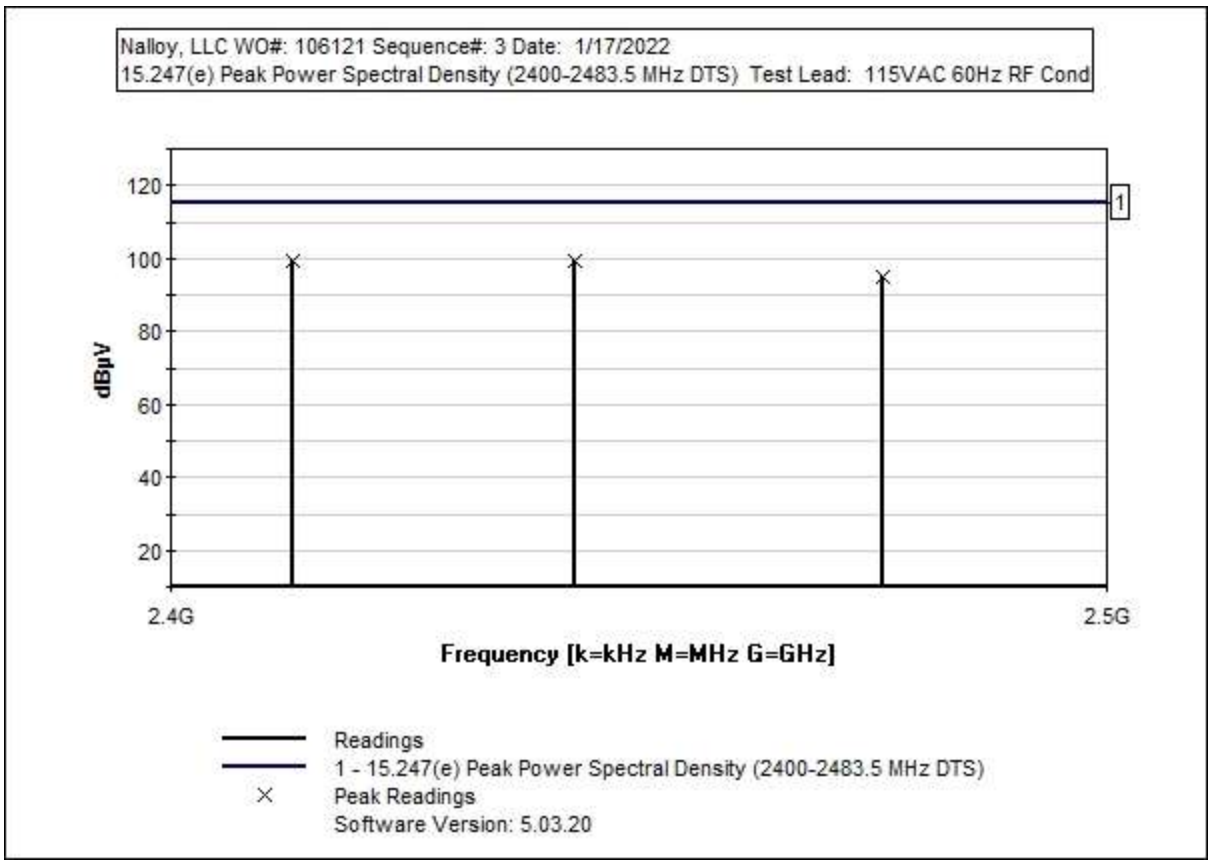
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Setup:
802.11n20
Rate: MCS0_20
PWR Output Setting: 19 dBm for Low and Mid Channel, 15dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2435.704M	78.4	+20.2	+0.3	+0.5		+0.0	99.4	115.0	-15.6	RF Co
2	2410.728M	78.3	+20.2	+0.3	+0.5		+0.0	99.3	115.0	-15.7	RF Co
3	2463.296M	74.0	+20.2	+0.3	+0.5		+0.0	95.0	115.0	-20.0	RF Co

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**106121**	Date:	1/17/2022
Test Type:	**Conducted Emissions**	Time:	15:22:16
Tested By:	Michael Atkinson	Sequence#:	4
Software:	EMITest 5.03.20		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

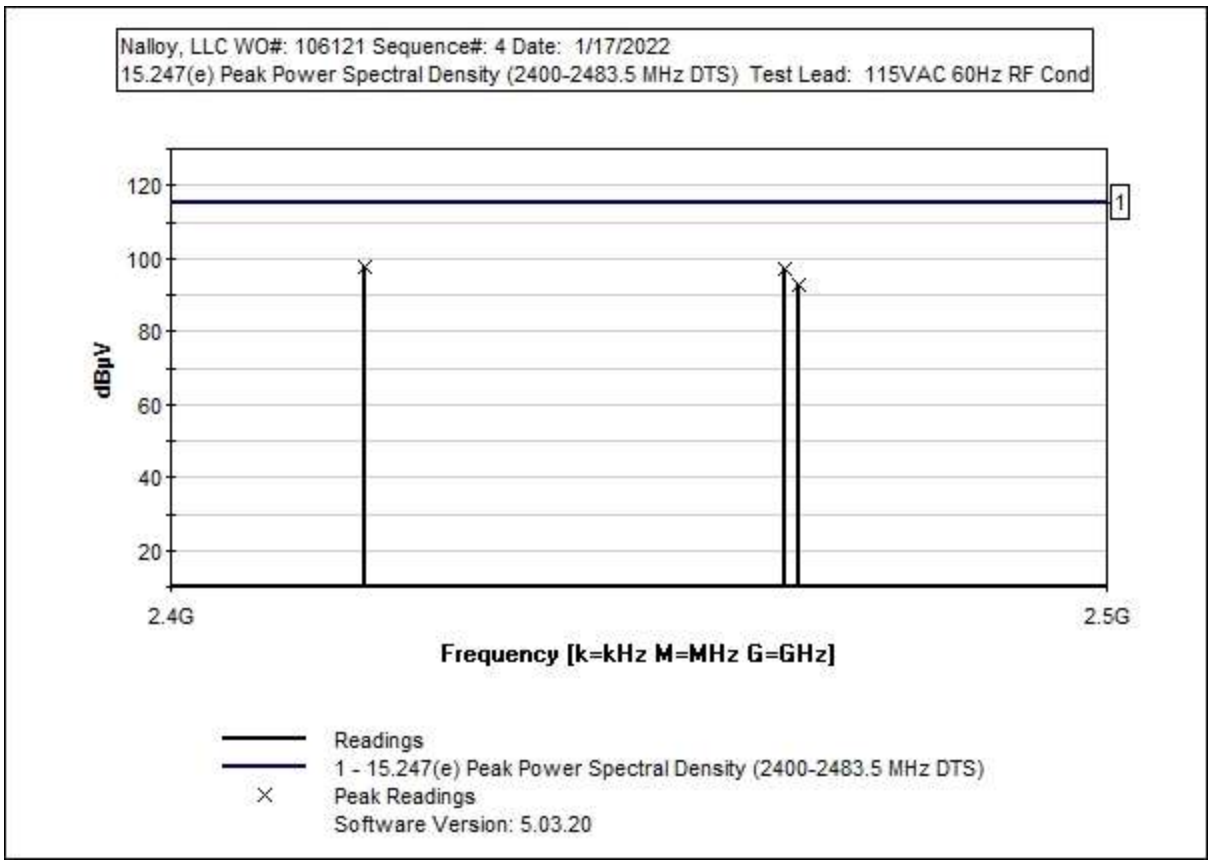
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 19°C
Humidity: 42%
Pressure: 101.5kPa

Frequency range: Fundamental

Setup:
802.11n40
Rate: MCS0_40
PWR Output Setting: 19 dBm for Low and Mid Channel, 15dBm for Mid and High Channel
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07229	Attenuator	PE7004-20	8/9/2021	8/9/2023
T2	ANP07796	Cable	Heliax	7/7/2021	7/7/2023
T3	ANUFL Adapter	Test Data Adjustment		1/14/2022	1/14/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2417.018M	76.4	+20.2	+0.3	+0.5		+0.0	97.4	115.0	-17.6	RF Co
2	2454.490M	76.3	+20.2	+0.3	+0.5		+0.0	97.3	115.0	-17.7	RF Co
3	2455.763M	71.7	+20.2	+0.3	+0.5		+0.0	92.7	115.0	-22.3	RF Co

Plots

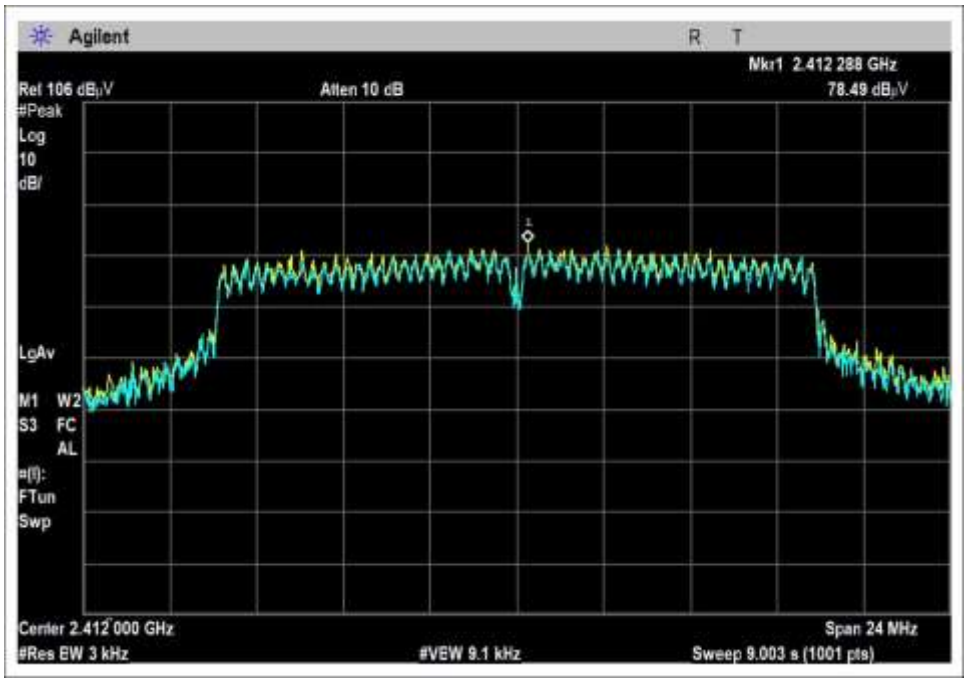
PSD 802.11b

Channel 2412

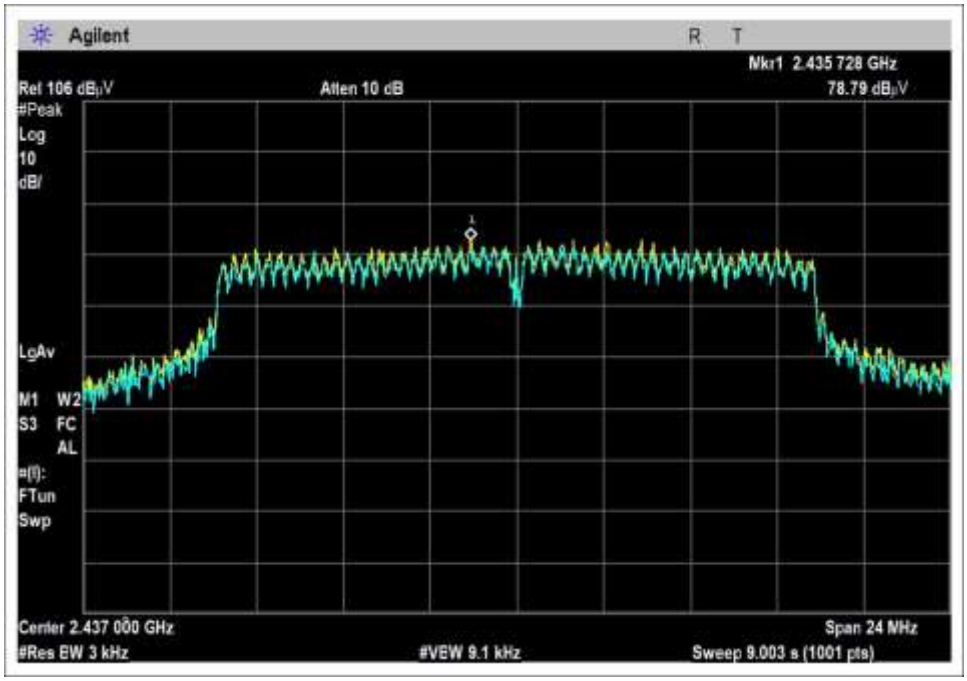
Channel 2437

Channel 2462

PSD 802.11g



Channel 2412



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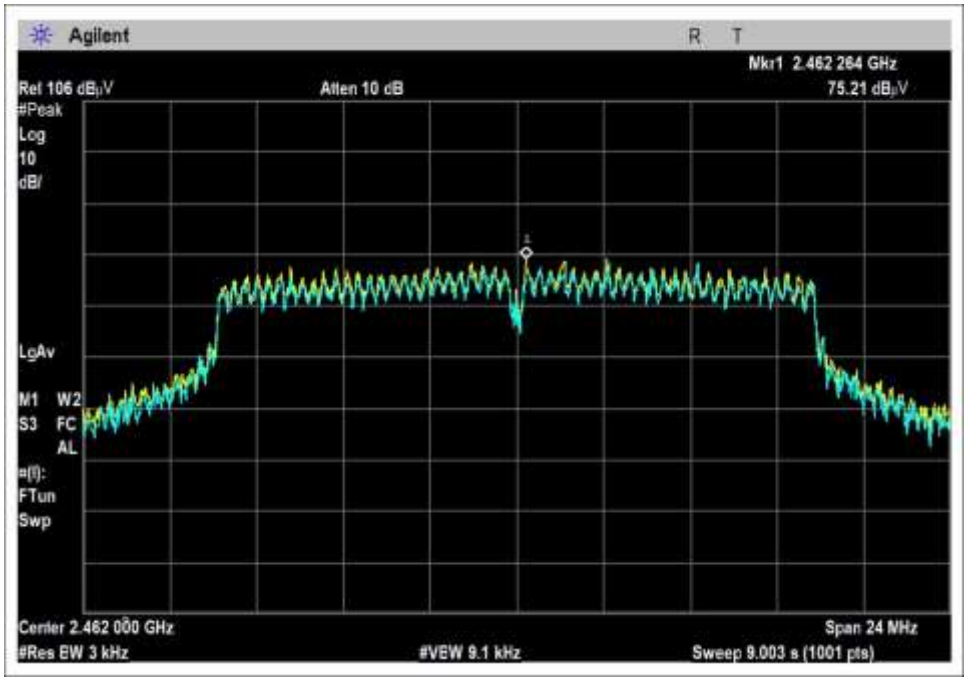
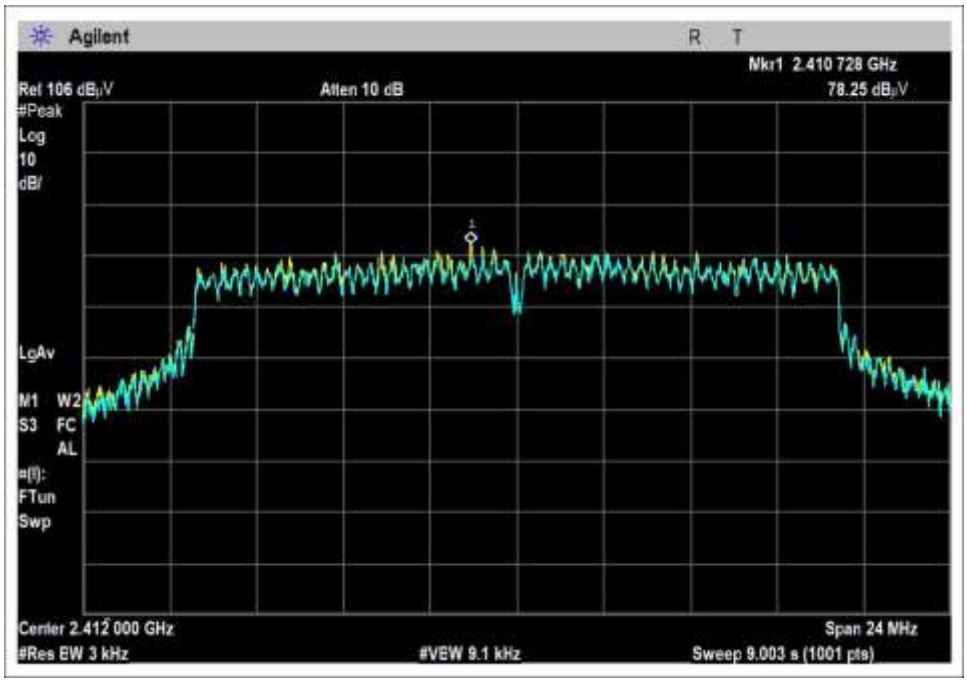
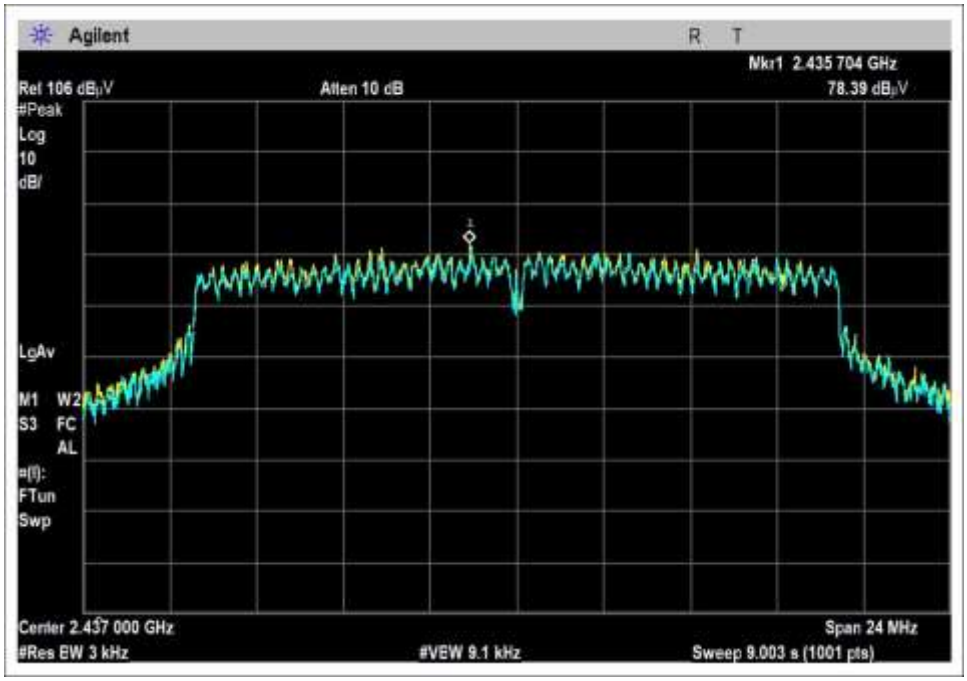


Channel 2462

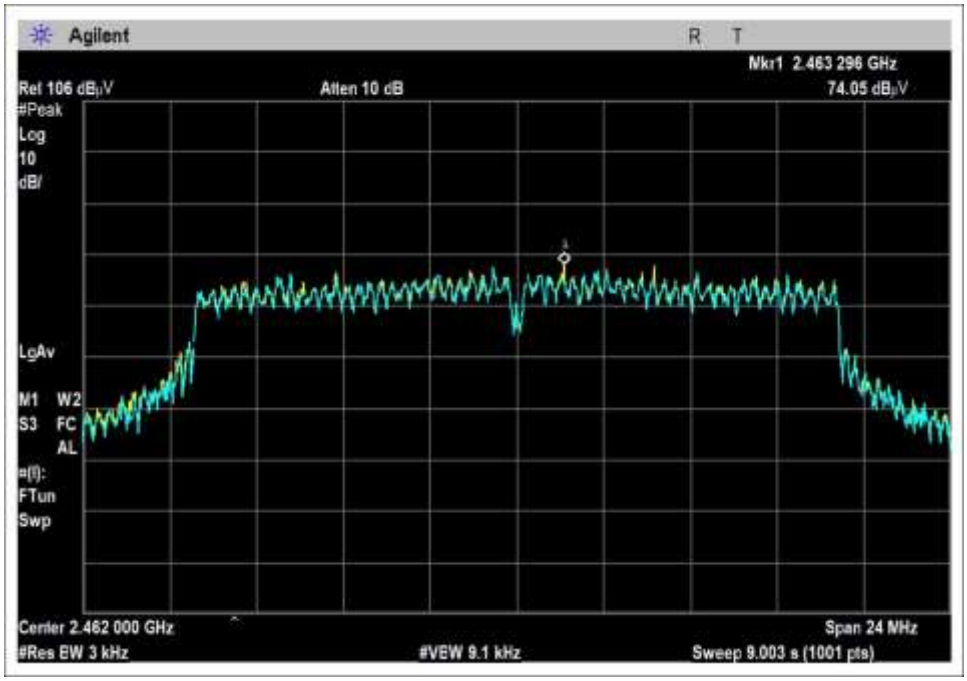
PSD 802.11n20



Channel 2412

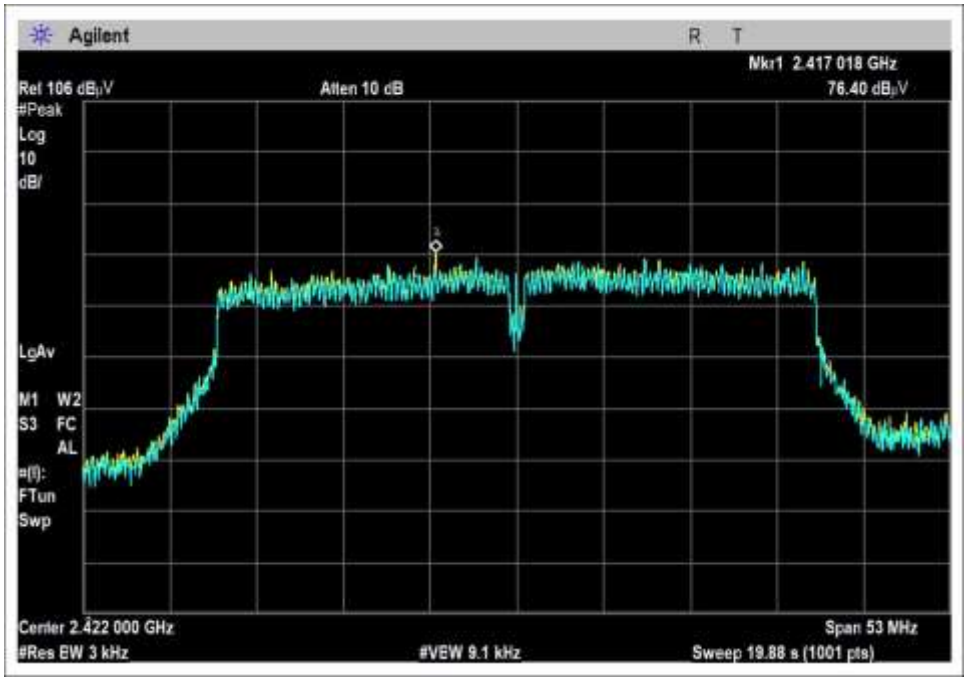


Channel 2437

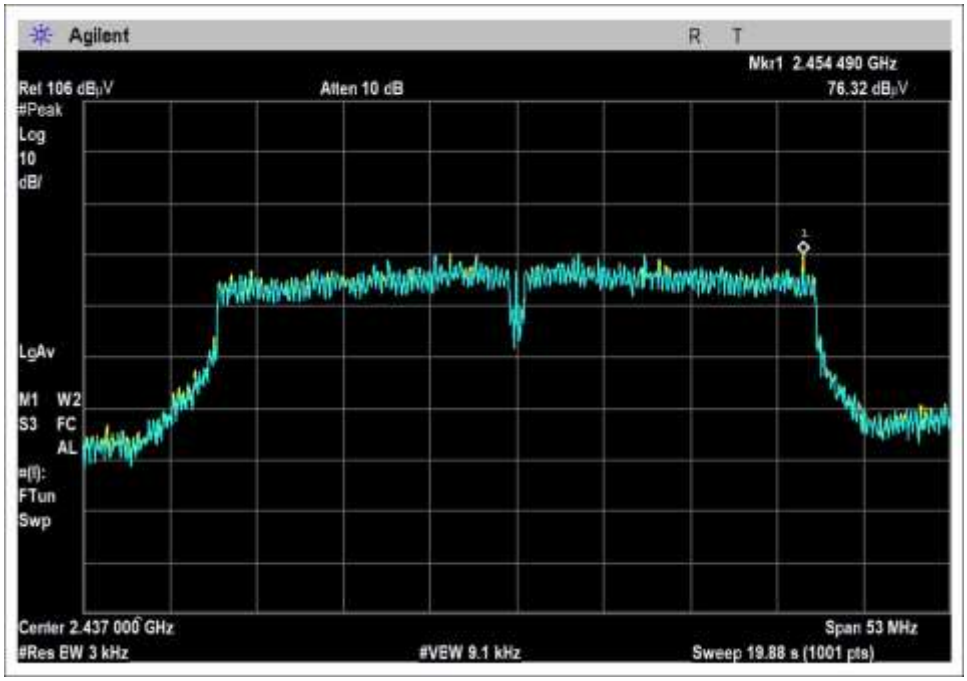


Channel 2462

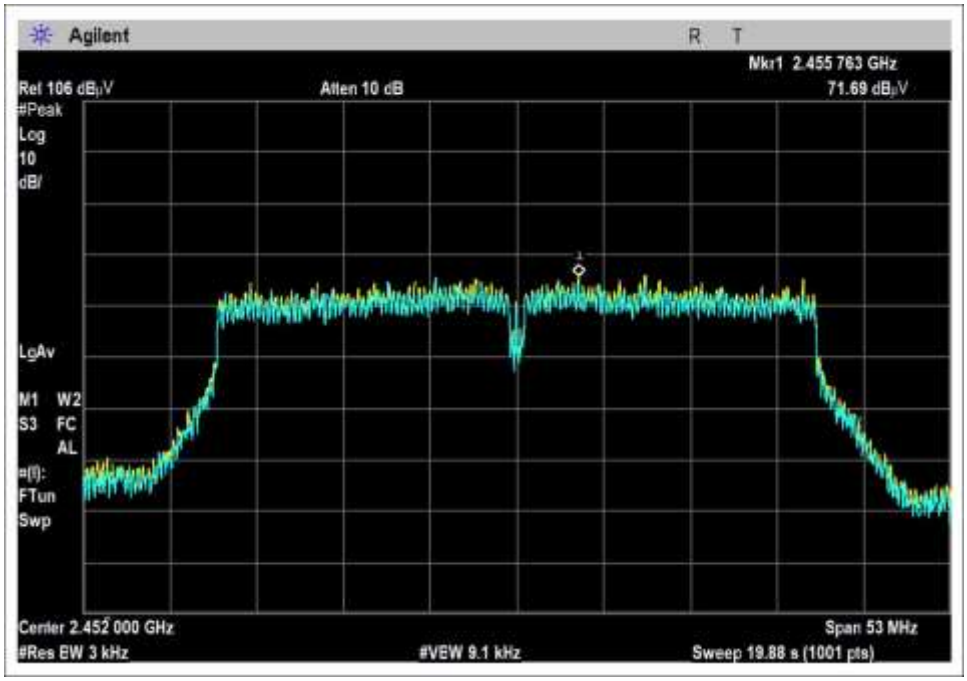
6db OBW 802.11n40



Channel 2422



Channel 2437



Channel 2452

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**106407**	Date:	1/19/2022
Test Type:	**Conducted Emissions**	Time:	08:39:37
Tested By:	M. Harrison	Sequence#:	57
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			

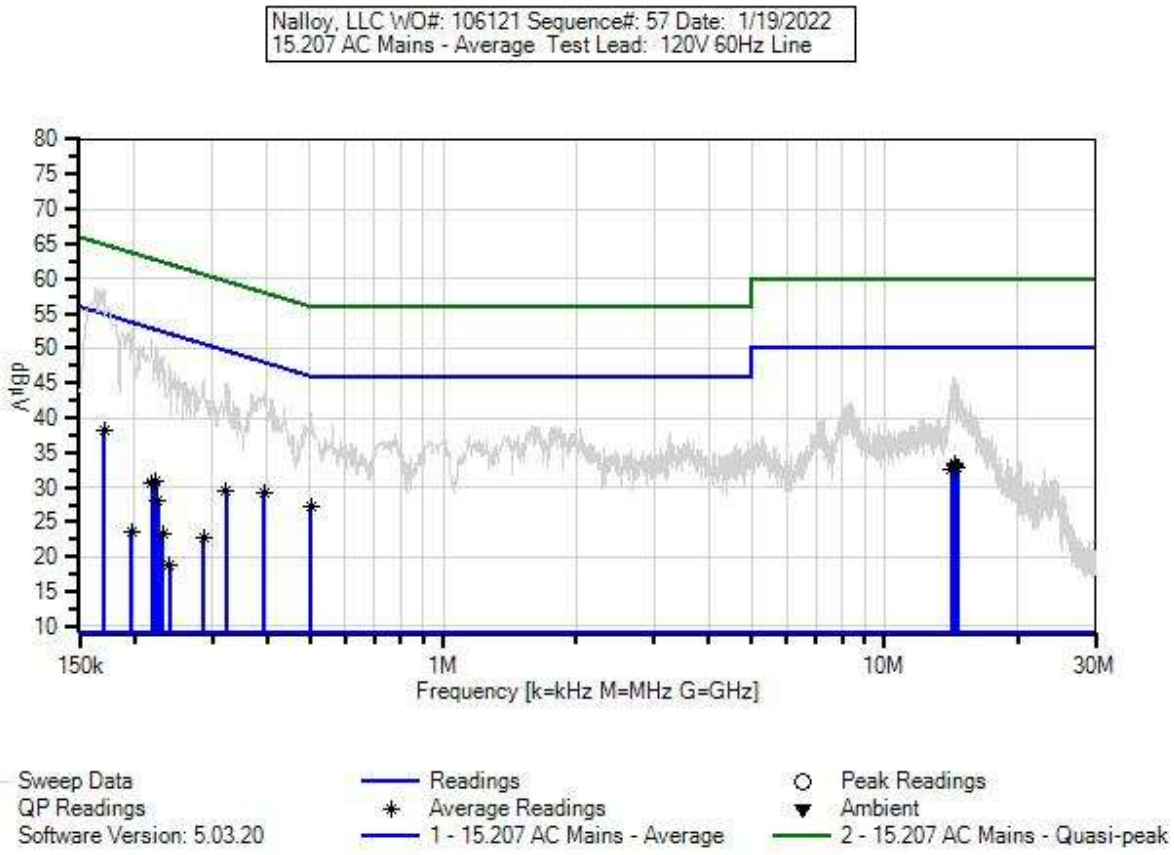
Test Conditions / Notes:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 150k-30 MHz

Setup:
Antenna 0
Channels: 2412, 2442, 2462 MHz
802.11b
Rate: 1-11MBps
PWR Output: Low: 19 dBm, Mid/High: 20 dBm
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T2	ANP06011	Cable	Heliax	8/7/2020	8/7/2022
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
T4	AN01311	50uH LISN-Line1 (L)	3816/2	2/24/2020	2/24/2022
	AN01311	50uH LISN-Line2 (N)	3816/2	2/24/2020	2/24/2022
T5	AN02611	High Pass Filter	HE9615-150K-50-720B	1/5/2022	1/5/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	170.362k	27.4	+9.1	+0.0	+0.0	+1.5	+0.0	38.3	54.9	-16.6	Line
	Ave		+0.3								
^	170.361k	47.6	+9.1	+0.0	+0.0	+1.5	+0.0	58.5	54.9	+3.6	Line
			+0.3								
3	14.355M	23.4	+9.1	+0.0	+0.2	+0.6	+0.0	33.3	50.0	-16.7	Line
	Ave		+0.0								
^	14.355M	35.9	+9.1	+0.0	+0.2	+0.6	+0.0	45.8	50.0	-4.2	Line
			+0.0								
5	14.472M	23.3	+9.1	+0.0	+0.2	+0.6	+0.0	33.2	50.0	-16.8	Line
	Ave		+0.0								
^	14.472M	35.3	+9.1	+0.0	+0.2	+0.6	+0.0	45.2	50.0	-4.8	Line
			+0.0								
7	14.643M	23.0	+9.1	+0.0	+0.2	+0.6	+0.0	32.9	50.0	-17.1	Line
	Ave		+0.0								
^	14.643M	35.1	+9.1	+0.0	+0.2	+0.6	+0.0	45.0	50.0	-5.0	Line
			+0.0								
9	14.139M	22.6	+9.1	+0.0	+0.2	+0.6	+0.0	32.5	50.0	-17.5	Line
	Ave		+0.0								
^	14.139M	34.7	+9.1	+0.0	+0.2	+0.6	+0.0	44.6	50.0	-5.4	Line
			+0.0								
11	393.614k	19.6	+9.1	+0.0	+0.0	+0.5	+0.0	29.3	48.0	-18.7	Line
	Ave		+0.1								
^	393.614k	33.7	+9.1	+0.0	+0.0	+0.5	+0.0	43.4	48.0	-4.6	Line
			+0.1								
13	502.695k	17.6	+9.1	+0.0	+0.0	+0.4	+0.0	27.2	46.0	-18.8	Line
	Ave		+0.1								
^	502.694k	31.0	+9.1	+0.0	+0.0	+0.4	+0.0	40.6	46.0	-5.4	Line
			+0.1								
15	323.075k	19.8	+9.1	+0.0	+0.0	+0.7	+0.0	29.6	49.6	-20.0	Line
	Ave		+0.0								
^	323.075k	35.2	+9.1	+0.0	+0.0	+0.7	+0.0	45.0	49.6	-4.6	Line
			+0.0								
17	223.448k	20.7	+9.1	+0.0	+0.0	+1.0	+0.0	30.9	52.7	-21.8	Line
	Ave		+0.1								
18	219.085k	20.3	+9.1	+0.0	+0.0	+1.1	+0.0	30.6	52.9	-22.3	Line
	Ave		+0.1								
^	219.084k	41.0	+9.1	+0.0	+0.0	+1.1	+0.0	51.3	52.9	-1.6	Line
			+0.1								
20	226.357k	18.0	+9.1	+0.0	+0.0	+1.0	+0.0	28.2	52.6	-24.4	Line
	Ave		+0.1								
^	223.447k	40.0	+9.1	+0.0	+0.0	+1.0	+0.0	50.2	52.7	-2.5	Line
			+0.1								
^	226.356k	38.8	+9.1	+0.0	+0.0	+1.0	+0.0	49.0	52.6	-3.6	Line
			+0.1								
23	286.715k	12.9	+9.1	+0.0	+0.0	+0.7	+0.0	22.7	50.6	-27.9	Line
	Ave		+0.0								

^	286.714k	35.7	+9.1 +0.0	+0.0	+0.0	+0.7	+0.0	45.5	50.6	-5.1	Line
25	231.447k Ave	13.2	+9.1 +0.1	+0.0	+0.0	+1.0	+0.0	23.4	52.4	-29.0	Line
^	231.447k	38.8	+9.1 +0.1	+0.0	+0.0	+1.0	+0.0	49.0	52.4	-3.4	Line
27	197.268k Ave	13.3	+9.1 +0.1	+0.0	+0.0	+1.2	+0.0	23.7	53.7	-30.0	Line
^	197.268k	42.4	+9.1 +0.1	+0.0	+0.0	+1.2	+0.0	52.8	53.7	-0.9	Line
29	240.174k Ave	8.7	+9.1 +0.1	+0.0	+0.0	+0.9	+0.0	18.8	52.1	-33.3	Line
^	240.173k	37.6	+9.1 +0.1	+0.0	+0.0	+0.9	+0.0	47.7	52.1	-4.4	Line

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Nalloy, LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**106407**	Date:	1/19/2022
Test Type:	**Conducted Emissions**	Time:	08:49:29
Tested By:	M. Harrison	Sequence#:	58
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			

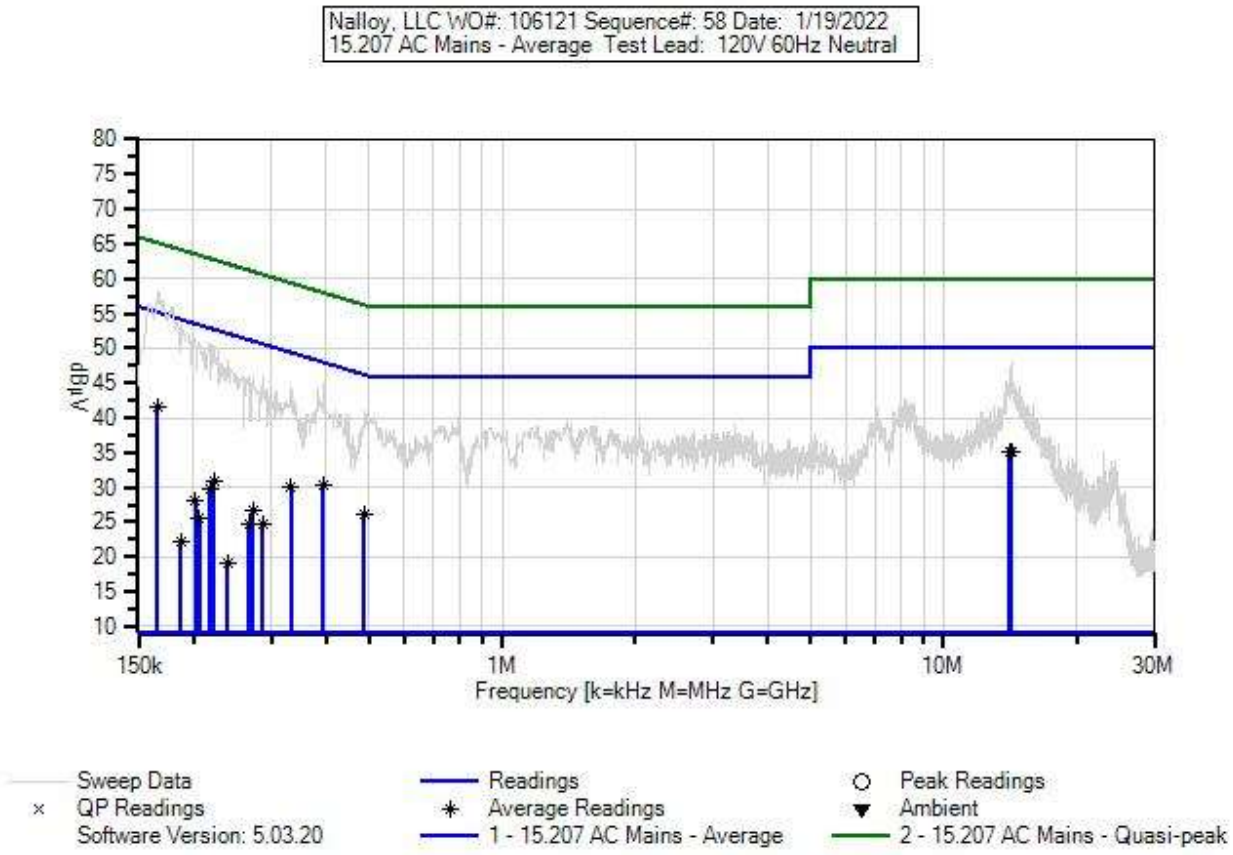
Test Conditions / Notes:

Environmental Conditions:
Temperature: 21°C
Humidity: 45%
Pressure: 101.2kPa

Method: ANSI C63.10: 2013

Frequency range: 150k-30 MHz

Setup:
Antenna 0
Channels: 2412, 2442, 2462 MHz
802.11b
Rate: 1-11MBps
PWR Output: Low: 19 dBm, Mid/High: 20 dBm
100% Duty Cycle



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T2	ANP06011	Cable	Heliax	8/7/2020	8/7/2022
T3	ANP06515	Cable	Heliax	7/1/2020	7/1/2022
	AN01311	50uH LISN-Line1 (L)	3816/2	2/24/2020	2/24/2022
T4	AN01311	50uH LISN-Line2 (N)	3816/2	2/24/2020	2/24/2022
T5	AN02611	High Pass Filter	HE9615-150K-50-720B	1/5/2022	1/5/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	165.999k	30.6	+9.1	+0.0	+0.0	+1.5	+0.0	41.6	55.2	-13.6	Neutr
	Ave		+0.4								
^	165.998k	47.2	+9.1	+0.0	+0.0	+1.5	+0.0	58.2	55.2	+3.0	Neutr
			+0.4								
3	14.256M	25.2	+9.1	+0.0	+0.2	+0.6	+0.0	35.1	50.0	-14.9	Neutr
	Ave		+0.0								
^	14.256M	38.2	+9.1	+0.0	+0.2	+0.6	+0.0	48.1	50.0	-1.9	Neutr
			+0.0								
5	14.094M	25.1	+9.1	+0.0	+0.2	+0.6	+0.0	35.0	50.0	-15.0	Neutr
	Ave		+0.0								
^	14.094M	36.7	+9.1	+0.0	+0.2	+0.6	+0.0	46.6	50.0	-3.4	Neutr
			+0.0								
7	393.614k	20.6	+9.1	+0.0	+0.0	+0.5	+0.0	30.3	48.0	-17.7	Neutr
	Ave		+0.1								
^	393.614k	35.3	+9.1	+0.0	+0.0	+0.5	+0.0	45.0	48.0	-3.0	Neutr
			+0.1								
9	333.256k	20.3	+9.1	+0.0	+0.0	+0.6	+0.0	30.0	49.4	-19.4	Neutr
	Ave		+0.0								
^	333.255k	34.7	+9.1	+0.0	+0.0	+0.6	+0.0	44.4	49.4	-5.0	Neutr
			+0.0								
11	487.424k	16.6	+9.1	+0.0	+0.0	+0.4	+0.0	26.2	46.2	-20.0	Neutr
	Ave		+0.1								
^	487.423k	31.3	+9.1	+0.0	+0.0	+0.4	+0.0	40.9	46.2	-5.3	Neutr
			+0.1								
13	221.993k	20.7	+9.1	+0.0	+0.0	+1.0	+0.0	30.9	52.7	-21.8	Neutr
	Ave		+0.1								
14	217.630k	19.5	+9.1	+0.0	+0.0	+1.1	+0.0	29.8	52.9	-23.1	Neutr
	Ave		+0.1								
^	217.630k	40.6	+9.1	+0.0	+0.0	+1.1	+0.0	50.9	52.9	-2.0	Neutr
			+0.1								
^	221.993k	40.1	+9.1	+0.0	+0.0	+1.0	+0.0	50.3	52.7	-2.4	Neutr
			+0.1								
17	272.171k	16.8	+9.1	+0.0	+0.0	+0.8	+0.0	26.7	51.1	-24.4	Neutr
	Ave		+0.0								
^	272.170k	35.9	+9.1	+0.0	+0.0	+0.8	+0.0	45.8	51.1	-5.3	Neutr
			+0.0								
19	201.632k	17.6	+9.1	+0.0	+0.0	+1.2	+0.0	28.0	53.5	-25.5	Neutr
	Ave		+0.1								
20	286.715k	14.8	+9.1	+0.0	+0.0	+0.7	+0.0	24.6	50.6	-26.0	Neutr
	Ave		+0.0								
^	286.714k	36.2	+9.1	+0.0	+0.0	+0.7	+0.0	46.0	50.6	-4.6	Neutr
			+0.0								
22	267.080k	14.7	+9.1	+0.0	+0.0	+0.8	+0.0	24.7	51.2	-26.5	Neutr
	Ave		+0.1								
^	267.080k	35.9	+9.1	+0.0	+0.0	+0.8	+0.0	45.9	51.2	-5.3	Neutr
			+0.1								

24 Ave	205.995k	15.2	+9.1 +0.1	+0.0	+0.0	+1.1	+0.0	25.5	53.4	-27.9	Neutr
^	201.631k	41.0	+9.1 +0.1	+0.0	+0.0	+1.2	+0.0	51.4	53.5	-2.1	Neutr
^	205.994k	40.6	+9.1 +0.1	+0.0	+0.0	+1.1	+0.0	50.9	53.4	-2.5	Neutr
27 Ave	187.088k	11.7	+9.1 +0.2	+0.0	+0.0	+1.3	+0.0	22.3	54.2	-31.9	Neutr
^	187.087k	42.7	+9.1 +0.2	+0.0	+0.0	+1.3	+0.0	53.3	54.2	-0.9	Neutr
29 Ave	239.446k	9.1	+9.1 +0.1	+0.0	+0.0	+0.9	+0.0	19.2	52.1	-32.9	Neutr
^	239.446k	38.3	+9.1 +0.1	+0.0	+0.0	+0.9	+0.0	48.4	52.1	-3.7	Neutr

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

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

Emissions Test Details

TESTING PARAMETERS

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

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

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

CORRECTION FACTORS

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

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

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

Peak

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

Quasi-Peak

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

Average

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