Nalloy, LLC

TEST REPORT FOR

Model: PFAY0H

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(FHSS 2400-2483.5 MHz)

Report No.: 102802-4

Date of issue: May 14, 2020

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
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Seattle, WA 98108

REPORT PREPARED BY:

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Representative: Naga Suryadevara
Customer Reference Number: 2D-03187704

Project Number: 102802

DATE OF EQUIPMENT RECEIPT: March 26, 2020
DATE(S) OF TESTING: March 26 -27, 2020
April 1 and 7, 2020

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	5.03.12

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Japan
Canyon Park, Bothell, WA	US0081	US1022	A-0136
Brea, CA	US0060	US1025	A-0136
Fremont, CA	US0082	US1023	A-0136
Mariposa, CA	US0103	US1024	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 (FHSS)

Test Procedure	Description	Modifications	Results
15.247(a)(1)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(iii)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(iii)	Average Time of Occupancy	NA	Pass
15.247(b)(1)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
15.247(d)	Radiated Emissions & Band Edge	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
None

EQUIPMENT UNDER TEST (EUT)

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

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
NA	Nalloy, LLC.	PFAY0H	9906679780

Support Equipment:

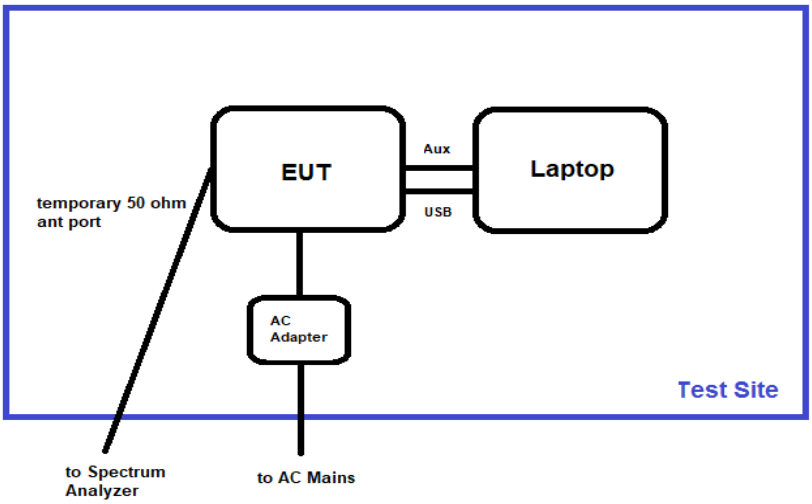
Device	Manufacturer	Model #	S/N
PC	Lenovo	81KT	YD07YGLG
PC PSU	Lenovo	ADL45WCC	NA
EUT PSU	Delta Electronics	MDS-030AAC15	24QW96P00CS

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS (Bluetooth)
Operating Frequency Range:	2402-2480 MHz
Number of Hopping Channels:	80
Receiver Bandwidth and Synchronization:	The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter.
Modulation Type(s):	GFSK, π/4 DQPSK, 8DPSK
Maximum Duty Cycle:	100% Modulated (tested worst-case)
Number of TX Chains:	1
Antenna Type(s) and Gain:	Linear Polarized / 3.7dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral (External connector provided to facilitate testing)
Nominal Input Voltage:	120VAC
Firmware / Software used for Test:	ro.build.id=PKQ1.180819.001

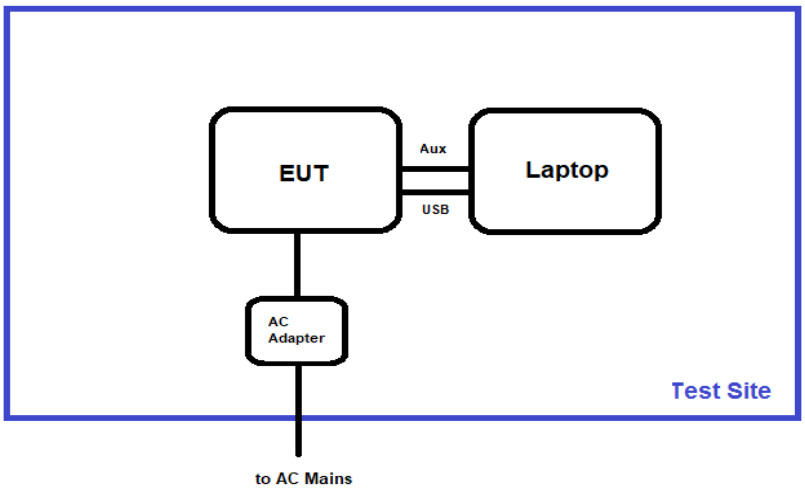
Block Diagram (s)

Test Setup Block Diagram



Tx Cond Ant Port

Test Setup Block Diagram



Tx with Antenna

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	3/26/2020
Configuration:	1		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: EUT is transmitting through the antenna port connector and is attached to the spectrum analyzer.		

Environmental Conditions			
Temperature (ºC)	22	Relative Humidity (%):	33

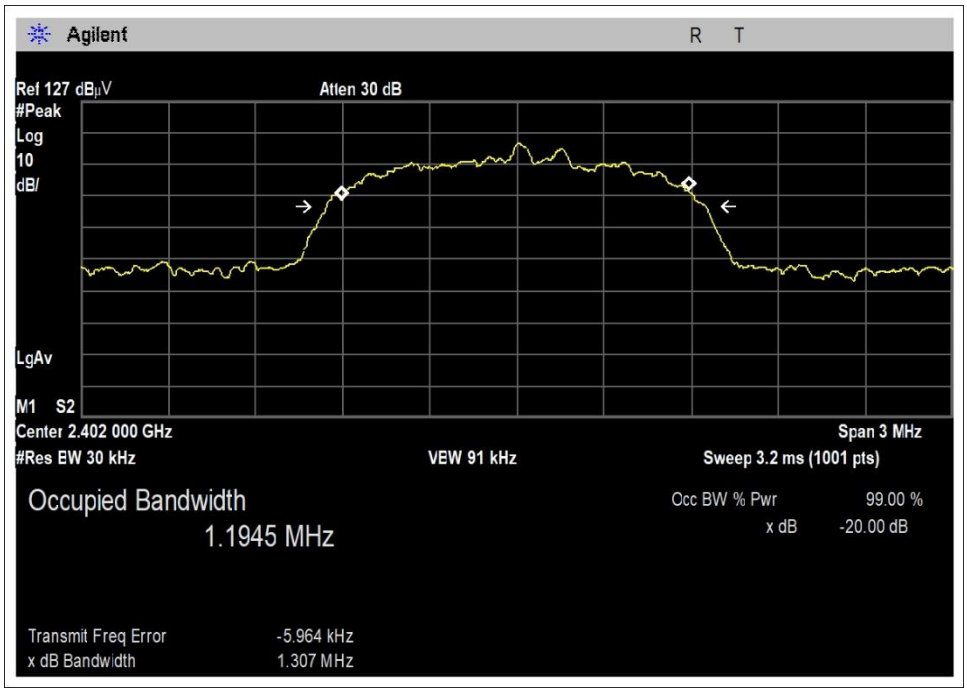
Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02673	Spectrum Analyzer	Agilent	E4446A	2/22/2019	2/22/2021

15.247(a)(1) 20 dB Bandwidth

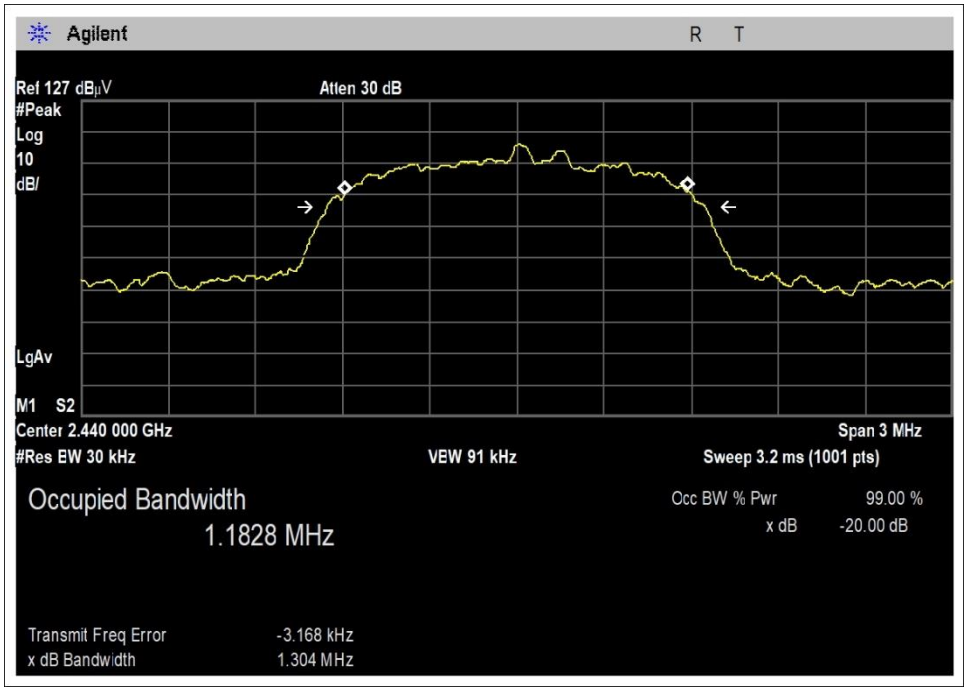
Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
2402	0	GFSK	946.4	None	NA
2440	0	GFSK	942.9		
2480	0	GFSK	943.3		
2402	0	π/4 DQPSK	1291	None	NA
2440	0	π/4 DQPSK	1289		
2480	0	π/4 DQPSK	1290		
2402	0	8DPSK	1307	None	NA
2440	0	8DPSK	1304		
2480	0	8DPSK	1308		

NA = Not applicable

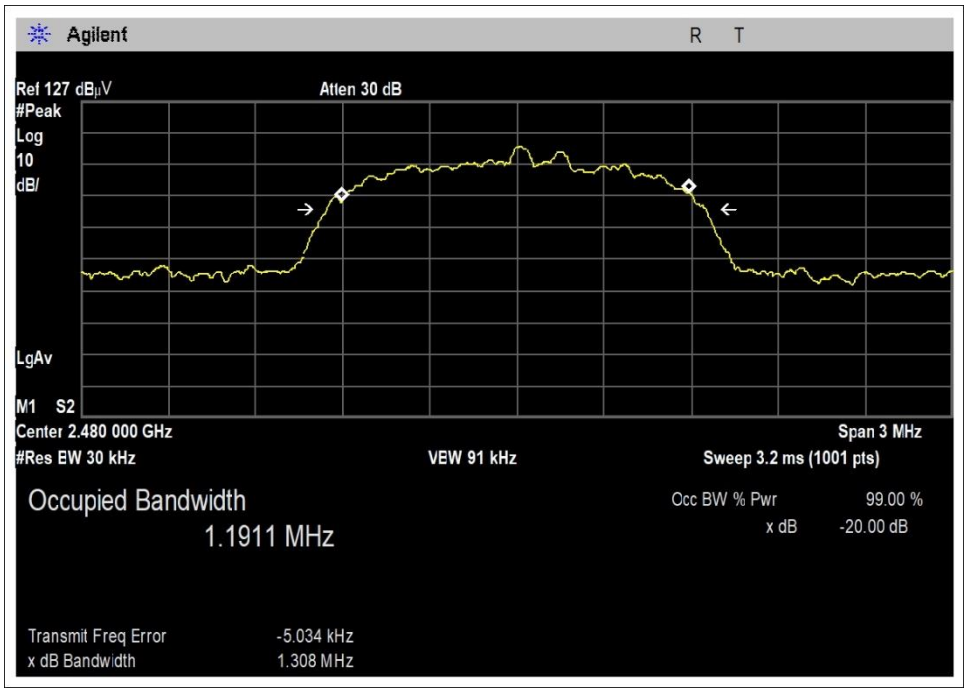
8DPSK Plot(s)



Low Channel

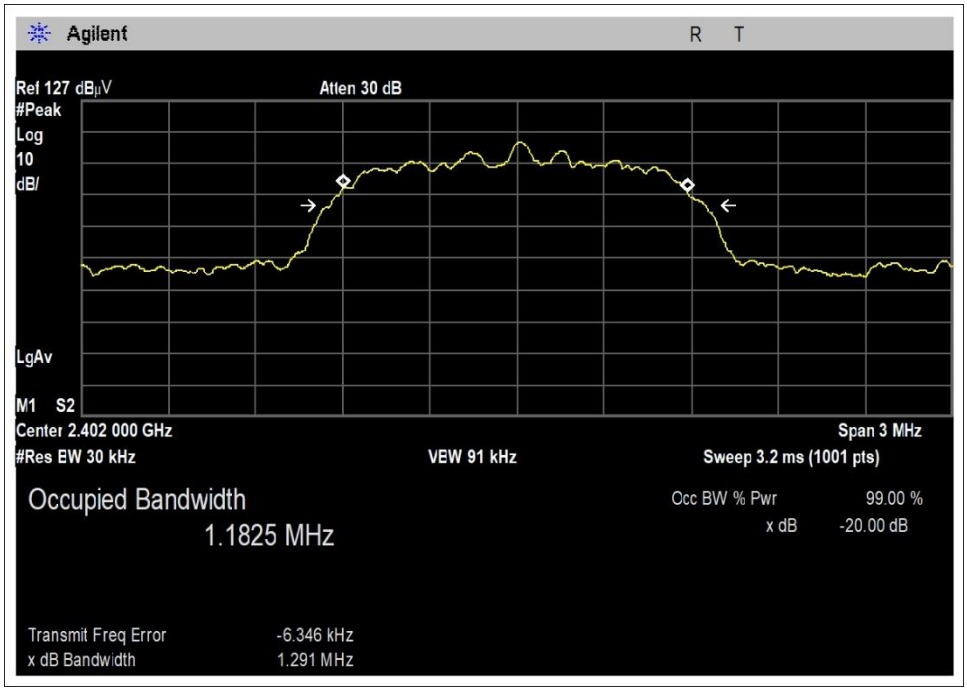


Middle Channel



High Channel

DQPSK Plot(s)



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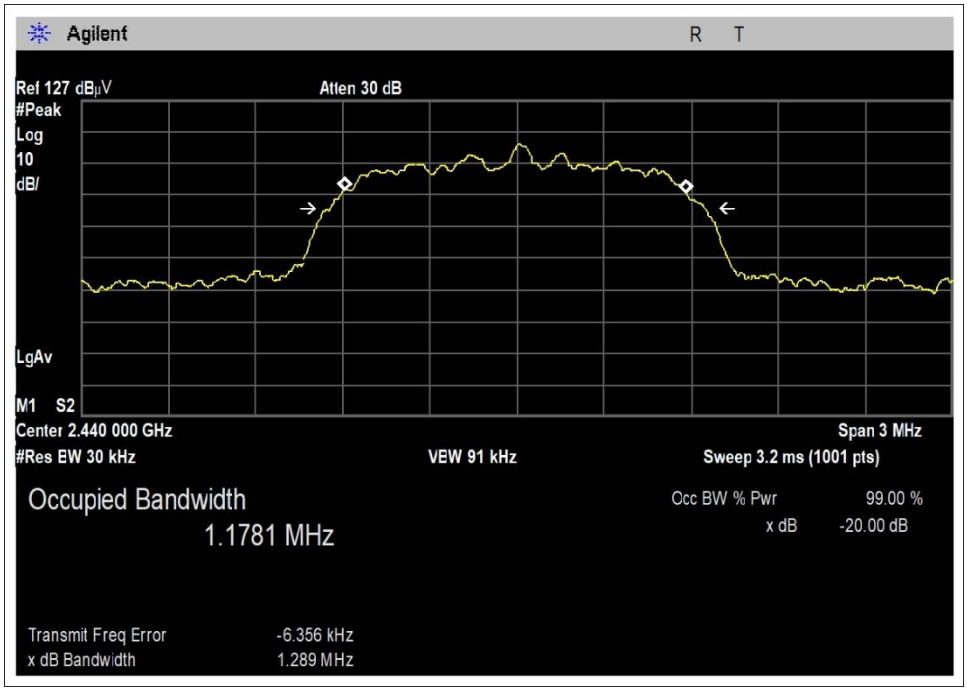
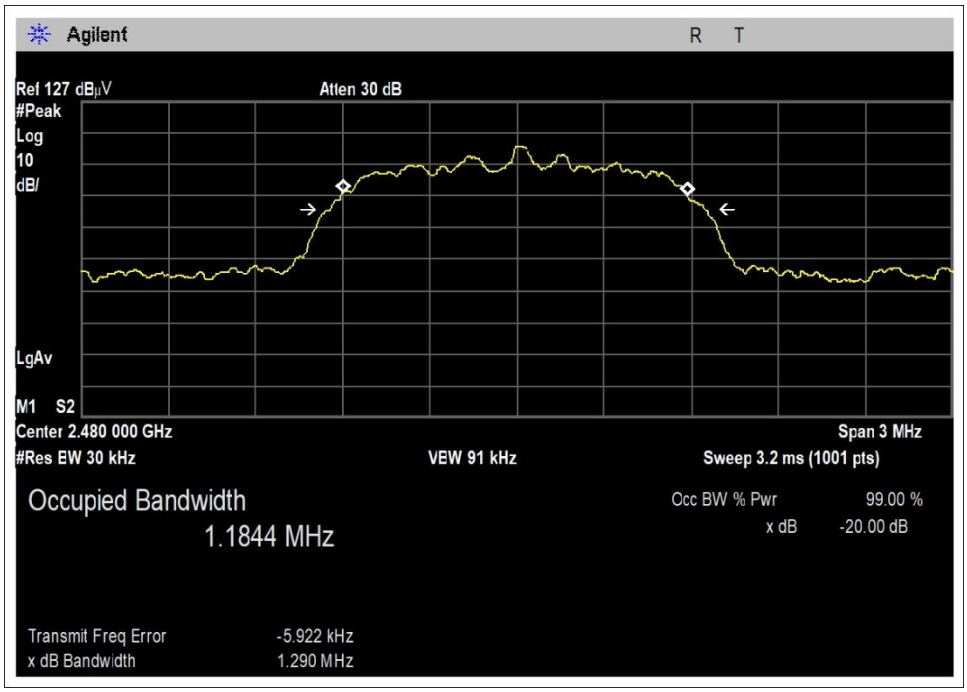
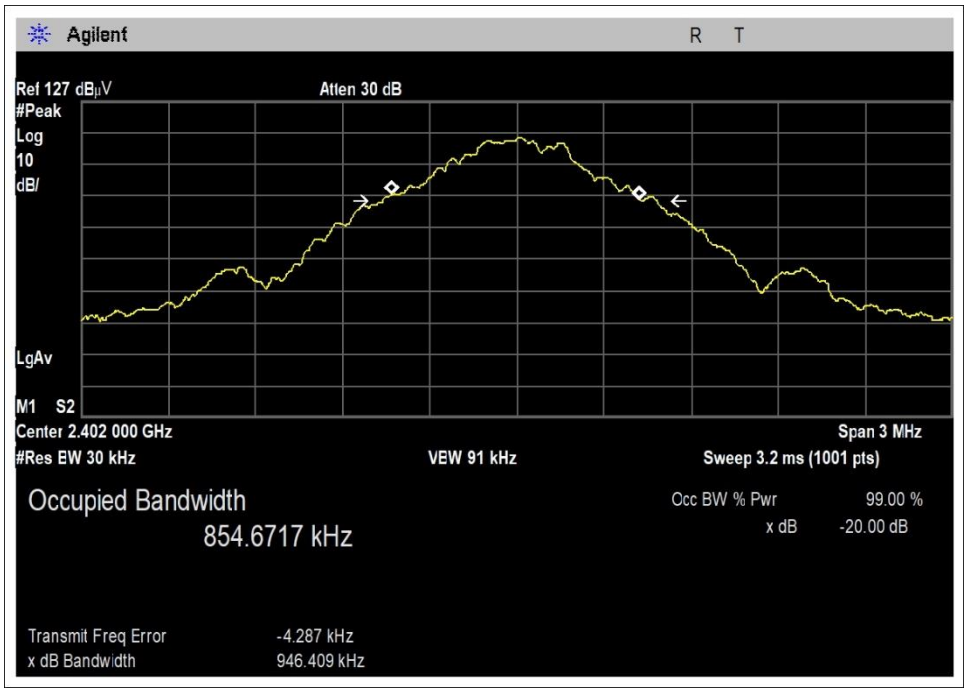


Middle Channel

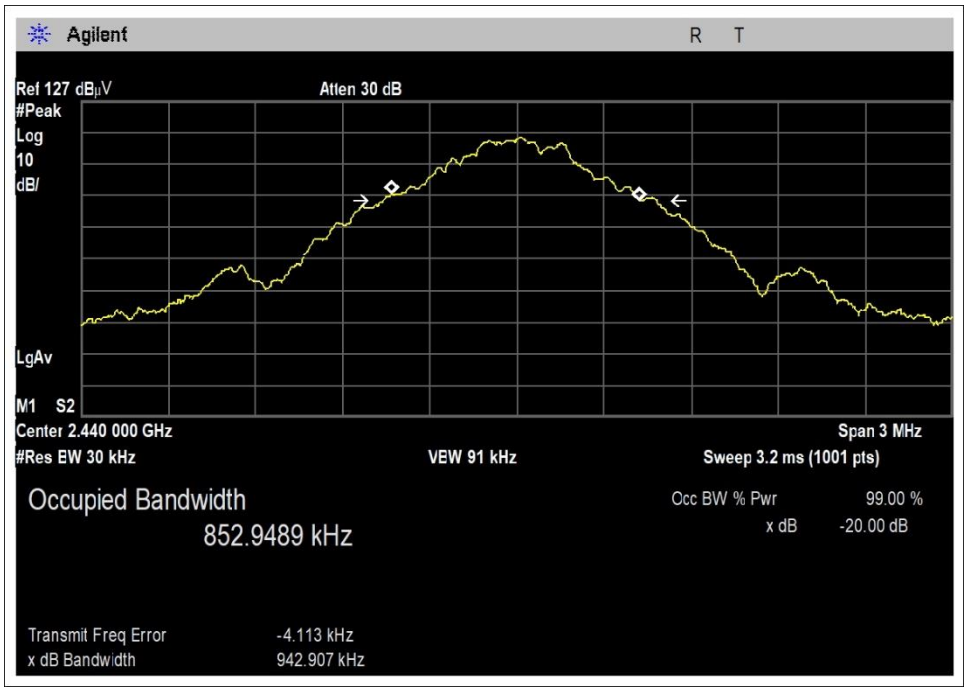


High Channel

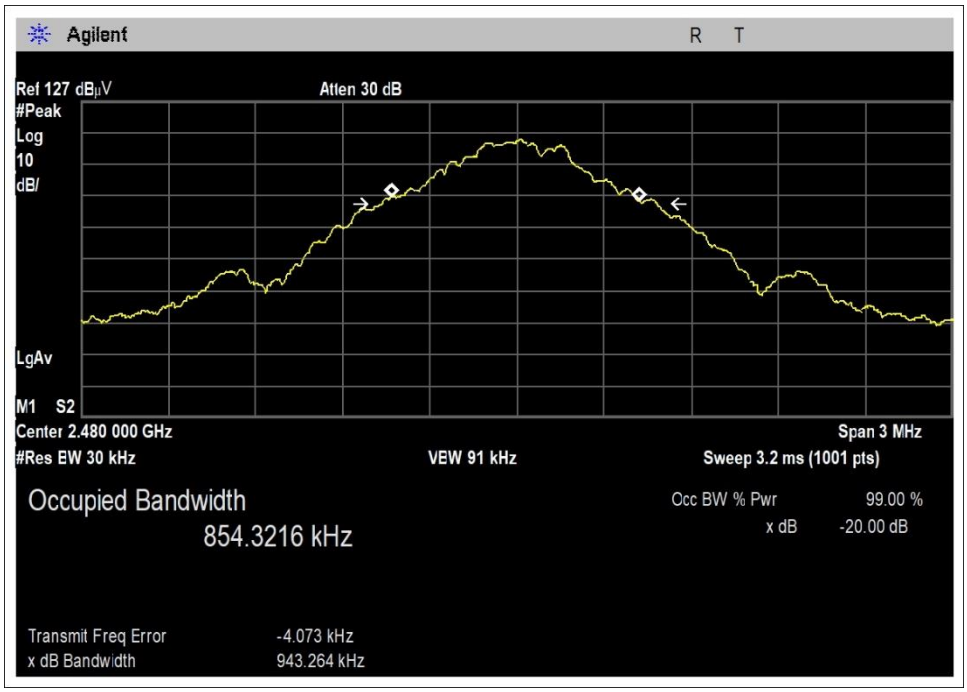
GFSK Plot(s)



Low Channel



Middle Channel

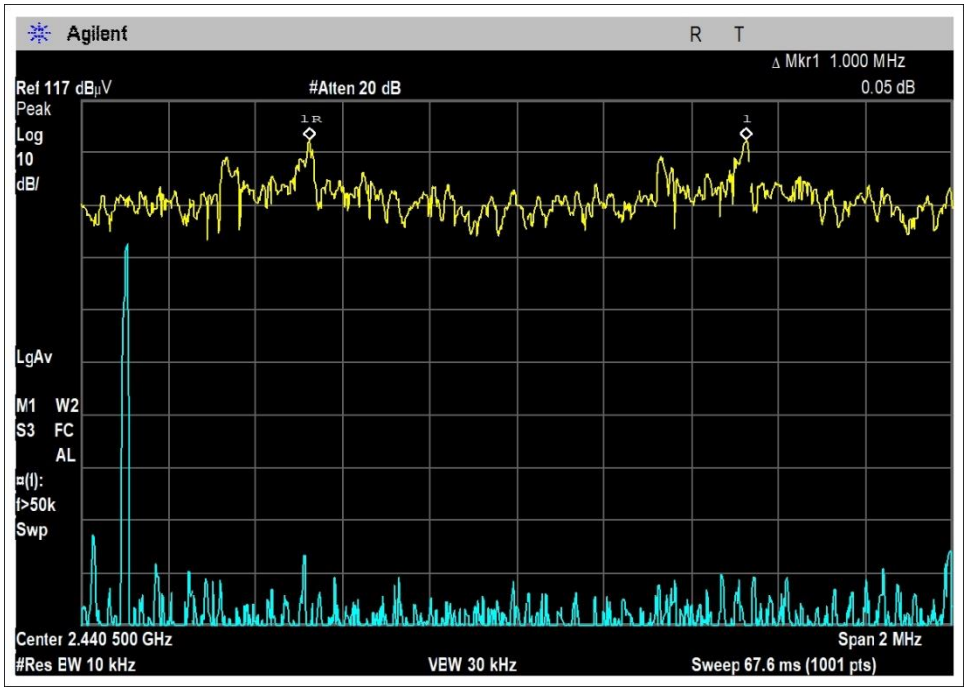


High Channel

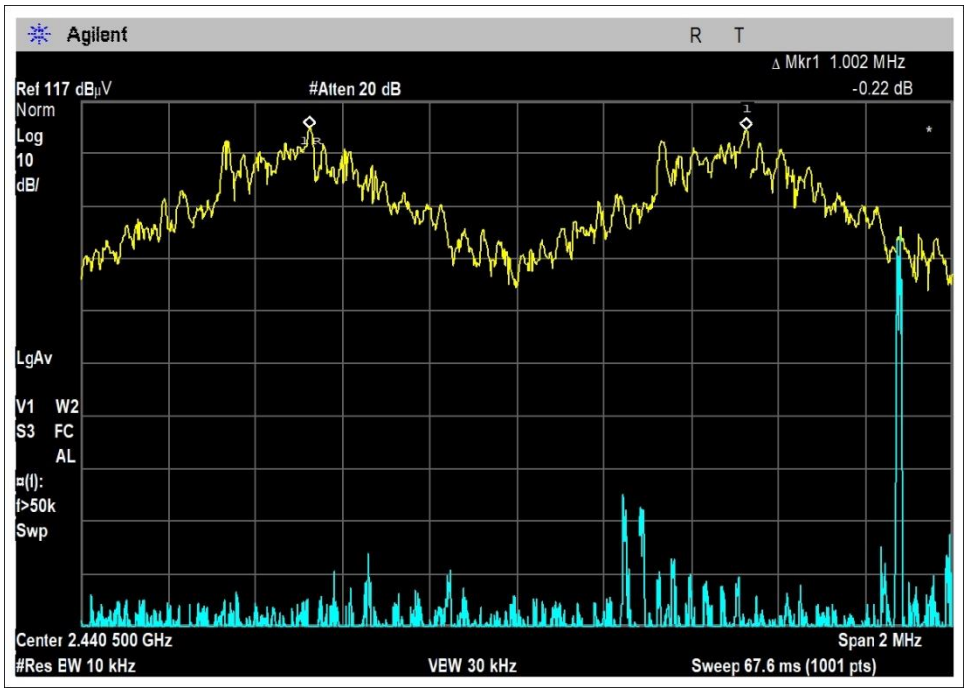
15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: two-thirds of the 20dB bandwidth of the hopping channel for devices with output power <125mW.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
0	GFSK	1002	≥631	Pass
0	π/4 DQPSK	1000	≥861	Pass
0	8DPSK	1000	≥872	Pass

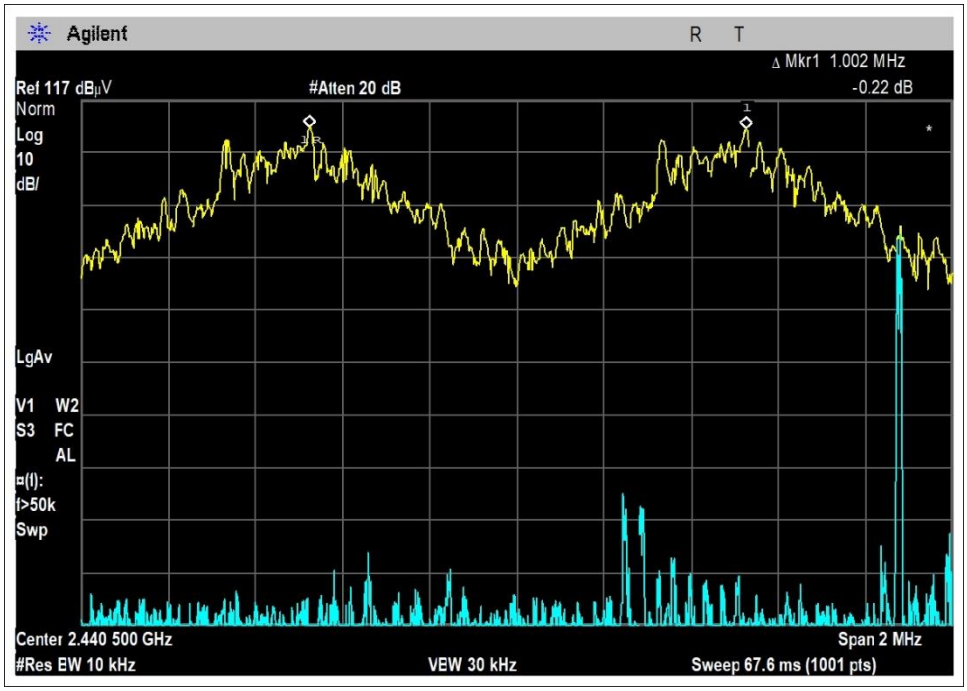
Plot(s)



8DPSK


Agilent
R T
Δ Mkr1 1.002 MHz
Ref 117 dBµV
#Atten 20 dB
-0.22 dB
Norm
Log
10
dB/
LgAv
V1 W2
S3 FC
AL
¤(f):
f>50k
Swp
Center 2.440 500 GHz
Span 2 MHz
#Res EW 10 kHz
VEW 30 kHz
Sweep 67.6 ms (1001 pts)

DQPSK

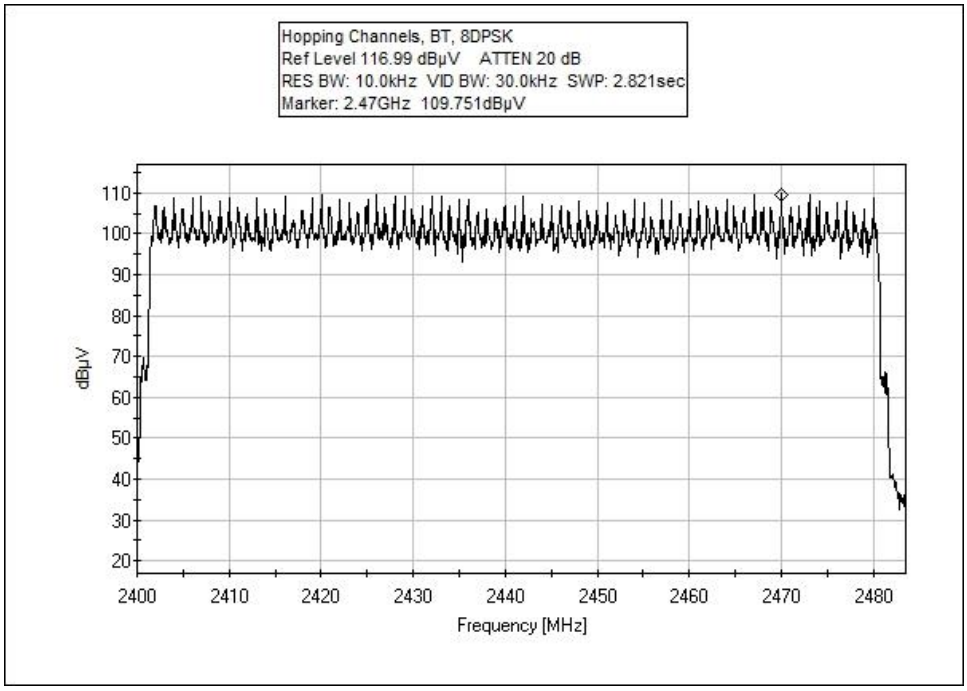

Agilent
R T
Δ Mkr1 1.002 MHz
Ref 117 dBµV
#Atten 20 dB
-0.22 dB
Norm
Log
10
dB/
LgAv
V1 W2
S3 FC
AL
¤(f):
f>50k
Swp
Center 2.440 500 GHz
Span 2 MHz
#Res EW 10 kHz
VEW 30 kHz
Sweep 67.6 ms (1001 pts)

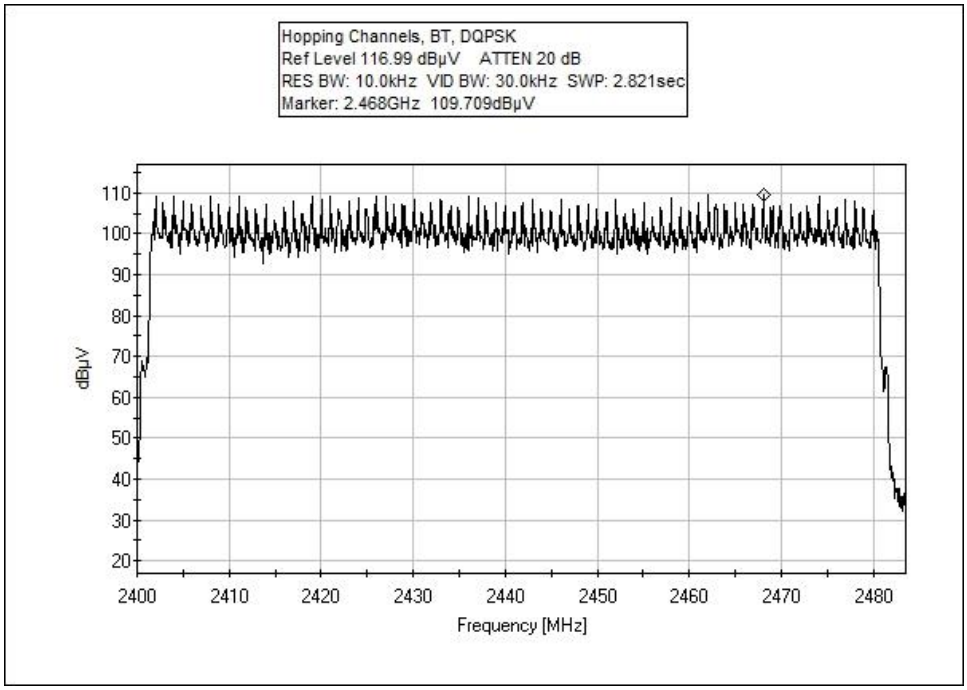
GFSK

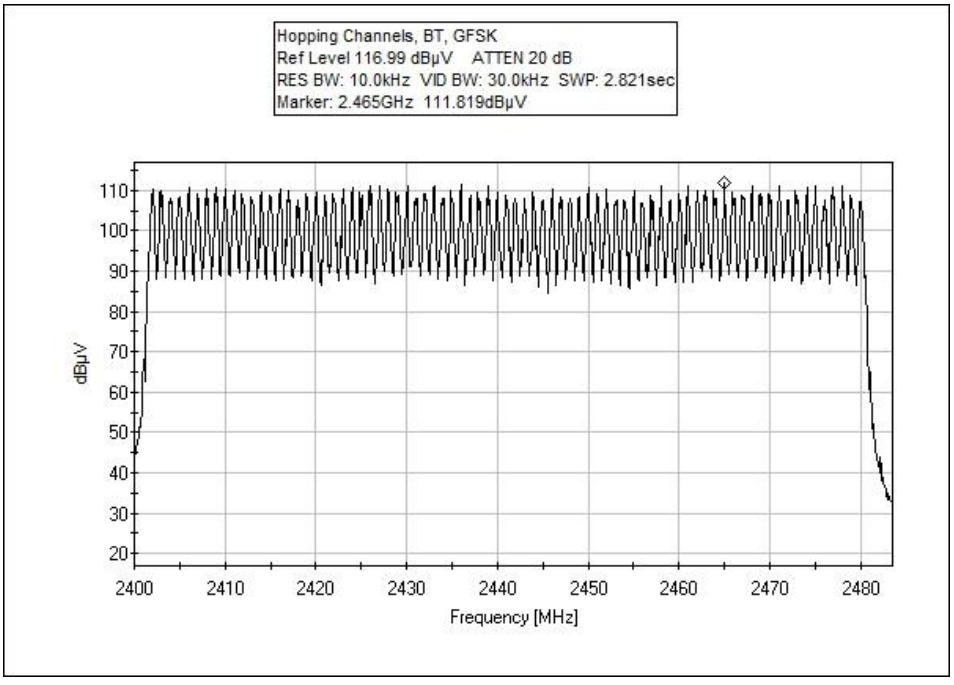
15.247(a)(1)(iii) Number of Channels

Test Data Summary				
Limit applied: 15; for equipment with power output < 125 mW..				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
0	GFSK	79	≥15	Pass
0	π/4 DQPSK	79	≥15	Pass
0	8DPSK	79	≥15	Pass

Plot(s)




Hopping Channels, BT, DQPSK
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 10.0kHz VID BW: 30.0kHz SWP: 2.821sec
Marker: 2.468GHz 109.709dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
2400
2410
2420
2430
2440
2450
2460
2470
2480
Frequency [MHz]


Hopping Channels, BT, GFSK
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 10.0kHz VID BW: 30.0kHz SWP: 2.821sec
Marker: 2.465GHz 111.819dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
2400
2410
2420
2430
2440
2450
2460
2470
2480
Frequency [MHz]

15.247(a)(1)(iii) Time of Occupancy

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = 0.4\ x \max number\ of\ hopping\ channels$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
0	GFSK	0.84	≤400	Pass
0	π/4 DQPSK	0.85	≤400	Pass
0	8DPSK	0.85	≤400	Pass

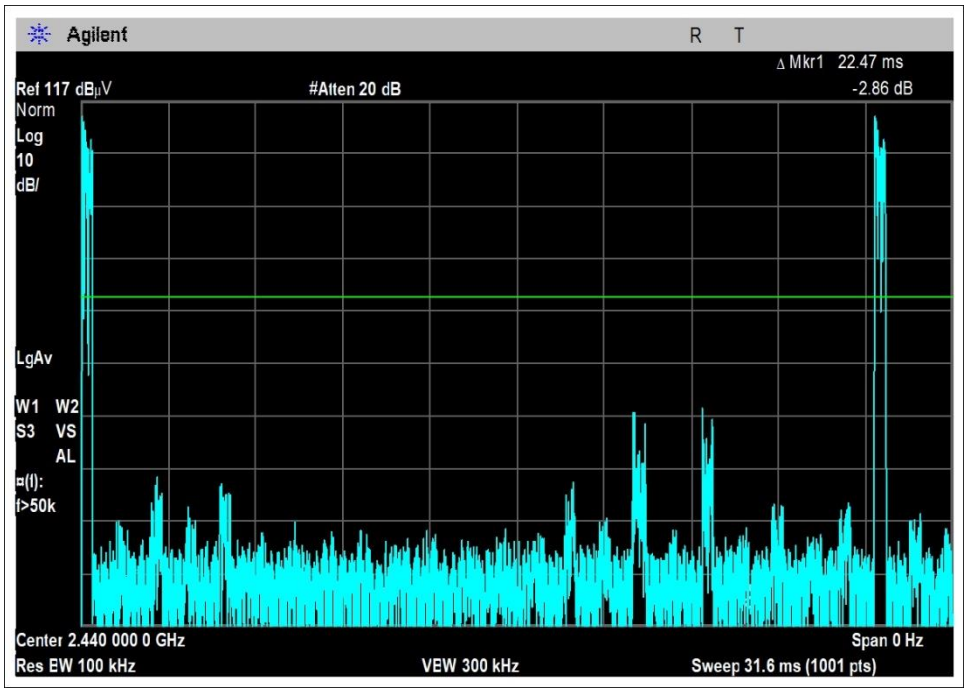
Measured results are calculated as follows:

$$Dwell\ time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right)\Big|_{P_{obs}}$$

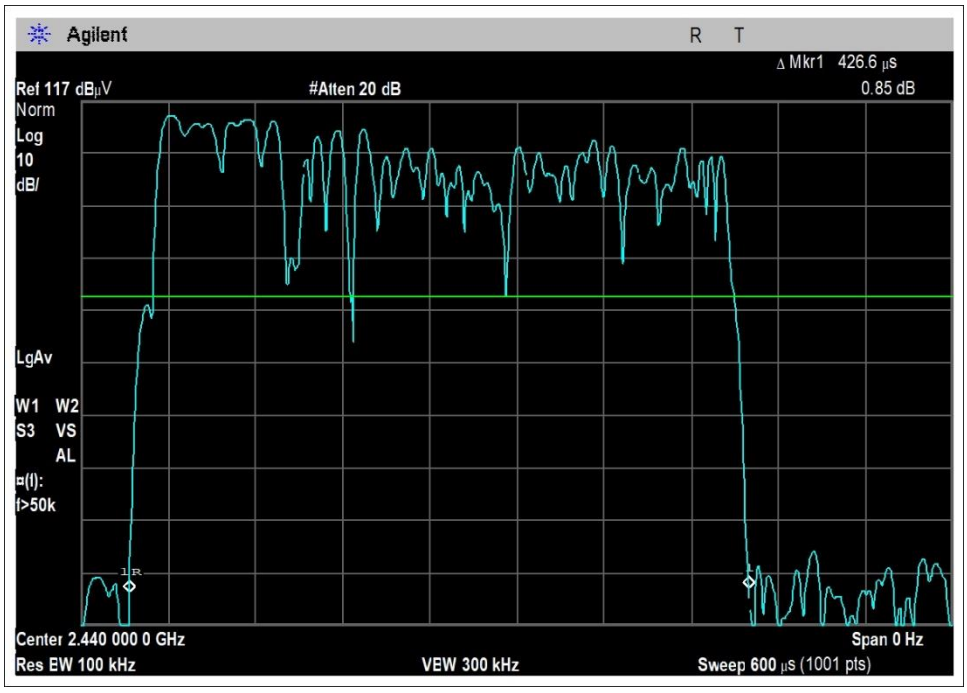
Actual Calculated Values:

Parameter	**Value (GFSK)**	**Value (π/4 DQPSK)**	**Value (8DPSK)**
Observation Period (P_{obs}):	31.6	31.6	31.6
Number of RF Bursts / P_{obs}::	2	2	2
On time of RF Burst:	420 µs	426 µs	426.6 µs
Number of Control or other signals / P_{obs}:	0	0	0
On time of Control or other Signals:	0	0	0
Total Measured On Time:	0.84ms	0.85ms	0.85ms

8DPSK Plot(s)

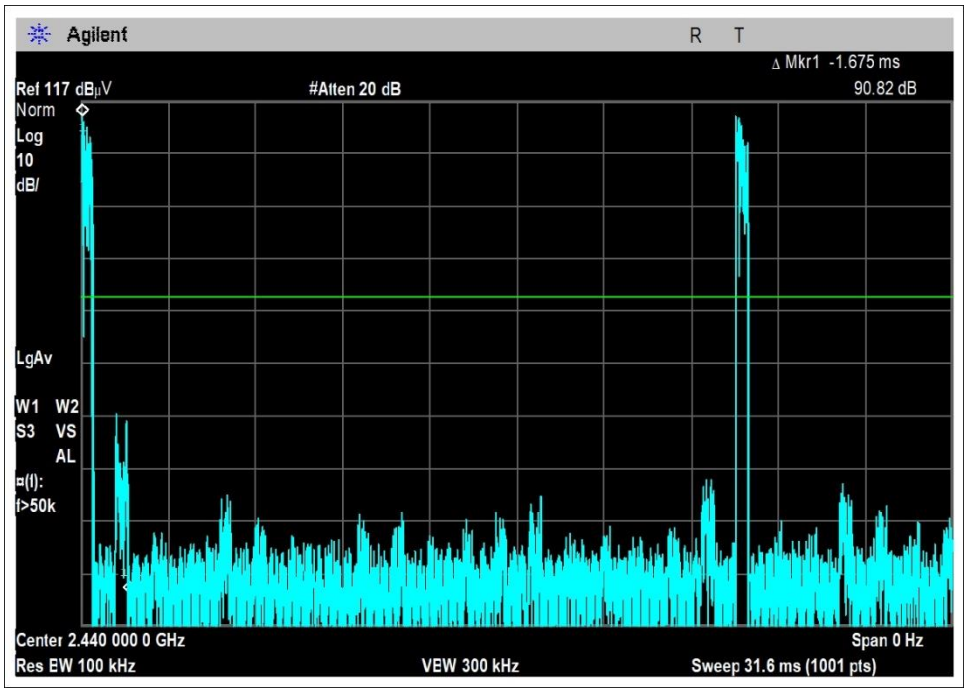


TOO 8DPSK, 1

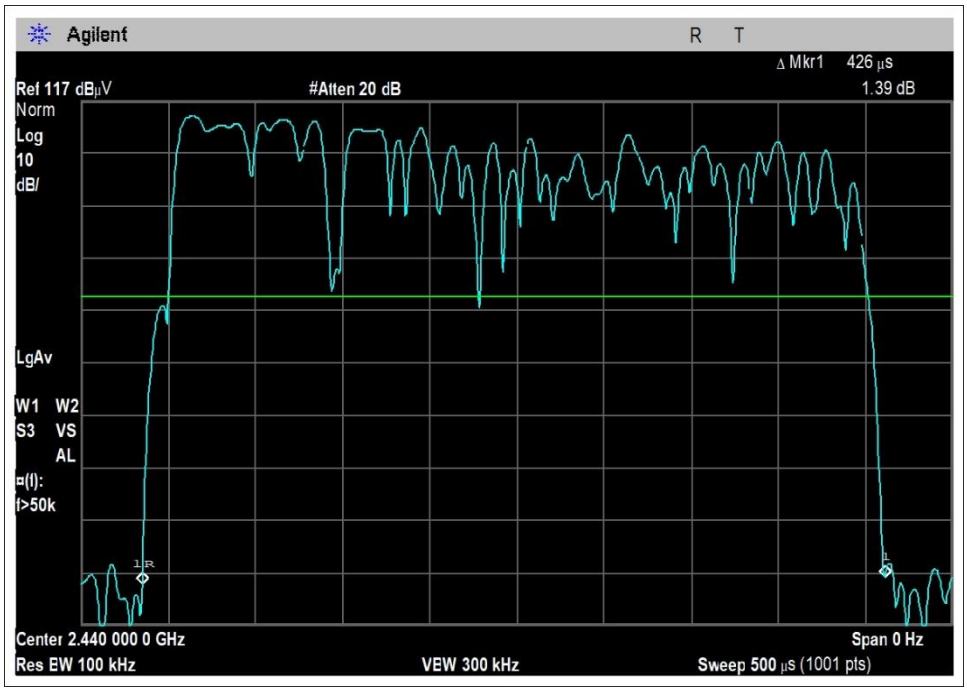


TOO 8DPSK, 2

DQPSK Plot(s)

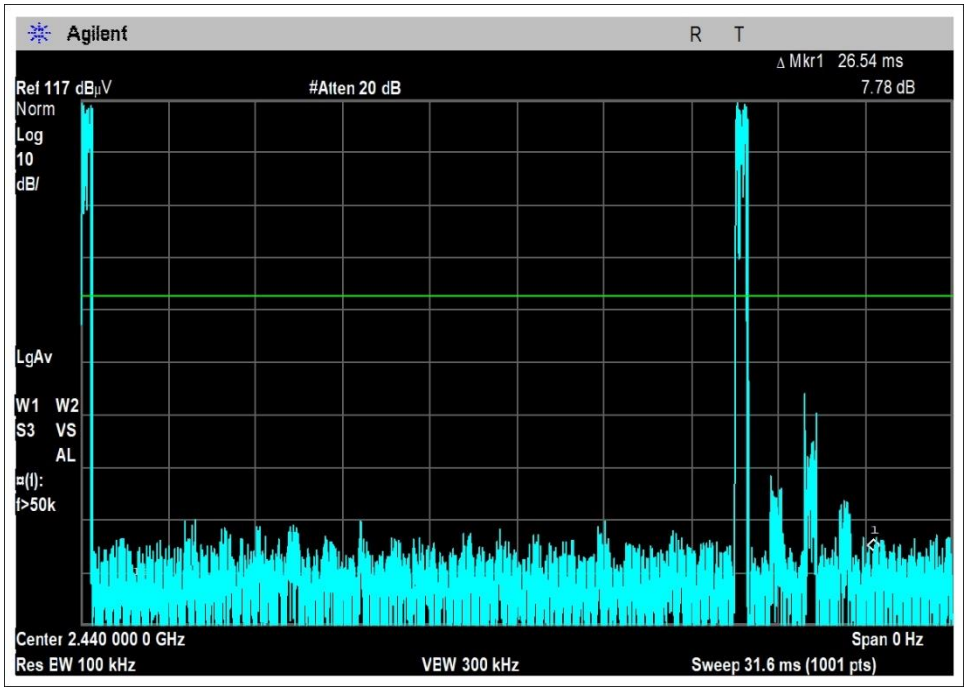


TOO DQPSK, 1

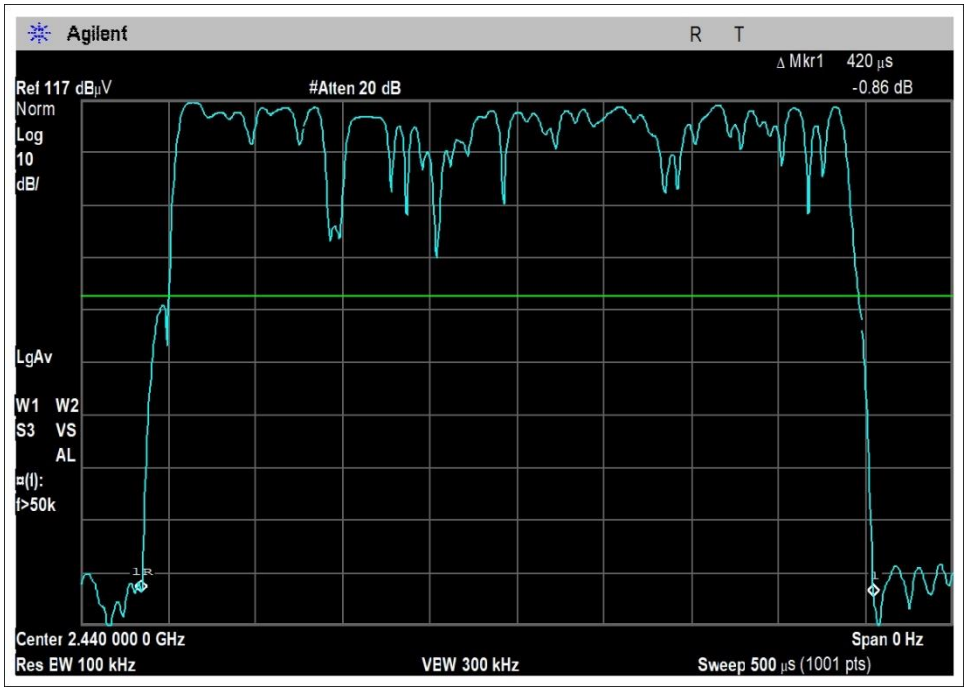


TOO DQPSK, 2

GFSK Plot(s)



TOO GFSK, 1



TOO GFSK, 2

Test Setup Photo(s)

15.247(b)(1) Output Power

Test Setup / Conditions			
Test Location:	Bothell Lab Bench	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	3/26/2020
Configuration:	1		
Test Setup:	Duty Cycle: 100% (Test Mode) Test Mode: Continuously transmitting Test Setup: The EUT is transmitting through the antenna port connector and is attached to the spectrum analyzer.		

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

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02673	Spectrum Analyzer	Agilent	E4446A	2/22/2019	2/22/2021
01318	Multimeter	Fluke	Fluke 85	7/22/2019	7/22/2021
P07527	Variac	Simpson	NA	11/21/2018	11/21/2020

Test Data Summary - Voltage Variations					
Frequency (MHz)	**Modulation / Ant Port**	**Conducted Power at $V_{Minimum}$ (dBm)**	**Conducted Power at $V_{Nominal}$ (dBm)**	**Conducted Power at $V_{Maximum}$ (dBm)**	**Conducted Power Max Deviation During Voltage Variations (dB)**
2402	GFSK / 0	10	10	10	0
2440	GFSK / 0	9.9	9.9	9.9	0
2480	GFSK / 0	9.4	9.4	9.4	0
2402	π/4 DQPSK / 0	9.5	9.5	9.5	0
2440	π/4 DQPSK / 0	9.2	9.2	9.2	0
2480	π/4 DQPSK / 0	8.8	8.8	8.8	0
2402	8DPSK / 0	9.8	9.8	9.8	0
2440	8DPSK / 0	9.5	9.5	9.5	0
2480	8DPSK / 0	9.1	9.1	9.1	0

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

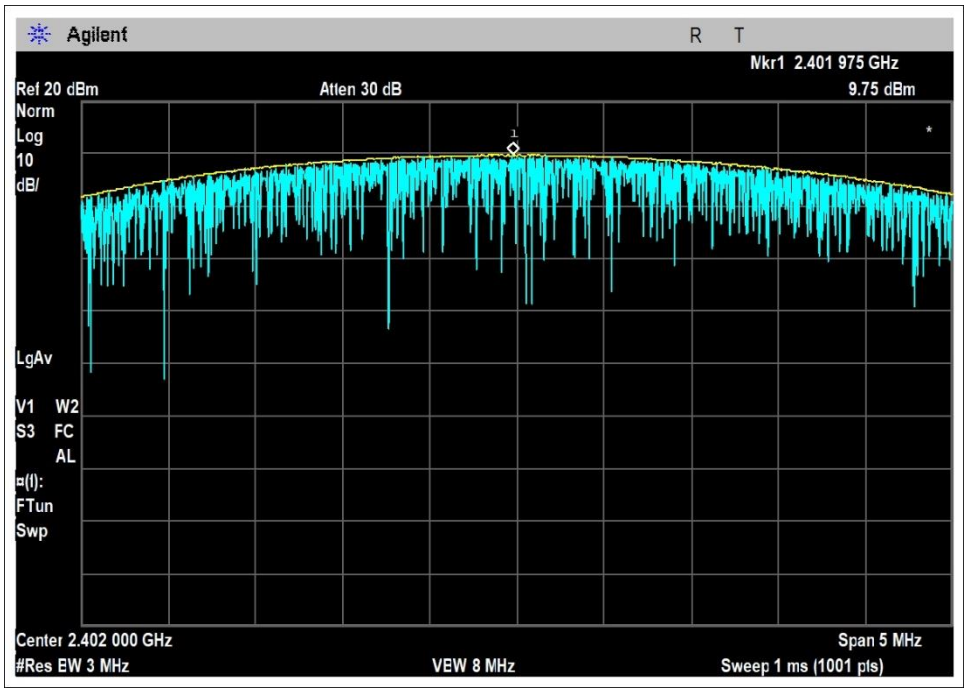
Test Data Summary - RF Conducted Measurement					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 75\ Channels \\ 21dBm\ Conducted/27dBm\ EIRP \mid < 75\ Channels\ (\min 15) \end{cases}$					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
2402	GFSK	Linear Polarized / 3.7dBi	10	≤30	Pass
2440	GFSK	Linear Polarized / 3.7dBi	9.9	≤30	Pass
2480	GFSK	Linear Polarized / 3.7dBi	9.4	≤30	Pass
2402	π/4 DQPSK	Linear Polarized / 3.7dBi	9.5	≤30	Pass
2440	π/4 DQPSK	Linear Polarized / 3.7dBi	9.2	≤30	Pass
2480	π/4 DQPSK	Linear Polarized / 3.7dBi	8.8	≤30	Pass
2402	8DPSK	Linear Polarized / 3.7dBi	9.8	≤30	Pass
2440	8DPSK	Linear Polarized / 3.7dBi	9.5	≤30	Pass
2480	8DPSK	Linear Polarized / 3.7dBi	9.1	≤30	Pass

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

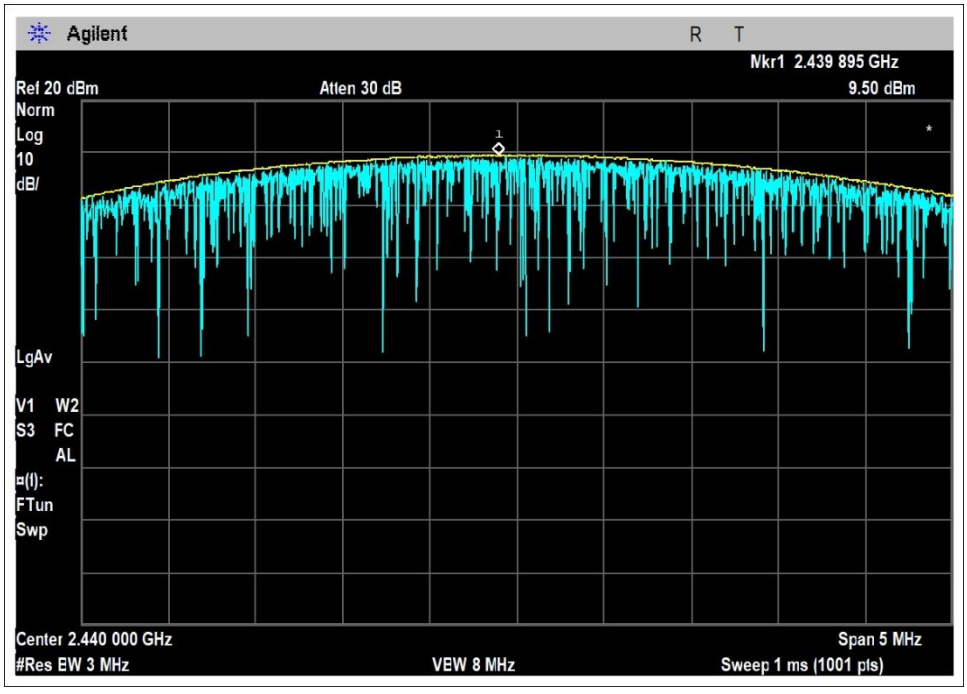
$Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$

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

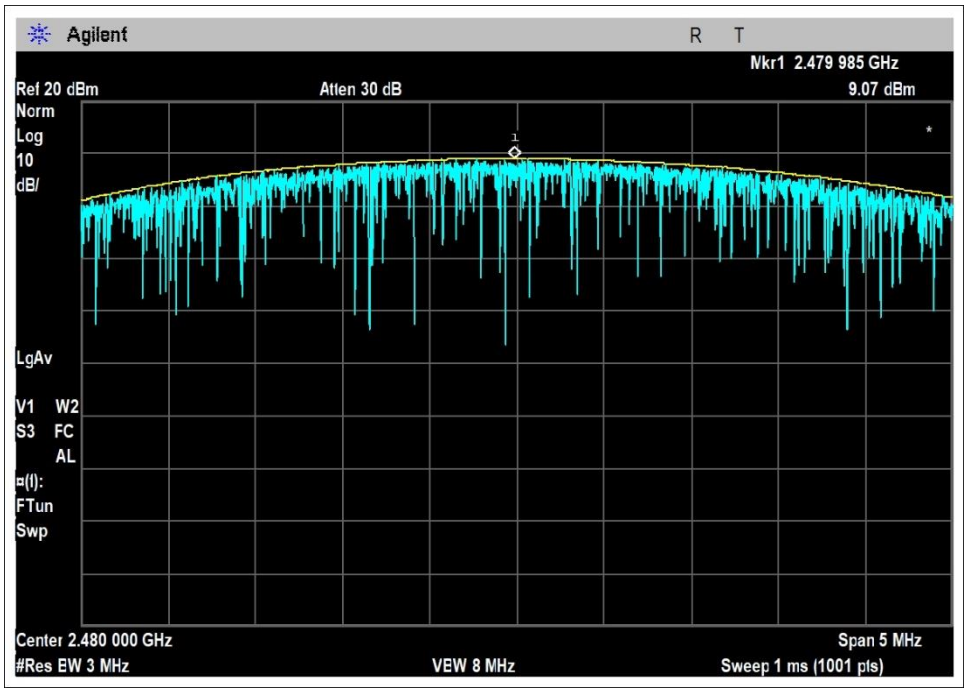
8DPSK Plot(s)



Low Channel

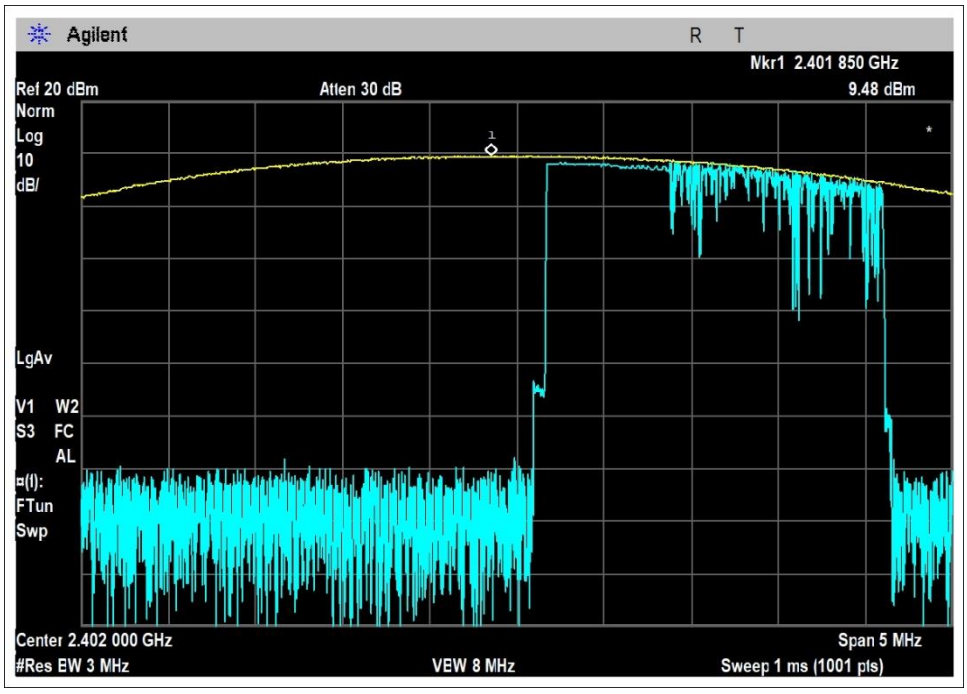


Middle Channel

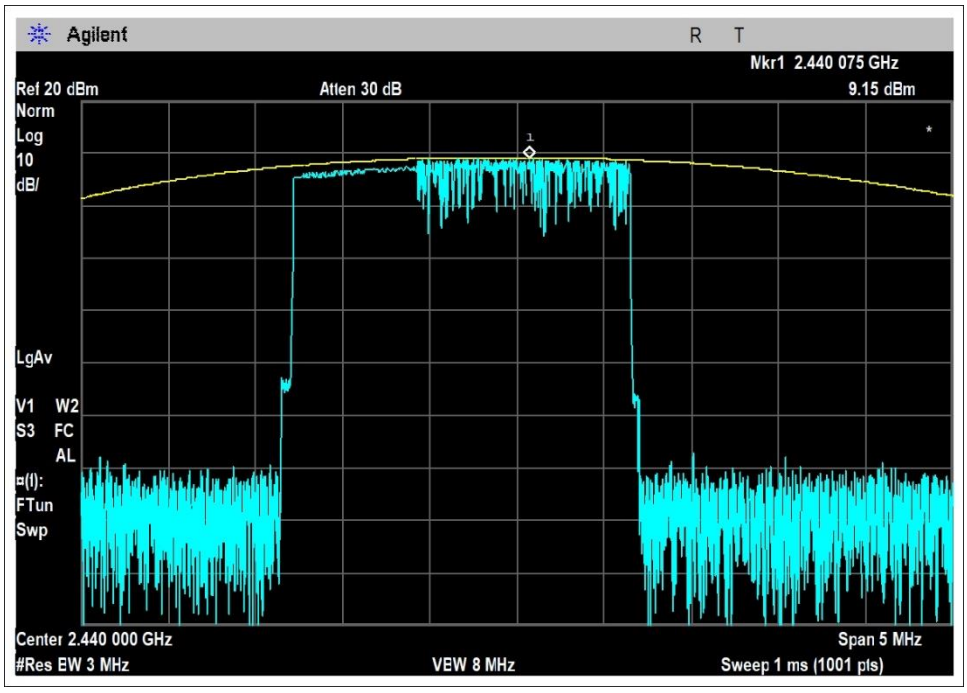


High Channel

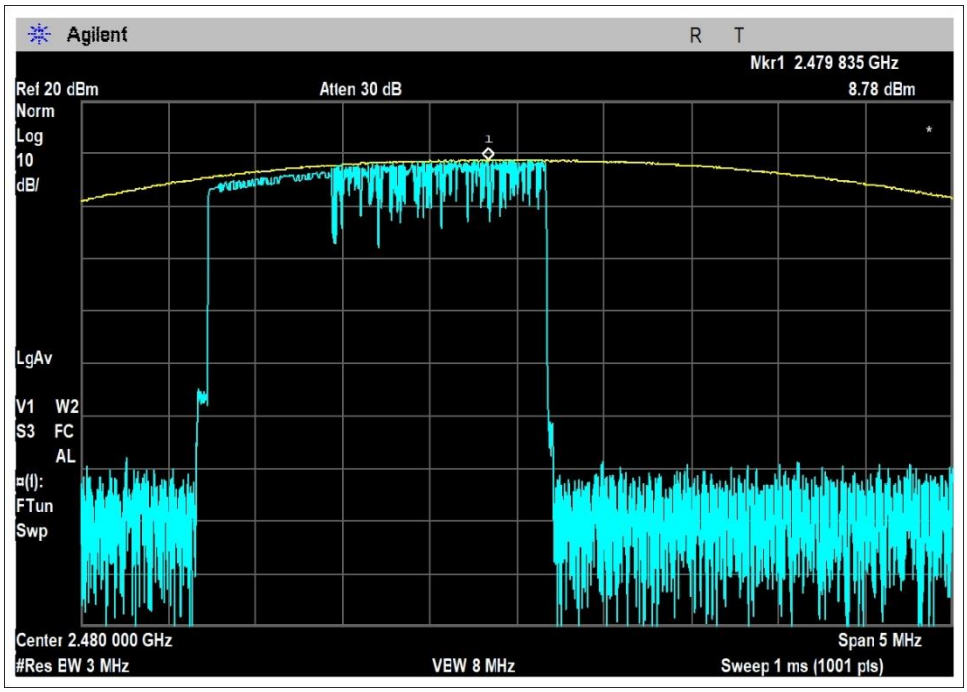
DQPSK Plot(s)



Low Channel

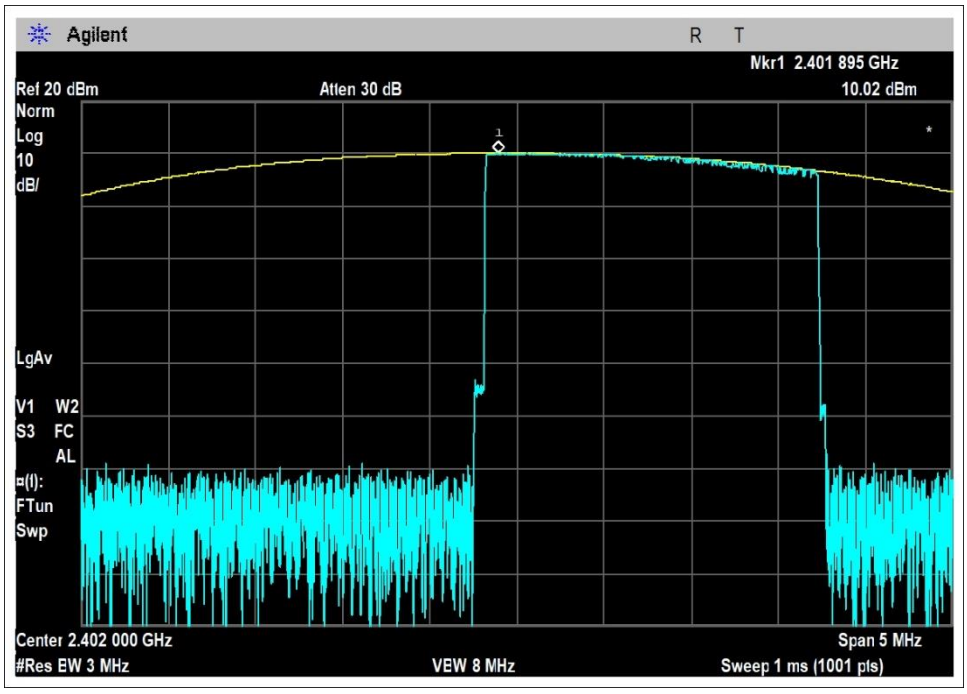


Middle Channel

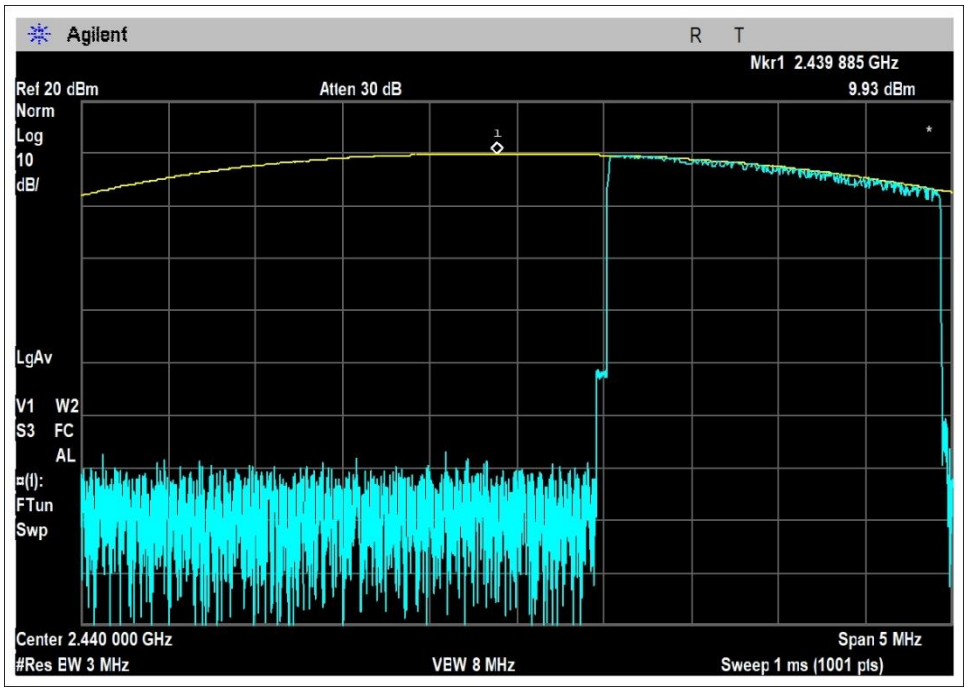


High Channel

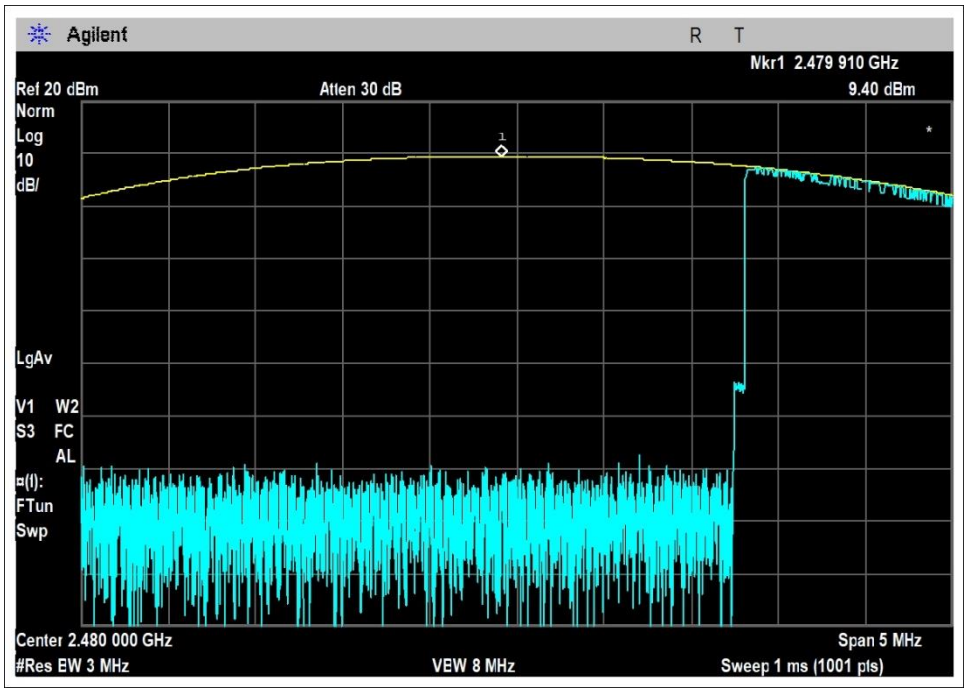
GFSK Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)

15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

8DPSK Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	10:58:12
Tested By:	Matthew Harrison	Sequence#:	54
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

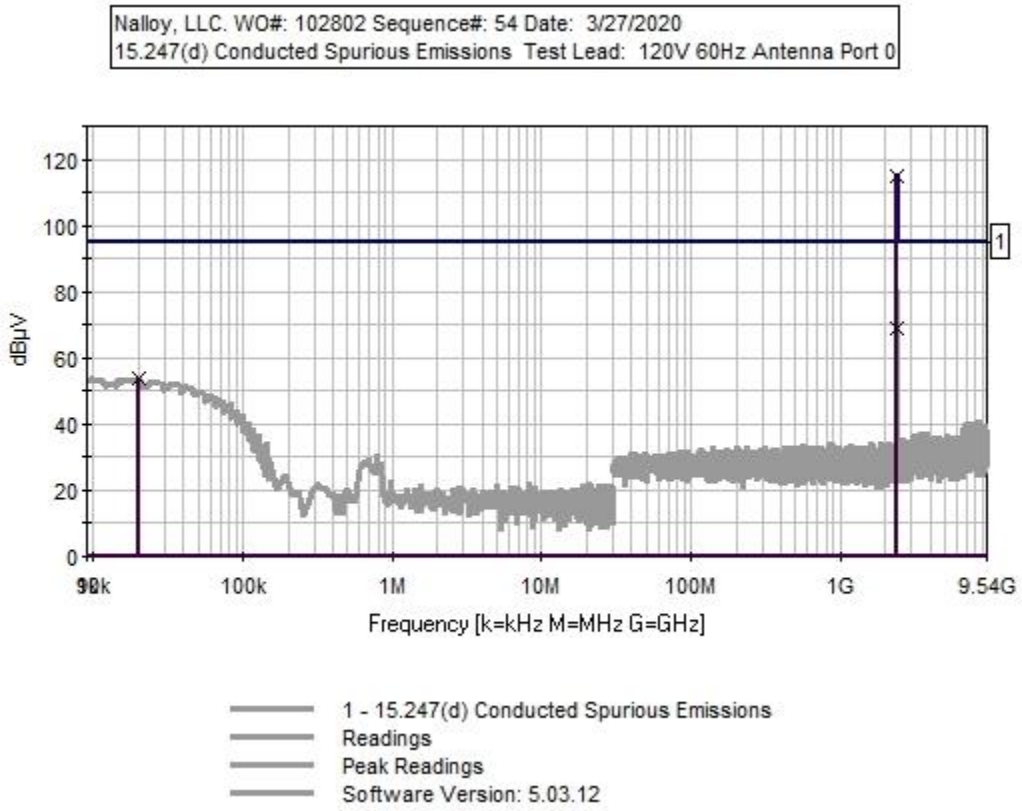
Frequency Range: 9kHz-25GHz
Frequency tested: 2402
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, 8DPSK, 3DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2401.846M	114.8					+0.0	114.8	115.0	-0.2	Anten
2	20.138k	53.8					+0.0	53.8	95.0	-41.2	Anten
3	2403.171M	69.0					+0.0	69.0	115.0	-46.0	Anten
4	9608.569M	46.4					+0.0	46.4	95.0	-48.6	Anten
5	9608.970M	45.5					+0.0	45.5	95.0	-49.5	Anten
6	24821.270 M	44.3					+0.0	44.3	95.0	-50.7	Anten

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	11:09:37
Tested By:	Matthew Harrison	Sequence#:	55
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

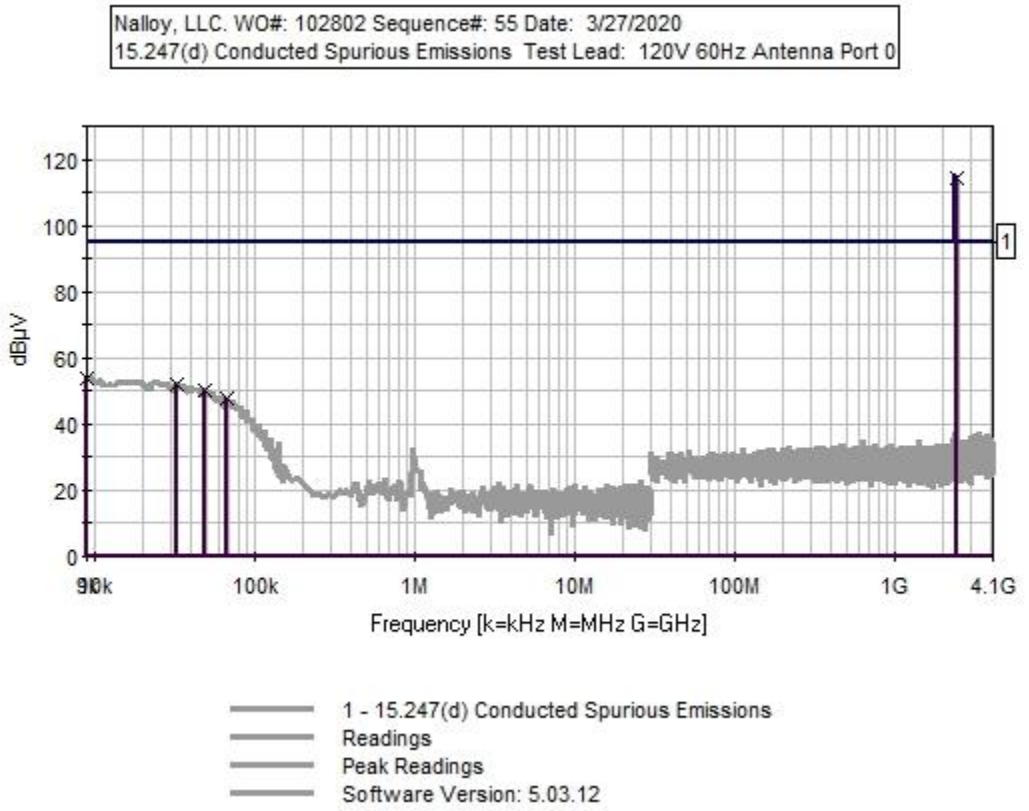
Frequency Range: 9kHz-25GHz
Frequency tested: 2440
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, 8DPSK, 3DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2439.836M	114.2					+0.0	114.2	115.0	-0.8	Anten
2	9.000k	53.8					+0.0	53.8	95.0	-41.2	Anten
3	32.829k	52.1					+0.0	52.1	95.0	-42.9	Anten
4	49.749k	50.2					+0.0	50.2	95.0	-44.8	Anten
5	9759.920M	47.8					+0.0	47.8	95.0	-47.2	Anten
6	67.092k	47.5					+0.0	47.5	95.0	-47.5	Anten
7	24829.620 M	43.9					+0.0	43.9	95.0	-51.1	Anten

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	11:20:19
Tested By:	Matthew Harrison	Sequence#:	56
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

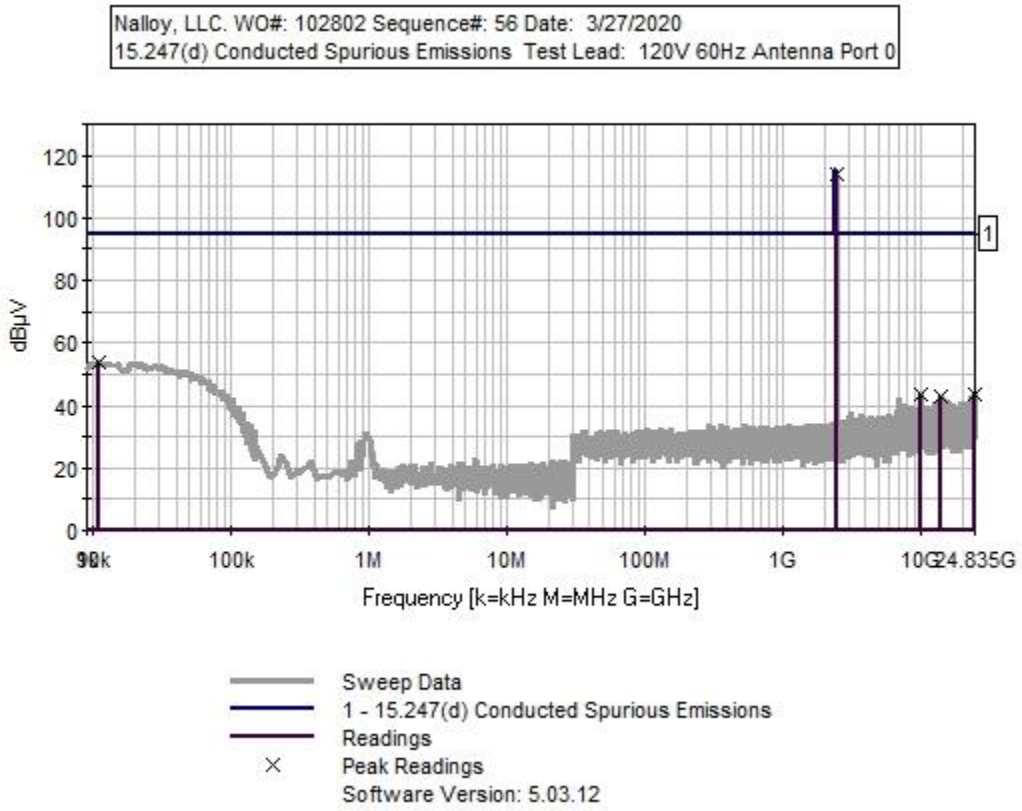
Frequency Range: 9kHz-25GHz
Frequency tested: 2480
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, 8DPSK, 3DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2479.843M	114.2					+0.0	114.2	115.0	-0.8	Anten
2	11.115k	53.6					+0.0	53.6	95.0	-41.4	Anten
3	9920.581M	43.6					+0.0	43.6	95.0	-51.4	Anten
4	24803.920 M	43.4					+0.0	43.4	95.0	-51.6	Anten
5	14198.450 M	42.6					+0.0	42.6	95.0	-52.4	Anten

DQPSK Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	10:46:19
Tested By:	Matthew Harrison	Sequence#:	53
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

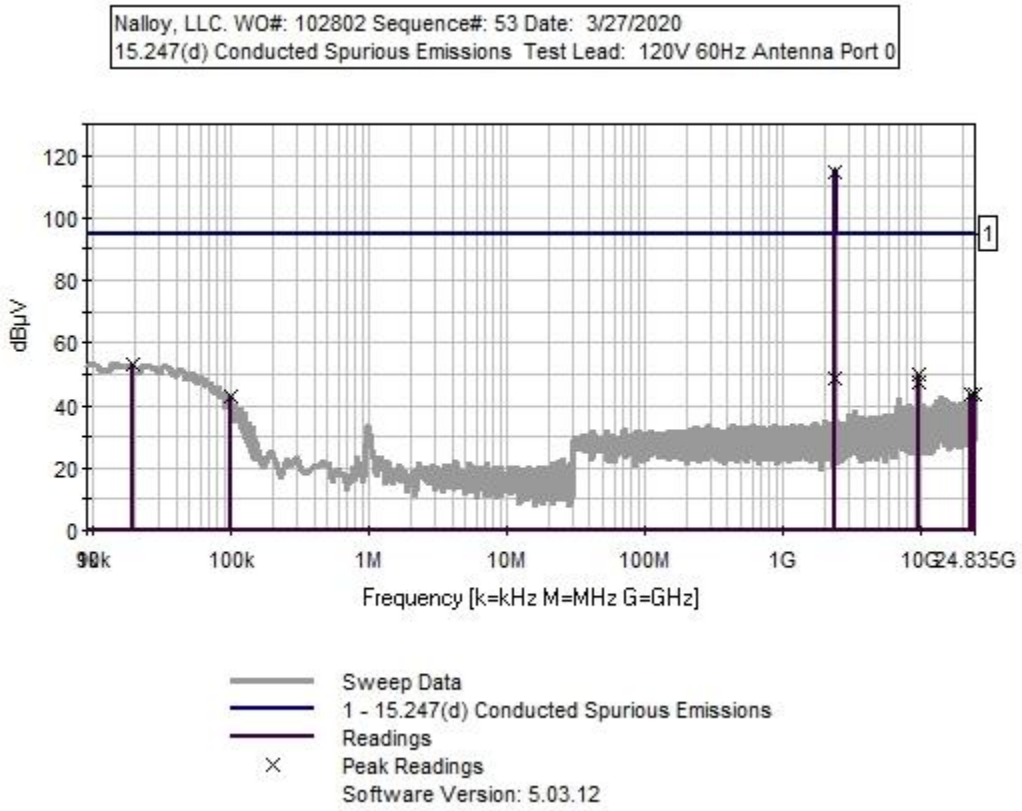
Frequency Range: 9kHz-25GHz
Frequency tested: 2402
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, DQPSK, 2DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2401.839M	114.8					+0.0	114.8	115.0	-0.2	Anten
2	19.575k	53.4					+0.0	53.4	95.0	-41.6	Anten
3	9608.469M	50.2					+0.0	50.2	95.0	-44.8	Anten
4	2399.367M	48.9					+0.0	48.9	95.0	-46.1	Anten
5	9607.969M	47.3					+0.0	47.3	95.0	-47.7	Anten
6	23298.350 M	43.7					+0.0	43.7	95.0	-51.3	Anten
7	24717.960 M	43.7					+0.0	43.7	95.0	-51.3	Anten
8	98.958k	42.8					+0.0	42.8	95.0	-52.2	Anten

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	10:34:28
Tested By:	Matthew Harrison	Sequence#:	52
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

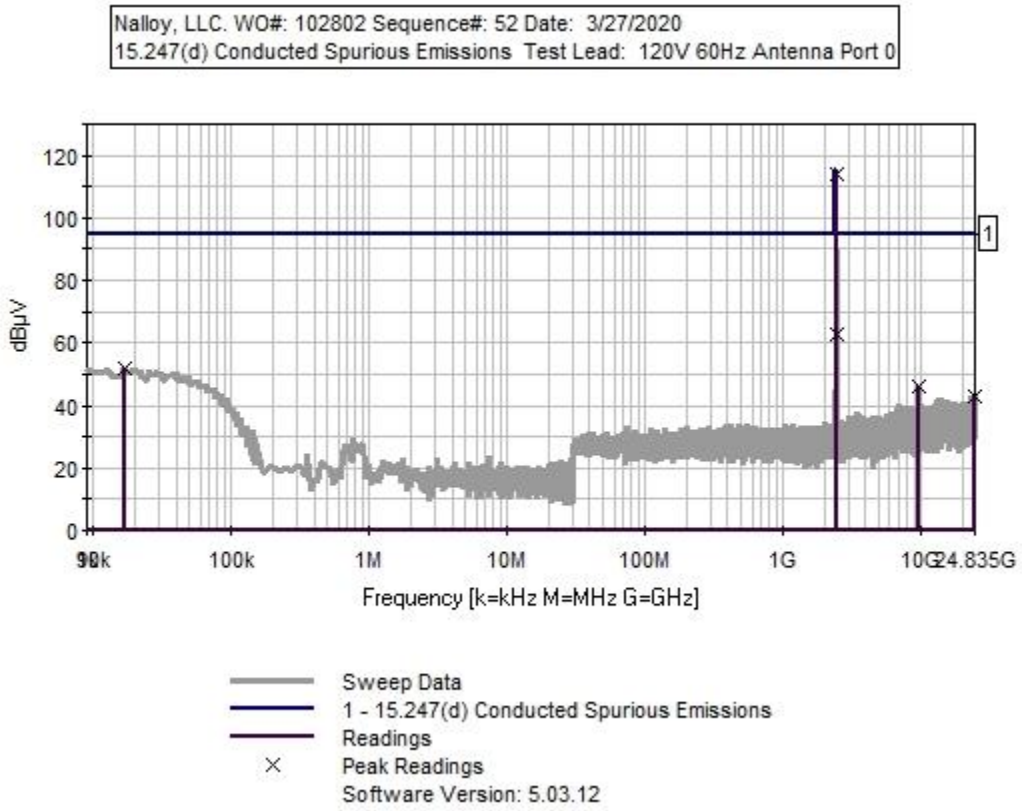
Frequency Range: 9kHz-25GHz
Frequency tested: 2440
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, DQPSK, 2DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #/	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2439.839M	114.2					+0.0	114.2	115.0	-0.8	Anten
2	16.755k	51.6					+0.0	51.6	95.0	-43.4	Anten
3	9760.421M	46.1					+0.0	46.1	95.0	-48.9	Anten
4	24790.590 M	43.0					+0.0	43.0	95.0	-52.0	Anten
5	24791.160 M	43.0					+0.0	43.0	95.0	-52.0	Anten
6	2438.306M	62.9					+0.0	62.9	115.0	-52.1	Anten

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	10:19:07
Tested By:	Matthew Harrison	Sequence#:	51
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

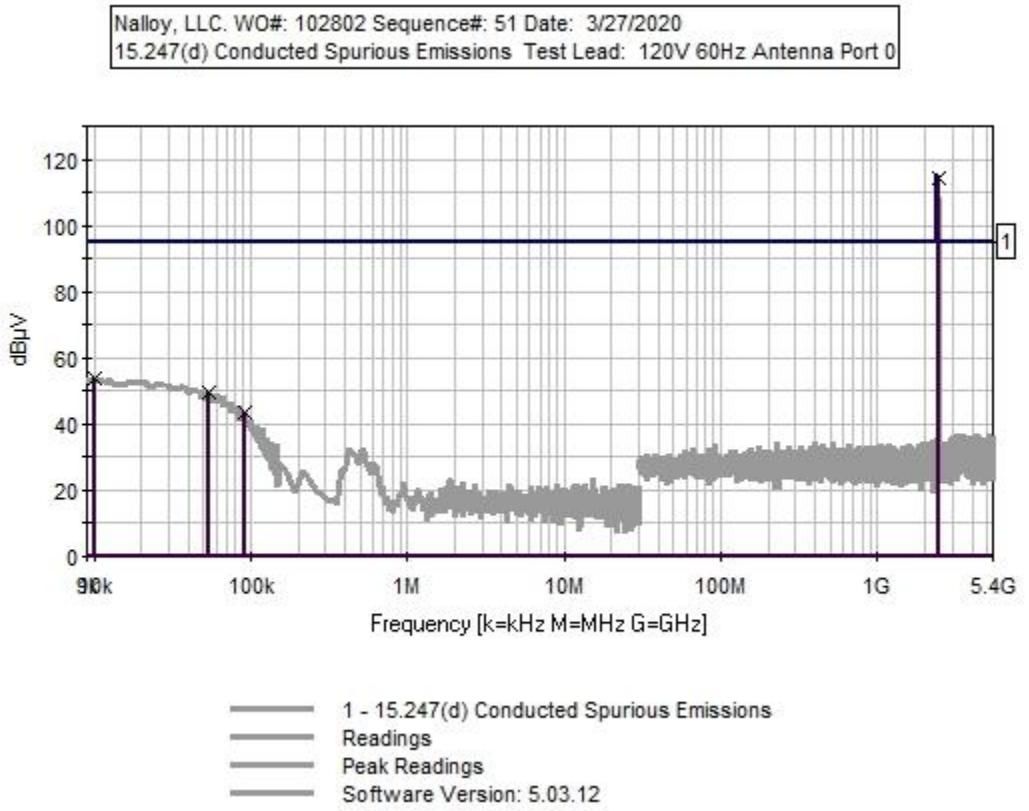
Frequency Range: 9kHz-25GHz
Frequency tested: 2480
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, DQPSK, 2DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021

Measurement Data: Reading listed by margin. Test Lead: Antenna Port 0

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2479.844M	114.1					+0.0	114.1	115.0	-0.9	Anten
2	9.987k	53.6					+0.0	53.6	95.0	-41.4	Anten
3	54.684k	49.6					+0.0	49.6	95.0	-45.4	Anten
4	92.049k	43.5					+0.0	43.5	95.0	-51.5	Anten
5	24672.020 M	43.3					+0.0	43.3	95.0	-51.7	Anten
6	24745.290 M	43.2					+0.0	43.2	95.0	-51.8	Anten

GFSK Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102802**	Date:	3/27/2020
Test Type:	**Conducted Emissions**	Time:	10:11:08
Tested By:	Matthew Harrison	Sequence#:	48
Software:	EMITest 5.03.12		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: 22° C
Humidity: 28%
Pressure: 101.3 kPa

Frequency Range: 9kHz-25GHz
Frequency tested: 2402
Firmware power setting: 9
EUT Firmware:
Protocol /MCS/Modulation: BT, GFSK, DH1 (Worst-Case)

Antenna type: Linear Polarized
Antenna Gain: 3.7 dBi.

Duty Cycle: 100% Modulated

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurements.
Setup: EUT is connected to a Laptop via USB and Audio cable.

All data rates investigated, worst-case provided.