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.





TABLE OF CONTENTS

Administrative Information	3
Test Report Information	3
Report Authorization	3
Test Facility Information	4
Software Versions	4
Site Registration & Accreditation Information	4
Summary of Results	5
Modifications During Testing	5
Conditions During Testing	5
Equipment Under Test	6
General Product Information	6
FCC Part 15 Subpart C	8
15.247(a) Transmitter Characteristics	8
15.247(a)(1) 20 dB Bandwidth	8
15.247(a)(1) Carrier Separation	15
15.247(a)(1)(iii) Number of Channels	17
15.247(a)(1)(iii) Time of Occupancy	19
15.247(b)(1) Output Power	24
15.247(d) RF Conducted Emissions & Band Edge	32
15.247(d) Radiated Emissions & Band Edge	64
15.207 AC Conducted Emissions	96
Supplemental Information	105
Measurement Uncertainty	105
Emissions Test Details	105



ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Nalloy, LLC 2301 5th Avenue Seattle, WA 98108 **REPORT PREPARED BY:**

Dianne Dudley CKC Laboratories, Inc. 5046 Sierra Pines Drive Mariposa, CA 95338

Representative: Naga Suryadevara Customer Reference Number: 2D-03187704 Project Number: 102802

DATE OF EQUIPMENT RECEIPT: DATE(S) OF TESTING: March 26, 2020 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 -7 Be

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

Faui	nment	Tested	•
Lyui	pincinc	/ CJICU	•

Manufacturer	Model #	S/N
Nalloy, LLC.	PFAYOH	9906679780
Manufacturer	Model #	S/N
Lenovo	81KT	YD07YGLG
Lenovo	ADL45WCC	NA
Delta Electronics	MDS-030AAC15	24QW96P00CS
	Manufacturer Nalloy, LLC. Manufacturer Lenovo Lenovo Delta Electronics	ManufacturerModel #Nalloy, LLC.PFAY0HManufacturerModel #Lenovo81KTLenovoADL45WCCDelta ElectronicsMDS-030AAC15

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 (^o C)	Temperature (^o C) 22 Relative Humidity (%): 33				

Test Equipment					
Asset# Description Manufacturer Model Cal Date Cal Due					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		
2440	0	GFSK	942.9	None	NA
2480	0	GFSK	943.3		
2402	0	π/4 DQPSK	1291		
2440	0	π/4 DQPSK	1289	None	NA
2480	0	π/4 DQPSK	1290		
2402	0	8DPSK	1307		
2440	0	8DPSK	1304	None	NA
2480	0	8DPSK	1308		

NA = Not applicable



8DPSK Plot(s)



Low Channel







High Channel



DQPSK Plot(s)



Low Channel







High Channel



GFSK Plot(s)



Low 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





8DPSK





DQPSK



GFSK



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

Test Data Summary					
Limit applied: 1	L5; for equipment with power output < 125	mW			
Antenna PortOperational ModeMeasured (Channels)Limit (Channels)Results					
0	GFSK	79	≥15	Pass	
0	π/4 DQPSK	79	≥15	Pass	
0	8DPSK	79	≥15	Pass	

Plot(s)











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	na Operational Mode Measured Limit Results t (ms) (ms/Pobs)					
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 (Pobs):	31.6	31.6	31.6
Number of RF Bursts / Pobs::	2	2	2
On time of RF Burst:	420 μs	426 µs	426.6 μs
Number of Control or other signals / Pobs:	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 (^o C)	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						
$Limit = \begin{cases} 30\\ 21 \end{cases}$	$Limit = \begin{cases} 30dBm \ Conducted/36dBm \ EIRP \mid \ge 75 \ Channels \\ 21dBm \ Conducted/27dBm \ EIRP \mid < 75 \ Channels \ (\min 15) \end{cases}$					
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







High Channel



DQPSK Plot(s)



Low Channel







High Channel



GFSK Plot(s)

Low 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 98	8021 • 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:

<u>-1r</u>			
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

support Bympinterin			
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.

Nalloy, LLC. WO#: 102802 Sequence#: 54 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

Software Version: 5.03.12

Test E	Equipment:										
ID	Asset #	ŧ	Dese	cription		Model		Calibrati	on Date	Cal Due I	Date
	AN026	73	Spec	ctrum Ana	lyzer	E4446A		2/22/2019	1	2/22/2021	
Measu	rement Data:	Re	ading l	listed by m	nargin.			Test Lead	1: Antenna	a Port 0	
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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	44.3					+0.0	44.3	95.0	-50.7	Anten
	Μ										

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE •	Bothell, WA 98	021 • 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 Condition	s:			
Temperature: 22° C				
Humidity: 28%				
Pressure: 101.3 kPa				
Frequency Range: 9kHz-2	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.

Nalloy, LLC. WO#: 102802 Sequence#: 55 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

Software Version: 5.03.12

Test I	Equipment:										
ID) Asset #	ŧ .	Desc	ription		Model		Calibrati	on Date	Cal Due I	Date
	AN02673		Spec	trum Ana	ılyzer	E4446A		2/22/2019		2/22/2021	
Measu	rement Data:	Re	eading li	isted by n	nargin.			Test Lead	1: Antenna	a Port 0	
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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	43.9					+0.0	43.9	95.0	-51.1	Anten
	Μ										

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • 1	Bothell, WA 98	021 • 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:

zquipinene zesteut				
Device	Manufacturer	Model #	S/N	
Configuration 1				
Support Equipment:				
Device	Manufacturer	Model #	S/N	
Configuration 1				
Test Conditions / Notes	s:			
Environmental Conditio	ns:			
Temperature: 22° C				
Humidity: 28%				
Pressure: 101.3 kPa				
Frequency Range: 9kHz	-25GHz			
Frequency tested: 2480				
Firmware power setting:	: 9			
EUT Firmware:				
Protocol /MCS/Modulat	ion: BT, 8DPSK, 3DH1 (W	Vorst-Case)		
Antenna type: Linear Po	olarized			
Antenna Gain: 3.7 dB	í.			
Duty Cycle: 100% Mod	ulated			

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.

Nalloy, LLC. WO#: 102802 Sequence#: 56 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

Test E	Equipment:											
ID) Asset #	ŧ	Des	cription		Model		Calibratio	on Date	Cal Due J	Date	
	AN026	573	Spe	ctrum Ana	ılyzer	E4446A		2/22/2019		2/22/2021		
Measu	rement Data:	Re	eading l	listed by m	nargin.			Test Lead	1: Antenn	a Port 0	a Port 0	
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar	
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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	43.4					+0.0	43.4	95.0	-51.6	Anten	
	Μ											
5	14198.450	42.6					+0.0	42.6	95.0	-52.4	Anten	
	Μ											

DQPSK Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE •	Bothell, WA 98	021 • 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.

Nalloy, LLC. WO#: 102802 Sequence#: 53 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

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

Measu	Measurement Data: Reading listed by margin.						Test Lead: Antenna Port 0				
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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 98	021 • 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									
	A 11								
Frequency Range: 9kHz-25	GHz								
Frequency tested: 2440									
Firmware power setting: 9									
EUI Firmware:	DT DODGE 2DUI (Verst Case)							
FIOLOCOL/MCS/MOdulation	\mathbf{D} \mathbf{D} \mathbf{D} \mathbf{U} \mathbf{D} \mathbf{U} \mathbf{D} \mathbf{U}	WOIST-Case)							
Antenna type: Linear Polari	zed								
Antenna Gain: 3.7 dBi									
Duty Cycle: 100% Modulat	ed								
Test Method: ANSI C63.10	: 2013								
Test Mode: Transmitting	Test Mode: Transmitting								
Test Setup: EUT is setup fo	r conducted measureme	ents.							
Setup: EUT is connected to	a Laptop via USB and	Audio cable.							
All data rates investigated,	worst-case provided.								

Nalloy, LLC. WO#: 102802 Sequence#: 52 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

Test 1	Equipment:										
II	Asset #	ŧ/	Desc	ription		Model		Calibrati	on Date	Cal Due l	Date
	AN026	573	Spec	trum Ana	lyzer	E4446A		2/22/2019		2/22/2021	
Measu	rement Data:	Re	eading li	isted by n	nargin.			Test Lead	l: Antenna	a Port 0	
#	Freq	Rdng			Ŭ		Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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	43.0					+0.0	43.0	95.0	-52.0	Anten
	Μ										
5	24791.160	43.0					+0.0	43.0	95.0	-52.0	Anten
	Μ										
6	2438.306M	62.9					+0.0	62.9	115.0	-52.1	Anten

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE • 1	Bothell, WA 98	8021 • 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 / N	otes:								
Environmental Cond	litions:								
Temperature: 22° C									
Humidity: 28%									
Pressure: 101.3 kPa									
Eraguanay Danga; 01	-Uz 25CUz								
Frequency tested: 24	80								
Firmware power sett	ing: 9								
EUT Firmware	ing. 7								
Protocol /MCS/Mod	ulation: BT. DOPSK. 2DH1 (V	Vorst-Case)							
Antenna type: Linear	r Polarized								
Antenna Gain: 3.7	dBi.								
Duty Cycle: 100% N	Iodulated								
Test Method: ANSI	C63.10: 2013								
Test Mode: Transmi	tting								
Setup: EUT is compo	etad to a Lanton via USP and	nus. Audio coble							
Setup: EUT is conne	cied to a Laptop via USB and A	Audio cable.							
All data rates investi	gated, worst-case provided.								

Nalloy, LLC. WO#: 102802 Sequence#: 51 Date: 3/27/2020 15.247(d) Conducted Spurious Emissions Test Lead: 120V 60Hz Antenna Port 0

Test I	Equipment:										
Π) Asset #	ŧ .	Desc	ription		Model		Calibrati	on Date	Cal Due l	Date
	AN026	573	Spec	trum Ana	ılyzer	E4446A		2/22/2019		2/22/2021	
Measu	rement Data:	Re	eading li	isted by n	nargin.			Test Lead	d: Antenna	a Port 0	
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	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	43.3					+0.0	43.3	95.0	-51.7	Anten
	Μ										
6	24745.290	43.2					+0.0	43.2	95.0	-51.8	Anten
	Μ										

GFSK Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Dr SE •	Bothell, WA 98	8021 • 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.