Nalloy, LLC

TEST REPORT FOR

Model: 142HL8

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.225
(13.110-14.010 MHz)

Report No.: 102803-3

Date of issue: June 16, 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
2301 5th Avenue
Seattle, WA 98108

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

REPORT PREPARED BY:

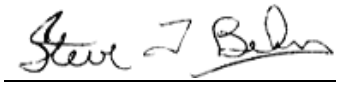
Darcy Thompson
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 102803

DATE OF EQUIPMENT RECEIPT: May 19, 2020
DATE(S) OF TESTING: May 19 - June 2, 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.
22116 23rd Drive S.E., Suite A
Canyon Park, 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 - 15.225

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.225(a)-(c)	Field Strength of Fundamental	NA	Pass
15.225(e)	Frequency Stability	NA	Pass
15.225(d)	Field Strength of Spurious Emissions	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	142HL8	P3A1R70393630100

Support Equipment:

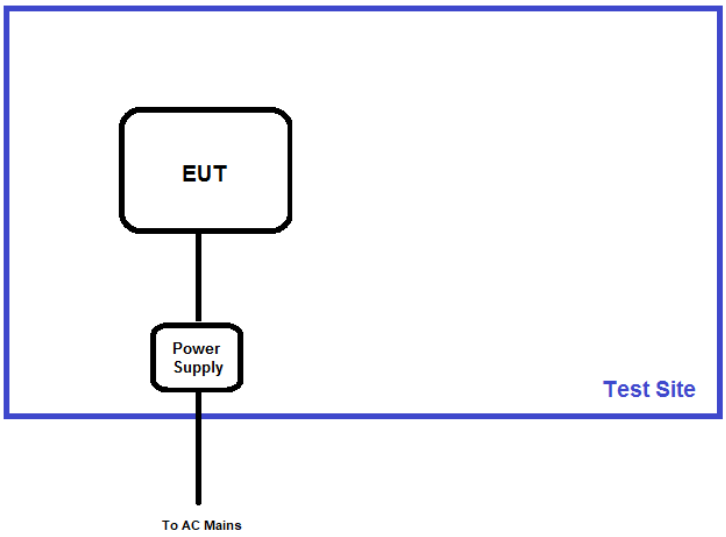
Device	Manufacturer	Model #	S/N
AC Adapter	Amazon	PS57CP	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Modulation Type(s):	NFC A (ASK) NFC B (ASK)
Maximum Duty Cycle:	100%
Antenna Type(s) and Gain:	Loop, 1.8µH/3.164Ω + j149.856 @ 13.56MHz
Antenna Connection Type:	SMB
Nominal Input Voltage:	120VAC
Firmware / Software used for Test:	Realterm 3.0.1.42 / FW 1.4.364.0

Block Diagram of Test Setup(s)

Test Setup Block Diagram



FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/2/2020
Configuration:	1		
Test Setup:	EUT is on foam test table continuously transmitting. NFC A and NFC B modes investigated.		

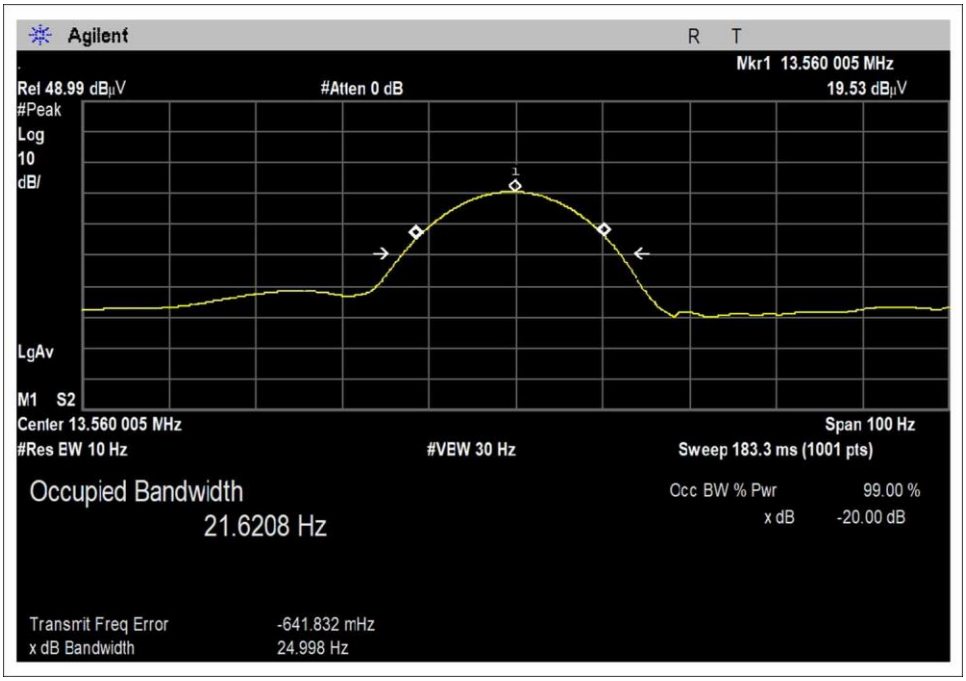
Environmental Conditions			
Temperature (ºC)	23.8	Relative Humidity (%):	33

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	2/22/2019	2/22/2021
P06540	Cable	Andrews	Heliax	8/23/2019	8/23/2021
P06515	Cable	Andrews	Heliax	6/29/2018	6/29/2020
00052	Loop Antenna	EMCO	6502	5/4/2020	5/4/2022

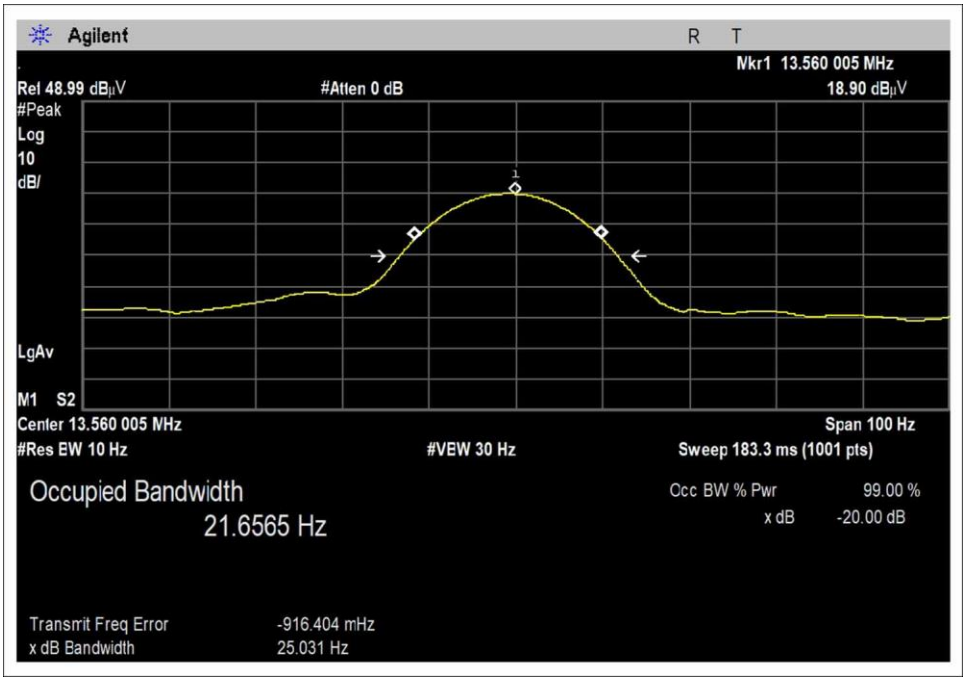
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (Hz)	Limit (kHz)	Results
13.56	1	NFC A	24.998Hz	None	NA
13.56	1	NFC B	25.031Hz	None	NA

Note: OBW measurement performed with 10Hz RBW, unable to meet ANSI C63.10 (2013) ratio due to nature of signal.

Plot(s)



NFC A



NFC B

Test Setup Photo(s)

15.225(a)-(c) Field Strength of Fundamental

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBuV/m@30m)	$V_{Nominal}$ (dBuV/m@30m)	$V_{Maximum}$ (dBuV/m@30m)	Max Deviation from $V_{Nominal}$ (dB)
13.56	NFC A (worst case)	26.6	26.7	26.4	0.3

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

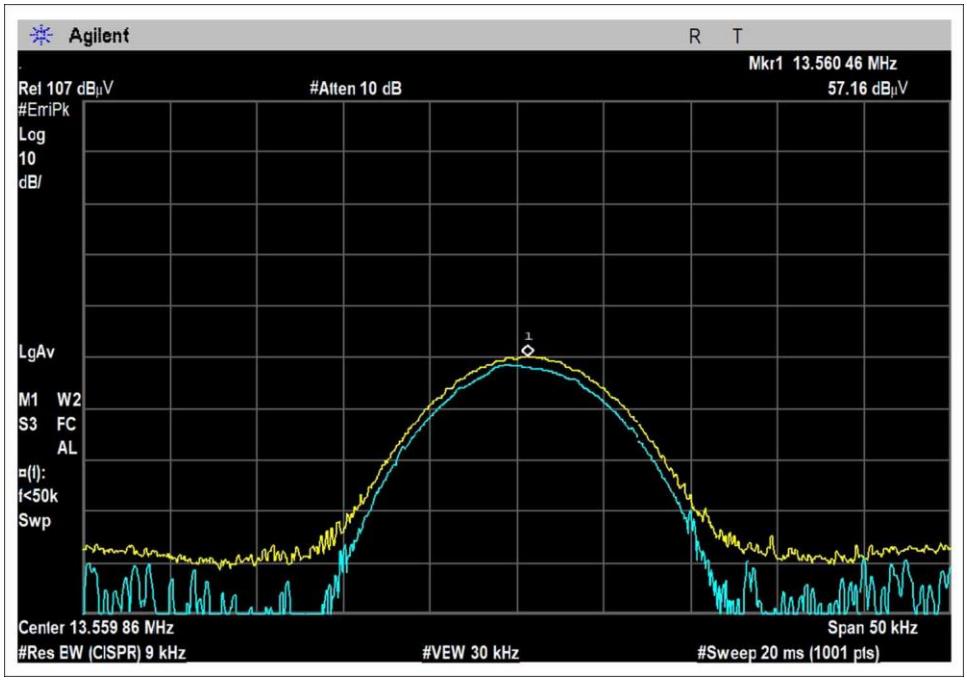
Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
$V_{Nominal}$:	120 VAC
$V_{Minimum}$:	85VAC
$V_{Maximum}$:	264 VAC

Test Data Summary – Radiated Field Strength Measurement					
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 30m)	Limit (dBuV/m @ 30m)	Results
13.56	NFC A (worst case)	Loop	26.6	≤84	Pass

Plot(s)



Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**		
Work Order #:	**102803**	Date:	5/19/2020
Test Type:	**Radiated Scan**	Time:	15:12:08
Tested By:	Michael Atkinson	Sequence#:	7
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

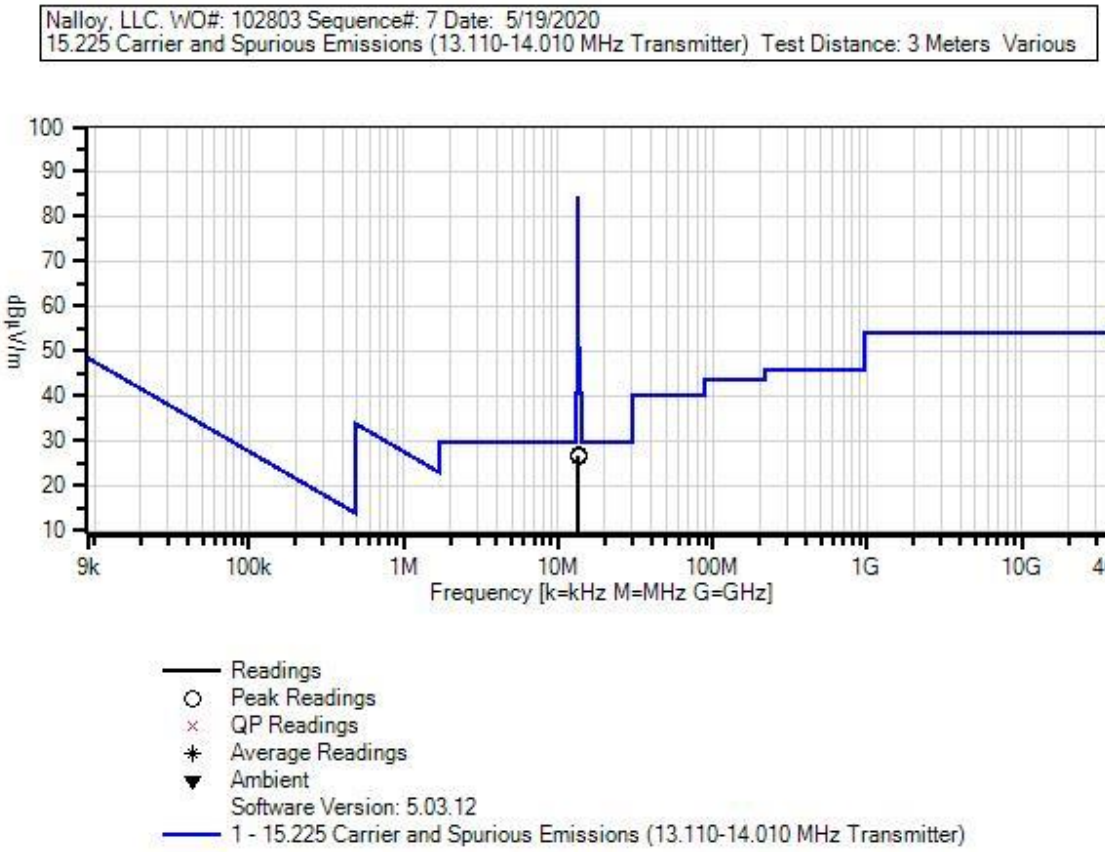
Frequency Range: Fund

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A and NFC B investigated, worst case reported.
NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

3 x orthogonal antenna axes investigated, worst case reported.
XYZ EUT board axes investigated, worst case reported. NFC antenna in installed orientation.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	13.560M	57.2	+0.0	+0.0	+0.2	+9.3	-40.0	26.7	84.0 NFC A	-57.3	Perp
2	13.560M	57.1	+0.0	+0.0	+0.2	+9.3	-40.0	26.6	84.0 NFC B	-57.4	Perp

Test Setup Photo(s)

X-Axis

Y-Axis

Z-Axis

15.225(e) Frequency Stability

Test Setup/Conditions			
Test Location:	Brea Lab Bench	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013)	Test Date(s):	5/22/2020
Configuration:	1		
Test Setup:	EUT continuously transmitting signal inside of temperature chamber.		

Environmental Conditions			
Temperature (ºC)	25	Relative Humidity (%):	30

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02872	Spectrum Analyzer	Agilent	E4440A	11/18/2019	11/18/2021
03514	Multimeter	Fluke	87	12/7/2018	12/7/2020
03029	Thermometer, Digital Infrared	Fluke	566	2/20/2019	2/20/2021
02757	Temperature Chamber	Bemco	F100/350-8	12/20/2018	12/20/2020

Test Data Summary					
Temperature (ºC)	**Voltage**	**Frequency (MHz)**	**Deviation (%)**	**Limit (%)**	**Results**
-20	$V_{Nominal}$	13.560466	0.00039	±0.01	Pass
-10	$V_{Nominal}$	13.560457	0.00032	±0.01	
0	$V_{Nominal}$	13.560467	0.00040	±0.01	
10	$V_{Nominal}$	13.560456	0.00032	±0.01	
20	$V_{Minimum}$	13.560415	0.00001	±0.01	
20	$V_{Nominal}$	13.560413	0.00000	±0.01	
20	$V_{Maximum}$	13.560412	0.00001	±0.01	
30	$V_{Nominal}$	13.560410	0.00002	±0.01	
40	$V_{Nominal}$	13.560390	0.00017	±0.01	
50	$V_{Nominal}$	13.560385	0.00021	±0.01	
Nominal Frequency:		13.560413			

Parameter Definitions:

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
$V_{Nominal}$:	120 VAC
$V_{Minimum}$:	85 VAC
$V_{Maximum}$:	264 VAC

Test Setup Photo(s)

In Chamber

Outside

15.225(d) Radiated Emissions & Band Edge

Test Setup / Conditions/ Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102803**	Date:	5/19/2020
Test Type:	**Radiated Scan**	Time:	14:58:21
Tested By:	Michael Atkinson	Sequence#:	5
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

Frequency Range: 9kHz-30MHz

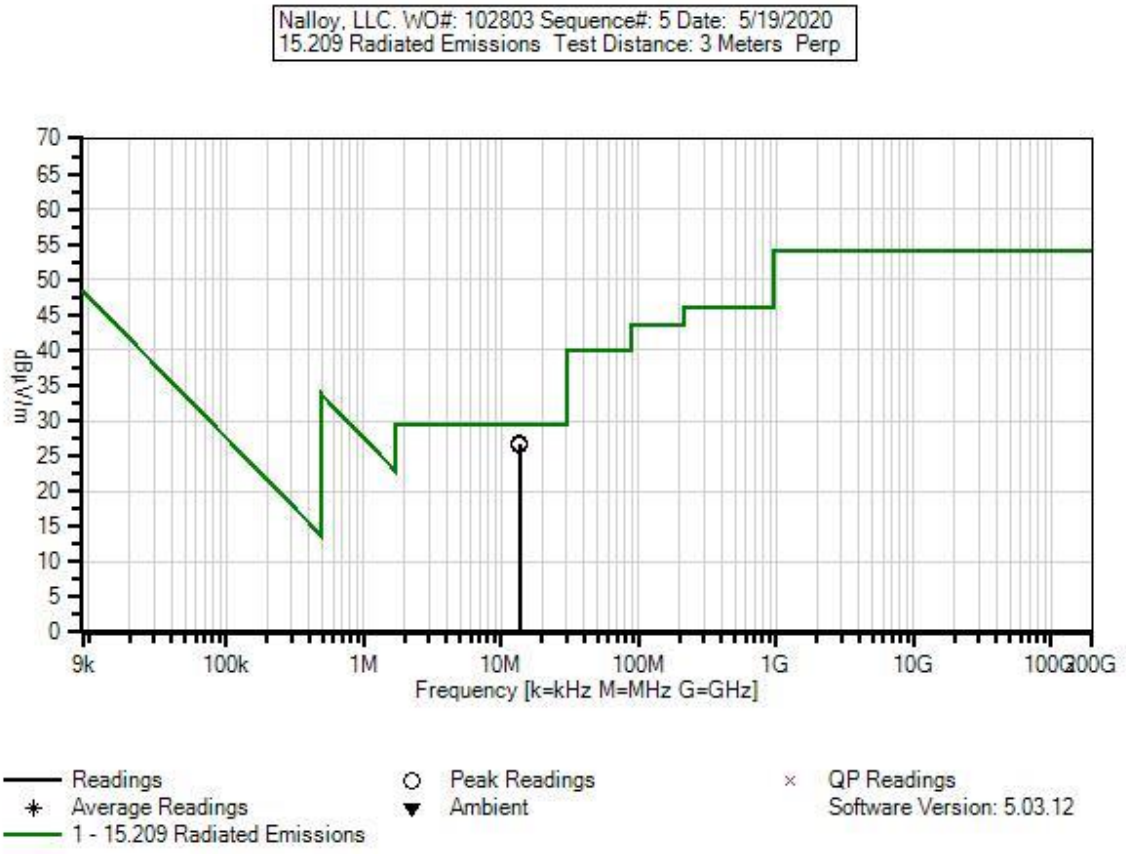
Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A and NFC B investigated, worst case reported.
NFC I2C on.
EEPROM on.
Force test on.
CPU Stress test.

Note:
1 x ferrite 431177081 and 2 x ferrite 431164181 on AC cable installed underneath the ground plane outside of the test volume, this is NOT a mod to the unit.

3 x orthogonal antenna axes investigated, worst case reported.
XYZ EUT board axes investigated, worst case reported. NFC antenna in installed orientation.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	13.560M	57.2	+0.0	+0.0	+0.2	+9.3	-40.0	26.7	29.5 antenna bottom 1m	-2.8	Perp
2	13.561M	57.1	+0.0	+0.0	+0.2	+9.3	-40.0	26.6	29.5	-2.9	Perp
3 QP	27.121M	29.6	+0.0	+0.1	+0.3	+5.5	-40.0	-4.5	29.5	-34.0	Perp
^	27.120M	29.3	+0.0	+0.1	+0.3	+5.5	-40.0	-4.8	29.5	-34.3	Perp

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Radiated Scan**	Time:	12:04:06
Tested By:	Michael Atkinson	Sequence#:	30
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

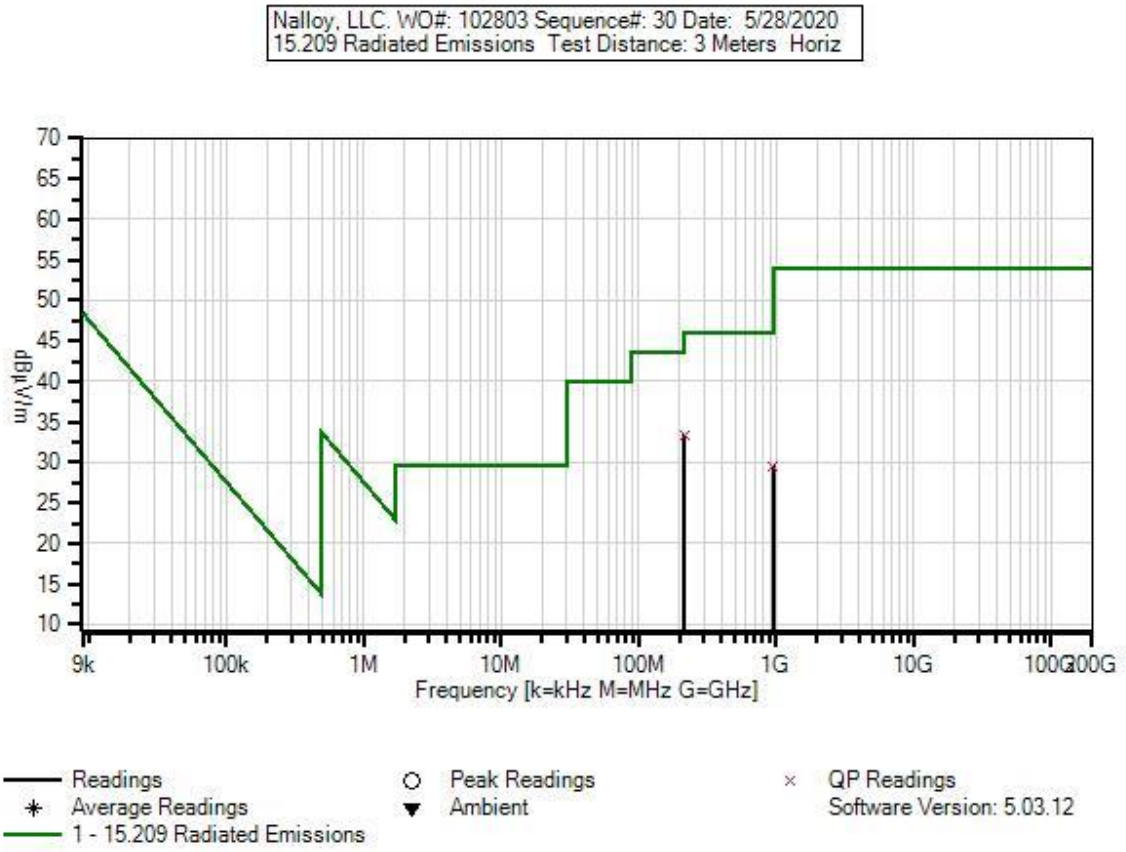
Frequency Range: 30-1000MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.
XYZ EUT board axes investigated, worst case reported.
NFC antenna in installed orientation

Note:
1 x ferrite 431177081 and 2 x ferrite 431164181 on AC cable installed underneath the ground plane outside of the test volume, this is NOT a modification to the unit.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T2	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T3	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T6	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	216.963M	42.3	+0.2	+0.7	-27.2	+0.9	+0.0	33.4	46.0	-12.6	Horiz
	QP		+5.8	+10.7							
^	216.909M	42.8	+0.2	+0.7	-27.2	+0.9	+0.0	33.9	46.0	-12.1	Horiz
			+5.8	+10.7							
3	944.214M	22.4	+0.4	+1.5	-27.2	+2.2	+0.0	29.5	46.0	-16.5	Horiz
	QP		+5.8	+24.4							
^	944.214M	28.2	+0.4	+1.5	-27.2	+2.2	+0.0	35.3	46.0	-10.7	Horiz
			+5.8	+24.4							

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Radiated Scan**	Time:	12:11:55
Tested By:	Michael Atkinson	Sequence#:	31
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

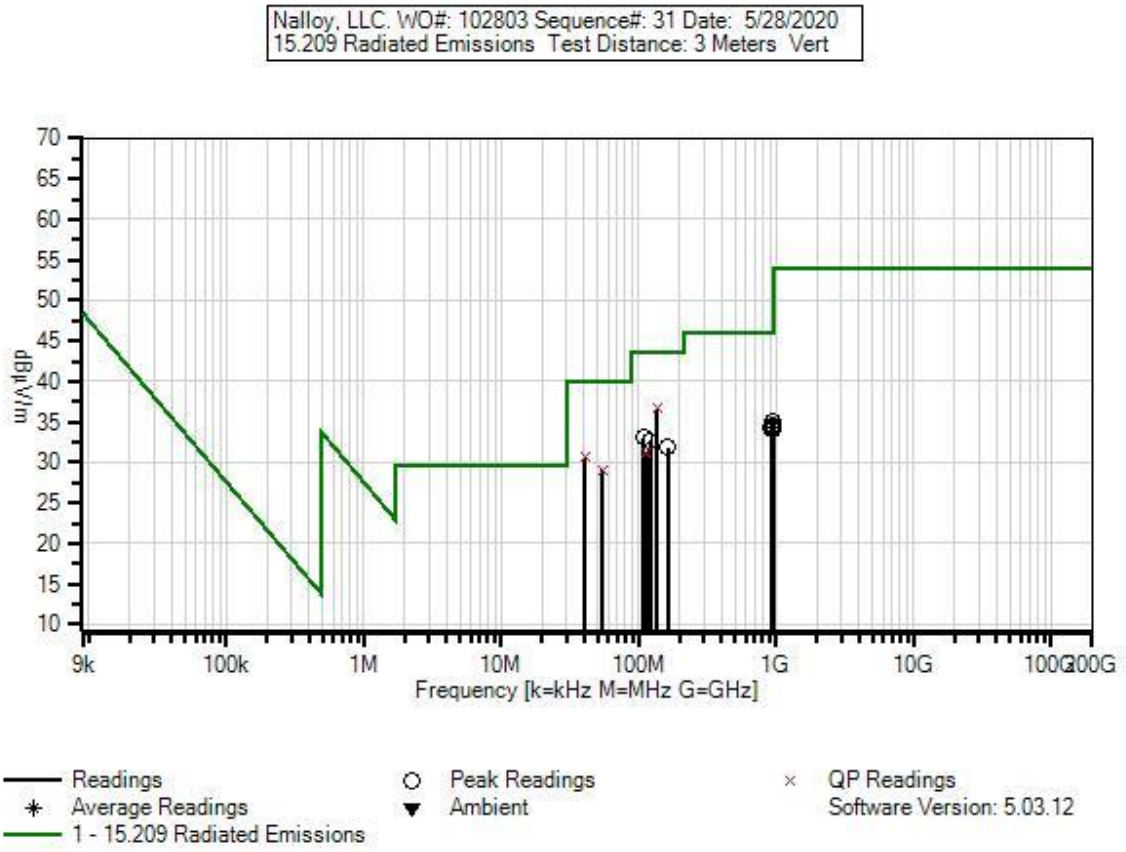
Frequency Range: 30-1000MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.
XYZ EUT board axes investigated, worst case reported.
NFC antenna in installed orientation

Note:
1 x ferrite 431177081 and 2 x ferrite 431164181 on AC cable installed underneath the ground plane outside of the test volume, this is NOT a modification to the unit.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T2	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T3	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T6	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	135.612M	48.9	+0.1	+0.5	-27.6	+0.7	+0.0	36.7	43.5	-6.8	Vert
	QP		+5.8	+8.3							
^	135.588M	49.5	+0.1	+0.5	-27.6	+0.7	+0.0	37.3	43.5	-6.2	Vert
			+5.8	+8.3							
3	40.680M	40.3	+0.1	+0.3	-28.0	+0.3	+0.0	30.6	40.0	-9.4	Vert
	QP		+5.8	+11.8							
^	40.714M	40.7	+0.1	+0.3	-28.0	+0.3	+0.0	31.0	40.0	-9.0	Vert
			+5.8	+11.8							
5	108.441M	45.7	+0.1	+0.5	-27.7	+0.6	+0.0	33.1	43.5	-10.4	Vert
			+5.8	+8.1							
6	122.014M	45.3	+0.1	+0.5	-27.6	+0.7	+0.0	32.7	43.5	-10.8	Vert
			+5.8	+7.9							
7	54.246M	42.8	+0.1	+0.4	-27.9	+0.4	+0.0	29.1	40.0	-10.9	Vert
	QP		+5.8	+7.5							
^	54.224M	44.3	+0.1	+0.4	-27.9	+0.4	+0.0	30.6	40.0	-9.4	Vert
			+5.8	+7.5							
9	943.525M	27.9	+0.4	+1.5	-27.2	+2.2	+0.0	35.0	46.0	-11.0	Vert
			+5.8	+24.4							
10	946.655M	27.9	+0.4	+1.5	-27.2	+2.2	+0.0	35.0	46.0	-11.0	Vert
			+5.8	+24.4							
11	958.551M	27.2	+0.4	+1.5	-27.1	+2.2	+0.0	34.6	46.0	-11.4	Vert
			+5.8	+24.6							
12	922.734M	27.7	+0.4	+1.5	-27.3	+2.2	+0.0	34.4	46.0	-11.6	Vert
			+5.8	+24.1							
13	162.735M	42.0	+0.2	+0.6	-27.4	+0.7	+0.0	31.9	43.5	-11.6	Vert
			+5.8	+10.0							
14	941.020M	27.3	+0.4	+1.5	-27.2	+2.2	+0.0	34.3	46.0	-11.7	Vert
			+5.8	+24.3							
15	942.022M	27.0	+0.4	+1.5	-27.2	+2.2	+0.0	34.1	46.0	-11.9	Vert
			+5.8	+24.4							
16	938.078M	27.1	+0.4	+1.5	-27.2	+2.2	+0.0	34.1	46.0	-11.9	Vert
			+5.8	+24.3							
17	939.079M	27.1	+0.4	+1.5	-27.2	+2.2	+0.0	34.1	46.0	-11.9	Vert
			+5.8	+24.3							
18	114.207M	44.0	+0.1	+0.5	-27.7	+0.6	+0.0	31.3	43.5	-12.2	Vert
	QP		+5.8	+8.0							
^	114.207M	47.8	+0.1	+0.5	-27.7	+0.6	+0.0	35.1	43.5	-8.4	Vert
			+5.8	+8.0							

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Radiated Scan**	Time:	11:47:01
Tested By:	Michael Atkinson	Sequence#:	29
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

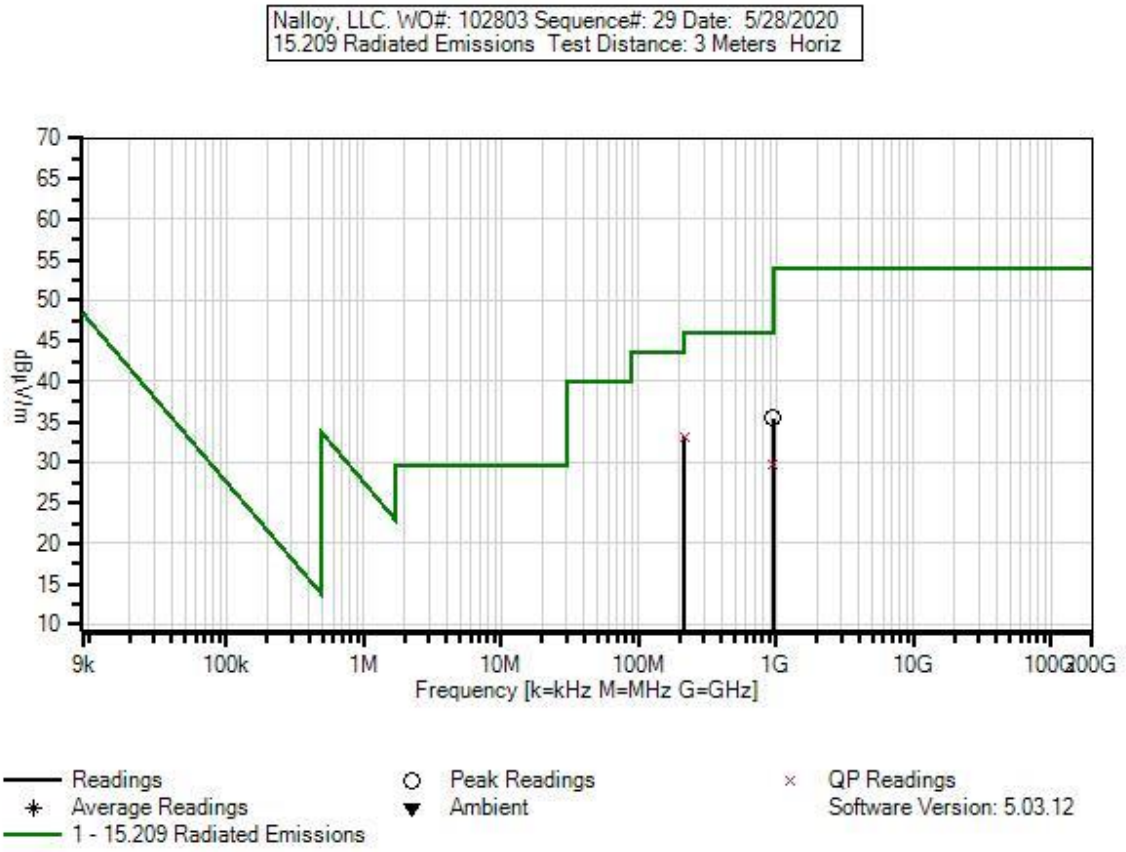
Frequency Range: 30-1000MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC B. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.
XYZ EUT board axes investigated, worst case reported.
NFC antenna in installed orientation

Note:
1 x ferrite 431177081 and 2 x ferrite 431164181 on AC cable installed underneath the ground plane outside of the test volume, this is NOT a modification to the unit.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T2	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T3	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T6	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	959.115M	28.1	+0.4 +5.8	+1.5 +24.6	-27.1	+2.2	+0.0	35.5	46.0	-10.5	Horiz
2	216.967M QP	42.1	+0.2 +5.8	+0.7 +10.7	-27.2	+0.9	+0.0	33.2	46.0	-12.8	Horiz
^	216.909M	43.1	+0.2 +5.8	+0.7 +10.7	-27.2	+0.9	+0.0	34.2	46.0	-11.8	Horiz
4	958.238M QP	22.3	+0.4 +5.8	+1.5 +24.6	-27.1	+2.2	+0.0	29.7	46.0	-16.3	Horiz
^	958.238M	28.3	+0.4 +5.8	+1.5 +24.6	-27.1	+2.2	+0.0	35.7	46.0	-10.3	Horiz

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.209 Radiated Emissions**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Radiated Scan**	Time:	11:35:58
Tested By:	Michael Atkinson	Sequence#:	28
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

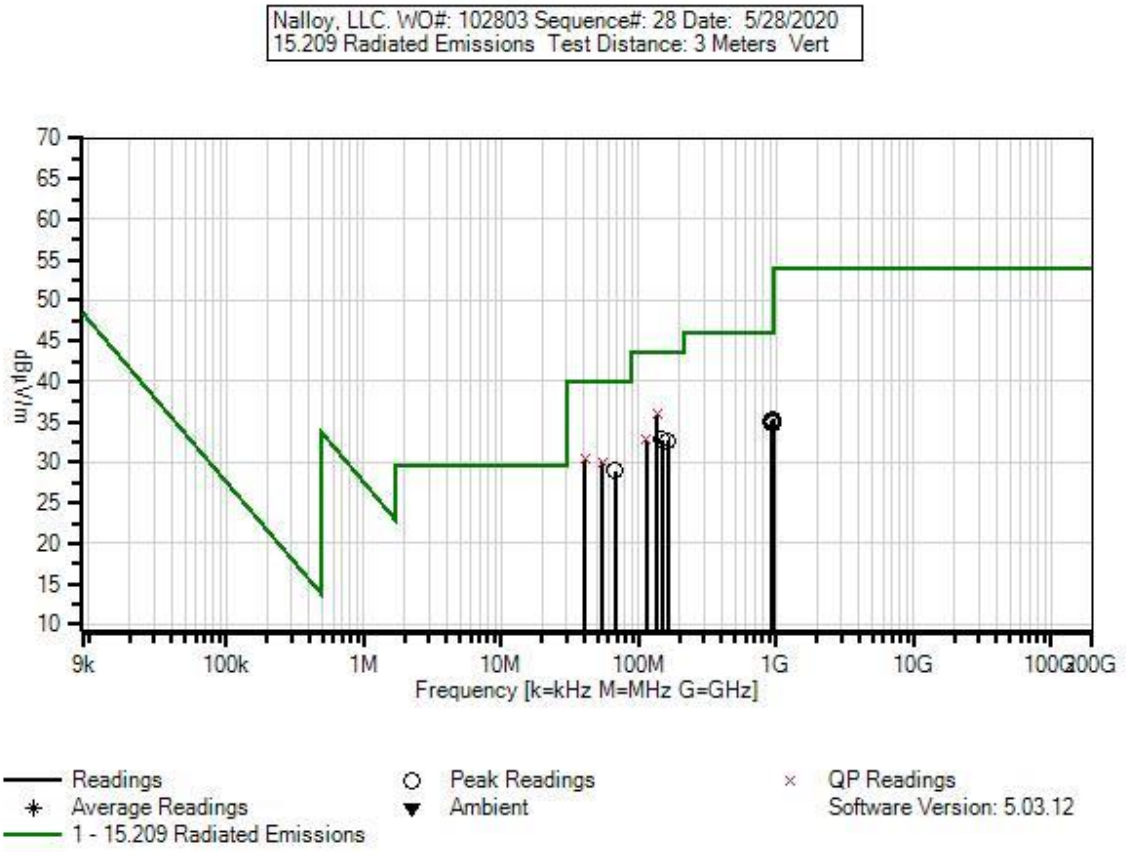
Frequency Range: 30-1000MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC B. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.
XYZ EUT board axes investigated, worst case reported.
NFC antenna in installed orientation

Note:
1 x ferrite 431177081 and 2 x ferrite 431164181 on AC cable installed underneath the ground plane outside of the test volume, this is NOT a modification to the unit.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T2	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T3	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T6	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021

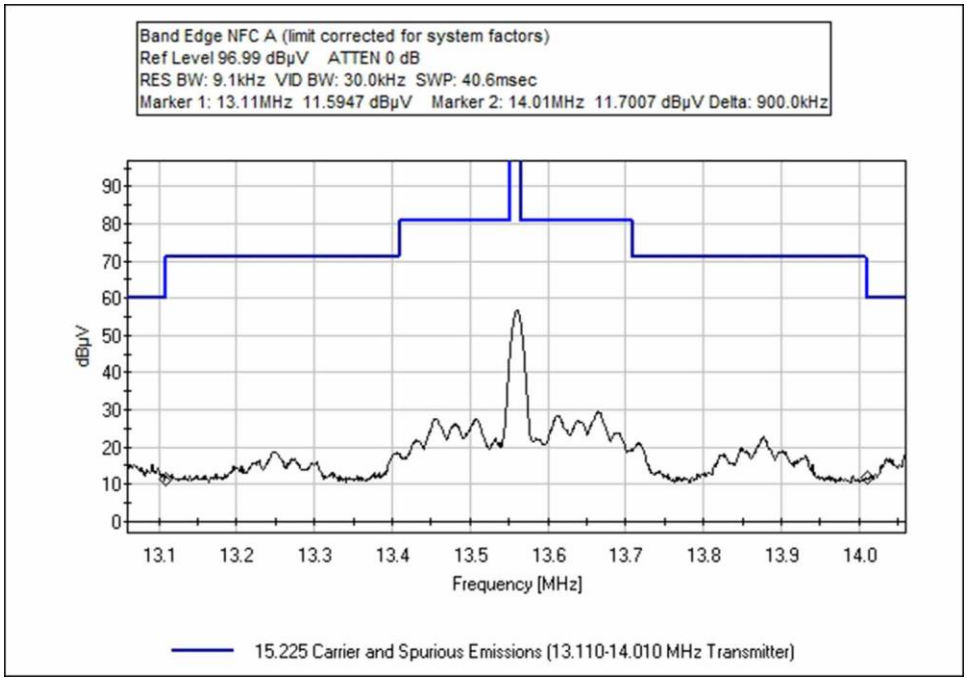
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

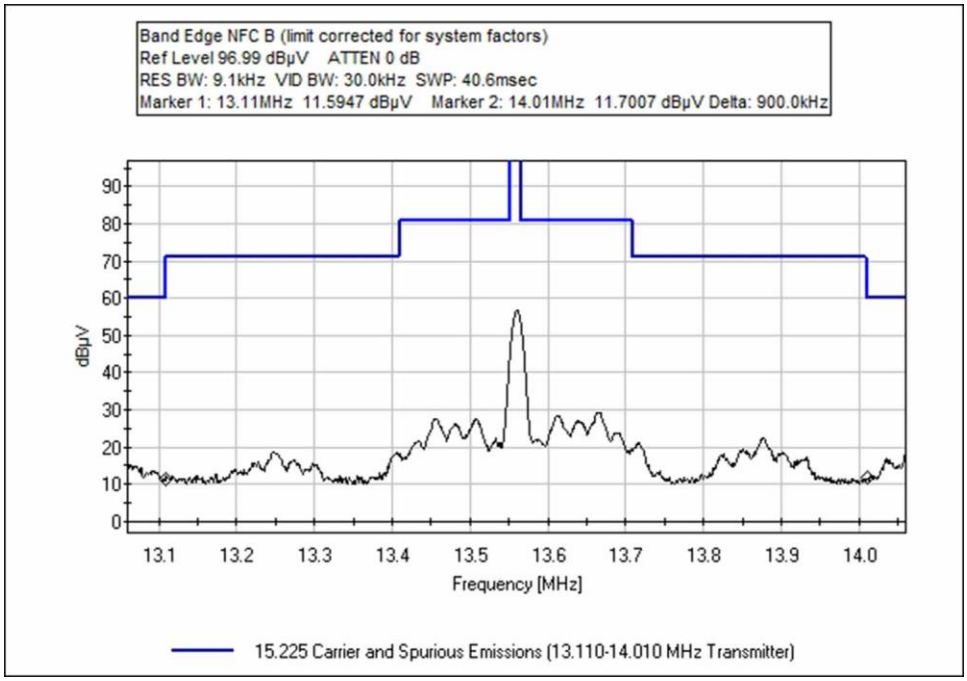
#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	135.615M	48.1	+0.1	+0.5	-27.6	+0.7	+0.0	35.9	43.5	-7.6	Vert
	QP		+5.8	+8.3							
^	135.588M	49.5	+0.1	+0.5	-27.6	+0.7	+0.0	37.3	43.5	-6.2	Vert
			+5.8	+8.3							
3	40.684M	40.1	+0.1	+0.3	-28.0	+0.3	+0.0	30.4	40.0	-9.6	Vert
	QP		+5.8	+11.8							
^	40.648M	40.4	+0.1	+0.3	-28.0	+0.3	+0.0	30.8	40.0	-9.2	Vert
			+5.8	+11.9							
5	54.242M	43.7	+0.1	+0.4	-27.9	+0.4	+0.0	30.0	40.0	-10.0	Vert
	QP		+5.8	+7.5							
^	54.224M	45.0	+0.1	+0.4	-27.9	+0.4	+0.0	31.3	40.0	-8.7	Vert
			+5.8	+7.5							
7	944.214M	28.2	+0.4	+1.5	-27.2	+2.2	+0.0	35.3	46.0	-10.7	Vert
			+5.8	+24.4							
8	114.327M	45.5	+0.1	+0.5	-27.7	+0.6	+0.0	32.8	43.5	-10.7	Vert
	QP		+5.8	+8.0							
^	114.327M	49.3	+0.1	+0.5	-27.7	+0.6	+0.0	36.6	43.5	-6.9	Vert
			+5.8	+8.0							
10	149.161M	44.0	+0.2	+0.6	-27.5	+0.7	+0.0	32.8	43.5	-10.7	Vert
			+5.8	+9.0							
11	950.162M	28.0	+0.4	+1.5	-27.2	+2.2	+0.0	35.2	46.0	-10.8	Vert
			+5.8	+24.5							
12	162.735M	42.8	+0.2	+0.6	-27.4	+0.7	+0.0	32.7	43.5	-10.8	Vert
			+5.8	+10.0							
13	922.014M	28.5	+0.4	+1.5	-27.3	+2.1	+0.0	35.1	46.0	-10.9	Vert
			+5.8	+24.1							
14	951.664M	27.8	+0.4	+1.5	-27.2	+2.2	+0.0	35.0	46.0	-11.0	Vert
			+5.8	+24.5							
15	932.104M	28.1	+0.4	+1.5	-27.2	+2.2	+0.0	35.0	46.0	-11.0	Vert
			+5.8	+24.2							
16	959.178M	27.6	+0.4	+1.5	-27.1	+2.2	+0.0	35.0	46.0	-11.0	Vert
			+5.8	+24.6							
17	67.800M	42.4	+0.1	+0.4	-27.8	+0.5	+0.0	28.9	40.0	-11.1	Vert
			+5.8	+7.5							
18	940.457M	27.8	+0.4	+1.5	-27.2	+2.2	+0.0	34.8	46.0	-11.2	Vert
			+5.8	+24.3							
19	954.482M	27.5	+0.4	+1.5	-27.1	+2.2	+0.0	34.8	46.0	-11.2	Vert
			+5.8	+24.5							

Band Edge

Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @30m)**	**Limit (dBuV/m @30m)**	**Results**
13.110	NFC A	Loop	-18.9	≤29.5	Pass
14.010	NFC A	Loop	-18.8	≤29.5	Pass
13.110	NFC B	Loop	-18.9	≤29.5	Pass
14.010	NFC B	Loop	-18.8	≤29.5	Pass

Band Edge Plots





Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**		
Work Order #:	**102803**	Date:	6/2/2020
Test Type:	**Radiated Scan**	Time:	10:43:27
Tested By:	Michael Atkinson	Sequence#:	8
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 22°C
Humidity: 28%
Pressure: 101.3 kPa

Frequency Range: Band Edge

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A and NFC B investigated.
NFC I2C on.
EEPROM on.
CPU stress test.
Force test on.

3 x orthogonal antenna axes investigated, worst case reported.
XYZ EUT board axes investigated, worst case reported.
NFC antenna in installed orientation.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T1	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T2	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T3	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	14.010M	11.7	+0.0	+0.2	+9.3		-40.0	-18.8	29.5 NFC A	-48.3	Perp
2	14.010M	11.7	+0.0	+0.2	+9.3		-40.0	-18.8	29.5 NFC B	-48.3	Perp
3	13.110M	11.6	+0.0	+0.2	+9.3		-40.0	-18.9	29.5 NFC B	-48.4	Perp
4	13.110M	11.6	+0.0	+0.2	+9.3		-40.0	-18.9	29.5 NFC A	-48.4	Perp

Test Setup Photo(s)

X-Axis

Y-Axis

Z-Axis

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	08:33:19
Tested By:	Michael Atkinson	Sequence#:	1
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

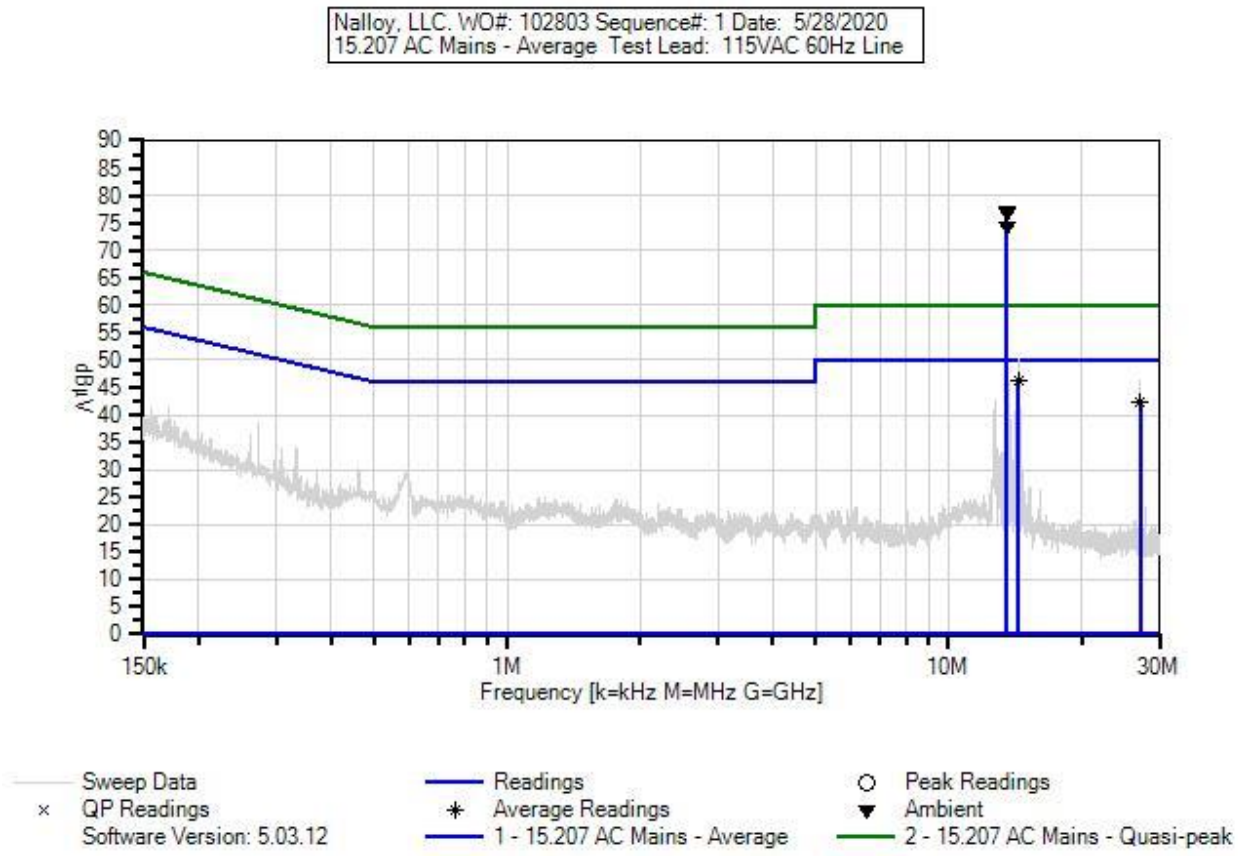
Frequency Range: 0.15-30MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Fundamental of NFC transmitter marked as ambient, additional measurement performed in separate datasheet with fundamental measured with termination on antenna.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
T6	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

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.557M	68.4	+0.2	+0.0	+0.2	+9.1	+0.0	77.3	50.0	+27.3	Line
	Ambient		+0.0	-0.6							
2	13.561M	68.1	+0.2	+0.0	+0.2	+9.1	+0.0	77.0	50.0	+27.0	Line
	Ambient		+0.0	-0.6							
3	13.561M	65.4	+0.2	+0.0	+0.2	+9.1	+0.0	74.3	50.0	+24.3	Line
	Ambient		+0.0	-0.6							
4	14.408M	37.3	+0.2	+0.0	+0.2	+9.1	+0.0	46.2	50.0	-3.8	Line
	Ave		+0.0	-0.6							
^	14.407M	41.5	+0.2	+0.0	+0.2	+9.1	+0.0	50.4	50.0	+0.4	Line
			+0.0	-0.6							
6	27.121M	33.7	+0.2	+0.1	+0.3	+9.1	+0.0	42.5	50.0	-7.5	Line
	Ave		+0.0	-0.9							
^	27.121M	38.4	+0.2	+0.1	+0.3	+9.1	+0.0	47.2	50.0	-2.8	Line
			+0.0	-0.9							
^	27.120M	37.4	+0.2	+0.1	+0.3	+9.1	+0.0	46.2	50.0	-3.8	Line
			+0.0	-0.9							

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	08:32:12
Tested By:	Michael Atkinson	Sequence#:	2
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

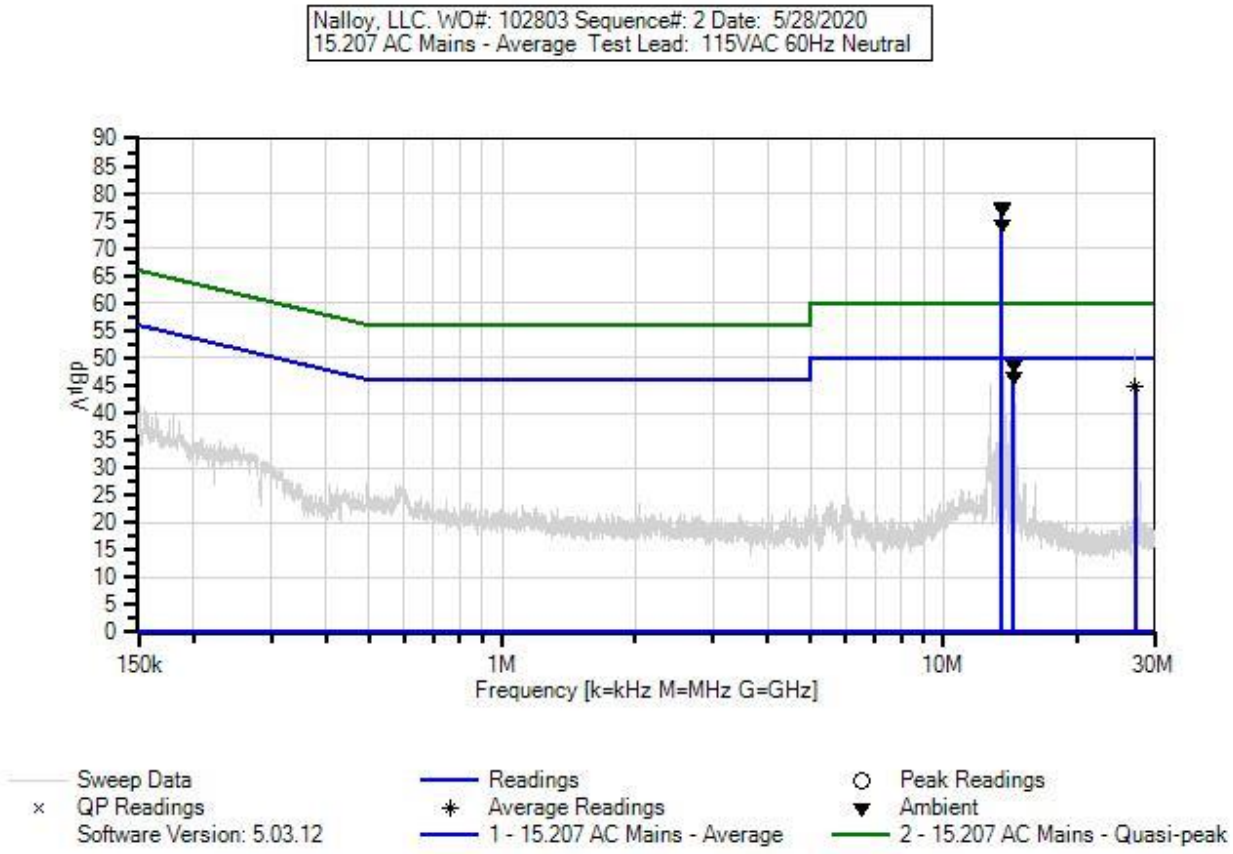
Frequency Range: 0.15-30MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Fundamental of NFC transmitter marked as ambient, additional measurement performed in separate datasheet with fundamental measured with termination on antenna.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
	AN01311	50uH LISN-Line1 (L)	3816/2	2/24/2020	2/24/2022
T5	AN01311	50uH LISN-Line2 (N)	3816/2	2/24/2020	2/24/2022

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	13.557M	68.6	+0.2	+0.0	+0.2	+9.1	+0.0	77.5	50.0	+27.5	Neutr
	Ambient		-0.6								
2	13.561M	68.3	+0.2	+0.0	+0.2	+9.1	+0.0	77.2	50.0	+27.2	Neutr
	Ambient		-0.6								
3	13.561M	65.5	+0.2	+0.0	+0.2	+9.1	+0.0	74.4	50.0	+24.4	Neutr
	Ambient		-0.6								
4	14.407M	40.0	+0.2	+0.0	+0.2	+9.1	+0.0	48.9	50.0	-1.1	Neutr
	Ambient		-0.6								
5	14.409M	37.6	+0.2	+0.0	+0.2	+9.1	+0.0	46.5	50.0	-3.5	Neutr
	Ambient		-0.6								
6	27.121M	36.0	+0.2	+0.1	+0.3	+9.1	+0.0	44.8	50.0	-5.2	Neutr
	Ave		-0.9								
7	27.121M	36.0	+0.2	+0.1	+0.3	+9.1	+0.0	44.8	50.0	-5.2	Neutr
	Ave		-0.9								
^	27.120M	42.9	+0.2	+0.1	+0.3	+9.1	+0.0	51.7	50.0	+1.7	Neutr
			-0.9								

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	08:41:06
Tested By:	Michael Atkinson	Sequence#:	3
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

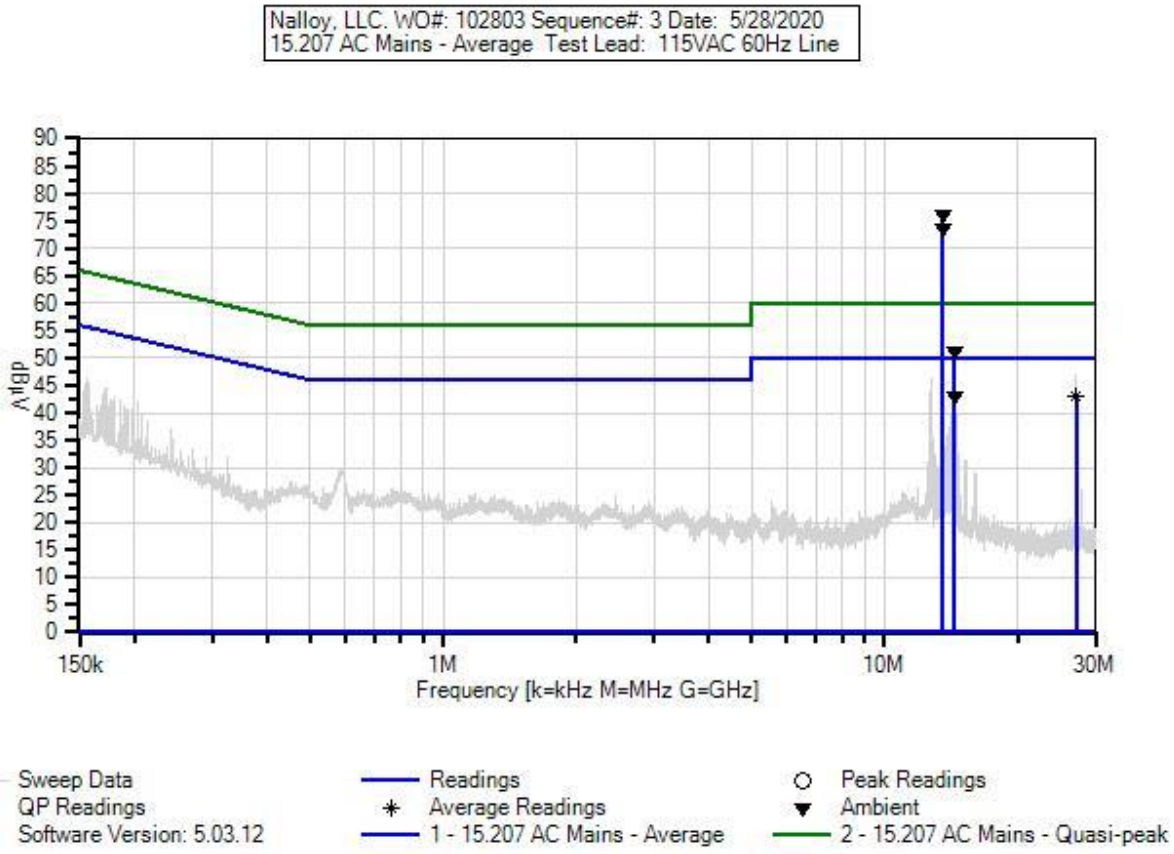
Frequency Range: 0.15-30MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC B. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Fundamental of NFC transmitter marked as ambient, additional measurement performed in separate datasheet with fundamental measured with termination on antenna.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
T5	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

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	13.561M	67.4	+0.2	+0.0	+0.2	+9.1	+0.0	76.3	50.0	+26.3	Line
	Ambient		-0.6								
2	13.557M	67.1	+0.2	+0.0	+0.2	+9.1	+0.0	76.0	50.0	+26.0	Line
	Ambient		-0.6								
3	13.561M	64.7	+0.2	+0.0	+0.2	+9.1	+0.0	73.6	50.0	+23.6	Line
	Ambient		-0.6								
4	14.407M	42.4	+0.2	+0.0	+0.2	+9.1	+0.0	51.3	50.0	+1.3	Line
	Ambient		-0.6								
5	14.408M	34.3	+0.2	+0.0	+0.2	+9.1	+0.0	43.2	50.0	-6.8	Line
	Ambient		-0.6								
6	27.121M	34.2	+0.2	+0.1	+0.3	+9.1	+0.0	43.0	50.0	-7.0	Line
	Ave		-0.9								
^	27.120M	38.4	+0.2	+0.1	+0.3	+9.1	+0.0	47.2	50.0	-2.8	Line
			-0.9								

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	08:45:30
Tested By:	Michael Atkinson	Sequence#:	4
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

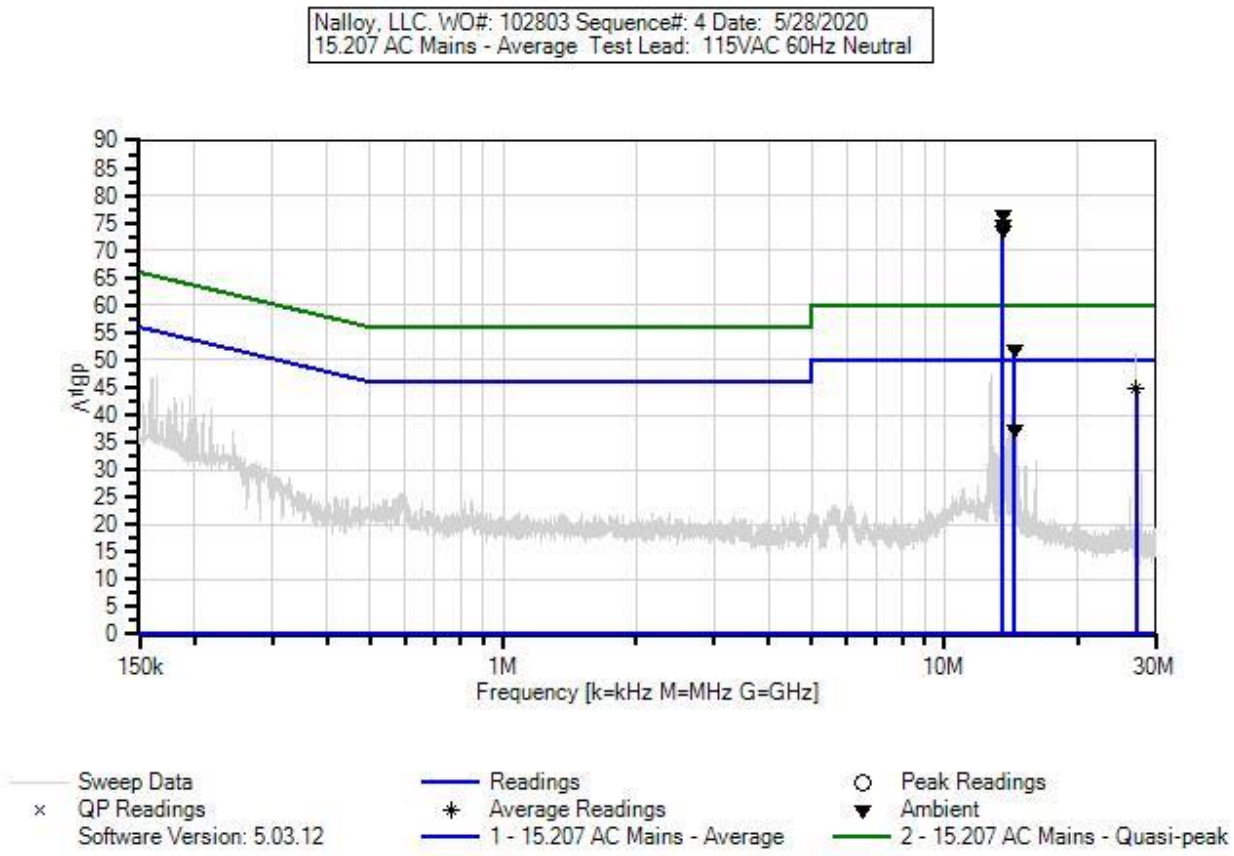
Frequency Range: 0.15-30MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC B. NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Fundamental of NFC transmitter marked as ambient, additional measurement performed in separate datasheet with fundamental measured with termination on antenna.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
	AN01311	50uH LISN-Line1 (L)	3816/2	2/24/2020	2/24/2022
T5	AN01311	50uH LISN-Line2 (N)	3816/2	2/24/2020	2/24/2022

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	13.561M	67.7	+0.2	+0.0	+0.2	+9.1	+0.0	76.6	50.0	+26.6	Neutr
	Ambient		-0.6								
2	13.557M	65.8	+0.2	+0.0	+0.2	+9.1	+0.0	74.7	50.0	+24.7	Neutr
	Ambient		-0.6								
3	13.561M	64.9	+0.2	+0.0	+0.2	+9.1	+0.0	73.8	50.0	+23.8	Neutr
	Ambient		-0.6								
4	14.356M	43.0	+0.2	+0.0	+0.2	+9.1	+0.0	51.9	50.0	+1.9	Neutr
	Ambient		-0.6								
5	27.121M	35.9	+0.2	+0.1	+0.3	+9.1	+0.0	44.7	50.0	-5.3	Neutr
	Ave		-0.9								
^	27.120M	42.6	+0.2	+0.1	+0.3	+9.1	+0.0	51.4	50.0	+1.4	Neutr
			-0.9								
7	14.354M	28.6	+0.2	+0.0	+0.2	+9.1	+0.0	37.5	50.0	-12.5	Neutr
	Ambient		-0.6								

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	12:31:20
Tested By:	Michael Atkinson	Sequence#:	13
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

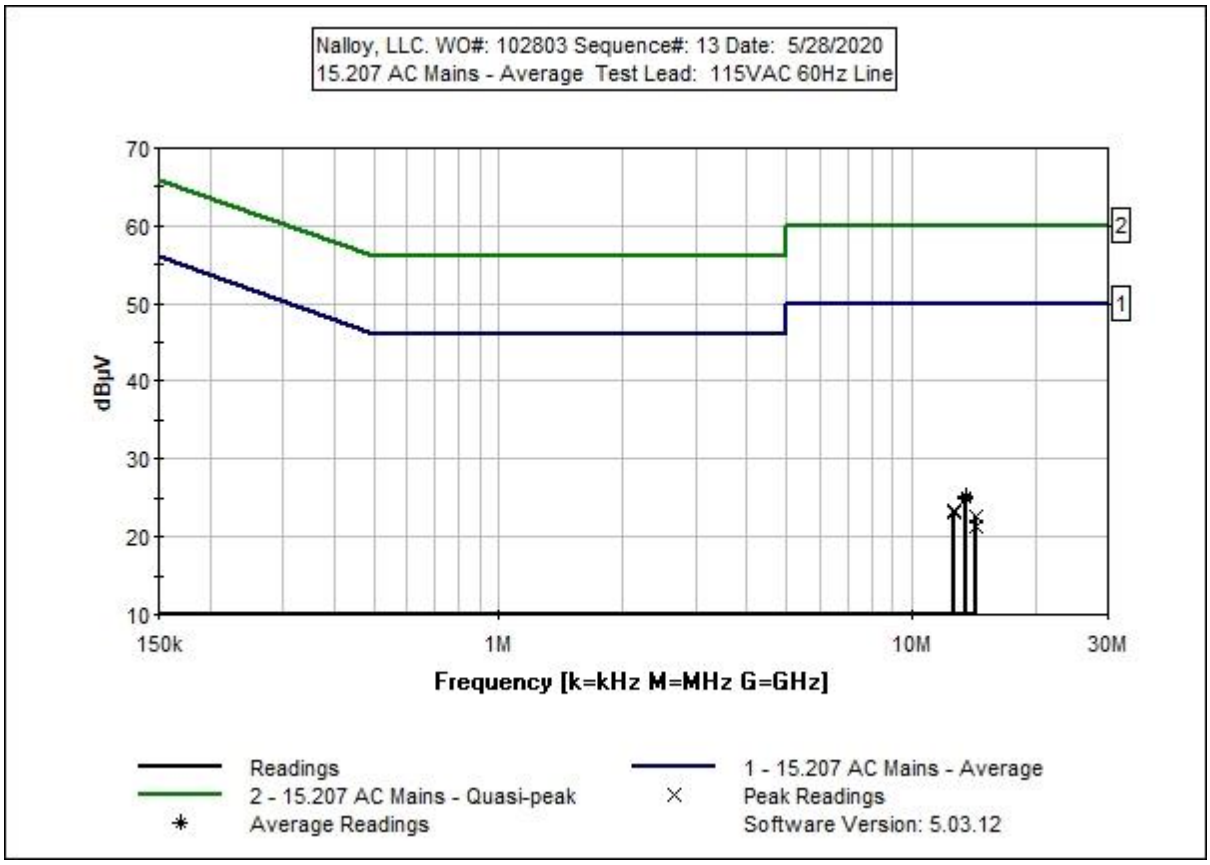
Frequency Range: 0.15-30MHz

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A and NFC B both investigated.
NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Antenna with termination, fundamental of transmitter measured while this termination was in place.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
T5	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

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	13.561M Ave	15.0	+0.2 +0.6	+0.0	+0.2	+9.1	+0.0	25.1	50.0 NFC B	-24.9	Line
2	13.561M Ave	14.9	+0.2 +0.6	+0.0	+0.2	+9.1	+0.0	25.0	50.0 NFC A	-25.0	Line
^	13.560M	19.9	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	29.9	50.0 NFC B	-20.1	Line
^	13.560M	19.8	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	29.8	50.0 NFC A	-20.2	Line
5	12.704M	13.3	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	23.3	50.0 NFC B	-26.7	Line
6	12.705M	13.1	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	23.1	50.0 NFC A	-26.9	Line
7	14.408M	12.5	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	22.5	50.0 NFC B	-27.5	Line
8	14.408M	11.3	+0.2 +0.5	+0.0	+0.2	+9.1	+0.0	21.3	50.0 NFC A	-28.7	Line

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98021 • 800-500-4362		
Customer:	**Nalloy, LLC.**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102803**	Date:	5/28/2020
Test Type:	**Conducted Emissions**	Time:	12:26:57
Tested By:	Michael Atkinson	Sequence#:	12
Software:	EMITest 5.03.12		115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

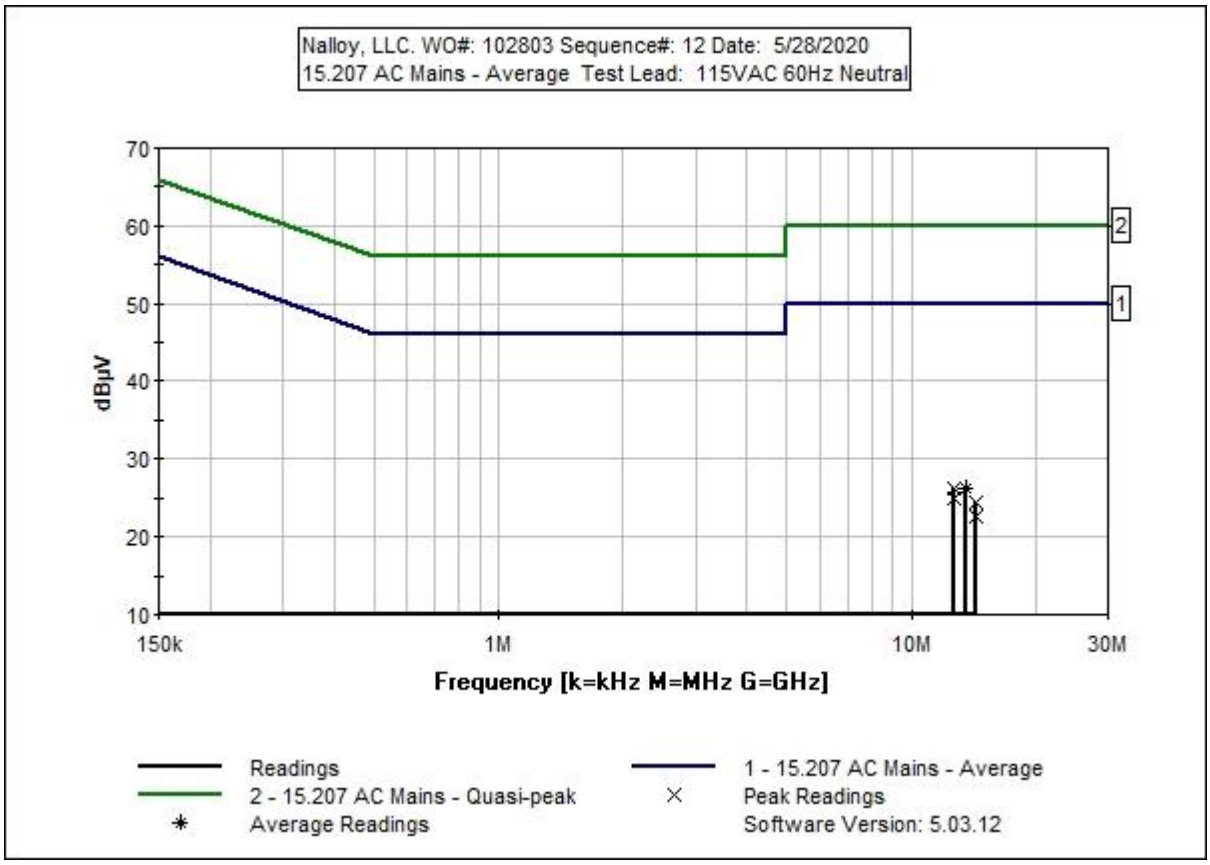
Temperature: 23°C
Humidity: 37%
Pressure: 101.6 kPa

Test Method: ANSI C63.10 (2013)

Test Setup:
EUT is setup 0.8 meters high on Styrofoam table.

Setup:
NFC A and NFC B both investigated.
NFC I2C on.
EEPROM on.
Force test on.
CPU Stress Test.

Antenna with termination, fundamental of transmitter measured while this termination was in place.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliax	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliax	6/29/2018	6/29/2020
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
T6	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

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

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	13.561M	16.3	+0.2	+0.0	+0.2	+9.1	+0.0	26.3	50.0	-23.7	Neutr
	Ave		+0.0	+0.5					NFC A		
2	12.715M	16.2	+0.2	+0.0	+0.2	+9.1	+0.0	26.2	50.0	-23.8	Neutr
			+0.0	+0.5					NFC B		
3	13.561M	16.2	+0.2	+0.0	+0.2	+9.1	+0.0	26.2	50.0	-23.8	Neutr
	Ave		+0.0	+0.5					NFC B		
^	13.561M	21.9	+0.2	+0.0	+0.2	+9.1	+0.0	31.9	50.0	-18.1	Neutr
			+0.0	+0.5					NFC A		
^	13.557M	21.1	+0.2	+0.0	+0.2	+9.1	+0.0	31.1	50.0	-18.9	Neutr
			+0.0	+0.5					NFC B		
6	12.713M	14.9	+0.2	+0.0	+0.2	+9.1	+0.0	24.9	50.0	-25.1	Neutr
			+0.0	+0.5					NFC A		
7	14.405M	14.2	+0.2	+0.0	+0.2	+9.1	+0.0	24.3	50.0	-25.7	Neutr
			+0.0	+0.6					NFC A		
8	14.407M	12.6	+0.2	+0.0	+0.2	+9.1	+0.0	22.7	50.0	-27.3	Neutr
			+0.0	+0.6					NFC B		

Test Setup Photo(s)

NFC

NFC Antenna Termination

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.