Indyme Solutions, LLC

TEST REPORT FOR

Proprietary ISM Band Access Point for Large Retail Store Location
Model: AP9100

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(FHSS 902-928 MHz)

Report No.: 102820-14

Date of issue: August 7, 2019

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:

Indyme Solutions, LLC
8295 Aero Place
San Diego, CA 92123

Representative: Joe Silberman
Customer Reference Number: 6928-00

REPORT PREPARED BY:

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 102820

DATE OF EQUIPMENT RECEIPT: July 18, 2019
DATE(S) OF TESTING: July 18, 2019 and July 23, 2019

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.
110 Olinda Place
Brea, CA 92823

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 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(i)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(i)	Average Time of Occupancy	NA	Pass
15.247(b)(2)	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
48Vdc Power Adapter	Trendnet	NU36-D480080-I1	NA
Network switch	Trendnet	TPE-S44	C21802P403101
Proprietary ISM Band Access Point for Large Retail Store Location	Indyme Solutions, LLC	AP9100	78-8C-4D-8C-6F-E4

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	Lenovo	T500	NA
Laptop power adapter	Lenovo	45N0121	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	918.1-923.2MHz
Number of Hopping Channels:	51
Modulation Type(s):	FSK
Maximum Duty Cycle:	1.375 %
Number of TX Chains:	1
Antenna Type(s) and Gain:	Monopole/3dBi
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	48Vdc
Firmware / Software used for Test:	PuTTY ver.0.62

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	7/18/2019
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on test bench and is set into continuously transmitting mode. Operating frequency: 918.1MHz to 923.2MHz. Tested frequencies: 918.1MHz, 920.5MHz, 923.2MHz. Frequency range of measurement = 918.1-923.2MHz RBW=1kHz, 10kHz VBW=3kHz, 62kHz		

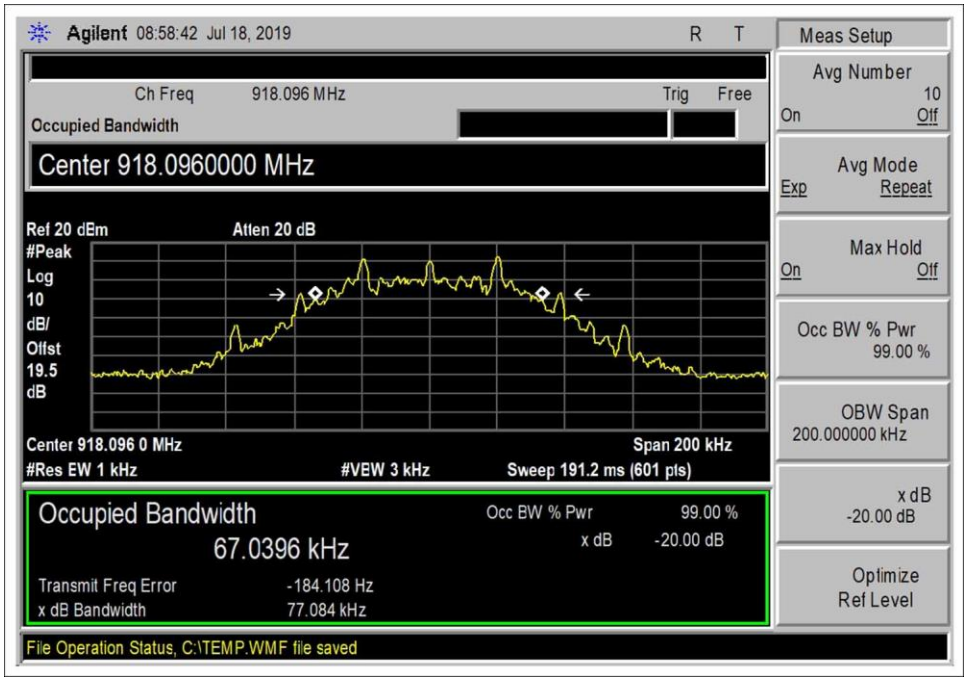
Environmental Conditions			
Temperature (ºC)	24.3	Relative Humidity (%):	55

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P07243	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
02672	Spectrum Analyzer	Agilent	E4446A	3/13/2019	3/13/2021
03431	Attenuator	Aeroflex/Weinschel	89-20-21	12/19/2017	12/19/2019

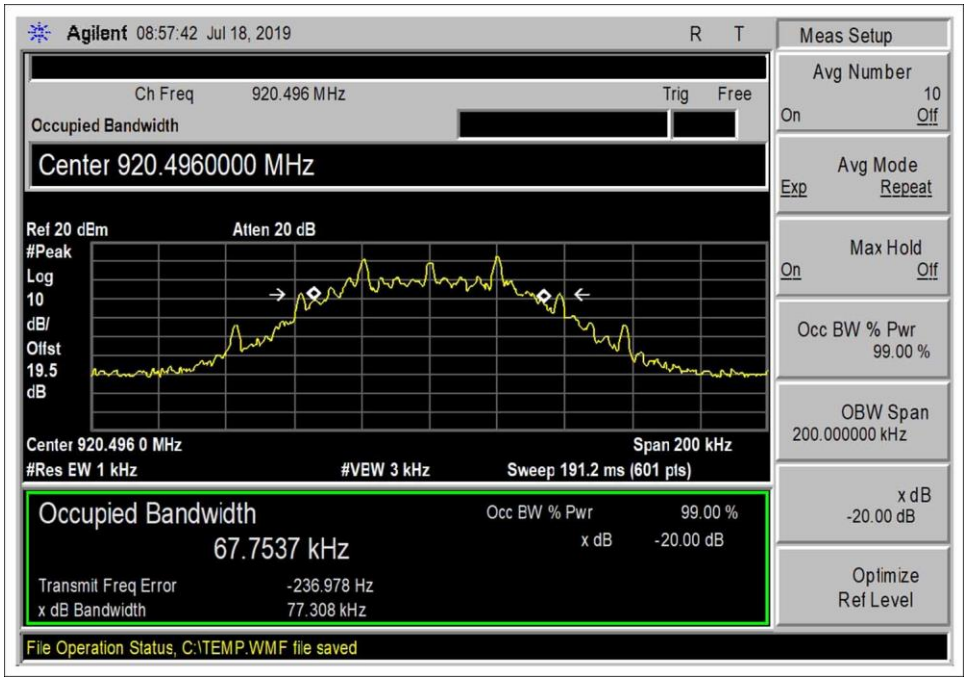
15.247(a)(1)(i) 20 dB Bandwidth

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
918.1	1	FSK	77.084	≤500	Pass
920.5	1	FSK	77.308		
923.2	1	FSK	77.460		

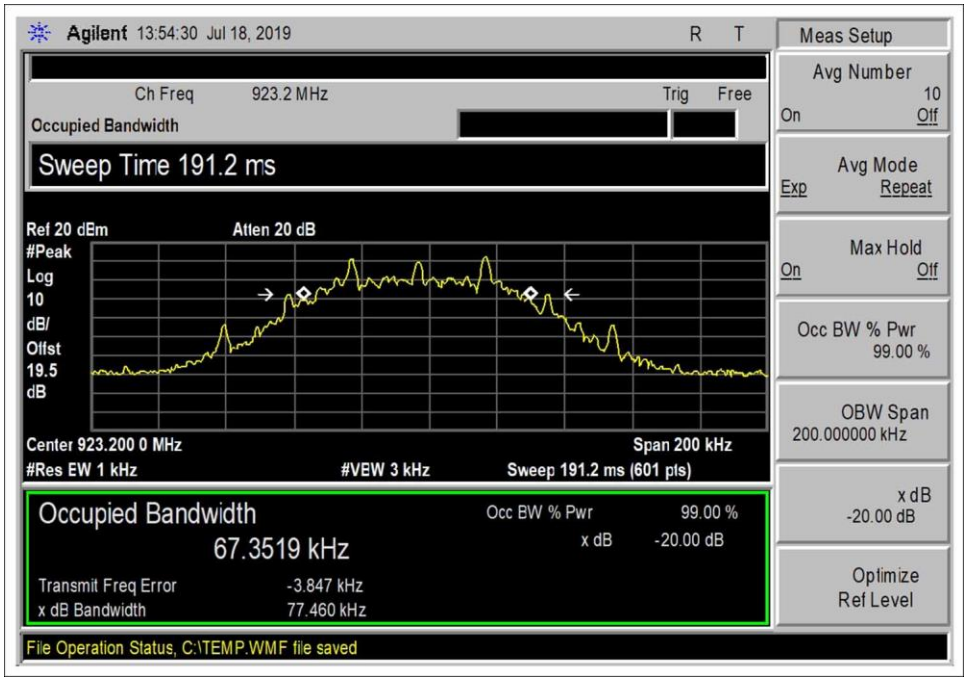
Plot(s)



Low Channel



Middle Channel

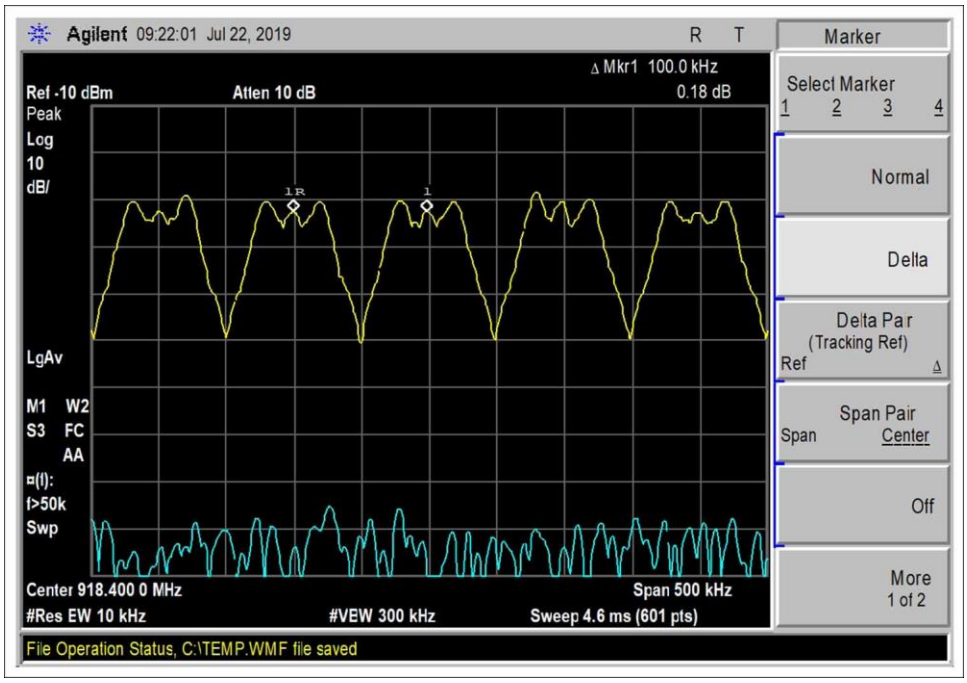


High Channel

15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	Hopping	100	>77.460	Pass

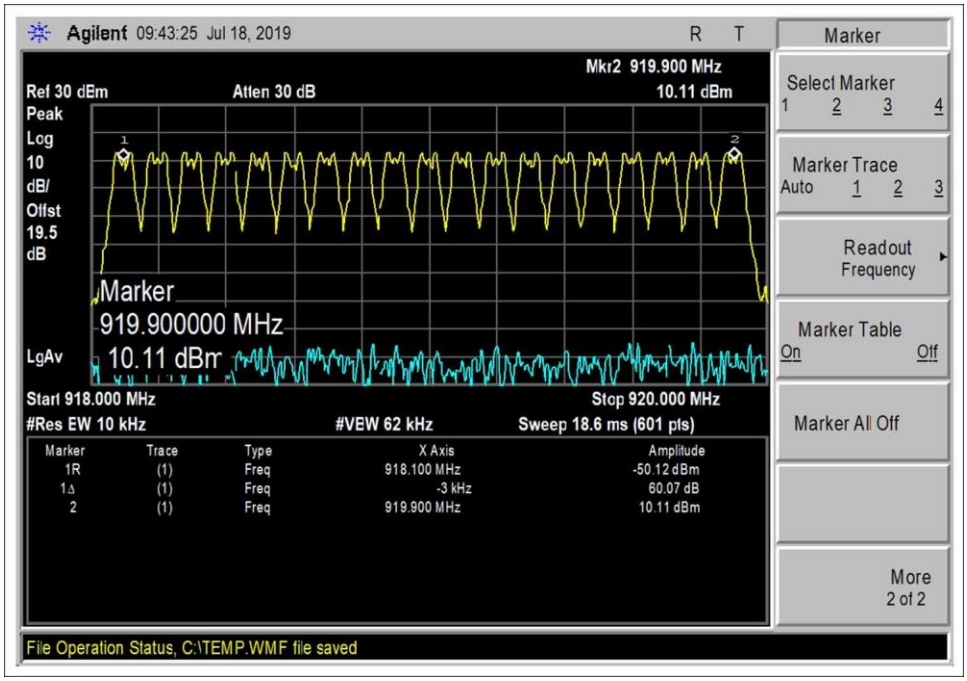
Plot



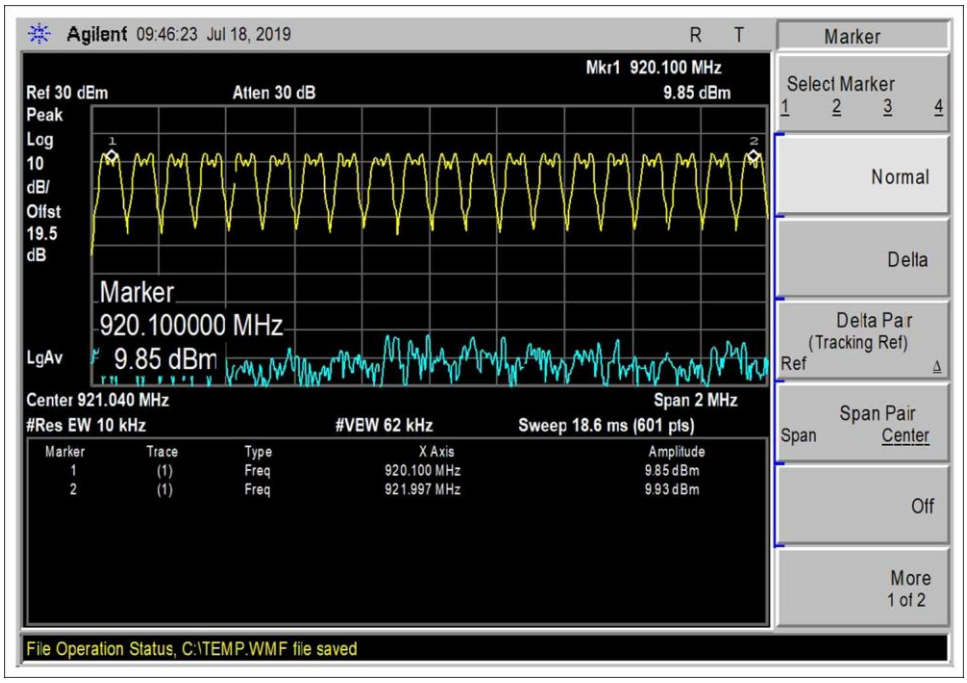
15.247(a)(1)(i) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
1	Hopping	51	≥50	Pass

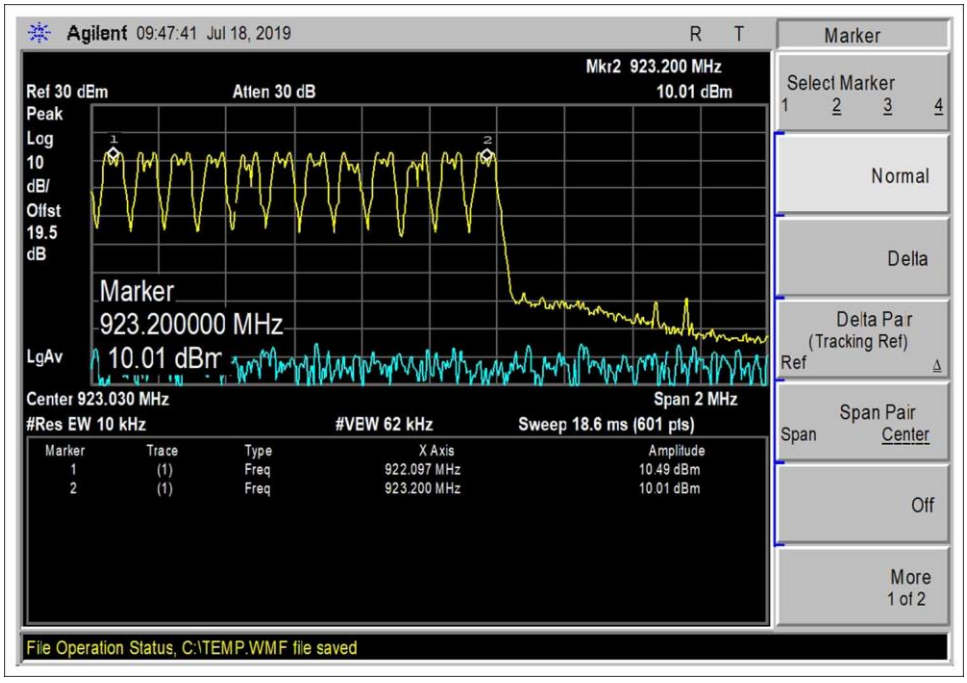
Plot(s)



918.1-919.9MHz



920.1-922.0MHz



922.1-923.2MHz

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

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = \begin{cases} 20\ Seconds & \lvert 20\ dB\ BW < 250kHz \\ 10\ Seconds & \lvert 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
1	Hopping	208.2628	≤400	Pass

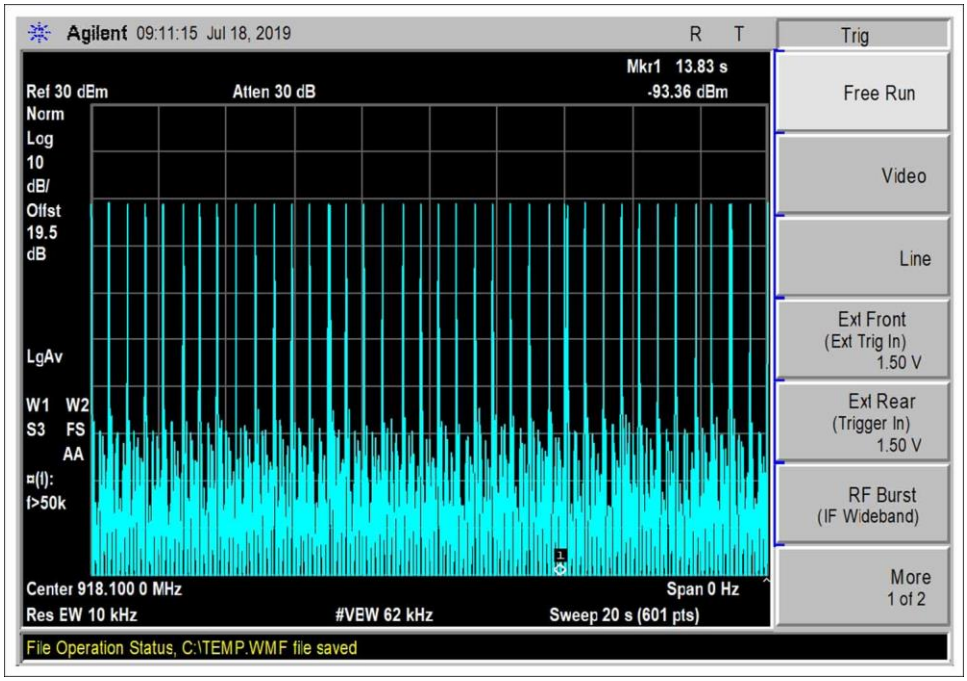
Measured results are calculated as follows:

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

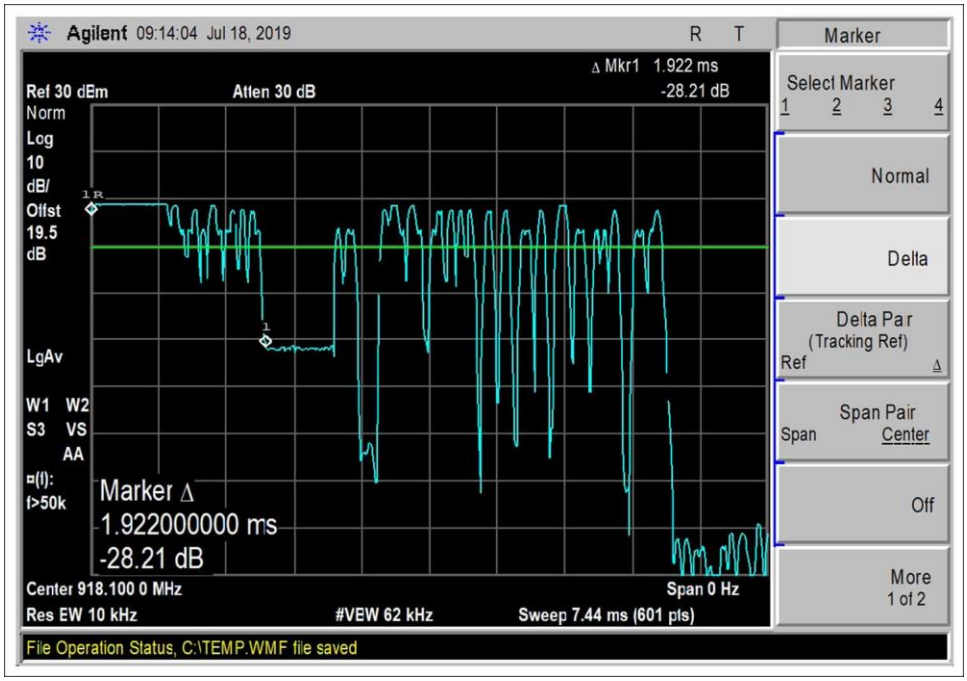
Actual Calculated Values:

Parameter	Value
Observation Period (P_{obs}):	20 s
Number of RF Bursts / P_{obs}:	38
On time of RF Burst:	1.922+0.2976+3.261=5.4806 ms
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	208.2628 ms

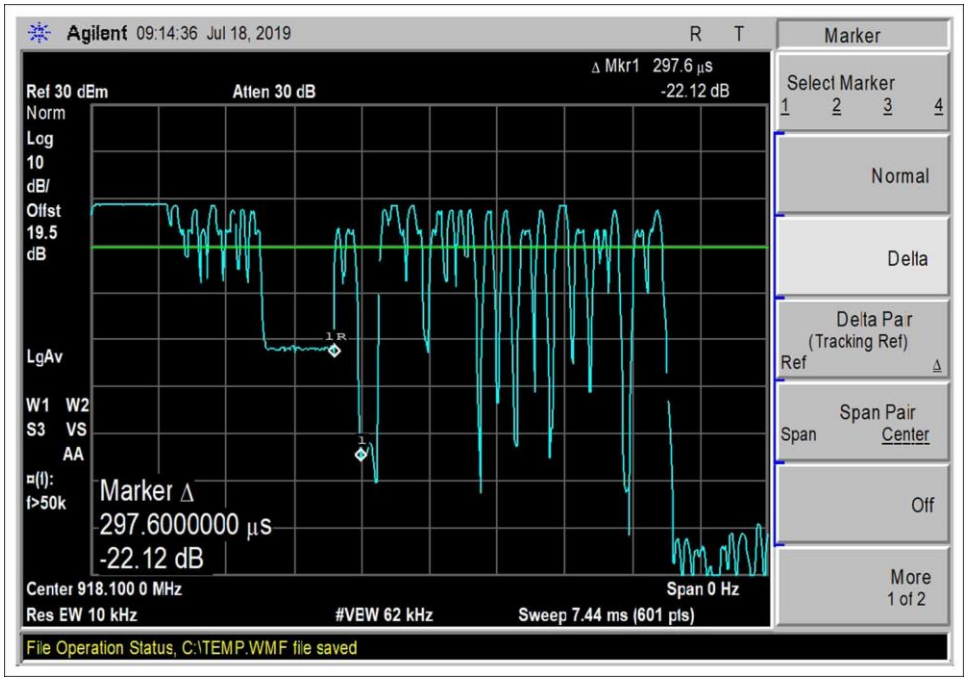
Plot(s)



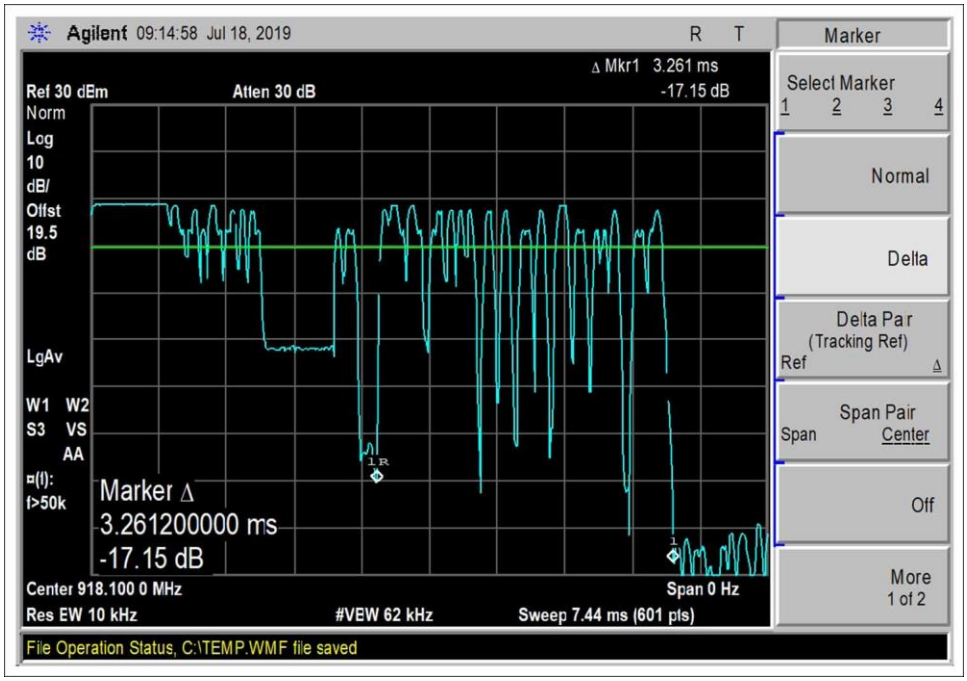
Total Burst



Signal Plot #1



Signal Plot #2



Signal Plot #3

Test Setup Photo

15.247(b)(1) Output Power

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	7/18/2019
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on test bench and is set into continuously transmitting mode. Operating frequency: 918.1MHz to 923.2MHz. Tested frequencies: 918.1MHz, 920.5MHz, 923.2MHz. Frequency range of measurement = 918.1-923.2MHz RBW=2MHz, VBW=6MHz		

Environmental Conditions			
Temperature (ºC)	24.3	Relative Humidity (%):	55

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
P07243	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
02672	Spectrum Analyzer	Agilent	E4446A	3/13/2019	3/13/2021
03431	Attenuator	Aeroflex/Weinschel	89-20-21	12/19/2017	12/19/2019

Test Data Summary - Voltage Variations					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
918.1	FSK/1	12.78	12.79	12.79	0.01
920.5	FSK/1	12.70	12.70	12.71	0.01
923.2	FSK/1	12.69	12.68	12.70	0.02

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

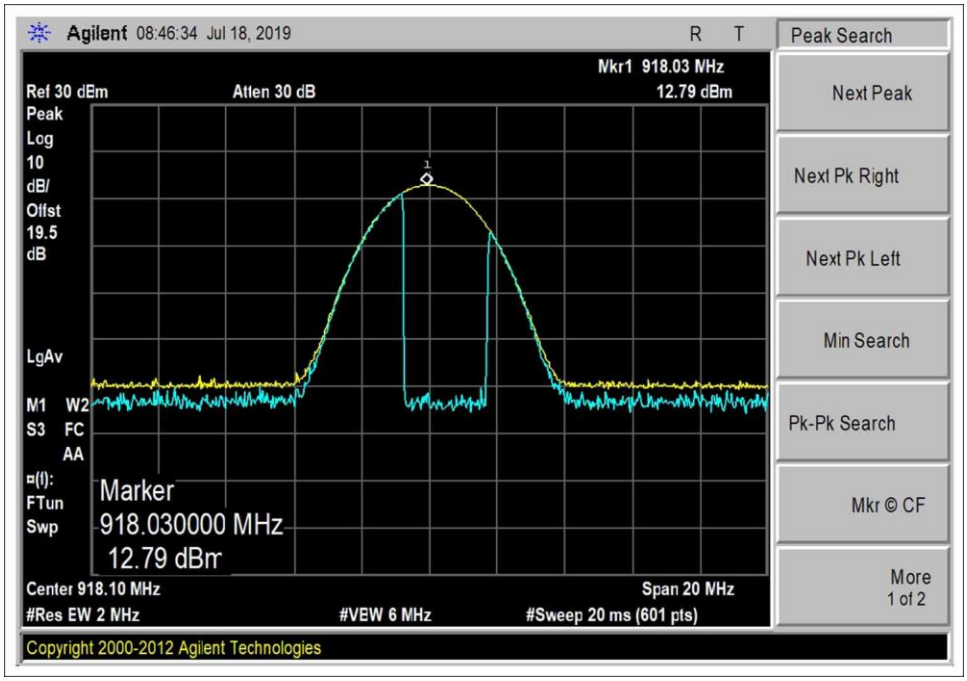
Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

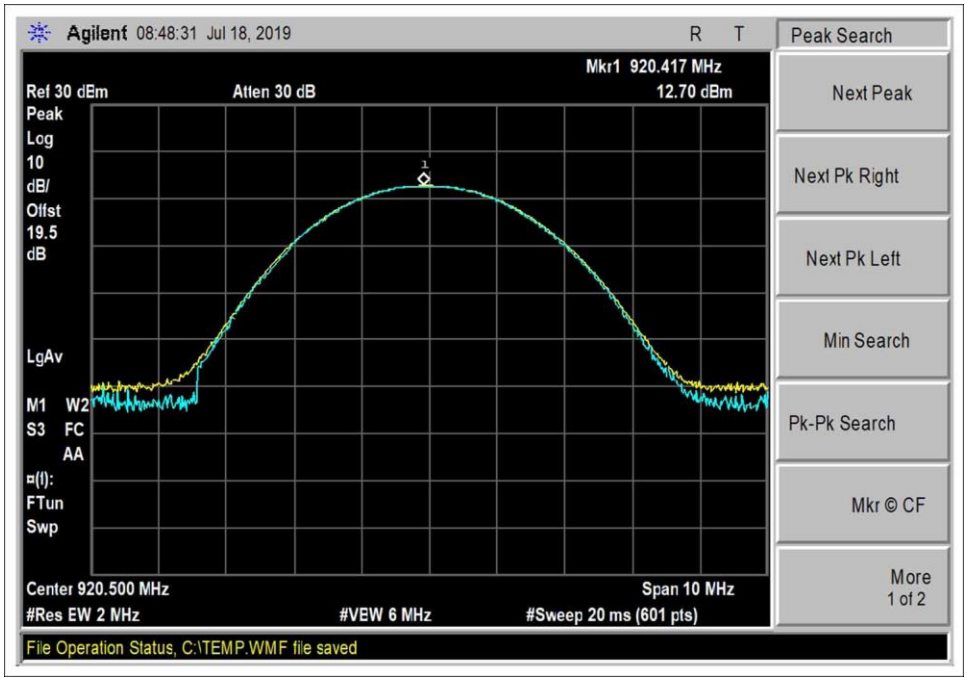
Parameter	Value
$V_{Nominal}$:	48VDC
$V_{Minimum}$:	40.8 VDC
$V_{Maximum}$:	55.2 VDC

Test Data Summary - RF Conducted Measurement					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
918.1	FSK	Monopole/3	12.79	≤30	Pass
920.5	FSK	Monopole/3	12.70	≤30	Pass
923.2	FSK	Monopole/3	12.68	≤30	Pass

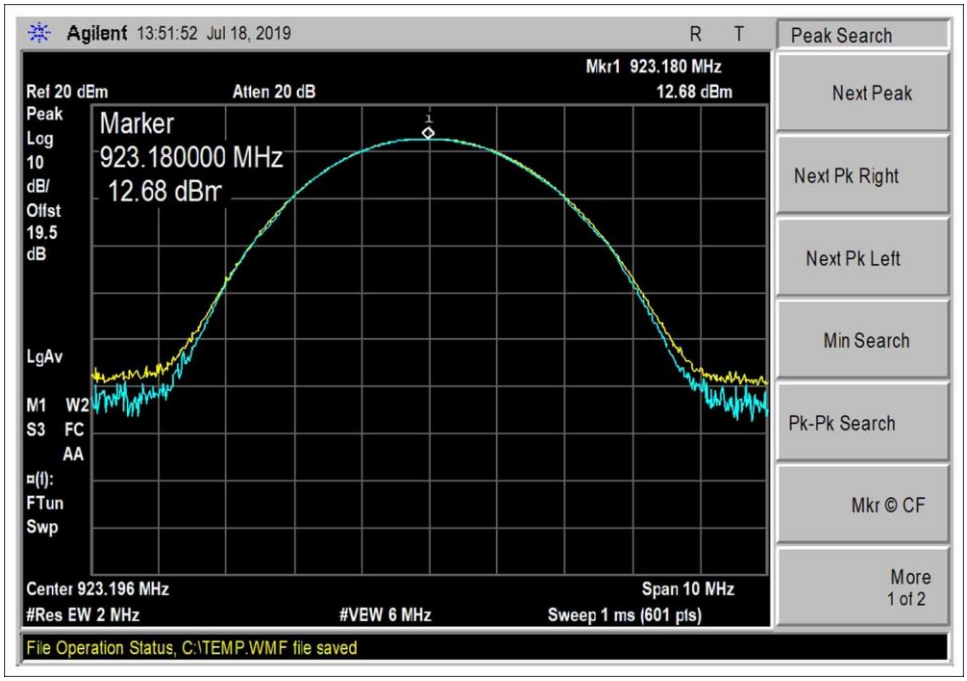
Plots



Low Channel



Middle Channel



High Channel

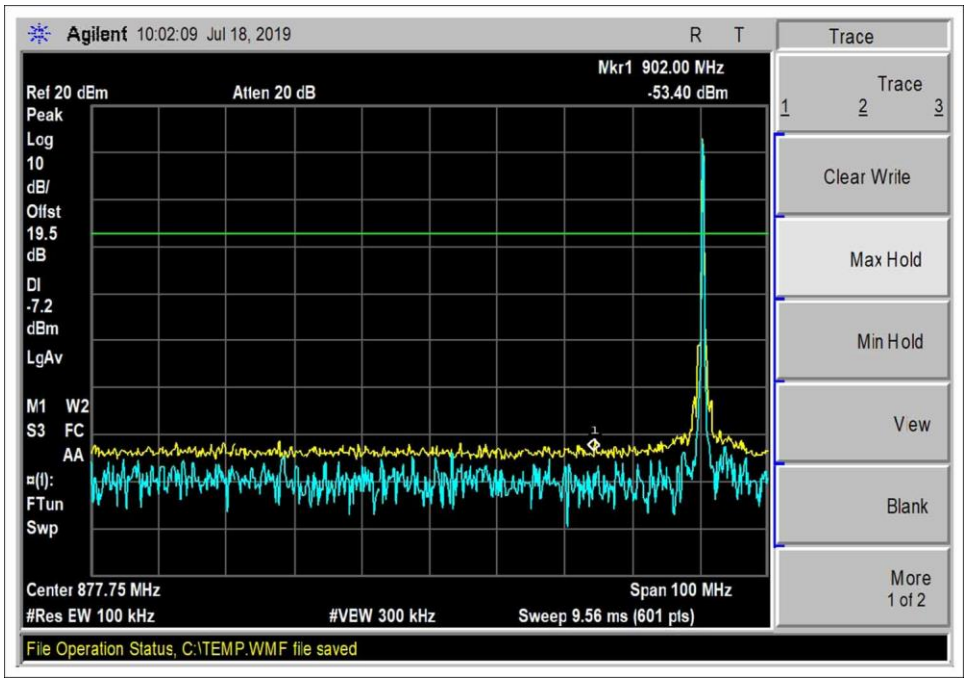
Test Setup Photo

15.247(d) RF Conducted Emissions & Band Edge

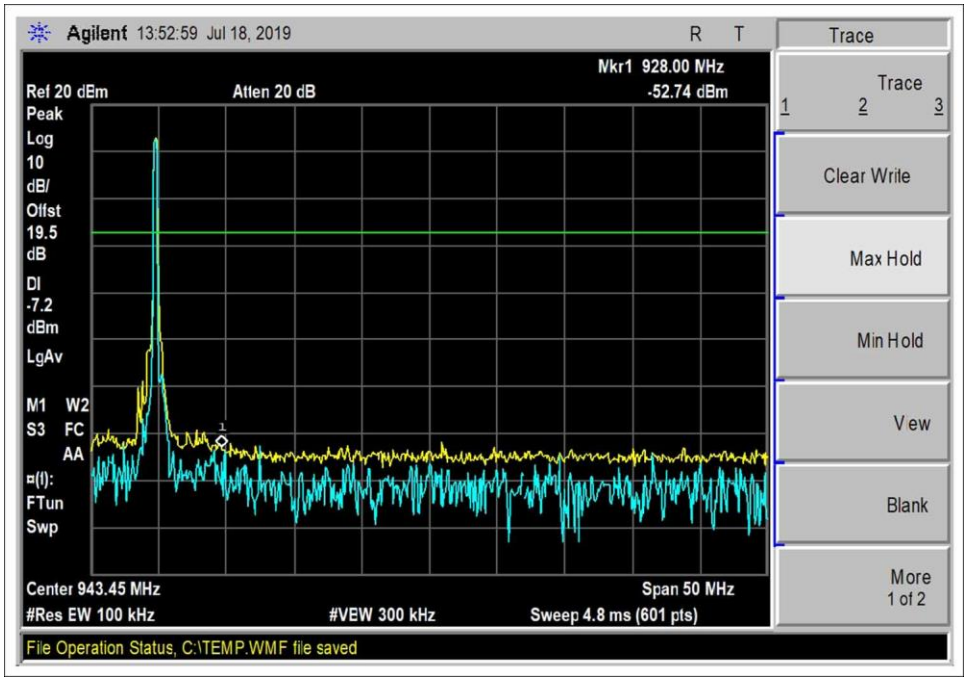
Band Edge

Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB.				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	FSK	-53.40	<-7.21	Pass
928	FSK	-52.74	<-7.21	Pass
902	FSK, Hopping	-52.19	<-7.21	Pass
928	FSK, Hopping	-51.55	<-7.21	Pass

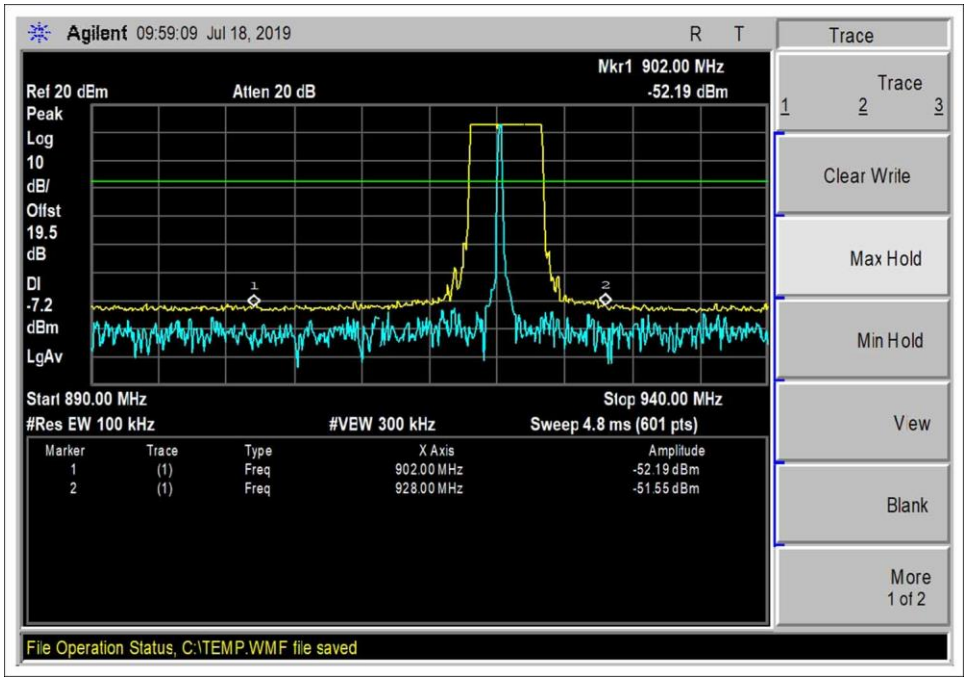
Band Edge Plots



Low Channel



High Channel



Hopping Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Indyme Solutions, LLC**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**102820**	Date:	7/18/2019
Test Type:	**Conducted Emissions**	Time:	13:59:23
Tested By:	Don Nguyen	Sequence#:	0
Software:	EMITest 5.03.12		48Vdc

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on test bench and is set into continuously transmitting mode.

Operating frequency: 918.1MHz to 923.2MHz.
Tested frequencies: 918.1MHz, 920.5MHz, 923.2MHz.

Frequency range of measurement = 9 kHz- 10GHz.
RBW=100kHz, VBW=300kHz

Temperature: 24.3°C, Humidity: 55%
Site A.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07243	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1840.967M	38.1	+0.2	+19.3			+0.0	57.6	99.8	-42.2	Anten
2	450.200M	37.4	+0.2	+19.2			+0.0	56.8	99.8	-43.0	Anten
3	1846.413M	36.7	+0.2	+19.3			+0.0	56.2	99.8	-43.6	Anten

4	1836.137M	36.6	+0.2	+19.3		+0.0	56.1	99.8	-43.7	Anten

Test Setup Photo

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Indyme Solutions, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**102820**	Date:	7/23/2019
Test Type:	**Maximized Emissions**	Time:	10:59:21
Tested By:	Don Nguyen	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			

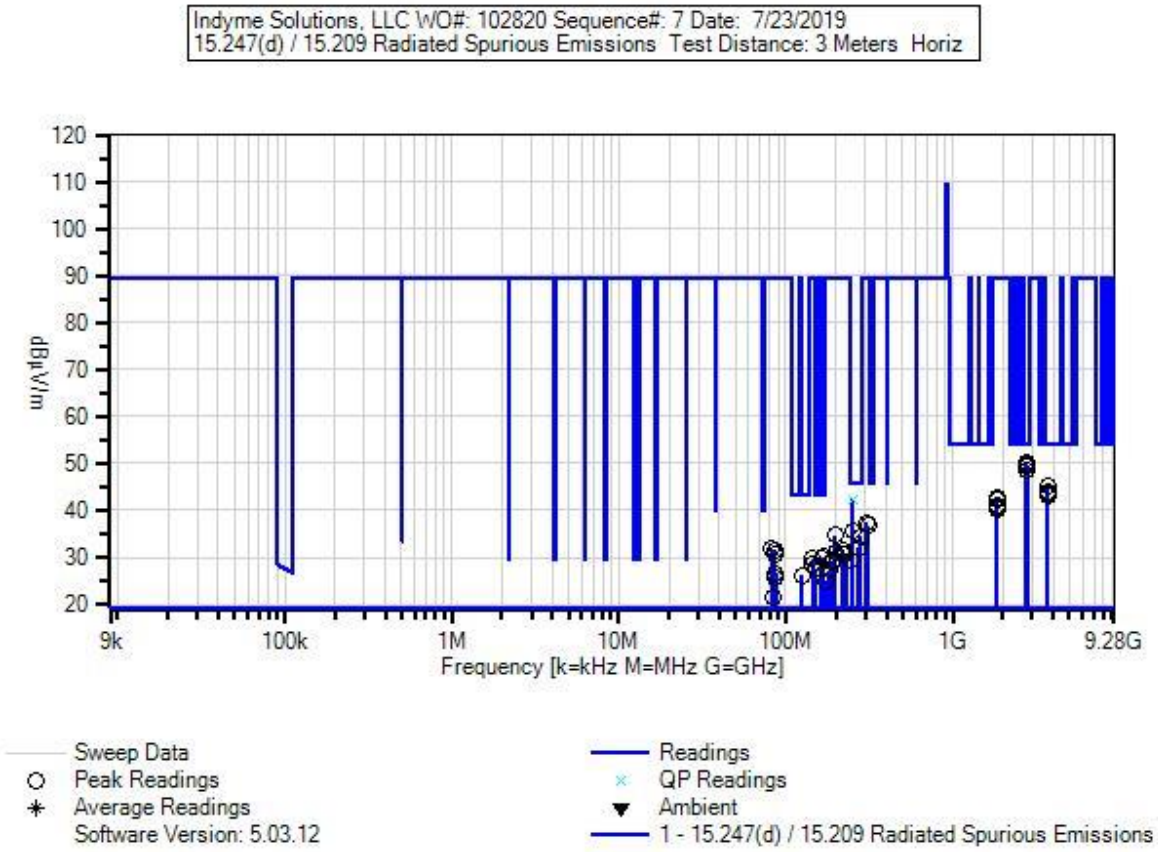
Test Conditions / Notes:

The equipment under test (EUT) is placed on Styrofoam platform. The EUT is power from 48Vdc PoE switch via shielded CAT5e cable. The EUT is set to TX mode. All remaining ports on the PoE switch are connected to unterminated UTP CAT5e cables.
EUT is rotated in three orthogonal axes. Data represents the worst case orientation.

Operating frequency: 918.1MHz to 923.2MHz
Tested frequencies: 918.1MHz, 920.5MHz, 923.2MHz.

Frequency range of measurement = 9kHz- 9232MHz.
9 kH -150 kHz;RBW=200 Hz,VBW=600 Hz;
150 kHz-30 MHz;RBW=9 kHz,VBW=27 kHz;
30MHz-1000MHz, RBW=120kHz, VBW=360kHz
1000MHz-9232MHz, RBW=1000kHz, VBW=3000kHz
-20dBc, RBW=100kHz, VBW=300kHz

Temperature: 25.3°C, Humidity: 56%
Site A.
Test Method: ANSI C63.10 (2013)


Indyme Solutions, LLC \WO#: 102820 Sequence#: 7 Date: 7/23/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
120
110
100
90
80
70
60
50
40
30
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
Peak Readings
Average Readings
Software Version: 5.03.12
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020
T1	AN00309	Preamp	8447D	2/19/2018	2/19/2020
T2	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
T3	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
T4	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T5	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T6	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T7	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T8	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T9	ANP07246	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T10	AN03169	High Pass Filter	HM1155-11SS	5/8/2019	5/8/2021

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	250.005M QP	48.4	-28.0 +2.9 +0.0	+12.9 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	42.4	46.0	-3.6	Vert
^	250.005M	51.9	-28.0 +2.9 +0.0	+12.9 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	45.9	46.0	-0.1	Vert
3	2754.292M	55.4	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.4	+0.0 +3.5	+0.0	50.2	54.0	-3.8	Vert
4	2769.600M	54.8	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.5	+0.0 +3.5	+0.0	49.7	54.0	-4.3	Vert
5	2761.500M	54.7	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.4	+0.0 +3.5	+0.0	49.5	54.0	-4.5	Vert
6	2754.300M	54.6	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.4	+0.0 +3.5	+0.0	49.4	54.0	-4.6	Horiz
7	2761.500M	54.5	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.4	+0.0 +3.5	+0.0	49.3	54.0	-4.7	Horiz
8	2769.600M	53.7	+0.0 +0.0 +0.3	+0.0 -38.6 +0.2	+0.0 +29.5	+0.0 +3.5	+0.0	48.6	54.0	-5.4	Horiz

9	3672.392M	47.4	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.6	+0.0 +4.1	+0.0	45.4	54.0	-8.6	Vert
10	3672.400M	46.1	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.6	+0.0 +4.1	+0.0	44.1	54.0	-9.9	Horiz
11	3682.000M	45.6	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.7	+0.0 +4.1	+0.0	43.7	54.0	-10.3	Vert
12	250.025M	41.6	-28.0 +2.9 +0.0	+12.9 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	35.6	46.0	-10.4	Horiz
13	3692.800M	45.4	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.8	+0.0 +4.1	+0.0	43.6	54.0	-10.4	Vert
14	3692.800M	45.0	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.8	+0.0 +4.1	+0.0	43.2	54.0	-10.8	Horiz
15	3682.000M	45.0	+0.0 +0.0 +0.4	+0.0 -38.3 +0.2	+0.0 +31.7	+0.0 +4.1	+0.0	43.1	54.0	-10.9	Horiz
16	278.425M	39.9	-28.0 +3.1 +0.0	+13.1 +0.0 +0.0	+6.0 +0.0	+0.3 +0.0	+0.0	34.4	46.0	-11.6	Horiz
17	164.250M	39.2	-28.0 +2.3 +0.0	+10.3 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	30.0	43.5	-13.5	Vert
18	273.875M	37.4	-28.0 +3.1 +0.0	+13.1 +0.0 +0.0	+6.0 +0.0	+0.3 +0.0	+0.0	31.9	46.0	-14.1	Horiz
19	247.350M	35.4	-28.0 +2.9 +0.0	+12.7 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	29.2	46.0	-16.8	Horiz
20	125.500M	34.2	-28.0 +2.0 +0.0	+11.9 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	26.2	43.5	-17.3	Horiz
21	171.400M	34.6	-28.0 +2.4 +0.0	+9.8 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	25.0	43.5	-18.5	Horiz
22	1841.000M	51.3	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.2	+0.0 +2.6	+0.0	42.6	89.5	-46.9	Vert
23	1836.192M	51.4	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.1	+0.0 +2.6	+0.0	42.6	89.5	-46.9	Vert
24	1846.400M	51.0	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.2	+0.0 +2.6	+0.0	42.3	89.5	-47.2	Vert
25	1836.200M	49.6	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.1	+0.0 +2.6	+0.0	40.8	89.5	-48.7	Horiz

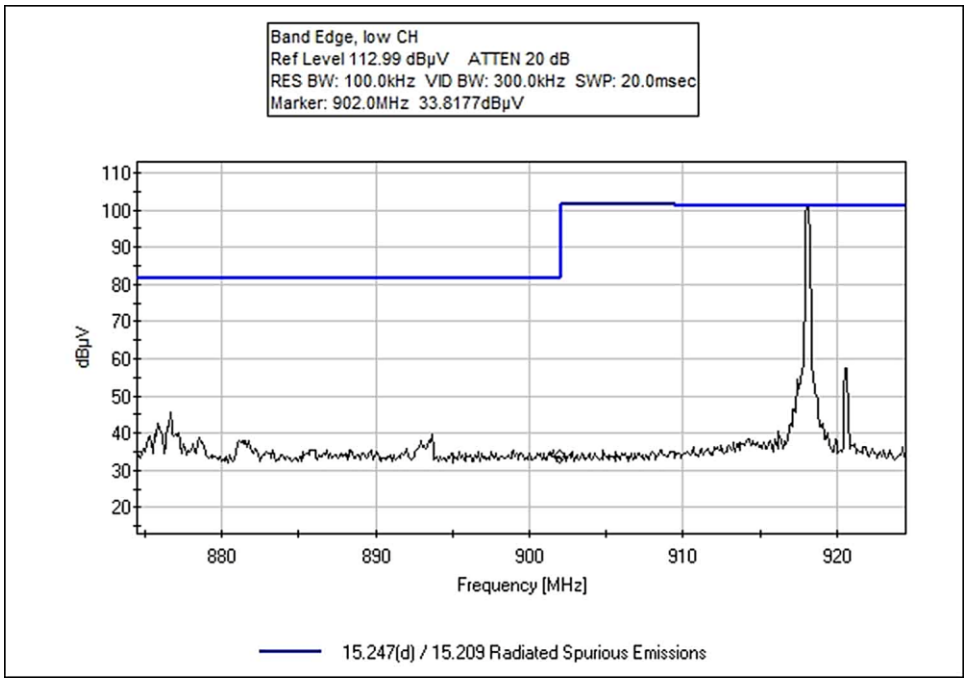
26	1841.000M	49.4	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.2	+0.0 +2.6	+0.0	40.7	89.5	-48.8	Horiz
27	1846.400M	49.1	+0.0 +0.0 +0.2	+0.0 -38.9 +0.2	+0.0 +27.2	+0.0 +2.6	+0.0	40.4	89.5	-49.1	Horiz
28	302.920M	42.4	-28.0 +3.2 +0.0	+13.4 +0.0 +0.0	+6.0 +0.0	+0.3 +0.0	+0.0	37.3	89.5	-52.2	Horiz
29	311.890M	41.6	-28.0 +3.3 +0.0	+13.7 +0.0 +0.0	+6.0 +0.0	+0.3 +0.0	+0.0	36.9	89.5	-52.6	Vert
30	197.350M	44.9	-28.0 +2.6 +0.0	+9.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	34.8	89.5	-54.7	Horiz
31	82.100M	44.2	-28.1 +1.6 +0.0	+8.0 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	31.8	89.5	-57.7	Vert
32	85.200M	43.6	-28.1 +1.7 +0.0	+8.3 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	31.6	89.5	-57.9	Vert
33	219.850M	40.0	-28.0 +2.7 +0.0	+10.7 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	31.6	89.5	-57.9	Horiz
34	196.400M	41.1	-28.0 +2.6 +0.0	+9.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	31.0	89.5	-58.5	Vert
35	86.200M	42.6	-28.1 +1.7 +0.0	+8.4 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	30.7	89.5	-58.8	Vert
36	228.450M	38.2	-28.0 +2.8 +0.0	+11.4 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	30.6	89.5	-58.9	Horiz
37	220.400M	38.9	-28.0 +2.7 +0.0	+10.8 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	30.6	89.5	-58.9	Vert
38	167.300M	39.6	-28.0 +2.3 +0.0	+10.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	30.2	89.5	-59.3	Vert
39	144.000M	37.8	-28.0 +2.1 +0.0	+11.5 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	29.6	89.5	-59.9	Horiz
40	195.850M	39.3	-28.0 +2.6 +0.0	+9.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	29.2	89.5	-60.3	Horiz
41	185.650M	39.2	-28.0 +2.5 +0.0	+9.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	29.0	89.5	-60.5	Vert
42	143.900M	36.6	-28.0 +2.1 +0.0	+11.5 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	28.4	89.5	-61.1	Vert

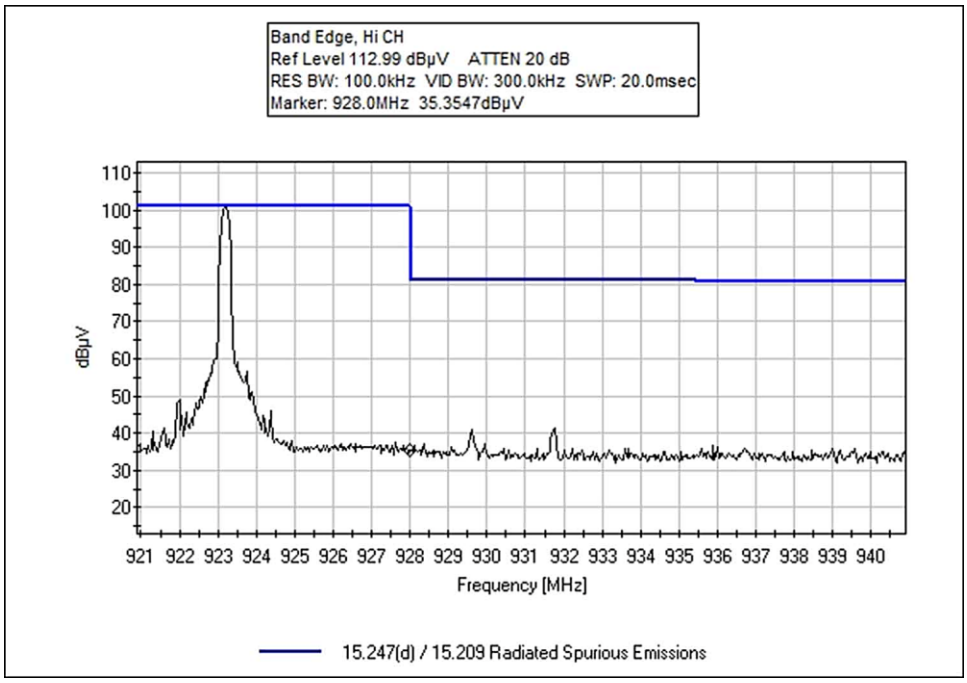
43	150.900M	36.0	-28.0 +2.2 +0.0	+11.2 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	27.6	89.5	-61.9	Horiz
44	182.600M	37.4	-28.0 +2.4 +0.0	+9.1 +0.0 +0.0	+6.0 +0.0	+0.2 +0.0	+0.0	27.1	89.5	-62.4	Vert
45	87.200M	38.5	-28.1 +1.7 +0.0	+8.5 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	26.7	89.5	-62.8	Horiz
46	86.700M	37.7	-28.1 +1.7 +0.0	+8.4 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	25.8	89.5	-63.7	Horiz
47	83.650M	33.9	-28.1 +1.6 +0.0	+8.1 +0.0 +0.0	+6.0 +0.0	+0.1 +0.0	+0.0	21.6	89.5	-67.9	Horiz

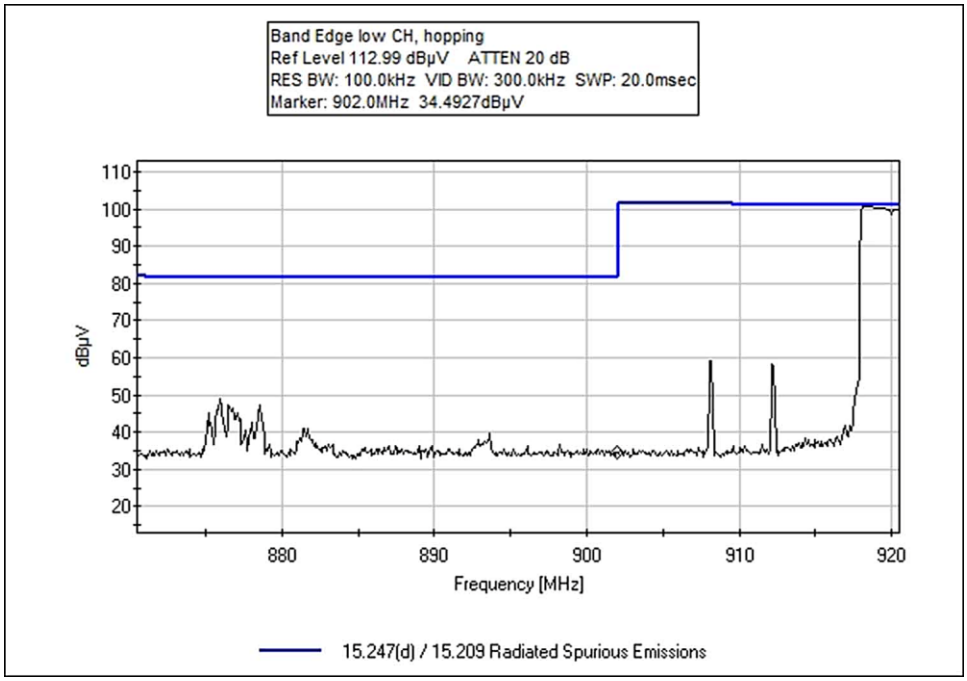
Band Edge

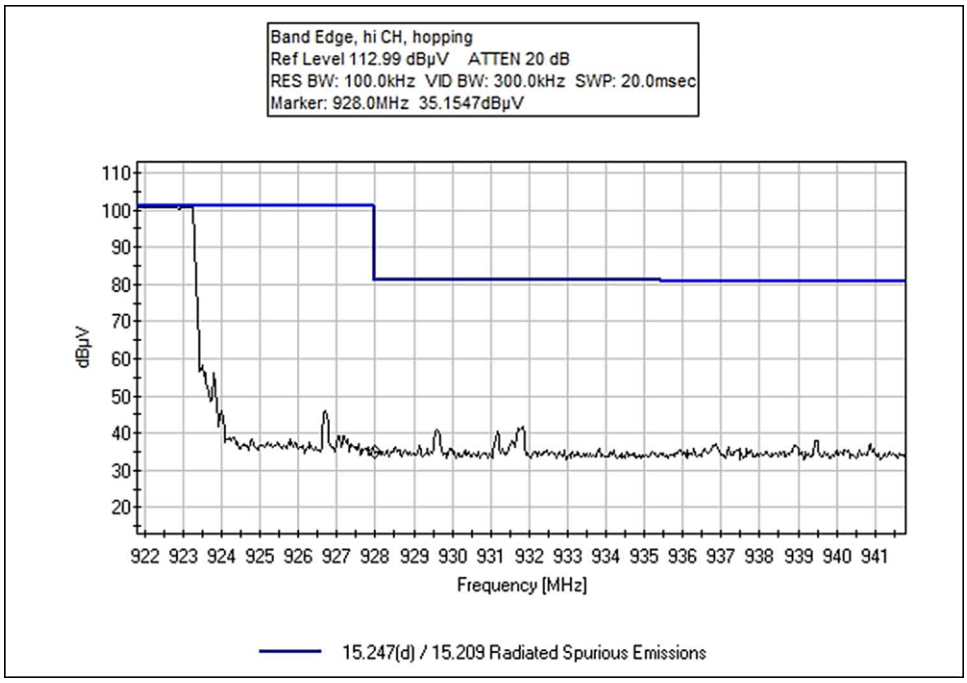
Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	FSK	Monopole	38.4	<46	Pass
902	FSK	Monopole	41.8	<89.5	Pass
928	FSK	Monopole	43.8	<89.5	Pass
960	FSK	Monopole	44.5	<54	Pass
614	FSK, Hopping	Monopole	38.7	<46	Pass
902	FSK, Hopping	Monopole	42.5	<89.5	Pass
928	FSK, Hopping	Monopole	43.6	<89.5	Pass
960	FSK, Hopping	Monopole	43.9	<54	Pass

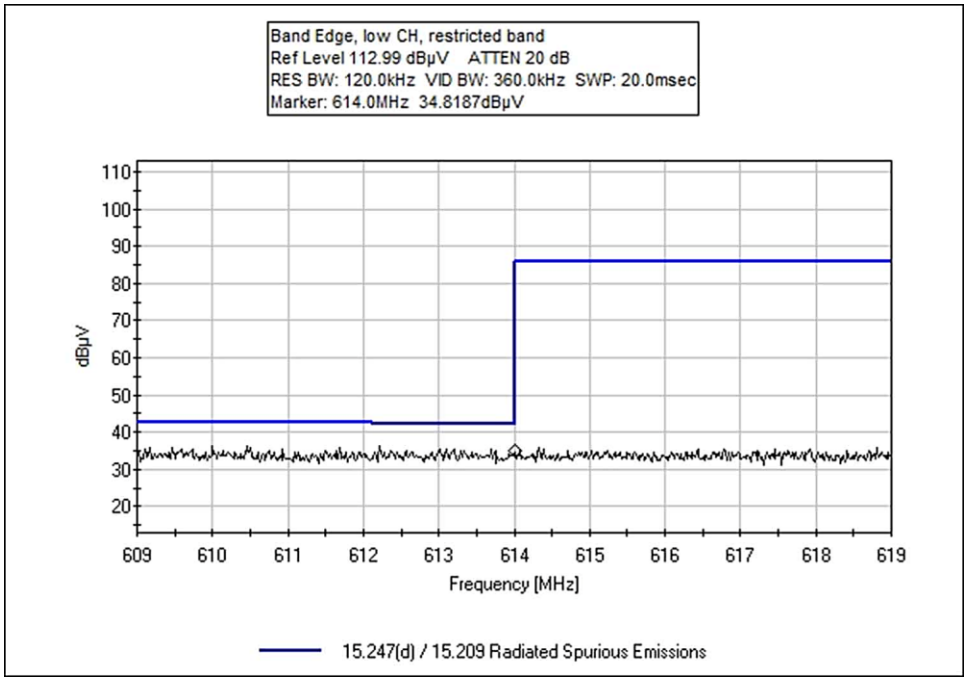
Band Edge Plots

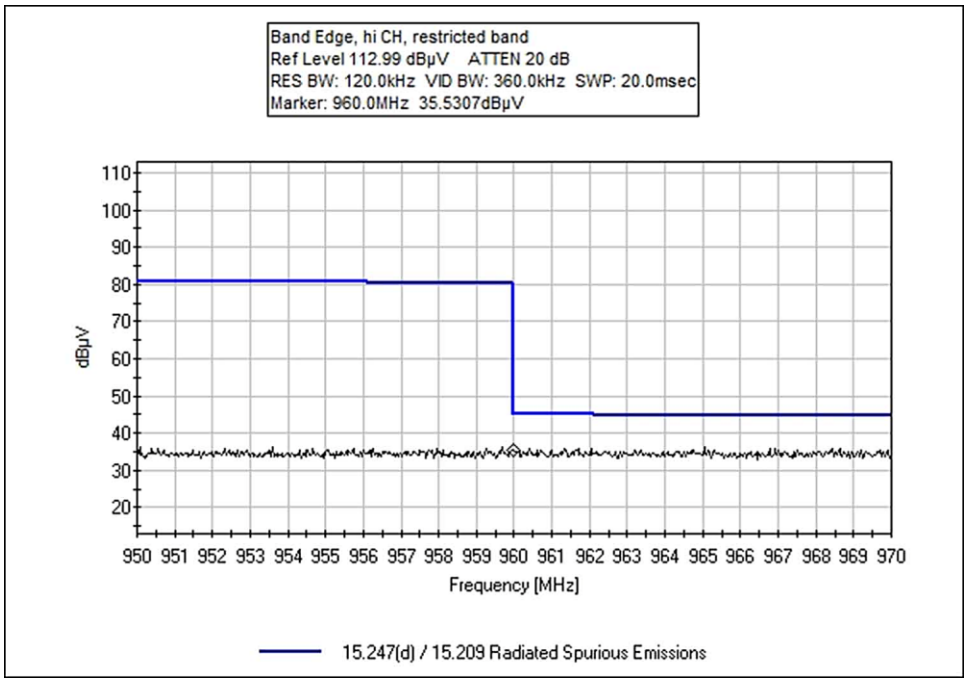


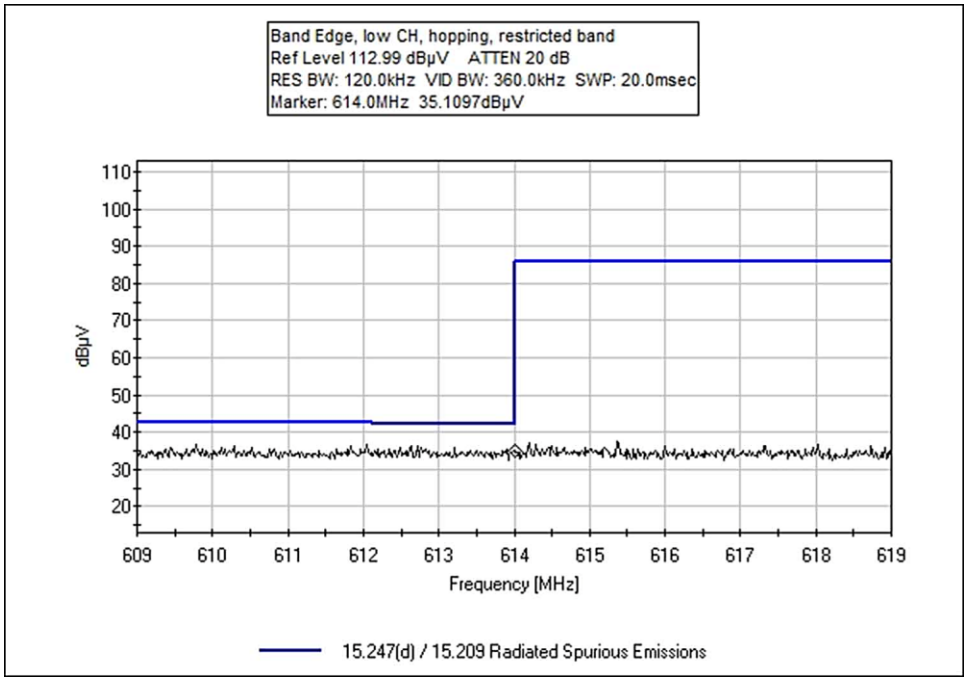

Band Edge, Hi CH
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 35.3547dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

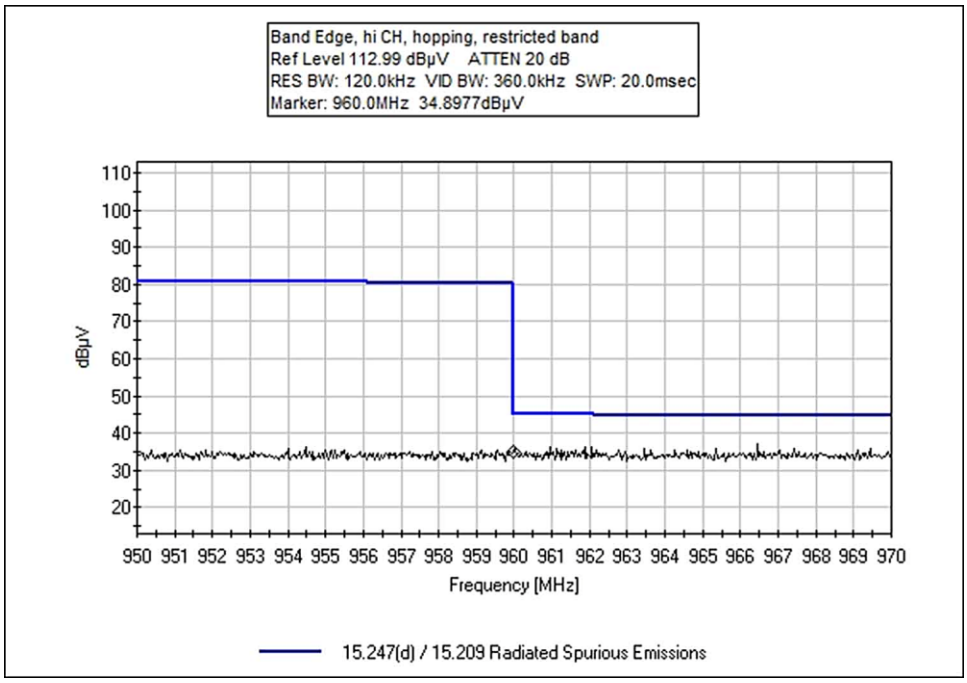

Band Edge low CH, hopping
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 34.4927dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Band Edge, hi CH, hopping
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 35.1547dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Band Edge, low CH, restricted band
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 614.0MHz 34.8187dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
609 610 611 612 613 614 615 616 617 618 619
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Band Edge, hi CH, restricted band
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 35.5307dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Band Edge, low CH, hopping, restricted band
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 614.0MHz 35.1097dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
609 610 611 612 613 614 615 616 617 618 619
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Band Edge, hi CH, hopping, restricted band
Ref Level 112.99 dBµV ATTEN 20 dB
RES BW: 120.0kHz VID BW: 360.0kHz SWP: 20.0msec
Marker: 960.0MHz 34.8977dBµV
dBµV
110
100
90
80
70
60
50
40
30
20
950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Indyme Solutions, LLC**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**102820**	Date:	7/23/2019
Test Type:	**Maximized Emissions**	Time:	09:25:59
Tested By:	Don Nguyen	Sequence#:	6
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:

The equipment under test (EUT) is placed on Styrofoam platform. The EUT is power from 48Vdc PoE switch via shielded CAT5e cable. The EUT is set to TX mode. All remaining ports on the PoE switch are connected to unterminated UTP CAT5e cables.
EUT is rotated in three orthogonal axes.

Operating frequency: 918.1MHz to 923.2MHz
Tested frequencies: 918.1MHz, 920.5MHz, 923.2MHz.

Frequency range of measurement = 9kHz- 9232MHz.
9 kH -150 kHz;RBW=200 Hz,VBW=600 Hz;
150 kHz-30 MHz;RBW=9 kHz,VBW=27 kHz;
30MHz-1000MHz, RBW=120kHz, VBW=360kHz
1000MHz-9232MHz, RBW=1000kHz, VBW=3000kHz
-20dBc, RBW=100kHz, VBW=300kHz

Temperature: 25.3°C, Humidity: 56%
Site A.
Test Method: ANSI C63.4 (2014)

Test Equipment:

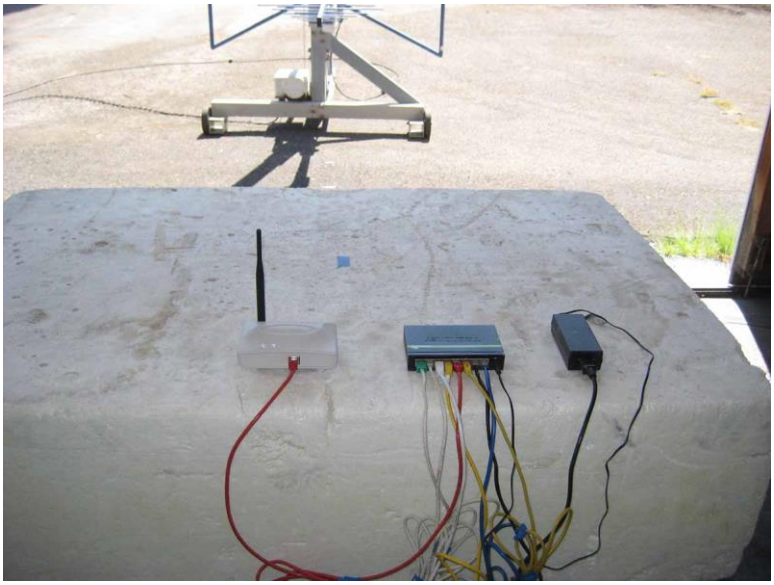
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	2/19/2018	2/19/2020
T2	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
T3	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
T4	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T5	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T6	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021

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	614.000M	35.1	-27.5 +4.7	+20.0 +0.0	+6.0	+0.4	+0.0	38.7	46.0 hopping	-7.3	Vert
2	614.000M	34.8	-27.5 +4.7	+20.0 +0.0	+6.0	+0.4	+0.0	38.4	46.0	-7.6	Vert
3	960.000M	35.5	-27.3 +6.1	+23.7 +0.0	+6.1	+0.4	+0.0	44.5	54.0	-9.5	Vert
4	960.000M	34.9	-27.3 +6.1	+23.7 +0.0	+6.1	+0.4	+0.0	43.9	54.0 hopping	-10.1	Vert
5	928.000M	35.4	-27.3 +6.0	+23.2 +0.0	+6.1	+0.4	+0.0	43.8	89.5	-45.7	Vert
6	928.000M	35.2	-27.3 +6.0	+23.2 +0.0	+6.1	+0.4	+0.0	43.6	89.5 hopping	-45.9	Vert
7	902.000M	34.5	-27.2 +5.9	+22.8 +0.0	+6.1	+0.4	+0.0	42.5	89.5 hopping	-47.0	Vert
8	902.000M	33.8	-27.2 +5.9	+22.8 +0.0	+6.1	+0.4	+0.0	41.8	89.5	-47.7	Vert

Test Setup Photo(s)

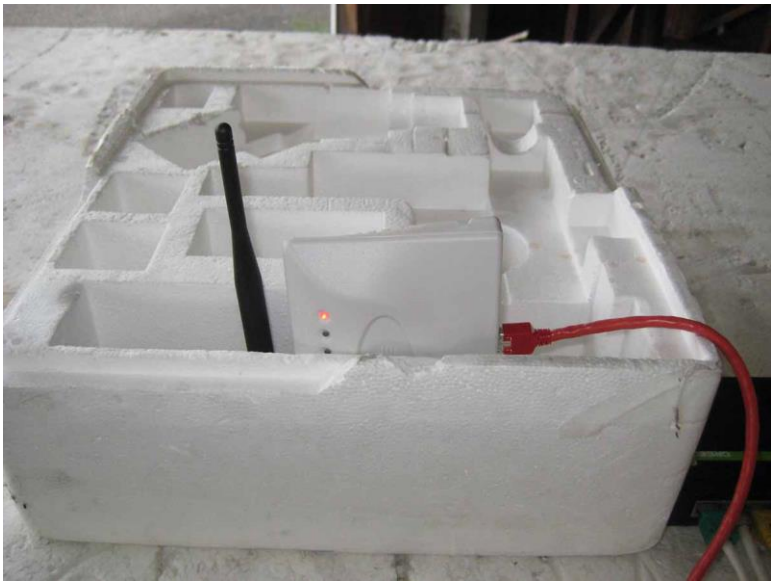
Below 1GHz



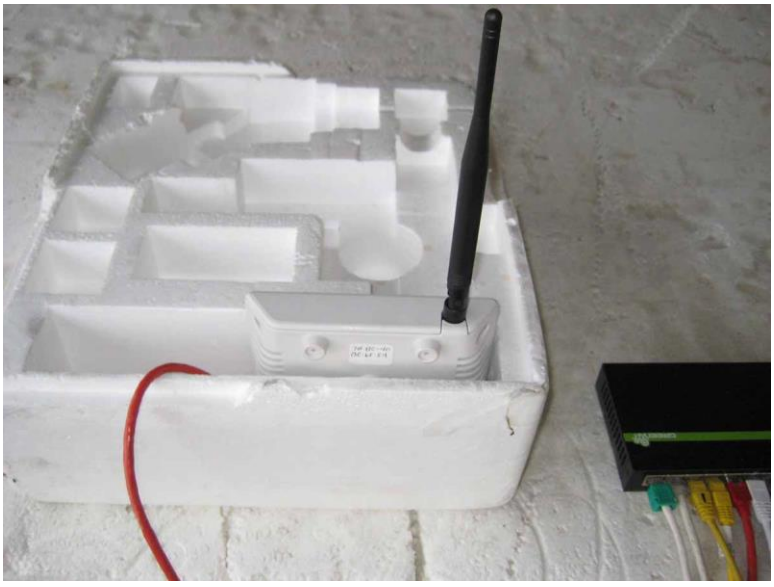
Below 1GHz

Above 1GHz

Above 1GHz



Y-Axis



Z-Axis

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Indyme Solutions, LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102820**	Date:	7/19/2019
Test Type:	**Conducted Emissions**	Time:	10:50:59
Tested By:	Don Nguyen	Sequence#:	5
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			

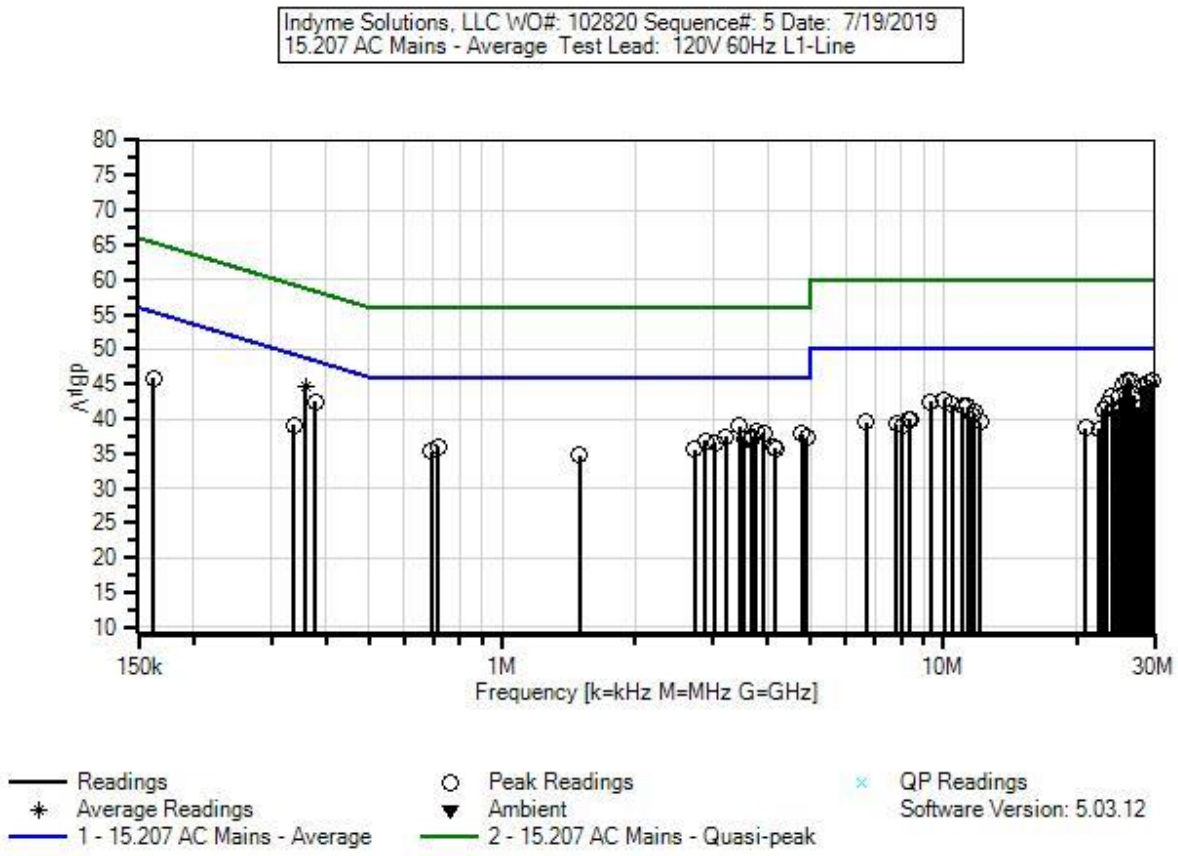
Test Conditions / Notes:

The equipment under test (EUT) is placed on table top and is set into continuously TX mode. The laptop is connected to the access point via network switch and running puTTY to issue commands. The access point receives power from network switch via 48Vdc PoE adapter.

Operating frequency: 918.1-923.2MHz
Tested frequency: 920.5MHz

Frequency range of measurement = 150kHz-30MHz
RBW=9kHz, VBW=30kHz

Temperature: 24.2°C, Humidity: 53%
Site A.
Test Method: ANSI C63.10 (2013)


Indyme Solutions, LLC WO#: 102820 Sequence#: 5 Date: 7/19/2019
15.207 AC Mains - Average Test Lead: 120V 60Hz L1-Line
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak
QP Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07545	Attenuator	SA18N10W-06	1/18/2019	1/18/2021
T2	ANP07338	Cable	2249-Y-240	2/19/2018	2/19/2020
T3	AN00969A	50uH LISN-Line (dB)	3816/2NM	3/11/2019	3/11/2021
	AN00969A	50uH LISN-Return (dB)	3816/2NM	3/11/2019	3/11/2021
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T4	AN02610	High Pass Filter	HE9615-150K-50-720B	10/25/2017	10/25/2019

Measurement Data: Reading listed by margin. Test Lead: L1-Line

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	358.315k Ave	38.7	+5.8	+0.0	+0.0	+0.2	+0.0	44.7	48.8	-4.1	L1-Li
^	361.616k	40.6	+5.8	+0.0	+0.1	+0.2	+0.0	46.7	48.7	-2.0	L1-Li
^	358.315k	40.5	+5.8	+0.0	+0.0	+0.2	+0.0	46.5	48.8	-2.3	L1-Li
4	26.026M	38.4	+5.8	+0.4	+0.7	+0.2	+0.0	45.5	50.0	-4.5	L1-Li
5	26.540M	38.4	+5.8	+0.4	+0.7	+0.2	+0.0	45.5	50.0	-4.5	L1-Li
6	29.603M	38.1	+5.8	+0.5	+0.8	+0.2	+0.0	45.4	50.0	-4.6	L1-Li
7	29.089M	37.8	+5.8	+0.5	+0.8	+0.2	+0.0	45.1	50.0	-4.9	L1-Li
8	25.519M	37.7	+5.8	+0.4	+0.7	+0.2	+0.0	44.8	50.0	-5.2	L1-Li
9	28.075M	37.5	+5.8	+0.5	+0.7	+0.2	+0.0	44.7	50.0	-5.3	L1-Li
10	28.582M	37.5	+5.8	+0.5	+0.7	+0.2	+0.0	44.7	50.0	-5.3	L1-Li
11	377.615k	36.4	+5.8	+0.0	+0.1	+0.2	+0.0	42.5	48.3	-5.8	L1-Li
12	27.054M	36.3	+5.8	+0.4	+0.7	+0.2	+0.0	43.4	50.0	-6.6	L1-Li
13	23.991M	36.2	+5.8	+0.4	+0.6	+0.2	+0.0	43.2	50.0	-6.8	L1-Li
14	25.012M	36.2	+5.8	+0.4	+0.6	+0.2	+0.0	43.2	50.0	-6.8	L1-Li
15	3.446M	32.8	+5.8	+0.1	+0.1	+0.1	+0.0	38.9	46.0	-7.1	L1-Li
16	10.031M	36.1	+5.8	+0.3	+0.4	+0.1	+0.0	42.7	50.0	-7.3	L1-Li
17	9.319M	35.9	+5.8	+0.3	+0.4	+0.1	+0.0	42.5	50.0	-7.5	L1-Li

18	3.765M	32.2	+5.8	+0.1	+0.1	+0.1	+0.0	38.3	46.0	-7.7	L1-Li
19	10.454M	35.5	+5.8	+0.3	+0.4	+0.1	+0.0	42.1	50.0	-7.9	L1-Li
20	23.477M	35.1	+5.8	+0.4	+0.6	+0.2	+0.0	42.1	50.0	-7.9	L1-Li
21	3.905M	31.8	+5.8	+0.2	+0.1	+0.1	+0.0	38.0	46.0	-8.0	L1-Li
22	4.785M	31.5	+5.8	+0.2	+0.2	+0.1	+0.0	37.8	46.0	-8.2	L1-Li
23	11.067M	35.1	+5.8	+0.3	+0.4	+0.1	+0.0	41.7	50.0	-8.3	L1-Li
24	11.355M	35.1	+5.8	+0.3	+0.4	+0.1	+0.0	41.7	50.0	-8.3	L1-Li
25	27.561M	34.4	+5.8	+0.5	+0.7	+0.2	+0.0	41.6	50.0	-8.4	L1-Li
26	3.203M	31.3	+5.8	+0.1	+0.1	+0.1	+0.0	37.4	46.0	-8.6	L1-Li
27	24.498M	34.3	+5.8	+0.4	+0.6	+0.2	+0.0	41.3	50.0	-8.7	L1-Li
28	3.693M	31.2	+5.8	+0.1	+0.1	+0.1	+0.0	37.3	46.0	-8.7	L1-Li
29	4.905M	31.0	+5.8	+0.2	+0.2	+0.1	+0.0	37.3	46.0	-8.7	L1-Li
30	3.667M	31.1	+5.8	+0.1	+0.1	+0.1	+0.0	37.2	46.0	-8.8	L1-Li
31	22.968M	34.2	+5.8	+0.4	+0.6	+0.2	+0.0	41.2	50.0	-8.8	L1-Li
32	3.531M	30.9	+5.8	+0.1	+0.1	+0.1	+0.0	37.0	46.0	-9.0	L1-Li
33	2.889M	30.7	+5.8	+0.1	+0.1	+0.2	+0.0	36.9	46.0	-9.1	L1-Li
34	11.716M	34.3	+5.8	+0.3	+0.4	+0.1	+0.0	40.9	50.0	-9.1	L1-Li
35	3.038M	30.4	+5.8	+0.1	+0.1	+0.2	+0.0	36.6	46.0	-9.4	L1-Li
36	162.362k	39.5	+5.8	+0.0	+0.1	+0.4	+0.0	45.8	55.3	-9.5	L1-Li
37	11.598M	33.7	+5.8	+0.3	+0.4	+0.1	+0.0	40.3	50.0	-9.7	L1-Li
38	717.947k	29.8	+5.8	+0.1	+0.1	+0.2	+0.0	36.0	46.0	-10.0	L1-Li
39	8.337M	33.6	+5.8	+0.2	+0.3	+0.1	+0.0	40.0	50.0	-10.0	L1-Li
40	338.346k	33.2	+5.8	+0.0	+0.0	+0.1	+0.0	39.1	49.2	-10.1	L1-Li
41	4.135M	29.7	+5.8	+0.2	+0.1	+0.1	+0.0	35.9	46.0	-10.1	L1-Li
42	8.400M	33.4	+5.8	+0.3	+0.3	+0.1	+0.0	39.9	50.0	-10.1	L1-Li
43	4.156M	29.5	+5.8	+0.2	+0.1	+0.1	+0.0	35.7	46.0	-10.3	L1-Li

44	2.727M	29.4	+5.8	+0.1	+0.1	+0.2	+0.0	35.6	46.0	-10.4	L1-Li
45	6.670M	33.2	+5.8	+0.2	+0.2	+0.1	+0.0	39.5	50.0	-10.5	L1-Li
46	12.112M	32.8	+5.8	+0.3	+0.4	+0.2	+0.0	39.5	50.0	-10.5	L1-Li
47	691.041k	29.1	+5.8	+0.1	+0.1	+0.2	+0.0	35.3	46.0	-10.7	L1-Li
48	7.833M	32.9	+5.8	+0.2	+0.3	+0.1	+0.0	39.3	50.0	-10.7	L1-Li
49	8.076M	32.7	+5.8	+0.2	+0.3	+0.1	+0.0	39.1	50.0	-10.9	L1-Li
50	1.498M	28.6	+5.8	+0.1	+0.1	+0.2	+0.0	34.8	46.0	-11.2	L1-Li
51	20.923M	31.6	+5.8	+0.4	+0.7	+0.2	+0.0	38.7	50.0	-11.3	L1-Li
52	22.454M	31.6	+5.8	+0.4	+0.6	+0.2	+0.0	38.6	50.0	-11.4	L1-Li

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Indyme Solutions, LLC**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102820**	Date:	7/19/2019
Test Type:	**Conducted Emissions**	Time:	10:49:14
Tested By:	Don Nguyen	Sequence#:	4
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			

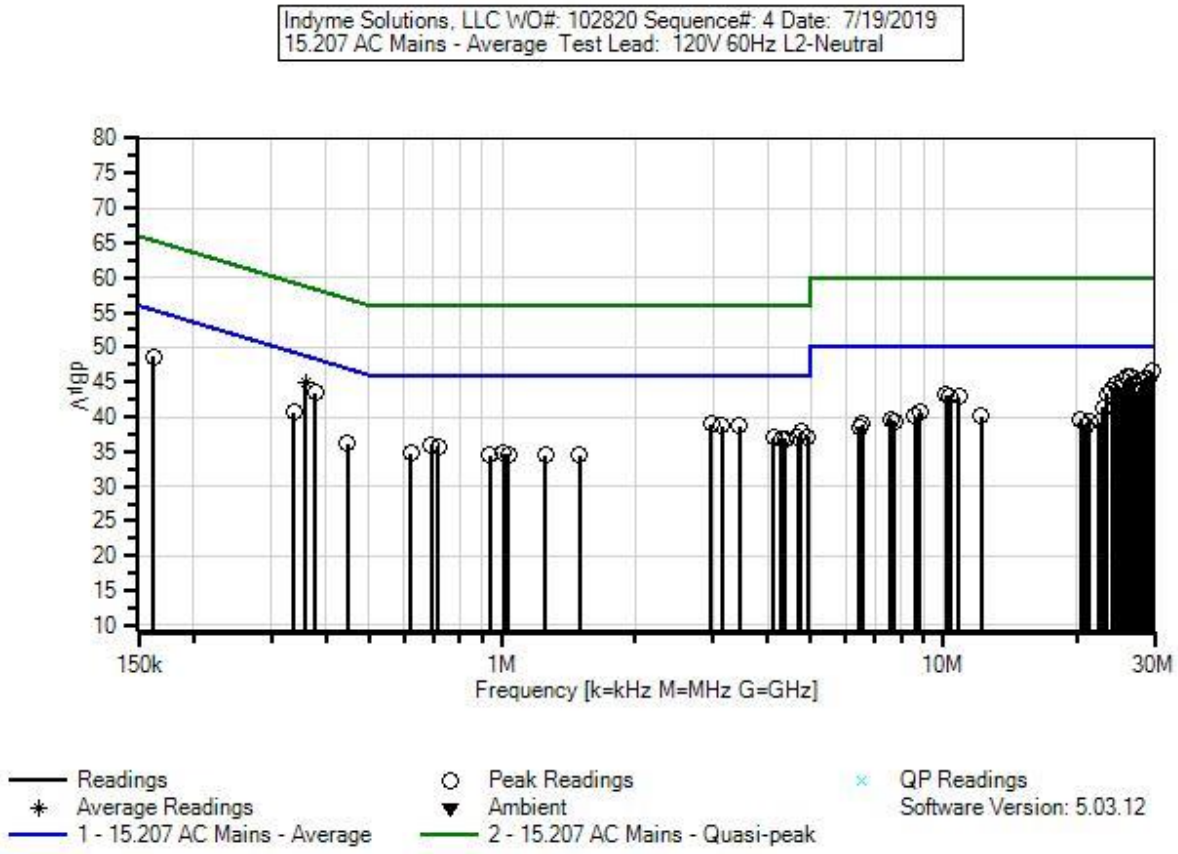
Test Conditions / Notes:

The equipment under test (EUT) is placed on table top and is set into continuously TX mode. The laptop is connected to the access point via network switch and running puTTY to issue commands. The access point receives power from network switch via 48Vdc PoE adapter.

Operating frequency: 918.1-923.2MHz
Tested frequency: 920.5MHz

Frequency range of measurement = 150kHz-30MHz
RBW=9kHz, VBW=30kHz

Temperature: 24.2°C, Humidity: 53%
Site A.
Test Method: ANSI C63.10 (2013)


Indyme Solutions, LLC WO#: 102820 Sequence#: 4 Date: 7/19/2019
15.207 AC Mains - Average Test Lead: 120V 60Hz L2-Neutral
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak
QP Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07545	Attenuator	SA18N10W-06	1/18/2019	1/18/2021
T2	ANP07338	Cable	2249-Y-240	2/19/2018	2/19/2020
	AN00969A	50uH LISN-Line (dB)	3816/2NM	3/11/2019	3/11/2021
T3	AN00969A	50uH LISN-Return (dB)	3816/2NM	3/11/2019	3/11/2021
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T4	AN02610	High Pass Filter	HE9615-150K-50-720B	10/25/2017	10/25/2019

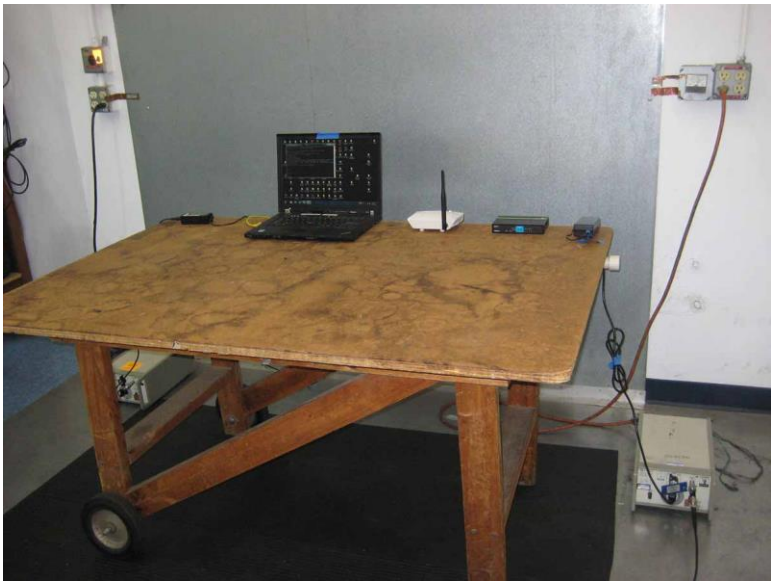
Measurement Data: Reading listed by margin. Test Lead: L2-Neutral

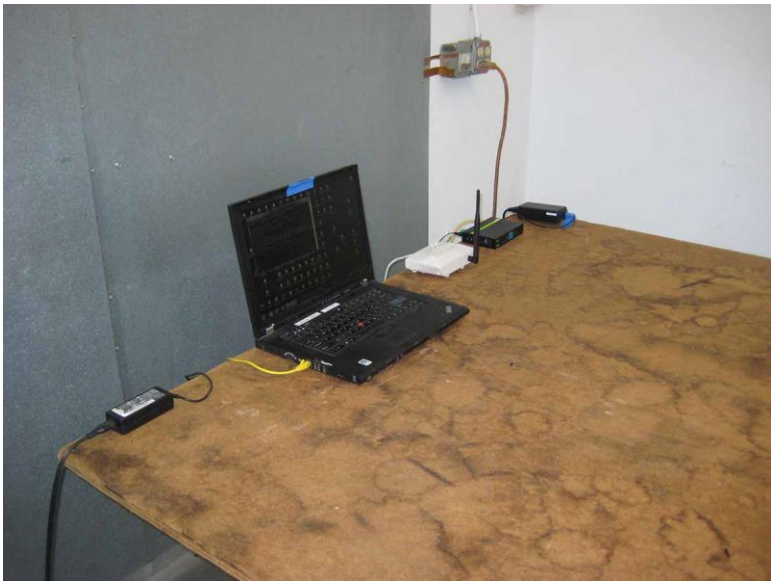
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	29.609M	39.2	+5.8	+0.5	+0.8	+0.2	+0.0	46.5	50.0	-3.5	L2-Ne
2	359.366k Ave	38.8	+5.8	+0.0	+0.1	+0.2	+0.0	44.9	48.7	-3.8	L2-Ne
^	361.615k	41.7	+5.8	+0.0	+0.1	+0.2	+0.0	47.8	48.7	-0.9	L2-Ne
^	361.616k	41.5	+5.8	+0.0	+0.1	+0.2	+0.0	47.6	48.7	-1.1	L2-Ne
5	26.547M	38.7	+5.8	+0.4	+0.7	+0.2	+0.0	45.8	50.0	-4.2	L2-Ne
6	26.033M	38.6	+5.8	+0.4	+0.7	+0.2	+0.0	45.7	50.0	-4.3	L2-Ne
7	29.096M	38.3	+5.8	+0.5	+0.8	+0.2	+0.0	45.6	50.0	-4.4	L2-Ne
8	28.588M	38.2	+5.8	+0.5	+0.8	+0.2	+0.0	45.5	50.0	-4.5	L2-Ne
9	28.075M	38.0	+5.8	+0.5	+0.8	+0.2	+0.0	45.3	50.0	-4.7	L2-Ne
10	25.526M	38.1	+5.8	+0.4	+0.7	+0.2	+0.0	45.2	50.0	-4.8	L2-Ne
11	378.341k	37.4	+5.8	+0.0	+0.1	+0.2	+0.0	43.5	48.3	-4.8	L2-Ne
12	27.054M	37.5	+5.8	+0.4	+0.8	+0.2	+0.0	44.7	50.0	-5.3	L2-Ne
13	24.505M	37.6	+5.8	+0.4	+0.7	+0.2	+0.0	44.7	50.0	-5.3	L2-Ne
14	25.012M	37.1	+5.8	+0.4	+0.7	+0.2	+0.0	44.2	50.0	-5.8	L2-Ne
15	23.991M	36.7	+5.8	+0.4	+0.7	+0.2	+0.0	43.8	50.0	-6.2	L2-Ne
16	27.568M	36.3	+5.8	+0.5	+0.8	+0.2	+0.0	43.6	50.0	-6.4	L2-Ne
17	162.361k	42.4	+5.8	+0.0	+0.1	+0.4	+0.0	48.7	55.3	-6.6	L2-Ne

18	23.484M	36.2	+5.8	+0.4	+0.7	+0.2	+0.0	43.3	50.0	-6.7	L2-Ne
19	10.130M	36.6	+5.8	+0.3	+0.4	+0.1	+0.0	43.2	50.0	-6.8	L2-Ne
20	10.337M	36.4	+5.8	+0.3	+0.4	+0.1	+0.0	43.0	50.0	-7.0	L2-Ne
21	10.815M	36.3	+5.8	+0.3	+0.4	+0.1	+0.0	42.9	50.0	-7.1	L2-Ne
22	2.970M	32.7	+5.8	+0.1	+0.1	+0.2	+0.0	38.9	46.0	-7.1	L2-Ne
23	3.442M	32.6	+5.8	+0.1	+0.1	+0.1	+0.0	38.7	46.0	-7.3	L2-Ne
24	3.152M	32.5	+5.8	+0.1	+0.1	+0.2	+0.0	38.7	46.0	-7.3	L2-Ne
25	4.760M	31.6	+5.8	+0.2	+0.2	+0.1	+0.0	37.9	46.0	-8.1	L2-Ne
26	338.345k	34.7	+5.8	+0.0	+0.1	+0.1	+0.0	40.7	49.2	-8.5	L2-Ne
27	22.968M	34.3	+5.8	+0.4	+0.7	+0.2	+0.0	41.4	50.0	-8.6	L2-Ne
28	4.930M	30.9	+5.8	+0.2	+0.2	+0.1	+0.0	37.2	46.0	-8.8	L2-Ne
29	4.683M	30.8	+5.8	+0.2	+0.2	+0.1	+0.0	37.1	46.0	-8.9	L2-Ne
30	4.122M	30.8	+5.8	+0.2	+0.1	+0.1	+0.0	37.0	46.0	-9.0	L2-Ne
31	4.386M	30.5	+5.8	+0.2	+0.2	+0.1	+0.0	36.8	46.0	-9.2	L2-Ne
32	4.284M	30.5	+5.8	+0.2	+0.2	+0.1	+0.0	36.8	46.0	-9.2	L2-Ne
33	8.851M	34.1	+5.8	+0.3	+0.3	+0.1	+0.0	40.6	50.0	-9.4	L2-Ne
34	8.589M	33.6	+5.8	+0.3	+0.3	+0.1	+0.0	40.1	50.0	-9.9	L2-Ne
35	12.139M	33.4	+5.8	+0.3	+0.4	+0.2	+0.0	40.1	50.0	-9.9	L2-Ne
36	691.040k	29.8	+5.8	+0.1	+0.1	+0.2	+0.0	36.0	46.0	-10.0	L2-Ne
37	716.492k	29.6	+5.8	+0.1	+0.1	+0.2	+0.0	35.8	46.0	-10.2	L2-Ne
38	7.580M	33.2	+5.8	+0.2	+0.3	+0.1	+0.0	39.6	50.0	-10.4	L2-Ne
39	20.418M	32.4	+5.8	+0.4	+0.7	+0.2	+0.0	39.5	50.0	-10.5	L2-Ne
40	7.752M	33.0	+5.8	+0.2	+0.3	+0.1	+0.0	39.4	50.0	-10.6	L2-Ne
41	21.436M	32.2	+5.8	+0.4	+0.8	+0.2	+0.0	39.4	50.0	-10.6	L2-Ne
42	447.426k	29.9	+5.8	+0.1	+0.1	+0.2	+0.0	36.1	46.9	-10.8	L2-Ne
43	22.463M	32.3	+5.8	+0.4	+0.5	+0.2	+0.0	39.2	50.0	-10.8	L2-Ne

44	6.544M	32.7	+5.8	+0.2	+0.2	+0.1	+0.0	39.0	50.0	-11.0	L2-Ne
45	1.009M	28.5	+5.8	+0.1	+0.1	+0.2	+0.0	34.7	46.0	-11.3	L2-Ne
46	20.932M	31.5	+5.8	+0.4	+0.8	+0.2	+0.0	38.7	50.0	-11.3	L2-Ne
47	622.682k	28.5	+5.8	+0.1	+0.1	+0.2	+0.0	34.7	46.0	-11.3	L2-Ne
48	6.436M	32.3	+5.8	+0.2	+0.2	+0.1	+0.0	38.6	50.0	-11.4	L2-Ne
49	1.035M	28.4	+5.8	+0.1	+0.1	+0.2	+0.0	34.6	46.0	-11.4	L2-Ne
50	936.743k	28.3	+5.8	+0.1	+0.1	+0.2	+0.0	34.5	46.0	-11.5	L2-Ne
51	1.494M	28.2	+5.8	+0.1	+0.1	+0.2	+0.0	34.4	46.0	-11.6	L2-Ne
52	1.251M	28.2	+5.8	+0.1	+0.1	+0.2	+0.0	34.4	46.0	-11.6	L2-Ne

Test Setup Photo(s)





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.