

Ittron, Inc.

TEST REPORT FOR

AMR Transceiver Device for Communicating with Utility Meters Models: IMRC-INTand IMRC-EXT

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.249

Report No.: 103955-27

Date of issue: August 5, 2020



Test Certificate # 803.01

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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Ittron, Inc.
2111 N. Molter Road
Liberty Lake, WA 99019

Representative: Jay Holcomb
Customer Reference Number: 208224

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 103955

June 12, 2020

June 12, 15, and 25, 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.

A handwritten signature in black ink, reading "Steve Behm", is written over a horizontal line.

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 - 15.249

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.249(a)	Field Strength of Fundamental	NA	Pass
15.249(a)	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 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-INT	66034283
10" Tablet	Panasonic	FZ-G1	NA
5Vdc AC Adapter	zip	SG-511	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
10" Tablet	Panasonic	FZ-G1	NA
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-EXT	66034368
3dBi Rubber Duck Antenna	Generic	NA	NA
12Vdc AC Adapter	Husky	FW 1288	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-INT	66034283
Power Distribution Box	Itron, Inc.	Generic	NA
10" Tablet	Panasonic	FZ-G1	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
5Vdc AC Adapter	zip	SG-511	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Configuration 6

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-EXT	66034368
3dBi Rubber Duck Antenna	Generic	NA	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
10" Tablet	Panasonic	FZ-G1	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Configuration 7

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-EXT	66034368
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
10" Tablet	Panasonic	FZ-G1	NA
5dBi Antenna	PCTEL	Generic	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Configuration 8

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-INT	66034283
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
5Vdc AC Adapter	zip	SG-511	NA
7" Tablet	Panasonic	FZ-M1	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Configuration 9

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-EXT	66034368
3dBi Rubber Duck Antenna	Generic	NA	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
7" Tablet	Panasonic	FZ-M1	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

Configuration 10

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRC-EXT	66034368
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
5dBi Antenna	PCTEL	Generic	NA
7" Tablet	Panasonic	FZ-M1	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	Topward	6306D	988614

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Modulation Type(s):	FSK
Maximum Duty Cycle:	100%
Antenna Type(s) and Gain:	Internal, directional 1.2dBi External, Vehicular mount 5dBi monopole, 3dBi Rubber Duck
Antenna Connection Type:	Integral/External Connector
Nominal Input Voltage:	Internal antenna unit: 5VDC Adapter External antenna unit: 13.8VDC (7 to 18VDC)
Firmware / Software used for Test:	Arm Version: 7.73.00.01 DSP Version: 5.76.00.07 FPGA Version: 3.02 MC3 SuperRaptor Test ver.4.0.3.5
Tablets FCC ID:	7" tablet – Panasonic FZ-M1 FCC ID: ACJ9TGWL15B IC: 216A-CFWL15B contains: FCC ID: ACJ9TGWW13B3 IC: 216A-CFWW13B 10" tablet – Panasonic FZ-G1 FCC ID: ACJ9TGWL15A IC: 216A-CFWL15A contains: FCC ID: ACJ9TGWW13B1 IC: 216A-CFWW13B

EUT and Accessory Photo(s)



IMRC-INT



IMRC-EXT



3dBi Antenna



5dBi Antenna



5VDC Adapter



12VDC Adapter



Power Distribution



Tablet Power Adapter



Tablet #1



Tablet #2

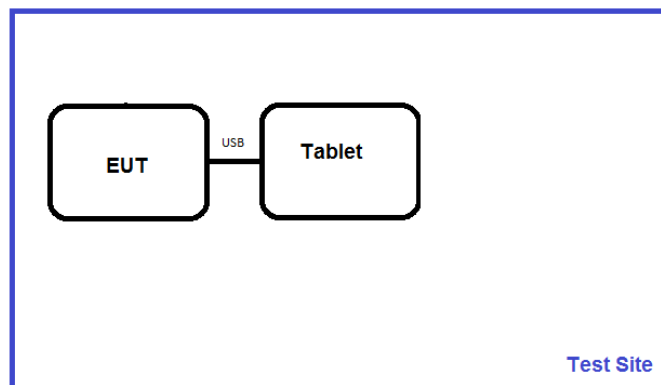
Support Equipment Photo(s)



12VDC Power Supply

Block Diagram of Test Setup(s)

Test Setup Block Diagram



FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

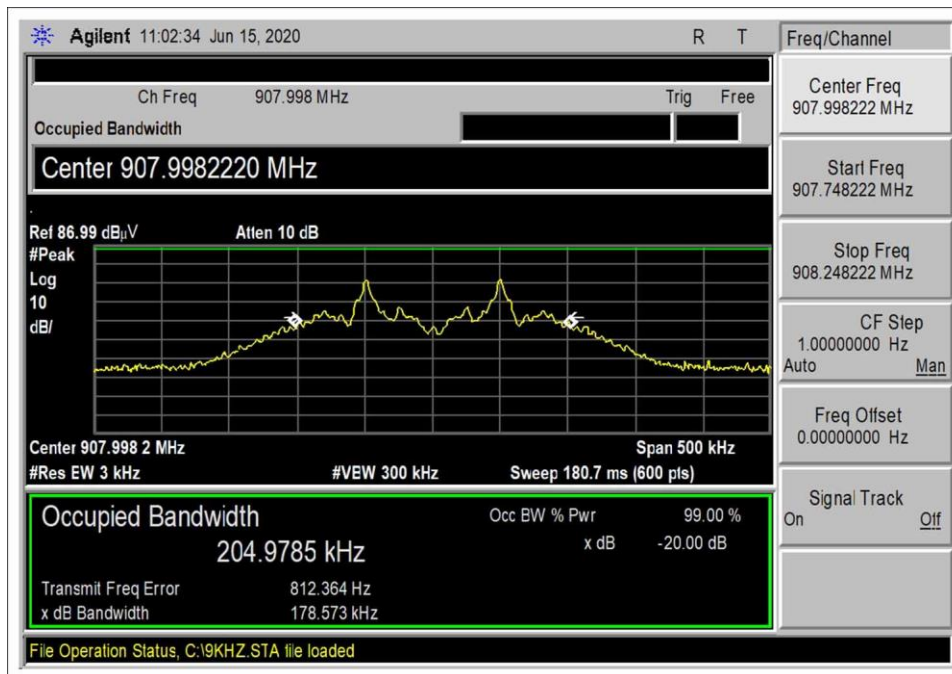
Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/15/2020
Configuration:	5		
Test Setup	The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to DC power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 908MHz, 916MHz, 924MHz RBW=3kHz, VBW=300kHz		

Environmental Conditions			
Temperature (°C)	23.7	Relative Humidity (%):	51

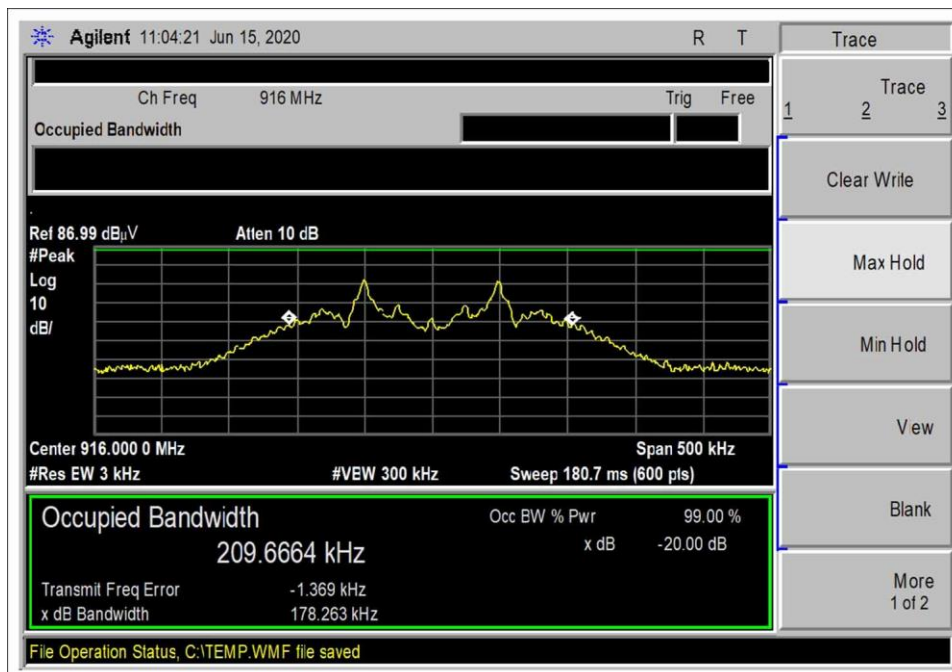
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
00309	Preamp	HP	8447D	12/24/2019	12/24/2021
P05050	Cable	Pasternack	RG223/U	12/24/2018	12/24/2020
P05198	Cable	Belden	8268	12/4/2018	12/4/2020
02869	Spectrum Analyzer	Agilent	E4440A	7/25/2019	7/25/2020
01993	Biconilog Antenna	Chase	CBL6111C	6/11/2019	6/11/2021
P05281	Attenuator	Weinschel	1B	4/7/2020	4/7/2022

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
908	NA	FSK	178.573	None	N/A
916	NA	FSK	178.263	None	N/A
924	NA	FSK	201.264	None	N/A

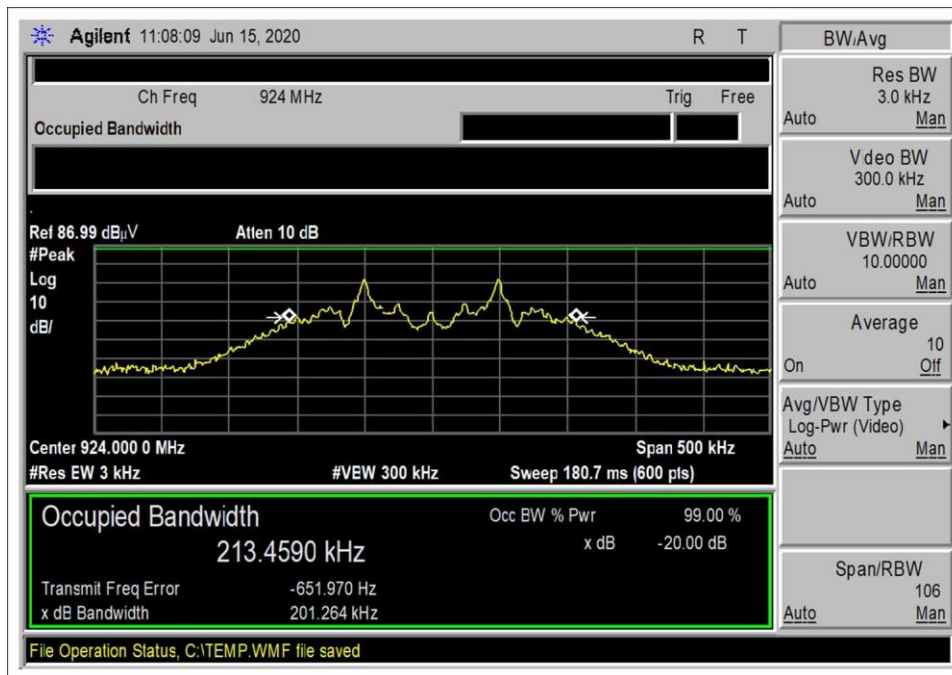
Plot(s)



Low Channel

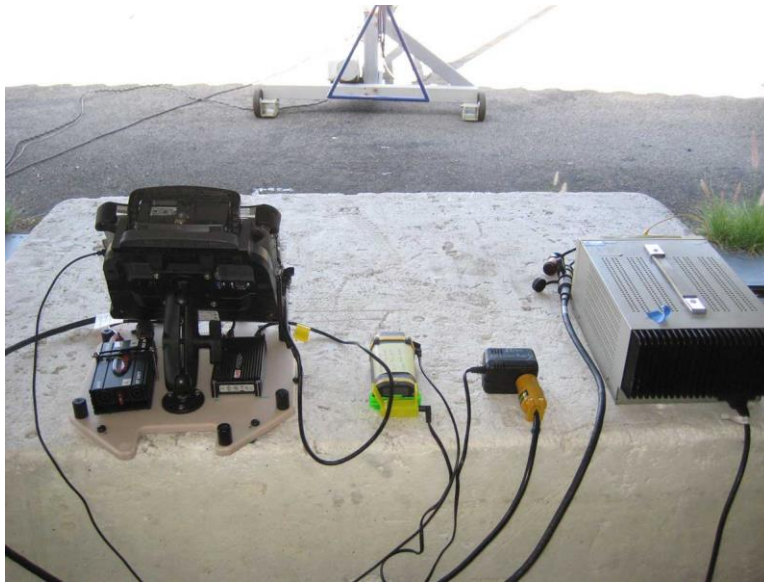


Middle Channel



High Channel

Test Setup Photo(s)



IMRC-INT



IMRC-EXT

15.249(a) Field Strength of Fundamental

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/15/2020
Configuration:	5, 6, and 7		
Test setup	The EUT is placed on styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to DC power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 908MHz, 916MHz, 924MHz RBW=300kHz, VBW=910kHz Note: The EUT is rotated in 3 orthogonal axis. Only the worst-case emissions are recorded. Band Edge measurement was performed with 10" tablet. Results were verified with 7" tablet and no change was observed.		

Environmental Conditions			
Temperature (°C)	23.7	Relative Humidity (%):	51

Test Data Summary - Voltage Variations-					
Configuration 6					
Frequency (MHz)	Modulation	V _{Minimum} (dBuV/m)	V _{Nominal} (dBuV/m)	V _{Maximum} (dBuV/m)	Max Deviation from V _{Nominal} (dB)
908	FSK	76.9	76.9	76.8	0.1
916	FSK	76.5	76.5	76.5	0
924	FSK	76.6	76.6	76.5	0.1

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

Parameter Definitions:

Measurements performed at input voltage V_{nominal} ± 15%. (AC Input)

Measurements performed at input voltage according to manufacturer specification. (DC Input)

Parameter	Value
V _{Nominal} :	115VAC / 13.8VDC
V _{Minimum} :	97VAC / 7VDC
V _{Maximum} :	133VAC / 18VDC

Test Data Summary – Radiated Field Strength Measurement					
Configuration 5 - - (Integral antenna+10in tablet)					
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
908	FSK	Integral directional	77.8	≤94	Pass
916	FSK	Integral directional	78.7	≤94	Pass
924	FSK	Integral directional	78.0	≤94	Pass

Test Data Summary – Radiated Field Strength Measurement					
Configuration 6 - (3dBi external antenna+10in tablet)					
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
908	FSK	3dbi external Rubber Duck	76.9	≤94	Pass
916	FSK	3dbi external Rubber Duck	76.5	≤94	Pass
924	FSK	3dbi external Rubber Duck	76.6	≤94	Pass

Test Data Summary – Radiated Field Strength Measurement					
Configuration 7 - (5dBi external antenna+10in tablet)					
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
908	FSK	5dbi external Monopole	77.3	≤94	Pass
916	FSK	5dbi external Monopole	76.7	≤94	Pass
924	FSK	5dbi external Monopole	77.6	≤94	Pass

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/15/2020
 Test Type: **Conducted Emissions** Time: 10:51:26
 Tested By: Don Nguyen Sequence#: 0
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

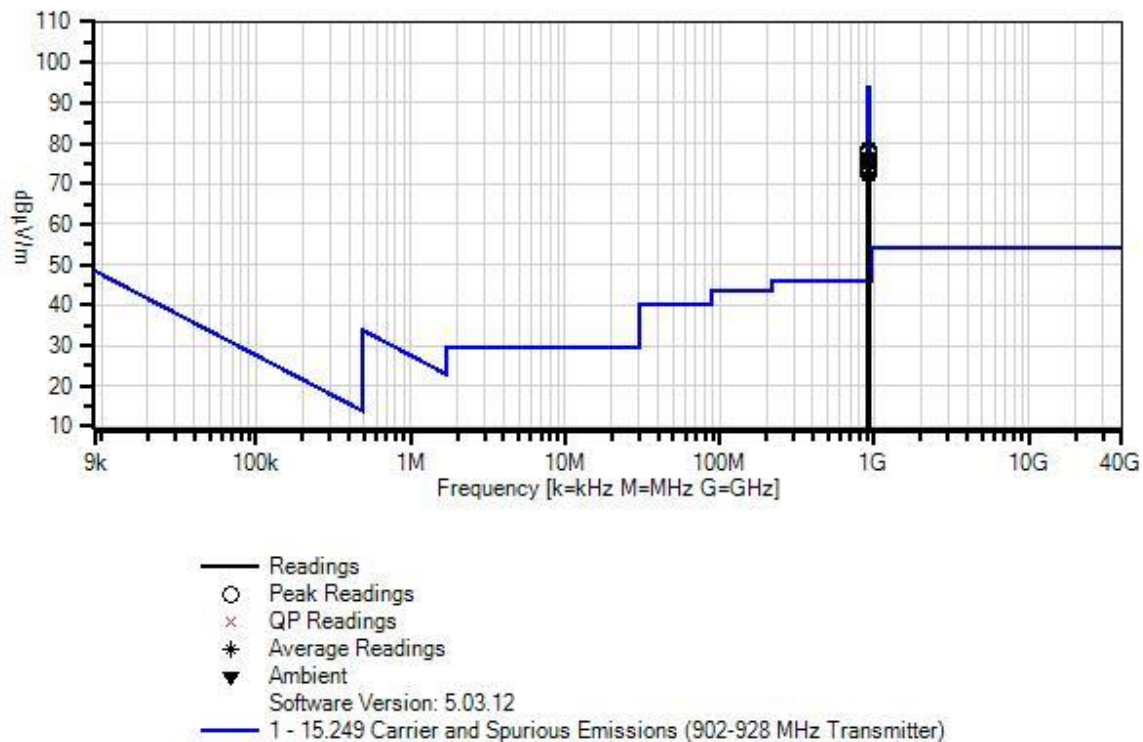
Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to 5Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=300kHz, VBW=910kHz

The worst case emission were verified with power supply on and off the table. No change in emission level was observed.

Itron, Inc. W/O#: 103955 Sequence#: 0 Date: 6/15/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T4	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	915.952M	69.7	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	78.7	94.0 Y	-15.3	Vert
2	923.965M	68.9	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	78.0	94.0 Y	-16.0	Vert
3	907.947M	69.0	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	77.8	94.0 Y	-16.2	Vert
4	916.025M	67.1	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	76.1	94.0 Z	-17.9	Horiz
5	908.046M	67.1	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	75.9	94.0 X	-18.1	Horiz
6	923.955M	66.7	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	75.8	94.0 Z	-18.2	Horiz
7	907.945M	67.0	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	75.8	94.0 X	-18.2	Vert
8	915.949M	66.6	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	75.6	94.0 X	-18.4	Horiz
9	908.048M	66.5	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	75.3	94.0 Z	-18.7	Horiz
10	923.938M	66.2	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	75.3	94.0 X	-18.7	Horiz
11	924.042M	65.1	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	74.2	94.0 X	-19.8	Vert
12	923.965M	64.5	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	73.6	94.0 Y	-20.4	Horiz
13	923.955M	64.4	-27.1 +23.9	+0.4 +6.0	+5.9	+0.0	+0.0	73.5	94.0 Z	-20.5	Vert
14	915.955M	64.3	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	73.3	94.0 Z	-20.7	Vert
15	907.948M	63.9	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	72.7	94.0 Y	-21.3	Horiz
16	908.048M	63.9	-27.1 +23.6	+0.4 +6.0	+5.9	+0.0	+0.0	72.7	94.0 Z	-21.3	Vert
17	916.047M	63.4	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	72.4	94.0 Y	-21.6	Horiz
18	915.948M	63.2	-27.1 +23.8	+0.4 +6.0	+5.9	+0.0	+0.0	72.2	94.0 X	-21.8	Vert

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/16/2020
 Test Type: **Conducted Emissions** Time: 09:02:34
 Tested By: Don Nguyen Sequence#: 1
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

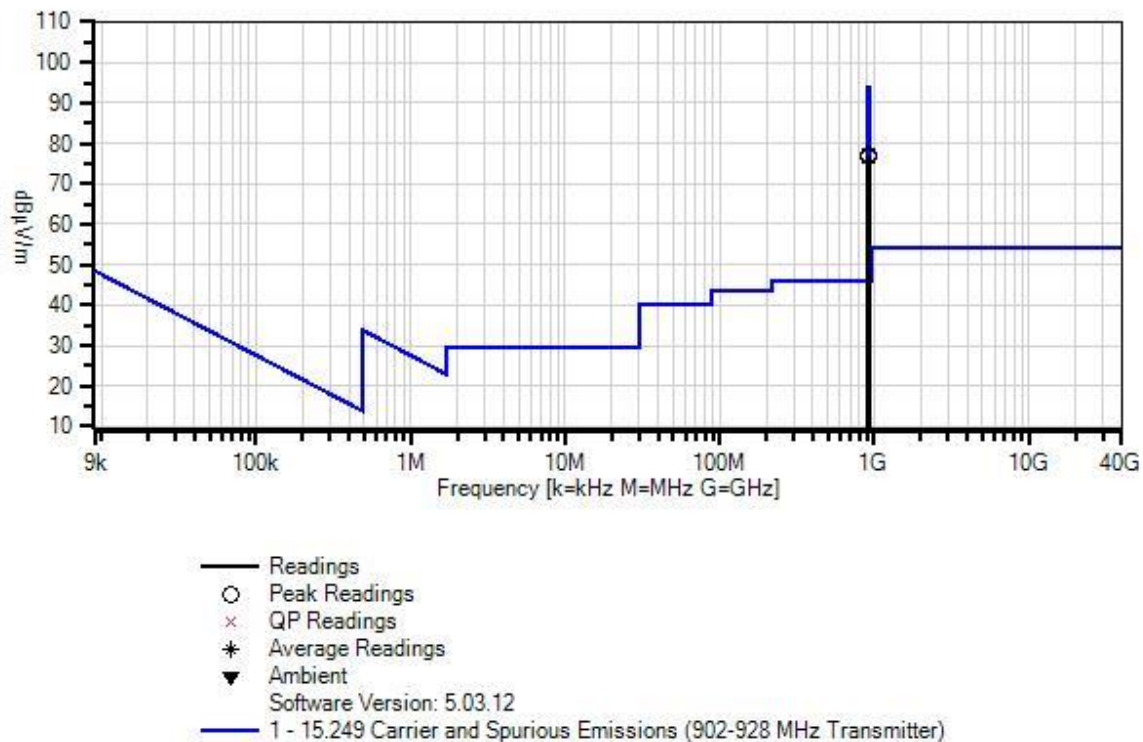
Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to 13.8Vdc power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5.
 The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=300kHz, VBW=910kHz

Ittron, Inc. WO#: 103955 Sequence#: 1 Date: 6/16/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T4	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T5	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5								
			dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	907.947M	68.1	-27.1 +6.0	+0.4	+5.9	+23.6	+0.0	76.9	94.0	-17.1	Vert
2	924.057M	67.5	-27.1 +6.0	+0.4	+5.9	+23.9	+0.0	76.6	94.0	-17.4	Vert
3	916.047M	67.5	-27.1 +6.0	+0.4	+5.9	+23.8	+0.0	76.5	94.0	-17.5	Vert

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/16/2020
 Test Type: **Conducted Emissions** Time: 10:09:22
 Tested By: Don Nguyen Sequence#: 2
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

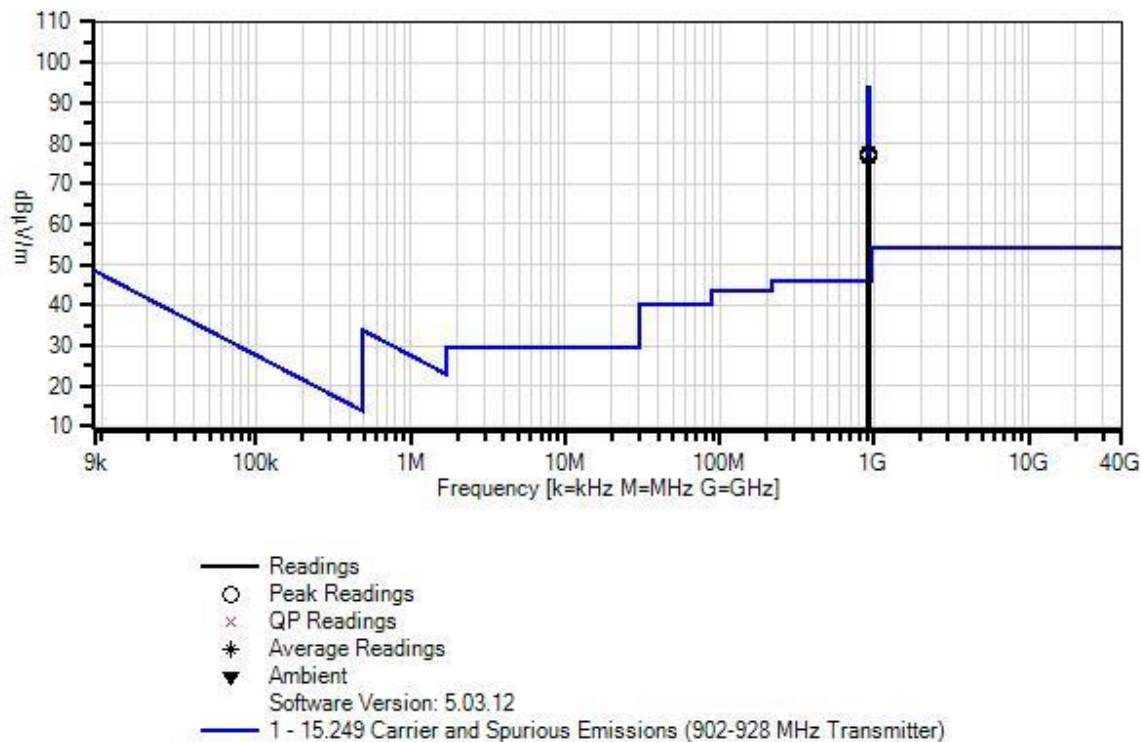
Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to 13.8Vdc power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5.
 The EUT is set to continuously transmit.

 Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=300kHz, VBW=910kHz

Ittron, Inc. WO#: 103955 Sequence#: 2 Date: 6/16/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T4	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T5	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

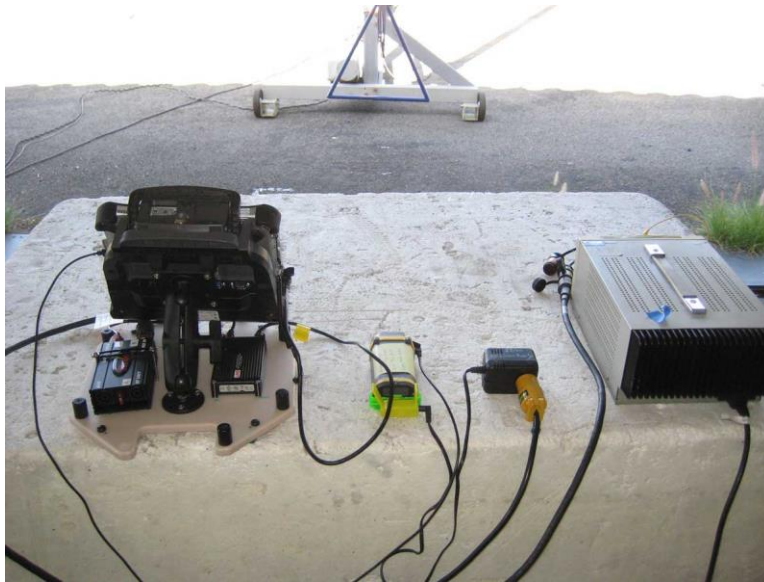
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5								
			dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	924.040M	68.5	-27.1 +6.0	+0.4	+5.9	+23.9	+0.0	77.6	94.0	-16.4	Vert
2	908.040M	68.5	-27.1 +6.0	+0.4	+5.9	+23.6	+0.0	77.3	94.0	-16.7	Vert
3	915.940M	67.8	-27.1 +6.0	+0.4	+5.9	+23.7	+0.0	76.7	94.0	-17.3	Vert

Test Setup Photo(s)



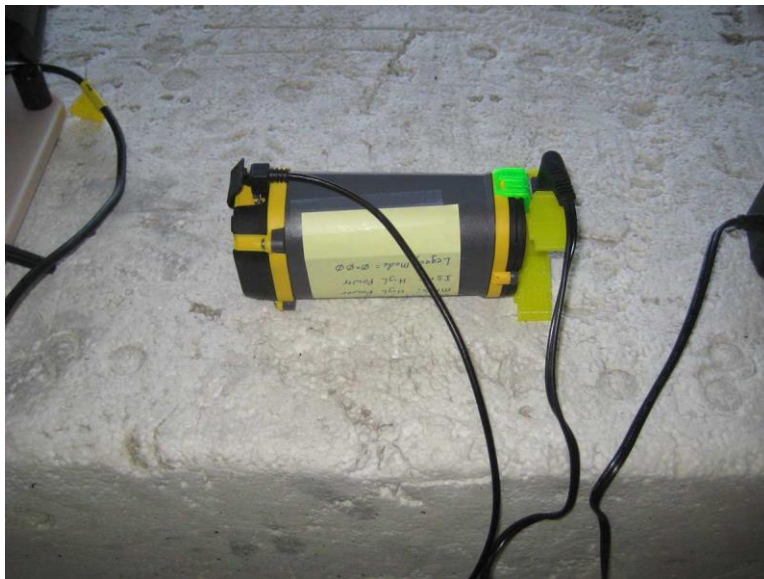
X Axis, Configuration 5



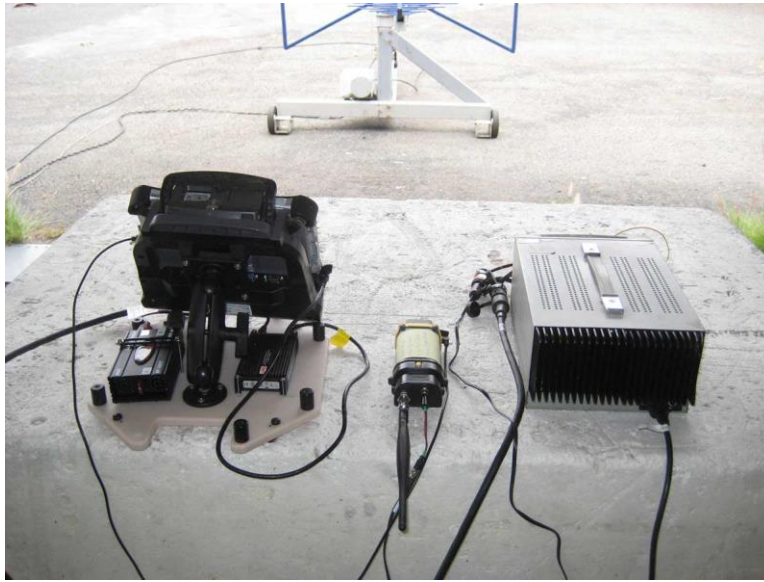
X Axis, Configuration 5



Y Axis, Configuration 5



Z Axis, Configuration 5



X Axis, Configuration 6



X Axis, Configuration 6



Y Axis, Configuration 6



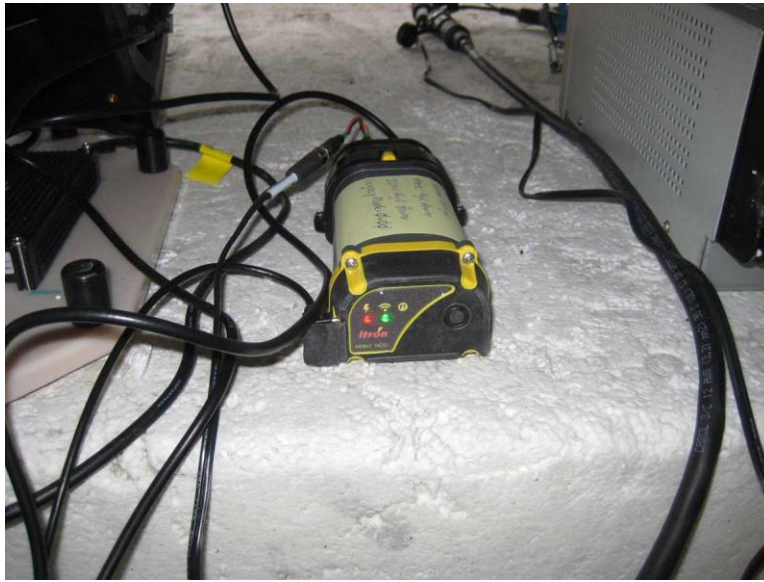
Z Axis, Configuration 6



Configuration 7



Configuration 7



X Axis, Configuration 7



Y Axis, Configuration 7



Z Axis, Configuration 7

15.249(a) Field Strength of Spurious Emissions

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/25/2020
Configuration:	5, 6, 7, 8, 9, 10		
Test Setup	The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to DC power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 9kHz-9.28GHz 9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz. 150kHz to 30MHz RBW=9kHz, VBW=27kHz. 30-1000MHz, RBW=120kHz, VBW=360kHz 1000-9280MHz, RBW=1MHz, VBW=3MHz Note: The EUT is rotated in 3 orthogonal axis. Only the worst-case emissions are recorded. Band Edge measurement was performed with 10" tablet. Results were verified with 7" tablet and no change was observed.		

Environmental Conditions			
Temperature (°C)	26	Relative Humidity (%):	50

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/23/2020
 Test Type: **Maximized Emissions** Time: 08:53:11
 Tested By: Don Nguyen Sequence#: 8
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5.

The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz

Frequency of measurement: 9kHz-9.28GHz

9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz.

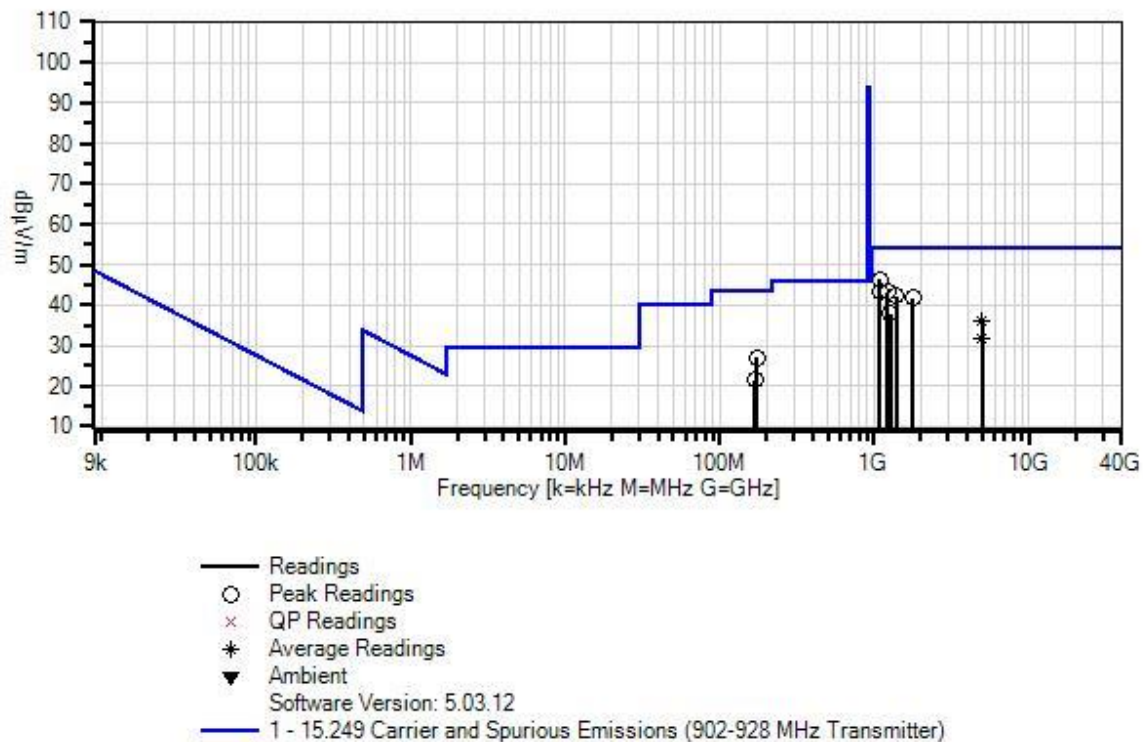
150kHz to 30MHz RBW=9kHz, VBW=27kHz.

30-1000MHz, RBW=120kHz, VBW=360kHz

1000-9280MHz, RBW=1MHz, VBW=3MHz

The worst case emission were verified with power supply on and off the table. No change in emission level was observed.

Ittron, Inc. WO#: 103955 Sequence#: 8 Date: 6/23/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Cal Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T4	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T5	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T6	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T7	AN00786	Preamp	83017A	5/20/2020	5/20/2022
T8	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
T9	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
T10	ANP07243	Cable	32022-29094K- 29094K-24TC	5/29/2020	5/29/2022

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	1080.000M	59.7	+0.0 +0.0 +2.1	+0.0 +0.0 +0.3	+0.0 -40.6	+0.0 +24.9	+0.0	46.4	54.0	-7.6	Horiz
2	1077.500M	56.6	+0.0 +0.0 +2.1	+0.0 +0.0 +0.3	+0.0 -40.6	+0.0 +24.9	+0.0	43.3	54.0	-10.7	Vert
3	1215.000M	55.2	+0.0 +0.0 +2.2	+0.0 +0.0 +0.4	+0.0 -39.8	+0.0 +25.3	+0.0	43.3	54.0	-10.7	Horiz
4	1395.000M	53.0	+0.0 +0.0 +2.5	+0.0 +0.0 +0.4	+0.0 -39.3	+0.0 +25.6	+0.0	42.2	54.0	-11.8	Horiz
5	1775.000M	50.9	+0.0 +0.0 +2.8	+0.0 +0.0 +0.4	+0.0 -38.8	+0.0 +26.5	+0.0	41.8	54.0	-12.2	Vert
6	1262.500M	49.3	+0.0 +0.0 +2.3	+0.0 +0.0 +0.4	+0.0 -39.6	+0.0 +25.4	+0.0	37.8	54.0	-16.2	Vert
7	173.500M	37.0	+2.4 -28.0 +0.0	+5.9 +0.0 +0.0	+9.5 +0.0	-28.0 +0.0	+0.0	27.0	43.5	-16.5	Vert
8	4999.250M Ave	34.8	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.5	+0.0 +33.5	+0.0	36.0	54.0	-18.0	Vert
^	4999.250M	54.9	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.5	+0.0 +33.5	+0.0	56.1	54.0	+2.1	Vert
10	169.000M	31.0	+2.4 -28.0 +0.0	+5.9 +0.0 +0.0	+9.9 +0.0	-28.0 +0.0	+0.0	21.4	43.5	-22.1	Horiz
11	4998.000M Ave	30.4	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.5	+0.0 +33.5	+0.0	31.6	54.0	-22.4	Horiz
^	4998.000M	51.5	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.5	+0.0 +33.5	+0.0	52.7	54.0	-1.3	Horiz

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/22/2020
 Test Type: **Maximized Emissions** Time: 13:46:05
 Tested By: Don Nguyen Sequence#: 6
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

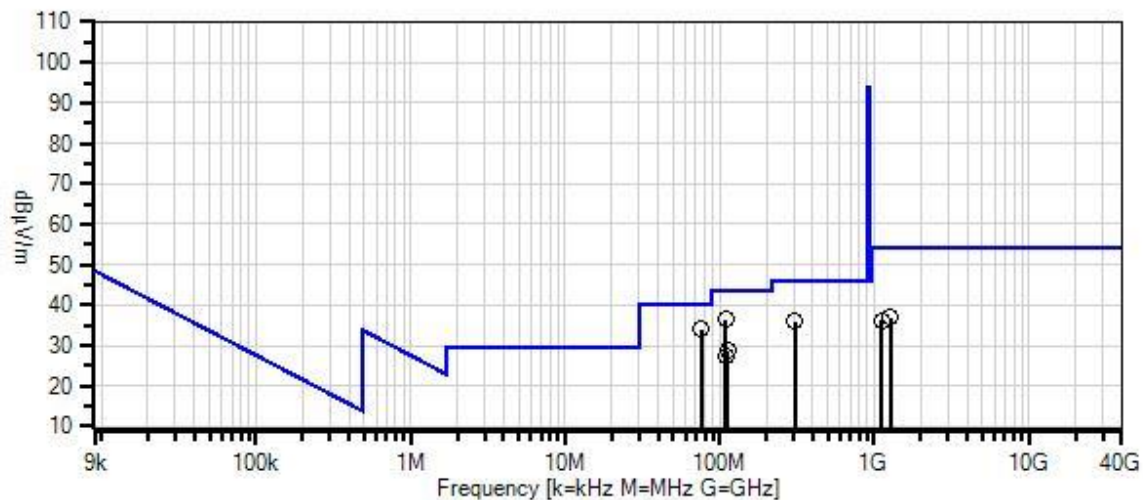
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 9kHz-9.28GHz 9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz. 150kHz to 30MHz RBW=9kHz, VBW=27kHz. 30-1000MHz, RBW=120kHz, VBW=360kHz 1000-9280MHz, RBW=1MHz, VBW=3MHz
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Ittron, Inc. WO#: 103955 Sequence#: 6 Date: 6/22/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Horiz



— Readings
○ Peak Readings
× QP Readings
* Average Readings
▼ Ambient
Software Version: 5.03.12
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Equipment:

ID	Asset #	Description	Model	Cal Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T4	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T5	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T6	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T7	AN00786	Preamp	83017A	5/20/2020	5/20/2022
T8	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
T9	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
T10	ANP07243	Cable	32022-29094K- 29094K-24TC	5/29/2020	5/29/2022

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	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	75.500M	47.4	+1.6 +0.1 +0.0	+5.9 +0.0 +0.0	+7.0 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	33.9	40.0	-6.1	Vert
2	109.500M	46.0	+1.8 +0.1 +0.0	+5.9 +0.0 +0.0	+10.6 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	36.4	43.5	-7.1	Vert
3	304.000M	41.0	+3.2 +0.3 +0.0	+5.9 +0.0 +0.0	+13.4 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	35.9	46.0	-10.1	Vert
4	112.000M	38.0	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.7 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	28.6	43.5	-14.9	Horiz
5	110.500M	37.0	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.7 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	27.6	43.5	-15.9	Horiz
6	1274.500M	48.3	+0.0 +0.0 +2.4	+0.0 +0.0 +0.4	+0.0 -39.6 +25.4	+0.0 +25.4	+0.0	36.9	54.0	-17.1	Vert
7	1107.500M	49.3	+0.0 +0.0 +2.1	+0.0 +0.0 +0.3	+0.0 -40.4 +25.0	+0.0 +25.0	+0.0	36.3	54.0	-17.7	Horiz

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/22/2020
 Test Type: **Maximized Emissions** Time: 09:37:07
 Tested By: Don Nguyen Sequence#: 7
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

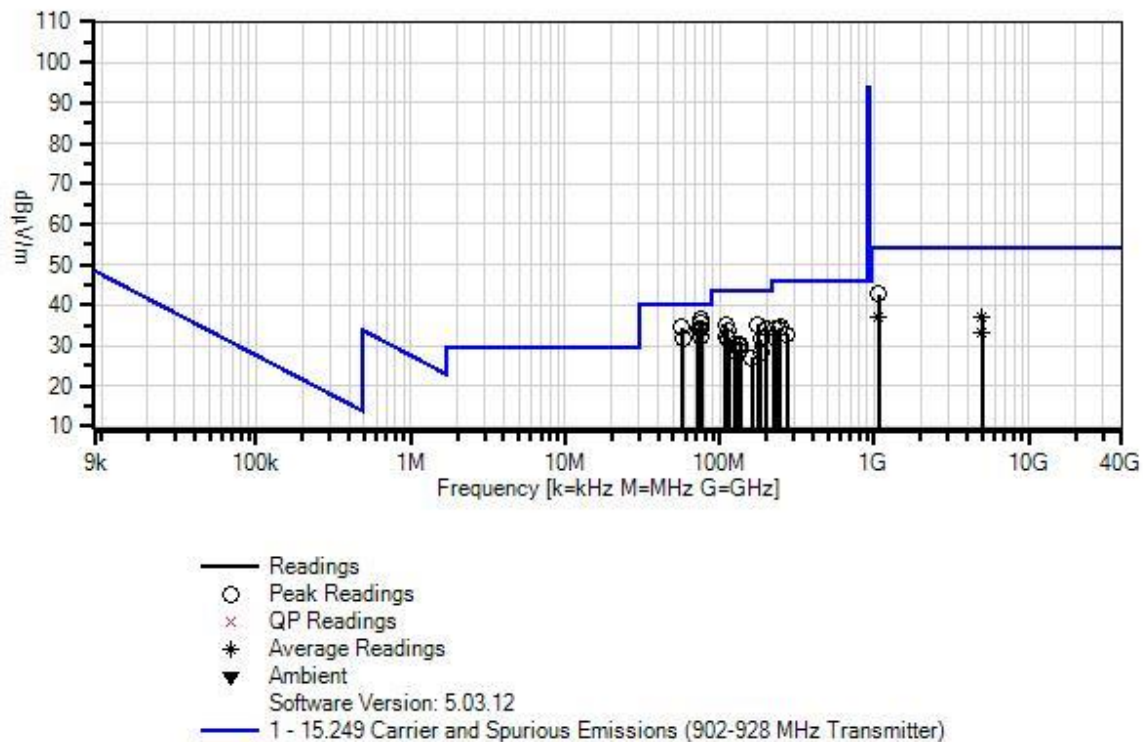
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 9kHz-9.28GHz 9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz. 150kHz to 30MHz RBW=9kHz, VBW=27kHz. 30-1000MHz, RBW=120kHz, VBW=360kHz 1000-9280MHz, RBW=1MHz, VBW=3MHz
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Ittron, Inc. W/O#: 103955 Sequence#: 7 Date: 6/22/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Cal Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T4	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T5	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T6	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T7	AN00786	Preamp	83017A	5/20/2020	5/20/2022
T8	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
T9	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
T10	ANP07243	Cable	32022-29094K- 29094K-24TC	5/29/2020	5/29/2022

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	75.375M	49.9	+1.6 +0.1 +0.0	+5.9 +0.0 +0.0	+7.0 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	36.4	40.0	-3.6	Vert
2	75.725M	49.2	+1.6 +0.1 +0.0	+5.9 +0.0 +0.0	+7.0 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	35.7	40.0	-4.3	Vert
3	56.700M	48.0	+1.3 +0.1 +0.0	+5.9 +0.0 +0.0	+7.2 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	34.4	40.0	-5.6	Vert
4	73.075M	47.7	+1.5 +0.1 +0.0	+5.9 +0.0 +0.0	+6.8 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	33.9	40.0	-6.1	Vert
5	75.400M	47.4	+1.6 +0.1 +0.0	+5.9 +0.0 +0.0	+7.0 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	33.9	40.0	-6.1	Horiz
6	74.750M	45.9	+1.5 +0.1 +0.0	+5.9 +0.0 +0.0	+6.9 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	32.2	40.0	-7.8	Horiz
7	109.775M	44.8	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.6 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	35.3	43.5	-8.2	Vert
8	175.700M	45.4	+2.4 +0.2 +0.0	+5.9 +0.0 +0.0	+9.4 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	35.3	43.5	-8.2	Horiz
9	57.325M	45.6	+1.3 +0.1 +0.0	+5.9 +0.0 +0.0	+7.0 +0.0 +0.0	-28.1 +0.0 +0.0	+0.0	31.8	40.0	-8.2	Vert
10	200.900M	44.5	+2.6 +0.2 +0.0	+5.9 +0.0 +0.0	+9.0 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	34.2	43.5	-9.3	Horiz
11	112.075M	42.9	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.8 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	33.6	43.5	-9.9	Vert
12	1074.500M	56.0	+0.0 +0.0 +2.1	+0.0 +0.0 +0.3	+0.0 +0.0 +0.0	+0.0 +24.9 +0.0	+0.0	42.7	54.0	-11.3	Vert
13	111.400M	41.6	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.7 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	32.2	43.5	-11.3	Horiz
14	246.100M	41.2	+2.9 +0.2 +0.0	+5.9 +0.0 +0.0	+12.1 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	34.4	46.0	-11.6	Horiz
15	114.725M	40.9	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+10.9 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	31.7	43.5	-11.8	Vert

16	240.880M	41.3	+2.9 +0.2 +0.0	+5.9 +0.0 +0.0	+11.7 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	34.1	46.0	-11.9	Vert
17	184.500M	42.0	+2.4 +0.2 +0.0	+5.9 +0.0 +0.0	+9.1 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	31.6	43.5	-11.9	Horiz
18	224.800M	42.2	+2.8 +0.2 +0.0	+5.9 +0.0 +0.0	+10.7 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	33.9	46.0	-12.1	Horiz
19	136.000M	38.9	+2.1 +0.2 +0.0	+5.9 +0.0 +0.0	+11.4 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	30.5	43.5	-13.0	Horiz
20	124.525M	39.1	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+11.3 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	30.3	43.5	-13.2	Vert
21	272.000M	38.8	+3.0 +0.2 +0.0	+5.9 +0.0 +0.0	+12.8 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	32.8	46.0	-13.2	Horiz
22	136.675M	38.3	+2.1 +0.2 +0.0	+5.9 +0.0 +0.0	+11.4 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	29.9	43.5	-13.6	Vert
23	220.880M	40.9	+2.7 +0.2 +0.0	+5.9 +0.0 +0.0	+10.4 +0.0 +0.0	-27.9 +0.0 +0.0	+0.0	32.2	46.0	-13.8	Vert
24	133.400M	37.5	+2.0 +0.2 +0.0	+5.9 +0.0 +0.0	+11.4 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	29.0	43.5	-14.5	Horiz
25	124.500M	37.5	+1.9 +0.1 +0.0	+5.9 +0.0 +0.0	+11.3 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	28.7	43.5	-14.8	Horiz
26	184.480M	38.7	+2.4 +0.2 +0.0	+5.9 +0.0 +0.0	+9.1 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	28.3	43.5	-15.2	Vert
27	160.900M	36.1	+2.3 +0.2 +0.0	+5.9 +0.0 +0.0	+10.5 +0.0 +0.0	-28.0 +0.0 +0.0	+0.0	27.0	43.5	-16.5	Horiz

28	1070.000M	50.3	+0.0	+0.0	+0.0	+0.0	+0.0	37.0	54.0	-17.0	Horiz
	Ave		+0.0	-40.6	+24.9	+2.1					
			+0.3	+0.0							
^	1070.000M	62.1	+0.0	+0.0	+0.0	+0.0	+0.0	48.8	54.0	-5.2	Horiz
			+0.0	+0.0	-40.6	+24.9					
			+2.1	+0.3							
30	4997.200M	35.8	+0.0	+0.0	+0.0	+0.0	+0.0	37.0	54.0	-17.0	Vert
	Ave		+0.0	+0.0	-37.5	+33.5					
			+4.5	+0.7							
^	4997.200M	55.4	+0.0	+0.0	+0.0	+0.0	+0.0	56.6	54.0	+2.6	Vert
			+0.0	+0.0	-37.5	+33.5					
			+4.5	+0.7							
32	4989.000M	31.8	+0.0	+0.0	+0.0	+0.0	+0.0	33.0	54.0	-21.0	Horiz
	Ave		+0.0	+0.0	-37.5	+33.5					
			+4.5	+0.7							
^	4989.000M	53.9	+0.0	+0.0	+0.0	+0.0	+0.0	55.1	54.0	+1.1	Horiz
			+0.0	+0.0	-37.5	+33.5					
			+4.5	+0.7							

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/18/2020
 Test Type: **Maximized Emissions** Time: 15:46:19
 Tested By: Don Nguyen Sequence#: 7
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 8			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 8			

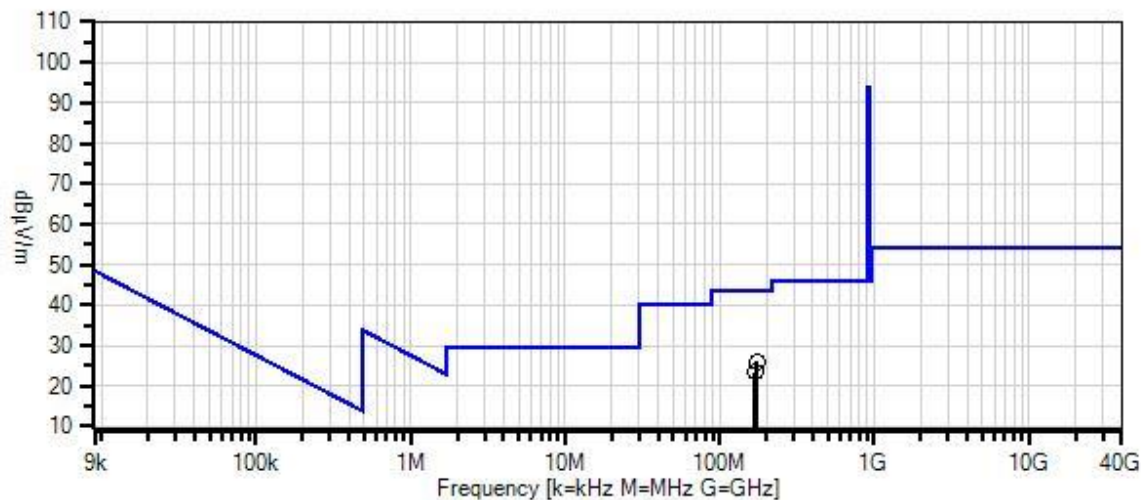
Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5.
 The EUT is set to continuously transmit.

 Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 9kHz-9.28GHz
 9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz.
 150kHz to 30MHz RBW=9kHz, VBW=27kHz.
 30-1000MHz, RBW=120kHz, VBW=360kHz
 1000-9280MHz, RBW=1MHz, VBW=3MHz

 The worst case emission were verified with power supply on and off the table. No change in emission level was observed.
Note: No emission is detected above 1GHz.

Ittron, Inc. W/O#: 103955 Sequence#: 7 Date: 6/18/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



— Readings
○ Peak Readings
× QP Readings
* Average Readings
▼ Ambient
Software Version: 5.03.12
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T2	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T3	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T4	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T5	AN00309	Preamplifier	8447D	12/24/2019	12/24/2021
	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5								
		dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	173.700M	36.0	+0.0 -28.0	+2.4	+5.9	+9.5	+0.0	26.0	43.5	-17.5	Vert
2	168.500M	33.0	+0.0 -28.0	+2.4	+5.9	+9.9	+0.0	23.4	43.5	-20.1	Horiz

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/22/2020
 Test Type: **Maximized Emissions** Time: 09:57:40
 Tested By: Don Nguyen Sequence#: 5
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5.

The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz

Frequency of measurement: 9kHz-9.28GHz

9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz.

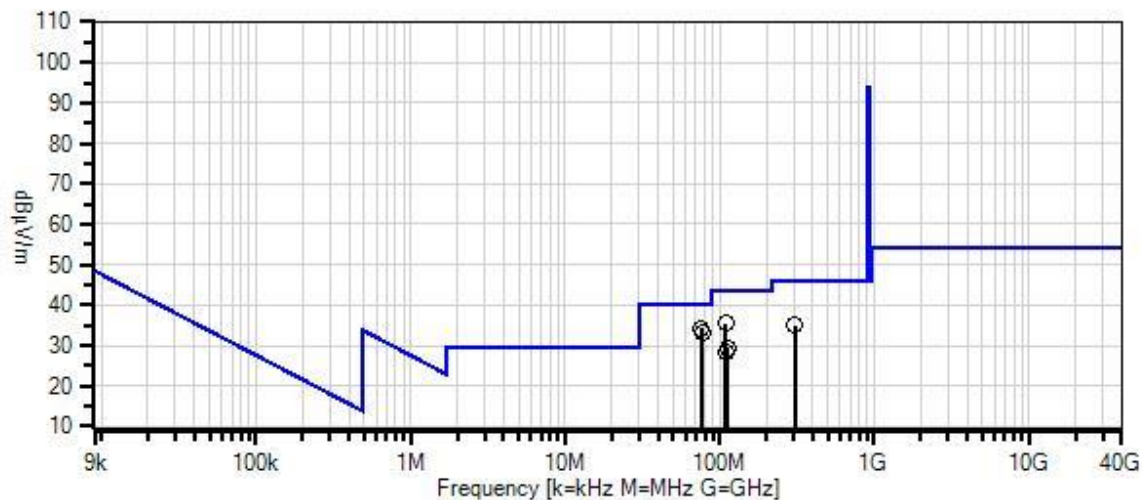
150kHz to 30MHz RBW=9kHz, VBW=27kHz.

30-1000MHz, RBW=120kHz, VBW=360kHz

1000-9280MHz, RBW=1MHz, VBW=3MHz

Note: No emission is detected above 1GHz.

Ittron, Inc. WO#: 103955 Sequence#: 5 Date: 6/22/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Horiz



— Readings
○ Peak Readings
× QP Readings
* Average Readings
▼ Ambient
Software Version: 5.03.12
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Equipment:

ID	Asset #	Description	Model	Cal Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T4	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T5	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
	AN00786	Preamp	83017A	5/20/2020	5/20/2022
	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
	ANP07243	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	75.525M	47.7	+1.6 +0.1	+5.9	+7.0	-28.1	+0.0	34.2	40.0	-5.8	Vert
2	76.825M	46.4	+1.6 +0.1	+5.9	+7.1	-28.1	+0.0	33.0	40.0	-7.0	Vert
3	109.875M	45.0	+1.9 +0.1	+5.9	+10.6	-28.0	+0.0	35.5	43.5	-8.0	Vert
4	303.980M	40.0	+3.2 +0.3	+5.9	+13.4	-27.9	+0.0	34.9	46.0	-11.1	Vert
5	111.700M	38.7	+1.9 +0.1	+5.9	+10.7	-28.0	+0.0	29.3	43.5	-14.2	Horiz
6	110.000M	38.0	+1.9 +0.1	+5.9	+10.6	-28.0	+0.0	28.5	43.5	-15.0	Horiz

Test Location: CKC Laboratories • 100 North Olinda Place • Brea CA 92823 • 714 993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/22/2020
 Test Type: **Maximized Emissions** Time: 09:48:55
 Tested By: Don Nguyen Sequence#: 8
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 10			

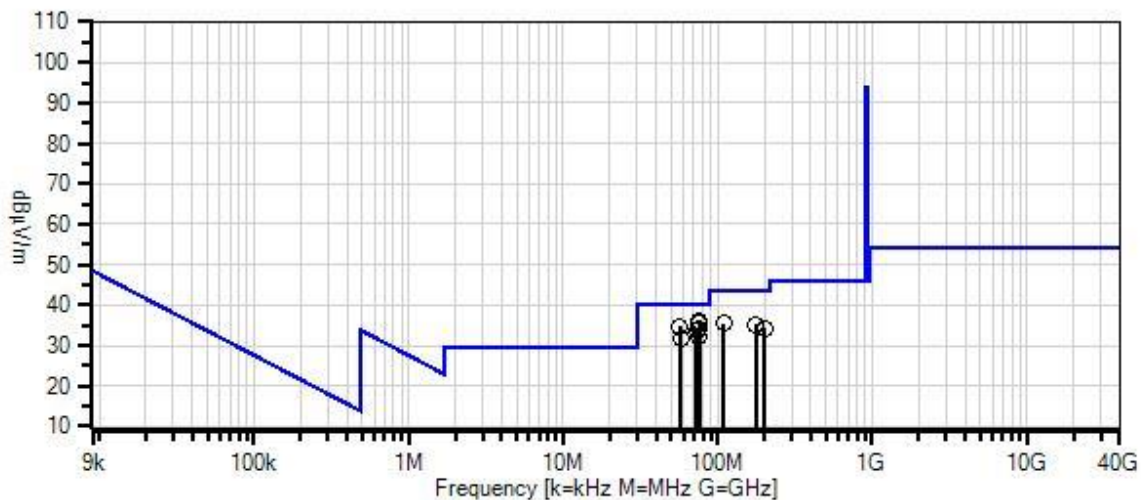
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 10			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform and connected to DC power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit. Operating frequency: 908MHz, 916MHz, 924MHz Frequency of measurement: 9kHz-9.28GHz 9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz. 150kHz to 30MHz RBW=9kHz, VBW=27kHz. 30-1000MHz, RBW=120kHz, VBW=360kHz 1000-9280MHz, RBW=1MHz, VBW=3MHz Note: No emission detected above 1GHz.

Itron, Inc. W/O#: 103955 Sequence#: 8 Date: 6/22/2020
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Vert



— Readings
○ Peak Readings
× QP Readings
* Average Readings
▼ Ambient
Software Version: 5.03.12
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Equipment:

ID	Asset #	Description	Model	Cal Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T4	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T5	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T6	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
	AN00786	Preamp	83017A	5/20/2020	5/20/2022
	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
	ANP07243	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	75.400M	49.8	+1.6 +0.1	+5.9 +0.0	+7.0	-28.1	+0.0	36.3	40.0	-3.7	Vert
2	75.600M	49.0	+1.6 +0.1	+5.9 +0.0	+7.0	-28.1	+0.0	35.5	40.0	-4.5	Vert
3	56.780M	48.4	+1.3 +0.1	+5.9 +0.0	+7.1	-28.1	+0.0	34.7	40.0	-5.3	Vert
4	75.400M	47.4	+1.6 +0.1	+5.9 +0.0	+7.0	-28.1	+0.0	33.9	40.0	-6.1	Horiz
5	73.100M	47.6	+1.5 +0.1	+5.9 +0.0	+6.8	-28.1	+0.0	33.8	40.0	-6.2	Vert
6	74.800M	46.0	+1.5 +0.1	+5.9 +0.0	+6.9	-28.1	+0.0	32.3	40.0	-7.7	Horiz
7	109.800M	45.0	+1.9 +0.1	+5.9 +0.0	+10.6	-28.0	+0.0	35.5	43.5	-8.0	Vert
8	57.500M	45.6	+1.4 +0.1	+5.9 +0.0	+6.9	-28.1	+0.0	31.8	40.0	-8.2	Vert
9	175.700M	45.4	+2.4 +0.2	+5.9 +0.0	+9.4	-28.0	+0.0	35.3	43.5	-8.2	Horiz
10	200.900M	44.5	+2.6 +0.2	+5.9 +0.0	+9.0	-28.0	+0.0	34.2	43.5	-9.3	Horiz

Band Edge

Band Edge Summary

Configuration 5 (Internal Antenna)

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	FSK	Integral directional	36.4	<46	Pass
928	FSK	Integral directional	36.1	<46	Pass
902	FSK Hopping	Integral directional	36.6	<46	Pass
928	FSK Hopping	Integral directional	37.7	<46	Pass

Band Edge Summary

Configuration 6 (3dBi External Antenna)

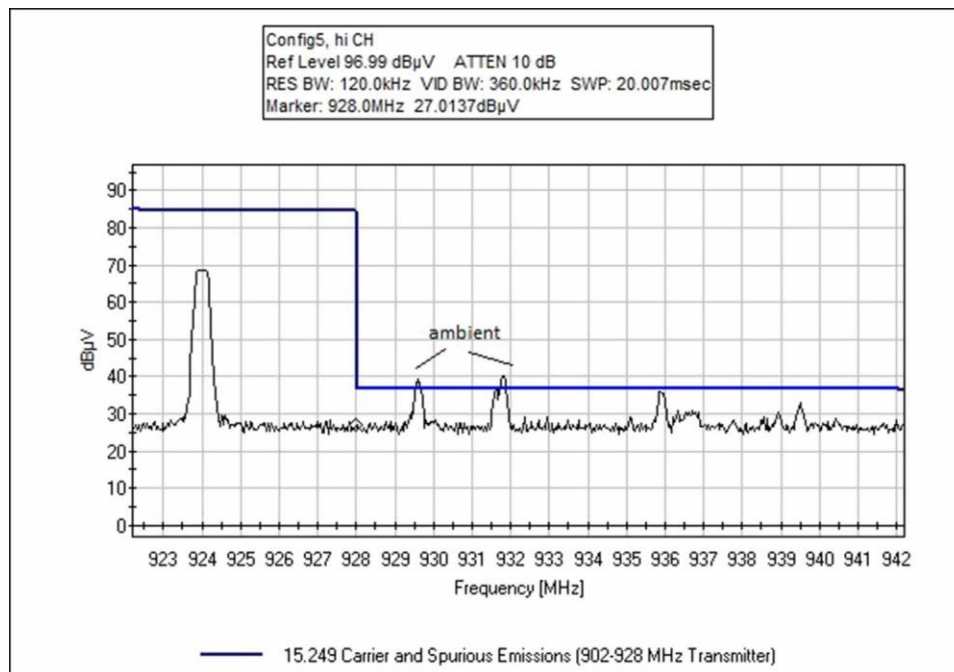
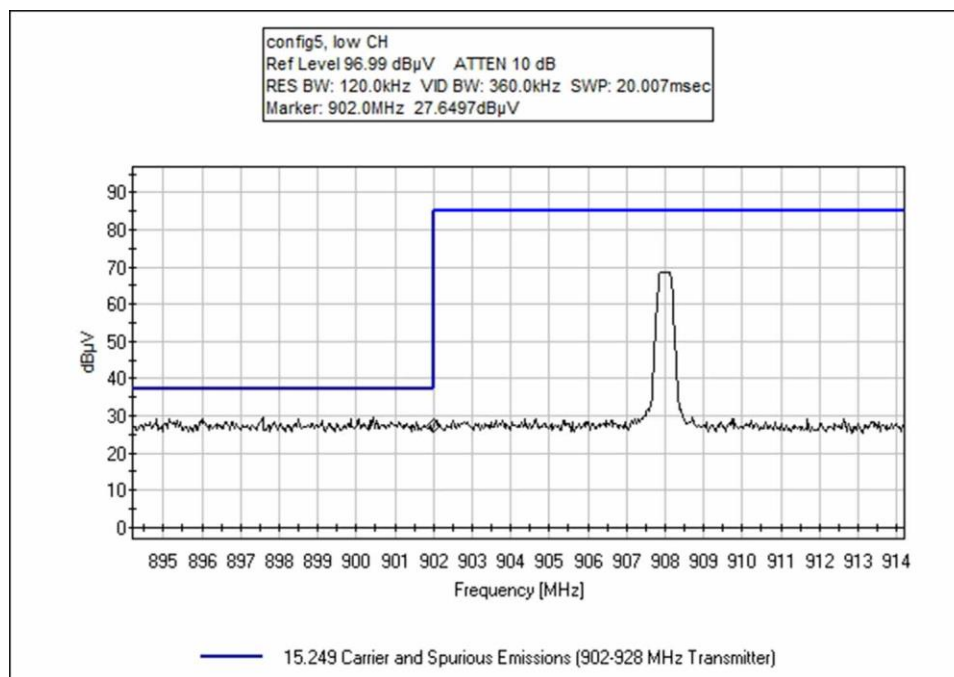
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	FSK	3dBi Rubber Duck	35.5	<46	Pass
928	FSK	3dBi Rubber Duck	34.2	<46	Pass
902	FSK Hopping	3dBi Rubber Duck	35.3	<46	Pass
928	FSK Hopping	3dBi Rubber Duck	34.6	<46	Pass

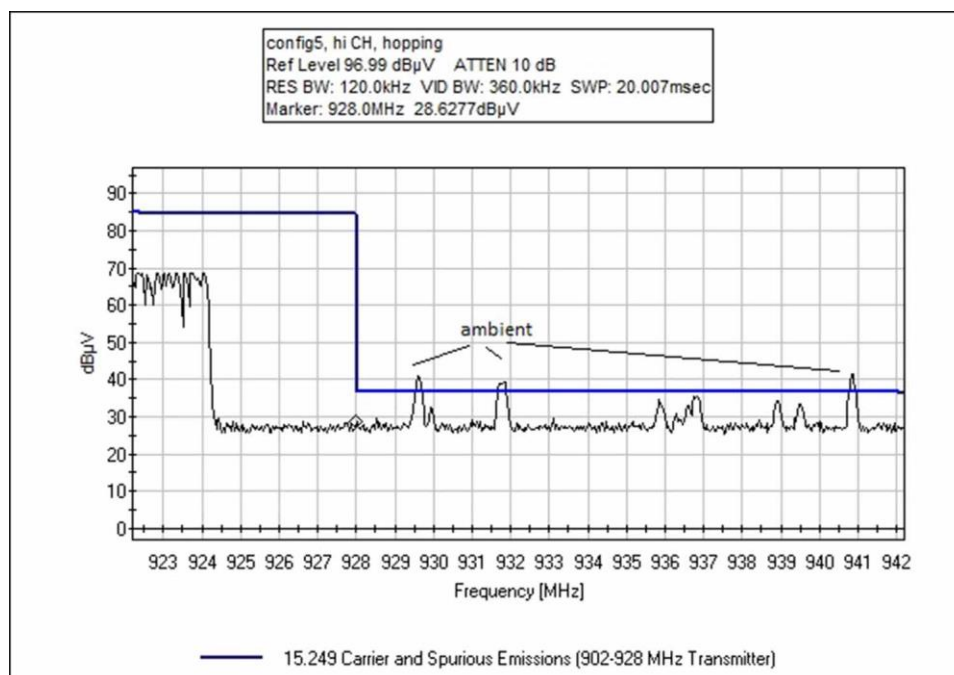
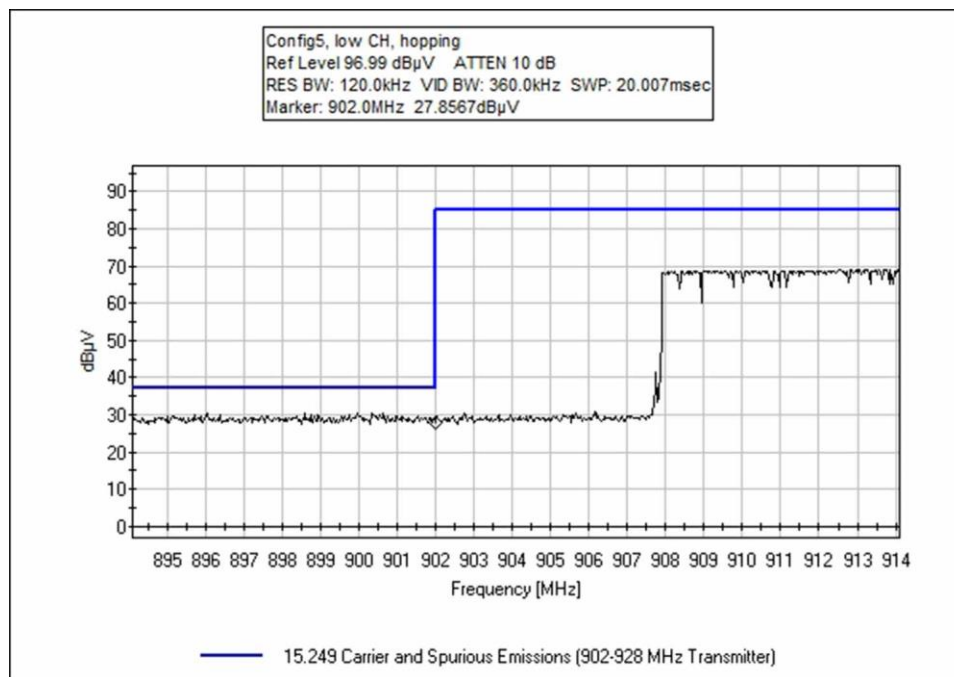
Band Edge Summary

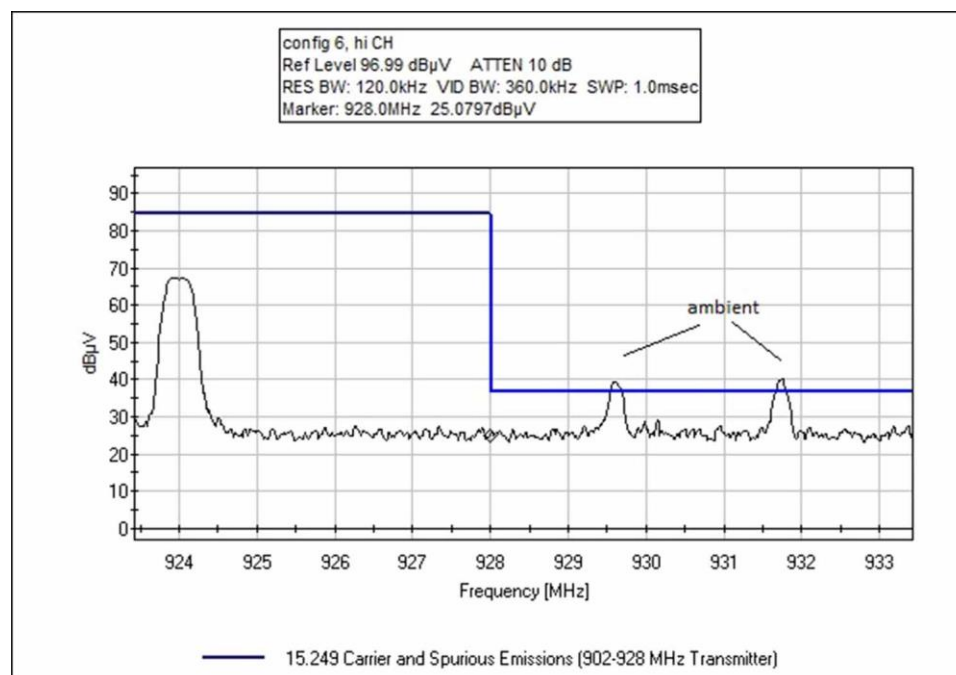
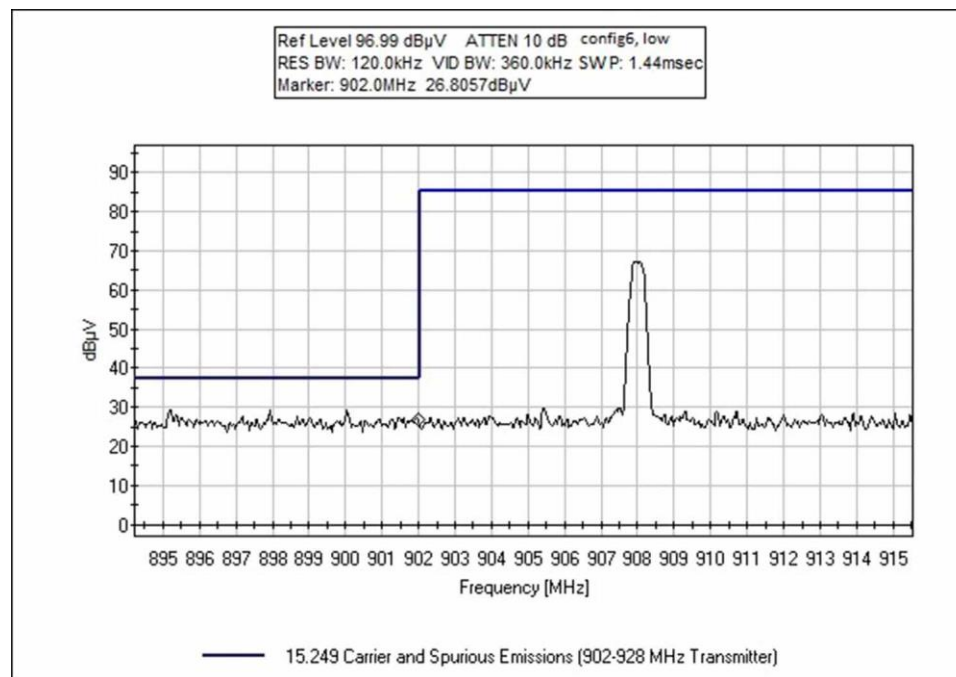
Configuration 7 (5dBi External Antenna)

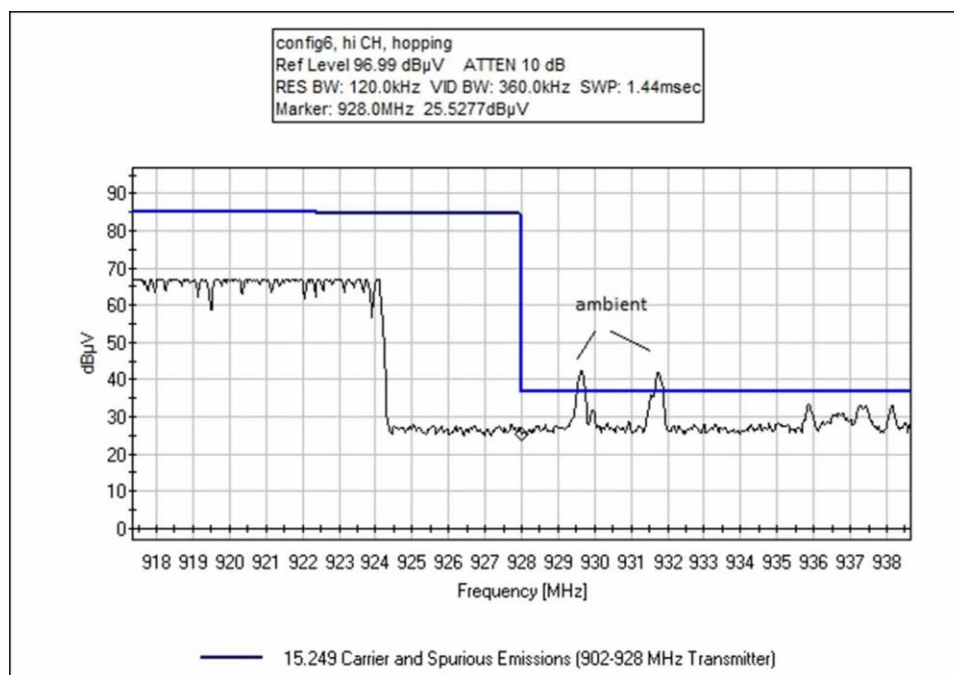
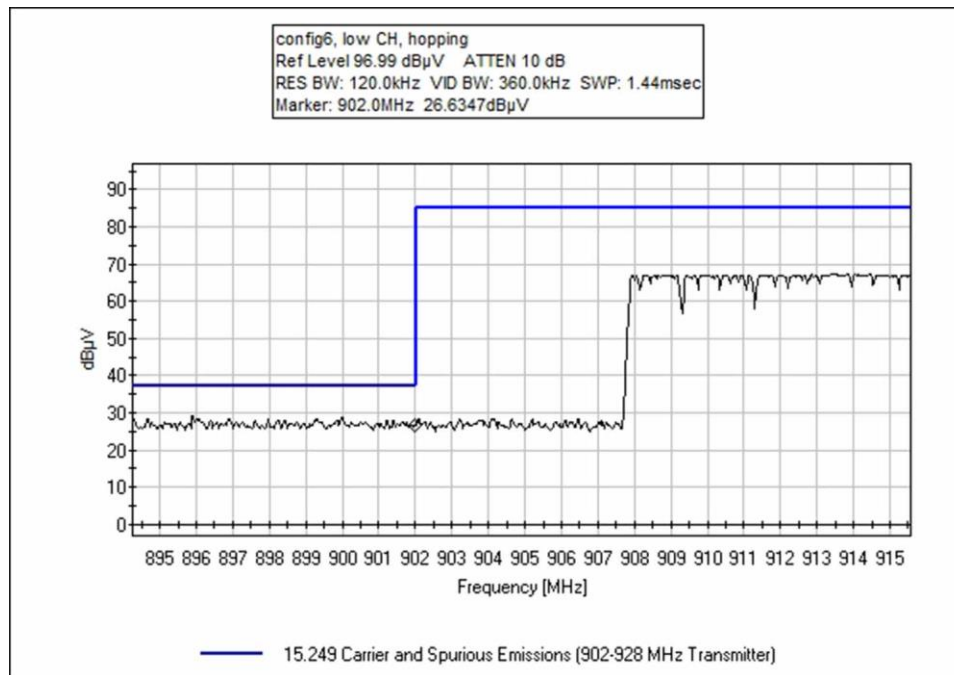
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	FSK	5dBi Monopole	34.5	<46	Pass
928	FSK	5dBi Monopole	35.8	<46	Pass
902	FSK Hopping	5dBi Monopole	35.4	<46	Pass
928	FSK Hopping	5dBi Monopole	35.6	<46	Pass

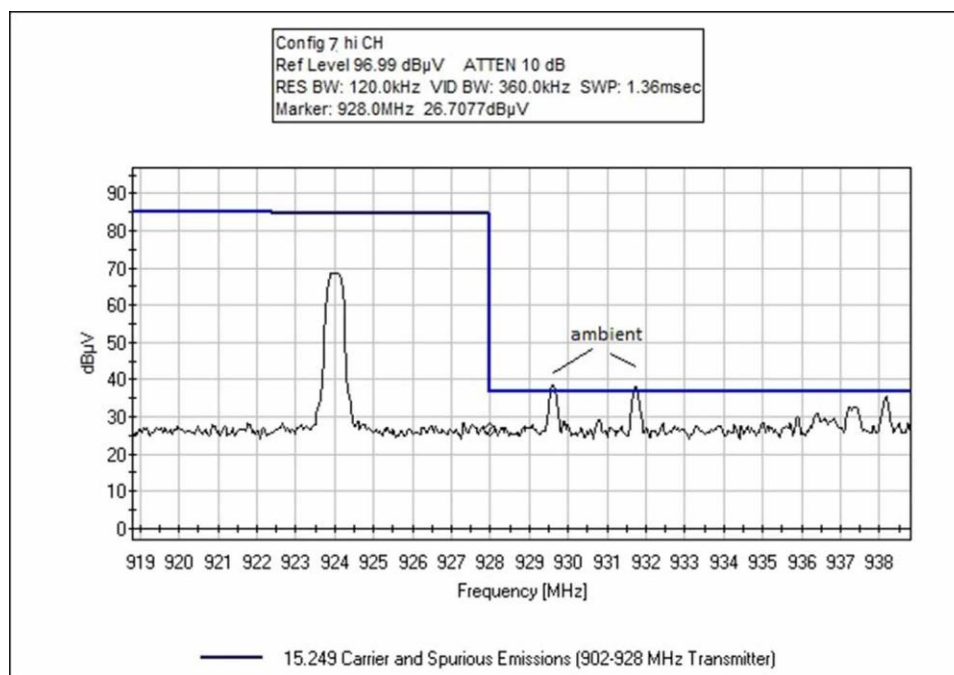
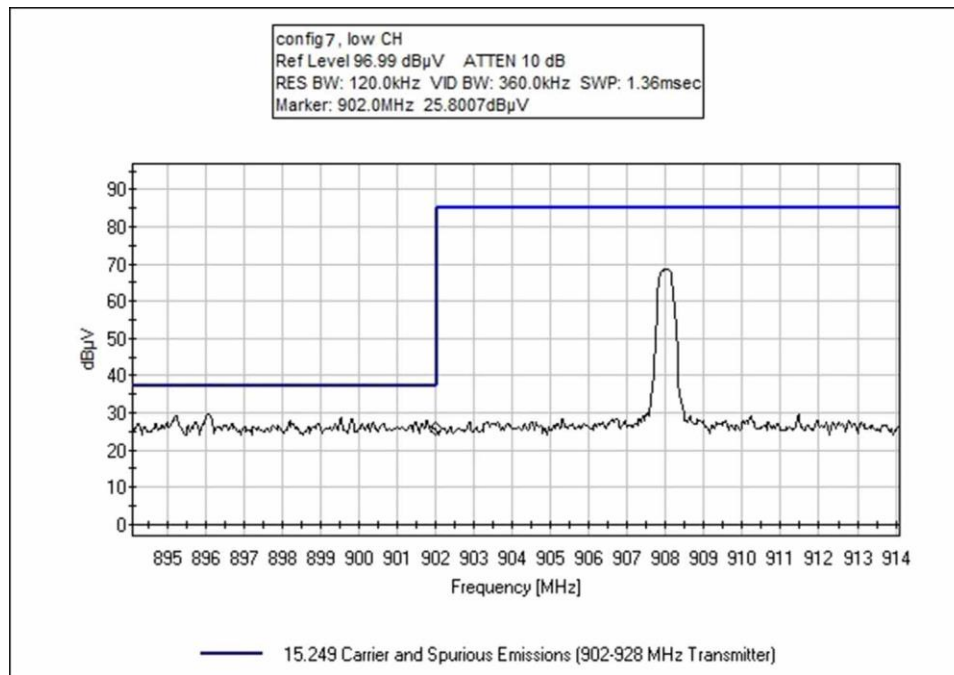
Band Edge Plots

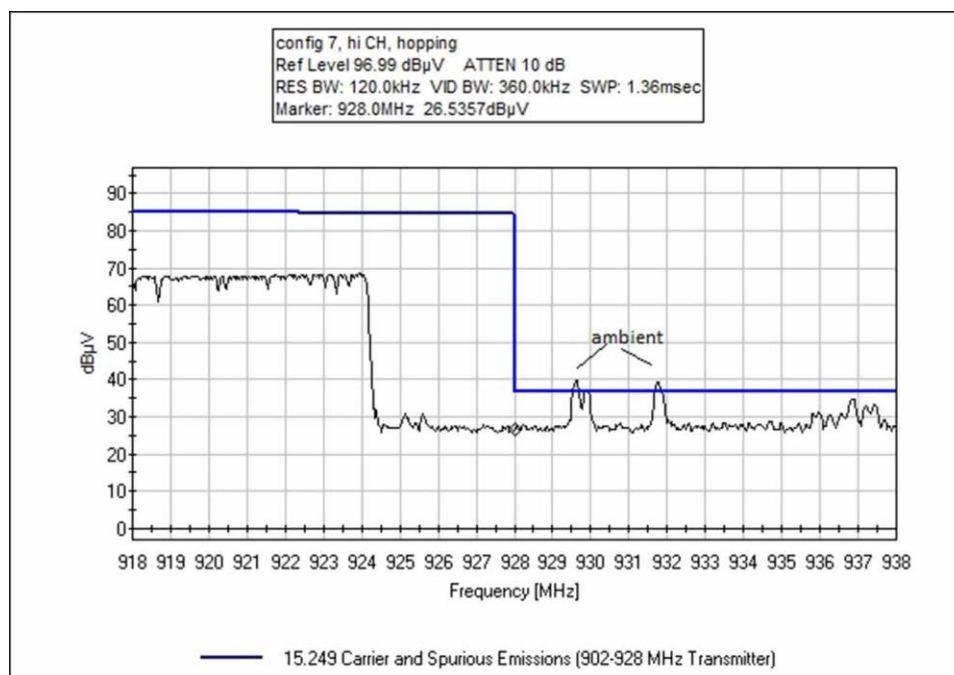
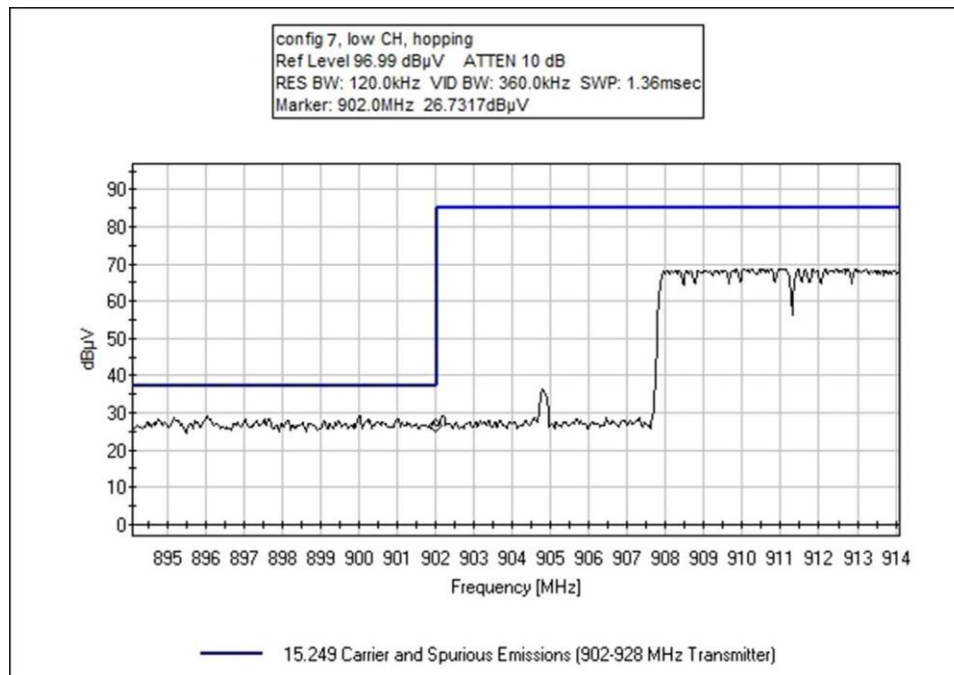


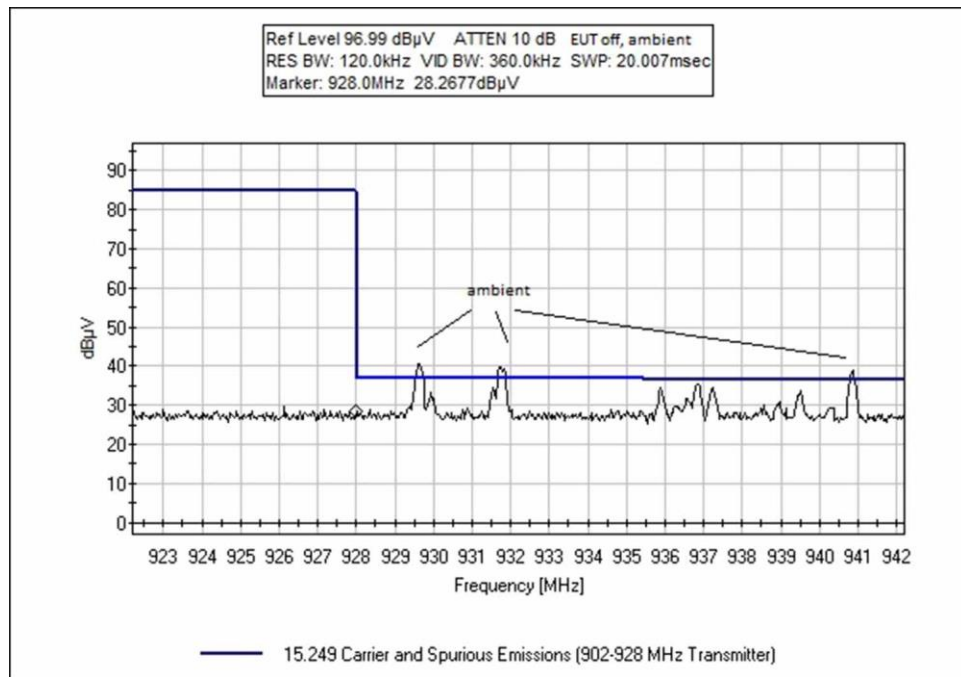












Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/25/2020
 Test Type: **Conducted Emissions** Time: 14:23:14
 Tested By: Don Nguyen Sequence#: 1
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to 5Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=120kHz, VBW=360kHz

Note: The EUT is rotated in 3 orthogonal axis. Only the worst-case emissions are recorded.

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T4	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5	T6							
			dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	928.000M	28.6	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	37.7	46.0 hopping	-8.3	Vert
2	902.000M	27.9	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	36.6	46.0 hopping	-9.4	Vert
3	902.000M	27.7	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	36.4	46.0	-9.6	Vert
4	928.000M	27.0	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	36.1	46.0	-9.9	Vert

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/25/2020
 Test Type: **Conducted Emissions** Time: 14:25:38
 Tested By: Don Nguyen Sequence#: 2
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to dc power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=120kHz, VBW=360kHz

Note: The EUT is rotated in 3 orthogonal axis. Only the worst-case emissions are recorded.

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamplifier	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T4	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

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	902.000M	26.8	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	35.5	46.0	-10.5	Vert
2	902.000M	26.6	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	35.3	46.0 hopping	-10.7	Vert
3	928.000M	25.5	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	34.6	46.0 hopping	-11.4	Vert
4	928.000M	25.1	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	34.2	46.0	-11.8	Vert

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **103955** Date: 6/25/2020
 Test Type: **Conducted Emissions** Time: 14:29:25
 Tested By: Don Nguyen Sequence#: 3
 Software: EMITest 5.03.12

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

The EUT is placed on Styrofoam platform. USB port is connected to a touchscreen tablet. The EUT is connected to dc power supply. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
 Frequency of measurement: 908MHz, 916MHz, 924MHz
 RBW=120kHz, VBW=360kHz

Note: The EUT is rotated in 3 orthogonal axis. Only the worst-case emissions are recorded.

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamplifier	8447D	12/24/2019	12/24/2021
T2	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T3	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T4	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	ANP05281	Attenuator	1B	4/7/2020	4/7/2022

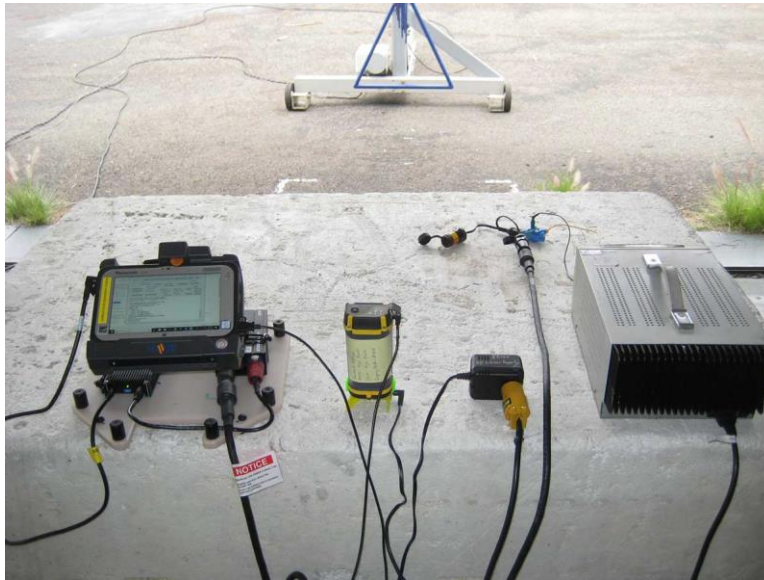
Measurement Data:

Reading listed by margin.

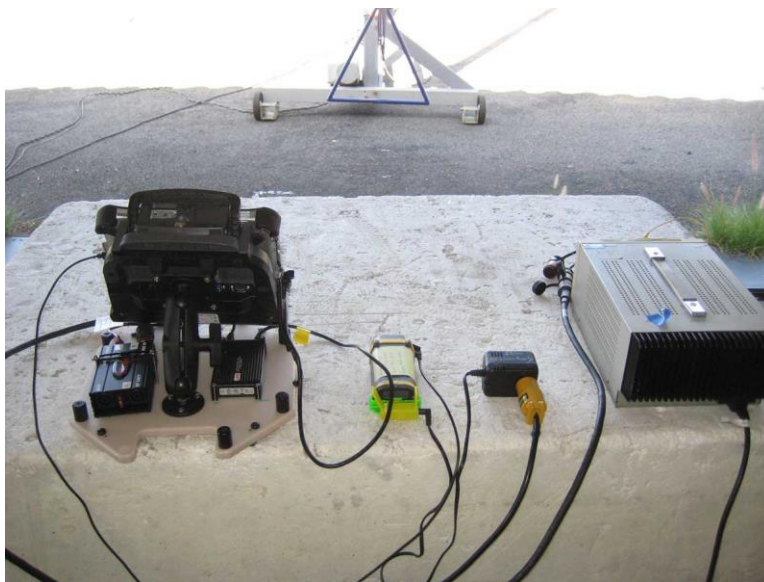
Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	928.000M	26.7	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	35.8	46.0	-10.2	Vert
2	928.000M	26.5	-27.2 +23.9	+0.4 +6.0	+6.0	+0.0	+0.0	35.6	46.0 hopping	-10.4	Vert
3	902.000M	26.7	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	35.4	46.0 hopping	-10.6	Vert
4	902.000M	25.8	-27.1 +23.5	+0.4 +6.0	+5.9	+0.0	+0.0	34.5	46.0	-11.5	Vert

Test Setup Photo(s)



7" Tablet



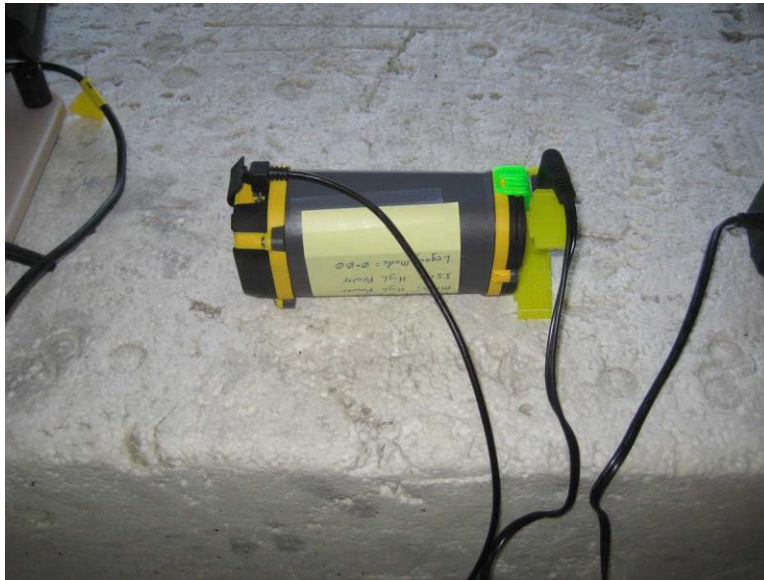
X Axis, IMRC-INT



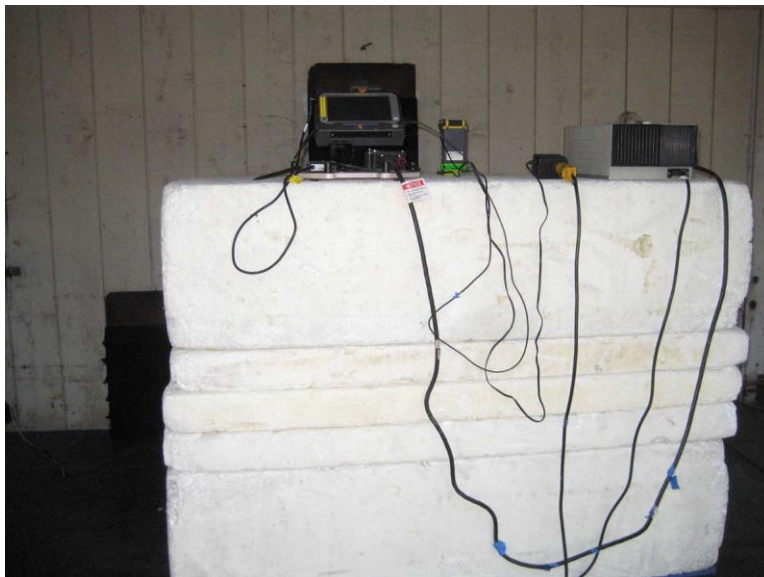
X Axis, IMRC-INT



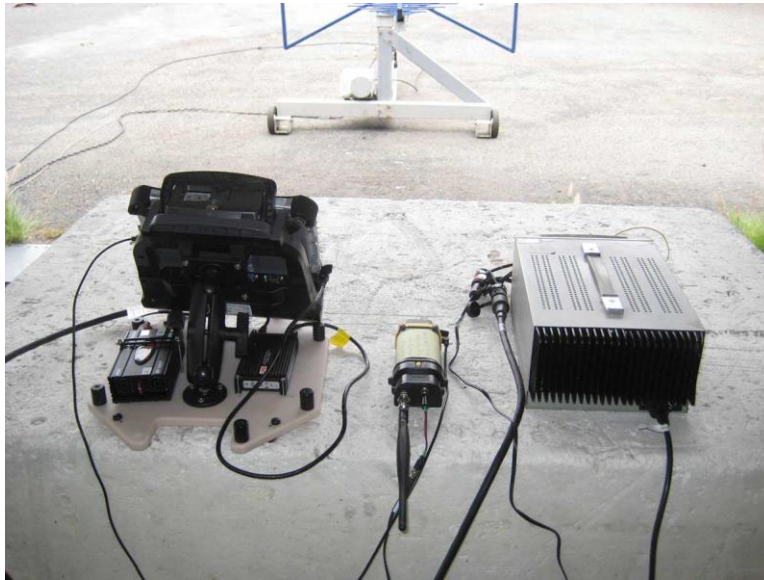
Y Axis, IMRC-INT



Z Axis, IMRC-INT



Above 1GHz, IMRC-INT



X Axis, IMRC-EXT 3dBi



X Axis, IMRC-EXT 3dBi



Y Axis, IMRC-EXT 3dBi



Z Axis, IMRC-EXT 3dBi



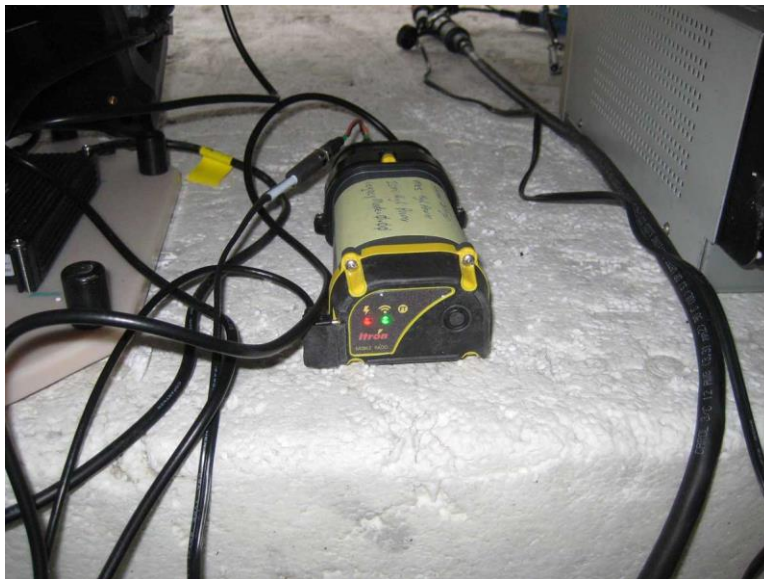
Above 1GHz, IMRC-EXT 3dBi



IMRC-EXT 5dBi



IMRC-EXT 5dBi



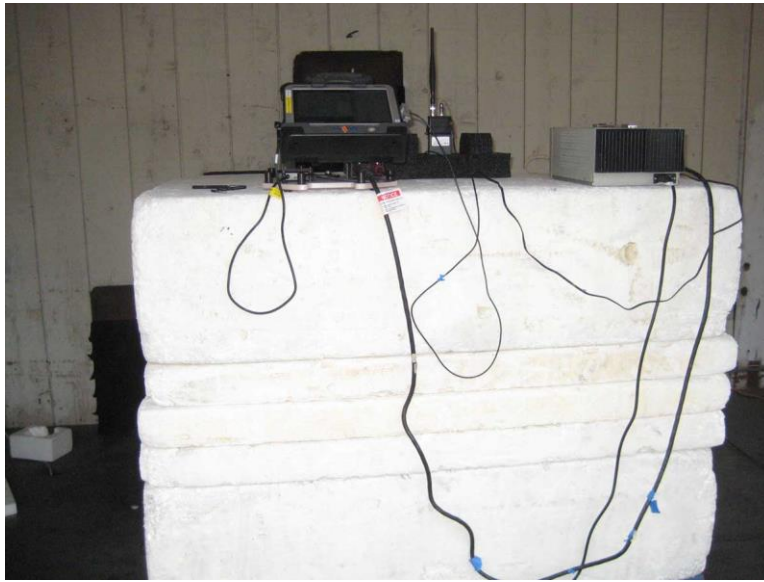
X Axis, IMRC-EXT 5dBi



Y Axis, IMRC-EXT 5dBi



Z Axis, IMRC-EXT 5dBi



Above 1GHz, IMRC-EXT 5dBi

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **103955** Date: 6/12/2020
 Test Type: **Conducted Emissions** Time: 09:52:27
 Tested By: Don Nguyen Sequence#: 6
 Software: EMITest 5.03.12 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

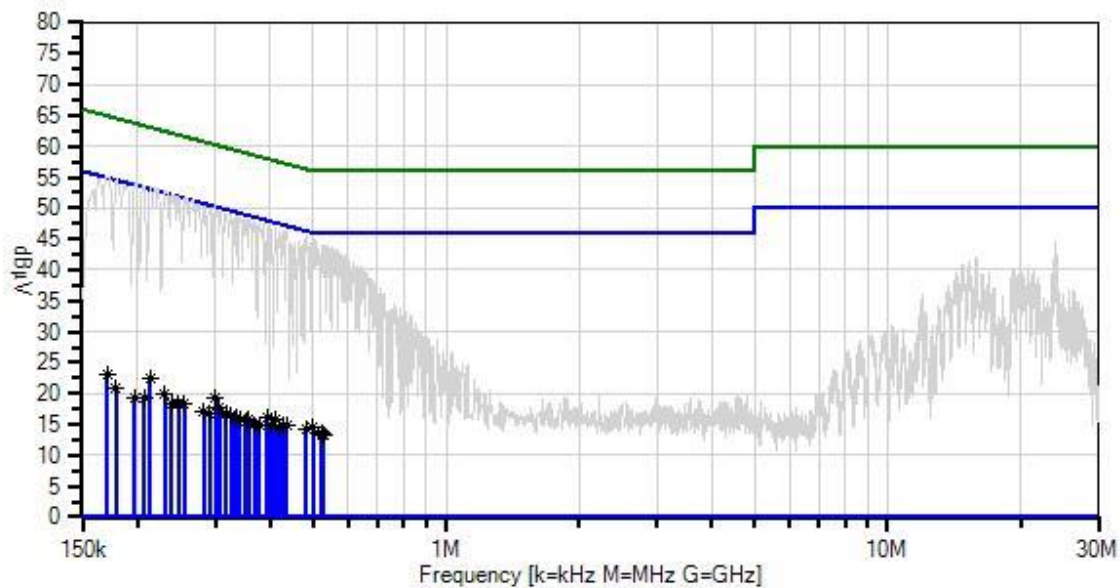
Test Conditions / Notes:

The EUT is placed on test bench. USB port is connected to a touchscreen tablet. The EUT is connected to 5Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitting mode.

Operating frequency: 908MHz (worst case with highest power)
 Frequency of measurement: 150kHz-30MHz
 RBW=9kHz, VBW=30kHz

Site A
 Temperature: 25°C
 Relative Humidity: 46%
 Test Method: ANSI C63.10:2013

Itron, Inc. WO#: 103955 Sequence#: 6 Date: 6/12/2020
15.207 AC Mains - Average Test Lead: 120V 60Hz L1-Line



— Sweep Data
× QP Readings
Software Version: 5.03.12
— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

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	12/24/2019	12/24/2021
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	10/22/2019	10/22/2021
T4	AN00847.1	50uH LISN-(L) Line 1	3816/2NM	3/10/2020	3/10/2021
	AN00847.1	50uH LISN-(N) Line 2	3816/2NM	3/10/2020	3/10/2021
T5	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2020	3/31/2022
	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2020	3/31/2022

Measurement Data:

Reading listed by margin.

Test Lead: L1-Line

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	213.994k	16.6	+5.8	+0.0	+0.2	+0.0	+0.0	22.6	53.0	-30.4	L1-Li
	Ave		+0.0								
^	213.994k	47.5	+5.8	+0.0	+0.2	+0.0	+0.0	53.5	53.0	+0.5	L1-Li
			+0.0								
^	218.357k	47.4	+5.8	+0.0	+0.2	+0.0	+0.0	53.4	52.9	+0.5	L1-Li
			+0.0								
4	299.804k	13.4	+5.8	+0.0	+0.1	+0.0	+0.0	19.3	50.2	-30.9	L1-Li
	Ave		+0.0								
^	299.804k	44.3	+5.8	+0.0	+0.1	+0.0	+0.0	50.2	50.2	+0.0	L1-Li
			+0.0								
6	500.513k	8.6	+5.8	+0.0	+0.3	+0.0	+0.0	14.7	46.0	-31.3	L1-Li
	Ave		+0.0								
^	500.513k	39.0	+5.8	+0.0	+0.3	+0.0	+0.0	45.1	46.0	-0.9	L1-Li
			+0.0								
8	410.340k	9.8	+5.8	+0.0	+0.2	+0.0	+0.0	15.8	47.6	-31.8	L1-Li
	Ave		+0.0								
^	410.339k	40.8	+5.8	+0.0	+0.2	+0.0	+0.0	46.8	47.6	-0.8	L1-Li
			+0.0								
10	393.614k	10.2	+5.8	+0.0	+0.2	+0.0	+0.0	16.2	48.0	-31.8	L1-Li
	Ave		+0.0								
^	393.614k	40.9	+5.8	+0.0	+0.2	+0.0	+0.0	46.9	48.0	-1.1	L1-Li
			+0.0								
12	170.362k	16.9	+5.8	+0.0	+0.3	+0.0	+0.0	23.0	54.9	-31.9	L1-Li
	Ave		+0.0								
^	170.361k	49.0	+5.8	+0.0	+0.3	+0.0	+0.0	55.1	54.9	+0.2	L1-Li
			+0.0								
14	483.060k	8.1	+5.8	+0.0	+0.3	+0.0	+0.0	14.2	46.3	-32.1	L1-Li
	Ave		+0.0								
^	483.060k	39.3	+5.8	+0.0	+0.3	+0.0	+0.0	45.4	46.3	-0.9	L1-Li
			+0.0								
16	307.076k	11.7	+5.8	+0.0	+0.1	+0.0	+0.0	17.6	50.0	-32.4	L1-Li
	Ave		+0.0								
^	307.076k	43.7	+5.8	+0.0	+0.1	+0.0	+0.0	49.6	50.0	-0.4	L1-Li
			+0.0								
18	434.338k	8.8	+5.8	+0.0	+0.2	+0.0	+0.0	14.8	47.2	-32.4	L1-Li
	Ave		+0.0								
^	434.337k	40.2	+5.8	+0.0	+0.2	+0.0	+0.0	46.2	47.2	-1.0	L1-Li
			+0.0								
20	229.993k	14.0	+5.8	+0.0	+0.2	+0.0	+0.0	20.0	52.4	-32.4	L1-Li
	Ave		+0.0								
^	229.992k	46.8	+5.8	+0.0	+0.2	+0.0	+0.0	52.8	52.4	+0.4	L1-Li
			+0.0								
22	523.784k	7.4	+5.8	+0.0	+0.3	+0.0	+0.0	13.5	46.0	-32.5	L1-Li
	Ave		+0.0								
23	427.065k	8.8	+5.8	+0.0	+0.2	+0.0	+0.0	14.8	47.3	-32.5	L1-Li
	Ave		+0.0								
^	427.065k	40.3	+5.8	+0.0	+0.2	+0.0	+0.0	46.3	47.3	-1.0	L1-Li
			+0.0								

25	523.784k	7.3	+5.8	+0.0	+0.3	+0.0	+0.0	13.4	46.0	-32.6	L1-Li
^	523.783k	38.0	+5.8	+0.0	+0.3	+0.0	+0.0	44.1	46.0	-1.9	L1-Li
			+0.0								
27	528.874k	7.1	+5.8	+0.0	+0.3	+0.0	+0.0	13.2	46.0	-32.8	L1-Li
^	528.874k	38.0	+5.8	+0.0	+0.3	+0.0	+0.0	44.1	46.0	-1.9	L1-Li
			+0.0								
29	418.339k	8.7	+5.8	+0.0	+0.2	+0.0	+0.0	14.7	47.5	-32.8	L1-Li
^	418.339k	40.2	+5.8	+0.0	+0.2	+0.0	+0.0	46.2	47.5	-1.3	L1-Li
			+0.0								
31	317.257k	11.0	+5.8	+0.0	+0.1	+0.0	+0.0	16.9	49.8	-32.9	L1-Li
^	317.257k	43.3	+5.8	+0.0	+0.1	+0.0	+0.0	49.2	49.8	-0.6	L1-Li
			+0.0								
33	357.254k	9.9	+5.8	+0.0	+0.2	+0.0	+0.0	15.9	48.8	-32.9	L1-Li
^	357.253k	42.1	+5.8	+0.0	+0.2	+0.0	+0.0	48.1	48.8	-0.7	L1-Li
			+0.0								
35	401.613k	8.8	+5.8	+0.0	+0.2	+0.0	+0.0	14.8	47.8	-33.0	L1-Li
^	401.613k	40.6	+5.8	+0.0	+0.2	+0.0	+0.0	46.6	47.8	-1.2	L1-Li
			+0.0								
37	325.257k	10.6	+5.8	+0.0	+0.1	+0.0	+0.0	16.5	49.6	-33.1	L1-Li
^	325.256k	43.3	+5.8	+0.0	+0.1	+0.0	+0.0	49.2	49.6	-0.4	L1-Li
			+0.0								
39	334.710k	10.2	+5.8	+0.0	+0.1	+0.0	+0.0	16.1	49.3	-33.2	L1-Li
^	334.710k	42.8	+5.8	+0.0	+0.1	+0.0	+0.0	48.7	49.3	-0.6	L1-Li
			+0.0								
41	255.445k	12.5	+5.8	+0.0	+0.1	+0.0	+0.0	18.4	51.6	-33.2	L1-Li
^	255.444k	45.8	+5.8	+0.0	+0.1	+0.0	+0.0	51.7	51.6	+0.1	L1-Li
			+0.0								
43	340.528k	10.0	+5.8	+0.0	+0.1	+0.0	+0.0	15.9	49.2	-33.3	L1-Li
^	340.527k	42.6	+5.8	+0.0	+0.1	+0.0	+0.0	48.5	49.2	-0.7	L1-Li
			+0.0								
45	376.888k	9.0	+5.8	+0.0	+0.2	+0.0	+0.0	15.0	48.3	-33.3	L1-Li
^	376.888k	41.5	+5.8	+0.0	+0.2	+0.0	+0.0	47.5	48.3	-0.8	L1-Li
			+0.0								
47	352.163k	9.6	+5.8	+0.0	+0.2	+0.0	+0.0	15.6	48.9	-33.3	L1-Li
^	352.163k	42.1	+5.8	+0.0	+0.2	+0.0	+0.0	48.1	48.9	-0.8	L1-Li
			+0.0								
49	179.088k	14.9	+5.8	+0.0	+0.3	+0.0	+0.0	21.0	54.5	-33.5	L1-Li
^	179.088k	48.6	+5.8	+0.0	+0.3	+0.0	+0.0	54.7	54.5	+0.2	L1-Li
			+0.0								

51	368.889k	9.0	+5.8	+0.0	+0.2	+0.0	+0.0	15.0	48.5	-33.5	L1-Li
	Ave		+0.0								
^	368.889k	41.8	+5.8	+0.0	+0.2	+0.0	+0.0	47.8	48.5	-0.7	L1-Li
			+0.0								
53	291.078k	11.0	+5.8	+0.0	+0.1	+0.0	+0.0	16.9	50.5	-33.6	L1-Li
	Ave		+0.0								
^	291.077k	44.2	+5.8	+0.0	+0.1	+0.0	+0.0	50.1	50.5	-0.4	L1-Li
			+0.0								
55	247.446k	12.3	+5.8	+0.0	+0.1	+0.0	+0.0	18.2	51.8	-33.6	L1-Li
	Ave		+0.0								
^	247.445k	46.0	+5.8	+0.0	+0.1	+0.0	+0.0	51.9	51.8	+0.1	L1-Li
			+0.0								
57	282.351k	11.1	+5.8	+0.0	+0.1	+0.0	+0.0	17.0	50.7	-33.7	L1-Li
	Ave		+0.0								
^	282.351k	44.4	+5.8	+0.0	+0.1	+0.0	+0.0	50.3	50.7	-0.4	L1-Li
			+0.0								
59	238.719k	12.3	+5.8	+0.0	+0.2	+0.0	+0.0	18.3	52.1	-33.8	L1-Li
	Ave		+0.0								
^	238.719k	46.4	+5.8	+0.0	+0.2	+0.0	+0.0	52.4	52.1	+0.3	L1-Li
			+0.0								
61	206.722k	13.3	+5.8	+0.0	+0.2	+0.0	+0.0	19.3	53.3	-34.0	L1-Li
	Ave		+0.0								
^	206.722k	47.7	+5.8	+0.0	+0.2	+0.0	+0.0	53.7	53.3	+0.4	L1-Li
			+0.0								
63	197.268k	13.4	+5.8	+0.0	+0.2	+0.0	+0.0	19.4	53.7	-34.3	L1-Li
	Ave		+0.0								
^	197.268k	48.0	+5.8	+0.0	+0.2	+0.0	+0.0	54.0	53.7	+0.3	L1-Li
			+0.0								

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **103955** Date: 6/12/2020
 Test Type: **Conducted Emissions** Time: 09:42:00
 Tested By: Don Nguyen Sequence#: 5
 Software: EMITest 5.03.12 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

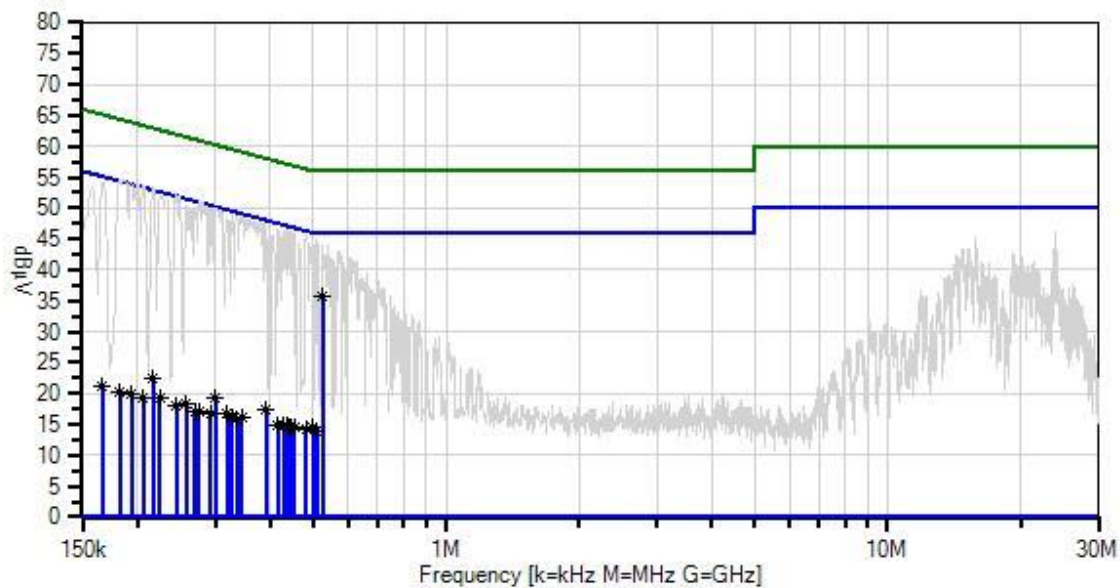
Test Conditions / Notes:

The EUT is placed on test bench. USB port is connected to a touchscreen tablet. The EUT is connected to 5Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitting mode.

Operating frequency: 908MHz (worst case with highest power)
 Frequency of measurement: 150kHz-30MHz
 RBW=9kHz, VBW=30kHz

Site A
 Temperature: 25°C
 Relative Humidity: 46%
 Test Method: ANSI C63.10:2013

Itron, Inc. WO#: 103955 Sequence#: 5 Date: 6/12/2020
15.207 AC Mains - Average Test Lead: 120V 60Hz L2-Neutral



— Sweep Data
× QP Readings
Software Version: 5.03.12

— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average

○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

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	12/24/2019	12/24/2021
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	10/22/2019	10/22/2021
	AN00847.1	50uH LISN-(L) Line 1	3816/2NM	3/10/2020	3/10/2021
T4	AN00847.1	50uH LISN-(N) Line 2	3816/2NM	3/10/2020	3/10/2021
	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2020	3/31/2022
T5	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2020	3/31/2022

Measurement Data:

Reading listed by margin.

Test Lead: L2-Neutral

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	524.510k	29.5	+5.8	+0.0	+0.3	+0.0	+0.0	35.6	46.0	-10.4	L2-Ne
	Ave		+0.0								
^	524.510k	38.0	+5.8	+0.0	+0.3	+0.0	+0.0	44.1	46.0	-1.9	L2-Ne
			+0.0								
3	216.902k	16.6	+5.8	+0.0	+0.2	+0.0	+0.0	22.6	52.9	-30.3	L2-Ne
	Ave		+0.0								
^	216.901k	47.4	+5.8	+0.0	+0.2	+0.0	+0.0	53.4	52.9	+0.5	L2-Ne
			+0.0								
5	390.704k	11.4	+5.8	+0.0	+0.2	+0.0	+0.0	17.4	48.0	-30.6	L2-Ne
	Ave		+0.0								
^	390.704k	41.1	+5.8	+0.0	+0.2	+0.0	+0.0	47.1	48.0	-0.9	L2-Ne
			+0.0								
7	300.531k	13.4	+5.8	+0.0	+0.1	+0.0	+0.0	19.3	50.2	-30.9	L2-Ne
	Ave		+0.0								
^	300.530k	44.1	+5.8	+0.0	+0.1	+0.0	+0.0	50.0	50.2	-0.2	L2-Ne
			+0.0								
9	499.058k	8.4	+5.8	+0.0	+0.3	+0.0	+0.0	14.5	46.0	-31.5	L2-Ne
	Ave		+0.0								
^	499.057k	39.2	+5.8	+0.0	+0.3	+0.0	+0.0	45.3	46.0	-0.7	L2-Ne
			+0.0								
11	482.332k	8.2	+5.8	+0.0	+0.3	+0.0	+0.0	14.3	46.3	-32.0	L2-Ne
	Ave		+0.0								
^	482.332k	39.4	+5.8	+0.0	+0.3	+0.0	+0.0	45.5	46.3	-0.8	L2-Ne
			+0.0								
13	452.517k	8.5	+5.8	+0.0	+0.3	+0.0	+0.0	14.6	46.8	-32.2	L2-Ne
	Ave		+0.0								
^	452.516k	39.9	+5.8	+0.0	+0.3	+0.0	+0.0	46.0	46.8	-0.8	L2-Ne
			+0.0								
15	509.966k	7.7	+5.8	+0.0	+0.3	+0.0	+0.0	13.8	46.0	-32.2	L2-Ne
	Ave		+0.0								
^	509.965k	38.9	+5.8	+0.0	+0.3	+0.0	+0.0	45.0	46.0	-1.0	L2-Ne
			+0.0								
17	434.337k	8.8	+5.8	+0.0	+0.2	+0.0	+0.0	14.8	47.2	-32.4	L2-Ne
	Ave		+0.0								
^	434.336k	40.5	+5.8	+0.0	+0.2	+0.0	+0.0	46.5	47.2	-0.7	L2-Ne
			+0.0								
19	427.792k	8.9	+5.8	+0.0	+0.2	+0.0	+0.0	14.9	47.3	-32.4	L2-Ne
	Ave		+0.0								
^	427.791k	40.2	+5.8	+0.0	+0.2	+0.0	+0.0	46.2	47.3	-1.1	L2-Ne
			+0.0								
21	416.156k	9.0	+5.8	+0.0	+0.2	+0.0	+0.0	15.0	47.5	-32.5	L2-Ne
	Ave		+0.0								
^	416.156k	40.6	+5.8	+0.0	+0.2	+0.0	+0.0	46.6	47.5	-0.9	L2-Ne
			+0.0								
23	445.972k	8.4	+5.8	+0.0	+0.2	+0.0	+0.0	14.4	46.9	-32.5	L2-Ne
	Ave		+0.0								
^	445.971k	40.2	+5.8	+0.0	+0.2	+0.0	+0.0	46.2	46.9	-0.7	L2-Ne
			+0.0								

25	440.881k Ave	8.5	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	14.5	47.0	-32.5	L2-Ne
^	440.881k	40.2	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	46.2	47.0	-0.8	L2-Ne
27	318.711k Ave	10.9	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	16.8	49.7	-32.9	L2-Ne
^	318.710k	42.1	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	48.0	49.7	-1.7	L2-Ne
29	344.890k Ave	10.1	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	16.0	49.1	-33.1	L2-Ne
^	344.890k	42.7	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	48.6	49.1	-0.5	L2-Ne
31	224.901k Ave	13.3	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	19.3	52.6	-33.3	L2-Ne
^	224.901k	45.9	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	51.9	52.6	-0.7	L2-Ne
33	258.353k Ave	12.3	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	18.2	51.5	-33.3	L2-Ne
^	258.352k	44.5	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	50.4	51.5	-1.1	L2-Ne
35	327.437k Ave	10.2	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	16.1	49.5	-33.4	L2-Ne
^	327.437k	43.0	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	48.9	49.5	-0.6	L2-Ne
37	336.164k Ave	10.0	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	15.9	49.3	-33.4	L2-Ne
^	336.163k	42.9	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	48.8	49.3	-0.5	L2-Ne
39	275.806k Ave	11.3	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	17.2	50.9	-33.7	L2-Ne
^	275.805k	45.4	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	51.3	50.9	+0.4	L2-Ne
41	292.531k Ave	10.9	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	16.8	50.5	-33.7	L2-Ne
^	292.531k	44.2	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	50.1	50.5	-0.4	L2-Ne
43	244.536k Ave	12.1	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	18.1	51.9	-33.8	L2-Ne
^	244.535k	46.5	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	52.5	51.9	+0.6	L2-Ne
45	269.261k Ave	11.3	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	17.2	51.1	-33.9	L2-Ne
^	269.260k	43.9	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	49.8	51.1	-1.3	L2-Ne
47	166.725k Ave	15.0	+5.8 +0.0	+0.0	+0.4	+0.0	+0.0	21.2	55.1	-33.9	L2-Ne
^	166.724k	48.0	+5.8 +0.0	+0.0	+0.4	+0.0	+0.0	54.2	55.1	-0.9	L2-Ne
49	194.359k Ave	13.8	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	19.8	53.8	-34.0	L2-Ne
^	194.358k	48.2	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	54.2	53.8	+0.4	L2-Ne

51	205.994k	13.4	+5.8	+0.0	+0.2	+0.0	+0.0	19.4	53.4	-34.0	L2-Ne
	Ave		+0.0								
^	205.993k	47.7	+5.8	+0.0	+0.2	+0.0	+0.0	53.7	53.4	+0.3	L2-Ne
			+0.0								
53	181.996k	14.1	+5.8	+0.0	+0.3	+0.0	+0.0	20.2	54.4	-34.2	L2-Ne
	Ave		+0.0								
^	181.996k	48.7	+5.8	+0.0	+0.3	+0.0	+0.0	54.8	54.4	+0.4	L2-Ne
			+0.0								

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **103955** Date: 6/12/2020
 Test Type: **Conducted Emissions** Time: 10:32:22 AM
 Tested By: Don Nguyen Sequence#: 14
 Software: EMITest 5.03.12 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

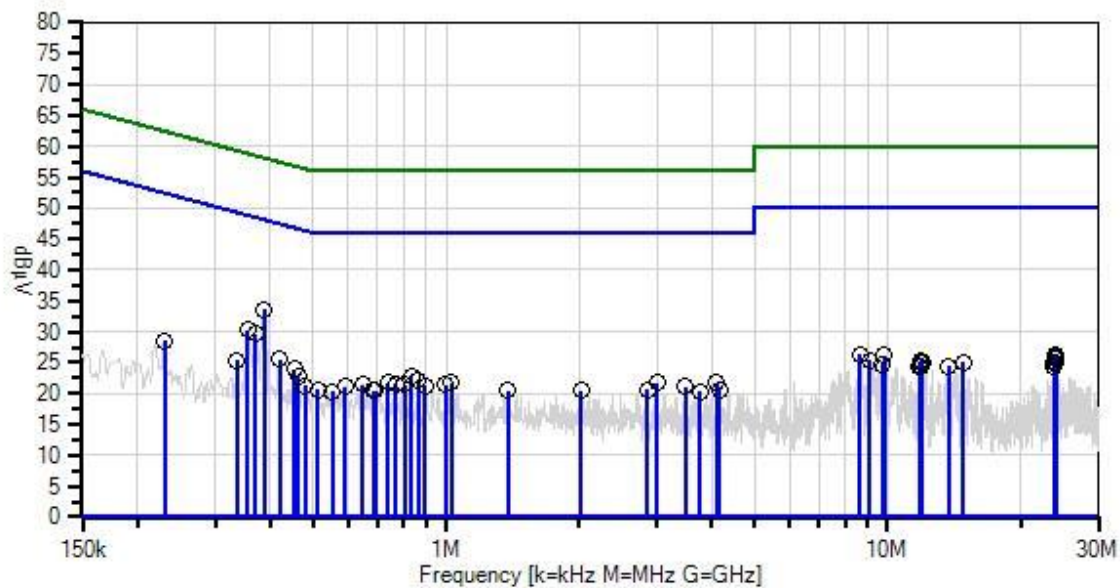
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The EUT is placed on test bench. USB port is connected to a touchscreen tablet. The EUT is connected to 12Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitting mode. Operating frequency: 908MHz (worst case) Frequency of measurement: 150kHz-30MHz RBW=9kHz, VBW=30kHz Site A Temperature: 25°C Relative Humidity: 46% Test Method: ANSI C63.10:2013

Itron, Inc. WO#: 103955 Sequence#: 14 Date: 6/12/2020
15.207 AC Mains - Average Test Lead: 120V 60Hz L1-Line



— Sweep Data
× QP Readings
Software Version: 5.03.12
— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

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	12/24/2019	12/24/2021
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	10/22/2019	10/22/2021
T4	AN00847.1	50uH LISN-(L) Line 1	3816/2NM	3/10/2020	3/10/2021
	AN00847.1	50uH LISN-(N) Line 2	3816/2NM	3/10/2020	3/10/2021
T5	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2020	3/31/2022
	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2020	3/31/2022

Measurement Data:

Reading listed by margin.

Test Lead: L1-Line

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	386.341k	27.6	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	33.6	48.1	-14.5	L1-Li
2	355.072k	24.3	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	30.3	48.8	-18.5	L1-Li
3	370.343k	23.7	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	29.7	48.5	-18.8	L1-Li
4	419.793k	19.5	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	25.5	47.5	-22.0	L1-Li
5	452.517k	17.8	+5.8 +0.0	+0.0	+0.3	+0.0	+0.0	23.9	46.8	-22.9	L1-Li
6	834.300k	16.6	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	22.8	46.0	-23.2	L1-Li
7	463.425k	16.8	+5.8 +0.0	+0.0	+0.3	+0.0	+0.0	22.9	46.6	-23.7	L1-Li
8	8.652M	19.8	+5.8 +0.2	+0.3	+0.1	+0.1	+0.0	26.3	50.0	-23.7	L1-Li
9	229.992k	22.6	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	28.6	52.4	-23.8	L1-Li
10	865.570k	16.0	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	22.2	46.0	-23.8	L1-Li
11	23.977M	18.9	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	26.2	50.0	-23.8	L1-Li
12	336.164k	19.5	+5.8 +0.0	+0.0	+0.1	+0.0	+0.0	25.4	49.3	-23.9	L1-Li
13	9.833M	19.4	+5.8 +0.2	+0.3	+0.2	+0.2	+0.0	26.1	50.0	-23.9	L1-Li
14	24.025M	18.6	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	25.9	50.0	-24.1	L1-Li
15	738.309k	15.6	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.8	46.0	-24.2	L1-Li
16	1.026M	15.7	+5.8 +0.0	+0.1	+0.2	+0.0	+0.0	21.8	46.0	-24.2	L1-Li
17	2.999M	15.6	+5.8 +0.1	+0.1	+0.2	+0.0	+0.0	21.8	46.0	-24.2	L1-Li
18	4.088M	15.4	+5.8 +0.1	+0.2	+0.1	+0.1	+0.0	21.7	46.0	-24.3	L1-Li
19	23.909M	18.4	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	25.7	50.0	-24.3	L1-Li
20	768.852k	15.4	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.6	46.0	-24.4	L1-Li
21	803.758k	15.3	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.5	46.0	-24.5	L1-Li
22	24.046M	18.2	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	25.5	50.0	-24.5	L1-Li
23	648.136k	15.2	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.4	46.0	-24.6	L1-Li
24	996.281k	15.3	+5.8 +0.0	+0.1	+0.2	+0.0	+0.0	21.4	46.0	-24.6	L1-Li

25	11.950M	18.7	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	25.4	50.0	-24.6	L1-Li
26	9.112M	18.7	+5.8 +0.2	+0.3	+0.2	+0.1	+0.0	25.3	50.0	-24.7	L1-Li
27	894.215k	15.0	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.2	46.0	-24.8	L1-Li
28	591.414k	14.9	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.1	46.0	-24.9	L1-Li
29	3.480M	14.9	+5.8 +0.1	+0.1	+0.1	+0.1	+0.0	21.1	46.0	-24.9	L1-Li
30	11.860M	18.4	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	25.1	50.0	-24.9	L1-Li
31	11.977M	18.3	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	25.0	50.0	-25.0	L1-Li
32	14.860M	18.2	+5.8 +0.4	+0.3	+0.2	+0.1	+0.0	25.0	50.0	-25.0	L1-Li
33	479.424k	15.1	+5.8 +0.0	+0.0	+0.3	+0.0	+0.0	21.2	46.3	-25.1	L1-Li
34	23.813M	17.6	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	24.9	50.0	-25.1	L1-Li
35	23.929M	17.6	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	24.9	50.0	-25.1	L1-Li
36	9.743M	18.1	+5.8 +0.2	+0.3	+0.2	+0.2	+0.0	24.8	50.0	-25.2	L1-Li
37	512.148k	14.6	+5.8 +0.0	+0.0	+0.3	+0.0	+0.0	20.7	46.0	-25.3	L1-Li
38	2.863M	14.4	+5.8 +0.1	+0.1	+0.2	+0.0	+0.0	20.6	46.0	-25.4	L1-Li
39	4.169M	14.3	+5.8 +0.1	+0.2	+0.1	+0.1	+0.0	20.6	46.0	-25.4	L1-Li
40	23.861M	17.2	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	24.5	50.0	-25.5	L1-Li
41	1.379M	14.3	+5.8 +0.0	+0.1	+0.2	+0.0	+0.0	20.4	46.0	-25.6	L1-Li
42	691.768k	14.2	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	20.4	46.0	-25.6	L1-Li
43	685.223k	14.2	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	20.4	46.0	-25.6	L1-Li
44	13.761M	17.6	+5.8 +0.4	+0.3	+0.2	+0.1	+0.0	24.4	50.0	-25.6	L1-Li
45	11.797M	17.7	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	24.4	50.0	-25.6	L1-Li
46	2.021M	14.3	+5.8 +0.0	+0.1	+0.2	+0.0	+0.0	20.4	46.0	-25.6	L1-Li
47	553.599k	14.1	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	20.3	46.0	-25.7	L1-Li
48	3.765M	14.1	+5.8 +0.1	+0.1	+0.1	+0.1	+0.0	20.3	46.0	-25.7	L1-Li
49	11.833M	17.6	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	24.3	50.0	-25.7	L1-Li
50	11.815M	17.5	+5.8 +0.3	+0.3	+0.2	+0.1	+0.0	24.2	50.0	-25.8	L1-Li

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **103955** Date: 6/12/2020
 Test Type: **Conducted Emissions** Time: 10:30:32 AM
 Tested By: Don Nguyen Sequence#: 13
 Software: EMITest 5.03.12 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

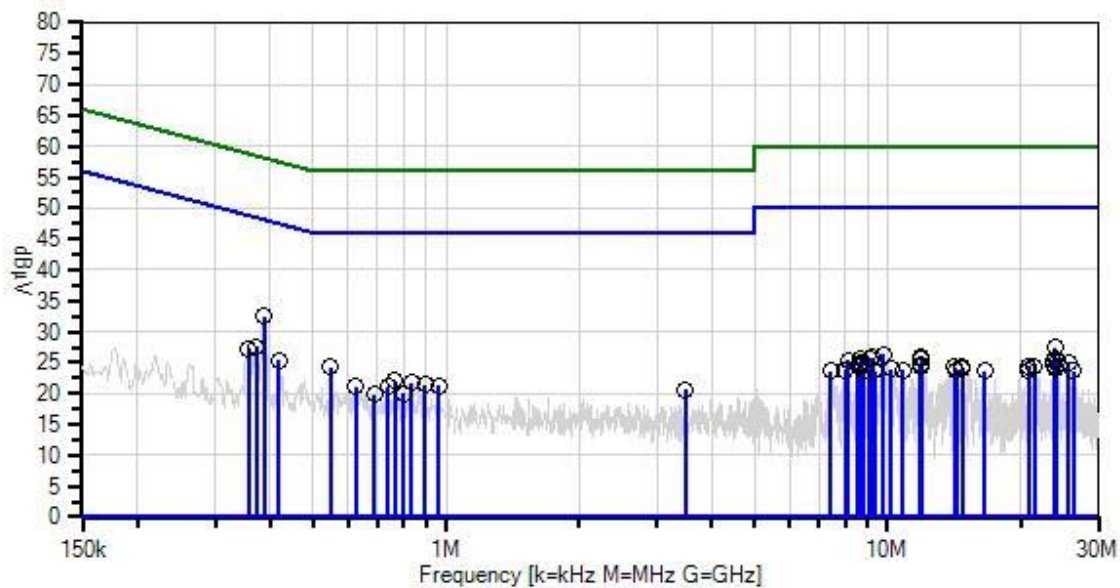
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The EUT is placed on test bench. USB port is connected to a touchscreen tablet. The EUT is connected to 12Vdc charger. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitting mode. Operating frequency: 908MHz (worst case) Frequency of measurement: 150kHz-30MHz RBW=9kHz, VBW=30kHz Site A Temperature: 25°C Relative Humidity: 46% Test Method: ANSI C63.10:2013

Itron, Inc. WO#: 103955 Sequence#: 13 Date: 6/12/2020
15.207 AC Mains - Average Test Lead: 120V 60Hz L2-Neutral



— Sweep Data
× QP Readings
Software Version: 5.03.12
— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

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	12/24/2019	12/24/2021
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	10/22/2019	10/22/2021
	AN00847.1	50uH LISN-(L) Line 1	3816/2NM	3/10/2020	3/10/2021
T4	AN00847.1	50uH LISN-(N) Line 2	3816/2NM	3/10/2020	3/10/2021
	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2020	3/31/2022
T5	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2020	3/31/2022

Measurement Data:

Reading listed by margin.

Test Lead: L2-Neutral

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	387.069k	26.5	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	32.5	48.1	-15.6	L2-Ne
2	371.070k	21.6	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	27.6	48.5	-20.9	L2-Ne
3	356.526k	21.2	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	27.2	48.8	-21.6	L2-Ne
4	546.327k	18.1	+5.8 +0.0	+0.0	+0.3	+0.0	+0.0	24.2	46.0	-21.8	L2-Ne
5	417.611k	19.4	+5.8 +0.0	+0.0	+0.2	+0.0	+0.0	25.4	47.5	-22.1	L2-Ne
6	23.977M	19.9	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	27.4	50.0	-22.6	L2-Ne
7	9.770M	19.5	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	26.3	50.0	-23.7	L2-Ne
8	766.670k	15.7	+5.8 +0.1	+0.1	+0.3	+0.0	+0.0	22.0	46.0	-24.0	L2-Ne
9	833.573k	15.5	+5.8 +0.1	+0.1	+0.3	+0.0	+0.0	21.8	46.0	-24.2	L2-Ne
10	9.256M	19.0	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	25.8	50.0	-24.2	L2-Ne
11	11.950M	18.9	+5.8 +0.4	+0.3	+0.2	+0.2	+0.0	25.8	50.0	-24.2	L2-Ne
12	8.697M	19.1	+5.8 +0.3	+0.3	+0.1	+0.1	+0.0	25.7	50.0	-24.3	L2-Ne
13	9.139M	18.9	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	25.7	50.0	-24.3	L2-Ne
14	11.905M	18.8	+5.8 +0.4	+0.3	+0.2	+0.2	+0.0	25.7	50.0	-24.3	L2-Ne
15	894.215k	15.2	+5.8 +0.1	+0.1	+0.3	+0.0	+0.0	21.5	46.0	-24.5	L2-Ne
16	9.121M	18.7	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	25.5	50.0	-24.5	L2-Ne
17	23.888M	18.0	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	25.5	50.0	-24.5	L2-Ne
18	8.121M	18.8	+5.8 +0.3	+0.2	+0.1	+0.1	+0.0	25.3	50.0	-24.7	L2-Ne
19	962.259k	15.1	+5.8 +0.1	+0.1	+0.2	+0.0	+0.0	21.3	46.0	-24.7	L2-Ne
20	24.162M	17.8	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	25.3	50.0	-24.7	L2-Ne
21	23.833M	17.8	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	25.3	50.0	-24.7	L2-Ne
22	739.764k	14.9	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.1	46.0	-24.9	L2-Ne
23	623.411k	14.9	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	21.1	46.0	-24.9	L2-Ne
24	25.724M	17.5	+5.8 +0.9	+0.4	+0.2	+0.3	+0.0	25.1	50.0	-24.9	L2-Ne

25	8.652M	18.5	+5.8 +0.3	+0.3	+0.1	+0.1	+0.0	25.1	50.0	-24.9	L2-Ne
26	23.813M	17.3	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	24.8	50.0	-25.2	L2-Ne
27	8.625M	18.1	+5.8 +0.3	+0.3	+0.1	+0.1	+0.0	24.7	50.0	-25.3	L2-Ne
28	11.860M	17.8	+5.8 +0.4	+0.3	+0.2	+0.2	+0.0	24.7	50.0	-25.3	L2-Ne
29	3.480M	14.4	+5.8 +0.1	+0.1	+0.1	+0.1	+0.0	20.6	46.0	-25.4	L2-Ne
30	20.887M	17.2	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	24.5	50.0	-25.5	L2-Ne
31	11.842M	17.5	+5.8 +0.4	+0.3	+0.2	+0.2	+0.0	24.4	50.0	-25.6	L2-Ne
32	24.094M	16.9	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	24.4	50.0	-25.6	L2-Ne
33	21.535M	16.9	+5.8 +0.8	+0.4	+0.2	+0.2	+0.0	24.3	50.0	-25.7	L2-Ne
34	8.580M	17.6	+5.8 +0.3	+0.3	+0.1	+0.1	+0.0	24.2	50.0	-25.8	L2-Ne
35	14.166M	17.2	+5.8 +0.5	+0.3	+0.2	+0.2	+0.0	24.2	50.0	-25.8	L2-Ne
36	14.743M	17.2	+5.8 +0.5	+0.3	+0.2	+0.2	+0.0	24.2	50.0	-25.8	L2-Ne
37	800.849k	13.7	+5.8 +0.1	+0.1	+0.3	+0.0	+0.0	20.0	46.0	-26.0	L2-Ne
38	24.073M	16.5	+5.8 +0.8	+0.4	+0.2	+0.3	+0.0	24.0	50.0	-26.0	L2-Ne
39	686.678k	13.7	+5.8 +0.0	+0.1	+0.3	+0.0	+0.0	19.9	46.0	-26.1	L2-Ne
40	10.184M	17.1	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	23.9	50.0	-26.1	L2-Ne
41	14.797M	16.9	+5.8 +0.5	+0.3	+0.2	+0.2	+0.0	23.9	50.0	-26.1	L2-Ne
42	10.842M	17.0	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	23.8	50.0	-26.2	L2-Ne
43	8.004M	17.3	+5.8 +0.3	+0.2	+0.1	+0.1	+0.0	23.8	50.0	-26.2	L2-Ne
44	20.869M	16.5	+5.8 +0.7	+0.4	+0.2	+0.2	+0.0	23.8	50.0	-26.2	L2-Ne
45	14.328M	16.8	+5.8 +0.5	+0.3	+0.2	+0.2	+0.0	23.8	50.0	-26.2	L2-Ne
46	8.815M	17.1	+5.8 +0.3	+0.3	+0.1	+0.1	+0.0	23.7	50.0	-26.3	L2-Ne
47	7.436M	17.2	+5.8 +0.3	+0.2	+0.1	+0.1	+0.0	23.7	50.0	-26.3	L2-Ne
48	16.598M	16.6	+5.8 +0.6	+0.3	+0.2	+0.2	+0.0	23.7	50.0	-26.3	L2-Ne
49	9.355M	16.9	+5.8 +0.3	+0.3	+0.2	+0.2	+0.0	23.7	50.0	-26.3	L2-Ne
50	26.396M	16.0	+5.8 +0.9	+0.4	+0.2	+0.3	+0.0	23.6	50.0	-26.4	L2-Ne

Test Setup Photo(s)



Configuration 3



Configuration 3



Configuration 4



Configuration 4

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 $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ 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	($\text{dB}\mu\text{V}$)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

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.