

Ittron, Inc.

REVISED TEST REPORT TO 105444-3

AMR Transceiver Device For Communicating With Utility Meters Models: IMRD-INT and IMRD-EXT

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.249

Report No.: 105444-3A

Date of issue: November 9, 2021



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: 238223

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: 105444

June 21, 2021

June 21-30, 2021 and July 1-9, 2021

August 17 & 20, 2021

Revision History

Original: Testing of the AMR Transceiver Device For Communicating With Utility Meters Models: IMRD-INT and IMRD-EXT to FCC Part 15 Subpart C Section(s) 15.207 & 15.249.

Revision A: To revise the antenna description of the EUT and added limit line to conducted emissions.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E.,
Canyon Park, Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.19

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Canada	Japan
Canyon Park, Bothell, WA	US0103	US1024	3082C	A-0136
Brea, CA	US0103	US1024	3082D	A-0136
Fremont, CA	US0103	US1024	3082B	A-0136
Mariposa, CA	US0103	US1024	3082A	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 / 15.207

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.249(a)	Field Strength of Fundamental	NA	Pass
15.249(a)	Radiated Emissions and 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
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA
Attached Antenna	L-comm	3dBi Rubber Duck	NA
TNC to RMA Adapter	Molex	73386-1250	NA

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-EXT	105444-ext

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA
Ground Plane	Itron, Inc.	4ft	NA
Vehicle Antenna	PCTEL	5dBi Vehicle Mount	NA

Configuration 7

Equipment Tested:

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-INT	105444-int rad

Support Equipment:

Device	Manufacturer	Model #	S/N
Toughpad	Panasonic	FZ-G1	NA
DC Power Supply	Rigol	DP711	NA

Configuration 9

Equipment Tested9

Device	Manufacturer	Model #	S/N
AMR transceiver device for communicating with utility meters	Itron, Inc.	IMRD-INT	105444-int rad

Support Equipment:

Device	Manufacturer	Model #	S/N
AC-USB Adapter	ELJINTEK. INC	GUSB05	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Modulation Type(s):	FSK
Maximum Duty Cycle:	Assume 100% as worst case
Antenna Type(s) and Gain:	Internal PIFA 1.2 dBi External Omni Vehicle 5 dBi External Omni Attached 3dBi
Antenna Connection Type:	Internal and External variant
Nominal Input Voltage:	120VAC 60Hz to AC Adapter on Internal Unit 13.8V DC on External Unit
Firmware / Software used for Test:	DSP Version 7.00.00.26 / FPGA Version 3.08 / MC3 Test v 4.0.3.5 DSP Version 7.00.00.28 for Hopping Tests

EUT Photo(s)



Support Equipment Photo(s)



AC-USB Adapter



Attached Antenna with adapter



DC Power Supply



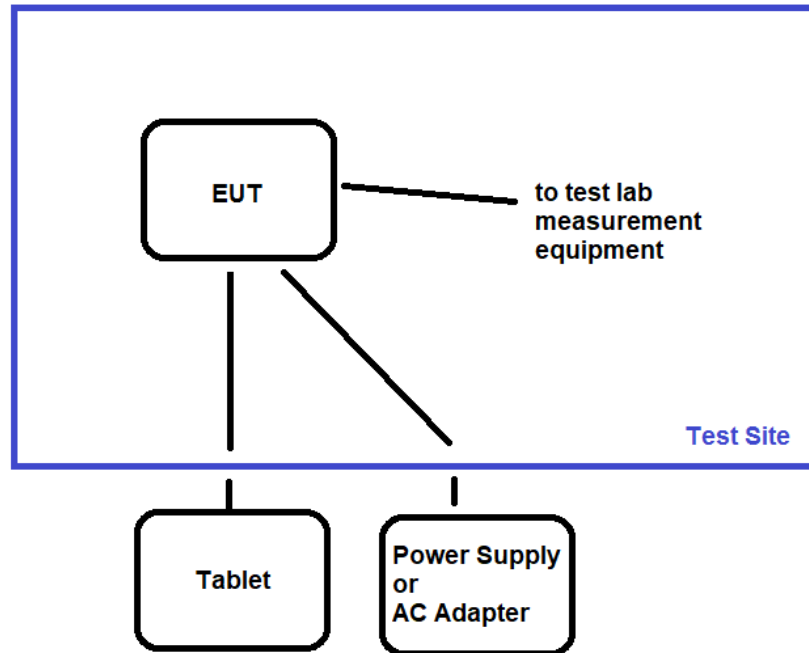
External Antenna + Ground Plane



Tablet

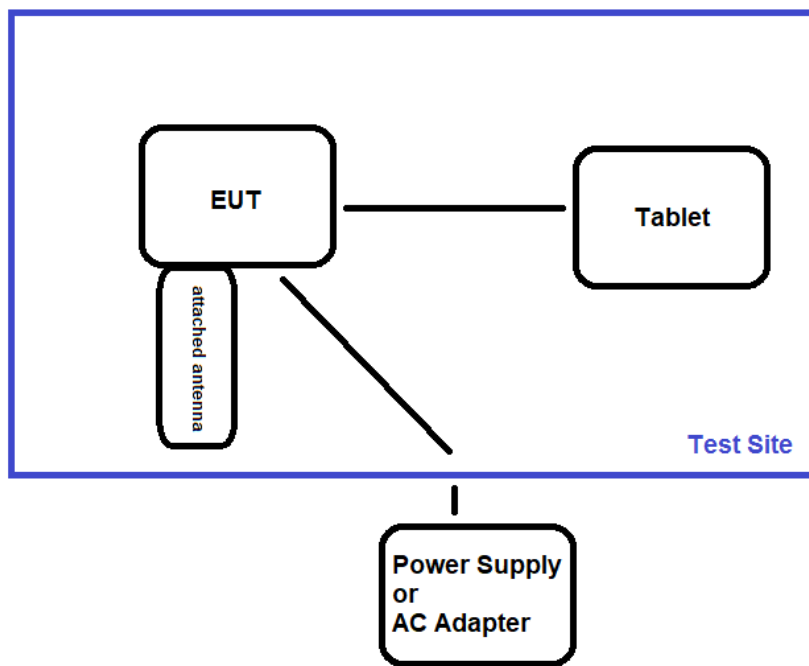
Block Diagram of Test Setup(s)

Test Setup Block Diagram



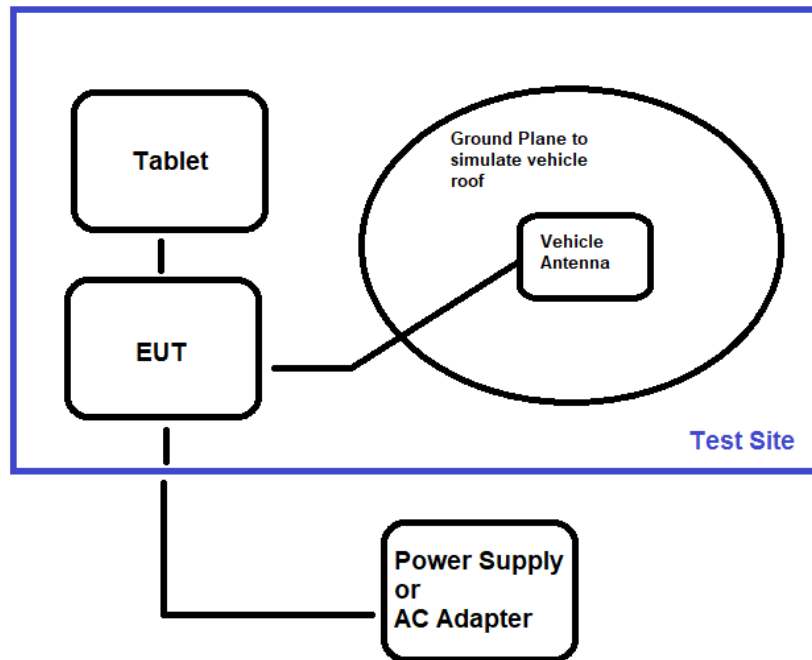
Configuration 1

Test Setup Block Diagram



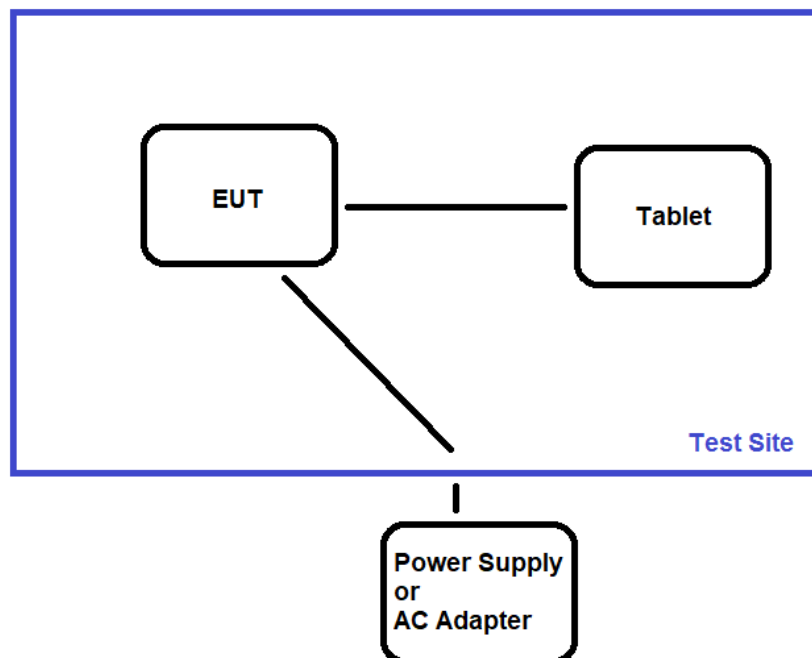
Configuration 3

Test Setup Block Diagram



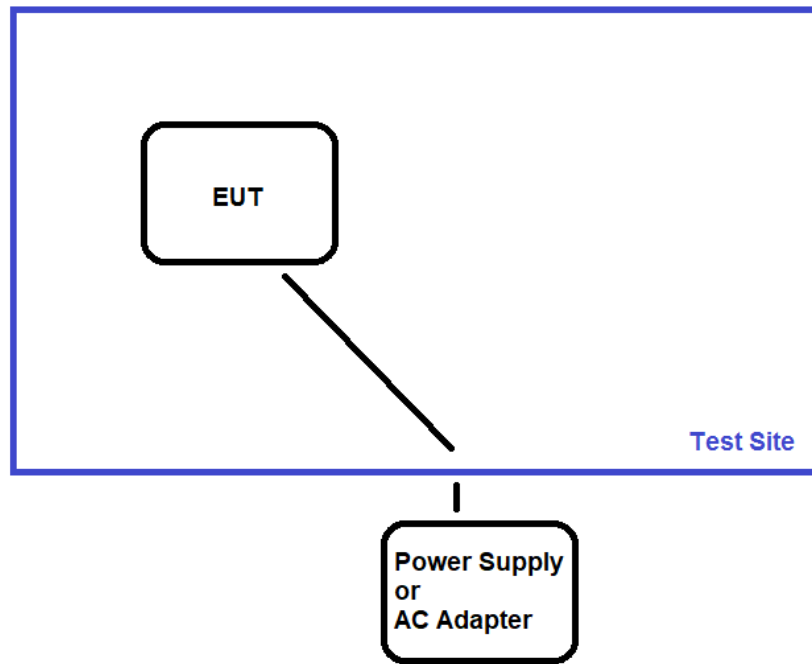
Configuration 5

Test Setup Block Diagram



Configuration 7

Test Setup Block Diagram



Configuration 9

FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

Test Setup/Conditions			
Test Location:	Canyon Park Lab B2	Test Engineer:	M. Atkinson/M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	6/21/2021 to 6/23/2021
Configuration:	1		
Test Setup:	EUT directly connected to spectrum analyzer through appropriate cables and attenuators. EUT is continuously transmitting with modulation.		

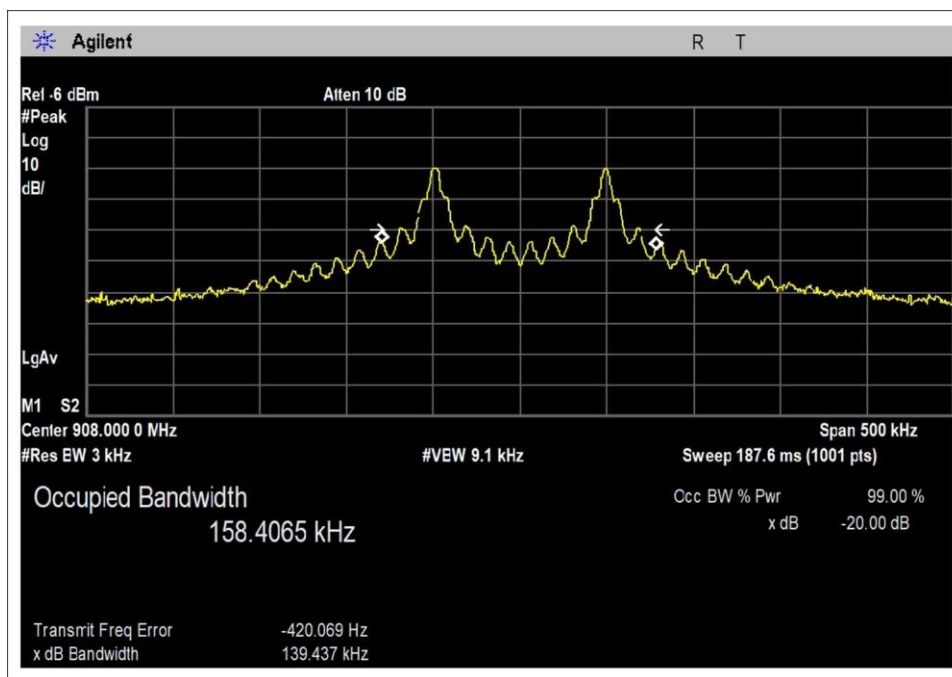
Environmental Conditions			
Temperature (°C)	24	Relative Humidity (%):	40

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02871	Spectrum Analyzer	Agilent	E4440A	3/12/2020	3/12/2022
P07670	Attenuator	Pasternack	PE7389-20	8/20/2020	8/20/2022
P06454	Cable	Andrews	Heliac	1/20/2020	1/20/2022

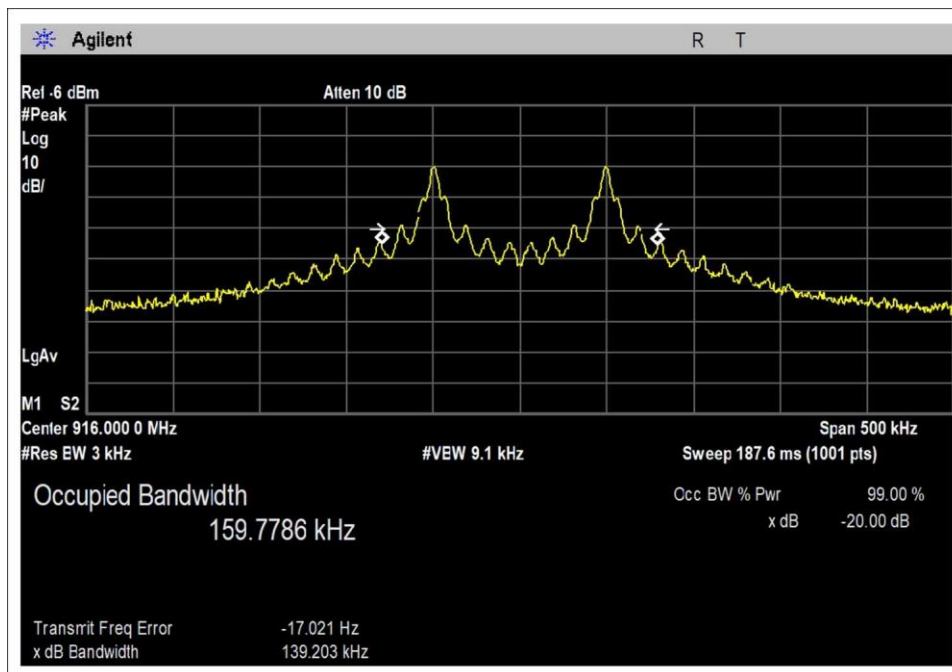
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
908	1	FSK	139.437	None	NA
916	1	FSK	139.203	None	NA
924	1	FSK	139.513	None	NA

NA = Not applicable, because FCC 15.215 does not give any limits so there is no criteria for pass or fail.

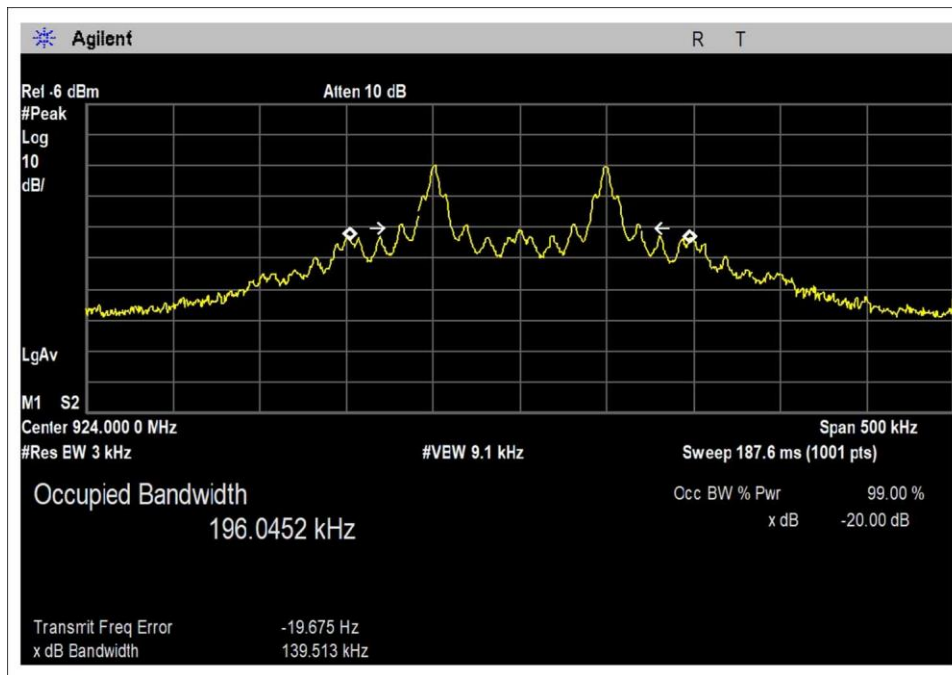
Plot(s)



Low Channel

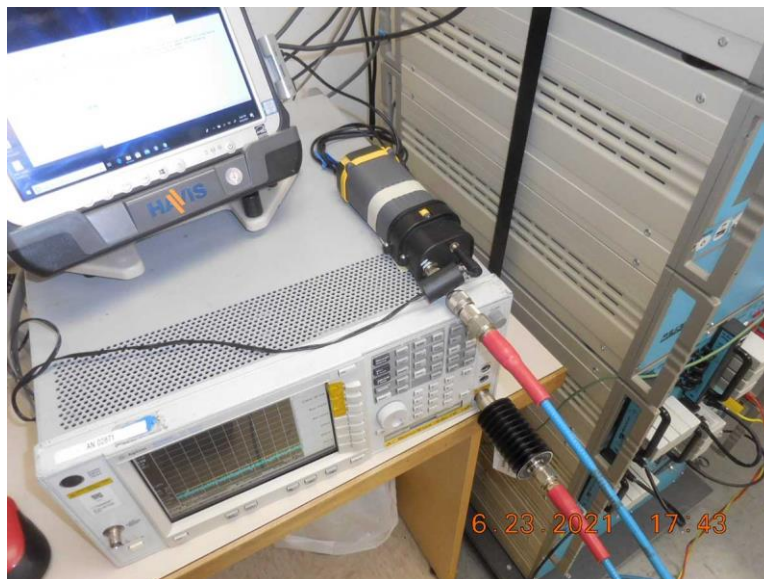


Middle Channel



High Channel

Test Setup Photo(s)



15.249(a) Field Strength of Fundamental

Test Equipment Not Included on Datasheets

Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06996	Multimeter	Fluke	87-5	6/16/2020	6/16/2022
P07527	Variac	Simpson	NA	1/27/2021	1/27/2023
02272	Power Source, AC	California Instruments	1251WP	1/18/2021	1/18/2023
P07355	Power Supply	YescomUSA	DCP305D	3/3/2020	3/3/2022
P06123	Attenuator	Aeroflex	18N-6	4/2/2021	4/2/2023

Test Data Summary - Voltage Variations

Frequency (MHz)	Modulation / Ant Port	V _{Minimum} (dBuV/m)	V _{Nominal} (dBuV/m)	V _{Maximum} (dBuV/m)	Max Deviation from V _{Nominal} (dB)
908	FSK / (Internal Ant Version)	93.4	93.4	93.3	0.1
908	FSK / (External Ant Version)	93.0	93.0	93.0	0.0

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

Parameter Definitions (Internal Antenna Version):

Measurements performed at input voltage V_{Nominal} ± 15%.

Parameter	Value
V _{Nominal} :	120 VAC
V _{Minimum} :	102.00 VAC
V _{Maximum} :	138.00 VAC

Parameter Definitions (External Antenna Version):

Measurements performed at input voltage V_{Nominal} ± 15%.

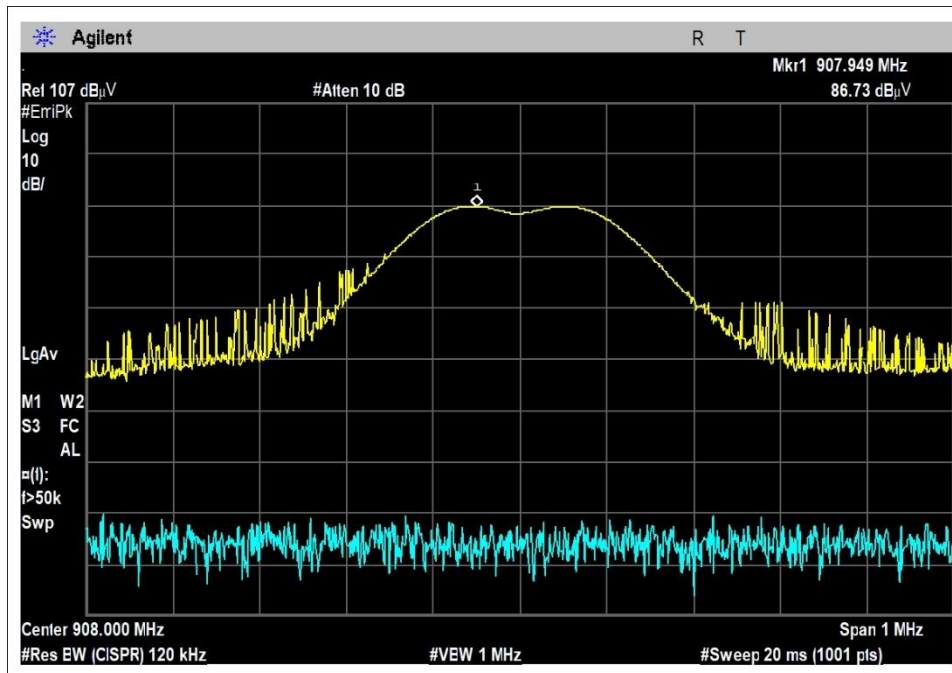
Parameter	Value
V _{Nominal} :	13.8VDC
V _{Minimum} :	11.7VDC
V _{Maximum} :	15.9VDC

Test Data Summary – Radiated Field Strength Measurement

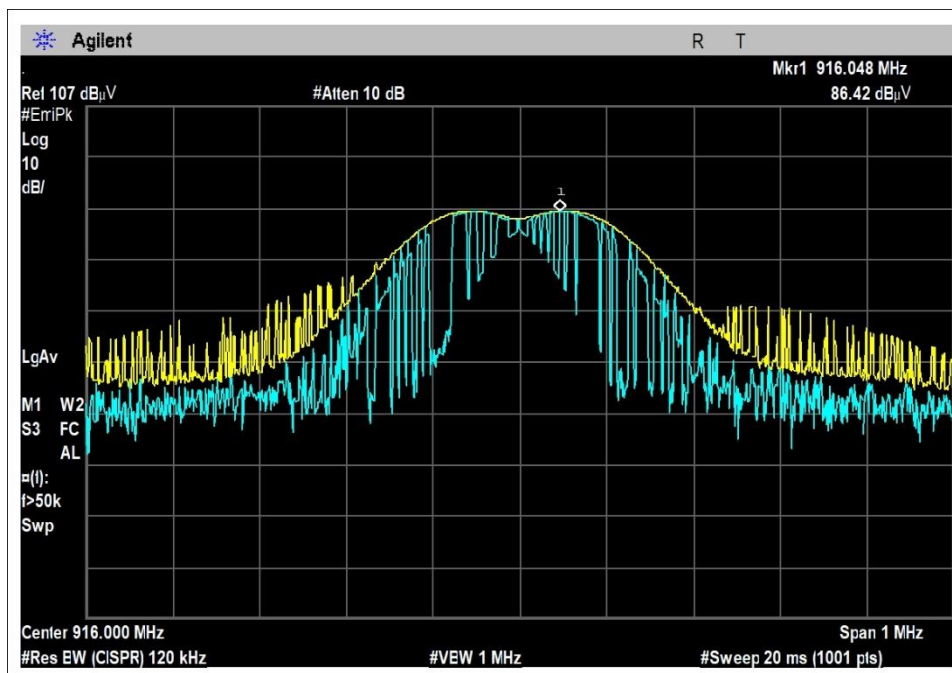
Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 3m)	Limit (dBuV/m @ 3m)	Results
908	FSK	External Attached	93.0	≤94	Pass
916	FSK	External Attached	93.0	≤94	Pass
924	FSK	External Attached	92.8	≤94	Pass
908	FSK	External Vehicle	91.9	≤94	Pass
916	FSK	External Vehicle	91.5	≤94	Pass
924	FSK	External Vehicle	92.3	≤94	Pass
908	FSK	Internal	93.4	≤94	Pass
916	FSK	Internal	93.5	≤94	Pass
924	FSK	Internal	93.4	≤94	Pass

Plot(s)

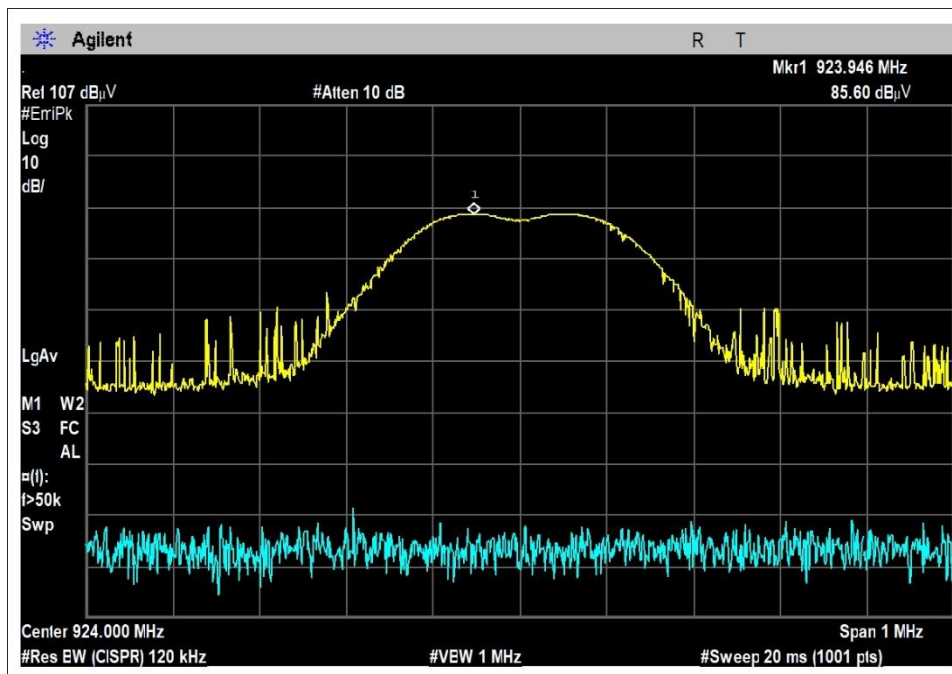
Configuration 3



Low Channel

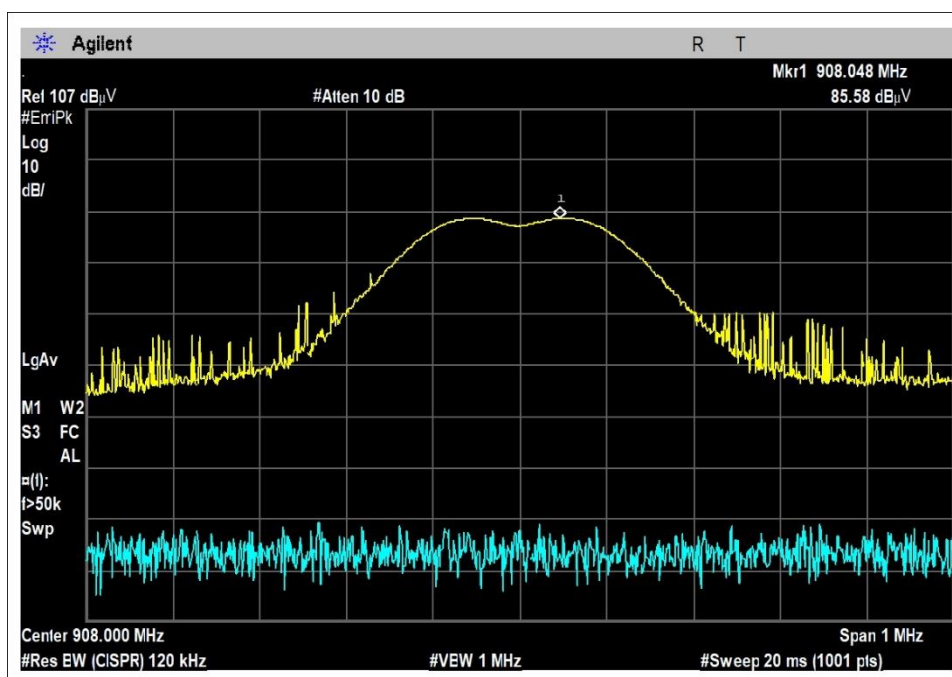


Middle Channel

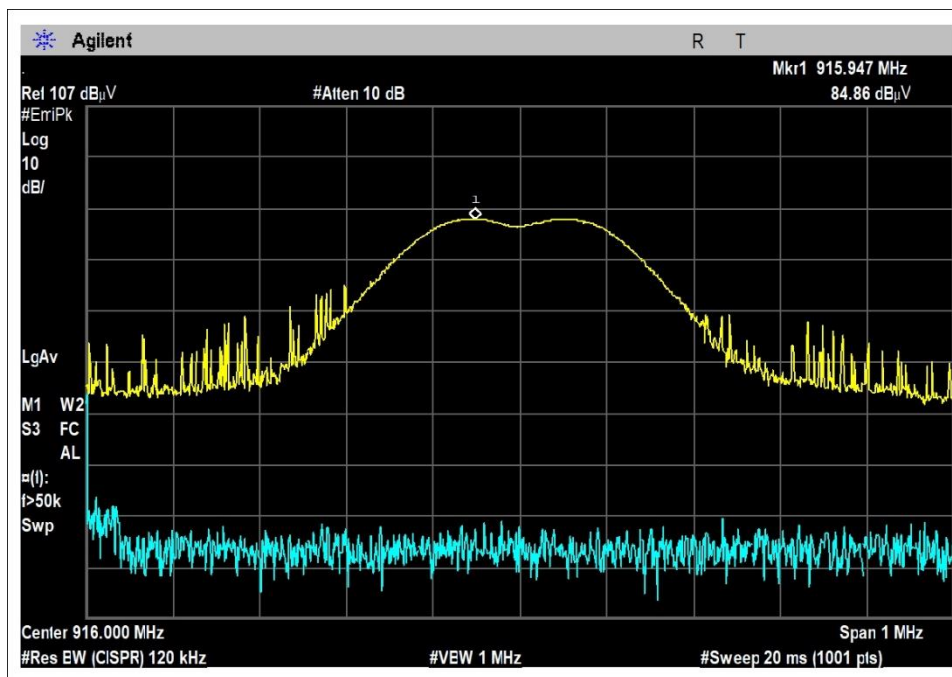


High Channel

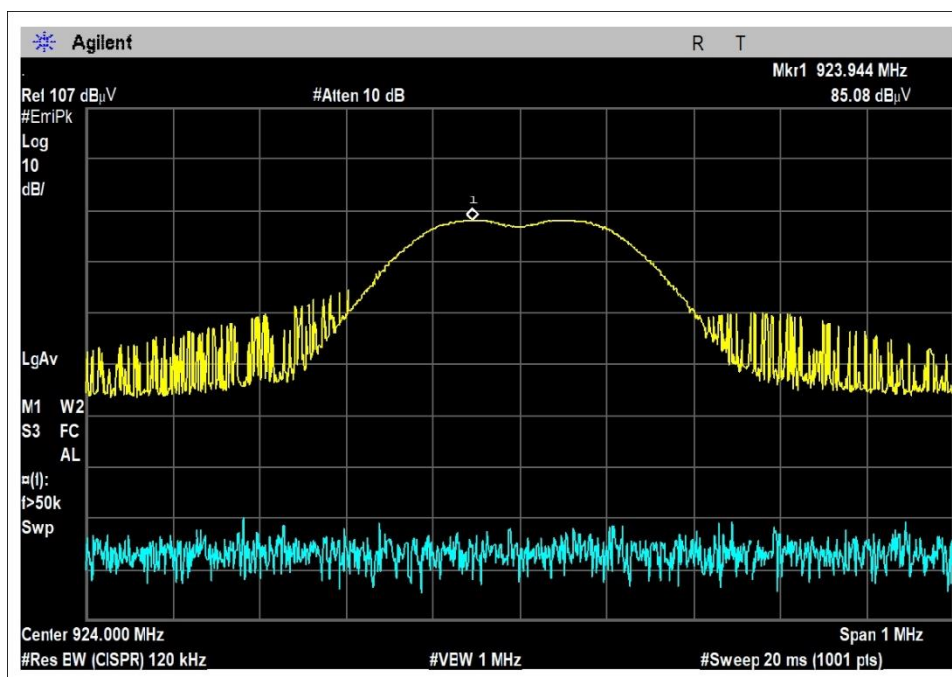
Configuration 5



Low Channel

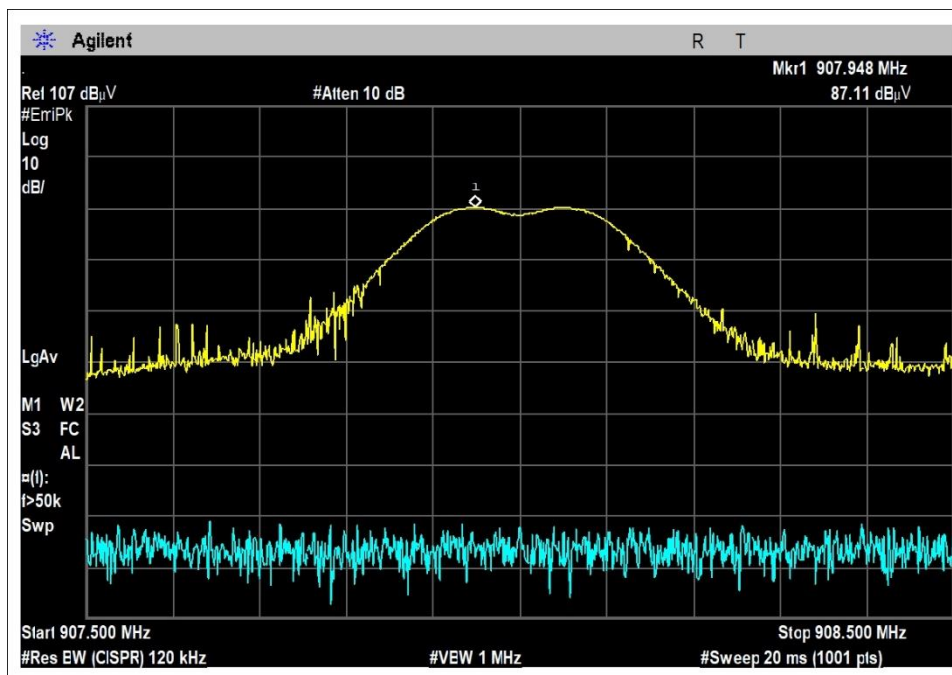


Middle Channel

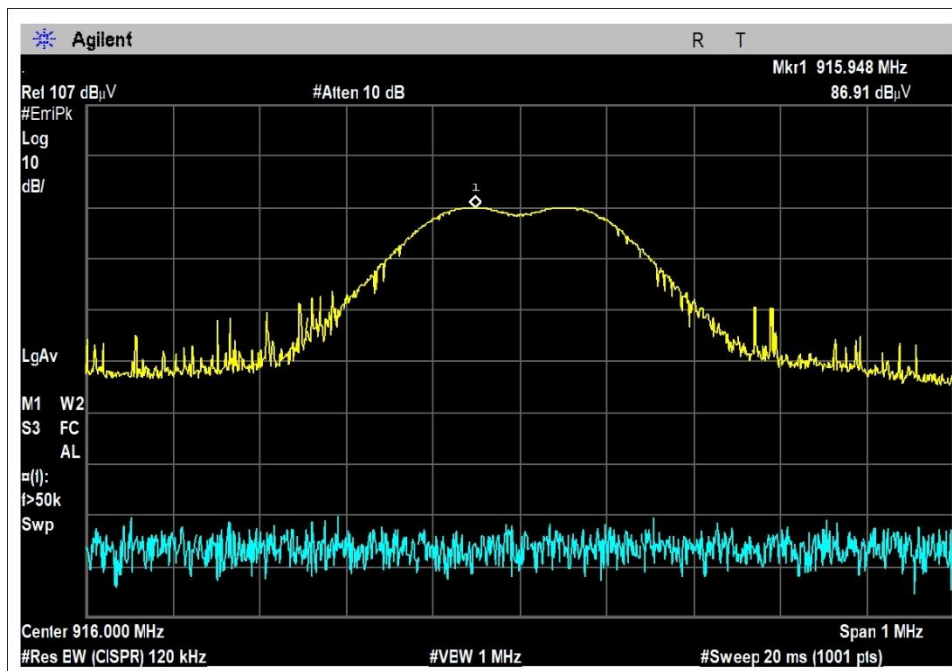


High Channel

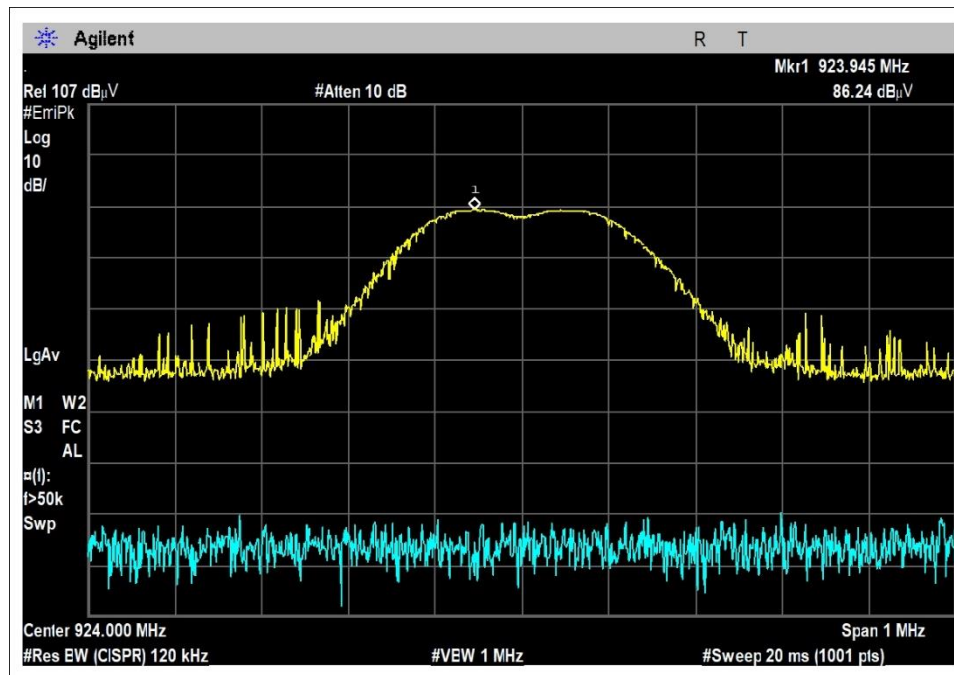
Configuration 7



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 8/17/2021
 Test Type: **Maximized Emissions** Time: 15:50:51
 Tested By: M. Harrison/M. Atkinson Sequence#: 12
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

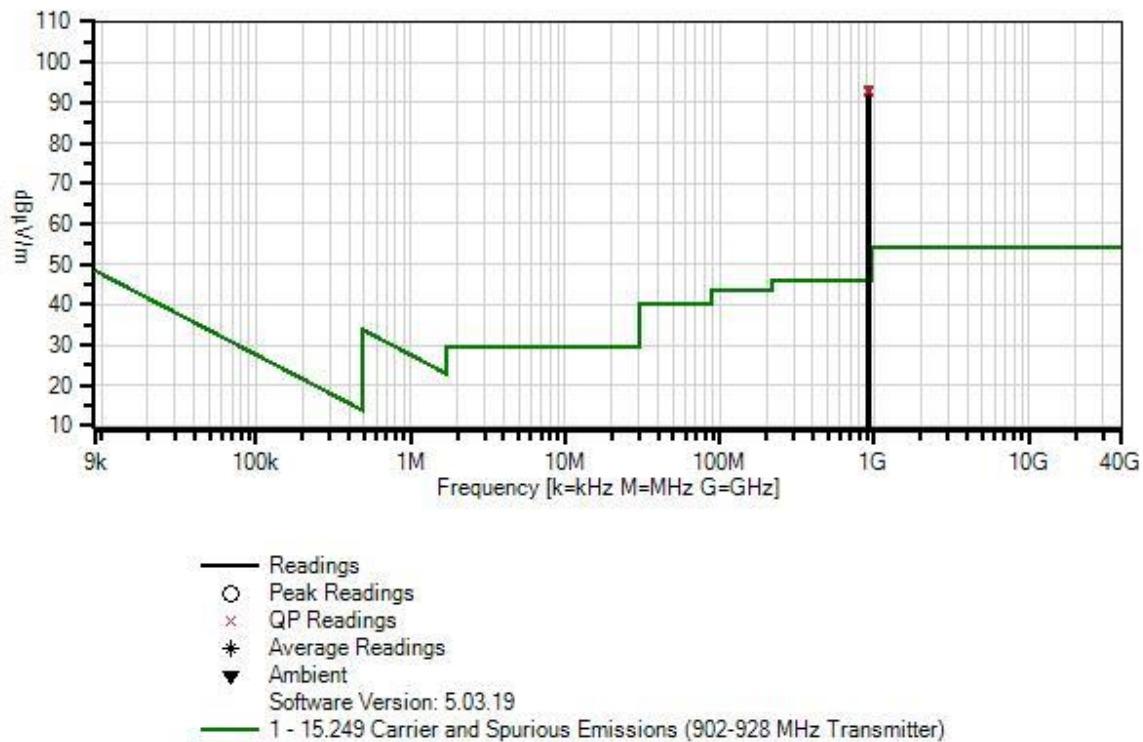
EUT with external attached antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 48

Relative Humidity (%): 22

Itron, Inc. W/O#: 105444 Sequence#: 12 Date: 8/17/2021
 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	ANP06540	Cable	Helix	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

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	907.949M	86.7	+0.3 +29.8	-27.3	+1.4	+2.1	+0.0	93.0	94.0	-1.0	Vert
^	907.949M	86.7	+0.3 +29.8	-27.3	+1.4	+2.1	+0.0	93.0	94.0	-1.0	Vert
3	916.048M	86.4	+0.4 +29.9	-27.3	+1.5	+2.1	+0.0	93.0	94.0	-1.0	Vert
^	916.048M	86.4	+0.4 +29.9	-27.3	+1.5	+2.1	+0.0	93.0	94.0	-1.0	Vert
5	923.946M	85.6	+0.4 +30.3	-27.2	+1.5	+2.2	+0.0	92.8	94.0	-1.2	Vert
^	923.946M	85.6	+0.4 +30.3	-27.2	+1.5	+2.2	+0.0	92.8	94.0	-1.2	Vert

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 8/17/2021
 Test Type: **Maximized Emissions** Time: 16:09:41
 Tested By: M. Harrison/M. Atkinson Sequence#: 11
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

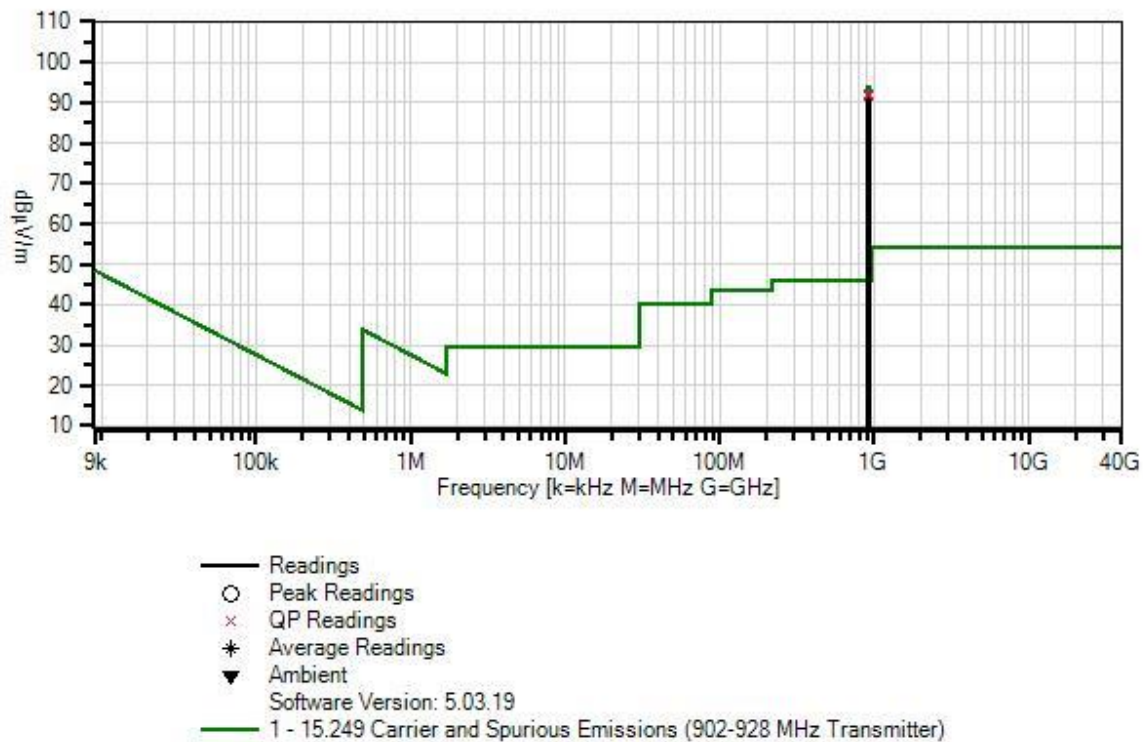
EUT with external vehicle antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 48

Relative Humidity (%): 22

Itron, Inc. W/O#: 105444 Sequence#: 11 Date: 8/17/2021
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	ANP06540	Cable	Helix	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

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	923.944M	85.1	+0.4 +30.3	-27.2	+1.5	+2.2	+0.0	92.3	94.0	-1.7	Vert
^	923.944M	85.1	+0.4 +30.3	-27.2	+1.5	+2.2	+0.0	92.3	94.0	-1.7	Vert
3	908.048M	85.6	+0.3 +29.8	-27.3	+1.4	+2.1	+0.0	91.9	94.0	-2.1	Vert
^	908.048M	85.6	+0.3 +29.8	-27.3	+1.4	+2.1	+0.0	91.9	94.0	-2.1	Vert
5	915.947M	84.9	+0.4 +29.9	-27.3	+1.5	+2.1	+0.0	91.5	94.0	-2.5	Vert
^	915.947M	84.9	+0.4 +29.9	-27.3	+1.5	+2.1	+0.0	91.5	94.0	-2.5	Vert

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 8/17/2021
 Test Type: **Maximized Emissions** Time: 15:12:04
 Tested By: M. Harrison/M. Atkinson Sequence#: 12
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

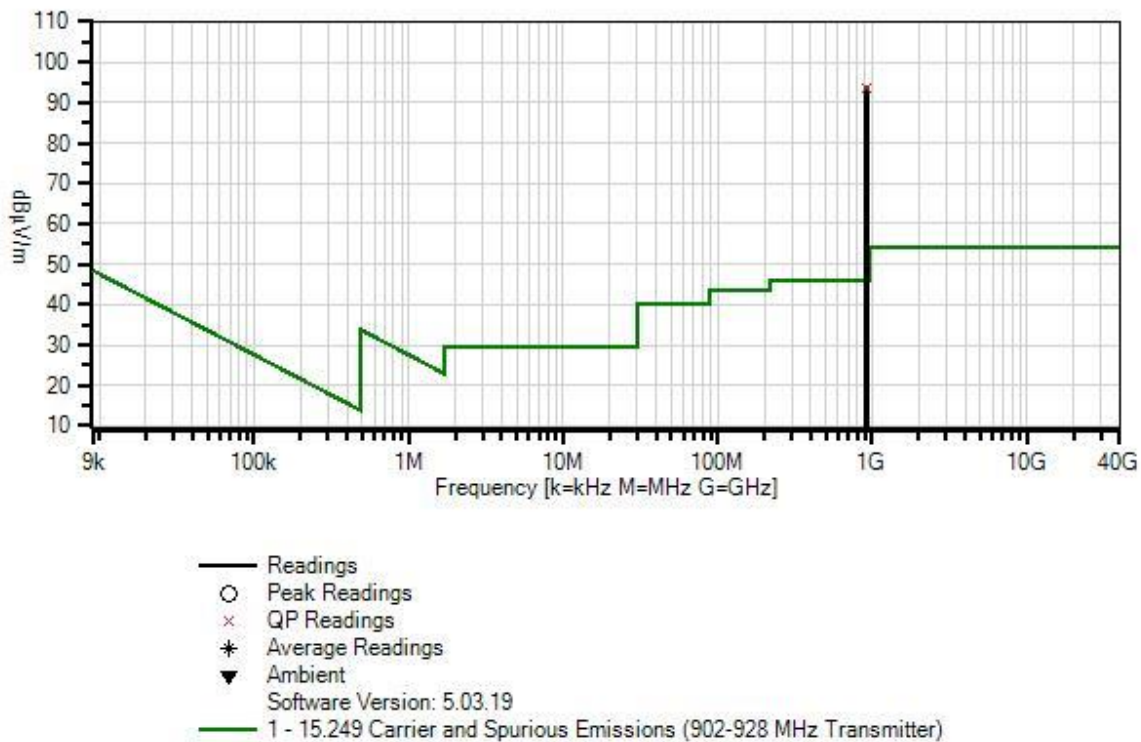
EUT with integral antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 48

Relative Humidity (%): 22

Itron, Inc. W/O#: 105444 Sequence#: 12 Date: 8/17/2021
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	ANP06540	Cable	Helix	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
	AN02871	Spectrum Analyzer	E4440A	3/12/2020	3/12/2022
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	T5 dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	915.948M	86.9	+0.4	-27.3	+1.5	+2.1	+0.0	93.5	94.0	-0.5	Vert
	QP		+29.9								
^	915.948M	86.9	+0.4	-27.3	+1.5	+2.1	+0.0	93.5	94.0	-0.5	Vert
			+29.9								
3	923.947M	86.2	+0.4	-27.2	+1.5	+2.2	+0.0	93.4	94.0	-0.6	Vert
	QP		+30.3								
^	923.947M	86.2	+0.4	-27.2	+1.5	+2.2	+0.0	93.4	94.0	-0.6	Vert
			+30.3								
5	907.948M	87.1	+0.3	-27.3	+1.4	+2.1	+0.0	93.4	94.0	-0.6	Vert
	QP		+29.8								
^	907.948M	87.1	+0.3	-27.3	+1.4	+2.1	+0.0	93.4	94.0	-0.6	Vert
			+29.8								

Test Setup Photo(s)

Configuration 3



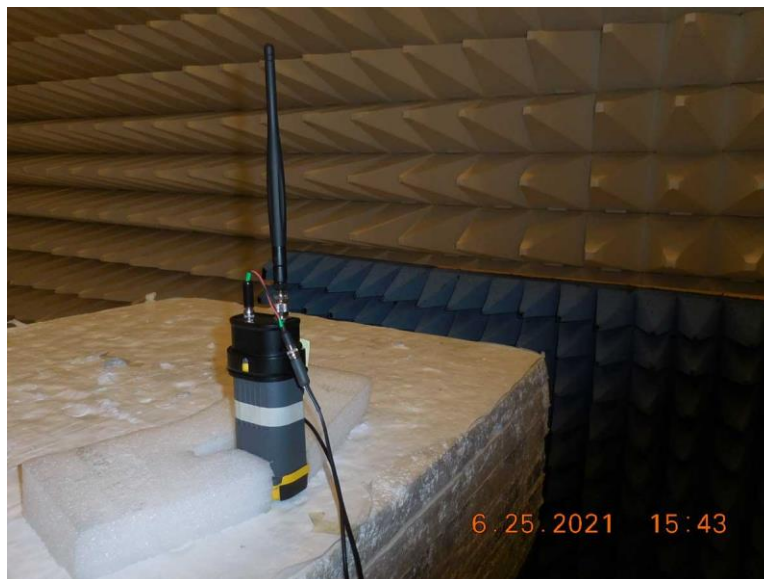
X Axis, View #1



X Axis, View #2



Y Axis



Z Axis

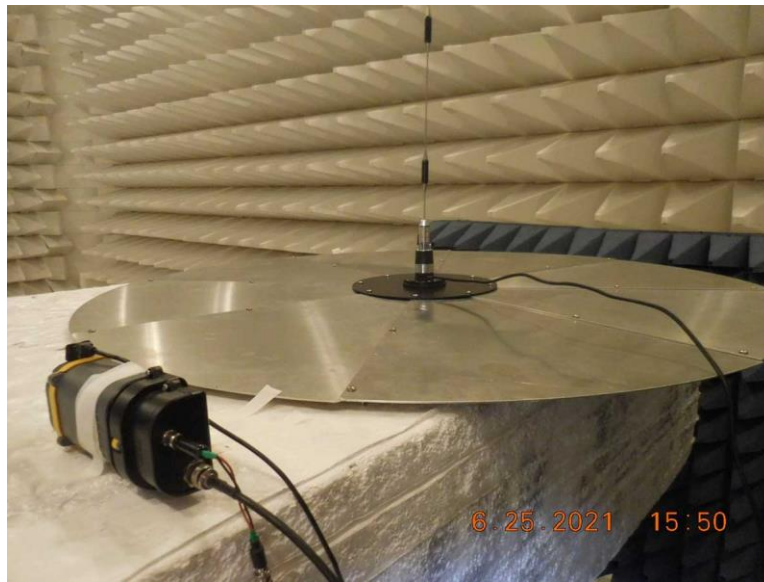


Below 1GHz

Configuration 5



X Axis



Y Axis

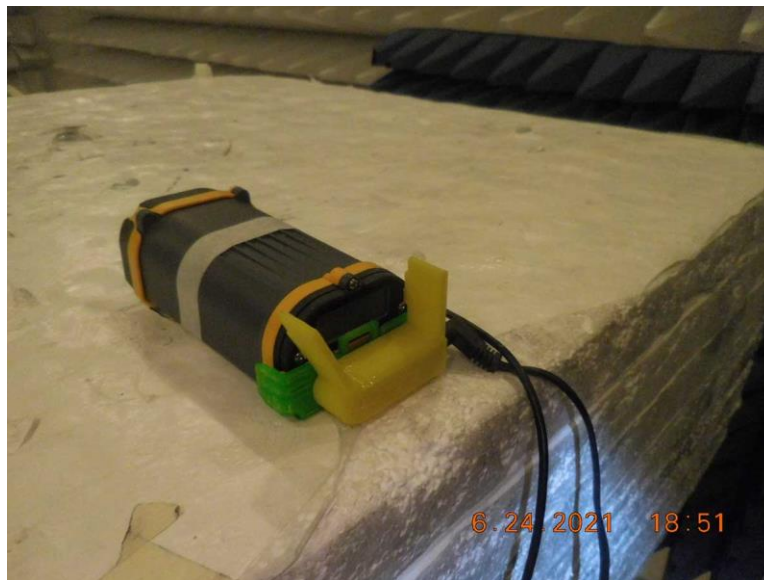


Z Axis



Below 1GHz

Configuration 7



X Axis



Y Axis



Z Axis



Below 1GHz

15.249(a) Radiated Emissions and Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 6/30/2021
 Test Type: **Maximized Emissions** Time: 19:31:45
 Tested By: Matt Harrison Sequence#: 9
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Frequency: 9kHz to 10GHz

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported.

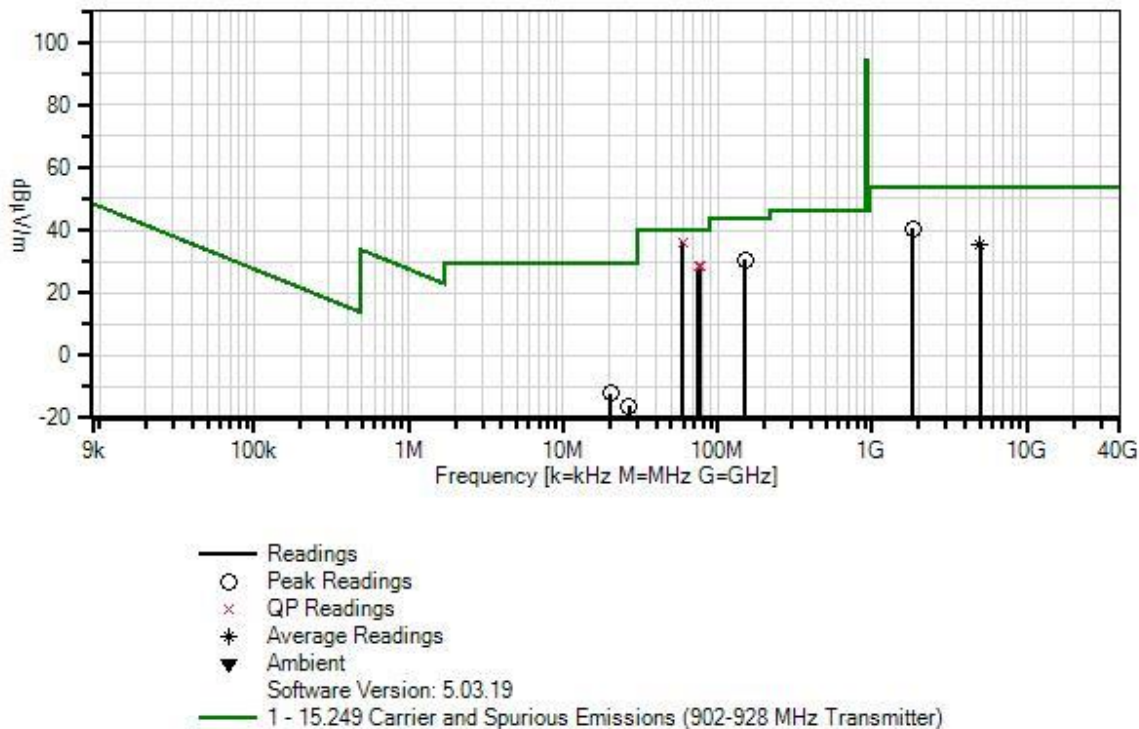
EUT with external attached antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 44

Relative Humidity (%): 25

Ittron, Inc. W/O#: 105444 Sequence#: 9 Date: 6/30/2021
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Various



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T2	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T3	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T4	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T5	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T6	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T7	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T8	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T9	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T10	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T11	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T12	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	59.055M	51.1	+0.1	+0.0	+0.0	+0.0	+0.0	36.0	40.0	-4.0	Horiz
	QP		+0.0	-27.8	+0.4	+0.4					
			+5.8	+6.0	+0.0	+0.0					
^	59.055M	58.0	+0.1	+0.0	+0.0	+0.0	+0.0	42.9	40.0	+2.9	Horiz
			+0.0	-27.8	+0.4	+0.4					
			+5.8	+6.0	+0.0	+0.0					
3	76.612M	42.3	+0.1	+0.0	+0.0	+0.0	+0.0	28.4	40.0	-11.6	Vert
	QP		+0.0	-27.8	+0.4	+0.5					
			+6.9	+6.0	+0.0	+0.0					
^	76.612M	47.7	+0.1	+0.0	+0.0	+0.0	+0.0	33.8	40.0	-6.2	Vert
			+0.0	-27.8	+0.4	+0.5					
			+6.9	+6.0	+0.0	+0.0					
5	74.998M	42.3	+0.1	+0.0	+0.0	+0.0	+0.0	28.3	40.0	-11.7	Vert
	QP		+0.0	-27.8	+0.4	+0.5					
			+6.8	+6.0	+0.0	+0.0					
^	74.998M	48.4	+0.1	+0.0	+0.0	+0.0	+0.0	34.4	40.0	-5.6	Vert
			+0.0	-27.8	+0.4	+0.5					
			+6.8	+6.0	+0.0	+0.0					
7	150.300M	39.3	+0.2	+0.0	+0.0	+0.0	+0.0	30.6	43.5	-12.9	Horiz
			+0.0	-27.5	+0.6	+0.7					
			+11.3	+6.0	+0.0	+0.0					
8	1815.925M	44.2	+0.5	+2.4	-34.7	+0.3	+0.0	40.5	54.0	-13.5	Horiz
			+0.4	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+27.4					
9	4976.825M	29.0	+0.9	+3.8	-33.4	+0.5	+0.0	35.1	54.0	-18.9	Horiz
	Ave		+0.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+33.8					
^	4976.825M	51.6	+0.9	+3.8	-33.4	+0.5	+0.0	57.7	54.0	+3.7	Horiz
			+0.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+33.8					
11	20.373M	20.5	+0.1	+0.2	+0.0	+0.0	-40.0	-12.0	29.5	-41.5	Para
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+7.2	+0.0					
12	26.671M	17.8	+0.1	+0.3	+0.0	+0.0	-40.0	-16.1	29.5	-45.6	Para
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+5.7	+0.0					

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 6/30/2021
 Test Type: **Maximized Emissions** Time: 19:47:56
 Tested By: Matt Harrison Sequence#: 9
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

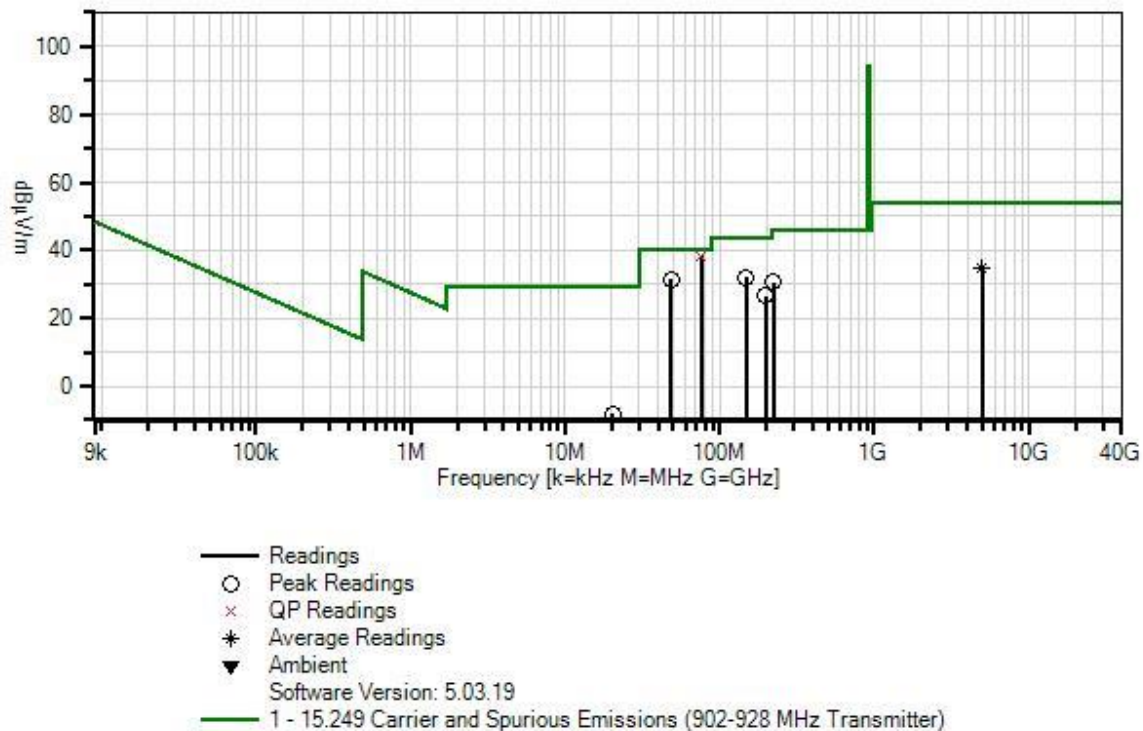
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Frequency: 9kHz to 10GHz Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported. EUT with external vehicle antenna. Test Method: ANSI C63.10 (2013) Temperature (°C): 44 Relative Humidity (%): 25

Ittron, Inc. W/O#: 105444 Sequence#: 9 Date: 6/30/2021
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Various



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T7	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T8	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T9	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T10	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T11	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T12	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T13	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10	T3 T7 T11	T4 T8 T12	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	75.901M	52.3	+0.0	+0.1	+0.0	+0.0	+0.0	38.3	40.0	-1.7	Vert
	QP		+0.0	+0.0	-27.8	+0.4					
			+0.5	+6.8	+6.0	+0.0					
			+0.0								
^	75.901M	57.9	+0.0	+0.1	+0.0	+0.0	+0.0	43.9	40.0	+3.9	Vert
			+0.0	+0.0	-27.8	+0.4					
			+0.5	+6.8	+6.0	+0.0					
			+0.0								
3	48.400M	43.8	+0.0	+0.1	+0.0	+0.0	+0.0	31.5	40.0	-8.5	Vert
			+0.0	+0.0	-27.9	+0.4					
			+0.4	+8.7	+6.0	+0.0					
			+0.0								
4	148.300M	40.8	+0.0	+0.2	+0.0	+0.0	+0.0	32.2	43.5	-11.3	Vert
			+0.0	+0.0	-27.5	+0.6					
			+0.7	+11.4	+6.0	+0.0					
			+0.0								
5	224.000M	38.8	+0.0	+0.2	+0.0	+0.0	+0.0	30.5	46.0	-15.5	Vert
			+0.0	+0.0	-27.1	+0.7					
			+0.9	+10.9	+6.1	+0.0					
			+0.0								
6	198.800M	36.7	+0.0	+0.2	+0.0	+0.0	+0.0	26.5	43.5	-17.0	Vert
			+0.0	+0.0	-27.2	+0.7					
			+0.9	+9.1	+6.1	+0.0					
			+0.0								
7	4976.950M	28.8	+0.0	+0.9	+3.8	-33.4	+0.0	34.9	54.0	-19.1	Horiz
	Ave		+0.5	+0.5	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+33.8								
^	4976.950M	50.8	+0.0	+0.9	+3.8	-33.4	+0.0	56.9	54.0	+2.9	Horiz
			+0.5	+0.5	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+33.8								

9	20.223M	24.4	+0.0	+0.1	+0.2	+0.0	-40.0	-8.0	29.5	-37.5	Groun
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+7.3					
			+0.0								
10	12.005M	17.0	+0.0	+0.0	+0.2	+0.0	-40.0	-13.6	29.5	-43.1	Para
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+9.2					
			+0.0								
11	26.611M	19.8	+0.0	+0.1	+0.3	+0.0	-40.0	-14.1	29.5	-43.6	Para
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+5.7					
			+0.0								
12	20.223M	17.8	+0.0	+0.1	+0.2	+0.0	-40.0	-14.6	29.5	-44.1	Para
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0	+7.3					
			+0.0								

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 7/1/2021
 Test Type: **Maximized Emissions** Time: 09:10:21
 Tested By: Matt Harrison Sequence#: 8
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Frequency: 9kHz to 10GHz

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated above 30MHz, 3 orthogonal axes investigated below 30MHz, worst case reported.

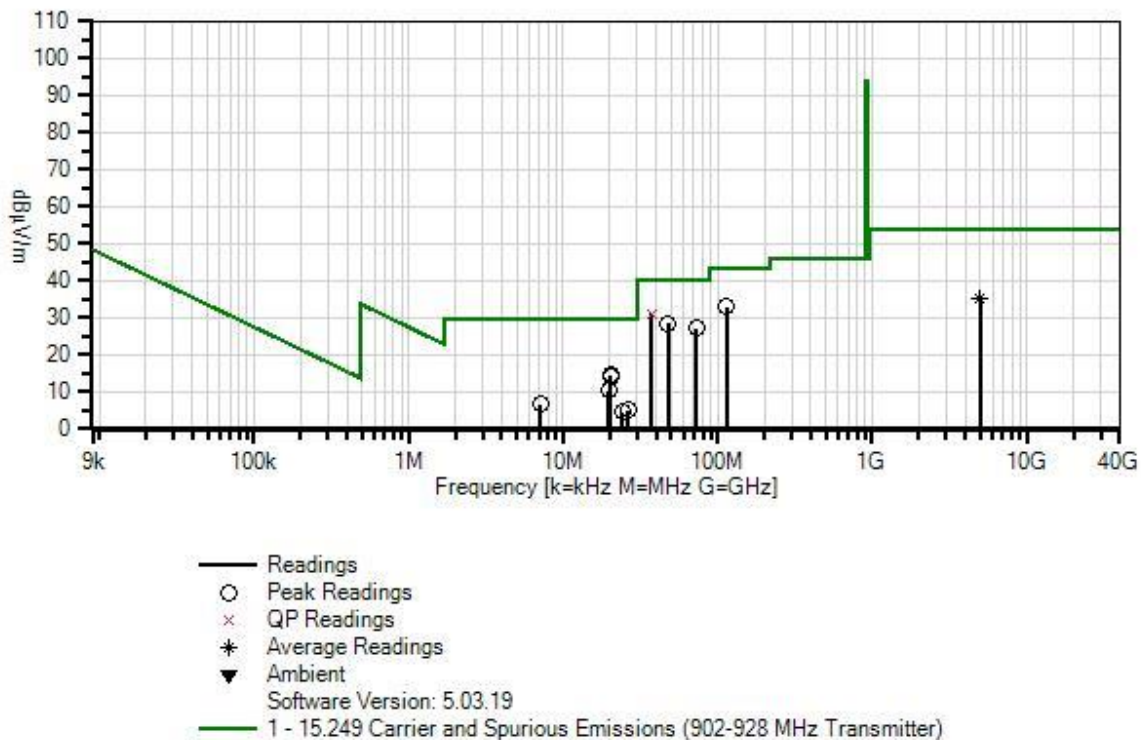
EUT with internal antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 44

Relative Humidity (%): 25

Ittron, Inc. W/O#: 105444 Sequence#: 8 Date: 7/1/2021
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Various



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	AN03540	Preamplifier	83017A	5/14/2021	5/14/2023
T5	ANP07505	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T6	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T7	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022
T8	AN02307	Preamplifier	8447D	1/10/2020	1/10/2022
T9	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T10	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T11	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T12	ANP05275	Attenuator	1W	3/26/2020	3/26/2022
T13	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10	T3 T7 T11	T4 T8 T12	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	37.499M	38.5	+0.0	+0.1	+0.0	+0.0	+0.0	31.3	40.0	-8.7	Vert
	QP		+0.0	+0.0	+0.0	-28.0					
			+0.3	+0.3	+14.1	+6.0					
			+0.0								
^	37.499M	44.4	+0.0	+0.1	+0.0	+0.0	+0.0	37.2	40.0	-2.8	Vert
			+0.0	+0.0	+0.0	-28.0					
			+0.3	+0.3	+14.1	+6.0					
			+0.0								
3	113.790M	41.9	+0.0	+0.1	+0.0	+0.0	+0.0	32.9	43.5	-10.6	Vert
			+0.0	+0.0	+0.0	-27.7					
			+0.5	+0.6	+11.5	+6.0					
			+0.0								
4	47.640M	40.5	+0.0	+0.1	+0.0	+0.0	+0.0	28.6	40.0	-11.4	Vert
			+0.0	+0.0	+0.0	-27.9					
			+0.4	+0.4	+9.1	+6.0					
			+0.0								
5	73.218M	41.5	+0.0	+0.1	+0.0	+0.0	+0.0	27.3	40.0	-12.7	Vert
			+0.0	+0.0	+0.0	-27.8					
			+0.4	+0.5	+6.6	+6.0					
			+0.0								
6	20.223M	26.9	+0.0	+0.1	+0.2	+0.0	-20.0	14.5	29.5	-15.0	Para
			+0.0	+0.0	+7.3	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
7	20.223M	26.7	+0.0	+0.1	+0.2	+0.0	-20.0	14.3	29.5	-15.2	Groun
			+0.0	+0.0	+7.3	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
8	4976.950M	29.1	+0.0	+0.9	+3.8	-33.4	+0.0	35.2	54.0	-18.8	Vert
	Ave		+0.5	+0.5	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+33.8								
^	4976.950M	51.0	+0.0	+0.9	+3.8	-33.4	+0.0	57.1	54.0	+3.1	Vert
			+0.5	+0.5	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+33.8								
10	19.773M	22.7	+0.0	+0.1	+0.2	+0.0	-20.0	10.4	29.5	-19.1	Perp
			+0.0	+0.0	+7.4	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
11	7.147M	17.5	+0.0	+0.0	+0.1	+0.0	-20.0	6.8	29.5	-22.7	Para
			+0.0	+0.0	+9.2	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								

12	26.431M	19.0	+0.0	+0.1	+0.3	+0.0	-20.0	5.2	29.5	-24.3	Para
			+0.0	+0.0	+5.8	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
13	24.002M	17.6	+0.0	+0.1	+0.3	+0.0	-20.0	4.6	29.5	-24.9	Perp
			+0.0	+0.0	+6.6	+0.0					
			+0.0	+0.0	+0.0	+0.0					
			+0.0								

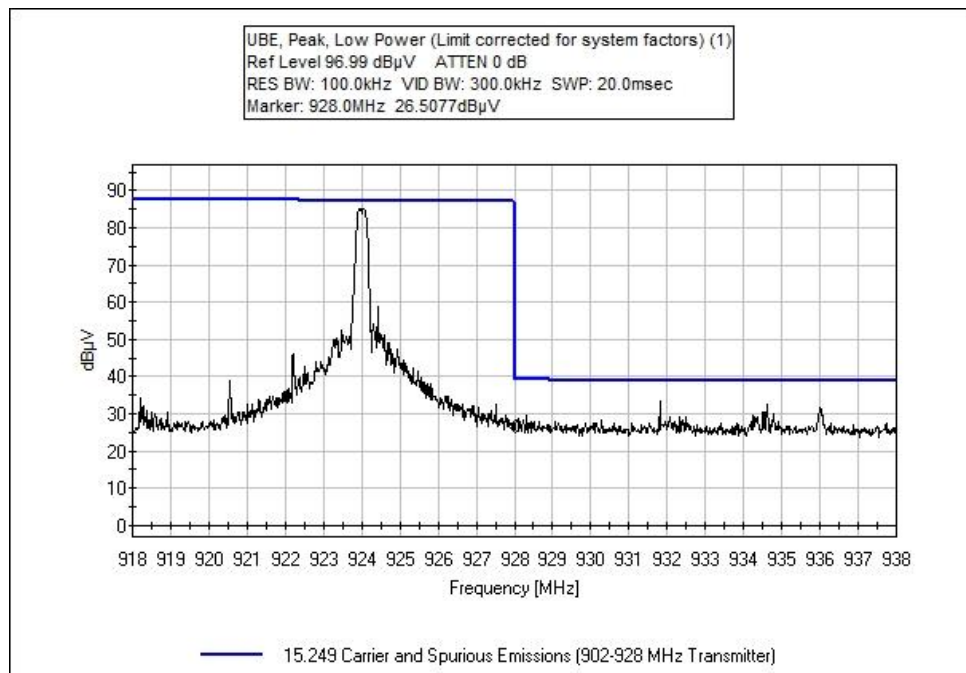
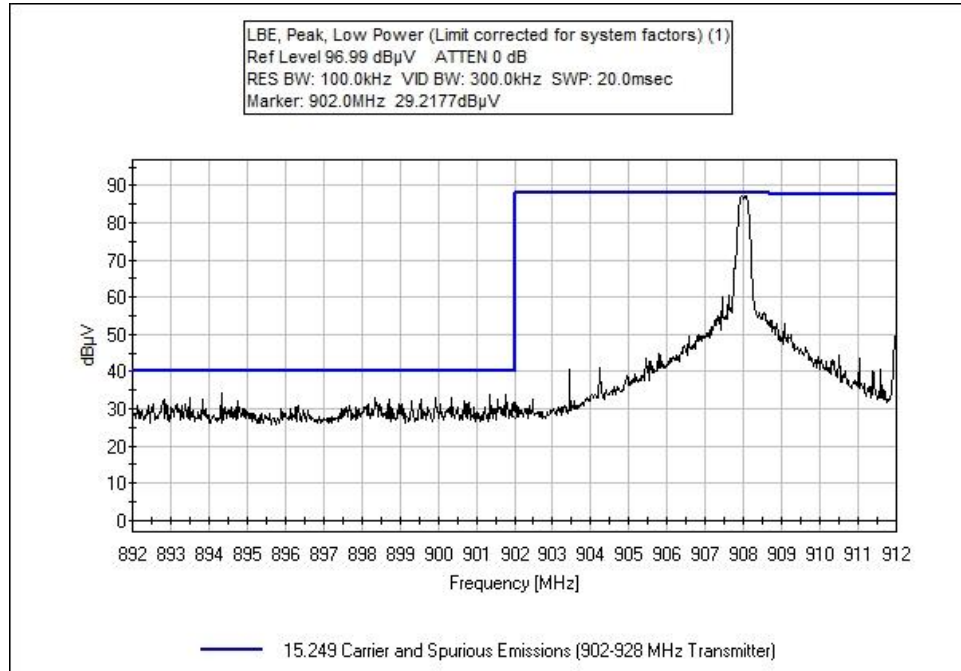
Band Edge

Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	FSK	External Attached	35.2	<46	Pass
928	FSK	External Attached	33.3	<46	Pass
902	FSK	External Vehicle	30.9	<46	Pass
928	FSK	External Vehicle	32.2	<46	Pass
902	FSK	Internal	33.7	<46	Pass
928	FSK	Internal	36.3	<46	Pass

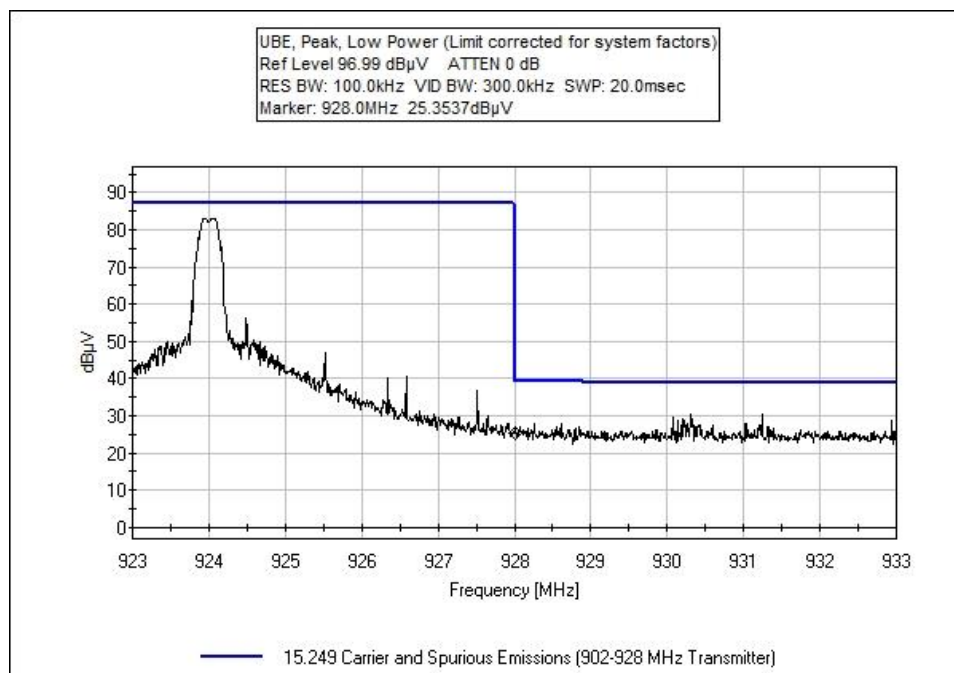
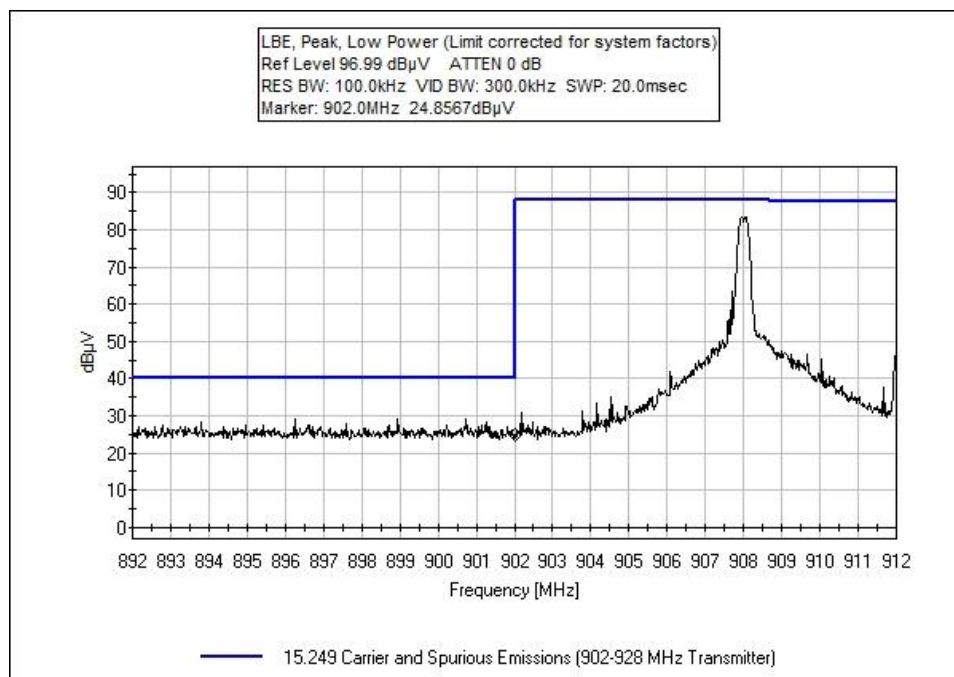
Note: Per ANSI C63.10 (2013); 100kHz RBW was used for restricted band edge peak data per 6.10.5.2 (e) (6) (iii).

Band Edge Plots

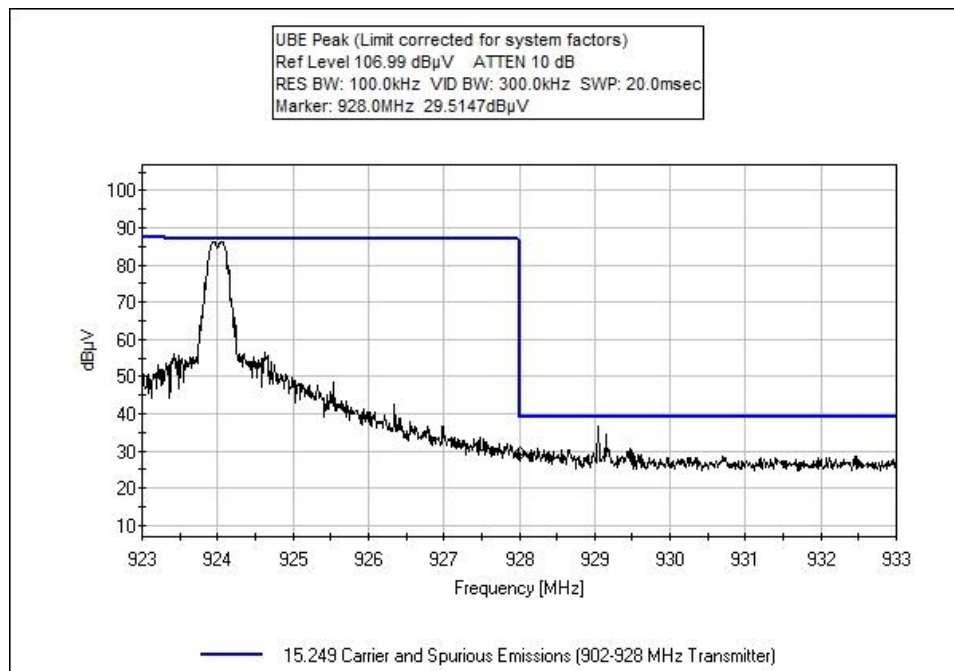
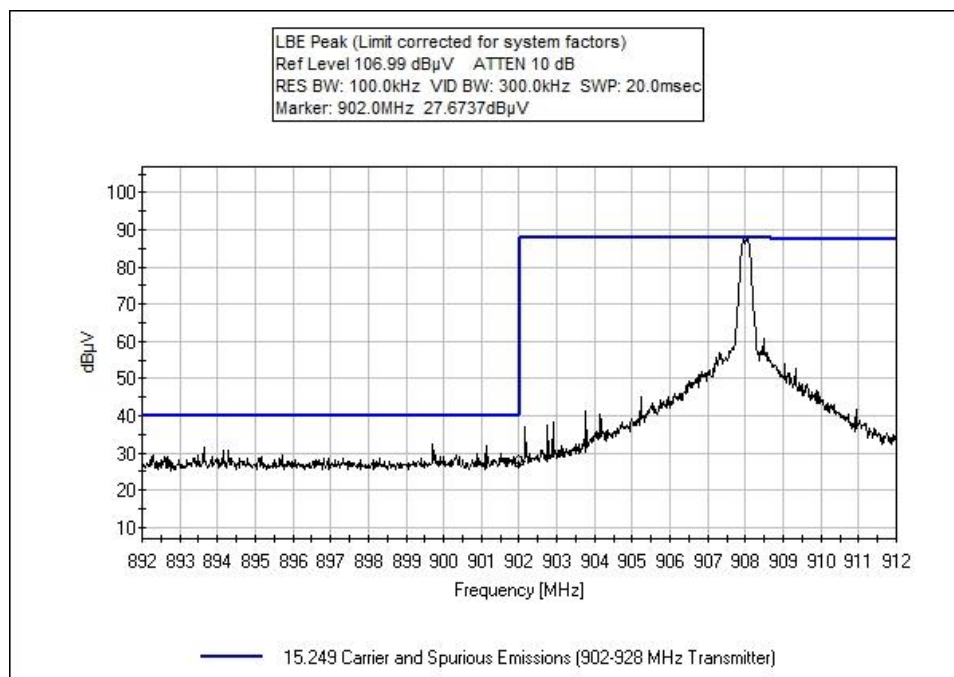
Configuration 3



Configuration 5



Configuration 7



Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 6/29/2021
 Test Type: **Maximized Emissions** Time: 11:48:30
 Tested By: Matt Harrison Sequence#: 10
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Frequency: Band Edge
Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.
EUT with external attached antenna.
Test Method: ANSI C63.10 (2013)
Temperature (°C): 44
Relative Humidity (%): 25

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022

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	902.000M	29.2	+0.3	-27.3	+1.4	+2.1	+0.0	35.2	46.0	-10.8	Vert
			+23.4	+6.1							
2	928.000M	26.5	+0.4	-27.2	+1.5	+2.2	+0.0	33.3	46.0	-12.7	Vert
			+23.8	+6.1							

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 6/29/2021
 Test Type: **Maximized Emissions** Time: 14:09:15
 Tested By: Matt Harrison Sequence#: 10
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Frequency: Band Edge
Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.
EUT with external vehicle antenna.
Test Method: ANSI C63.10 (2013)
Temperature (°C): 44
Relative Humidity (%): 25

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP06540	Cable	Helix	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022

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	25.4	+0.4	-27.2	+1.5	+2.2	+0.0	32.2	46.0	-13.8	Vert
			+23.8	+6.1							
2	902.000M	24.9	+0.3	-27.3	+1.4	+2.1	+0.0	30.9	46.0	-15.1	Vert
			+23.4	+6.1							

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **105444** Date: 7/1/2021
 Test Type: **Maximized Emissions** Time: 08:41:54
 Tested By: Matt Harrison Sequence#: 10
 Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Frequency: Band Edge

Setup: EUT is on foam table. EUT is connected to support tablet. EUT is transmitting using test software on support tablet to control EUT. XYZ axes investigated, horizontal and vertical antenna polarities investigated, worst case reported.

EUT with internal antenna.

Test Method: ANSI C63.10 (2013)

Temperature (°C): 44

Relative Humidity (%): 25

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP06540	Cable	Helix	8/23/2019	8/23/2021
T2	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T3	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T4	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T5	AN01995	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
T6	ANP05275	Attenuator	1W	3/26/2020	3/26/2022

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			Table	dBμV/m	dBμV/m	dB	Ant
1	928.000M	29.5	+0.4	-27.2	+1.5	+2.2	+0.0	36.3	46.0	-9.7	Vert
			+23.8	+6.1							
2	902.000M	27.7	+0.3	-27.3	+1.4	+2.1	+0.0	33.7	46.0	-12.3	Vert
			+23.4	+6.1							

Test Setup Photo(s)

Configuration 3



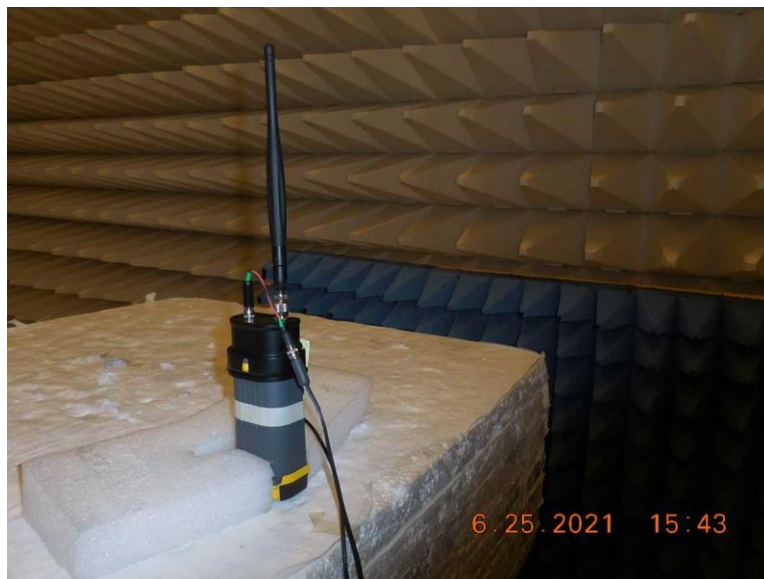
X Axis, View #1



X Axis, View #2



Y Axis



Z Axis



Below 1GHz

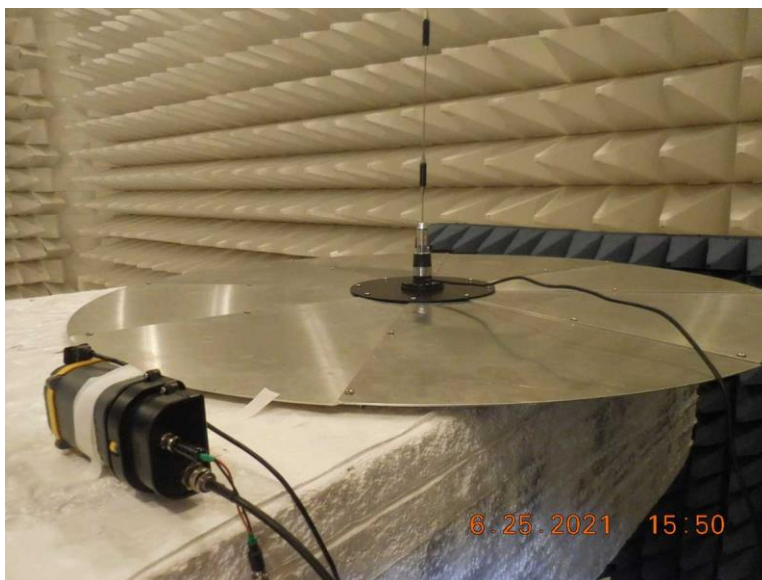


Above 1GHz

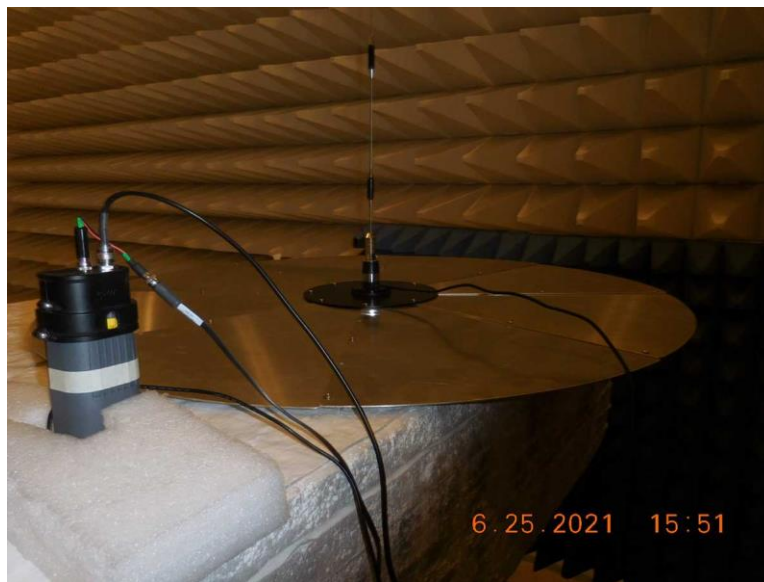
Configuration 5



X Axis



Y Axis



Z Axis

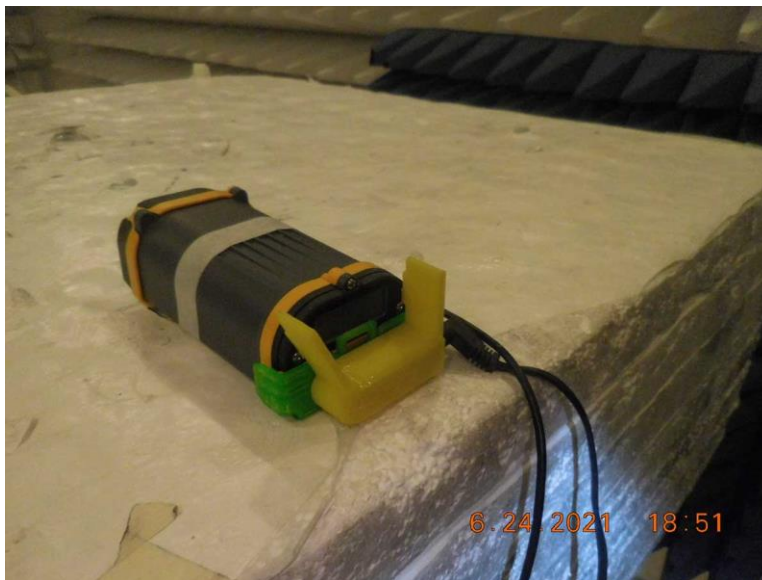


Below 1GHz



Above 1GHz

Configuration 7



X Axis



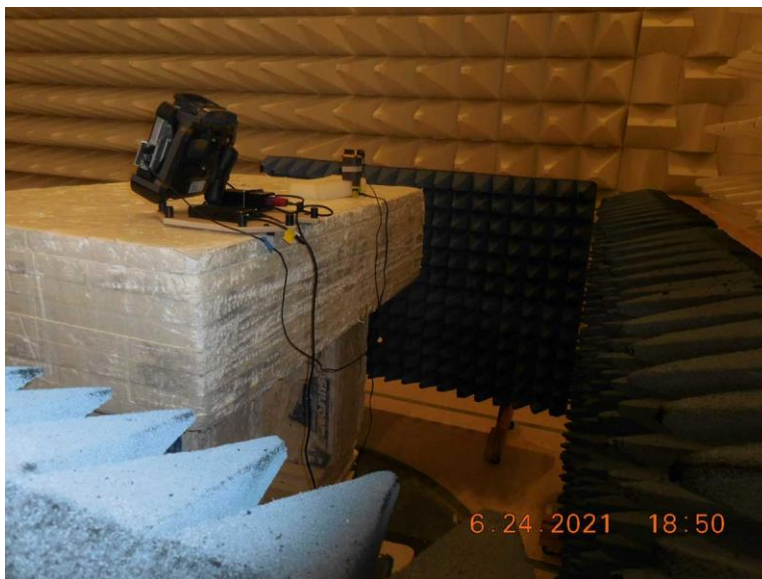
Y Axis



Z Axis



Below 1GHz



Above 1GHz

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **105444** Date: 7/9/2021
 Test Type: **Conducted Emissions** Time: 18:06:16
 Tested By: Michael Atkinson Sequence#: 25
 Software: EMITest 5.03.19 115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

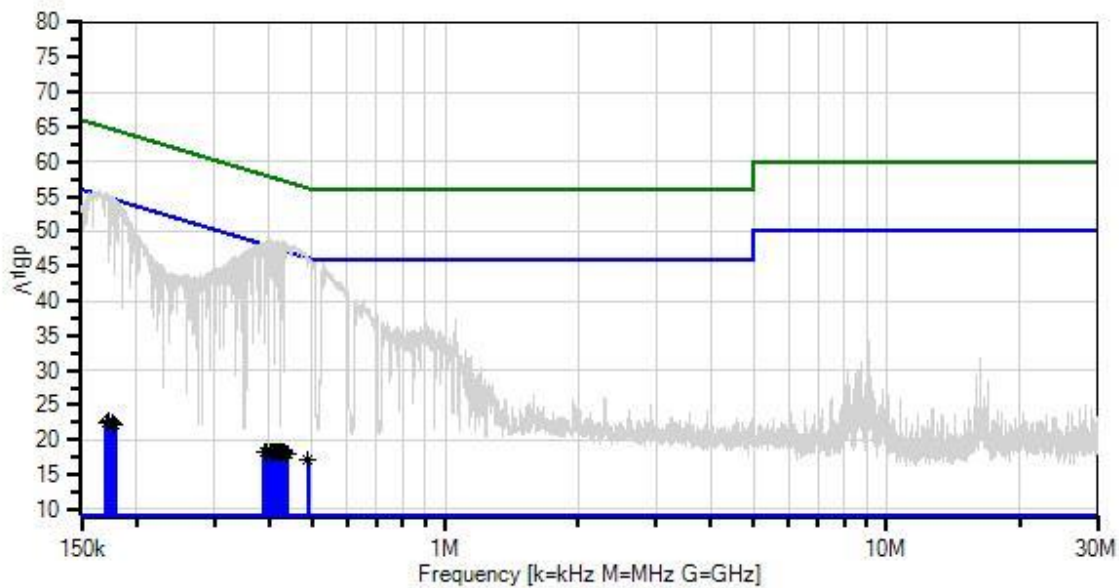
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to support tablet with USB cable. EUT is transmitting using test software on support tablet to control EUT. EUT is connected to a DC power supply which connects to AC mains.

High power and Low power ISM investigated, worst case reported. EUT has external attached antenna connected. Also investigated with vehicle antenna, data collected is representative of worst case.

Test Location: Canyon Park Lab C3
 Test Method: ANSI C63.10 (2013)
 Temperature (°C): 23
 Relative Humidity (%): 45

Itron, Inc. WD#: 105444 Sequence#: 25 Date: 7/9/2021
15.207 AC Mains - Average Test Lead: 115VAC 60Hz Line



— Sweep Data
× QP Readings
Software Version: 5.03.20

— 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
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data:		Reading listed by margin.						Test Lead: Line			
#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV	dBμV	dB	Ant
1	432.633k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.2	-28.9	Line
	Ave		+0.7								
2	440.672k	8.1	+0.2	+0.0	+0.0	+9.1	+0.0	18.0	47.0	-29.0	Line
	Ave		+0.6								
^	440.671k	38.2	+0.2	+0.0	+0.0	+9.1	+0.0	48.1	47.0	+1.1	Line
			+0.6								
4	432.810k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.2	-29.0	Line
	Ave		+0.7								
5	489.960k	7.3	+0.2	+0.0	+0.0	+9.1	+0.0	17.2	46.2	-29.0	Line
	Ave		+0.6								
^	489.960k	36.6	+0.2	+0.0	+0.0	+9.1	+0.0	46.5	46.2	+0.3	Line
			+0.6								
7	427.471k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.3	-29.1	Line
	Ave		+0.7								
^	427.470k	38.7	+0.2	+0.0	+0.0	+9.1	+0.0	48.7	47.3	+1.4	Line
			+0.7								
9	434.624k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	47.2	-29.1	Line
	Ave		+0.6								
^	432.632k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.2	+1.4	Line
			+0.7								
^	434.624k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.2	+1.2	Line
			+0.6								
^	432.810k	37.9	+0.2	+0.0	+0.0	+9.1	+0.0	47.9	47.2	+0.7	Line
			+0.7								
13	422.130k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.4	-29.2	Line
	Ave		+0.6								
14	416.256k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.5	-29.3	Line
	Ave		+0.6								
15	417.858k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.5	-29.3	Line
	Ave		+0.6								
^	422.130k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.5	47.4	+1.1	Line
			+0.6								
17	407.889k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.7	-29.4	Line
	Ave		+0.6								
18	410.025k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.6	-29.4	Line
	Ave		+0.6								
^	407.889k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.7	+0.7	Line
			+0.6								
20	413.051k	8.3	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.6	-29.4	Line
	Ave		+0.6								
^	416.255k	38.9	+0.2	+0.0	+0.0	+9.1	+0.0	48.8	47.5	+1.3	Line
			+0.6								
^	417.857k	38.8	+0.2	+0.0	+0.0	+9.1	+0.0	48.7	47.5	+1.2	Line
			+0.6								
^	413.051k	38.6	+0.2	+0.0	+0.0	+9.1	+0.0	48.5	47.6	+0.9	Line
			+0.6								
^	410.025k	38.5	+0.2	+0.0	+0.0	+9.1	+0.0	48.4	47.6	+0.8	Line
			+0.6								

25	400.590k Ave	8.3	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	18.3	47.8	-29.5	Line
^	400.590k	39.0	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	49.0	47.8	+1.2	Line
27	392.758k Ave	8.2	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	18.2	48.0	-29.8	Line
28	389.020k Ave	8.3	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	18.2	48.1	-29.9	Line
^	392.757k	38.6	+0.2 +0.7	+0.0	+0.0	+9.1	+0.0	48.6	48.0	+0.6	Line
^	389.019k	38.6	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	48.5	48.1	+0.4	Line
31	173.683k Ave	11.5	+0.4 +1.7	+0.0	+0.0	+9.1	+0.0	22.7	54.8	-32.1	Line
32	175.675k Ave	11.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	22.6	54.7	-32.1	Line
33	177.142k Ave	11.4	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.4	54.6	-32.2	Line
34	170.539k Ave	11.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	22.6	54.9	-32.3	Line
^	170.539k	44.6	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	55.7	54.9	+0.8	Line
^	173.683k	44.2	+0.4 +1.7	+0.0	+0.0	+9.1	+0.0	55.4	54.8	+0.6	Line
37	178.818k Ave	11.2	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.2	54.5	-32.3	Line
^	175.674k	44.1	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	55.2	54.7	+0.5	Line
^	177.141k	43.9	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	54.9	54.6	+0.3	Line
^	178.818k	43.7	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	54.7	54.5	+0.2	Line

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **105444** Date: 7/9/2021
 Test Type: **Conducted Emissions** Time: 18:16:31
 Tested By: Michael Atkinson Sequence#: 26
 Software: EMITest 5.03.19 115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

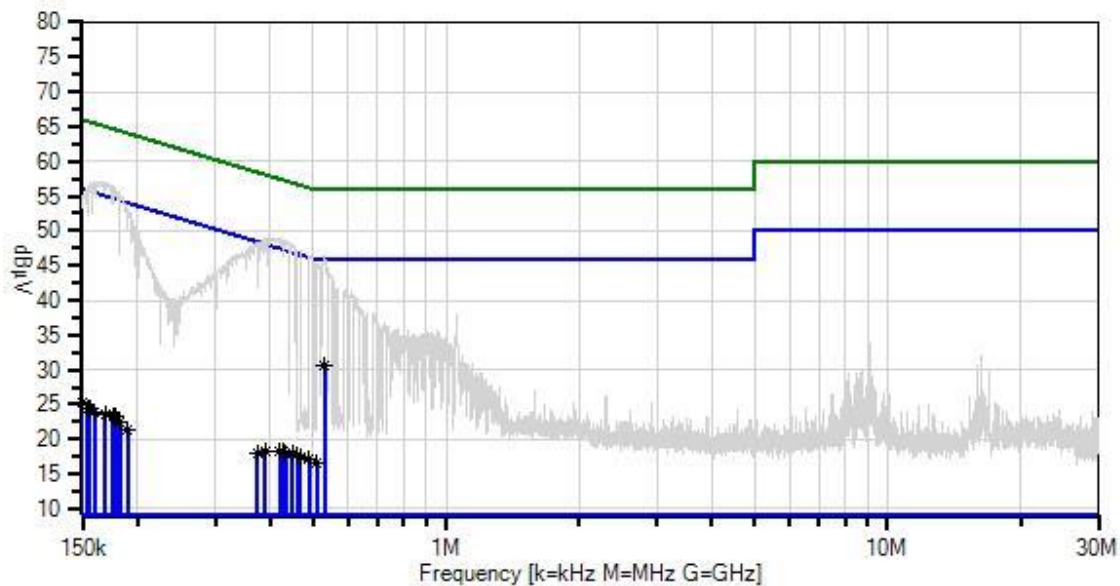
Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to support tablet with USB cable. EUT is transmitting using test software on support tablet to control EUT. EUT is connected to a DC power supply which connects to AC mains.

High power and Low power ISM investigated, worst case reported. EUT has external attached antenna connected. Also investigated with vehicle antenna, data collected is representative of worst case.

Test Location: Canyon Park Lab C3
 Test Method: ANSI C63.10 (2013)
 Temperature (°C): 23
 Relative Humidity (%): 45

Itron, Inc. WO#: 105444 Sequence#: 26 Date: 7/9/2021
15.207 AC Mains - Average Test Lead: 115VAC 60Hz Neutral



— Sweep Data
× QP Readings
Software Version: 5.03.19
— 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
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
T5	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data:

Reading listed by margin.

Test Lead: Neutral

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	529.875k	20.7	+0.3	+0.0	+0.0	+9.1	+0.0	30.6	46.0	-15.4	Neutr
	Ave		+0.5								
^	529.874k	36.5	+0.3	+0.0	+0.0	+9.1	+0.0	46.4	46.0	+0.4	Neutr
			+0.5								
3	449.743k	8.1	+0.2	+0.0	+0.0	+9.1	+0.0	18.0	46.9	-28.9	Neutr
	Ave		+0.6								
^	449.743k	38.2	+0.2	+0.0	+0.0	+9.1	+0.0	48.1	46.9	+1.2	Neutr
			+0.6								
5	459.722k	7.9	+0.2	+0.0	+0.0	+9.1	+0.0	17.7	46.7	-29.0	Neutr
	Ave		+0.5								
^	459.721k	37.5	+0.2	+0.0	+0.0	+9.1	+0.0	47.3	46.7	+0.6	Neutr
			+0.5								
7	432.810k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	47.2	-29.1	Neutr
	Ave		+0.6								
8	428.717k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.2	47.3	-29.1	Neutr
	Ave		+0.5								
^	432.810k	38.7	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.2	+1.4	Neutr
			+0.6								
^	428.716k	38.8	+0.2	+0.0	+0.0	+9.1	+0.0	48.6	47.3	+1.3	Neutr
			+0.5								
11	489.960k	7.2	+0.2	+0.0	+0.0	+9.1	+0.0	17.1	46.2	-29.1	Neutr
	Ave		+0.6								
^	489.960k	36.6	+0.2	+0.0	+0.0	+9.1	+0.0	46.5	46.2	+0.3	Neutr
			+0.6								
13	468.491k	7.6	+0.2	+0.0	+0.0	+9.1	+0.0	17.4	46.5	-29.1	Neutr
	Ave		+0.5								
^	468.491k	37.3	+0.2	+0.0	+0.0	+9.1	+0.0	47.1	46.5	+0.6	Neutr
			+0.5								
15	420.172k	8.4	+0.2	+0.0	+0.0	+9.1	+0.0	18.3	47.4	-29.1	Neutr
	Ave		+0.6								
^	420.172k	39.0	+0.2	+0.0	+0.0	+9.1	+0.0	48.9	47.4	+1.5	Neutr
			+0.6								
17	510.825k	6.8	+0.2	+0.0	+0.0	+9.1	+0.0	16.6	46.0	-29.4	Neutr
	Ave		+0.5								
^	510.824k	35.5	+0.2	+0.0	+0.0	+9.1	+0.0	45.3	46.0	-0.7	Neutr
			+0.5								
19	388.308k	8.5	+0.2	+0.0	+0.0	+9.1	+0.0	18.4	48.1	-29.7	Neutr
	Ave		+0.6								
^	388.307k	39.0	+0.2	+0.0	+0.0	+9.1	+0.0	48.9	48.1	+0.8	Neutr
			+0.6								
21	373.710k	8.2	+0.2	+0.0	+0.0	+9.1	+0.0	18.1	48.4	-30.3	Neutr
	Ave		+0.6								
^	373.710k	38.4	+0.2	+0.0	+0.0	+9.1	+0.0	48.3	48.4	-0.1	Neutr
			+0.6								
23	150.000k	11.6	+2.5	+0.0	+0.0	+9.1	+0.0	25.2	56.0	-30.8	Neutr
	Ave		+2.0								
24	176.304k	12.3	+0.4	+0.0	+0.0	+9.1	+0.0	23.4	54.7	-31.3	Neutr
	Ave		+1.6								

25	155.973k Ave	12.6	+0.8 +1.9	+0.0	+0.0	+9.1	+0.0	24.4	55.7	-31.3	Neutr
26	179.029k Ave	12.1	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	23.2	54.5	-31.3	Neutr
^	176.304k	45.4	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	56.5	54.7	+1.8	Neutr
28	168.864k Ave	12.5	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	23.6	55.0	-31.4	Neutr
^	168.863k	46.0	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	57.1	55.0	+2.1	Neutr
30	154.192k Ave	12.7	+0.8 +1.8	+0.0	+0.0	+9.1	+0.0	24.4	55.8	-31.4	Neutr
^	154.191k	44.4	+0.8 +1.8	+0.0	+0.0	+9.1	+0.0	56.1	55.8	+0.3	Neutr
^	150.000k	41.5	+2.5 +2.0	+0.0	+0.0	+9.1	+0.0	55.1	56.0	-0.9	Neutr
33	160.165k Ave	12.5	+0.6 +1.8	+0.0	+0.0	+9.1	+0.0	24.0	55.5	-31.5	Neutr
^	160.165k	45.6	+0.6 +1.8	+0.0	+0.0	+9.1	+0.0	57.1	55.5	+1.6	Neutr
^	155.973k	45.2	+0.8 +1.9	+0.0	+0.0	+9.1	+0.0	57.0	55.7	+1.3	Neutr
36	182.802k Ave	11.5	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	22.5	54.4	-31.9	Neutr
^	179.029k	45.0	+0.4 +1.6	+0.0	+0.0	+9.1	+0.0	56.1	54.5	+1.6	Neutr
^	182.801k	44.1	+0.4 +1.5	+0.0	+0.0	+9.1	+0.0	55.1	54.4	+0.7	Neutr
39	190.347k Ave	10.5	+0.3 +1.4	+0.0	+0.0	+9.1	+0.0	21.3	54.0	-32.7	Neutr
^	190.347k	42.2	+0.3 +1.4	+0.0	+0.0	+9.1	+0.0	53.0	54.0	-1.0	Neutr

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Quasi-peak**
 Work Order #: **105444** Date: 7/9/2021
 Test Type: **Conducted Emissions** Time: 19:03:34
 Tested By: Michael Atkinson Sequence#: 28
 Software: EMITest 5.03.19 115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to AC-USB adapter which is connected to AC mains. EUT is configured to transmit while connected to AC-USB adapter.

High power and Low power ISM investigated, worst case reported. EUT has internal antenna.

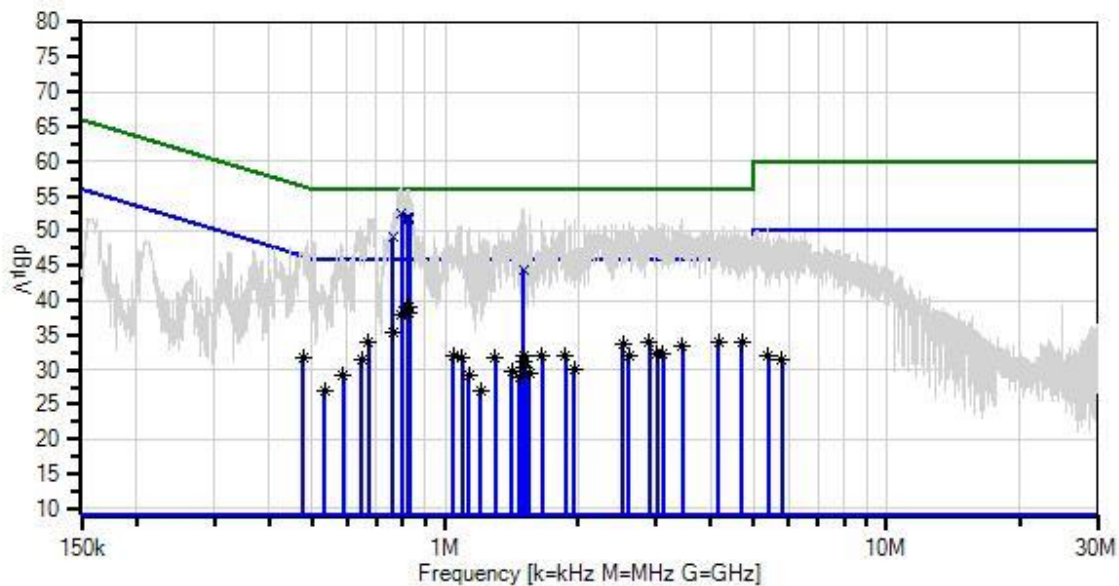
Test Location: Canyon Park Lab C3

Test Method: ANSI C63.10 (2013)

Temperature (°C): 23

Relative Humidity (%): 45

Itron, Inc. WO#: 105444 Sequence#: 28 Date: 7/9/2021
15.207 AC Mains - Quasi-peak Test Lead: 115VAC 60Hz Line



— Sweep Data
× QP Readings
Software Version: 5.03.19

— 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
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
T5	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data:

Reading listed by margin.

Test Lead: Line

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	795.287k	42.7	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	52.5	56.0	-3.5	Line
2	821.996k	42.4	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	52.1	56.0	-3.9	Line
3	825.592k	42.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	52.0	56.0	-4.0	Line
4	831.242k	42.1	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.8	56.0	-4.2	Line
5	762.928k	39.4	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	49.1	56.0	-6.9	Line
6	821.996k	29.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	39.0	46.0	-7.0	Line
7	825.592k	29.2	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	38.9	46.0	-7.1	Line
^	821.996k	46.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	56.0	46.0	+10.0	Line
^	825.591k	45.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.6	46.0	+9.6	Line
10	831.242k	28.5	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	38.2	46.0	-7.8	Line
^	831.241k	46.2	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.9	46.0	+9.9	Line
12	795.287k	28.2	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	38.0	46.0	-8.0	Line
^	795.286k	46.5	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	56.3	46.0	+10.3	Line
14	762.928k	25.7	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	35.4	46.0	-10.6	Line
^	762.927k	42.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	52.6	46.0	+6.6	Line
16	1.502M	34.6	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	44.5	56.0	-11.5	Line
17	671.994k	24.2	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	34.1	46.0	-11.9	Line
18	2.898M	24.3	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	34.1	46.0	-11.9	Line
^	2.898M	41.1	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	50.9	46.0	+4.9	Line
20	4.696M	24.1	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	34.0	46.0	-12.0	Line
^	4.696M	40.8	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	50.7	46.0	+4.7	Line
22	672.110k	24.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	34.0	46.0	-12.0	Line
^	671.994k	42.0	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.9	46.0	+5.9	Line
^	672.110k	41.4	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.3	46.0	+5.3	Line

25	4.156M	24.2	+0.1	+0.0	+0.1	+9.1	+0.0	34.0	46.0	-12.0	Line
^	4.156M	41.8	+0.1	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
			+0.5								
27	2.529M	23.9	+0.1	+0.0	+0.1	+9.1	+0.0	33.7	46.0	-12.3	Line
^	2.529M	41.1	+0.1	+0.0	+0.1	+9.1	+0.0	50.9	46.0	+4.9	Line
			+0.5								
29	3.439M	23.6	+0.1	+0.0	+0.1	+9.1	+0.0	33.4	46.0	-12.6	Line
^	3.439M	42.0	+0.1	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
			+0.5								
31	3.025M	22.7	+0.1	+0.0	+0.1	+9.1	+0.0	32.4	46.0	-13.6	Line
^	3.025M	42.1	+0.1	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
			+0.4								
33	3.122M	22.5	+0.1	+0.0	+0.1	+9.1	+0.0	32.3	46.0	-13.7	Line
^	3.122M	41.3	+0.1	+0.0	+0.1	+9.1	+0.0	51.1	46.0	+5.1	Line
			+0.5								
35	1.661M	22.3	+0.2	+0.0	+0.1	+9.1	+0.0	32.1	46.0	-13.9	Line
^	1.661M	41.7	+0.2	+0.0	+0.1	+9.1	+0.0	51.5	46.0	+5.5	Line
			+0.4								
37	2.607M	22.4	+0.1	+0.0	+0.1	+9.1	+0.0	32.1	46.0	-13.9	Line
^	2.607M	41.4	+0.1	+0.0	+0.1	+9.1	+0.0	51.1	46.0	+5.1	Line
			+0.4								
39	1.044M	22.3	+0.2	+0.0	+0.0	+9.1	+0.0	32.0	46.0	-14.0	Line
^	1.044M	40.1	+0.2	+0.0	+0.0	+9.1	+0.0	49.8	46.0	+3.8	Line
			+0.4								
41	1.502M	22.1	+0.2	+0.0	+0.1	+9.1	+0.0	32.0	46.0	-14.0	Line
^	1.502M	41.8	+0.2	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
			+0.5								
42	1.871M	22.1	+0.2	+0.0	+0.1	+9.1	+0.0	31.9	46.0	-14.1	Line
^	1.871M	41.8	+0.2	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
			+0.4								
44	1.300M	22.0	+0.2	+0.0	+0.1	+9.1	+0.0	31.8	46.0	-14.2	Line
^	1.300M	39.8	+0.2	+0.0	+0.1	+9.1	+0.0	49.6	46.0	+3.6	Line
			+0.4								
46	1.091M	21.9	+0.2	+0.0	+0.0	+9.1	+0.0	31.7	46.0	-14.3	Line
^	1.091M	39.8	+0.2	+0.0	+0.0	+9.1	+0.0	49.6	46.0	+3.6	Line
			+0.5								
48	647.190k	21.6	+0.3	+0.0	+0.0	+9.1	+0.0	31.5	46.0	-14.5	Line
^	647.190k	41.3	+0.3	+0.0	+0.0	+9.1	+0.0	51.2	46.0	+5.2	Line
			+0.5								

50	1.510M	21.3	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	31.2	46.0	-14.8	Line
^	1.502M	43.2	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	53.1	46.0	+7.1	Line
52	476.320k	21.7	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	31.6	46.4	-14.8	Line
^	476.320k	39.4	+0.2 +0.6	+0.0	+0.0	+9.1	+0.0	49.3	46.4	+2.9	Line
54	1.513M	20.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.3	46.0	-15.7	Line
^	1.510M	42.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	52.3	46.0	+6.3	Line
^	1.513M	41.9	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	51.8	46.0	+5.8	Line
57	1.962M	20.1	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.0	46.0	-16.0	Line
^	1.962M	41.6	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	51.5	46.0	+5.5	Line
59	1.419M	20.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	29.7	46.0	-16.3	Line
^	1.419M	41.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Line
61	1.554M	19.8	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	29.6	46.0	-16.4	Line
^	1.554M	42.5	+0.2 +0.4	+0.0	+0.1	+9.1	+0.0	52.3	46.0	+6.3	Line
63	1.133M	19.3	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Line
^	1.133M	40.8	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	50.6	46.0	+4.6	Line
65	586.830k	19.2	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Line
^	586.830k	37.2	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	47.1	46.0	+1.1	Line
67	1.472M	19.1	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	28.8	46.0	-17.2	Line
^	1.472M	41.5	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.2	46.0	+5.2	Line
69	5.399M	22.2	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	32.1	50.0	-17.9	Line
^	5.399M	40.4	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	50.3	50.0	+0.3	Line

71	5.782M	21.7	+0.1	+0.0	+0.1	+9.1	+0.0	31.5	50.0	-18.5	Line
	Ave		+0.5								
^	5.782M	40.1	+0.1	+0.0	+0.1	+9.1	+0.0	49.9	50.0	-0.1	Line
			+0.5								
73	532.660k	17.1	+0.3	+0.0	+0.0	+9.1	+0.0	27.0	46.0	-19.0	Line
	Ave		+0.5								
^	532.660k	38.8	+0.3	+0.0	+0.0	+9.1	+0.0	48.7	46.0	+2.7	Line
			+0.5								
75	1.202M	17.1	+0.2	+0.0	+0.1	+9.1	+0.0	27.0	46.0	-19.0	Line
	Ave		+0.5								
^	1.202M	41.7	+0.2	+0.0	+0.1	+9.1	+0.0	51.6	46.0	+5.6	Line
			+0.5								

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **105444** Date: 7/9/2021
 Test Type: **Conducted Emissions** Time: 18:44:44
 Tested By: Michael Atkinson Sequence#: 27
 Software: EMITest 5.03.19 115VAC 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 9			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 9			

Test Conditions / Notes:

Frequency: 0.15-30MHz

Setup: EUT is on foam table. EUT is connected to AC-USB adapter which is connected to AC mains. EUT is configured to transmit while connected to AC-USB adapter.

High power and Low power ISM investigated, worst case reported. EUT has internal antenna.

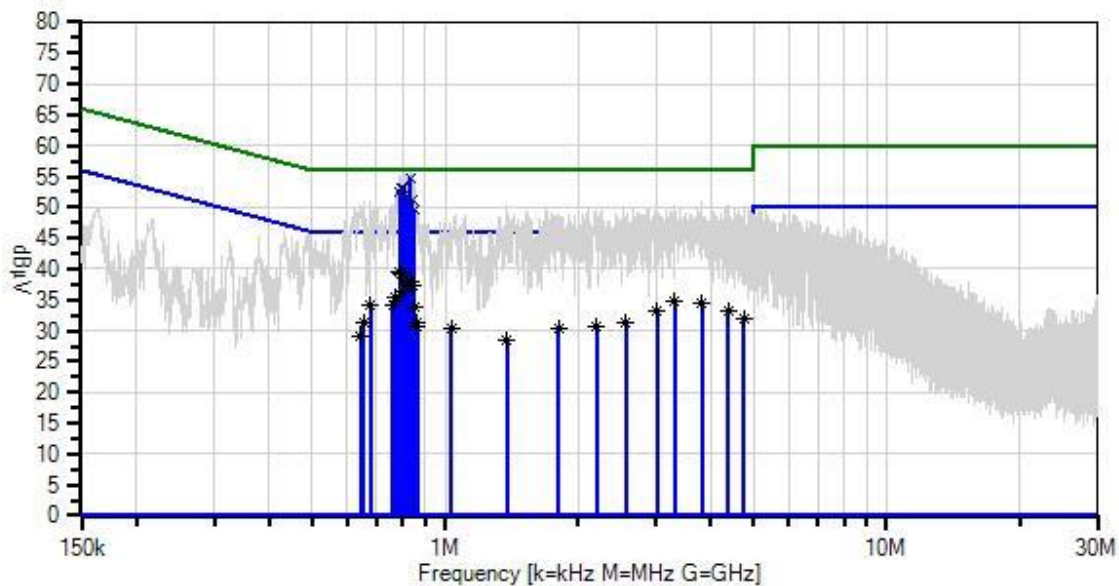
Test Location: Canyon Park Lab C3

Test Method: ANSI C63.10 (2013)

Temperature (°C): 23

Relative Humidity (%): 45

Itron, Inc. WO#: 105444 Sequence#: 27 Date: 7/9/2021
15.207 AC Mains - Average Test Lead: 115VAC 60Hz Neutral



— Sweep Data
× QP Readings
Software Version: 5.03.19

— 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
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	1/10/2020	1/10/2022
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	7/1/2020	7/1/2022
T4	ANP06219	Attenuator	768-10	4/7/2020	4/7/2022
	AN01492	50uH LISN-Line (L1)	3816/2NM	10/14/2019	10/14/2021
T5	AN01492	50uH LISN-Neutral (L2)	3816/2NM	10/14/2019	10/14/2021

Measurement Data:

Reading listed by margin.

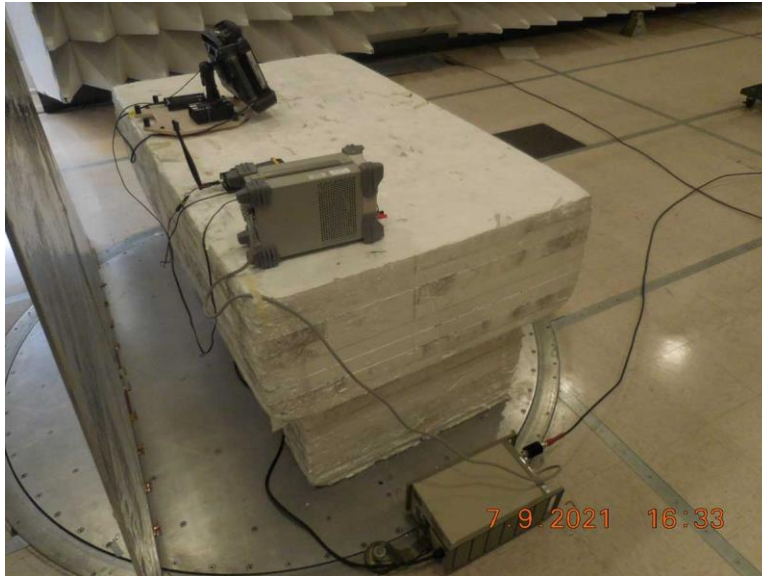
Test Lead: Neutral

#	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	836.378k QP	45.1	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	54.8	56.0	-1.2	Neutr
2	805.560k QP	43.4	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	53.1	56.0	-2.9	Neutr
3	794.260k QP	43.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	53.0	56.0	-3.0	Neutr
4	790.664k QP	42.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	52.6	56.0	-3.4	Neutr
5	821.996k QP	42.3	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	52.0	56.0	-4.0	Neutr
6	843.569k QP	41.4	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	51.1	56.0	-4.9	Neutr
7	851.274k QP	39.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	49.6	56.0	-6.4	Neutr
8	790.664k Ave	29.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	39.6	46.0	-6.4	Neutr
9	794.260k Ave	29.6	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	39.3	46.0	-6.7	Neutr
^	790.664k	45.5	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.2	46.0	+9.2	Neutr
^	794.259k	44.5	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	54.2	46.0	+8.2	Neutr
12	836.378k Ave	28.2	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	37.9	46.0	-8.1	Neutr
^	836.378k	45.8	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.5	46.0	+9.5	Neutr
14	821.996k Ave	27.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	37.6	46.0	-8.4	Neutr
^	821.996k	44.9	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	54.6	46.0	+8.6	Neutr
16	843.569k Ave	27.6	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	37.3	46.0	-8.7	Neutr
^	843.569k	45.8	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.5	46.0	+9.5	Neutr
18	805.560k Ave	26.8	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	36.5	46.0	-9.5	Neutr
^	805.559k	46.2	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	55.9	46.0	+9.9	Neutr
20	773.714k Ave	25.7	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	35.5	46.0	-10.5	Neutr
^	773.714k	42.7	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	52.5	46.0	+6.5	Neutr
22	3.311M Ave	25.1	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	34.8	46.0	-11.2	Neutr
^	3.311M	40.8	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	50.5	46.0	+4.5	Neutr
24	3.810M Ave	24.9	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	34.6	46.0	-11.4	Neutr

^	3.810M	41.3	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	51.0	46.0	+5.0	Neutr
26	678.042k Ave	24.4	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	34.3	46.0	-11.7	Neutr
^	678.041k	41.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Neutr
28	759.846k Ave	24.3	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	34.1	46.0	-11.9	Neutr
^	759.845k	40.6	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	50.4	46.0	+4.4	Neutr
30	851.274k Ave	24.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	33.7	46.0	-12.3	Neutr
^	851.273k	44.0	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	53.7	46.0	+7.7	Neutr
32	4.369M Ave	23.5	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	33.3	46.0	-12.7	Neutr
^	4.369M	40.5	+0.1 +0.5	+0.0	+0.1	+9.1	+0.0	50.3	46.0	+4.3	Neutr
34	3.019M Ave	23.6	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	33.3	46.0	-12.7	Neutr
^	3.019M	41.0	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	50.7	46.0	+4.7	Neutr
36	4.751M Ave	22.1	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	32.0	46.0	-14.0	Neutr
^	4.751M	40.4	+0.1 +0.6	+0.0	+0.1	+9.1	+0.0	50.3	46.0	+4.3	Neutr
38	653.851k Ave	21.5	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	31.4	46.0	-14.6	Neutr
^	653.851k	41.1	+0.3 +0.5	+0.0	+0.0	+9.1	+0.0	51.0	46.0	+5.0	Neutr
40	2.573M Ave	21.6	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	31.3	46.0	-14.7	Neutr
^	2.573M	40.0	+0.1 +0.4	+0.0	+0.1	+9.1	+0.0	49.7	46.0	+3.7	Neutr
42	859.492k Ave	21.6	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	31.2	46.0	-14.8	Neutr
43	862.574k Ave	21.2	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	30.8	46.0	-15.2	Neutr
^	859.491k	40.9	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	50.5	46.0	+4.5	Neutr
^	862.573k	40.7	+0.2 +0.3	+0.0	+0.0	+9.1	+0.0	50.3	46.0	+4.3	Neutr
46	2.201M Ave	20.7	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.6	46.0	-15.4	Neutr
^	2.201M	38.6	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	48.5	46.0	+2.5	Neutr
48	1.033M Ave	20.5	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	30.3	46.0	-15.7	Neutr
^	1.033M	39.4	+0.2 +0.5	+0.0	+0.0	+9.1	+0.0	49.2	46.0	+3.2	Neutr
50	1.803M Ave	20.4	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	30.3	46.0	-15.7	Neutr

^	1.803M	39.9	+0.2 +0.5	+0.0	+0.1	+9.1	+0.0	49.8	46.0	+3.8	Neutr
52	642.361k Ave	19.1	+0.3 +0.6	+0.0	+0.0	+9.1	+0.0	29.1	46.0	-16.9	Neutr
^	642.360k	40.3	+0.3 +0.6	+0.0	+0.0	+9.1	+0.0	50.3	46.0	+4.3	Neutr
54	1.380M Ave	18.7	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	28.4	46.0	-17.6	Neutr
^	1.380M	40.7	+0.2 +0.4	+0.0	+0.0	+9.1	+0.0	50.4	46.0	+4.4	Neutr

Test Setup Photo(s)



Configuration 3



Configuration 9

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.