

# Itron, Inc.

## TEST REPORT FOR

### MC3 & MC4Max

**Model: MC3C\***

**\*(See Appendix A for Manufacturer's Declaration)**

**Tested to The Following Standards:**

**FCC Part 15 Subpart C Section(s)**

**15.247  
(FHSS 902-928MHz)**

**Report No.: 107795-2**

**Date of issue: January 26, 2023**



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

**Test Certificate # 803.01**

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## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

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

Representative: Jack McPeck  
Customer Reference Number: 269629

**REPORT PREPARED BY:**

Viviana Prado  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 107795

**DATE OF EQUIPMENT RECEIPT:**

December 2, 2022

**DATE(S) OF TESTING:**

December 2-12 and 16-23, 2022

### 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.  
 Canyon Park  
 22116 23rd Drive S.E., Suite A  
 Bothell, WA 98021

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20

## 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 - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	NP
15.247(a)(1)	Carrier Separation	NA	NP
15.247(a)(1)(i)	Number of Hopping Channels	NA	NP
15.247(a)(1)(i)	Average Time of Occupancy	NA	NP
15.247(b)(2)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	NP
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	NA1

NA = Not Applicable

NA1 = Not applicable because the unit is battery powered from a vehicle only.

NP = CKC Laboratories was not contracted to perform test.

#### 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 (Radiated Laptop)

*Equipment Tested:*

Device	Manufacturer	Model #	S/N
MC3 & MC4Max	Itron, Inc.	MC3C	74008263

*Support Equipment:*

Device	Manufacturer	Model #	S/N
12VDC Power Supply	Lamda	LUS-10A-12	91K121691
5dBi Antenna	PCTEL	Generic	NA
Receiver Antenna	PCTEL	SUB-0275-001/H	S15180005
Laptop	Panasonic	CF-33	1GTSAA65082

### Configuration 2 (Radiated Tablet)

*Equipment Tested:*

Device	Manufacturer	Model #	S/N
MC3 & MC4Max	Itron, Inc.	MC3C	74008263

*Support Equipment:*

Device	Manufacturer	Model #	S/N
12VDC Power Supply	Lamda	LUS-10A-12	91K121691
5dBi Antenna	PCTEL	Generic	NA
Receiver Antenna	PCTEL	SUB-0275-001/H	S15180005
Tablet	Panasonic	FZ-G1	990005071111034

### Configuration 3 (Conducted Laptop)

*Equipment Tested:*

Device	Manufacturer	Model #	S/N
MC3 & MC4Max	Itron, Inc.	MC3C	74008263

*Support Equipment:*

Device	Manufacturer	Model #	S/N
12VDC Power Supply	Lamda	LUS-10A-12	91K121691
Laptop	Panasonic	CF-33	1GTSAA65082

## General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	908-924MHz
Number of Hopping Channels:	81
Receiver Bandwidth and Synchronization:	The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter.
Modulation Type(s):	12.5kbps FM
Maximum Duty Cycle:	45mS
Number of TX Chains:	1
Antenna Type(s) and Gain:	External Omni / 5dbi
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	13.8VDC from car battery
Firmware / Software used for Test:	ARM version: 7.73.00.09 DSP version: 5.76.00.13 FPGA version: 3.02 TX version: 1.03 PSoC version: 3.01  MC3 Test 4.2.0.0 and 4.0.2.3
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

## EUT Photo(s)



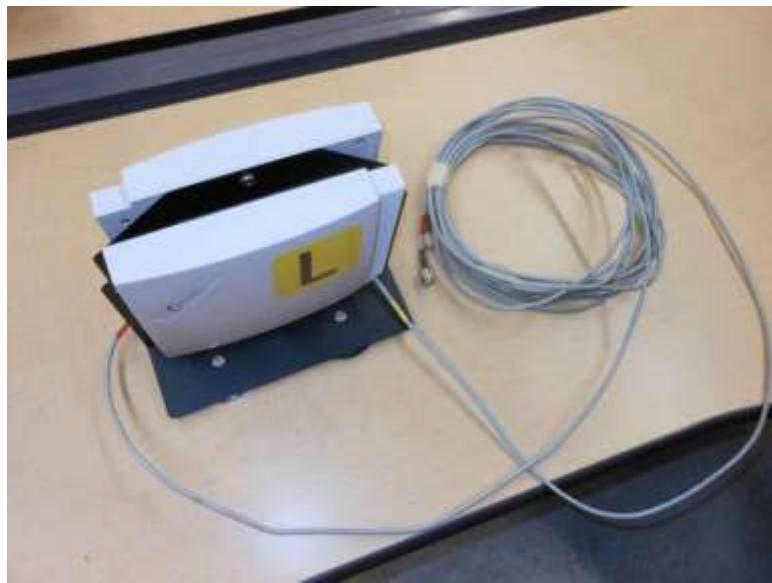
**Support Equipment Photo(s)**



Laptop



Tablet



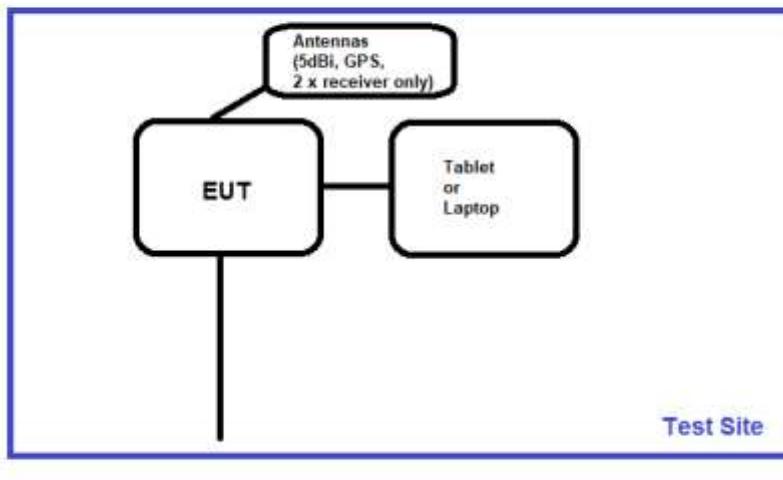
2xReceiver Antenna



5dBi and GPS Antenna

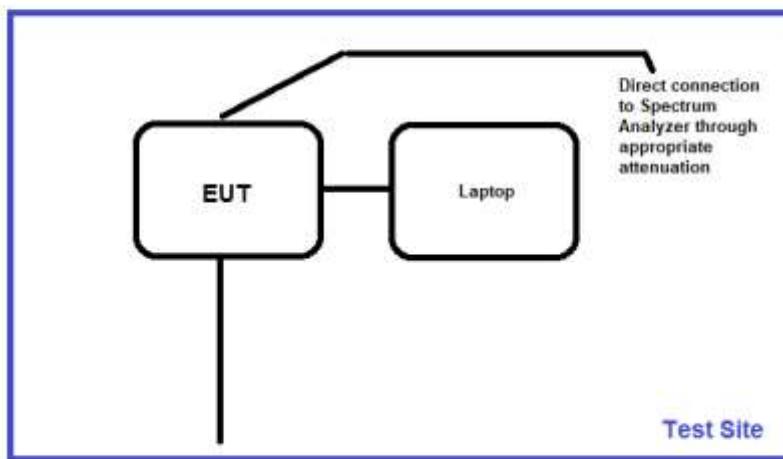
## Block Diagram of Test Setup(s)

### Test Setup Block Diagram



Radiated (Configuration 1 and 2)

### Test Setup Block Diagram



RF Conducted (Configuration 3)

## FCC Part 15 Subpart C

### 15.247(b)(2) Output Power

#### Test Setup/Conditions

Test Location:	Bothell Lab Bench	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013)	Test Date(s):	12/2/2022 – 12/12/2022
Configuration:	3		
Test Setup:	The EUT is placed on test bench. Powered from external power supply. USB port is connected to support computer. The EUT is continuously transmitting. The EUT is connected to a spectrum analyzer through appropriate cables and attenuation.		

#### Environmental Conditions

Temperature (°C)	20.5-22	Relative Humidity (%):	31-42
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#### Test Data Summary - Voltage Variations

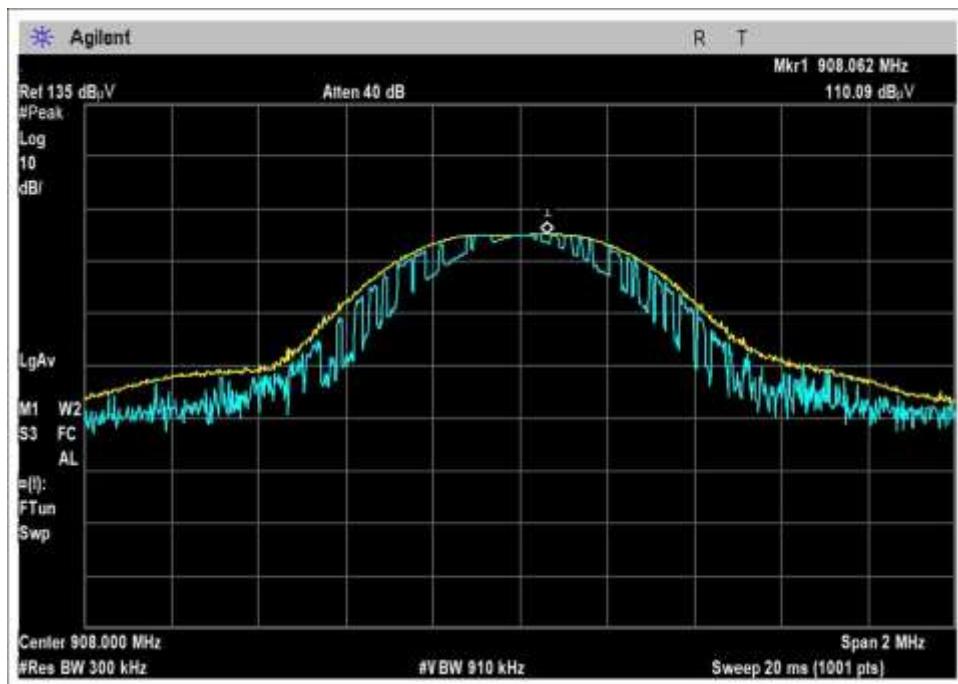
This equipment is battery powered. Power output tests were performed using an external power supply to simulate a fresh battery (13.8VDC).

#### Test Data Summary - RF Conducted Measurement

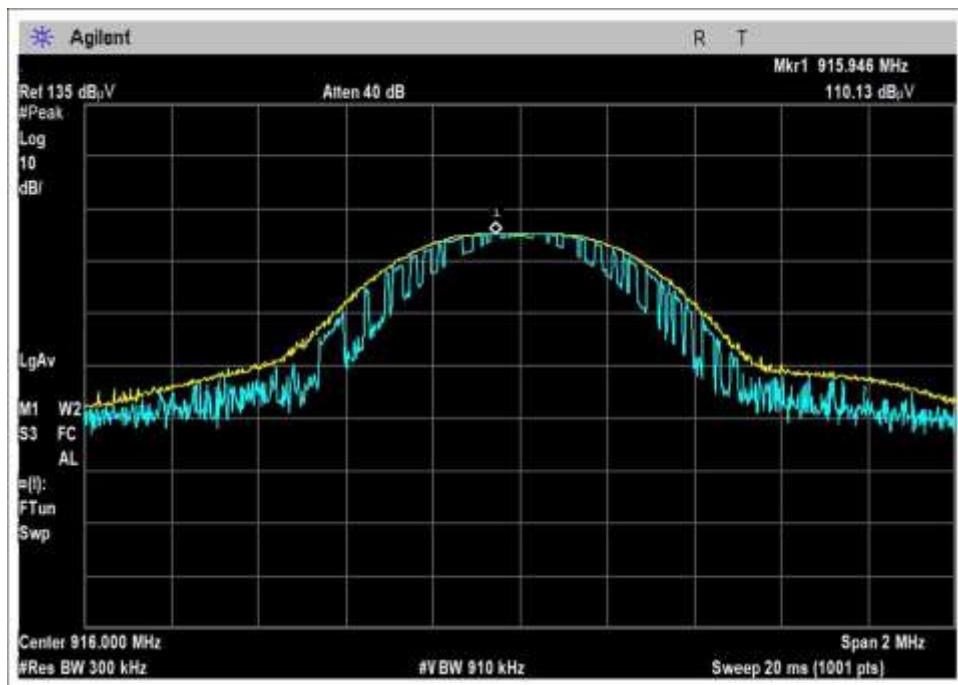
*Limit =  $\begin{cases} 30\text{dBm Conducted}/36\text{dBm EIRP} & | \geq 50 \text{ Channels} \\ 24\text{dBm Conducted}/30\text{dBm EIRP} & | < 50 \text{ Channels (min 25)} \end{cases}$*

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
908	12.5k FM	Omni, 5dBi	29.3	≤30	Pass
916	12.5k FM	Omni, 5dBi	29.4	≤30	Pass
924	12.5k FM	Omni, 5dBi	29.2	≤30	Pass

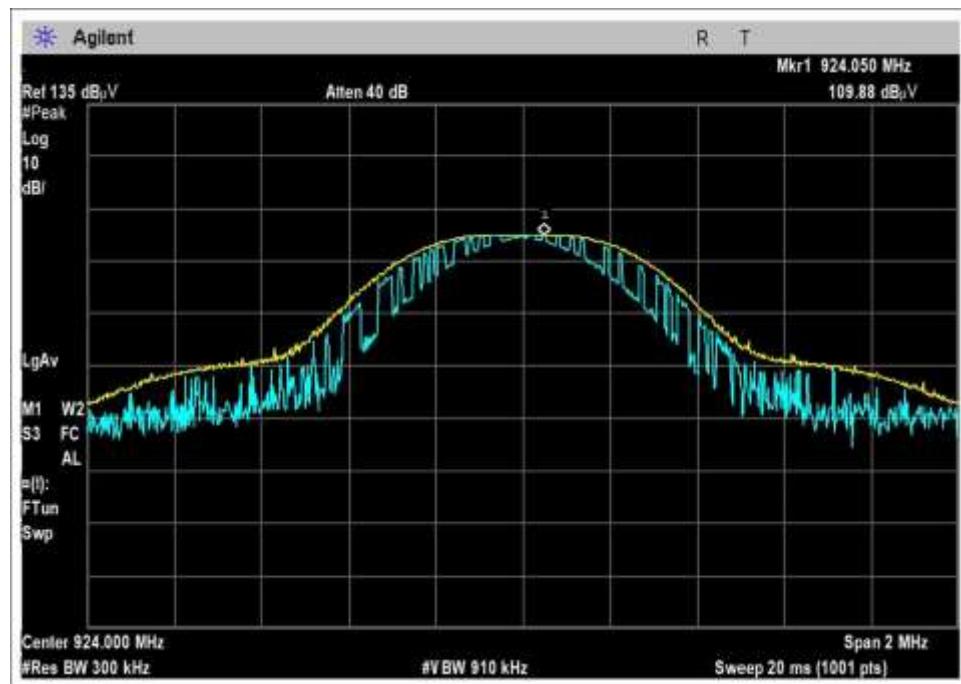
## Plots



Low Channel



Middle Channel



## High Channel

## Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**  
 Work Order #: **107795** Date: 12/12/2022  
 Test Type: **Conducted Emissions** Time: 13:33:58  
 Tested By: Michael Atkinson Sequence#: 1  
 Software: EMITest 5.03.20 13.8VDC

***Equipment Tested:***

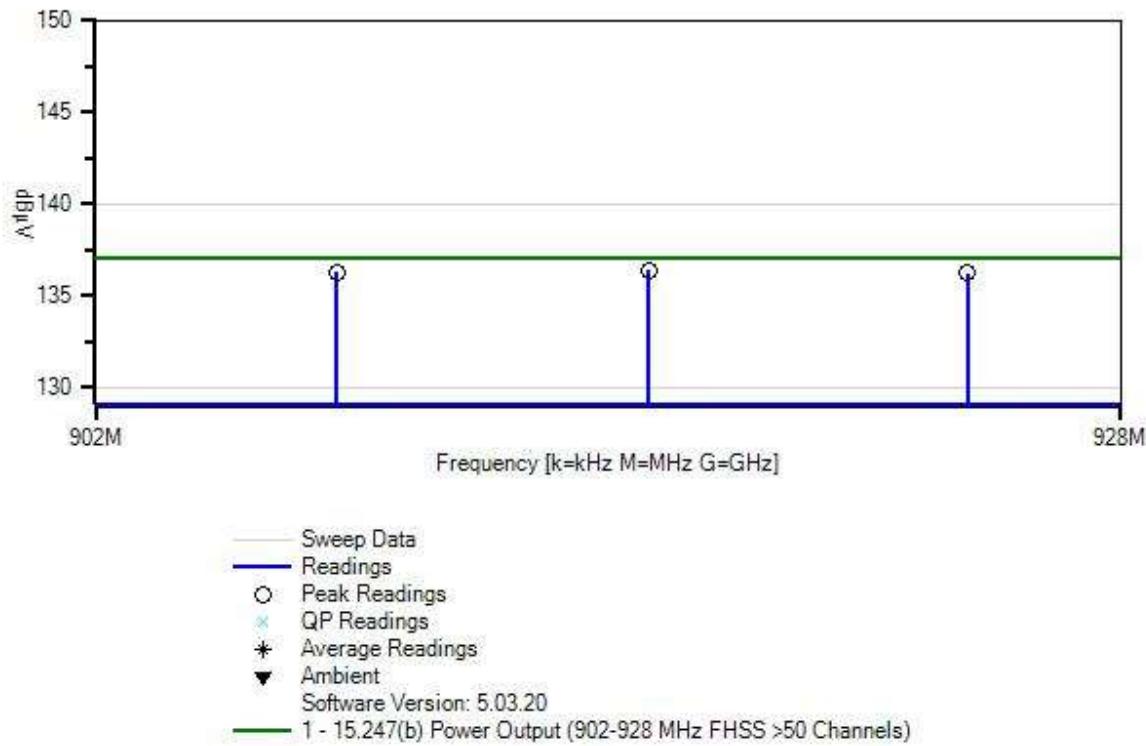
Device	Manufacturer	Model #	S/N
Configuration 3			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 3			

***Test Conditions / Notes:***

Frequency: Fundamental
Test Setup: Conducted Measurement, LMH channels.

Itron, Inc. WO#: 107795 Sequence#: 1 Date: 12/12/2022  
 15.247(b) Power Output (902-928 MHz FHSS >50 Channels) Test Lead: 13.8VDC RF Port

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07623	Attenuator	47-20-34	3/16/2022	3/16/2024
T2	ANP07746	Attenuator	PE7004-6	2/11/2021	2/11/2023
T3	ANP06452	Cable	Heliax	1/17/2022	1/17/2024
	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023

**Measurement Data:**

#	Freq MHz	Reading listed by margin.					Test Lead: RF Port				
		Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	915.946M	110.1	+19.7	+5.8	+0.8		+0.0	136.4	137.0	-0.6	RF Po
2	908.062M	110.1	+19.7	+5.8	+0.7		+0.0	136.3	137.0	-0.7	RF Po
3	924.054M	109.9	+19.7	+5.8	+0.8		+0.0	136.2	137.0	-0.8	RF Po

**Test Setup Photo(s)**



## 15.247(d) Radiated Emissions & Band Edge

### Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **107795** Date: 12/21/2022  
 Test Type: **Maximized Emissions** Time: 15:20:07  
 Tested By: Michael Atkinson Sequence#: 41  
 Software: EMITest 5.03.20

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Test Conditions / Notes:

Test Environment Conditions:

Temperature: 20°C

Humidity: 37%

Pressure: 102.2kPa

Test Method: ANSI C63.10 (2013)

Frequency: 9kHz-10GHz

Test Setup: EUT is continuously transmitting with modulation. Horizontal and vertical measurement antenna polarities investigated above 30MHz, 3 x orthogonal axes investigated below 30MHz, worst-case reported. EUT XYZ axes investigated, worst-case reported. Also investigated with MAS boards removed, as well as receiver only boards removed, the fully loaded unit is representative of worst-case.

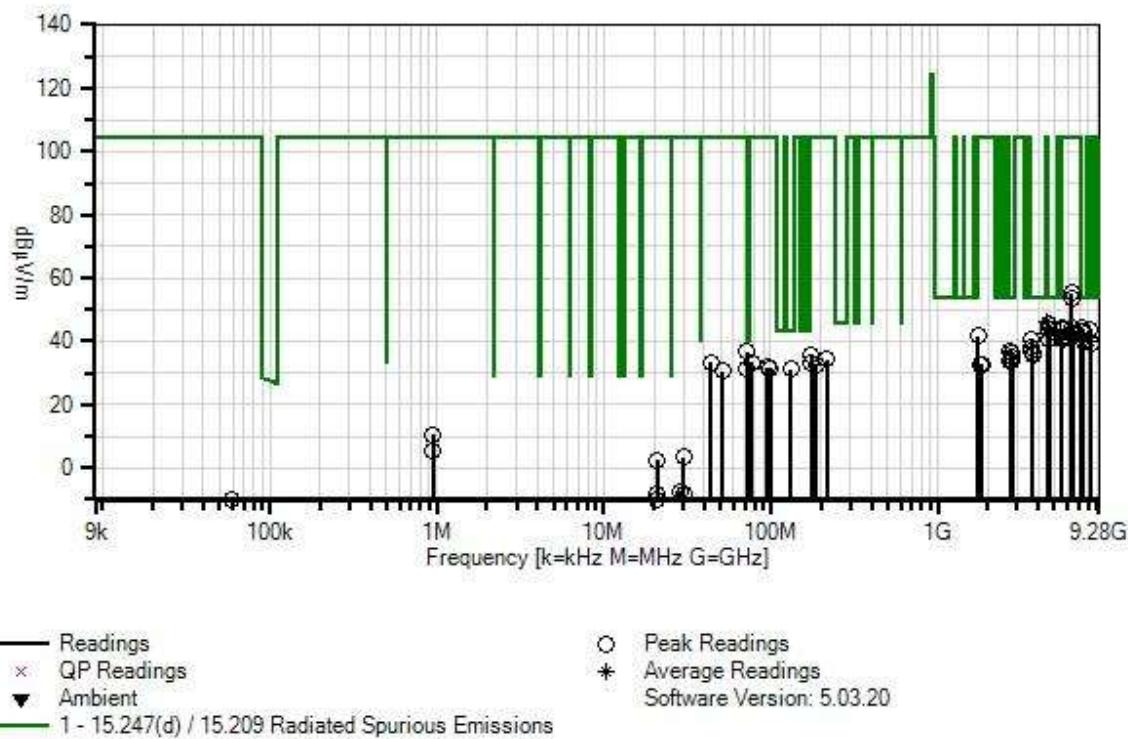
Power supply is remotely located outside of chamber with filter caps at chamber wall.

Investigated with antenna at 1.5m height, as well as moving the entire setup so the EUT is at 1.5m height, worst-case reported.

#### **MC4Max with Laptop**

Duty correction factor is applied to harmonics of the fundamental above 1GHz.

Correction factor =  $20\log(44.67\text{ms}/100\text{ms}) = -7.0\text{dB}$

Itron, Inc. WO#: 107795 Sequence#: 41 Date: 12/21/2022  
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T3	ANP05305	Cable	ETSI-50T	9/15/2021	9/15/2023
T4	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T6	AN00052	Loop Antenna	6502	5/11/2022	5/11/2024
T7	AN03170	High Pass Filter	HM1155-11SS	9/16/2021	9/16/2023
T8	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T9	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T10	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T11	AN45% DCCF	Test Data Adjustment		12/15/2022	12/15/2024

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8	Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m		Ant
1	4539.835M	49.6	+0.0	+0.6	+3.5	+0.0	+0.0	46.2	54.0	-7.8	Vert
	Ave		+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
^	4539.830M	53.5	+0.0	+0.6	+3.5	+0.0	+0.0	50.1	54.0	-3.9	Vert
			+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
3	4580.170M	49.0	+0.0	+0.6	+3.5	+0.0	+0.0	45.7	54.0	-8.3	Horiz
			+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
4	4579.860M	47.9	+0.0	+0.6	+3.5	+0.0	+0.0	44.6	54.0	-9.4	Vert
	Ave		+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
^	4579.860M	51.9	+0.0	+0.6	+3.5	+0.0	+0.0	48.6	54.0	-5.4	Vert
			+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
6	7328.260M	41.4	+0.0	+1.3	+4.5	+0.0	+0.0	44.2	54.0	-9.8	Vert
			+0.0	+0.0	+0.6	-34.9			916		
			+0.7	+37.5	-6.9						
7	8171.560M	39.5	+0.0	+1.2	+5.1	+0.0	+0.0	43.9	54.0	-10.1	Vert
			+0.0	+0.0	+0.7	-35.0			908		
			+0.7	+38.6	-6.9						
8	4620.020M	47.0	+0.0	+0.6	+3.5	+0.0	+0.0	43.8	54.0	-10.2	Horiz
			+0.0	+0.0	+0.4	-33.6			924		
			+0.4	+32.4	-6.9						
9	7263.900M	41.2	+0.0	+1.2	+4.5	+0.0	+0.0	43.3	54.0	-10.7	Vert
			+0.0	+0.0	+0.3	-34.9			908		
			+0.7	+37.2	-6.9						
10	5448.165M	43.3	+0.0	+0.8	+4.0	+0.0	+0.0	43.2	54.0	-10.8	Horiz
	Ave		+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
^	5448.165M	49.2	+0.0	+0.8	+4.0	+0.0	+0.0	49.1	54.0	-4.9	Horiz
			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
12	7327.840M	40.2	+0.0	+1.3	+4.5	+0.0	+0.0	43.0	54.0	-11.0	Horiz
			+0.0	+0.0	+0.6	-34.9			916		
			+0.7	+37.5	-6.9						
13	4540.000M	45.7	+0.0	+0.6	+3.5	+0.0	+0.0	42.3	54.0	-11.7	Horiz
	Ave		+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
^	4540.040M	49.5	+0.0	+0.6	+3.5	+0.0	+0.0	46.1	54.0	-7.9	Horiz
			+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
15	130.900M	16.3	+0.0	+0.1	+0.5	+0.7	+0.0	31.1	43.5	-12.4	Horiz
			+13.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						

16	3663.960M	45.2	+0.0	+0.6	+3.3	+0.0	+0.0	40.7	54.0	-13.3	Horiz
			+0.0	+0.0	+0.2	-33.8			916		
			+0.4	+31.7	-6.9						
17	3663.790M	45.2	+0.0	+0.6	+3.3	+0.0	+0.0	40.7	54.0	-13.3	Vert
			+0.0	+0.0	+0.2	-33.8			916		
			+0.4	+31.7	-6.9						
18	4620.220M	43.9	+0.0	+0.6	+3.5	+0.0	+0.0	40.7	54.0	-13.3	Vert
			+0.0	+0.0	+0.4	-33.6			924		
19	5448.545M	40.7	+0.0	+0.8	+4.0	+0.0	+0.0	40.6	54.0	-13.4	Vert
Ave			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
^	5448.540M	49.5	+0.0	+0.8	+4.0	+0.0	+0.0	49.4	54.0	-4.6	Vert
			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
21	7391.900M	37.2	+0.0	+1.3	+4.5	+0.0	+0.0	40.0	54.0	-14.0	Vert
			+0.0	+0.0	+0.7	-34.9			924		
			+0.7	+37.4	-6.9						
22	8172.265M	35.5	+0.0	+1.2	+5.1	+0.0	+0.0	39.9	54.0	-14.1	Horiz
Ave			+0.0	+0.0	+0.7	-35.0			908		
			+0.7	+38.6	-6.9						
^	8172.265M	42.8	+0.0	+1.2	+5.1	+0.0	+0.0	47.2	54.0	-6.8	Horiz
			+0.0	+0.0	+0.7	-35.0			908		
			+0.7	+38.6	-6.9						
24	8315.590M	34.4	+0.0	+1.2	+5.2	+0.0	+0.0	39.3	54.0	-14.7	Horiz
			+0.0	+0.0	+0.9	-34.9			924		
			+0.7	+38.7	-6.9						
25	3632.033M	42.3	+0.0	+0.6	+3.3	+0.0	+0.0	37.9	54.0	-16.1	Horiz
			+0.0	+0.0	+0.3	-33.8			908		
			+0.4	+31.7	-6.9						
26	2724.150M	44.7	+0.0	+0.5	+2.7	+0.0	+0.0	37.0	54.0	-17.0	Vert
			+0.0	+0.0	+0.2	-34.1			908		
			+0.5	+29.4	-6.9						
27	3631.910M	41.3	+0.0	+0.6	+3.3	+0.0	+0.0	36.9	54.0	-17.1	Vert
			+0.0	+0.0	+0.3	-33.8			908		
			+0.4	+31.7	-6.9						
28	2748.120M	44.3	+0.0	+0.5	+2.7	+0.0	+0.0	36.6	54.0	-17.4	Vert
			+0.0	+0.0	+0.3	-34.1			916		
			+0.5	+29.3	-6.9						
29	3696.130M	40.8	+0.0	+0.6	+3.3	+0.0	+0.0	36.4	54.0	-17.6	Vert
			+0.0	+0.0	+0.2	-33.8			924		
			+0.3	+31.9	-6.9						
30	3696.020M	40.1	+0.0	+0.6	+3.3	+0.0	+0.0	35.7	54.0	-18.3	Horiz
			+0.0	+0.0	+0.2	-33.8			924		
			+0.3	+31.9	-6.9						
31	2748.000M	43.0	+0.0	+0.5	+2.7	+0.0	+0.0	35.3	54.0	-18.7	Vert
			+0.0	+0.0	+0.3	-34.1			916		
			+0.5	+29.3	-6.9						
32	2772.000M	42.8	+0.0	+0.5	+2.7	+0.0	+0.0	35.1	54.0	-18.9	Horiz
			+0.0	+0.0	+0.3	-34.1			924		
			+0.5	+29.3	-6.9						

33	2747.680M	41.6	+0.0	+0.5	+2.7	+0.0	+0.0	33.9	54.0	-20.1	Horiz
			+0.0	+0.0	+0.3	-34.1			916		
			+0.5	+29.3	-6.9						
34	2772.020M	41.5	+0.0	+0.5	+2.7	+0.0	+0.0	33.8	54.0	-20.2	Vert
			+0.0	+0.0	+0.3	-34.1			924		
			+0.5	+29.3	-6.9						
35	2724.333M	41.4	+0.0	+0.5	+2.7	+0.0	+0.0	33.7	54.0	-20.3	Horiz
			+0.0	+0.0	+0.2	-34.1			908		
			+0.5	+29.4	-6.9						
36	6356.490M	54.9	+0.0	+0.9	+4.4	+0.0	+0.0	55.4	104.5	-49.1	Horiz
			+0.0	+0.0	+0.4	-34.0			908		
			+0.6	+35.1	-6.9						
37	6356.590M	53.2	+0.0	+0.9	+4.4	+0.0	+0.0	53.7	104.5	-50.8	Vert
			+0.0	+0.0	+0.4	-34.0			908		
			+0.6	+35.1	-6.9						
38	6411.510M	43.9	+0.0	+0.9	+4.5	+0.0	+0.0	44.5	104.5	-60.0	Vert
			+0.0	+0.0	+0.5	-34.0			916		
			+0.6	+35.0	-6.9						
39	5544.400M	44.2	+0.0	+0.8	+4.0	+0.0	+0.0	44.1	104.5	-60.4	Horiz
			+0.0	+0.0	+0.5	-33.6			924		
			+0.5	+34.6	-6.9						
40	5544.110M	43.9	+0.0	+0.8	+4.0	+0.0	+0.0	43.8	104.5	-60.7	Vert
			+0.0	+0.0	+0.5	-33.6			924		
			+0.5	+34.6	-6.9						
41	6412.500M	42.0	+0.0	+0.9	+4.5	+0.0	+0.0	42.6	104.5	-61.9	Horiz
			+0.0	+0.0	+0.5	-34.0			916		
			+0.6	+35.0	-6.9						
42	6468.250M	41.7	+0.0	+0.9	+4.5	+0.0	+0.0	42.4	104.5	-62.1	Vert
			+0.0	+0.0	+0.6	-34.0			924		
			+0.7	+34.9	-6.9						
43	6467.490M	41.0	+0.0	+0.9	+4.5	+0.0	+0.0	41.7	104.5	-62.8	Horiz
			+0.0	+0.0	+0.6	-34.0			924		
			+0.7	+34.9	-6.9						
44	1744.000M	46.8	+0.0	+0.4	+2.1	+0.0	+0.0	41.6	104.5	-62.9	Vert
			+0.0	+0.0	+0.6	-34.8					
			+0.3	+26.2	+0.0						
45	5495.670M	41.5	+0.0	+0.8	+4.0	+0.0	+0.0	41.4	104.5	-63.1	Vert
			+0.0	+0.0	+0.4	-33.6			916		
			+0.5	+34.7	-6.9						
46	5496.340M	40.7	+0.0	+0.8	+4.0	+0.0	+0.0	40.6	104.5	-63.9	Horiz
			+0.0	+0.0	+0.4	-33.6			916		
			+0.5	+34.7	-6.9						
47	71.700M	23.0	+0.0	+0.1	+0.4	+0.5	+0.0	36.9	104.5	-67.6	Vert
			+12.9	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
48	173.600M	18.6	+0.0	+0.1	+0.6	+0.9	+0.0	35.8	104.5	-68.7	Vert
			+15.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
49	216.200M	16.0	+0.0	+0.1	+0.7	+1.0	+0.0	34.3	104.5	-70.2	Horiz
			+16.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						

50	43.600M	18.2	+0.0	+0.1	+0.3	+0.5	+0.0	33.4	104.5	-71.1	Vert
			+14.3	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
51	76.600M	19.6	+0.0	+0.1	+0.4	+0.6	+0.0	33.4	104.5	-71.1	Vert
			+12.7	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
52	173.600M	16.0	+0.0	+0.1	+0.6	+0.9	+0.0	33.2	104.5	-71.3	Horiz
			+15.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
53	1831.940M	43.5	+0.0	+0.4	+2.1	+0.0	+0.0	32.8	104.5	-71.7	Vert
			+0.0	+0.0	+0.6	-34.7			916		
			+0.3	+27.5	-6.9						
54	1816.070M	43.5	+0.0	+0.4	+2.1	+0.0	+0.0	32.7	104.5	-71.8	Vert
			+0.0	+0.0	+0.6	-34.7			908		
			+0.3	+27.4	-6.9						
55	188.100M	15.5	+0.0	+0.1	+0.7	+0.9	+0.0	32.6	104.5	-71.9	Vert
			+15.4	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
56	1848.040M	42.9	+0.0	+0.4	+2.1	+0.0	+0.0	32.3	104.5	-72.2	Vert
			+0.0	+0.0	+0.6	-34.7			924		
			+0.3	+27.6	-6.9						
57	96.000M	17.3	+0.0	+0.1	+0.5	+0.6	+0.0	31.8	104.5	-72.7	Vert
			+13.3	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
58	98.900M	16.6	+0.0	+0.1	+0.5	+0.6	+0.0	31.5	104.5	-73.0	Horiz
			+13.7	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
59	71.700M	17.2	+0.0	+0.1	+0.4	+0.5	+0.0	31.1	104.5	-73.4	Horiz
			+12.9	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
60	51.300M	17.5	+0.0	+0.1	+0.3	+0.5	+0.0	30.7	104.5	-73.8	Vert
			+12.3	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
61	949.200k	40.8	+0.0	+0.1	+0.1	+0.0	-40.0	10.5	104.5	-94.0	Perp
			+0.0	+9.5	+0.0	+0.0					
			+0.0	+0.0	+0.0						
62	950.100k	36.0	+0.0	+0.1	+0.1	+0.0	-40.0	5.7	104.5	-98.8	Para
			+0.0	+9.5	+0.0	+0.0					
			+0.0	+0.0	+0.0						
63	29.855M	39.4	+0.0	+0.1	+0.3	+0.0	-40.0	3.5	104.5	-101.0	Groun
			+0.0	+3.7	+0.0	+0.0					
			+0.0	+0.0	+0.0						
64	20.894M	36.0	+0.0	+0.1	+0.2	+0.0	-40.0	2.5	104.5	-102.0	Groun
			+0.0	+6.2	+0.0	+0.0					
			+0.0	+0.0	+0.0						
65	28.347M	28.1	+0.0	+0.1	+0.2	+0.0	-40.0	-7.3	104.5	-111.8	Para
			+0.0	+4.3	+0.0	+0.0					
			+0.0	+0.0	+0.0						
66	29.855M	27.8	+0.0	+0.1	+0.3	+0.0	-40.0	-8.1	104.5	-112.6	Perp
			+0.0	+3.7	+0.0	+0.0					
			+0.0	+0.0	+0.0						

67	20.894M	25.1	+0.0	+0.1	+0.2	+0.0	-40.0	-8.4	104.5	-112.9	Para
			+0.0	+6.2	+0.0	+0.0					
			+0.0	+0.0	+0.0						
68	58.428k	60.6	+0.0	+0.1	+0.0	+0.0	-80.0	-9.7	104.5	-114.2	Para
			+0.0	+9.6	+0.0	+0.0					
			+0.0	+0.0	+0.0						
69	20.894M	23.7	+0.0	+0.1	+0.2	+0.0	-40.0	-9.8	104.5	-114.3	Perp
			+0.0	+6.2	+0.0	+0.0					
			+0.0	+0.0	+0.0						



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
Customer: **Itron, Inc.**  
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
Work Order #: **107795** Date: 12/21/2022  
Test Type: **Maximized Emissions** Time: 16:15:33  
Tested By: Michael Atkinson Sequence#: 42  
Software: EMITest 5.03.20

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Test Conditions / Notes:***

Test Environment Conditions:

Temperature: 20°C

Humidity: 37%

Pressure: 102.2kPa

Test Method: ANSI C63.10 (2013)

Frequency: 9kHz-10GHz

Test Setup: EUT is continuously transmitting with modulation. Horizontal and vertical measurement antenna polarities investigated above 30MHz, 3 x orthogonal axes investigated below 30MHz, worst-case reported. EUT XYZ axes investigated, worst-case reported. Also investigated with MAS boards removed, as well as receiver only boards removed, the fully loaded unit is representative of worst-case.

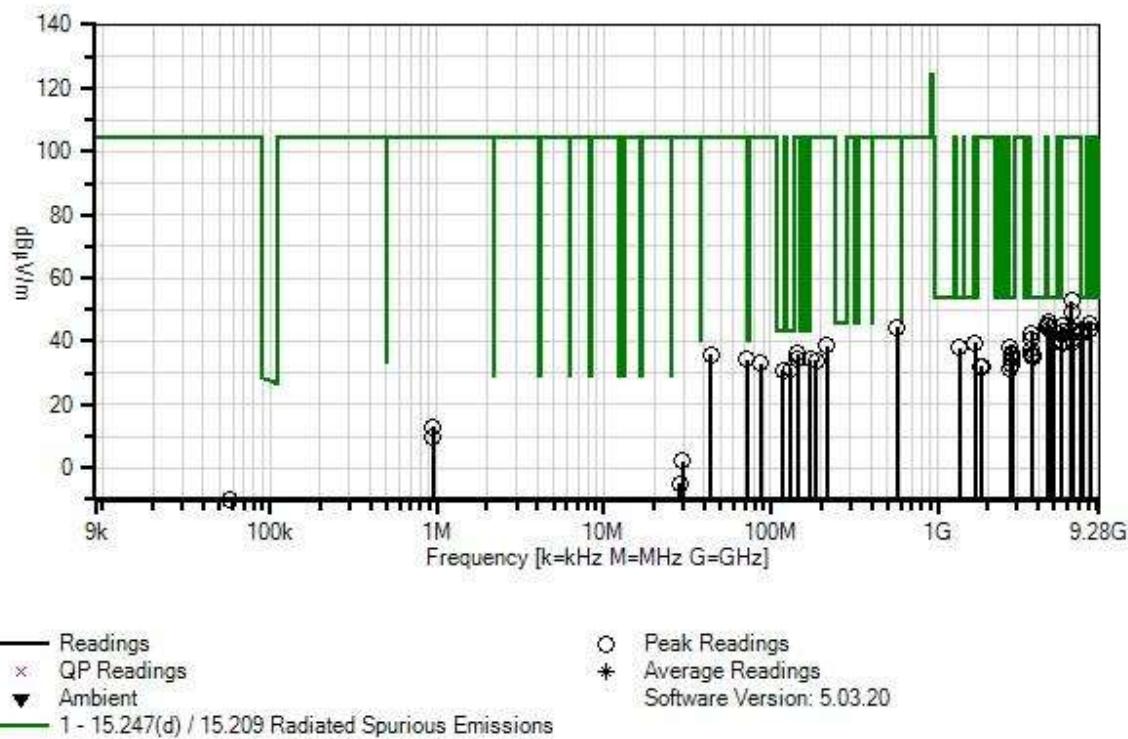
Power supply is remotely located outside of chamber with filter caps at chamber wall.

Investigated with antenna at 1.5m height, as well as moving the entire setup so the EUT is at 1.5m height, worst-case reported.

***MC4Max with Tablet***

Duty correction factor is applied to harmonics of the fundamental above 1GHz

Correction factor =  $20\log(44.67\text{ms}/100\text{ms}) = -7.0\text{dB}$

Itron, Inc. WO#: 107795 Sequence#: 42 Date: 12/21/2022  
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T3	ANP05305	Cable	ETSI-50T	9/15/2021	9/15/2023
T4	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T5	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T6	AN00052	Loop Antenna	6502	5/11/2022	5/11/2024
T7	AN03170	High Pass Filter	HM1155-11SS	9/16/2021	9/16/2023
T8	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T9	ANP07504	Cable	CLU40-KMKM-02.00F	1/26/2021	1/26/2023
T10	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T11	AN45% DCCF	Test Data Adjustment		12/15/2022	12/15/2024

<b>Measurement Data:</b>			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8	Table	dB $\mu$ V/m	dB $\mu$ V/m		
			T9	T10	T11						
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	4580.160M	49.7	+0.0	+0.6	+3.5	+0.0	+0.0	46.4	54.0	-7.6	Horiz
			+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
2	8172.360M	41.3	+0.0	+1.2	+5.1	+0.0	+0.0	45.7	54.0	-8.3	Horiz
			+0.0	+0.0	+0.7	-35.0			908		
			+0.7	+38.6	-6.9						
3	4540.060M	48.6	+0.0	+0.6	+3.5	+0.0	+0.0	45.2	54.0	-8.8	Horiz
			+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
4	4620.310M	48.1	+0.0	+0.6	+3.5	+0.0	+0.0	44.9	54.0	-9.1	Horiz
			+0.0	+0.0	+0.4	-33.6			924		
			+0.4	+32.4	-6.9						
5	172.600M	17.0	+0.0	+0.1	+0.6	+0.9	+0.0	34.2	43.5	-9.3	Horiz
			+15.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
6	4620.140M	47.2	+0.0	+0.6	+3.5	+0.0	+0.0	44.0	54.0	-10.0	Vert
Ave			+0.0	+0.0	+0.4	-33.6			924		
			+0.4	+32.4	-6.9						
^	4620.140M	51.2	+0.0	+0.6	+3.5	+0.0	+0.0	48.0	54.0	-6.0	Vert
			+0.0	+0.0	+0.4	-33.6			924		
			+0.4	+32.4	-6.9						
8	7264.250M	41.8	+0.0	+1.2	+4.5	+0.0	+0.0	43.9	54.0	-10.1	Horiz
			+0.0	+0.0	+0.3	-34.9			908		
			+0.7	+37.2	-6.9						
9	4539.650M	46.9	+0.0	+0.6	+3.5	+0.0	+0.0	43.5	54.0	-10.5	Vert
Ave			+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
^	4539.650M	51.9	+0.0	+0.6	+3.5	+0.0	+0.0	48.5	54.0	-5.5	Vert
			+0.0	+0.0	+0.6	-33.6			908		
			+0.3	+32.1	-6.9						
11	8172.270M	39.0	+0.0	+1.2	+5.1	+0.0	+0.0	43.4	54.0	-10.6	Vert
			+0.0	+0.0	+0.7	-35.0			908		
			+0.7	+38.6	-6.9						
12	7327.610M	40.4	+0.0	+1.3	+4.5	+0.0	+0.0	43.2	54.0	-10.8	Vert
			+0.0	+0.0	+0.6	-34.9			916		
			+0.7	+37.5	-6.9						
13	4579.700M	46.2	+0.0	+0.6	+3.5	+0.0	+0.0	42.9	54.0	-11.1	Vert
Ave			+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
^	4579.700M	51.7	+0.0	+0.6	+3.5	+0.0	+0.0	48.4	54.0	-5.6	Vert
			+0.0	+0.0	+0.5	-33.6			916		
			+0.4	+32.2	-6.9						
15	7327.710M	40.0	+0.0	+1.3	+4.5	+0.0	+0.0	42.8	54.0	-11.2	Horiz
			+0.0	+0.0	+0.6	-34.9			916		
			+0.7	+37.5	-6.9						

16	7264.410M	40.5	+0.0	+1.2	+4.5	+0.0	+0.0	42.6	54.0	-11.4	Vert
			+0.0	+0.0	+0.3	-34.9			908		
			+0.7	+37.2	-6.9						
17	3663.780M	47.0	+0.0	+0.6	+3.3	+0.0	+0.0	42.5	54.0	-11.5	Vert
			+0.0	+0.0	+0.2	-33.8			916		
			+0.4	+31.7	-6.9						
18	5448.380M	42.3	+0.0	+0.8	+4.0	+0.0	+0.0	42.2	54.0	-11.8	Horiz
Ave			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
^	5448.380M	47.7	+0.0	+0.8	+4.0	+0.0	+0.0	47.6	54.0	-6.4	Horiz
			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
20	5448.410M	42.1	+0.0	+0.8	+4.0	+0.0	+0.0	42.0	54.0	-12.0	Vert
Ave			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
^	5448.430M	48.8	+0.0	+0.8	+4.0	+0.0	+0.0	48.7	54.0	-5.3	Vert
			+0.0	+0.0	+0.4	-33.6			908		
			+0.5	+34.7	-6.9						
22	130.900M	16.6	+0.0	+0.1	+0.5	+0.7	+0.0	31.4	43.5	-12.1	Horiz
			+13.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
23	4989.223M	35.5	+0.0	+0.7	+3.8	+0.0	+0.0	41.7	54.0	-12.3	Vert
Ave			+0.0	+0.0	+0.6	-33.4					
			+0.7	+33.8	+0.0						
^	4989.220M	47.8	+0.0	+0.7	+3.8	+0.0	+0.0	54.0	54.0	+0.0	Vert
			+0.0	+0.0	+0.6	-33.4					
			+0.7	+33.8	+0.0						
25	118.300M	16.1	+0.0	+0.1	+0.5	+0.7	+0.0	30.8	43.5	-12.7	Vert
			+13.4	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
26	4989.000M	35.0	+0.0	+0.7	+3.8	+0.0	+0.0	41.2	54.0	-12.8	Horiz
Ave			+0.0	+0.0	+0.6	-33.4					
			+0.7	+33.8	+0.0						
^	4989.000M	47.0	+0.0	+0.7	+3.8	+0.0	+0.0	53.2	54.0	-0.8	Horiz
			+0.0	+0.0	+0.6	-33.4					
			+0.7	+33.8	+0.0						
28	3663.950M	44.9	+0.0	+0.6	+3.3	+0.0	+0.0	40.4	54.0	-13.6	Horiz
			+0.0	+0.0	+0.2	-33.8			916		
			+0.4	+31.7	-6.9						
29	1662.000M	45.4	+0.0	+0.4	+2.0	+0.0	+0.0	39.4	54.0	-14.6	Vert
			+0.0	+0.0	+0.4	-34.9					
			+0.3	+25.8	+0.0						
30	1354.000M	45.3	+0.0	+0.3	+1.8	+0.0	+0.0	38.1	54.0	-15.9	Vert
			+0.0	+0.0	+0.7	-35.6					
			+0.2	+25.4	+0.0						
31	2723.870M	45.6	+0.0	+0.5	+2.7	+0.0	+0.0	37.9	54.0	-16.1	Vert
			+0.0	+0.0	+0.2	-34.1			908		
			+0.5	+29.4	-6.9						
32	3632.350M	41.7	+0.0	+0.6	+3.3	+0.0	+0.0	37.3	54.0	-16.7	Horiz
			+0.0	+0.0	+0.3	-33.8			908		
			+0.4	+31.7	-6.9						

33	2748.120M	44.0	+0.0	+0.5	+2.7	+0.0	+0.0	36.3	54.0	-17.7	Vert
			+0.0	+0.0	+0.3	-34.1			916		
			+0.5	+29.3	-6.9						
34	3696.050M	40.4	+0.0	+0.6	+3.3	+0.0	+0.0	36.0	54.0	-18.0	Horiz
			+0.0	+0.0	+0.2	-33.8			924		
			+0.3	+31.9	-6.9						
35	2771.960M	43.5	+0.0	+0.5	+2.7	+0.0	+0.0	35.8	54.0	-18.2	Horiz
			+0.0	+0.0	+0.3	-34.1			924		
			+0.5	+29.3	-6.9						
36	3632.130M	40.1	+0.0	+0.6	+3.3	+0.0	+0.0	35.7	54.0	-18.3	Vert
			+0.0	+0.0	+0.3	-33.8			908		
			+0.4	+31.7	-6.9						
37	3695.960M	39.4	+0.0	+0.6	+3.3	+0.0	+0.0	35.0	54.0	-19.0	Vert
			+0.0	+0.0	+0.2	-33.8			924		
			+0.3	+31.9	-6.9						
38	2772.020M	42.3	+0.0	+0.5	+2.7	+0.0	+0.0	34.6	54.0	-19.4	Vert
			+0.0	+0.0	+0.3	-34.1			924		
			+0.5	+29.3	-6.9						
39	2747.970M	40.4	+0.0	+0.5	+2.7	+0.0	+0.0	32.7	54.0	-21.3	Horiz
			+0.0	+0.0	+0.3	-34.1			916		
			+0.5	+29.3	-6.9						
40	2724.200M	39.1	+0.0	+0.5	+2.7	+0.0	+0.0	31.4	54.0	-22.6	Horiz
			+0.0	+0.0	+0.2	-34.1			908		
			+0.5	+29.4	-6.9						
41	6356.260M	52.3	+0.0	+0.9	+4.4	+0.0	+0.0	52.8	104.5	-51.7	Horiz
			+0.0	+0.0	+0.4	-34.0			908		
			+0.6	+35.1	-6.9						
42	6356.440M	48.8	+0.0	+0.9	+4.4	+0.0	+0.0	49.3	104.5	-55.2	Vert
			+0.0	+0.0	+0.4	-34.0			908		
			+0.6	+35.1	-6.9						
43	5544.310M	44.9	+0.0	+0.8	+4.0	+0.0	+0.0	44.8	104.5	-59.7	Horiz
			+0.0	+0.0	+0.5	-33.6			924		
			+0.5	+34.6	-6.9						
44	571.300M	15.8	+0.0	+0.2	+1.1	+1.8	+0.0	44.5	104.5	-60.0	Vert
			+25.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
45	6411.400M	43.2	+0.0	+0.9	+4.5	+0.0	+0.0	43.8	104.5	-60.7	Vert
			+0.0	+0.0	+0.5	-34.0			916		
			+0.6	+35.0	-6.9						
46	6468.360M	42.4	+0.0	+0.9	+4.5	+0.0	+0.0	43.1	104.5	-61.4	Vert
			+0.0	+0.0	+0.6	-34.0			924		
			+0.7	+34.9	-6.9						
47	5544.160M	43.0	+0.0	+0.8	+4.0	+0.0	+0.0	42.9	104.5	-61.6	Vert
			+0.0	+0.0	+0.5	-33.6			924		
			+0.5	+34.6	-6.9						
48	6411.770M	40.2	+0.0	+0.9	+4.5	+0.0	+0.0	40.8	104.5	-63.7	Horiz
			+0.0	+0.0	+0.5	-34.0			916		
			+0.6	+35.0	-6.9						
49	6467.580M	39.5	+0.0	+0.9	+4.5	+0.0	+0.0	40.2	104.5	-64.3	Horiz
			+0.0	+0.0	+0.6	-34.0			924		
			+0.7	+34.9	-6.9						

50	5496.160M	39.9	+0.0	+0.8	+4.0	+0.0	+0.0	39.8	104.5	-64.7	Horiz
			+0.0	+0.0	+0.4	-33.6			916		
			+0.5	+34.7	-6.9						
51	5495.990M	39.4	+0.0	+0.8	+4.0	+0.0	+0.0	39.3	104.5	-65.2	Vert
			+0.0	+0.0	+0.4	-33.6			916		
			+0.5	+34.7	-6.9						
52	217.200M	20.2	+0.0	+0.1	+0.7	+1.0	+0.0	38.5	104.5	-66.0	Horiz
			+16.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
53	144.500M	20.6	+0.0	+0.1	+0.5	+0.8	+0.0	36.0	104.5	-68.5	Vert
			+14.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
54	43.600M	20.5	+0.0	+0.1	+0.3	+0.5	+0.0	35.7	104.5	-68.8	Vert
			+14.3	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
55	145.400M	19.2	+0.0	+0.1	+0.5	+0.8	+0.0	34.6	104.5	-69.9	Horiz
			+14.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
56	71.700M	20.3	+0.0	+0.1	+0.4	+0.5	+0.0	34.2	104.5	-70.3	Vert
			+12.9	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
57	186.200M	16.8	+0.0	+0.1	+0.7	+0.9	+0.0	34.0	104.5	-70.5	Vert
			+15.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
58	87.200M	19.6	+0.0	+0.1	+0.4	+0.6	+0.0	33.2	104.5	-71.3	Vert
			+12.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
59	1847.580M	42.7	+0.0	+0.4	+2.1	+0.0	+0.0	32.1	104.5	-72.4	Vert
			+0.0	+0.0	+0.6	-34.7			924		
			+0.3	+27.6	-6.9						
60	1816.360M	42.9	+0.0	+0.4	+2.1	+0.0	+0.0	32.1	104.5	-72.4	Vert
			+0.0	+0.0	+0.6	-34.7			908		
			+0.3	+27.4	-6.9						
61	950.100k	43.3	+0.0	+0.1	+0.1	+0.0	-40.0	13.0	104.5	-91.5	Groun
			+0.0	+9.5	+0.0	+0.0					
			+0.0	+0.0	+0.0						
62	949.200k	40.0	+0.0	+0.1	+0.1	+0.0	-40.0	9.7	104.5	-94.8	Para
			+0.0	+9.5	+0.0	+0.0					
			+0.0	+0.0	+0.0						
63	29.826M	38.1	+0.0	+0.1	+0.3	+0.0	-40.0	2.2	104.5	-102.3	Groun
			+0.0	+3.7	+0.0	+0.0					
			+0.0	+0.0	+0.0						
64	28.318M	30.3	+0.0	+0.1	+0.2	+0.0	-40.0	-5.0	104.5	-109.5	Para
			+0.0	+4.4	+0.0	+0.0					
			+0.0	+0.0	+0.0						
65	57.688k	60.5	+0.0	+0.1	+0.0	+0.0	-80.0	-9.7	104.5	-114.2	Groun
			+0.0	+9.7	+0.0	+0.0					
			+0.0	+0.0	+0.0						
66	57.780k	59.1	+0.0	+0.1	+0.0	+0.0	-80.0	-11.1	104.5	-115.6	Para
			+0.0	+9.7	+0.0	+0.0					
			+0.0	+0.0	+0.0						

## Band Edge

### Band Edge Summary

Configuration 1 (MC4Max and Laptop)

Frequency (MHz)	SC or Hopping	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	SC	Omni	55.4	104.5	Pass
928	SC	Omni	65.6	104.5	Pass
902	Hopping	Omni	56.3	104.5	Pass
928	Hopping	Omni	64.2	104.5	Pass
614	SC	Omni	38.4	46	Pass
960	SC	Omni	42.8	54	Pass
614	Hopping	Omni	38.5	46	Pass
960	Hopping	Omni	42.8	54	Pass

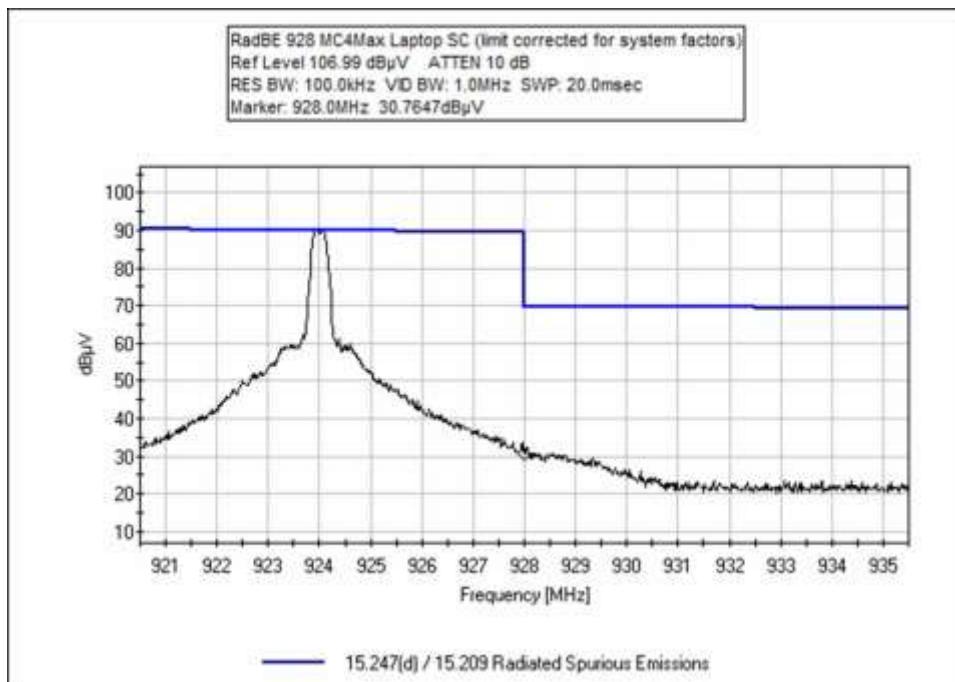
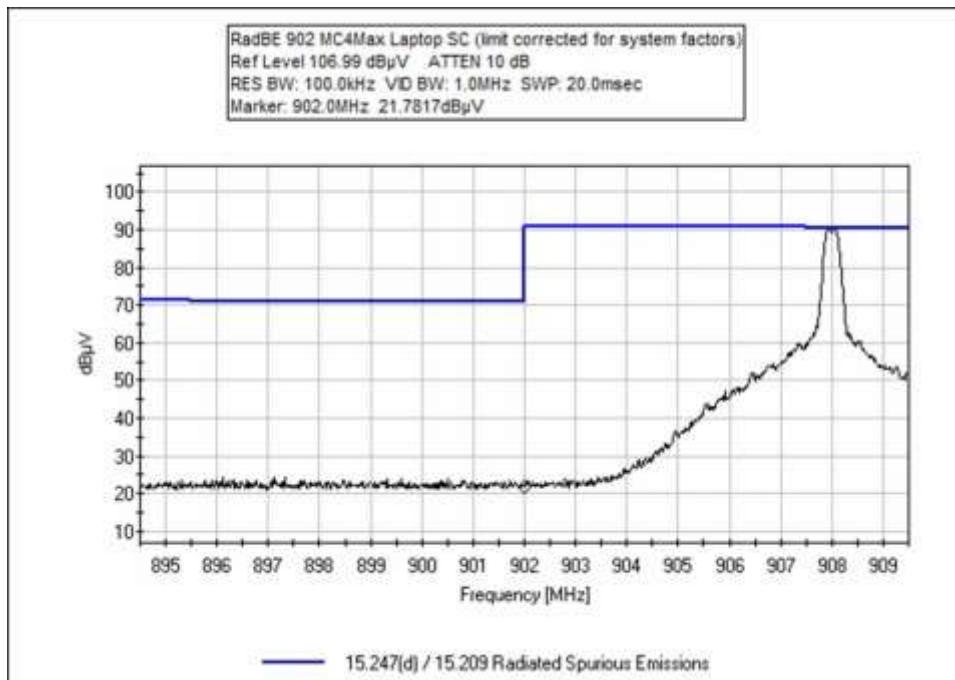
### Band Edge Summary

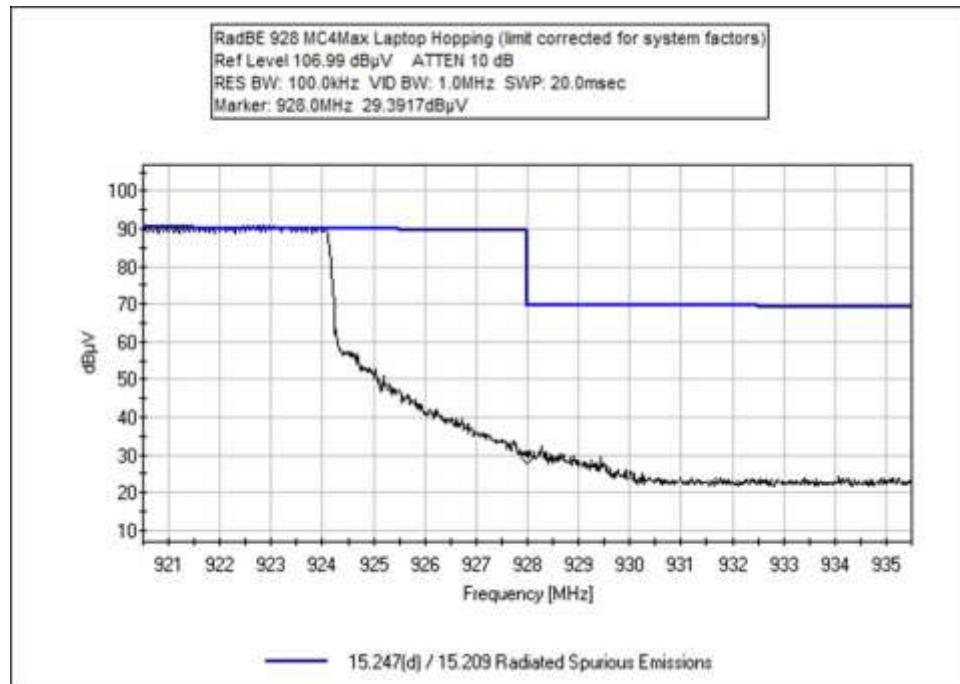
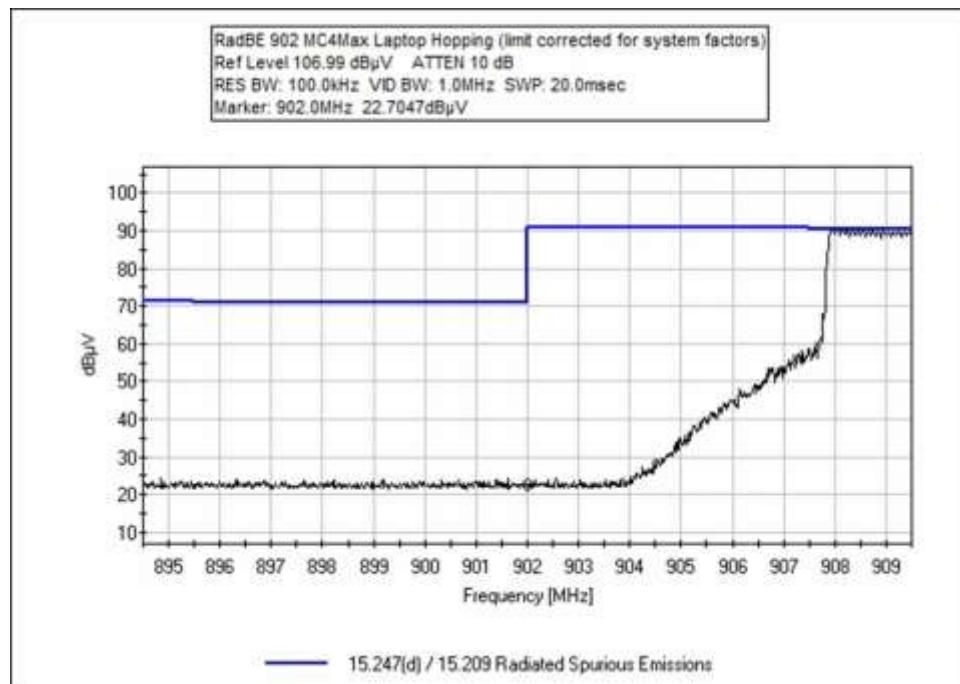
Configuration 2 (MC4Max and Tablet)

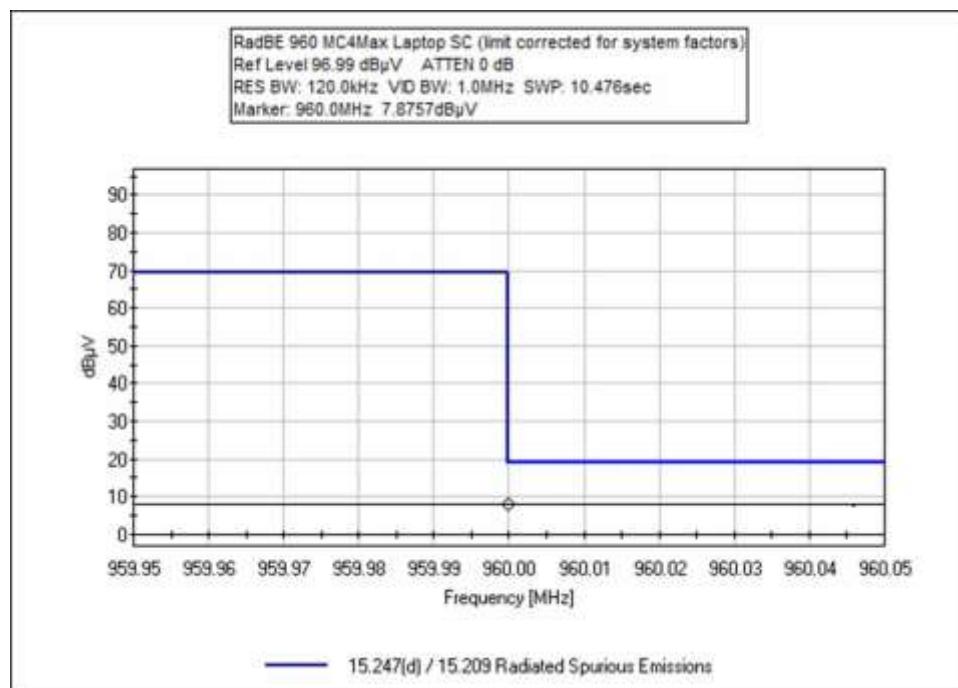
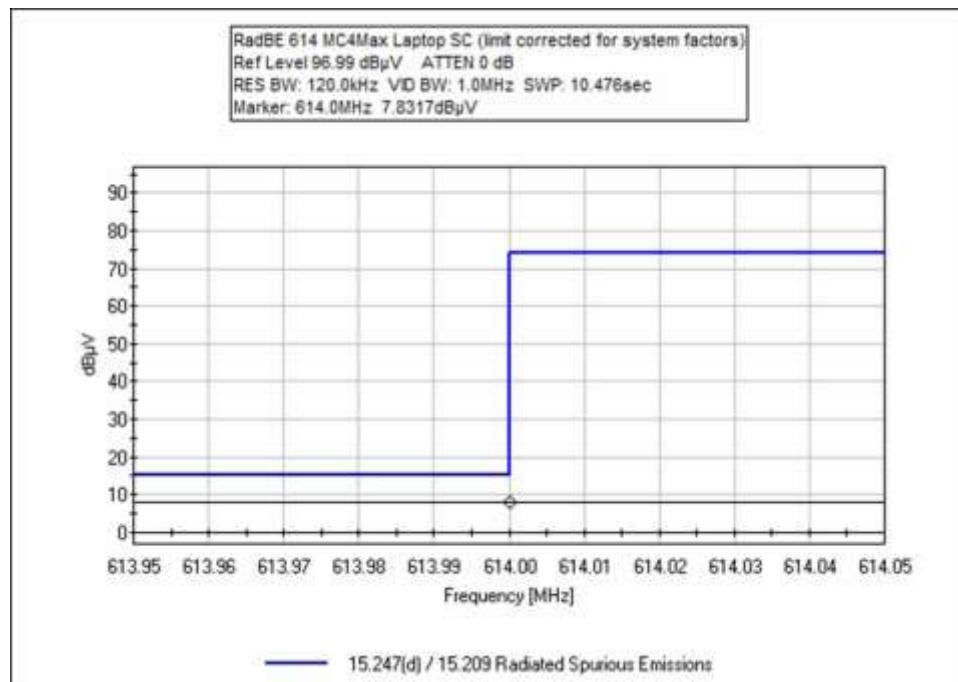
Frequency (MHz)	SC or Hopping	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	SC	Omni	46.5	104.5	Pass
928	SC	Omni	66.3	104.5	Pass
902	Hopping	Omni	46.7	104.5	Pass
928	Hopping	Omni	65.7	104.5	Pass
614	SC	Omni	38.5	46	Pass
960	SC	Omni	42.8	54	Pass
614	Hopping	Omni	38.4	46	Pass
960	Hopping	Omni	42.8	54	Pass

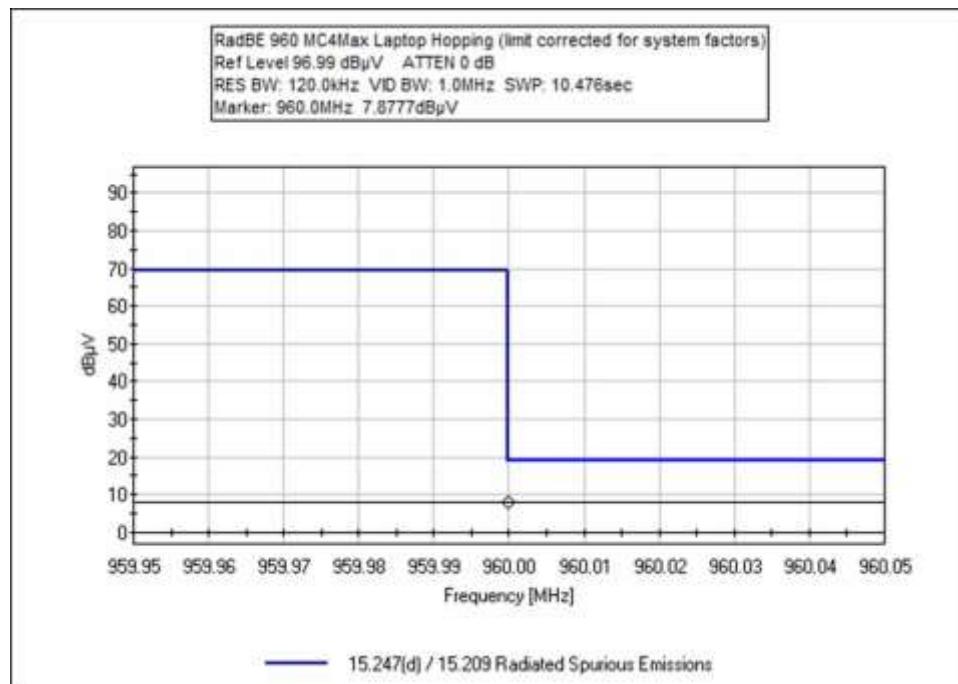
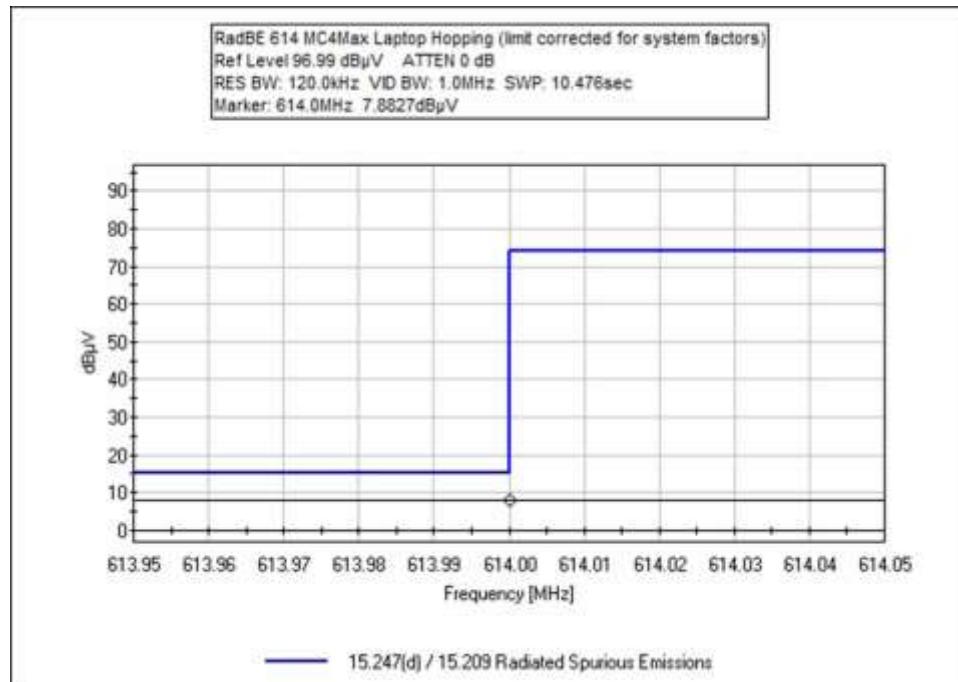
## Band Edge Plots

### Configuration 1

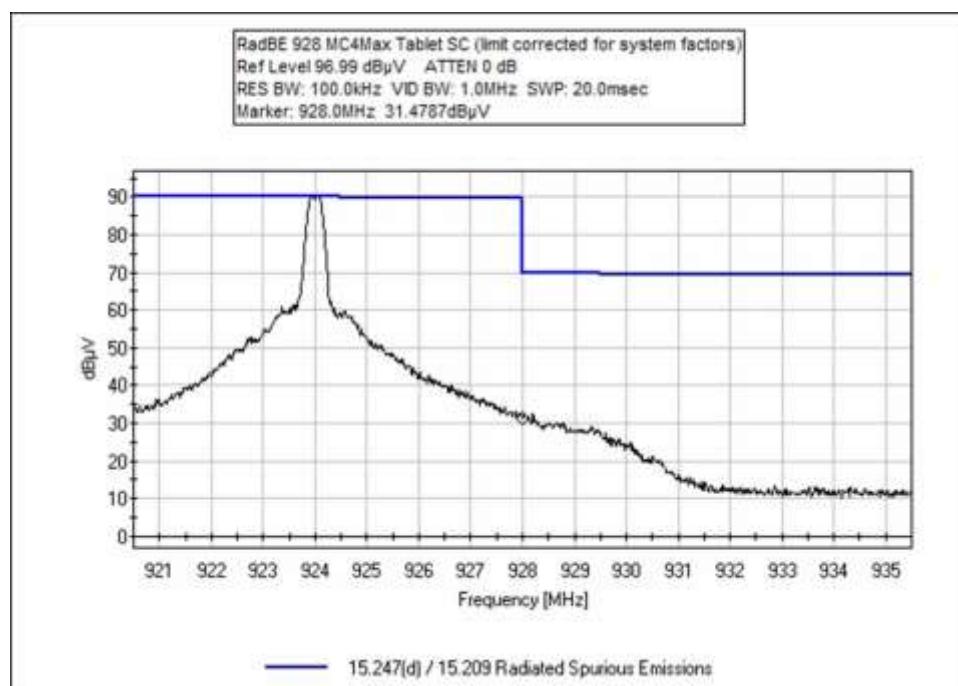
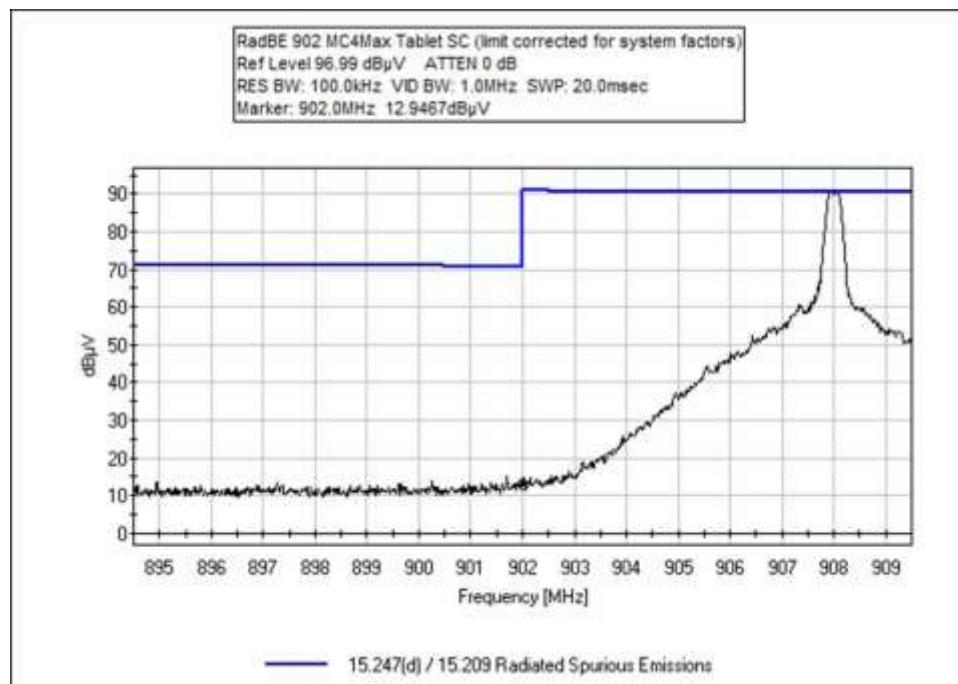


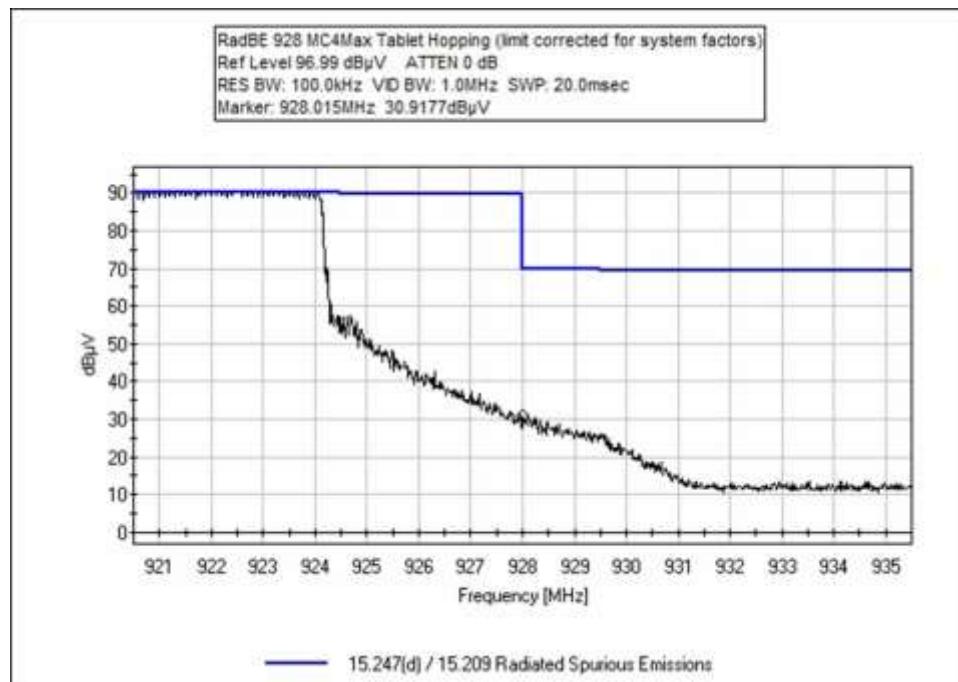
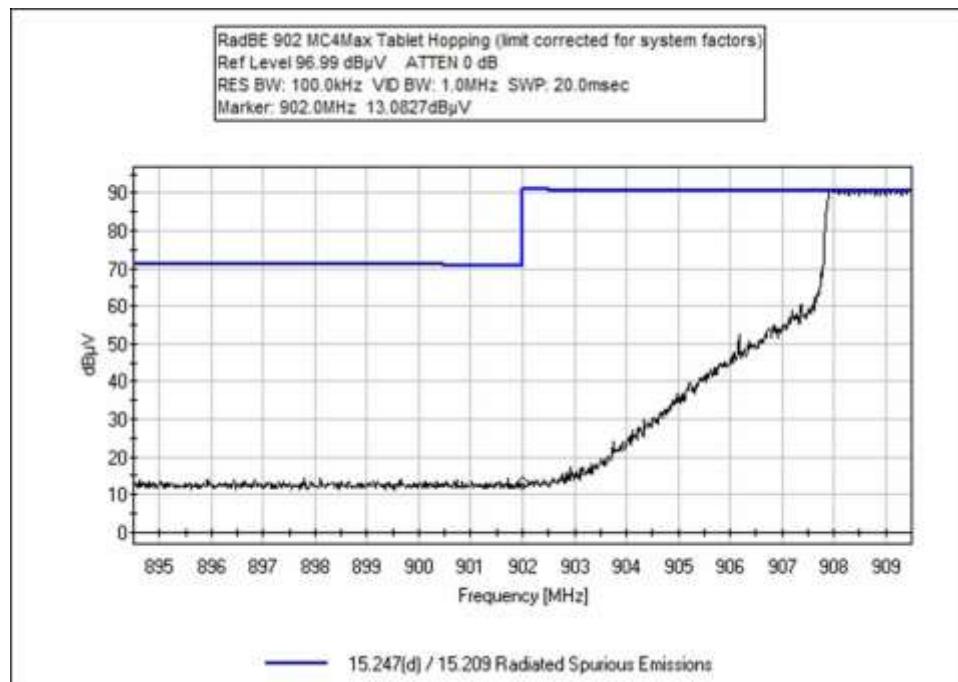


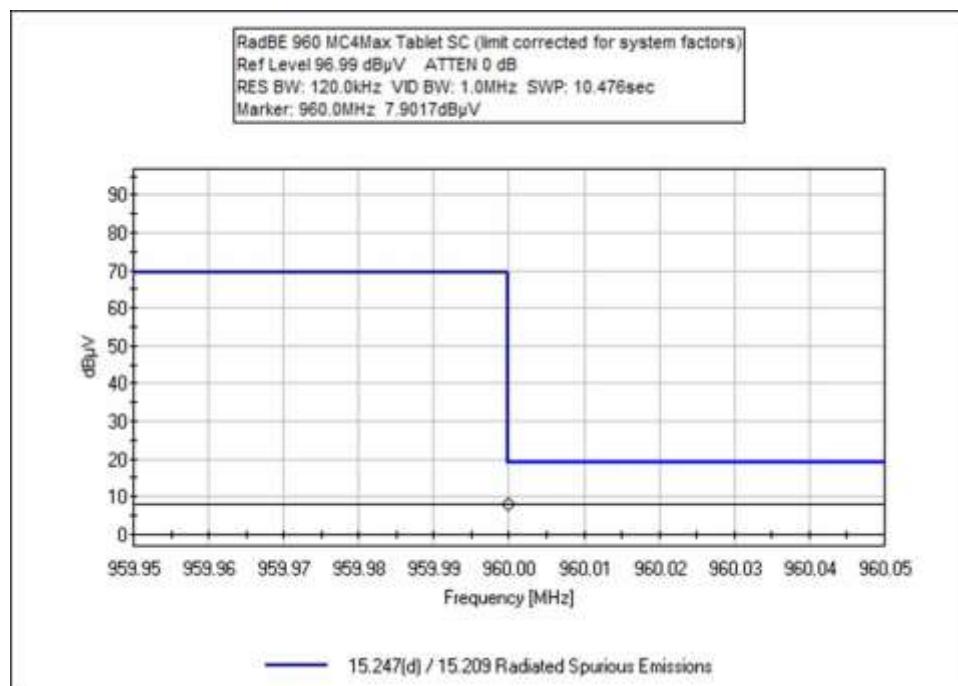
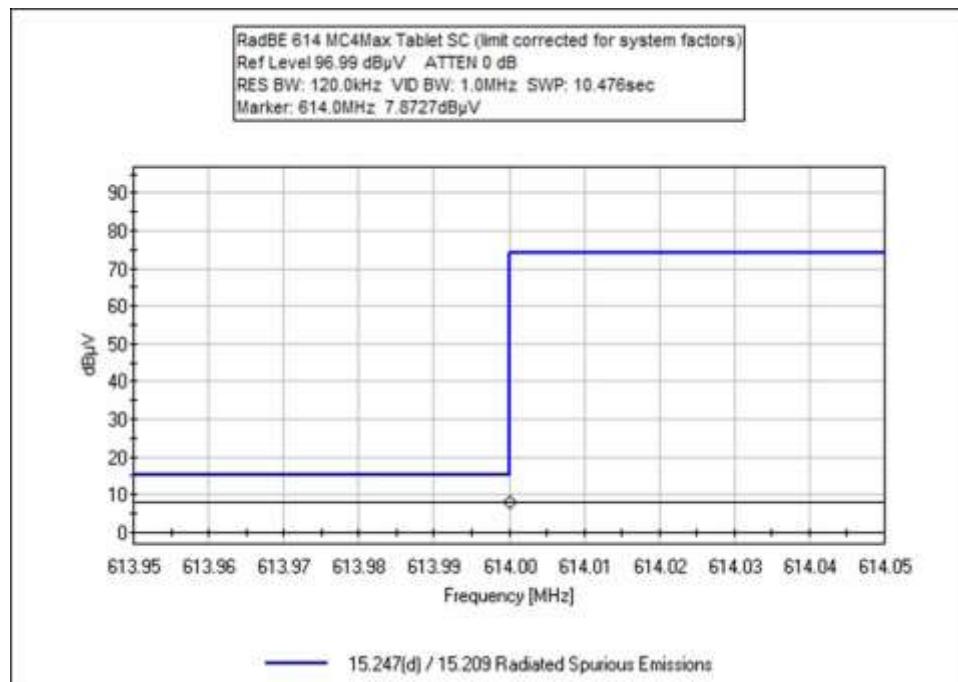


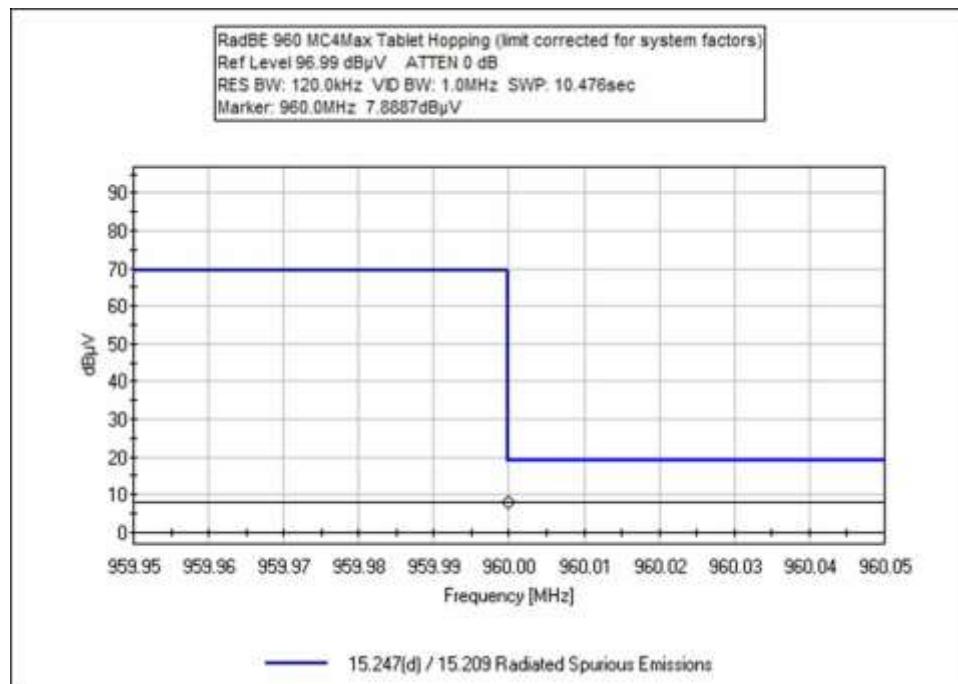
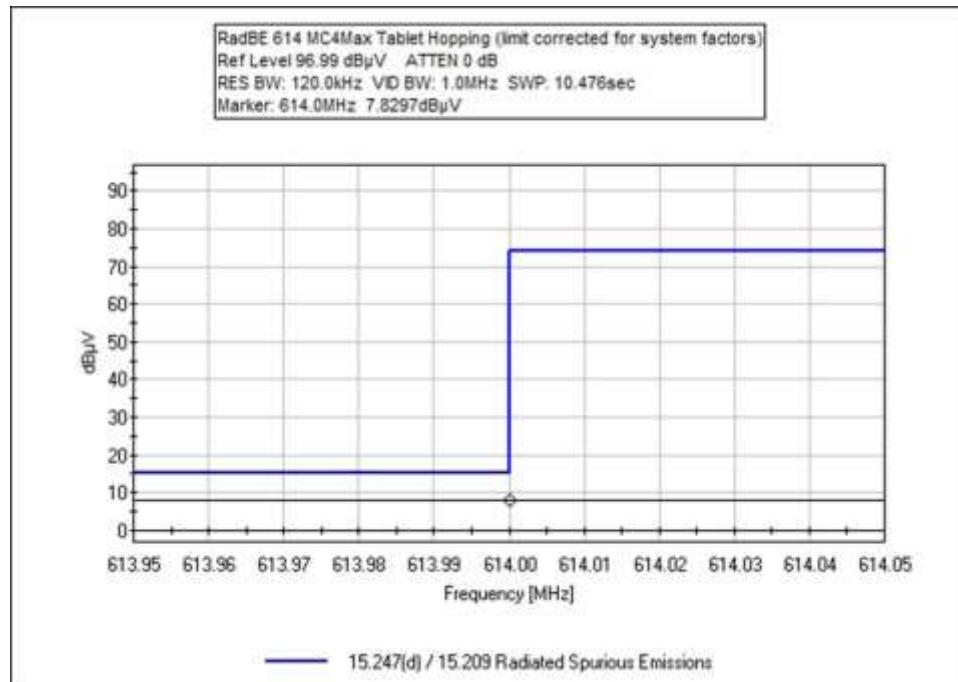


**Configuration 2**









## Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **107795** Date: 12/16/2022  
 Test Type: **Maximized Emissions** Time: 14:14:54  
 Tested By: Michael Atkinson Sequence#: 31  
 Software: EMITest 5.03.20

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 1			

***Test Conditions / Notes:***

Test Environment Conditions
Temperature: 20°C
Humidity: 33%
Pressure: 102.3kPa
Frequency: Band Edge
Test Setup: EUT is continuously transmitting with modulation. Horizontal and vertical measurement antenna polarities investigated, worst-case reported. EUT XYZ axes investigated, worst-case reported.
Power supply is remotely located outside of chamber with filter caps at chamber wall.
<b>MC4Max with Laptop</b>

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023
T1	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T2	ANP05305	Cable	ETSI-50T	9/15/2021	9/15/2023
T3	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T4	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	614.000M	7.9	+0.3	+1.2	+1.9	+27.2	+0.0	38.5	46.0	-7.5	Vert
	QP								Hopping		
2	614.000M	7.8	+0.3	+1.2	+1.9	+27.2	+0.0	38.4	46.0	-7.6	Vert
	QP								SC		
3	960.000M	7.9	+0.3	+1.5	+2.4	+30.7	+0.0	42.8	54.0	-11.2	Vert
	QP								SC		
4	960.000M	7.9	+0.3	+1.5	+2.4	+30.7	+0.0	42.8	54.0	-11.2	Vert
	QP								Hopping		
5	928.000M	30.8	+0.3	+1.5	+2.4	+30.6	+0.0	65.6	104.5	-38.9	Vert
	SC										
6	928.000M	29.4	+0.3	+1.5	+2.4	+30.6	+0.0	64.2	104.5	-40.3	Vert
	Hopping										
7	902.000M	22.7	+0.3	+1.4	+2.3	+29.6	+0.0	56.3	104.5	-48.2	Vert
	Hopping										
8	902.000M	21.8	+0.3	+1.4	+2.3	+29.6	+0.0	55.4	104.5	-49.1	Vert
	SC										



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717  
Customer: **Itron, Inc.**  
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
Work Order #: **107795** Date: 12/16/2022  
Test Type: **Maximized Emissions** Time: 16:32:37  
Tested By: Michael Atkinson Sequence#: 32  
Software: EMITest 5.03.20

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Support Equipment:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Test Conditions / Notes:***

Test Environment Conditions:

Temperature: 20°C

Humidity: 37%

Pressure: 102.2kPa

Frequency: Band Edge

Test Setup: EUT is continuously transmitting with modulation. Horizontal and vertical measurement antenna polarities investigated, worst-case reported. EUT XYZ axes investigated, worst-case reported. Also investigated with MAS boards removed, as well as receiver only boards removed, the fully loaded unit is representative of worst-case.

Power supply is remotely located outside of chamber with filter caps at chamber wall.

**MC4Max with Tablet**

**Test Equipment:**

<b>ID</b>	<b>Asset #</b>	<b>Description</b>	<b>Model</b>	<b>Calibration Date</b>	<b>Cal Due Date</b>
	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023
T1	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T2	ANP05305	Cable	ETSI-50T	9/15/2021	9/15/2023
T3	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T4	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023

**Measurement Data:**

Reading listed by margin.

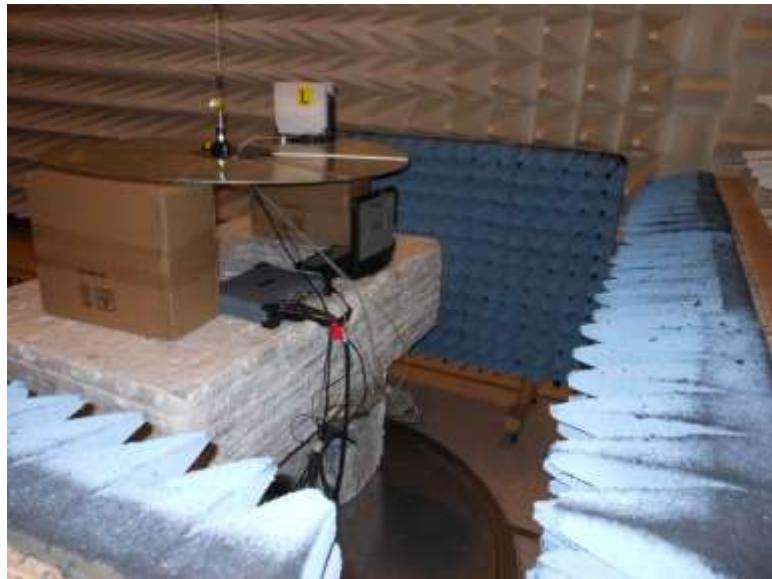
Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	614.000M QP	7.9	+0.3	+1.2	+1.9	+27.2	+0.0	38.5	46.0	-7.5	Vert
2	614.000M QP	7.8	+0.3	+1.2	+1.9	+27.2	+0.0	38.4	46.0	-7.6	Vert
3	960.000M QP	7.9	+0.3	+1.5	+2.4	+30.7	+0.0	42.8	54.0	-11.2	Vert
4	960.000M QP	7.9	+0.3	+1.5	+2.4	+30.7	+0.0	42.8	54.0	-11.2	Vert
5	928.000M	31.5	+0.3	+1.5	+2.4	+30.6	+0.0	66.3	104.5	-38.2	Vert
6	928.015M	30.9	+0.3	+1.5	+2.4	+30.6	+0.0	65.7	104.5	-38.8	Vert
7	902.000M	13.1	+0.3	+1.4	+2.3	+29.6	+0.0	46.7	104.5	-57.8	Vert
8	902.000M	12.9	+0.3	+1.4	+2.3	+29.6	+0.0	46.5	104.5	-58.0	Vert
								SC			
								Hopping			
								SC			
								Hopping			
								SC			

**Test Setup Photo(s)**



Below 1GHz; Laptop



Above 1GHz; Laptop



Below 1GHz; Tablet



Above 1GHz; Tablet



X-Axis



Y-Axis



Z-Axis

## Appendix A: Manufacturer Declaration

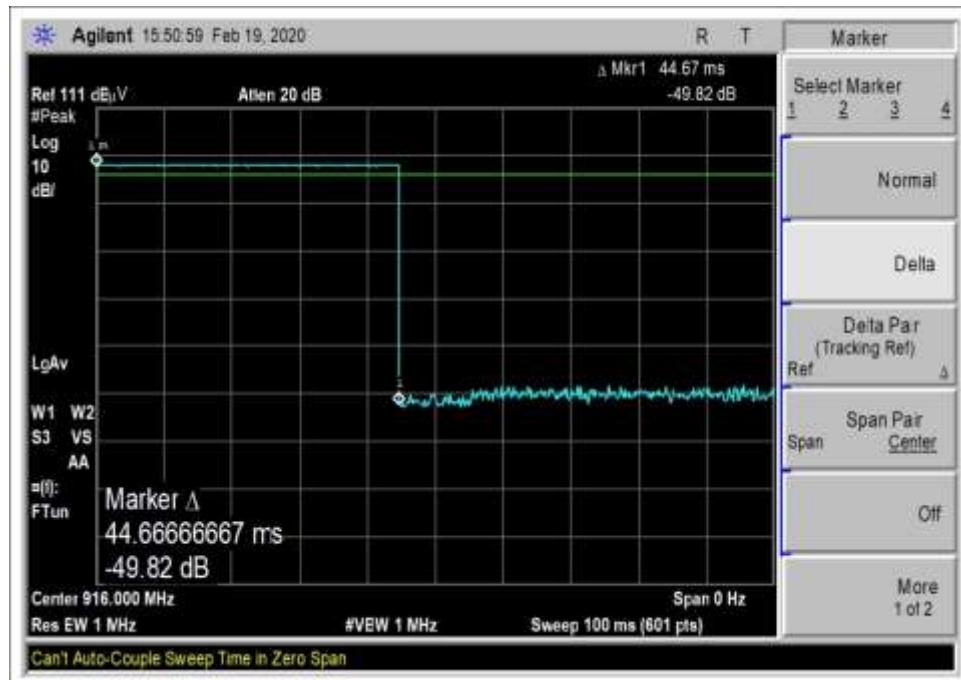
The manufacturer declares that the **MC3C** model applies to device names: **MC3** and **MC4Max**.

These are identical hardware configurations and the only difference is in the name. Testing on the **MC3C** is representative of testing on the following model(s):

**MC3C1** (device name **MC3Lite**)

## Appendix B: Manufacturer Provided Data

### Duty Cycle Plot



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