Itron, Inc.

EMC TEST REPORT FOR

MC3 & MC4Max
Model: MC3C*

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

Tested to The Following Standards:

FCC Part 101 Subpart C

Report No.: 107795-3

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:

Itron, 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 14, 2022
DATE(S) OF TESTING: December 14 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.
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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	5.03.19
EMITest Immunity	5.03.10

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 2 / 101

Test Procedure	Description	Modifications	Results
2.1055 / 101.107(a)	Frequency Tolerance	NA	NP
2.1049 / 101.109(c)	Bandwidth	NA	NP
2.1051 / 101.111 (a)(5)	Emissions Limitations - Conducted	NA	Pass
2.1053 / 101.111 (a)(5)	Emissions Limitations- Radiated	NA	Pass
2.1046 / 101.113(a)	Transmitter Power Limitations	NA	Pass
2.1047	Modulation Characteristics	NA	NA1

NA = Not Applicable
NA1 = Not applicable because the equipment does not support voice communication.
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	1GTSA65082

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	1GTSA65082

General Product Information:

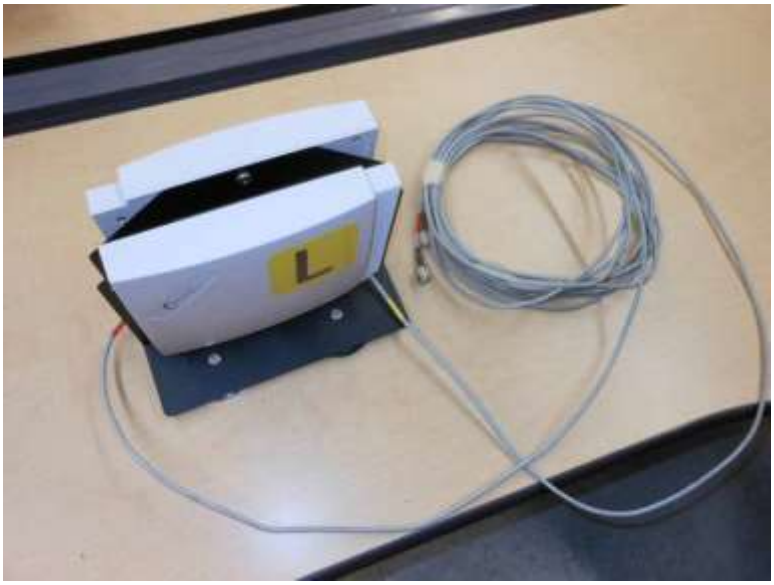
Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	Land-Mobile Transmitter and Receiver (27.41-960 MHz) (MAS transmitter)
Operating Frequency Range:	952.0-959.85MHz
Number of Hopping Channels:	NA
Modulation Type(s):	24.76-57.78Hz AM
Maximum Duty Cycle:	Tested as 100% worst case
Number of TX Chains:	1
Antenna Gain:	5dbi
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	13.8VDC from vehicle 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

EUT Photo(s)

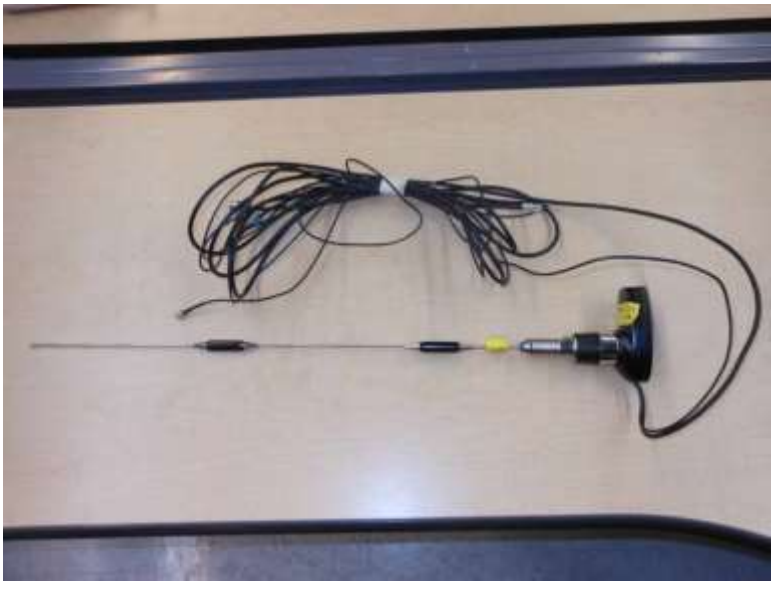
Support Equipment Photo(s)

Laptop

Tablet

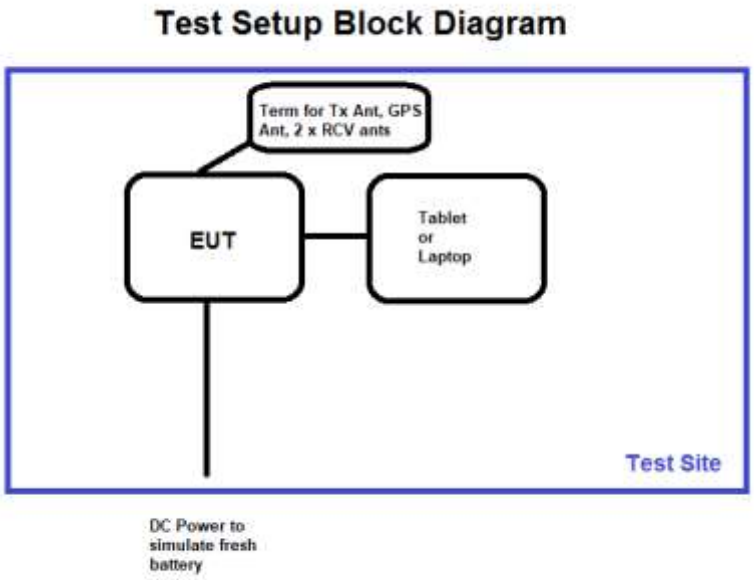


2xReceiver Antenna

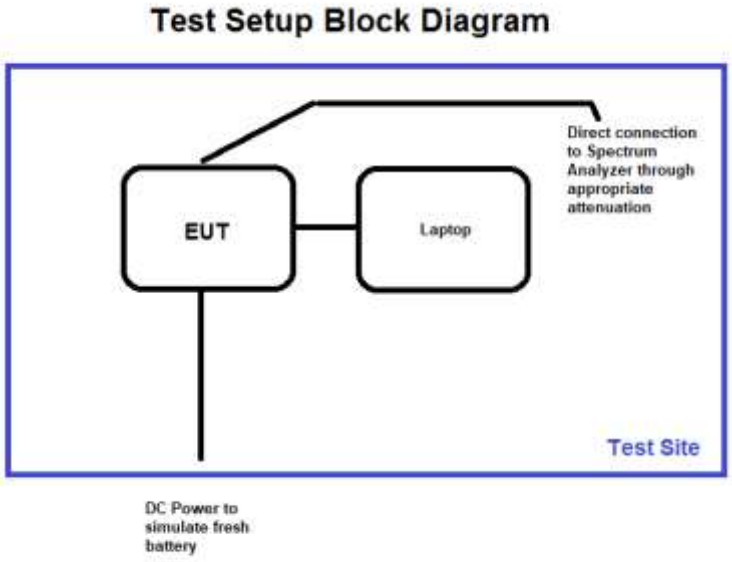


5dBi and GPS Antenna

Block Diagram(s) of Test Setup



Radiated (Configuration 1 and 2)



RF Conducted (Configuration 3)

FCC PART(S) 101 Subpart C

2.1051 / 101.111(a)(5) Emissions Limitations – Conducted

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	M. Atkinson
Test Method:	FCC CFR 47 Part 101.111, ANSI C63.26 (2015)	Test Date(s):	12/14/2022
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.		

Test Data Summary
Limit applied: Part 101.111 (a) (2) (i) Max Power – (35 + 0.8(P – 50) + 10Log10 B) down to -13dBm P = Percent removed from the center frequency of the transmitter bandwidth. B = Authorized bandwidth in MHz Conversion to Limit (dBµV) = Limit (dBm) +107

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:	**101.111(a)(5) Antenna Conducted Emissions (Low Channel)**		
Work Order #:	**107795**	Date:	12/14/2022
Test Type:	**Conducted Emissions**	Time:	15:37:07
Tested By:	Michael Atkinson	Sequence#:	20
Software:	EMITest 5.03.20		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

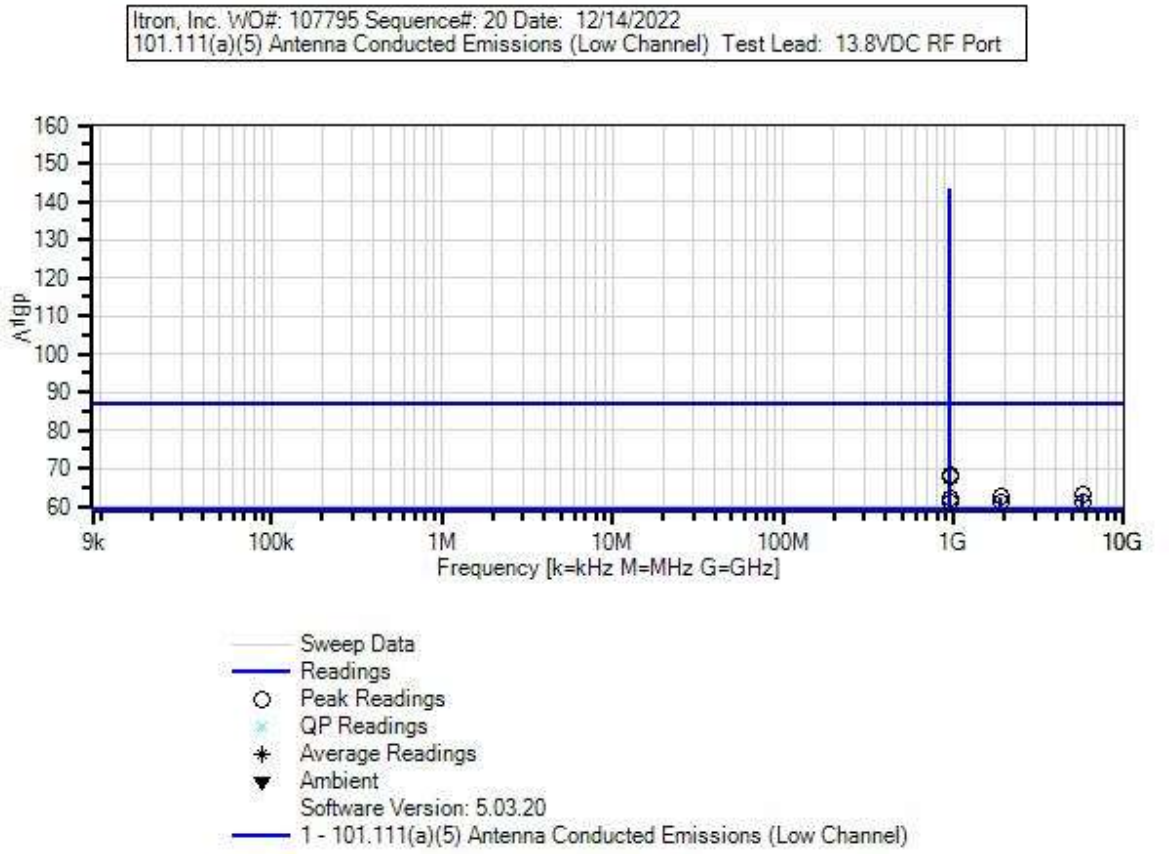
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Test Environment Conditions:
Temperature: 21°C
Humidity: 39%
Pressure: 102.7

Mask was created assuming worst case 35.7dBm output power.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP07623	Attenuator	47-20-34	3/16/2022	3/16/2024
T2	ANP07746	Attenuator	PE7004-6	2/11/2021	2/11/2023

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	952.015M	42.5	+19.7	+5.8			+0.0	68.0	71.8 24.76	-3.8	RF Po
2	951.985M	42.1	+19.7	+5.8			+0.0	67.6	71.8 24.76	-4.2	RF Po
3	951.985M	36.4	+19.7	+5.8			+0.0	61.9	71.8 57.78	-9.9	RF Po
4	952.015M	35.5	+19.7	+5.8			+0.0	61.0	71.8 57.78	-10.8	RF Po
5	5712.005M	37.0	+19.9	+6.0			+0.0	62.9	87.0	-24.1	RF Po
6	1904.002M	36.7	+19.8	+5.9			+0.0	62.4	87.0 24.76	-24.6	RF Po
7	1903.997M	35.6	+19.8	+5.9			+0.0	61.3	87.0	-25.7	RF Po
8	5712.025M	35.4	+19.9	+6.0			+0.0	61.3	87.0 24.76	-25.7	RF Po

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717		
Customer:	**Itron, Inc.**		
Specification:	**101.111(a)(5) Antenna Conducted Emissions (High Channel)**		
Work Order #:	**107795**	Date:	12/14/2022
Test Type:	**Conducted Emissions**	Time:	15:38:04
Tested By:	Michael Atkinson	Sequence#:	21
Software:	EMITest 5.03.20		13.8VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

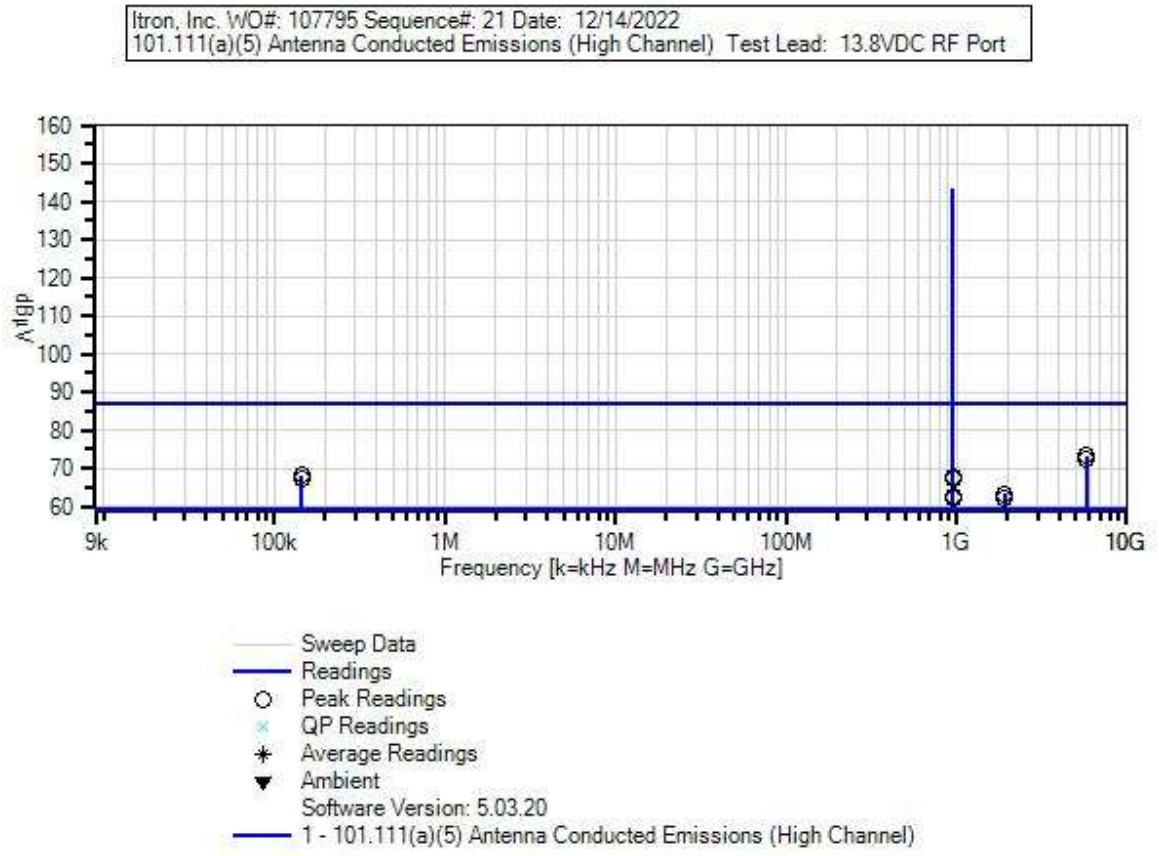
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Test Environment Conditions:
Temperature: 21°C
Humidity: 39%
Pressure: 102.7

Mask was created assuming worst case 35.7dBm output power.



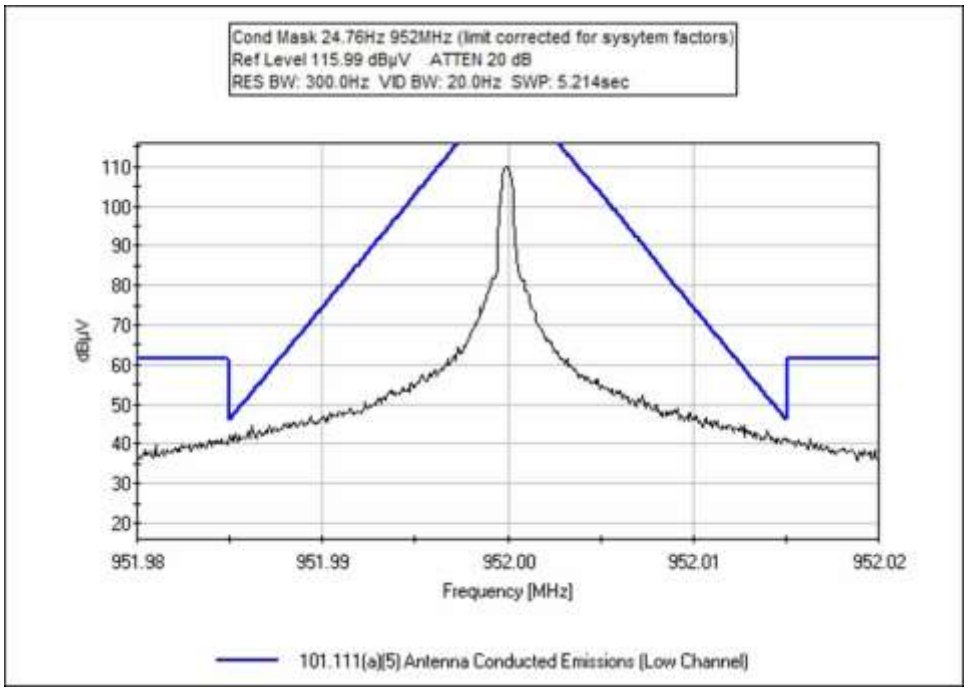
Test Equipment:

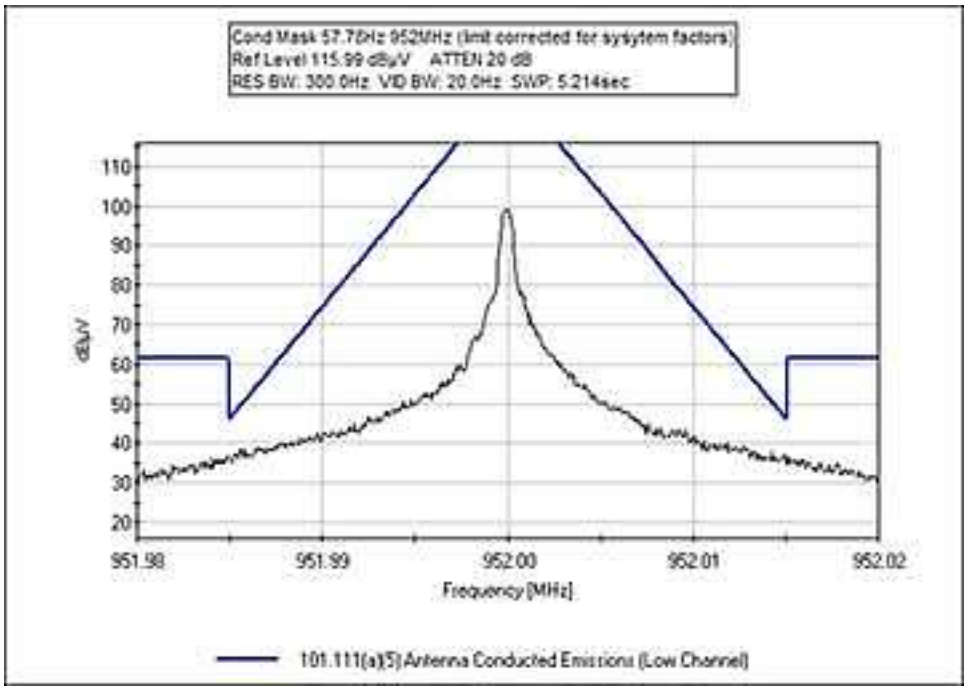
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T1	ANP07623	Attenuator	47-20-34	3/16/2022	3/16/2024
T2	ANP07746	Attenuator	PE7004-6	2/11/2021	2/11/2023

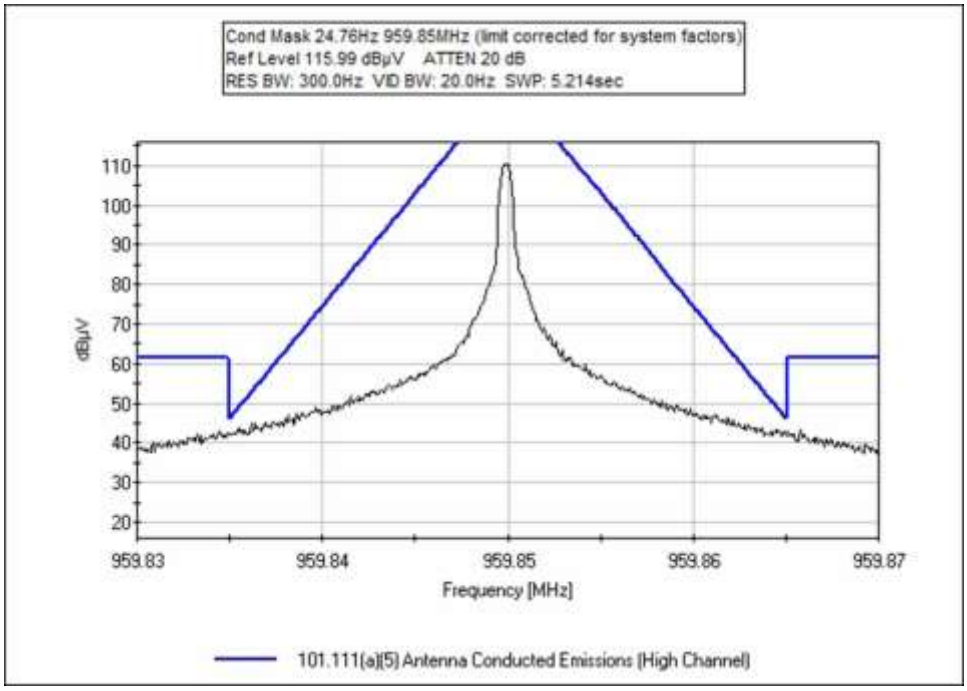
Measurement Data: Reading listed by margin. Test Lead: RF Port

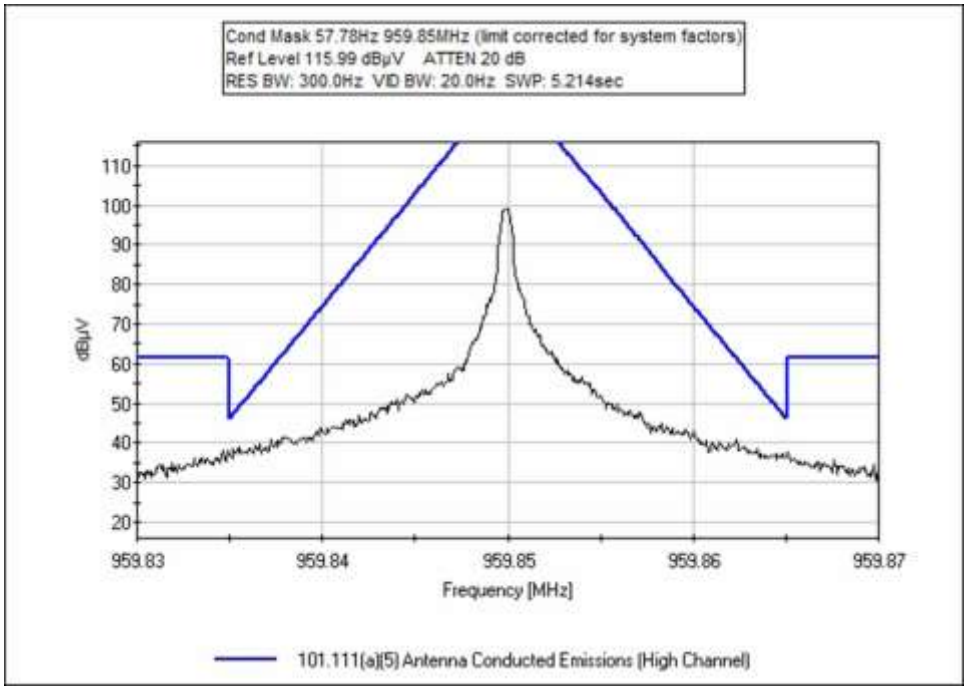
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	959.835M	42.3	+19.7	+5.8			+0.0	67.8	71.8 24.76	-4.0	RF Po
2	959.865M	41.8	+19.7	+5.8			+0.0	67.3	71.8 24.76	-4.5	RF Po
3	959.835M	37.0	+19.7	+5.8			+0.0	62.5	71.8 57.78	-9.3	RF Po
4	959.865M	36.6	+19.7	+5.8			+0.0	62.1	71.8 57.78	-9.7	RF Po
5	5759.100M	47.3	+19.9	+6.0			+0.0	73.2	87.0 57.78	-13.8	RF Po
6	5759.100M	46.5	+19.9	+6.0			+0.0	72.4	87.0 24.76	-14.6	RF Po
7	144.600k	42.8	+19.5	+5.8			+0.0	68.1	87.0	-18.9	RF Po
8	145.600k	41.8	+19.5	+5.8			+0.0	67.1	87.0	-19.9	RF Po
9	1919.700M	37.5	+19.9	+5.9			+0.0	63.3	87.0 24.76	-23.7	RF Po
10	1919.703M	36.4	+19.9	+5.9			+0.0	62.2	87.0 57.78	-24.8	RF Po

Plot(s)


Cond Mask 24.76Hz 952MHz (limit corrected for sysytem factors)
Ref Level 115.99 dBµV ATTEN 20 dB
RES BW: 300.0Hz VID BW: 20.0Hz SWP: 5.214sec
dBµV
110
100
90
80
70
60
50
40
30
20
951.98
951.99
952.00
952.01
952.02
Frequency [MHz]
101.111(a)(5) Antenna Conducted Emissions (Low Channel)


Cond Mask 57.76Hz 952MHz (limit corrected for sysytem factors)
Ref Level 115.99 dBµV ATTEN 20 dB
RES BW: 300.0Hz VID BW: 20.0Hz SWP: 5.214sec
dBµV
110
100
90
80
70
60
50
40
30
20
951.98
951.99
952.00
952.01
952.02
Frequency [MHz]
101.111(a)(5) Antenna Conducted Emissions (Low Channel)


Cond Mask 24.76Hz 959.85MHz (limit corrected for system factors)
Ref Level 115.99 dBµV ATTEN 20 dB
RES BW: 300.0Hz VID BW: 20.0Hz SWP: 5.214sec
dBµV
110
100
90
80
70
60
50
40
30
20
959.83
959.84
959.85
959.86
959.87
Frequency [MHz]
101.111(a)(5) Antenna Conducted Emissions (High Channel)


Cond Mask 57.78Hz 959.85MHz (limit corrected for system factors)
Ref Level 115.99 dBµV ATTEN 20 dB
RES BW: 300.0Hz VID BW: 20.0Hz SWP: 5.214sec
dBµV
110
100
90
80
70
60
50
40
30
20
959.83
959.84
959.85
959.86
959.87
Frequency [MHz]
101.111(a)(5) Antenna Conducted Emissions (High Channel)

Test Setup Photo(s)

2.1053 / 101.111(a)(5) Emission limitations - Radiated emission

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	Michael Atkinson
Test Method:	ANSI C63.26 (2015), section 5.5	Test Date(s):	12/16/2022 to 12/23/2022
Configuration:	1 and 2		
Test Setup:	The EUT is placed on turntable. Input voltage is 13.8Vdc from external power supply. GPS port is connected to an external antenna. Main antenna port is terminated with 50-ohm load. USB port is connected to a support laptop or tablet. The EUT is continuously transmitting		

Test Data Summary
Limit applied for Radiated Emissions outside of mask: -20dBm worst case at any power level Conversion to EIRP limit E(dBuV/m)=P(dBm)-20log(3)+104.77=-20-20log(3)+104.77=75.2dbuV/m

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:	**101.111(a)(5) Radiated Emissions (non-mask)**		
Work Order #:	**107795**	Date:	12/21/2022
Test Type:	**Maximized Emissions**	Time:	18:02:58
Tested By:	Michael Atkinson	Sequence#:	51
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 C63.26 (2015)

Frequency: 9kHz-10GHz

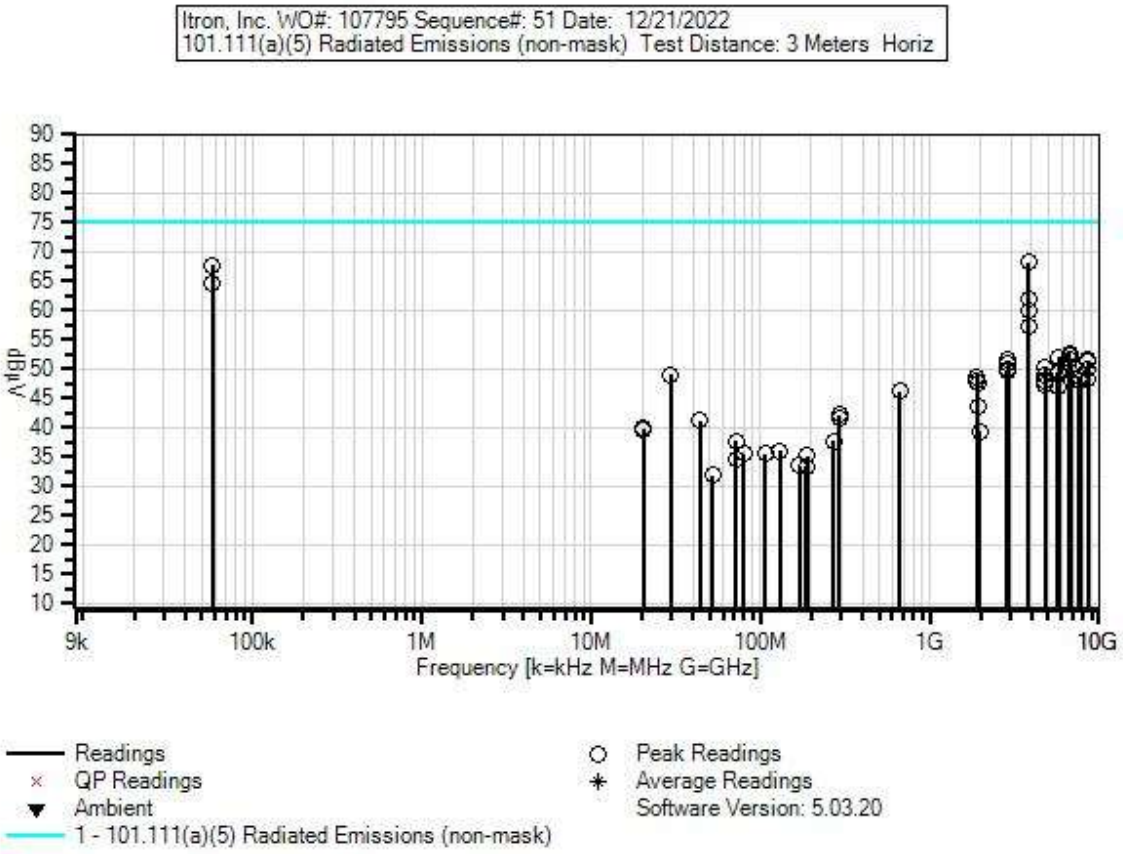
Test Setup: EUT is continuously transmitting with modulation; antenna port is terminated. Horizontal and vertical measurement antenna polarities investigated above 30MHz, 3 x orthogonal axes investigated below 30MHz, worst-case reported. EUT XYZ axes investigated, worst-case reported. Investigated with received boards removed, fully loaded unit is representative of worst-case.

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

Investigated with antennas at 1.5m height, as well as moving the entire setup so the EUT is at 1.5m height, worst-case reported. Left the Tx antenna in chamber as the antenna based is shared with the EUT's GPS antenna.

Investigated 24.76 and 57.78Hz modulation, worst-case reported.

MC4Max with Laptop



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

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	3808.030M	65.2	+0.0 +0.0 +0.3	+0.6 +0.0 +32.4	+3.3 +0.3	+0.0 -33.8	+0.0	68.3	75.2 952	-6.9	Vert
2	57.597k	57.9	+0.0 +0.0 +0.0	+0.1 +9.7 +0.0	+0.0 +0.0	+0.0 +0.0	+0.0	67.7	75.2	-7.5	Para
3	57.597k	55.0	+0.0 +0.0 +0.0	+0.1 +9.7 +0.0	+0.0 +0.0	+0.0 +0.0	+0.0	64.8	75.2	-10.4	Groun
4	3839.440M	58.9	+0.0 +0.0 +0.3	+0.6 +0.0 +32.5	+3.3 +0.3	+0.0 -33.8	+0.0	62.1	75.2 959.85	-13.1	Vert
5	3807.920M	57.0	+0.0 +0.0 +0.3	+0.6 +0.0 +32.4	+3.3 +0.3	+0.0 -33.8	+0.0	60.1	75.2 952	-15.1	Horiz
6	3839.440M	54.2	+0.0 +0.0 +0.3	+0.6 +0.0 +32.5	+3.3 +0.3	+0.0 -33.8	+0.0	57.4	75.2 959.85	-17.8	Horiz
7	6664.100M	44.7	+0.0 +0.0 +0.6	+0.9 +0.0 +35.4	+4.6 +0.7	+0.0 -34.1	+0.0	52.8	75.2 952	-22.4	Vert
8	6664.010M	44.3	+0.0 +0.0 +0.6	+0.9 +0.0 +35.4	+4.6 +0.7	+0.0 -34.1	+0.0	52.4	75.2 952	-22.8	Horiz
9	5759.060M	45.3	+0.0 +0.0 +0.5	+0.8 +0.0 +34.4	+4.1 +0.5	+0.0 -33.6	+0.0	52.0	75.2 959.85	-23.2	Vert
10	6718.840M	43.4	+0.0 +0.0 +0.5	+0.9 +0.0 +35.5	+4.6 +1.0	+0.0 -34.1	+0.0	51.8	75.2 959.85	-23.4	Vert
11	2879.480M	52.1	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.8 +0.4	+0.0 -34.1	+0.0	51.6	75.2 959.85	-23.6	Vert
12	8568.000M	40.1	+0.0 +0.0 +0.7	+1.1 +0.0 +38.7	+5.2 +0.6	+0.0 -34.9	+0.0	51.5	75.2 952	-23.7	Vert
13	8638.760M	40.4	+0.0 +0.0 +0.7	+1.0 +0.0 +38.7	+5.1 +0.5	+0.0 -34.9	+0.0	51.5	75.2 959.85	-23.7	Vert
14	2879.600M	51.5	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.8 +0.4	+0.0 -34.1	+0.0	51.0	75.2 959.85	-24.2	Horiz
15	4760.120M	45.7	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	50.3	75.2 952	-24.9	Vert

16	2856.180M	50.6	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.7 +0.4	+0.0 -34.1	+0.0	50.0	75.2 952	-25.2	Horiz
17	8567.970M	38.5	+0.0 +0.0 +0.7	+1.1 +0.0 +38.7	+5.2 +0.6	+0.0 -34.9	+0.0	49.9	75.2 952	-25.3	Horiz
18	6718.970M	41.2	+0.0 +0.0 +0.5	+0.9 +0.0 +35.5	+4.6 +1.0	+0.0 -34.1	+0.0	49.6	75.2 959.85	-25.6	Horiz
19	2856.010M	50.2	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.7 +0.4	+0.0 -34.1	+0.0	49.6	75.2 952	-25.6	Vert
20	5759.140M	42.8	+0.0 +0.0 +0.5	+0.8 +0.0 +34.4	+4.1 +0.5	+0.0 -33.6	+0.0	49.5	75.2 959.85	-25.7	Horiz
21	5712.100M	42.8	+0.0 +0.0 +0.5	+0.8 +0.0 +34.3	+4.1 +0.6	+0.0 -33.6	+0.0	49.5	75.2 952	-25.7	Vert
22	29.565M	44.9	+0.0 +0.0 +0.0	+0.1 +3.8 +0.0	+0.3 +0.0	+0.0 +0.0	+0.0	49.1	75.2	-26.1	Groun
23	4799.250M	44.4	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	49.0	75.2 959.85	-26.2	Vert
24	7678.820M	39.0	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.7 +0.6	+0.0 -34.9	+0.0	48.8	75.2 959.85	-26.4	Horiz
25	1904.090M	51.9	+0.0 +0.0 +0.3	+0.4 +0.0 +28.0	+2.2 +0.5	+0.0 -34.6	+0.0	48.7	75.2 952	-26.5	Horiz
26	7616.080M	39.0	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.6 +0.6	+0.0 -34.9	+0.0	48.7	75.2 952	-26.5	Horiz
27	8638.670M	37.1	+0.0 +0.0 +0.7	+1.0 +0.0 +38.7	+5.1 +0.5	+0.0 -34.9	+0.0	48.2	75.2 959.85	-27.0	Horiz
28	7678.690M	38.4	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.7 +0.6	+0.0 -34.9	+0.0	48.2	75.2 959.85	-27.0	Vert
29	1903.970M	51.3	+0.0 +0.0 +0.3	+0.4 +0.0 +28.0	+2.2 +0.5	+0.0 -34.6	+0.0	48.1	75.2 952	-27.1	Vert
30	4799.350M	43.5	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	48.1	75.2 959.85	-27.1	Horiz
31	7616.100M	38.4	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.6 +0.6	+0.0 -34.9	+0.0	48.1	75.2 952	-27.1	Vert
32	1919.680M	50.8	+0.0 +0.0 +0.3	+0.4 +0.0 +28.1	+2.2 +0.5	+0.0 -34.6	+0.0	47.7	75.2 959.85	-27.5	Vert

33	4759.990M	42.6	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	47.2	75.2 952	-28.0	Horiz
34	5712.020M	40.4	+0.0 +0.0 +0.5	+0.8 +0.0 +34.3	+4.1 +0.6	+0.0 -33.6	+0.0	47.1	75.2 952	-28.1	Horiz
35	663.400M	15.5	+0.0 +27.1 +0.0	+0.3 +0.0 +0.0	+1.2 +0.0	+2.1 +0.0	+0.0	46.2	75.2	-29.0	Horiz
36	1919.730M	46.9	+0.0 +0.0 +0.3	+0.4 +0.0 +28.1	+2.2 +0.5	+0.0 -34.6	+0.0	43.8	75.2 959.85	-31.4	Horiz
37	292.900M	21.8	+0.0 +18.1 +0.0	+0.2 +0.0 +0.0	+0.9 +0.0	+1.2 +0.0	+0.0	42.2	75.2	-33.0	Horiz
38	291.900M	21.3	+0.0 +18.1 +0.0	+0.2 +0.0 +0.0	+0.8 +0.0	+1.2 +0.0	+0.0	41.6	75.2	-33.6	Horiz
39	43.600M	26.0	+0.0 +14.3 +0.0	+0.1 +0.0 +0.0	+0.3 +0.0	+0.5 +0.0	+0.0	41.2	75.2	-34.0	Vert
40	20.459M	33.4	+0.0 +0.0 +0.0	+0.1 +6.3 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	40.0	75.2	-35.2	Groun
41	20.372M	33.2	+0.0 +0.0 +0.0	+0.1 +6.3 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	39.8	75.2	-35.4	Para
42	1968.000M	42.5	+0.0 +0.0 +0.3	+0.4 +0.0 +28.3	+2.2 +0.4	+0.0 -34.6	+0.0	39.5	75.2	-35.7	Horiz
43	71.700M	23.8	+0.0 +12.9 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.5 +0.0	+0.0	37.7	75.2	-37.5	Vert
44	271.500M	16.5	+0.0 +19.1 +0.0	+0.2 +0.0 +0.0	+0.8 +0.0	+1.1 +0.0	+0.0	37.7	75.2	-37.5	Horiz
45	130.900M	21.2	+0.0 +13.5 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.7 +0.0	+0.0	36.0	75.2	-39.2	Vert
46	106.600M	20.2	+0.0 +14.2 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.6 +0.0	+0.0	35.6	75.2	-39.6	Vert
47	79.500M	21.8	+0.0 +12.6 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.6 +0.0	+0.0	35.5	75.2	-39.7	Vert
48	189.100M	18.2	+0.0 +15.4 +0.0	+0.1 +0.0 +0.0	+0.7 +0.0	+0.9 +0.0	+0.0	35.3	75.2	-39.9	Vert
49	71.700M	20.7	+0.0 +12.9 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.5 +0.0	+0.0	34.6	75.2	-40.6	Horiz

50	168.700M	16.8	+0.0 +15.3 +0.0	+0.1 +0.0 +0.0	+0.6 +0.0	+0.9 +0.0	+0.0	33.7	75.2	-41.5	Horiz
51	186.200M	16.2	+0.0 +15.5 +0.0	+0.1 +0.0 +0.0	+0.7 +0.0	+0.9 +0.0	+0.0	33.4	75.2	-41.8	Horiz
52	52.300M	18.8	+0.0 +12.3 +0.0	+0.1 +0.0 +0.0	+0.3 +0.0	+0.5 +0.0	+0.0	32.0	75.2	-43.2	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717		
Customer:	**Itron, Inc.**		
Specification:	**101.111(a)(5) Radiated Emissions (non-mask)**		
Work Order #:	**107795**	Date:	12/21/2022
Test Type:	**Maximized Emissions**	Time:	17:16:26
Tested By:	Michael Atkinson	Sequence#:	52
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 C63.26 (2015)

Frequency: 9kHz-10GHz

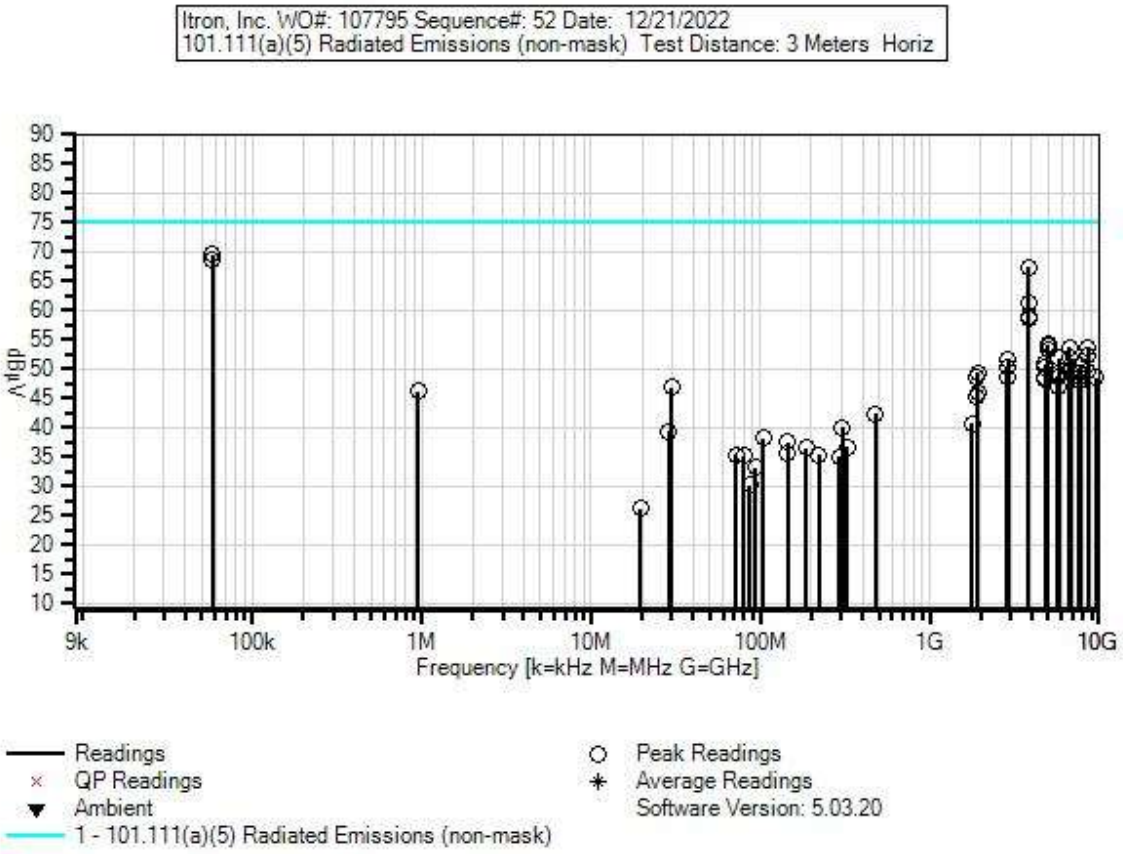
Test Setup: EUT is continuously transmitting with modulation; antenna port is terminated. Horizontal and vertical measurement antenna polarities investigated above 30MHz, 3 x orthogonal axes investigated below 30MHz, worst-case reported. EUT XYZ axes investigated, worst-case reported. Investigated with received boards removed, fully loaded unit is representative of worst-case.

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

Investigated with antennas at 1.5m height, as well as moving the entire setup so the EUT is at 1.5m height, worst-case reported. Left the Tx antenna in chamber as the antenna based is shared with the EUT's GPS antenna.

Investigated 24.76 and 57.78Hz modulation, worst-case reported.

MC4Max with Tablet



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

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	57.597k	59.8	+0.0 +0.0 +0.0	+0.1 +9.7 +0.0	+0.0 +0.0	+0.0 +0.0	+0.0	69.6	75.2	-5.6	Groun
2	57.597k	58.9	+0.0 +0.0 +0.0	+0.1 +9.7 +0.0	+0.0 +0.0	+0.0 +0.0	+0.0	68.7	75.2	-6.5	Para
3	3808.000M	64.3	+0.0 +0.0 +0.3	+0.6 +0.0 +32.4	+3.3 +0.3	+0.0 -33.8	+0.0	67.4	75.2 952 57.78	-7.8	Vert
4	3808.050M	64.1	+0.0 +0.0 +0.3	+0.6 +0.0 +32.4	+3.3 +0.3	+0.0 -33.8	+0.0	67.2	75.2 952 24.76	-8.0	Vert
5	3839.400M	58.2	+0.0 +0.0 +0.3	+0.6 +0.0 +32.5	+3.3 +0.3	+0.0 -33.8	+0.0	61.4	75.2 959.85	-13.8	Vert
6	3808.020M	55.9	+0.0 +0.0 +0.3	+0.6 +0.0 +32.4	+3.3 +0.3	+0.0 -33.8	+0.0	59.0	75.2 952 24.76	-16.2	Horiz
7	3839.370M	55.4	+0.0 +0.0 +0.3	+0.6 +0.0 +32.5	+3.3 +0.3	+0.0 -33.8	+0.0	58.6	75.2 959.85	-16.6	Horiz
8	4977.180M	48.0	+0.0 +0.0 +0.7	+0.7 +0.0 +33.8	+3.8 +0.6	+0.0 -33.4	+0.0	54.2	75.2	-21.0	Vert
9	4992.410M	47.9	+0.0 +0.0 +0.7	+0.7 +0.0 +33.7	+3.8 +0.6	+0.0 -33.3	+0.0	54.1	75.2	-21.1	Horiz
10	6664.020M	45.7	+0.0 +0.0 +0.6	+0.9 +0.0 +35.4	+4.6 +0.7	+0.0 -34.1	+0.0	53.8	75.2 952 24.76	-21.4	Vert
11	8568.140M	42.4	+0.0 +0.0 +0.7	+1.1 +0.0 +38.7	+5.2 +0.6	+0.0 -34.9	+0.0	53.8	75.2 952 24.76	-21.4	Vert
12	4991.340M	47.1	+0.0 +0.0 +0.7	+0.7 +0.0 +33.8	+3.8 +0.6	+0.0 -33.4	+0.0	53.3	75.2	-21.9	Vert
13	8638.550M	41.3	+0.0 +0.0 +0.7	+1.0 +0.0 +38.7	+5.1 +0.5	+0.0 -34.9	+0.0	52.4	75.2 959.85	-22.8	Vert
14	5759.100M	45.3	+0.0 +0.0 +0.5	+0.8 +0.0 +34.4	+4.1 +0.5	+0.0 -33.6	+0.0	52.0	75.2 959.85	-23.2	Vert
15	6664.000M	43.8	+0.0 +0.0 +0.6	+0.9 +0.0 +35.4	+4.6 +0.7	+0.0 -34.1	+0.0	51.9	75.2 952 24.76	-23.3	Horiz

16	6719.060M	43.5	+0.0 +0.0 +0.5	+0.9 +0.0 +35.5	+4.6 +1.0	+0.0 -34.1	+0.0	51.9	75.2 959.85	-23.3	Vert
17	2879.580M	52.1	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.8 +0.4	+0.0 -34.1	+0.0	51.6	75.2 959.85	-23.6	Vert
18	4799.240M	46.3	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	50.9	75.2 959.85	-24.3	Vert
19	7678.750M	40.8	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.7 +0.6	+0.0 -34.9	+0.0	50.6	75.2 959.85	-24.6	Vert
20	2856.020M	50.9	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.7 +0.4	+0.0 -34.1	+0.0	50.3	75.2 952 24.76	-24.9	Vert
21	4760.010M	45.7	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	50.3	75.2 952 24.76	-24.9	Vert
22	6718.970M	41.4	+0.0 +0.0 +0.5	+0.9 +0.0 +35.5	+4.6 +1.0	+0.0 -34.1	+0.0	49.8	75.2 959.85	-25.4	Horiz
23	8638.680M	38.4	+0.0 +0.0 +0.7	+1.0 +0.0 +38.7	+5.1 +0.5	+0.0 -34.9	+0.0	49.5	75.2 959.85	-25.7	Horiz
24	1919.820M	52.6	+0.0 +0.0 +0.3	+0.4 +0.0 +28.1	+2.2 +0.5	+0.0 -34.6	+0.0	49.5	75.2 959.85	-25.7	Vert
25	5759.230M	42.8	+0.0 +0.0 +0.5	+0.8 +0.0 +34.4	+4.1 +0.5	+0.0 -33.6	+0.0	49.5	75.2 959.85	-25.7	Horiz
26	7616.020M	39.6	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.6 +0.6	+0.0 -34.9	+0.0	49.3	75.2 952 24.76	-25.9	Vert
27	4759.960M	44.2	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	48.8	75.2 952 24.76	-26.4	Horiz
28	1903.870M	51.9	+0.0 +0.0 +0.3	+0.4 +0.0 +28.0	+2.2 +0.5	+0.0 -34.6	+0.0	48.7	75.2 952 24.76	-26.5	Vert
29	2856.120M	49.3	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.7 +0.4	+0.0 -34.1	+0.0	48.7	75.2 952 24.76	-26.5	Horiz
30	5712.130M	42.0	+0.0 +0.0 +0.5	+0.8 +0.0 +34.3	+4.1 +0.6	+0.0 -33.6	+0.0	48.7	75.2 952 24.76	-26.5	Vert
31	7616.130M	38.9	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.6 +0.6	+0.0 -34.9	+0.0	48.6	75.2 952 24.76	-26.6	Horiz
32	9598.590M	36.4	+0.0 +0.0 +0.8	+1.0 +0.0 +38.5	+5.1 +0.8	+0.0 -34.1	+0.0	48.5	75.2 959.85	-26.7	Vert

33	2879.500M	49.0	+0.0 +0.0 +0.4	+0.5 +0.0 +29.5	+2.8 +0.4	+0.0 -34.1	+0.0	48.5	75.2 959.85	-26.7	Horiz
34	4799.350M	43.6	+0.0 +0.0 +0.5	+0.6 +0.0 +33.2	+3.6 +0.3	+0.0 -33.6	+0.0	48.2	75.2 959.85	-27.0	Horiz
35	7678.820M	38.1	+0.0 +0.0 +0.6	+1.4 +0.0 +37.4	+4.7 +0.6	+0.0 -34.9	+0.0	47.9	75.2 959.85	-27.3	Horiz
36	5712.100M	40.2	+0.0 +0.0 +0.5	+0.8 +0.0 +34.3	+4.1 +0.6	+0.0 -33.6	+0.0	46.9	75.2 952 24.76	-28.3	Horiz
37	29.971M	42.9	+0.0 +0.0 +0.0	+0.1 +3.6 +0.0	+0.3 +0.0	+0.0 +0.0	+0.0	46.9	75.2	-28.3	Groun
38	950.100k	36.5	+0.0 +0.0 +0.0	+0.1 +9.5 +0.0	+0.1 +0.0	+0.0 +0.0	+0.0	46.2	75.2	-29.0	Para
39	1919.790M	49.1	+0.0 +0.0 +0.3	+0.4 +0.0 +28.1	+2.2 +0.5	+0.0 -34.6	+0.0	46.0	75.2 959.85	-29.2	Horiz
40	1903.900M	48.7	+0.0 +0.0 +0.3	+0.4 +0.0 +28.0	+2.2 +0.5	+0.0 -34.6	+0.0	45.5	75.2 952 24.76	-29.7	Horiz
41	478.100M	15.7	+0.0 +23.9 +0.0	+0.2 +0.0 +0.0	+1.1 +0.0	+1.5 +0.0	+0.0	42.4	75.2	-32.8	Vert
42	1776.000M	45.3	+0.0 +0.0 +0.3	+0.4 +0.0 +26.8	+2.1 +0.6	+0.0 -34.8	+0.0	40.7	75.2	-34.5	Horiz
43	303.500M	19.0	+0.0 +18.7 +0.0	+0.2 +0.0 +0.0	+0.9 +0.0	+1.2 +0.0	+0.0	40.0	75.2	-35.2	Horiz
44	28.840M	35.0	+0.0 +0.0 +0.0	+0.1 +4.1 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	39.4	75.2	-35.8	Para
45	103.700M	22.9	+0.0 +14.1 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.6 +0.0	+0.0	38.2	75.2	-37.0	Vert
46	145.400M	22.1	+0.0 +14.0 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.8 +0.0	+0.0	37.5	75.2	-37.7	Vert
47	324.900M	15.3	+0.0 +19.2 +0.0	+0.2 +0.0 +0.0	+0.9 +0.0	+1.2 +0.0	+0.0	36.8	75.2	-38.4	Horiz
48	187.100M	19.4	+0.0 +15.5 +0.0	+0.1 +0.0 +0.0	+0.7 +0.0	+0.9 +0.0	+0.0	36.6	75.2	-38.6	Vert
49	145.400M	20.2	+0.0 +14.0 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.8 +0.0	+0.0	35.6	75.2	-39.6	Horiz

50	71.700M	21.5	+0.0 +12.9 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.5 +0.0	+0.0	35.4	75.2	-39.8	Vert
51	221.100M	17.0	+0.0 +16.6 +0.0	+0.1 +0.0 +0.0	+0.7 +0.0	+1.0 +0.0	+0.0	35.4	75.2	-39.8	Vert
52	79.500M	21.5	+0.0 +12.6 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.6 +0.0	+0.0	35.2	75.2	-40.0	Vert
53	292.900M	14.7	+0.0 +18.1 +0.0	+0.2 +0.0 +0.0	+0.9 +0.0	+1.2 +0.0	+0.0	35.1	75.2	-40.1	Vert
54	93.000M	19.0	+0.0 +13.0 +0.0	+0.1 +0.0 +0.0	+0.5 +0.0	+0.6 +0.0	+0.0	33.2	75.2	-42.0	Vert
55	86.300M	16.7	+0.0 +12.4 +0.0	+0.1 +0.0 +0.0	+0.4 +0.0	+0.6 +0.0	+0.0	30.2	75.2	-45.0	Horiz
56	19.415M	19.5	+0.0 +0.0 +0.0	+0.1 +6.5 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	26.3	75.2	-48.9	Para

Test Setup Photo(s)

Below 1GHz; Laptop

Above 1GHz; Laptop

Below 1GHz; Tablet

Above 1GHz; Tablet

2.1046 / 101.113(a) Transmitter Power Limitations

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	Michael Atkinson
Test Method:	ANSI C63.26 (2015), section 5.2	Test Date(s):	12/2/2022 to 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.		

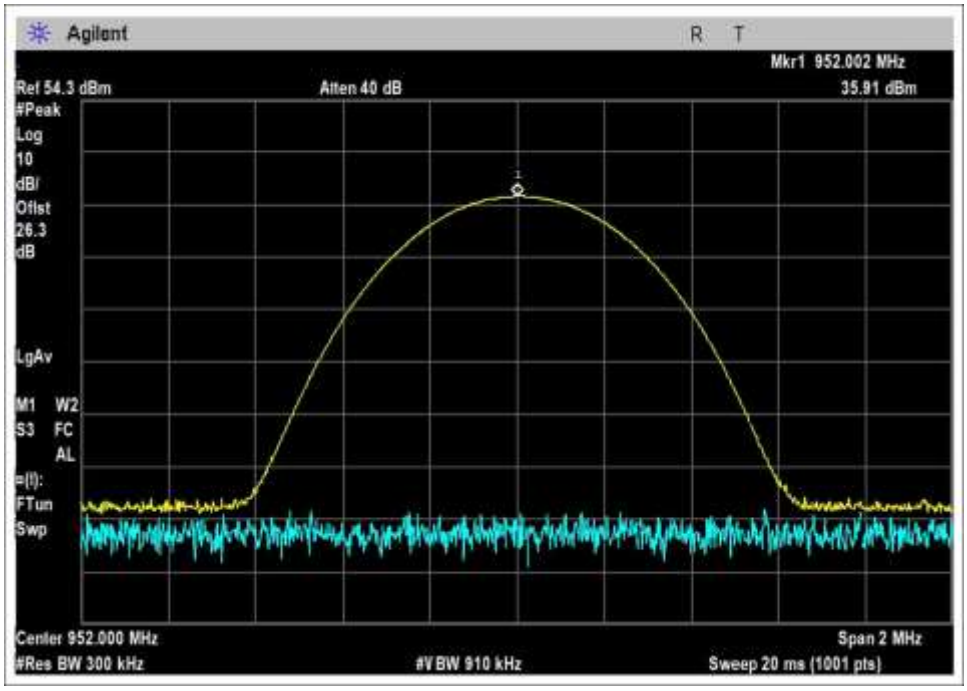
Environmental Conditions			
Temperature (ºC)	20.5	Relative Humidity (%):	31-41

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02872	Spectrum Analyzer	Agilent	E4440A	11/29/2021	11/29/2023
P07746	Attenuator	Pasternack	PE7004-6	2/11/2021	2/11/2023
P07623	Attenuator	API Weinschel	47-20-34	3/16/2022	3/16/2024
P06452	Cable	Andrews	Heliax	1/17/2022	1/17/2024

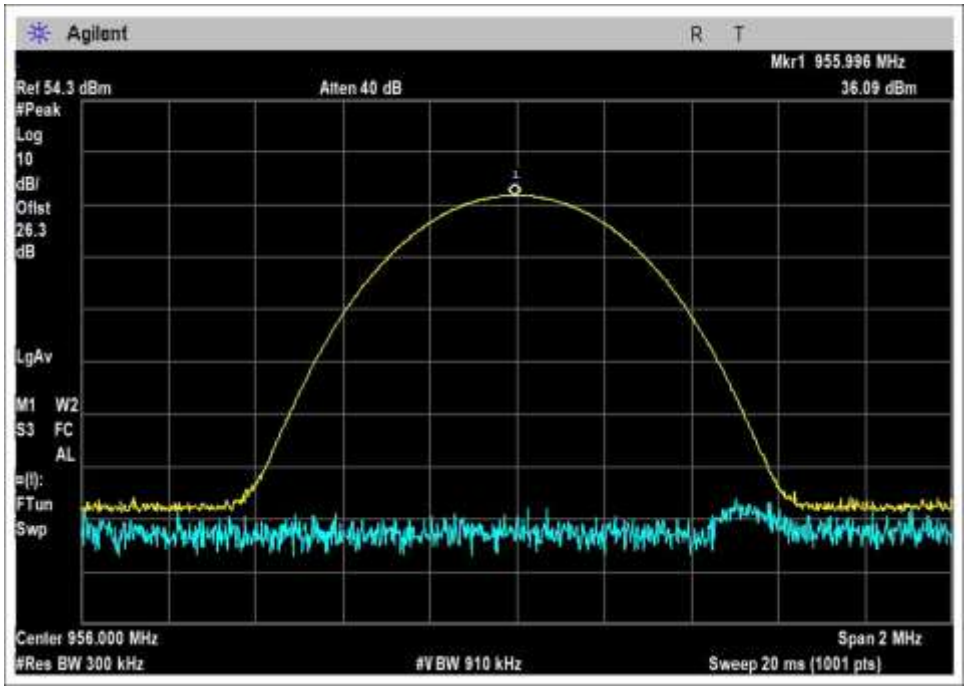
Test Data Summary - RF Conducted Measurement							
Frequency (MHz)	**Modulation**	**Ant. Gain (dBi)**	**Measured (dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Limit (dBW)**	**Results**
952.0	24.76 Hz AM	5	35.91	40.91	≤44	≤14	Pass
956.0	24.76 Hz AM	5	36.09	41.09	≤44	≤14	Pass
959.85	24.76 Hz AM	5	36.13	41.13	≤44	≤14	Pass
952.0	57.78 Hz AM	5	35.67	40.67	≤44	≤14	Pass
956.0	57.78 Hz AM	5	35.86	40.86	≤44	≤14	Pass
959.85	57.78 Hz AM	5	36.26	41.26	≤44	≤14	Pass

Plot(s)

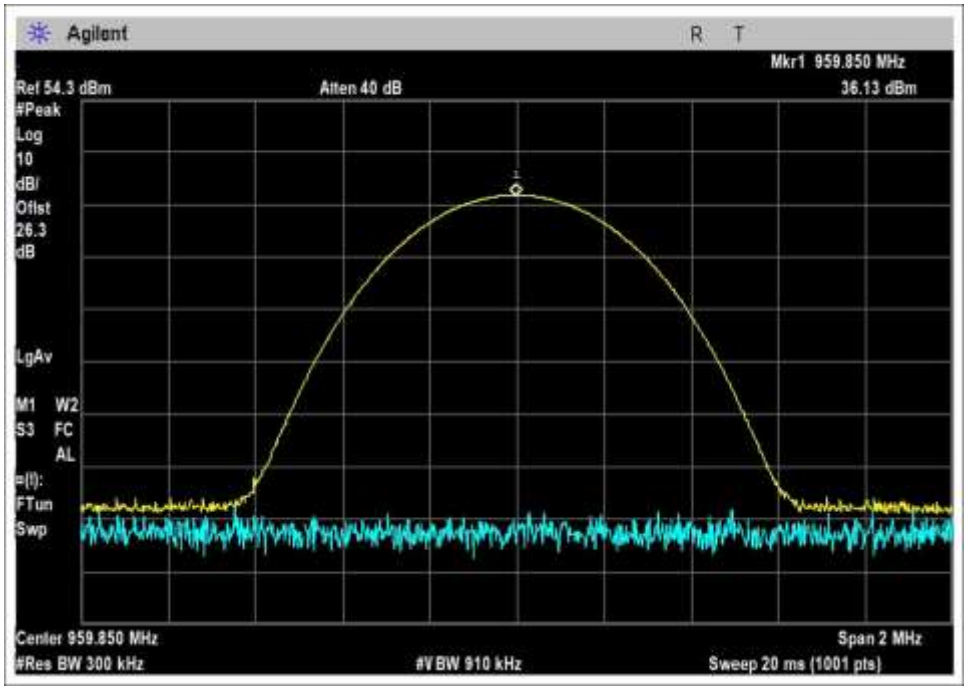
24.76Hz AM Mod



Low Channel

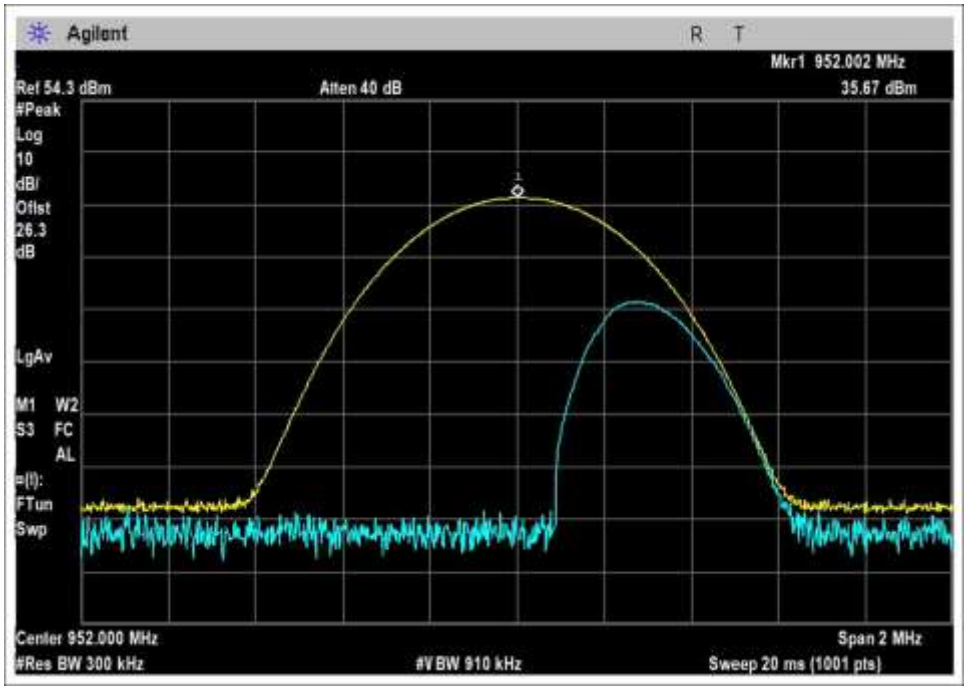


Middle Channel

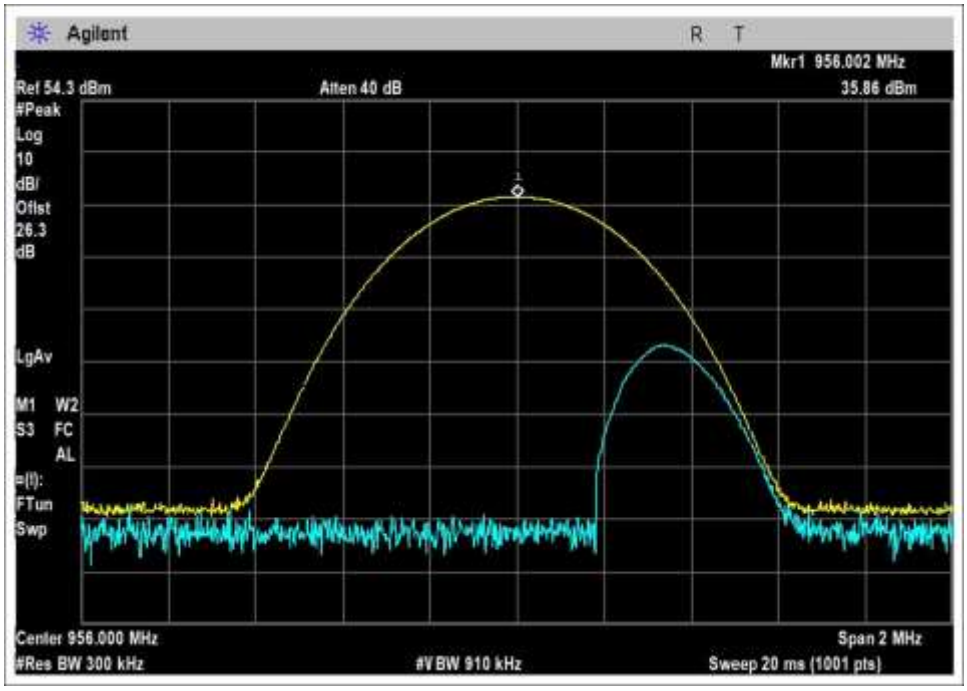


High Channel

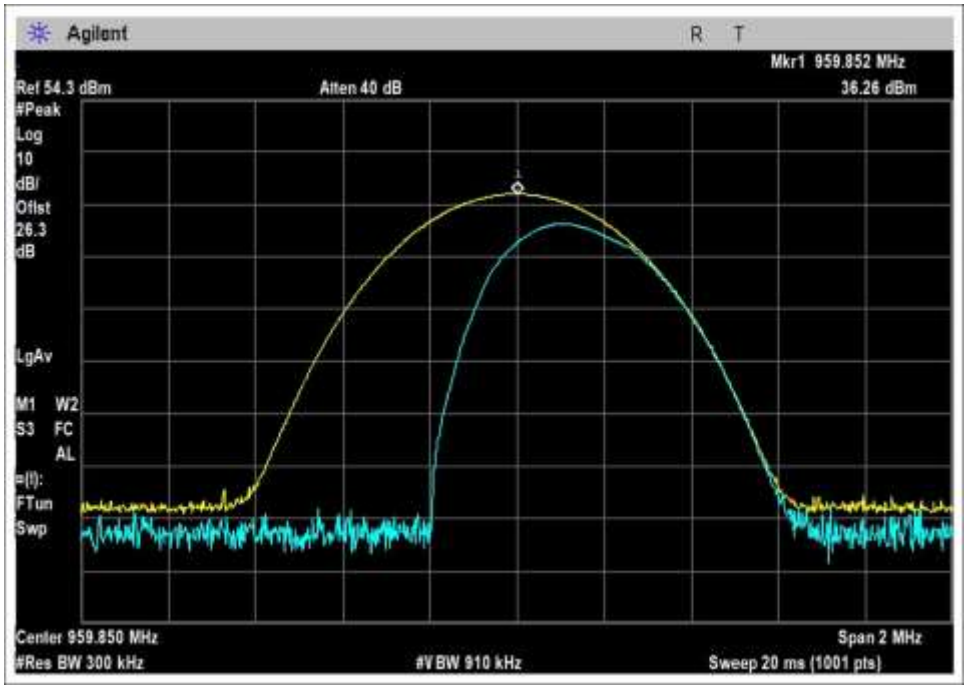
57.78Hz AM Mod



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)

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: MEASUREMENT UNCERTAINTIES

Uncertainty Parameter	Actual	Limit	Unit of Measure
Occupied Channel Bandwidth	1	5	%
RF output power, conducted	0.67	1.5	dB
Power Spectral Density, conducted	0.67	3	dB
Unwanted Emissions, conducted	0.67	3	dB
All emissions, radiated	3.73	6	dB
Temperature	1	3	ºC
Humidity	3.4	5	%
DC and low frequency voltages	2	3	%
Time	1.1	5	%

Reported uncertainties 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.

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point, the measuring device is set into the linear mode and the scan time is reduced.