Itron, Inc.

REVISED TEST REPORT TO 103557-12

Mobile Collection Device, MC3
Model: DCU5310C

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247
(FHSS 902-928 MHz)

Report No.: 103557-12A

Date of issue: July 14, 2020

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: Jay Holcomb
Customer Reference Number: 201865

REPORT PREPARED BY:

Darcy Thompson
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 103557

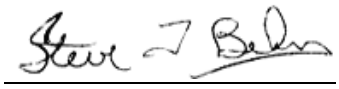
DATE OF EQUIPMENT RECEIPT: February 13, 2020
DATE(S) OF TESTING: February 13-21, 2020

Revision History

Original: Testing of the Mobile Collection Device, MC3 Model: DCU5310C to FCC Part 15 Subpart C Section(s) 15.247 (FHSS 902-928 MHz).
Revision A: Added statement to Radiated Spurious Emissions Test Conditions: Average readings are calculated from formula Average=peak -7.0db (duty cycle correction factor). Therefore, none of the peak readings are over 20dB on Configuration 3, 4 and 5.

Report Authorization

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



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

Test Facility Information

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

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.12

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Japan
Canyon Park, Bothell, WA	US0081	US1022	A-0136
Brea, CA	US0060	US1025	A-0136
Fremont, CA	US0082	US1023	A-0136
Mariposa, CA	US0103	US1024	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

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

NA = Not Applicable
NA1- = Not applicable because the EUT is connected to 12V car battery and shall not be connected to public utility AC power line.

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
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
Tablet	Panasonic	FZ-G1	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Mobile Collection Device, MC3	Itron, Inc.	DCU5310C	74007411

Support Equipment:

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

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
5dBi Antenna	PCTEL	Generic	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Mobile Collection Device, MC3	Itron, Inc.	DCU5310C	74007707
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
Tablet	Panasonic	FZ-M1	NA

Support Equipment:

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

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
5dBi Antenna	PCTEL	Generic	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Mobile Collection Device, MC3	Itron, Inc.	DCU5310C	74007707
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
Tablet	Panasonic	FZ-G1	NA

Support Equipment:

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

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
5dBi Antenna	PCTEL	Generic	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
Tablet	Panasonic	FZ-M1	NA
Mobile Collection Device, MC3	Itron, Inc.	DCU5310C	74007411
Receiver Antenna	PCTEL	SUB-0275-001/H	S15180005

Support Equipment:

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

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
5dBi Antenna	PCTEL	Generic	NA
Power Distribution Box	Itron, Inc.	Generic	NA
Automobile Adapter	Lind Electronics, Inc.	PA1555-2155 FB	NA
Mobile Collection Device, MC3	Itron, Inc.	DCU5310C	74007411
Receiver Antenna	PCTEL	SUB-0275-001/H	S15180005
Tablet	Panasonic	FZ-G1	NA

Support Equipment:

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

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
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/ 5dbi
Beamforming Type:	NA
Antenna Connection Type:	External Connector
Nominal Input Voltage:	13.8Vdc from car battery
Firmware / Software used for Test:	Arm Version: 7.66.00.01 DSP Version: 5.70.00.00 FPGA Version: 3.02 PSoC Version: 3.01 MC3 SuperRaptor Test ver.4.0.3.5
FCC ID:	7” tablet – Panasonic FZ-M1 FCC ID: ACJ9TGWL15B IC: 216A-CFWL15B contains: FCC ID: ACJ9TGWW13B3 IC: 216A-CFWW13B 10” tablet – Panasonic FZ-G1 FCC ID: ACJ9TGWL15A IC: 216A-CFWL15A contains: FCC ID: ACJ9TGWW13B1 IC: 216A-CFWW13B

EUT and Accessory Photo(s)

EUT's

Tablet 1

Tablet 2

Tablet Power Adapter

Power Distribution

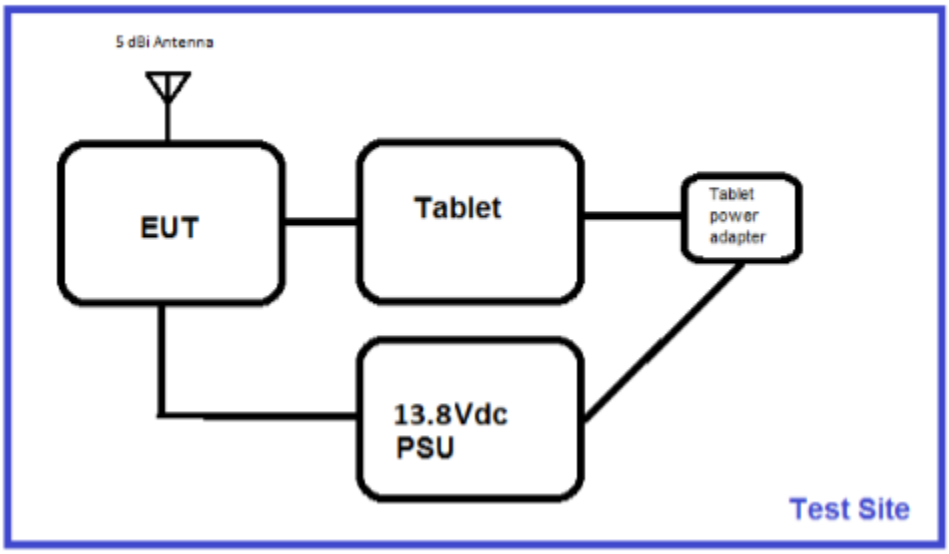
Antennas

Support Equipment Photo(s)

12Vdc PSU

Block Diagram of Test Setup(s)

Test Setup Block Diagram



FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	2/13/2020
Configuration:	1		
Test Setup:	The EUT is placed on test bench. Input voltage is 13.8Vdc from external power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5 The EUT is set to continuously transmit. Operating frequency: 908-924MHz Frequency of measurement: 908-924MHz RBW=3kHz, 30kHz, 62kHz VBW=10kHz, 91kHz, 180kHz Note: There are two EUTs with the same transmitter. The difference between them is the optional receivers in one of them. The EUT used for this test is the one with optional receivers as it is the worst-case configuration.		

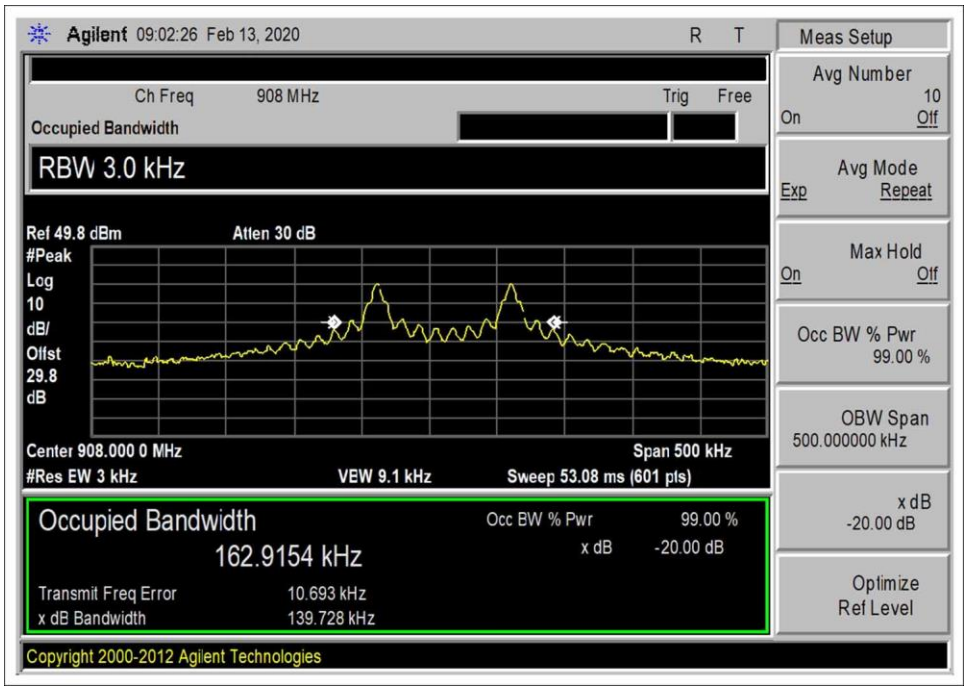
Environmental Conditions			
Temperature (ºC)	19.7	Relative Humidity (%):	45

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	7/25/2019	7/25/2020
03432	Attenuator	Aeroflex/Weinschel	90-30-34	10/22/2019	10/22/2021
P07244	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020

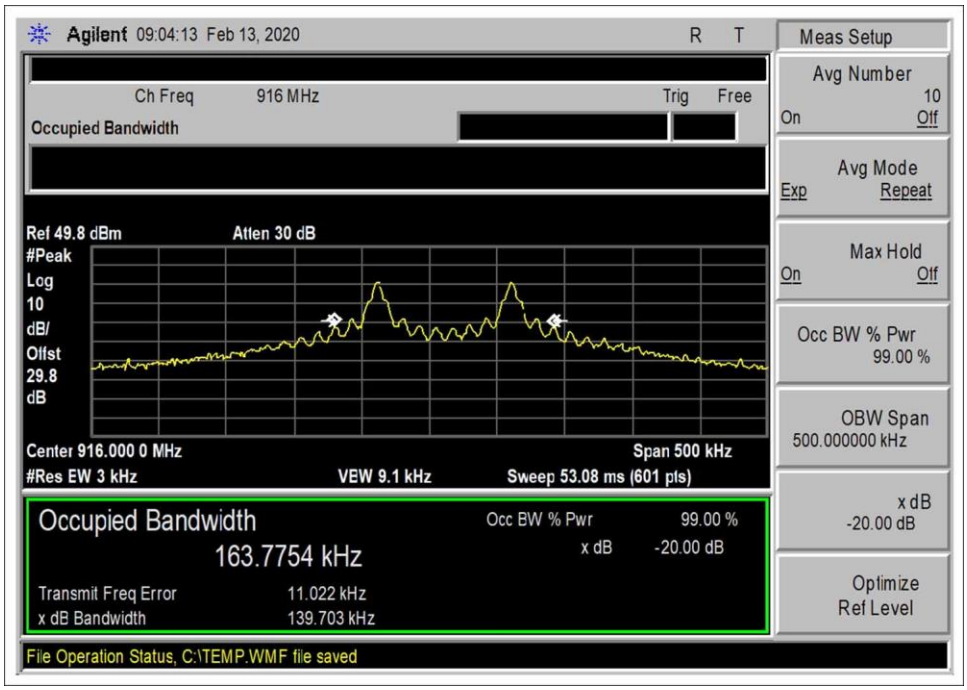
15.247(a)(1) 20 dB Bandwidth

Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
908	1	12.5kbps FM	139.728	≤500	Pass
916	1	12.5kbps FM	139.703	≤500	Pass
924	1	12.5kbps FM	140.608	≤500	Pass

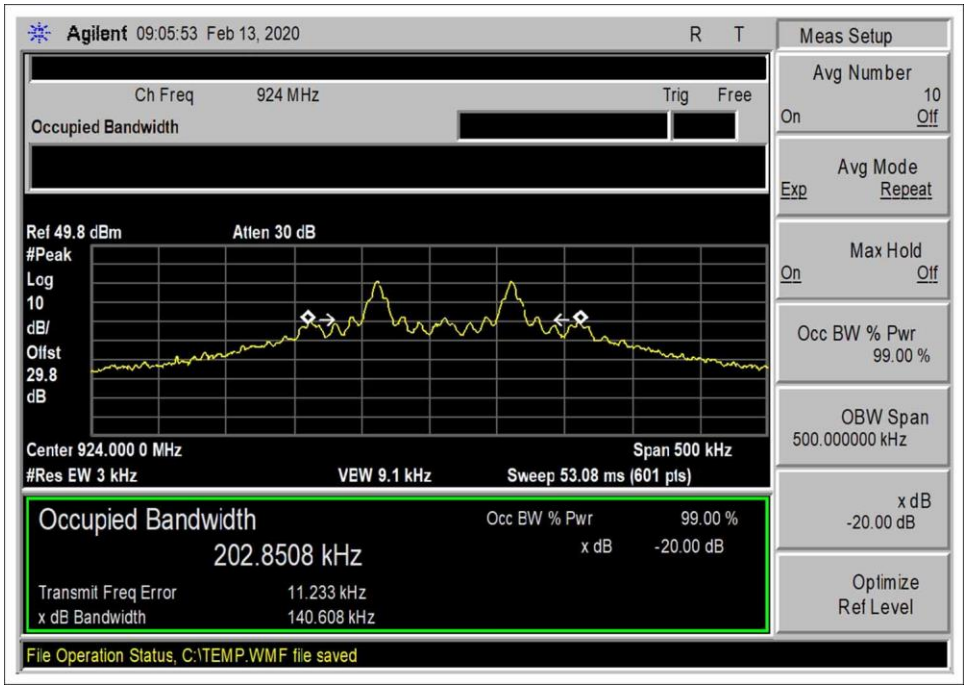
Plot(s)



Low Channel



Middle Channel

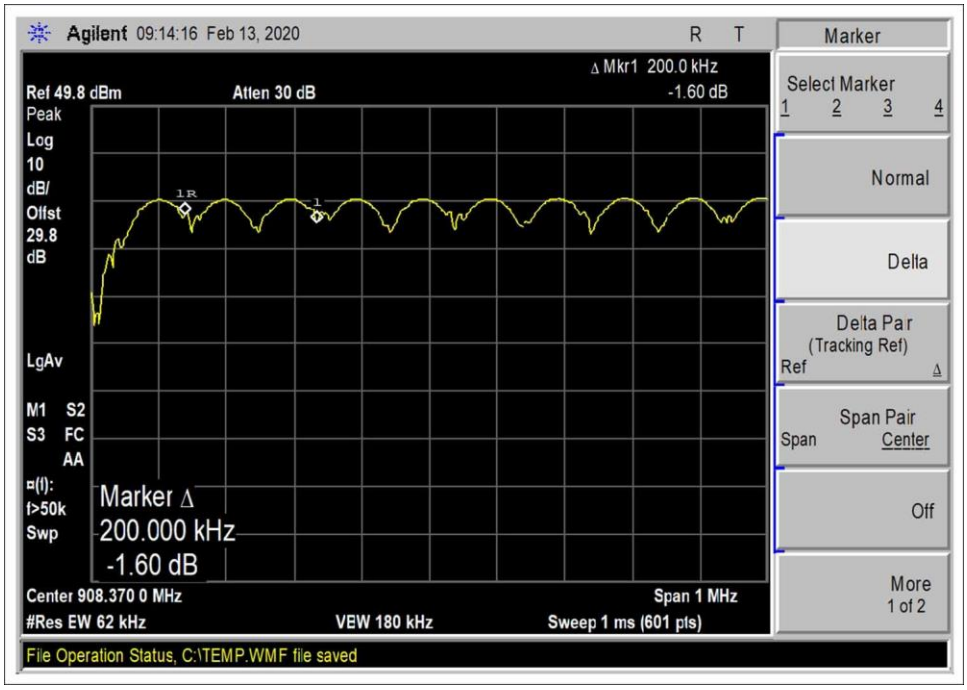


High Channel

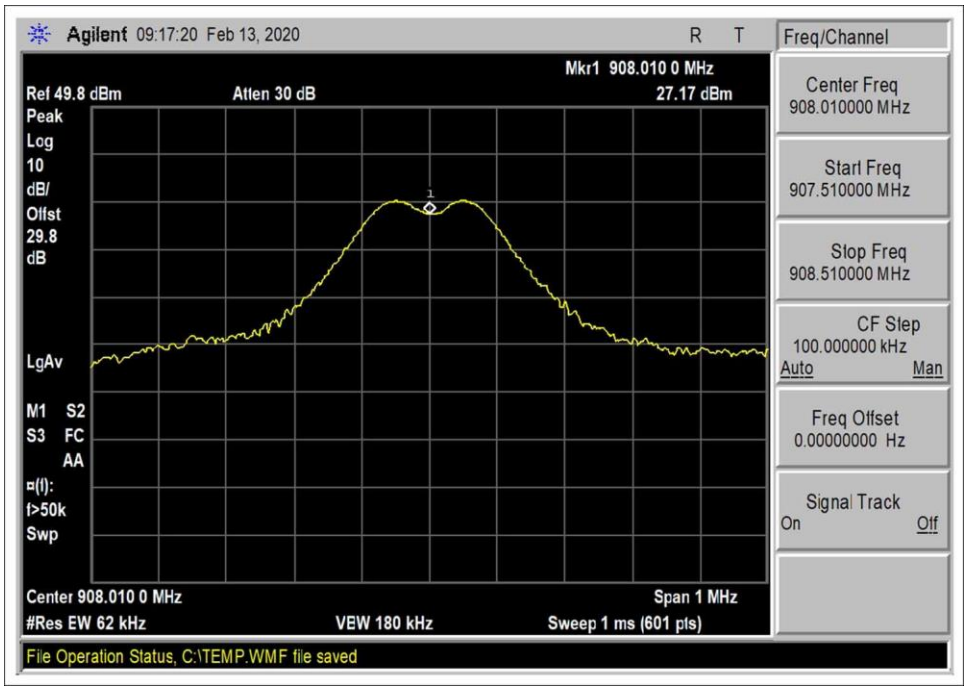
15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	Hopping	200	>140.608	Pass

Plot(s)



Carrier Separation

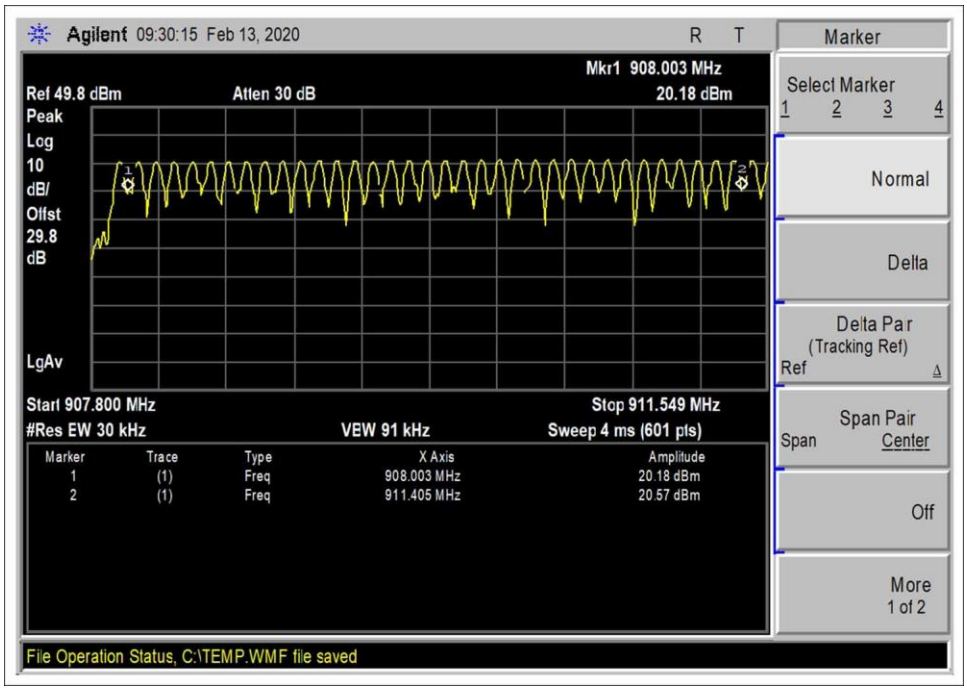


Single Frequency

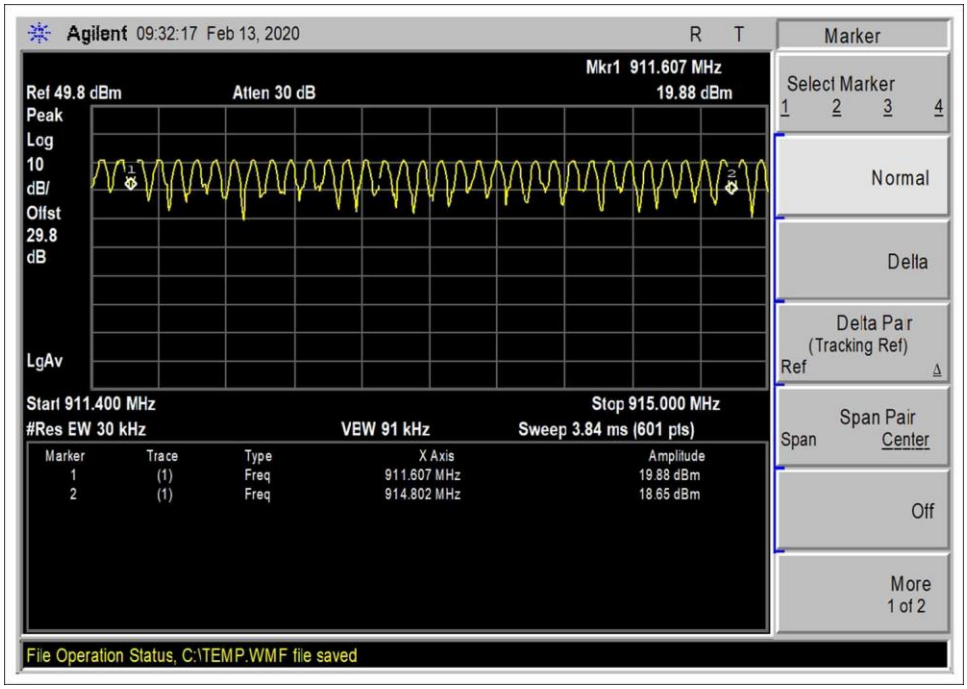
15.247(a)(1)(iii) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
1	Hopping	81	≥50	Pass

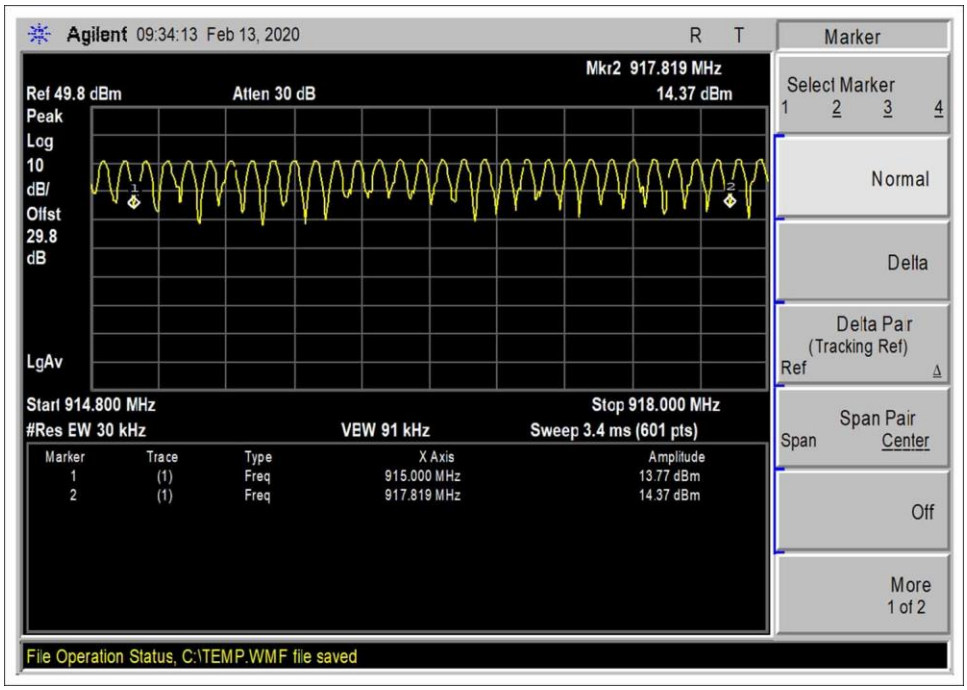
Plot(s)



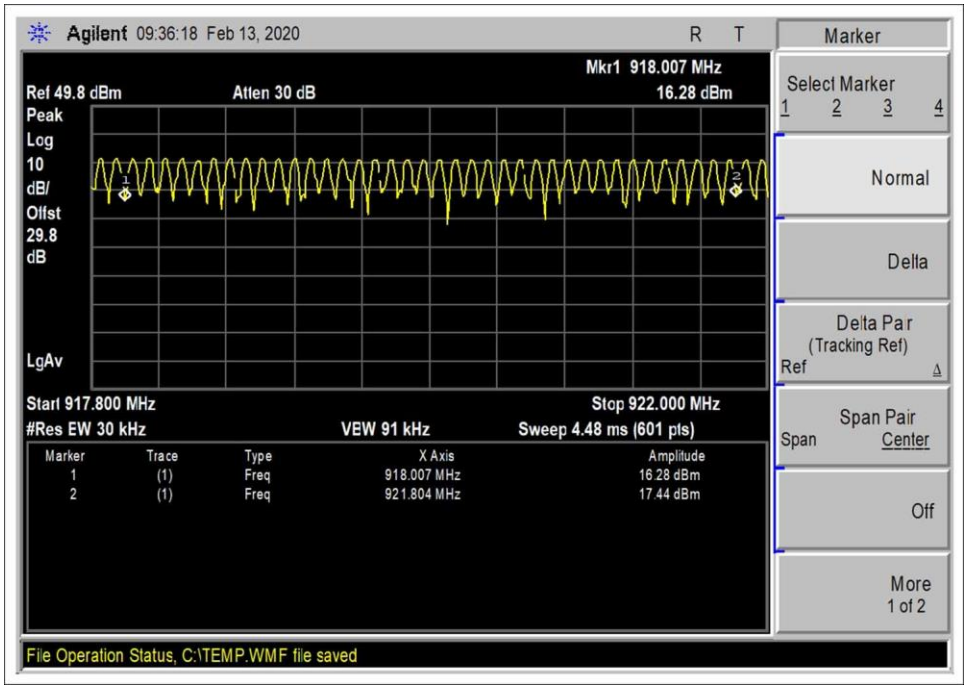
908-911.4MHz – 18 Channel



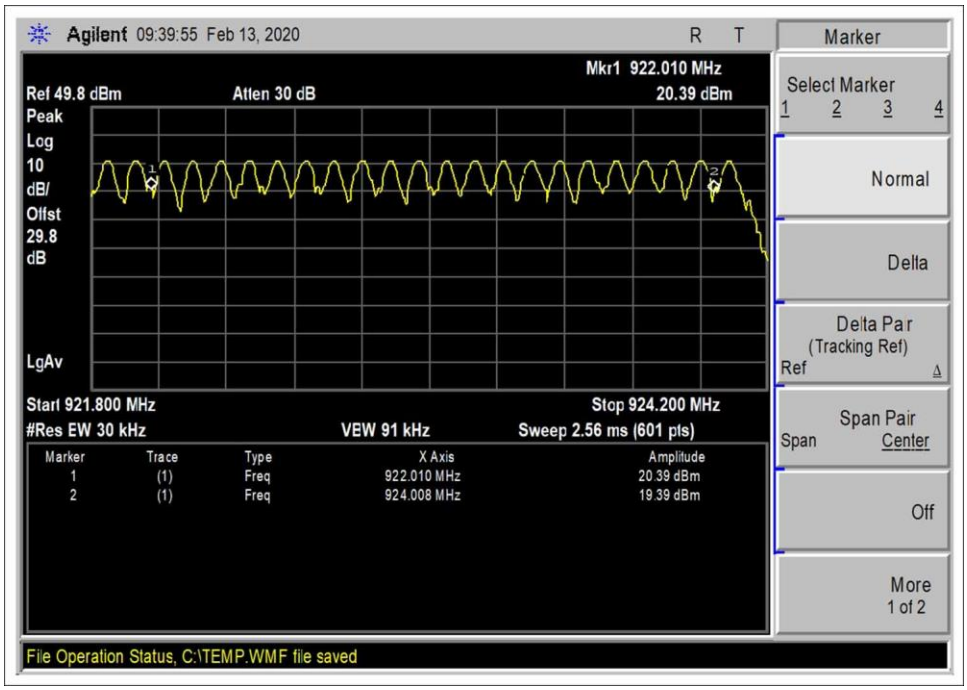
911.6-914.8MHz – 17 Channel



915-917.8MHz – 15 Channel



918-921.8MHz - 20 Channel



922-924MHz - 11 Channel

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

Test Data Summary				
Observation Period, P_{obs} is derived from the following: $P_{Obs} = \begin{cases} 20\ Seconds & 20\ dB\ BW < 250kHz \\ 10\ Seconds & 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (ms)**	**Limit (ms/P_{obs})**	**Results**
1	Hopping	357.36	≤400	Pass

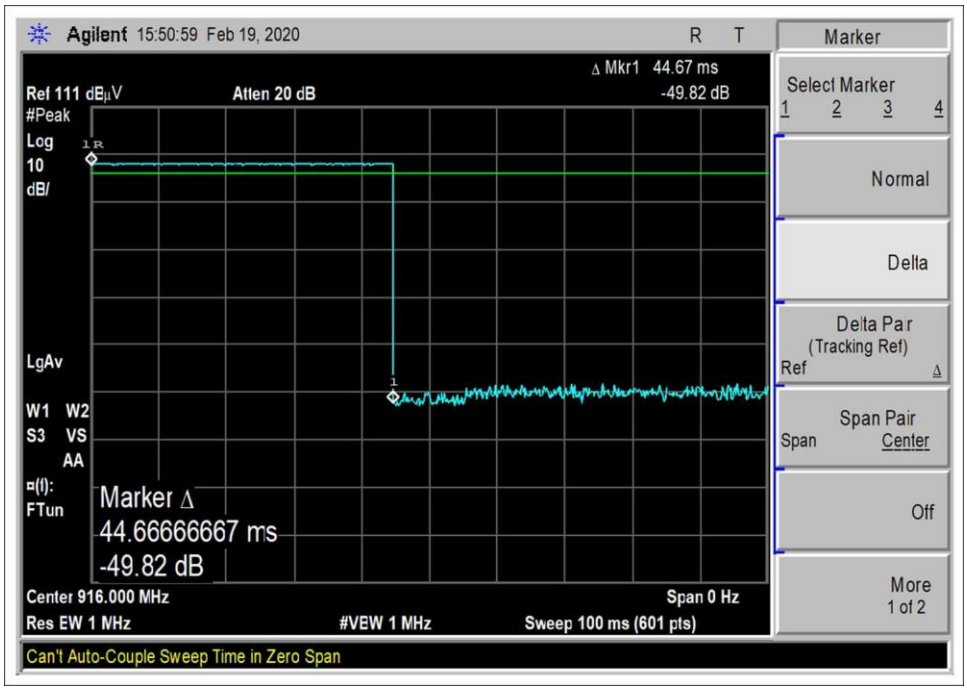
Measured results are calculated as follows:

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

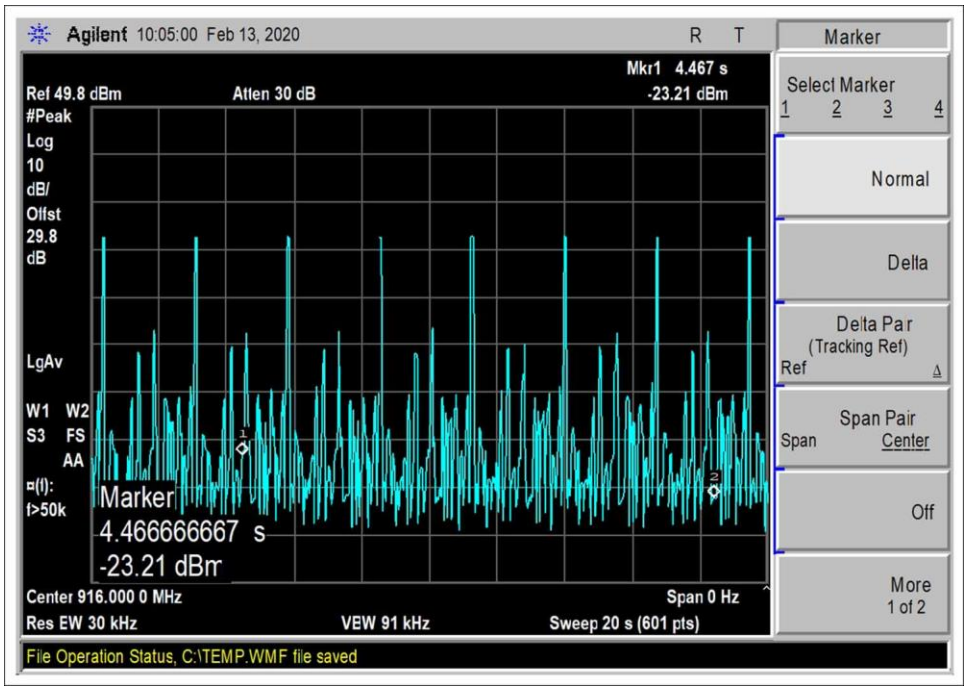
Actual Calculated Values:

Parameter	Value
Observation Period (P_{obs}):	20 seconds
Number of RF Bursts / P_{obs}:	8
On time of RF Burst:	44.67ms
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	357.36 ms

Plot(s)



Single Transmission



8 Transmissions in 20 seconds

Test Setup Photo(s)

15.247(b)(2) Output Power

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	ANSI C63.10 (2013)	Test Date(s):	2/13/2020
Configuration:	1		
Test Setup:	The EUT is placed on test bench. Input voltage is 13.8Vdc from external power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5 The EUT is set to continuously transmit. Operating frequency: 908-924MHz Frequency of measurement: 902-928MHz RBW=300kHz VBW=910kHz Note: There are two EUTs with the same transmitter. The difference between them is the optional receivers in one of them. The EUT used for this test is the one with optional receivers as it is the worst-case configuration.		

Environmental Conditions			
Temperature (ºC)	19.7	Relative Humidity (%):	45

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	7/25/2019	7/25/2020
03432	Attenuator	Aeroflex/Weinschel	90-30-34	10/22/2019	10/22/2021
P07244	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020

Test Data Summary - Voltage Variations					
Frequency (MHz)	**Modulation / Ant Port**	**$V_{Minimum}$ (dBm)**	**$V_{Nominal}$ (dBm)**	**$V_{Maximum}$ (dBm)**	**Max Deviation from $V_{Nominal}$ (dB)**
908	12.5kbps FM	NA	28.81	NA	NA
916	12.5kbps FM	NA	29.55	NA	NA
924	12.5kbps FM	NA	29.51	NA	NA

Test performed using operational mode with the highest output power, representing worst case.
NA: This equipment is battery powered. Power output tests were performed using an external power supply to simulate a fresh battery.

Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	13.8
$V_{Minimum}$:	NA
$V_{Maximum}$:	NA

NA: This equipment is battery powered. Power output tests were performed using an external power supply to simulate a fresh battery.

Test Data Summary - Voltage Variations

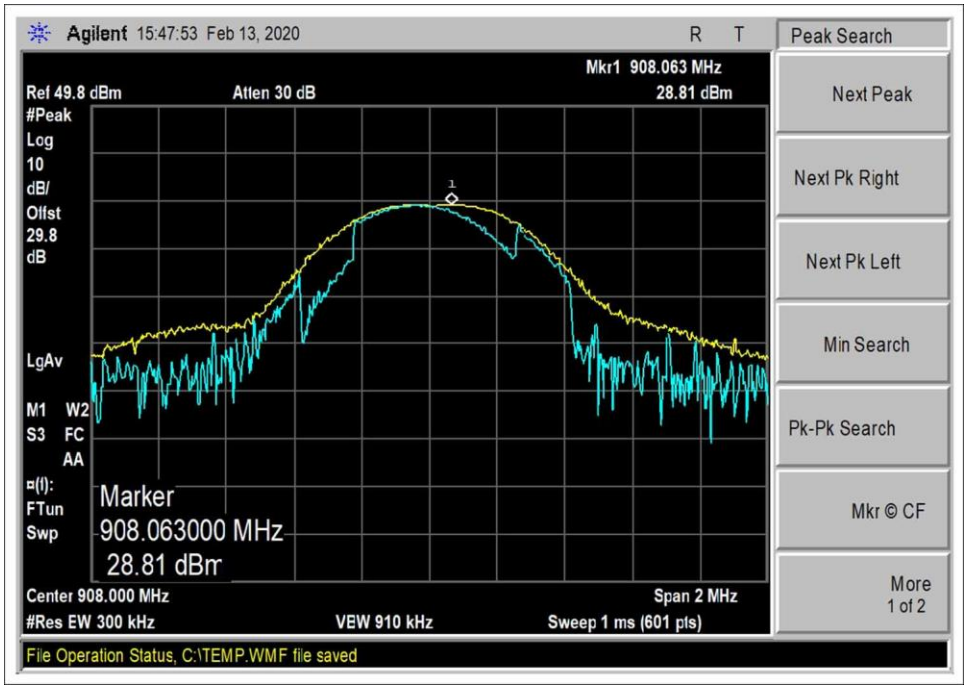
This equipment is battery powered. Power output tests were performed using an external power supply to simulate a fresh battery.

Test Data Summary - RF Conducted Measurement

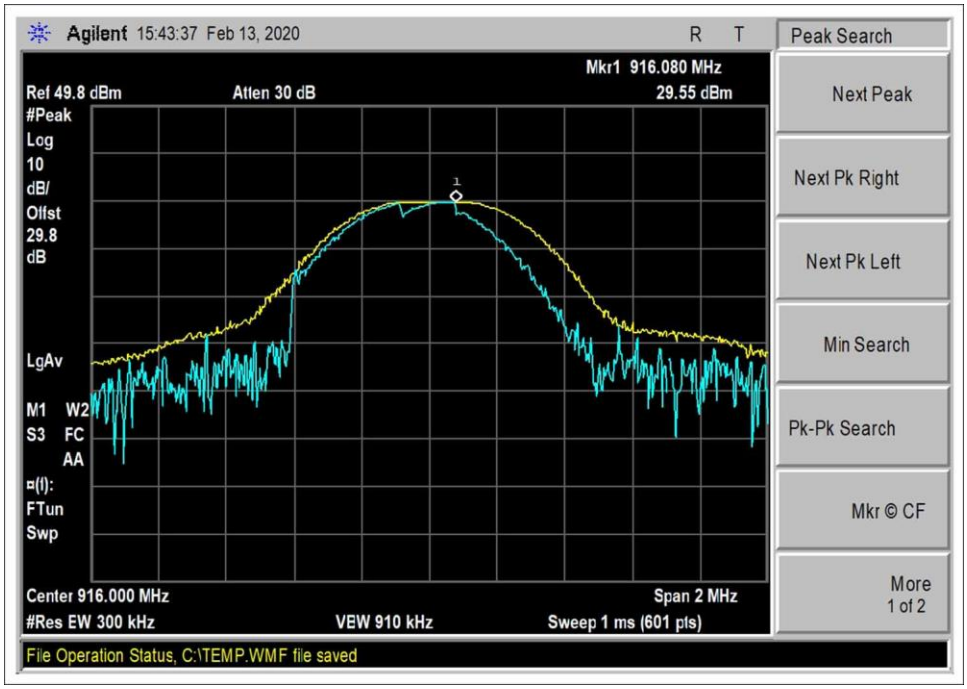
$$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$$

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
908	12.5kbps FM	5	28.81	≤30	Pass
916	12.5kbps FM	5	29.55	≤30	Pass
924	12.5kbps FM	5	29.51	≤30	Pass

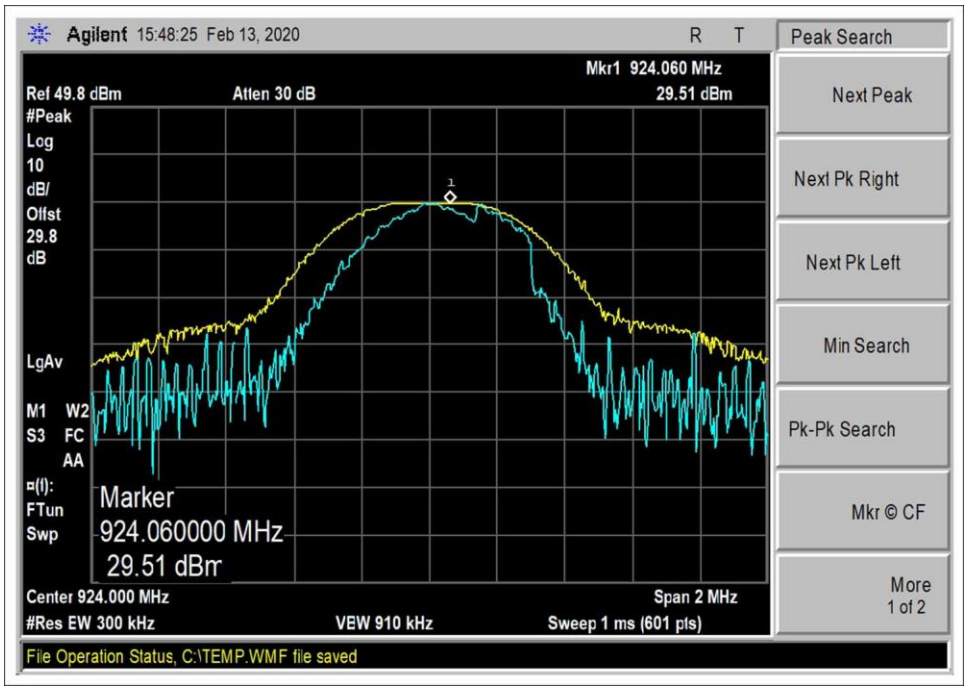
Plots



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)

15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**103557**	Date:	2/14/2020
Test Type:	**Conducted Emissions**	Time:	09:22:36
Tested By:	Don Nguyen	Sequence#:	0
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

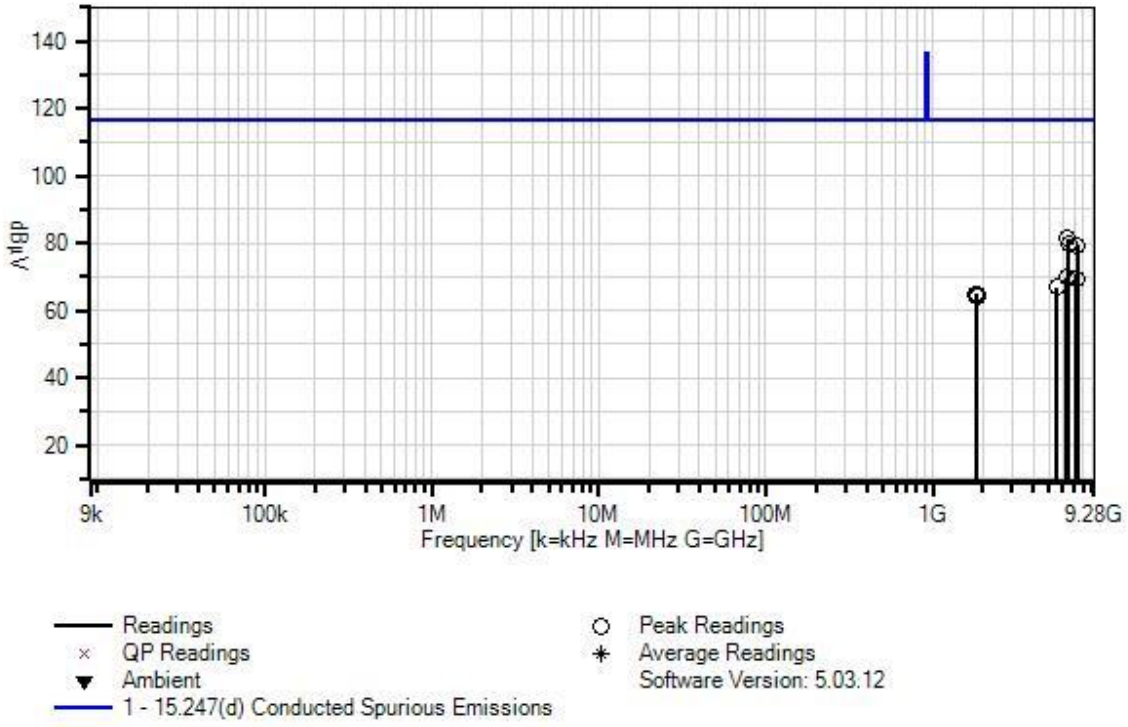
The EUT is placed on test bench. Input voltage is 13.8Vdc from external power supply. USB port is connected to a touchscreen tablet. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set to continuously transmit.

Operating frequency: 908MHz, 916MHz, 924MHz
Frequency of measurement: 9kHz-9.28GHz
RBW=100kHz, VBW=300kHz

Temperature: 17°C
Relative Humidity: 41%

Test Location: Brea Lab A
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 103557 Sequence#: 0 Date: 2/14/2020
15.247(d) Conducted Spurious Emissions Test Distance: None Antenna Port



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07244	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T2	AN03432	Attenuator	90-30-34	10/22/2019	10/22/2021

Measurement Data: Reading listed by margin. Test Distance: None

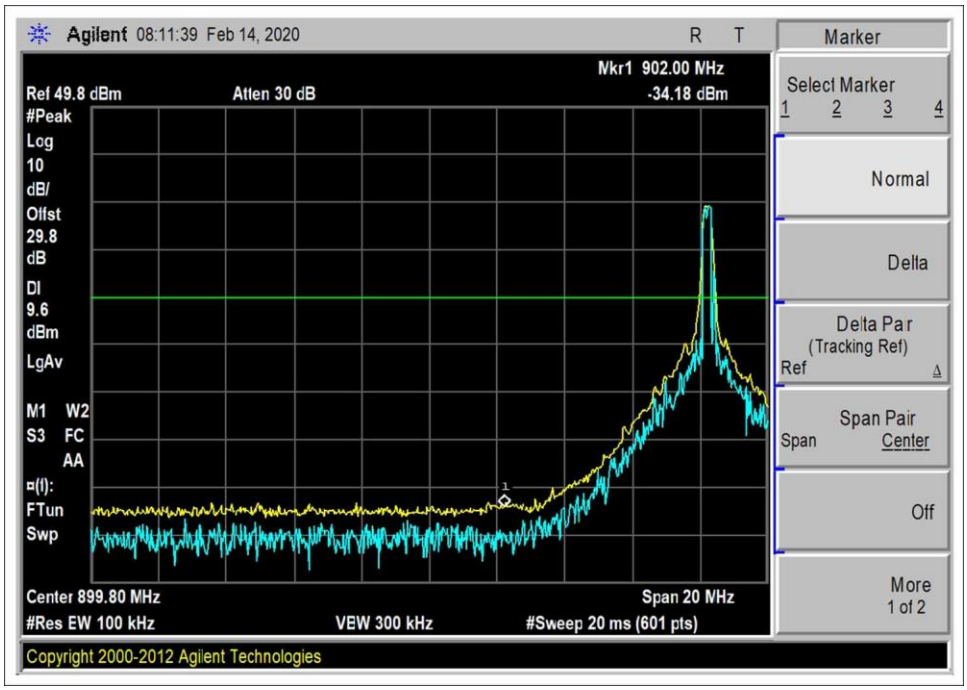
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	6411.750M	51.7	+0.3	+29.5			+0.0	81.5	116.6	-35.1	Anten
2	6467.692M	50.0	+0.3	+29.4			+0.0	79.7	116.6	-36.9	Anten
3	7327.692M	49.8	+0.2	+29.4			+0.0	79.4	116.6	-37.2	Anten
4	6355.742M	40.1	+0.3	+29.5			+0.0	69.9	116.6	-46.7	Anten
5	7263.667M	40.0	+0.2	+29.4			+0.0	69.6	116.6	-47.0	Anten
6	5544.433M	36.6	+0.4	+29.9			+0.0	66.9	116.6	-49.7	Anten
7	1847.875M	35.0	+0.2	+29.6			+0.0	64.8	116.6	-51.8	Anten
8	1815.950M	35.0	+0.2	+29.6			+0.0	64.8	116.6	-51.8	Anten
9	1832.100M	34.3	+0.2	+29.6			+0.0	64.1	116.6	-52.5	Anten

Band Edge

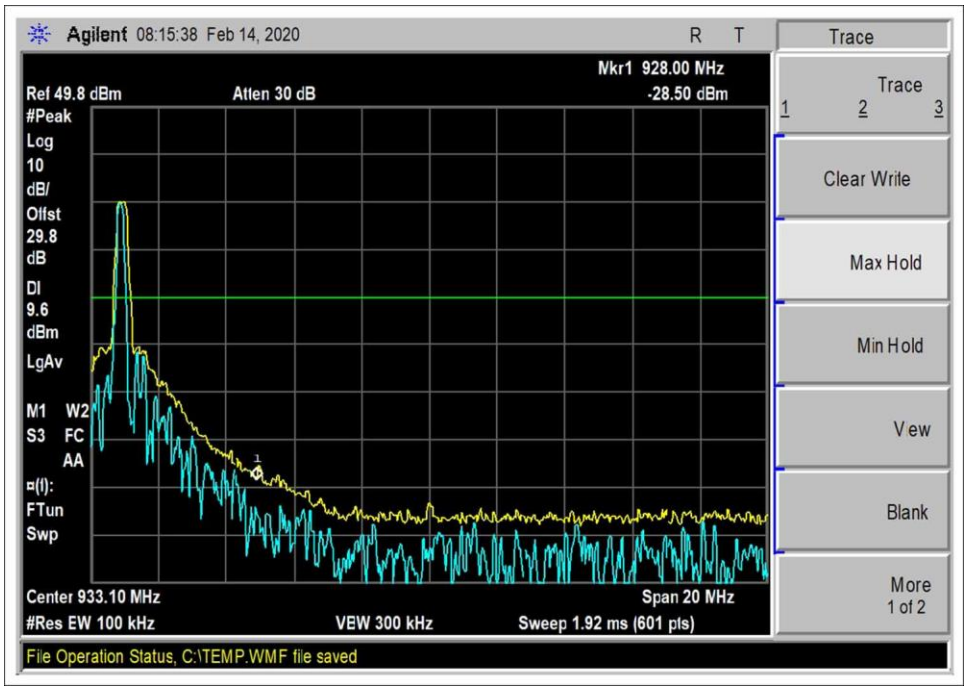
Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Single Channel (Low and High)				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	12.5kbps FM	-34.18	<9.55	Pass
928	12.5kbps FM	-28.50	<9.55	Pass

Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB. Operating Mode: Hopping				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	12.5kbps FM	-34.18	<9.55	Pass
928	12.5kbps FM	-28.50	<9.55	Pass

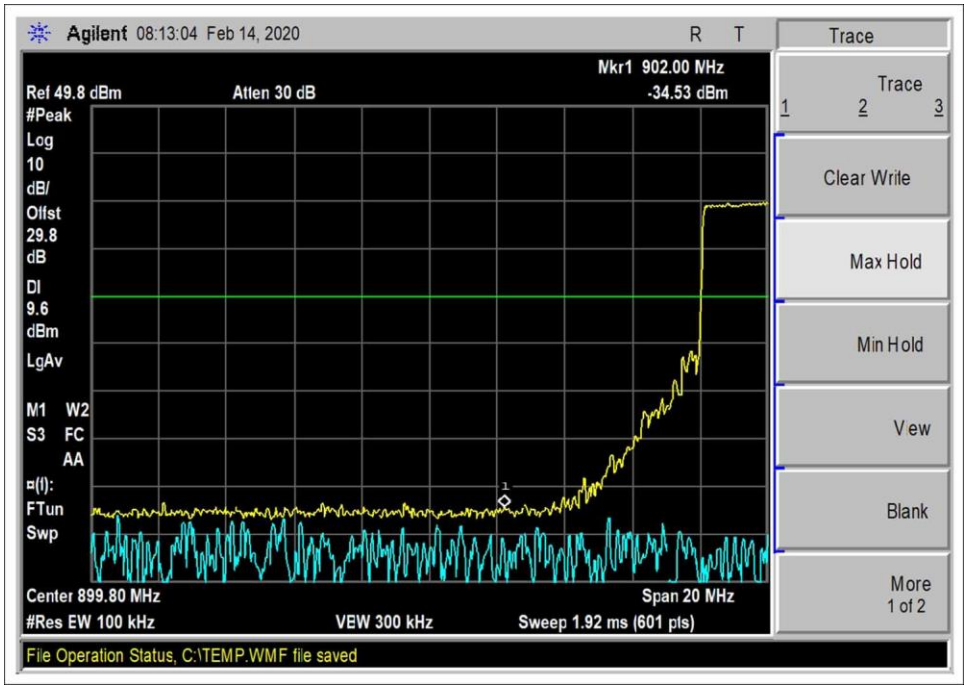
Band Edge Plots



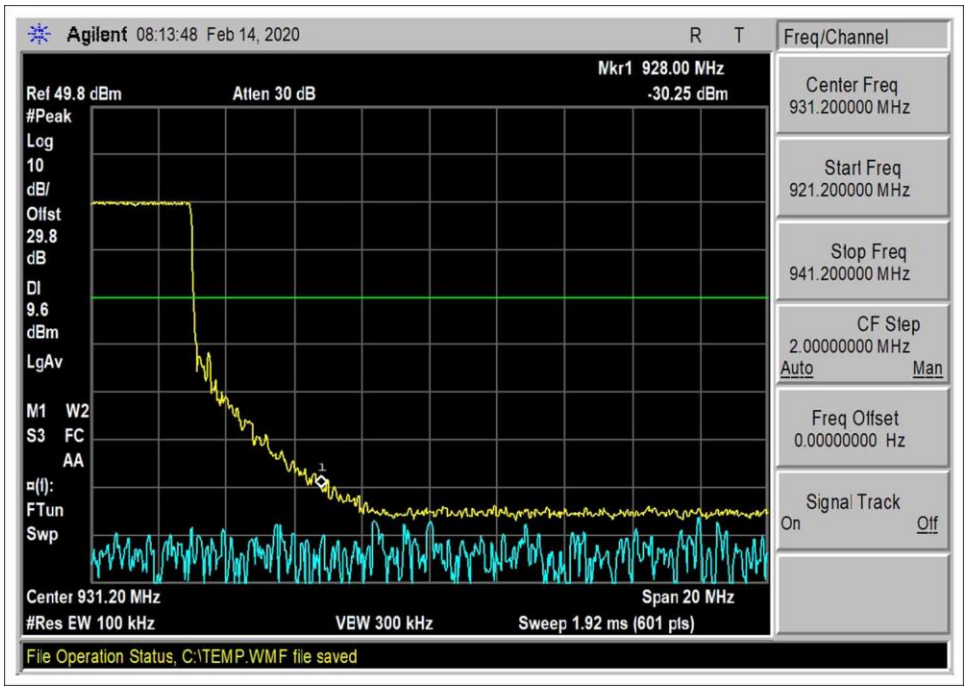
Low Channel



High Channel

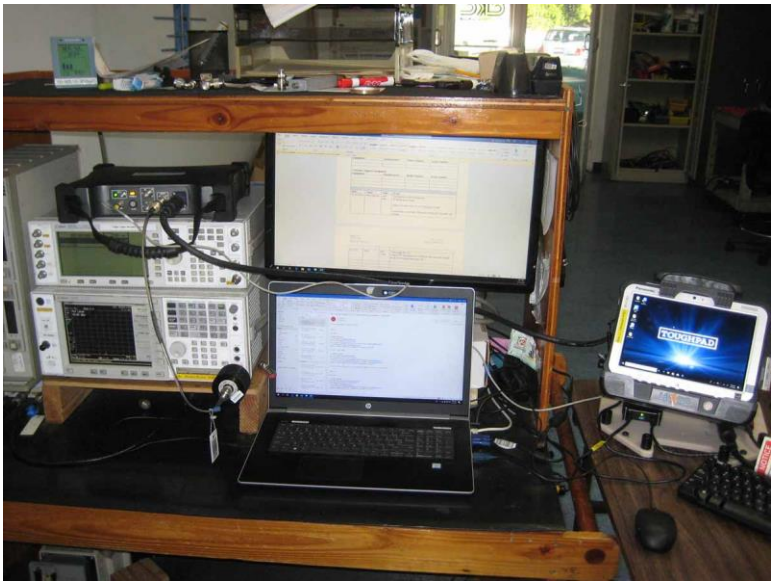


Low Channel Hopping



High Channel Hopping

Test Setup Photo(s)



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103557**	Date:	2/20/2020
Test Type:	**Maximized Emissions**	Time:	09:55:24
Tested By:	Don Nguyen	Sequence#:	1
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

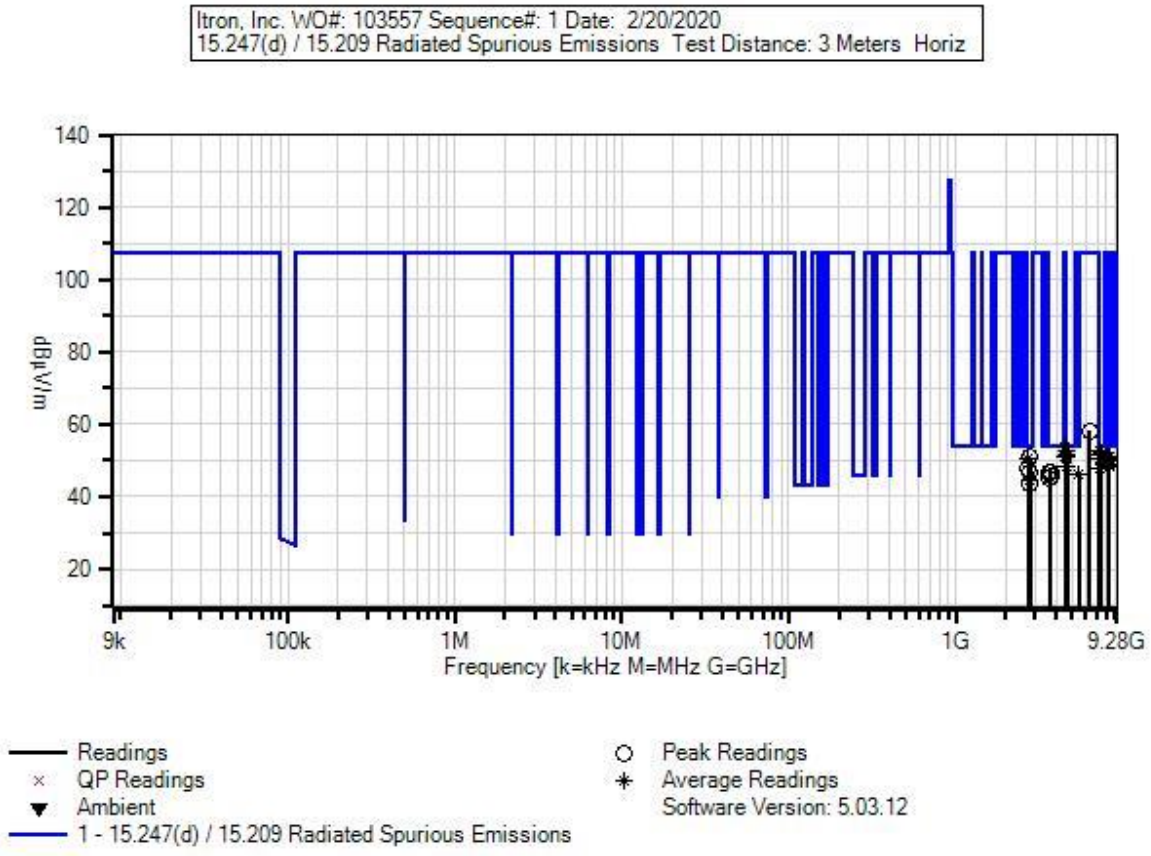
Test Conditions / Notes:

The EUT is placed on turn table. Input voltage is 13.8Vdc from external power supply. GPS and main antenna ports are connected to an external antenna. USB port is connected to a touchscreen computer. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitter mode. The EUT is rotated in three orthogonal orientations. Data represents the worst case orientation.
The antenna of the EUT is mounted to a 52" diameter aluminum plate to represent a vehicle roof. The aluminum plate is supported by foam blocks. The EUT is directly below the plate, on the test table.

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

Temperature 20.3°C, Relative Humidity 32%

Site A
Test Method: ANSI C63.10 (2013)
Duty correction factor is applied to average reading above 1GHz per FCC part 15.35c
Correction factor = 20log(44.67ms/100ms) = -7.0dB


Itron, Inc. WO#: 103557 Sequence#: 1 Date: 2/20/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020
	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T1	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T2	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T3	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T4	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T5	ANP07244	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN03169	High Pass Filter	HM1155-11SS	5/8/2019	5/8/2021
T7	ANDuty Cycle Correction Factor	Test Data Adjustment		2/19/2020	2/19/2022

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4539.667M	60.4	+0.0	-37.8	+32.9	+4.5	+0.0	53.9	54.0	-0.1	Horiz
	Ave		+0.7	+0.2	-7.0						
^	4539.667M	60.4	+0.0	-37.8	+32.9	+4.5	+0.0	60.9	54.0	+6.9	Horiz
			+0.7	+0.2	+0.0						
3	4580.333M	58.8	+0.0	-37.7	+33.0	+4.6	+0.0	52.6	54.0	-1.4	Vert
	Ave		+0.7	+0.2	-7.0						
^	4580.333M	58.8	+0.0	-37.7	+33.0	+4.6	+0.0	59.6	54.0	+5.6	Vert
			+0.7	+0.2	+0.0						
5	7327.650M	54.5	+0.0	-37.4	+36.0	+5.9	+0.0	52.4	54.0	-1.6	Horiz
	Ave		+0.2	+0.2	-7.0						
^	7327.650M	54.5	+0.0	-37.4	+36.0	+5.9	+0.0	59.4	54.0	+5.4	Horiz
			+0.2	+0.2	+0.0						
7	7391.617M	53.8	+0.0	-37.4	+36.2	+5.9	+0.0	52.0	54.0	-2.0	Vert
	Ave		+0.3	+0.2	-7.0						
^	7391.617M	53.8	+0.0	-37.4	+36.2	+5.9	+0.0	59.0	54.0	+5.0	Vert
			+0.3	+0.2	+0.0						
9	7264.283M	54.1	+0.0	-37.4	+35.7	+5.9	+0.0	51.7	54.0	-2.3	Horiz
	Ave		+0.2	+0.2	-7.0						
^	7264.283M	54.1	+0.0	-37.4	+35.7	+5.9	+0.0	58.7	54.0	+4.7	Horiz
			+0.2	+0.2	+0.0						
11	4620.400M	57.8	+0.0	-37.7	+32.9	+4.6	+0.0	51.5	54.0	-2.5	Horiz
	Ave		+0.7	+0.2	-7.0						
^	4620.400M	57.8	+0.0	-37.7	+32.9	+4.6	+0.0	58.5	54.0	+4.5	Horiz
			+0.7	+0.2	+0.0						
13	4540.103M	57.8	+0.0	-37.8	+32.9	+4.5	+0.0	51.3	54.0	-2.7	Vert
	Ave		+0.7	+0.2	-7.0						
^	4540.103M	57.8	+0.0	-37.8	+32.9	+4.5	+0.0	58.3	54.0	+4.3	Vert
			+0.7	+0.2	+0.0						

15	4579.933M	57.4	+0.0	-37.7	+33.0	+4.6	+0.0	51.2	54.0	-2.8	Horiz
	Ave		+0.7	+0.2	-7.0						
^	4579.933M	57.4	+0.0	-37.7	+33.0	+4.6	+0.0	58.2	54.0	+4.2	Horiz
			+0.7	+0.2	+0.0						
17	8244.533M	51.6	+0.0	-37.4	+36.9	+6.2	+0.0	51.1	54.0	-2.9	Horiz
	Ave		+0.5	+0.3	-7.0						
^	8244.533M	51.6	+0.0	-37.4	+36.9	+6.2	+0.0	58.1	54.0	+4.1	Horiz
			+0.5	+0.3	+0.0						
19	8171.533M	51.5	+0.0	-37.4	+36.8	+6.2	+0.0	50.9	54.0	-3.1	Horiz
	Ave		+0.5	+0.3	-7.0						
^	8171.533M	51.5	+0.0	-37.4	+36.8	+6.2	+0.0	57.9	54.0	+3.9	Horiz
			+0.5	+0.3	+0.0						
21	2772.017M	55.9	+0.0	-38.6	+29.5	+3.5	+0.0	50.9	54.0	-3.1	Vert
			+0.4	+0.2	+0.0						
22	2724.050M	63.1	+0.0	-38.6	+29.2	+3.4	+0.0	50.7	54.0	-3.3	Vert
	Ave		+0.4	+0.2	-7.0						
^	2724.050M	63.1	+0.0	-38.6	+29.2	+3.4	+0.0	57.7	54.0	+3.7	Vert
			+0.4	+0.2	+0.0						
24	7264.370M	52.9	+0.0	-37.4	+35.7	+5.9	+0.0	50.5	54.0	-3.5	Vert
	Ave		+0.2	+0.2	-7.0						
^	7264.370M	52.9	+0.0	-37.4	+35.7	+5.9	+0.0	57.5	54.0	+3.5	Vert
			+0.2	+0.2	+0.0						
26	7391.800M	52.3	+0.0	-37.4	+36.2	+5.9	+0.0	50.5	54.0	-3.5	Horiz
	Ave		+0.3	+0.2	-7.0						
^	7391.800M	52.3	+0.0	-37.4	+36.2	+5.9	+0.0	57.5	54.0	+3.5	Horiz
			+0.3	+0.2	+0.0						
28	8172.603M	51.0	+0.0	-37.4	+36.8	+6.2	+0.0	50.4	54.0	-3.6	Vert
	Ave		+0.5	+0.3	-7.0						
^	8172.603M	51.0	+0.0	-37.4	+36.8	+6.2	+0.0	57.4	54.0	+3.4	Vert
			+0.5	+0.3	+0.0						
30	8315.800M	50.3	+0.0	-37.4	+37.0	+6.2	+0.0	50.0	54.0	-4.0	Vert
	Ave		+0.5	+0.4	-7.0						
^	8315.800M	50.3	+0.0	-37.4	+37.0	+6.2	+0.0	57.0	54.0	+3.0	Vert
			+0.5	+0.4	+0.0						
32	8244.300M	49.4	+0.0	-37.4	+36.9	+6.2	+0.0	48.9	54.0	-5.1	Vert
	Ave		+0.5	+0.3	-7.0						
^	8244.300M	49.4	+0.0	-37.4	+36.9	+6.2	+0.0	55.9	54.0	+1.9	Vert
			+0.5	+0.3	+0.0						
34	8315.900M	48.9	+0.0	-37.4	+37.0	+6.2	+0.0	48.6	54.0	-5.4	Horiz
	Ave		+0.5	+0.4	-7.0						
^	8315.900M	48.9	+0.0	-37.4	+37.0	+6.2	+0.0	55.6	54.0	+1.6	Horiz
			+0.5	+0.4	+0.0						
36	4620.350M	54.8	+0.0	-37.7	+32.9	+4.6	+0.0	48.5	54.0	-5.5	Vert
	Ave		+0.7	+0.2	-7.0						
^	4620.350M	54.8	+0.0	-37.7	+32.9	+4.6	+0.0	55.5	54.0	+1.5	Vert
			+0.7	+0.2	+0.0						
38	7327.633M	49.7	+0.0	-37.4	+36.0	+5.9	+0.0	47.6	54.0	-6.4	Vert
	Ave		+0.2	+0.2	-7.0						
^	7327.633M	49.7	+0.0	-37.4	+36.0	+5.9	+0.0	54.6	54.0	+0.6	Vert
			+0.2	+0.2	+0.0						
40	2724.050M	53.0	+0.0	-38.6	+29.2	+3.4	+0.0	47.6	54.0	-6.4	Horiz
			+0.4	+0.2	+0.0						

41	3664.083M	48.8	+0.0 +0.5	-38.3 +0.2	+31.6 +0.0	+4.1	+0.0	46.9	54.0	-7.1	Vert
42	2772.100M	51.6	+0.0 +0.4	-38.6 +0.2	+29.5 +0.0	+3.5	+0.0	46.6	54.0	-7.4	Horiz
43	3696.050M	48.2	+0.0 +0.5	-38.3 +0.2	+31.8 +0.0	+4.1	+0.0	46.5	54.0	-7.5	Horiz
44	5448.103M Ave	51.0	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	46.4	54.0	-7.6	Vert
^	5448.103M	51.0	+0.0 +0.4	-37.5 +0.2	+33.9 +0.0	+5.4	+0.0	53.4	54.0	-0.6	Vert
46	5448.517M Ave	50.7	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	46.1	54.0	-7.9	Horiz
^	5448.517M	50.7	+0.0 +0.4	-37.5 +0.2	+33.9 +0.0	+5.4	+0.0	53.1	54.0	-0.9	Horiz
48	3696.017M	47.3	+0.0 +0.5	-38.3 +0.2	+31.8 +0.0	+4.1	+0.0	45.6	54.0	-8.4	Vert
49	3632.103M	47.3	+0.0 +0.5	-38.3 +0.2	+31.3 +0.0	+4.1	+0.0	45.1	54.0	-8.9	Vert
50	3632.050M	47.2	+0.0 +0.5	-38.3 +0.2	+31.3 +0.0	+4.1	+0.0	45.0	54.0	-9.0	Horiz
51	3664.083M	46.9	+0.0 +0.5	-38.3 +0.2	+31.6 +0.0	+4.1	+0.0	45.0	54.0	-9.0	Horiz
52	2747.833M Ave	56.9	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	44.7	54.0	-9.3	Vert
^	2747.833M	56.9	+0.0 +0.4	-38.6 +0.2	+29.4 +0.0	+3.4	+0.0	51.7	54.0	-2.3	Vert
54	2748.083M	48.6	+0.0 +0.4	-38.6 +0.2	+29.4 +0.0	+3.4	+0.0	43.4	54.0	-10.6	Horiz
55	6355.937M	55.7	+0.0 +0.3	-37.4 +0.2	+33.8 +0.0	+5.7	+0.0	58.3	107.2	-48.9	Vert

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103557**	Date:	2/20/2020
Test Type:	**Maximized Emissions**	Time:	13:22:37
Tested By:	Don Nguyen	Sequence#:	2
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

The EUT is placed on turn table. Input voltage is 13.8Vdc from external power supply. GPS and main antenna ports are connected to an external antenna. USB port is connected to a touchscreen computer. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitter mode. The EUT is rotated in three orthogonal orientations. Data represents the worst case orientation.
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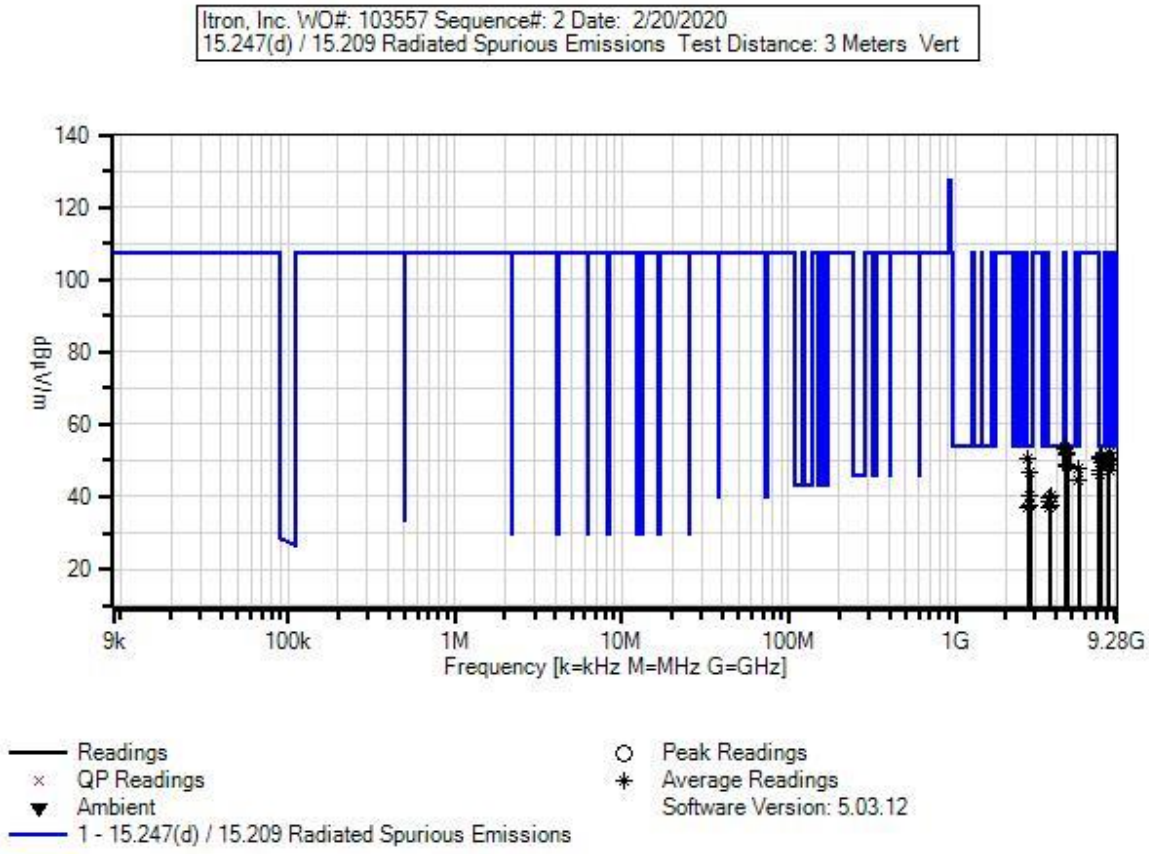
30-1000MHz, RBW=120kHz, VBW=360kHz
1000-9280MHz, RBW=1MHz, VBW=3MHz

Temperature 20.3°C, Relative Humidity 32%
Site A
Test Method: ANSI C63.10 (2013)
Duty correction factor is applied to average reading above 1GHz per FCC part 15.35c
Correction factor = 20log(44.67ms/100ms) = -7.0dB

Average readings are calculated from formula Average=peak -7.0db (duty cycle correction factor). Therefore, none of the peak readings are over 20dB.


Itron, Inc. WO#: 103557 Sequence#: 2 Date: 2/20/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
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	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
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T1	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T2	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T3	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T4	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T5	ANP07244	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN03169	High Pass Filter	HM1155-11SS	5/8/2019	5/8/2021
T7	ANDuty Cycle Correction Factor	Test Data Adjustment		2/19/2020	2/19/2022

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4539.637M	60.0	+0.0	-37.8	+32.9	+4.5	+0.0	53.5	54.0	-0.5	Vert
	Ave		+0.7	+0.2	-7.0						
2	4540.317M	59.9	+0.0	-37.8	+32.9	+4.5	+0.0	53.4	54.0	-0.6	Horiz
	Ave		+0.7	+0.2	-7.0						
3	4580.183M	58.5	+0.0	-37.7	+33.0	+4.6	+0.0	52.3	54.0	-1.7	Vert
	Ave		+0.7	+0.2	-7.0						
4	8244.483M	52.7	+0.0	-37.4	+36.9	+6.2	+0.0	52.2	54.0	-1.8	Horiz
	Ave		+0.5	+0.3	-7.0						
5	4620.333M	57.9	+0.0	-37.7	+32.9	+4.6	+0.0	51.6	54.0	-2.4	Horiz
	Ave		+0.7	+0.2	-7.0						
6	7392.433M	53.1	+0.0	-37.4	+36.2	+5.9	+0.0	51.3	54.0	-2.7	Horiz
	Ave		+0.3	+0.2	-7.0						
7	7264.483M	53.7	+0.0	-37.4	+35.7	+5.9	+0.0	51.3	54.0	-2.7	Horiz
	Ave		+0.2	+0.2	-7.0						
8	7263.633M	52.9	+0.0	-37.4	+35.7	+5.9	+0.0	50.5	54.0	-3.5	Vert
	Ave		+0.2	+0.2	-7.0						
9	2724.200M	62.8	+0.0	-38.6	+29.2	+3.4	+0.0	50.4	54.0	-3.6	Vert
	Ave		+0.4	+0.2	-7.0						
10	8316.633M	50.7	+0.0	-37.4	+37.0	+6.2	+0.0	50.4	54.0	-3.6	Vert
	Ave		+0.5	+0.4	-7.0						
11	8172.450M	50.5	+0.0	-37.4	+36.8	+6.2	+0.0	49.9	54.0	-4.1	Vert
	Ave		+0.5	+0.3	-7.0						
12	7392.450M	51.4	+0.0	-37.4	+36.2	+5.9	+0.0	49.6	54.0	-4.4	Vert
	Ave		+0.3	+0.2	-7.0						
13	8171.800M	49.6	+0.0	-37.4	+36.8	+6.2	+0.0	49.0	54.0	-5.0	Horiz
	Ave		+0.5	+0.3	-7.0						
14	8244.817M	49.4	+0.0	-37.4	+36.9	+6.2	+0.0	48.9	54.0	-5.1	Vert
	Ave		+0.5	+0.3	-7.0						

15	4579.683M Ave	55.1	+0.0 +0.7	-37.7 +0.2	+33.0 -7.0	+4.6	+0.0	48.9	54.0	-5.1	Horiz
16	4619.933M Ave	54.6	+0.0 +0.7	-37.7 +0.2	+32.9 -7.0	+4.6	+0.0	48.3	54.0	-5.7	Vert
17	5448.350M Ave	52.6	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	48.0	54.0	-6.0	Vert
18	8315.750M Ave	47.8	+0.0 +0.5	-37.4 +0.4	+37.0 -7.0	+6.2	+0.0	47.5	54.0	-6.5	Horiz
19	7327.550M Ave	49.4	+0.0 +0.2	-37.4 +0.2	+36.0 -7.0	+5.9	+0.0	47.3	54.0	-6.7	Vert
20	2772.167M Ave	58.7	+0.0 +0.4	-38.6 +0.2	+29.5 -7.0	+3.5	+0.0	46.7	54.0	-7.3	Vert
21	2747.817M Ave	58.9	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	46.7	54.0	-7.3	Vert
22	7327.967M Ave	48.5	+0.0 +0.2	-37.4 +0.2	+36.0 -7.0	+5.9	+0.0	46.4	54.0	-7.6	Horiz
23	5448.317M Ave	49.2	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	44.6	54.0	-9.4	Horiz
24	3696.100M Ave	49.0	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	40.3	54.0	-13.7	Horiz
25	2772.100M Ave	52.3	+0.0 +0.4	-38.6 +0.2	+29.5 -7.0	+3.5	+0.0	40.3	54.0	-13.7	Horiz
26	3664.000M Ave	48.4	+0.0 +0.5	-38.3 +0.2	+31.6 -7.0	+4.1	+0.0	39.5	54.0	-14.5	Vert
27	3664.217M Ave	47.8	+0.0 +0.5	-38.3 +0.2	+31.6 -7.0	+4.1	+0.0	38.9	54.0	-15.1	Horiz
28	2748.017M Ave	49.8	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	37.6	54.0	-16.4	Horiz
29	3696.133M Ave	46.1	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	37.4	54.0	-16.6	Vert
30	3632.050M Ave	46.4	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	37.2	54.0	-16.8	Horiz
31	3632.050M Ave	46.3	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	37.1	54.0	-16.9	Vert
32	2724.050M Ave	49.3	+0.0 +0.4	-38.6 +0.2	+29.2 -7.0	+3.4	+0.0	36.9	54.0	-17.1	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103557**	Date:	2/21/2020
Test Type:	**Maximized Emissions**	Time:	09:09:45
Tested By:	Don Nguyen	Sequence#:	4
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

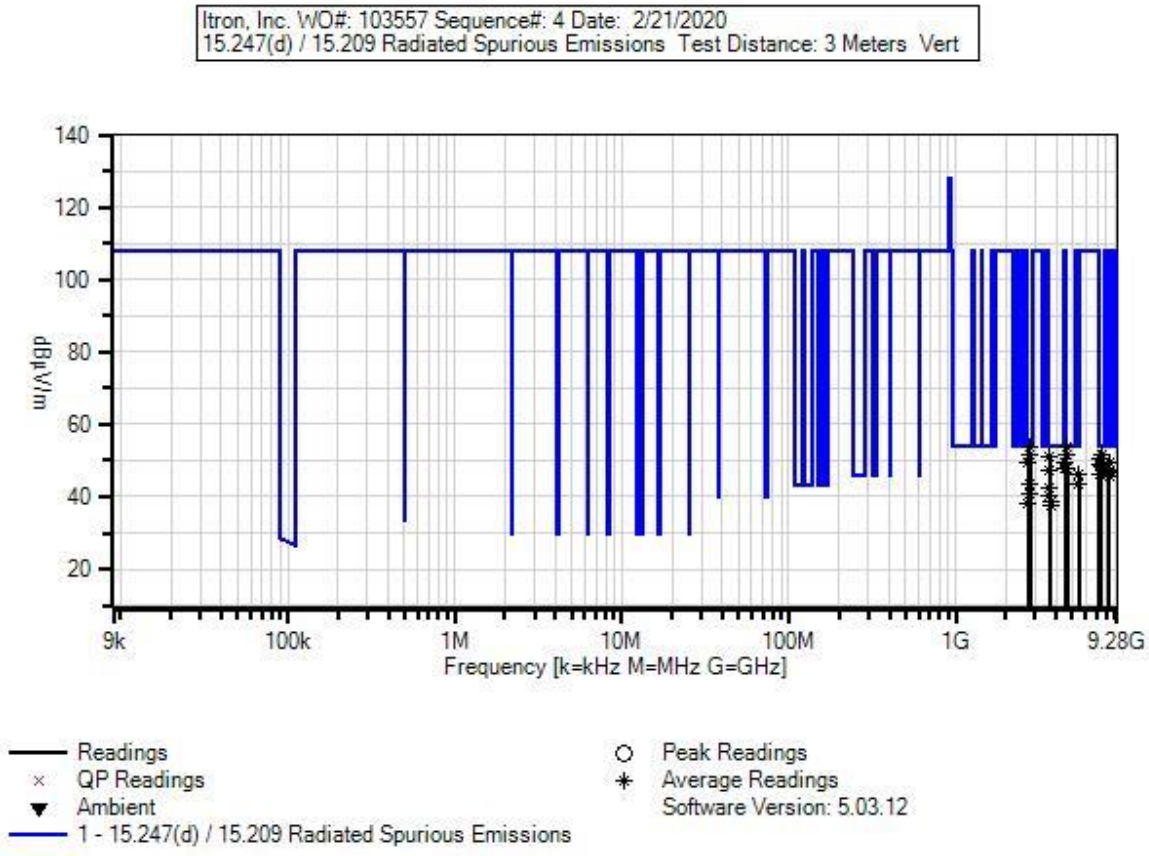
The EUT is placed on turn table. Input voltage is 13.8Vdc from external power supply. GPS and main antenna ports are connected to an external antenna. USB port is connected to a touchscreen computer. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitter mode. The EUT is rotated in three orthogonal orientations. Data represents the worst case orientation.
The antenna of the EUT is mounted to a 52" diameter aluminum plate to represent a vehicle roof. The aluminum plate is supported by foam blocks. The EUT is directly below the plate, on the test table.

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

Temperature 20.3°C, Relative Humidity 32%

Site A
Test Method: ANSI C63.10 (2013)
Duty correction factor is applied to average reading above 1GHz per FCC part 15.35c
Correction factor = 20log(44.67ms/100ms) = -7.0dB

Average readings are calculated from formula Average=peak -7.0db (duty cycle correction factor). Therefore, none of the peak readings are over 20dB.


Itron, Inc. WO#: 103557 Sequence#: 4 Date: 2/21/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020
	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T1	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T2	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T3	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T4	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T5	ANP07244	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN03169	High Pass Filter	HM1155-11SS	5/8/2019	5/8/2021
T7	ANDuty Cycle Correction Factor	Test Data Adjustment		2/19/2020	2/19/2022

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4580.350M	60.0	+0.0	-37.7	+33.0	+4.6	+0.0	53.8	54.0	-0.2	Vert
	Ave		+0.7	+0.2	-7.0						
2	2747.800M	66.0	+0.0	-38.6	+29.4	+3.4	+0.0	53.8	54.0	-0.2	Vert
	Ave		+0.4	+0.2	-7.0						
3	2772.183M	63.5	+0.0	-38.6	+29.5	+3.5	+0.0	51.5	54.0	-2.5	Vert
	Ave		+0.4	+0.2	-7.0						
4	7391.767M	53.2	+0.0	-37.4	+36.2	+5.9	+0.0	51.4	54.0	-2.6	Horiz
	Ave		+0.3	+0.2	-7.0						
5	4580.300M	57.6	+0.0	-37.7	+33.0	+4.6	+0.0	51.4	54.0	-2.6	Horiz
	Ave		+0.7	+0.2	-7.0						
6	3664.183M	60.1	+0.0	-38.3	+31.6	+4.1	+0.0	51.2	54.0	-2.8	Horiz
	Ave		+0.5	+0.2	-7.0						
7	7327.733M	52.6	+0.0	-37.4	+36.0	+5.9	+0.0	50.5	54.0	-3.5	Vert
	Ave		+0.2	+0.2	-7.0						
8	8316.467M	49.9	+0.0	-37.4	+37.0	+6.2	+0.0	49.6	54.0	-4.4	Horiz
	Ave		+0.5	+0.4	-7.0						
9	4539.800M	55.9	+0.0	-37.8	+32.9	+4.5	+0.0	49.4	54.0	-4.6	Vert
	Ave		+0.7	+0.2	-7.0						
10	2724.183M	61.8	+0.0	-38.6	+29.2	+3.4	+0.0	49.4	54.0	-4.6	Vert
	Ave		+0.4	+0.2	-7.0						
11	7263.733M	51.4	+0.0	-37.4	+35.7	+5.9	+0.0	49.0	54.0	-5.0	Vert
	Ave		+0.2	+0.2	-7.0						
12	7392.600M	50.1	+0.0	-37.4	+36.2	+5.9	+0.0	48.3	54.0	-5.7	Vert
	Ave		+0.3	+0.2	-7.0						
13	4539.667M	54.5	+0.0	-37.8	+32.9	+4.5	+0.0	48.0	54.0	-6.0	Horiz
	Ave		+0.7	+0.2	-7.0						
14	4619.750M	54.1	+0.0	-37.7	+32.9	+4.6	+0.0	47.8	54.0	-6.2	Horiz
	Ave		+0.7	+0.2	-7.0						

15	4619.800M Ave	54.0	+0.0 +0.7	-37.7 +0.2	+32.9 -7.0	+4.6	+0.0	47.7	54.0	-6.3	Vert
16	8316.767M Ave	47.5	+0.0 +0.5	-37.4 +0.4	+37.0 -7.0	+6.2	+0.0	47.2	54.0	-6.8	Vert
17	3663.833M Ave	56.0	+0.0 +0.5	-38.3 +0.2	+31.6 -7.0	+4.1	+0.0	47.1	54.0	-6.9	Vert
18	8171.617M Ave	47.2	+0.0 +0.5	-37.4 +0.3	+36.8 -7.0	+6.2	+0.0	46.6	54.0	-7.4	Horiz
19	8172.483M Ave	47.1	+0.0 +0.5	-37.4 +0.3	+36.8 -7.0	+6.2	+0.0	46.5	54.0	-7.5	Vert
20	8244.433M Ave	47.0	+0.0 +0.5	-37.4 +0.3	+36.9 -7.0	+6.2	+0.0	46.5	54.0	-7.5	Horiz
21	7263.600M Ave	48.8	+0.0 +0.2	-37.4 +0.2	+35.7 -7.0	+5.9	+0.0	46.4	54.0	-7.6	Horiz
22	5447.650M Ave	51.0	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	46.4	54.0	-7.6	Vert
23	7327.567M Ave	48.1	+0.0 +0.2	-37.4 +0.2	+36.0 -7.0	+5.9	+0.0	46.0	54.0	-8.0	Horiz
24	8244.600M Ave	46.1	+0.0 +0.5	-37.4 +0.3	+36.9 -7.0	+6.2	+0.0	45.6	54.0	-8.4	Vert
25	5448.550M Ave	48.3	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	43.7	54.0	-10.3	Horiz
26	2772.050M Ave	55.3	+0.0 +0.4	-38.6 +0.2	+29.5 -7.0	+3.5	+0.0	43.3	54.0	-10.7	Horiz
27	3632.400M Ave	51.5	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	42.3	54.0	-11.7	Vert
28	2748.050M Ave	52.9	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	40.7	54.0	-13.3	Horiz
29	3632.000M Ave	49.3	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	40.1	54.0	-13.9	Horiz
30	3695.617M Ave	47.6	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	38.9	54.0	-15.1	Vert
31	2724.000M Ave	50.6	+0.0 +0.4	-38.6 +0.2	+29.2 -7.0	+3.4	+0.0	38.2	54.0	-15.8	Horiz
32	3696.150M Ave	46.3	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	37.6	54.0	-16.4	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**103557**	Date:	2/20/2020
Test Type:	**Maximized Emissions**	Time:	14:48:19
Tested By:	Don Nguyen	Sequence#:	3
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

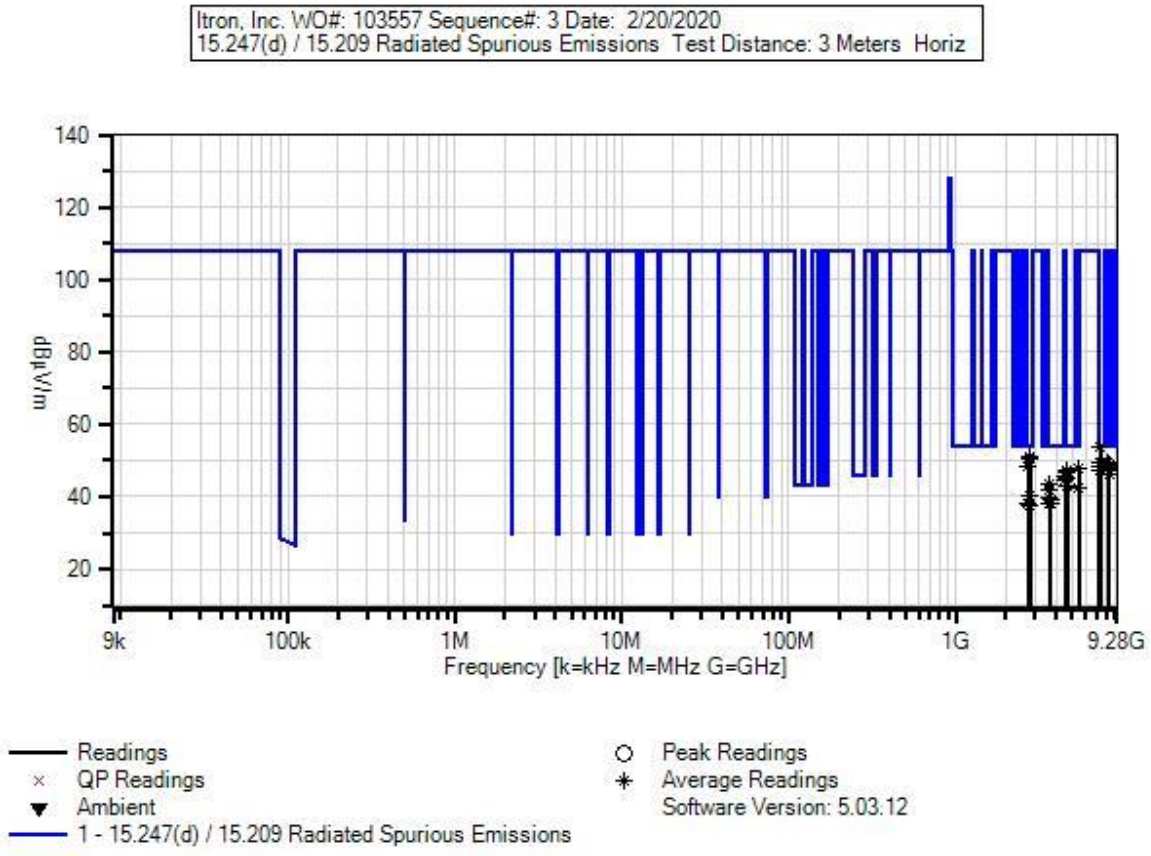
The EUT is placed on turn table. Input voltage is 13.8Vdc from external power supply. GPS and main antenna ports are connected to an external antenna. USB port is connected to a touchscreen computer. The computer is sending command to the EUT using software MC3 SuperRaptor Test ver.4.0.3.5. The EUT is set into transmitter mode. The EUT is rotated in three orthogonal orientations. Data represents the worst case orientation.
The antenna of the EUT is mounted to a 52" diameter aluminum plate to represent a vehicle roof. The aluminum plate is supported by foam blocks. The EUT is directly below the plate, on the test table.

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

Temperature 20.3°C, Relative Humidity 32%

Site A
Test Method: ANSI C63.10 (2013)
Duty correction factor is applied to average reading above 1GHz per FCC part 15.35c
Correction factor = 20log(44.67ms/100ms) = -7.0dB

Average readings are calculated from formula Average=peak -7.0db (duty cycle correction factor). Therefore, none of the peak readings are over 20dB.


Itron, Inc. WO#: 103557 Sequence#: 3 Date: 2/20/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020
	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T1	AN02869	Spectrum Analyzer	E4440A	7/25/2019	7/25/2020
T2	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T3	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T4	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T5	ANP07244	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN03169	High Pass Filter	HM1155-11SS	5/8/2019	5/8/2021
T7	ANDuty Cycle Correction Factor	Test Data Adjustment		2/19/2020	2/19/2022

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

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	7327.450M Ave	56.0	+0.0 +0.2	-37.4 +0.2	+36.0 -7.0	+5.9	+0.0	53.9	54.0	-0.1	Horiz
2	2747.900M Ave	63.4	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	51.2	54.0	-2.8	Vert
3	2771.867M Ave	62.4	+0.0 +0.4	-38.6 +0.2	+29.5 -7.0	+3.5	+0.0	50.4	54.0	-3.6	Vert
4	7391.800M Ave	51.3	+0.0 +0.3	-37.4 +0.2	+36.2 -7.0	+5.9	+0.0	49.5	54.0	-4.5	Vert
5	7328.633M Ave	51.4	+0.0 +0.2	-37.4 +0.2	+36.0 -7.0	+5.9	+0.0	49.3	54.0	-4.7	Vert
6	7391.683M Ave	51.1	+0.0 +0.3	-37.4 +0.2	+36.2 -7.0	+5.9	+0.0	49.3	54.0	-4.7	Horiz
7	8171.900M Ave	49.9	+0.0 +0.5	-37.4 +0.3	+36.8 -7.0	+6.2	+0.0	49.3	54.0	-4.7	Vert
8	8244.783M Ave	49.3	+0.0 +0.5	-37.4 +0.3	+36.9 -7.0	+6.2	+0.0	48.8	54.0	-5.2	Horiz
9	8315.433M Ave	48.9	+0.0 +0.5	-37.4 +0.4	+37.0 -7.0	+6.2	+0.0	48.6	54.0	-5.4	Horiz
10	2724.267M Ave	60.7	+0.0 +0.4	-38.6 +0.2	+29.2 -7.0	+3.4	+0.0	48.3	54.0	-5.7	Vert
11	7263.683M Ave	50.5	+0.0 +0.2	-37.4 +0.2	+35.7 -7.0	+5.9	+0.0	48.1	54.0	-5.9	Vert
12	8172.783M Ave	48.4	+0.0 +0.5	-37.4 +0.3	+36.8 -7.0	+6.2	+0.0	47.8	54.0	-6.2	Horiz
13	5447.683M Ave	52.2	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	47.6	54.0	-6.4	Vert
14	7263.633M Ave	49.9	+0.0 +0.2	-37.4 +0.2	+35.7 -7.0	+5.9	+0.0	47.5	54.0	-6.5	Horiz

15	8316.700M Ave	47.6	+0.0 +0.5	-37.4 +0.4	+37.0 -7.0	+6.2	+0.0	47.3	54.0	-6.7	Vert
16	4620.517M Ave	53.6	+0.0 +0.7	-37.7 +0.2	+32.9 -7.0	+4.6	+0.0	47.3	54.0	-6.7	Vert
17	4619.683M Ave	52.9	+0.0 +0.7	-37.7 +0.2	+32.9 -7.0	+4.6	+0.0	46.6	54.0	-7.4	Horiz
18	8244.283M Ave	46.8	+0.0 +0.5	-37.4 +0.3	+36.9 -7.0	+6.2	+0.0	46.3	54.0	-7.7	Vert
19	4539.717M Ave	52.4	+0.0 +0.7	-37.8 +0.2	+32.9 -7.0	+4.5	+0.0	45.9	54.0	-8.1	Horiz
20	4579.717M Ave	51.3	+0.0 +0.7	-37.7 +0.2	+33.0 -7.0	+4.6	+0.0	45.1	54.0	-8.9	Vert
21	4539.650M Ave	51.2	+0.0 +0.7	-37.8 +0.2	+32.9 -7.0	+4.5	+0.0	44.7	54.0	-9.3	Vert
22	3664.633M Ave	52.5	+0.0 +0.5	-38.3 +0.2	+31.6 -7.0	+4.1	+0.0	43.6	54.0	-10.4	Vert
23	4580.267M Ave	49.4	+0.0 +0.7	-37.7 +0.2	+33.0 -7.0	+4.6	+0.0	43.2	54.0	-10.8	Horiz
24	5447.667M Ave	46.8	+0.0 +0.4	-37.5 +0.2	+33.9 -7.0	+5.4	+0.0	42.2	54.0	-11.8	Horiz
25	3664.150M Ave	51.0	+0.0 +0.5	-38.3 +0.2	+31.6 -7.0	+4.1	+0.0	42.1	54.0	-11.9	Horiz
26	2772.017M Ave	52.2	+0.0 +0.4	-38.6 +0.2	+29.5 -7.0	+3.5	+0.0	40.2	54.0	-13.8	Horiz
27	3631.967M Ave	48.7	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	39.5	54.0	-14.5	Vert
28	3695.833M Ave	47.9	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	39.2	54.0	-14.8	Vert
29	3695.967M Ave	46.7	+0.0 +0.5	-38.3 +0.2	+31.8 -7.0	+4.1	+0.0	38.0	54.0	-16.0	Horiz
30	3632.033M Ave	47.2	+0.0 +0.5	-38.3 +0.2	+31.3 -7.0	+4.1	+0.0	38.0	54.0	-16.0	Horiz
31	2723.933M Ave	50.3	+0.0 +0.4	-38.6 +0.2	+29.2 -7.0	+3.4	+0.0	37.9	54.0	-16.1	Horiz
32	2748.083M Ave	50.0	+0.0 +0.4	-38.6 +0.2	+29.4 -7.0	+3.4	+0.0	37.8	54.0	-16.2	Horiz

Band Edge

Band Edge Summary-Configuration 2					
Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	12.5kbps FM	External	42.8	<46	Pass
902	12.5kbps FM	External	47.1	<107.2	Pass
928	12.5kbps FM	External	73.0	<107.2	Pass
960	12.5kbps FM	External	46.6	<54	Pass

Band Edge Summary-Configuration 2					
Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	12.5kbps FM	External	41.6	<46	Pass
902	12.5kbps FM	External	47.5	<107.2	Pass
928	12.5kbps FM	External	71.3	<107.2	Pass
960	12.5kbps FM	External	47.1	<54	Pass

Band Edge Summary-Configuration 3					
Operating Mode: Single Channel (Low and High)					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	12.5kbps FM	External	43.6	<46	Pass
902	12.5kbps FM	External	48.5	<107.2	Pass
928	12.5kbps FM	External	73.5	<107.2	Pass
960	12.5kbps FM	External	48.6	<54	Pass

Band Edge Summary-Configuration 3					
Operating Mode: Hopping					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	12.5kbps FM	External	42.1	<46	Pass
902	12.5kbps FM	External	47.2	<107.2	Pass
928	12.5kbps FM	External	73.0	<107.2	Pass
960	12.5kbps FM	External	47.6	<54	Pass