Itron, Inc.

REVISED TEST REPORT FOR 107652-3

Intelis Gas
Model: ERG-7300-312*
***(See Appendix A for Manufacturers Declaration)**

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247
(HYBRID 902-928MHz)

Report No.: 107652-3A

Date of issue: May 4, 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.
2401 N. State Street
Waseca, MN 56093

Representative: Dan Bomsta
Customer Reference Number: 271433

REPORT PREPARED BY:

Lisa Bevington
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 107652

DATE OF EQUIPMENT RECEIPT: January 10, 2023
DATE(S) OF TESTING: January 10, 11 & 13, 20, 23 & 28, 2023
February 4 & 6, 2023
April 24, 2023

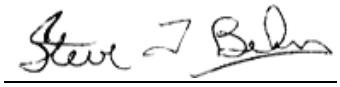
Revision History

Original: Testing of Intelis Gas, Model: : ERG-7300-312 to FCC Part 15 Subpart C, Section 15.247 (HYBRID 902-928MHz).

Revision A: Update Radiated Emissions test conditions. Added Conducted Emission and Conducted Bandedge data.

Report Authorization

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



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

Test Facility Information

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

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive SE, Suite A
Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.20
EMITest Immunity	5.03.19

Site Registration & Accreditation Information

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

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

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (Hybrid 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	NA1
15.247(a)(1)(i)	Average Time of Occupancy	NA	NA1
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
15.247 (f)	Hybrid Systems Time of Occupancy	NA	NP
15.247 (f)	Hybrid Systems Power Spectral Density	NA	Pass
15.207	AC Conducted Emissions	NA	NA2

NA = Not Applicable
NA1 = This test is not applicable under Hybrid System requirements section 15.247 (f)
NA2 = Manufacturer declares EUT is battery powered.
NP = CKC Laboratories Inc. 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

Equipment Under Test:

Device	Manufacturer	Model #	S/N
Intelis Gas	Itron, Inc.	ERG-7300-312	Igcp-221116-**cond**

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	HP	14-dq1033cl	5CD941CCWS
Laptop PSU	HP	TPN-CA14	WHGRE0AVKCR55T
Adapter Board	Itron, Inc.	None	None

Configuration 2

Equipment Under Test:

Device	Manufacturer	Model #	S/N
Intelis Gas	Itron, Inc.	ERG-7300-312	Igcp-01122023-**rad**

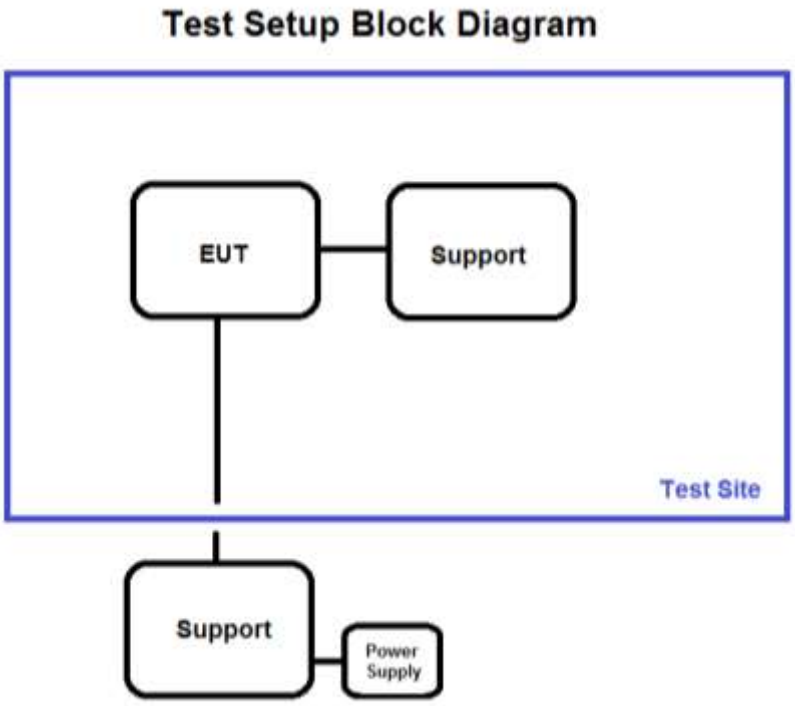
Support Equipment:

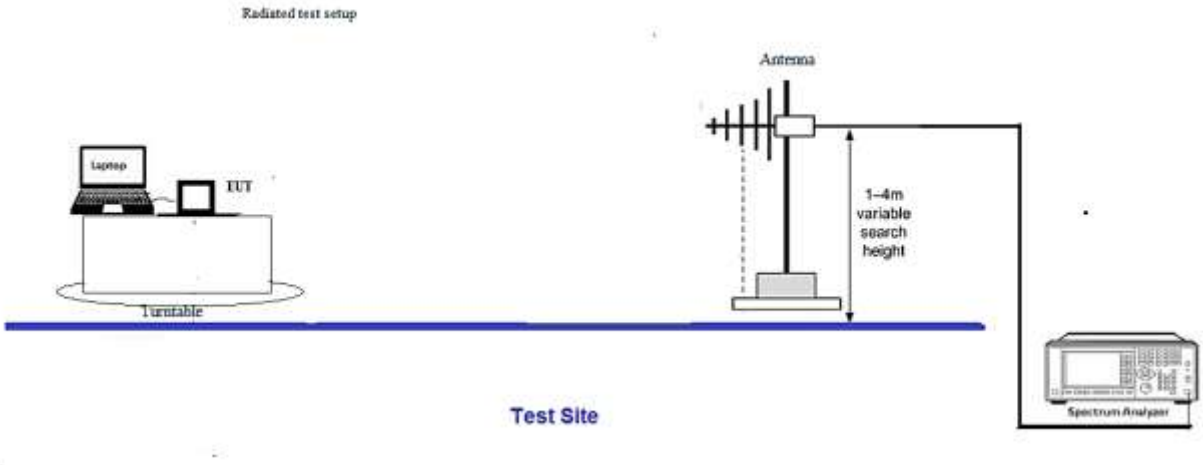
Device	Manufacturer	Model #	S/N
Laptop	HP	14-dq1033cl	5CD941CCWS
Laptop PSU	HP	TPN-CA14	WHGRE0AVKCR55T
Adapter Board	Itron, Inc.	None	None

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	Hybrid
Operating Frequency Range:	GFSK 150kbps: 902.4-927.6 MHz GFSK 300kbps: 902.4-927.6 MHz
Number of Hopping Channels:	GFSK 150kbps: 64 GFSK 300kbps: 64
Modulation Type(s):	GFSK 150kbps GFSK 300kbps
Maximum Duty Cycle:	Tested at 100%
Number of TX Chains:	1
Antenna Type(s) and Gain:	Proprietary F / 5dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral (External connector provided to facilitate testing)
Nominal Input Voltage:	Battery (6VDC)
Firmware / Software used for Test:	RAIL: V2 11.3.1
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

Block Diagram of Test Setup(s)





FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	M. Harrison
Test Method:	ANSI C63.10 (2013)	Test Date(s):	1/13/2023
Configuration:	1		
Test Setup:	EUT is setup for conducted measurements. It is directly connected to a spectrum analyzer via cable and attenuator.		

Environmental Conditions			
Temperature (ºC)	20	Relative Humidity (%):	40

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02673	Spectrum Analyzer	Agilent	E4446A	2/3/2021	2/3/2023
P05503	Attenuator	Narda	766-10	6/8/2021	6/8/2023
P06540	Cable	Andrews	Heliax	1/17/2022	1/17/2024

15.247(a)(1)(i) 20 dB Bandwidth

20dB Occupied Bandwidth

Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
902.4	1	GFSK 150kbps	180.8	*See Note	N/A
914.8	1	GFSK 150kbps	214.0		
927.6	1	GFSK 150kbps	180.7		
902.4	1	GFSK 300kbps	361.3	*See Note	N/A
914.8	1	GFSK 300kbps	364.8		
927.6	1	GFSK 300kbps	361.2		

15.247(a)(1)(i) DTS Bandwidth

DTS Bandwidth

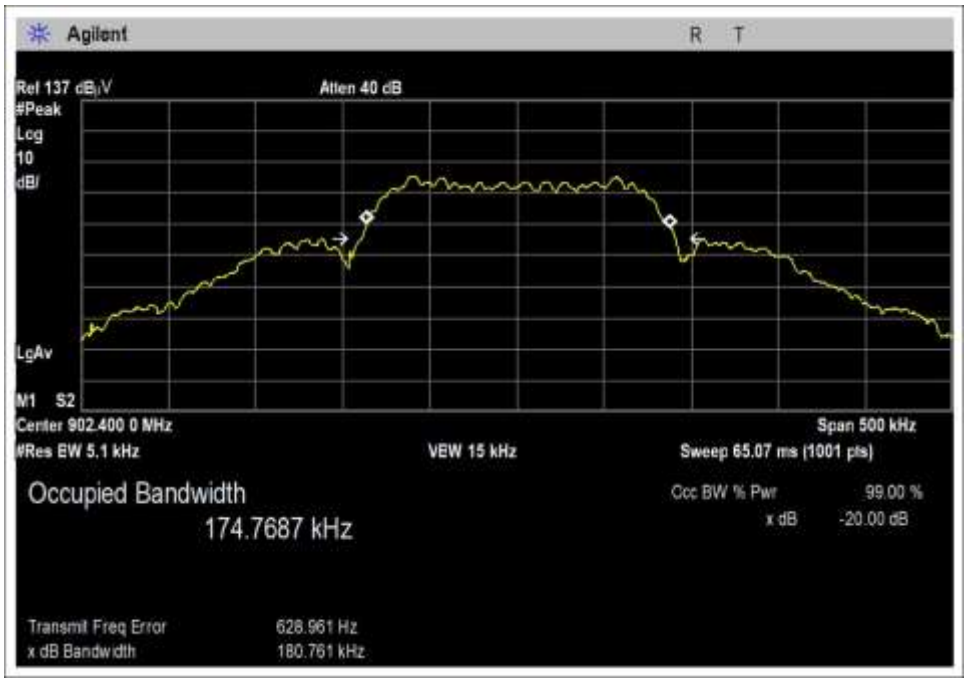
Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
902.4	1	GFSK 150kbps	252.7	*See Note	N/A
914.8	1	GFSK 150kbps	253.5		
927.6	1	GFSK 150kbps	253.3		
902.4	1	GFSK 300kbps	312.9	*See Note	N/A
914.8	1	GFSK 300kbps	314.9		
927.6	1	GFSK 300kbps	313.8		

*For this Hybrid mode there is no requirement to meet the FHSS or DTS bandwidth limits. See Supplemental Section of data in 15.247 (f) Hybrid Systems.

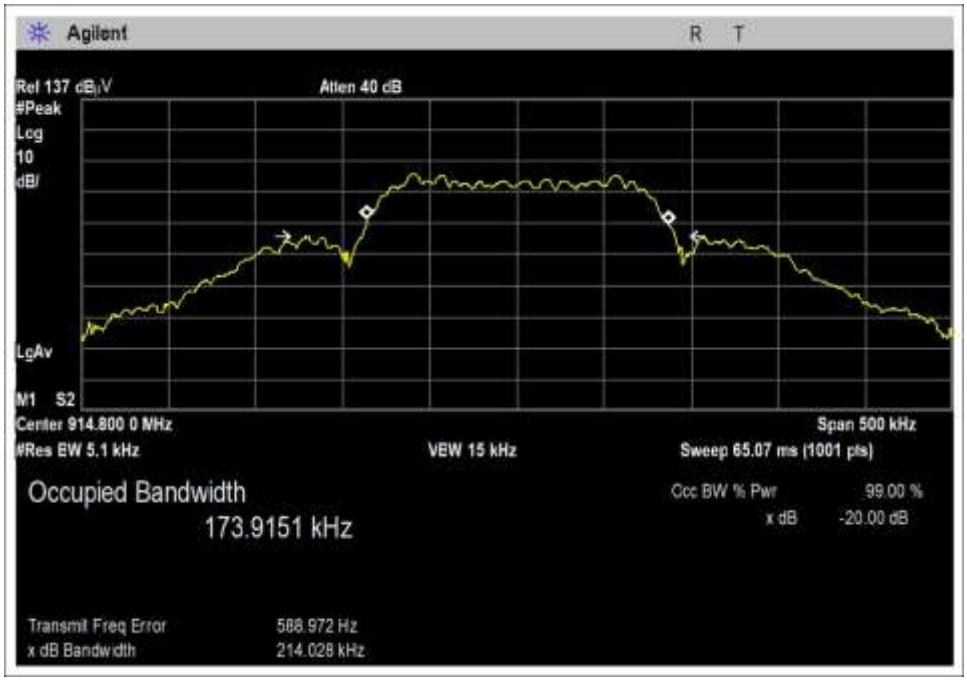
Plot(s)

(Note: At the time of the test the spectrum analyzer date and time was not set correctly.)

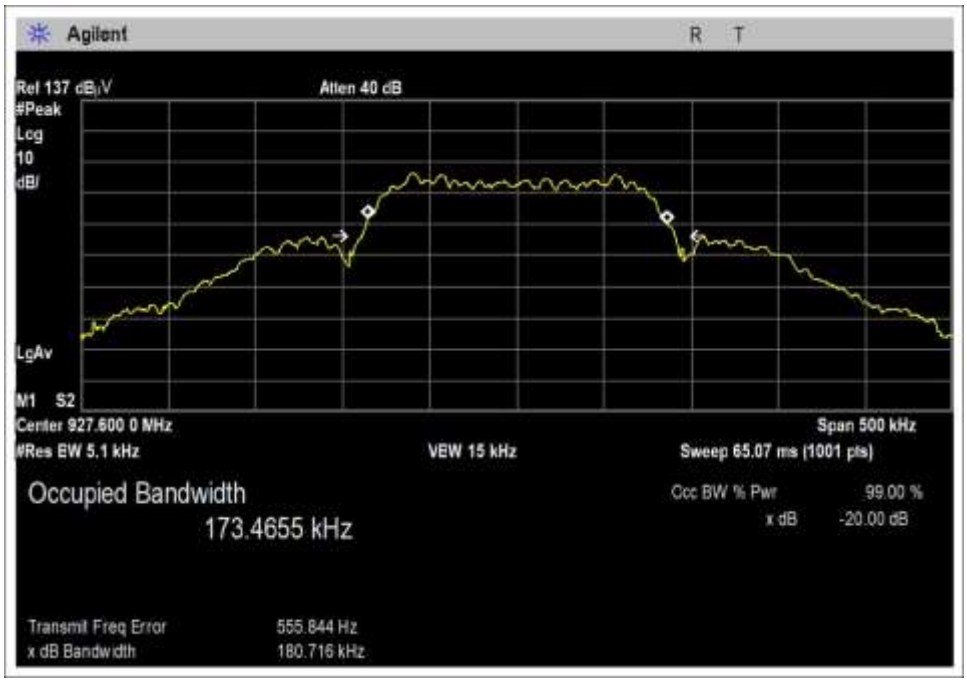
OBW GFSK 150kbps



Low Channel

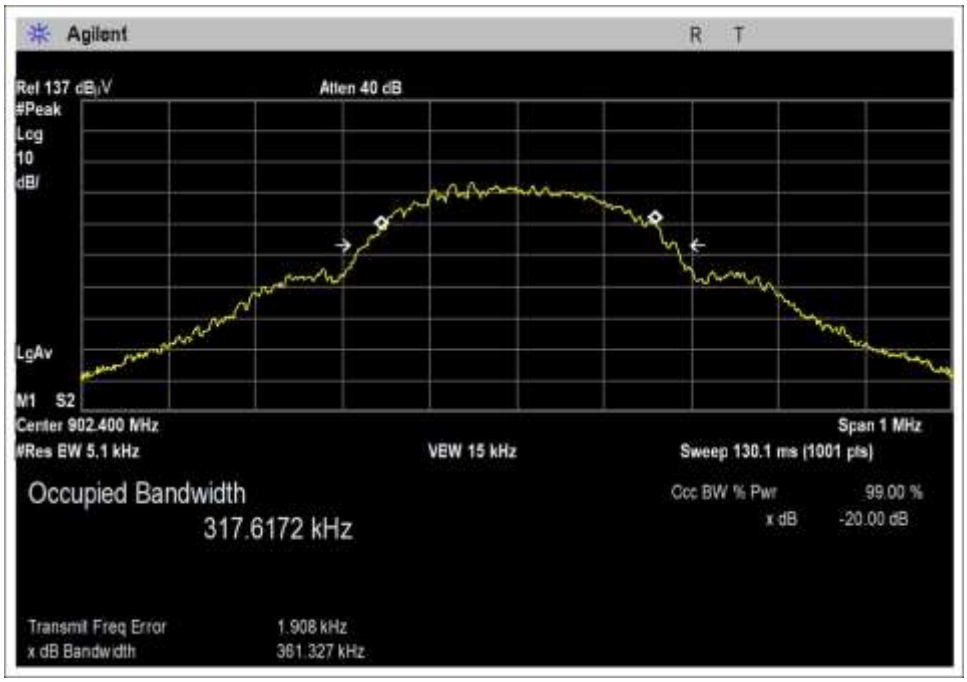


Middle Channel



High Channel

OBW GFSK 300kbps



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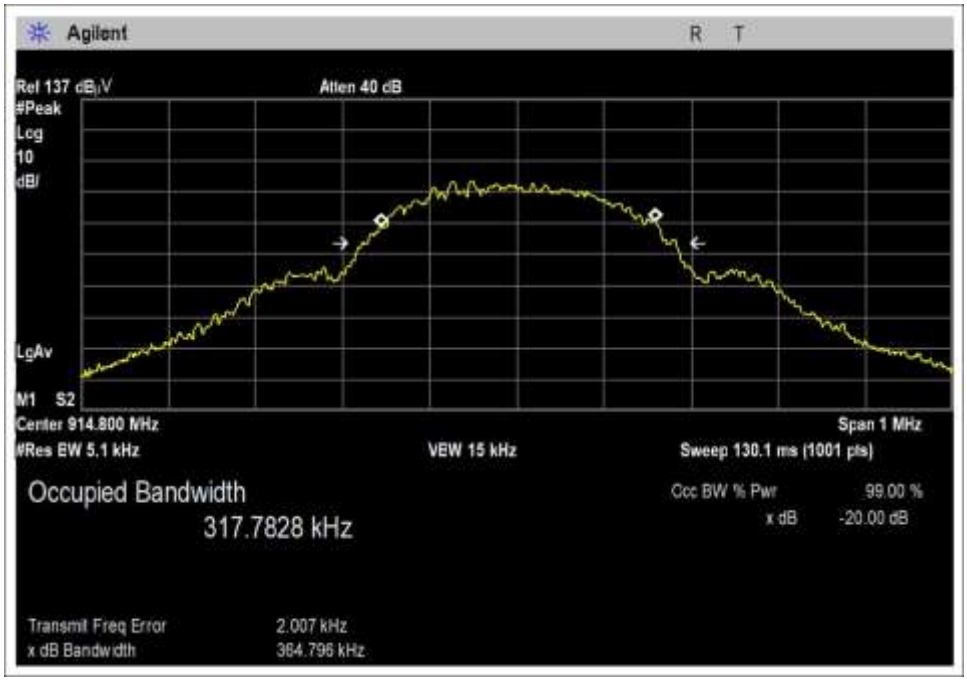

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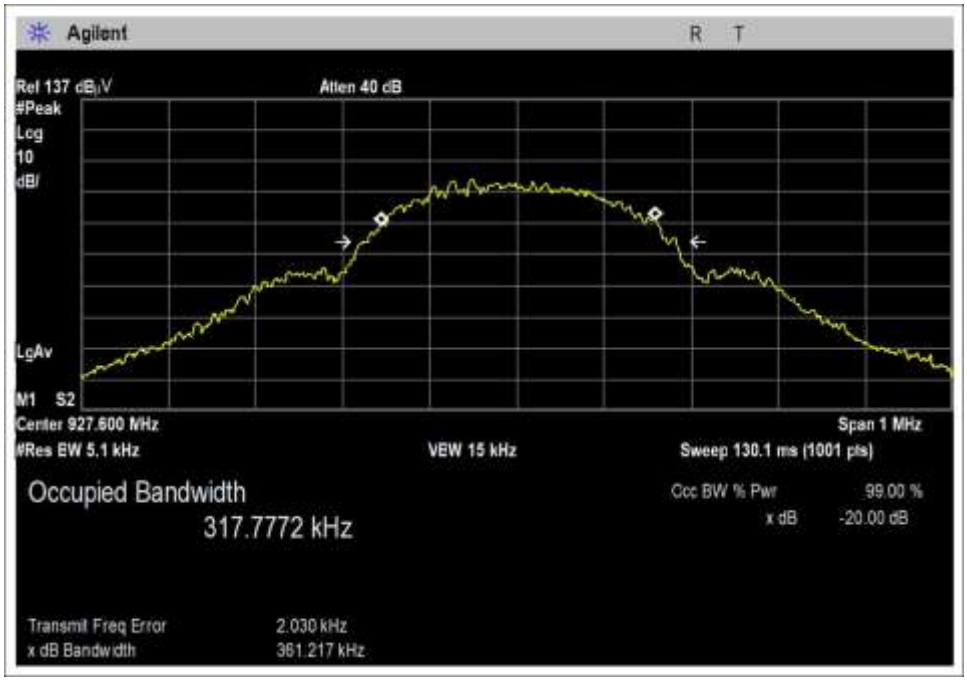
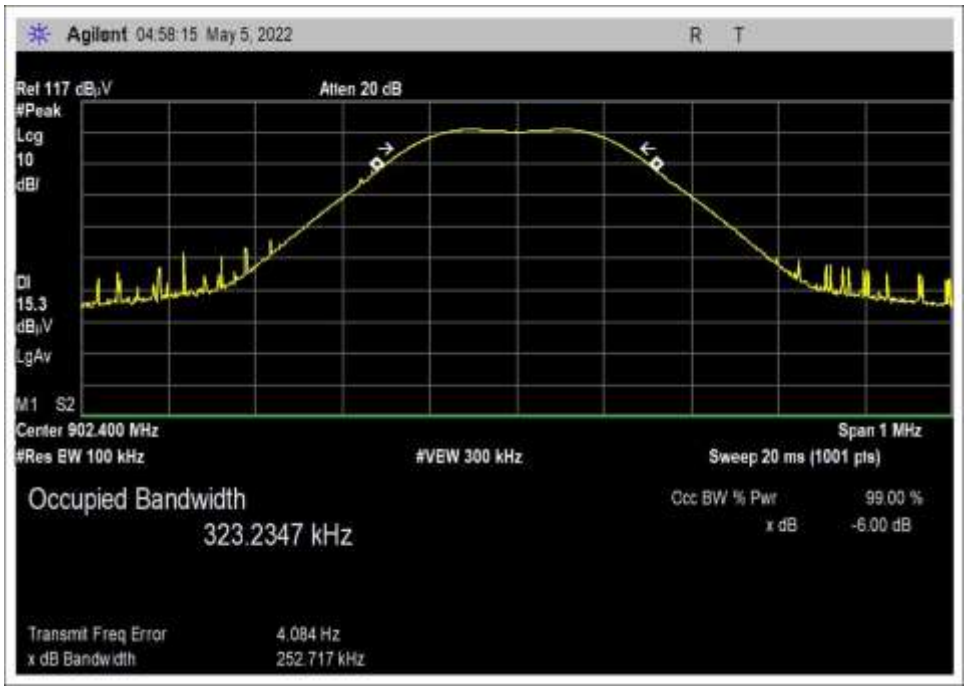
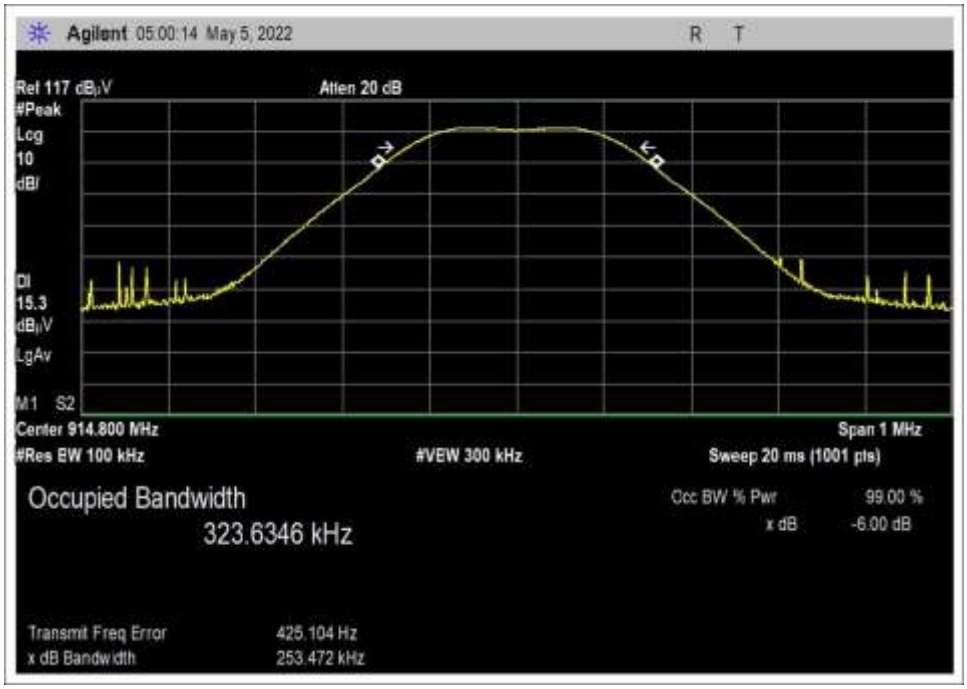


High Channel

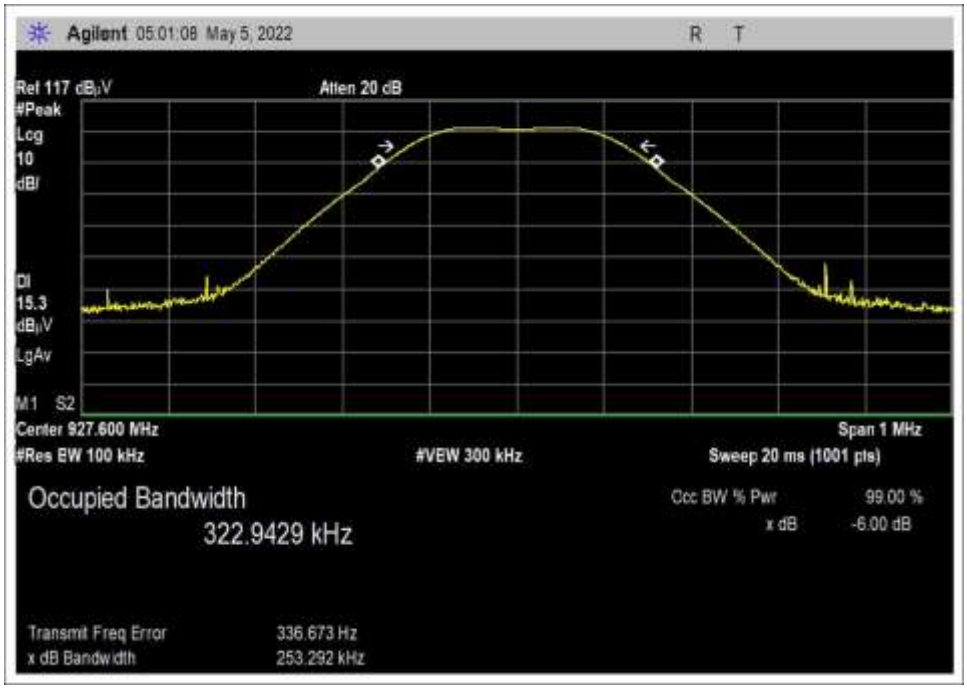
DTS GFSK 150kbps



Low Channel

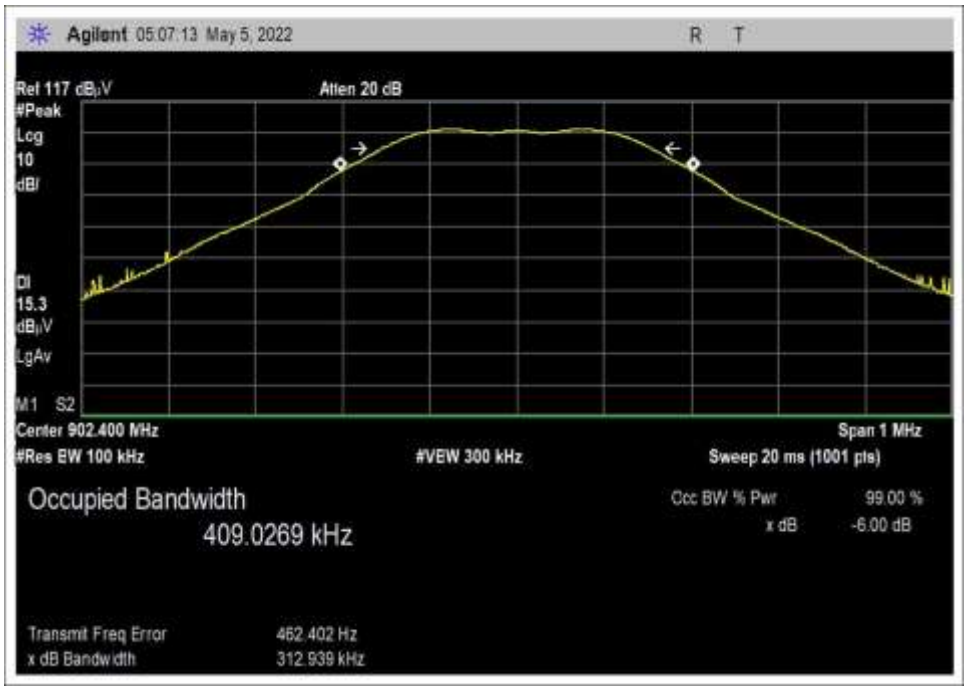


Middle Channel

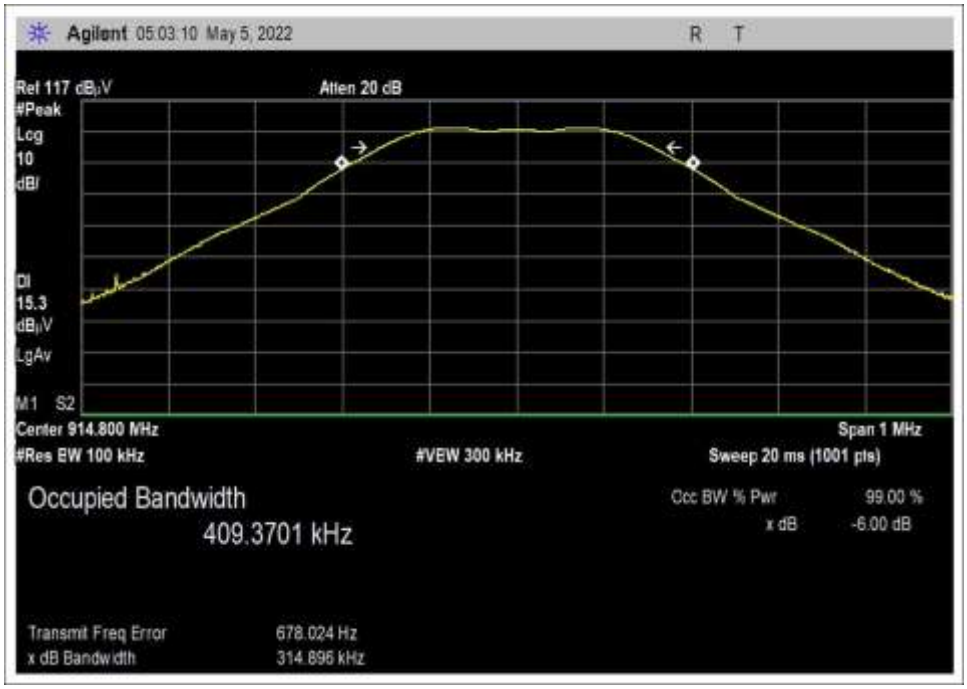


High Channel

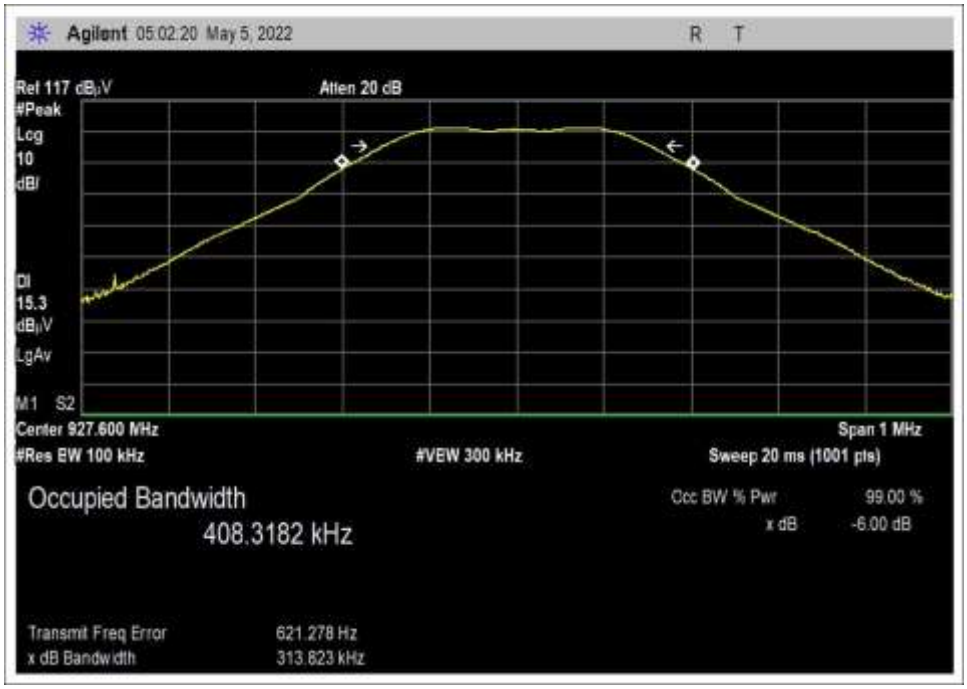
DTS GFSK 300kbps



Low Channel



Middle Channel



High Channel

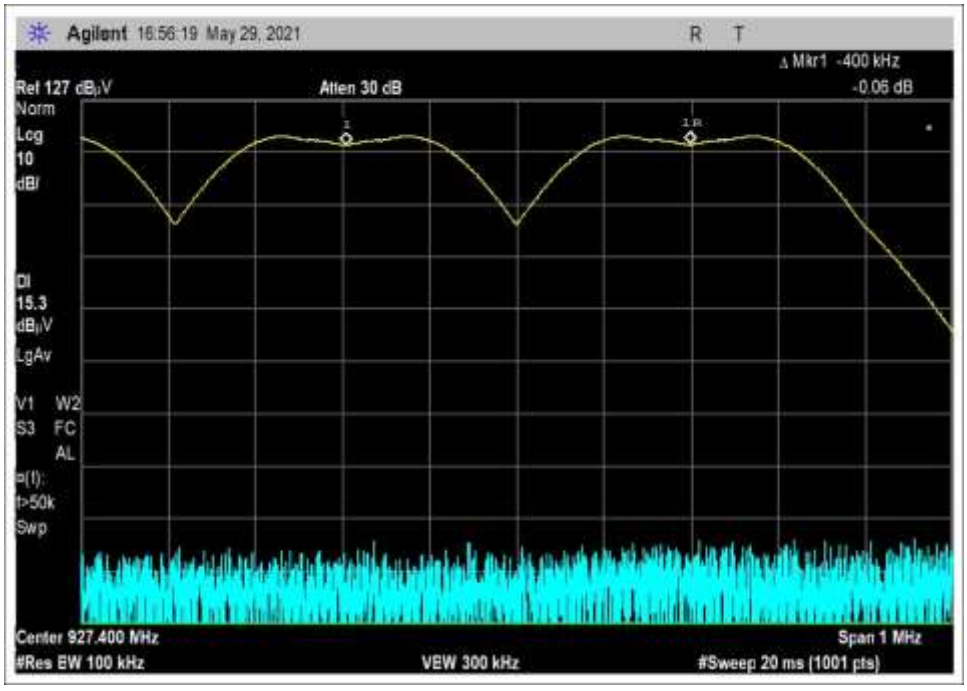
15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
1	GFSK 150kbps	400.0	> 269.6	**Pass**
1	GFSK 300kbps	400.0	> 358.4	Pass

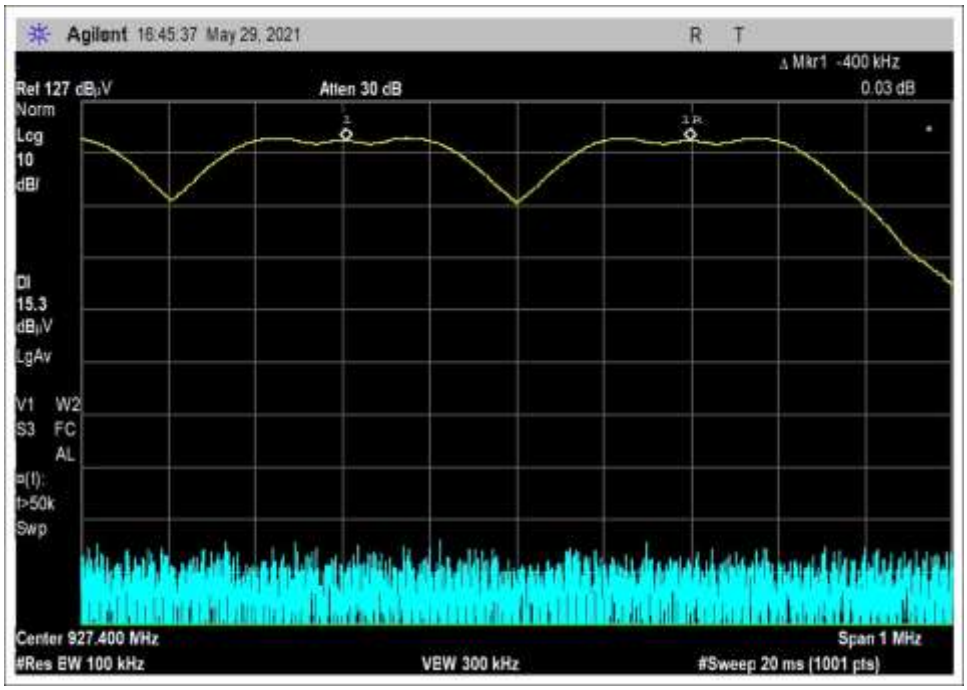
Plot(s)

(Note: At the time of the test the spectrum analyzer date and time was not set correctly.)

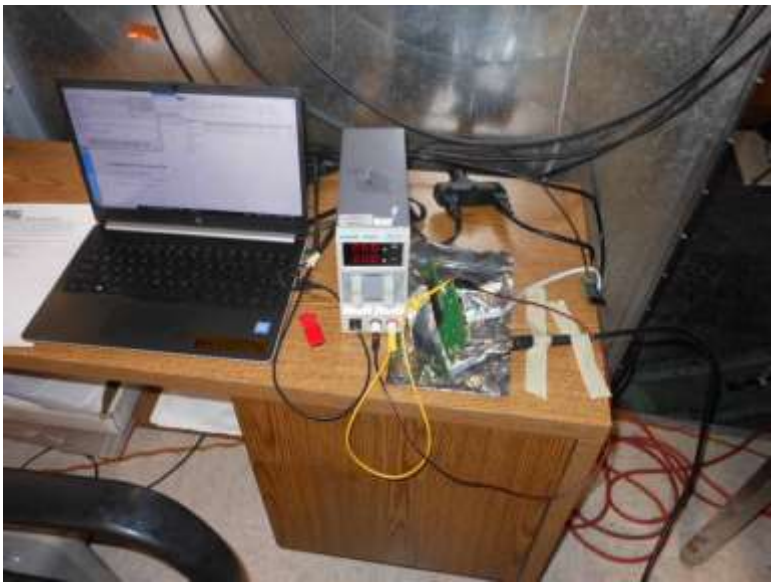
GFSK 150kbps



GFSK 300kbps



Test Setup Photo(s)



15.247(b)(2) Output Power

Test Data Summary - Voltage Variations

This equipment is battery powered. Power output tests were performed using a fresh battery.

Test Data Summary - RF Conducted Measurement

$Limit = 30dBm\ Conducted/36dBm\ EIRP$

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
902.4	GFSK 150kbps	F / 5dBi	11.3	≤ 30	Pass
914.8	GFSK 150kbps	F / 5dBi	11.5	≤ 30	Pass
927.6	GFSK 150kbps	F / 5dBi	11.4	≤ 30	Pass
902.4	GFSK 300kbps	F / 5dBi	11.2	≤ 30	Pass
914.8	GFSK 300kbps	F / 5dBi	11.4	≤ 30	Pass
927.6	GFSK 300kbps	F / 5dBi	11.5	≤ 30	Pass

*For this Hybrid Mode there is no minimum number of hopping channels required for the 1 Watt (30dBm) limit.

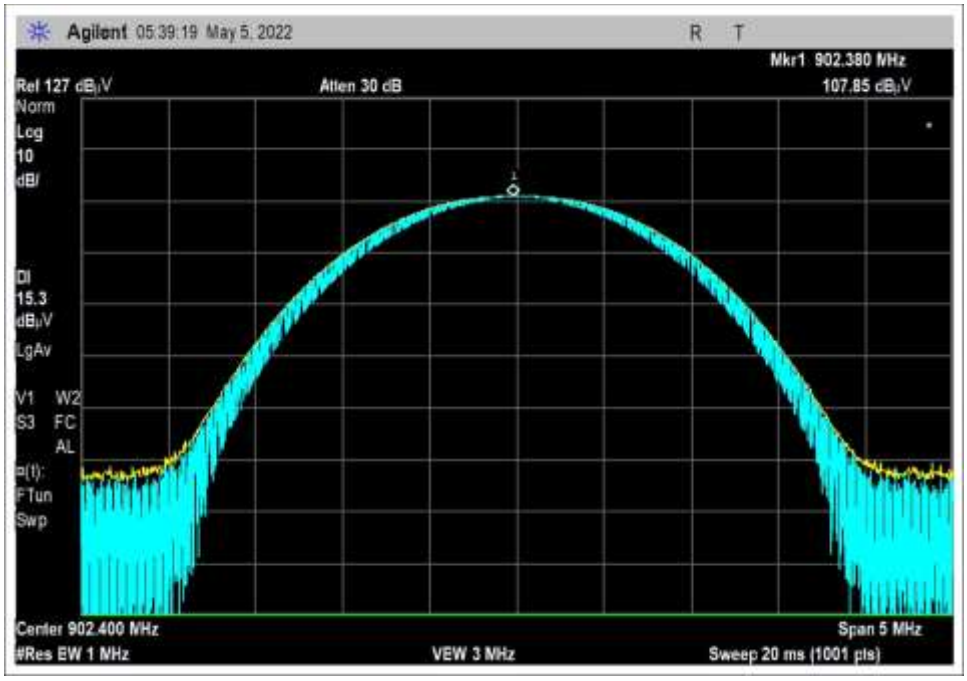
The limit is calculated according to a maximum of 1W (30 dBm) conducted power with a maximum of 6dBi gain antenna in accordance with 15.247(b)

$Limit = 30 - Roundup(G - 6)$

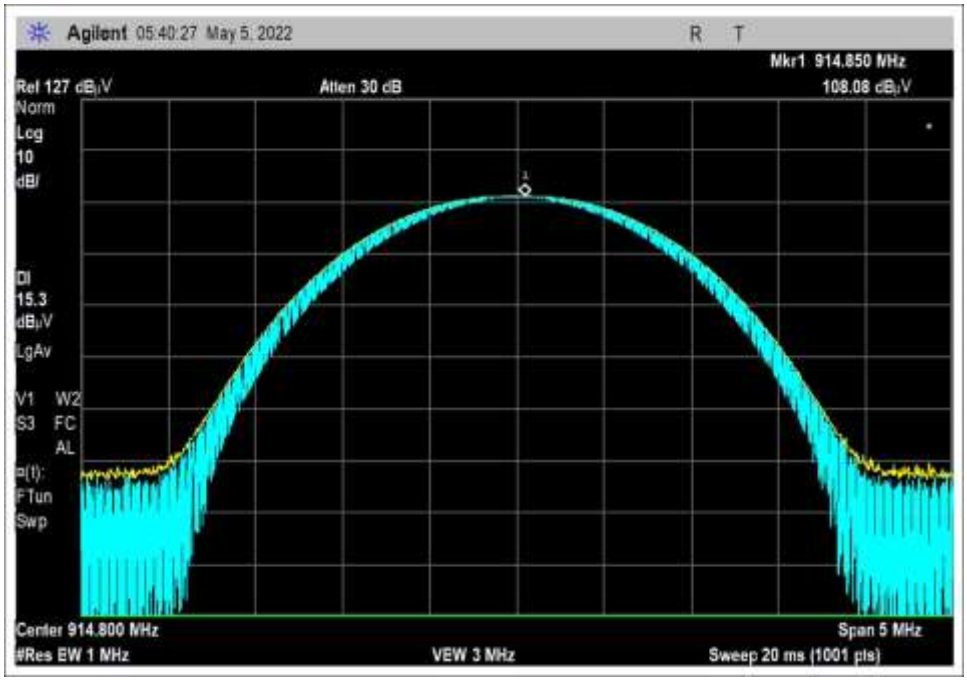
Plot Data

(Note: At the time of the test the spectrum analyzer date and time was not set correctly.)

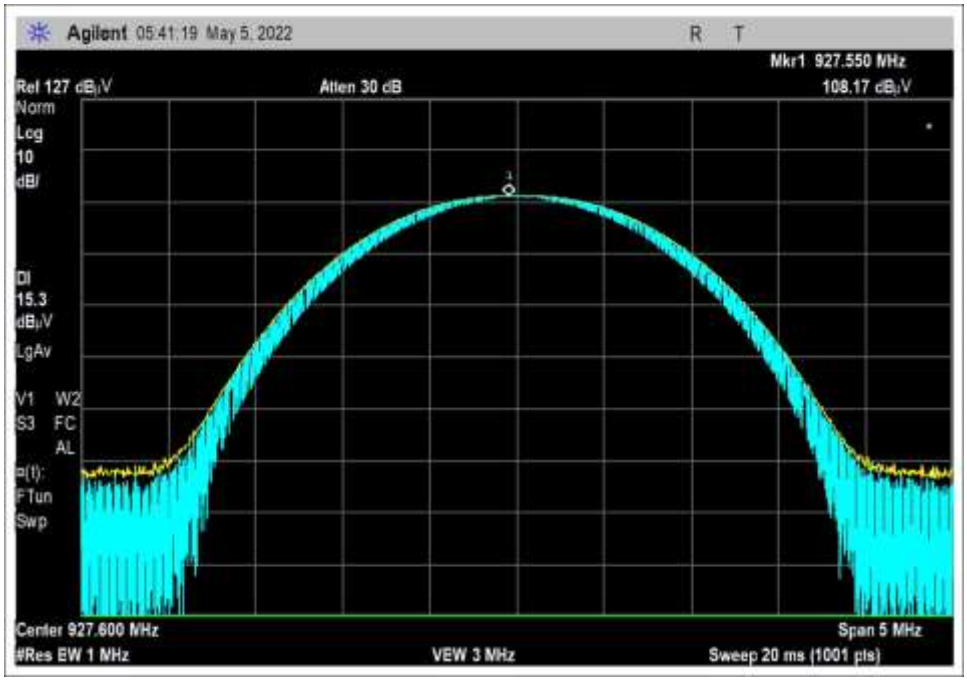
GFSK 150kbps Level 2



Low Channel

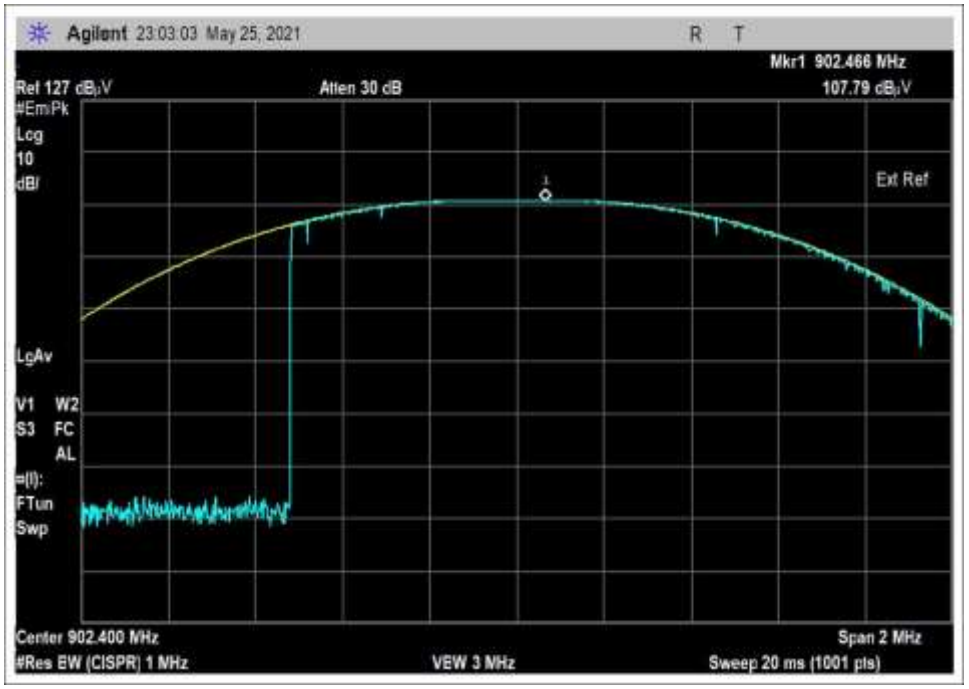


Middle Channel

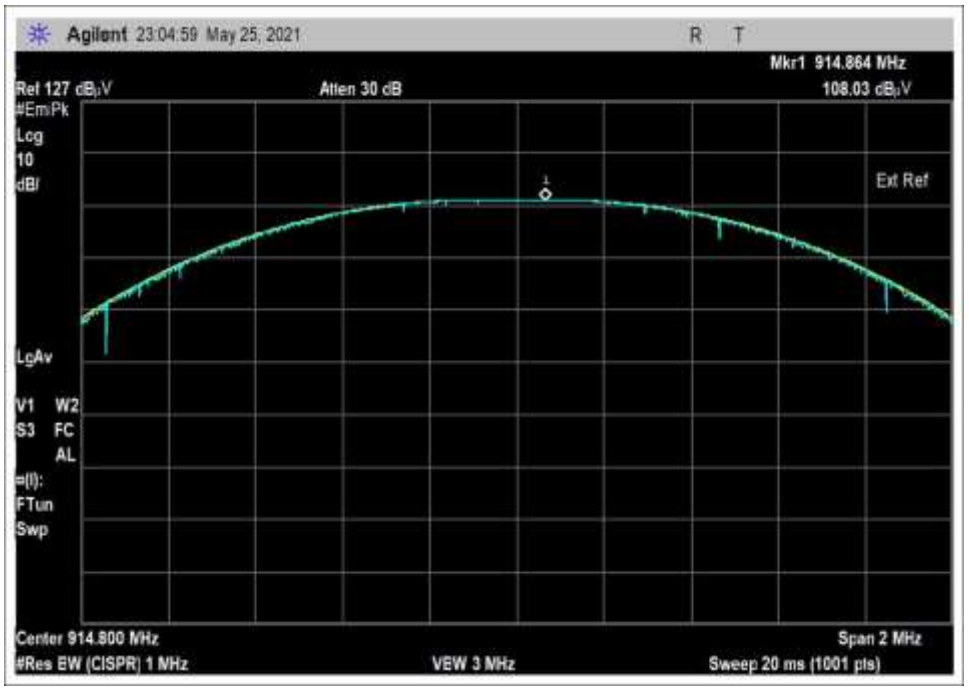


High Channel

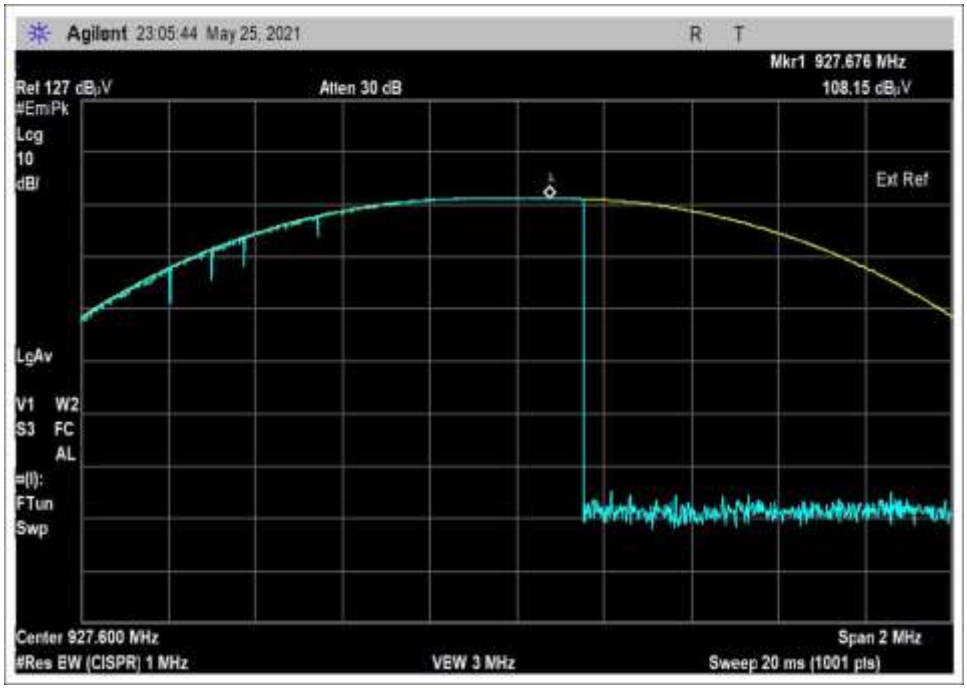
GFSK 300kbps Level 2



Low Channel



Middle Channel



Hight Channel

Test Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**107652**	Date:	2/4/2023
Test Type:	**Conducted Emissions**	Time:	10:44:27
Tested By:	Matt Harrison	Sequence#:	1
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

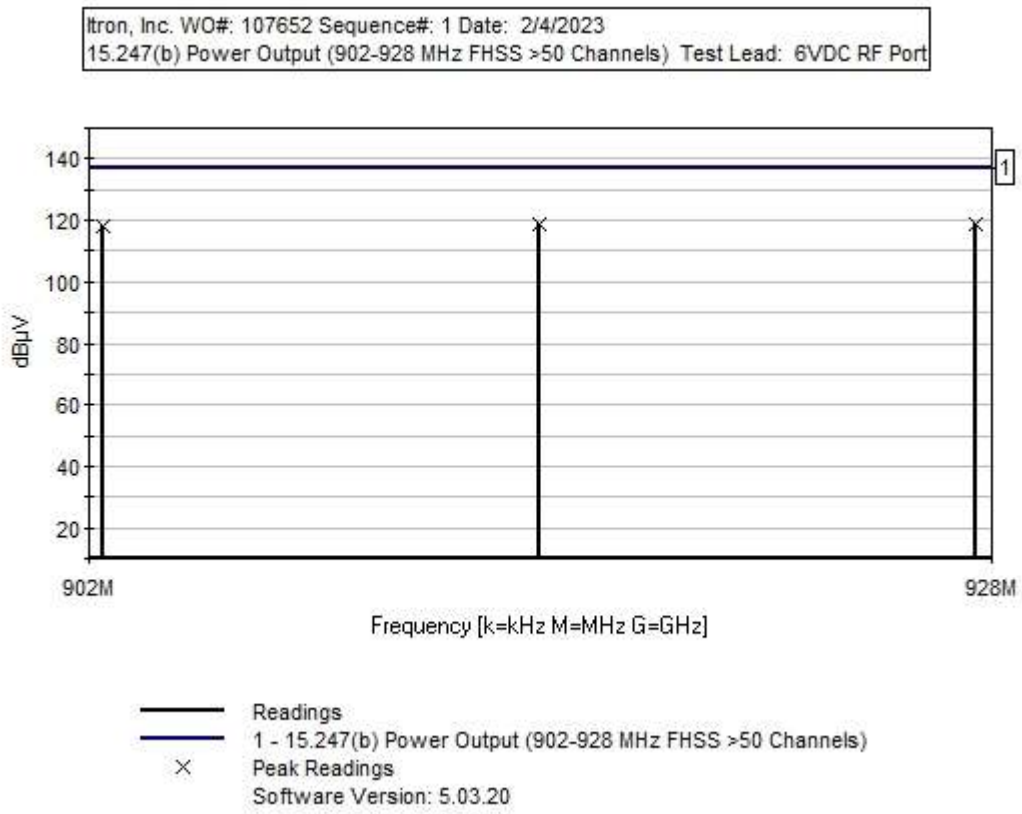
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 916, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 150kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

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	927.550M	108.2	+10.1	+0.3			+0.0	118.6	137.0	-18.4	RF Po
2	914.850M	108.1	+10.1	+0.3			+0.0	118.5	137.0	-18.5	RF Po
3	902.380M	107.9	+10.1	+0.3			+0.0	118.3	137.0	-18.7	RF Po

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**		
Work Order #:	**107652**	Date:	1/10/2023
Test Type:	**Conducted Emissions**	Time:	14:51:38
Tested By:	Matt Harrison	Sequence#:	11
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

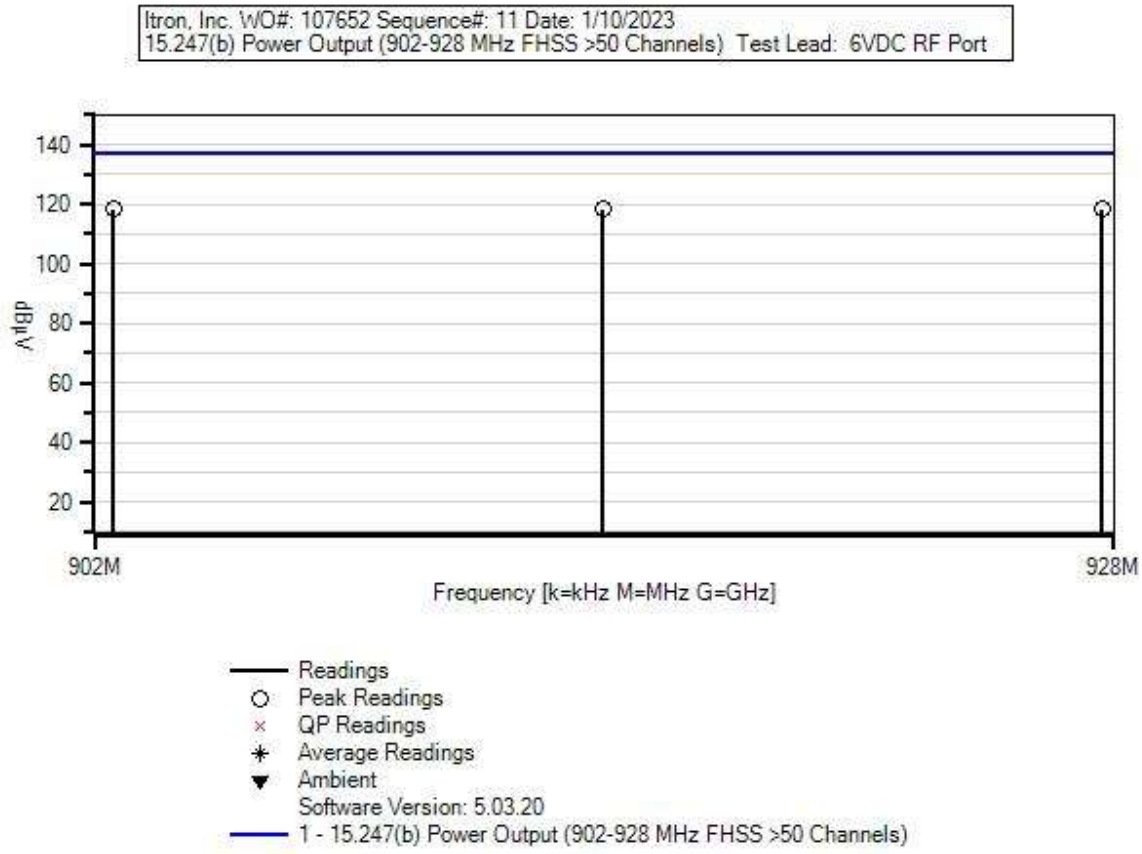
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 914.8, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023

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	927.676M	108.1	+10.1	+0.3			+0.0	118.5	137.0	-18.5	RF Po
2	914.864M	108.0	+10.1	+0.3			+0.0	118.4	137.0	-18.6	RF Po
3	902.466M	107.8	+10.1	+0.3			+0.0	118.2	137.0	-18.8	RF Po

Test Setup Photo(s)

15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**107652**	Date:	4/24/2023
Test Type:	**Conducted Emissions**	Time:	14:49:04
Tested By:	Matt Harrison	Sequence#:	69
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

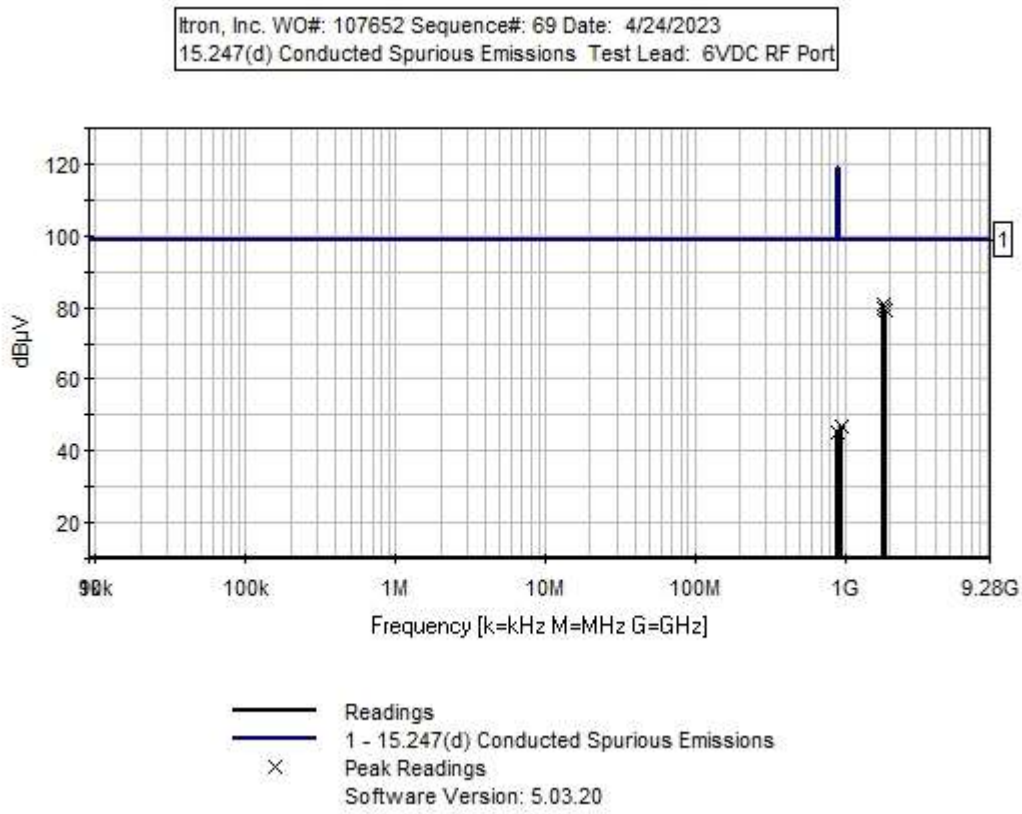
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6◦C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: 30-10000MHz
Frequency tested: 902.4, 914.8, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None



Test Equipment:

ID	Asset # #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
	AN03807	Spectrum Analyzer	E4440A	12/14/2022	12/14/2024
T2	ANP06454	Cable	Heliax	1/25/2022	1/25/2024

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	1804.950M	69.7	+10.2	+1.0			+0.0	80.9	98.7	-17.8	RF Po
2	1829.757M	68.4	+10.2	+1.0			+0.0	79.6	98.7	-19.1	RF Po
3	1855.047M	67.9	+10.2	+1.0			+0.0	79.1	98.7	-19.6	RF Po
4	966.100M	36.0	+10.1	+0.7			+0.0	46.8	98.7	-51.9	RF Po
5	889.400M	34.1	+10.1	+0.7			+0.0	44.9	98.7	-53.8	RF Po

Band Edge

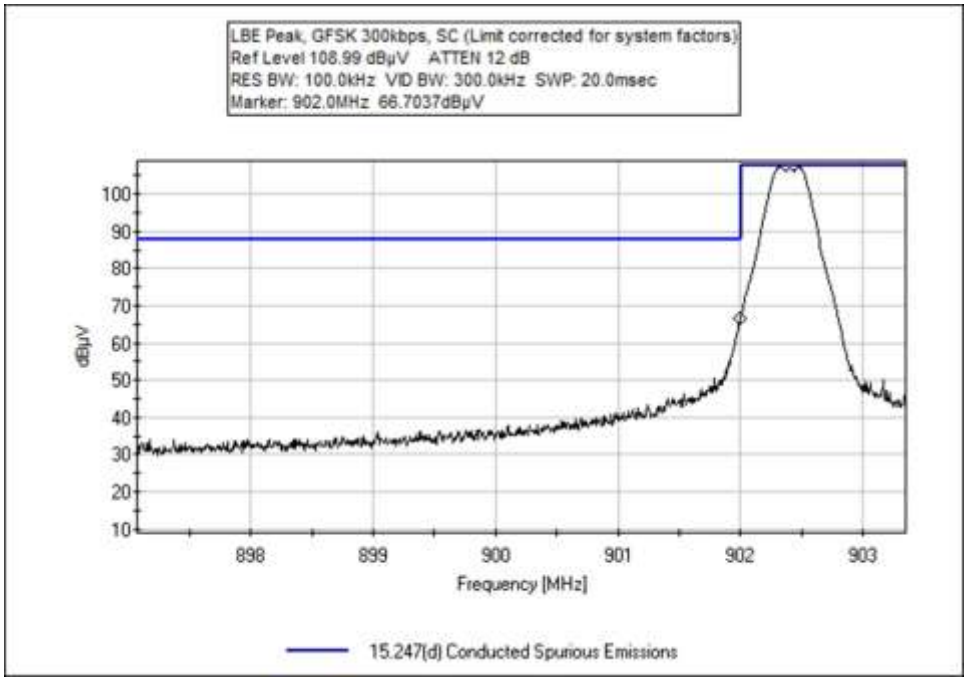
Testing Notes:
- Conducted Emission band edge plot. RBW=100kHz, limit is -20dBc if Fundamental power was measured with peak detector, and -30dBc for average/RMS detector/RMS power meter.
- Band edge plots must be performed with center frequency set at L and H.

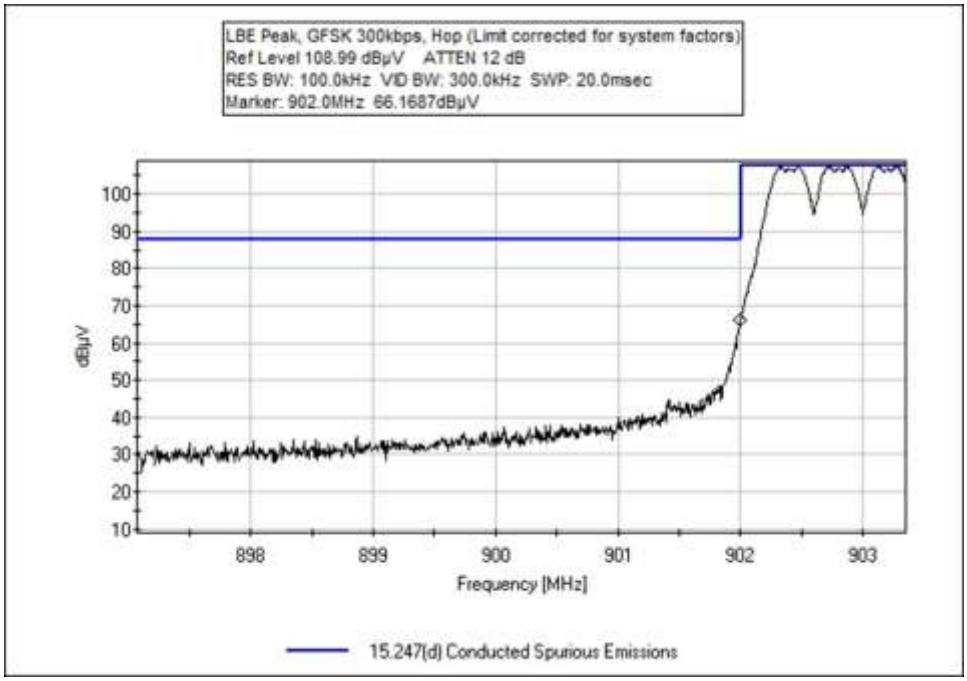
Band Edge Summary

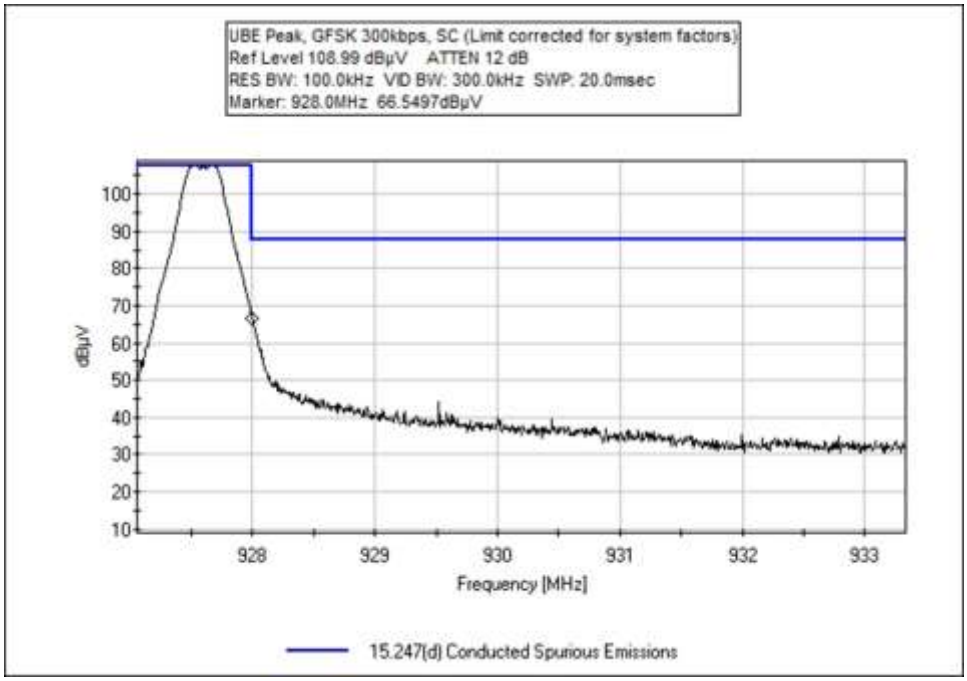
Limit applied: Max Power/100kHz - 20dB.

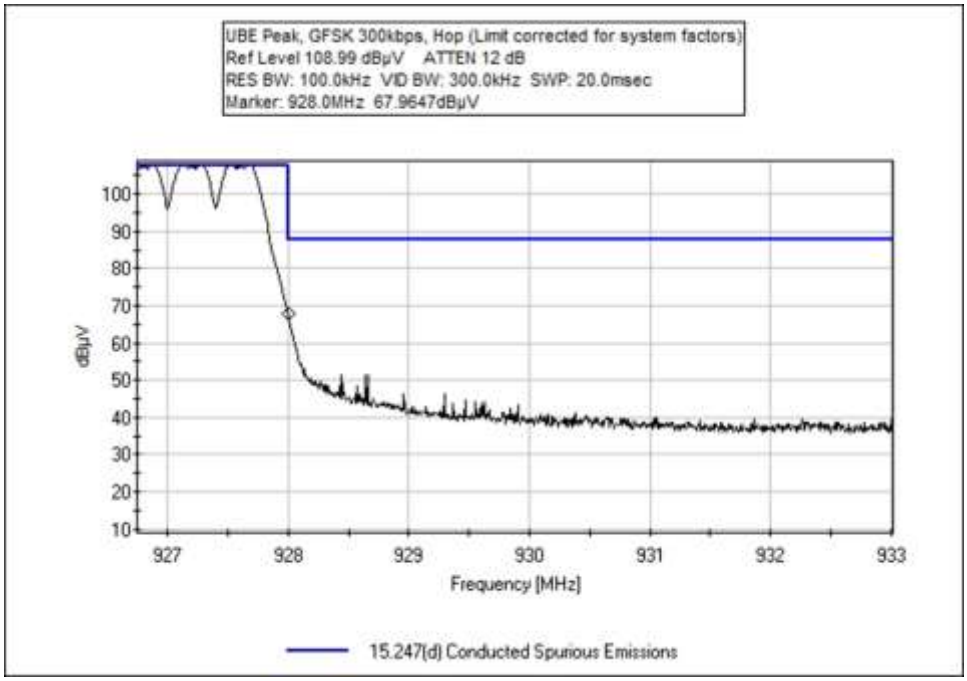
Frequency (MHz)	Modulation	Measured (dBµV)	Limit (dBµV)	Results
902	GFSK 300kbps (Worst-Case) (Single Channel)	77.5	98.7	Pass
928		77.3	98.7	Pass
902	GFSK 300kbps (Worst-Case) (Hopping)	77.0	98.7	Pass
928		78.8	98.7	Pass

Band Edge Plots






UBE Peak, GFSK 300kbps, SC (Limit corrected for system factors)
Ref Level 108.99 dBµV ATTEN 12 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 66.5497dBµV
dBµV
Frequency [MHz]
15.247(d) Conducted Spurious Emissions


UBE Peak, GFSK 300kbps, Hop (Limit corrected for system factors)
Ref Level 108.99 dBµV ATTEN 12 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 67.9647dBµV
dBµV
Frequency [MHz]
15.247(d) Conducted Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**107652**	Date:	4/24/2023
Test Type:	**Conducted Emissions**	Time:	14:37:25
Tested By:	Matt Harrison	Sequence#:	67
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6◦C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: 900-928MHz
Frequency tested: 902.4, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None

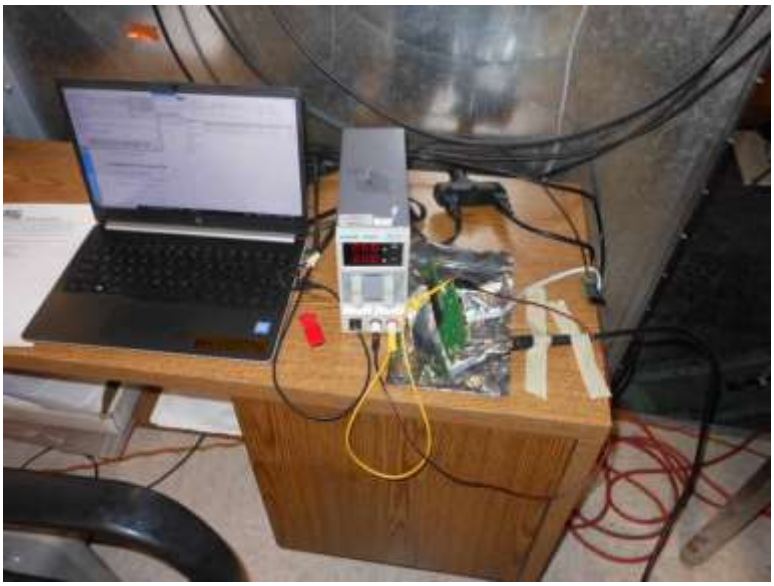
Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
T2	AN03807	Spectrum Analyzer	E4440A	12/14/2022	12/14/2024
T3	ANP06454	Cable	Heliax	1/25/2022	1/25/2024

Measurement Data: Reading listed by order taken. Test Lead: RF Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	928.000M	68.0	+10.1	+0.0	+0.7		+0.0	78.8	98.7 Hop	-19.9	RF Po
2	902.000M	66.2	+10.1	+0.0	+0.7		+0.0	77.0	98.7 Hop	-21.7	RF Po
3	902.000M	66.7	+10.1	+0.0	+0.7		+0.0	77.5	98.7 SC	-21.2	RF Po
4	928.000M	66.5	+10.1	+0.0	+0.7		+0.0	77.3	98.7 SC	-21.4	RF Po

Test Setup Photo(s)



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**107652**	Date:	2/6/2023
Test Type:	**Radiated Scan**	Time:	10:02:24
Tested By:	Matt Harrison	Sequence#:	68
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

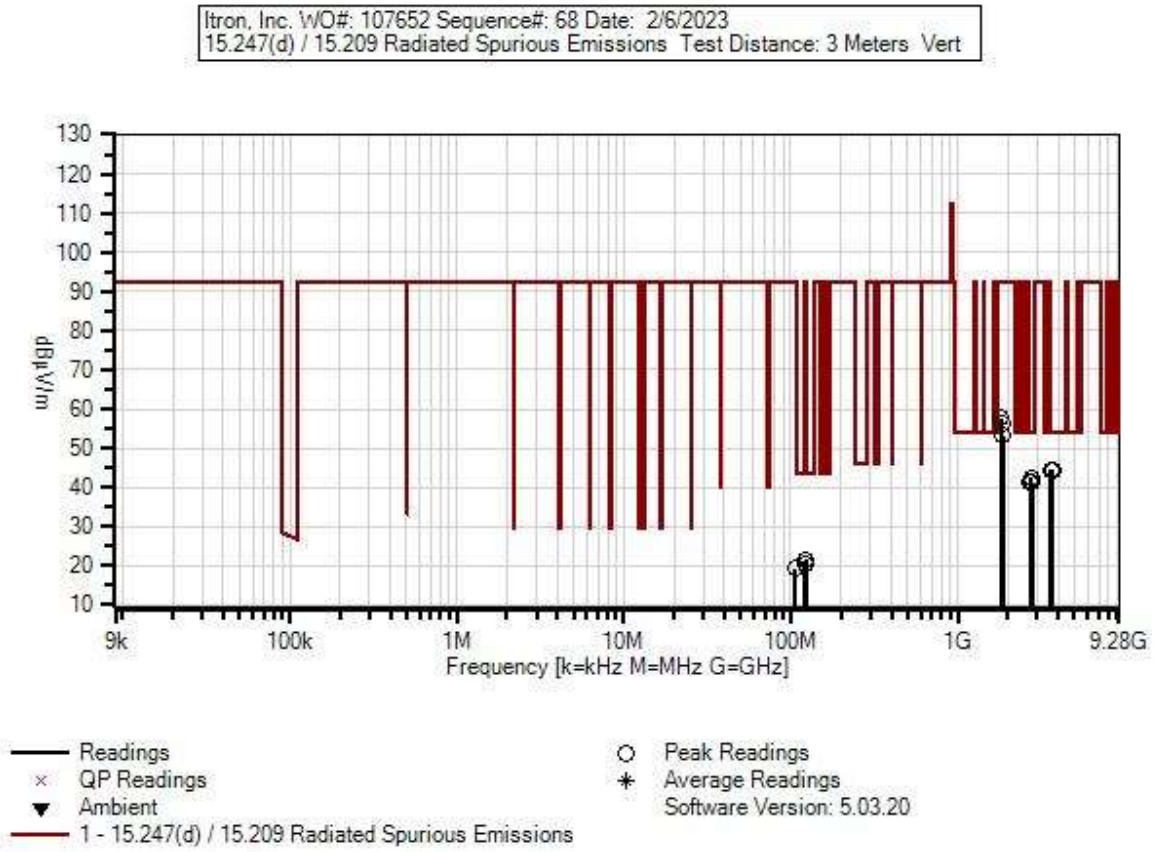
Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range:Fundamental
Frequency tested: 904.2, 916, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK 150kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup in a tabletop configuration. It is 80cm high for below 1GHz and 150cm above 1GHz on a Styrofoam table.
Modifications Added: None

Notes:
No EUT emissions found within 20dB of the limit below 30MHz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T2	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T3	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T4	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T5	AN03170	High Pass Filter	HM1155-11SS	9/16/2021	9/16/2023
T6	ANP05333	Cable	Heliax	3/14/2022	3/14/2024
T7	ANP07505	Cable	CLU40-KMKM-02.00F	1/24/2023	1/24/2025
	AN02307	Preamp	8447D	1/6/2022	1/6/2024
	AN00052	Loop Antenna	6502	5/11/2022	5/11/2024
	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
	ANP05360	Cable	RG214	2/4/2022	2/4/2024
	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

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	3609.445M	42.0	-33.8 +0.3	+31.7 +3.4	+0.5 +0.5	+0.0	+0.0	44.6	54.0	-9.4	Vert
2	3658.835M	41.6	-33.8 +0.2	+31.7 +3.5	+0.6 +0.6	+0.0	+0.0	44.4	54.0	-9.6	Vert
3	3710.295M	41.2	-33.8 +0.2	+32.0 +3.5	+0.6 +0.6	+0.0	+0.0	44.3	54.0	-9.7	Vert
4	2744.600M	43.2	-34.1 +0.3	+29.3 +2.8	+0.5 +0.5	+0.0	+0.0	42.5	54.0	-11.5	Vert
5	2707.215M	42.2	-34.1 +0.2	+29.5 +2.8	+0.5 +0.5	+0.0	+0.0	41.6	54.0	-12.4	Vert
6	2782.680M	42.0	-34.1 +0.3	+29.3 +2.8	+0.5 +0.5	+0.0	+0.0	41.3	54.0	-12.7	Vert
7	123.400M	34.5	+13.1 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	21.5	43.5	-22.0	Horiz
8	122.300M	34.3	+13.1 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	21.3	43.5	-22.2	Horiz
9	120.780M	33.4	+13.2 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	20.5	43.5	-23.0	Vert
10	106.500M	31.6	+14.2 -27.7	+0.6 +0.0	+0.1 +0.0	+0.6	+0.0	19.4	43.5	-24.1	Vert
11	1804.655M	61.5	-34.7 +0.6	+27.3 +2.2	+0.4 +0.4	+0.0	+0.0	57.7	92.5	-34.8	Vert
12	1829.715M	59.6	-34.7 +0.6	+27.5 +2.3	+0.4 +0.4	+0.0	+0.0	56.1	92.5	-36.4	Vert
13	1855.285M	56.5	-34.7 +0.6	+27.7 +2.3	+0.4 +0.4	+0.0	+0.0	53.2	92.5	-39.3	Vert

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**107652**	Date:	1/28/2023
Test Type:	**Radiated Scan**	Time:	12:25:36
Tested By:	Matt Harrison	Sequence#:	37
Software:	EMITest 5.03.20		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

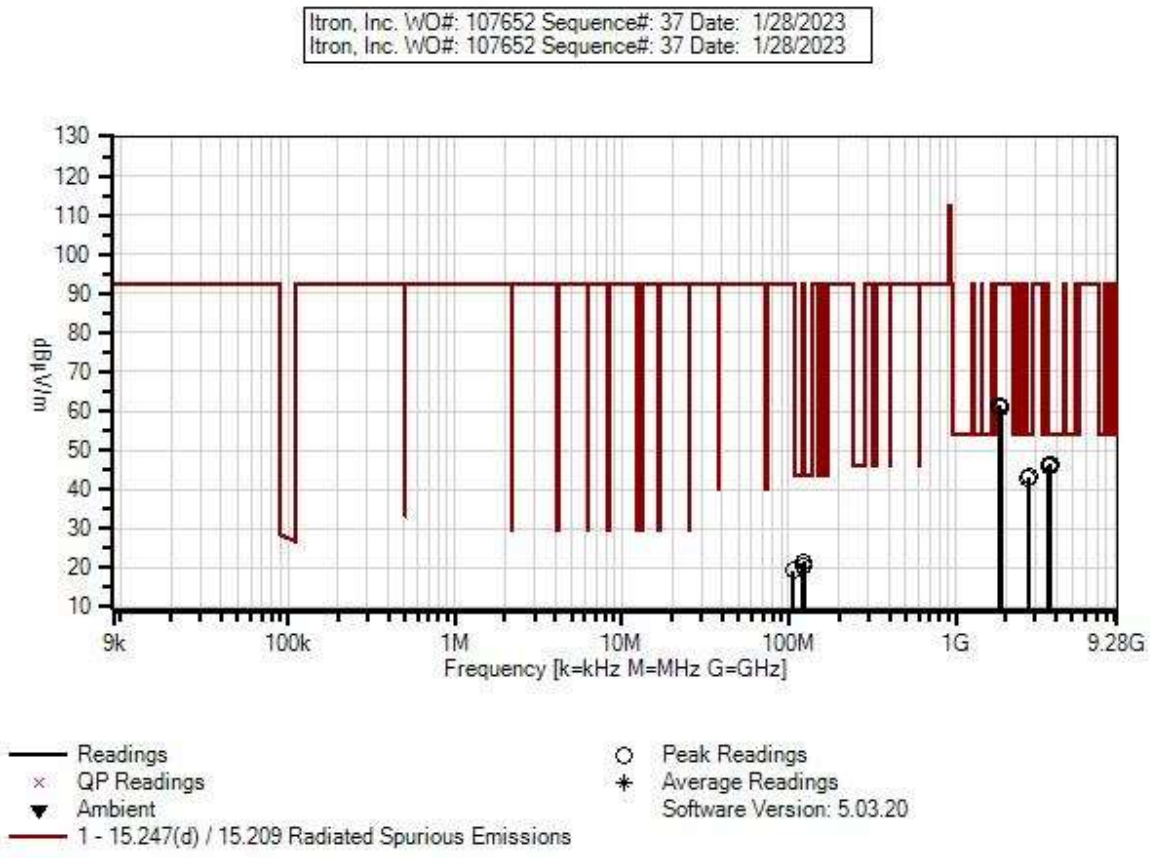
Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 904.2, 916, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup in a tabletop configuration. It is 80cm high for below 1GHz and 150cm above 1GHz on a Styrofoam table.
Modifications Added: None

Notes:
No EUT emissions found within 20dB of the limit below 30MHz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03540	Preamp	83017A	5/14/2021	5/14/2023
T2	AN02374ANSI	Horn Antenna	RGA-60	5/25/2021	5/25/2023
T3	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T4	AN02673	Spectrum Analyzer	E4446A	2/3/2021	2/3/2023
T5	AN03170	High Pass Filter	HM1155-11SS	9/16/2021	9/16/2023
T6	ANP05333	Cable	Heliax	3/14/2022	3/14/2024
T7	ANP07505	Cable	CLU40-KMKM-02.00F	1/24/2023	1/24/2025
	AN02307	Preamp	8447D	1/6/2022	1/6/2024
	AN00052	Loop Antenna	6502	5/11/2022	5/11/2024
	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
	ANP05360	Cable	RG214	2/4/2022	2/4/2024
	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

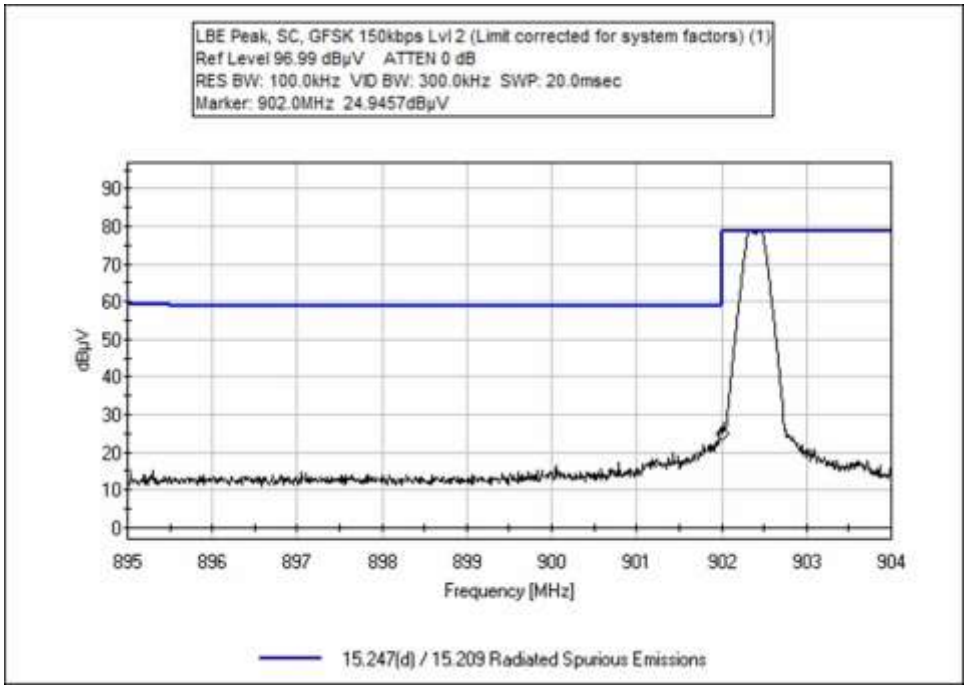
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

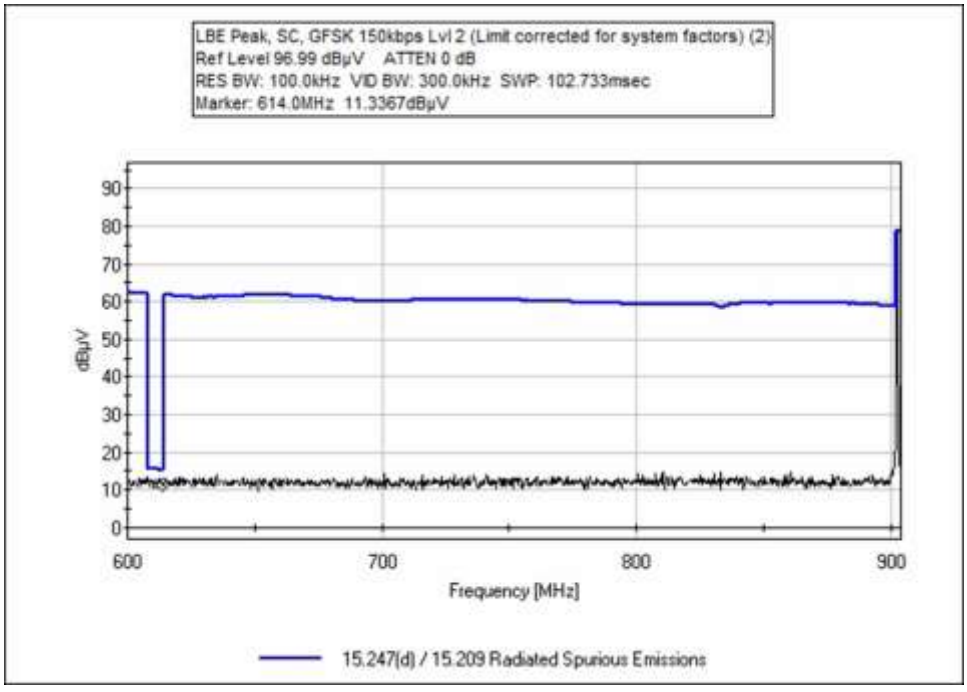
#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	3709.795M	43.4	-33.8 +0.2	+32.0 +3.5	+0.6 +0.6	+0.0	+0.0	46.5	54.0	-7.5	Vert
2	3658.625M	43.7	-33.8 +0.2	+31.7 +3.5	+0.6 +0.6	+0.0	+0.0	46.5	54.0	-7.5	Vert
3	3609.950M	43.3	-33.8 +0.3	+31.7 +3.4	+0.5 +0.5	+0.0	+0.0	45.9	54.0	-8.1	Vert
4	2744.235M	43.9	-34.1 +0.3	+29.3 +2.8	+0.5 +0.5	+0.0	+0.0	43.2	54.0	-10.8	Vert
5	2706.970M	43.5	-34.1 +0.2	+29.5 +2.8	+0.5 +0.5	+0.0	+0.0	42.9	54.0	-11.1	Vert
6	123.400M	34.5	+13.1 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	21.5	43.5	-22.0	Horiz
7	122.300M	34.3	+13.1 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	21.3	43.5	-22.2	Horiz
8	120.780M	33.4	+13.2 -27.6	+0.7 +0.0	+0.1 +0.0	+0.7	+0.0	20.5	43.5	-23.0	Vert
9	106.500M	31.6	+14.2 -27.7	+0.6 +0.0	+0.1 +0.0	+0.6	+0.0	19.4	43.5	-24.1	Vert
10	1804.695M	65.3	-34.7 +0.6	+27.3 +2.2	+0.4 +0.4	+0.0	+0.0	61.5	92.5	-31.0	Vert
11	1829.575M	64.9	-34.7 +0.6	+27.5 +2.3	+0.4 +0.4	+0.0	+0.0	61.4	92.5	-31.1	Vert
12	1855.025M	64.0	-34.7 +0.6	+27.7 +2.3	+0.4 +0.4	+0.0	+0.0	60.7	92.5	-31.8	Vert

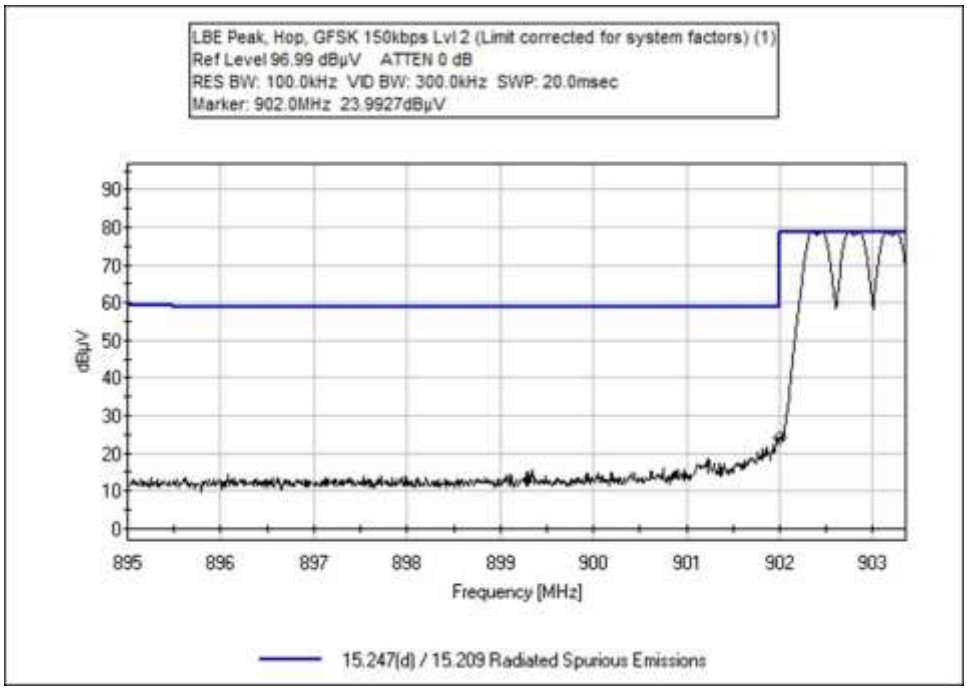
Band Edge

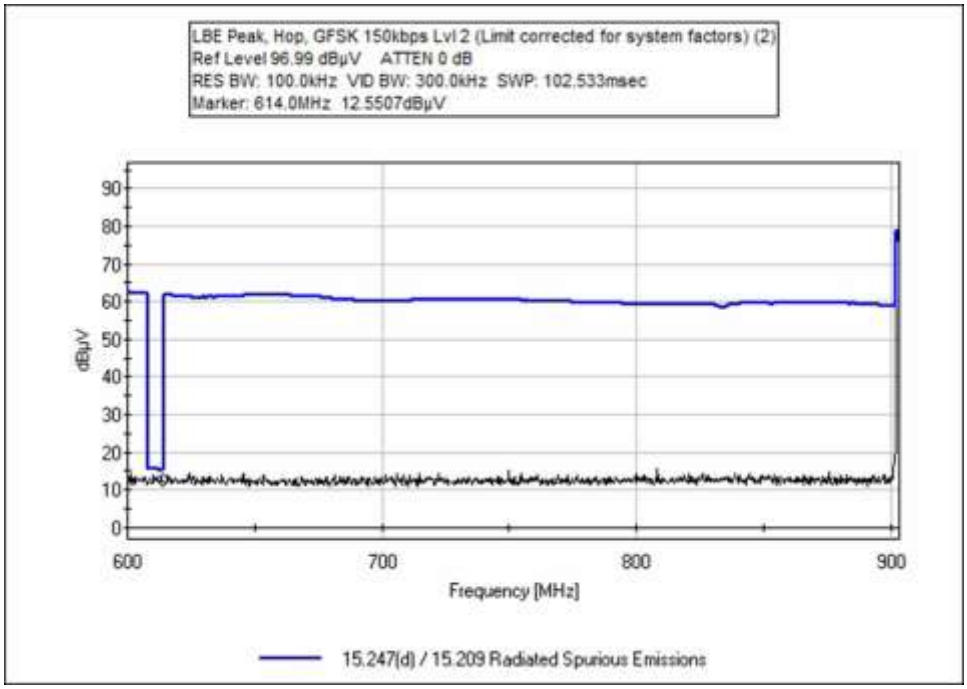
Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	GFSK 150kbps / Single Channel	F	39.8	<46	Pass
902			58.6	<92.5	Pass
928			71.8	<92.5	Pass
960			46.9	<54	Pass
614	GFSK 150kbps / Hopping	F	39.8	<46	Pass
902			57.7	<92.5	Pass
928			71.9	<92.5	Pass
960			47.6	<54	Pass
614	GFSK 300kbps / Single Channel	F	40.1	<46	Pass
902			72.2	<92.5	Pass
928			71.2	<92.5	Pass
960			44.5	<54	Pass
614	GFSK 300kbps / Hopping	F	40.1	<46	Pass
902			72.2	<92.5	Pass
928			71.7	<92.5	Pass
960			44.6	<54	Pass

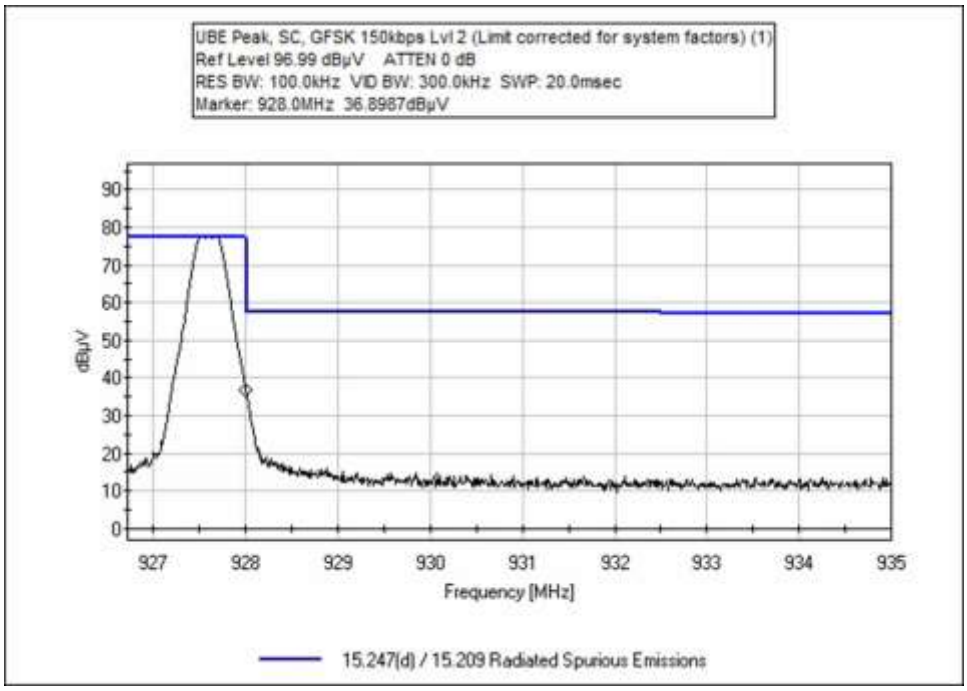
Band Edge Plots

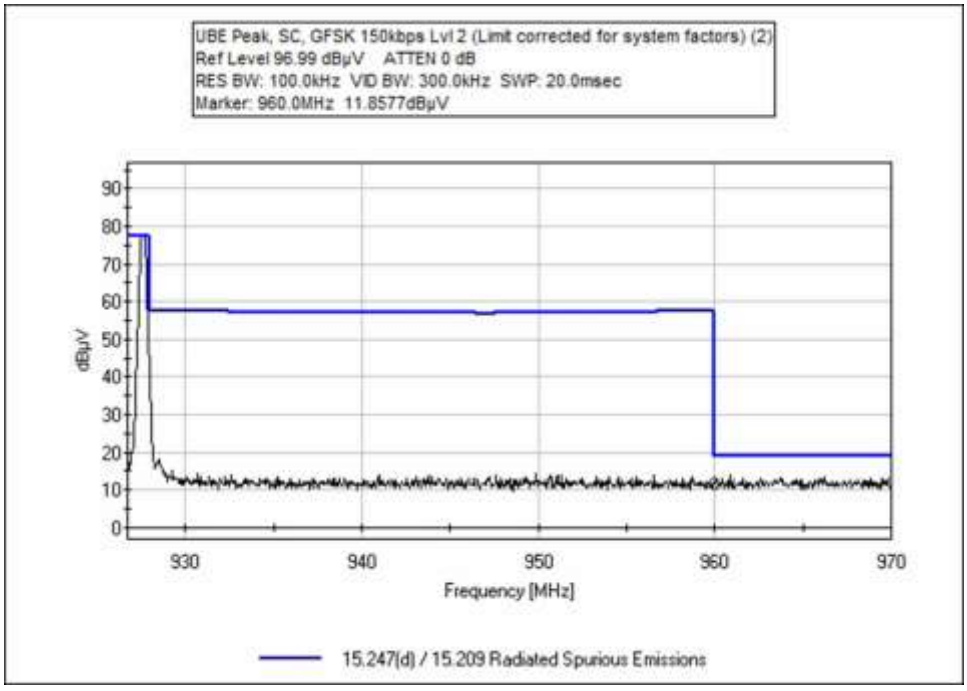


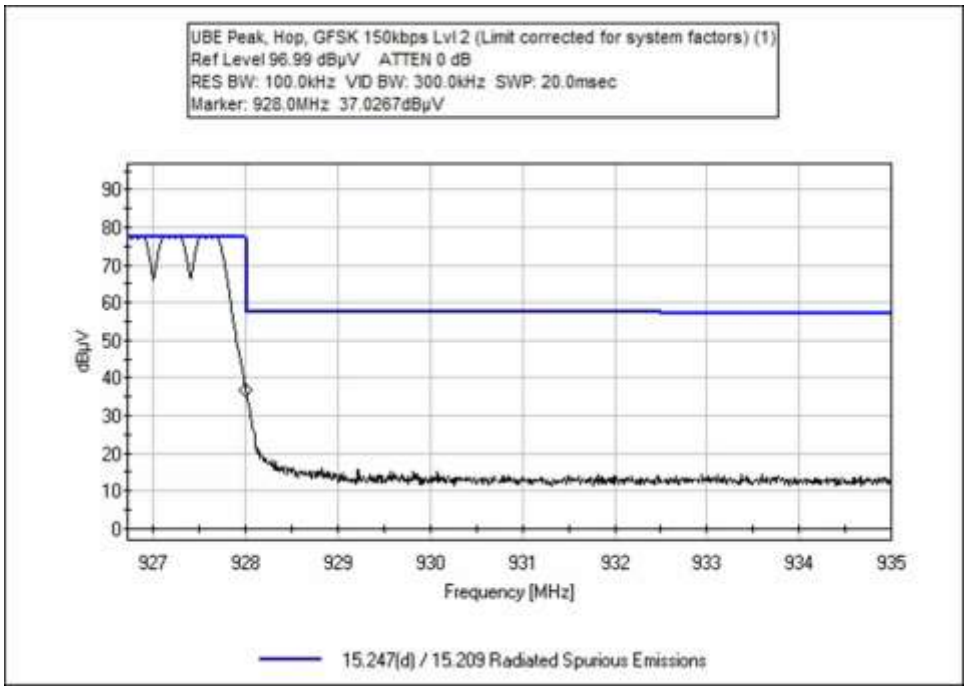


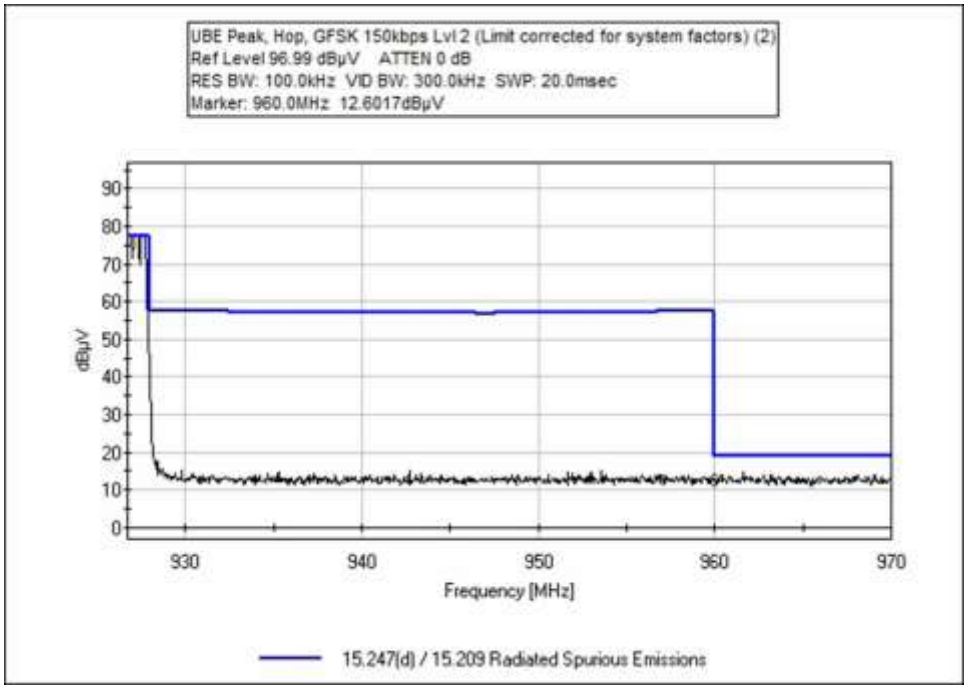

LBE Peak, Hop, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 23.9927dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

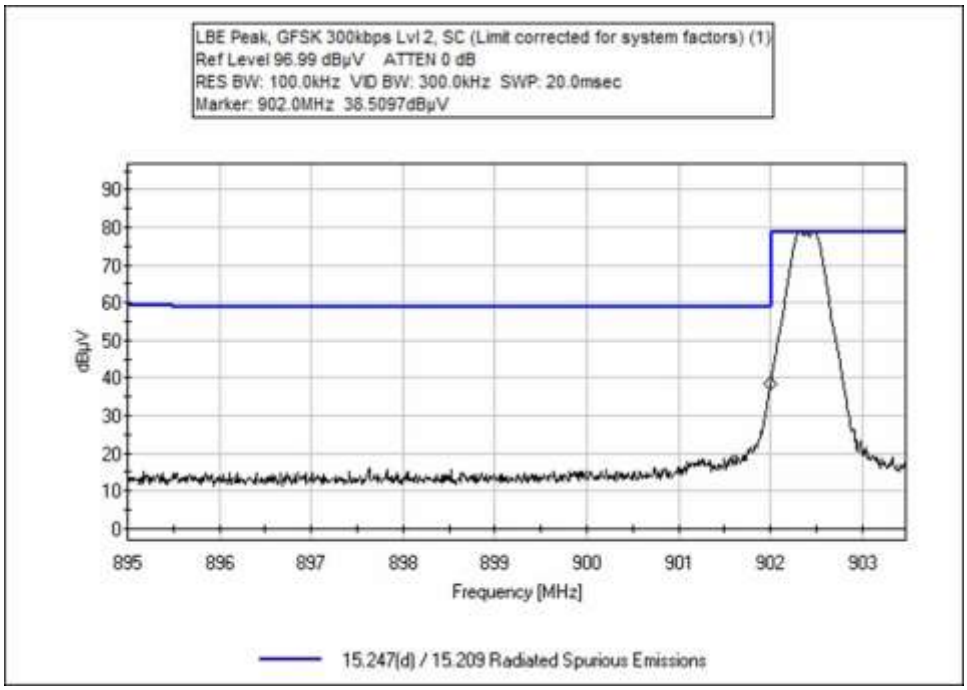

LBE Peak, Hop, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 102.533msec
Marker: 614.0MHz 12.5507dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

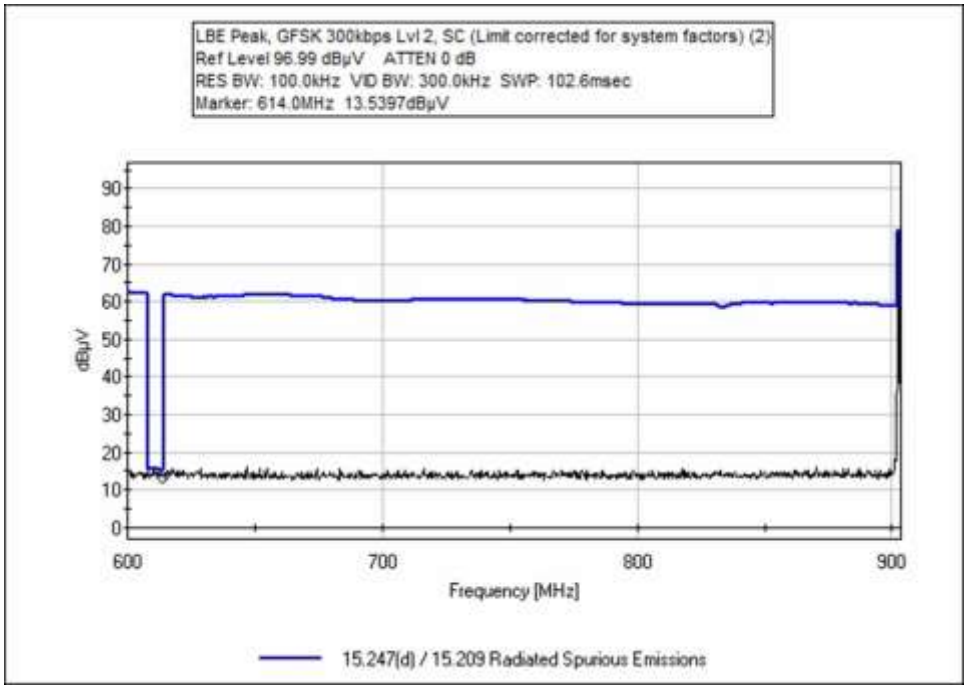

UBE Peak, SC, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 36.8987dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

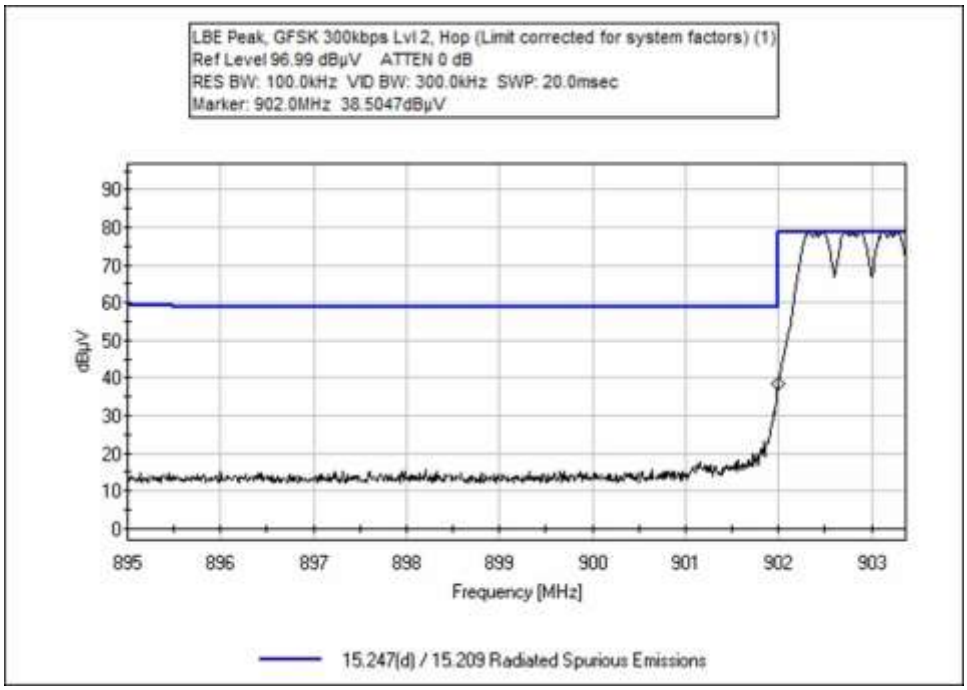

UBE Peak, SC, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 11.8577dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

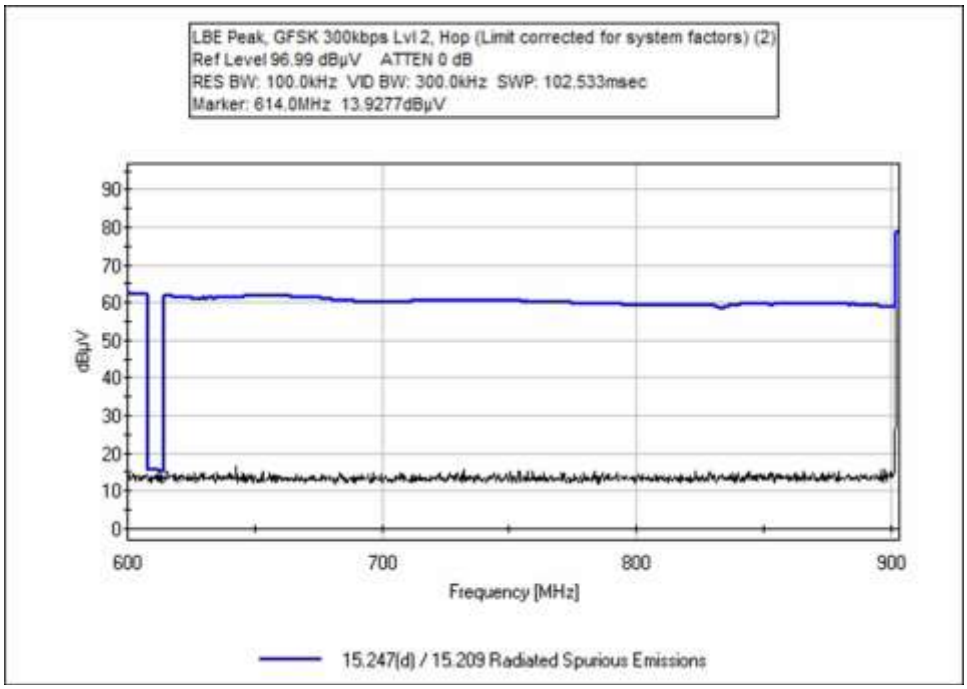

UBE Peak, Hop, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 37.0267dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

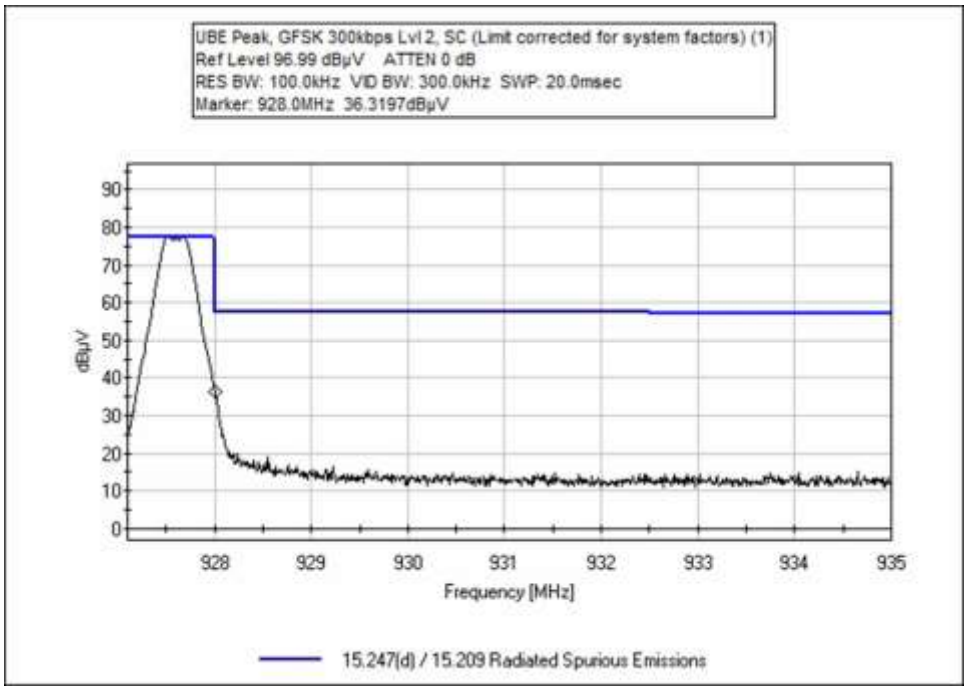

UBE Peak, Hop, GFSK 150kbps Lvl 2 (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 12.6017dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

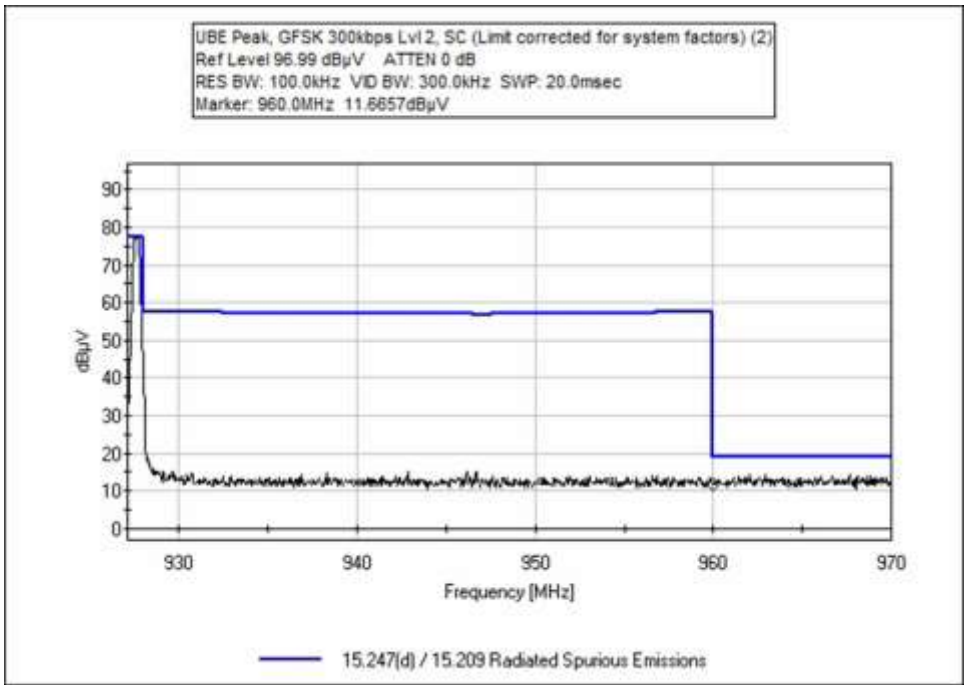

LBE Peak, GFSK 300kbps Lvl 2, SC (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 38.5097dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

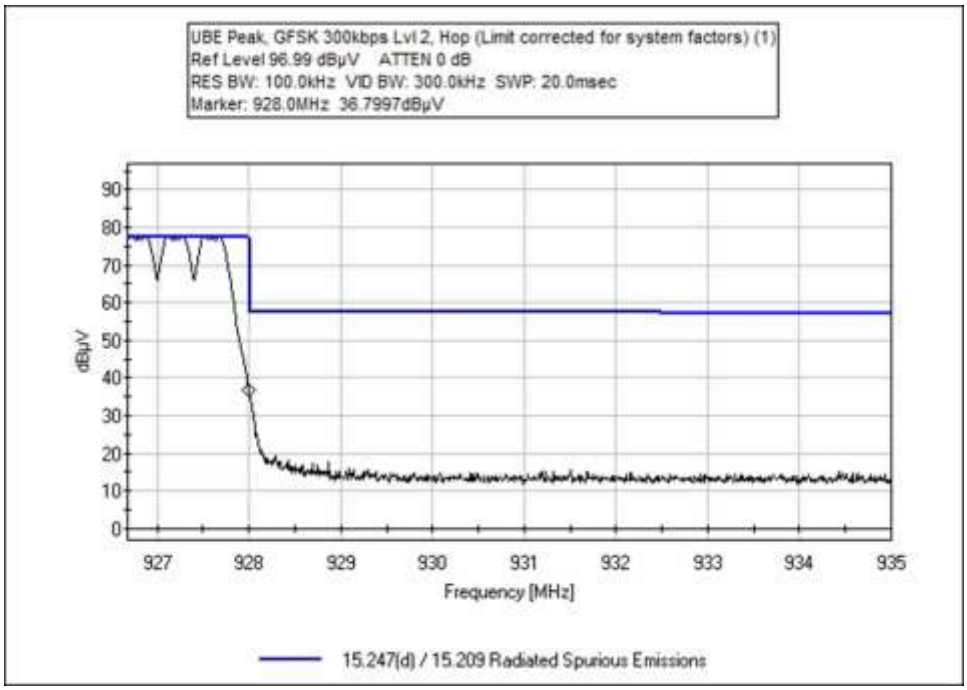

LBE Peak, GFSK 300kbps Lvl 2, SC (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 102.6msec
Marker: 614.0MHz 13.5397dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

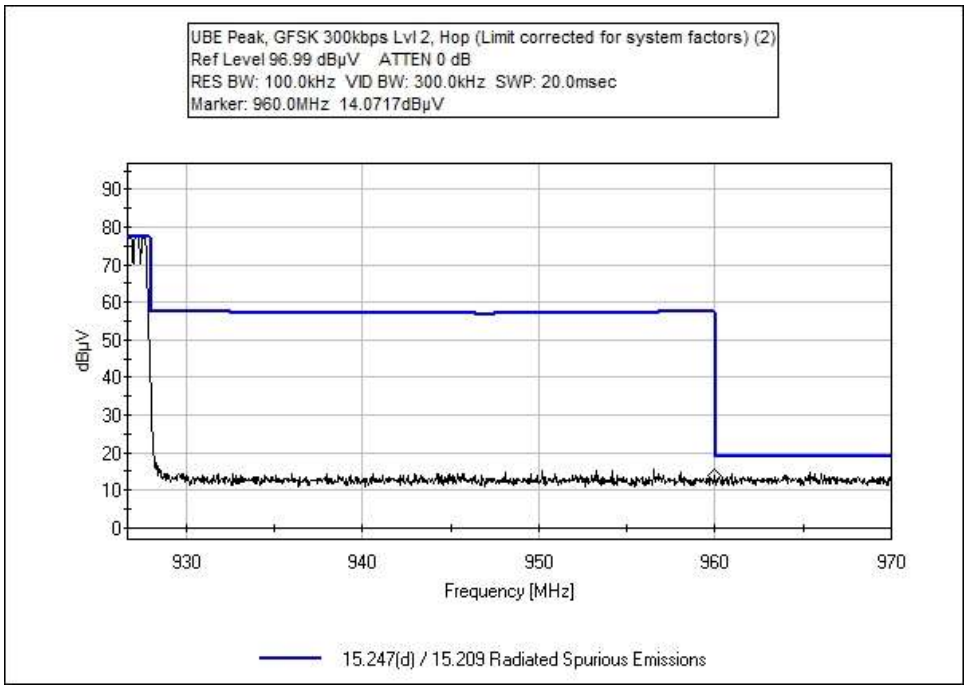

LBE Peak, GFSK 300kbps Lvl 2, Hop (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 902.0MHz 38.5047dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
895
896
897
898
899
900
901
902
903
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


LBE Peak, GFSK 300kbps Lvl 2, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 102.533msec
Marker: 614.0MHz 13.9277dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
600
700
800
900
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak, GFSK 300kbps Lvl 2, SC (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 36.3197dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak, GFSK 300kbps Lvl 2, SC (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 11.6657dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak, GFSK 300kbps Lvl 2, Hop (Limit corrected for system factors) (1)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 928.0MHz 36.7997dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


UBE Peak, GFSK 300kbps Lvl 2, Hop (Limit corrected for system factors) (2)
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 960.0MHz 14.0717dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**107652**	Date:	2/4/2023
Test Type:	**Radiated Scan**	Time:	09:40:55
Tested By:	Matt Harrison	Sequence#:	56
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:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK 150kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup in a tabletop configuration. It is 80cm high on a Styrofoam table.
Modifications Added: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T2	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T3	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T4	ANP05333	Cable	Heliax	3/14/2022	3/14/2024
T5	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	928.000M	37.0	+30.6 +0.0	+2.4	+0.3	+1.6	+0.0	71.9	92.5 Hop	-20.6	Horiz
2	960.000M	12.6	+30.7 +0.0	+2.4	+0.3	+1.6	+0.0	47.6	54.0 Hop	-6.4	Horiz
3	928.000M	36.9	+30.6 +0.0	+2.4	+0.3	+1.6	+0.0	71.8	92.5 SC	-20.7	Horiz
4	960.000M	11.9	+30.7 +0.0	+2.4	+0.3	+1.6	+0.0	46.9	54.0 SC	-7.1	Horiz
5	902.000M	24.9	+29.6 +0.0	+2.3	+0.3	+1.5	+0.0	58.6	92.5 SC	-33.9	Horiz
6	614.000M	11.3	+27.2 +0.0	+1.9	+0.3	+1.3	+0.0	42.0	46.0 SC	-4.0	Horiz
7	614.000M QP	9.1	+27.2 +0.0	+1.9	+0.3	+1.3	+0.0	39.8	46.0 SC	-6.2	Horiz
8	902.000M	24.0	+29.6 +0.0	+2.3	+0.3	+1.5	+0.0	57.7	92.5 Hop	-34.8	Horiz
9	614.000M	12.6	+27.2 +0.0	+1.9	+0.3	+1.3	+0.0	43.3	46.0 Hop	-2.7	Horiz
10	614.000M QP	9.1	+27.2 +0.0	+1.9	+0.3	+1.3	+0.0	39.8	46.0 Hop	-6.2	Horiz

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**107652**	Date:	1/23/2023
Test Type:	**Radiated Scan**	Time:	12:51:23
Tested By:	Matt Harrison	Sequence#:	13
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:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 927.5
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup in a tabletop configuration. It is 80cm high on a Styrofoam table.
Modifications Added: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03628	Biconilog Antenna	3142E	6/3/2021	6/3/2023
T2	ANP05360	Cable	RG214	2/4/2022	2/4/2024
T3	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
T4	AN02872	Spectrum Analyzer	E4440A	11/29/2021	11/29/2023
T5	ANP05333	Cable	Heliax	3/14/2022	3/14/2024

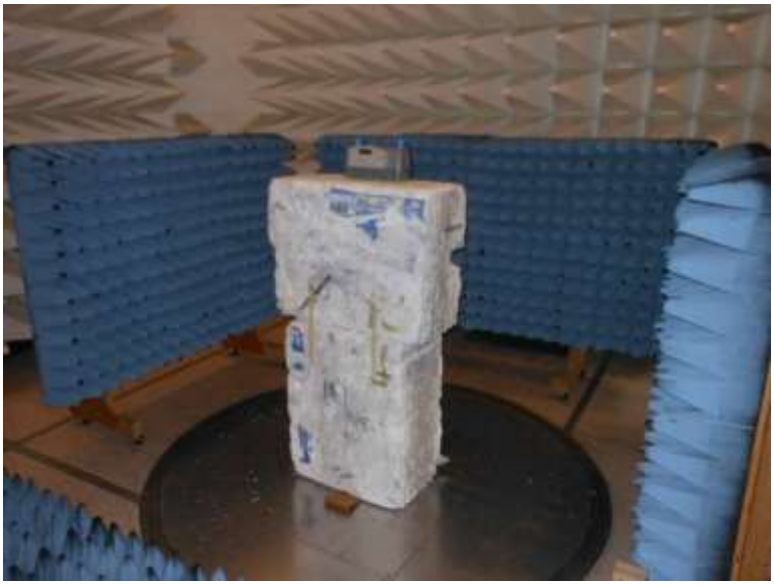
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M QP	9.4	+27.2 +1.3	+1.9	+0.3	+0.0	+0.0	40.1	46.0 Hop	-5.9	Horiz
2	614.000M QP	9.4	+27.2 +1.3	+1.9	+0.3	+0.0	+0.0	40.1	46.0 SC	-5.9	Horiz
^	614.000M	13.9	+27.2 +1.3	+1.9	+0.3	+0.0	+0.0	44.6	46.0 Hop	-1.4	Horiz
^	614.000M	13.5	+27.2 +1.3	+1.9	+0.3	+0.0	+0.0	44.2	46.0 SC	-1.8	Horiz
5	960.000M QP	9.6	+30.7 +1.6	+2.4	+0.3	+0.0	+0.0	44.6	54.0 Hop	-9.4	Horiz
6	960.000M QP	9.5	+30.7 +1.6	+2.4	+0.3	+0.0	+0.0	44.5	54.0 SC	-9.5	Horiz
^	960.000M	14.1	+30.7 +1.6	+2.4	+0.3	+0.0	+0.0	49.1	54.0 Hop	-4.9	Horiz
^	960.000M	11.7	+30.7 +1.6	+2.4	+0.3	+0.0	+0.0	46.7	54.0 SC	-7.3	Horiz
9	902.000M	38.5	+29.6 +1.5	+2.3	+0.3	+0.0	+0.0	72.2	92.5 SC	-20.3	Horiz
10	902.000M	38.5	+29.6 +1.5	+2.3	+0.3	+0.0	+0.0	72.2	92.5 Hop	-20.3	Horiz
11	928.000M	36.8	+30.6 +1.6	+2.4	+0.3	+0.0	+0.0	71.7	92.5 Hop	-20.8	Horiz
12	928.000M	36.3	+30.6 +1.6	+2.4	+0.3	+0.0	+0.0	71.2	92.5 SC	-21.3	Horiz

Test Setup Photo(s)

Below 1GHz

Above 1GHz, View #1

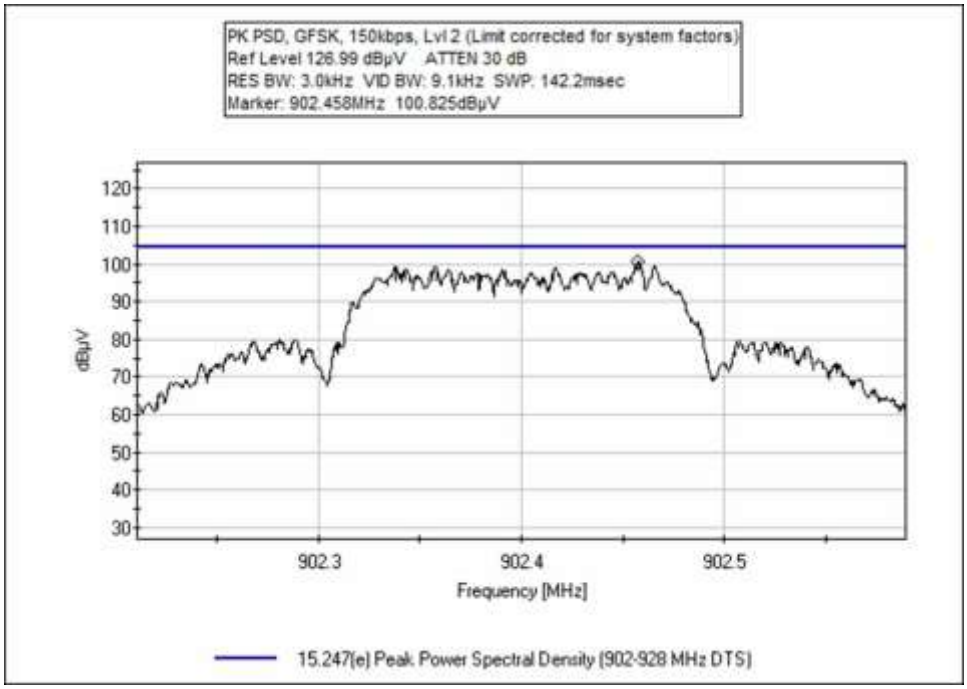


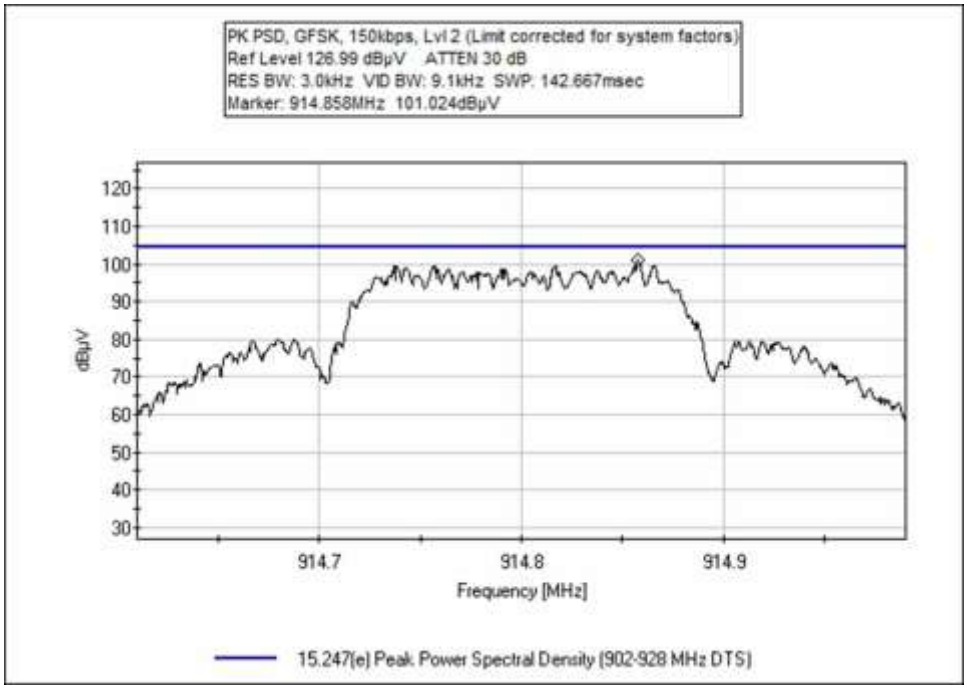
Above 1GHz, View #2

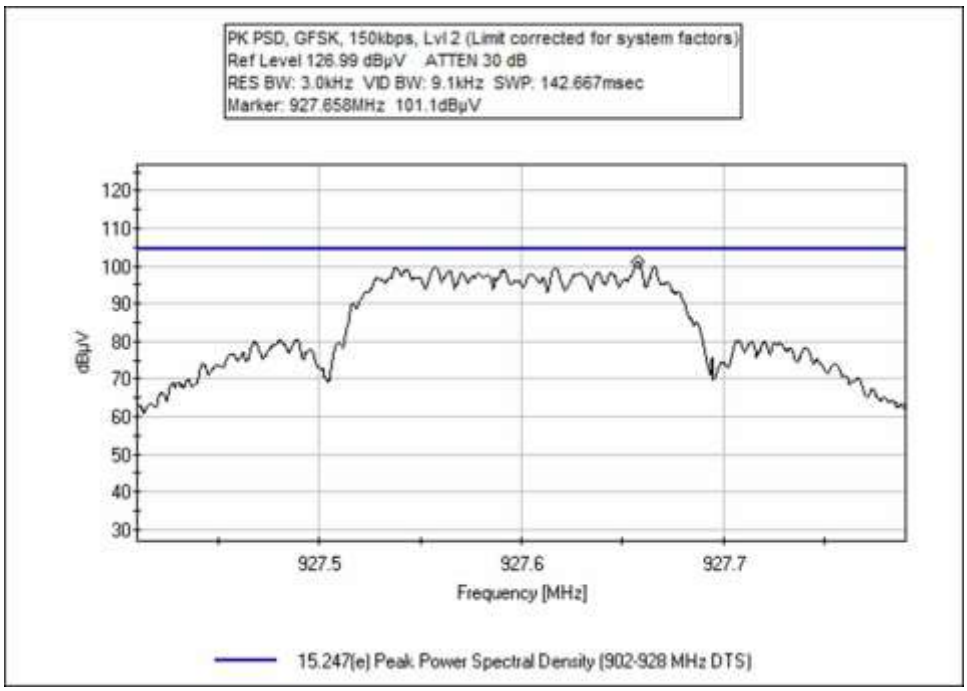
15.247(f) Hybrid Systems Power Spectral Density

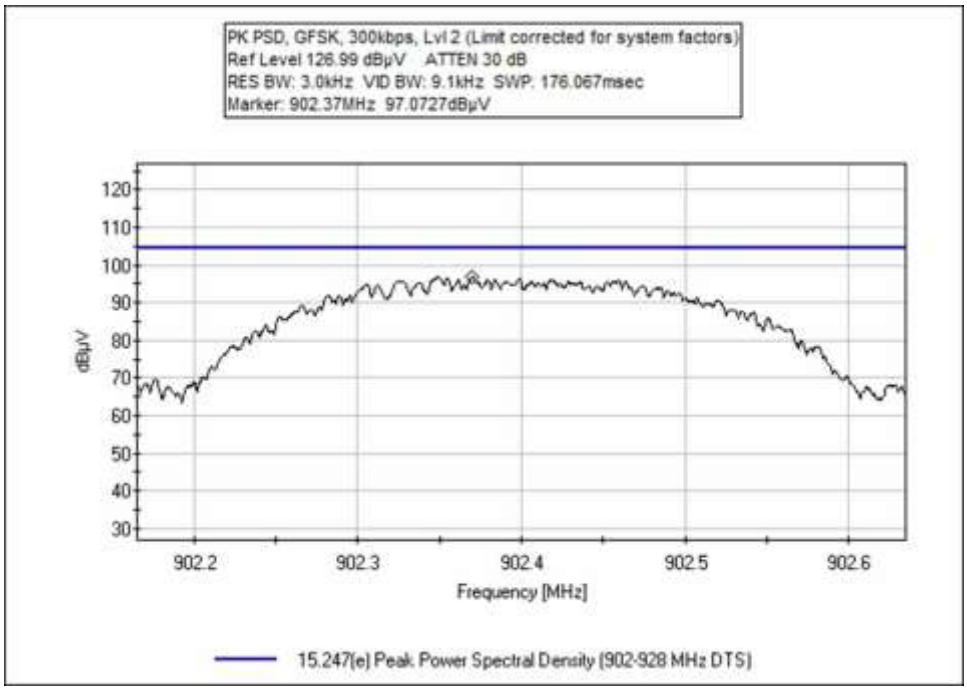
Test Data Summary - RF Conducted Measurement				
Measurement Method: PKPSD				
Frequency (MHz)	**Modulation**	**Measured (dBµV/3kHz)**	**Limit (dBµV /3kHz)**	**Results**
902.4	GFSK 150kbps	111.2	≤115	Pass
914.8	GFSK 150kbps	111.4	≤115	Pass
927.6	GFSK 150kbps	111.5	≤115	Pass
902.4	GFSK 300kbps	107.5	≤115	Pass
914.8	GFSK 300kbps	107.7	≤115	Pass
927.6	GFSK 300kbps	107.8	≤115	Pass

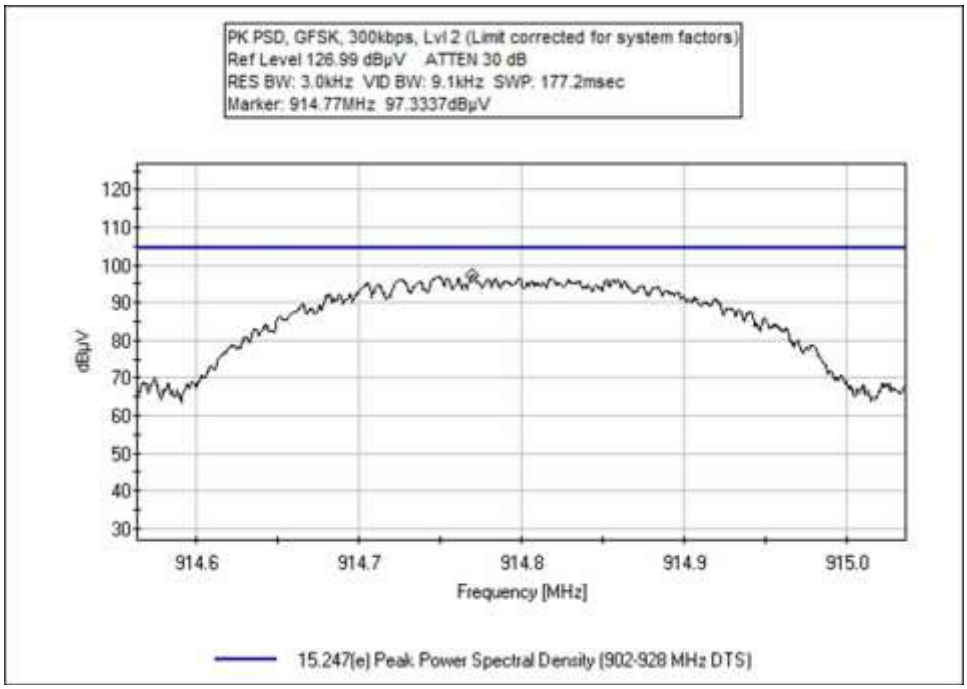
Plots

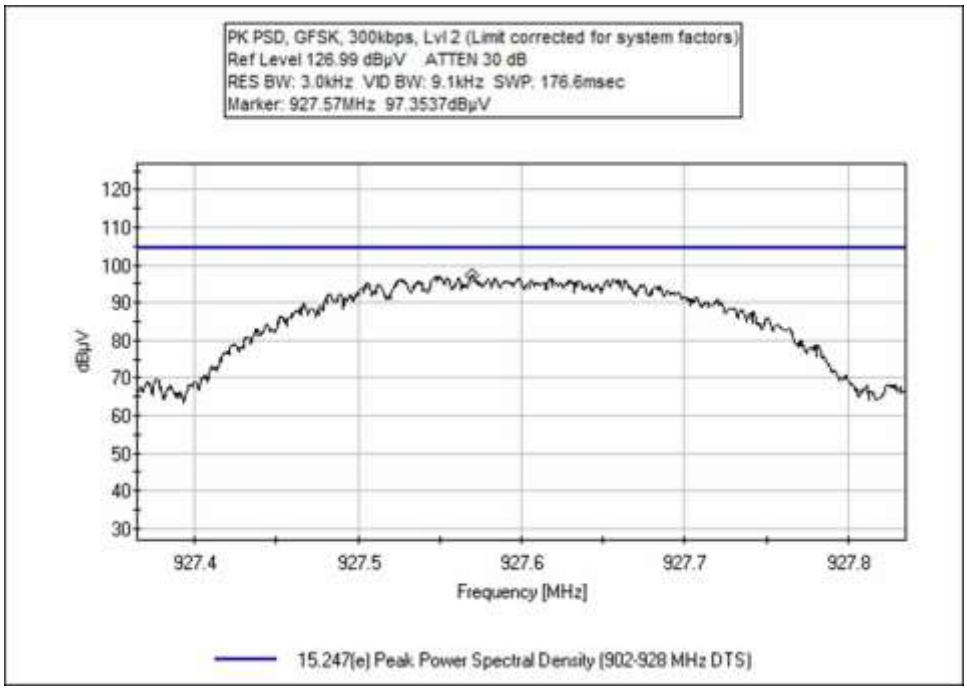



PK PSD, GFSK, 150kbps, Lvl 2 (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 3.0kHz VID BW: 9.1kHz SWP: 142.667msec
Marker: 914.858MHz 101.024dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
914.7
914.8
914.9
Frequency [MHz]
15.247(e) Peak Power Spectral Density (902-928 MHz DTS)


PK PSD, GFSK, 150kbps, Lvl 2 (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 3.0kHz VID BW: 9.1kHz SWP: 142.667msec
Marker: 927.658MHz 101.1dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
927.5
927.6
927.7
Frequency [MHz]
15.247(e) Peak Power Spectral Density (902-928 MHz DTS)


PK PSD, GFSK, 300kbps, Lvl 2 (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 3.0kHz VID BW: 9.1kHz SWP: 176.067msec
Marker: 902.37MHz 97.0727dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
902.2
902.3
902.4
902.5
902.6
Frequency [MHz]
15.247(e) Peak Power Spectral Density (902-928 MHz DTS)


PK PSD, GFSK, 300kbps, Lvl 2 (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 3.0kHz VID BW: 9.1kHz SWP: 177.2msec
Marker: 914.77MHz 97.3337dBµV
dBµV
120
110
100
90
80
70
60
50
40
30
914.6
914.7
914.8
914.9
915.0
Frequency [MHz]
15.247(e) Peak Power Spectral Density (902-928 MHz DTS)


PK PSD, GFSK, 300kbps, Lvl 2 (Limit corrected for system factors)
Ref Level 126.99 dBµV ATTEN 30 dB
RES BW: 3.0kHz VID BW: 9.1kHz SWP: 176.6msec
Marker: 927.57MHz 97.3537dBµV
120
110
100
90
80
70
60
50
40
30
dBµV
927.4
927.5
927.6
927.7
927.8
Frequency [MHz]
15.247(e) Peak Power Spectral Density (902-928 MHz DTS)

Test Setup / Conditions / Data

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(e) Peak Power Spectral Density (902-928 MHz DTS)**		
Work Order #:	**107652**	Date:	2/4/2023
Test Type:	**Conducted Emissions**	Time:	10:34:24
Tested By:	Matt Harrison	Sequence#:	58
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

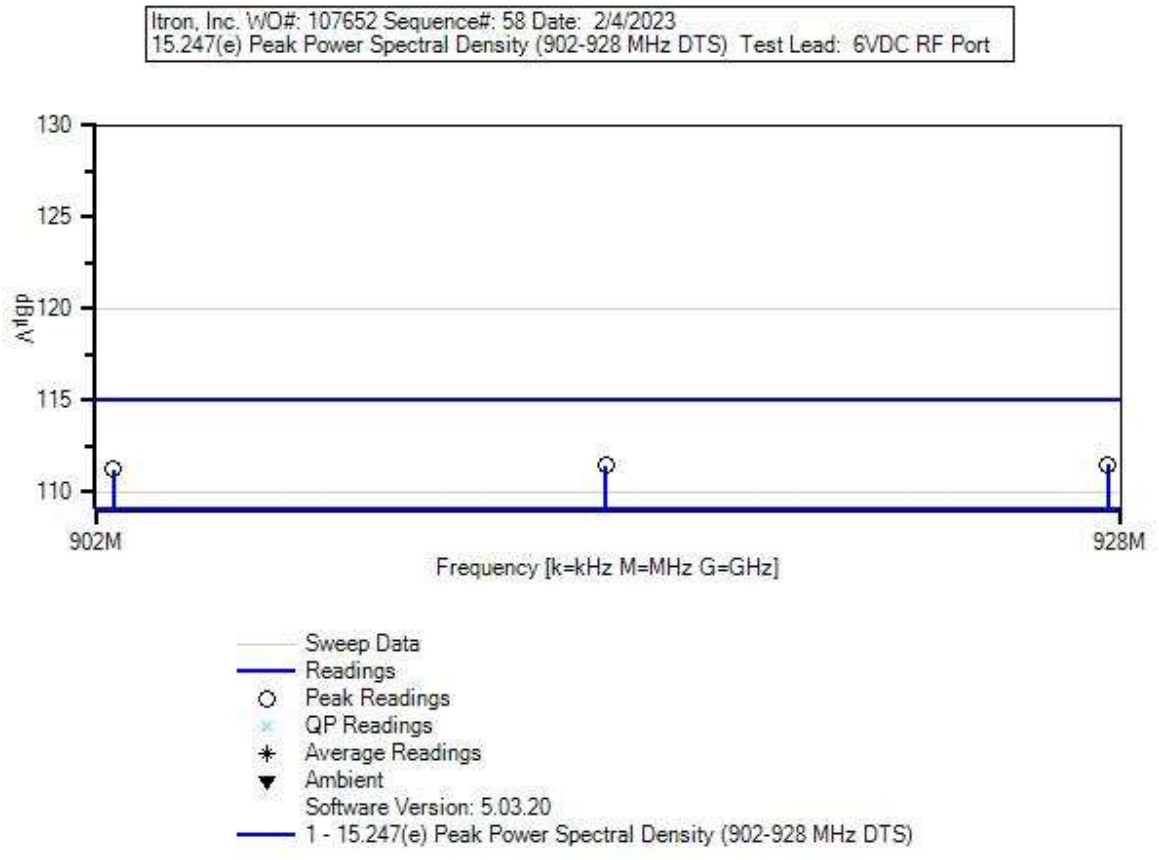
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 914.8, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 150kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

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	927.658M	101.1	+10.1	+0.3			+0.0	111.5	115.0	-3.5	RF Po
2	914.858M	101.0	+10.1	+0.3			+0.0	111.4	115.0	-3.6	RF Po
3	902.458M	100.8	+10.1	+0.3			+0.0	111.2	115.0	-3.8	RF Po

Test Location:	CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(e) Peak Power Spectral Density (902-928 MHz DTS)**		
Work Order #:	**107652**	Date:	2/4/2023
Test Type:	**Conducted Emissions**	Time:	10:24:22
Tested By:	Matt Harrison	Sequence#:	57
Software:	EMITest 5.03.20		6VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

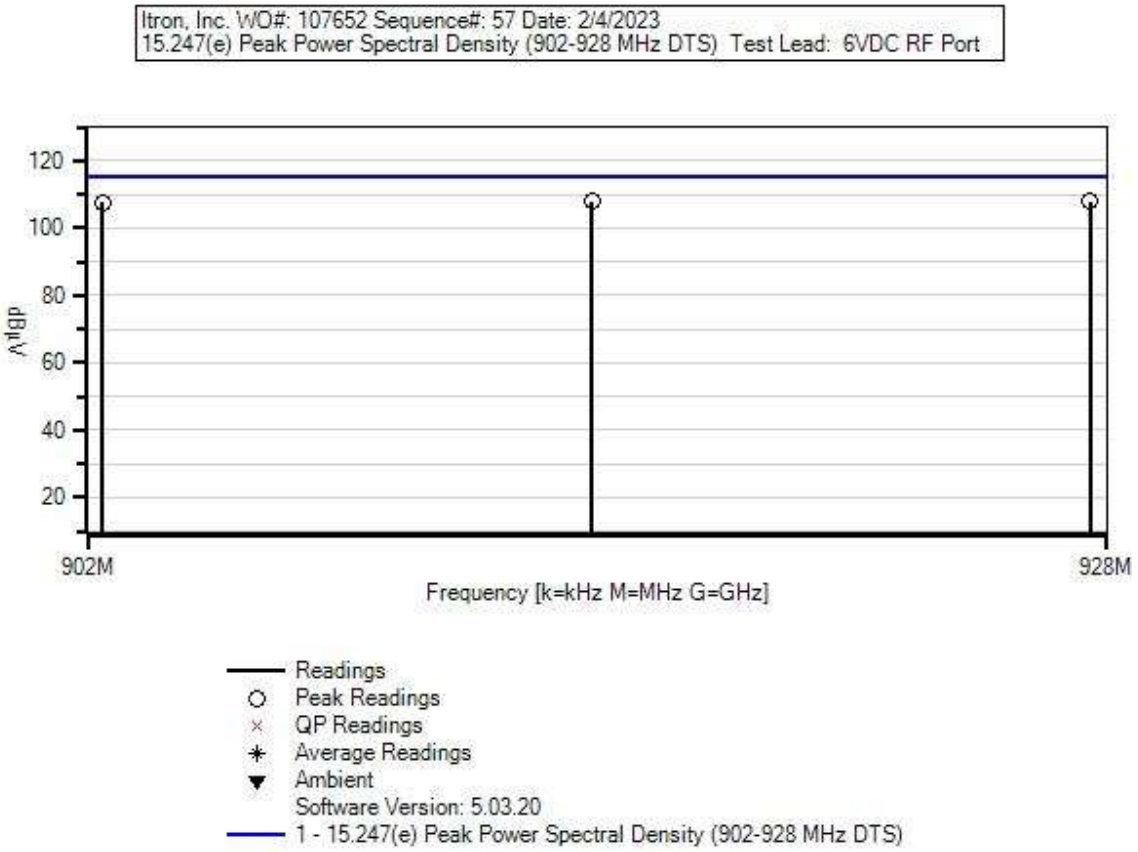
Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Environmental Conditions:
Temperature: 18.6°C
Pressure: 100.9 kPa
Humidity: 40%

Frequency Range: Fundamental
Frequency tested: 902.4, 914.8, 927.6
Firmware power setting: Level 2
EUT Firmware:
Protocol /MCS/Modulation: **GFSK, 300kbps**

Test Method: ANSI C63.10: 2013
Test Mode: Transmitting
Test Setup: EUT is setup for conducted measurement. It is directly connected to the Analyzer via cable and attenuator
Modifications Added: None



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05503	Attenuator	766-10	6/8/2021	6/8/2023
T2	ANP06540	Cable	Heliax	1/17/2022	1/17/2024
	AN03807	Spectrum Analyzer	E4440A	10/6/2022	10/6/2024

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	927.570M	97.4	+10.1	+0.3			+0.0	107.8	115.0	-7.2	RF Po
2	914.770M	97.3	+10.1	+0.3			+0.0	107.7	115.0	-7.3	RF Po
3	902.370M	97.1	+10.1	+0.3			+0.0	107.5	115.0	-7.5	RF Po

Test Setup Photo(s)

Appendix A: Manufacturer Declaration

The following model have been tested by CKC Laboratories:
Device: Intelis Gas
Model: ERG-7300-312

The Intelis Gas, Model: ERG-7300-312 are representative of worst-case testing of the following models per the manufacturer:

The manufacturer declares that the following additional models are identical electrically or any differences between them do not affect their EMC characteristics, and therefore meets the level of testing equivalent to the tested model.

Equivalent Models:

Device	Manufacturer	Model #
Intelis Gas	Itron, Inc.	MTR-7300 (425 – 8.25”)
Intelis Gas	Itron, Inc.	MTR-7300 (425-6”)
Intelis Gas	Itron, Inc.	MTR-7400 (250)
Intelis Gas	Itron, Inc.	MTR-7500 (250 w/Pressure Sensor)

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.