ITRON, INC.
TEST REPORT

SCOPE OF WORK
RADIO TESTING – RIVA HW 4.1 METER MODULE C2PC (DSS)

REPORT NUMBER
106366295ATL-001

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RADIO TEST REPORT

Report Number:	**106366295ATL-001**
Project Number:	**G106366295**
Report Revision Date:	**23 January 2026**
Model(s) Tested:	**ACT2**
FCC ID:	**SK9ACT2**
IC:	**864G-ACT2**
Standards:	**47 CFR Part 15 Subpart C, 15.247** **RSS-247, Issue 4** **ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024** **+ Errata to C63.10a-2024**

Test Location

Intertek
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096 USA
FCC Designation: US1046
CAB Designator: US0128

Client

Itron Inc.
313 North Hwy 11
West Union, SC 29696-2706 USA

Report prepared by

Jeremy Pickens / Senior Staff Engineer

Report reviewed by

Uri Spector / Sr. EMC Staff Engineer

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Table of Contents

1 Introduction and Conclusion

The tests indicated in Section 2 were performed on the product constructed as described in Section 4. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test Description	Test Specification		Result
		FCC	ISED	
5	20dB and 99% Bandwidth	15.247(a)(1)	RSS-247 S6.2.2.1	Compliant
6	Peak Output Power	15.247(b)(2)	RSS-247 S6.2.2.2	Compliant
7	Carrier Frequency Separation	15.247(a)(1)	RSS-247 S6.2.1(b)	Compliant
8	Number of Hopping Channels	15.247(a)(1)(i)	RSS-247 S6.2.2.1	Compliant
9	Channel Dwell Time	15.247(a)(1)(i)	RSS-247 S6.2.2.1	Compliant
10	Conducted Spurious Emissions / Band Edge	15.247(d)	RSS-247 S6.6	Compliant
11	Radiated Spurious Emissions	15.205(a), 15.209(a)	RSS-GEN S8.9-8.10	Compliant
NA	AC Conducted Emissions	15.207	RSS-GEN S8.8	NS[1]
NA	Antenna Requirement	15.203	RSS-GEN S6.8	Compliant[2]

1) There have been no hardware changes since the initial module certification.
2) The antenna is a ¼ Wave Embedded Slot Antenna which is not removable by the end user.

3 Client Information

This evaluation was performed at the request of:

Client: Itron Inc.
313 North Hwy 11
West Union, SC 29696-2706 USA

Contact: Christopher O'Steen

Email: christopher.o'steen@itron.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Itron Inc.
313 North Hwy 11
West Union, SC 29696-2706 USA

Equipment Under Test			
Description	**Manufacturer**	**Model Number**	**Serial Number**
Electricity Meter Module	Itron, Inc.	ACT2	105100513370

Receive Date:	28 October 2025
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The Itron ACT2 is an electricity metering module which includes a 902.3 to 927.6MHz transmitter as well as 2.4GHz WLAN. The module operates on 24Vdc which is supplied by a host device.

Certification Purpose
Class 2 Permissive Change: Itron has added additional data rates and modulations to the existing certification.

Radio/Receiver Characteristics	
Frequency Range / Number of Channels	FSK/50kbps: 902.4 – 927.6MHz, 64 Channels[1] FSK/100kbps: 902.3 – 926.9MHz, 83 Channels FSK/150kbps: 902.3 – 926.9MHz, 64 Channels[1] DSS/12.5kbps: 902.4 – 927.6MHz, 64 Channels[1] GFSK/150kbps: 902.3 – 926.9MHz, 83 Channels GFSK/200kbps: 902.3 – 926.9MHz, 83 Channels GFSK/300kbps: 902.4 – 927.6MHz, 64 Channels OFDM/200kbps: 902.4 – 927.6MHz, 64 Channels[1] OFDM/600kbps: 902.4 – 927.6MHz, 64 Channels[1] Hybrid OFDM/1200kbps: 902.8 – 926.8MHz, 31 Channels[1] DTS OFDM/1200kbps: 903.2 – 926.0MHz, 20 Channels[2] DTS OFDM/2400kbps: 903.2 – 926.0MHz, 20 Channels[2]
Data Rate / Modulation Type(s)	DSS: 12.5kbps FSK: 50kbps/100kbps/150kbps GFSK: 150kbps/200kbps/300kbps OFDM: 200kbps/600kbps/1200kbps/2400kbps
Channel Separation:	DSS: 12.5kbps / FSK: 50kbps/150kbps / GFSK: 300kbps / OFDM: 200kbps/600kbps (400kHz) FSK: 100kbps / GFSK: 150kbps/200kbps (300kHz) Hybrid OFDM: 1200kbps (800kHz) DTS OFDM: 1200kbps/2400kbps (1200kHz)
Maximum Conducted Output Power:	29.47dBm
Equipment Type	Single Module - Mobile
Antenna Type and Gain	¼ Wave Embedded Slot Antenna (2.5dBi) (Provided by Itron - Intertek takes no responsibility for the accuracy of this information.)

1) Previously certified data rates and channel usages
2) Note the DTS operations results are reported in a separate test report.

Software

No.	Description of EUT Software
1	MPU Firmware: Rel 10.9.507

4.1 Justification

All testing performed in this report was for the radio only.

For this evaluation, limited testing was performed to address the addition of new data rates and channel spacings. This report is specific to the FSK 100k and GFSK 150k/200k/300k FHSS operations.

For antenna port measurements, the ACT2 was directly connected to the test instruments using a u.fl to SMA adapter cable. The module was powered by a regulated 24V DC supply and transmit test commands were sent via the WiFi interface to the radio.

For radiated emission measurements the DUT was placed on a non-conductive platform (80cm or 1.5meters depending on the frequency range. The EUT was tested at low, mid, and high channels with the module oriented in three different axes. The test modes for all modulations produced a 100% duty cycle. The worst-case data is reported.

Software Setting for Power: 30 dBm

The new FSK 100kbps and GFSK 150kbps data rates were used as worst-case modulations during radiated spurious emissions measurements.

4.2 Modifications Required for Compliance

No modifications were made during compliance testing in order to bring the product into compliance.

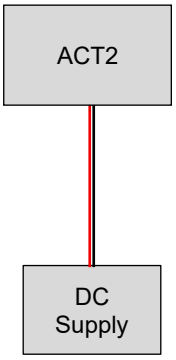
4.3 Additions, Deviations and Exclusions from Standards

No additions, deviations or exclusion have been made from standard.

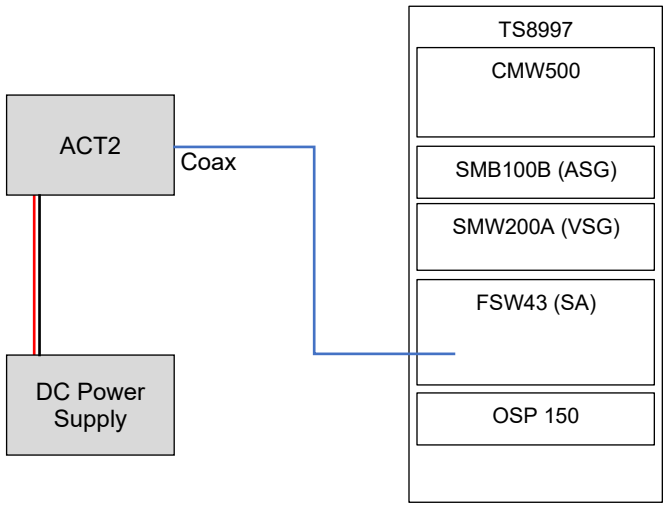
4.4 Method

Configuration as required by ANSI C63.10.

4.5 EUT Block Diagram – Radiated Measurements



4.6 EUT Block Diagram – Conducted Measurements



5 Bandwidth

5.1 Method

The procedures from ANSI C63.10 Clauses 6.9.2 and 6.9.3 were used to measure the 20dB and 99% Occupied Bandwidths.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

5.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

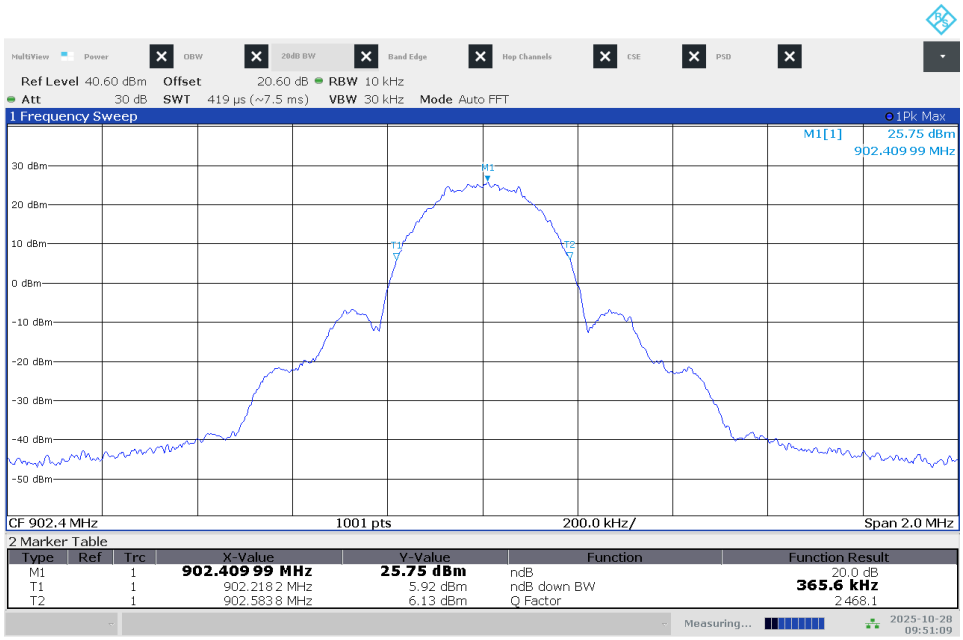
Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

5.3 Test Data

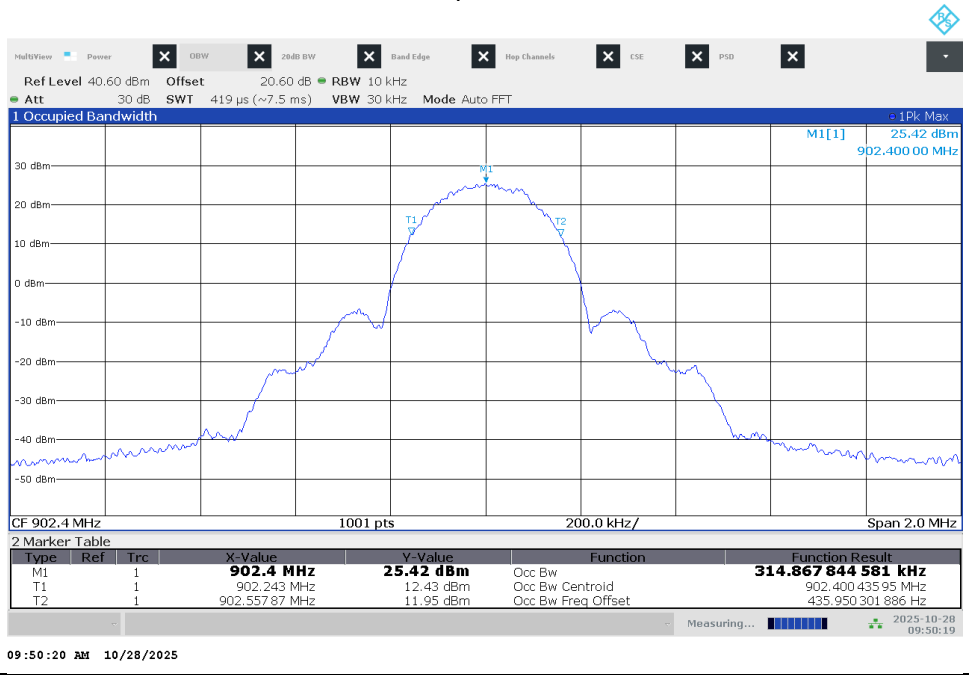
Modulation / Data Rate	Frequency (MHz)	20dB Bandwidth (kHz)	99% OBW (kHz)	Result
100kbps / FSK	902.3	130.87	117.718	Reported
100kbps / FSK	915.2	129.87	118.146	Reported
100kbps / FSK	926.9	130.37	117.428	Reported
150kbps / GFSK	902.3	183.8	160.168	Reported
150kbps / GFSK	915.2	187.8	159.974	Reported
150kbps / GFSK	926.9	186.8	159.624	Reported
200kbps / GFSK	902.3	239.8	210.616	Reported
200kbps / GFSK	915.2	244.8	209.981	Reported
200kbps / GFSK	926.9	241.8	208.894	Reported
300kbps / GFSK	902.4	365.6	314.868	Reported
300kbps / GFSK	915.2	365.6	315.105	Reported
300kbps / GFSK	927.6	361.6	313.605	Reported

Sample Plots – 300kbps GFSK, Low Channel

20dB Bandwidth



99% Occupied Bandwidth



Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6ºC
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

6 Peak Output Power

6.1 Method

The procedures from ANSI C63.10 Clause 7.8.5 were used to measure the peak output power.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

6.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

6.3 Results

The sample tested was found to Comply.

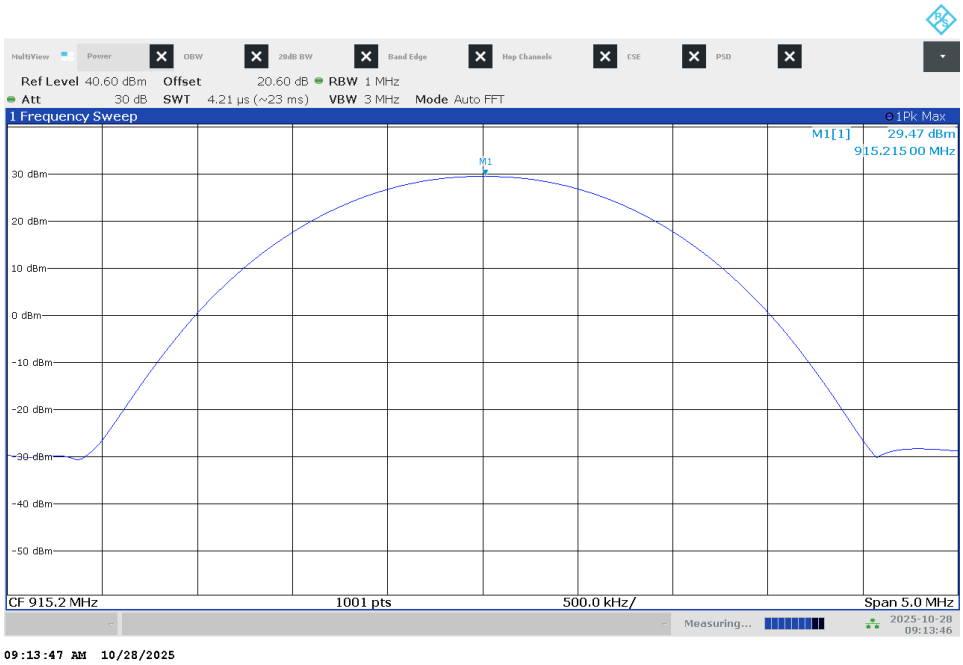
6.4 Test Data

Mode	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
100kbps / FSK	902.3	29.31	30	Pass
100kbps / FSK	915.2	29.47	30	Pass
100kbps / FSK	926.9	29.16	30	Pass
150kbps / GFSK	902.3	29.08	30	Pass
150kbps / GFSK	915.2	29.44	30	Pass
150kbps / GFSK	926.9	29.12	30	Pass
200kbps / GFSK	902.3	29.16	30	Pass
200kbps / GFSK	915.2	29.43	30	Pass
200kbps / GFSK	926.9	29.09	30	Pass
300kbps / GFSK	902.4	29.07	30	Pass
300kbps / GFSK	915.2	29.40	30	Pass
300kbps / GFSK	927.6	29.05	30	Pass

Mode	Frequency (MHz)	Conducted Peak Power	Antenna Gain (dBi)	EIRP (dBm)	IC EIRP Limit (dBm)	Result
100kbps / FSK	902.3	29.31	2.5	31.81	34	Pass
100kbps / FSK	915.2	29.47	2.5	31.97	34	Pass
100kbps / FSK	926.9	29.16	2.5	31.66	34	Pass
150kbps / GFSK	902.3	29.08	2.5	31.58	34	Pass
150kbps / GFSK	915.2	29.44	2.5	31.94	34	Pass
150kbps / GFSK	926.9	29.12	2.5	31.62	34	Pass
200kbps / GFSK	902.3	29.16	2.5	31.66	34	Pass
200kbps / GFSK	915.2	29.43	2.5	31.93	34	Pass
200kbps / GFSK	926.9	29.09	2.5	31.59	34	Pass
300kbps / GFSK	902.4	29.07	2.5	31.57	34	Pass
300kbps / GFSK	915.2	29.40	2.5	31.90	34	Pass
300kbps / GFSK	927.6	29.05	2.5	31.55	34	Pass

EIRP = Peak Power + Antenna Gain

Sample Plot



Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6°C
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

7 Carrier Frequency Separation

7.1 Method

The procedures from ANSI C63.10 Clause 7.8.2 were used to measure the carrier frequency separation.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

7.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

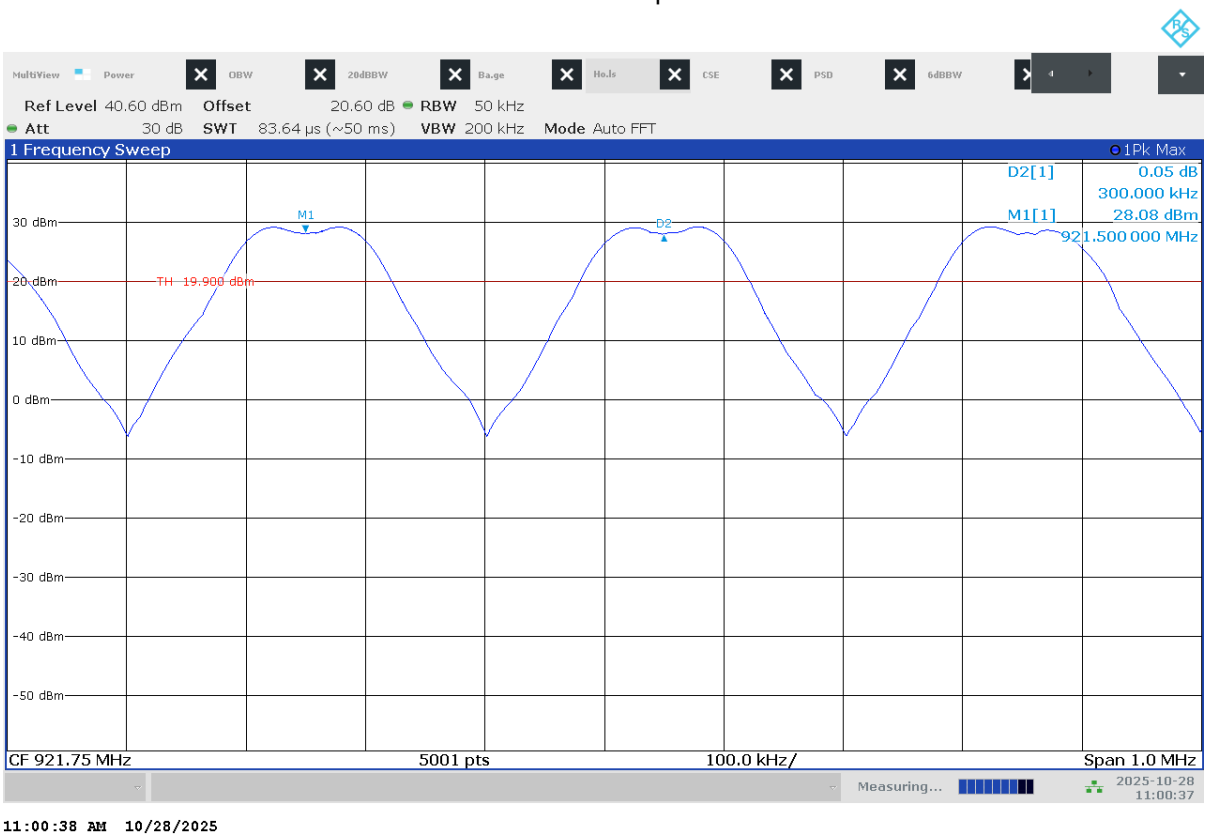
Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

7.3 Results

The sample tested was found to Comply.

7.4 Test Data

FSK 100kbps



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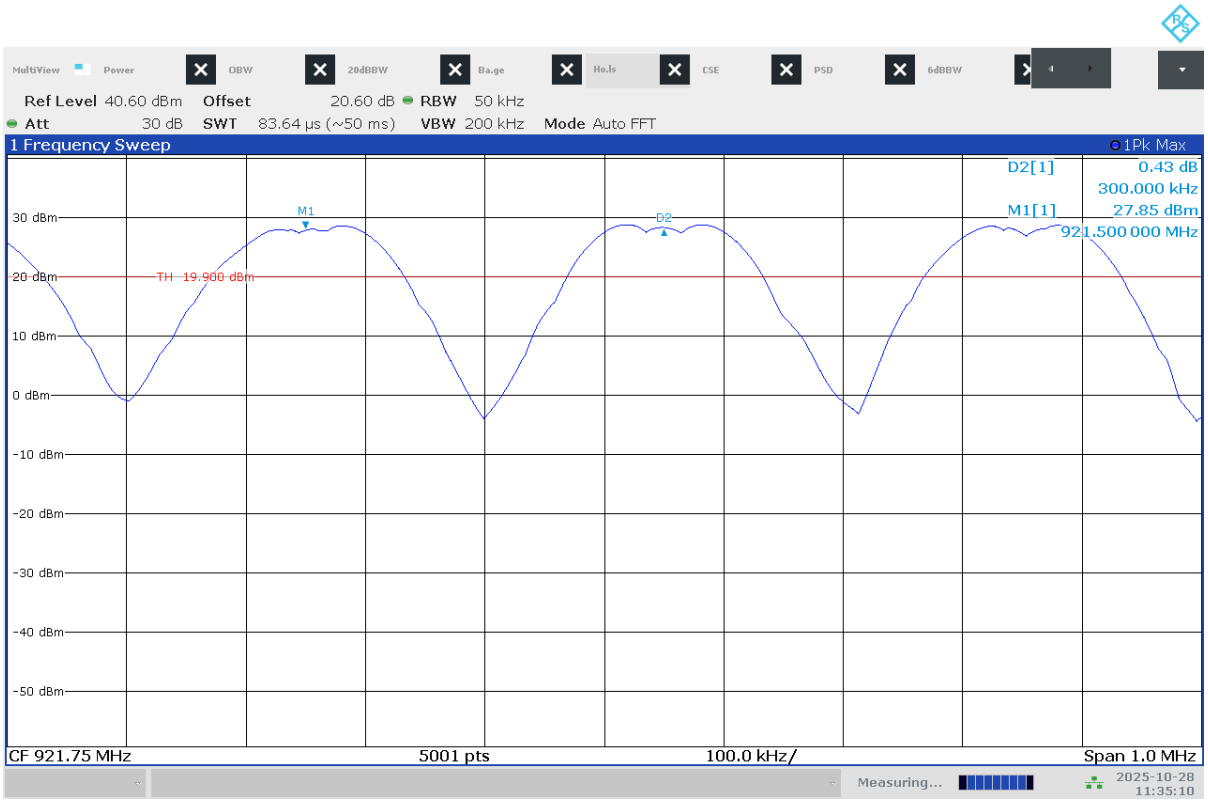

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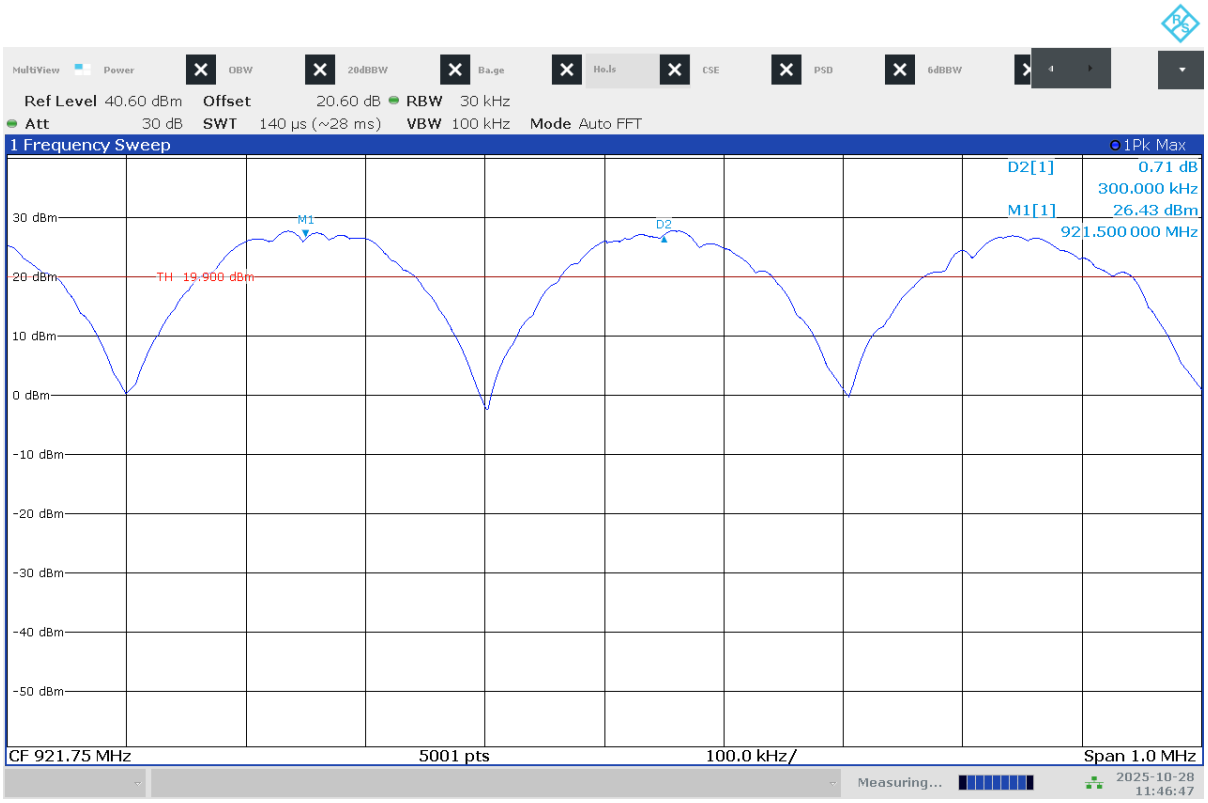
GFSK 200kbps



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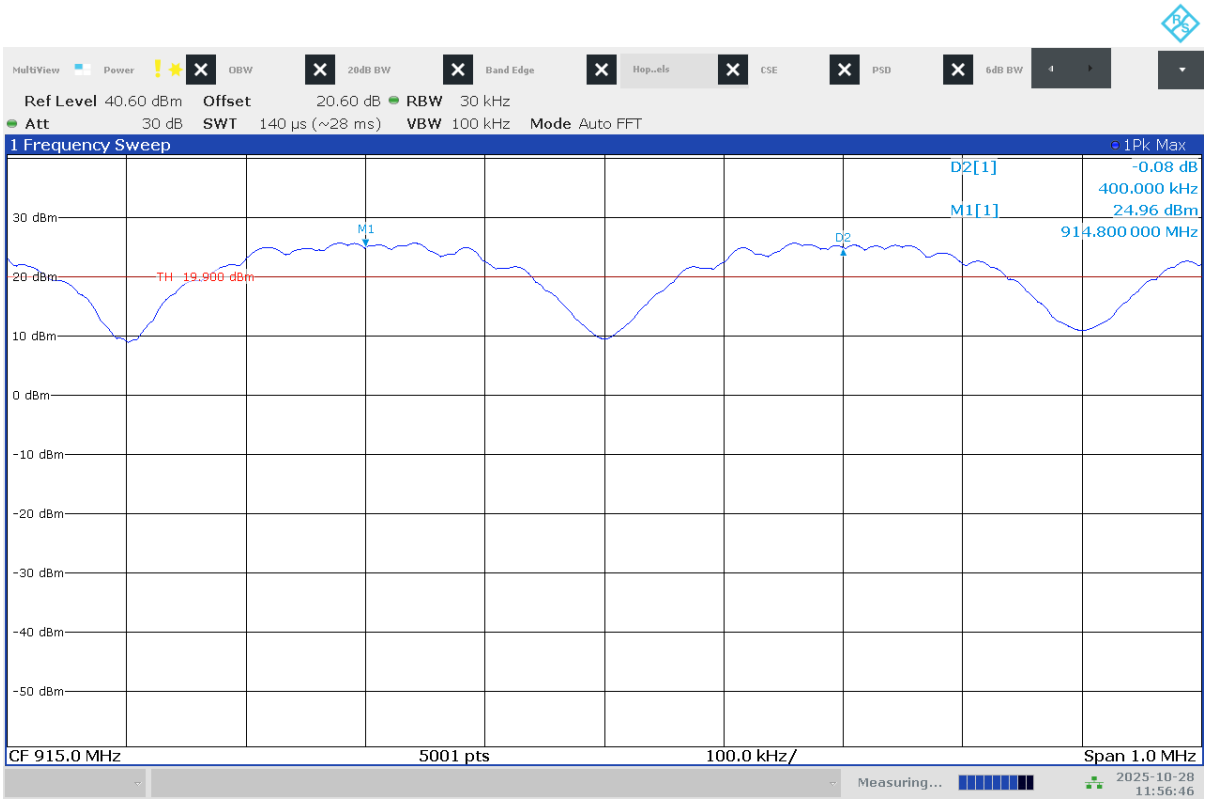
GFSK 300kbps



Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6ºC
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

8 Number of Hopping Channels

8.1 Method

The procedures from ANSI C63.10 Clause 7.8.3 were used to measure the number of hopping channels.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

8.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

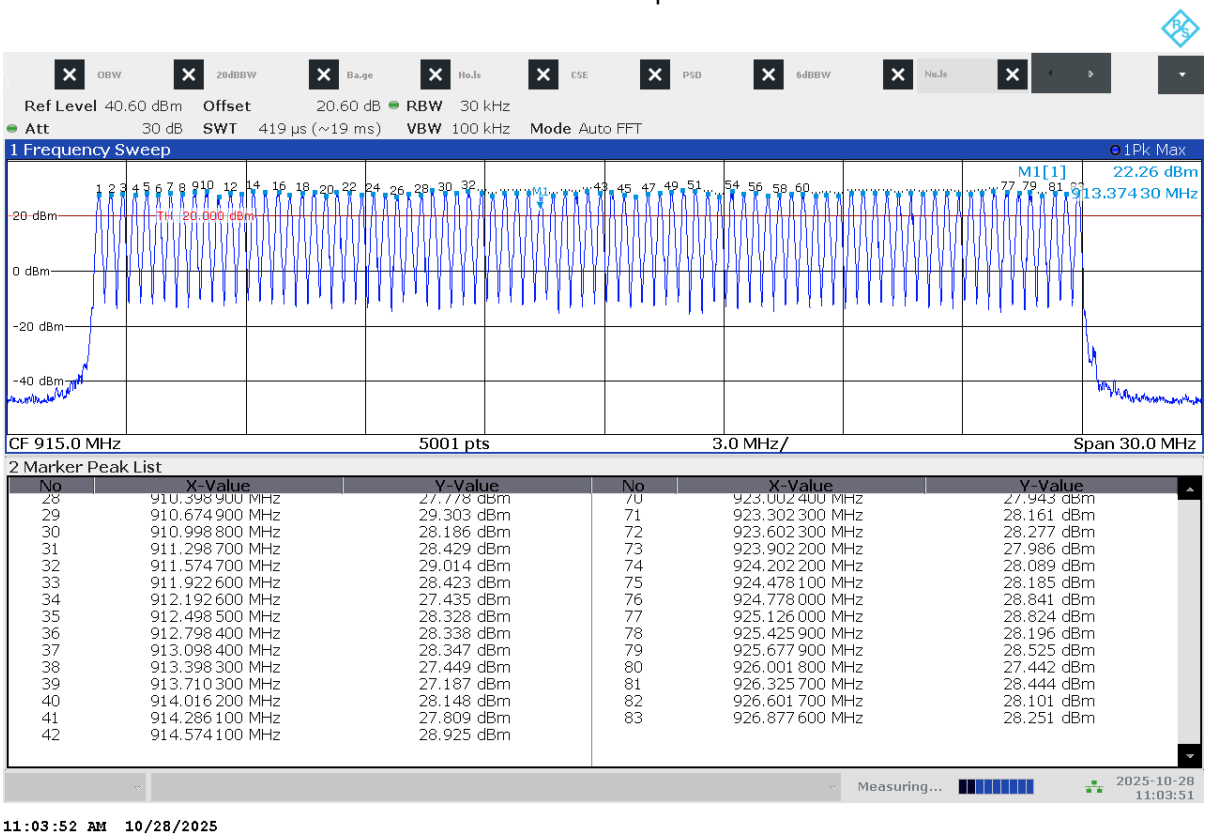
Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

8.3 Results

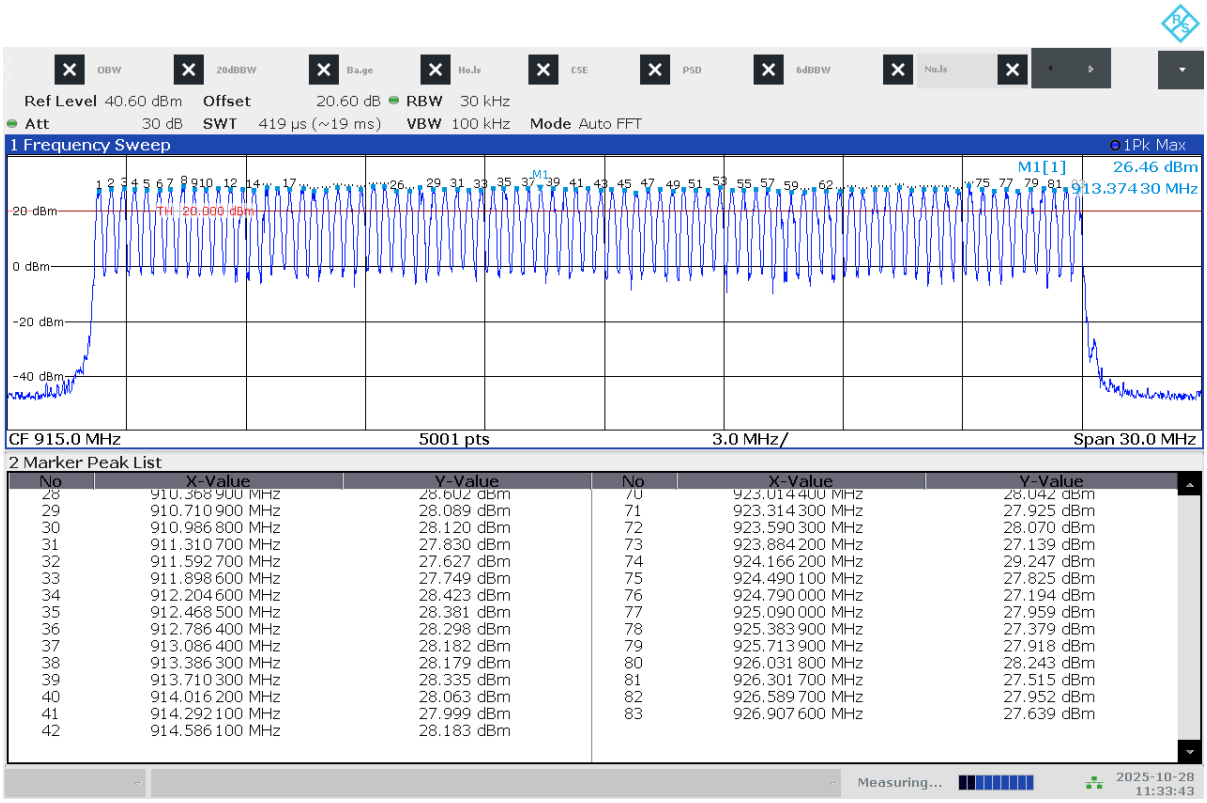
The sample tested was found to Comply.

8.4 Test Data

FSK 100kbps



GFSK 150kbps



No	X-Value	Y-Value	No	X-Value	Y-Value
28	910.368 900 MHz	28.602 dBm	70	923.014 400 MHz	28.042 dBm
29	910.710 900 MHz	28.089 dBm	71	923.314 300 MHz	27.925 dBm
30	910.986 800 MHz	28.120 dBm	72	923.590 300 MHz	28.070 dBm
31	911.310 700 MHz	27.830 dBm	73	923.884 200 MHz	27.139 dBm
32	911.592 700 MHz	27.627 dBm	74	924.166 200 MHz	29.247 dBm
33	911.898 600 MHz	27.749 dBm	75	924.490 100 MHz	27.825 dBm
34	912.204 600 MHz	28.423 dBm	76	924.790 000 MHz	27.194 dBm
35	912.468 500 MHz	28.381 dBm	77	925.090 000 MHz	27.959 dBm
36	912.786 400 MHz	28.298 dBm	78	925.383 900 MHz	27.379 dBm
37	913.086 400 MHz	28.182 dBm	79	925.713 900 MHz	27.918 dBm
38	913.386 300 MHz	28.179 dBm	80	926.031 800 MHz	28.243 dBm
39	913.710 300 MHz	28.335 dBm	81	926.301 700 MHz	27.515 dBm
40	914.016 200 MHz	28.063 dBm	82	926.589 700 MHz	27.952 dBm
41	914.292 100 MHz	27.999 dBm	83	926.907 600 MHz	27.639 dBm
42	914.586 100 MHz	28.183 dBm			

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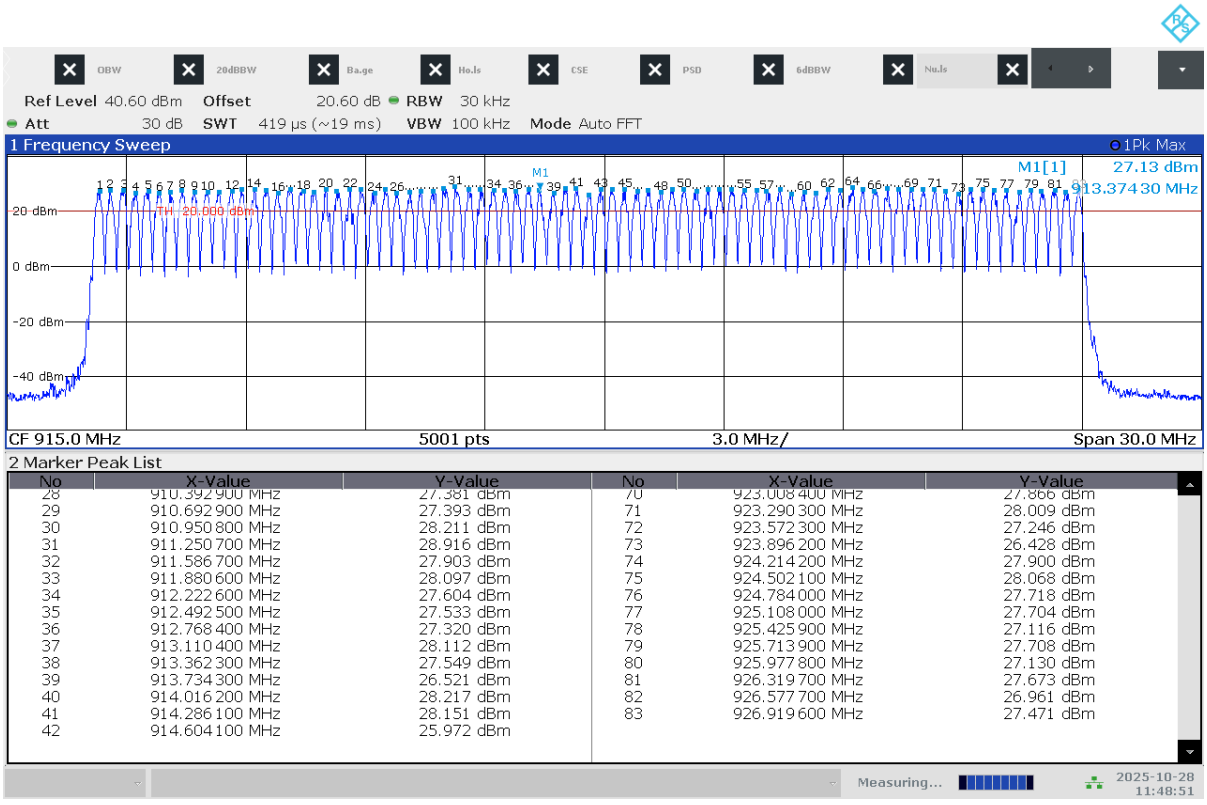
GFSK 200kbps



No	X-Value	Y-Value	No	X-Value	Y-Value
28	910.392 900 MHz	27.381 dBm	70	923.008 400 MHz	27.866 dBm
29	910.692 900 MHz	27.393 dBm	71	923.290 300 MHz	28.009 dBm
30	910.950 800 MHz	28.211 dBm	72	923.572 300 MHz	27.246 dBm
31	911.250 700 MHz	28.916 dBm	73	923.896 200 MHz	26.428 dBm
32	911.586 700 MHz	27.903 dBm	74	924.214 200 MHz	27.900 dBm
33	911.880 600 MHz	28.097 dBm	75	924.502 100 MHz	28.068 dBm
34	912.222 600 MHz	27.604 dBm	76	924.784 000 MHz	27.718 dBm
35	912.492 500 MHz	27.533 dBm	77	925.108 000 MHz	27.704 dBm
36	912.768 400 MHz	27.320 dBm	78	925.425 900 MHz	27.116 dBm
37	913.110 400 MHz	28.112 dBm	79	925.713 900 MHz	27.708 dBm
38	913.362 300 MHz	27.549 dBm	80	925.977 800 MHz	27.130 dBm
39	913.734 300 MHz	26.521 dBm	81	926.319 700 MHz	27.673 dBm
40	914.016 200 MHz	28.217 dBm	82	926.577 700 MHz	26.961 dBm
41	914.286 100 MHz	28.151 dBm	83	926.919 600 MHz	27.471 dBm
42	914.604 100 MHz	25.972 dBm			

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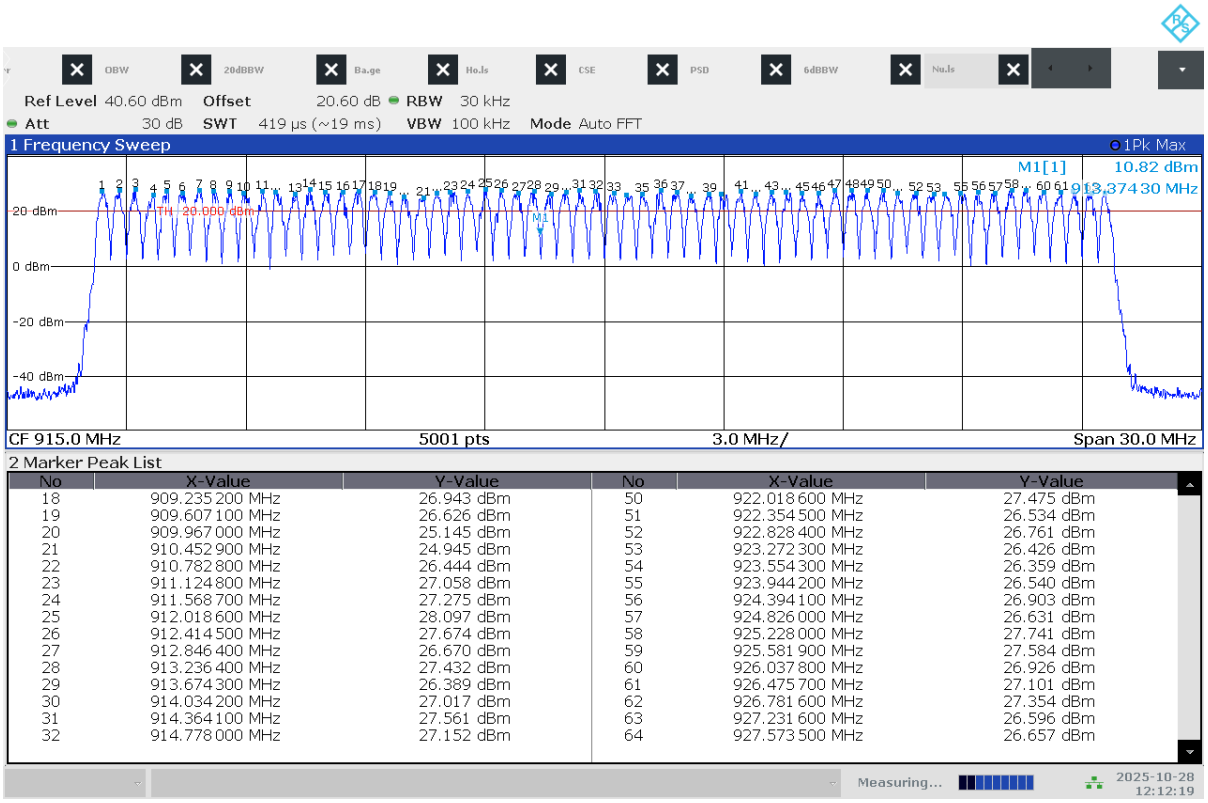
GFSK 300kbps



No	X-Value	Y-Value	No	X-Value	Y-Value
18	909.235 200 MHz	26.943 dBm	50	922.018 600 MHz	27.475 dBm
19	909.607 100 MHz	26.626 dBm	51	922.354 500 MHz	26.534 dBm
20	909.967 000 MHz	25.145 dBm	52	922.828 400 MHz	26.761 dBm
21	910.452 900 MHz	24.945 dBm	53	923.272 300 MHz	26.426 dBm
22	910.782 800 MHz	26.444 dBm	54	923.554 300 MHz	26.359 dBm
23	911.124 800 MHz	27.058 dBm	55	923.944 200 MHz	26.540 dBm
24	911.568 700 MHz	27.275 dBm	56	924.394 100 MHz	26.903 dBm
25	912.018 600 MHz	28.097 dBm	57	924.826 000 MHz	26.631 dBm
26	912.414 500 MHz	27.674 dBm	58	925.228 000 MHz	27.741 dBm
27	912.846 400 MHz	26.670 dBm	59	925.581 900 MHz	27.584 dBm
28	913.236 400 MHz	27.432 dBm	60	926.037 800 MHz	26.926 dBm
29	913.674 300 MHz	26.389 dBm	61	926.475 700 MHz	27.101 dBm
30	914.034 200 MHz	27.017 dBm	62	926.781 600 MHz	27.354 dBm
31	914.364 100 MHz	27.561 dBm	63	927.231 600 MHz	26.596 dBm
32	914.778 000 MHz	27.152 dBm	64	927.573 500 MHz	26.657 dBm

Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6ºC
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

9 Channel Dwell Time

9.1 Method

The procedures from ANSI C63.10 Clause 7.8.4 were used to measure the channel dwell time.

The limit is 0.4 seconds of occupancy within any 20 second period for hopping channels with less than a 250kHz 20dB bandwidth and 0.4 seconds within a 10 second period for channels with a greater than 250kHz 20dB bandwidth.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

9.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

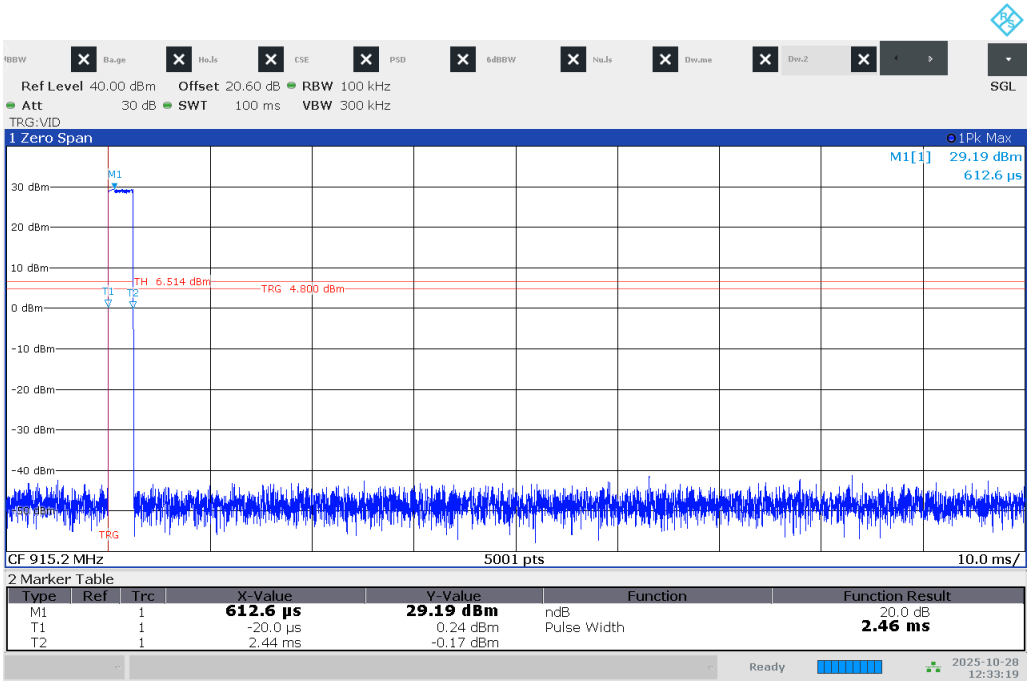
Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

9.3 Results

The sample tested was found to Comply.

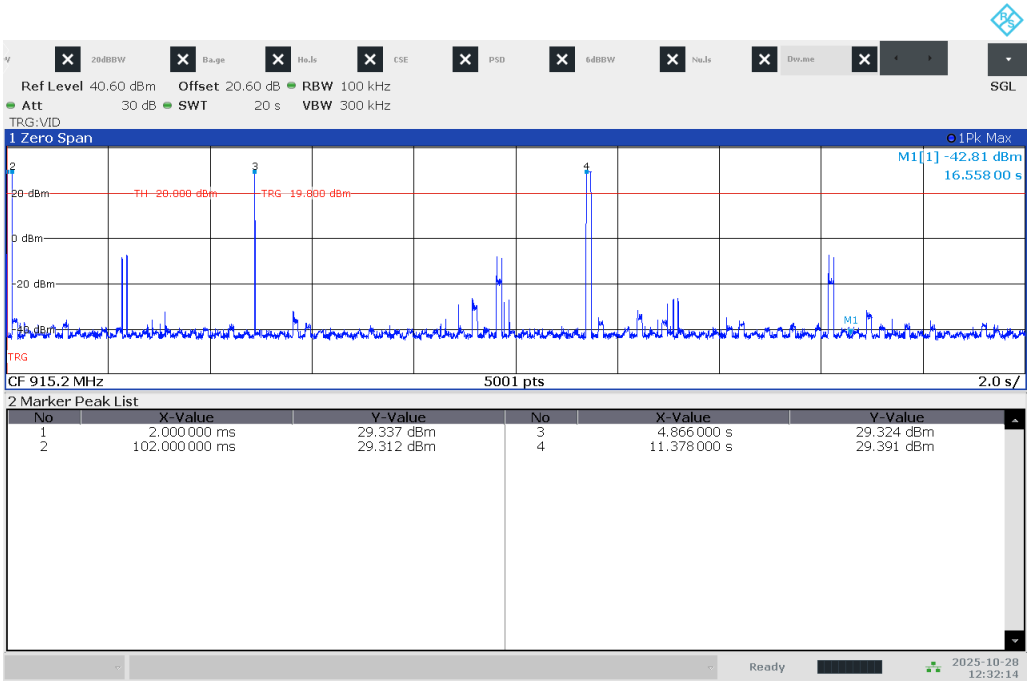
9.4 Test Data – FSK 100k

Single Pulse Width



12:33:20 PM 10/28/2025

Pulses in 20 seconds



12:32:15 PM 10/28/2025

Calculations:

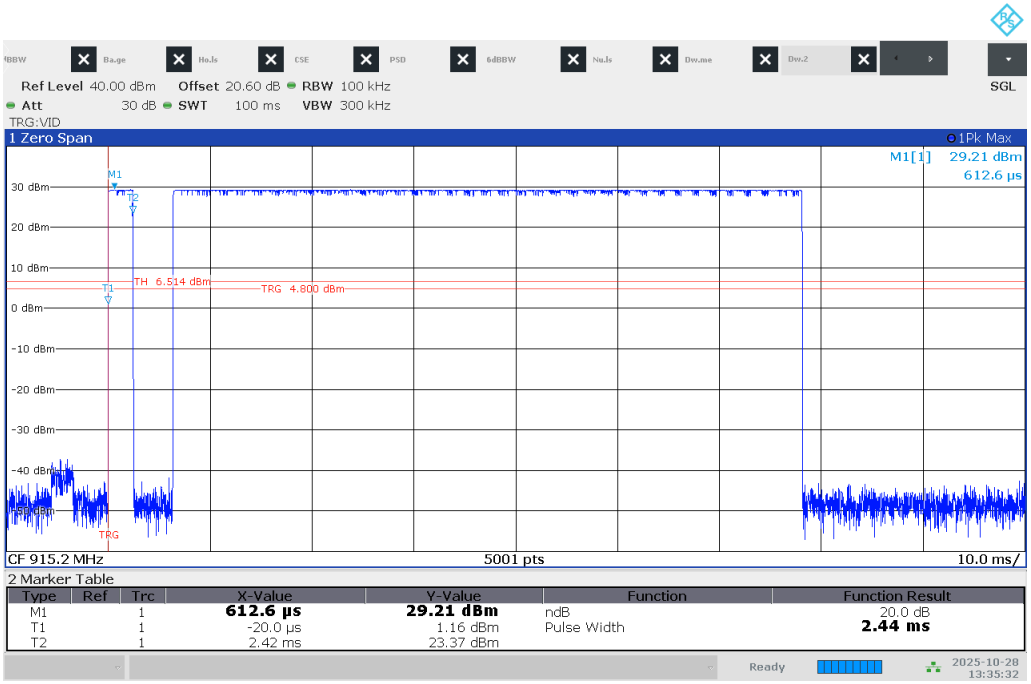
4 pulses in 20 seconds

2.46ms pulse width (0.00246s)

4 * 0.00246 = 0.098s

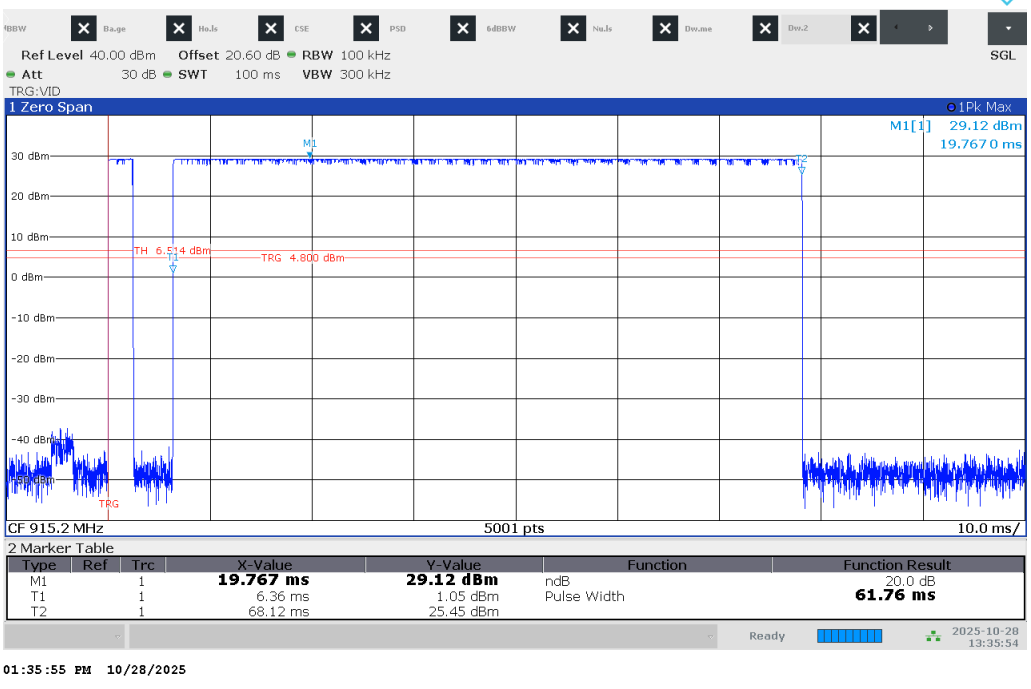
9.5 Test Data – GFSK 150k

Single Pulse Width 1



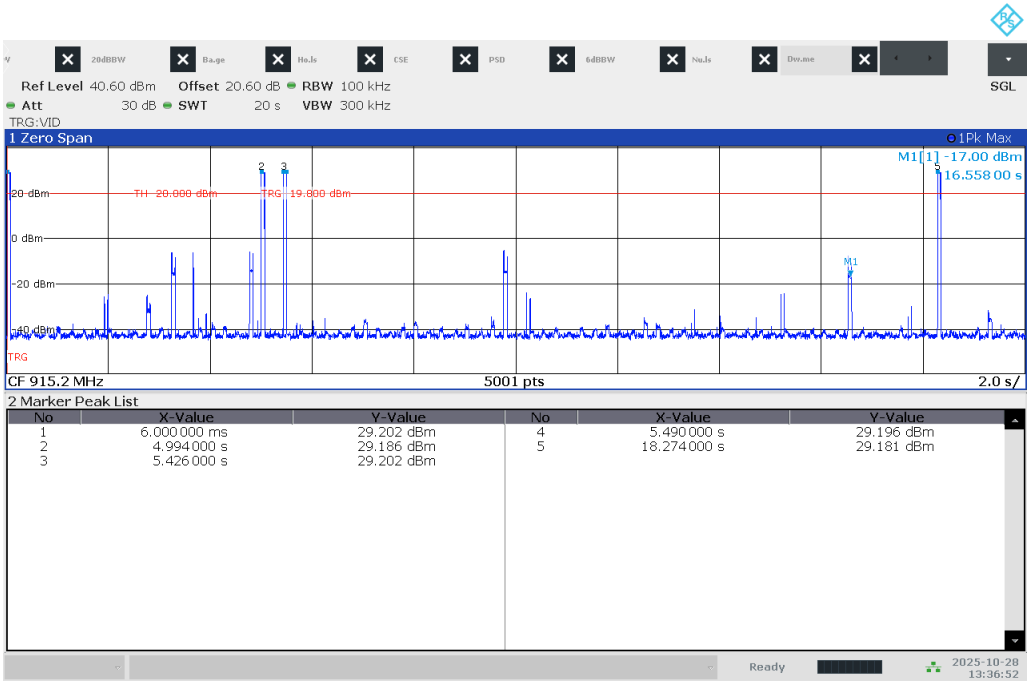
01:35:33 PM 10/28/2025

Single Pulse Width 2



01:35:55 PM 10/28/2025

Pulses in 20 seconds



Calculations:

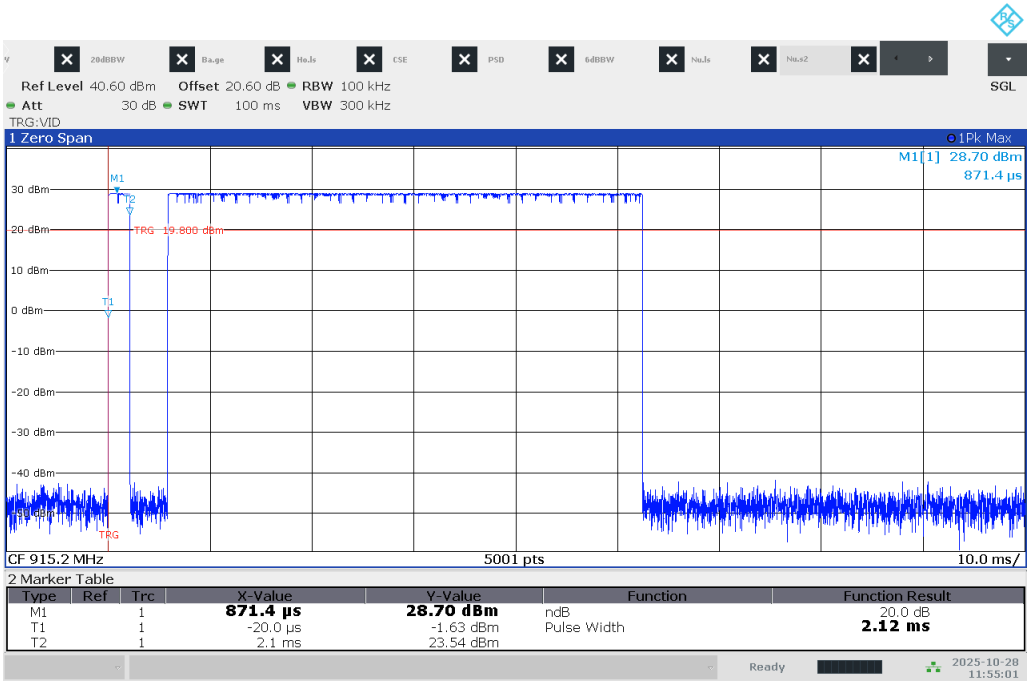
5 pulses in 20 seconds

2.44 + 61.76 ms pulse width (0.0642s)

5 * 0.0642 = 0.321s

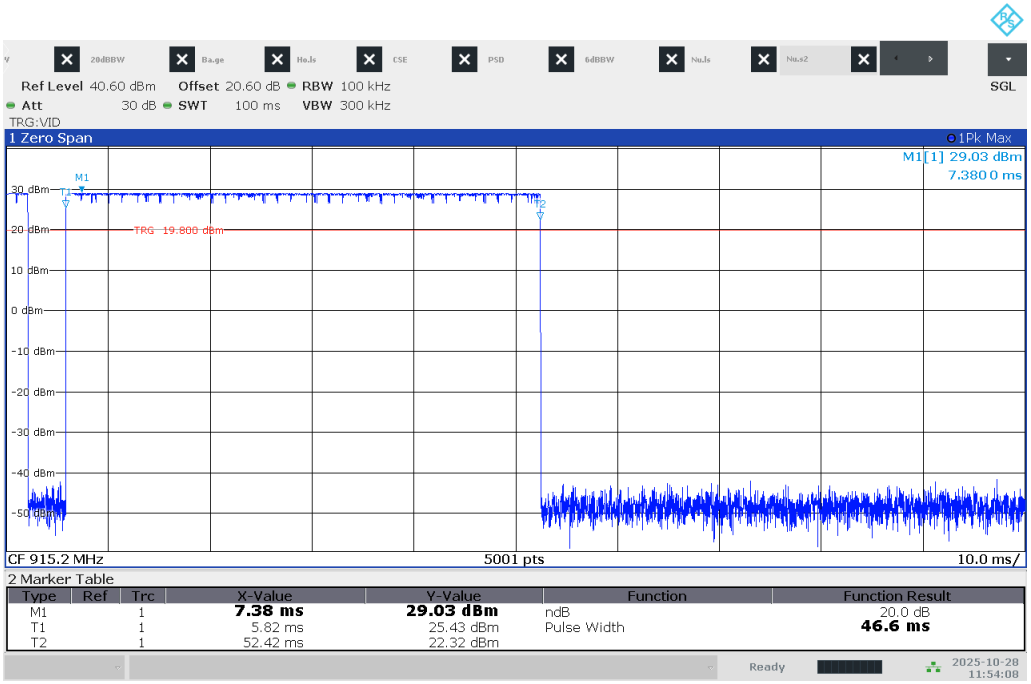
9.6 Test Data – GFSK 200k

Single Pulse Width 1



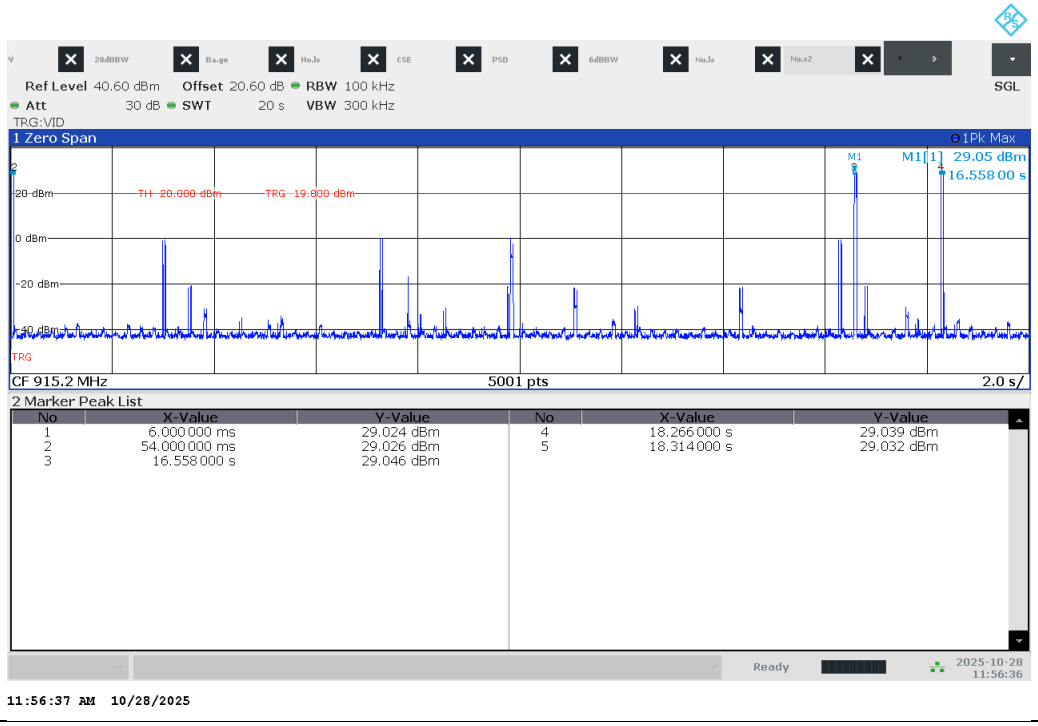
11:55:02 AM 10/28/2025

Single Pulse Width 2



11:54:09 AM 10/28/2025

Pulses in 20 seconds



Calculations:

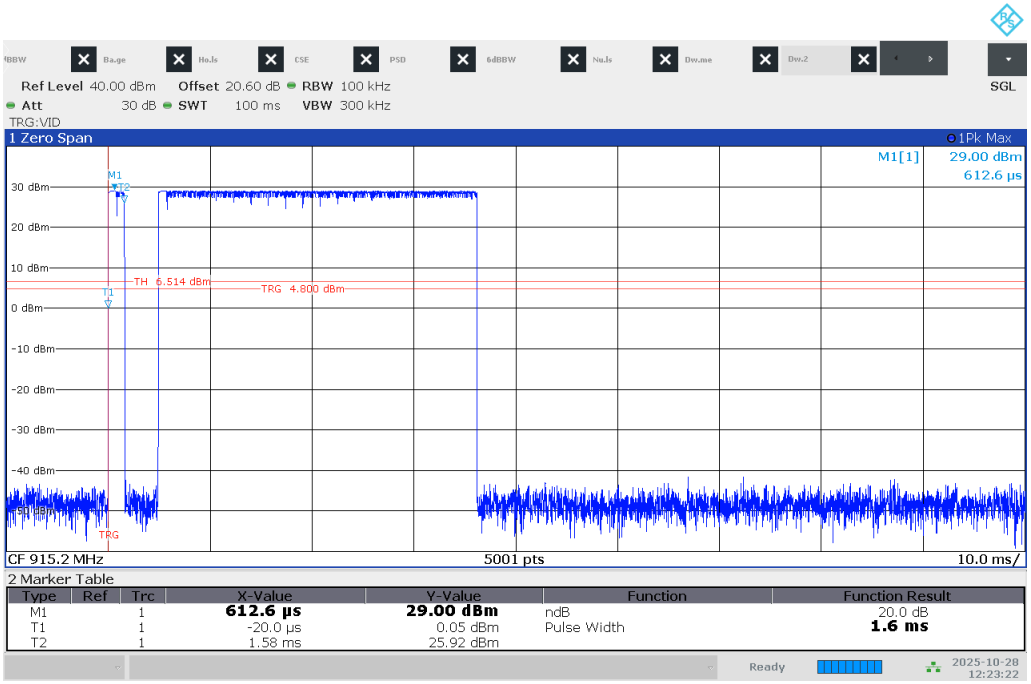
5 pulses in 20 seconds

2.12 + 46.6 ms pulse width (0.04872s)

5 * 0.04872 = 0.2436s

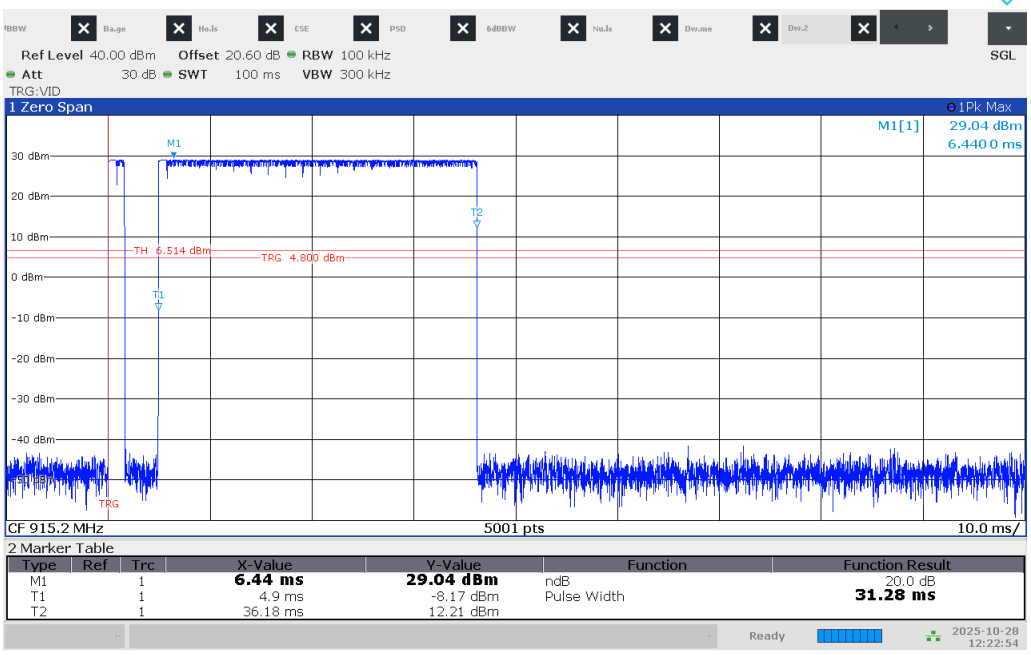
9.7 Test Data – GFSK 300k

Single Pulse Width 1



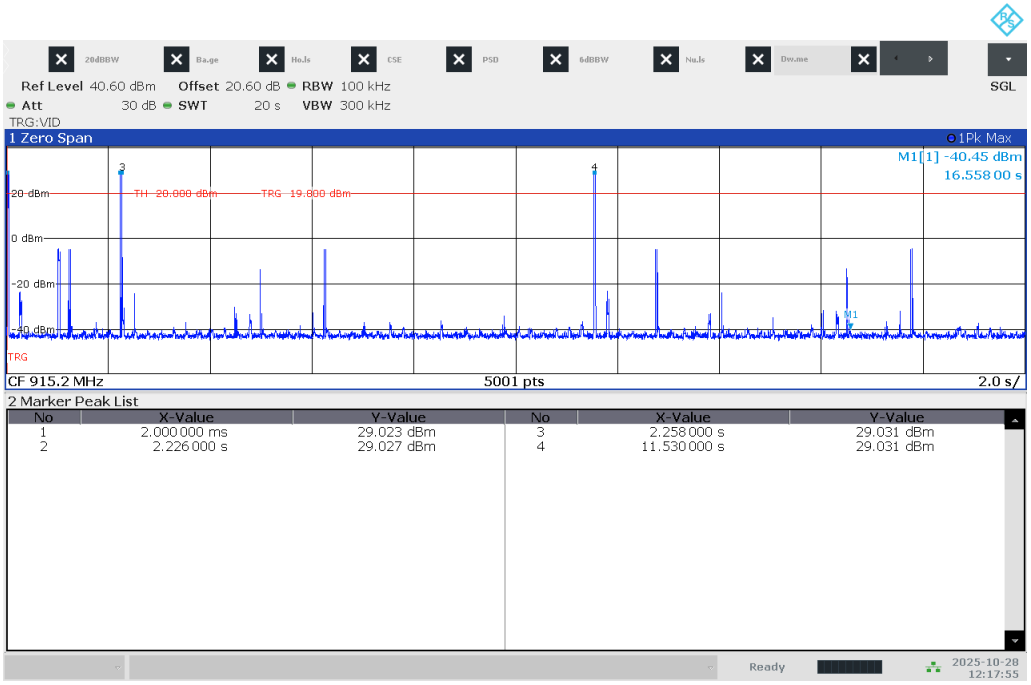
12:23:23 PM 10/28/2025

Single Pulse Width 2



12:22:55 PM 10/28/2025

Pulses in 20 seconds



Calculations:

4 pulses in 20 seconds / 2 in 10 seconds

1.6 + 31.28 ms pulse width (0.03288s)

4 * 0.03288 = 0.1315s / 2 * 0.03288 = 0.0658s

Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6ºC
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

10 Conducted Spurious Emissions / Band Edge

10.1 Method

The procedures from ANSI C63.10 Clause 6.10 and 7.8.7 were used to measure the conducted spurious emissions and allocated band edges.

The limit is 20 dB below the measured peak power in any 100kHz band.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Measurements are automated using the Rohde & Schwarz EMC32 test software. The TS8997 system houses a switch matrix (OSP), along with a spectrum analyzer, vector network analyzer, and analog signal generator.

10.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
212164	Temperature/Pressure/Humidity Sensor	Extech	SD700	109402	07/08/2025	07/08/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	05/08/2025	05/08/2027
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213506-02	Huber+Suhner	RF Test Cable	Enviroflex 400	213506-02	VBU	VBU
213507-20	Tojoin	20dB SMA Attenuator	20dB	241123	VBU	VBU

Software Utilized

Name	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64-bit (2023)

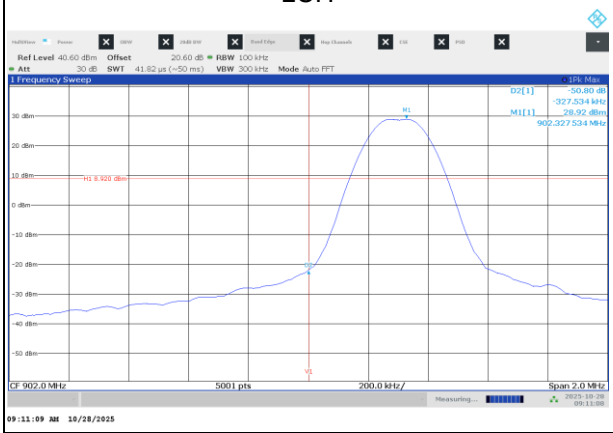
10.3 Results

The sample tested was found to Comply.

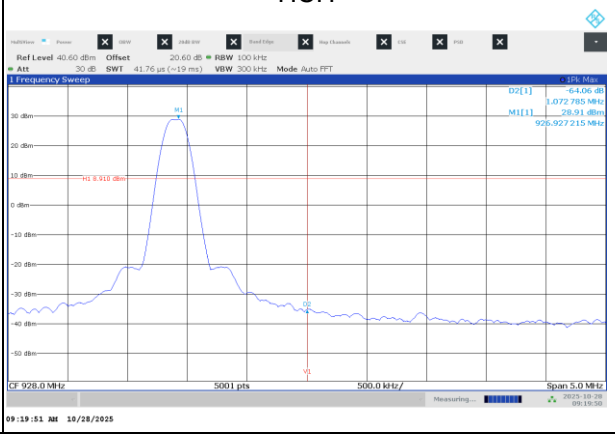
10.4 Plots – Band Edges

FSK 100kbps

LCH

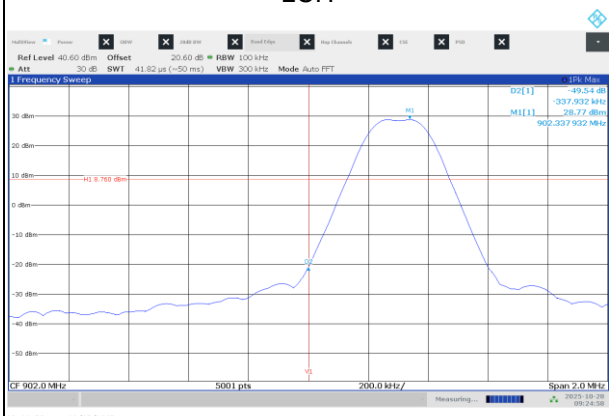


HCH

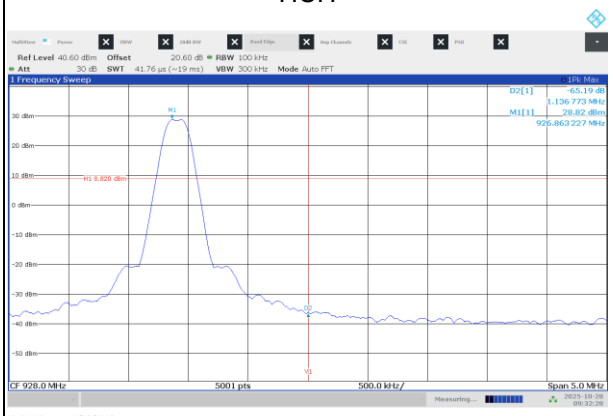


GFSK 150kbps

LCH

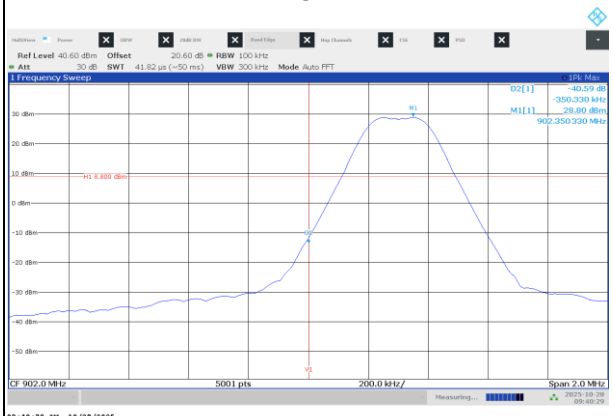


HCH

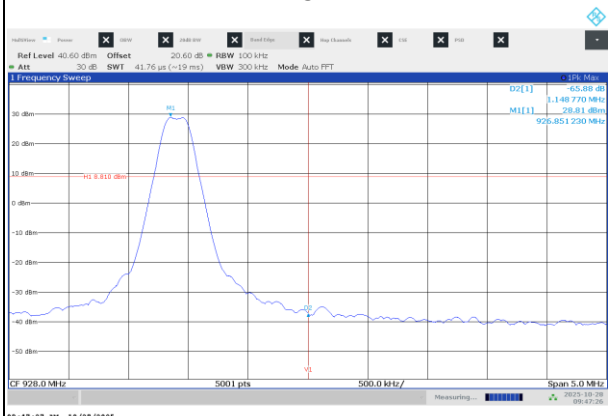


GFSK 200kbps

LCH

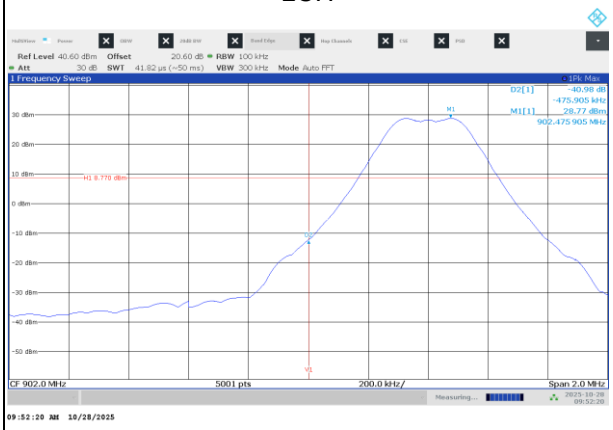


HCH

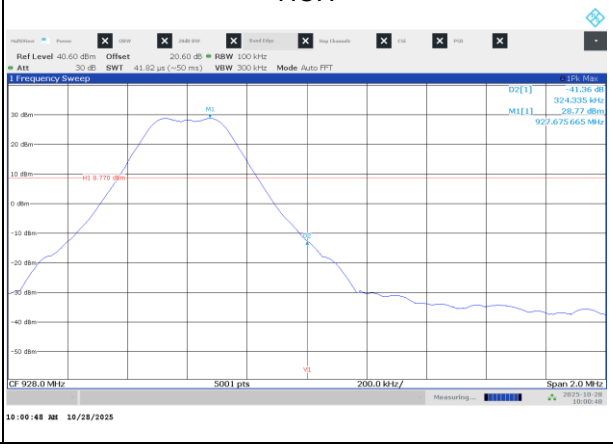


GFSK 300kbps

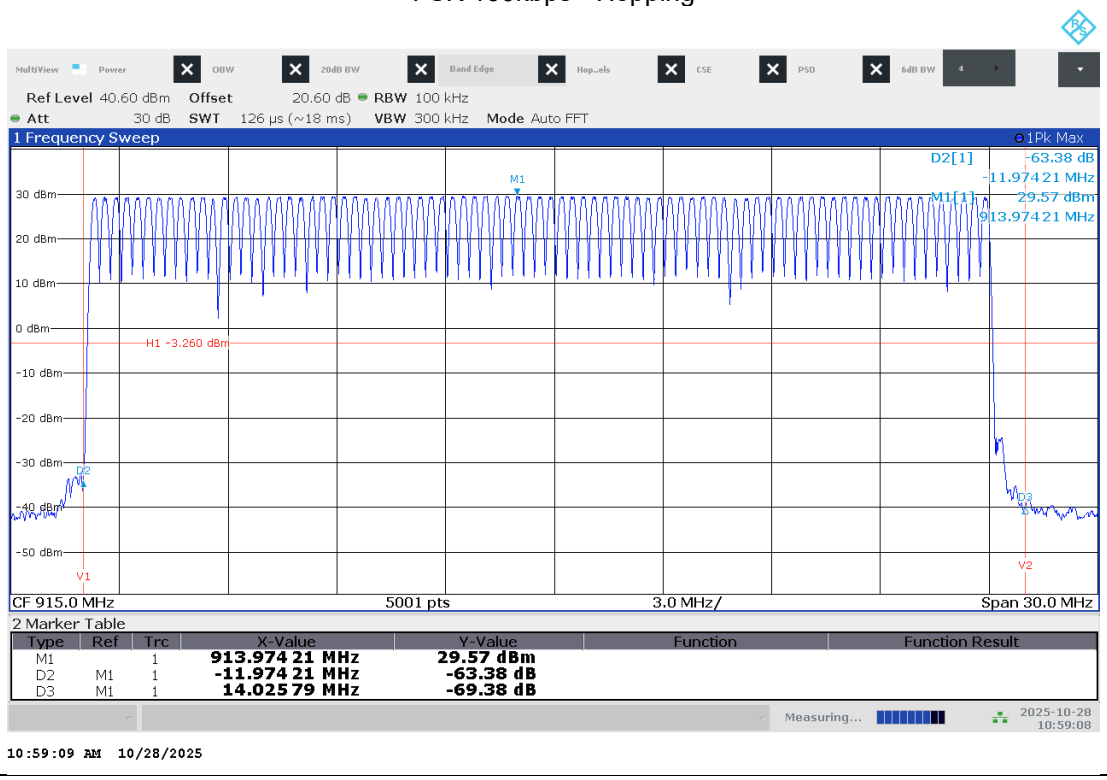
LCH



HCH



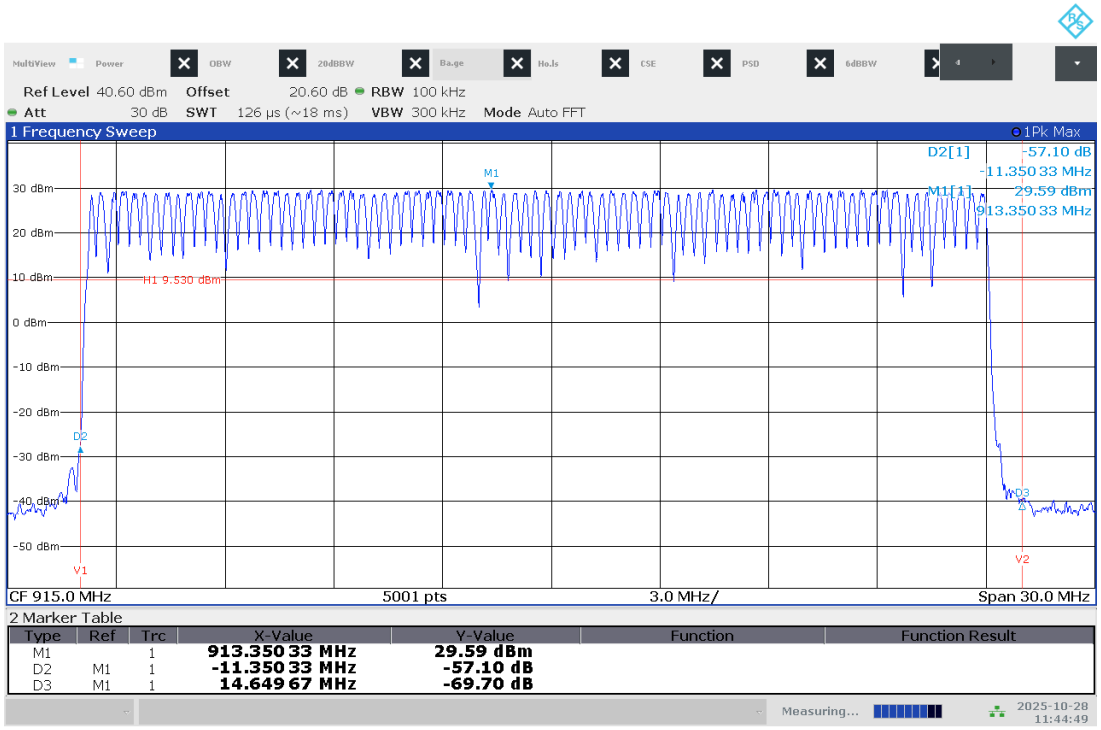
FSK 100kbps - Hopping



GFSK 150kbps - Hopping

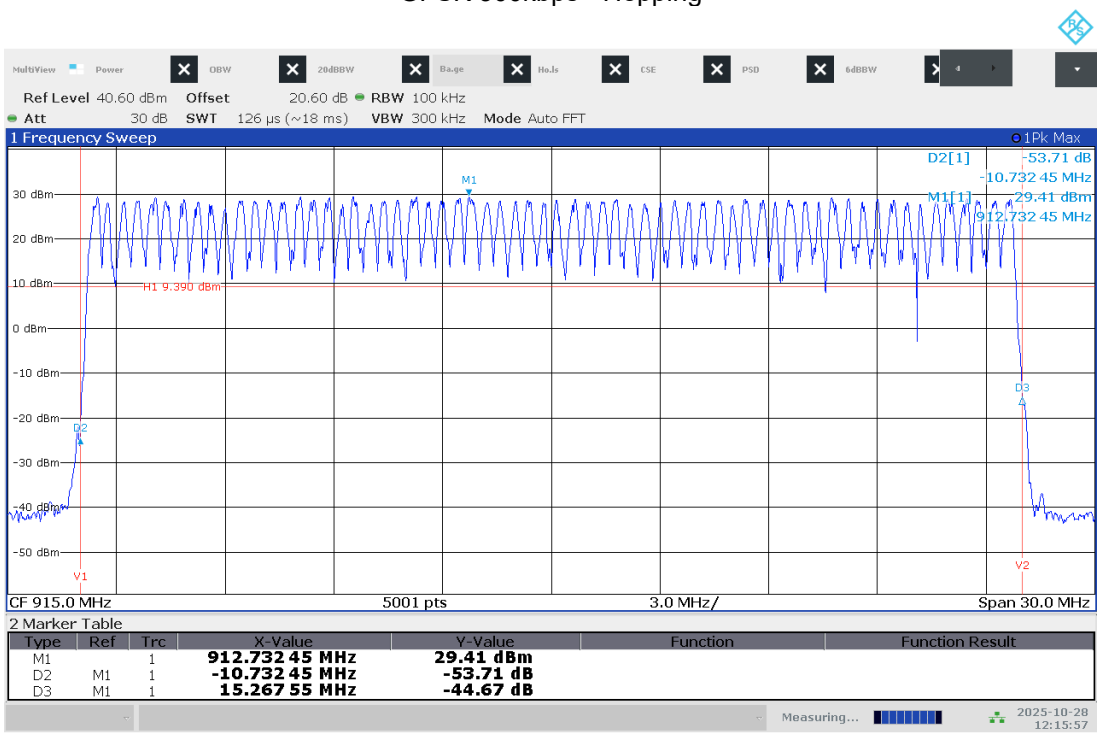
11:37:03 AM 10/28/2025

GFSK 200kbps - Hopping



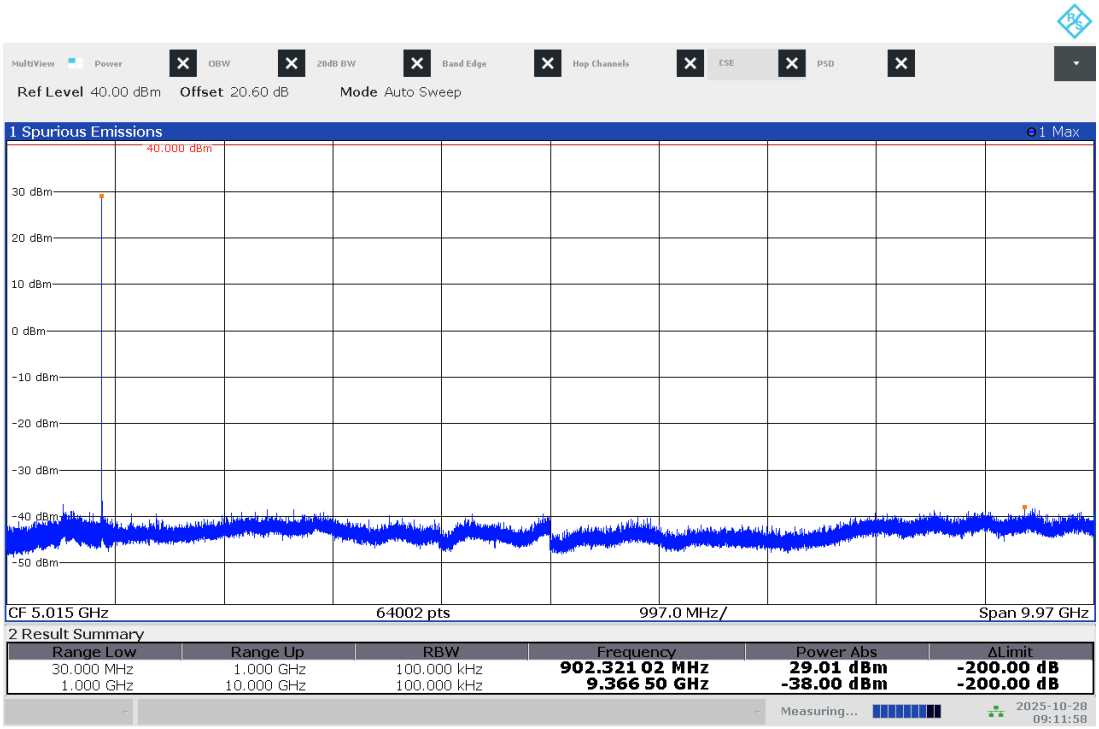
11:44:50 AM 10/28/2025

GFSK 300kbps - Hopping



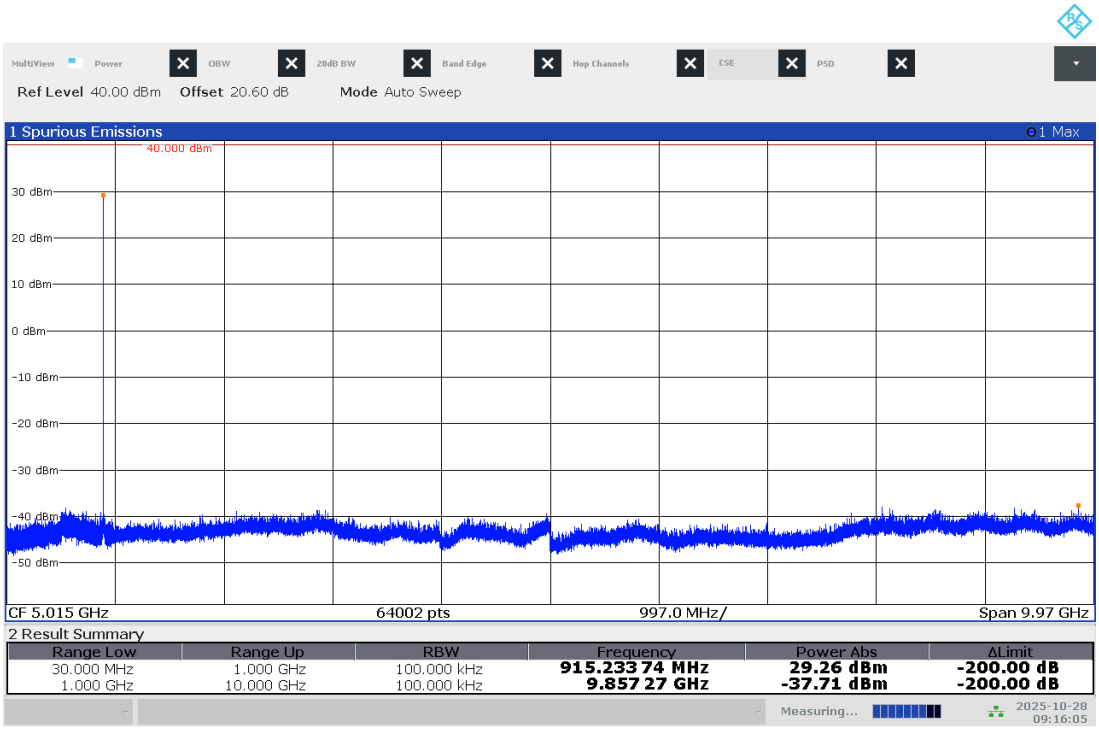
10.5 Test Data – Conducted Spurious

FSK 100kbps - LCH



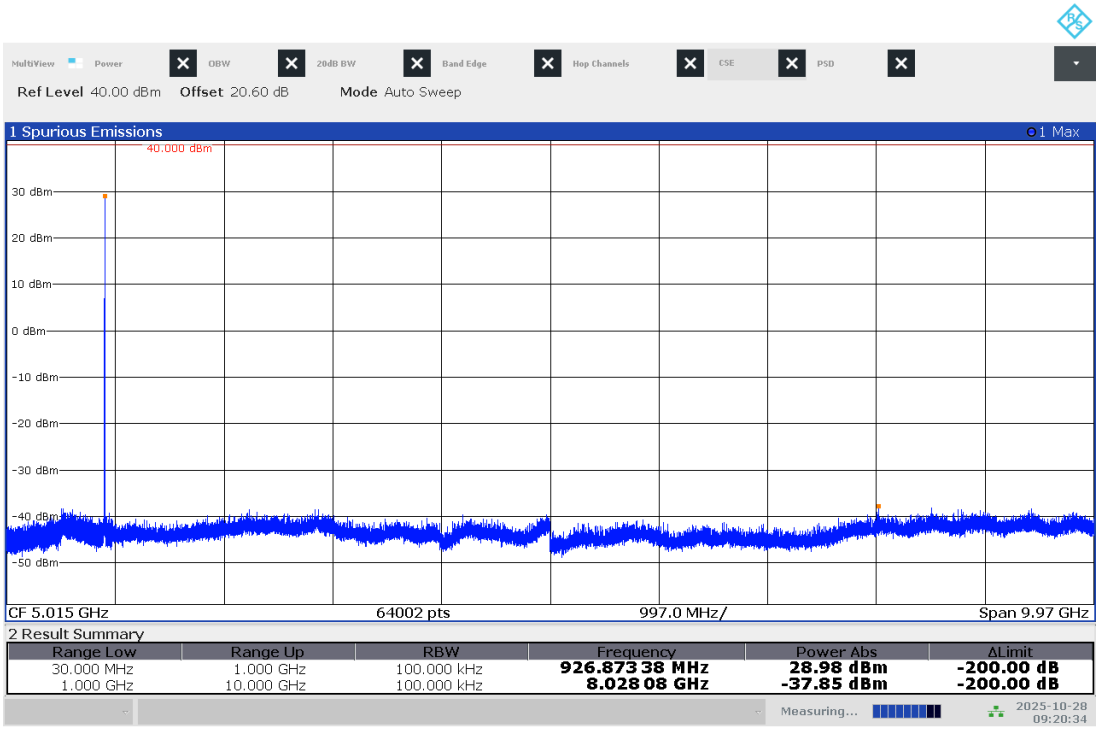
09:11:59 AM 10/28/2025

FSK 100kbps - MCH



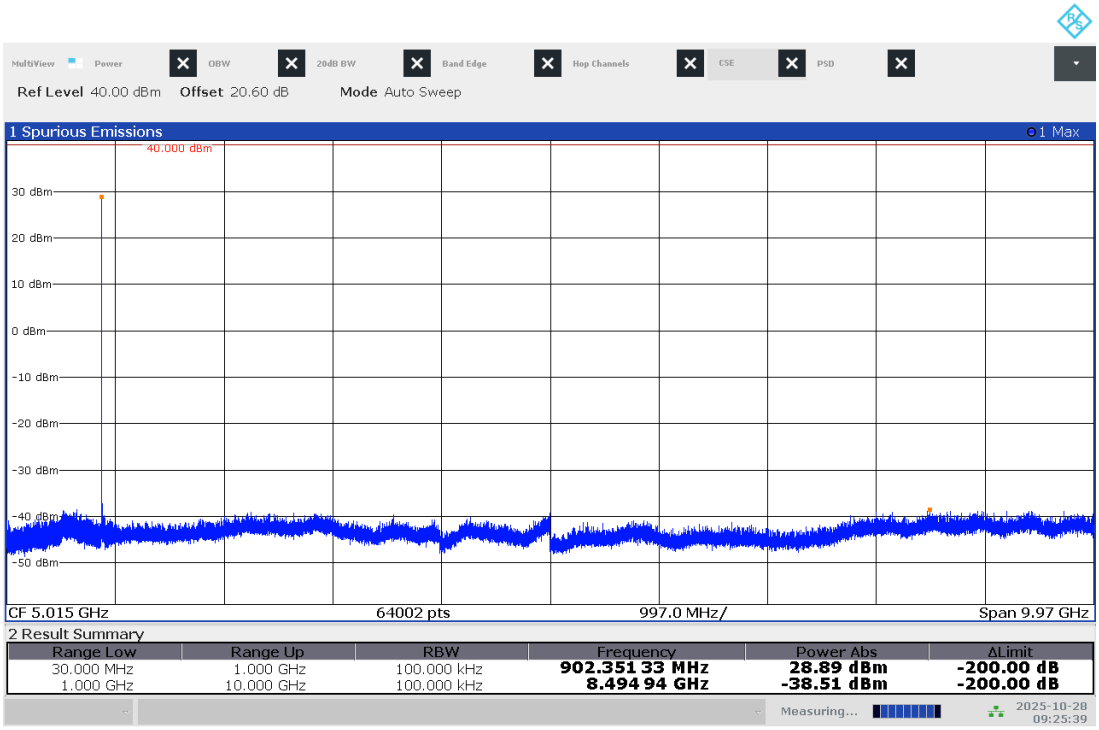
09:16:06 AM 10/28/2025

FSK 100kbps - HCH



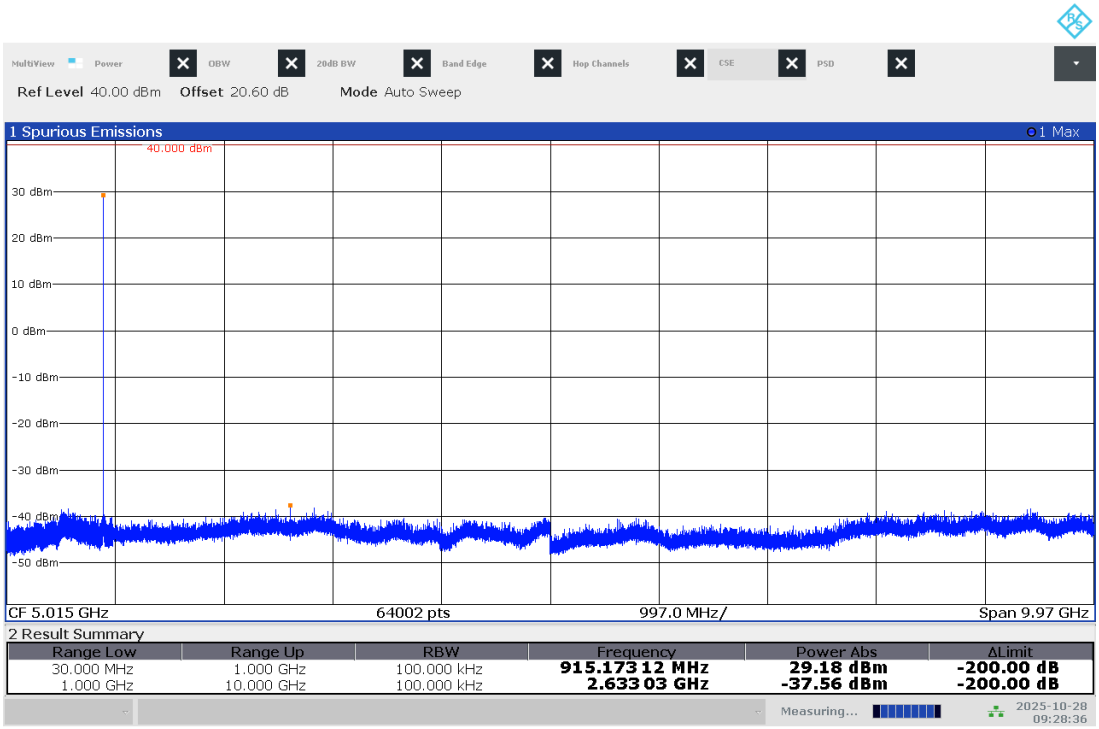
09:20:35 AM 10/28/2025

GFSK 150kbps - LCH



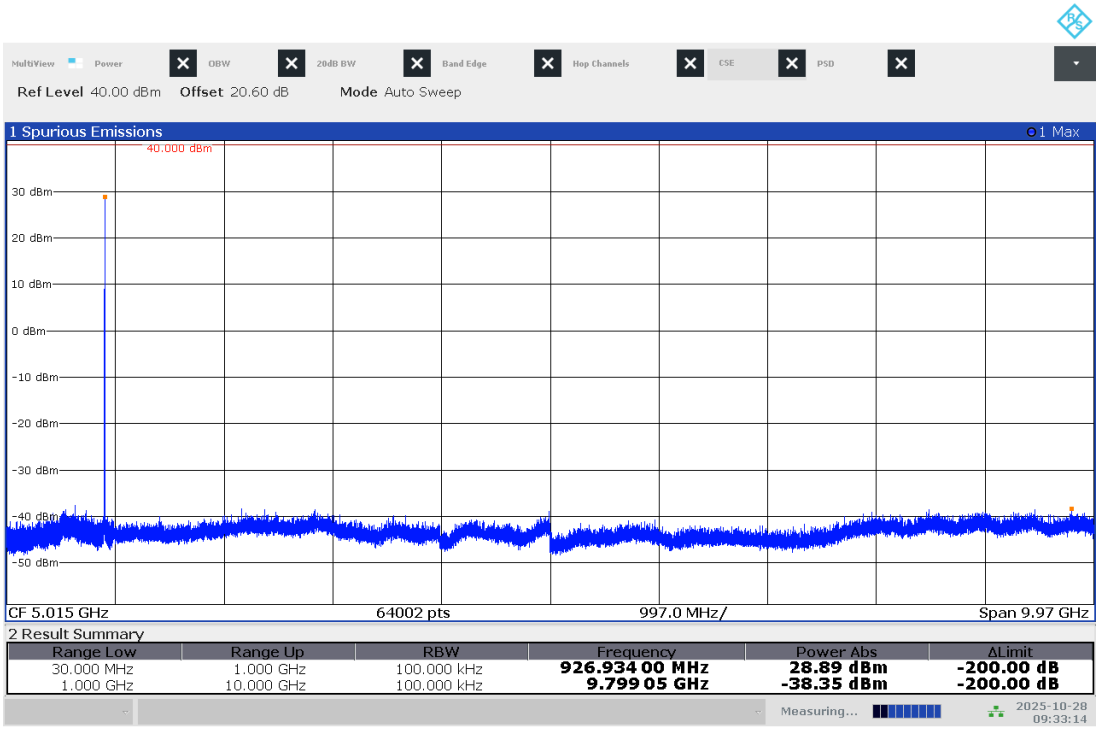
09:25:40 AM 10/28/2025

GFSK 150kbps - MCH



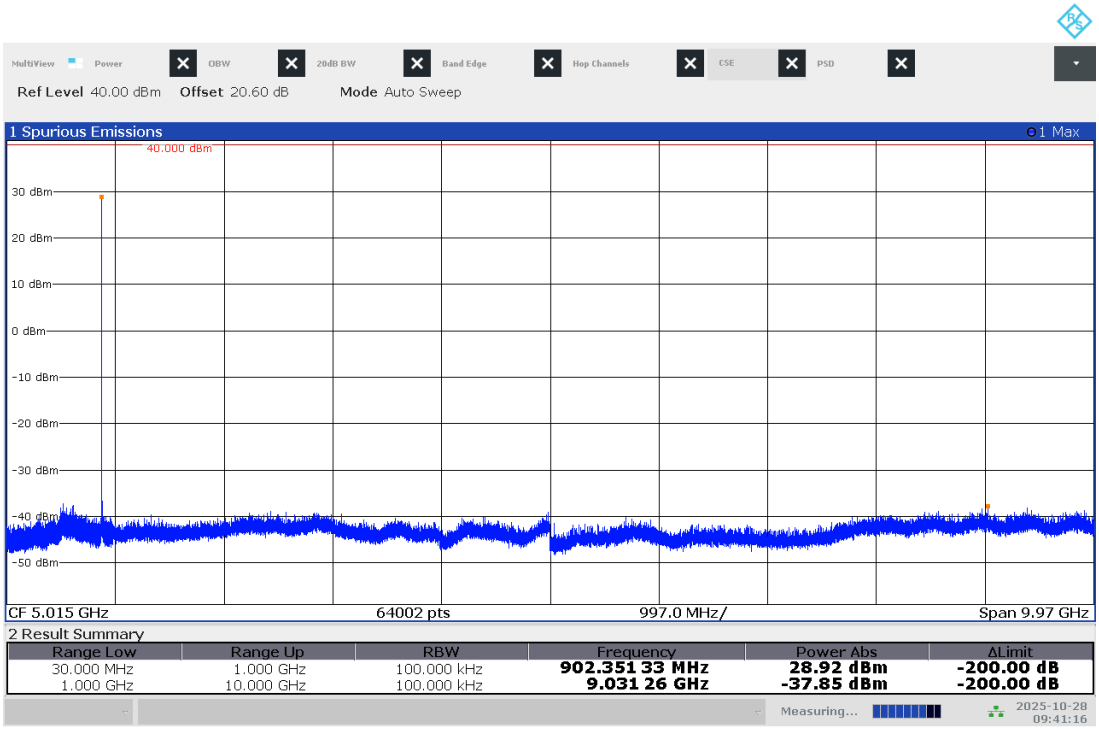
09:28:37 AM 10/28/2025

GFSK 150kbps - HCH



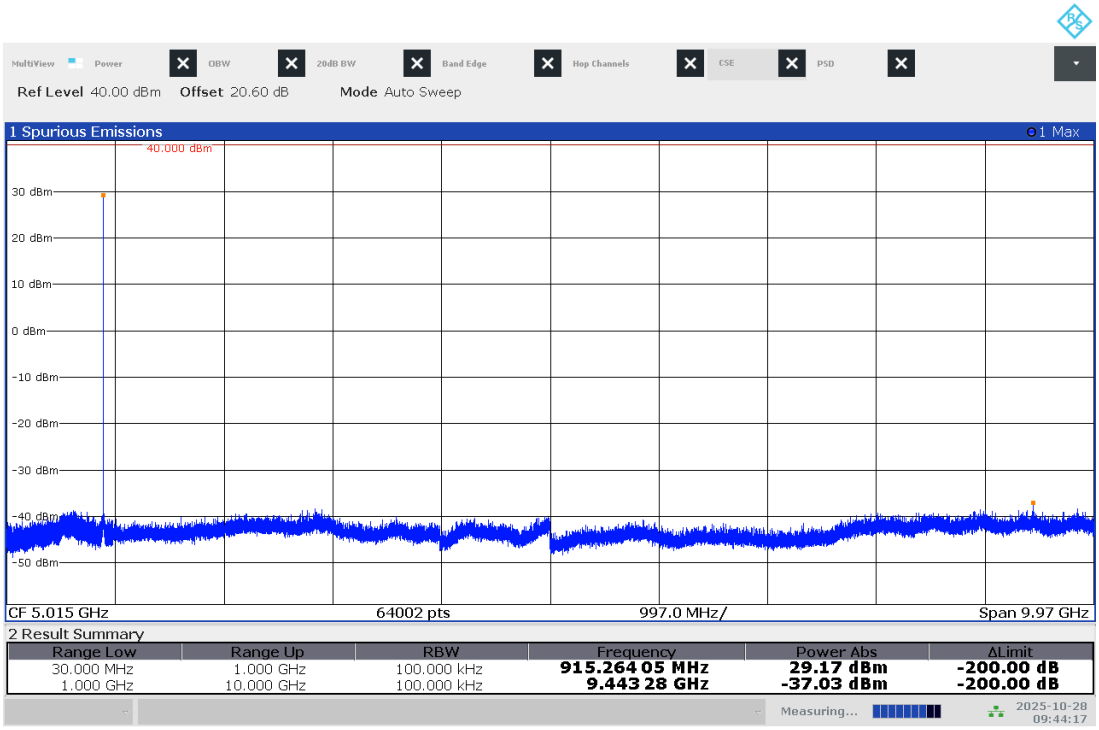
09:33:15 AM 10/28/2025

GFSK 200kbps - LCH



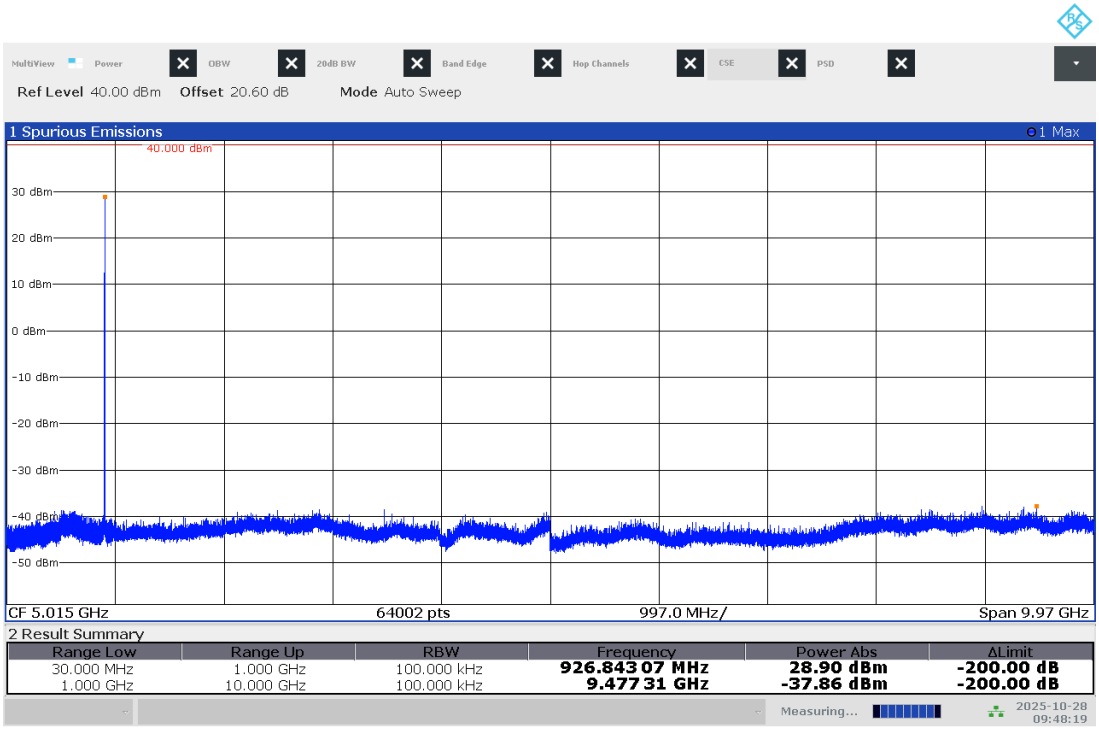
09:41:17 AM 10/28/2025

GFSK 200kbps - MCH



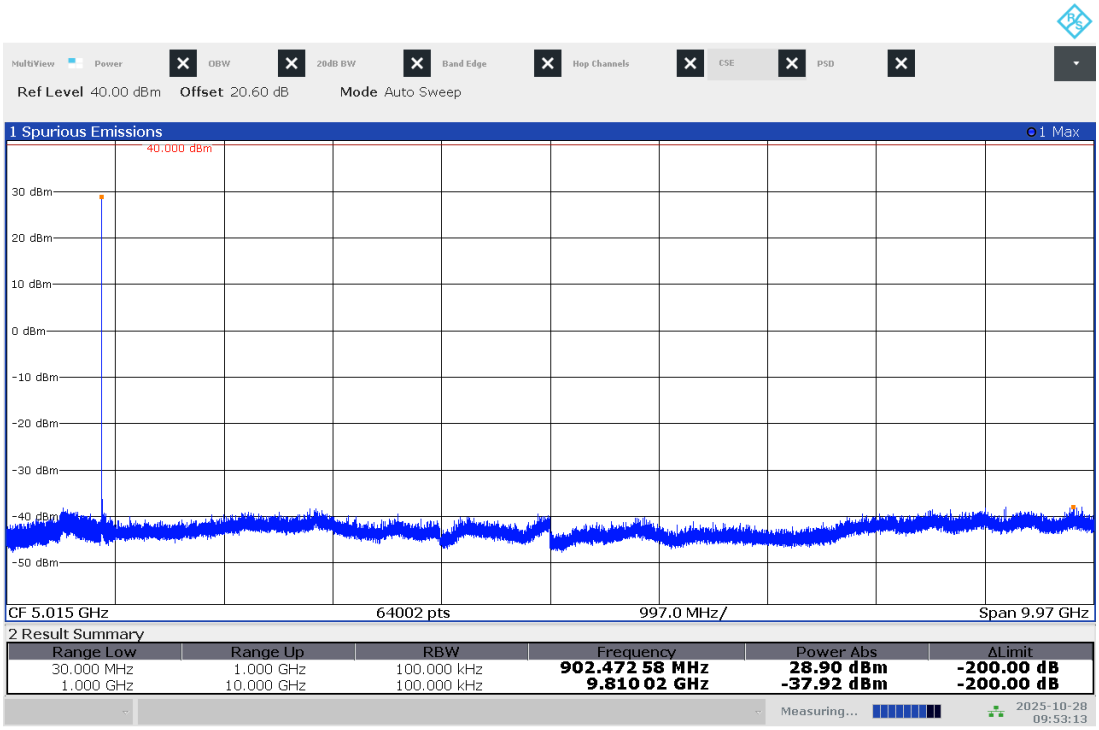
09:44:18 AM 10/28/2025

GFSK 200kbps - HCH



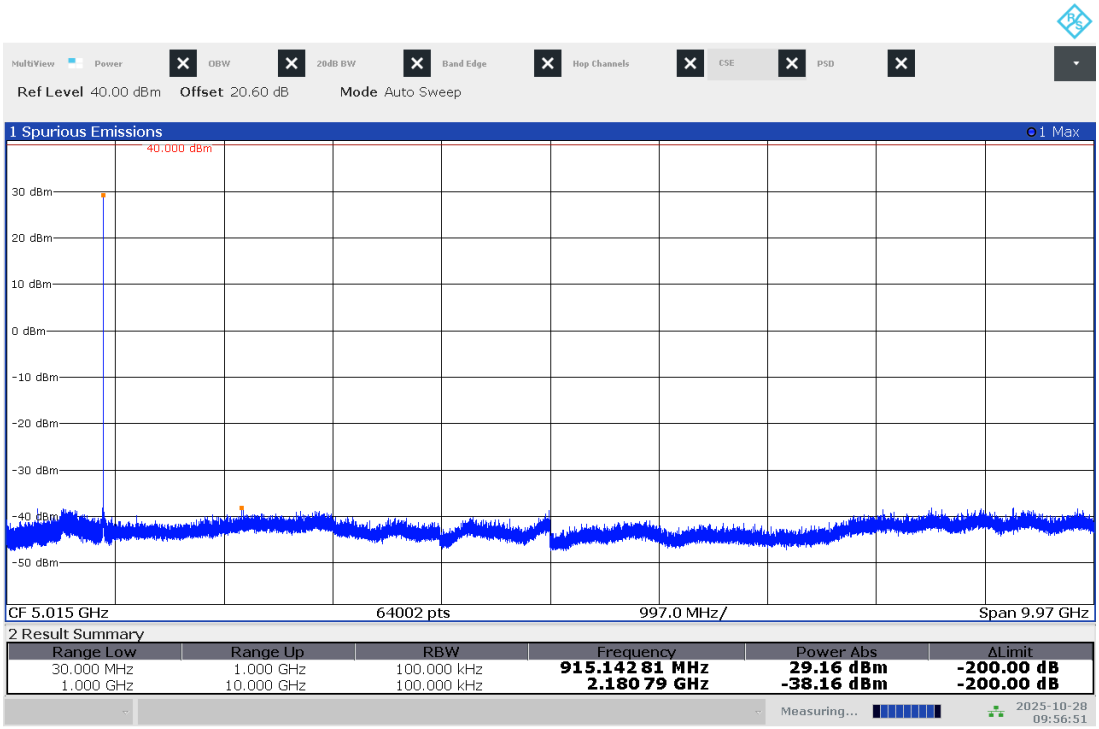
09:48:20 AM 10/28/2025

GFSK 300kbps - LCH



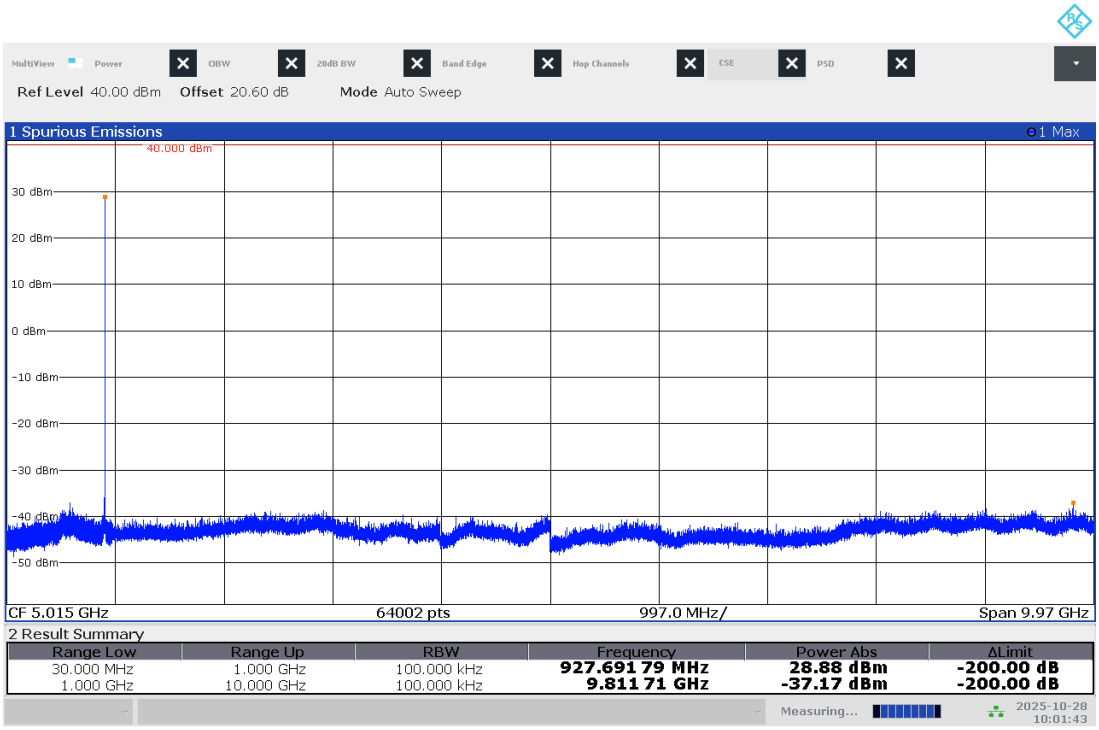
09:53:13 AM 10/28/2025

GFSK 300kbps - MCH



09:56:52 AM 10/28/2025

GFSK 300kbps - HCH



10:01:44 AM 10/28/2025

10.6 Tabular Data – Band Edges

Mode	TX Frequency (MHz)	Measured Frequency (MHz)	Measured Value (dBc)	Limit (dBc)	Margin (dB)	Result
FSK100k	902.3	902	-50.80	-20	-30.8	Pass
FSK100k	926.9	928	-64.06	-20	-44.06	Pass
FSK100k	Hopping – Low Channel	902	-63.38	-20	-43.38	Pass
FSK100k	Hopping – High Channel	928	-69.38	-20	-49.38	Pass
GFSK150k	902.3	902	-49.54	-20	-29.54	Pass
GFSK150k	926.9	928	-65.19	-20	-45.19	Pass
GFSK150k	Hopping – Low Channel	902	-58.68	-20	-38.68	Pass
GFSK150k	Hopping – High Channel	928	-70.55	-20	-50.55	Pass
GFSK200k	902.3	902	-40.59	-20	-20.59	Pass
GFSK200k	926.9	928	-65.88	-20	-45.88	Pass
GFSK200k	Hopping – Low Channel	902	-57.10	-20	-37.1	Pass
GFSK200k	Hopping – High Channel	928	-69.70	-20	-49.7	Pass
GFSK300k	902.4	902	-40.98	-20	-20.98	Pass
GFSK300k	927.6	928	-41.36	-20	-21.36	Pass
GFSK300k	Hopping – Low Channel	902	-53.71	-20	-33.71	Pass
GFSK300k	Hopping – High Channel	928	-44.67	-20	-24.67	Pass

Test Personnel:	Jeremy Pickens	Test Date:	28 October 2025
Supervising/Reviewing Engineer: (Where Applicable)		Ambient Temperature:	19.6ºC
Product Standard:	ANSI C63.10	Relative Humidity:	43.2%
Input Voltage:	24Vdc	Atmospheric Pressure:	98.1kPa

11 Radiated Spurious Emissions / Restricted Frequency Bands

11.1 Method

Tests were performed in accordance with ANSI C63.10.

TEST SITE: 10 Meter Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10-meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3-meter diameter turntable.

Sample Calculation

The field strength was calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.
Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

FS = 32 dBμV/m
RA = 52.0 dBμV
CF = 1.6 dB
AF = 7.4 dB/m
AG = 29.0 dB

To convert from dBμV to μV or mV the following was used

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0dBμV/m
UF = $10^{(32\ dB\mu V/m\ /\ 20)}$ = 39.8 μV/m

11.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200074	Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D011105	1/24/2025	01/24/2026
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	10/7/2025	10/07/2026
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
211264	Mast - Antenna	Sunol	TWR95	NNN2	VBU	VBU
212166	Temperature/Pressure/Humidity Sensor	Extech	SD700	110392	4/2/2025	04/2/2026
213073	Antenna positioning tower	Sunol	TLT2	040314-5	VBU	VBU
213103	1GHz High Pass Filter	Micro-Tronics	HPM50108	140	6/18/2025	06/18/2026
213370	10dB Attenuator <18GHz	Centric RF	C18N5W-10	C18N5W-10-2	05/05/2025	05/05/2026
213451	Omni -directional Comb Generator	Com-Power	CGO-520	281266	VBU	VBU
213453	Preamplifier 500MHz-18GHz	Com-Power	PAM-118A	18040030	10/20/2025	10/20/2026
213058A	Antenna, Horn, <18 GHz	A.H. Systems	SAS-200/571	246	4/3/2025	04/03/2026
MM5	RF Coax Cable 9KHz-18GHz	Maury Microwave	UC-N-MM78	1514381	04/01/2025	04/01/2026
MM8	RF Coax Cable 9kHz-18GHz	Maury Microwave	UC-N-MM-267	1635289	6/18/2025	06/18/2026
MM36	RF Coax Cable 9kHz-18GHz	Maury Microwave	UC-N-NM-36	16 32 10	06/18/2025	06/18/2026
MP10	RF Coax Cable 9KHz-18GHz	Fairview Microwave	FMCA1282-394	MP10	6/18/2025	06/18/2026
MP12	RF Coax Cable 9KHz-18GHz	Fairview Microwave	SCE180060505-700CM	MP12	1/23/2025	01/23/2026
MP14	RF Coax Cable 9kHz-18GHz	Megaphase	EC29-N1N1-276-H	20938802	9/19/2025	09/19/2026

Software Utilized

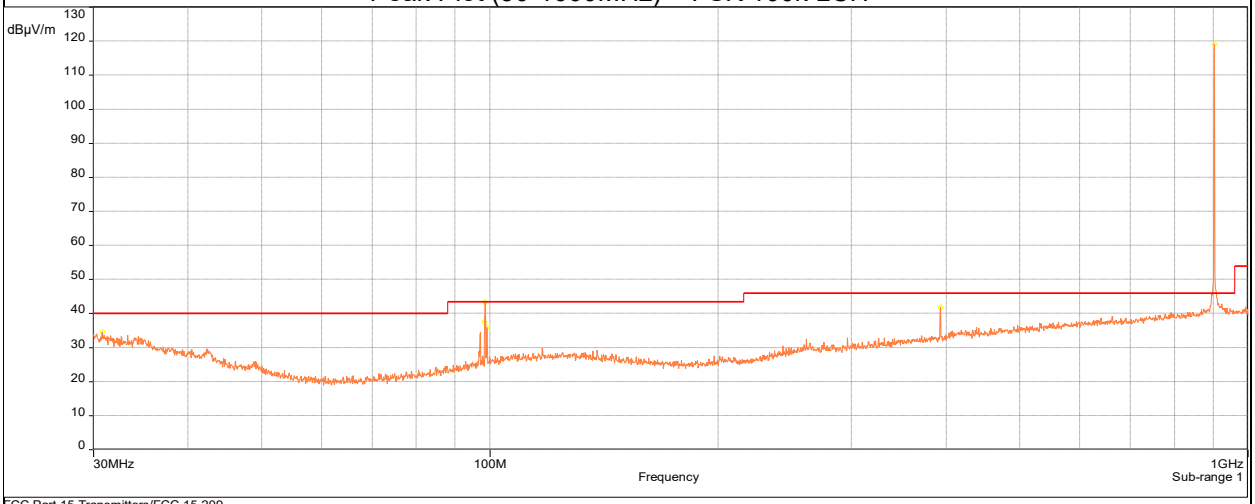
Name	Manufacturer	Version
BAT EMC	NEXIO	3.19.1.18

11.3 Results

The sample tested was found to Comply.

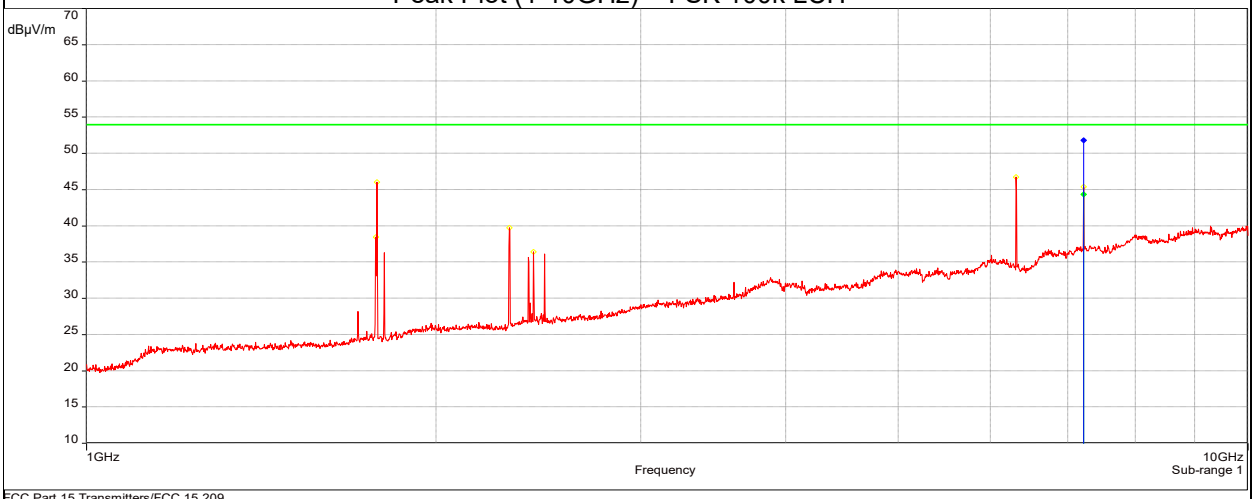
11.4 Plots/Data

Peak Plot (30-1000MHz) – FSK 100k LCH



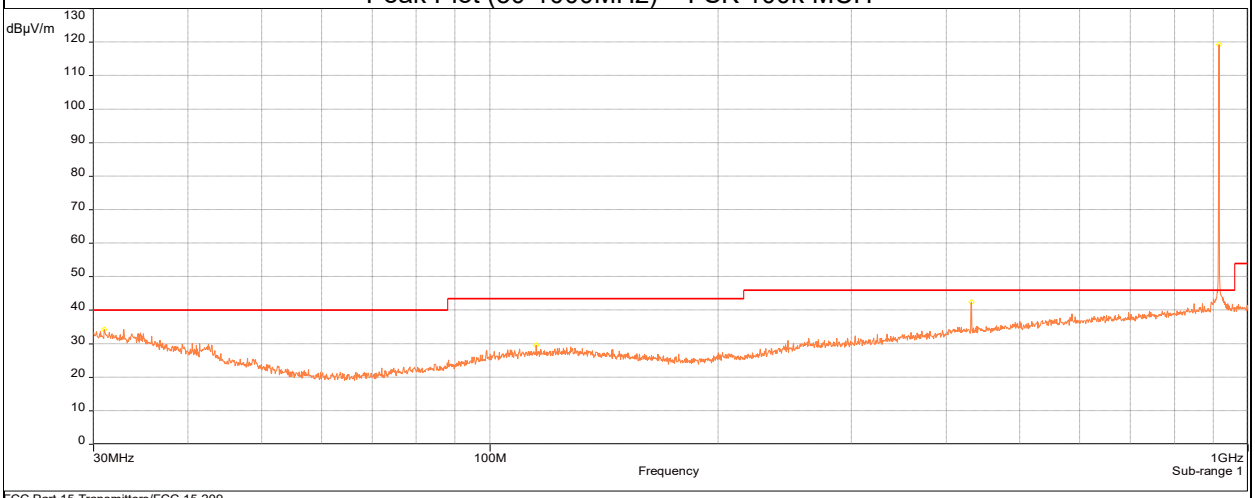
Note: Visible spurs were not located in restricted bands.

Peak Plot (1-10GHz) – FSK 100k LCH



Note: Harmonics around 1800 and 6400MHz were not in restricted bands

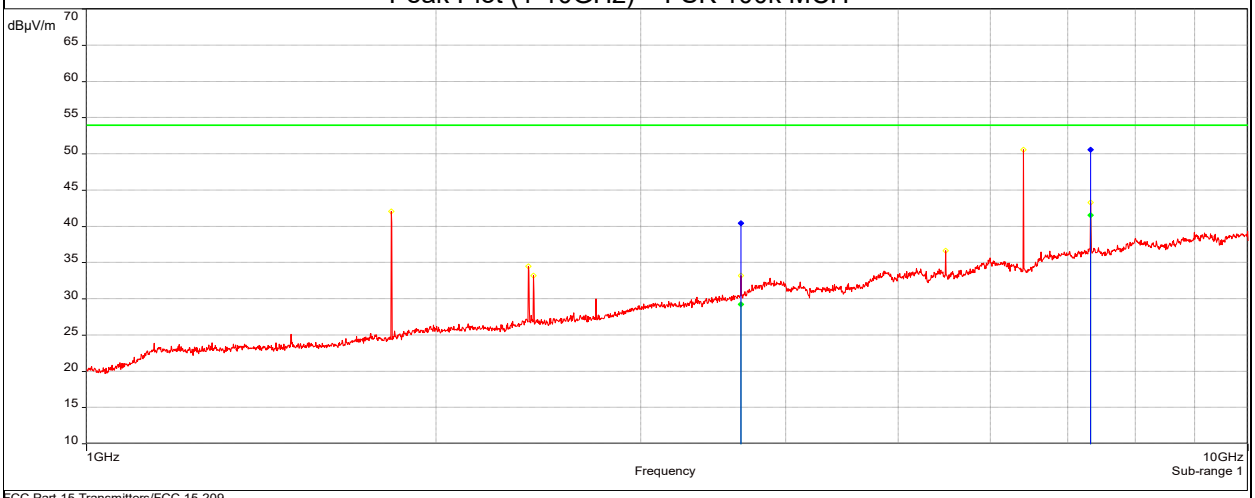
Peak Plot (30-1000MHz) – FSK 100k MCH



FCC Part 15 Transmitters/FCC 15.209

Note: Visible spurs were not located in restricted bands.

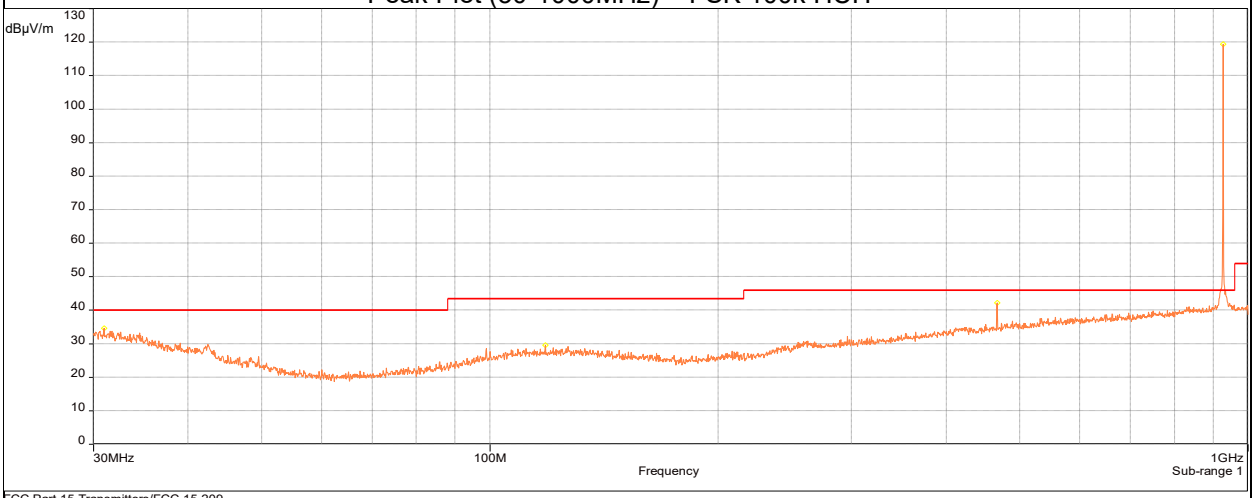
Peak Plot (1-10GHz) – FSK 100k MCH



FCC Part 15 Transmitters/FCC 15.209

Note: Harmonics around 1800 and 6400MHz were not in restricted bands

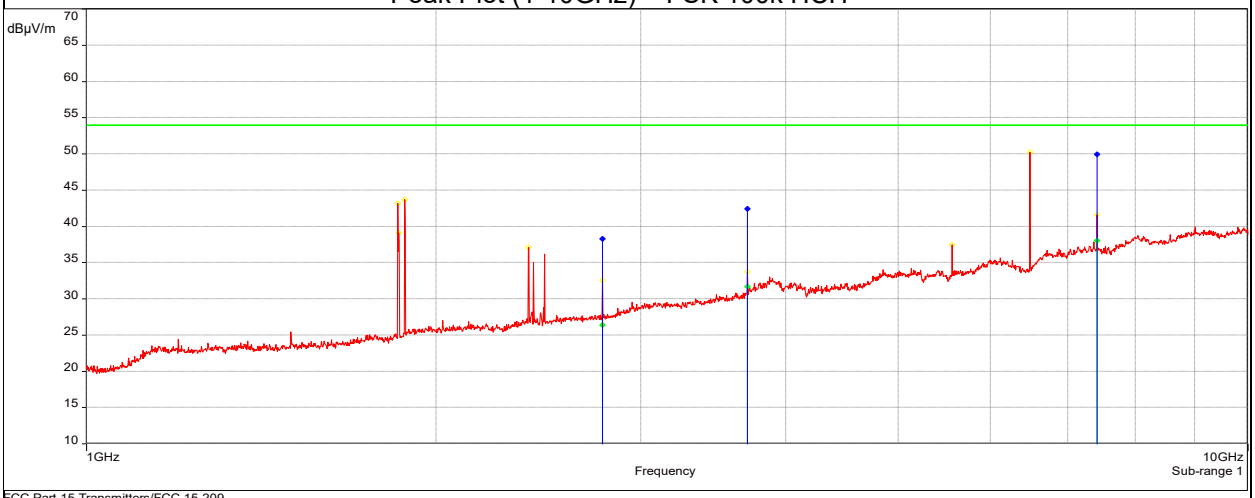
Peak Plot (30-1000MHz) – FSK 100k HCH



FCC Part 15 Transmitters/FCC 15.209

Note: Visible spurs were not located in restricted bands.

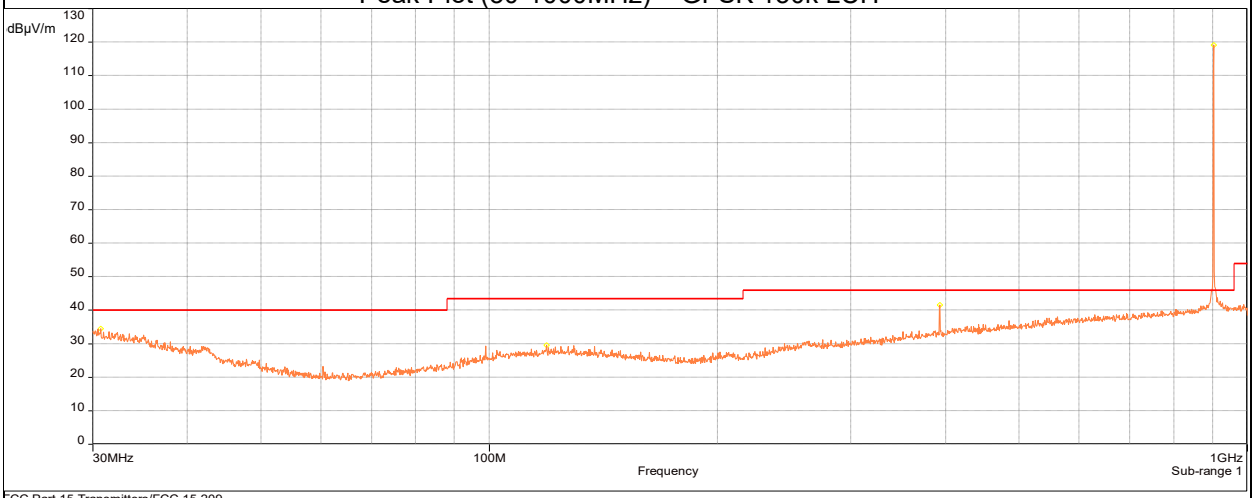
Peak Plot (1-10GHz) – FSK 100k HCH



FCC Part 15 Transmitters/FCC 15.209

Note: Harmonics around 1800 and 6400MHz were not in restricted bands

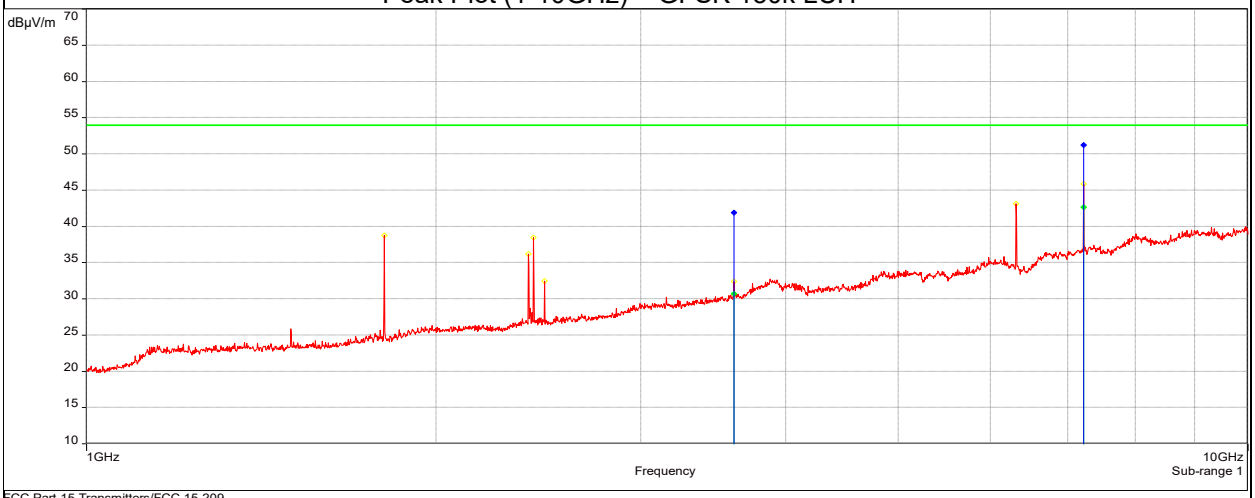
Peak Plot (30-1000MHz) – GFSK 150k LCH



FCC Part 15 Transmitters/FCC 15.209

Note: Visible spurs were not located in restricted bands.

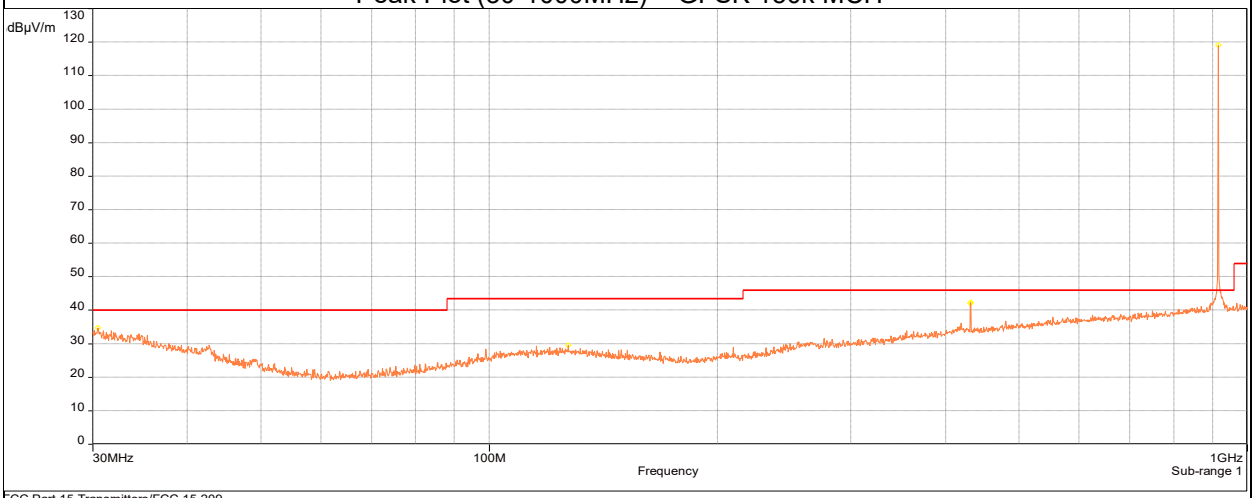
Peak Plot (1-10GHz) – GFSK 150k LCH



FCC Part 15 Transmitters/FCC 15.209

Note: Harmonics around 1800 and 6400MHz were not in restricted bands

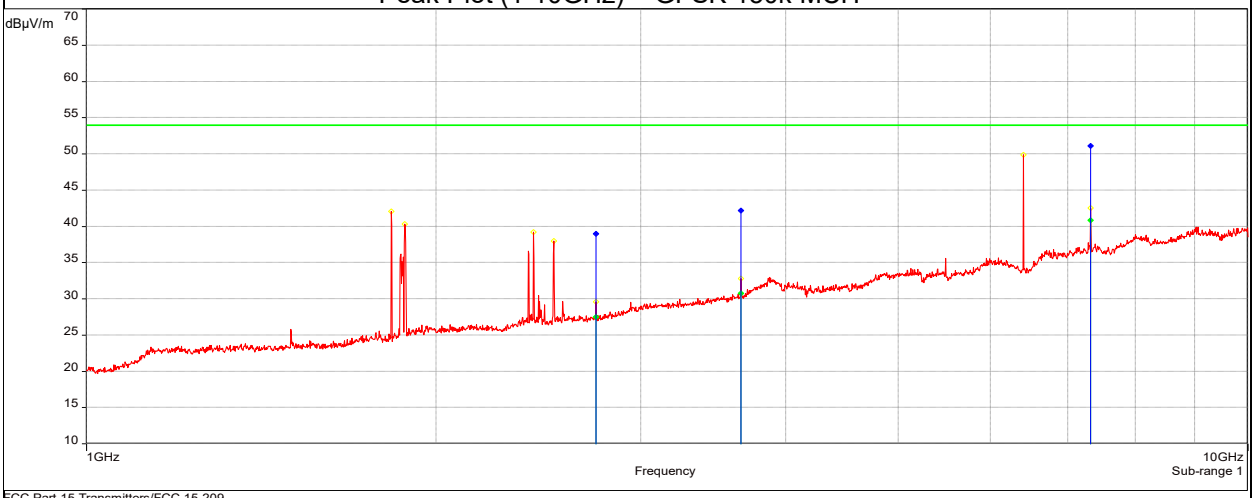
Peak Plot (30-1000MHz) – GFSK 150k MCH



FCC Part 15 Transmitters/FCC 15.209

Note: Visible spurs were not located in restricted bands.

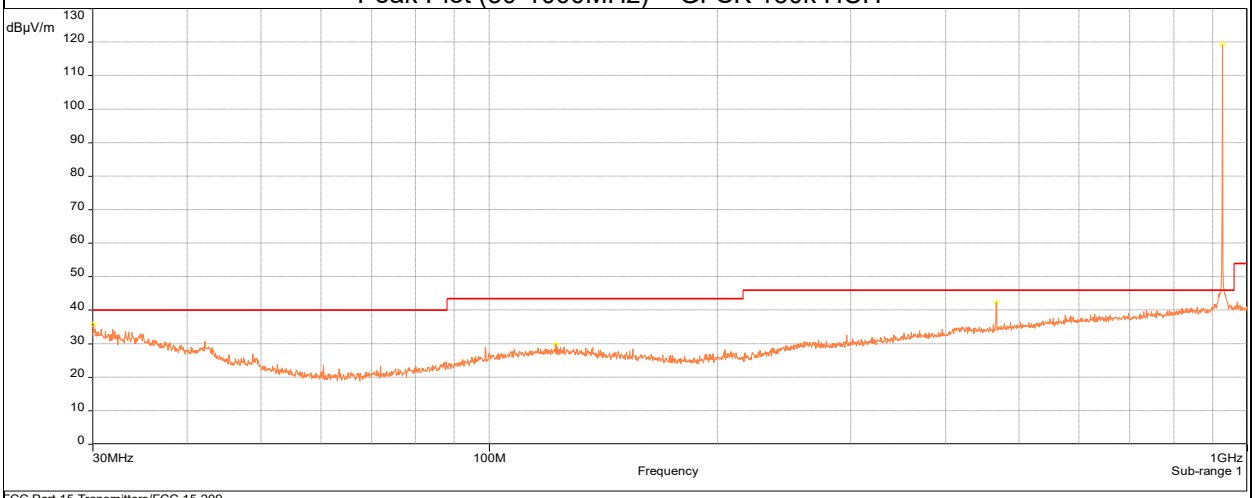
Peak Plot (1-10GHz) – GFSK 150k MCH



FCC Part 15 Transmitters/FCC 15.209

Note: Harmonics around 1800 and 6400MHz were not in restricted bands

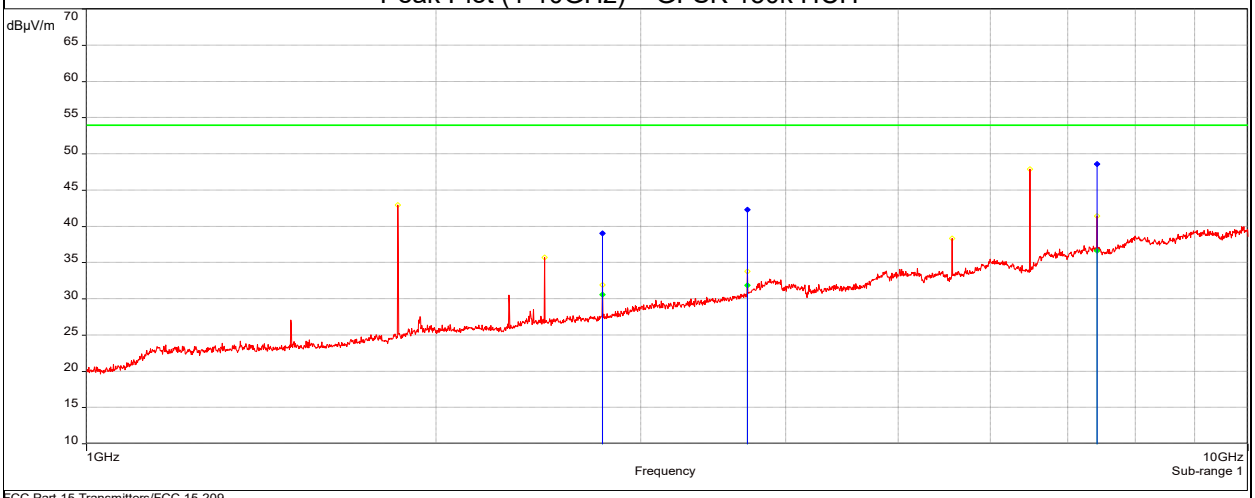
Peak Plot (30-1000MHz) – GFSK 150k HCH



FCC Part 15 Transmitters/FCC 15.209

Note: Visible spurs were not located in restricted bands.

Peak Plot (1-10GHz) – GFSK 150k HCH



FCC Part 15 Transmitters/FCC 15.209

Note: Harmonics around 1800 and 6400MHz were not in restricted bands

Tabular Data

Peak

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
FSK 100k - LCH								
7218.625	51.83	74	-22.17	239	2.8	Horizontal	1	-1.09
FSK 100k - MCH								
3660.799	40.43	74	-33.57	181	1.26	Horizontal	1	-7.44
7321.817	50.6	74	-23.4	232	1.06	Horizontal	1	-0.73
FSK 100k - HCH								
2780.612	38.26	74	-35.74	154	1.3	Vertical	1	-9.73
3707.599	42.39	74	-31.61	226	2.84	Horizontal	1	-7.13
7415.423	49.93	74	-24.07	250	2.96	Horizontal	1	-0.55
GFSK 150k - LCH								
3609.199	41.92	74	-32.08	230	1.32	Horizontal	1	-7.7
7218.700	51.24	74	-22.76	239	2.98	Horizontal	1	-1.09
GFSK 150k - MCH								
2745.686	38.99	74	-35.01	294	2.79	Vertical	1	-9.87
3660.799	42.18	74	-31.82	203	1.68	Horizontal	1	-7.44
7321.898	51.12	74	-22.88	236	2.84	Horizontal	1	-0.73
GFSK 150k - HCH								
2780.601	39.06	74	-34.94	268	2.54	Vertical	1	-9.73
3707.599	42.32	74	-31.68	216	1.02	Horizontal	1	-7.13
7415.500	48.62	74	-25.38	266	1.32	Horizontal	1	-0.55

Average

Frequency (MHz)	AVG Level (dBµV/m)	AVG Limit (dBµV/m)	AVG Margin (dB)	Azimuth (°)	Height (m)	Polarity	RBW (MHz)	Correction (dB)
FSK 100k - LCH								
7218.625	44.34	54	-9.66	239	2.8	Horizontal	1	-1.09
FSK 100k - MCH								
3660.799	29.24	54	-24.76	181	1.26	Horizontal	1	-7.44
7321.817	41.53	54	-12.47	232	1.06	Horizontal	1	-0.73
FSK 100k - HCH								
2780.612	26.41	54	-27.59	154	1.3	Vertical	1	-9.73
3707.599	31.71	54	-22.29	226	2.84	Horizontal	1	-7.13
7415.423	38.03	54	-15.97	250	2.96	Horizontal	1	-0.55
GFSK 150k - LCH								
3609.199	30.68	54	-23.32	230	1.32	Horizontal	1	-7.7
7218.700	42.68	54	-11.32	239	2.98	Horizontal	1	-1.09
GFSK 150k - MCH								
2745.686	27.5	54	-26.5	294	2.79	Vertical	1	-9.87
3660.799	30.76	54	-23.24	203	1.68	Horizontal	1	-7.44
7321.898	40.87	54	-13.13	236	2.84	Horizontal	1	-0.73
GFSK 150k - HCH								
2780.601	39.06	54	-14.94	268	2.54	Vertical	1	-9.73
3707.599	42.32	54	-11.68	216	1.02	Horizontal	1	-7.13
7415.500	48.62	54	-5.38	266	1.32	Horizontal	1	-0.55

Test Personnel: Jeremy Pickens
Test Date: 29-30 October 2025

Supervising/Reviewing Engineer: (Where Applicable)

v

Product Standard: ANSI C63.10
Limit Applied: 15.209

Input Voltage: 24Vdc

Pretest Verification w/ Ambient Signals or BB Source: BB

Ambient Temperature: 20.3 – 21.5ºC
Relative Humidity: 43.2 – 45.8%
Atmospheric Pressure: 98.1 – 98.4kPa

Deviations, Additions, or Exclusions: None

12 Measurement Uncertainty

Parameter	Expanded Uncertainty for Normal k factor equal to 2
Radio Frequency	0.07
Total RF Power (Conducted)	0.65
Power Density (Conducted)	0.65
RF Spurious (Conducted)	1.8 dB
Radiated Emissions (9kHz-30MHz)	4.7 dB
Radiated Emissions (30MHz-1GHz)	4.1 dB
Radiated Emissions (1GHz-18GHz)	4.5dB
Radiated Emissions (18GHz-40GHz)	4.7 dB
AC Line Conducted Emissions	2.8 dB
Temperature	0.7°
Humidity	3.9%

13 Revision History

Revision Level	Date	Prepared By	Reviewed By	Notes
0	11 December 2025	JOP	US	Original Issue
1	16 December 2025	JOP	US	• Corrected modulation, channels, data rates table.
2	23 January 2026	JOP	US	• Updated ANSI C63.10 reference • Added cable and attenuator info in call conducted equipment tables • Added AC conducted emissions reference in summary table • Added statement of duty cycle in Section 4.1.

END OF REPORT