SENSUS METERING SYSTEMS INC.

TEST REPORT

SCOPE OF WORK
RADIO TESTING –C2PC SDBSNUSCM1 / 2220A-SNUSCM1 – PART 24/RSS-133

REPORT NUMBER
106435507ATL-007B

ISSUE DATE
23 April 2026

REVISED DATE
N/A

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23

DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. January 2025

RADIO TEST REPORT

Report Number:	**106435507ATL-001B**
Project Number:	**G106435507**
Report Issue Date:	**23 April 2026**
PMN:	**SNUSCM1**
Model/HVIN:	**GM02S**
FCC ID:	**SDBSNUSCM1**
IC:	**2220A-SNUSCM1**
Standards:	**47 CFR Part 24, Subpart E** **RSS-133, Issue 7** **ANSI C63.26-2015** **RSS-GEN, Issue 5**

Test Location

Intertek
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096 USA
FCC Designation: US1046
ISED CAB Designator: US0128
ISO 17025 A2LA Accreditation: 1455.01

Client

Sensus Metering Systems Inc.
639 Davis Drive
Morrisville, NC 27560 USA

Report prepared by

Jeremy Pickens / Senior Staff Engineer

Report reviewed by

David Perry / EMC Engineer

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, 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 Rule Part	ISED RSS	
6	RF Output Power	2.1046 24.232	RSS-GEN S6.12 RSS-133 S5.5	Compliant
7	Spurious Emissions at Antenna Terminals	2.1051 24.238	RSS-Gen S6.13 RSS-133 S5.6	Compliant
8	Field Strength of Spurious Emissions	2.1053 24.238	RSS-Gen S6.13 RSS-133 S5.6	Compliant

3 Client Information

This evaluation was performed at the request of:

Client: Sensus Metering Systems Inc.
639 Davis Drive
Morrisville, NC 27560 USA

Contact: James Francisco

Email: James.Francisco@xylem.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Sensus Metering Systems Inc.
639 Davis Drive
Morrisville, NC 27560 USA

Equipment Under Test			
Description	**Manufacturer**	**Model Number (HVIN)**	**Serial Number**
Transceiver Module	Sensus Metering Systems Inc.	GM02S	G0R2549_135[1] G0R2549_334[2]
Cellular Modem	Sequans	GM02S	IMEI: 359197355731598[1] IMEI: 359197355760357[2]

1) Conducted Measurements
2) Radiated Measurements

Receive Date:	17 December 2025
Received Condition:	Good
Type:	Production

Description of Equipment Under Test
This cell module is designed to be installed into the Stratus IQ+ family of electric meters utilizing a M2 socket. It has its own antenna and cannot transmit simultaneously with the electric meter resident radio. The cell module is a Cat-M and NB-IoT module.

Certification Purpose
This test report is to support a Class II Permissive Change of the cellular modem to address a trace layout change through a u.fl connector to a PCB antenna.

Equipment Under Test Power Configuration			
Rated Voltage	**Rated Current**	**Rated Frequency**	**Number of Phases**
4.2Vdc	1.0A	NA	NA

Operating modes of the EUT

No.	Descriptions of EUT Exercising
1	The on-board eSIM was programmed as a test SIM. Using TeraTerm, AT commands were sent over USB. The EUT was configured to allow constant connection to a CMW-500 communications test set. The CMW was used to control the band, channel, and force the radio to transmit at max power. In RMC Test Mode, the duty cycles for CatM and NbIoT were 30.1% and 52.0% respectively.

Test Channels						
FCC Rule Part	ISED RSS	LTE Band	Frequency Band (MHz)	Channel Location	Test Frequency (MHz)	
					CatM	NBIoT
Part 24E	RSS-133	2	1850-1910	Low	1852.5	1850.2
				Middle	1882.5	1882.5
				High	1907.5	1909.8

Software used by the EUT

No.	Description of Control Software
1	TeraTerm Version 5.0

Radio/Receiver Characteristics (Band 2)	
Frequency Ranges	1850-1910MHz
Modulation Type(s)	CatM: QPSK / 16QAM NBIoT: π/2 BPSK / π/4 QPSK
Maximum Output Power (Conducted):	25dBm (0.316W) – Including tune up tolerance
Power Setting	Max
MIMO Information (# of Transmit and Receive antenna ports)	1 (SISO)
Equipment Type	Full Module
Antenna Type and Gain	PCB Patch Antenna (+0.59dBi) *Note: Values provided by Sensus. Intertek does not claim any responsibility for the accuracy of this data.*

Note: The worst-case CatM configuration from the original certification was with a 5MHz cell bandwidth, QPSK modulation, and 1RB Pos 0. For NBIoT, the worst-case setting was 12kHz bandwidth, π/4 QPSK, and 3 tones. The worst-case orientation for radiated field strength measurements was the Y-Axis.

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	DC Power	2.0	None	None	DC Power Supply

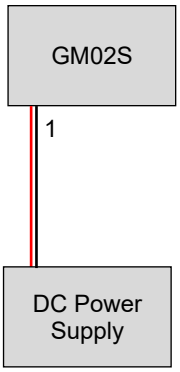
System Configuration			
Description	Manufacturer	Model Number	Serial Number
Transceiver Module	Sensus Metering Systems Inc.	GM02S	G0R2549_135[1] G0R2549_334[2]
Cellular Modem	Sequans	GM02S	IMEI: 359197355731598[1] IMEI: 359197355760357[2]
DC Power Supply	Kikusui	PAS 60-18	ML000349

1) Conducted Measurements
2) Radiated Measurements

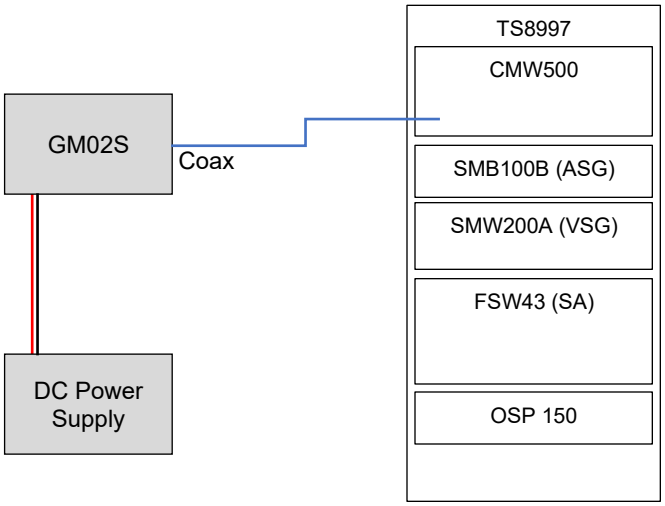
5.1 Method

Configuration as required by ANSI C63.26.

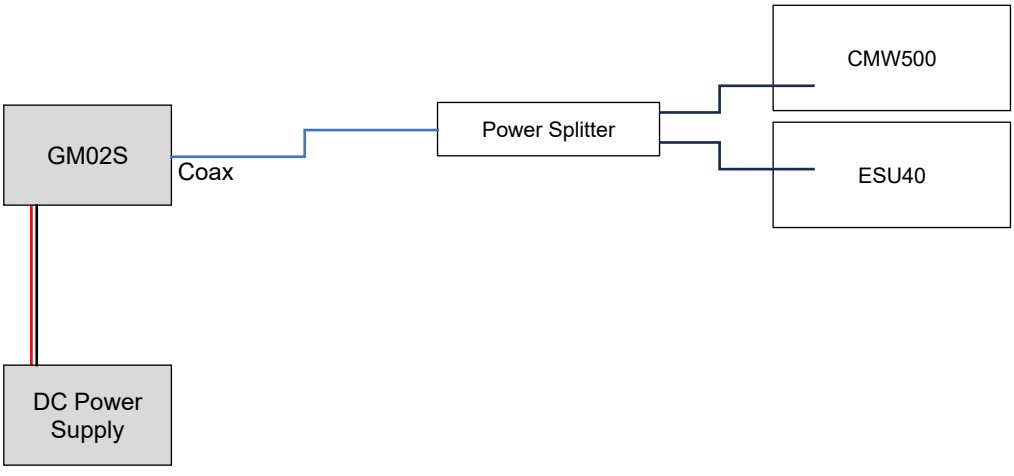
5.2 EUT Block Diagram – Radiated Measurements



5.3 EUT Block Diagram – Conducted Measurements (Power)



5.4 EUT Block Diagram – Conducted Measurements (Spurious Emissions)



6 RF Output Power (FCC 24.232 / RSS-133, S5.5)

6.1 Method

The methods defined in ANSI C63.26, Sections 5.2.4.2 were applied for measuring the average (RMS Burst) output power. Because power was only reported during on times of the transmission, no duty cycle correction was required. The antenna port was connected directly to a CMW500 through a coaxial cable. The CMW was configured with both signaling and measurement capabilities. The attenuation was accounted for by applying an offset on the CMW.

TEST SITE: RF Bench

The RF bench consists of a Rohde & Schwarz TS8997 automated test system coupled with a temperature/humidity environmental chamber. Where applicable, 2.4 and 5GHz radio 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
212165	Temperature/Humidity/Pressure Sensor	Extech	SD700	110344	04/29/2025	04/29/2026
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	08/20/2024	08/20/2026
213499	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	172359	08/08/2025	08/08/2027
213503-01	Megaphase	OSP DUT Cable 1	KC12-K1K1-80	20815001 001	VBU	VBU

Software Utilized

Name	Manufacturer	Version
CMW-KS300 NB-IOT SIG	Rohde & Schwarz	4.0.230.8
CMW-KS590 LTE MTC SIG	Rohde & Schwarz	4.0.230.5
CMW-KS500 LTE FDD R8 SIG BASIC	Rohde & Schwarz	4.0.230.5
CMW-KM300 NB-IOT R13/14 TX MEAS	Rohde & Schwarz	4.0.230.8
CMW-KM500 LTE FDD R8 TX MEAS	Rohde & Schwarz	4.0.230.5
CMW-KM550 LTE TDD R8 TX MEAS	Rohde & Schwarz	4.0.230.5

6.3 Results

The sample tested was found to Comply.

6.4 Test Data

FCC Rule Part / RSS	Frequency (MHz)	Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ERP (dBm)	FCC EIRP Limit (dBm)	ISED EIRP Limit (dBm)
CatM							
24E / RSS-133	1852.5	22.03	0.59	22.62	20.47	33.0	33.0
24E / RSS-133	1882.5	22.85	0.59	23.44	21.29	33.0	33.0
24E / RSS-133	1907.5	21.88	0.59	22.47	20.32	33.0	33.0
NBIoT							
24E / RSS-133	1850.2	22.79	0.59	23.38	21.23	33.0	33.0
24E / RSS-133	1882.5	22.76	0.59	23.35	21.2	33.0	33.0
24E / RSS-133	1909.8	22.62	0.59	23.21	21.06	33.0	33.0

Calculation: P_{EIRP} = Power + Antenna Gain (dBi)
P_{ERP} = Power + Antenna Gain (dBi) - 2.15
2.15 is the conversion from EIRP to ERP

Test Personnel:	Jeremy Pickens	Test Date:	16 January 2026
		Ambient Temperature:	17.2ºC
Reference Standard:	ANSI C63.26	Relative Humidity:	16.8%
		Atmospheric Pressure:	98.1kPa

7 Spurious Emissions at Antenna Terminals (FCC 24.238 / RSS-133, S5.6)

7.1 Method

The methods defined in ANSI C63.26, Section 5.7.3 were applied for measuring the out of band emissions. The antenna port was connected directly to a spectrum analyzer and CMW500 through cables and attenuator(s). Tile software was used to collect the data from the spectrum analyzer in ranges with the preselector active to prevent overloading. The RF path attenuation was accounted for by applying a correction factor to the data collected from the spectrum analyzer. The spectrum analyzer was configured with the following Resolution Bandwidth (RBW) settings:

Frequency Range (MHz)	RBW
30 – 1000	100 kHz
1000 – 10000	1 MHz

TEST SITE: 10-Meter Chamber Control Room

7.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	10/07/2025	10/07/2026
212166	Temperature/Humidity/Pressure Sensor	Extech	SD700	110392	04/02/2025	04/02/2026
213499	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	172359	08/08/2025	08/08/2027
213500	Analog Signal Generator (8kHz-40GHz)	Rohde & Schwarz	SMB100B	106096	08/20/2024	08/20/2026
213502	Spectrum Analyzer (2Hz-43.5GHz)	Rohde & Schwarz	FSW43	102972	08/01/2024	08/01/2026
213503-01	Megaphase	OSP DUT Cable 1	KC12-K1K1-80	20815001 001	VBU	VBU
213503-02	Megaphase	OSP DUT Cable 2	KC12-K1K1-80	20815001 002	VBU	VBU
213503-03	Megaphase	OSP DUT Cable 3	KC12-K1K1-80	20815001 003	VBU	VBU
213507-06	Tojoin	6dB SMA Attenuator	6dB	240425	VBU	VBU
213530	Mini-Circuits	Power Divider	ZC2PD-5R263-S+	5383081	VBU	VBU

1) Note: The signal generator and spectrum analyzer were used to characterize the path losses.

Software Utilized

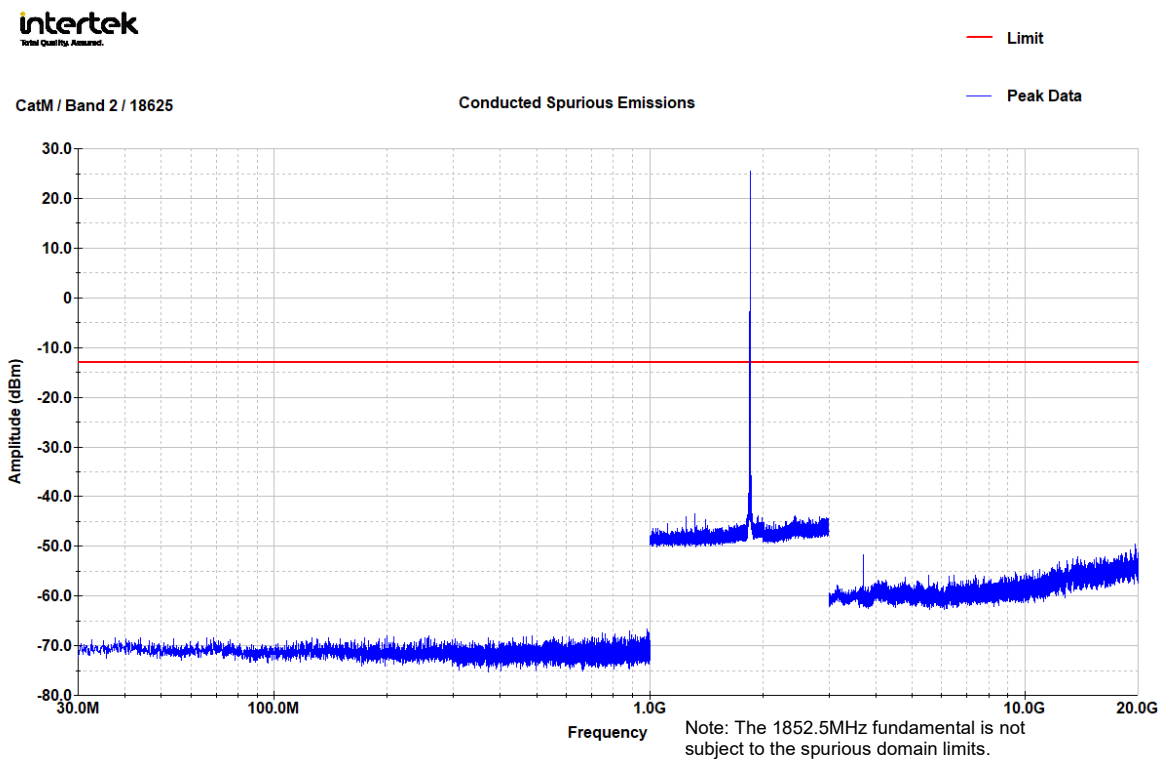
Name	Manufacturer	Version
Tile7	ETS-Lindgren	7.9.3.6

7.3 Results

The sample tested was found to Comply.

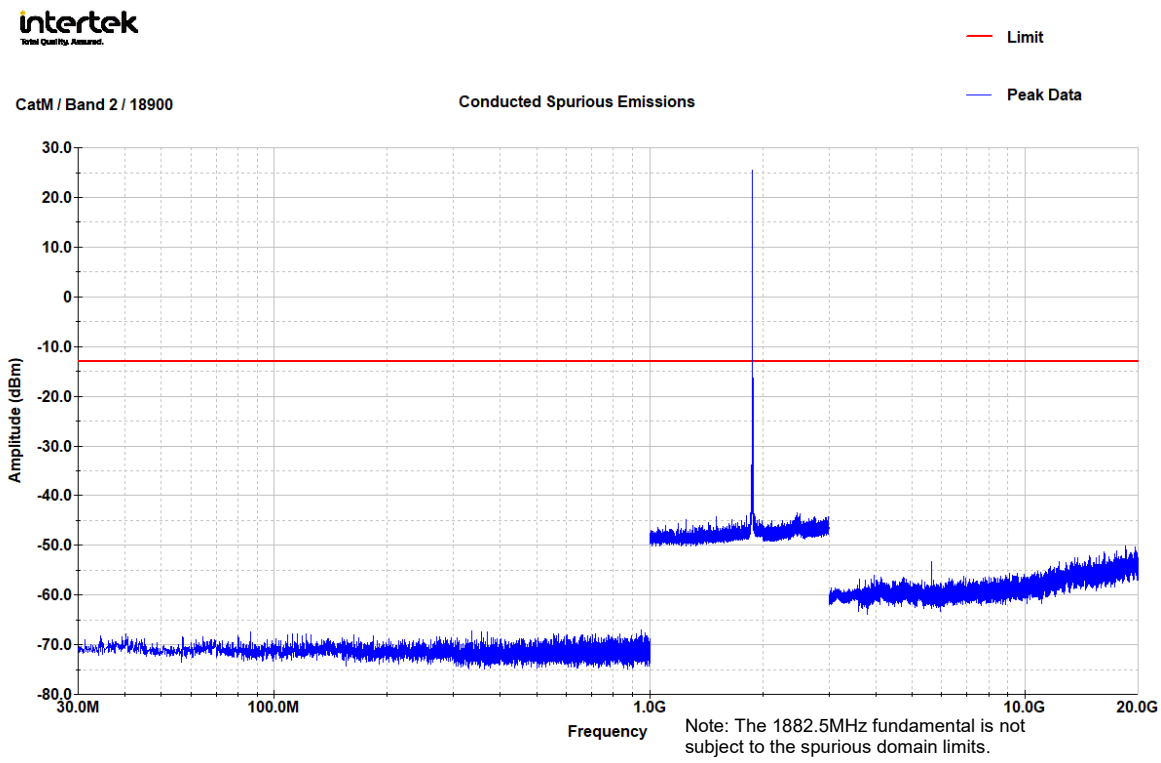
7.4 Test Data

1852.5MHz – CatM



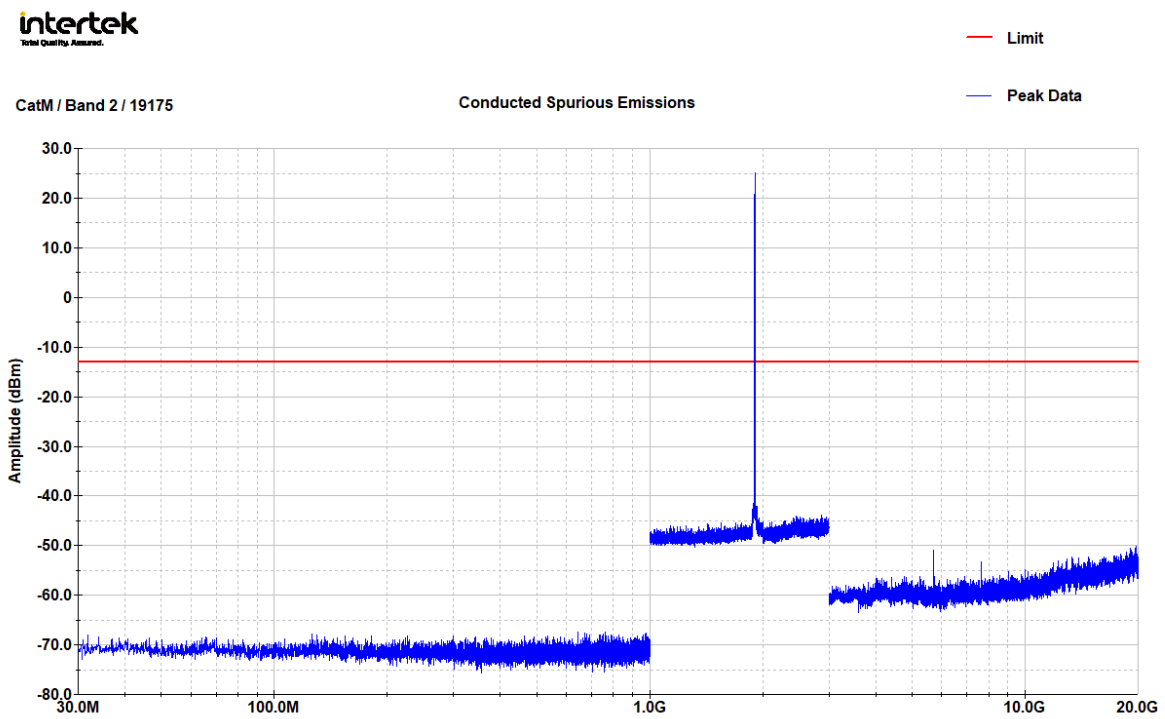
Note: The 1852.5MHz fundamental is not subject to the spurious domain limits.

1882.5MHz – CatM



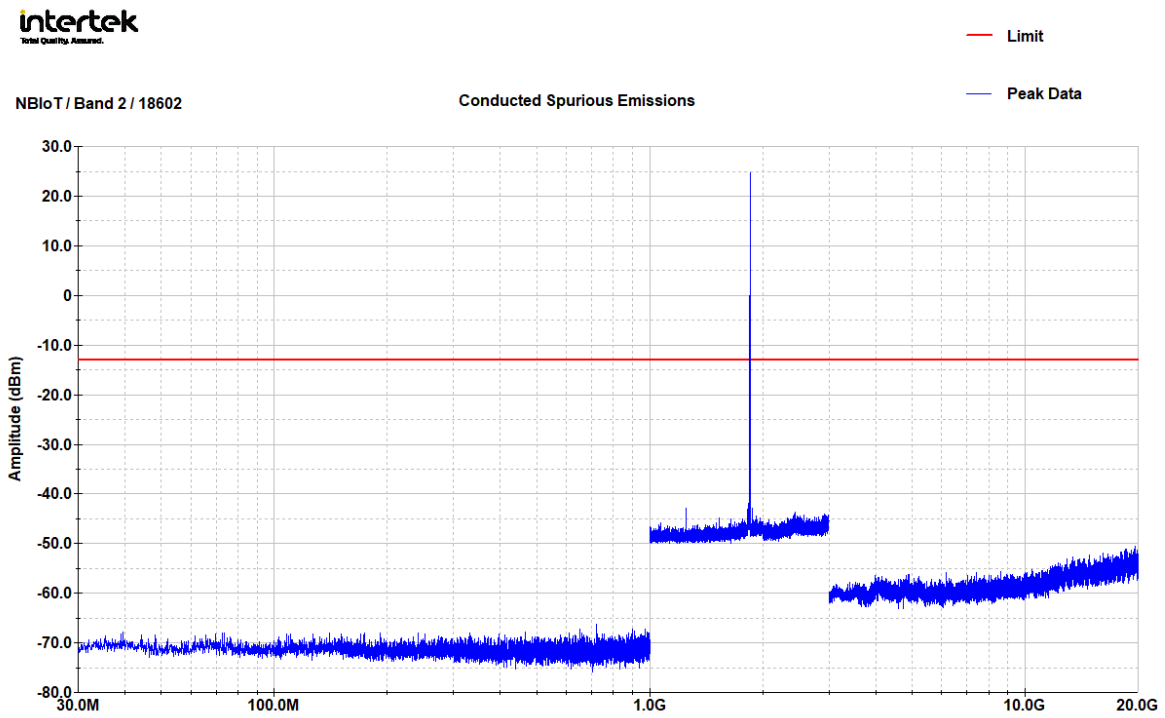
Note: The 1882.5MHz fundamental is not subject to the spurious domain limits.

1907.5MHz – CatM



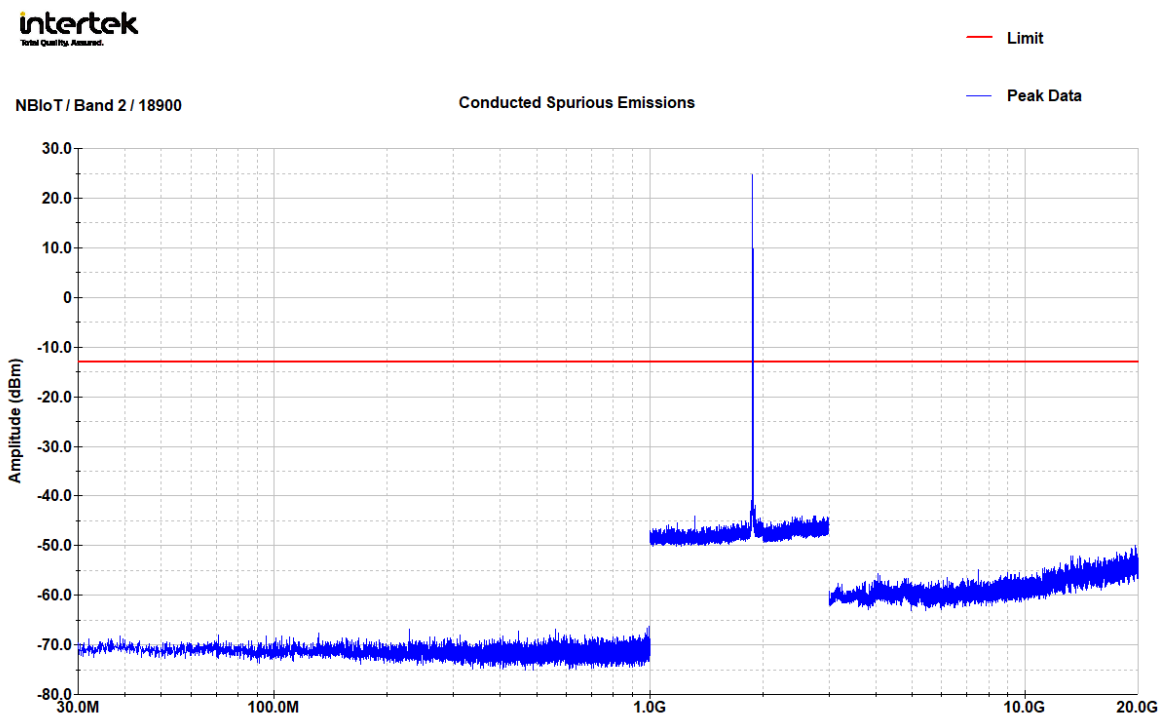
Note: The 1907.5MHz fundamental is not subject to the spurious domain limits.

1850.2MHz – NBIoT



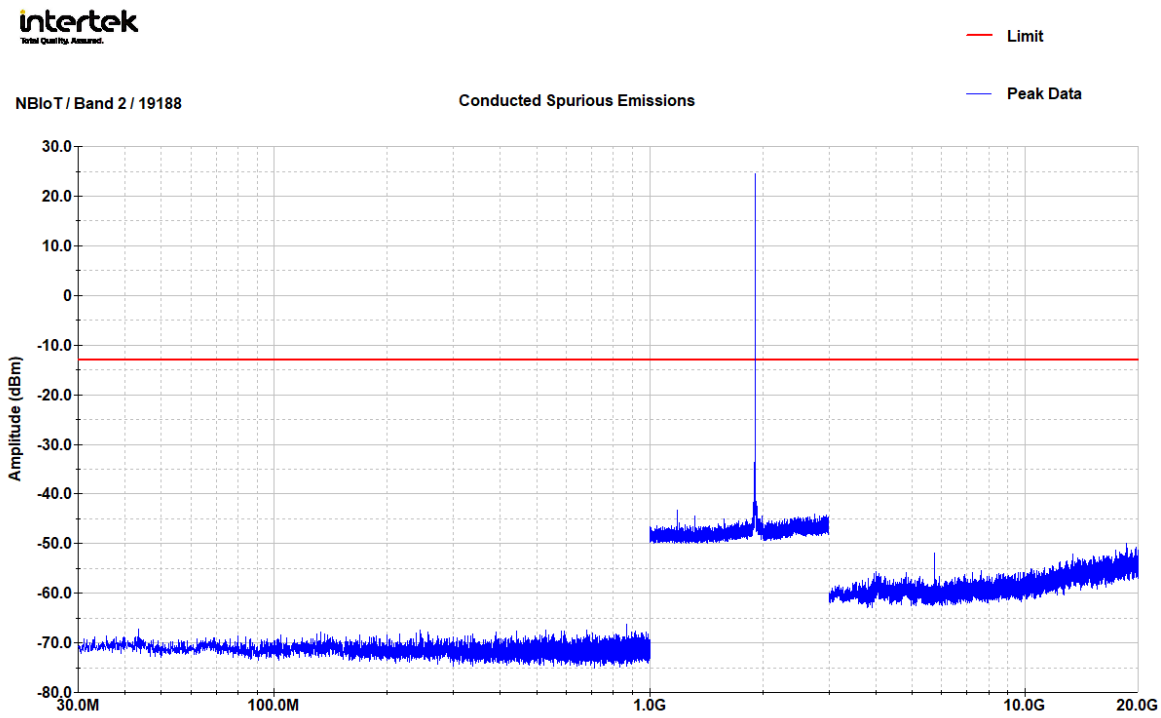
Note: The 1850.2MHz fundamental is not subject to the spurious domain limits.

1882.5MHz – NBIoT



Note: The 1882.5MHz fundamental is not subject to the spurious domain limits.

1909.8MHz – NBIoT



Note: The 1909.8MHz fundamental is not subject to the spurious domain limits.

Test Personnel:	Jeremy Pickens	Test Date:	03 February 2026
		Ambient Temperature:	19.1ºC
Reference Standard:	ANSI C63.26	Relative Humidity:	19.7%
		Atmospheric Pressure:	98. 3kPa

8 Field Strength of Spurious Emissions (FCC 24.238 / RSS-133, S5.6)

8.1 Method

The field strength methods defined in ANSI C63.26, Section 5.5.4 were applied for measuring the radiated spurious emissions. The EUT was tested at a height of 0.8m for measurements below 1GHz and at 1.5 meters for measurements above 1GHz. Radiated field strength pre-scans were performed at a distance of 3 meters using a peak detector, and resolution bandwidth of 200Hz (9kHz to 150kHz), 10kHz (15kHz-30MHz), 100kHz (30MHz-1GHz), and 1MHz above 1GHz. The video bandwidth (VBW) was set to at least 3 times the RBW. . The results were compared to the EIRP limits by applying a 95.2dB conversion to the applicable limit (-13dBm + 95.2 = 82.2dBµV/m at 3 meters). For tabular data, the resulting peak field strength measurements were converted to EIRP using the same 95.2dB correction and compared to the applicable EIRP limit.

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:

Correction = AF + CF - AG
FS = RA + Correction

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

An example for the calculations in the following table is as follows.

Assume a receiver reading of 70.92 dBµV is obtained. The correction factor is calculated by adding the antenna factor of 26.26 dB and cable factor of 1.89 dB. The amplifier gain of 40.11 dB is subtracted, giving a correction factor of -11.96 dB/m. The correction factor is then added to the receiver amplitude resulting a field strength of 58.96dBµV/m.

RA = 70.92 dBµV
Correction = -11.96 dB/m
FS = 58.96 dBµV/m

To convert from field strength to EIRP, the following equations were used

$EIRP = (E \times d)^2 / 30$

Where: E = field strength in V/m
d = measurement distance in m
EIRP = equivalent isotropically radiated power in W

Working in dB units:

$EIRP_{dBm} = E_{dB\mu V/m} + 20\log(d_m) - 104.77$

For d = 3:

$EIRP_{dBm} = E_{dB\mu V/m} - 95.2$

Example

FS = 58.96 dBµV/m
$EIRP_{dBm}$ = 58.96 – 95.2 = --36.24 dBm

8.2 Test Equipment

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200074	Preamplifier, 10 MHz to 2000 MHz	Mini-Circuits	ZKL-2	D052005	08/04/2025	08/04/2026
200162	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	10/07/2025	10/07/2026
211262	Controller - Turntable and Mast	Sunol	SC99V	SC99V-1	VBU	VBU
211264	Mast - Antenna	Sunol	TWR95	NNN2	VBU	VBU
211386	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	06/30/2025	06/30/2026
212166	Temperature/Humidity/Pressure Sensor	Extech	SD700	110392	04/02/2025	04/02/2026
213073	Antenna positioning tower	Sunol	TLT2	040314-5	VBU	VBU
213154A	3 GHz High Pass Filter	Filtek	HP12/3000-5AB	15B57-01	05/21/2025	05/21/2026
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
BOX-HORN1	Antenna, Horn, <18 GHz	EMCO	3115	9512-4632	06/25/2025	06/25/2026
MM5	RF Coax Cable 9kHz-18GHz	Maury Microwave	UC-N-MM78	1514381	04/01/2025	04/01/2026
MM12	RF Coax Cable 9kHz-18GHz	Fairview Microwave	SCE18110505-600CM	MM12	09/11/2025	09/11/2026
MM36	RF Coax Cable 9kHz-18GHz	Maury Microwave	UC-N-MM36	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
MP14	RF Coax Cable 9kHz-18GHz	Megaphase	EC29-N1N1-276-H	20938802	9/19/2025	09/19/2026

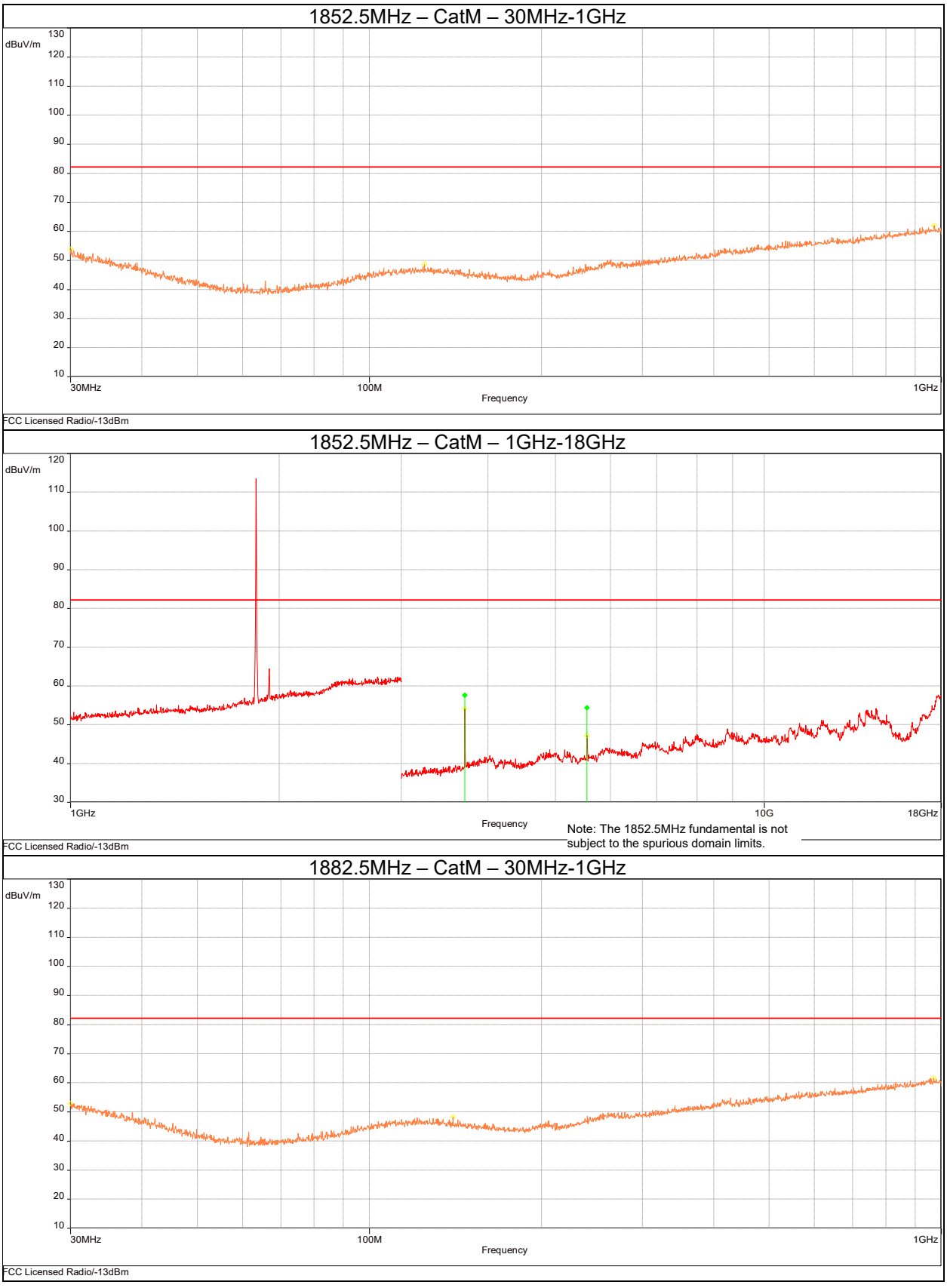
Software Utilized

Name	Manufacturer	Version
BAT EMC	NEXIO	3.19.1.18

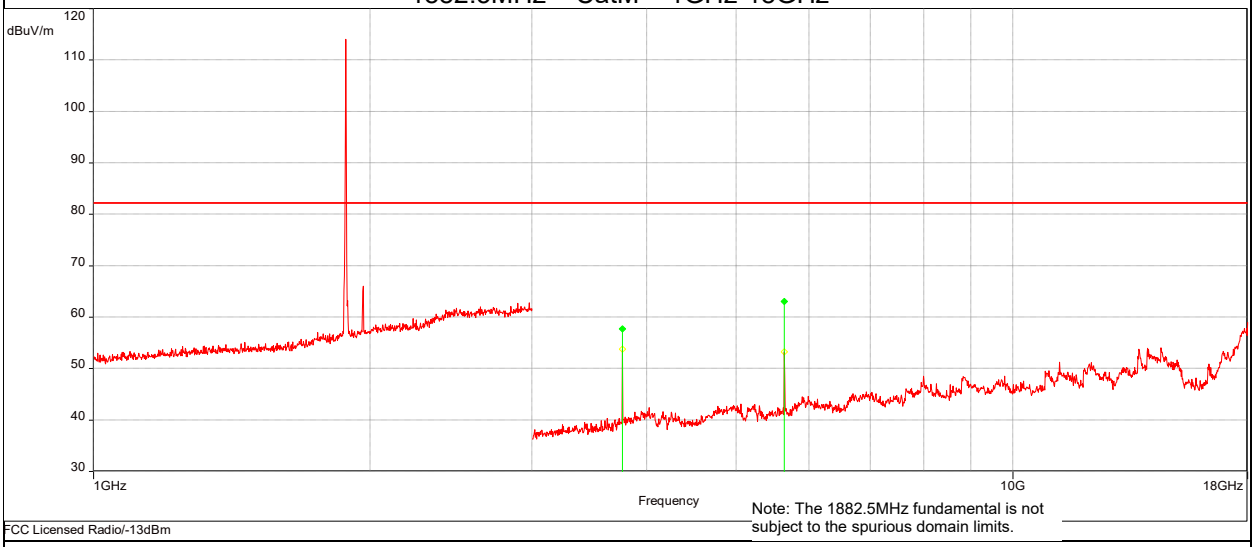
8.3 Results

The sample tested was found to Comply.

8.4 Plots/Data

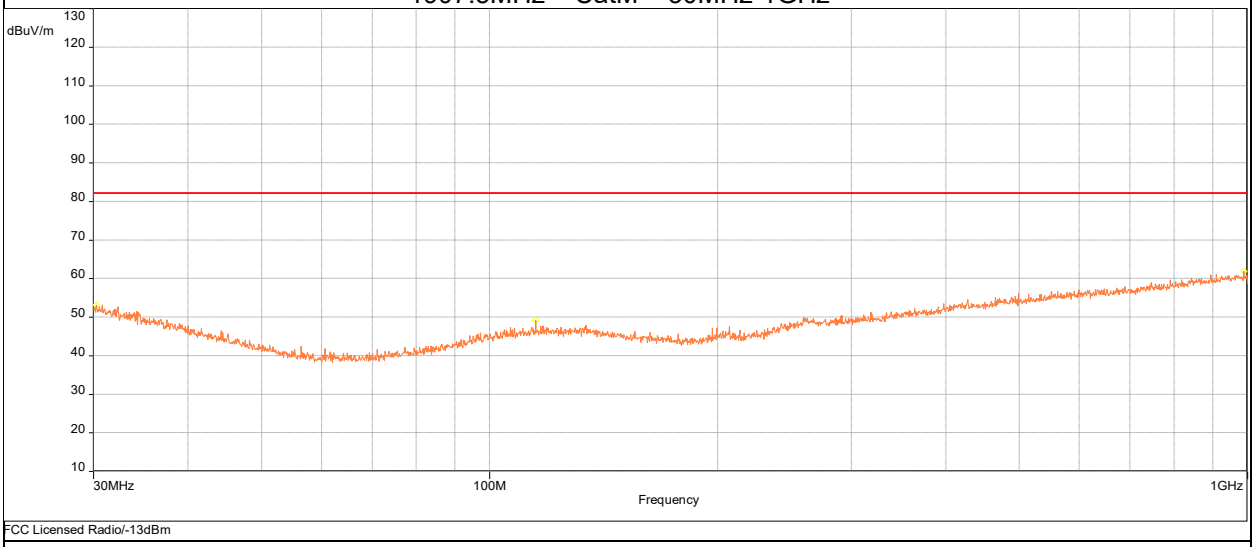


1882.5MHz – CatM – 1GHz-18GHz

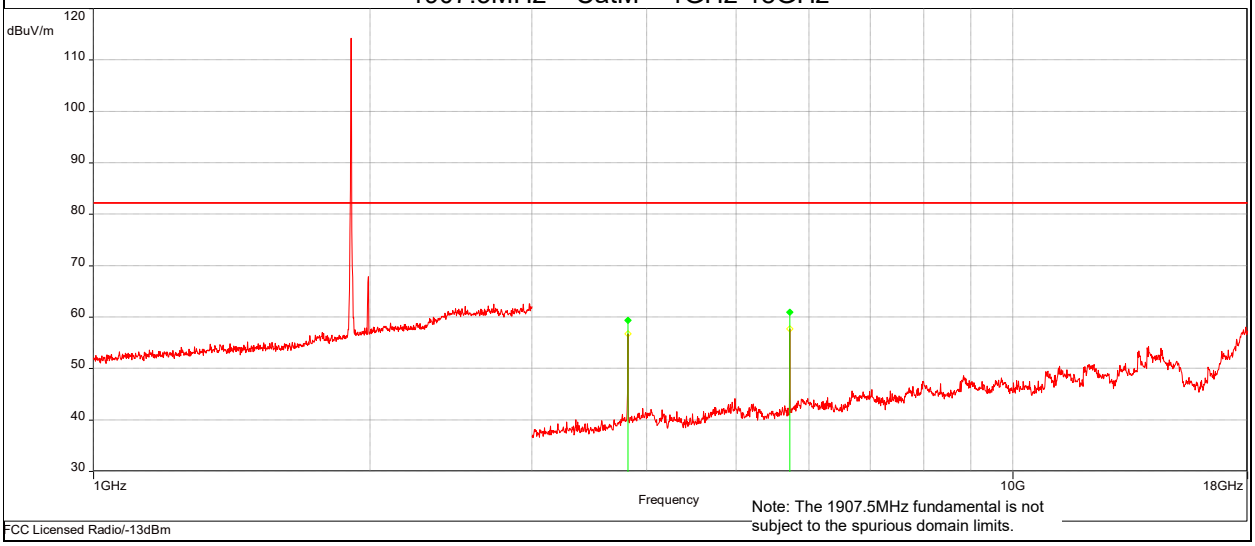


Note: The 1882.5MHz fundamental is not subject to the spurious domain limits.

1907.5MHz – CatM – 30MHz-1GHz

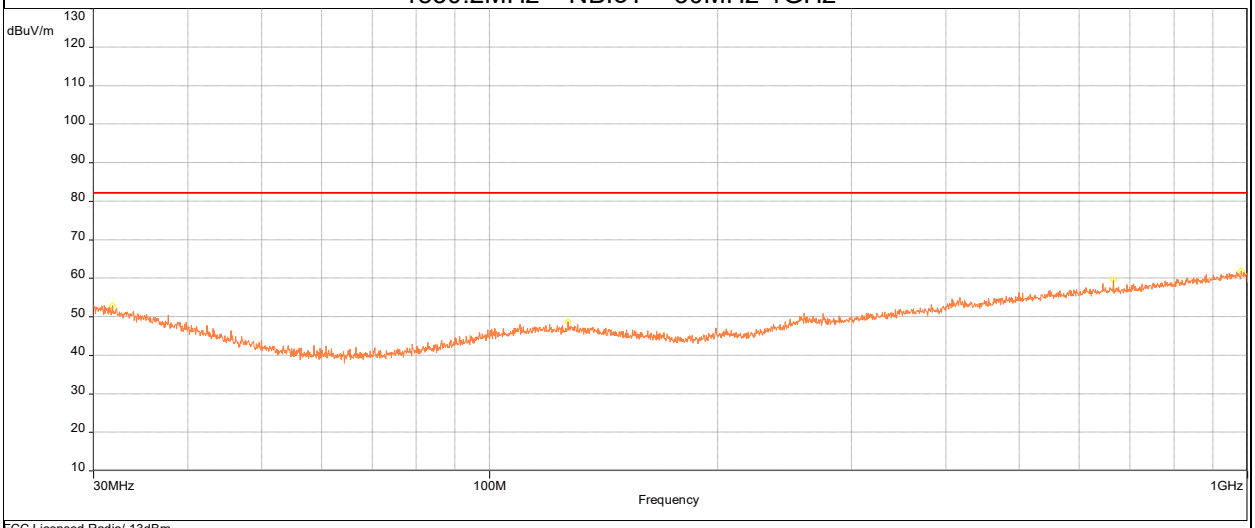


1907.5MHz – CatM – 1GHz-18GHz



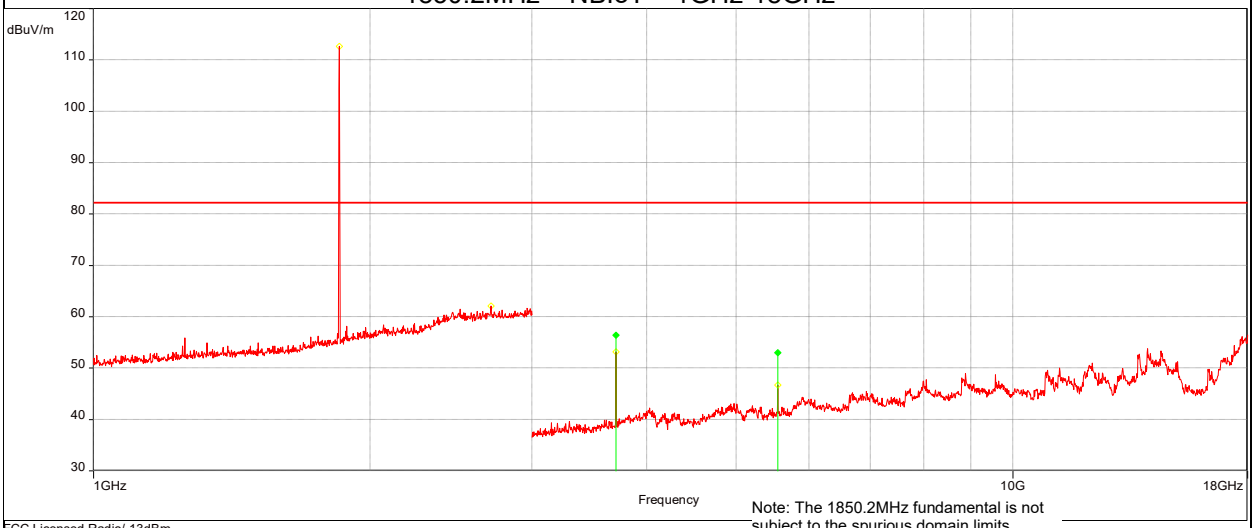
Note: The 1907.5MHz fundamental is not subject to the spurious domain limits.

1850.2MHz – NBIoT – 30MHz-1GHz



FCC Licensed Radio/-13dBm

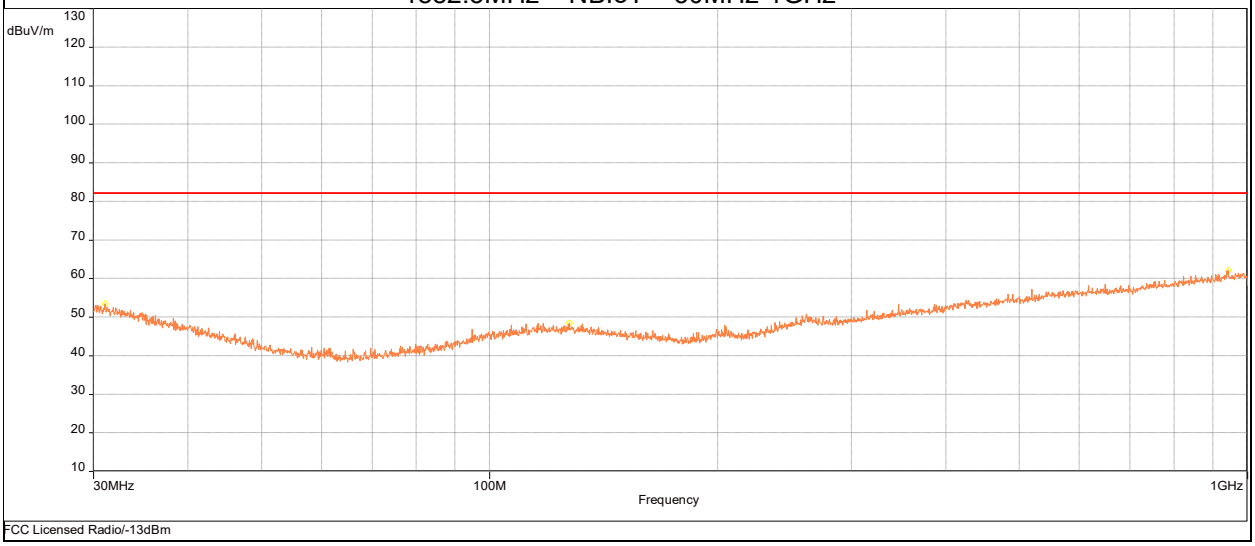
1850.2MHz – NBIoT – 1GHz-18GHz



FCC Licensed Radio/-13dBm

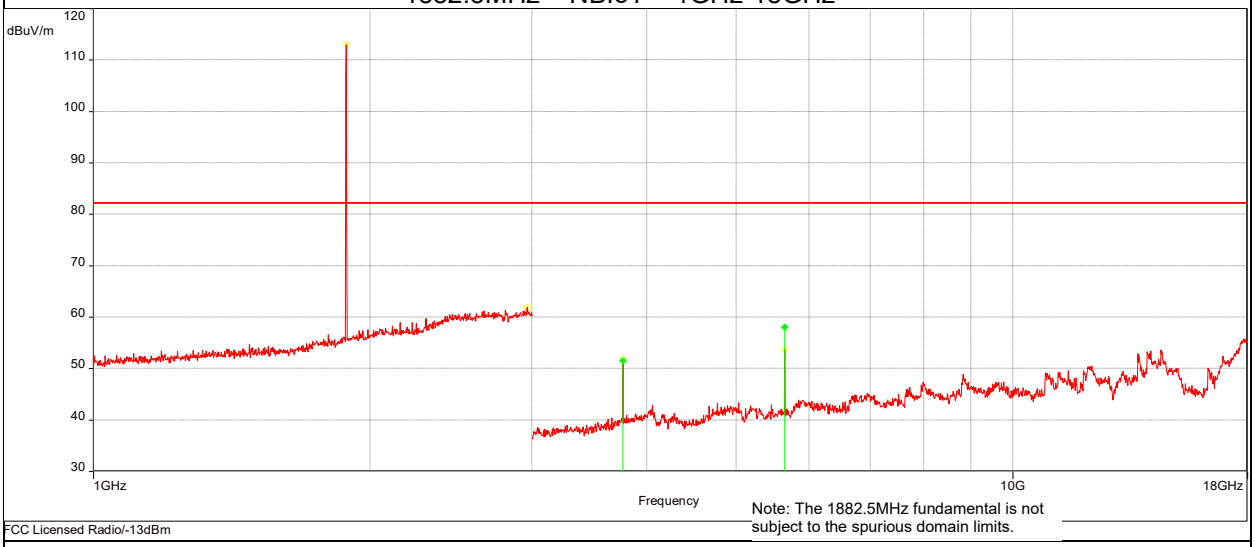
Note: The 1850.2MHz fundamental is not subject to the spurious domain limits.

1882.5MHz – NBIoT – 30MHz-1GHz



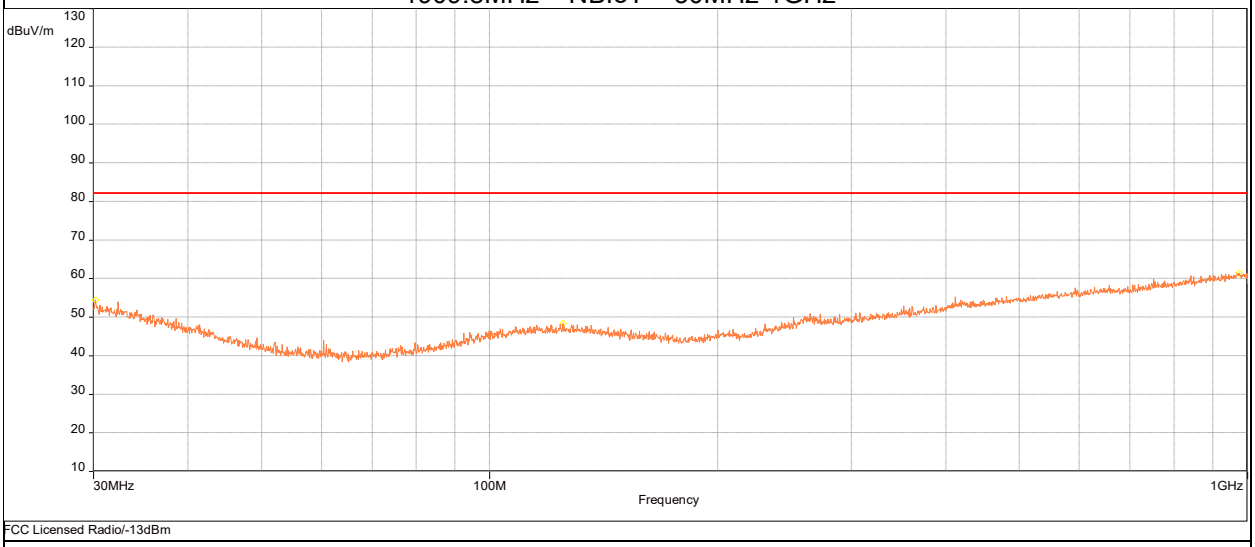
FCC Licensed Radio/-13dBm

1882.5MHz – NBIoT – 1GHz-18GHz

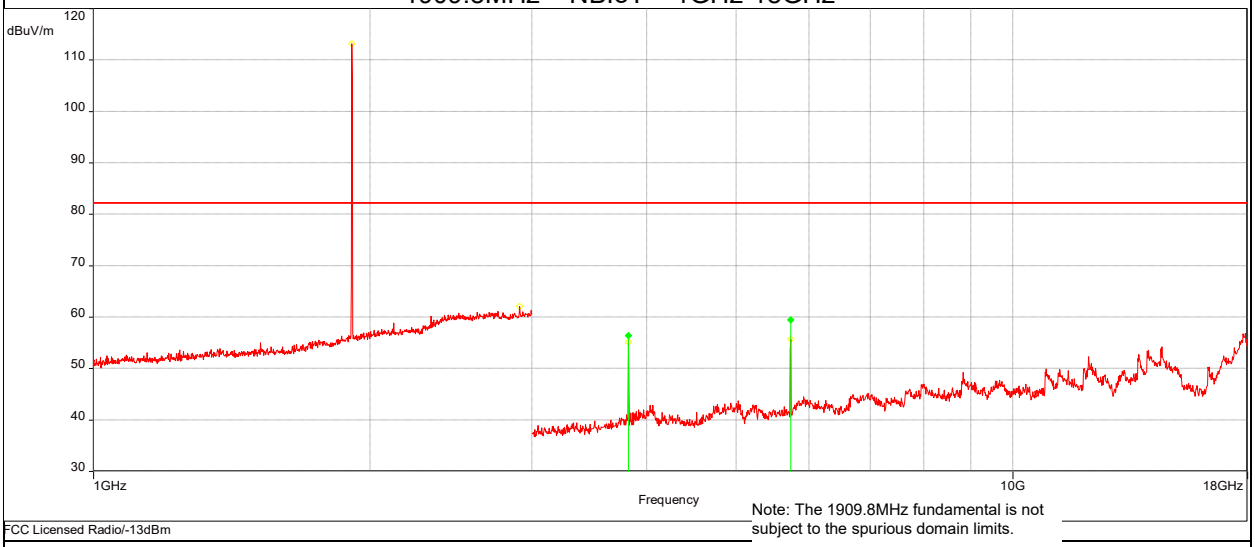


Note: The 1882.5MHz fundamental is not subject to the spurious domain limits.

1909.8MHz – NBIoT – 30MHz-1GHz



1909.8MHz – NBIoT – 1GHz-18GHz



Note: The 1909.8MHz fundamental is not subject to the spurious domain limits.

Note: Spot checks were performed for 18-20GHz and no spurious emissions were detected.

Tabular Data									
Mode	TX Frequency (MHz)	Frequency (MHz)	Reading (dBµV)	Correction (dB/m)	Field Strength (dBµV/m)	Free Space Conversion	EIRP (dBm)	Limit (dBm)	Margin (dB)
CatM Band 2	1852.500	3701.774	64.80	-7.17	57.63	95.2	-37.57	-13	-24.57
CatM Band 2	1852.500	5552.439	58.07	-3.69	54.38	95.2	-40.82	-13	-27.82
CatM Band 2	1882.500	3761.774	64.51	-6.77	57.74	95.2	-37.46	-13	-24.46
CatM Band 2	1882.500	5642.607	66.57	-3.55	63.02	95.2	-32.18	-13	-19.18
CatM Band 2	1907.500	3811.772	65.92	-6.53	59.39	95.2	-35.81	-13	-22.81
CatM Band 2	1907.500	5717.697	64.52	-3.53	60.99	95.2	-34.21	-13	-21.21
NBIoT Band 2	1850.200	3700.282	63.64	-7.18	56.46	95.2	-38.74	-13	-25.74
NBIoT Band 2	1850.200	5550.397	56.73	-3.69	53.04	95.2	-42.16	-13	-29.16
NBIoT Band 2	1882.500	3764.881	58.28	-6.75	51.53	95.2	-43.67	-13	-30.67
NBIoT Band 2	1882.500	5647.295	61.66	-3.55	58.11	95.2	-37.09	-13	-24.09
NBIoT Band 2	1909.800	3819.462	62.94	-6.50	56.44	95.2	-38.76	-13	-25.76
NBIoT Band 2	1909.800	5729.226	63.00	-3.53	59.47	95.2	-35.73	-13	-22.73

Test Personnel: Jeremy Pickens
Jean Rene

Reference Standard: ANSI C63.26

Test Date: 13 – 26 January 2026
Ambient Temperature: 17.5 – 21.3ºC
Relative Humidity: 17.2 – 20.9%
Atmospheric Pressure: 97.7 – 98.3kPa

9 Measurement Uncertainty

Parameter	Expanded Uncertainty for Normal k factor equal to 2
Radio Frequency	0.07 PPM
Total RF Power (Conducted)	0.65 dB
Power Density (Conducted)	0.65 dB
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%

10 Revision History

Revision Level	Date	Prepared By	Reviewed By	Notes
0	23 April 2026	JOP	JOP	Original Issue

END OF REPORT