Electromagnetic Compatibility Test Report

Tests Performed on a New Cosmos Electric Co., Ltd., DBA DeNova Detect Methane Detector with Radio Transciever, Model 810NLR

Radiometrics Document RP-10101

ACCREDITED
TESTING CERT #1495.01

Product Detail:
FCC ID: 2ARF2ML-340LR Equipment type: DSS 900 MHz
Test Standards:
US CFR Title 47, Chapter I, FCC Part 15 Subpart C FCC Part 15 CFR Title 47: 2025 This report concerns: Original Grant for Certification FCC Part 15.247

Tests Performed For:	*Test Facility:*
New Cosmos Electric Co., Ltd. **DBA DeNova Detect** 2-5-4 Misuya-naka Yodogawa--ku Osaka 5320036	**Radiometrics Midwest Corporation** 12 Devonwood Avenue Romeoville, IL 60446-1349 (815) 293-0772

Test Date(s):
January 16 to February 11, 2025

Document RP-10101 Revisions:

Rev.	Issue Date	Revised By
0	March 25, 2025	

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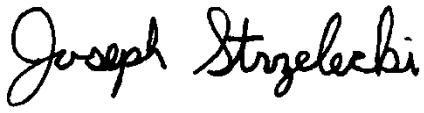
1.0 ADMINISTRATIVE DATA

Equipment Under Test:	
A New Cosmos Electric Co., Ltd. DBA DeNova Detect, Methane Detector with Radio Model: 810NLR Serial Number: RMC-03 This will be referred to as the EUT in this Report	
Date EUT Received at Radiometrics: January 15, 2025	*Test Date(s):* January 16 to February 11, 2025
Test Report Written and Authorized By: Joseph Strzelecki Senior EMC Engineer	*Test Witnessed By:* The tests were not witnessed by personnel from New Cosmos Electric Co., Ltd.
Radiometrics' Personnel Responsible for Test:  03/25/2025 Date Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE Chris D'Alessio EMC Technician	*EUT Checked By:* Joseph Strzelecki Radiometrics

2.0 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a Methane Detector with Radio, Model 810NLR, manufactured by New Cosmos Electric Co., Ltd. DBA DeNova Detect. The detailed test results are presented in a separate section. The following is a summary of the test results.

Emissions Tests Results

Environmental Phenomena	Frequency Range	Test Result
Carrier Frequency Separation	902-928 MHz	Pass
Number of Hopping Frequencies	902-928 MHz	Pass
Time of Occupancy (Dwell Time)	902-928 MHz	Pass
20 dB Bandwidth Test	902-928 MHz	Pass
Peak Output Power	902-928 MHz	Pass
Band-edge Compliance of RF Conducted Emissions	902-928 MHz	Pass
Spurious RF Conducted Emissions	30-9300 MHz	Pass
Spurious Radiated Emissions	30-9300 MHz	Pass
RF Radiated Emissions (Unintential Radiation Receive mode)	30-5,000 MHz	Pass
AC conducted Emissions	0.15-30 MHz	Not Required; No AC Power Battery powered

IEC 17025 Decision Rule:
The declaration of pass or fail is based on the specifications listed above. The declaration of pass or fail did not consider measurement uncertainty.

3.0 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is a Methane Detector with Radio, Model 810NLR, manufactured by New Cosmos Electric Co., Ltd. DBA DeNova Detect. The EUT was in good working condition during the tests, with no known defects.

3.1.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The antenna is permanently attached to the printed circuit board. The antenna is internal to the EUT and it is not readily available to be modified by the end user. Therefore, it meets the 15.203 Requirements.

Since the measurements at the antenna port are used to determine the RF output power, RSS-GEN section 6.8 requires that the effective gain of the products antenna be stated, based on a measurement or on data from the antenna's manufacturer.

4.0 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm or 150 cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

The EUT was tested as a stand-alone device. Power was supplied with a new battery.

Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	Methane Detector with Radio	E	New Cosmos Electric Co., Ltd. DBA DeNova Detect	810NLR	RMC-03

* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

Type of modulation including the bit rate and symbol rate	LoRa modulation(SF10):122.1Sps, 976.6bps
Name and version of the test software used to exercise the device	Software: FSKLoRaCmd.exe Version: v0.0.02
Power settings used for the purpose of exercising the device	22dBm
Firmware number of the transmitter	V0015

4.2 EUT Operating Modes

The EUT was in its normal LoRa modulation during the tests. It was tested as a stand-alone battery powered device, since that is the configuration in the final installation.

4.3 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.4 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5.0 TEST SPECIFICATIONS

Document	Date	Title
FCC CFR Title 47	2025	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices

6.0 TEST PROCEDURE DOCUMENTS

The tests were performed using the procedures from the following specifications:

Document	Date	Title
ANSI C63.4-2014	2014	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2013	2013	American National Standard for Testing Unlicensed Wireless Devices
558074 D01 DTS Meas Guidance	2019	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247; v05r02

7.0 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 2017 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during the tests:

Chamber E: Is a custom-made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorbers. Pro-shield of Collinsville, Oklahoma manufactured the chamber. The floor has a 9' x 9' section of microwave absorber for testing above 1 GHz.

Test Station F: Is an area that measures 10' D X 12' W X 10' H. The floor and back wall are metal shielded. This area is used for conducted emissions measurements.

A separate ten-foot long, brass plated, steel ground rod attached via a 6-inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as site number IC 3124A with a CAB ID of US0224.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

8.0 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

9.0 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification and the data contained herein was taken with calibrated test equipment. The results relate only to the EUT listed herein.

10.0 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12 GHz	12 Mo.	01/31/24
ANT-66	ETS-Lindgren	Horn Antenna	3115	62580	1.0-18 GHz	24 Mo.	03/16/23
ANT-68	EMCO	Log-Periodic Ant.	93146	9604-4456	200-1000 MHz	24 Mo.	01/30/24
ANT-80	AH Systems	Bicon Antenna	SAS-540	294	20-330 MHz	24 Mo.	01/27/25
ATT-45	Narda	Attenuator (10 dB)	779C-10dB	03078	DC-18 GHz	24 Mo.	05/31/24
ATT-66	Inmet	Attenuator(6dB)	6B10W-6dB	ATT-66	DC-10 GHz	24 Mo	05/31/24
CAB-1221	Storm	Coaxial Cable	N/A	1221	DC-18 GHz	24 Mo.	12/18/23
CAB-114G	Teledyne	Coaxial Cable	N/A	N/A	DC-25 GHz	24 Mo.	12/18/23
CAB-160B	Teledyne	Coaxial Cable	N/A	N/A	DC-25 GHz	24 Mo.	12/18/23
CAB-507A	Teledyne	Coaxial Cable	N/A	N/A	DC-25 GHz	24 Mo.	12/18/23
HPF-07	Mini-Circuits	High Pass Filter	VHF-1500+	31121	1.7-10 GHz	24 Mo.	05/22/24
REC-31	Agilent	Spectrum Analyzer	E7402A	US41160415	9kHz-3 GHz	24 Mo.	06/23/23
REC-44	Agilent	Spectrum Analyzer	E4440A	US40420673	3Hz-26.5 GHz	24 Mo.	07/18/24
THM-03	Fluke	Temp/Humid Meter	971	95850465	N/A	24 Mo.	04/14/23

Note: All calibrated equipment is subject to periodic checks.

Software Company	Test Software Name	Version	Applicable Tests
Radiometrics	REREC11D	07.21.22	RF Radiated Emissions (FCC Part 15 & EN 55032)
Agilent	PSA/ESA-E/L/EMC	2.4.0.42	Bandwidth and screen shots

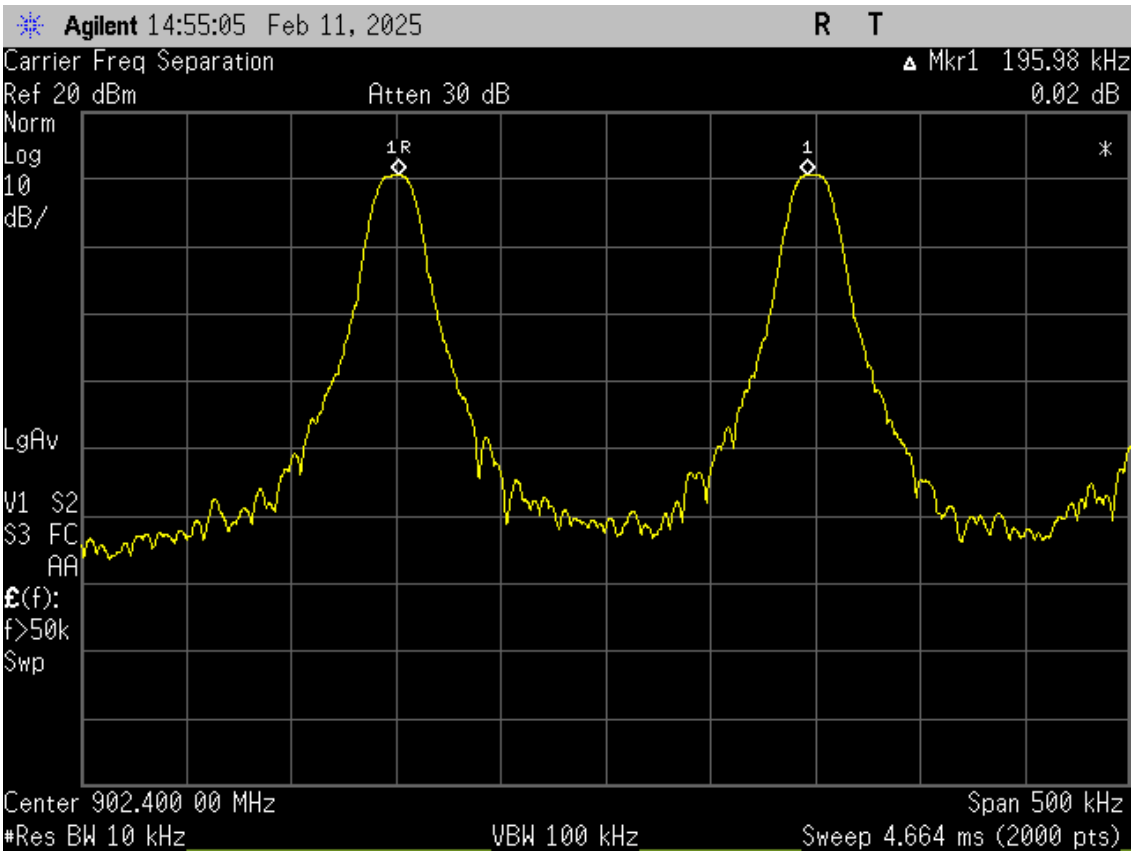
11.0 TEST SECTIONS

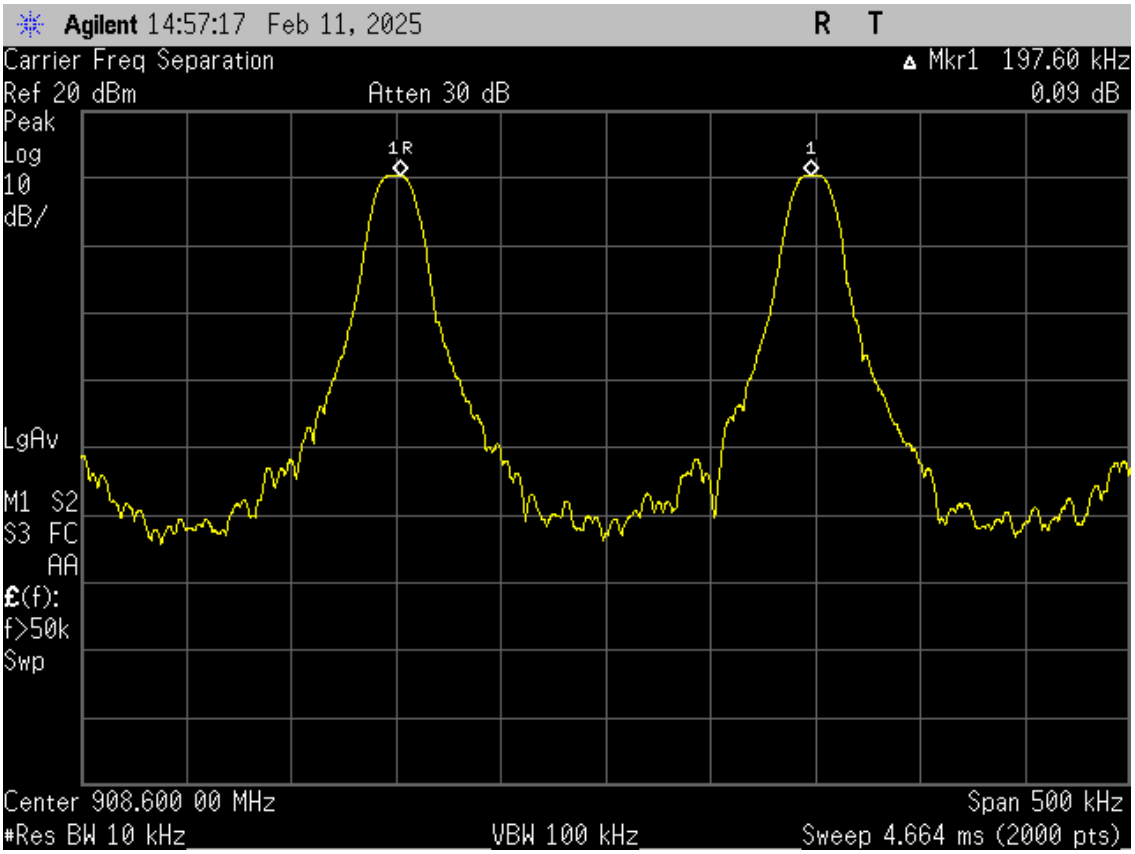
11.1 Carrier Frequency Separation

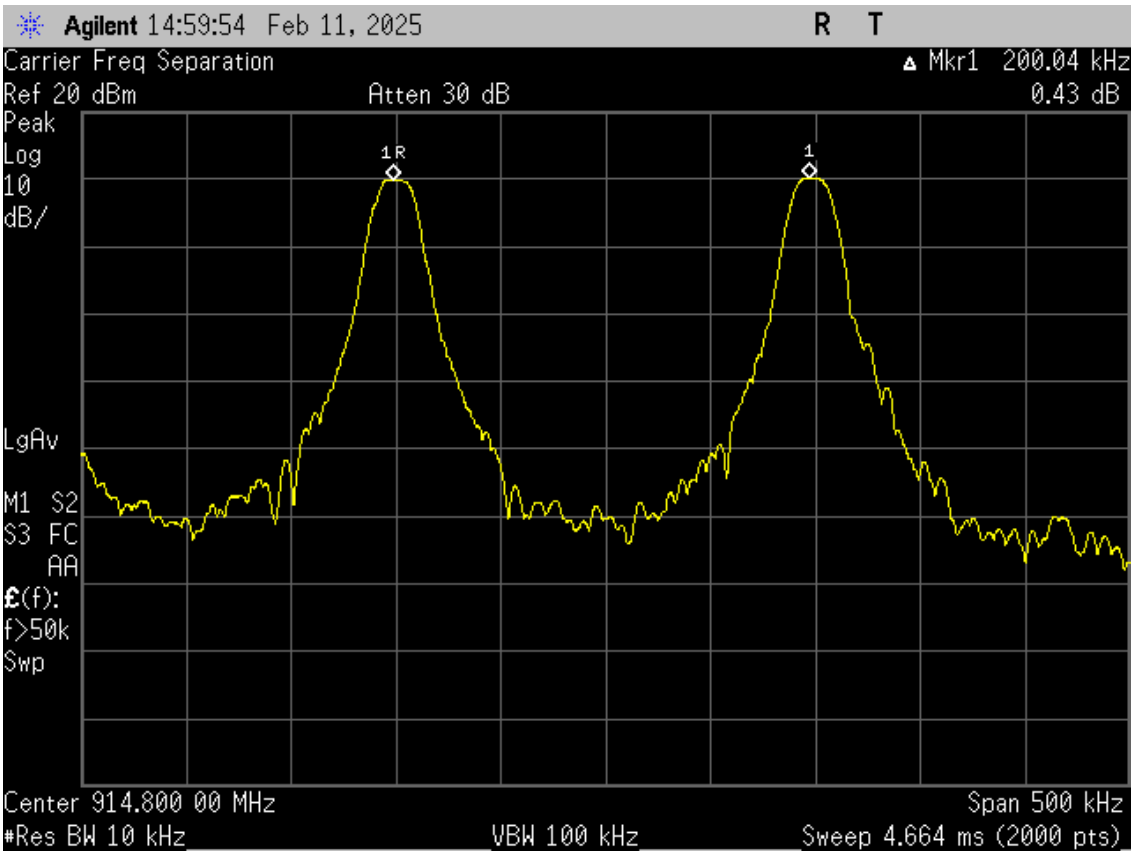
The EUT has its hopping function enabled. The spectrum analyzer was set to the MAX HOLD mode to read peak emissions. The sweep was set to AUTO. The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

As per FCC 15.247 (a) (1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Since the 20 dB bandwidth is 128.1 kHz, the minimum seperation shall be at least 128.1 kHz.

Tested by: Joseph Strzelecki
Test Date: February 11, 2025
Test Equipment: REC-44; ATT-45





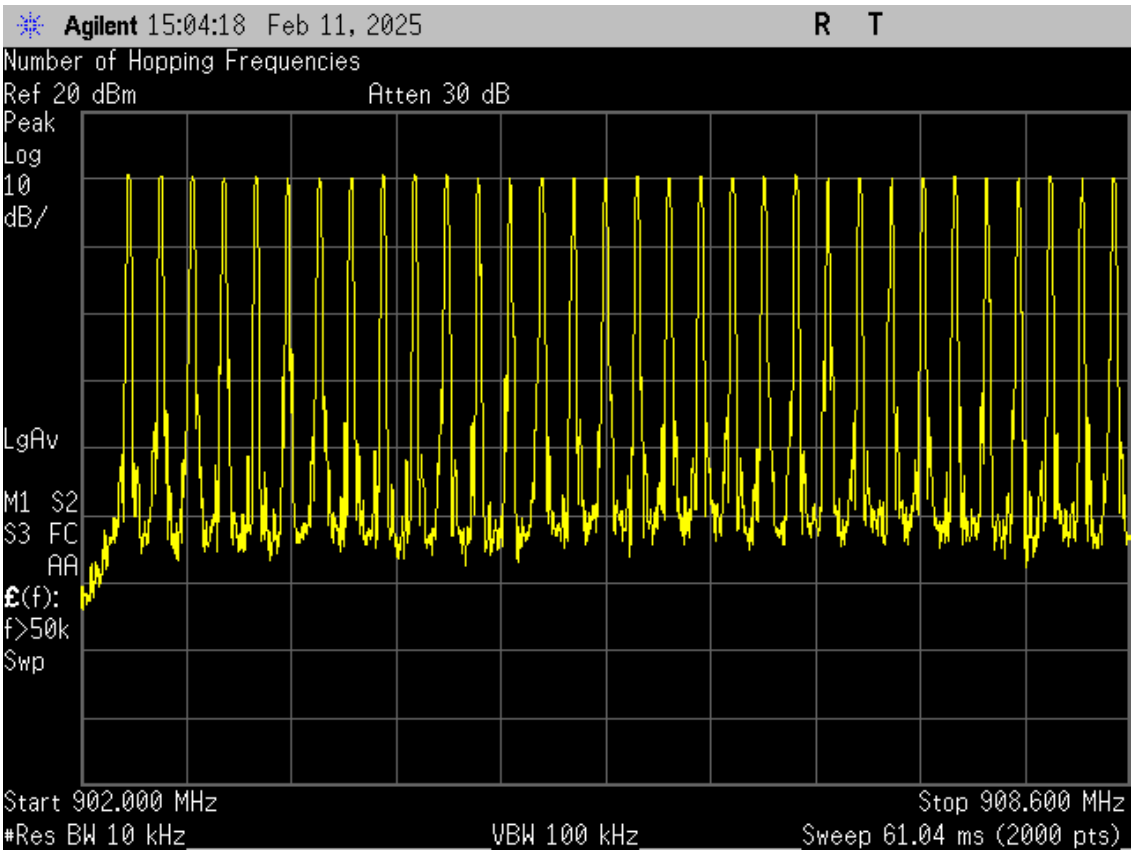


Judgement: Pass

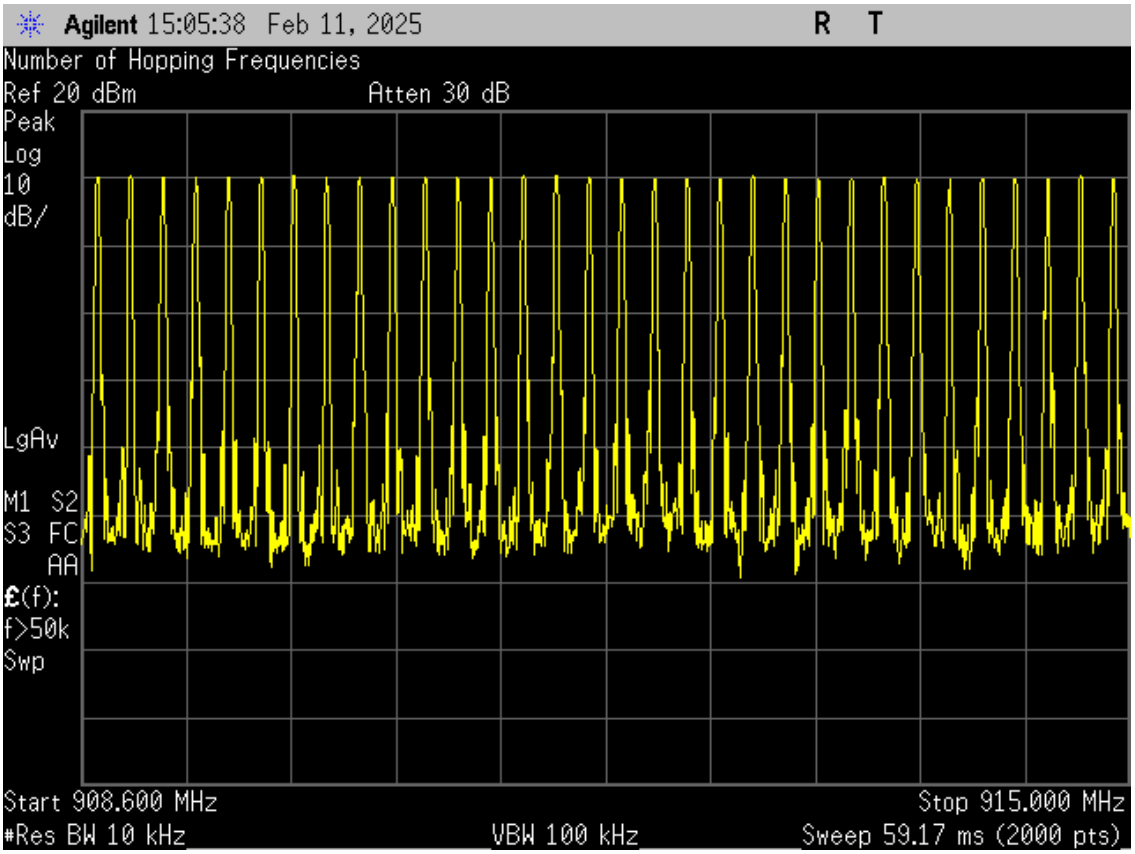
11.2 Number of Hopping Frequencies

The EUT has its hopping function enabled. The spectrum analyzer was set to the MAX HOLD mode to read peak emissions. The sweep was set to AUTO. The trace was allowed to stabilize.

Tested by: Joseph Strzelecki
Test Date: February 11, 2025
Test Equipment: REC-44; ATT-45



32 channels from 902 to 908.6 MHz



32 channels from 908.6 to 915 MHz
Judgement: Pass

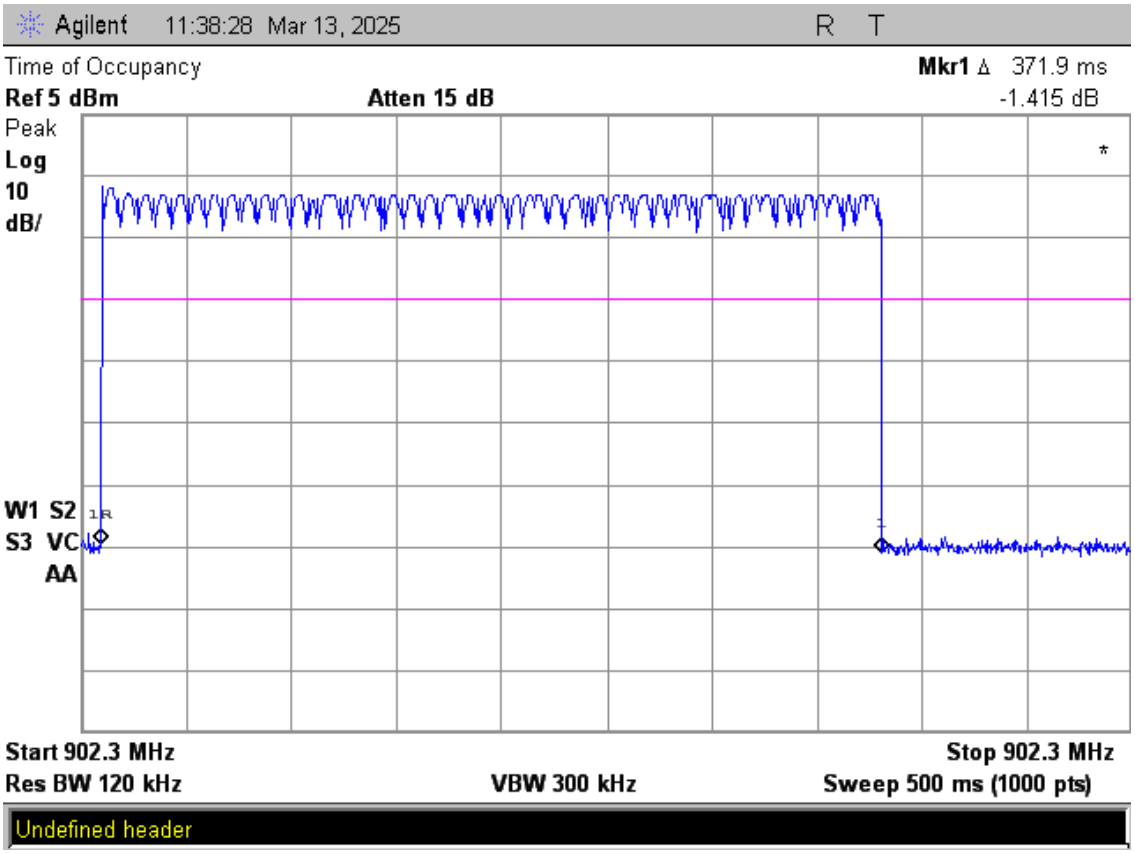
11.3 Time of Occupancy (Dwell Time)

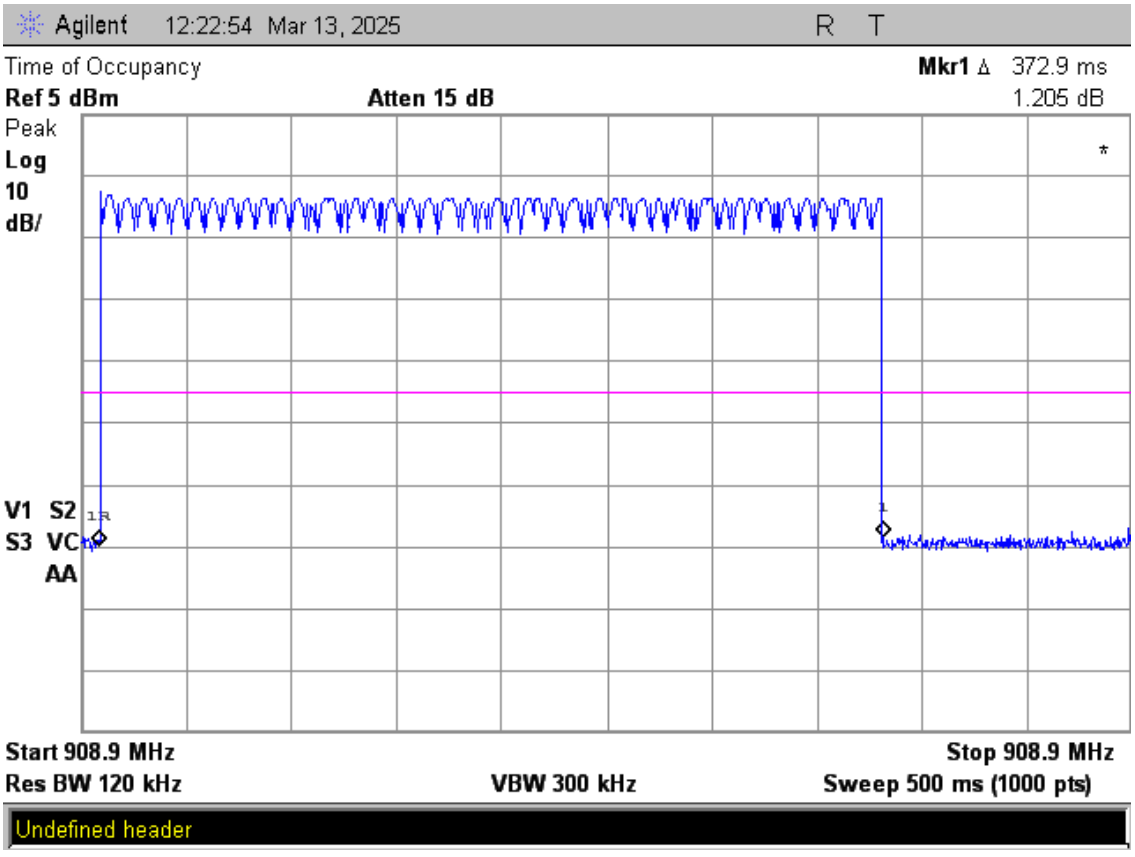
The EUT has its hopping function enabled. The spectrum analyzer was set to the MAX HOLD mode to read peak emissions. The span was set to zero. The marker-delta function to determine the dwell time. The spectrum analyzer was connected to the EUT Directly. The test procedures are in accordance with ANSI C63.10 section 7.8.4.

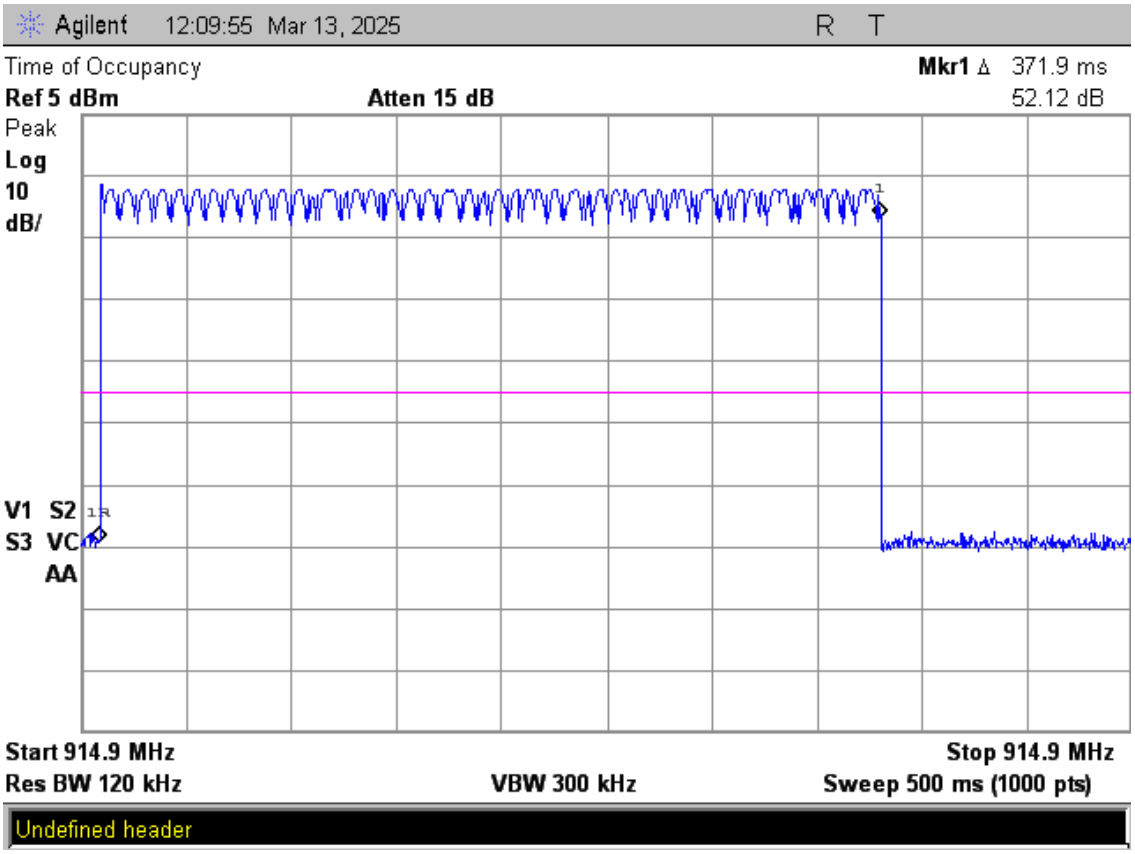
In accordance with FCC 15.247 (a)(1), the time of occupancy should be less than 400 mSec in a period of 20 seconds.

The time of occupancy was measured to be at most 372.9 mS. On any given channel, this pulse will occur less than once every 30 seconds in normal operation. This is set in firmware and cannot be changed by the end user.

Tested by: Joseph Strzelecki
Test Date: March 13, 2025
Test Equipment: REC-31; ATT-45


Agilent 11:38:28 Mar 13, 2025
R T
Time of Occupancy
Mkr1 Δ 371.9 ms
-1.415 dB
Ref 5 dBm
Atten 15 dB
Peak
Log
10
dB/
W1 S2
S3 VC
AA
Start 902.3 MHz
Res BW 120 kHz
VBW 300 kHz
Stop 902.3 MHz
Sweep 500 ms (1000 pts)
Undefined header


Agilent 12:22:54 Mar 13, 2025
R T
Time of Occupancy
Mkr1 Δ 372.9 ms
1.205 dB
Ref 5 dBm
Atten 15 dB
Peak
Log
10
dB/
V1 S2
S3 VC
AA
Start 908.9 MHz
Res BW 120 kHz
VBW 300 kHz
Stop 908.9 MHz
Sweep 500 ms (1000 pts)
Undefined header



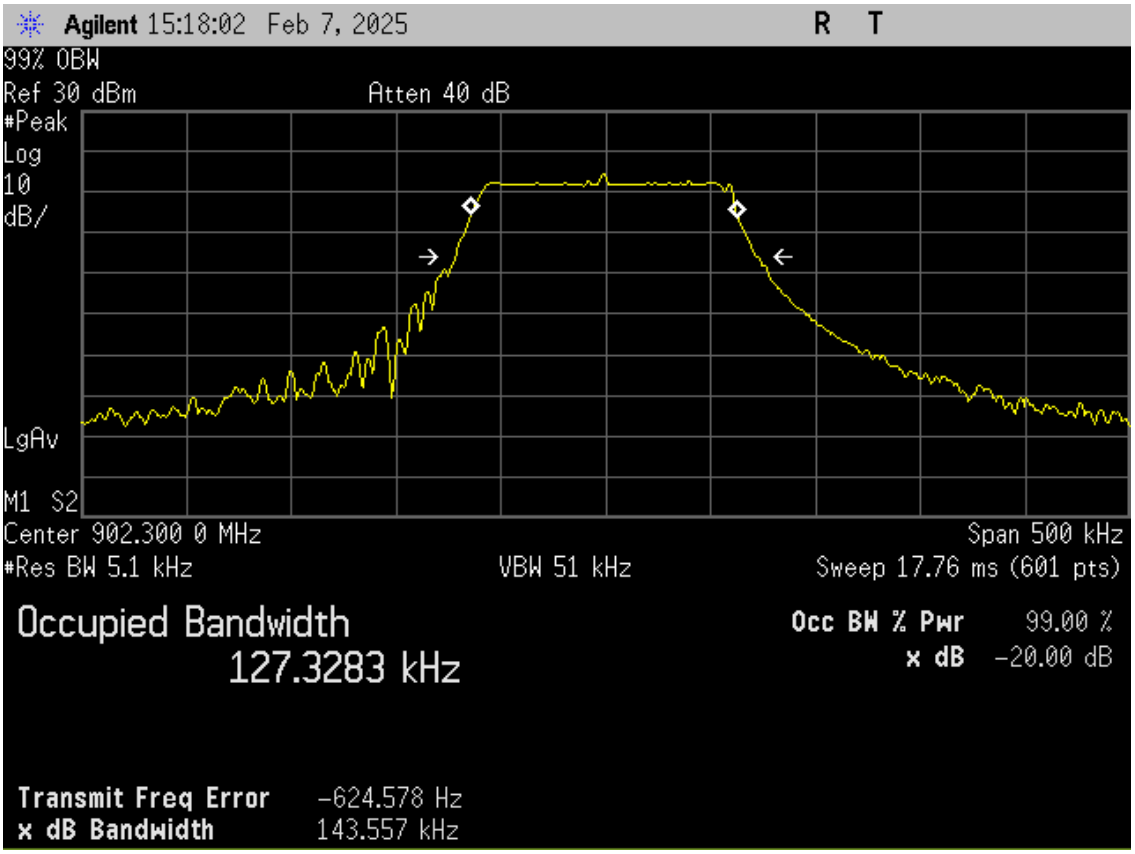
Judgement: Pass

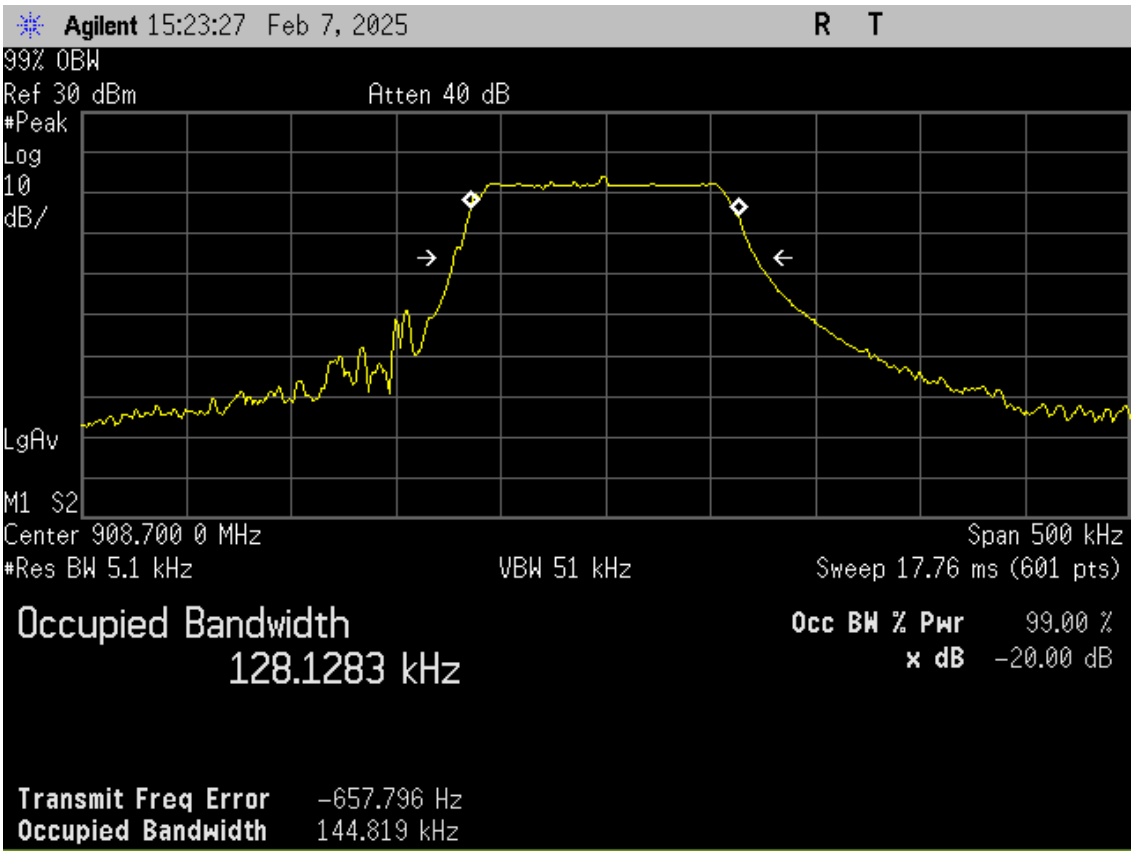
11.4 Occupied Bandwidth Data

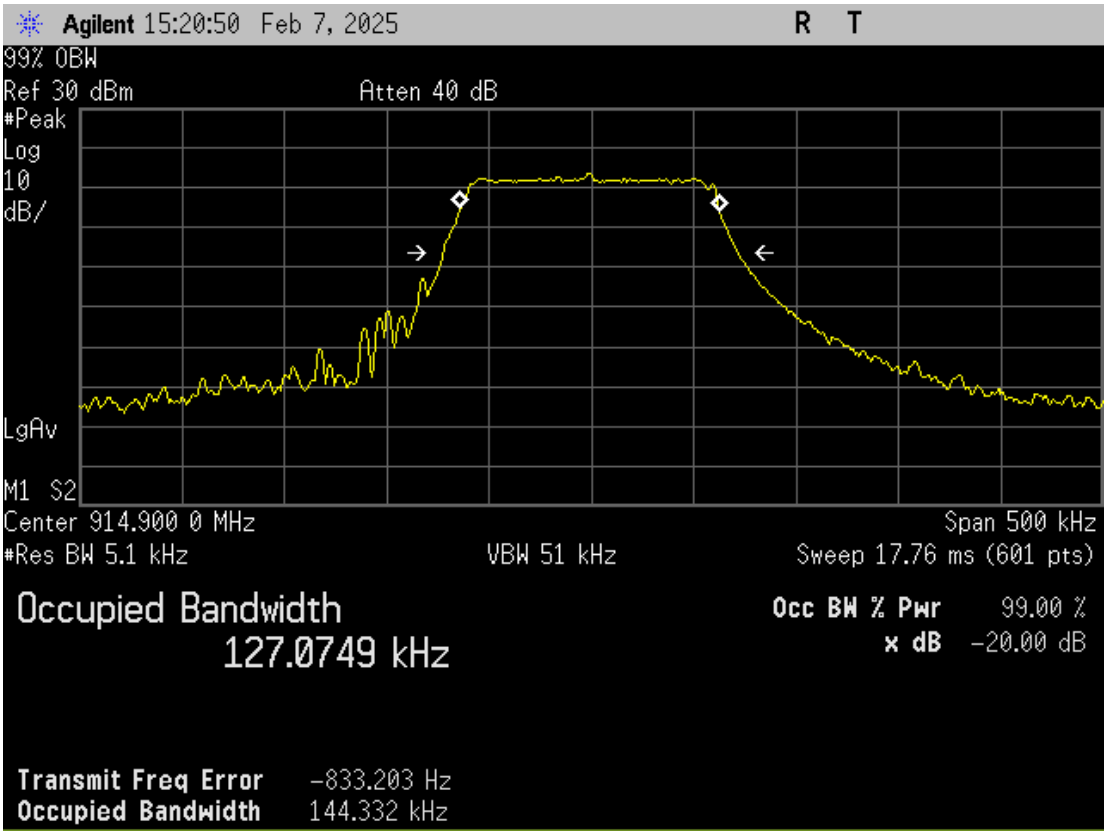
The occupied bandwidth of the RF output was measured using a spectrum analyzer. The bandwidth was measured using the peak detector function and a narrow resolution bandwidth. A broadband antenna was used to receive the modulated signal. The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The spectrum analyzer display was digitized and plotted. The plots of the occupied bandwidth for the EUT are supplied on the following pages.

Tested by: Joseph Strzelecki
Test Date: February 7, 2025
Test Equipment: REC-44; ATT-66

Channel	99% EBW kHz	20 dB EBW kHz
902.75	127.328	143.557
915.00	128.128	144.819
927.25	127.075	144.332


Agilent 15:18:02 Feb 7, 2025
R T
99% OBW
Ref 30 dBm
Atten 40 dB
#Peak
Log
10
dB/
LgAv
M1 S2
Center 902.300 0 MHz
Span 500 kHz
#Res BW 5.1 kHz
VBW 51 kHz
Sweep 17.76 ms (601 pts)
Occupied Bandwidth
127.3283 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -624.578 Hz
x dB Bandwidth 143.557 kHz


Agilent 15:23:27 Feb 7, 2025
R T
99% OBW
Ref 30 dBm
Atten 40 dB
#Peak
Log
10
dB/
LgAv
M1 S2
Center 908.700 0 MHz
Span 500 kHz
#Res BW 5.1 kHz
VBW 51 kHz
Sweep 17.76 ms (601 pts)
Occupied Bandwidth
128.1283 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -657.796 Hz
Occupied Bandwidth 144.819 kHz



Judgement: Pass

11.5 Peak Output Power

The EUT antenna port was connected to the spectrum analyzer via a low loss coaxial cable. The power output test method from ANSI C63.10 section 12.3.1 was used for this test. Trace averaging was not used. The EUT was transmitting continously. The spectrum analyzer was set to the following settings:

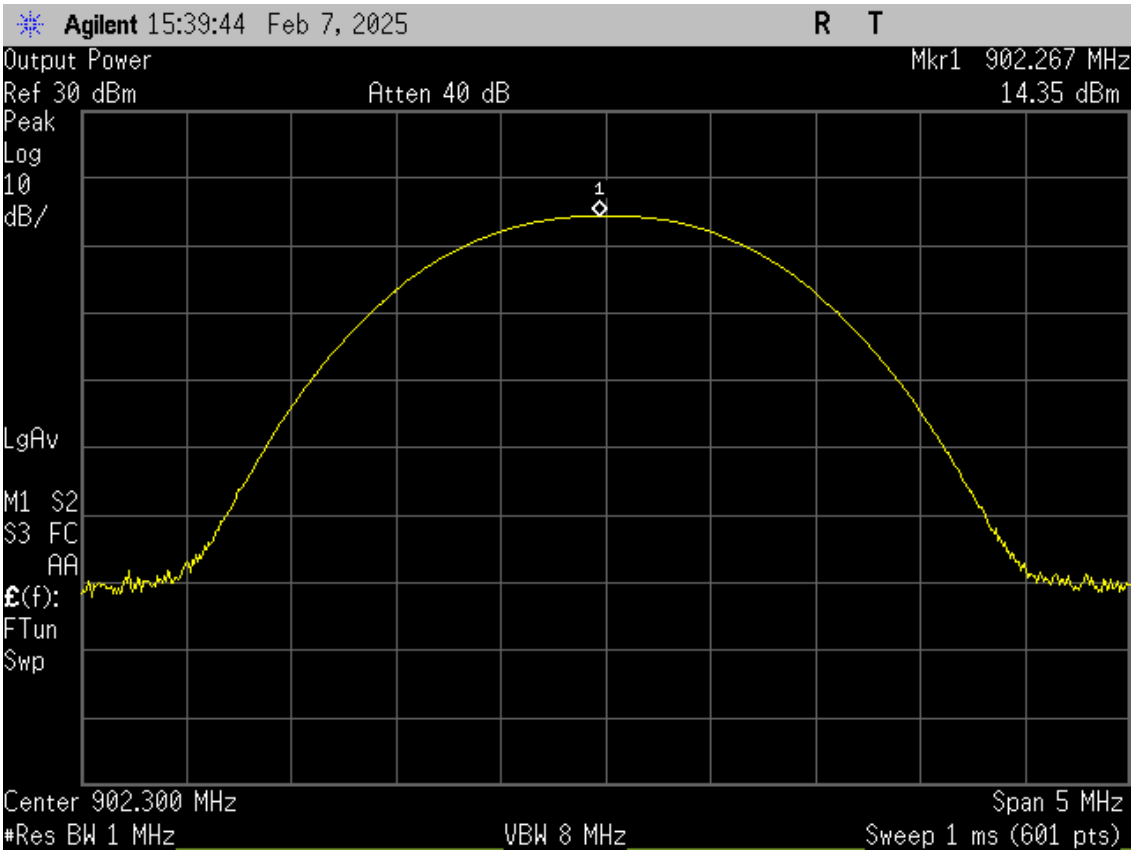
Span = 5 MHz; RBW = 1 MHz; VBW = 8 MHz; Sweep = auto
Detector function = peak; Trace = max hold

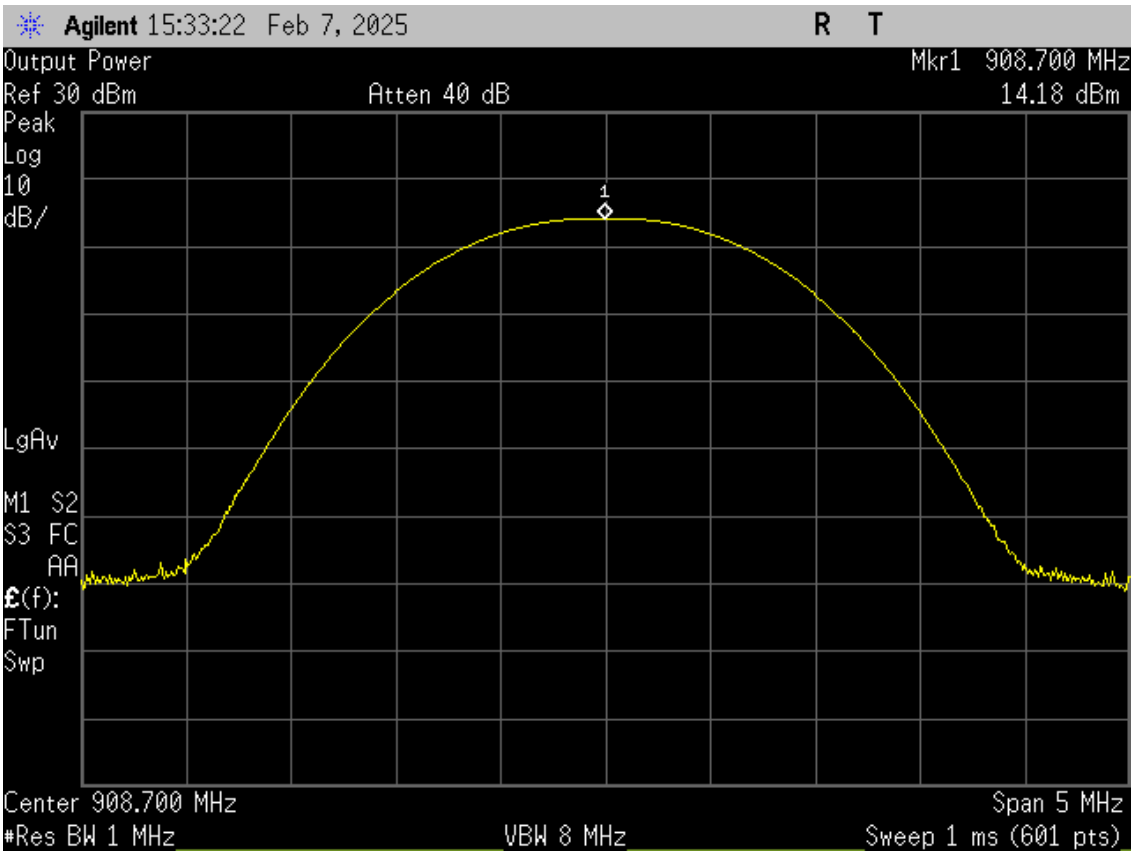
The trace was allowed to stabilize. The indicated level is the peak output power. Since the gain of the antenna is less than 6 dB, the limit is not reduced.

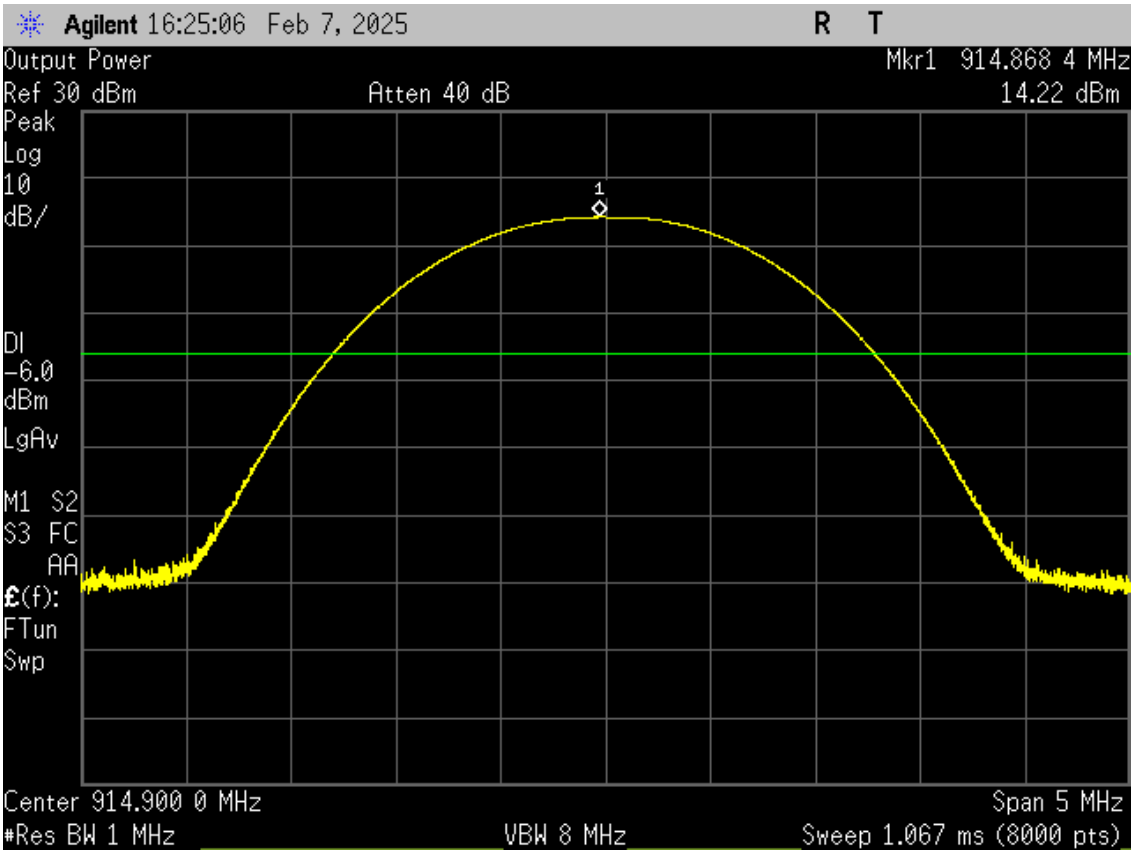
Tested by: Joseph Strzelecki
Test Date: February 7, 2025
Test Equipment: REC-44; ATT-66

Frequency (MHz)	Reading (dBm)	Cable + Att Loss (dB)	Total Power (dBm)		Limit (dBm)
			dBm	Watts	
902.3	14.4	6.6	21.0	0.124	30.0
908.7	14.2	6.6	20.8	0.120	30.0
914.9	14.2	6.6	20.8	0.121	30.0

Judgment: Passed by 9.0 dB


Agilent 15:39:44 Feb 7, 2025
R T
Output Power
Mkr1 902.267 MHz
Ref 30 dBm
Atten 40 dB
14.35 dBm
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 902.300 MHz
Span 5 MHz
#Res BW 1 MHz
VBW 8 MHz
Sweep 1 ms (601 pts)


Agilent 15:33:22 Feb 7, 2025
R T
Output Power
Mkr1 908.700 MHz
Ref 30 dBm
Atten 40 dB
14.18 dBm
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 908.700 MHz
Span 5 MHz
#Res BW 1 MHz
VBW 8 MHz
Sweep 1 ms (601 pts)



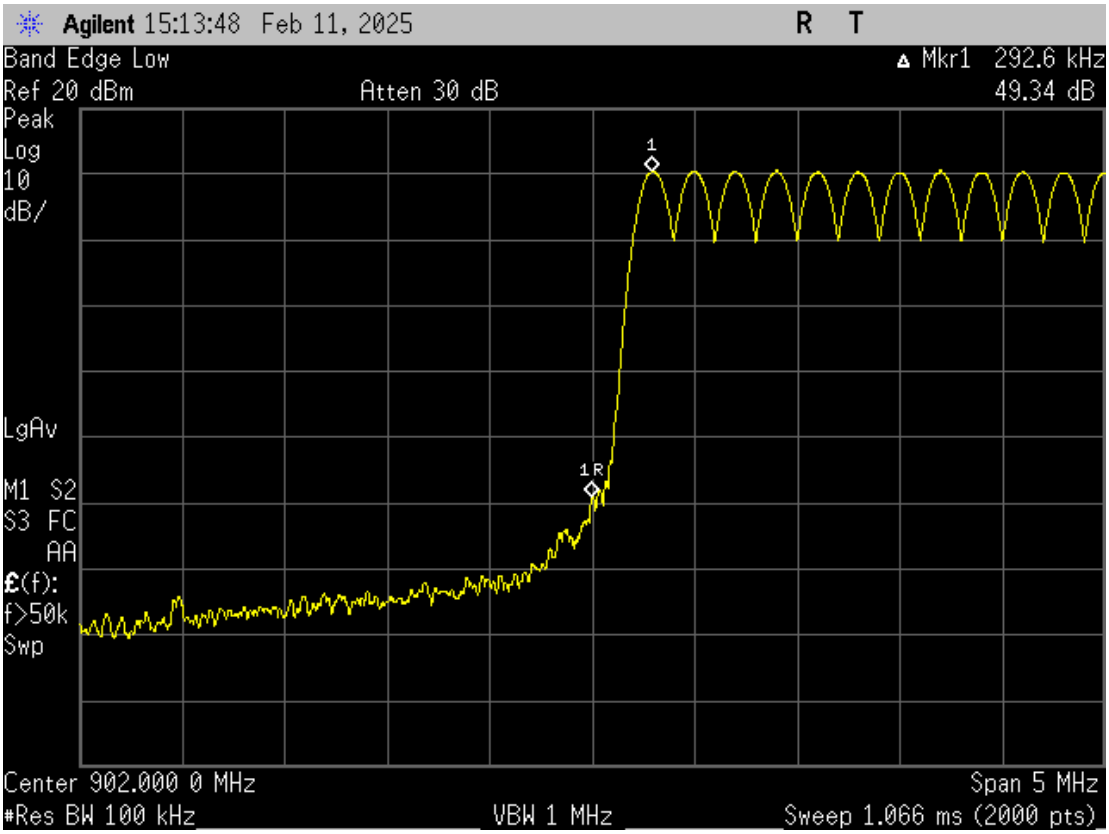
11.6 Band-edge Compliance of RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation at the band-edge, with the EUT set to the lowest frequency. The trace was allowed to stabilize.

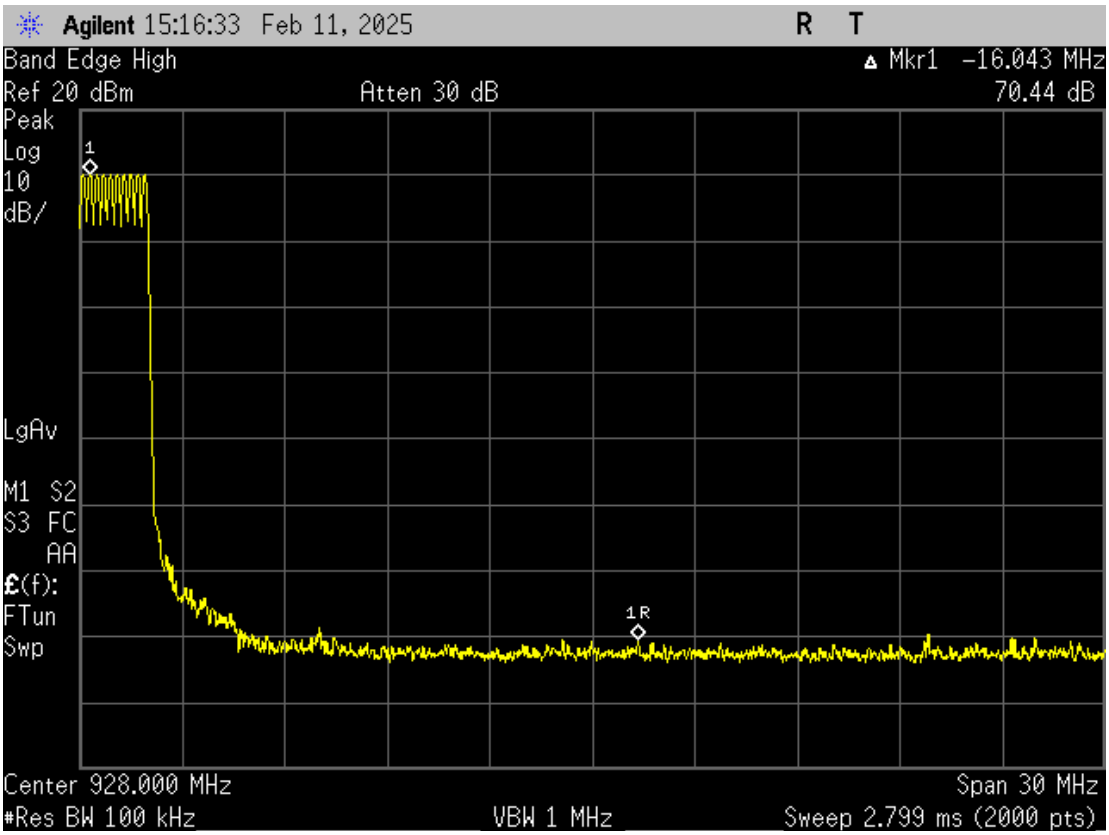
Tested by: Joseph Strzelecki
Test Date: February 11, 2025
Test Equipment: REC-44; ATT-45

Channel	Reading at Band Edge		Minimum Allowed	
	Freq. (MHz)	Delta (dB)	dB	Mode
902.3 Lower Band edge	902.0	49.3	20	Hopping
914.9 Upper Band edge	929.3	70.4	20	Hopping
902.3 Lower Band edge	902.0	48.7	20	Non Hopping
914.9 Upper Band edge	928.4	71.1	20	Non Hopping

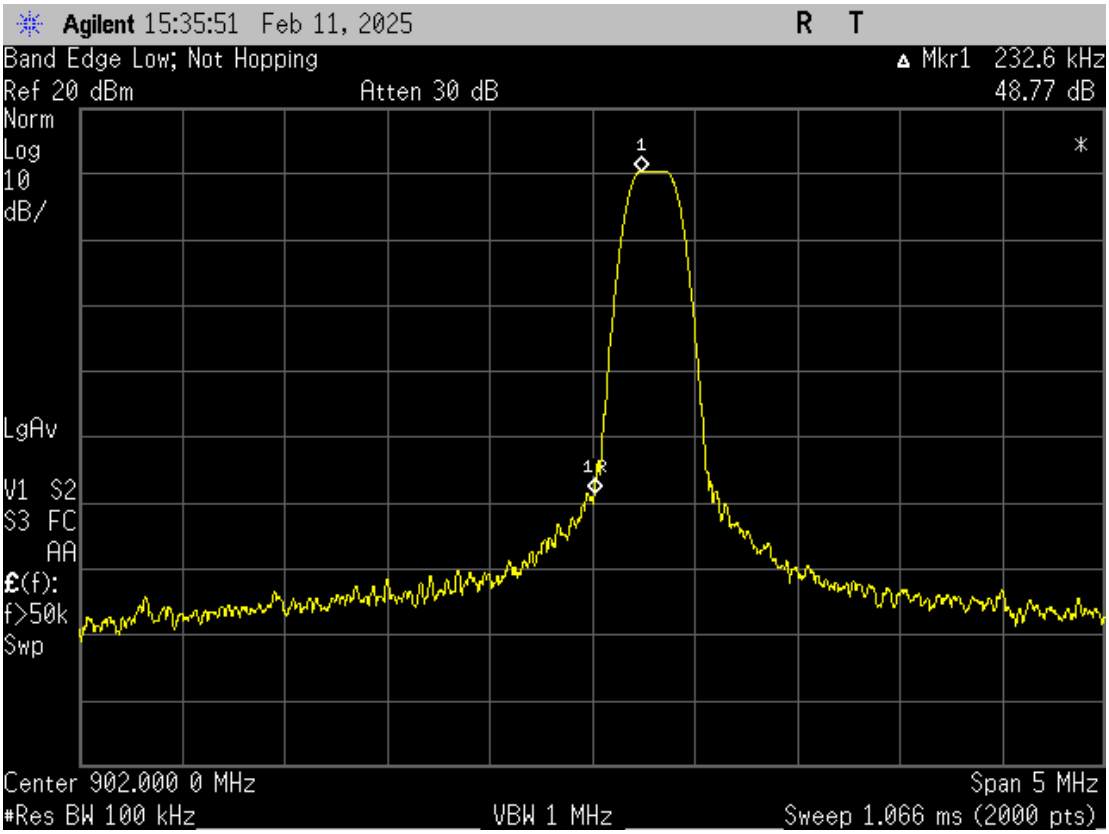
Judgment: Passed by 28.7 dB



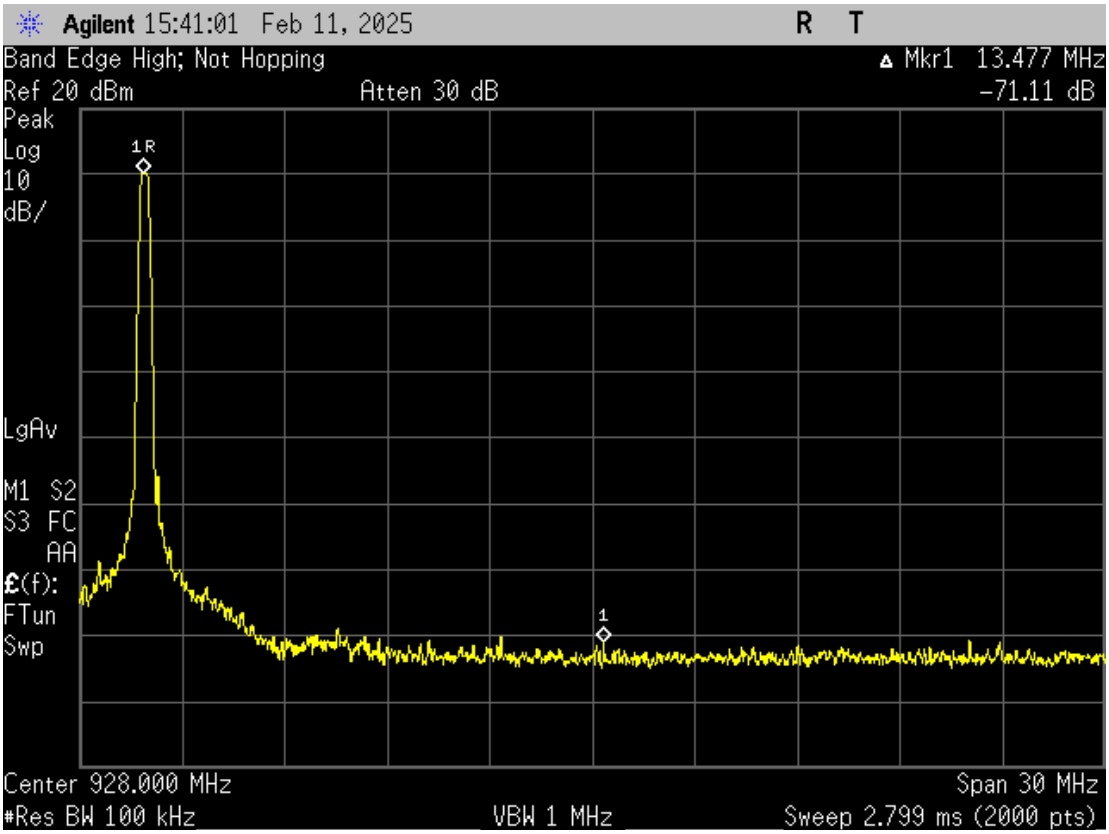
Hopping Mode



Hopping Mode



Non-Hopping Mode

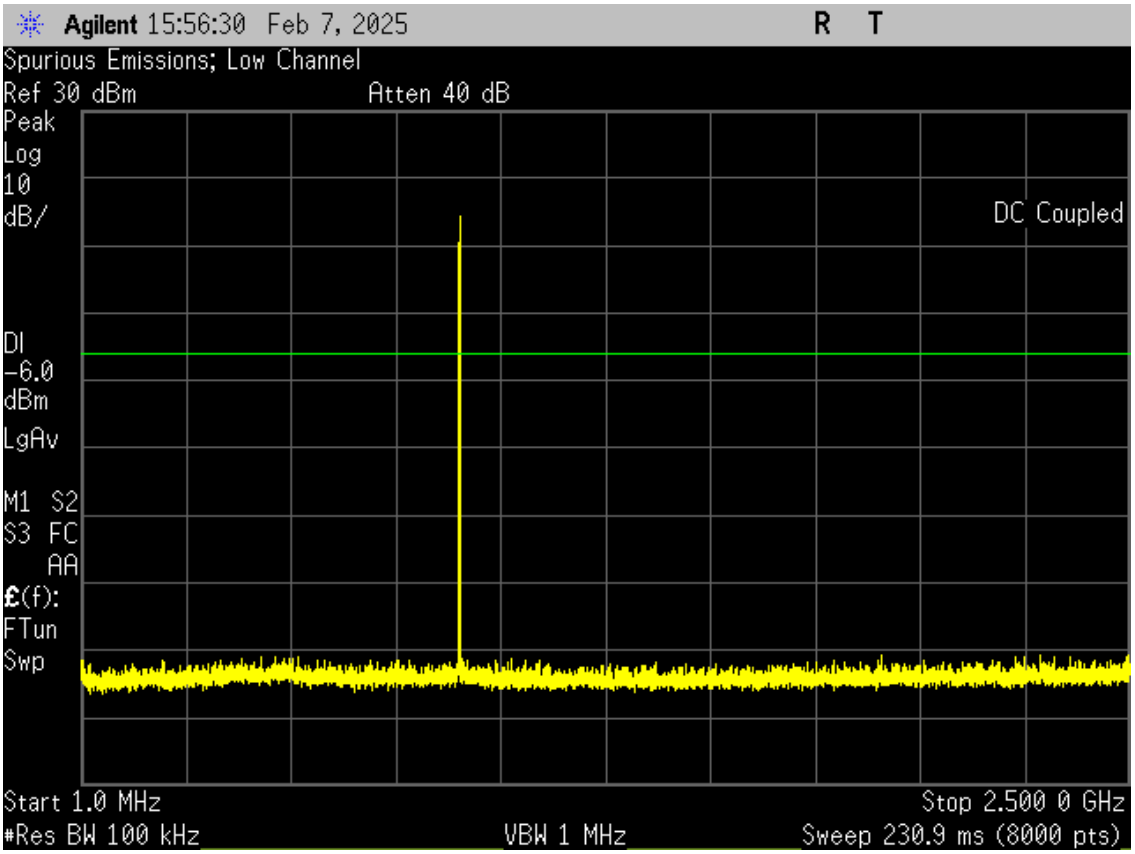


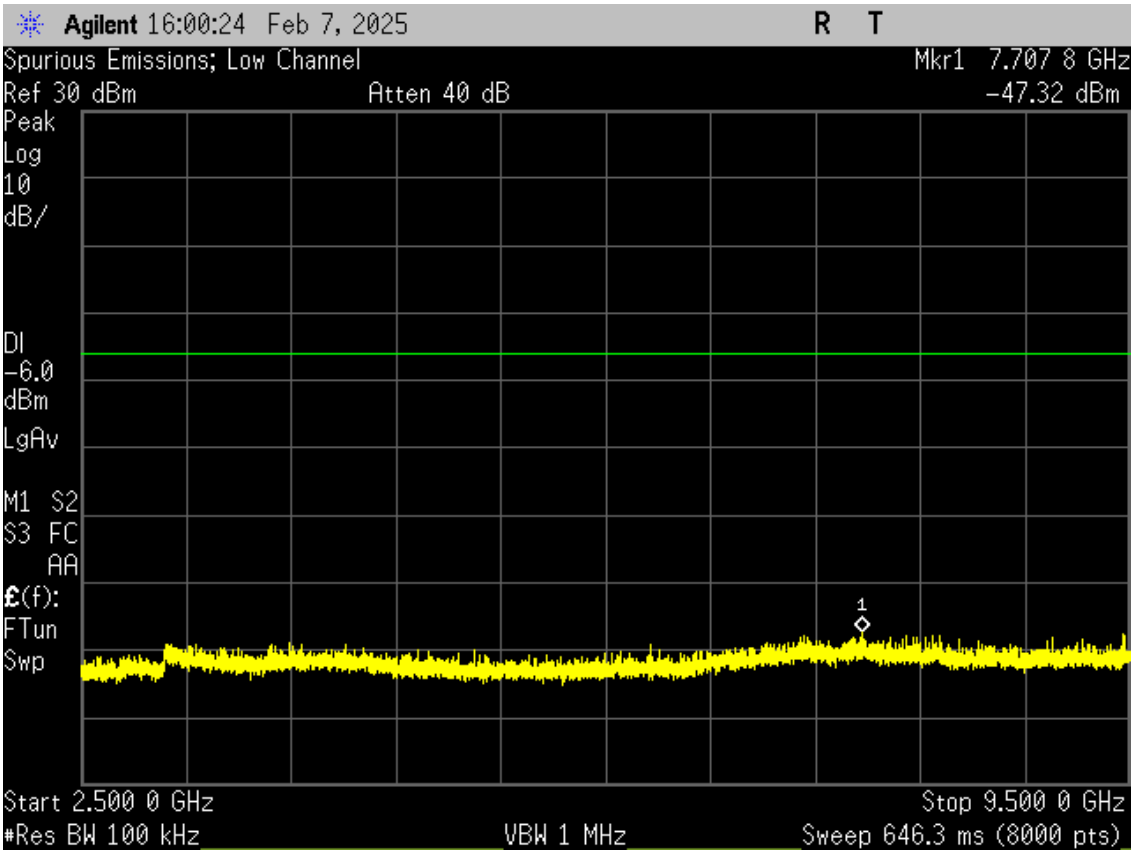
Non-Hopping Mode

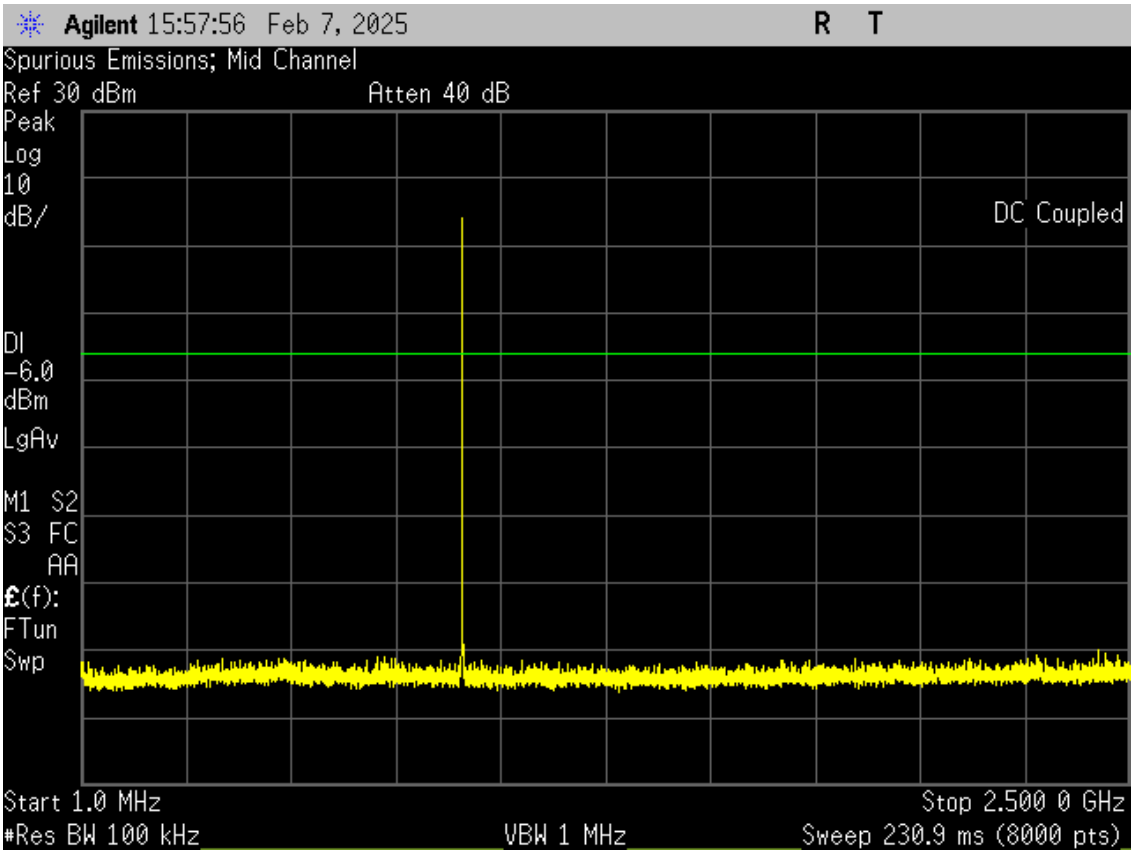
11.7 Spurious RF Conducted Emissions at Antenna Port

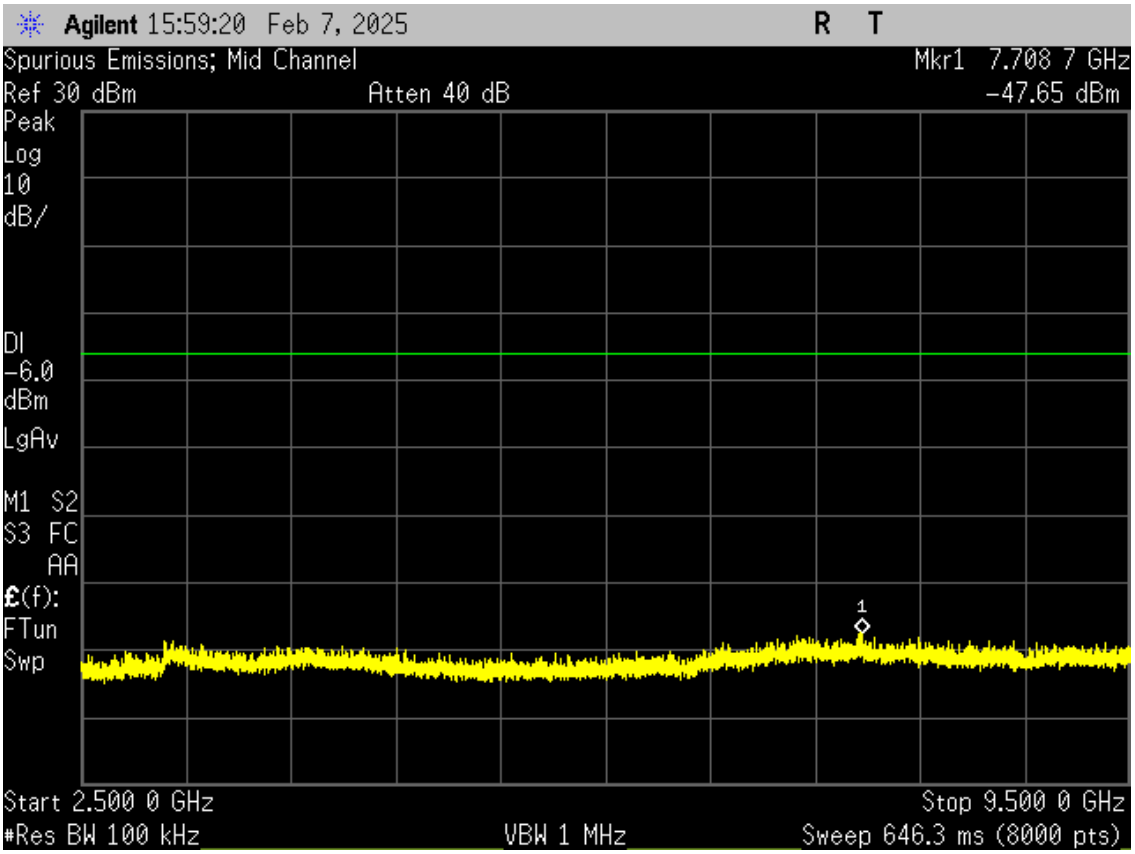
The spectrum analyzer was set to the MAX HOLD mode to record all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic. The trace was allowed to stabilize. The first two plots were made while stepping through three frequencies (Low middle and high). Each frequency was on for 30 seconds. The red dislplay line was set to 20 dB below the level of the fundamental.

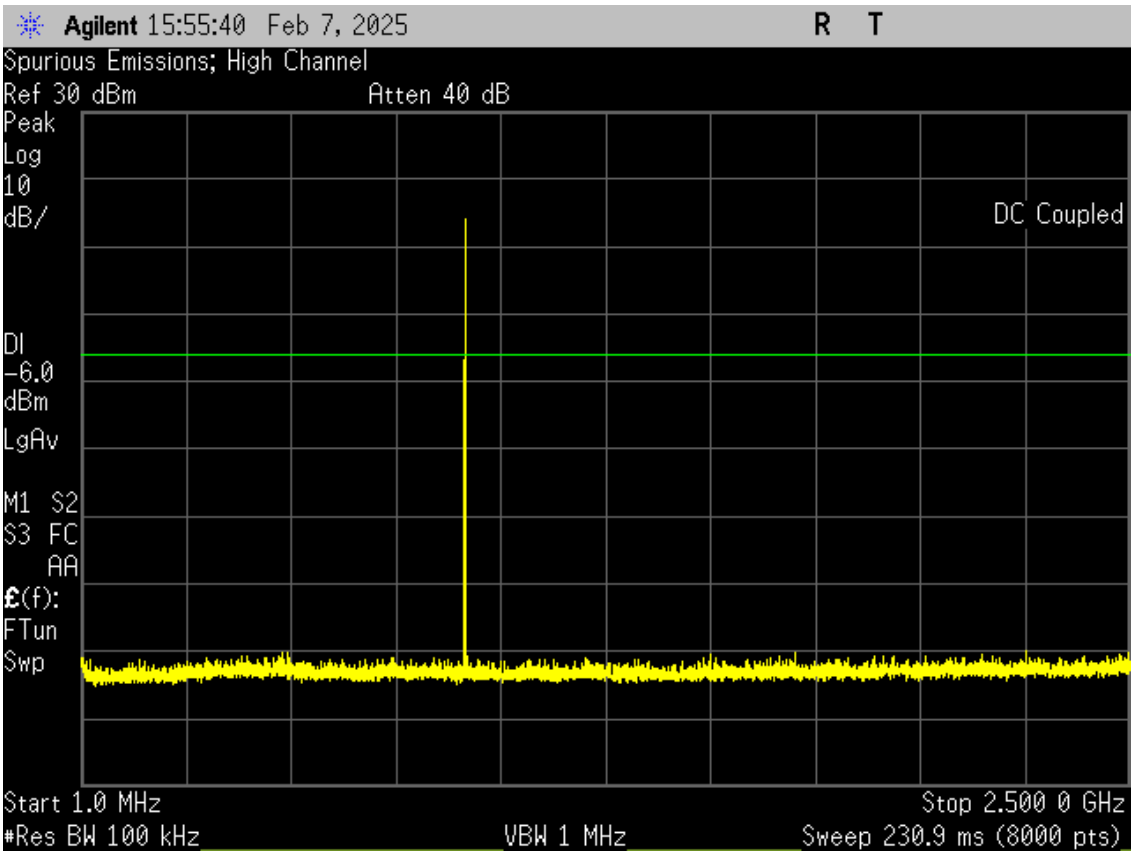
Tested by: Joseph Strzelecki
Test Date: February 7, 2025
Test Equipment: REC-44; ATT-66

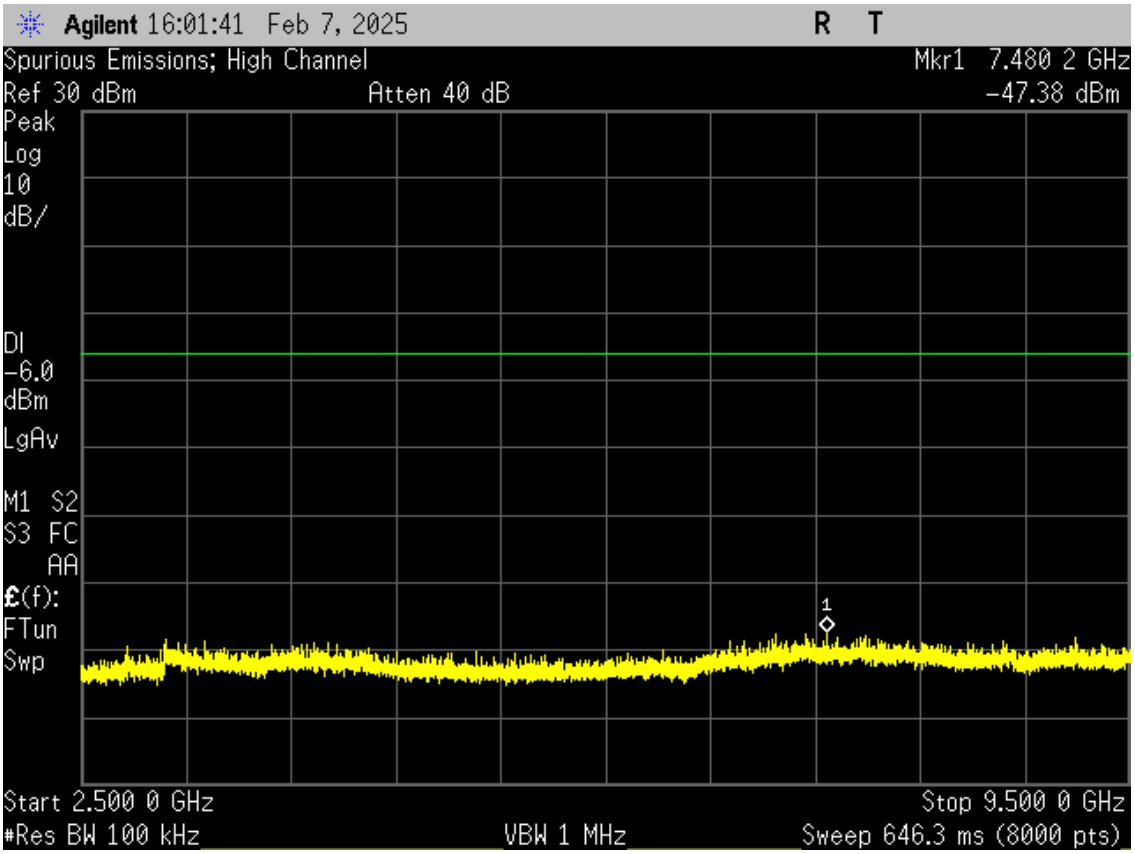



Agilent 16:00:24 Feb 7, 2025
R T
Spurious Emissions; Low Channel
Mkr1 7.707 8 GHz
Ref 30 dBm
Atten 40 dB
-47.32 dBm
Peak
Log
10
dB/
Dl
-6.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Start 2.500 0 GHz
Stop 9.500 0 GHz
#Res BW 100 kHz
VBW 1 MHz
Sweep 646.3 ms (8000 pts)


Agilent 15:57:56 Feb 7, 2025
R T
Spurious Emissions; Mid Channel
Ref 30 dBm
Atten 40 dB
Peak
Log
10
dB/
DC Coupled
Dl
-6.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 1.0 MHz
Stop 2.500 0 GHz
#Res BW 100 kHz
VBW 1 MHz
Sweep 230.9 ms (8000 pts)


Agilent 15:59:20 Feb 7, 2025
R T
Spurious Emissions; Mid Channel
Mkr1 7.708 7 GHz
Ref 30 dBm
Atten 40 dB
-47.65 dBm
Peak
Log
10
dB/
Dl
-6.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Start 2.500 0 GHz
Stop 9.500 0 GHz
#Res BW 100 kHz
VBW 1 MHz
Sweep 646.3 ms (8000 pts)


Agilent 15:55:40 Feb 7, 2025
R T
Spurious Emissions; High Channel
Ref 30 dBm
Atten 40 dB
Peak
Log
10
dB/
DC Coupled
Dl
-6.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 1.0 MHz
Stop 2.500 0 GHz
#Res BW 100 kHz
VBW 1 MHz
Sweep 230.9 ms (8000 pts)



The green display Line on all plots was set to 20 dB below the level of the carrier.

Judgement: Pass by at least 20 dB

11.8 Radiated RF Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 150 kHz to 30 MHz is 9 or 10 kHz and the bandwidth from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists. Figure 4 herein lists the details of the test equipment used during radiated emissions tests.

In addition, a high pass filter was used to reduce the fundamental emission. The EUT was rotated through three orthogonal axis as per 5.10.1 of ANSI C63.10 during the radiated tests.

Final radiated emissions measurements were performed inside of an anechoic chamber at a test distance of 3 meters. The anechoic chamber is designated as Chamber E. This Chamber meets the Site Attenuation requirements of ANSI C63.4 and CISPR 16-1. Chamber E is located at 12 Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 to 9300 MHz was slowly scanned. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded. All measurements may be performed using either the peak, average or quasi-peak detector functions. If the peak detector data exceeds or is marginally close to the limits, the measurements are repeated using a quasi-peak detector or average function as required by the specification for final determination of compliance. The QP and average detectors have a linear response.

The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground.

11.8.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

FS = RA + AF + CF - AG + HPF + PKA

Where: FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain
HPF = High pass Filter Loss

11.8.2 Radiated Emissions Test Results

Emissions Below 1 GHz

Test Date	Jan 17, 2025
Test Distance	3 Meters
Specification	FCC Part 15 Subpart C & RSS-247
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP
Configuration	The EUT is in the transmit mode with the receiver on

This table includes all emissions except Fundamental, Band edge and Harmonics emissions.

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
35.3	15.3	P	H	11.8	0.7	0.0	27.8	40.0	12.2	
52.1	10.9	P	H	9.0	0.8	0.0	20.7	40.0	19.3	
68.3	10.7	P	H	8.8	1.0	0.0	20.5	40.0	19.5	
88.4	12.6	P	H	9.4	1.1	0.0	23.1	43.5	20.4	
96.4	19.9	P	H	9.8	1.1	0.0	30.8	43.5	12.7	
119.8	14.7	P	H	11.5	1.3	0.0	27.5	43.5	16.0	
124.9	15.5	P	H	11.7	1.3	0.0	28.5	43.5	15.0	
161.8	12.8	P	H	12.8	1.5	0.0	27.1	43.5	16.4	
188.6	12.4	P	H	13.7	1.6	0.0	27.7	43.5	15.8	
218.3	12.3	P	H	14.7	1.7	0.0	28.7	46.0	17.3	
235.3	13.2	P	H	15.0	1.8	0.0	30.0	46.0	16.0	
272.7	11.8	P	H	13.0	1.9	0.0	26.7	46.0	19.3	
309.5	9.9	P	H	14.7	2.1	0.0	26.7	46.0	19.3	
336.3	9.3	P	H	14.2	2.2	0.0	25.7	46.0	20.3	
364.5	10.0	P	H	14.5	2.2	0.0	26.7	46.0	19.3	
390.0	11.3	P	H	15.2	2.3	0.0	28.8	46.0	17.2	

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
417.5	11.3	P	H	15.6	2.4	0.0	29.3	46.0	16.7	
441.2	13.2	P	H	16.2	2.5	0.0	31.9	46.0	14.1	
485.9	11.1	P	H	17.3	2.6	0.0	31.0	46.0	15.0	
530.5	10.6	P	H	17.6	2.7	0.0	30.9	46.0	15.1	
583.1	10.7	P	H	18.5	2.8	0.0	32.0	46.0	14.0	
640.1	10.2	P	H	19.7	3.0	0.0	32.9	46.0	13.1	
707.7	10.3	P	H	21.1	3.1	0.0	34.5	46.0	11.5	
784.8	11.0	P	H	21.2	3.3	0.0	35.5	46.0	10.5	
869.4	10.4	P	H	22.8	3.5	0.0	36.7	46.0	9.3	
965.5	10.4	P	H	23.5	3.7	0.0	37.6	54.0	16.4	
1158.2	37.5	P	H	24.7	-31.7	0.0	30.5	74.0	43.5	1
1322.3	37.9	P	H	25.0	-31.5	0.0	31.4	74.0	42.6	1
1508.5	38.9	P	H	25.2	-31.4	0.0	32.7	74.0	41.3	1
1713.7	37.9	P	H	26.4	-31.0	0.0	33.3	74.0	40.7	1
1863.9	38.2	P	H	27.0	-30.8	0.0	34.4	74.0	39.6	1
2180.2	36.6	P	H	27.7	-30.2	0.0	34.1	74.0	39.9	1
2374.4	37.3	P	H	28.2	-30.0	0.0	35.5	74.0	38.5	1
2512.5	36.7	P	H	28.5	-29.7	0.0	35.5	74.0	38.5	1
2713.7	37.4	P	H	29.0	-29.3	0.0	37.1	74.0	36.9	1
2892.9	39.5	P	H	29.5	-29.1	0.0	39.9	74.0	34.1	1
3192.2	36.1	P	H	30.9	-28.2	0.0	38.8	74.0	35.2	1
3372.4	35.0	P	H	31.2	-27.9	0.0	38.3	74.0	35.7	1
3546.5	35.5	P	H	31.3	-27.6	0.0	39.2	74.0	34.8	1
3745.7	36.0	P	H	32.3	-27.4	0.0	40.9	74.0	33.1	1
4158.2	37.2	P	H	32.4	-26.7	0.0	42.9	74.0	31.1	1
4626.6	35.0	P	H	33.2	-25.5	0.0	42.7	74.0	31.3	1
35.5	17.3	P	V	11.7	0.7	0.0	29.7	40.0	10.3	
51.7	10.3	P	V	9.1	0.8	0.0	20.2	40.0	19.8	
62.5	10.4	P	V	9.0	0.9	0.0	20.3	40.0	19.7	
69.4	20.2	P	V	8.9	1.0	0.0	30.1	40.0	9.9	
90.4	11.8	P	V	9.6	1.1	0.0	22.5	43.5	21.0	
134.6	11.9	P	V	12.2	1.4	0.0	25.5	43.5	18.0	
153.9	11.4	P	V	12.6	1.4	0.0	25.4	43.5	18.1	
196.4	12.3	P	V	14.1	1.6	0.0	28.0	43.5	15.5	
225.3	12.8	P	V	14.9	1.8	0.0	29.5	46.0	16.5	
246.6	12.3	P	V	15.2	1.8	0.0	29.3	46.0	16.7	
263.9	15.1	P	V	12.4	1.9	0.0	29.4	46.0	16.6	
291.6	17.6	P	V	14.1	2.0	0.0	33.7	46.0	12.3	
314.6	14.0	P	V	14.3	2.1	0.0	30.4	46.0	15.6	
342.3	14.6	P	V	14.3	2.2	0.0	31.1	46.0	14.9	
381.9	10.8	P	V	15.0	2.3	0.0	28.1	46.0	17.9	
429.1	11.2	P	V	16.0	2.4	0.0	29.6	46.0	16.4	
465.2	11.2	P	V	16.8	2.5	0.0	30.5	46.0	15.5	
493.7	11.7	P	V	17.5	2.6	0.0	31.8	46.0	14.2	
521.0	10.8	P	V	17.7	2.7	0.0	31.2	46.0	14.8	
588.6	11.4	P	V	18.6	2.9	0.0	32.9	46.0	13.1	
611.1	10.6	P	V	19.0	2.9	0.0	32.5	46.0	13.5	
713.2	10.9	P	V	21.0	3.1	0.0	35.0	46.0	11.0	
840.8	10.7	P	V	22.1	3.4	0.0	36.2	46.0	9.8	
895.4	13.4	P	V	22.8	3.6	0.0	39.8	46.0	6.2	
988.0	10.9	P	V	24.1	3.7	0.0	38.7	54.0	15.3	
1242.2	46.6	P	V	24.9	-31.7	0.0	39.8	74.0	34.2	1
1307.3	42.8	P	V	25.0	-31.6	0.0	36.2	74.0	37.8	1

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
1393.4	40.7	P	V	25.0	-31.4	0.0	34.3	74.0	39.7	1
1699.7	46.0	P	V	26.3	-31.0	0.0	41.3	74.0	32.7	1
1891.9	41.0	P	V	27.1	-30.8	0.0	37.3	74.0	36.7	1
2157.2	40.8	P	V	27.7	-30.3	0.0	38.2	74.0	35.8	1
2222.2	39.5	P	V	27.8	-30.3	0.0	37.0	74.0	37.0	1
2614.6	41.8	P	V	28.8	-29.5	0.0	41.1	74.0	32.9	1
2891.9	39.9	P	V	29.5	-29.1	0.0	40.3	74.0	33.7	1
3180.2	36.1	P	V	30.8	-28.2	0.0	38.7	74.0	35.3	1
3379.4	36.5	P	V	31.2	-27.8	0.0	39.9	74.0	34.1	1
3572.6	35.7	P	V	31.4	-27.5	0.0	39.6	74.0	34.4	1
3844.8	35.5	P	V	32.7	-27.2	0.0	41.0	74.0	33.0	1
4370.4	36.5	P	V	32.6	-26.4	0.0	42.7	74.0	31.3	1
4525.5	35.6	P	V	33.0	-25.8	0.0	42.8	74.0	31.2	1

Judgment: Passed by at least 10 dB
No other emissions were detected in the restricted bands.

Restricted Band Emissions

	Tx	Spectrum Analyzer Readings dBuV									EUT	Peak	Ave	Peak	Ave	Margin
hrm	Freq	Peak			Ave	Peak			Ave	Corr.	Emission	Tot. FS		Limit		Under
		Vertical Polarization				Horizontal Polarization				Fact	Freq					Limit
#	MHz	X	Y	Z	Max	X	Y	Z	Max	dB/m	MHz	dBuV/m		dBuV/m		dB
3	902	45.4	42.9	44.2	45.4	43.8	41.1	42.7	43.8	0.0	2706.9	45.4	45.4	74	54	8.6
4	902	38.8	41.3	35.8	41.3	39.0	38.6	40.2	40.2	4.2	3609.2	45.5	45.5	74	54	8.5
5	902	37.4	37.5	38.2	38.2	37.4	37.2	37.5	37.5	8.3	4511.5	46.5	46.5	74	54	7.5
3	909	42.3	40.7	42.1	42.3	44.7	42.1	41.1	44.7	0.2	2726.1	44.9	44.9	74	54	9.1
4	909	39.7	41.7	38.6	41.7	41.3	39.3	39.0	41.3	4.4	3634.8	46.1	46.1	74	54	7.9
5	909	37.8	38.4	38.7	38.7	37.6	38.0	37.8	38.0	8.6	4543.5	47.3	47.3	74	54	6.7
3	915	42.6	40.4	43.2	43.2	37.3	42.9	39.2	42.9	0.1	2744.7	43.3	43.3	74	54	10.7
4	915	34.0	32.2	33.8	34.0	31.7	32.0	30.6	32.0	4.5	3659.6	38.5	38.5	74	54	15.5
5	915	32.4	30.6	30.9	32.4	29.2	30.4	32.3	32.3	8.5	4574.5	40.9	40.9	74	54	13.1
6	915	28.5	0.0	0.0	28.5	28.6	28.8	0.0	28.8	11.9	5489.4	40.7	40.7	95	75	34.3
Column numbers (see below for explanations)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Column #1. hrm = Harmonic; BE = Band Edge emissions
Column #2. Frequency of Transmitter.
Column #3. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #4. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #5. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #6. Average Reading based on peak reading reduced by the Duty cycle correction
Column #7. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #8. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #9. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #10. Average Reading based on peak reading reduced by the Duty cycle correction
Column #11. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor + HPF
Column #12. Frequency of Tested Emission
Column #13. Highest peak field strength at listed frequency.
Column #14. Highest Average field strength at listed frequency.
Column #15. Peak Limit.
Column #16. Average Limit.
Column #17. The margin (last column) is the worst-case margin under the peak or average limits for that row.

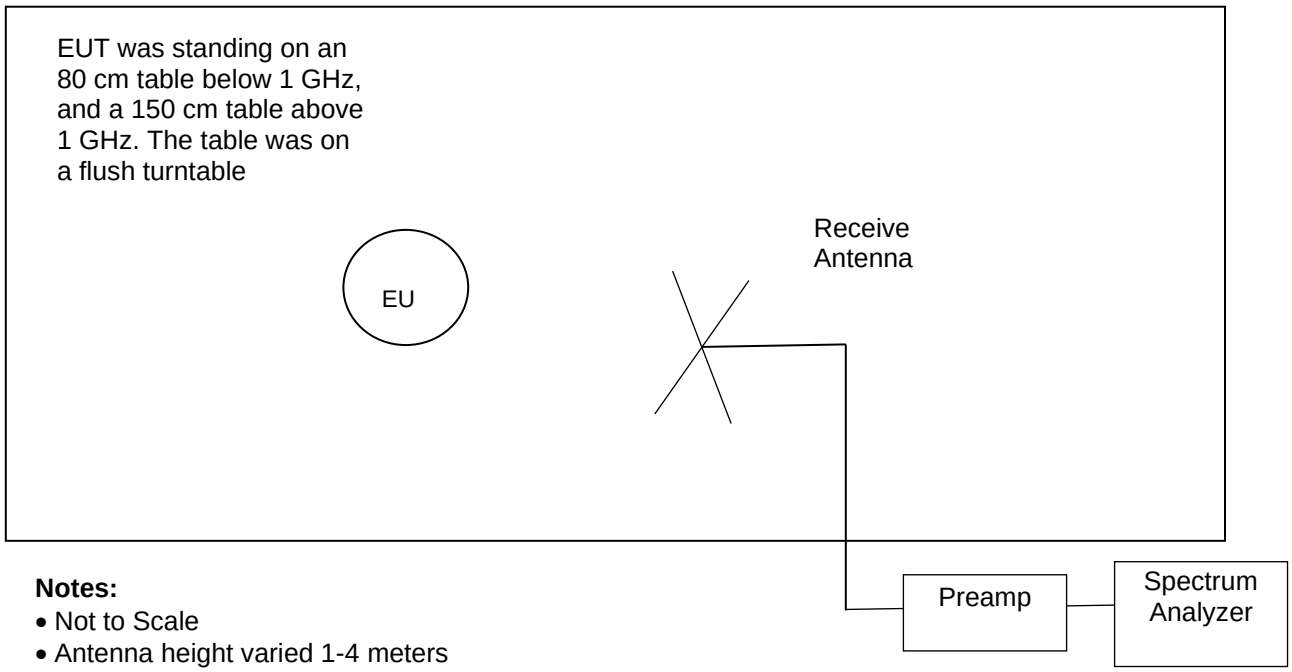
All emissions outside of the band from 902 to 928 were below the limits of 15.209. The peak emissions met the average limits so an average detector was not used.

Overall Judgment: Passed by at least 6 dB

No other Emissions in the restricted bands were detected from 30 to 9300 MHz within 10 dB of the limits.

Figure 1. Drawings of Radiated Emissions Setup

Chamber E, anechoic

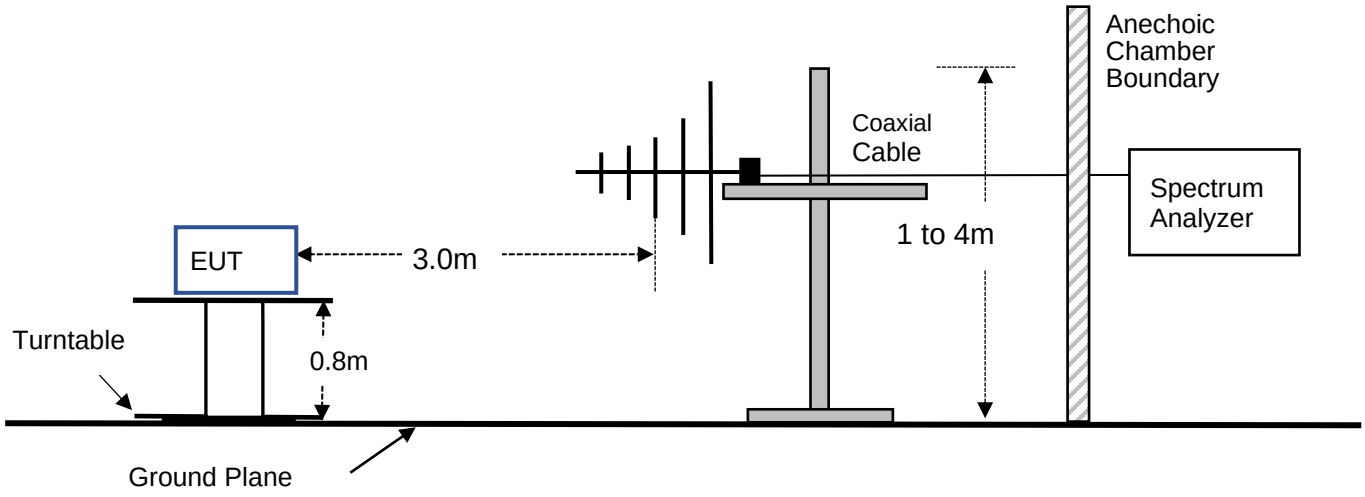


Notes:
- Not to Scale
- Antenna height varied 1-4 meters
- Distance from antenna to tested system is 3 meters
- AC cords not shown. They are connected to AC outlet with low-pass filter on turntable

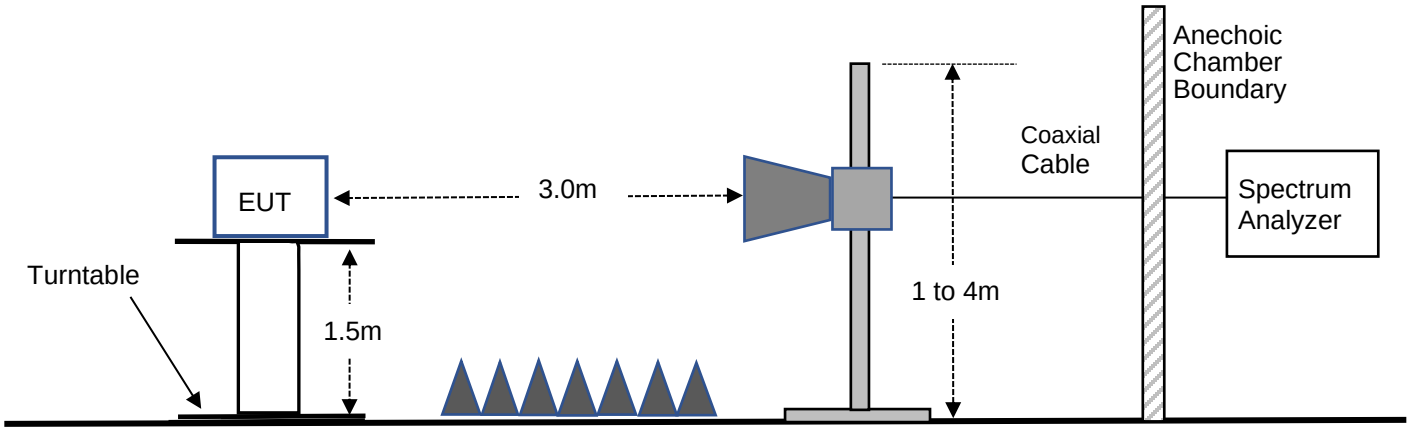
Frequency Range	Receive Antenna	Pre-Amplifier	Spectrum Analyzer	High Pass Filter
30 to 200 MHz	ANT-80	Internal	REC-21	None*
200 to 1000 MHz	ANT-68	Internal	REC-21	None*
1 to 10 GHz	ANT-66	AMP-05	REC-21	HPF-07

* A high pass filter was not needed since the fundamental frequency was outside of the amplifiers pass band.

Radiated Emissions Test Setup for Frequencies from 30MHz to 1000MHz (Side View)



Radiated Emissions Test Setup for Frequencies over 1000MHz (Side View)



11.9 Unintentional Emissions (Receive Mode)

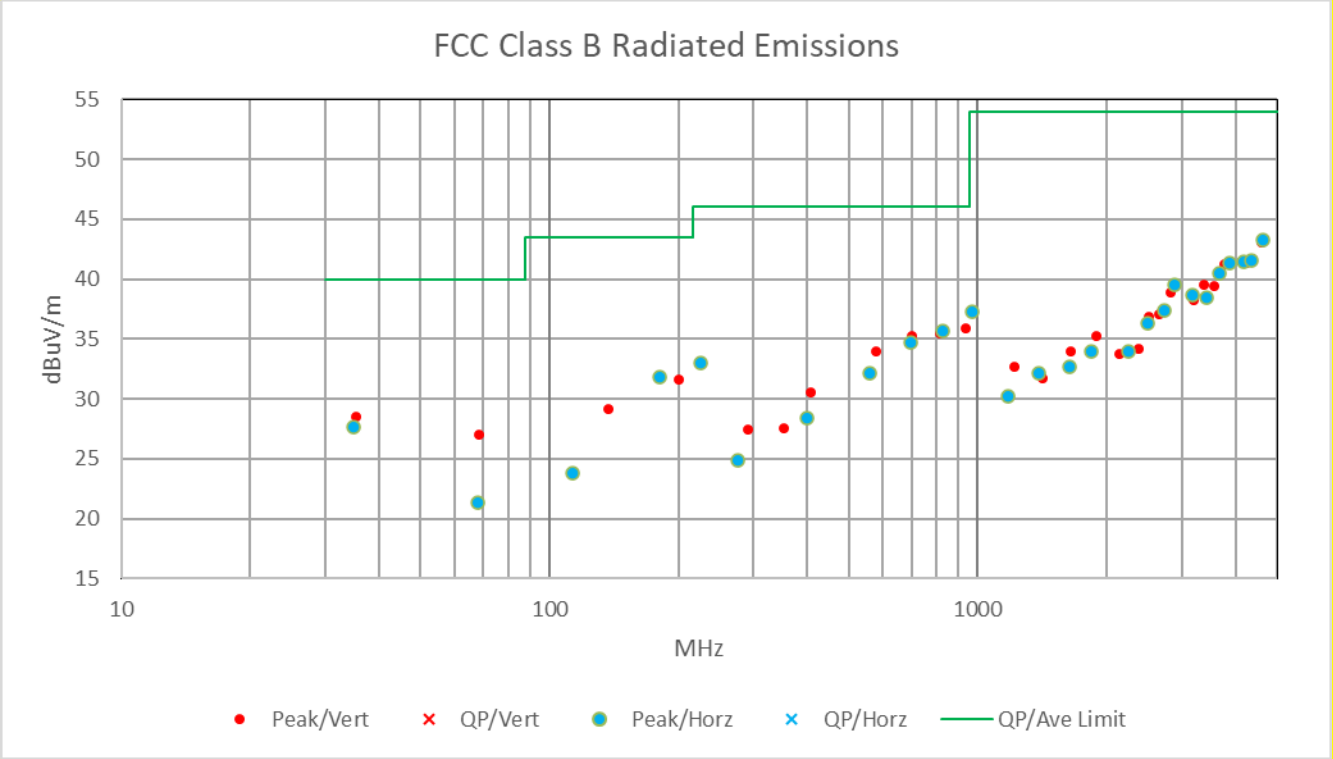
Manufacturer	New Cosmos Electric Co., Ltd DBA DeNova Detect	Specification	FCC Part 15.209 & RSS-GEN
Model	810NLR	Test Date	January 16-17, 2025
Serial Number	RMC-03	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Corr. Factors = Cable Loss – Preamp Gain		
Configuration	Receive mode		

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors dB	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
34.9	15.0	P	H	12.0	0.7	0.0	27.7	40.0	12.3	
68.2	11.5	P	H	8.8	1.0	0.0	21.3	40.0	18.7	
113.0	11.6	P	H	11.0	1.2	0.0	23.8	43.5	19.7	
181.3	16.7	P	H	13.5	1.6	0.0	31.8	43.5	11.7	
225.3	16.3	P	H	14.9	1.8	0.0	33.0	46.0	13.0	
275.7	9.8	P	H	13.2	1.9	0.0	24.9	46.0	21.1	
398.3	10.8	P	H	15.3	2.3	0.0	28.4	46.0	17.6	
560.6	11.1	P	H	18.3	2.8	0.0	32.2	46.0	13.8	
695.7	10.3	P	H	21.3	3.1	0.0	34.7	46.0	11.3	
826.8	10.5	P	H	21.8	3.4	0.0	35.7	46.0	10.3	
973.0	10.0	P	H	23.6	3.7	0.0	37.3	54.0	16.7	
1179.2	37.0	P	H	24.8	-31.6	0.0	30.2	74.0	43.8	1
1388.4	38.6	P	H	25.0	-31.4	0.0	32.2	74.0	41.8	1
1640.6	38.1	P	H	25.8	-31.2	0.0	32.7	74.0	41.3	1
1841.8	37.9	P	H	27.0	-30.9	0.0	34.0	74.0	40.0	1
2241.2	36.5	P	H	27.9	-30.4	0.0	34.0	74.0	40.0	1
2499.5	37.6	P	H	28.4	-29.7	0.0	36.3	74.0	37.7	1
2732.7	37.6	P	H	29.1	-29.3	0.0	37.4	74.0	36.6	1
2889.9	39.1	P	H	29.5	-29.1	0.0	39.5	74.0	34.5	1
3177.2	36.1	P	H	30.8	-28.2	0.0	38.7	74.0	35.3	1
3421.4	35.0	P	H	31.2	-27.7	0.0	38.5	74.0	35.5	1
3677.7	36.2	P	H	31.9	-27.6	0.0	40.5	74.0	33.5	1
3882.9	35.6	P	H	32.8	-27.1	0.0	41.3	74.0	32.7	1
4171.2	35.8	P	H	32.4	-26.7	0.0	41.5	74.0	32.5	1
4360.4	35.5	P	H	32.6	-26.5	0.0	41.6	74.0	32.4	1
4639.6	35.6	P	H	33.2	-25.5	0.0	43.3	74.0	30.7	1
35.3	16.0	P	V	11.8	0.7	0.0	28.5	40.0	11.5	
68.5	17.2	P	V	8.8	1.0	0.0	27.0	40.0	13.0	
137.5	15.6	P	V	12.2	1.4	0.0	29.2	43.5	14.3	
200.1	15.7	P	V	14.2	1.7	0.0	31.6	43.5	11.9	
290.9	11.3	P	V	14.1	2.0	0.0	27.4	46.0	18.6	
353.4	11.0	P	V	14.4	2.2	0.0	27.6	46.0	18.4	
408.4	12.8	P	V	15.4	2.3	0.0	30.5	46.0	15.5	
580.6	12.7	P	V	18.5	2.8	0.0	34.0	46.0	12.0	
701.7	11.0	P	V	21.2	3.1	0.0	35.3	46.0	10.7	
819.3	10.4	P	V	21.7	3.4	0.0	35.5	46.0	10.5	
938.4	9.3	P	V	23.0	3.6	0.0	35.9	46.0	10.1	
1222.2	39.5	P	V	24.9	-31.7	0.0	32.7	74.0	41.3	1
1417.4	38.2	P	V	25.0	-31.5	0.0	31.7	74.0	42.3	1
1653.7	39.2	P	V	25.9	-31.1	0.0	34.0	74.0	40.0	1
1888.9	38.9	P	V	27.1	-30.8	0.0	35.2	74.0	38.8	1
2143.1	36.4	P	V	27.6	-30.3	0.0	33.7	74.0	40.3	1

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors dB	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
2371.4	36.1	P	V	28.2	-30.1	0.0	34.2	74.0	39.8	1
2515.5	38.0	P	V	28.5	-29.7	0.0	36.8	74.0	37.2	1
2649.6	37.7	P	V	28.9	-29.5	0.0	37.1	74.0	36.9	1
2828.8	38.7	P	V	29.3	-29.1	0.0	38.9	74.0	35.1	1
3195.2	35.5	P	V	30.9	-28.2	0.0	38.2	74.0	35.8	1
3385.4	36.1	P	V	31.2	-27.8	0.0	39.5	74.0	34.5	1
3566.6	35.6	P	V	31.3	-27.5	0.0	39.4	74.0	34.6	1
3766.8	36.2	P	V	32.4	-27.4	0.0	41.2	74.0	32.8	1
4224.2	35.6	P	V	32.4	-26.7	0.0	41.3	74.0	32.7	1
4395.4	35.2	P	V	32.6	-26.1	0.0	41.7	74.0	32.3	1
4593.6	35.6	P	V	33.1	-25.6	0.0	43.1	74.0	30.9	1

Note: All Peak readings above 1 GHz were under the Average limits, so average readings are not required.
Judgment: Passed by at least 10 dB

Radiated emissions in a graphical format. The following chart is the same data as the previous table.



The peak limit is not shown, since the peak readings meet the lower average limit.

Radiated Emissions Field Strength Limits

Frequency Range (MHz)	Test Distance (meters)	Class B Limits	
		uV/m	dB(uV/m)
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 - 960	3	200	46.0
Above 960	3	500	54.0

11.9.1 Measurement Instrumentation Uncertainty

Measurement	Uncertainty
Radiated Emissions, E-field, 3 meters, 30 to 200 MHz	4.8 dB
Radiated Emissions, E-field, 3 meters, 200 to 1000 MHz	4.6 dB
Radiated Emissions, E-field, 3 meters, 1 to 6 GHz	5.0 dB
Radiated Emissions, E-field, 3 meters, 6 to 18 GHz	5.5 dB
Bandwidth using marker delta method at a span of 500 kHz	2 kHz
99% Occupied Bandwidth using REC-43	1% of frequency span
Amplitude measurement 1-10000 MHz	1.5 dB
Temperature THM-02	0.6 Deg C

The uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2 in accordance with CISPR 16-4-2.

12.0 REVISION HISTORY

Document RP-10101 Revisions:			
Rev.	Affected Sections	Description	Rationale