

December 15, 2025

Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda
Albert Nissimoff
Rua Hungria, 888
8th floor
São Paulo, Brazil
01455-000

Dear Albert Nissimoff,

Enclosed is the EMC Wireless test report for compliance testing of the Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda iDFace Max as tested to the requirements of FCC Part 15.247 and RSS-247 Issue 4 for Intentional Radiators. This test report pertains specifically to the Bluetooth Low Energy (BLE) transmitter onboard which operates in the 2400-2483.5MHz band.

Thank you for using the services of Eurofins MET Labs. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS MET LABS



Nancy LaBrecque
Documentation Department

Reference: WIRA139090-FCC-IC-BLE - iDFace Max – Rev 5

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Bluetooth Low Energy Test Report

for the

Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda
iDFace Max

Tested under
FCC Part 15.247 and RSS-247 Issue 4
For Intentional Radiators



Veer Patel, EMC/Wireless Test Engineer
Electromagnetic Compatibility Lab



Nancy LaBrecque
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 15.247 under normal use and maintenance.



Matthew Hinojosa
EMC Manager, Austin Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	October 22, 2025	Initial Issue.
1	October 28, 2025	Customer Requested Changes.
2	October 30, 2025	Customer Requested Changes.
3	October 31, 2025	Customer Requested Changes.
4	November 3, 2025	Customer Requested Changes.
5	December 15, 2025	TCB Reviewer Changes

List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dB μ A	Decibels above one microamp
dB μ V	Decibels above one microvolt
dB μ A/m	Decibels above one microamp per meter
dB μ V/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μ H	microhenry
μ	microfarad
μ s	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the *iDFace Max*, with the requirements of FCC Part 15.247 and RSS-247 Issue 4. Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the iDFace Max, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with 4, in accordance with Compatibility for the Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda purchase order number 2025562648. All tests were conducted using measurement procedures ANSI C63.4-2014 and ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024.

FCC Reference 47 CFR Part 15.247	IC Reference RSS-247 Issue 4 RSS-GEN Issue 5	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	---	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN (8.8)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(2)	RSS-247 (5.2)	6dB Occupied Bandwidth	Compliant
---	RSS-GEN (6.7)	99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-247 (5.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-GEN (6.13), (8.9), & (8.10)	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-247 (5.5)	RF Conducted Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	RSS-247 (5.2)	Peak Power Spectral Density	Compliant

Table 1. Executive Summary

II. Equipment Configuration

A. Overview

Eurofins MET Labs was contracted by Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda to perform testing on the iDFace Max, under Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda's purchase order number 2025562648.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the IDFMAXFPH.

The results obtained relate only to the item(s) tested.

Product Name:	iDFace Max	
Model(s) Tested:	IDFMAXFPH	
Test Sample Number:	25743-14	
Equipment Specifications:	Primary Power:	12VDC via AC / DC Power Adapter
	Type of Modulations:	GFSK
	Equipment Code:	DTS
	Peak RF Output Power:	3.86 dBm
	EUT Frequency Ranges:	2402MHz – 2480MHz
	Antenna Gain ¹ :	3.47 dBi
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: -20 to 50° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Bryan Taylor, Veer Patel	
Report Date(s):	December 15, 2025	

Table 2. EUT Summary Table

¹ The antenna gain information was provided by HID Global Corporation (US) and may affect compliance.

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
RSS-247, Issue 4, August 2023	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN, Issue 5, July 24: 2025	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

C. Test Site

All testing was performed at Eurofins MET Labs, 13501 McCallen Pass, Austin, TX 78753. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

ISED Lab Info:

CAB Identifier: US0004
Company Number: 2043D

FCC Lab Info:

Designation Number: US1127

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Occupied Bandwidth Measurements	±4.52 Hz	2	95%
Conducted Power Measurements	±2.74 dB	2	95%
Power Spectral Density Measurements	±2.74 dB	2	95%
Conducted Spurious Emissions	±2.80 dB	2	95%
Conducted Emissions (Mains)	±2.97 dB	2	95%
Radiated Spurious Emissions (9kHz – 1GHz)	±2.95 dB	2	95%
Radiated Spurious Emissions (1GHz - 40GHz)	±3.54 dB	2	95%

Table 4. Uncertainty Calculations Summary

E. Description of Test Sample

The iDFace Max, is an access control reader employing facial recognition technology, as well as RFID and Bluetooth technologies.

The iDFace Max has a LF, HF and a BLE radio on board enable the use of traditional RFID access control as well as mobile access through cell phone BLE and the HID Mobile Access App.

The iDFace Max allows a user that is enrolled to access a door through the means of facial recognition (by looking into the cameras on the screen) or presenting an RFID credential, in the form of a fob, card or mobile device.

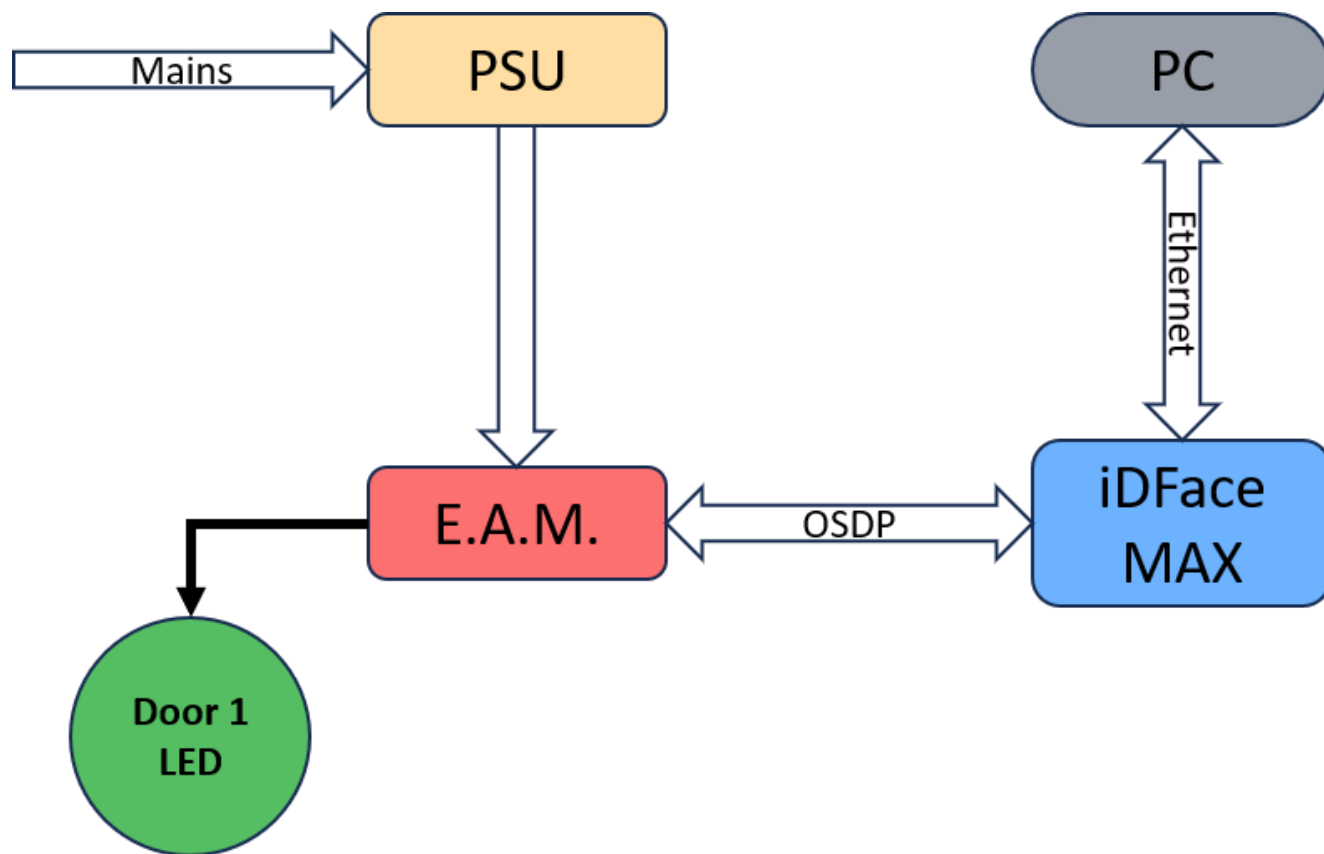


Figure 1. Block Diagram of Test Configuration

F. Equipment Configuration

A laptop was connected to the test sample and software commands were used to force the BLE radio to transmit on low, mid, or high channels and at 1Mbps or 2Mbps

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Name/Description	Manufacturer	Model Number	Serial Number	*Customer Supplied Calibration Data
Smart Phone	Motorola	Moto E7	ZF523HTN WG	N/A
Smart Phone	Samsung	Galaxy A03	R9XT501Z14J	N/A
Laptop	Asus	M509D	L5N0B6017297222	N/A
Power Supply	XP Power	VEC65US12	N/A	N/A

Table 5. Support Equipment

H. Ports and Cabling Information

Name/Description	Manufacturer	Model Number	Serial Number	*Customer Supplied Calibration Data
Smart Phone	Motorola	Moto E7	ZF523HTN WG	N/A
Smart Phone	Samsung	Galaxy A03	R9XT501Z14J	N/A
Laptop	Asus	M509D	L5N0B6017297222	N/A

Table 6. Ports and Cabling Information

I. Mode of Operation

A laptop was connected to the test sample and software commands were used to force the BLE radio to transmit on low, mid, or high channels and at 1Mbps or 2Mbps.

Transmit Band	Modulation	Channel Frequencies Tested	Test Tool Name	Test Tool Power Setting ²
2400 – 2483.5MHz	BLE (GFSK)	2402MHz / 2440MHz / 2480MHz	STM32CubeMonitor-RF Version 2.12.0	6

Table 7. Test Channels Utilized

J. Method of Monitoring EUT Operation

A spectrum analyzer was used to confirm proper transmitter operation.

K. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to the Controlid Industria e Comercio de Hardware e Servicos De Tecnologia Ltda upon completion of testing.

² Note the power settings are relative levels and do not necessarily correspond to the actual measured output power.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: § 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

- a.) Antenna must be permanently attached to the unit.
- b.) Antenna must use a unique type of connector to attach to the EUT.
- c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The iDFace Max was compliant with this requirement. The antenna is permanently attached to the unit.

Test Engineer(s): Bryan Taylor

Test Date(s): 7/28/2025

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) Conducted Emissions Limits

Test Requirement(s): § 15.207 (a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 - 56	56 - 46
0.5-5	56	46
5-30	60	50

Table 8. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

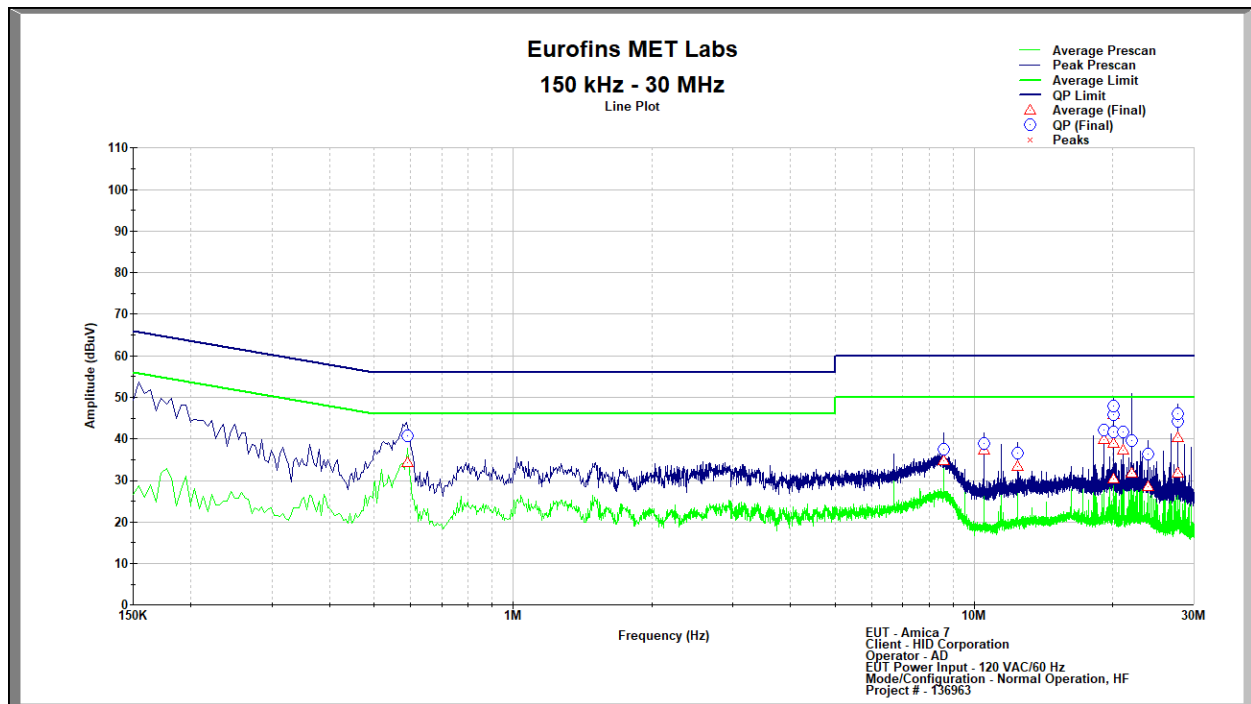
Test Procedure: The EUT was placed on a 0.8 m-high wooden table. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω /50 μ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2014 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed using a 50 Ω /50 μ H LISN as the input transducer to an EMI receiver. For the purpose of this testing, the transmitter was turned on.

Test Results: The EUT was compliant with this requirement. During these tests the the iDface Max was powered via an external AC/DC Power adapter. Both the LF and HF antennas were replaced with 50 ohm load resistors. The resistors were located at the antenna solder locations on the main printed circuit board.

Test Engineer(s): An Dang

Test Date(s): 7/28/2025

15.207(a) Conducted Emissions Test Results

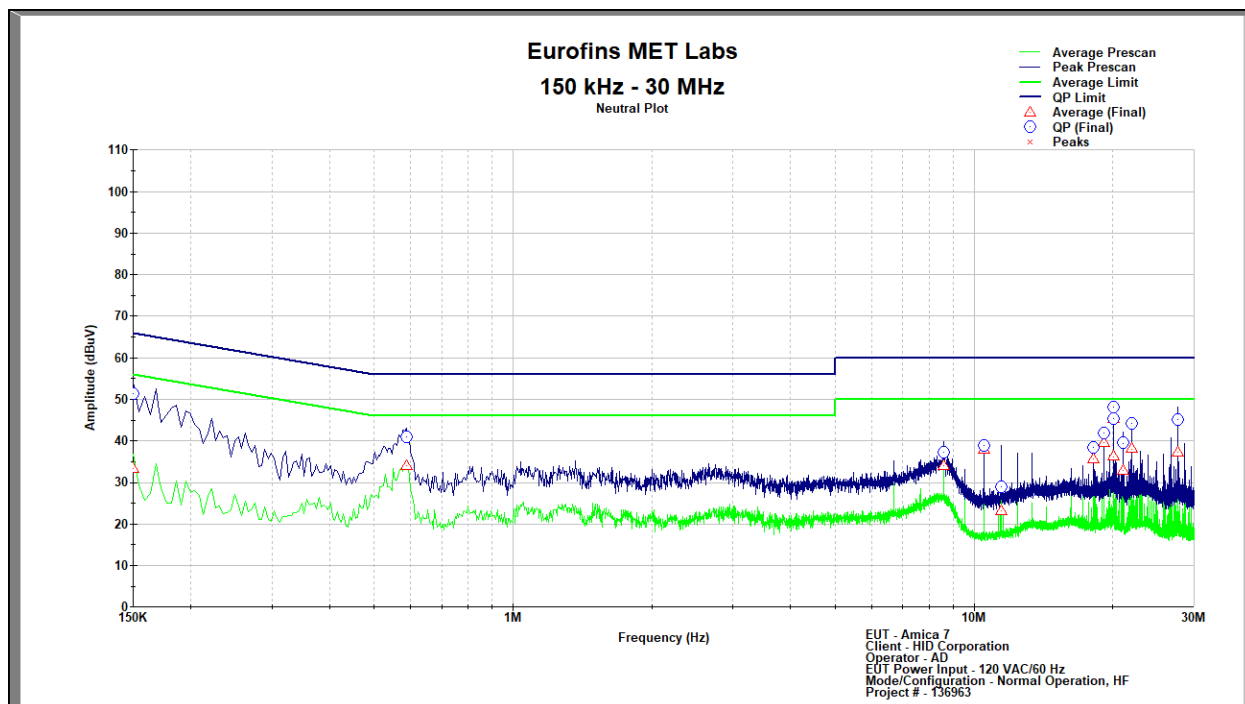


Conducted Emissions, 15.207(a), Phase

Frequency (MHz)	Quasi-Peak (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Quasi-Peak Margin (dB)	Average (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
0.591	40.678	56.000	15.322	34.233	46.000	11.767
8.600	37.439	60.000	22.561	34.727	50.000	15.273
10.509	38.927	60.000	21.073	37.205	50.000	12.795
12.418	36.532	60.000	23.468	33.433	50.000	16.567
19.110	42.218	60.000	17.782	39.751	50.000	10.249
20.058	41.683	60.000	18.317	30.241	50.000	19.759
20.063	45.900	60.000	14.100	38.938	50.000	11.062
20.067	47.908	60.000	12.092	45.763	50.000	4.237
21.020	41.740	60.000	18.260	37.342	50.000	12.658
21.972	39.530	60.000	20.470	31.697	50.000	18.303
23.884	36.336	60.000	23.664	28.460	50.000	21.540
27.703	44.138	60.000	15.862	31.773	50.000	18.227
27.708	46.053	60.000	13.947	40.231	50.000	9.769

Table 9. Conducted Emissions, 15.207(a), Phase, Test Results

15.207(a) Conducted Emissions Test Results



Conducted Emissions, 15.207(a), Neutral

Frequency (MHz)	Quasi-Peak (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Quasi-Peak Margin (dB)	Average (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
0.150	51.421	66.000	14.579	33.349	56.000	22.651
0.587	40.921	56.000	15.079	33.960	46.000	12.040
8.600	37.295	60.000	22.705	33.986	50.000	16.014
10.514	38.879	60.000	21.121	37.941	50.000	12.059
11.460	28.851	60.000	31.149	23.069	50.000	26.931
18.160	38.361	60.000	21.639	35.608	50.000	14.392
19.113	41.872	60.000	18.128	39.525	50.000	10.475
20.067	48.161	60.000	11.839	45.370	50.000	4.630
20.072	45.294	60.000	14.706	36.230	50.000	13.770
21.026	39.474	60.000	20.526	32.856	50.000	17.144
21.977	44.085	60.000	15.915	38.080	50.000	11.920
27.708	45.202	60.000	14.798	37.242	50.000	12.758

Table 10. Conducted Emissions, 15.207(a), Neutral, Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(2) 6 dB Bandwidth

Test Requirements: § 15.247(a)(2): Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Procedure: The transmitter was on and transmitting at the highest output power. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately 1% of the total emission bandwidth, and the VBW > RBW. The 6 dB Bandwidth was measured and recorded. The measurements were performed on the low, mid and high channels.

Test Results The iDFace Max was compliant with § 15.247 (a)(2). The 6 dB Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Veer Patel

Test Date(s): 7/29/2025

Electromagnetic Compatibility Criteria for Intentional Radiators

RSS-GEN (6.7) 99% Bandwidth

Test Requirements: The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency rang between two points, one above and the other blow the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Test Procedure: The transmitter was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, and the VBW > RBW. The 99% Bandwidth was measured and recorded.

Test Results The 99% Bandwidth is shown on the plots on the following pages.

Test Engineer(s): Veer Patel

Test Date(s): 7/29/2025

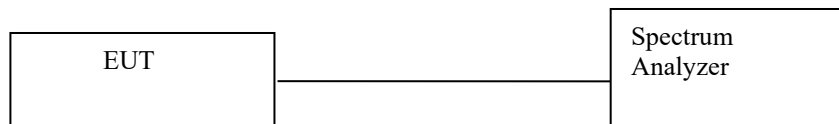


Figure 2. Block Diagram, Occupied Bandwidth Test Setup

Data Rate	Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Result
1Mbps	Low	2402	1.050	0.6773	> 0.5	Pass
	Middle	2440	1.041	0.6773	> 0.5	Pass
	High	2480	1.041	0.6773	> 0.5	Pass

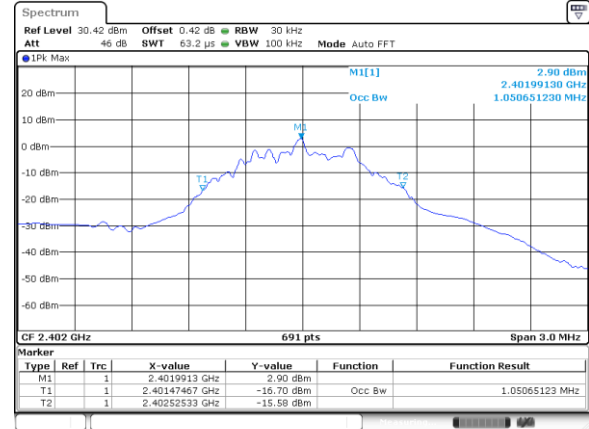
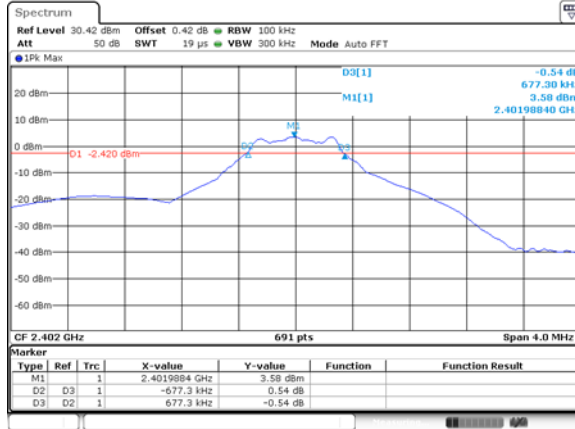
Table 11. 99% and 6dB Occupied Bandwidth, Test Results (1Mbps)

Data Rate	Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (MHz)	Result
2Mbps	Low	2402	2.031	1.1404	> 0.5	Pass
	Middle	2440	2.026	1.1462	> 0.5	Pass
	High	2480	2.008	1.1346	> 0.5	Pass

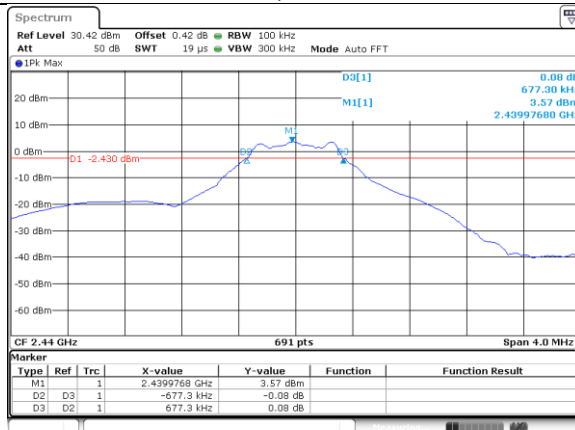
Table 12. 99% and 6 dB Occupied Bandwidth, Test Results (2Mbps)

Occupied Bandwidth Test Results

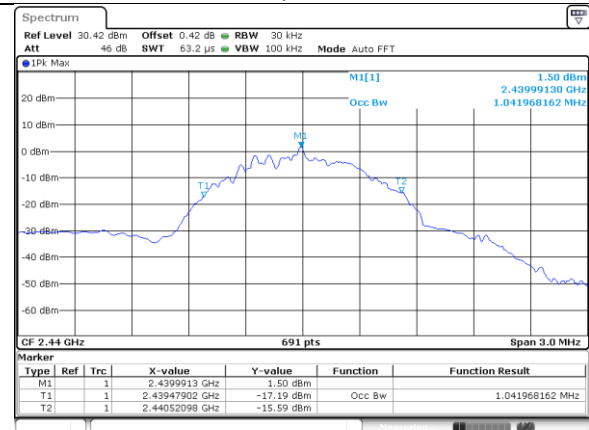
Occupied Bandwidth Plots (1Mbps)



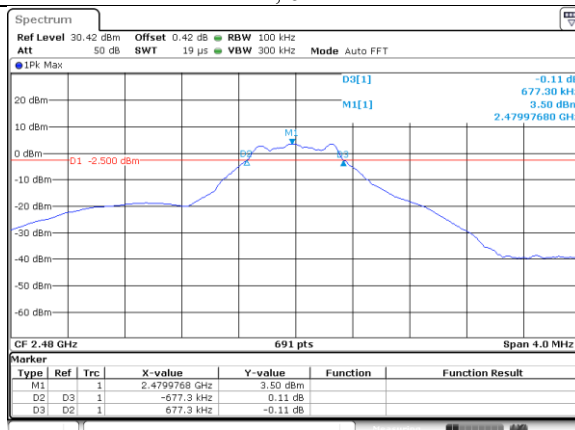
Low Channel, 6dB Bandwidth



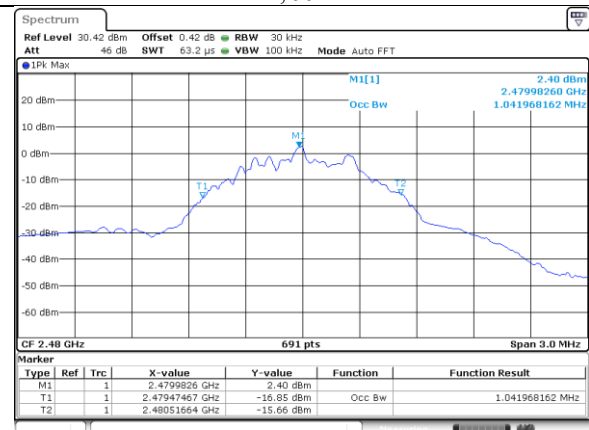
Low Channel, 99% Bandwidth



Mid Channel, 6dB Bandwidth



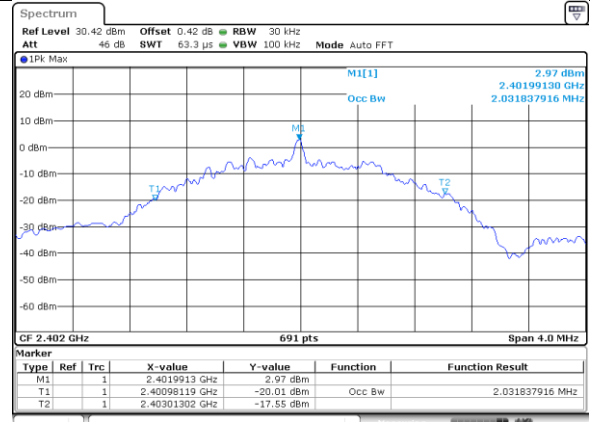
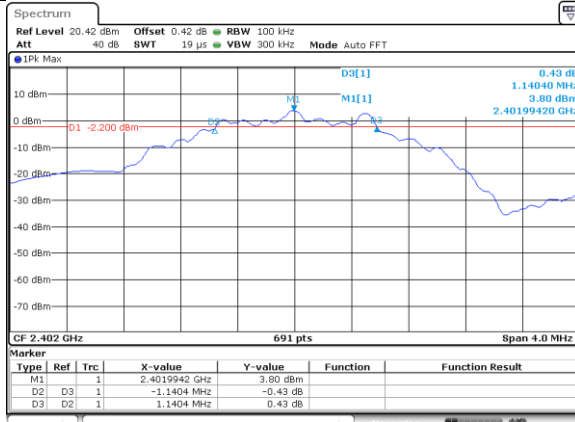
Mid Channel, 99% Bandwidth



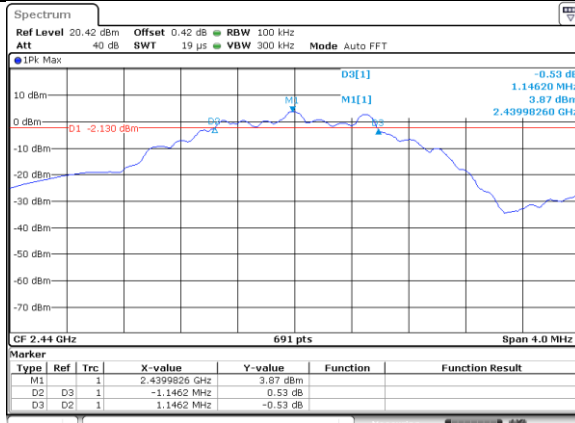
High Channel, 6dB Bandwidth

High Channel, 99% Bandwidth

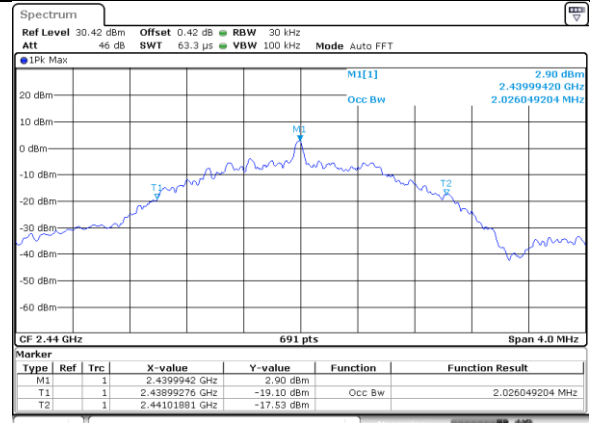
Occupied Bandwidth Plots (2Mbps)



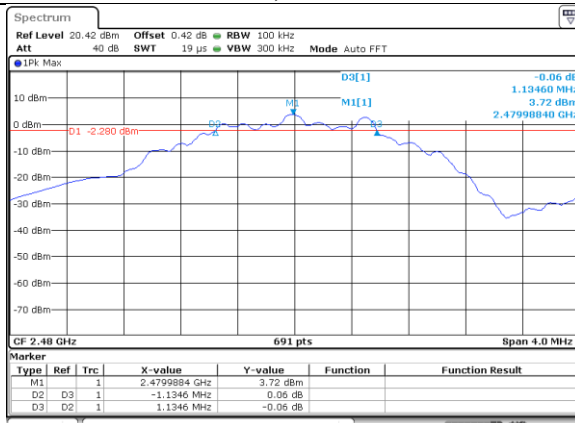
Low Channel, 6dB Bandwidth



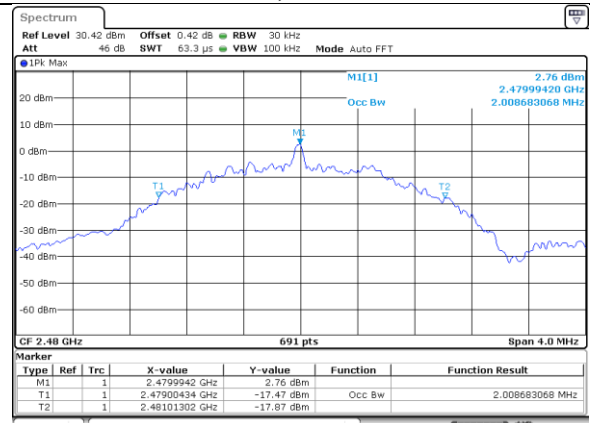
Low Channel, 99% Bandwidth



Mid Channel, 6dB Bandwidth



Mid Channel, 99% Bandwidth



High Channel, 6dB Bandwidth

High Channel, 99% Bandwidth

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

Test Requirements: §15.247(b): The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400-2483.5	1.000
5725- 5850	1.000

Table 13. Output Power Requirements from §15.247(b)

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the Table 13, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band and using a point to point application may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Fixed, point-to-point operation excludes the use of point-to-multipoint systems, Omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The analyzer reference level was offset by cable loss connecting to the test sample. The peak power was measured at the low, mid and high channels of each band at the maximum power level. The antenna gain provided by the manufacturer was added to the measured conducted power to arrive at the EIRP.

Test Results: The iDFace Max was compliant with the Peak Power Output limits of §15.247(b).

Test Engineer(s): Veer Patel

Test Date(s): 07/29/2025

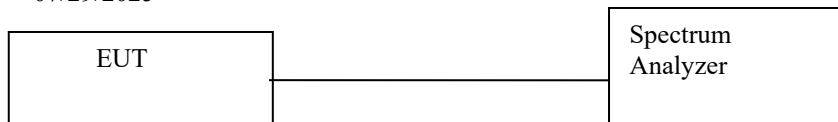


Figure 3. Peak Power Output Test Setup

Peak Power Output Test Results

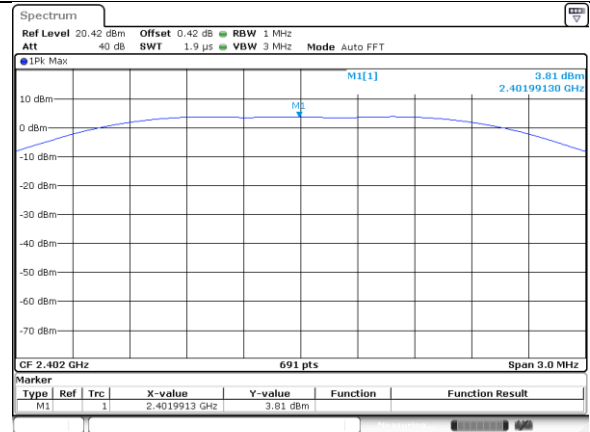
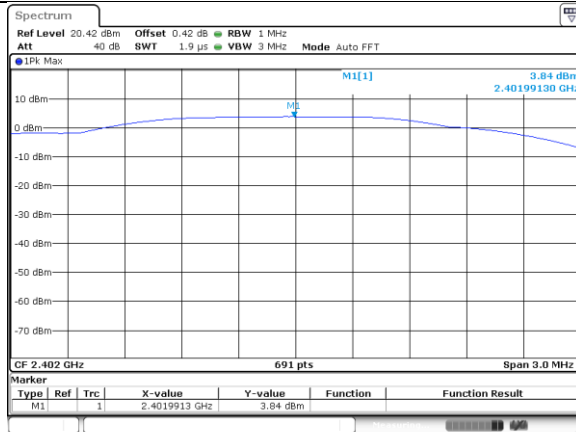
Data Rate	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Peak Power Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
1Mbps	Low	2402MHz	3.84	30	3.47	7.31	36	Pass
	Middle	2440MHz	3.82	30	3.47	7.29	36	Pass
	High	2480MHz	3.64	30	3.47	7.11	36	Pass

Table 14. Peak Power and EIRP, Test Results (1Mbps)

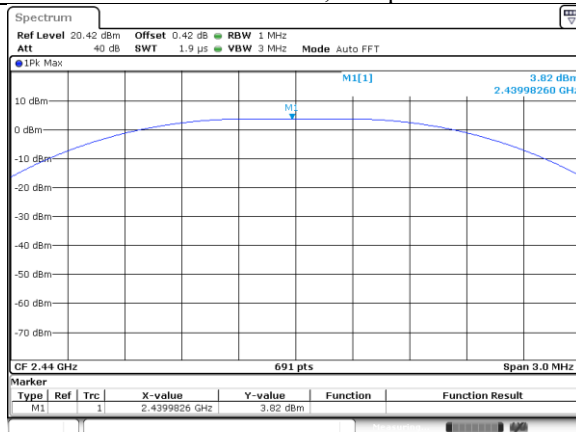
Data Rate	Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Peak Power Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
2Mbps	Low	2402MHz	3.81	30	3.47	7.28	36	Pass
	Middle	2440MHz	3.86	30	3.47	7.33	36	Pass
	High	2480MHz	3.76	30	3.47	7.23	36	Pass

Table 15. Peak Power and EIRP, Test Results (2Mbps)

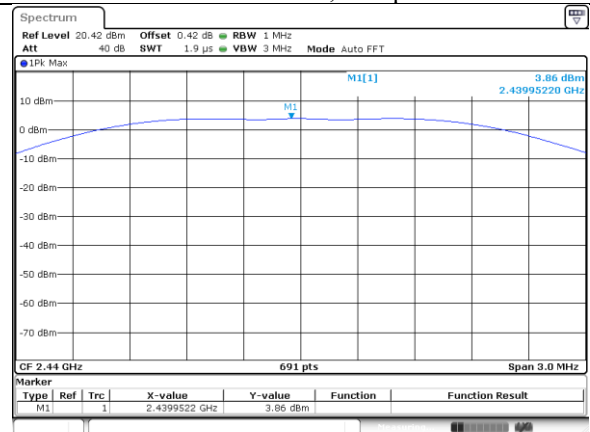
Peak EIRP Plots



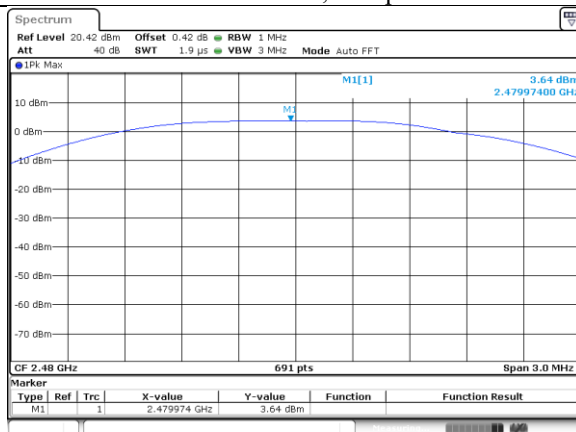
Low Channel, 1Mbps



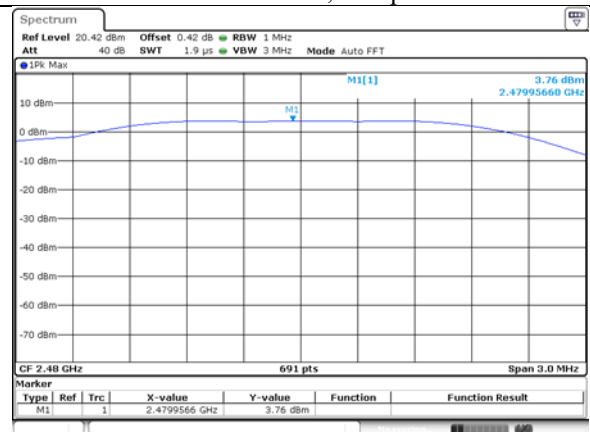
Low Channel, 2Mbps



Mid Channel, 1Mbps



Mid Channel, 2Mbps



High Channel, 1Mbps

High Channel, 2Mbps

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(e) Peak Power Spectral Density

Test Requirements: §15.247(e): For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. The RBW was set between 3kHz and 100 kHz. The VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time, and a peak detector was used. Measurements were carried out at the low, mid and high channels.

Test Results: The iDFace Max was compliant with the peak power spectral density limits of § 15.247 (e).

Test Engineer: Veer Patel

Test Date: 07/28/2025

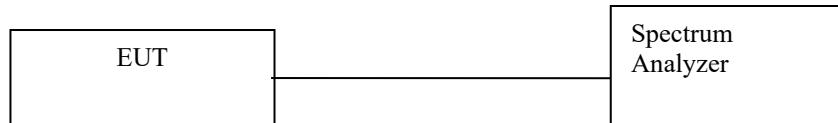


Figure 4. Block Diagram, Peak Power Spectral Density Test Setup

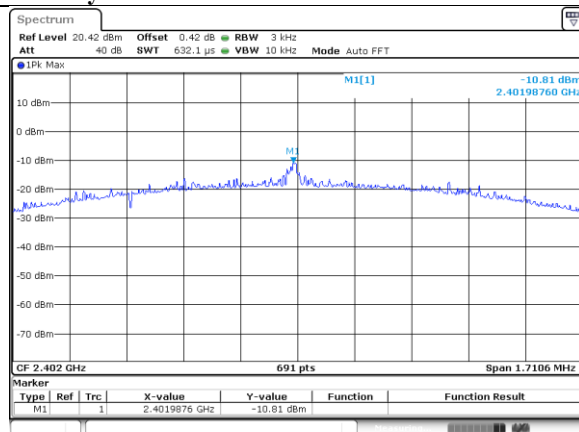
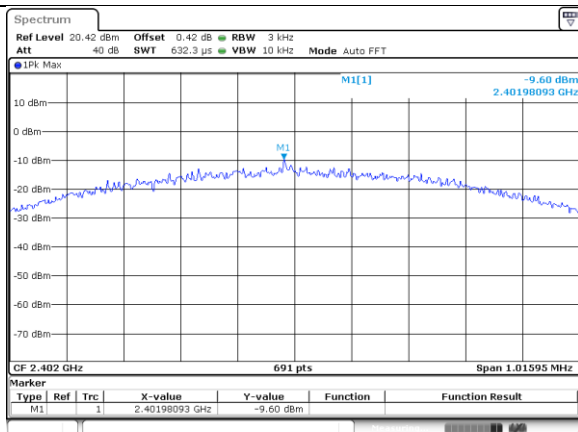
Data Rate	Channel	Frequency (MHz)	Peak Power Spectral Density (dBm / 3kHz)	Peak Power Spectral Density Limit (dBm / 3kHz)	Result
1Mbps	Low	2402	-9.60	8	Pass
	Middle	2440	-9.76	8	Pass
	High	2480	-9.79	8	Pass

Table 16. Peak Power Spectral Density, Test Results (1Mbps)

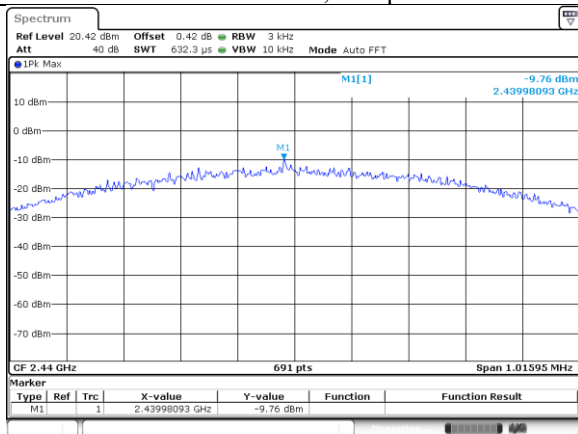
Data Rate	Channel	Frequency (MHz)	Peak Power Spectral Density (dBm / 3kHz)	Peak Power Spectral Density Limit (dBm / 3kHz)	Result
2Mbps	Low	2402	-10.81	8	Pass
	Middle	2440	-11.39	8	Pass
	High	2480	-11.14	8	Pass

Table 17. Peak Power Spectral Density, Test Results (2Mbps)

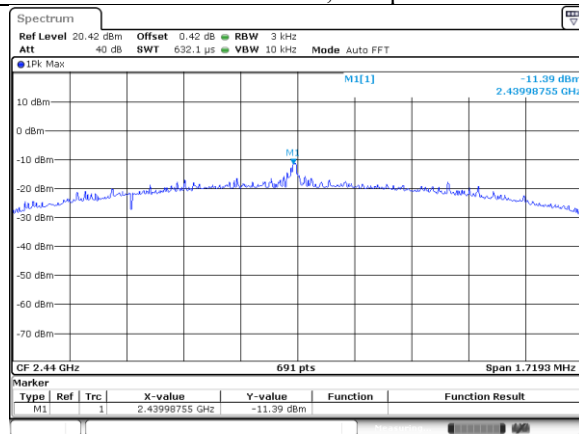
Peak Power Spectral Density Plots



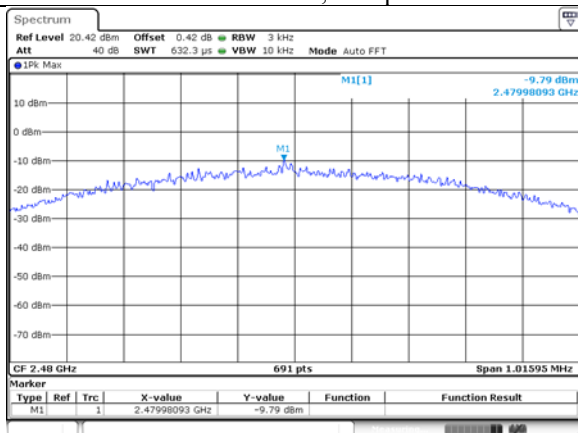
Low Channel, 1Mbps



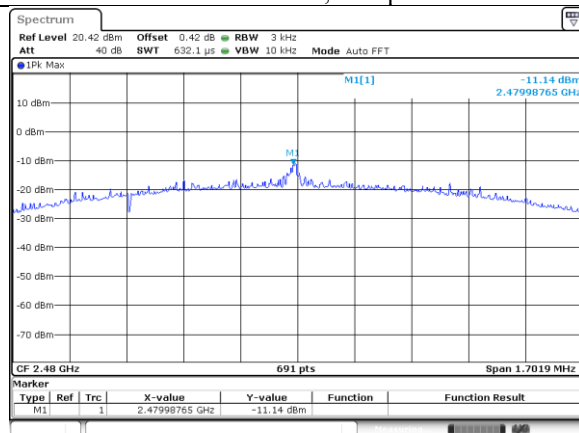
Low Channel, 2Mbps



Mid Channel, 1Mbps



Mid Channel, 2Mbps



High Channel, 1Mbps

High Channel, 2Mbps

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements

Test Requirement: **15.247(d)** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Procedure: For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. The RBW was set to 100 kHz. The VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels. Measurements were carried out at the low, mid and high channels. The analyzer settings are shown in the following table:

RBW:	100kHz	Detector:	Peak	Reference Level:	30dBm
VBW:	300kHz	Sweep Time:	Auto	Internal Attenuation:	20dB

Figure 5. Analyzer Settings During Measurement

Test Software: TILE Version 7.4.2.5 (Manufactured by ETS Lindgren) was utilized to perform these measurements.

Test Results: The iDFace Max was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

Test Engineer(s): Veer Patel

Test Date(s): 07/29/2025

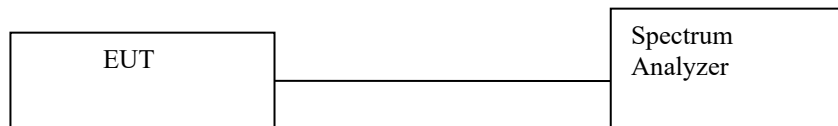
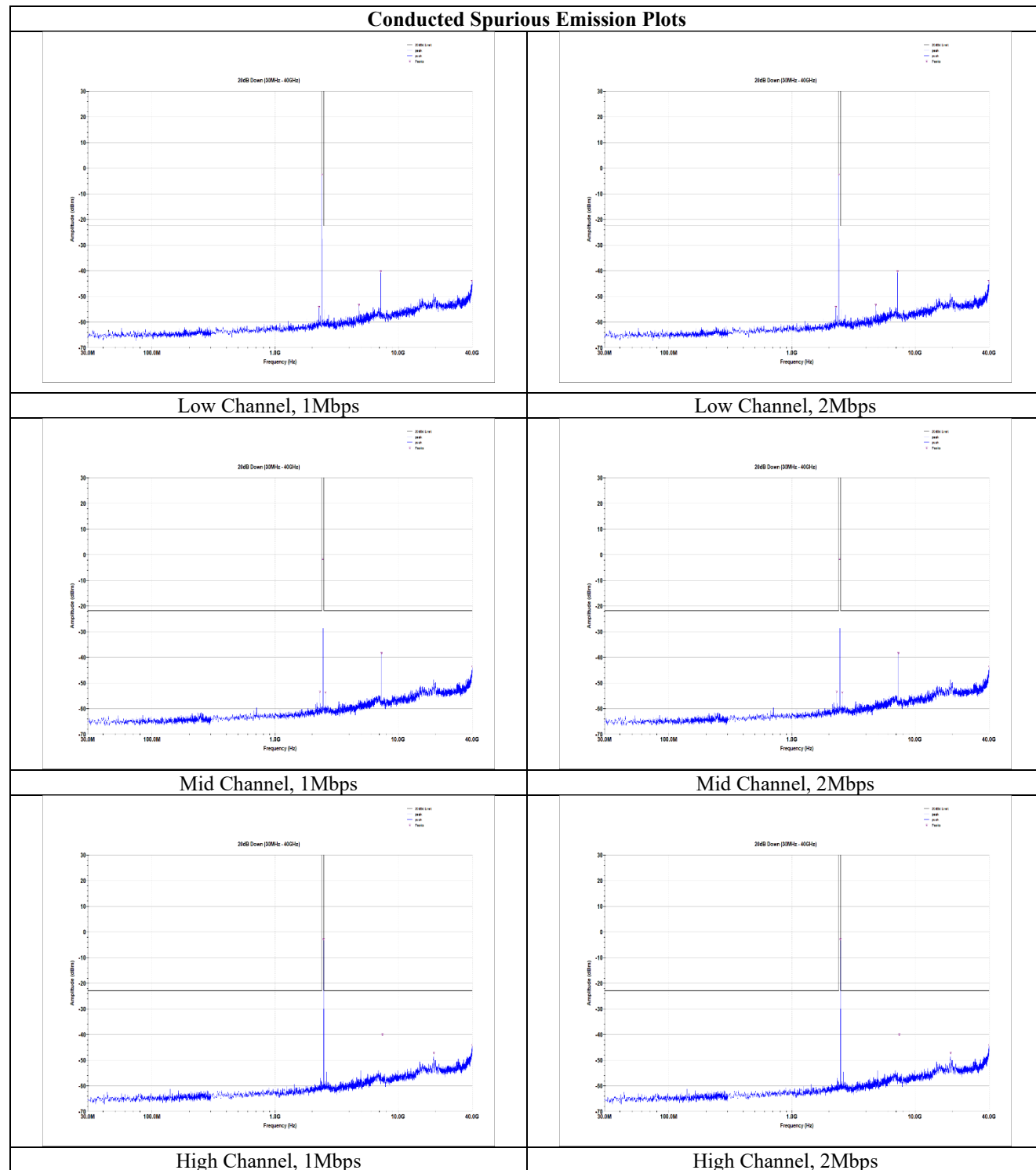
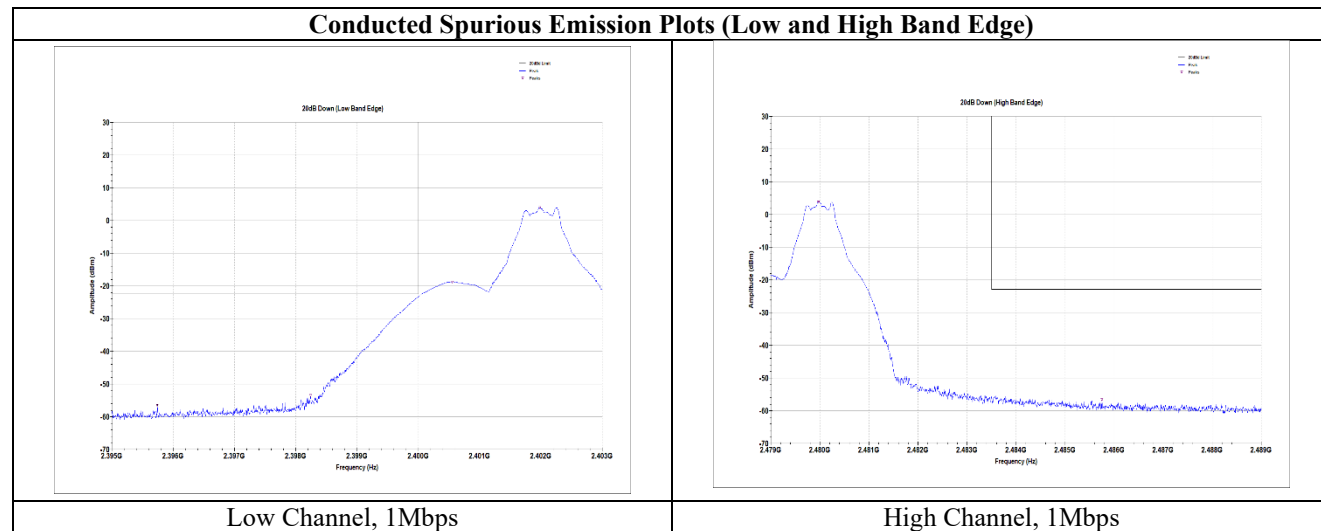


Figure 6. Block Diagram, Conducted Spurious Emissions Test Setup



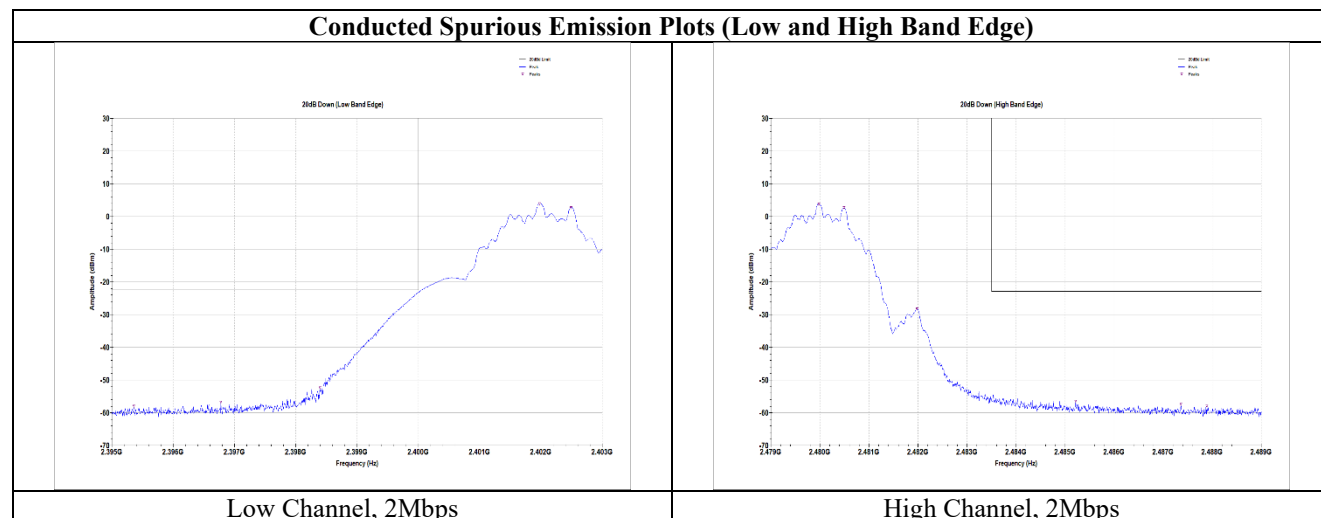


Spurious Frequency (MHz)	Peak Amplitude (dBm)	-20dBd Limit (dBm)	Margin (dB)	Result
2395.744	-56.49	-22.43	34.06	Pass
2398.24	-53.41	-22.43	30.98	Pass

Figure 7. Low Channel, Low Band Edge (1Mbps)

Spurious Frequency (MHz)	Peak Amplitude (dBm)	-20dBd Limit (dBm)	Margin (dB)	Result
2485.75	-56.61	-22.94	33.67	Pass

Figure 8. High Channel, High Band Edge (1Mbps)



Spurious Frequency (MHz)	Peak Amplitude (dBm)	-20dBd Limit (dBm)	Margin (dB)	Result
2395.36	-57.96	-22.43	35.53	Pass
2396.776	-56.76	-22.43	34.33	Pass
2398.392	-52.31	-22.43	29.88	Pass

Figure 9. Low Channel, Low Band Edge (2Mbps)

Spurious Frequency (MHz)	Peak Amplitude (dBm)	-20dBd Limit (dBm)	Margin (dB)	Result
2485.21	-56.4	-22.94	33.46	Pass
2487.36	-57.36	-22.94	34.42	Pass
2487.89	-57.95	-22.94	35.01	Pass

Figure 10. High Channel, High Band Edge (2Mbps)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

Test Requirements: §15.247(d); §15.205: Emissions outside the frequency band.

§15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110-----	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505-----	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905-----	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128-----	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775-----	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775-----	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218-----	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825-----	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225-----	123–138	2200–2300	14.47–14.5
8.291–8.294-----	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366-----	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675-----	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475-----	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293-----	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025-----	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725-----	322–335.4	3600–4400	(²)

Table 18. Restricted Bands of Operation

¹ Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.

² Above 38.6

Test Requirement(s): § 15.209 (a): Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 19.

Frequency (MHz)	§ 15.209(a), Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 19. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: The radiated methodology referenced in ANSI C63.10 Section 11.12.1 was utilized in order to assess the unwanted emissions in the restricted bands.

A radiated scan was performed with the antenna of proper impedance installed. The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes if multiple mounting orientations are supported. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.

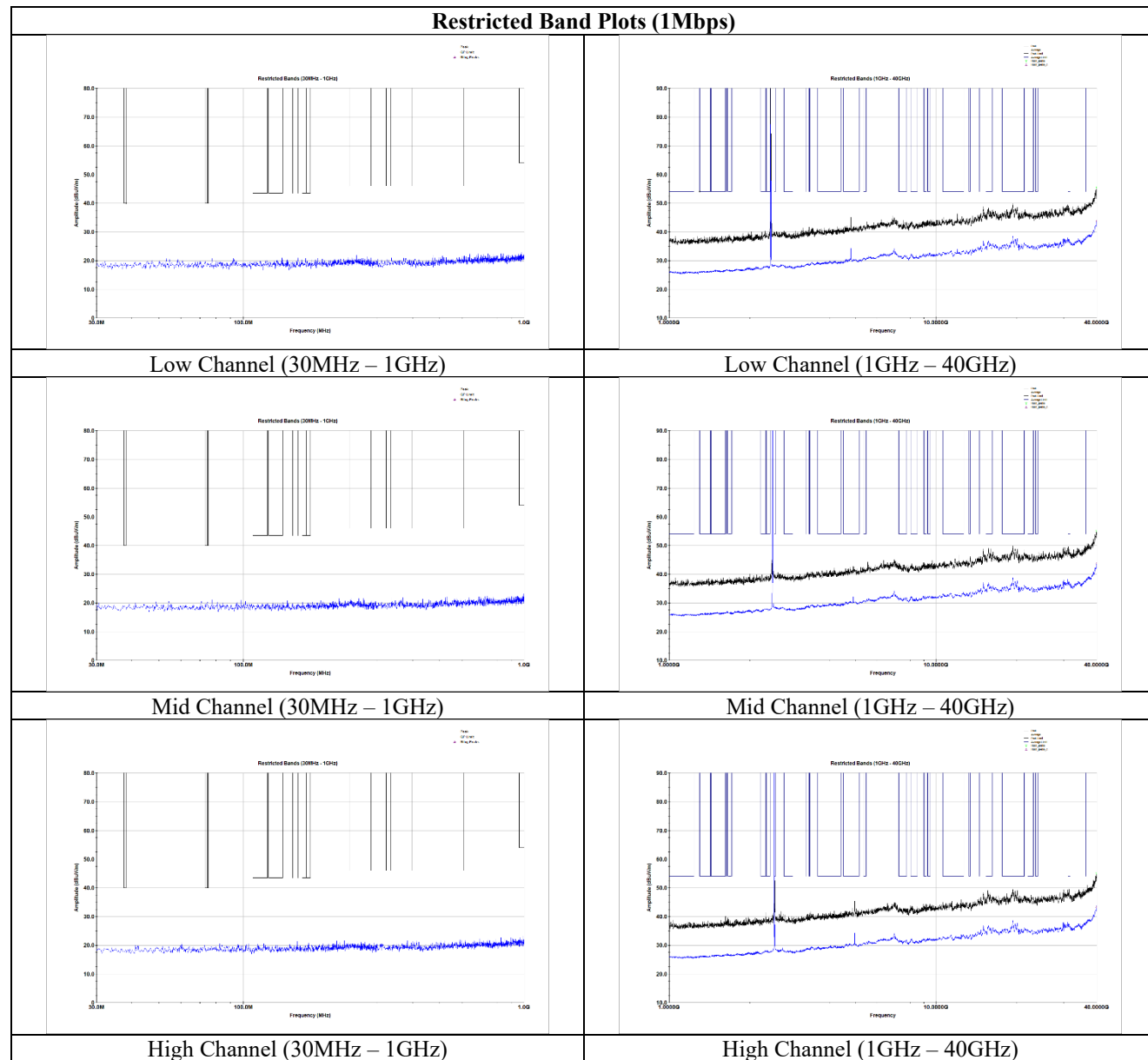
Radiated measurements below 30MHz were performed in a semi-anechoic chamber that has been correlated to an open area site.

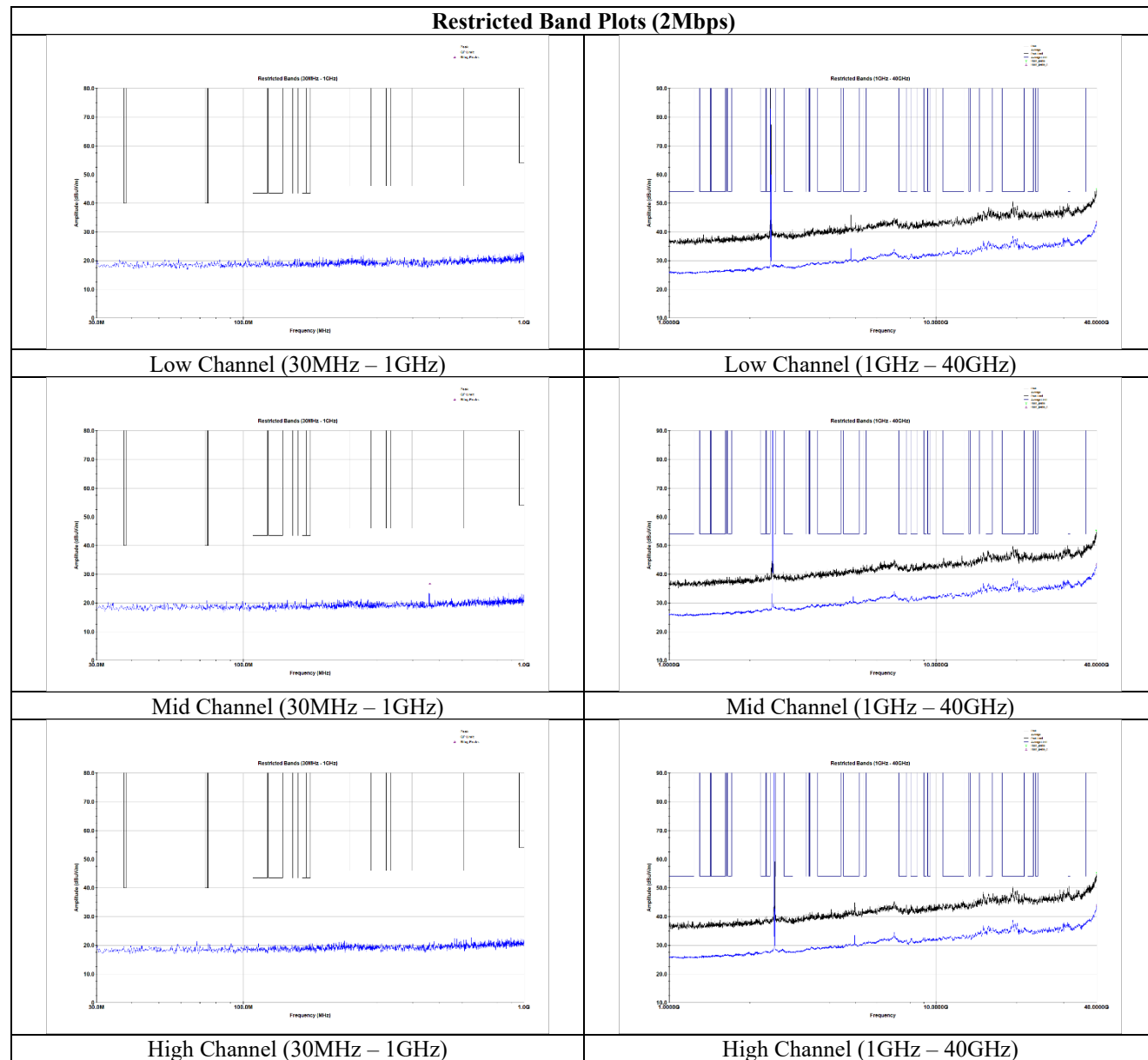
Test Software: TILE Version 7.4.2.5 (Manufactured by ETS Lindgren) and ELEKTRA Version 4.61 (Manufactured by Rohde&Schwarz) was utilized to perform these measurements.

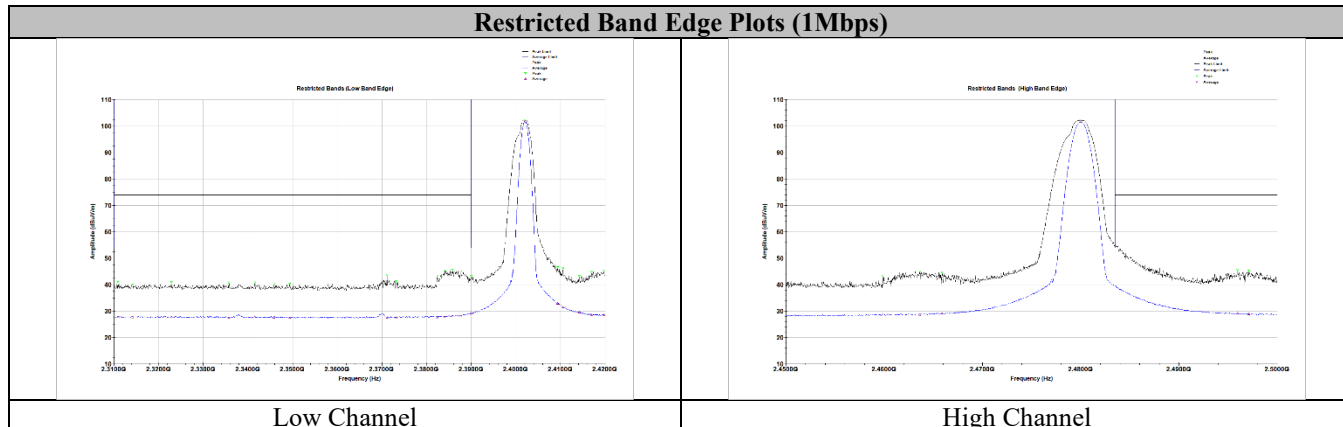
Test Results: The iDFace Max was compliant with the Radiated Spurious Emission limits of § 15.247(d).

Test Engineer(s): Veer Patel, Bryan Taylor

Test Date(s): 7/29/2025 – 8/11/2025





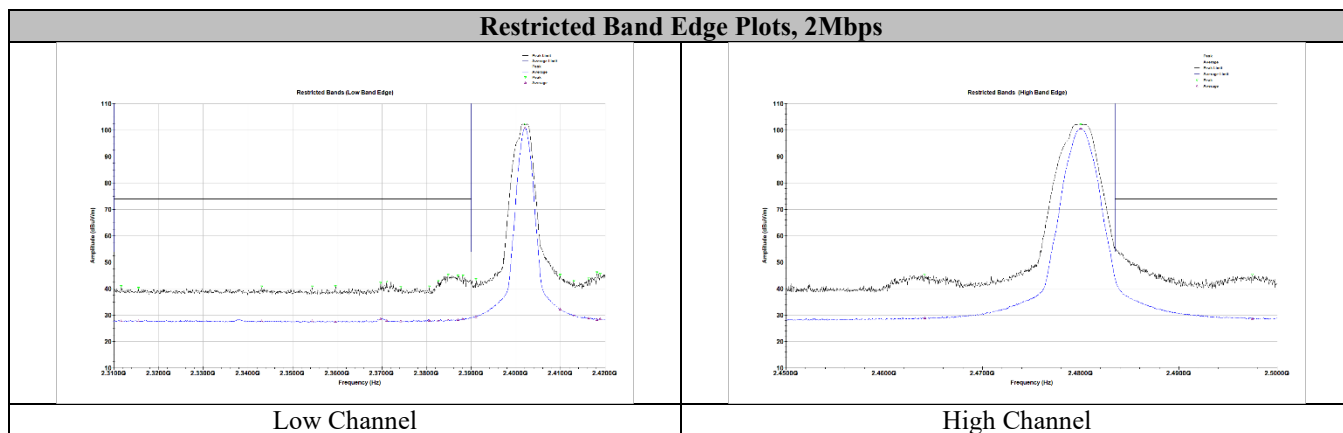


Frequency (MHz)	Peak Reading (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Avg Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dBuV/m)	Result
2310.88	41.01	74	32.99	27.87	54	26.13	Pass
2314.18	40.35	74	33.65	27.7	54	26.3	Pass
2322.87	40.99	74	33.01	27.85	54	26.15	Pass
2335.74	40.86	74	33.14	27.59	54	26.41	Pass
2341.57	40.82	74	33.18	27.79	54	26.21	Pass
2345.86	40.44	74	33.56	27.58	54	26.42	Pass
2349.38	40.33	74	33.67	27.5	54	26.5	Pass
2371.16	43.69	74	30.31	27.58	54	26.42	Pass
2373.14	41.21	74	32.79	27.7	54	26.3	Pass
2382.38	43.42	74	30.58	27.69	54	26.31	Pass
2384.03	45.28	74	28.72	27.87	54	26.13	Pass
2385.79	45.54	74	28.46	28.07	54	25.93	Pass
2387.66	45.03	74	28.97	28.31	54	25.69	Pass
2389.97	43.34	74	30.66	29.14	54	24.86	Pass

Figure 11. Restricted Band Edge Spurious Emissions (Low Band Edge, 1Mbps)

Frequency (MHz)	Peak Reading (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Avg Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dBuV/m)	Result
2495.95	45.48	74	28.52	29.17	54	24.83	Pass
2497.1	45.2	74	28.8	28.85	54	25.15	Pass

Figure 12. Restricted Band Edge Spurious Emissions (High Band Edge, 1Mbps)



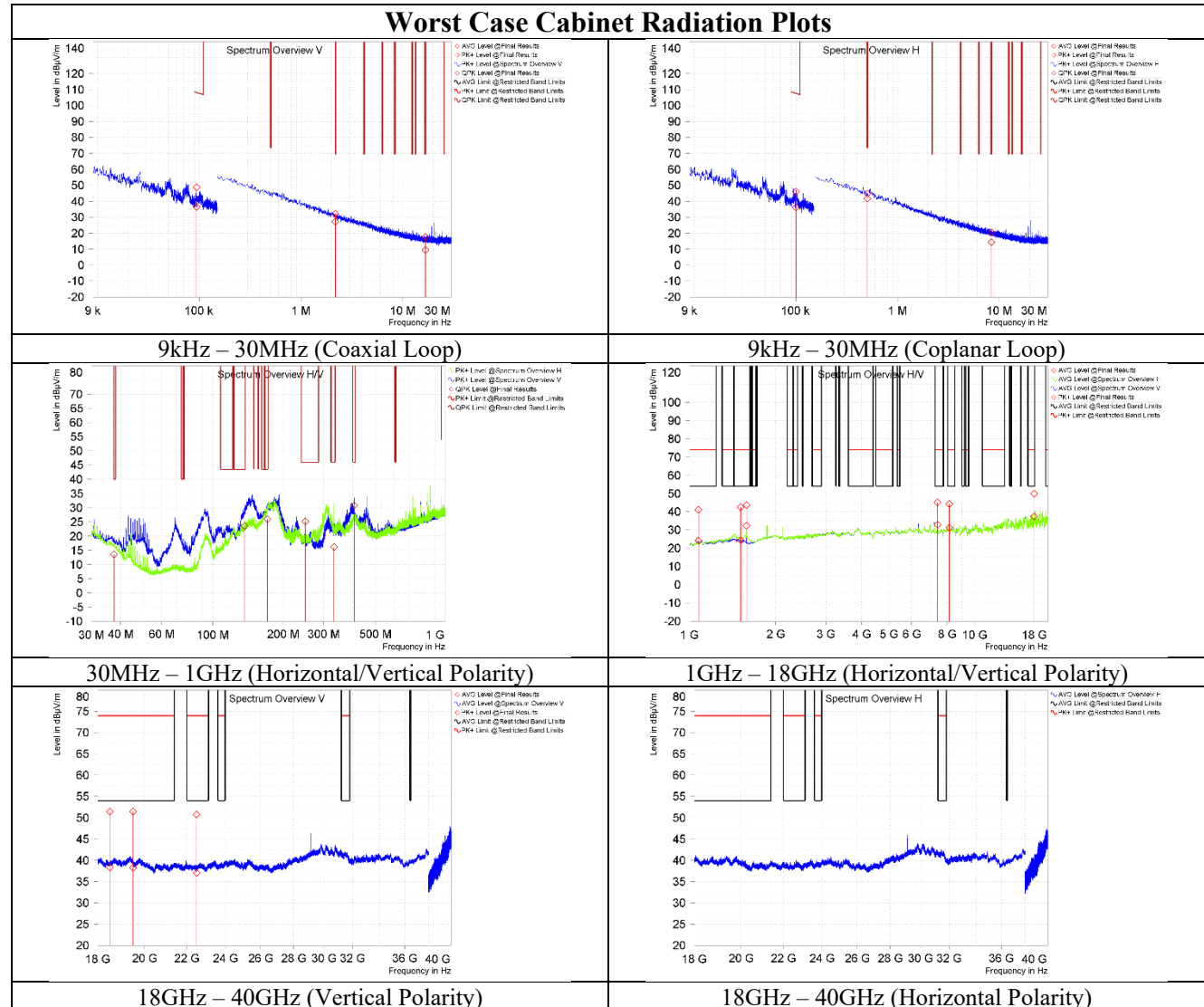
Frequency (MHz)	Peak Reading (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Avg Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dBuV/m)	Result
2311.65	40.89	74	33.11	27.74	54	26.26	Pass
2315.5	40.28	74	33.72	27.83	54	26.17	Pass
2343.11	40.86	74	33.14	27.82	54	26.18	Pass
2354.44	40.85	74	33.15	27.74	54	26.26	Pass
2359.61	40.91	74	33.09	27.5	54	26.5	Pass
2369.73	42.16	74	31.84	28.6	54	25.4	Pass
2371.05	42.69	74	31.31	27.97	54	26.03	Pass
2374.24	40.49	74	33.51	27.61	54	26.39	Pass
2380.62	40.77	74	33.23	27.9	54	26.1	Pass
2382.6	42.97	74	31.03	27.8	54	26.2	Pass
2384.8	45.21	74	28.79	28.06	54	25.94	Pass
2387	44.92	74	29.08	28.17	54	25.83	Pass
2388.1	44.92	74	29.08	28.51	54	25.49	Pass

Figure 13. Restricted Band Edge Spurious Emissions (Low Band Edge, 2Mbps)

Frequency (MHz)	Peak Reading (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Avg Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dBuV/m)	Result
2497.45	45.31	74	28.69	28.64	54	25.36	Pass

Figure 14. Restricted Band Edge Spurious Emissions (High Band Edge, 2Mbps)

Worst Case Cabinet Spurious Emissions



Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.094	48.59	108.14	59.56	11.55	V	164.9	1.00	0.200	Pass
0.100	45.94	107.58	61.64	11.26	H	312.6	1.00	0.200	Pass
0.506	44.68	73.62	28.93	11.31	H	351.8	1.00	9.000	Pass
2.180	32.16	69.54	37.38	11.69	V	253.1	1.00	9.000	Pass
8.385	20.40	69.54	49.14	10.84	H	214.2	1.00	9.000	Pass
16.697	17.58	69.54	51.96	10.55	V	312.3	1.00	9.000	Pass

Figure 15. Worst Case Cabinet Radiation, 9kHz - 30MHz

Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
37.560	13.56	40.00	26.44	-6.06	V	153.9	1.74	120.000	Pass
137.370	23.56	43.52	19.96	-6.86	V	0	1.47	120.000	Pass
171.660	25.94	43.52	17.58	-8.31	H	300.9	3.18	120.000	Pass
250.020	25.12	46.02	20.90	-7.68	H	339.3	3.63	120.000	Pass
332.250	16.12	46.02	29.90	-4.70	H	190.7	3.99	120.000	Pass
405.030	30.79	46.02	15.23	-2.61	V	10.3	0.99	120.000	Pass

Figure 16. Radiated Spurious, 30MHz - 1GHz

Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
1,075.000	41.08	74.00	32.92	24.15	54.00	29.85	-0.36	V	92.5	2.07	Pass
1,512.000	42.52	74.00	31.48	24.30	54.00	29.70	-1.46	H	273.8	1.75	Pass
1,584.000	43.60	74.00	30.40	32.38	54.00	21.62	-2.42	H	68.7	2.08	Pass
7,392.500	45.14	74.00	28.86	32.90	54.00	21.10	-2.49	H	297.9	3.07	Pass
8,139.500	44.30	74.00	29.70	31.29	54.00	22.71	-3.92	H	-0.1	3.25	Pass
16,130.000	49.94	74.00	24.06	37.38	54.00	16.62	-1.17	H	282	1.98	Pass
18,495.600	51.45	74.00	22.55	38.29	54.00	15.71	13.02	V	360.2	0.99	Pass
19,496.350	51.42	74.00	22.58	38.27	54.00	15.73	12.38	V	263.4	0.99	Pass
22,497.300	50.71	74.00	23.29	37.12	54.00	16.88	13.52	V	328.9	0.99	Pass

Figure 17. Radiated Spurious, 1GHz to 40GHz

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

MET Asset #	Description	Manufacturer	Model	Last Cal Date	Cal Due Date
1A1234	FSV Signal Analyzer	Rohde & Schwarz	FSV 40	03/13/2025	03/13/2026
1A1250	EMI Test Receiver	Rohde & Schwarz	ESW44	03/28/2025	03/28/2026
MY46180897	Spectrum Analyzer	Agilent Technologies	E4448A	08/28/2024	08/28/2025
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	08/22/2024	08/22/2025
1A1050	Bi-Log Antenna	Schaffner	CBL-6112D	03/05/2024	03/05/2026
1A1183	Double Ridged Waveguide Antenna	ETS Lindgren	3117	02/20/2024	02/20/2026
1A1180	Preamplifier	Miteq	AMF-7D-01001800-22-10P	04/16/2025	04/16/2026
1A1161	Horn Antenna (18-40GHz)	ETS - Lindgren	3116c	08/01/2024	08/01/2026
1A1065	EMI Test Receiver	Rohde & Schwarz	ESCI	08/20/2024	08/20/2025
1A1177	Pulse Limiter	Rohde & Schwarz	ESH3Z2	12/11/2024	12/11/2025
1A1149	DC Milli-Ohm Meter	GW Instek	GOM-802	10/15/2024	10/15/2025
3A3377	Thermohygrometer with barometer	Omega	Q68706	03/31/2025	03/31/2026
1A1257	True-RMS Multimeter	Fluke	179	02/07/2025	02/07/2026
1A1123	LISN	TESEQ	NNB 51	12/11/2024	12/11/2025
1A1225	Environmental Chamber	Espec	EXP-2H/New	05/16/2025	05/16/2026
1A1099	Generator	Com-Power	CGO-51000	See Note	
1A1044	Generator	Com-Power	CG-520	See Note	
1A1073	Multi Device Controller	ETS	2090	See Note	
1A1074	System Controller	Panasonic	WV-CU101	See Note	
1A1080	Multi-Device	ETS	2090	See Note	

Table 20. Test Equipment Table 21. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

End of Report