



**FCC PART 15.247 AND ISED CANADA RSS-247
PERMISSIVE CHANGE TEST REPORT**

for the

G2 BLEM

FCC ID: YJ7-NA230951

IC ID: 9082A-NA230951

WLL REPORT# 19635-01 REV 1

Prepared for:

STANLEY BLACK & DECKER, INC.

701 E. JOPPA ROAD

TOWSON, MARYLAND 21286

Prepared By:

WASHINGTON LABORATORIES, LTD.

4840 WINCHESTER BOULEVARD, SUITE 5

FREDERICK, MARYLAND 21703





FCC Part 15.247 and ISED Canada RSS-247
Permissive Change Test Report

for the

Stanley Black & Decker, Inc.

FCC ID: YJ7-NA230951

IC ID: 9028A-NA230951

WLL Report# 19635-01 Rev 1

May 1, 2026

Prepared by:

Ryan Mascaro
RF Test Engineer

Reviewed by:

Steven D. Koster
President



Abstract

This report has been prepared on behalf of Stanley Black & Decker, Inc. to support the attached application for a Permissive Change authorization under Part 15.247 of the FCC Rules and Regulations (current at the time of testing) and under Innovation, Science and Economic Development (ISED) Canada RSS-247, Issue 4 (2025).

The test report and application are submitted for incorporating the NA230951 G2 BLE Module into a host device. For this permissive change, the host device is a DCPS966 60V PowerShift Demo Hammer. Please note that the embedded module is currently certified under FCC ID: YJ7-NA230951 and IC ID: 9028A-NA230951. The information provided within this report is only applicable to the device herein documented as the EUT.

Radiated testing above 30MHz was performed in the Free-space Anechoic Chamber Test-site (FACT) 3m chamber of Washington Laboratories, Ltd., located at: 4840 Winchester Boulevard, Suite 5., Frederick, MD 21703. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories has been accepted and designated by the FCC under Test Firm Number US3001. Washington Laboratories is approved by the ANSI National Accreditation Board (ANAB), as an independent test laboratory under ISO/IEC 17025:2017. Please refer to Certificate Number AT-1448. The ISED Canada number for Washington Laboratories is 3035A.

Compliance Statement -

The Stanley Black & Decker, Inc., NA230951 BLE Module complies with the requirements for a Digital Transmission System (DTS) transmitter device under FCC Rule Part 15.247 and with Innovation, Science and Economic Development (ISED) Canada RSS-247, Issue 4 (2025).

Revision History	Description of Change	Date
Rev 0	Initial Release	May 1, 2026
Rev 1	Clarify co-located modules per ACB	September 15, 2026



Table of Contents

1	Introduction.....	6
1.1	Compliance Statement	6
1.2	Test Scope.....	6
1.3	Contract Information.....	6
1.4	Test and Support Personnel	6
1.5	Testing Algorithm.....	6
1.6	Test Location	7
1.7	Customer Supplied Data or EUT Information.....	7
1.8	Software Employed by the Test Laboratory	7
1.9	Deviations to the Standard or Test Plan.....	7
1.10	Reason for Permissive Change	7
1.11	Testing Dates	7
2	Equipment Under Test	8
2.1	EUT Identification	8
2.2	EUT Description and Testing Configuration.....	8
2.3	EUT and Host Platform Configuration.....	9
3	Measurements	10
3.1	References.....	10
3.2	Measurement Uncertainty.....	10
3.3	Test Equipment List.....	12
3.4	Environmental Conditions During All Testing.....	12
4	Test Results.....	13
4.1	Occupied (DTS) Bandwidth	14
4.2	Peak Transmit Power	16
4.3	Power Spectral Density.....	18
4.4	Band-edge	20
4.5	Radiated Emissions.....	23
4.6	AC Powerline Conducted Emissions.....	36
Annex A		37



List of Tables

Table 1: EUT Device Summary.....	8
Table 2: EUT and Host Configuration List.....	9
Table 3: EUT Port and Cable Configuration	9
Table 4: Support Equipment	9
Table 5: Expanded Uncertainty List	11
Table 6: Test Equipment List.....	12
Table 7: Testing and Results Summary	13
Table 8: Permissive Change, Uncorrected Field Strength, Low Channel, 1Mbps	17
Table 9: Radiated Emissions Test Data, 30MHz to 1GHz	25
Table 10: Radiated Emissions Test Data, 1GHz to 12GHz, 1Mbps Mode.....	27
Table 11: Radiated Emissions Test Data, 12GHz to 18GHz, 1Mbps Mode.....	29
Table 12: Radiated Emissions Test Data, 1GHz to 12GHz, 2Mbps Mode.....	31
Table 13: Radiated Emissions Test Data, 12GHz to 18GHz, 2Mbps Mode.....	33

List of Figures

Figure 1: Permissive Change, Occupied Bandwidth, Low Channel, 2Mbps.....	15
Figure 2: Permissive Change, Lower Band-edge, 1Mbps, Hopping Enabled	21
Figure 3: Permissive Change, Upper Band-edge, 1Mbps, Hopping Enabled.....	21
Figure 4: Permissive Change, Lower Band-edge, 2Mbps, Hopping Enabled	22
Figure 5: Permissive Change, Upper Band-edge, 2Mbps, Hopping Enabled.....	22



1 Introduction

1.1 Compliance Statement

The Stanley Black & Decker, Inc., NA230951 BLE Module complies with the requirements for a Digital Transmission System (DTS) transmitter device under FCC Rule Part 15.247 and with Innovation, Science and Economic Development (ISED) Canada RSS-247, Issue 4 (2025).

1.2 Test Scope

Tests for radiated emissions were performed. All measurements were performed in accordance with the 2020 version of ANSI C63.10. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation. The EUT module was tested while embedded in a host tool. The host was also evaluated for co-location and RF exposure.

1.3 Contract Information

Customer:	Stanley Black & Decker, Inc.
Purchase Order Number:	643642
Quotation Number:	75851
Date the EUT Arrived at the Laboratory:	3/23/2026

1.4 Test and Support Personnel

Washington Laboratories, LTD:	Ryan Mascaro
Customer Representative:	Cynthia Byrd

1.5 Testing Algorithm

The NA230951 (G2 BLEM) was operated continuously in a transmit enabled steady-state mode. The embedded BLE module was exercised in both the 1Mbps and the 2Mbps modes, as necessary, to meet the requirements of the module's integration guide (Rev 1, dated: 06 Aug 2024) retrieved from the original filing exhibits. Please know that the module's integration guide has been appended to this test report for reference. The host tool also contains two other modules. The other modules are FCC ID: YJ7-NA382408 (2.4GHz) (within Proteus Battery) and FCC ID: YJ7WTCTX (433.9MHz). The other two modules were set to transmit continuously during all testing. All three co-located modules were transmitting during the radiated testing. The AC powerline portion was not evaluated for this test report as the EUT module is a DC powered device that gets a voltage from the host tool. The host tool is a battery powered device only. The host tool is not sold with a battery charger. The worst-case emissions levels are provided throughout this report.



1.6 Test Location

All measurements herein were performed by Washington Laboratories in Frederick, Maryland. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory. The ISED Canada number for Washington Laboratories is 3035A.

1.7 Customer Supplied Data or EUT Information

Please note that the applicant has provided the information regarding the EUT contents and configuration. The test laboratory is not responsible for verifying the accuracy of this information.

1.8 Software Employed by the Test Laboratory

The following test and measurement software were used by the Laboratory:

- (1) Amplifier Research, EMCWare Software Suite v7.0.4
- (2) Keysight 2019, Update Rev. A.25.08
- (3) Keysight 2023, Update Rev. A.33.03

1.9 Deviations to the Standard or Test Plan

There were no deviations to the requirements of the standard(s).

1.10 Reason for Permissive Change

This permissive change was performed due to the NA230951 module being incorporated into a host tool. The host tool is a DeWalt Cordless Powershift Demolition Hammer, Model: DCPS966. Please note that the embedded module is currently certified under FCC ID: YJ7-NA230951 // IC ID: 9028A-NA230951.

1.11 Testing Dates

4/20/2026 & 4/21/2026



2 Equipment Under Test

2.1 EUT Identification

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

Table 1: EUT Device Summary

Manufacturer:	Stanley Black & Decker, Inc.	
EUT Embedded Module:	FCC ID: YJ7-NA230951	IC ID: 9028A-NA230951
Other Embedded Module: (within Host Battery)	FCC ID: YJ7-NA382408	IC ID: 9082A-NA382408
Other Embedded Module:	FCC ID: YJ7WTCTX	IC ID: 9082A-WTCTX
Host Tool Platform:	DeWalt Powershift Demolition Hammer	
Host Tool Model:	DCPS966	
Host Tool Input Voltage:	60 VDC	
Embedded Module Input Voltage:	3VDC to 5VDC	
Host Tool Software Version:	<i>not declared by manufacturer</i>	
Embedded Module Software Version:	<i>not declared by manufacturer</i>	
FCC Rule Part:	§15.247	
ISED Rule Part:	RSS-247, Issue 4 (2025)	
Testing Dats:	4/20/2026 & 4/21/2026	

2.2 EUT Description and Testing Configuration

The NA230951 is DeWalt's Bluetooth Low Energy Module (BLEM). The BLE transmitter module is designed for tracking, locating, enabling/disabling, and customizing DeWalt professional power tools via the DeWalt Site Manger App., and via DeWalt Asset Gateway. The module can operate off the internal CR2450 coin cell battery or alternately the DeWalt battery pack, when present. The NA230951 module was tested while embedded in a host device. The host tool also contains two other modules. The other modules are FCC ID: YJ7-NA382408 (2.4GHz) and FCC ID: YJ7WTCTX (433.9MHz). The other two modules were set to transmit continuously during all testing. All three co-located modules were transmitting during the radiated testing. Only the worst-case emissions levels are provided throughout this report. Co-location and RF Exposure are addressed.



2.3 EUT and Host Platform Configuration

The EUT was comprised of the following equipment, provided on the following page. All Modules, PCBs, etc. listed were considered as part of the EUT, as tested.

Table 2: EUT and Host Configuration List

EUT Description	Model	Part Number	Serial Number	Revision
BLEM (EUT)	NA230951	--	--	--
Proteus Module	NA382408	--	--	--
WTC (other module)	WTCTX	--	--	--
Host Tool	DCPS966	--	--	--

Table 3: EUT Port and Cable Configuration

Ref. ID	EUT Port Name	Cable/Port Description	Qty.	Length (meters)	Shielded	Term.
--	--	--	--	--	--	--

Table 4: Support Equipment

Item	Description for Test Mode	Note
60V Proteus Battery	Host Tool Battery Pack	Not Sold with EUT Module



3 Measurements

3.1 References

ANSI C63.2 (Jan-2016) Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 (Jan-2014) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 (NOV 2024) American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

3.2 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm \sqrt{\frac{a^2}{div_a^2} + \frac{b^2}{div_b^2} + \frac{c^2}{div_c^2} + \dots}$$

Where:

uc	= standard uncertainty
a, b, c	= individual uncertainty elements
Diva, b, c	= the individual uncertainty element divisor based on the probability distribution
Divisor	= 1.732 for rectangular distribution
Divisor	= 2 for normal distribution
Divisor	= 1.414 for trapezoid distribution



Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where

- U = expanded uncertainty
- k = coverage factor
- k ≤ 2 for 95% coverage (ANSI/NCSL Z540-2 Annex G)
- uc = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 5 below.

Table 5: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR32, FCC Part 15, RSS-247, RSS-Gen	± 2.63 dB
Radiated Emissions	CISPR11, CISPR32, FCC Part 15, RSS-247, RSS-Gen	± 4.55 dB



3.3 Test Equipment List

Table 6 provides a list of the test equipment used for data measurements along with the calibration information.

Table 6: Test Equipment List

Test Name: Radiated Emissions Testing		Test Date: 4/20/2026 & 4/21/2026	
Asset #	Manufacturer/Model	Description	Cal. Due
00644	SUNOL SCIENCES CORP	BICONALOG ANTENNA	12/2/2026
01029	RF-LAMDA-RW6220B	HORN ANTENNA	8/8/2027
00993	KEYSIGHT N9020B	MXA SIGNAL ANALYZER	12/23/2027
00425	ARA DRG-118/A	HORN ANTENNA	6/25/2028
01042	EMC SHOP PA2500MB	RF PRE- AMPLIFIER	9/24/2026
00066	HP BZ-01002650	RF PRE-AMPLIFIER	8/25/2026
00825	CABLE ASSOCIATES, MTC1010	SMA-SMA COAXIAL CABLE	6/17/2026
00897	TELEDYNE DURATEST 921	SMA-SMA COAXIAL CABLE	6/6/2026
00683	MEC, INC. KMR-240	SMA-SMA COAXIAL CABLE	8/25/2026
00281	ITC, 21A-3A1	WAVEGUIDE BANDPASS	8/21/2027
00992	KEYSIGHT, N5173B	EXG SIGNAL GENERATOR	1/8/2028
00731	NARDA-4779-3	2W 3DB ATTN.	6/6/2026
N/A	MINICIRCUITS	25W, 10DB ATTENUATOR	Verify Before Use

3.4 Environmental Conditions During All Testing

Ambient Temperature	Between 16°C and 23°C
Relative Humidity	Between 39% and 60%



4 Test Results

The table below provides the compliance results for a DTS modular transmitter. Full test results are shown in subsequent report sub-sections.

Table 7: Testing and Results Summary

FCC Rule Part	ISED Rule Part	Description	Result
15.247(a)(2)	RSS-247 Clause 6.3.1(a)	Occupied Channel Bandwidth	Pass
15.247 (b)(3)	RSS-247 Clause 6.3.2	Transmit Output Power	Pass
15.247 (e)	RSS-247 Clause 6.3.1(b)	Power Spectral Density	Pass
15.247 (d)	RSS-247 Clause 6.6	Out-of-Band Emissions (Band Edge @ 20dB below)	Pass
15.205 15.209	RSS-247 Clause 7.3	General Field Strength Limits (Restricted Bands)	Pass
15.207	RSS-Gen Clause 8.8	AC Conducted Emissions	N/A *

* the EUT is not subject to the provisions of 15.207, or RSS-Gen, for AC powerline emissions.



4.1 Occupied (DTS) Bandwidth

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(a)(2) requires the minimum 6dB bandwidth be at least 500 kHz. The 99% BW shall also be recorded.

For this permissive change, the transmitter OBW of the embedded EUT module shall closely resemble the original filing test data for the module.

The OBW data from the original filing is as follows:

OET Module Data (pg. 18/101):

Modulation	Data Rate	Channel Frequency	6dB Bandwidth	99% Bandwidth
$\pi/4$ DQPSK	2 Mbps	2402 MHz	1.136 MHz	2.0779 MHz

4.1.1 Measurement Method

This test was performed in accordance with Clause 11.8.2, Option 2, of ANSI C63.10-2020.

This test was performed as a 3-meter radiated emissions measurement. The transmit signal was maximized by rotating the turntable and varying the height of the test antenna.

4.1.2 Test Data

The EUT was investigated across various channels, only the worst-case emissions are reported.

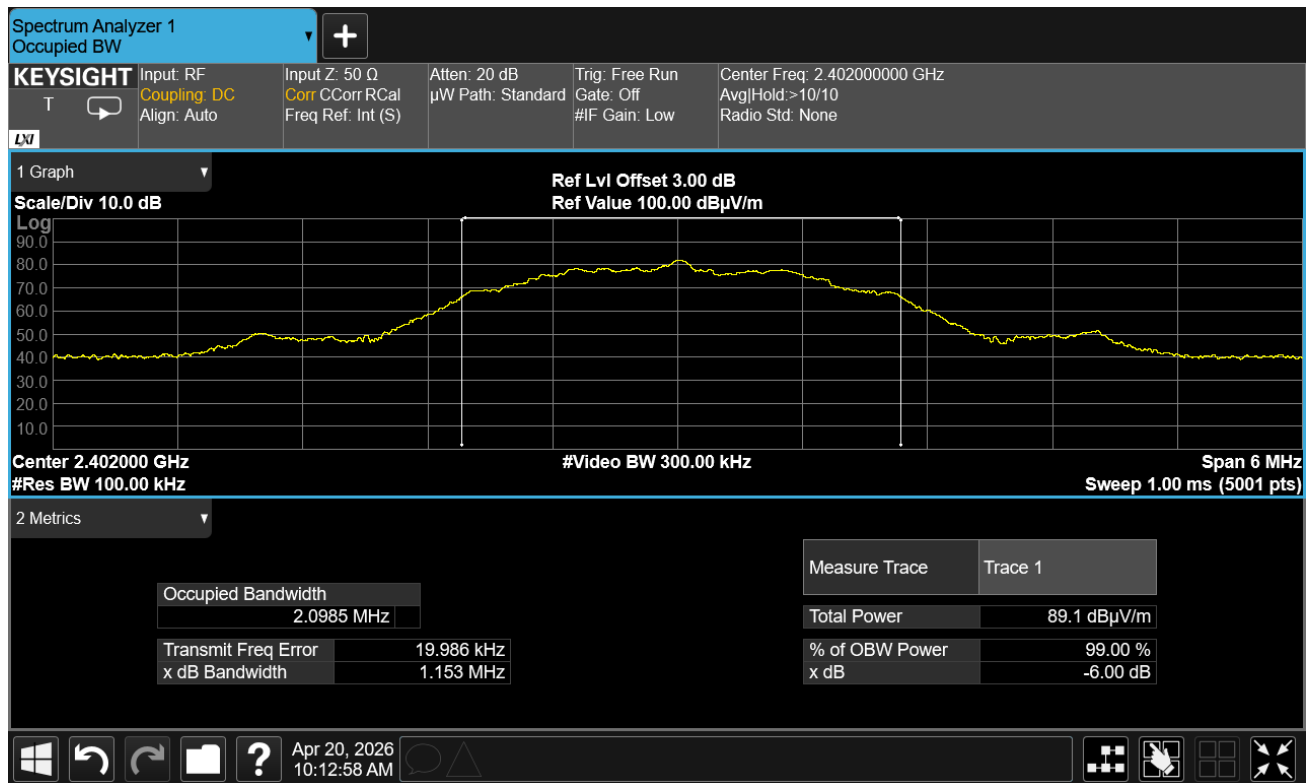
The EUT was configured to transmit a modulated signal, with channel hopping disabled.

The EUT is compliant with the requirements of this test.

The final permissive change test data is provided below.



Figure 1: Permissive Change, Occupied Bandwidth, Low Channel, 2Mbps



Permissive Data:

-6dB OBW = 1.153 MHz

99% OBW = 2.098 MHz



4.2 Peak Transmit Power

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(b)(3) requires that the maximum peak conducted output power shall not exceed 30 dBm (1W). Additionally, the EIRP shall not exceed 36 dBm.

For this permissive change, the transmitter power of the embedded EUT module shall closely resemble the original filing test data for the module. The EUT employs a PCB trace antenna with -6.48 dBi of gain.

The transmit output power data from the original filing is as follows:

OET Module Data (pg. 22/101):

Modulation	Data Rate	Channel Frequency	Conducted Power (dBm)	EIRP (dBm)
GFSK	1 Mbps	2402 MHz	+0.89	-5.59

4.2.1 Measurement Method

This test was performed as a 3-meter radiated field strength measurement. The transmit signal was maximized by rotating the turntable and varying the height of the test antenna. Testing and compliance calculations are performed based on the informative guidance provided in Annex G of ANSI C63.10-2020.

4.2.2 Test Data

The EUT was configured to transmit a modulated signal, with channel hopping disabled.

The EUT is compliant with the requirements of this test.

When comparing conducted power to radiated field strength, the final result is acceptable

The final permissive change test data is provided below.



Table 8: Permissive Change, Uncorrected Field Strength, Low Channel, 1Mbps

EUT TX (Mode)	Corr. Field Strength (dBuV/m)	C2PC EIRP (dBm)	Gain (dBi)	C2PC Conducted Power (dBm)	Final Result
1Mbps, 2402MHz	88.791	-6.37	-6.48	+0.11	Pass

The EUT transmitter power was measured via 3-meter radiated emissions. The EUT fundamental was evaluated at both 1Mbps and 2Mbps. The worst-case mode for power is 1Mbps, Low Channel. The corrected field strength measured 88.791 dBuV/m. Please see Page 27 and 28 of this report for the spectral data that provided the radiated power result.

$$\text{EIRP}_{\text{dBm}} = \text{FS}_{\text{dBuV/m}} + 20\text{LOG}(D_m) - 104.7_{\text{dB}}$$

$$\text{Conducted Power}_{\text{dBm}} = \text{EIRP}_{\text{dBm}} - \text{Gain}_{\text{dBi}}$$

where,

D_m is the measurement distance in meters

therefore,

$$88.791 + 20\text{LOG}(3) - 104.7 = -6.37 \text{ dBm EIRP}$$

$$-6.37_{\text{dBm}} - (-6.48_{\text{dBi}}) = 0.11 \text{ dBm Peak Conducted Power (Mathematical Equivalent).}$$

$$\text{Original Filing Power} = 0.89 \text{ dBm}$$

$$\text{C2PC Power} = 0.11 \text{ dBm}$$

$$\text{Result} = \text{Pass}$$



4.3 Power Spectral Density

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(e) requires that the maximum peak power spectral density (PSD) shall not exceed 8 dBm in any 3 kHz band.

For this permissive change, the transmitter PSD of the embedded EUT module shall closely resemble the original filing test data for the module. The EUT employs a PCB trace antenna with -6.48 dBi of gain.

The transmit output power data from the original filing is as follows:

OET Module Data (pg. 29/101):

Modulation	Data Rate	Channel Frequency	Conducted PSD
GFSK	1 Mbps	2402 MHz	0.70 dBm/100kHz

4.3.1 Measurement Method

This test was performed as a 3-meter radiated field strength measurement. The transmit signal was maximized by rotating the turntable and varying the height of the test antenna. The final measurement was performed in accordance with Clause 11.10.2 of ANSI C63.10-2020.

4.3.2 Test Data

The EUT was configured to transmit a modulated signal, with channel hopping disabled.

The EUT is compliant with the requirements of this test.

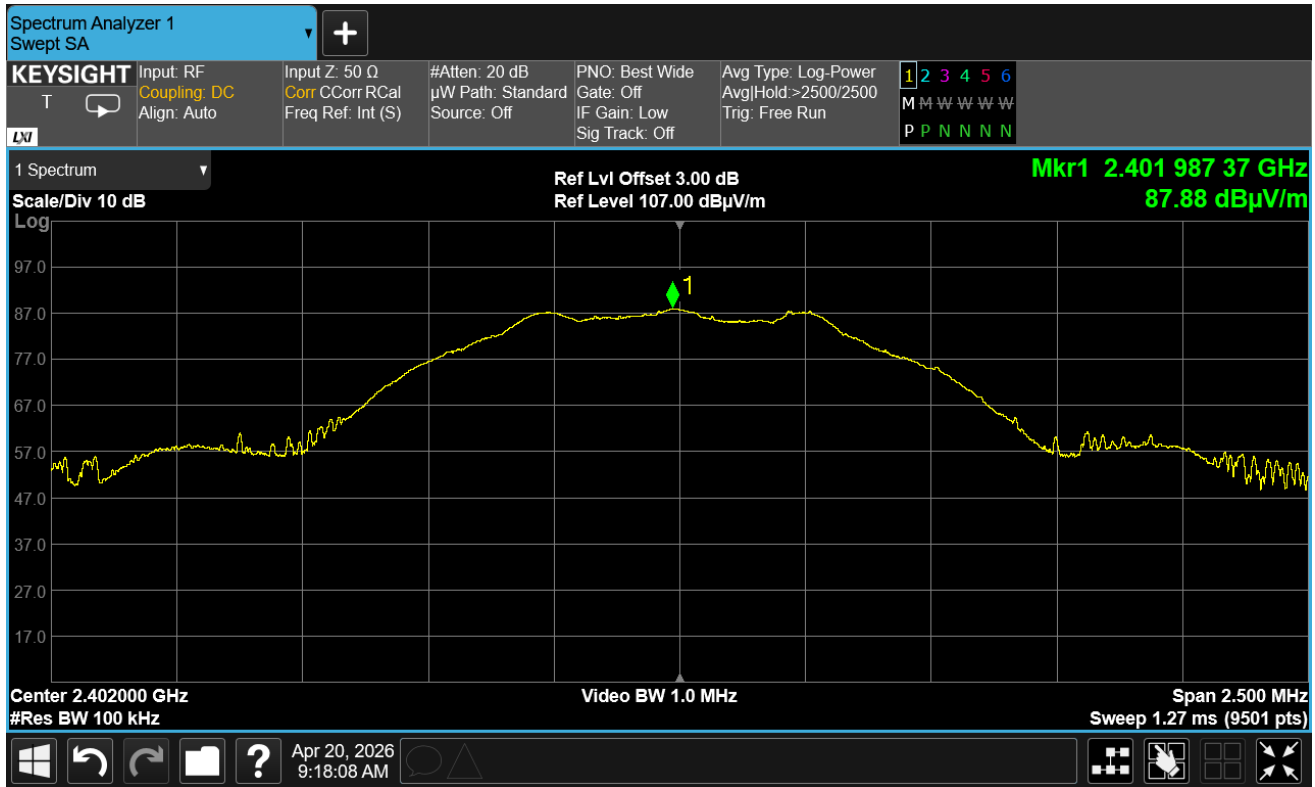
The EUT employs a PCB trace antenna with a peak gain of -6.48 dBi.

The final permissive change test data is provided below.

Note that $EIRP_{dBm} = FS_{dBuV/m} + 20\text{LOG}(D_m) - 104.8$ where, D_m is the measurement distance in meters.



Figure 4: Permissive Change, Uncorrected PSD (Radiated), Low Channel, 1Mbps



* note: this plot is corrected field strength

Permissive Change Data:

EUT TX (Mode)	Corr. Field Strength (dBuV/m)	C2PC EIRP (dBm)	Gain (dBi)	Final PSD (dBm)	PSD Limit (dBm)	Final Result
1Mbps, 2402MHz	87.88	-7.28	-6.48	-0.80	0.70	Pass

Original Filing PSD = +0.70 dBm

C2PC PSD = -0.80 dBm

Result = Pass



4.4 Band-edge

This section provides close-up plots of the band-edge for the low channel of 2402 MHz.

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(d) requires that in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the unwanted 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.

4.4.1 Measurement Method

This test was performed as a 3-meter radiated field strength measurement. The transmit signal was maximized by rotating the turntable and varying the height of the test antenna. The final measurement was performed in accordance with Clause 6.10 through Clause 6.10.4 of ANSI C63.10-2020.

4.4.2 Test Data

The EUT was configured to transmit a modulated signal.

The EUT is compliant with the requirements of this test.

The EUT was evaluated in two modes, channel hopping enabled and channel hopping disabled.

The permissive change test data is provided below:

For hopping enabled: please see Figure 2 through Figure 5.

For hopping disabled: please refer to the radiated emissions data provided in Section 4.5.4 of this report.



Figure 2: Permissive Change, Lower Band-edge, 1Mbps, Hopping Enabled

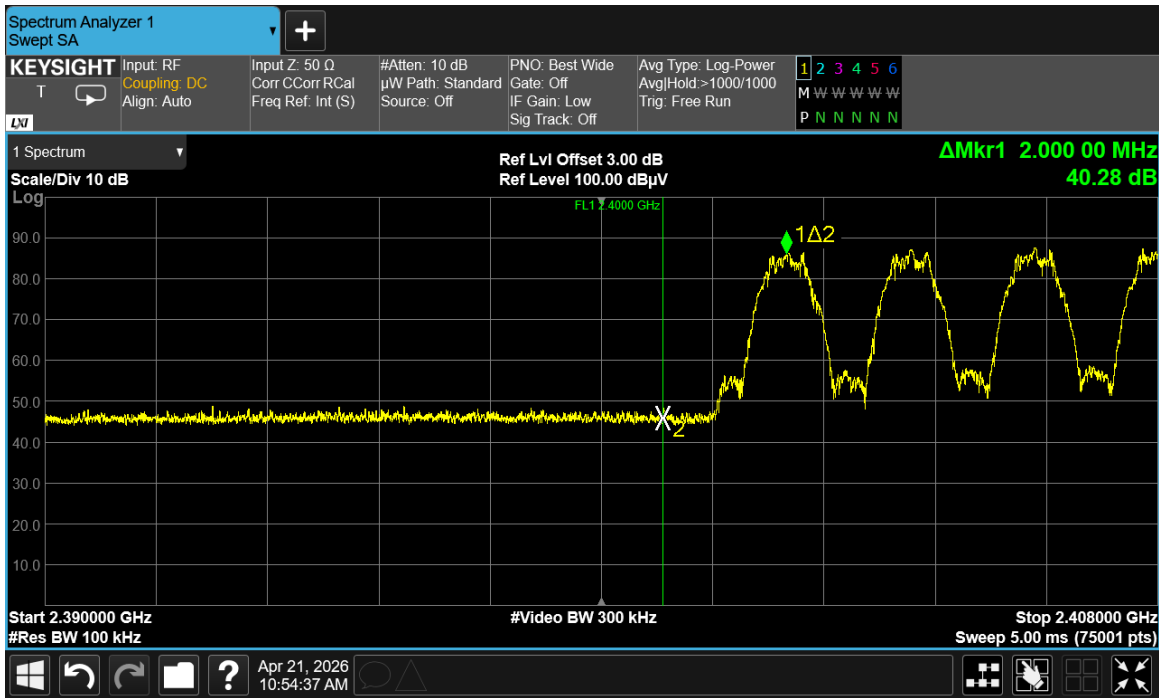


Figure 3: Permissive Change, Upper Band-edge, 1Mbps, Hopping Enabled

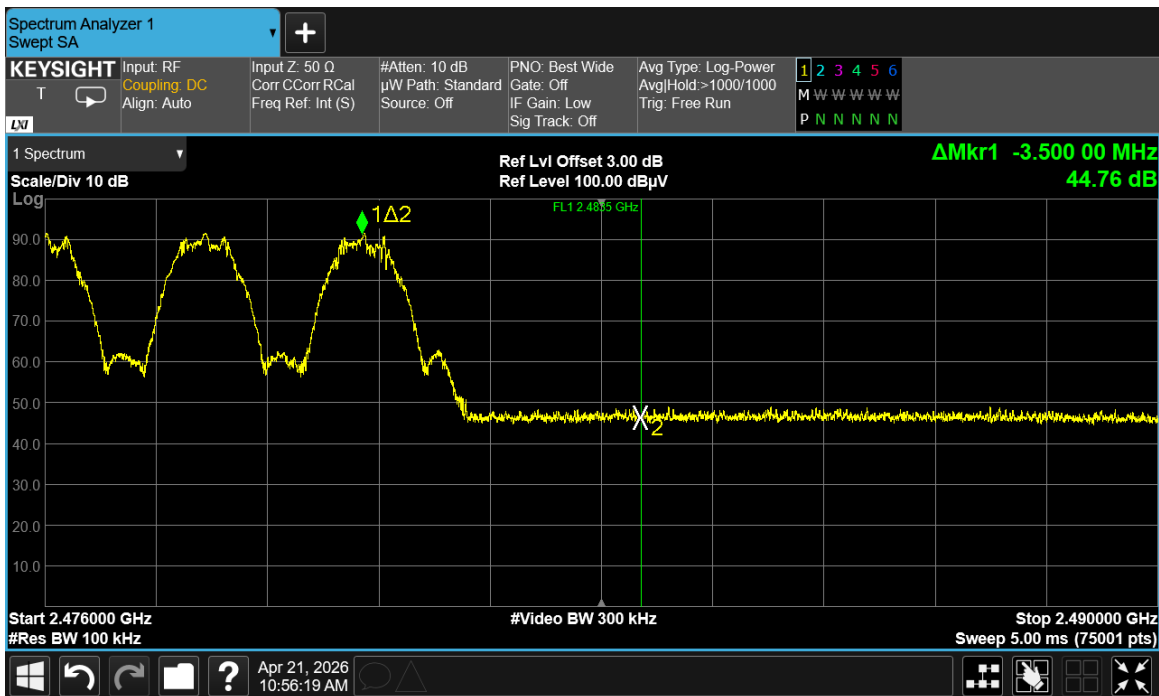




Figure 4: Permissive Change, Lower Band-edge, 2Mbps, Hopping Enabled

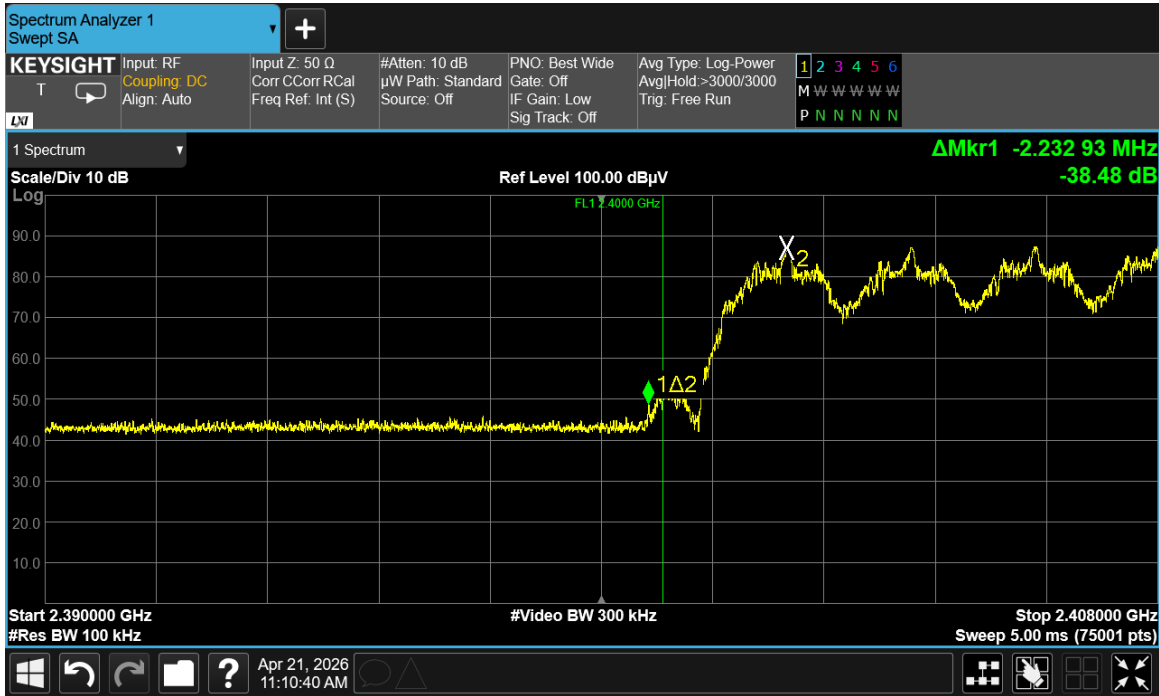
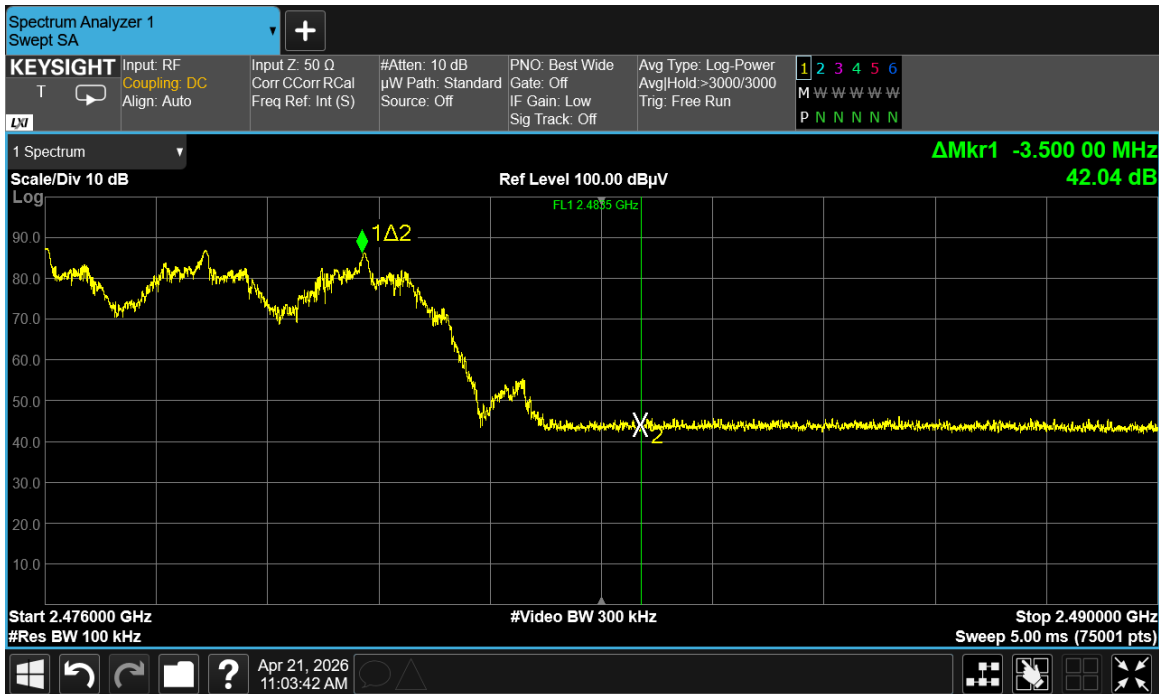


Figure 5: Permissive Change, Upper Band-edge, 2Mbps, Hopping Enabled





4.5 Radiated Emissions

4.5.1 Requirements

Compliance Standard: FCC Part(s) 15.209, 15.247, 15.205

Radiated Emissions, Compliance Limits	
Frequency Range	15.209 (3-meters)
30 to 88 MHz	100 μ V/m
88 to 216 MHz	150 μ V/m
216 to 960 MHz	200 μ V/m
> 960 MHz	500 μ V/m

4.5.2 Test Procedure

The requirements of FCC Part 15 call for the EUT to be placed on a 1 X 1.5 meters non-conductive motorized turntable for radiated testing on an open air test site. The height of the table is 80cm for testing below 1GHz. The height of the table is 150cm for testing above 1GHz. Please note the test distances: from 30MHz to 18GHz = 3-meters. From 18GHz to 26GHz = 1-meter.

An initial pre-scan of the EUT was performed to identify any emissions that exceed, or come within 6dB of, the applicable limit. This pre-scan was performed with the employment of a spectrum analyzer peak detector function. The highest amplitude (worst-case) emissions noted during the pre-scan were selected for final compliance measurements.

The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Broadband log periodic and double-ridged horn antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The output of the antenna was connected to the input of the spectrum analyzer and the emissions in the frequency range of 30MHz to 26GHz were measured. When applicable, any peripherals were placed on the table in accordance with ANSI C63.4 and cables are varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The detector function was set to quasi-peak for measurements below 1 GHz. The measurement bandwidth of the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. For measurements above 1 GHz, the average levels are recorded, using a measurement bandwidth of 1 MHz, with a video bandwidth setting of 20 Hz, in the case of video averaging. Otherwise, an EMI AVG detector was employed.



4.5.3 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antenna(s) and other measurement equipment. These factors include the antenna factor ((AF)(in dB/m)), cable loss factors ((CF)(in dB)), and the pre-amplifier gain [if applicable] ((G)(in dB)). These correction values are algebraically added to the raw Spectrum Analyzer Voltage (in dBμV) to obtain the corrected radiated electric field, which shall be the final corrected logarithm amplitude ((Corr. Meas.)(in dBμV/m)). This logarithm amplitude is then compared to the FCC limit, which has been converted to a unit of log in dBμV/m.

Example:

Spectrum Analyzer Voltage:	VdBμV (SA)
Antenna Correction Factor:	AFdB/m
Cable Correction Factor:	CFdB
Pre-Amplifier Gain (if applicable):	GdB
Electric Field:	$EdB\mu V/m = V\ dB\mu V\ (SA) + AFdB/m + CFdB - GdB$
To convert from linear units of measure:	$dBuV/m = 20\text{LOG}(uV/m)$
To convert limits, based on D_{Measure} :	$3m\ \text{Limit} = 10m\ \text{Limit} + 20\text{LOG}(10/3)$

4.5.4 Test Data

The EUT complies with the Radiated Emission requirements.

A complete investigation of the radiated fundamental field strength was performed. The EUT was evaluated in three orthogonal axes (x, y, z). The EUT position the produced the highest radiated power was maintained during all testing.

The EUT was investigated and scanned for radiated emissions in the range of 30MHz to 26GHz, which covers the tenth harmonic of the fundamental.

Only the worst-case emissions levels are provided. The emissions reported below 100MHz were confirmed to be from the host tool.



Table 9: Radiated Emissions Test Data, 30MHz to 1GHz

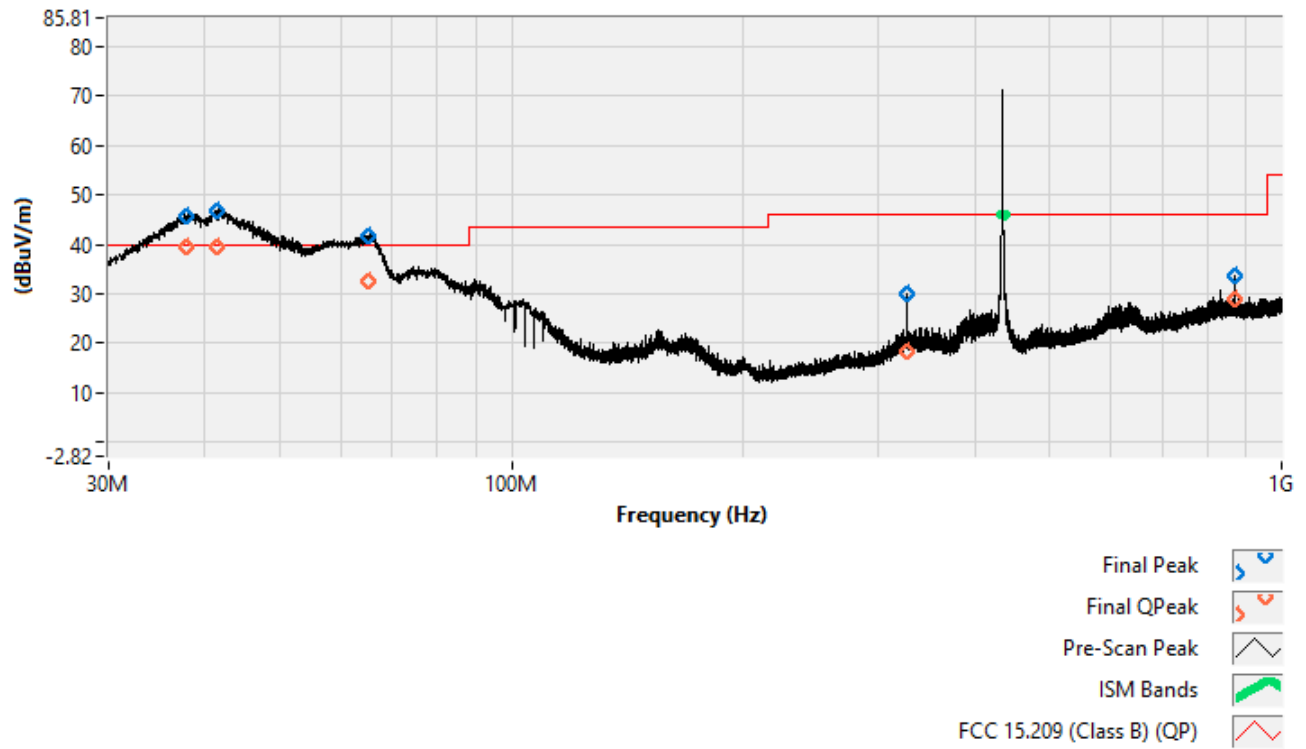
Frequency (MHz)	Detector	Corr. Meas. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Turn Table (deg)	Antenna (cm)
37.741	Peak	45.702	--	--	165	Vert, 125
	QP	39.586	40	-0.414	165	Vert, 125
41.521	Peak	46.664	--	--	165	Vert, 125
	QP	39.523	40	-0.477	165	Vert, 125
64.623	Peak	38.716	--	--	0	Horiz, 185
	QP	31.600	40	-8.400	0	Horiz, 185
65.284	Peak	41.77	--	--	165	Vert, 125
	QP	32.398	40	-7.602	165	Vert, 125
325.410	Peak	30.002	--	--	165	Vert, 125
	QP	18.228	46	-27.772	165	Vert, 125
433.900 ^{WTC}	Peak	78.429	--	--	0	Horiz, 185
	QP	--	--	--	0	Horiz, 185
867.887	Peak	32.654	--	--	0	Horiz, 185
	QP	29.342	46	-16.658	0	Horiz, 185

* for 30MHz to 1GHz, please note the following:

1. the EUT module was set to a transmit enabled mode, 1Mbps, hopping enabled
2. the WTC module (433.9MHz) was set to a transmit enabled mode.
3. the NA382408 module was set to transmit enabled mode, Low Chan., 2402MHz



Pre-scan and Final Data (Vertical)



Pre-scan and Final Data (Horizontal)

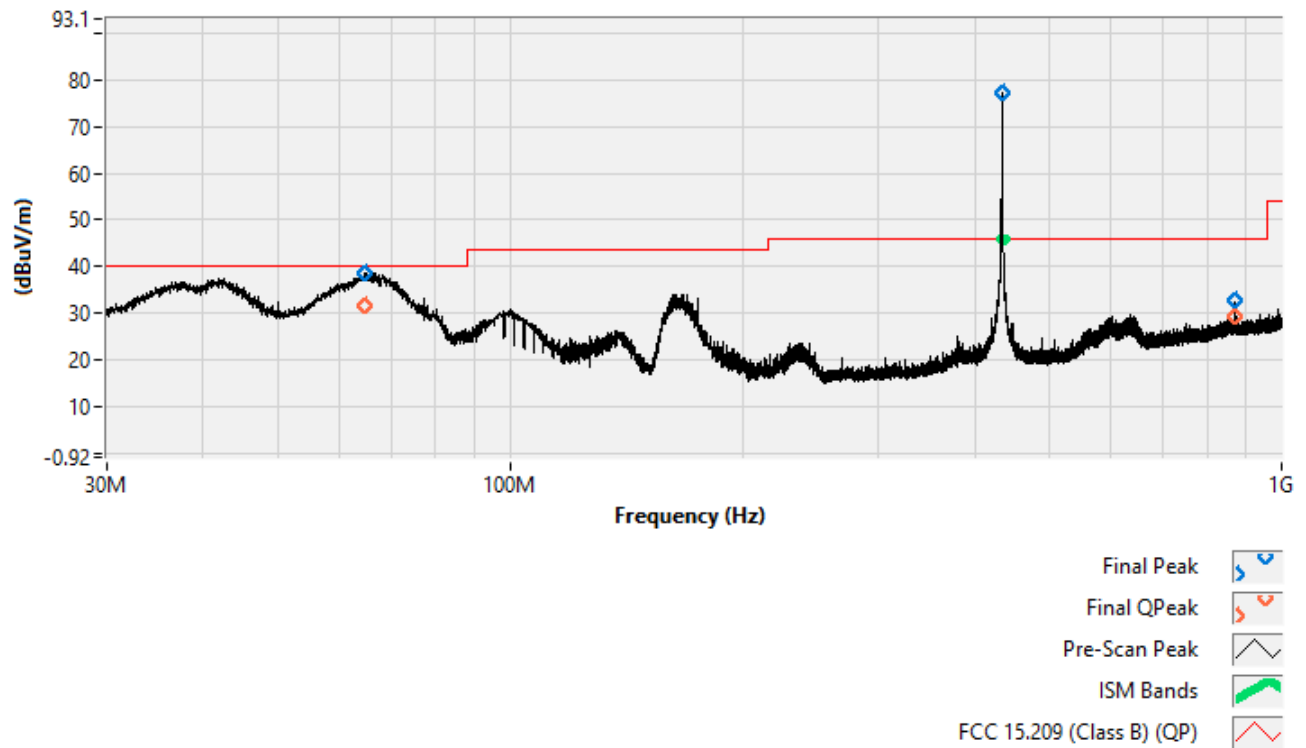




Table 10: Radiated Emissions Test Data, 1GHz to 12GHz, 1Mbps Mode

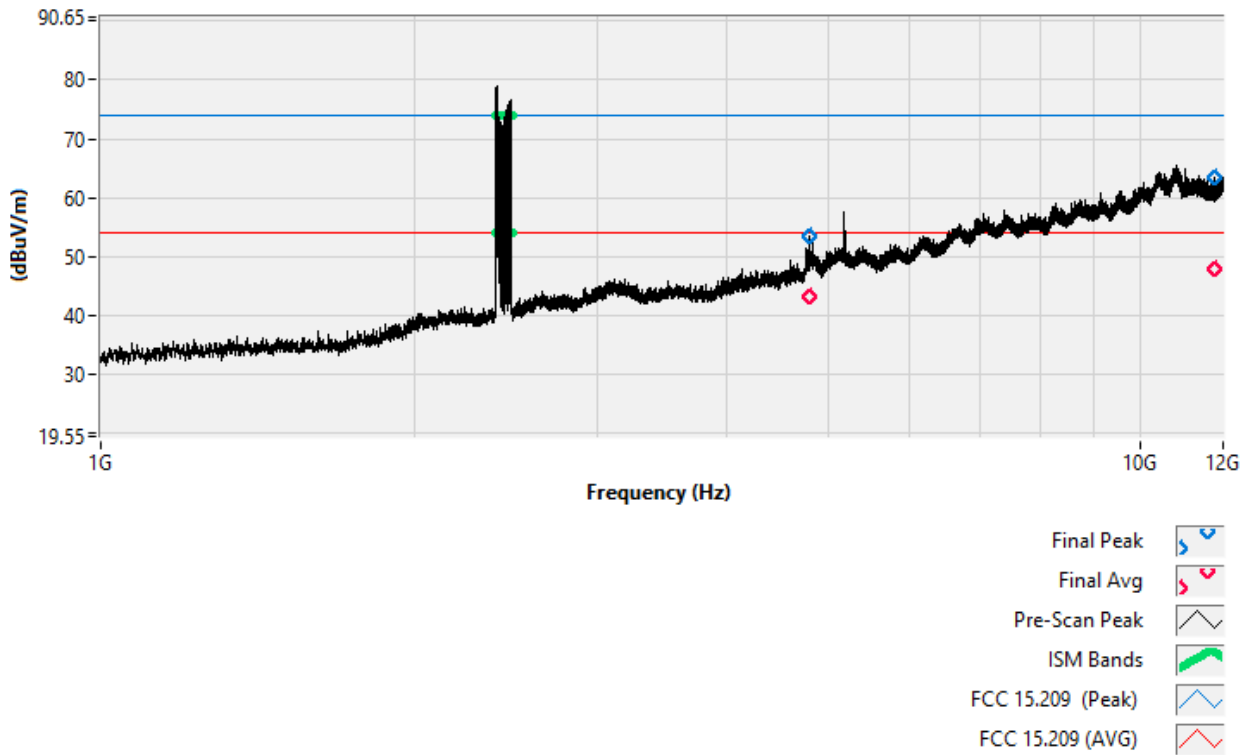
Frequency (MHz)	Detector	Corr. Meas. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Turn Table (deg)	Antenna (cm)
2274.0	Peak	43.066	74	-30.934	275	Horiz, 135
	Avg	26.478	54	-27.522	275	Horiz, 135
2390.0 ^{BE}	Peak	40.865	74	-33.135	275	Horiz, 135
	Avg	25.811	54	-28.189	275	Horiz, 135
2402.0 ^{NA230951}	Peak	88.791	--	--	275	Horiz, 135
	Avg	--	--	--	275	Horiz, 135
2480.0 ^{NA382408}	Peak	77.095	--	--	295	Vert, 160
	Avg	--	--	--	295	Vert, 160
2483.5 ^{BE}	Peak	39.875	74	-34.125	275	Horiz, 135
	Avg	27.235	54	-26.765	275	Horiz, 135
4804.0	Peak	53.394	74	-20.606	295	Vert, 160
	Avg	43.365	54	-10.635	295	Vert, 160
5184.0	Peak	58.222	74	-15.778	275	Horiz, 135
	Avg	36.112	54	-17.888	275	Horiz, 135
11292.0	Peak	65.061	74	-8.939	275	Horiz, 135
	Avg	48.698	54	-5.302	275	Horiz, 135
11777.0	Peak	63.490	74	-10.510	295	Vert, 160
	Avg	47.842	54	-6.158	295	Vert, 160

* for 1GHz to 26GHz, in the 1Mbps mode, please note the following:

1. the EUT module was set to a transmit enabled mode, 1Mbps, hopping disabled, 2402MHz fixed
2. the WTC module (433.9MHz) was set to a transmit enabled mode.
3. the NA382408 module was set to transmit enabled mode, hopping enabled.



EUT 1Mbps, Pre-scan and Final Data (Vertical)



EUT 1Mbps, Pre-scan and Final Data (Horizontal)

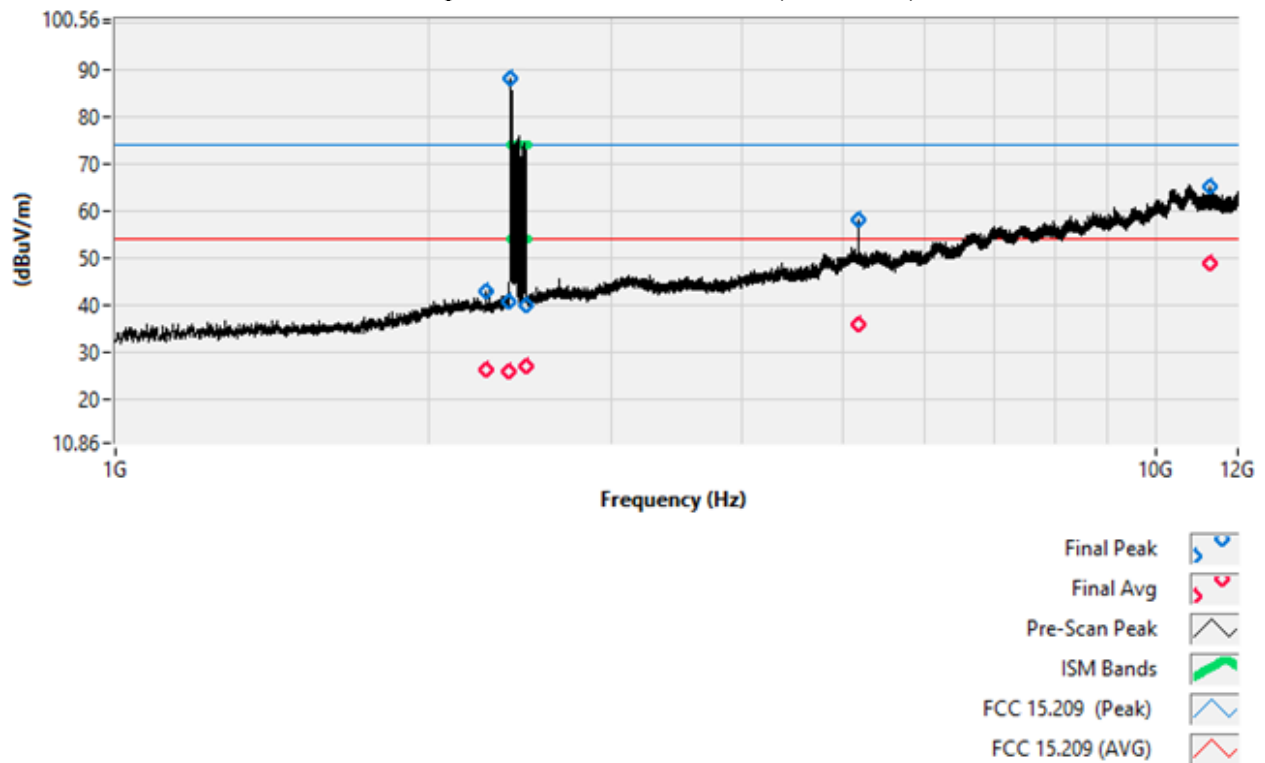




Table 11: Radiated Emissions Test Data, 12GHz to 18GHz, 1Mbps Mode

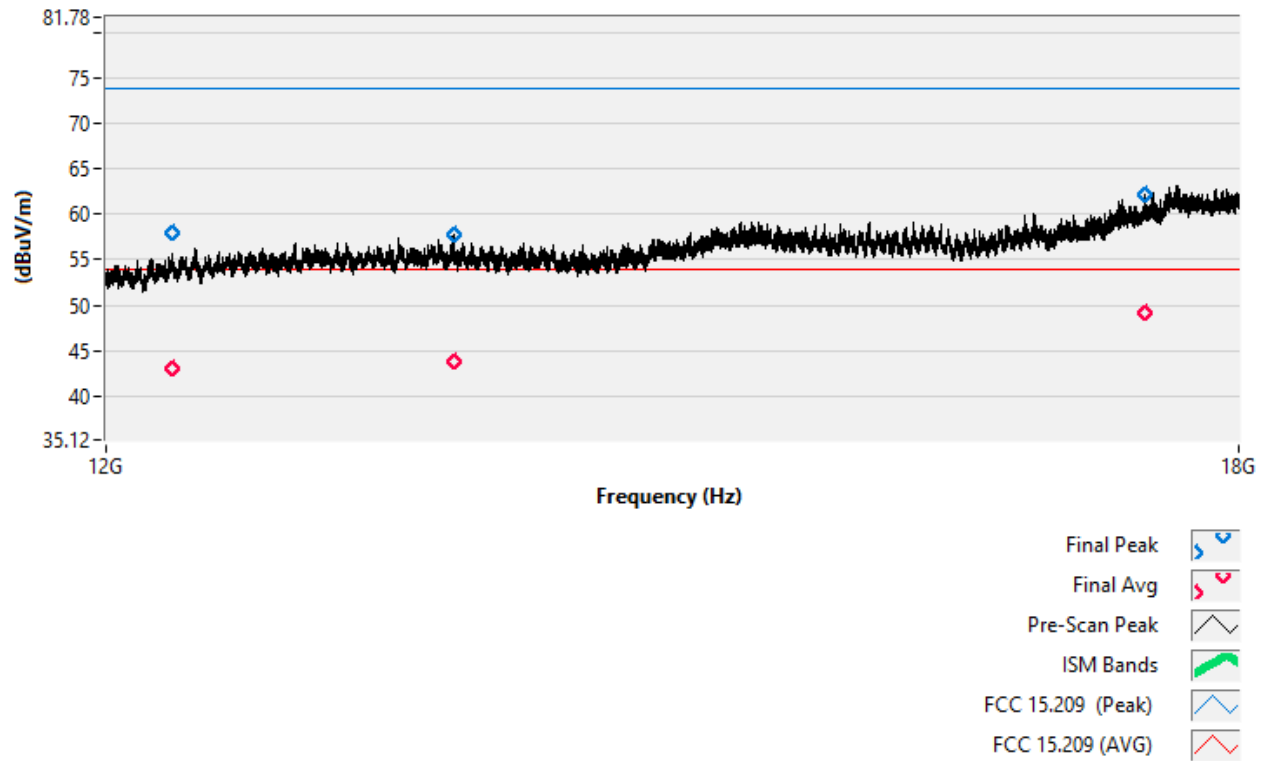
Frequency (MHz)	Detector	Corr. Meas. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Turn Table (deg)	Antenna (cm)
12290.0	Peak	57.887	74	-16.113	295	Vert, 160
	Avg	42.902	54	-11.098	295	Vert, 160
13595.0	Peak	57.694	74	-16.306	295	Vert, 160
	Avg	43.801	54	-10.199	295	Vert, 160
17407.0	Peak	62.234	74	-11.766	295	Vert, 160
	Avg	47.119	54	-6.881	295	Vert, 160
17850.0	Peak	63.340	74	-10.66	275	Horiz, 135
	Avg	48.325	54	-5.975	275	Horiz, 135

* for 1GHz to 26GHz, in the 1Mbps mode, please note the following:

1. the EUT module was set to a transmit enabled mode, 1Mbps, hopping disabled, 2402MHz fixed
2. the WTC module (433.9MHz) was set to a transmit enabled mode.
3. the NA382408 module was set to transmit enabled mode, hopping enabled.



EUT 1Mbps, Pre-scan and Final Data (Vertical)



EUT 1Mbps, Pre-scan and Final Data (Horizontal)

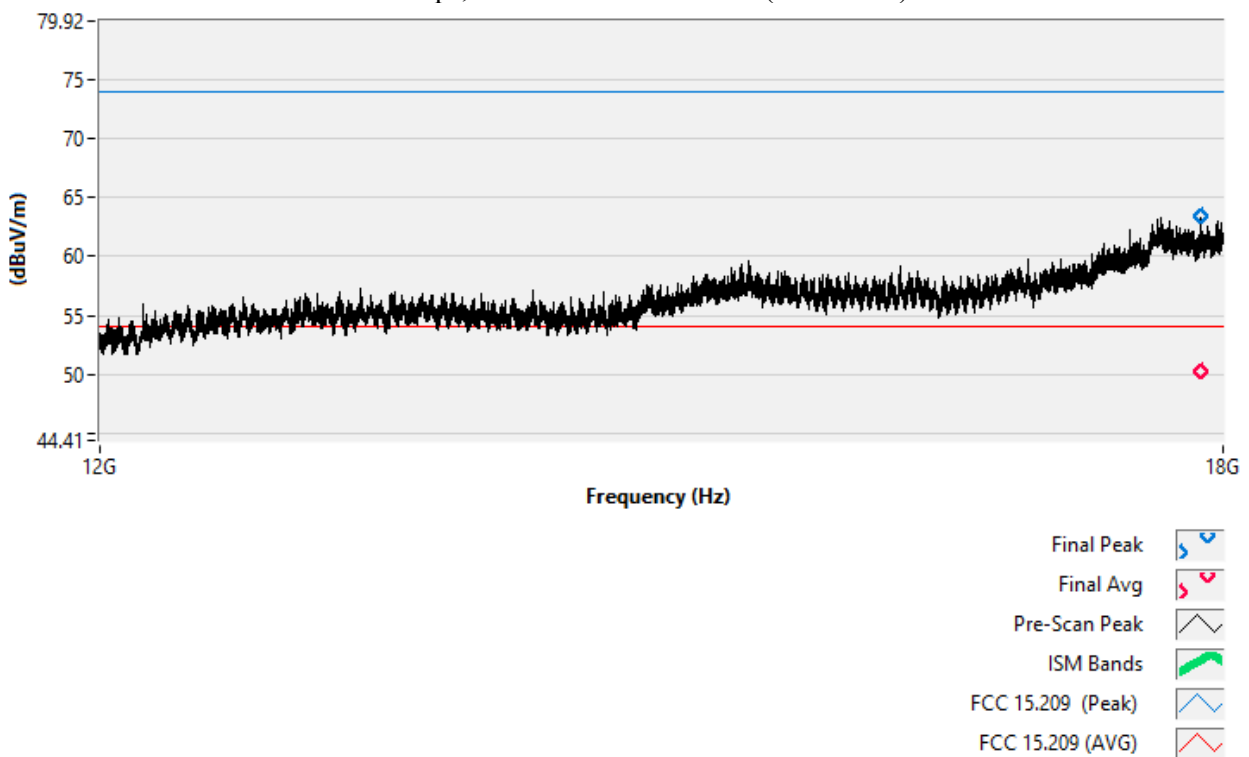




Table 12: Radiated Emissions Test Data, 1GHz to 12GHz, 2Mbps Mode

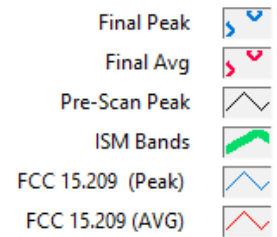
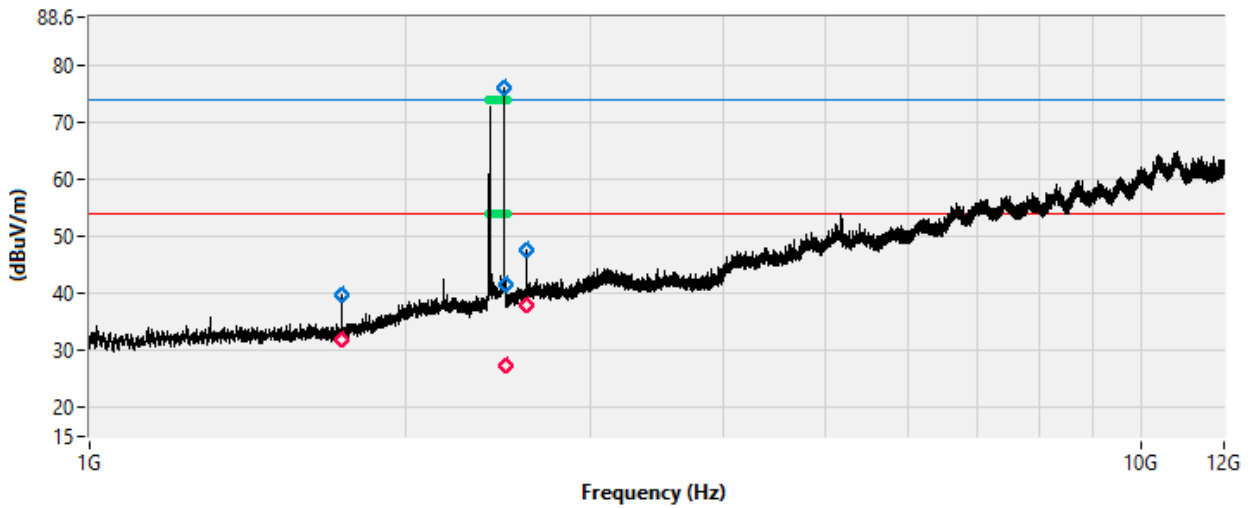
Frequency (MHz)	Detector	Corr. Meas. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Turn Table (deg)	Antenna (cm)
1736.0	Peak	39.765	74	-34.235	295	Vert, 160
	Avg	31.939	54	-22.061	295	Vert, 160
2390.0 ^{BE}	Peak	39.268	74	-34.732	275	Horiz, 135
	Avg	25.808	54	-28.192	275	Horiz, 135
2402.0 ^{NA230951}	Peak	86.724	--	--	275	Horiz, 135
	Avg	--	--	--	275	Horiz, 135
2480.0 ^{NA382408}	Peak	76.328	--	--	295	Vert, 160
	Avg	--	--	--	295	Vert, 160
2483.5 ^{BE}	Peak	41.556	--	--	295	Vert, 160
	Avg	27.27	--	--	295	Vert, 160
2.604	Peak	47.862	74	-26.138	295	Vert, 160
	Avg	38.047	54	-15.953	295	Vert, 160
5.197	Peak	55.551	74	-18.449	275	Horiz, 135
	Avg	36.005	54	-17.995	275	Horiz, 135
9.164	Peak	60.562	74	-13.437	275	Horiz, 135
	Avg	44.127	54	-9.873	275	Horiz, 135
11.591	Peak	62.632	74	-11.368	275	Horiz, 135
	Avg	47.033	54	-6.967	275	Horiz, 135

* for 1GHz to 26GHz, in the 2Mbps mode, please note the following:

1. the EUT module was set to a transmit enabled mode, 2Mbps, hopping disabled, 2402MHz fixed
2. the WTC module (433.9MHz) was set to a transmit enabled mode.
3. the NA382408 module was set to transmit enabled mode, hopping disabled, 2480MHz fixed



EUT 2Mbps, Pre-scan and Final Data (Vertical)



EUT 2Mbps, Pre-scan and Final Data (Horizontal)

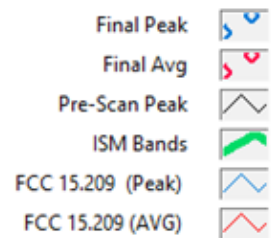
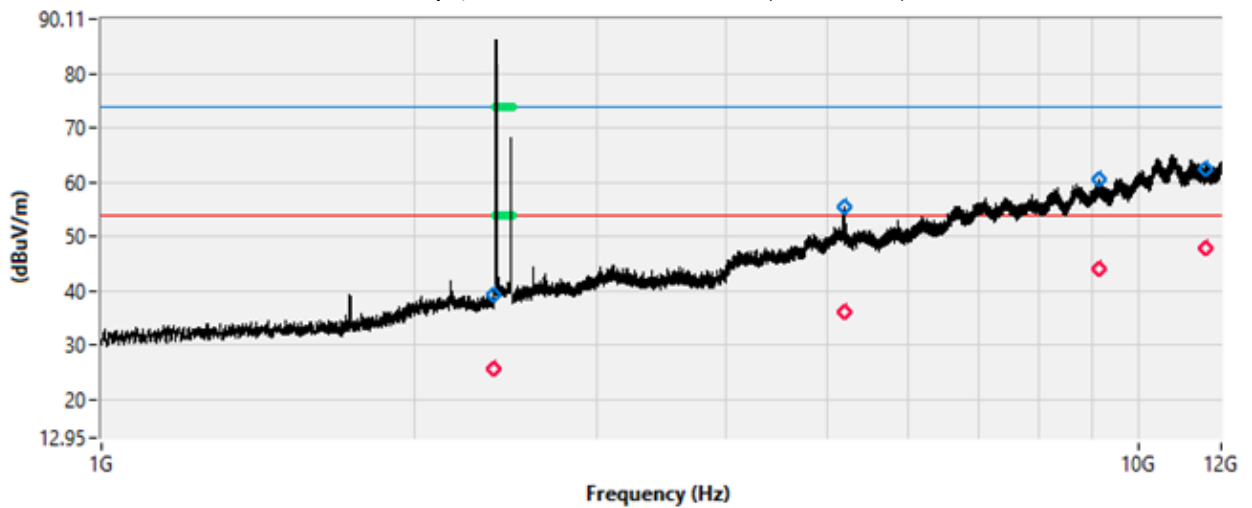




Table 13: Radiated Emissions Test Data, 12GHz to 18GHz, 2Mbps Mode

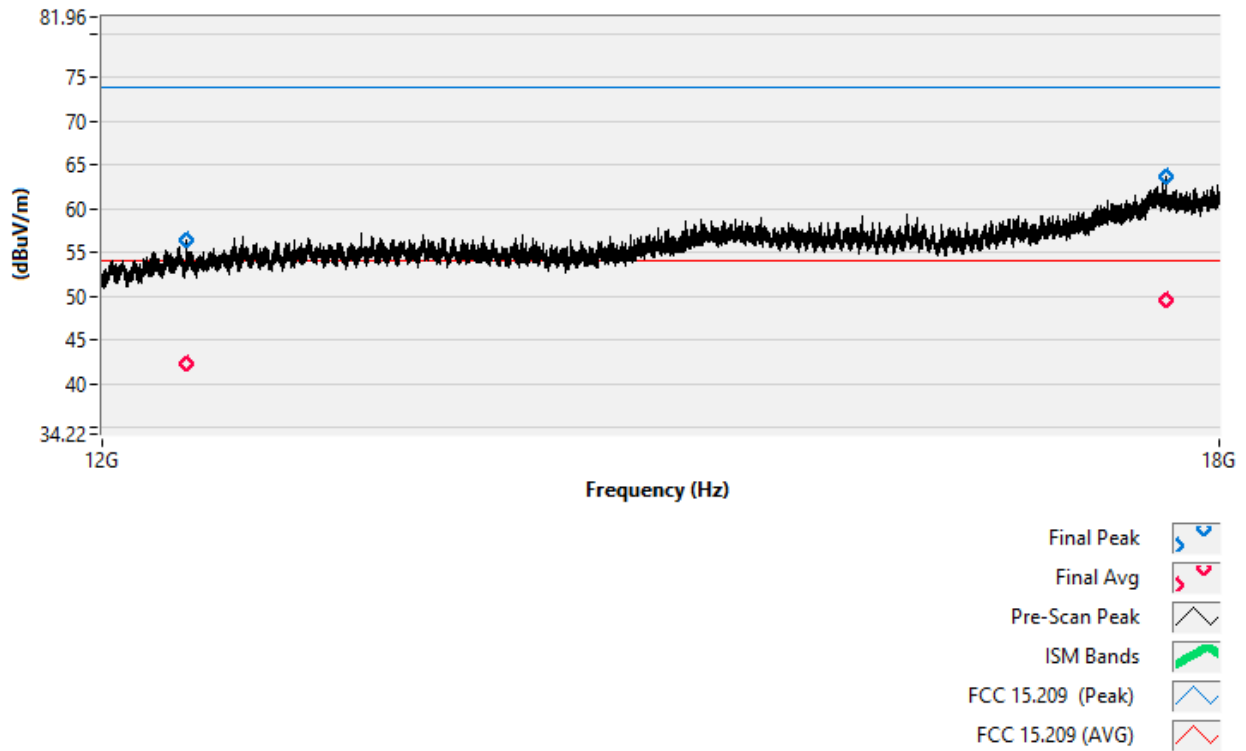
Frequency (MHz)	Detector	Corr. Meas. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Turn Table (deg)	Antenna (cm)
12376.0	Peak	56.422	74	-17.578	295	Vert, 160
	Avg	42.182	54	-11.818	295	Vert, 160
16023.0	Peak	59.288	74	-14.712	275	Horiz, 135
	Avg	45.373	54	-8.627	275	Horiz, 135
17651.0	Peak	63.786	74	-10.214	295	Vert, 160
	Avg	48.181	54	-5.819	295	Vert, 160
17796.0	Peak	63.035	74	-10.965	275	Horiz, 135
	Avg	48.024	54	-5.976	275	Horiz, 135

* for 1GHz to 26GHz, in the 2Mbps mode, please note the following:

1. the EUT module was set to a transmit enabled mode, 2Mbps, hopping disabled, 2402MHz fixed
2. the WTC module (433.9MHz) was set to a transmit enabled mode.
3. the NA382408 module was set to transmit enabled mode, hopping disabled, 2480MHz fixed



EUT 2Mbps, Pre-scan and Final Data (Vertical)



EUT 2Mbps, Pre-scan and Final Data (Horizontal)

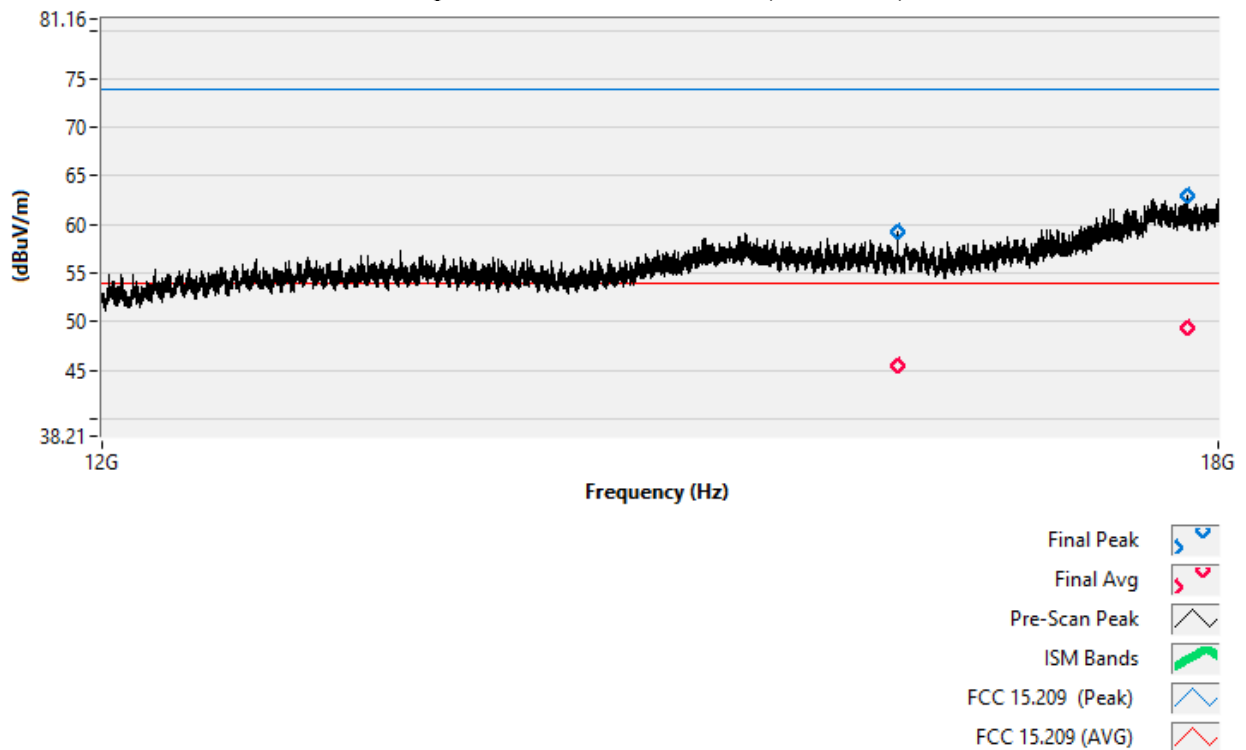
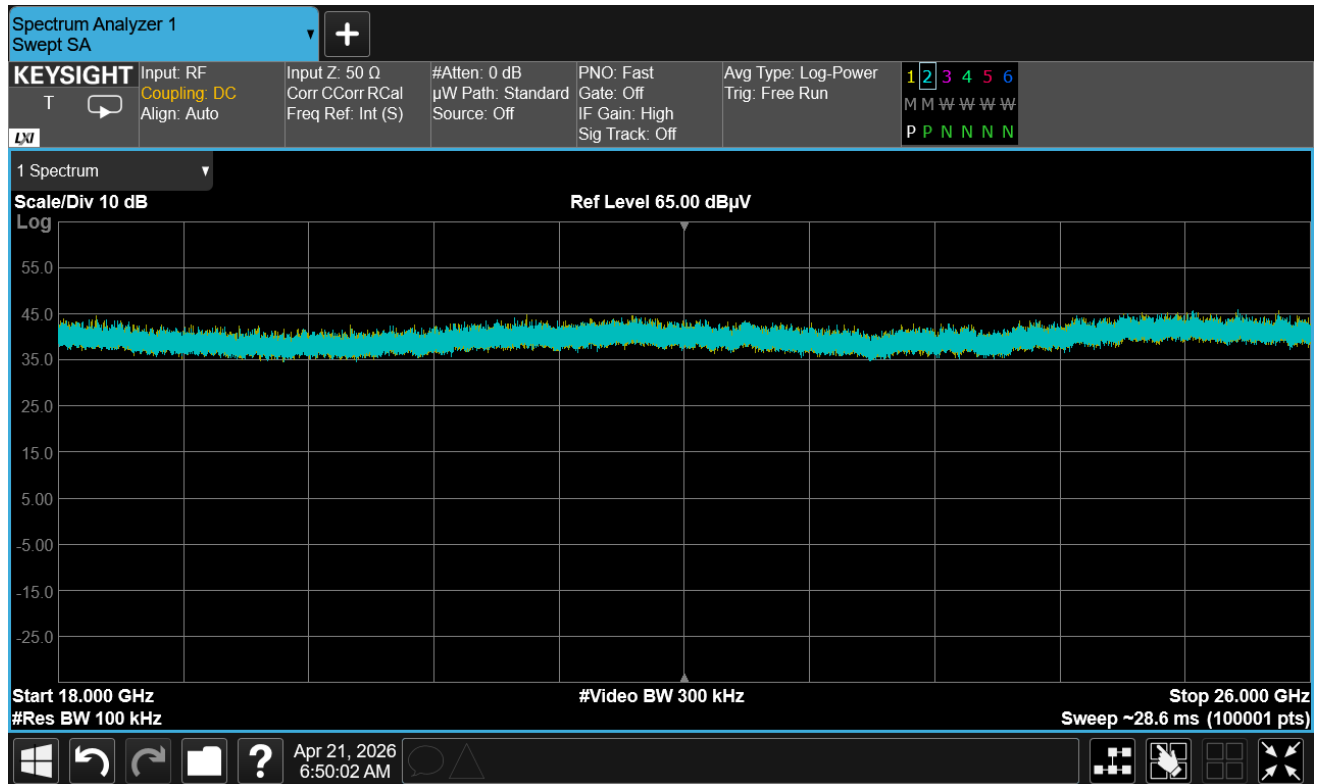




Figure 4: Radiated Emissions Test Data, 18GHz to 26GHz, Worst-Case, Both Data Rates



Trace 1 = EUT TX On

Trace 2 = EUT Off

There are no emissions detected from the EUT in this range (regardless of data rate).

This plot provides the final test data for both 1Mbps and 2Mbps.

The test distance for 18GHz to 26GHz was 1-meter.



4.6 AC Powerline Conducted Emissions

4.6.1 Requirement

Compliance Standard: FCC Part 15.207 and RSS-Gen, Clause 8.8.

AC Powerline Compliance Limits				
Frequency Range	Class A Device		Class B Device	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5 MHz	79 dB μ V	66 dB μ V	66 to 56 dB μ V	56 to 46 dB μ V
0.5 to 5 MHz	79 dB μ V	66 dB μ V	56 dB μ V	46 dB μ V
0.5 to 30 MHz	73 dB μ V	60 dB μ V	60 dB μ V	50 dB μ V

4.6.2 Test Summary

The EUT was not evaluated for AC powerline emissions.

The EUT is battery powered only and is not provided with a charger at the point of sale.



Annex A

NA230951 LMA BT Module Integration Manual Rev 1

August 6, 2024

The NA230951 BT module is intended only for use in proprietary Stanley Black and Decker power tools and lighting products. It is not intended for sale to third parties and these integration instructions are internal, manufacturing documents.

FCC Part 15.212(a)(I) Modular Transmitter Requirements:

- (i) The module does not have its own shielding. The end-product host must be additionally tested to ensure continued RF compliance when this module is implemented. This testing must include spurious radiated emissions testing. See the host testing guidance in this integration manual.
- (ii) The module's data inputs are buffered internal to the Bluetooth IC on the module.
- (iii) The module contains its own power supply regulation, separate from the host.
- (iv) The antenna for the module is permanent and etched into the module PCB. The antenna design cannot be changed without a Class II permissive change application for this module.
- (v) The module has been tested in a stand-alone configuration, independent of any host device.
- (vi) The module is labeled with its FCC ID and IC number granted by the FCC and ISED after authorization. These identification numbers must appear on a permanent label on the host device. See the labeling instructions in this integration manual.
- (vii) The module complies with FCC Part 15C, Intentional Radiator requirements. § 15.247 describes operation requirements for the module transmit frequency range of 2400-2483.5 MHz.
- (viii) The module meets Portable exclusion levels.

Module Integration Instructions:

The NA230951 module is an intentional radiator and is therefore governed by the FCC rules 47 CFR Part 15, Subpart C. As a Bluetooth radio transmitting in the frequency range 2400-2483.5 MHz, § 15.247 applies. The module is not for sale and only to be used by the Grantee in their proprietary power tools without any modifications to the radio circuitry or PCB antenna.

The NA230951 Grant of Authorization is issued as a Limited Modular Approval because the module does not have its own RF shield. As such, deployment of the module in a host device requires a Class II Permissive Change filing for the module. The host product must also be evaluated for RF exposure.

A fixed PCB trace antenna is integral to this radio module. This antenna cannot be modified in any way without a Class II Permissive Change filing for the module.

Changes or modifications to the module not expressly approved by Stanley Black & Decker could void the user's authority to operate the device.



Host Device Testing Guidance:

Because of the Limited Modular Approval of the NA230951 due to the lack of a shield, extra care must be exercised when evaluating all end-product hosts incorporating this module. In particular, the host device must be evaluated using the following test plan to demonstrate compliance with the following:

FCC Rule Part: 15.247
Approval FCC ID: YJ7-NA230951
Modulation Modes: 1 Mb/s and 2 Mb/s
Maximum power: Low Channel, 1.23 mW (1 Mb/s)
Highest Spectral Density: Low Channel (1 Mb/s)
Highest Occupied Bandwidth: Low Channel (2 Mb/s)

Based on this test data from the module filing, confirm and then select the worst-case channel in the host for each band under each specific rule part and verify that each specific fundamental frequency remains in full compliance with the respective rule part (i.e. 15.247 for Bluetooth LE).

The host device must be investigated with the NA230951 module in each modulation mode (1 Mb/s and 2 Mb/s) to demonstrate full compliance with the specific rule part. The permissive change test data shall compliment the test data from the original module filing with regard to the worst-case modulation.

With the NA230951 module set to hop between low-, mid-, and high-channels, record the radiated emissions band edge measurements for both the widest and narrowest BW available to ensure the host device is compliant.

Per Part 15.31(m), one frequency near the low-end, one frequency near the middle, and one frequency near the high-end of the frequency range of the module must be evaluated in the host device. The worst-case channel may be confirmed through an approved investigation. The widest BW, highest aggregate power, and highest power spectral density conditions shall be investigated. If these conditions do not occur within the same operating mode of the module, then multiple modes require testing. Only the data for worst-case condition among the modes needs to be included in the permissive change report if the overall testing strategy is explained and justified. For the LMA NA230951, since it has no shield, testing of radiated spurious emissions shall cover the 10th harmonic of the fundamental, per the requirements in Part 15.247, to confirm no additional parasitic non-compliant emissions exist. In all cases, a test of each worst-case modulation is required for channels over the frequency range defined in Part 15.33(a).

Lastly, confirm and demonstrate with the host radiated testing that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.). This can be based on ANSI C63.10 and C63.26. Complete FCC Part 15, Subpart B testing as necessary.



If the host device contains additional intentional radiator devices, modular or otherwise, all transmitter devices must be operated simultaneously to ensure that the transmitters can be co-located. The host device is otherwise operated in a typical user mode. The antenna used for this transmitter must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

This modular transmitter is ONLY authorized for the specific FCC and ISSED intentional radiator rules listed in the grants of authorization. The host device must be evaluated for RF compliance to any other FCC and ISSED rules that apply to the host device and not covered by the modular transmitter grant. At a minimum, the host device must be evaluated for compliance to 47 CFR Part 15, Subpart B with the module installed. **All new host configurations require a Class II Permissive Change filing to the LMA authorization of this module.**

Refer to the FCC KDB 996369 D04 Module Integration Guide for additional guidance.

Host Device Labeling Instructions:

The host device employing the NA230951 module shall be permanently marked with a label stating, "Contains FCC ID: YJ7-NA230951" and "Contains IC: 9082A-NA230951". If the host device employs additional certified modules, the FCC ID and IC number for each additional module can be appended to each statement. The two statements can be combined so that only one "Contains" is used, but the other text is required. E-labeling of the host device is also allowed. Check current agency regulations for e-labeling.

Host devices that comply with the RF requirements must follow the Labeling requirements in §15.19 of 47 CFR Part 15 and bear the following compliance statement in a conspicuous location on the device if space allows. If there isn't enough space to accommodate this compliance statement in at least 4 point size, the statement must be included in the user manual and on the packaging of the host device.

"This device complies with part 15 of the FCC Rules and Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."