



**FCC & ISED CANADA**  
**CLASS II PERMISSIVE CHANGE TEST REPORT**

for the

**FCC ID: YJ7-NA080801**

**IC ID: 9082A-NA080801**

**WLL REPORT# 18862-01 REV 0**

Prepared for:

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Prepared By:

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**Frederick, Maryland 21703**



Testing Certificate AT-1448



## Class II Permissive Change Test Report

for the

Stanley Black & Decker, Inc.  
Limited Single Module, NA080801  
FCC ID: YJ7-NA080801

August 29, 2024

WLL Report# 18862-01 Rev 0

Prepared by:

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RF Test Engineer

Reviewed by:

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Steven D. Koster  
President



## Abstract

This report has been prepared on behalf of Stanley Black & Decker, Inc. to support the attached permissive change application for equipment authorization. The test report and application are submitted for incorporating this LMA module into a host device, in this case the DCG4158SHD angle grinder. The embedded module is currently certified under FCC ID: YJ7-NA08080 and IC ID: 9082A-NA080801.

This test report documents the test configuration and Class II Permissive Change (CIIPC) test results for the Stanley Black & Decker, Inc., Single Limited Module, NA080801. The information provided in this report is only applicable to device herein documented as the EUT.

Radiated testing 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, 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.

The Stanley Black & Decker, Inc., NA080801, BLE Module [FCC ID: YJ7-NA080801] complies with the requirements for a Digital Transmission System (DTS) transmitter device under FCC Part 15.247 and ISED Canada RSS-247 Issue 3 (8/2023).

| Revision History | Description of Change | Date            |
|------------------|-----------------------|-----------------|
| Rev 0            | Initial Release       | August 29, 2024 |
|                  |                       |                 |



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# 1 Introduction

## 1.1 Compliance Statement

The Stanley Black & Decker, Inc., NA080801, BLE Module [FCC ID: YJ7-NA080801] complies with the requirements for a Digital Transmission System (DTS) transmitter device under FCC Part 15.247 and ISED Canada RSS-247 Issue 3 (8/2023).

## 1.2 Test Scope

Tests for radiated emissions were performed. All measurements were performed in accordance with ANSI C63.10-2020 “ANSI Procedures for Compliance Testing of Unlicensed Wireless Devices”. The measurement equipment conforms to ANSI C63.2 “Specifications for Electromagnetic Noise and Field Strength Instrumentation”. The modules were tested “stand alone” as required for modular testing and approval.

## 1.3 Contract Information

|                        |                              |
|------------------------|------------------------------|
| Customer:              | Stanley Black & Decker, Inc. |
| Purchase Order Number: | A417624C                     |
| Quotation Number:      | 74848                        |

## 1.4 Test and Support Personnel

Washington Laboratories, Ryan Mascaro and Randon McIlwain  
LTD

Customer Representative Kirwan Magdamo

## 1.5 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Frederick, MD. 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. The ISED Canada number for Washington Laboratories, Ltd. is 3035A. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.



## 2 Equipment Under Test

### 2.1 EUT Identification

Table 1: EUT Device Summary

|                            |                                              |
|----------------------------|----------------------------------------------|
| Manufacturer:              | Stanley Black & Decker, Inc.                 |
| Embedded Module:           | FCC ID: YJ7-NA080801                         |
|                            | IC ID: 9082A-NA080801                        |
| Host Model Number:         | DCG418SHD                                    |
| Host Part Number:          | NA373519                                     |
| Power Source & Voltage:    | 3VDC, via coin-cell battery (primary)        |
|                            | 20VDC to 60VDC from battery pack (secondary) |
| Software/Firmware Version: | Not Declared by Applicant                    |
| CIIPC Testing Date:        | 8/23/2024                                    |

### 2.2 EUT Description

The NA080801 is DeWalt's Gen2 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 Manager App., and via DeWalt Asset Gateway. The device can operate off the internal CR2450 coin cell battery or alternately the DeWalt battery pack, when present. Please note the device being certified is a limited single-modular transmitter. The EUT was tested while embedded in a host device. For this report, the host was a hand-held DeWalt grinder, powered by a 20V or 60V battery pack.

### 2.3 Test Configuration and Algorithm

The EUT was provided in a variety of engineering samples that were configured for testing. The EUT samples were loaded with test-mode software/firmware to allow individual samples to dwell, hop, sweep, and/or receive only as needed for required testing. The EUT was tested in a powered on, steady state. The 2.4GHz BLE radio was exercised as necessary to meet the requirements of the testing. Please note that the EUT was investigated in accordance with the module's approved test plan, which is provided in Annex A of this report. The transmitter investigation complimented the original filing test data. That is, the low channel of 2402 MHz was the worst-case channel. Only the worst-case emissions are provided throughout this report.



## 2.4 Deviations to the Test Standard

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

## 2.5 EUT Configuration Details

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 System Configuration List

| Name / Description  | Model Number | Part Number | Serial Number | Rev. # |
|---------------------|--------------|-------------|---------------|--------|
| NA080801 Antenna    | --           | NA080801    | Antenna       | rF1    |
| NA080801 Radiated   | --           | NA080801    | 2402M         | rF1    |
| NA080801 Radiated   | --           | NA080801    | 2440M         | rF1    |
| NA080801 Radiated   | --           | NA080801    | 2480M         | rF1    |
| NA080801 Radiated   | --           | NA080801    | Hopping       | rF1    |
| NA080801 Production | --           | NA080801    | Production    | rF1    |

Table 3: Support Equipment

| Name / Description | Manufacturer | Model Number | Calibration Data |
|--------------------|--------------|--------------|------------------|
| 20V battery        | DeWalt       | DCB606       | N/A              |
| Battery charger    | DeWalt       | --           | N/A              |

Table 4: Cable Configuration

| Ref. ID | EUT Port Name | Cable Description | Qty. | Length (m) | Shielded | Termination Port ID |
|---------|---------------|-------------------|------|------------|----------|---------------------|
| --      | None          | --                | --   | --         | --       | --                  |



Figure 1: EUT Module Image (Example Only)

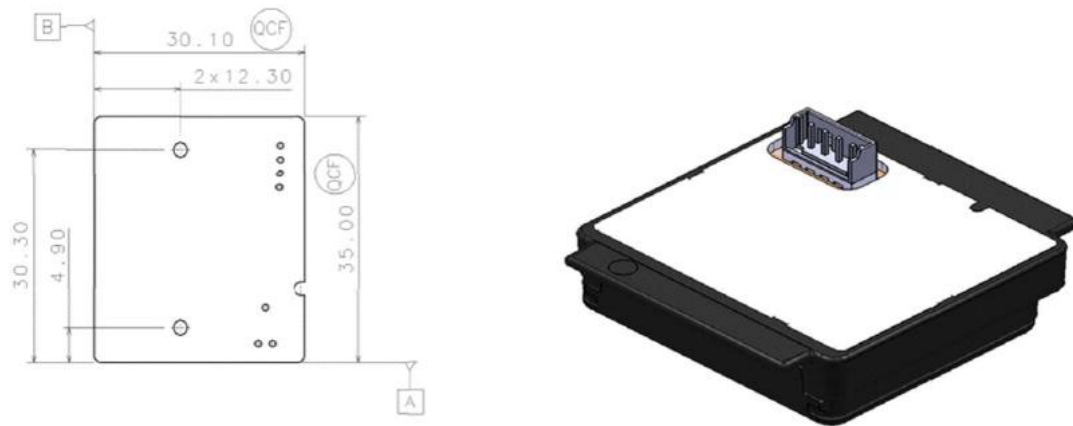


Figure 2: Host Product Image (Stock Photo)





### 3 Test Results

The table below shows the results of testing for compliance with a Digital Transmission System in accordance with FCC Part 15.247 and RSS-247 Issue 3. Full test results are shown in subsequent sub-sections.

Table 5: Testing and Results Summary

| FCC Rule Part    | IC Rule Part          | Description                                                     | Result |
|------------------|-----------------------|-----------------------------------------------------------------|--------|
| 15.247(a)(2)     | RSS-247 [5.2 (a)]     | Occupied Channel Bandwidth                                      | Pass   |
| 15.247 (b)(3)    | RSS-247 [5.4 (d)]     | Transmit Output Power                                           | Pass   |
| 15.247 (e)       | RSS-247 [5.2 (b)]     | Power Spectral Density                                          | Pass   |
| 15.247 (d)       | RSS-247 [5.5]         | Out-of-Band Emissions<br>(Band Edge @ 20dB below)               | Pass   |
| 15.205<br>15.209 | RSS-Gen<br>[8.9/8.10] | General Field Strength Limits<br>(Restricted Bands & RE Limits) | Pass   |
| 15.207           | RSS-Gen [8.8]         | AC Conducted Emissions                                          | N/A *  |

\* the EUT is not subject to the provisions of 15.207 for powerline emissions.



### 3.1 Occupied (DTS) Bandwidth

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(a)(2) and RSS-247, 5.2(a) require the minimum 6dB bandwidth be at least 500 kHz. The 99% BW shall also be recorded.

The transmitter OBW of the EUT shall also closely resemble the original filing test data for the embedded module. In this case, the reported OBW data from the LMA filing is as follows:

Limited Module Data:

| Modulation    | Data Rate | TX Frequency | 6dB Bandwidth | 99% Bandwidth |
|---------------|-----------|--------------|---------------|---------------|
| $\pi/4$ DQPSK | 2 Mbps    | 2402 MHz     | 1.147 MHz     | 2.083 MHz     |

#### 3.1.1 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.

#### 3.1.2 Test Data

The EUT was investigated for worst-case emissions, across various channels and data rates.

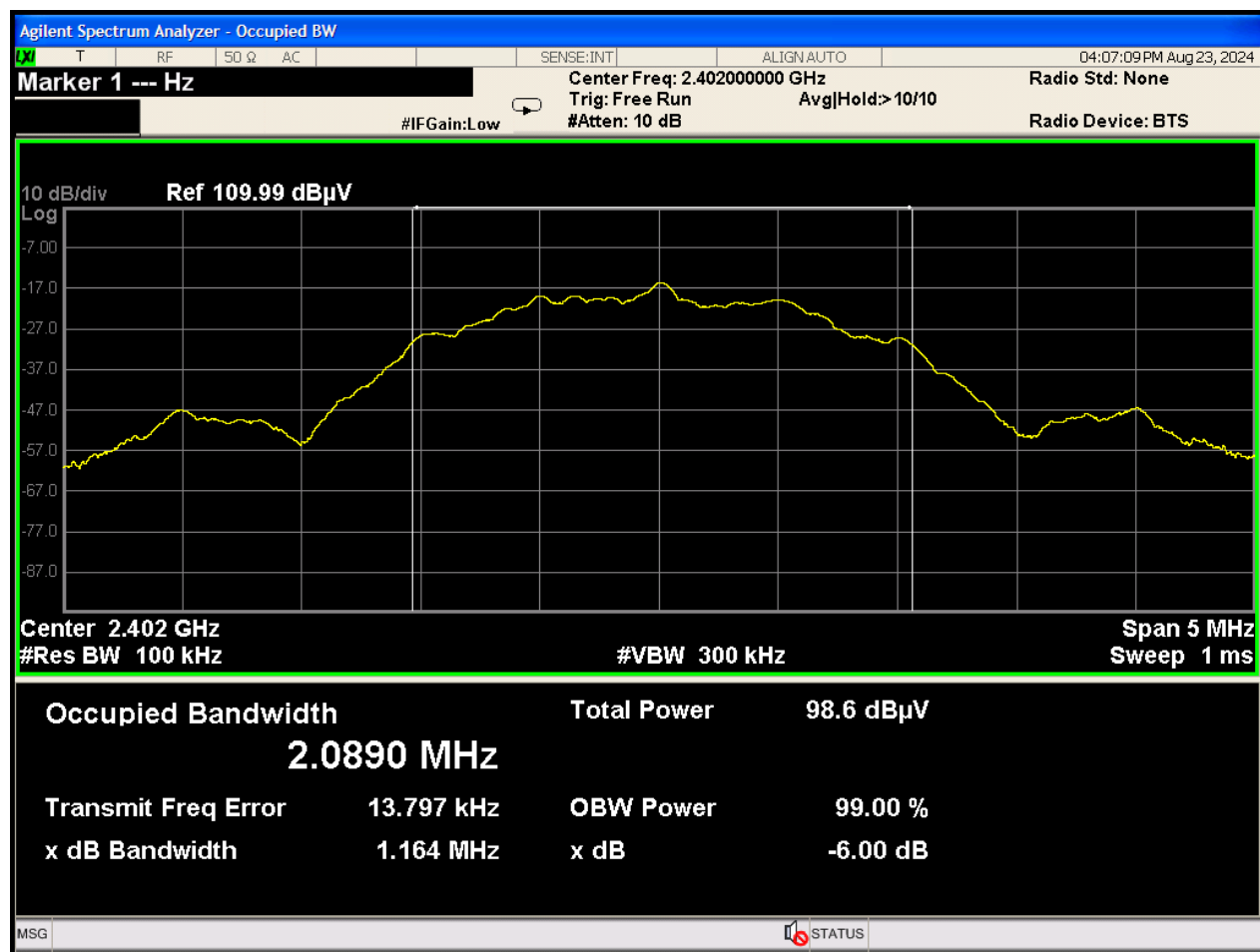
The EUT was configured to transmit a modulated signal, with channel hopping disabled.

The EUT is compliant with the requirements of this test.

The final CIIPC test data is provided below.



Figure 3: CIIPC Occupied Bandwidth, Low Channel, 2Mbps (2DH5)





## 3.2 Peak Transmit Power

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(b)(3) and RSS-247, 5.4(d) require that the maximum peak conducted output power shall not exceed 30 dBm, or 1W. Additionally, the EIRP shall not exceed 36 dBm, or 4W.

The transmitter power of the EUT shall also closely resemble the original filing test data for the embedded module. In this case, the reported output power data from the LMA filing is as follows:

Limited Module Data:

| Modulation | Data Rate | TX Frequency | Peak Power (dBm) | EIRP (dBm) |
|------------|-----------|--------------|------------------|------------|
| GFSK       | 1 Mbps    | 2402 MHz     | 1.11             | -5.37      |

### 3.2.1 Measurement Method

This test was performed as a 3-meter radiated field strength measurement. The EUT was investigated in three orthogonal axes (x, y, z). The EUT position that produced the highest fundamental field strength was maintained during the final 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.

### 3.2.2 Test Data

The EUT was investigated for worst-case emissions, across various channels and data rates.

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

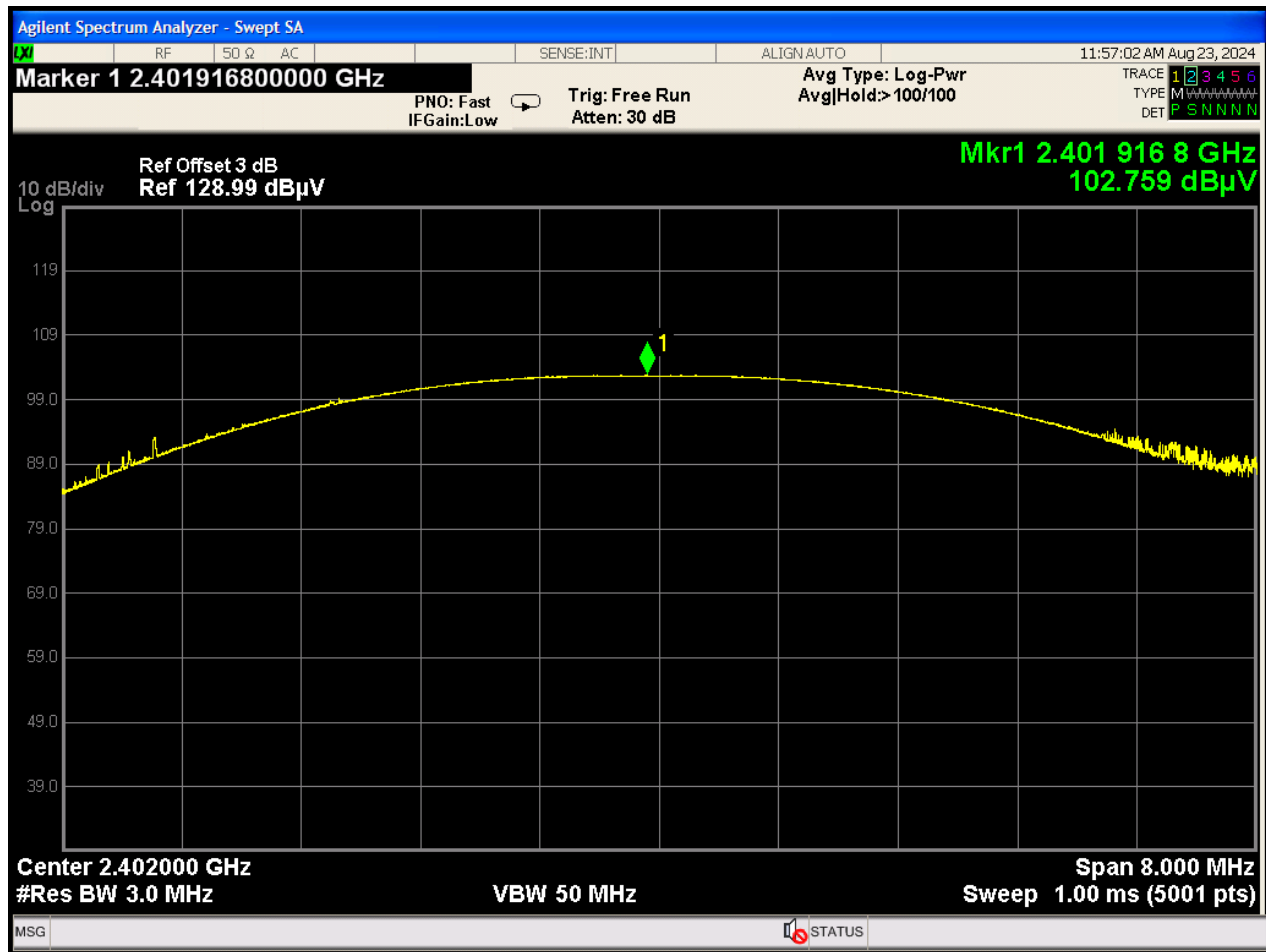
The EUT is compliant with the requirements of this test.

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

The final CIIPC test data is provided below.



Figure 4: CIIPC, Uncorrected Field Strength, Low Channel, 1Mbps (DH5)



| Modulation | Data Rate | TX Frequency | SA Level (dBuV) | Corr. Factors (dB/m) | Corr. Level (dBuV/m) | EIRP (dBm) |
|------------|-----------|--------------|-----------------|----------------------|----------------------|------------|
| GFSK       | 1 Mbps    | 2402 MHz     | 102.76          | -14.77               | 87.99                | -7.26      |

$$\text{EIRP} = \text{dBuV/m} + 20\text{LOG}(D_m) - 104.8$$

where,  $D_m$  is the measurement distance in meters

$$\text{EIRP} = 87.99 + 20\text{LOG}(3) - 104.8 = -7.26$$

The result of -7.26 dBm EIRP is within  $\pm 1.9$  dB of the granted power of the LMA.



### 3.3 Power Spectral Density

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(e) and RSS-247, 5.2(b) require that the maximum peak power spectral density shall not exceed 8 dBm in any 3 kHz band.

The transmitter PSD of the EUT shall also closely resemble the original filing test data for the embedded module. In this case, the reported PSD data from the LMA filing is as follows:

Limited Module Data:

| Modulation | Data Rate | TX Frequency | Measured PSD (dBm) |
|------------|-----------|--------------|--------------------|
| GFSK       | 1 Mbps    | 2402 MHz     | 0.99               |

#### 3.3.1 Measurement Method

This test was performed in accordance with Clause 11.10.2 of ANSI C63.10-2020.

This test was performed as a 3-meter radiated field strength measurement. The EUT was investigated in three orthogonal axes (x, y, z). The EUT position that produced the highest fundamental field strength was maintained during the final measurement. The transmit signal was maximized by rotating the turntable and varying the height of the test antenna.

#### 3.3.2 Test Data

The EUT was investigated for worst-case emissions, across various channels and data rates.

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

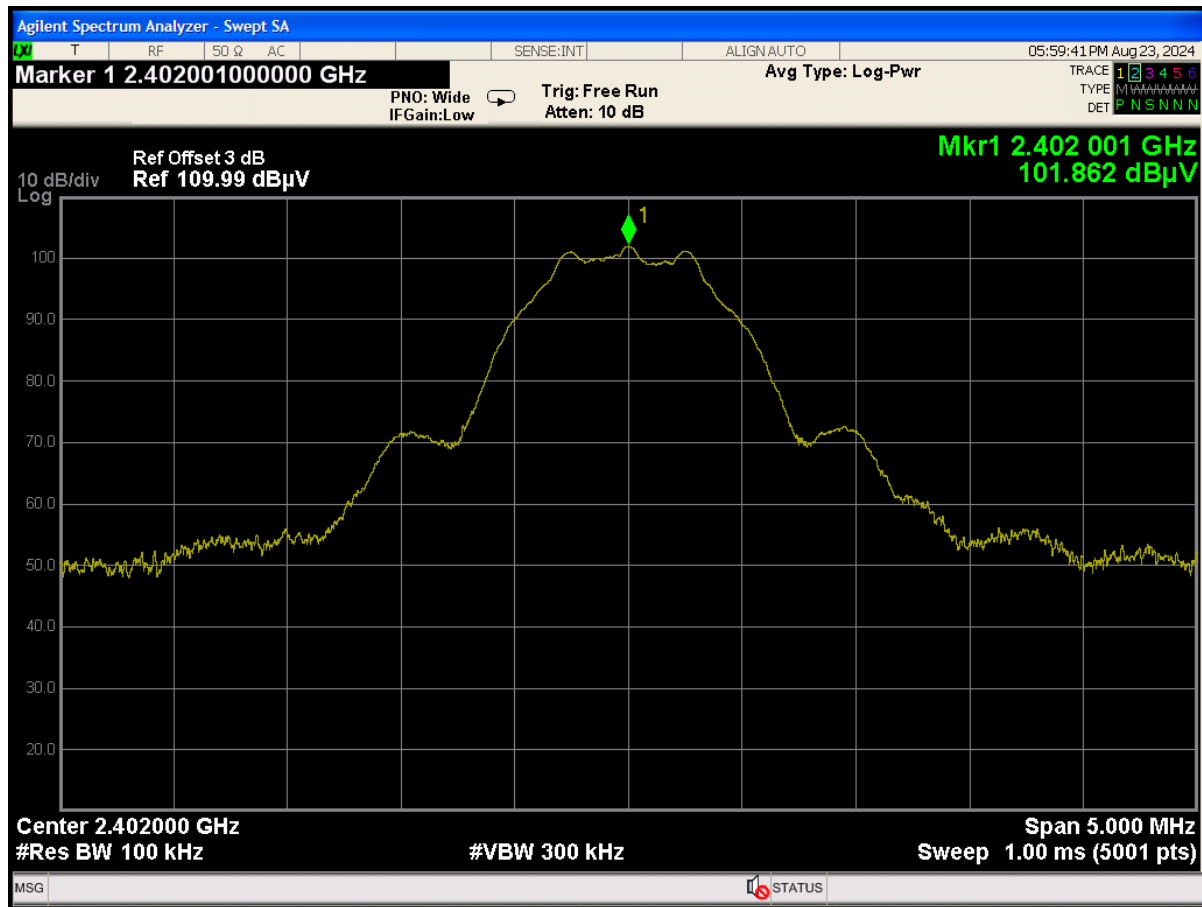
The EUT is compliant with the requirements of this test.

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

The final CIIPC test data is provided below.



Figure 5: CIIPC Power Spectral Density, Low Channel, 1Mbps (DH5)



| Modulation | Data Rate | TX Frequency | SA Level (dBuV) | Corr. Factors (dB/m) | Corr. Level (dBuV/m) | Corr. PSD (dBm) |
|------------|-----------|--------------|-----------------|----------------------|----------------------|-----------------|
| GFSK       | 1 Mbps    | 2402 MHz     | 101.87          | -14.77               | 87.10                | -1.68           |

$$\text{EIRP} = \text{dBuV/m} + 20\text{LOG}(D_m) - 104.8$$

$$\text{PSD} = \text{EIRP} - G_{\text{dBi}}$$

where,  $D_m$  is the measurement distance in meters

$G_{\text{dBi}}$  transmitting antenna gain of the EUT in dBi

$$\text{PSD} = -8.16 - (-6.48) = -1.68$$

The result of -1.68 dBm PSD is within  $\pm 2.67$  dB of the granted PSD of the LMA.





## 3.4 Band-edge

This section provides close-up band-edge plots of the low and high channel, with respect to the nearest authorized band-edge.

For a DTS operating in the 2.4GHz band, FCC Rule Part 15.247(d) and RSS-247, 5.5 require 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.

### 3.4.1 Measurement Method

This test was performed in accordance with Clause 6.10 through Clause 6.10.4 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.

### 3.4.2 Test Data

The EUT was investigated for worst-case emissions, across various channels and data rates.

The EUT was configured to transmit a modulated signal. The EUT was evaluated in two modes, channel hopping enabled and channel hopping disabled. The hopping/sweeping function had no impact on the results of this test. The worst-case band-edge is reported below.

The EUT is compliant with the requirements of this test.

The final CIIPC test data is provided below.



Figure 6: CIIPC, Worst-Case Band-Edge, Low Channel

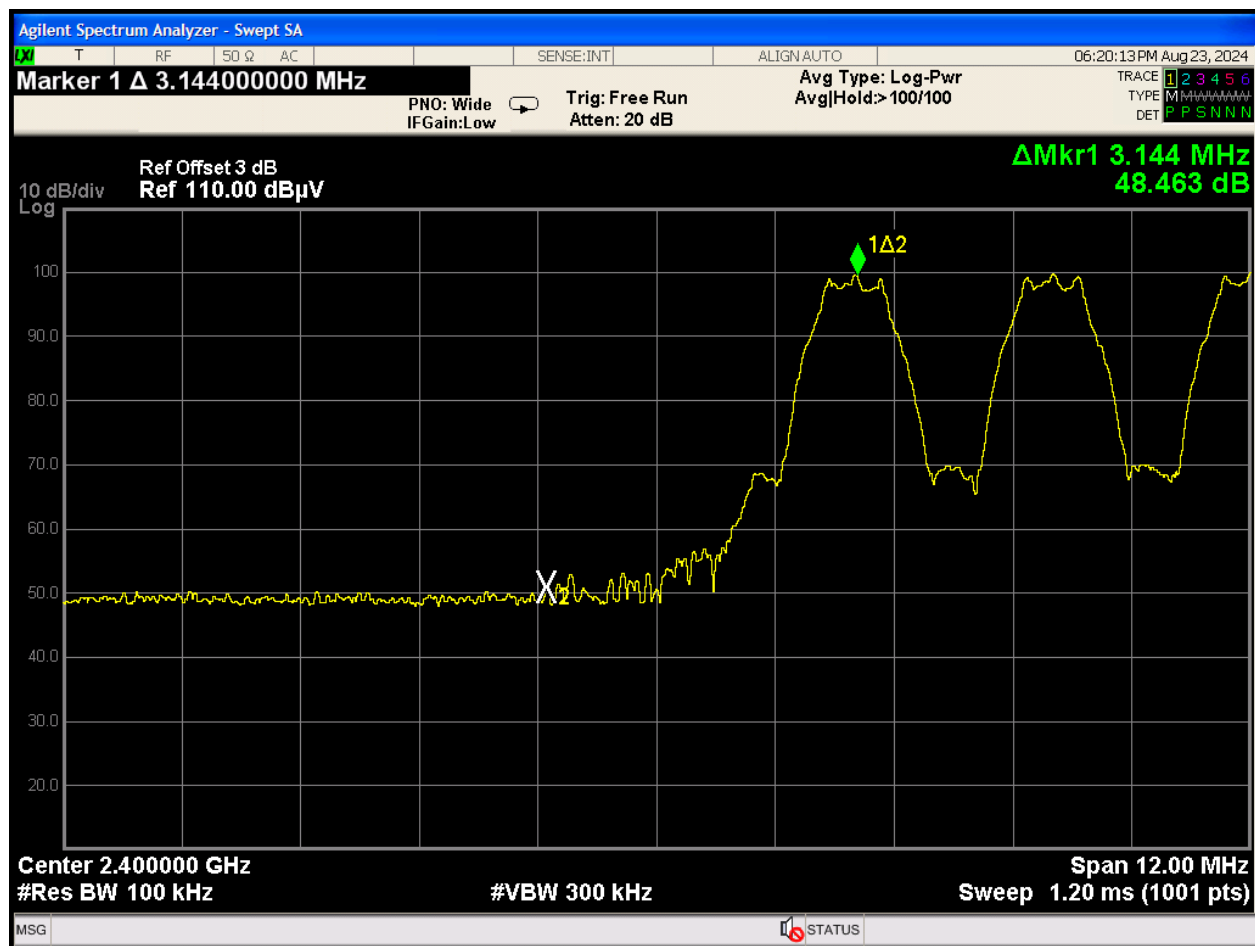
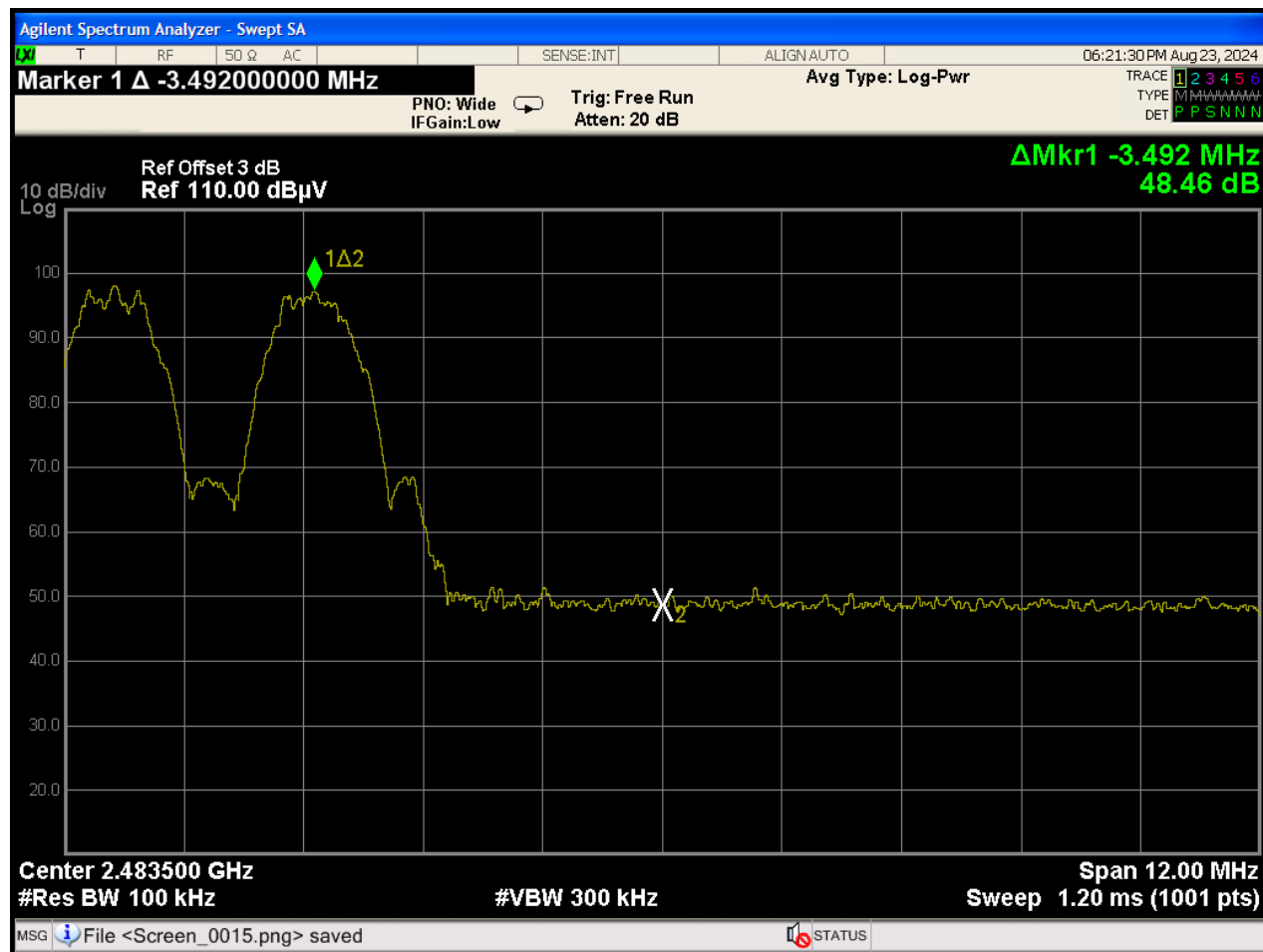




Figure 7: CIIPC, Worst-Case Band-Edge, High Channel





## 3.5 Radiated Emissions

### 3.5.1 Requirements

Compliance Standard: FCC Part 15.247, 15.209, 15.205

| Radiated Emissions, Compliance Limits |                               |
|---------------------------------------|-------------------------------|
| Frequency Range                       | Class B Equivalent (3-meters) |
| 30 – 88 MHz                           | 100 $\mu$ V/m                 |
| 88 – 216 MHz                          | 150 $\mu$ V/m                 |
| 216 – 960 MHz                         | 200 $\mu$ V/m                 |
| > 960 MHz                             | 500 $\mu$ V/m                 |

### 3.5.2 Test Procedure

The requirements of FCC Part 15 and ICES-003 call for the EUT to be placed on a 1 X 1.5 meters non-conductive motorized turntable for radiated testing on a 3-meter 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.

The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Bi-conical and log periodic broadband 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 30 MHz to 26.5 GHz were measured. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak or peak, as appropriate. Above 1GHz average measurement are recorded. 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. Frequencies above 1GHz were performed using a measurement bandwidth of 1 MHz with a video bandwidth setting of 10 Hz for the average measurement.

### 3.5.3 Test Results Summary

The EUT complies with the Class B Radiated Emissions requirements.



### 3.5.4 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 antennas and other measurement accessories. These factors are included into the antenna factor (AF) column of the table and in the cable factor (CF) column of the table. The AF (in dB/m) and the CF (in dB) is algebraically added to the raw Spectrum Analyzer Voltage in dBμV to obtain the Radiated Electric Field in dBμV/m. This logarithm amplitude is converted to a linear amplitude, then compared to the FCC limit.

*Example:*

Spectrum Analyzer Voltage: VdBμV  
Antenna Correction Factor: AFdB/m  
Cable Correction Factor: CFdB  
Pre-Amplifier Gain: GdB  
Electric Field:  $\text{EdB}\mu\text{V/m} = \text{V dB}\mu\text{V} + \text{AFdB/m} + \text{CFdB} - \text{GdB}$   
Convert to linear unit:  $\text{EdB}\mu\text{V/m}/20 \text{ Inv log}$

### 3.5.5 Test Data

The EUT was investigated for worst-case emissions, across various channels and data rates.

There were no EUT emissions detected in the frequency range of 6 GHz to 26.5 GHz.

The final CIIPC test data is provided below.

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 configured to transmit a modulated signal as follows:

- a) for testing of 30 MHz to 1 GHz, the EUT was set to a transmitter enabled mode, the BLE transceiver was set to sweep the 2.4GHz ISM band, in an active hopping.
- b) for testing of 1 GHz to 26.5 GHz, the EUT was set to a transmitter enabled mode, the BLE transceiver was set to dwell on the low channel.

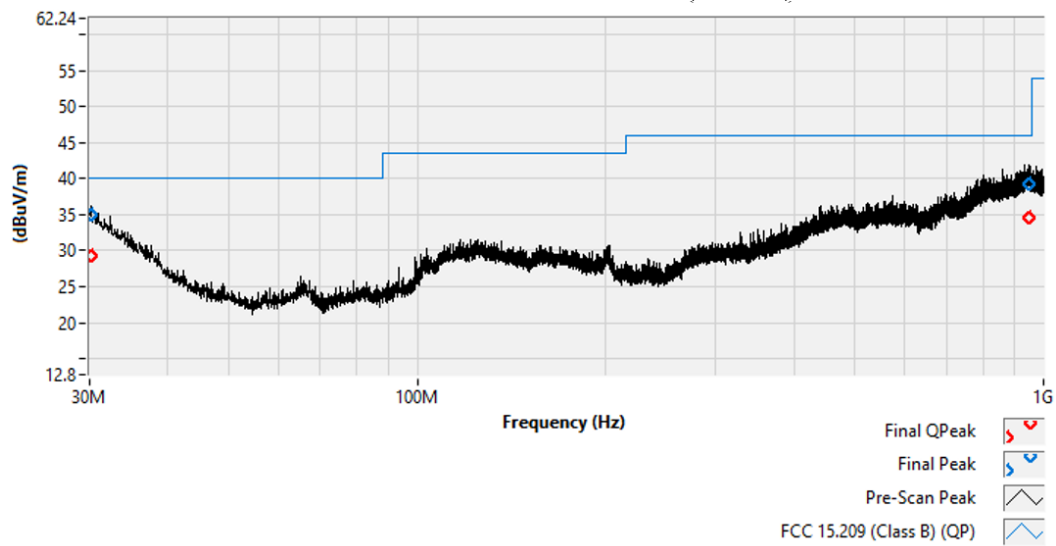
Please accept the 30MHz to 1GHz data to cover the digital portion under the provisions of 15.109(a).



Table 6: Radiated Emissions Test Data, 30MHz to 1GHz

| Frequency (MHz) | Detector | Corr. Meas (dBuV/m) | Limit (dBuV/m) | Delta (dB) | Table (deg) | Antenna (cm) |
|-----------------|----------|---------------------|----------------|------------|-------------|--------------|
| 30.18           | Peak     | 37.67               | --             | --         | 320         | Horiz, 100   |
|                 | QP       | 30.788              | 40             | -9.212     | 320         | Horiz, 100   |
| 948.043         | Peak     | 42.09               | --             | --         | 320         | Horiz, 100   |
|                 | QP       | 35.069              | 46             | -10.931    | 320         | Horiz, 100   |

Worst-Case Pre-scan and Final Data (Vertical)



Worst-Case Pre-scan and Final Data (Horizontal)

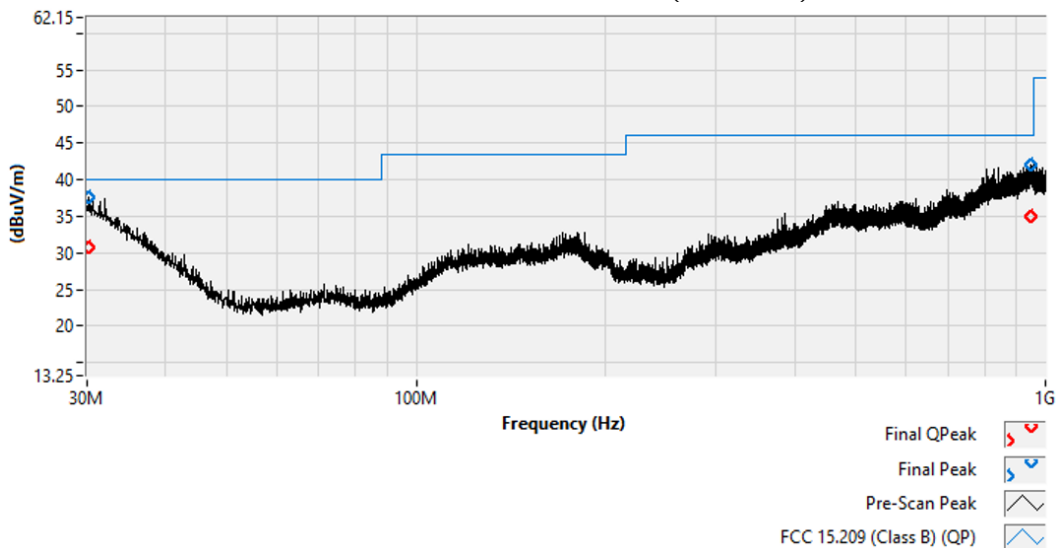




Table 7: Radiated Emissions Test Data, 1GHz to 26.5GHz

| Frequency (GHz)     | Detector | Corr. Meas (dBuV/m) | Limit (dBuV/m) | Delta (dB) | Turn Table (deg) | Antenna (cm) |
|---------------------|----------|---------------------|----------------|------------|------------------|--------------|
| 2.390 <sup>1</sup>  | Peak     | 45.707              | 74             | -28.293    | 320              | Vert, 130    |
|                     | AVG      | 31.358              | 54             | -22.642    | 320              | Vert, 130    |
| 2.402 <sup>2</sup>  | Peak     | 86.962              | --             | --         | 320              | Vert, 130    |
|                     | AVG      | --                  | --             | --         | --               | --           |
| 4.804               | Peak     | 53.567              | 74             | -20.433    | 320              | Vert, 130    |
|                     | AVG      | 43.157              | 54             | -10.843    | 320              | Vert, 130    |
| 10.703 <sup>3</sup> | Peak     | 64.434              | 74             | -9.566     | 320              | Vert, 130    |
|                     | AVG      | 49.884              | 54             | -4.116     | 320              | Vert, 130    |
| 11.930 <sup>3</sup> | Peak     | 67.049              | 74             | -6.951     | 320              | Vert, 130    |
|                     | AVG      | 52.248              | 54             | -1.752     | 320              | Horiz, 130   |

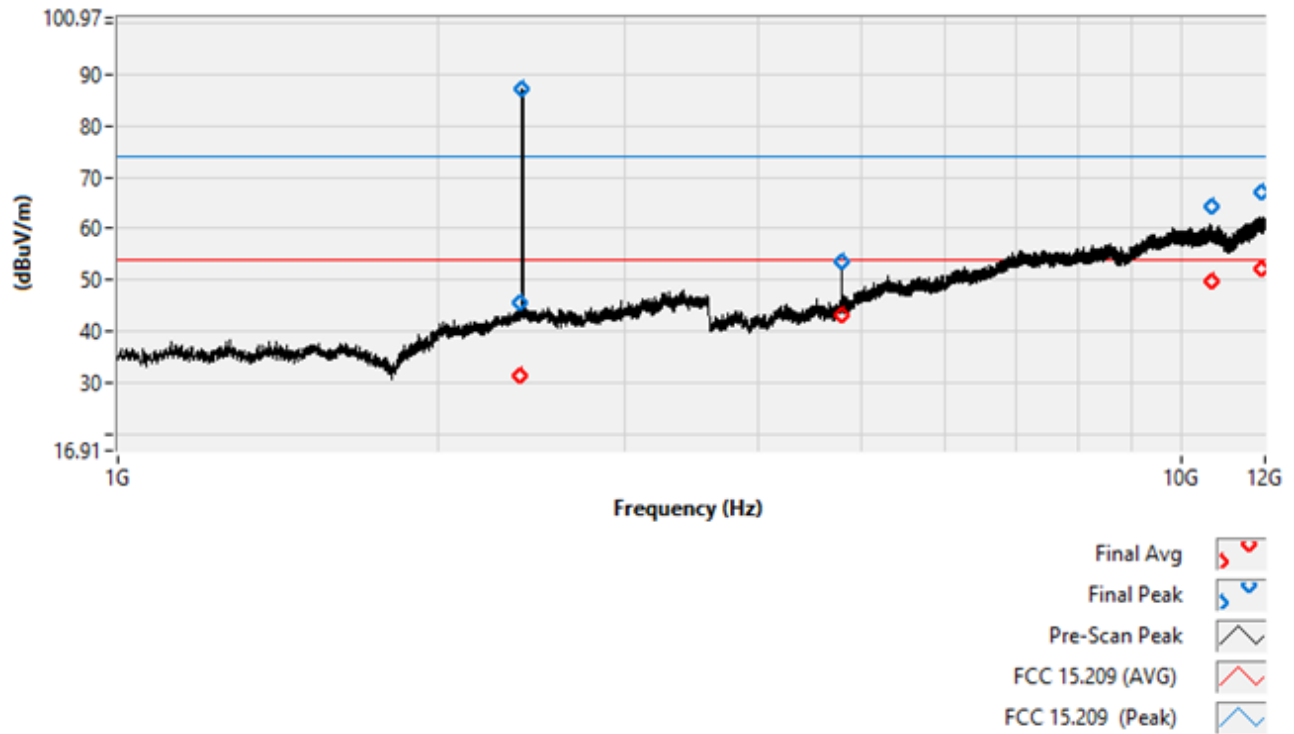
<sup>1</sup> Restricted BE

<sup>2</sup> Low Chan TX

<sup>3</sup> Ambient



Worst-Case Pre-scan and Final Data (Vertical)



Worst-Case Pre-scan and Final Data (Horizontal)

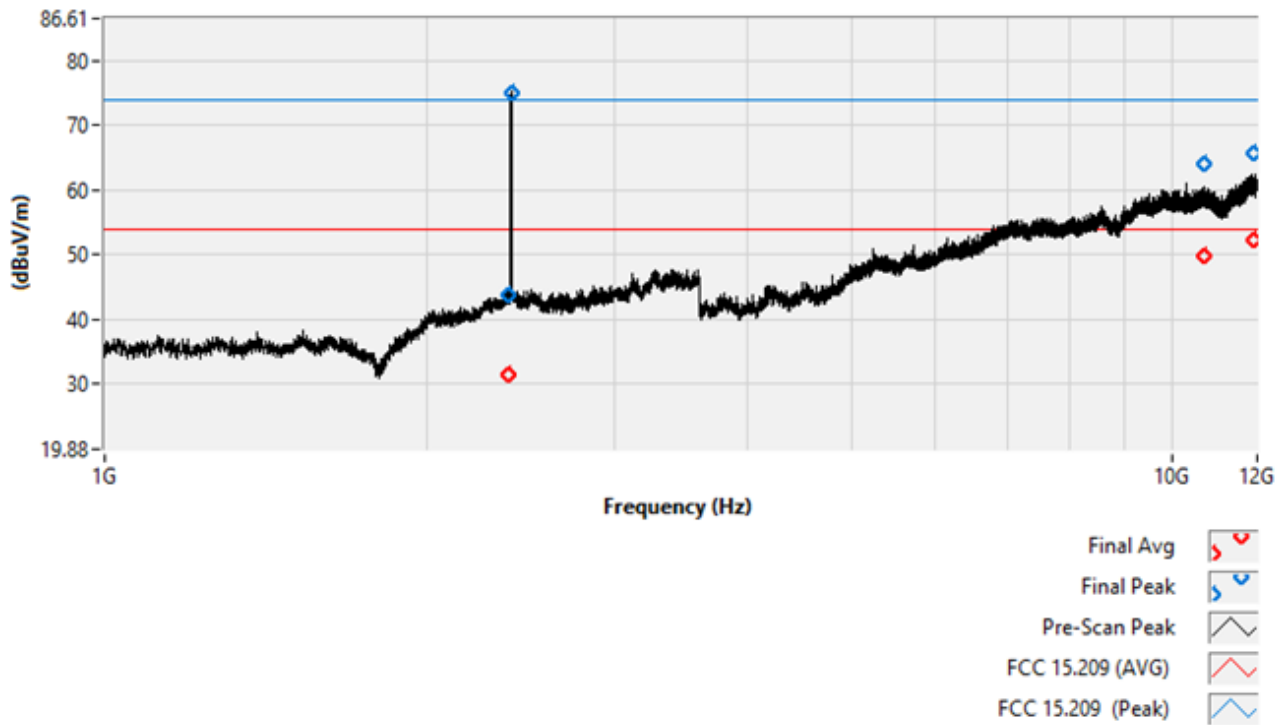
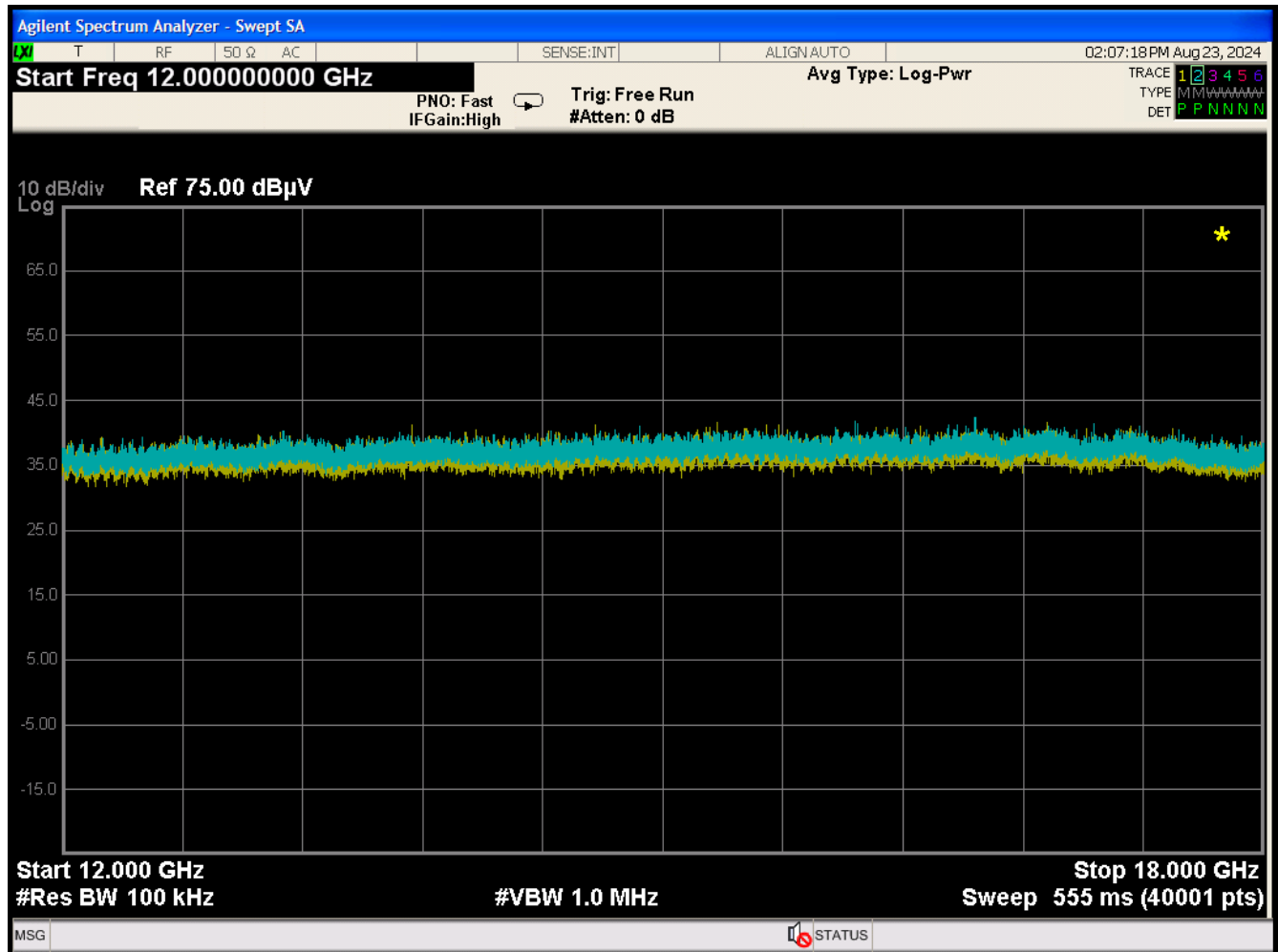






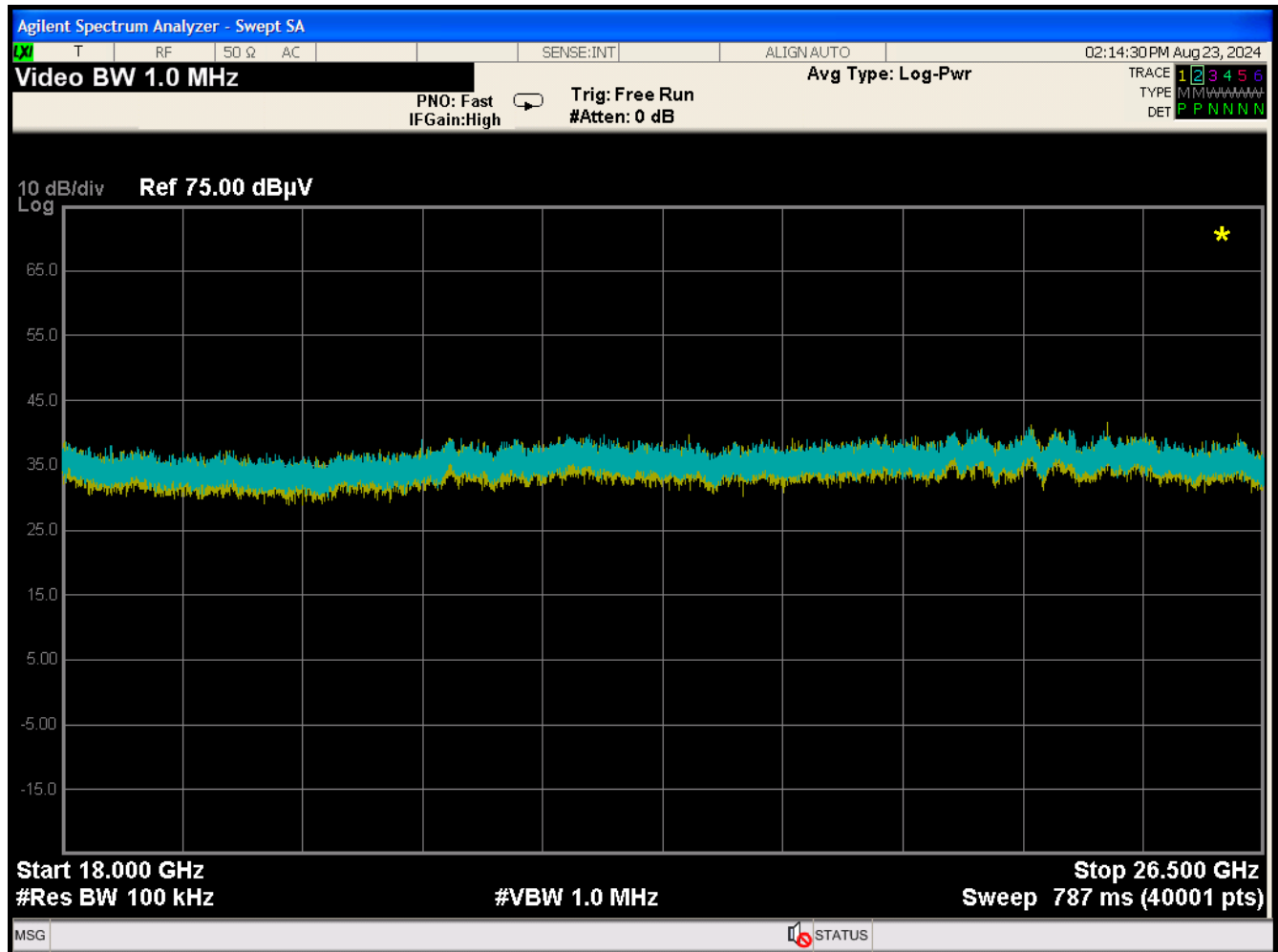
Figure 8: Radiated Emissions Investigation (12GHz to 18GHz)



- EUT emissions are not detected in this frequency range.
- Trace 1 = EUT Low Chan. TX On
- Trace 2 = Ambient



Figure 9: Radiated Emissions Investigation (18GHz to 26.5GHz)



- EUT emissions are not detected in this frequency range.
- Trace 1 = EUT Low Chan. TX On
- Trace 2 = Ambient



## 4 Test Equipment

The table below provides a list of the test equipment used for measurements along with the calibration information.

Table 8: Test Equipment List

| Test Name: <b>Radiated Emissions</b> |                              | Testing Date: 8/23/2024 |                 |
|--------------------------------------|------------------------------|-------------------------|-----------------|
| <b>Asset #</b>                       | <b>Manufacturer/Model</b>    | <b>Description</b>      | <b>Cal. Due</b> |
| 00382                                | SUNOL SCIENCES CORP., B1     | ANTENNA BICONLOG        | 6/12/2027       |
| 00823                                | AGILENT, N9010A              | EXA SPECTRUM ANALYZER   | 6/21/2026       |
| 00825                                | CABLE ASSOCIATES,<br>MTC1010 | SMA, COAXIAL CABLE      | 6/14/2025       |
| 00626                                | ARA, DRG-118/A               | HORN ANTENNA            | 6/19/2025       |
| 00806                                | MINI-CIRCUITS, CBL-6FT       | SMA COAXIAL CABLE       | 12/26/2024      |
| 00847                                | ASTROLABS, K-48TG            | SMA, COAXIAL CABLE      | 6/20/2025       |
| 00731                                | NARDA 4779-3                 | 2W, 3DB ATTENUATOR      | 6/20/2025       |
| 00823                                | AGILENT, N9010A              | EXA SPECTRUM ANALYZER   | 6/21/2026       |
| 00559                                | HP, 8447D                    | RF PRE-AMPLIFIER        | 6/25/2025       |



## 5 Measurements

### 5.1.1 References

ANSI C63.2 (1/2016) Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 (1/2014) 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 (9/2020) American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Office of Engineering and Technology (OET), Exhibits List for FCC ID: YJ7-NA080801, “NA080801 LMA BT Module Integration Manual Rev 1 (8/7/2024); retrieved from:  
[https://apps.fcc.gov/oetcf/eas/reports/ViewExhibitReport.cfm?mode=Exhibits&RequestTimeout=500&calledFromFrame=Y&application\\_id=Noip8jSvNUBFISHOb%2BypoQ%3D%3D&fcc\\_id=YJ7-NA080801](https://apps.fcc.gov/oetcf/eas/reports/ViewExhibitReport.cfm?mode=Exhibits&RequestTimeout=500&calledFromFrame=Y&application_id=Noip8jSvNUBFISHOb%2BypoQ%3D%3D&fcc_id=YJ7-NA080801)

### 5.2 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 the table below.

Table 9: Expanded Uncertainty List

| Scope               | Standard(s)                            | Expanded Uncertainty |
|---------------------|----------------------------------------|----------------------|
| Conducted Emissions | CISPR11, CISPR32, CISPR14, FCC Part 15 | ± 2.63 dB            |
| Radiated Emissions  | CISPR11, CISPR32, CISPR14, FCC Part 15 | ± 4.55 dB            |

## 5.3 Environmental Conditions

### Environmental Conditions During All Measurements

|                      |                          |
|----------------------|--------------------------|
| Ambient Temperature: | Between 19.9 and 23.9 °C |
| Relative Humidity:   | Between 45 and 60 %      |



## 6 Annex A

This Annex provides the module's integration guide and permissive change test plan. The data provided in this section was retrieved from the EUT original filing exhibits.

NA080801 LMA BT Module Integration Manual Rev 0.6

August 5, 2024

The NA080801 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)(1) 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 NA080801 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 NA080801 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 NA080801 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-NA080801                    |
| 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 NA080801 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 NA080801 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 NA080801, since it has no shield, testing of radiated spurious emissions shall cover the 10<sup>th</sup> 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 simultaneous 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 ISED intentional radiator rules listed in the grants of authorization. The host device must be evaluated for RF compliance to any other FCC and ISED 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 NA080801 module shall be permanently marked with a label stating, “Contains FCC ID: YJ7-NA080801” and “Contains IC: 9082A-NA080801”. 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.”