

MEASUREMENT REPORT

FCC PART 15.407 Narrowband (NB) U-NII 5GHz

Applicant Name:

Apple Inc.
One Apple Park Way
Cupertino, CA 95014
United States

Date of Testing:

12/11/2025 - 02/19/2026

Test Report Issue Date:

2/24/2026

Test Site/Location:

Element Materials Technology, Morgan Hill, CA,
USA

Test Report Serial No.:

1C2512110102-06-R3.BCG

FCC ID:

BCG-A3454

APPLICANT:

Apple Inc.

Application Type:

Certification

Model:

A3454

EUT Type:

Wireless Headphones

Frequency Range:

5157 – 5245MHz, 5731 – 5844MHz

Modulation Type:

GFSK, $\pi/4$ -DQPSK

FCC Classification:

Unlicensed National Information Infrastructure (UNII)

FCC Rule Part(s):

Part 15 Subpart E (15.407)

Test Procedure(s):

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to
C63.10a:2024, KDB 789033 D02 v02r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1C2512110102-06-R3.BCG) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



RJ Ortanez
Executive Vice President



FCC ID: BCG-A3454	 MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Revision Summary

Revision	Date	Comments	Revised By
-	02/10/2026	Initial Release	WKR007359
R1	02/17/2026	Addressed TCB comments in Section 2.5, and 7.2	WKR007359
R2	02/18/2026	Addressed TCB comments minor formatting	WKR007359
R3	2/19/2026	Addressed TCB comments minor formatting In section7.5	WKR007203

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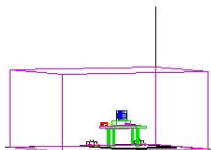
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MEASUREMENT REPORT



UNII Band	Tx Frequency (MHz)	Mode	Max. Power (mW)	Max. Power (dBm)
1	5157-5245	NB UNII BDR	9.354	9.71
		NB UNII LE	9.354	9.71
		NB UNII HDR	10.765	10.32
3	5731-5844	NB UNII BDR	20.559	13.13
		NB UNII LE	21.777	13.38
		NB UNII HDR	11.194	10.49

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

1.2 Element Materials Technology Test Location

These measurement tests were conducted at the Element Materials Technology facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element Materials Technology located in Morgan Hill, CA 95037, U.S.A.

- Element Materials Technology is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Materials Technology facility is a registered (22831) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB# US0110) for ISED Canada as designed by NIST under the U.S. and Canada Mutual Recognition Agreements (MRAs)

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Wireless Headphones FCC ID: BCG-A3454**. The test data contained in this report pertains only to the emissions due to the EUT's Narrowband UNII transmitter.

1. This Narrowband UNII module has been tested by manufacturer and the following were confirmed:
 - A) The hopping sequence is pseudorandom
 - B) The receiver input bandwidth equals the transmit bandwidth
 - C) The receiver hops in sequence with the transmit signal
 - D) Narrowband UNII can only hop within the same UNII band and cannot hop between bands

Test Device Serial No.: J72HNC000CN000109R, JMLHC5Y0WT, F5932FW6X9, JQ6WVLXL9Q

2.2 Device Capabilities

This device contains the following capabilities:

Narrowband (NB) UNII (5GHz and 6GHz), Bluetooth (1x, LE, EDR, HDR).

Band 1	Band 3
Frequency (MHz)	Frequency (MHz)
5157	5731
:	:
5200	5788
:	:
5245	5844

Table 2-1. NB UNII Frequency / Channel Operations

Group	Mode	Data Rate (Mbps)	Modulation	Bandwidth (MHz)
1	BDR	1	GFSK	1
2	LE1M	1		1
3	LE2M	2		2
4	HDR4	4	Pi/4-DQPSK	2
5	HDR8	8		4
6	HDRp4	4		2
	HDRp8	8		4

Table 2-2. NB UNII Configuration

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Notes: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between different channels in the U-NII Band 1 & U-NII Band 3. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of KDB 789033 D02 v02r01 and ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Measured Duty Cycles		
Mode	Duty Cycle [%]	DCCF [dB]
NB UNII BDR	76.68	1.15
NB UNII LE1M	86.24	0.64
NB UNII LE2M	80.04	0.97
NB UNII HDR4	77.95	1.08
NB UNII HDR8	78.23	1.07
NB UNII HDRp4	87.24	0.59
NB UNII HDRp8	87.48	0.58

Table 2-3. Measured Duty Cycles

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2.3 Antenna Description

The following antenna gain provided by the manufacturer was used for testing.

Frequency [MHz]	Highest Antenna Gain (dBi)
5157-5245	-2.67
5731-5844	-1.09

Table 2-4. Highest Antenna Gain

2.4 Test Support Equipment

1	Apple MacBook Pro	Model:	A2141	S/N:	C02H604EQ05D
	w/AC/DC Adapter	Model:	A2166	S/N:	C4H042705ZNPM0WA6
2	Headphones Left Cushion	Model:	N/A	S/N:	J72HNM0001M00016SJ
	Headphones Right Cushion	Model:	N/A	S/N:	J72HNM0000500016SP
	Headphones Case	Model:	N/A	S/N:	JQ6WWLXL9Q
3	USB-C Cable	Model:	A246C	S/N:	N/A
	w/ AC Adapter	Model:	A2305	S/N:	N/A
4	Apple USB-C Cable	Model:	Spartan	S/N:	GXK1336018XKTR024

Table 2-5. Test Support Equipment List

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2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01. ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, and 7.5 for antenna port conducted emissions test setups.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel were reported.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

For AC line conducted and radiated test below 1GHz, following configurations were investigated and EUT powered by AC/DC adaptor was the worst case.

- EUT powered by AC/DC adaptor to USB-C cable with wire charger
- EUT powered by host PC via USB-C cable with wire charger

2.6 Software and Firmware

The test was conducted with firmware version 8E228 installed on the EUT.

2.7 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT.

Deviation from measurement procedure.....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is EPCOS 2X60A Power Line Filter (100dB Attenuation, 14kHz-18GHz) and the two EPCOs 2X48A filters (100dB Minimum Insertion Loss, 14kHz - 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.8. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 10.50.40.

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3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

Per KDB 414788 D01 v01r01, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was used while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antennas of the EUT are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

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5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty ($\pm$ dB)
Conducted Bench Top Measurements	2.00
AC Line Conducted Disturbance	1.88
Radiated Disturbance (<30MHz)	4.24
Radiated Disturbance (30MHz - 1GHz)	4.96
Radiated Disturbance (1 - 18GHz)	5.18
Radiated Disturbance (>18GHz)	5.18

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6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance with the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9020A	MXA Signal Analyzer	7/7/2025	Biennial	7/7/2027	MY56470202
Anritsu	ML2496A	Power Meter	2/10/2025	Annual	2/10/2026	1306009
Anritsu	MA2411B	Pulse Power Sensor	2/10/2025	Annual	2/10/2026	1315051
Anritsu	MA2411B	Pulse Power Sensor	2/10/2025	Annual	2/10/2026	1339027
ATM	180-442-KF	20dB Nominal Gain Horn Antenna	3/24/2025	Annual	3/24/2026	T058601-02
ETS-Lindgren	3117	Double Ridged Guide Horn (1-18 GHz)	4/16/2025	Annual	4/16/2026	218555
Fairview Microwave/MCL	FMCA1975-36/BW-K10-2W44+	30MHz-40GHz RF Cable/Attenuator *	6/10/2025	Annual	6/10/2026	-
Keysight Technology	N9040B	UXA Signal Analyzer	6/9/2025	Annual	6/9/2026	MY57212015
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	8/6/2025	Annual	8/6/2026	101639
Rohde & Schwarz	FSW43	Spectrum Analyzer 2Hz to 43GHz	8/5/2025	Annual	8/5/2026	104093
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	5/13/2025	Annual	5/13/2026	101867
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	10/14/2025	Annual	10/14/2026	102328
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	6/3/2025	Annual	6/3/2026	100052
Rohde & Schwarz	HFH2-Z2	Loop Antenna	5/12/2025	Annual	5/12/2026	100546
Rohde & Schwarz	ENV216	Two-Line V-Network	4/24/2025	Annual	4/24/2026	101364
Schwarzbeck	VULB 9162	Bilog Antenna (30MHz - 6GHz)	7/17/2025	Annual	7/17/2026	00302

Table 6-1. Test Equipment List

Note:

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- * Denotes passive equipment that have been internally verified/calibrated.

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7.0 TEST RESULTS

7.1 Summary

Company Name: Apple Inc.

FCC ID: BCG-A3454

FCC Classification: Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407	26dB Bandwidth	N/A	CONDUCTED	N/A	Section 7.2
15.407(e)	6dB Bandwidth	>500kHz(5725-5850MHz)		PASS	Section 7.3
2.1049	Occupied Bandwidth	N/A		N/A	Section 7.2
15.407 (a.1.iv), (a.3.i)	Maximum Conducted Output Power	Maximum conducted powers must meet the limits detailed in 15.407 (a)		PASS	Section 7.4
15.407 (a.1.iv), (a.3.i)	Maximum Power Spectral Density	Maximum power spectral density must meet the limits detailed in 15.407 (a)		PASS	Section 7.5
15.407(b.1), (b.4)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 15.407(b)	RADIATED	PASS	Section 7.6
15.205, 15.407(b.1), (b.4)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS	Section 7.6, 7.7
15.207	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits	AC LINE CONDUCTED	PASS	Section 7.8

Table 7-1. Summary of Test Results

Notes:

1. All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
2. The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
3. All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
4. For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Conducted Automation Software," Version 1.5.0.
5. For radiated testing, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Chamber Automation," Version 3.6.1.

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7.2 26dB & 99% Bandwidth Measurement

\$2.1049; \$15.407

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

Test Procedure Used

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 – Subclause 12.5.2.
KDB 789033 D02 v02r01 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 26$. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = in the range of 1% to 5% of the emission bandwidth
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Low, mid and high channels were tested and tabular data has been reported. Only mid channel plots has been reported.

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7.2.1 26dB & 99% Bandwidth Measurements (UNII-1)

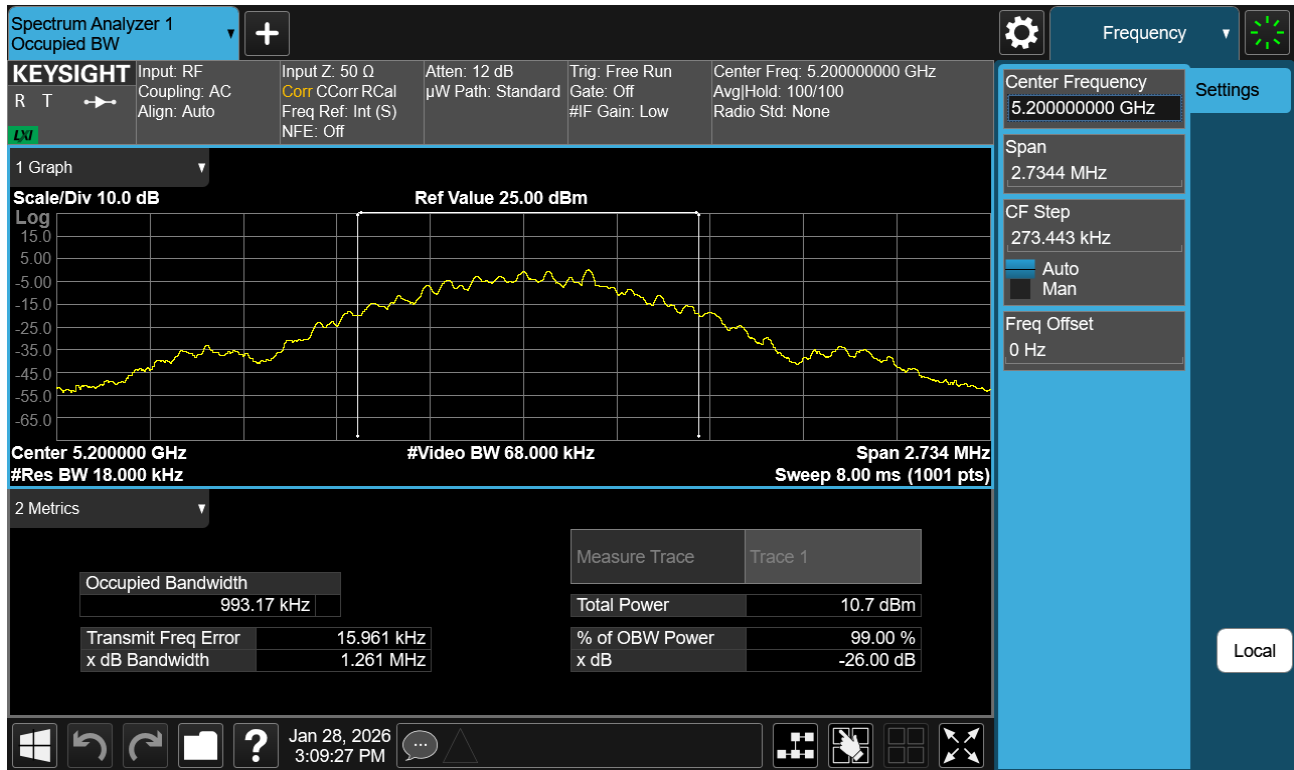
Frequency [MHz]	Data Rate [Mbps]	Mode	Measured 99% Occupied Bandwidth [MHz]	Measured 26dB Bandwidth [MHz]	Pass/Fail
5157	1.0	NB UNII BDR	0.99	1.26	Pass
5200	1.0	NB UNII BDR	0.99	1.26	Pass
5245	1.0	NB UNII BDR	0.99	1.26	Pass
5157	1.0	NB UNII LE1M	1.25	0.18	Pass
5200	1.0	NB UNII LE1M	1.07	0.13	Pass
5245	1.0	NB UNII LE1M	1.07	0.13	Pass
5157	2.0	NB UNII LE2M	2.09	0.25	Pass
5200	2.0	NB UNII LE2M	2.09	0.25	Pass
5245	2.0	NB UNII LE2M	2.09	0.25	Pass
5157	4.0	NB UNII HDR4	2.26	2.63	Pass
5200	4.0	NB UNII HDR4	2.26	2.63	Pass
5245	4.0	NB UNII HDR4	2.26	2.63	Pass
5157	8.0	NB UNII HDR8	4.50	5.13	Pass
5200	8.0	NB UNII HDR8	4.50	5.11	Pass
5245	8.0	NB UNII HDR8	4.50	5.12	Pass
5157	4.0	NB UNII HDRp4	2.43	2.75	Pass
5200	4.0	NB UNII HDRp4	2.43	2.77	Pass
5245	4.0	NB UNII HDRp4	2.43	2.77	Pass
5157	8.0	NB UNII HDRp8	4.88	5.53	Pass
5200	8.0	NB UNII HDRp8	4.90	5.77	Pass
5245	8.0	NB UNII HDRp8	4.86	5.53	Pass

Table 7-2. Conducted BW Measurements

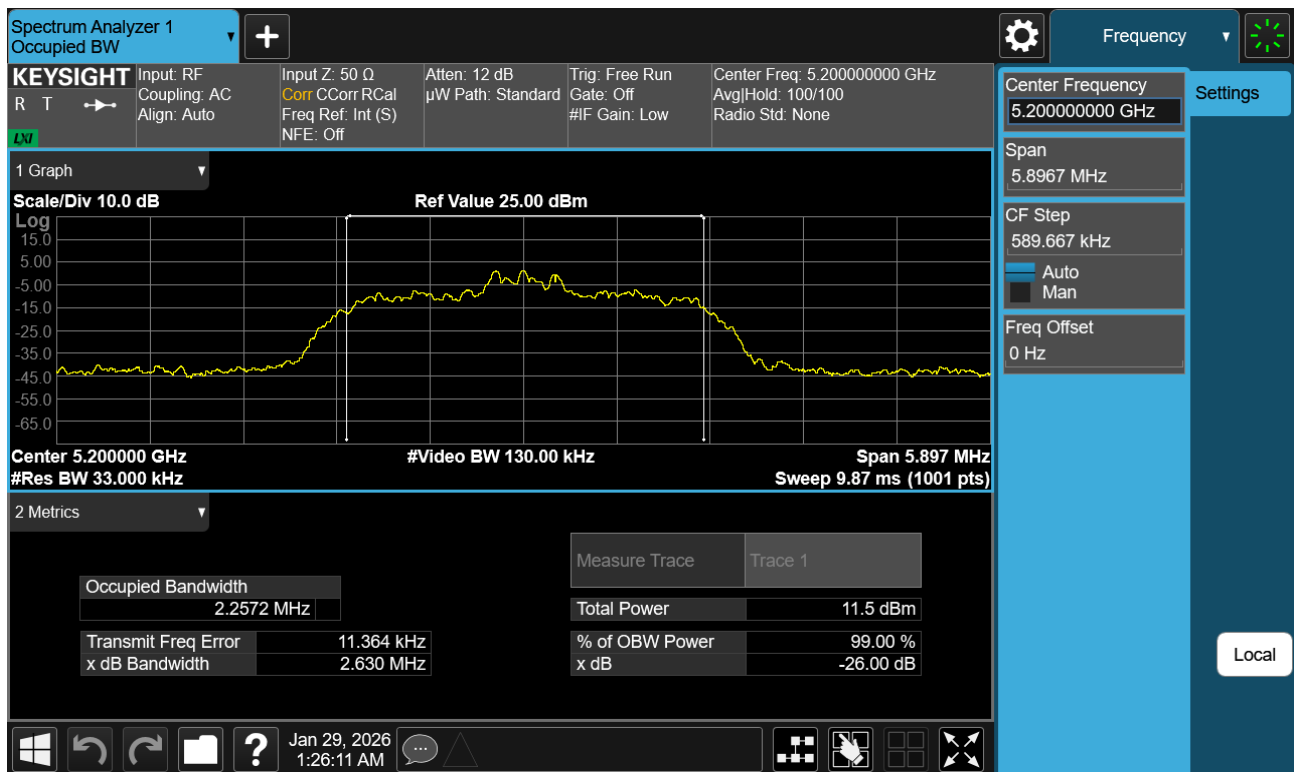
FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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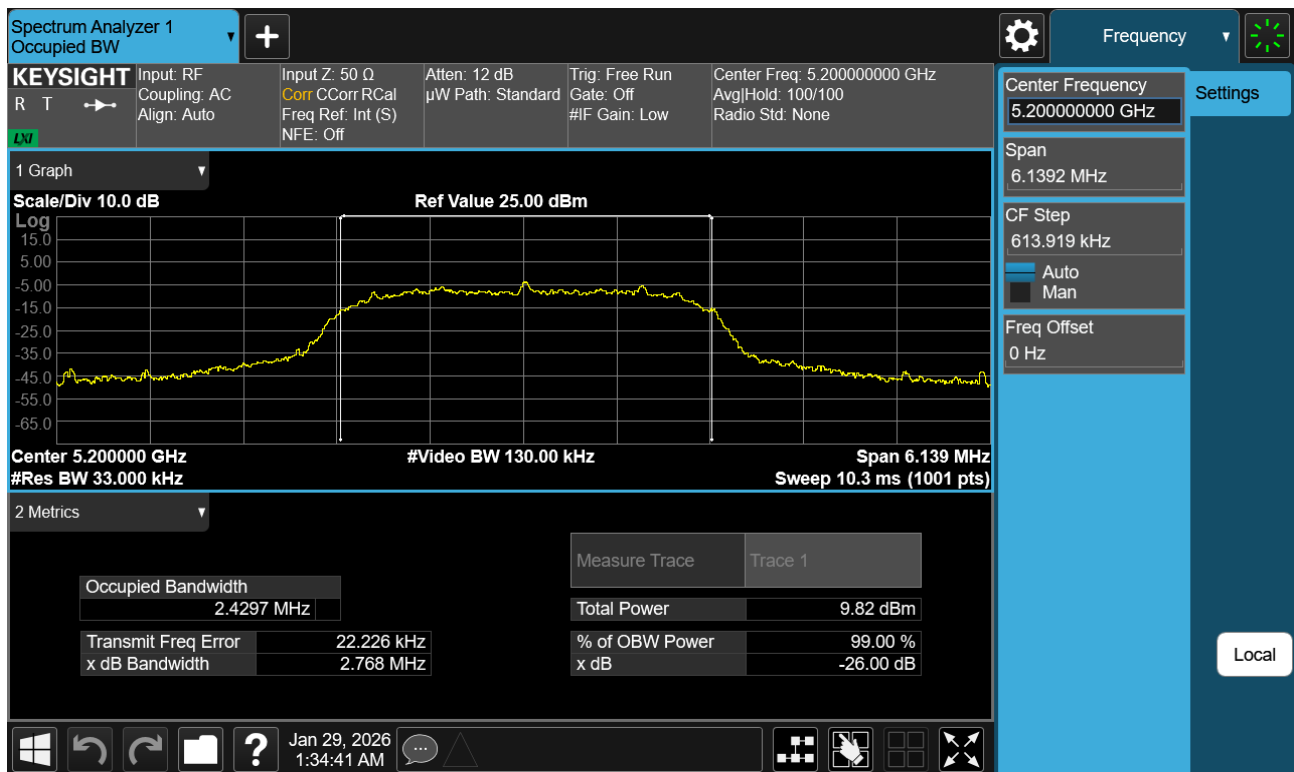
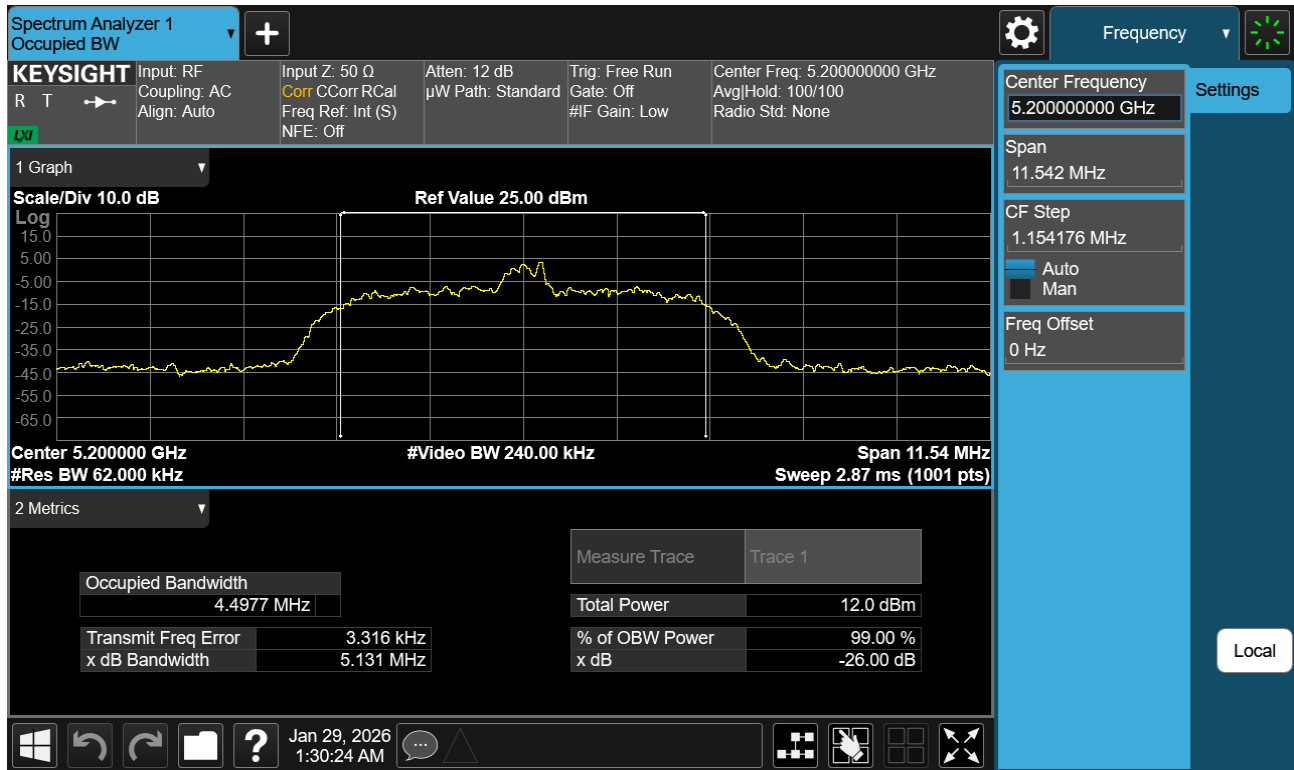
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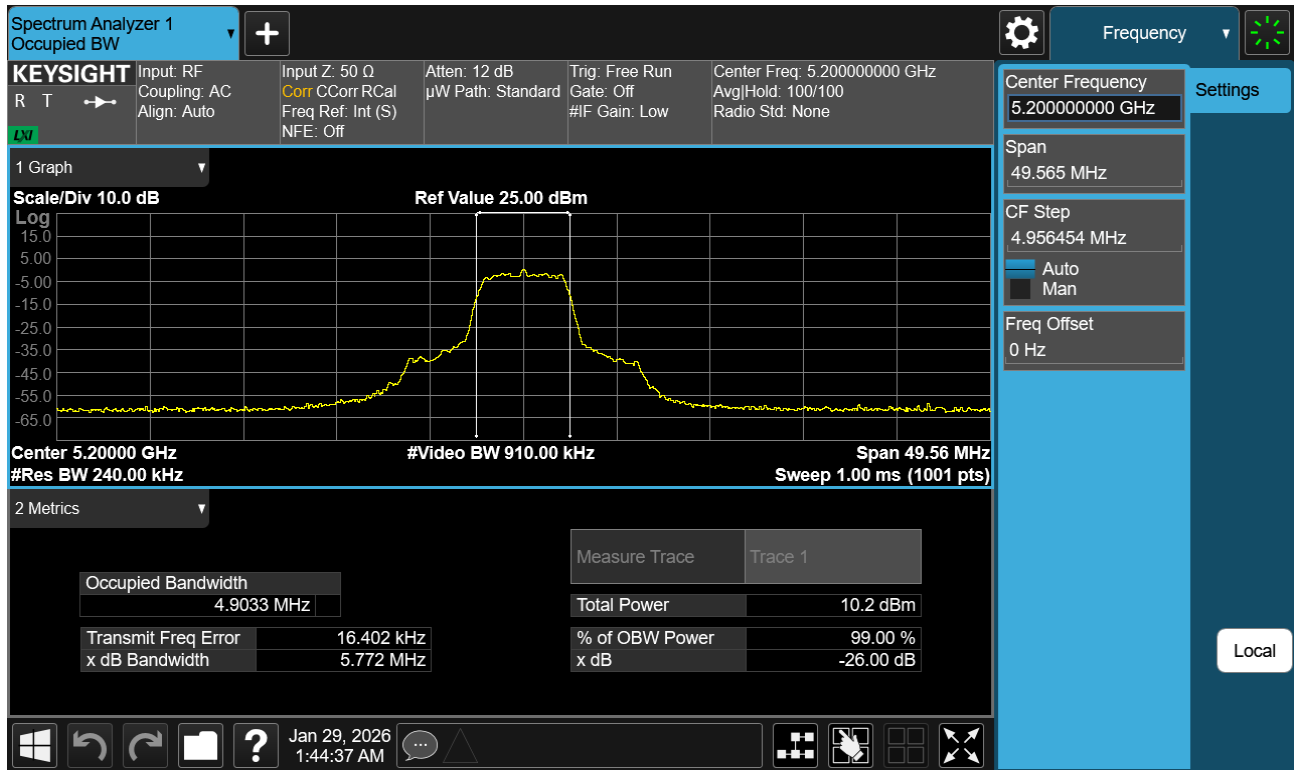
FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-7. 26dB BW & 99% OBW (NB UNII HDRp8 – 5200MHz)

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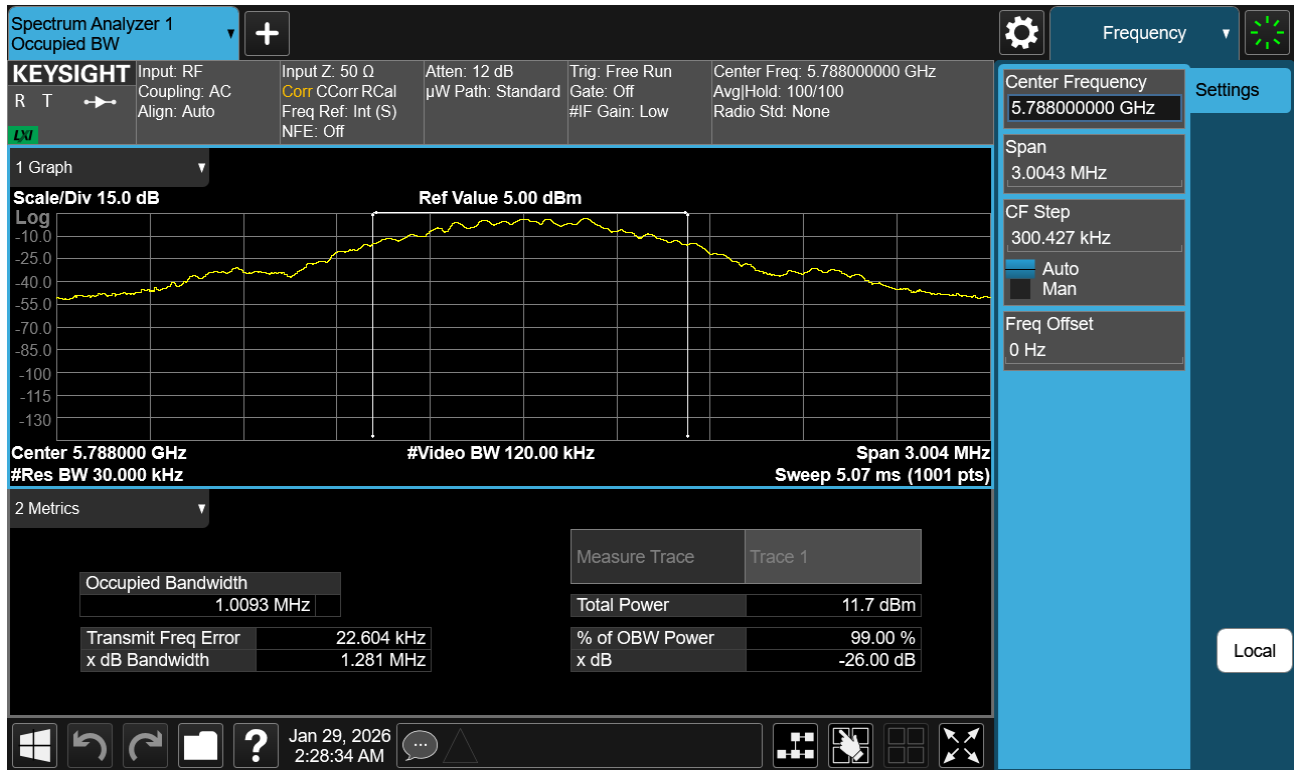
7.2.2 99% Bandwidth Measurements (UNII-3)

Frequency [MHz]	Data Rate [Mbps]	Mode	Measured 99% Occupied Bandwidth [MHz]
5731	1.0	NB UNII BDR	1.01
5788	1.0	NB UNII BDR	1.01
5844	1.0	NB UNII BDR	1.01
5731	1.0	NB UNII LE1M	1.07
5788	1.0	NB UNII LE1M	1.07
5844	1.0	NB UNII LE1M	1.06
5731	2.0	NB UNII LE2M	2.06
5788	2.0	NB UNII LE2M	2.06
5844	2.0	NB UNII LE2M	2.06
5731	4.0	NB UNII HDR4	2.27
5788	4.0	NB UNII HDR4	2.27
5844	4.0	NB UNII HDR4	2.27
5731	8.0	NB UNII HDR8	4.56
5788	8.0	NB UNII HDR8	4.57
5844	8.0	NB UNII HDR8	4.58
5731	4.0	NB UNII HDRp4	2.43
5788	4.0	NB UNII HDRp4	2.43
5844	4.0	NB UNII HDRp4	2.43
5731	8.0	NB UNII HDRp8	4.86
5788	8.0	NB UNII HDRp8	4.85
5844	8.0	NB UNII HDRp8	4.84

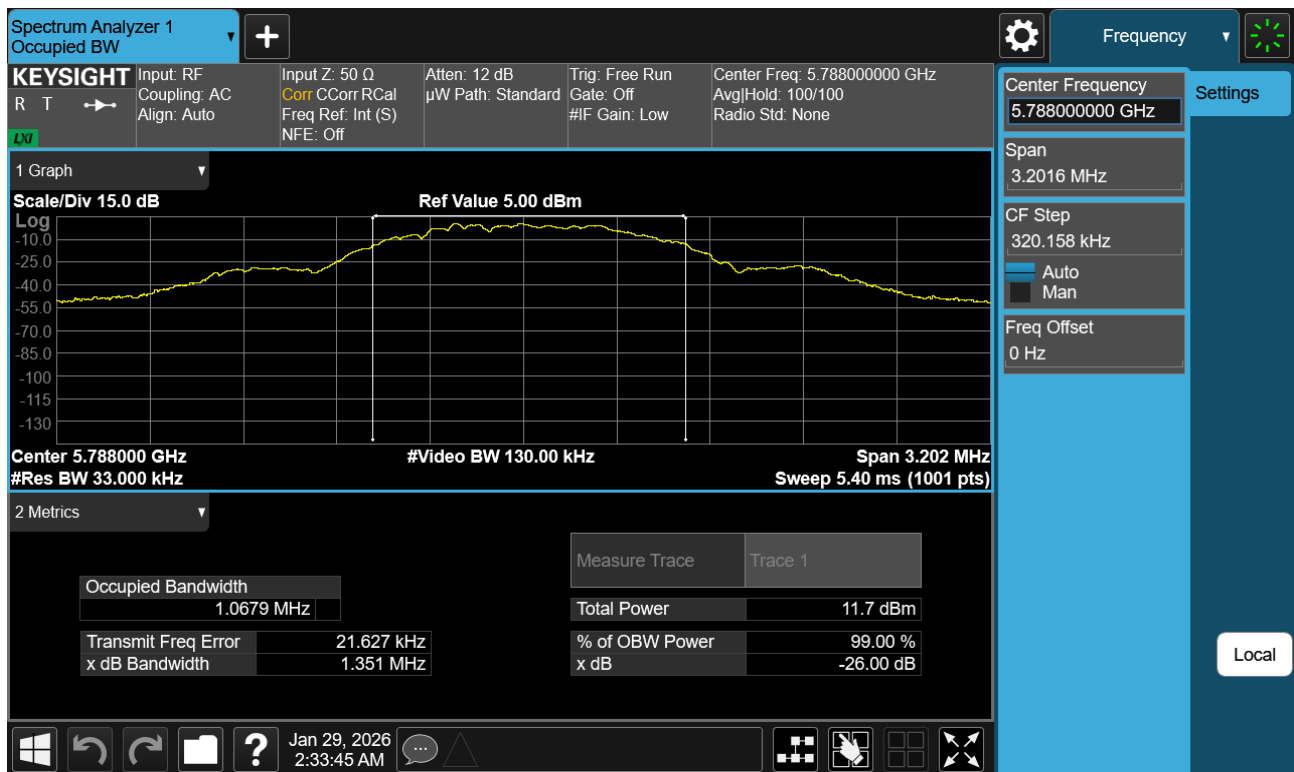
Table 7-3. Conducted BW Measurements

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Plot 7-8. 99% OBW (NB UNII BDR - 5788MHz)

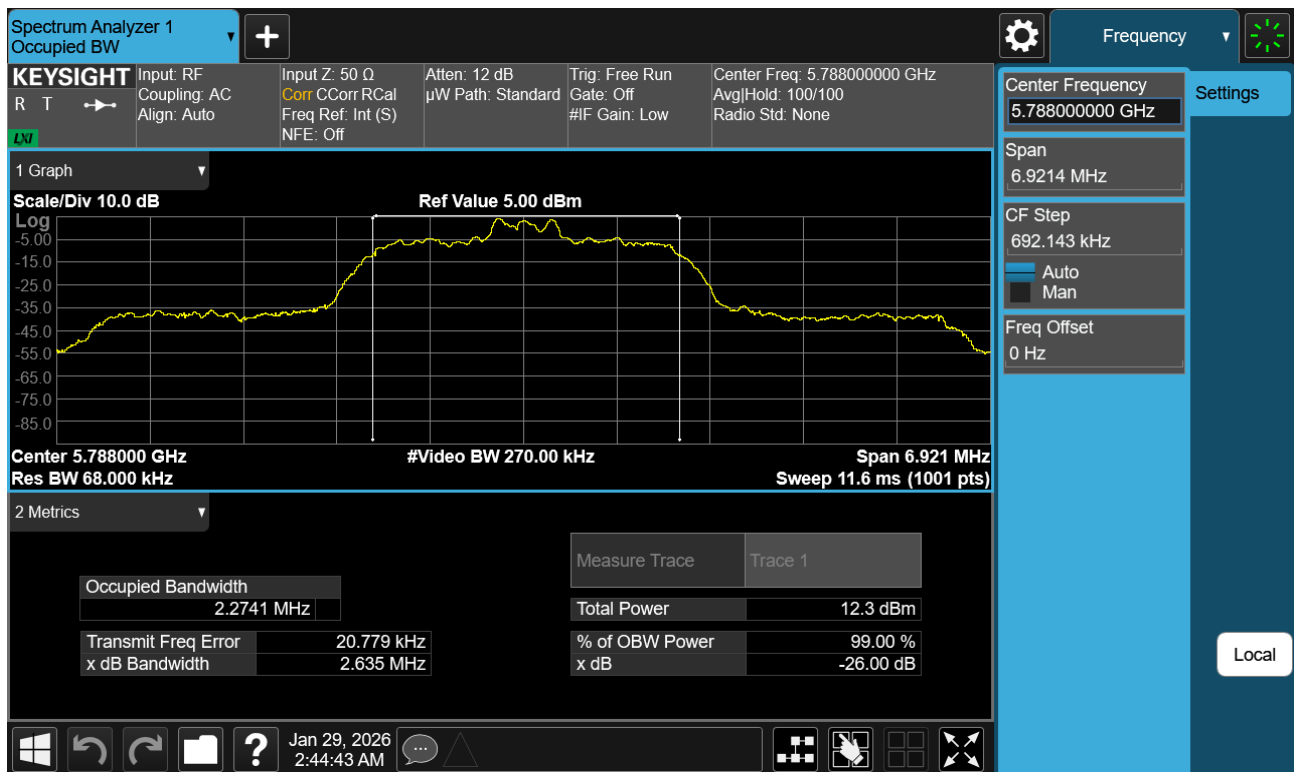


Plot 7-9. 99% OBW (NB UNII LE1M - 5788MHz)

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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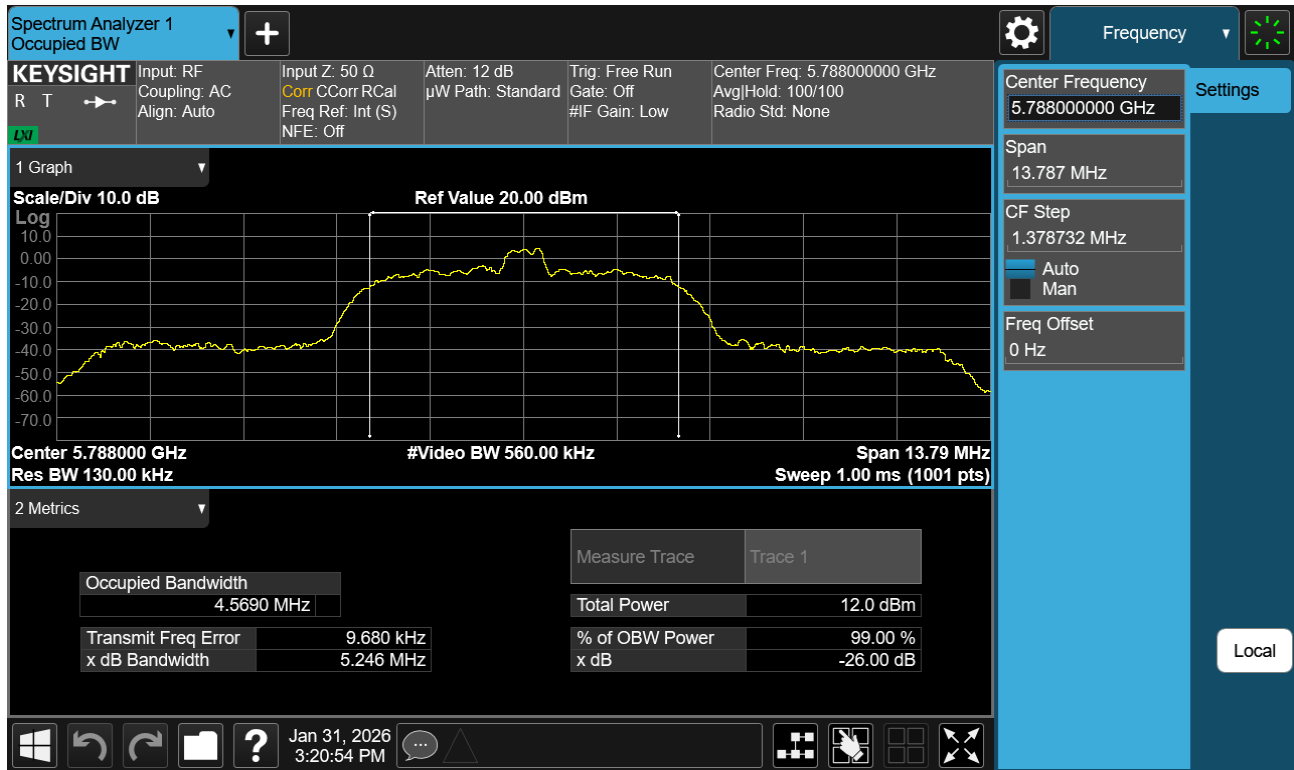


Plot 7-10. 99% OBW (NB UNII LE2M- 5788MHz)

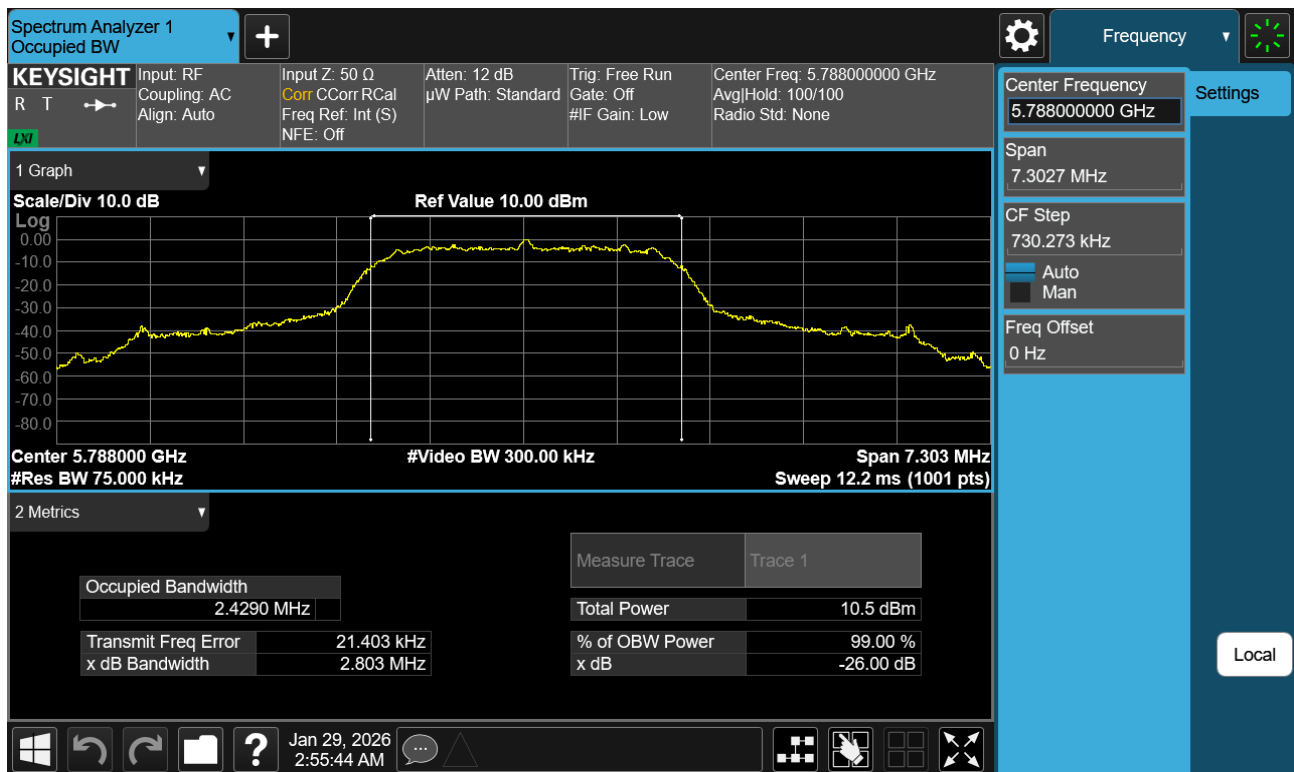


Plot 7-11. 99% OBW (NB UNII HDR4- 5788MHz)

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Plot 7-12. 99% OBW (NB UNII HDR8– 5788MHz)



Plot 7-13. 99% OBW (NB UNII HDRp4– 5788MHz)

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Plot 7-14. 99% OBW (NB UNII HDRp8- 5788MHz)

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7.3 6dB Bandwidth Measurement

§2.1049; §15.407 (e)

Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 6dB bandwidth.

In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.

Test Procedure Used

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 – Subclause 12.5.1
KDB 789033 D02 v02r01 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100 kHz
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

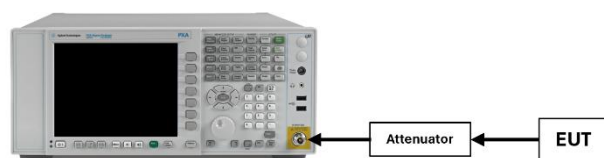


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

1. Low, mid and high channels were tested and tabular data has been reported. Only mid channel plots has been reported.

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7.3.1 6dB Bandwidth Measurements (U-NII-3)

Frequency [MHz]	Data Rate [Mbps]	Mode	Measured 6dB Bandwidth [MHz]	Minimum 6dB Bandwidth [MHz]	Pass / Fail
5731	1.0	NB UNII BDR	0.56	0.500	Pass
5788	1.0	NB UNII BDR	0.56	0.500	Pass
5844	1.0	NB UNII BDR	0.56	0.500	Pass
5731	1.0	NB UNII LE1M	0.74	0.500	Pass
5788	1.0	NB UNII LE1M	0.73	0.500	Pass
5844	1.0	NB UNII LE1M	0.73	0.500	Pass
5731	2.0	NB UNII LE2M	1.14	0.500	Pass
5788	2.0	NB UNII LE2M	1.20	0.500	Pass
5844	2.0	NB UNII LE2M	1.19	0.500	Pass
5731	4.0	NB UNII HDR4	0.55	0.500	Pass
5788	4.0	NB UNII HDR4	0.55	0.500	Pass
5844	4.0	NB UNII HDR4	0.55	0.500	Pass
5731	8.0	NB UNII HDR8	0.57	0.500	Pass
5788	8.0	NB UNII HDR8	0.55	0.500	Pass
5844	8.0	NB UNII HDR8	0.56	0.500	Pass
5731	4.0	NB UNII HDRp4	2.13	0.500	Pass
5788	4.0	NB UNII HDRp4	2.12	0.500	Pass
5844	4.0	NB UNII HDRp4	2.12	0.500	Pass
5731	8.0	NB UNII HDRp8	4.11	0.500	Pass
5788	8.0	NB UNII HDRp8	4.13	0.500	Pass
5844	8.0	NB UNII HDRp8	4.08	0.500	Pass

Table 7-4. Conducted BW Measurements

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Plot 7-15. 6dB BW (NB UNII BDR - 5788MHz)



Plot 7-16. 6dB BW (NB UNII LE1M- 5788MHz)

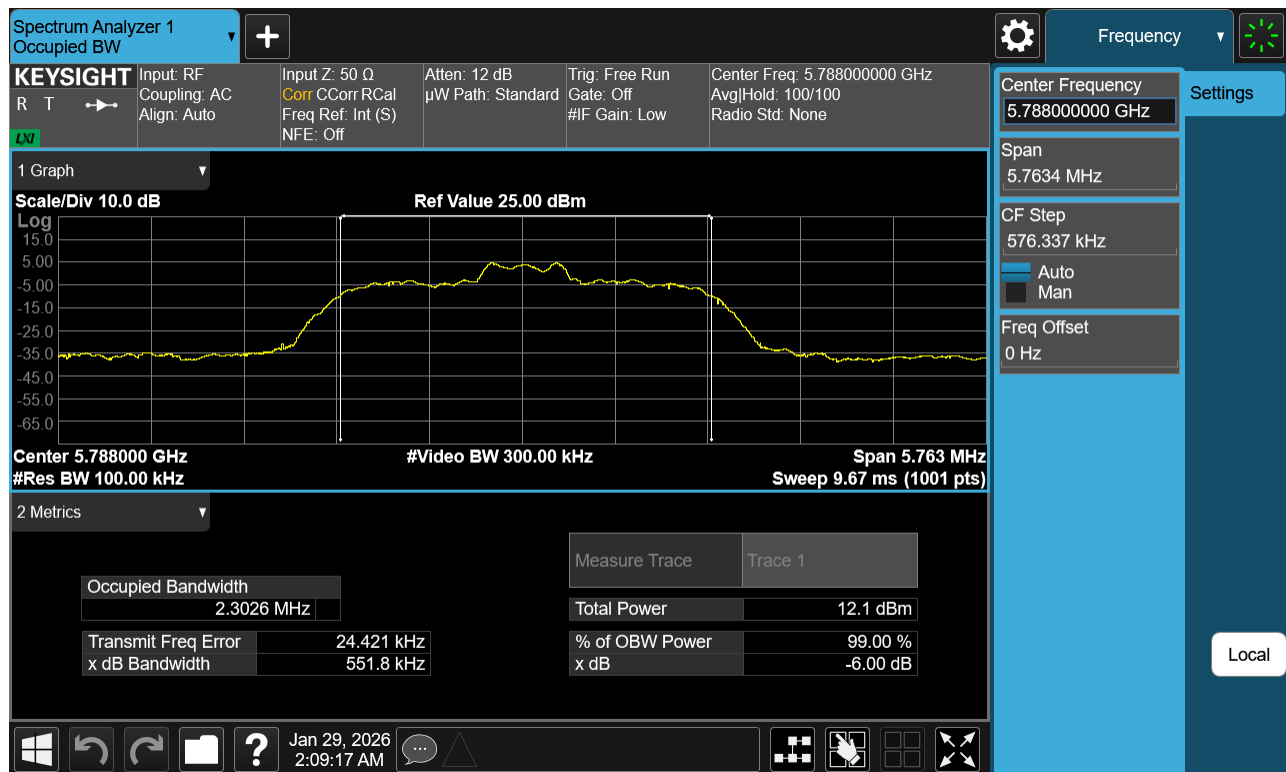
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Plot 7-17. 6dB BW (NB UNII LE2M- 5788MHz)

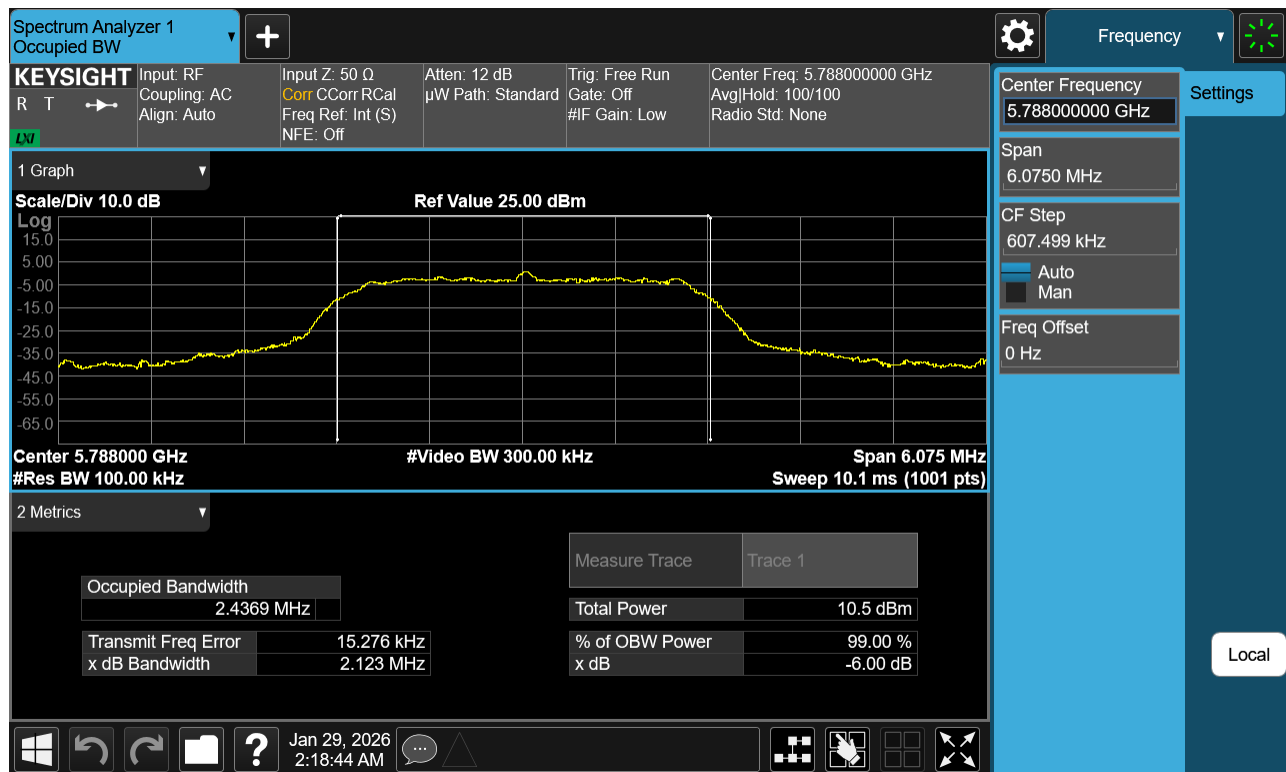
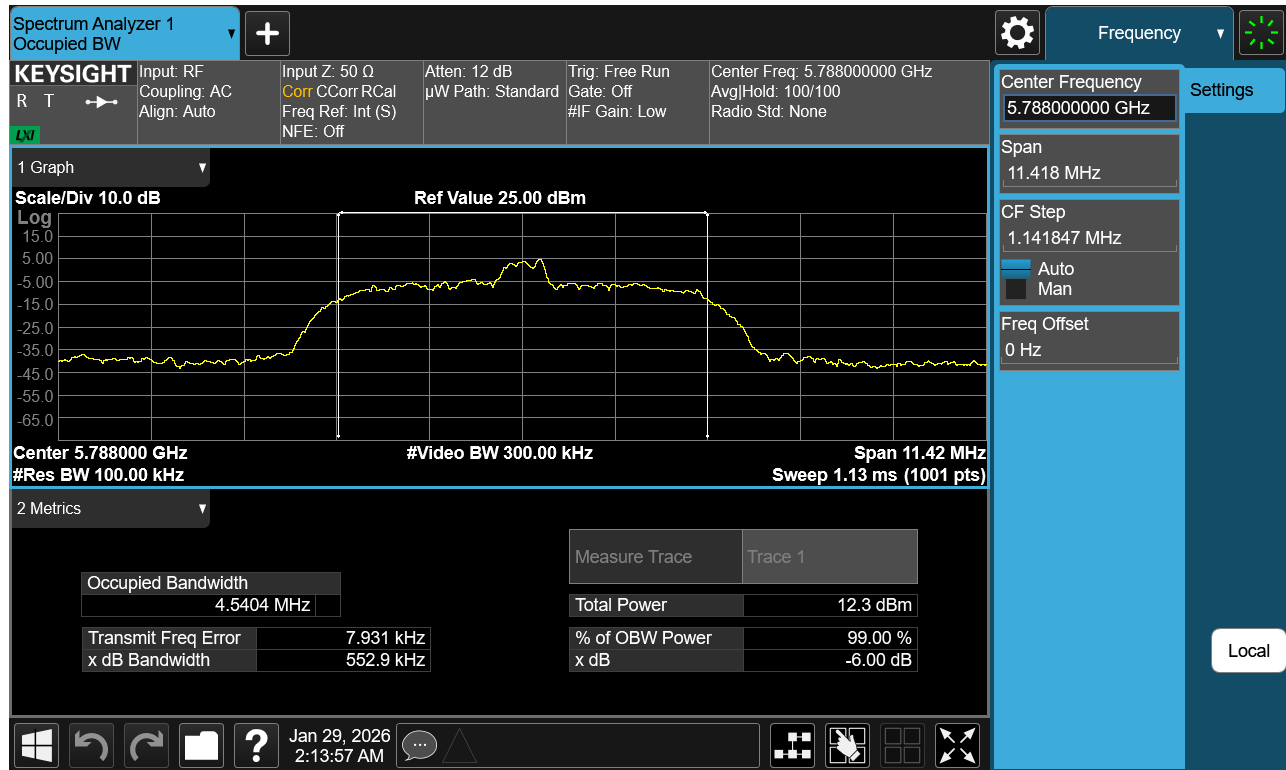


Plot 7-18. 6dB BW (NB UNII HDR4 - 5788MHz)

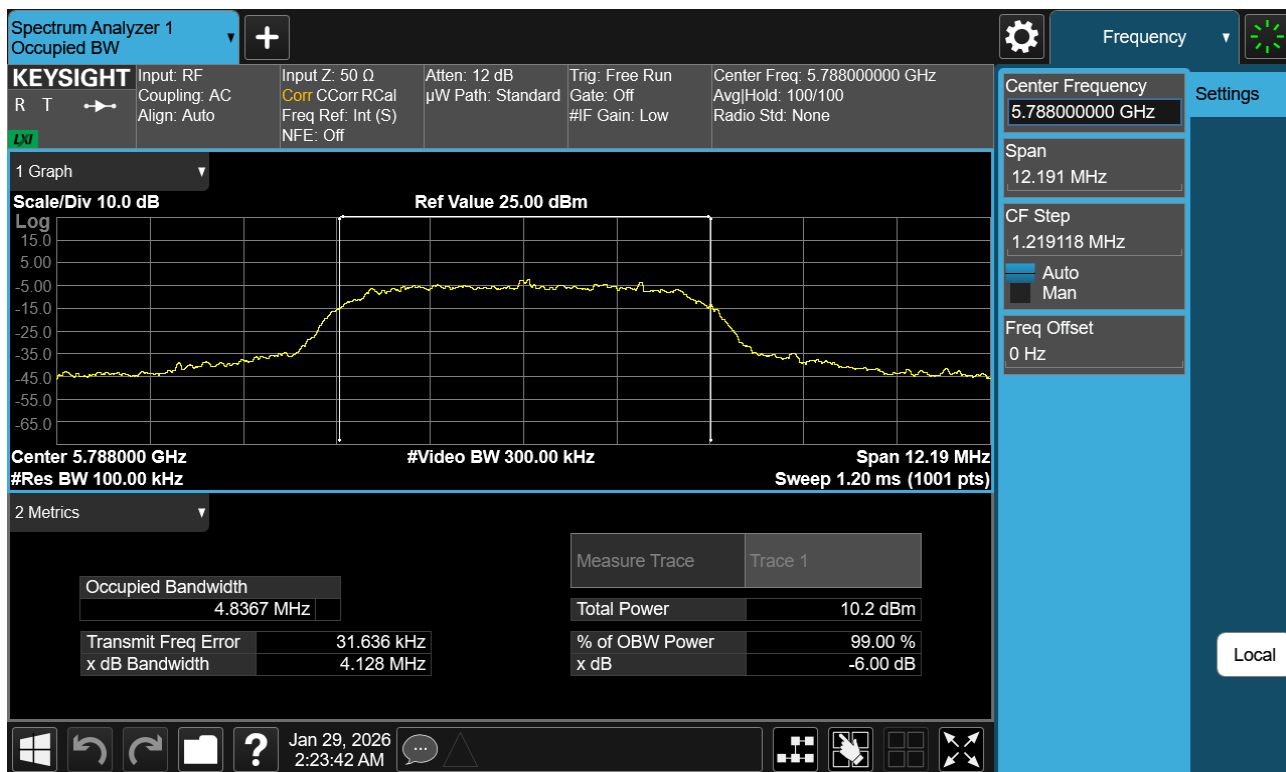
FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-21. 6dB BW (NB UNII HDRp8 – 5788MHz)

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7.4 Conducted Output Power Measurement

§15.407(a.1.iv) §15.407(a.3.i)

Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, and at the appropriate frequencies.

In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is 250mW (23.98dBm).

In the 5.725 – 5.850GHz band, the maximum permissible conducted output power is 1W (30dBm).

Test Procedure Used

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 – Subclause 12.4.3.2 Method PM-G
KDB 789033 D02 v02r01 – Section E)3)b) Method PM-G

Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-3. Test Instrument & Measurement Setup

Test Notes

None

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7.4.1 Conducted Output Power Measurements

Frequency [MHz]	Detector	Mode	Conducted Powers [dBm]	Conducted Power Limit [dBm]	Conducted Power Margin [dB]
5157	AVG	NB UNII BDR	9.71	23.98	-14.27
5200	AVG	NB UNII BDR	9.54	23.98	-14.45
5245	AVG	NB UNII BDR	9.57	23.98	-14.41
5731	AVG	NB UNII BDR	13.09	30.00	-16.91
5788	AVG	NB UNII BDR	13.12	30.00	-16.88
5844	AVG	NB UNII BDR	13.13	30.00	-16.87
5157	AVG	NB UNII LE1M	9.68	23.98	-14.30
5200	AVG	NB UNII LE1M	9.68	23.98	-14.30
5245	AVG	NB UNII LE1M	9.55	23.98	-14.43
5731	AVG	NB UNII LE1M	13.06	30.00	-16.94
5788	AVG	NB UNII LE1M	13.01	30.00	-16.99
5844	AVG	NB UNII LE1M	13.38	30.00	-16.62
5157	AVG	NB UNII LE2M	9.71	23.98	-14.28
5200	AVG	NB UNII LE2M	9.62	23.98	-14.36
5245	AVG	NB UNII LE2M	9.55	23.98	-14.43
5731	AVG	NB UNII LE2M	13.18	30.00	-16.82
5788	AVG	NB UNII LE2M	13.13	30.00	-16.87
5844	AVG	NB UNII LE2M	13.01	30.00	-16.99
5157	AVG	NB UNII HDR4	10.25	23.98	-13.73
5200	AVG	NB UNII HDR4	10.22	23.98	-13.76
5245	AVG	NB UNII HDR4	10.20	23.98	-13.79
5157	AVG	NB UNII HDRp4	10.22	23.98	-13.76
5200	AVG	NB UNII HDRp4	10.30	23.98	-13.68
5245	AVG	NB UNII HDRp4	10.18	23.98	-13.80
5157	AVG	NB UNII HDR8	10.27	23.98	-13.71
5200	AVG	NB UNII HDR8	10.32	23.98	-13.66
5245	AVG	NB UNII HDR8	10.23	23.98	-13.76
5157	AVG	NB UNII HDRp8	10.27	23.98	-13.71
5200	AVG	NB UNII HDRp8	10.30	23.98	-13.68
5245	AVG	NB UNII HDRp8	10.29	23.98	-13.69
5731	AVG	NB UNII HDR4	10.10	30.00	-19.90
5788	AVG	NB UNII HDR4	10.08	30.00	-19.92
5844	AVG	NB UNII HDR4	10.39	30.00	-19.61
5731	AVG	NB UNII HDRp4	10.45	30.00	-19.55
5788	AVG	NB UNII HDRp4	10.48	30.00	-19.52
5844	AVG	NB UNII HDRp4	10.36	30.00	-19.65
5731	AVG	NB UNII HDR8	10.47	30.00	-19.53
5788	AVG	NB UNII HDR8	10.49	30.00	-19.51
5844	AVG	NB UNII HDR8	10.38	30.00	-19.62
5731	AVG	NB UNII HDRp8	10.48	30.00	-19.52
5788	AVG	NB UNII HDRp8	10.45	30.00	-19.55
5844	AVG	NB UNII HDRp8	10.34	30.00	-19.66

Table 7-5. FCC Maximum Conducted Output Power

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7.5 Maximum Power Spectral Density

§15.407(a.1.iv) §15.407(a.3.i)

Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, and at the appropriate frequencies. Method SA-1, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, was used to measure the power spectral density.

In the 5.15 – 5.25GHz band, the maximum permissible power spectral density is 11dBm/MHz.

In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.

Test Procedure Used

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 – Subclause 12.4.2.2
KDB 789033 D02 v02r01 – Section F

Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Set span to encompass the entire 99% OBW of the signal
3. RBW = 1MHz for U-NII 1, 500kHz for U-NII 3
4. VBW $\geq$ 3MHz for U-NII 1, $\geq$ 3 x RBW for U-NII 3
5. Number of sweep points $\geq$ 2 x (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1. Low, mid and high channels were tested and tabular data has been reported. Only mid channel plots has been reported.

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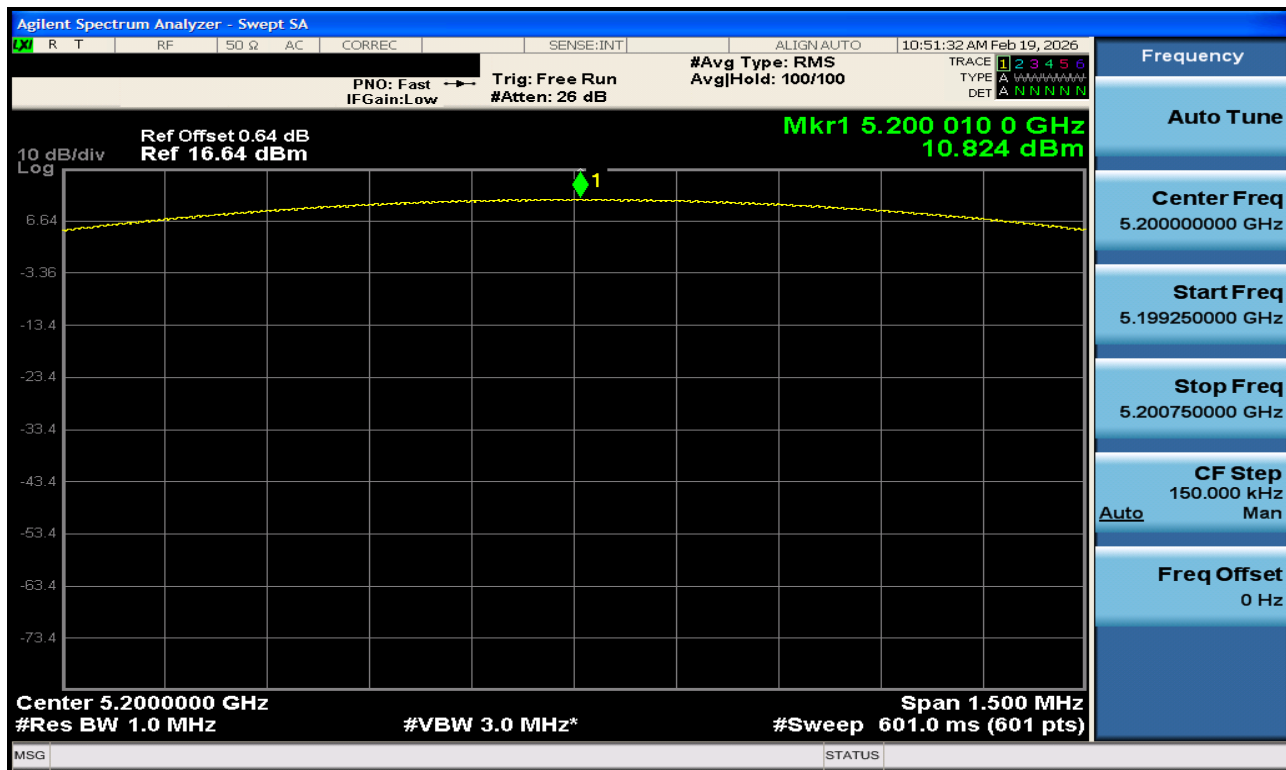
7.5.1 Power Spectral Density Measurements (U-NII-1)

Frequency [MHz]	Data Rate [Mbps]	Mode	Measured Power Density [dBm/MHz]	Max Power Density [dBm/MHz]	Margin [dB]
5157	1.0	NB UNII BDR	8.85	11.00	-2.15
5200	1.0	NB UNII BDR	8.91	11.00	-2.09
5245	1.0	NB UNII BDR	8.66	11.00	-2.34
5157	1.0	NB UNII LE1M	8.81	11.00	-2.19
5200	1.0	NB UNII LE1M	8.74	11.00	-2.26
5245	1.0	NB UNII LE1M	8.51	11.00	-2.49
5157	2.0	NB UNII LE2M	7.66	11.00	-3.34
5200	2.0	NB UNII LE2M	7.60	11.00	-3.40
5245	2.0	NB UNII LE2M	7.57	11.00	-3.43
5157	4.0	NB UNII HDR4	4.09	11.00	-6.91
5200	4.0	NB UNII HDR4	4.58	11.00	-6.43
5245	4.0	NB UNII HDR4	4.57	11.00	-6.43
5157	8.0	NB UNII HDR8	1.89	11.00	-9.11
5200	8.0	NB UNII HDR8	1.70	11.00	-9.30
5245	8.0	NB UNII HDR8	2.39	11.00	-8.61
5157	4.0	NB UNII HDRp4	3.94	11.00	-7.06
5200	4.0	NB UNII HDRp4	4.30	11.00	-6.70
5245	4.0	NB UNII HDRp4	4.08	11.00	-6.92
5157	8.0	NB UNII HDRp8	1.03	11.00	-9.98
5200	8.0	NB UNII HDRp8	0.82	11.00	-10.19
5245	8.0	NB UNII HDRp8	1.22	11.00	-9.78

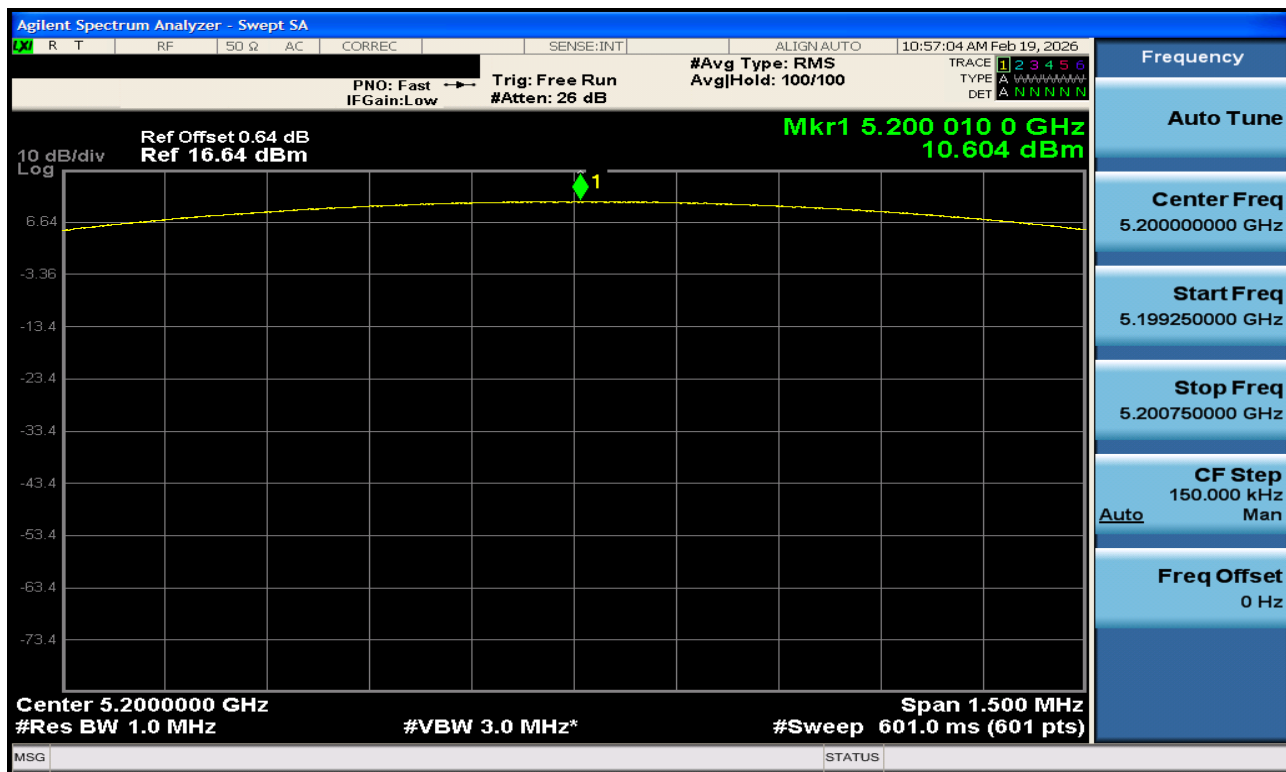
Table 7-6. Power Spectral Density Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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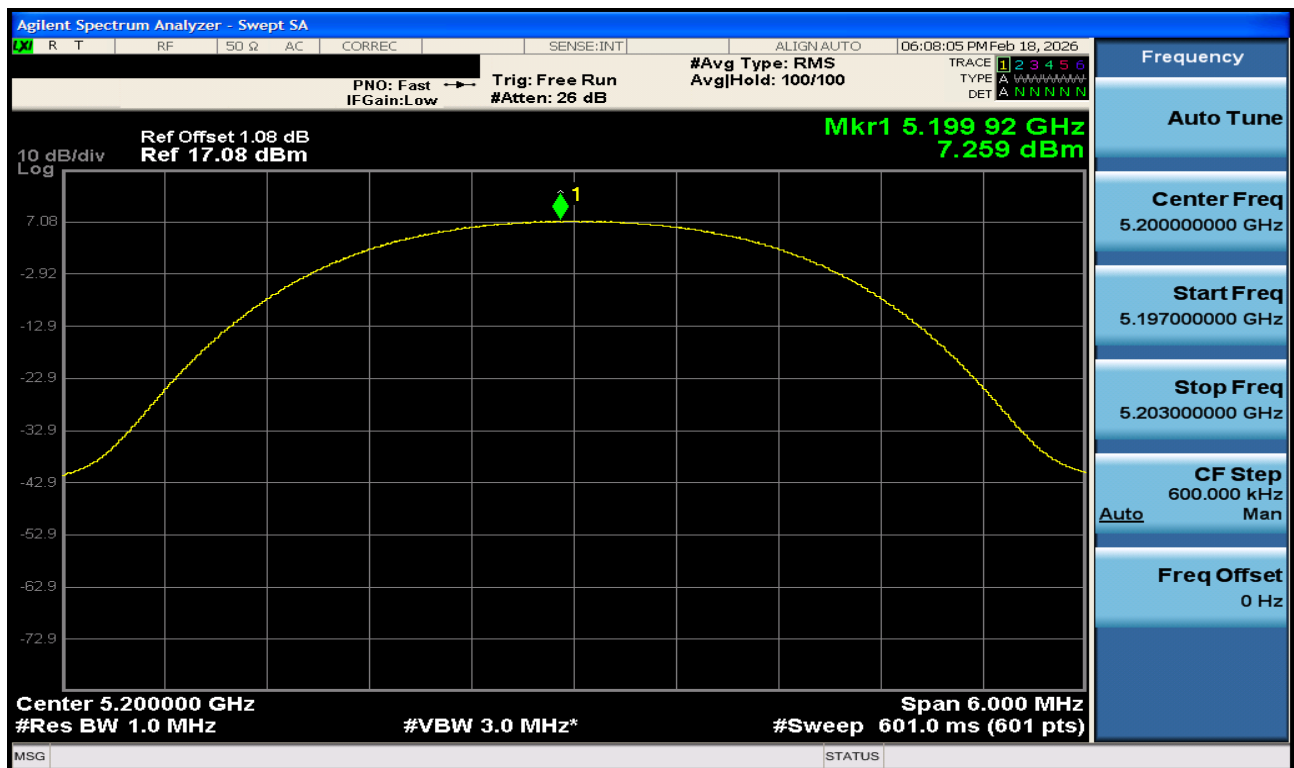
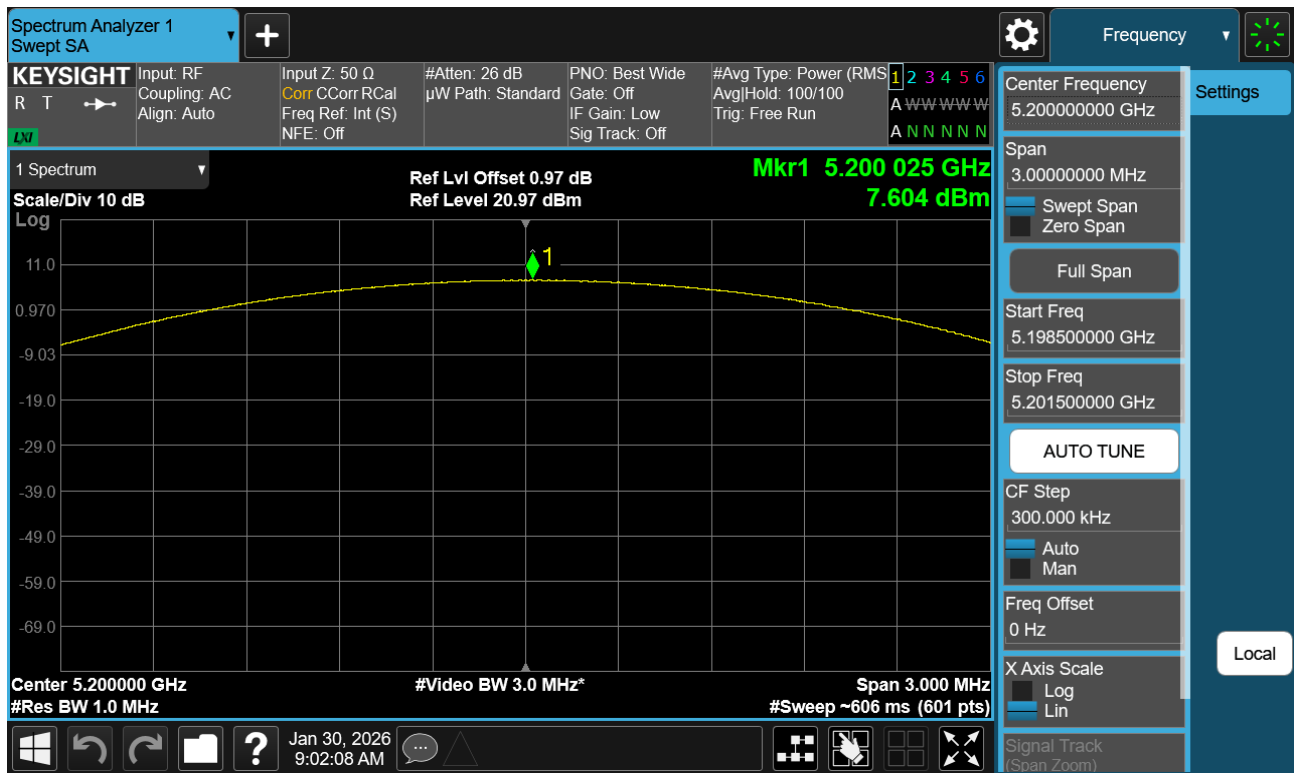


Plot 7-22. PSD (NB UNII BDR – 5200MHz)

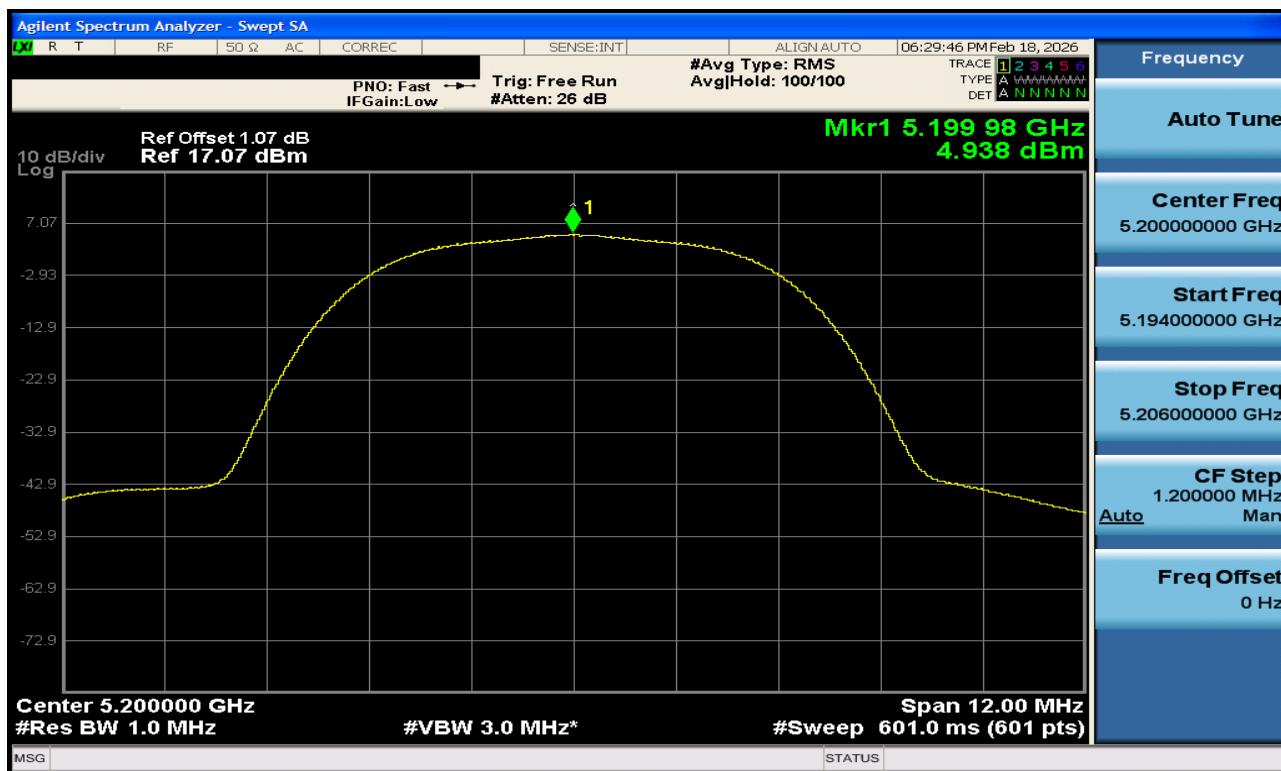


Plot 7-23. PSD (NB UNII LE1M – 5200MHz)

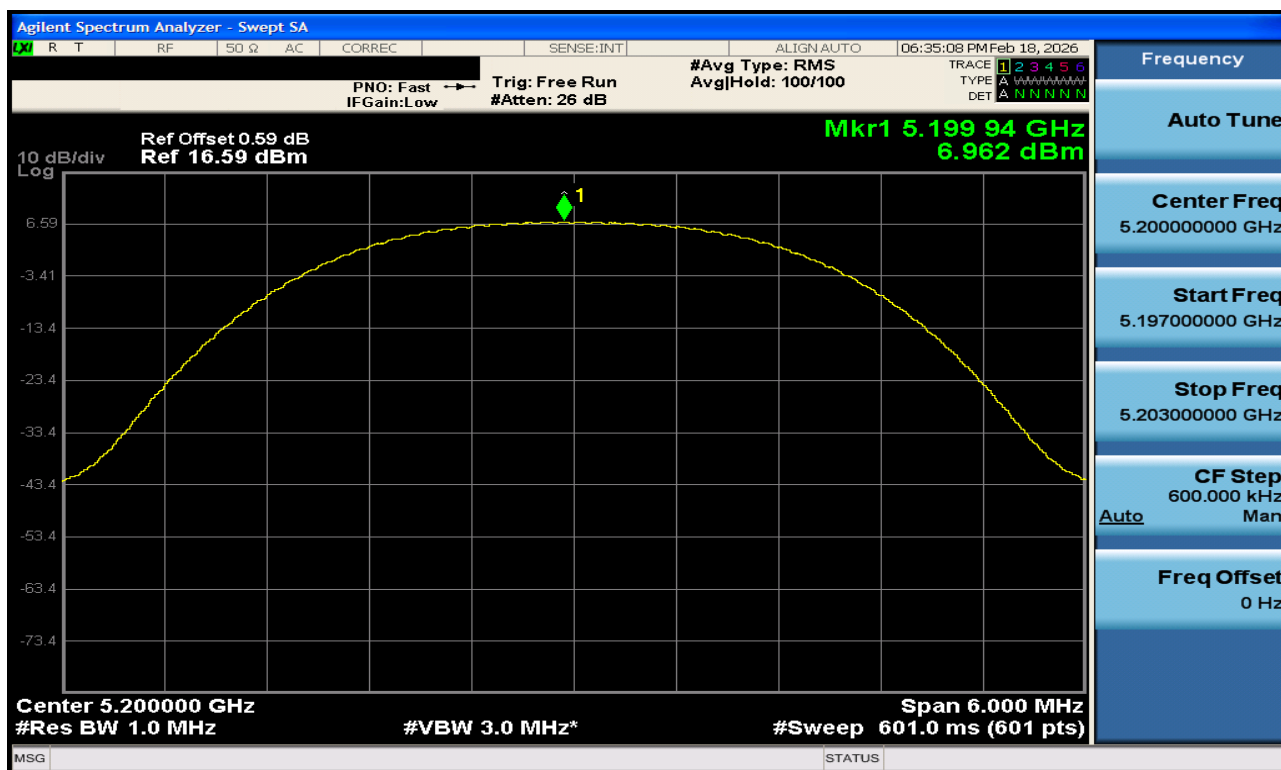
FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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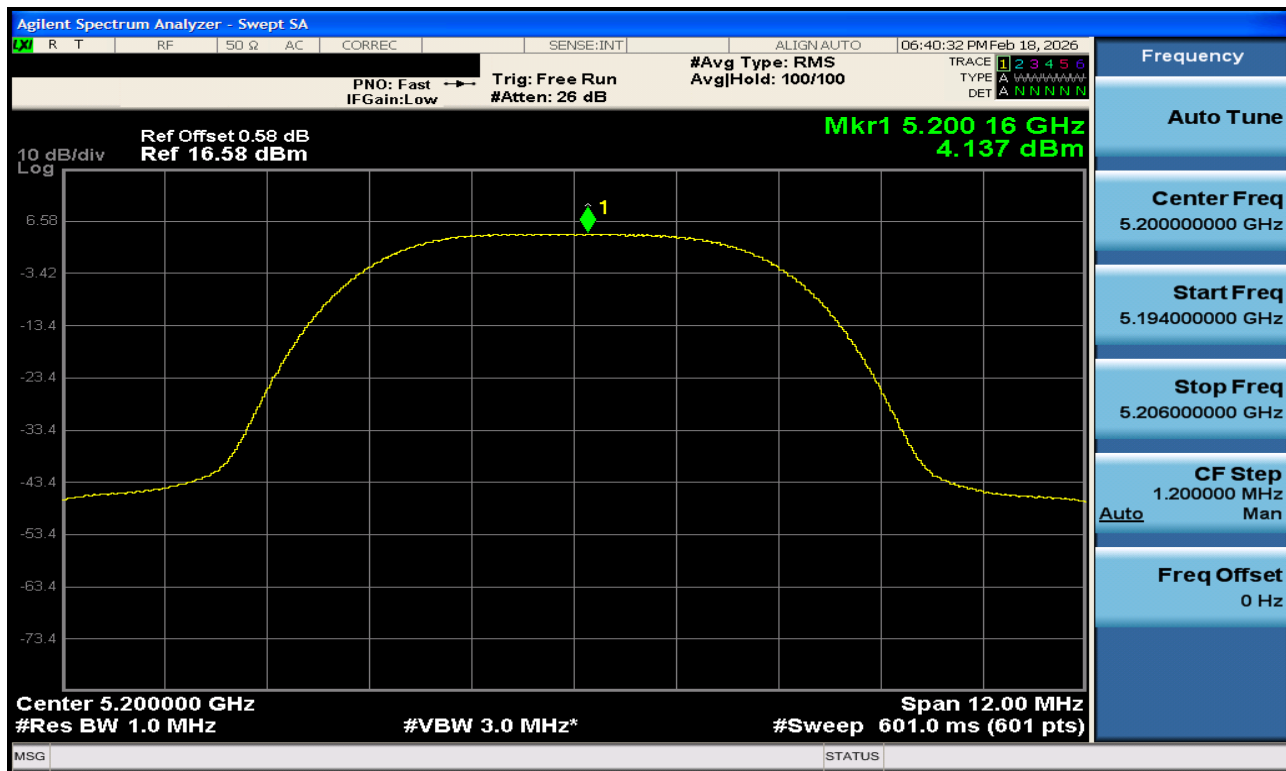


Plot 7-26. PSD (NB UNII HDR8 – 5200MHz)



Plot 7-27. PSD (NB UNII HDRp4 – 5200MHz)

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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7.5.2 Power Spectral Density Measurements (U-NII-3)

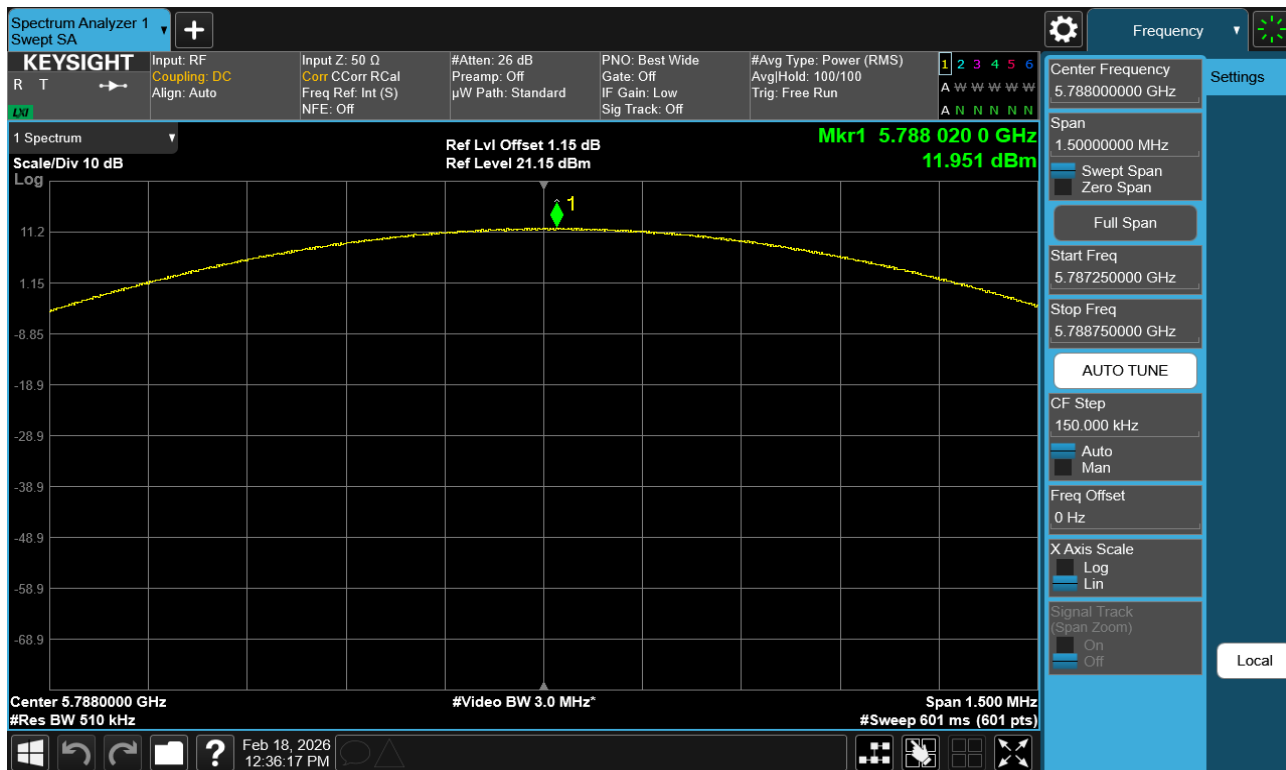
Frequency [MHz]	Data Rate [Mbps]	Mode	Measured Power Density [dBm/500kHz]	Max Power Density [dBm/500kHz]	Margin [dB]
5731	1.0	NB UNII BDR	11.86	30.00	-18.14
5788	1.0	NB UNII BDR	11.95	30.00	-18.05
5844	1.0	NB UNII BDR	11.96	30.00	-18.04
5731	1.0	NB UNII LE1M	8.27	30.00	-21.73
5788	1.0	NB UNII LE1M	8.07	30.00	-21.93
5844	1.0	NB UNII LE1M	7.94	30.00	-22.06
5731	2.0	NB UNII LE2M	9.38	30.00	-20.62
5788	2.0	NB UNII LE2M	9.23	30.00	-20.77
5844	2.0	NB UNII LE2M	9.17	30.00	-20.83
5731	4.0	NB UNII HDR4	4.69	30.00	-25.31
5788	4.0	NB UNII HDR4	4.55	30.00	-25.45
5844	4.0	NB UNII HDR4	4.88	30.00	-25.12
5731	8.0	NB UNII HDR8	3.16	30.00	-26.84
5788	8.0	NB UNII HDR8	3.06	30.00	-26.94
5844	8.0	NB UNII HDR8	3.15	30.00	-26.85
5731	4.0	NB UNII HDRp4	4.61	30.00	-25.39
5788	4.0	NB UNII HDRp4	4.42	30.00	-25.58
5844	4.0	NB UNII HDRp4	4.63	30.00	-25.37
5731	8.0	NB UNII HDRp8	1.54	30.00	-28.46
5788	8.0	NB UNII HDRp8	1.35	30.00	-28.65
5844	8.0	NB UNII HDRp8	1.30	30.00	-28.70

Table 7-7. Power Spectral Density Measurements

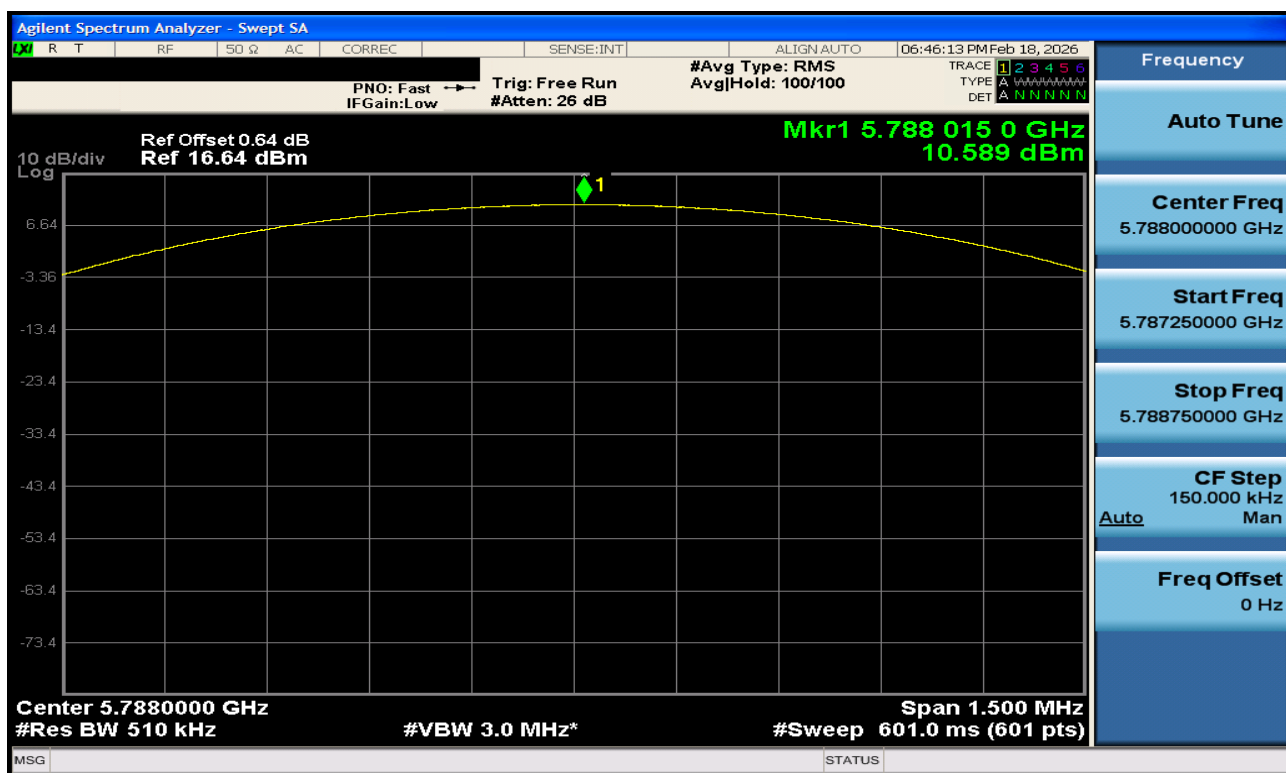
FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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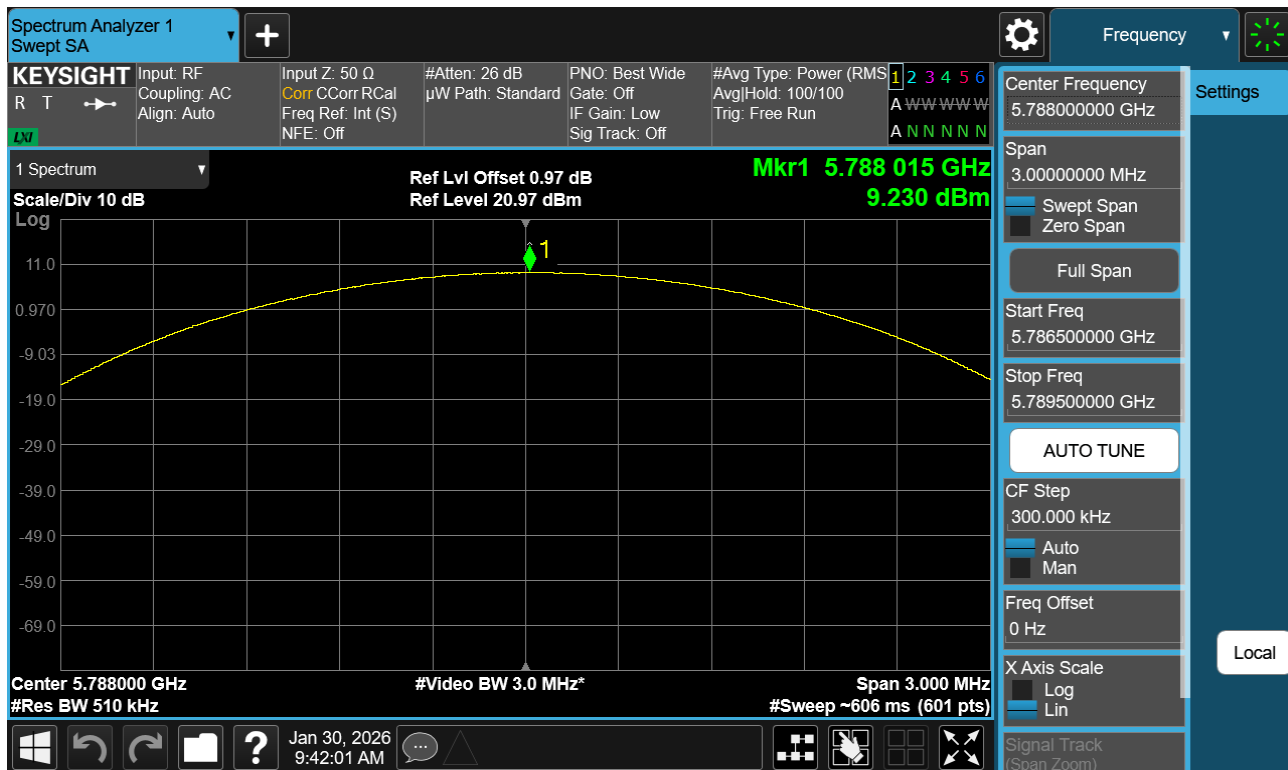


Plot 7-29. PSD (NB UNII BDR – 5788MHz)

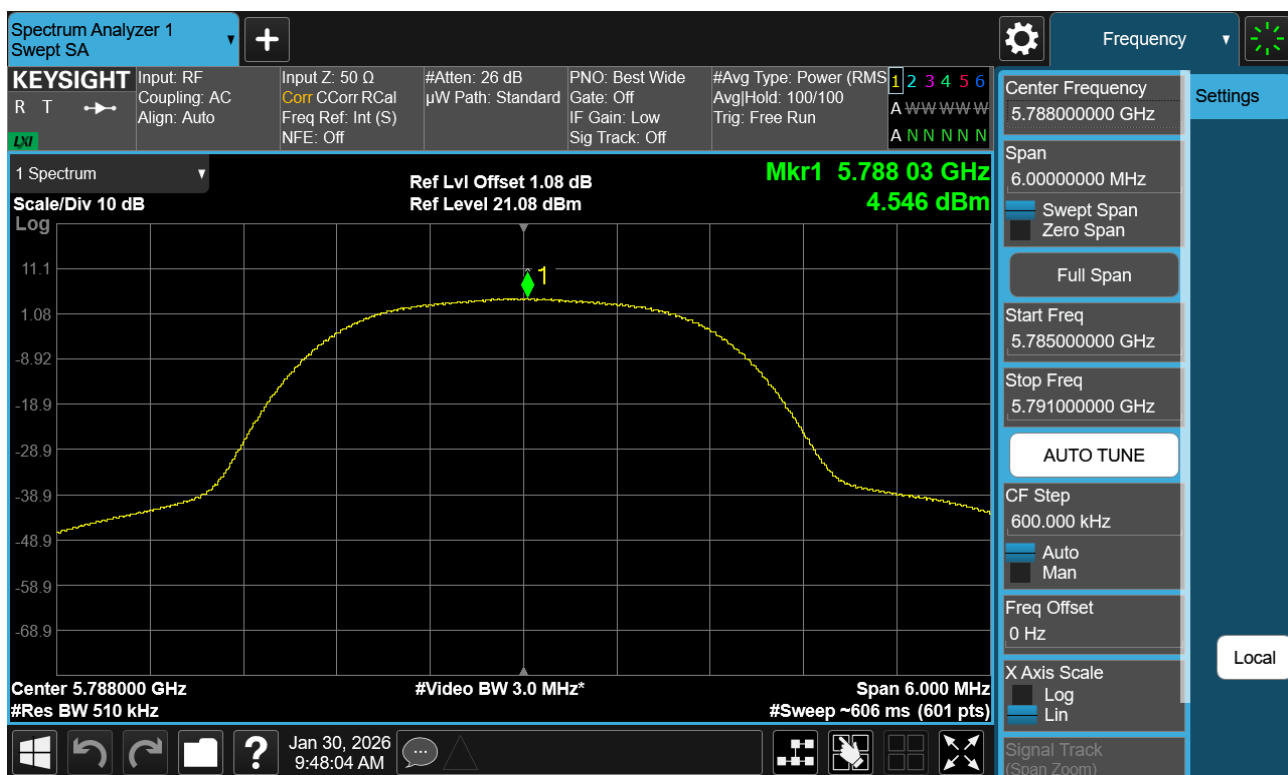


Plot 7-30. PSD (NB UNII LE1M – 5788MHz)

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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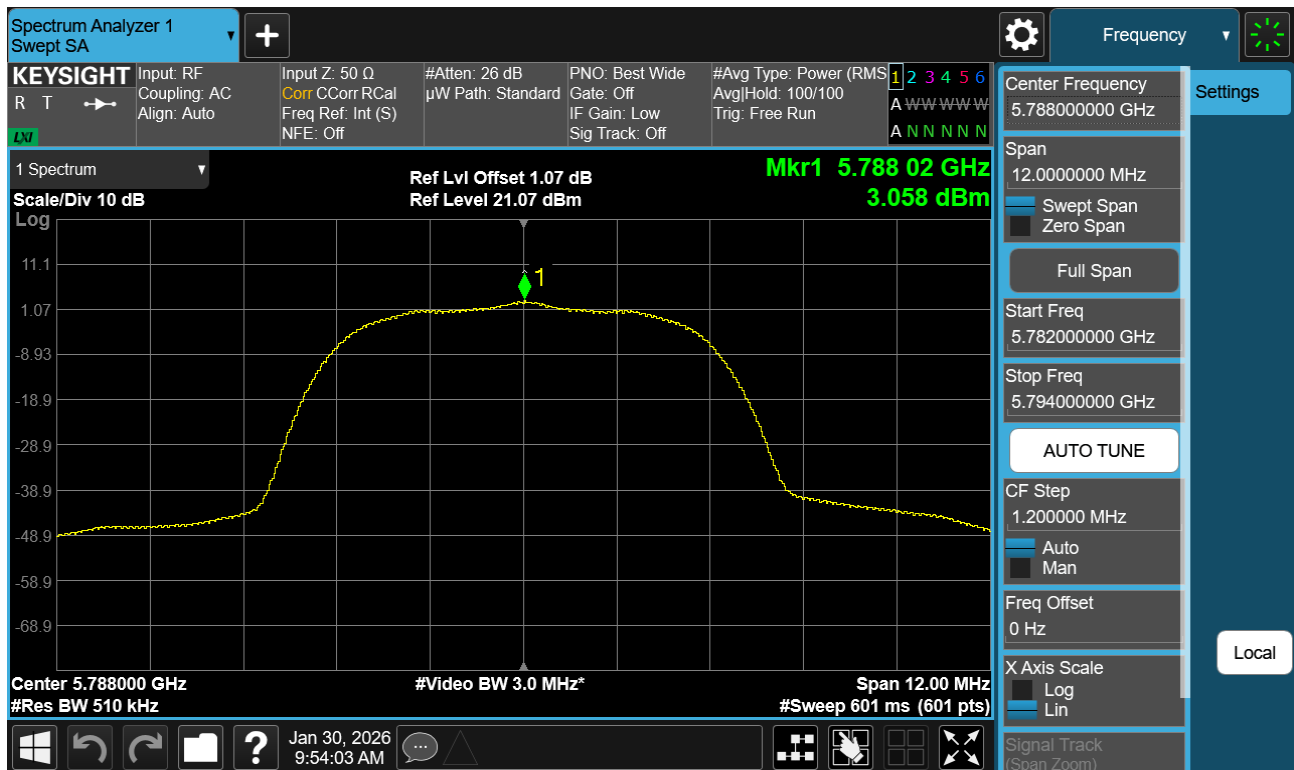


Plot 7-31. PSD (NB UNII LE2M – 5788MHz)

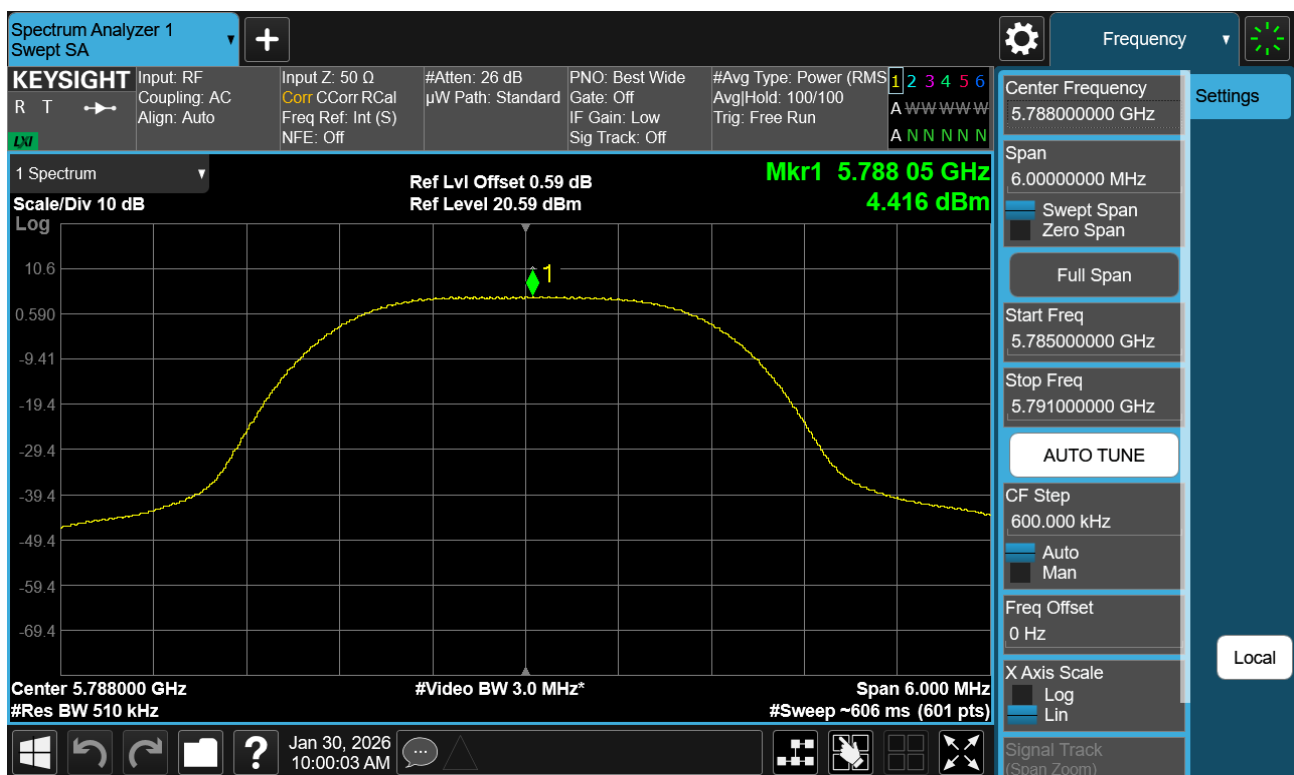


Plot 7-32. PSD (NB UNII HDR4 – 5788MHz)

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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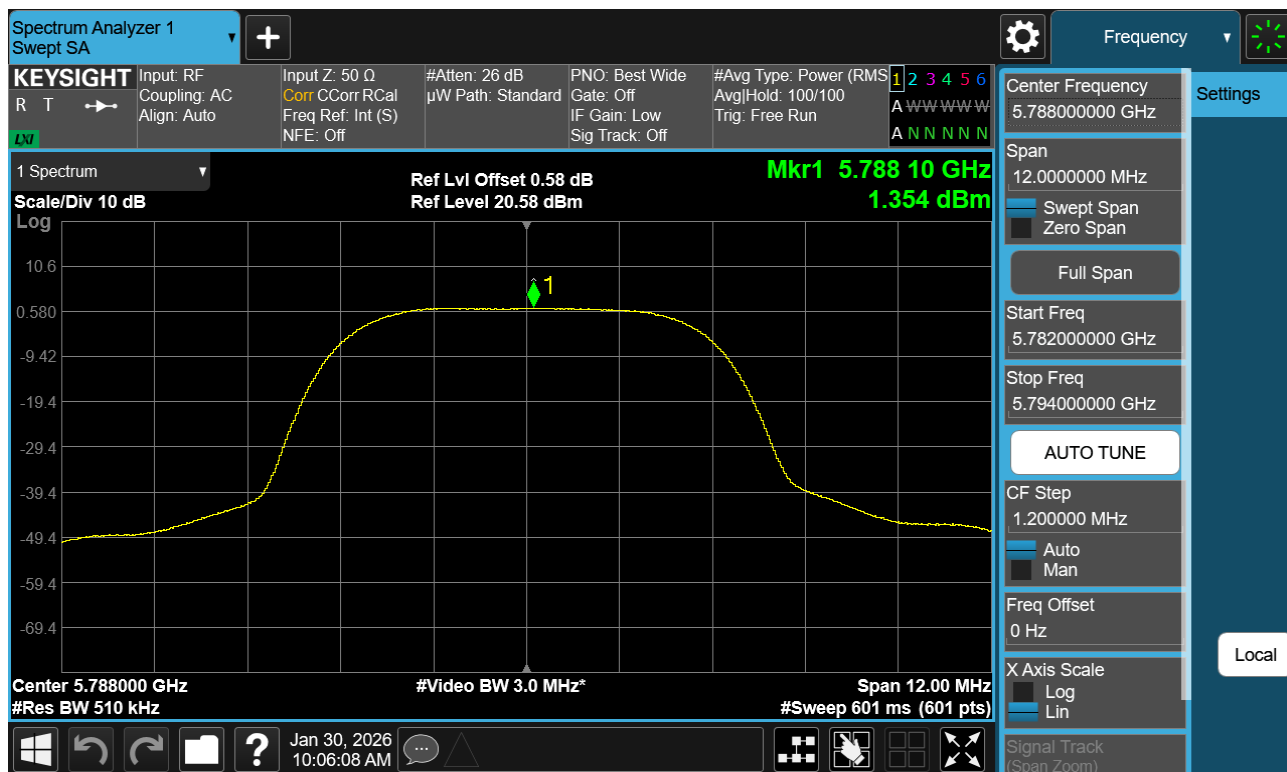


Plot 7-33. PSD (NB UNII HDR8 – 5788MHz)



Plot 7-34. PSD (NB UNII HDRP4 – 5788MHz)

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-35. PSD (NB UNII HDRP8 – 5788MHz)

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7.6 Radiated Spurious Emission – Above 1GHz

§15.407(b) §15.205 §15.209

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 and KDB 789033 D02 v02r01, and at the appropriate frequencies. All channels and power schemes were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.25 GHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5.725 – 5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-8 per Section 15.209.

Frequency	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-8. Radiated Limits

Test Procedures Used

ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024 – Subclauses 12.7.7, 12.7.6
KDB 789033 D02 v02r01 – Section G

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Test Settings

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be $\geq 2 \times \text{span/RBW}$)
6. Averaging type = power (RMS)
7. Sweep time = auto couple
8. Trace was averaged over 100 sweeps

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

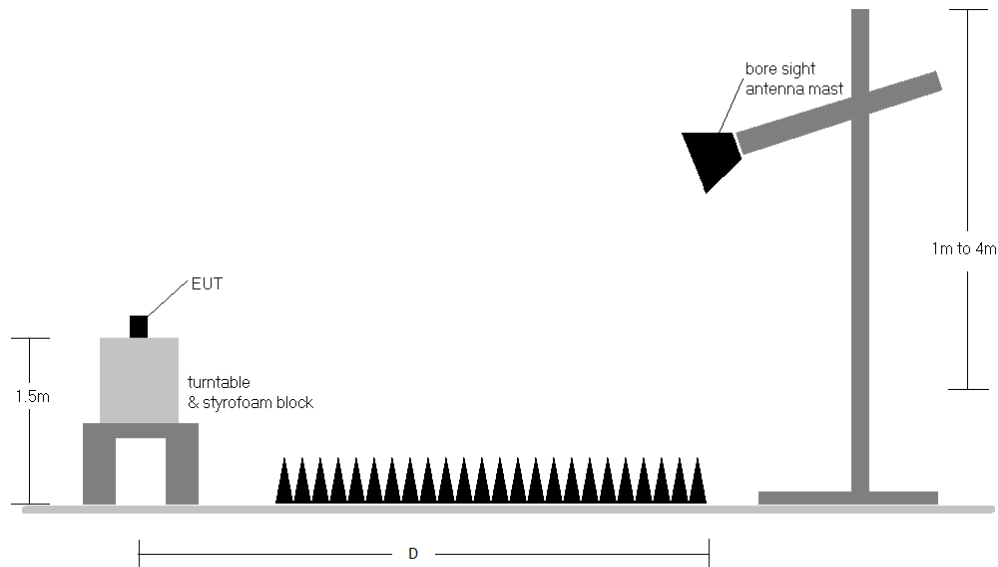


Figure 7-5. Test Instrument & Measurement Setup

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Test Notes

1. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 7-8.
2. All spurious emissions lying in restricted bands specified in §15.205 is below the limit shown in Table 7-8. All spurious emissions that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dB μ V/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dB μ V/m.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas.
6. D is the measurement test distance and emissions 1-18GHz were measured at a 3 meters test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. The “-” shown in the following RSE tables are used to denote a noise floor measurement.
8. All supported modulation and power schemes have been tested on the unit and only worst case configuration is reported.

Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level [dB μ V/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB] – Preamplifier Gain [dB]
- Margin [dB] = Field Strength Level [dB μ V/m] – Limit [dB μ V/m]

Radiated Band Edge Measurement Offset

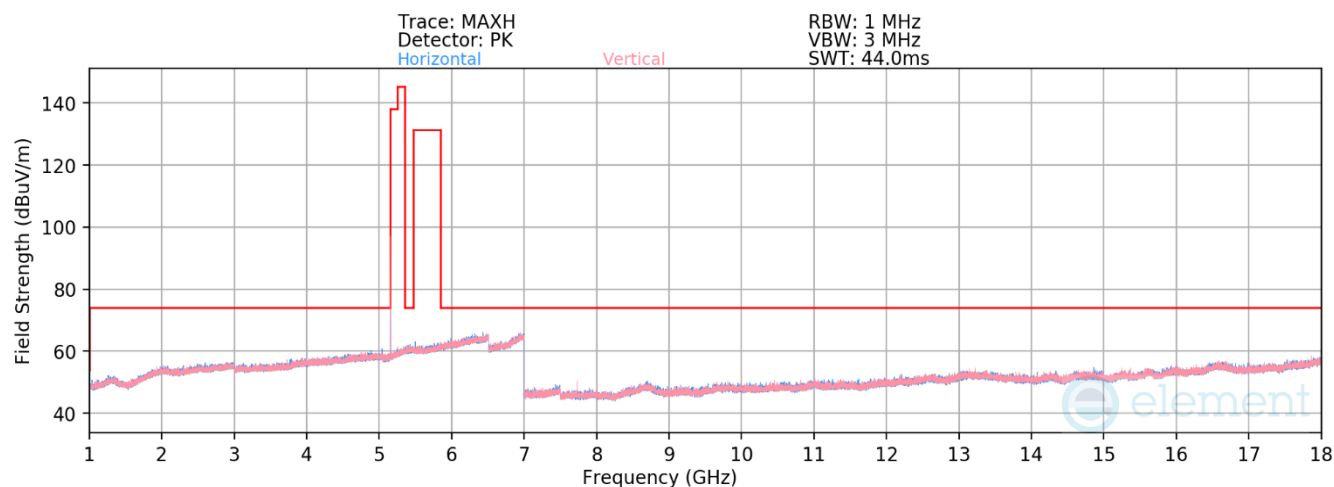
- The amplitude offset shown in the radiated restricted band edge plots in Section 7.6.2 and 7.6.3 was calculated using the formula:
Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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7.6.1 Radiated Spurious Emission (Above 1GHz)

BDR (UNII 1)



Plot 7-36. Radiated Spurious Emissions 1-18GHz (BDR GFSK – 5157MHz)

Mode: BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

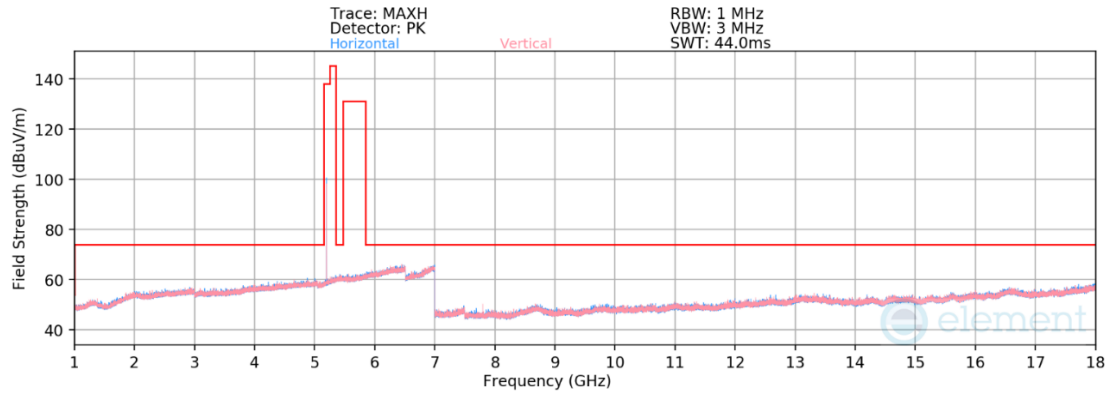
Operating Frequency: 5157MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10314.00	Peak	-	-	-	-67.38	10.30	49.92	68.20	-18.28
* 15471.00	Average	-	-	-	-79.00	14.68	42.68	53.98	-11.30
* 15471.00	Peak	-	-	-	-68.52	14.68	53.16	73.98	-20.82

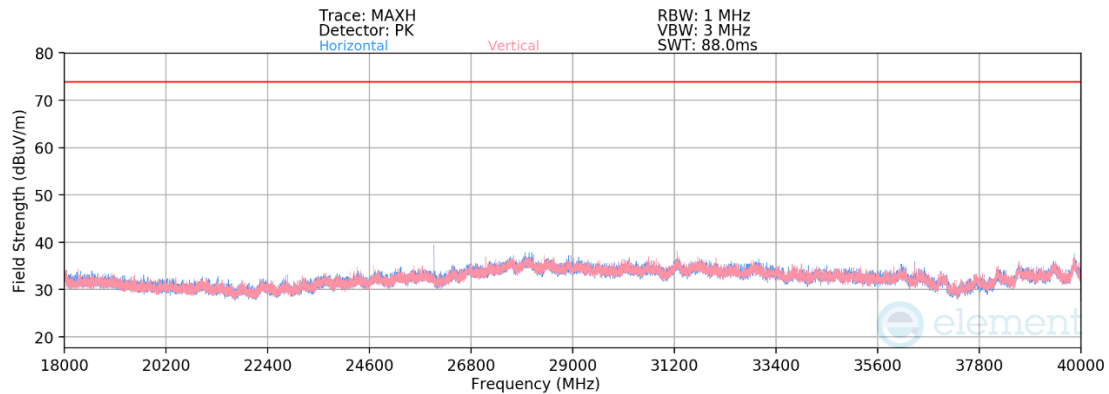
Table 7-9. Radiated Spurious Emissions Measurements

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Plot 7-37. Radiated Spurious Emissions 1-18GHz (BDR GFSK – 5200MHz)



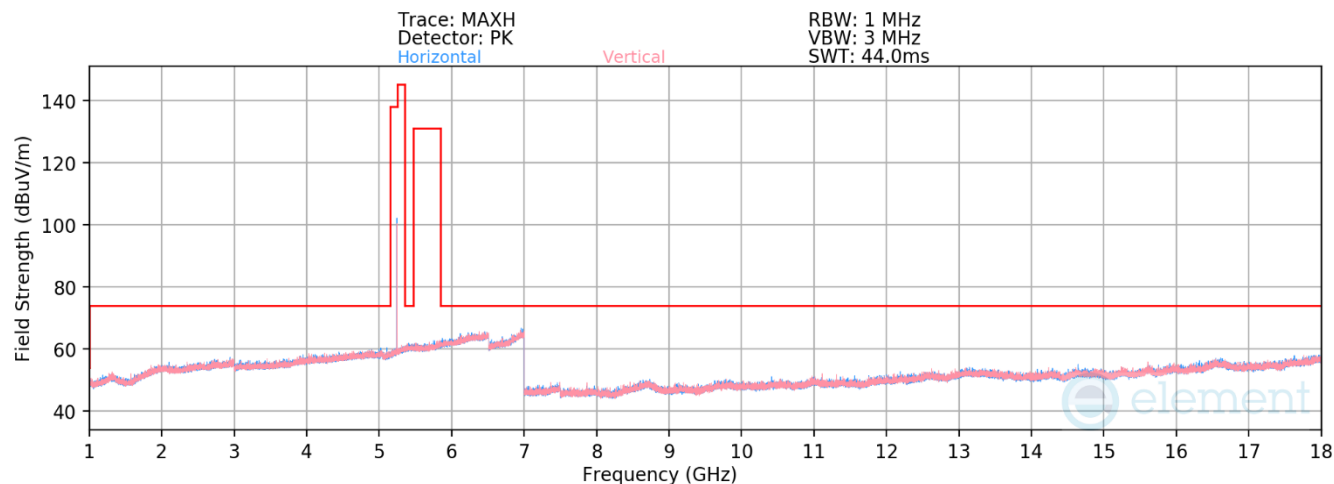
Plot 7-38. Radiated Spurious Emissions Above 18GHz (BDR GFSK – 5200MHz)

Mode: BDR
 Data Rate: 1Mbps
 Distance of Measurements: 3 Meters
 Operating Frequency: 5200MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
10400.00	Peak	-	-	-	-66.84	8.57	0.00	0.00	48.73	68.20	-19.47
* 15600.00	Average	-	-	-	-83.23	17.50	0.00	0.00	41.27	53.98	-12.71
* 15600.00	Peak	-	-	-	-71.57	17.50	0.00	0.00	52.93	73.98	-21.05
* 20800.00	Average	V	150	210	-72.02	-6.62	-9.54	1.17	29.53	53.98	-23.28
* 20800.00	Peak	V	150	210	-60.97	-6.62	-9.54	0.00	39.41	73.98	-34.57
26000.00	Peak	H	150	224	-59.32	-5.17	-9.54	0.00	42.51	68.20	-25.69
* 31200.00	Average	-	-	-	-74.98	-3.27	-9.54	0.00	28.75	53.98	-25.23
* 31200.00	Peak	-	-	-	-63.45	-3.27	-9.54	0.00	40.28	73.98	-33.70
36400.00	Peak	V	150	167	-62.11	-5.21	-9.54	0.00	39.68	68.20	-28.52

Table 7-10. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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Plot 7-39. Radiated Spurious Emissions 1-18GHz (BDR GFSK – 5245MHz)

Mode: BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5245MHz

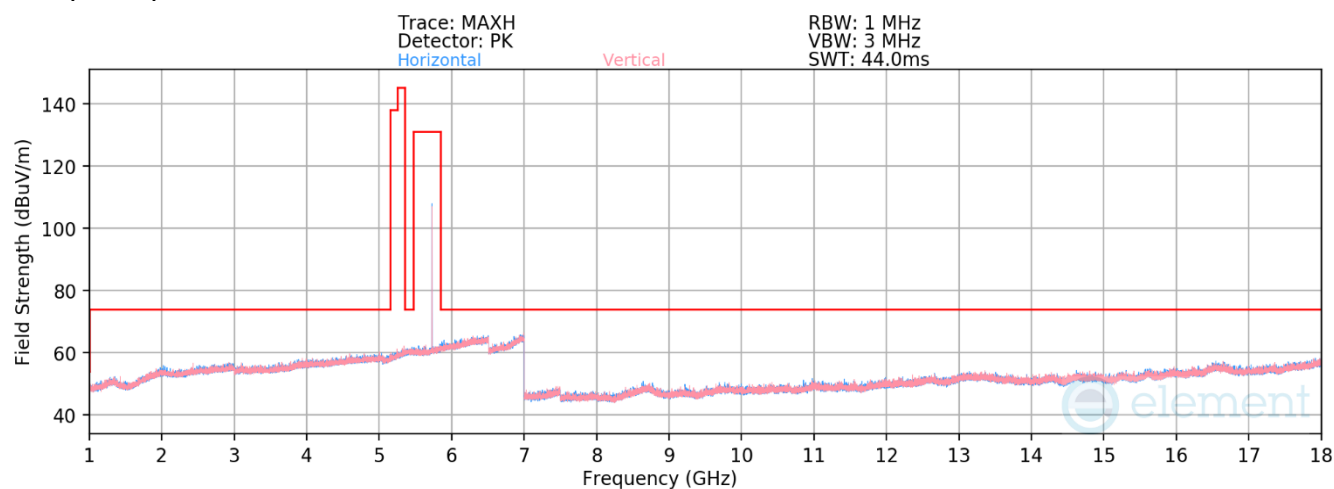
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10490.00	Peak	-	-	-	-68.22	11.24	50.02	68.20	-18.18
* 15735.00	Average	-	-	-	-79.50	15.63	43.13	53.98	-10.85
* 15735.00	Peak	-	-	-	-68.91	15.63	53.72	73.98	-20.26

Table 7-11. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones		Page 51 of 87

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BDR (UNII 3)



Plot 7-40. Radiated Spurious Emissions 1-18GHz (BDR GFSK – 5731MHz)

Mode: BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

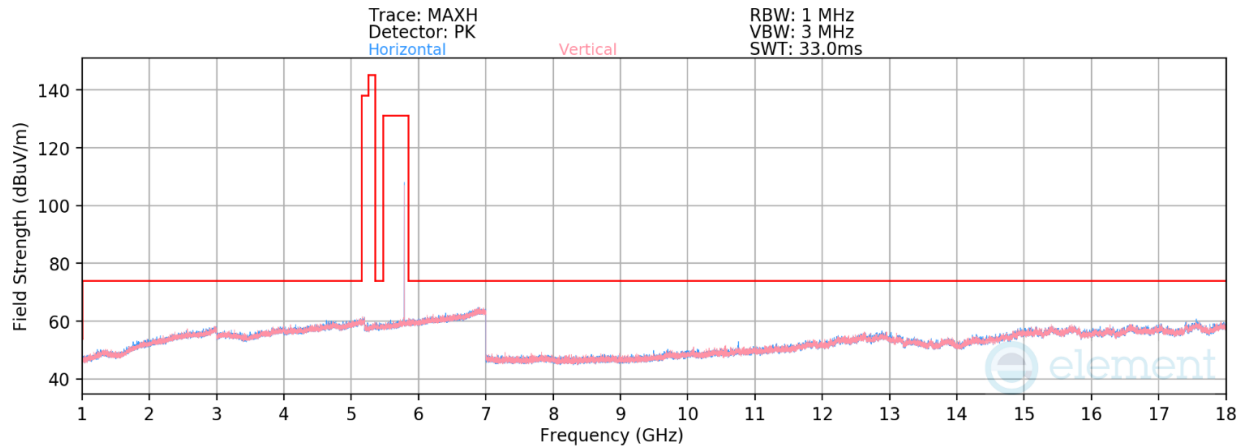
Operating Frequency: 5731MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
*	11462.00	Average	-	-	-	-79.72	12.08	39.36	53.98	-14.62
*	11462.00	Peak	-	-	-	-69.12	12.08	49.96	73.98	-24.02
	17193.00	Peak	-	-	-	-69.44	17.25	54.81	68.20	-13.39

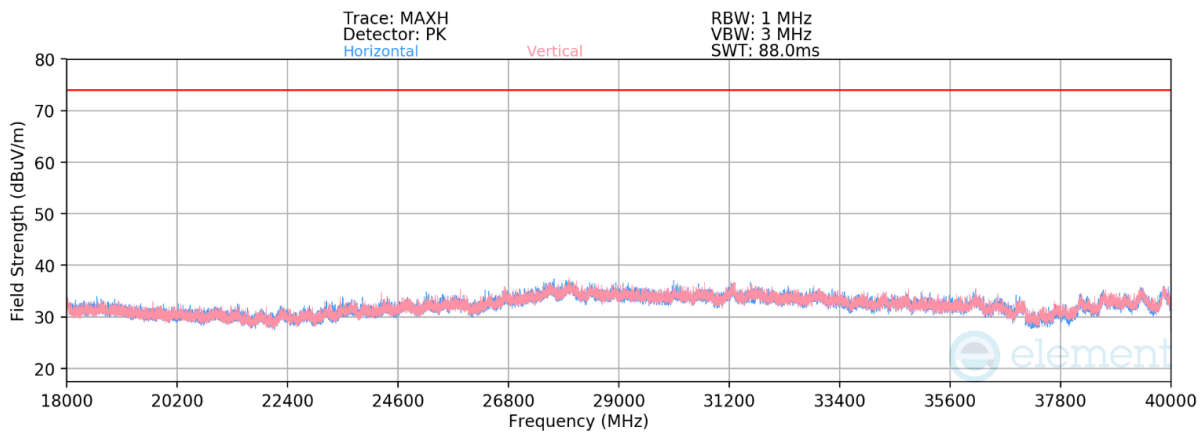
Table 7-12. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 52 of 87

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Plot 7-41. Radiated Spurious Emissions 1-18GHz (BDR GFSK – 5788MHz)



Plot 7-42. Radiated Spurious Emissions Above 18GHz (BDR GFSK – 5788MHz)

Mode: BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

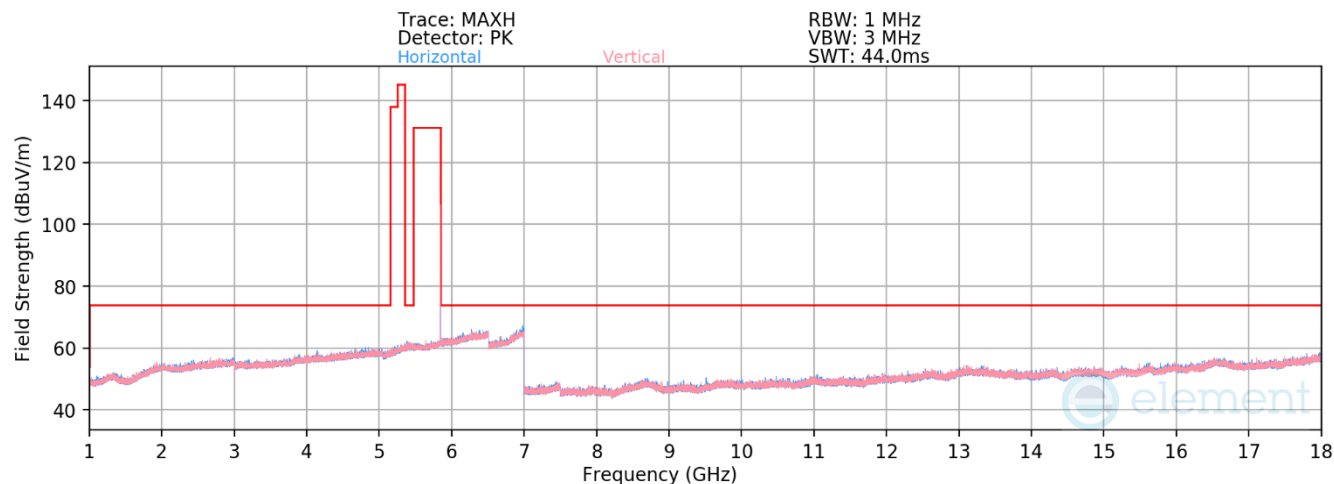
Operating Frequency: 5788MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 11576.00	Average	-	-	-	-83.12	16.68	0.00	0.00	40.56	53.98	-13.42
* 11576.00	Peak	-	-	-	-71.41	16.68	0.00	0.00	52.27	73.98	-21.71
17364.00	Peak	-	-	-	-71.81	23.48	0.00	0.00	58.68	68.20	-9.53
23152.00	Peak	-	-	-	-61.11	-6.22	-9.54	0.00	39.67	68.20	-28.53
28940.00	Peak	V	150	163	-61.97	-3.42	-9.54	0.00	41.61	68.20	-26.59
34728.00	Peak	H	150	179	-61.02	-5.00	-9.54	0.00	40.98	68.20	-27.22

Table 7-13. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 53 of 87

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Plot 7-43. Radiated Spurious Emissions 1-18GHz (BDR GFSK- 5844MHz)

Mode: BDR

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

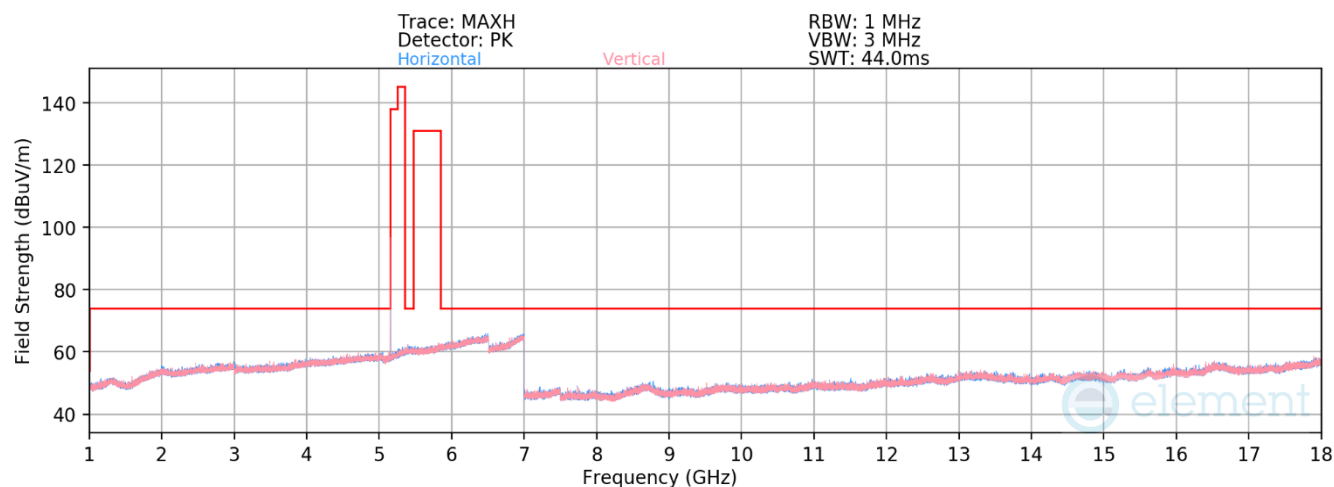
Operating Frequency: 5844MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
*	11688.00	Average	-	-	-	-79.82	12.18	39.36	53.98	-14.62
*	11688.00	Peak	-	-	-	-68.74	12.18	50.44	73.98	-23.54
	17532.00	Peak	-	-	-	-69.35	17.86	55.51	68.20	-12.69

Table 7-14. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 54 of 87

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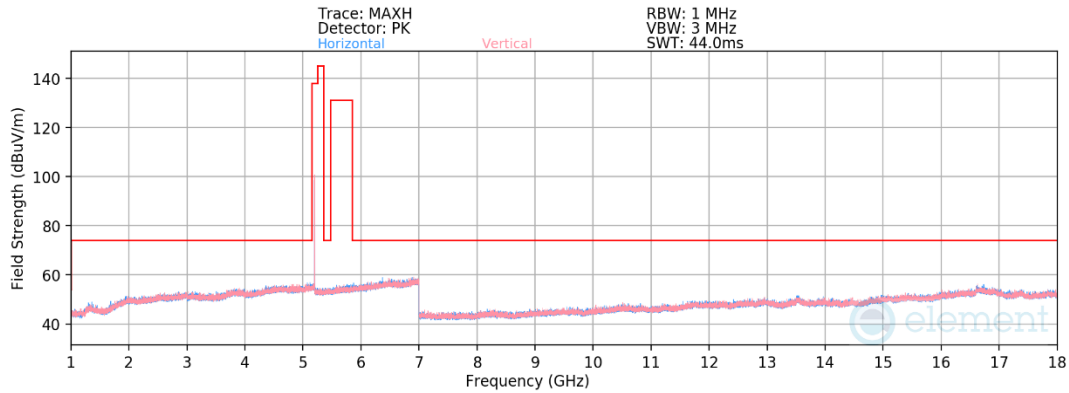
Plot 7-44. Radiated Spurious Emissions 1-18GHz (HDR4 – 5157MHz)

Mode:	HDR4
Data Rate:	4Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	5157MHz

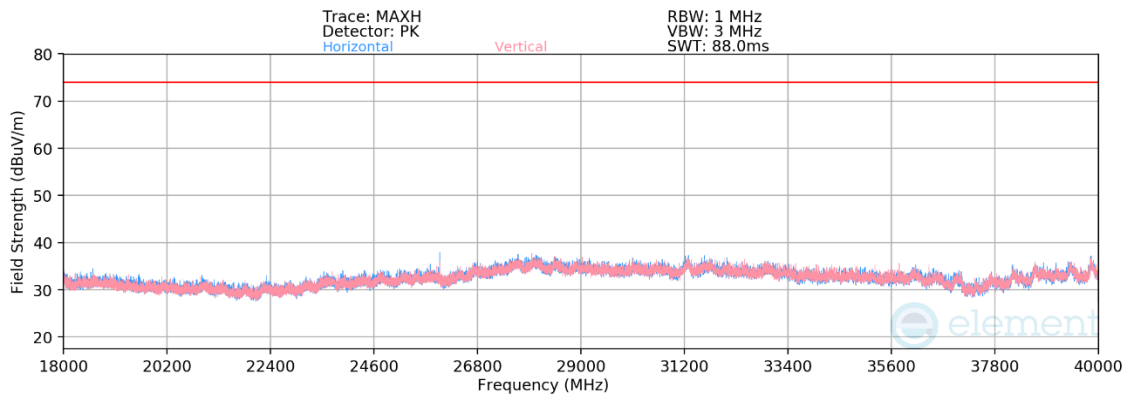
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10314.00	Peak	-	-	-	-67.89	8.82	47.93	68.20	-20.27
* 15471.00	Average	-	-	-	-82.86	17.32	41.46	53.98	-12.52
* 15471.00	Peak	-	-	-	-70.91	17.32	53.41	73.98	-20.57

Table 7-15. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 55 of 87



Plot 7-45. Radiated Spurious Emissions 1-18GHz (HDR4- 5200MHz)



Plot 7-46. Radiated Spurious Emissions Above 18GHz (HDR4- 5200MHz)

Mode: HDR4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

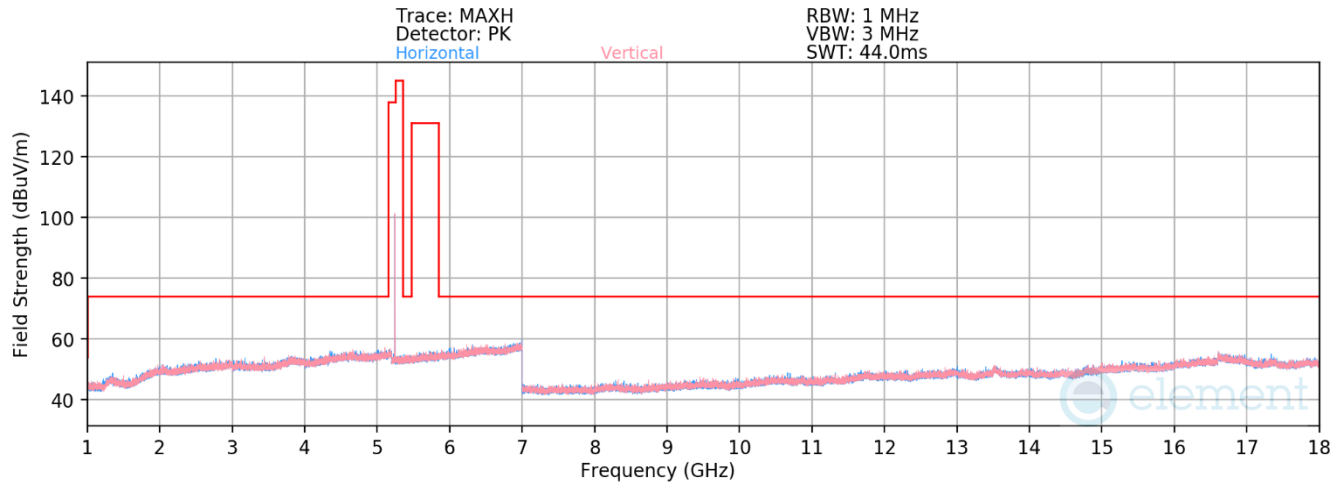
Operating Frequency: 5200MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
10400.00	Peak	-	-	-	-66.84	8.57	0.00	0.00	48.73	68.20	-19.47
* 15600.00	Average	-	-	-	-83.23	17.50	0.00	0.00	41.27	53.98	-12.71
* 15600.00	Peak	-	-	-	-71.57	17.50	0.00	0.00	52.93	73.98	-21.05
* 20800.00	Average	-	-	-	-72.59	-6.62	-9.54	0.00	27.79	53.98	-26.19
* 20800.00	Peak	-	-	-	-61.17	-6.62	-9.54	0.00	39.21	73.98	-34.77
26000.00	Peak	H	150	179	-57.09	-5.17	-9.54	0.00	44.74	68.20	-23.46
* 31200.00	Average	-	-	-	-74.75	-3.27	-9.54	0.00	28.98	53.98	-25.00
* 31200.00	Peak	-	-	-	-62.87	-3.27	-9.54	0.00	40.86	73.98	-33.12
36400.00	Peak	V	150	201	-59.87	-5.21	-9.54	0.00	41.92	68.20	-26.28

Table 7-16. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones		Page 56 of 87

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Plot 7-47. Radiated Spurious Emissions 1-18GHz (HDR4– 5245MHz)

Mode: HDR4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

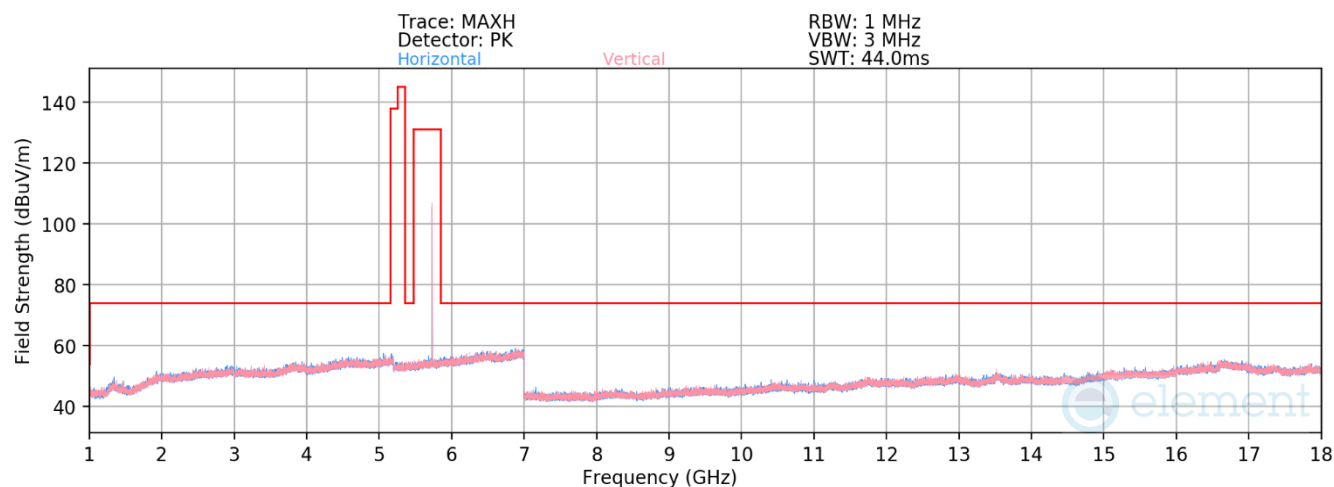
Operating Frequency: 5245MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10490.00	Peak	-	-	-	-67.33	8.88	48.55	68.20	-19.65
* 15735.00	Average	-	-	-	-83.58	17.55	40.97	53.98	-13.01
* 15735.00	Peak	-	-	-	-72.57	17.55	51.98	73.98	-22.00

Table 7-17. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 57 of 87

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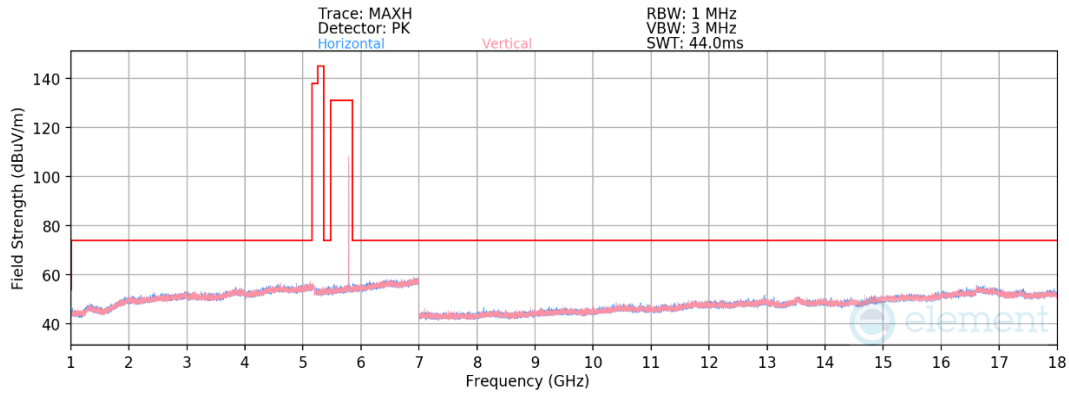
Plot 7-48. Radiated Spurious Emissions 1-18GHz (HDR4- 5731MHz)

Mode:	HDR4
Data Rate:	4Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	5731MHz

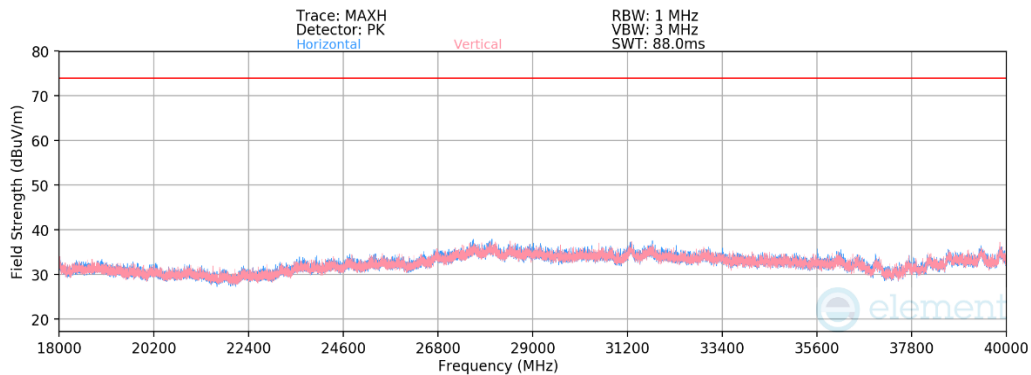
	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
*	11462.00	Average	-	-	-	-80.35	10.01	36.66	53.98	-17.32
*	11462.00	Peak	-	-	-	-68.69	10.01	48.32	73.98	-25.66
	17193.00	Peak	-	-	-	-71.83	18.78	53.95	68.20	-14.25

Table 7-18. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 58 of 87



Plot 7-49. Radiated Spurious Emissions 1-18GHz (HDR4- 5788MHz)



Plot 7-50. Radiated Spurious Emissions Above 18GHz (HDR4- 5788MHz)

Mode: HDR4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

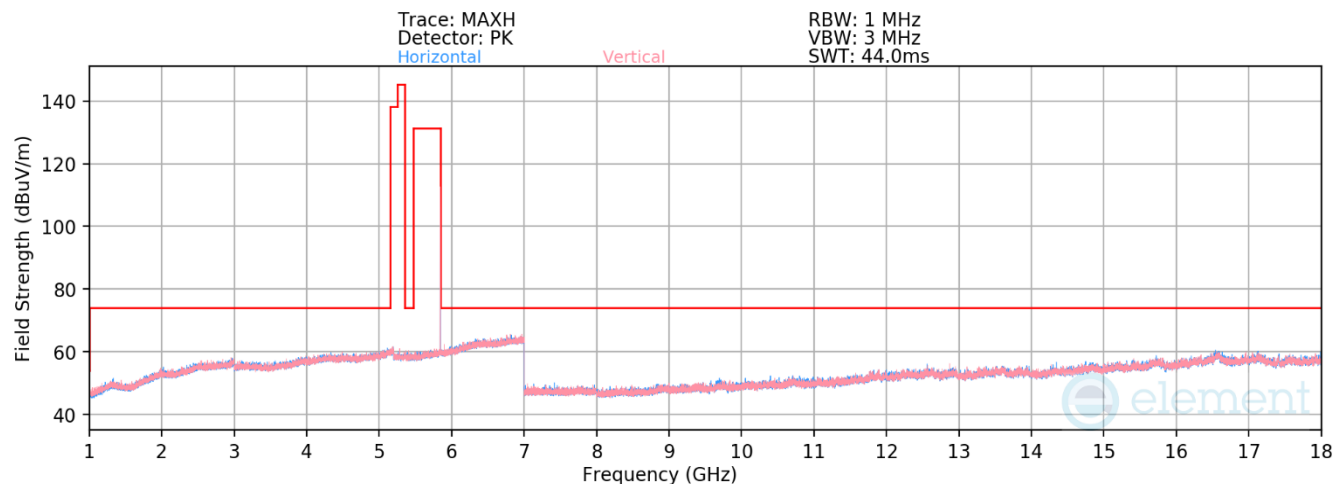
Operating Frequency: 5788MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Duty Cycle Correction [dB]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
* 11576.00	Average	-	-	-	-79.48	10.12	0.00	0.00	37.64	53.98	-16.34
* 11576.00	Peak	-	-	-	-68.21	10.12	0.00	0.00	48.91	73.98	-25.07
17364.00	Peak	-	-	-	-72.31	18.97	0.00	0.00	53.66	68.20	-14.54
23152.00	Peak	-	-	-	-61.26	-6.22	-9.54	0.00	39.52	68.20	-28.68
28940.00	Peak	V	150	208	-61.95	-3.42	-9.54	0.00	41.63	68.20	-26.57
34728.00	Peak	H	150	219	-61.63	-5.00	-9.54	0.00	40.37	68.20	-27.83

Table 7-19. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones		Page 59 of 87

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Plot 7-51. Radiated Spurious Emissions 1-18GHz (HDR4– 5844MHz)

Mode: HDR4

Data Rate: 4Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5844MHz

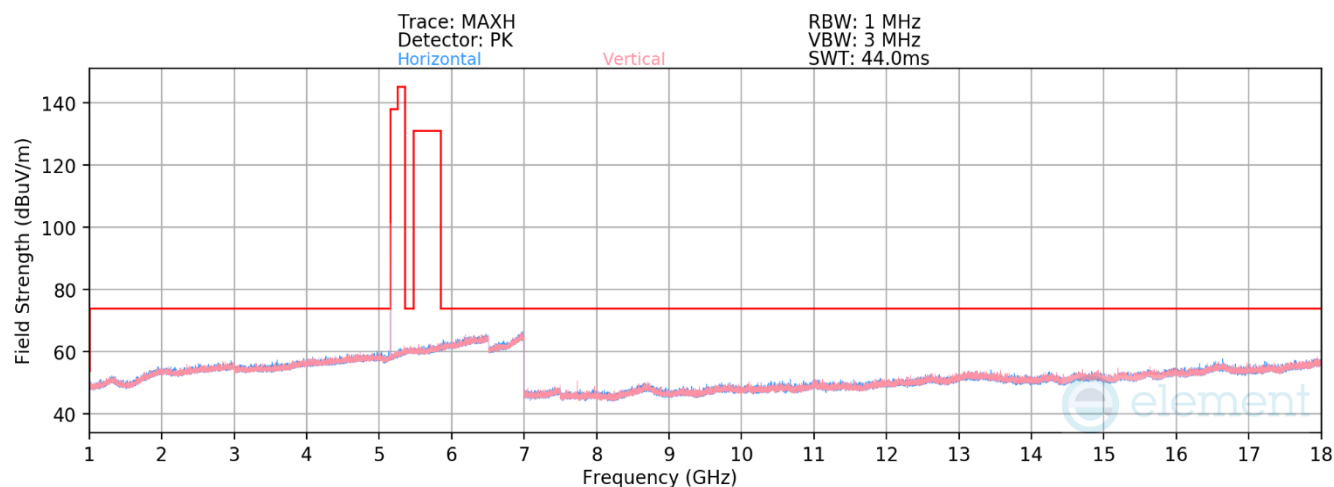
Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11688.00	Average	-	-	-	-79.87	10.76	37.89	53.98	-16.09
* 11688.00	Peak	-	-	-	-68.83	10.76	48.93	73.98	-25.05
17532.00	Peak	-	-	-	-72.02	18.23	53.21	68.20	-14.99

Table 7-20. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 60 of 87

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LE (UNII 1)



Plot 7-52. Radiated Spurious Emissions 1-18GHz (LE1M- 5157MHz)

Mode: LE

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

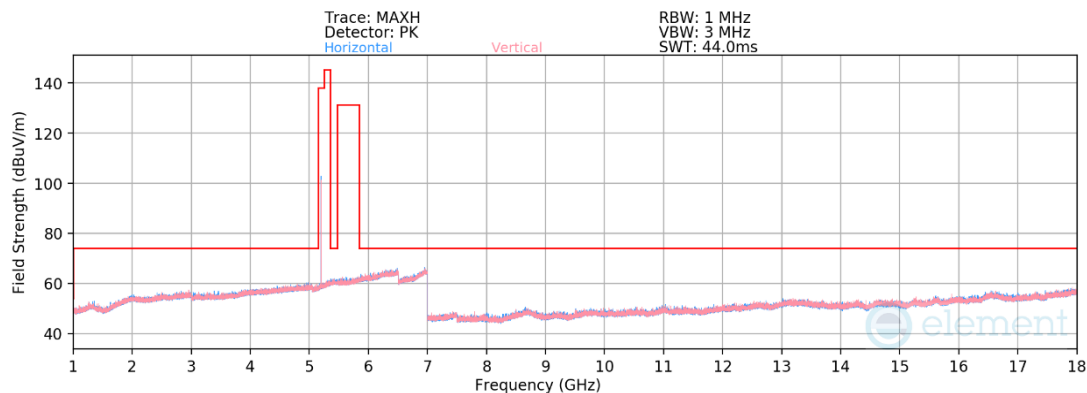
Operating Frequency: 5157MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10314.00	Peak	-	-	-	-68.70	10.30	48.60	68.20	-19.60
* 15471.00	Average	-	-	-	-79.02	14.68	42.66	53.98	-11.32
* 15471.00	Peak	-	-	-	-68.03	14.68	53.65	73.98	-20.33

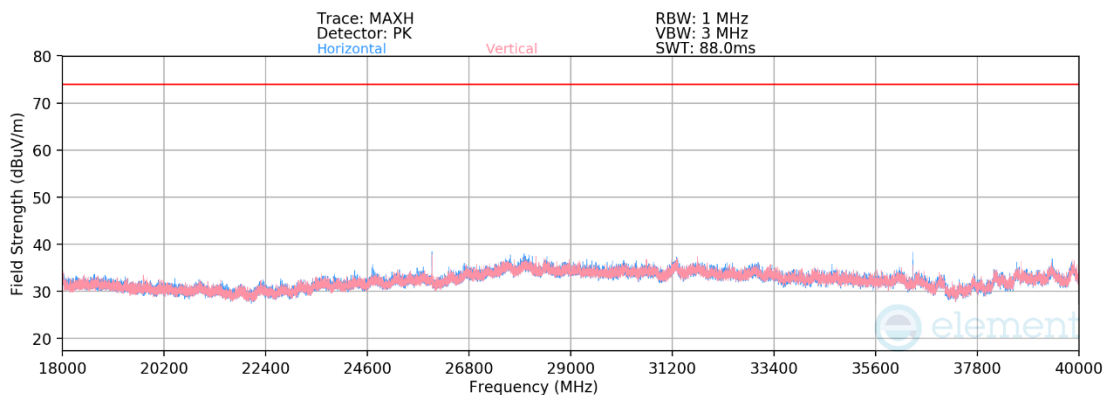
Table 7-21. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 61 of 87

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Plot 7-53. Radiated Spurious Emissions 1-18GHz (LE1M- 5200Hz)



Plot 7-54. Radiated Spurious Emissions Above 18GHz (LE1M- 5200MHz)

Mode: LE

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5200MHz

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 62 of 87

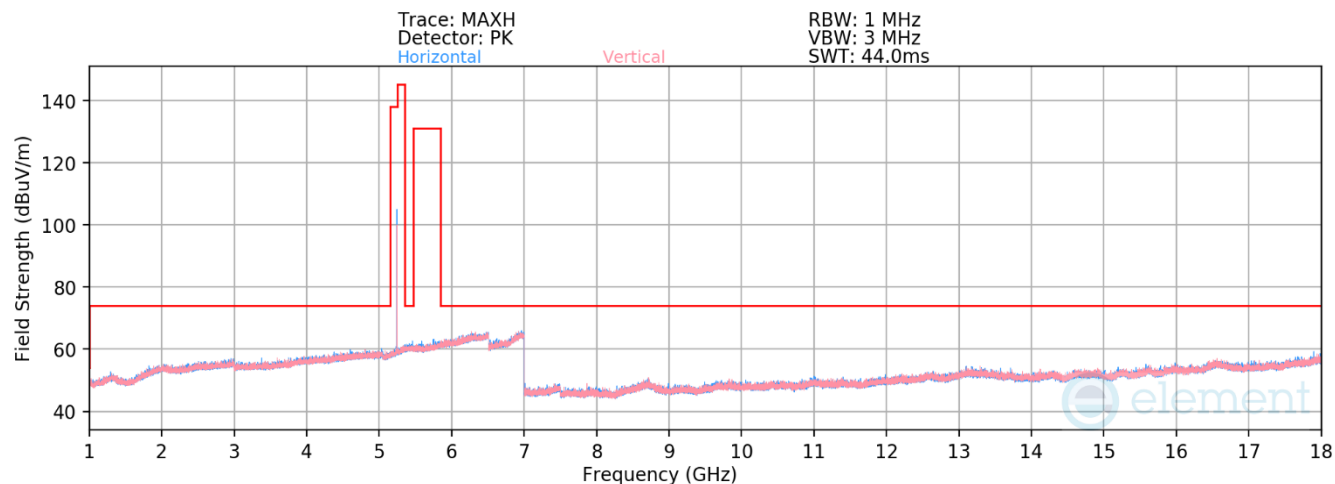
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Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10400.00	Peak	-	-	-	-68.24	10.51	0.00	0.00	49.27	68.20	-18.93
* 15600.00	Average	-	-	-	-79.14	16.20	0.00	0.00	44.06	53.98	-9.92
* 15600.00	Peak	-	-	-	-68.32	16.20	0.00	0.00	54.88	73.98	-19.10
* 20800.00	Average	-	-	-	-72.71	-6.62	-9.54	0.00	27.67	53.98	-26.31
* 20800.00	Peak	-	-	-	-60.98	-6.62	-9.54	0.00	39.40	73.98	-34.58
26000.00	Peak	H	150	175	-56.77	-5.17	-9.54	0.00	45.06	68.20	-23.14
* 31200.00	Average	H	150	214	-74.31	-3.27	-9.54	0.64	30.06	53.98	-23.92
* 31200.00	Peak	H	150	214	-63.46	-3.27	-9.54	0.00	40.27	73.98	-33.71
36400.00	Peak	H	150	200	-57.69	-5.21	-9.54	0.00	44.10	68.20	-24.10

Table 7-22. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 63 of 87

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Plot 7-55. Radiated Spurious Emissions 1-18GHz (LE1M- 5245MHz)

Mode: LE

Data Rate: 1Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5245MHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10490.00	Peak	-	-	-	-68.12	11.24	50.12	68.20	-18.08
* 15735.00	Average	-	-	-	-79.60	15.63	43.03	53.98	-10.95
* 15735.00	Peak	-	-	-	-68.66	15.63	53.96	73.98	-20.02

Table 7-23. Radiated Spurious Emissions Measurements

FCC ID: BCG-A3454		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N: 1C2512110102-06-R3.BCG	Test Dates: 12/11/2025 - 02/19/2026	EUT Type: Wireless Headphones	Page 64 of 87

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