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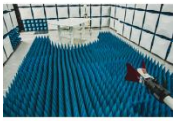

MEASUREMENT REPORT
FCC PART 15.407 Narrowband UNII BDR

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

Date of Testing:
5/5/2023 - 8/1/2023
Test Report Issue Date:
8/25/2023
Test Site/Location:
Element Materials Technology, Morgan Hill, CA,USA
Test Report Serial No.:
1C2305020010-06.BCG

FCC ID:	**BCG-A3047**
APPLICANT:	**Apple Inc.**

Application Type:	Certification
Model:	A3047
EUT Type:	Wireless Earbud
Frequency Range:	5157 – 5245MHz, 5731 – 5844MHz
Modulation Type:	GFSK
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15 Subpart E (15.407)
Test Procedure(s):	ANSI C63.10-2013, 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 C63.10-2013 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

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

ACCREDITED
CERT #2041.02

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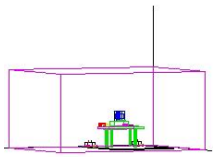
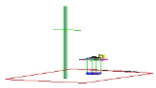


MEASUREMENT REPORT



UNII Band	Tx Frequency(MHz)	Mode	Max. Power (mW)	Max. Power (dBm)
1	5157-5245	GFSK	8.872	9.48
3	5731-5844	GFSK	11.169	10.48

EUT Overview

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 and the Innovation, Science and Economic Development Canada.

1.2 Element Materials Technology Morgan Hill 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 Morgan Hill 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 Morgan Hill 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)

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Wireless Right Earbud FCC ID: BCG-A3047**. The test data contained in this report pertains only to the emissions due to the EUT's Narrowband UNII BDR transmitter.

- This Narrowband UNII module has been tested by manufacturer and the following were confirmed:
  - A) The hopping sequence is pseudorandom
  - B) 79 channels can be used at a time for hopping
  - C) The receiver input bandwidth equals the transmit bandwidth
  - D) The receiver hops in sequence with the transmit signal
  - E) Narrowband UNII can only hop within the same UNII band and cannot hop between bands

Test Device Serial No.: GFJKK0NJ26K0, GFJKK0UK26K0, GFJKJ2H326K0, AK412961272KSGN2AP2

2.2 Device Capabilities

This device contains the following capabilities:

Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8, HDRp4, HDRp8), NB UNII (1x, LE2M, HDR4, HDR8, HDRp4, HDRp8).

Band 1	Band 3
Frequency (MHz)	**Frequency (MHz)**
5157	5731
:	:
5201	5788
:	:
5245	5844

Table 2-1. NB UNII BDR Frequency / Channel Operations

Notes:

This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 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 C63.10-2013. 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	**Frequency (MHz)**	**Duty Cycle [%]**
NB UNII BDR	5157-5245	76.8
	5731-5844	76.8

Table 2-2. Measured Duty Cycles

1. Additionally, this device is sold together in the same package as a system with FCC ID: BCG-A3048 and FCC ID: BCG-A2968. Co-tx configurations were tested, and the worst case has been included in the RF BTLE Report.

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for testing.

Frequency [MHz]	Antenna Gain (dBi)
5157 - 5245	-0.93
5731 – 5844	-1.99

Table 2-3. Highest Antenna Gain

2.4 Test Support Equipment

1	Apple MacBook Pro	Model:	A2141	S/N:	C02DV7VKMD6T
	w/AC/DC Adapter	Model:	A2166	S/N:	N/A
2	Apple Airpod Charging Case	Model:	A2968	S/N:	W1G9FWQMLX
	Apple Airpod (Left)	Model:	A3048	S/N:	GX1KJ41026JY
3	Apple USB-C Cable	Model:	Spartan	S/N:	000MKTR02U
4	USB-C Cable	Model:	A146	S/N:	N/A
	w/ AC Adapter	Model:	A2305	S/N:	N/A

Table 2-4. Test Support Equipment List

2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013 and KDB 789033 D02 v02r01. ANSI C63.10-2013 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, and 7.5 for antenna port conducted emissions test setups.

The EUT was investigated with and without charging case.

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.

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 charged by charging case and powered by AC/DC adaptor with USB-C cable.
- EUT charged by charging case and powered by host PC with USB-C cable.

2.6 Software and Firmware

The test was conducted with firmware version 5A92420m 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.

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 C63.10-2013) 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.

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

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.

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 (±dB)
Conducted Bench Top Measurements	1.77
Line Conducted Disturbance	2.70
Radiated Disturbance (<30MHz)	4.38
Radiated Disturbance (30MHz - 1GHz)	4.75
Radiated Disturbance (1 - 18GHz)	5.20
Radiated Disturbance (>18GHz)	4.72

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 to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9020A	MXA Signal Analyzer	4/26/2022	Biennial	4/26/2024	MY56470202
Anritsu	MA2411B	Pulse Power Sensor	8/31/2022	Annual	8/31/2023	1911106
Anritsu	ML2496A	Power Meter	10/17/2022	Annual	10/17/2023	2002005
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	3/30/2023	Annual	3/30/2024	00218555
Keysight Technologies	N9030A	3Hz-44Ghz PXA Signal Analyzer	6/21/2023	Annual	6/21/2024	MY49430244
Keysight Technologies	N9040B	UXA Spectrum Analyzer	7/10/2023	Annual	7/10/2024	US57212289
Rohde & Schwarz	180-442A-KF	Horn (Small)	11/1/2022	Annual	11/1/2023	T058701-1
Rohde & Schwarz	ENV216	Two-Line V-Network	6/20/2023	Annual	6/20/2024	101363
Rohde & Schwarz	FSW67	Signal and Spectrum Analyzer (2Hz-67GHz)	4/4/2023	Annual	4/4/2024	101366
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz - 44GHz	3/6/2023	Annual	3/6/2024	101867
Rohde & Schwarz	HFH2-Z2	Loop Antenna	5/1/2023	Annual	5/1/2024	100519
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	6/22/2023	Annual	6/22/2024	102356
Rohde & Schwarz	TS-PR18	Pre Amplifier 1-18GHz	3/3/2023	Annual	3/3/2024	102130
Rohde & Schwarz	TS-PR1840	Pre Amplifier 18-40GHz	6/2/2023	Annual	6/2/2024	100050
Schwarzbeck	VULB 9162	Bilog Antenna (30MHz - 6GHz)	4/17/2023	Annual	4/17/2024	00304

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.

7.0 TEST RESULTS

7.1 Summary

Company Name: Apple Inc.

FCC ID: BCG-A3047

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, 7.3
15.407 (a.1.iv), (a.3)	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)	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
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 "UNII Automation," Version 7.0.
5. For radiated band edge, 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 2.0.0.

7.2 26dB & 99% Bandwidth Measurement – BDR

§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 C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

The 26dB bandwidth is used to determine the conducted power limits.

Test Procedure Used

ANSI C63.10-2013 – Subclause 12.4
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 = approximately 1% of the emission bandwidth
3. VBW $\geq$ 3 x 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

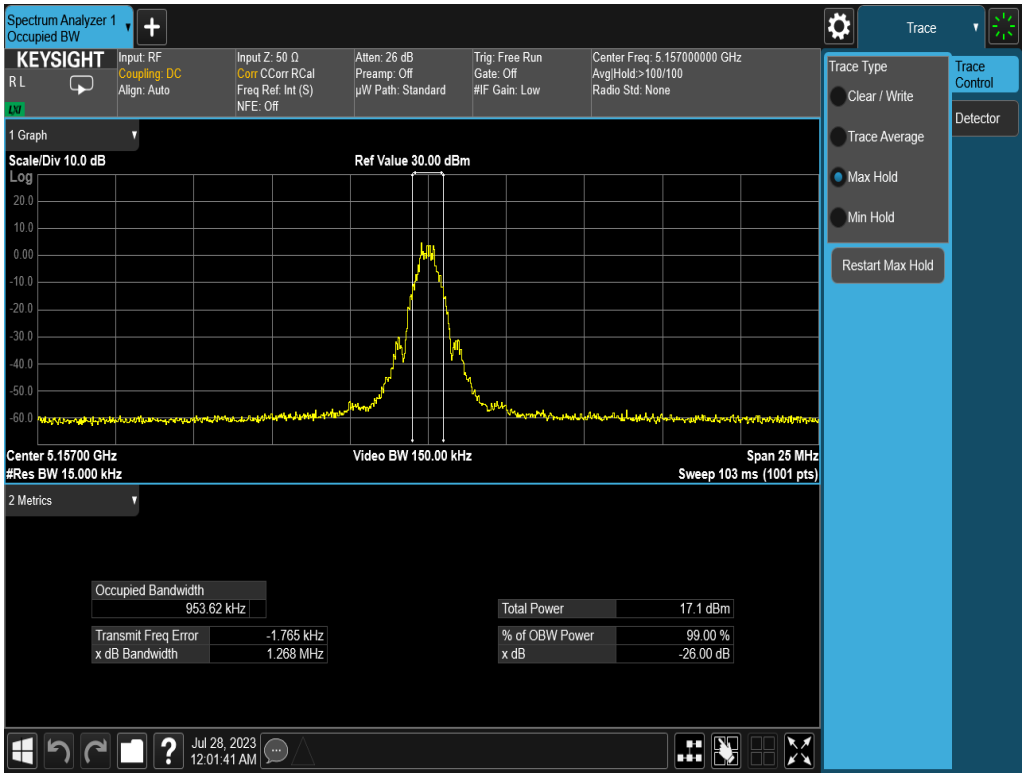
Test Notes

None.

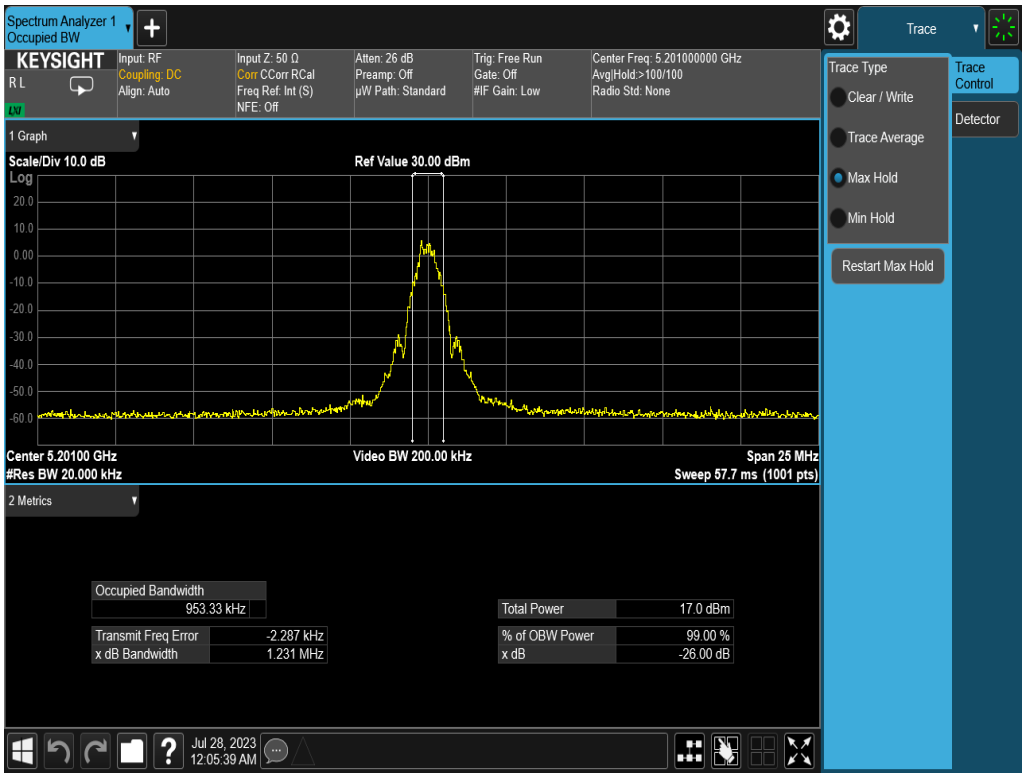
26dB & 99% Bandwidth Measurements

	Frequency [MHz]	Mode	Measured 99% Occupied Bandwidth [MHz]	Measured 26dB Bandwidth [MHz]
Band 1	5157	GFSK	0.9536	1.2680
	5201	GFSK	0.9533	1.2310
	5245	GFSK	0.9527	1.2700

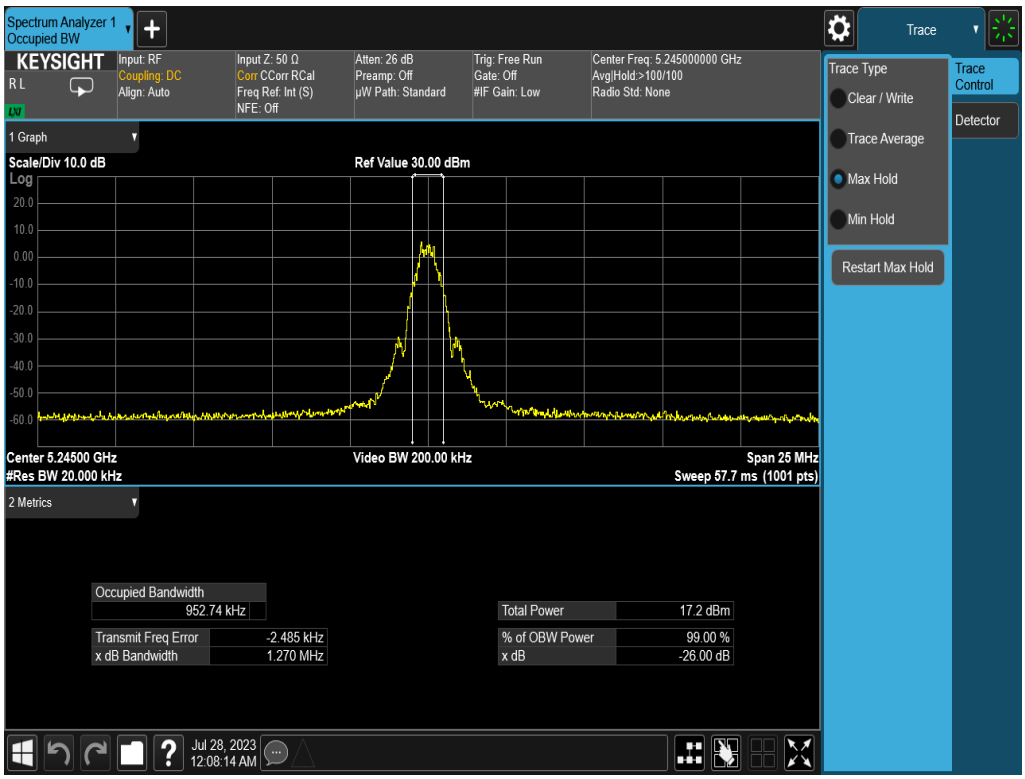
Table 7-2. Conducted BW Measurements



Plot 7-1. 26dB BW & 99% OBW (BDR GFSK– 5157MHz)



Plot 7-2. 26dB BW & 99% OBW (BDR GFSK– 5201MHz)



Plot 7-3. 26dB BW & 99% OBW (BDR GFSK– 5245MHz)

7.3 6dB & 99% Bandwidth Measurement – BDR

§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 C63.10-2013 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 C63.10-2013 – Subclause 6.9.2
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 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 = 100 kHz
3. VBW ≥ 3 x 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

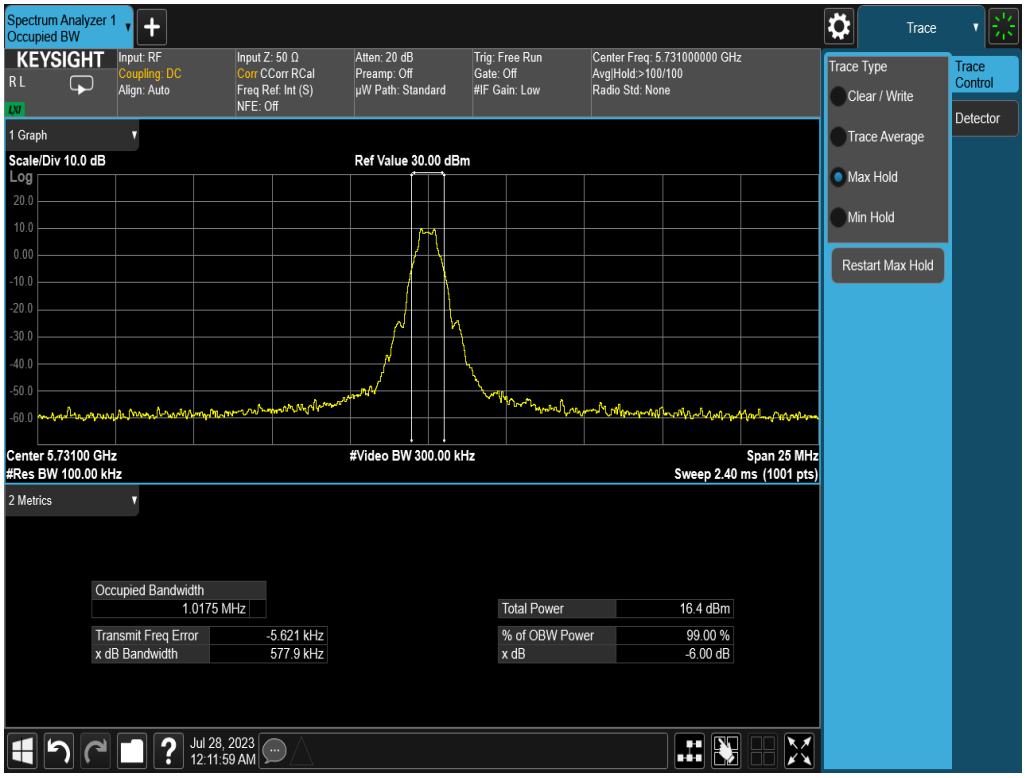
Test Notes

None.

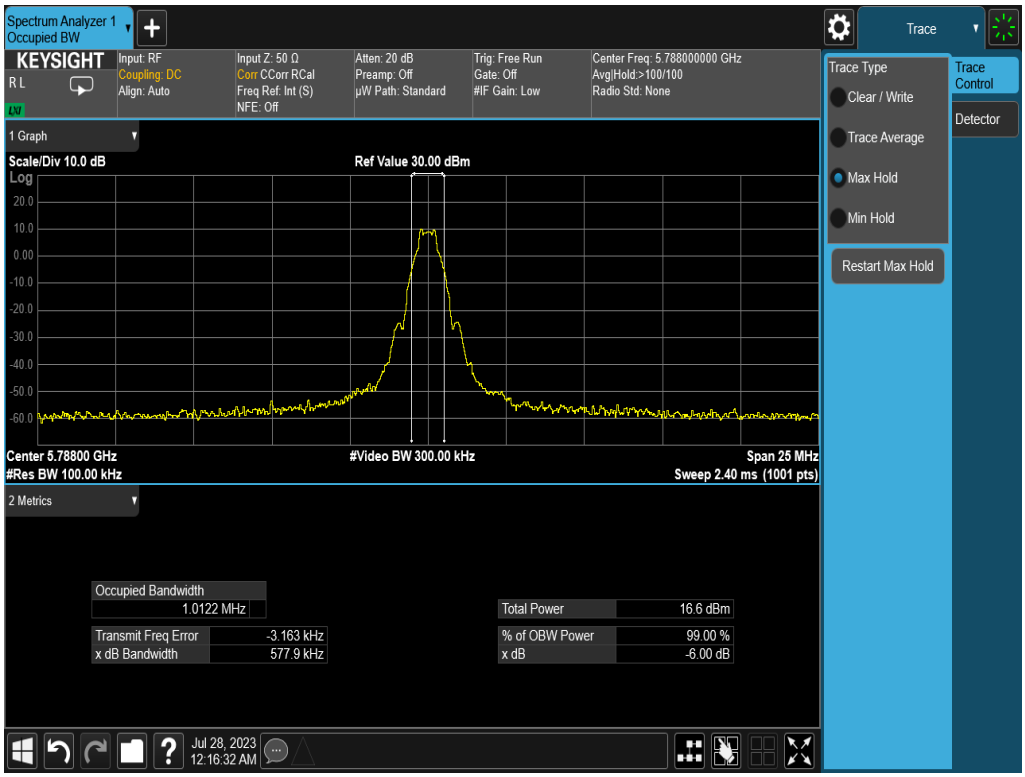
6dB & 99% Bandwidth Measurements

	Frequency [MHz]	Mode	Measured 99% Occupied Bandwidth [MHz]	Measured 6dB Bandwidth [MHz]	Minimum 6dB Bandwidth [MHz]	Pass / Fail
Band 3	5731	GFSK	1.0175	0.5779	0.50	Pass
	5788	GFSK	1.0122	0.5779	0.50	Pass
	5844	GFSK	1.0199	0.5810	0.50	Pass

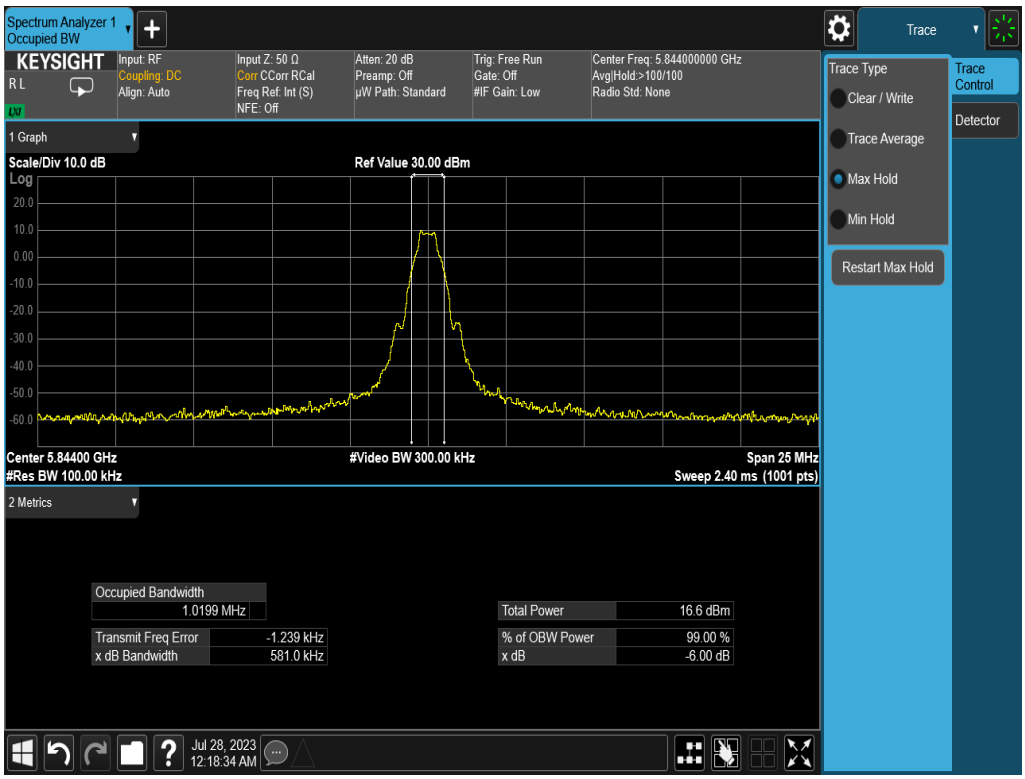
Table 7-3. Conducted BW Measurements



Plot 7-4. 6dB BW & 99% OBW (BDR, 5731MHz)



Plot 7-5. 6dB BW & 99% OBW (BDR, 5788MHz)



Plot 7-6. 6dB BW & 99% OBW (BDR, 5844MHz)

7.4 Conducted Output Power – BDR

§15.407(a.1.iv), (a.3)

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 C63.10-2013 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 C63.10-2013 – Subclause 12.3.3.2 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

Conducted Output Power Measurements

Freq [MHz]	Detector	Mode	Conducted Powers [dBm]	Conducted Power Limit [dBm]	Conducted Power Margin [dB]
5157	AVG	GFSK	9.48	23.98	-14.50
5201	AVG	GFSK	9.32	23.98	-14.66
5245	AVG	GFSK	9.39	23.98	-14.59
5731	AVG	GFSK	10.48	30.00	-19.52
5788	AVG	GFSK	10.44	30.00	-19.56
5844	AVG	GFSK	10.40	30.00	-19.60

Table 7-4. Maximum Conducted Output Power

7.5 Maximum Power Spectral Density – BDR

§15.407(a.1.iv), (a.3)

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 C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. Method SA-1, as defined in ANSI C63.10-2013 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 C63.10-2013 – Subclause 12.3.2.2
KDB 789033 D02 v02r01 – Section F

Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz for U-NII 1, 500kHz for U-NII 3
4. VBW ≥ 3MHz for U-NII 1, ≥ 3 x RBW for U-NII 3
5. Number of sweep points ≥ 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

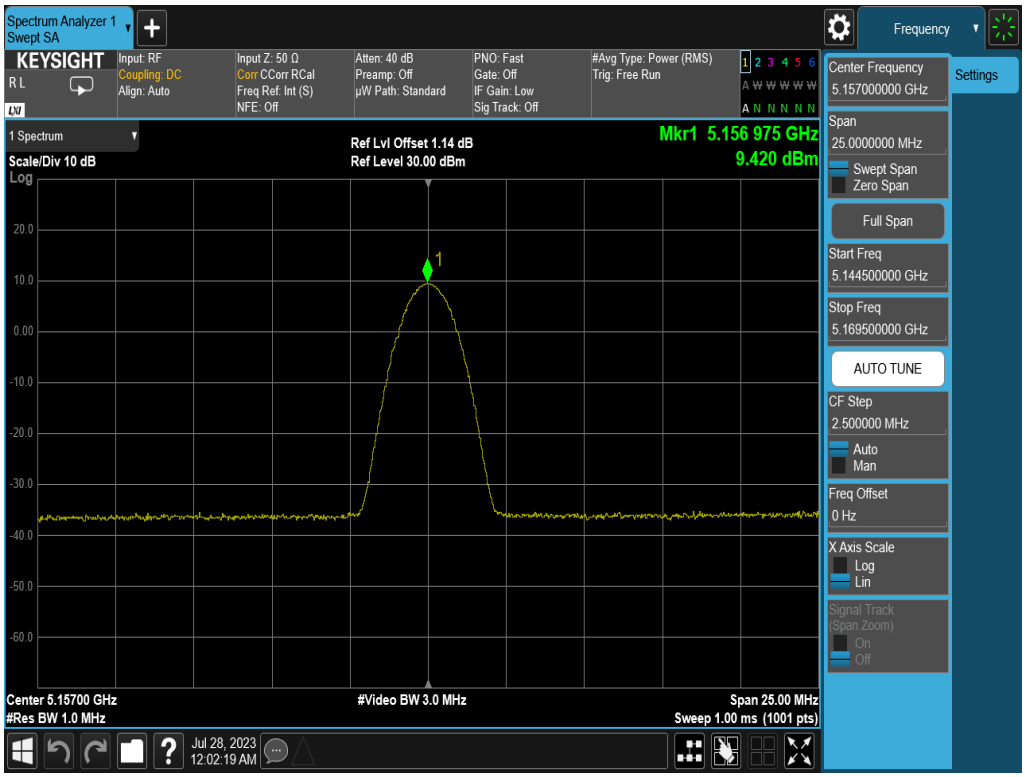
Test Notes

None

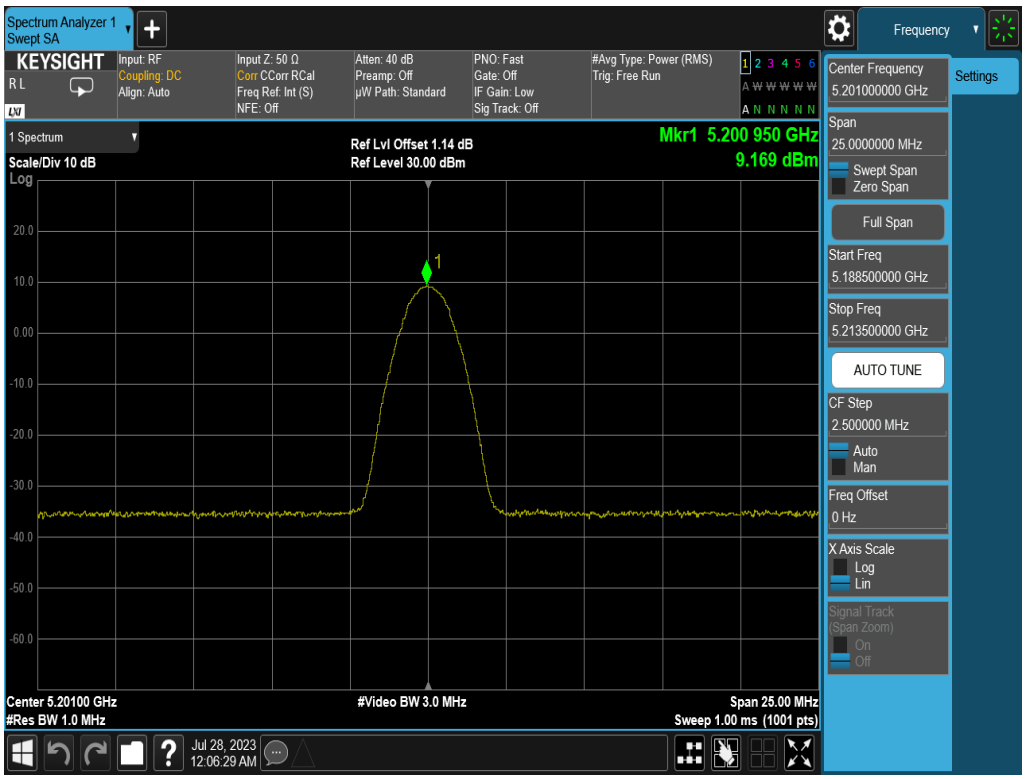
Power Spectral Density Measurements

	Frequency [MHz]	Mode	Measured Power Density [dBm/MHz]	Max Power Density [dBm/MHz]	Margin [dB]
Band 1	5157	GFSK	9.42	11.0	-1.58
	5201	GFSK	9.17	11.0	-1.83
	5245	GFSK	8.94	11.0	-2.06

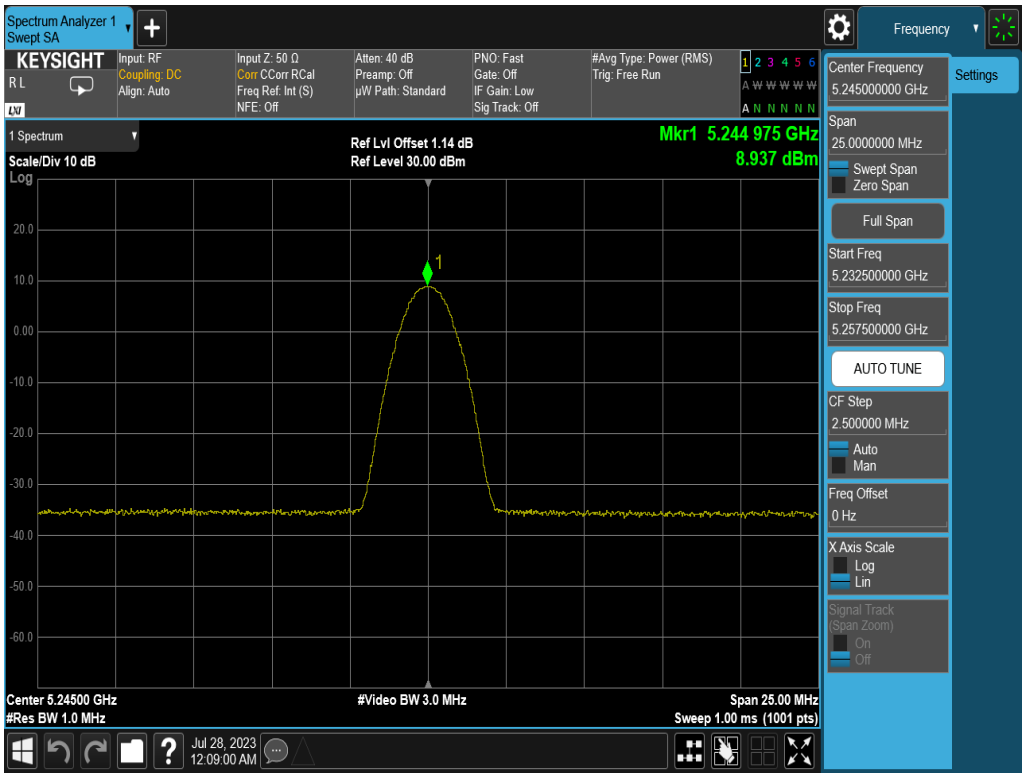
Table 7-5. Power Spectral Density Measurements



Plot 7-7. PSD (BDR GFSK – 5157MHz)



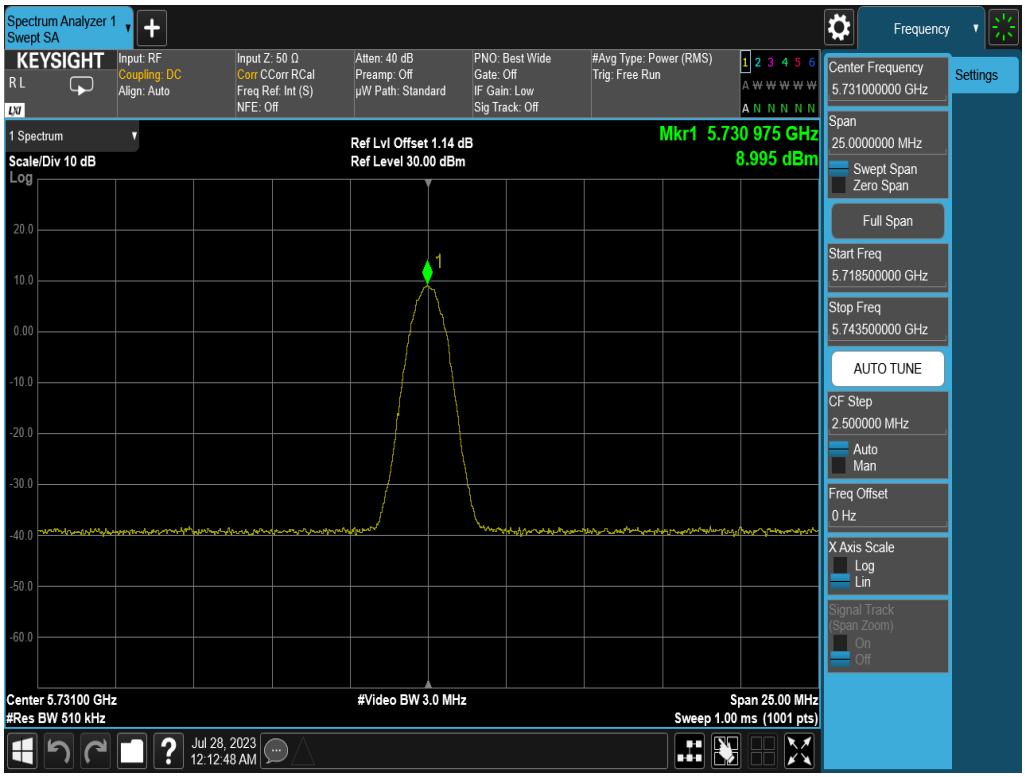
Plot 7-8. PSD (BDR GFSK – 5201MHz)



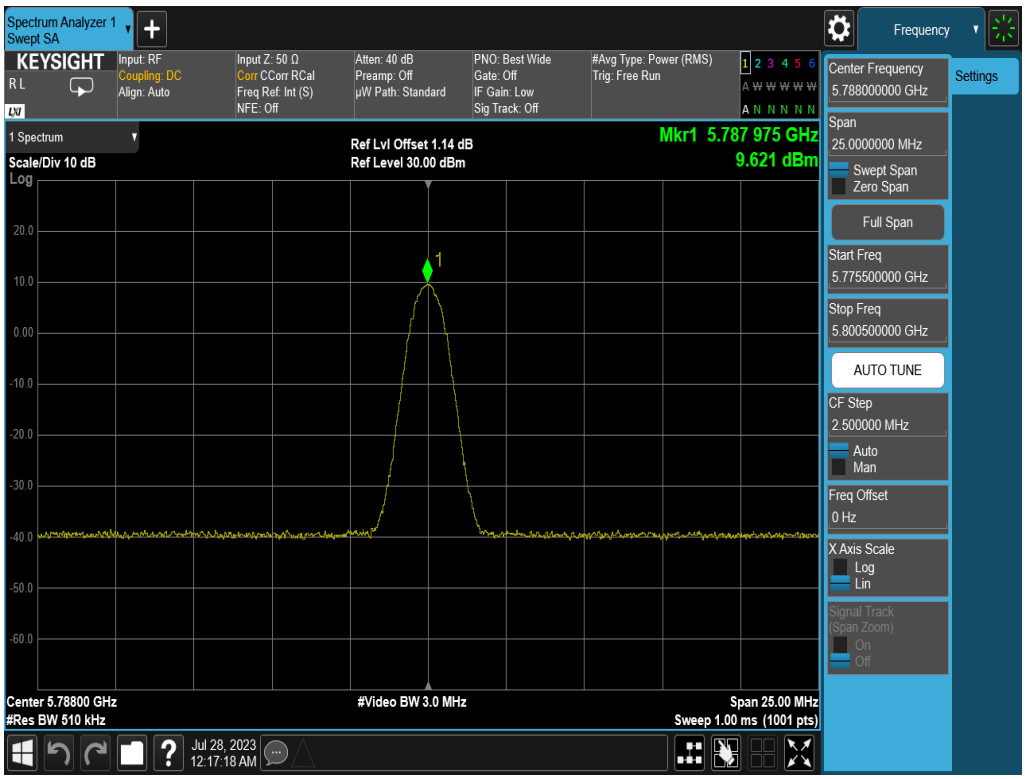
Plot 7-9. PSD (BDR GFSK– 5245MHz)

	Frequency [MHz]	Mode	Measured Power Density [dBm/500kHz]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]
Band 3	5731	GFSK	9.00	30.0	-21.00
	5788	GFSK	9.62	30.0	-20.38
	5844	GFSK	9.32	30.0	-20.68

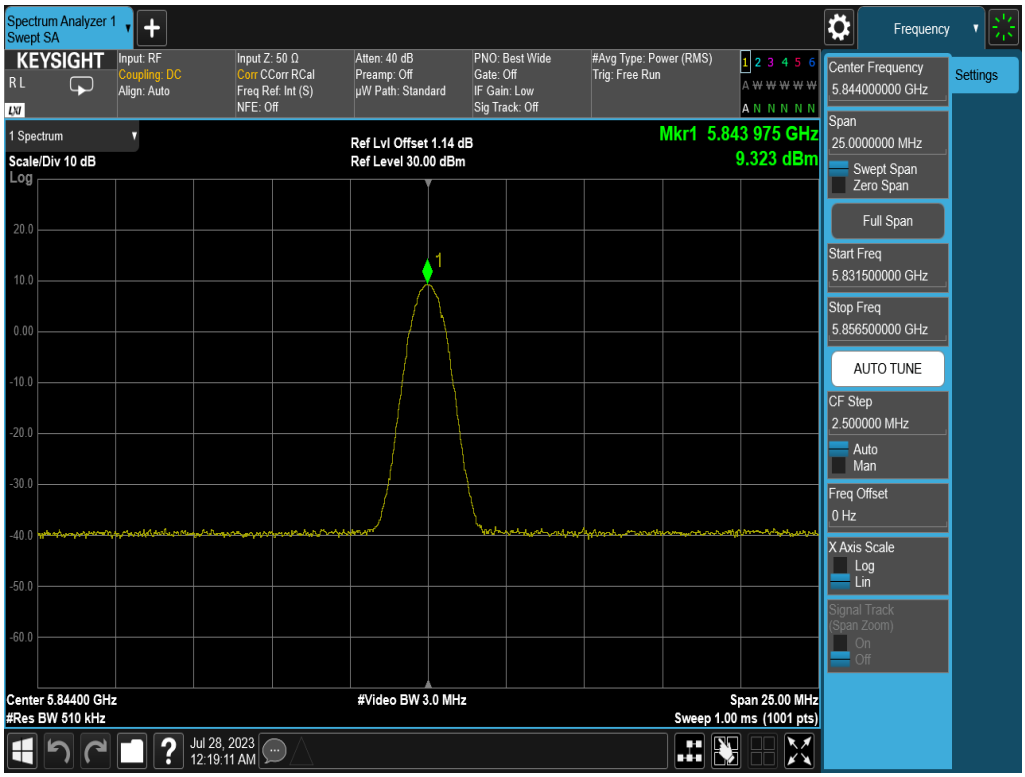
Table 7-6. Power Spectral Density Measurements



Plot 7-10. PSD (BDR, 5731MHz)



Plot 7-11. PSD (BDR, 5788MHz)



Plot 7-12. PSD (BDR, 5844MHz)

7.6 Radiated Spurious Emission – Above 1GHz

§15.407(b.1), (b.4), §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 C63.10-2013 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 7-7 per Section 15.209.

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-7. Radiated Limits

Test Procedures Used

ANSI C63.10-2013 – Subclauses 12.7.7.2, 12.7.6, 12.7.5
KDB 789033 D02 v02r01 – Section G

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 ≥ 2 x 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.

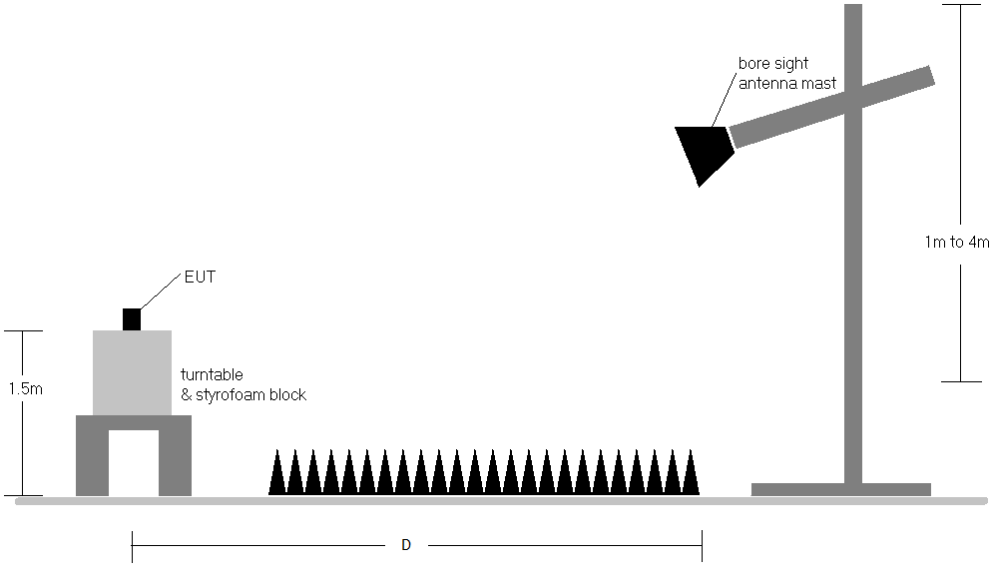


Figure 7-5. Test Instrument & Measurement Setup

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 7-7.
2. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-7. 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 dBμV/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 68.2dBμV/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 have been tested on the unit and only worst case configuration is reported.

Sample Calculations

Determining Spurious Emissions Levels

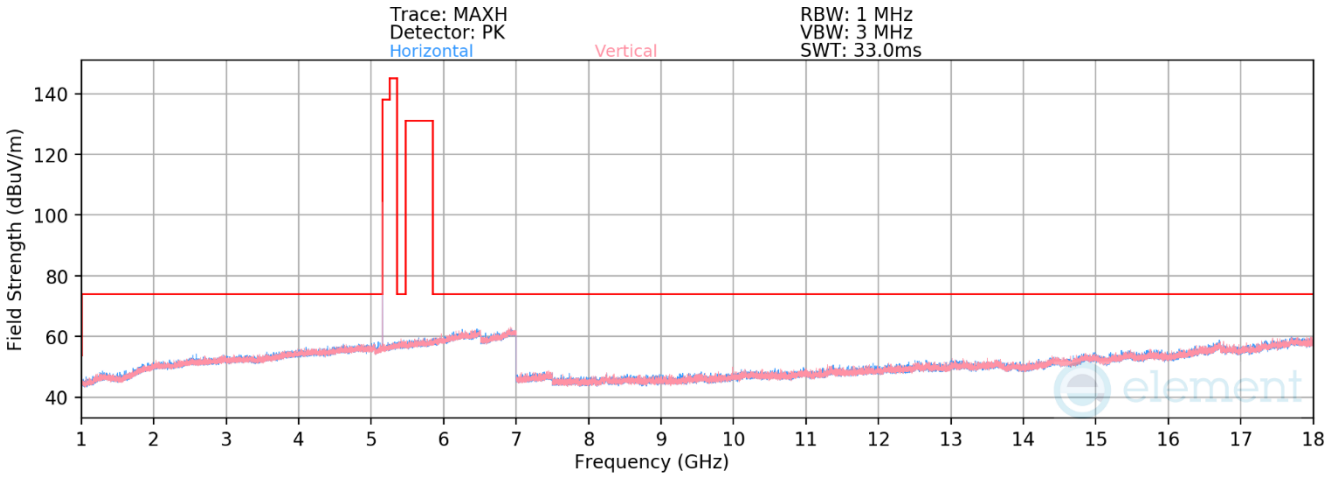
- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$ – Preamplifier Gain $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.6.2 was calculated using the formula:

  Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

7.6.1 Radiated Spurious Emission (1-18GHz)

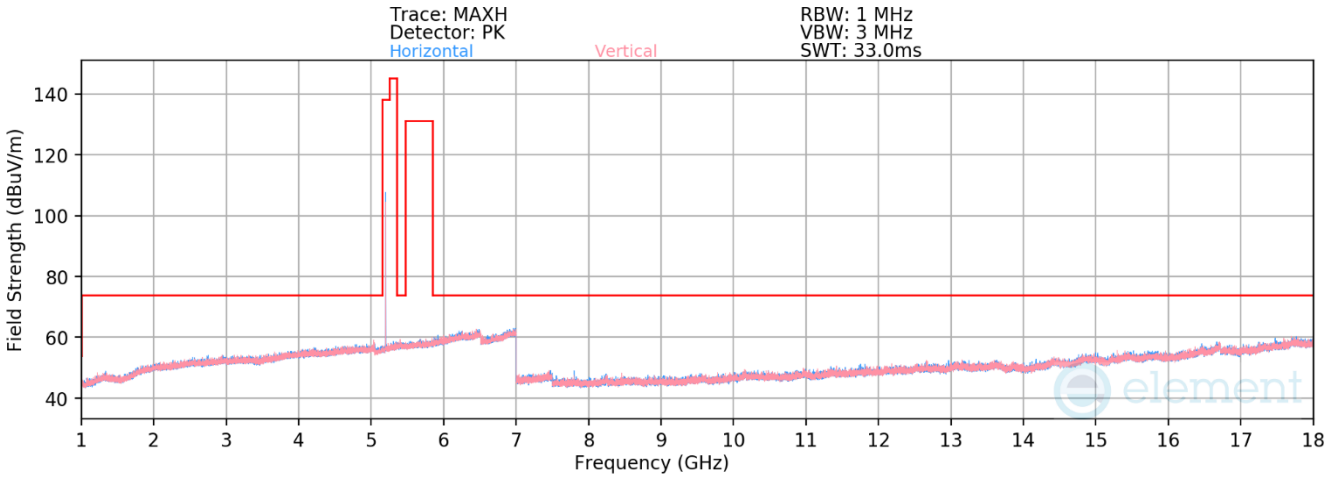


Plot 7-13. Radiated Spurious Emissions 1-18GHz (BDR – 5157MHz)

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]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10314.00	Peak	H	139	113	-71.07	12.60	0.00	48.53	68.23	-19.70
*	15471.00	Avg	H	102	202	-81.51	18.33	1.15	44.96	53.98	-9.01
*	15471.00	Peak	H	102	202	-71.95	18.33	0.00	53.38	73.98	-20.60

Table 7-8. Radiated Spurious Emissions Measurements

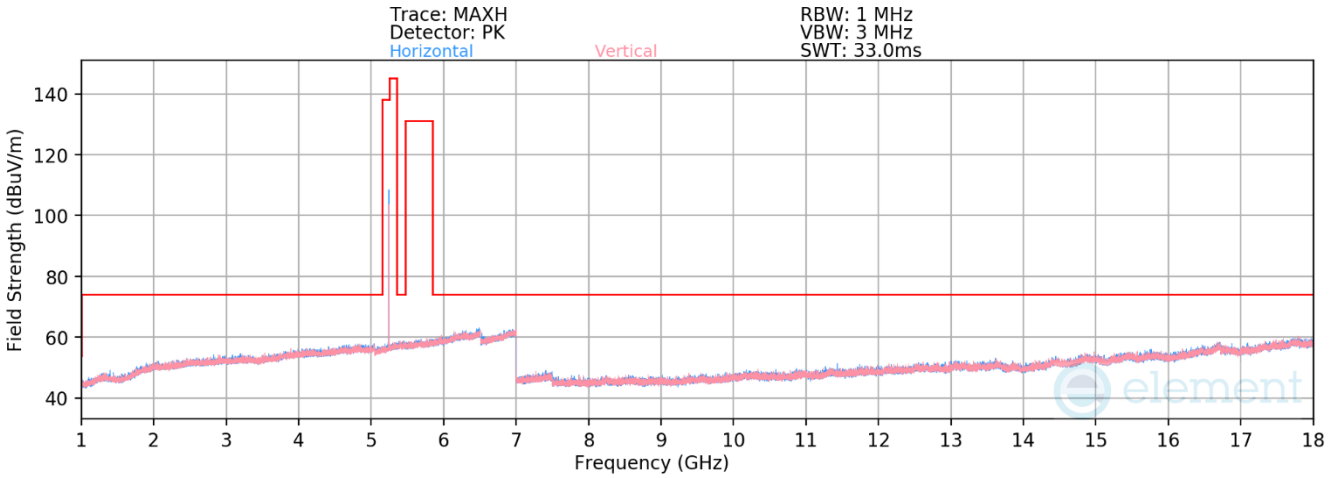


Plot 7-14. Radiated Spurious Emissions 1-18GHz (BDR – 5201MHz)

Mode:	BDR
Data Rate:	1Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	5201MHz

	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10402.00	Peak	H	139	106	-71.20	12.49	0.00	48.29	68.23	-19.94
*	15603.00	Avg	H	102	196	-81.86	18.27	1.15	44.56	53.98	-9.42
*	15603.00	Peak	H	102	196	-71.74	18.27	0.00	53.53	73.98	-20.45

Table 7-9. Radiated Spurious Emissions Measurements



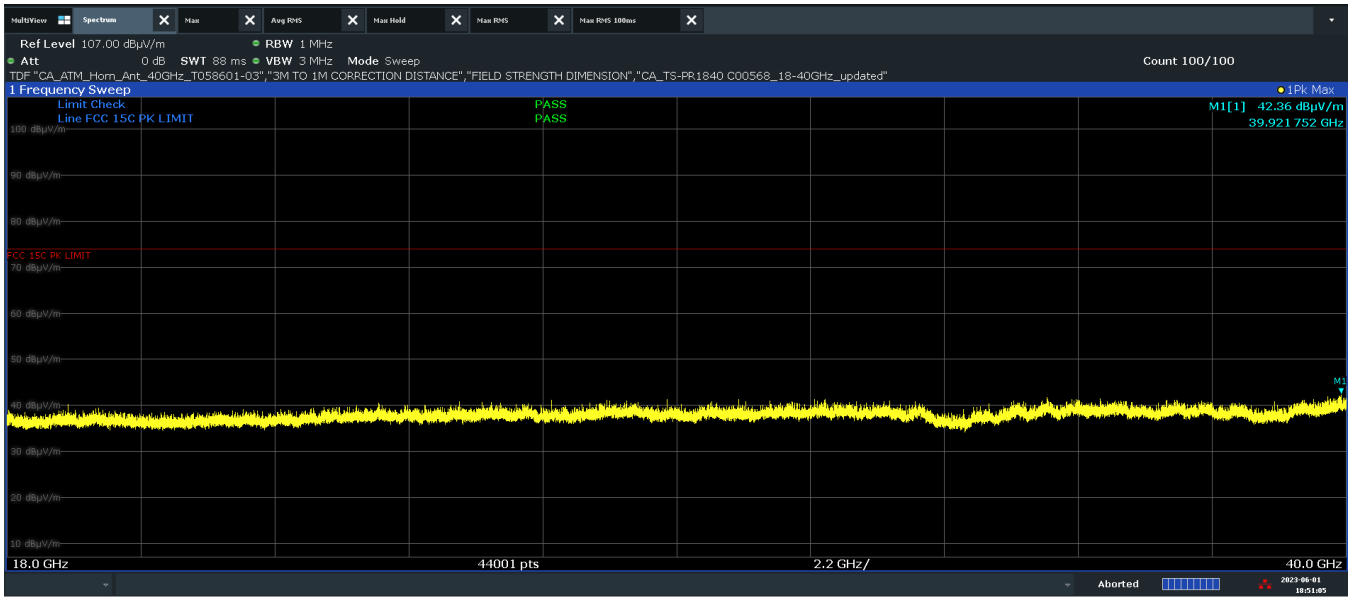
Plot 7-15. Radiated Spurious Emissions 1-18GHz (BDR – 5245MHz)

Mode:	BDR
Data Rate:	1Mbps
Distance of Measurements:	3 Meters
Operating Frequency:	5245MHz

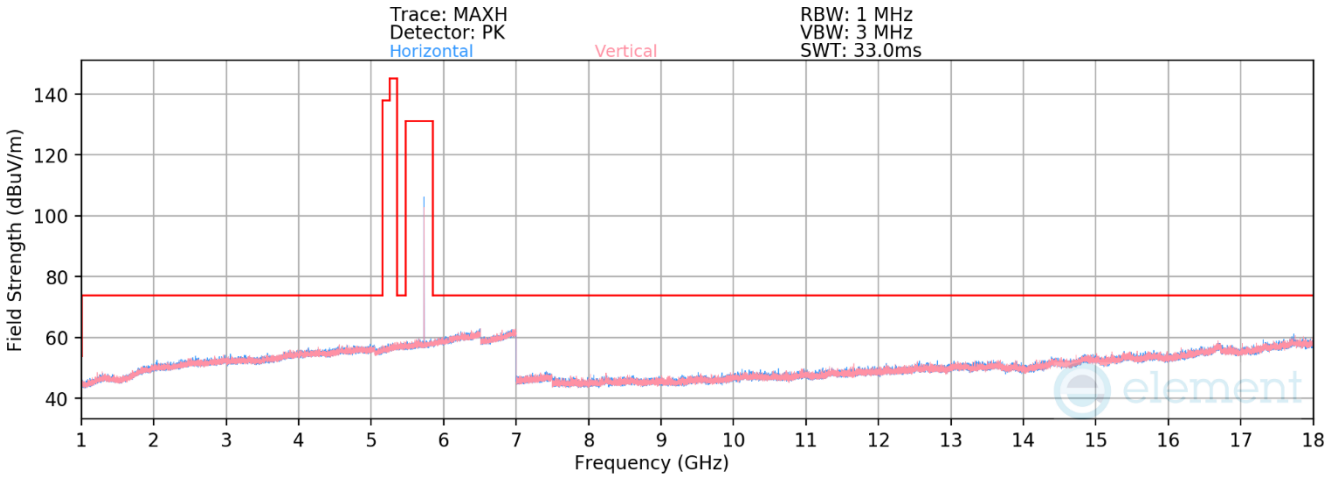
	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10490.00	Peak	H	181	321	-70.89	12.68	0.00	48.79	68.23	-19.44
*	15735.00	Avg	V	109	283	-83.30	18.96	1.15	43.81	53.98	-10.17
*	15735.00	Peak	V	109	283	-71.89	18.96	0.00	54.07	73.98	-19.91

Table 7-10. Radiated Spurious Emissions Measurements

Plot 7-16. Radiated Spurious Emissions Above 18GHz (BDR – 5157MHz Pol H)



Plot 7-17. Radiated Spurious Emissions Above 18GHz (BDR – 5157MHz Pol V)

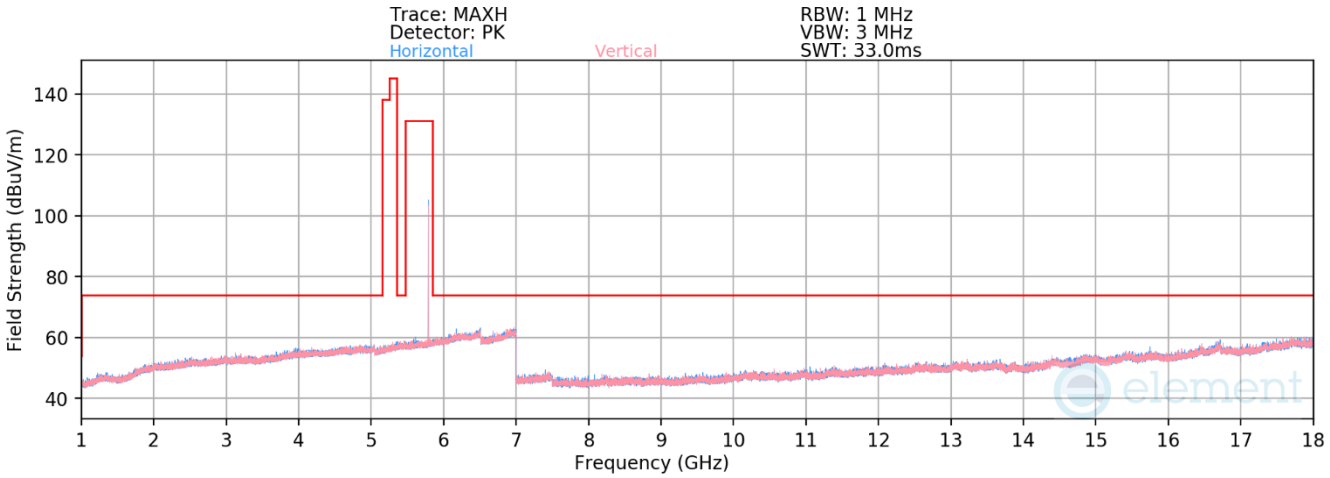


Plot 7-18. Radiated Spurious Emissions 1-18GHz (BDR – 5731MHz)

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	Avg	-	-	-	-82.68	13.30	37.62	53.98	-16.36
*	11462.00	Peak	-	-	-	-71.25	13.30	49.05	73.98	-24.93
	17193.00	Peak	H	304	240	-72.33	22.02	56.69	68.23	-11.54

Table 7-11. Radiated Spurious Emissions Measurements

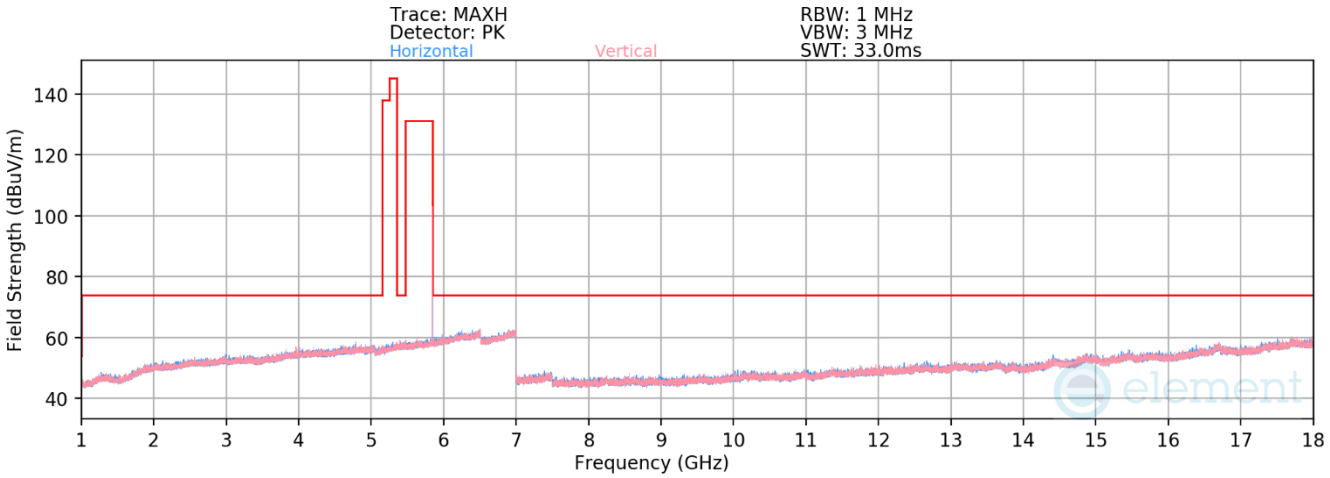


Plot 7-19. Radiated Spurious Emissions 1-18GHz (BDR – 5788MHz)

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]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11576.00	Avg	-	-	-	-83.21	13.44	37.23	53.98	-16.75
*	11576.00	Peak	-	-	-	-71.52	13.44	48.92	73.98	-25.06
	17364.00	Peak	-	-	-	-71.58	22.83	58.25	68.23	-9.98

Table 7-12. Radiated Spurious Emissions Measurements



Plot 7-20. Radiated Spurious Emissions 1-18GHz (BDR – 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	Avg	-	-	-	-83.07	13.74	37.67	53.98	-16.31
*	11688.00	Peak	-	-	-	-70.46	13.74	50.28	73.98	-23.70
	17532.00	Peak	-	-	-	-72.26	23.75	58.49	68.23	-9.74

Table 7-13. Radiated Spurious Emissions Measurements

7.6.2 Radiated Band Edge Measurements

§15.407(b.1), (b.4), §15.205, §15.209

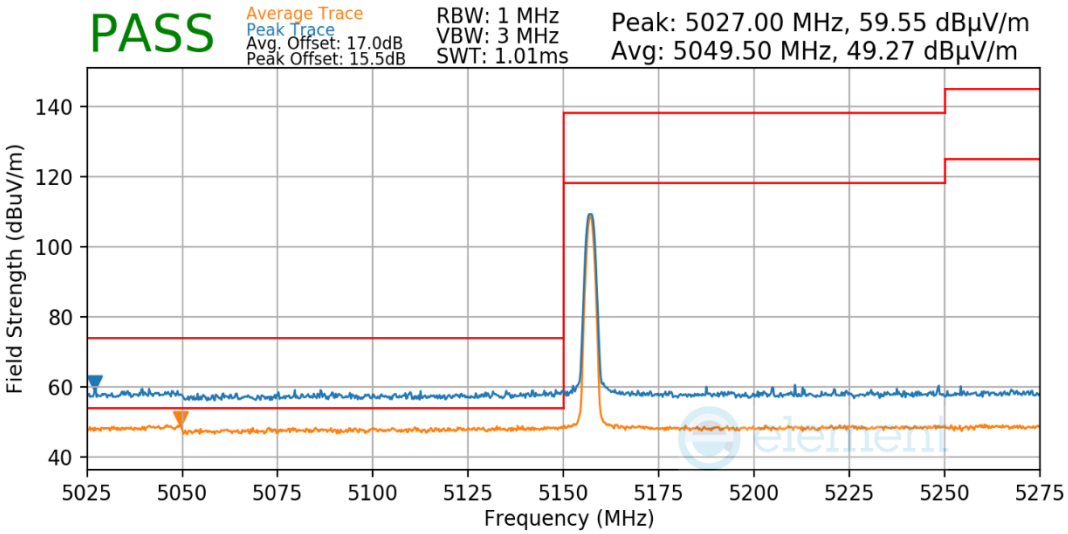
The amplitude offset shown in the following plots for average measurements was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

Mode: BDR

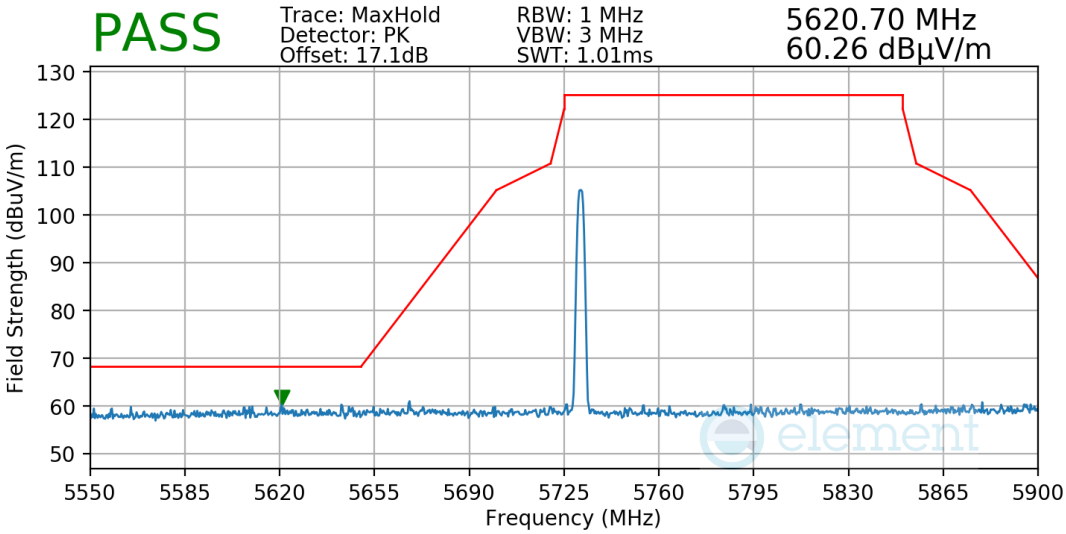
Measurement Distance: 3 Meters

Operating Frequency: 5157MHz



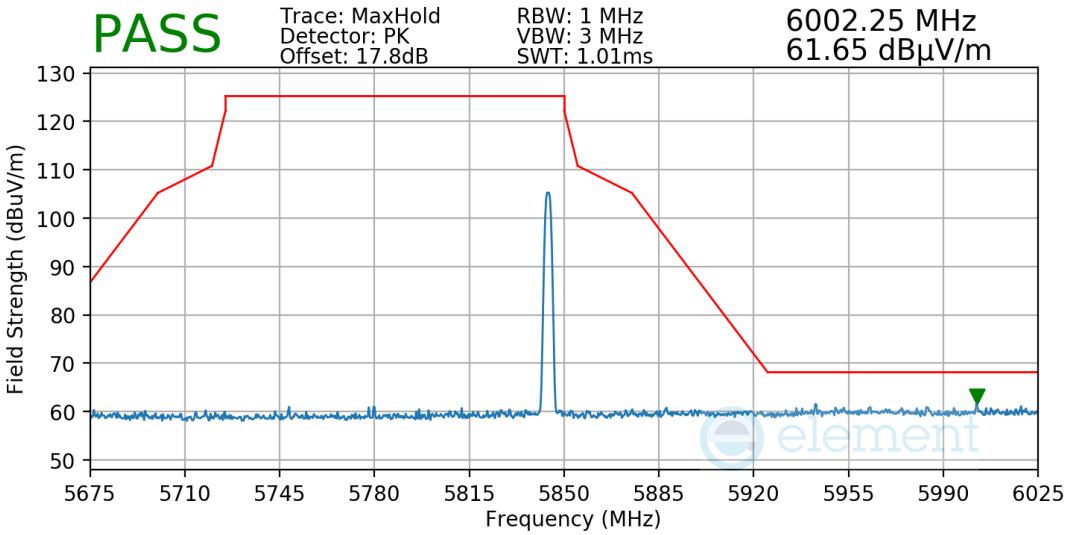
Plot 7-21. Radiated Lower Band Edge Measurement

Mode:	BDR
Measurement Distance:	3 Meters
Operating Frequency:	5731MHz



Plot 7-22. Radiated Lower Band Edge Measurement

Mode:	BDR
Measurement Distance:	3 Meters
Operating Frequency:	5844MHz



Plot 7-23. Radiated Upper Band Edge Measurement

7.7 Radiated Spurious Emissions – Below 1GHz

§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 maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

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 7-14 per Section 15.209.

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-14. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
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 diagrams below.

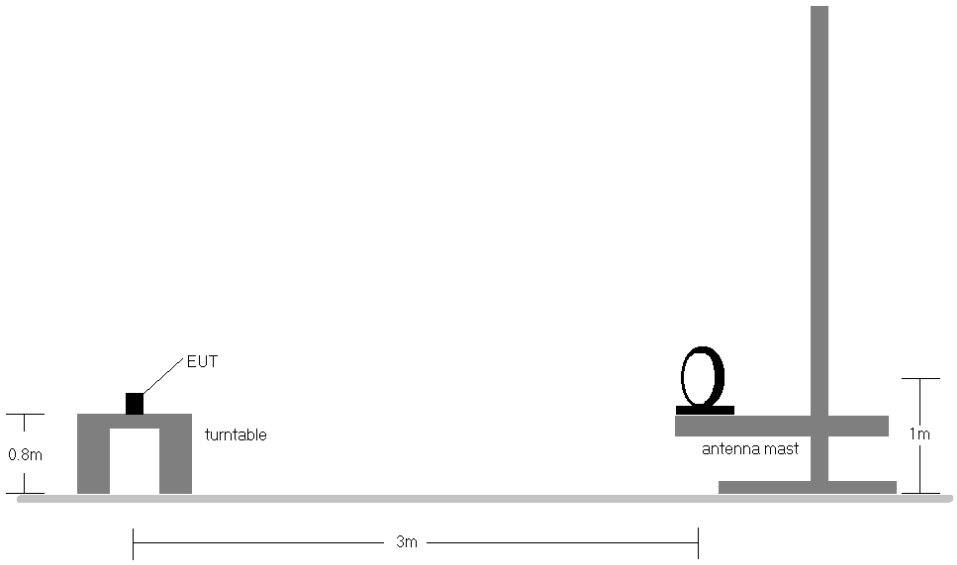


Figure 7-6. Radiated Test Setup < 30MHz

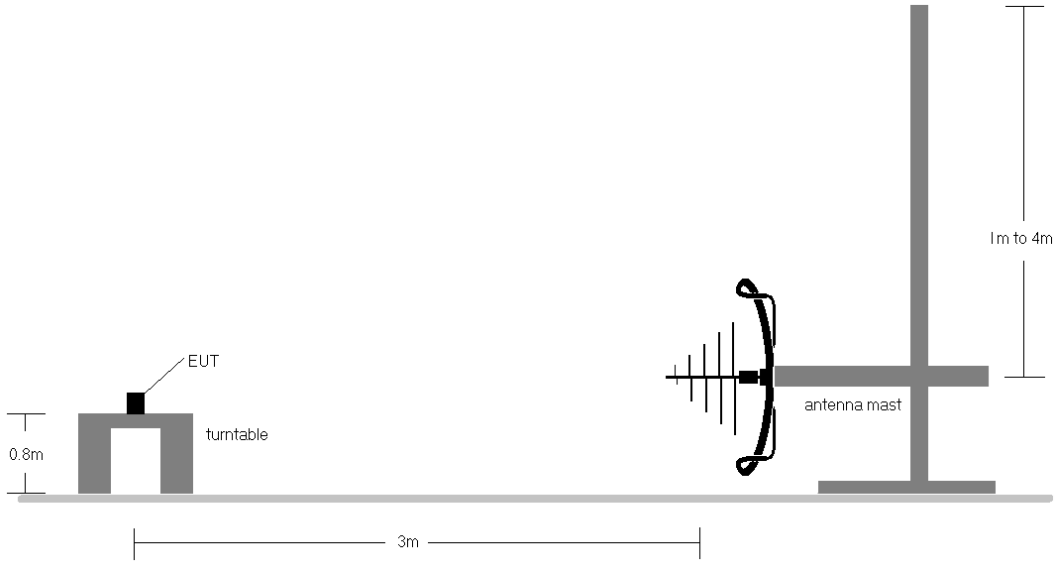


Figure 7-7. Radiated Test Setup < 1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-14.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector for emissions within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. Both configurations below were investigated, and the worst case has been reported.
    a. EUT charged by charging case and powered by AC/DC adaptor with USB-C cable.
    b. EUT charged by charging case and powered by host PC with USB-C cable.

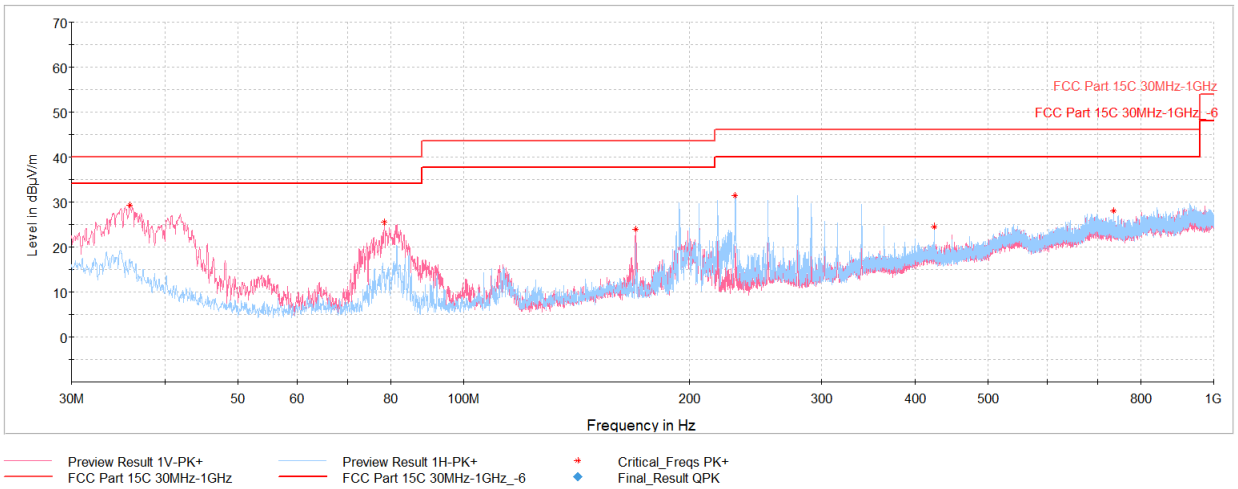
Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level $_{[dB\mu V/m]}$ = 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 $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

Radiated Spurious Emissions (Below 1GHz)

§15.209



Plot 7-24. RSE 30MHz - 1GHz (BDR – 5157MHz), with AC/DC Adapter and USB-C Cable

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]
35.87	Max Peak	V	100	220	-65.52	-12.28	29.20	40.00	-10.80
78.50	Max Peak	V	100	272	-64.10	-17.55	25.35	40.00	-14.65
169.34	Max Peak	V	100	0	-69.81	-13.16	24.03	43.52	-19.49
229.97	Max Peak	H	100	259	-63.97	-11.71	31.32	46.02	-14.70
423.72	Max Peak	H	200	232	-77.03	-5.36	24.61	46.02	-21.41
734.90	Max Peak	H	200	195	-81.12	1.98	27.86	46.02	-18.16

Table 7-15. RSE 30MHz - 1GHz (BDR – 5157MHz), with AC/DC Adapter and USB-C Cable

7.8 AC Line Conducted Emissions Measurement

§15.207

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for AC Line conducted spurious emissions. All data rates and modes were investigated for AC Line conducted spurious emissions.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-16. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Subclause 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Test Setup

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

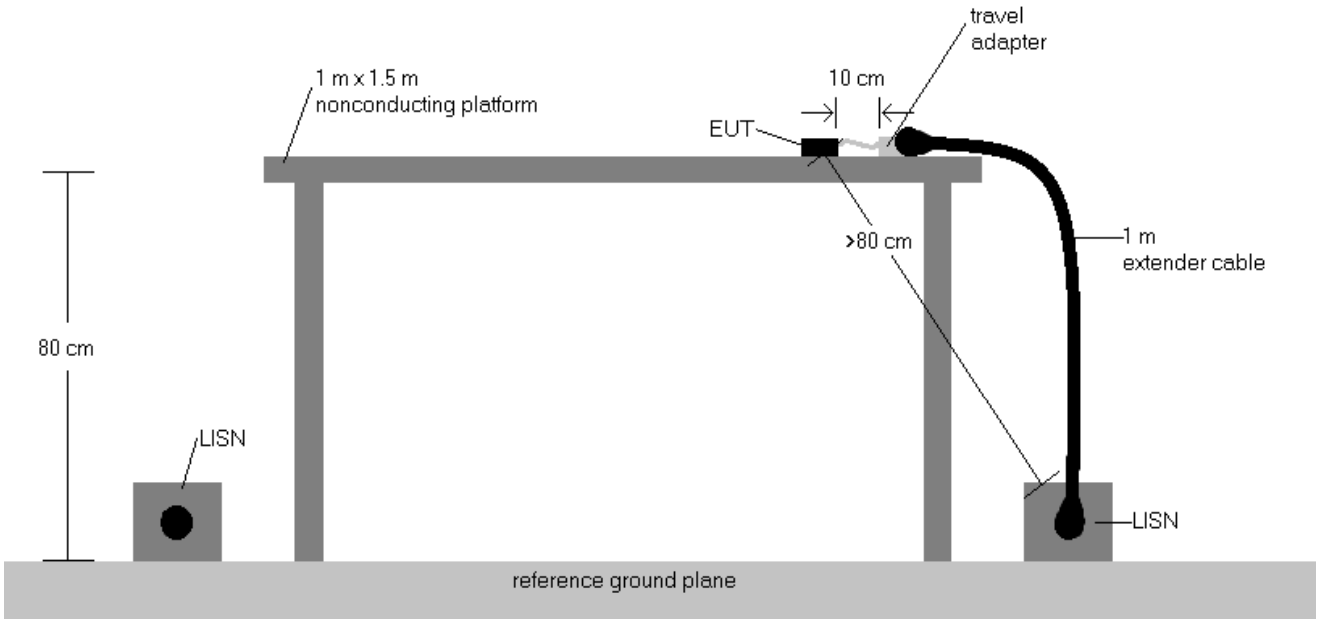
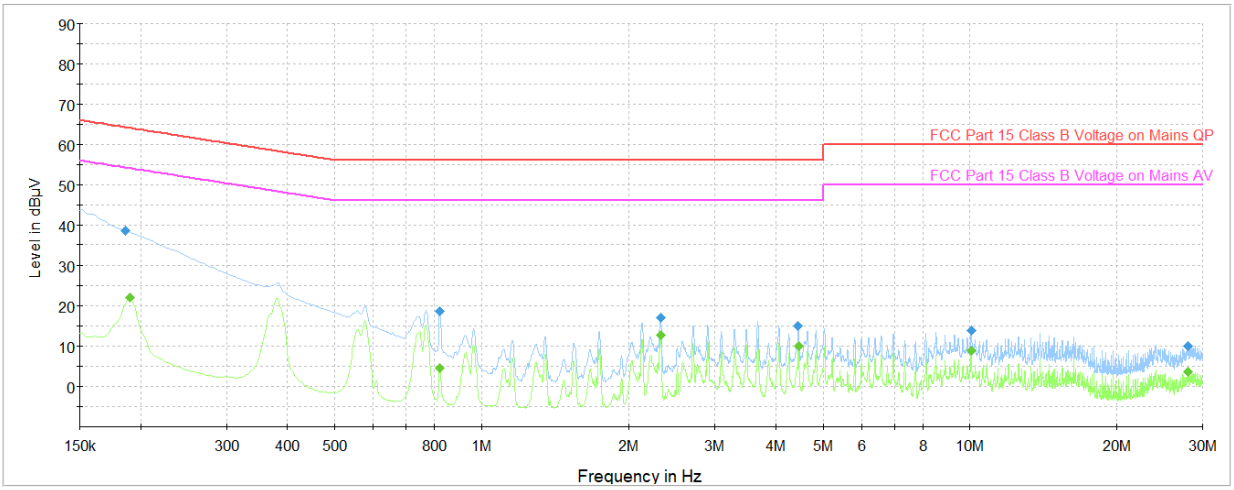


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

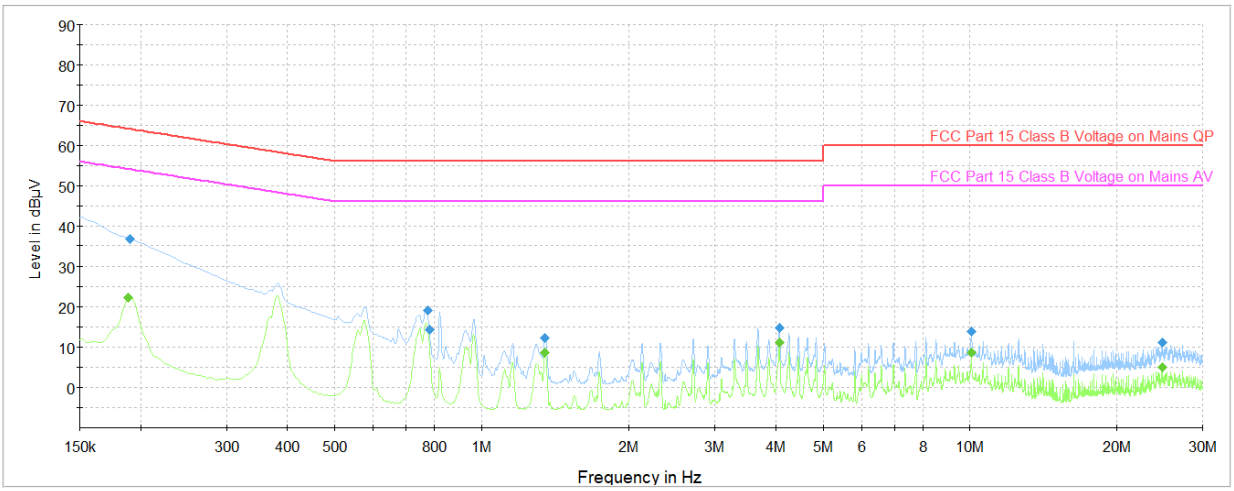
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT charged by charging case and powered by AC/DC adaptor with USB-C cable.
    b. EUT charged by charging case and powered by host PC with USB-C cable.
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
4. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Correction Factor (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plots are made using quasi-peak and average detectors.
8. Deviations to the Specifications: None.



Plot 7-25. AC Line Conducted Plot (BDR – 5157MHz) (L1) with host PC and USB-C cable

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.186	FINAL	38.5	—	64.21	-25.69	L1	GND
0.191	FINAL	—	22.05	54.02	-31.96	L1	GND
0.823	FINAL	—	4.56	46.00	-41.44	L1	GND
0.823	FINAL	18.7	—	56.00	-37.27	L1	GND
2.319	FINAL	17.2	—	56.00	-38.81	L1	GND
2.321	FINAL	—	12.87	46.00	-33.13	L1	GND
4.441	FINAL	15.0	—	56.00	-40.98	L1	GND
4.450	FINAL	—	10.09	46.00	-35.91	L1	GND
10.064	FINAL	—	8.90	50.00	-41.10	L1	GND
10.070	FINAL	13.8	—	60.00	-46.16	L1	GND
28.050	FINAL	—	3.66	50.00	-46.34	L1	GND
28.050	FINAL	10.1	—	60.00	-49.88	L1	GND

Table 7-17. AC Line Conducted (BDR – 5157MHz) (L1) with host PC and USB-C cable



Plot 7-26. AC Line Conducted Plot (BDR – 5157MHz) (N) with host PC and USB-C cable

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.188	FINAL	—	22.35	54.11	-31.76	N	GND
0.191	FINAL	36.7	—	64.02	-27.32	N	GND
0.776	FINAL	19.1	—	56.00	-36.92	N	GND
0.782	FINAL	14.3	—	56.00	-41.71	N	GND
1.349	FINAL	—	8.58	46.00	-37.42	N	GND
1.349	FINAL	12.4	—	56.00	-43.64	N	GND
4.063	FINAL	—	11.08	46.00	-34.92	N	GND
4.065	FINAL	14.9	—	56.00	-41.09	N	GND
10.061	FINAL	13.8	—	60.00	-46.19	N	GND
10.064	FINAL	—	8.72	50.00	-41.28	N	GND
24.790	FINAL	—	4.99	50.00	-45.01	N	GND
24.792	FINAL	11.2	—	60.00	-48.84	N	GND

Table 7-18. AC Line Conducted (BDR – 5157MHz) (N) with host PC and USB-C cable

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Wireless Right Earbud FCC ID: BCG-A3047** is in compliance with Part 15 Subpart E (15.407) of the FCC Rules.