



**CONTENTION BASED PROTOCOL PORTION of FCC 47 CFR PART 15 SUBPART E,
KDB 987594**

CONTENTION BASED PROTOCOL PORTION of RSS-248, ISSUE 2

CERTIFICATION TEST REPORT

FOR

SMARTPHONE

**MODEL NUMBER: A3105 (PARENT MODEL)
A3106 and A3108
(VARIANT MODELS)**

**FCC ID: BCG-E8440A (PARENT MODEL)
BCG-E8441A and BCG-E8442A
(VARIANT MODELS)**

**ISED ID: 579C-E8440A (PARENT MODEL)
579C-E8441A and 579C-E8442A
(VARIANT MODELS)**

REPORT NUMBER: 14523772-E31V1

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Cert. #0751.05

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|---------------|---------------|------------|
| V1 | 08/08/2023 | Initial Issue | -- |

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: SMARTPHONE

MODEL NUMBER: A3105 (PARENT MODEL)
A3106 and A3108 (VARIANT MODELS)

MODEL TESTED: A3105

SERIAL NUMBER: N5HH7647FY

DATE TESTED: JUNE 29; JULY 10 to 11 and JULY 13, 2023

| APPLICABLE STANDARDS | |
|--|--------------|
| STANDARD | TEST RESULTS |
| Contention Based Protocol Portion of 47 CFR Part 15 Subpart E, KDB 987594 | Complies |
| Contention Based Protocol Portion of RSS-248, Issue 2 | Complies |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

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TEST METHODOLOGY

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following standards/rules/KDBs:

- FCC KDB 987594 D01 U-NII 6GHz General Requirements v01r03
- FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01
- FCC KDB 987594 D03 U-NII 6GHz Q&A v01
- FCC KDB 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01
- RSS-248, ISSUE 2

3. SUMMARY OF TEST RESULTS

| Requirement Description | Result | Remarks |
|---|----------|---------|
| Contention Based Protocol Portion of FCC 47 CFR PART 15 SUBPART E, KDB 987594 | Complies | |
| Contention Based Protocol Portion of RSS-248, Issue 2 | Complies | |

4. REFERENCE DOCUMENTS

Measurements of transmitter parameters as referenced in this report and all other manufacturer's declarations relevant to the RF test requirements are documented in UL Verification Services report number 14523772-E10V2 & E11V2 FCCISED UNII WLAN 6E_11ax Conducted Report".

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

5. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

| | Address | ISED CABID | ISED Company Number | FCC Registration |
|-------------------------------------|--|------------|---------------------|------------------|
| <input checked="" type="checkbox"/> | Building 1: 47173 Benicia Street, Fremont, California, USA | US0104 | 2324A | 550739 |

6. DECISION RULES AND MEASUREMENT UNCERTAINTY

6.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

6.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

7. MODEL DIFFERENCES

The manufacturer hereby declares that:

- All Models use the same System and Cellular radio electrical schematics.
- Removal of FR2 and LTE bands on models not supporting them, is done by de-population of related components. Electrically there is no difference among the models.
- Models A3105, A3106 and A3108 support the same Wi-Fi/ BT.
- All Models use the same Applications Processor and PMU.
- All Models use the same UICC hardware/software interface.
- All Models run the same baseband firmware and iOS software.

The characteristics listed above do not have any influence upon the FCC Contention Based Protocol performance of the models covered by this report and therefore the test results documented for Parent Model A3105 for may be applied as representative to Variant Models A3106 and A3108.

Additional spot check testing will be performed to confirm that the data presented in the report for Parent Model A3105 is representative to Variant Models A3106 and A3108 within the scope of this report.

8. CONTENTION BASED PROTOCOL

8.1. OVERVIEW

8.1.1. LIMITS

FCC

FCC Part 15 Subpart E, FCC KDB 987594 "U-NII 6 GHz devices operating in the 5.925-7.125 GHz band"; Section I.

INNOVATION, SCIENCE and ECONOMIC DEVELOPMENT CANADA (ISED)

Per Section 4.8.1 of RSS-248, Issue 2:

"The Federal Communications Commission's accepted KDB procedure KDB 987594 D02 shall be used to demonstrate the compliance of a device with the contention-based protocol requirements set out in this section:

8.1.1. FREQUENCY BANDS AND GOVERNING RULES

FCC Rules

| Band | Frequency (GHz) | Rules | Notes | KDB/Publication |
|---------|-----------------|------------------------|-------------|-----------------|
| U-NII 5 | 5.925-6.425 | 15.407(a)(4) – (8) | Dual Client | 987594 |
| U-NII 6 | 6.425-6.525 | 15.407(a)(5), (6), (8) | Dual Client | |
| U-NII 7 | 6.525-6.875 | 15.407(a)(4) – (8) | Dual Client | |
| U-NII 8 | 6.875 -7.125 | 15.407(a)(5), (6), (8) | Dual Client | |

ISED Rules

| Band | Frequency (GHz) | Rules | Notes | KDB/Publication |
|---------|-----------------|----------------------|-------------|-----------------|
| U-NII 5 | 5.925-6.425 | RSS 248, section 4.7 | Dual Client | 987594 D02 |
| U-NII 6 | 6.425-6.525 | RSS 248, section 4.7 | Dual Client | |
| U-NII 7 | 6.525-6.875 | RSS 248, section 4.7 | Dual Client | |
| U-NII 8 | 6.875 -7.125 | RSS 248, section 4.7 | Dual Client | |

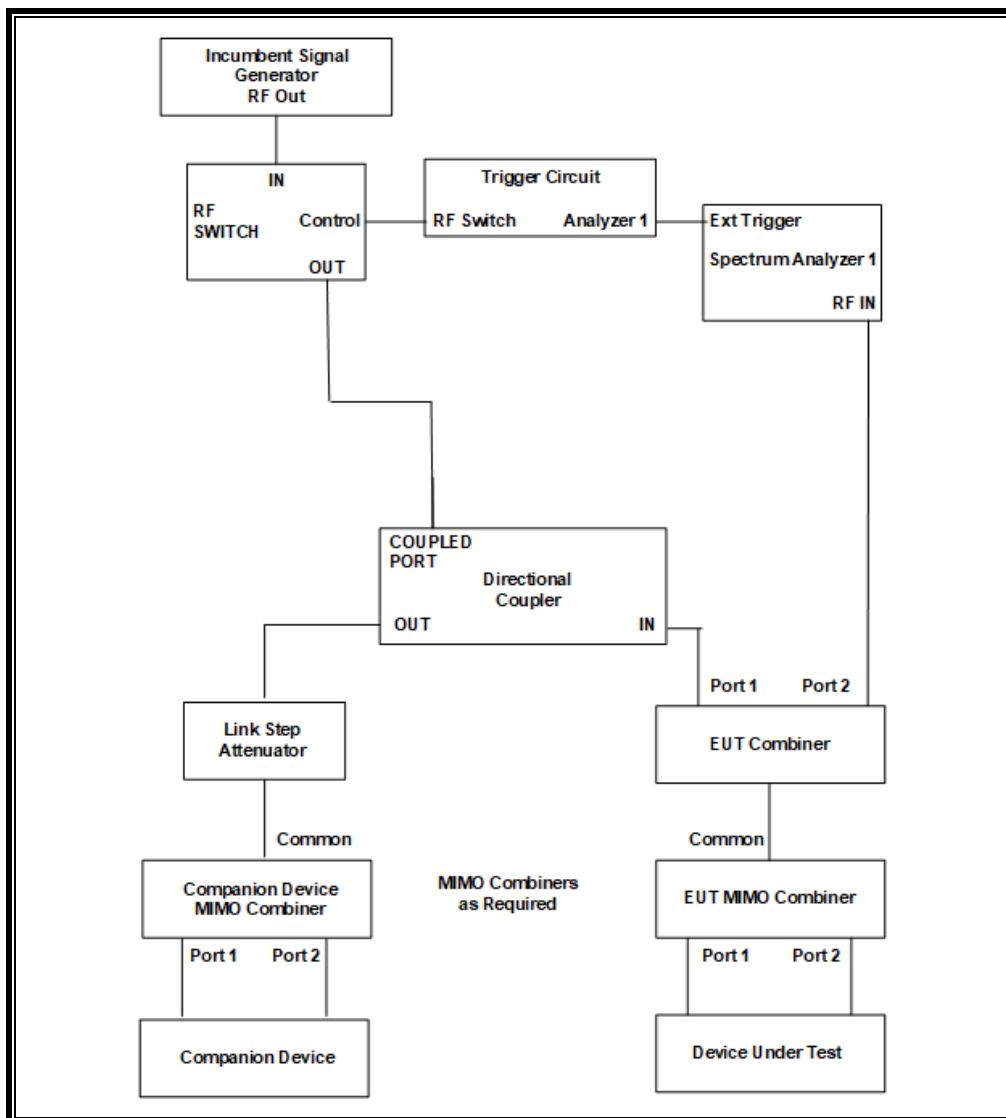
8.2. DESCRIPTION OF TEST SETUP

8.2.1. TEST AND MEASUREMENT SYSTEM

These tests were performed using a Conducted instrument configuration.

CONDUCTED TEST CONFIGURATION

NOTE: This is a comprehensive setup diagram of the receiver performance test and measurement system. Not all of the devices shown below are used for every applicable receiver test. Also, coupler port designations “IN” and “OUT” refer to labeling on the coupler, not the RF signal flow.



SYSTEM OVERVIEW

Should multiple RF ports be utilized for the EUT and/or Companion devices (for example, for diversity or MIMO implementations), combiner/dividers are inserted between the EUT MIMO Combiner/Divider and the attenuator connected to the EUT (and/or between the Companion MIMO Combiner/Divider and the attenuator connected to the Companion Device). Additional attenuators may be utilized such that there is one attenuator at each RF port on each device.

SYSTEM CALIBRATION

The monitoring cable is disconnected from the spectrum analyzer and a 50-ohm load is connected to the end of the monitoring cable in place of the spectrum analyzer. The cable connected to the EUT is then attached to the spectrum analyzer in place of the monitoring cable. A signal generator is then set to produce a modulated AWGN Incumbent Signal that has a 99% occupied power bandwidth of 10 MHz. The output amplitude of the signal generator is adjusted to yield the allowable maximum AWGN Incumbent Signal level as measured on the spectrum analyzer. The EUT and monitoring cables are then returned to their original configurations to perform the test.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | |
|--|--------------|---------|--------|----------|
| Description | Manufacturer | Model | ID No. | Cal Due |
| Spectrum Analyzer, PXA, 3Hz to 8.4GHz | Keysight | N9030A | 150667 | 01/31/24 |
| Signal Generator, MXG X-Series RF Vector | Keysight | N5182B | 215999 | 02/07/24 |
| Frequency Extender | Keysight | N5182BX | 213906 | 02/06/24 |

Note: An MXG series Signal Generator and separate external Frequency Extender module are shown in the preceding test system block diagram as a stand-alone Incumbent Signal Generator.

8.2.2. TEST AND MEASUREMENT SOFTWARE

The following test and measurement software was utilized for the tests documented in this report:

| TEST SOFTWARE LIST | | |
|--------------------|---------|---------------------------------|
| Name | Version | Test / Function |
| PXA Read | 3.1 | Signal Generator Screen Capture |

8.2.3. TEST ROOM ENVIRONMENT

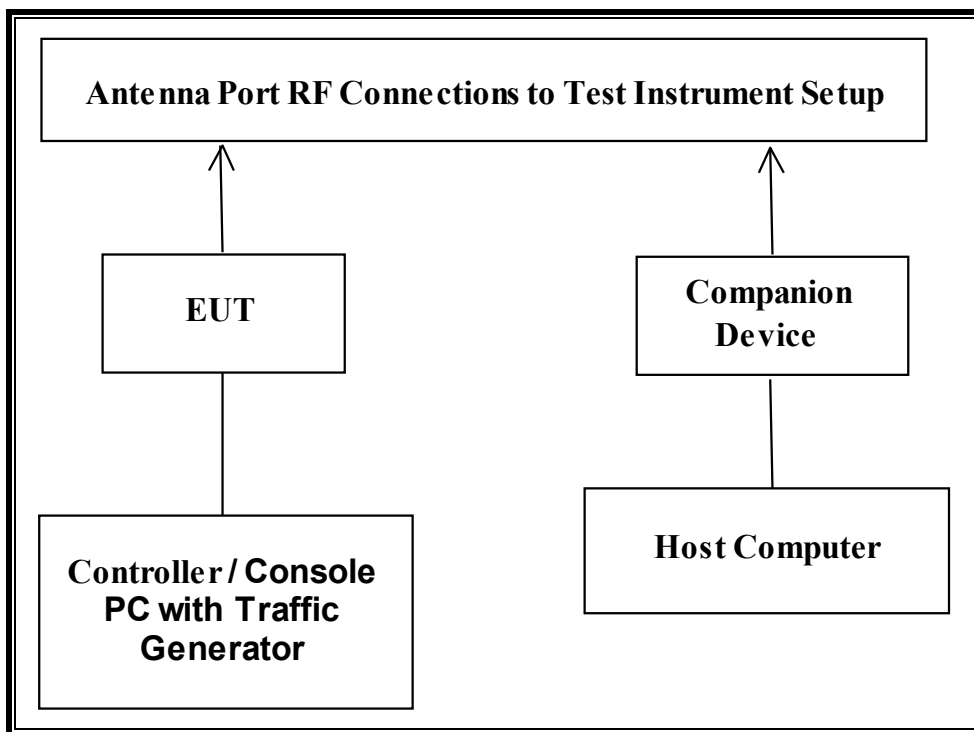
The test room temperature and humidity shall be maintained within normal temperature of 15~35 °C and normal humidity 20~75% (relative humidity).

ENVIRONMENT CONDITION

| Parameter | Value |
|-------------|------------------------------|
| Temperature | 24.1, 22.6, 23.2 and 24.0 °C |
| Humidity | 54, 53, 49 and 50 % |

8.2.4. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the tests documented in this report:

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | |
|--|-----------------------------|------------------|------------------------|--------------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| Notebook PC 1 (EUT Console) | Apple | A2779 | C962RJ4D3Y | DoC |
| WiFi 6e Gaming Router (Companion Device) | ASUS Computer International | GT-AXE11000 | M9IG0X403210HEZ | MSQ-RTAXJF00 |
| AC Adapter 1 (Companion) | AC BEL | ADD011 LPS | ADD01117AG213402136A | DoC |
| Notebook PC 2 (Companion Host) | Lenovo | Type 20B7-S0A200 | PF-02JN9J 14/06 | DoC |
| AC Adapter 2 (Notebook PC 2) | Lenovo | ADLX65NLC2A | 11S45N0259Z1ZS974594A9 | DoC |

8.2.5. DESCRIPTION OF EUT

The EUT operates in the following band / bands: U-NII 5 (5925 MHz-6425 MHz), U-NII 6 (6425 MHz-6525 MHz), U-NII 7 (6525 MHz-6875 MHz) and U-NII 8 (6875 MHz-7125 MHz).

The EUT is classified as a 6 GHz Dual Client.

The manufacturer has declared that the lowest gain antenna assembly utilized with the EUT has a gain of -4.4 dBi in the U-NII 5 band, -1.1 dBi in the U-NII 6 band, -5.8 dBi in the U-NII 7 band and -6.4 dBi in the U-NII 8 band.

Two antennas are utilized to meet the diversity and MIMO operational requirements.

The maximum allowable conducted AWGN Incumbent Detection Threshold level is -62 dBm/MHz. After correction for antenna gain the conducted AWGN Incumbent Detection Threshold at the antenna port is -62 + antenna gain. This results in a maximum allowable AWGN Incumbent Detection Threshold of -66.4 dBm in the U-NII 5 band, -63.1 dBm in the U-NII 6 band, -67.8 dBm in the U-NII 7 band and -68.4 dBm in the U-NII 8 band.

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. All antenna ports are connected to the test system via a power divider to perform conducted tests.

WLAN traffic was generated by transferring a data stream from the EUT to the Companion Device using iPerf version 2.0.5 software package.

The EUT utilizes the 802.11ax architecture. Four nominal channel bandwidths are implemented: 20 MHz, 40 MHz, 80 MHz and 160 MHz.

The software installed in the EUT is version 17.0.

The firmware installed in the Companion Device is ASUS version V3.0.0.4.386.42489.

TEST SETUP

The EUT is attached to a USB port of a host notebook PC during testing. The EUT is linked to a companion 802.11 wireless radio device. A commercial traffic generation program (iPERF) was utilized to generate traffic from the EUT to the companion radio device.

9. CONTENTION BASED PROTOCOL

9.1. LIMITS AND PROCEDURES

LIMITS

FCC Part 15 Subpart E, FCC KDB 987594 "U-NII 6 GHz devices operating in the 5.925-7.125 GHz band"; Section I.

AWGN INCUMBENT SIGNAL DETECTION THRESHOLD

FCC Part 15 Subpart E, FCC KDB 987594 "U-NII 6 GHz devices operating in the 5.925-7.125 GHz band"; Section I, Clause (c), Step 6.

For an EUT with a non-zero dBi antenna gain the maximum detection threshold level, T_L , of the 10 MHz wide AWGN Incumbent Signal at the port of the radio module in a conducted test setup shall be no greater than -62 dBm/MHz. It shall be adjusted by the gain of the bypassed antenna as shown in the table below:

| Band | Frequency Range (MHz) | Antenna Gain (dBi) | T_L at Radio Port (dBm/MHz) |
|---------|-----------------------|--------------------|-------------------------------|
| U-NII 5 | 5925 to 6425 | -4.4 | -66.4 |
| U-NII 6 | 6425 to 6525 | -1.1 | -63.1 |
| U-NII 7 | 6525 to 6875 | -5.8 | -67.8 |
| U-NII 8 | 6875 to 7125 | -6.4 | -68.4 |

TEST PROCEDURE

FCC Part 15 Subpart E, FCC KDB 987594 "U-NII 6 GHz devices operating in the 5.925-7.125 GHz band"; Section I, Clause (c).

9.2. U-NII 5 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

$$99\% BW_{EUT} \leq 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.3. U-NII 5 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

$$99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$$

9.3.1. TEST CHANNEL

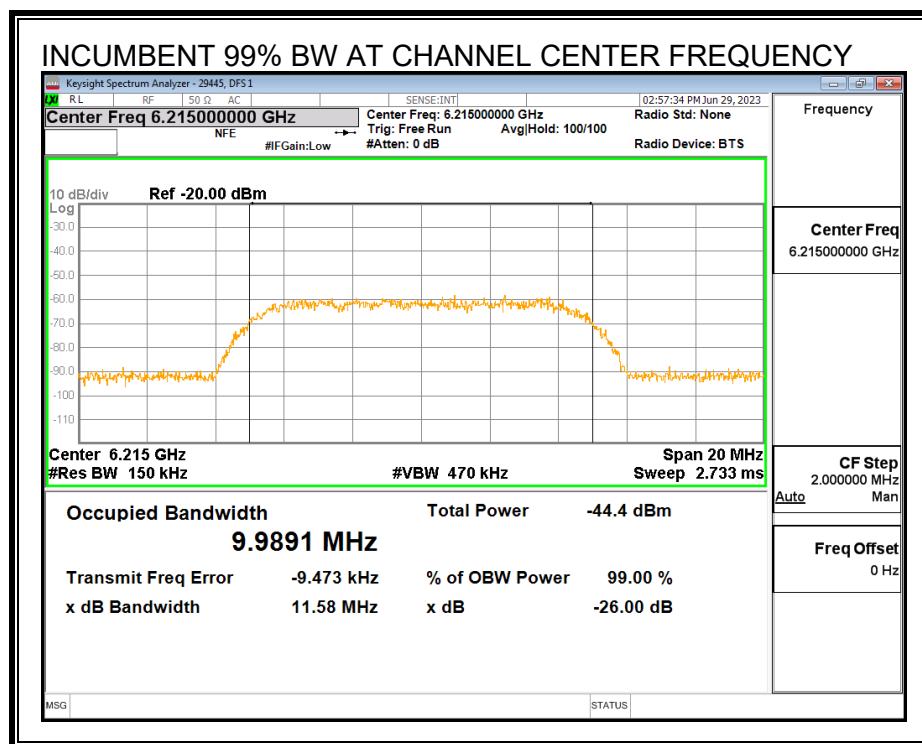
All tests were performed with the EUT set to a channel center frequency of 6215 MHz and a nominal channel bandwidth of 20 MHz.

Only the lowest and highest supported channel bandwidths are required to be tested.

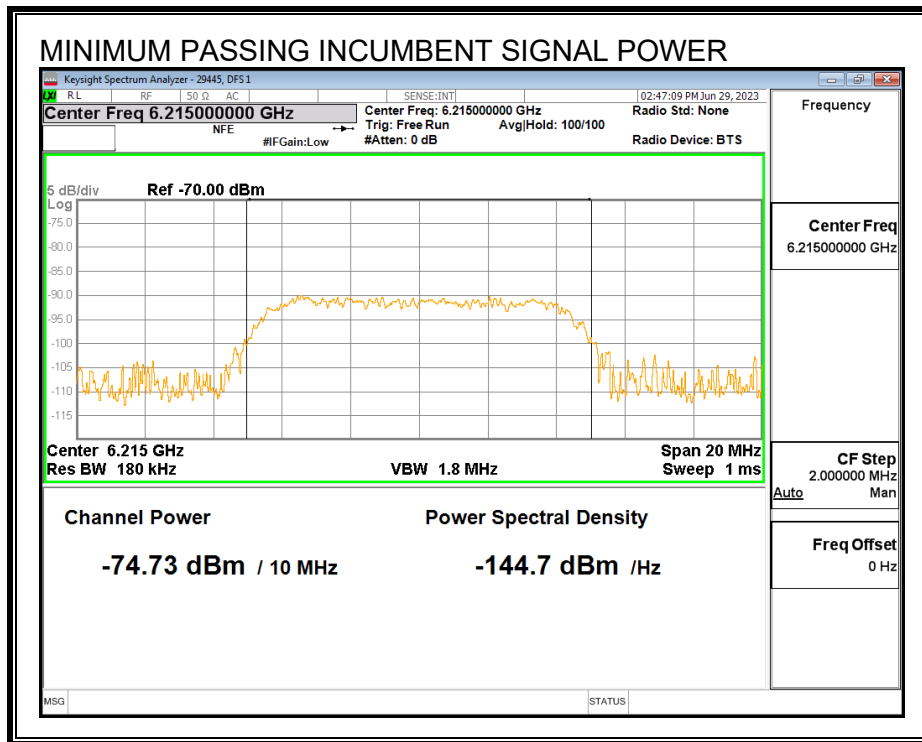
9.3.2. INCUMBENT SIGNAL PLOTS

All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

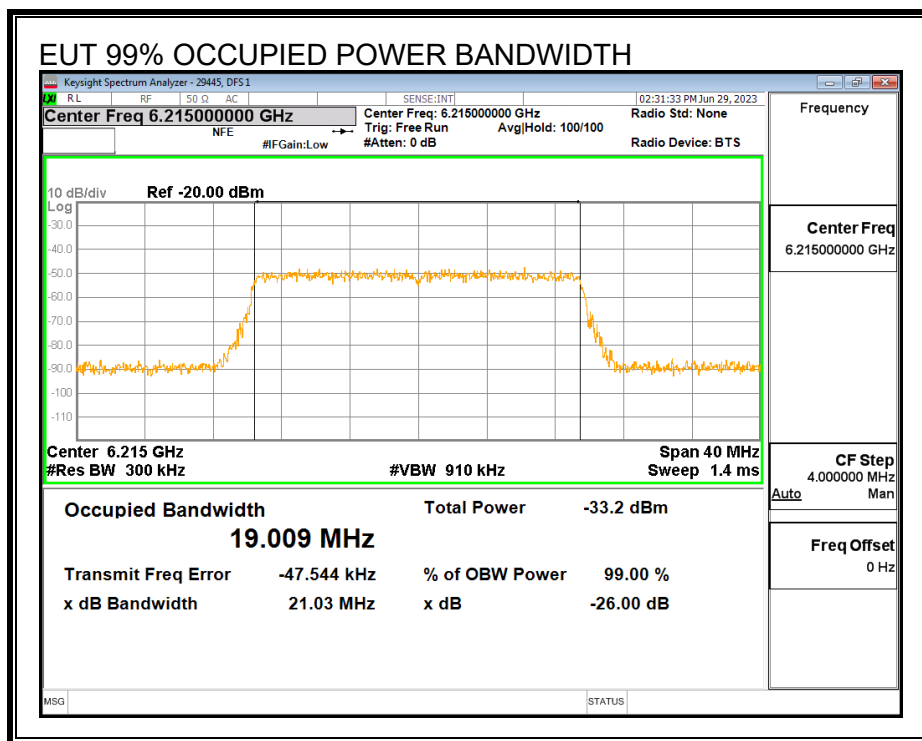


MINIMUM PASSING INCUMBENT SIGNAL POWER

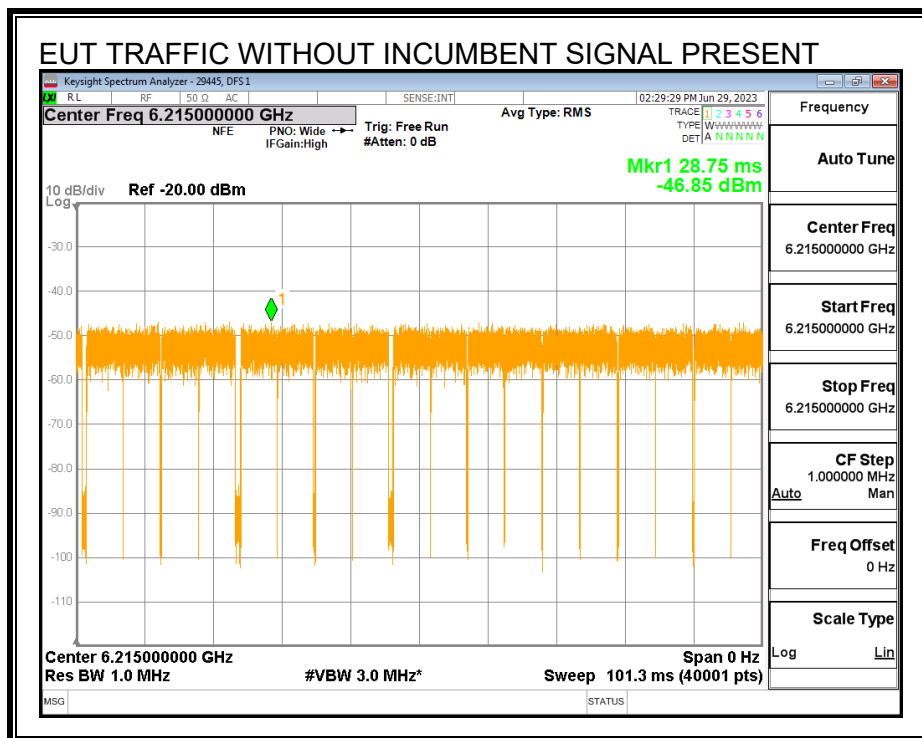


9.3.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

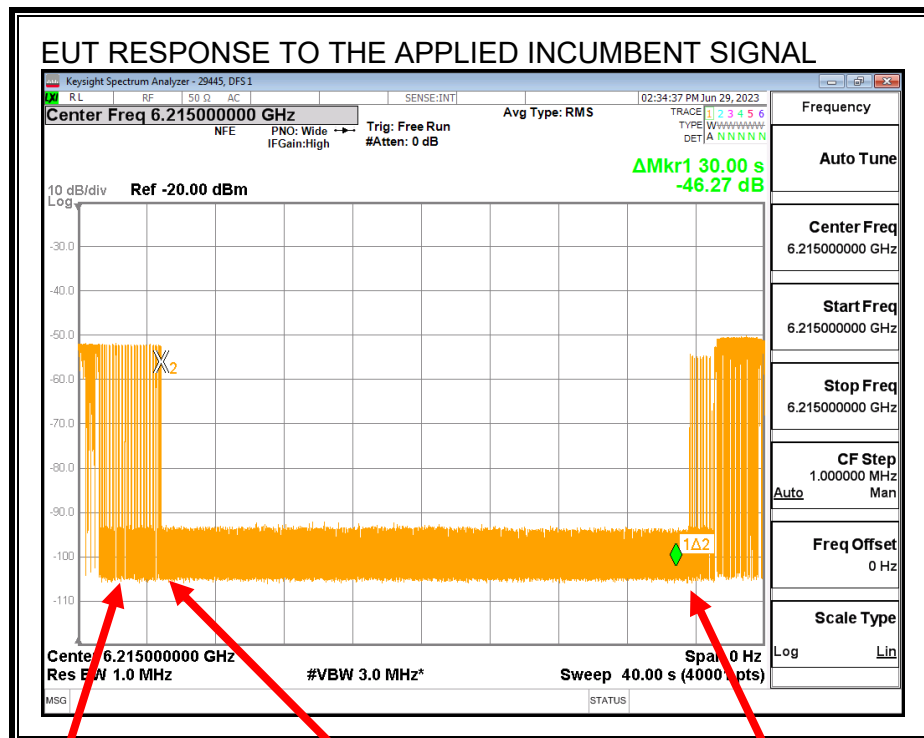


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.3.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|-------------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6215 |
| EUT Nominal Channel Bandwidth (MHz) | 20 |
| 99% Occupied Bandwidth of the EUT (MHz) | 19.009 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6205.50 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6224.50 |
| Test Frequency of Incumbent Signal (MHz) | 6215 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -4.4 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -66.4 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude (dBm) | -79.23 |
| Margin (dBm) | -12.83 |
| Result (PASS / FAIL) | PASS |

Test Date: 06/29/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| AWGN Detected (Yes / No) | |
|--------------------------|----------------------------|
| Trial | Incumbent AWGN at f_{c1} |
| 1 | Yes |
| 2 | Yes |
| 3 | Yes |
| 4 | Yes |
| 5 | Yes |
| 6 | No |
| 7 | Yes |
| 8 | Yes |
| 9 | Yes |
| 10 | Yes |
| Test Result | PASS |

Test Date: 06/29/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.3.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: $99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$

Incumbent AWGN at f_{c1} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -74.73 | 4.5 | -79.23 | -4.4 | -74.83 | -62 | Ceased |
| -79.52 | 4.5 | -84.02 | -4.4 | -79.62 | -62 | Minimal |
| -80.04 | 4.5 | -84.54 | -4.4 | -80.14 | -62 | Normal |

Test Date: 06/29/23

Tested by: 29445

Test location: DFS 1

9.4. U-NII 5 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

$$2 \times 99\% BW_{INC} < 99\% BW_{EUT} \leq 4 \times 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.5. U-NII 5 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

$$99\% BW_{EUT} > 4 \times 99\% BW_{INC}$$

9.5.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6185 MHz and a nominal channel bandwidth of 160 MHz.

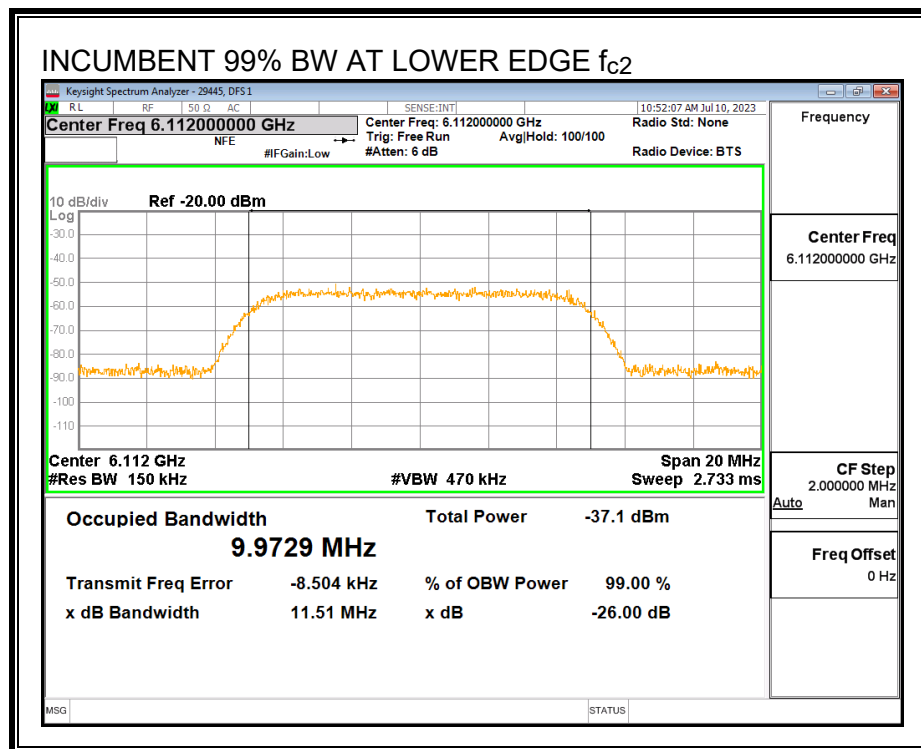
Only the lowest and highest supported channel bandwidths are required to be tested.

9.5.2. INCUMBENT SIGNAL PLOTS

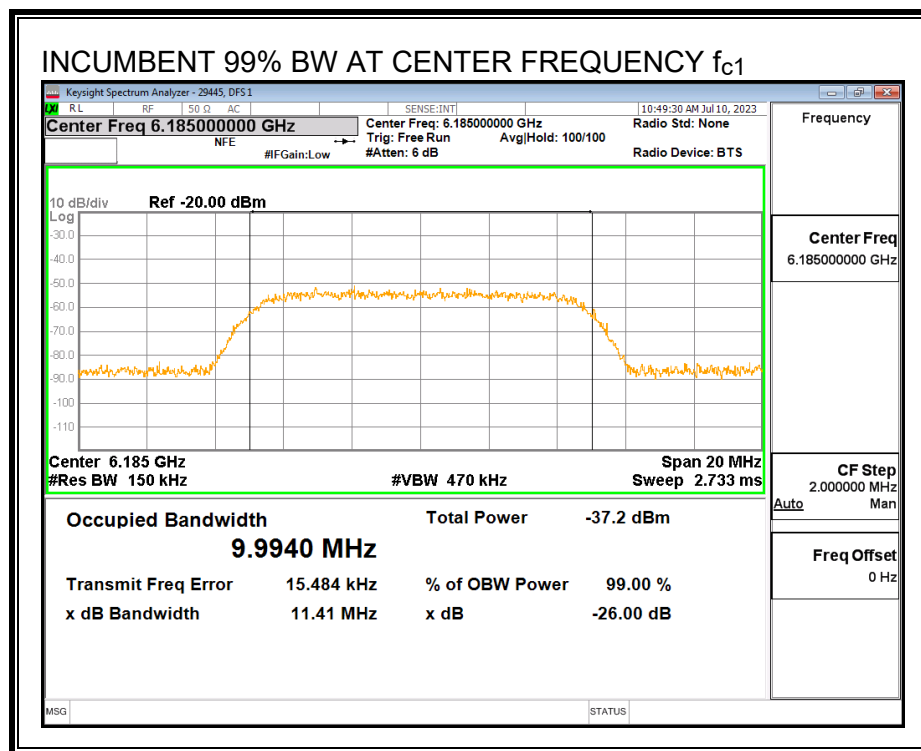
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

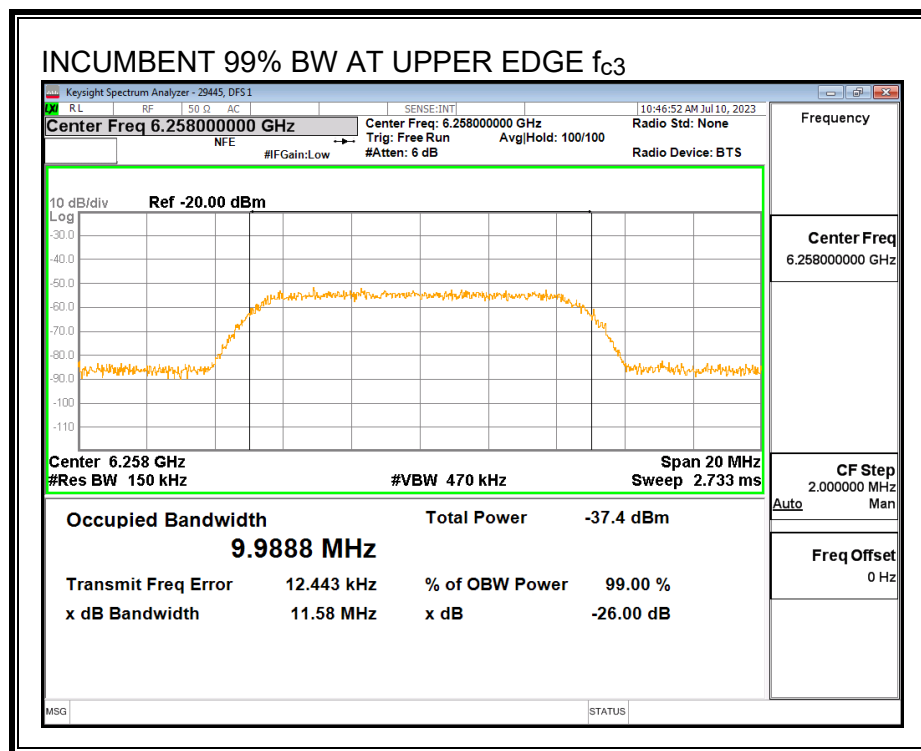
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

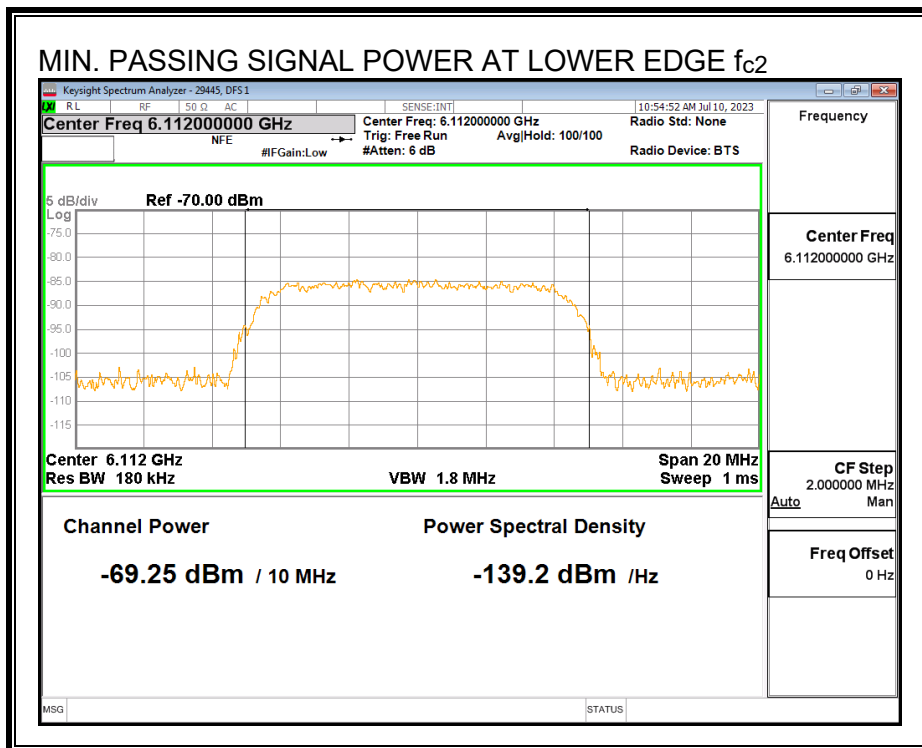


Upper Edge Incumbent Signal f_{c3} :

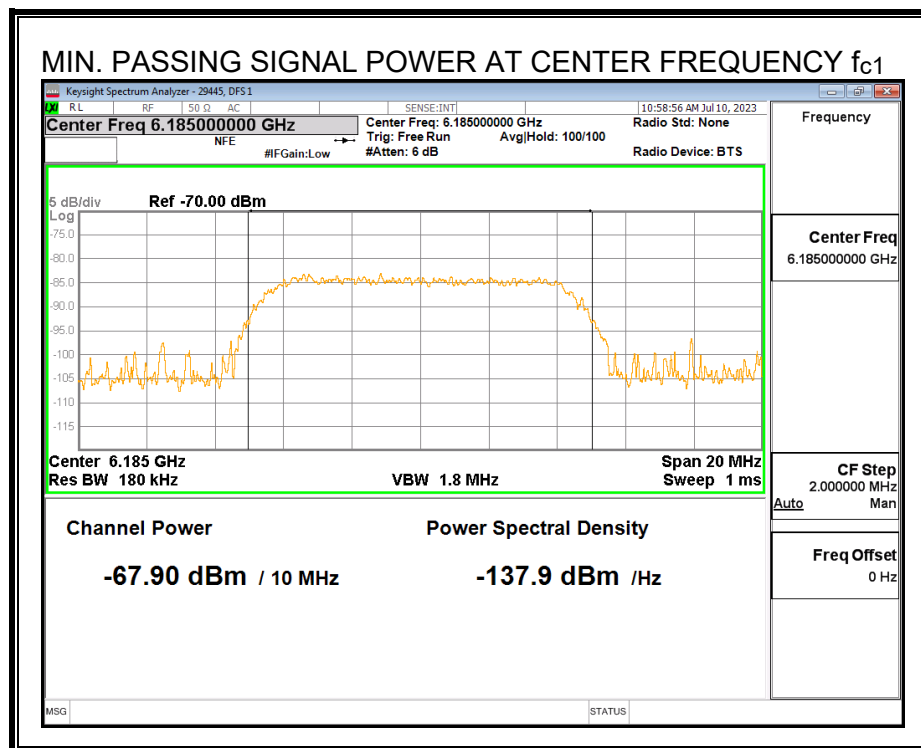


MINIMUM PASSING INCUMBENT SIGNAL POWER

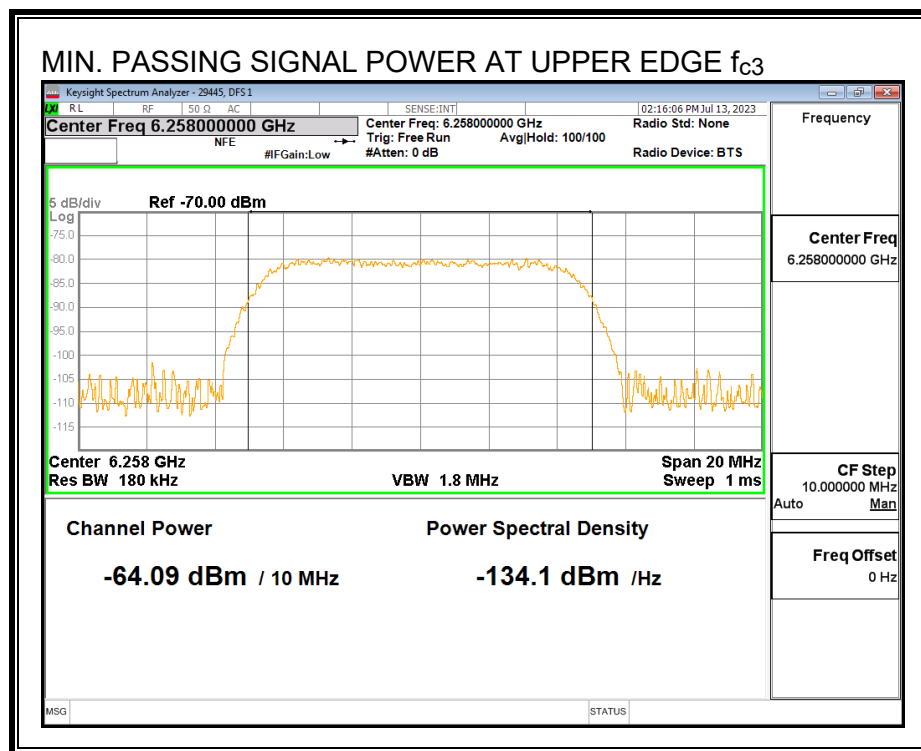
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

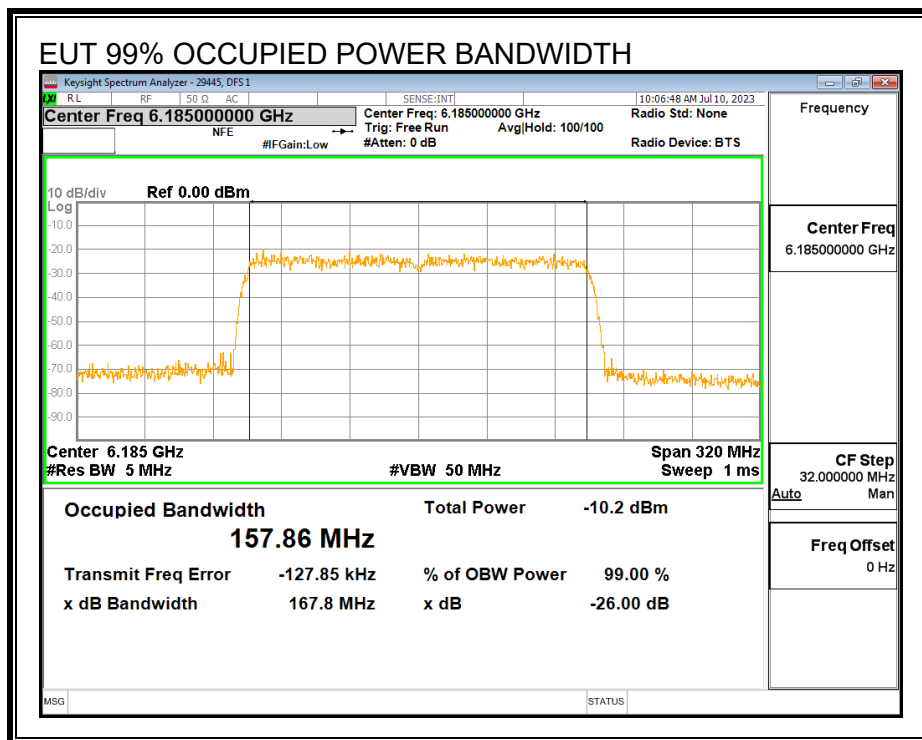


Upper Edge Incumbent Signal f_{c3} :



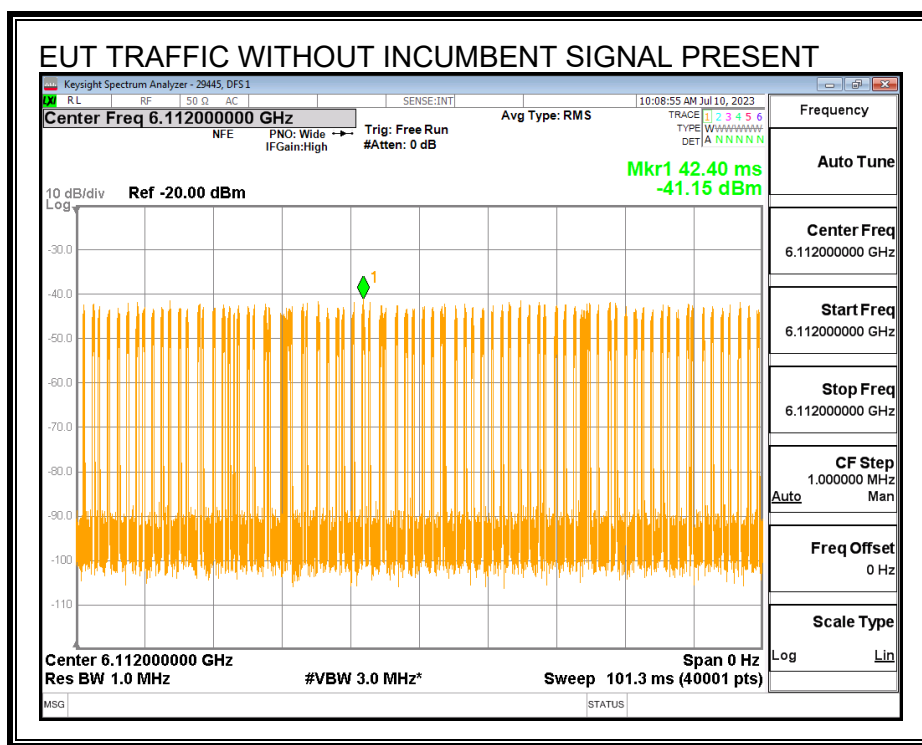
9.5.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

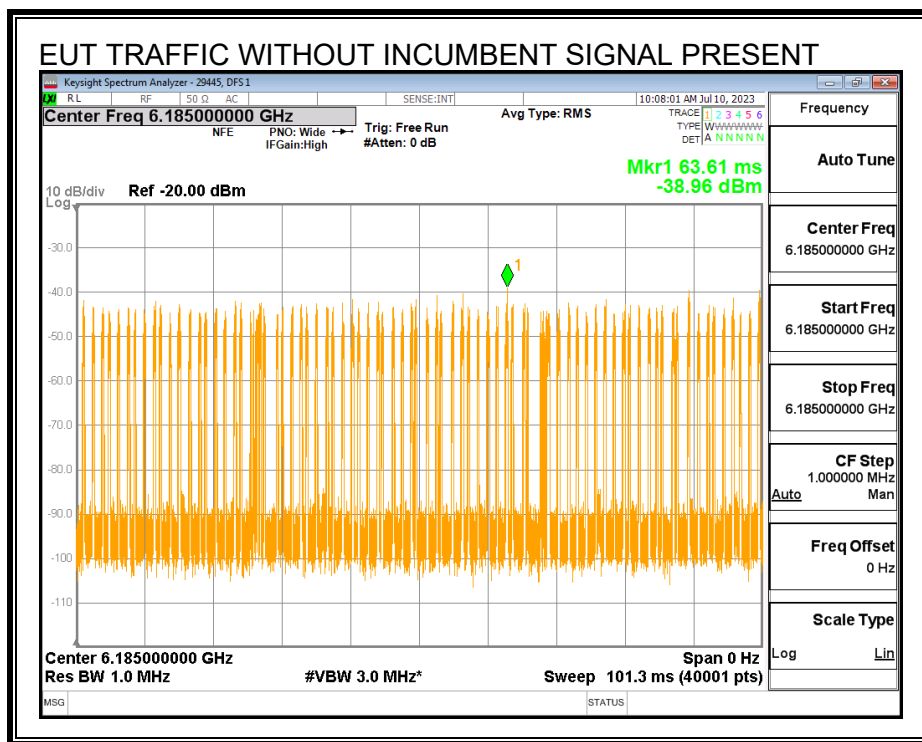


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

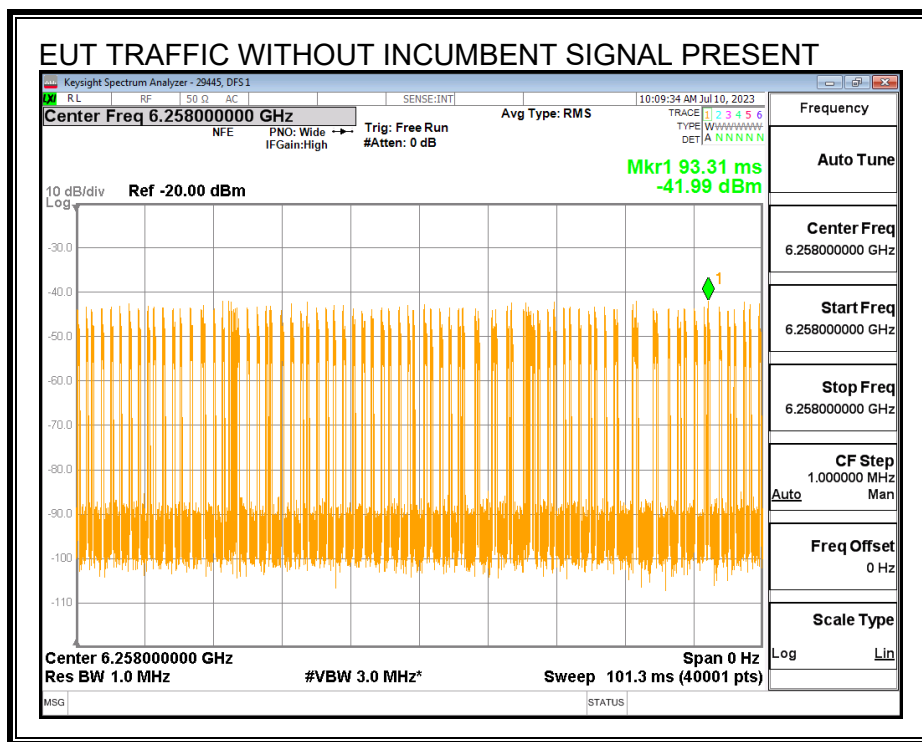
Lower Edge f_{c2} :



Center Frequency f_{c1} :



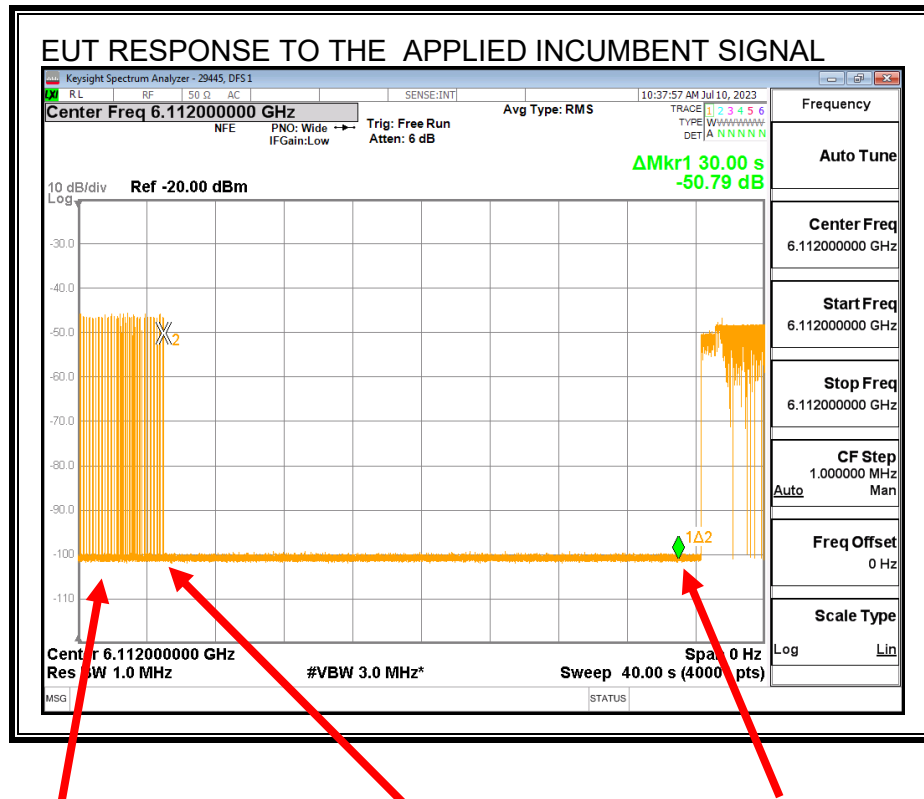
Upper Edge f_{c3} :



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.

Lower Edge Incumbent Signal f_{c2} :



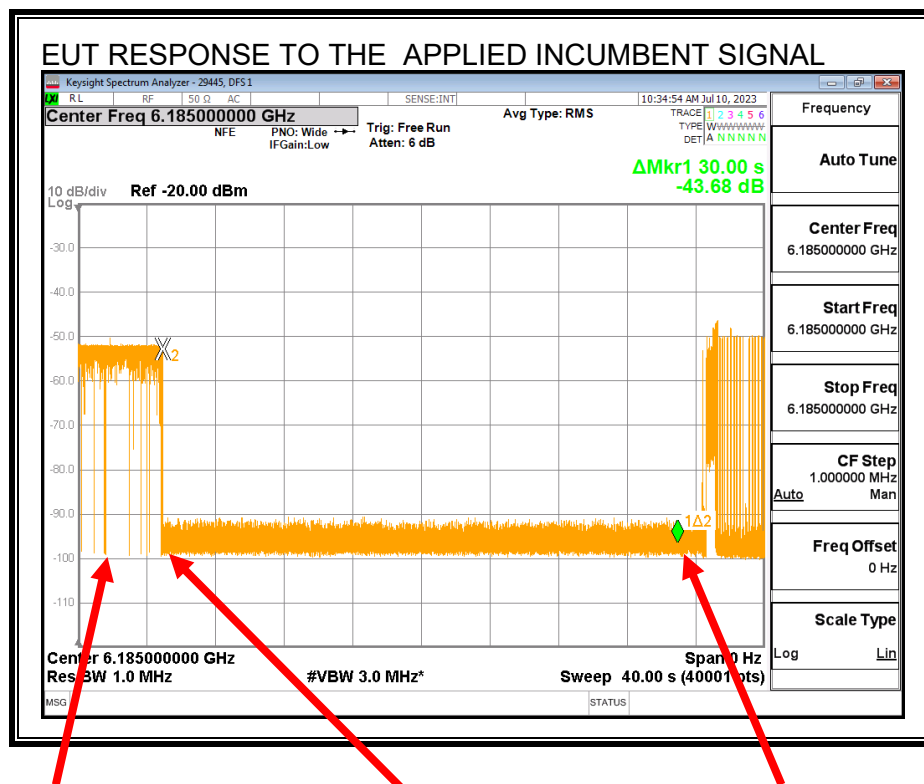
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{c1} :



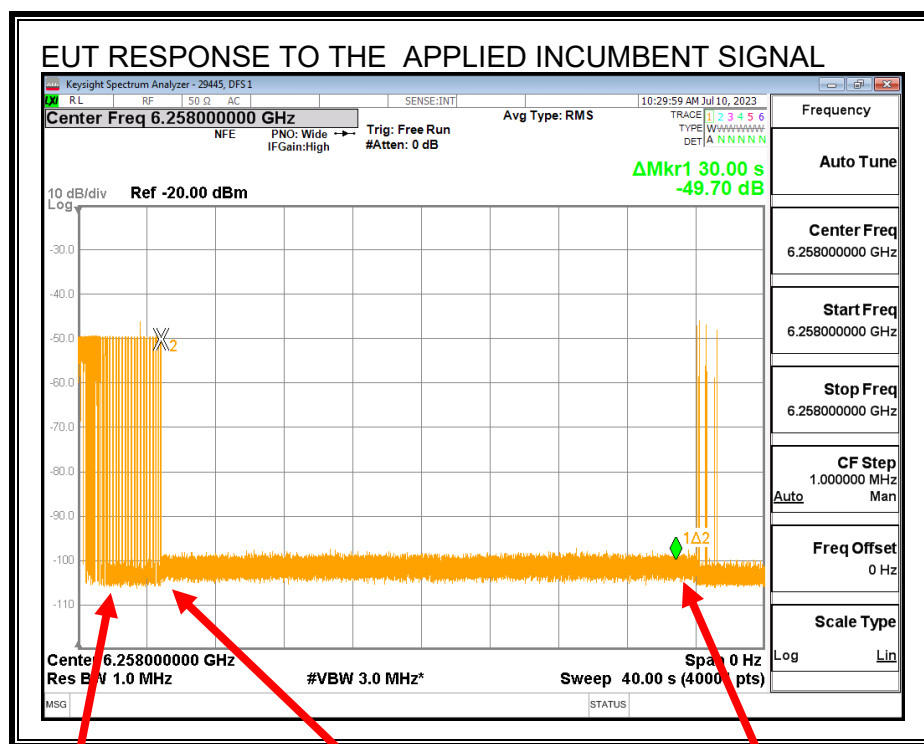
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Upper Edge Incumbent Signal f_{c3} :



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.5.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|-------------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6185 |
| EUT Nominal Channel Bandwidth (MHz) | 160 |
| 99% Occupied Bandwidth of the EUT (MHz) | 157.86 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6106.07 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6263.93 |
| 99% Occupied Bandwidth of the Incumbent Signal (MHz) | 9.994 |
| Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz) | 6112 |
| Test Frequency of Incumbent Signal at f_{c1} (MHz) | 6185 |
| Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz) | 6258 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -4.4 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -66.40 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm) | -73.75 |
| Margin (dBm) | -7.35 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm) | -72.40 |
| Margin (dBm) | -6.00 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm) | -68.59 |
| Margin (dBm) | -2.19 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| Trial | AWGN Detected (Yes / No) | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|
| | Incumbent AWGN at f_{c2} | Incumbent AWGN at f_{c1} | Incumbent AWGN at f_{c3} |
| 1 | Yes | Yes | Yes |
| 2 | Yes | Yes | Yes |
| 3 | Yes | Yes | Yes |
| 4 | Yes | Yes | Yes |
| 5 | Yes | Yes | Yes |
| 6 | Yes | Yes | Yes |
| 7 | Yes | Yes | Yes |
| 8 | Yes | No | Yes |
| 9 | No | Yes | Yes |
| 10 | Yes | Yes | Yes |
| Test Result | PASS | PASS | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.5.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 4: 99% BW_{EUT} > 4 x 99% BW_{INC}

Incumbent AWGN at f_{c2}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -69.25 | 4.5 | -73.75 | -4.4 | -69.35 | -62 | Ceased |
| -74.93 | 4.5 | -79.43 | -4.4 | -75.03 | -62 | Minimal |
| -76.78 | 4.5 | -81.28 | -4.4 | -76.88 | -62 | Normal |

Incumbent AWGN at f_{c1}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -67.9 | 4.5 | -72.40 | -4.4 | -68 | -62 | Ceased |
| -72.81 | 4.5 | -77.31 | -4.4 | -72.91 | -62 | Minimal |
| -74.81 | 4.5 | -79.31 | -4.4 | -74.91 | -62 | Normal |

Incumbent AWGN at f_{c3}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -64.09 | 4.5 | -68.59 | -4.4 | -64.19 | -62 | Ceased |
| -70.39 | 4.5 | -74.89 | -4.4 | -70.49 | -62 | Minimal |
| -71.55 | 4.5 | -76.05 | -4.4 | -71.65 | -62 | Normal |

Test Date: 07/10 and 13/23

Tested by: 29445

Test location: DFS 1

9.6. U-NII 6 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

$$99\% BW_{EUT} \leq 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.7. U-NII 6 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

$$99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$$

9.7.1. TEST CHANNEL

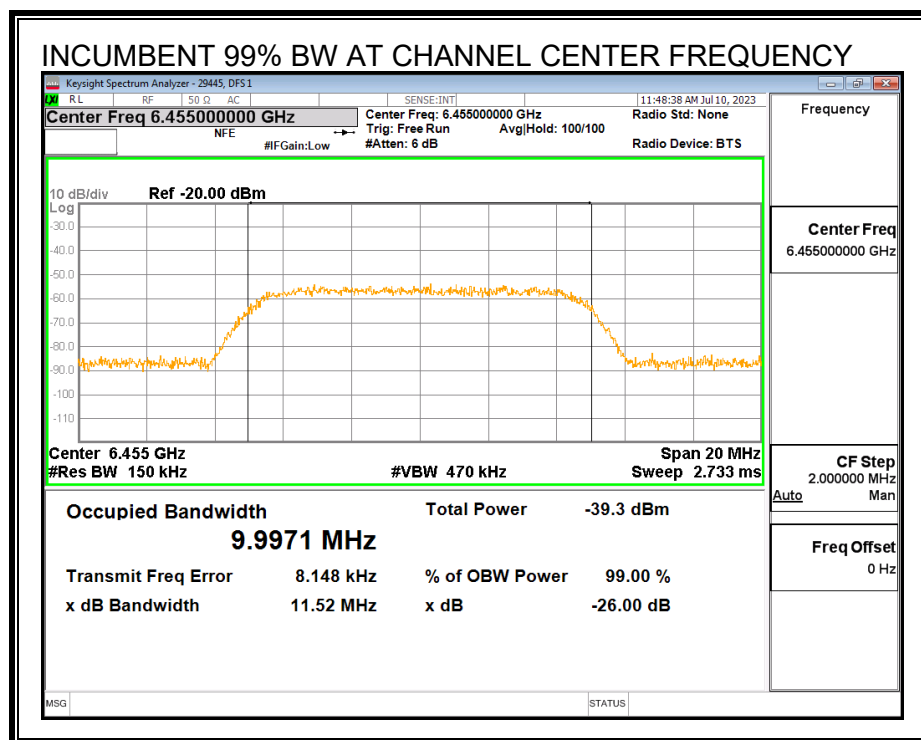
All tests were performed with the EUT set to a channel center frequency of 6455 MHz and a nominal channel bandwidth of 20 MHz.

Only the lowest and highest supported channel bandwidths are required to be tested.

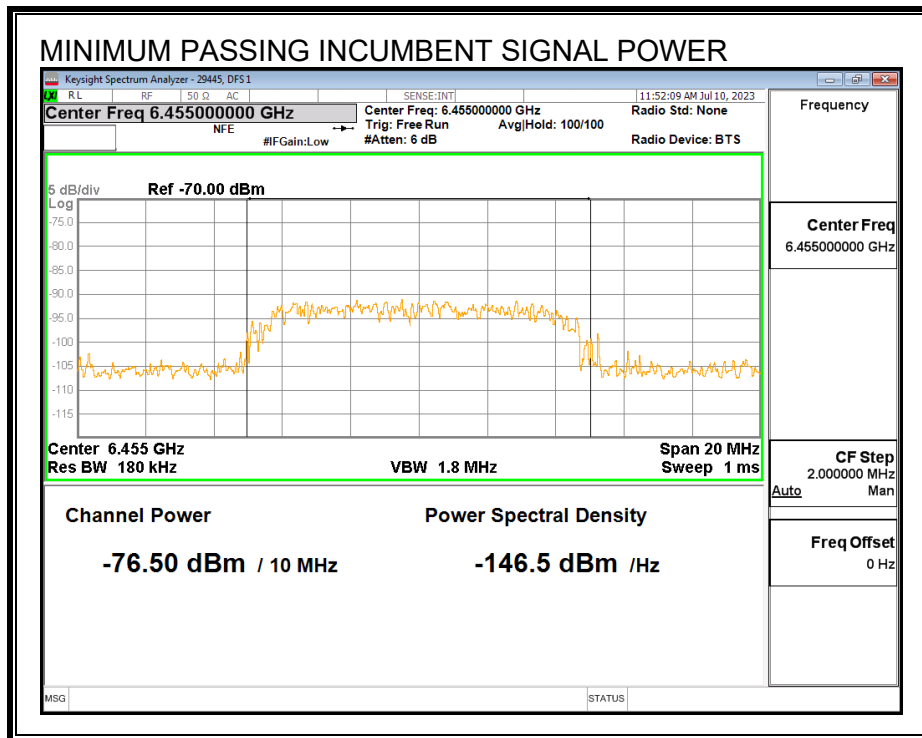
9.7.2. INCUMBENT SIGNAL PLOTS

All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

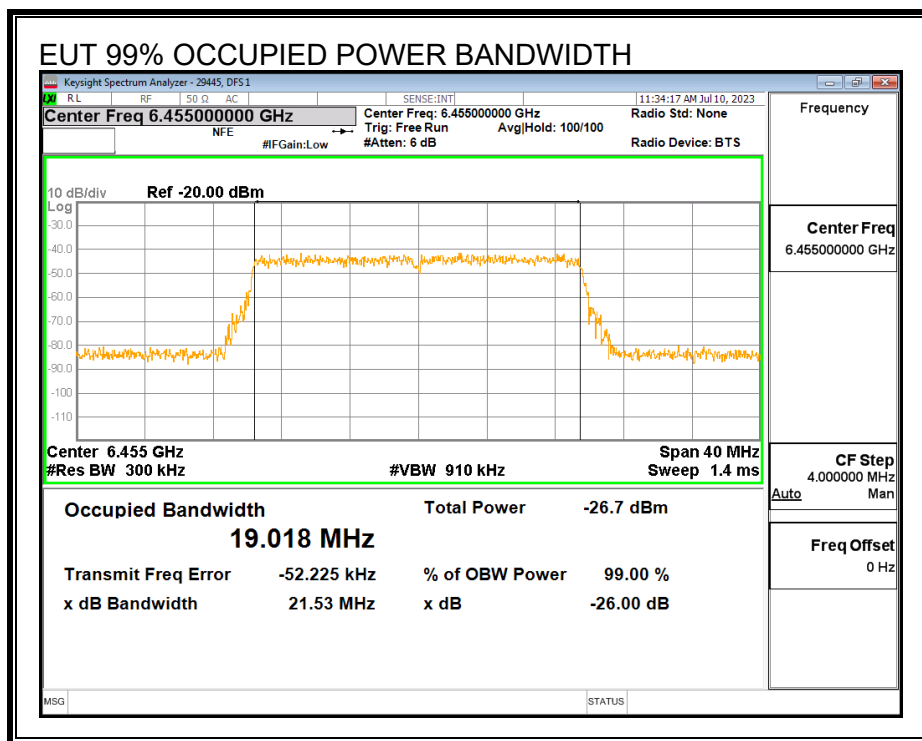


MINIMUM PASSING INCUMBENT SIGNAL POWER

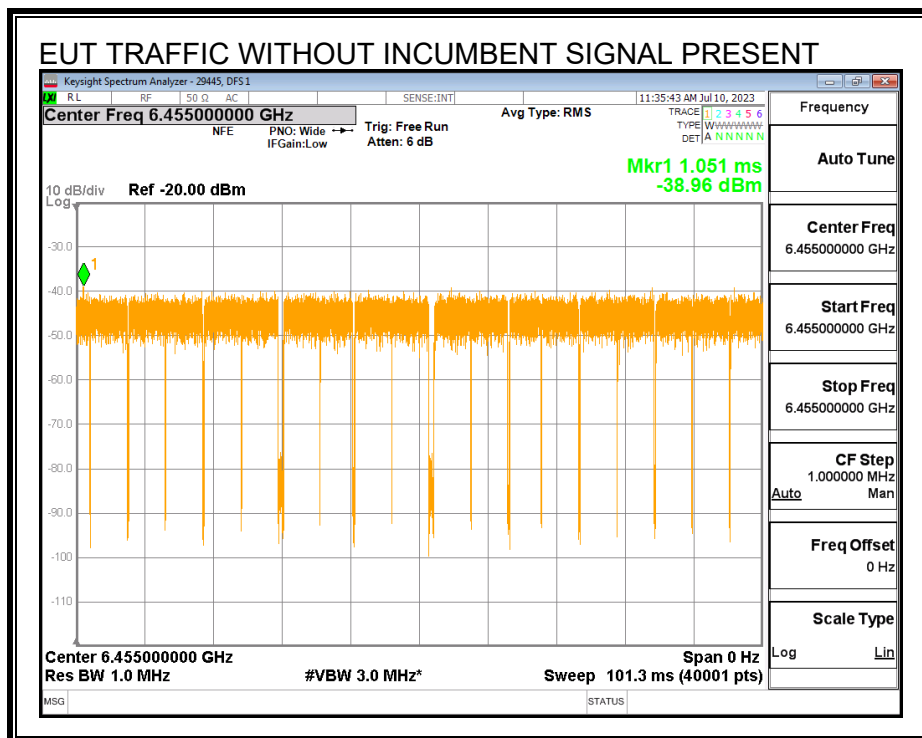


9.7.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

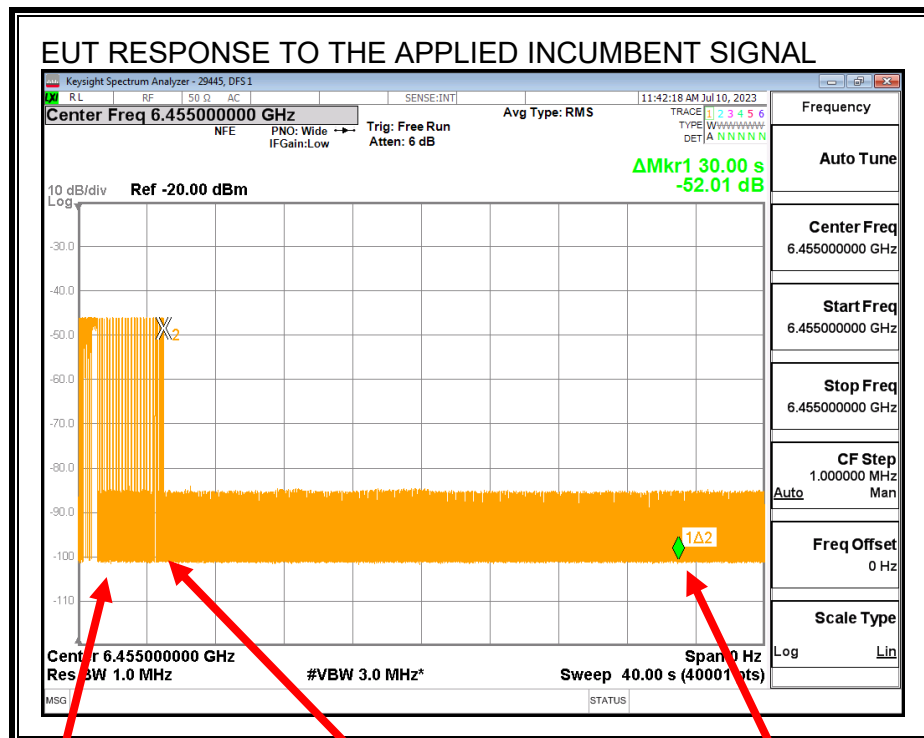


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Association to Companion Lost

Transmissions cease while the Incumbent AWGN Signal is present and do not resume after it is removed due to the loss of the association to the Companion Device.

9.7.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|-------------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6455 |
| EUT Nominal Channel Bandwidth (MHz) | 20 |
| 99% Occupied Bandwidth of the EUT (MHz) | 19.018 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6445.49 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6464.51 |
| Test Frequency of Incumbent Signal (MHz) | 6455 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -1.1 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -63.1 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude (dBm) | -81.20 |
| Margin (dBm) | -18.10 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| | AWGN Detected (Yes / No) |
|-------------|----------------------------|
| Trial | Incumbent AWGN at f_{c1} |
| 1 | Yes |
| 2 | Yes |
| 3 | Yes |
| 4 | Yes |
| 5 | Yes |
| 6 | Yes |
| 7 | Yes |
| 8 | Yes |
| 9 | Yes |
| 10 | Yes |
| Test Result | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.7.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: $99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$

Incumbent AWGN at f_{c1} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -76.5 | 4.7 | -81.2 | -1.1 | -80.1 | -62 | Ceased |
| -81.07 | 4.7 | -85.77 | -1.1 | -84.67 | -62 | Minimal |
| -84.3 | 4.7 | -89 | 1.1 | -90.1 | -62 | Normal |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

9.8. U-NII 6 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

$$2 \times 99\% BW_{INC} < 99\% BW_{EUT} \leq 4 \times 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.9. U-NII 6 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

$$99\% BW_{EUT} > 4 \times 99\% BW_{INC}$$

9.9.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6505 MHz and a nominal channel bandwidth of 160 MHz.

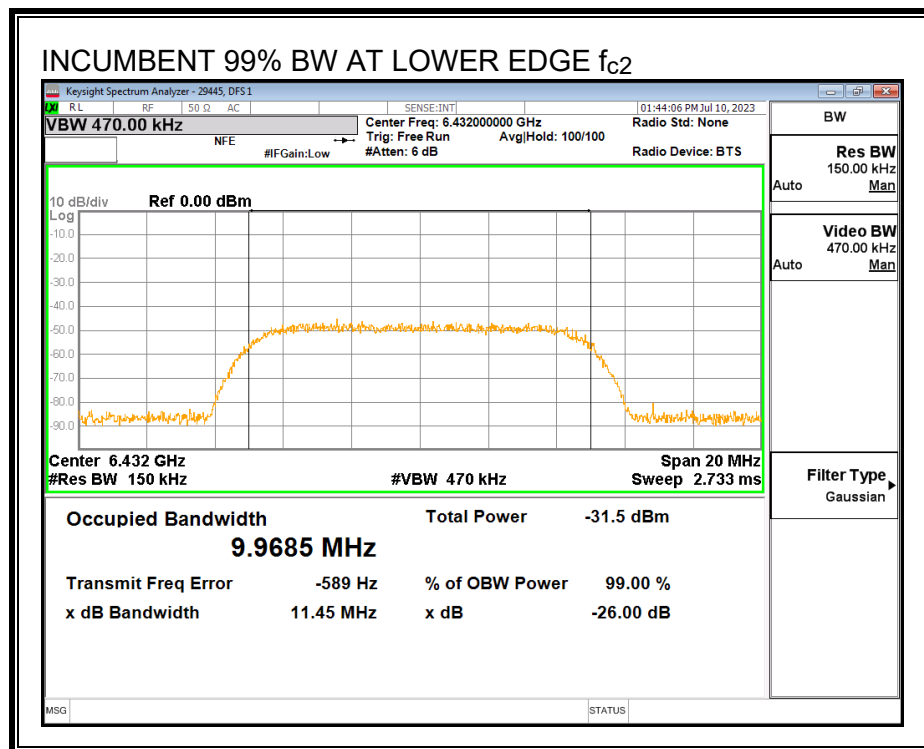
Only the lowest and highest supported channel bandwidths are required to be tested.

9.9.2. INCUMBENT SIGNAL PLOTS

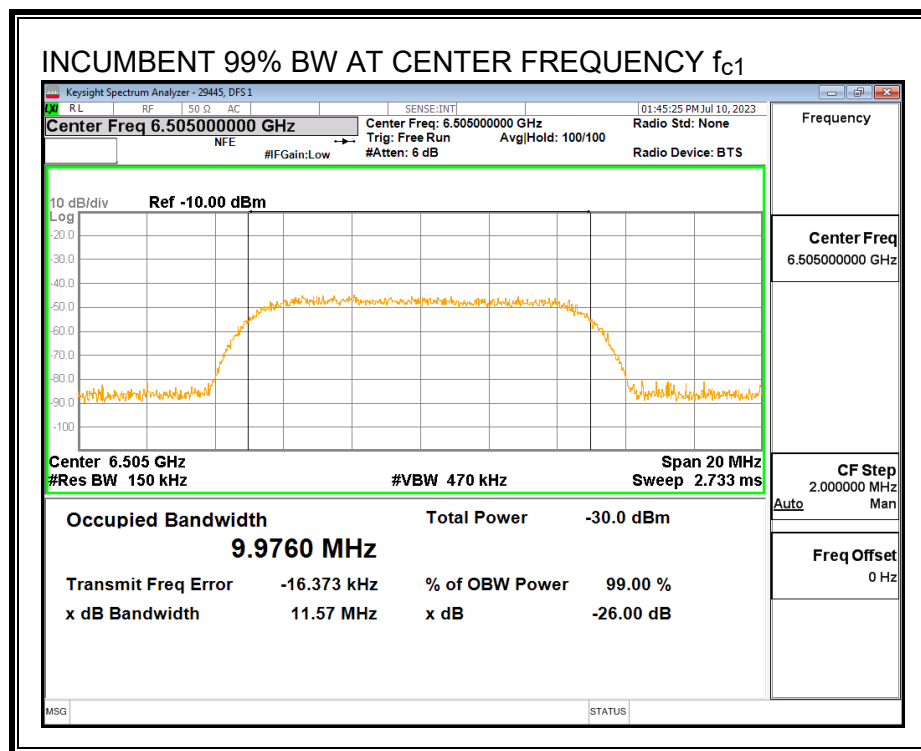
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :



INCUMBENT 99% BW AT UPPER EDGE f_{c3}

Keysight Spectrum Analyzer - 29445, DFS1

RL RF 50 Ω AC SENSE:INT 01:49:28 PM Jul 10, 2023

Center Freq 6.578000000 GHz Center Freq: 6.578000000 GHz Radio Std: None
 NFE Trig: Free Run Avg/Hold: 100/100
 #IFGain:Low #Atten: 6 dB Radio Device: BTS

10 dB/div **Ref -10.00 dBm**

Log

Center 6.578 GHz Span 20 MHz
 #Res BW 150 kHz #VBW 470 kHz Sweep 2.733 ms

| | | | | |
|----------------------------|-------------------|-----------------------|------------------|------------------|
| Occupied Bandwidth | | Total Power | | -29.6 dBm |
| 9.9721 MHz | | | | |
| Transmit Freq Error | -1.993 kHz | % of OBW Power | 99.00 % | |
| x dB Bandwidth | 11.41 MHz | x dB | -26.00 dB | |

MSG STATUS

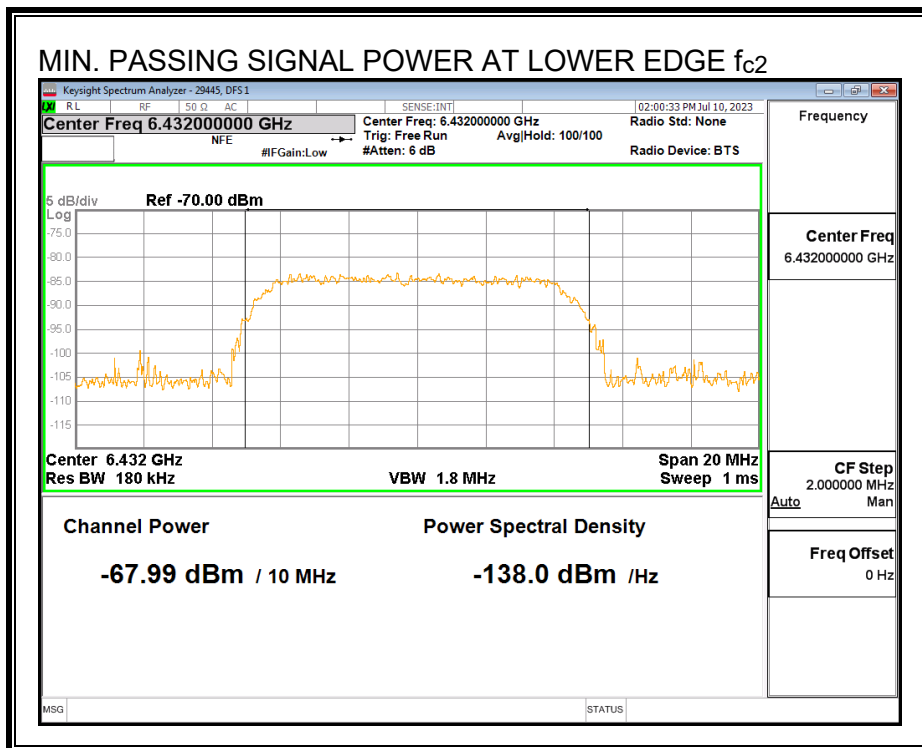
Frequency
Center Freq 6.578000000 GHz

CF Step
2.000000 MHz

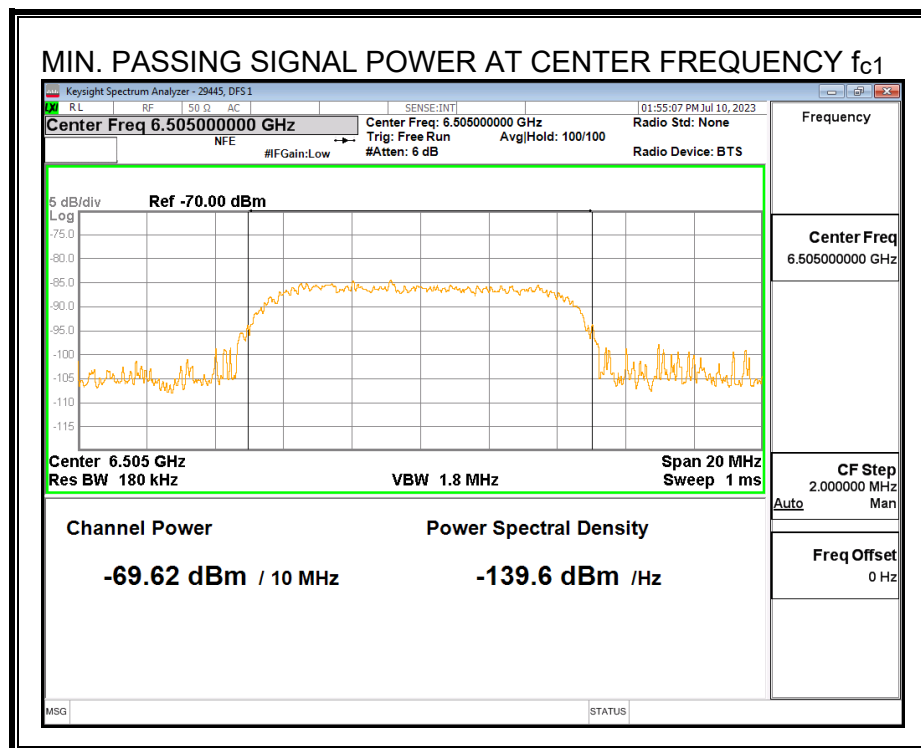
Freq Offset
0 Hz

MINIMUM PASSING INCUMBENT SIGNAL POWER

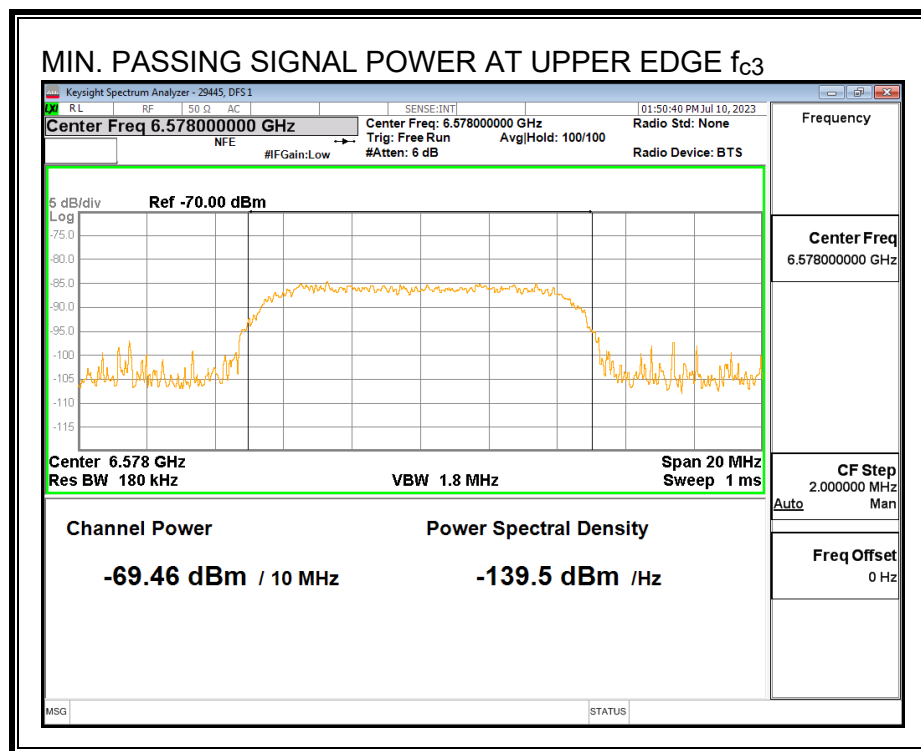
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

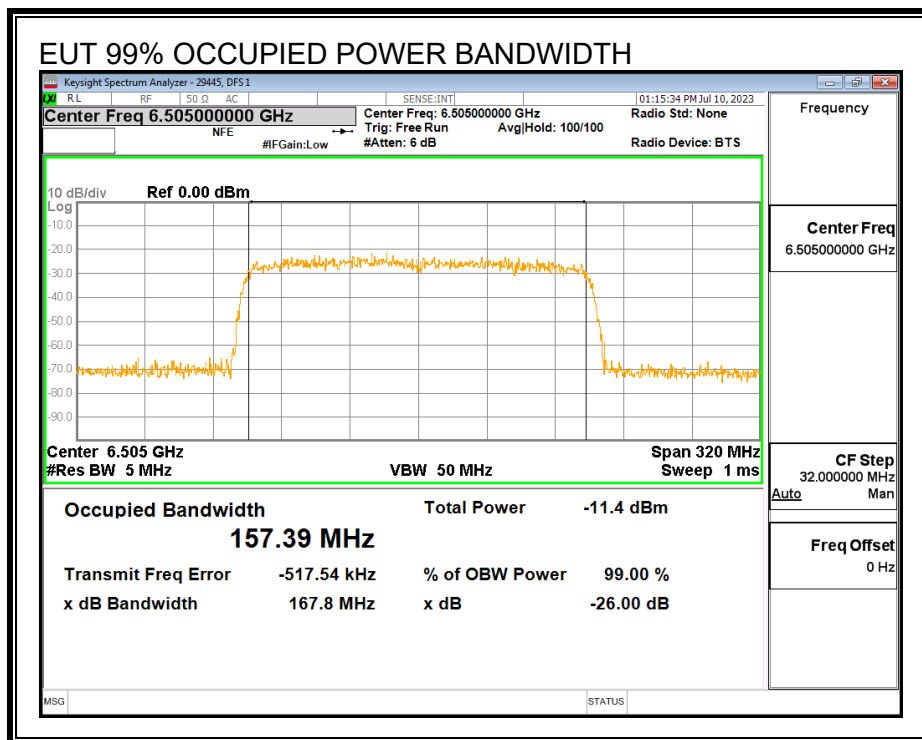


Upper Edge Incumbent Signal f_{c3} :



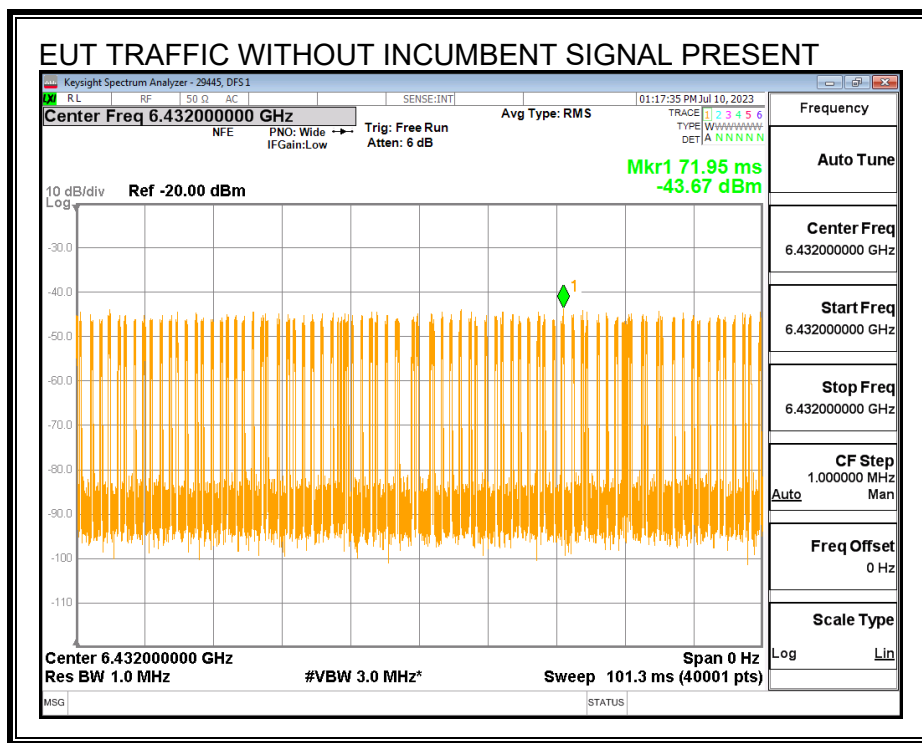
9.9.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

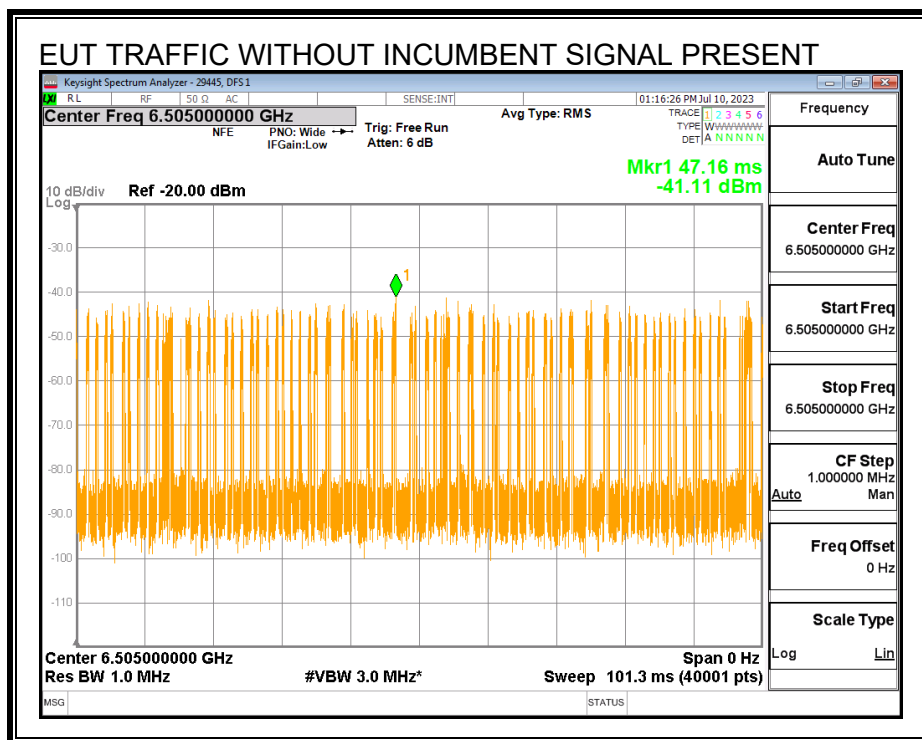


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

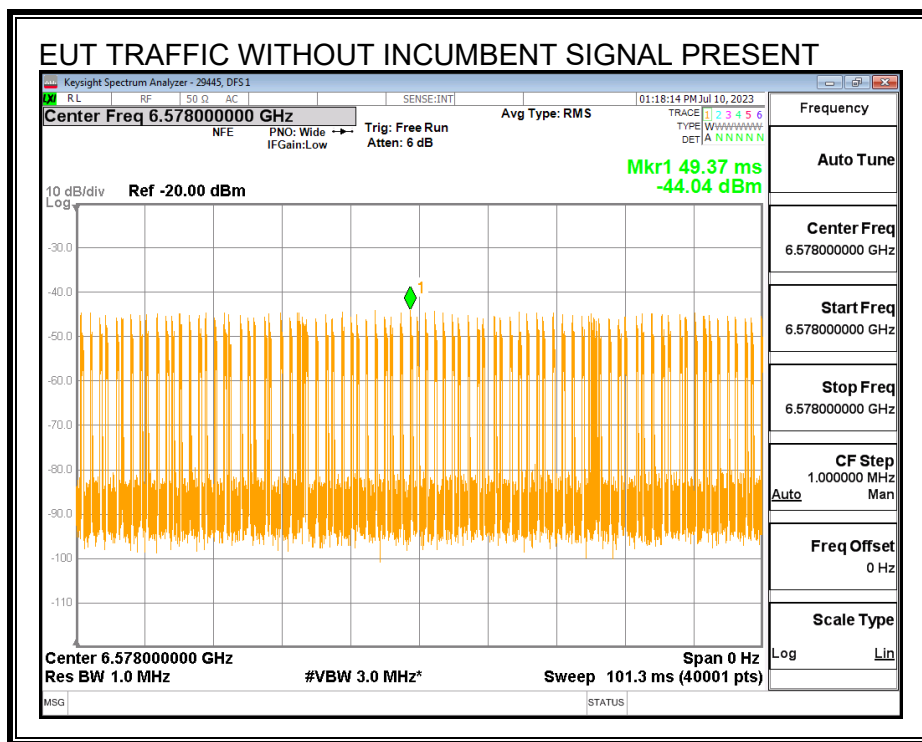
Lower Edge f_{c2}:



Center Frequency f_{c1} :



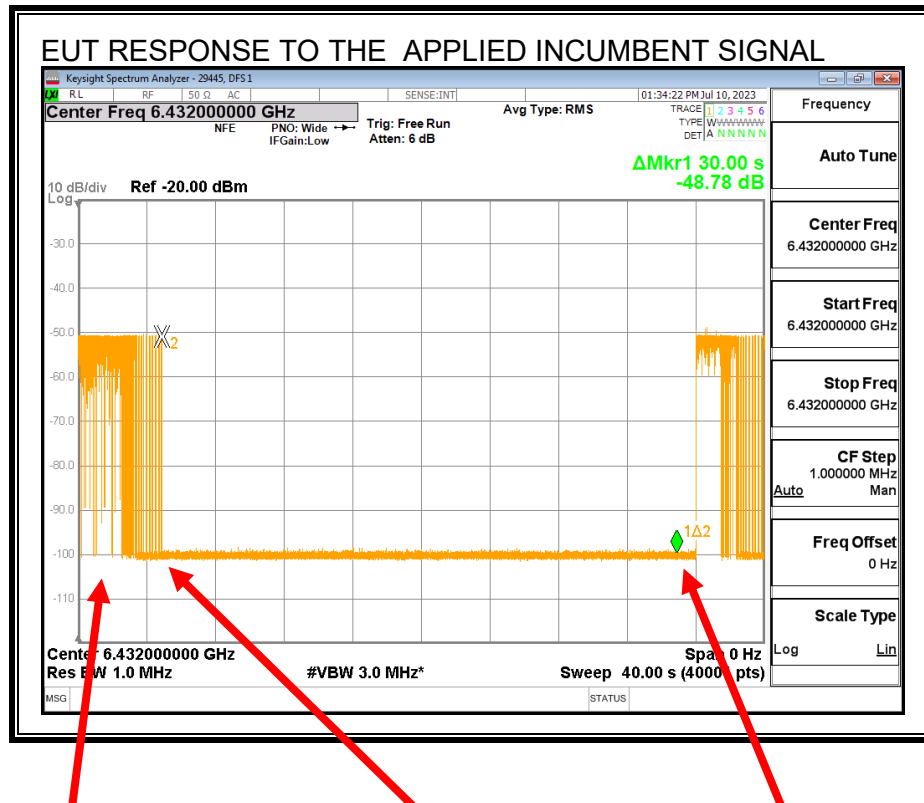
Upper Edge f_{c2} :



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.

Lower Edge Incumbent Signal f_{c2} :



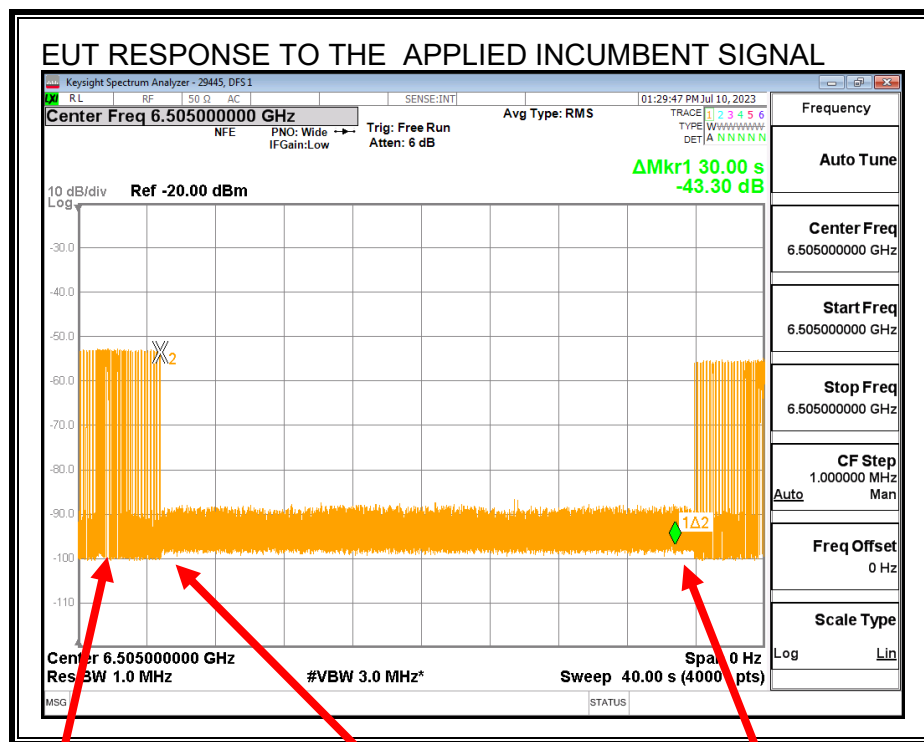
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{c1} :



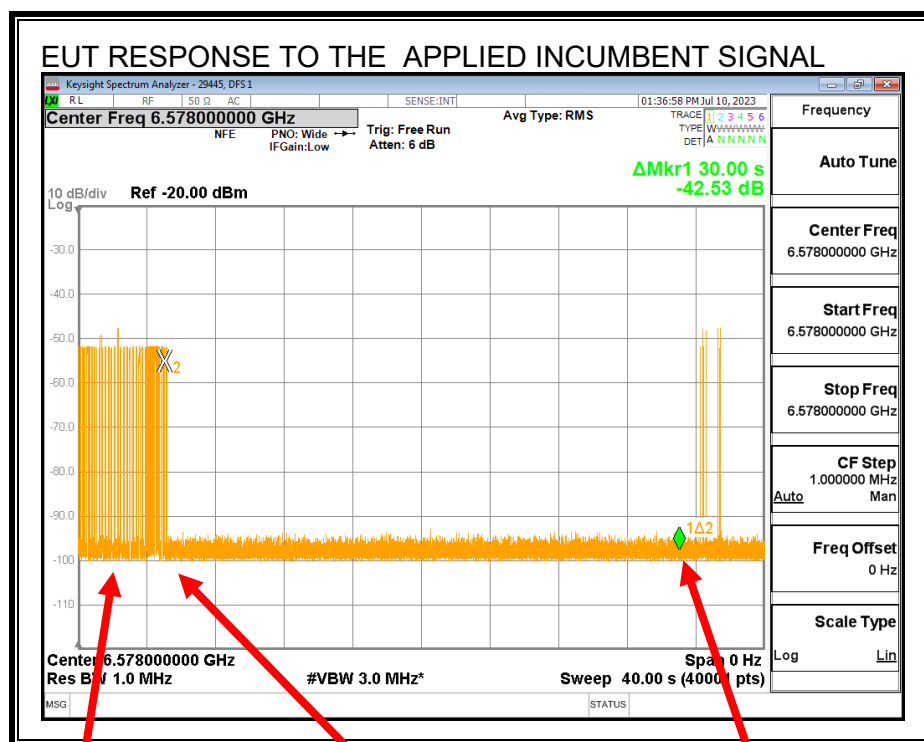
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Upper Edge Incumbent Signal f_{c3} :



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.9.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|-------------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6505 |
| EUT Nominal Channel Bandwidth (MHz) | 160 |
| 99% Occupied Bandwidth of the EUT (MHz) | 157.39 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6426.31 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6583.70 |
| 99% Occupied Bandwidth of the Incumbent Signal (MHz) | 9.976 |
| Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz) | 6432 |
| Test Frequency of Incumbent Signal at f_{c1} (MHz) | 6505 |
| Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz) | 6578 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -1.1 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -63.10 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm) | -72.69 |
| Margin (dBm) | -9.59 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm) | -74.32 |
| Margin (dBm) | -11.22 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm) | -74.16 |
| Margin (dBm) | -11.06 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| Trial | AWGN Detected (Yes / No) | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|
| | Incumbent AWGN at f_{c2} | Incumbent AWGN at f_{c1} | Incumbent AWGN at f_{c3} |
| 1 | Yes | Yes | Yes |
| 2 | Yes | Yes | Yes |
| 3 | Yes | Yes | Yes |
| 4 | Yes | Yes | Yes |
| 5 | Yes | Yes | Yes |
| 6 | Yes | Yes | Yes |
| 7 | Yes | Yes | Yes |
| 8 | Yes | Yes | Yes |
| 9 | Yes | Yes | Yes |
| 10 | Yes | Yes | Yes |
| Test Result | PASS | PASS | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.9.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 4: $99\% BW_{EUT} > 4 \times 99\% BW_{INC}$

Incumbent AWGN at f_{c2} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -67.99 | 4.7 | -72.69 | -1.1 | -71.59 | -62 | Ceased |
| -78.89 | 4.7 | -83.59 | -1.1 | -82.49 | -62 | Minimal |
| -81.03 | 4.7 | -85.73 | -1.1 | -84.63 | -62 | Normal |

Incumbent AWGN at f_{c1} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -69.62 | 4.7 | -74.32 | -1.1 | -73.22 | -62 | Ceased |
| -76.98 | 4.7 | -81.68 | -1.1 | -80.58 | -62 | Minimal |
| -79.69 | 4.7 | -84.39 | -1.1 | -83.29 | -62 | Normal |

Incumbent AWGN at f_{c3} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -69.46 | 4.7 | -74.16 | -1.1 | -73.06 | -62 | Ceased |
| -75.72 | 4.7 | -80.42 | -1.1 | -79.32 | -62 | Minimal |
| -77.84 | 4.7 | -82.54 | -1.1 | -81.44 | -62 | Normal |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

9.10. U-NII 7 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

$$99\% BW_{EUT} \leq 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.11. U-NII 7 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

$$99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$$

9.11.1. TEST CHANNEL

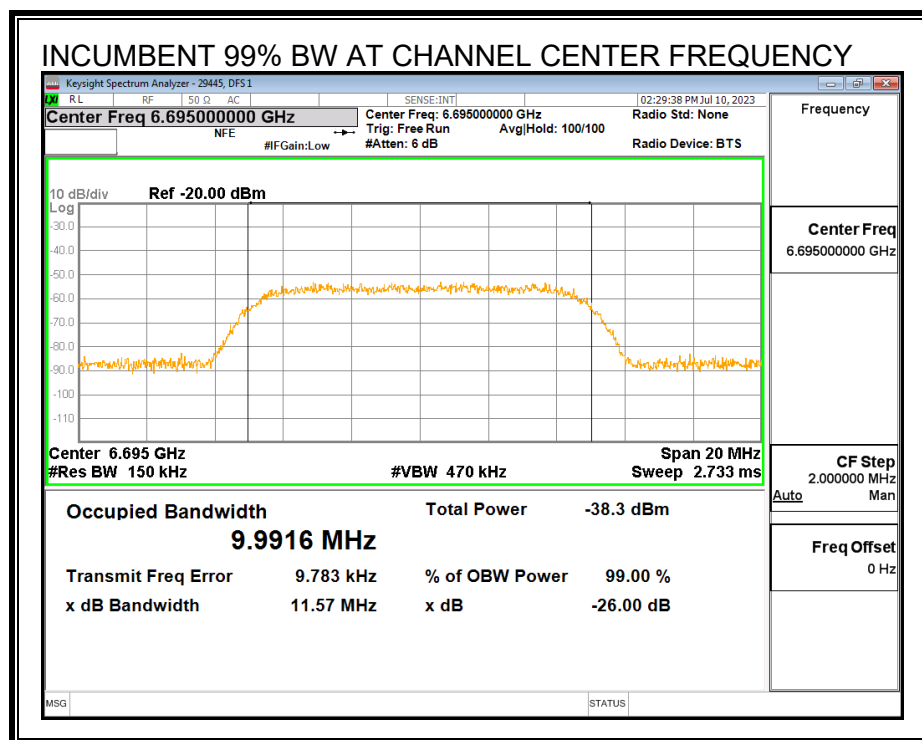
All tests were performed with the EUT set to a channel center frequency of 6695 MHz and a nominal channel bandwidth of 20 MHz.

Only the lowest and highest supported channel bandwidths are required to be tested.

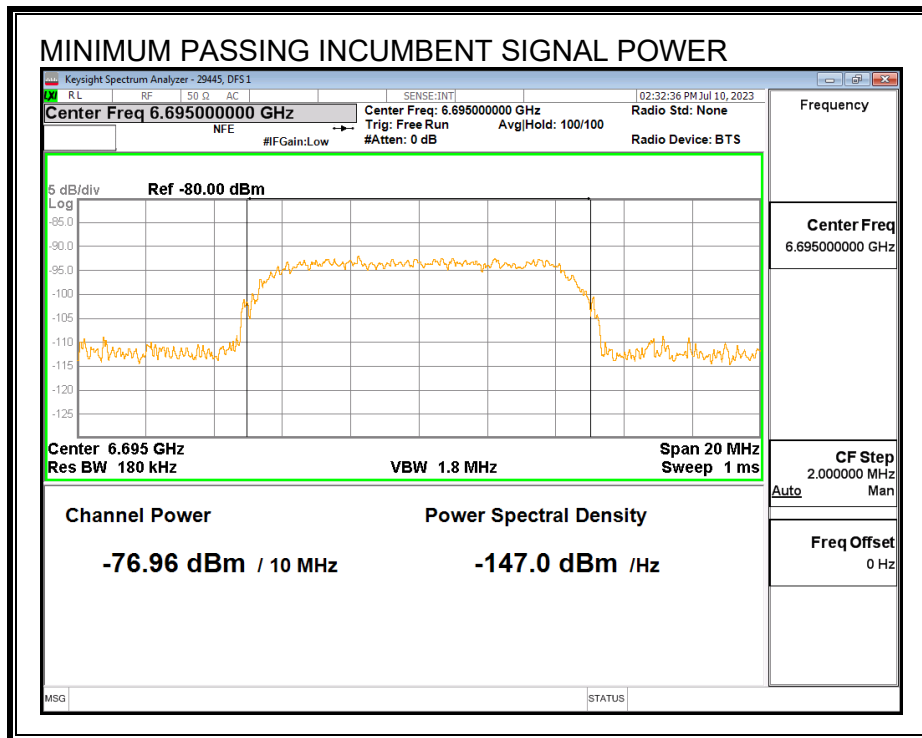
9.11.2. INCUMBENT SIGNAL PLOTS

All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

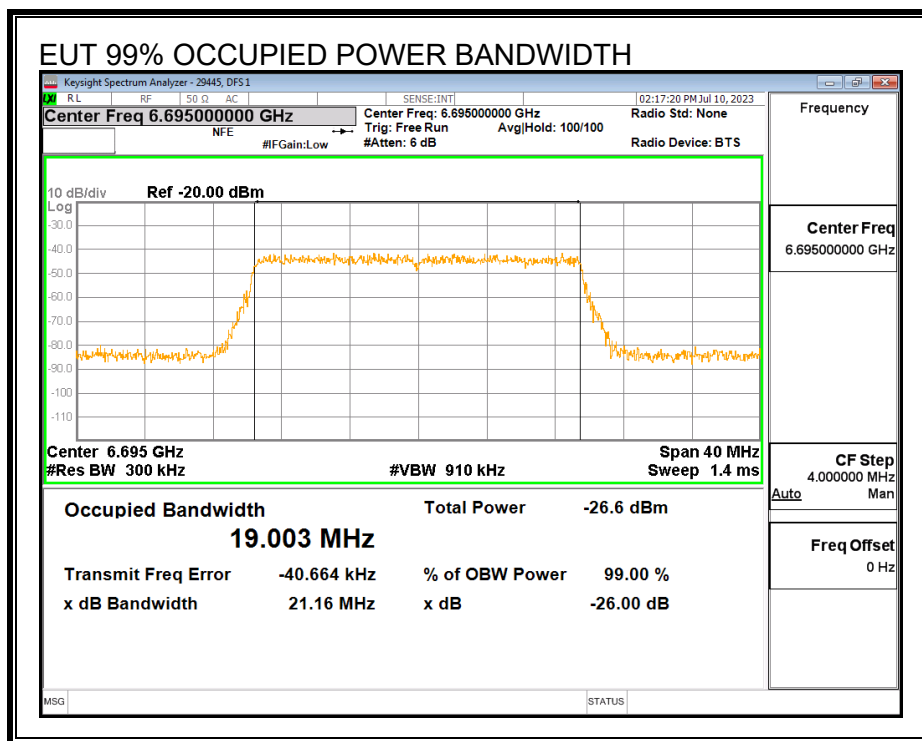


MINIMUM PASSING INCUMBENT SIGNAL POWER

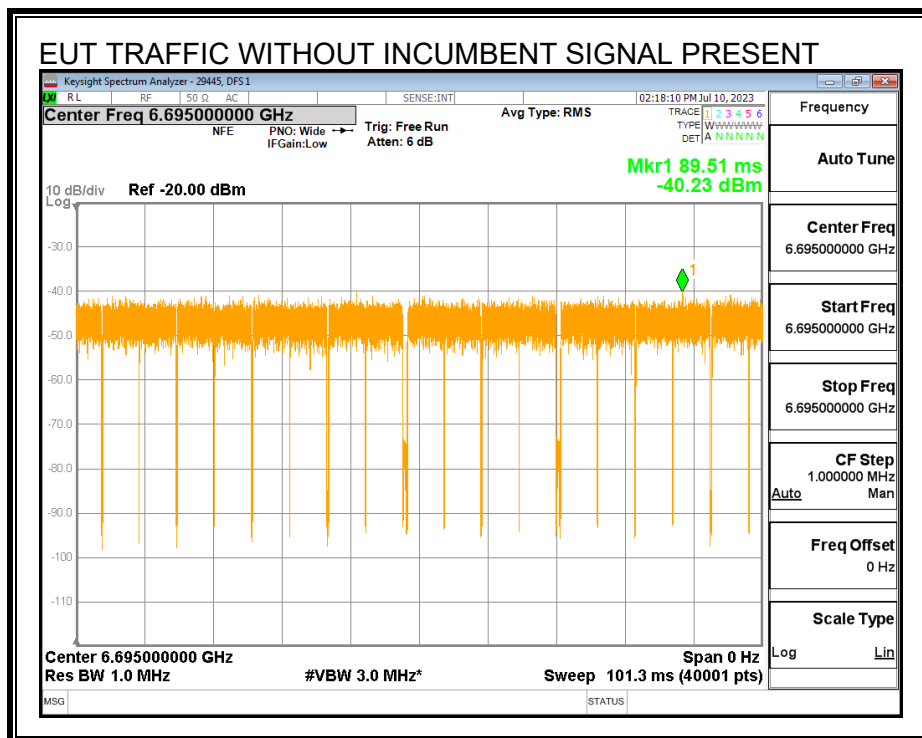


9.11.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

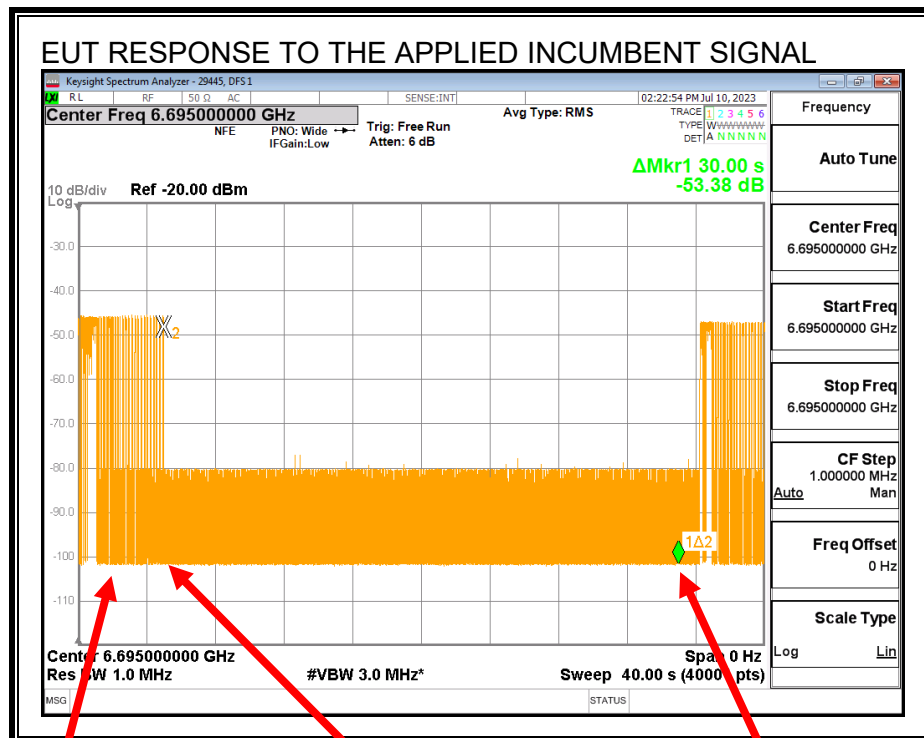


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.11.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|--------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6695 |
| EUT Nominal Channel Bandwidth (MHz) | 20 |
| 99% Occupied Bandwidth of the EUT (MHz) | 19.003 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6685.5 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6704.5 |
| Test Frequency of Incumbent Signal (MHz) | 6695 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -5.8 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -67.8 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude (dBm) | -81.76 |
| Margin (dBm) | -13.96 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| AWGN Detected (Yes / No) | |
|--------------------------|----------------------------|
| Trial | Incumbent AWGN at f_{c1} |
| 1 | Yes |
| 2 | Yes |
| 3 | Yes |
| 4 | Yes |
| 5 | Yes |
| 6 | Yes |
| 7 | Yes |
| 8 | Yes |
| 9 | Yes |
| 10 | Yes |
| Test Result | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.11.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: $99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$

Incumbent AWGN at f_{c1} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -76.96 | 4.8 | -81.76 | -5.8 | -75.96 | -62 | Ceased |
| -79.86 | 4.8 | -84.66 | -5.8 | -78.86 | -62 | Minimal |
| -80.47 | 4.8 | -85.27 | -5.8 | -79.47 | -62 | Normal |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

9.12. U-NII 7 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

$$2 \times 99\% BW_{INC} < 99\% BW_{EUT} \leq 4 \times 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.13. U-NII 7 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

$$99\% BW_{EUT} > 4 \times 99\% BW_{INC}$$

9.13.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6665 MHz and a nominal channel bandwidth of 160 MHz.

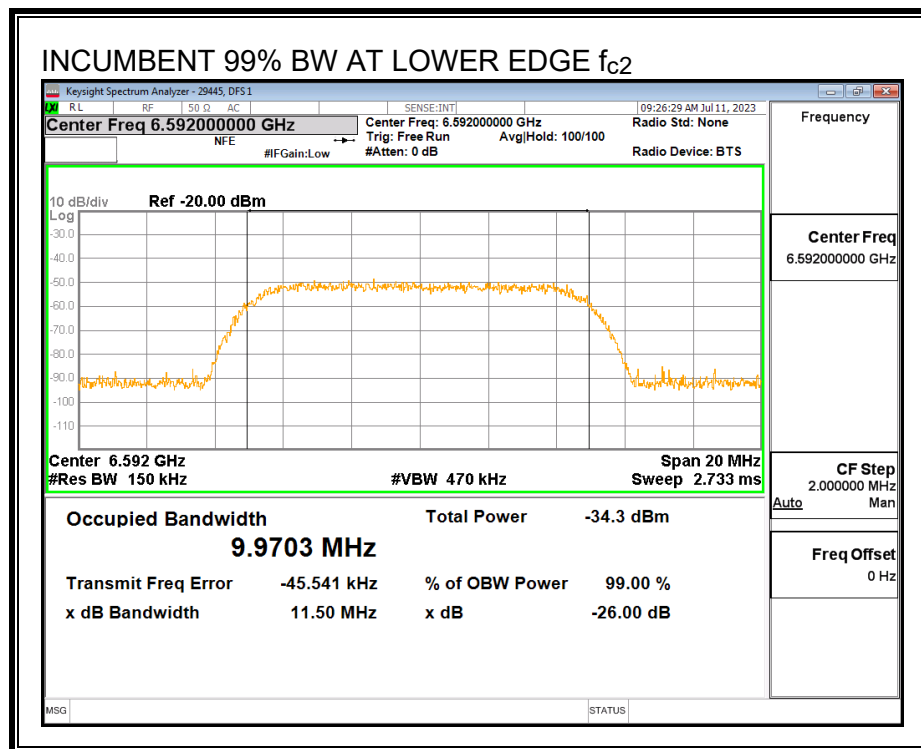
Only the lowest and highest supported channel bandwidths are required to be tested.

9.13.2. INCUMBENT SIGNAL PLOTS

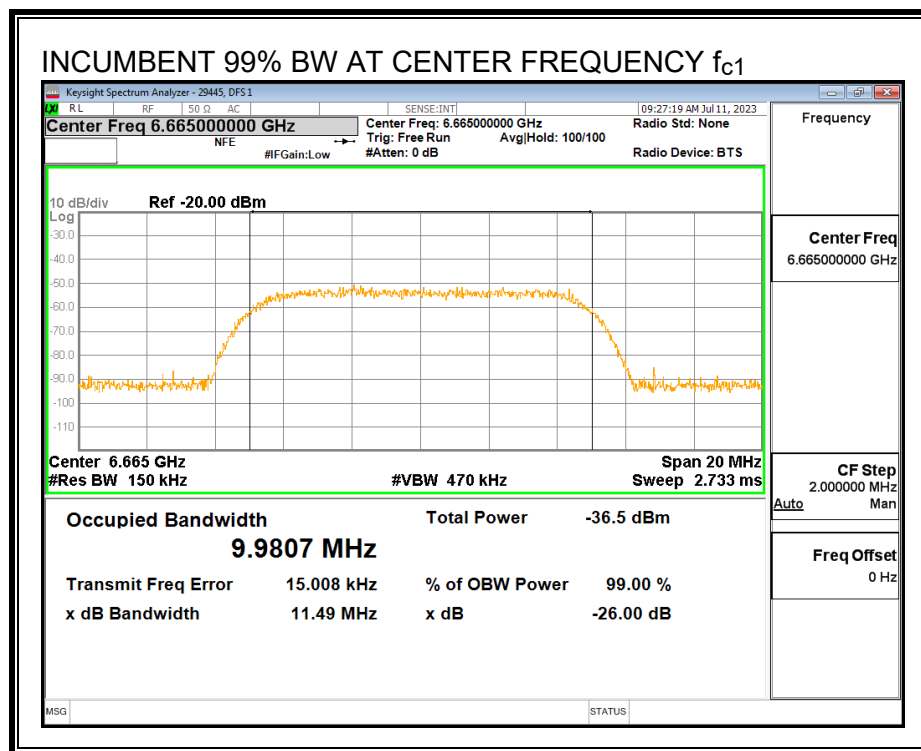
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :



INCUMBENT 99% BW AT UPPER EDGE f_{c3}

Keysight Spectrum Analyzer - 29445, DFS 1

RL RF 50 Ω AC SENSE:INT 09:31:00 AM Jul 11, 2023

Center Freq 6.738000000 GHz Center Freq: 6.738000000 GHz Radio Std: None
 NFE Trig: Free Run Avg/Hold: 100/100
 #IFGain: Low #Atten: 0 dB Radio Device: BTS

10 dB/div Ref -20.00 dBm

Center 6.738 GHz Span 20 MHz
 #Res BW 150 kHz #VBW 470 kHz Sweep 2.733 ms

| Occupied Bandwidth | | Total Power | |
|---------------------|-----------|----------------|-----------|
| 9.9939 MHz | | -35.2 dBm | |
| Transmit Freq Error | 7.393 kHz | % of OBW Power | 99.00 % |
| x dB Bandwidth | 11.50 MHz | x dB | -26.00 dB |

Frequency
 Center Freq
 6.738000000 GHz

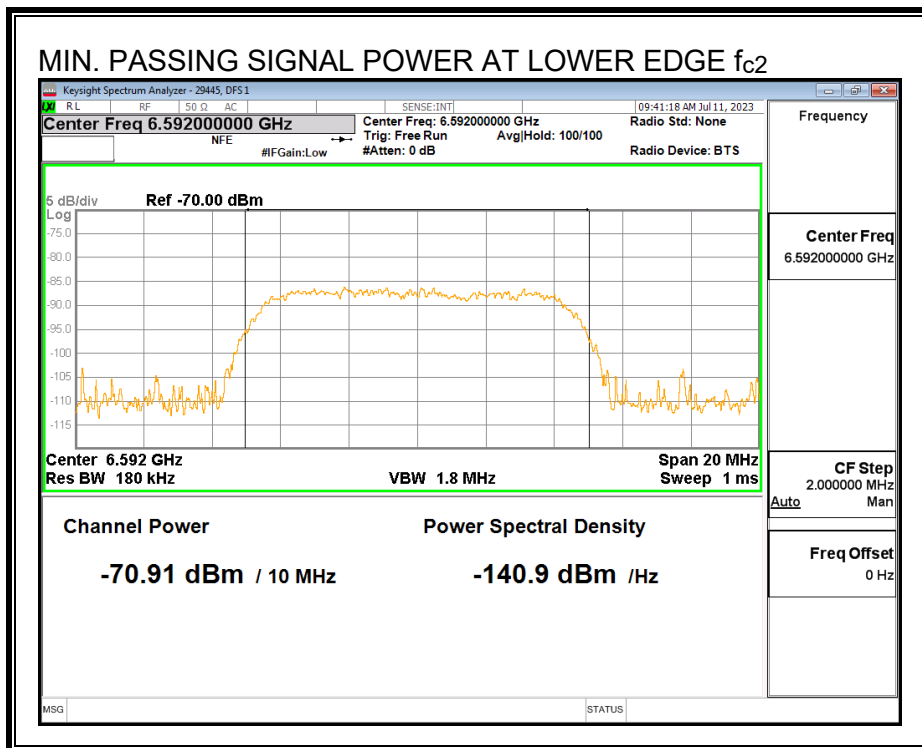
CF Step
 2.000000 MHz
 Auto Man

Freq Offset
 0 Hz

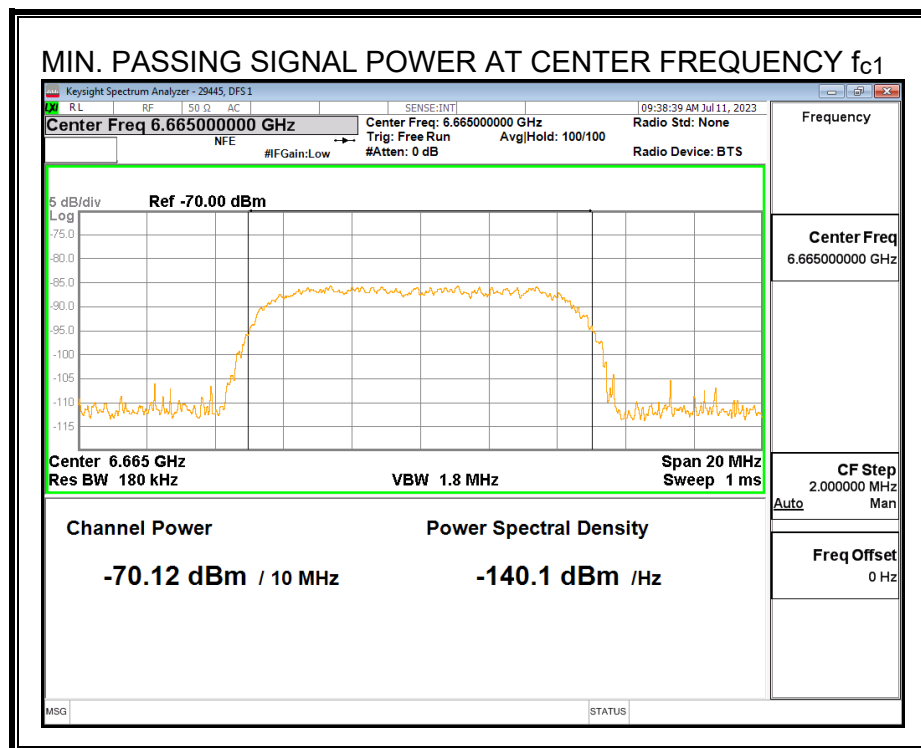
MSG STATUS

MINIMUM PASSING INCUMBENT SIGNAL POWER

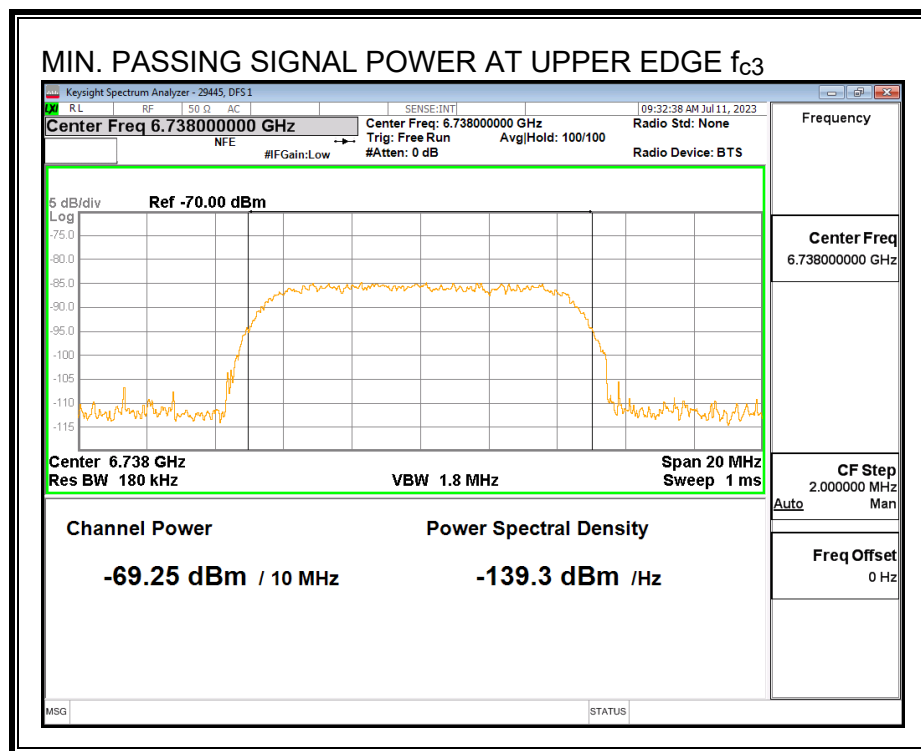
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

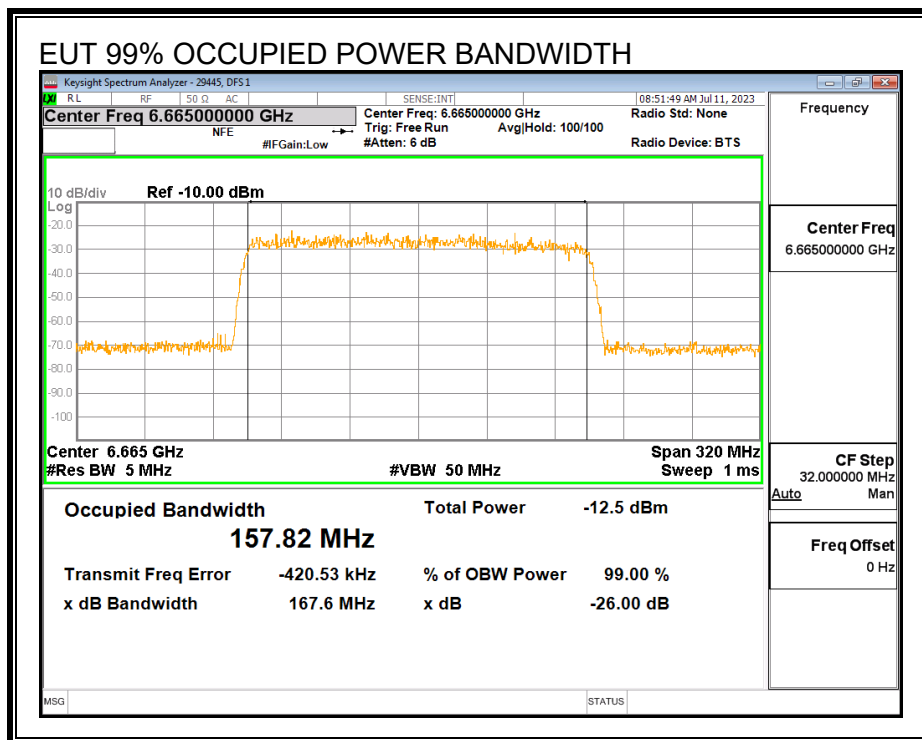


Upper Edge Incumbent Signal f_{c3} :



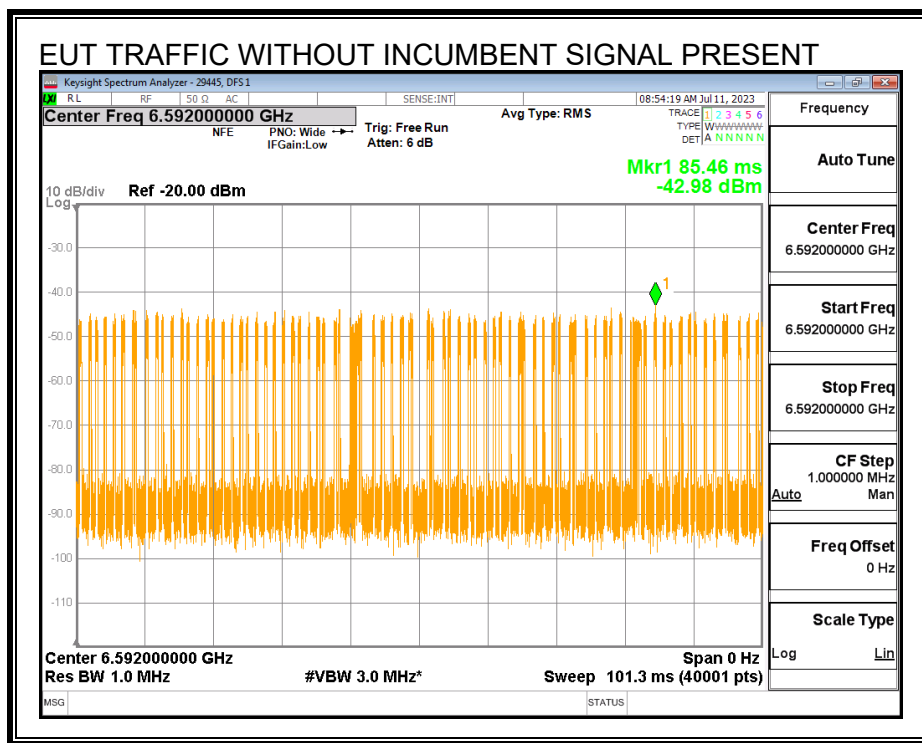
9.13.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

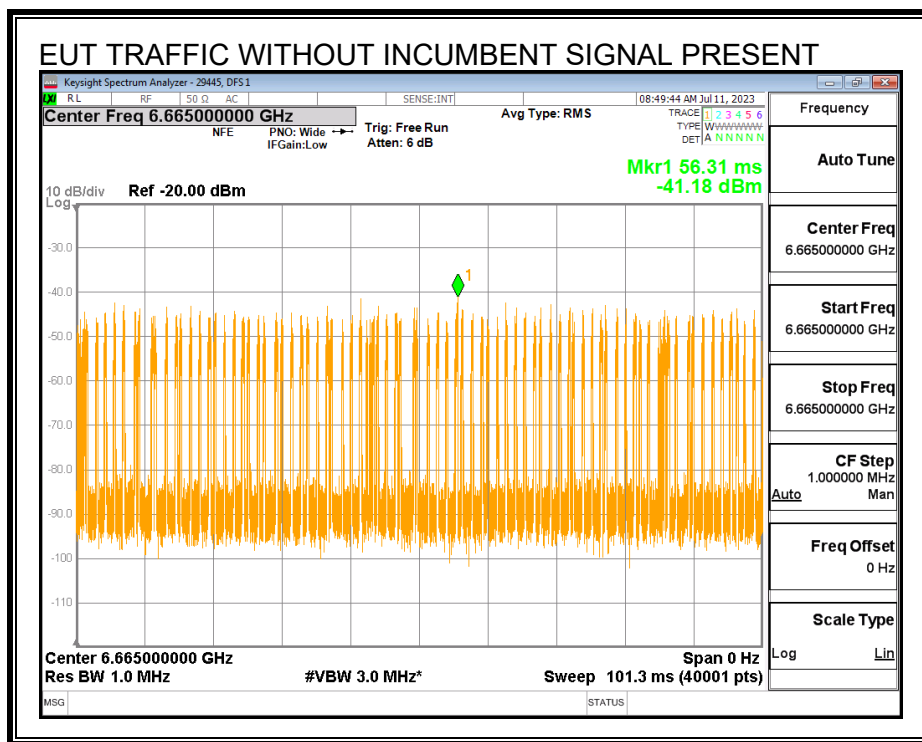


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

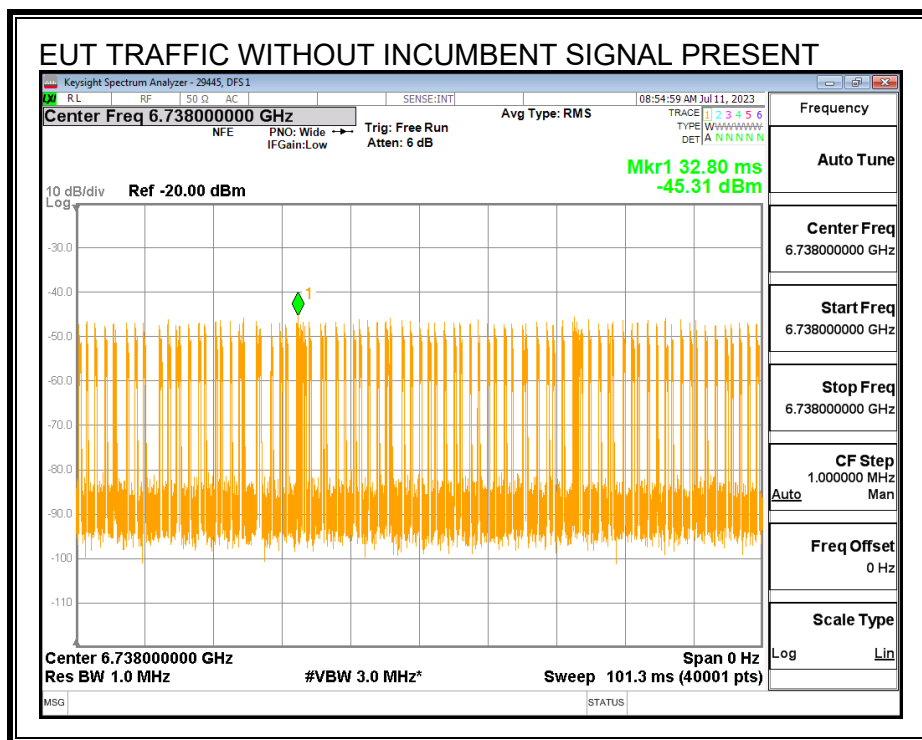
Lower Edge f_{c2} :



Center Frequency f_{c1} :



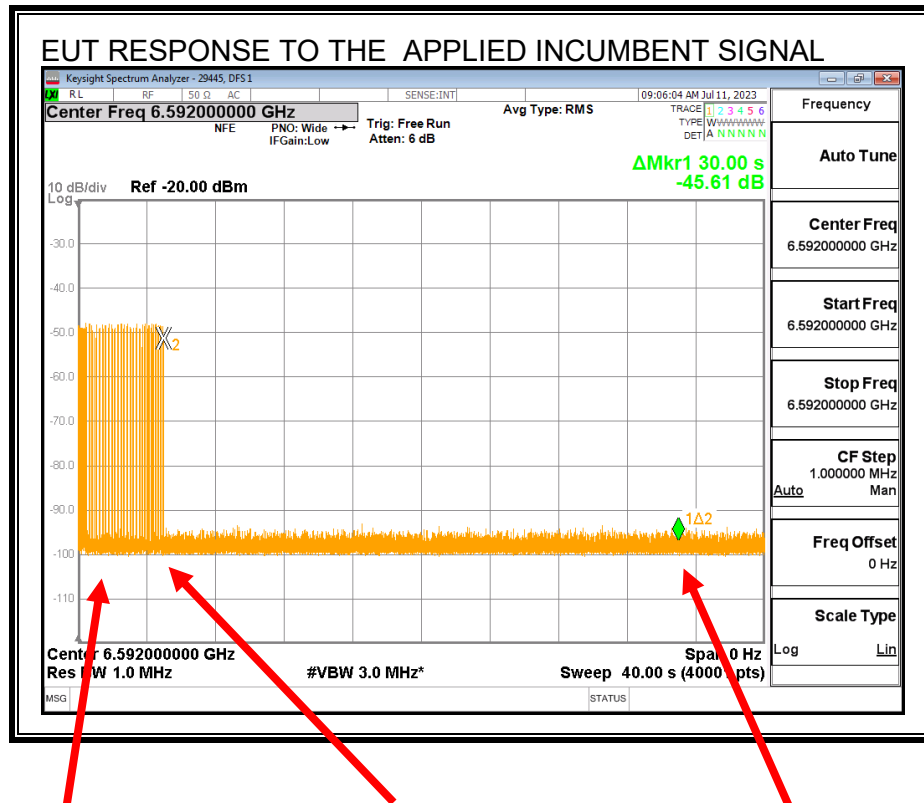
Upper Edge f_{c3} :



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.

Lower Edge Incumbent Signal f_{c2} :



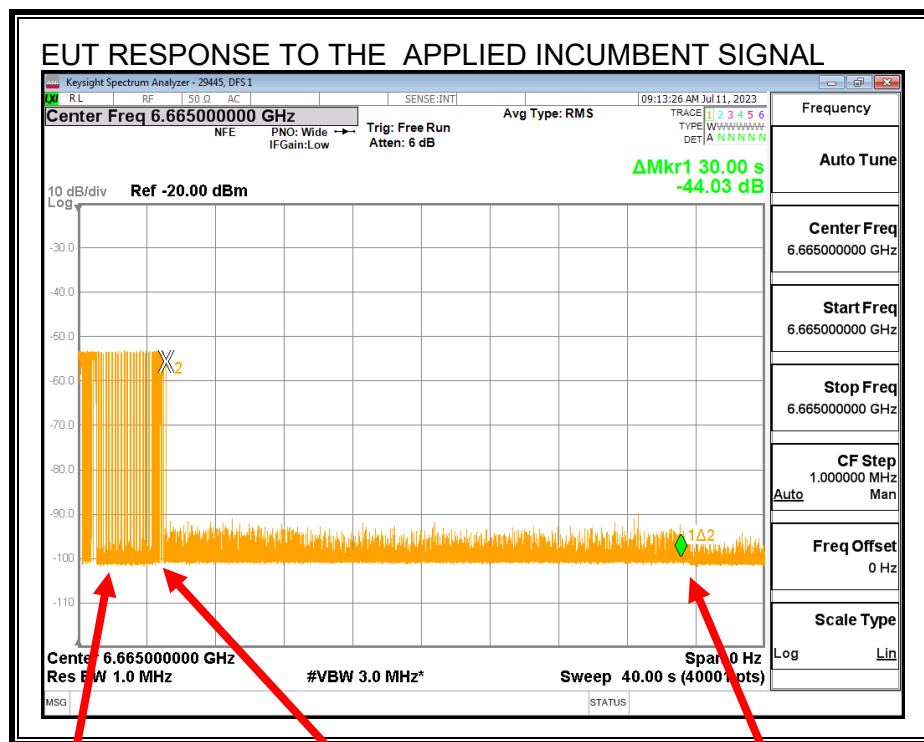
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Association to Companion Lost

Transmissions cease while the Incumbent AWGN Signal is present and do not resume after it is removed due to the loss of the association to the Companion Device.

Center Frequency Incumbent Signal f_{c1} :



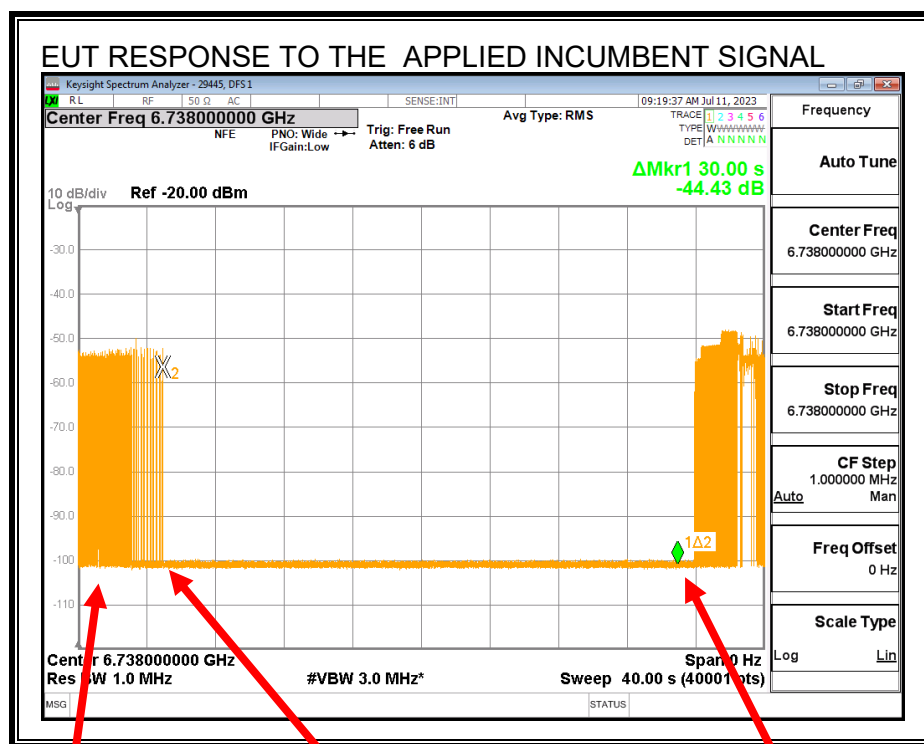
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Association to Companion Lost

Transmissions cease while the Incumbent AWGN Signal is present and do not resume after it is removed due to the loss of the association to the Companion Device.

Upper Edge Incumbent Signal f_{c3} :



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.13.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|---------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6665 |
| EUT Nominal Channel Bandwidth (MHz) | 160 |
| 99% Occupied Bandwidth of the EUT (MHz) | 157.82 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6586.09 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6743.91 |
| 99% Occupied Bandwidth of the Incumbent Signal (MHz) | 9.9807 |
| Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz) | 6592 |
| Test Frequency of Incumbent Signal at f_{c1} (MHz) | 6665 |
| Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz) | 6738 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -5.8 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -67.80 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm) | -75.71 |
| Margin (dBm) | -7.91 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm) | -74.92 |
| Margin (dBm) | -7.12 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm) | -74.05 |
| Margin (dBm) | -6.25 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| Trial | AWGN Detected (Yes / No) | | |
|--------------------|----------------------------|----------------------------|----------------------------|
| | Incumbent AWGN at f_{c2} | Incumbent AWGN at f_{c1} | Incumbent AWGN at f_{c3} |
| 1 | Yes | Yes | Yes |
| 2 | Yes | Yes | Yes |
| 3 | Yes | Yes | Yes |
| 4 | Yes | Yes | Yes |
| 5 | Yes | Yes | Yes |
| 6 | Yes | Yes | Yes |
| 7 | Yes | Yes | Yes |
| 8 | No | No | No |
| 9 | Yes | Yes | Yes |
| 10 | Yes | Yes | Yes |
| Test Result | PASS | PASS | PASS |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.13.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 4: 99% BW_{EUT} > 4 x 99% BW_{INC}

Incumbent AWGN at f_{c2}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -70.91 | 4.8 | -75.71 | -5.8 | -69.91 | -62 | Ceased |
| -75.36 | 4.8 | -80.16 | -5.8 | -74.36 | -62 | Minimal |
| -76.16 | 4.8 | -80.96 | -5.8 | -75.16 | -62 | Normal |

Incumbent AWGN at f_{c1}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -70.12 | 4.8 | -74.92 | -5.8 | -69.12 | -62 | Ceased |
| -75.3 | 4.8 | -80.1 | -5.8 | -74.3 | -62 | Minimal |
| -76.61 | 4.8 | -81.41 | -5.8 | -75.61 | -62 | Normal |

Incumbent AWGN at f_{c3}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -69.25 | 4.8 | -74.05 | -5.8 | -68.25 | -62 | Ceased |
| -73.25 | 4.8 | -78.05 | -5.8 | -72.25 | -62 | Minimal |
| -75.31 | 4.8 | -80.11 | -5.8 | -74.31 | -62 | Normal |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

9.14. U-NII 8 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

$$99\% BW_{EUT} \leq 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.15. U-NII 8 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

$$99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$$

9.15.1. TEST CHANNEL

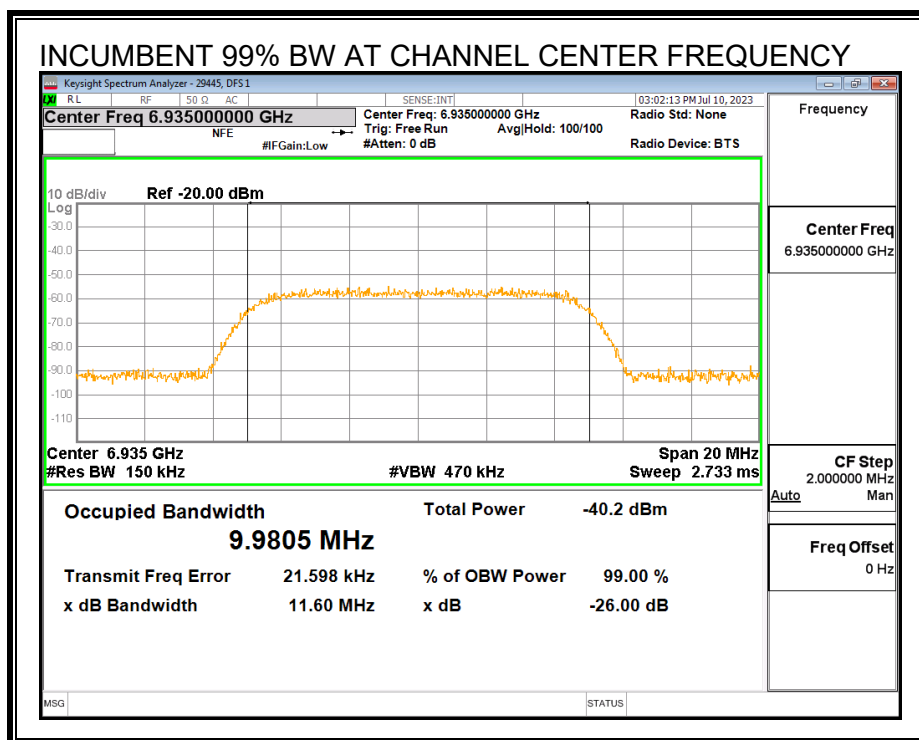
All tests were performed with the EUT set to a channel center frequency of 6935 MHz and a nominal channel bandwidth of 20 MHz.

Only the lowest and highest supported channel bandwidths are required to be tested.

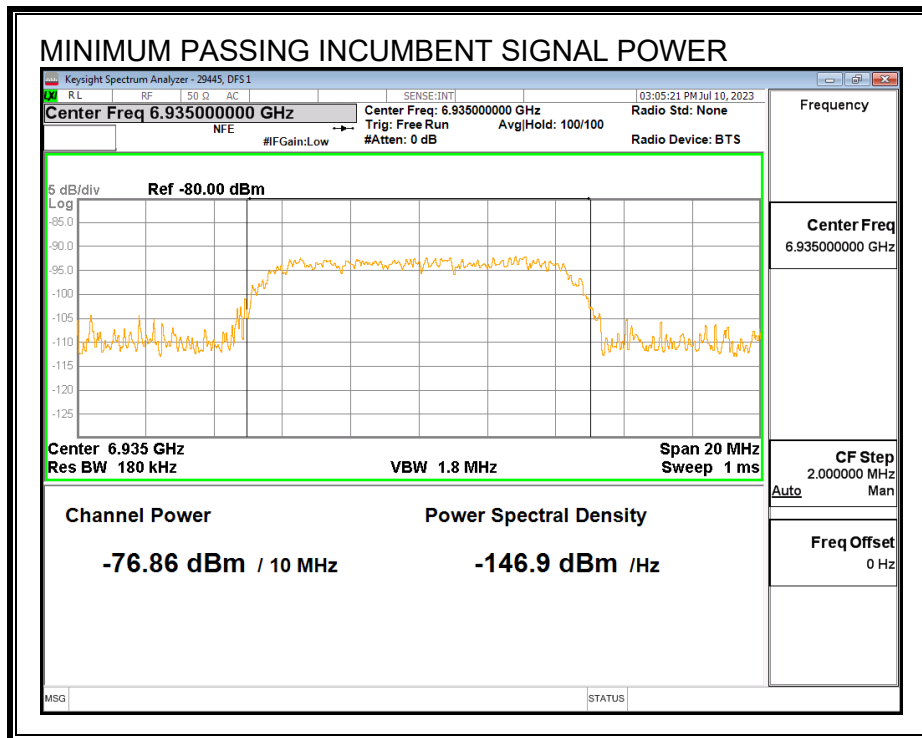
9.15.2. INCUMBENT SIGNAL PLOTS

All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

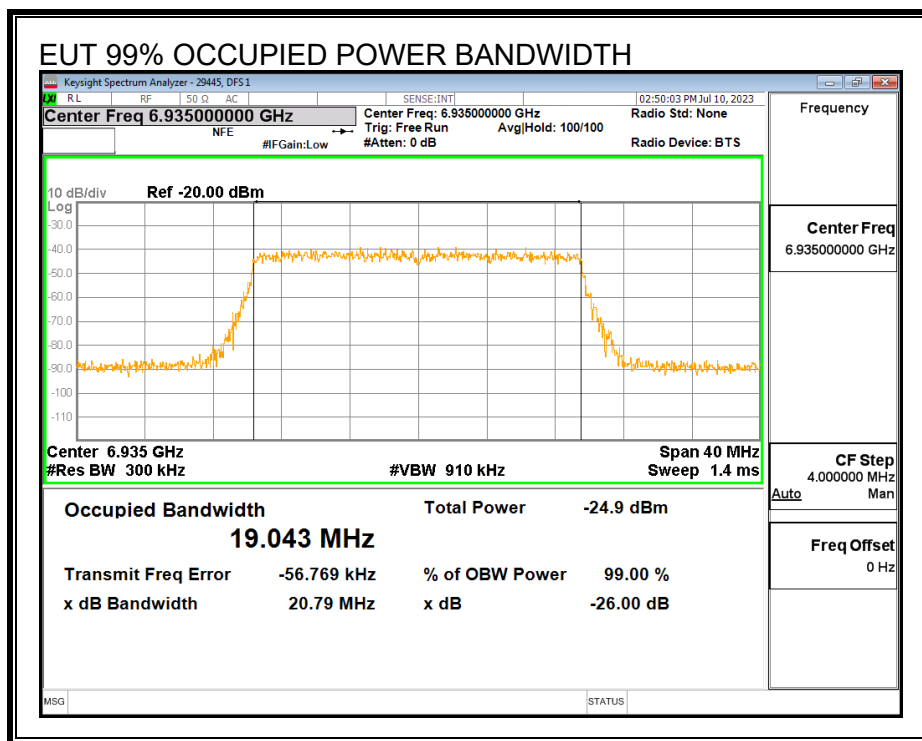


MINIMUM PASSING INCUMBENT SIGNAL POWER

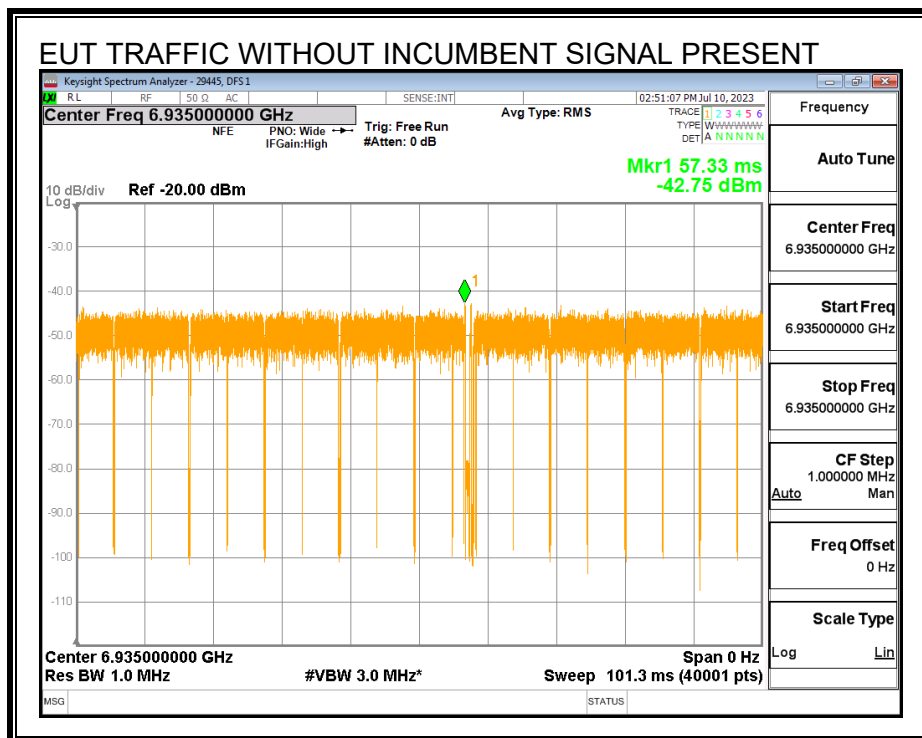


9.15.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

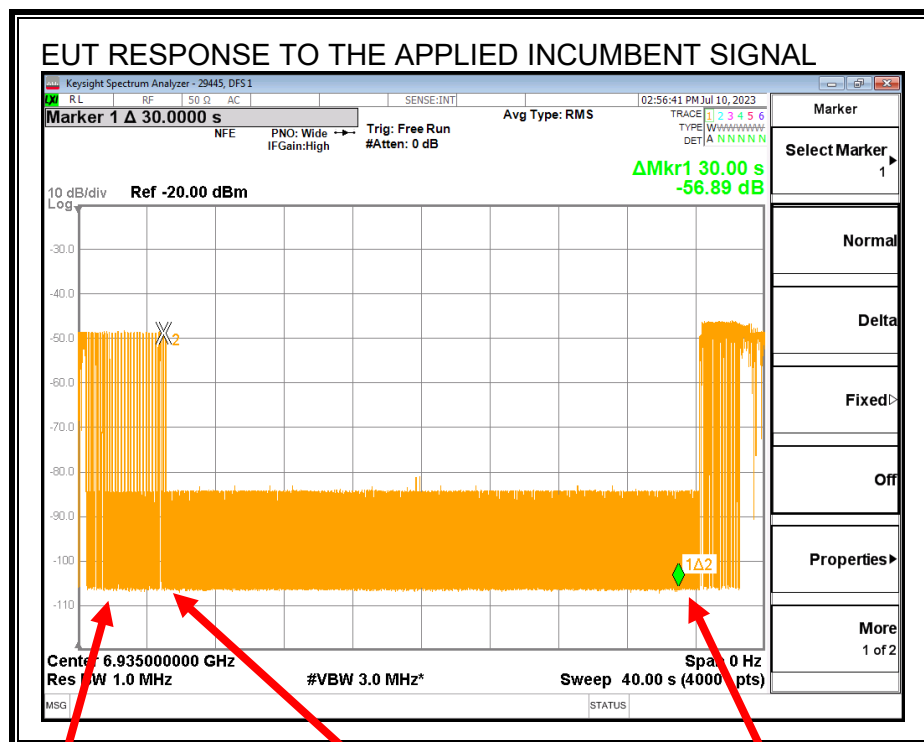


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

9.15.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|---------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6935 |
| EUT Nominal Channel Bandwidth (MHz) | 20 |
| 99% Occupied Bandwidth of the EUT (MHz) | 19.043 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6925.48 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 6944.52 |
| Test Frequency of Incumbent Signal (MHz) | 6935 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -6.4 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -68.4 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude (dBm) | -81.76 |
| Margin (dBm) | -13.36 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| AWGN Detected (Yes / No) | |
|--------------------------|----------------------------|
| Trial | Incumbent AWGN at f_{c1} |
| 1 | Yes |
| 2 | Yes |
| 3 | Yes |
| 4 | Yes |
| 5 | Yes |
| 6 | Yes |
| 7 | Yes |
| 8 | Yes |
| 9 | Yes |
| 10 | Yes |
| Test Result | PASS |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.15.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: $99\% BW_{INC} < 99\% BW_{EUT} \leq 2 \times 99\% BW_{INC}$

Incumbent AWGN at f_{c1} :

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -76.86 | 4.9 | -81.76 | -6.4 | -75.36 | -62 | Ceased |
| -79.73 | 4.9 | -84.63 | -6.4 | -78.23 | -62 | Minimal |
| -80.66 | 4.9 | -85.56 | -6.4 | -79.16 | -62 | Normal |

Test Date: 07/10/23

Tested by: 29445

Test location: DFS 1

9.16. U-NII 8 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

$$2 \times 99\% BW_{INC} < 99\% BW_{EUT} \leq 4 \times 99\% BW_{INC}$$

The lowest and highest supported channel bandwidths do not meet the criteria for this test condition therefore this test was not performed.

9.17. U-NII 8 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

$$99\% BW_{EUT} > 4 \times 99\% BW_{INC}$$

9.17.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6985 MHz and a nominal channel bandwidth of 160 MHz.

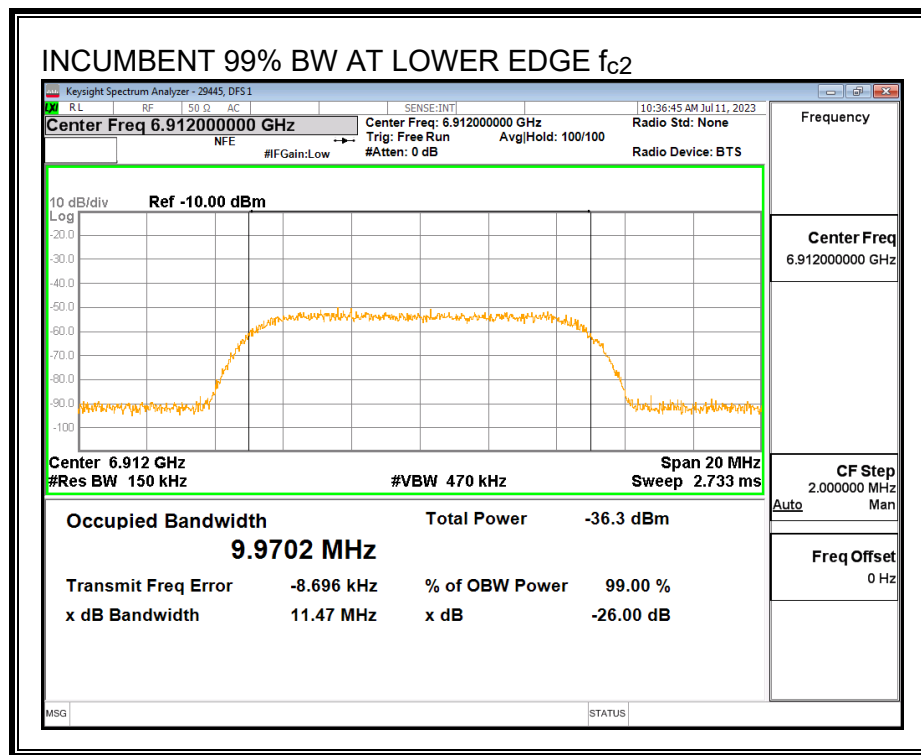
Only the lowest and highest supported channel bandwidths are required to be tested.

9.17.2. INCUMBENT SIGNAL PLOTS

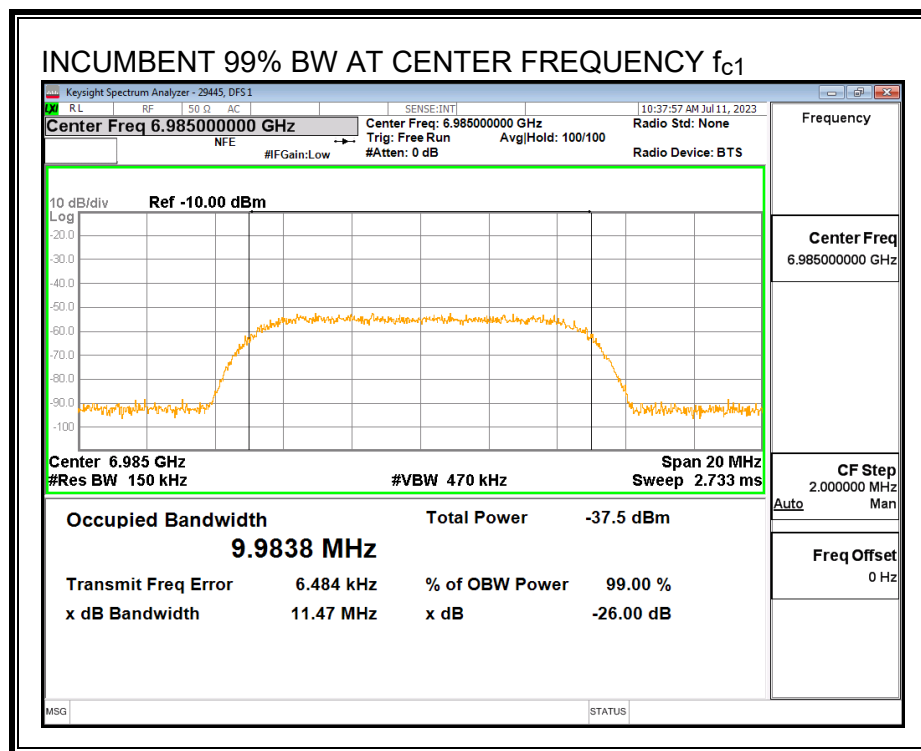
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

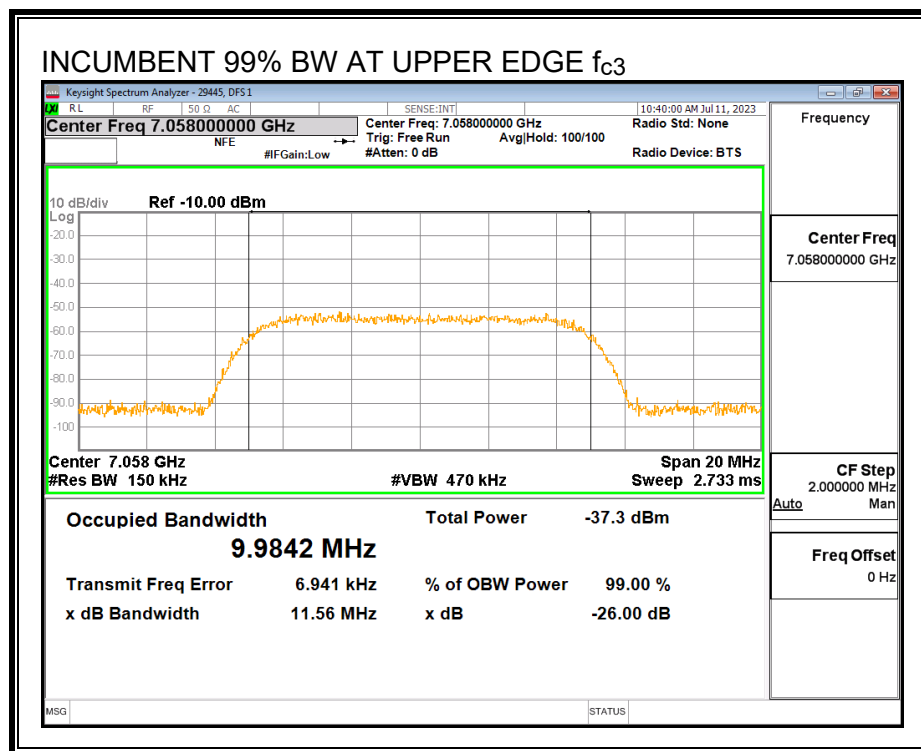
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

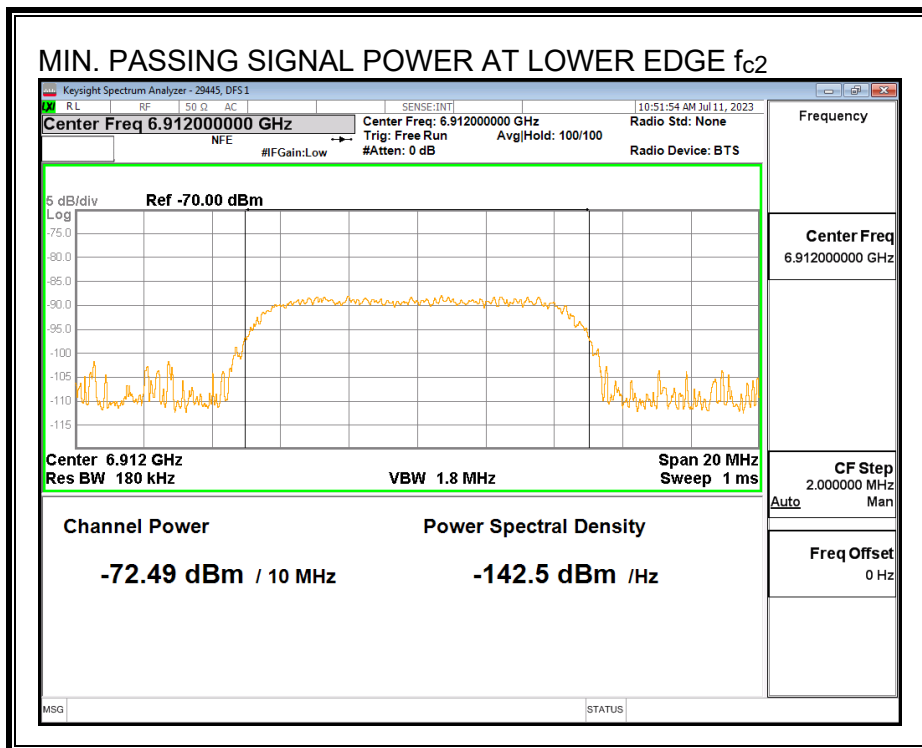


Upper Edge Incumbent Signal f_{c3} :

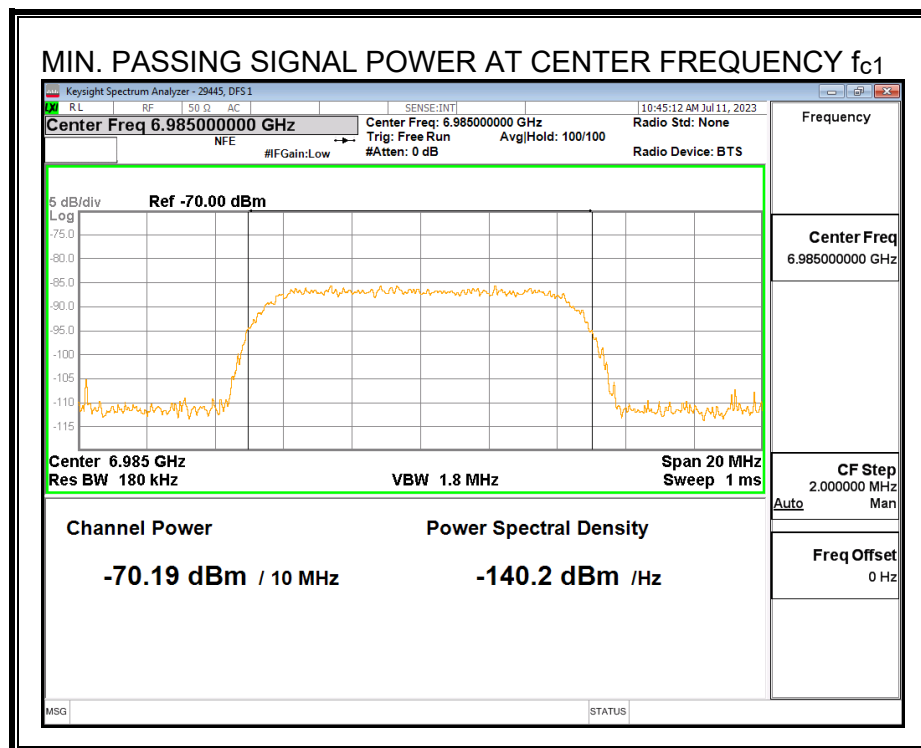


MINIMUM PASSING INCUMBENT SIGNAL POWER

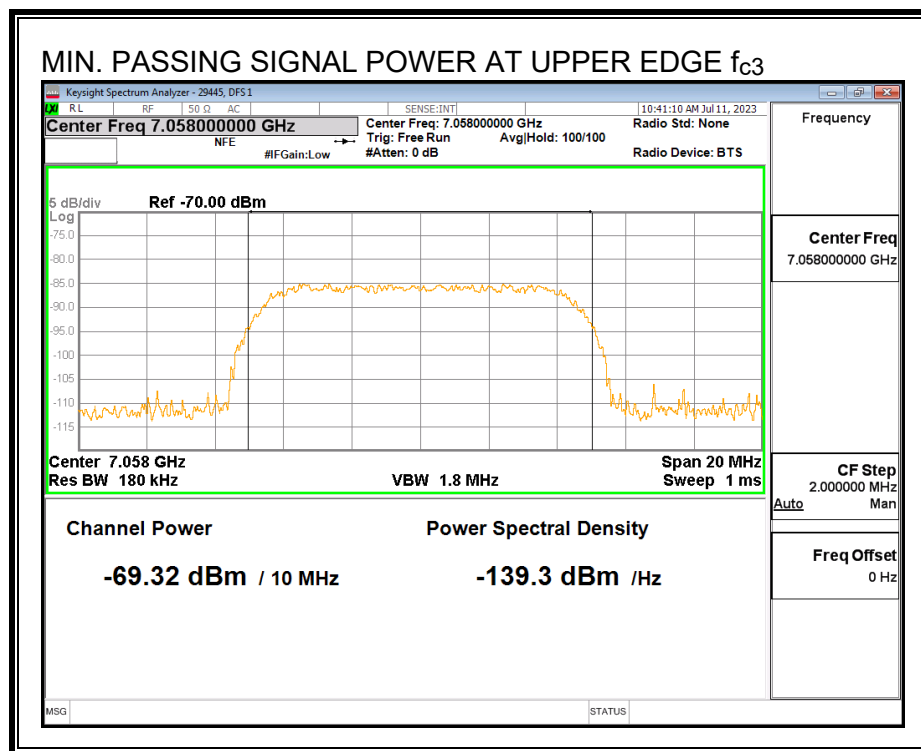
Lower Edge Incumbent Signal f_{c2} :



Center Frequency Incumbent Signal f_{c1} :

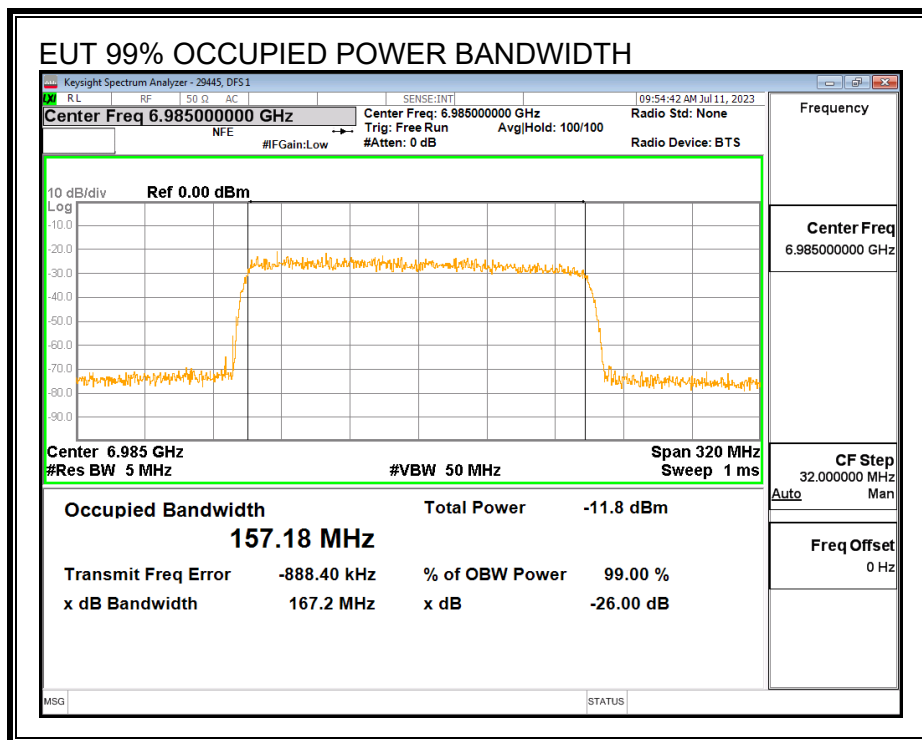


Upper Edge Incumbent Signal f_{c3} :



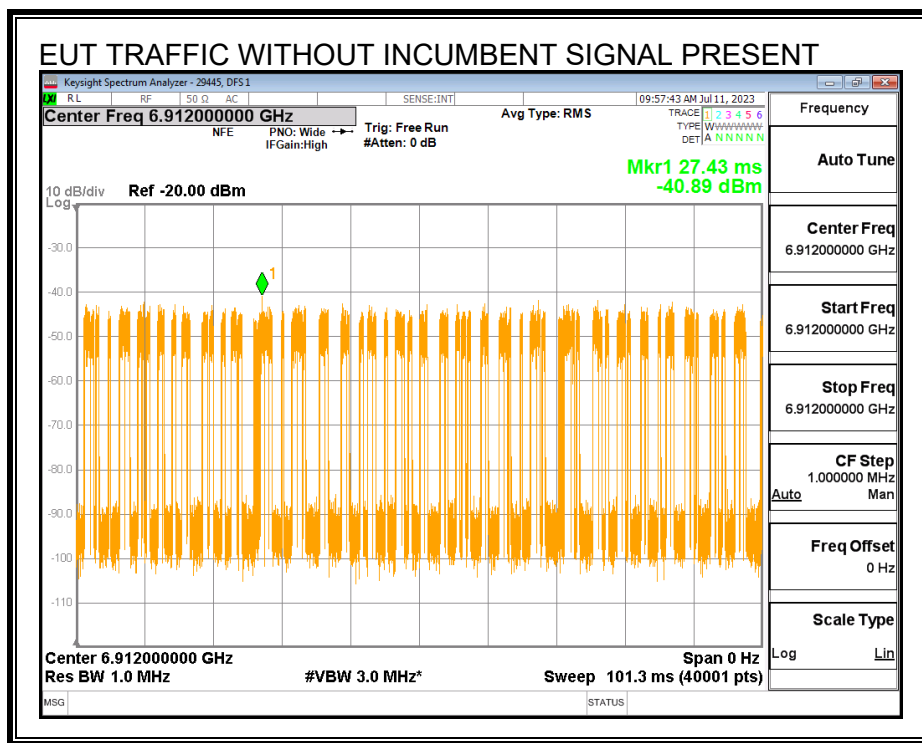
9.17.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

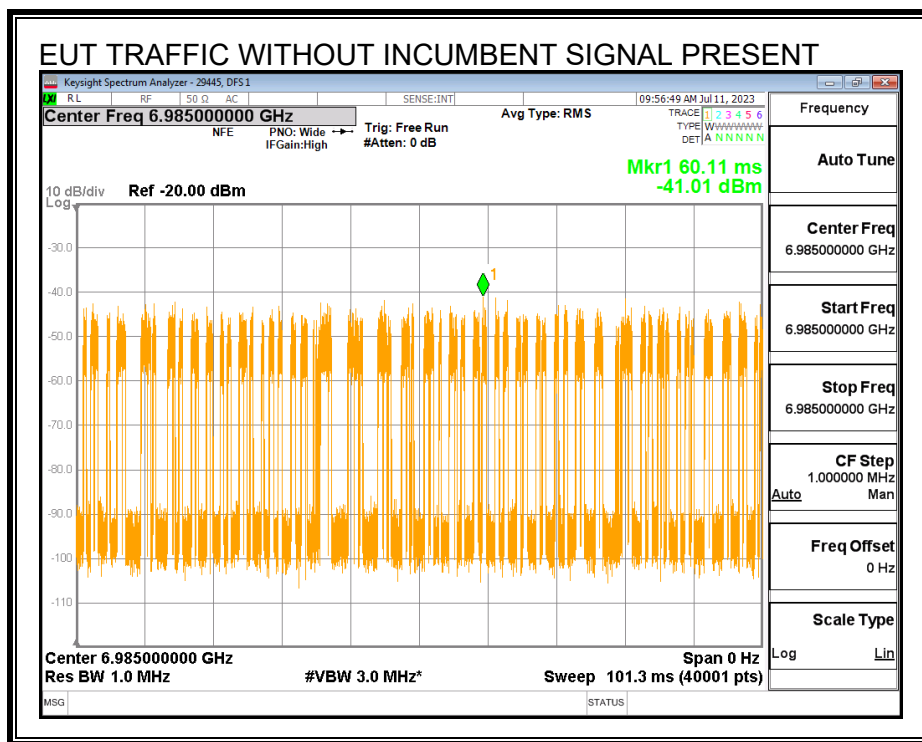


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

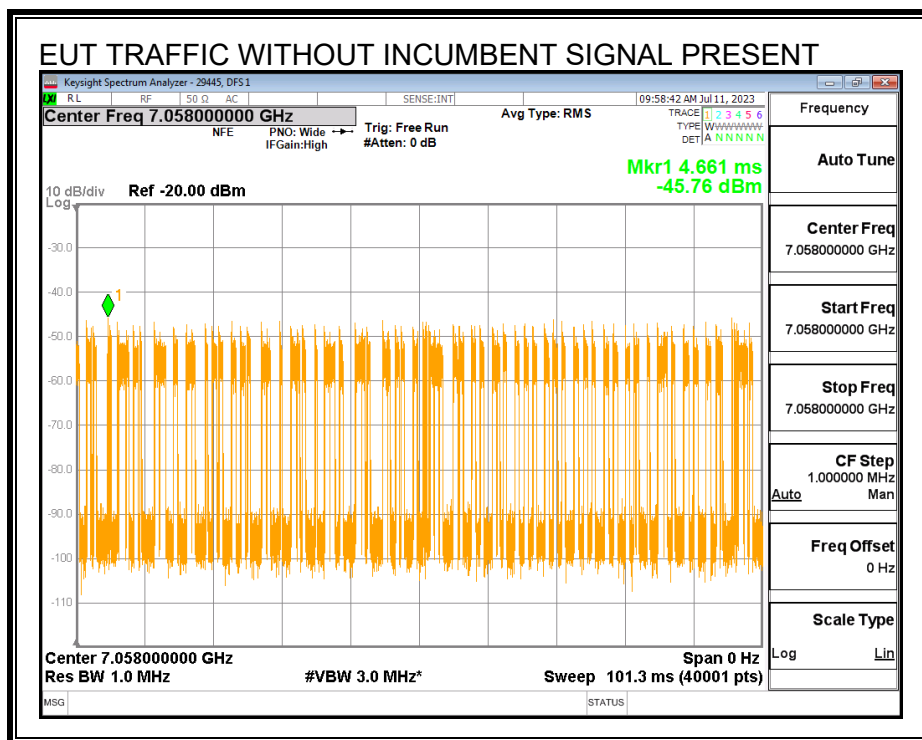
Lower Edge f_{c2} :



Center Frequency f_{c1} :



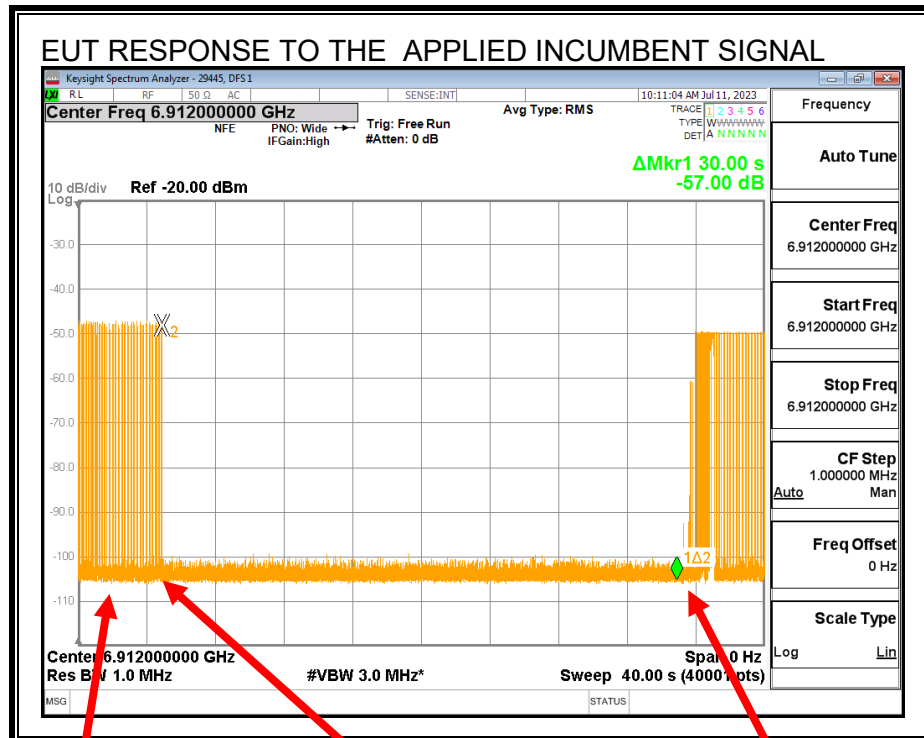
Upper Edge f_{c3} :



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 30 seconds and removed after the end of the observation period. Markers are placed at the beginning and end of the observation period.

Lower Edge Incumbent Signal f_{c2} :



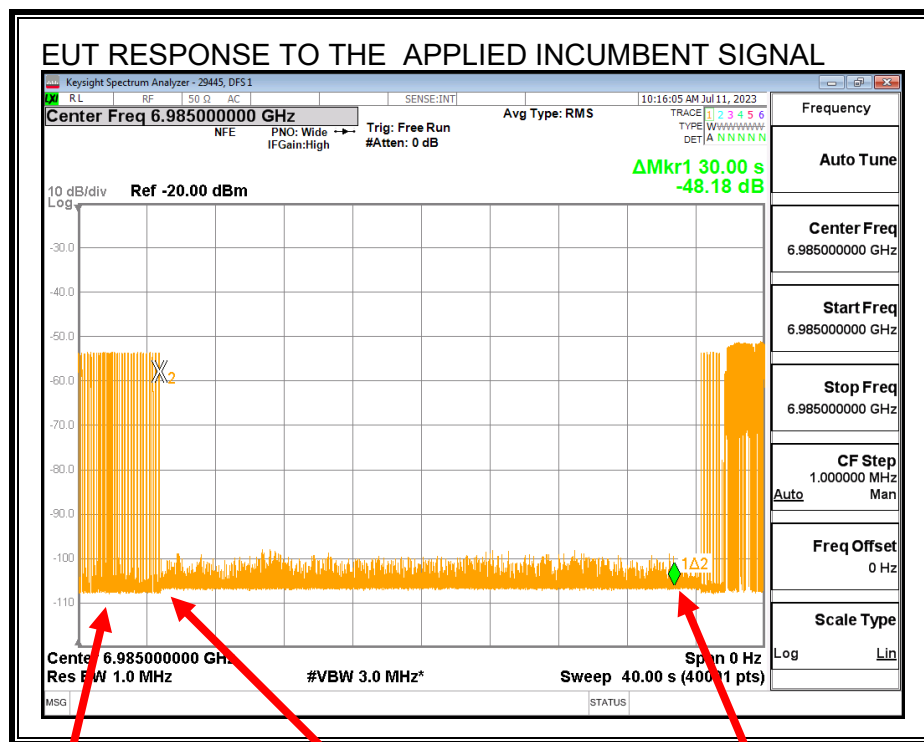
Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{c1} :



Normal Traffic

Application of Incumbent
Transmissions Ceased

Incumbent Removed
Transmissions Resume

Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

The screenshot displays the Keysight Spectrum Analyzer interface. The main plot shows a signal at 7.058 GHz with a 3.0 MHz span. The signal level is -20.00 dBm. The plot is labeled 'Log' and 'Ref -20.00 dBm'. The signal is identified as 'X2'. The interface includes various controls and readouts for frequency, span, and signal level.

Center Freq 7.058000000 GHz

Ref -20.00 dBm

Log

Center 7.058000000 GHz

Res BW 1.0 MHz

#VBW 3.0 MHz*

Span 0 Hz

Sweep 40.00 s (40001 pts)

Frequency

Auto Tune

Center Freq 7.058000000 GHz

Start Freq 7.058000000 GHz

Stop Freq 7.058000000 GHz

CF Step 1.000000 MHz

Auto

Man

Freq Offset 0 Hz

Scale Type

Log

Lin

MSG

STATUS

KeySight Spectrum Analyzer - 29445, DFS1

RF

50.0 AC

SENSE:INT

10:20:35 AM Jul 11, 2023

Avg Type: RMS

TRACE 1 2 3 4 5 6

TYPE W W W W W W W W

DET A N N N N N

ΔMkr1 30.00 s

-49.21 dB

Trig: Free Run

#Atten: 0 dB

NFE

PNO: Wide

IFGain: High

10 dB/div

-30.0

-40.0

-50.0

-60.0

-70.0

-80.0

-90.0

-100

-110

X2

1Δ2

Incumbent Removed
Transmissions Resume

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9.17.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

| | |
|--|---------|
| EUT Channel Center Frequency, f_{c1} (MHz) | 6985 |
| EUT Nominal Channel Bandwidth (MHz) | 160 |
| 99% Occupied Bandwidth of the EUT (MHz) | 157.18 |
| EUT 99% OBW Lower Edge, F_L (MHz) | 6906.41 |
| EUT 99% OBW Upper Edge, F_H (MHz) | 7063.59 |
| 99% Occupied Bandwidth of the Incumbent Signal (MHz) | 9.9838 |
| Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz) | 6912 |
| Test Frequency of Incumbent Signal at f_{c1} (MHz) | 6985 |
| Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz) | 7058 |
| Maximum Allowed Incumbent Amplitude at Antenna (dBm) | -62 |
| Minimum Antenna Gain (dBi) | -6.4 |
| Maximum Allowed Incumbent Amplitude at Radio Port (dBm) | -68.40 |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm) | -77.39 |
| Margin (dBm) | -8.99 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm) | -75.09 |
| Margin (dBm) | -6.69 |
| Result (PASS / FAIL) | PASS |
| | |
| Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm) | -74.22 |
| Margin (dBm) | -5.82 |
| Result (PASS / FAIL) | PASS |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

| Trial | AWGN Detected (Yes / No) | | |
|-------------|-------------------------------|-------------------------------|-------------------------------|
| | Incumbent AWGN at f_{c2} | Incumbent AWGN at f_{c1} | Incumbent AWGN at f_{c3} |
| 1 | Yes | Yes | Yes |
| 2 | Yes | Yes | Yes |
| 3 | Yes | Yes | Yes |
| 4 | Yes | Yes | Yes |
| 5 | Yes | Yes | Yes |
| 6 | Yes | Yes | Yes |
| 7 | Yes | Yes | Yes |
| 8 | Yes | Yes | Yes |
| 9 | Yes | Yes | Yes |
| 10 | Yes | Yes | Yes |
| Test Result | PASS | PASS | PASS |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

A minimum detection rate of 90% is required for the EUT to be compliant.

9.17.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 4: 99% BW_{EUT} > 4 x 99% BW_{INC}

Incumbent AWGN at f_{c2}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -72.49 | 4.9 | -77.39 | -6.4 | -70.99 | -62 | Ceased |
| -76.21 | 4.9 | -81.11 | -6.4 | -74.71 | -62 | Minimal |
| -77.07 | 4.9 | -81.97 | -6.4 | -75.57 | -62 | Normal |

Incumbent AWGN at f_{c1}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -70.19 | 4.9 | -75.09 | -6.4 | -68.69 | -62 | Ceased |
| -74.21 | 4.9 | -79.11 | -6.4 | -72.71 | -62 | Minimal |
| -75.66 | 4.9 | -80.56 | -6.4 | -74.16 | -62 | Normal |

Incumbent AWGN at f_{c3}:

| Measured Incumbent Power at the EUT Test Fixture Connector (dBm) | Test Fixture Cable Path Loss (dB) | Adjusted Incumbent Power at the Radio Port (dBm) | Antenna Gain (dBi) | Adjusted Incumbent Power at the Antenna (dBm) | Detection Limit (dBm) | EUT Tx Status |
|--|-----------------------------------|--|--------------------|---|-----------------------|---------------|
| -69.32 | 4.9 | -74.22 | -6.4 | -67.82 | -62 | Ceased |
| -70.76 | 4.9 | -75.66 | -6.4 | -69.26 | -62 | Minimal |
| -72.79 | 4.9 | -77.69 | -6.4 | -71.29 | -62 | Normal |

Test Date: 07/11/23

Tested by: 29445

Test location: DFS 1

10. SETUP PHOTOS

Please refer to setup photos 14523772-EP1V1

END OF TEST REPORT