TEST REPORT

Report Number : 15126863-E9V1

Applicant	:	Sonos Inc. 301 Coromar Dr. Goleta, CA 93117 USA
Model	:	S55
Brand	:	SONOS
FCC ID	:	SBVRM055
IC	:	5373A-RM055
EUT Description	:	Wireless Smart Speaker
Test Standard(s)	:	CONTENTION BASED PROTOCOL PORTION of FCC 47 CFR PART 15 SUBPART E, KDB 987594 CONTENTION BASED PROTOCOL PORTION of RSS-248, ISSUE 2

Date Of Issue:
2024-04-31

Prepared by:
UL VERIFICATION SERVICES
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-31	Initial Issue	--

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos Inc.
301 Coromar Dr.
Goleta, CA 93117 USA

EUT DESCRIPTION: Wireless Smart Speaker

MODEL: S55

SERIAL NUMBER: NTU4130CU00233

DATE TESTED: 2024-04-11 – 2024-04-12

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.

Approved & Released For
UL Verification Services Inc. By:

Frank Ibrahim
Staff Engineer
CONSUMER TECHNOLOGY DIVISION
UL Verification Services Inc.

Prepared By:

Henry Lau
Senior Project Engineer
CONSUMER TECHNOLOGY DIVISION
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the Contention Based Protocol portion of

- FCC 47 CFR Part 15 Subpart E
- FCC KDB 987594 D01 U-NII 6GHz General Requirements v02r02
- FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v02r01
- 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	

Channel puncturing and channel bandwidth reduction: Not supported, please refer to section 7.2.5 in the report confirming this.

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 15126863-E7 & E8.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 7.3)

5. FACILITIES AND ACCREDITATION

UL Verification Services Inc 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
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☐	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

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).

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{Lab}
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
Worst Case Conducted Disturbance, 9kHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9kHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Time Domain Measurements	0.02 %
Temperature	0.57˚C
Humidity	3.39%
DC Supply Voltages	0.57%

Uncertainty figures are valid to a confidence level of 95%.

7. CONTENTION BASED PROTOCOL

7.1. OVERVIEW

7.1.1. 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 4.7.1 of RSS-248, Issue 2:

"The Federal Communications Commission's accepted KDB procedure KDB 987594 D02 listed on ISED's Certification and Engineering website (see the Normative Test Standards and Acceptable Alternate Procedures page) shall be used to demonstrate the compliance of a device with the contention-based protocol requirements set out in this section.

7.1.2. FREQUENCY BANDS AND GOVERNING RULES

FCC

Band	Frequency (GHz)	Rules	Notes	KDB/Publication
U-NII 5	5.925-6.425	15.407(a)(4) – (8)	Low Power Indoor AP, Subordinates, Indoor Clients Standard Power AP, Fixed , Standard Clients & Dual Client	789033 (U-NII) 987594 (6 GHz Band)
U-NII 6	6.425-6.525	15.407(a)(5), (6), (8)	Low Power Indoor AP, Subordinates, Indoor Clients & Dual Client	
U-NII 7	6.525-6.875	15.407(a)(4) – (8)	Low Power Indoor AP, Subordinates, Indoor Clients Standard Power AP, Fixed & Standard Clients & Dual Client	
U-NII 8	6.875 -7.125	15.407(a)(5), (6), (8)	Low Power Indoor AP, Subordinates, Indoor Clients & Dual Client	
*** Transition period ended March 2, 2020 for marketing DTS in the 5 GHz Band, as stated in 15.408(b)(4)(ii)**				

Table 1: Overview of U-NII Rules

ISED

Band	Frequency (GHz)	Rules	Notes	KDB/Publication
U-NII 5	5.925-6.425	RSS 248 - Section 4.2	Low-Power indoor AP, indoor subordinate devices, low-power client devices, Standard Power AP, Fixed client devices, standard client devices and dual client device	RSS 248 987594 D02
U-NII 6	6.425-6.525	RSS 248 - Section 4.2	Low-Power indoor AP, indoor subordinate devices, low-power client devices, Standard Power AP, Fixed client devices, standard client devices and dual client device	
U-NII 7	6.525-6.875	RSS 248 - Section 4.2	Low-Power indoor AP, indoor subordinate devices, low-power client devices, Standard Power AP, Fixed client devices, standard client devices and dual client device	
U-NII 8	6.875 -7.125	RSS 248 - Section 4.2	Low-Power indoor AP, indoor subordinate devices, low-power client devices, and dual client device	

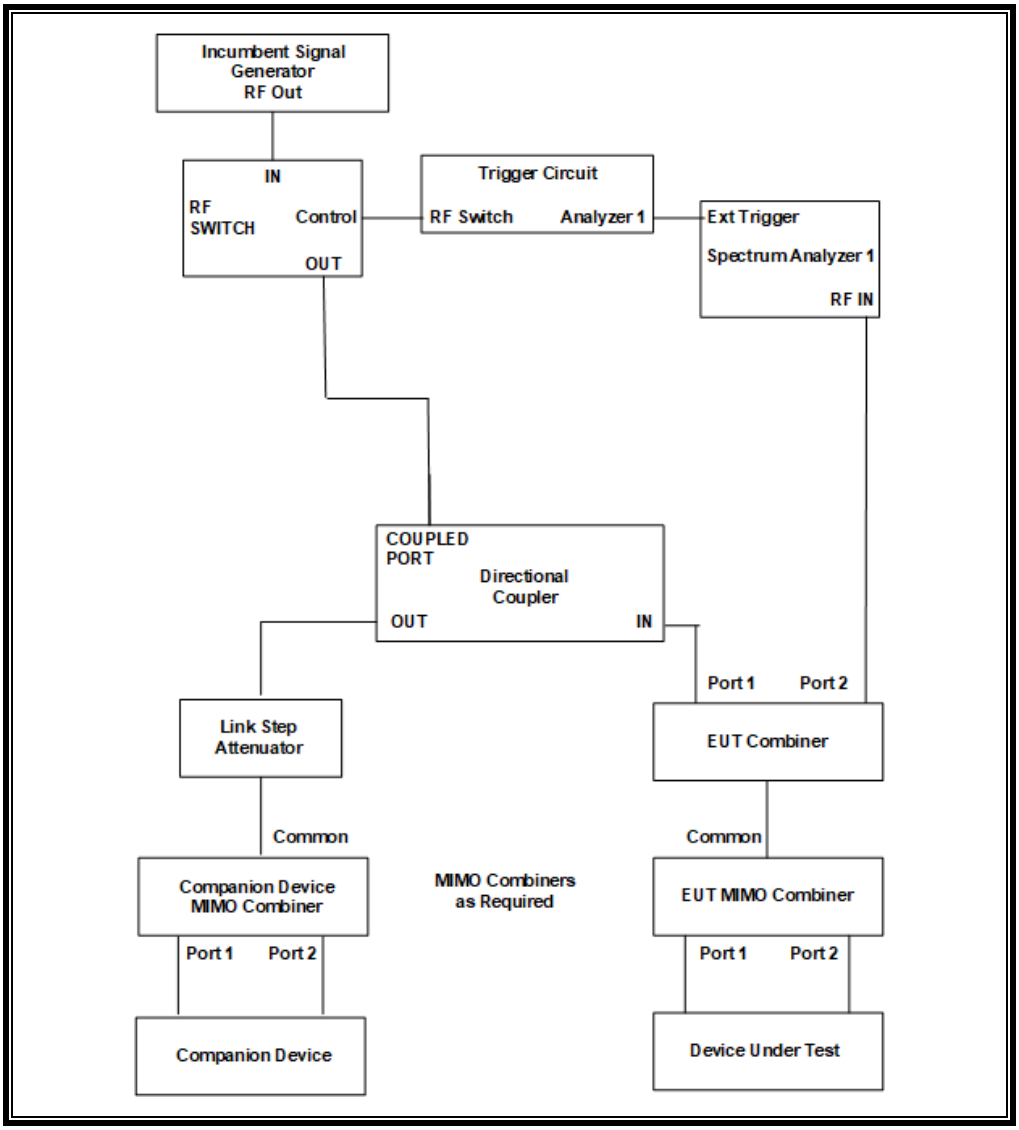
7.2. DESCRIPTION OF TEST SETUP

7.2.1. 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. This testing was performed in a MIMO configuration with two transmit/receive chains on the EUT.

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 one of the ports on the EUT is then attached to the spectrum analyzer in place of the monitoring cable. The cable connected to the other EUT port is terminated. 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:

FRE

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**ID No.**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 8.4GHz	Keysight	N9030A	150667	2025-01-31
Signal Generator, MXG X-Series RF Vector	Keysight	N5182B	215999	2025-01-31
Frequency Extender	Keysight	N5182BX	213906	2025-01-31

Note:

1. 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.

7.2.2. 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

7.2.3. TEST ROOM ENVIRONMENT

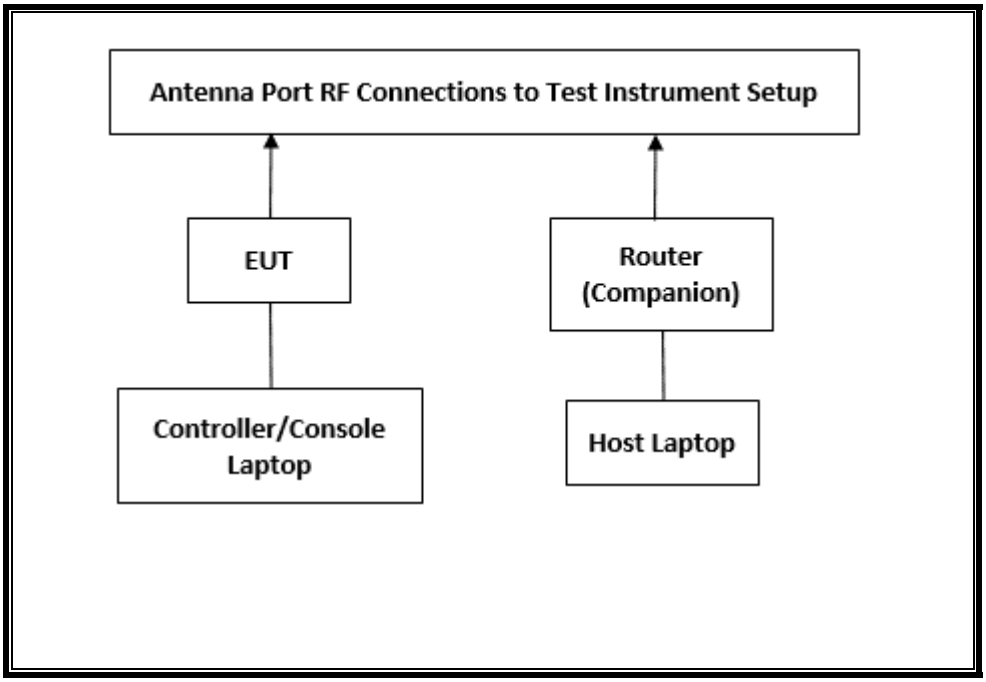
The test room temperature and humidity shall be maintained within normal temperature of 15~35 °C and normal humidity 20~75% (relative humidity).

ENVIRONMENT CONDITION

Parameter	Value
Temperature	23 °C
Humidity	45 %

7.2.4. 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**
Wireless GT-AXE11000 Wifi 6E Tri Band Gigabit Router	ASUSTEK Computer	GT-AXE11000	M9IG0X403210HEZ	MSQ-RTAXJF00
AC/DC Adapter (AP)	Acbel Electronic Co.	ADD011	ADD01117AG213402136A	DoC
Host PC (AP)	Lenovo	Type 4236-B92	PB-HEX04 12/05	DoC
AC/DC Adapter (AP Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG08R90M	DoC
Controller/Console Laptop (EUT)	Lenovo	TYPE 20L8-S1GA00	PC-0yQ74R 18/10	DoC
AC/DC Adapter (EUT Laptop)	Lenovo	ADLX6SYAC2D	8SSA10R16896A1WH9BK08LF	DoC

7.2.5. DESCRIPTION OF EUT

The EUT operates in the following 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 lowest gain antenna assembly utilized with the EUT has a gain of 2.8 dBi in the U-NII 5 band, 2 dBi in the U-NII 6 band, 2.3 dBi in the U-NII 7 band and 2 dBi in the U-NII 8 band.

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 -59.2 dBm in the U-NII 5 band, -60 dBm in the U-NII 6 band, -59.7 dBm in the U-NII 7 band and -60 dBm in the U-NII 8 band.

The calibrated conducted AWGN Incumbent Detection Threshold level is set to –62 dBm. The tested level is lower than the maximum allowable level hence it provides a margin to the limit.

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

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.

Channel puncturing is not supported.

Channel bandwidth reduction is not supported.

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. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz.

The software installed in the EUT is 78.1-48130-diag-jaws-dev-woosung-202312211600.

The software installed in the access point is V3.0.0.4.386_45940-gaafbb83.

TEST SETUP

The EUT is attached to a USB port of a host laptop computer 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.

8. CONTENTION BASED PROTOCOL

8.1. 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	2.8	-59.2
U-NII 6	6425 to 6525	2	-60
U-NII 7	6525 to 6875	2.3	-59.7
U-NII 8	6875 to 7125	2	-60

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).

Testing is performed by starting at a level much lower than required detection level and then the level is increased.

8.2. 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.

8.3. U-NII 5 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

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

8.3.1. 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.

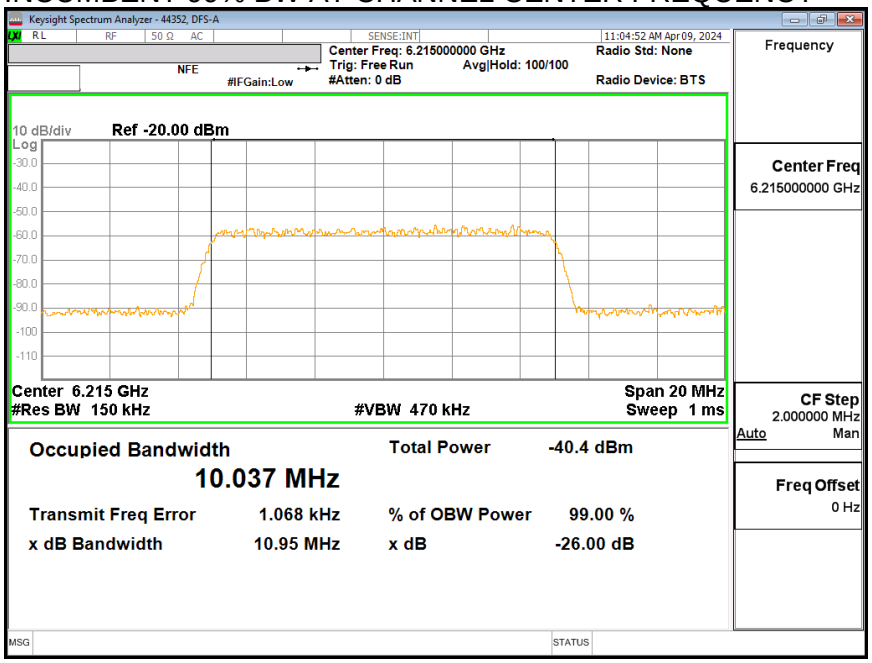
Only the lowest and highest supported channel bandwidths are required to be tested.

8.3.2. INCUMBENT SIGNAL PLOTS

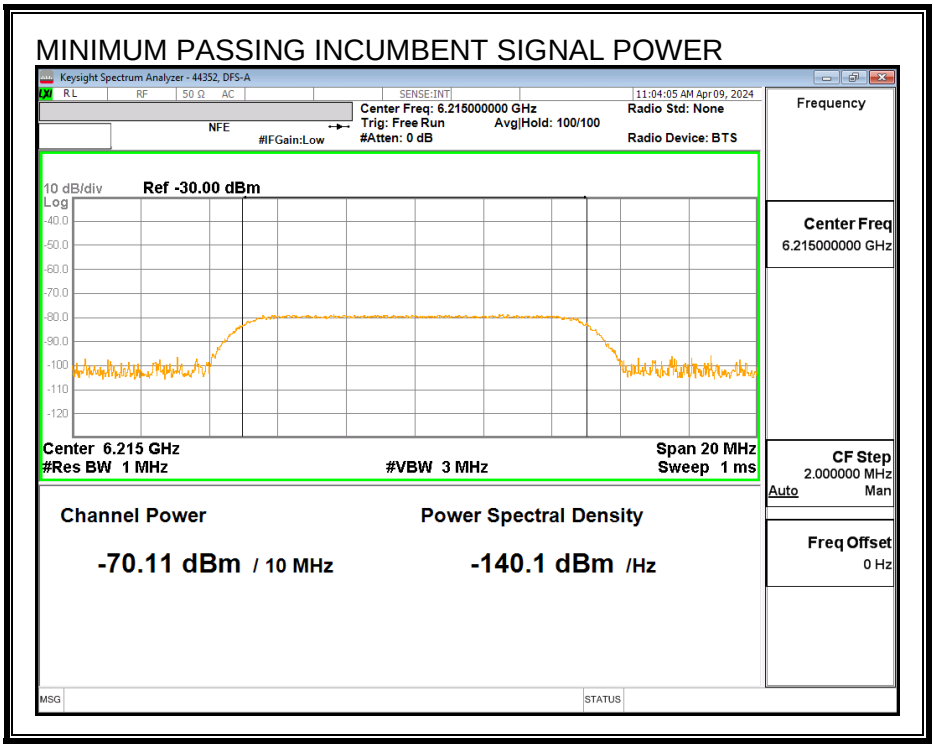
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY

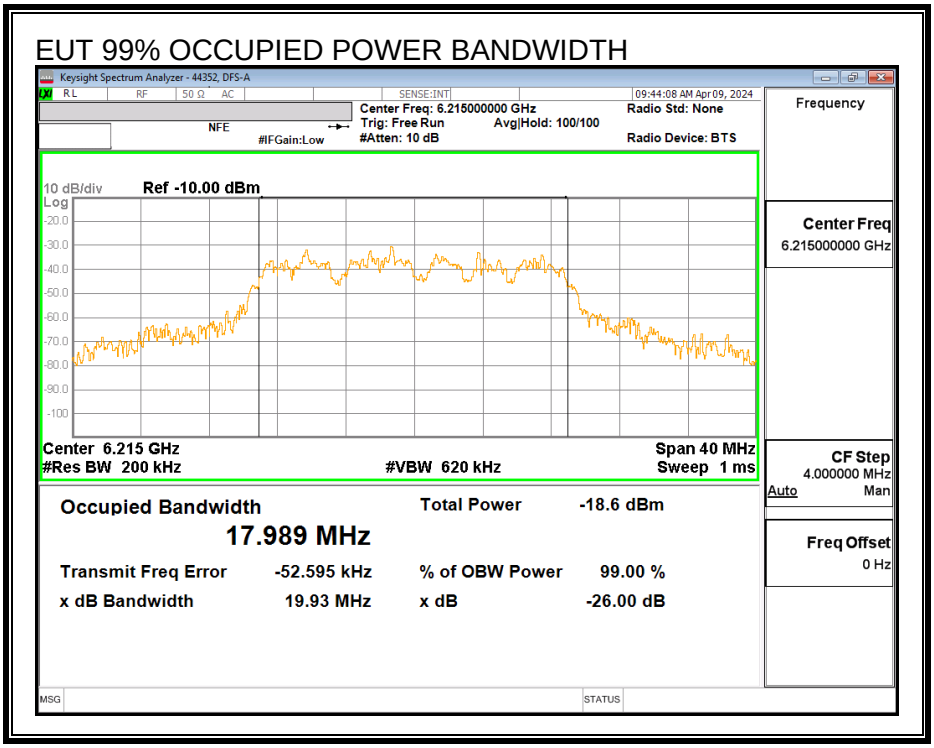


MINIMUM PASSING INCUMBENT SIGNAL POWER



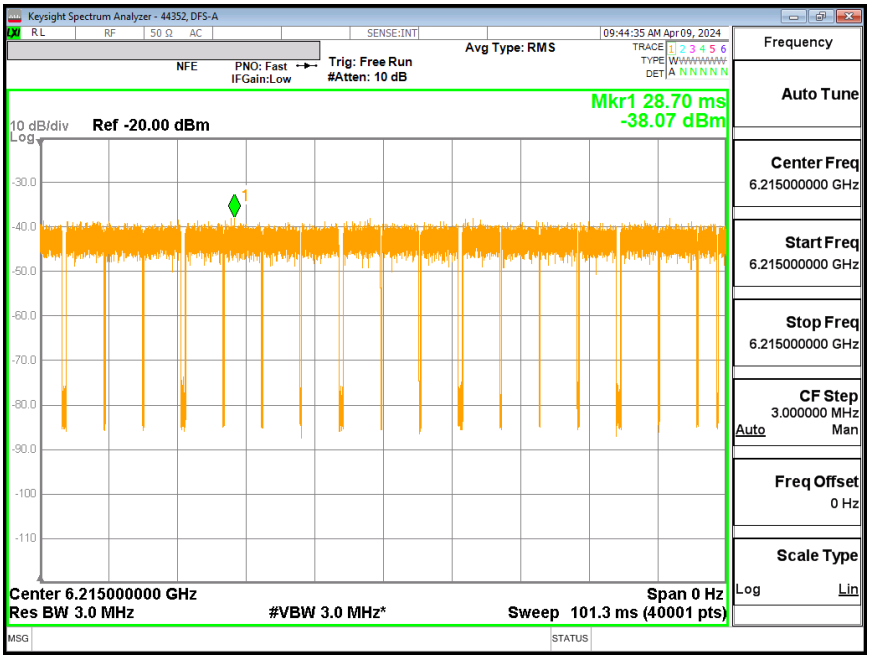
8.3.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



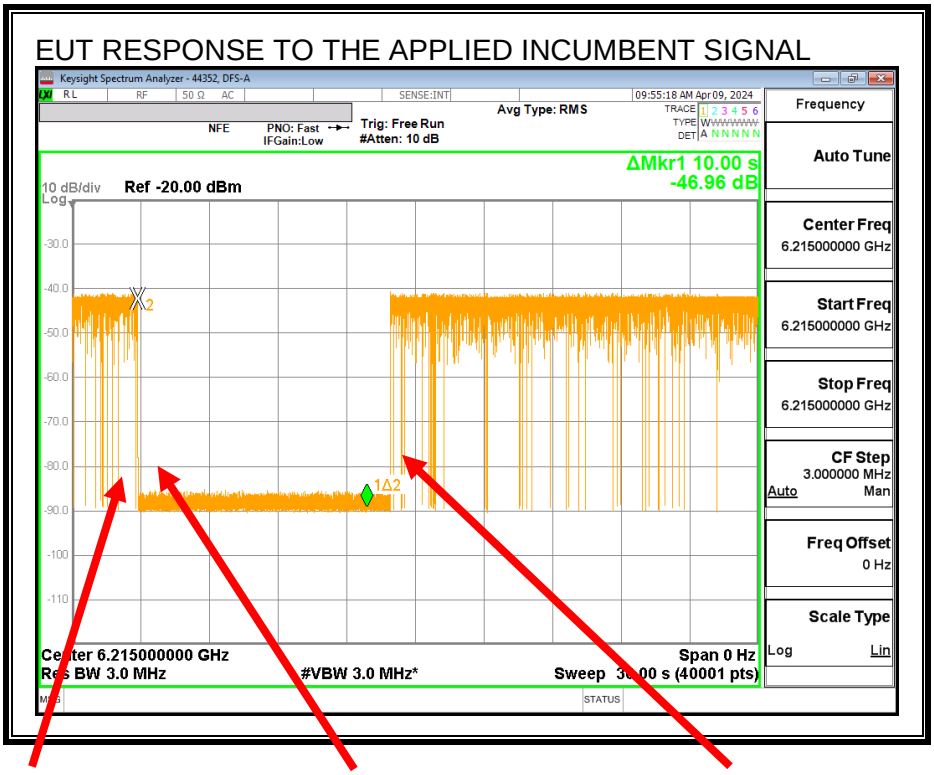
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

EUT TRAFFIC WITHOUT 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.



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

8.3.4. 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)	17.989
EUT 99% OBW Lower Edge, F_L (MHz)	6206.01
EUT 99% OBW Upper Edge, F_H (MHz)	6223.99
Test Frequency of Incumbent Signal (MHz)	**6215**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.80
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-59.2
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-70.1
Margin (dBm)	-10.91
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-09
Tested by: 44352
Test location: DFS-A

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: 2024-04-09

Tested by: 44352

Test location: DFS-A

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

8.3.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: 99% BW_{INC} < 99% BW_{EUT} ≤ 2 x 99% BW_{INC}

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-70.11	2.8	0	-72.91	-62	Ceased
-71.08	2.8	0	-73.88	-62	Minimal
-77.98	2.8	0	-80.78	-62	Normal

Test Date: 2024-04-09

Tested by: 44352

Test location: DFS-A

8.4. 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.

8.5. U-NII 5 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.5.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6225 MHz and a nominal channel bandwidth of 80 MHz.

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

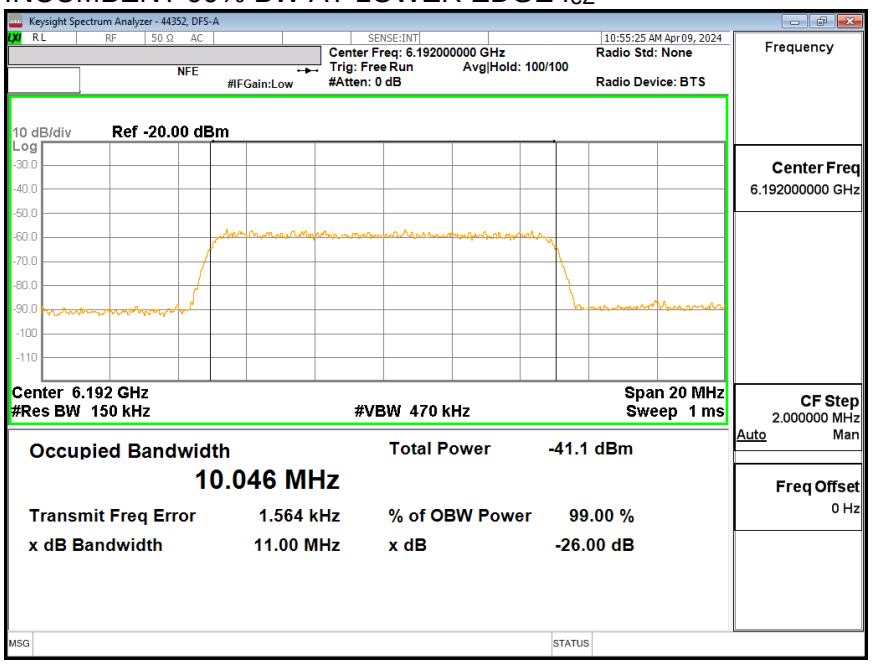
8.5.2. INCUMBENT SIGNAL PLOTS

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.

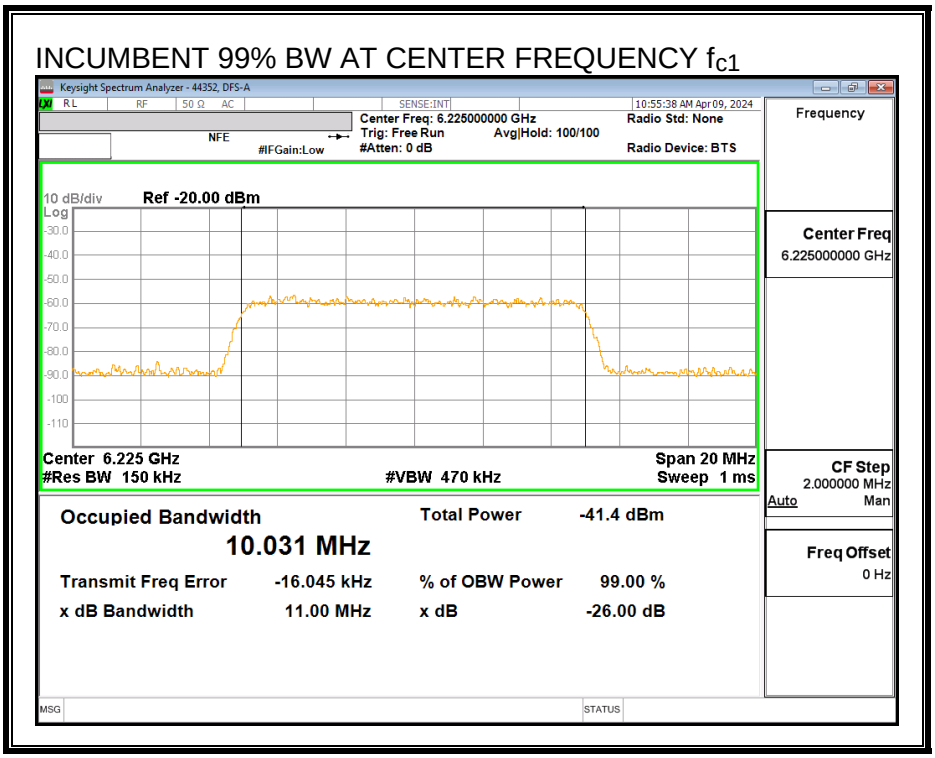
INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:

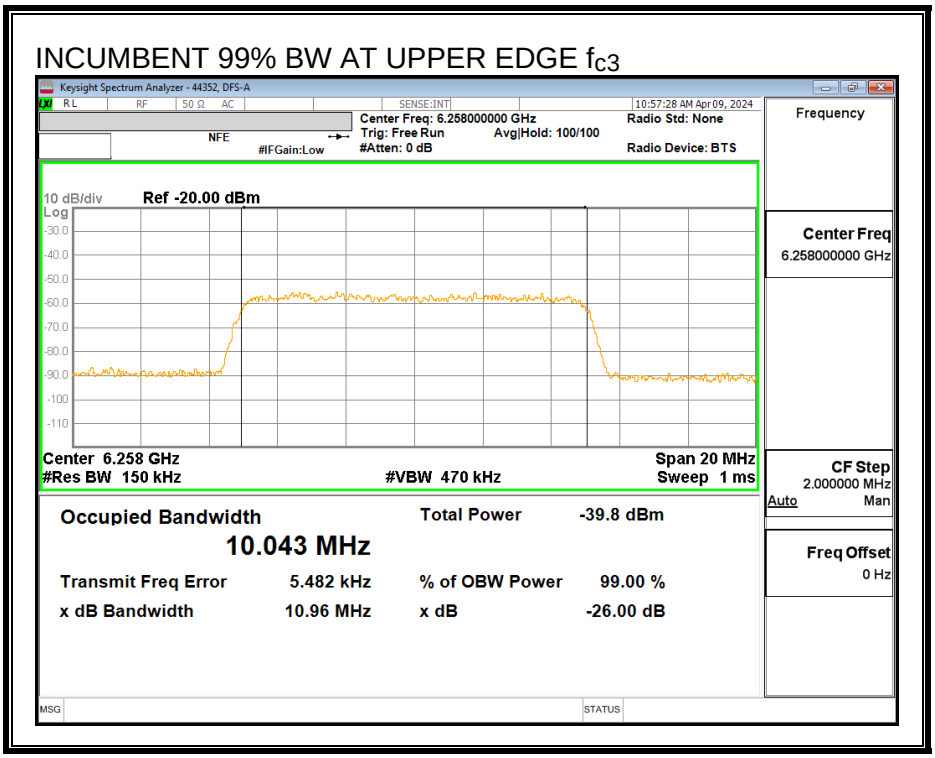
INCUMBENT 99% BW AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



Upper Edge Incumbent Signal f_{c3}:



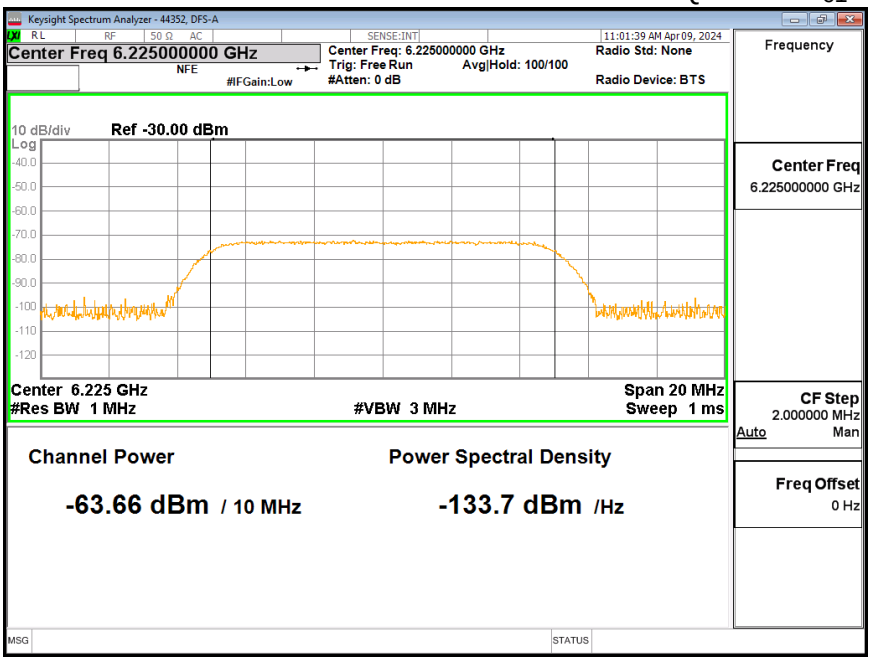
MINIMUM PASSING INCUMBENT SIGNAL POWER

Lower Edge Incumbent Signal f_{c2}:

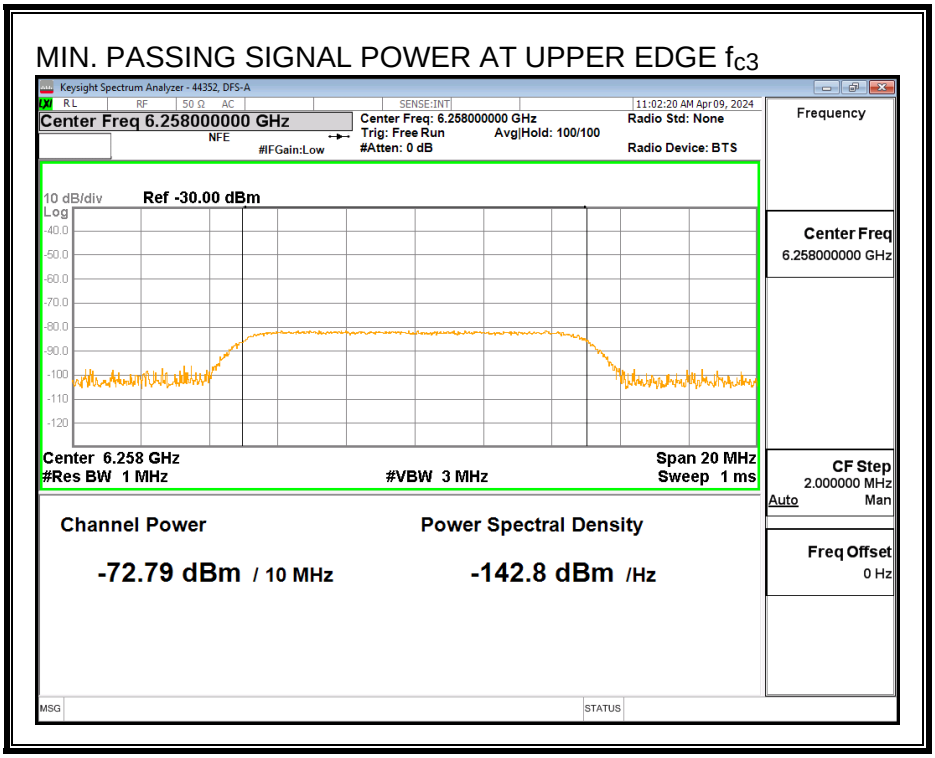
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}

Center Frequency Incumbent Signal f_{c1}:

MIN. PASSING SIGNAL POWER AT CENTER FREQUENCY f_{c1}

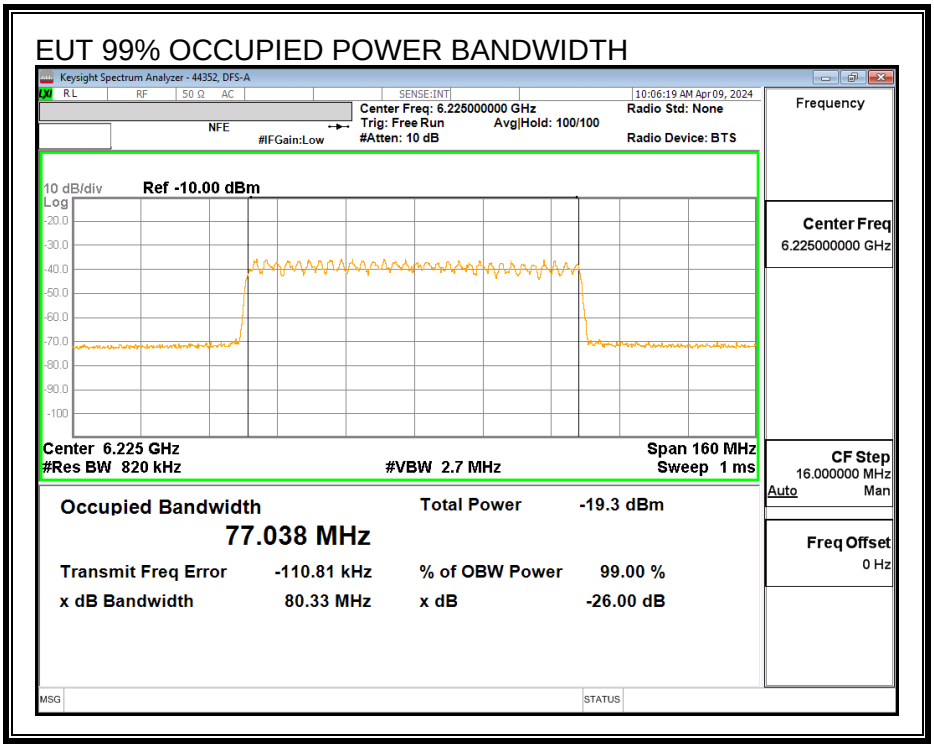


Upper Edge Incumbent Signal f_{c3}:



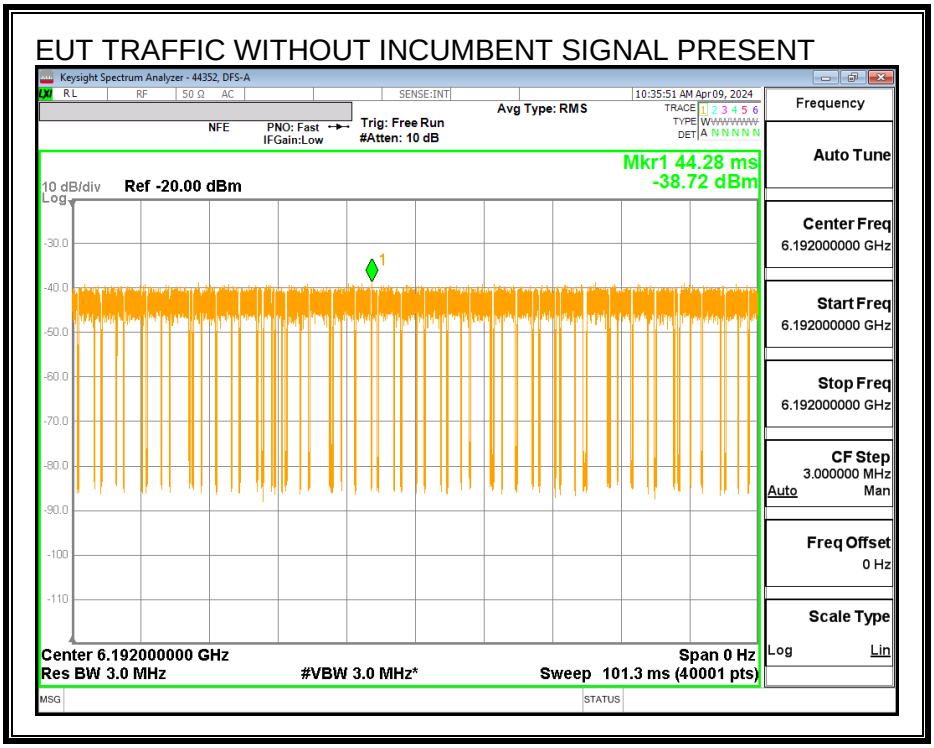
8.5.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

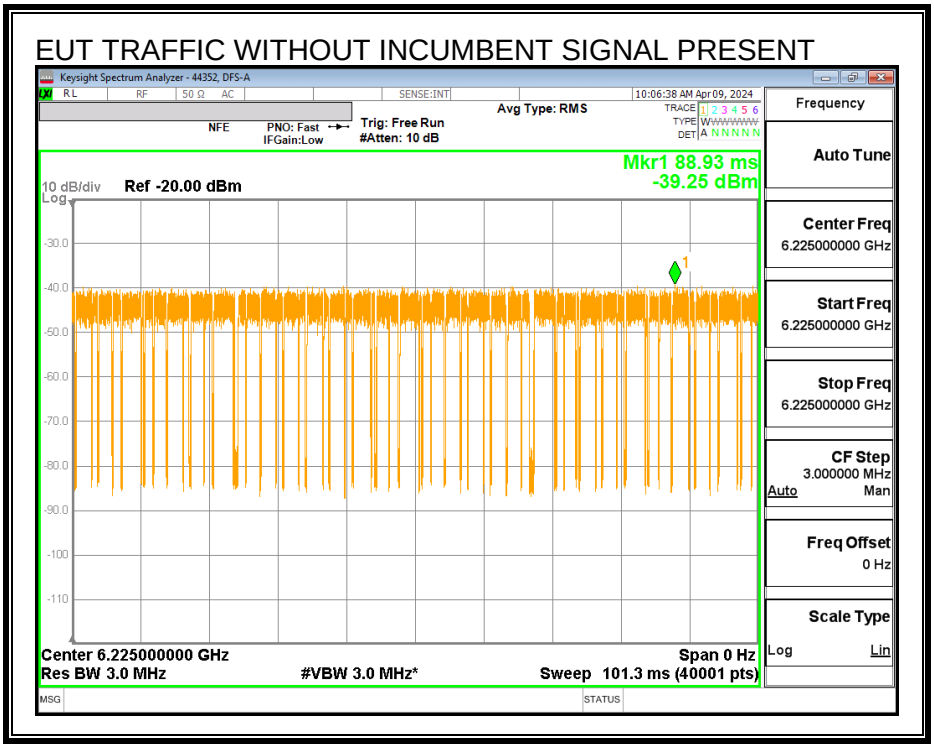


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

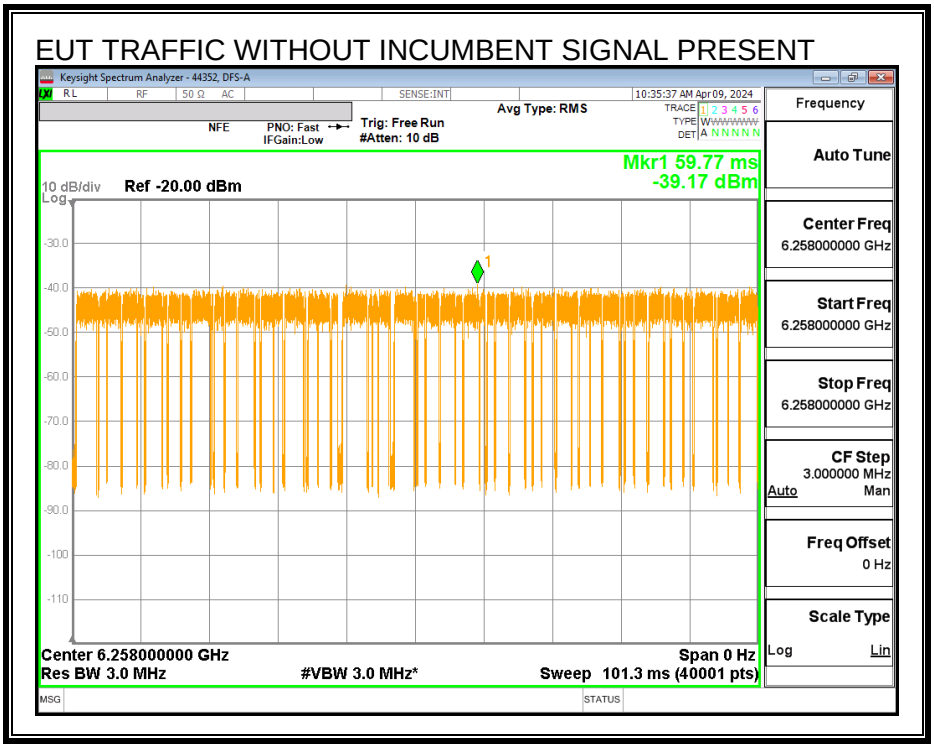
Lower Edge f_{c2}:



Center Frequency f_{C1}:



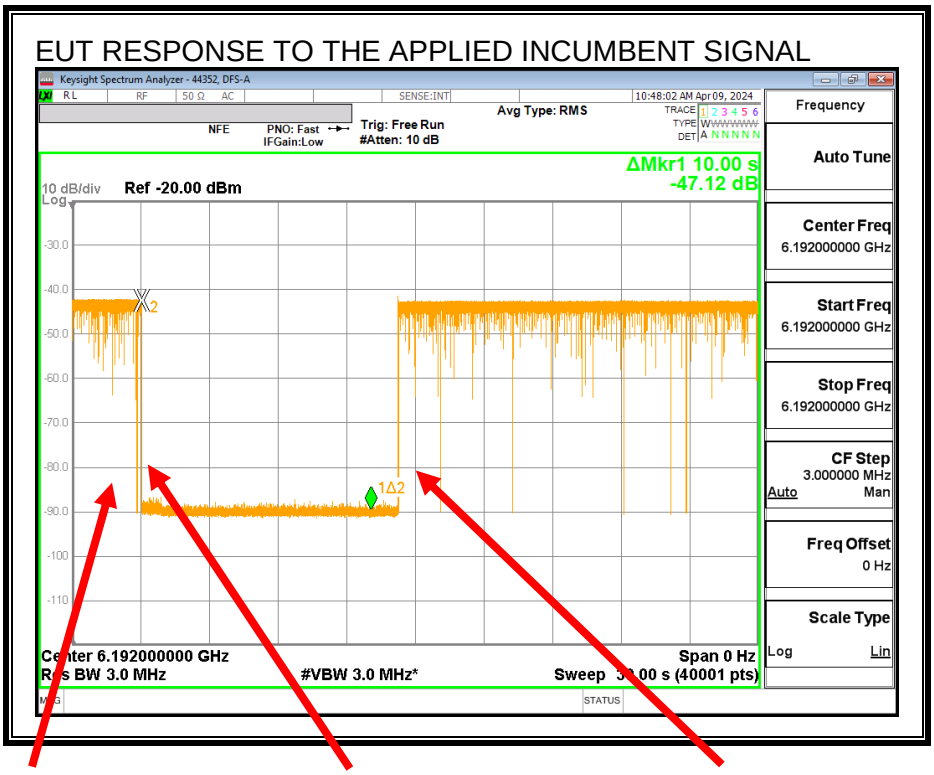
Upper Edge f_{C3}:



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

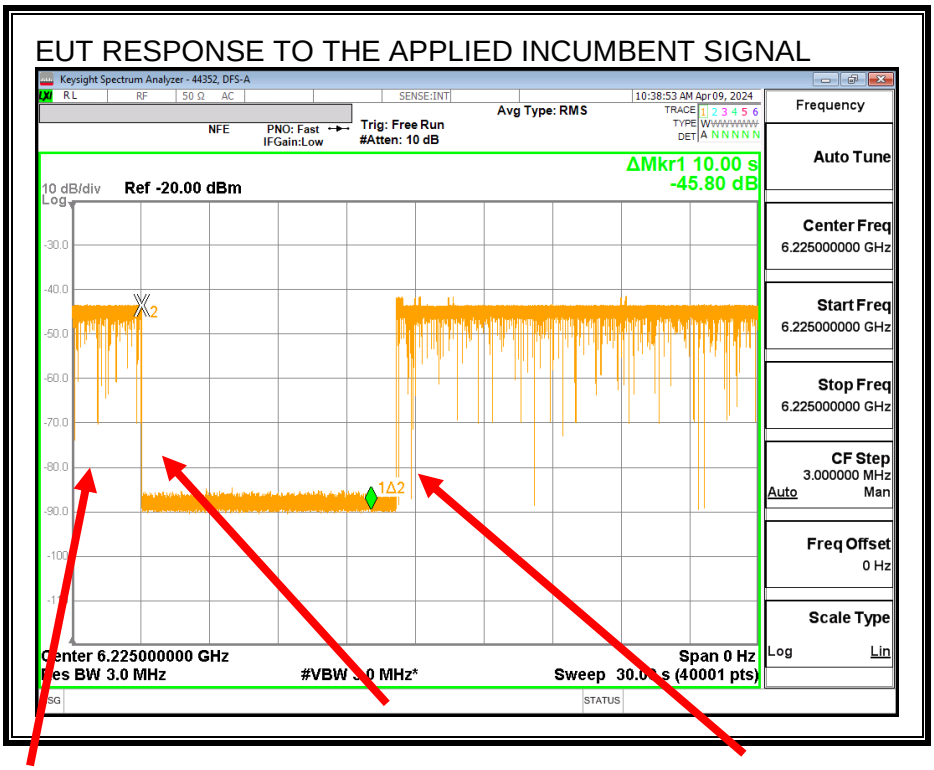
A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started, and the incumbent signal was continuously applied at approximately 5 seconds after the start of the sweep for a duration of 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}:



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

Center Frequency Incumbent Signal f_{C1}:



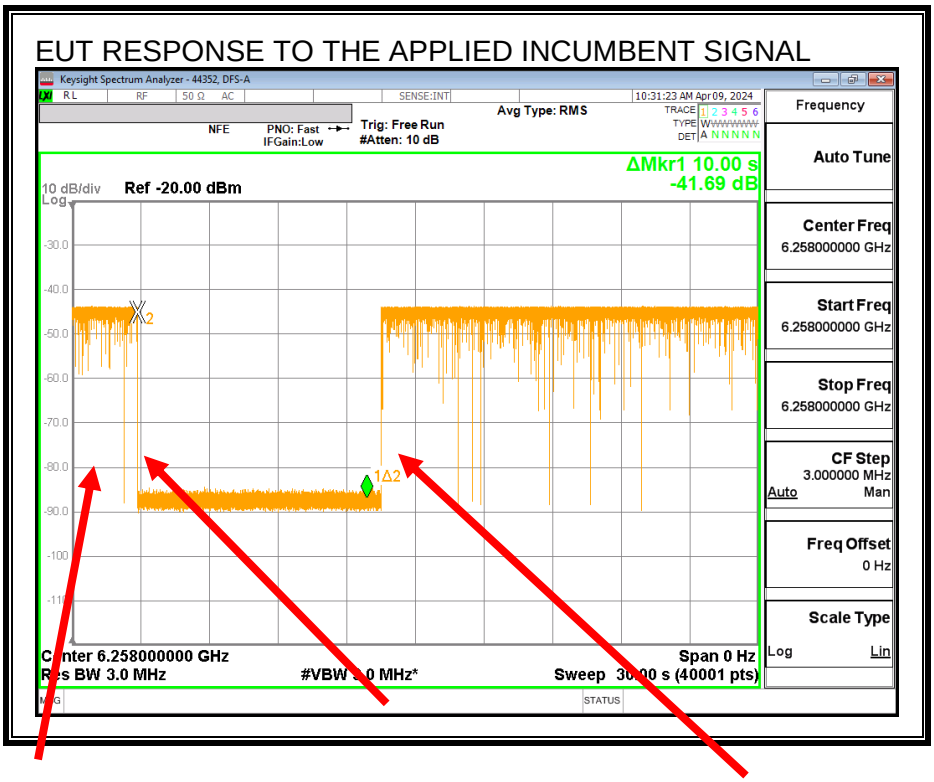
Normal Traffic

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}:



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

8.5.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{c1} (MHz)	6225
EUT Nominal Channel Bandwidth (MHz)	80
99% Occupied Bandwidth of the EUT (MHz)	77.038
EUT 99% OBW Lower Edge, F_L (MHz)	6186.48
EUT 99% OBW Upper Edge, F_H (MHz)	6263.52
99% Occupied Bandwidth of the Incumbent Signal (MHz)	10.031
Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz)	**6192**
Test Frequency of Incumbent Signal at f_{c1} (MHz)	**6225**
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)	2.80
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-59.2
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-73.3
Margin (dBm)	-14.06
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-63.7
Margin (dBm)	-4.46
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-72.8
Margin (dBm)	-13.59
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-09
Tested by: 44352
Test location: DFS-A

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)		
Trial	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: 2024-04-09

Tested by: 44352

Test location: DFS-A

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

8.5.5. 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 Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-73.26	2.8	0	-76.06	-62	Ceased
-74.22	2.8	0	-77.02	-62	Minimal
-79.17	2.8	0	-81.97	-62	Normal

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-63.66	2.8	0	-66.46	-62	Ceased
-64.65	2.8	0	-67.45	-62	Minimal
-73.62	2.8	0	-76.42	-62	Normal

Incumbent AWGN at f_{c3}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-72.79	2.8	0	-75.59	-62	Ceased
-73.76	2.8	0	-76.56	-62	Minimal
-77.66	2.8	0	-80.46	-62	Normal

Test Date: 2024-04-09

Tested by: 44352

Test location: DFS-A

8.6. 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.

8.7. U-NII 6 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

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

8.7.1. 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.

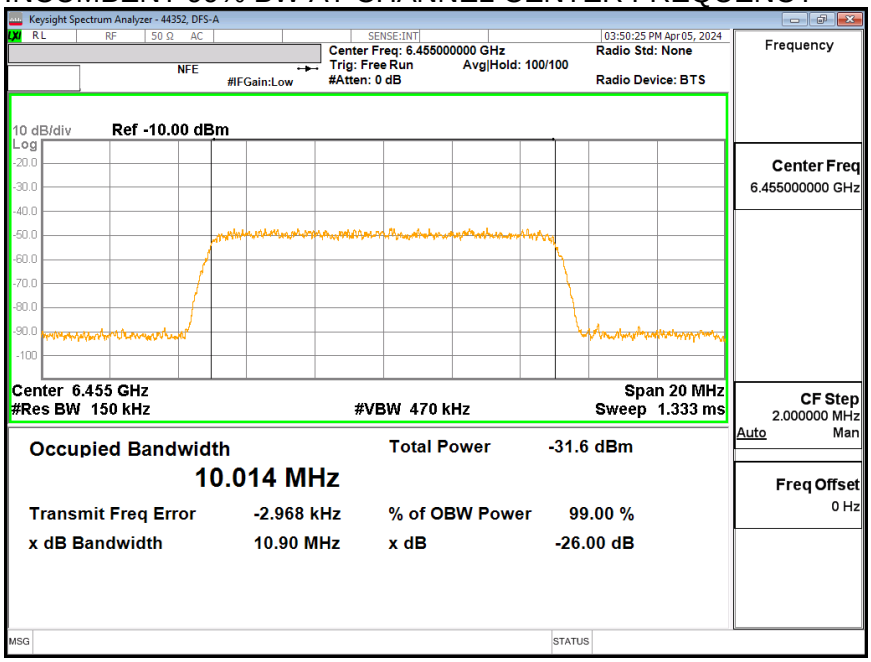
Only the lowest and highest supported channel bandwidths are required to be tested.

8.7.2. INCUMBENT SIGNAL PLOTS

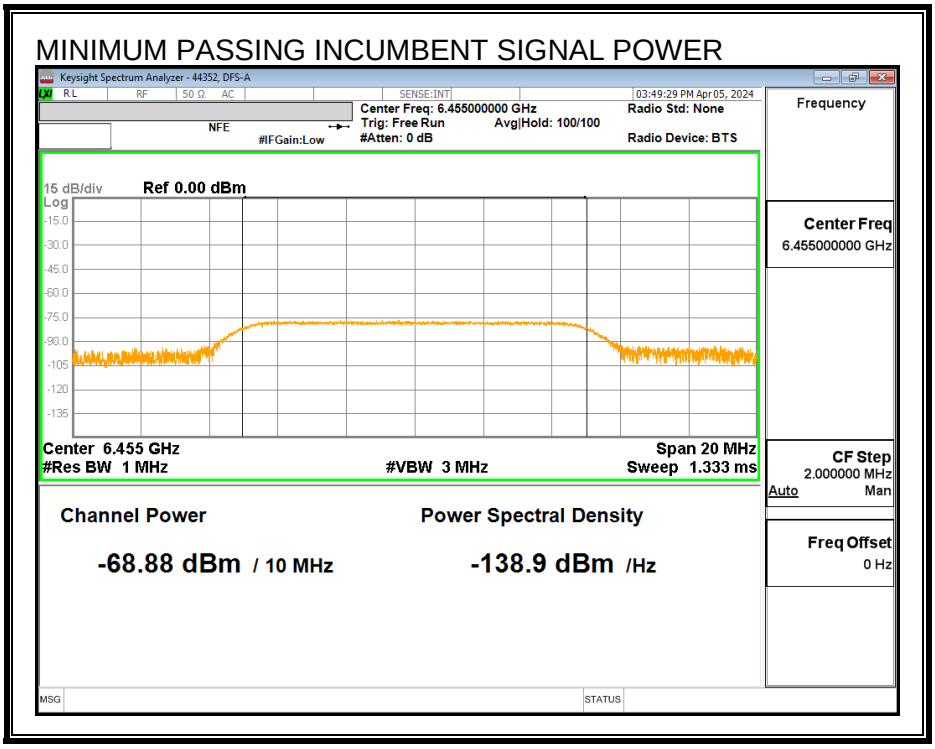
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY

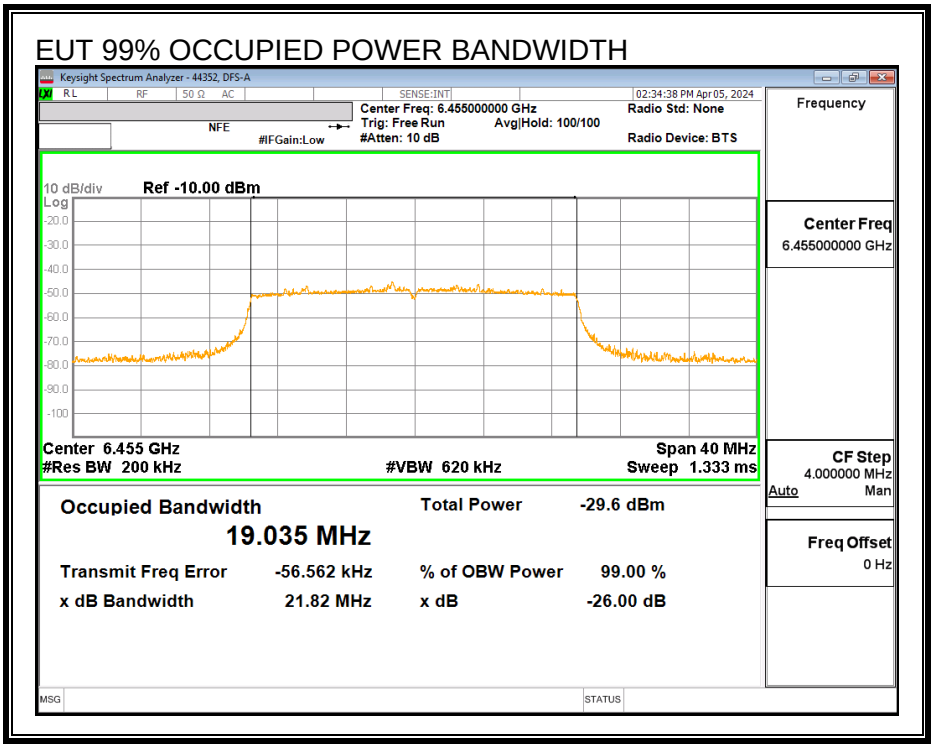


MINIMUM PASSING INCUMBENT SIGNAL POWER



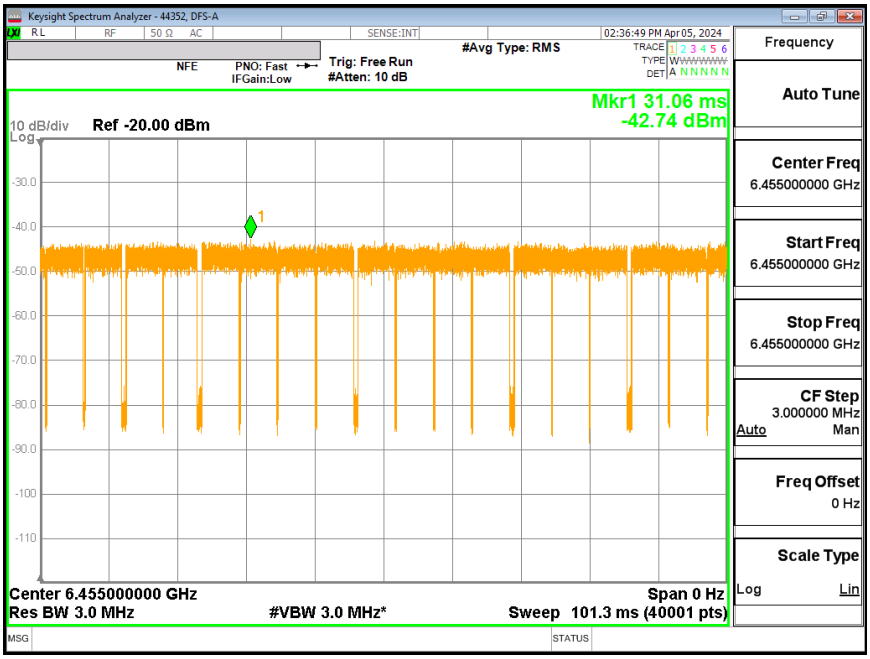
8.7.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



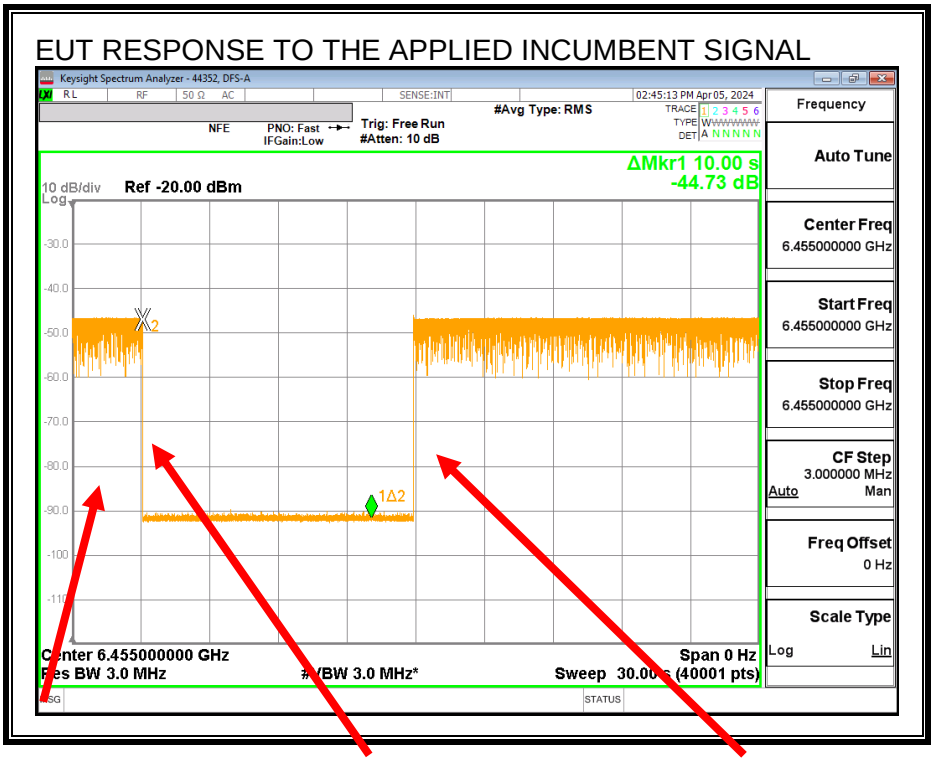
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

EUT TRAFFIC WITHOUT 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.



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

8.7.4. 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)	19.035
EUT 99% OBW Lower Edge, F_L (MHz)	6445.48
EUT 99% OBW Upper Edge, F_H (MHz)	6464.52
Test Frequency of Incumbent Signal (MHz)	**6455**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.00
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-60.0
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-68.9
Margin (dBm)	-8.88
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05
Tested by: 44352
Test location: DFS-A

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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.7.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: 99% BW_{INC} < 99% BW_{EUT} ≤ 2 x 99% BW_{INC}

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-68.88	2	0	-70.88	-62	Ceased
-69.91	2	0	-71.91	-62	Minimal
-74.77	2	0	-76.77	-62	Normal

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

8.8. 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.

8.9. U-NII 6 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.9.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6465 MHz and a nominal channel bandwidth of 80 MHz.

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

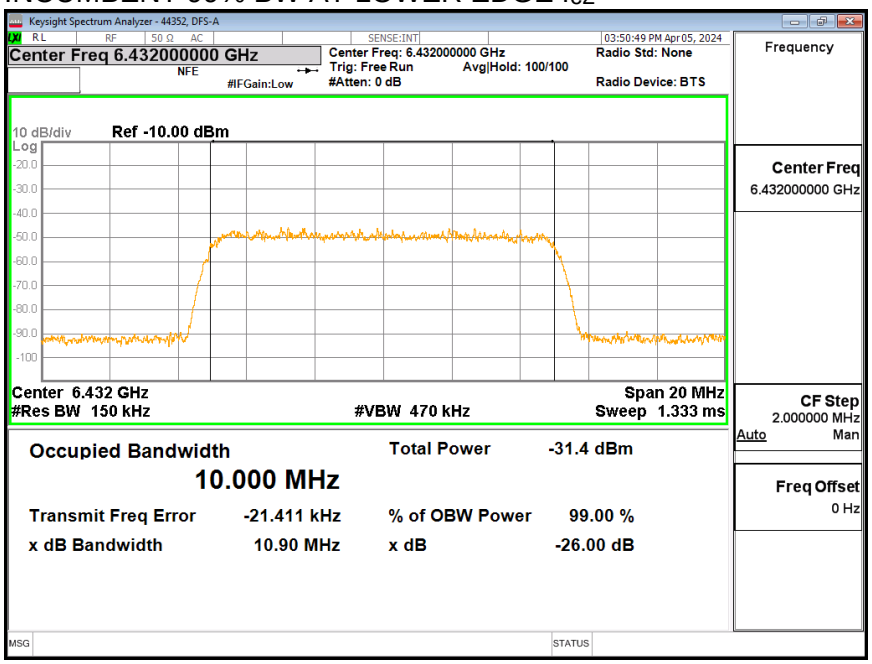
8.9.2. INCUMBENT SIGNAL PLOTS

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.

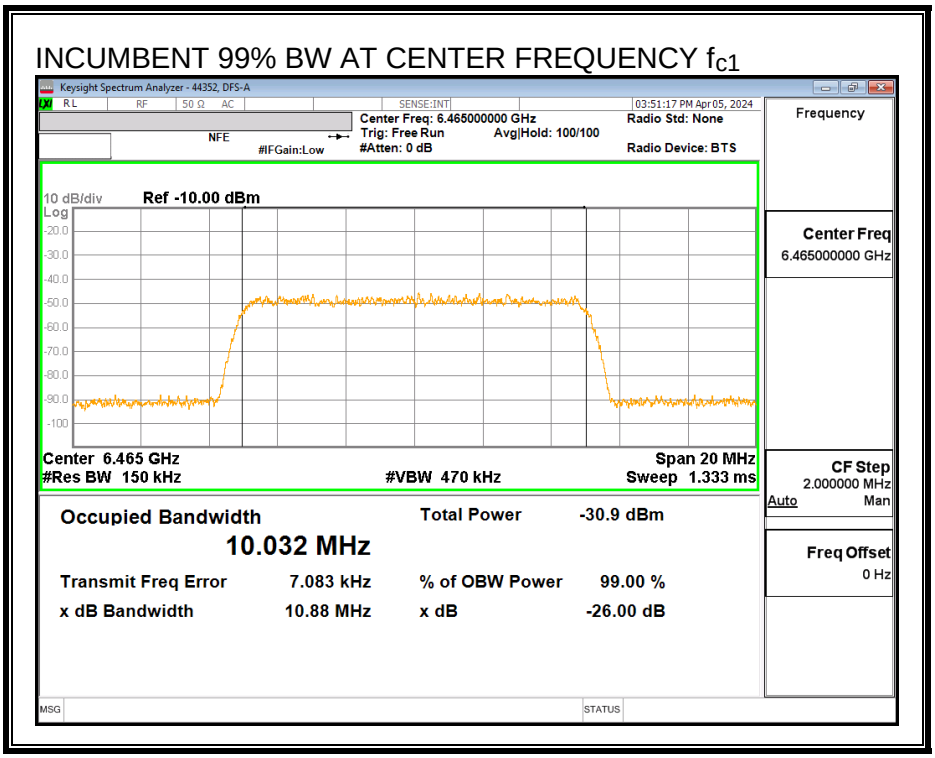
INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:

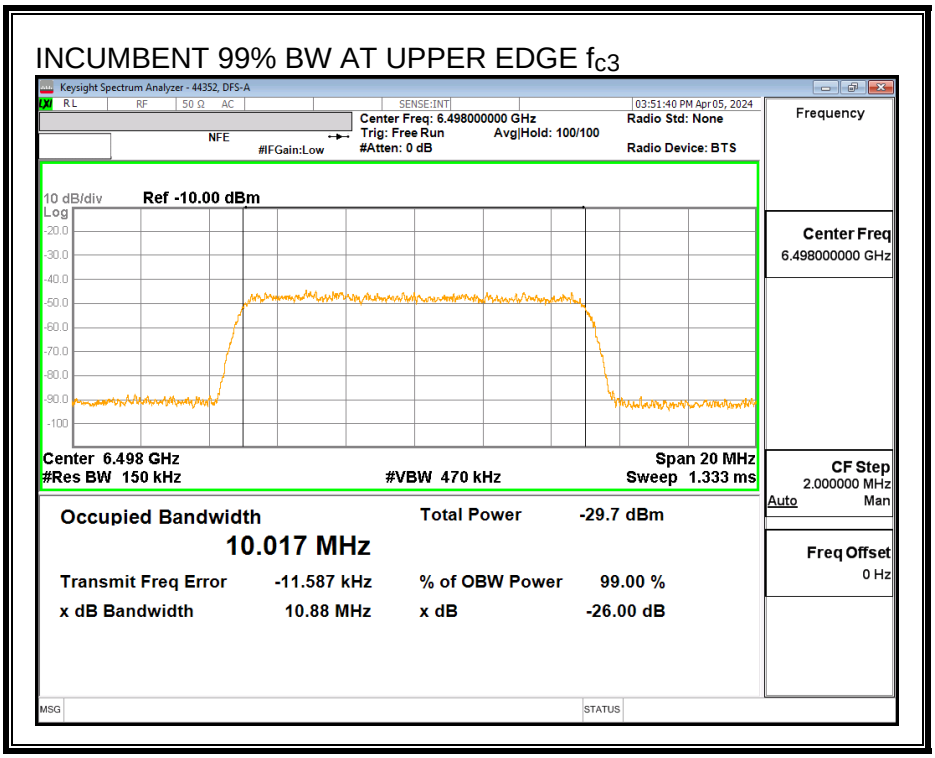
INCUMBENT 99% BW AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



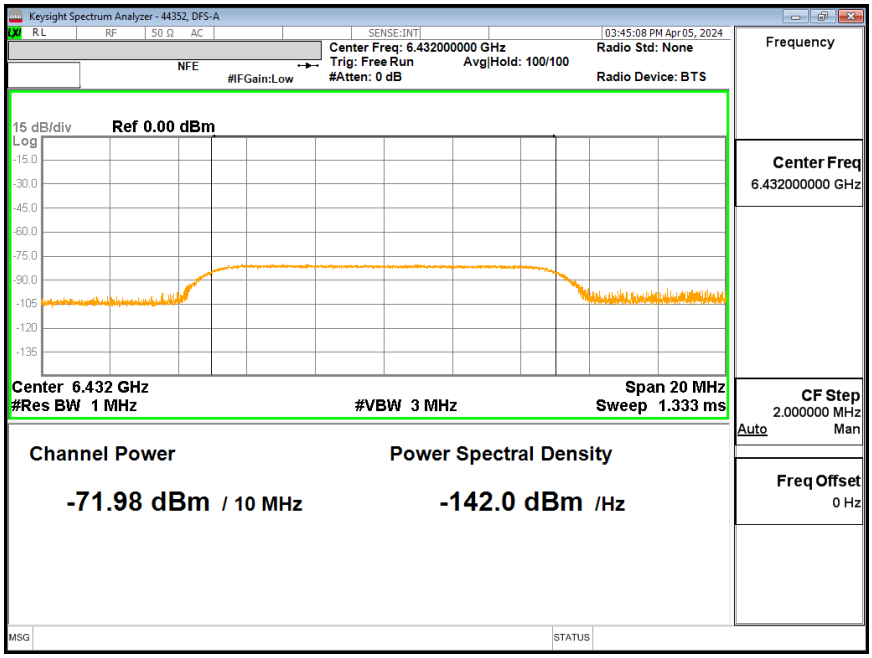
Upper Edge Incumbent Signal f_{c3}:



MINIMUM PASSING INCUMBENT SIGNAL POWER

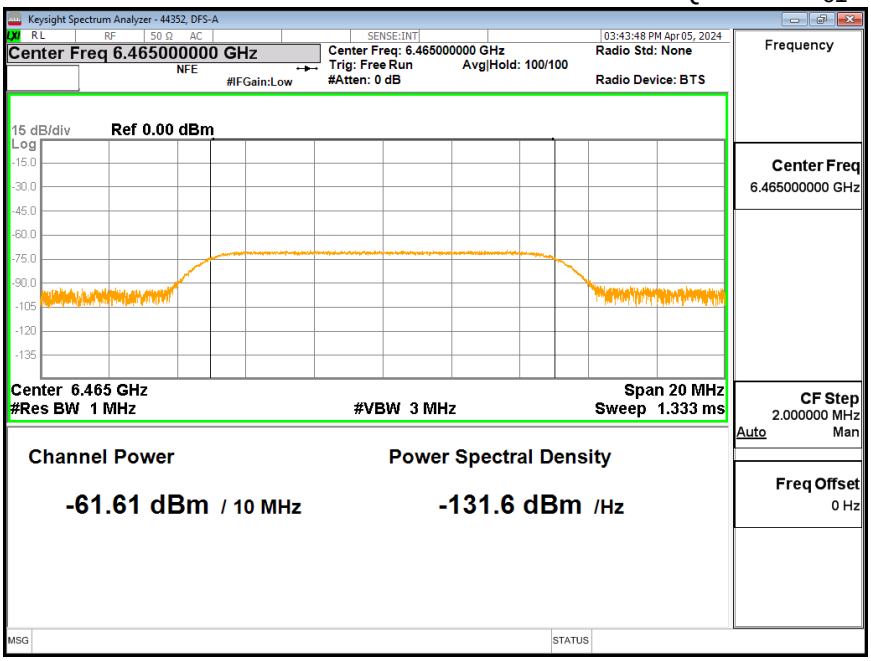
Lower Edge Incumbent Signal f_{c2}:

MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}

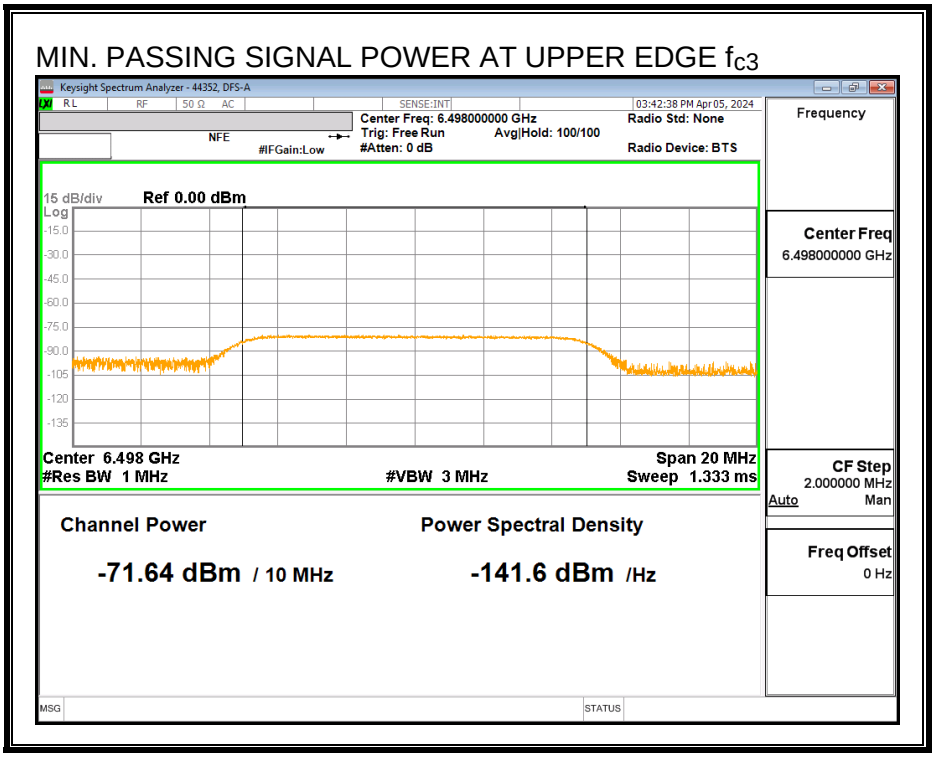


Center Frequency Incumbent Signal f_{c1}:

MIN. PASSING SIGNAL POWER AT CENTER FREQUENCY f_{c1}

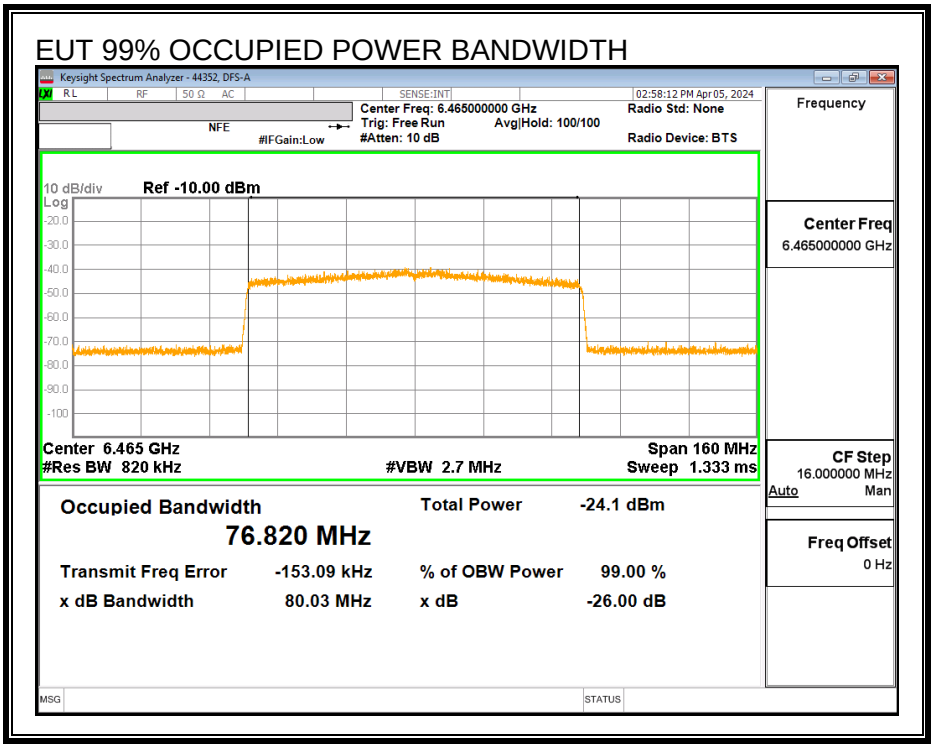


Upper Edge Incumbent Signal f_{c3}:



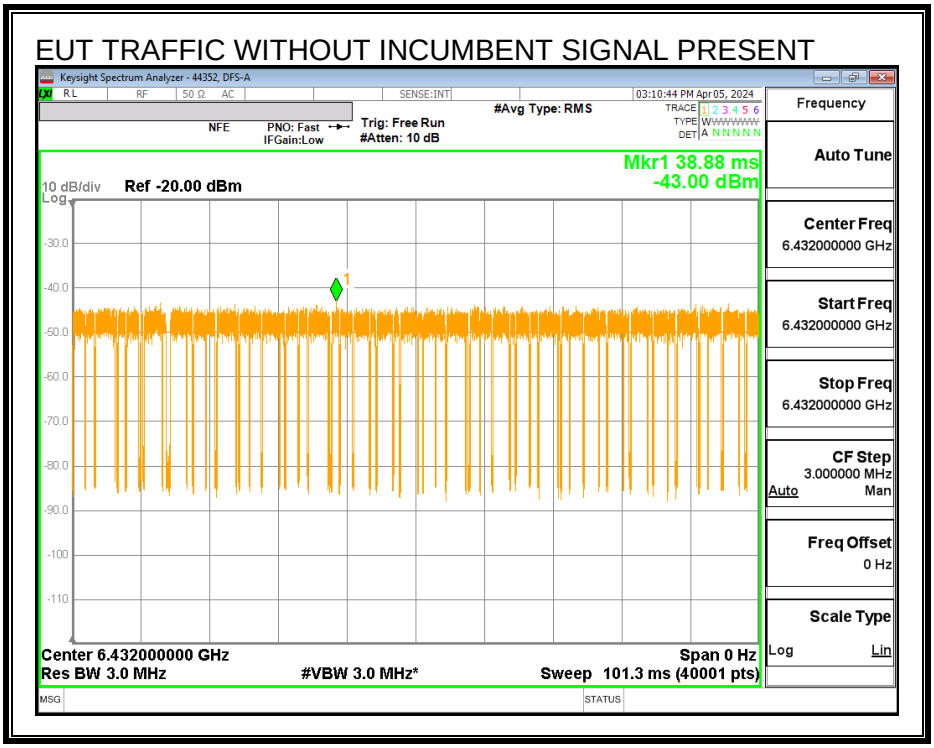
8.9.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

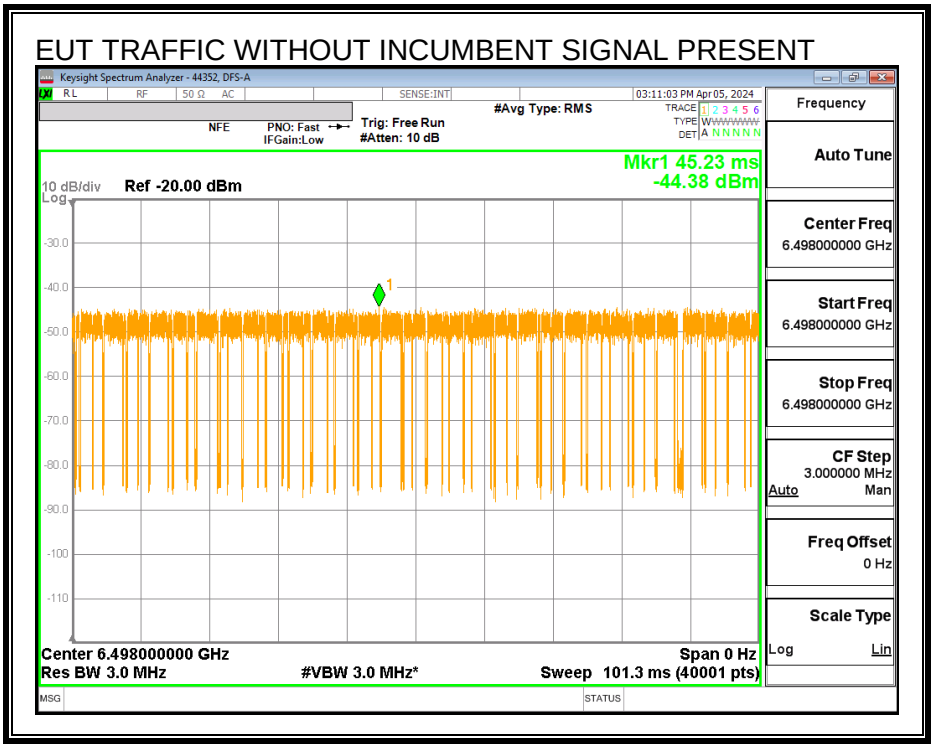
Lower Edge f_{c2}:



Center Frequency f_{C1}:

EUT TRAFFIC WITHOUT INCUMBENT SIGNAL PRESENT

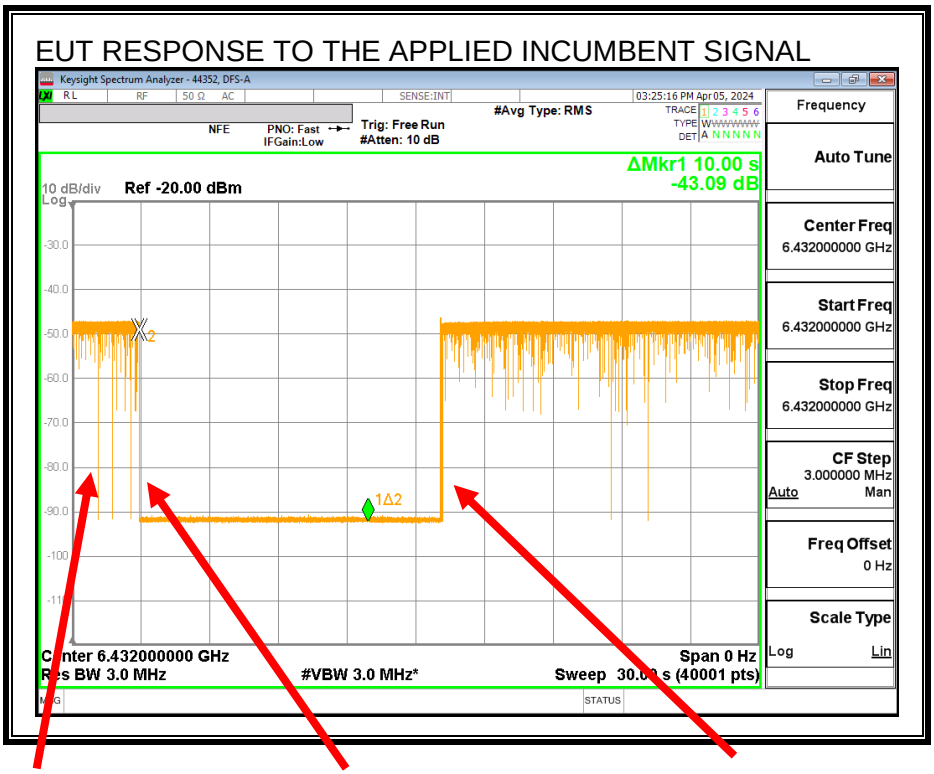
Upper Edge f_{C3}:



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}:



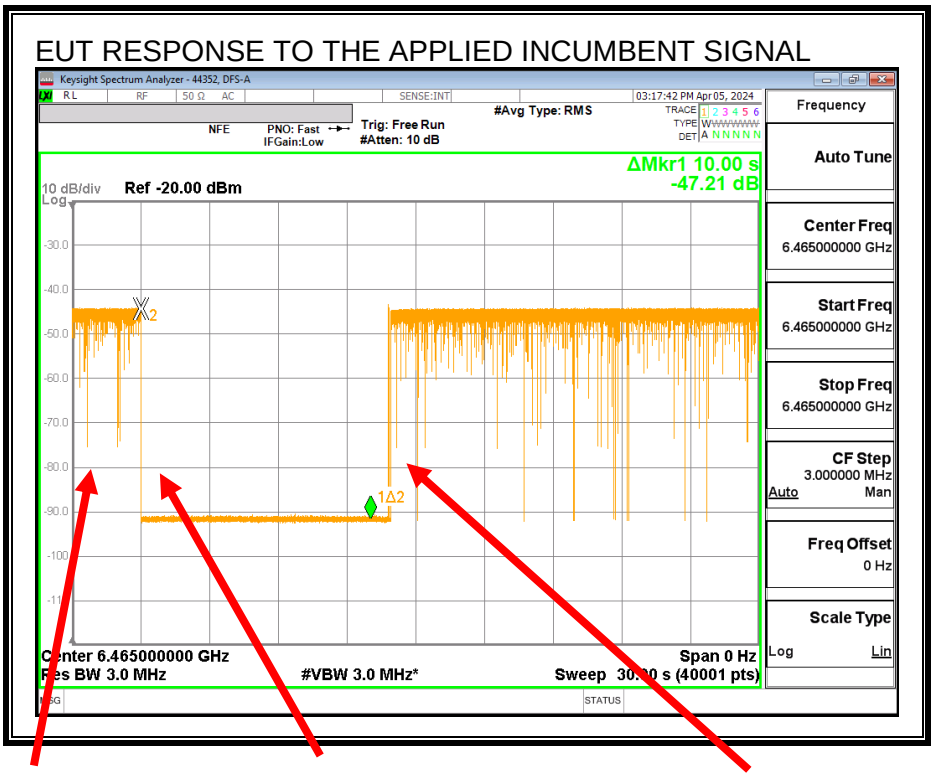
Normal Traffic

Application of Incumbent Transmissions Ceased

Incumbent Removed Transmissions Resume

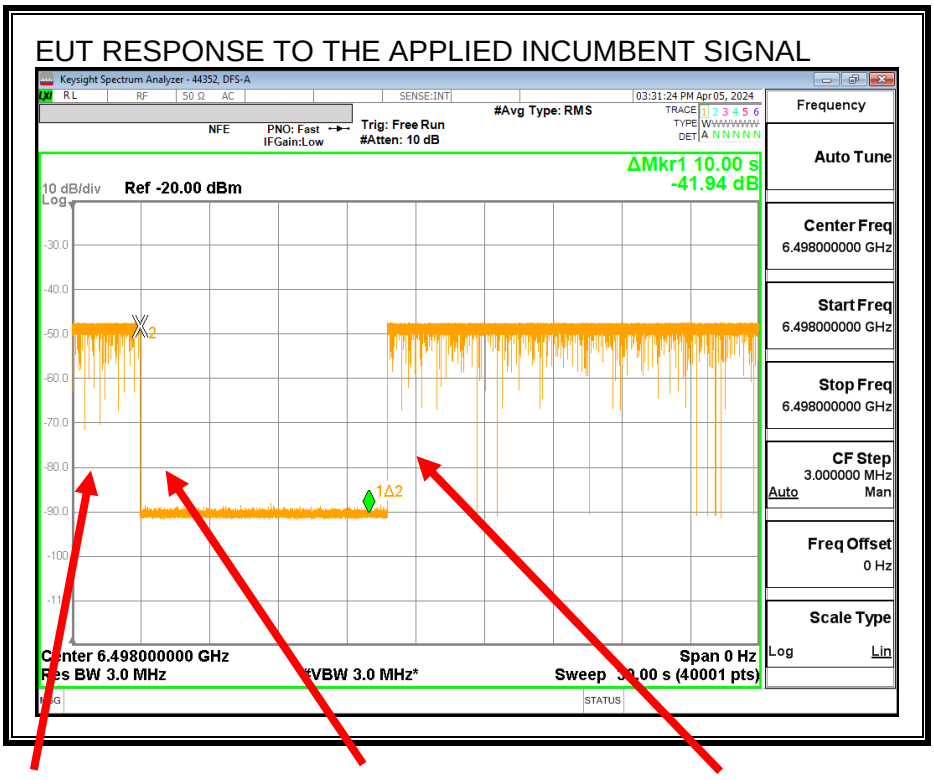
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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

Upper Edge Incumbent Signal f_{C3}:



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

8.9.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{c1} (MHz)	6465
EUT Nominal Channel Bandwidth (MHz)	80
99% Occupied Bandwidth of the EUT (MHz)	76.82
EUT 99% OBW Lower Edge, F_L (MHz)	6426.59
EUT 99% OBW Upper Edge, F_H (MHz)	6503.41
99% Occupied Bandwidth of the Incumbent Signal (MHz)	10
Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz)	**6432**
Test Frequency of Incumbent Signal at f_{c1} (MHz)	**6465**
Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz)	**6498**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.00
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-60.0
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-72.0
Margin (dBm)	-11.98
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-61.6
Margin (dBm)	-1.61
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-71.6
Margin (dBm)	-11.64
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05
Tested by: 44352
Test location: DFS-A

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)		
Trial	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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.9.5. 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 Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-71.98	2	0	-73.98	-62	Ceased
-72.97	2	0	-74.97	-62	Minimal
-77.98	2	0	-79.98	-62	Normal

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-61.61	2	0	-63.61	-62	Ceased
-62.56	2	0	-64.56	-62	Minimal
-72.39	2	0	-74.39	-62	Normal

Incumbent AWGN at f_{c3}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-71.64	2	0	-73.64	-62	Ceased
-72.57	2	0	-74.57	-62	Minimal
-76.33	2	0	-78.33	-62	Normal

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

8.10. 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.

8.11. U-NII 7 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

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

8.11.1. 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.

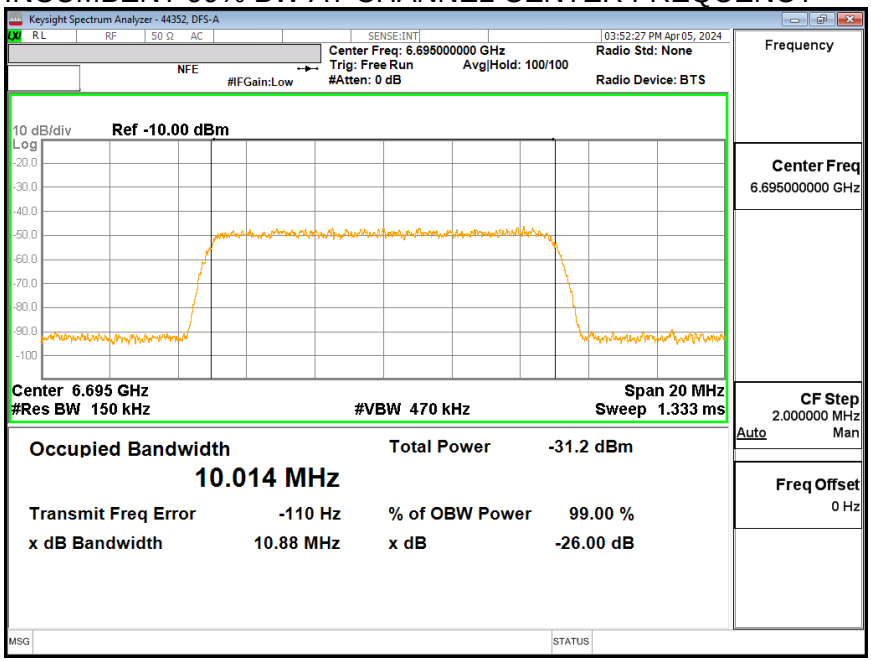
Only the lowest and highest supported channel bandwidths are required to be tested.

8.11.2. INCUMBENT SIGNAL PLOTS

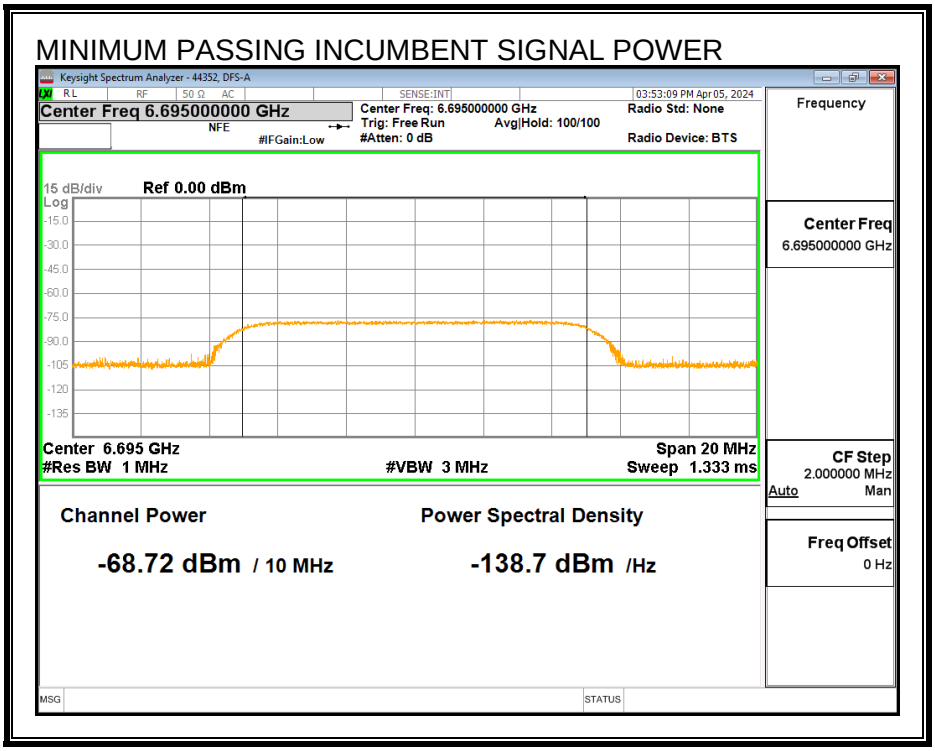
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY

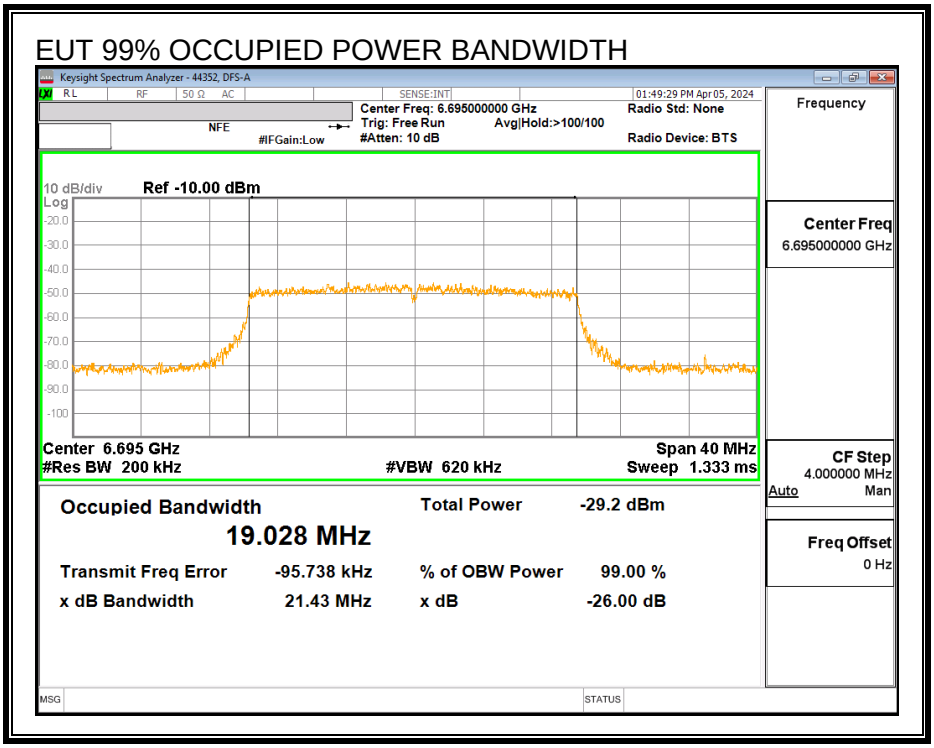


MINIMUM PASSING INCUMBENT SIGNAL POWER



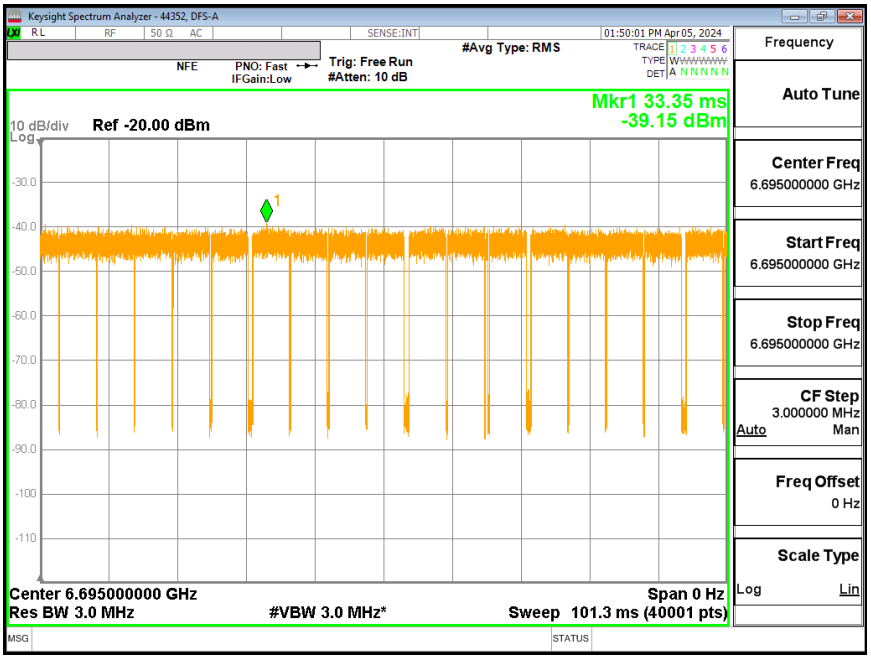
8.11.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



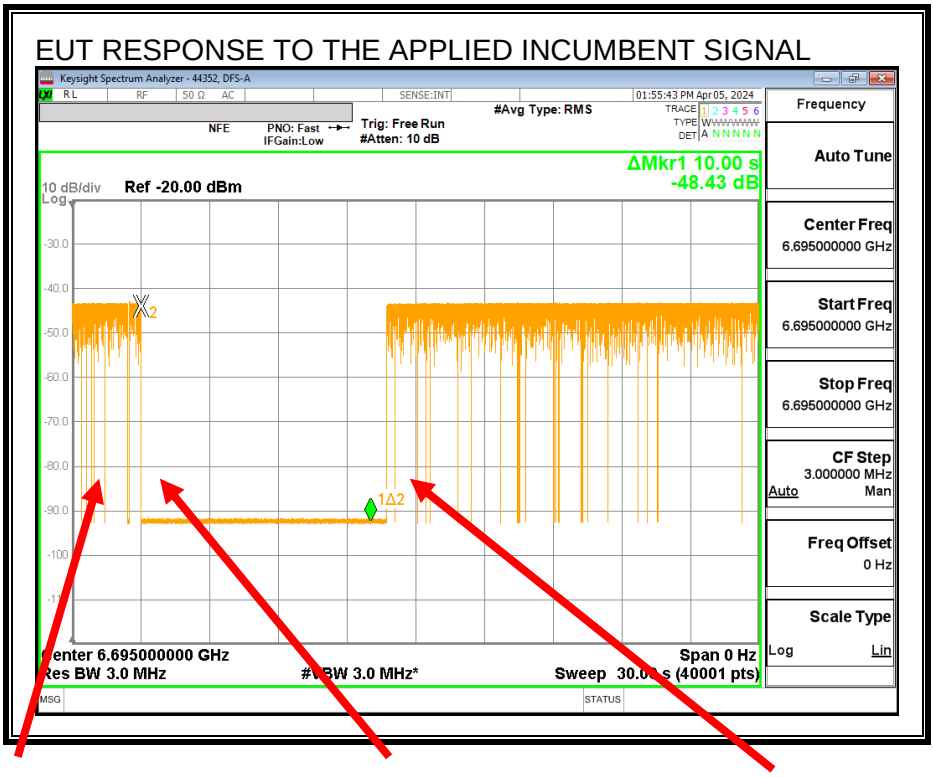
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

EUT TRAFFIC WITHOUT 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.

8.11.4. 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)	19.028
EUT 99% OBW Lower Edge, F_L (MHz)	6685.49
EUT 99% OBW Upper Edge, F_H (MHz)	6704.51
Test Frequency of Incumbent Signal (MHz)	**6695**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.30
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-59.7
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-68.7
Margin (dBm)	-9.02
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.11.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: 99% BW_{INC} < 99% BW_{EUT} ≤ 2 x 99% BW_{INC}

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-68.72	2.3	0	-71.02	-62	Ceased
-69.75	2.3	0	-72.05	-62	Minimal
-74.83	2.3	0	-77.13	-62	Normal

The path loss from the internal antenna assembly to the radio port is incorporated into the antenna gain figure.

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

8.12. U-NII 7 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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

8.13. U-NII 7 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.13.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6705 MHz and a nominal channel bandwidth of 80 MHz.

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

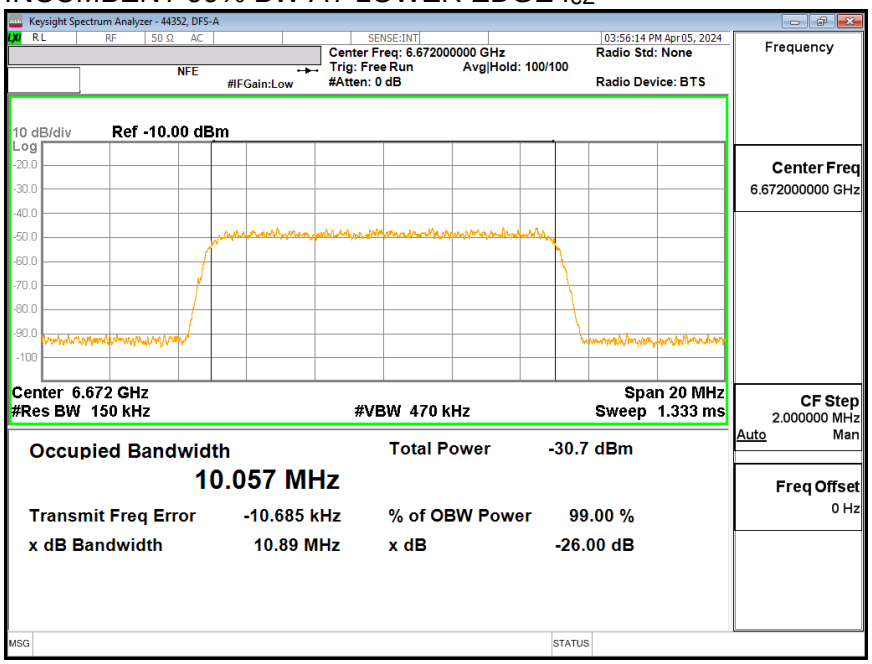
8.13.2. INCUMBENT SIGNAL PLOTS

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.

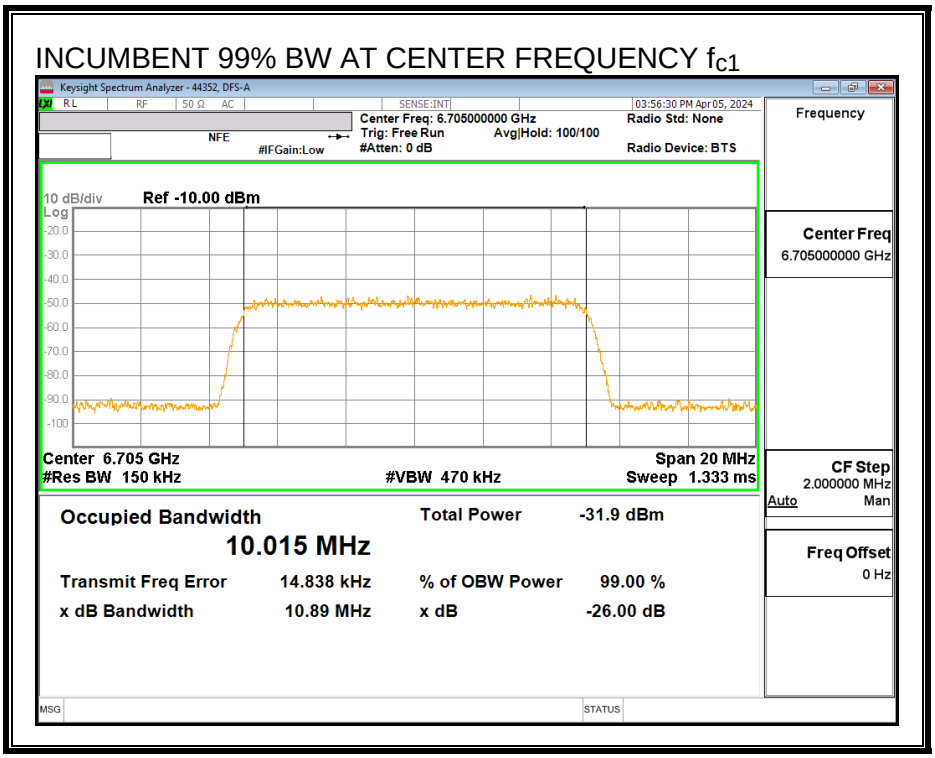
INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:

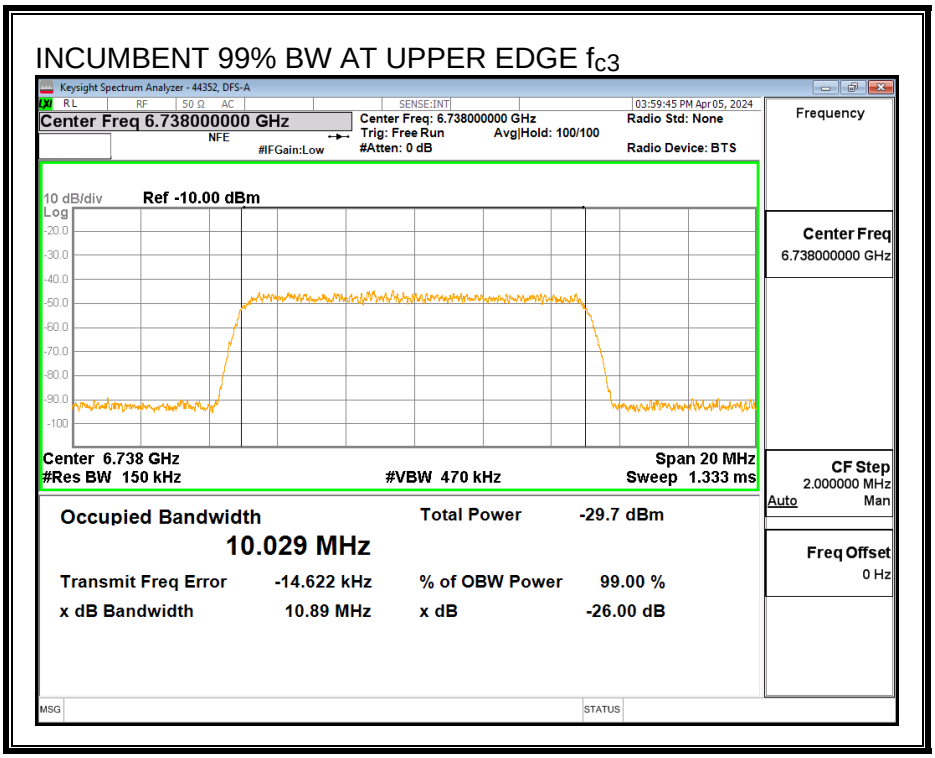
INCUMBENT 99% BW AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



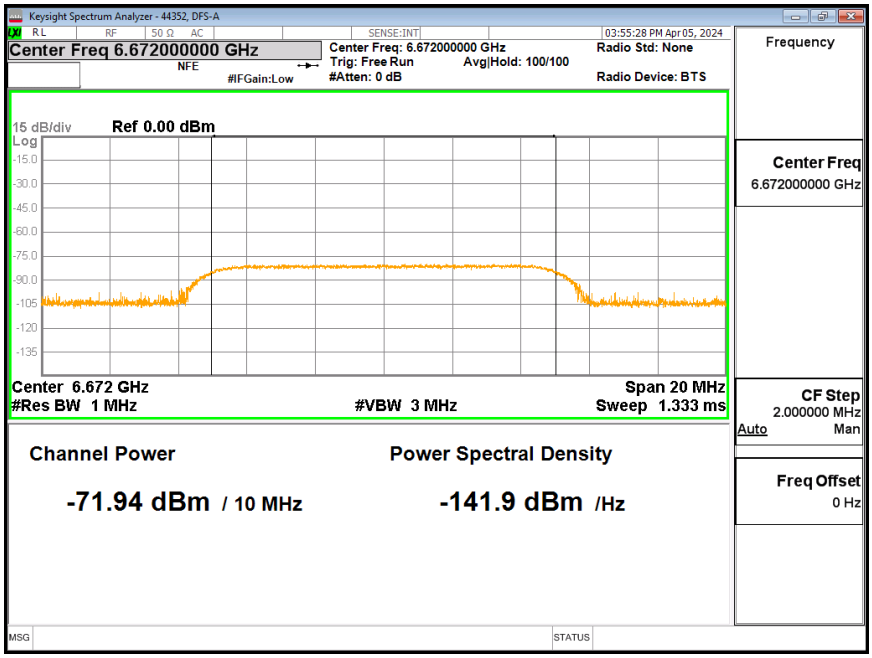
Upper Edge Incumbent Signal f_{c3}:



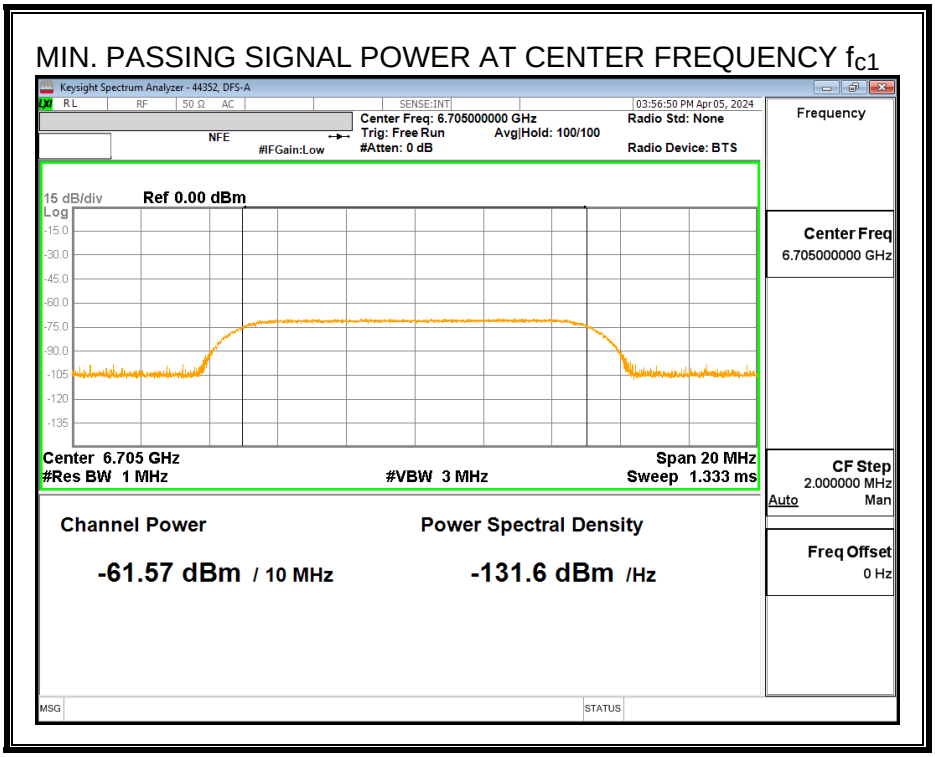
MINIMUM PASSING INCUMBENT SIGNAL POWER

Lower Edge Incumbent Signal f_{c2}:

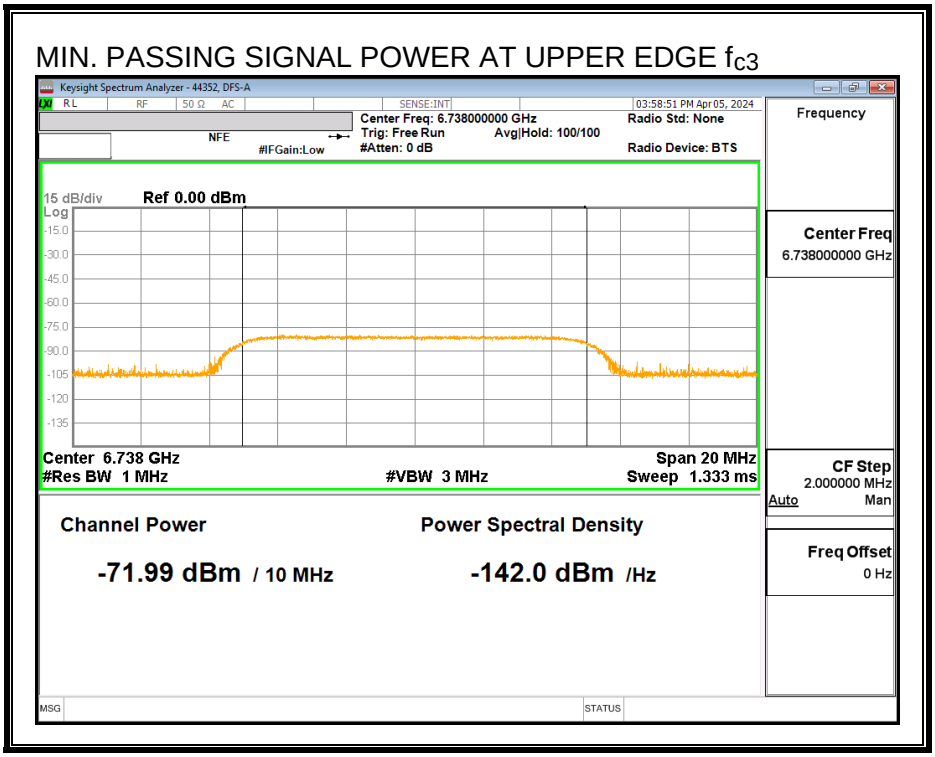
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



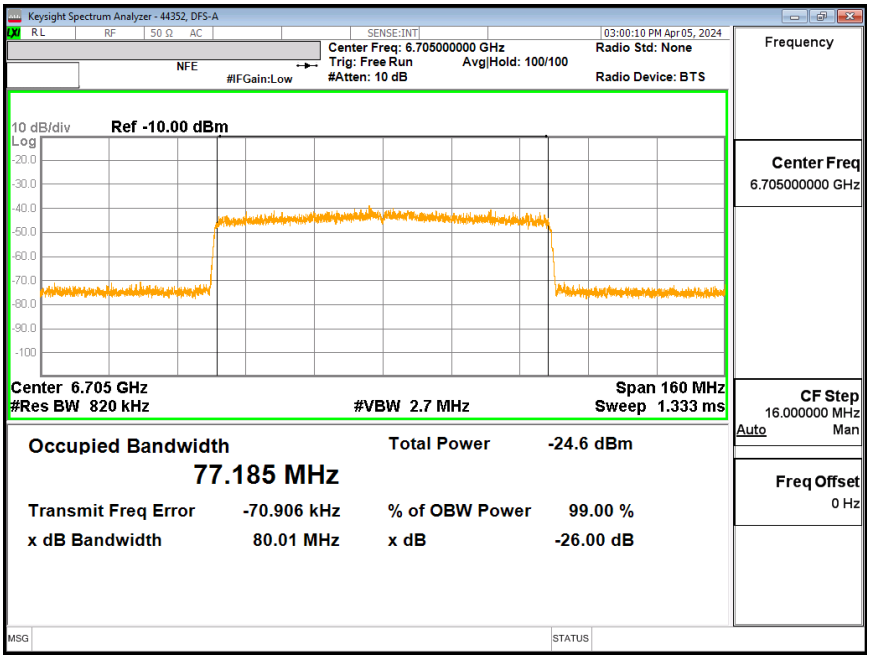
Upper Edge Incumbent Signal f_{c3}:



8.13.3. EUT TRANSMISSION PLOTS

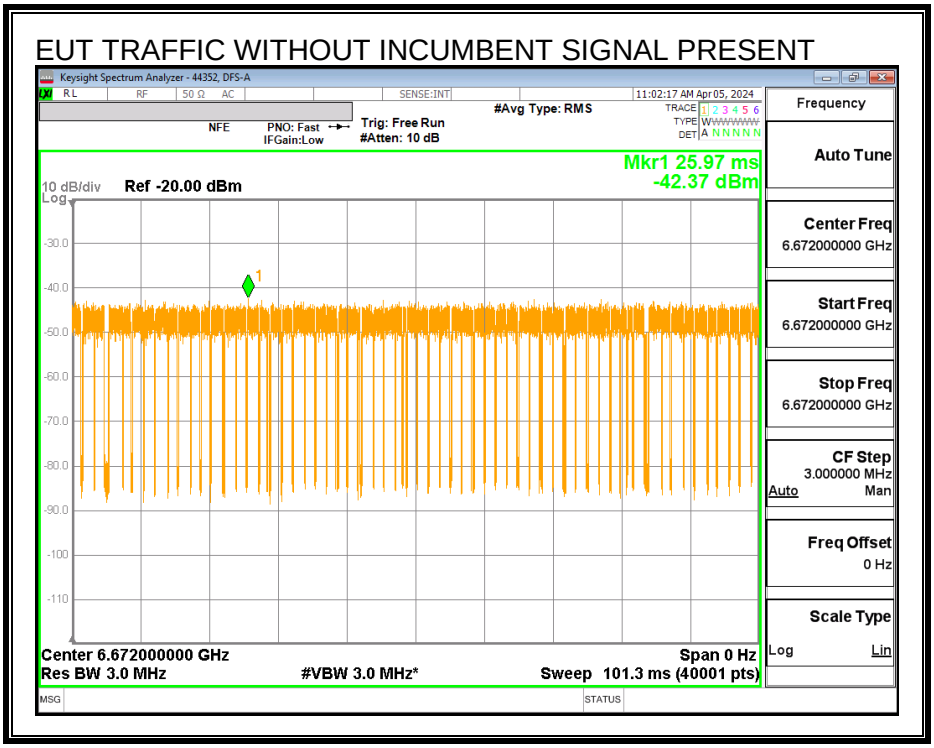
EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH

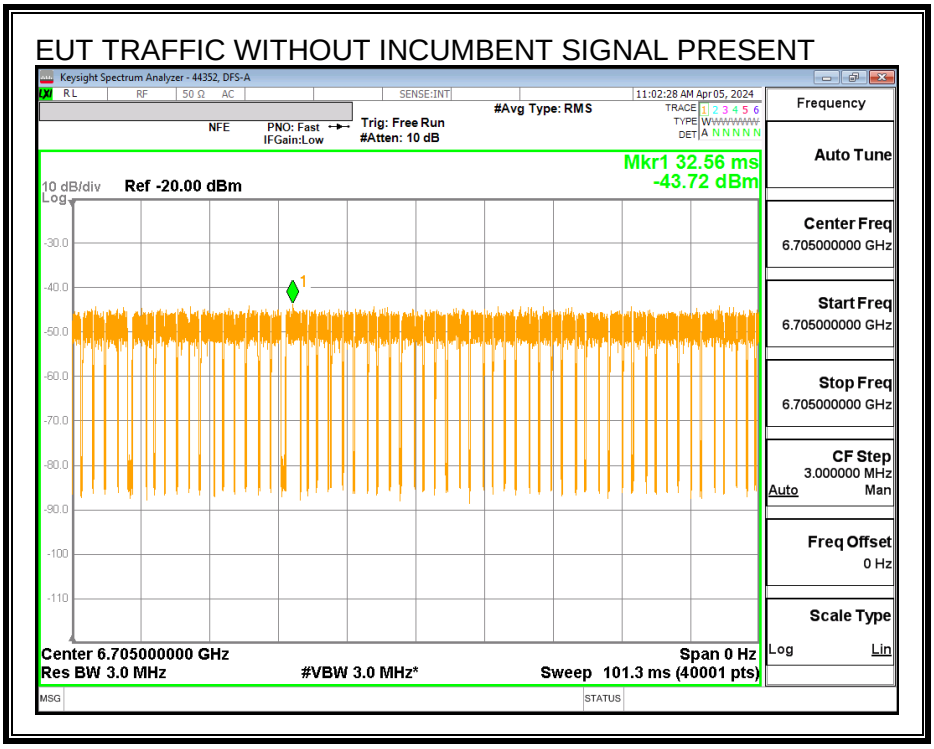


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

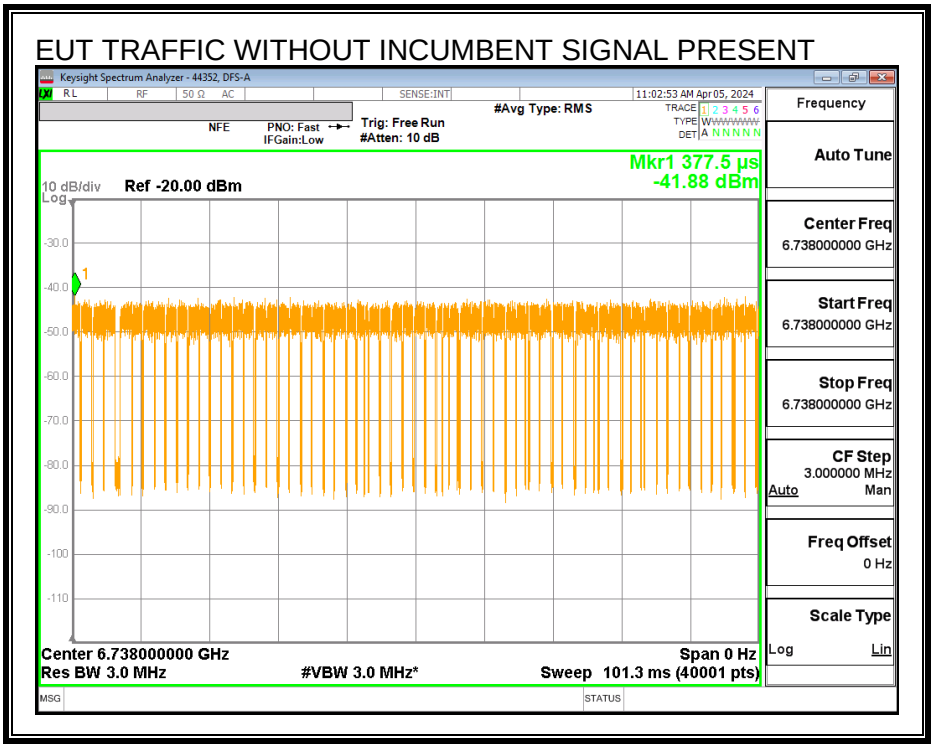
Lower Edge f_{c2}:



Center Frequency f_{C1}:



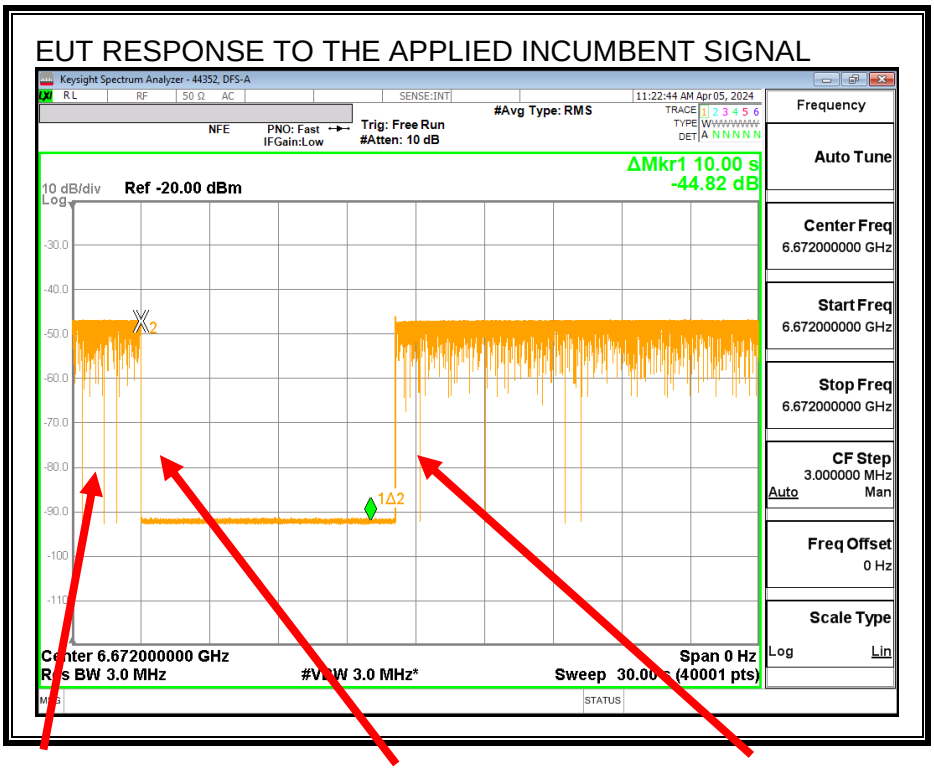
Upper Edge f_{C3}:



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}:



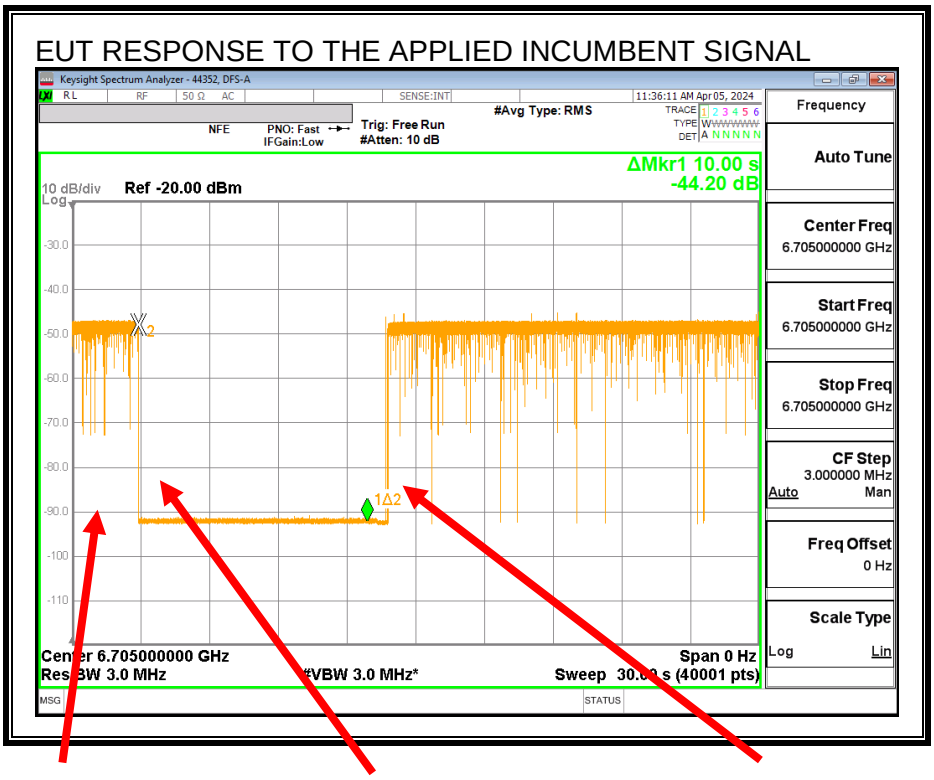
Normal Traffic

Application of Incumbent Transmissions Ceased

Incumbent Removed Transmissions Resume

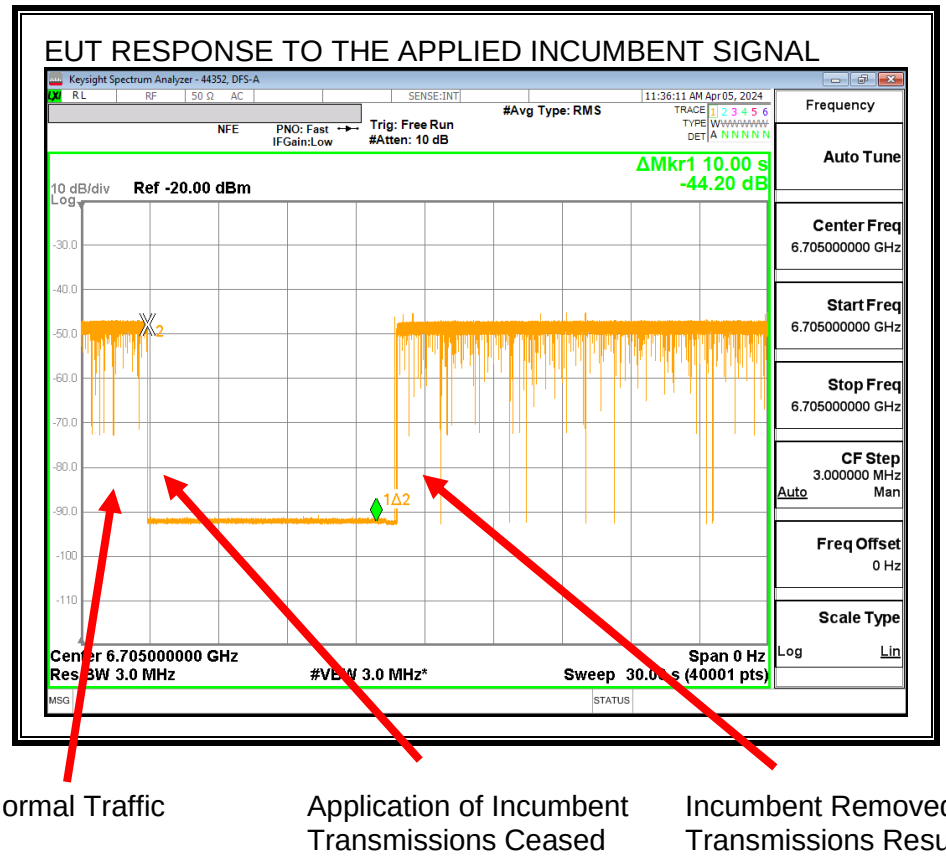
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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

Upper Edge Incumbent Signal f_{C3}:



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

8.13.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{c1} (MHz)	6705
EUT Nominal Channel Bandwidth (MHz)	80
99% Occupied Bandwidth of the EUT (MHz)	77.185
EUT 99% OBW Lower Edge, F_L (MHz)	6666.41
EUT 99% OBW Upper Edge, F_H (MHz)	6743.59
99% Occupied Bandwidth of the Incumbent Signal (MHz)	10.015
Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz)	**6672**
Test Frequency of Incumbent Signal at f_{c1} (MHz)	**6705**
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)	2.30
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-59.7
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-71.9
Margin (dBm)	-12.24
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-61.6
Margin (dBm)	-1.87
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-72.0
Margin (dBm)	-12.29
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05
Tested by: 44352
Test location: DFS-A

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)		
Trial	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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.13.5. 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 Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-71.94	2.3	0	-74.24	-62	Ceased
-72.94	2.3	0	-75.24	-62	Minimal
-78.12	2.3	0	-80.42	-62	Normal

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-61.57	2.3	0	-63.87	-62	Ceased
-62.61	2.3	0	-64.91	-62	Minimal
-73.23	2.3	0	-75.53	-62	Normal

Incumbent AWGN at f_{c3}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-71.99	2.3	0	-74.29	-62	Ceased
-73	2.3	0	-75.3	-62	Minimal
-77.15	2.3	0	-79.45	-62	Normal

The path loss from the internal antenna assembly to the radio port is incorporated into the antenna gain figure.

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

8.14. 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.

8.15. U-NII 8 BAND TEST CONDITION 2 RESULTS

TEST CONDITION 2 CRITERIA

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

8.15.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 7015 MHz and a nominal channel bandwidth of 20 MHz.

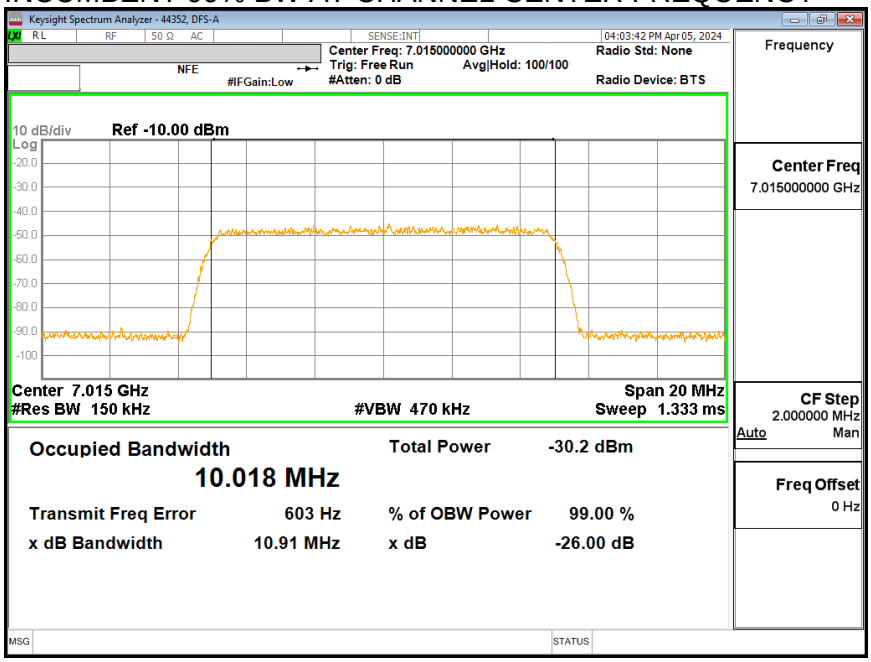
Only the lowest and highest supported channel bandwidths are required to be tested.

8.15.2. INCUMBENT SIGNAL PLOTS

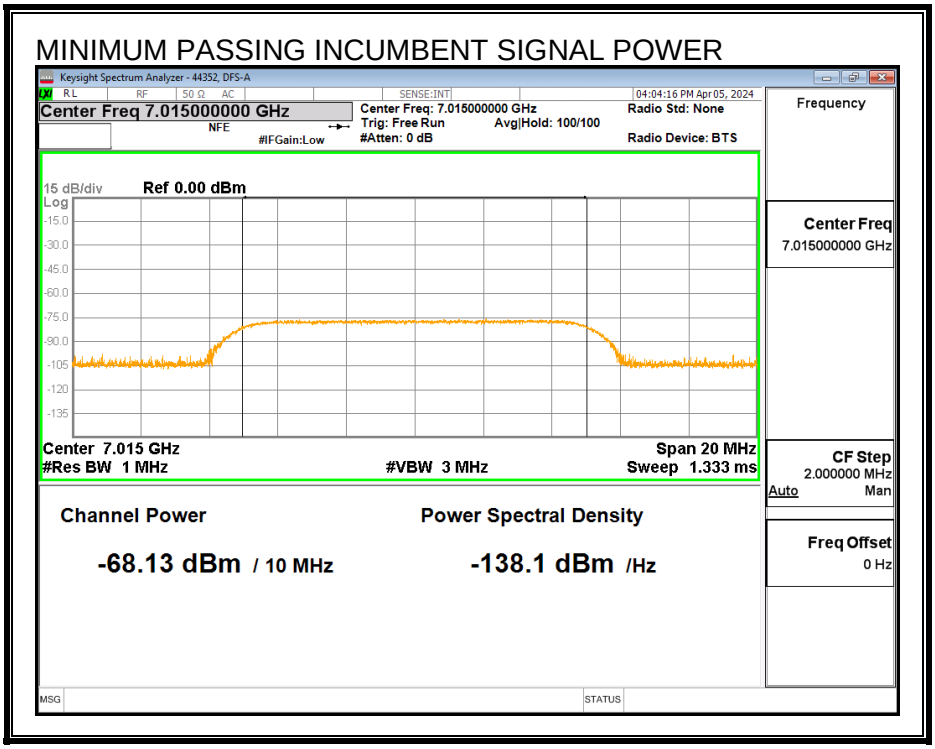
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY

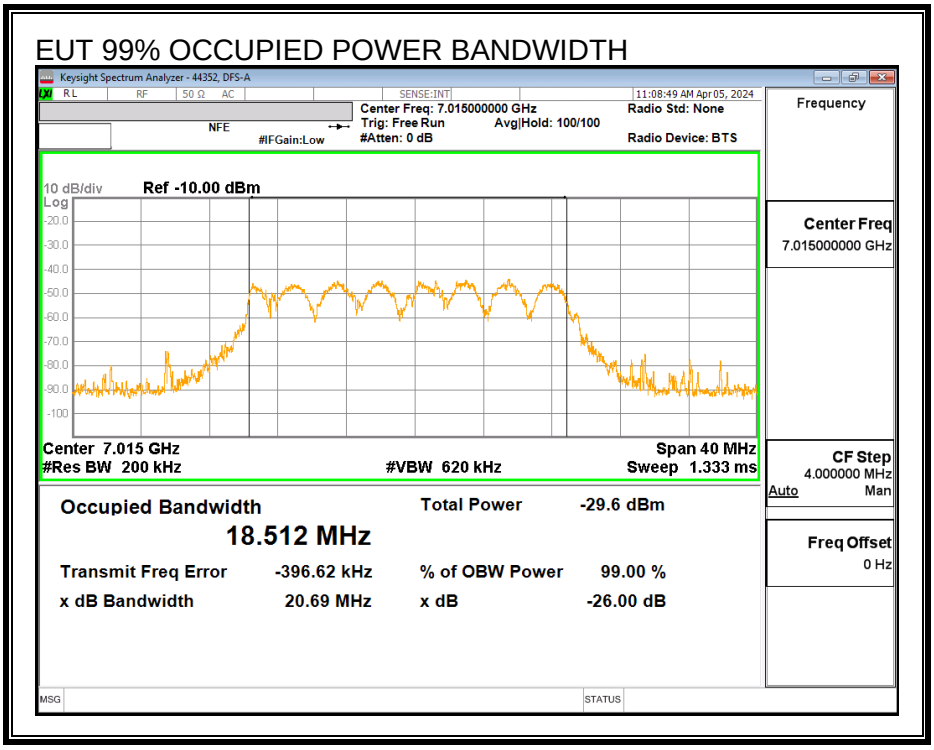


MINIMUM PASSING INCUMBENT SIGNAL POWER



8.15.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

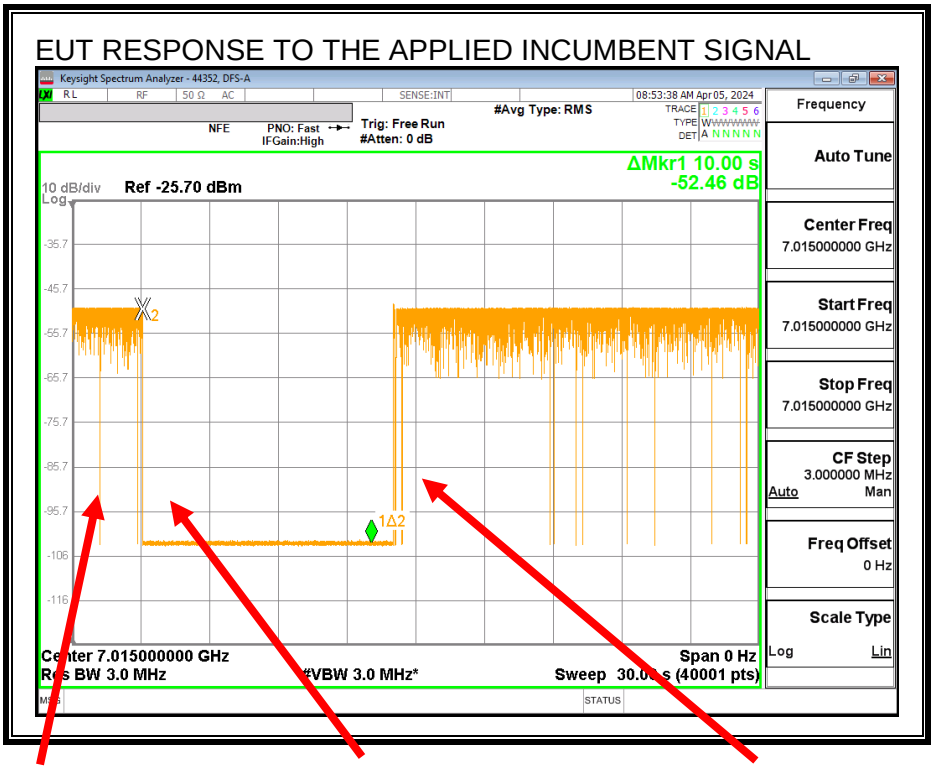


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

EUT TRAFFIC WITHOUT 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.



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

8.15.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{c1} (MHz)	7015
EUT Nominal Channel Bandwidth (MHz)	20
99% Occupied Bandwidth of the EUT (MHz)	18.512
EUT 99% OBW Lower Edge, F_L (MHz)	7005.74
EUT 99% OBW Upper Edge, F_H (MHz)	7024.26
Test Frequency of Incumbent Signal (MHz)	**7015**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.00
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-60.0
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-68.1
Margin (dBm)	-8.13
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05
Tested by: 44352
Test location: DFS-A

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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.15.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: 99% BW_{INC} < 99% BW_{EUT} ≤ 2 x 99% BW_{INC}

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-68.13	2	0	-70.13	-62	Ceased
-69.13	2	0	-71.13	-62	Minimal
-75.19	2	0	-77.19	-62	Normal

The path loss from the internal antenna assembly to the radio port is incorporated into the antenna gain figure.

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

8.16. U-NII 8 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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

8.17. U-NII 8 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.17.1. TEST CHANNEL

All tests were performed with the EUT set to a channel center frequency of 6945 MHz and a nominal channel bandwidth of 80 MHz.

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

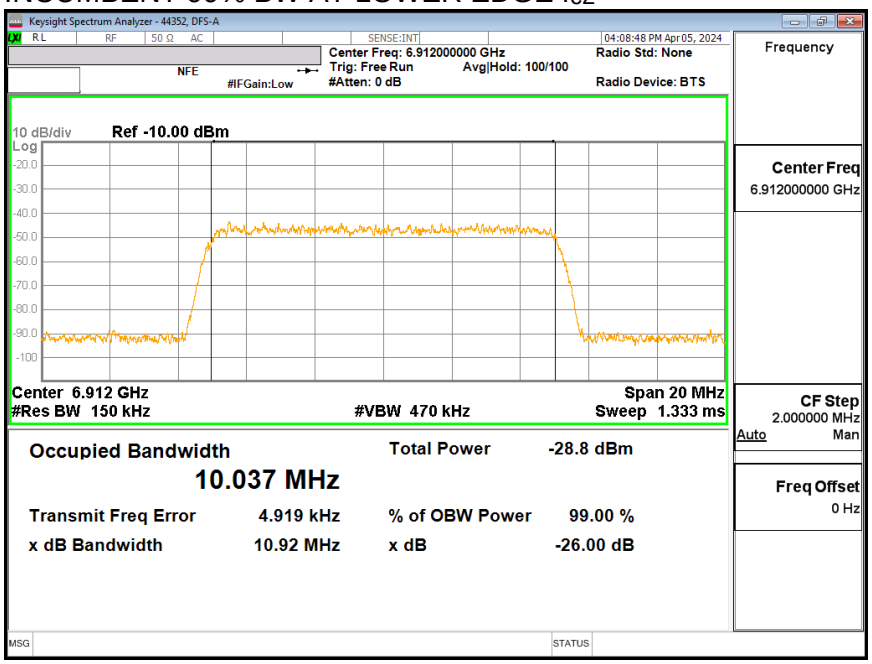
8.17.2. INCUMBENT SIGNAL PLOTS

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.

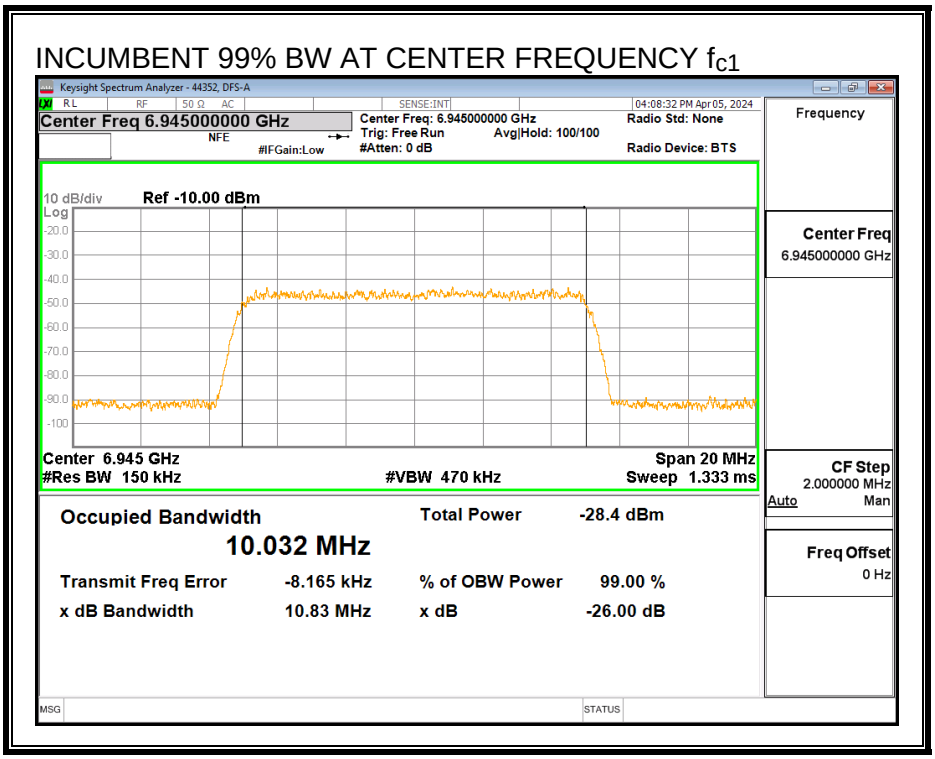
INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:

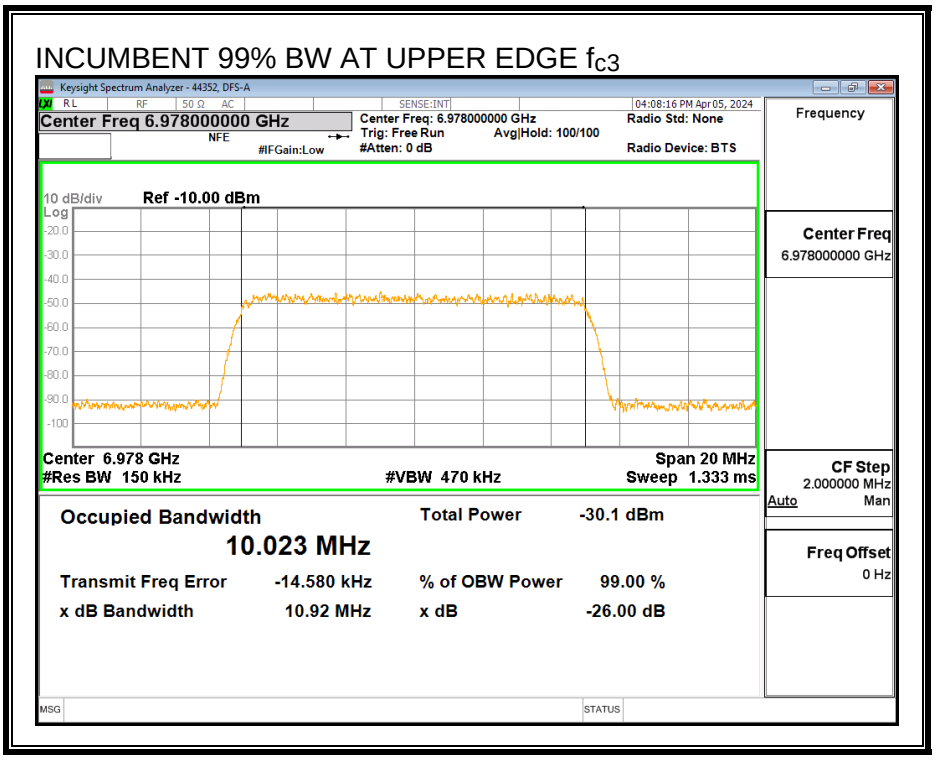
INCUMBENT 99% BW AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



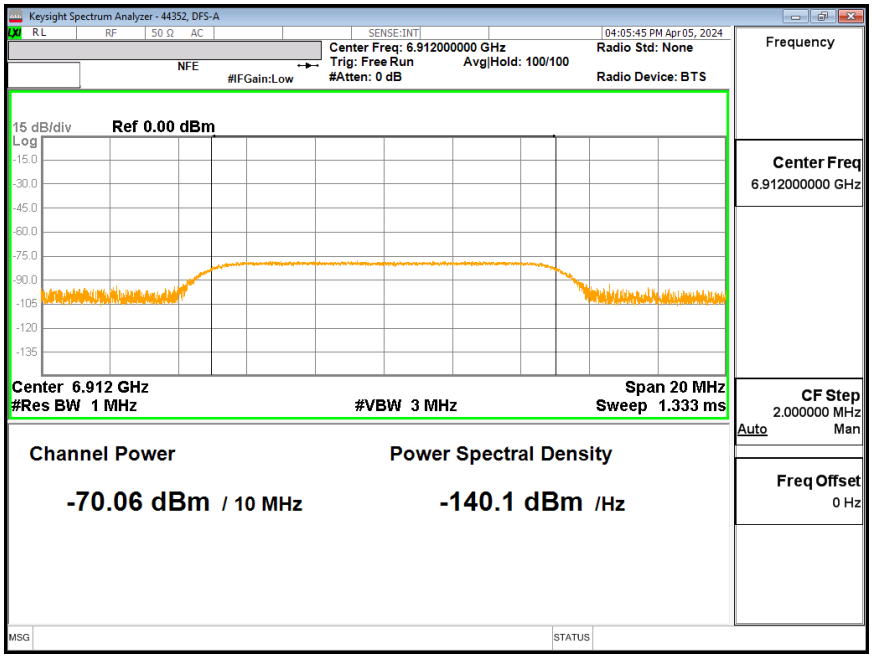
Upper Edge Incumbent Signal f_{c3}:



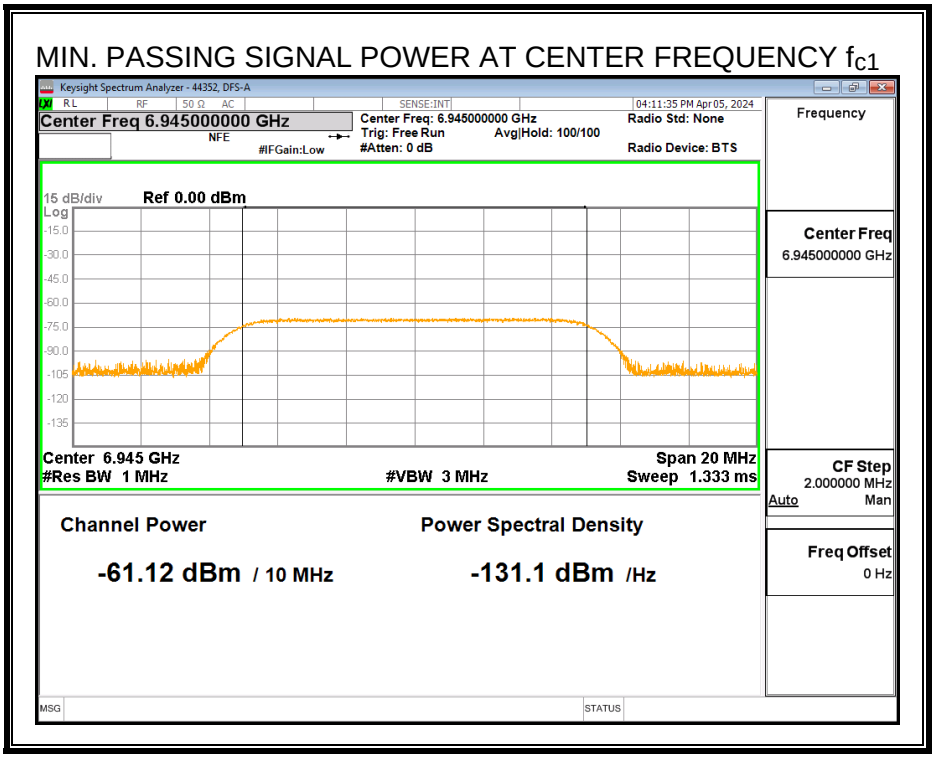
MINIMUM PASSING INCUMBENT SIGNAL POWER

Lower Edge Incumbent Signal f_{c2}:

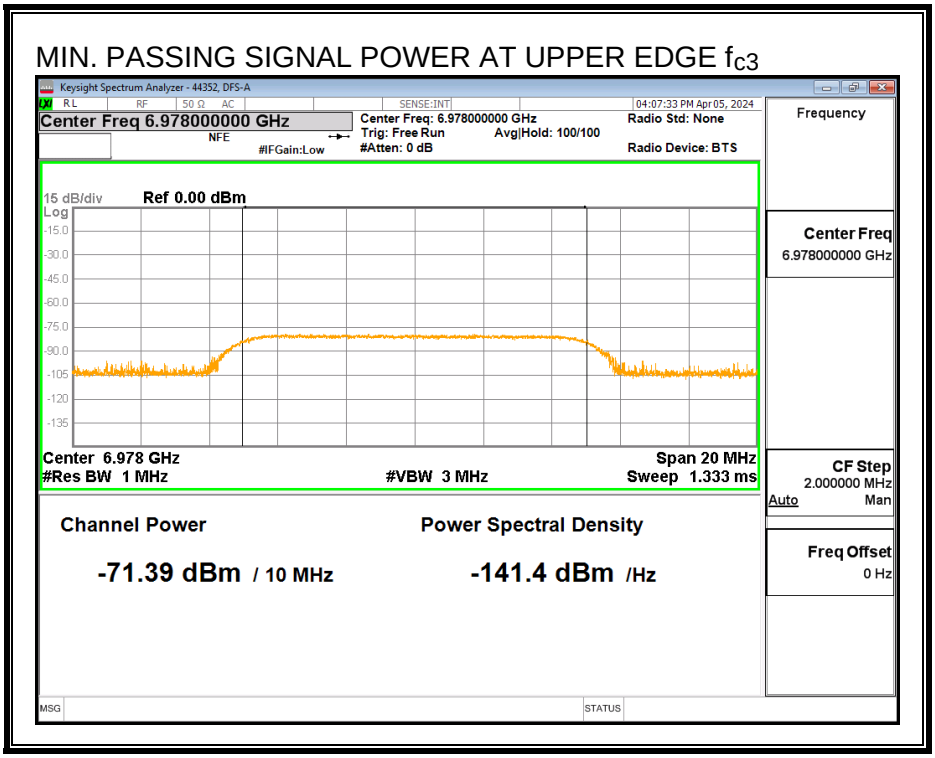
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:

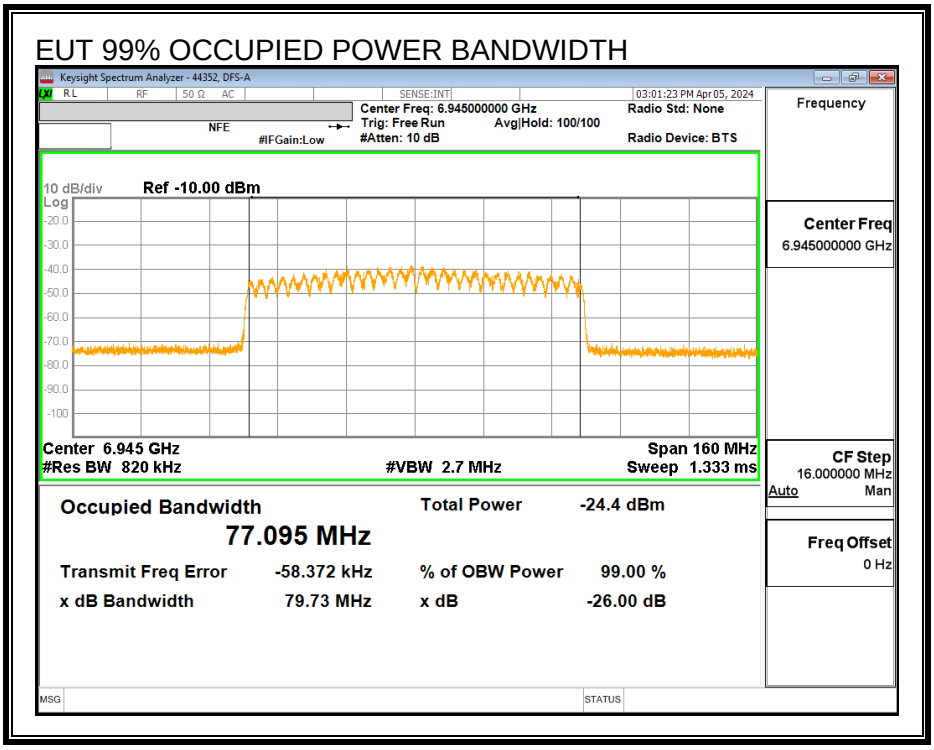


Upper Edge Incumbent Signal f_{c3}:



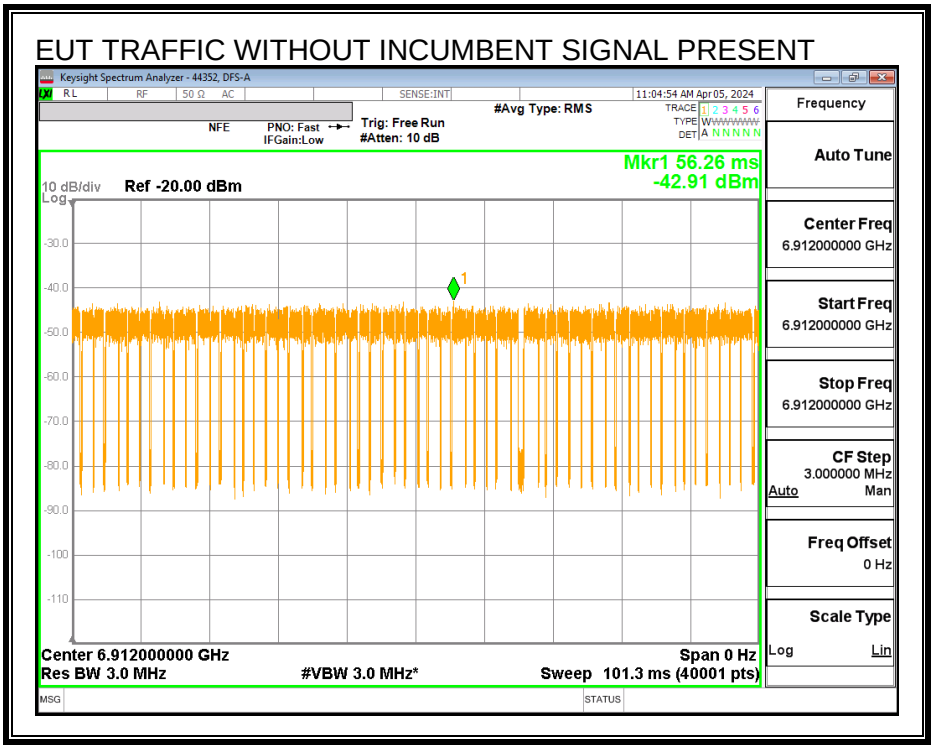
8.17.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



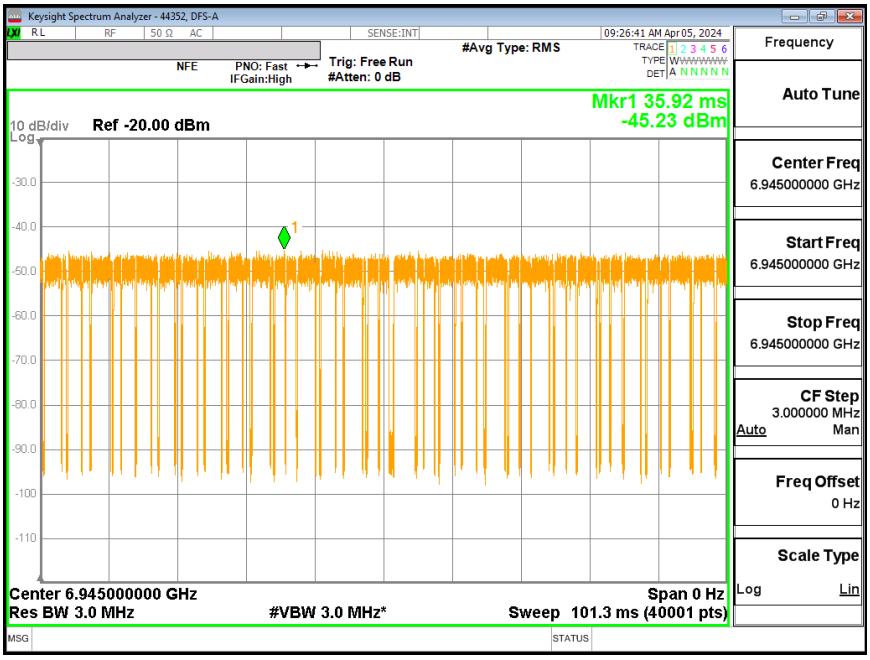
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge f_{c2}:

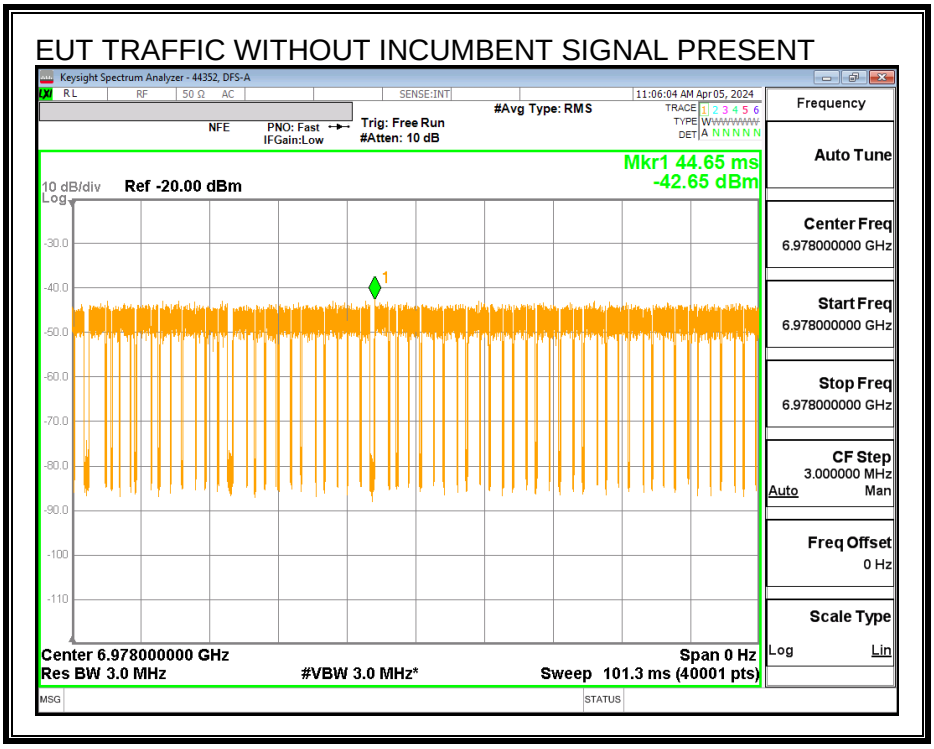


Center Frequency f_{C1}:

EUT TRAFFIC WITHOUT INCUMBENT SIGNAL PRESENT



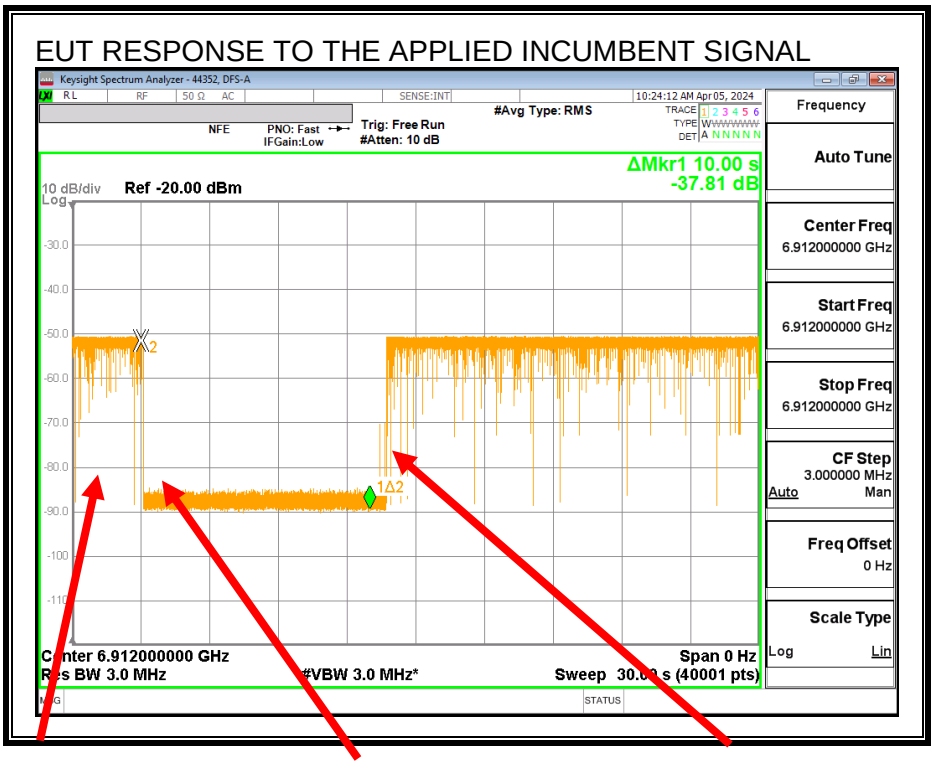
Upper Edge f_{C3}:



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}:



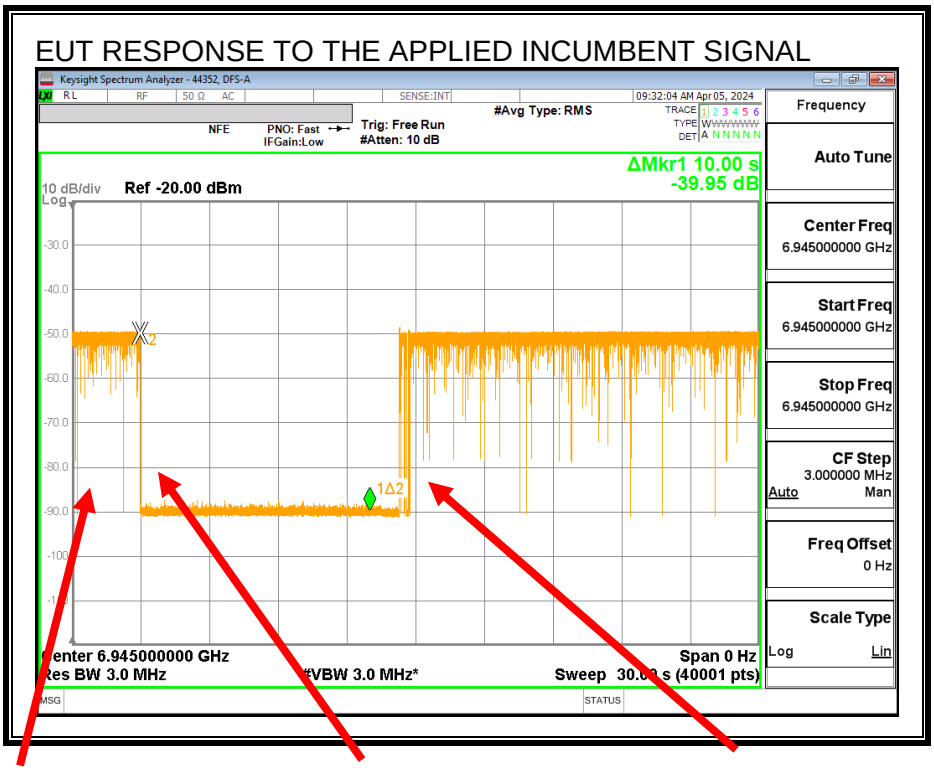
Normal Traffic

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}:



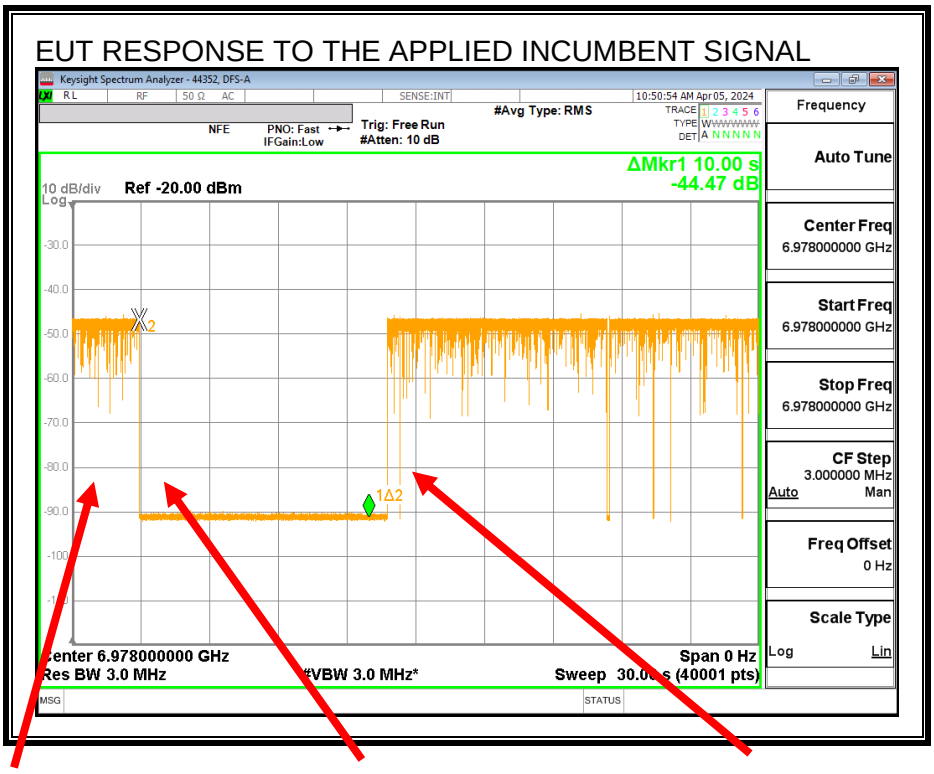
Normal Traffic

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.

8.17.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{c1} (MHz)	6945
EUT Nominal Channel Bandwidth (MHz)	80
99% Occupied Bandwidth of the EUT (MHz)	77.095
EUT 99% OBW Lower Edge, F_L (MHz)	6906.45
EUT 99% OBW Upper Edge, F_H (MHz)	6983.55
99% Occupied Bandwidth of the Incumbent Signal (MHz)	10.023
Test Frequency of Incumbent Signal (f_{c2}) Near EUT F_L (MHz)	**6912**
Test Frequency of Incumbent Signal at f_{c1} (MHz)	**6945**
Test Frequency of Incumbent Signal (f_{c3}) Near EUT F_H (MHz)	**6978**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	2.00
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-60.0
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-70.1
Margin (dBm)	-10.06
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-61.1
Margin (dBm)	-1.12
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-71.4
Margin (dBm)	-11.39
Result (PASS / FAIL)	**PASS**

Test Date: 2024-04-05
Tested by: 44352
Test location: DFS-A

INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)		
Trial	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: 2024-04-05

Tested by: 44352

Test location: DFS-A

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

8.17.5. 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 Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-70.06	2	0	-72.06	-62	Ceased
-71.03	2	0	-73.03	-62	Minimal
-76.03	2	0	-78.03	-62	Normal

Incumbent AWGN at f_{c1}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-61.12	2	0	-63.12	-62	Ceased
-62.1	2	0	-64.1	-62	Minimal
-72.1	2	0	-74.1	-62	Normal

Incumbent AWGN at f_{c3}:

Measured Incumbent Power at the EUT Radio Port (dBm)	Antenna Gain (dBi)	Antenna Cable Path Loss (dB)	Adjusted Incumbent Power at the Antenna (dBm)	Detection Limit (dBm)	EUT Tx Status
-71.39	2	0	-73.39	-62	Ceased
-72.31	2	0	-74.31	-62	Minimal
-77.43	2	0	-79.43	-62	Normal

The path loss from the internal antenna assembly to the radio port is incorporated into the antenna gain figure.

Test Date: 2024-04-05

Tested by: 44352

Test location: DFS-A

9. SETUP PHOTOS

Refer to UL Verification Services Inc Report # 15126863-EP1V1.

END OF TEST REPORT