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

CONTENTION BASED PROTOCOL PORTION of RSS-248, ISSUE 1

TEST REPORT

FOR

GSM/WCDMA/LTE 5G NR Tablet with BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT

MODEL NUMBER: SM-X716B

FCC ID: A3LSMX716B

REPORT NUMBER: R14720550-C1

ISSUE DATE: 2023-06-05

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU,
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ACCREDITED
CERT #0751.06

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-05-16	Initial Issue	Samuel Bryson
V2	2023-06-05	Editorial changes	John E. Manser III

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
EUT DESCRIPTION:	GSM/WCDMA/LTE 5G NR Tablet with BT/BLE, DTS/UNII a/b/g/n/ac/ax and WPT
MODEL:	SM-X716B
SERIAL NUMBER:	R32W30042XX
DATE TESTED:	2023-04-17 to 2023-05-08

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 1	Complies

UL LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
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Prepared By:

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CONSUMER TECHNOLOGY DIVISION
UL LLC

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 and FCC KDB 987594.

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 1	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 LLC report number R14720550-E3.

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.
Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 7.2.5)

5. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, 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: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

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. 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 4.8.1 of RSS-248, Issue 1:

"The Federal Communications Commission's accepted KDB procedures 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

Band	Frequency (GHz)	Rules	Notes	KDB/Publication
U-NII 1	5.15-5.25	15.407(a)(1)	Indoor Use/Outdoor Restrictions	789033 (U-NII)
U-NII 2A	5.25-5.35	15.407(a)(2)	Indoor/Outdoor/DFS	789033 (U-NII) 905462 (DFS)
U-NII 2B	5.35-5.47	**Not Available**		
U-NII 2C	5.47-5.725	15.407(a)(2)	Indoor/Outdoor/DFS	789033 (U-NII) 905462 (DFS)
U-NII 3	5.725-5.85	14.407(a)(3)	Indoor/Outdoor	789033 (U-NII) 926956 **(*)**
DSRC	5.85-5.925	95 Subpart L and 90 Subpart M	On-Board Units (OBU) must transmit signals to other OBUs and Roadside Units (RSU).	DSRC
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	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	
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	
U-NII 8	6.875 -7.125	15.407(a)(5), (6), (8)	Low Power Indoor AP, Subordinates, Indoor Clients	
*** 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

7.1.3. EQUIPMENT CLASSIFICATIONS

There are seven applicable equipment classes for U-NII 6 GHz device certifications, as illustrated in Figure 1. Multiple equipment classes can apply to one FCC ID. Equipment classes categorize the certification record by the different technical rules that apply.

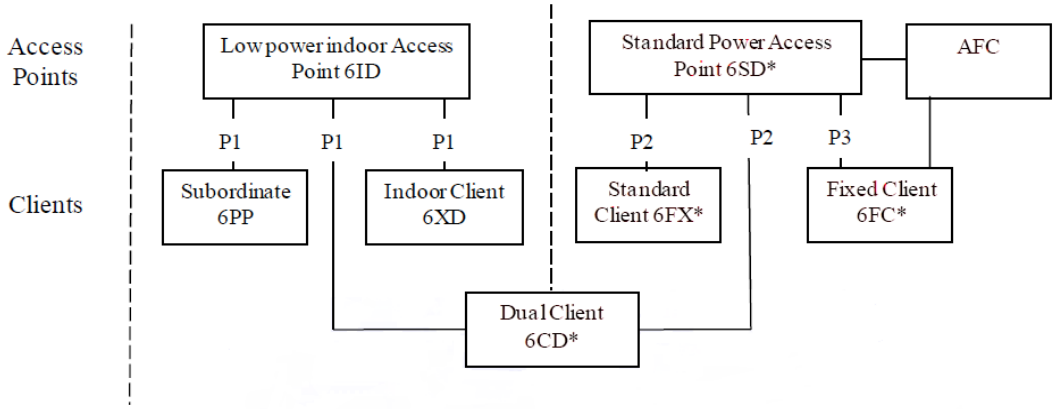


Figure 1 – Equipment Classes Overview

*** Applications accepted in phase 2.**

DEFINITION OF EQUIPMENT CLASSES

1. 6ID: 15E 6 GHz Low power indoor access point.
2. 6PP: 15E 6 GHz Subordinate indoor device. These devices are under control of a Low power indoor access point (P1).
3. 6XD: 15E 6 GHz Low power Indoor client. These devices are under control of a low power indoor access point (P1).
4. **6SD***: 15E 6 GHz Standard power access point. These devices are managed by the Automatic Frequency Coordination (AFC) system.
5. **6CD***: 15E 6 GHz Dual client. These devices are under control of either a low power indoor access point (6ID) (P1) or Standard power access point (P2).*
6. **6FX***: 15E 6 GHz Standard client. These devices are under control of a Standard power access point (P2).
7. **6FC***: 15E 6 GHz Fixed client. These devices are associated with a standard power access point (P3).

*** Applications accepted in phase 2.**

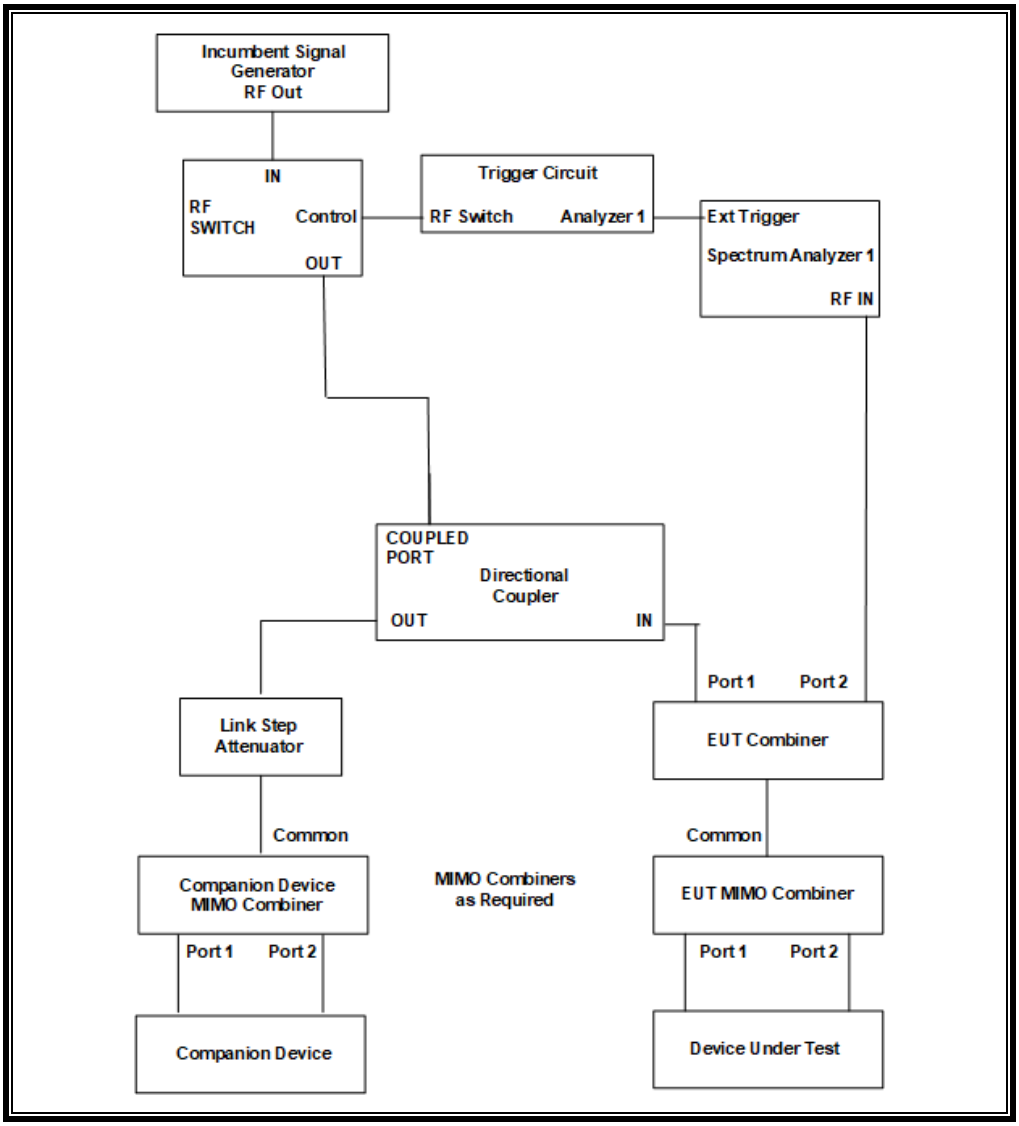
7.2. DESCRIPTION OF TEST SETUP

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.

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	89232	2023-07-14
Signal Generator, MXG X-Series RF Vector	Keysight	N5182B	215042	2024-01-25
Frequency Extender	Keysight	N5182BX	215272	2024-01-13

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.

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	22.9 – 27.4 °C
Humidity	26.0 – 49.2 %

7.2.4. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP

Please refer to R14720550-EP1 for 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**
Access Point	ASUS	GT-AXE11000	M9IG0X400839JKM	MSQ-RTAXJF00
AP Power Supply	Ac Bel	ADDD011 LPS	ADD01117AG213403440A	N/A
Control Laptop	HP	14-dk1003dx	5CGO16B3DL	TX2-RTL8821CE
Laptop Power Supply	HP	HSTNN-CA40	N/A	N/A
RF Shielded Chamber	OctoScope	OB-26	OB2650224-01	N/A

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 EUT is classified as a 6 GHz Dual Client Device.

The highest gain antenna assembly utilized with the EUT has a gain of -0.36 dBi in the U-NII 5 band, -1.14 dBi in the U-NII 6 band, -1.8 dBi in the U-NII 7 band and -2.01 dBi in the U-NII 8 band. The lowest gain antenna assembly utilized with the EUT has a gain of -3.37 dBi in the U-NII 5 band, -4.63 dBi in the U-NII 6 band, -4.63 dBi in the U-NII 7 band and -3.98 dBi in the U-NII 8 band.

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

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.

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 EUT hardware installed during testing was REV0.1.

The software version used during testing was X716B.001.

The software installed in the Companion Device is 3.0.0.4.386.42489.

TEST SETUP

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	-3.37	-65.37
U-NII 6	6425 to 6525	-4.63	-66.63
U-NII 7	6525 to 6875	-4.63	-66.63
U-NII 8	6875 to 7125	-3.98	-65.98

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).

This test was performed by starting at a signal level significantly lower than the required minimum detection level and then slowly increasing the signal level until the required detection requirements were met.

8.2. U-NII 5 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

$$\textbf{99\% BW}_{\textbf{EUT}} \leq \textbf{99\% BW}_{\textbf{INC}}$$

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

$$\textbf{99\% BW}_{\textbf{INC}} < \textbf{99\% BW}_{\textbf{EUT}} \leq \textbf{2 x 99\% BW}_{\textbf{INC}}$$

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.

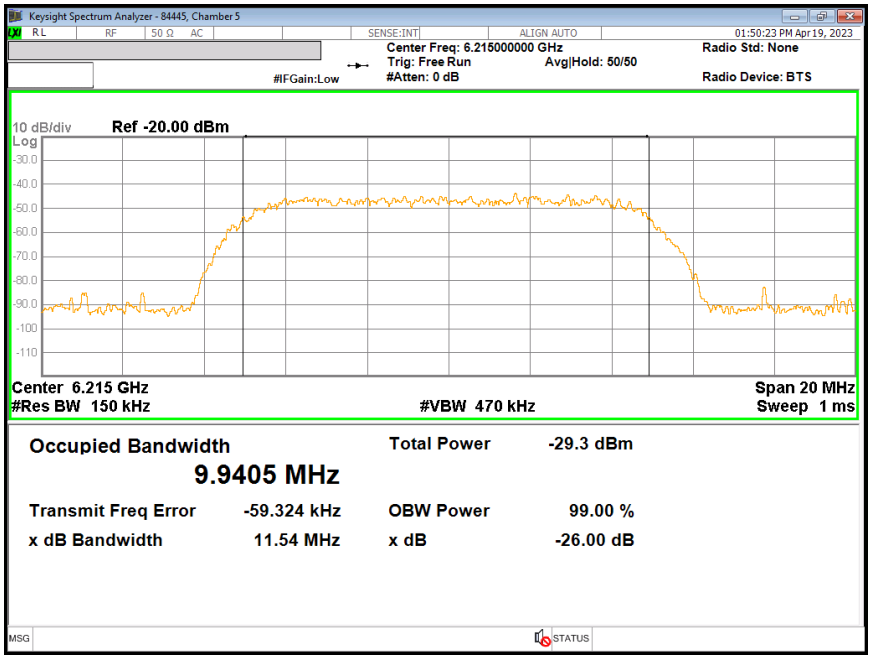
Only the lowest and highest supported channel bandwidths are required to be tested.

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

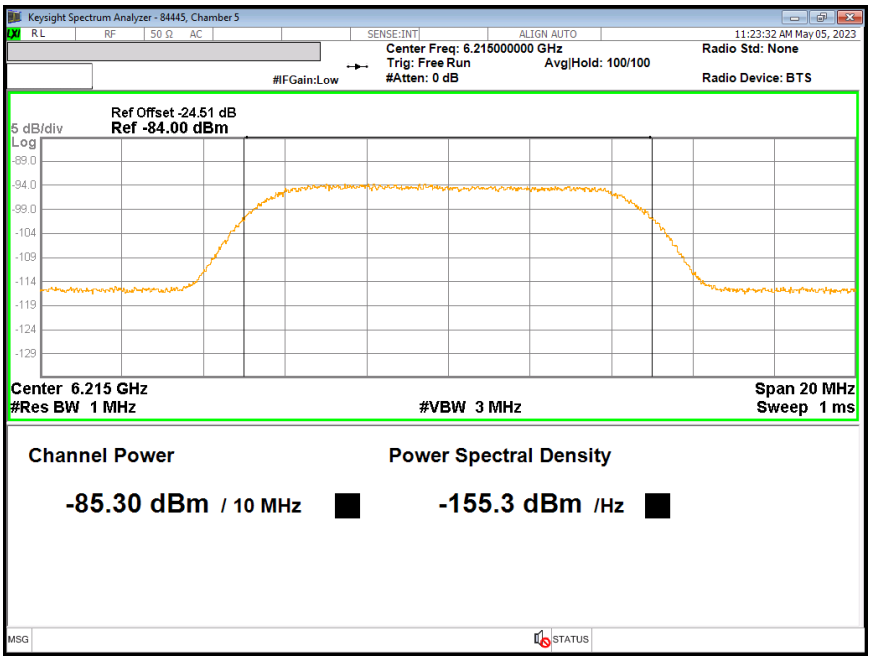
INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY



MINIMUM PASSING INCUMBENT SIGNAL POWER

The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

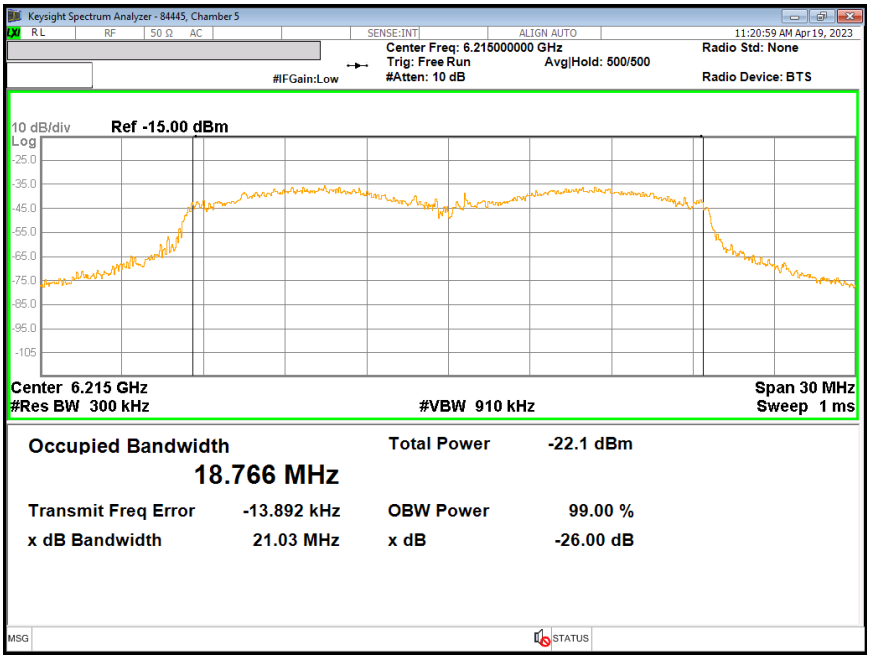
MINIMUM PASSING INCUMBENT SIGNAL POWER



8.3.3. EUT TRANSMISSION PLOTS

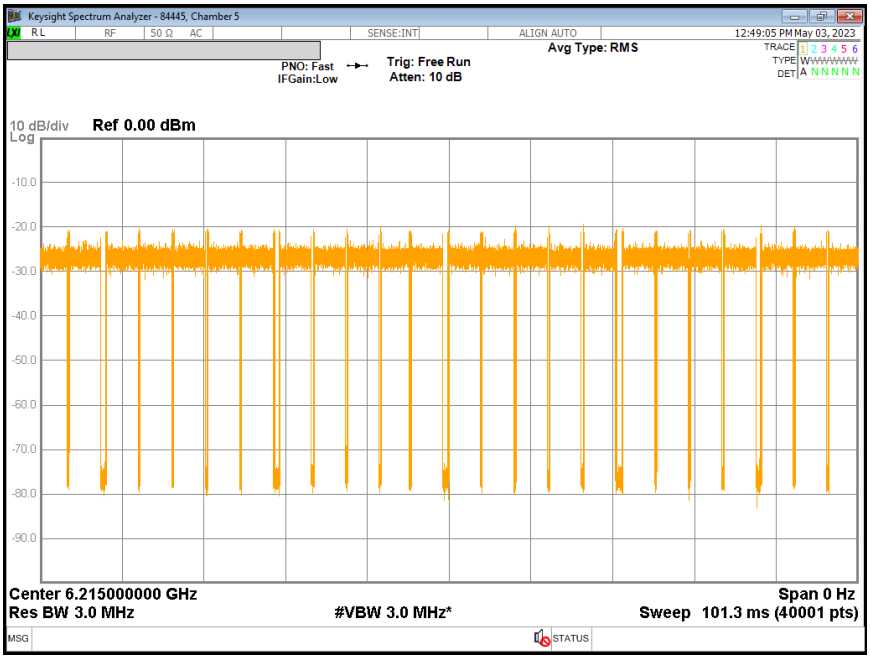
EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH



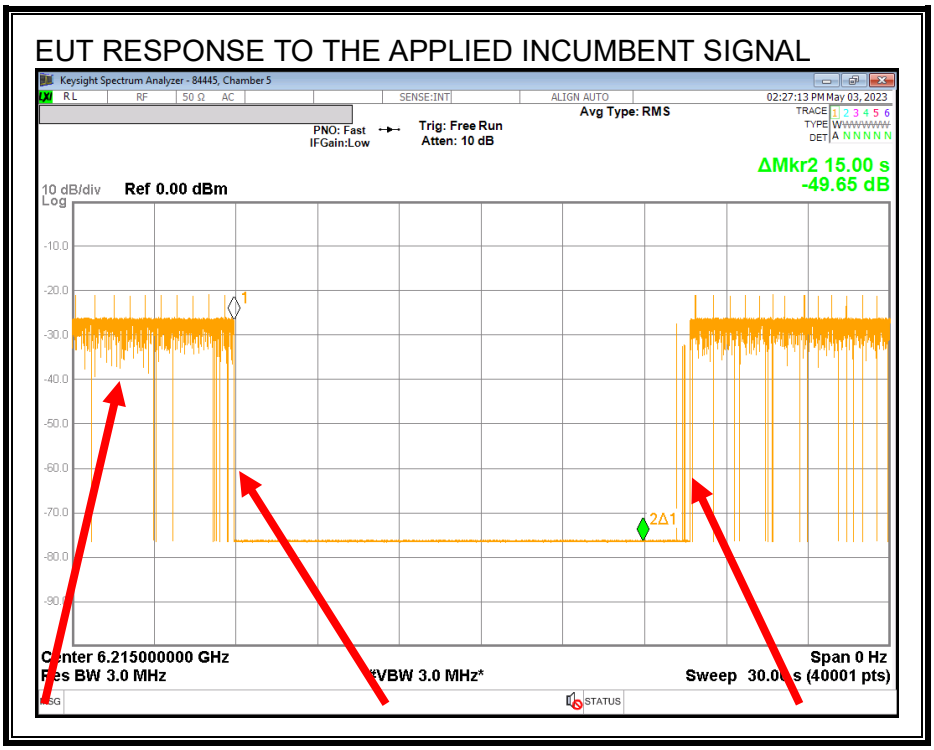
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

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 6 seconds after the start of the sweep for a duration of 15 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.

8.3.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f_{C1} (MHz)	6215
EUT Nominal Channel Bandwidth (MHz)	6215
99% Occupied Bandwidth of the EUT (MHz)	18.766
EUT 99% OBW Lower Edge, F_L (MHz)	6205.62
EUT 99% OBW Upper Edge, F_H (MHz)	6224.38
Test Frequency of Incumbent Signal (MHz)	**6215**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	-3.37
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-65.37
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-85.30
Margin (dBm)	-19.93
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-03
Tested by: 84445
Test location: Chamber 5

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	**No**
9	Yes
10	Yes
Test Result	**PASS**

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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
-85.30	-3.37	0	-81.93	-62	Ceased
-86.09	-3.37	0	-82.72	-62	Minimal
-92.72	-3.37	0	-89.35	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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 5185 MHz and a nominal channel bandwidth of 160 MHz.

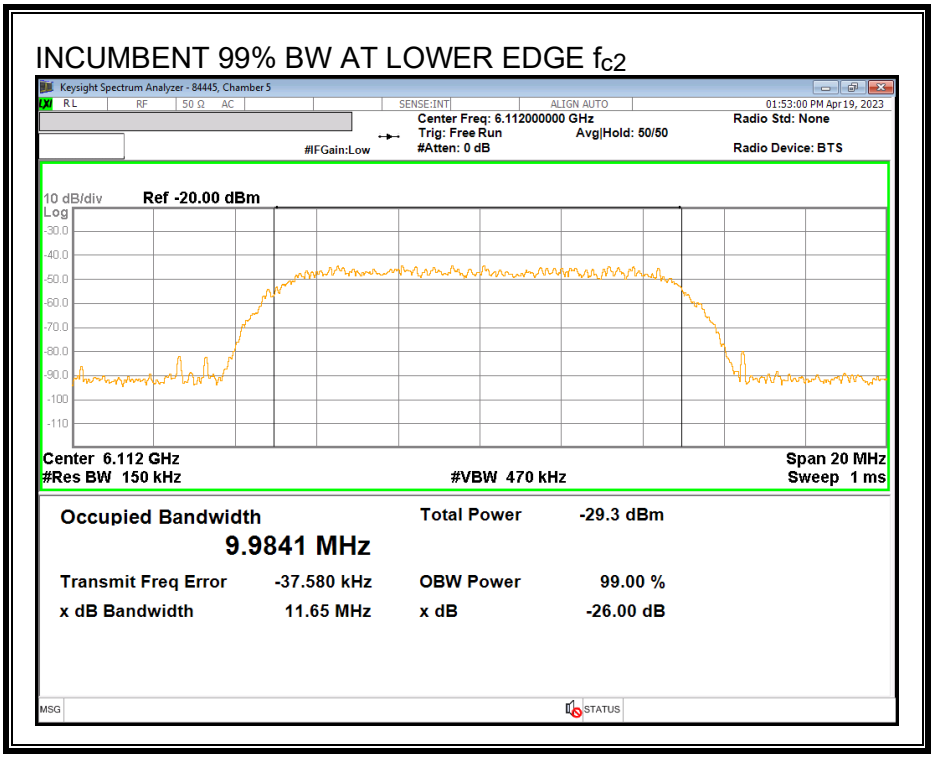
Only the lowest and highest supported channel bandwidths are required to be tested.

8.5.2. INCUMBENT SIGNAL PLOTS

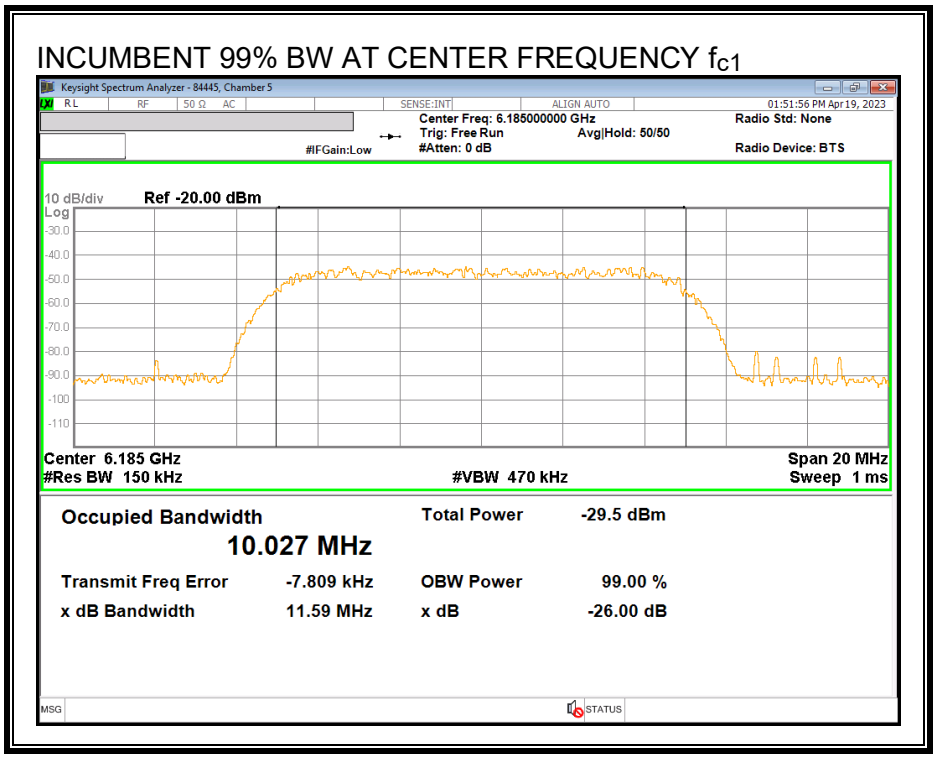
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

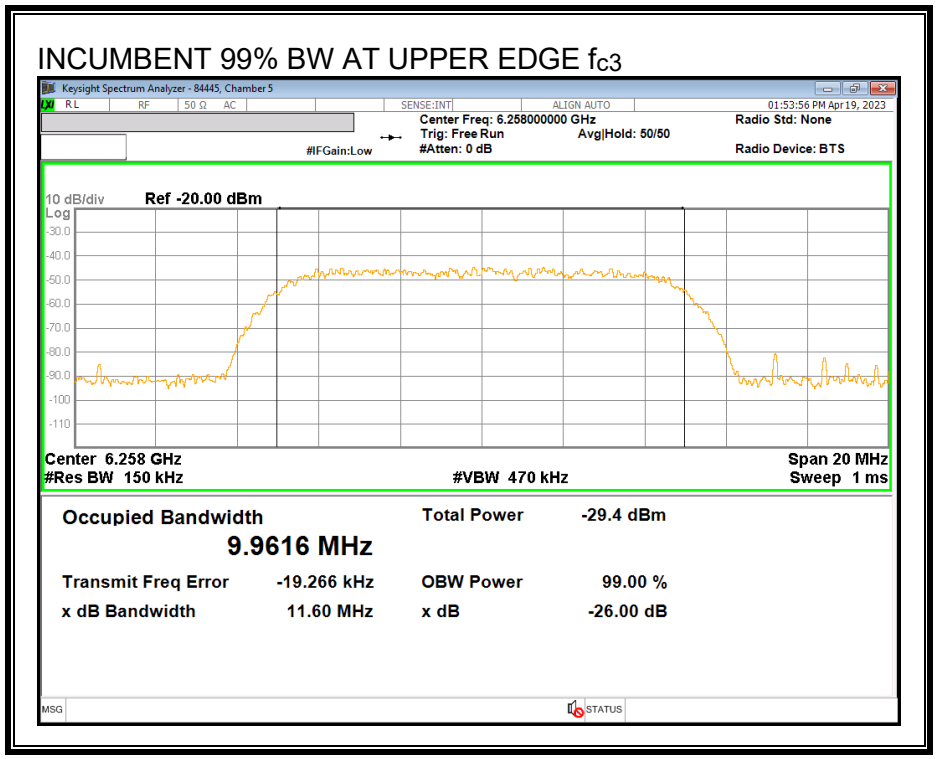
Lower Edge Incumbent Signal f_{c2}:



Center Frequency Incumbent Signal f_{c1}:



Upper Edge Incumbent Signal f_{c3}:

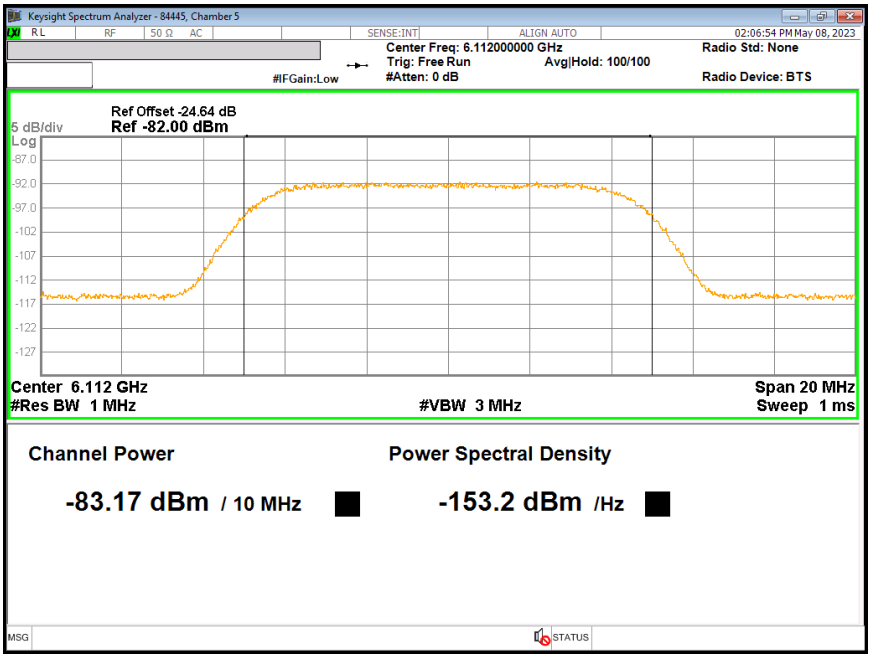


MINIMUM PASSING INCUMBENT SIGNAL POWER

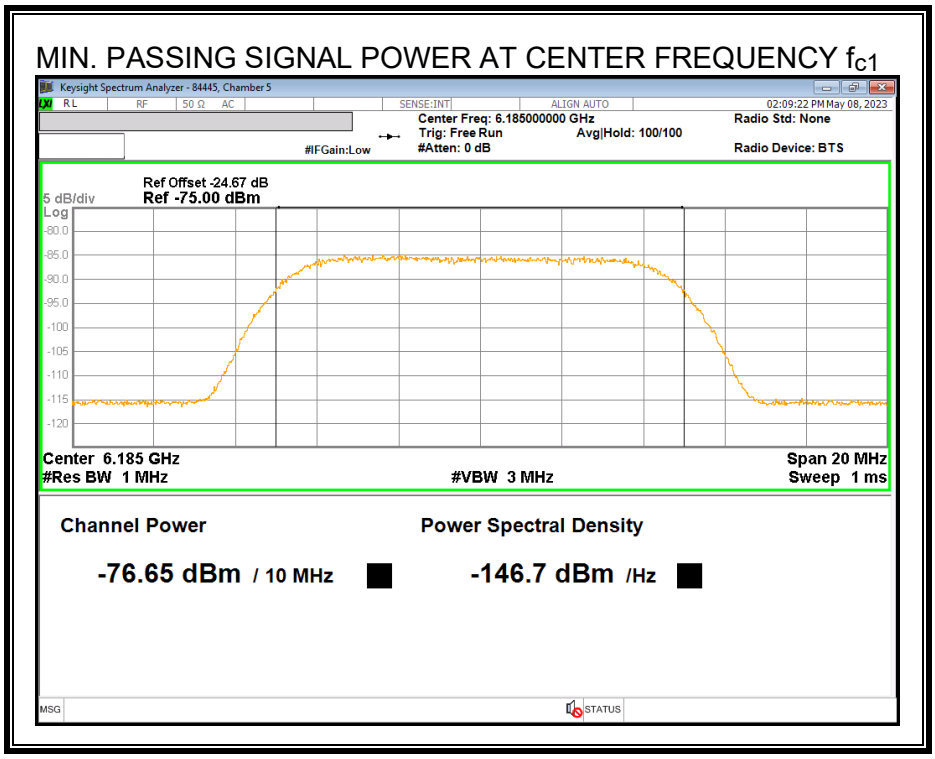
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

Lower Edge Incumbent Signal f_{c2}:

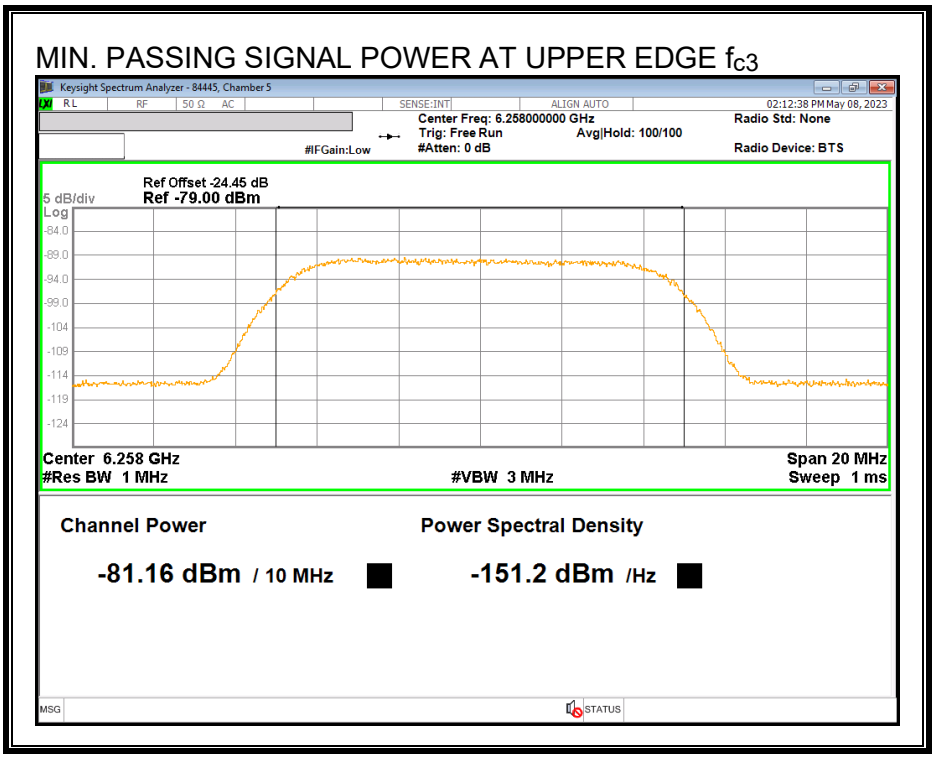
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:

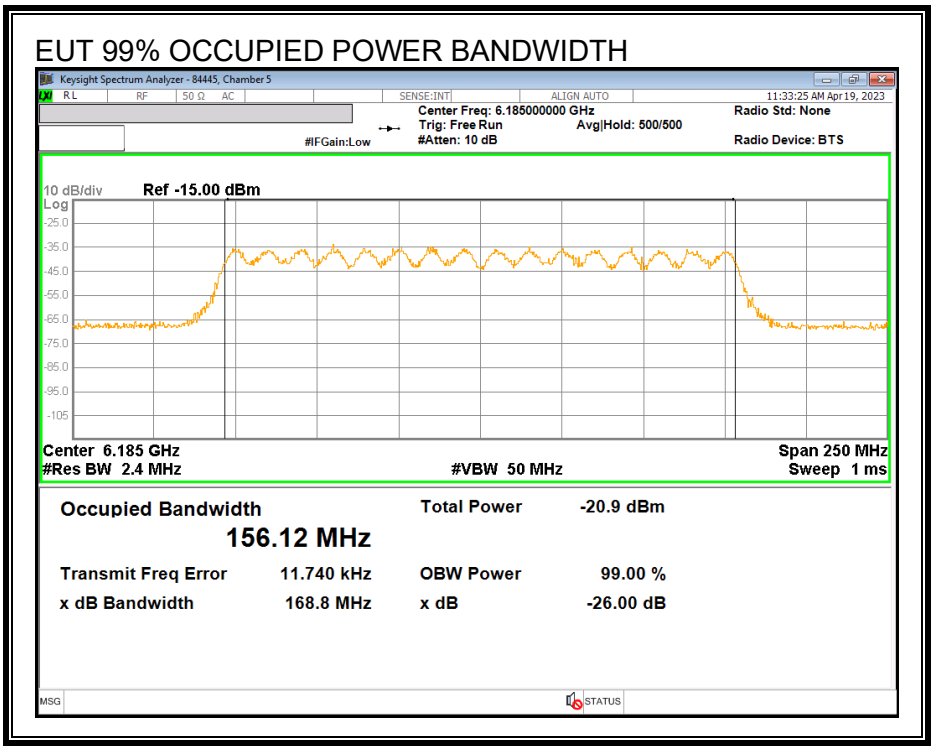


Upper Edge Incumbent Signal f_{c3}:



8.5.3. EUT TRANSMISSION PLOTS

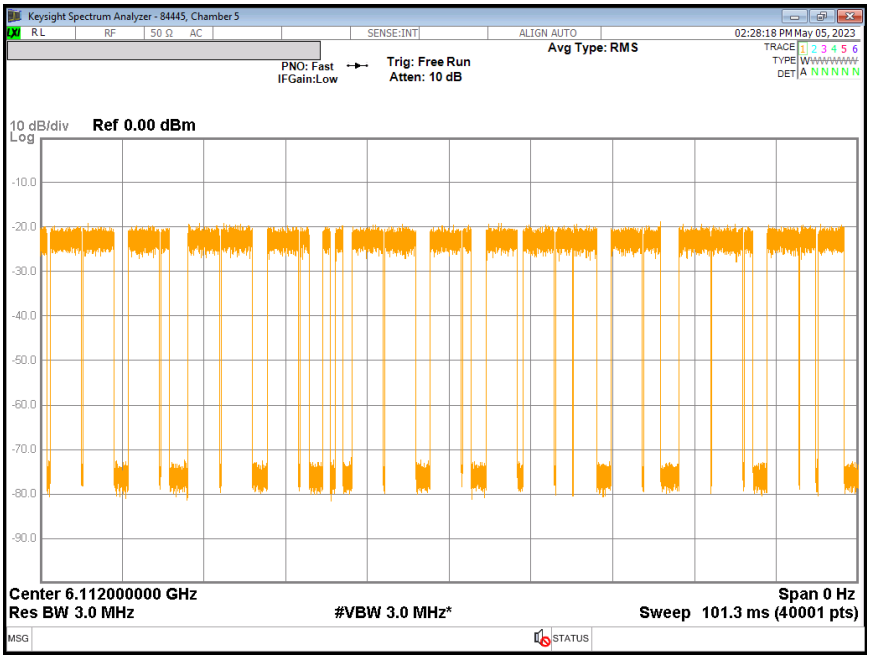
EUT 99% OCCUPIED POWER BANDWIDTH



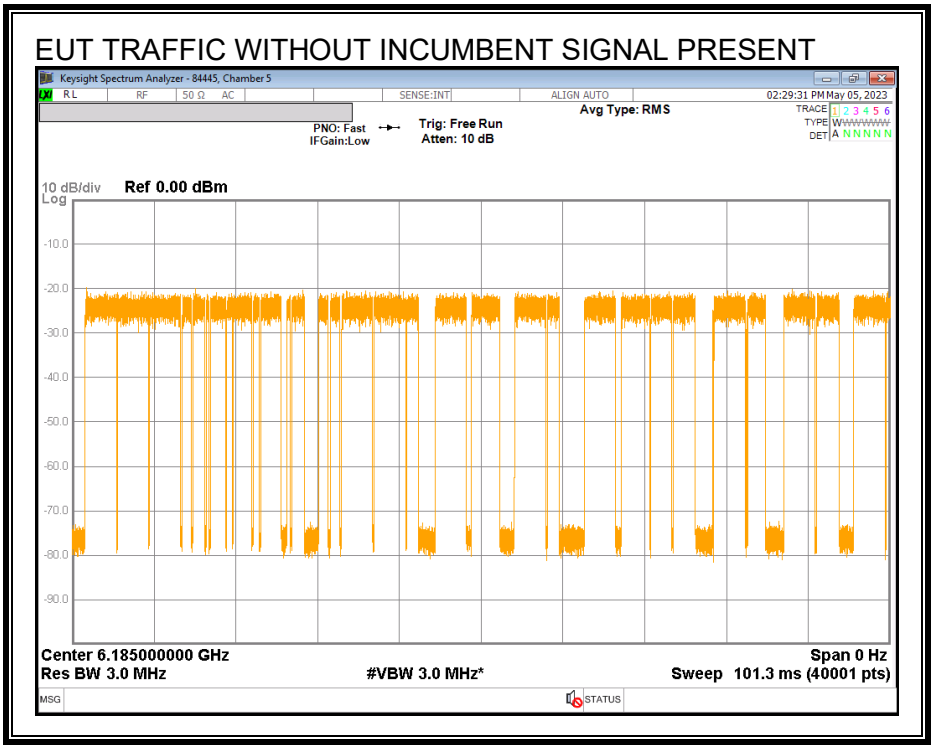
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge f_{c2}:

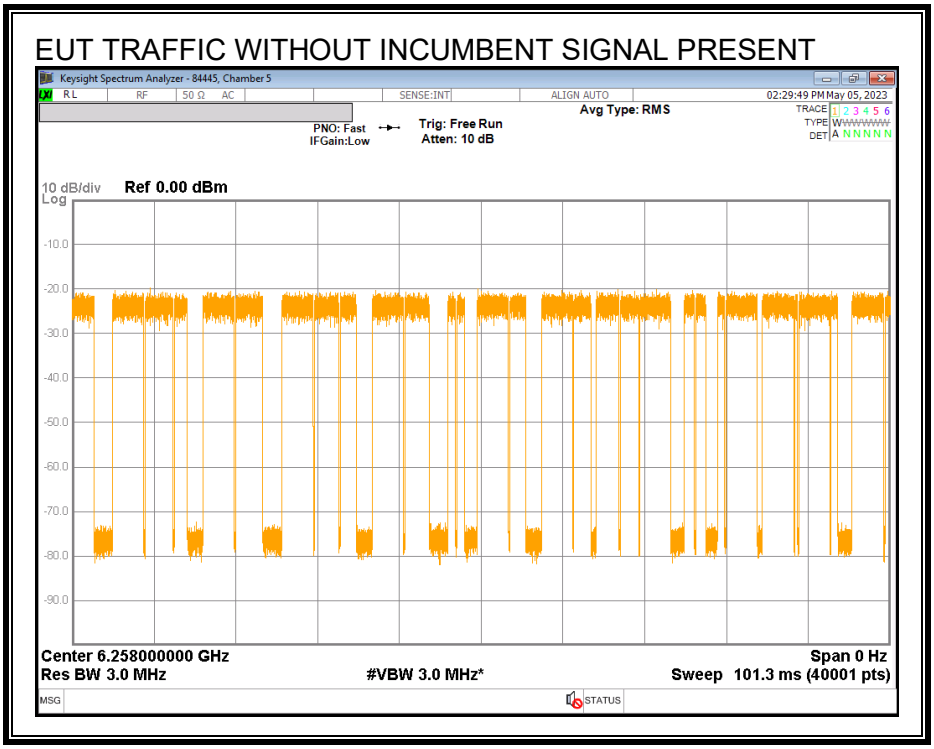
EUT TRAFFIC WITHOUT INCUMBENT SIGNAL PRESENT



Center Frequency f_{C1}:



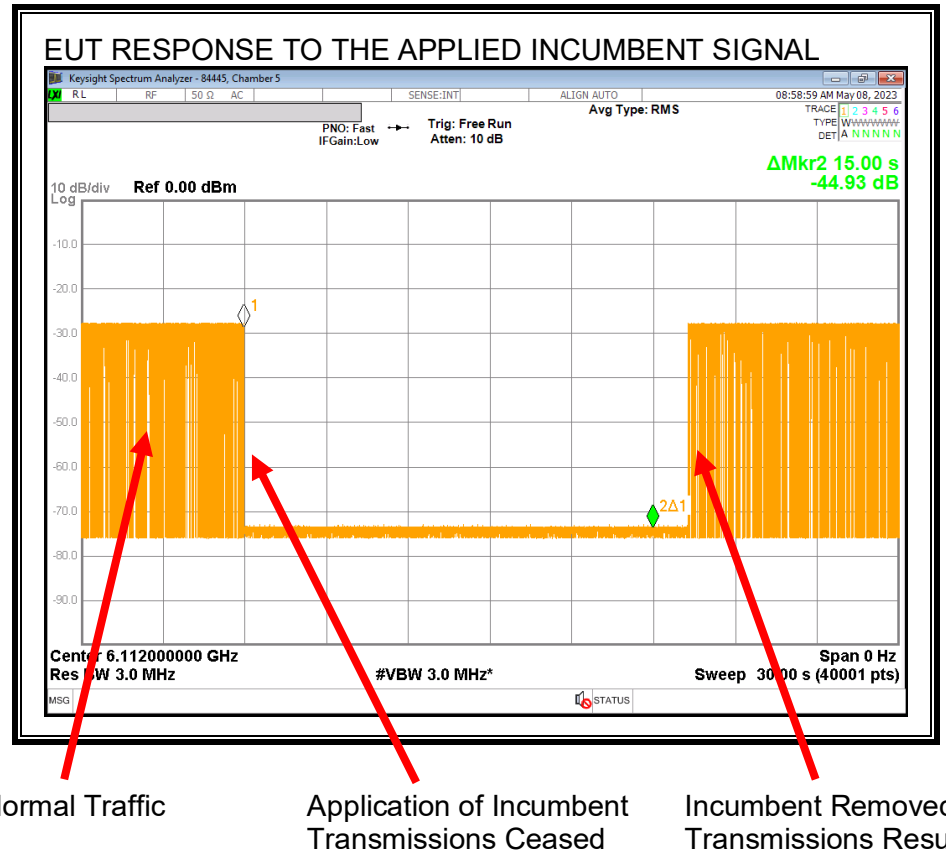
Upper Edge f_{C3}:



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

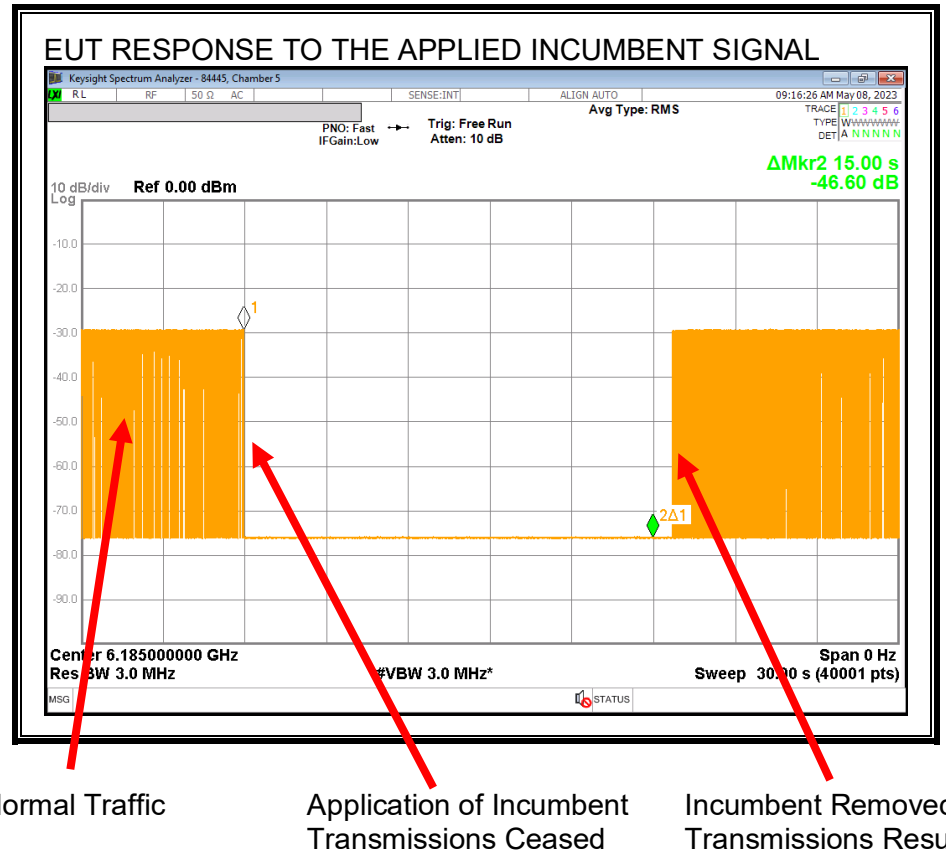
A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 6 seconds after the start of the sweep for a duration of 15 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}:



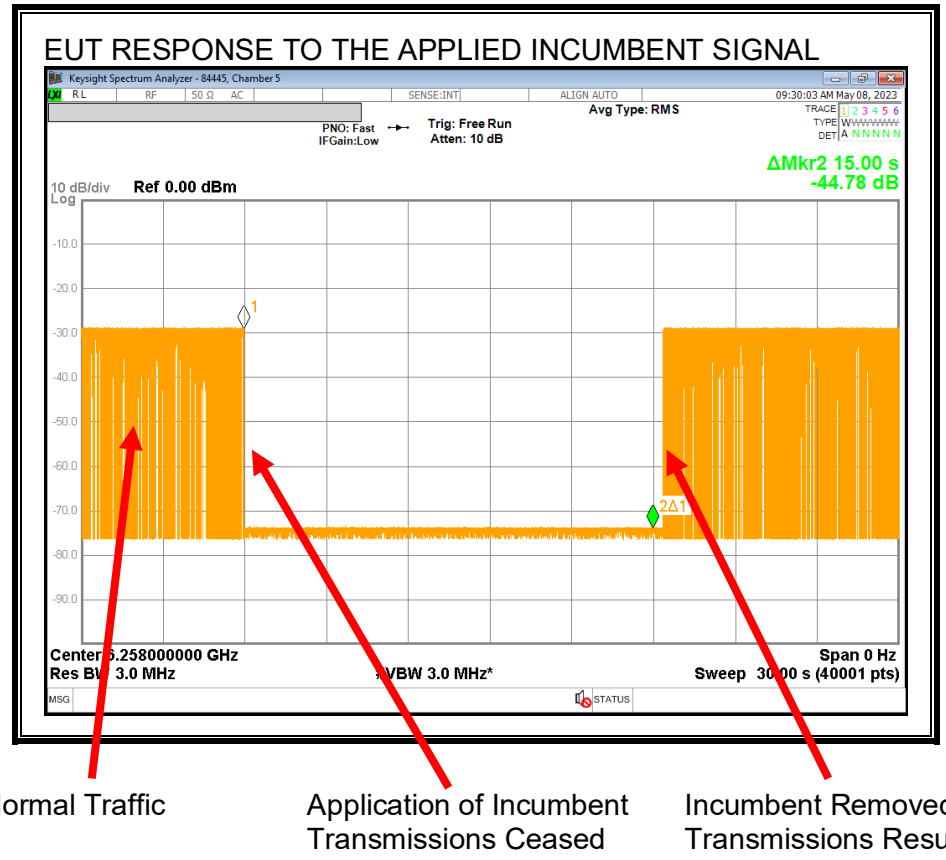
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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)	6185
EUT Nominal Channel Bandwidth (MHz)	160
99% Occupied Bandwidth of the EUT (MHz)	156.12
EUT 99% OBW Lower Edge, F_L (MHz)	6106.94
EUT 99% OBW Upper Edge, F_H (MHz)	6263.06
99% Occupied Bandwidth of the Incumbent Signal (MHz)	10.027
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)	-3.37
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-65.37
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-83.17
Margin (dBm)	-17.80
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-76.65
Margin (dBm)	-11.28
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-81.16
Margin (dBm)	-15.79
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-08
Tested by: 84445
Test location: Chamber 5

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	**No**	Yes	Yes
3	Yes	Yes	Yes
4	Yes	Yes	**No**
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: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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
-83.17	-3.37	0	-79.8	-62	Ceased
-84.45	-3.37	0	-81.08	-62	Minimal
-86.83	-3.37	0	-83.46	-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
-76.65	-3.37	0	-73.28	-62	Ceased
-77.57	-3.37	0	-74.2	-62	Minimal
-79.65	-3.37	0	-76.28	-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
-81.16	-3.37	0	-77.79	-62	Ceased
-82.52	-3.37	0	-79.15	-62	Minimal
-84.82	-3.37	0	-81.45	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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.

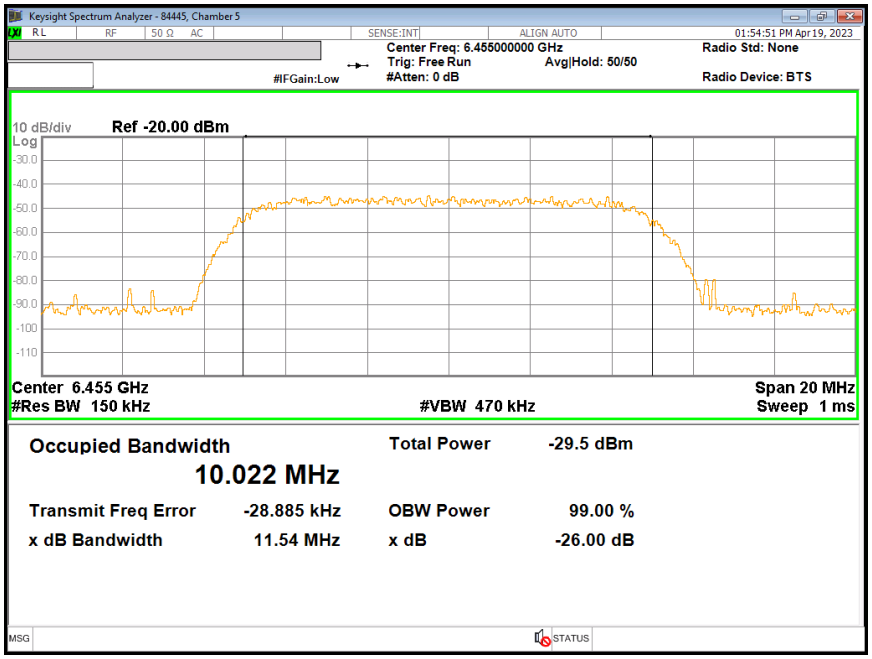
Only the lowest and highest supported channel bandwidths are required to be tested.

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

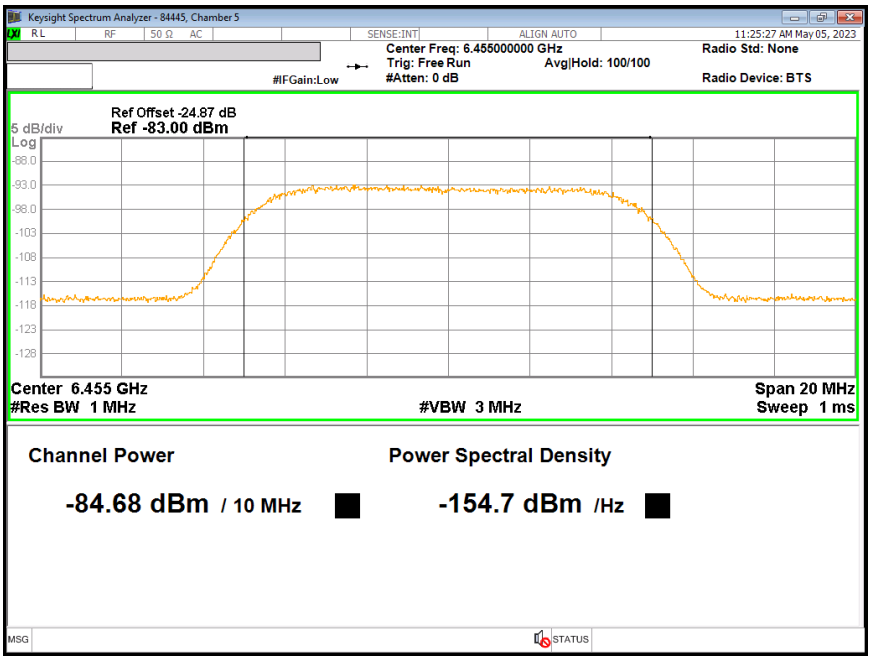
INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY



MINIMUM PASSING INCUMBENT SIGNAL POWER

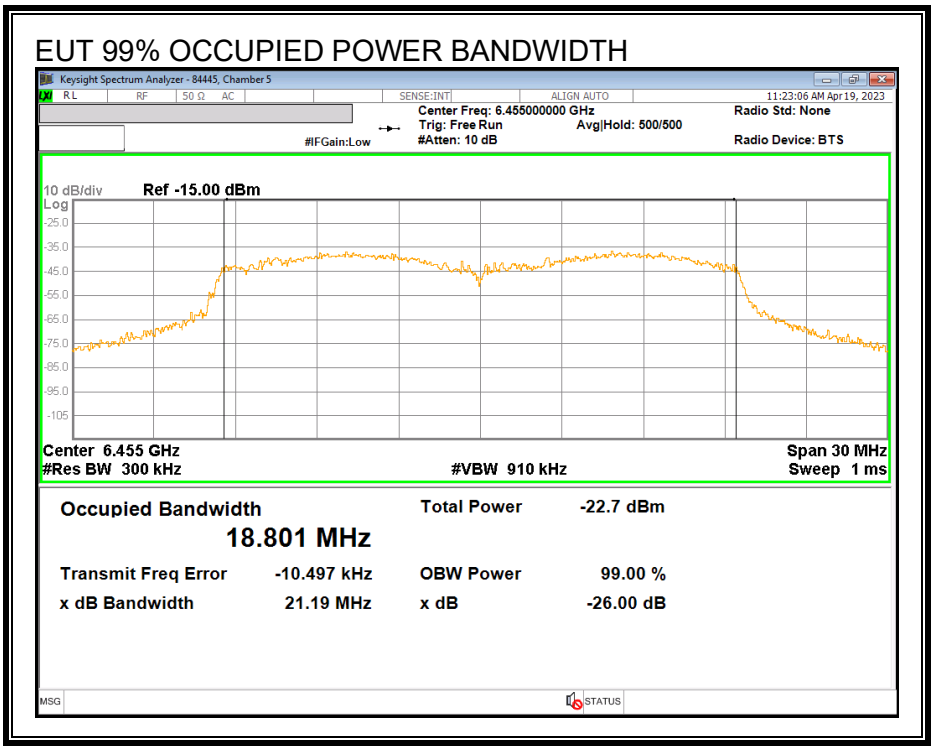
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

MINIMUM PASSING INCUMBENT SIGNAL POWER



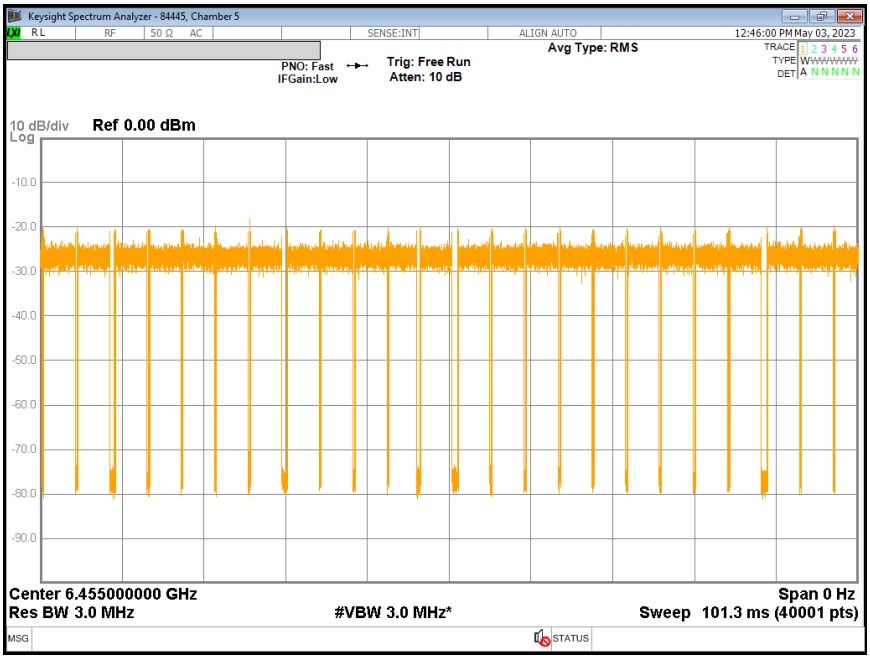
8.7.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



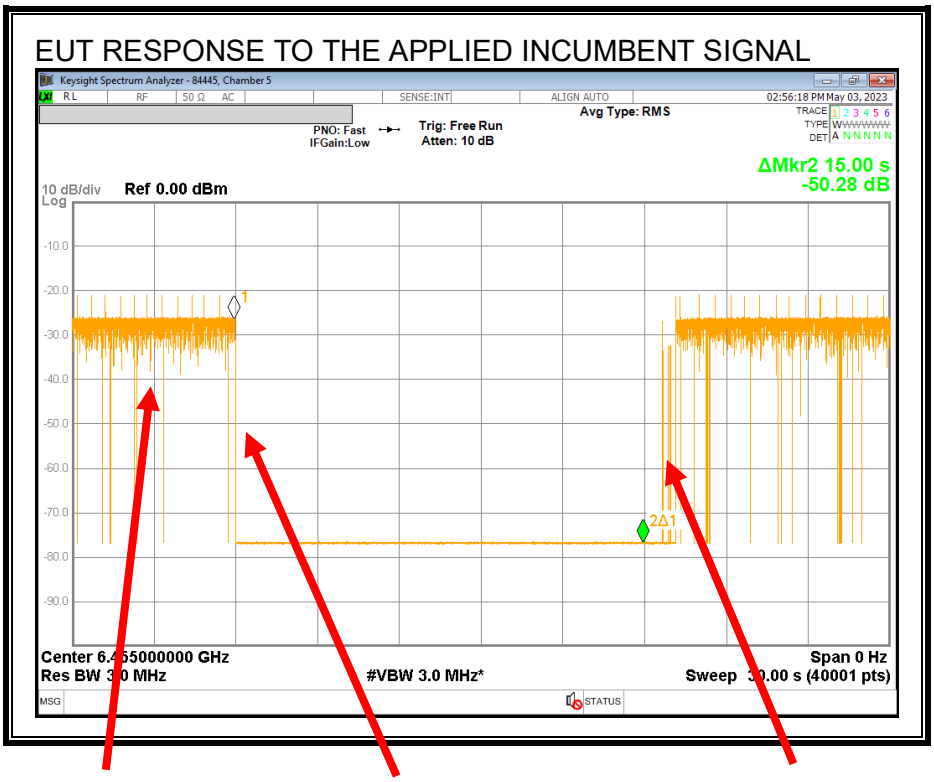
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

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 6 seconds after the start of the sweep for a duration of 15 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.

8.7.4. 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)	18.801
EUT 99% OBW Lower Edge, F_L (MHz)	6445.60
EUT 99% OBW Upper Edge, F_H (MHz)	6464.40
Test Frequency of Incumbent Signal (MHz)	**6455**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	-4.63
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-66.63
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-84.68
Margin (dBm)	-18.05
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-03
Tested by: 84445
Test location: Chamber 5

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: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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
-84.68	-4.63	0	-80.05	-62	Ceased
-85.81	-4.63	0	-81.18	-62	Minimal
-88.88	-4.63	0	-84.25	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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 6505 MHz and a nominal channel bandwidth of 160 MHz.

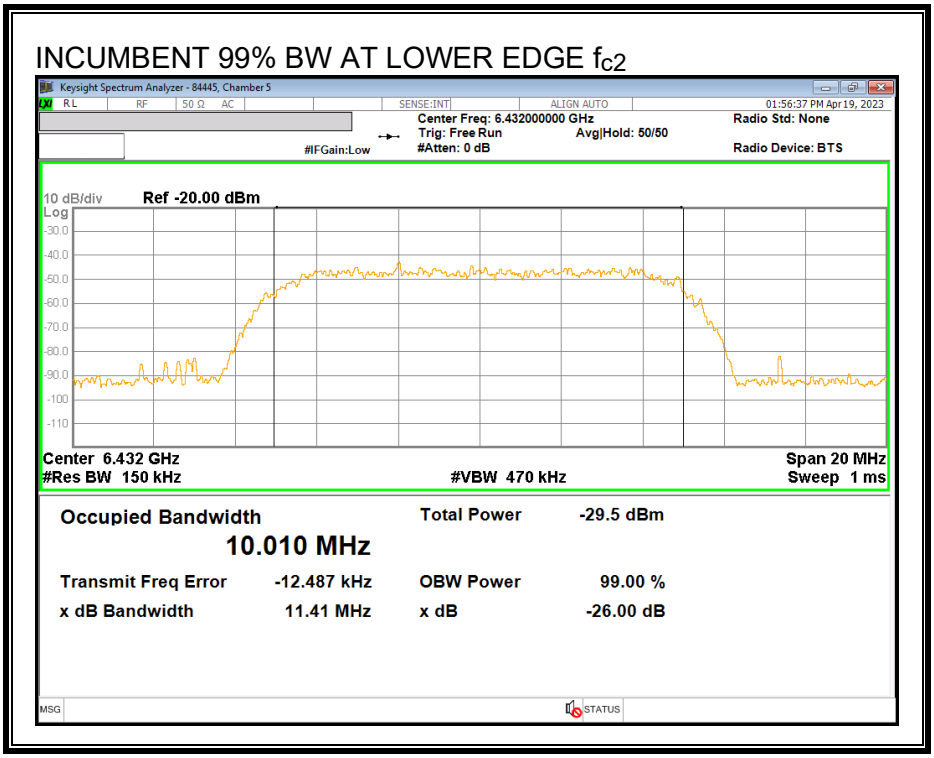
Only the lowest and highest supported channel bandwidths are required to be tested.

8.9.2. INCUMBENT SIGNAL PLOTS

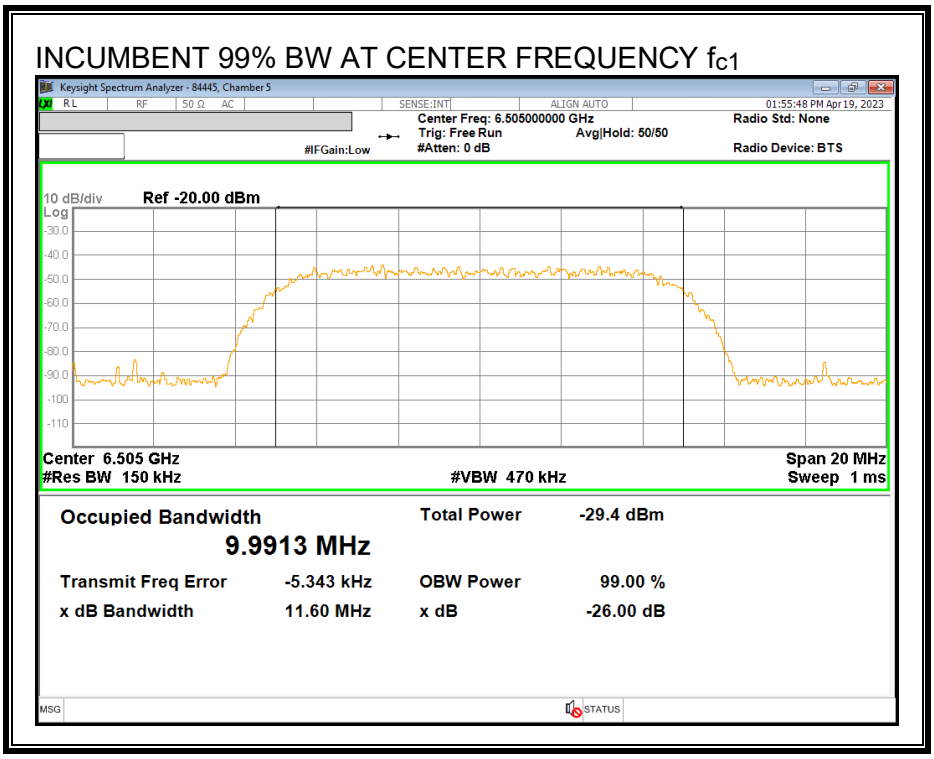
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

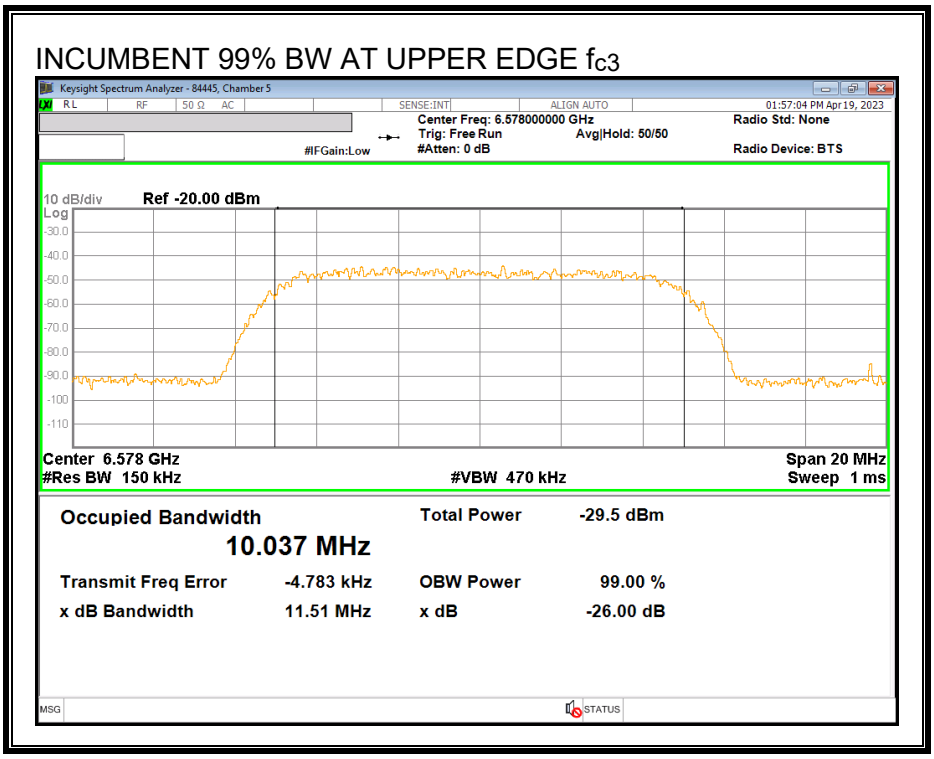
Lower Edge Incumbent Signal f_{c2}:



Center Frequency Incumbent Signal f_{c1}:



Upper Edge Incumbent Signal f_{c3}:

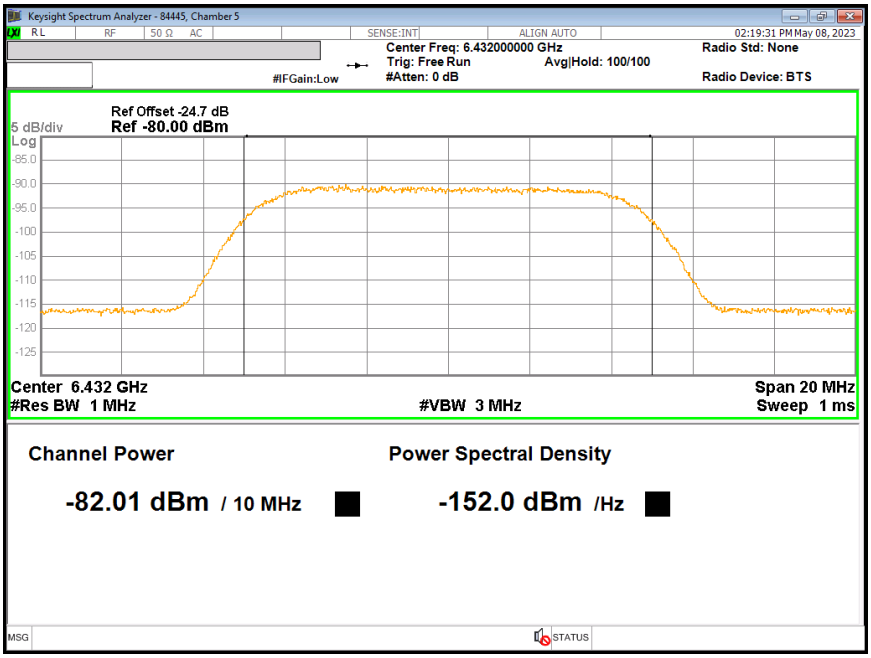


MINIMUM PASSING INCUMBENT SIGNAL POWER

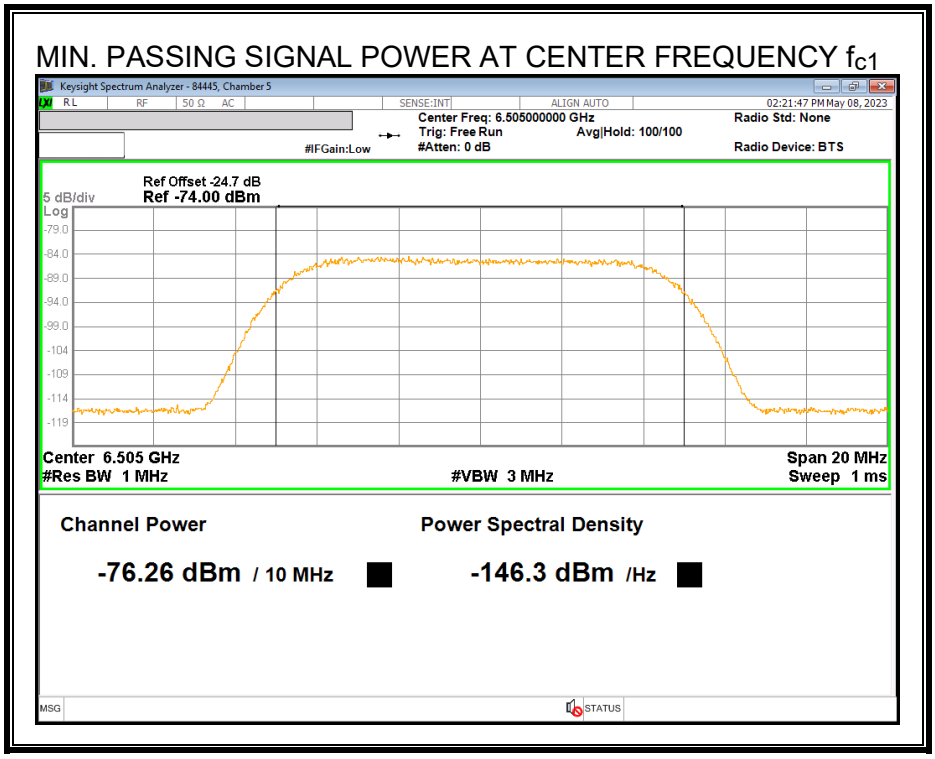
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

Lower Edge Incumbent Signal f_{c2}:

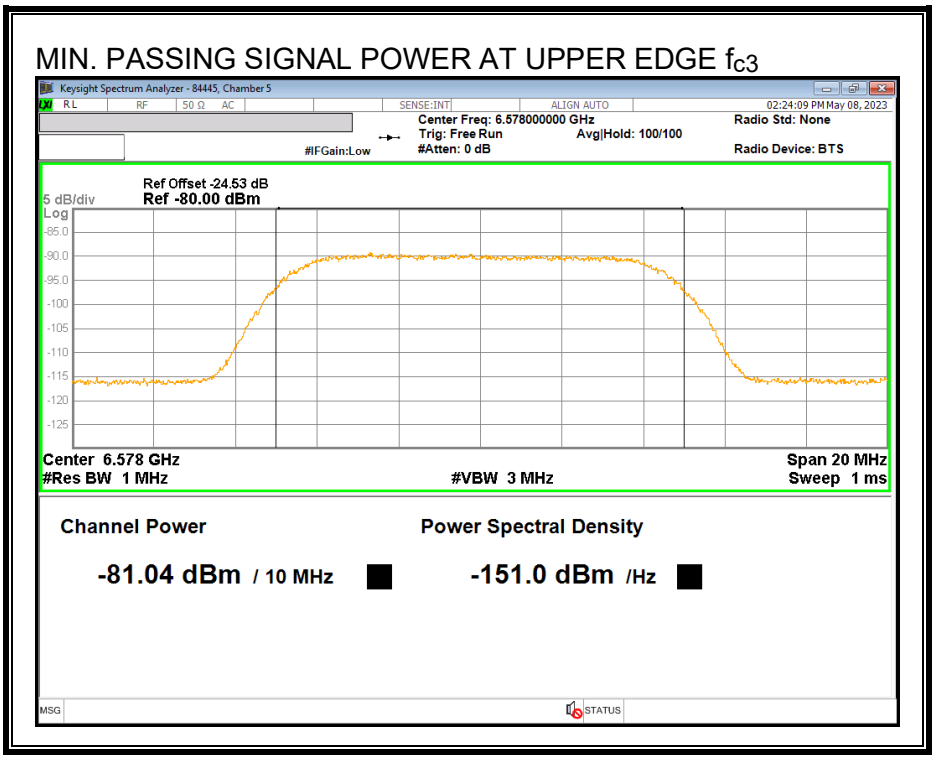
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:

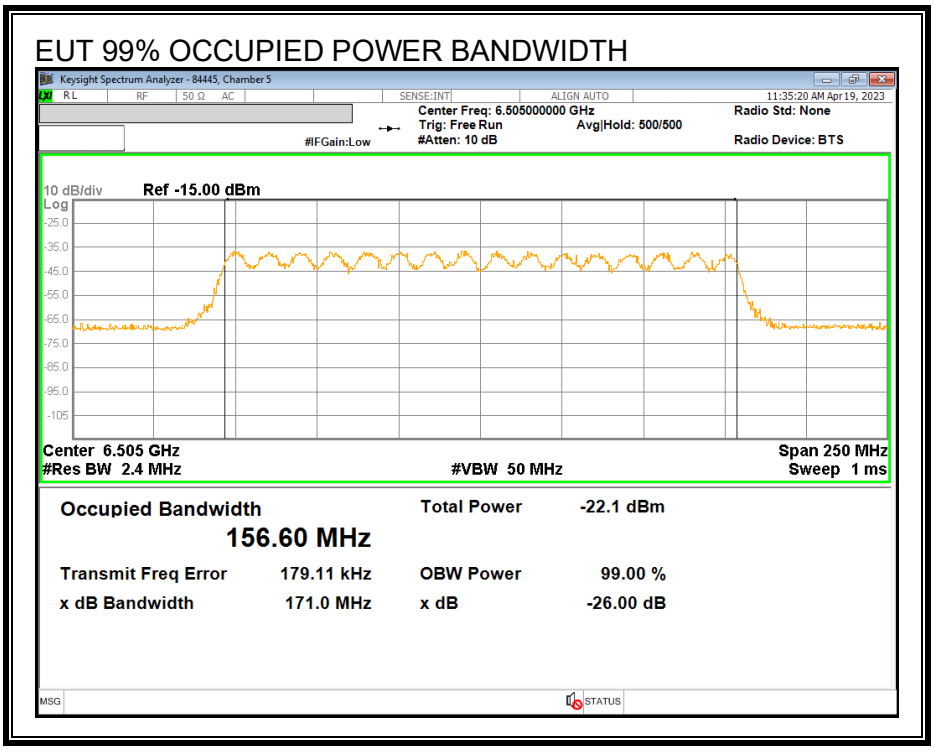


Upper Edge Incumbent Signal f_{c3}:



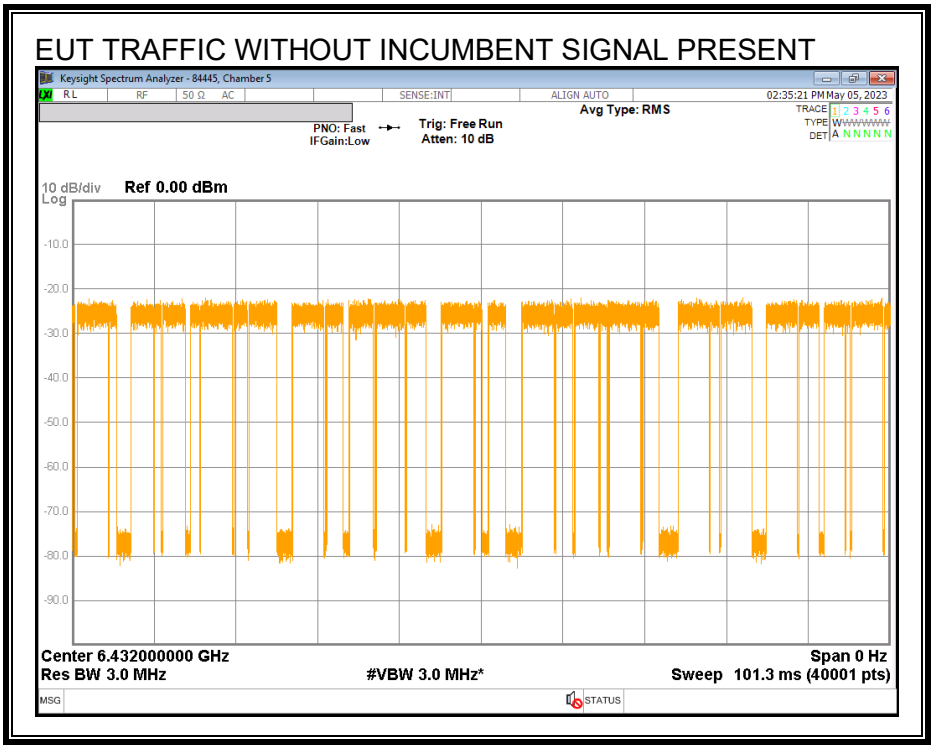
8.9.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

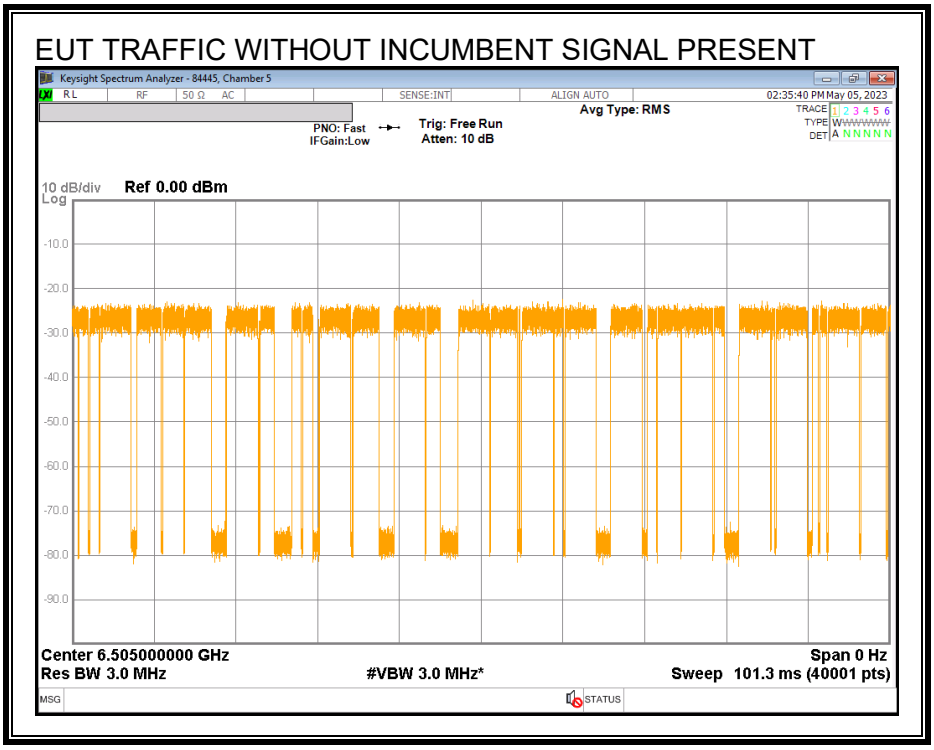


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

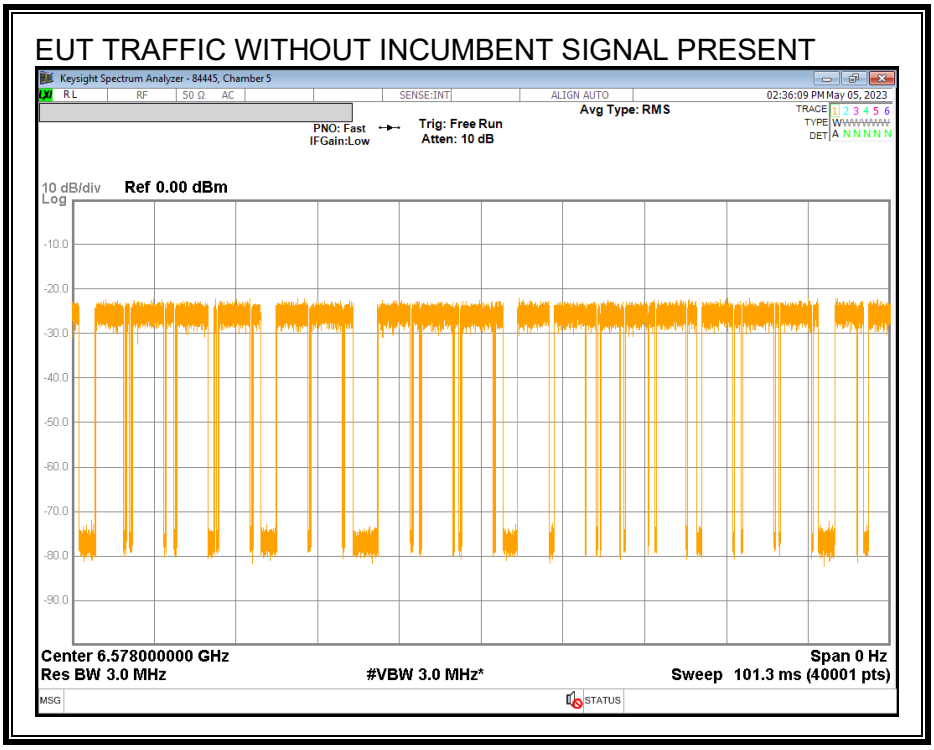
Lower Edge f_{c2}:



Center Frequency f_{C1}:



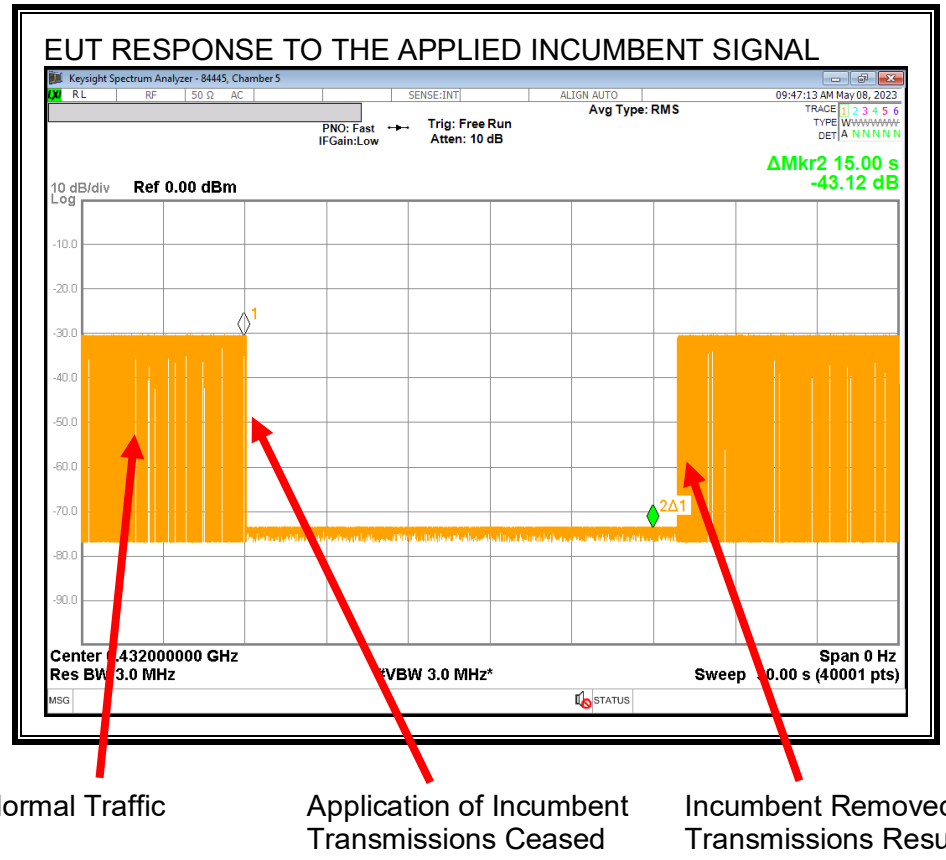
Upper Edge f_{C3}:



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

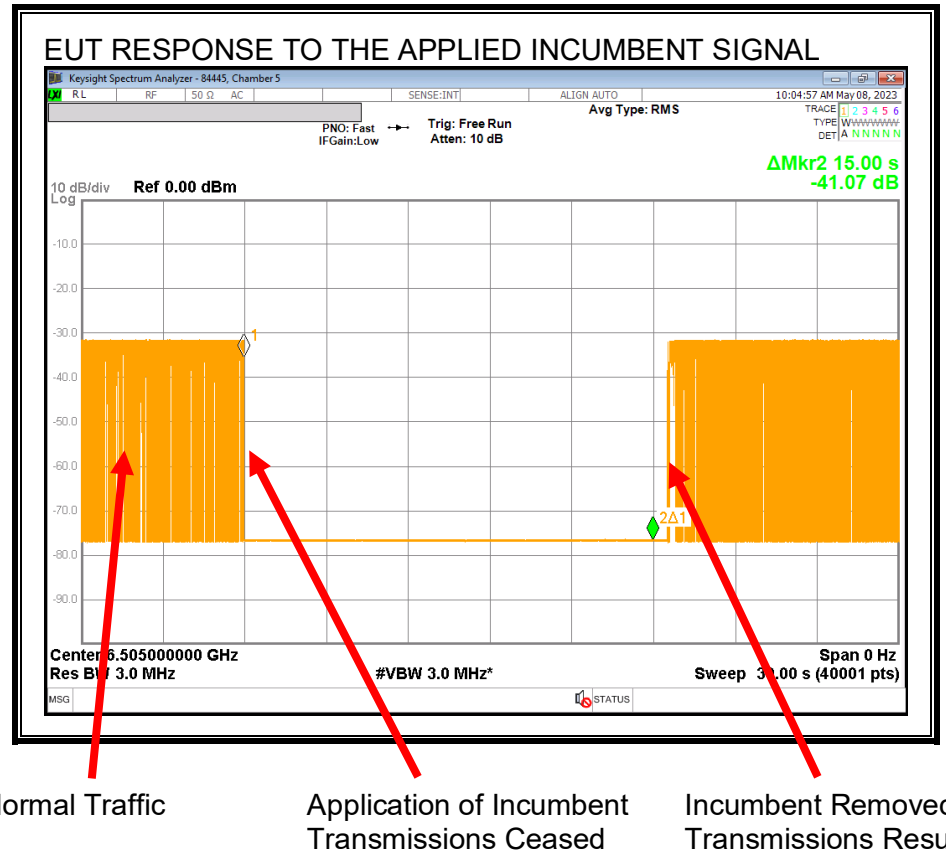
A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 6 seconds after the start of the sweep for a duration of 15 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}:



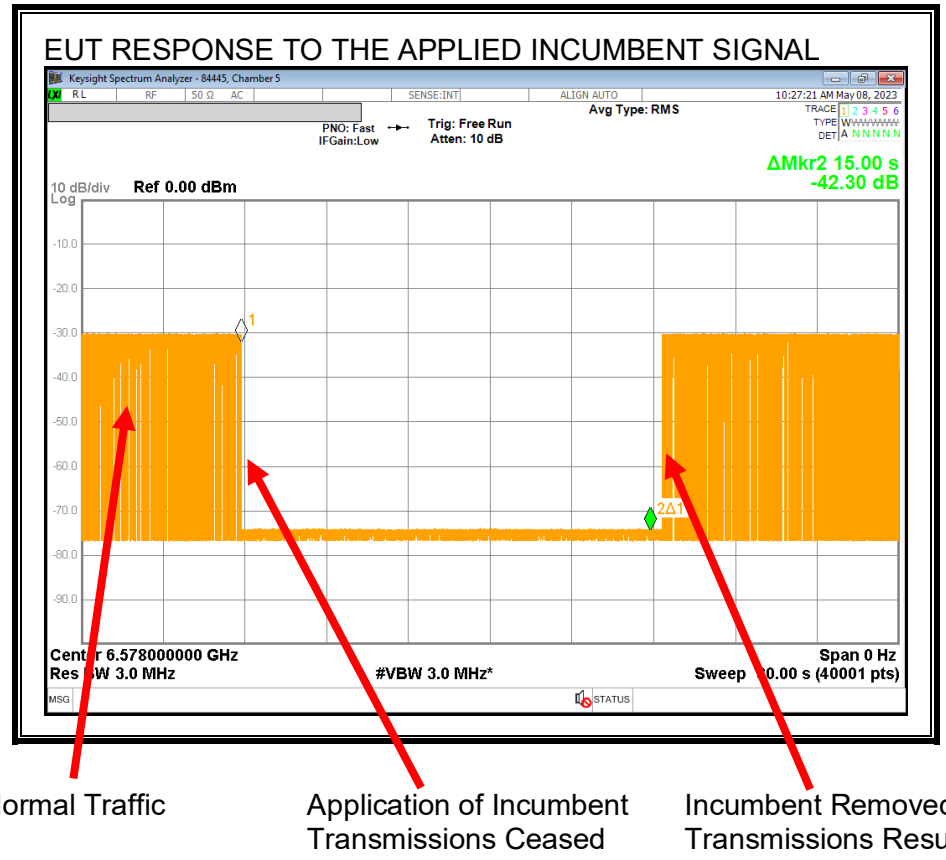
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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)	6505
EUT Nominal Channel Bandwidth (MHz)	160
99% Occupied Bandwidth of the EUT (MHz)	156.6
EUT 99% OBW Lower Edge, F_L (MHz)	6426.70
EUT 99% OBW Upper Edge, F_H (MHz)	6583.30
99% Occupied Bandwidth of the Incumbent Signal (MHz)	9.9913
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)	-4.63
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-66.63
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-82.01
Margin (dBm)	-15.38
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-76.26
Margin (dBm)	-9.63
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-81.04
Margin (dBm)	-14.41
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-08
Tested by: 84445
Test location: Chamber 5

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	**No**	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	**No**
Test Result	**PASS**	**PASS**	**PASS**

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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
-82.01	-4.63	0	-77.38	-62	Ceased
-83.41	-4.63	0	-78.78	-62	Minimal
-86.21	-4.63	0	-81.58	-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
-76.26	-4.63	0	-71.63	-62	Ceased
-76.96	-4.63	0	-72.33	-62	Minimal
-79.38	-4.63	0	-74.75	-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
-81.04	-4.63	0	-76.41	-62	Ceased
-82.16	-4.63	0	-77.53	-62	Minimal
-85.03	-4.63	0	-80.4	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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.

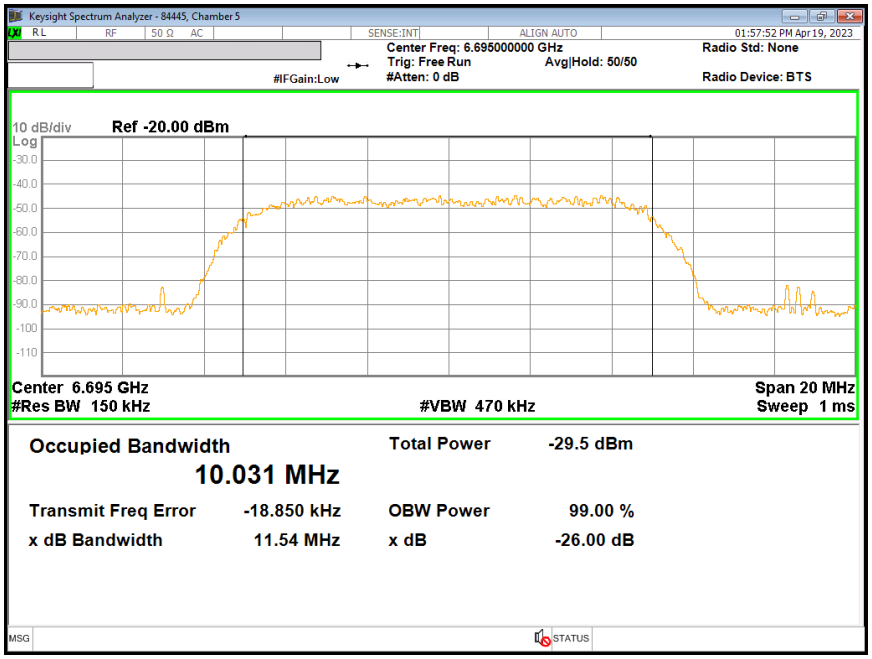
Only the lowest and highest supported channel bandwidths are required to be tested.

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

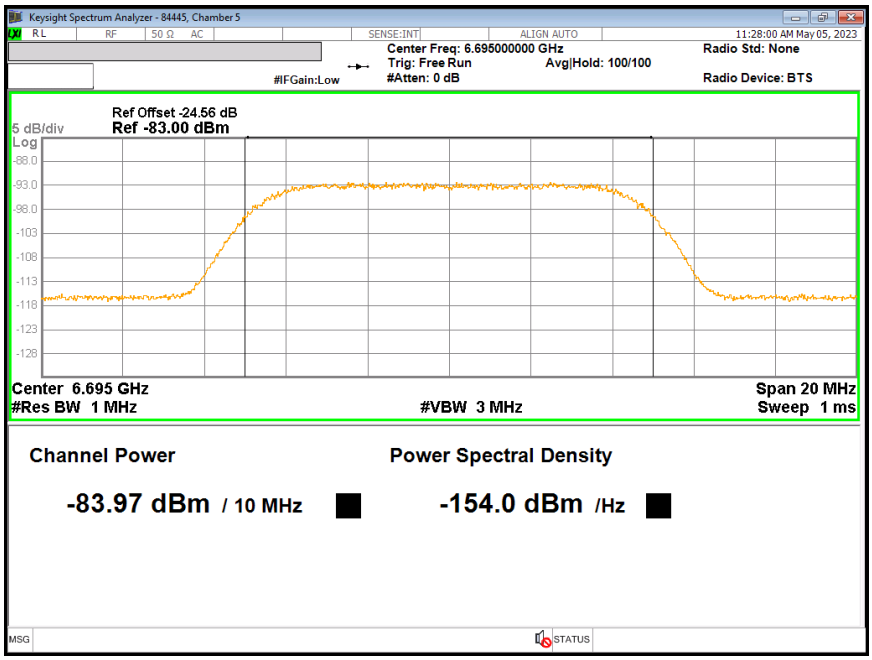
INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY



MINIMUM PASSING INCUMBENT SIGNAL POWER

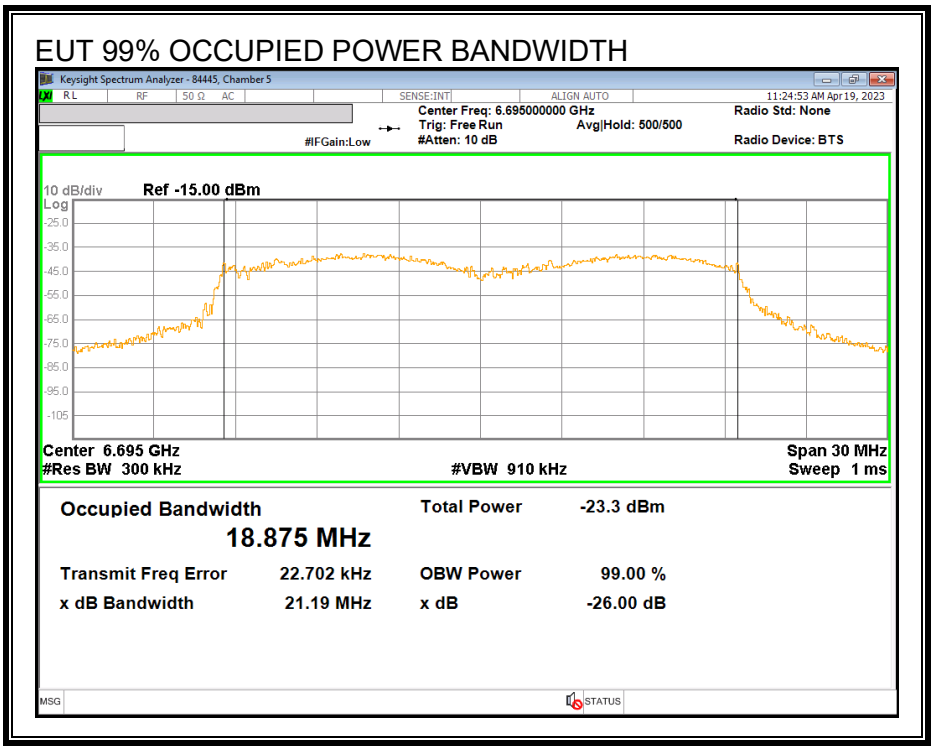
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

MINIMUM PASSING INCUMBENT SIGNAL POWER



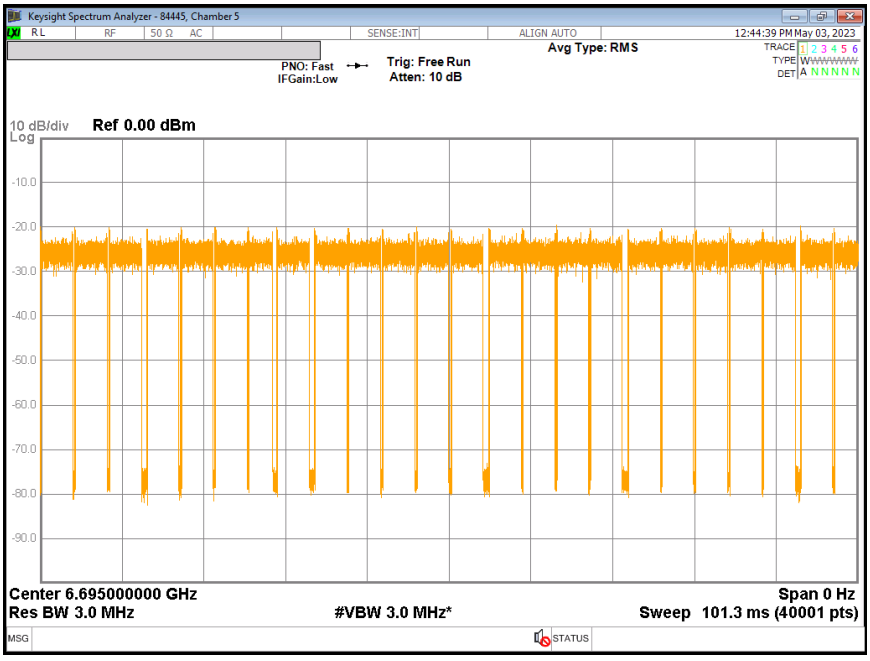
8.11.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



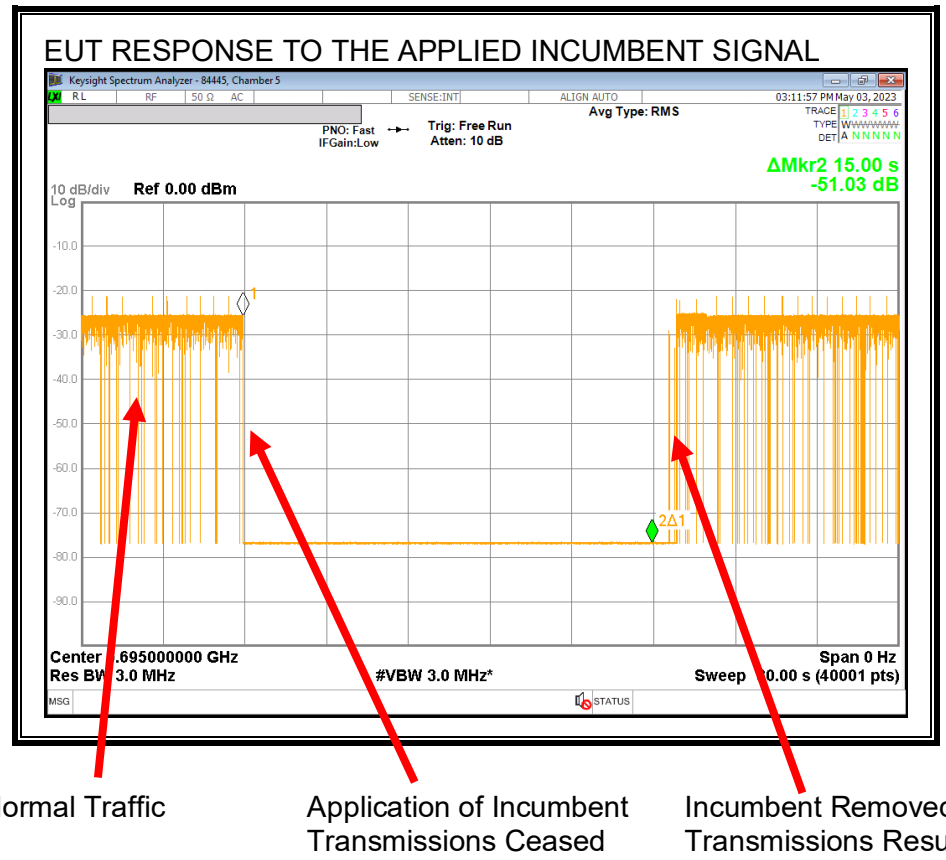
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

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 6 seconds after the start of the sweep for a duration of 15 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.

8.11.4. 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)	18.875
EUT 99% OBW Lower Edge, F_L (MHz)	6685.56
EUT 99% OBW Upper Edge, F_H (MHz)	6704.44
Test Frequency of Incumbent Signal (MHz)	**6695**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	-4.63
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-66.63
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-83.97
Margin (dBm)	-17.34
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-03
Tested by: 84445
Test location: Chamber 5

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: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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
-83.97	-4.63	0	-79.34	-62	Ceased
-84.89	-4.63	0	-80.26	-62	Minimal
-88.98	-4.63	0	-84.35	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

8.12. 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.

8.13. U-NII 7 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.13.1. TEST CHANNEL

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

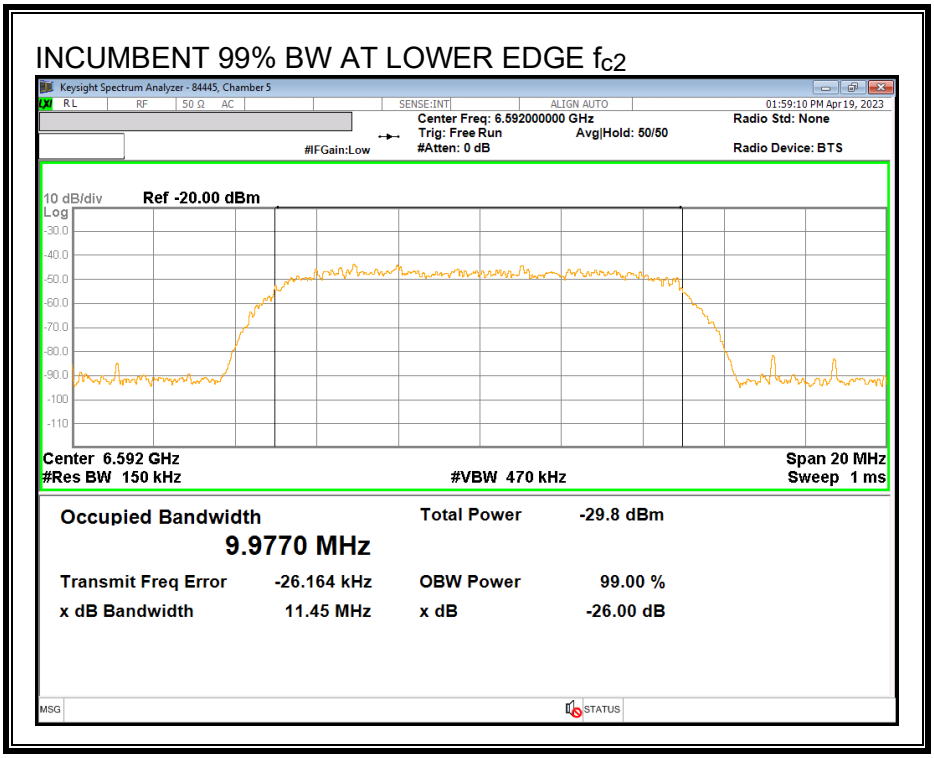
Only the lowest and highest supported channel bandwidths are required to be tested.

8.13.2. INCUMBENT SIGNAL PLOTS

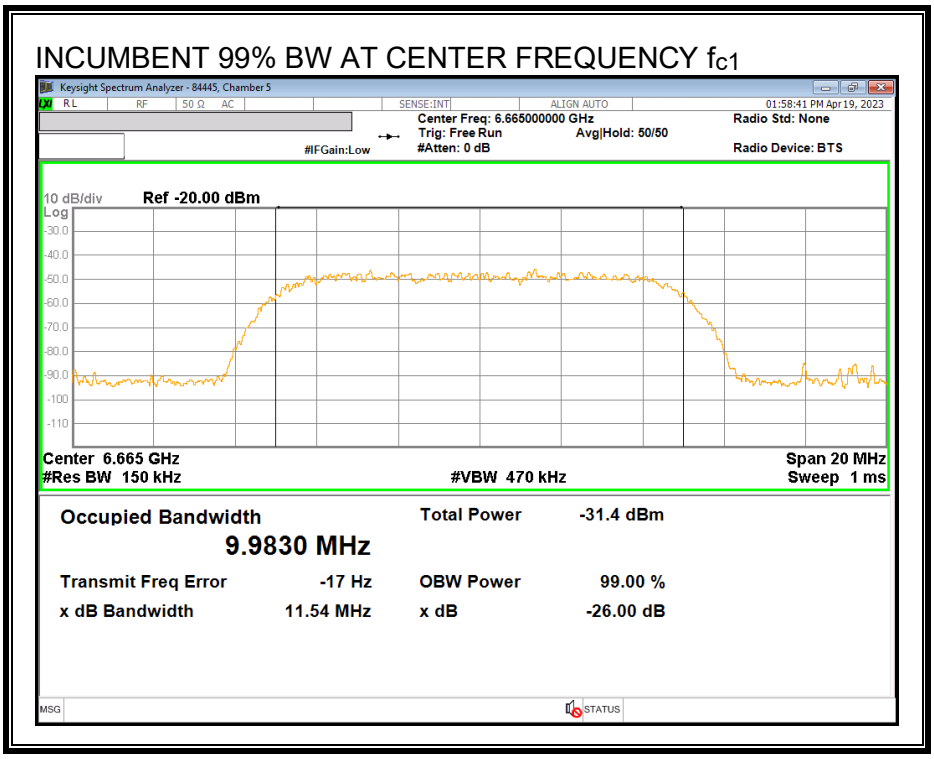
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

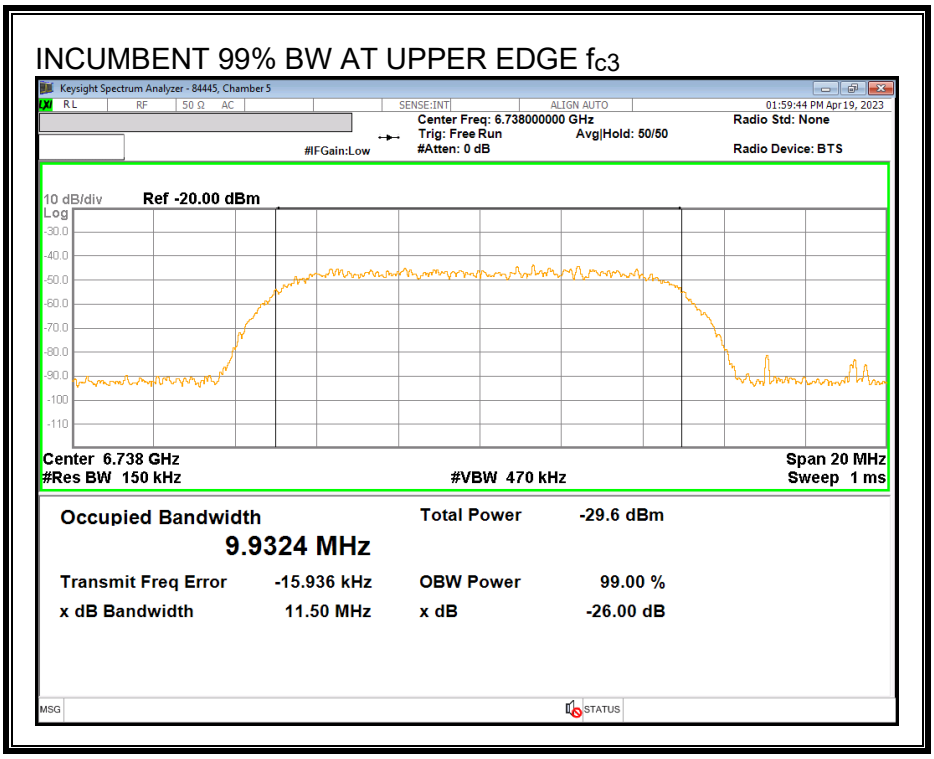
Lower Edge Incumbent Signal f_{c2}:



Center Frequency Incumbent Signal f_{c1}:



Upper Edge Incumbent Signal f_{c3}:

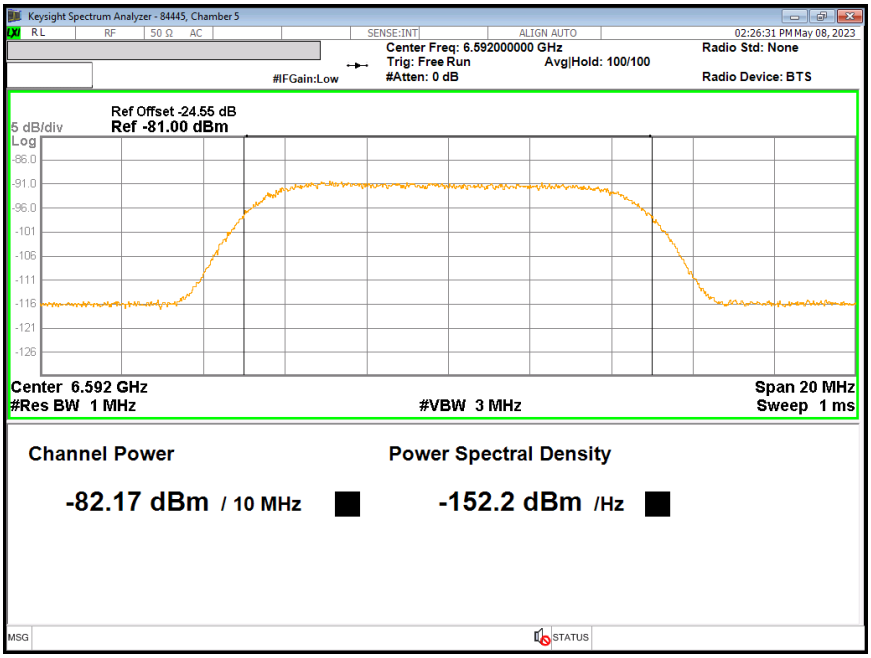


MINIMUM PASSING INCUMBENT SIGNAL POWER

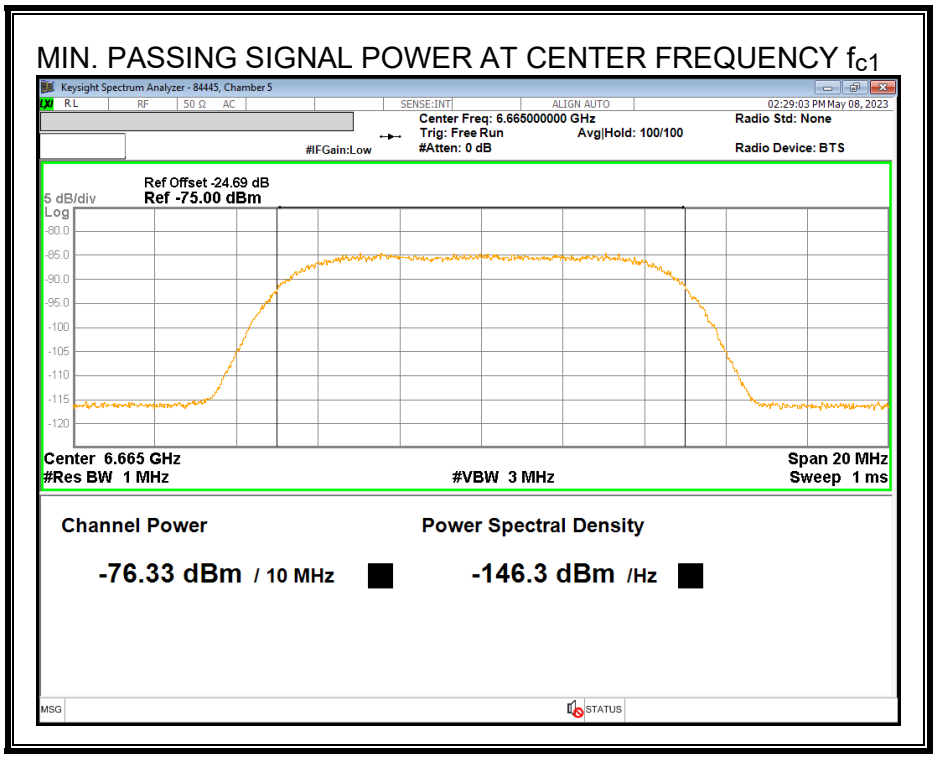
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

Lower Edge Incumbent Signal f_{c2}:

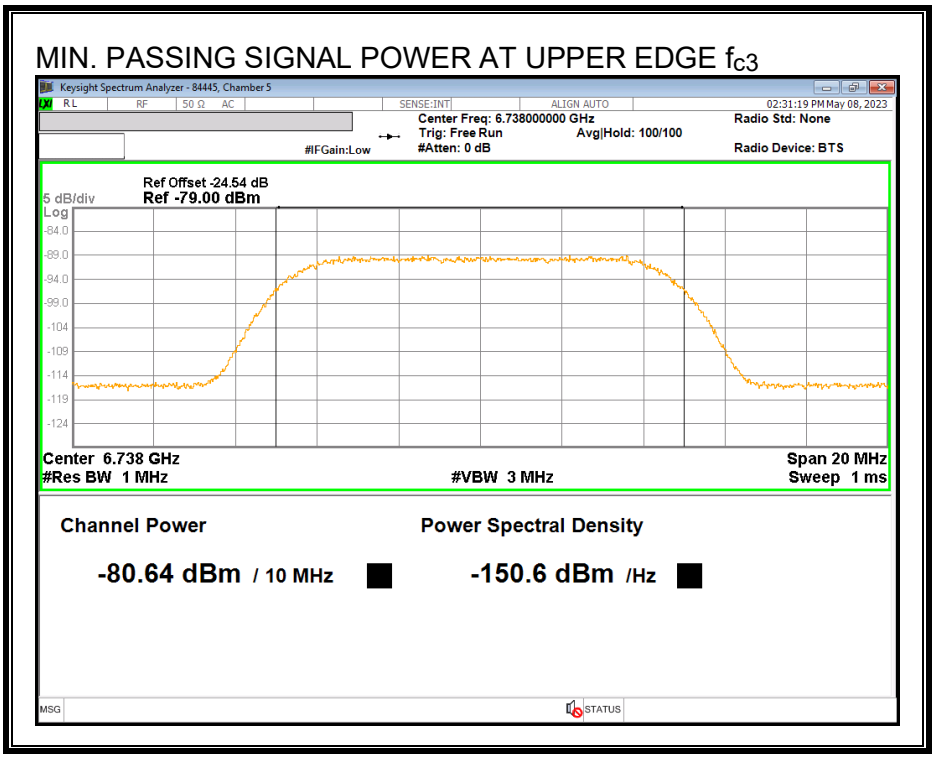
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{c1}:



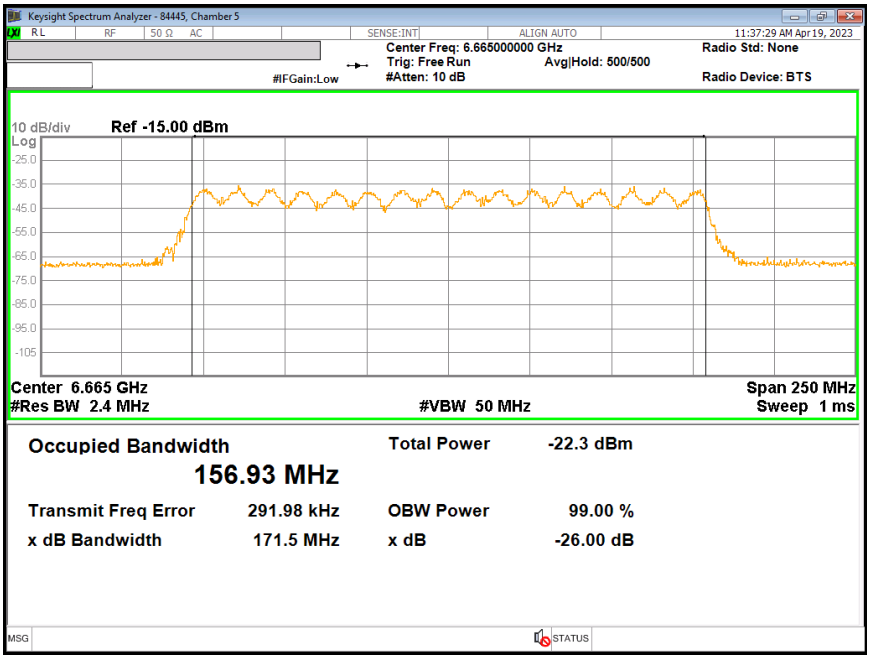
Upper Edge Incumbent Signal f_{c3}:



8.13.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

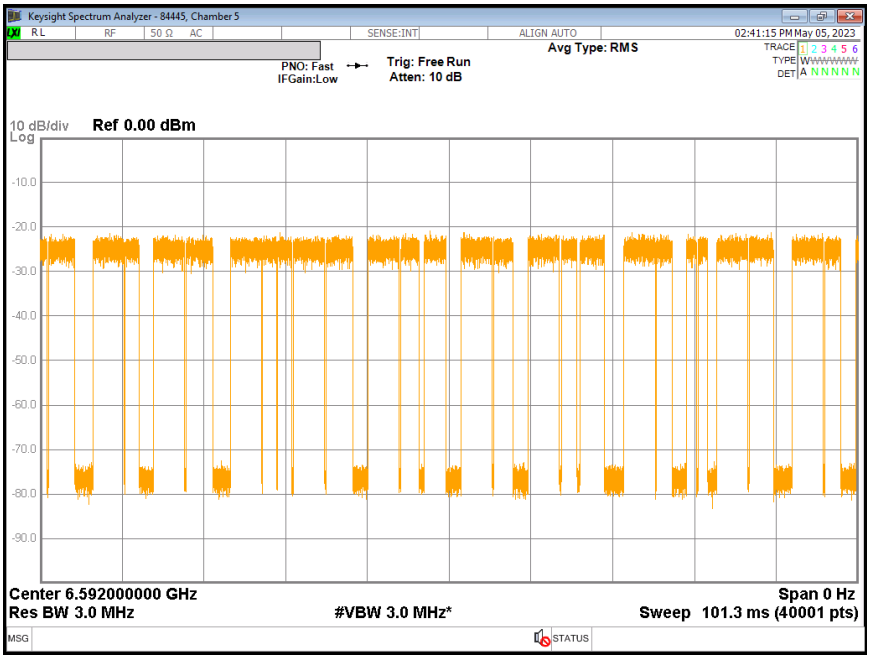
EUT 99% OCCUPIED POWER BANDWIDTH



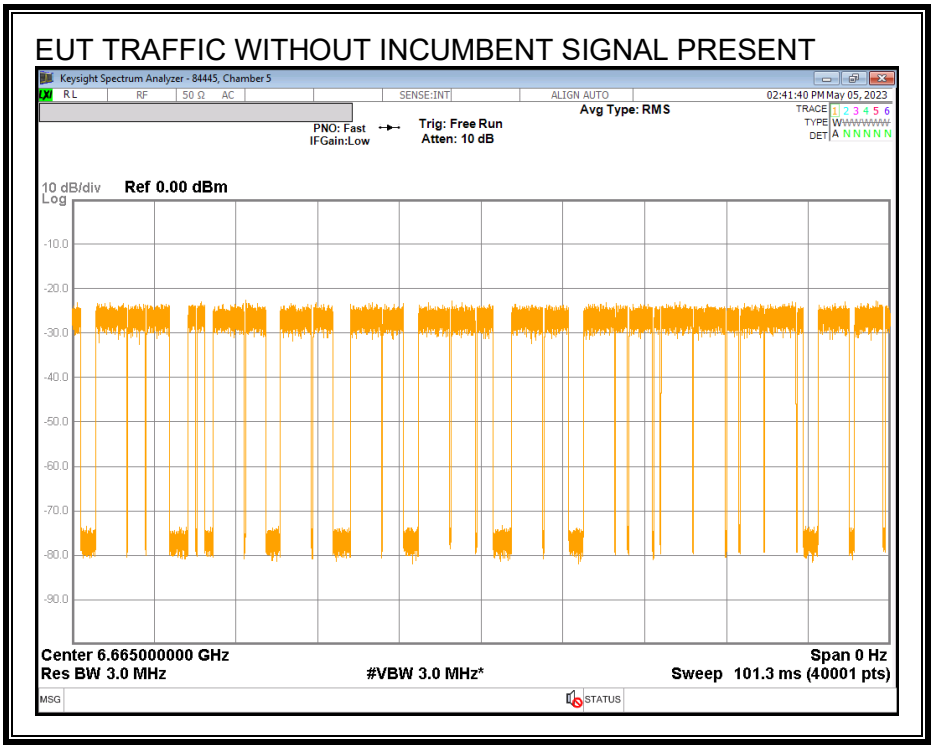
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge f_{c2}:

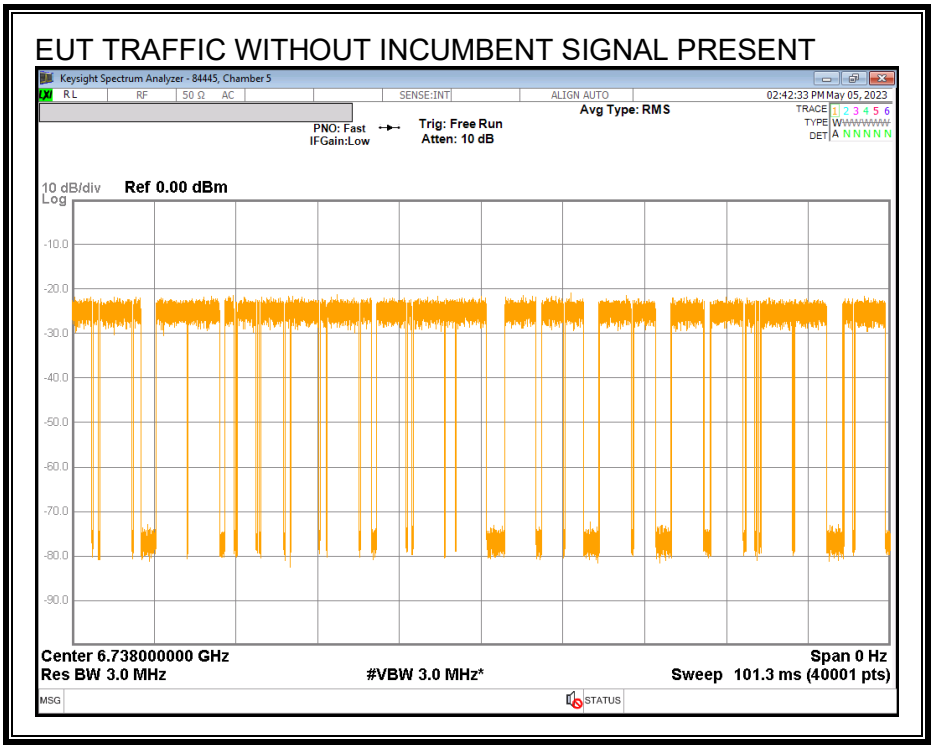
EUT TRAFFIC WITHOUT INCUMBENT SIGNAL PRESENT



Center Frequency f_{C1}:



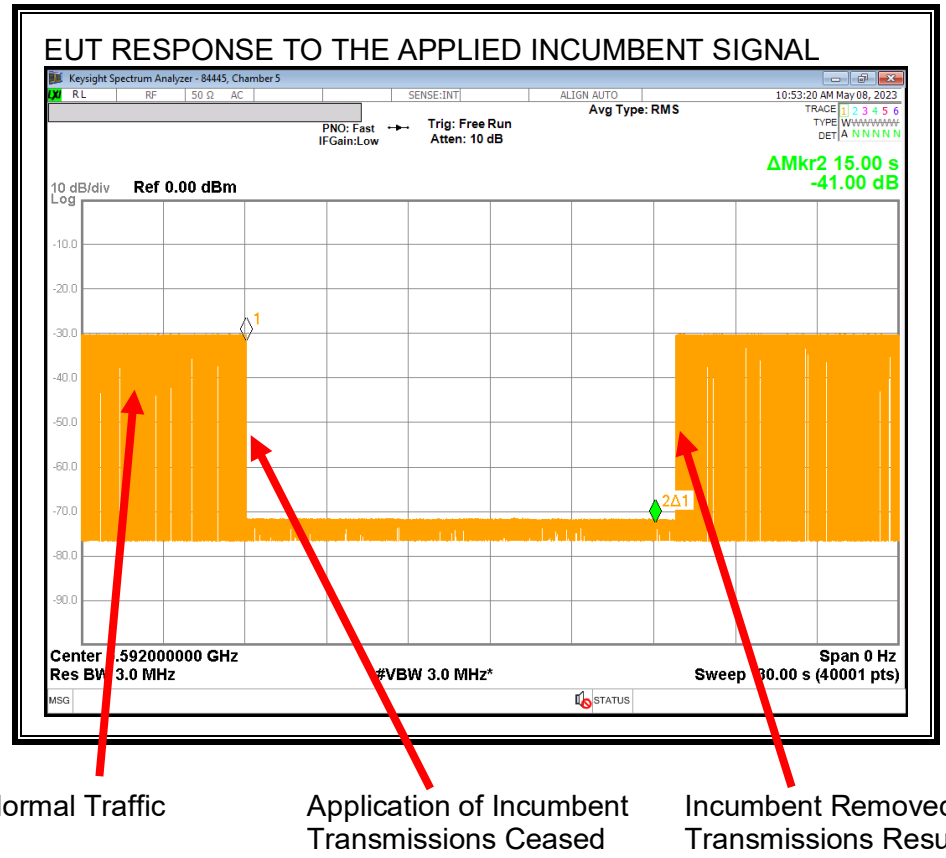
Upper Edge f_{C3}:



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

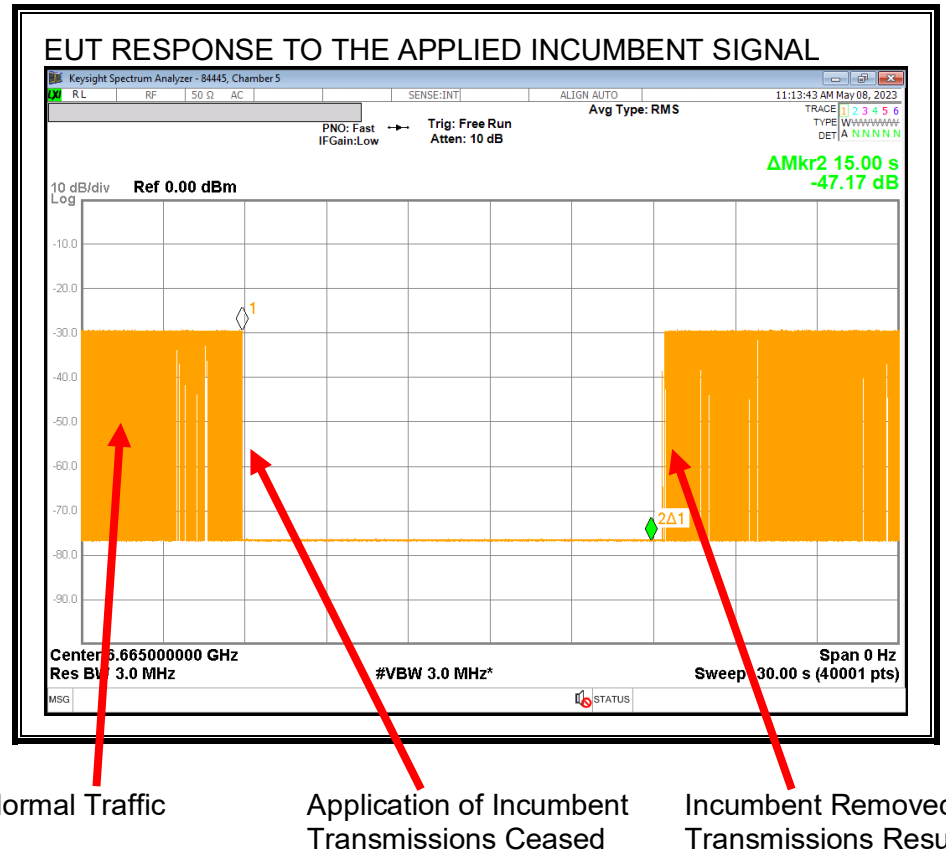
A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 6 seconds after the start of the sweep for a duration of 15 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}:



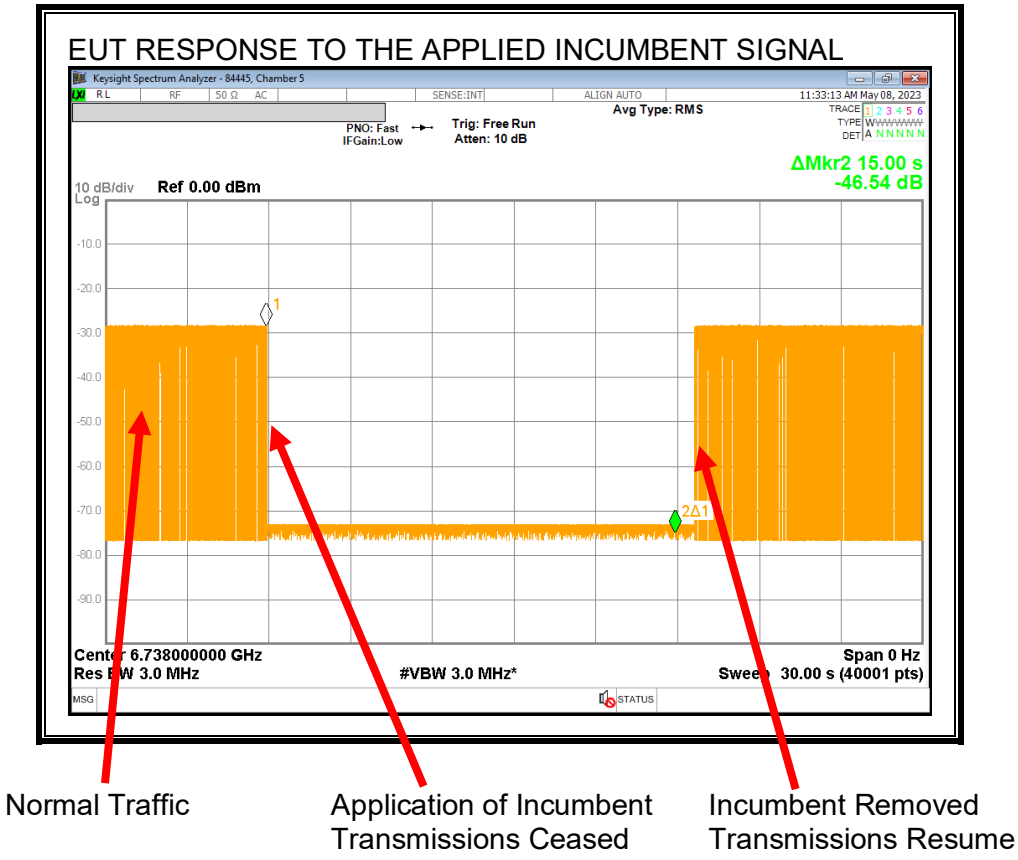
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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)	6665
EUT Nominal Channel Bandwidth (MHz)	160
99% Occupied Bandwidth of the EUT (MHz)	156.93
EUT 99% OBW Lower Edge, F_L (MHz)	6586.54
EUT 99% OBW Upper Edge, F_H (MHz)	6743.47
99% Occupied Bandwidth of the Incumbent Signal (MHz)	9.983
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)	-4.63
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-66.63
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-82.17
Margin (dBm)	-15.54
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-76.33
Margin (dBm)	-9.70
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-80.64
Margin (dBm)	-14.01
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-08
Tested by: 84445
Test location: Chamber 5

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	**No**	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	**No**
8	Yes	**No**	Yes
9	Yes	Yes	Yes
10	Yes	Yes	Yes
Test Result	**PASS**	**PASS**	**PASS**

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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
-82.17	-4.63	0	-77.54	-62	Ceased
-83.43	-4.63	0	-78.8	-62	Minimal
-87.10	-4.63	0	-82.47	-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
-76.33	-4.63	0	-71.7	-62	Ceased
-77.07	-4.63	0	-72.44	-62	Minimal
-79.66	-4.63	0	-75.03	-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
-80.64	-4.63	0	-76.01	-62	Ceased
-82.31	-4.63	0	-77.68	-62	Minimal
-85.08	-4.63	0	-80.45	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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.

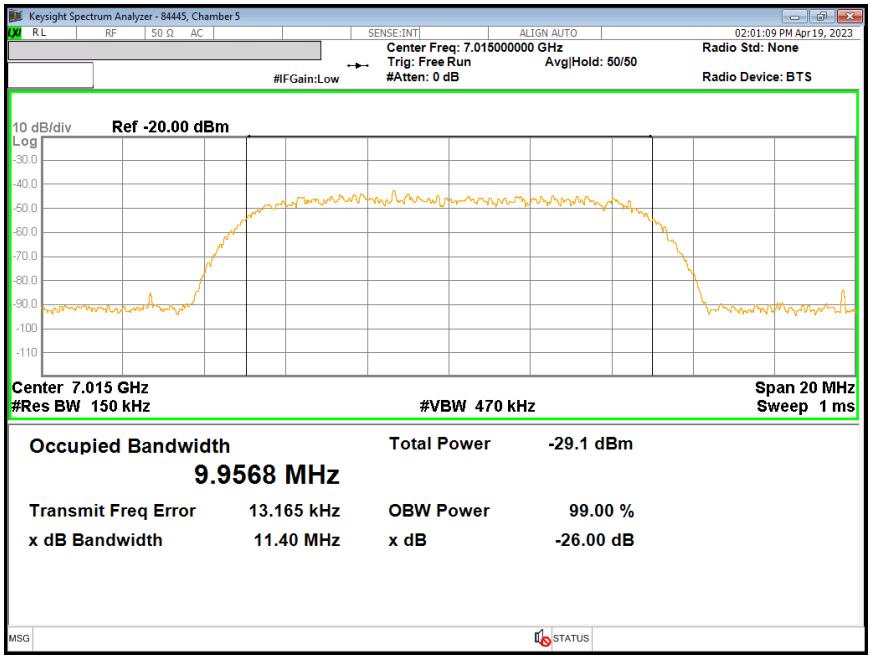
Only the lowest and highest supported channel bandwidths are required to be tested.

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

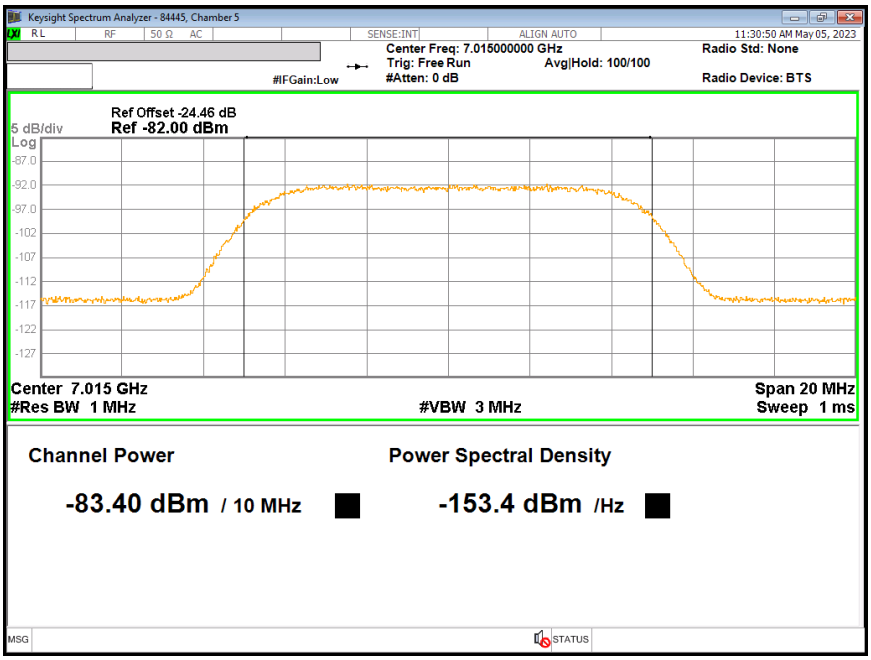
INCUMBENT 99% BW AT CHANNEL CENTER FREQUENCY



MINIMUM PASSING INCUMBENT SIGNAL POWER

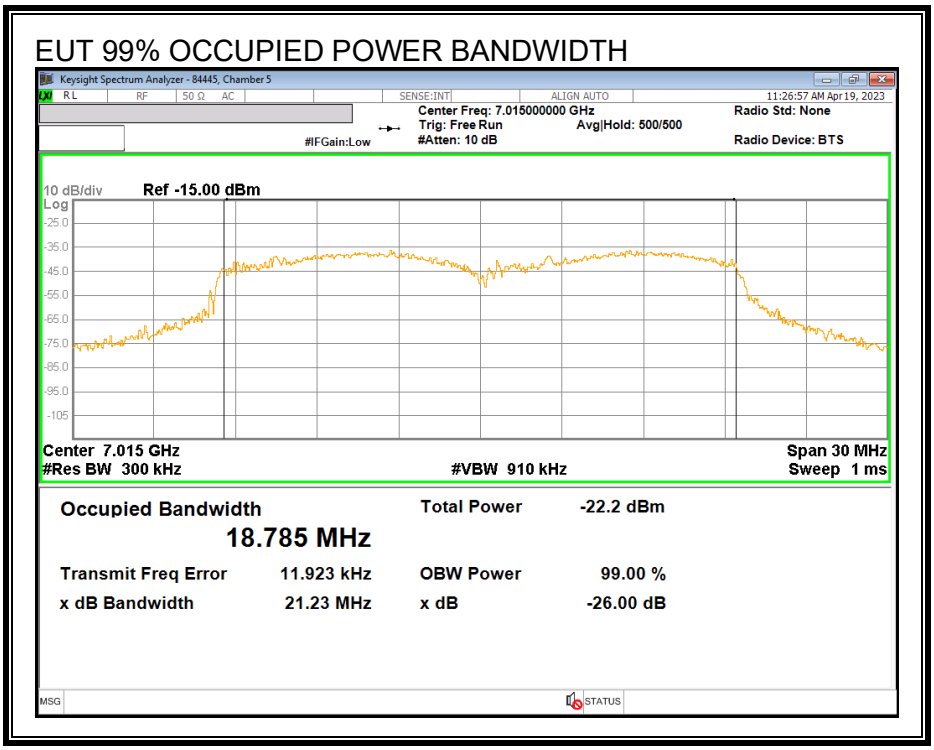
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

MINIMUM PASSING INCUMBENT SIGNAL POWER



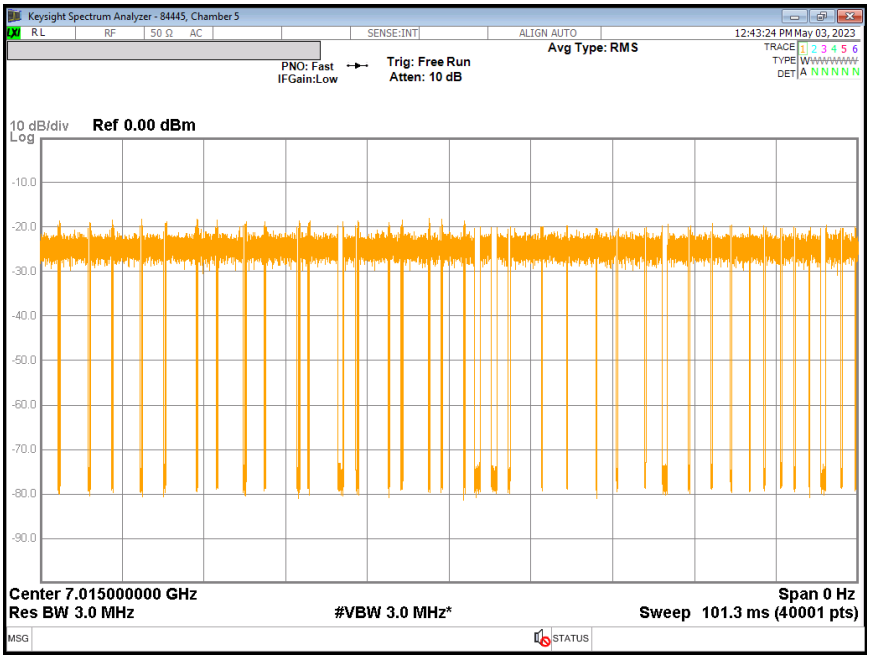
8.15.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



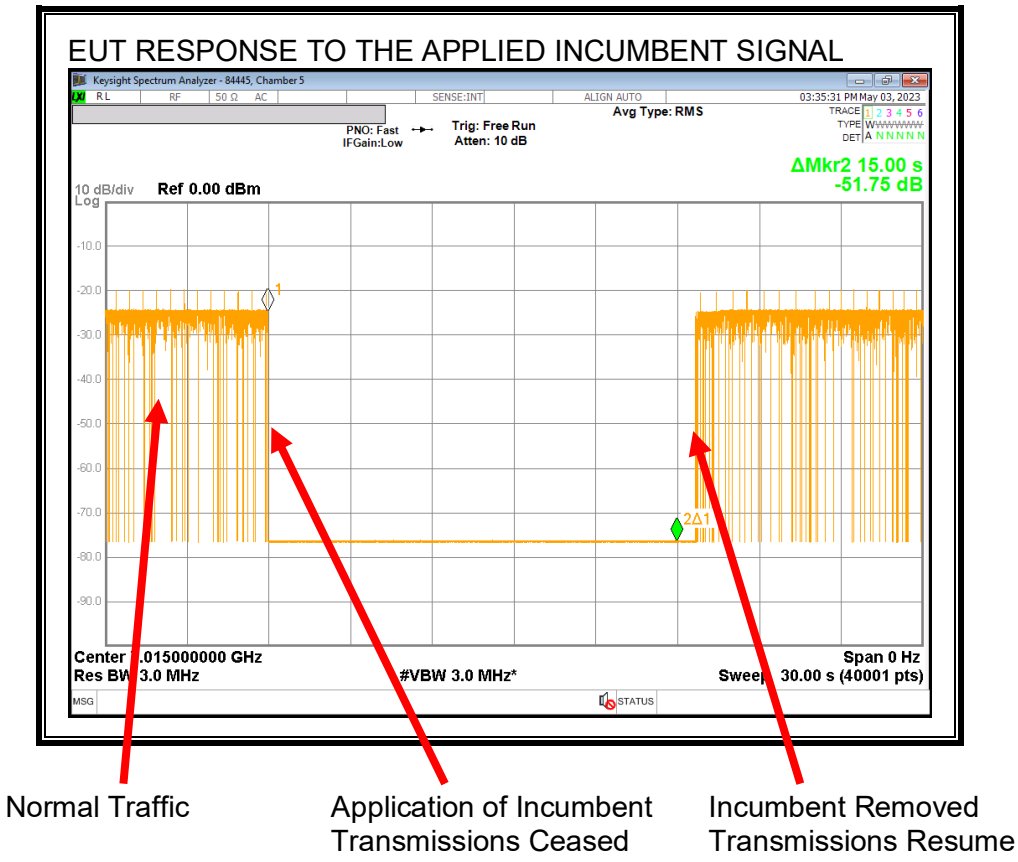
TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

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 6 seconds after the start of the sweep for a duration of 15 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)	18.785
EUT 99% OBW Lower Edge, F_L (MHz)	7005.61
EUT 99% OBW Upper Edge, F_H (MHz)	7024.39
Test Frequency of Incumbent Signal (MHz)	**7015**
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	-62
Minimum Antenna Gain (dBi)	-3.98
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-65.98
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	-83.40
Margin (dBm)	-17.42
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-03
Tested by: 84445
Test location: Chamber 5

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	No
Test Result	PASS

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

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
-83.40	-3.98	0	-79.42	-62	Ceased
-85.51	-3.98	0	-81.53	-62	Minimal
-89.96	-3.98	0	-85.98	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-03

Tested by: 84445

Test location: Chamber 5

8.16. 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.

8.17. U-NII 8 BAND TEST CONDITION 4 RESULTS

TEST CONDITION 4 CRITERIA

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

8.17.1. TEST CHANNEL

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

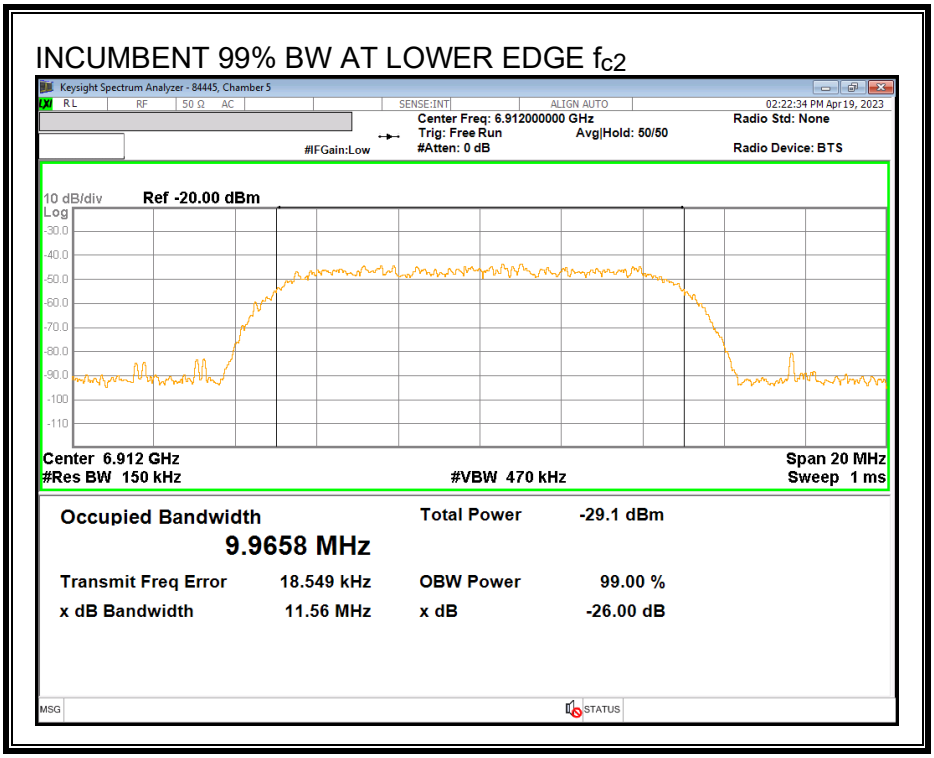
Only the lowest and highest supported channel bandwidths are required to be tested.

8.17.2. INCUMBENT SIGNAL PLOTS

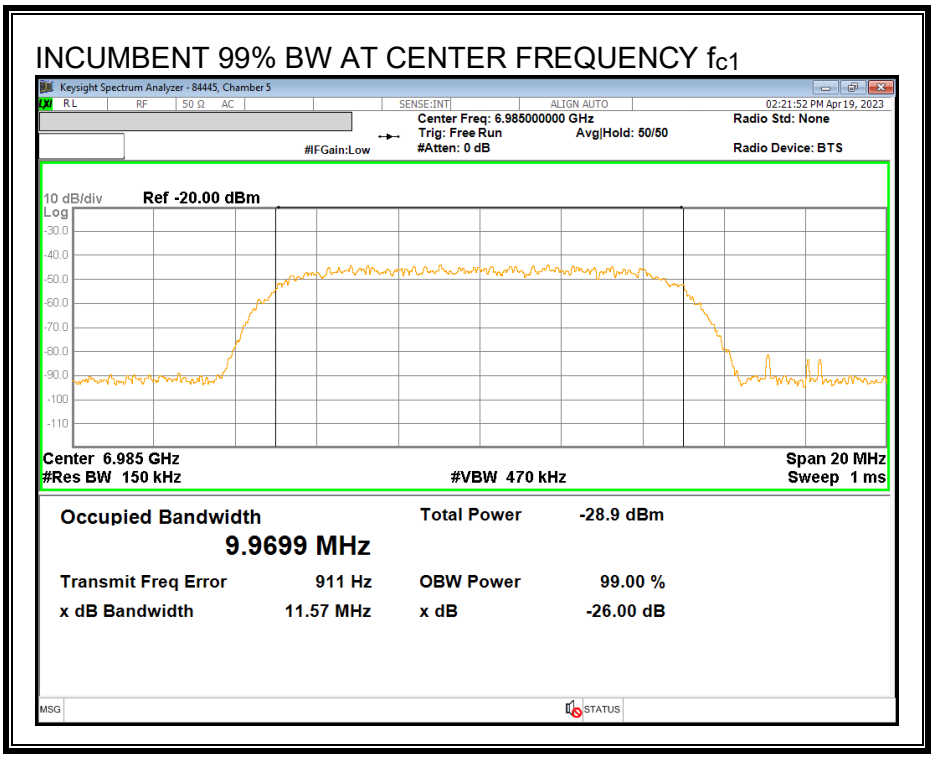
All tests were performed with the Incumbent Signal frequency set to the test channel center frequency and a nominal 99% Occupied Power Bandwidth of 10 MHz.

INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

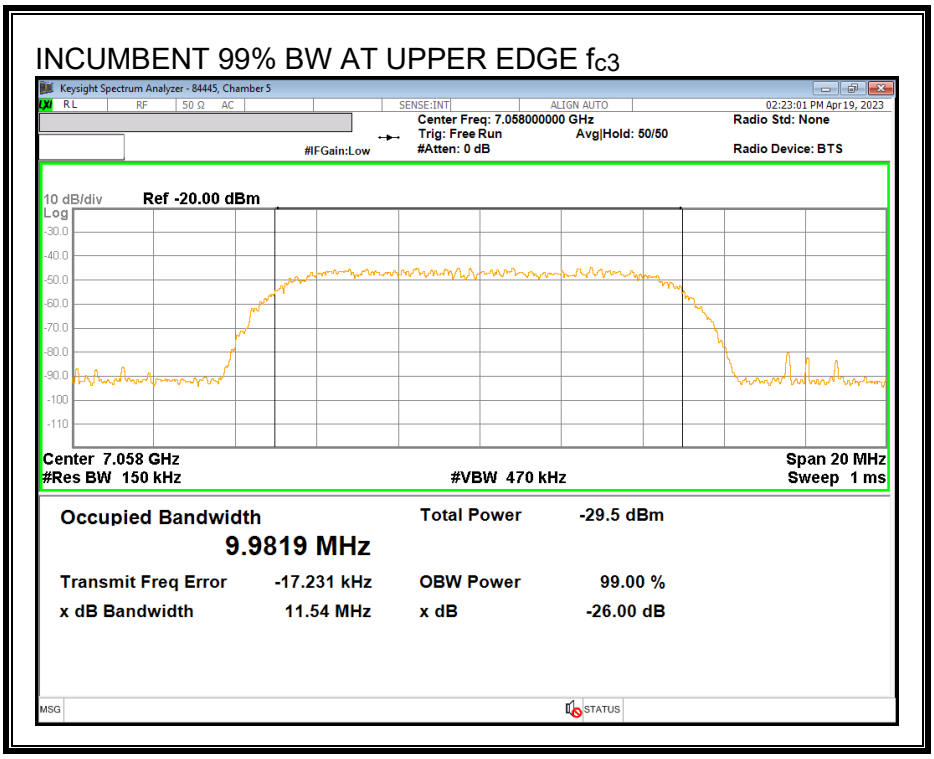
Lower Edge Incumbent Signal f_{c2}:



Center Frequency Incumbent Signal f_{c1}:



Upper Edge Incumbent Signal f_{c3}:

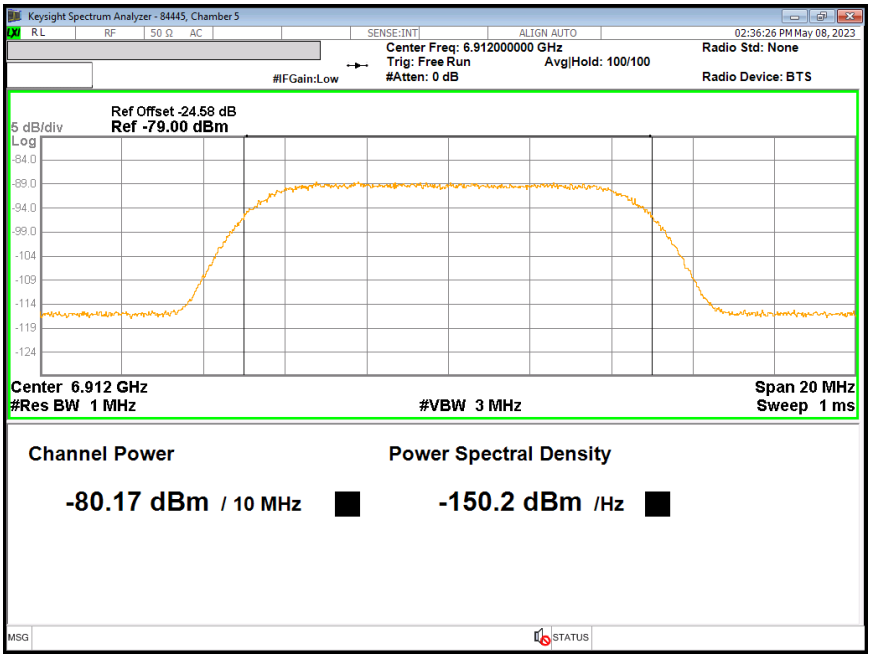


MINIMUM PASSING INCUMBENT SIGNAL POWER

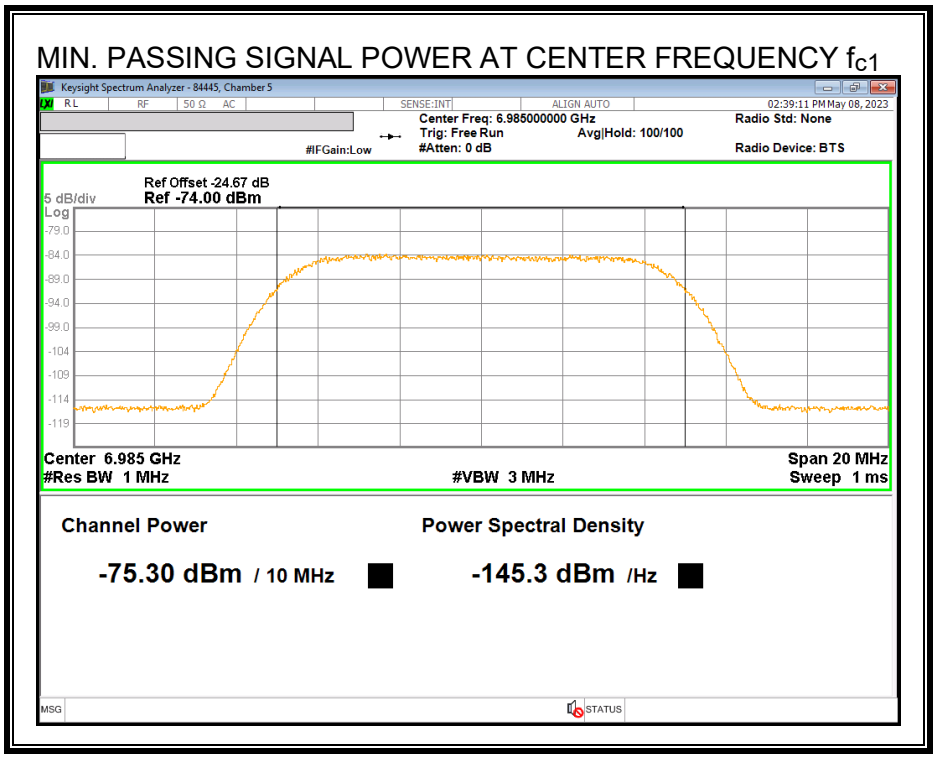
The signal power was measured at the output of the incumbent signal generator, and a correction was applied for the known path loss of the system.

Lower Edge Incumbent Signal f_{c2}:

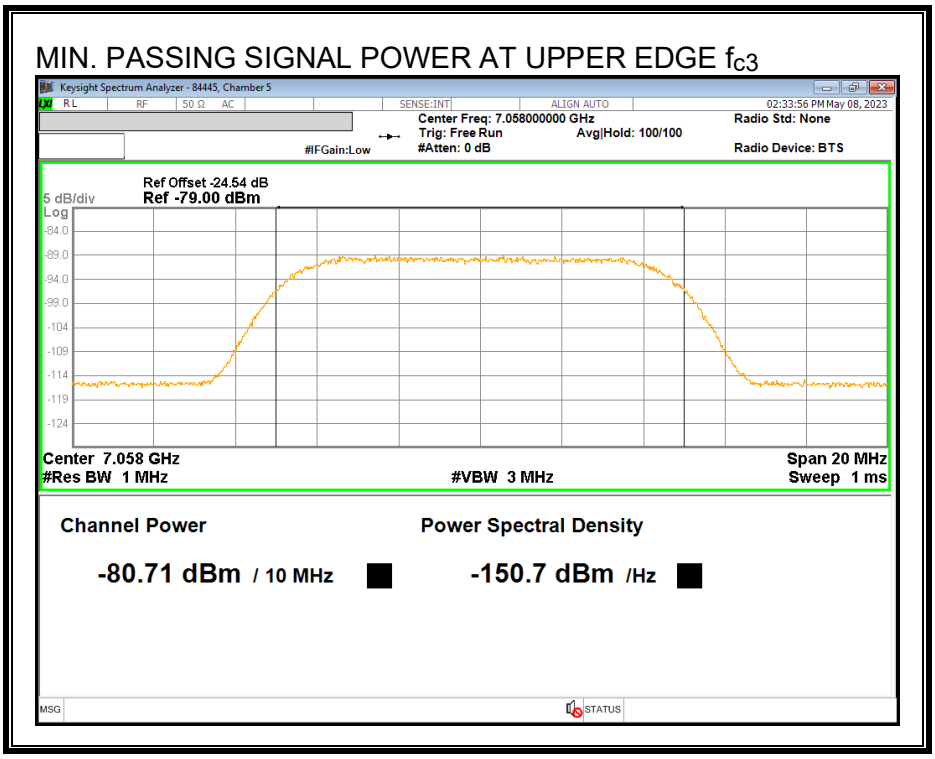
MIN. PASSING SIGNAL POWER AT LOWER EDGE f_{c2}



Center Frequency Incumbent Signal f_{C1}:



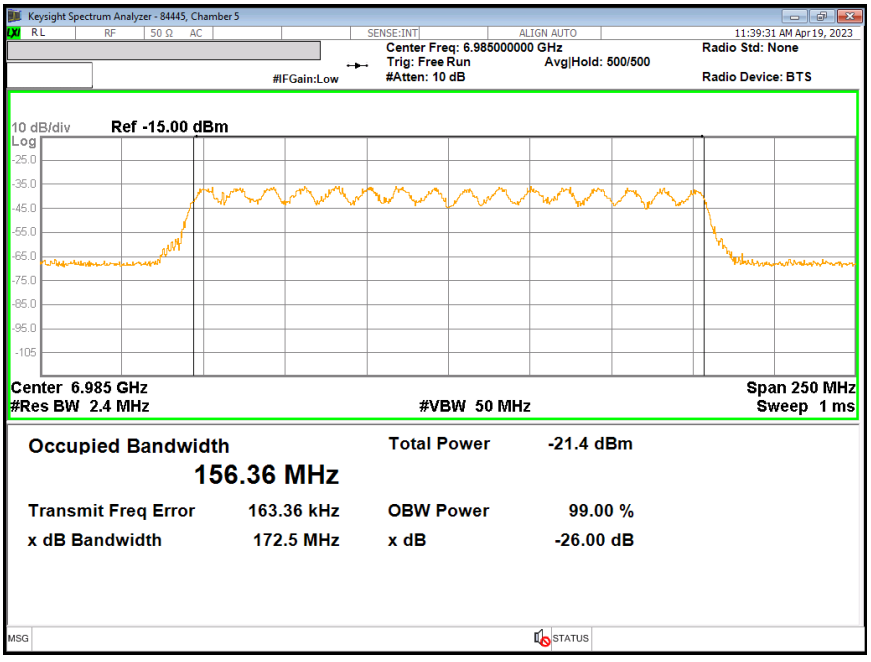
Upper Edge Incumbent Signal f_{C3}:



8.17.3. EUT TRANSMISSION PLOTS

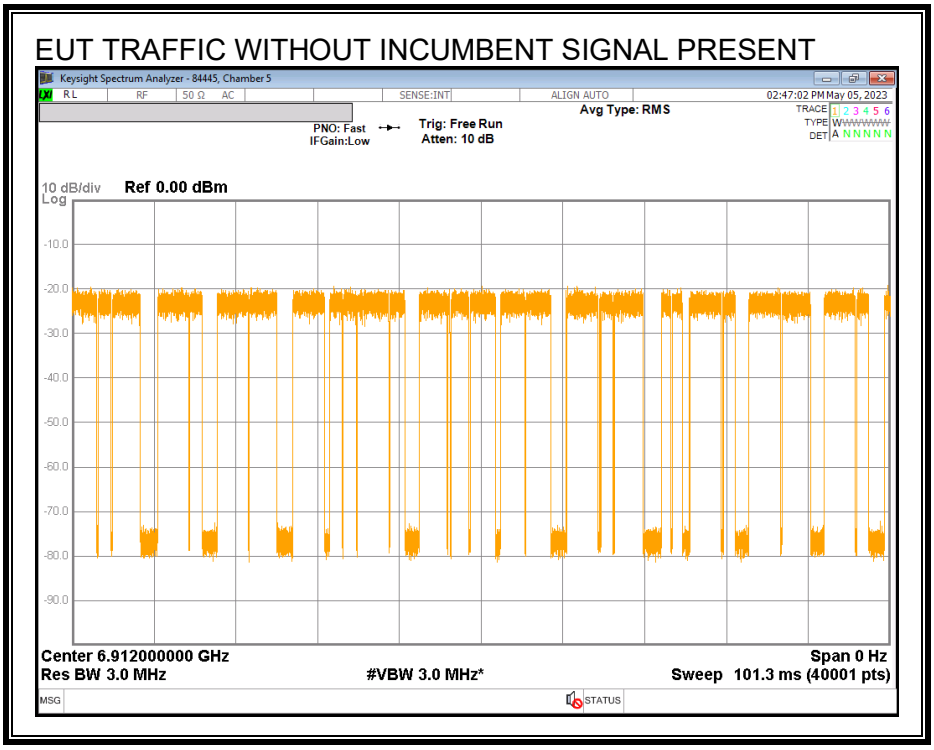
EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH

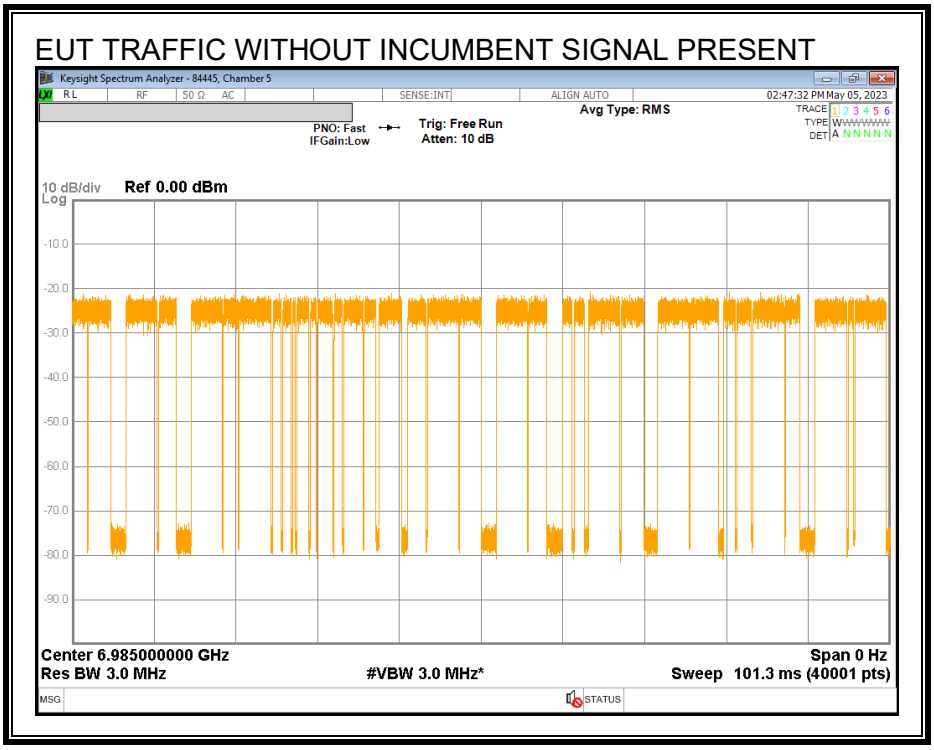


TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

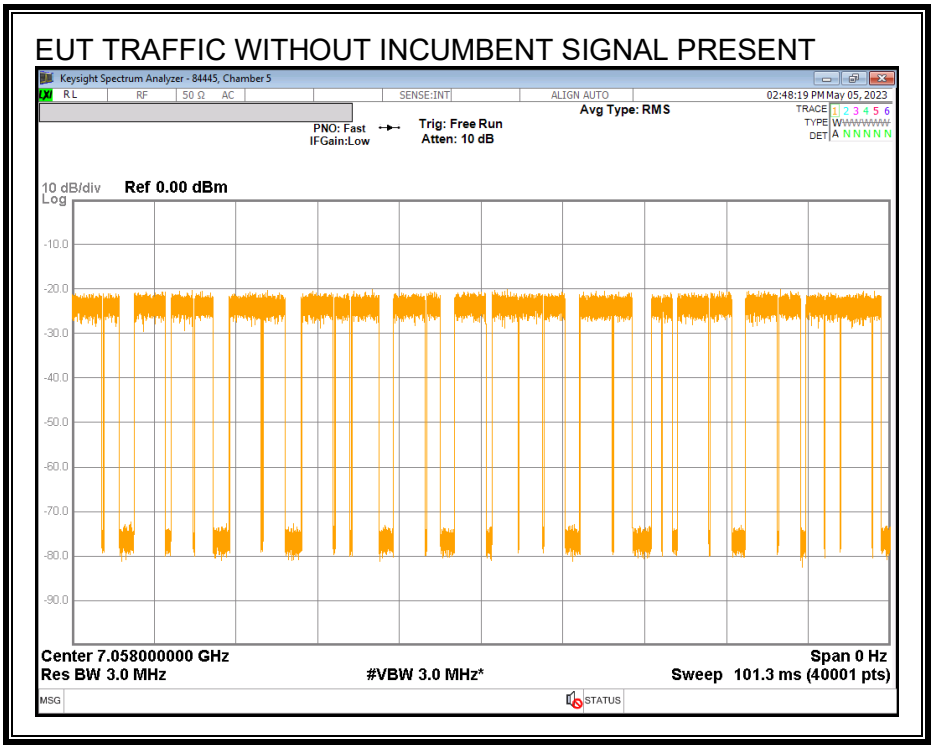
Lower Edge f_{c2}:



Center Frequency f_{C1}:



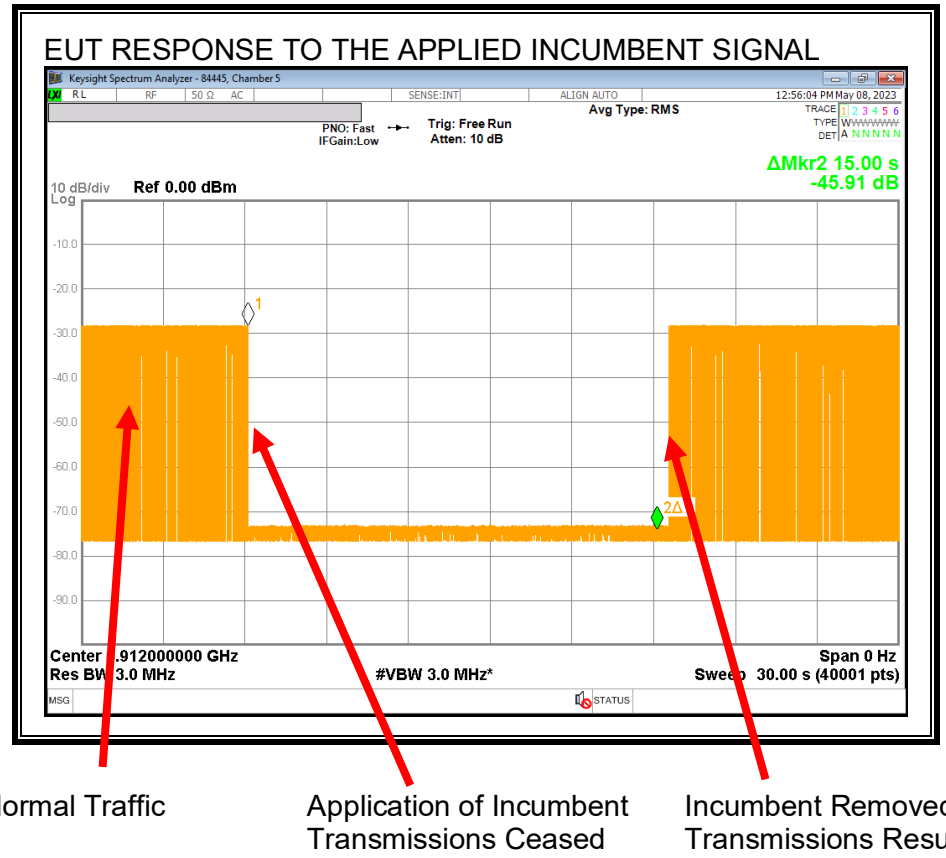
Upper Edge f_{C3}:



EUT RESPONSE TO THE APPLIED INCUMBENT SIGNAL

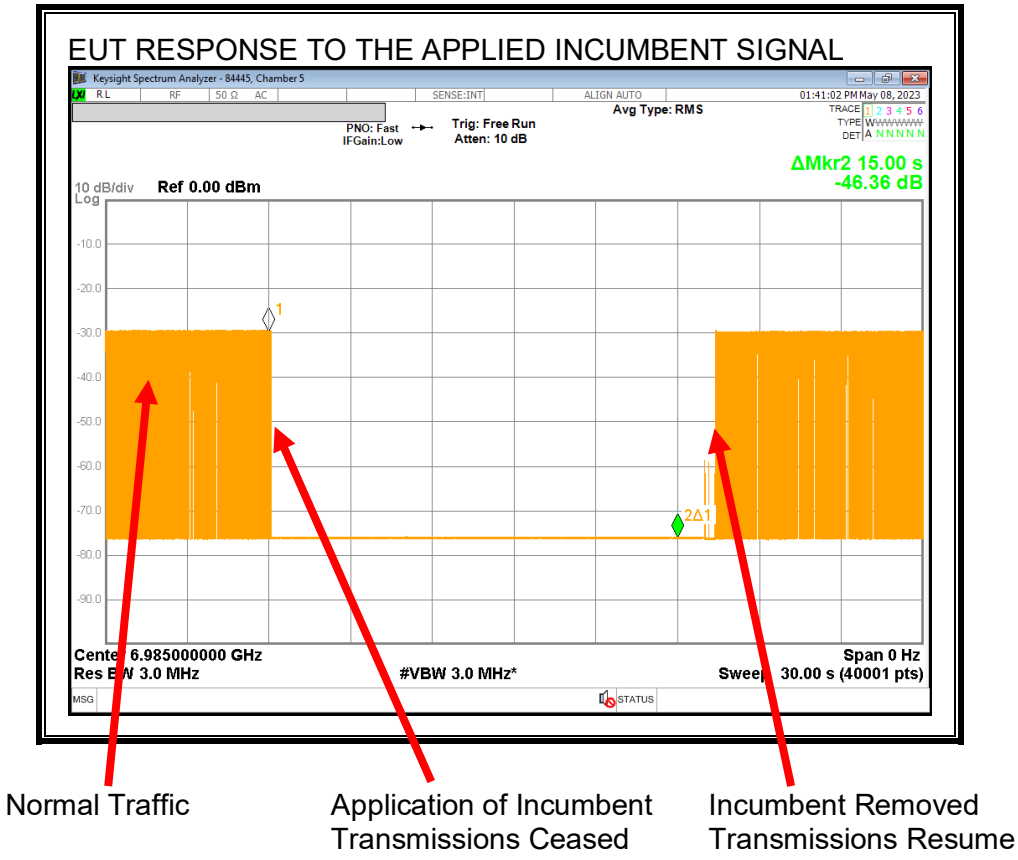
A link between the EUT and the Companion Device was established on the test channel. Traffic flowing from the EUT to the Companion Device was then initiated. A sweep was started and the incumbent signal was continuously applied at approximately 6 seconds after the start of the sweep for a duration of 15 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}:



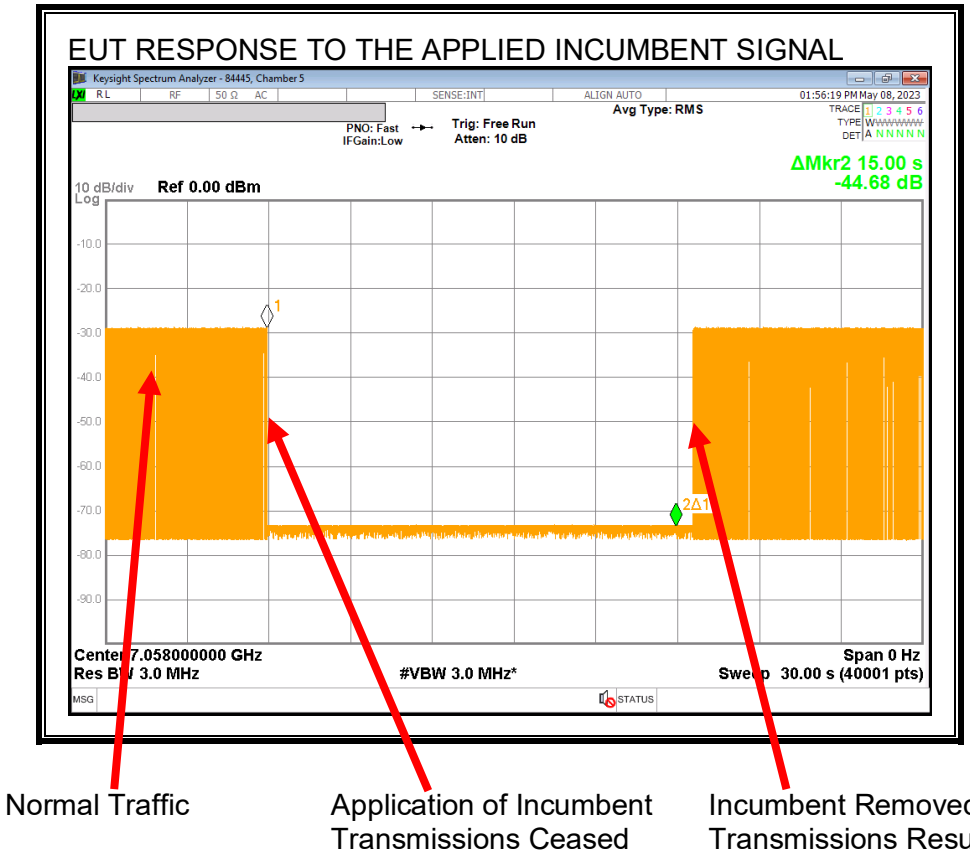
Transmissions cease while the Incumbent AWGN Signal is present and resume after it is removed.

Center Frequency Incumbent Signal f_{C1}:



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.

8.17.4. 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)	156.36
EUT 99% OBW Lower Edge, F_L (MHz)	6906.82
EUT 99% OBW Upper Edge, F_H (MHz)	7063.18
99% Occupied Bandwidth of the Incumbent Signal (MHz)	9.9699
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)	-3.98
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	-65.98
Lowest Passing Measured Incumbent Signal Amplitude at f_{c2} (dBm)	-80.17
Margin (dBm)	-14.19
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c1} (dBm)	-75.30
Margin (dBm)	-9.32
Result (PASS / FAIL)	**PASS**
Lowest Passing Measured Incumbent Signal Amplitude at f_{c3} (dBm)	-80.71
Margin (dBm)	-14.73
Result (PASS / FAIL)	**PASS**

Test Date: 2023-05-08
Tested by: 84445
Test location: Chamber 5

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	**No**
7	Yes	Yes	Yes
8	Yes	Yes	Yes
9	Yes	Yes	Yes
10	Yes	**No**	Yes
Test Result	**PASS**	**PASS**	**PASS**

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

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
-80.17	-3.98	0	-76.19	-62	Ceased
-81.59	-3.98	0	-77.61	-62	Minimal
-84.06	-3.98	0	-80.08	-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
-75.30	-3.98	0	-71.32	-62	Ceased
-76.31	-3.98	0	-72.33	-62	Minimal
-78.72	-3.98	0	-74.74	-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
-80.71	-3.98	0	-76.73	-62	Ceased
-82.73	-3.98	0	-78.75	-62	Minimal
-85.51	-3.98	0	-81.53	-62	Normal

The path loss from the antenna to the radio is incorporated into a system pathloss correction.

Test Date: 2023-05-08

Tested by: 84445

Test location: Chamber 5

9. SETUP PHOTOS

CONTENTION PROTOCOL MEASUREMENT SETUP

Please refer to R14720550-EP1 for setup photos.

END OF TEST REPORT