

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, SUWON-SI, GYEONGGI-DO, 16677, KOREA

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Revision History

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1. ATTESTATION OF TEST RESULTS

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

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 UL LLC By:

ma lony

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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	Complies	
47 CFR PART 15 SUBPART E, KDB 987594		
Contention Based Protocol Portion of RSS-	Complies	
248, Issue 1	-	

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	1150067	2180C	005074	
X	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	030007	27265	023374	

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.

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7.1.2. FREQUENCY BANDS AND GOVERNING RULES

	Frequency				
Band	(GHz)	Rules	Notes	KDB /Publication	
U-NII 1	5.15-5.25	15.407(a)(1)	Indoor Use/Outdoor Restrictions	789033 (U-NII)	
	5 75 5 75	15 407(a)(2)	Indoor/Outdoor/DES	789033 (U-NII)	
U-NII ZA	5.25-5.55	13.407(a)(2)	Indoor/Outdoor/DFS	905462 (DFS)	
U-NII 2B	5.35-5.47		Not Available		
LI NIL 2C	5 47 5 725	15 407(a)(2)	Indoor/Outdoor/DES	789033 (U-NII)	
U-INII 2C	5.47-5.725	13.407(a)(2)	IIIdool/Outdool/DFS	905462 (DFS)	
	5 775 5 85	14.407(a)(2)	Indoor/Outdoor	789033 (U-NII)	
0-MI 5	5.725-5.85	14.407(a)(5)	IIIdool/Outdool	926956 (*)	
		05 Subport I and 00	On-Board Units (OBU) must transmit		
DSRC	5.85-5.925	95 Subpart L and 90 Subpart M	signals to other OBUs and Roadside Units	DSRC	
		Subpart M	(RSU).		
			Low Power Indoor AP, Subordinates,		
U-NII 5	5.925-6.425	NII 5 5.925-6.425	15.407(a)(4) - (8)	Indoor Clients Standard Power AP, Fixed	
			& Standard Clients		
U-NIL6	6 425-6 525	15.407(2)(5) (6) (8)	Low Power Indoor AP, Subordinates,	789033 (ULNIII)	
0-1111 0	0.425-0.525	13.407(a)(3), (0), (0)	Indoor Clients	987594 (6 GHz	
			Low Power Indoor AP, Subordinates,	Band)	
U-NII 7	6.525-6.875	15.407(a)(4) - (8)	Indoor Clients Standard Power AP, Fixed	Danay	
			& Standard Clients		
U-NII 8	6 875 -7 125	$15\ 407(a)(5)\ (6)\ (8)$	Low Power Indoor AP, Subordinates,		
0-1110	0.075 -7.125	15.10/(a)(5), (0), (0)	Indoor Clients		
* Transitio	n period ended	l March 2, 2020 for ma	arketing DTS in the 5 GHz Band, as stated	in 15.408(b)(4)(ii)	

Table 1: Overview of U-NII Rules

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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.

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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.



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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 Du						
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

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

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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 %	

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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							
Access Doint				MSQ-			
ACCESS POINT	ASUS	GI-AXEI1000	1019100740062917101	RTAXJF00			
	A a Dal		ADD01117AG2134034	N/A			
AP Power Supply	AC Bel	ADDD011LPS	40A				
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.

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8. CONTENTION BASED PROTOCOL

8.1. LIMITS AND PROCEDURES

<u>LIMITS</u>

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:

	Frequency Range	Antenna	T _L at Radio Port		
Band	(MHz)	Gain (dBi)	(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.

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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} ≤ 2 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH



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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.



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8.3.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RL 11:20:59 AM Apr 19, 2023 Radio Std: None Center Freq: 6.21500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Center 6.215 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 910 kHz **Occupied Bandwidth Total Power** -22.1 dBm 18.766 MHz -13.892 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 21.03 MHz x dB -26.00 dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



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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.

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8.3.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f _{c1} (MHz)				
EUT Nominal Channel Bandwidth (MHz)				
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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)
Trial	Incumbent AWGN at ${\rm f_{c1}}$
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.

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8.3.5. Tx OPERATIONAL STATUS TEST RESULTS

Test Condition 2: 99% BWINC < 99% BWEUT ≤ 2 x 99% BWINC

Incumbent AWGN at f_{c1}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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8.4. U-NII 5 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:



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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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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}:

R L	ctrum Analyzer - 84445, Ch RF 50 Ω AC	amber 5	+→ #IFGain:Low	SENSE:INT Center Freq Trig: Free R #Atten: 0 dB	AL : 6.112000000 un	IGN AUTO) GHz Avg Hold: 1	00/100		02:06:5 Radio Std: M Radio Devic	4 PM May 08, 202 None e: BTS
dB/div	Ref Offset -24.6 Ref -82.00 d	54 dB Bm								
2g 7.0										
2.0			Martin Carlo Carlo	-	Martin Martin	along the for the set				
			comment.				Mar and a second			
02		-						Y_		
07								- Y		
12	and the second	r i							have a set	
17	areas and and what									
22										
27										
enter 6. Res BW	112 GHz 1 MHz		·	#VBV	V 3 MHz				Sp Sv	oan 20 MHz weep 1 ms
Chanr	nel Power			Power	Spectra	Density				
o	2 17 dPm			4	53 2 4	Bm				
-0		1/10	WHZ	-	55.2 (z			

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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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8.5.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RL 11:33:25 AM Apr 19, 2023 Radio Std: None Center Freq: 6.18500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Center 6.185 GHz #Res BW 2.4 MHz Span 250 MHz #VBW 50 MHz Sweep 1 ms **Occupied Bandwidth Total Power** -20.9 dBm 156.12 MHz 11.740 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 168.8 MHz x dB -26.00 dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge fc2:



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Center Frequency f_{c1}:



Upper Edge f_{c3}:



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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 fc2:



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

Center Frequency Incumbent Signal fc1:



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

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Upper Edge Incumbent Signal fc3:



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

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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)				
Result (PASS / FAIL)	PASS			

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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN	I Detected (Yes / No)
	Incumbent AWGN	Incumbent AWGN	Incumbent
Trial	at f _{c2}	at f _{c1}	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.

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8.5.5. Tx OPERATIONAL STATUS TEST RESULTS

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

Incumbent AWGN at f_{c2}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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8.6. U-NII 6 BAND TEST CONDITION 1 RESULTS

TEST CONDITION 1 CRITERIA

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

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} ≤ 2 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH



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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.



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8.7.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RL 11:23:06 AM Apr 19, 2023 Radio Std: None Center Freq: 6.45500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Center 6.455 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 910 kHz **Occupied Bandwidth Total Power** -22.7 dBm 18.801 MHz -10.497 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 21.19 MHz x dB -26.00 dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



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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.

8.7.4. 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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)
Trial	Incumbent AWGN at ${\rm f_{c1}}$
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.

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8.7.5. Tx OPERATIONAL STATUS TEST RESULTS

<u>Test Condition 2: 99% BWINC < 99% BWEUT ≤ 2 x 99% BWINC</u>

Incumbent AWGN at f_{c1}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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8.8. U-NII 6 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:



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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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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}:

Keysight Spe	ectrum Analyzer - 84445, Chamber 5 RF 50 Ω AC	#IFGain:Low	Center Freq: 6.432000 Trig: Free Run #Atten: 0 dB	ALIGN AUTO 000 GHz Avg Hold: 100/100	02:19 Radio Std Radio Dev	:31 PM May 08, 202 : None vice: BTS
dB/div	Ref Offset -24.7 dB Ref -80.00 dBm					
2g 5.0						
a.o		La shupping the	to the contract to a loss of the state			
5.0		- and a start of the start of t	ale – A. B. B. B. S.	and a series of the series of		
	/				<u> </u>	
05					<u>\</u>	
10					- ¥	
15 15	may and a second and a second and a second and a second a					an way you always
20						
25						
enter 6. Res BW	432 GHz 1 MHz		#VBW/3MH	Z	5	Span 20 MHz Sweep 1 ms
Chani	nel Power		Power Spect	ral Density		
-8	32.01 dBm / 10	0 MHz	-152.0	dBm /Hz	•	

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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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8.9.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RL 11:35:20 AM Apr 19, 2023 Radio Std: None Center Freq: 6.50500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Center 6.505 GHz #Res BW 2.4 MHz Span 250 MHz #VBW 50 MHz Sweep 1 ms **Occupied Bandwidth Total Power** -22.1 dBm 156.60 MHz 179.11 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 171.0 MHz -26.00 dB x dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge fc2:



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Center Frequency f_{c1}:



Upper Edge f_{c3}:



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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 fc2:



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

Center Frequency Incumbent Signal fc1:



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

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Upper Edge Incumbent Signal fc3:



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

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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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN	I Detected (Yes / No)
	Incumbent AWGN	Incumbent AWGN	Incumbent
Trial	at f _{c2}	at f _{c1}	AWGN at $\rm f_{c3}$
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.

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8.9.5. Tx OPERATIONAL STATUS TEST RESULTS

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

Incumbent AWGN at f_{c2}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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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} ≤ 2 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH



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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.



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8.11.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RL 11:24:53 AM Apr 19, 2023 Radio Std: None Center Freq: 6.6500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Mr M Center 6.695 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 910 kHz **Occupied Bandwidth Total Power** -23.3 dBm 18.875 MHz 22.702 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 21.19 MHz x dB -26.00 dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



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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.

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8.11.4. TABULATED TEST RESULTS

INCUMBENT SIGNAL DETECTION RESULTS

EUT Channel Center Frequency, f _{c1} (MHz)	
EUT Nominal Channel Bandwidth (MHz)	
99% Occupied Bandwidth of the EUT (MHz)	
EUT 99% OBW Lower Edge, F _L (MHz)	
EUT 99% OBW Upper Edge, F _H (MHz)	
Test Frequency of Incumbent Signal (MHz)	
Maximum Allowed Incumbent Amplitude at Antenna (dBm)	
Minimum Antenna Gain (dBi)	
Maximum Allowed Incumbent Amplitude at Radio Port (dBm)	
Lowest Passing Measured Incumbent Signal Amplitude (dBm)	
Margin (dBm)	
Result (PASS / FAIL)	

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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)		
Trial	Incumbent AWGN at ${\rm f_{c1}}$		
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.

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8.11.5. Tx OPERATIONAL STATUS TEST RESULTS

<u>Test Condition 2: 99% BWINC < 99% BWEUT ≤ 2 x 99% BWINC</u>

Incumbent AWGN at f_{c1}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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8.12. U-NII 7 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:



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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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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}:

Keysight Spe	sctrum Analyzer - 84445, Chamber 5 RF 50 Ω AC	#IFGain:Low	SENSE:INT Center Freq: 6.5920000 Trig: Free Run #Atten: 0 dB	ALIGN AUTO D00 GHz Avg Hold: 100/100	R	02:26:31 PM Mi adio Std: None adio Device: BT	iy 08, 202
dB/div	Ref Offset -24.55 dB Ref -81.00 dBm						
9 3.0							
		and the state of t	analise and and and the station	- the man			
				- The second			
11					~		
D6	/						
11					h h		
16	wounder the state of the state				· · ·	marran and the	Automan
21							
26							
enter 6. Res BW	592 GHz 1 MHz		#VBW 3 MH	Z		Span 2 Sweep	20 MHz) 1 ms
Chanr	nel Power		Power Spectr	al Density			
-8	32.17 dBm / 1	0 MHz	-152 2	dBm /Hz			

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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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8.13.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge fc2:



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Center Frequency f_{c1}:



Upper Edge f_{c3}:



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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 fc2:



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

Center Frequency Incumbent Signal fc1:



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

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Upper Edge Incumbent Signal f_{c3}:



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

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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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN	Detected (Yes / No)
	Incumbent AWGN	Incumbent AWGN	Incumbent
Trial	at f _{c2}	at f _{c1}	AWGN at $\rm f_{c3}$
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.

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8.13.5. Tx OPERATIONAL STATUS TEST RESULTS

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

Incumbent AWGN at f_{c2}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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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} ≤ 2 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH



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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.



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8.15.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH

EUT 99% OCCUPIED POWER BANDWIDTH RI 11:26:57 AM Apr 19, 2023 Radio Std: None Center Freq: 7.01500000 GHz Trig: Free Run Avg|Hold: 500/500 #Atten: 10 dB ----#IFGain:Low Radio Device: BTS Ref -15.00 dBm Center 7.015 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 910 kHz **Occupied Bandwidth Total Power** -22.2 dBm 18.785 MHz 11.923 kHz OBW Power Transmit Freq Error 99.00 % x dB Bandwidth 21.23 MHz x dB -26.00 dB **I**status

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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT



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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.

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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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN Detected (Yes / No)
Trial	Incumbent AWGN at ${\rm f_{c1}}$
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.

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8.15.5. Tx OPERATIONAL STATUS TEST RESULTS

<u>Test Condition 2: 99% BWINC < 99% BWEUT ≤ 2 x 99% BWINC</u>

Incumbent AWGN at f_{c1}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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8.16. U-NII 8 BAND TEST CONDITION 3 RESULTS

TEST CONDITION 3 CRITERIA

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

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 x 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.

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INCUMBENT SIGNAL 99% OCCUPIED POWER BANDWIDTH

Lower Edge Incumbent Signal f_{c2}:



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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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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}:

Keysight Spec	trum Analyzer - 84445, (RF 50 Ω /	Chamber 5	#EGaint ov	SENSE:INT Center Freq: 6.91200 → Trig: Free Run #Atten: 0 dB	ALIGN AUTO 00000 GHz Avg Hold:	100/100	02:36:2 Radio Std: I	6 PM May 08, 202 None
dB/div	Ref Offset -24 Ref -79.00	1.58 dB dBm	WFGall.Low					
19 1.0								
0.0				and the state of t	an a			
.0			A CONTRACT			mall my		
		$+ \wedge$				- Ny-		
04								
19							X	
14	and a start of the						manneh	man
19								
24								
enter 6.9 Res BW	912 GHz 1 MHz			#VBW 3 M	Hz		Sr St	oan 20 MHz weep 1 ms
Chann	el Power			Power Spec	tral Density	,		
_Q	0 17 dBr	m / 10		-150	2 dBm ⊮	-		
-0		11 / 10		-150.				

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Center Frequency Incumbent Signal fc1:



Upper Edge Incumbent Signal f_{c3}:



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8.17.3. EUT TRANSMISSION PLOTS

EUT 99% OCCUPIED POWER BANDWIDTH



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TRAFFIC WITHOUT THE INCUMBENT SIGNAL PRESENT

Lower Edge fc2:



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Center Frequency f_{c1}:



Upper Edge f_{c3}:



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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 fc2:



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

Center Frequency Incumbent Signal fc1:



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

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Upper Edge Incumbent Signal fc3:



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

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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

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INCUMBENT SIGNAL DETECTION CERTAINTY RATE

	AWGN	Detected (Yes / No)
	Incumbent AWGN	Incumbent AWGN	Incumbent
Trial	at f _{c2}	at f _{c1}	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.

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8.17.5. Tx OPERATIONAL STATUS TEST RESULTS

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

Incumbent AWGN at f_{c2}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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}:

			Adjusted		
Measured Incumbent		Antenna	Incumbent		
Power at the EUT Radio	Antenna Gain	Cable Path	Power at the	Detection Limit	EUT Tx
Port (dBm)	(dBi)	Loss (dB)	Antenna (dBm)	(dBm)	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

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9. SETUP PHOTOS

CONTENTION PROTOCOL MEASUREMENT SETUP

Please refer to R14720550-EP1 for setup photos.

END OF TEST REPORT

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