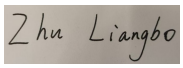
FCC CBP Test Report

Archer AXE75

Basic Information

EUT Description:	AXE5400 Tri-Band Wi-Fi 6E Router		
Brand Name:	tp-link		
Model Name:	Archer AXE75		
FCC ID:	2AXJ4AXE75		
Tested By:	Zhuliangbo 	Date:	2024/11/14

CONTENTS

1 Information

1.1 EUT Information

The Archer AXE75 is the Three-band wireless router of 6 external antennas, of which 2 were 2.4G antennas and 2 were 5G antennas and 2 were 6G antennas, the appearance of EUT was shown below:

Figure 1 Archer AXE75

1.2 Test Sample

Five samples from the factory for the self-test, which were shown below:

Figure 2 Test Samples

The test samples' S/N code were shown below:

Table 1 Test samples

	Model	FCC ID	SN
#1	Archer AXE75	2AXJ4AXE75	Y2490P2001569
#2	Archer AXE75	2AXJ4AXE75	Y2490P2001572
#3	Archer AXE75	2AXJ4AXE75	Y2490P2001570
#4	Archer AXE75	2AXJ4AXE75	Y2490P2001574
#5	Archer AXE75	2AXJ4AXE75	Y2490P2001576

The test samples' label were shown in Appendix A.

2 Test Summary

2.1 Test Standard

KDB 987594 D02 U-NII 6 GHz EMC Measurement v03 section I

2.2 Test Environment

The Test was performed a Radiated method in a Semi Anechoic Chamber. The test setup was shown below:

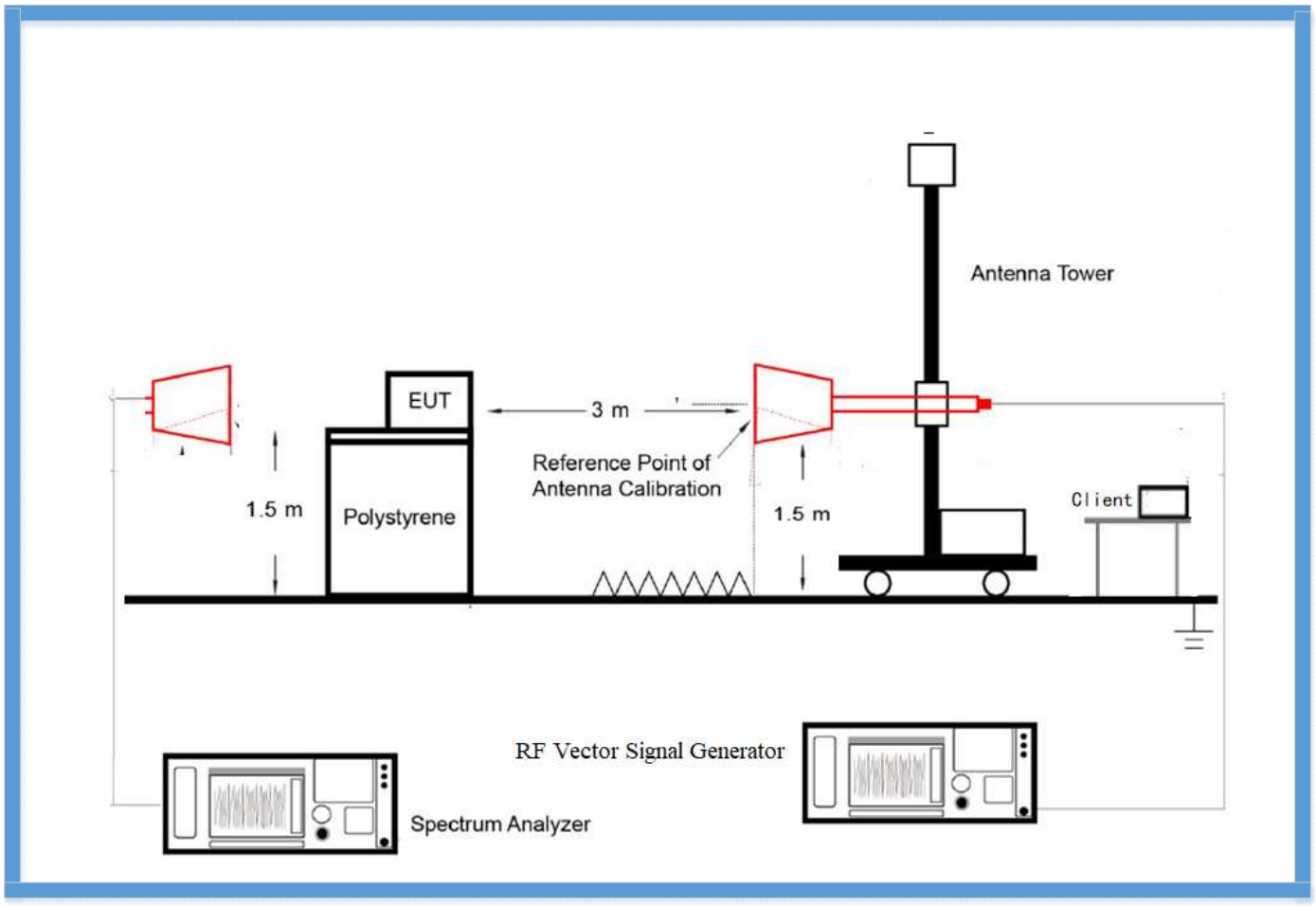


Figure 3 Radiated method in a Semi Anechoic Chamber

2.3 Test Method

To perform the Radiation test in a radiated chamber, it is imperative to ensure that the AWGN signal can be emitted in a controlled environment, the AWGN radiated signal can illuminate the EUT antenna entirely, and the AWGN signal power level can be accurately measured at the EUT antenna's exact location. The radiated test setup where the AWGN signal is generated and transmitted via antenna 1. The antenna one was selected so that its 3 dB beamwidth can illuminate the EUT entirely. To ensure the AWGN signal level can be accurately measured at the EUT location, the EUT is initially replaced by antenna 2, which has a known gain. The radiated signal level is then measured using antenna 2. Antennas 1 and 2 are

aligned and placed at a distance 3m more significant than the far-field distances of both antennae 1 and 2. The AWGN signal power level is measured by the signal analyzer 1. The measured power Pm is then corrected by the gain of antenna 2 and by all cable losses and attenuations to determine the AWGN signal power level at antenna 2, according to:

$$P_2 = P_m + L - G_2$$

The Test Setup was shown below:

Figure 4 **Contention-based protocol test setup, radiated method, AWGN power measurement**

The Test Setup photos were shown in Appendix B.

The AWGN signal power level measured procedure:

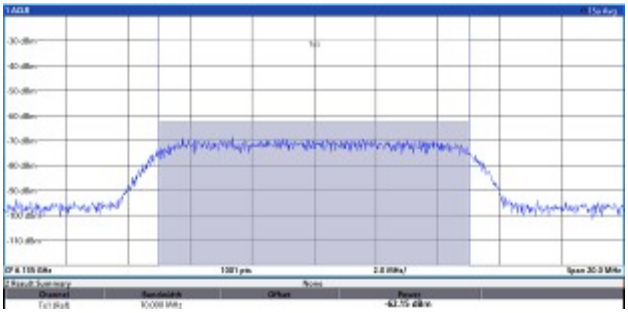
1) Using the AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
2) Connect the AWGN signal source to antenna 1, as shown in Figure 4, and transmit the signal (RF ON).
3) Measure the AWGN signal power level using signal analyzer 1 and antenna 2. Align antenna 2 and antenna 1 to maximize emission.
4) Using equation 1, correct the measured power by antenna 2's gain and all cable losses and attenuations to obtain the AWGN signal power level at antenna 2 P2.

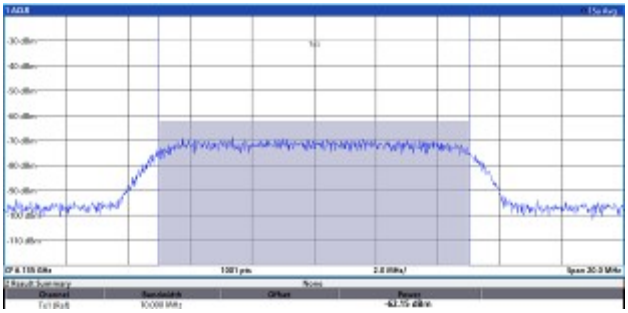
The AWGN signal power level were shown below:

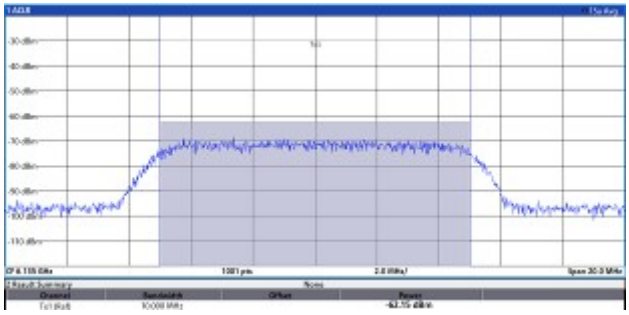
Table 2 AWGN Power

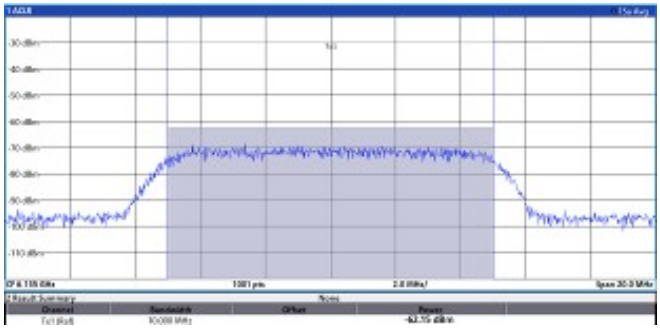
Frequency Channel(MHz)	Power(dBm)	Frequency Channel(MHz)	Power(dBm)
6110	-62.16	6590	-62.21
6135	-62.15	6665	-62.29
6185	-62.18	6695	-62.06
6260	-62.1	6740	-62.17
6430	-62.13	6910	-62.26
6455	-62.29	6985	-62.20
6505	-62.27	7015	-62.21
6580	-62.11	7060	-62.1

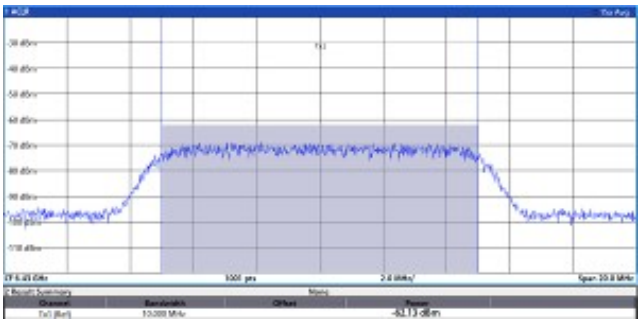
AWGN Power Measured Figures were shown below:

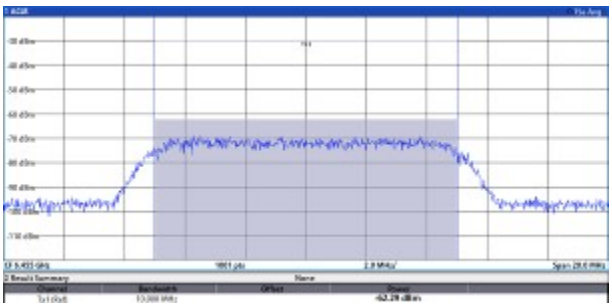


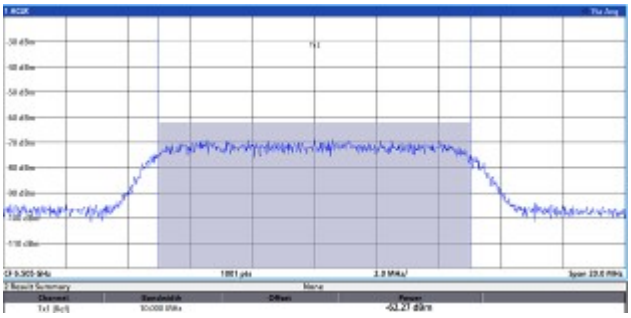


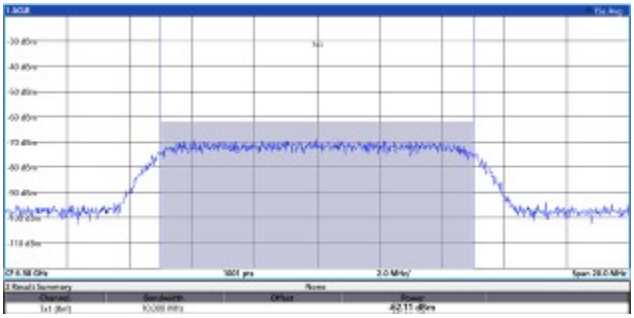


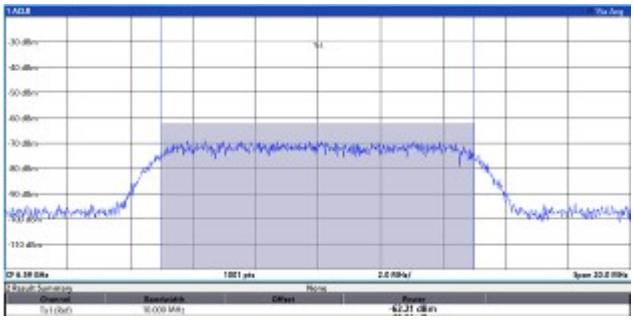


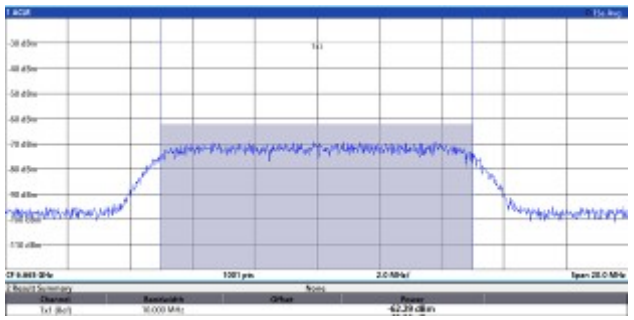












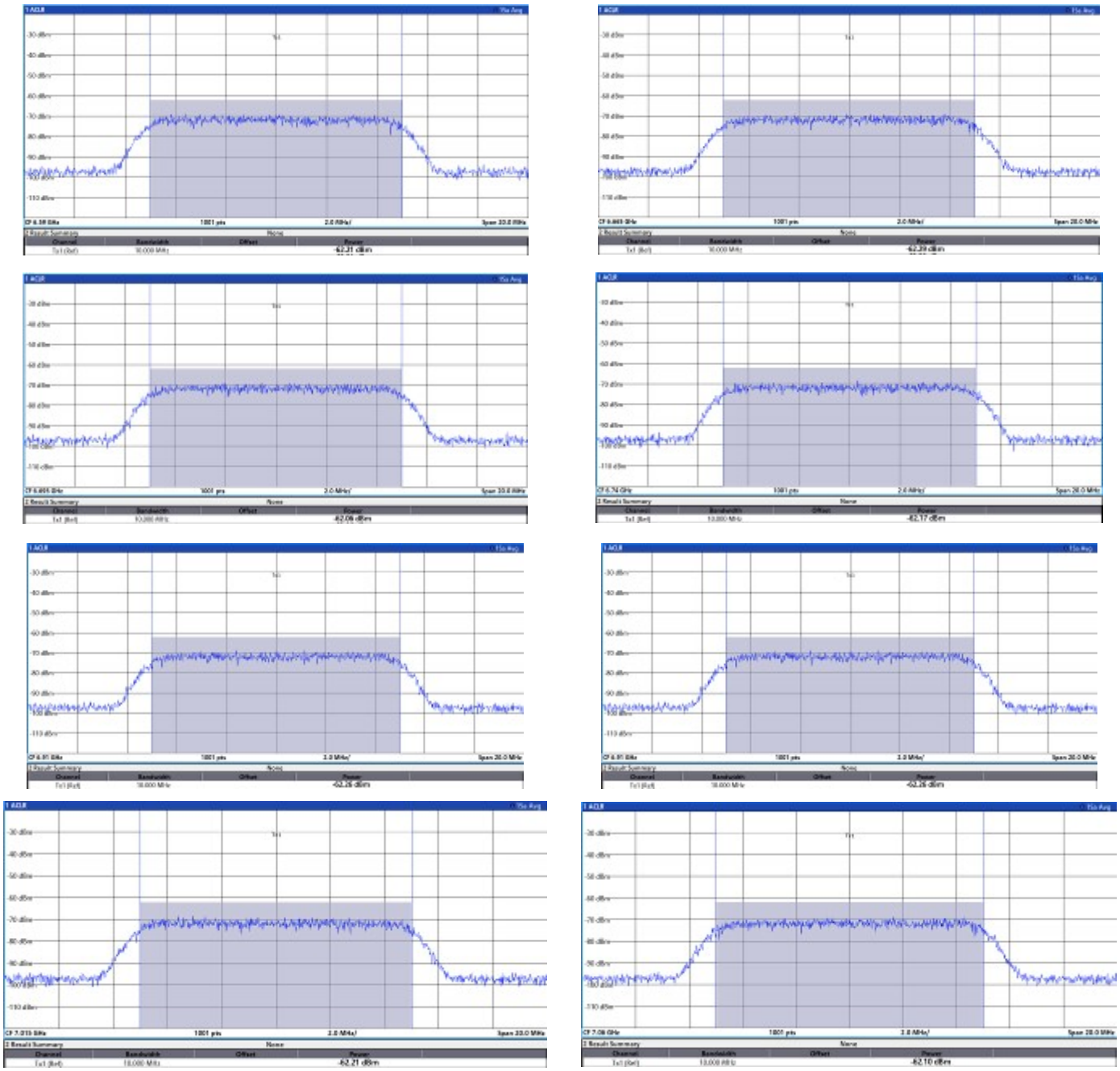


Figure 5 AWGN Signal Power

2.4 Test Procedure

The following is a step-by-step procedure for testing the contention-based protocol using the radiated setup describe in section 2.3&2.4:

1) Set the corrected power to the -62 dBm level.
2) Place the EUT exactly where antenna 2 was. Configure the EUT to transmit a constant duty cycle.
3) Set the EUT's operating parameters, using the 160MHz bandwidth channels.
4) iPerf ran between client’s control PC and AP’s control PC via AP to generate traffic on 6 GHz band. The traffic was from AP to Client.

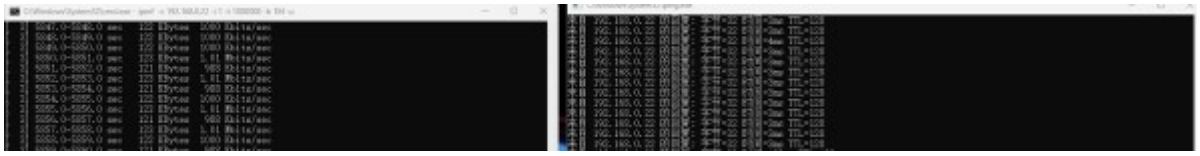


Figure 6 Iperf Traffic

5) Set the signal analyzer center frequency to the EUT beacon channel frequency. The signal analyzer's span range shall be between 1 times and 2 times the EUT OBW.

6) Monitor signal analyzer to verify if an AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, incrementally increase the AWGN signal power level until it stops transmitting.

7) Determine and record the AWGN signal power level at which the EUT ceased transmission. Repeat the procedure at least ten times to verify the EUT can detect the AWGN signal with a 90% (or better) level of certainty.

8) If testing is required more than once, go back to step 1, choose a different center frequency for the AWGN signal, and repeat the process.

The Test Setup figure was shown below:

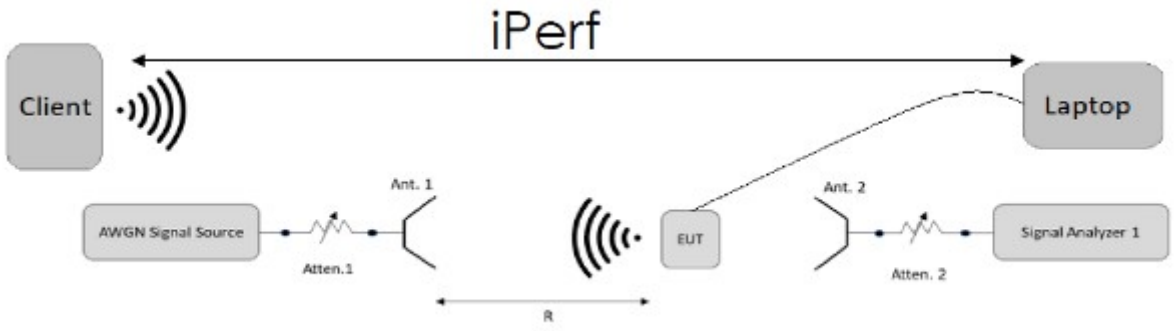


Figure 7 Contention-based protocol test setup, radiated method, detection threshold measurement

2.5 Test Equipment

Table 3 Test Equipment

Equipment	Model	Manufacturer	S/N
Signal Analyzer	N9038B	Keysight	MY63460143
Signal Analyzer	FSV3044	R&S	101371
Vector Signal Generator	N5182B+BX07	Keysight	MY57300110
Semi Anechoic Chamber	SAC-3	ETS	SAC-3: 8600mm× 6100mm× 5900mm(H)
Antenna1	3117	ETS	0085522
Antenna2	3117	ETS	00261464
PC	ThinkPad E14	LENOVO	RF39LACM
PC	288ProG9MT	HP	4CE316B42K
PC	288ProG9MT	HP	4CE312BQP2
Client	TBE550	TP	/

3 Test Result

3.1 Website Firmware

All Samples were updated to the latest publicly available firmware from the website.

Figure 8 Website Firmware

The test results were shown below:

1) AWGN=-62dBm

Table 4 -62dBm Test Result

DUT	firmware 1.3.0 Build 20240830 rel.68386	
	AWGN=-62dBm	
	test phenomenon	result
#1	traffic on	fail
#2	traffic off, beacon on	fail
#3	traffic on	fail
#4	traffic off, beacon on	fail
#5	traffic off, beacon off	pass

Test Result Figures:

1) PASS, traffic off, beacon off

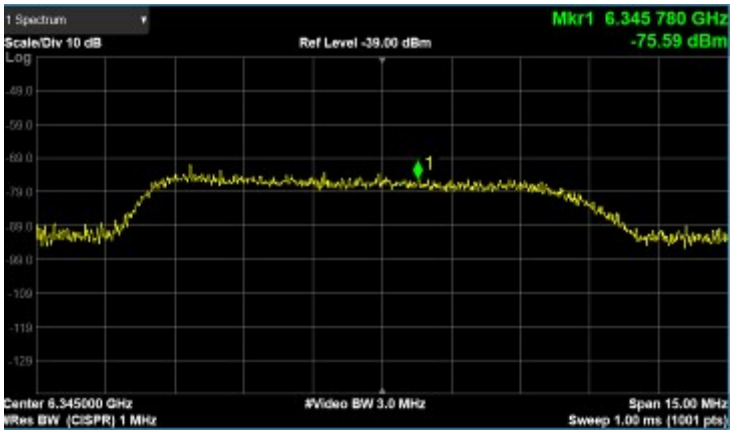


Figure 9 traffic off, beacon off

2) Fail, traffic off, beacon on

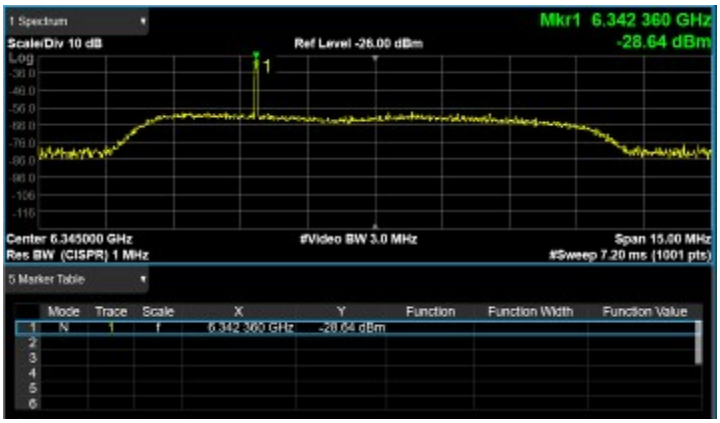


Figure 10 traffic off, beacon on

3) Fail, traffic on

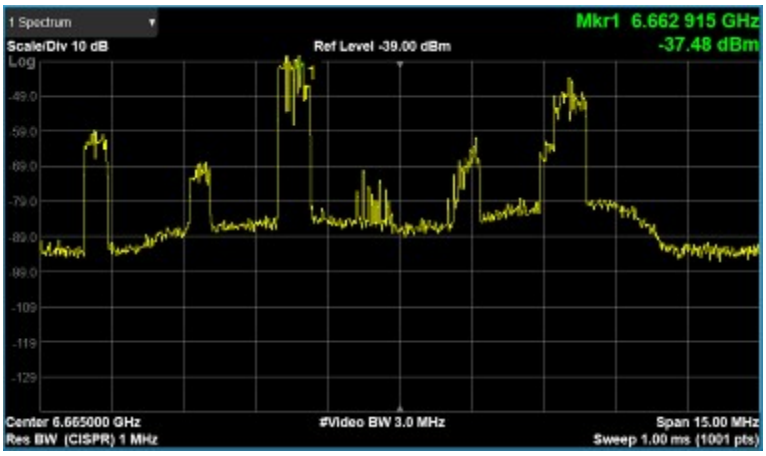


Figure 11 traffic on

3.2 New Firmware

All Samples were updated to the firmware which fixed the issue.

Figure 12 New Firmware

The test results were shown below:

1) AWGN=-62dBm

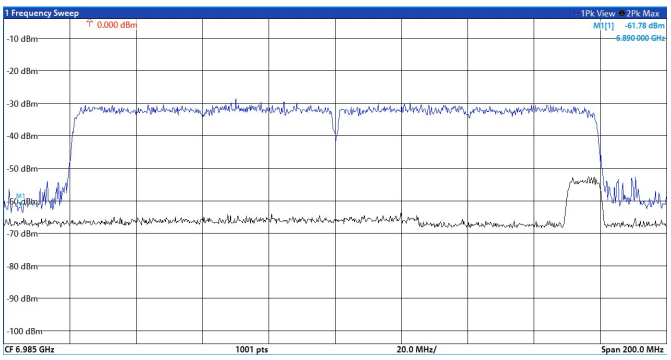
Table 5 -62dBm Test Result

DUT	firmware 1.3.0 Build 20241101 rel.60873	
	AWGN=-62dBm	
	test phenomenon	result
#1	traffic off, beacon off	pass

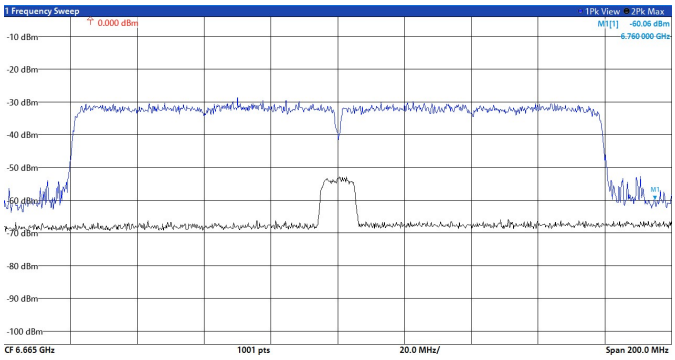
#2	traffic off, beacon off	pass
#3	traffic off, beacon off	pass
#4	traffic off, beacon off	pass
#5	traffic off, beacon off	pass

The test figures were shown below:

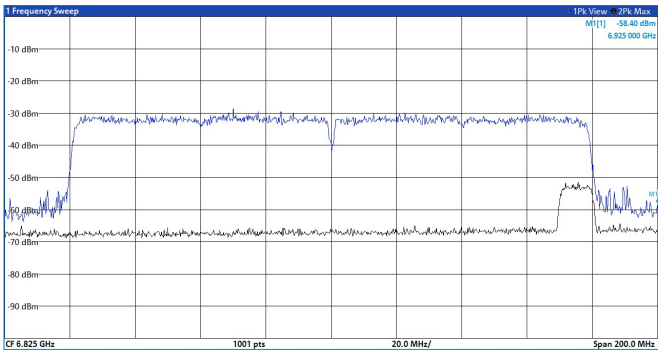
#1



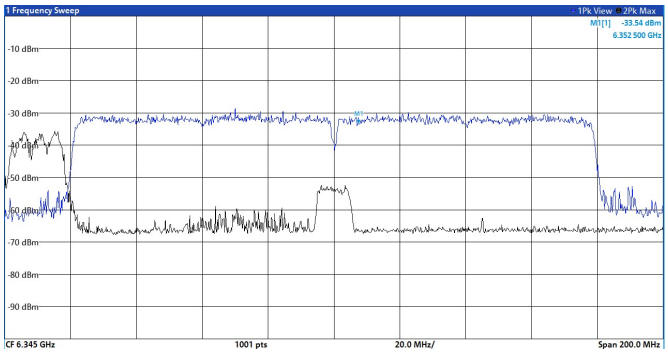
#2



#3



#4



#5

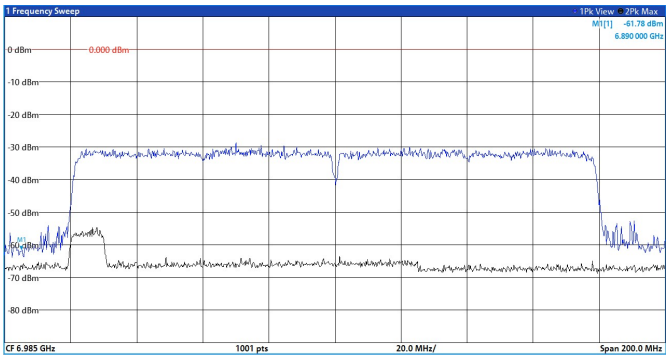


Figure 13 CBP Test figures

Used the #1 Sample to test the full band:

Table 6 -62dBm Full Band Test Result

Band	firmware 1.3.0 Build 20241101 rel.60873

	AWGN=-62dBm				
	Channel frequency(MHz)	AWGN frequency (MHz)	test phenomenon	Detect certainty	result
U-NII5	6185	6110	traffic off, beacon off	90%	pass
	6185	6185	traffic off, beacon off	100%	pass
	6185	6260	traffic off, beacon off	90%	pass
	6185	6135	traffic off, beacon off	100%	Pass
U-NII6	6505	6430	traffic off, beacon off	90%	pass
	6505	6505	traffic off, beacon off	90%	pass
	6505	6580	traffic off, beacon off	90%	pass
	6505	6455	traffic off, beacon off	100%	pass
U-NII7	6665	6590	traffic off, beacon off	90%	pass
	6665	6665	traffic off, beacon off	90%	pass
	6665	6740	traffic off, beacon off	90%	pass
	6665	6695	traffic off, beacon off	100%	pass
U-NII8	6985	6910	traffic off, beacon off	100%	Pass
	6985	6985	traffic off, beacon off	90%	pass
	6985	7060	traffic off, beacon off	90%	pass
	6985	7015	traffic off, beacon off	100%	Pass

The test figures were shown below:

1) U-NII5

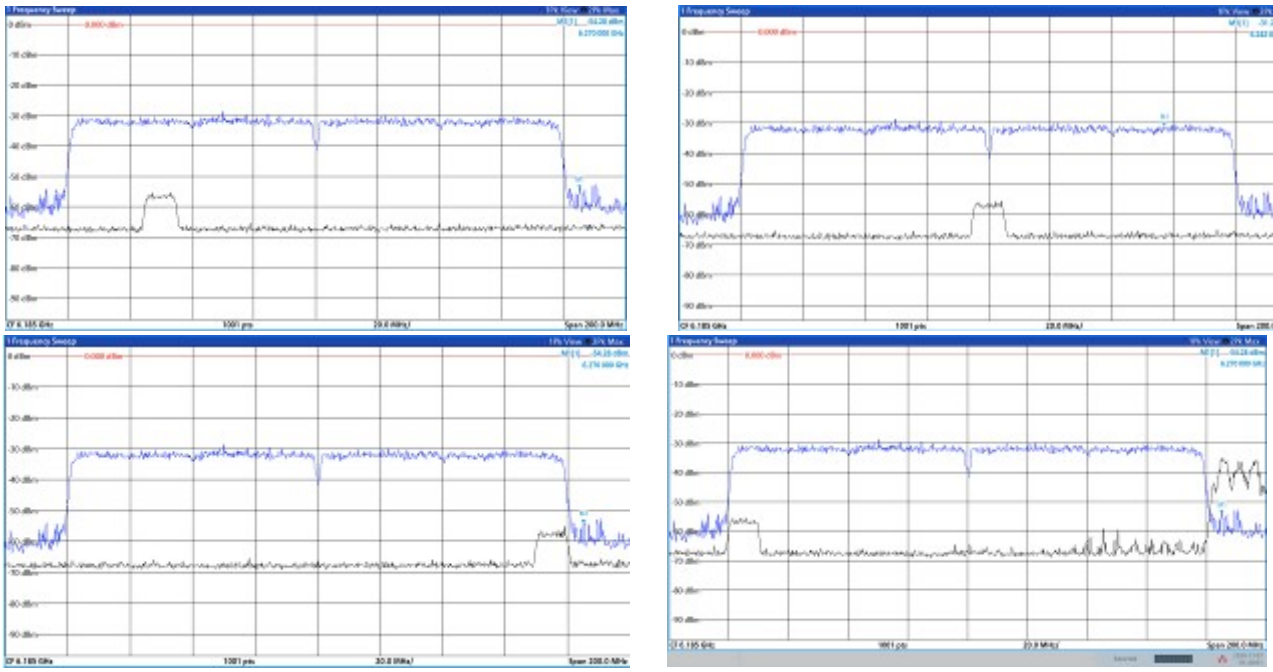


Figure 14 CBP Test figures

2) U-NII6

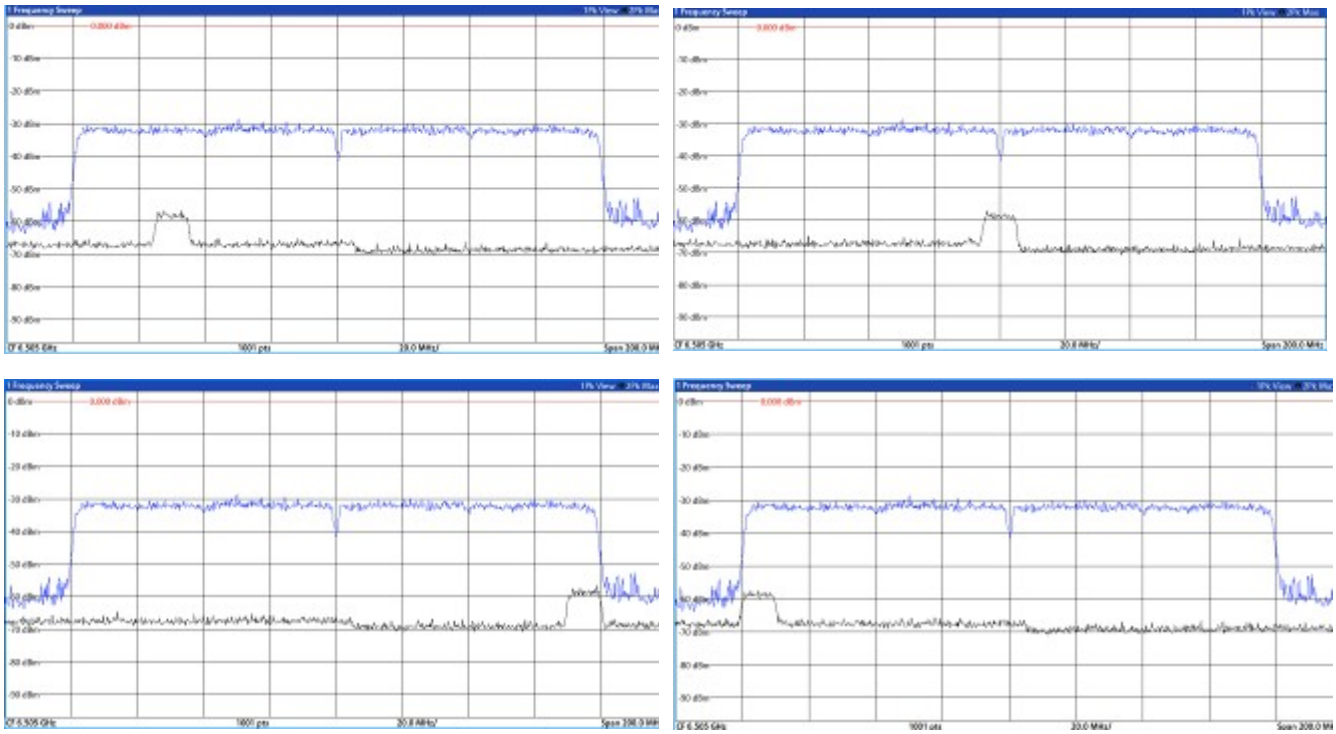


Figure 15 CBP Test figures

3) U-NII7

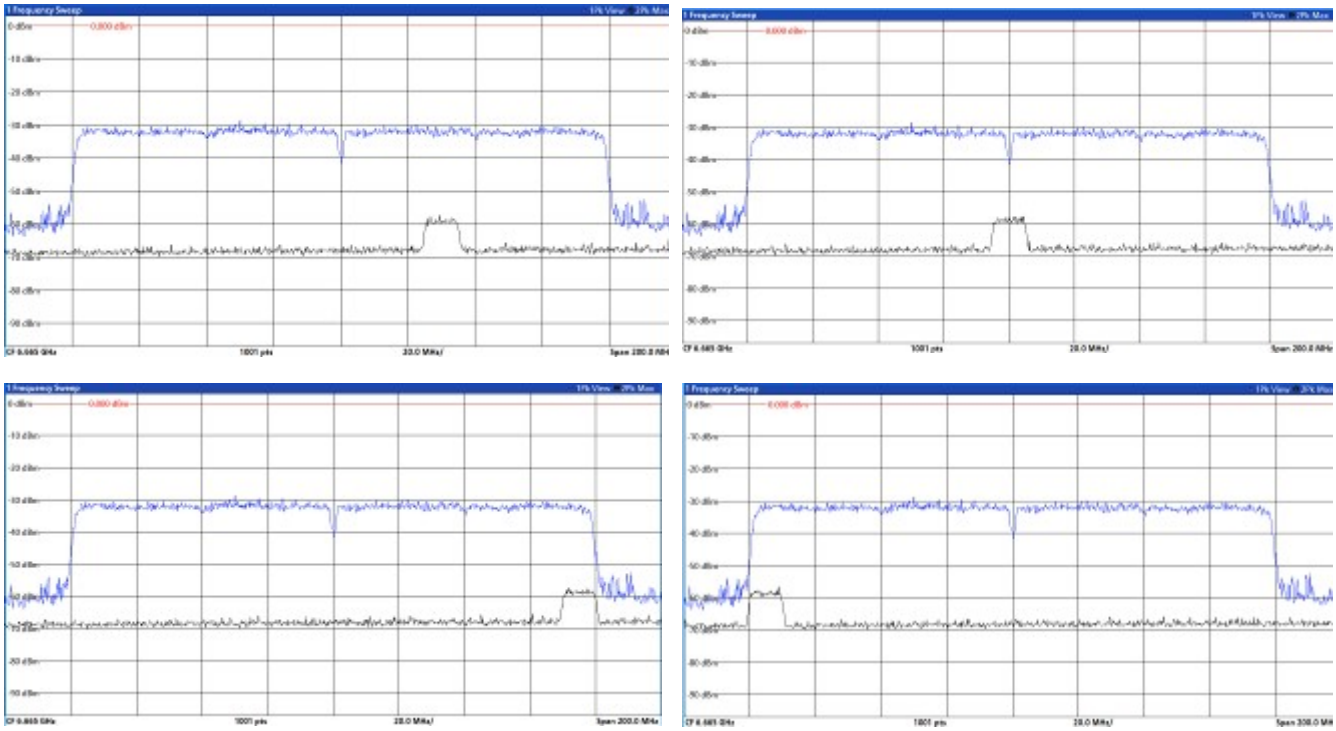


Figure 16 CBP Test figures

4) U-NII8

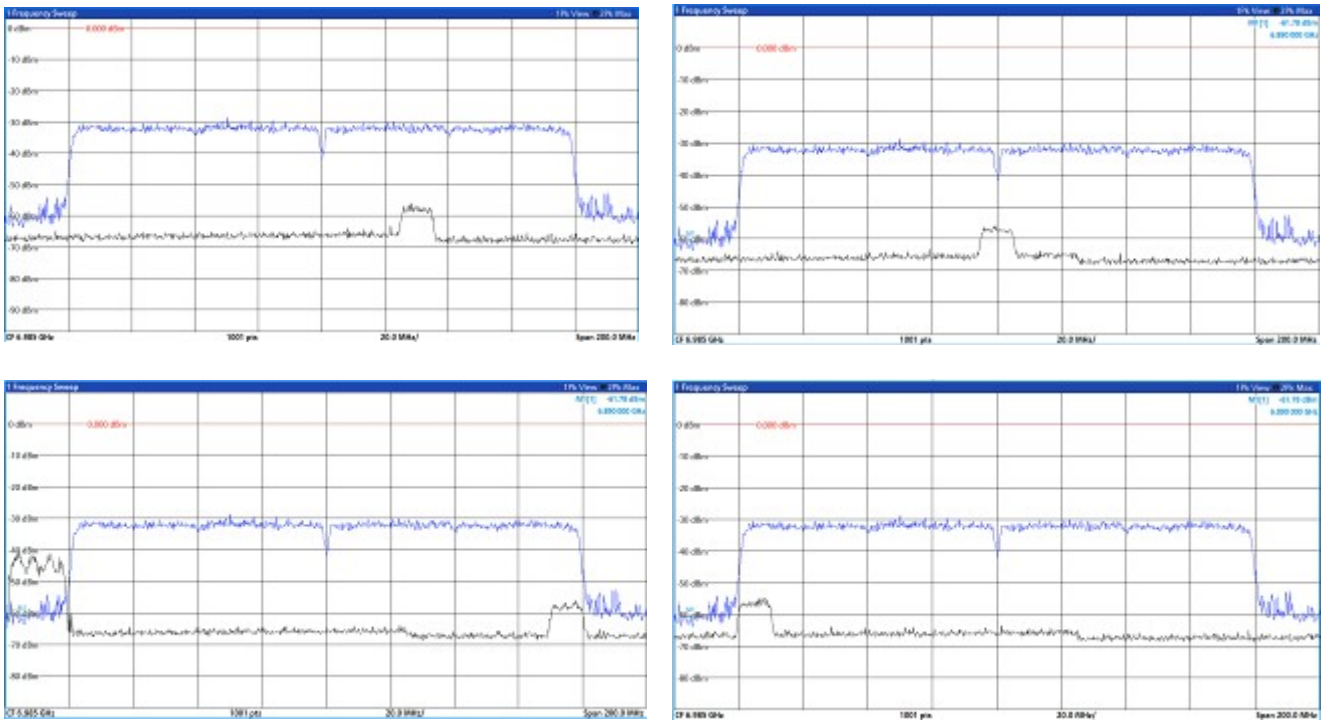


Figure 17 CBP Test figures

Appendix A: Samples Photos

#1

#2

#3

#4

#5

Figure 18 S/N CODE

Appendix B: Test Setup Photos

Figure 19 Contention-based protocol test setup photo, radiated method, power measurement

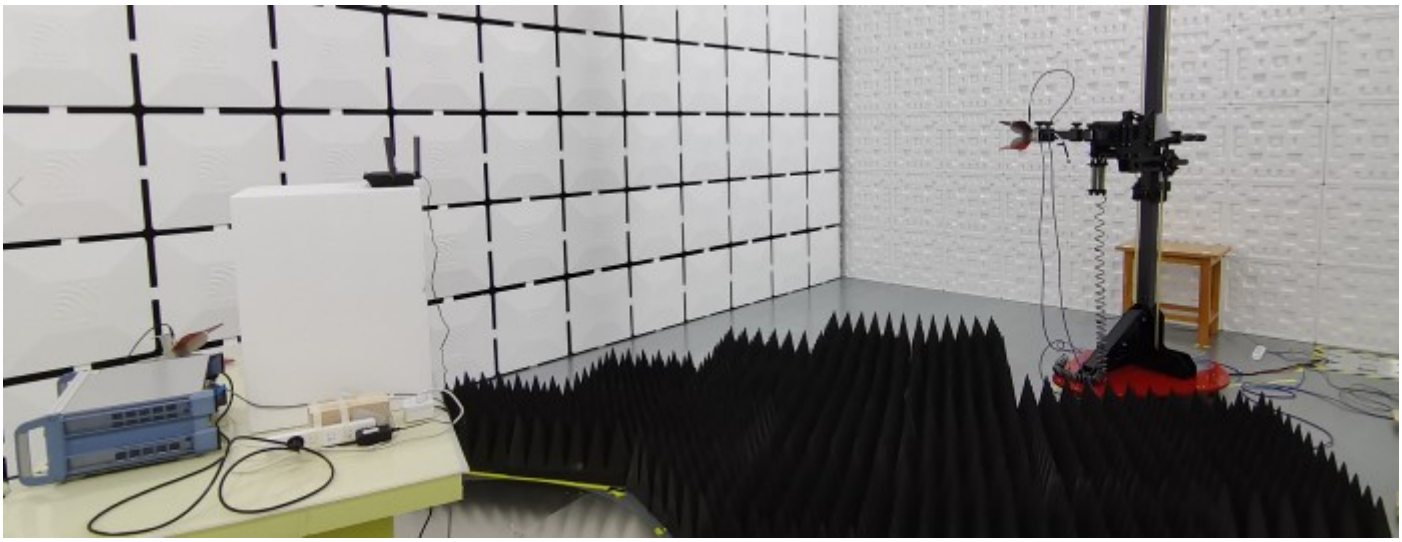


Figure 20 Contention-based protocol test setup photo, radiated method, test measurement