Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15 SUBPART E 15.407

Report Reference No.....:	**MTEB24070452-R1**
FCC ID..... :	**2BH3H-LP365P**
Compiled by (position+printed name+signature)..:	File administrators Alisa Luo
Supervised by (position+printed name+signature)..:	Test Engineer Sunny Deng
Approved by (position+printed name+signature)..:	Manager Yvette Zhou
Date of issue.....:	July 31,2024
Representative Laboratory Name. :	**Shenzhen Most Technology Service Co., Ltd.**
Address..... :	No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.
Applicant's name.....:	**FRIZZLIFE INC**
Address..... :	201 E CENTER ST STE 112 #3500,ANAHEIM,CA 92805,United States
Test specification.....:	
Standard.....:	**FCC Part 15 Subpart E 15.407**

Shenzhen Most Technology Service Co., Ltd. All rights reserved.
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Most Technology Service Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Most Technology Service Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description.....:	Smart Water Monitor and Shutoff
Trade Mark.....:	FRIZZLIFE
Model/Type reference..... :	LP365-P
Listed Models ..... :	LP365,LP365-PRO,LP365-A,LP365-B,LP365-C,LP365-PA,LP365-PB,LP365-PC,ST01,ST01-P,ST01-PA,ST99,ST99-P,ST99-PA, ST99-A,ST99-B,DP01,DP01-P,DP01-PA,DP01-A,DP01-B,WP-01,WP-02,WP-01P,WP-02P,WP365-X,WP365-XS
Ratings.....:	DC 5V by Adapter DC 3.7V by Battery
Modulation ..... :	OFDM
Frequency.....	From 5180MHz-5240MHz；5260MHz-5320MHz； 5500MHz-5700MHz；5745MHz-5825MHz
Hardware version.....:	V1.0.2
Software version ..... :	1.1.14
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Smart Water Monitor and Shutoff
Model /Type	:	LP365-P
Listed Models	:	LP365,LP365-PRO,LP365-A,LP365-B,LP365-C,LP365-PA,LP365-PB,LP365-PC,ST01,ST01-P,ST01-PA,ST99,ST99-P,ST99-PA, ST99-A,ST99-B,DP01,DP01-P,DP01-PA,DP01-A,DP01-B,WP-01,WP-02,WP-01P,WP-02P,WP365-X,WP365-XS
Remark		It's just that the product models are called differently
Applicant	:	FRIZZLIFE INC
Address	:	201 E CENTER ST STE 112 #3500,ANAHEIM,CA 92805,United States
Manufacturer	:	Haining Beirui Environmental protection Technology Co., LTD
Address	:	East side,2-4 Floor,Ist Floor,Building E,No 2,Xiner Road,Changan Town,Haining City, Jiaxing City,Zhejiang Province

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 REVISION HISTORY 4

2 TEST STANDARDS 5

3 SUMMARY 6

3.1 General Remarks 6
3.2 Product Description 6
3.3 Equipment Under Test 6
3.4 Short description of the Equipment under Test (EUT) 6
3.5 EUT operation mode 7
3.6 Block Diagram of Test Setup 7
3.1 Test Item (Equipment Under Test) Description 7
3.2 Auxiliary Equipment (AE) Description 8
3.3 Antenna Information* 8
3.4 Related Submittal(s) / Grant (s) 8
3.5 Modifications 8
3.6 EUT configuration 8

4 TEST ENVIRONMENT 9

4.1 Address of the test laboratory 9
4.2 Test Facility 9
4.3 Environmental conditions 9
4.4 Test Description 10
4.5 Statement of the measurement uncertainty 10
4.6 Equipments Used during the Test 11

5 TEST CONDITIONS AND RESULTS 12

5.1 AC Power Conducted Emission 12
5.2 Radiated Emissions 15
5.3 Conduction spurious emission 26
5.4 Maximum Conducted Average Output Power 27
5.5 Power Spectral Density 28
5.6 Emission Bandwidth (26dBm Bandwidth) 29
5.7 Minimum Emission Bandwidth (6dBm Bandwidth) 30
5.8 Frequency Stability 31
5.9 Duty Cycle Information 32

6 TEST SETUP PHOTOS OF THE EUT 33

7 PHOTOS OF THE EUT 34

APPENDIX I.Frequency Stability 35
APPENDIX II.Duty Cycle 41
APPENDIX III.Peak Power Spectral Density 58
APPENDIX IV.Conducted Output Power 64
APPENDIX V.99% Bandwidth 65
APPENDIX VI.6dB Bandwidth 71
APPENDIX VII.26dB Bandwidth 73
APPENDIX VIII.Conducted Out Of Band Emission 77

1 Revision History

Revision	Issue Date	Revisions	Revised By
00	2024.07.31	Initial Issue	Alisa Luo

2 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15 Subpart E—Unlicensed National Information Infrastructure Devices
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB789033 D02: General UNII Test Procedures New Rules v01r02

3 SUMMARY

3.1 General Remarks

Date of receipt of test sample	:	2024.07.24
Testing commenced on	:	2024.07.25
Testing concluded on	:	2024.07.31

3.2 Product Description

Product Description:	Smart Water Monitor and Shutoff			
Model:	LP365-P			
Power supply:	DC 5V by Adapter DC 3.7V by Battery			
Testing sample ID:	MTYP06194			
WIFI				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n	802.11n	N/A	N/A
Operation frequency:	5180MHz-5240MHz 5260MHz-5320MHz 5500MHz-5700MHz 5745MHz-5825MHz	5190MHz-5230MHz 5270MHz-5310MHz 5510MHz-5670MHz 5755MHz-5795MHz	N/A	N/A
Modulation:	OFDM	OFDM	N/A	N/A
Antenna type:	FPC Antenna			
Antenna gain:	5180MHz-5240MHz:2.12dBi, 5260MHz-5320MHz:2.72dBi, 5500MHz-5700MHz:4.23dBi, 5745MHz-5825MHz:5.27dBi,			

3.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 5V by Adapter
DC 3.7V by Battery

3.4 Short description of the Equipment under Test (EUT)

This is a Smart Water Monitor and Shutoff For more details, refer to the user's manual of the EUT.

3.5 EUT operation mode

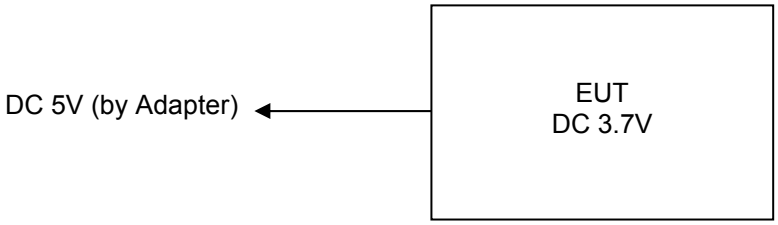
The Applicant provides communication tools software (AT command) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.
All test performed at the low, middle and high of operational frequency range of each mode.

Operation Frequency List WIFI on 5G Band：

Operating band	20MHz		40MHz		80MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
U-NII 1 (5150MHz-5250MHz)	**36**	**5180**	**38**	**5190**	--	--
	40	**5200**				
	44	5220	**46**	**5230**		
	48	**5240**				
U-NII 2A	**52**	**5260**	**54**	**5270**	--	--
	56	**5280**				
	60	5300	**62**	**5310**		
	64	**5320**				
U-NII 2C	**100**	**5500**	**102**	**5510**	--	--
	104	5520				
	108	5540	110	5550		
	112	5560				
	116	5580	**118**	**5590**	--	--
	120	**5600**				
	124	5620	--	--		
	128	5640				
	132	5660	**134**	**5670**	--	--
	140	**5700**			--	--
U-NII 3 (5725MHz-5850MHz)	**149**	**5745**	**151**	**5755**	--	--
	153	5765				
	157	**5785**	**159**	**5795**		
	161	5805				
	165	**5825**	--	--	--	--

Note: The line display in grey is those Channels/Frequencies select to test in this report for each operation mode.

3.6 Block Diagram of Test Setup



3.1 Test Item (Equipment Under Test) Description

Short designation	EUT Name	EUT Description	Serial number	Hardware status	Software status
EUT A	Adapter	YZDZ18-LD-01z	/	/	/
EUT B					

*: declared by the applicant. According to customers information EUTs A and B are the same devices.

3.2 Auxiliary Equipment (AE) Description

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	-		-	
AE 2	-			

3.3 Antenna Information*

Short designation	Antenna Name	Antenna Type	Frequency Range	Serial number	Antenna Peak Gain
Antenna 1	---	FPC Antenna	5180MHz-5240MHz 5260MHz-5320MHz 5500MHz-5700MHz 5745MHz-5825MHz	---	2.12dBi 2.72dBi 4.23dBi 5.27dBi
Antenna 2					

*: declared by the applicant.

3.4 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

3.5 Modifications

No modifications were implemented to meet testing criteria.

3.6 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - Supplied by the lab

●	ADAPTER	M/N:	YZDZ18-LD-01z
		Manufacturer:	/

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 0031192610

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

A2LA-Lab Cert. No.: 6343.01

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

4.3 Environmental conditions

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

4.4 Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dBm Bandwidth)	PASS$_{Note1}$
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dBm Bandwidth)	PASS$_{Note2}$
FCC Part 15.407(a)	Maximum Conducted Output Power	PASS
FCC Part 15.407(a)	Peak Power Spectral Density	PASS
FCC Part 15.407(g)	Frequency Stability	PASS
FCC Part 15.407(b)	Undesirable emission	PASS
FCC Part 15.407(b)/15.205/15.209	Radiated Emissions	PASS
FCC Part 15.407(h)	Dynamic Frequency Selection	PASS $_{Note\ 3}$
FCC Part 15.203/15.247(b)	Antenna Requirement	PASS

Note 1: Apply to U-NII 1, U-NII 2A, and U-NII 2C band.
Note 2: Apply to U-NII 3 band only.
Note 3: DFS is a separate report.

Data Rate Used:
Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate
Maximum Conducted Output Power Power Spectral Density Emission Bandwidth(26dBm Bandwidth) Minimum Emission Bandwidth(6dBm Bandwidth) Undesirable emission Frequency Stability	11a/OFDM	54 Mbps
	11n(20MHz)/OFDM	MCS7
	11n(40MHz)/OFDM	MCS7

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Most Technology Service Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Most Technology Service Co., Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)
20dB Bandwidth & 99% Bandwidth	/	5%	(1)
Maximum Conducted Output Power	/	0.80dB	(1)
Spurious RF Conducted Emission	/	1.6dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.6 Equipments Used during the Test

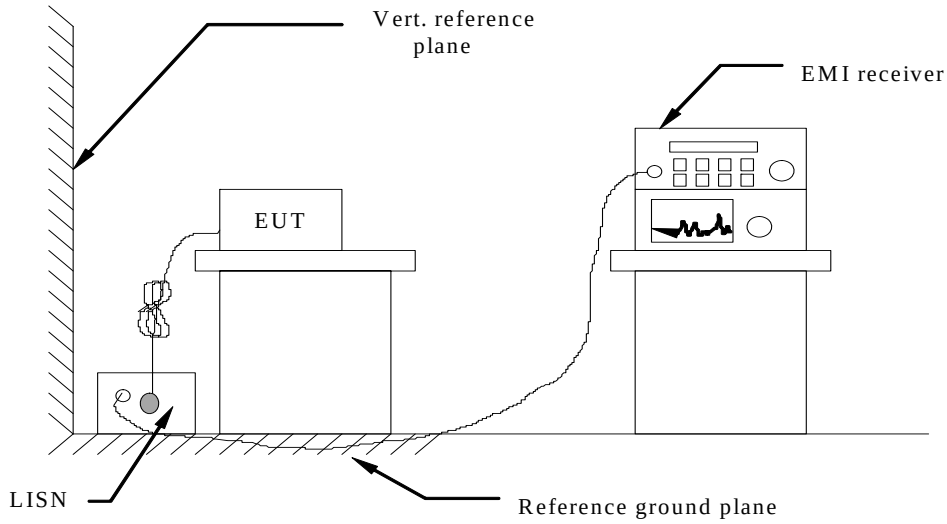
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware versions	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	100093	/	2024/03/15	1 Year
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	/	2024/03/15	1 Year
3.	Receiver	R&S	ESCI	100492	V3.0-10-2	2024/03/15	1 Year
4	Receiver	R&S	ESPI	101202	V3.0-10-2	2024/03/15	1 Year
5	Spectrum analyzer	Agilent	9020A	MT-E306	A14.16	2024/03/15	1 Year
6	Bilong Antenna	Sunol Sciences	JB3	A121206	/	2023/08/15	1 Year
7	Horn antenna	HF Antenna	HF Antenna	MT-E158	/	2024/03/15	1 Year
8	Loop antenna	Beijing Daze	ZN30900B	/	/	2024/03/15	1 Year
9	Horn antenna	R&S	OBH100400	26999002	/	2024/03/15	1 Year
10	Wireless Communication Test Set	R&S	CMW500	/	CMW-BASE-3.7.21	2024/03/15	1 Year
11	Spectrum analyzer	R&S	FSP	100019	V4.40 SP2	2024/03/15	1 Year
12	High gain antenna	Schwarzbeck	LB-180400KF	MT-E389	/	2024/03/15	1 Year
13	Preamplifier	Schwarzbeck	BBV 9743	MT-E390	/	2024/03/15	1 Year
14	Pre-amplifier	EMCI	EMC051845SE	MT-E391	/	2024/03/15	1 Year
15	Pre-amplifier	Agilent	83051A	MT-E392	/	2024/03/15	1 Year
16	High pass filter unit	Tonscend	JS0806-F	MT-E393	/	2024/03/15	1 Year
17	RF Cable(below1GHz)	Times	9kHz-1GHz	MT-E394	/	2024/03/15	1 Year
18	RF Cable(above 1GHz)	Times	1-40G	MT-E395	/	2024/03/15	1 Year
19	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	/	2024/03/15	1 Year

Note: The Cal.Interval was one year.

5 TEST CONDITIONS AND RESULTS

5.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC 5V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

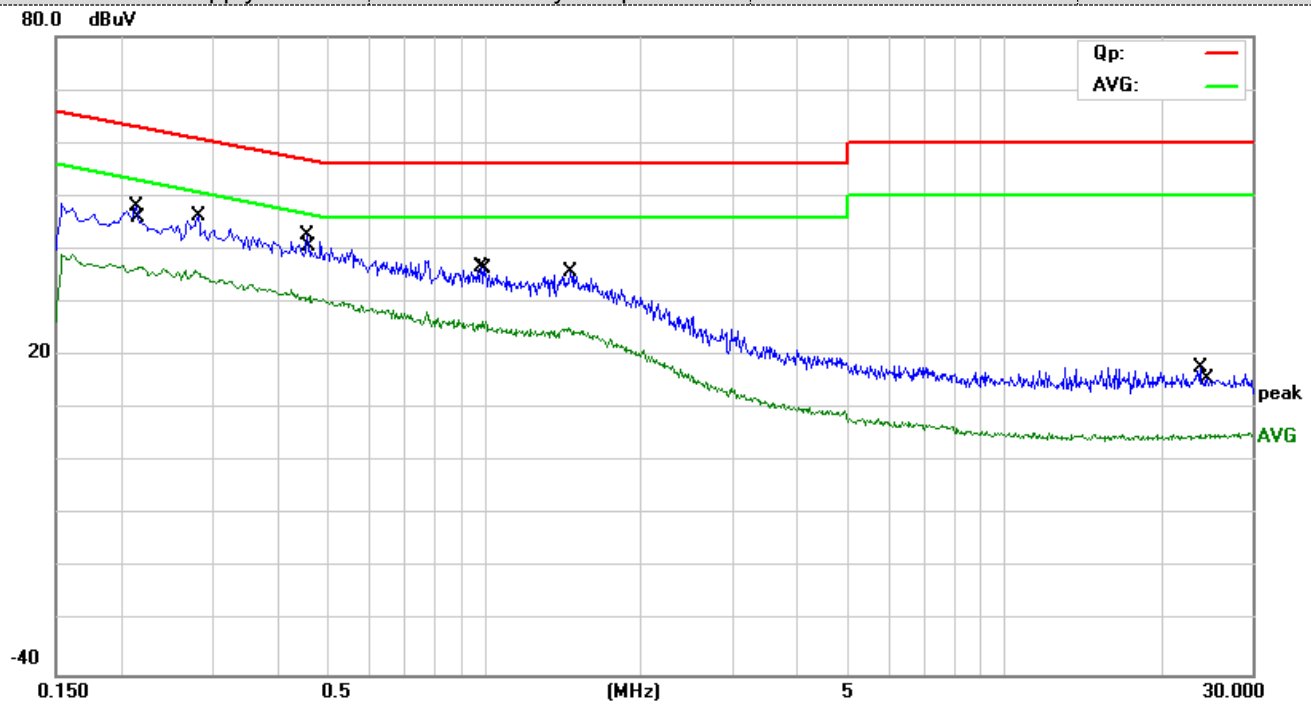
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

Remark:

1. WIFI 5G modes were test at 802.11a, 802.11n(20), 802.11n(40)(Low, Middle, and High channel); only the worst result of 802.11a Middle Channel was reported as below:

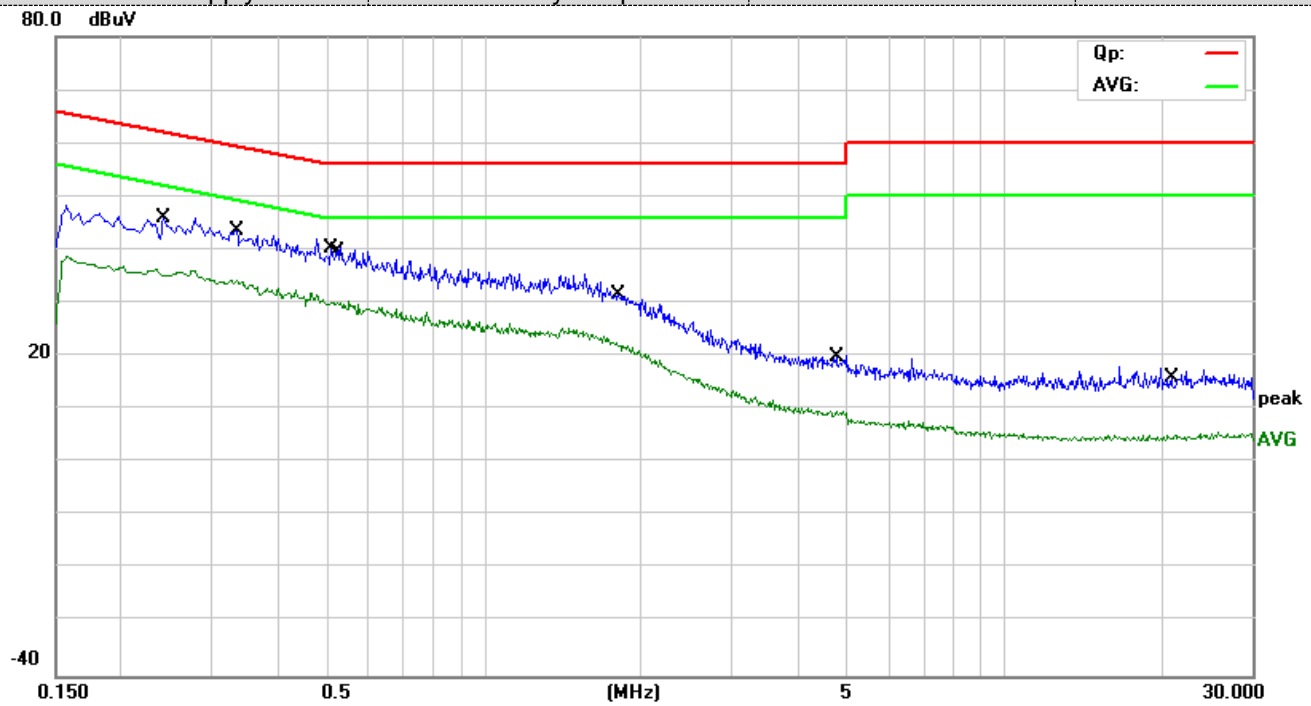
Power supply:	DC 5V by Adapter	Polarization	L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2140	38.37	9.60	47.97	63.05	-15.08	QP	
2		0.2180	27.06	9.60	36.66	52.89	-16.23	AVG	
3		0.2780	26.37	9.59	35.96	50.88	-14.92	AVG	
4		0.2820	36.79	9.59	46.38	60.76	-14.38	QP	
5	*	0.4580	32.93	9.59	42.52	56.73	-14.21	QP	
6		0.4620	21.65	9.59	31.24	46.66	-15.42	AVG	
7		0.9860	26.91	9.60	36.51	56.00	-19.49	QP	
8		1.0100	16.76	9.60	26.36	46.00	-19.64	AVG	
9		1.4660	26.15	9.60	35.75	56.00	-20.25	QP	
10		1.4660	15.29	9.60	24.89	46.00	-21.11	AVG	
11		23.8780	7.95	9.75	17.70	60.00	-42.30	QP	
12		24.4020	-4.56	9.75	5.19	50.00	-44.81	AVG	

*:Maximum data x:Over limit !:over margin

Power supply:	DC 5V by Adapter	Polarization	N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2380	25.74	9.60	35.34	52.17	-16.83	AVG	
2		0.2420	36.23	9.60	45.83	62.03	-16.20	QP	
3		0.3340	34.08	9.59	43.67	59.35	-15.68	QP	
4	*	0.3340	24.79	9.59	34.38	49.35	-14.97	AVG	
5		0.5100	30.67	9.59	40.26	56.00	-15.74	QP	
6		0.5140	20.57	9.59	30.16	46.00	-15.84	AVG	
7		1.8180	21.95	9.60	31.55	56.00	-24.45	QP	
8		1.8180	12.44	9.60	22.04	46.00	-23.96	AVG	
9		4.7660	10.10	9.63	19.73	56.00	-36.27	QP	
10		4.7660	0.10	9.63	9.73	46.00	-36.27	AVG	
11		20.6060	-4.57	9.73	5.16	50.00	-44.84	AVG	
12		20.9780	6.21	9.73	15.94	60.00	-44.06	QP	

*:Maximum data x:Over limit !:over margin

5.2 Radiated Emissions

Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Undesirable emission limits

Requirement	Limit(EIRP)	Limit (Field strength at 3m) Note1
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)		

Note1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

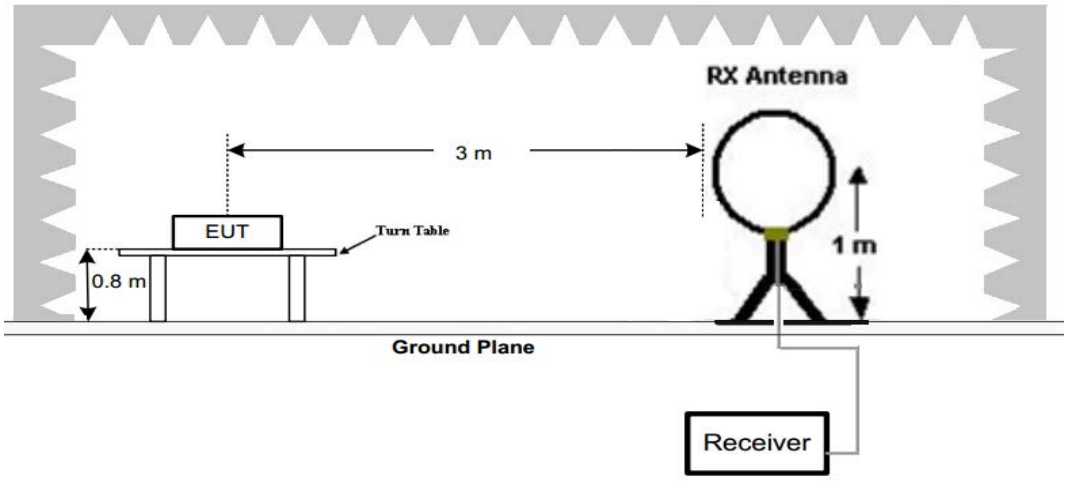
(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

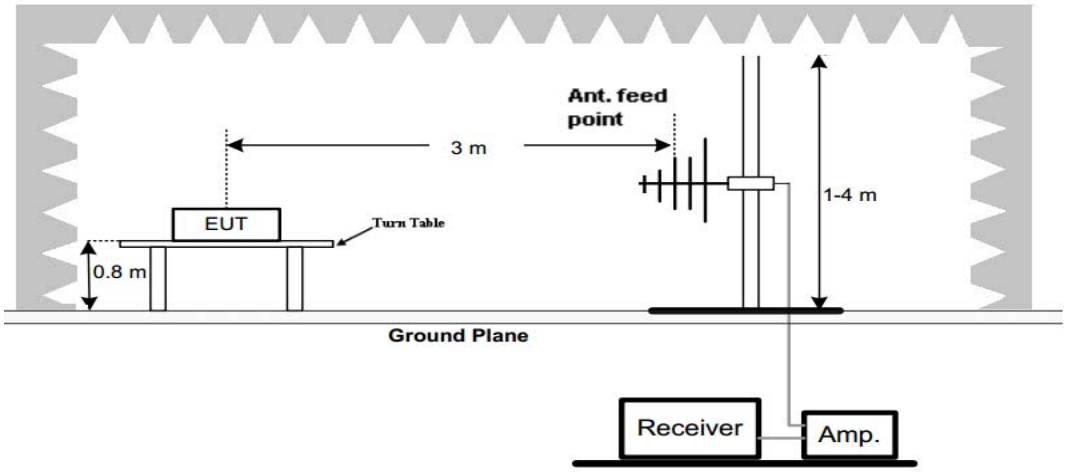
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

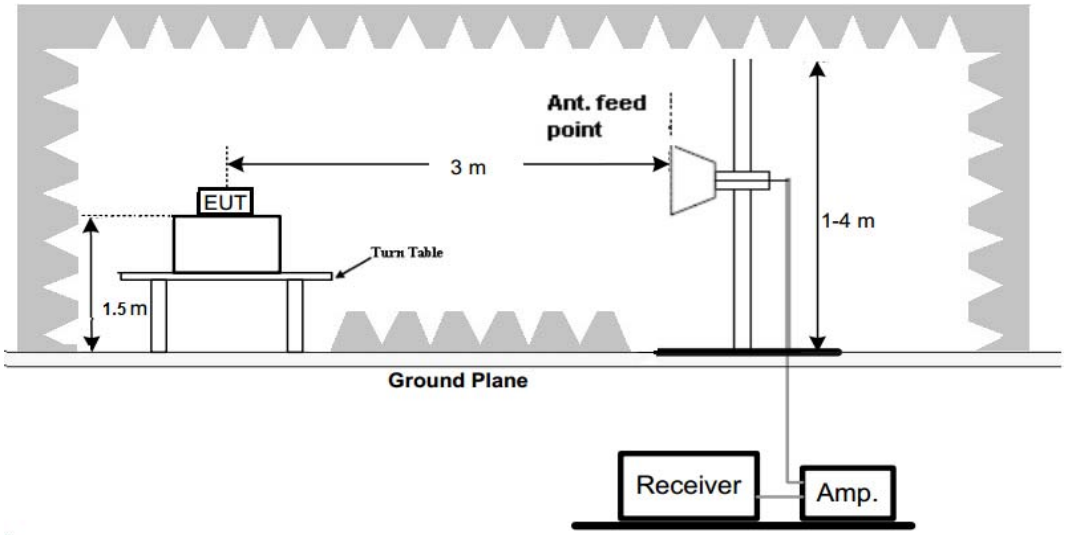
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

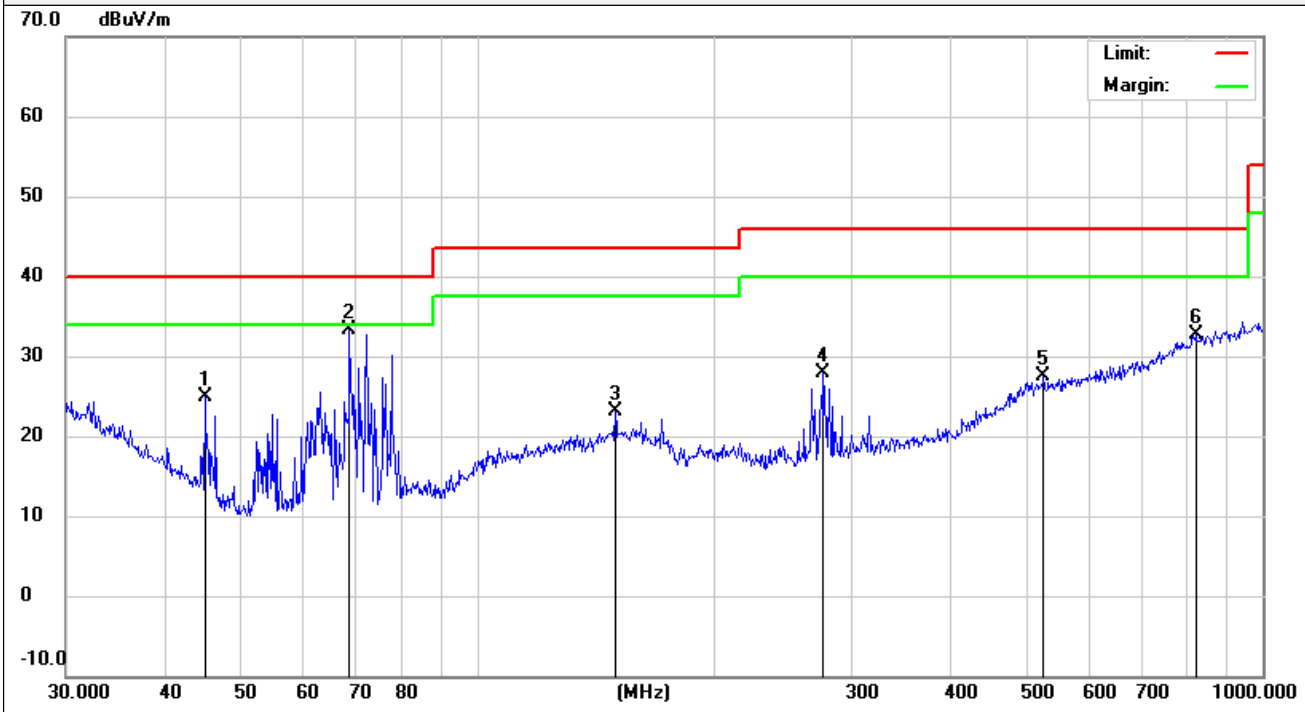
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

TEST RESULTS

Remark:
1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. All 802.11a / 802.11n (HT20) / 802.11n (HT40) modes have been tested for below 1GHz test, only the worst case 802.11a low channel of U-NII 1 band was recorded.
3. All 802.11a / 802.11n (HT20) / 802.11n (HT40) modes have been tested for above 1GHz test, only the worst case 802.11a was recorded.
4. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
5. Remark: Result=Reading value+Factor

For 30MHz-1GHz

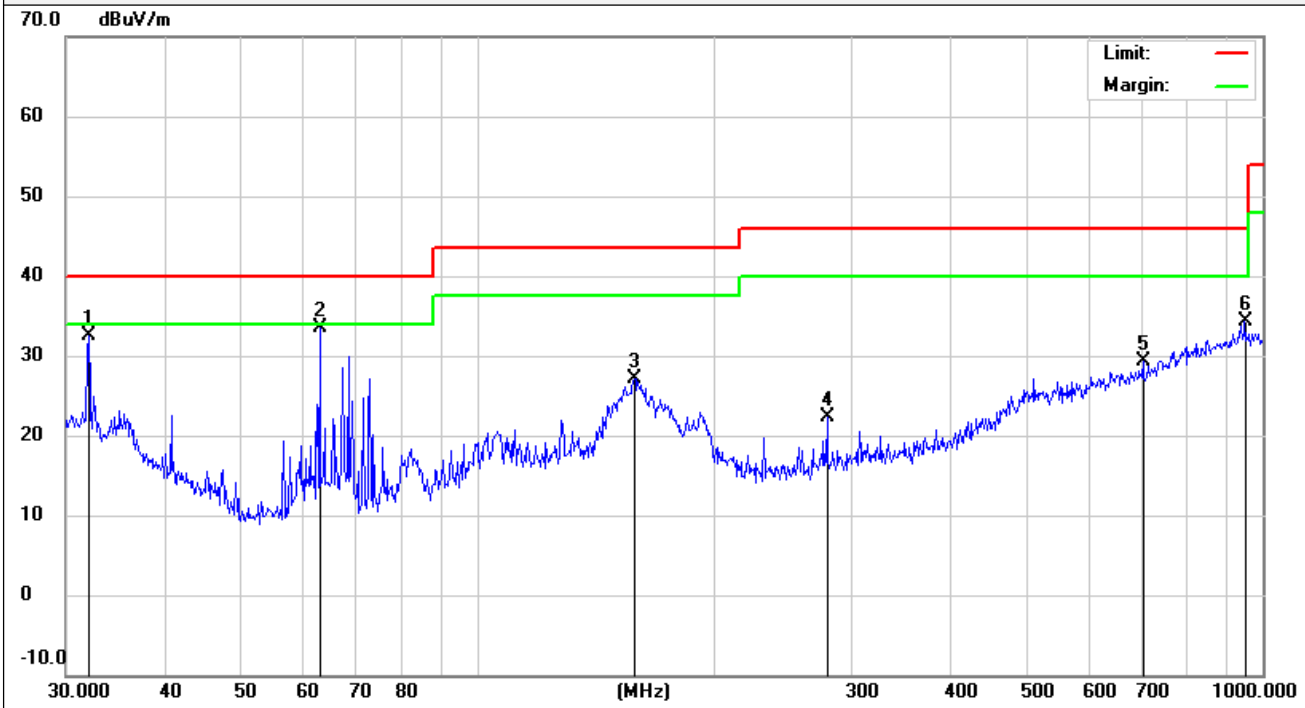
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		45.0583	14.40	10.47	24.87	40.00	-15.13	QP	200	20	
2	*	68.8721	24.02	9.22	33.24	40.00	-6.76	QP	200	40	
3		150.0108	5.46	17.70	23.16	43.50	-20.34	QP	200	100	
4		276.1235	13.17	14.69	27.86	46.00	-18.14	QP	200	150	
5		526.3967	4.45	22.99	27.44	46.00	-18.56	QP	200	200	
6		821.7103	4.49	28.14	32.63	46.00	-13.37	QP	200	270	

*:Maximum data x:Over limit !:over margin

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		32.0667	12.97	19.49	32.46	40.00	-7.54	QP	100	20	
2	*	63.0916	24.68	8.82	33.50	40.00	-6.50	QP	100	120	
3		158.6677	9.83	17.35	27.18	43.50	-16.32	QP	100	200	
4		279.0436	7.48	14.79	22.27	46.00	-23.73	QP	100	240	
5		704.2261	4.10	25.22	29.32	46.00	-16.68	QP	100	300	
6		948.7610	4.82	29.49	34.31	46.00	-11.69	QP	100	320	

*:Maximum data x:Over limit !:over margin

For 1GHz to 40GHz

Note: All 802.11a / 802.11n (HT20) / 802.11n (HT40) modes have been tested for above 1GHz test, only the worst case 802.11a was recorded.

U-NII 1

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
***802.11a Mode* -5180MHz**									
V	3586	54.6	29.03	5.24	36.4	52.47	68.2	15.73	PK
V	3586	42.87	29.03	5.24	36.4	40.74	54	13.26	AV
H	3586	52.72	29.03	5.24	36.4	50.59	68.2	17.61	PK
H	3586	46.5	29.03	5.24	36.4	44.37	54	9.63	AV
V	10360	33.88	39.41	11.45	34.28	50.46	68.2	17.74	PK
V	10360	24.52	39.41	11.45	34.28	41.1	54	12.9	AV
H	10360	34.44	39.41	11.45	34.28	51.02	68.2	17.18	PK
H	10360	27.42	39.41	11.45	34.28	44	54	10	AV
***802.11a Mode* -5200MHz**									
V	3586	52.8	29.03	5.24	36.4	50.67	68.2	17.53	PK
V	3586	42.8	29.03	5.24	36.4	40.67	54	13.33	AV
H	3586	53.44	29.03	5.24	36.4	51.31	68.2	16.89	PK
H	3586	47.95	29.03	5.24	36.4	45.82	54	8.18	AV
V	10400	35.91	39.42	11.47	34.28	52.52	68.2	15.68	PK
V	10400	26.33	39.42	11.47	34.28	42.94	54	11.06	AV
H	10400	36.78	39.42	11.47	34.28	53.39	68.2	14.81	PK
H	10400	28.2	39.42	11.47	34.28	44.81	54	9.19	AV
***802.11a Mode* -5240MHz**									
V	3586	53.34	29.03	5.24	36.4	51.21	68.2	16.99	PK
V	3586	43.02	29.03	5.24	36.4	40.89	54	13.11	AV
H	3586	54.12	29.03	5.24	36.4	51.99	68.2	16.21	PK
H	3586	46.98	29.03	5.24	36.4	44.85	54	9.15	AV
V	10480	36.22	39.43	11.47	34.28	52.84	68.2	15.36	PK
V	10480	26.02	39.43	11.47	34.28	42.64	54	11.36	AV
H	10480	36.82	39.43	11.47	34.28	53.44	68.2	14.76	PK
H	10480	26.51	39.43	11.47	34.28	43.13	54	10.87	AV

U-NII 2A

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
***802.11a Mode* -5260MHz**									
V	3603	54.82	29.03	5.24	36.4	52.69	68.2	15.51	PK
V	3603	42.35	29.03	5.24	36.4	40.22	54	13.78	AV
H	3603	54.96	29.03	5.24	36.4	52.83	68.2	15.37	PK
H	3603	48.71	29.03	5.24	36.4	46.58	54	7.42	AV
V	10520	35.99	39.43	11.47	34.28	52.61	68.2	15.59	PK
V	10520	24.09	39.43	11.47	34.28	40.71	54	13.29	AV
H	10520	34.02	39.43	11.47	34.28	50.64	68.2	17.56	PK
H	10520	27.45	39.43	11.47	34.28	44.07	54	9.93	AV
***802.11a Mode* -5280MHz**									
V	3603	54.26	29.03	5.24	36.4	52.13	68.2	16.07	PK
V	3603	43.01	29.03	5.24	36.4	40.88	54	13.12	AV
H	3603	54	29.03	5.24	36.4	51.87	68.2	16.33	PK
H	3603	46.94	29.03	5.24	36.4	44.81	54	9.19	AV
V	10560	35.38	39.43	11.47	34.28	52	68.2	16.2	PK
V	10560	25.56	39.43	11.47	34.28	42.18	54	11.82	AV
H	10560	35.74	39.43	11.47	34.28	52.36	68.2	15.84	PK
H	10560	26.38	39.43	11.47	34.28	43	54	11	AV
***802.11a Mode* -5320MHz**									
V	3603	52.9	29.03	5.24	36.4	50.77	68.2	17.43	PK
V	3603	43.97	29.03	5.24	36.4	41.84	54	12.16	AV
H	3603	52.77	29.03	5.24	36.4	50.64	68.2	17.56	PK
H	3603	47.18	29.03	5.24	36.4	45.05	54	8.95	AV
V	10640	36.07	39.44	11.47	34.28	52.7	68.2	15.5	PK
V	10640	26.29	39.44	11.47	34.28	42.92	54	11.08	AV
H	10640	36.88	39.44	11.47	34.28	53.51	68.2	14.69	PK
H	10640	28.02	39.44	11.47	34.28	44.65	54	9.35	AV

U-NII 2C

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
***802.11a Mode* -5500MHz**									
V	4982	52.57	32.52	5.24	36.4	53.93	68.2	14.27	PK
V	4982	39.56	32.52	5.24	36.4	40.92	54	13.08	AV
H	4982	50.48	32.52	5.24	36.4	51.84	68.2	16.36	PK
H	4982	43.36	32.52	5.24	36.4	44.72	54	9.28	AV
V	11000	36.34	39.46	11.47	34.28	52.99	68.2	15.21	PK
V	11000	24.01	39.46	11.47	34.28	40.66	54	13.34	AV
H	11000	35.17	39.46	11.47	34.28	51.82	68.2	16.38	PK
H	11000	26.47	39.46	11.47	34.28	43.12	54	10.88	AV
***802.11a Mode* -5600MHz**									
V	4982	49.71	32.52	5.24	36.4	51.07	68.2	17.13	PK
V	4982	40.4	32.52	5.24	36.4	41.76	54	12.24	AV
H	4982	51.11	32.52	5.24	36.4	52.47	68.2	15.73	PK
H	4982	44.85	32.52	5.24	36.4	46.21	54	7.79	AV
V	11200	34.57	39.46	11.47	34.28	51.22	68.2	16.98	PK
V	11200	25.38	39.46	11.47	34.28	42.03	54	11.97	AV
H	11200	35.79	39.46	11.47	34.28	52.44	68.2	15.76	PK
H	11200	28.42	39.46	11.47	34.28	45.07	54	8.93	AV
***802.11a Mode* -5700MHz**									
V	4982	49.82	32.52	5.24	36.4	51.18	68.2	17.02	PK
V	4982	40.16	32.52	5.24	36.4	41.52	54	12.48	AV
H	4982	49.58	32.52	5.24	36.4	50.94	68.2	17.26	PK
H	4982	44.94	32.52	5.24	36.4	46.3	54	7.7	AV
V	11400	37.29	39.46	11.47	34.28	53.94	68.2	14.26	PK
V	11400	25.43	39.46	11.47	34.28	42.08	54	11.92	AV
H	11400	37.06	39.46	11.47	34.28	53.71	68.2	14.49	PK
H	11400	28.89	39.46	11.47	34.28	45.54	54	8.46	AV

U-NII 3

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
***802.11a Mode* -5745MHz**									
V	5112	50.54	32.84	5.24	36.4	52.22	68.2	15.98	PK
V	5112	38.51	32.84	5.24	36.4	40.19	54	13.81	AV
H	5112	51.25	32.84	5.24	36.4	52.93	68.2	15.27	PK
H	5112	44.36	32.84	5.24	36.4	46.04	54	7.96	AV
V	11490	35.01	39.52	11.47	34.28	51.72	68.2	16.48	PK
V	11490	24.99	39.52	11.47	34.28	41.7	54	12.3	AV
H	11490	34.81	39.52	11.47	34.28	51.52	68.2	16.68	PK
H	11490	27.24	39.52	11.47	34.28	43.95	54	10.05	AV
***802.11a Mode* -5785MHz**									
V	5112	49.41	32.84	5.24	36.4	51.09	68.2	17.11	PK
V	5112	38.74	32.84	5.24	36.4	40.42	54	13.58	AV
H	5112	50.83	32.84	5.24	36.4	52.51	68.2	15.69	PK
H	5112	43.87	32.84	5.24	36.4	45.55	54	8.45	AV
V	11570	34.64	39.52	11.47	34.28	51.35	68.2	16.85	PK
V	11570	26.15	39.52	11.47	34.28	42.86	54	11.14	AV
H	11570	35.01	39.52	11.47	34.28	51.72	68.2	16.48	PK
H	11570	26.29	39.52	11.47	34.28	43	54	11	AV
***802.11a Mode* -5825MHz**									
V	5112	49.21	32.84	5.24	36.4	50.89	68.2	17.31	PK
V	5112	38.63	32.84	5.24	36.4	40.31	54	13.69	AV
H	5112	50.32	32.84	5.24	36.4	52	68.2	16.2	PK
H	5112	43.46	32.84	5.24	36.4	45.14	54	8.86	AV
V	11650	36.97	39.52	11.47	34.28	53.68	68.2	14.52	PK
V	11650	26.87	39.52	11.47	34.28	43.58	54	10.42	AV
H	11650	35.44	39.52	11.47	34.28	52.15	68.2	16.05	PK
H	11650	27.93	39.52	11.47	34.28	44.64	54	9.36	AV

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the other emission levels were very low against the limit.
5. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Radiated Band Edge Test:

All 802.11a / 802.11n (HT20) / 802.11n (HT40) modes have been tested for above 1GHz test, only the worst case 802.11a was recorded.

U-NII 1

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11a									
V	5150	55.07	31.22	7.62	36.5	57.41	74	16.59	PK
V	5150	37.66	31.22	7.62	36.5	40	54	14	AV
H	5150	54.33	31.22	7.62	36.5	56.67	74	17.33	PK
H	5150	41.77	31.22	7.62	36.5	44.11	54	9.89	AV
V	5350	55.78	31.56	7.83	35.82	59.35	74	14.65	PK
V	5350	39.92	31.56	7.83	35.82	43.49	54	10.51	AV
H	5350	54.51	31.56	7.83	35.82	58.08	74	15.92	PK
H	5350	39.89	31.56	7.83	35.82	43.46	54	10.54	AV

U-NII 2A

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11a									
V	5150	56.04	31.22	7.62	36.5	58.38	74	15.62	PK
V	5150	39.04	31.22	7.62	36.5	41.38	54	12.62	AV
H	5150	55.62	31.22	7.62	36.5	57.96	74	16.04	PK
H	5150	42.59	31.22	7.62	36.5	44.93	54	9.07	AV
V	5350	54.14	31.56	7.83	35.82	57.71	74	16.29	PK
V	5350	38.66	31.56	7.83	35.82	42.23	54	11.77	AV
H	5350	55.86	31.56	7.83	35.82	59.43	74	14.57	PK
H	5350	41.01	31.56	7.83	35.82	44.58	54	9.42	AV

U-NII 2C

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable loss (dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11a									
V	5460	53.75	31.62	7.89	35.76	57.5	74	16.5	PK
V	5460	36.79	31.62	7.89	35.76	40.54	54	13.46	AV
H	5460	52.6	31.62	7.89	35.76	56.35	74	17.65	PK
H	5460	42.03	31.62	7.89	35.76	45.78	54	8.22	AV
V	5850	53.47	31.71	7.92	35.55	57.55	74	16.45	PK
V	5850	39.29	31.71	7.92	35.55	43.37	54	10.63	AV
H	5850	55.73	31.71	7.92	35.55	59.81	74	14.19	PK
H	5850	41.69	31.71	7.92	35.55	45.77	54	8.23	AV

U-NII 3

Polar (H/V)	Frequency	Meter Reading	Antenna Factor	Cable loss	Preamp factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
802.11a									
V	5460	54.29	31.62	7.89	35.76	58.04	74	15.96	PK
V	5460	37.5	31.62	7.89	35.76	41.25	54	12.75	AV
H	5460	55.07	31.62	7.89	35.76	58.82	74	15.18	PK
H	5460	40.53	31.62	7.89	35.76	44.28	54	9.72	AV
V	5850	54.68	31.71	7.92	35.55	58.76	74	15.24	PK
V	5850	39.06	31.71	7.92	35.55	43.14	54	10.86	AV
H	5850	54.54	31.71	7.92	35.55	58.62	74	15.38	PK
H	5850	40.31	31.71	7.92	35.55	44.39	54	9.61	AV

5.3 Conduction spurious emission

Limit

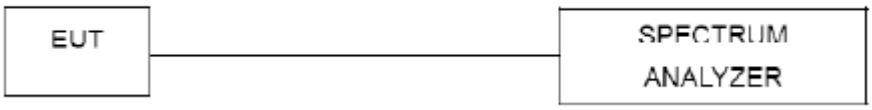
The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Test Procedure

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 1 MHz for f ⩾ 1 GHz, 100 kHz for f < 1 GHz
VBW ⩾ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

Test Configuration



TEST RESULTS
See Appendix VIII

5.4 Maximum Conducted Average Output Power

Limit

For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

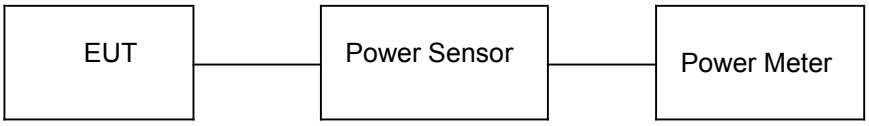
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration



Test Results

See Appendix IV

5.5 Power Spectral Density

Limit

(1) For the band 5.15 - 5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.[note1]

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.[note1]

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band. [note1]

(2) For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. [note1]

(3) For the band 5.725 - 5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. [note1, note2]

Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 510KHz for U-NII 3 band.
3. Set the VBW ≥ 3× RBW.
4. Set the span to encompass the entire EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.

Test Configuration

Test Results

See Appendix III

5.6 Emission Bandwidth (26dBm Bandwidth)

Limit

N/A

Test Procedure

1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

Test Configuration

Test Results

See Appendix VII

5.7 Minimum Emission Bandwidth (6dBm Bandwidth)

Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration

Test Results

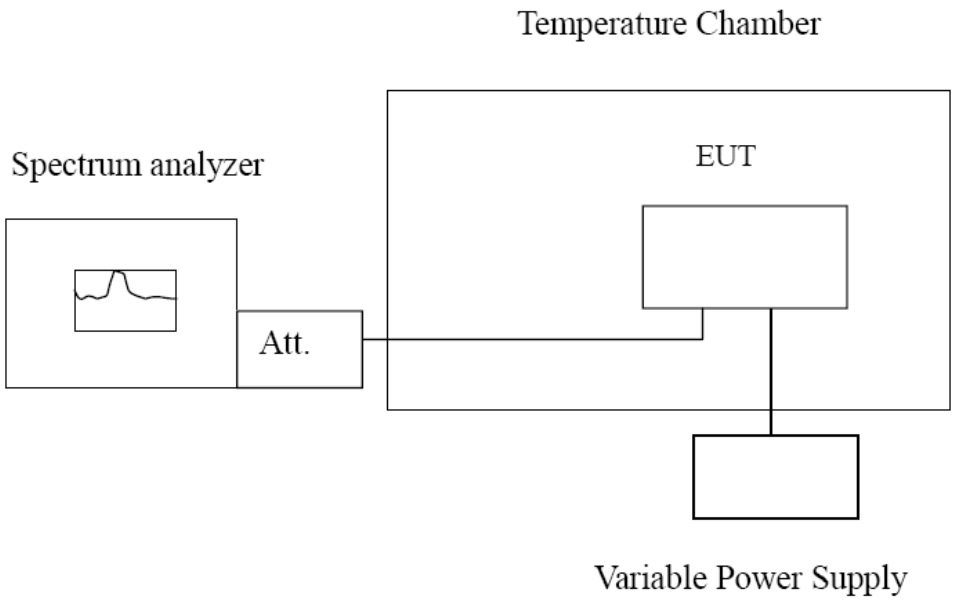
See Appendix VI

5.8 Frequency Stability

LIMIT

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

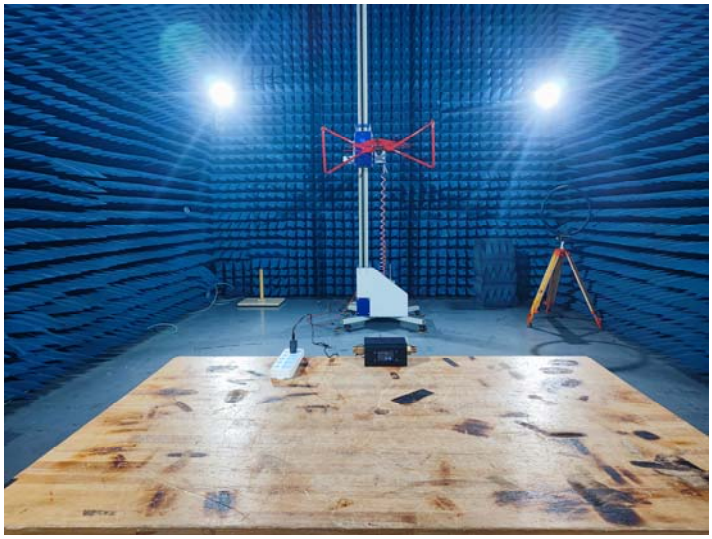
TEST RESULTS

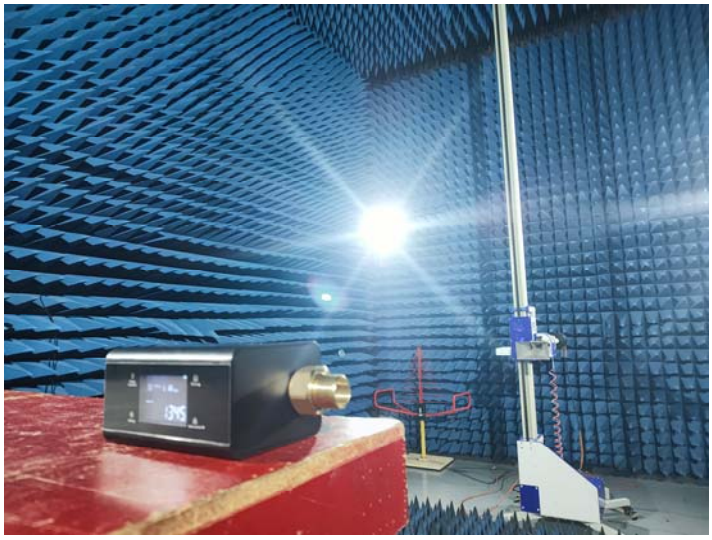
See Appendix I

5.9 Duty Cycle Information

See Appendix II

6 Test Setup Photos of the EUT





7 Photos of the EUT

see photo report.

APPENDIX I.Frequency Stability

Test Result

Condition	Mode	Ch.	Antenna	Center Frequency (MHz)	Calculated Value of Center Frequency(MHz)	Result (ppm)	Limit (ppm)	State
NT/NV	IEEE 802.11a	36	0	5180.0	5180.235587	45.48	Within authorized band	PASS
		40		5200.0	5200.233375	44.88		PASS
		48		5240.0	5240.227049	43.33		PASS
		52		5260.0	5260.226512	43.06		PASS
		56		5280.0	5280.240275	45.51		PASS
		64		5320.0	5320.236225	44.4		PASS
		100		5500.0	5500.236587	43.02		PASS
		120		5600.0	5600.241050	43.04		PASS
		140		5700.0	5700.228699	40.12		PASS
	IEEE 802.11n_20	36		5180.0	5180.236700	45.69		PASS
		40		5200.0	5200.244000	46.92		PASS
		48		5240.0	5240.243662	46.5		PASS
		52		5260.0	5260.238012	45.25		PASS
		56		5280.0	5280.244012	46.21		PASS
		64		5320.0	5320.226049	42.49		PASS
		100		5500.0	5500.236887	43.07		PASS
		120		5600.0	5600.242900	43.37		PASS
		140		5700.0	5699.779101	-38.75		PASS
	IEEE 802.11n_40	38		5190.0	5190.231762	44.66		PASS
		46		5230.0	5230.220149	42.09		PASS
		54		5270.0	5269.956093	-8.33		PASS
		62		5310.0	5310.212987	40.11		PASS
		102		5510.0	5509.986581	-2.44		PASS
		118		5590.0	5590.235775	42.18		PASS
		134		5670.0	5669.751700	-43.79		PASS

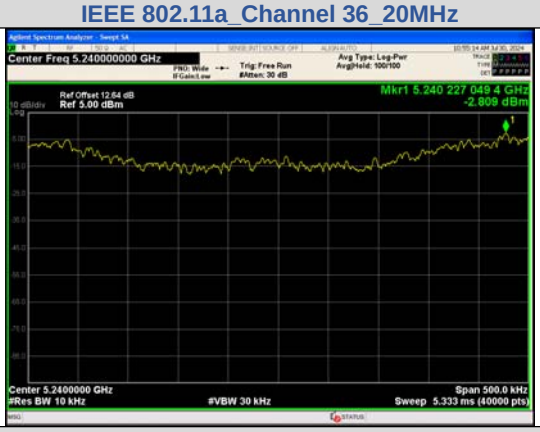
Test Graphs

NT/NV

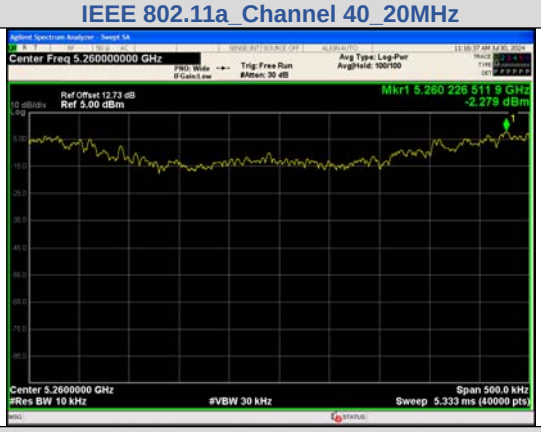
IEEE 802.11a

NT/NV_Antenna 0
IEEE 802.11a_Channel 36_20MHz

NT/NV_Antenna 0
IEEE 802.11a_Channel 40_20MHz



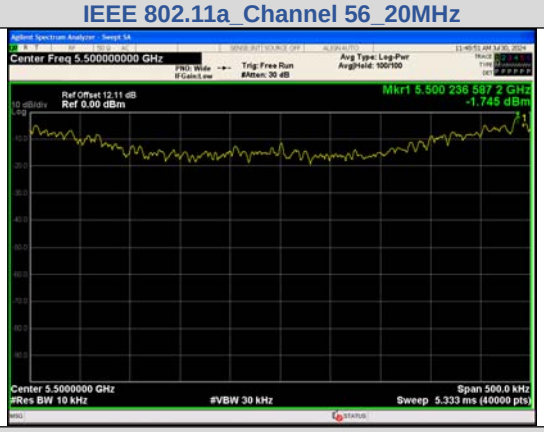
NT/NV_Antenna 0
IEEE 802.11a_Channel 48_20MHz



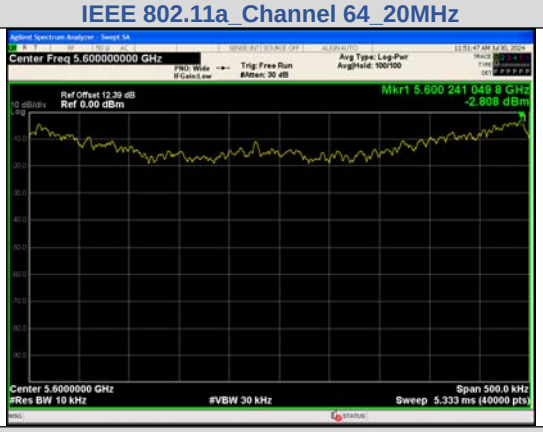
NT/NV_Antenna 0
IEEE 802.11a_Channel 52_20MHz

NT/NV_Antenna 0
IEEE 802.11a_Channel 56_20MHz

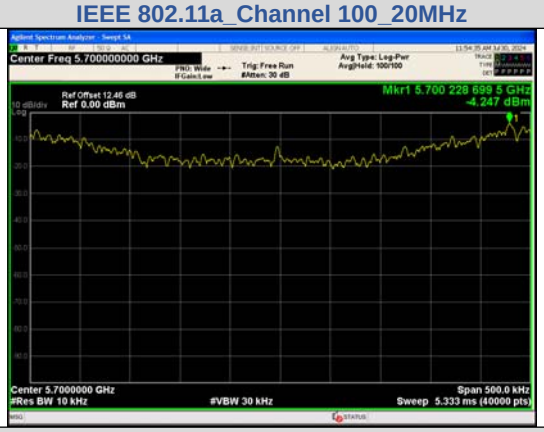
NT/NV_Antenna 0
IEEE 802.11a_Channel 64_20MHz



NT/NV_Antenna 0
IEEE 802.11a_Channel 100_20MHz



NT/NV_Antenna 0
IEEE 802.11a_Channel 120_20MHz



NT/NV_Antenna 0
IEEE 802.11a_Channel 140_20MHz

IEEE 802.11n_20

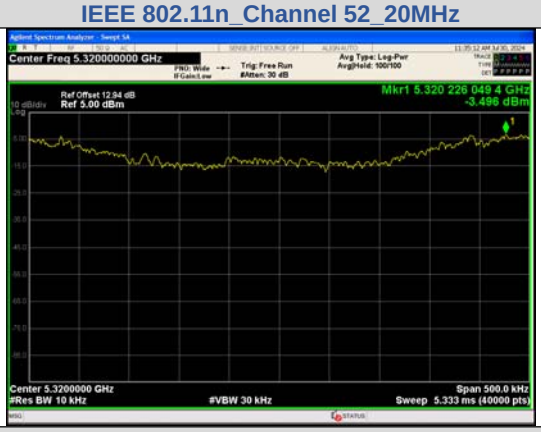
NT/NV_Antenna 0
IEEE 802.11n_Channel 36_20MHz

NT/NV_Antenna 0
IEEE 802.11n_Channel 40_20MHz

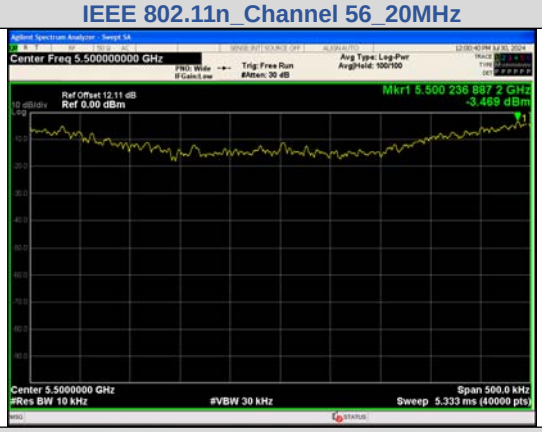
NT/NV_Antenna 0
IEEE 802.11n_Channel 48_20MHz

NT/NV_Antenna 0
IEEE 802.11n_Channel 52_20MHz

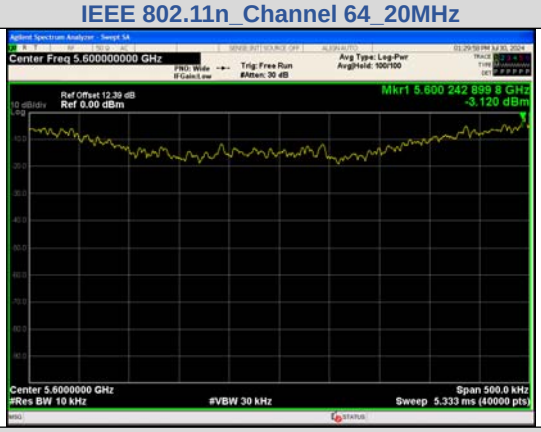
NT/NV_Antenna 0
IEEE 802.11n_Channel 56_20MHz



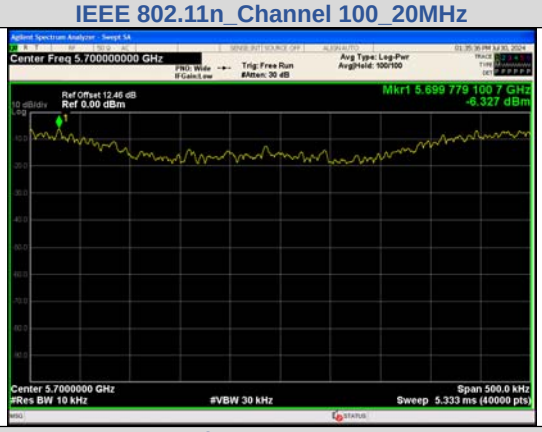
NT/NV_Antenna 0
IEEE 802.11n_Channel 64_20MHz



NT/NV_Antenna 0
IEEE 802.11n_Channel 100_20MHz



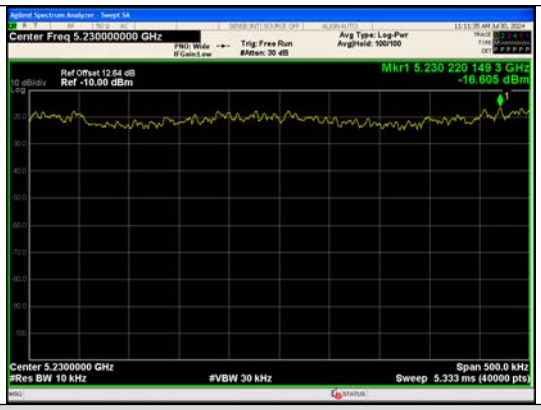
NT/NV_Antenna 0
IEEE 802.11n_Channel 120_20MHz



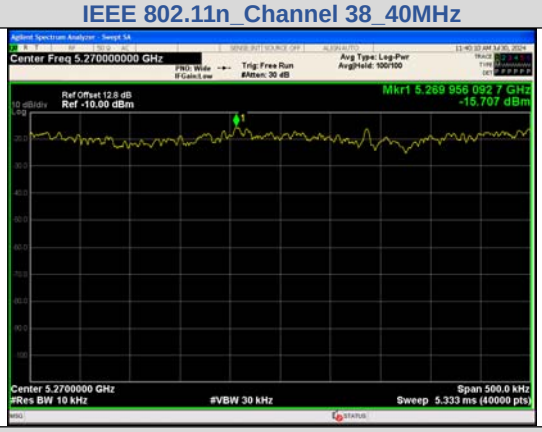
NT/NV_Antenna 0
IEEE 802.11n_Channel 140_20MHz

IEEE 802.11n_40

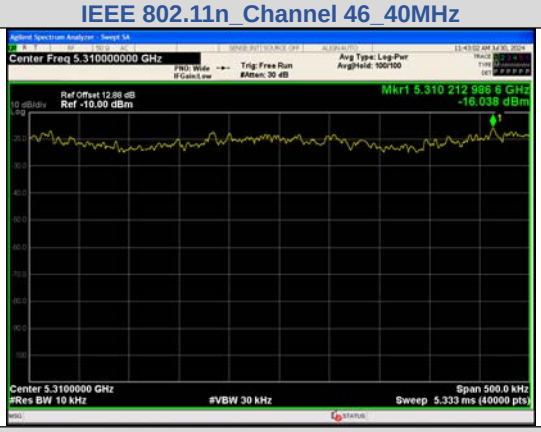
NT/NV_Antenna 0
IEEE 802.11n_Channel 38_40MHz



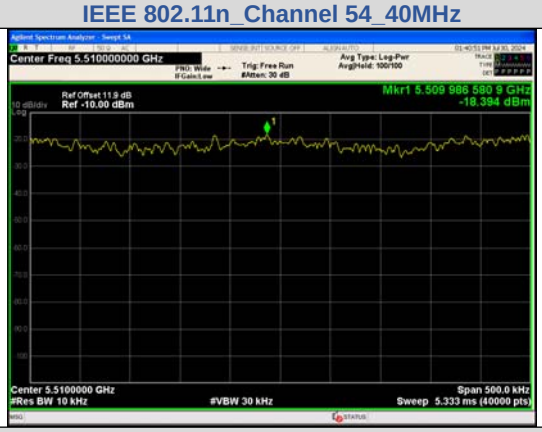
NT/NV_Antenna 0
IEEE 802.11n_Channel 46_40MHz



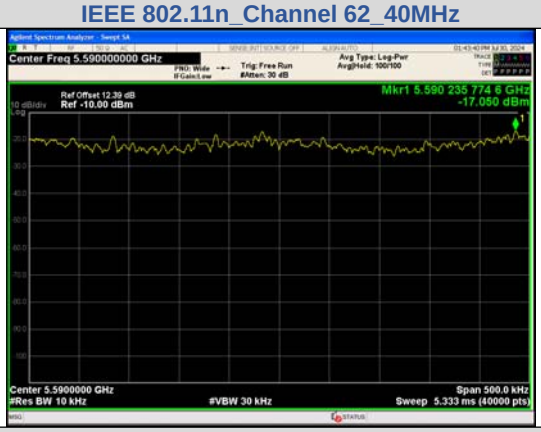
NT/NV_Antenna 0
IEEE 802.11n_Channel 54_40MHz



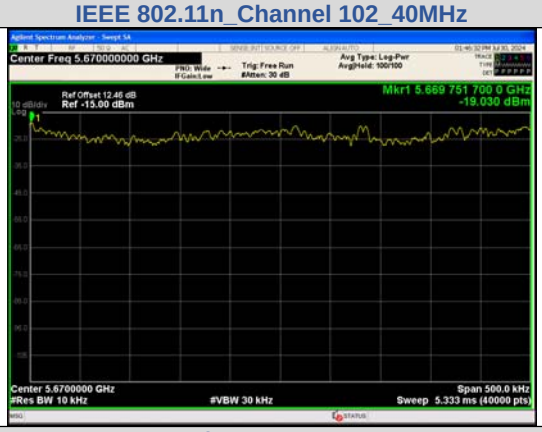
NT/NV_Antenna 0
IEEE 802.11n_Channel 62_40MHz



NT/NV_Antenna 0
IEEE 802.11n_Channel 102_40MHz



NT/NV_Antenna 0
IEEE 802.11n_Channel 118_40MHz



NT/NV_Antenna 0
IEEE 802.11n_Channel 134_40MHz

Test Result

Condition	Mode	Ch.	Antenna	Center Frequency (MHz)	Calculated Value of Center Frequency(MHz)	Result (ppm)	Limit (ppm)	State
NT/NV	IEEE 802.11a	149	0	5745.0	5745.233712	40.68	Within authorized band	PASS
		157		5785.0	5785.224062	38.73		PASS
		165		5825.0	5825.226762	38.93		PASS
	IEEE 802.11n_20	149		5745.0	5745.243962	42.47		PASS
		157		5785.0	5785.242262	41.88		PASS
		165		5825.0	5825.243262	41.76		PASS
	IEEE 802.11n_40	151		5755.0	5755.185761	32.28		PASS
		159		5795.0	5795.246075	42.46		PASS

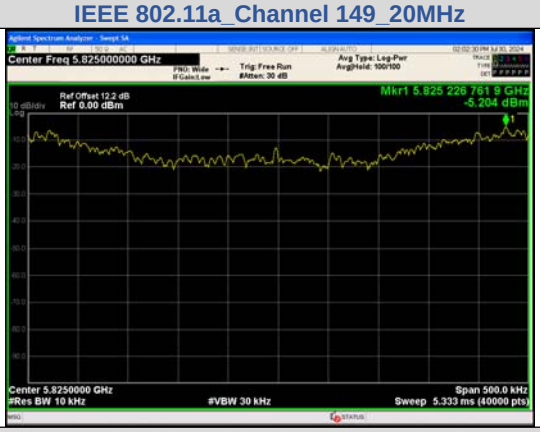
Test Graphs

NT/NV

IEEE 802.11a

NT/NV_Antenna 0
IEEE 802.11a_Channel 149_20MHz

NT/NV_Antenna 0
IEEE 802.11a_Channel 157_20MHz



NT/NV_Antenna 0
IEEE 802.11a_Channel 165_20MHz

IEEE 802.11n_20

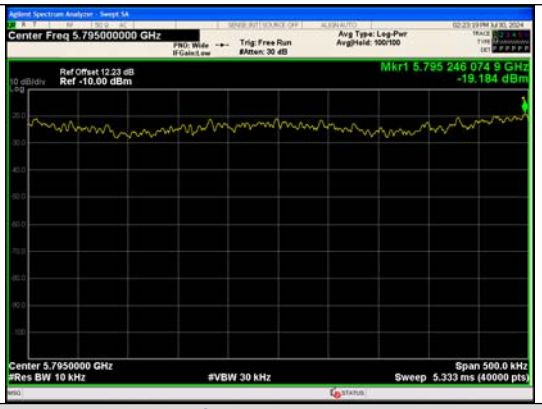
NT/NV_Antenna 0
IEEE 802.11n_Channel 149_20MHz

NT/NV_Antenna 0
IEEE 802.11n_Channel 157_20MHz

NT/NV_Antenna 0
IEEE 802.11n_Channel 165_20MHz

IEEE 802.11n_40

NT/NV_Antenna 0
IEEE 802.11n_Channel 151_40MHz



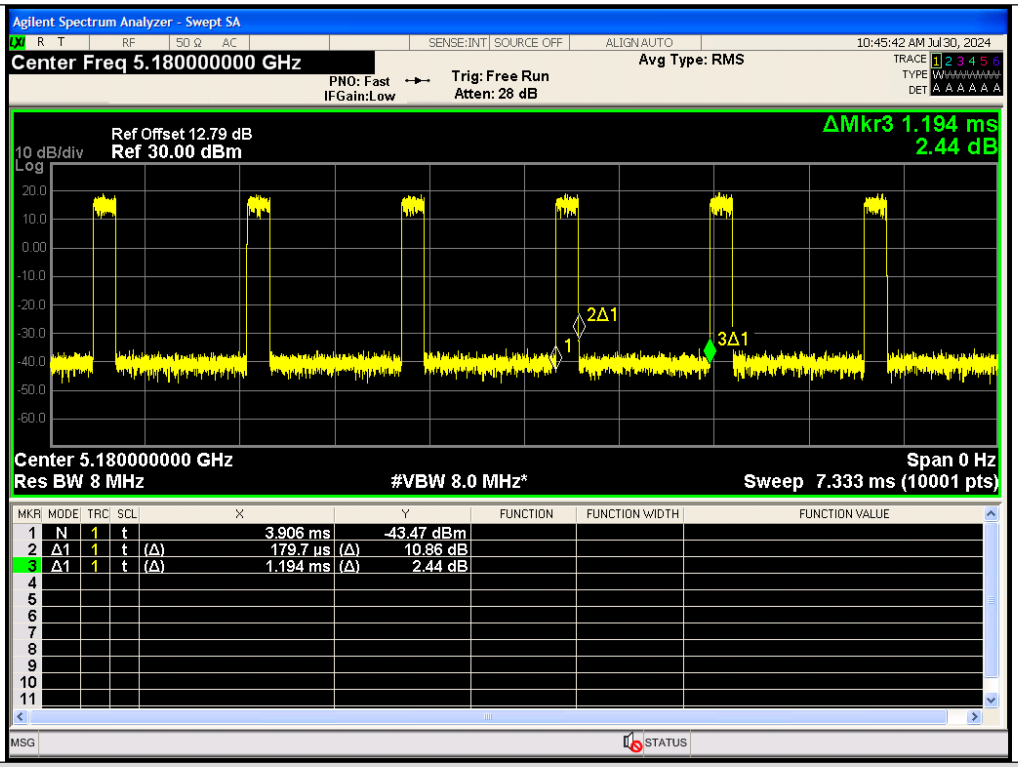
NT/NV_Antenna 0
IEEE 802.11n_Channel 159_40MHz

APPENDIX II.Duty Cycle

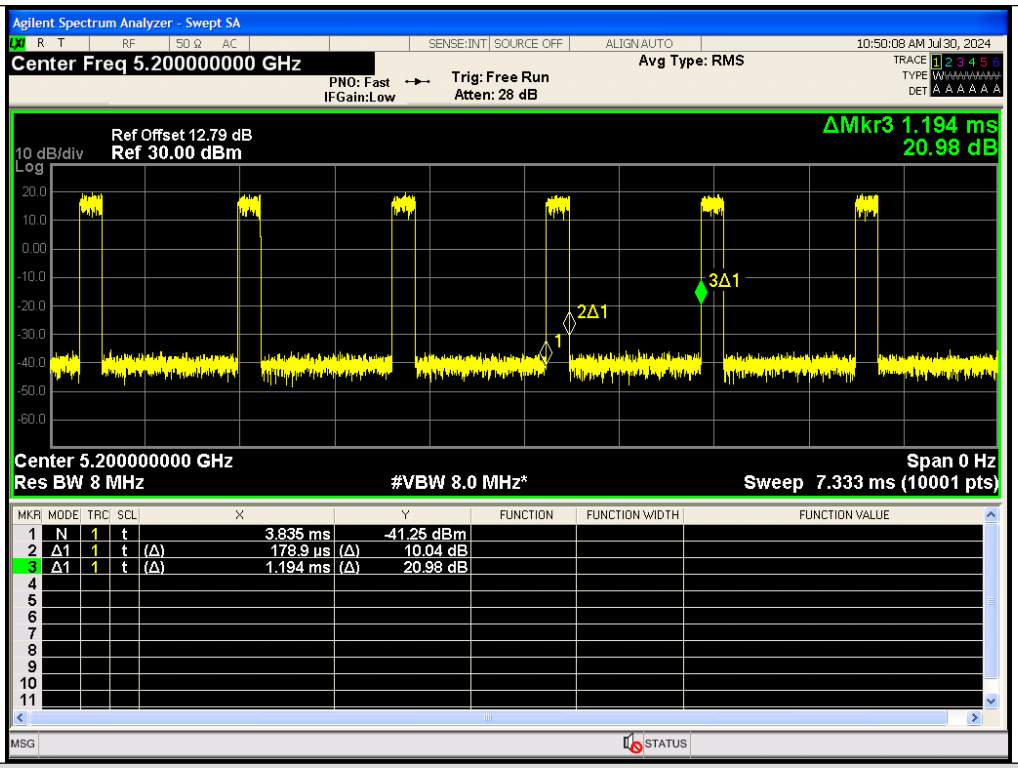
Test Result

Mode	Data rates	Channel	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
IEEE 802.11a	54	36	1	0.180	1.194	15.05	0.1505	8.2246
		40		0.179	1.194	14.99	0.1499	8.242
		48		0.179	1.194	14.99	0.1499	8.242
		52		0.179	1.200	14.91	0.1491	8.2652
		56		0.179	1.198	14.94	0.1494	8.2565
		64		0.179	1.198	14.94	0.1494	8.2565
		100		0.179	1.198	14.93	0.1493	8.2594
		120		0.180	1.198	14.99	0.1499	8.242
		140		0.179	1.198	14.94	0.1494	8.2565
IEEE 802.11n_20	MCS 7	36		0.549	1.832	29.97	0.2997	5.2331
		40		0.548	1.561	35.11	0.3511	4.5457
		48		0.548	1.566	34.99	0.3499	4.5606
		52		0.548	1.566	34.99	0.3499	4.5606
		56		0.548	1.566	34.99	0.3499	4.5606
		64		0.548	1.566	34.99	0.3499	4.5606
		100		0.548	1.566	34.99	0.3499	4.5606
		120		0.548	1.566	34.99	0.3499	4.5606
		140		0.548	1.566	34.99	0.3499	4.5606
IEEE 802.11n_40		38		0.527	1.545	34.12	0.3412	4.6699
		46		0.528	1.543	34.22	0.3422	4.6572
		54		0.528	1.547	34.13	0.3413	4.6686
		62		0.529	1.546	34.22	0.3422	4.6572
		102		0.528	1.547	34.13	0.3413	4.6686
		118		0.527	1.547	34.09	0.3409	4.6737
		134		0.527	1.544	34.09	0.3409	4.6737

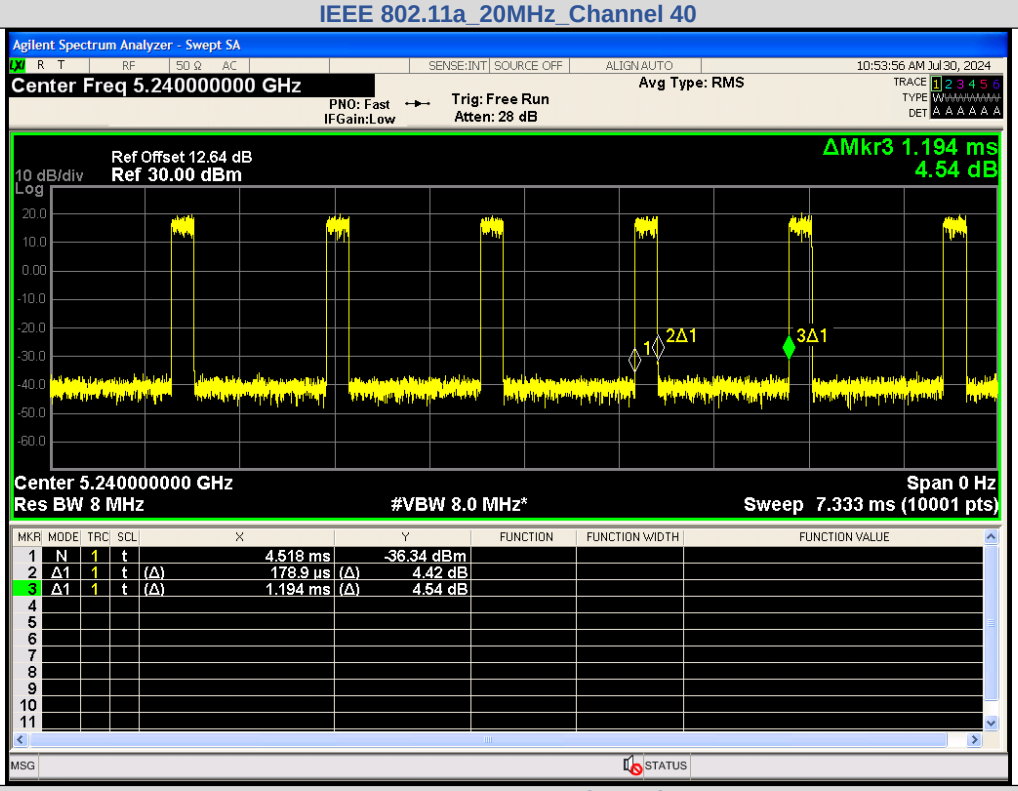
Test Graphs



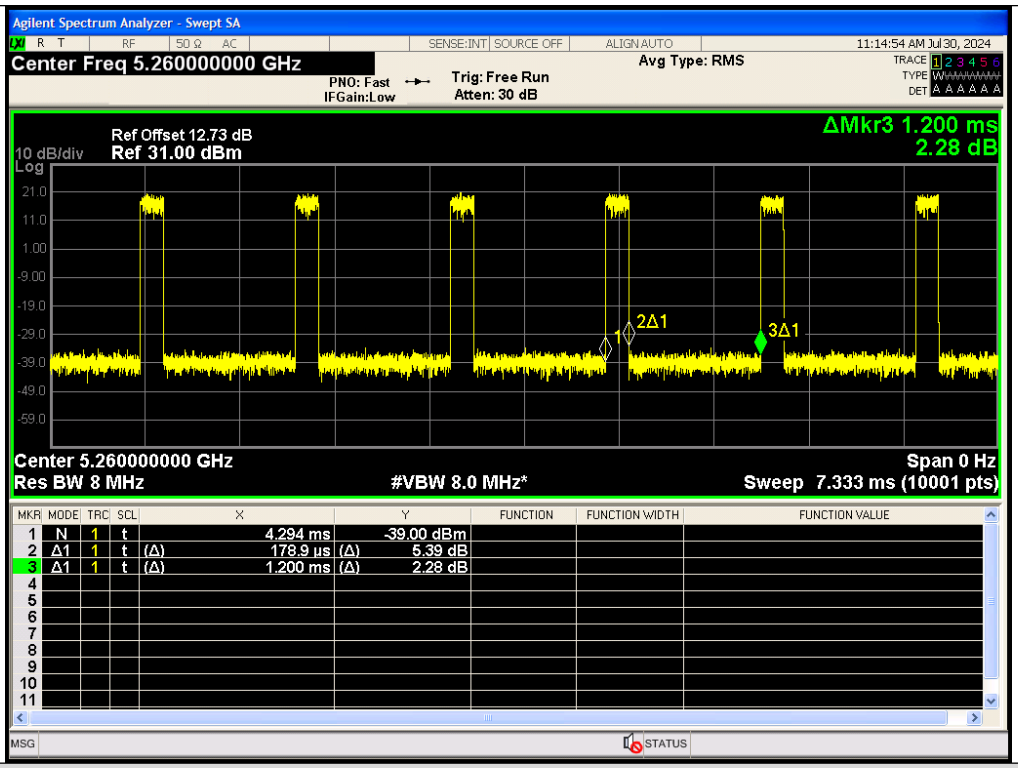
IEEE 802.11a_20MHz_Channel 36



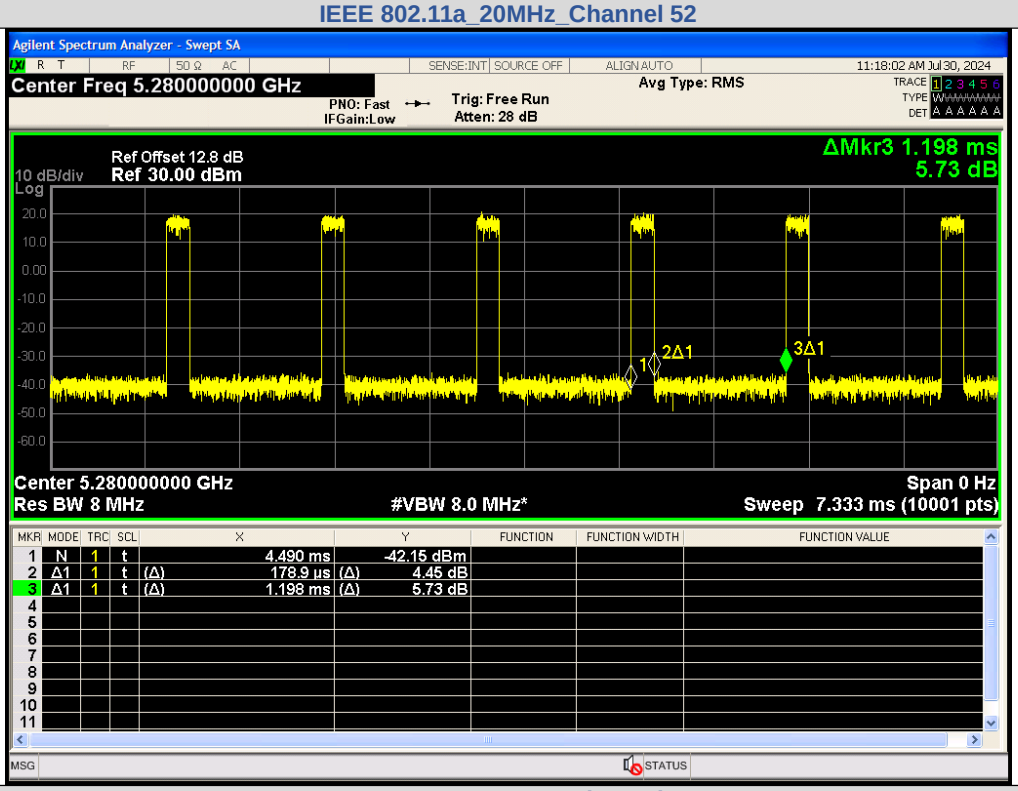
IEEE 802.11a_20MHz_Channel 40



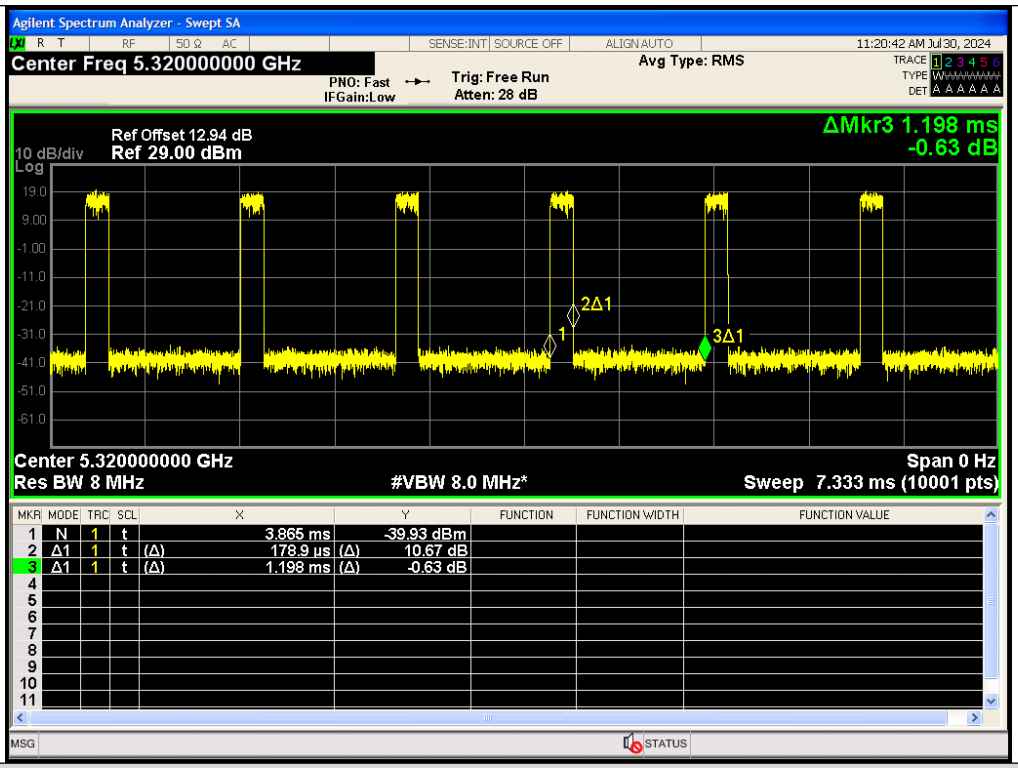
IEEE 802.11a_20MHz_Channel 48



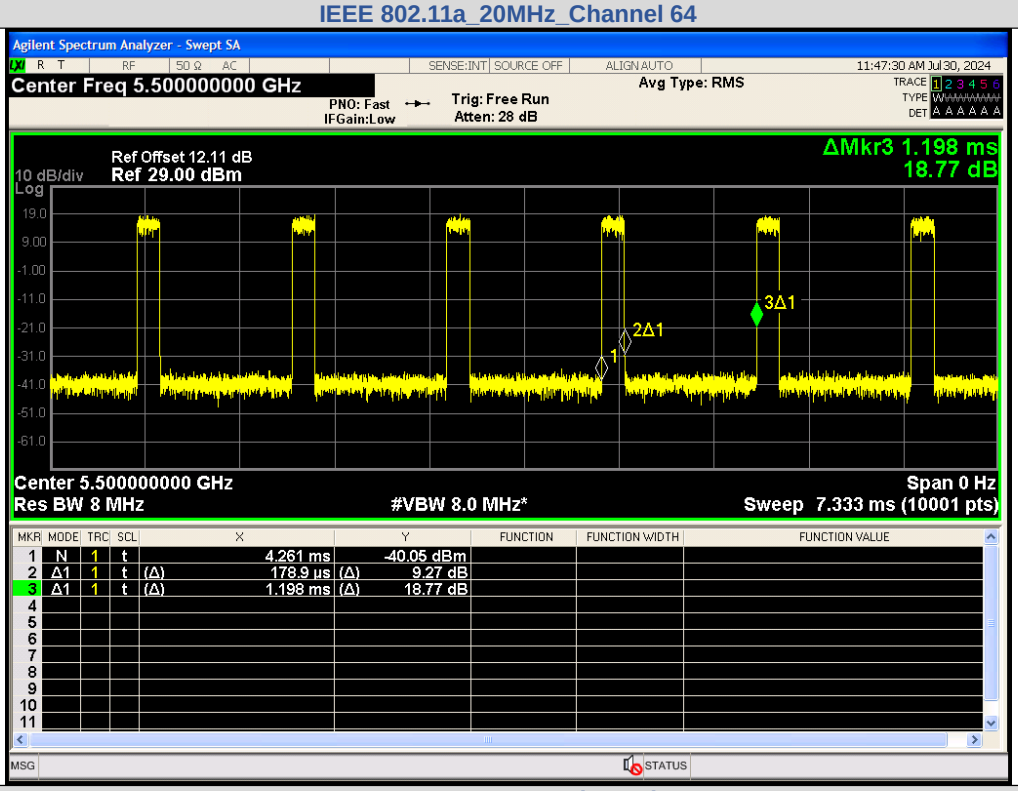
IEEE 802.11a_20MHz_Channel 52



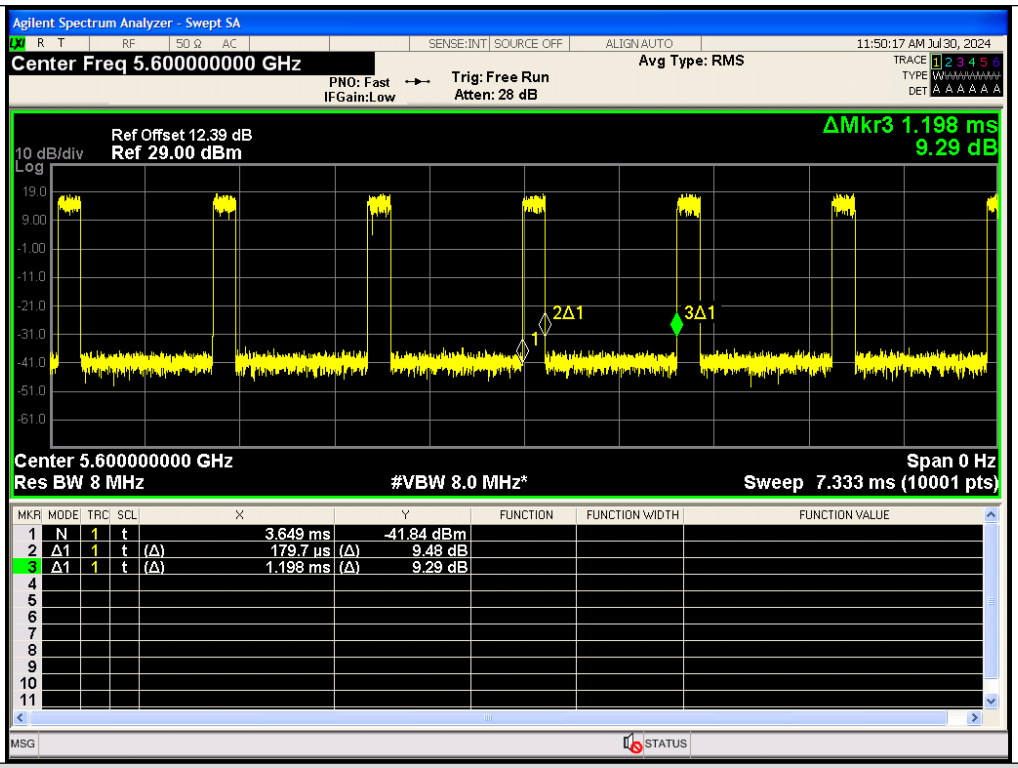
IEEE 802.11a_20MHz_Channel 56



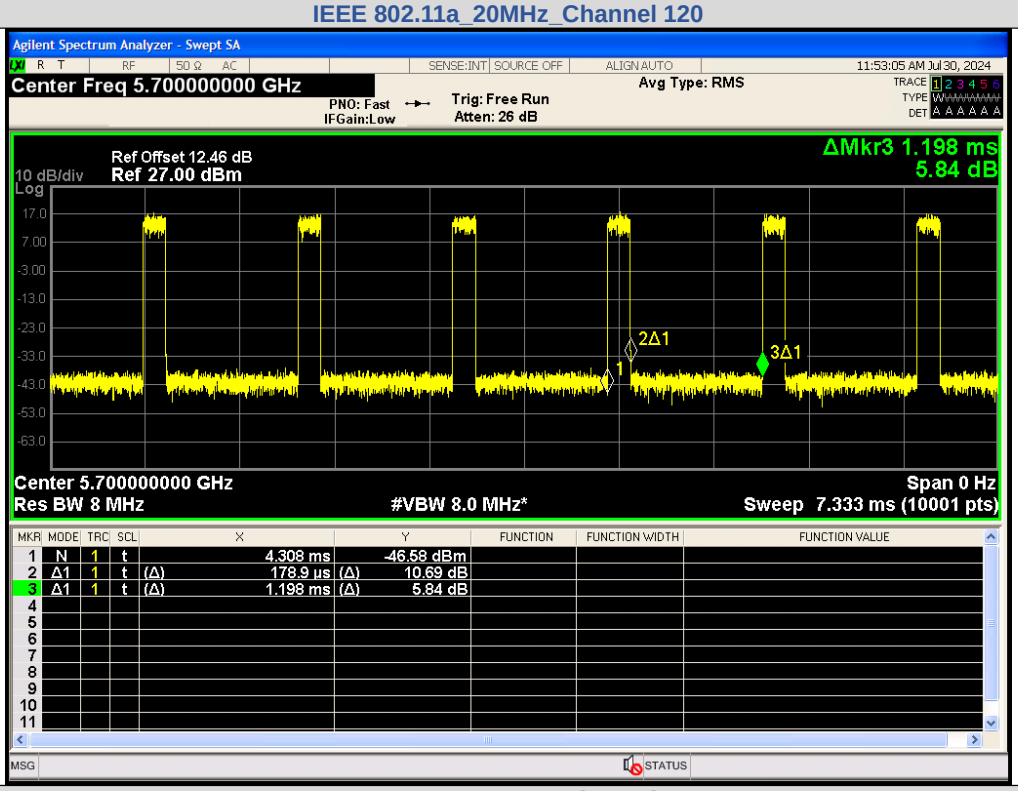
IEEE 802.11a_20MHz_Channel 64



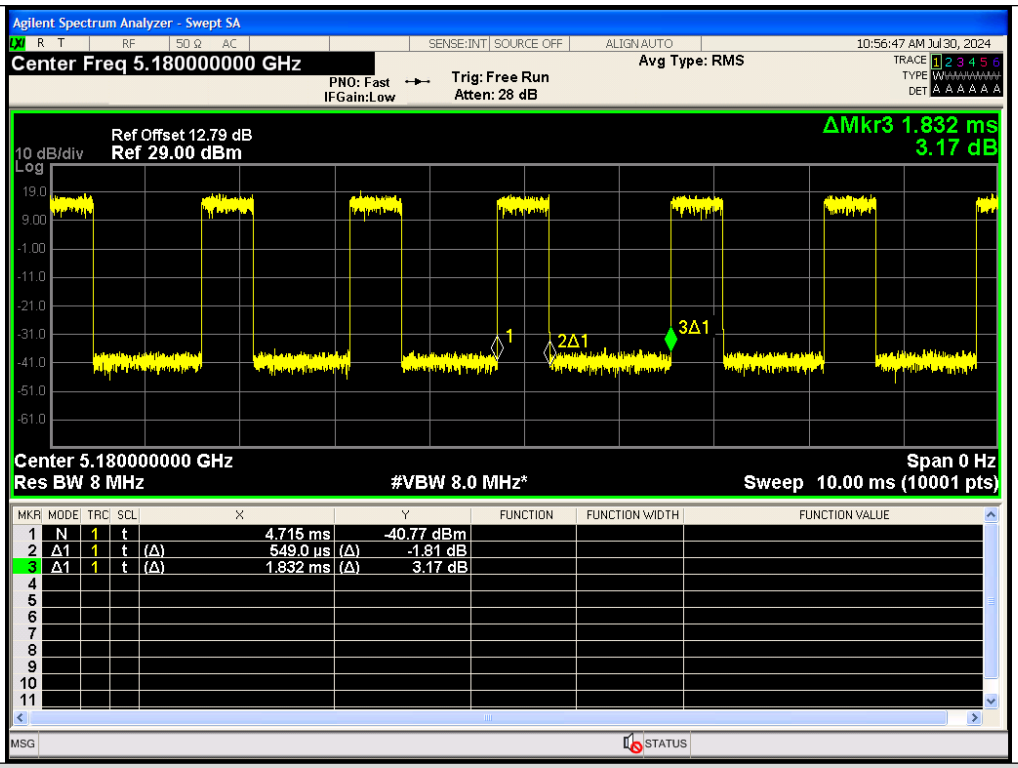
IEEE 802.11a_20MHz_Channel 100



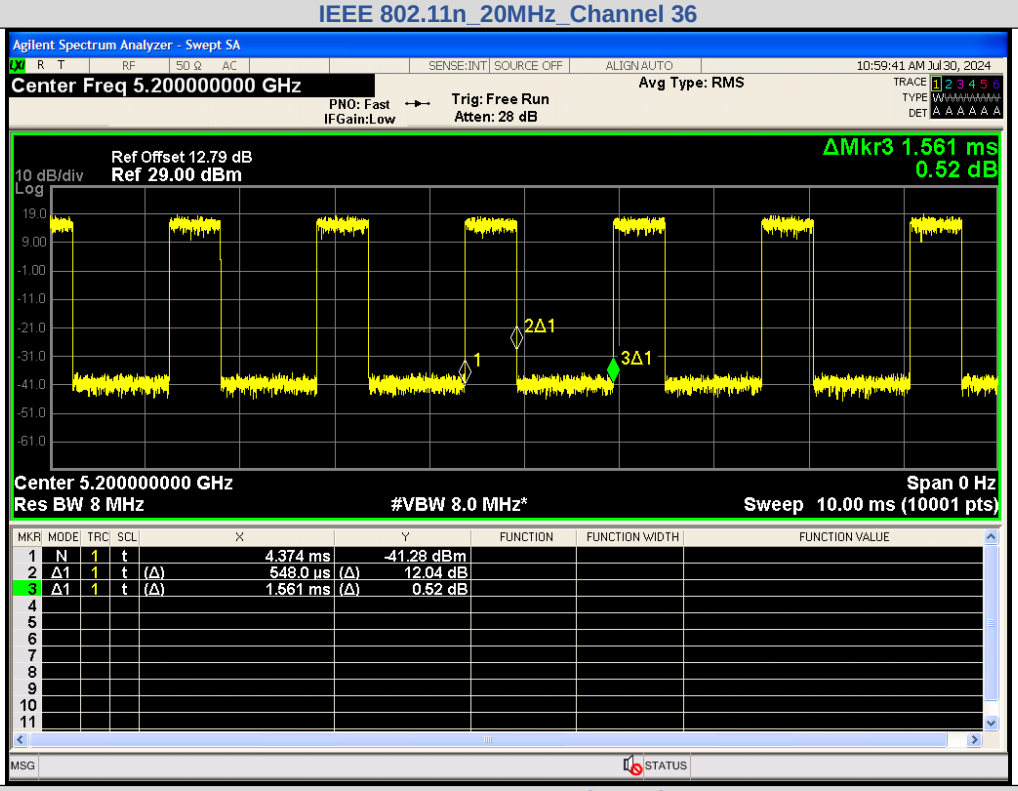
IEEE 802.11a_20MHz_Channel 120



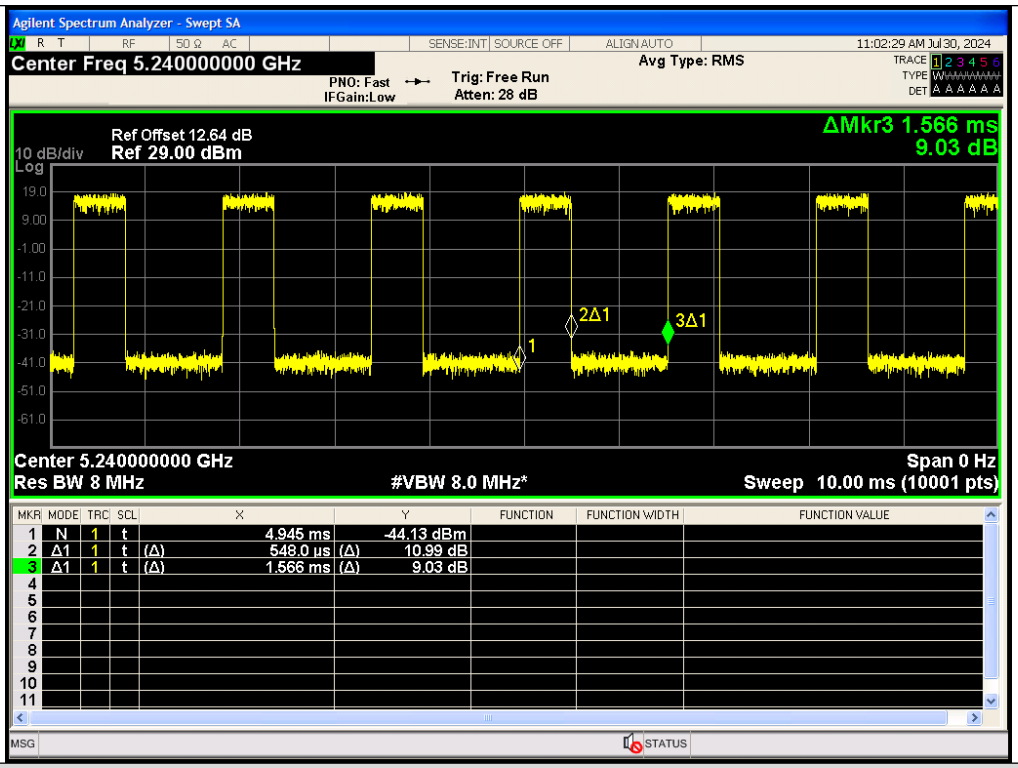
IEEE 802.11a_20MHz_Channel 140



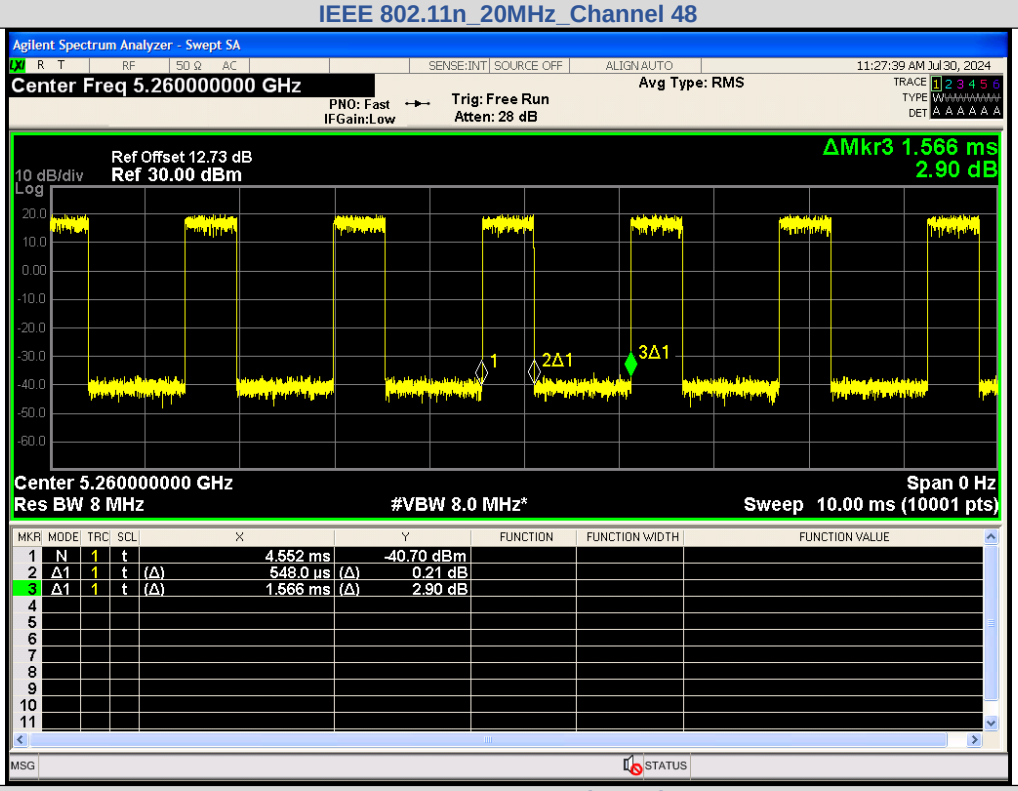
IEEE 802.11n_20MHz_Channel 36



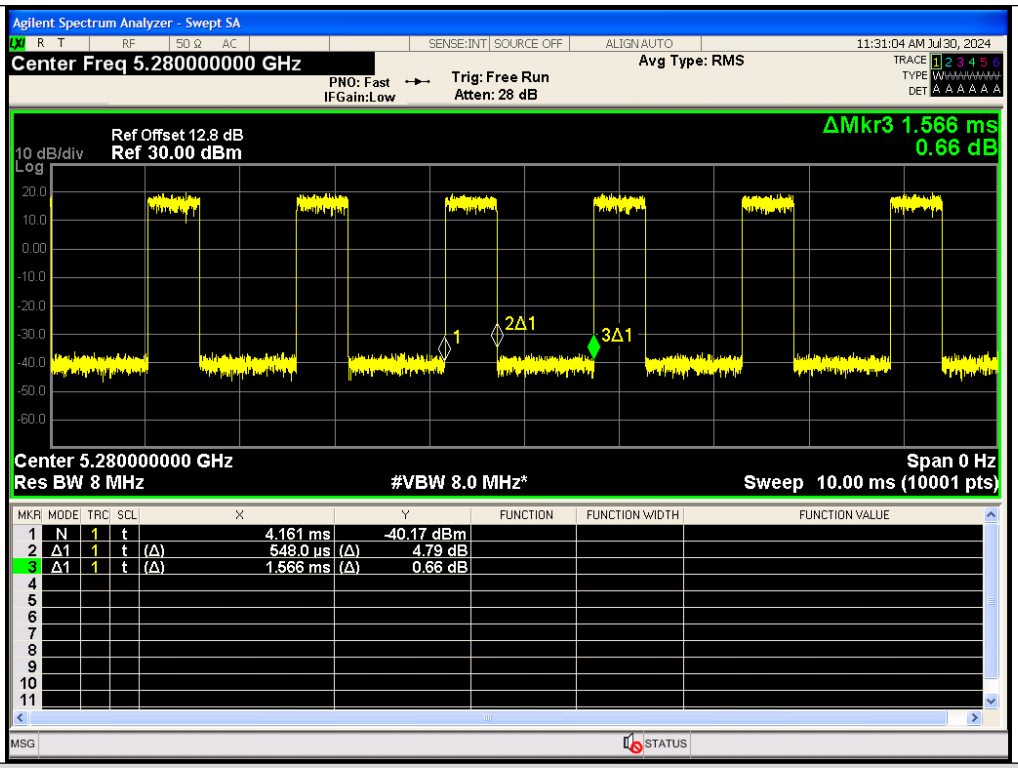
IEEE 802.11n_20MHz_Channel 40



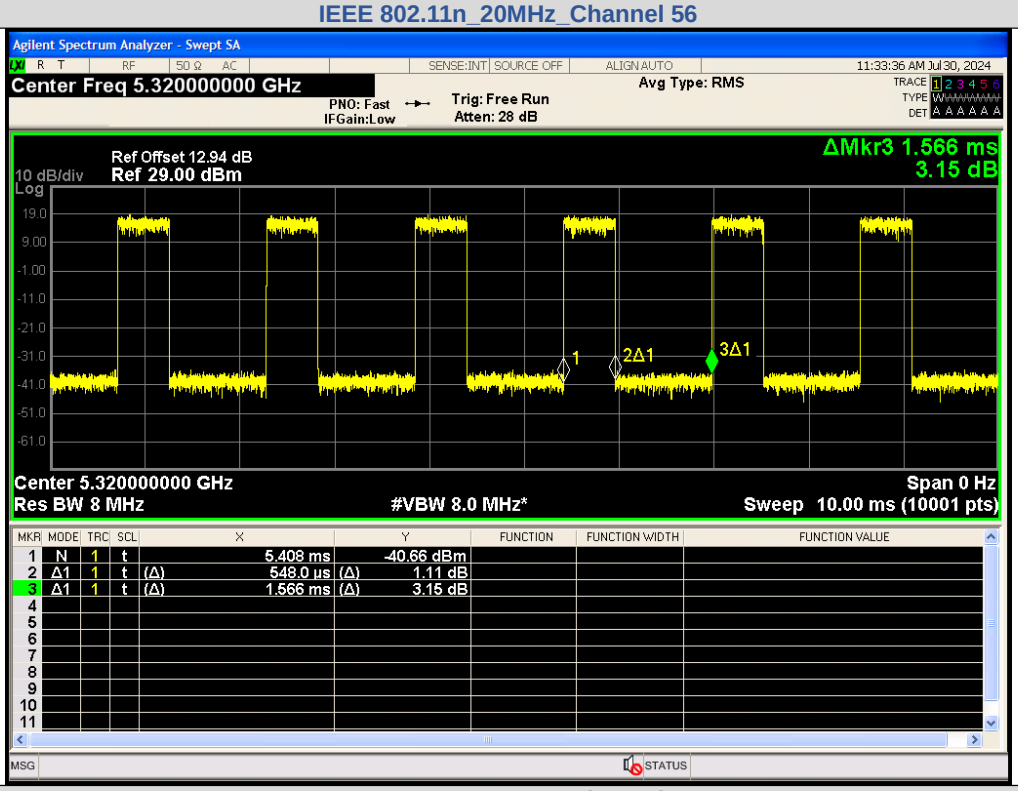
IEEE 802.11n_20MHz_Channel 48



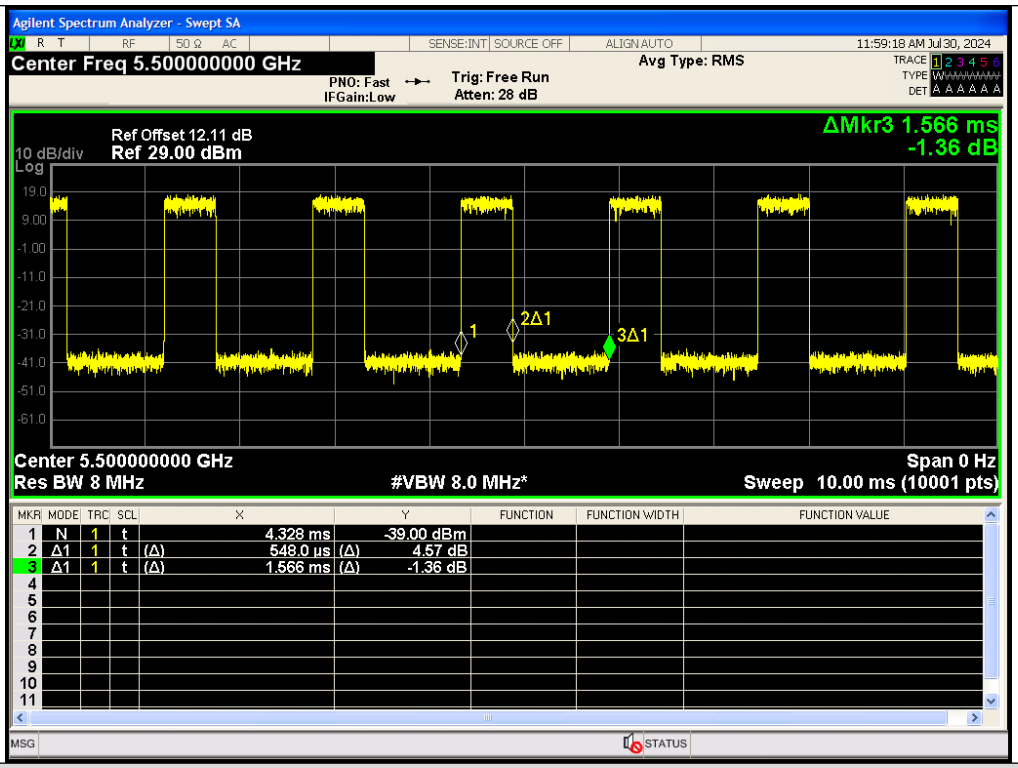
IEEE 802.11n_20MHz_Channel 52



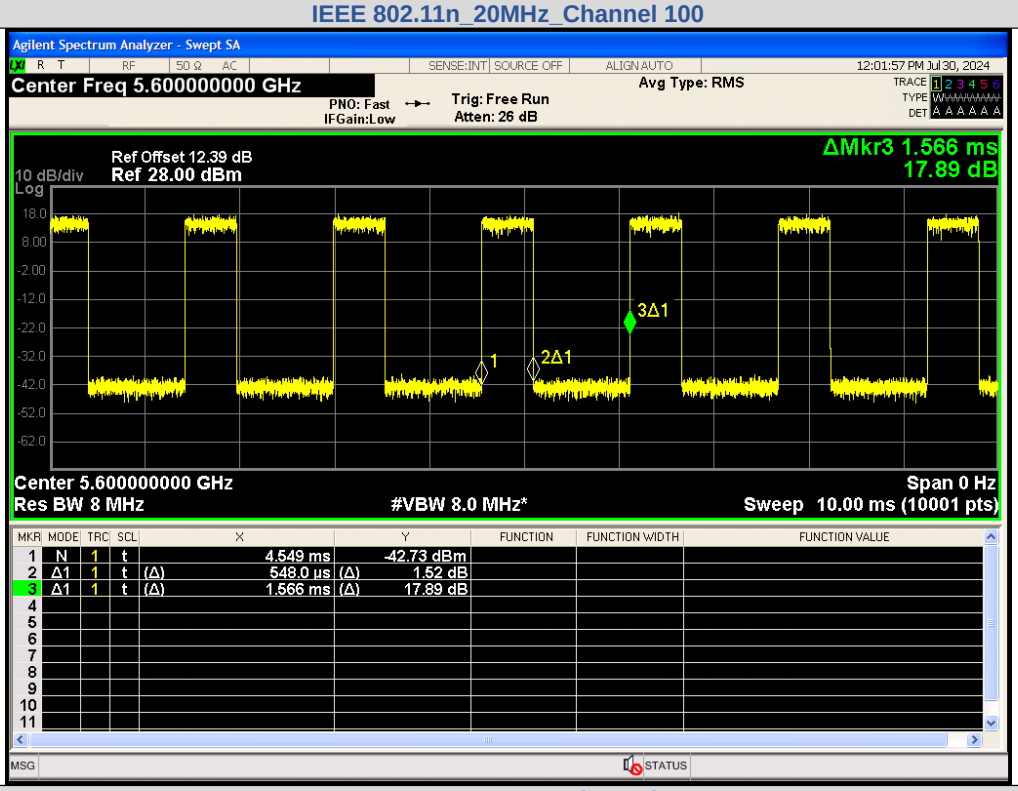
IEEE 802.11n_20MHz_Channel 56



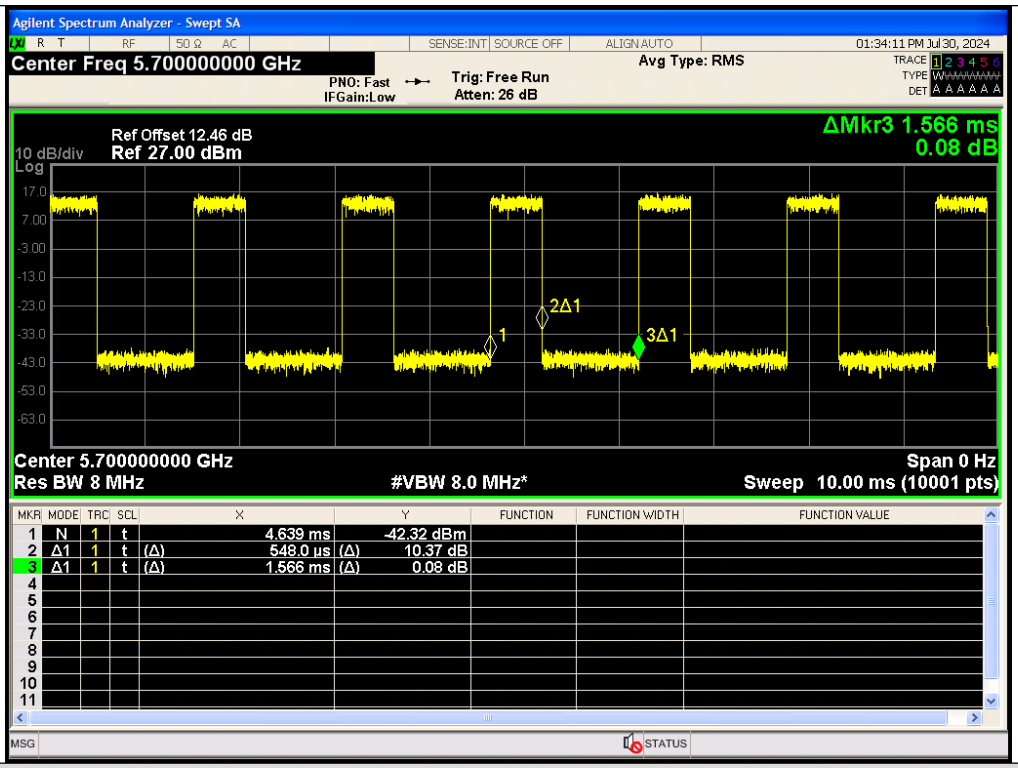
IEEE 802.11n_20MHz_Channel 64



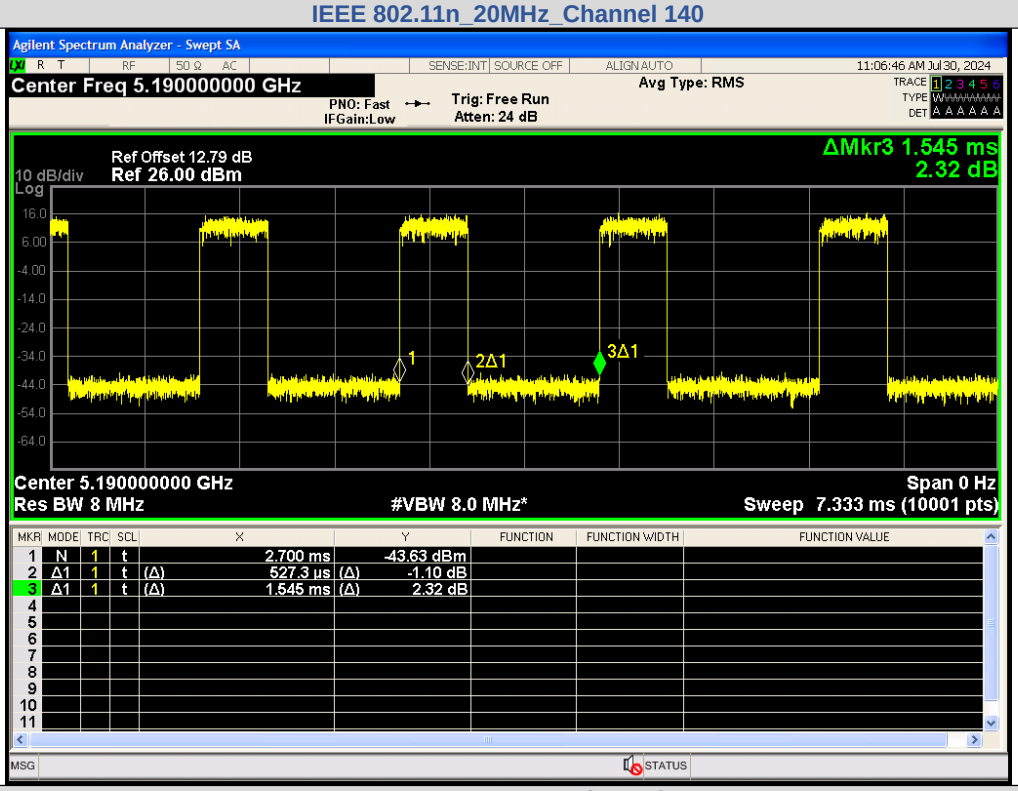
IEEE 802.11n_20MHz_Channel 100



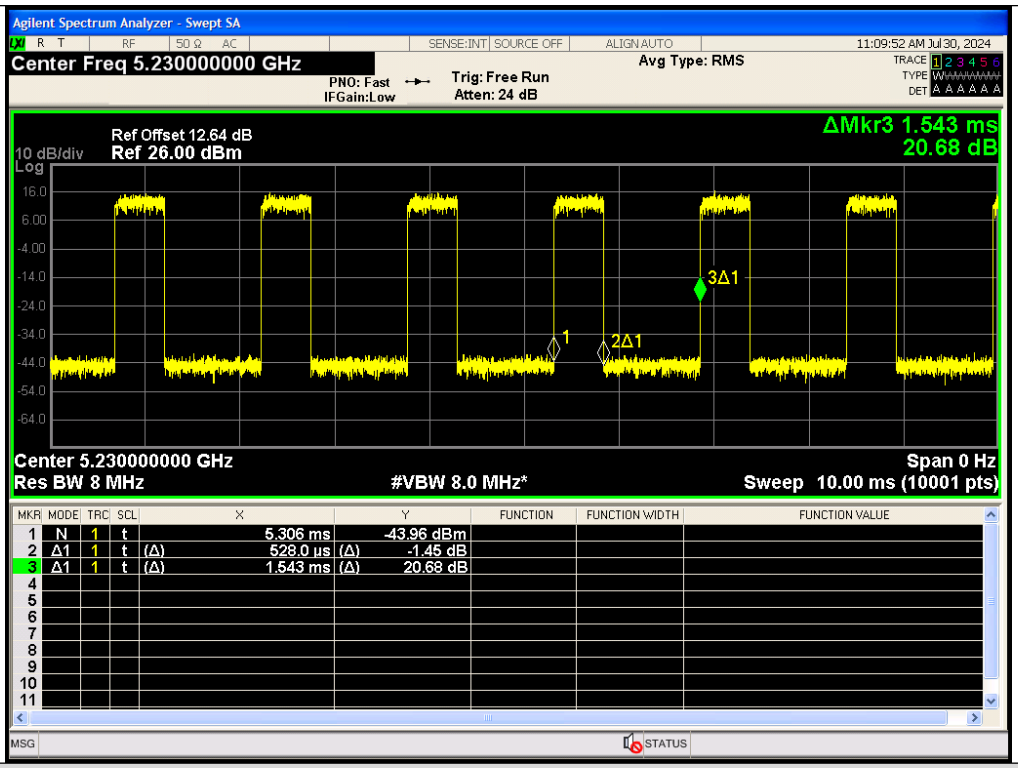
IEEE 802.11n_20MHz_Channel 120



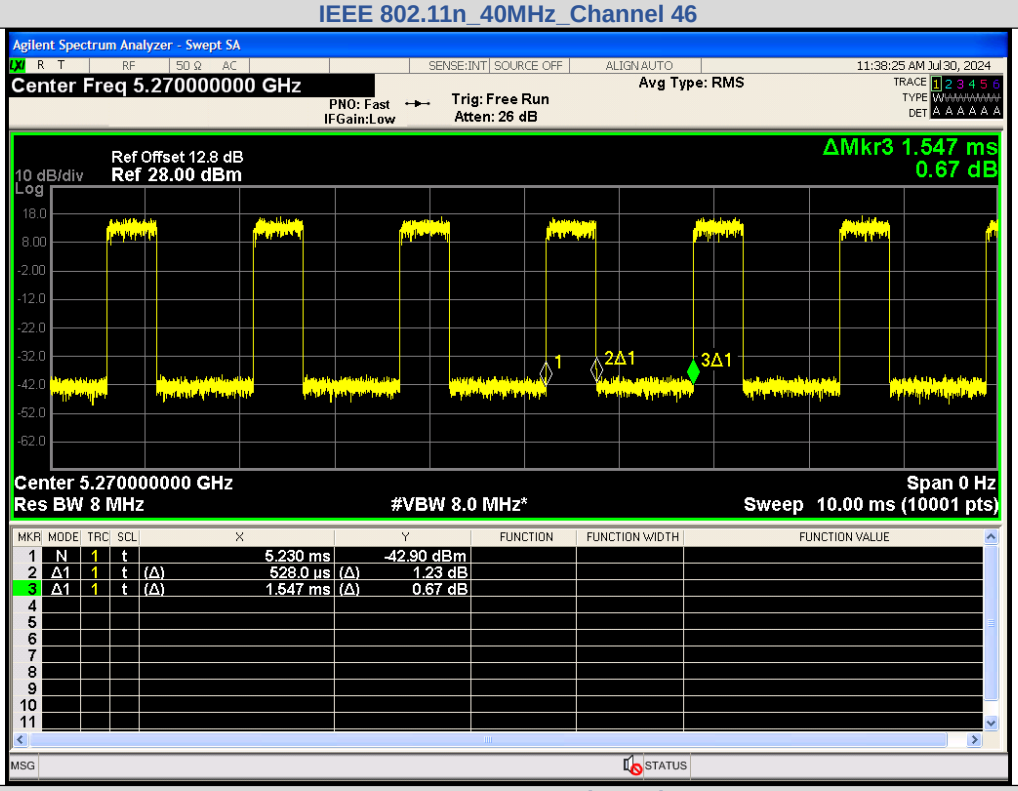
IEEE 802.11n_20MHz_Channel 140



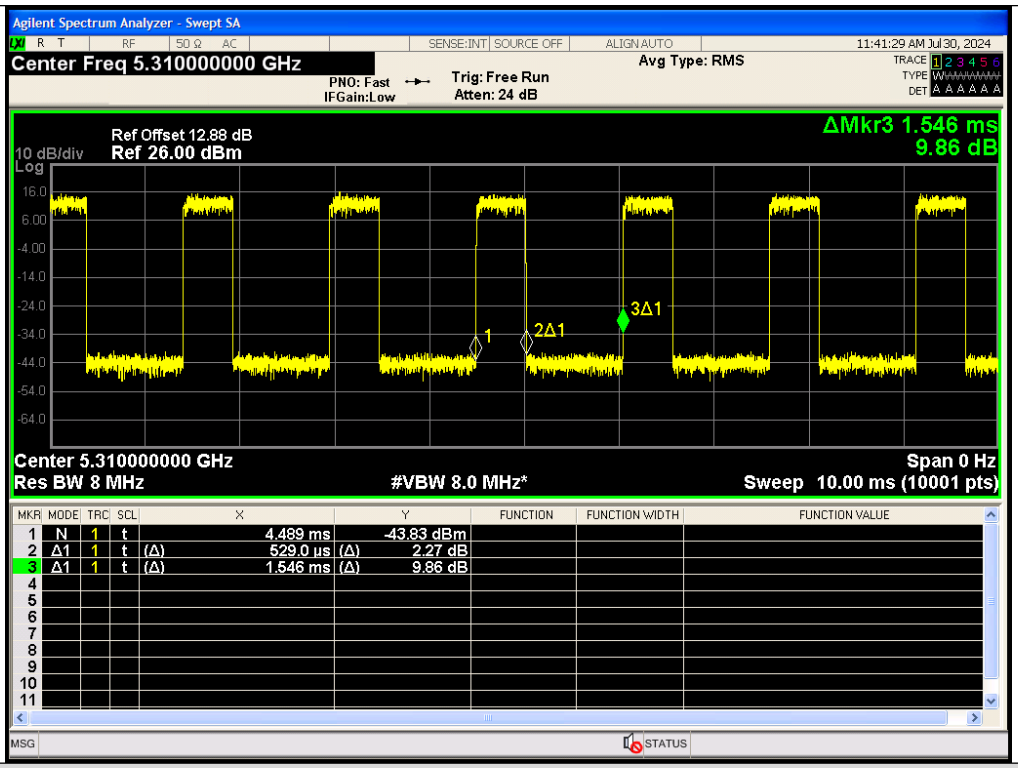
IEEE 802.11n_40MHz_Channel 38



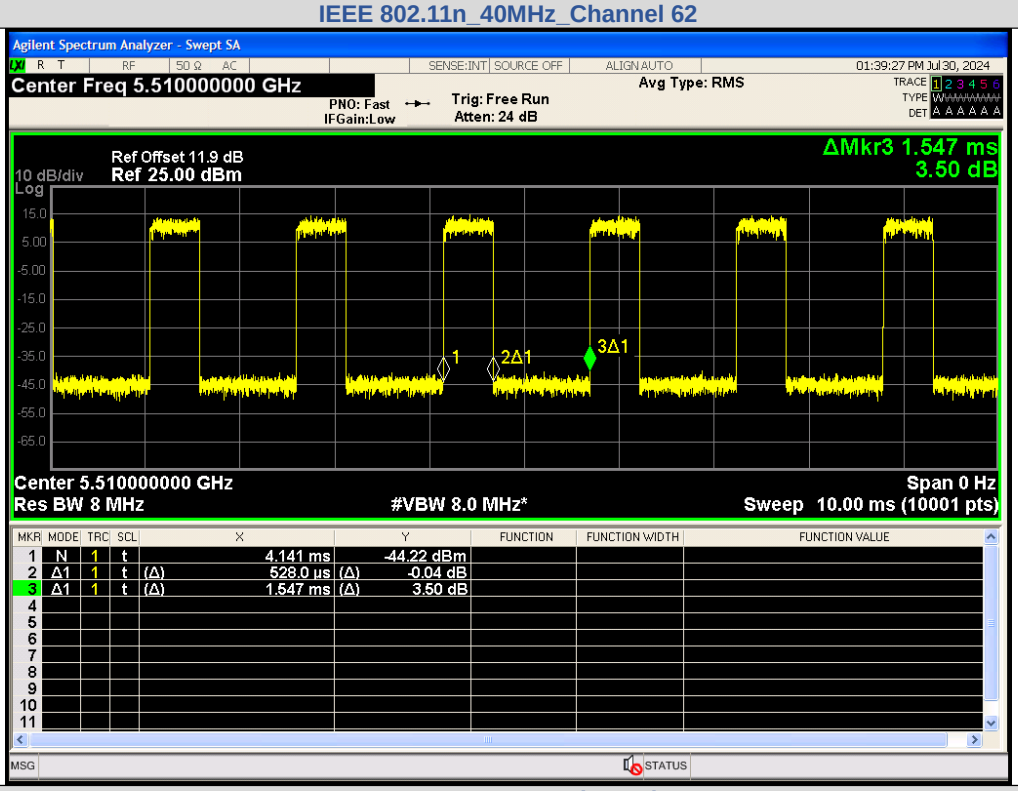
IEEE 802.11n_40MHz_Channel 46



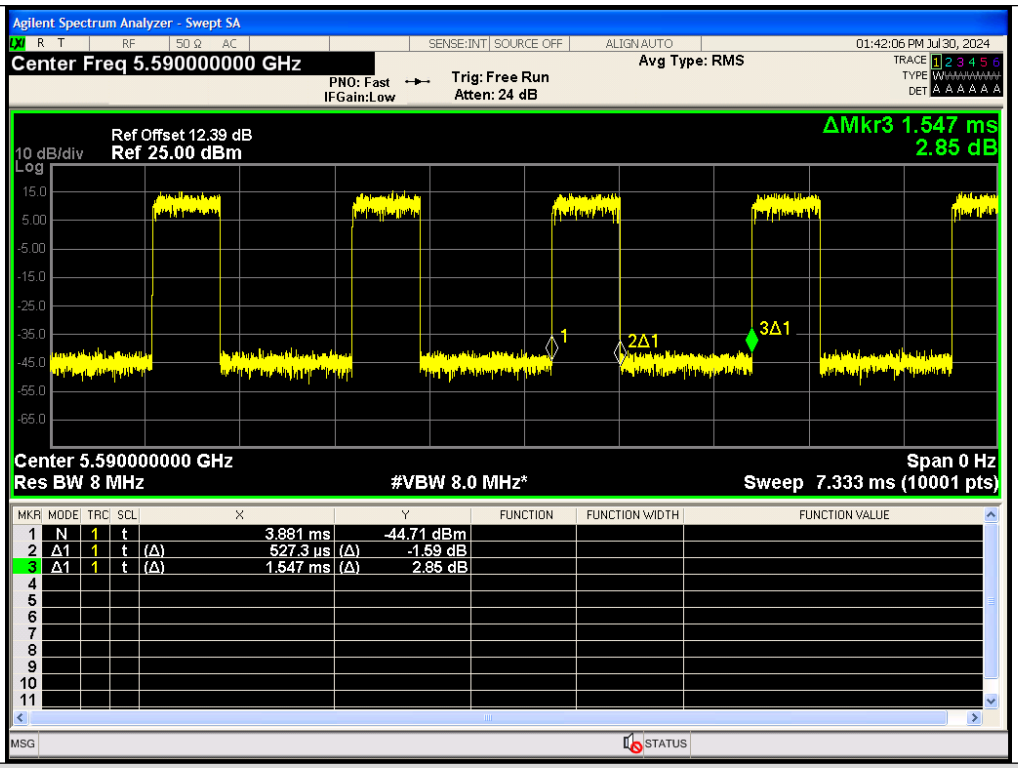
IEEE 802.11n_40MHz_Channel 54



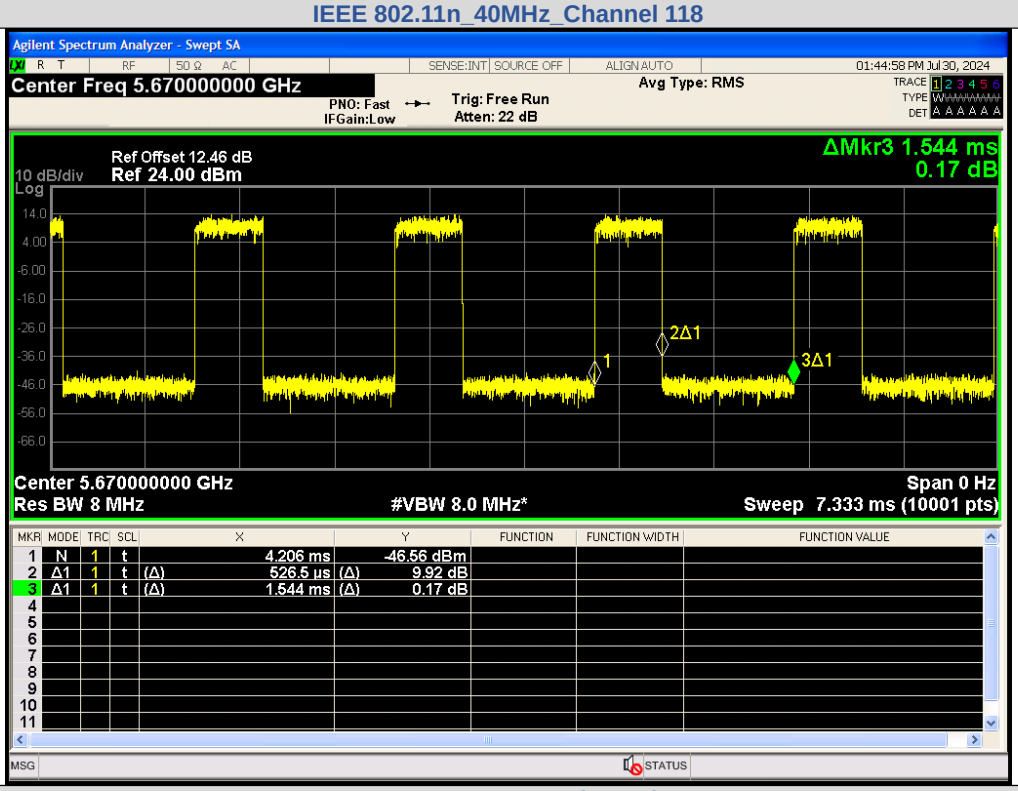
IEEE 802.11n_40MHz_Channel 62



IEEE 802.11n_40MHz_Channel 102



IEEE 802.11n_40MHz_Channel 118

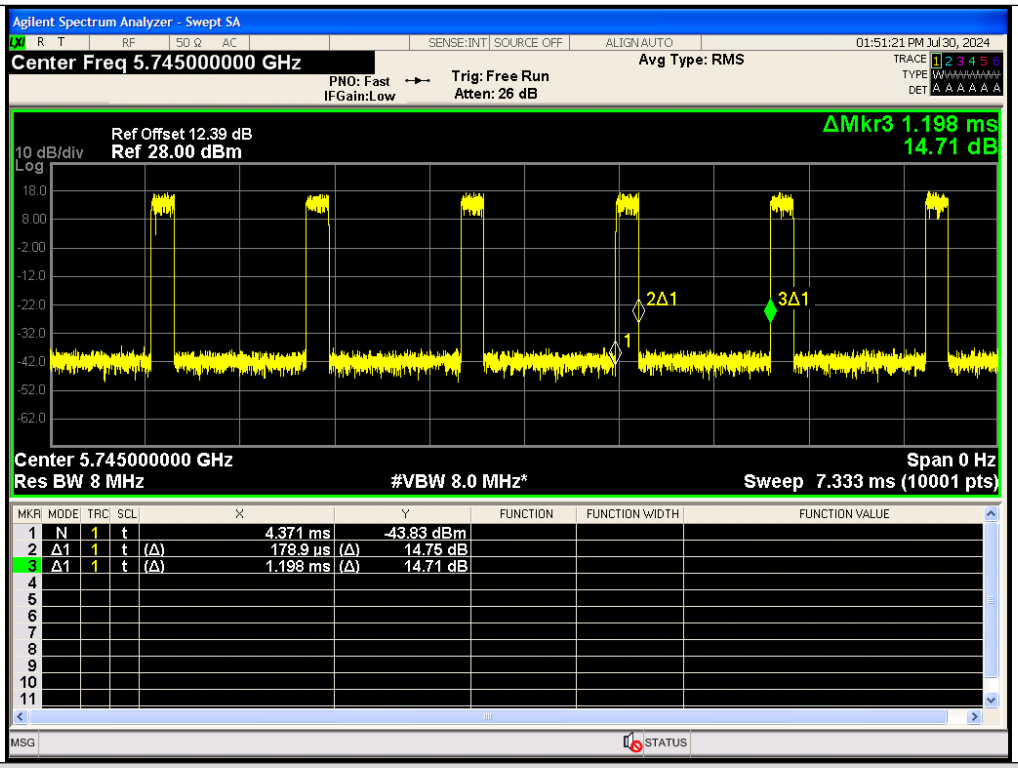


IEEE 802.11n_40MHz_Channel 134

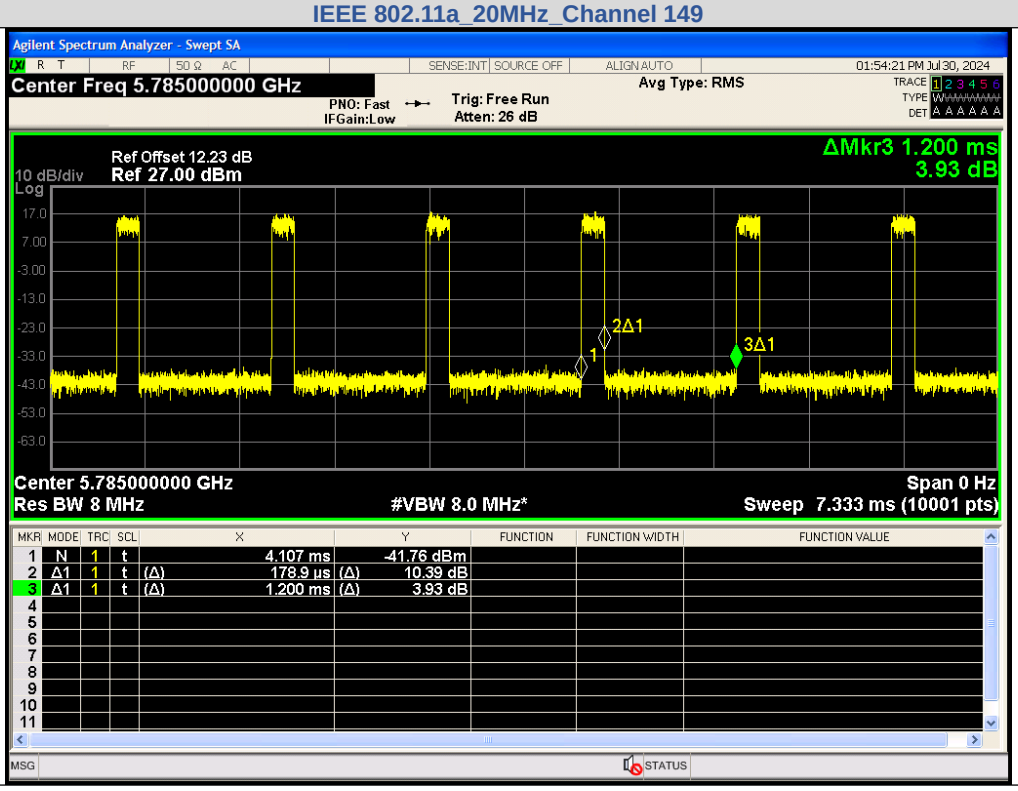
Test Result

Mode	Data rates	Channel	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
IEEE 802.11a	54	149	1	0.179	1.198	14.93	0.1493	8.2594
		157		0.179	1.200	14.91	0.1491	8.2652
		165		0.179	1.198	14.94	0.1494	8.2565
IEEE 802.11n_20	MCS 7	149		0.548	1.568	34.95	0.3495	4.5655
		157		0.548	1.568	34.95	0.3495	4.5655
		165		0.547	1.566	34.93	0.3493	4.568
IEEE 802.11n_40		151		0.528	1.541	34.26	0.3426	4.6521
		159		0.528	1.546	34.15	0.3415	4.6661

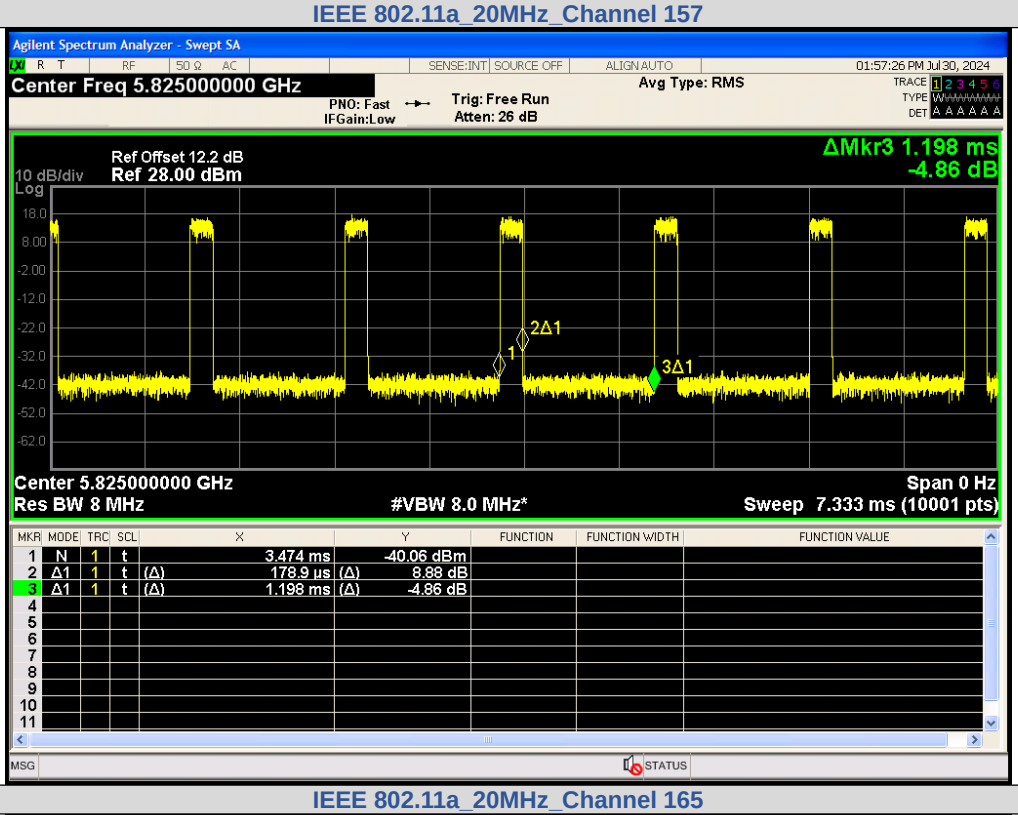
Test Graphs



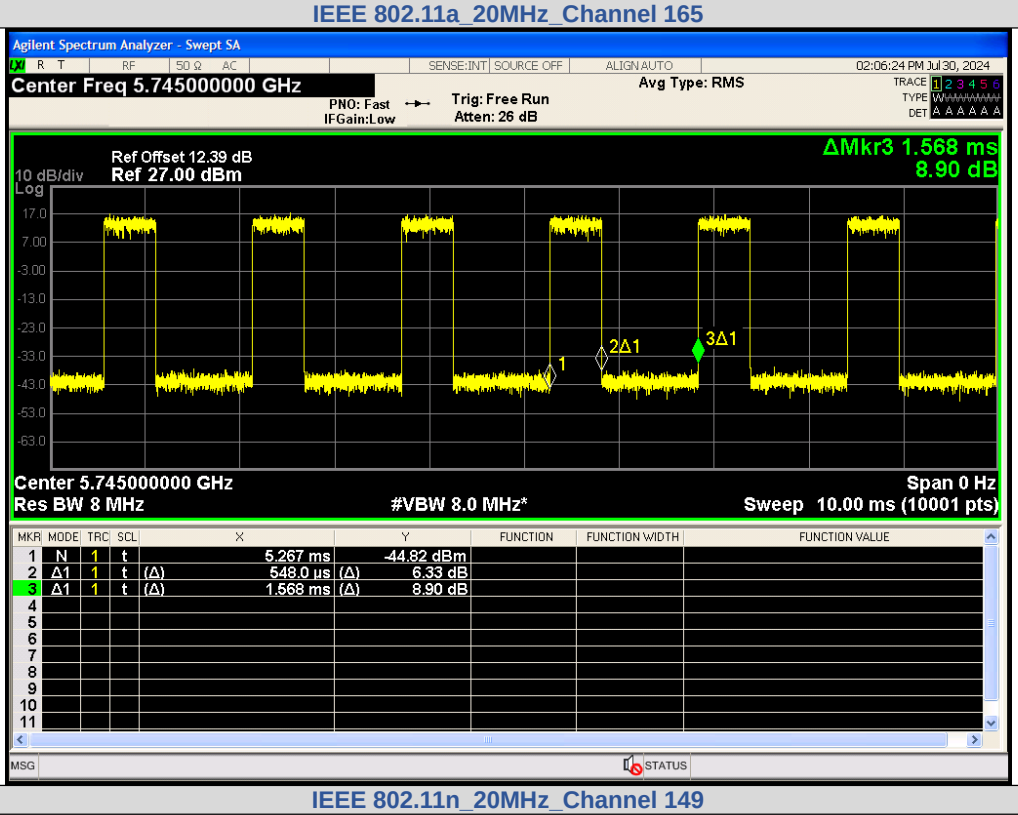
IEEE 802.11a_20MHz_Channel 149



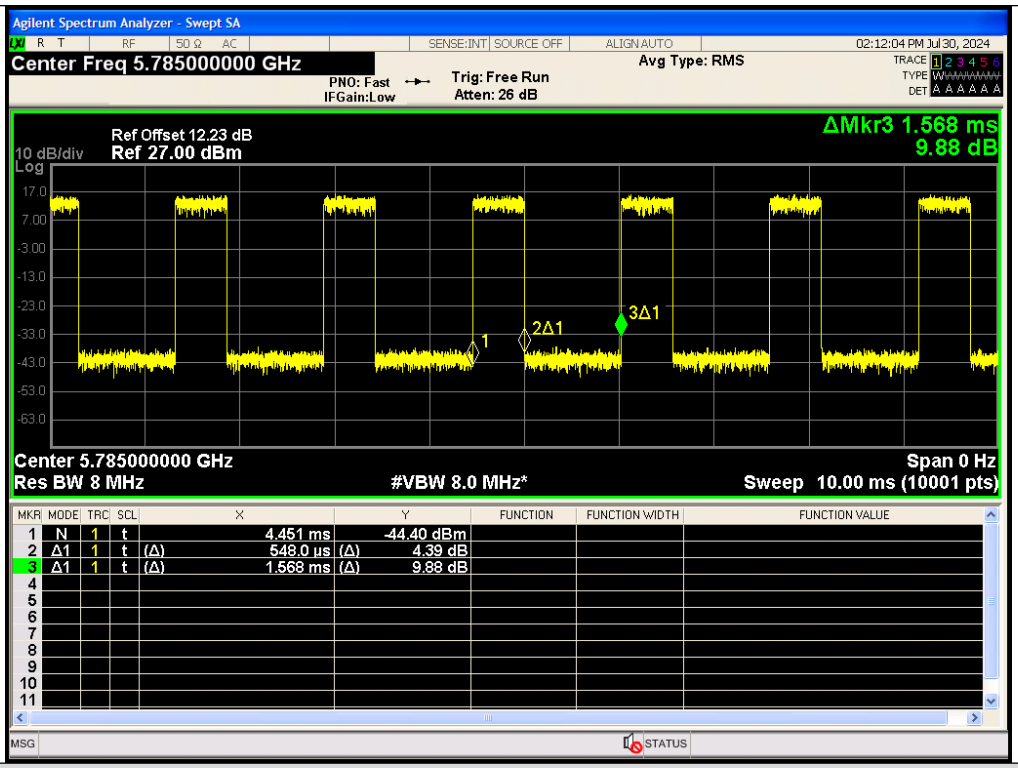
IEEE 802.11a_20MHz_Channel 157



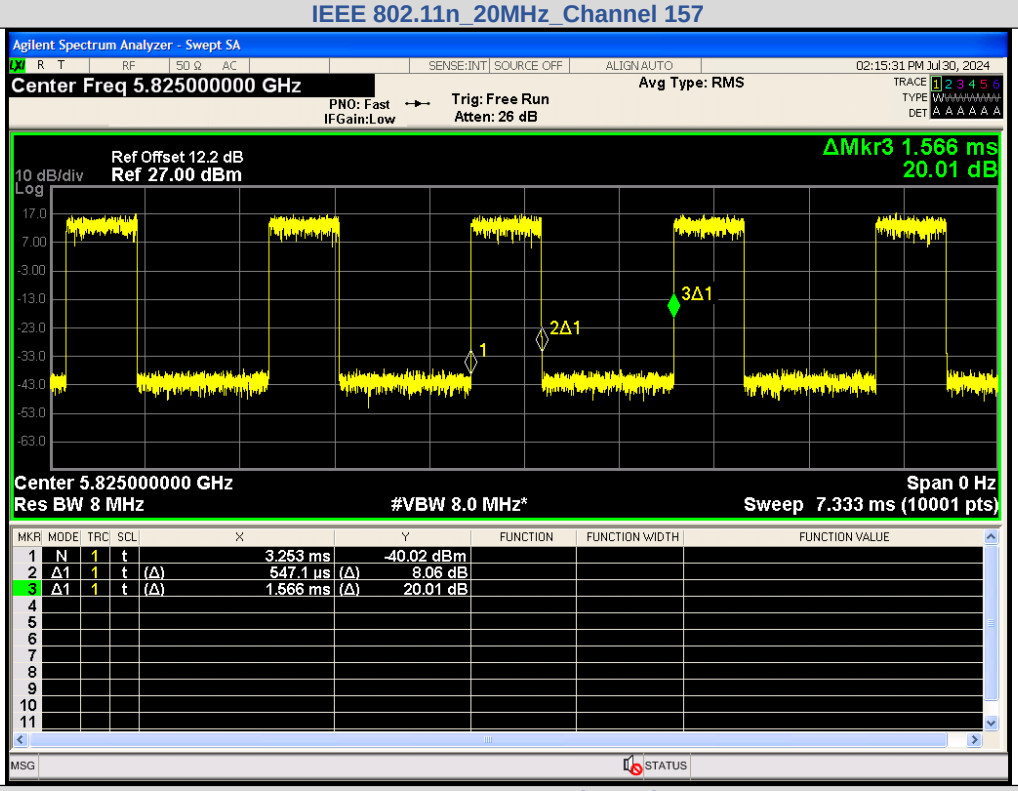
IEEE 802.11a_20MHz_Channel 165



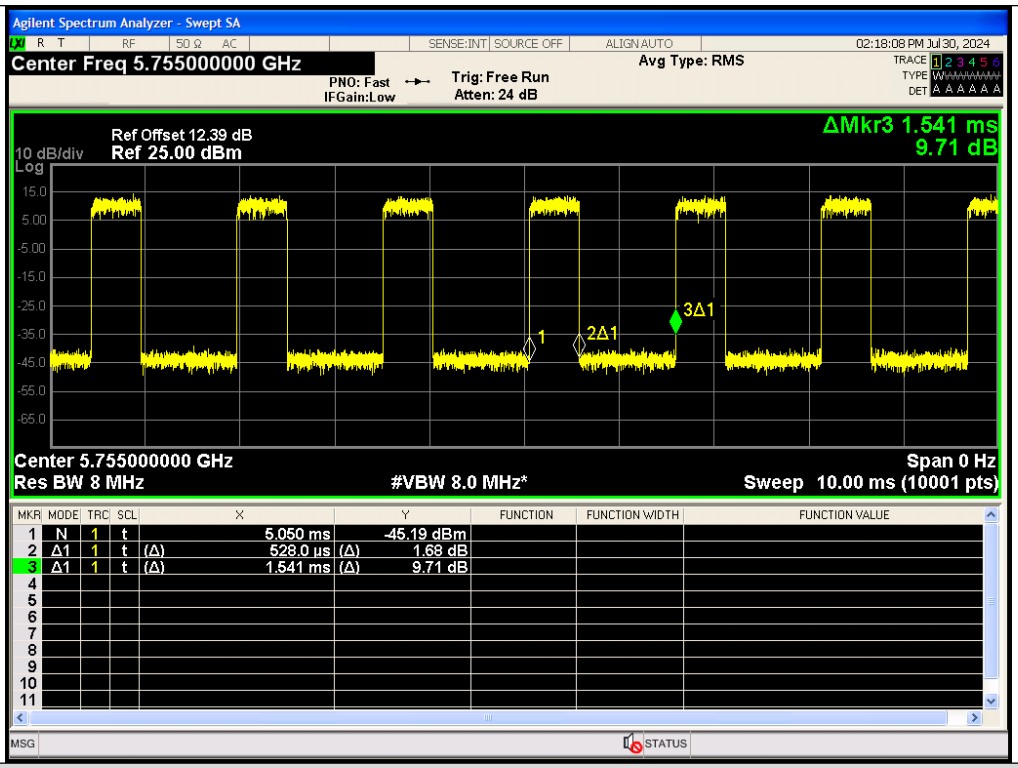
IEEE 802.11n_20MHz_Channel 149



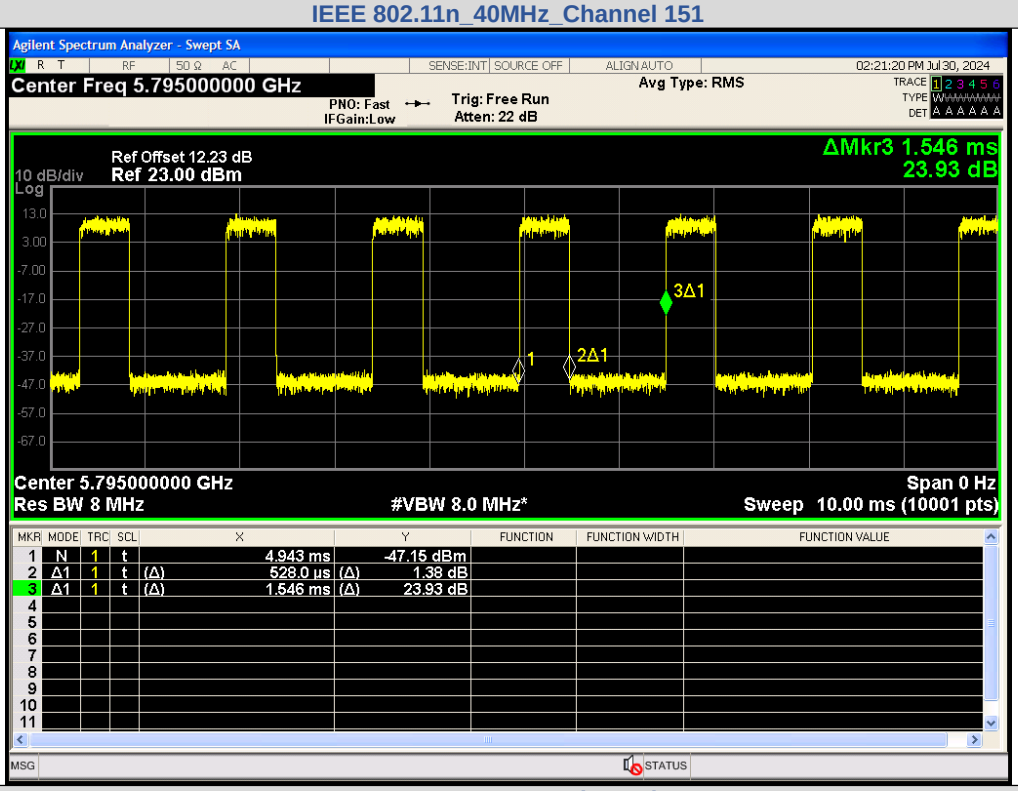
IEEE 802.11n_20MHz_Channel 157



IEEE 802.11n_20MHz_Channel 165



IEEE 802.11n_40MHz_Channel 151



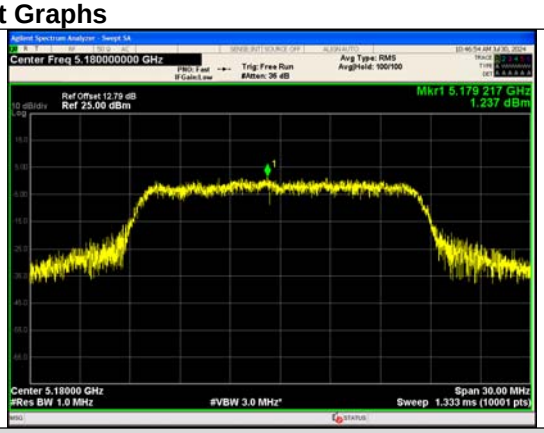
IEEE 802.11n_40MHz_Channel 159

APPENDIX III.Peak Power Spectral Density

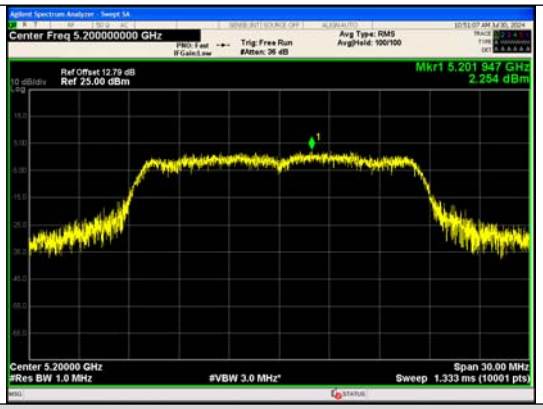
Test Result

Mode	Channel	Ant. 0 Meas PSD (dBm/MHz)	Ant. 0 Corr'd PSD (dBm/MHz)	Limit (dBm/MHz)	Result
IEEE 802.11a	36	1.237	9.494	11	PASS
	40	2.254	10.511		PASS
	48	2.412	10.669		PASS
	52	2.725	10.982		PASS
	56	-8.702	-0.445		PASS
	64	-8.146	0.111		PASS
	100	2.059	10.316		PASS
	120	2.238	10.495		PASS
	140	0.514	8.771		PASS
IEEE 802.11n_20	36	3.285	7.846		PASS
	40	4.359	8.92		PASS
	48	4.996	9.557		PASS
	52	6.339	10.9		PASS
	56	4.902	9.463		PASS
	64	4.764	9.325		PASS
	100	3.335	7.896		PASS
	120	3.941	8.502		PASS
	140	2.365	6.926		PASS
IEEE 802.11n_40	38	0.604	5.278		PASS
	46	1.314	5.988		PASS
	54	2.032	6.706		PASS
	62	2.386	7.06		PASS
	102	1.710	6.384		PASS
	118	1.217	5.891		PASS
	134	-1.040	3.634		PASS

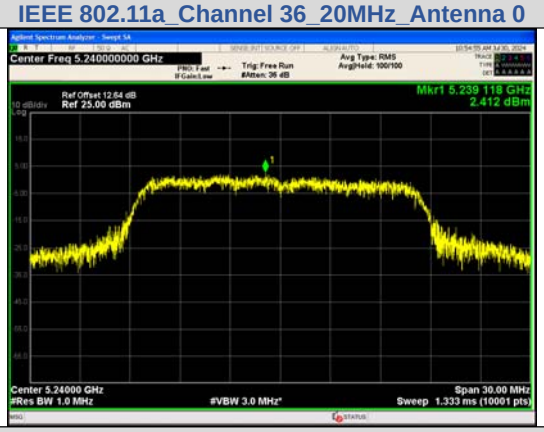
Test Graphs



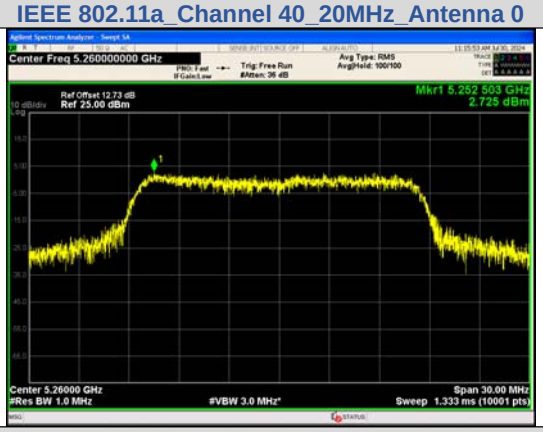
IEEE 802.11a_Channel 36_20MHz_Antenna 0



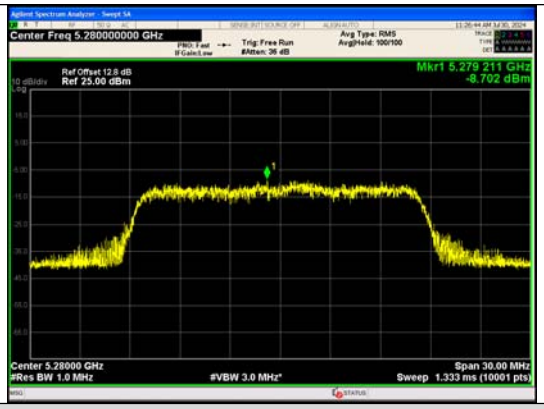
IEEE 802.11a_Channel 40_20MHz_Antenna 0



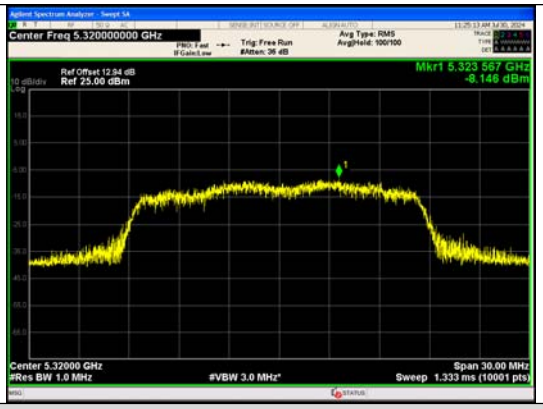
IEEE 802.11a_Channel 48_20MHz_Antenna 0



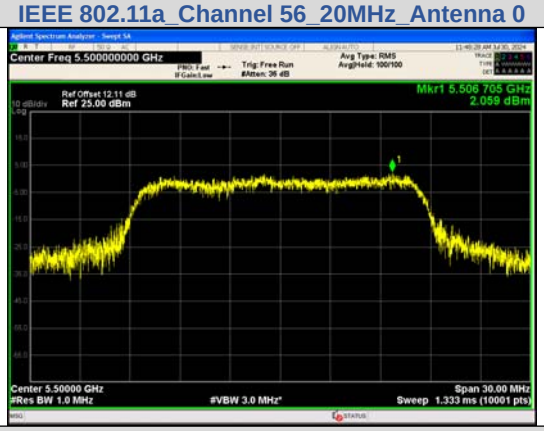
IEEE 802.11a_Channel 52_20MHz_Antenna 0



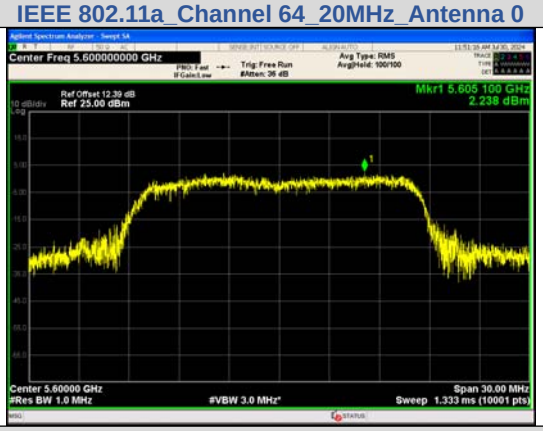
IEEE 802.11a_Channel 56_20MHz_Antenna 0



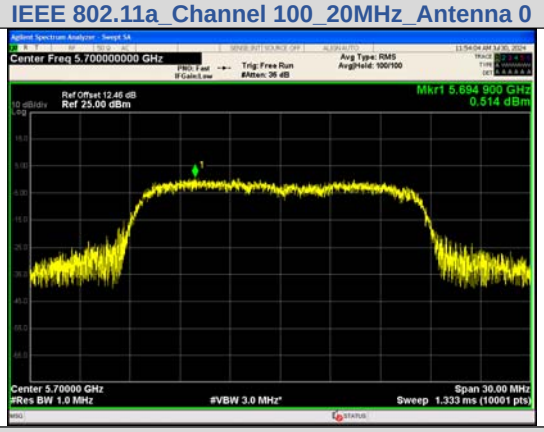
IEEE 802.11a_Channel 64_20MHz_Antenna 0



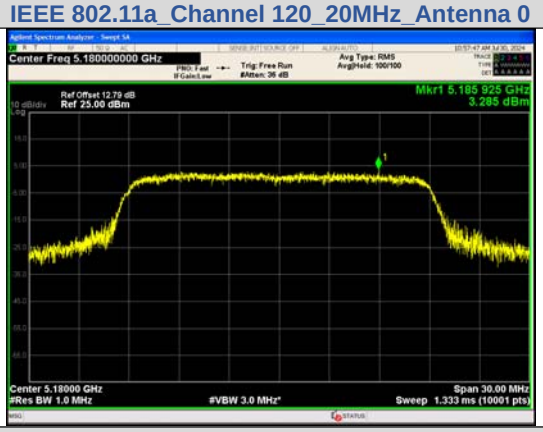
IEEE 802.11a_Channel 100_20MHz_Antenna 0



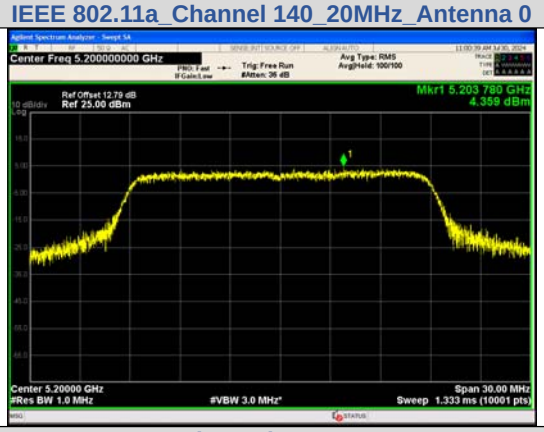
IEEE 802.11a_Channel 120_20MHz_Antenna 0



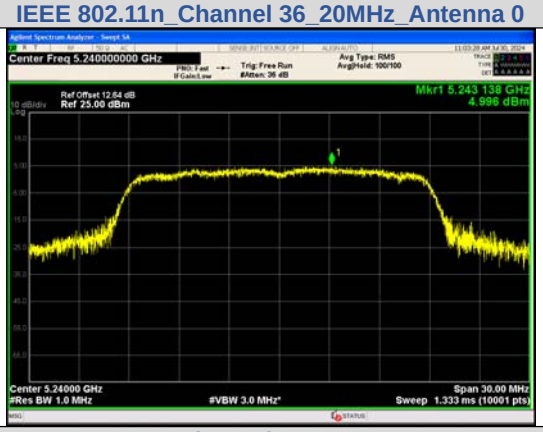
IEEE 802.11a_Channel 140_20MHz_Antenna 0



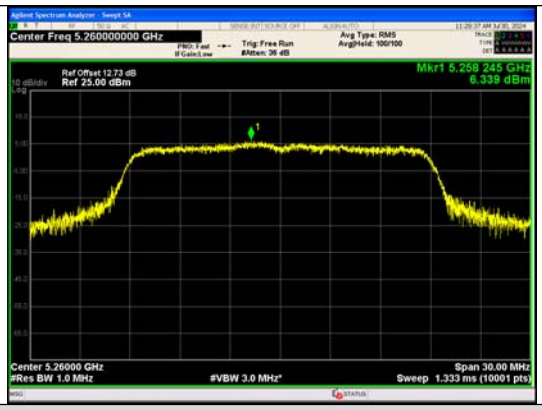
IEEE 802.11n_Channel 36_20MHz_Antenna 0



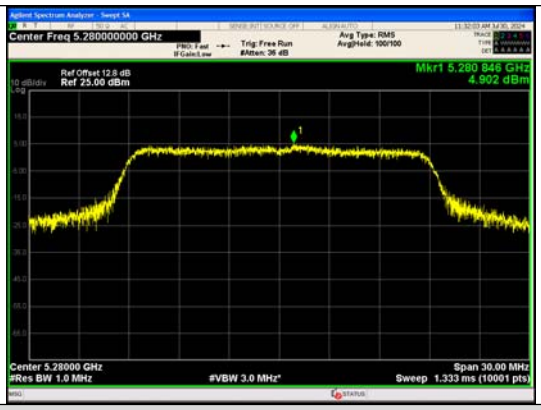
IEEE 802.11n_Channel 40_20MHz_Antenna 0



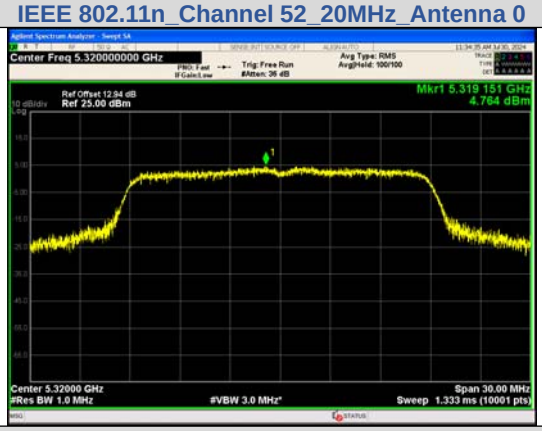
IEEE 802.11n_Channel 48_20MHz_Antenna 0



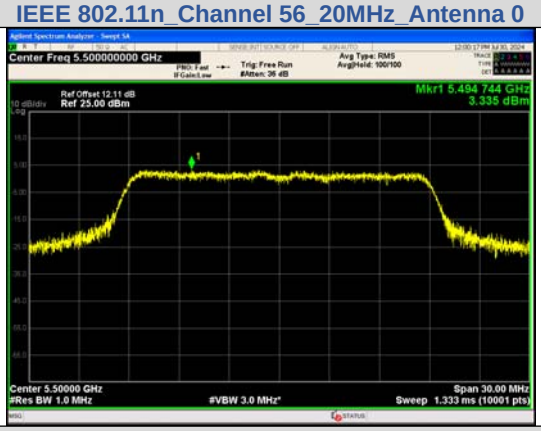
IEEE 802.11n_Channel 52_20MHz_Antenna 0



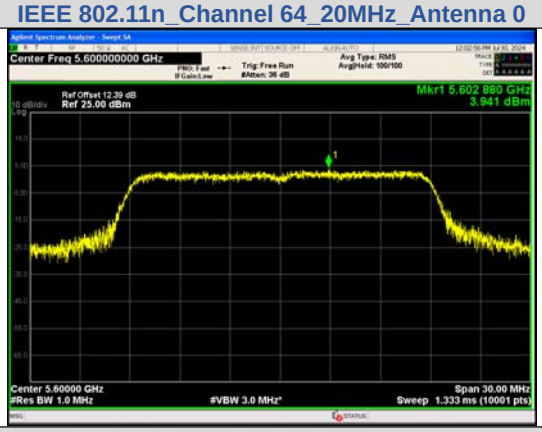
IEEE 802.11n_Channel 56_20MHz_Antenna 0



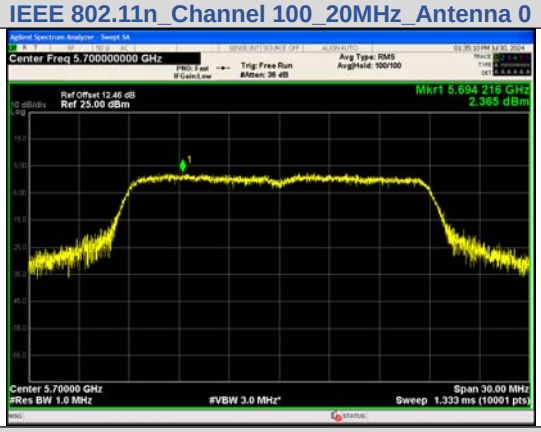
IEEE 802.11n_Channel 64_20MHz_Antenna 0



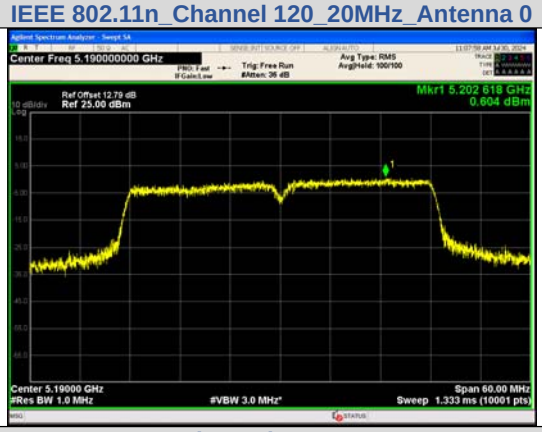
IEEE 802.11n_Channel 100_20MHz_Antenna 0



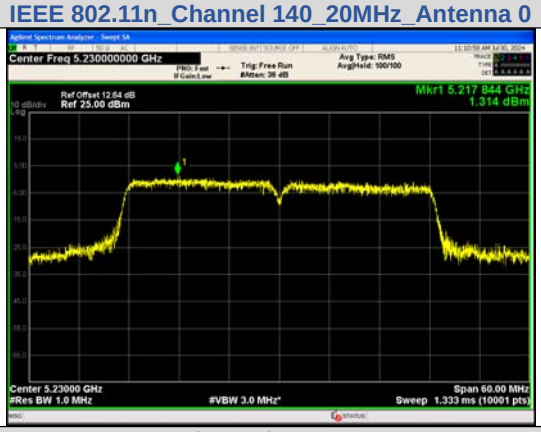
IEEE 802.11n_Channel 120_20MHz_Antenna 0



IEEE 802.11n_Channel 140_20MHz_Antenna 0

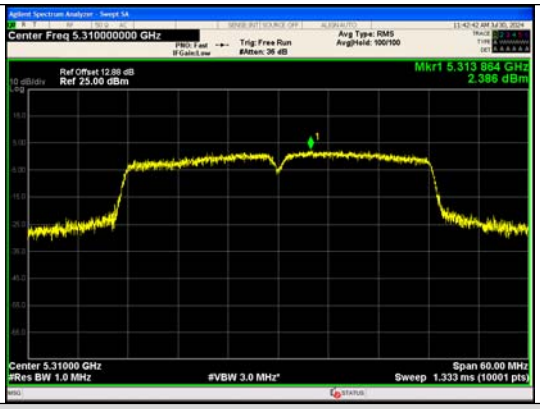


IEEE 802.11n_Channel 38_40MHz_Antenna 0

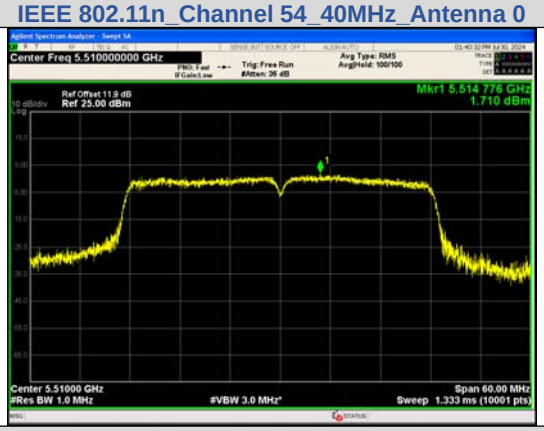


IEEE 802.11n_Channel 46_40MHz_Antenna 0

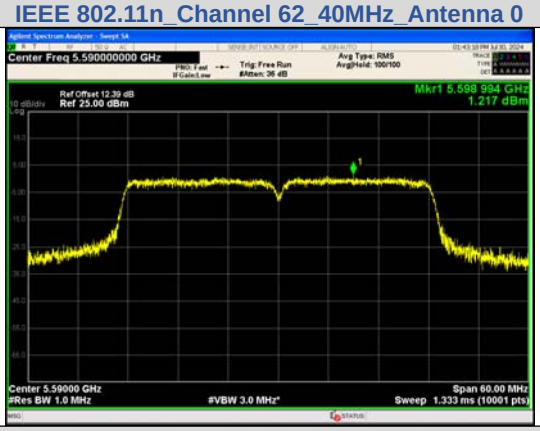
IEEE 802.11n_Channel 54_40MHz_Antenna 0



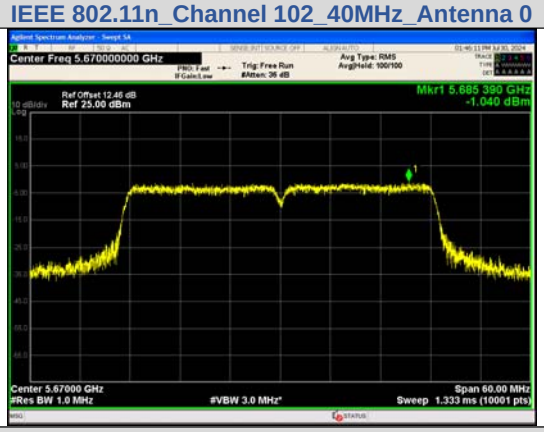
IEEE 802.11n_Channel 62_40MHz_Antenna 0



IEEE 802.11n_Channel 102_40MHz_Antenna 0



IEEE 802.11n_Channel 118_40MHz_Antenna 0

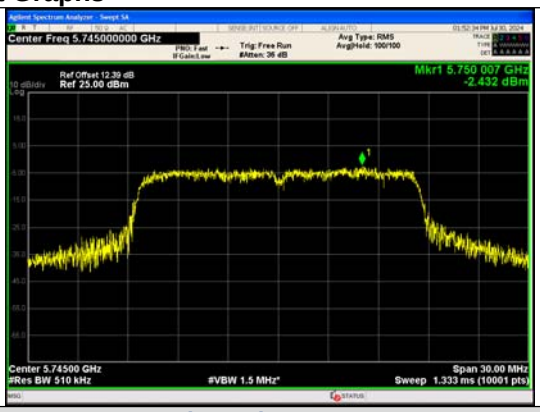


IEEE 802.11n_Channel 134_40MHz_Antenna 0

Test Result

Mode	Channel	Ant. 0 Meas PSD (dBm/0.5MHz)	Ant. 0 Corr'd PSD (dBm/0.5MHz)	Limit (dBm/0.5MHz)	Result
IEEE 802.11a	149	-2.432	5.825	30	PASS
	157	-3.059	5.198		PASS
	165	-3.038	5.219		PASS
IEEE 802.11n_20	149	0.674	5.242		PASS
	157	-0.515	4.053		PASS
	165	-0.760	3.808		PASS
IEEE 802.11n_40	151	-2.735	1.931		PASS
	159	-3.778	0.888		PASS

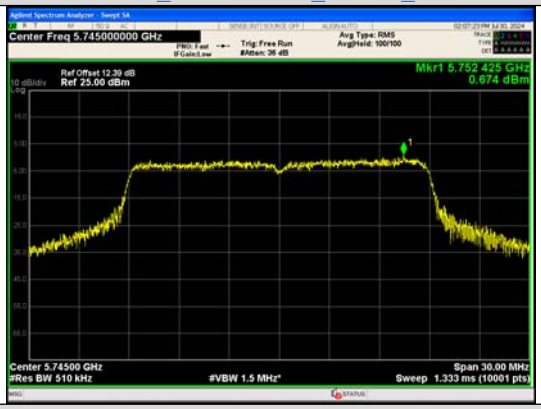
Test Graphs



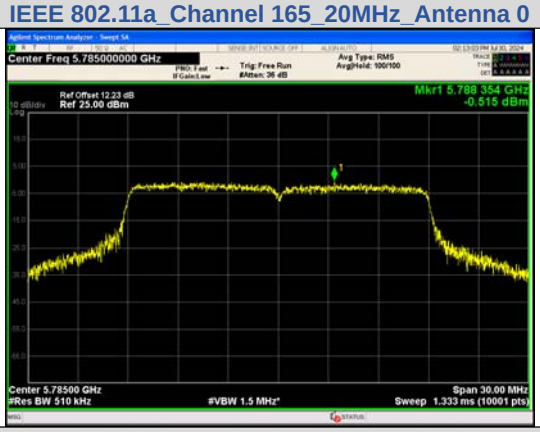
IEEE 802.11a_Channel 149_20MHz_Antenna 0

IEEE 802.11a_Channel 157_20MHz_Antenna 0

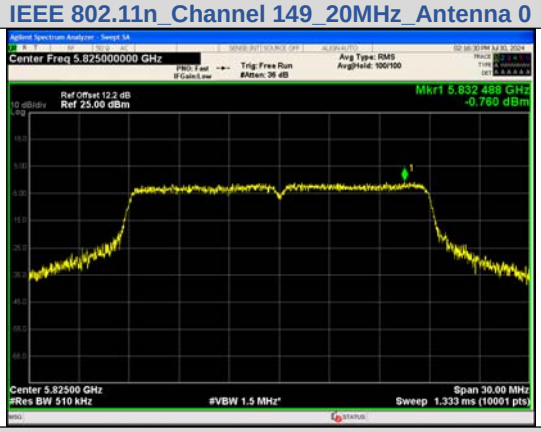
IEEE 802.11a_Channel 165_20MHz_Antenna 0



IEEE 802.11n_Channel 149_20MHz_Antenna 0



IEEE 802.11n_Channel 157_20MHz_Antenna 0



IEEE 802.11n_Channel 165_20MHz_Antenna 0

IEEE 802.11n_Channel 151_40MHz_Antenna 0

IEEE 802.11n_Channel 159_40MHz_Antenna 0

APPENDIX IV.Conducted Output Power

Conducted output power

Mode	Channel	Ant. 0 (dBm)	Corr'd Value Ant. 0 (dBm)	Limit (dBm)	Result
IEEE 802.11a	36	9.771	18.03	≤24	PASS
	40	10.555	18.81	≤24	PASS
	48	10.741	19.0	≤24	PASS
	52	11.783	20.04	≤24	PASS
	56	11.489	19.75	≤24	PASS
	64	10.554	18.81	≤24	PASS
	100	10.296	18.55	≤24	PASS
	120	10.164	18.42	≤24	PASS
	140	8.463	16.72	≤24	PASS
IEEE 802.11n_20	36	13.312	17.87	≤24	PASS
	40	14.045	18.61	≤24	PASS
	48	14.297	18.86	≤24	PASS
	52	15.333	19.89	≤24	PASS
	56	14.941	19.5	≤24	PASS
	64	14.066	18.63	≤24	PASS
	100	13.595	18.16	≤24	PASS
	120	13.578	18.14	≤24	PASS
	140	11.972	16.53	≤24	PASS
IEEE 802.11n_40	38	13.363	18.04	≤24	PASS
	46	14.014	18.69	≤24	PASS
	54	14.925	19.6	≤24	PASS
	62	13.987	18.66	≤24	PASS
	102	13.308	17.98	≤24	PASS
	118	13.626	18.3	≤24	PASS
	134	12.107	16.78	≤24	PASS

Conducted output power

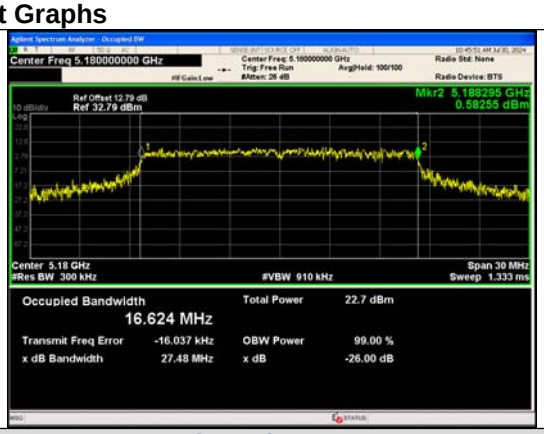
Mode	Channel	Ant. 0 (dBm)	Corr'd Value Ant. 0 (dBm)	Limit (dBm)	Result
IEEE 802.11a	149	8.848	17.1	≤30	PASS
	157	8.480	16.74	≤30	PASS
	165	8.540	16.8	≤30	PASS
IEEE 802.11n_20	149	12.565	17.13	≤30	PASS
	157	11.954	16.52	≤30	PASS
	165	12.040	16.61	≤30	PASS
IEEE 802.11n_40	151	12.541	17.21	≤30	PASS
	159	11.686	16.35	≤30	PASS

APPENDIX V.99% Bandwidth

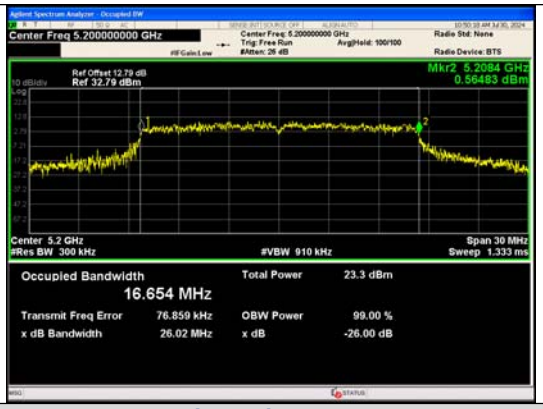
Test Result

Mode	Channel	Ant.	Center Frequency (MHz)	99% BW (MHz)
IEEE 802.11a	36	0	5180	16.624
	40		5200	16.654
	48		5240	16.763
	52		5260	16.741
	56		5280	16.720
	64		5320	16.873
	100		5500	16.813
	120		5600	16.842
	140		5700	16.719
IEEE 802.11n_20	36		5180	17.977
	40		5200	17.989
	48		5240	17.942
	52		5260	17.982
	56		5280	18.020
	64		5320	18.085
	100		5500	18.071
	120		5600	18.151
	140		5700	17.954
IEEE 802.11n_40	38		5190	36.513
	46		5230	36.514
	54		5270	36.443
	62		5310	36.671
	102		5510	36.686
	118		5590	36.668
	134		5670	36.550

Test Graphs

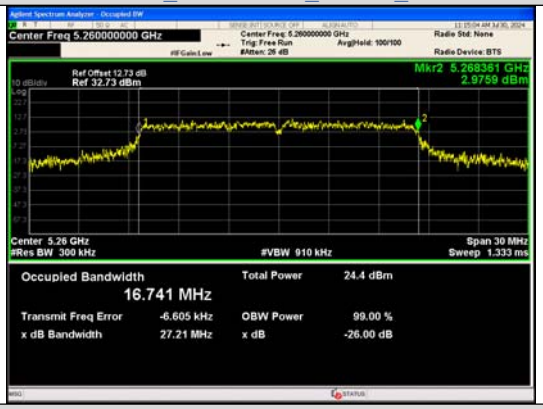


IEEE 802.11a_Channel 36_20MHz_Antenna 0

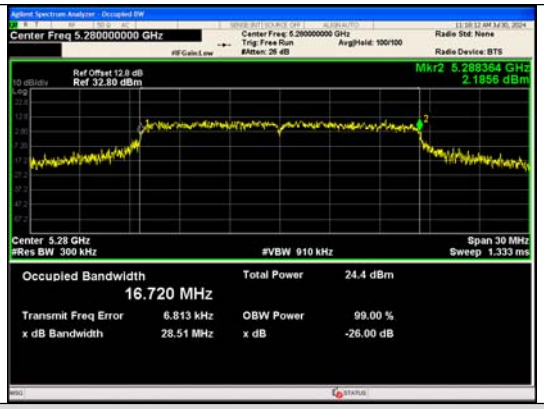


IEEE 802.11a_Channel 40_20MHz_Antenna 0

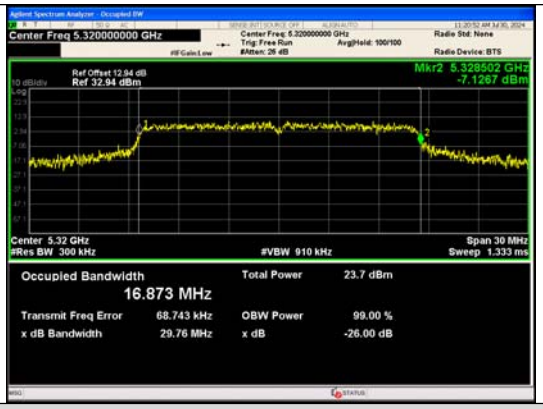
IEEE 802.11a_Channel 48_20MHz_Antenna 0



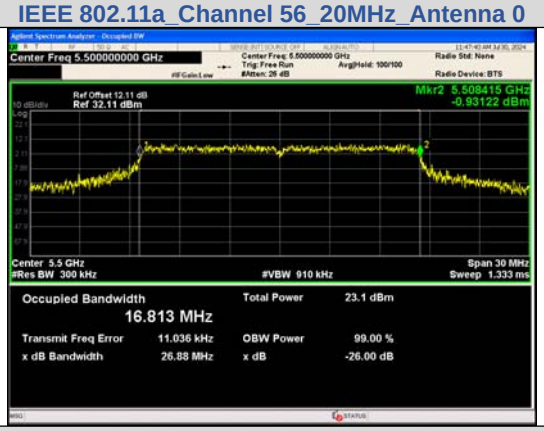
IEEE 802.11a_Channel 52_20MHz_Antenna 0



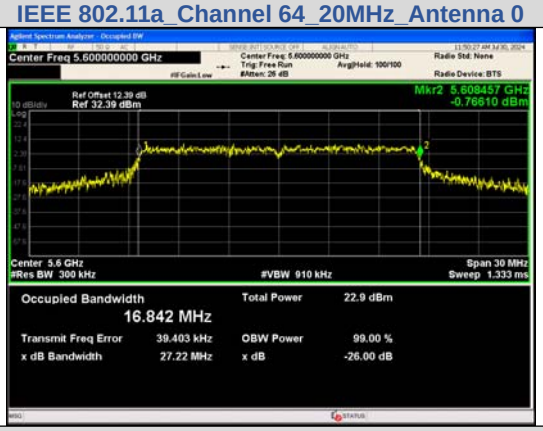
IEEE 802.11a_Channel 56_20MHz_Antenna 0



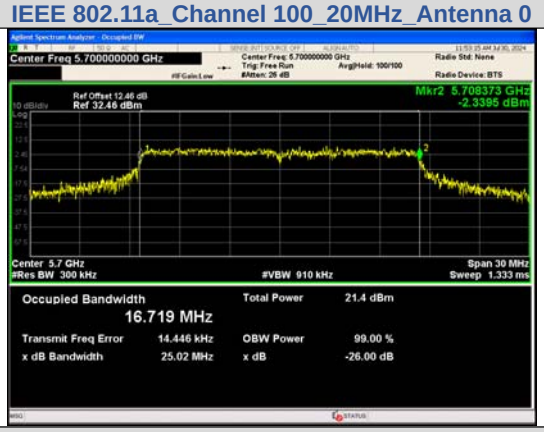
IEEE 802.11a_Channel 64_20MHz_Antenna 0



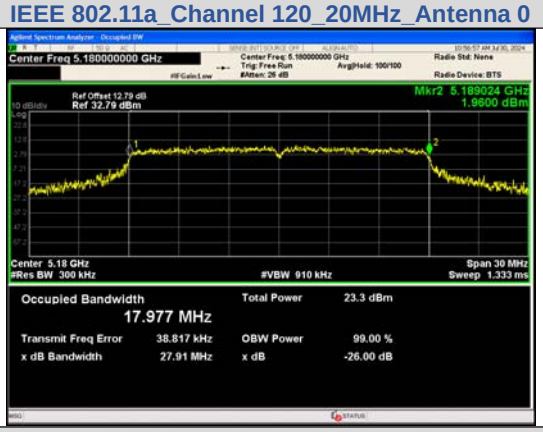
IEEE 802.11a_Channel 100_20MHz_Antenna 0



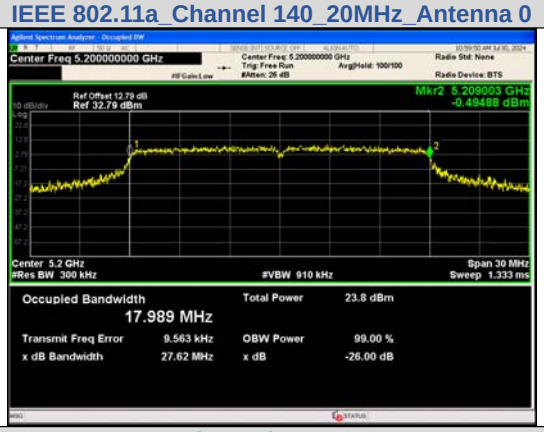
IEEE 802.11a_Channel 120_20MHz_Antenna 0



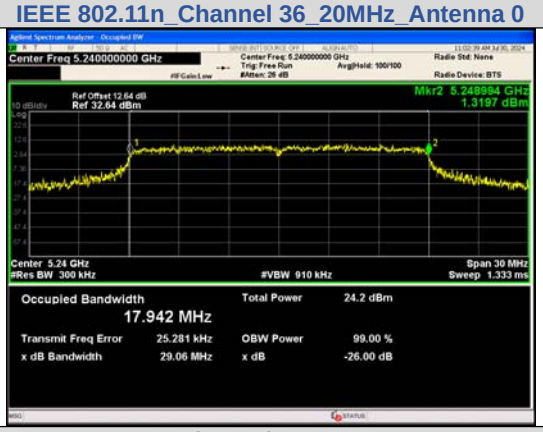
IEEE 802.11a_Channel 140_20MHz_Antenna 0



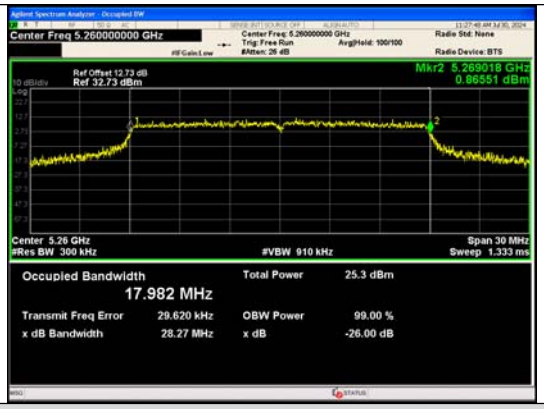
IEEE 802.11n_Channel 36_20MHz_Antenna 0



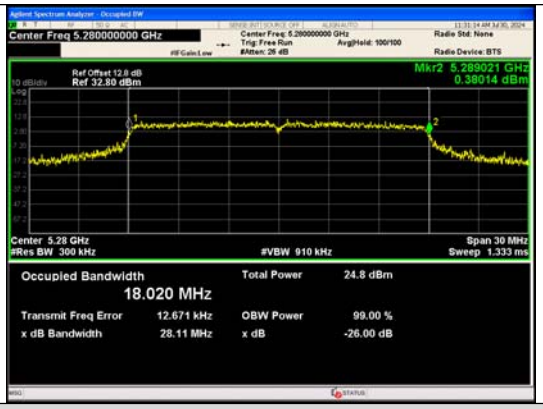
IEEE 802.11n_Channel 40_20MHz_Antenna 0



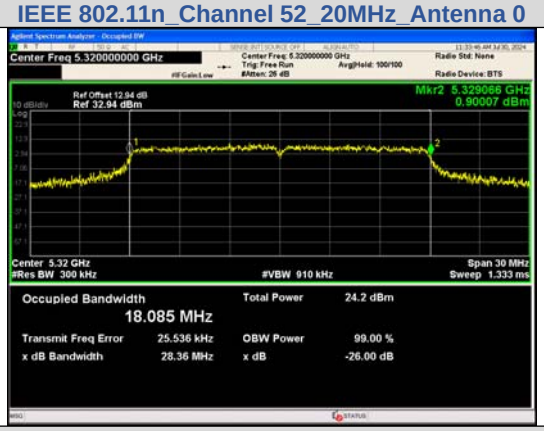
IEEE 802.11n_Channel 48_20MHz_Antenna 0



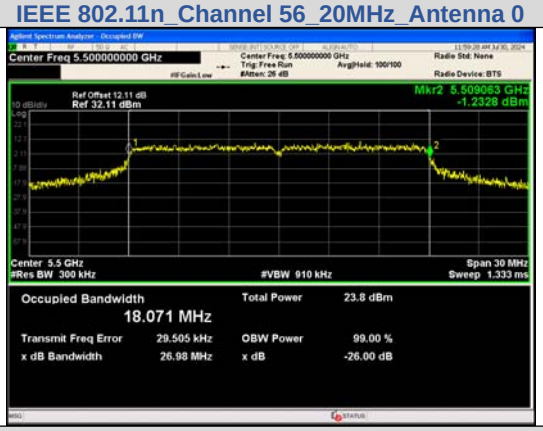
IEEE 802.11n_Channel 52_20MHz_Antenna 0



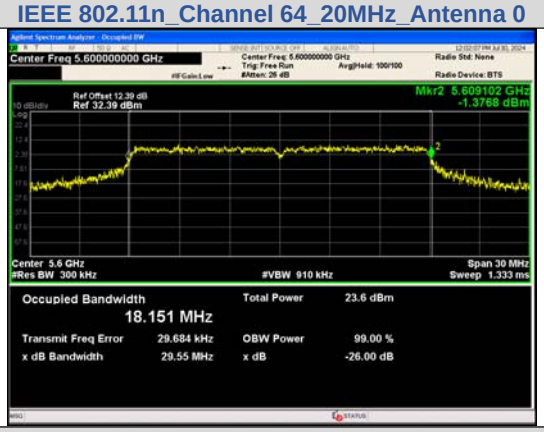
IEEE 802.11n_Channel 56_20MHz_Antenna 0



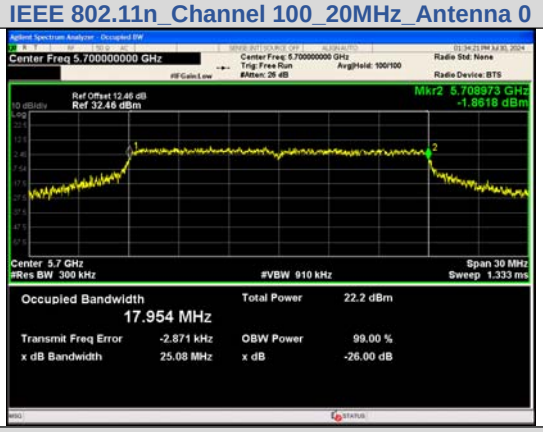
IEEE 802.11n_Channel 64_20MHz_Antenna 0



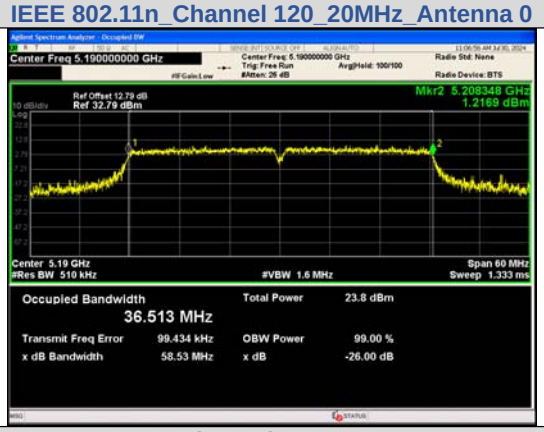
IEEE 802.11n_Channel 100_20MHz_Antenna 0



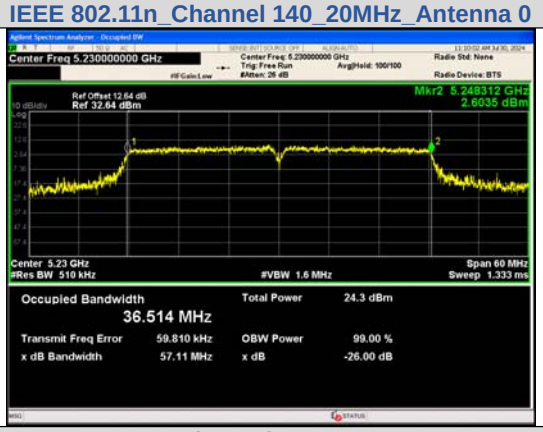
IEEE 802.11n_Channel 120_20MHz_Antenna 0



IEEE 802.11n_Channel 140_20MHz_Antenna 0

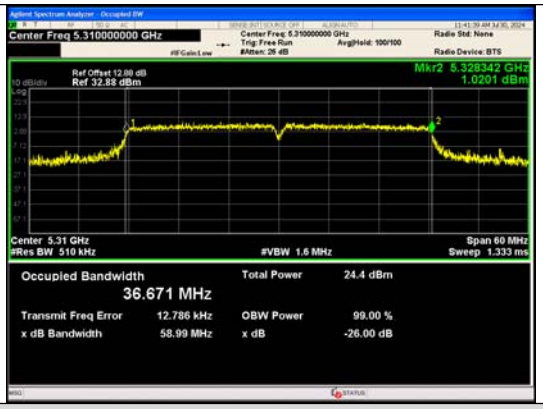


IEEE 802.11n_Channel 38_40MHz_Antenna 0

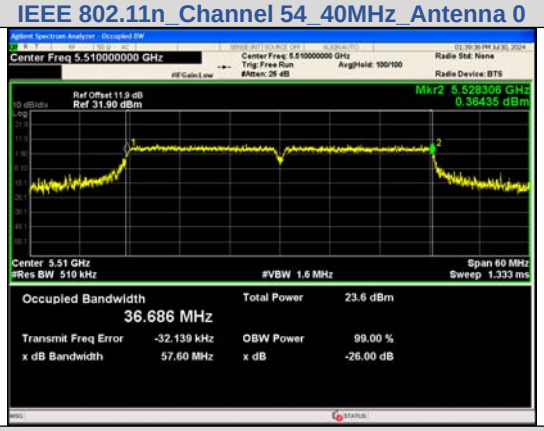


IEEE 802.11n_Channel 46_40MHz_Antenna 0

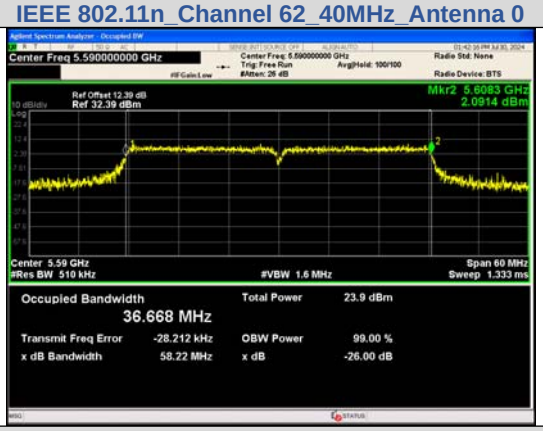
IEEE 802.11n_Channel 54_40MHz_Antenna 0



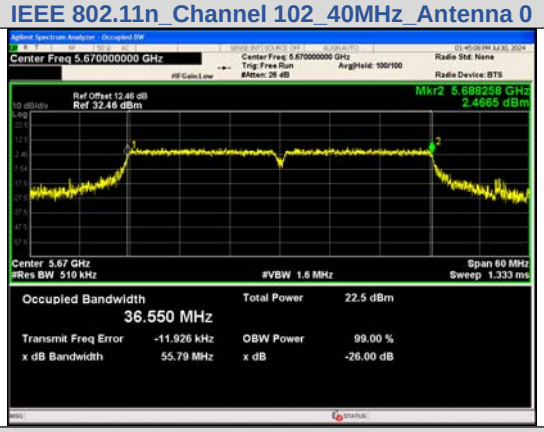
IEEE 802.11n_Channel 62_40MHz_Antenna 0



IEEE 802.11n_Channel 102_40MHz_Antenna 0



IEEE 802.11n_Channel 118_40MHz_Antenna 0

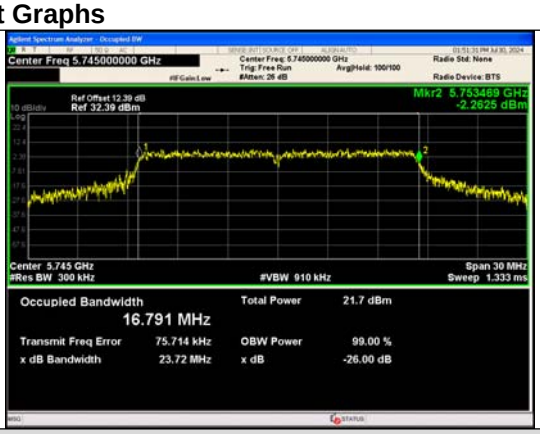


IEEE 802.11n_Channel 134_40MHz_Antenna 0

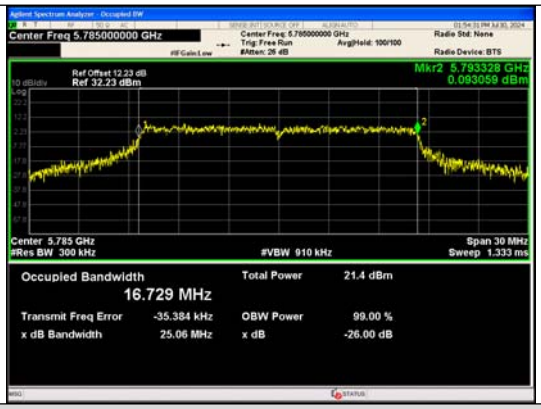
Test Result

Mode	Channel	Ant.	Center Frequency (MHz)	99% BW (MHz)
IEEE 802.11a	149	0	5745	16.791
	157		5785	16.729
	165		5825	16.708
IEEE 802.11n_20	149		5745	18.044
	157		5785	18.035
	165		5825	17.958
IEEE 802.11n_40	151		5755	36.507
	159		5795	36.578

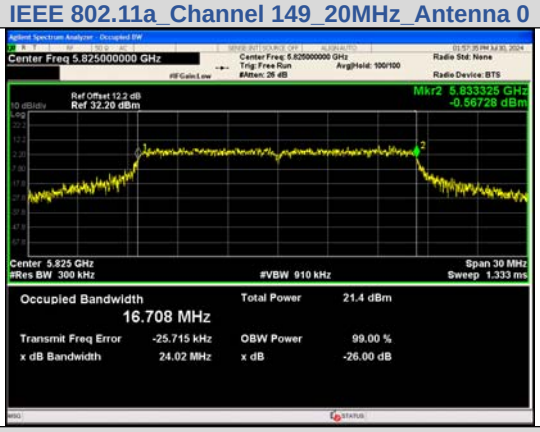
Test Graphs



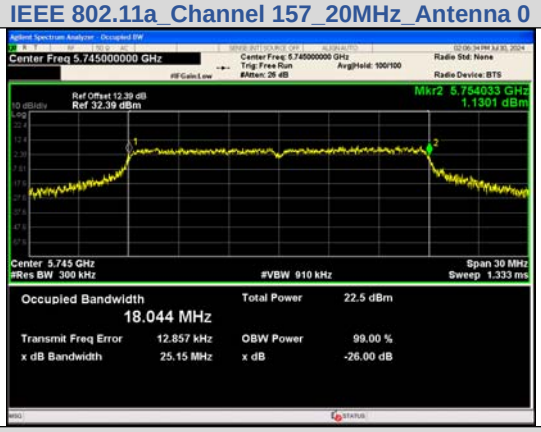
IEEE 802.11a_Channel 149_20MHz_Antenna 0



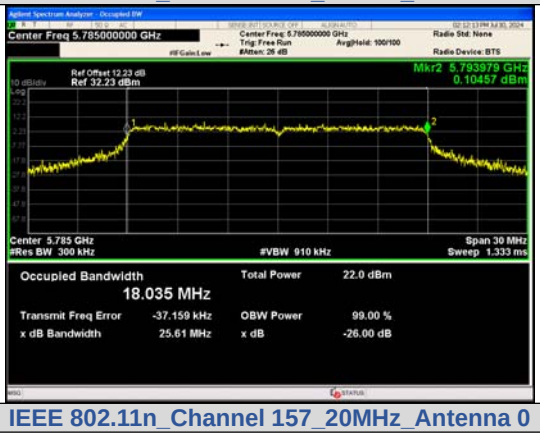
IEEE 802.11a_Channel 157_20MHz_Antenna 0



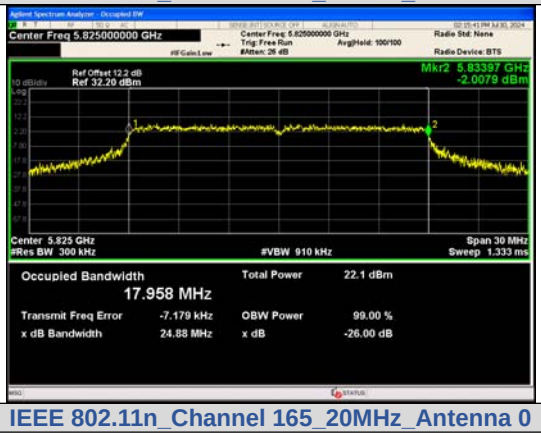
IEEE 802.11a_Channel 165_20MHz_Antenna 0



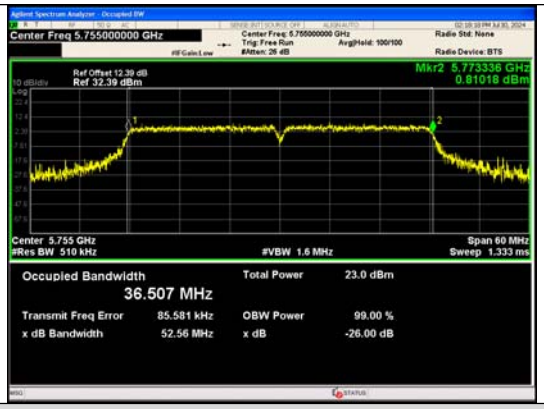
IEEE 802.11n_Channel 149_20MHz_Antenna 0



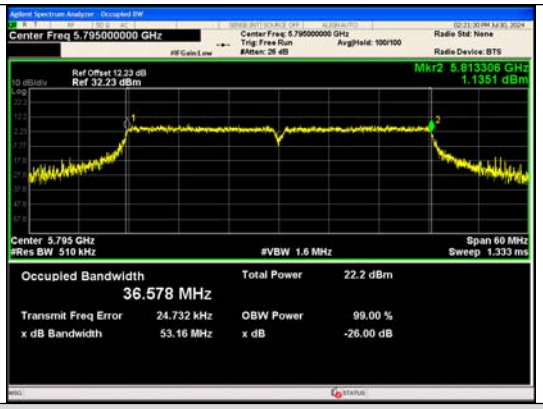
IEEE 802.11n_Channel 157_20MHz_Antenna 0



IEEE 802.11n_Channel 165_20MHz_Antenna 0



IEEE 802.11n_Channel 151_40MHz_Antenna 0



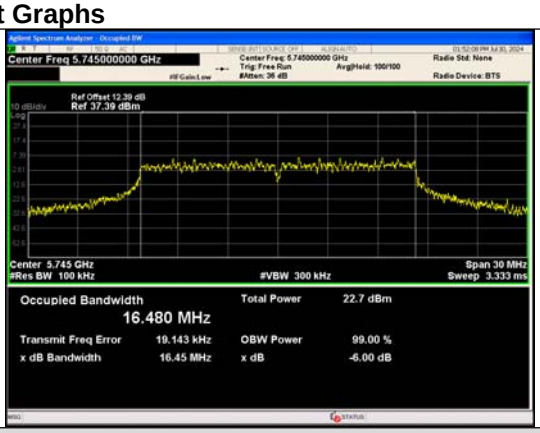
IEEE 802.11n_Channel 159_40MHz_Antenna 0

APPENDIX VI.6dB Bandwidth

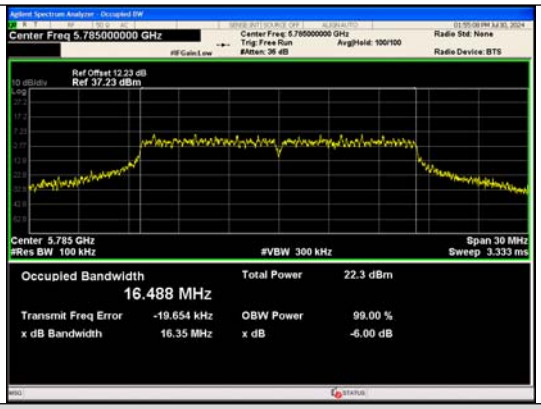
Test Result

Mode	Channel	Ant.	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
IEEE 802.11a	149	0	5745	16.45	≥0.5	PASS
	157		5785	16.35		PASS
	165		5825	16.39		PASS
IEEE 802.11n_20	149		5745	17.67		PASS
	157		5785	17.73		PASS
	165		5825	17.62		PASS
IEEE 802.11n_40	151		5755	36.40		PASS
	159		5795	36.45		PASS

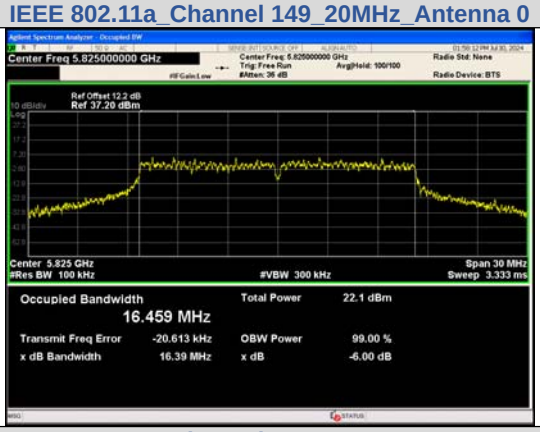
Test Graphs



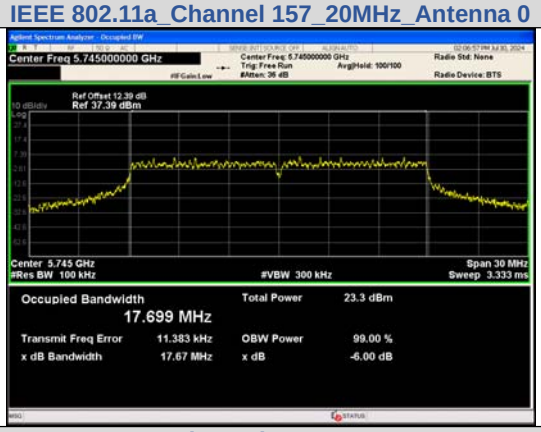
IEEE 802.11a_Channel 149_20MHz_Antenna 0



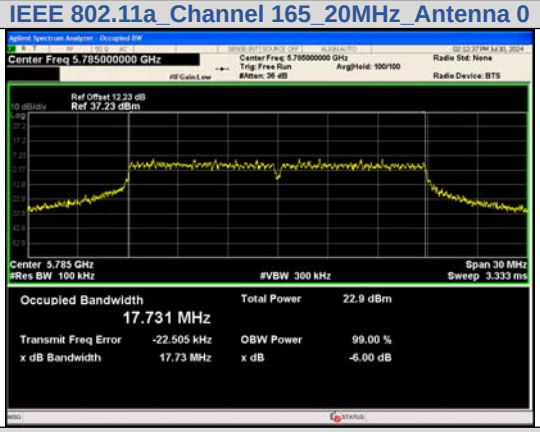
IEEE 802.11a_Channel 157_20MHz_Antenna 0



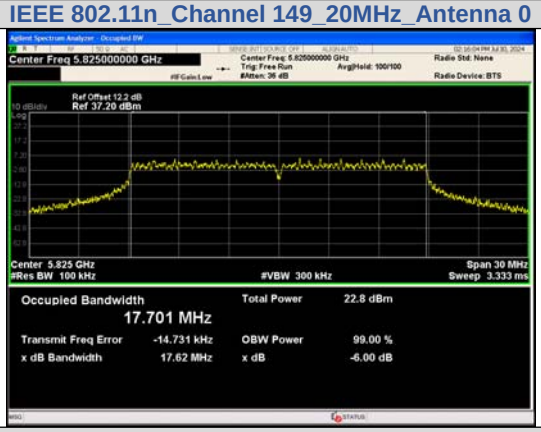
IEEE 802.11a_Channel 165_20MHz_Antenna 0



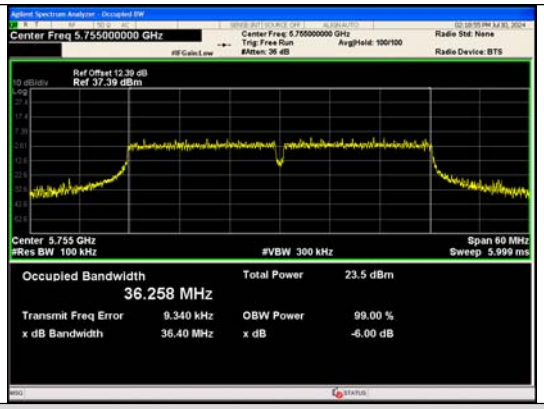
IEEE 802.11n_Channel 149_20MHz_Antenna 0



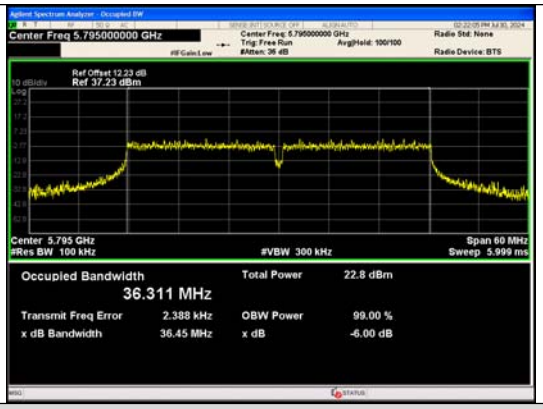
IEEE 802.11n_Channel 157_20MHz_Antenna 0



IEEE 802.11n_Channel 165_20MHz_Antenna 0



IEEE 802.11n_Channel 151_40MHz_Antenna 0



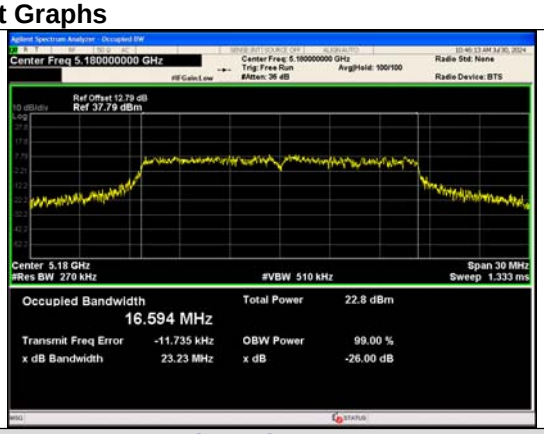
IEEE 802.11n_Channel 159_40MHz_Antenna 0

APPENDIX VII.26dB Bandwidth

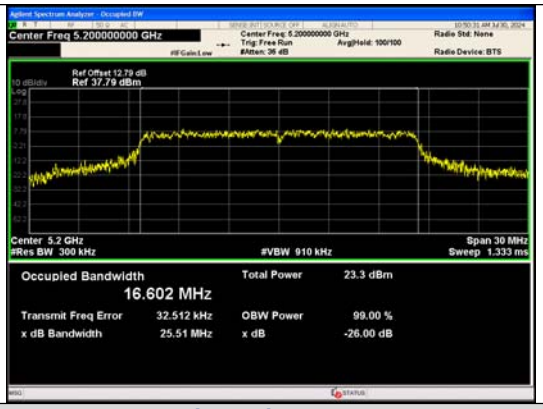
Test Result

Mode	Channel	Ant.	Center Frequency (MHz)	26 dB Bandwidth (MHz)	RBW/EBW
IEEE 802.11a	36	0	5180	23.23	1.14
	40		5200	25.51	1.18
	48		5240	29.07	1.03
	52		5260	28.65	1.05
	56		5280	28.44	1.05
	64		5320	29.55	1.02
	100		5500	28.73	1.04
	120		5600	26.58	1.13
	140		5700	25.62	1.17
IEEE 802.11n_20	36		5180	25.21	1.19
	40		5200	27.97	1.07
	48		5240	28.19	1.06
	52		5260	29.35	1.02
	56		5280	29.28	1.02
	64		5320	28.95	1.04
	100		5500	28.79	1.04
	120		5600	29.58	1.01
	140		5700	26.98	1.11
IEEE 802.11n_40	38		5190	54.71	1.02
	46		5230	55.94	1.09
	54		5270	55.39	1.09
	62		5310	59.97	1.03
	102		5510	57.81	1.01
	118		5590	59.33	1.02
	134		5670	52.16	1.11

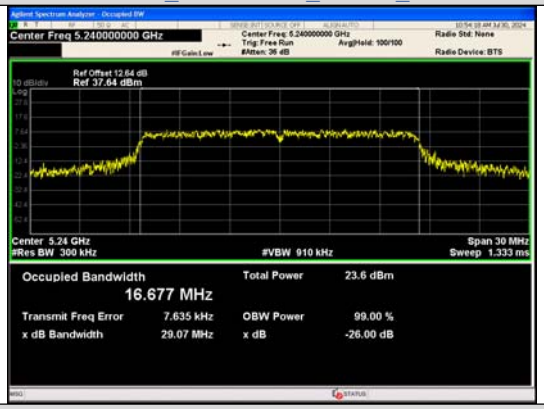
Test Graphs



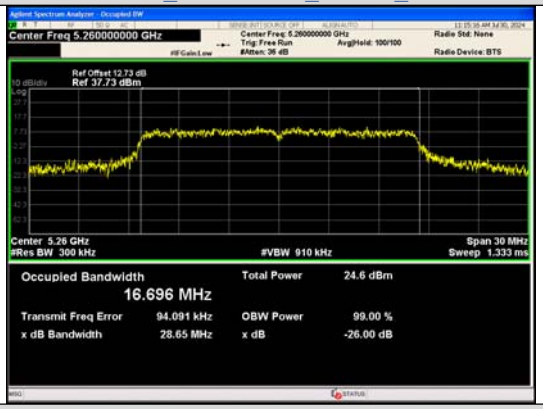
IEEE 802.11a_Channel 36_20MHz_Antenna 0



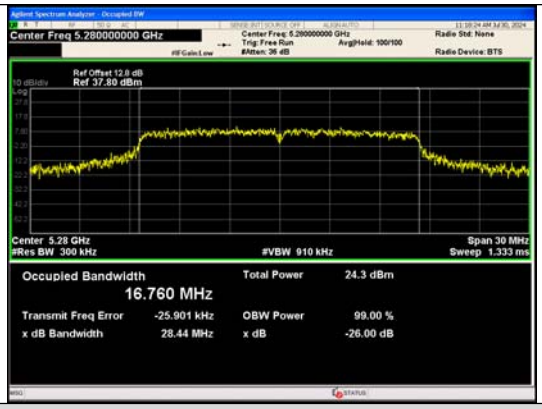
IEEE 802.11a_Channel 40_20MHz_Antenna 0



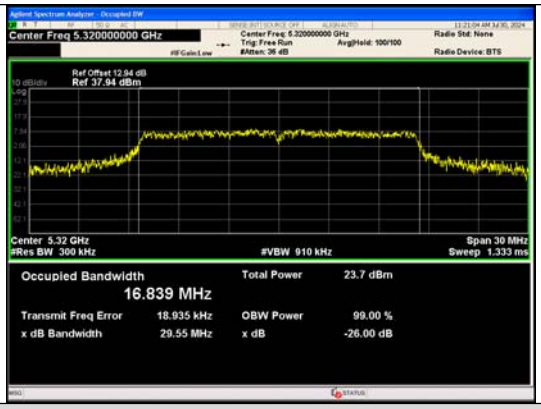
IEEE 802.11a_Channel 48_20MHz_Antenna 0



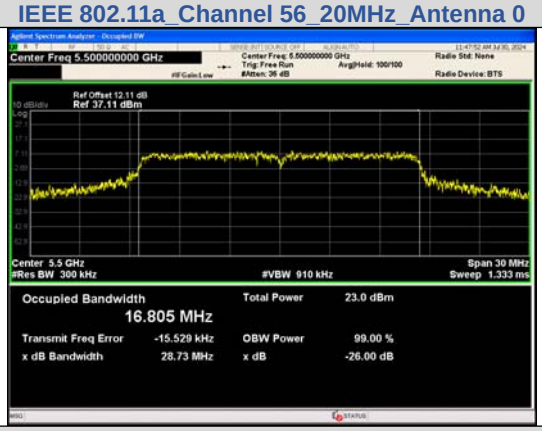
IEEE 802.11a_Channel 52_20MHz_Antenna 0



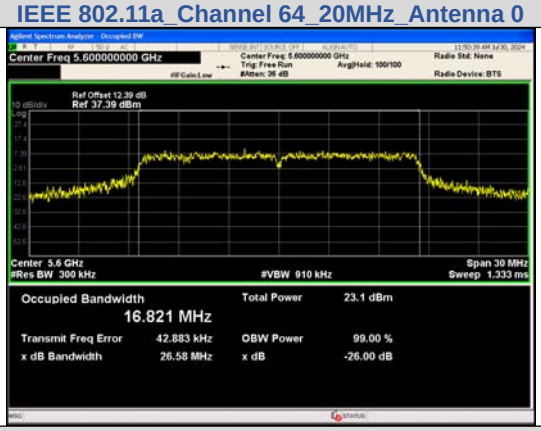
IEEE 802.11a_Channel 56_20MHz_Antenna 0



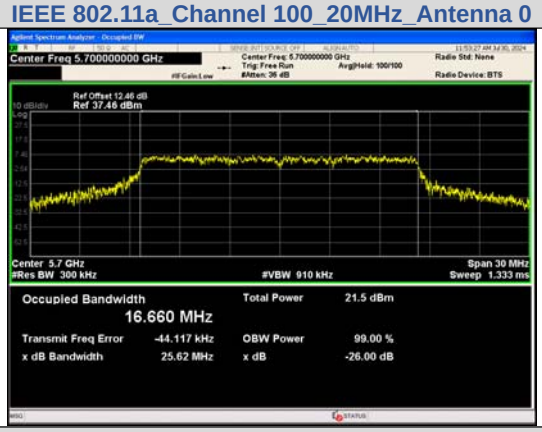
IEEE 802.11a_Channel 64_20MHz_Antenna 0



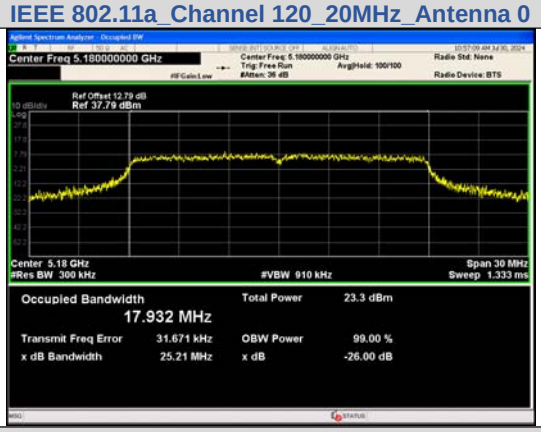
IEEE 802.11a_Channel 100_20MHz_Antenna 0



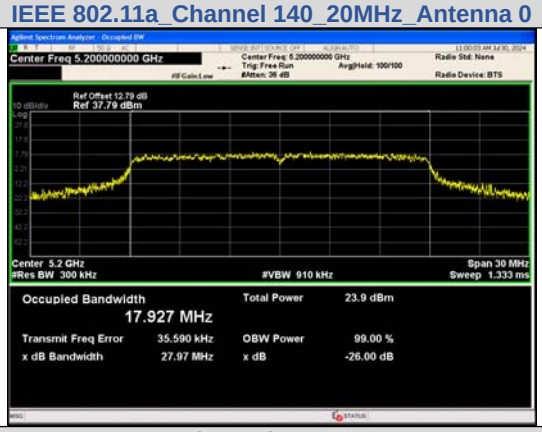
IEEE 802.11a_Channel 120_20MHz_Antenna 0



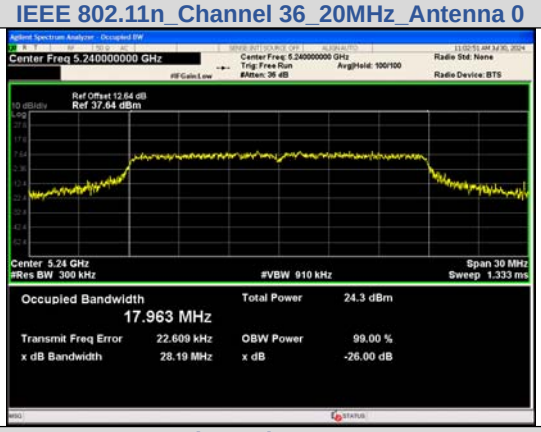
IEEE 802.11a_Channel 140_20MHz_Antenna 0



IEEE 802.11n_Channel 36_20MHz_Antenna 0



IEEE 802.11n_Channel 40_20MHz_Antenna 0



IEEE 802.11n_Channel 48_20MHz_Antenna 0