

Element Materials Technology

(formerly PCTEST)

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MEASUREMENT REPORT FCC PART 15.407 / ISED RSS-248 UNII 802.11a/ax OFDM WIFI 6E

Applicant Name: Date of Testing:

Apple Inc. 10/25/2024 - 1/2/2025

One Apple Park Way

Test Report Issue Date:

Cupertino, CA 95014 2/12/2025 United States **Test Site/**

Test Site/Location:

Element Materials Technology, Morgan Hill, CA, USA

Test Report Serial No.: 1C2410210075-23.BCG

FCC ID: BCGA3269

IC: 579C-A3269

APPLICANT: Apple Inc.

Application Type: Certification

Model/HVIN: A3269, A3271

EUT Type: Tablet Device

Frequency Range: 5955 – 7115MHz

Modulation Type: OFDM

FCC Classification: 15E 6GHz Low Power Dual Client (6CD)

FCC Rule Part(s): Part 15 Subpart E (15.407)

ISED Specification: RSS-248 Issue 3

Test Procedure(s): ANSI C63.10-2020, KDB 789033 D02 v02r01

KDB 662911 D01 v02r01, KDB 987594 D02 v03 KDB 987594 D03 v03, KDB 987594 D04 v03

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2020 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RI Ortanez

Executive Vice President





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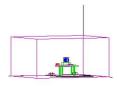


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MEASUREMENT REPORT



						SI	SO			SDM F	Primary	SDM D	iversity
	UNII Band Channel Bandwidth Mo	hannel	Antenna 5T		Antenna 3b		Antenna 1b		Summed		Summed		
UNII Band		Mode	Tx Frequency (MHz)	Max. Power (mW)	Max e.i.r.p. [dBm]								
5		802.11a/ax	5955 - 6415	7.745	8.89	3.304	5.19	1.968	2.94	7.638	8.83	6.166	7.90
6	20	802.11a/ax	6435 - 6515	7.551	8.78	2.301	3.62	1.535	1.86	7.430	8.71	6.412	8.07
7	20	802.11a/ax	6535 - 6875	7.534	8.77	2.270	3.56	1.660	2.20	7.345	8.66	6.295	7.99
8		802.11a/ax	6895 - 7115	7.211	8.58	1.932	2.86	1.403	1.47	7.178	8.56	6.194	7.92
5		802.11ax	5965 - 6405	15.668	11.95	6.531	8.15	3.999	6.02	15.205	11.82	12.388	10.93
6	40	802.11ax	6445 - 6525	15.311	11.85	4.446	6.48	3.373	5.28	14.825	11.71	12.882	11.10
7	40	802.11ax	6565 - 6845	15.560	11.92	4.667	6.69	3.373	5.28	14.894	11.73	12.589	11.00
8		802.11ax	6885 - 7085	14.689	11.67	3.767	5.76	2.729	4.36	14.997	11.76	12.706	11.04
5		802.11ax	5985 - 6385	27.861	14.45	12.359	10.92	6.776	8.31	28.314	14.52	22.699	13.56
6	80	802.11ax	6465	28.054	14.48	7.780	8.91	5.572	7.46	26.242	14.19	21.827	13.39
7	00	802.11ax	6545 - 6865	27.733	14.43	8.222	9.15	6.039	7.81	26.669	14.26	22.594	13.54
8		802.11ax	6945 - 7025	25.823	14.12	6.714	8.27	4.808	6.82	26.122	14.17	22.080	13.44
5		802.11ax	6025 - 6345	48.084	16.82	21.878	13.40	11.830	10.73	48.978	16.90	39.811	16.00
6	1	802.11ax	6505	43.954	16.43	12.134	10.84	8.690	9.39	42.170	16.25	35.400	15.49
7	160	802.11ax	6665 - 6825	46.774	16.70	14.655	11.66	9.954	9.98	46.881	16.71	39.446	15.96
8		802.11ax	6985	46.026	16.63	11.535	10.62	8.933	9.51	46.989	16.72	38.994	15.91

EUT Overview Low Power Indoor

				SISO						CDD/SDM Primary		CDD/SDM Diversity	
	Channel		T. F	Anten	na 5T	Antenna 3b		Anten	na 1b	Sum	nmed	Summed	
UNII Band	Bandwidth Mode (MHz)	Tx Frequency (MHz)	Max. Power (mW)	Max e.i.r.p. [dBm]									
5	- 20	802.11a/ax	5955 - 6415	173.780	22.40	80.538	19.06	45.604	16.59	331.131	25.20	278.612	24.45
7	20	802.11a/ax	6535 - 6855	174.985	22.43	50.816	17.06	37.931	15.79	341.979	25.34	286.418	24.57
5	40	802.11ax	5965 - 6405	177.419	22.49	80.538	19.06	45.394	16.57	352.371	25.47	298.538	24.75
7	40	802.11ax	6565 - 6845	173.380	22.39	51.523	17.12	38.459	15.85	347.536	25.41	289.068	24.61
5	- 80	802.11ax	5985 - 6385	174.985	22.43	78.886	18.97	45.082	16.54	354.813	25.50	291.743	24.65
7	30	802.11ax	6545 - 6865	171.791	22.35	50.119	17.00	38.282	15.83	343.558	25.36	285.759	24.56
5	160	802.11ax	6025 - 6345	180.302	22.56	76.033	18.81	44.463	16.48	360.579	25.57	299.916	24.77
7	100	802.11ax	6665 - 6825	177.419	22.49	51.761	17.14	37.154	15.70	335.738	25.26	276.694	24.42

EUT Overview Standard Power (FCC)

						SI	SO			CDD/SDI	M Primary	CDD/SDN	1 Diversity
	Channel Bandwidth (MHz)		T. C	Antenna 5T		Antenna 3b		Anten	na 1b	Sum	nmed	Sum	Summed
UNII Band		Tx Frequency (MHz)	Max. Power (mW)	Max e.i.r.p. [dBm]									
5		802.11a/ax	5955 - 6415	173.780	22.40	80.538	19.06	45.604	16.59	331.131	25.20	278.612	24.45
6	20	802.11a/ax	6435 - 6515	157.036	21.96	46.666	16.69	32.584	15.13	301.301	24.79	251.768	24.01
7		802.11a/ax	6535 - 6855	174.985	22.43	50.816	17.06	37.931	15.79	341.979	25.34	286.418	24.57
5		802.11ax	5965 - 6405	177.419	22.49	80.538	19.06	45.394	16.57	352.371	25.47	298.538	24.75
6	40	802.11ax	6445 - 6525	170.608	22.32	50.582	17.04	35.892	15.55	338.065	25.29	287.078	24.58
7		802.11ax	6565 - 6845	173.380	22.39	51.523	17.12	38.459	15.85	347.536	25.41	289.068	24.61
5		802.11ax	5985 - 6385	174.985	22.43	78.886	18.97	45.082	16.54	354.813	25.50	291.743	24.65
6	80	802.11ax	6465	147.571	21.69	44.361	16.47	30.269	14.81	295.801	24.71	247.742	23.94
7		802.11ax	6545 - 6865	171.791	22.35	50.119	17.00	38.282	15.83	343.558	25.36	285.759	24.56
5		802.11ax	6025 - 6345	180.302	22.56	76.033	18.81	44.463	16.48	360.579	25.57	299.916	24.77
6	160	802.11ax	6505	153.109	21.85	42.658	16.30	30.761	14.88	300.608	24.78	254.683	24.06
7	1	802.11ax	6665 - 6825	177.419	22.49	51.761	17.14	37.154	15.70	335.738	25.26	276.694	24.42

EUT Overview Standard Power (ISED)

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 Element Materials Technology Test Location

These measurement tests were conducted at the Element Materials Technology facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element Materials Technology located in Morgan Hill, CA 95037, U.S.A.

- Element Materials Technology is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Materials Technology facility is a registered (22831) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreements (MRAs).

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA3269** and **IC: 579C-A3269**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter while operating in the 6GHz band.

Test Device Serial No.: CJ2X56PPQJ, X4H6PMH769, HN7DY16103, QCWY69QGC5, DLXHAB0004W0000047, DLXHAB0003T0000047, Q43TPYXWGF, VQDMXWXDC4

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, 802.11a/ax WIFI 6E, 802.15.4, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), NB UNII (1x, HDR4, HDR8), WPT

This device supports BT Beamforming

Standard Power (SP) mode is supported in U-NII Bands 5 and 7 for FCC and U-NII Band 5, 6, and 7 for ISED. Lower Power Indoor (LPI) mode is supported in U-NII Bands 5, 6, 7, 8. Throughout report, data of Standard Power mode is denoted as SP while data of Lower Power Indoor mode is denoted as LPI.

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Band 5

	Baria
Ch.	Frequency (MHz)
1	5955
•••	:
45	6175
:	:
93	6415

Band 6

	– 4.1.4	
Ch.	Frequency ((MHz)
97	6435	
:	:	
105	6475	
:	:	
113	6515	

Band 7

Ch.	Frequency (MHz)
117	6535
•••	•
149	6695
:	:
185	6875
_	/ 01 1 0

Band 8

Ch.	Frequency (MHz)
189	6895
• •	•
209	6995
:	:
233	7115

Table 2-1. 802.11a / 802.11ax (20MHz) Frequency / Channel Operations

Band 5

Ch.	Frequency (MHz)
3	5965
:	:
43	6165
:	:
91	6405

Band 6

	Bana o
Ch.	Frequency (MHz)
99	6445
:	:
107	6485
:	:
115	6525

Band 7

Ch.	Frequency (MHz)
123	6565
•••	•
155	6725
:	:
179	6845

Band 8

Ch.	Frequency (MHz)
187	6885
•	•
211	7005
	•
227	7085

Table 2-2. 802.11ax (40MHz BW) Frequency / Channel Operations

Band 5

Ch.	Frequency (MHz)
7	5985
	•
39	6145
:	:
87	6385

Band 6

Ch.	Frequency (MHz)
103	6465

Band 7

Ch.	Frequency (MHz)
119	6545
:	:
151	6705
:	:
183	6865

Band 8

Ch.	Frequency (MHz)
199	6945
:	:
215	7025

Table 2-3. 802.11ax (80MHz BW) Frequency / Channel Operations

Band 5

Ch.	Frequency (MHz)
15	6025
	:
47	6185
:	:
79	6345

Band 6

Ch.	Frequency (MHz)
111	6505

Band 7

Ch.	Frequency (MHz)
143	6665
:	:
175	6825
	,

R	an	Ы	Ω
Di	2 I I	α	o

Ch.	Frequency (MHz)
207	6985

Table 2-4. 802.11ax (160MHz BW) Frequency / Channel Operations

Notes:

1. 6GHz NII operation is possible in 20MHz, 40MHz, 80MHz, and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) KDB 789033 D02 v02r01 and ANSI C63.10-2020. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

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	Measured Duty Cycles											
		Ante	nna 5T	Ante	nna 3a	Ante	enna 1b	_	D/SDM mary	_	D/SDM ersity	
802.	802.11 Mode / Band		Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]	
	11a (20MHz) (Low Rate)	98.15	0.08	98.13	0.08	98.08	0.08	N/A	N/A	N/A	N/A	
	11a (20MHz) (Mid Rate)	97.21	0.12	97.21	0.12	97.19	0.12	N/A	N/A	N/A	N/A	
	11a (20MHz) (High Rate)	93.93	0.27	93.91	0.27	93.89	0.27	N/A	N/A	N/A	N/A	
	11ax(SU) (20MHz) (Low Rate)	97.14	0.13	97.10	0.13	97.12	0.13	97.93	0.09	97.88	0.09	
	11ax(SU) (20MHz) (Mid Rate)	95.46	0.20	95.43	0.20	95.41	0.20	96.07	0.17	96.09	0.17	
	11ax(SU) (20MHz) (High Rate)	91.45	0.39	91.43	0.39	91.47	0.39	92.81	0.32	92.85	0.32	
	11ax(SU) (40MHz) (Low Rate)	97.68	0.10	97.70	0.10	97.66	0.10	97.57	0.11	97.54	0.11	
6GHz	11ax(SU) (40MHz) (Mid Rate)	96.65	0.15	96.63	0.15	96.67	0.15	94.97	0.22	95.02	0.22	
	11ax(SU) (40MHz) (High Rate)	92.81	0.32	92.83	0.32	92.88	0.32	89.83	0.47	89.78	0.47	
	11ax(SU) (80MHz) (Low Rate)	96.32	0.16	96.34	0.16	96.29	0.16	96.78	0.14	96.76	0.14	
	11ax(SU) (80MHz) (Mid Rate)	96.25	0.17	96.23	0.17	96.21	0.17	95.54	0.20	95.57	0.20	
	11ax(SU) (80MHz) (High Rate)	91.73	0.38	91.66	0.38	91.71	0.38	93.18	0.31	93.20	0.31	
	11ax(SU) (160MHz) (Low Rate)	96.78	0.14	96.76	0.14	96.81	0.14	94.95	0.23	94.89	0.23	
	11ax(SU) (160MHz) (Mid Rate)	95.10	0.22	95.15	0.22	95.08	0.22	92.62	0.33	92.60	0.33	
	11ax(SU) (160MHz) (High Rate)	89.31	0.49	89.27	0.49	89.29	0.49	89.00	0.51	88.96	0.51	

Table 2-5. Measured Duty Cycles

CDD/SDM Primary = Antenna 5T + Antenna 3a CDD/SDM Diversity = Antenna 5T + Antenna 1b

2. The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		SISO		CDD		SDM			STBC				
		Antenna 5T	Antenna 3b	Antenna 1b									
	11a	✓	✓	✓	*	×	×	×	*	*	*	×	×
	11ax(SU) (20MHz)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6GHz	11ax(SU) (40MHz)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	11ax(SU) (80MHz)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	11ax(SU) (160MHz)	✓	✓	√	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2-6. WIFI Configurations

 \checkmark = Support ; \times = NOT Support

SISO = Single Input Single Output

SDM = Spatial Diversity Multiplexing – MIMO function

CDD = Cyclic Delay Diversity - 2Tx Function

STBC = Space-Time Block Coding – 2Tx Function

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3. The device supports the following data rates (shown in Mbps):

802.11a	MCS	0						OFDM (8	302.11ax)]
20MHz	Index	Spatial Stream		20MHz			40MHz			80MHz			160MHz]
ZUIVIMZ	HE	Siream	0.8µs Gl	1.6µs Gl	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs Gl	0.8µs GI	1.6µs GI	3.2µs GI	
6	0	1	8.6	8.1	7.3	17.2	16.3	14.6	36	34	30.6	72.1	68.1	61.3	
9	1	1	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3	144.1	136.1	122.5	Low rate
12	2	1	25.8	24.4	21.9	51.6	48.8	43.9	108.1	102.1	91.9	216.2	204.2	183.8	
18	3	1	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5	288.2	272.2	245	Mid rate
24	4	1	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8	432.4	408.3	367.5	IVIIU Tate
36	5	1	68.8	65	58.5	137.6	130	117	288.2	272.2	245	576.5	544.4	490	
48	6	1	77.4	73.1	65.8	154.9	146.3	131.6	324.3	306.3	275.6	648.5	612.5	551.3	
54	7	1	86	81.3	73.1	172.1	162.5	146.3	360.3	340.3	306.3	720.6	680.6	612.5	
-	8	1	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5	864.7	816.7	735	High Rate
-	9	1	114.7	108.3	97.5	229.4	216.7	195	480.4	453.7	408.3	960.8	907.4	816.7	
-	10	1	129	121.9	109.7	258.1	243.8	219.4	540.4	510.4	459.4	1080.9	1020.8	918.8	
-	11	1	143.4	135.4	121.9	286.8	270.8	243.8	600.5	567.1	510.4	1201	1134.3	1020.8	
6	0	2	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3	144.1	136.1	122.5	
9	1	2	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5	288.2	272.2	245	Low rate
12	2	2	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8	432.4	408.3	367.5	
18	3	2	68.8	65	58.5	137.6	130	117	288.2	272.2	245	576.5	544.4	490	Mid rate
24	4	2	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5	864.7	816.7	735	IVIIU Tate
36	5	2	137.6	130	117	275.3	260	234	576.5	544.4	490	1152.9	1088.9	980	
48	6	2	154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3	1297.1	1225	1102.5	
54	7	2	172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5	1441.2	1361.1	1225	
-	8	2	206.5	195	175.5	412.9	390	351	864.7	816.7	735	1729.4	1633.3	1470	High Rate
-	9	2	229.4	216.7	195	458.8	433.3	390	960.8	907.4	816.7	1921.6	1814.8	1633.3	
-	10	2	258.1	243.8	219.4	516.2	487.5	438.8	1080.9	1020.8	918.8	2161.8	2041.7	1837.5	
-	11	2	286.8	270.8	243.8	573.5	541.7	487.5	1201	1134.3	1020.8	2402	2268.5	2041.7	

Table 2-7. Supported Data Rates

4. This device supports simultaneous transmission operations, which allows multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.

	Simultaneous	Bluetooth 2.4GHz	Thread	WLAN	NB UNII	WIFI 5GHz	WIFI 6GHz	LTE/FR1 NR		
Antenna	Tx Config	BDR, EDR, HDR4/8, LE1/2M	802.15.4	802.11 b/g/n/ax	BDR, HDR4/8	802.11 a/n/ac/ax	802.11 a/ax	LB	МВ/НВ	Ultra High Band
Ant 3b	Config 1	×	×	×	✓	*	×	×	✓	×
Ant 3b	Config 2	*	×	×	×	✓	×	×	✓	×
Ant 3b	Config 3	*	×	×	*	*	✓	×	✓	*
Ant 3a	Config 4	✓	×	×	*	*	×	×	×	✓
Ant 3a	Config 5	*	✓	×	*	*	*	×	*	✓
Ant 3a	Config 6	*	×	✓	×	×	×	×	×	✓
Ant 1a	Config 7	✓	*	×	*	*	×	×	*	✓
Ant 1a	Config 8	*	✓	×	*	*	*	×	*	✓
Ant 1a	Config 9	*	*	✓	*	*	×	×	*	✓
Ant 1b	Config 10	*	*	×	✓	*	×	×	✓	×
Ant 1b	Config 11	*	×	×	*	✓	×	×	✓	×
Ant 1b	Config 12	*	*	×	×	×	✓	×	✓	×

Table 2-8. Simultaneous Transmission Configurations

√ = Support; × = Not Support

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Note:

All the above simultaneous transmission configurations have been tested and the worst-case configuration was found to be Config 2 and reported in RF UNII OFDM, Part 27b and RSS-199 test reports.

Specific 2.4 GHz Wi-Fi antenna that can only transmit simultaneously with 2.4 GHz Bluetooth antenna is listed in the SAR test report. For BT (2.4 GHz), in both connected and disconnected modes, and Wi-Fi (2.4 GHz) – Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. Bluetooth can simultaneously transmit with IEEE 802.11a/n/ac/ax 5/6 GHz on separate antenna.

2.3 Antenna Description

Following antenna gains were provided by the manufacturer were used for the testing.

UNII	Tx	High	est Antenna Gain	(dBi)	Lowest Antenna Gain (dBi)			
Band	Frequency (MHz)	Antenna 5T	Antenna 3b	Antenna 1b	Antenna 5T	Antenna 3b	Antenna 1b	
	5955-6095	3.70	0.20	-0.40				
5	6115-6255	3.20	-0.80	-1.10	3.00	-2.20	-1.70	
	6275-6415	3.40	-2.20	-0.80				
6	6435-6515	4.00	-1.30	-1.10	4.00	-1.30	-1.10	
7	6535-6855	4.50	-0.80	-0.40	4.30	-3.30	-3.00	
8	6895-7115	4.80	-1.00	-0.60	4.40	-2.10	-2.10	

Table 2-9. Antenna Gains

2.4 Test Support Equipment

1	Apple MacBook Pro	Model:	A2141	S/N:	C02H604EQ05D
	w/AC/DC Adapter	Model:	A2166	S/N:	C4H042705ZNPM0WA6
2	Apple USB-C Cable	Model:	Spartan	S/N:	GXK1336018XKTR024
3	USB-C Cable	Model:	A246C	S/N:	DWH80115BK826GV19
	w/ AC Adapter	Model:	A2305	S/N:	C4H95160004PF4F4V
4	Apple Pencil	Model:	A2538	S/N:	KJ26TCFXJW
5	DC Power Supply	Model:	KPS3010D	S/N:	N/A
6	Netgear	Model:	RAXE500	S/N:	6JX215GA10A5

Table 2-10. Test Support Equipment List

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2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2020, KDB 789033 D02 v02r01 and KDB 987594 D02 v03. ANSI C63.10-2020 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.3 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5 and 7.5 for antenna port conducted emissions test setups.

There are two vendors of the WiFi/Bluetooth radio modules, variant 1 and variant 2. Both radio modules have the same mechanical outline, same on-board antenna matching circuit, identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances. The worst case configuration was found between the two variants. The EUT was also investigated with and without charger.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

For AC line conducted and radiated test below 1GHz, following configuration were investigated and EUT powered by AC/DC was the worst case.

- EUT powered by AC/DC adaptor via USB-C cable with wire charger
- EUT powered by host PC via USB-C cable with wire charger

802.11ax HE20/40/80/160 2TX SDM mode test data provided in this report covers 802.11ax HE20/40/80/160 2TX STBC mode.

The data rates have been categorized into three groups: low, middle, and high data rates (see Table 2-7). All three groups have been investigated, and only the worst-case data rate has been reported.

For 802.11ax-RU test results, see separate UNII 6E OFDMA report, 1C2410210075-24.BCG.

2.6 Software and Firmware

The test was conducted with firmware version 22D20 installed on the EUT.

2.7 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2020) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT.

Deviation from measurement procedure......None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, $50\Omega/50\mu$ H Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is EPCOS 2X60A Power Line Filter (100dB Attenuation, 14kHz-18GHz) and the two EPCOs 2X48A filters (100dB Minimum Insertion Loss, 14kHz - 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.9. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 10.50.40.

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3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

Per KDB 414788, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was used while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antennas of the EUT are permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

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5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. All measurement uncertainty values are shown with a coverage factor of k=2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	2.07
Line Conducted Disturbance	1.91
Radiated Disturbance (<30MHz)	4.12
Radiated Disturbance (30MHz - 1GHz)	4.85
Radiated Disturbance (1 - 18GHz)	5.08
Radiated Disturbance (>18GHz)	5.22

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6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance with the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Anritsu	ML2495A	Power Meter	7/8/2024	Annual	7/8/2025	1039008
Anritsu	MA2411B	Pulse Power Sensor	7/1/2024	Annual	7/1/2025	1911105
Anritsu	MA2411B	Pulse Power Sensor	10/21/2024	Annual	10/21/2025	1027293
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	3/14/2024	Annual	3/14/2025	T058701-01
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	4/9/2024	Annual	4/9/2025	00218555
Fairview Microwave	FMCA1975-36	30MHz-40GHz Conducted Cable *	6/10/2024	Annual	6/10/2025	-
Fairview Microwave	FM2CP1122-10	Directional Coupler *	6/10/2024	Annual	6/10/2025	1946
Fairview Microwave/MCL	FMCA1975-36/BW-K10-2W44+	30MHz-40GHz RF Cable/Attenuator *	6/10/2024	Annual	6/10/2025	-
Keysight Technology	N9040B	UXA Signal Analyzer	5/28/2024	Annual	5/28/2025	MY57212015
Keysight Technology	N9030A	PXA Signal Analyzer	7/11/2024	Annual	7/11/2025	MY49430244
Mini-Circuits	ZN2PD-9G	Power Splitter*	8/16/2024	Annual	8/16/2025	SF456200530
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	3/1/2024	Annual	3/1/2025	102145
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	8/14/2024	Annual	8/14/2025	101648
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	5/29/2024	Annual	5/29/2025	101619
Rohde & Schwarz	ESW44	EMI Test Receiver	5/1/2024	Annual	5/1/2025	101867
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	7/3/2024	Annual	7/3/2025	102356
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	6/10/2024	Annual	6/10/2025	100057
Rohde & Schwarz	HFH2-Z2	Loop Antenna	6/21/2024	Annual	6/21/2025	100519
Rohde & Schwarz	ENV216	Two-Line V-Network	4/24/2024	Annual	4/24/2025	101364
Rohde & Schwarz	SMW200A	Vector Signal Generator	4/4/2024	Annual	4/4/2025	109456
Schwarzbeck	VULB 9162	Bilog Antenna (30MHz - 6GHz)	4/29/2024	Annual	4/29/2025	00304

Table 6-1. Test Equipment List

Note:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. * denotes passive equipment that have been internally verified/calibrated.

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7.0 TEST RESULTS

7.1 Summary

 Company Name:
 Apple Inc.

 FCC ID:
 BCGA3269

 IC:
 579C-A3269

FCC Classification: <u>15E 6GHz Low Power Dual Client (6CD)</u>

FCC Part Section(s) / KDB Reference	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049, 15.407(a)(11)	RSS Gen [6.7], RSS-248 [4.4]	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands		PASS	Section 7.2
			< 320MHz (5.925 - 7.125GHz)			
15.407(a)(8)	RSS-248 [4.5.3]	Manifestore Bassac Constant Bassaite	< -1dBm/MHz e.i.r.p.for Low Power Indoor		PASS	Onetine 7.4
15.407(a)(7)	RSS-248 [4.5.5]	Maximum Power Spectral Density	< 17dBm/MHz e.i.r.p. for Standard Power		PASS	Section 7.4
15.407(a)(8)	RSS-248 [4.5.3]		< 24dBm over the frequency band of operation		PASS	0 : 70
15.407(a)(7)	RSS-248 [4.5.5]	Maximum EIRP	< 30dBm over the frequency band of operation	CONDUCTED	PASS	Section 7.3
15.407(b)(7)	RSS-248 [4.6.2]	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(7) and RSS-248 [4.6.2] b)		PASS	Section 7.5
15.407(d)(6)	RSS-248 [4.7]	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty		PASS	Section 7.6
15.407(a)(7)	RSS-248 [4.5.5]	Proper Power Adjustment, Client Devices Connected to a Standard Power Access Point	EUT maintains its power level at least 6 dB lower than that of the standard-power access point		PASS	See UNII 6E OFDMA
987594 D02 v03	987594 D02 v03	Dual Client Test, Demonstration of Proper Power Adjustment based on Associated AP	EUT maximum power level shall not exceed 30dBm EIRP when connected to Standard Power AP, and 24dBm EIRP when connected to Low Power Indoor AP		PASS	Report 1C24102100 75-24.BCG
15.407(b)(6)	RSS-248 [4.7.2]	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band		PASS	Section 7.7
15.205, 15.209	RSS-248 [4.6.2] RSS-Gen [8.9]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-Gen [8.9])	RADIATED	PASS	Section 7.7, 7.8
15.407(b)(9)	RSS-Gen [8.8]	AC Conducted Emissions (150kHz – 30MHz)	< FCC 15.207 (RSS-Gen [8.8]) limits	LINE CONDUCTED	PASS	Section 7.9

Table 7-1. Summary of Test Results

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Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Conducted Automation," Version 1.1.1.
- 5) For radiated testing, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Chamber Automation," Version 3.1.0.
- 6) All radiated measurements were tested at the highest supported power setting per band.

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7.2 26dB & 99% Bandwidth Measurement

§2.1049; §15.407; RSS-Gen [6.7]

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2020 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

Test Procedure Used

ANSI C63.10-2020 – Section 12.5.2 KDB 789033 D02 v02r01 – Section C

Test Settings

- 1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = in the range of 1% to 5% of the emission bandwidth
- 3. $VBW > 3 \times RBW$
- 4. Detector = Peak
- 5. Trace mode = max hold

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. All data rates and antenna configurations were investigated, and tabular data has been reported. Only worst-case plots per bandwidth have been reported.

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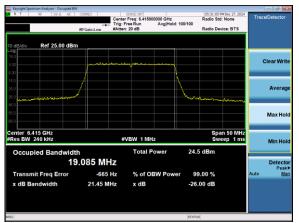
7.2.1 Antenna 5T 26dB & 99% Bandwidth Measurements - SP

	Frequency [MHz]	Channel	802.11 MODE	Data Rate [Mbps]	Measured 99% Occupied Bandwidth [MHz]	Measured 26dB Bandwidth [MHz]	Maximum Bandwidth Limit [MHz]	Pass / Fail
	5955	1	а	12.00	16.78	21.11	320	Pass
	6175	45	a	12.00	16.80	20.87	320	Pass
	6415	93	a	12.00	16.77	21.03	320	Pass
	5955	1	ax (20MHz)	24/25.8 (MCS2)	19.03	21.40	320	Pass
	6175	45	ax (20MHz)	24/25.8 (MCS2)	19.07	21.43	320	Pass
	6415	93	ax (20MHz)	24/25.8 (MCS2)	19.09	21.45	320	Pass
rv [5965	3	ax (40MHz)	49/51.6 (MCS2)	37.97	41.67	320	Pass
Band 5	6165	43	ax (40MHz)	49/51.6 (MCS2)	37.94	41.78	320	Pass
ĕ	6405	91	ax (40MHz)	49/51.6 (MCS2)	37.98	41.71	320	Pass
	5985	7	ax (80MHz)	102/108.1 (MCS2)	77.25	82.19	320	Pass
	6145	39	ax (80MHz)	102/108.1 (MCS2)	77.26	82.07	320	Pass
	6385	87	ax (80MHz)	204/216.2 (MCS4)	77.14	81.90	320	Pass
	6025	15	ax (160MHz)	1020.8/1201 (MCS11)	156.62	166.50	320	Pass
	6185	47	ax (160MHz)	1020.8/1201 (MCS11)	156.57	166.30	320	Pass
	6345	79	ax (160MHz)	1020.8/1201 (MCS11)	157.20	258.19	320	Pass
	6435	97	a	12.00	16.71	20.87	320	Pass
	6475	105	a	54.00	16.68	20.90	320	Pass
	6515	113	a	12.00	16.73	20.79	320	Pass
	6345	97	ax (20MHz)	135/143.4 (MCS11)	19.02	21.20	320	Pass
9	6475	105	ax (20MHz)	135/143.4 (MCS11)	19.01	21.22	320	Pass
Band 6	6515	113	ax (20MHz)	49/51.6 (MCS4)	19.03	21.37	320	Pass
ĕ	6445	99	ax (40MHz)	49/51.6 (MCS2)	37.96	41.49	320	Pass
	6485	107	ax (40MHz)	98/103.2 (MCS4)	37.91	41.54	320	Pass
	6525	115	ax (40MHz)	98/103.2 (MCS4)	37.92	41.59	320	Pass
	6465	103	ax (80MHz)	102/108.1 (MCS2)	77.10	82.22	320	Pass
	6505	111	ax (160MHz)	183.8/216.2 (MCS2)	156.49	165.86	320	Pass
	6535	117	a	12.00	16.77	21.21	320	Pass
	6695	149	a	12.00	16.79	21.12	320	Pass
	6855	181	a	12.00	16.79	21.15	320	Pass
	6535	117	ax (20MHz)	135/143.4 (MCS11)	19.06	21.23	320	Pass
	6695	149	ax (20MHz)	49/51.6 (MCS4)	19.03	21.55	320	Pass
7 -	6855	181	ax (20MHz)	24/25.8 (MCS2)	19.04	21.39	320	Pass
Band 7	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.94	41.59	320	Pass
ď	6725	155	ax (40MHz)	49/51.6 (MCS2)	37.96	41.63	320	Pass
	6845	179	ax (40MHz)	98/103.2 (MCS4)	37.93	41.58	320	Pass
	6625	135	ax (80MHz)	102/108.1 (MCS2)	77.28	82.22	320	Pass
	6705	151	ax (80MHz)	102/108.1 (MCS2)	77.20	82.42	320	Pass
	6785	167	ax (80MHz)	567/600.5 (MCS11)	77.26	82.42	320	Pass
	6665	143	ax (160MHz)	1020.8/1201 (MCS11)	156.80	165.93	320	Pass

Table 7-2. Conducted Bandwidth Measurements Antenna 5T

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 19 of 264	
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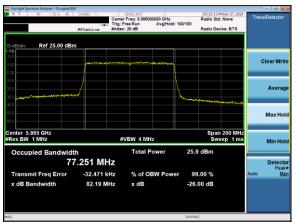




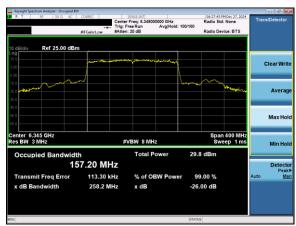
Plot 7-1. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 5) - Ch. 93)



Plot 7-2. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 5) – Ch. 43)



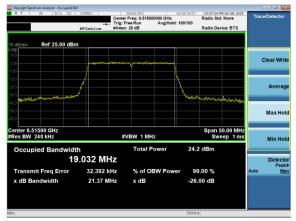
Plot 7-3. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 5) - Ch. 7)



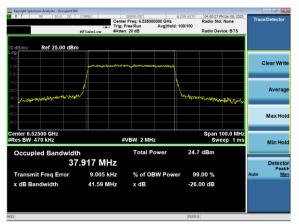
Plot 7-4. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 5) – Ch. 79)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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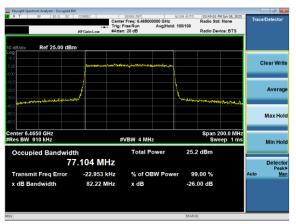




Plot 7-5. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 6) – Ch. 113)



Plot 7-6. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 6) - Ch. 115)



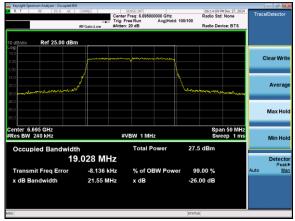
Plot 7-7. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 6) – Ch. 103)



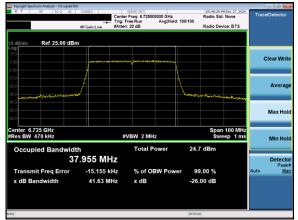
Plot 7-8. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 6) – Ch. 111)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 21 of 264	
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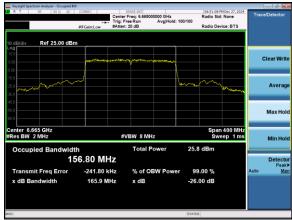
Plot 7-9. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 7) – Ch. 149)



Plot 7-10. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 7) – Ch. 155)



Plot 7-11. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 7) – Ch. 167)



Plot 7-12. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 22 of 264	
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7.2.2 Antenna 5T 26dB & 99% Bandwidth Measurements – LPI

	Frequency	Channel	802.11	Data Rate [Mbps]	Measured 99% Occupied	Measured 26dB Bandwidth	Maximum Bandwidth Limit	Pass / Fail
	[MHz]		MODE		Bandwidth [MHz]	[MHz]	[MHz]	
	5955	1	а	12.00	16.76	21.09	320	Pass
	6175	45	a	12.00	16.76	20.96	320	Pass
	6415	93	а	12.00	16.76	21.16	320	Pass
	5955	1	ax (20MHz)	135/143.4 (MCS11)	19.07	21.50	320	Pass
	6175	45	ax (20MHz)	24/25.8 (MCS2)	19.09	21.42	320	Pass
	6415	93	ax (20MHz)	135/143.4 (MCS11)	19.11	21.49	320	Pass
n	5965	3	ax (40MHz)	98/103.2 (MCS4)	37.96	41.56	320	Pass
Band 5	6165	43	ax (40MHz)	49/51.6 (MCS2)	37.95	41.69	320	Pass
ă	6405	91	ax (40MHz)	271/286.8 (MCS11)	37.93	41.78	320	Pass
	5985	7	ax (80MHz)	204/216.2 (MCS4)	77.28	82.36	320	Pass
	6145	39	ax (80MHz)	102/108.1 (MCS2)	77.28	82.17	320	Pass
	6385	87	ax (80MHz)	204/216.2 (MCS4)	77.18	82.18	320	Pass
	6025	15	ax (160MHz)	183.8/216.2 (MCS2)	156.69	166.25	320	Pass
	6185	47	ax (160MHz)	183.8/216.2 (MCS2)	156.25	166.00	320	Pass
	6345	79	ax (160MHz)	1020.8/1201 (MCS11)	156.15	166.33	320	Pass
	6435	97	а	12.00	16.78	21.06	320	Pass
	6475	105	a	12.00	16.79	21.10	320	Pass
	6515	113	a	12.00	16.79	21.18	320	Pass
	6435	97	ax (20MHz)	135/143.4 (MCS11)	19.04	21.39	320	Pass
9	6475	105	ax (20MHz)	49/51.6 (MCS4)	19.08	21.30	320	Pass
Band 6	6515	113	ax (20MHz)	24/25.8 (MCS2)	19.06	21.48	320	Pass
Ä	6445	99	ax (40MHz)	49/51.6 (MCS2)	37.94	41.67	320	Pass
	6485	107	ax (40MHz)	98/103.2 (MCS4)	37.93	41.61	320	Pass
	6525	115	ax (40MHz)	98/103.2 (MCS4)	37.94	41.51	320	Pass
	6465	103	ax (80MHz)	204/216.2 (MCS4)	77.26	82.14	320	Pass
	6505	111	ax (160MHz)	183.8/216.2 (MCS2)	156.47	165.68	320	Pass
	6535	117	а	12.00	16.77	21.02	320	Pass
	6695	149	а	12.00	16.77	21.10	320	Pass
	6875	185	а	12.00	16.76	21.02	320	Pass
	6535	117	ax (20MHz)	135/143.4 (MCS11)	19.04	21.35	320	Pass
	6695	149	ax (20MHz)	135/143.4 (MCS11)	19.05	21.37	320	Pass
	6875	185	ax (20MHz)	135/143.4 (MCS11)	19.07	21.32	320	Pass
<u> </u>	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.99	41.52	320	Pass
Band 7	6725	155	ax (40MHz)	49/51.6 (MCS2)	37.96	41.65	320	Pass
	6885	179	ax (40MHz)	49/51.6 (MCS2)	37.94	41.74	320	Pass
	6545	119	ax (80MHz)	102/108.1 (MCS2)	77.23	82.02	320	Pass
	6705	151	ax (80MHz)	102/108.1 (MCS2)	77.31	82.44	320	Pass
	6865	183	ax (80MHz)	102/108.1 (MCS2)	77.26	82.23	320	Pass
	6665	143	ax (160MHz)	1020.8/1201 (MCS11)	156.32	166.81	320	Pass
	6825	175	ax (160MHz)	367.5/432.4 (MCS4)	156.10	165.43	320	Pass
	6895	189	a	12.00	16.77	21.00	320	Pass
	6995	209	a	12.00	16.75	21.14	320	Pass
	7115	233	a	12.00	16.77	21.09	320	Pass
	6895	189	ax (20MHz)	24/25.8 (MCS2)	19.04	21.33	320	Pass
8	6995	209	ax (20MHz)	24/25.8 (MCS2)	19.06	21.33	320	Pass
Band 8	7115	233	ax (20MHz)	24/25.8 (MCS2)	19.07	21.24	320	Pass
Ваі	6885	187	ax (40MHz)	49/51.6 (MCS2)	37.95	41.56	320	Pass
	7005	211	ax (40MHz)	98/103.2 (MCS4)	37.91	41.73	320	Pass
	7085	227	ax (40MHz)	49/51.6 (MCS2)	37.97	41.66	320	Pass
	6945	199	ax (80MHz)	102/108.1 (MCS2)	77.28	82.40	320	Pass
	7025	215	ax (80MHz)	102/108.1 (MCS2)	77.08	81.99	320	Pass
	6985	207	ax (160MHz)	1020.8/1201 (MCS11)	156.35	166.09	320	Pass

Table 7-3. Conducted Bandwidth Measurements Antenna 5T

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogg 22 of 264	
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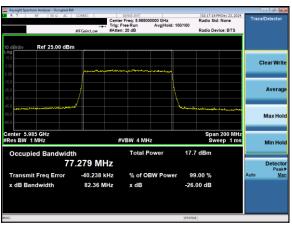




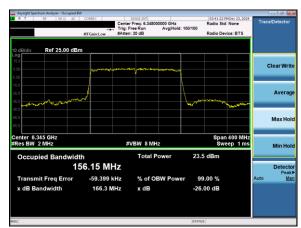
Plot 7-13. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 5) – Ch. 1)



Plot 7-14. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 5) – Ch. 91)



Plot 7-15. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 5) - Ch. 7)



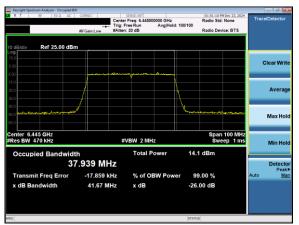
Plot 7-16. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 5) - Ch. 79)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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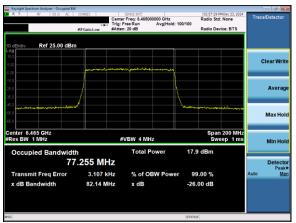




Plot 7-17. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 6) – Ch. 113)



Plot 7-18. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 6) – Ch. 99)



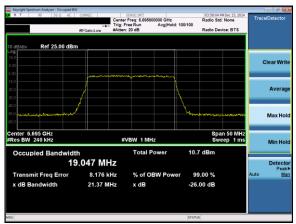
Plot 7-19. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 6) – Ch. 103)



Plot 7-20. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 6) – Ch. 111)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 25 of 264	
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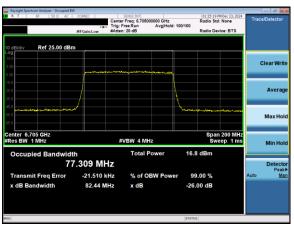




Plot 7-21. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 7) – Ch. 149)



Plot 7-22. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 7) – Ch. 179)



Plot 7-23. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 7) - Ch. 151)



Plot 7-24. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
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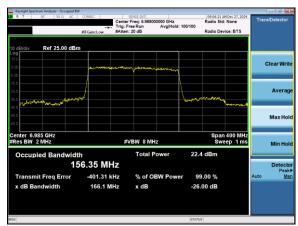
Plot 7-25. 26dB & 99% Bandwidth Plot Antenna 5T (20MHz 802.11ax (UNII Band 8) – Ch. 209)



Plot 7-26. 26dB & 99% Bandwidth Plot Antenna 5T (40MHz 802.11ax (UNII Band 8) – Ch. 211)



Plot 7-27. 26dB & 99% Bandwidth Plot Antenna 5T (80MHz 802.11ax (UNII Band 8) – Ch. 199)



Plot 7-28. 26dB & 99% Bandwidth Plot Antenna 5T (160MHz 802.11ax (UNII Band 8) – Ch. 207)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 27 of 264	
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7.2.3 Antenna 3b 26dB & 99% Bandwidth Measurements – SP

	_				Measured 99%	Measured 26dB	Maximum	
	Frequency	Channel	802.11	Data Rate [Mbps]	Occupied	Bandwidth	Bandwidth Limit	Pass / Fail
	[MHz]		MODE		Bandwidth [MHz]	[MHz]	[MHz]	
	5955	1	а	12.00	16.77	21.06	320	Pass
	6175	45	a	12.00	16.76	21.11	320	Pass
	6415	93	a	12.00	16.79	21.19	320	Pass
	5955	1	ax (20MHz)	24/25.8 (MCS2)	19.06	21.36	320	Pass
	6175	45	ax (20MHz)	135/143.4 (MCS11)	19.04	21.23	320	Pass
	6415	93	ax (20MHz)	135/143.4 (MCS11)	19.16	23.90	320	Pass
2	5965	3	ax (40MHz)	49/51.6 (MCS2)	38.06	41.72	320	Pass
Band 5	6165	43	ax (40MHz)	49/51.6 (MCS2)	37.96	41.99	320	Pass
ä	6405	91	ax (40MHz)	49/51.6 (MCS2)	38.00	41.87	320	Pass
	5985	7	ax (80MHz)	204/216.2 (MCS4)	77.32	82.52	320	Pass
	6145	39	ax (80MHz)	204/216.2 (MCS4)	77.40	82.41	320	Pass
	6385	87	ax (80MHz)	567/600.5 (MCS11)	77.47	85.71	320	Pass
	6025	15	ax (160MHz)	1020.8/1201 (MCS11)	157.58	260.87	320	Pass
	6185	47	ax (160MHz)	1020.8/1201 (MCS11)	157.37	263.65	320	Pass
	6345	79	ax (160MHz)	1020.8/1201 (MCS11)	158.15	301.28	320	Pass
	6435	97	a	12.00	16.72	20.95	320	Pass
	6475	105	a	24.00	16.69	20.92	320	Pass
	6515	113	a	12.00	16.68	20.78	320	Pass
	6345	97	ax (20MHz)	49/51.6 (MCS4)	19.01	21.18	320	Pass
9	6475	105	ax (20MHz)	49/51.6 (MCS4)	19.02	21.20	320	Pass
Band 6	6515	113	ax (20MHz)	135/143.4 (MCS11)	19.11	21.12	320	Pass
ě	6445	99	ax (40MHz)	49/51.6 (MCS2)	37.89	41.37	320	Pass
	6485	107	ax (40MHz)	98/103.2 (MCS4)	37.89	41.56	320	Pass
	6525	115	ax (40MHz)	98/103.2 (MCS4)	37.93	41.48	320	Pass
	6465	103	ax (80MHz)	102/108.1 (MCS2)	77.22	81.89	320	Pass
	6505	111	ax (160MHz)	1020.8/1201 (MCS11)	156.75	166.12	320	Pass
	6535	117	а	12.00	16.79	21.18	320	Pass
	6695	149	a	12.00	16.78	21.21	320	Pass
	6855	181	a	24.00	16.76	21.33	320	Pass
	6535	117	ax (20MHz)	135/143.4 (MCS11)	19.10	24.69	320	Pass
	6695	149	ax (20MHz)	135/143.4 (MCS11)	19.18	21.34	320	Pass
7 1	6855	181	ax (20MHz)	135/143.4 (MCS11)	19.19	25.20	320	Pass
Band 7	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.94	41.92	320	Pass
ä	6725	155	ax (40MHz)	271/286.8 (MCS11)	37.99	41.86	320	Pass
	6845	179	ax (40MHz)	271/286.8 (MCS11)	38.09	54.46	320	Pass
	6625	135	ax (80MHz)	567/600.5 (MCS11)	77.36	84.74	320	Pass
	6705	151	ax (80MHz)	204/216.2 (MCS4)	77.39	82.69	320	Pass
	6785	167	ax (80MHz)	567/600.5 (MCS11)	77.56	96.27	320	Pass
	6665	143	ax (160MHz)	1020.8/1201 (MCS11)	157.56	263.82	320	Pass

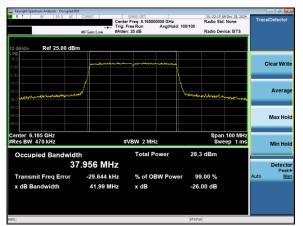
Table 7-4. Conducted Bandwidth Measurements Antenna 3b

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-29. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 5) - Ch. 93)



Plot 7-30. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 5) - Ch. 43)



Plot 7-31. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 5) - Ch. 87)



Plot 7-32. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 5) - Ch. 79)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-33. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 6) – Ch. 105)



Plot 7-34. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 6) - Ch. 155)



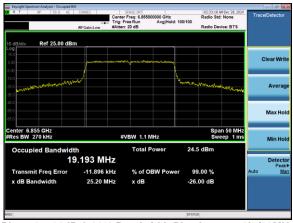
Plot 7-35. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 6) – Ch. 103)



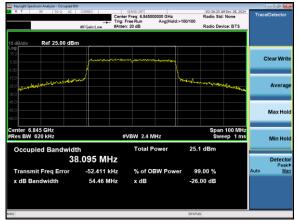
Plot 7-36. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 6) – Ch. 111)

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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Plot 7-37. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 7) – Ch. 181)



Plot 7-38. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 7) - Ch. 179)



Plot 7-39. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 7) – Ch. 167)



Plot 7-40. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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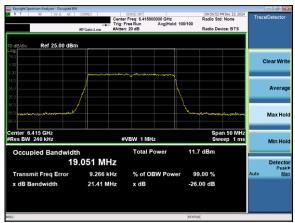
7.2.4 Antenna 3b 26dB & 99% Bandwidth Measurements - LPI

	Frequency [MHz]	Channel	802.11 MODE	Data Rate [Mbps]	Measured 99% Occupied Bandwidth [MHz]	Measured 26dB Bandwidth [MHz]	Maximum Bandwidth Limit [MHz]	Pass / Fail
	5955	1	а	12.00	16.77	21.14	320	Pass
	6175	45	a	12.00	16.78	21.12	320	Pass
	6415	93	a	12.00	16.76	21.02	320	Pass
	5955	1	ax (20MHz)	49/51.6 (MCS4)	19.03	21.30	320	Pass
	6175	45	ax (20MHz)	135/143.4 (MCS11)	19.03	21.31	320	Pass
	6415	93	ax (20MHz)	135/143.4 (MCS11)	19.05	21.41	320	Pass
2	5965	3	ax (40MHz)	49/51.6 (MCS2)	38.00	41.63	320	Pass
Band 5	6165	43	ax (40MHz)	98/103.2 (MCS4)	37.93	41.58	320	Pass
ă	6405	91	ax (40MHz)	49/51.6 (MCS2)	38.00	41.66	320	Pass
	5985	7	ax (80MHz)	204/216.2 (MCS4)	77.21	82.21	320	Pass
	6145	39	ax (80MHz)	567/600.5 (MCS11)	77.20	81.96	320	Pass
	6385	87	ax (80MHz)	102/108.1 (MCS2)	77.16	82.15	320	Pass
	6025	15	ax (160MHz)	183.8/216.2 (MCS2)	156.42	166.38	320	Pass
	6185	47	ax (160MHz)	183.8/216.2 (MCS2)	156.41	165.79	320	Pass
	6345	79	ax (160MHz)	367.5/432.4 (MCS4)	156.49	166.40	320	Pass
	6435	97	a	12.00	16.75	21.02	320	Pass
	6475	105	a	12.00	16.77	21.13	320	Pass
	6515	113	a	12.00	16.76	21.11	320	Pass
	6435	97	ax (20MHz)	135/143.4 (MCS11)	19.03	21.44	320	Pass
9_	6475	105	ax (20MHz)	49/51.6 (MCS4)	19.03	21.42	320	Pass
Band 6	6515	113	ax (20MHz)	135/143.4 (MCS11)	19.05	21.34	320	Pass
œ ·	6445	99	ax (40MHz)	49/51.6 (MCS2)	37.91	41.46	320	Pass
	6485	107	ax (40MHz)	49/51.6 (MCS2)	37.92	41.65	320	Pass
	6525	115	ax (40MHz)	98/103.2 (MCS4)	37.94	41.57	320	Pass
	6465	103	ax (80MHz)	204/216.2 (MCS4)	77.35	82.57	320	Pass
	6505	111	ax (160MHz)	183.8/216.2 (MCS2)	156.37	165.71	320	Pass
	6535	117	a	12.00	16.77	21.04	320	Pass
	6695	149	a	12.00	16.75	21.10	320	Pass
	6875	185	a	12.00	16.75	20.96	320	Pass
	6535	117	ax (20MHz)	24/25.8 (MCS2)	19.05	21.40	320	Pass
	6695	149	ax (20MHz)	135/143.4 (MCS11)	19.04	21.44	320	Pass
_	6875	185	ax (20MHz)	135/143.4 (MCS11)	19.03	21.32	320	Pass
Band 7	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.96	41.67	320	Pass
Ba	6725	155	ax (40MHz)	49/51.6 (MCS2)	37.97	41.58	320	Pass
	6885	179	ax (40MHz)	98/103.2 (MCS4)	37.94	41.57	320	Pass
	6545	119	ax (80MHz)	102/108.1 (MCS2)	77.13	82.12	320	Pass
	6705	151	ax (80MHz)	567/600.5 (MCS11)	77.23	81.95	320	Pass
	6865	183	ax (80MHz)	204/216.2 (MCS4)	77.19	82.15	320	Pass
	6665	143	ax (160MHz)	1020.8/1201 (MCS11)	156.23	166.31	320	Pass
	6825	175	ax (160MHz)	1020.8/1201 (MCS11)	156.23	166.11	320	Pass
	6895	189	а	12.00	16.75	20.99	320	Pass
	6995	209	а	12.00	16.75	21.00	320	Pass
	7115	233	a	12.00	16.77	21.07	320	Pass
	6895	189	ax (20MHz)	135/143.4 (MCS11)	19.09	21.33	320	Pass
∞	6995	209	ax (20MHz)	24/25.8 (MCS2)	19.06	21.31	320	Pass
Band	7115	233	ax (20MHz)	135/143.4 (MCS11)	19.07	21.43	320	Pass
Ba	6885	187	ax (40MHz)	49/51.6 (MCS2)	37.94	41.61	320	Pass
	7005	211	ax (40MHz)	49/51.6 (MCS2)	37.93	41.57	320	Pass
	7085	227	ax (40MHz)	49/51.6 (MCS2)	37.95	41.65	320	Pass
	6945	199	ax (80MHz)	204/216.2 (MCS4)	77.32	82.26	320	Pass
	7025	215	ax (80MHz)	102/108.1 (MCS2)	77.19	82.17	320	Pass
	6985	207	ax (160MHz)	367.5/432.4 (MCS4)	156.14	166.18	320	Pass

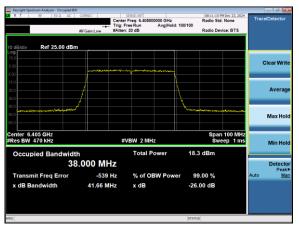
Table 7-5. Conducted Bandwidth Measurements Antenna 3b

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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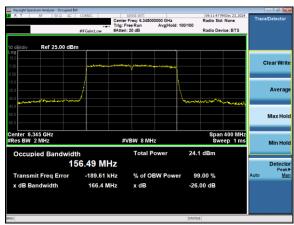
Plot 7-41. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 5) - Ch. 93)



Plot 7-42. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 5) - Ch. 91)



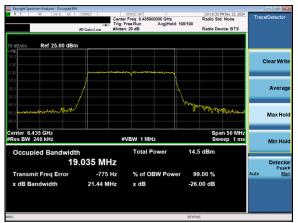
Plot 7-43. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 5) – Ch. 7)



Plot 7-44. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 5) - Ch. 79)

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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Plot 7-45. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 6) - Ch. 97)



Plot 7-46. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 6) – Ch. 107)



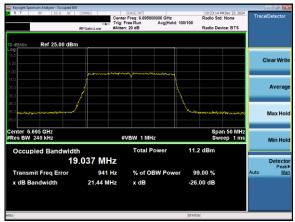
Plot 7-47. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 6) – Ch. 103)



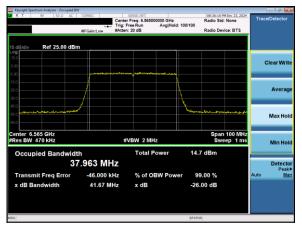
Plot 7-48. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 6) – Ch. 111)

FCC ID: BCGA3269 IC: 579C-A3269	element	element MEASUREMENT REPORT (CERTIFICATION)	
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Plot 7-49. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 7) - Ch. 149)



Plot 7-50. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 7) - Ch. 123)



Plot 7-51. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 7) - Ch. 183)



Plot 7-52. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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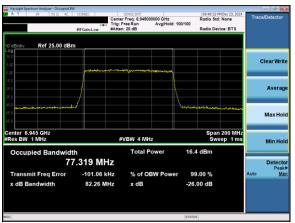




Plot 7-53. 26dB & 99% Bandwidth Plot Antenna 3b (20MHz 802.11ax (UNII Band 8) – Ch. 233)



Plot 7-54. 26dB & 99% Bandwidth Plot Antenna 3b (40MHz 802.11ax (UNII Band 8) – Ch. 227)



Plot 7-55. 26dB & 99% Bandwidth Plot Antenna 3b (80MHz 802.11ax (UNII Band 8) – Ch. 199)



Plot 7-56. 26dB & 99% Bandwidth Plot Antenna 3b (160MHz 802.11ax (UNII Band 8) – Ch. 207)

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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7.2.5 Antenna 1b 26dB & 99% Bandwidth Measurements - SP

	Frequency		802.11		Measured 99%	Measured 26dB	Maximum	
	[MHz]	Channel	MODE	Data Rate [Mbps]	Occupied	Bandwidth	Bandwidth	Pass / Fail
	[IVII12]		WIODL		Bandwidth [MHz]	[MHz]	Limit [MHz]	
	5955	1	a	12.00	16.75	21.02	320	Pass
	6175	45	a	12.00	16.76	21.01	320	Pass
	6415	93	а	12.00	16.81	21.25	320	Pass
	5955	1	ax (20MHz)	135/143.4 (MCS11)	19.13	22.34	320	Pass
	6175	45	ax (20MHz)	135/143.4 (MCS11)	19.12	22.60	320	Pass
	6415	93	ax (20MHz)	135/143.4 (MCS11)	19.20	27.40	320	Pass
ī	5965	3	ax (40MHz)	271/286.8 (MCS11)	38.05	42.05	320	Pass
Band 5	6165	43	ax (40MHz)	49/51.6 (MCS2)	37.96	41.54	320	Pass
ĕ	6405	91	ax (40MHz)	271/286.8 (MCS11)	38.11	55.14	320	Pass
	5985	7	ax (80MHz)	567/600.5 (MCS11)	77.29	82.19	320	Pass
	6145	39	ax (80MHz)	102/108.1 (MCS2)	77.23	82.52	320	Pass
	6385	87	ax (80MHz)	567/600.5 (MCS11)	77.60	106.45	320	Pass
	6025	15	ax (160MHz)	1020.8/1201 (MCS11)	157.62	266.60	320	Pass
	6185	47	ax (160MHz)	1020.8/1201 (MCS11)	157.69	266.56	320	Pass
	6345	79	ax (160MHz)	1020.8/1201 (MCS11)	158.70	304.72	320	Pass
	6435	97	а	12.00	16.71	21.13	320	Pass
	6475	105	а	12.00	16.69	20.89	320	Pass
	6515	113	а	12.00	16.69	20.92	320	Pass
	6345	97	ax (20MHz)	24/25.8 (MCS2)	19.00	21.23	320	Pass
9	6475	105	ax (20MHz)	24/25.8 (MCS2)	19.00	21.20	320	Pass
Band 6	6515	113	ax (20MHz)	135/143.4 (MCS11)	18.98	21.41	320	Pass
Ä	6445	99	ax (40MHz)	98/103.2 (MCS4)	37.93	41.83	320	Pass
	6485	107	ax (40MHz)	271/286.8 (MCS11)	37.87	41.54	320	Pass
	6525	115	ax (40MHz)	49/51.6 (MCS2)	37.93	41.51	320	Pass
	6465	103	ax (80MHz)	204/216.2 (MCS4)	77.12	81.68	320	Pass
	6505	111	ax (160MHz)	1020.8/1201 (MCS11)	156.77	256.83	320	Pass
	6535	117	а	12.00	16.77	21.13	320	Pass
	6695	149	а	12.00	16.78	21.12	320	Pass
	6855	181	а	24.00	16.78	21.36	320	Pass
	6535	117	ax (20MHz)	135/143.4 (MCS11)	19.09	22.83	320	Pass
	6695	149	ax (20MHz)	135/143.4 (MCS11)	19.15	25.82	320	Pass
7	6855	181	ax (20MHz)	135/143.4 (MCS11)	19.17	26.05	320	Pass
Band 7	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.96	41.79	320	Pass
ä	6725	155	ax (40MHz)	98/103.2 (MCS4)	38.05	43.93	320	Pass
	6845	179	ax (40MHz)	271/286.8 (MCS11)	38.21	47.27	320	Pass
	6625	135	ax (80MHz)	102/108.1 (MCS2)	77.30	82.53	320	Pass
	6705	151	ax (80MHz)	567/600.5 (MCS11)	77.36	84.74	320	Pass
	6785	167	ax (80MHz)	567/600.5 (MCS11)	77.57	86.36	320	Pass
	6665	143	ax (160MHz)	1020.8/1201 (MCS11)	157.99	264.32	320	Pass

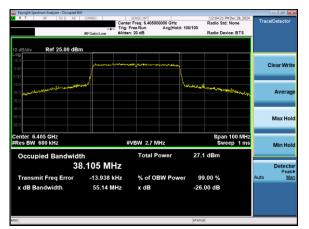
Table 7-6. Conducted Bandwidth Measurements Antenna 1b

FCC ID: BCGA3269 IC: 579C-A3269	element	element MEASUREMENT REPORT (CERTIFICATION)	
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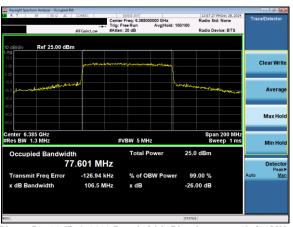




Plot 7-57. 26dB & 99% Bandwidth Plot 1b (20MHz 802.11ax (UNII Band 5) - Ch. 93)



Plot 7-58. 26dB & 99% Bandwidth Plot Antenna 1b (40MHz 802.11ax (UNII Band 5) - Ch. 91)



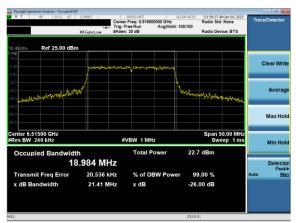
Plot 7-59. 26dB & 99% Bandwidth Plot Antenna 1b (80MHz 802.11ax (UNII Band 5) - Ch. 87)



Plot 7-60. 26dB & 99% Bandwidth Plot Antenna 1b (160MHz 802.11ax (UNII Band 5) – Ch. 79)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-61. 26dB & 99% Bandwidth Plot Antenna 1b (20MHz 802.11ax (UNII Band 6) – Ch. 113)



Plot 7-62. 26dB & 99% Bandwidth Plot Antenna 1b (40MHz 802.11ax (UNII Band 6) – Ch. 99)



Plot 7-63. 26dB & 99% Bandwidth Plot Antenna 1b (80MHz 802.11ax (UNII Band 6) – Ch. 103)



Plot 7-64. 26dB & 99% Bandwidth Plot Antenna 1b (160MHz 802.11ax (UNII Band 6) – Ch. 111)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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Plot 7-65. 26dB & 99% Bandwidth Plot Antenna 1b (20MHz 802.11ax (UNII Band 7) – Ch. 181)



Plot 7-66. 26dB & 99% Bandwidth Plot Antenna 1b (40MHz 802.11ax (UNII Band 7) – Ch. 179)



Plot 7-67. 26dB & 99% Bandwidth Plot Antenna 1b (80MHz 802.11ax (UNII Band 7) – Ch. 167)



Plot 7-68. 26dB & 99% Bandwidth Plot Antenna 1b (160MHz 802.11ax (UNII Band 7) - Ch. 143)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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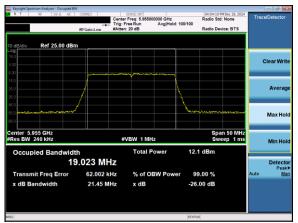
7.2.6 Antenna 1b 26dB & 99% Bandwidth Measurements - LPI

	Frequency	Channel	802.11 MODE	Data Rate [Mbps]	Measured 99% Occupied	Measured 26dB Bandwidth	Maximum Bandwidth Limit	Pass / Fail
	[MHz]		IVIODE		Bandwidth [MHz]	[MHz]	[MHz]	
- - -	5955	1	a	12.00	16.77	21.12	320	Pass
	6175	45	a	12.00	16.78	21.06	320	Pass
	6415	93	a	12.00	16.76	21.10	320	Pass
	5955	1	ax (20MHz)	49/51.6 (MCS4)	19.03	21.45	320	Pass
	6175	45	ax (20MHz)	135/143.4 (MCS11)	19.03	21.39	320	Pass
	6415	93	ax (20MHz)	135/143.4 (MCS11)	19.05	21.43	320	Pass
ro.	5965	3	ax (40MHz)	49/51.6 (MCS2)	38.00	41.60	320	Pass
Band 5	6165	43	ax (40MHz)	49/51.6 (MCS2)	37.97	41.94	320	Pass
ŭ	6405	91	ax (40MHz)	49/51.6 (MCS2)	38.00	41.53	320	Pass
	5985	7	ax (80MHz)	102/108.1 (MCS2)	77.28	82.24	320	Pass
	6145	39	ax (80MHz)	567/600.5 (MCS11)	77.20	82.33	320	Pass
	6385	87	ax (80MHz)	204/216.2 (MCS4)	77.32	82.37	320	Pass
	6025	15	ax (160MHz)	1020.8/1201 (MCS11)	156.09	166.10	320	Pass
	6185	47	ax (160MHz)	1020.8/1201 (MCS11)	156.16	166.03	320	Pass
	6345	79	ax (160MHz)	183.8/216.2 (MCS2)	156.56	166.05	320	Pass
	6435	97	a	12.00	16.75	20.93	320	Pass
	6475	105	a	12.00	16.77	21.17	320	Pass
	6515	113	a	12.00	16.76	21.07	320	Pass
	6435	97	ax (20MHz)	135/143.4 (MCS11)	19.03	21.40	320	Pass
9	6475	105	ax (20MHz)	49/51.6 (MCS4)	19.03	21.28	320	Pass
Band 6	6515	113	ax (20MHz)	24/25.8 (MCS2)	19.08	21.36	320	Pass
m [6445	99	ax (40MHz)	49/51.6 (MCS2)	37.91	41.85	320	Pass
	6485	107	ax (40MHz)	49/51.6 (MCS2)	37.92	41.70	320	Pass
	6525	115	ax (40MHz)	49/51.6 (MCS2)	37.95	41.66	320	Pass
	6465	103	ax (80MHz)	102/108.1 (MCS2)	77.23	82.12	320	Pass
	6505	111	ax (160MHz)	367.5/432.4 (MCS4)	156.07	165.94	320	Pass
	6535	117	a	12.00	16.77	21.10	320	Pass
	6695	149	a	12.00	16.75	20.99	320	Pass
	6875	185	a	12.00	16.75	20.95	320	Pass
	6535	117	ax (20MHz)	24/25.8 (MCS2)	19.05	21.33	320	Pass
	6695	149	ax (20MHz)	24/25.8 (MCS2)	19.03	21.41	320	Pass
	6875	185	ax (20MHz)	135/143.4 (MCS11)	19.03	21.38	320	Pass
Band 7	6565	123	ax (40MHz)	49/51.6 (MCS2)	37.96	41.72	320	Pass
Вал	6725	155	ax (40MHz)	271/286.8 (MCS11)	37.94	41.63	320	Pass
	6885	179	ax (40MHz)	49/51.6 (MCS2)	37.91	41.50	320	Pass
	6545	119	ax (80MHz)	102/108.1 (MCS2)	77.13	82.27	320	Pass
	6705	151	ax (80MHz)	102/108.1 (MCS2)	77.21	82.38	320	Pass
	6865	183	ax (80MHz)	102/108.1 (MCS2)	77.21	82.26	320	Pass
	6665	143	ax (160MHz)	183.8/216.2 (MCS2)	156.29	166.13	320	Pass
	6825	175	ax (160MHz)	1020.8/1201 (MCS11)	156.23	165.74	320	Pass
	6895	189	a	12.00	16.75	21.10	320	Pass
	6995	209	a	12.00	16.75	21.08	320	Pass
	7115	233	a	12.00	16.77	21.10	320	Pass
	6895	189	ax (20MHz)	24/25.8 (MCS2)	19.03	21.30	320	Pass
∞ -	6995	209	ax (20MHz)	24/25.8 (MCS2)	19.06	21.35	320	Pass
Band 8	7115	233	ax (20MHz)	135/143.4 (MCS11)	19.07	21.33	320	Pass
Ва	6885	187	ax (40MHz)	49/51.6 (MCS2)	37.94	41.70	320	Pass
	7005	211	ax (40MHz)	49/51.6 (MCS2)	37.93	41.65	320	Pass
	7085	227	ax (40MHz)	49/51.6 (MCS2)	37.95	41.61	320	Pass
	6945	199	ax (80MHz)	567/600.5 (MCS11)	77.31	82.21	320	Pass
	7025	215	ax (80MHz)	102/108.1 (MCS2)	77.19	82.17	320	Pass
	6985	207	ax (160MHz)	1020.8/1201 (MCS11)	156.39	165.67	320	Pass

Table 7-7. Conducted Bandwidth Measurements Antenna 1b

FCC ID: BCGA3269 IC: 579C-A3269	element MEASUREMENT REPORT (CERTIFICATION)		Approved by: Technical Manager
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Plot 7-69. 26dB & 99% Bandwidth Plot Antenna 1b (20MHz 802.11ax (UNII Band 5) - Ch. 1)



Plot 7-70. 26dB & 99% Bandwidth Plot Antenna 1b (40MHz 802.11ax (UNII Band 5) - Ch. 43)



Plot 7-71. 26dB & 99% Bandwidth Plot Antenna 1b (80MHz 802.11ax (UNII Band 5) - Ch. 87)



Plot 7-72. 26dB & 99% Bandwidth Plot Antenna 1b (160MHz 802.11ax (UNII Band 5) - Ch. 15)

FCC ID: BCGA3269 IC: 579C-A3269	element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
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