

Test Report # 3584 B (UNII)

Equipment Under Test: A700x Series Devices (A710x, A720x, A730x)

Requirement(s): FCC 15.407, FCC 15.207, FCC 15.209, RSS-247, RSS-GEN

Test Date(s): May 11th – June 6th, 2022

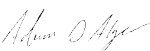
Prepared for: Honeywell International Inc.
Attn: Gretchen Bullen
9680 Old Bailes Road
Fort Mill, SC 29707

Report Issued by: Adam Alger, Laboratory Manager

Signature: 

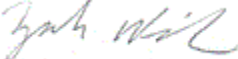
Date: 9/15/2022

Report Reviewed by: Adam Alger, Laboratory Manager

Signature: 

Date: 7/6/2022

Report Constructed by: Zach Wilson, EMC Engineer

Signature: 

Date: 7/1/2022

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Laird Connectivity Test Services in Review

The Laird Connectivity LLC laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers



**Government
of Canada**

Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

Company: Honeywell International Inc.	Page 3 of 45	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 B		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

1 TEST REPORT SUMMARY

During **May 11th – June 6th, 2022**, the Equipment Under Test (EUT), **A700x Series Devices (A710x, A720x, A730x)**, as provided by **Honeywell International Inc.** was tested to the following requirements **Federal Communications Commission and Innovation, Science and Economic Development Canada**:

Operation in the 5.15 – 5.25 GHz band

FCC	ISED Canada	Test Description	Measurement Procedure	Compliant
15.407 (a)(1)(iv)	RSS-247 Section 6.2.1	Power Limits	ANSI C63.10-2013 Section 12.3	Yes
15.407 (a)(1)(iv)	RSS-247 Section 6.2.1	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Yes
2.1049	RSS-GEN Section 6.7	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Yes
15.407 (b)(1)	RSS-247 Section 6.2.1	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(9)	RSS-GEN 8.10	Spurious Emissions below 1GHz	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(10)	RSS-GEN 8.9	Restricted Bands	ANSI C63.10-2013 Section 12.7	Yes
2.1055(d)	RSS-GEN 6.11	Frequency Stability	ANSI C63.10-2013 Section 6.8	Yes

Operation in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands

FCC	ISED Canada	Test Description	Measurement Procedure	Compliant
15.407 (a)(2)	RSS-247 Section 6.2.2 & 6.2.3	Power Limits	ANSI C63.10-2013 Section 12.3	Yes
15.407 (a)(2)	RSS-247 Section 6.2.2 & 6.2.3	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Yes
2.1049	RSS-GEN Section 6.7	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Yes
15.407 (b)(2)(3)	RSS-247 Section 6.2.2 & 6.2.3	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(9)	RSS-GEN 8.10	Spurious Emissions below 1GHz	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(10)	RSS-GEN 8.9	Restricted Bands	ANSI C63.10-2013 Section 12.7	Yes
2.1055(d)	RSS-GEN 6.11	Frequency Stability	ANSI C63.10-2013 Section 6.8	Yes

Operation in the 5.725 – 5.85 GHz band

FCC	ISED Canada	Test Description	Measurement Procedure	Compliant
15.407 (a)(3)(i)	RSS-247 Section 6.2.4	Power Limits	ANSI C63.10-2013 Section 12.3	Yes
15.407 (a)(3)(i)	RSS-247 Section 6.2.4	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Yes
15.1049	RSS-GEN Section 6.7	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Yes
15.407 (b)(4)	RSS-247 Section 6.2.4	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(6)	RSS-GEN 8.10	Spurious Emissions below 1GHz	ANSI C63.10-2013 Section 12.7	Yes
15.407 (b)(10)	RSS-GEN 8.9	Restricted Bands	ANSI C63.10-2013 Section 12.7	Yes
2.1055(d)	RSS-GEN 6.11	Frequency Stability	ANSI C63.10-2013 Section 6.8	Yes
15.407(e)	RSS-247 Section 6.2.4	Minimum 6dB bandwidth	ANSI C63.10-2013 Section 11.8	Yes

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	Below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

2 CLIENT INFORMATION

Company Name	Honeywell International Inc.
Contact Person	Gretchen Bullen
Address	9680 Old Bailes Road Fort Mill, SC 29707

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	A700x Series Devices (A710x, 720x, 730x)
Model Number	TAP1010-02, TAP1020-02, TAP1030-02
Serial Number	Engineering Sample
FCC ID	HD5-TAP1000-02
IC ID	1693B-TAP100002

2.2 Product Description

The EUT is a handheld communication device consisting of the Laird SU60-SIPT WLAN 2.4/5 GHz and BLE/BT module. The EUT also contains the NXP PN7150BOHN/C110xx NFC radio. The EUT was powered by a 3.7 VDC battery. The WLAN operates in SISO mode only.

The EUT has three different models:

- A710x - Contains the basic wireless functionality
- A720x - Contains an end cap with two external proprietary connectors that add on the ability to connect a wired headset and a peripheral device such as a printer or scanner.
- A730x - Contains an imager end cap that adds scanning functionality.

All models use identical radios and circuit boards in the “base unit” and the different A700x versions add additional (non-radio) capabilities through different, factory configurable “end caps”.

All conducted testing was completed on the A710x model. Radiated measurements completed for all three models.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

Company: Honeywell International Inc.	Page 6 of 45	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 B		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

2.5 Channels and Data Rates

IEEE Standard	Data Rate
802.11a	6, 54 Mbps
802.11n(20)	MCS0, MCS7
802.11ac(40)	MCS0, MCS9
802.11ac(80)	MCS0, MCS9

Channel	Frequency (MHz)	Channel Bandwidth (MHz)
36	5180	20
40	5200	20
48	5240	20
52	5260	20
56	5280	20
64	5320	20
100	5500	20
116	5580	20
140	5700	20
149	5745	20
157	5785	20
165	5825	20
38	5190	40
46	5230	40
54	5270	40
62	5310	40
102	5510	40
134	5670	40
151	5755	40
159	5795	40
42	5210	80
58	5290	80
106	5530	80
138	5690	80
155	5775	80

2.6 Radio Programming

The WLAN radios were programmed using the Laird Regulatory Tool v 9.32.0.6. BLE and BT radios were programmed using default HCI commands via the windows command prompt. The NFC radio was programmed using Honeywell's CBOB program V1.0.

2.7 Antennas

The device contains three antennas:

- Custom dual band PCB inverted F type antenna with a peak gain of
 - +4.7 dBi in 2400-2484 MHz
 - +6.4 dBi in 5150-5350 MHz
 - +6.9 dBi in 5470-5725 MHz
 - +7.3 dBi in 5725-5850 MHz
- Custom PCB inverted F type antenna with a peak gain of +0.2 dBi for the BT/BLE radios.
- Flex circuit magnetic loop antenna, P/N 1002403 for the NFC radio.

2.8 Simultaneous Transmission

The EUT radio combinations that are capable of simultaneous transmission are shown below:

- WLAN 5 GHz + BT/BLE + NFC
- WLAN 2.4 GHz + NFC

3 REFERENCES

Publication	Edition	Date	AMD 1	AMD 2
FCC eCFR	-	2022	-	-
ANSI C63.10	-	2013	-	-
RSS-Gen	5	2018	2019	2021
RSS-247	2	2017	-	-
KDB 789033 D02	v02r01	2017	-	-

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty $\pm$
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

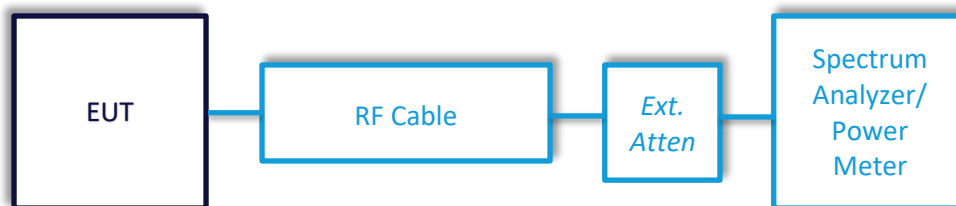
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960144	Cable	Gore	EKD01D010720	5800373	3/22/2022	3/22/2023	Active Verification
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	3/22/2022	3/22/2023	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2022	4/12/2023	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/13/2022	4/13/2023	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/13/2022	4/13/2023	Active Calibration

5.1.1 26dB/6dB Emission Bandwidth and 99% Occupied Bandwidth

Operator	Zach Wilson	QA	Adam Alger
Temperature	21.5° C	R.H. %	44.3
Test Date	6/2/2022	Location	Conducted Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.4.1 ANSI C63.10 §6.9.3

UNII 1, 2A, 2C Limits: Reported

UNII 3 Limits: 6dB EBW greater than 500kHz

Test Parameters

Frequency	(20): 5180, 5200, 5240, 5260, 5280, 5320, 5500, 5580, 5700, 5745, 5785, 5825 (40): 5190, 5230, 5270, 5310, 5510, 5670, 5755, 5795 (80): 5210, 5290, 5530, 5690, 5775	Setup	Conducted
RBW	26dB EBW/99% OBW: 200kHz 6dB EBW: 100kHz	VBW	26dB EBW/99% OBW: 2 MHz 6dB EBW: 300kHz
Detector(s)	Max hold with peak detector	Sweep Time	Auto

EUT Parameters

Input Power	3.7VDC	Mode	WLAN TX
Channels	(20): 36, 40, 48, 52, 56, 64, 100, 116, 140, 149, 157, 165 (40): 38, 46, 54, 62, 102, 134, 151, 159 (80): 42, 58, 106, 138, 155	Data Rates	802.11a: 6Mbps, 54Mbps 802.11n HT20: MCS0, MCS7 802.11ac HT40/80: MCS0, MCS9

Data Tables

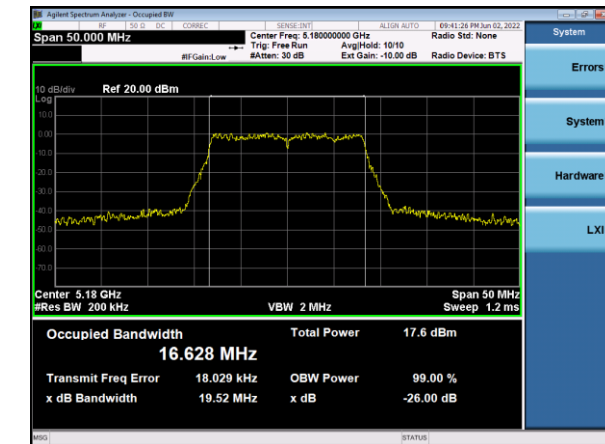
Channel	IEEE Standard	Data Rate	Nominal BW (MHz)	EWB/26dB Reading (MHz)	99% OBW (MHz)
36	802.11a	6Mbps	20	19.5	16.6
36	802.11a	54Mbps	20	19.4	16.6
36	802.11n	MCS0	20	19.4	16.6
36	802.11n	MCS7	20	19.7	17.7
40	802.11a	6Mbps	20	20.7	16.6
40	802.11a	54Mbps	20	19.0	16.5
40	802.11n	MCS0	20	20.1	17.7
40	802.11n	MCS7	20	20.0	17.7
48	802.11a	6Mbps	20	22.8	16.6
48	802.11a	54Mbps	20	19.3	16.6
48	802.11n	MCS0	20	19.9	17.7
48	802.11n	MCS7	20	19.8	17.7
38	802.11ac	MCS0	40	40.1	36.1
38	802.11ac	MCS9	40	39.8	36.2
46	802.11ac	MCS0	40	40.6	36.1
46	802.11ac	MCS9	40	39.9	36.2
42	802.11ac	MCS0	80	81.1	75.9
42	802.11ac	MCS9	80	80.8	75.8

Channel	IEEE Standard	Data Rate	Nominal BW (MHz)	EWB/26dB Reading (MHz)	99% OBW (MHz)
52	802.11a	6Mbps	20	19.6	16.6
52	802.11a	54Mbps	20	19.1	16.5
52	802.11n	MCS0	20	19.8	17.6
52	802.11n	MCS7	20	19.9	17.6
60	802.11a	6Mbps	20	19.4	16.6
60	802.11a	54Mbps	20	19.4	16.5
60	802.11n	MCS0	20	19.9	17.7
60	802.11n	MCS7	20	19.9	17.7
64	802.11a	6Mbps	20	19.6	16.7
64	802.11a	54Mbps	20	19.1	16.6
64	802.11n	MCS0	20	19.8	17.7
64	802.11n	MCS7	20	19.9	17.7
54	802.11ac	MCS0	40	40.4	36.1
54	802.11ac	MCS9	40	40.4	36.2
62	802.11ac	MCS0	40	40.1	36.2
62	802.11ac	MCS9	40	39.8	36.2
58	802.11ac	MCS0	80	81.7	76.0
58	802.11ac	MCS9	80	81.1	75.9

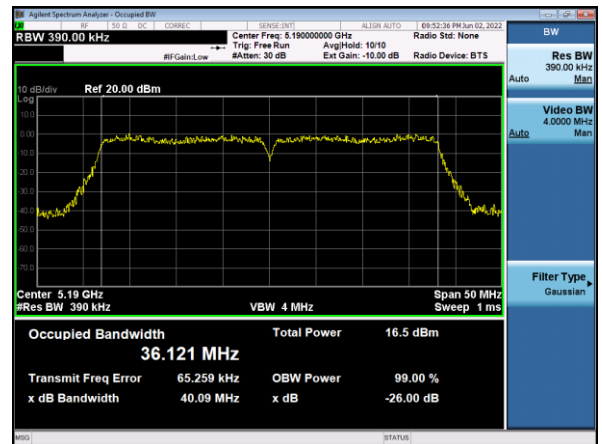
Channel	IEEE Standard	Data Rate	Nominal BW (MHz)	EWB/26dB Reading (MHz)	99% OBW (MHz)
100	802.11a	6Mbps	20	19.5	16.6
100	802.11a	54Mbps	20	19.3	16.6
100	802.11n	MCS0	20	19.9	16.6
100	802.11n	MCS7	20	20.0	17.7
116	802.11a	6Mbps	20	28.7	16.8
116	802.11a	54Mbps	20	19.4	16.6
116	802.11n	MCS0	20	28.8	17.8
116	802.11n	MCS7	20	20.0	17.7
140	802.11a	6Mbps	20	19.6	16.6
140	802.11a	54Mbps	20	19.3	16.6
140	802.11n	MCS0	20	19.9	17.7
140	802.11n	MCS7	20	19.9	17.7
102	802.11ac	MCS0	40	40.0	36.1
102	802.11ac	MCS9	40	40.1	36.2
134	802.11ac	MCS0	40	40.3	36.1
134	802.11ac	MCS9	40	40.1	36.2
106	802.11ac	MCS0	80	81.6	76.1
106	802.11ac	MCS9	80	81.2	76.0
138	802.11ac	MCS0	80	81.7	76.2
138	802.11ac	MCS9	80	81.2	75.9

Channel	IEEE Standard	Data Rate	Nominal BW (MHz)	6 dB BW (MHz)	6 dB BW Limit (MHz)	6 dB BW Margin (MHz)	99% OBW (MHz)
149	802.11a	6Mbps	20	16.6	0.5	16.1	16.6
149	802.11a	54Mbps	20	16.6	0.5	16.1	16.5
149	802.11n	MCS0	20	17.8	0.5	17.3	17.7
149	802.11n	MCS7	20	17.8	0.5	17.3	17.7
157	802.11a	6Mbps	20	16.6	0.5	16.1	16.6
157	802.11a	54Mbps	20	16.5	0.5	16.0	16.4
157	802.11n	MCS0	20	17.8	0.5	17.3	17.7
157	802.11n	MCS7	20	17.8	0.5	17.3	17.6
165	802.11a	6Mbps	20	16.6	0.5	16.1	16.6
165	802.11a	54Mbps	20	16.6	0.5	16.1	16.5
165	802.11n	MCS0	20	17.8	0.5	17.3	17.7
165	802.11n	MCS7	20	17.8	0.5	17.3	17.7
151	802.11ac	MCS0	40	36.5	0.5	36.0	36.1
151	802.11ac	MCS9	40	36.5	0.5	36.0	36.2
159	802.11ac	MCS0	40	36.5	0.5	36.0	36.1
159	802.11ac	MCS9	40	36.5	0.5	36.0	36.2
155	802.11ac	MCS0	80	76.6	0.5	76.1	75.9
155	802.11ac	MCS9	80	76.6	0.5	76.1	75.8

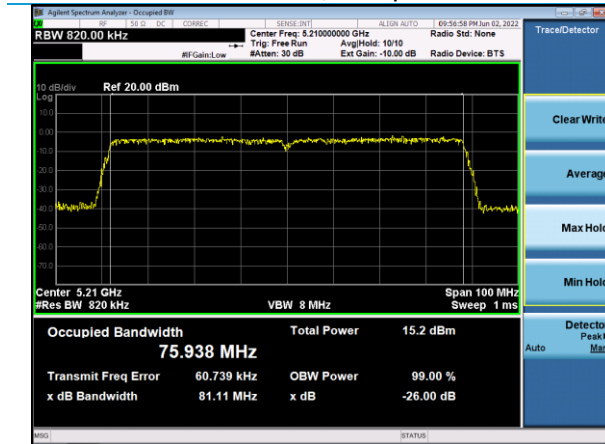
Plots



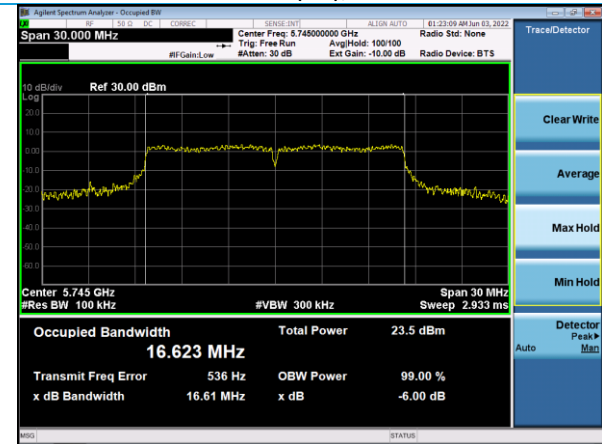
26 dB/99% Emission Bandwidth, Channel 36
802.11a, 6Mbps



26 dB/99% Emission Bandwidth, Channel 38
802.11ac(40), MCS0



26 dB/99% Emission Bandwidth, Channel 42
802.11ac(80), MCS0



6 dB Emission Bandwidth, Channel 149
802.11a, 6Mbps

5.1.2 Fundamental Emission Output Power

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.5° C	R.H. %	34.9
Test Date	5/17/2022	Location	Conducted Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.3.3.1 PM

Limits

Band	ISED Output Power Limit (dBm)	FCC Output Power Limit (dBm)
UNII 1	23.0 (EIRP)	24.0 (23.6)
UNII 2A	24.0	24.0 (23.6)
UNII 2C	24.0	24.0 (23.1)
UNII 3	30.0 (28.7)	30.0 (28.7)

Note: (Limit reduced by antenna gain exceeding 6 dBi)

Test Parameters

Frequency	(20): 5180, 5200, 5240, 5260, 5280, 5320, 5500, 5580, 5700, 5745, 5785, 5825 (40): 5190, 5230, 5270, 5310, 5510, 5670, 5755, 5795 (80): 5210, 5290, 5530, 5690, 5775	Setup	Conducted
Detector	RMS	Measuring Device	Power Meter

EUT Parameters

Input Power	3.7VDC	Mode	WLAN TX
Channels	(20): 36, 40, 48, 52, 56, 64, 100, 116, 140, 149, 157, 165 (40): 38, 46, 54, 62, 102, 134, 151, 159 (80): 42, 58, 106, 138, 155	Data Rates	802.11a: 6Mbps, 54Mbps 802.11n HT20: MCS0, MCS7 802.11ac HT40/80: MCS0, MCS9

Data Tables

UNII-1 (FCC) (24 dBm – (6.4 dBi – 6 dBi)) = 23.6 dBm limit

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	FCC limit (dBm)	FCC Margin (dB)
36	20	802.11a, 6Mbps	10.4	23.6	13.2
40	20	802.11a, 6Mbps	14.4	23.6	9.2
48	20	802.11a, 6Mbps	13.7	23.6	9.9
52	20	802.11a, 6Mbps	12.5	23.6	11.1
36	20	802.11a, 54Mbps	10.1	23.6	13.5
40	20	802.11a, 54Mbps	12.1	23.6	11.5
48	20	802.11a, 54Mbps	11.6	23.6	12.0
36	20	802.11n, MCS0	10.3	23.6	13.3
40	20	802.11n, MCS0	14.4	23.6	9.2
48	20	802.11n, MCS0	13.7	23.6	9.9
36	20	802.11n, MCS7	10.2	23.6	13.4
40	20	802.11n, MCS7	12.2	23.6	11.4
48	20	802.11n, MCS7	11.7	23.6	11.9
38	40	802.11n, MCS0	9.3	23.6	14.3
46	40	802.11n, MCS0	11.3	23.6	12.3
38	40	802.11n, MCS9	9.4	23.6	14.2
46	40	802.11n, MCS9	11.3	23.6	12.3
42	80	802.11n, MCS0	6.9	23.6	16.7
42	80	802.11n, MCS9	6.8	23.6	16.8

UNII-1 (ISED) 6.4 dBi antenna gain

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	EIRP (dBm)	ISED Limit (dBm)	Margin (dB)
36	20	802.11a, 6Mbps	10.4	16.8	23.0	6.2
40	20	802.11a, 6Mbps	14.4	20.8	23.0	2.2
48	20	802.11a, 6Mbps	13.7	20.1	23.0	2.9
52	20	802.11a, 6Mbps	12.5	18.9	23.0	4.1
36	20	802.11a, 54Mbps	10.1	16.5	23.0	6.5
40	20	802.11a, 54Mbps	12.1	18.5	23.0	4.5
48	20	802.11a, 54Mbps	11.6	18.0	23.0	5.0
36	20	802.11n, MCS0	10.3	16.7	23.0	6.3
40	20	802.11n, MCS0	14.4	20.8	23.0	2.2
48	20	802.11n, MCS0	13.7	20.1	23.0	2.9
36	20	802.11n, MCS7	10.2	16.6	23.0	6.4
40	20	802.11n, MCS7	12.2	18.6	23.0	4.4
48	20	802.11n, MCS7	11.7	18.1	23.0	4.9
38	40	802.11n, MCS0	9.3	15.7	23.0	7.3
46	40	802.11n, MCS0	11.3	17.7	23.0	5.3
38	40	802.11n, MCS9	9.4	15.8	23.0	7.2
46	40	802.11n, MCS9	11.3	17.7	23.0	5.3
42	80	802.11n, MCS0	6.9	13.3	23.0	9.7
42	80	802.11n, MCS9	6.8	13.2	23.0	9.8

UNII-2A (FCC) (24 dBm – (6.4 dBi – 6 dBi)) = 23.1 dBm limit

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	FCC Limit (dBm)	FCC Margin (dB)
52	20	802.11a, 6Mbps	12.5	23.6	11.1
56	20	802.11a, 6Mbps	11.8	23.6	11.8
64	20	802.11a, 6Mbps	10.7	23.6	12.9
52	20	802.11a, 54Mbps	12.4	23.6	11.2
56	20	802.11a, 54Mbps	11.7	23.6	11.9
64	20	802.11a, 54Mbps	10.5	23.6	13.1
52	20	802.11n, MCS0	12.5	23.6	11.1
56	20	802.11n, MCS0	11.8	23.6	11.8
64	20	802.11n, MCS0	10.6	23.6	13.0
52	20	802.11n, MCS7	12.5	23.6	11.1
56	20	802.11n, MCS7	11.8	23.6	11.8
64	20	802.11n, MCS7	10.6	23.6	13.0
54	40	802.11n, MCS0	11.1	23.6	12.5
62	40	802.11n, MCS0	8.0	23.6	15.6
54	40	802.11n, MCS9	11.2	23.6	12.4
62	40	802.11n, MCS9	8.2	23.6	15.4
58	80	802.11n, MCS0	8.1	23.6	15.5
58	80	802.11n, MCS9	7.1	23.6	16.5

UNII-2A (ISED) 6.4 dBi antenna gain

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	ISED Limit (dBm)	ISED Margin (dB)	ISED EIRP (dBm)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)
52	20	802.11a, 6Mbps	12.5	24.0	11.5	18.9	30.0	11.1
56	20	802.11a, 6Mbps	11.8	24.0	12.2	18.2	30.0	11.8
64	20	802.11a, 6Mbps	10.7	24.0	13.4	17.1	30.0	12.9
52	20	802.11a, 54Mbps	12.4	24.0	11.6	18.8	30.0	11.2
56	20	802.11a, 54Mbps	11.7	24.0	12.3	18.1	30.0	11.9
64	20	802.11a, 54Mbps	10.5	24.0	13.5	16.9	30.0	13.1
52	20	802.11n, MCS0	12.5	24.0	11.5	18.9	30.0	11.1
56	20	802.11n, MCS0	11.8	24.0	12.2	18.2	30.0	11.8
64	20	802.11n, MCS0	10.6	24.0	13.4	17.0	30.0	13.0
52	20	802.11n, MCS7	12.5	24.0	11.5	18.9	30.0	11.1
56	20	802.11n, MCS7	11.8	24.0	12.2	18.2	30.0	11.8
64	20	802.11n, MCS7	10.6	24.0	13.4	17.0	30.0	13.0
54	40	802.11n, MCS0	11.1	24.0	12.9	17.5	30.0	12.5
62	40	802.11n, MCS0	8.0	24.0	16.0	14.4	30.0	15.6
54	40	802.11n, MCS9	11.2	24.0	12.9	17.6	30.0	12.4
62	40	802.11n, MCS9	8.2	24.0	15.8	14.6	30.0	15.4
58	80	802.11n, MCS0	8.1	24.0	15.9	14.5	30.0	15.5
58	80	802.11n, MCS9	7.1	24.0	16.9	13.5	30.0	16.5

UNII-2C (FCC) (24 dBm – (6.9 dBi – 6 dBi)) = 23.1 dBm limit

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	FCC Limit (dBm)	FCC Margin (dB)
100	20	802.11a, 6Mbps	12.7	23.1	10.4
116	20	802.11a, 6Mbps	17.6	23.1	5.5
140	20	802.11a, 6Mbps	11.1	23.1	12.0
100	20	802.11a, 54Mbps	13.5	23.1	9.6
116	20	802.11a, 54Mbps	15.8	23.1	7.3
140	20	802.11a, 54Mbps	11.0	23.1	12.1
100	20	802.11n, MCS0	13.6	23.1	9.5
116	20	802.11n, MCS0	17.7	23.1	5.4
140	20	802.11n, MCS0	12.1	23.1	11.0
100	20	802.11n, MCS7	13.6	23.1	9.5
116	20	802.11n, MCS7	15.9	23.1	7.2
140	20	802.11n, MCS7	12.0	23.1	11.1
102	40	802.11n, MCS0	13.0	23.1	10.1
134	40	802.11n, MCS0	13.5	23.1	9.6
102	40	802.11n, MCS9	12.9	23.1	10.2
134	40	802.11n, MCS9	13.4	23.1	9.7
106	80	802.11n, MCS0	11.4	23.1	11.7
138	80	802.11n, MCS0	13.8	23.1	9.3
106	80	802.11n, MCS9	10.3	23.1	12.8
138	80	802.11n, MCS9	9.9	23.1	13.2

UNII-2C (ISED) (6.9 dBi antenna gain)

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	ISED Limit (dBm)	ISED Margin (dB)	ISED EIRP (dBm)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)
100	20	802.11a, 6Mbps	12.7	24.0	11.3	19.6	30.0	10.4
116	20	802.11a, 6Mbps	17.6	24.0	6.4	24.5	30.0	5.5
140	20	802.11a, 6Mbps	11.1	24.0	12.9	18.0	30.0	12.0
100	20	802.11a, 54Mbps	13.5	24.0	10.5	20.4	30.0	9.6
116	20	802.11a, 54Mbps	15.8	24.0	8.2	22.7	30.0	7.3
140	20	802.11a, 54Mbps	11.0	24.0	13.0	17.9	30.0	12.1
100	20	802.11n, MCS0	13.6	24.0	10.4	20.5	30.0	9.5
116	20	802.11n, MCS0	17.7	24.0	6.3	24.6	30.0	5.4
140	20	802.11n, MCS0	12.1	24.0	11.9	19.0	30.0	11.0
100	20	802.11n, MCS7	13.6	24.0	10.4	20.5	30.0	9.5
116	20	802.11n, MCS7	15.9	24.0	8.1	22.8	30.0	7.2
140	20	802.11n, MCS7	12.0	24.0	12.0	18.9	30.0	11.1
102	40	802.11n, MCS0	13.0	24.0	11.0	19.9	30.0	10.1
134	40	802.11n, MCS0	13.5	24.0	10.5	20.4	30.0	9.6
102	40	802.11n, MCS9	12.9	24.0	11.1	19.8	30.0	10.2
134	40	802.11n, MCS9	13.4	24.0	10.6	20.3	30.0	9.7
106	80	802.11n, MCS0	11.4	24.0	12.6	18.3	30.0	11.7
138	80	802.11n, MCS0	13.8	24.0	10.2	20.7	30.0	9.3
106	80	802.11n, MCS9	10.3	24.0	13.7	17.2	30.0	12.8
138	80	802.11n, MCS9	9.9	24.0	14.1	16.8	30.0	13.2

UNII-3 (30 dBm – (7.3 dBi – 6 dBi)) = 28.7 dBm limit

Channel	Channel Bandwidth (MHz)	IEEE Standard / Data Rate	Average Output Power (dBm)	ISED/FCC Limit (dBm)	ISED/FCC Margin (dB)
149	20	802.11a, 6Mbps	17.0	28.7	11.7
157	20	802.11a, 6Mbps	16.7	28.7	12.0
165	20	802.11a, 6Mbps	16.7	28.7	12.0
149	20	802.11a, 54Mbps	15.0	28.7	13.7
157	20	802.11a, 54Mbps	14.9	28.7	13.8
165	20	802.11a, 54Mbps	14.8	28.7	13.9
149	20	802.11n, MCS0	17.1	28.7	11.6
157	20	802.11n, MCS0	16.9	28.7	11.8
165	20	802.11n, MCS0	16.9	28.7	11.8
149	20	802.11n, MCS7	15.0	28.7	13.7
157	20	802.11n, MCS7	14.9	28.7	13.8
165	20	802.11n, MCS7	14.8	28.7	13.9
151	40	802.11n, MCS0	14.9	28.7	13.8
159	40	802.11n, MCS0	15.1	28.7	13.6
151	40	802.11n, MCS9	14.9	28.7	13.8
159	40	802.11n, MCS9	15.1	28.7	13.6
155	80	802.11n, MCS0	13.4	28.7	15.3
155	80	802.11n, MCS9	9.3	28.7	19.4

5.1.3 Maximum Power Spectral Density

Operator	Zach Wilson	QA	Adam Alger
Temperature	19.7° C	R.H. %	52.0
Test Date	6/6/2022	Location	Conducted Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §12.5

Limits

UNII 1: 10.0dBm/MHz EIRP (ISED); 11.0 (10.6) dBm/MHz (FCC antenna gain exceeding 6 dBi)

UNII 2A/2C: 11.0dBm/MHz (ISED); 10.6/10.1 dBm / MHz (FCC antenna gain exceeding 6 dBi)

UNII 3: 30dBm/500kHz (28.7 ISSED and FCC antenna gain exceeding 6 dBi)

Test Parameters

Frequency	(20): 5180, 5200, 5240, 5260, 5280, 5320, 5500, 5580, 5700, 5745, 5785, 5825 (40): 5190, 5230, 5270, 5310, 5510, 5670, 5755, 5795 (80): 5210, 5290, 5530, 5690, 5775	Setup	Conducted
RBW	UNII-1, UNII-2A, UNII-2C: 1 MHz UNII-3: 510 kHz	VBW	UNII-1, UNII-2A, UNII-2C: 3 MHz UNII-3: 3 MHz
Detector(s)	Average Hold with RMS Detector	Sweep Time	Auto
Number of Traces	100		

EUT Parameters

Input Power	3.7VDC	Mode	WLAN TX
Channels	(20): 36, 40, 48, 52, 56, 64, 100, 116, 140, 149, 157, 165 (40): 38, 46, 54, 62, 102, 134, 151, 159 (80): 42, 58, 106, 138, 155	Data Rates	802.11a: 6Mbps, 54Mbps 802.11n HT20: MCS0, MCS7 802.11ac HT40/80: MCS0, MCS9

Data Tables

UNII-1 (FCC) (11 dBm/MHz – (6.4 dBi – 6 dBi)) = 10.6 dBm/MHz limit

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PSD Reading (dBm / MHz)	Limit (dBm / MHz)	Margin (dB)
36	802.11a	6Mbps	20	-0.1	10.6	10.7
36	802.11a	54Mbps	20	-0.2	10.6	10.8
36	802.11n	MCS0	20	-0.4	10.6	11.0
36	802.11n	MCS7	20	-0.3	10.6	10.9
40	802.11a	6Mbps	20	2.2	10.6	8.4
40	802.11a	54Mbps	20	1.6	10.6	9.0
40	802.11n	MCS0	20	3.5	10.6	7.1
40	802.11n	MCS7	20	1.6	10.6	9.0
48	802.11a	6Mbps	20	2.8	10.6	7.8
48	802.11a	54Mbps	20	0.8	10.6	9.8
48	802.11n	MCS0	20	2.9	10.6	7.7
48	802.11n	MCS7	20	1.0	10.6	9.6
38	802.11ac	MCS0	40	-4.4	10.6	15.0
38	802.11ac	MCS9	40	-5.5	10.6	16.1
46	802.11ac	MCS0	40	-2.3	10.6	12.9
46	802.11ac	MCS9	40	-6.3	10.6	16.9
42	802.11ac	MCS0	80	-10.3	10.6	20.9
42	802.11ac	MCS9	80	-10.4	10.6	21.0

UNII-1 (ISED) (6.4 dBi antenna gain)

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PSD Reading (dBm / MHz)	PSD EIRP (dBm / MHz)	Limit (dBm / MHz)	Margin (dB)
36	802.11a	6Mbps	20	-0.1	6.3	10.0	3.7
36	802.11a	54Mbps	20	-0.2	6.2	10.0	3.8
36	802.11n	MCS0	20	-0.4	6.0	10.0	4.0
36	802.11n	MCS7	20	-0.3	6.1	10.0	3.9
40	802.11a	6Mbps	20	2.2	8.6	10.0	1.4
40	802.11a	54Mbps	20	1.6	8.0	10.0	2.0
40	802.11n	MCS0	20	3.5	9.9	10.0	0.1
40	802.11n	MCS7	20	1.6	8.0	10.0	2.0
48	802.11a	6Mbps	20	2.8	9.2	10.0	0.8
48	802.11a	54Mbps	20	0.8	7.2	10.0	2.8
48	802.11n	MCS0	20	2.9	9.3	10.0	0.7
48	802.11n	MCS7	20	1.0	7.4	10.0	2.6
38	802.11ac	MCS0	40	-4.4	2.0	10.0	8.0
38	802.11ac	MCS9	40	-5.5	0.9	10.0	9.1
46	802.11ac	MCS0	40	-2.3	4.1	10.0	5.9
46	802.11ac	MCS9	40	-6.3	0.1	10.0	9.9
42	802.11ac	MCS0	80	-10.3	-3.9	10.0	13.9
42	802.11ac	MCS9	80	-10.4	-4.0	10.0	14.0

UNII-2A (FCC) (11 dBm/MHz – (6.9 dBi – 6 dBi)) = 10.1 dBm/MHz limit

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PSD Reading (dBm)	Limit (dBm)	Margin (dB)
100	802.11a	6Mbps	20	1.6	10.1	8.5
100	802.11a	54Mbps	20	2.7	10.1	7.4
100	802.11n	MCS0	20	2.5	10.1	7.6
100	802.11n	MCS7	20	2.6	10.1	7.5
116	802.11a	6Mbps	20	6.6	10.1	3.5
116	802.11a	54Mbps	20	4.8	10.1	5.3
116	802.11n	MCS0	20	6.6	10.1	3.5
116	802.11n	MCS7	20	4.7	10.1	5.4
140	802.11a	6Mbps	20	0.3	10.1	9.8
140	802.11a	54Mbps	20	0.5	10.1	9.6
140	802.11n	MCS0	20	1.4	10.1	8.7
140	802.11n	MCS7	20	1.3	10.1	8.8
102	802.11ac	MCS0	40	-1.1	10.1	11.2
102	802.11ac	MCS9	40	-2.3	10.1	12.4
134	802.11ac	MCS0	40	-0.6	10.1	10.7
134	802.11ac	MCS9	40	-2.8	10.1	12.9
106	802.11ac	MCS0	80	-6.0	10.1	16.1
106	802.11ac	MCS9	80	-7.2	10.1	17.3
138	802.11ac	MCS0	80	-3.3	10.1	13.4
138	802.11ac	MCS9	80	-7.2	10.1	17.3

UNII-2A (ISED)

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PPSD Reading (dBm)	Limit (dBm)	Margin (dB)
52	802.11a	6Mbps	20	1.1	11.0	9.9
52	802.11a	54Mbps	20	1.1	11.0	9.9
52	802.11n	MCS0	20	1.0	11.0	10.0
52	802.11n	MCS7	20	1.3	11.0	9.7
60	802.11a	6Mbps	20	1.5	11.0	9.5
60	802.11a	54Mbps	20	1.7	11.0	9.3
60	802.11n	MCS0	20	1.6	11.0	9.4
60	802.11n	MCS7	20	1.4	11.0	9.6
64	802.11a	6Mbps	20	-0.3	11.0	11.3
64	802.11a	54Mbps	20	-0.5	11.0	11.5
64	802.11n	MCS0	20	-0.5	11.0	11.5
64	802.11n	MCS7	20	-0.6	11.0	11.6
54	802.11ac	MCS0	40	-2.6	11.0	13.6
54	802.11ac	MCS9	40	-5.4	11.0	16.4
62	802.11ac	MCS0	40	-5.4	11.0	16.4
62	802.11ac	MCS9	40	-5.6	11.0	16.6
58	802.11ac	MCS0	80	-9.0	11.0	20.0
58	802.11ac	MCS9	80	-10.1	11.0	21.1

UNII-2C (FCC) (11 dBm/MHz – (6.9 dBi – 6 dBi)) = 10.1 dBm/MHz limit

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PSD Reading (dBm)	Limit (dBm)	Margin (dB)
100	802.11a	6Mbps	20	1.6	10.1	8.5
100	802.11a	54Mbps	20	2.7	10.1	7.4
100	802.11n	MCS0	20	2.5	10.1	7.6
100	802.11n	MCS7	20	2.6	10.1	7.5
116	802.11a	6Mbps	20	6.6	10.1	3.5
116	802.11a	54Mbps	20	4.8	10.1	5.3
116	802.11n	MCS0	20	6.6	10.1	3.5
116	802.11n	MCS7	20	4.7	10.1	5.4
140	802.11a	6Mbps	20	0.3	10.1	9.8
140	802.11a	54Mbps	20	0.5	10.1	9.6
140	802.11n	MCS0	20	1.4	10.1	8.7
140	802.11n	MCS7	20	1.3	10.1	8.8
102	802.11ac	MCS0	40	-1.1	10.1	11.2
102	802.11ac	MCS9	40	-2.3	10.1	12.4
134	802.11ac	MCS0	40	-0.6	10.1	10.7
134	802.11ac	MCS9	40	-2.8	10.1	12.9
106	802.11ac	MCS0	80	-6.0	10.1	16.1
106	802.11ac	MCS9	80	-7.2	10.1	17.3
138	802.11ac	MCS0	80	-3.3	10.1	13.4
138	802.11ac	MCS9	80	-7.2	10.1	17.3

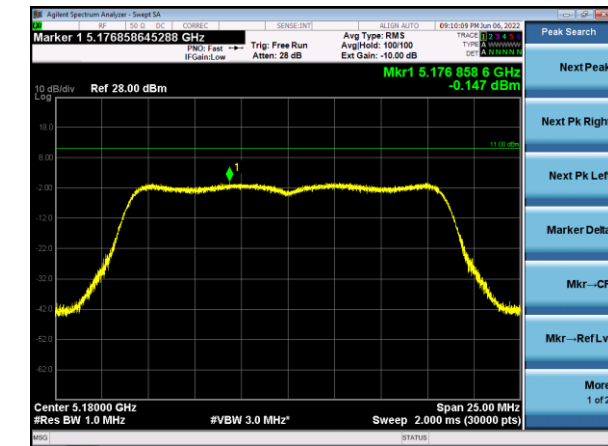
UNII-2C (ISED)

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PPSD Reading (dBm)	Limit (dBm)	Margin (dB)
100	802.11a	6Mbps	20	1.6	11.0	9.4
100	802.11a	54Mbps	20	2.7	11.0	8.3
100	802.11n	MCS0	20	2.5	11.0	8.5
100	802.11n	MCS7	20	2.6	11.0	8.4
116	802.11a	6Mbps	20	6.6	11.0	4.4
116	802.11a	54Mbps	20	4.8	11.0	6.2
116	802.11n	MCS0	20	6.6	11.0	4.4
116	802.11n	MCS7	20	4.7	11.0	6.3
140	802.11a	6Mbps	20	0.3	11.0	10.7
140	802.11a	54Mbps	20	0.5	11.0	10.5
140	802.11n	MCS0	20	1.4	11.0	9.6
140	802.11n	MCS7	20	1.3	11.0	9.7
102	802.11ac	MCS0	40	-1.1	11.0	12.1
102	802.11ac	MCS9	40	-2.3	11.0	13.3
134	802.11ac	MCS0	40	-0.6	11.0	11.6
134	802.11ac	MCS9	40	-2.8	11.0	13.8
106	802.11ac	MCS0	80	-6.0	11.0	17.0
106	802.11ac	MCS9	80	-7.2	11.0	18.2
138	802.11ac	MCS0	80	-3.3	11.0	14.3
138	802.11ac	MCS9	80	-7.2	11.0	18.2

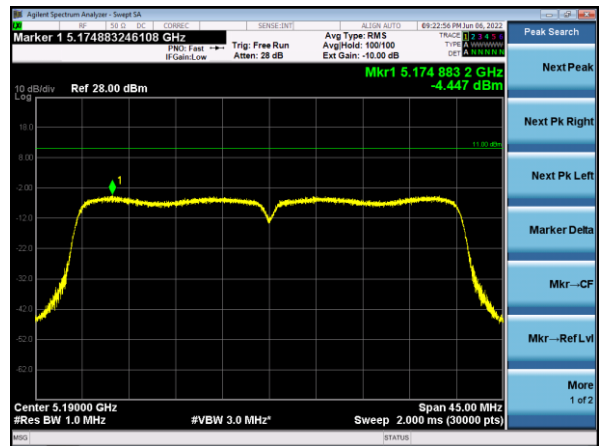
UNII-3 (30 dBm/500 kHz – (7.3 dBi – 6 dBi)) = 28.7 dBm/500 kHz limit

Channel	IEEE Standard	Data Rate	Channel BW (MHz)	PSD Reading (dBm / 500 kHz)	Limit (dBm / 500 kHz)	Margin (dB)
149	802.11a	6Mbps	20	3.1	28.7	25.6
149	802.11a	54Mbps	20	1.5	28.7	27.2
149	802.11n	MCS0	20	2.9	28.7	25.8
149	802.11n	MCS7	20	1.2	28.7	27.5
157	802.11a	6Mbps	20	3.9	28.7	24.8
157	802.11a	54Mbps	20	1.5	28.7	27.2
157	802.11n	MCS0	20	3.3	28.7	25.4
157	802.11n	MCS7	20	1.7	28.7	27.0
165	802.11a	6Mbps	20	3.4	28.7	25.3
165	802.11a	54Mbps	20	1.2	28.7	27.5
165	802.11n	MCS0	20	3.2	28.7	25.5
165	802.11n	MCS7	20	1.2	28.7	27.5
151	802.11ac	MCS0	40	-1.7	28.7	30.4
151	802.11ac	MCS9	40	-5.6	28.7	34.3
159	802.11ac	MCS0	40	-1.6	28.7	30.3
159	802.11ac	MCS9	40	-5.6	28.7	34.3
155	802.11ac	MCS0	80	-6.0	28.7	34.7
155	802.11ac	MCS9	80	-10.3	28.7	39.0

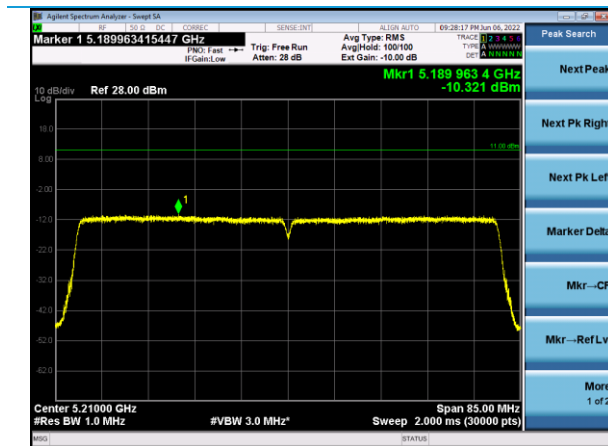
Plots



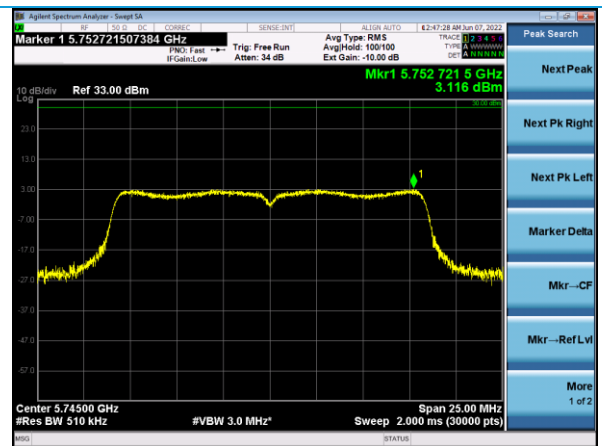
PSD, Channel 36, 802.11a, 6Mbps



PSD, Channel 38, 802.11ac(40), MCS0



PSD, Channel 42, 802.11ac(80), MCS0



PSD, Channel 149, 802.11a, 6Mbps

5.1.4 Frequency Stability

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.9°C	R.H. %	38.30%
Test Date	5/11/2022	Location	Conducted RF Bench
Requirement	FCC 15.1055 (d) (1)	Method	ANSI C63.10 §6.8.2

Limits: Reported

Test Parameters

Frequency	5180 MHz	Setup	Conducted
RBW	3 MHz	VBW	50 MHz

EUT Parameters

Input Power	5.1, 5.9, 6.9 VDC	Mode	WLAN TX CW
Channel	36		

Data Table

Protocol	Channel	3.3 VDC Freq. (Hz)	3.6 VDC Freq. (Hz)	4.1 VDC Freq. (Hz)	Deviation (Hz)
802.11a	36	5179994337	5180003478	5179997198	9140

5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m) Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m) Example at 4000 MHz: Reading = 40 dBμV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBμV/m Average Limit = 20 log (500) = 54 dBμV/m Margin = 54 dBμV/m - 50.8 dBμV/m = 3.2 dB

Block Diagram



Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	8/23/2021	8/23/2022	Active Calibration
AA 960158	Antenna - Double Ridge Horn	ETS Lindgren	3117	109300	9/27/2021	9/27/2022	Active Calibration
AA 960162	Cable	MegaPhase	EM2-S1S1-120	51503501 001	3/22/2022	3/22/2023	Active Verification
AA 960174	Antenna - Small Horn	ETS Lindgren	3116C-PA	00206880	9/1/2021	9/1/2022	Active Calibration
AA 960176	Cable	A.H. Systems, Inc.	SAC-26G-6	395	3/22/2022	3/22/2023	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/11/2022	4/11/2023	Active Calibration
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2022	4/12/2023	Active Calibration
EE 960161	Antenna - Low Noise Amplifier	Ducommun Technologies	ALN-33144030-01	1003717-01	8/16/2021	8/16/2022	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/13/2022	4/13/2023	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/26/2022	4/26/2023	Active Verification
LSC-500	Cable	Chamber 5 Emissions	-	-	4/25/2022	4/25/2023	Active Verification
AA 960150	Antenna - Biconical	ETS Lindgren	3110B	0003-3346	10/7/2021	10/7/2022	Active Calibration
AA 960151	Antenna - Small Bicon	Schwarzbeck	SBA 9112	SBA 9112-158	7/1/2020	7/1/2023	Active Calibration

Company: Honeywell International Inc.	Page 32 of 45	Name: A700x Series Devices (A710x, A720x, A730x)
Report: TR3584 B		Model: TAP1010-02, TAP1020-02, TAP1030-02
Quote: NBO-01-2022-004630		Serial: Engineering Sample

5.2.1 Radiated Emissions

Operator	Anthony Smith, Jon Dilley, Ivan Alvarez	QA	Zach Wilson, Braden Smith
Temperature	21.8°C to 23.8°C	R.H. %	56.2% to 62.3%
Test Date	5/11/2022, 5/12/2022	Location	Chamber 3, Chamber 5
Requirement	FCC 15.407, RSS-GEN, FCC 15.209	Method	ANSI C63.10

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 solely in the 5.725-5.850 GHz band:

(i) 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.

-27dBm = 68.2 dBμV/m @ 3m

Test Parameters

Frequency	30-40000 MHz	Distance	3m
Detector(s)	Max hold with peak detector for plots. Quasi peak detector for measurements below 1 GHz. Peak detector for measurements above 1 GHz. Average measurements taken with a reduced VBW of 10 Hz.	Table height	150cm
RBW	Below 1 GHz: 120 kHz Above 1 GHz: 1 MHz	VBW	Below 1 GHz: 1.2 MHz Above 1 GHz Peak: 3 MHz Above 1 GHz Avg: 10 Hz
Example Calculation	Radiated Limit @ 3m dBμV/m = 95.2 dBμV/m – (conducted limit dBm)		

UNII-3 Band-Edge Limits Converted to dBμV/m @ 3m (dBm + 92.5)

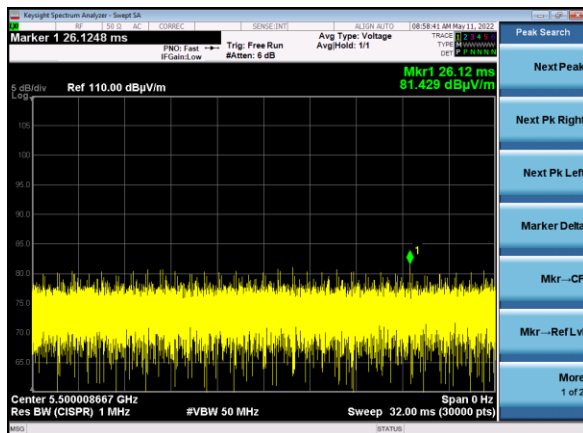
(Limits increase linearly as indicated above)

+/- BE	MHz	dBm/MHz	dBμV/m @ 3m
100	5625	-27	68.2
75	5650	-27	68.2
25	5700	10	105.2
5	5720	15.6	110.8
BE	5725	27	122.2
BE	5850	27	122.2
5	5855	15.6	110.8
25	5875	10	105.2
75	5925	-27	68.2
100	5950	-27	68.2

EUT Parameters

Input Power	5.9 VDC via DC Power Supply	Mode	WLAN TX Modulated
Channel	36, 44, 48, 52, 56, 64, 100, 116, 140, 149, 157, 165	Data Rate	Spurious: 6Mbps Band Edges: 6/54 Mbps, MCS0/MCS7/MCS9

Duty Cycle



100% all Rates, 10Hz VBW used for Average Measurements

Data Tables

Frequency (MHz)	Antenna Polarity	EUT Orientation	Height (cm)	Azimuth (degree)	Quasi-Peak Reading (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Quasi-Peak Margin (dB)	Channel	Notes
41.4	Vertical	Vertical	100	0	16.0	68.2	52.2	36	Noise floor
114.1	Horizontal	Vertical	100	0	15.0	68.2	53.2	36	Noise floor
189.8	Horizontal	Vertical	100	0	18.7	68.2	49.5	64	Noise floor
189.9	Vertical	Vertical	100	0	18.7	68.2	49.5	64	Noise floor
197.4	Horizontal	Vertical	100	0	18.9	68.2	49.3	100	Noise floor
600.0	Vertical	Vertical	100	339	39.0	68.2	29.2	36	Not a function of transmitter
600.0	Vertical	Vertical	100	2	38.6	68.2	29.6	165	Not a function of transmitter
800.0	Horizontal	Vertical	100	0	34.1	68.2	34.1	36	Not a function of transmitter

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
5150.0	802.11a	20	6Mbps	36	Vertical	207	180	41.9	54.0	12.1
5150.0	802.11a	20	6Mbps	40	Vertical	207	180	42.2	54.0	11.8
5131.3	802.11a	20	6Mbps	48	Vertical	207	180	40.2	54.0	13.8
5149.8	802.11a	20	54Mbps	36	Vertical	207	180	42.2	54.0	11.8
5149.9	802.11a	20	54Mbps	40	Vertical	207	180	40.4	54.0	13.6
5148.7	802.11a	20	54Mbps	48	Vertical	207	180	39.6	54.0	14.4
5150.0	802.11n	20	MCS0	36	Vertical	207	180	42.9	54.0	11.1
5150.0	802.11n	20	MCS0	40	Vertical	207	180	42.3	54.0	11.7
5130.9	802.11n	20	MCS0	48	Vertical	207	180	40.4	54.0	13.6
5150.0	802.11n	20	MCS7	36	Vertical	207	180	43.2	54.0	10.8
5149.2	802.11n	20	MCS7	40	Vertical	207	180	40.6	54.0	13.4
5130.1	802.11n	20	MCS7	48	Vertical	207	180	39.7	54.0	14.3
5150.0	802.11ac	40	MCS0	38	Vertical	207	180	44.2	54.0	9.8
5149.9	802.11ac	40	MCS0	46	Vertical	207	180	41.2	54.0	12.8
5150.0	802.11ac	40	MCS9	38	Vertical	207	180	44.3	54.0	9.7
5148.7	802.11ac	40	MCS9	46	Vertical	207	180	40.9	54.0	13.1
5149.9	802.11ac	80	MCS0	42	Vertical	207	180	43.8	54.0	10.2
5147.3	802.11ac	80	MCS9	42	Vertical	207	180	43.7	54.0	10.3

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5079.2	802.11a	20	6Mbps	36	Vertical	207	180	54.1	74.0	19.9
5148.4	802.11a	20	6Mbps	40	Vertical	207	180	56.2	74.0	17.8
5054.8	802.11a	20	6Mbps	48	Vertical	207	180	50.9	74.0	23.1
5144.9	802.11a	20	54Mbps	36	Vertical	207	180	52.4	74.0	21.7
5132.4	802.11a	20	54Mbps	40	Vertical	207	180	50.9	74.0	23.1
4954.4	802.11a	20	54Mbps	48	Vertical	207	180	50.8	74.0	23.3
5148.3	802.11n	20	MCS0	36	Vertical	207	180	52.8	74.0	21.2
5140.7	802.11n	20	MCS0	40	Vertical	207	180	56.6	74.0	17.5
4588.9	802.11n	20	MCS0	48	Vertical	207	180	51.5	74.0	22.5
5148.9	802.11n	20	MCS7	36	Vertical	207	180	54.1	74.0	19.9
5130.3	802.11n	20	MCS7	40	Vertical	207	180	50.5	74.0	23.5
4905.8	802.11n	20	MCS7	48	Vertical	207	180	50.1	74.0	23.9
5147.9	802.11ac	40	MCS0	38	Vertical	207	180	53.3	74.0	20.7
5131.2	802.11ac	40	MCS0	46	Vertical	207	180	50.7	74.0	23.3
5145.2	802.11ac	40	MCS9	38	Vertical	207	180	53.4	74.0	20.6
5149.1	802.11ac	40	MCS9	46	Vertical	207	180	51.8	74.0	22.2
5146.4	802.11ac	80	MCS0	42	Vertical	207	180	54.6	74.0	19.4
5150.0	802.11ac	80	MCS9	42	Vertical	207	180	53.9	74.0	20.1

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
5350.0	802.11a	20	6Mbps	52	Vertical	200	275	40.4	54.0	13.7
5357.8	802.11a	20	6Mbps	56	Vertical	200	275	40.8	54.0	13.2
5350.0	802.11a	20	6Mbps	64	Vertical	200	275	42.1	54.0	11.9
5358.8	802.11a	20	54Mbps	52	Vertical	200	275	40.4	54.0	13.6
5356.6	802.11a	20	54Mbps	56	Vertical	200	275	40.8	54.0	13.2
5350.1	802.11a	20	54Mbps	64	Vertical	200	275	41.9	54.0	12.1
5350.1	802.11n	20	MCS0	52	Vertical	200	275	40.5	54.0	13.5
5353.3	802.11n	20	MCS0	56	Vertical	200	275	40.9	54.0	13.1
5350.0	802.11n	20	MCS0	64	Vertical	200	275	42.4	54.0	11.6
5350.1	802.11n	20	MCS7	52	Vertical	200	275	40.4	54.0	13.6
5352.1	802.11n	20	MCS7	56	Vertical	200	275	40.9	54.0	13.2
5350.0	802.11n	20	MCS7	64	Vertical	200	275	42.4	54.0	11.6
5350.2	802.11ac	40	MCS0	54	Vertical	200	275	40.9	54.0	13.1
5350.0	802.11ac	40	MCS0	62	Vertical	200	275	43.0	54.0	11.0
5350.4	802.11ac	40	MCS9	54	Vertical	200	275	41.0	54.0	13.0
5350.0	802.11ac	40	MCS9	62	Vertical	200	275	42.8	54.0	11.2
5350.0	802.11ac	80	MCS0	58	Vertical	200	275	43.7	54.0	10.3
5350.0	802.11ac	80	MCS9	58	Vertical	200	275	43.3	54.0	10.7

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5427.2	802.11a	20	6Mbps	52	Vertical	200	275	53.1	74.0	20.9
5351.7	802.11a	20	6Mbps	56	Vertical	200	275	52.5	74.0	21.5
5351.0	802.11a	20	6Mbps	64	Vertical	200	275	53.3	74.0	20.7
5383.4	802.11a	20	54Mbps	52	Vertical	200	275	52.5	74.0	21.5
5247.7	802.11a	20	54Mbps	56	Vertical	200	275	52.6	74.0	21.4
5352.6	802.11a	20	54Mbps	64	Vertical	200	275	52.5	74.0	21.5
5359.0	802.11n	20	MCS0	52	Vertical	200	275	52.0	74.0	22.0
5360.3	802.11n	20	MCS0	56	Vertical	200	275	52.5	74.0	21.5
5351.0	802.11n	20	MCS0	64	Vertical	200	275	54.5	74.0	19.5
5362.2	802.11n	20	MCS7	52	Vertical	200	275	51.9	74.0	22.1
5360.2	802.11n	20	MCS7	56	Vertical	200	275	52.3	74.0	21.7
5350.9	802.11n	20	MCS7	64	Vertical	200	275	53.6	74.0	20.4
5427.4	802.11ac	40	MCS0	54	Vertical	200	275	52.7	74.0	21.3
5449.5	802.11ac	40	MCS0	62	Vertical	200	275	53.2	74.0	20.8
5353.9	802.11ac	40	MCS9	54	Vertical	200	275	52.8	74.0	21.2
5350.8	802.11ac	40	MCS9	62	Vertical	200	275	53.6	74.0	20.4
5356.4	802.11ac	80	MCS0	58	Vertical	200	275	55.4	74.0	18.6
5369.1	802.11ac	80	MCS9	58	Vertical	200	275	53.9	74.0	20.1

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5468.6	802.11a	20	6Mbps	52	Vertical	200	275	51.2	68.2	17.0
5469.6	802.11a	20	6Mbps	56	Vertical	200	275	51.2	68.2	17.1
5463.3	802.11a	20	6Mbps	64	Vertical	200	275	51.6	68.2	16.6
5466.6	802.11a	20	54Mbps	52	Vertical	200	275	51.0	68.2	17.2
5462.4	802.11a	20	54Mbps	56	Vertical	200	275	52.3	68.2	15.9
5465.6	802.11a	20	54Mbps	64	Vertical	200	275	51.0	68.2	17.2
5466.4	802.11n	20	MCS0	52	Vertical	200	275	51.4	68.2	16.8
5460.3	802.11n	20	MCS0	56	Vertical	200	275	51.3	68.2	16.9
5468.1	802.11n	20	MCS0	64	Vertical	200	275	51.2	68.2	17.0
5467.5	802.11n	20	MCS7	52	Vertical	200	275	51.7	68.2	16.5
5463.2	802.11n	20	MCS7	56	Vertical	200	275	51.5	68.2	16.7
5469.3	802.11n	20	MCS7	64	Vertical	200	275	51.2	68.2	17.0
5460.7	802.11ac	40	MCS0	54	Vertical	200	275	50.9	68.2	17.3
5461.3	802.11ac	40	MCS0	62	Vertical	200	275	50.3	68.2	17.9
5468.2	802.11ac	40	MCS9	54	Vertical	200	275	51.9	68.2	16.3
5467.8	802.11ac	40	MCS9	62	Vertical	200	275	51.9	68.2	16.3
5469.9	802.11ac	80	MCS0	58	Vertical	200	275	51.8	68.2	16.4
5462.2	802.11ac	80	MCS9	58	Vertical	200	275	51.7	68.2	16.5

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)
5453.4	802.11a	20	6Mbps	100	Vertical	251	256	41.7	54.0	12.3
5446.1	802.11a	20	6Mbps	116	Vertical	251	256	42.0	54.0	12.0
5454.7	802.11a	20	54Mbps	100	Vertical	251	256	42.0	54.0	12.0
5451.9	802.11a	20	54Mbps	116	Vertical	251	256	41.5	54.0	12.5
5459.7	802.11n	20	MCS0	100	Vertical	251	256	42.2	54.0	11.8
5447.9	802.11n	20	MCS0	116	Vertical	251	256	42.2	54.0	11.8
5459.9	802.11n	20	MCS7	100	Vertical	251	256	42.2	54.0	11.9
5454.6	802.11n	20	MCS7	116	Vertical	251	256	41.6	54.0	12.4
5459.1	802.11ac	40	MCS0	12	Vertical	251	256	43.9	54.0	10.1
5459.5	802.11ac	40	MCS9	102	Vertical	251	256	43.7	54.0	10.3
5460.0	802.11ac	80	MCS0	106	Vertical	251	256	45.3	54.0	8.7
5455.8	802.11ac	80	MCS9	106	Vertical	251	256	44.1	54.0	9.9

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5435.7	802.11a	20	6Mbps	100	Vertical	251	256	53.5	74.0	20.6
5443.8	802.11a	20	6Mbps	116	Vertical	251	256	53.0	74.0	21.0
5448.4	802.11a	20	54Mbps	100	Vertical	251	256	53.1	74.0	20.9
5454.8	802.11a	20	54Mbps	116	Vertical	251	256	53.0	74.0	21.0
5408.4	802.11n	20	MCS0	100	Vertical	251	256	53.5	74.0	20.5
5417.3	802.11n	20	MCS0	116	Vertical	251	256	54.0	74.0	20.0
5458.7	802.11n	20	MCS7	100	Vertical	251	256	54.5	74.0	19.5
5447.0	802.11n	20	MCS7	116	Vertical	251	256	52.9	74.0	21.1
5458.5	802.11ac	40	MCS0	12	Vertical	251	256	54.3	74.0	19.7
5455.6	802.11ac	40	MCS9	102	Vertical	251	256	55.1	74.0	18.9
5448.1	802.11ac	80	MCS0	106	Vertical	251	256	56.2	74.0	17.8
5452.0	802.11ac	80	MCS9	106	Vertical	251	256	56.4	74.0	17.6

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5468.9	802.11a	20	6Mbps	100	Vertical	251	256	59.0	68.2	9.2
5468.7	802.11a	20	6Mbps	116	Vertical	251	256	53.8	68.2	14.4
5469.7	802.11a	20	54Mbps	100	Vertical	251	256	60.3	68.2	7.9
5470.0	802.11a	20	54Mbps	116	Vertical	251	256	53.3	68.2	14.9
5464.2	802.11n	20	MCS0	100	Vertical	251	256	57.8	68.2	10.4
5462.4	802.11n	20	MCS0	116	Vertical	251	256	53.7	68.2	14.5
5469.8	802.11n	20	MCS7	100	Vertical	251	256	62.9	68.2	5.3
5464.3	802.11n	20	MCS7	116	Vertical	251	256	52.9	68.2	15.3
5466.6	802.11ac	40	MCS0	12	Vertical	251	256	56.0	68.2	12.2
5468.9	802.11ac	40	MCS9	102	Vertical	251	256	56.2	68.2	12.0
5461.6	802.11ac	80	MCS0	106	Vertical	251	256	57.9	68.2	10.3
5464.1	802.11ac	80	MCS9	106	Vertical	251	256	57.0	68.2	11.2

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5725.1	802.11a	20	6Mbps	140	Vertical	235	335	54.5	68.2	13.7
5725.1	802.11a	20	54Mbps	140	Vertical	235	335	55.1	68.2	13.1
5729.2	802.11n	20	MCS0	140	Vertical	235	335	58.5	68.2	9.7
5725.9	802.11n	20	MCS7	140	Vertical	235	335	63.9	68.2	4.3
5729.3	802.11ac	40	MCS0	134	Vertical	235	335	59.6	68.2	8.6
5725.8	802.11ac	40	MCS9	134	Vertical	235	335	56.4	68.2	11.8

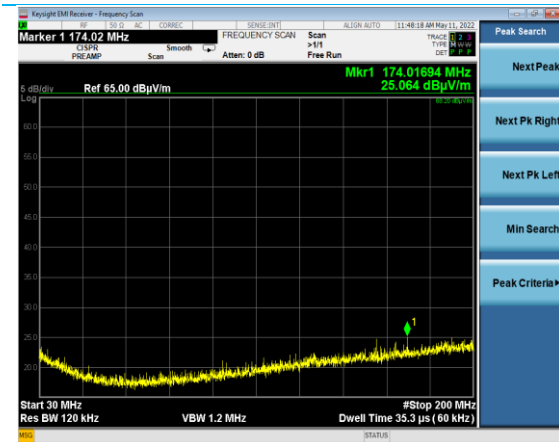
Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5467.0	802.11ac	80	MCS0	138	Vertical	236	333	54.0	68.2	14.2
5469.8	802.11ac	80	MCS9	138	Vertical	236	333	53.1	68.2	15.2
5686.3	802.11n	20	MCS7	165	Vertical	236	333	53.9	68.2	14.3
5690.6	802.11n	20	MCS0	165	Vertical	236	333	54.8	68.2	13.4
5695.1	802.11a	20	54Mbps	165	Vertical	236	333	53.8	68.2	14.4
5703.4	802.11a	20	6Mbps	165	Vertical	236	333	55.2	106.1	50.9
5703.9	802.11a	20	54Mbps	157	Vertical	236	333	54.5	106.3	51.8
5708.3	802.11ac	80	MCS9	155	Vertical	236	333	61.1	107.5	46.4
5720.6	802.11n	20	MCS0	157	Vertical	236	333	59.5	112.1	52.6
5721.1	802.11n	20	MCS7	157	Vertical	236	333	55.0	113.3	58.3
5721.5	802.11ac	40	MCS0	159	Vertical	236	333	59.0	114.3	55.3
5721.6	802.11ac	40	MCS9	159	Vertical	236	333	58.3	114.5	56.3
5723.8	802.11ac	40	MCS0	151	Vertical	236	333	78.1	119.4	41.3
5723.9	802.11ac	40	MCS9	151	Vertical	236	333	73.4	119.6	46.2
5723.9	802.11ac	80	MCS0	155	Vertical	236	333	70.4	119.6	49.2
5723.9	802.11a	20	6Mbps	157	Vertical	236	333	59.8	119.7	59.9
5724.2	802.11n	20	MCS0	149	Vertical	236	333	86.0	120.4	34.4
5724.5	802.11a	20	54Mbps	149	Vertical	236	333	74.4	120.9	46.5
5724.5	802.11n	20	MCS7	149	Vertical	236	333	76.0	121.1	45.1
5724.8	802.11a	20	6Mbps	149	Vertical	236	333	82.2	121.8	39.7
5850.1	802.11ac	40	MCS9	159	Vertical	236	333	67.7	122.0	54.3
5850.2	802.11a	20	54Mbps	165	Vertical	236	333	71.6	121.9	50.2
5850.5	802.11n	20	MCS7	165	Vertical	236	333	73.5	121.1	47.6
5851.2	802.11a	20	6Mbps	157	Vertical	236	333	62.5	119.5	56.9
5851.3	802.11ac	40	MCS9	151	Vertical	236	333	56.9	119.1	62.2
5851.5	802.11ac	80	MCS0	138	Vertical	236	333	57.9	118.7	60.8
5852.2	802.11ac	80	MCS9	155	Vertical	236	333	56.1	117.2	61.1
5852.3	802.11n	20	MCS0	165	Vertical	236	333	80.3	117.0	36.8
5852.5	802.11ac	40	MCS0	151	Vertical	236	333	60.2	116.6	56.4
5852.5	802.11a	20	6Mbps	165	Vertical	236	333	79.2	116.4	37.2
5853.1	802.11n	20	MCS7	149	Vertical	236	333	53.8	115.1	61.3
5853.4	802.11ac	40	MCS0	159	Vertical	236	333	69.9	114.5	44.7
5853.9	802.11ac	80	MCS0	155	Vertical	236	333	67.5	113.4	45.9
5855.7	802.11a	20	54Mbps	157	Vertical	236	333	56.4	110.6	54.2
5857.4	802.11n	20	MCS7	157	Vertical	236	333	57.1	110.1	53.0
5858.1	802.11n	20	MCS0	157	Vertical	236	333	63.0	109.9	47.0
5859.4	802.11n	20	MCS0	149	Vertical	236	333	57.2	109.6	52.4
5864.9	802.11a	20	54Mbps	149	Vertical	236	333	54.5	108.0	53.6
5865.3	802.11a	20	6Mbps	149	Vertical	236	333	55.9	107.9	52.0
5882.5	802.11ac	80	MCS9	138	Vertical	236	333	52.7	68.2	15.5

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Peak Reading (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)	Average Margin (dB)	Peak Margin (dB)
17822.8	802.11a	20	6Mbps	100	Horizontal	150	0	46.9	58.1	54.0	74.0	7.1	15.9
17808.1	802.11a	20	6Mbps	100	Vertical	150	0	47.1	59.1	54.0	74.0	6.9	14.9
17788.0	802.11a	20	6Mbps	64	Horizontal	150	0	46.8	58.5	54.0	74.0	7.2	15.5
17822.7	802.11a	20	6Mbps	64	Vertical	150	0	46.8	58.6	54.0	74.0	7.2	15.4
17749.6	802.11a	20	6Mbps	36	Vertical	150	0	47.2	57.9	54.0	74.0	6.8	16.1
17808.8	802.11a	20	6Mbps	36	Horizontal	150	0	47.3	59.5	54.0	74.0	6.7	14.5

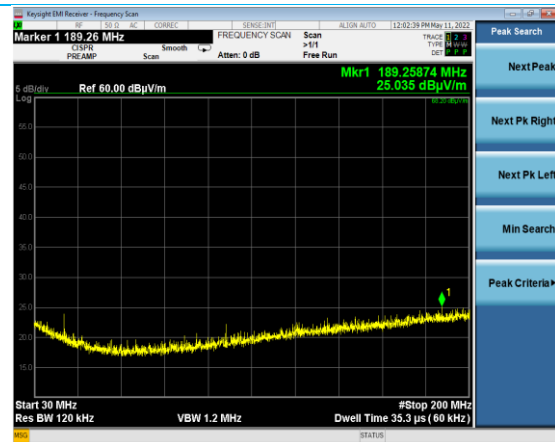
Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Peak Reading (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)	Average Margin (dB)	Peak Margin (dB)
24510.9	802.11a	20	6Mbps	165	Horizontal	150	0	43.7	54.9	54.0	74.0	10.3	19.1
24512.1	802.11a	20	6Mbps	165	Vertical	150	0	43.6	54.1	54.0	74.0	10.4	19.9
24759.4	802.11a	20	6Mbps	140	Vertical	150	0	43.5	55.6	54.0	74.0	10.4	18.4
24663.9	802.11a	20	6Mbps	140	Horizontal	150	0	43.4	54.9	54.0	74.0	10.6	19.1
22820.3	802.11a	20	6Mbps	100	Horizontal	150	0	44.2	55.4	54.0	74.0	9.8	18.6
24829.1	802.11a	20	6Mbps	100	Vertical	150	0	43.4	54.4	54.0	74.0	10.6	19.6

Frequency (MHz)	IEEE Standard	Channel Bandwidth (MHz)	Data Rate	Channel	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Peak Reading (dBμV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)	Average Margin (dB)	Peak Margin (dB)
38650.3	802.11a	20	6Mbps	36	Horizontal	150	0	44.8	57.7	54.0	74.0	9.2	16.3
38644.7	802.11a	20	6Mbps	36	Vertical	150	0	44.5	58.9	54.0	74.0	9.5	15.1
39560.9	802.11a	20	6Mbps	100	Horizontal	150	0	44.4	56.0	54.0	74.0	9.5	18.0
39542.0	802.11a	20	6Mbps	64	Horizontal	150	0	44.4	57.2	54.0	74.0	9.5	16.8
38585.5	802.11a	20	6Mbps	140	Horizontal	150	0	45.0	58.2	54.0	74.0	9.0	15.8
39345.7	802.11a	20	6Mbps	165	Horizontal	150	0	44.7	58.5	54.0	74.0	9.3	15.5

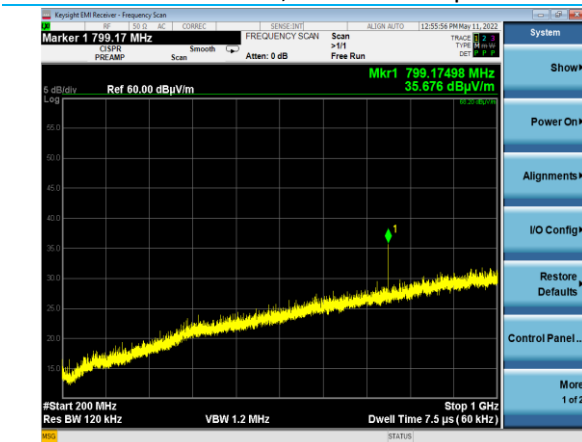
Plots



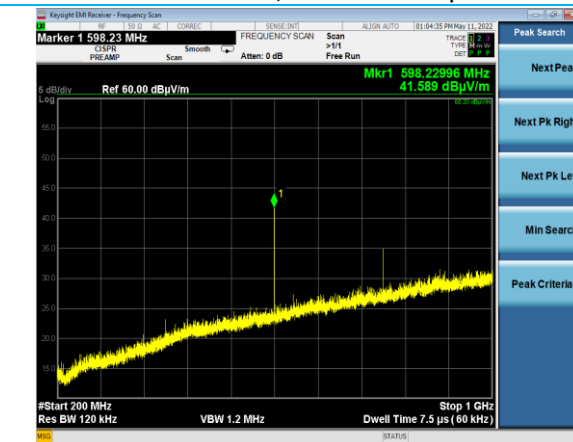
30-200 MHz, Horizontal Antenna, Vertical EUT
Channel 36, 802.11a 6Mbps



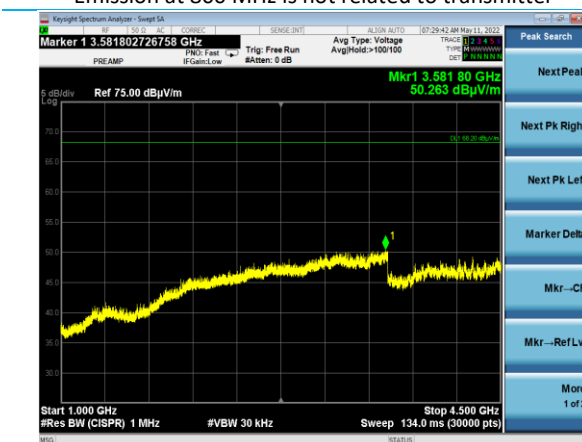
30-200 MHz, Vertical Antenna, Vertical EUT
Channel 36, 802.11a 6Mbps



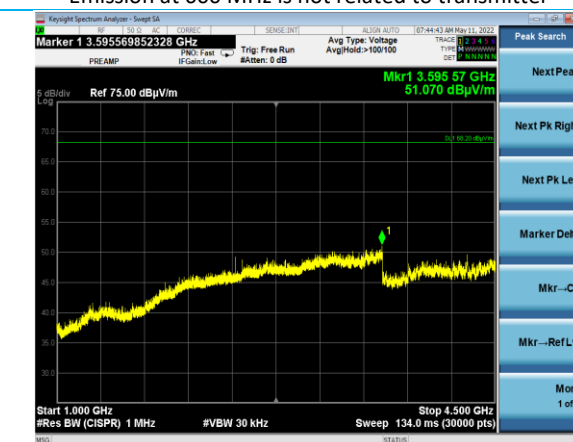
200-1000 MHz, Horizontal Antenna, Vertical EUT
Channel 165, 802.11a 6Mbps
Emission at 800 MHz is not related to transmitter



200-1000 MHz, Vertical Antenna, Vertical EUT
Channel 165, 802.11a 6Mbps
Emission at 600 MHz is not related to transmitter



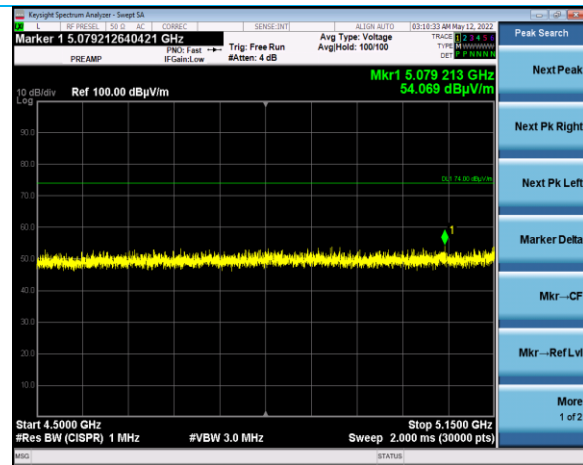
1000-4500 MHz, Horizontal Antenna, Flat EUT
Channel 48, 802.11a 6Mbps



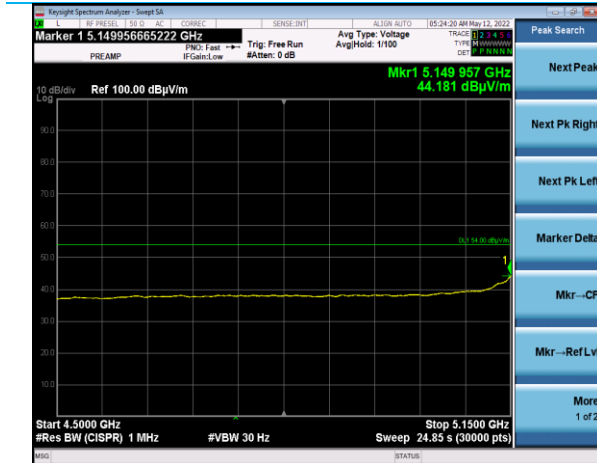
1000-4500 MHz, Vertical Antenna, Flat EUT
Channel 48, 802.11a 6Mbps



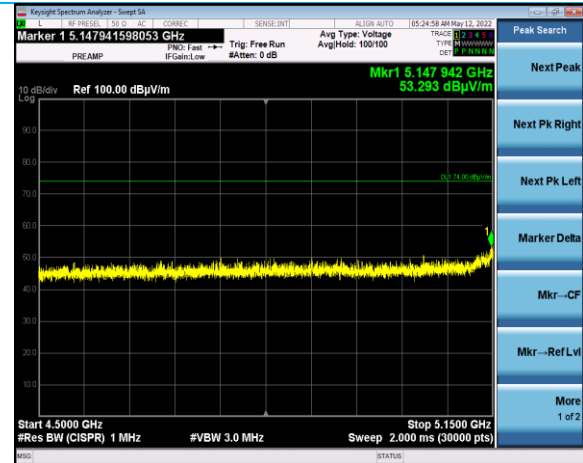
4500-5150 MHz, Horizontal Antenna, Average
Channel 36, 802.11n MCS0 (20)



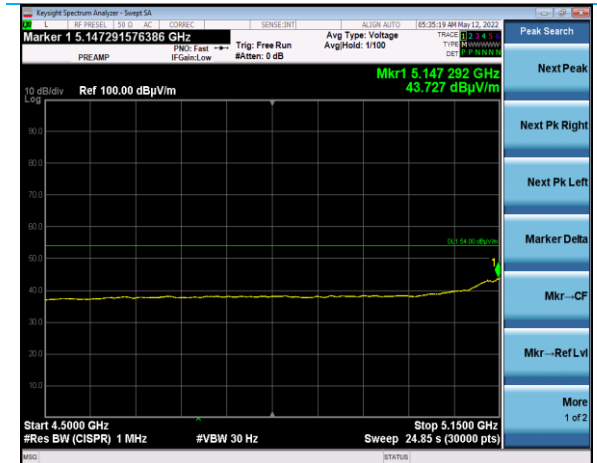
4500-5150 MHz, Horizontal Antenna, Peak
Channel 36, 802.11n MCS0 (20)



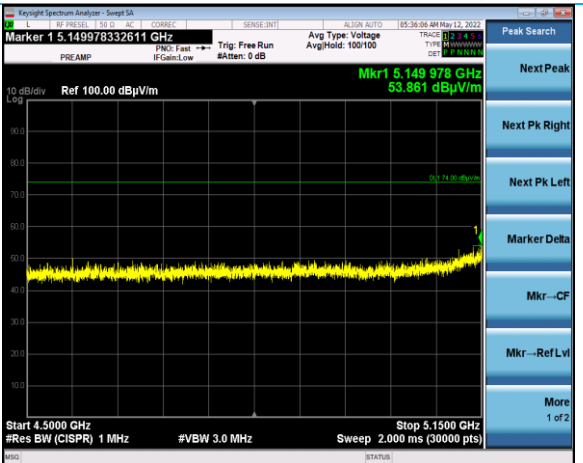
4500-5150 MHz, Horizontal Antenna, Average
Channel 38, 802.11n MCS0 (40)



4500-5150 MHz, Horizontal Antenna, Peak
Channel 38, 802.11n MCS0 (40)



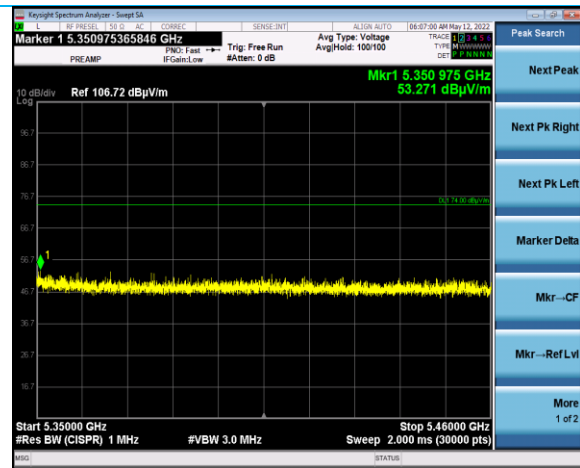
4500-5150 MHz, Horizontal Antenna, Average
Channel 42, 802.11n MCS0 (80)



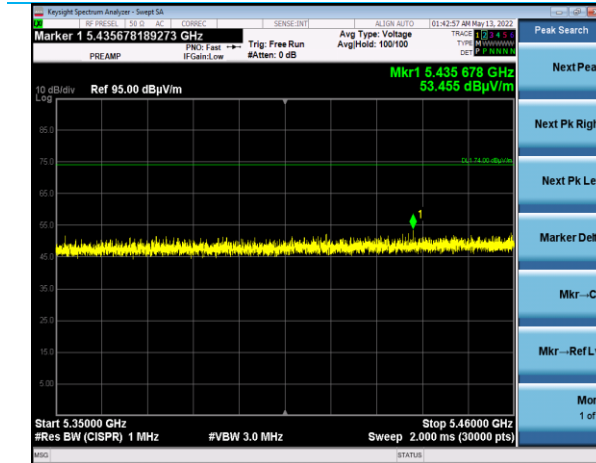
4500-5150 MHz, Horizontal Antenna, Peak
Channel 42, 802.11n MCS0 (80)



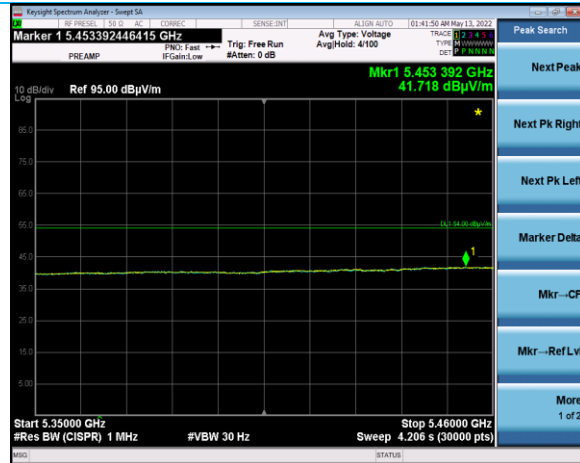
5350-5460 MHz, Horizontal Antenna, Flat EUT
Channel 64, 802.11n(20) MCS0, Average



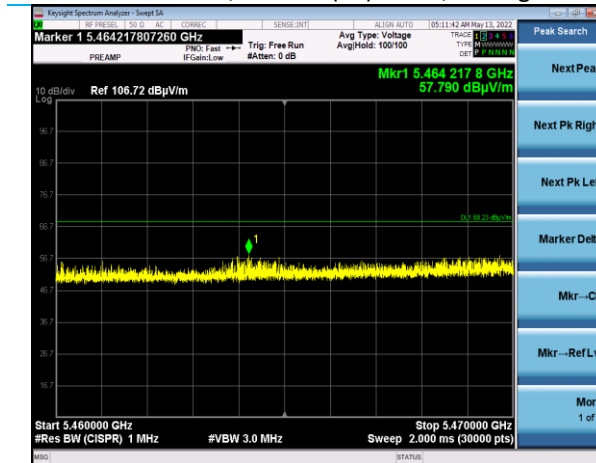
5350-5460 MHz, Horizontal Antenna, Flat EUT
Channel 64, 802.11n(20) MCS0, Peak



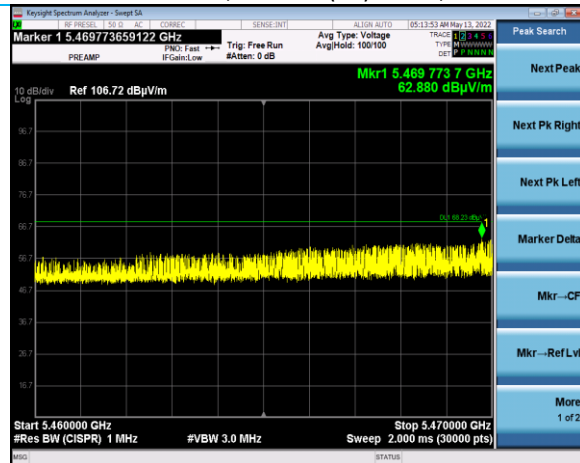
5350-5460 MHz, Vertical Antenna, Flat EUT
Channel 100, 802.11n(20) MCS0, Average



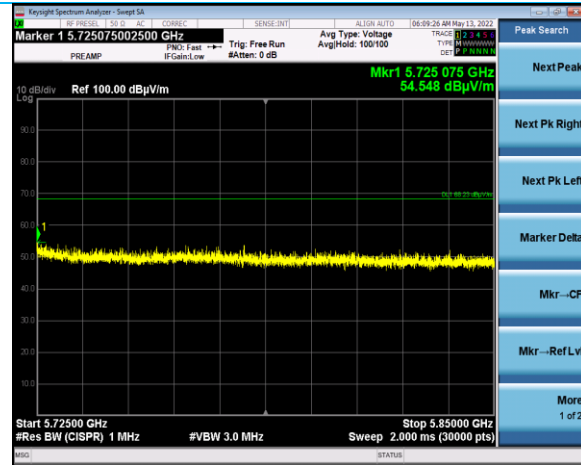
5350-5470 MHz, Vertical Antenna, Flat EUT
Channel 100, 802.11n(20) MCS0, Peak



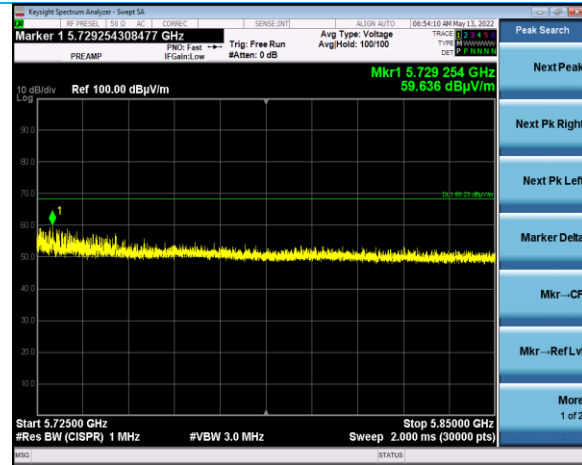
5460-5470 MHz, Horizontal Antenna, Flat EUT
Channel 100, 802.11n(20), Average



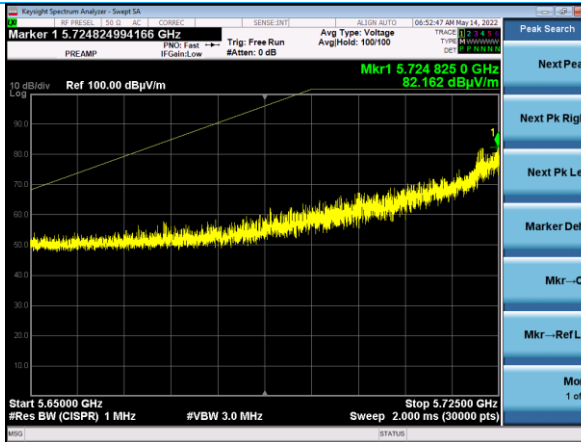
5460-5470 MHz, Horizontal Antenna, Flat EUT
Channel 100, 802.11n(20), Peak



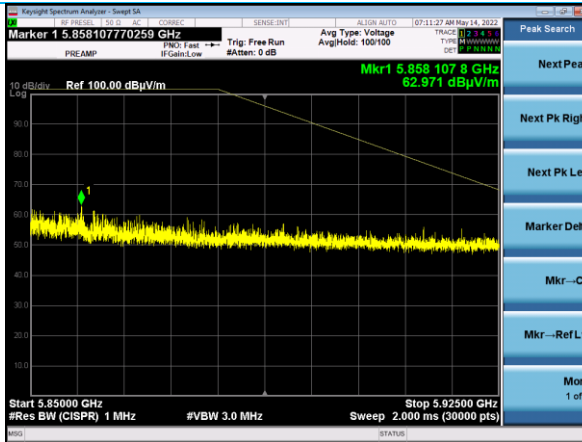
5725-5850 MHz, Horizontal Antenna, Flat EUT
Channel 140, 802.11n(20), Peak



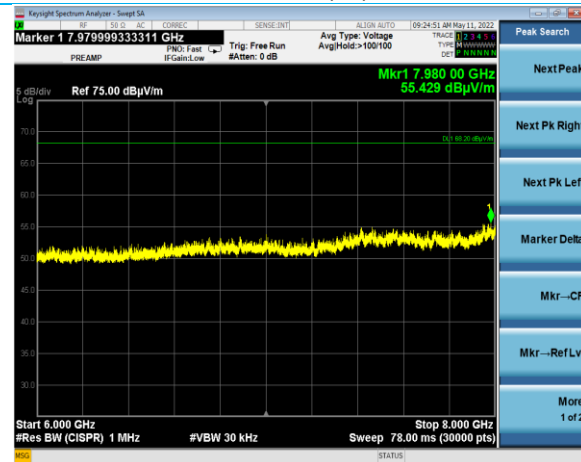
5725-5850 MHz, Horizontal Antenna, Flat EUT
Channel 134, 802.11ac(40), Peak



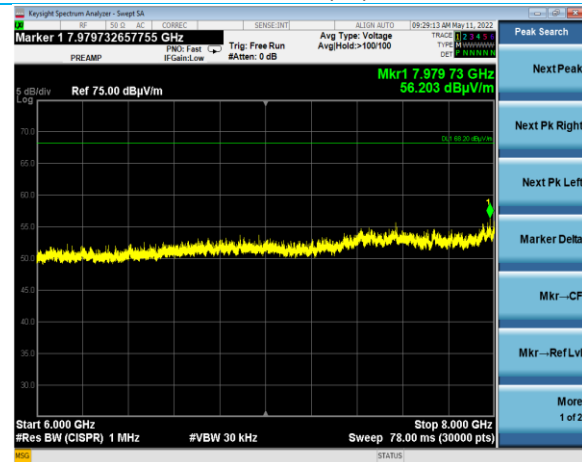
5850-5925 MHz, Horizontal Antenna, Flat EUT
Channel 149, 802.11n(20), MCS0, Peak



5850-5925 MHz, Horizontal Antenna, Flat EUT
Channel 157, 802.11n(20), MCS0, Peak



6-8 GHz, Horizontal Antenna, Flat EUT
Channel 165, 6Mbps



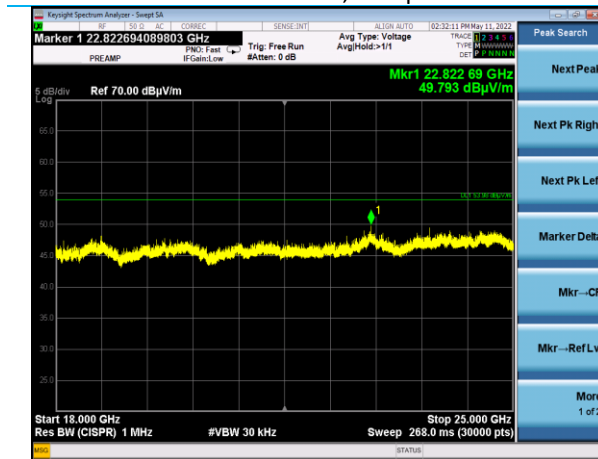
6-8 GHz, Vertical Antenna, Flat EUT
Channel 165, 6Mbps



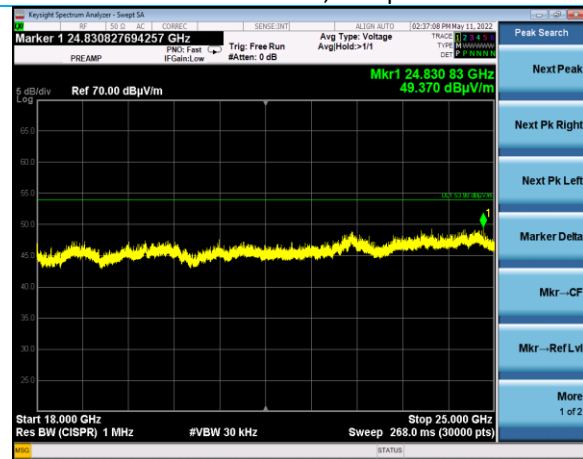
8-18 GHz, Horizontal Antenna, Flat EUT
Channel 165, 6Mbps



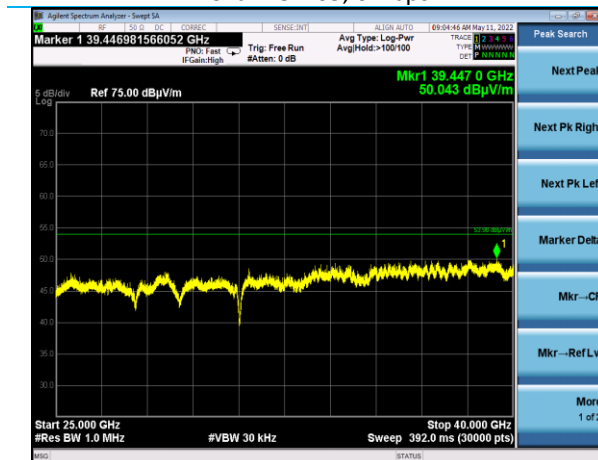
8-18 GHz, Vertical Antenna, Flat EUT
Channel 165, 6Mbps



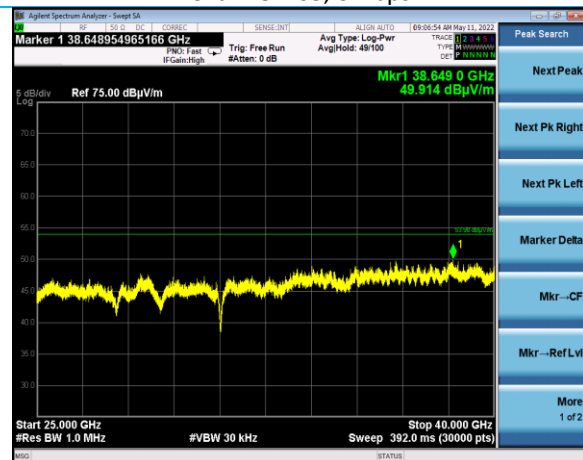
18-25 GHz, Horizontal Antenna, Vertical EUT
Channel 165, 6Mbps



18-25 GHz, Vertical Antenna, Vertical EUT
Channel 165, 6Mbps



25-40 GHz, Horizontal Antenna, Vertical EUT
Channel 165, 6Mbps



25-40 GHz, Vertical Antenna, Vertical EUT
Channel 165, 6Mbps

6 REVISION HISTORY

Version	Date	Notes	Person
0	7/5/2022	Initial Draft	Zach Wilson
1	7/6/2022	Final Draft	Zach Wilson
2	8/11/2022	Corrections for TCB Comments	Adam Alger
3	9/15/2022	Update antenna gain	Adam Alger

END OF REPORT