UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-UX
ISED ID	6545A-UX
Equipment Under Test	UX
Test Report Serial Number	TR8062_01
Date of Test(s)	April 20 Through May 1, 2023
Report Issue Date	May 3, 2023

Test Specification	Applicant
47 CFR FCC Part 15, Subpart E RSS-GEN Issue 5	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.

NVLAP TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

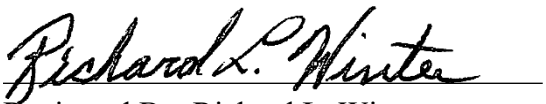
Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUTI
Model Number	UX
FCC ID	SWX-UX
ISED ID	6545A-UX

On this 3rd day of May 2023, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory

Written By: Clay Allred



Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	May 3, 2023

Table of Contents

1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UBIQUITI
Model Number	UX
Serial Number	N/A
Dimensions (cm)	9.8 x 9.8 x 2.8

2.2 Description of EUT

The UX is a WiFi 6 access point designed for wide-ranging wireless coverage while maintain overall network capacity. The UX delivers and aggregate radio rate of up to 2.7 Gbps with 5 GHz (2x2) and 2.4 GHz (2x2) radios. The UX uses a sophisticated antenna design to offer excellent range. The UX has a Bluetooth management radio for easy in setup and administration of the wireless system. The UX is power from a USB C connector.

Band	WiFi Mode	Modulation Bandwidth	Modulation Type	Frequency (MHz)
UNII-1	a	20 MHz	OFDM	5180, 5200, 5210, 5240
	n	20 MHz	HT	5180, 5200, 5210, 5240
	n	40 MHz	HT	5190, 5230
	ac	20 MHz	VHT	5180, 5200, 5210, 5240
	ac	40 MHz	VHT	5190, 5230
	ac	80 MHz	VHT	5210
	ax	20 MHz	HE	5180, 5200, 5210, 5240
	ax	40 MHz	HE	5190, 5230
	ax	80 MHz	HE	5210

This report covers the circuitry of the device subject to FCC Part 15, Subpart E. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

2.3 EUT and Support Equipment

The EUT and support equipment used during the test are listed below.

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UBIQUITI MN: UX SN: 5 DA	Wireless Access Point	See Section 2.4
BN: UBIQUITI MN: GP-M015-QC SN: N/A	USB C Power Adapter	See Section 2.4
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	LAN Port / Un-shielded Cat 5e cable (Note 2)
BN: UBIQUITI MN: UX SN: 5 DA	Wireless Access Point	See Section 2.4

Notes: (1) EUT
(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT

Name of Ports	No. of Ports Fitted to EUT	Cable Description/Length
RJ45 WAN	1	Cat.6 / 5M
RJ45 LAN	1	Cat.6 / 5M
USBC	1	USBC / 1M

2.5 Operating Environment

Power Supply	120 VAC
AC Mains Frequency	60 Hz
Temperature	22.2 – 24.2 °C
Humidity	23.1 – 28.5 %
Barometric Pressure	1015 mBar

2.6 Operating Modes

The UX was tested using test software in order to enable a constant transmission. The measurements within this report are corrected to reference a 100% duty cycle. All emission

modes of 802.11 a/n/ac/ax were investigated. All measurements are reported with the worst-case mode (802.11ax) unless otherwise stated.

2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

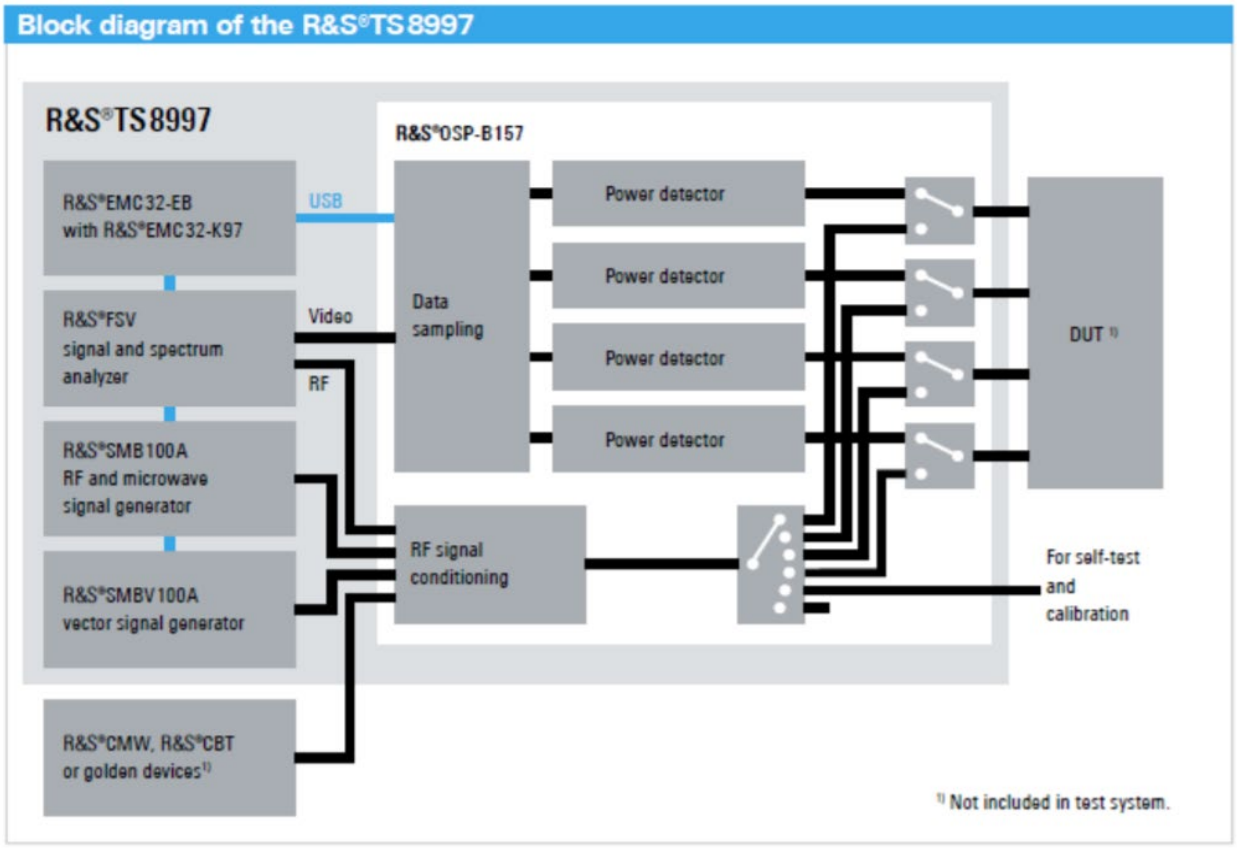


Diagram 1: Test Configuration Block Diagram

2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

There were no deviations, opinions, additional information or interpretations from the test specification.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title	47 CFR FCC Part 15, Subpart E, Section 15.407 Limits and methods of measurement of radio interference characteristics of Unlicensed National Information Infrastructure Devices
Purpose of Test	The tests were performed to demonstrate initial compliance

3.2 Methods & Procedures

3.2.1 47 CFR FCC Part 15 Section 15.407

See test standard for details.

3.3 FCC Part 15, Subpart E

3.3.1 Summary of Tests

FCC Section	ISED Section	Environmental Phenomena	Frequency Range (MHZ)	Result
15.407(a)	N/A	Antenna requirements	Structural Requirement	Compliant
15.407(b)	RSS-Gen	Conducted Disturbance at Mains Port	0.15 to 30	Compliant
15.407(c)	RSS-247 §6.2.2, §6.2.3	Bandwidth Requirement	5180 to 5210	Compliant
15.407(e)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	5180 to 5210	Compliant
15.407(f)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions	0.009 to 40000	N/A
15.407(g)	RSS-247 §6.2.2, §6.2.3	Radiated Spurious Emissions	0.009 to 40000	Compliant
15.407(h)	RSS-247 §6.2.2, §6.2.3	Peak Power Spectral Density	5180 to 5210	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 789033 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements.				

3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2023. This site has also been registered with Innovations, Science and Economic Development (ISED) department as was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2023.

Unified Compliance Laboratory has been assigned Designation Number US5037 by the FCC and Conformity Assessment Number US0223 by ISED.

4 Test Equipment

4.1 Conducted Emissions at Mains Ports

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	AFJ	FFT3010	UCL-2500	6/27/2022	6/27/2023
LISN	AFJ	LS16C/10	UCL-6749	12/6/2021	12/6/2023
ISN	Teseq	ISN T800	UCL-2974	6/27/2022	6/27/2023
LISN	Com-Power	LIN-120C	UCL-2612	1/24/2023	1/24/2024
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Test Software	UCL	Revision 1	UCL-3107	N/A	N/A

Table 1: List of equipment used for Conducted Emissions Testing at Mains Port

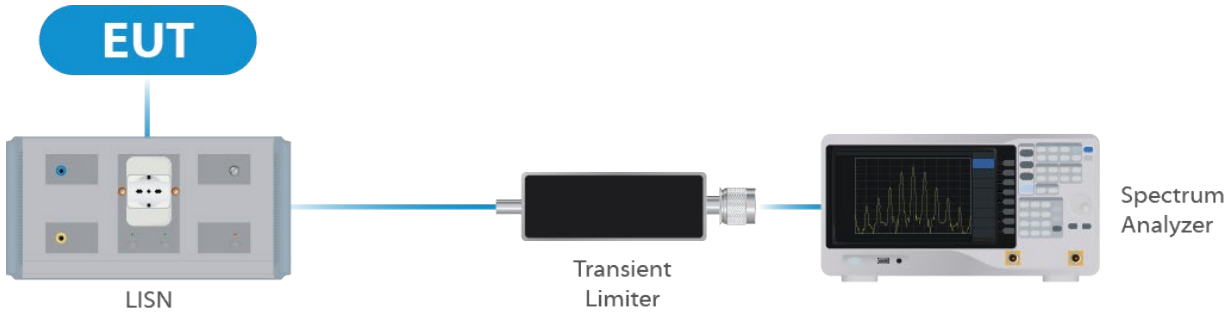


Figure 1: Conducted Emissions Test

4.2 Direct Connect at the Antenna Port Tests

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Spectrum Analyzer	R&S	FSV40	UCL-2861	11/7/2022	11/7/2023
Signal Generator	R&S	SMB100A	UCL-2864	N/A	N/A
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Switch Extension	R&S	OSP-B157WX	UCL-2867	2/22/2023	2/22/2024
Switch Extension	R&S	OSP-150W	UCL-2870	2/22/2023	2/22/2024

Table 2: List of equipment used for Direct Connect at the Antenna Port

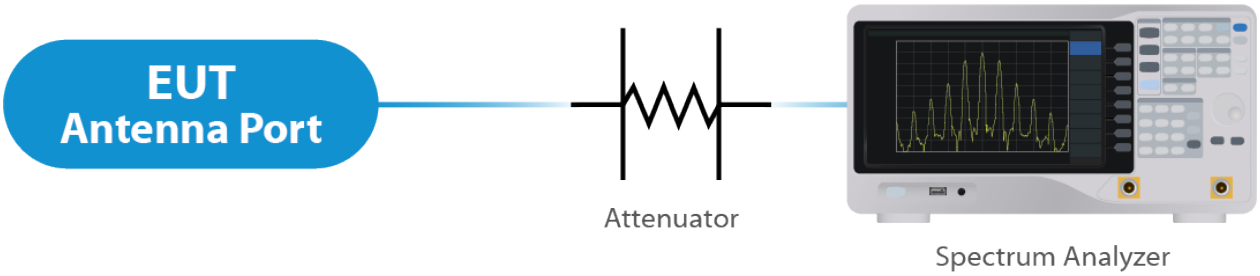


Figure 2: Direct Connect at the Antenna Port Test

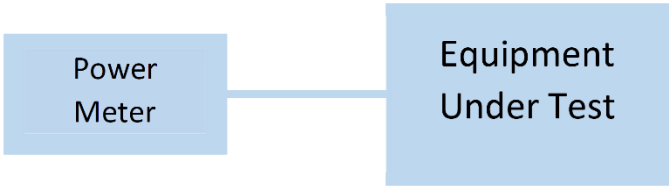


Figure 3: Output Power Measurement

4.3 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	1/27/2023	1/27/2024
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2023
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	2/22/2023	2/22/2025
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	1/11/2023	1/11/2025
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	9/22/2022	9/22/2024
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	6/09/2022	6/09/2024
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	12/9/2022	12/9/2023
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

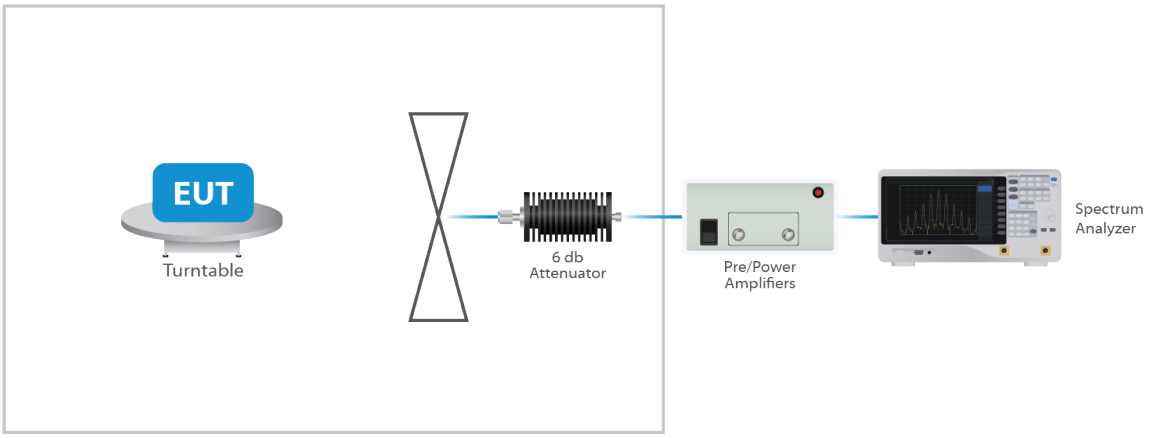


Figure 4: Radiated Emissions Test

4.4 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

4.5 Measurement Uncertainty

Test	Uncertainty (± dB)	Confidence (%)
Conducted Emissions	1.44	95
Radiated Emissions (9 kHz to 30 MHz)	2.50	95
Radiated Emissions (30 MHz to 1 GHz)	4.38	95
Radiated Emissions (1 GHz to 18 GHz)	4.37	95
Radiated Emissions (18 GHz to 40 GHz)	3.93	95
Direct Connect Tests	**K Factor**	**Value**
Emissions Bandwidth	2	2.0%
Output Power	2	1.0 dB
Peak Power Spectral Density	2	1.3 dB
Band Edge	2	0.8 dB
Transmitter Spurious Emissions	2	1.8 dB

5 Test Results

5.1 §15.203 Antenna Requirements

The EUT uses an integral antenna. Per the manufacturer, the Maximum gain of the antenna is 4.5 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable.

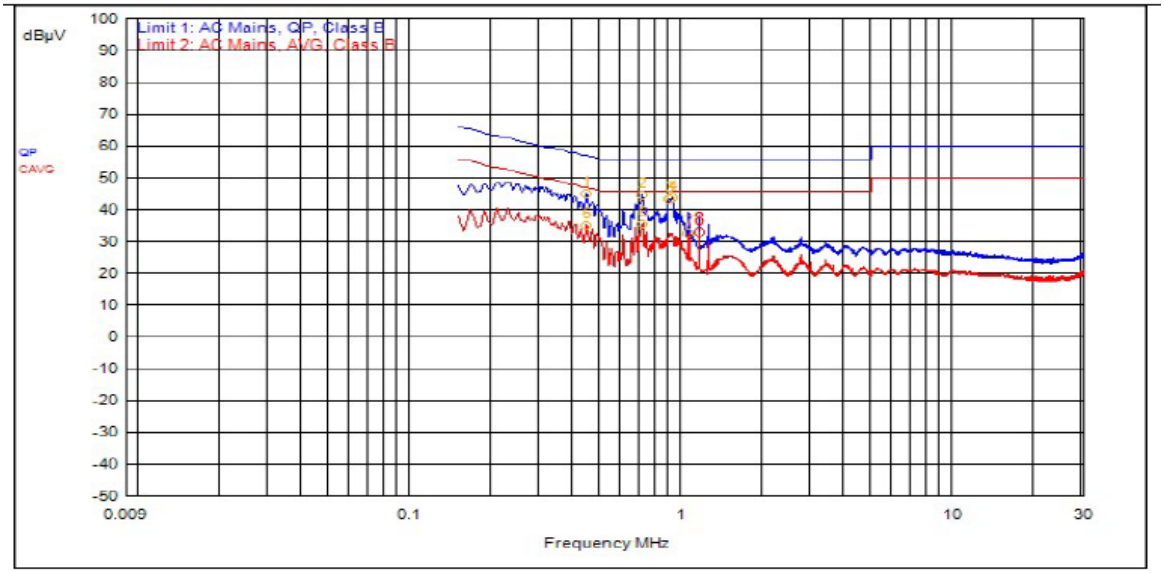
For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(Nant/Nss) dB = 3.01dB; Direction gain = Ant Gain + Array Gain or 7.51dB (4.5 dBi + 3.01 dB)

Results

The EUT complied with the specification.

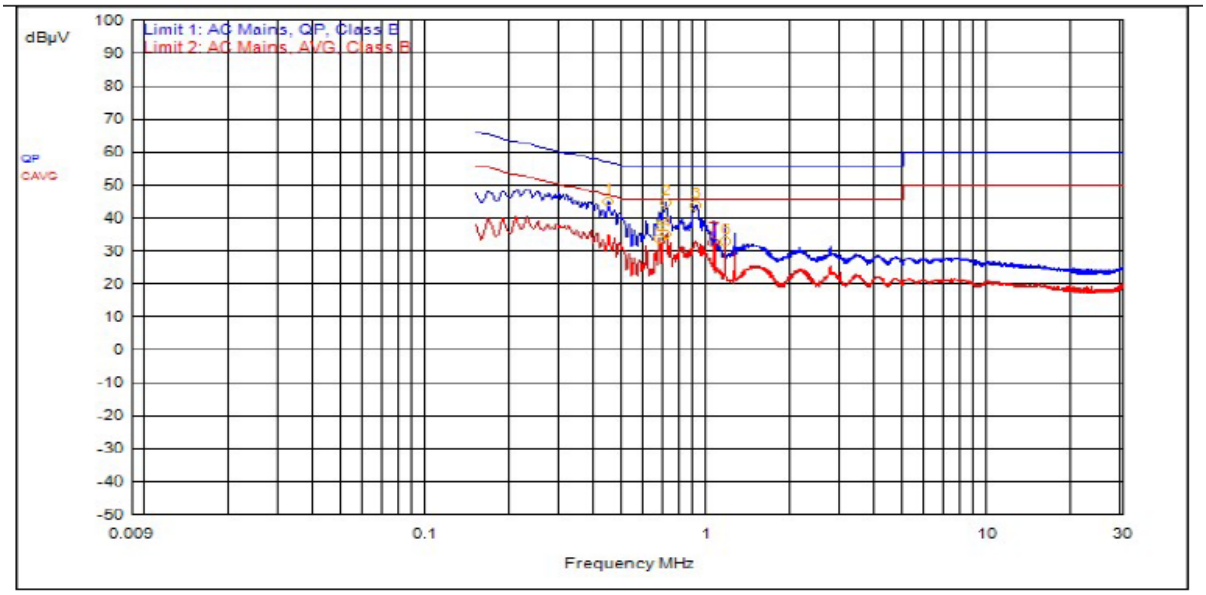
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
2	708,000kHz	12.4	0.0		QPeak	32.0	44.4	56.0	-11.6		
1	444,000kHz	12.4	0.0		QPeak	32.7	45.1	57.0	-11.9		
4	921,000kHz	12.4	0.1		QPeak	31.1	43.6	56.0	-12.4		
3	891,000kHz	12.4	0.1		QPeak	30.9	43.4	56.0	-12.6		
5	444,000kHz	12.4	0.0		C_AVG	22.8	35.2			47.0	-11.8
6	711,000kHz	12.4	0.0		C_AVG	22.9	35.3			46.0	-10.7
7	1.056MHz	12.4	0.1		C_AVG	20.2	32.7			46.0	-13.3
8	1.152MHz	12.4	0.1		C_AVG	20.3	32.8			46.0	-13.2

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
2	708,000kHz	12.4	0.0		QPeak	32.3	44.7	56.0	-11.3		
1	444,000kHz	12.4	0.0		QPeak	32.6	45.0	57.0	-12.0		
3	909,000kHz	12.4	0.1		QPeak	31.1	43.7	56.0	-12.3		
4	708,000kHz	12.4	0.0		C_AVG	22.8	35.2			46.0	-10.8
5	672,000kHz	12.4	0.0		C_AVG	21.3	33.8			46.0	-12.2
6	1.152MHz	12.4	0.1		C_AVG	20.3	32.8			46.0	-13.2
7	1.056MHz	12.4	0.1		C_AVG	20.1	32.6			46.0	-13.4

Result

The EUT complied with the specification limit.

5.3 §15.403(i) 26 dB Emissions Bandwidth

All chains were measured under the guidance of KDB 789033 Section II.C. and KDB 66291 D01. Please see associated annex for details on instrument settings.

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
20	5180	16.3	18.5
20	5210	16.3	49.9
20	5240	16.3	48.5
20	5180	17.5	20.3
20	5210	17.5	58.6
20	5240	17.5	57.8
40	5190	36.3	39.8
40	5230	36.0	62.1
20	5180	17.5	20.4
20	5210	17.6	44.7
20	5240	17.5	55.0
40	5190	36.3	39.9
40	5230	36.3	59.0
80	5210	75.5	81.5
20	5180	18.9	20.6
20	5210	20.5	47.2
20	5240	18.8	57.3
40	5190	37.8	39.9
40	5230	37.8	58.5
80	5210	77.5	81.5

Result

All chains were tested and the highest bandwidth per chain is reported above.
The 26 dB bandwidths are reported for information purposes. Please see Annex for all bandwidth measurements.

5.4 §15.407(a)(2) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.
The maximum average RF conducted output power measured for this device was 26.58 dBm or 454.99mW. The limit is 30 dBm, or 1 Watt when using an antenna with 6 dBi (indoor access point) or less gain. The antenna has a gain of 4.5 dBi.

5.4.1 FCC / US

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured EIRP
OFDM 20	5180	Mcs0	38	21.11	25.61
OFDM 20	5210	Mcs0	48	26.28	30.78
OFDM 20	5240	Mcs0	49	26.27	30.77
HT 20	5180	Mcs0	42	22.77	27.27
HT 20	5210	Mcs0	49	26.58	31.08
HT 20	5240	Mcs0	49	26.29	30.79
HT 40	5190	Mcs0	38	21.07	25.57
HT 40	5230	Mcs0	43	23.86	28.36
VHT 20	5180	Mcs0	41	22.18	26.68
VHT 20	5210	Mcs0	47	25.70	30.20
VHT 20	5240	Mcs0	49	26.30	30.80
VHT 40	5190	Mcs0	38	21.06	25.56
VHT 40	5230	Mcs0	43	23.85	28.35
VHT 80	5210	Mcs0	38	20.75	25.25
HE 20	5180	Mcs0	40	21.80	26.30
HE 20	5210	Mcs0	47	25.68	30.18
HE 20	5240	Mcs0	49	26.27	30.77
HE 40	5190	Mcs0	38	20.82	25.32
HE 40	5230	Mcs0	43	23.66	28.16
HE 80	5210	Mcs0	36	19.63	24.13

5.4.2 Canada / ICES

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured EIRP
OFDM 20	5180	Mcs0	32	18.01	22.51
OFDM 20	5210	Mcs0	33	18.38	22.88
OFDM 20	5240	Mcs0	33	18.14	22.64
HT 20	5180	Mcs0	33	17.88	22.38
HT 20	5210	Mcs0	34	18.31	22.81
HT 20	5240	Mcs0	34	18.12	22.62
HT 40	5190	Mcs0	32	18.03	22.53
HT 40	5230	Mcs0	33	18.47	22.97
VHT 20	5180	Mcs0	34	18.36	22.86
VHT 20	5210	Mcs0	34	18.35	22.85
VHT 20	5240	Mcs0	34	18.10	22.60
VHT 40	5190	Mcs0	32	18.03	22.53
VHT 40	5230	Mcs0	32	17.94	22.44
VHT 80	5210	Mcs0	33	18.20	22.70
HE 20	5180	Mcs0	33	18.08	22.58
HE 20	5210	Mcs0	33	18.05	22.55
HE 20	5240	Mcs0	34	18.32	22.82
HE 40	5190	Mcs0	33	18.32	22.82
HE 40	5230	Mcs0	33	18.21	22.71
HE 80	5210	Mcs0	33	18.15	22.65

Result

In the configuration tested, the maximum summed average RF output power was less than 1 watt; therefore, the EUT compiled with the requirements of the specification (see spectrum analyzer plots in attached Annex).

5.5 §15.407(b) Spurious Emissions

5.5.1 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The EUT uses various power settings based on the channel in use. In order to reduce test time, the radiated spurious emissions at the lowest, middle, and highest channel were measured at the maximum power of TP49 as this setting was found to be worst case for spurious emissions. Power was subsequently reduced during in-band and band edge testing. The band edge at the restricted band ending at 5150 MHz was measured using radiated measurement or conducted at the antenna port methods. All emissions modes were tested, and the worst-case measurement are shown below. For frequencies above 1 GHz, a measurement of 3 meters was used. For frequencies below 1 GHz, a measurement distance of 10 meters was used.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

Frequency	Detector	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
124.74MHz	QP	42.32	44	-1.68	56	1.13	Vertical	120 kHz	-13.79
34.558 MHz	QP	37.08	40	-2.92	206	1.13	Vertical	120 kHz	-9.98
131.8 MHz	QP	40.52	44	-3.48	358	1.13	Vertical	120 kHz	-13.65
35.971 MHz	QP	36.48	40	-3.52	214	1.13	Vertical	120 kHz	-11.12
124.21 MHz	QP	39.66	44	-4.34	192	2.57	Horizontal	120 kHz	-13.79
31.954 MHz	QP	35.3	40	-4.7	161	1.13	Horizontal	120 kHz	-8.25
40.218 MHz	QP	34.36	40	-5.64	295	1.13	Vertical	120 kHz	-14.21
6.2282 GHz	PK	49.529	74	-24.471	197	1.5	Vertical	1 MHz	-7.711
10.363 GHz	PK	55.432	74	-18.568	321	1.638	Vertical	1 MHz	2.246
15.541 GHz	PK	56.176	74	-17.824	35	3.311	Vertical	1 MHz	4.579
6.2282 GHz	AV	42.255	54	-11.745	197	1.5	Vertical	1 MHz	-7.711
10.363 GHz	AV	40.924	54	-13.076	321	1.638	Vertical	1 MHz	2.246
15.541 GHz	AV	41.969	54	-12.031	35	3.311	Vertical	1 MHz	4.579
10.359 GHz	PK	53.891	74	-20.109	26	2.819	Horizontal	1 MHz	2.269
12.603 GHz	PK	50.397	74	-23.603	283	1.5	Horizontal	1 MHz	4.694
15.543 GHz	PK	59.502	74	-14.498	179	2.65	Horizontal	1 MHz	4.574
10.359 GHz	AV	41.122	54	-12.878	26	2.819	Horizontal	1 MHz	2.269
12.603 GHz	AV	37.032	54	-16.968	283	1.5	Horizontal	1 MHz	4.694
15.543 GHz	AV	45.442	54	-8.558	179	2.65	Horizontal	1 MHz	4.574
29.674 GHz	PK	52.129	74	-21.871	148	1.5	Vertical	1 MHz	1.185
33.609 GHz	PK	54.674	74	-19.326	312	1.5	Vertical	1 MHz	5.767
37.349 GHz	PK	59.967	74	-14.033	258	1.5	Vertical	1 MHz	11.158
29.674 GHz	AV	37.17	54	-16.83	148	1.5	Vertical	1 MHz	1.185
33.609 GHz	AV	38.778	54	-15.222	312	1.5	Vertical	1 MHz	5.767
37.349 GHz	AV	43.159	54	-10.841	258	1.5	Vertical	1 MHz	11.158
28.162 GHz	PK	51.459	74	-22.541	207	1.5	Horizontal	1 MHz	1.172
33.412 GHz	PK	53.28	74	-20.72	214	1.5	Horizontal	1 MHz	5.104
37.392 GHz	PK	60.704	74	-13.296	32	1.5	Horizontal	1 MHz	11.326
38.97 GHz	PK	57.64	74	-16.36	161	1.5	Horizontal	1 MHz	9.38
28.162 GHz	AV	36.696	54	-17.304	207	1.5	Horizontal	1 MHz	1.172

Frequency	Detector	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
33.412 GHz	AV	37.723	54	-16.277	214	1.5	Horizontal	1 MHz	5.104
37.392 GHz	AV	41.111	54	-12.889	32	1.5	Horizontal	1 MHz	11.326
38.97 GHz	AV	40.198	54	-13.802	161	1.5	Horizontal	1 MHz	9.38

Table 4: Transmitting on the Lowest Frequency 5180 MHz

Frequency	Detector	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
124.74MHz	QP	42.32	44	-1.68	56	1.13	Vertical	120 kHz	-13.79
34.558 MHz	QP	37.08	40	-2.92	206	1.13	Vertical	120 kHz	-9.98
131.8 MHz	QP	40.52	44	-3.48	358	1.13	Vertical	120 kHz	-13.65
35.971 MHz	QP	36.48	40	-3.52	214	1.13	Vertical	120 kHz	-11.12
124.21 MHz	QP	39.66	44	-4.34	192	2.57	Horizontal	120 kHz	-13.79
31.954 MHz	QP	35.3	40	-4.7	161	1.13	Horizontal	120 kHz	-8.25
40.218 MHz	QP	34.36	40	-5.64	295	1.13	Vertical	120 kHz	-14.21
10.423 GHz	PK	59.426	74	-14.574	264	2.816	Vertical	1 MHz	3.316
11.989 GHz	PK	49.778	74	-24.222	274	3.802	Vertical	1 MHz	5.157
15.632 GHz	PK	60.213	74	-13.787	248	1.5	Vertical	1 MHz	4.63
16.806 GHz	PK	51.899	74	-22.101	301	1.638	Vertical	1 MHz	8.079
10.423 GHz	AV	44.6	54	-9.4	264	2.816	Vertical	1 MHz	3.316
11.989 GHz	AV	36.818	54	-17.182	274	3.802	Vertical	1 MHz	5.157
15.632 GHz	AV	46.609	54	-7.391	248	1.5	Vertical	1 MHz	4.63
16.806 GHz	AV	38.795	54	-15.205	301	1.638	Vertical	1 MHz	8.079
10.419 GHz	PK	55.922	74	-18.078	5	3.657	Horizontal	1 MHz	3.4
12.619 GHz	PK	51.451	74	-22.549	106	1.5	Horizontal	1 MHz	4.935
15.63 GHz	PK	56.902	74	-17.098	162	2.65	Horizontal	1 MHz	4.547
16.766 GHz	PK	51.645	74	-22.355	120	1.643	Horizontal	1 MHz	7.96
10.419 GHz	AV	43.057	54	-10.943	5	3.657	Horizontal	1 MHz	3.4
12.619 GHz	AV	37.358	54	-16.642	106	1.5	Horizontal	1 MHz	4.935
15.63 GHz	AV	43.349	54	-10.651	162	2.65	Horizontal	1 MHz	4.547
16.766 GHz	AV	38.679	54	-15.321	120	1.643	Horizontal	1 MHz	7.96
20.832 GHz	PK	60.919	74	-13.081	152	1.5	Vertical	1 MHz	-1.941
33.643 GHz	PK	55.541	74	-18.459	293	1.5	Vertical	1 MHz	5.622
37.368 GHz	PK	60.073	74	-13.927	42	1.5	Vertical	1 MHz	11.231
38.936 GHz	PK	58.806	74	-15.194	206	1.5	Vertical	1 MHz	9.59
20.832 GHz	AV	45.276	54	-8.724	152	1.5	Vertical	1 MHz	-1.941
33.643 GHz	AV	39.097	54	-14.903	293	1.5	Vertical	1 MHz	5.622
37.368 GHz	AV	42.578	54	-11.422	42	1.5	Vertical	1 MHz	11.231
38.936 GHz	AV	41.113	54	-12.887	206	1.5	Vertical	1 MHz	9.59
20.841 GHz	PK	63.113	74	-10.887	176	1.5	Horizontal	1 MHz	-1.969
37.29 GHz	PK	60.008	74	-13.992	249	1.5	Horizontal	1 MHz	10.554
39 GHz	PK	57.861	74	-16.139	359	1.5	Horizontal	1 MHz	9.204
20.841 GHz	AV	48.631	54	-5.369	176	1.5	Horizontal	1 MHz	-1.969
37.29 GHz	AV	41.448	54	-12.552	249	1.5	Horizontal	1 MHz	10.554
39 GHz	AV	39.423	54	-14.577	359	1.5	Horizontal	1 MHz	9.204

Table 5: Transmitting on the Middle Frequency 5210 MHz

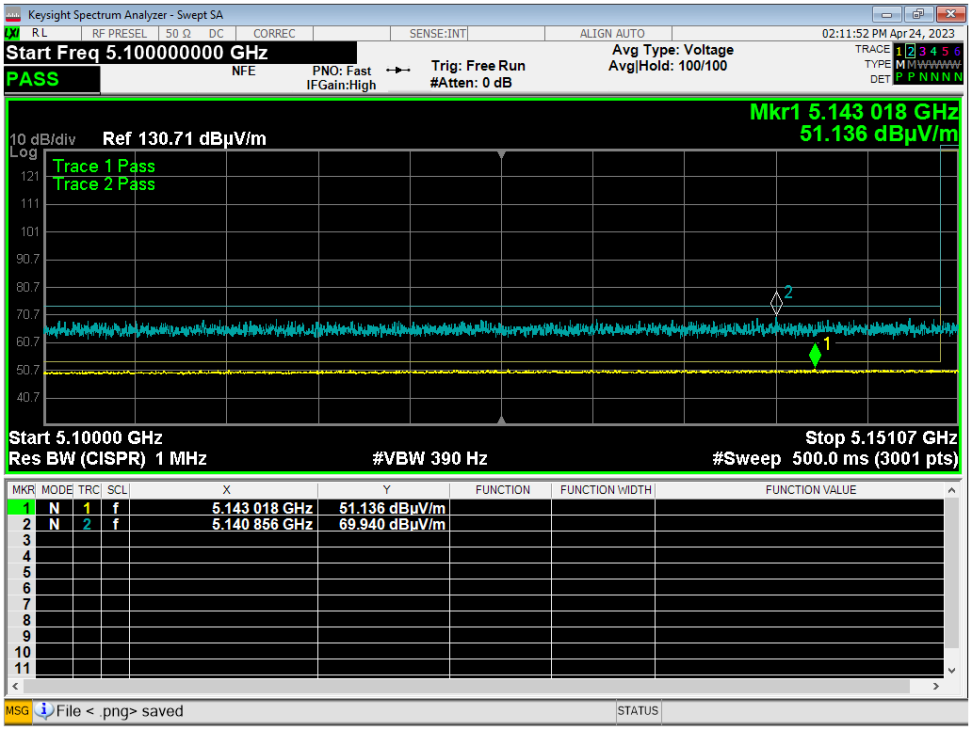
Frequency	Detector	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
124.74MHz	QP	42.32	44	-1.68	56	1.13	Vertical	120 kHz	-13.79
34.558 MHz	QP	37.08	40	-2.92	206	1.13	Vertical	120 kHz	-9.98
131.8 MHz	QP	40.52	44	-3.48	358	1.13	Vertical	120 kHz	-13.65
35.971 MHz	QP	36.48	40	-3.52	214	1.13	Vertical	120 kHz	-11.12
124.21 MHz	QP	39.66	44	-4.34	192	2.57	Horizontal	120 kHz	-13.79
31.954 MHz	QP	35.3	40	-4.7	161	1.13	Horizontal	120 kHz	-8.25
40.218 MHz	QP	34.36	40	-5.64	295	1.13	Vertical	120 kHz	-14.21
10.484 GHz	PK	55.141	74	-18.859	272	2.816	Vertical	1 MHz	1.705
12.619 GHz	PK	49.812	74	-24.188	320	2.325	Vertical	1 MHz	4.935
15.719 GHz	PK	60.945	74	-13.055	40	2.65	Vertical	1 MHz	4.751
16.808 GHz	PK	52.826	74	-21.174	53	3.656	Vertical	1 MHz	8.033
10.484 GHz	AV	42.295	54	-11.705	272	2.816	Vertical	1 MHz	1.705
12.619 GHz	AV	37.067	54	-16.933	320	2.325	Vertical	1 MHz	4.935
15.719 GHz	AV	47.978	54	-6.022	40	2.65	Vertical	1 MHz	4.751
16.808 GHz	AV	38.921	54	-15.079	53	3.656	Vertical	1 MHz	8.033
10.483 GHz	PK	55.358	74	-18.642	325	3.675	Horizontal	1 MHz	1.707
15.718 GHz	PK	59.611	74	-14.389	107	3.311	Horizontal	1 MHz	4.747
16.805 GHz	PK	52.108	74	-21.892	201	3.798	Horizontal	1 MHz	8.102
10.483 GHz	AV	41.131	54	-12.869	325	3.675	Horizontal	1 MHz	1.707
15.718 GHz	AV	46.163	54	-7.837	107	3.311	Horizontal	1 MHz	4.747
16.805 GHz	AV	38.974	54	-15.026	201	3.798	Horizontal	1 MHz	8.102
20.952 GHz	PK	59.151	74	-14.849	148	1.5	Vertical	1 MHz	-2.295
33.893 GHz	PK	53.09	74	-20.91	167	1.5	Vertical	1 MHz	5.474
37.329 GHz	PK	59.572	74	-14.428	277	1.5	Vertical	1 MHz	10.964
38.976 GHz	PK	59.069	74	-14.931	151	1.5	Vertical	1 MHz	9.345
20.952 GHz	AV	42.789	54	-11.211	148	1.5	Vertical	1 MHz	-2.295
33.893 GHz	AV	37.735	54	-16.265	167	1.5	Vertical	1 MHz	5.474
37.329 GHz	AV	42.524	54	-11.476	277	1.5	Vertical	1 MHz	10.964
38.976 GHz	AV	40.838	54	-13.162	151	1.5	Vertical	1 MHz	9.345
20.938 GHz	PK	53.436	74	-20.564	191	1.5	Horizontal	1 MHz	-2.259
20.952 GHz	PK	62.18	74	-11.82	57	1.5	Horizontal	1 MHz	-2.295
37.418 GHz	PK	60.327	74	-13.673	312	1.5	Horizontal	1 MHz	11.3
38.951 GHz	PK	58.061	74	-15.939	180	1.5	Horizontal	1 MHz	9.496
20.938 GHz	AV	35.995	54	-18.005	191	1.5	Horizontal	1 MHz	-2.259
20.952 GHz	AV	46.254	54	-7.746	57	1.5	Horizontal	1 MHz	-2.295
37.418 GHz	AV	40.943	54	-13.057	312	1.5	Horizontal	1 MHz	11.3
38.951 GHz	AV	39.436	54	-14.564	180	1.5	Horizontal	1 MHz	9.496

Table 6: Transmitting on the Highest Frequency 5240 MHz

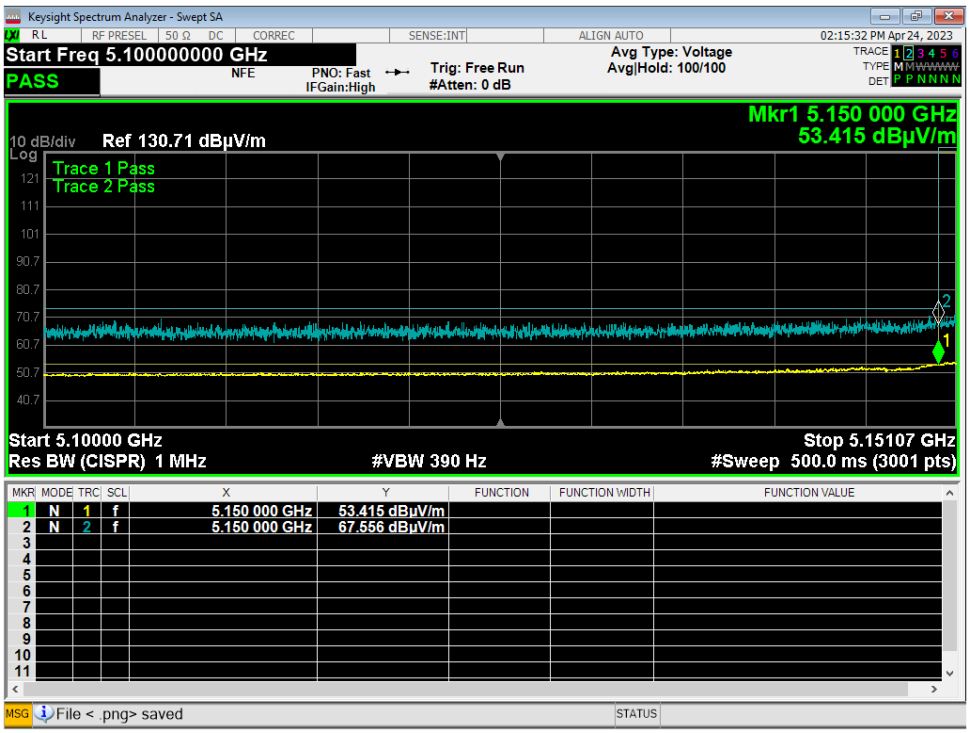
Result

All emissions in the restricted bands of § 15.205 met the limits specified in § 15.209; therefore, the EUT complies with the specification. All emissions me the limits specified in § 15.407(b).

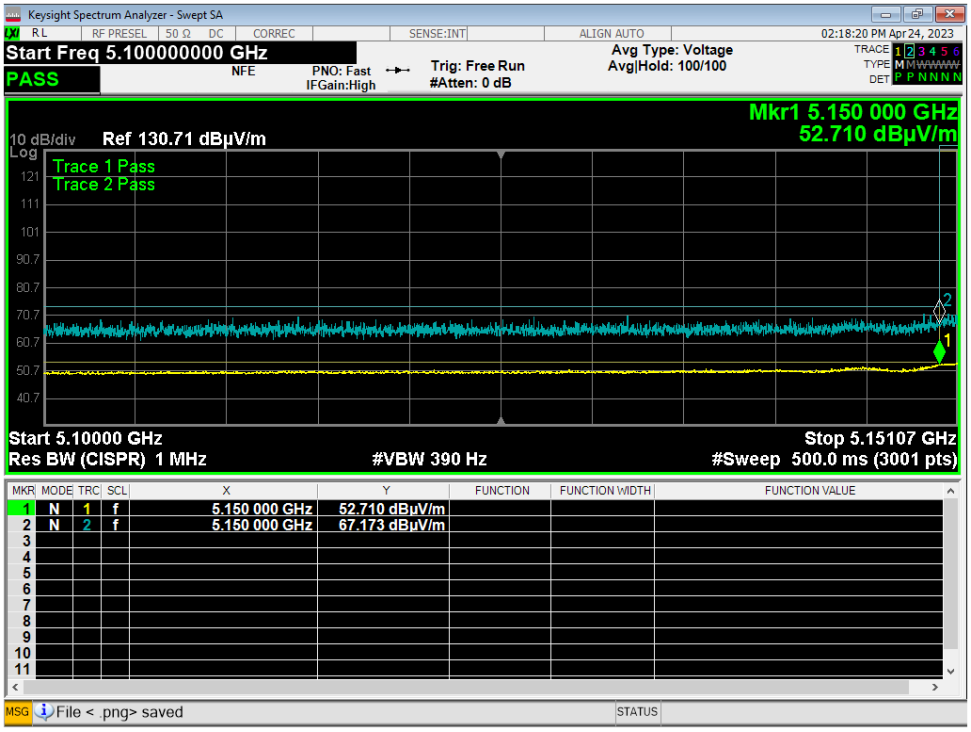
5.5.2 Band Edge



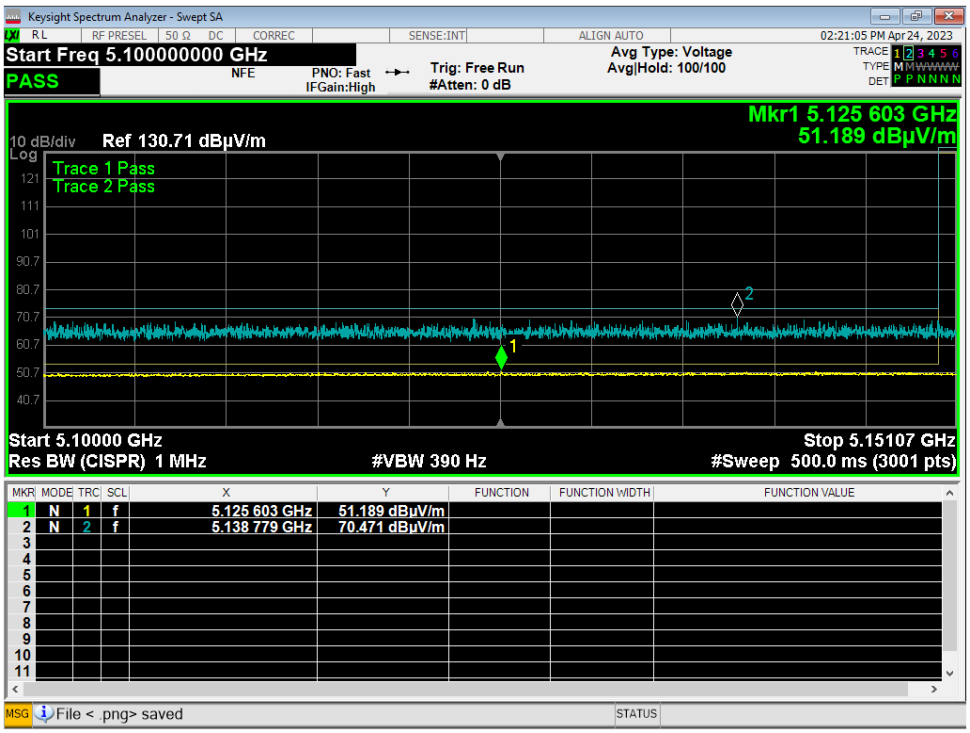
OFDM 20MHz 5180MHz



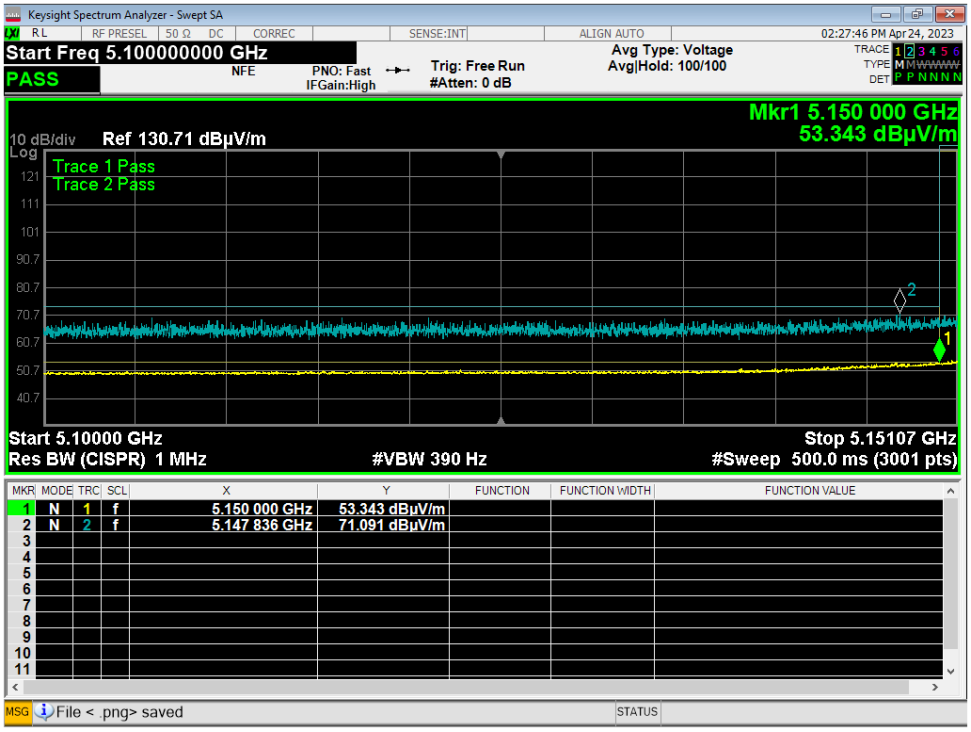
OFDM 20MHz 5200MHz



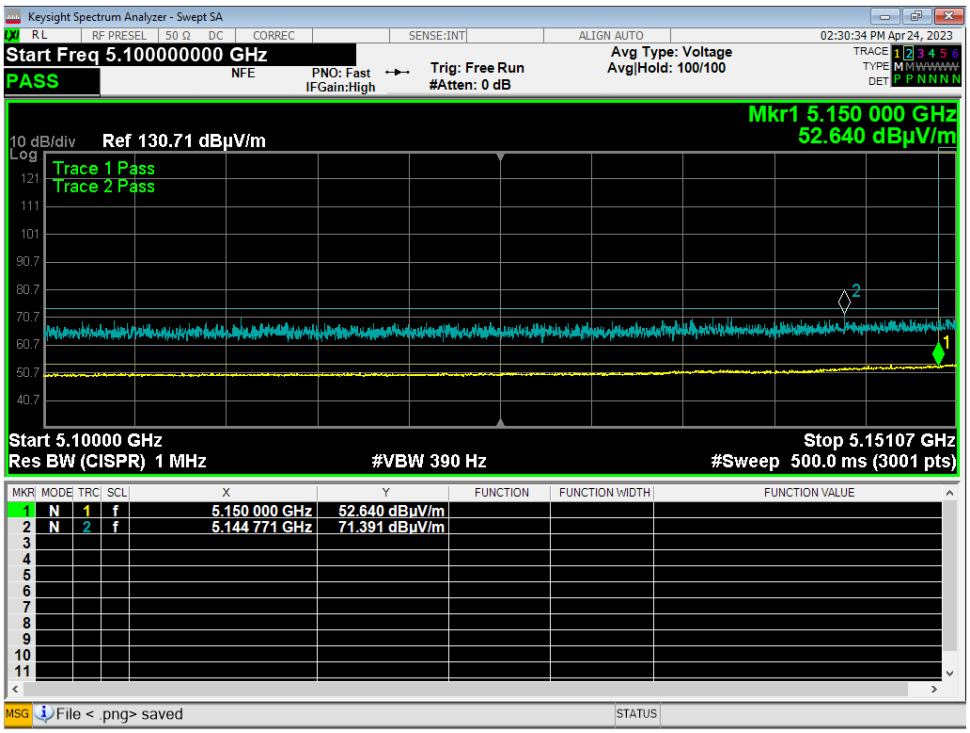
OFDM 20MHz 5210MHz



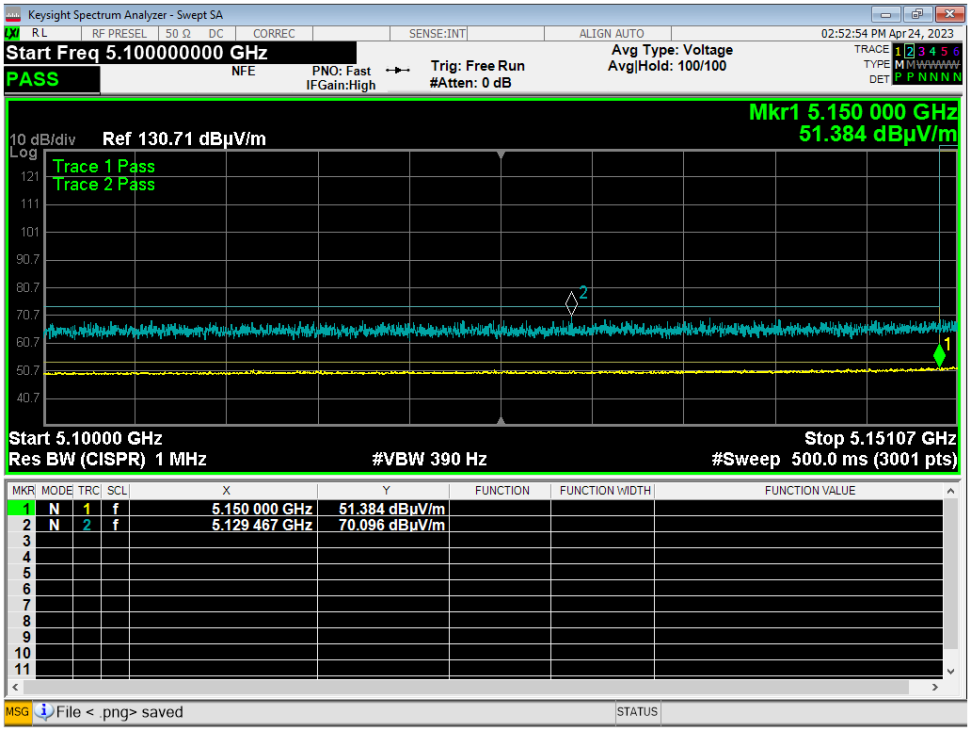
OFDM 20MHz 5240MHz



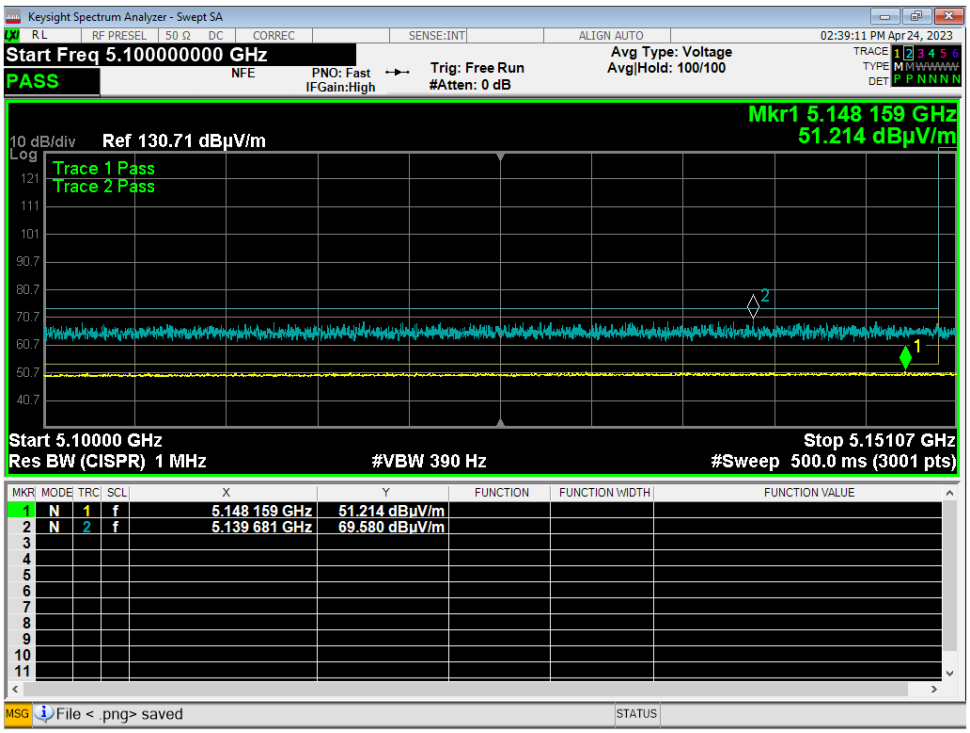
HT 20MHz 5180MHz



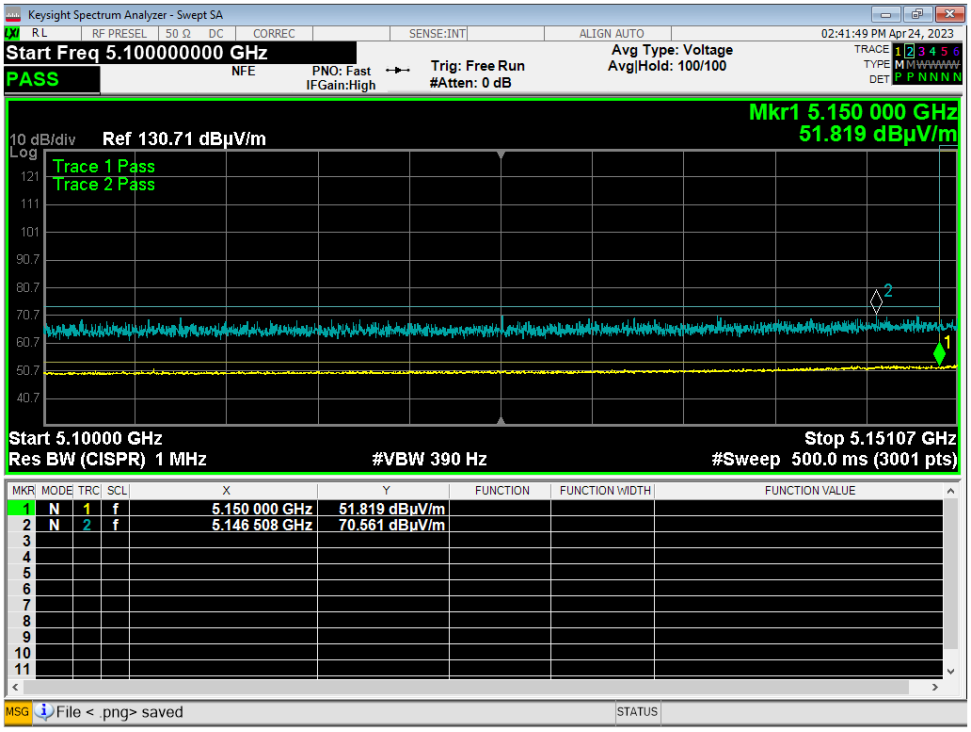
HT 20MHz 5200MHz



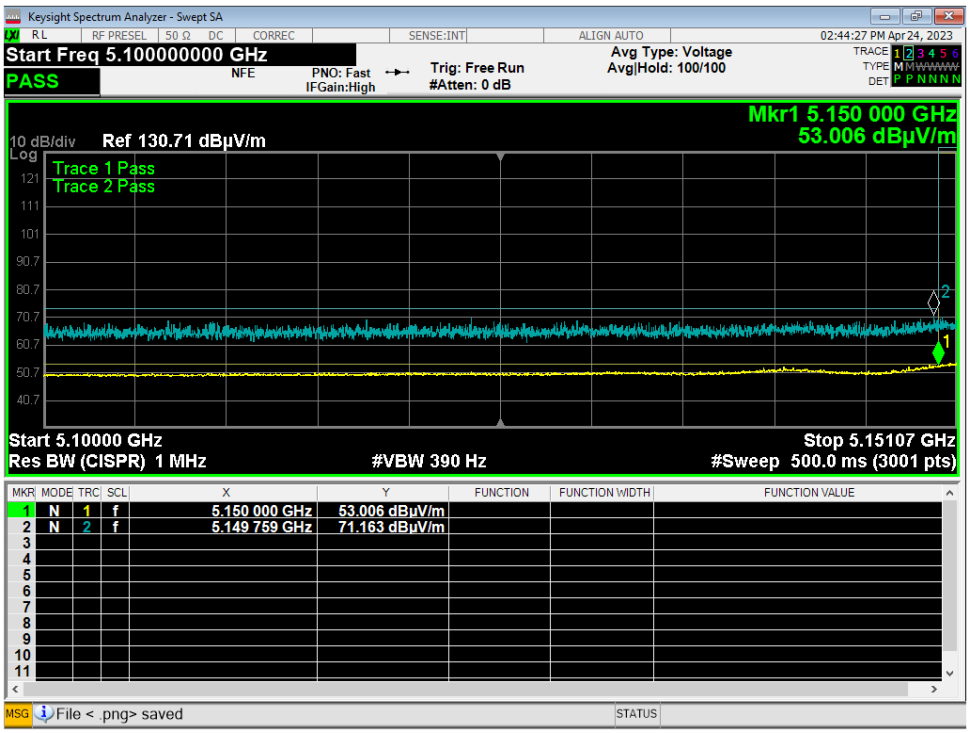
HT 20MHz 5210MHz



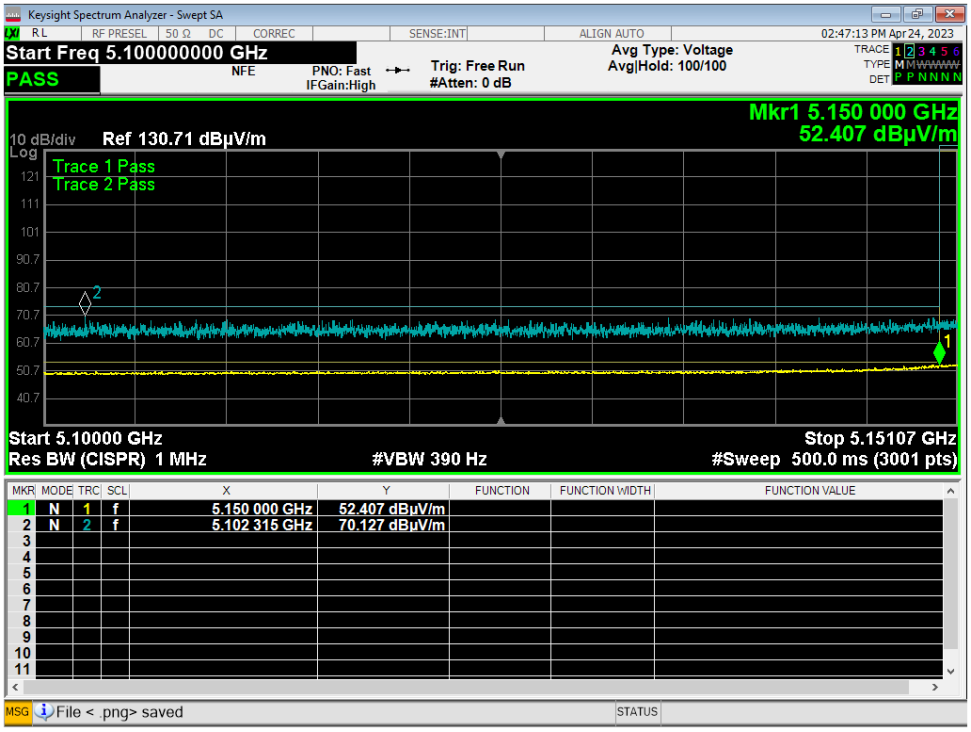
HT 20MHz 5240MHz



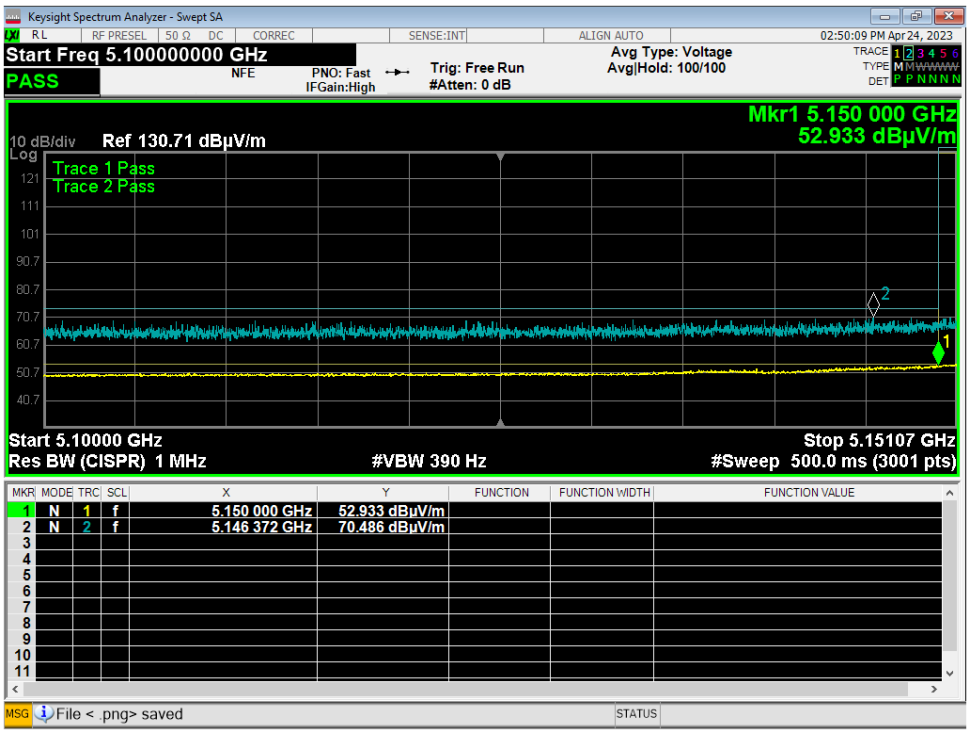
HT 40MHz 5190MHz



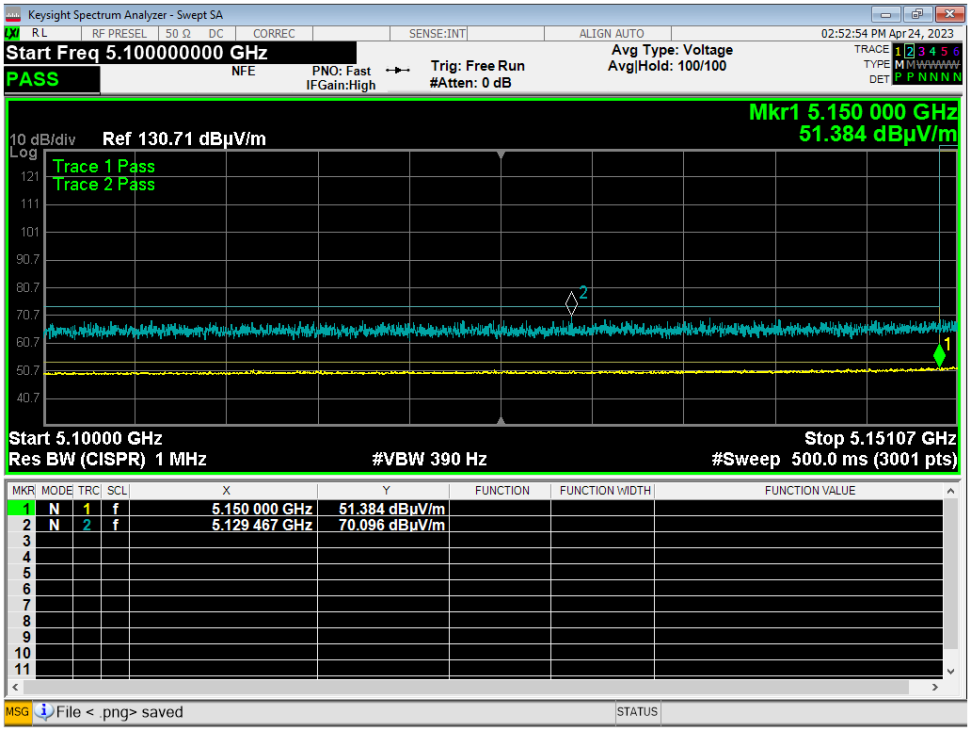
HT 40MHz 5230MHz



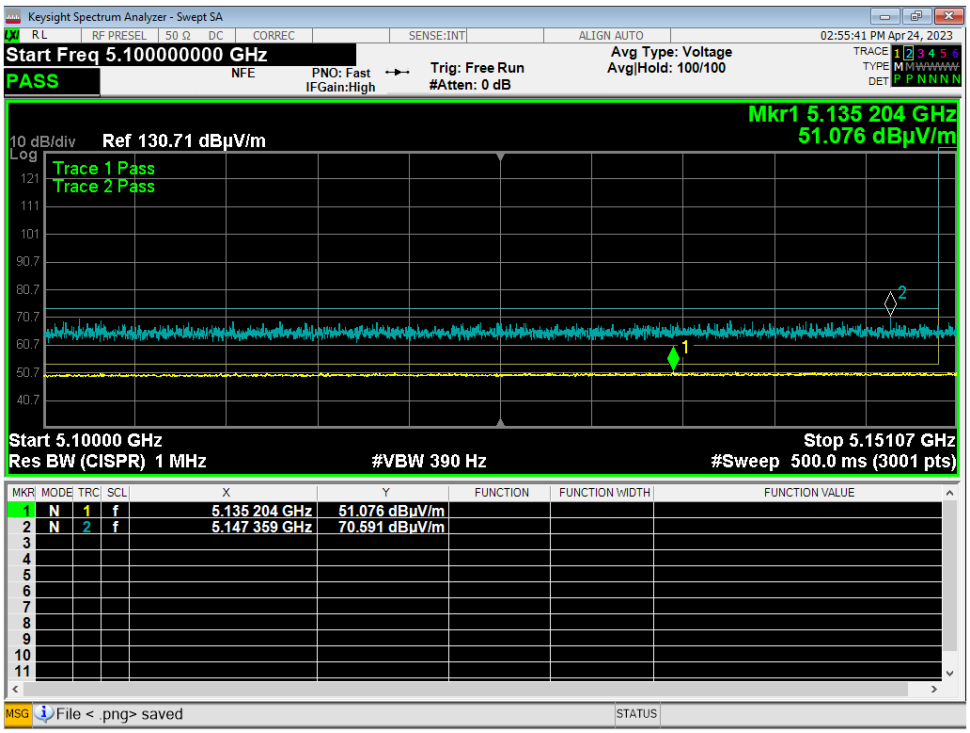
VHT 20MHz 5180MHz



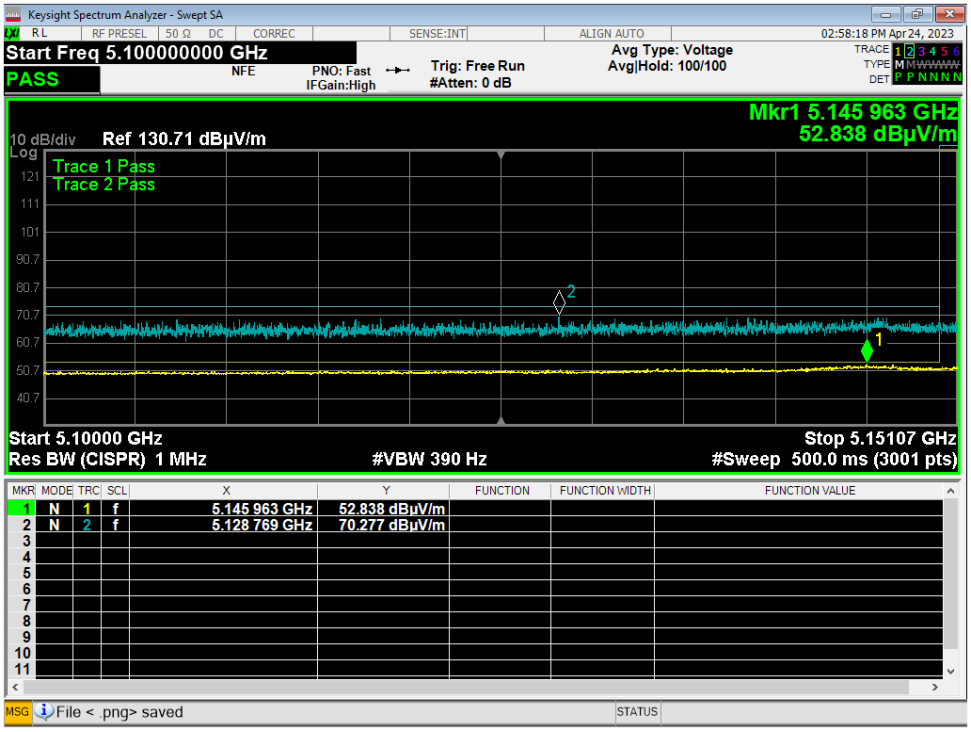
VHT 20MHz 5200MHz



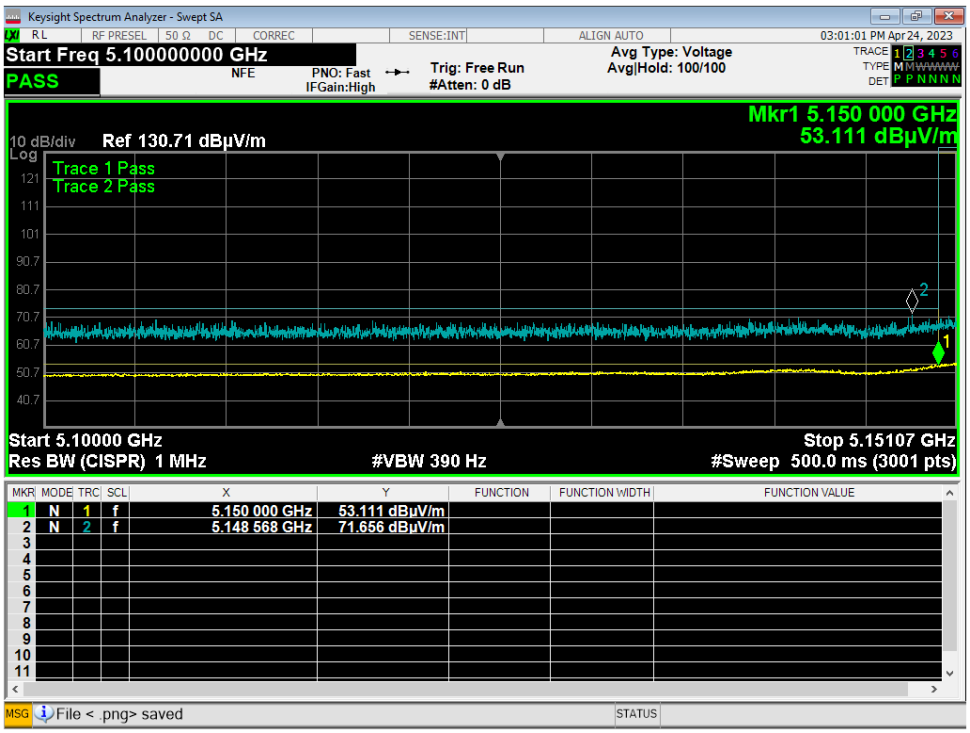
VHT 20MHz 5210MHz



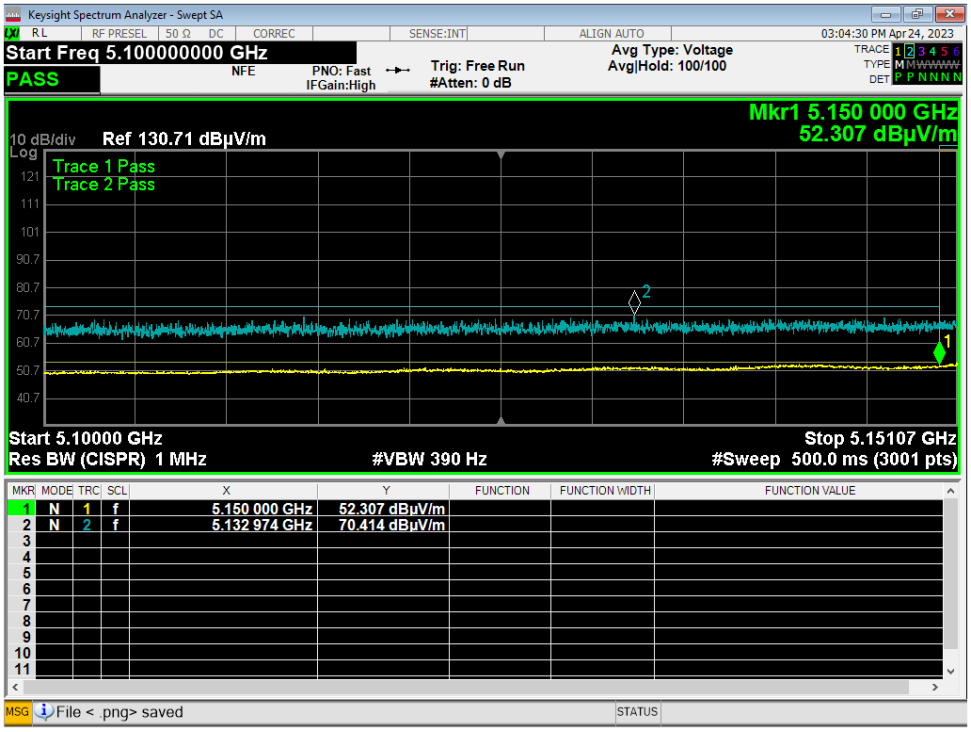
VHT 20MHz 5240MHz



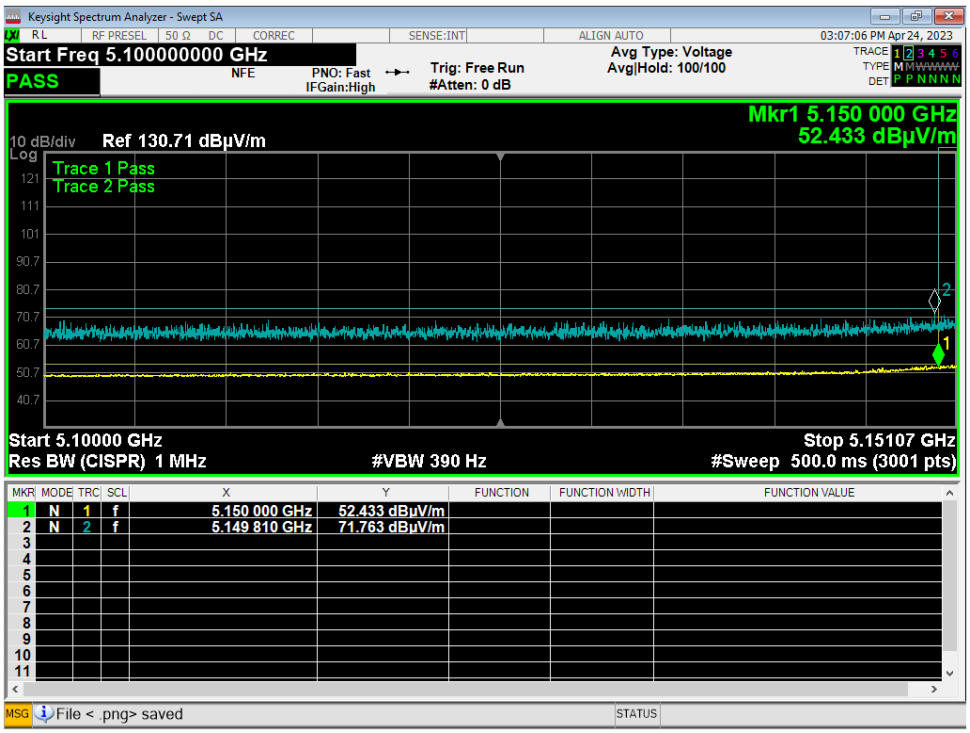
VHT 40MHz 5190MHz



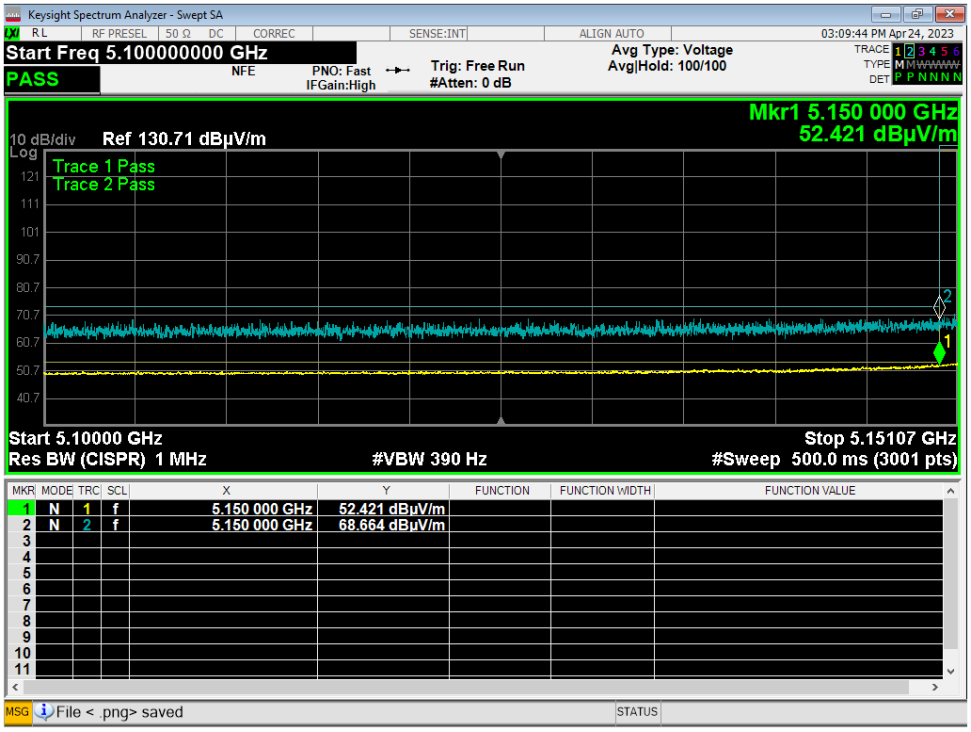
VHT 40MHz 5230MHz



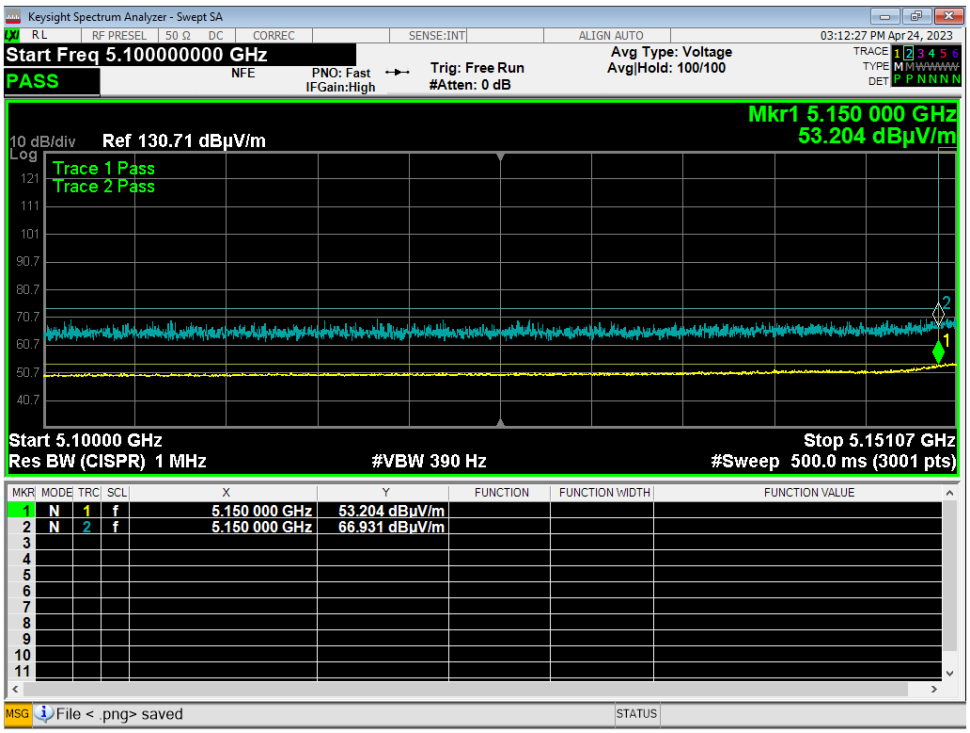
VHT 80MHz 5210MHz



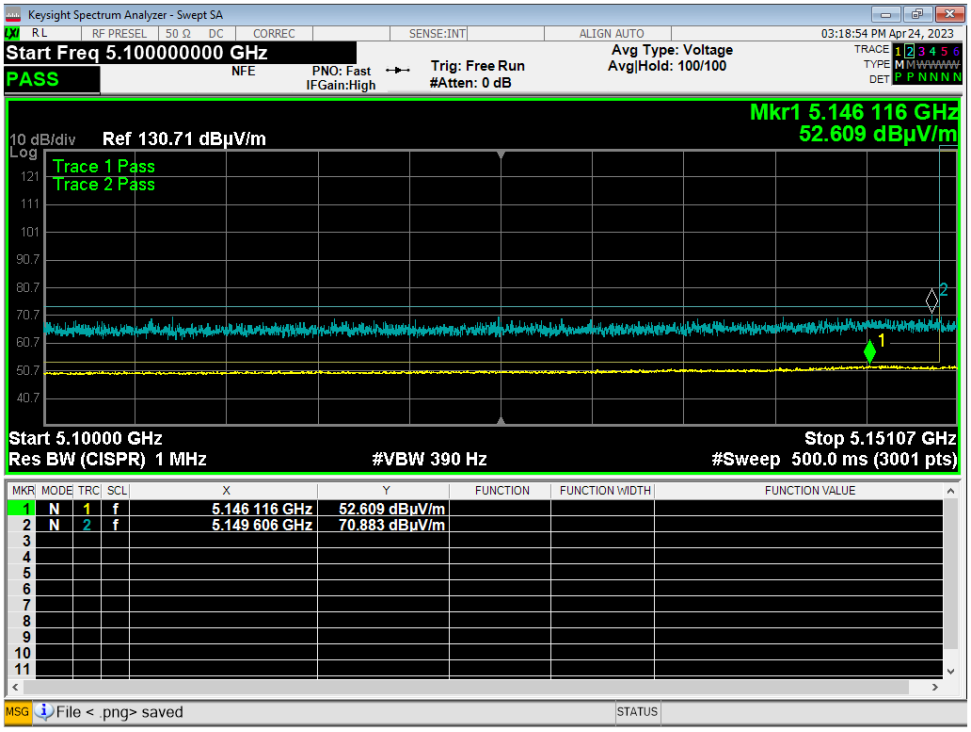
He 20MHz 5180MHz



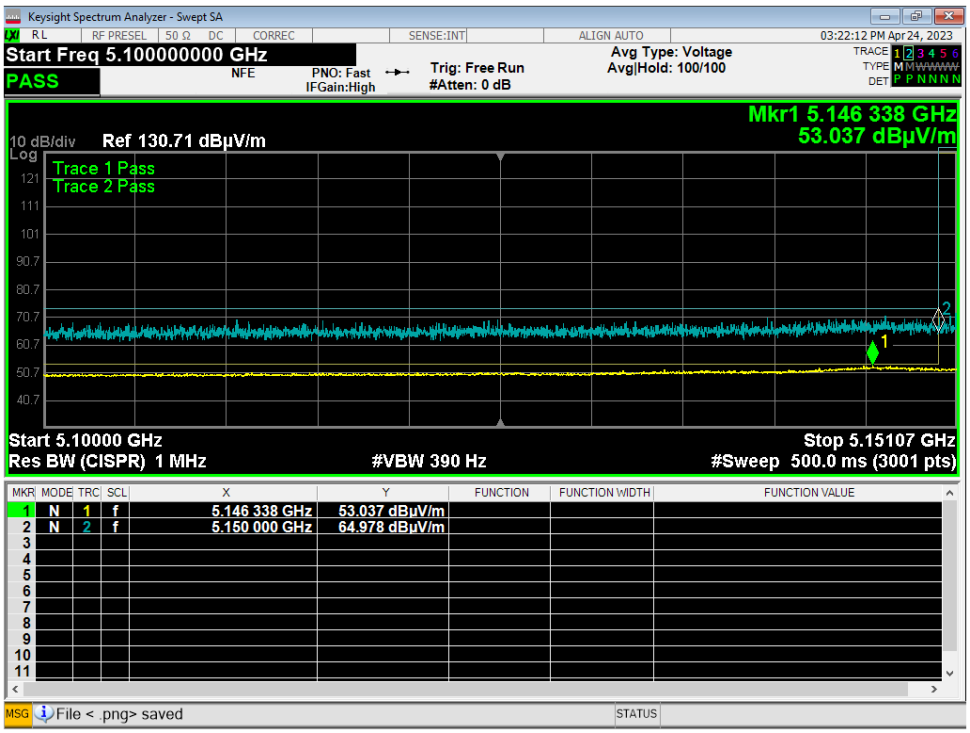
HE 20MHz 5200MHz



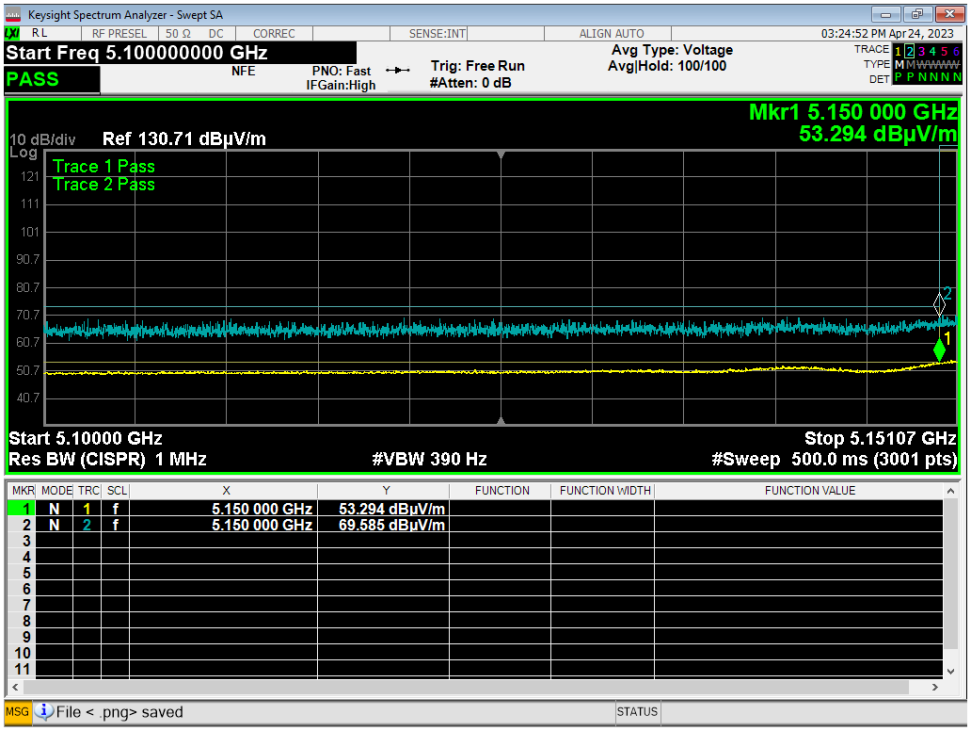
HE 20MHz 5210MHz



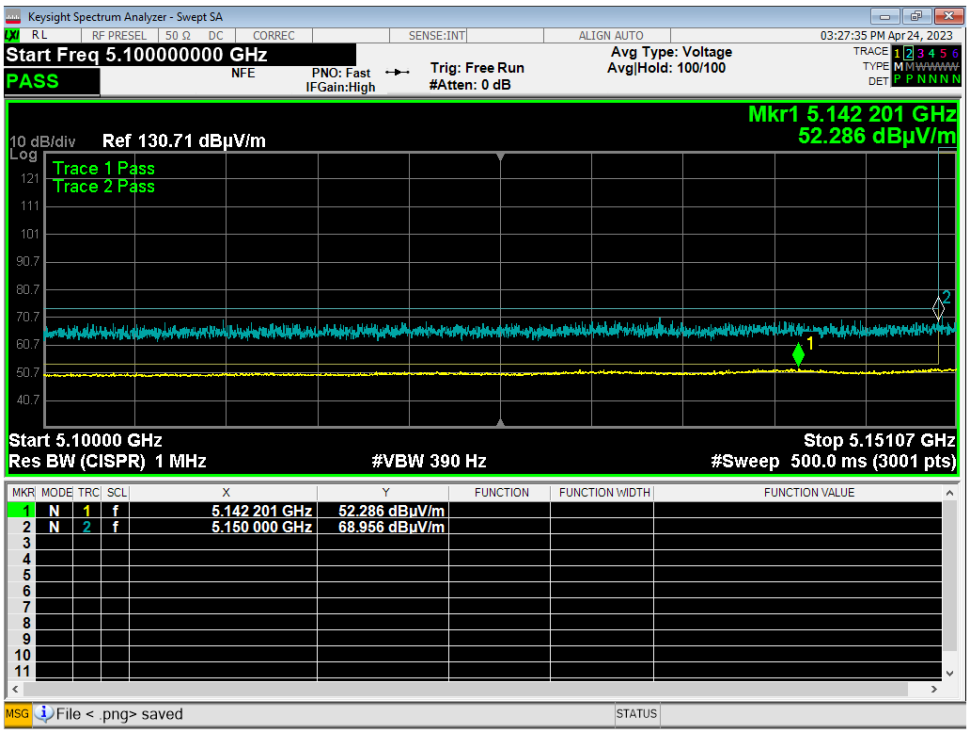
HE 20MHz 5240MHz



HE 40MHz 5190MHz



HE 40MHz 5230MHz



HE 80MHz 5210MHz

5.6 §15.407(a) Maximum Power Spectral Density

All chains were measured and summed under the guidance of KDB 789033 Section II. F. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 17 dBm in any 1 MHz band during any time interval of continuous transmission. However as per KDB 662911, when the EUT uses Nss=1 data rates, the antenna gain is 4.5 dBi + Array gain of 3.01 dB which is a total of 7.51 dBi. Therefore, the limit was adjusted as follows: PSD Limit = 17 – (7.51 – 6) = 15.49.
Results of this testing are summarized.

5.6.1 FCC / US

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Measured PSD
OFDM 20	5180	Mcs0	38	9.87
OFDM 20	5210	Mcs0	48	14.92
OFDM 20	5240	Mcs0	49	14.88
HT 20	5180	Mcs0	42	11.21
HT 20	5210	Mcs0	49	14.77
HT 20	5240	Mcs0	49	14.39
HT 40	5190	Mcs0	38	6.63
HT 40	5230	Mcs0	43	9.21
VHT 20	5180	Mcs0	41	10.64
VHT 20	5210	Mcs0	47	13.98
VHT 20	5240	Mcs0	49	14.35
VHT 40	5190	Mcs0	38	6.58
VHT 40	5230	Mcs0	43	9.13
VHT 80	5210	Mcs0	38	3.80
HE 20	5180	Mcs0	40	10.04
HE 20	5210	Mcs0	47	13.70
HE 20	5240	Mcs0	49	14.06
HE 40	5190	Mcs0	38	6.20
HE 40	5230	Mcs0	43	9.39
HE 80	5210	Mcs0	36	2.71

5.6.2 Canada / ICES

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Measured PSD
OFDM 20	5180	Mcs0	32	6.84
OFDM 20	5210	Mcs0	33	7.03
OFDM 20	5240	Mcs0	33	6.76
HT 20	5180	Mcs0	33	6.43
HT 20	5210	Mcs0	34	6.80
HT 20	5240	Mcs0	34	6.43
HT 40	5190	Mcs0	32	3.56
HT 40	5230	Mcs0	33	4.06
VHT 20	5180	Mcs0	34	6.87
VHT 20	5210	Mcs0	34	6.76
VHT 20	5240	Mcs0	34	6.43
VHT 40	5190	Mcs0	32	3.52
VHT 40	5230	Mcs0	32	3.33
VHT 80	5210	Mcs0	33	1.40
HE 20	5180	Mcs0	33	6.36
HE 20	5210	Mcs0	33	6.24
HE 20	5240	Mcs0	34	6.41
HE 40	5190	Mcs0	33	3.78
HE 40	5230	Mcs0	33	3.89

Result

The maximum summed average power spectral density was less than the limit of 15.49dBm; therefore, the EUT complies with the specification.

-- End of Test Report --