



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-WAVEAPG2
Equipment Under Test	Wave-AP-Gen2
Test Report Serial Number	TR9931_01
Date of Test(s)	11, 14, 18 February; 4, 26 - 27, 31 March; 1 April 2025
Report Issue Date	16 April 2025

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



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 with the specifications provided by the manufacturer.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	Wave-AP-Gen2
FCC ID	SWX-WAVEAPG2

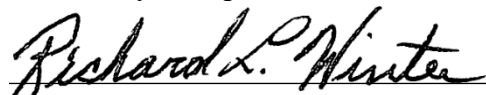
On this 16th day of April 2025, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge and are made in good faith. Unified Compliance laboratory is not responsible for incorrect information provided by the manufacturer.

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: Joseph W. Jackson



Reviewed By: Richard L. Winter

Revision History		
Revision	Description	Date
01	Original Report Release	16 April 2025

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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	Wave-AP-Gen2
Serial Number	2FD400
Dimensions (cm)	15.8 x 28.7 x 10.0

2.2 Description of EUT

The Wave-AP-Gen2 is a fixed point to multiple-point transceiver, intended for outdoor use, operating in the 57 GHz to 71 GHz range. The Wave-AP-Gen2 has a 5150 GHz to 5850 GHz transceiver operating in the UNII-1, UNII-2 and UNII-3 bands. A Bluetooth LE transceiver is included for set-up and device management. An Ethernet port is used for transfer and to provide power using an Ubiquiti UPOE-at power supply.

For CDD transmissions, directional gain is calculated as follows.

Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB

NANT = number of transmit antennas and

NSS = number of spatial streams. NSS = 1 considered worst case.

For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for $\text{NANT} \leq 4$;

For PSD measurements when $\text{Nss}=1$: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB + Antenna Gain (dBi).

Or 3.01 dB + 13 dBi = 16.01 dBi for the internal antenna.

Or 3.01 dB + 20 dBi = 23.01 dBi for the external antenna.

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.

Band	WiFi Mode	Modulation Bandwidth	Modulation Type	Frequency (MHz)
UNII-1	ax	20 MHz	HE	5165, 5175, 5185, 5200, 5210, 5220, 5230, 5240
	ax	40 MHz	HE	5175, 5185, 5200, 5215, 5230
	ax	80 MHz	HE	5195, 5200, 5205, 5210

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: airFiber MN: Wave-AP-Gen2 (Note 1) SN: 2FD400	Wireless Access Point	See Section 2.4
BN: Ubiquiti MN: U-POE-at SN: N/A	PoE Power Adapter	Shielded or Un-shielded cat 5e cable
BN: Dell MN: XPS 13 SN: N/A	Laptop Computer	Shielded or Un-shielded cat 5e cable

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
AC (PoE Injector)	1	3 conductor power cord/80cm
LAN (PoE Injector)	1	Shielded or Un-shielded cat 5e cable/1 meter
Data	1	Shielded or Un-shielded cat 5e cable/1 meter

2.5 Operating Environment

Power Supply	120 Volts AC Mains to 48 Volts PoE
AC Mains Frequency	60 Hz
Temperature	21.5 - 23.8 °C
Humidity	22.4 - 29.1 %
Barometric Pressure	1009 mBar

2.6 Operating Modes

The Wave-AP-Gen2 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 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

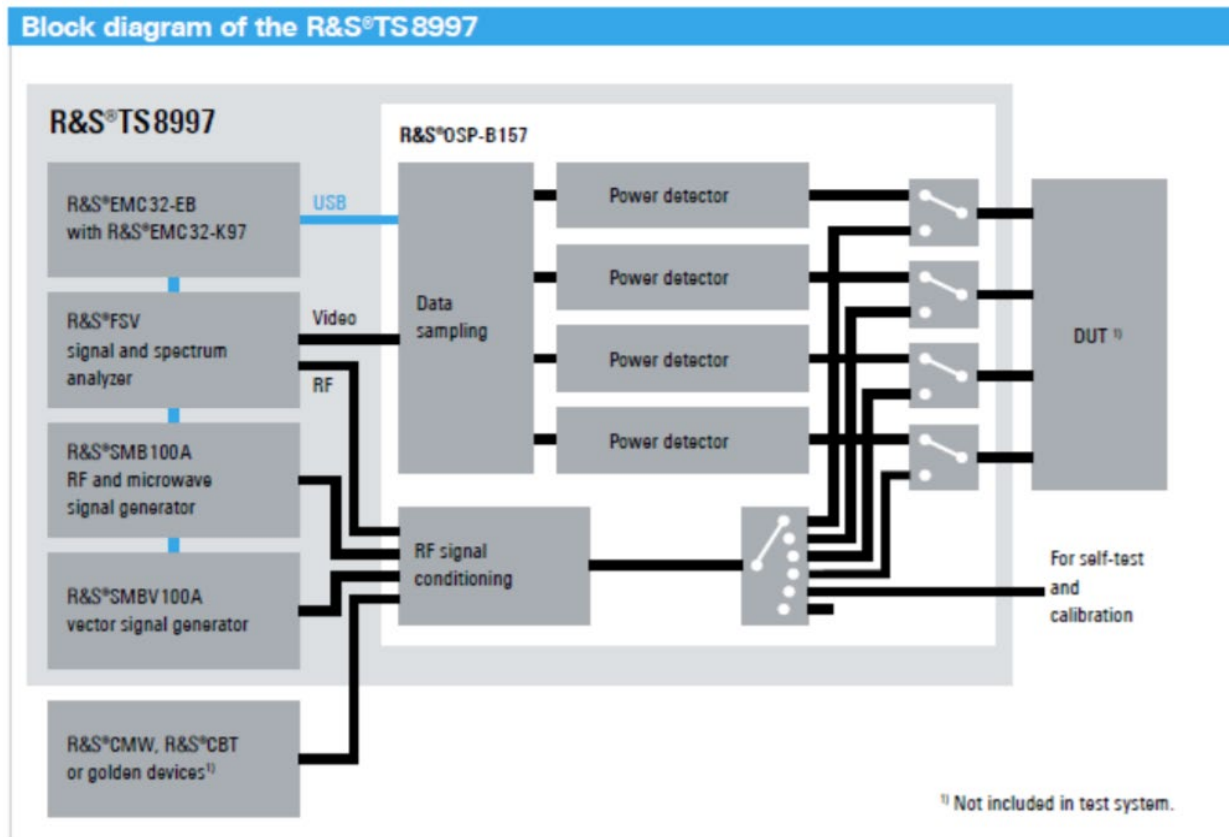


Diagram 1: Test Configuration Block Diagram

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	Environmental Phenomena	Frequency Range (MHZ)	Result
15.203	Antenna requirements	Structural Requirement	Compliant
15.207	Conducted Disturbance at Mains Port	0.15 to 30	Compliant
15.407(a)	Bandwidth Requirement	5180 to 5210	Compliant
15.407(a)	Peak Output Power	5180 to 5210	Compliant
15.407(b)	Antenna Conducted Spurious Emissions	0.009 to 40000	N/A Note ¹
15.209	Radiated Spurious Emissions	0.009 to 40000	Compliant
15.407(a)	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. Note ¹ : Radiated Spurious was performed per 15.209 with the antenna unterminated.			

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 3-Meter and 10-Meter chambers 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 2025. 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 2025.

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	8/27/2024	8/27/2025
LISN	AFJ	LS16C/10	UCL-2512	7/08/2024	7/08/2025
ISN	Teseq	ISN T800	UCL-2974	7/09/2024	7/09/2025
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Test Software	AFJ	AFJ FFT3010	UCL-3107	N/A	N/A

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

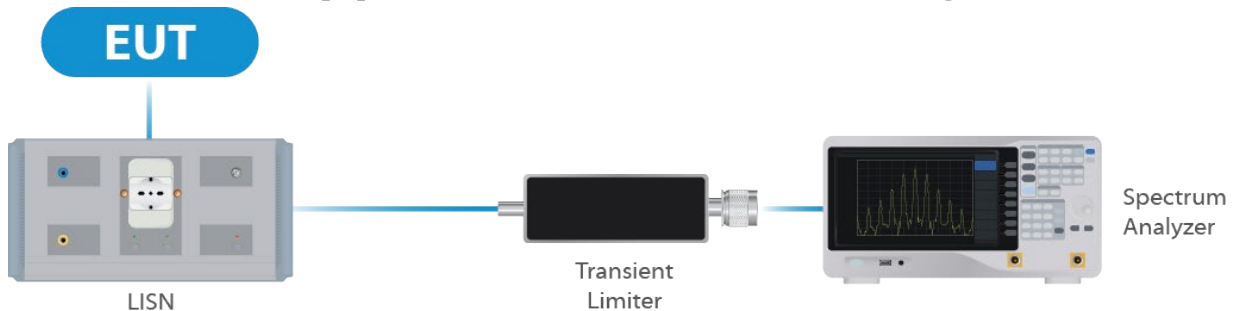


Figure 1: Conducted Emissions Test

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	1/16/2025	1/16/2026
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	4/12/2024	4/19/2025
Switch Extension	R&S	OSP-150W	UCL-2870	4/12/2024	4/19/2025
Test Software	R&S	EMC32	UCL-9442	-	-

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

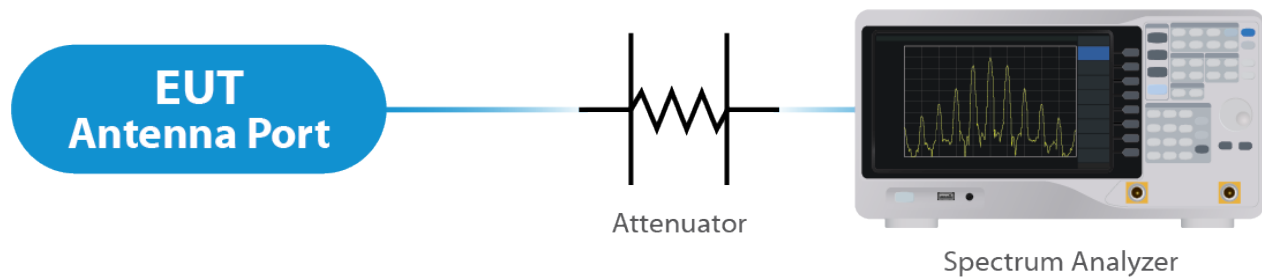


Figure 2: Direct Connect at the Antenna Port Test

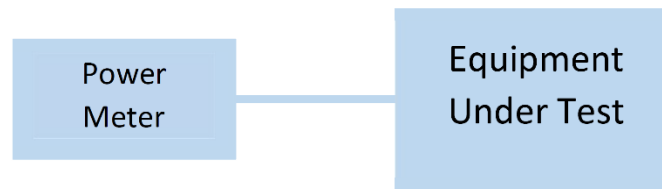


Figure 3: Output Power Measurement

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	12/27/2024	12/27/2025
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	1/19/2024	1/19/2026
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	2/22/2023	3/22/2025
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	3/10/2023	3/10/2025
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	2/11/2025	2/4/2027
10 - 40 GHz Horn Antenna	ETS-Lindgren	3116C	UCL-7209	6/6/2024	6/6/2026
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	7/2/2024	7/2/2025
Test Software	Nexio	BatEMC	UCL-5253 & UCL- 5249	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

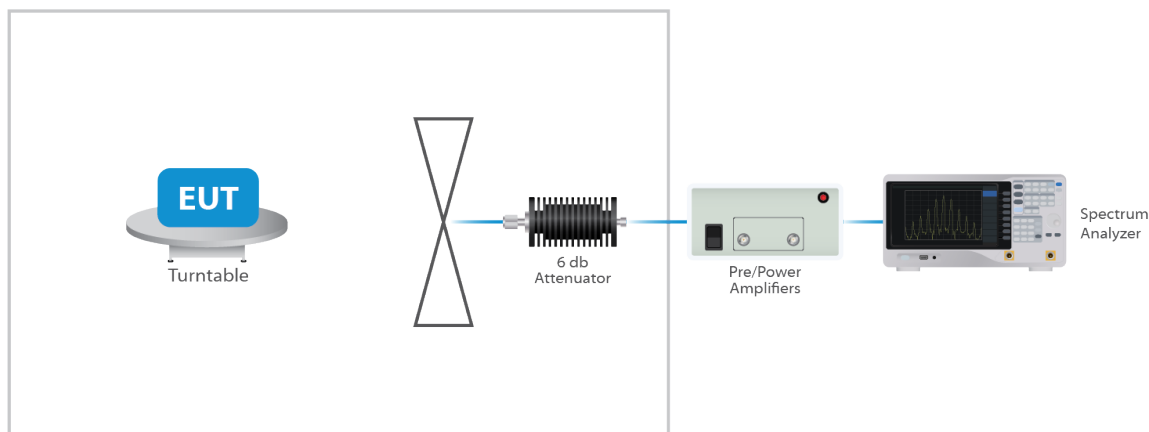


Figure 4: Radiated Emissions Test

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 ($\pm$ 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 a integral internal antenna and a Omni external antenna. Per the manufacturer, the Maximum gain of the internal antenna per chain is 13 dBi. Per the manufacturer, the Maximum gain of the external antenna per change is 20 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The internal antenna is not user replaceable. The external antenna is user replaceable.

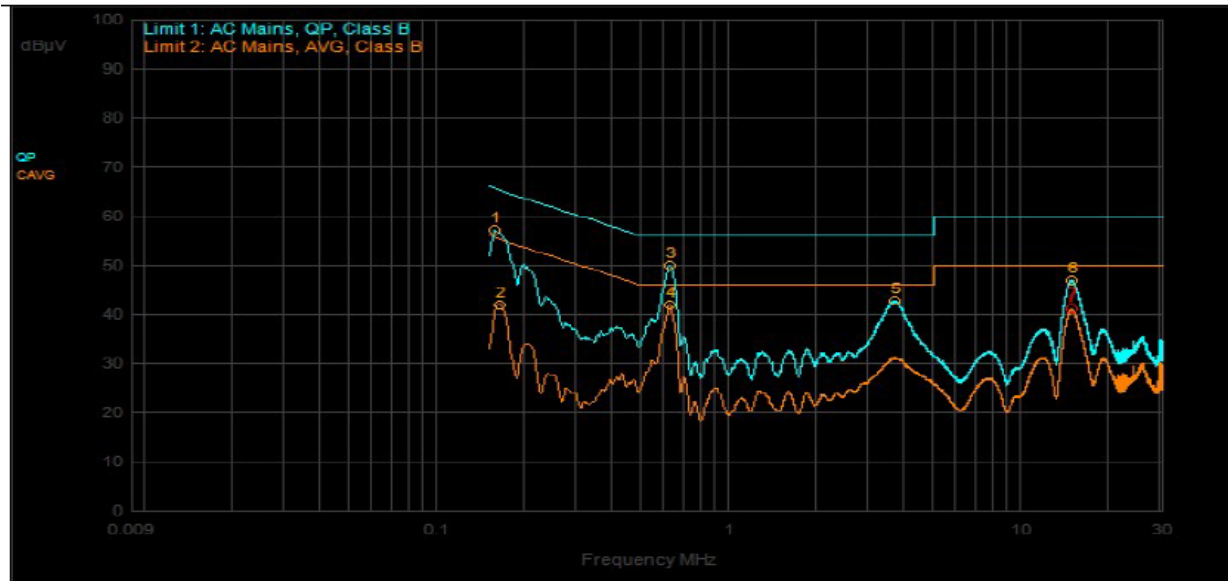
See Section 2.2 for directional gain calculation.

Results

The EUT complied with the specification

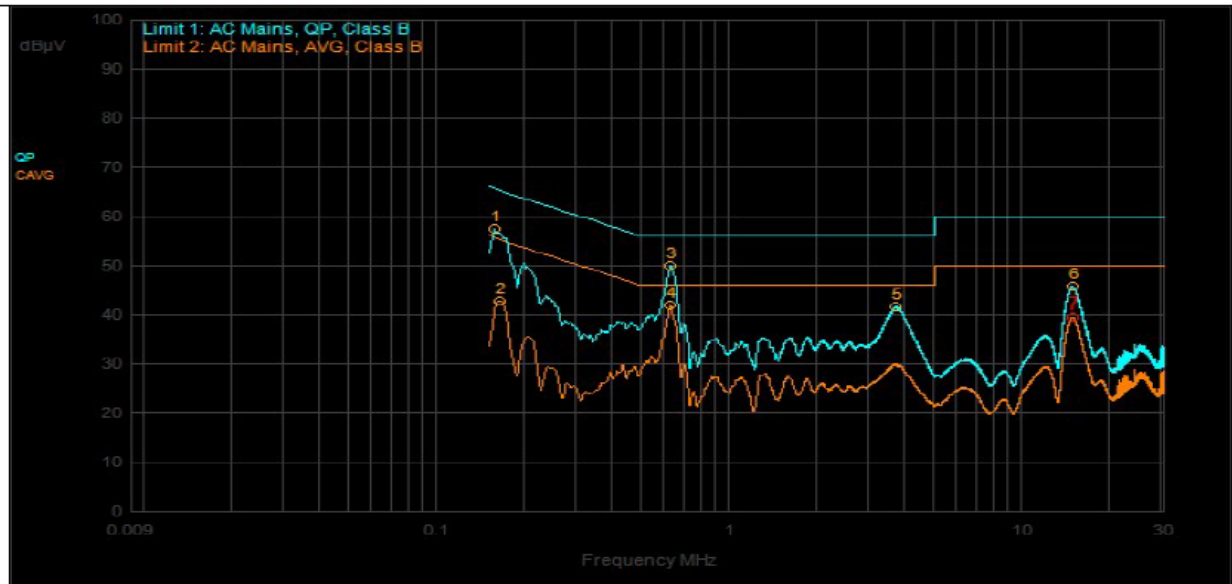
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBµV	dBµV	dBµV	dB	dBµV	dB	P/F
3	618,000kHz	12.37	0.00		QPeak	37.60	49.97	56.00	-6.03			
1	156,000kHz	12.40	0.00		QPeak	44.91	57.31	65.67	-8.36			
6	14.589	12.50	0.08		QPeak	34.36	46.94	60.00	-13.06			
5	3.630	11.97	0.00		QPeak	30.82	42.79	56.00	-13.21			
2	162,000kHz	12.39	0.00		C_AVG	29.57	41.96			55.36	-13.40	
4	618,000kHz	12.37	0.00		C_AVG	29.57	41.94			46.00	-4.06	
7	14.643	12.50	0.08		C_AVG	28.42	41.00			50.00	-9.00	

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBμV	dBμV	dBμV	dB	dBμV	dB	P/F
3	621,000kHz	12.37	0.00		QPeak	37.52	49.89	56.00	-6.11			
1	156,000kHz	12.38	0.00		QPeak	45.05	57.43	65.67	-8.24			
6	14.613	12.46	0.08		QPeak	33.27	45.81	60.00	-14.19			
5	3.660	11.92	0.00		QPeak	29.64	41.56	56.00	-14.44			
2	162,000kHz	12.38	0.00		C_AVG	30.51	42.89			55.36	-12.47	
4	621,000kHz	12.37	0.00		C_AVG	29.45	41.82			46.00	-4.18	
7	14.580	12.45	0.08		C_AVG	26.89	39.42			50.00	-10.58	

Result

The EUT complied with the specification limit.

5.3 §15.407(a) 26 dB Emissions Bandwidth

All chains were measured under the guidance of KDB 789033 Section II.C. and KDB 662911 D01.
Please see associated annex for details on instrument settings.

5.3.1 Internal Antenna

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
HE 20	5165	19.3	22.3
HE 20	5200	19.3	22.3
HE 20	5240	19.3	22.3
HE 40	5175	38.0	42.0
HE 40	5200	38.0	42.0
HE 40	5230	38.5	42.5
HE 80	5195	79.0	85.0
HE 80	5200	78.0	84.0
HE 80	5210	78.0	85.0

5.3.2 External Antenna

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
HE 20	5165	19.2	21.8
HE 20	5200	19.2	21.5
HE 20	5240	19.2	22.2
HE 40	5175	38.0	40.8
HE 40	5200	37.8	40.5
HE 40	5230	37.8	40.3
HE 80	5195	77.5	82.5
HE 80	5200	77.5	82.5

HE 80	5210	77.5	82.0
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Result

All chains were tested and the highest bandwidth per chain is reported above. Please see Annex for all bandwidth measurements.

5.4 §15.407(a) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 662911 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 22.72 dBm or 187.07 mW. The limit is 30 dBm, or 1 Watt when using an antenna with 23 dBi (Fixed point to point) or 6 dBi (indoor/outdoor access point) or less gain. The Wave-AP-Gen2 is a point-to-multi-point.

The internal antenna has a gain of 13 dBi while the external antenna has a gain of 20 dBi.

See Section 2.2 for directional gain calculation.

5.4.1 Internal Antenna

Nss>1

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	10.94	13	23.94	36	-12.06
HE 20	5200	Mcs0_Nss2	40	22.05	13	35.05	36	-0.95
HE 20	5240	Mcs0_Nss2	40	22.67	13	35.67	36	-0.33
HE 40	5175	Mcs0_Nss2	17	10.83	13	23.83	36	-12.17
HE 40	5200	Mcs0_Nss2	35	20.14	13	33.14	36	-2.86
HE 40	5230	Mcs0_Nss2	40	22.72	13	35.72	36	-0.28
HE 80	5195	Mcs0_Nss2	18	11.64	13	24.64	36	-11.36
HE 80	5200	Mcs0_Nss2	23	14.21	13	27.21	36	-8.79
HE 80	5210	Mcs0_Nss2	25	14.99	13	27.99	36	-8.01

Nss=1

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss1	17	10.94	13	23.94	36	-12.06
HE 20	5200	Mcs0_Nss1	40	22.05	13	35.05	36	-0.95
HE 20	5240	Mcs0_Nss1	40	22.67	13	35.67	36	-0.33
HE 40	5175	Mcs0_Nss1	17	10.83	13	23.83	36	-12.17
HE 40	5200	Mcs0_Nss1	35	20.14	13	33.14	36	-2.86

HE 40	5230	Mcs0_Nss1	40	22.72	13	35.72	36	-0.28
HE 80	5195	Mcs0_Nss1	18	11.64	13	24.64	36	-11.36
HE 80	5200	Mcs0_Nss1	23	14.21	13	27.21	36	-8.79
HE 80	5210	Mcs0_Nss1	25	14.99	13	27.99	36	-8.01

Outdoor 30+ Degree Elevation Angle Antenna Gain

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	10.37	1	11.37	21	-9.63
HE 20	5200	Mcs0_Nss2	35	19.58	1	20.58	21	-0.42
HE 20	5240	Mcs0_Nss2	34	19.68	1	20.68	21	-0.32
HE 40	5175	Mcs0_Nss2	17	10.41	1	11.41	21	-9.59
HE 40	5200	Mcs0_Nss2	35	19.72	1	20.72	21	-0.28
HE 40	5230	Mcs0_Nss2	40	19.69	1	20.69	21	0.31
HE 80	5195	Mcs0_Nss2	18	11.26	1	12.26	21	-8.74
HE 80	5200	Mcs0_Nss2	23	13.81	1	14.81	21	-6.19
HE 80	5210	Mcs0_Nss2	25	14.69	1	15.69	21	-5.31

5.4.2 Internal Antenna

Nss>1

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	10.53	20	30.53	36	-5.47
HE 20	5200	Mcs0_Nss2	30	15.70	20	35.70	36	-0.30
HE 20	5240	Mcs0_Nss2	35	15.93	20	35.93	36	-0.07
HE 40	5175	Mcs0_Nss2	18	11.09	20	31.09	36	-4.91
HE 40	5200	Mcs0_Nss2	27	15.76	20	35.76	36	-0.24
HE 40	5230	Mcs0_Nss2	27	15.96	20	35.96	36	-0.04
HE 80	5195	Mcs0_Nss2	19	11.77	20	31.77	36	-4.23
HE 80	5200	Mcs0_Nss2	24	14.14	20	34.13	36	-1.87
HE 80	5210	Mcs0_Nss2	25	14.52	20	34.52	36	-1.48

Nss=1

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss1	17	10.53	20	30.53	36	-5.47
HE 20	5200	Mcs0_Nss1	30	15.70	20	35.70	36	-0.30
HE 20	5240	Mcs0_Nss1	35	15.93	20	35.93	36	-0.07
HE 40	5175	Mcs0_Nss1	18	11.09	20	31.09	36	-4.91
HE 40	5200	Mcs0_Nss1	27	15.76	20	35.76	36	-0.24
HE 40	5230	Mcs0_Nss1	27	15.96	20	35.96	36	-0.04
HE 80	5195	Mcs0_Nss1	19	11.77	20	31.77	36	-4.23
HE 80	5200	Mcs0_Nss1	24	14.14	20	34.13	36	-1.87
HE 80	5210	Mcs0_Nss1	25	14.52	20	34.52	36	-1.48

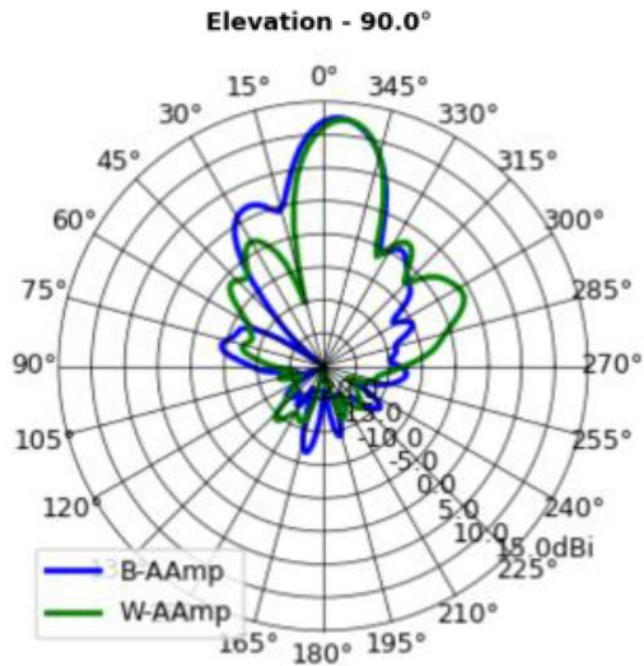
Outdoor 30+ Degree Elevation Angle Antenna Gain

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Total Summed Output Power* (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	10.62	-1	9.62	21	-11.38
HE 20	5200	Mcs0_Nss2	39	21.72	-1	20.72	21	-0.28
HE 20	5240	Mcs0_Nss2	28	21.41	-1	20.41	21	-0.59
HE 40	5175	Mcs0_Nss2	18	11.13	-1	10.13	21	-10.87
HE 40	5200	Mcs0_Nss2	33	18.76	-1	17.76	21	-3.24
HE 40	5230	Mcs0_Nss2	39	21.96	-1	20.96	21	-0.04
HE 80	5195	Mcs0_Nss2	19	11.85	-1	10.85	21	-10.15
HE 80	5200	Mcs0_Nss2	24	14.22	-1	13.22	21	-7.78
HE 80	5210	Mcs0_Nss2	25	14.63	-1	13.63	21	-7.37

Result

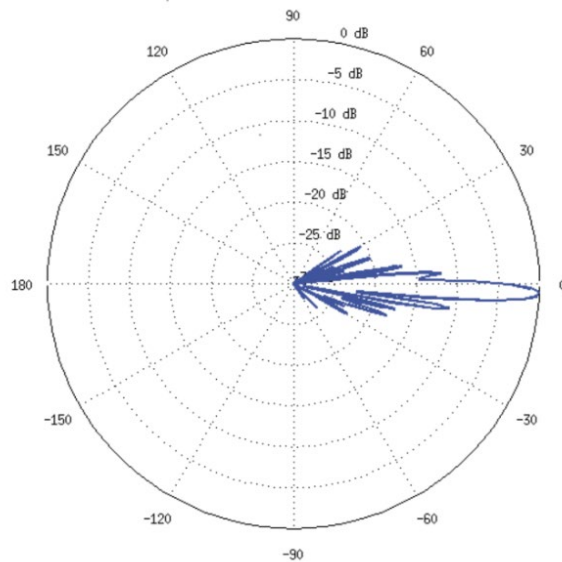
In the configuration tested, the maximum summed average RF output power was less than 1 watt; therefore, the EUT complied with the requirements of the specification (see spectrum analyzer plots in attached Annex).

* Gated EIRP shown in the Annex is the conducted measurement.



Plot 1: Elevation Plot Greater Than 30-Degrees From Horizon - Internal Antenna

Horizontal Elevation



Plot 2: Elevation Plot Greater Than 30-Degrees From Horizon - External Antenna

5.5 §15.209 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 TP50, 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 5165 MHz was measured using radiated measurement or conducted at the antenna port methods.

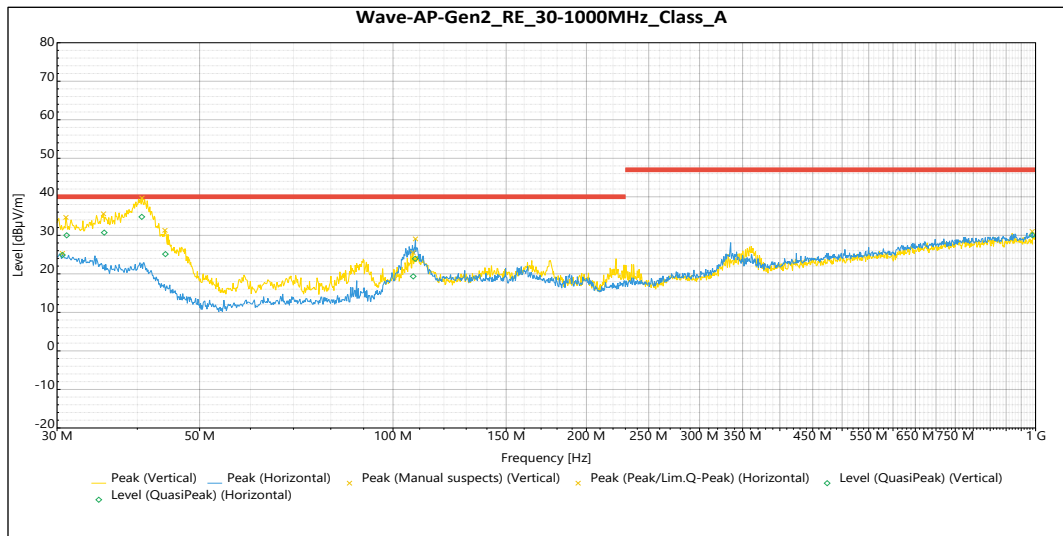
All emissions modes were tested, and the worst-case measurement are shown below. For frequencies above 1 GHz, a measurement of 3 meters was used. For frequencies below 1 GHz, a measurement distance of 10 meters was used.

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

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 met the limits specified in § 15.407(b). Representative band edge plots are included in this report. See Annex for Conducted Band edge plots.

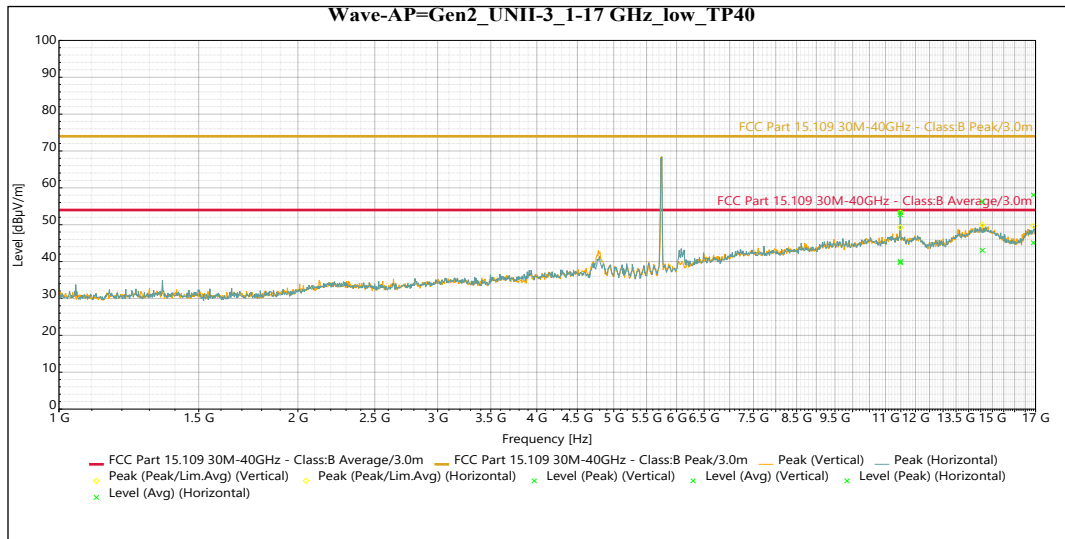
Internal Antenna



QuasiPeak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
31.05 MHz	30.01	40	-9.99	271	1.03	Vertical	-4.31
35.53 MHz	30.72	40	-9.28	212	1.03	Vertical	-6.93
40.65 MHz	34.80	40	-5.20	310	2.83	Vertical	-10.67
44.24 MHz	25.13	40	-14.87	222	3.86	Vertical	-13.26
107.51 MHz	19.35	40	-20.45	289	2.17	Vertical	-11.50
30.58 MHz	24.90	40	-15.10	134	3.17	Horizontal	-3.96
108.28 MHz	23.93	40	-16.08	328	4	Horizontal	-11.34
988.42 MHz	30.06	47	-16.94	319	4.01	Horizontal	0.70

Table 4: Radiated Emissions 30 – 1000 MHz



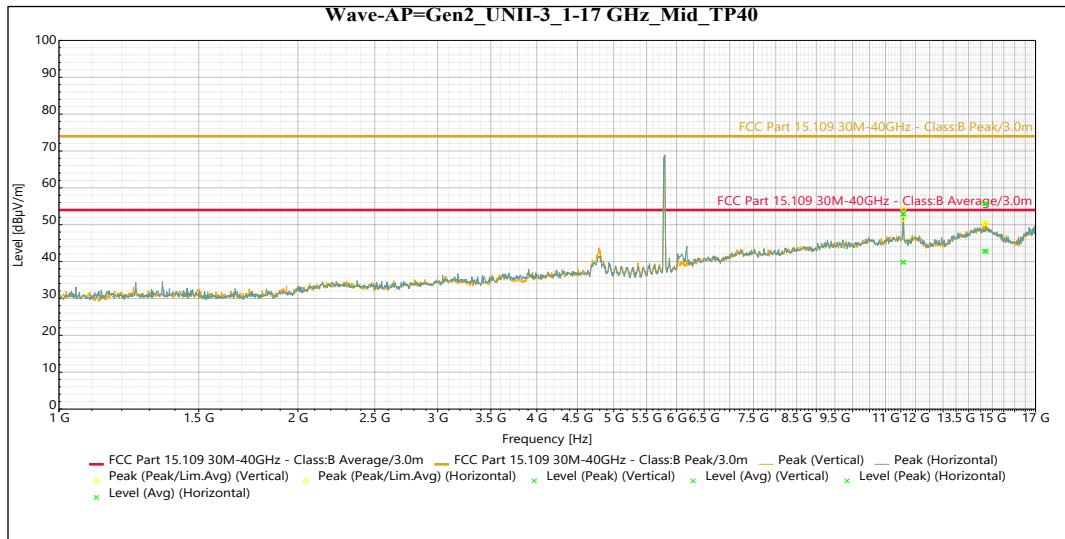
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.48 GHz	52.71	74.0	-21.29	205	3.802	Vertical	12.57
14.57 GHz	56.28	74.0	-17.72	298	3.311	Vertical	14.90
11.49 GHz	53.34	74.0	-20.66	16	1.5	Horizontal	12.57
16.90 GHz	58.06	74.0	-15.64	147	4	Horizontal	18.45

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.48 GHz	39.71	54.0	-14.29	205	3.802	Vertical	12.57
14.57 GHz	43.05	54.0	-10.95	298	3.311	Vertical	14.90
11.49 GHz	40.05	54.0	-13.95	16	1.5	Horizontal	12.57
16.90 GHz	45.11	54.0	-8.89	147	4	Horizontal	18.45

Table 5: Radiated Emissions 1 – 17 GHz at the Lowest Frequency



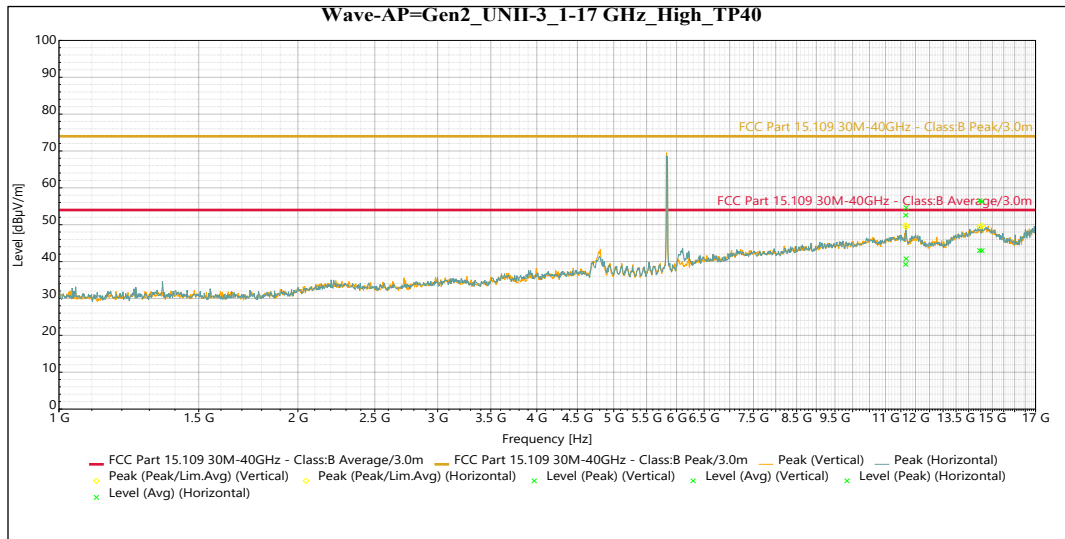
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.58 GHz	52.96	74.0	-21.04	270	3.311	Vertical	12.62
14.66 GHz	55.69	74.0	-18.31	51	2.816	Vertical	14.86
11.59 GHz	52.91	74.0	-21.09	123	3.307	Horizontal	12.62
14.73 GHz	55.75	74.0	-18.25	62	1.5	Horizontal	14.80

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.58 GHz	39.84	54.0	-14.16	270	3.311	Vertical	12.62
14.66 GHz	42.84	54.0	-11.16	51	2.816	Vertical	14.86
11.59 GHz	39.86	54.0	-14.14	123	3.307	Horizontal	12.62
14.73 GHz	42.81	54.0	-11.19	62	1.5	Horizontal	14.80

Table 6: Radiated Emissions 1 – 17 GHz at the Middle Frequency



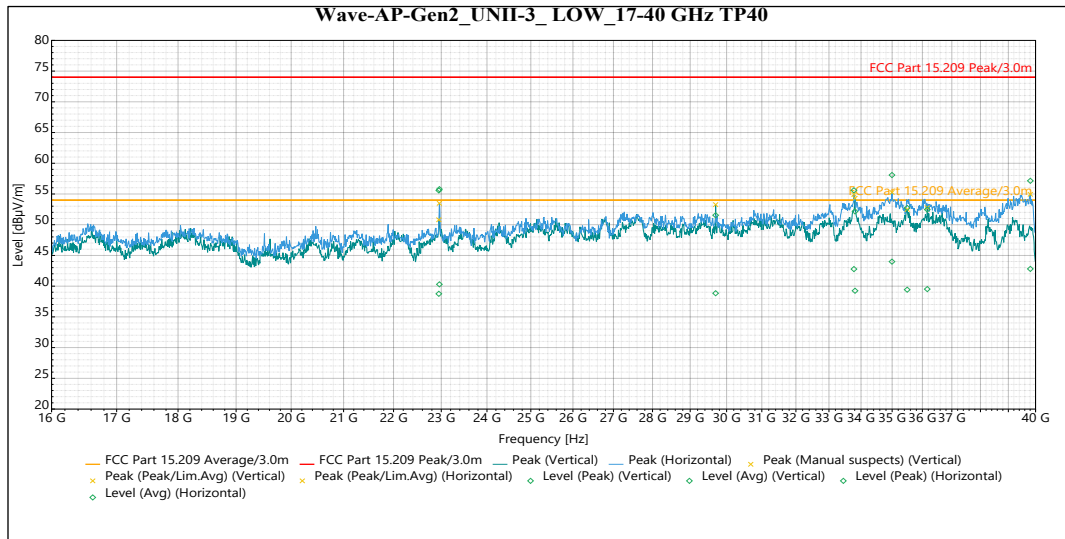
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.67 GHz	52.60	74.0	-21.40	113	3.802	Vertical	12.18
14.55 GHz	56.31	74.0	-17.69	13	2.82	Vertical	14.91
11.68 GHz	54.63	74.0	-19.37	1	1.5	Horizontal	12.10
14.46 GHz	56.49	74.0	-17.51	135	2.65	Horizontal	14.98

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.67 GHz	39.23	54.0	-14.77	113	3.802	Vertical	12.18
14.55 GHz	42.97	54.0	-11.03	13	2.82	Vertical	14.91
11.68 GHz	40.79	54.0	-13.21	1	1.5	Horizontal	12.10
14.46 GHz	43.02	54.0	-10.98	135	2.65	Horizontal	14.98

Table 7: Radiated Emissions 1 – 17 GHz at the Highest Frequency



Peak

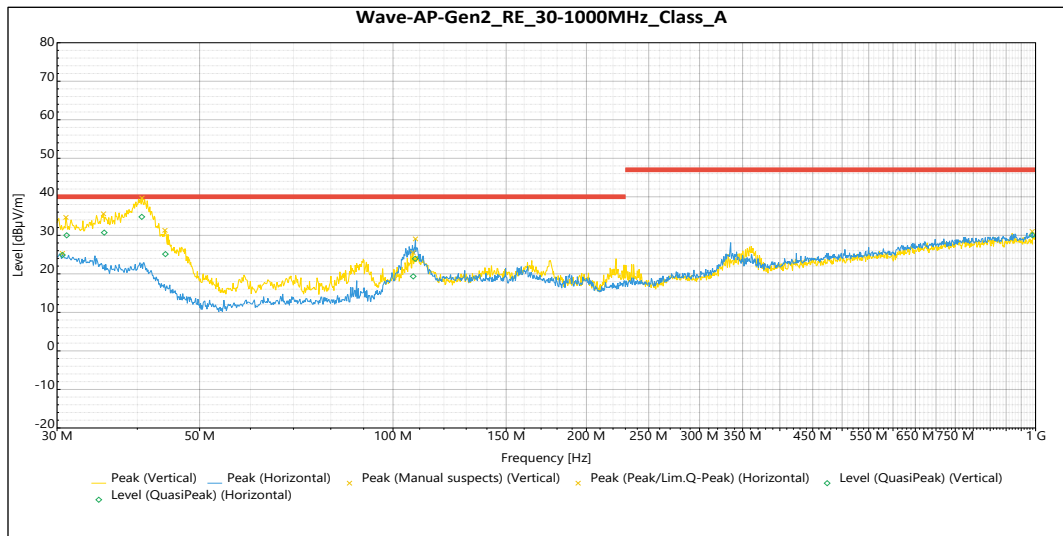
Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
22.95 GHz	55.58	74.0	-18.42	330	Vertical	-0.01
29.70 GHz	51.55	74.0	-22.45	358	Vertical	0.39
33.81 GHz	52.17	74.0	-21.83	284	Vertical	4.02
35.49 GHz	52.72	74.0	-21.28	180	Vertical	4.11
36.16 GHz	52.47	74.0	-21.53	260	Vertical	4.41
22.96 GHz	55.79	74.0	-18.21	61	Horizontal	0.04
33.78 GHz	55.61	74.0	-18.39	210	Horizontal	3.90
35.00 GHz	58.09	74.0	-15.91	309	Horizontal	5.11
39.81 GHz	57.15	74.0	-16.85	22	Horizontal	2.70

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
22.95 GHz	38.76	54.0	-15.24	330	Vertical	-0.01
29.70 GHz	38.85	54.0	-15.15	358	Vertical	0.39
33.81 GHz	39.25	54.0	-14.75	284	Vertical	4.02
35.49 GHz	39.43	54.0	-14.57	180	Vertical	4.11
36.16 GHz	39.52	54.0	-14.48	260	Vertical	4.41
22.96 GHz	40.30	54.0	-13.70	61	Horizontal	0.04
33.78 GHz	42.79	54.0	-11.21	210	Horizontal	3.90
35.00 GHz	44.00	54.0	-10.00	309	Horizontal	5.11
39.81 GHz	42.82	54.0	-11.18	22	Horizontal	2.70

Table 8: Radiated Emissions 17 – 40 GHz at the Lowest Frequency (worse case)

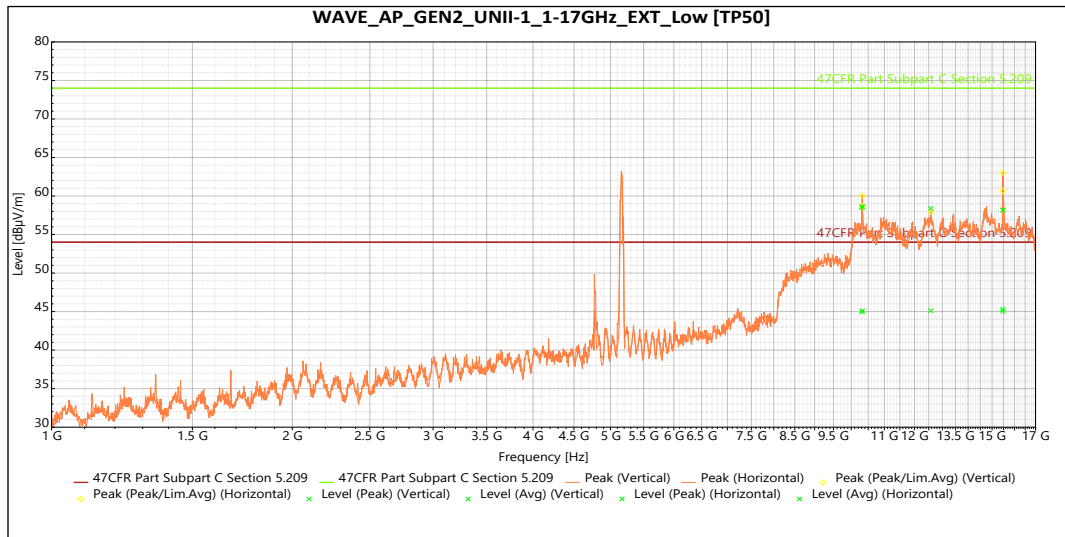
External Antenna



QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
31.05 MHz	30.01	40	-9.99	271	1.03	Vertical	-4.31
35.53 MHz	30.72	40	-9.28	212	1.03	Vertical	-6.93
40.65 MHz	34.80	40	-5.20	310	2.83	Vertical	-10.67
44.24 MHz	25.13	40	-14.87	222	3.86	Vertical	-13.26
107.51 MHz	19.35	40	-20.45	289	2.17	Vertical	-11.50
30.58 MHz	24.90	40	-15.10	134	3.17	Horizontal	-3.96
108.28 MHz	23.93	40	-16.08	328	4	Horizontal	-11.34
988.42 MHz	30.06	47	-16.94	319	4.01	Horizontal	0.70

Table 9: Radiated Emissions 30 – 1000 MHz



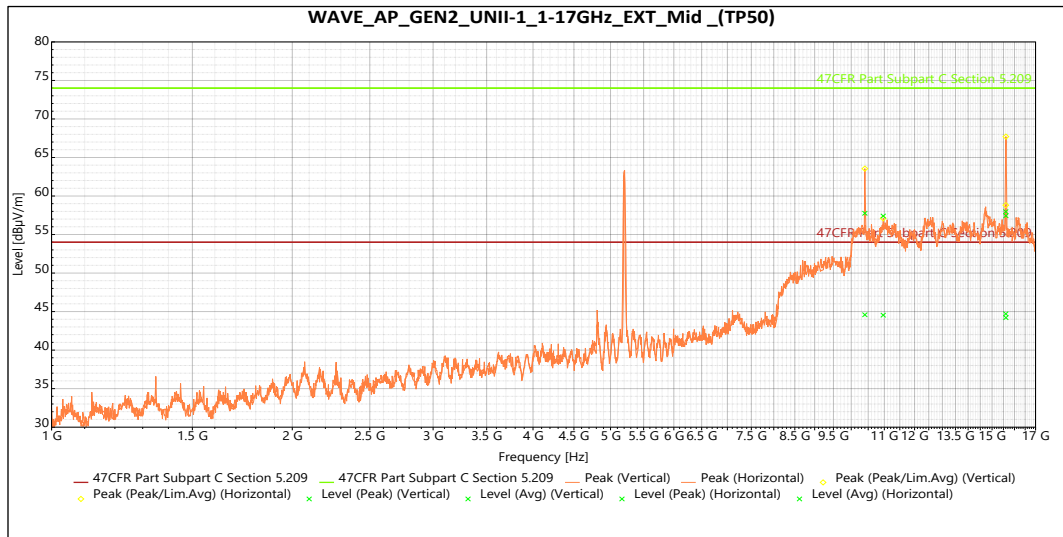
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.32 GHz	58.63	74.0	-15.37	148	3.81	Vertical	11.38
12.58 GHz	58.38	74.0	-15.62	330	3.317	Vertical	13.05
15.48 GHz	58.19	74.0	-15.81	155	2.337	Vertical	13.38
10.32 GHz	58.51	74.0	-15.49	180	4	Horizontal	11.38
15.48 GHz	58.17	74.0	-15.83	193	3.319	Horizontal	13.38

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.32 GHz	44.96	54.0	-9.04	148	3.81	Vertical	11.38
12.58 GHz	45.12	54.0	-8.88	330	3.317	Vertical	13.05
15.48 GHz	45.04	54.0	-8.96	155	2.337	Vertical	13.38
10.32 GHz	45.11	54.0	-8.89	180	4	Horizontal	11.38
15.48 GHz	45.32	54.0	-8.68	193	3.319	Horizontal	13.38

Table 10: Radiated Emissions 1 – 17 GHz at the Lowest Frequency



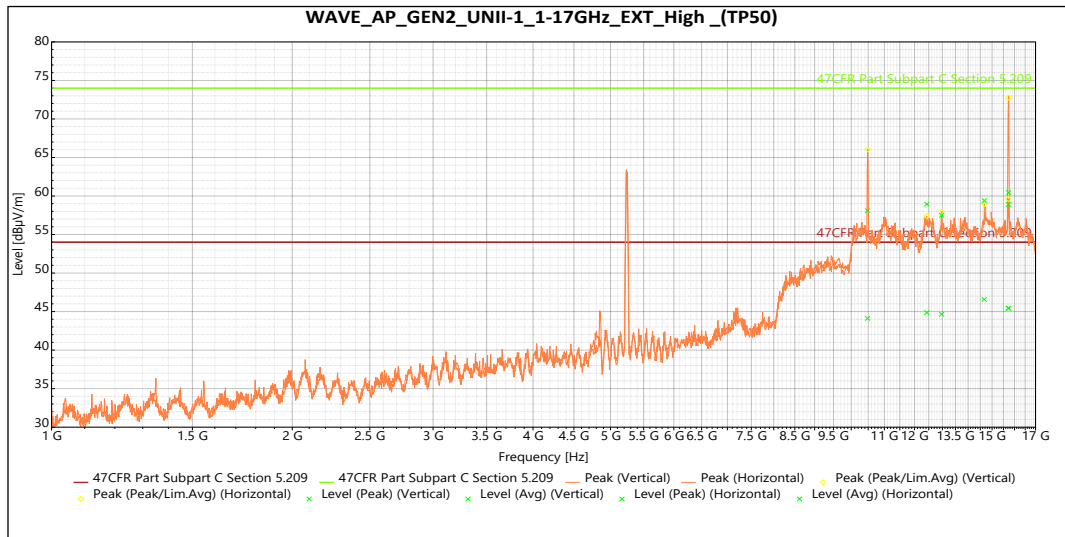
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.40 GHz	57.76	74.0	-16.24	213	1.5	Vertical	11.74
15.61 GHz	57.44	74.0	-16.56	212	1.63	Vertical	12.68
10.97 GHz	57.40	74.0	-16.60	310	1.632	Horizontal	12.90
15.60 GHz	57.97	74.0	-16.03	309	4	Horizontal	12.67

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.40 GHz	44.59	54.0	-9.41	213	1.5	Vertical	11.74
15.61 GHz	44.21	54.0	-9.79	212	1.63	Vertical	12.68
10.97 GHz	44.54	54.0	-9.46	310	1.632	Horizontal	12.90
15.60 GHz	44.71	54.0	-9.29	309	4	Horizontal	12.67

Table 11: Radiated Emissions 1 – 17 GHz at the Middle Frequency



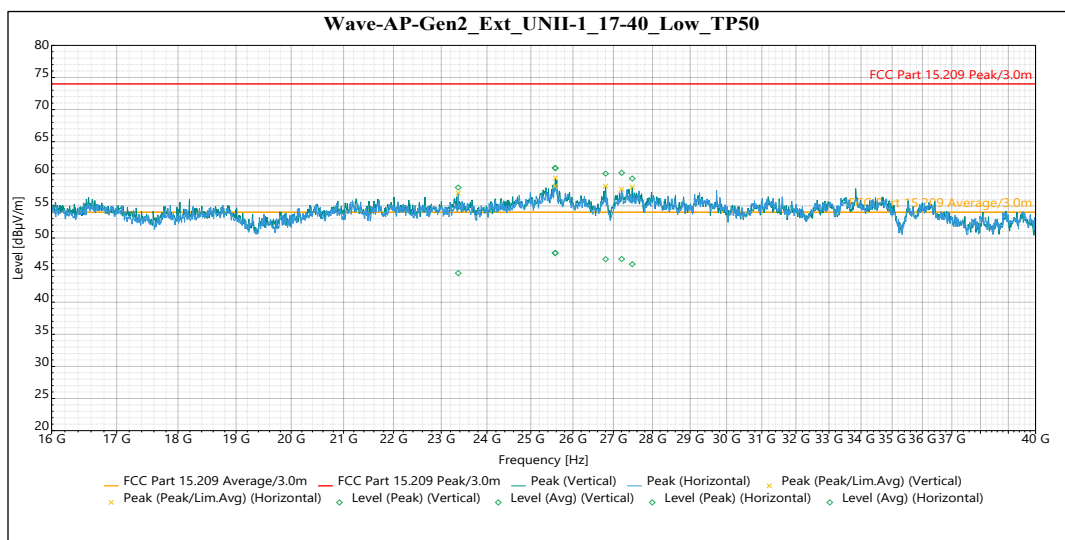
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.48 GHz	58.10	74.0	-15.90	182	1.5	Vertical	10.81
15.74 GHz	60.44	74.0	-13.56	106	1.632	Vertical	12.85
12.43 GHz	58.95	74.0	-15.05	87	2.64	Horizontal	13.58
12.97 GHz	57.49	74.0	-16.51	44	4	Horizontal	12.72
14.67 GHz	59.41	74.0	-14.59	74	3.808	Horizontal	14.66
15.72 GHz	58.92	74.0	-15.08	189	3.319	Horizontal	12.96

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.48 GHz	44.12	54.0	-9.88	182	1.5	Vertical	10.81
15.74 GHz	45.42	54.0	-8.58	106	1.632	Vertical	12.85
12.43 GHz	44.88	54.0	-9.12	87	2.64	Horizontal	13.58
12.97 GHz	44.66	54.0	-9.34	44	4	Horizontal	12.72
14.67 GHz	46.58	54.0	-7.42	74	3.808	Horizontal	14.66
15.72 GHz	45.44	54.0	-8.56	189	3.319	Horizontal	12.96

Table 12: Radiated Emissions 1 – 17 GHz at the Highest Frequency



Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
25.58 GHz	60.87	74.0	-13.13	120	Vertical	10.17
26.80 GHz	60.04	74.0	-13.96	2	Vertical	8.68
27.48 GHz	59.26	74.0	-14.74	113	Vertical	8.00
23.37 GHz	57.86	74.0	-16.14	353	Horizontal	7.14
25.57 GHz	60.92	74.0	-13.08	340	Horizontal	10.08
27.21 GHz	60.15	74.0	-13.85	319	Horizontal	8.62

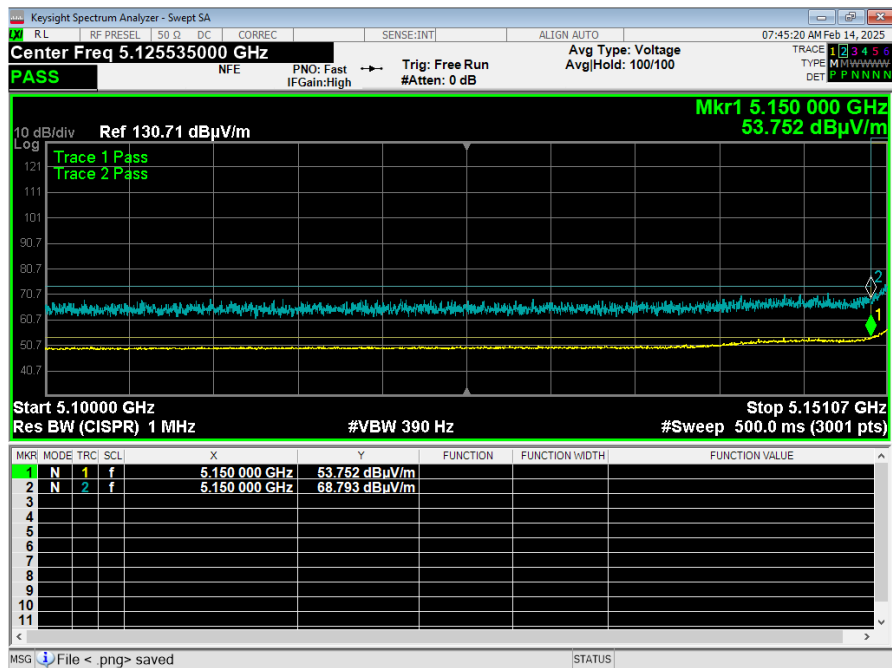
Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
25.58 GHz	47.69	54.0	-6.31	120	Vertical	10.17
26.80 GHz	46.70	54.0	-7.30	2	Vertical	8.68
27.48 GHz	45.92	54.0	-8.08	113	Vertical	8.00
23.37 GHz	44.53	54.0	-9.47	353	Horizontal	7.14
25.57 GHz	47.64	54.0	-6.36	340	Horizontal	10.08
27.21 GHz	46.73	54.0	-7.27	319	Horizontal	8.62

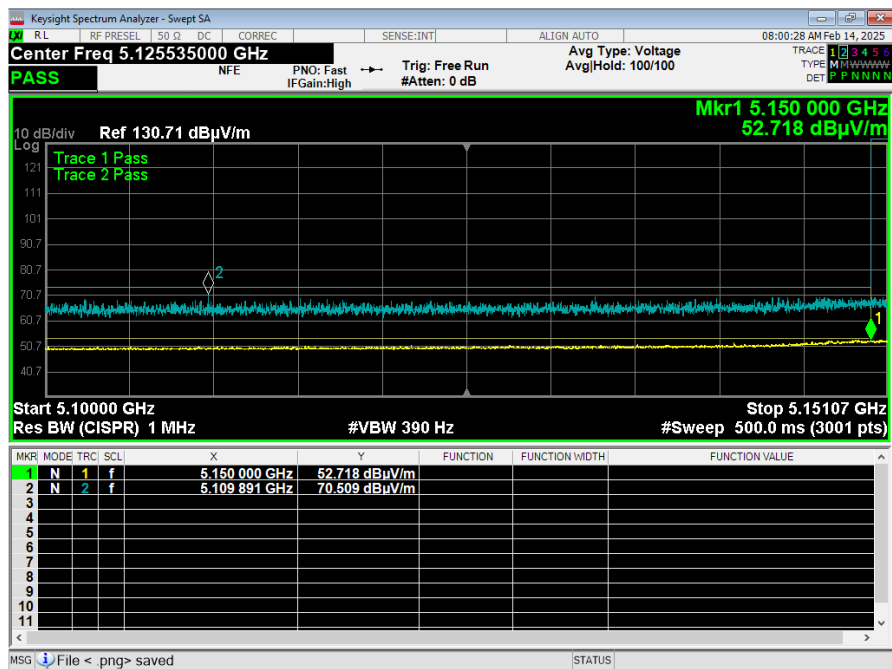
Table 13: Radiated Emissions 17 – 40 GHz at the Lowest Frequency (worse case)

5.5.2 BandEdge

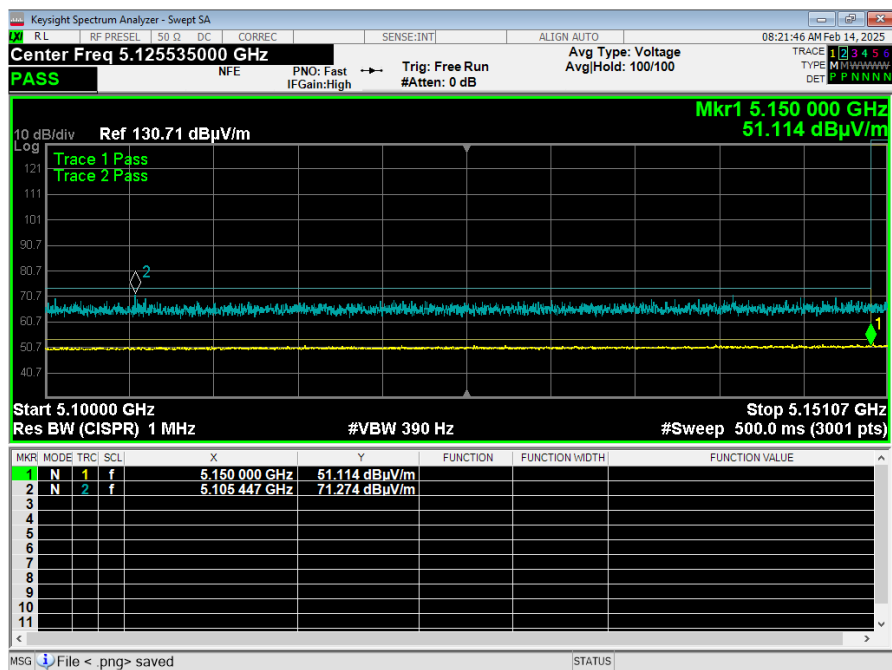
Internal Antenna



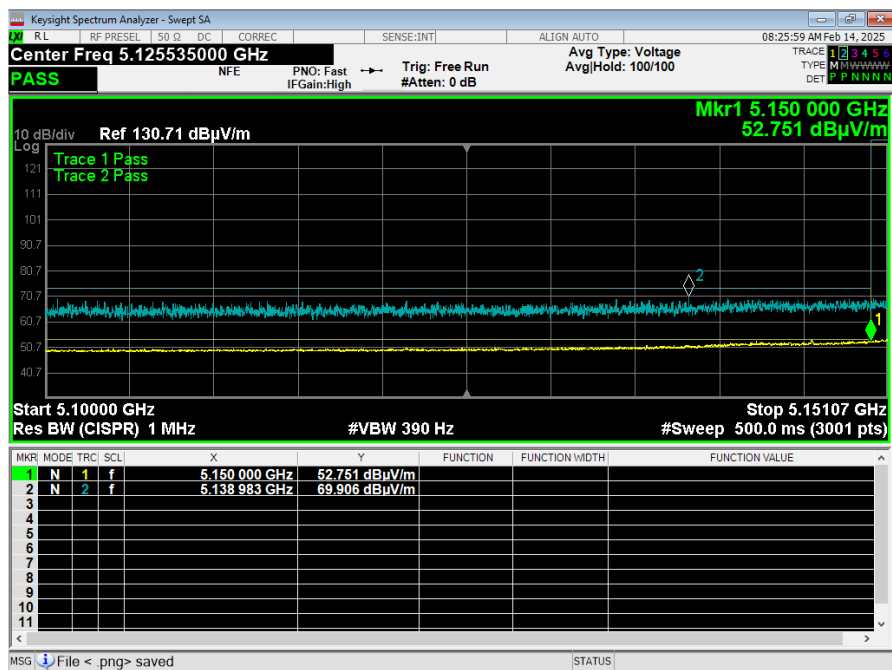
Plot 1: Band Edge HE 20 5165 MHz



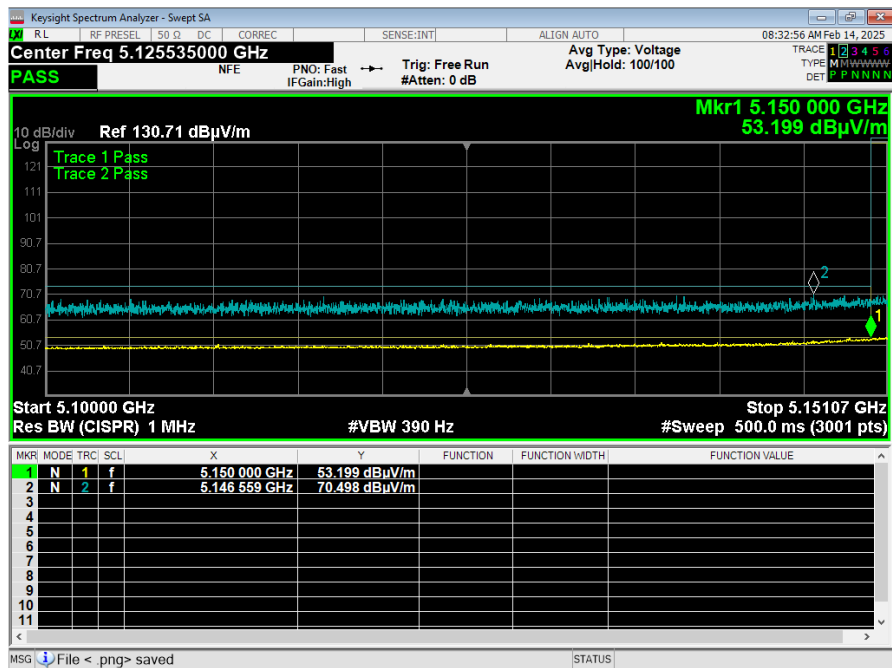
Plot 2: Band Edge HE 20 5200 MHz



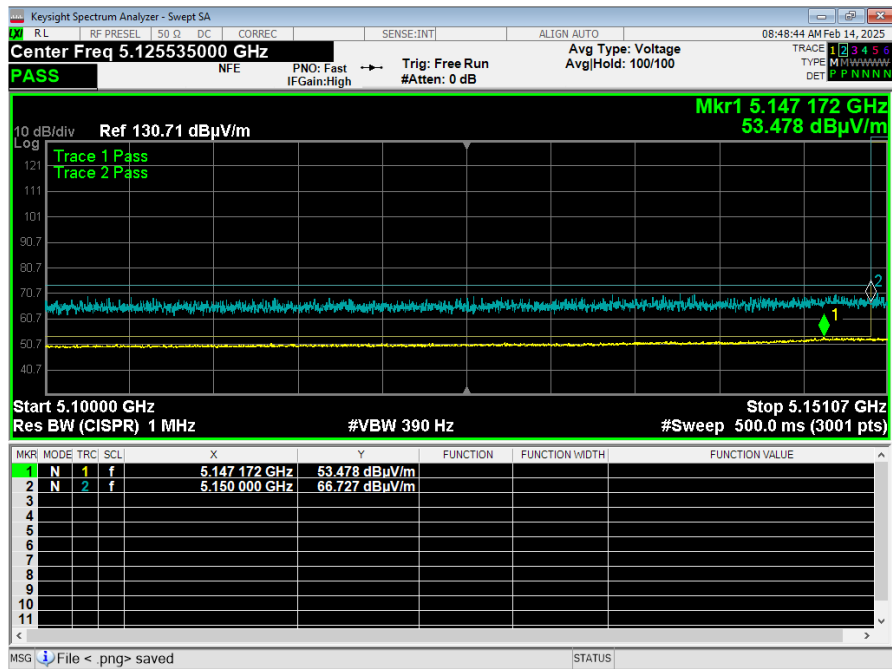
Plot 3: Band Edge HE 20 5240 MHz



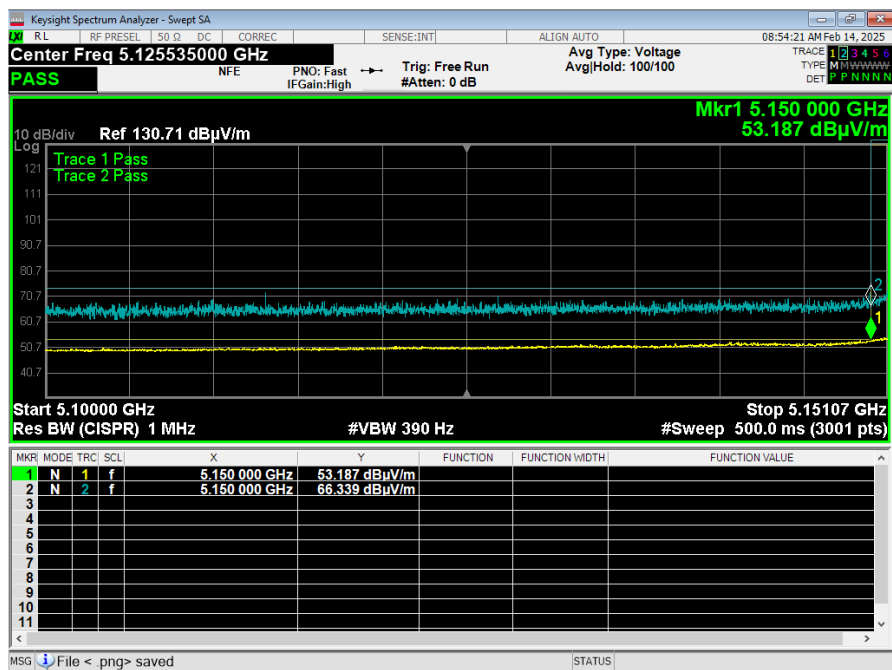
Plot 4: Band Edge HE 40 5175 MHz



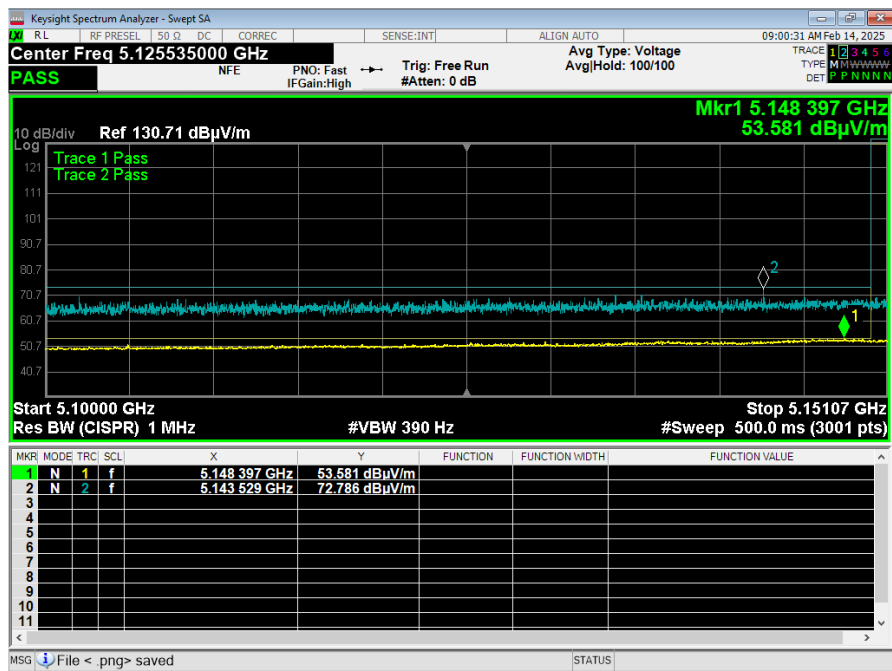
Plot 5: Band Edge HE 40 5200 MHz



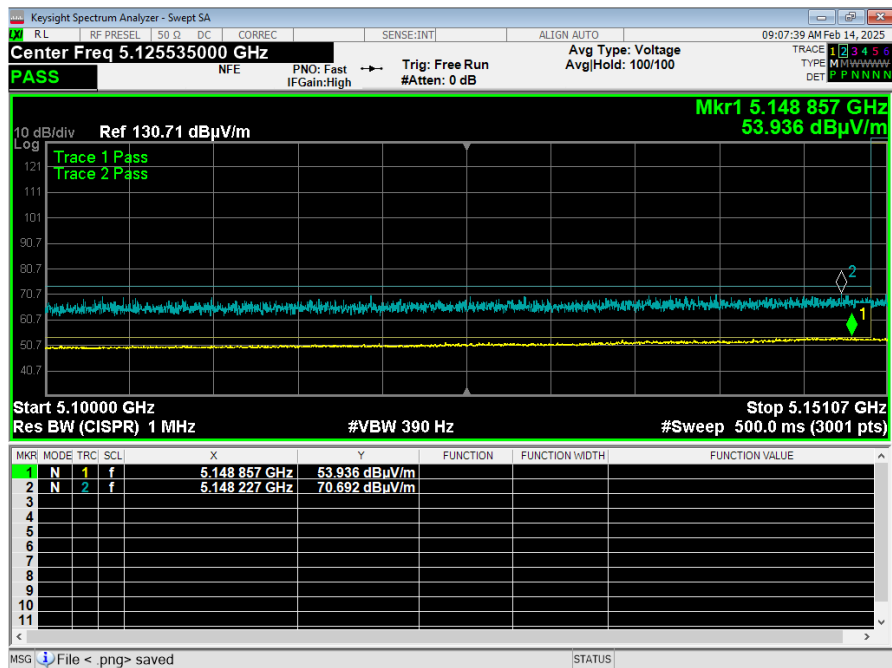
Plot 6: Band Edge HE 40 5230MHz



Plot 7: Band Edge HE 80 5195 MHz

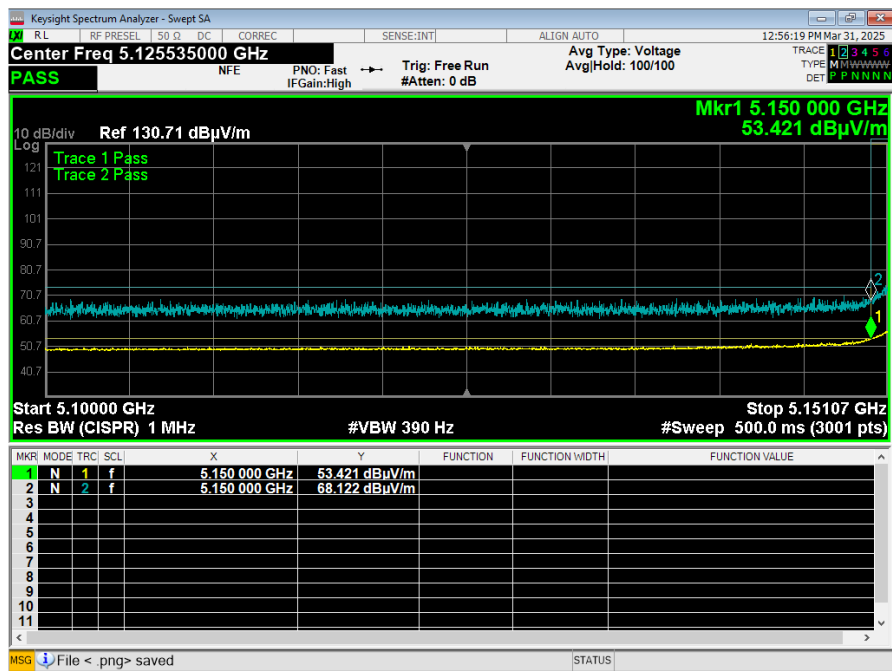


Plot 8: Band Edge HE 80 5200 MHz

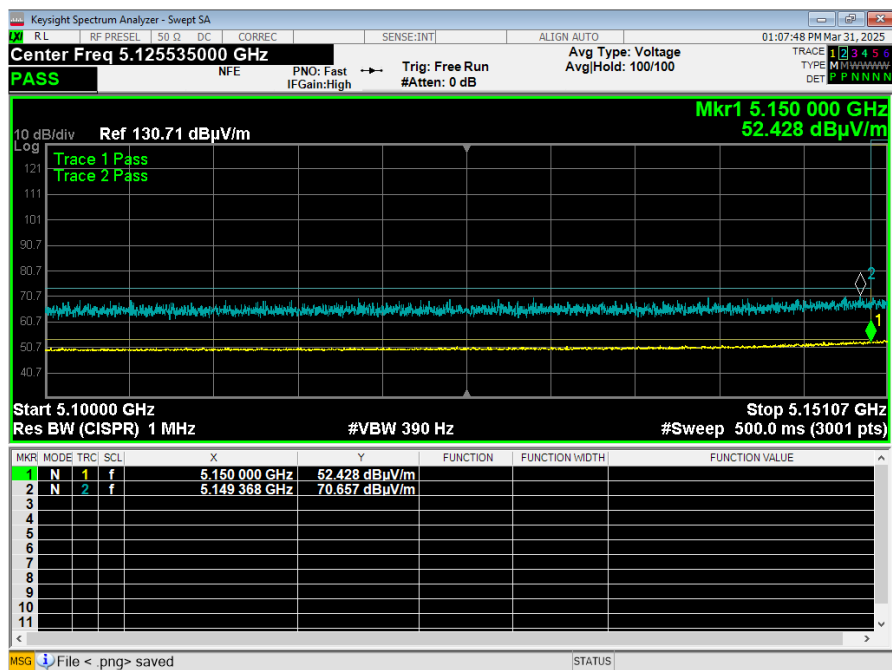


Plot 9: Band Edge HE 80 5210MHz

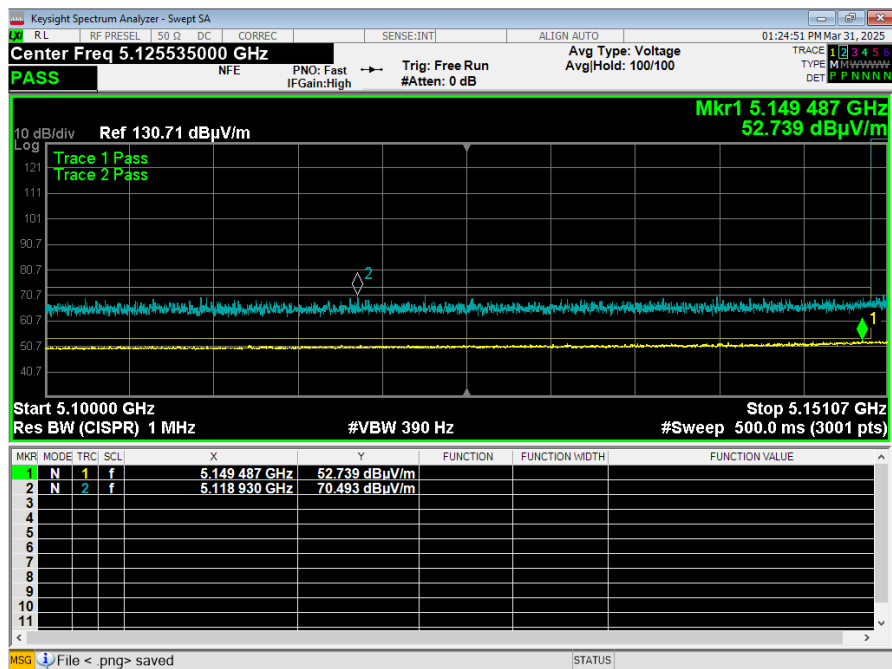
External Antenna



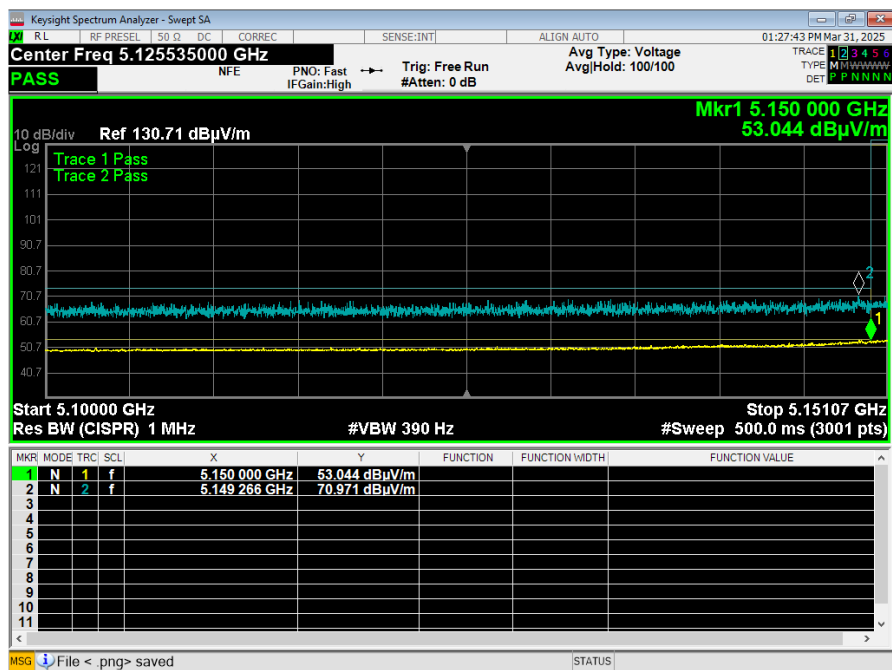
Plot 10: Band Edge HE 20 5165 MHz



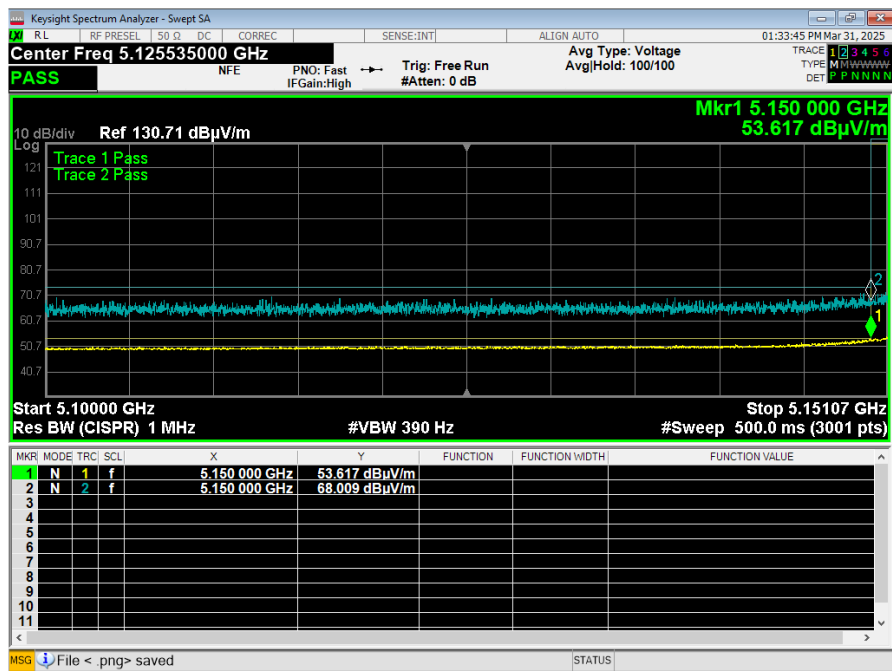
Plot 11: Band Edge HE 20 5200 MHz



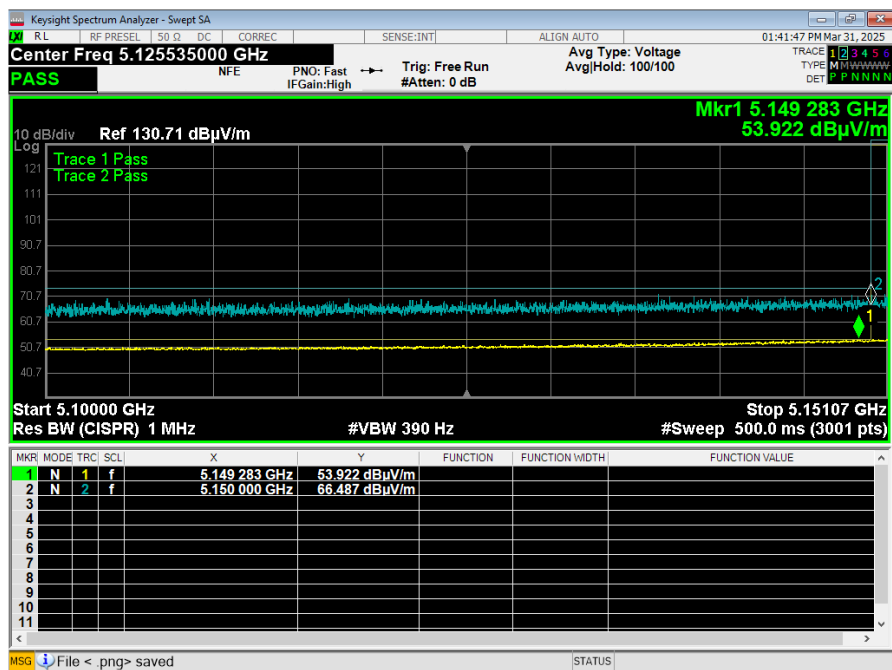
Plot 12: Band Edge HE 20 5240 MHz



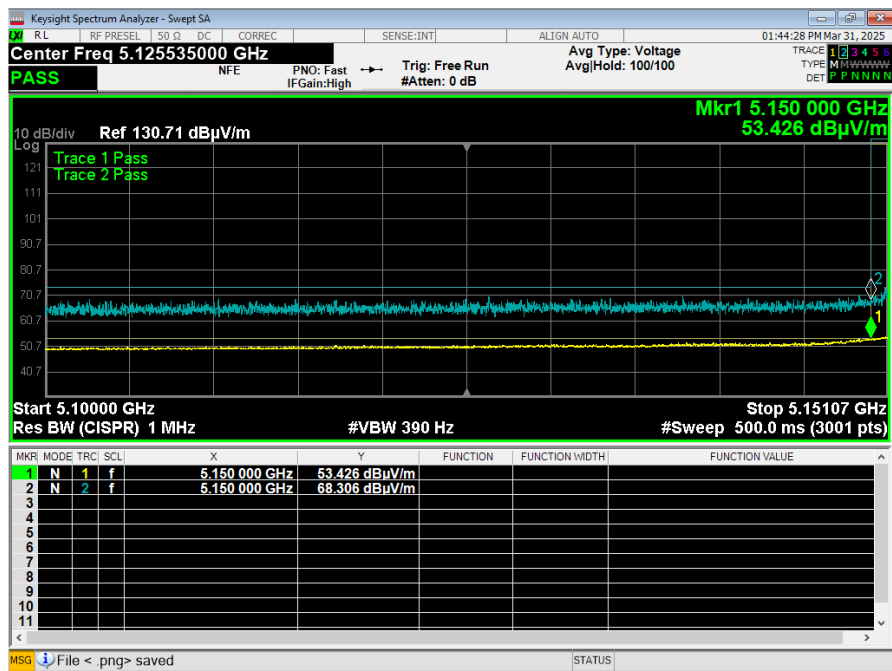
Plot 13: Band Edge HE 40 5175 MHz



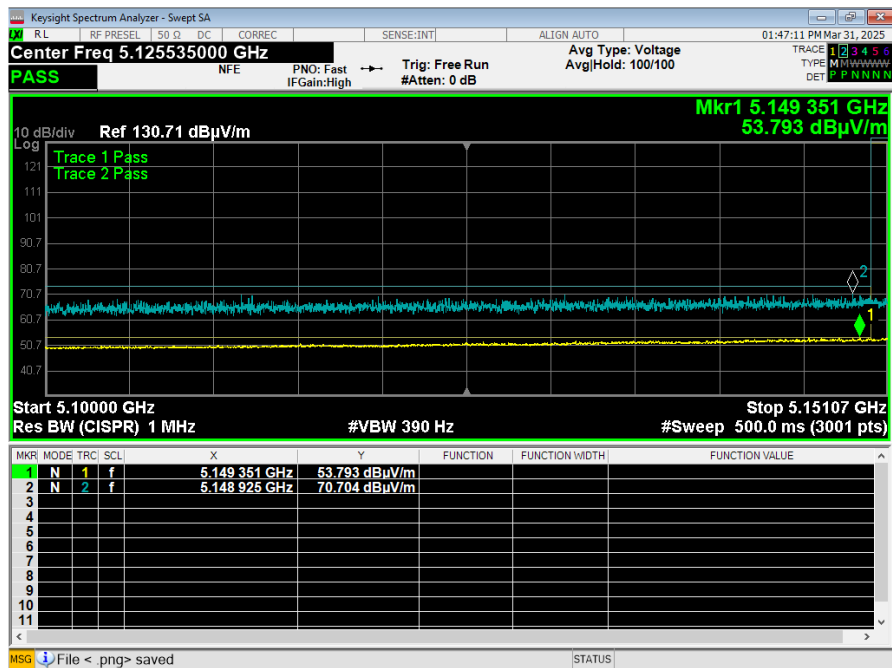
Plot 14: Band Edge HE 40 5200 MHz



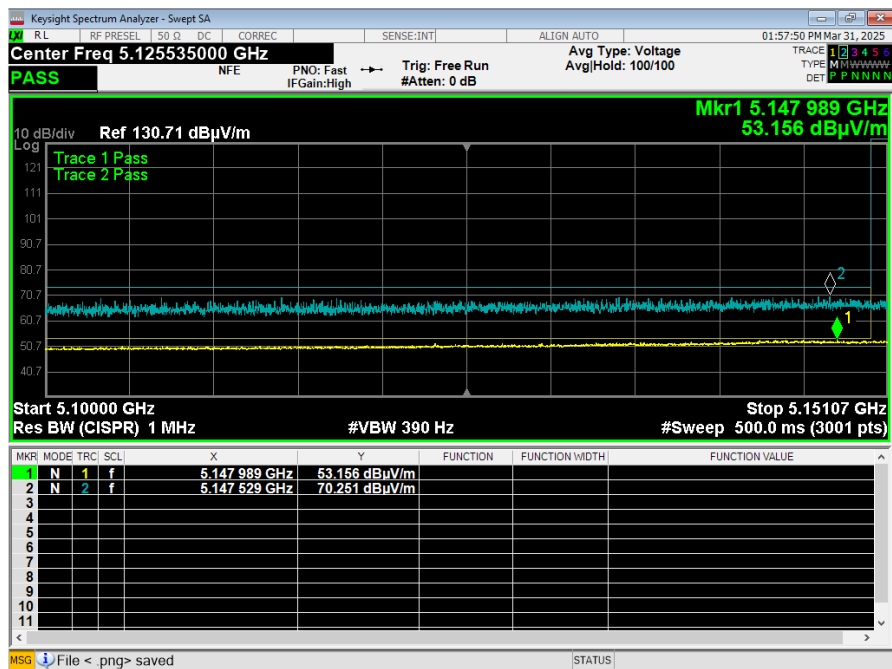
Plot 15: Band Edge HE 40 5230MHz



Plot 16: Band Edge HE 80 5195 MHz



Plot 17: Band Edge HE 80 5200 MHz



Plot 18: Band Edge HE 80 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 662911 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.

See Section 2.2 for directional gain calculation.

Results of this testing are summarized.

5.6.1 Internal Antenna

Modulation (BW)	Freq. (MHz)	Data Rate	TP Setting	Total Sum PSD EIRP (dBm)	Antenna Gain (dBi)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	-1.73	13	10	-11.73
HE 20	5200	Mcs0_Nss2	40	9.15	13	10	-0.85
HE 20	5240	Mcs0_Nss2	40	9.34	13	10	-0.66
HE 40	5175	Mcs0_Nss2	17	-5.16	13	10	-15.16
HE 40	5200	Mcs0_Nss2	35	3.82	13	10	-6.18
HE 40	5230	Mcs0_Nss2	40	6.32	13	10	-3.68
HE 80	5195	Mcs0_Nss2	18	-7.42	13	10	-17.42
HE 80	5200	Mcs0_Nss2	23	-5.05	13	10	-15.05
HE 80	5210	Mcs0_Nss2	25	-3.84	13	10	-13.84

Modulation (BW)	Freq. (MHz)	Data Rate	TP Setting	Total Sum PSD EIRP (dBm)	Antenna Gain (dBi)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss1	17	-1.73	13	10	-11.73
HE 20	5200	Mcs0_Nss1	40	9.15	13	10	-0.85
HE 20	5240	Mcs0_Nss1	40	9.34	13	10	-0.66
HE 40	5175	Mcs0_Nss1	17	-5.16	13	10	-15.16
HE 40	5200	Mcs0_Nss1	35	3.82	13	10	-6.18
HE 40	5230	Mcs0_Nss1	40	6.32	13	10	-3.68
HE 80	5195	Mcs0_Nss1	18	-7.42	13	10	-17.42
HE 80	5200	Mcs0_Nss1	23	-5.05	13	10	-15.05

HE 80	5210	Mcs0_Nss1	25	-3.84	13	10	-13.84
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5.6.2 External Antenna

Modulation (BW)	Freq. (MHz)	Data Rate	TP Setting	Total Sum PSD EIRP (dBm)	Antenna Gain (dBi)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss2	17	-2.44	20	3	-5.44
HE 20	5200	Mcs0_Nss2	30	2.35	20	3	-0.65
HE 20	5240	Mcs0_Nss2	35	2.32	20	3	-0.68
HE 40	5175	Mcs0_Nss2	18	-5.07	20	3	-8.07
HE 40	5200	Mcs0_Nss2	27	-0.62	20	3	-3.62
HE 40	5230	Mcs0_Nss2	27	-0.50	20	3	-3.50
HE 80	5195	Mcs0_Nss2	19	-7.53	20	3	-10.53
HE 80	5200	Mcs0_Nss2	24	-5.28	20	3	-8.28
HE 80	5210	Mcs0_Nss2	25	-4.70	20	3	-7.70

Modulation (BW)	Freq. (MHz)	Data Rate	TP Setting	Total Sum PSD EIRP (dBm)	Antenna Gain (dBi)	Limit (dBm)	Margin (dBm)
HE 20	5165	Mcs0_Nss1	17	-2.44	20	2.99	-5.43
HE 20	5200	Mcs0_Nss1	30	2.35	20	2.99	-0.64
HE 20	5240	Mcs0_Nss1	35	2.32	20	2.99	-0.67
HE 40	5175	Mcs0_Nss1	18	-5.07	20	2.99	-8.06
HE 40	5200	Mcs0_Nss1	27	-0.62	20	2.99	-3.61
HE 40	5230	Mcs0_Nss1	27	-0.50	20	2.99	-3.49
HE 80	5195	Mcs0_Nss1	19	-7.53	20	2.99	-10.52
HE 80	5200	Mcs0_Nss1	24	-5.28	20	2.99	-8.27
HE 80	5210	Mcs0_Nss1	25	-4.70	20	2.99	-7.69

Result

The maximum summed average power spectral density was less than the limit of 17dBm (adjusted limits shown above); therefore, the EUT complies with the specification.

-- End of Test Report --