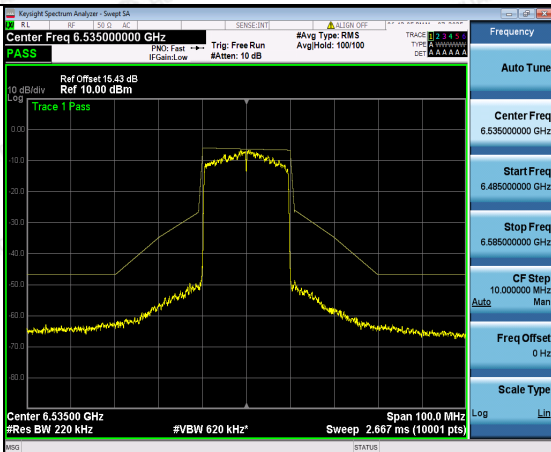
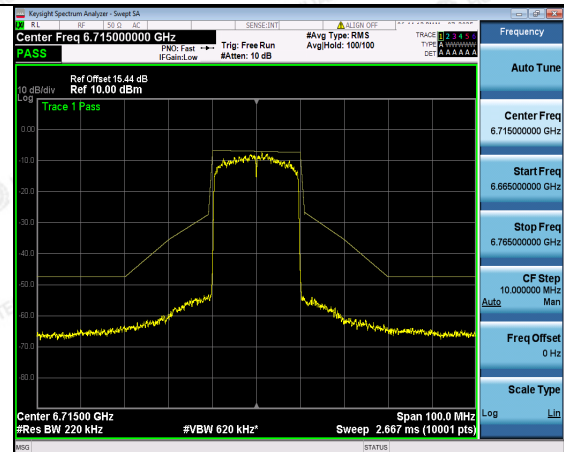




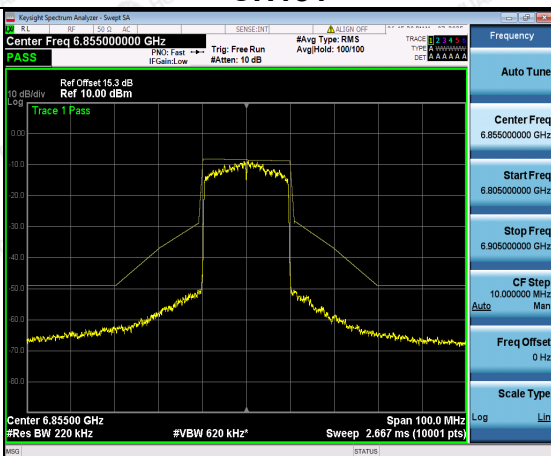
CH117



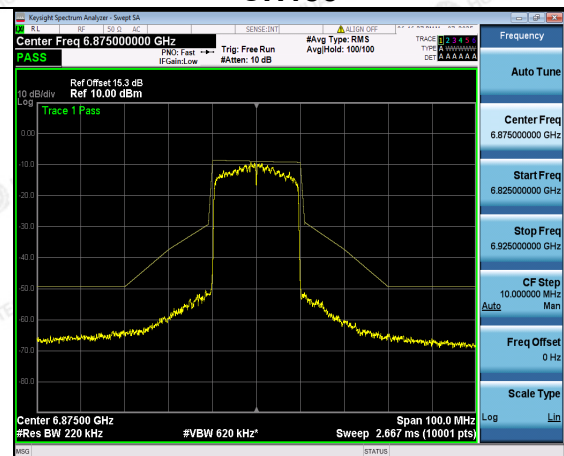
CH153



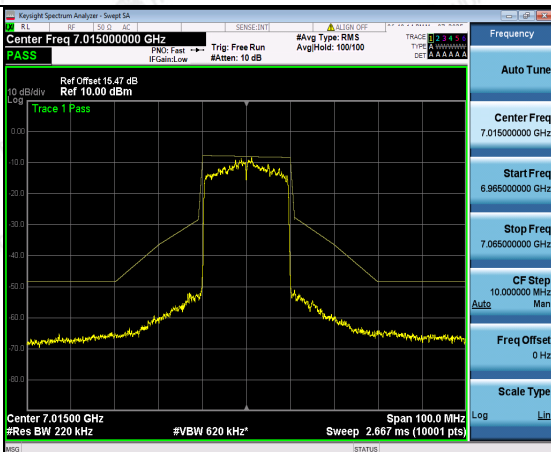
CH181



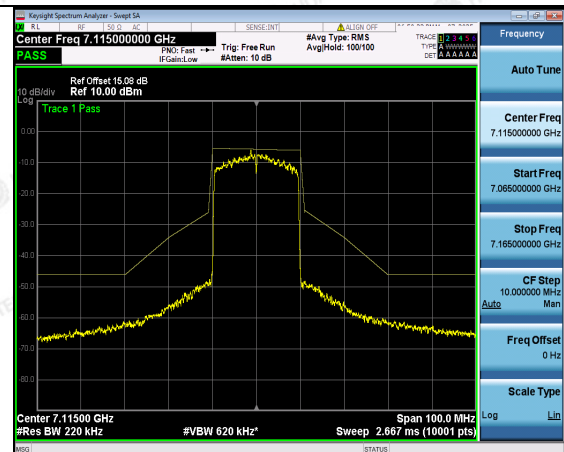
CH185



CH213



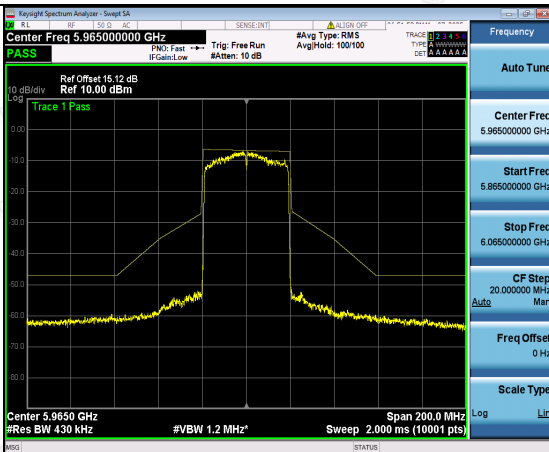
CH233



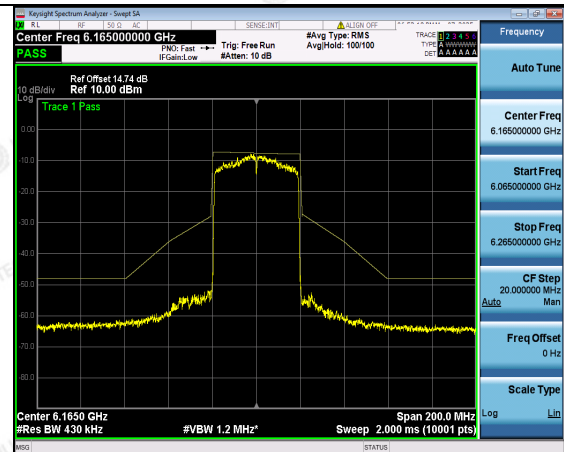


802.11be (HE40)

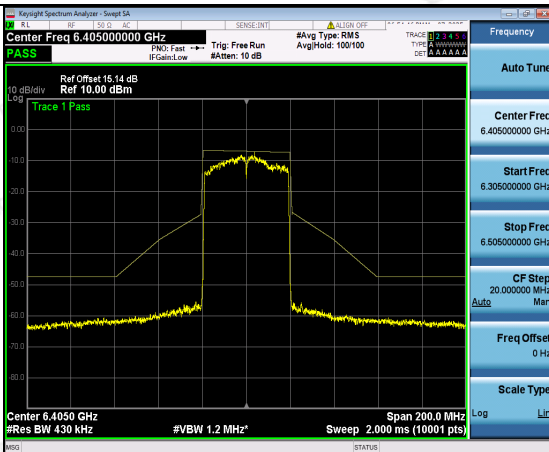
CH3



CH43



CH91



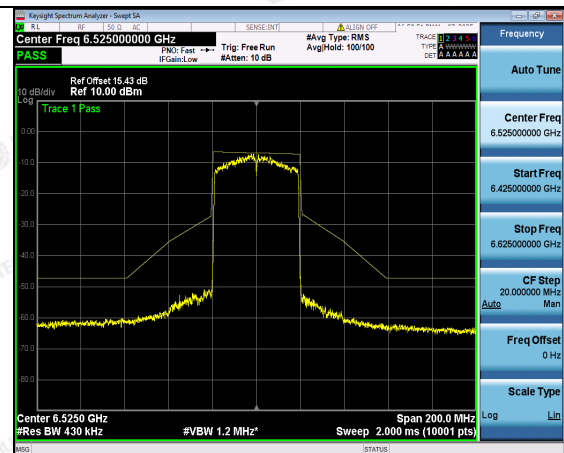
CH99



CH107

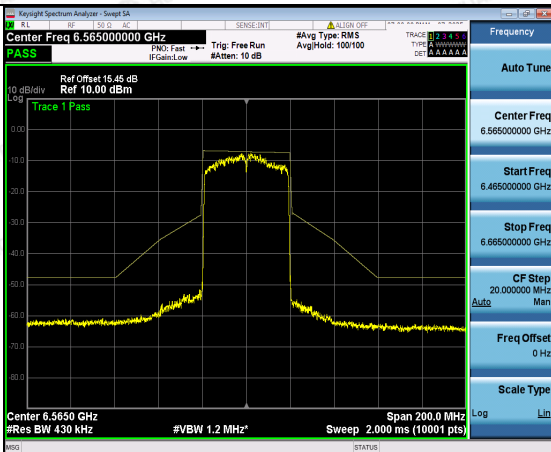


CH115

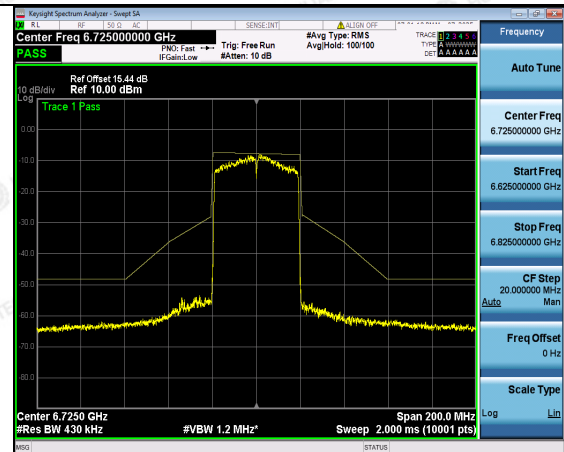




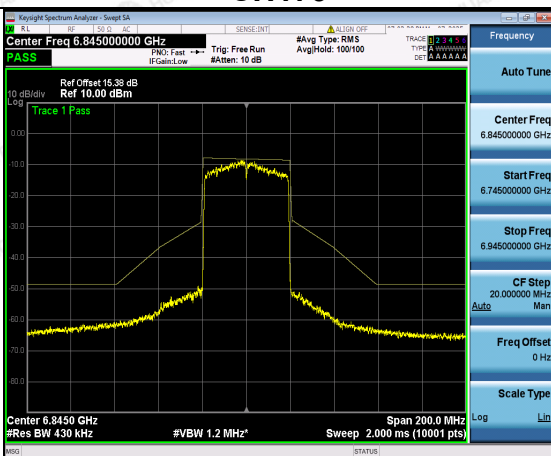
CH123



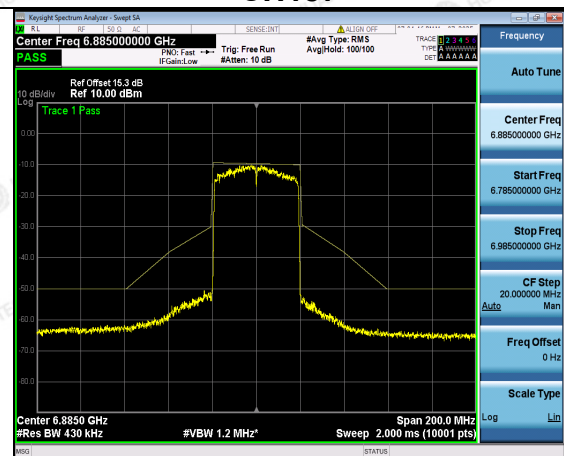
CH155



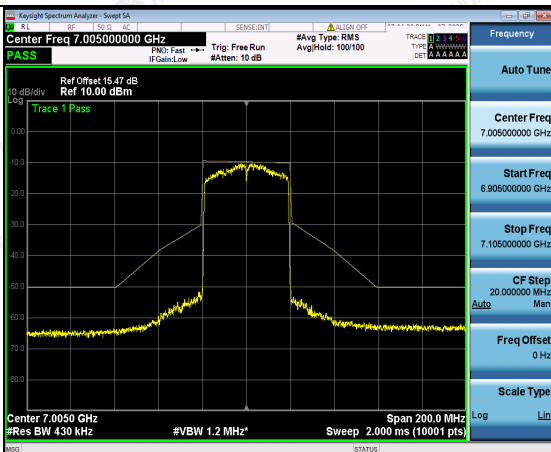
CH179



CH187



CH211



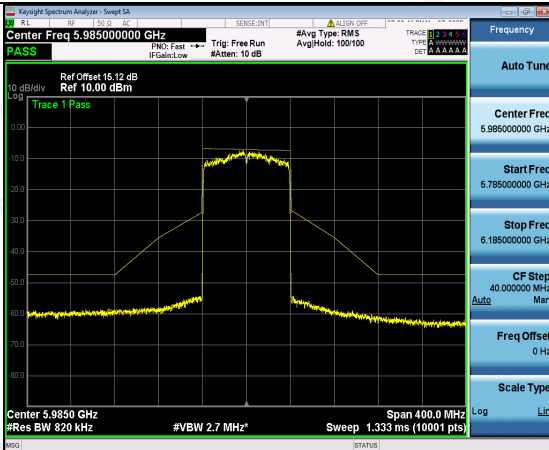
CH227



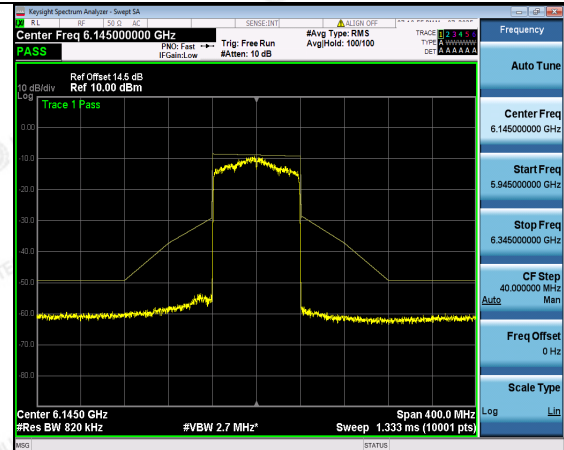


802.11be (HE80)

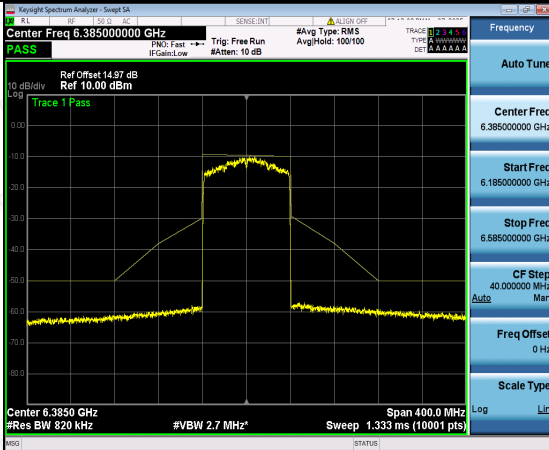
CH7



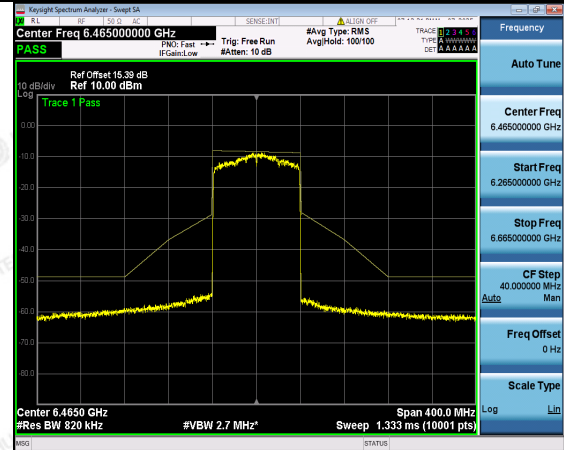
CH39



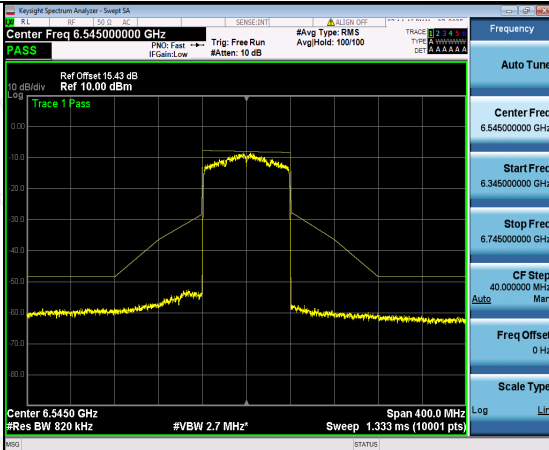
CH87



CH103



CH119



CH135

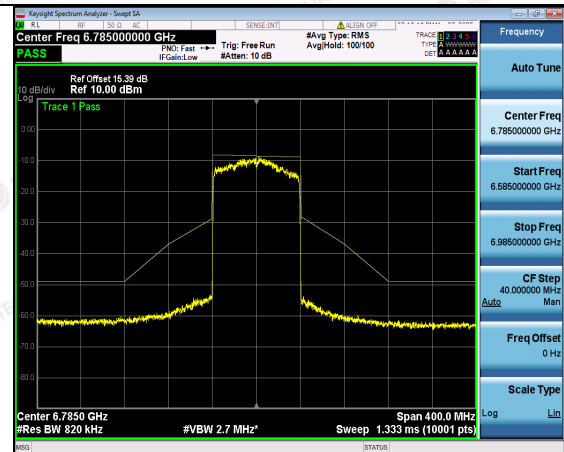




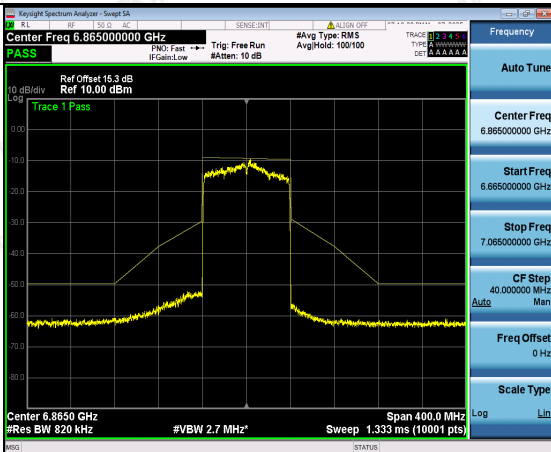
CH151



CH167



CH183



CH199



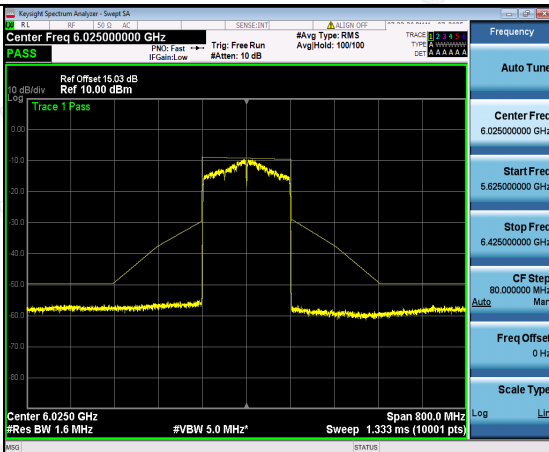
CH215



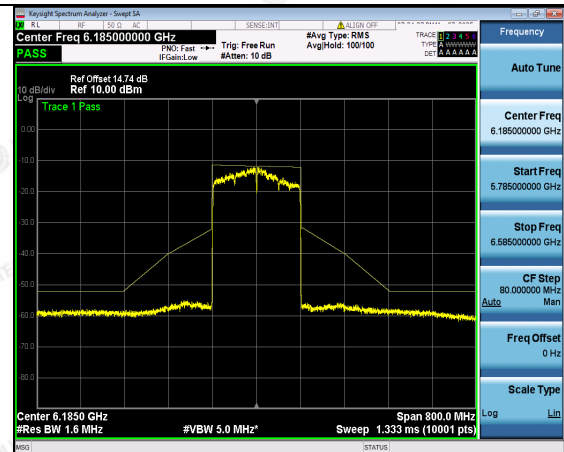


802.11be (HE160)

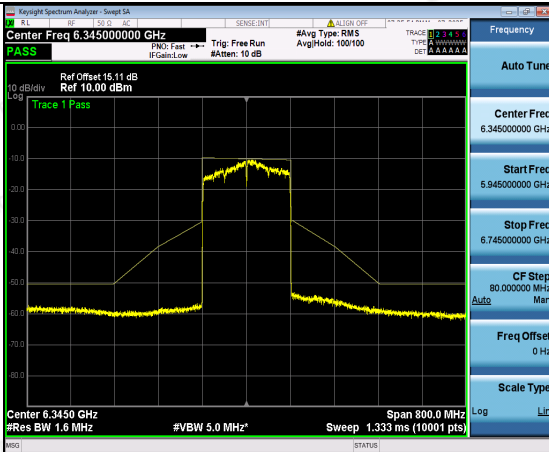
CH15



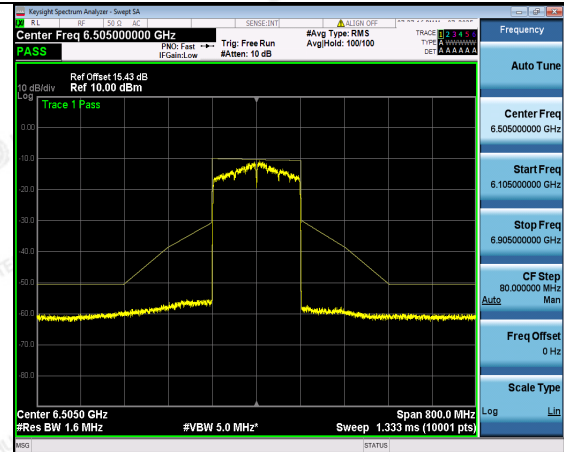
CH47



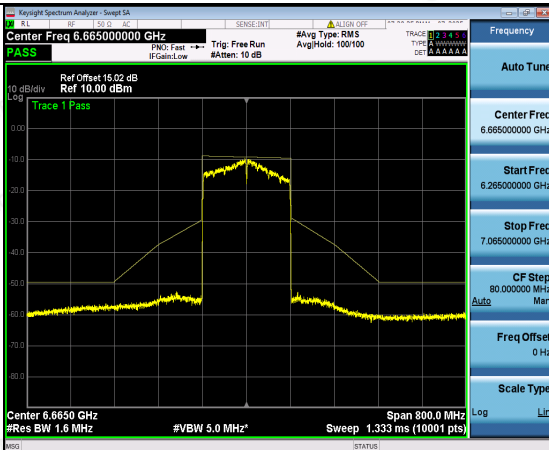
CH79



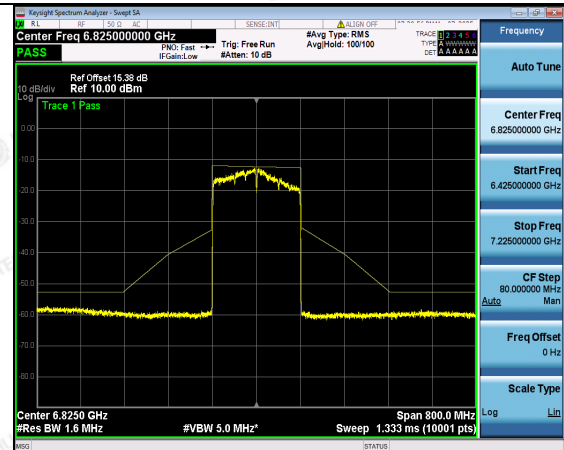
CH111

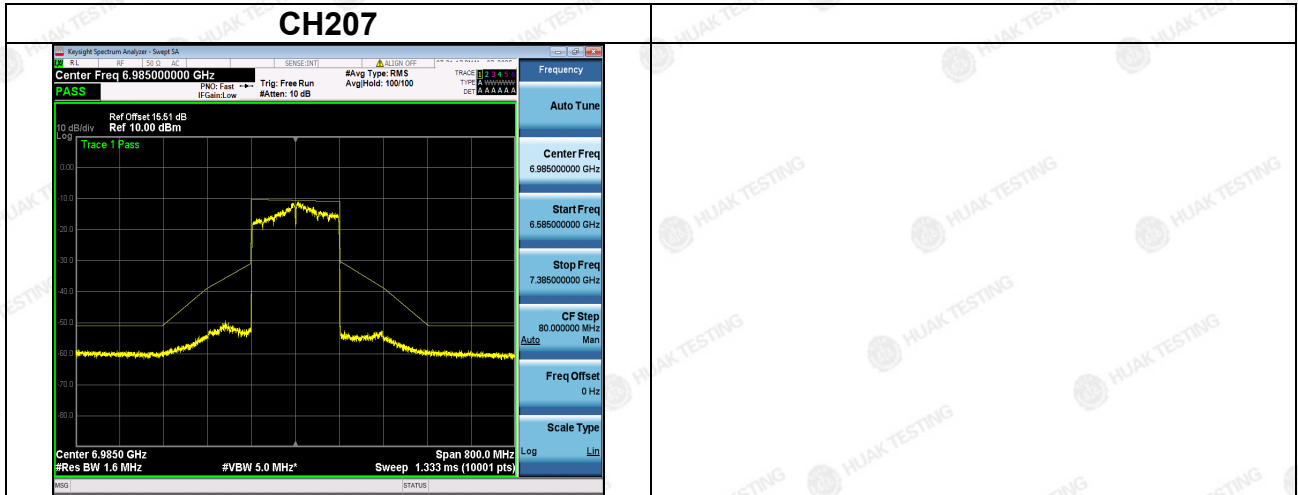


CH143



CH175







4.7 Contention-Based Protocol

4.7.1 Limits of Contention Based Protocol Measurement

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm (The threshold is referenced to a 0 dBi antenna gain.) or lower. Additionally, indoor low-power devices must detect co-channel energy with 90% or greater certainty.

4.7.2 Test Procedure

- Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters (set as following section 4.7.5 EUT operating condition).
- Determine number of times detection threshold test as following table,

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Same as EUT transmission
$BW_{Inc} < BW_{EUT} \leq 2 \times BW_{Inc}$	Once	Contained within BW_{EUT}
$2 \times BW_{Inc} < BW_{EUT} \leq 4 \times BW_{Inc}$	Twice. (Incumbent transmission is contained within BW_{EUT})	Closely to the lower edge and upper edge of the EUT Channel
$BW_{EUT} > 4 \times BW_{Inc}$	Three times	Closely to the lower edge ,in the middle and upper edge of the EUT Channel

- Using an AWGN signal source, generate (but do not transmit, i.e. RF OFF) a 10 MHz-wide AWGN signal. Use step C table to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT.
- Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- Refer to step C table to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step d, choose a different center frequency for the AWGN signal and repeat the process.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.



4.7.3 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A
Signal source	Rohde&Schwarz	SMCV100B	HKE-190	Feb. 20, 2024	Feb. 19, 2025

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 19, 2025	Feb. 18, 2026
RF cable	Times	1-40G	HKE-034	Feb. 19, 2025	Feb. 18, 2026
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 19, 2025	Feb. 18, 2026
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A
Signal source	Rohde&Schwarz	SMCV100B	HKE-190	Feb. 19, 2025	Feb. 18, 2026

4.7.4 Test Result

Pass



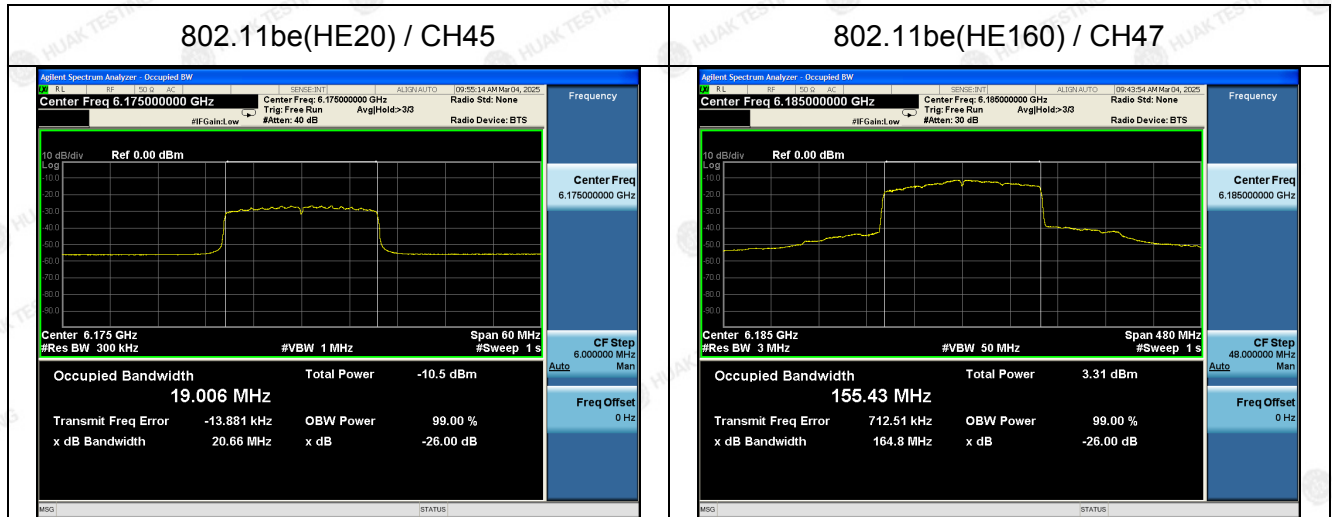
4.7.5 Test Data

Contention Based Protocol Measurement

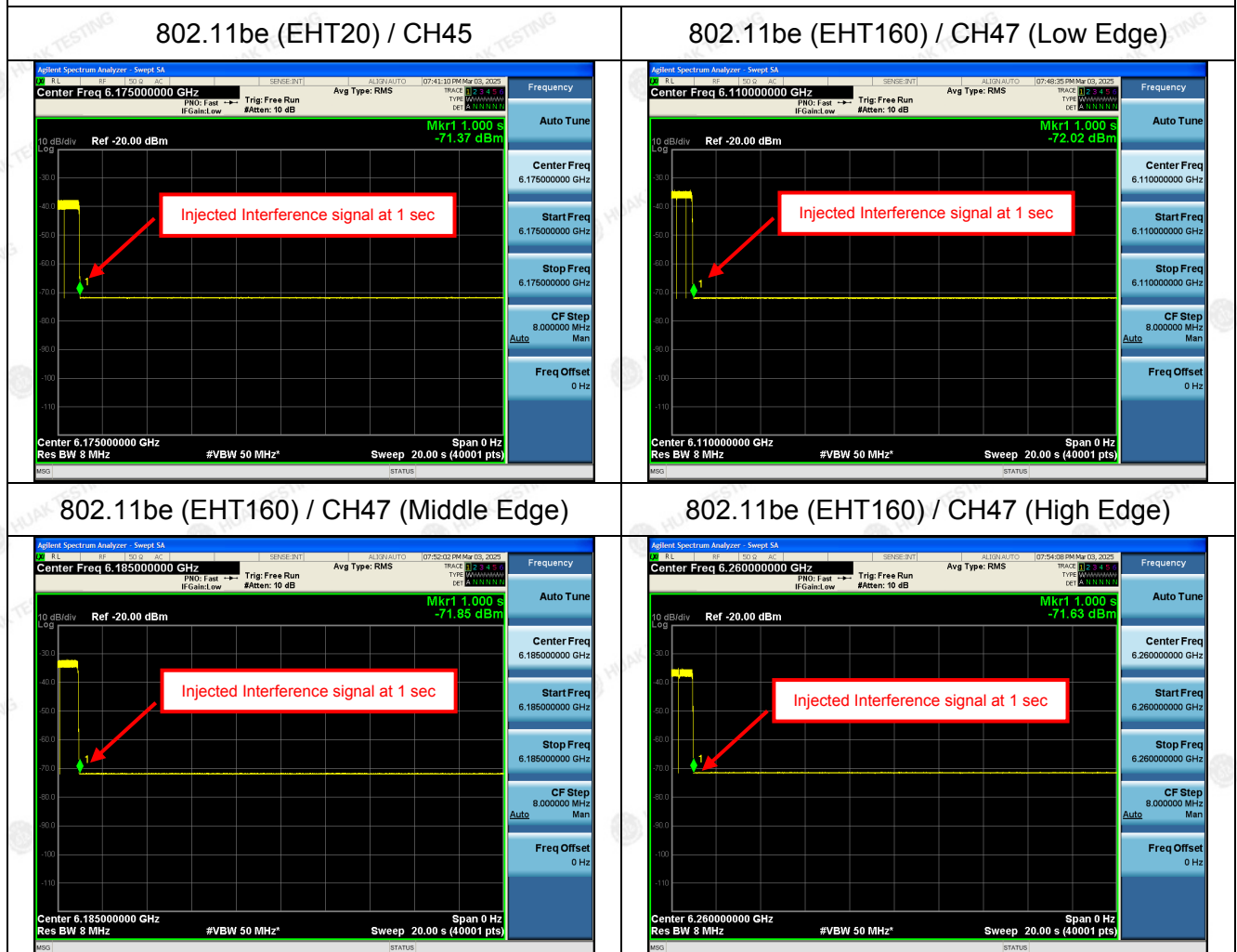
Operation Band	Operation Mode	Channel Bandwidth	Channel number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)		Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status	Test Result
					Freq. (MHz)	Power (dBm)					
U-NII-5	802.11be	20	45	6175	6175	-69.10	3.52	-65.58	-62	OFF	Pass
						-69.15	3.52	-65.63	-62	Minimal	Pass
						-69.27	3.52	-65.75	-62	ON	Pass
		160	47	6110	6110	-68.62	3.52	-65.10	-62	OFF	Pass
						-69.05	3.52	-65.53	-62	Minimal	Pass
						-69.34	3.52	-65.82	-62	ON	Pass
				6185	6185	-69.11	3.52	-65.59	-62	OFF	Pass
						-69.23	3.52	-65.71	-62	Minimal	Pass
						-69.48	3.52	-65.96	-62	ON	Pass
				6260	6260	-69.17	3.52	-65.65	-62	OFF	Pass
						-69.36	3.52	-65.84	-62	Minimal	Pass
						-69.39	3.52	-65.87	-62	ON	Pass

Contention Based Protocol Detection Probability

Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6175	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6110	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6185	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6260	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass



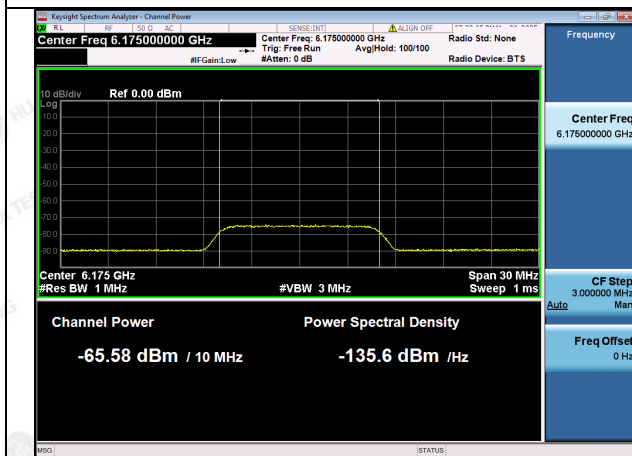
Plots of Incumbent Signal (AWGN) Level



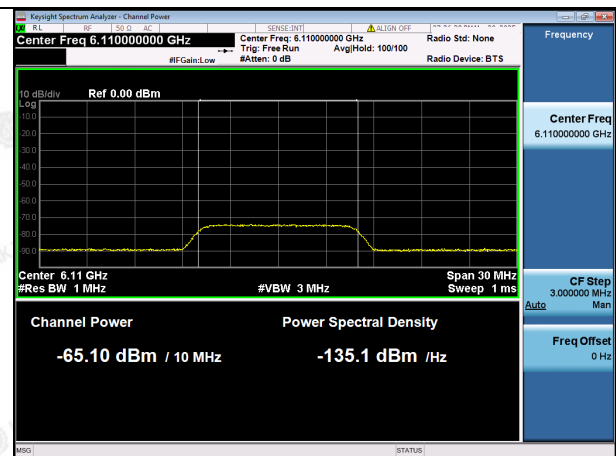


Plots of EUT Ceased Transmission In The Time Domain

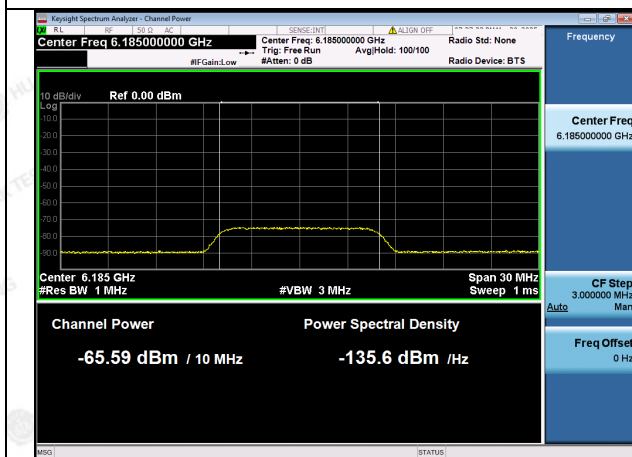
802.11be (EHT20) / CH45



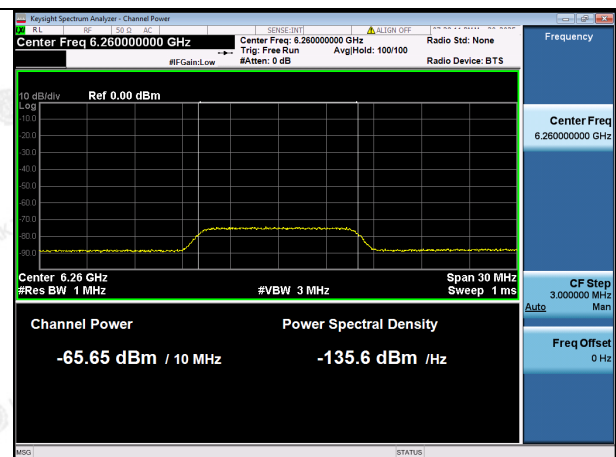
802.11be (EHT160) / CH47 (Low Edge)



802.11be (EHT160) / CH47 (Middle Edge)



802.11be (EHT160) / CH47 (High Edge)





Contention Based Protocol Measurement

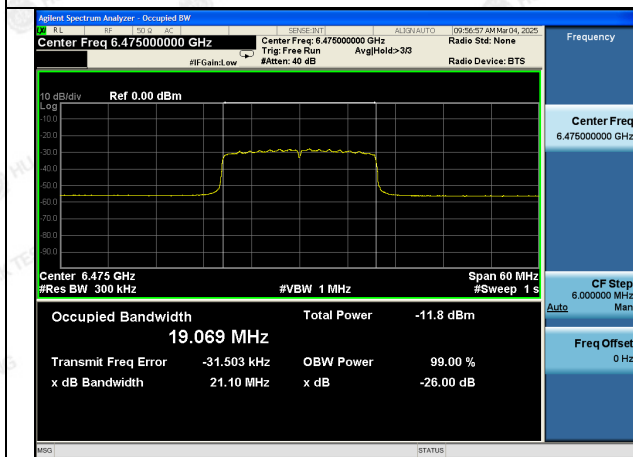
Operation Band	Operation Mode	Channel Bandwidth	Channel number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)		Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status	Test Result
					Freq. (MHz)	Power (dBm)					
U-NII-6	802.11be	20	105	6475	6475	-69.34	3.52	-65.82	-62	OFF	Pass
						-69.35	3.52	-65.83	-62	Minimal	Pass
						-69.49	3.52	-65.97	-62	ON	Pass
		160	111	6505	6430	-69.21	3.52	-65.69	-62	OFF	Pass
						-69.27	3.52	-65.75	-62	Minimal	Pass
						-69.4	3.52	-65.88	-62	ON	Pass
					6505	-69.02	3.52	-65.50	-62	OFF	Pass
						-69.08	3.52	-65.56	-62	Minimal	Pass
						-69.16	3.52	-65.64	-62	ON	Pass
					6580	-68.98	3.52	-65.46	-62	OFF	Pass
						-69.36	3.52	-65.84	-62	Minimal	Pass
						-69.43	3.52	-65.91	-62	ON	Pass

Contention Based Protocol Detection Probability

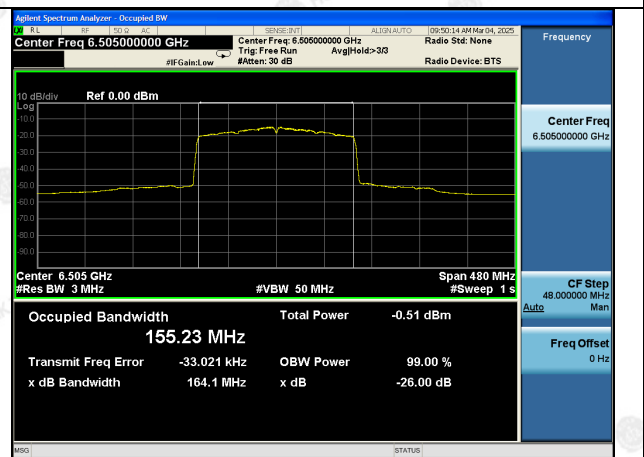
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6475	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6430	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6505	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6580	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass



802.11be (EHT20) / CH105

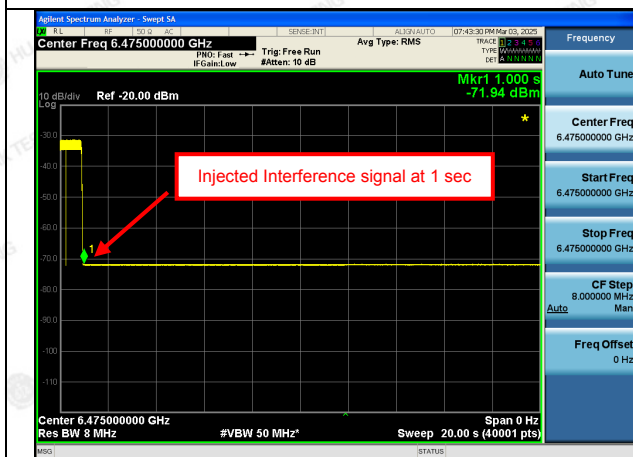


802.11be (EHT160) / CH111



Plots of Incumbent Signal (AWGN) Level

802.11be (EHT20) / CH105



802.11be (EHT160) / CH111 (Low Edge)



802.11be (EHT160) / CH111 (Middle Edge)



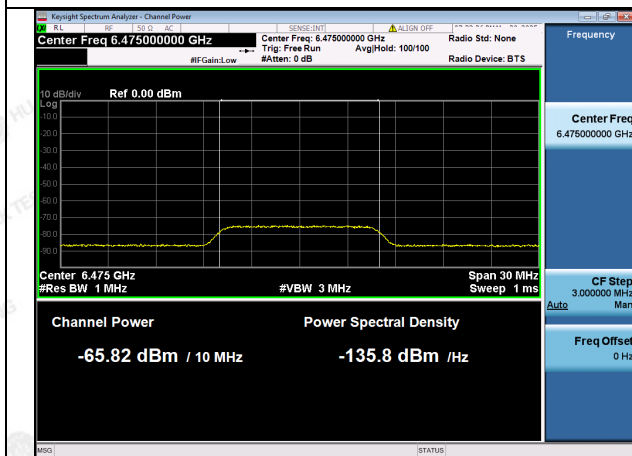
802.11be (EHT160) / CH111 (High Edge)



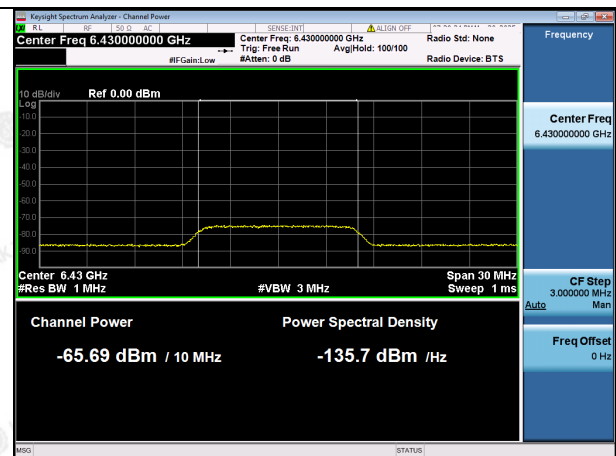


Plots of EUT Ceased Transmission In The Time Domain

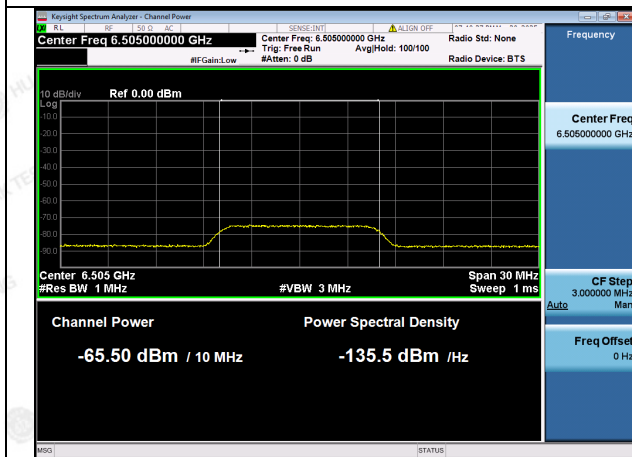
802.11be (EHT20) / CH105



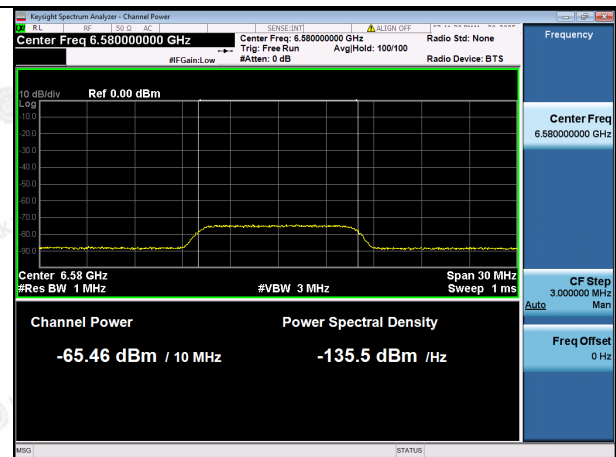
802.11be (EHT160) / CH111 (Low Edge)



802.11be (EHT160) / CH111 (Middle Edge)



802.11be (EHT160) / CH111 (High Edge)





Contention Based Protocol Measurement

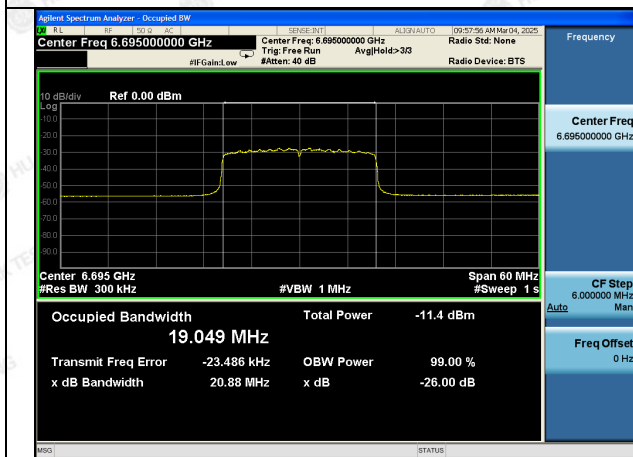
Operation Band	Operation Mode	Channel Bandwidth	Channel number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)		Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status	Test Result
					Freq. (MHz)	Power (dBm)					
U-NII-7	802.11be	20	149	6695	6695	-69.12	3.52	-65.60	-62	OFF	Pass
						-69.16	3.52	-65.64	-62	Minimal	Pass
						-69.23	3.52	-65.71	-62	ON	Pass
		160	143	6665	6590	-69.16	3.52	-65.64	-62	OFF	Pass
						-69.31	3.52	-65.79	-62	Minimal	Pass
						-69.41	3.52	-65.89	-62	ON	Pass
					6665	-69.2	3.52	-65.68	-62	OFF	Pass
						-69.2	3.52	-65.68	-62	Minimal	Pass
						-69.39	3.52	-65.87	-62	ON	Pass
					6740	-68.57	3.52	-65.05	-62	OFF	Pass
						-69.32	3.52	-65.80	-62	Minimal	Pass
						-69.35	3.52	-65.83	-62	ON	Pass

Contention Based Protocol Detection Probability

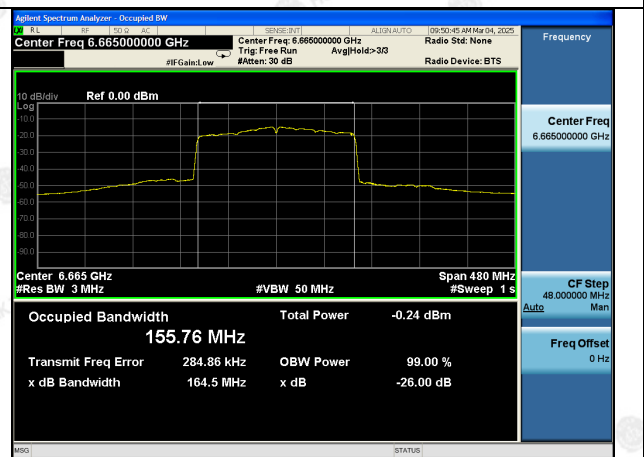
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6695	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6590	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6665	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6740	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass



802.11be (EHT20) / CH149



802.11be (EHT160) / CH143

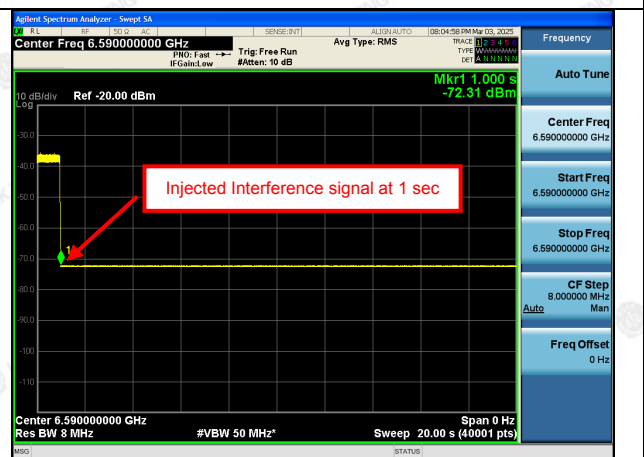


Plots of Incumbent Signal (AWGN) Level

802.11be (EHT20) / CH149



802.11be (EHT160) / CH143 (Low Edge)



802.11be (EHT160) / CH143 (Middle Edge)



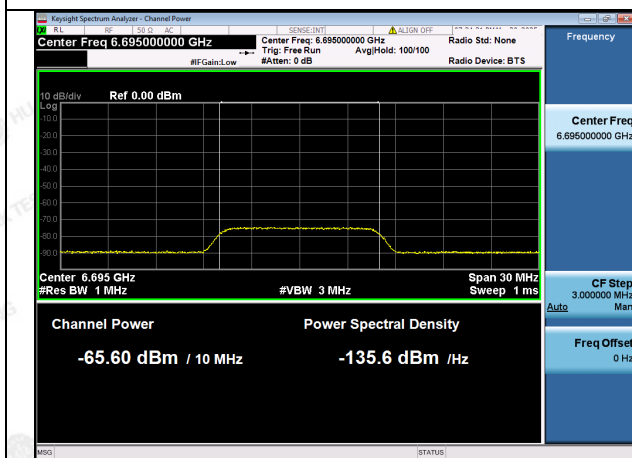
802.11be (EHT160) / CH143 (High Edge)



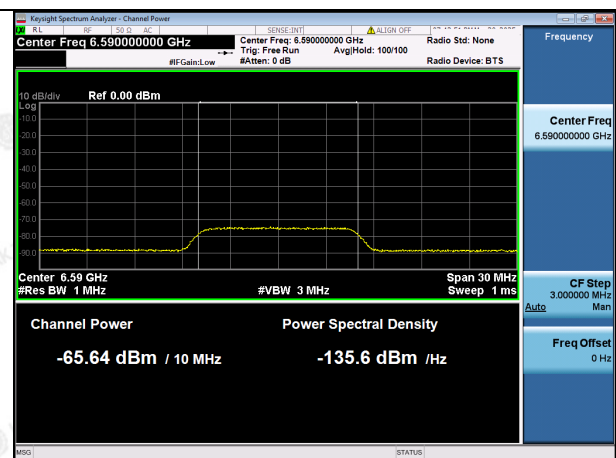


Plots of EUT Ceased Transmission In The Time Domain

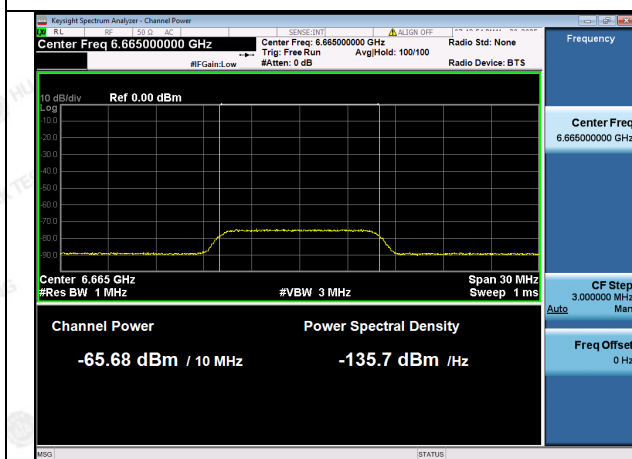
802.11be (EHT20) / CH149



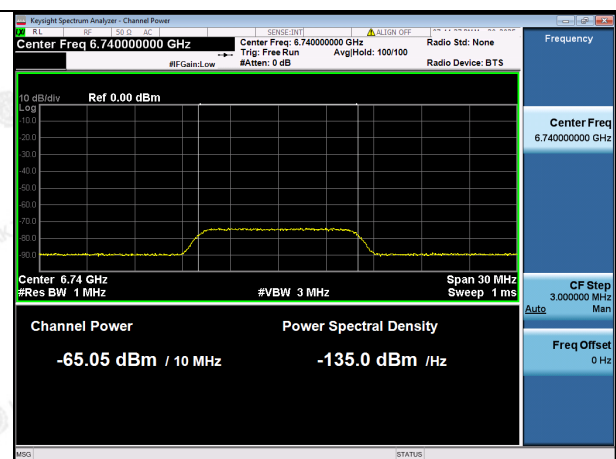
802.11be (EHT160) / CH143 (Low Edge)



802.11be (EHT160) / CH143 (Middle Edge)



802.11be (EHT160) / CH143 (High Edge)





Contention Based Protocol Measurement

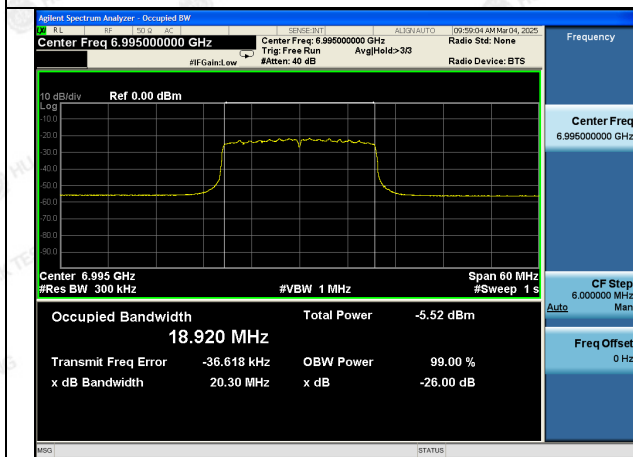
Operation Band	Operation Mode	Channel Bandwidth	Channel number	Channel Frequency (MHz)	AWGN Signal Frequency (MHz)		Antenna Gain (dBi)	Adjusted Power (dBm)	Detection Limit (dBm)	EUT TX Status	Test Result
					Freq. (MHz)	Power (dBm)					
U-NII-8	802.11be	20	209	6995	6995	-68.83	3.52	-65.31	-62	OFF	Pass
						-69.09	3.52	-65.57	-62	Minimal	Pass
						-69.11	3.52	-65.59	-62	ON	Pass
		160	207	6985	6910	-69.19	3.52	-65.67	-62	OFF	Pass
						-69.23	3.52	-65.71	-62	Minimal	Pass
						-69.28	3.52	-65.76	-62	ON	Pass
					6985	-68.59	3.52	-65.07	-62	OFF	Pass
						-69.08	3.52	-65.56	-62	Minimal	Pass
						-69.11	3.52	-65.59	-62	ON	Pass
					7060	-69.15	3.52	-65.63	-62	OFF	Pass
						-69.16	3.52	-65.64	-62	Minimal	Pass
						-69.27	3.52	-65.75	-62	ON	Pass

Contention Based Protocol Detection Probability

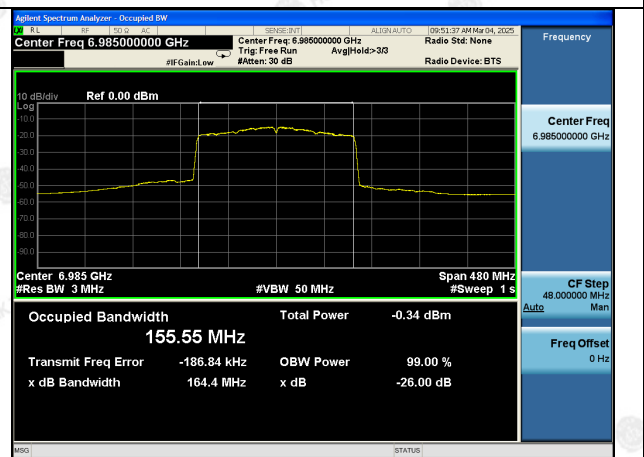
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11be	20	6995	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6910	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6985	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		7060	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass



802.11be (EHT20) / CH209

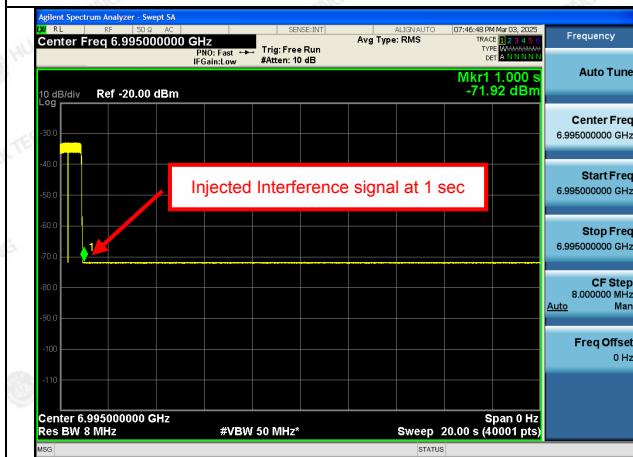


802.11be (EHT160) / CH207



Plots of Incumbent Signal (AWGN) Level

802.11be (EHT20) / CH209



802.11be (EHT160) / CH207 (Low Edge)



802.11be (EHT160) / CH207 (Middle Edge)



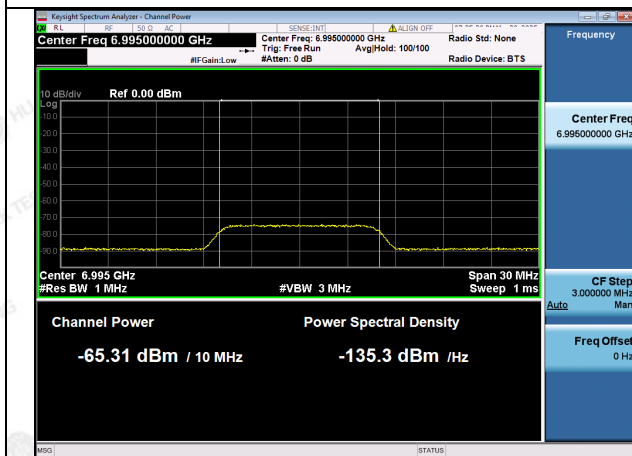
802.11be (EHT160) / CH207 (High Edge)



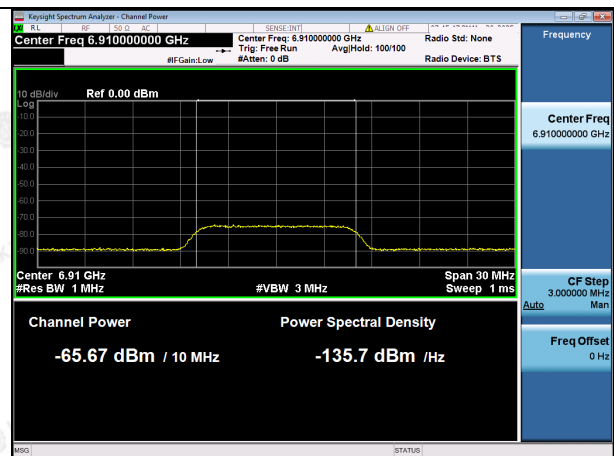


Plots of EUT Ceased Transmission In The Time Domain

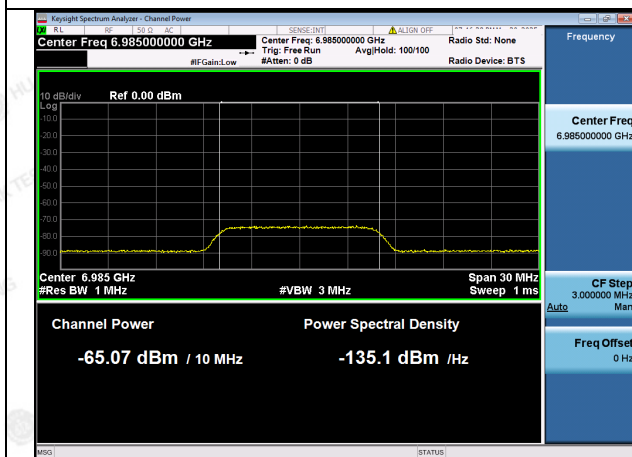
802.11be (EHT20) / CH209



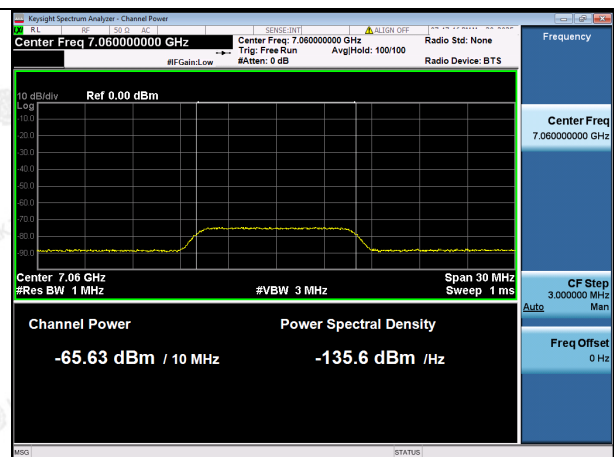
802.11be (EHT160) / CH207 (Low Edge)



802.11be (EHT160) / CH207 (Middle Edge)



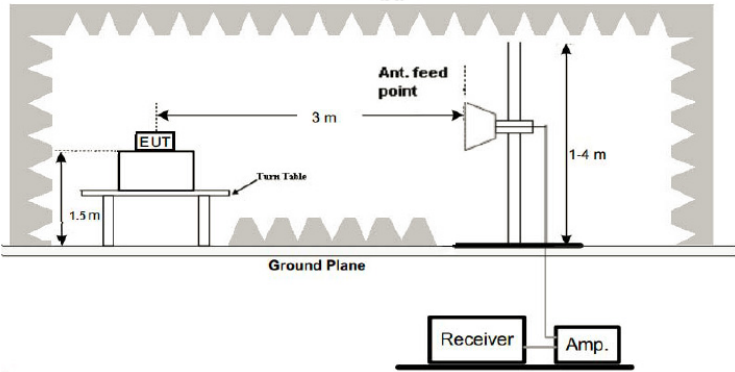
802.11be (EHT160) / CH207 (High Edge)





4.8 Band Edge

4.8.1 Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	In the 5.925-7.125 GHz band, client devices, except fixed client devices, must operate under the control of a standard power access point, indoor access point or subordinate devices; Subordinate devices must operate under the control of an indoor access point.
Test Setup:	 The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a turn table at a height of 1.5 m. The turn table is 3 m away from an antenna feed point. The antenna feed point is mounted on a variable-height antenna tower, with the height ranging from 1-4 m. The entire setup is on a ground plane. A receiver and an amplifier are connected to the antenna feed point.
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



	6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi peak or average method as specified and then reported in a data sheet.
Test Result:	PASS



4.8.2 Test Instruments

Radiated Emission Test Site (966)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	EMCI	EMC051845S	HKE-006	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	Schwarzbeck	BBV 9743	HKE-016	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	A.H. Systems	SAS-574	HKE-182	Feb. 20, 2024	Feb. 19, 2025
6dB Attenuator	Pasternack	6db	HKE-184	Feb. 20, 2024	Feb. 19, 2025
EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	Feb. 20, 2024	Feb. 19, 2025
Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 21, 2024	Feb. 20, 2026
Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 21, 2024	Feb. 20, 2026
Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 21, 2024	Feb. 20, 2026
EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	N/A	N/A
RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	N/A	N/A



4.8.3 Test Data

All modes of operation were investigated and the worst-case emissions of ANT.2 are reported.

802.11a Mode with NII-Band 5 LOW

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5825	53.12	-2.06	51.06	68.2	-17.14	peak
5850	87.33	-1.96	85.37	105.2	-19.83	peak
5900	84.56	-2.87	81.69	110.8	-29.11	peak
5925	109.71	-2.14	107.57	122.2	-14.63	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5825	58.92	-2.06	56.86	68.2	-11.34	peak
5850	87.85	-1.96	85.89	105.2	-19.31	peak
5900	94.24	-2.87	91.37	110.8	-19.43	peak
5925	110.09	-2.14	107.95	122.2	-14.25	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

**802.11a Mode with NII-Band 5 HIGH****Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6425	109.71	-1.97	107.74	122.2	-14.46	peak
6475	94.89	-2.13	92.76	110.8	-18.04	peak
6525	86.46	-2.65	83.81	105.2	-21.39	peak
6550	51.51	-2.28	49.23	68.2	-18.97	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6425	103.32	-1.97	101.35	122.2	-20.85	peak
6475	93.44	-2.13	91.31	110.8	-19.49	peak
6525	87.06	-2.65	84.41	105.2	-20.79	peak
6550	54.21	-2.28	51.93	68.2	-16.27	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

**802.11a Mode with NII-Band 6 LOW****Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6325	56.91	-2.06	54.85	68.2	-13.35	peak
6350	89.84	-1.96	87.88	105.2	-17.32	peak
6400	95.55	-2.87	92.68	110.8	-18.12	peak
6425	113.73	-2.14	111.59	122.2	-10.61	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6325	56.51	-2.06	54.45	68.2	-13.75	peak
6350	96.32	-1.96	94.36	105.2	-10.84	peak
6400	95.69	-2.87	92.82	110.8	-17.98	peak
6425	111.82	-2.14	109.68	122.2	-12.52	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

**802.11a Mode with NII-Band 6 HIGH****Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6525	109.11	-1.97	107.14	122.2	-15.06	peak
6575	93.24	-2.13	91.11	110.8	-19.69	peak
6625	97.59	-2.65	94.94	105.2	-10.26	peak
6650	53.78	-2.28	51.5	68.2	-16.7	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6525	107.52	-1.97	105.55	122.2	-16.65	peak
6575	94.96	-2.13	92.83	110.8	-17.97	peak
6625	88.73	-2.65	86.08	105.2	-19.12	peak
6650	56.24	-2.28	53.96	68.2	-14.24	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

**802.11a Mode with NII-Band 7 LOW****Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6425	58.62	-2.06	56.56	68.2	-11.64	peak
6450	91.19	-1.96	89.23	105.2	-15.97	peak
6500	93.25	-2.87	90.38	110.8	-20.42	peak
6525	110.07	-2.14	107.93	122.2	-14.27	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6425	58.45	-2.06	56.39	68.2	-11.81	peak
6450	91.78	-1.96	89.82	105.2	-15.38	peak
6500	98.21	-2.87	95.34	110.8	-15.46	peak
6525	111.65	-2.14	109.51	122.2	-12.69	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



802.11a Mode with NII-Band 7 HIGH

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6875	106.36	-1.97	104.39	122.2	-17.81	peak
6925	92.84	-2.13	90.71	110.8	-20.09	peak
6975	88.97	-2.65	86.32	105.2	-18.88	peak
7000	53.19	-2.28	50.91	68.2	-17.29	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6875	106.08	-1.97	104.11	122.2	-18.09	peak
6925	92.35	-2.13	90.22	110.8	-20.58	peak
6975	87.71	-2.65	85.06	105.2	-20.14	peak
7000	53.84	-2.28	51.56	68.2	-16.64	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



802.11a Mode with NII-Band 8 LOW

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6775	56.88	-2.06	54.82	68.2	-13.38	peak
6800	87.82	-1.96	85.86	105.2	-19.34	peak
6850	95.76	-2.87	92.89	110.8	-17.91	peak
6875	108.11	-2.14	105.97	122.2	-16.23	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
6775	59.99	-2.06	57.93	68.2	-10.27	peak
6800	90.25	-1.96	88.29	105.2	-16.91	peak
6850	94.68	-2.87	91.81	110.8	-18.99	peak
6875	106.71	-2.14	104.57	122.2	-17.63	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

**802.11a Mode with NII-Band 8 HIGH****Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
7125	110.24	-1.97	108.27	122.2	-13.93	peak
7175	93.65	-2.13	91.52	110.8	-19.28	peak
7225	87.76	-2.65	85.11	105.2	-20.09	peak
7250	53.83	-2.28	51.55	68.2	-16.65	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

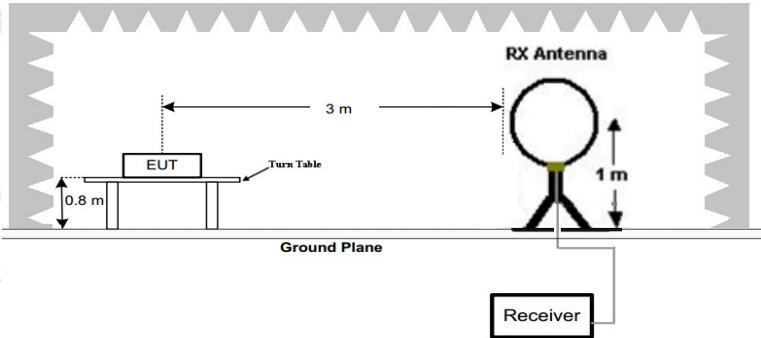
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
7125	109.14	-1.97	107.17	122.2	-15.03	peak
7175	93.36	-2.13	91.23	110.8	-19.57	peak
7225	87.98	-2.65	85.33	105.2	-19.87	peak
7250	55.14	-2.28	52.86	68.2	-15.34	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



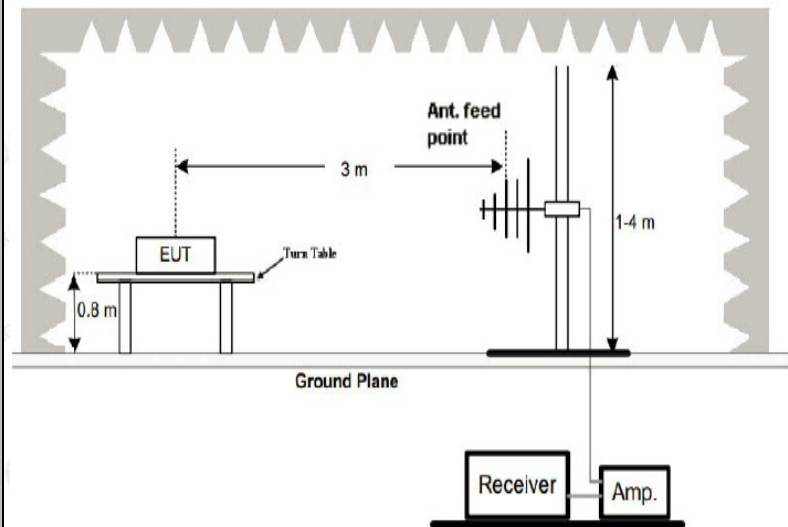
4.9 Spurious Emission

4.9.1.1 Test Specification

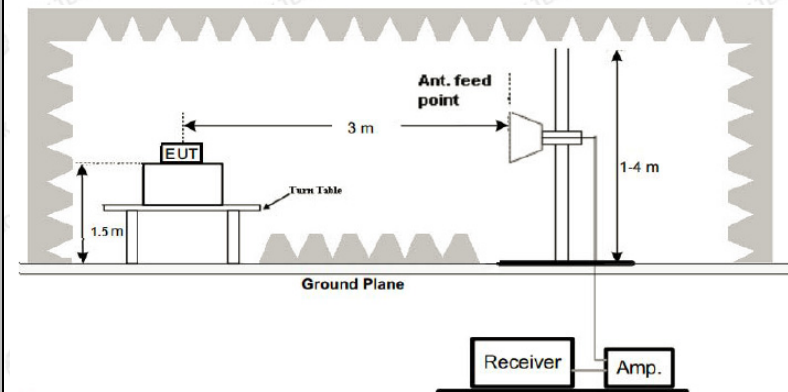
Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation Mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz. The limit of frequency below 1GHz and which fall in restricted bands should comply 15.209.				
Test Setup:	For radiated emissions below 30MHz 				



30MHz to 1GHz



Above 1GHz

**Test Procedure:**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.



	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Results:	PASS

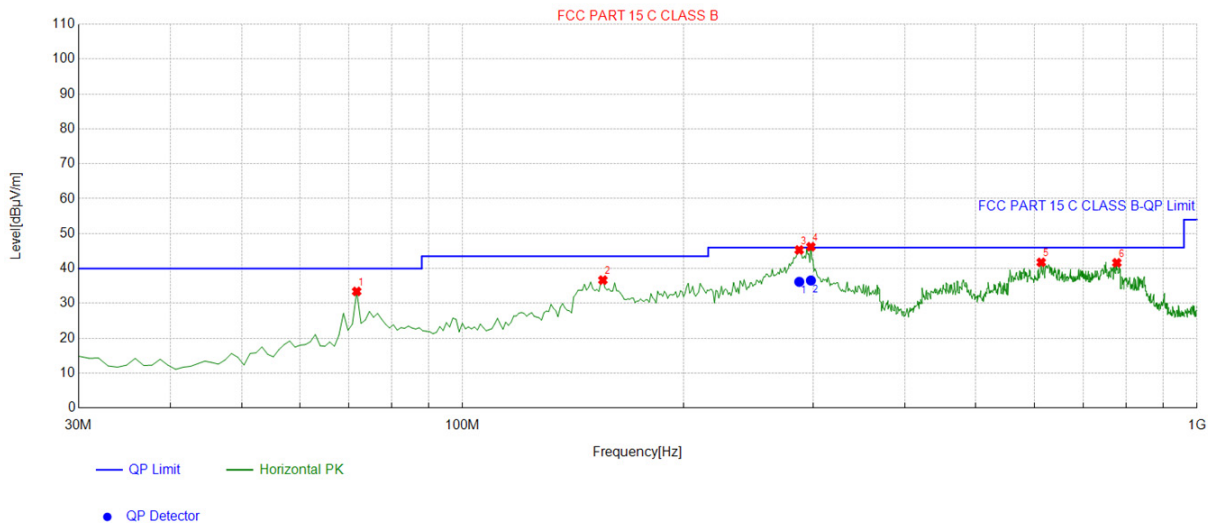


4.9.2 Test Data

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

Below 1GHz

Horizontal



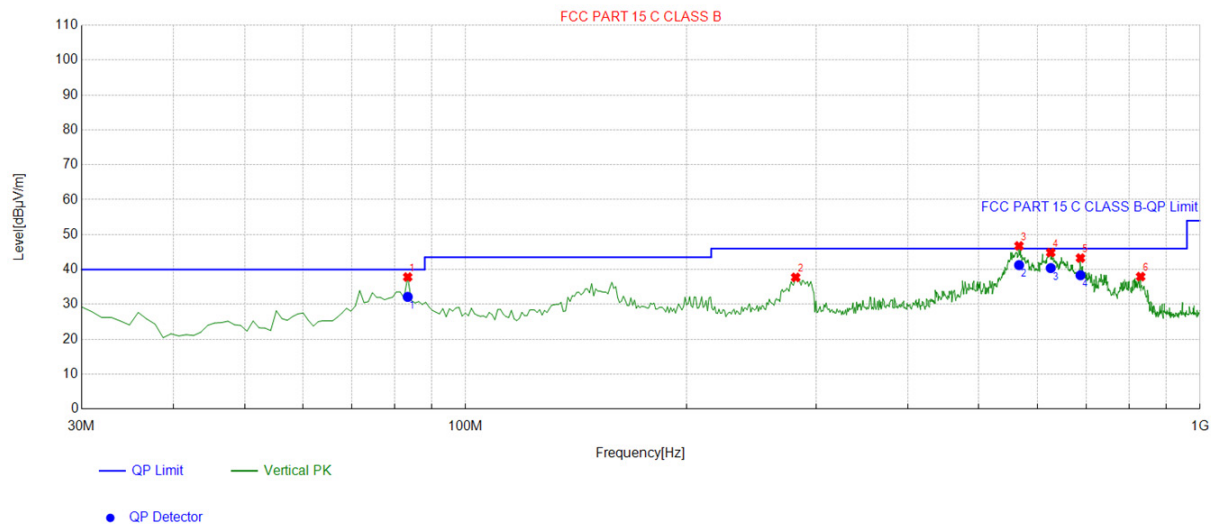
Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	71.751752	-17.38	50.80	33.42	40.00	6.58	100	239	Horizontal
2	155.25525	-17.80	54.46	36.66	43.50	6.84	100	207	Horizontal
3	287.30730	-12.28	57.59	45.31	46.00	0.69	100	201	Horizontal
4	297.98798	-11.79	58.02	46.23	46.00	-0.23	100	218	Horizontal
5	613.55355	-5.55	47.31	41.76	46.00	4.24	100	178	Horizontal
6	777.64764	-4.35	45.98	41.63	46.00	4.37	100	54	Horizontal

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBμV/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	287.3073	-12.28	48.47	36.19	46.00	9.81	100	201	Horizontal
2	297.9879	-11.79	48.35	36.56	46.00	9.44	100	218	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.



Vertical



Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	83.403403	-18.05	55.88	37.83	40.00	2.17	100	122	Vertical
2	158.16816	-17.83	54.14	36.31	43.50	7.19	100	14	Vertical
3	566.94694	-6.08	52.83	46.75	46.00	-0.75	100	247	Vertical
4	626.17617	-5.35	50.19	44.84	46.00	1.16	100	281	Vertical
5	687.34734	-4.32	47.59	43.27	46.00	2.73	100	209	Vertical
6	830.08008	-2.25	40.20	37.95	46.00	8.05	100	344	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBμV/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	83.40340	-18.05	50.21	32.16	40.00	7.84	100	122	Vertical
2	566.9469	-6.08	47.34	41.26	46.00	4.74	100	247	Vertical
3	626.1761	-5.35	45.75	40.40	46.00	5.60	100	281	Vertical
4	687.3473	-4.32	42.67	38.35	46.00	7.65	100	209	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Pre-amplifier; Level = Reading + Factor; Margin = Level-Limit.

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
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Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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All modes of operation were investigated and the worst-case of MIMO are reported.

LOW CH01 (802.11 ax Mode with NII-Band 5)/5955

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3368	53.96	-4.59	49.37	68.2	-18.83	peak
11910	49.15	4.21	53.36	68.2	-14.84	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3368	58.22	-4.59	53.63	68.2	-14.57	peak
11910	54.37	4.21	58.58	68.2	-9.62	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



MID CH45 (802.11 ax Mode with NII-Band 5)/6175

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	58.08	-4.59	53.49	68.2	-14.71	peak
12350	51.41	4.21	55.62	68.2	-12.58	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	57.32	-4.59	52.73	68.2	-15.47	peak
12350	52.96	4.21	57.17	68.2	-11.03	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.



HIGH CH93 (802.11 ax Mode with NII-Band 5)/6415

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	57.07	-4.59	52.48	74	-21.52	peak
2705	49.18	-4.59	44.59	54	-9.41	AVG
12830	54.42	4.84	59.26	74	-14.74	peak
12830	36.79	4.84	41.63	54	-12.37	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	59.81	-4.59	55.22	74	-18.78	peak
2705	44.63	-4.59	40.04	54	-13.96	AVG
12830	50.57	4.84	55.41	74	-18.59	peak
12830	38.11	4.84	42.95	54	-11.05	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



LOW CH01 (802.11 be Mode with NII-Band 5)/5955

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3368	56.36	-4.59	51.77	68.2	-16.43	peak
11910	41.27	4.21	45.48	68.2	-22.72	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3368	54.82	-4.59	50.23	68.2	-17.97	peak
11910	36.74	4.21	40.95	68.2	-27.25	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



MID CH45 (802.11 be Mode with NII-Band 5)/6175

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	55.4	-4.59	50.81	68.2	-17.39	peak
12350	39.2	4.21	43.41	68.2	-24.79	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	54.35	-4.59	49.76	68.2	-18.44	peak
12350	35.3	4.21	39.51	68.2	-28.69	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.



HIGH CH93 (802.11 be Mode with NII-Band 5)/6415

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	54.64	-4.59	50.05	74	-23.95	peak
2705	41.05	-4.59	36.46	54	-17.54	AVG
12830	54.62	4.84	59.46	74	-14.54	peak
12830	37.51	4.84	42.35	54	-11.65	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	55.42	-4.59	50.83	74	-23.17	peak
2705	40.78	-4.59	36.19	54	-17.81	AVG
12830	54.15	4.84	58.99	74	-15.01	peak
12830	35.05	4.84	39.89	54	-14.11	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



4.10 Frequency Stability Measurement

4.10.1 Test Specification

Test Requirement:	FCC Part15 Section 15.407(g)
Test Method:	ANSI C63.10: 2013
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Setup:	<pre>graph LR; SA[Spectrum Analyzer] --- EUT[EUT]; EUT --- TCh[Temperature Chamber]; TCh --- P[AC/DC Power supply];</pre>
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test Result:	PASS
Remark:	N/A

**Test Result as follows:**

Mode	Voltage (V)	FHL (5925MHz)	Deviation (KHz)	FHH (6425MHz)	Deviation (KHz)
U-NII 5 band	102V	5924.991	-9	6425.035	35
	120V	5925.017	17	6425.072	72
	138V	5925.023	23	6424.961	-39

Mode	Temperature (°C)	FHL (5925MHz)	Deviation (KHz)	FHH (6425MHz)	Deviation (KHz)
U-NII-5 band	-30	5924.952	-48	6424.937	-63
	-20	5924.987	-13	6424.934	-66
	-10	5925.015	15	6425.038	38
	0	5924.999	-1	6425.047	47
	10	5924.976	-24	6424.996	-4
	20	5925.031	31	6424.978	-22
	30	5925.015	15	6424.990	-10
	40	5925.027	27	6425.009	9
	50	5924.996	-4	6425.011	11



Mode	Voltage (V)	FHL (6425MHz)	Deviation (KHz)	FHH (6525MHz)	Deviation (KHz)
U-NII 6 band	102V	6425.034	34	6525.007	7
	120V	6424.933	-67	6524.994	-6
	138V	6424.938	-62	6525.013	13

Mode	Temperature (°C)	FHL (6425MHz)	Deviation (KHz)	FHH (6525MHz)	Deviation (KHz)
U-NII-6 band	-30	6425.011	11	6525.027	27
	-20	6424.956	-44	6524.999	-1
	-10	6424.975	-25	6524.982	-18
	0	6425.015	15	6525.011	11
	10	6425.008	8	6525.015	15
	20	6424.995	-5	6524.989	-11
	30	6424.937	-63	6524.984	-16
	40	6425.007	7	6525.011	11
	50	6425.024	24	6524.995	-5



Mode	Voltage (V)	FHL (6525MHz)	Deviation (KHz)	FHH (6875MHz)	Deviation (KHz)
U-NII 7 band	102V	6525.008	8	6875.005	5
	120V	6524.981	-19	6874.964	-36
	138V	6524.966	-34	6874.975	-25

Mode	Temperature (°C)	FHL (6525MHz)	Deviation (KHz)	FHH (6875MHz)	Deviation (KHz)
U-NII-7 band	-30	6525.004	4	6875.014	14
	-20	6525.021	21	6874.985	-15
	-10	6524.974	-26	6874.987	-13
	0	6524.985	-15	6874.982	-18
	10	6525.012	12	6875.054	54
	20	6524.981	-19	6875.030	30
	30	6524.995	-5	6874.988	-12
	40	6525.023	23	6875.031	31
	50	6525.021	21	6875.014	14



Mode	Voltage (V)	FHL (6875MHz)	Deviation (KHz)	FHH (7125MHz)	Deviation (KHz)
U-NII 8 band	102V	6875.041	41	7125.016	16
	120V	6874.967	-33	7124.978	-22
	138V	6875.025	25	7124.995	-5

Mode	Temperature (°C)	FHL (6875MHz)	Deviation (KHz)	FHH (7125MHz)	Deviation (KHz)
U-NII-8 band	-30	6875.004	4	7125.011	11
	-20	6874.995	-5	7125.011	11
	-10	6874.991	-9	7124.978	-22
	0	6875.012	12	7124.937	-63
	10	6874.986	-14	7124.964	-36
	20	6875.022	22	7124.995	-5
	30	6874.986	-14	7125.017	17
	40	6875.01	10	7125.015	15
	50	6875.023	23	7125.003	3



4.11 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is FPC antenna, need professional installation, not easy to remove. It conforms to the standard requirements. and the best case gain of the antenna is Antenna port 1: 3.52dBi and Antenna port 2: 3.35dBi.

WIFI ANTENNA

