

5. Power Spectral Density

5.1. Test Setup



5.2. Limit

5.2.1 FCC

According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.2.2 IC

According to RSS-247 Issue 4, 6.3.1(b), the transmitter power spectral density conducted from the transmitter to the antenna(s) shall not be greater than 8 dBm/3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 6.3.2 The power spectral density shall be determined using the same method as is used to determine the maximum conducted output power.

5.3. Test Procedure

The measurements are recorded using the PKPSD measurement procedure in section 11.10.2 of ANSI C63.10-2020 (for FCC) and ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024 (for ISSED).

- The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and is optional if the maximum conducted (average) output power was used to determine compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span > 1.5 times the DTS bandwidth.
3. Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq [3 \times \text{RBW}]$.
5. Detector = peak.
6. Sweep time = No faster than coupled (auto) time.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Note;

- For test plots, the reading values shown in plots were final results because all path loss of the cable and attenuator were investigated and compensated to spectrum analyzer as TDF function.

5.4. Test Results

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 %

- Legacy

Operation Mode	Channel	Frequency (MHz)	Measured PSD (dB m/3 kHz)	Limit (dB m/3 kHz)
11b	Low	2 412	-12.53	8
	Middle	2 437	-13.43	
	High	2 462	-14.05	
11g	Low	2 412	-14.47	
	Middle	2 437	-15.77	
	High	2 462	-15.34	
11n_HT20	Low	2 412	-13.57	
	Middle	2 437	-16.15	
	High	2 462	-14.71	

- 11ax_HE20

Operation Mode	Channel	Frequency (MHz)	Measured PSD (dB m/3 kHz)	Limit (dB m/3 kHz)
11ax_HE20 26T_0RU	Low	2 412	-14.07	8
	Middle	2 437	-14.26	
	High	2 462	-14.39	
11ax_HE20 26T_4RU	Low	2 412	-14.68	
	Middle	2 437	-14.10	
	High	2 462	-14.03	
11ax_HE20 26T_8RU	Low	2 412	-13.88	
	Middle	2 437	-12.89	
	High	2 462	-14.92	
11ax_HE20 52T_37RU	Low	2 412	-16.08	
	Middle	2 437	-16.82	
	High	2 462	-17.41	
11ax_HE20 52T_38RU	Low	2 412	-16.50	
	Middle	2 437	-16.04	
	High	2 462	-16.35	
11ax_HE20 52T_40RU	Low	2 412	-16.24	
	Middle	2 437	-16.76	
	High	2 462	-17.91	
11ax_HE20 106T_53RU	Low	2 412	-17.77	
	Middle	2 437	-18.50	
	High	2 462	-18.33	
11ax_HE20 106T_54RU	Low	2 412	-17.95	
	Middle	2 437	-18.13	
	High	2 462	-17.64	
11ax_HE20 242T_61RU	Low	2 412	-21.31	
	Middle	2 437	-21.48	
	High	2 462	-22.82	
11ax_HE20 SU	Low	2 412	-16.57	
	Middle	2 437	-16.20	
	High	2 462	-16.37	

Test plots

11b

Low Channel



Middle Channel

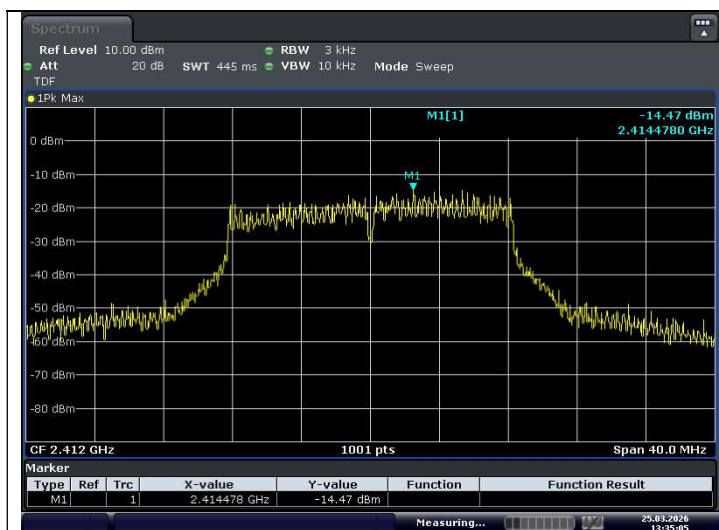


High Channel

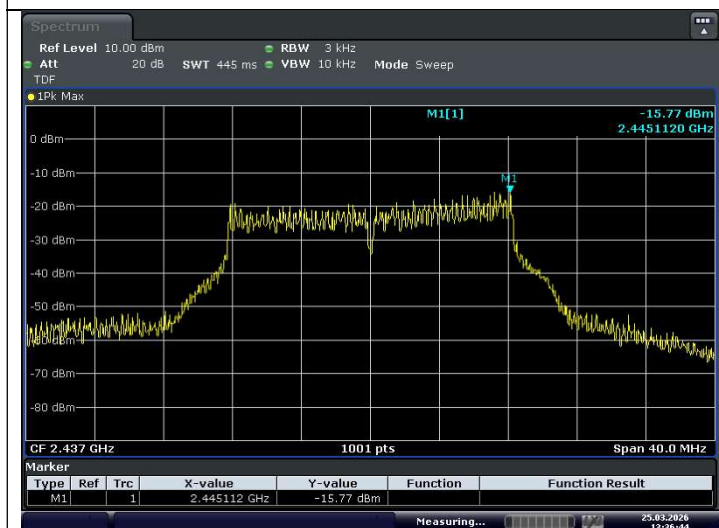


11g

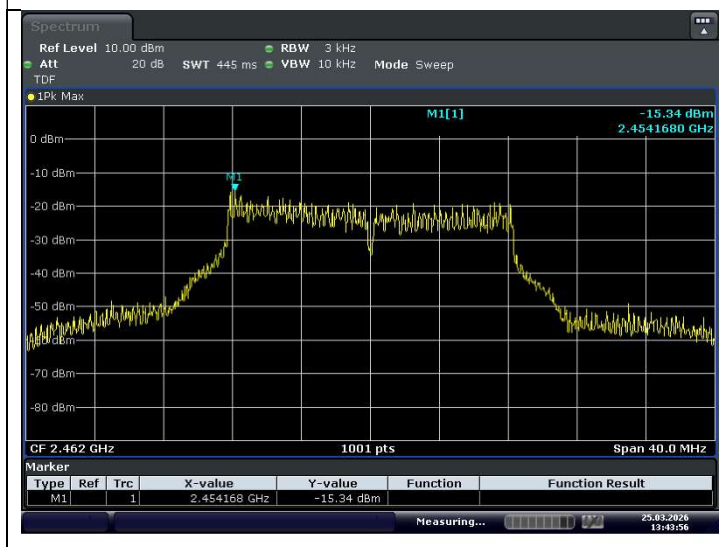
Low Channel



Middle Channel

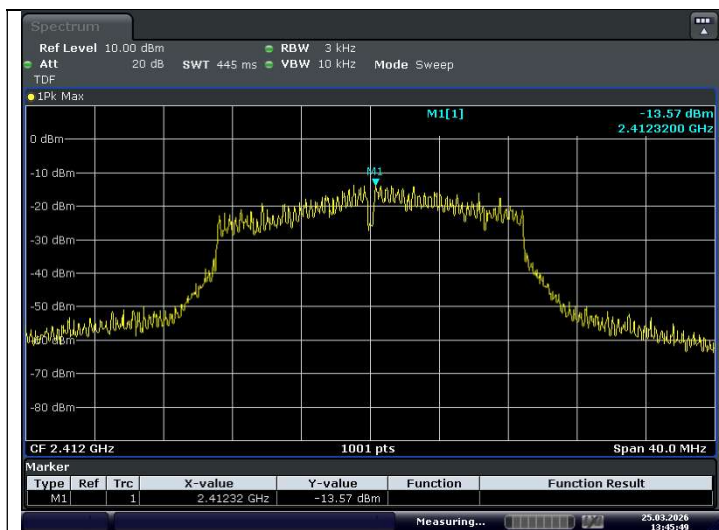


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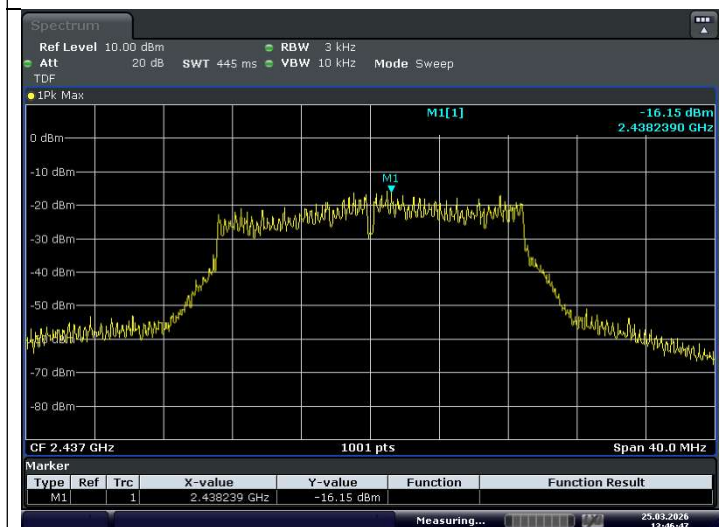


11n_HT20

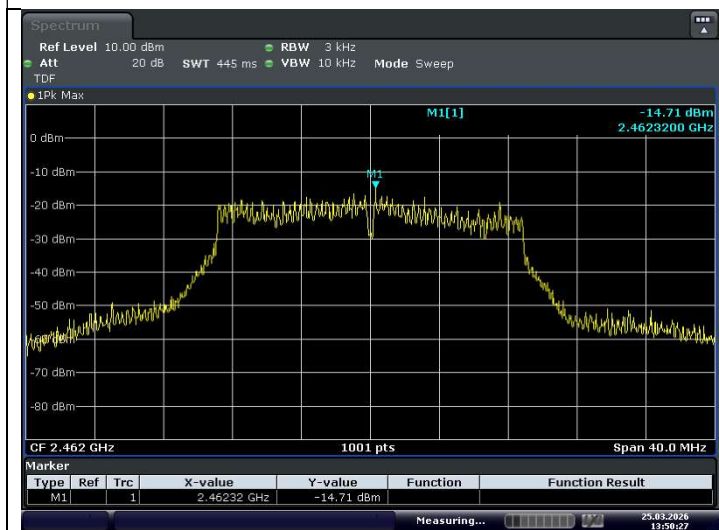
Low Channel



Middle Channel

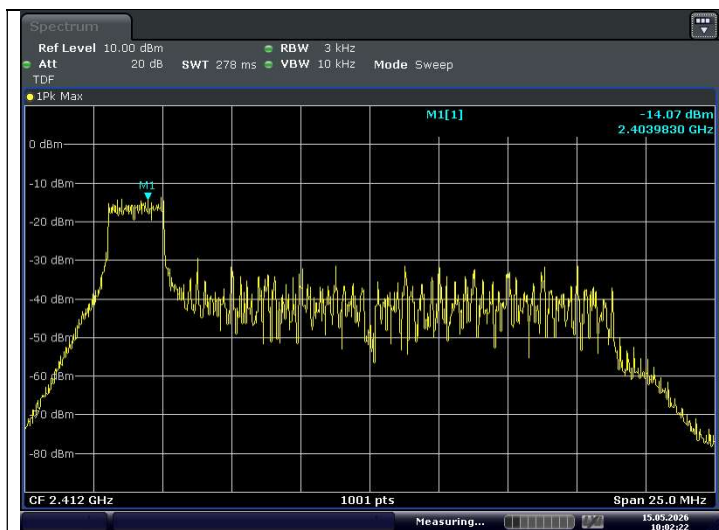


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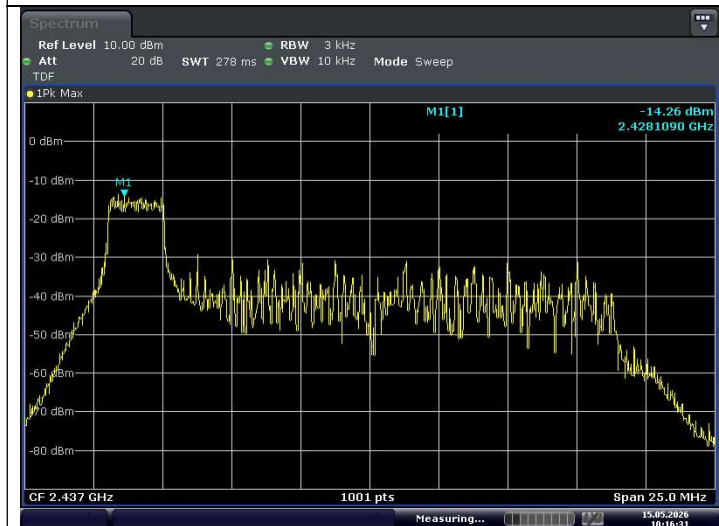


11ax_HE20_26T_0RU

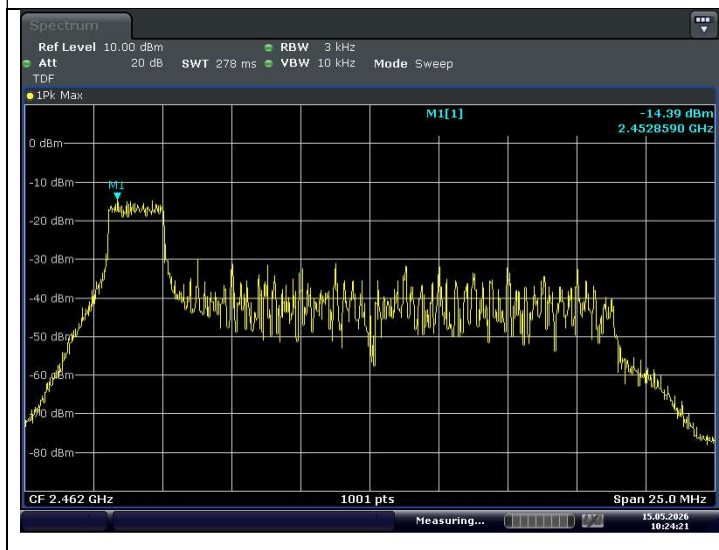
Low Channel



Middle Channel

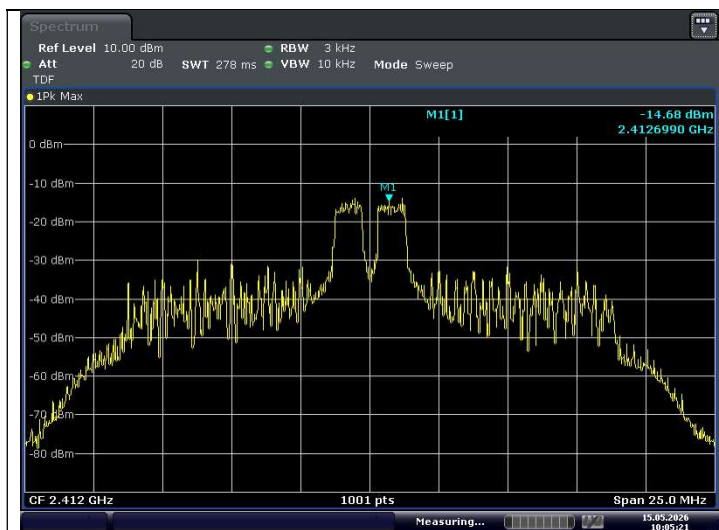


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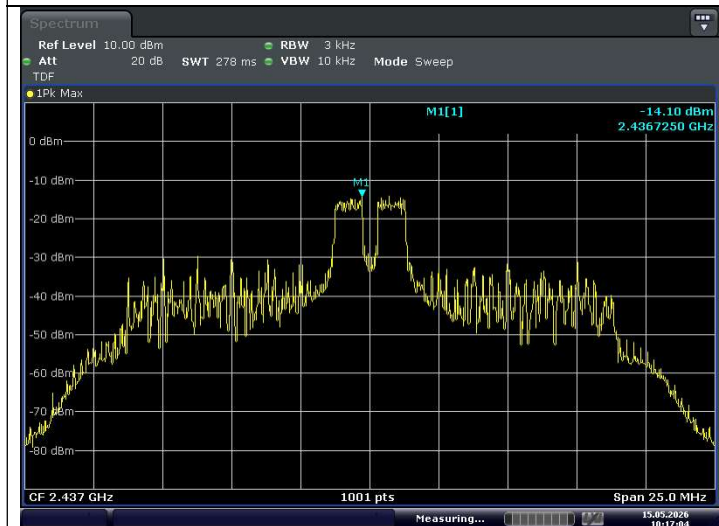


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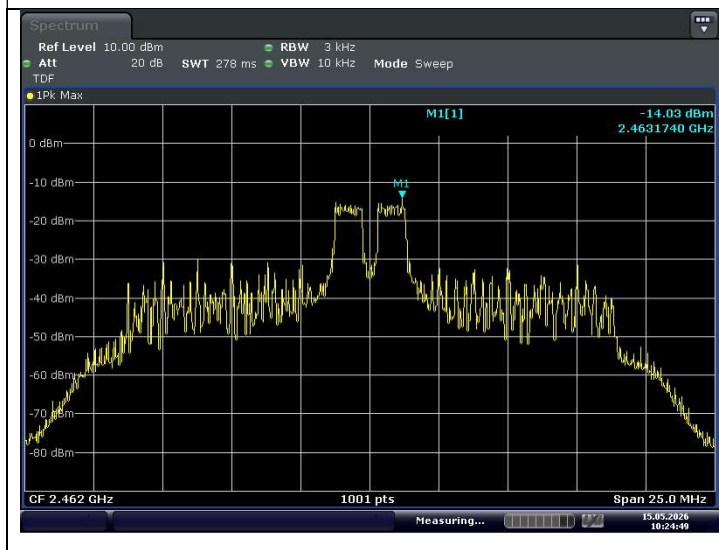
Low Channel



Middle Channel

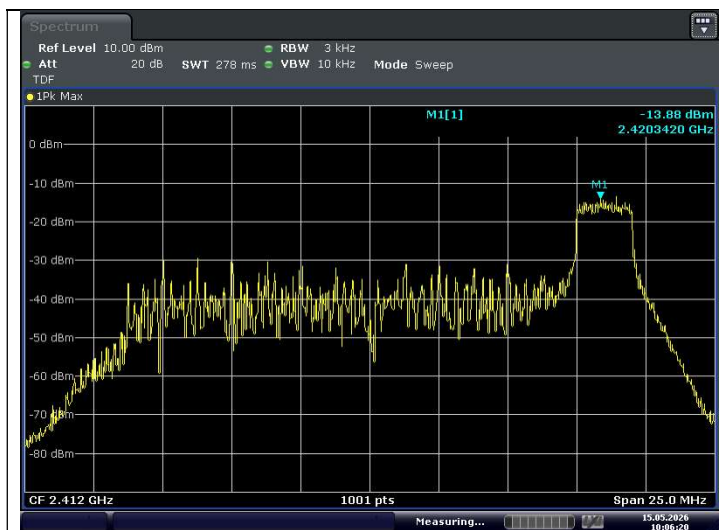


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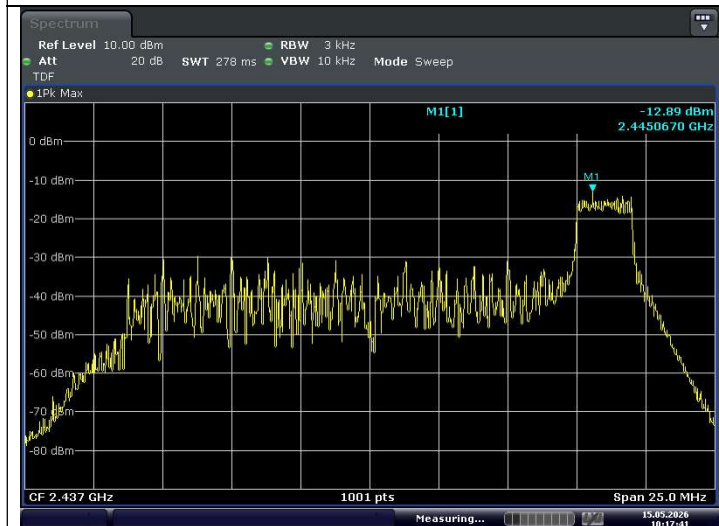


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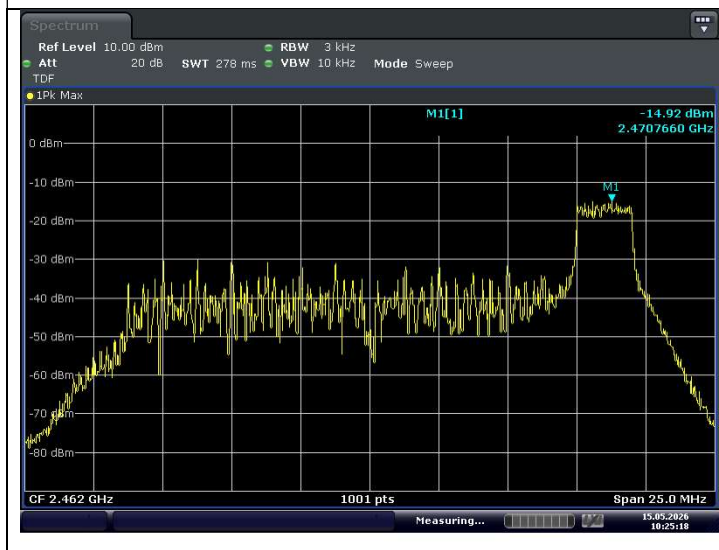
Low Channel



Middle Channel



High Channel

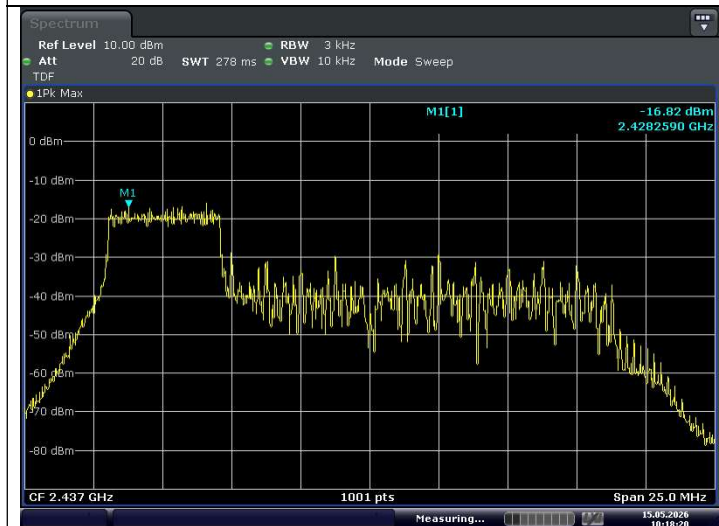


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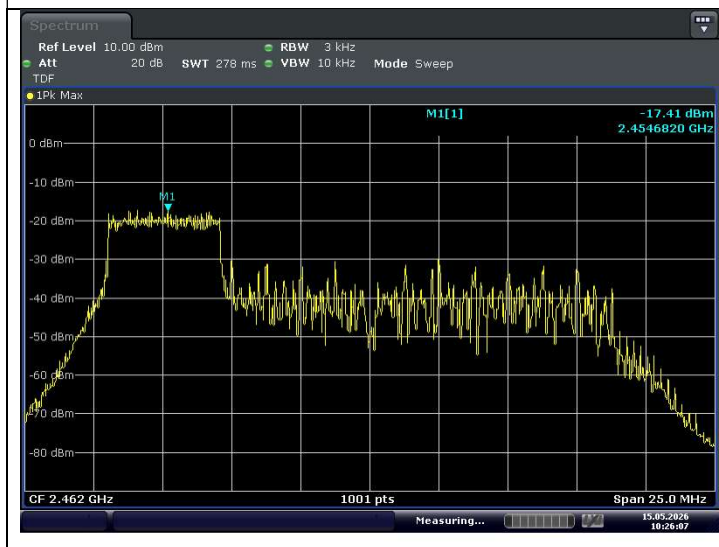
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Middle Channel

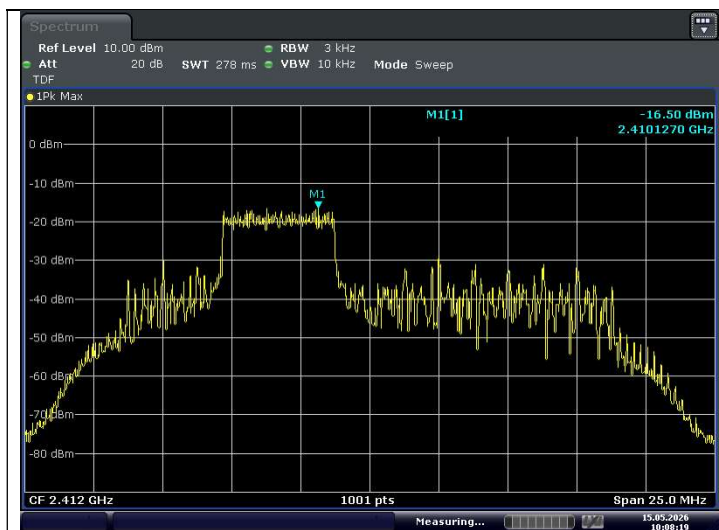


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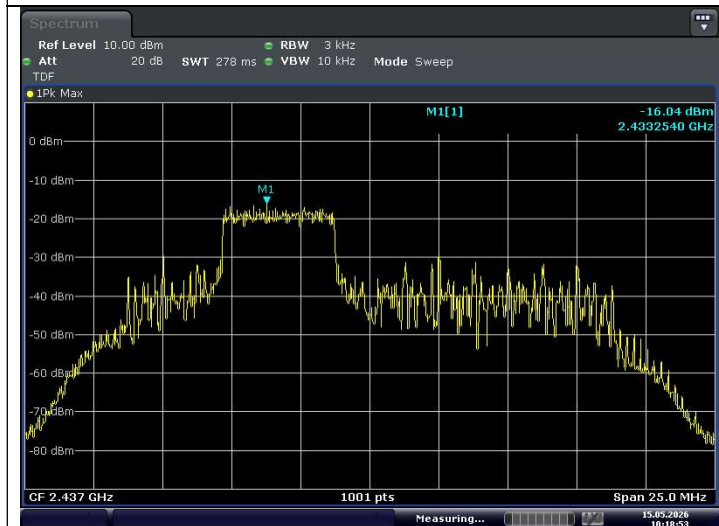


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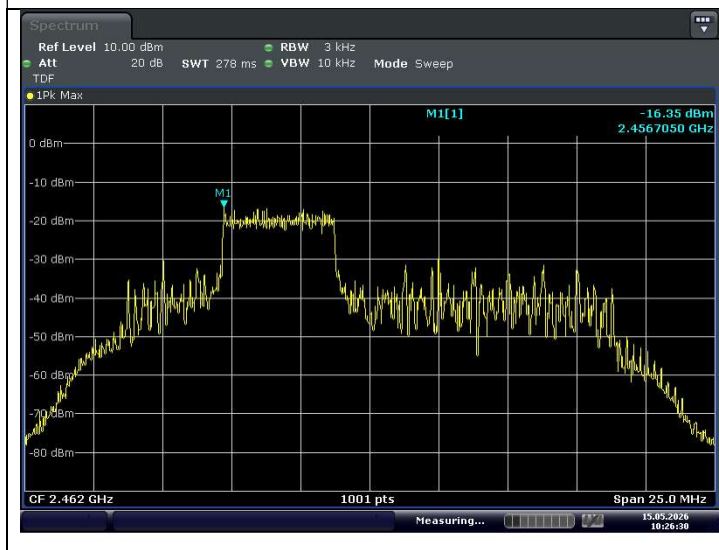
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Middle Channel

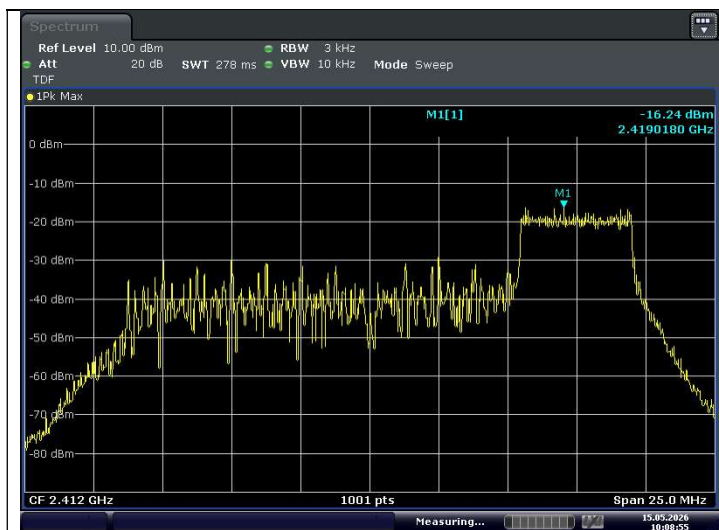


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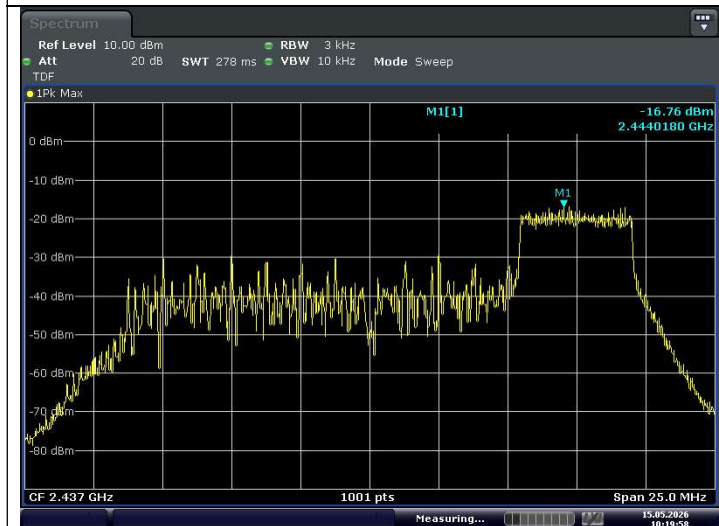


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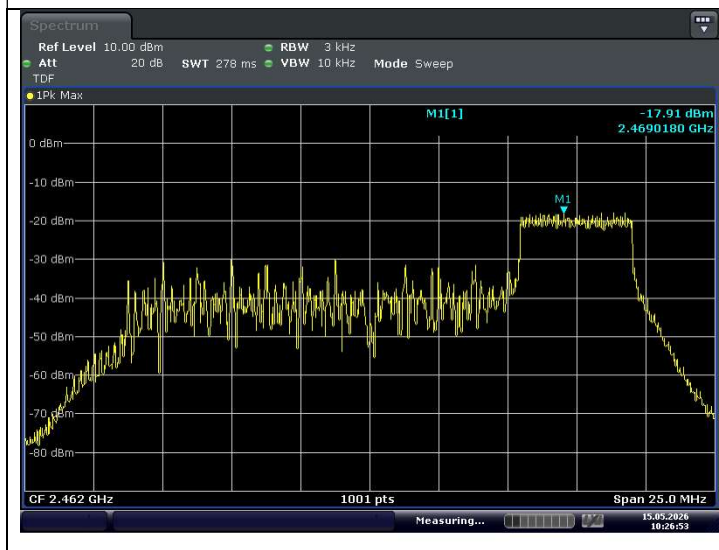
Low Channel



Middle Channel

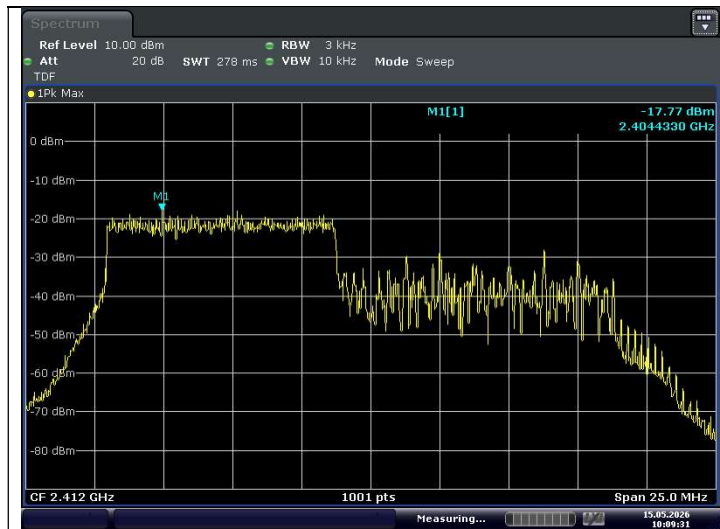


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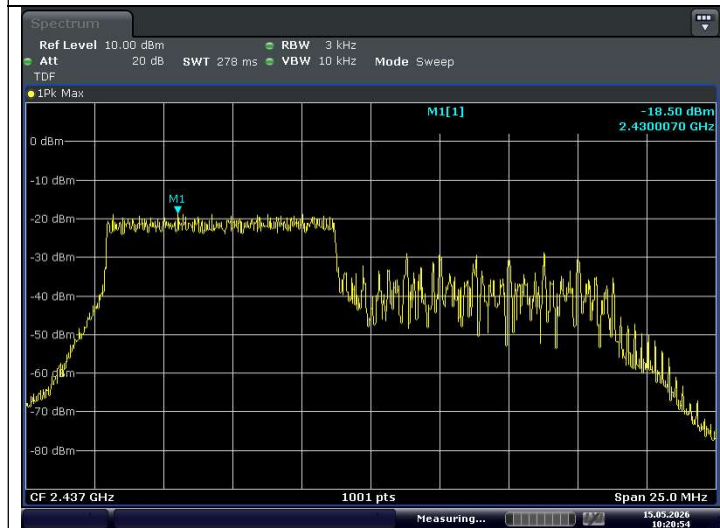


11ax_HE20_106T_53RU

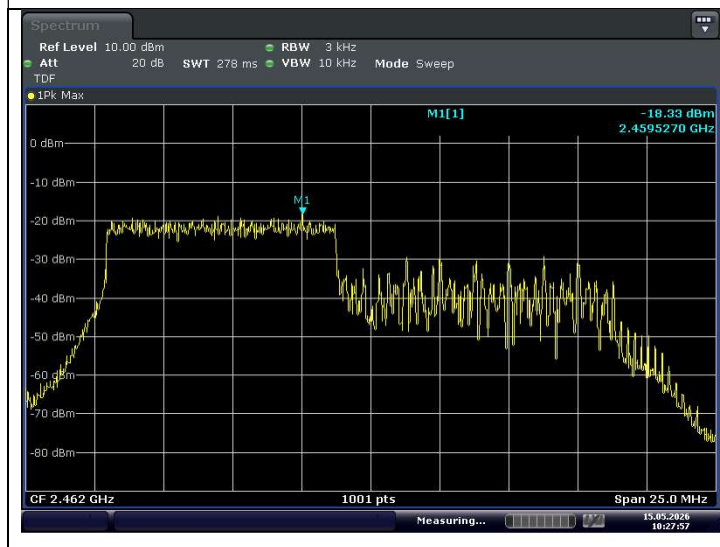
Low Channel



Middle Channel

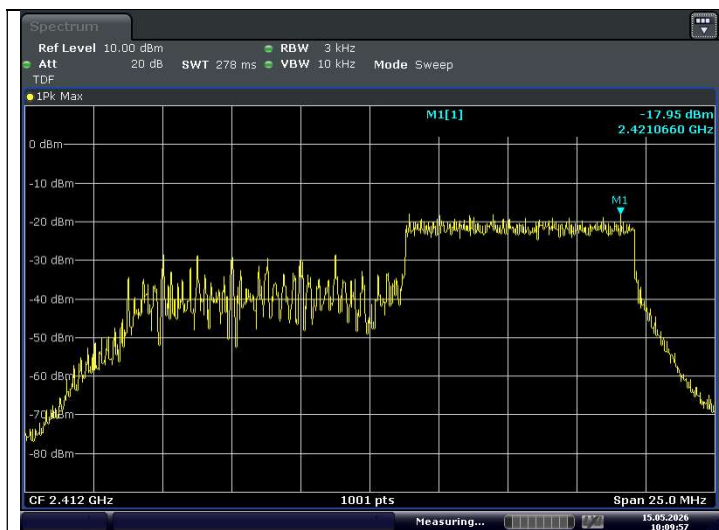


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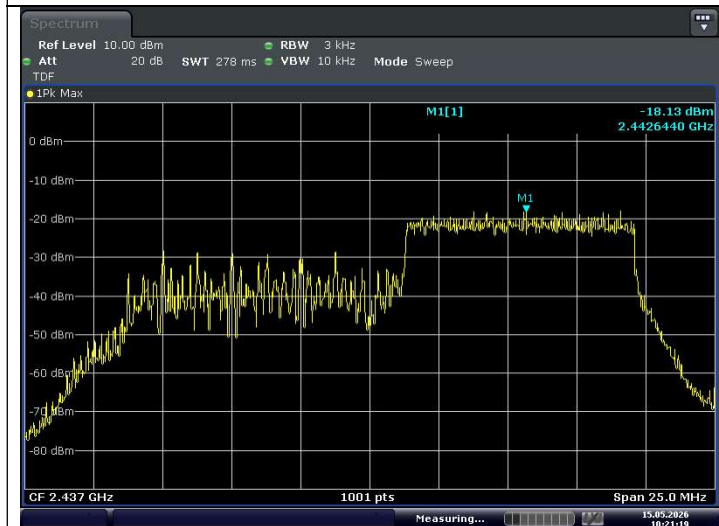


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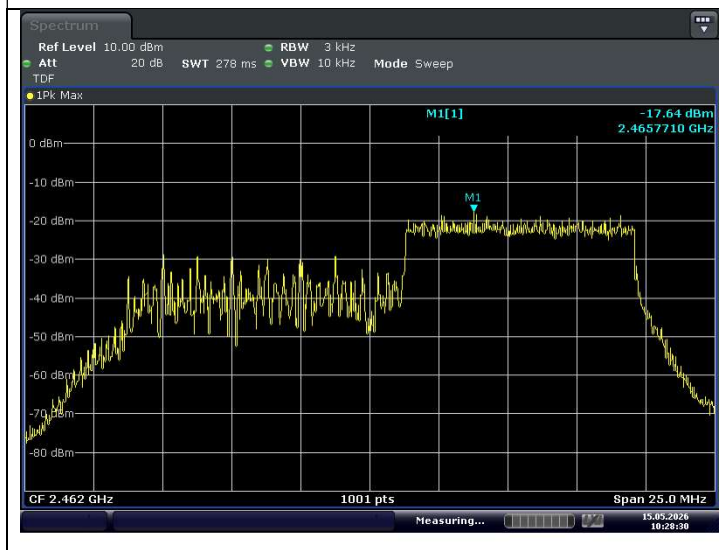
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Middle Channel

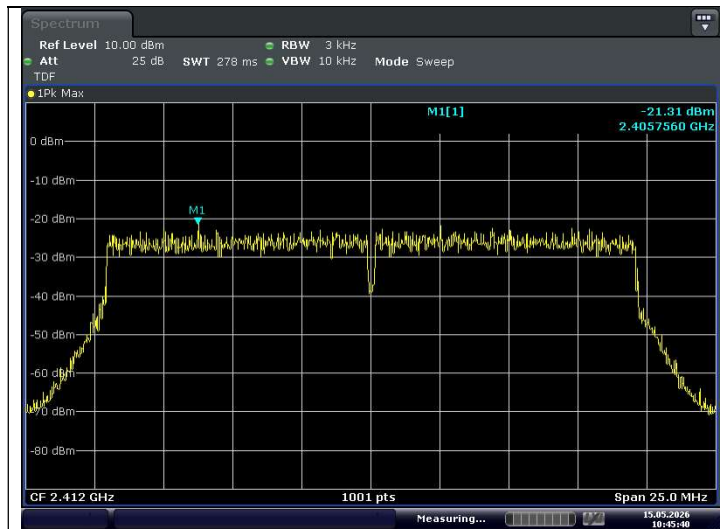


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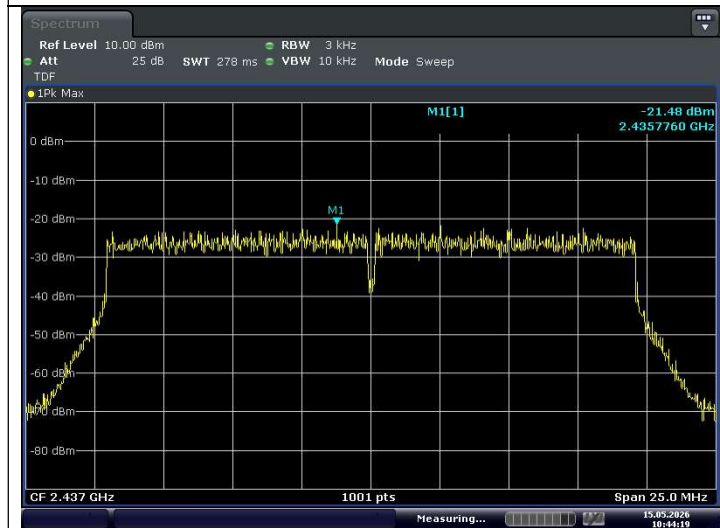


11ax_HE20_242T_61RU

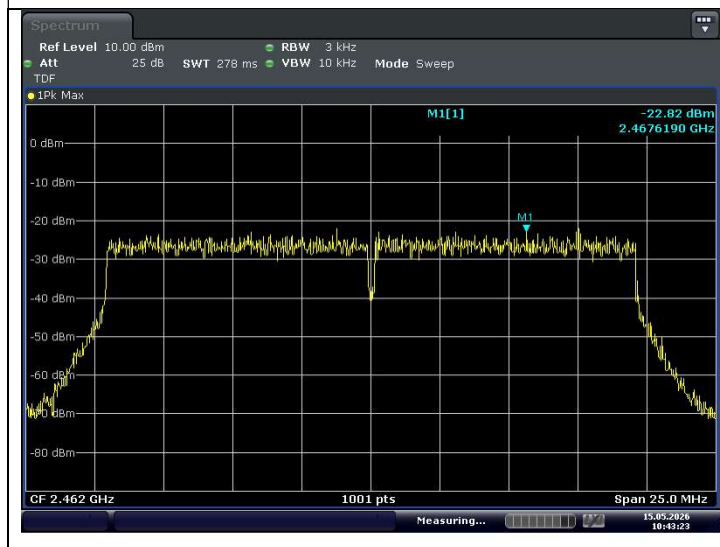
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Middle Channel

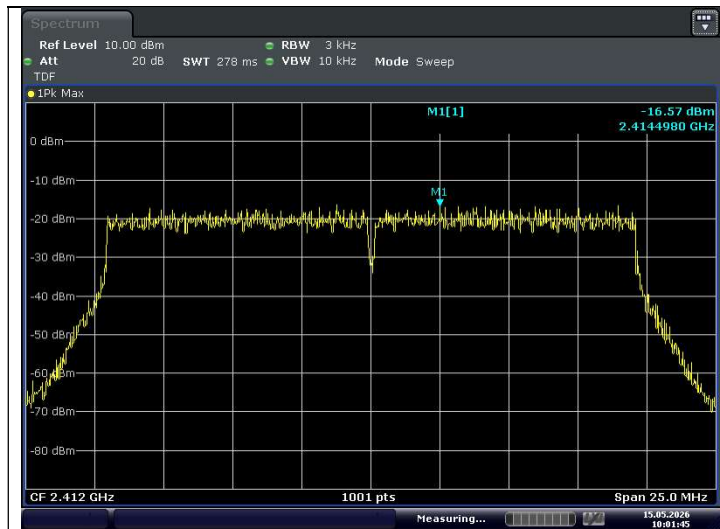


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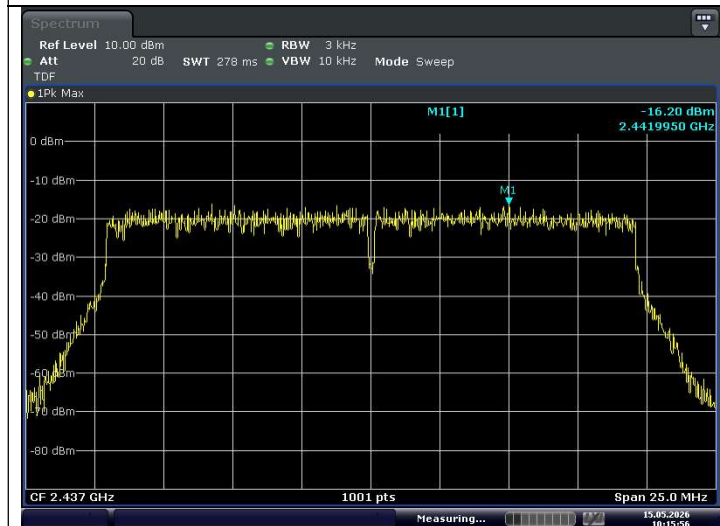


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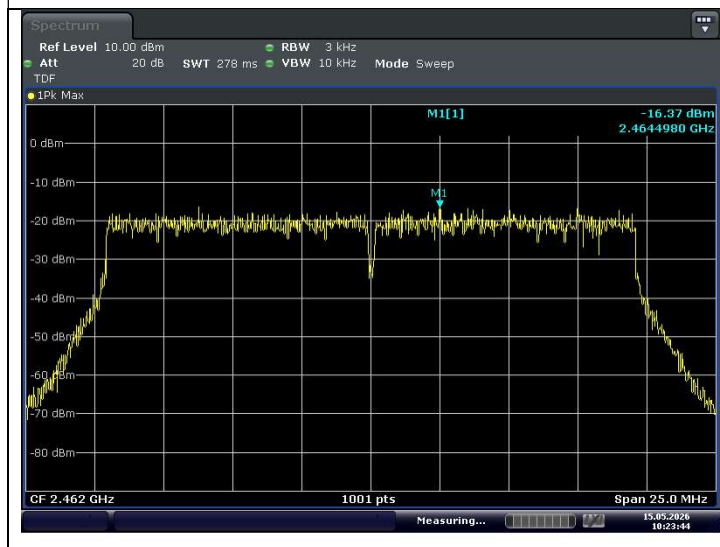
Low Channel



Middle Channel



High Channel



6. Antenna Requirement

6.1. 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, 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, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. And according to FCC 47 CFR Section §15.247(b) if transmitting antennas of directional gain greater than 6 dB i are used, the conducted output power shall be reduced appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

6.2. Antenna Connected Construction

Antenna used in this product is PCB Pattern Antenna with gain of -0.20 dB i.

- WLAN 2 is supported by Ant.3 only.

- End of the Test Report -