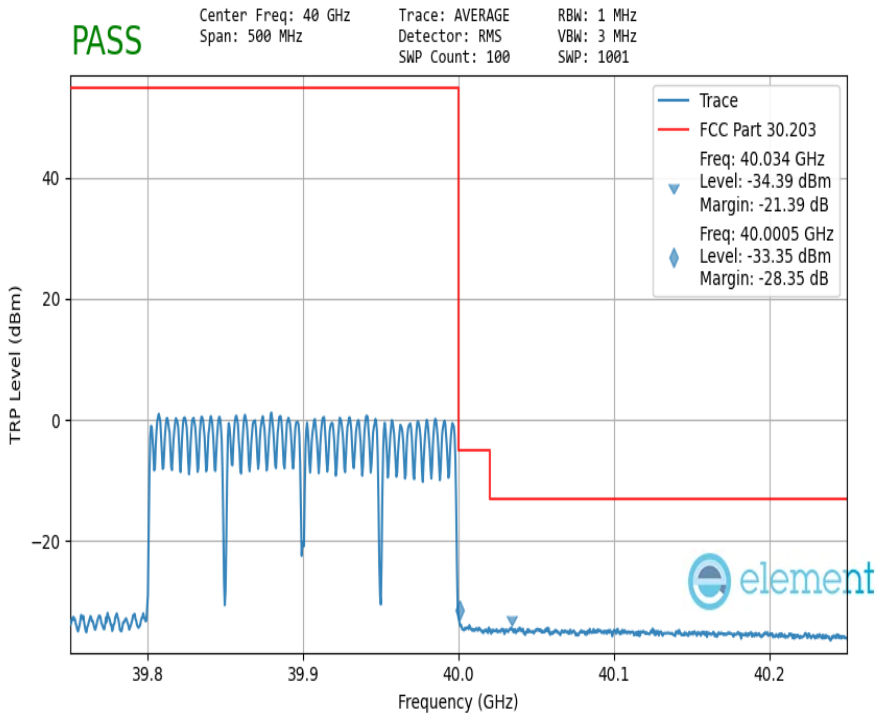
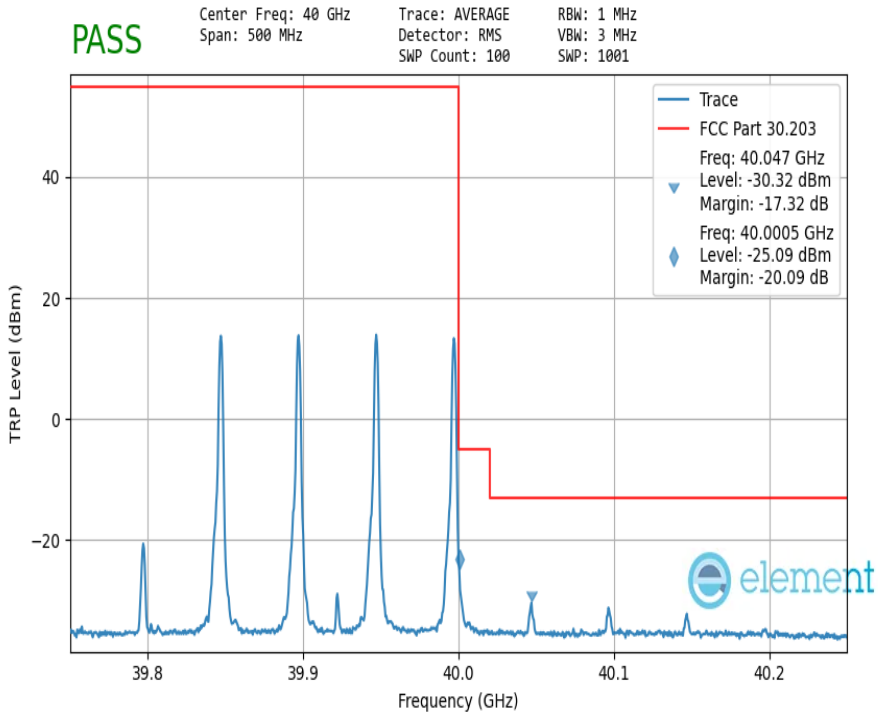
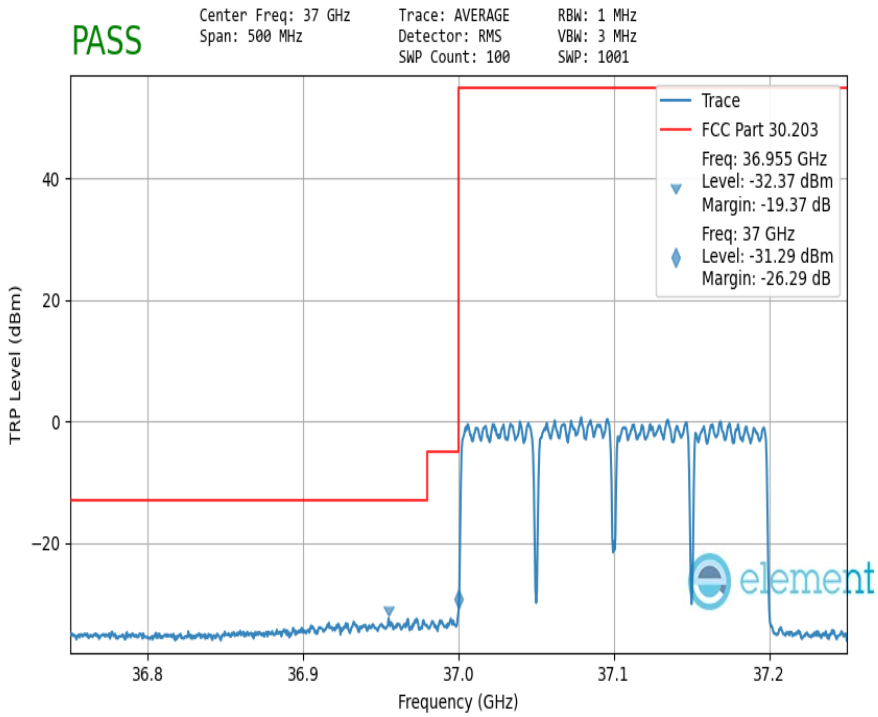


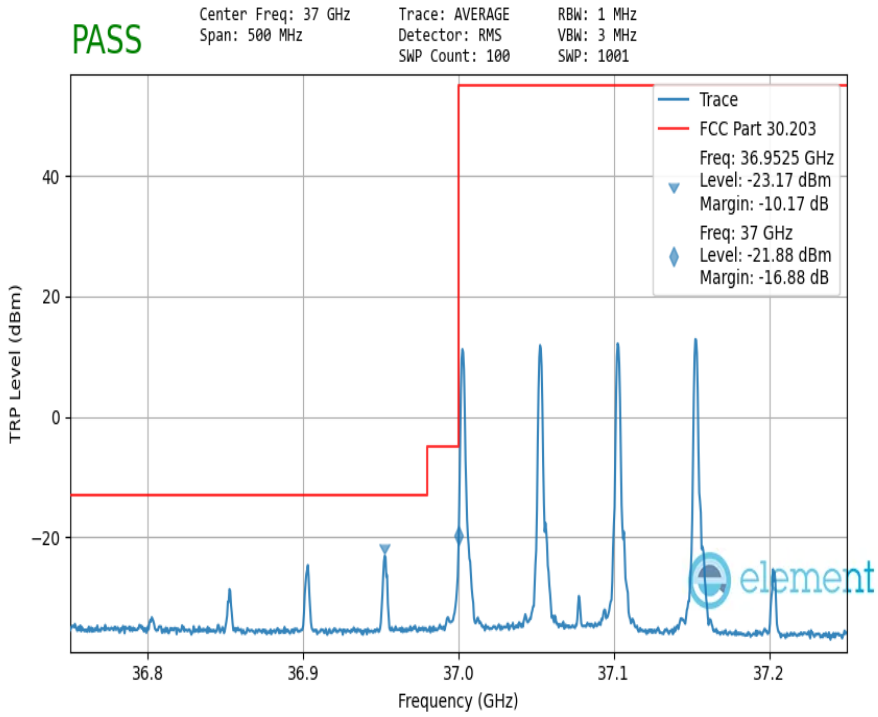
Plot 7-1651. Ant M3 Upper Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



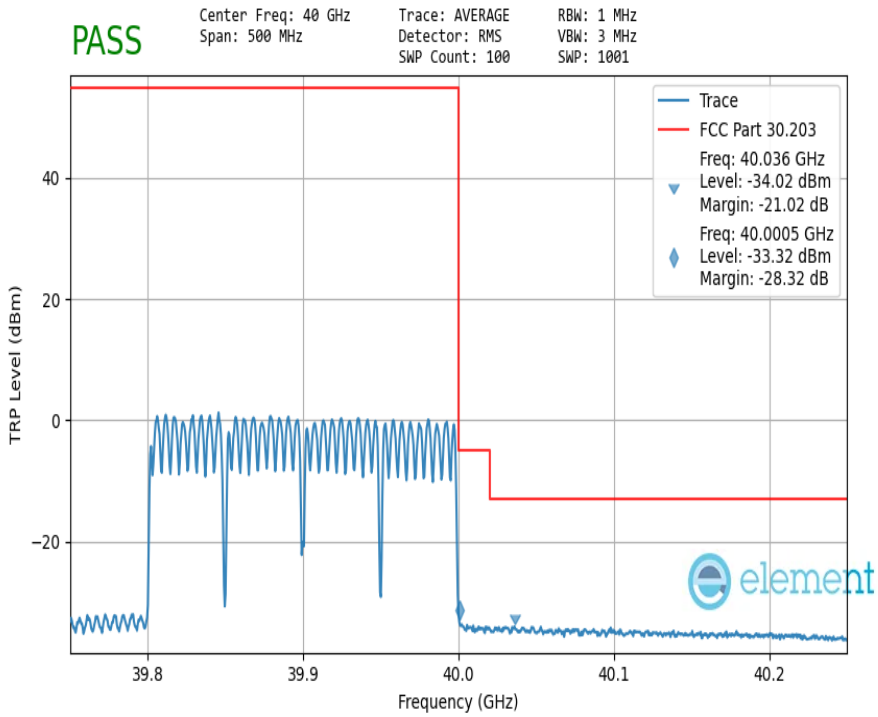
Plot 7-1652. Ant M3 Upper Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



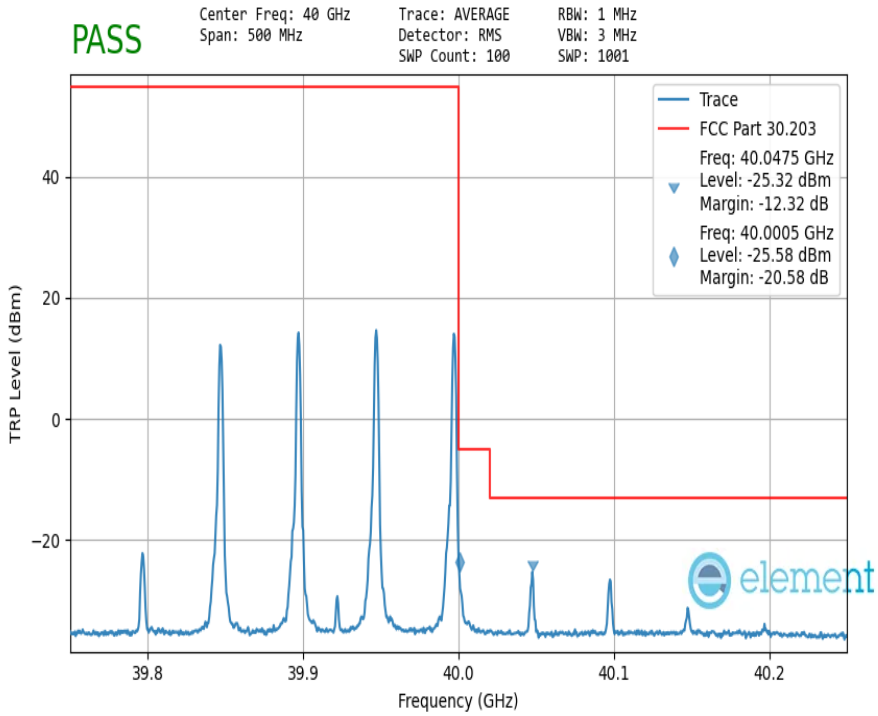
Plot 7-1653. Ant M3 Lower Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



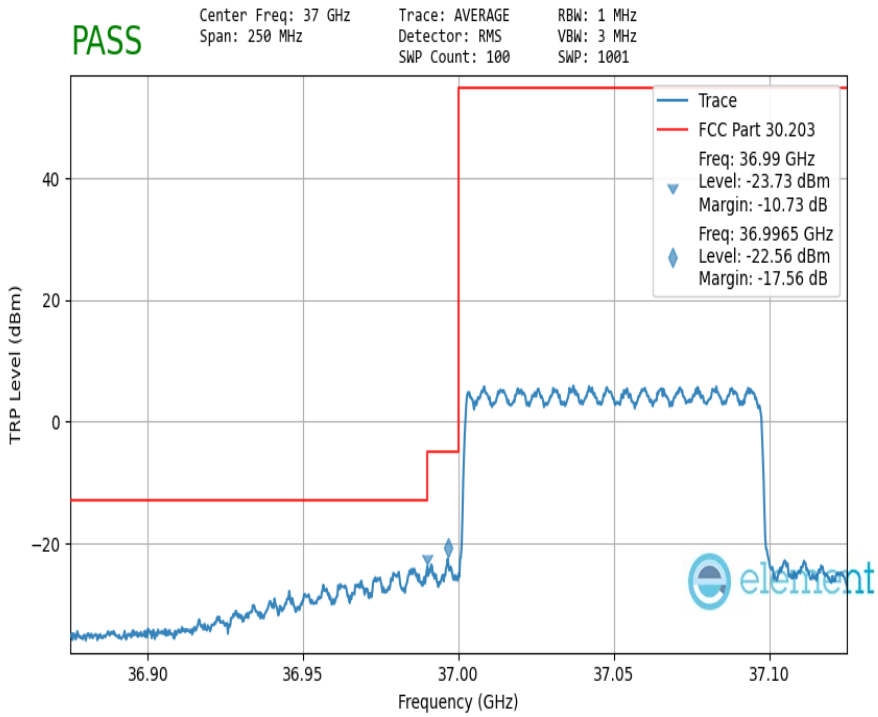
Plot 7-1654. Ant M3 Lower Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



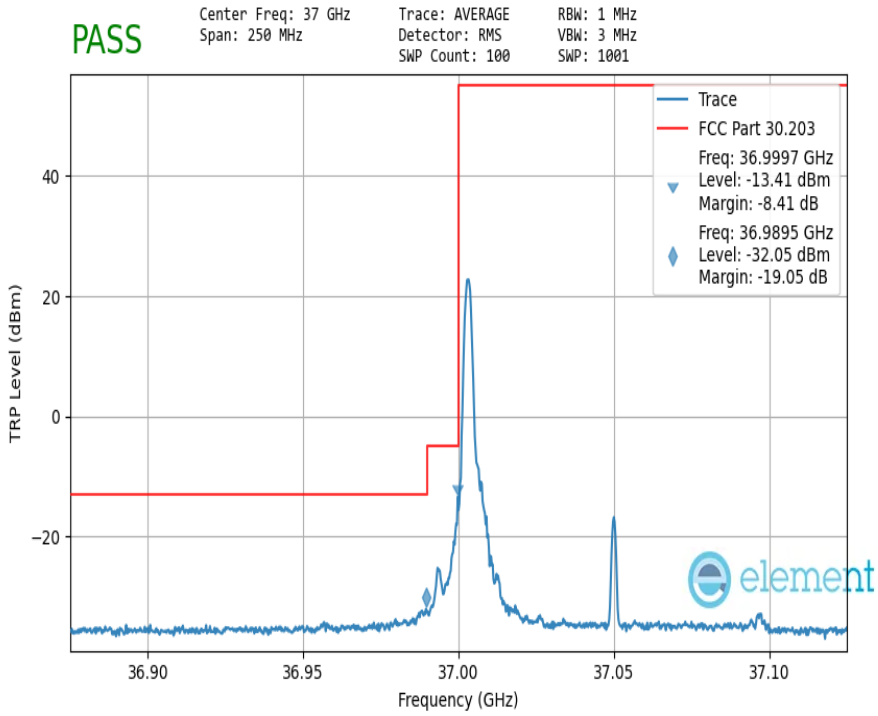
Plot 7-1655. Ant M3 Upper Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



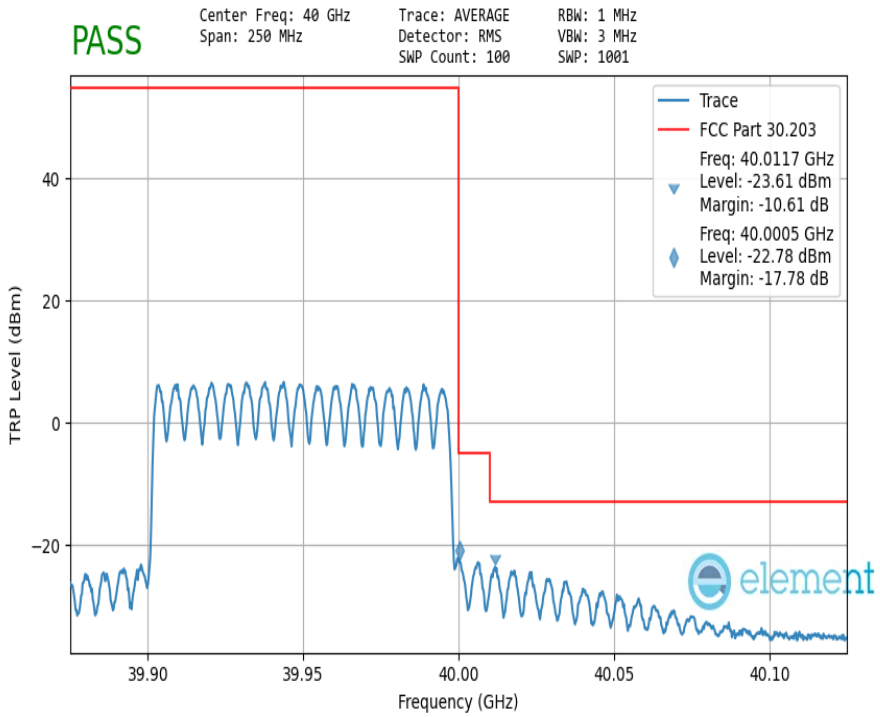
Plot 7-1656. Ant M3 Upper Band Edge (Band n260 50MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



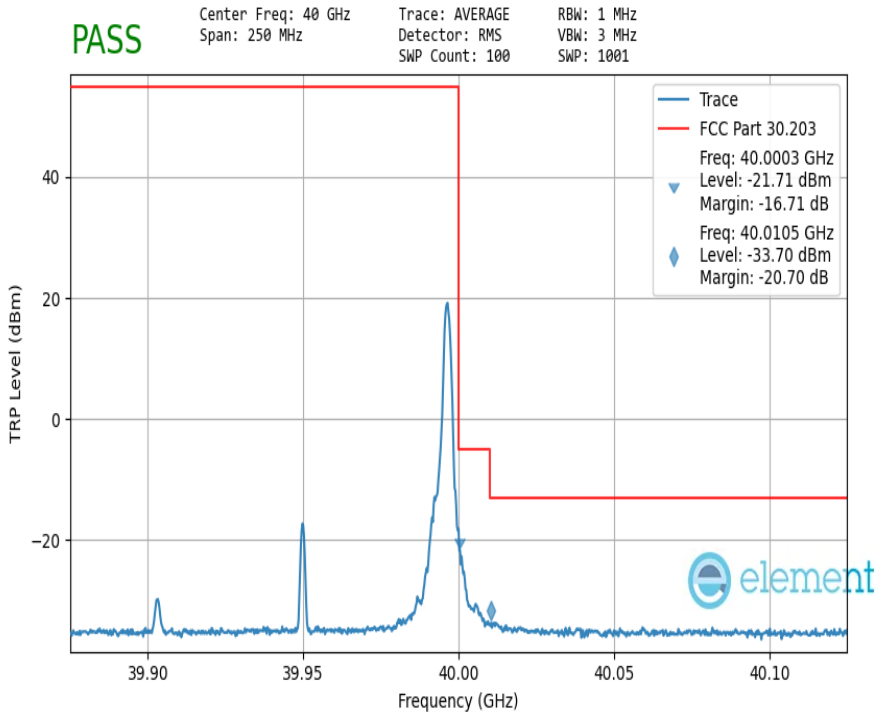
Plot 7-1657. Ant M3 Lower Band Edge (Band n260 100MHz-1CC MIMO CP-OFDM – QPSK Full RB)



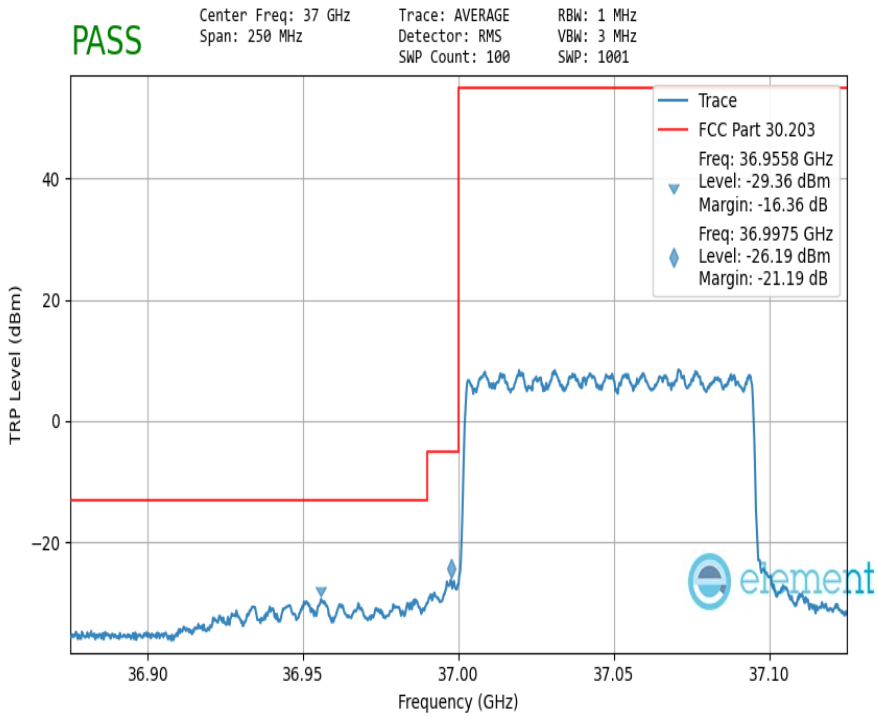
Plot 7-1658. Ant M3 Lower Band Edge (Band n260 100MHz-1CC MIMO CP-OFDM – QPSK 1RB)



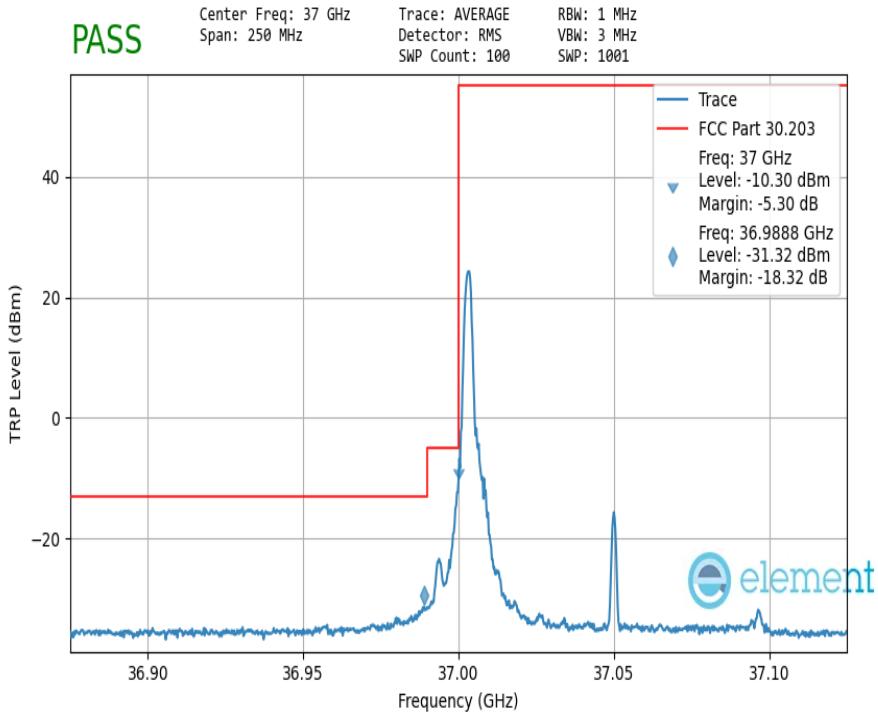
Plot 7-1659. Ant M3 Upper Band Edge (Band n260 100MHz-1CC MIMO CP-OFDM – QPSK Full RB)



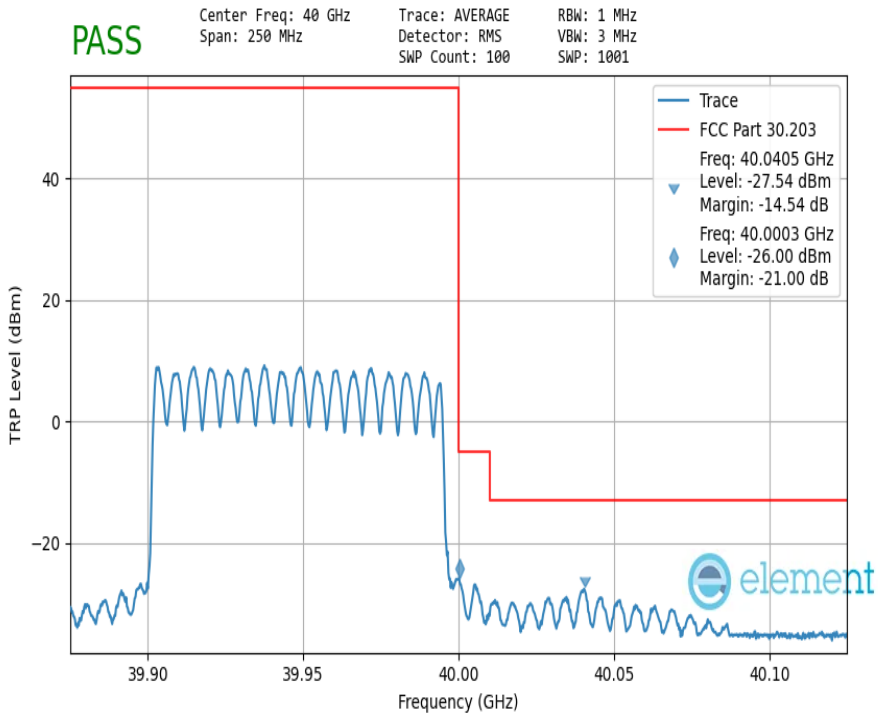
Plot 7-1660. Ant M3 Upper Band Edge (Band n260 100MHz-1CC MIMO CP-OFDM – QPSK 1RB)



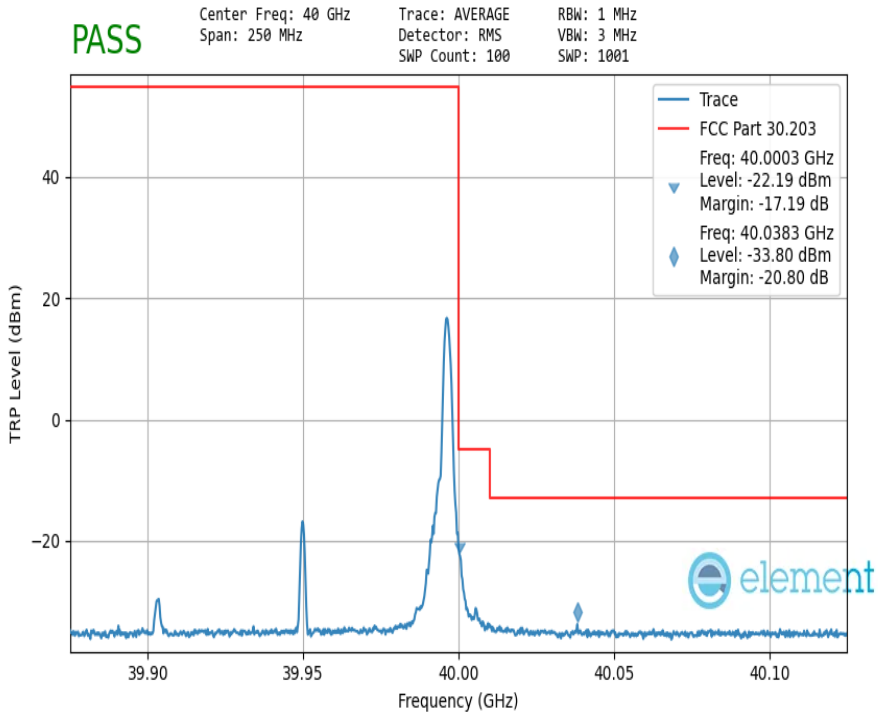
Plot 7-1661. Ant M3 Lower Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



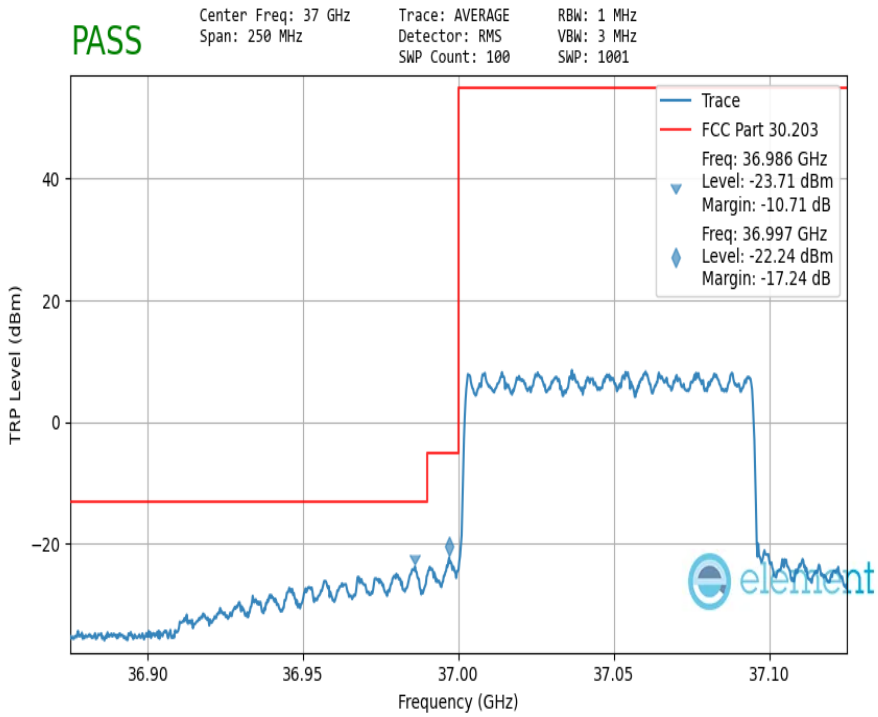
Plot 7-1662. Ant M3 Lower Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



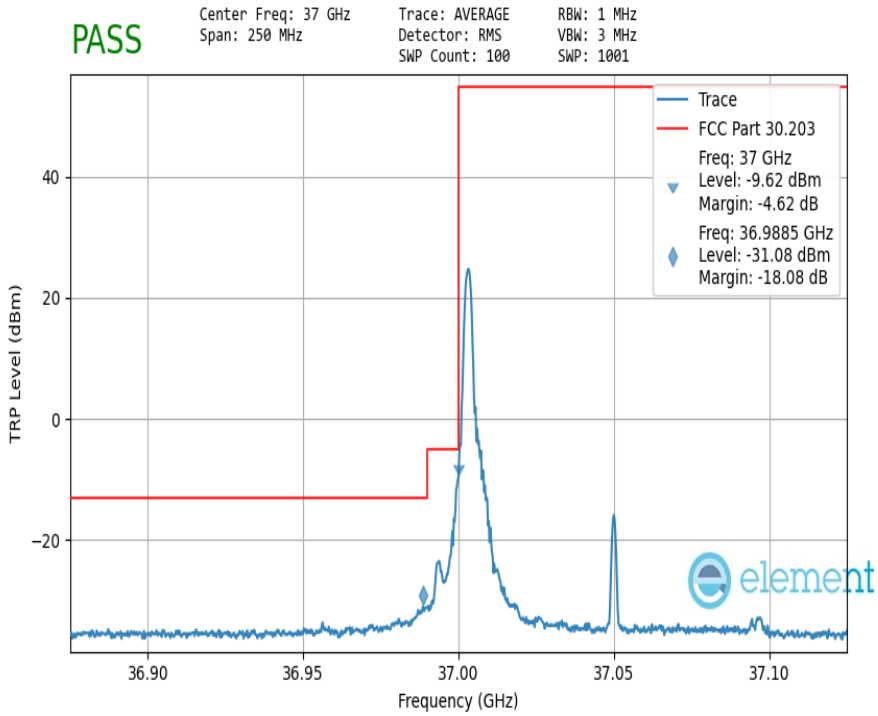
Plot 7-1663. Ant M3 Upper Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



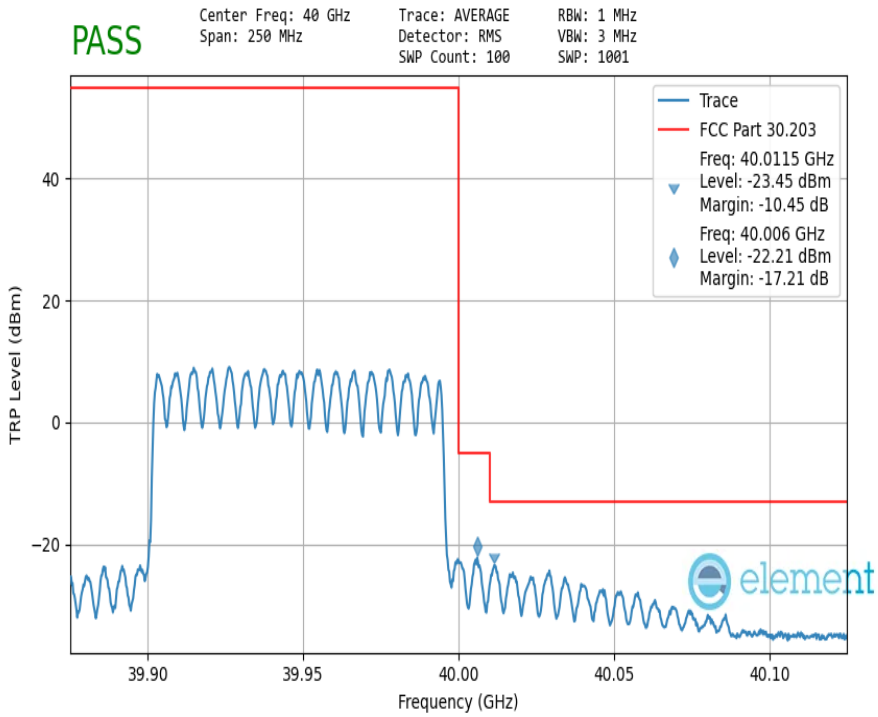
Plot 7-1664. Ant M3 Upper Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



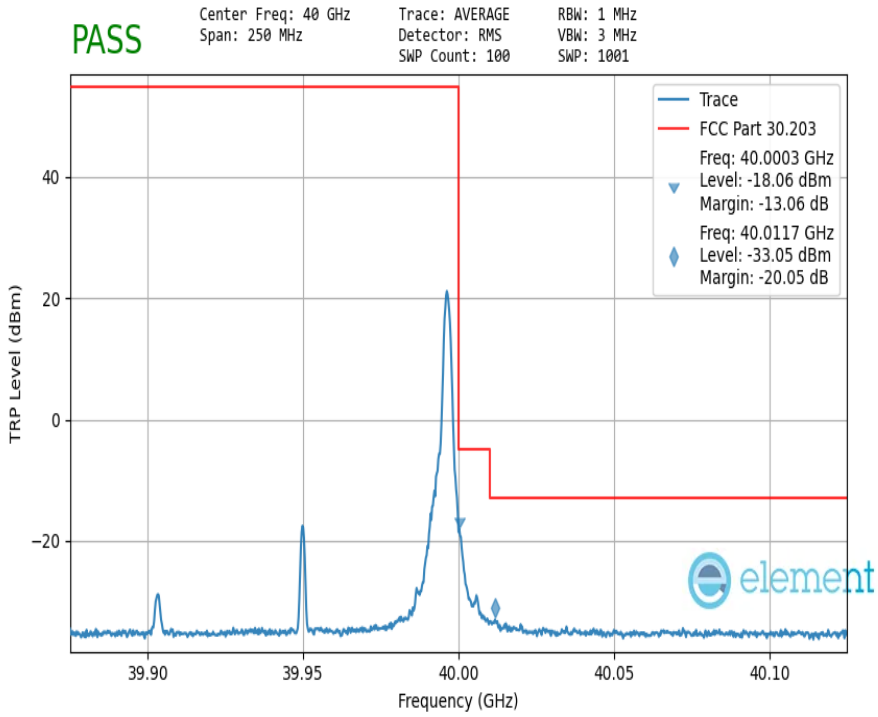
Plot 7-1665. Ant M3 Lower Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



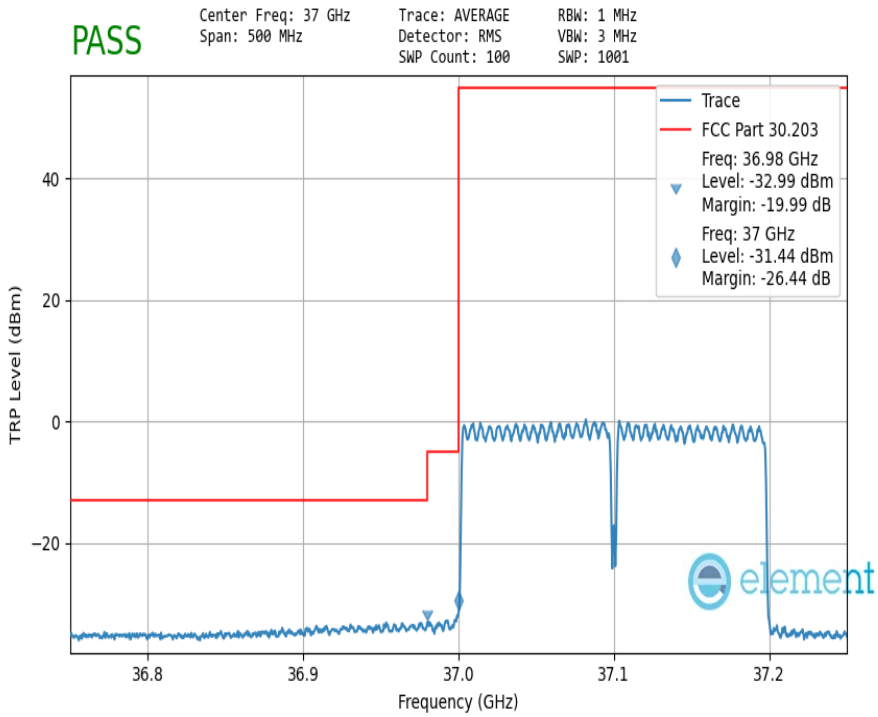
Plot 7-1666. Ant M3 Lower Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



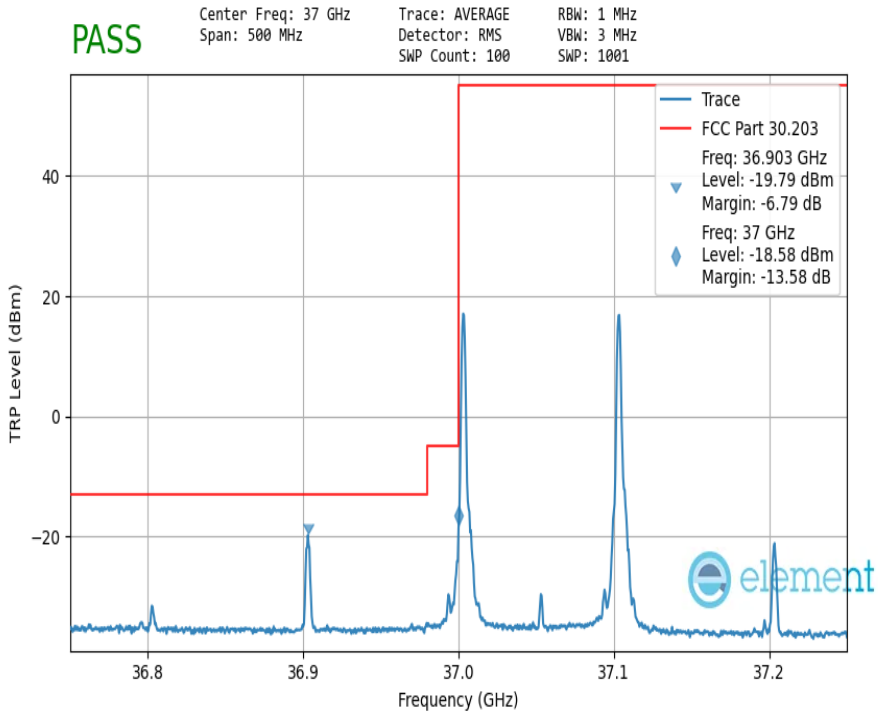
Plot 7-1667. Ant M3 Upper Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



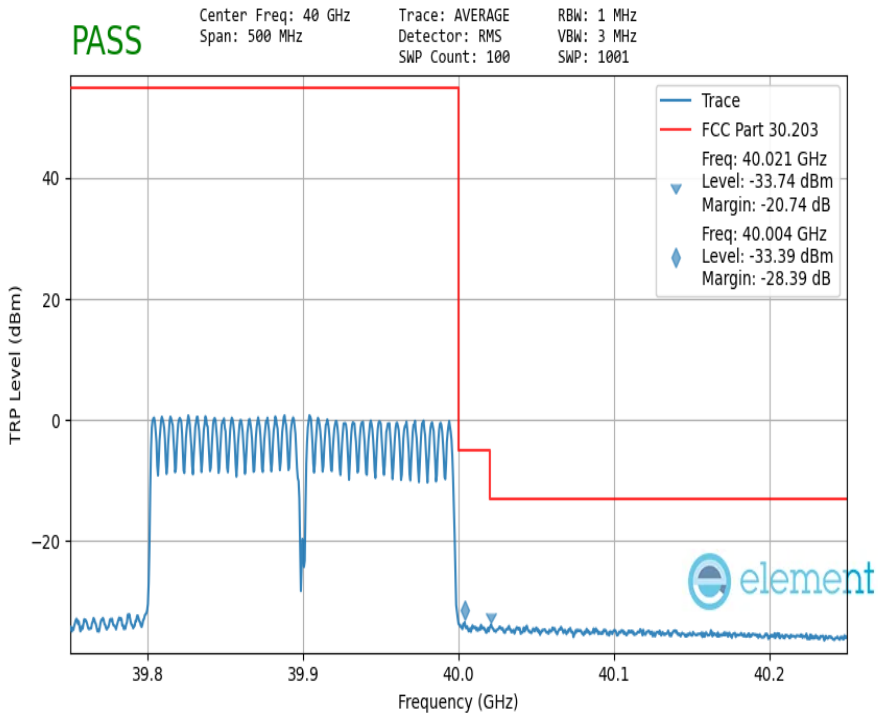
Plot 7-1668. Ant M3 Upper Band Edge (Band n260 100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



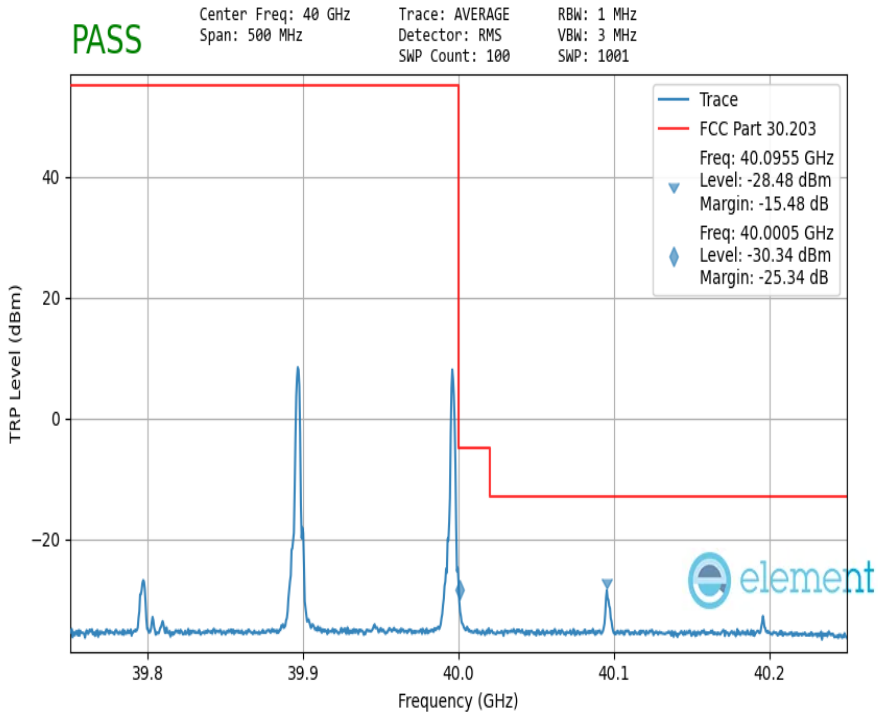
Plot 7-1669. Ant M3 Lower Band Edge (Band n260 100MHz-2CC MIMO CP-OFDM – QPSK Full RB)



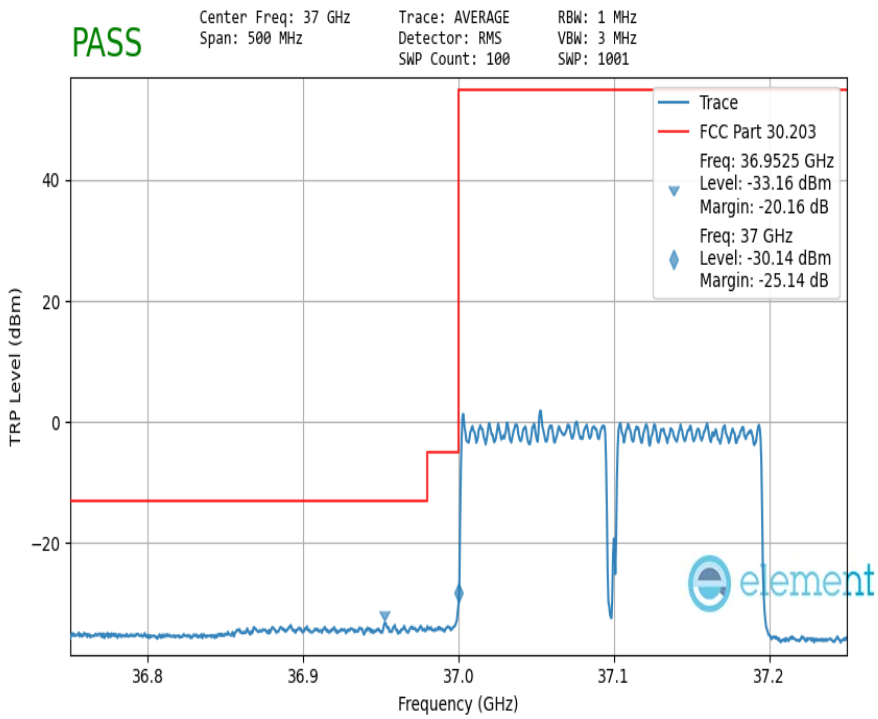
Plot 7-1670. Ant M3 Lower Band Edge (Band n260 100MHz-2CC MIMO CP-OFDM – QPSK 1RB)



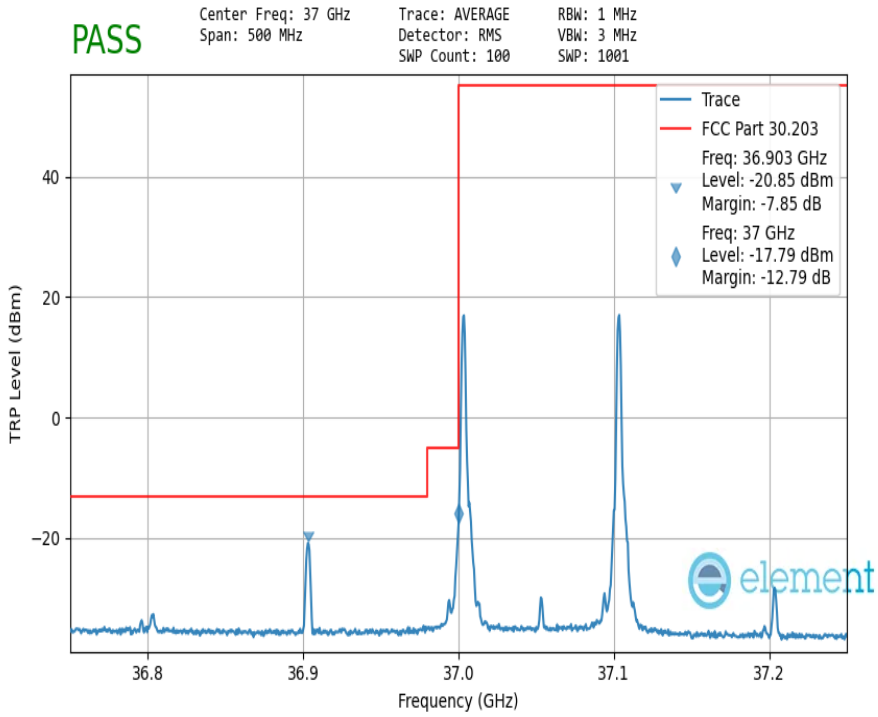
Plot 7-1671. Ant M3 Upper Band Edge (Band n260 100MHz-2CC MIMO CP-OFDM – QPSK Full RB)



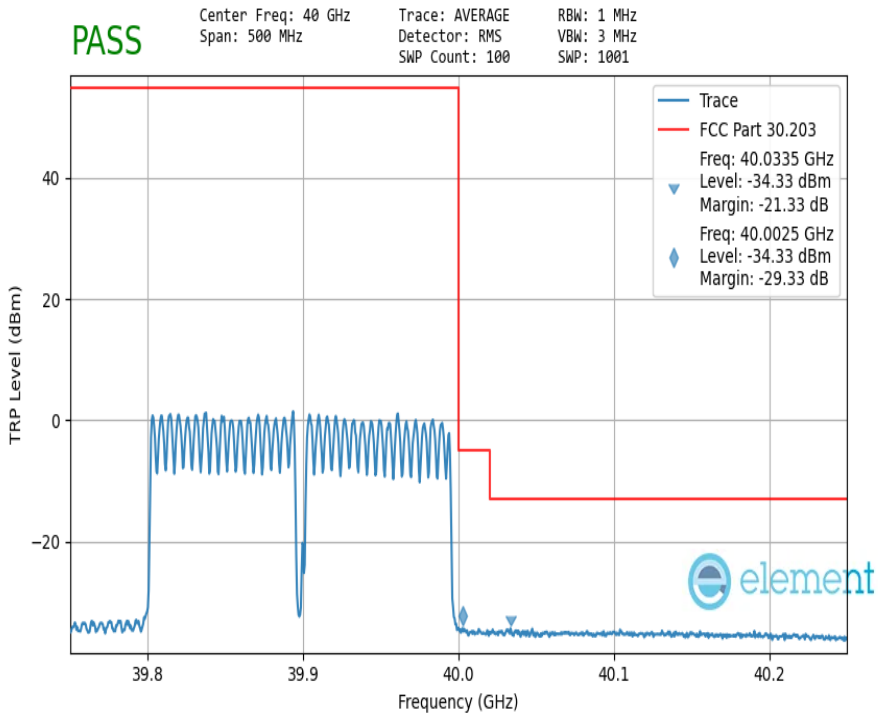
Plot 7-1672. Ant M3 Upper Band Edge (Band n260 100MHz-2CC MIMO CP-OFDM – QPSK 1RB)



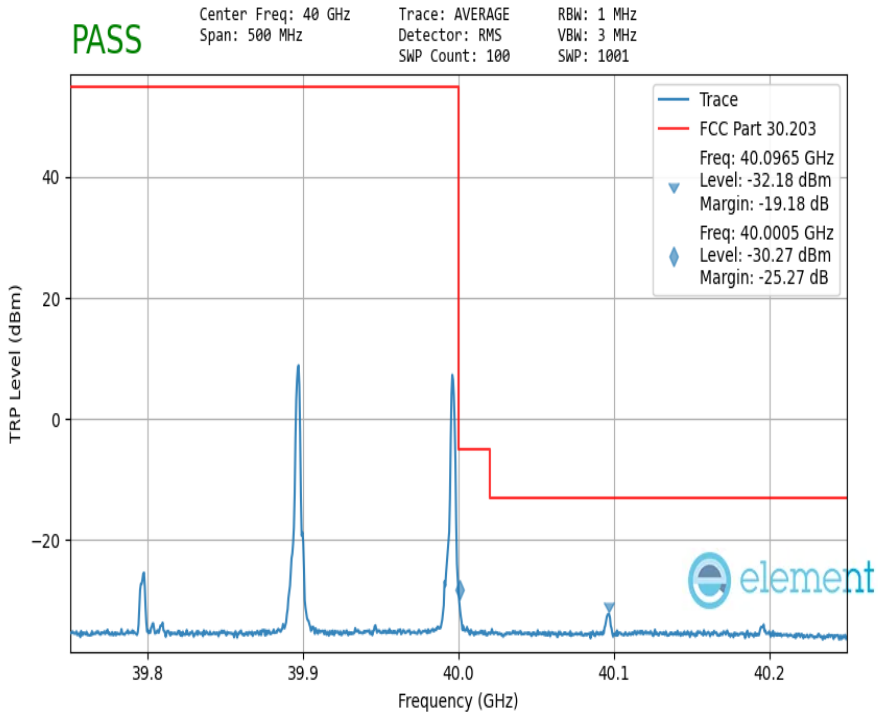
Plot 7-1673. Ant M3 Lower Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



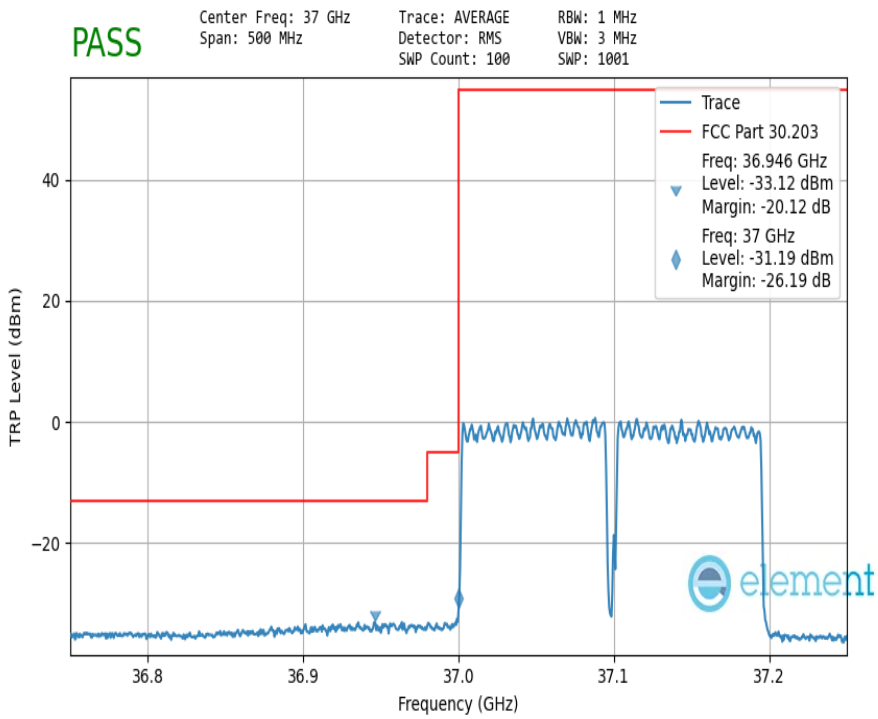
Plot 7-1674. Ant M3 Lower Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



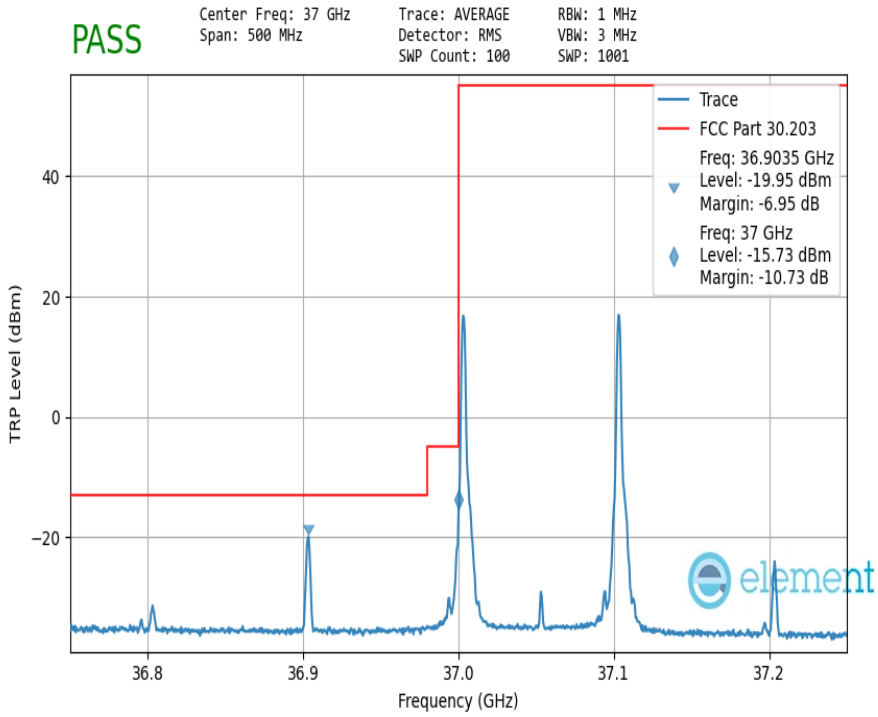
Plot 7-1675. Ant M3 Upper Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



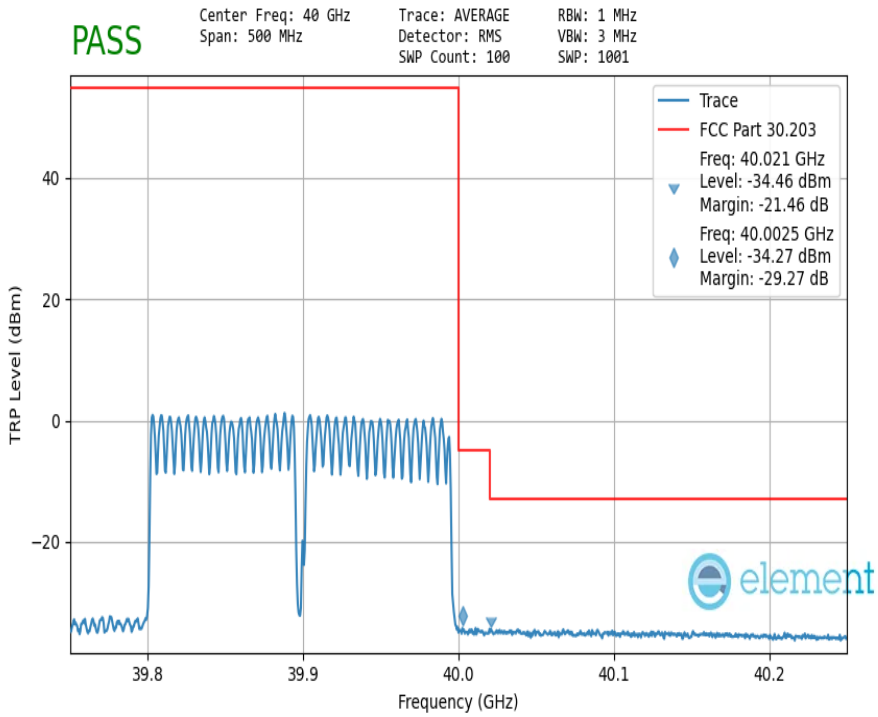
Plot 7-1676. Ant M3 Upper Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



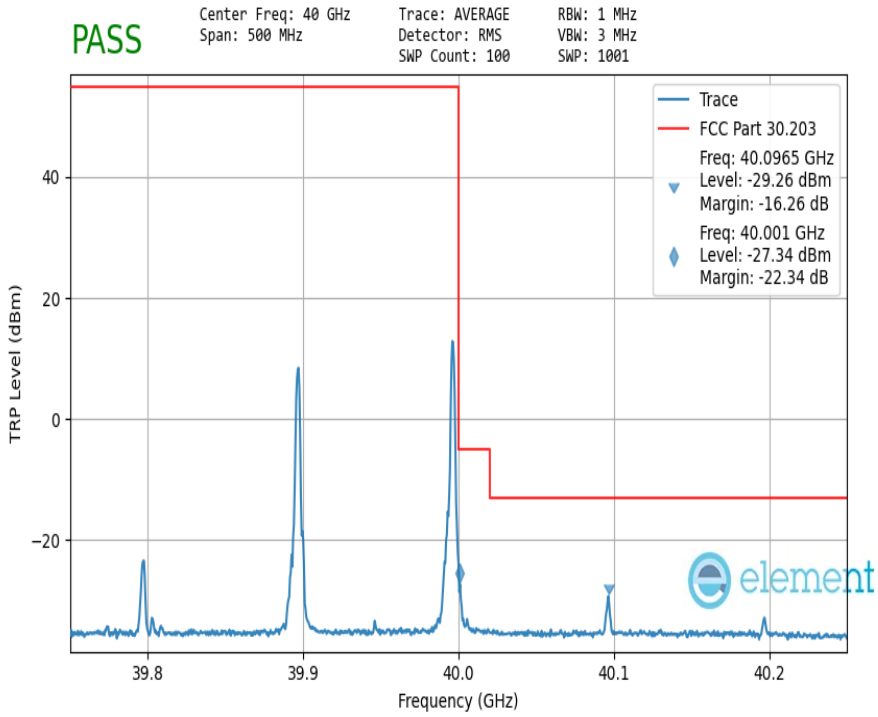
Plot 7-1677. Ant M3 Lower Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



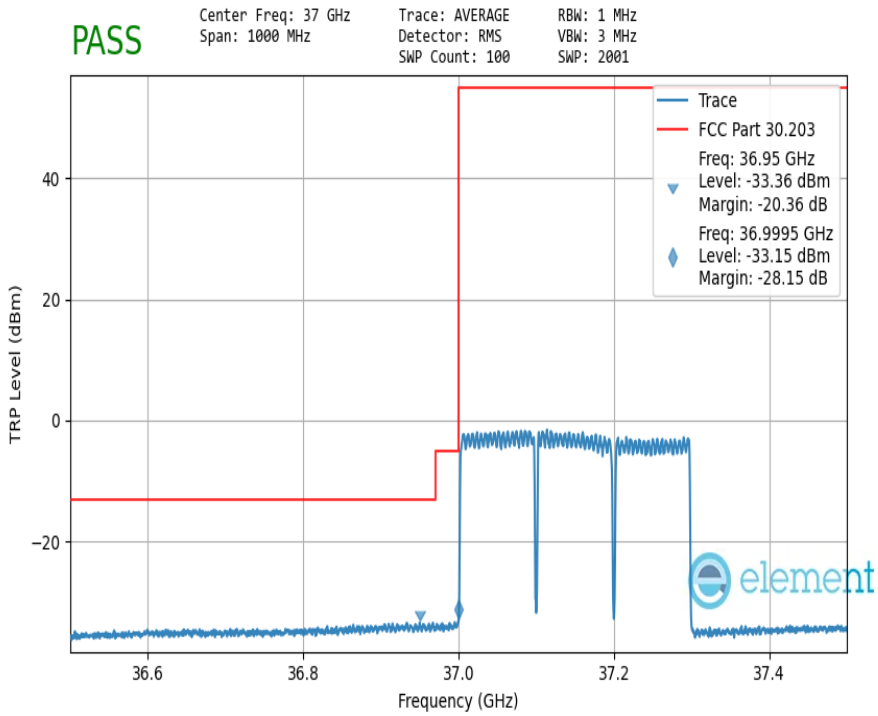
Plot 7-1678. Ant M3 Lower Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



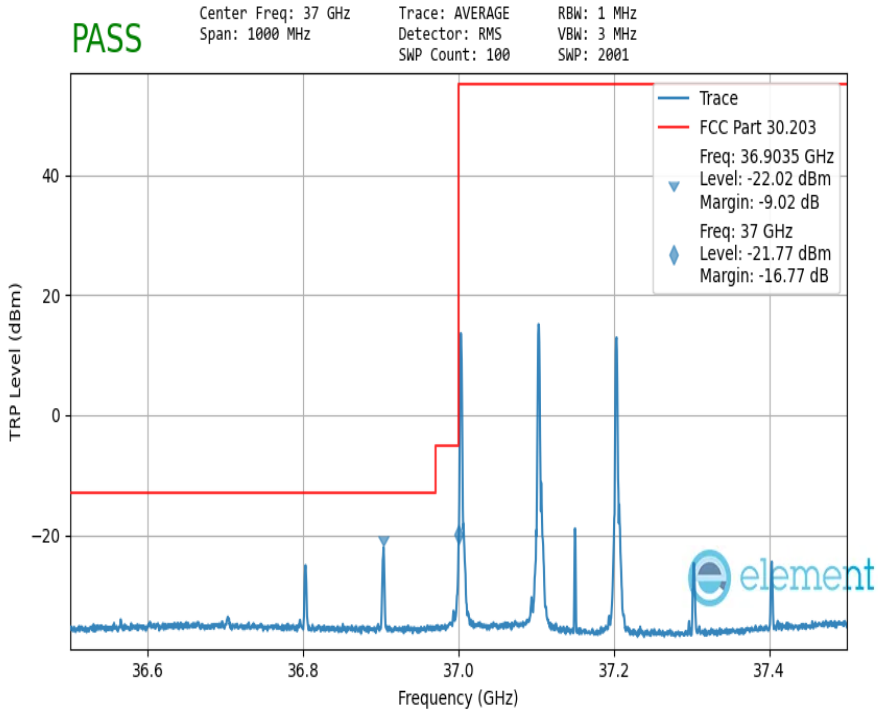
Plot 7-1679. Ant M3 Upper Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



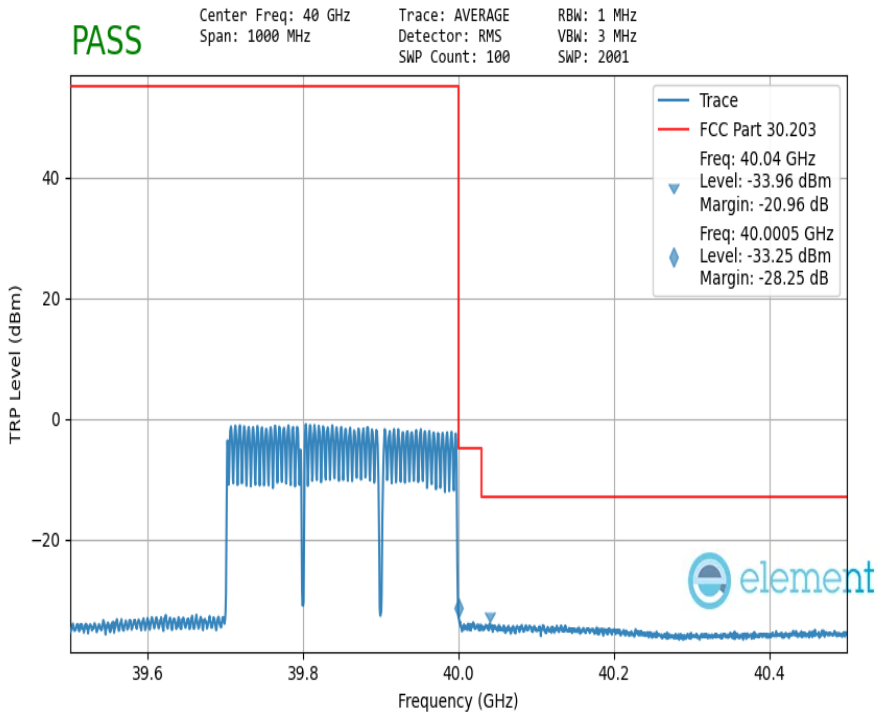
Plot 7-1680. Ant M3 Upper Band Edge (Band n260 100MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



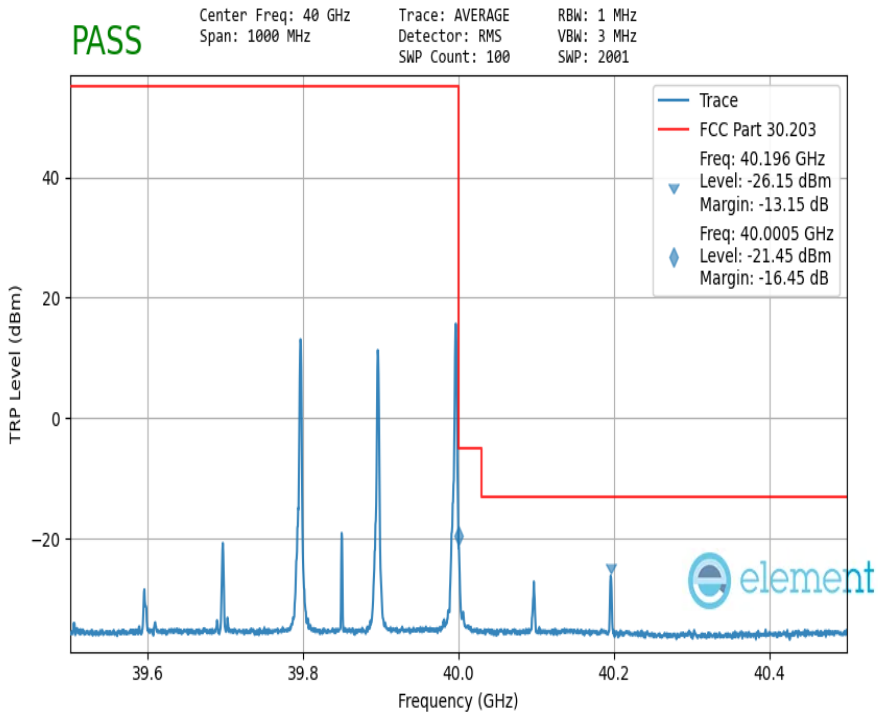
Plot 7-1681. Ant M3 Lower Band Edge (Band n260 100MHz-3CC MIMO CP-OFDM – QPSK Full RB)



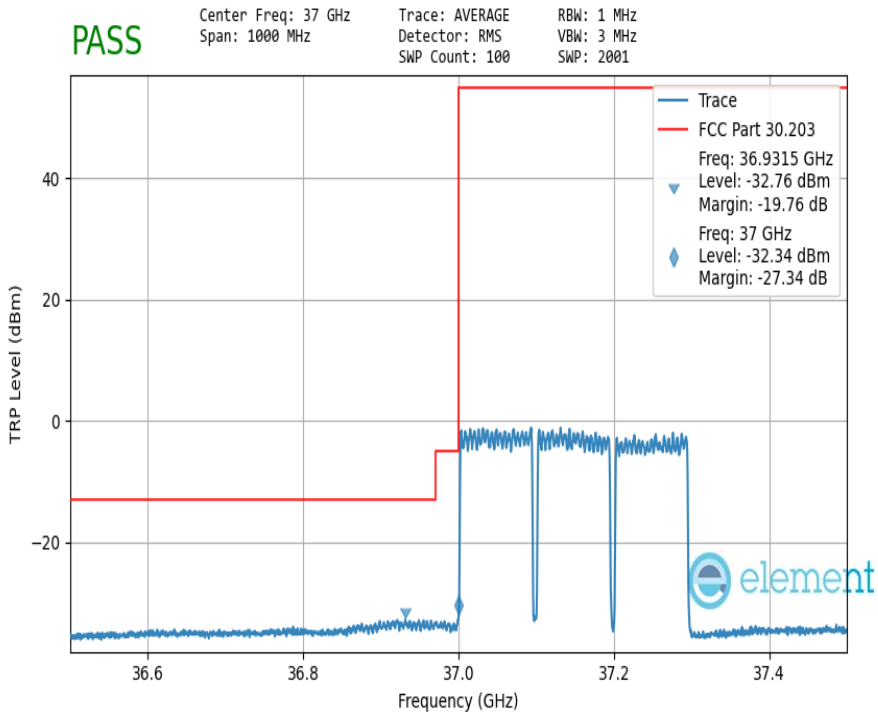
Plot 7-1682. Ant M3 Lower Band Edge (Band n260 100MHz-3CC MIMO CP-OFDM – QPSK 1RB)



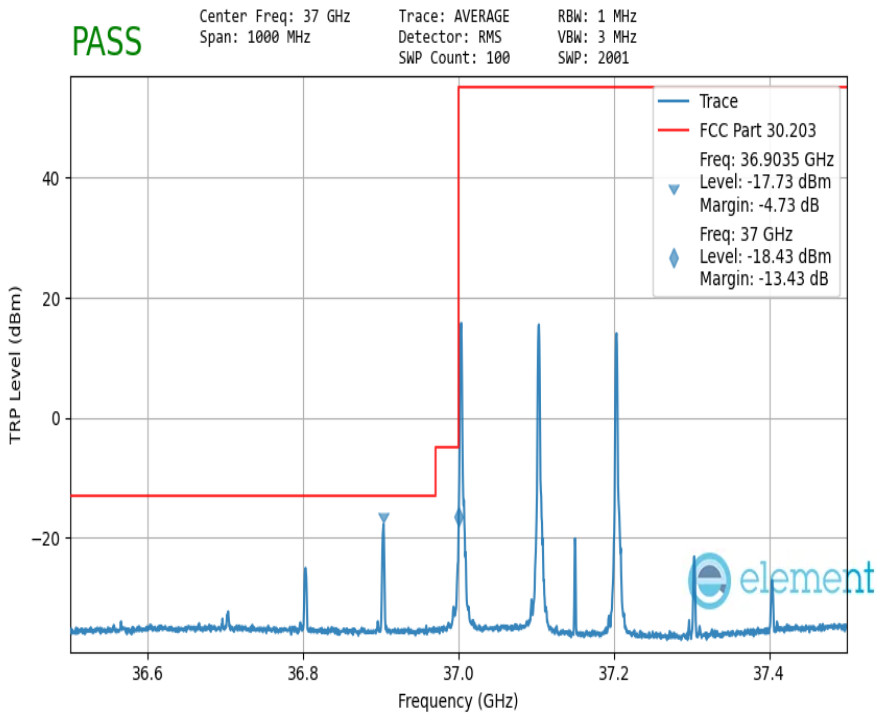
Plot 7-1683. Ant M3 Upper Band Edge (Band n260 100MHz-3CC MIMO CP-OFDM – QPSK Full RB)



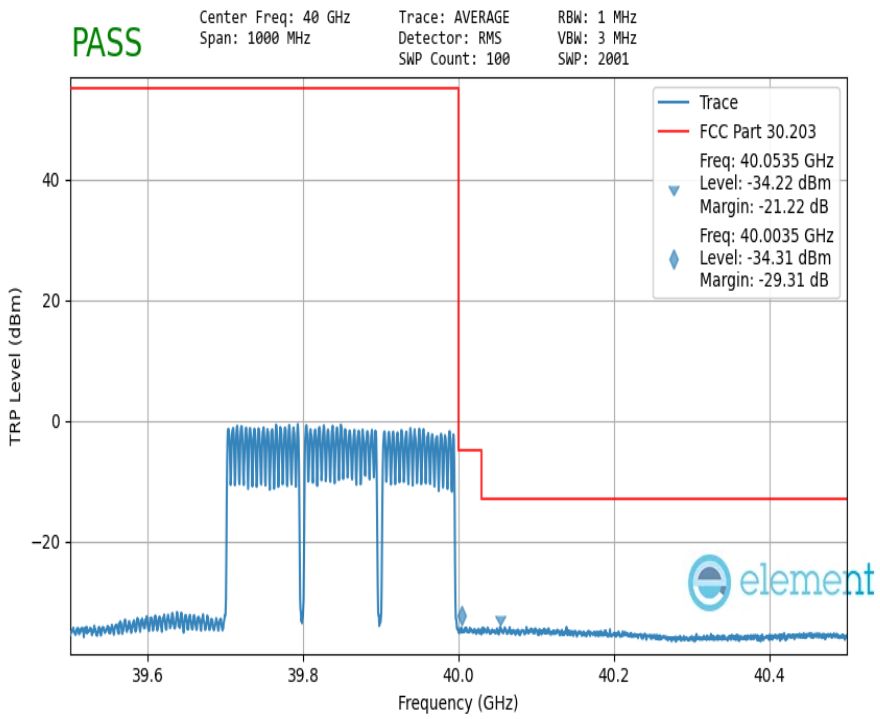
Plot 7-1684. Ant M3 Upper Band Edge (Band n260 100MHz-3CC MIMO CP-OFDM – QPSK 1RB)



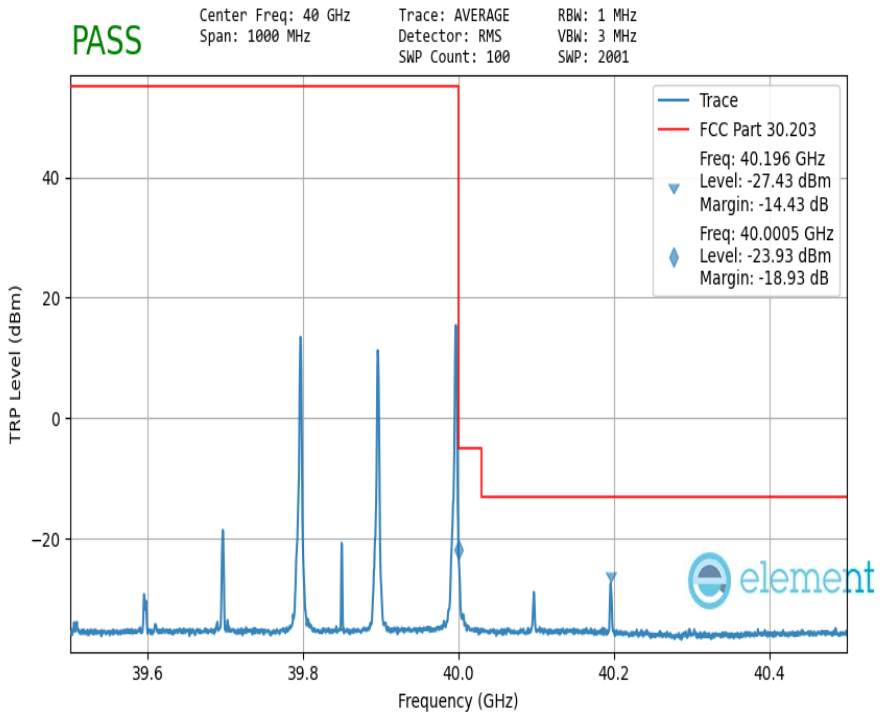
Plot 7-1685. Ant M3 Lower Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



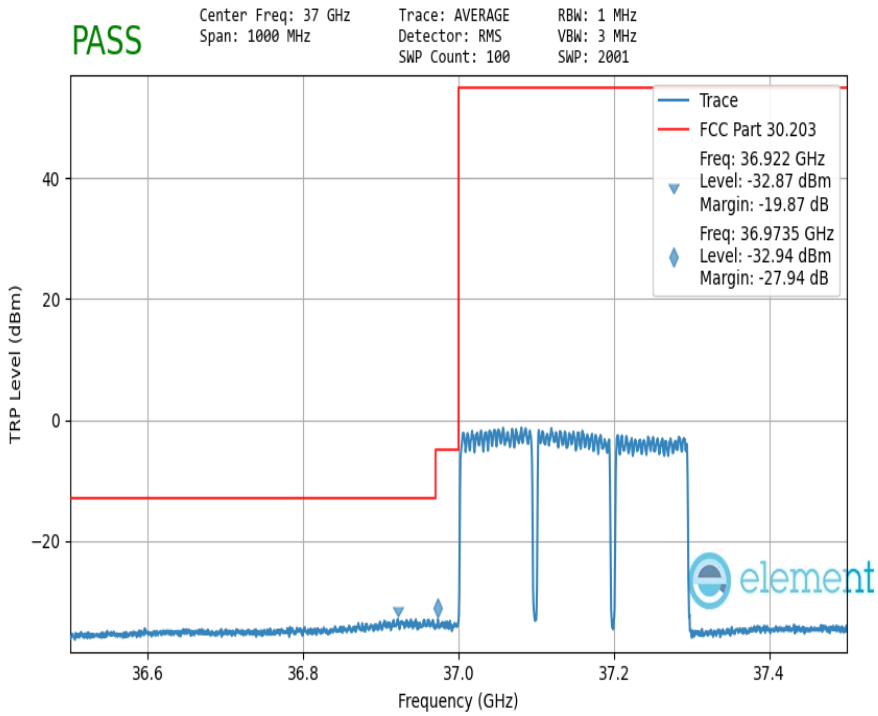
Plot 7-1686. Ant M3 Lower Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



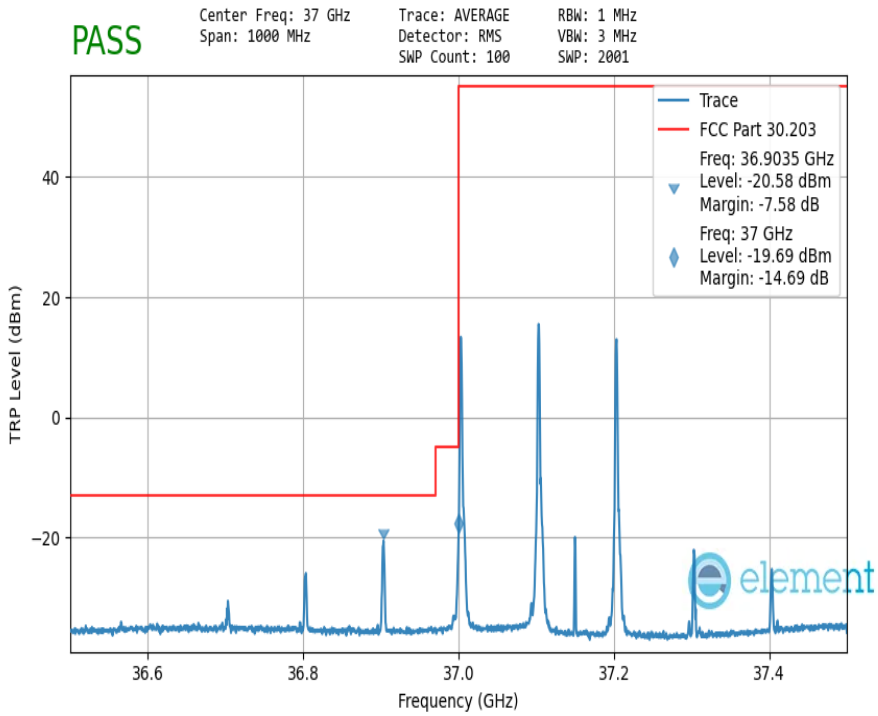
Plot 7-1687. Ant M3 Upper Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



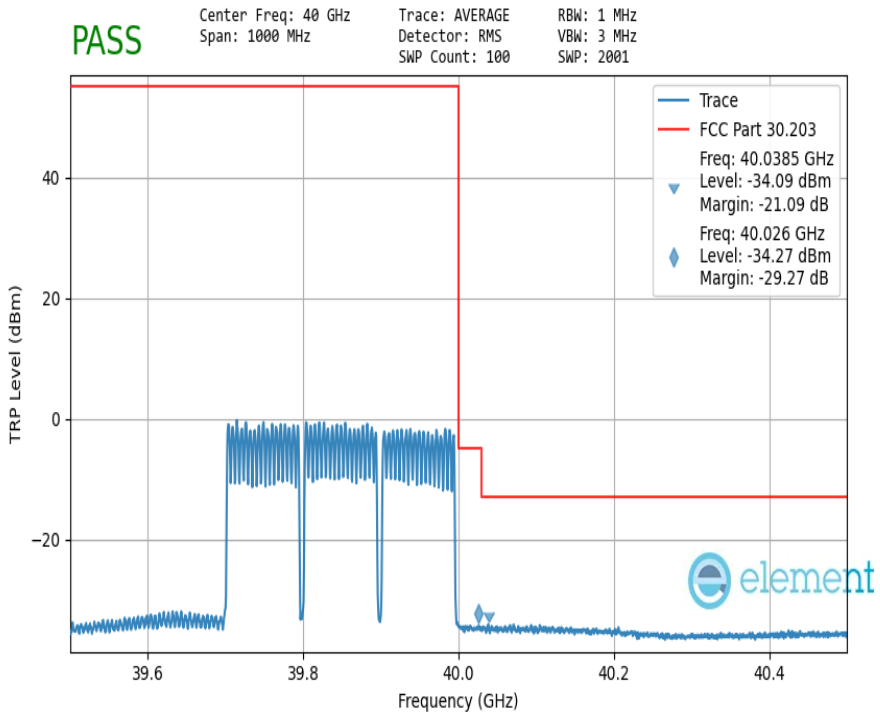
Plot 7-1688. Ant M3 Upper Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



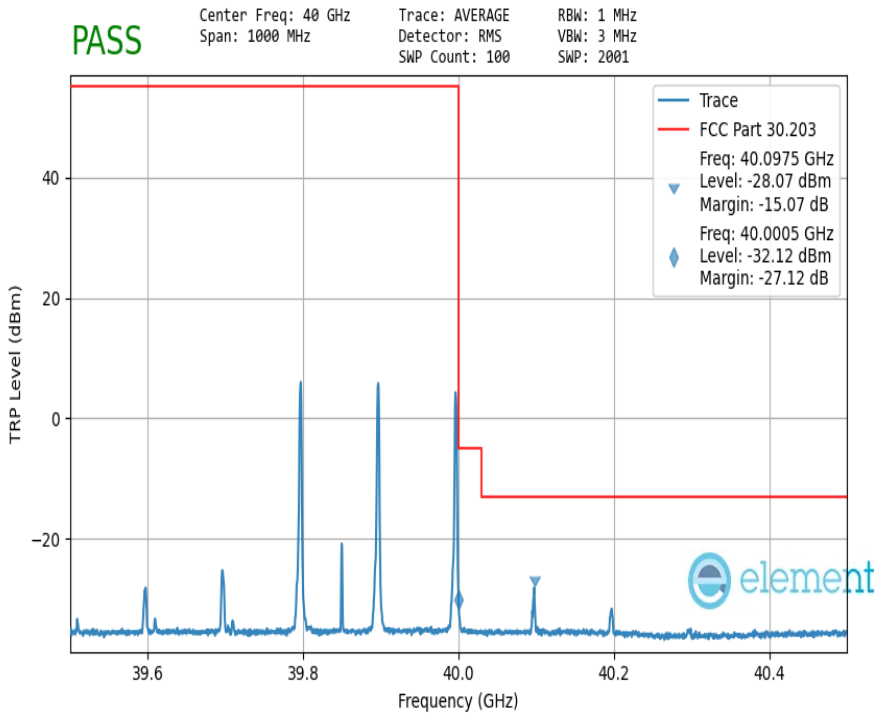
Plot 7-1689. Ant M3 Lower Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



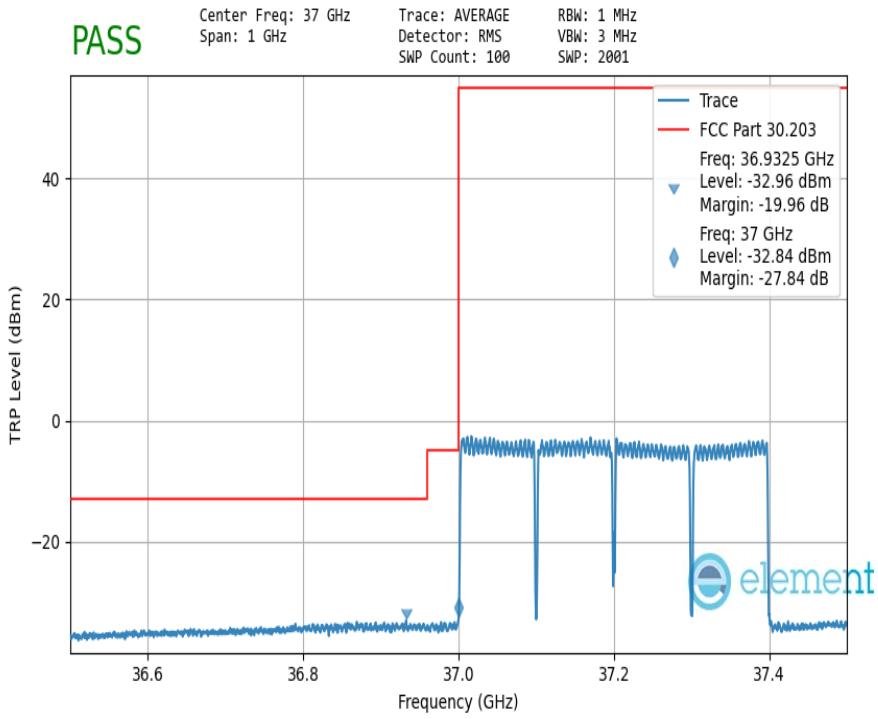
Plot 7-1690. Ant M3 Lower Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



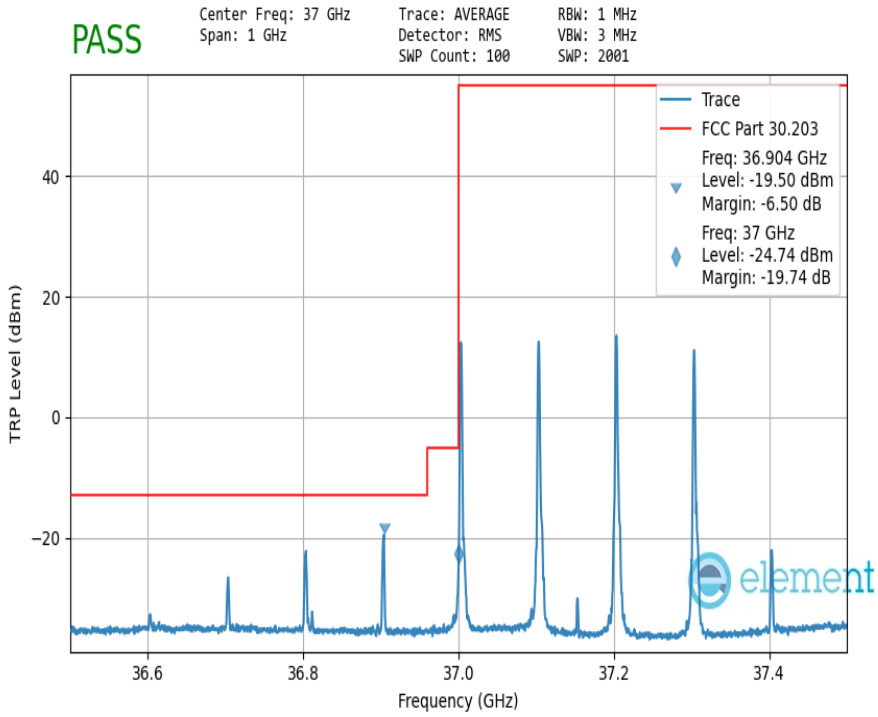
Plot 7-1691. Ant M3 Upper Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



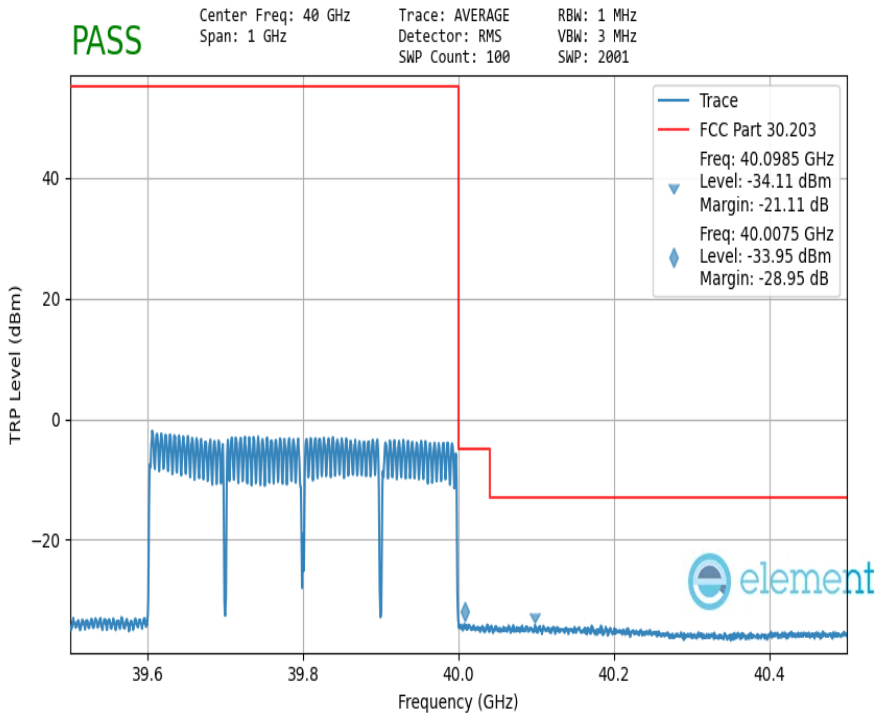
Plot 7-1692. Ant M3 Upper Band Edge (Band n260 100MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



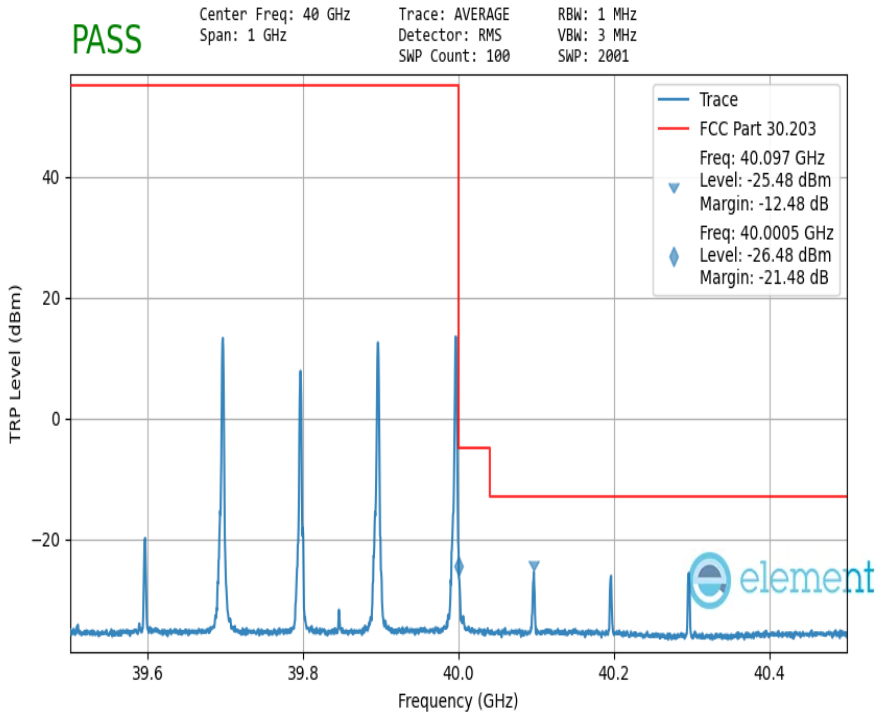
Plot 7-1693. Ant M3 Lower Band Edge (Band n260 100MHz-4CC MIMO CP-OFDM – QPSK Full RB)



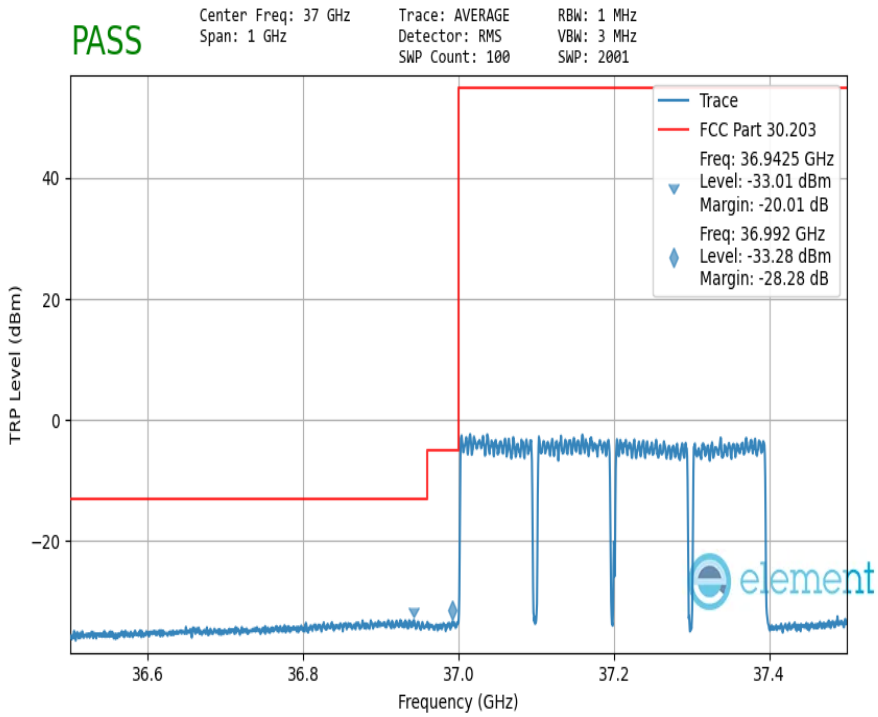
Plot 7-1694. Ant M3 Lower Band Edge (Band n260 100MHz-4CC MIMO CP-OFDM – QPSK 1RB)



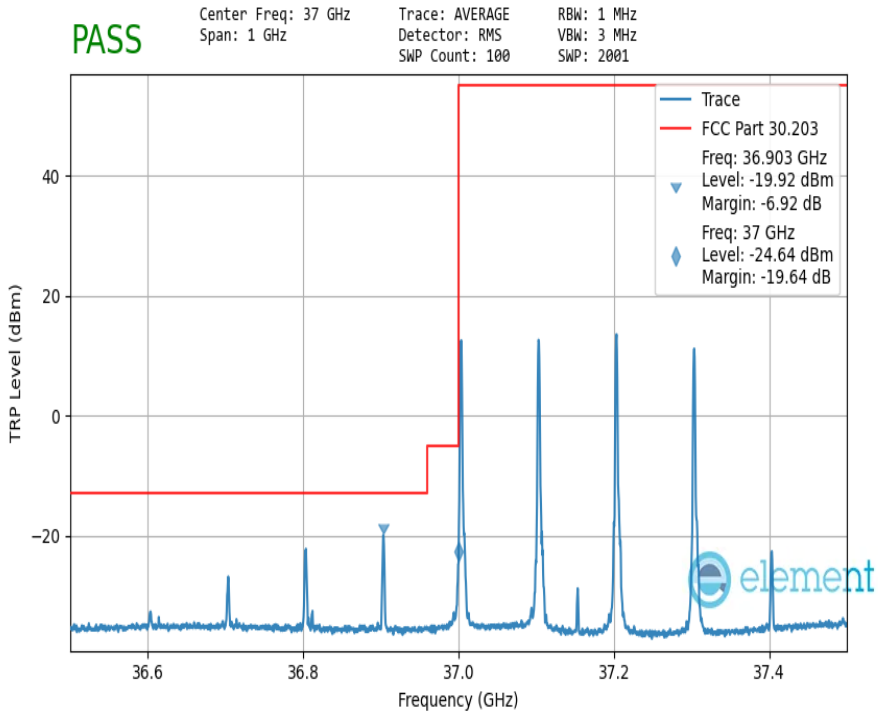
Plot 7-1695. Ant M3 Upper Band Edge (Band n260 100MHz-4CC MIMO CP-OFDM – QPSK Full RB)



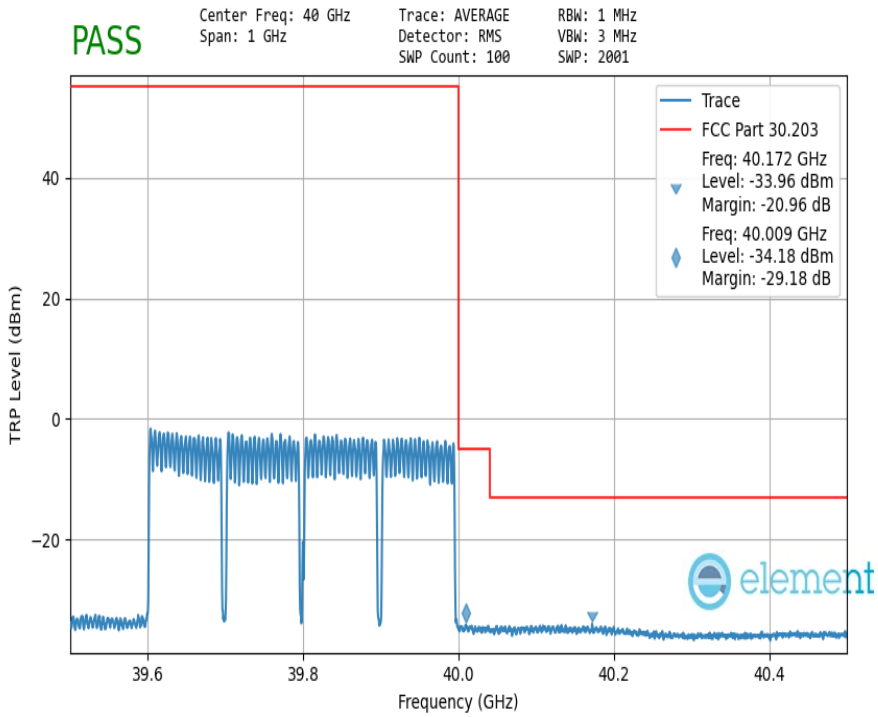
Plot 7-1696. Ant M3 Upper Band Edge (Band n260 100MHz-4CC MIMO CP-OFDM – QPSK 1RB)



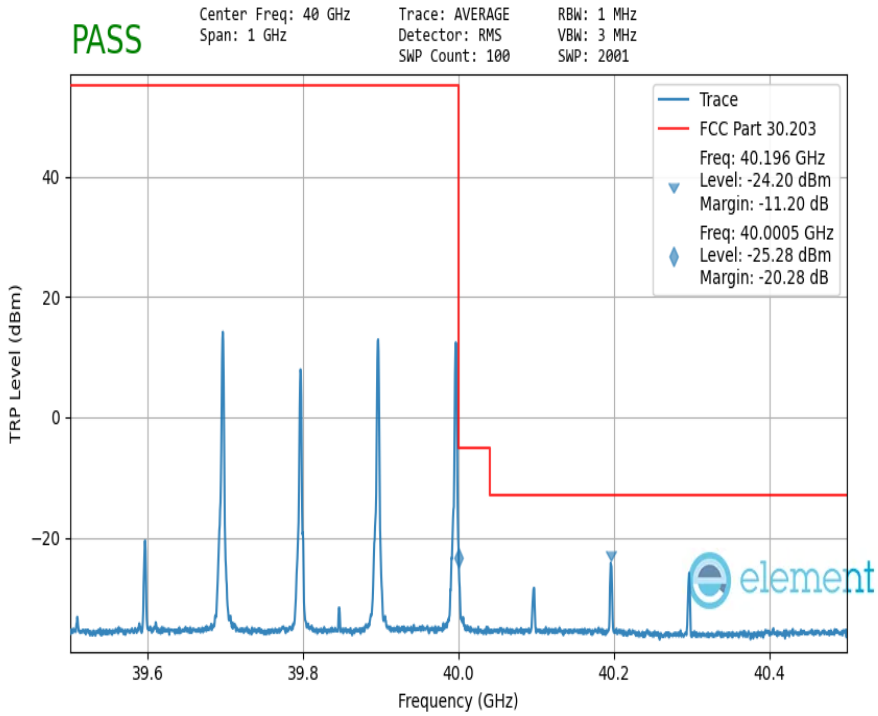
Plot 7-1697. Ant M3 Lower Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



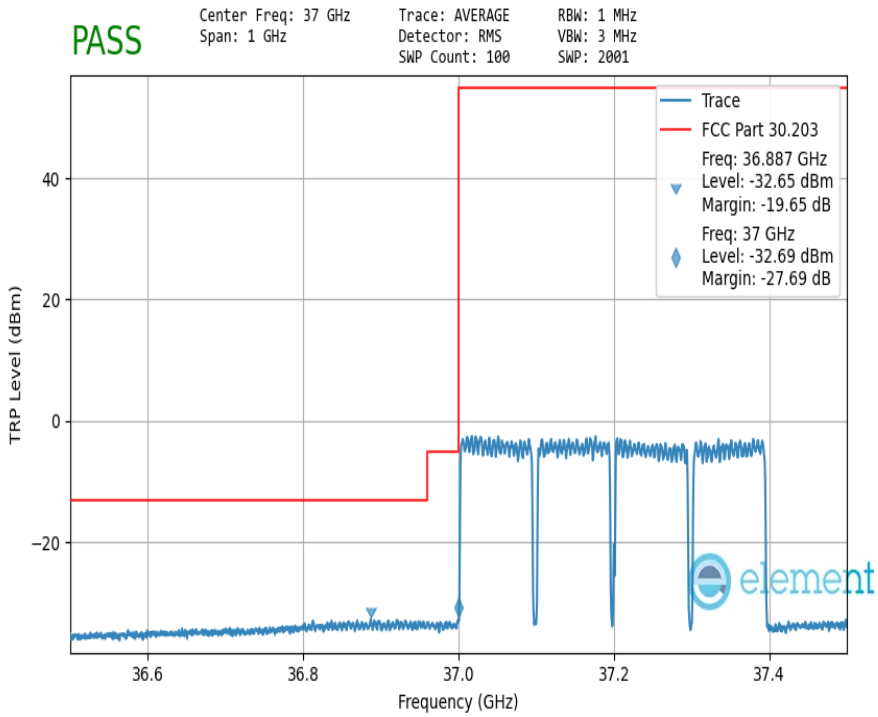
Plot 7-1698. Ant M3 Lower Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



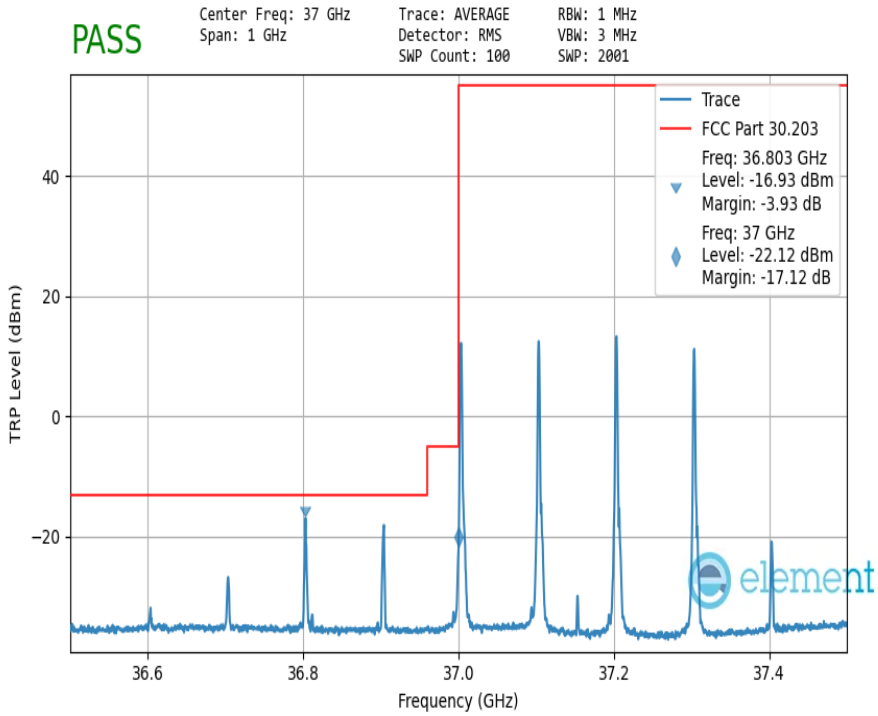
Plot 7-1699. Ant M3 Upper Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK Full RB)



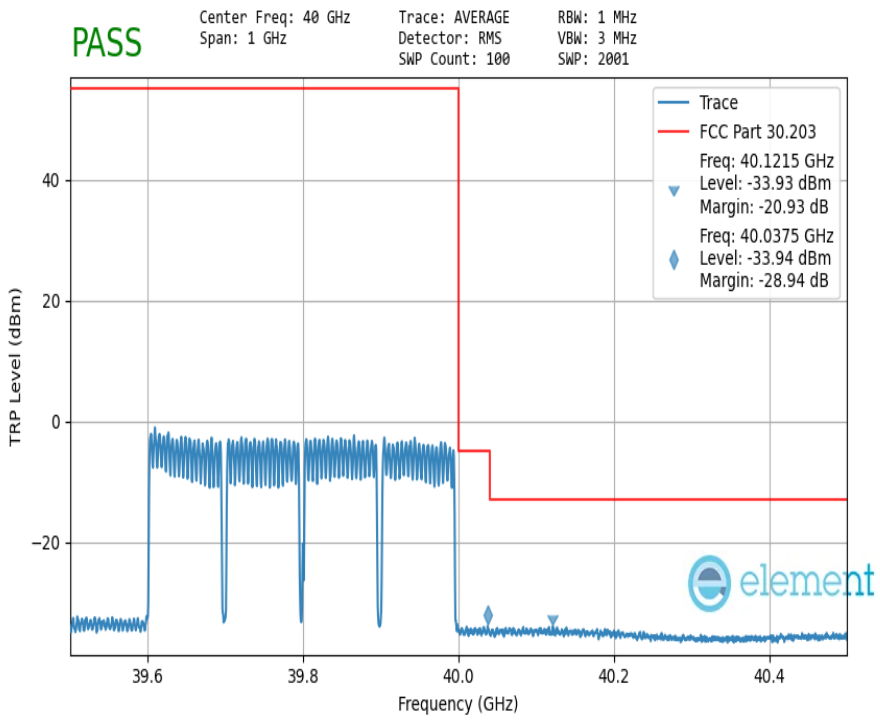
Plot 7-1700. Ant M3 Upper Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK 1RB)



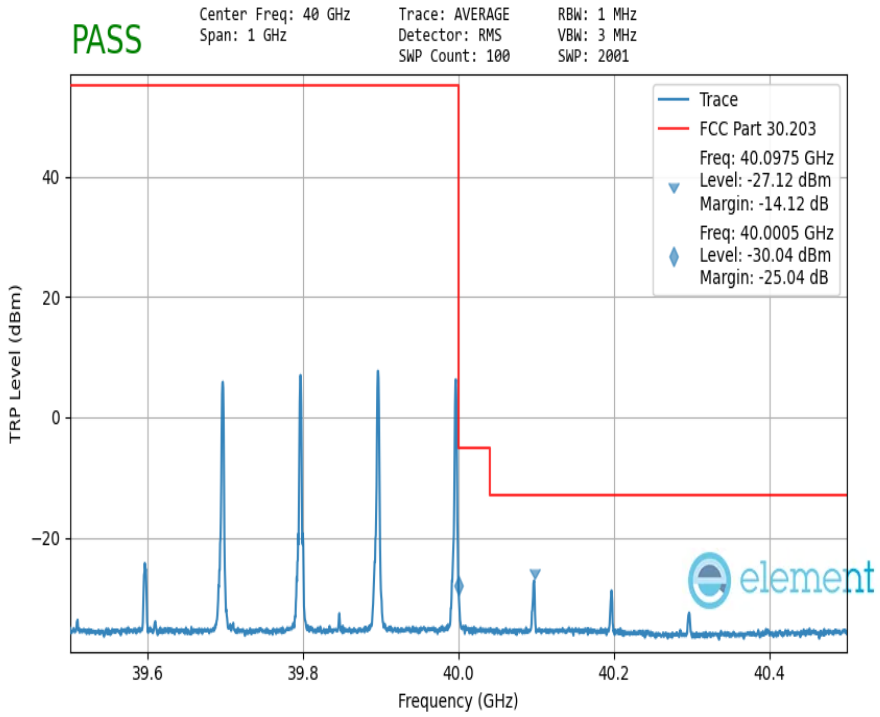
Plot 7-1701. Ant M3 Lower Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



Plot 7-1702. Ant M3 Lower Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)



Plot 7-1703. Ant M3 Upper Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK Full RB)



Plot 7-1704. Ant M3 Upper Band Edge (Band n260 100MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK 1RB)

7.6 Frequency Stability / Temperature Variation

§2.1055

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Test Procedure Used

ANSI C63.5-2015 Section 5.6
KDB 842590 D01 v01r02 Section 4.5

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was measured using horn antenna connected to a spectrum analyzer. The EUT was placed inside an environmental chamber that uses a foam plug to maintain the temperature condition inside the chamber. The horn antenna measured the frequency of the fundamental signal.

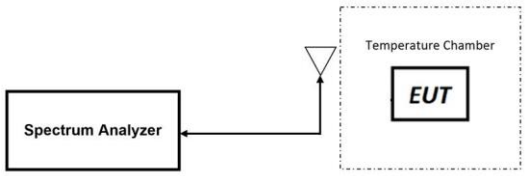


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. CW signal was used for frequency stability measurement
2. The Frequency Deviation column in the table below is the amount of deviation measured from the center frequency of the Reference measurement (first row).
3. Due to similar occupied bandwidth results between all three antennas, only Ant M0 frequency stability data have been included in this section.

Frequency Stability Measurements (Band n258)

§2.1055

OPERATING FREQUENCY: 24,300,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	24.2509101	-0.0009101
100 %		- 20	24.2508351	-0.0008351
100 %		- 10	24.2505250	-0.0005250
100 %		0	24.2502456	-0.0002456
100 %		+ 10	24.2509754	-0.0009754
100 %		+ 20	24.2512059	-0.0012059
100 %		+ 30	24.2508257	-0.0008257
100 %		+ 40	24.2509548	-0.0009548
100 %		+ 50	24.2510306	-0.0010306
BATT. ENDPOINT	3.23	+ 20	24.2512025	-0.0012025

Table 7-159. Frequency Stability Lower Boundary Data (n258)

OPERATING FREQUENCY: 25,200,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	25.2489255	-0.0010745
100 %		- 20	25.2496521	-0.0003479
100 %		- 10	25.2489651	-0.0010349
100 %		0	25.2491589	-0.0008411
100 %		+ 10	25.2488650	-0.0011350
100 %		+ 20	25.2480103	-0.0019897
100 %		+ 30	25.2474158	-0.0025842
100 %		+ 40	25.2474256	-0.0025744
100 %		+ 50	25.2486140	-0.0013860
BATT. ENDPOINT	3.23	+ 20	25.2480006	-0.0019994

Table 7-160. Frequency Stability Upper Boundary Data (n258)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore, the device is determined to remain operating in band over the temperature and voltage range as tested.

Frequency Stability Measurements (Band n261)

§2.1055

OPERATING FREQUENCY: 27,550,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	27.5012251	-0.0012251
100 %		- 20	27.5052510	-0.0052510
100 %		- 10	27.5056142	-0.0056142
100 %		0	27.5092512	-0.0092512
100 %		+ 10	27.5019680	-0.0019680
100 %		+ 20	27.5008164	-0.0008164
100 %		+ 30	27.5010495	-0.0010495
100 %		+ 40	27.5010024	-0.0010024
100 %		+ 50	27.5009791	-0.0009791
BATT. ENDPOINT	3.23	+ 20	27.5010704	-0.0010704

Table 7-161. Frequency Stability Lower Boundary Data (n261)

OPERATING FREQUENCY: 28,300,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	28.3475609	-0.0024391
100 %		- 20	28.3476520	-0.0023480
100 %		- 10	28.3472593	-0.0027407
100 %		0	28.3469680	-0.0030320
100 %		+ 10	28.3478824	-0.0021176
100 %		+ 20	28.3479639	-0.0020361
100 %		+ 30	28.3474344	-0.0025656
100 %		+ 40	28.3474256	-0.0025744
100 %		+ 50	28.3474601	-0.0025399
BATT. ENDPOINT	3.23	+ 20	28.3479535	-0.0020465

Table 7-162. Frequency Stability Upper Boundary Data (n261)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore, the device is determined to remain operating in band over the temperature and voltage range as tested.

Frequency Stability Measurements (Band n260)

§2.1055

OPERATING FREQUENCY: 37,050,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	37.0081699	-0.0081699
100 %		- 20	37.0015685	-0.0015685
100 %		- 10	37.0012351	-0.0012351
100 %		0	37.0011252	-0.0011252
100 %		+ 10	37.0010058	-0.0010058
100 %		+ 20	37.0009300	-0.0009300
100 %		+ 30	37.0009310	-0.0009310
100 %		+ 40	37.0009522	-0.0009522
100 %		+ 50	37.0009662	-0.0009662
BATT. ENDPOINT	3.23	+ 20	37.0010700	-0.0010700

Table 7-163. Frequency Stability Lower Boundary Data (n260)

OPERATING FREQUENCY: 39,950,000,000 Hz

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Measured Frequency (GHz)	Freq. Delta from Operating Edge (GHz)
100 %	3.80	- 30	39.9994419	-0.0005581
100 %		- 20	39.9987966	-0.0012034
100 %		- 10	39.9991526	-0.0008474
100 %		0	39.9989850	-0.0010150
100 %		+ 10	39.9987502	-0.0012498
100 %		+ 20	39.9981300	-0.0018700
100 %		+ 30	39.9970206	-0.0029794
100 %		+ 40	39.9976235	-0.0023766
100 %		+ 50	39.9977864	-0.0022136
BATT. ENDPOINT	3.23	+ 20	39.9979642	-0.0020358

Table 7-164. Frequency Stability Upper Boundary Data (n260)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore, the device is determined to remain operating in band over the temperature and voltage range as tested.

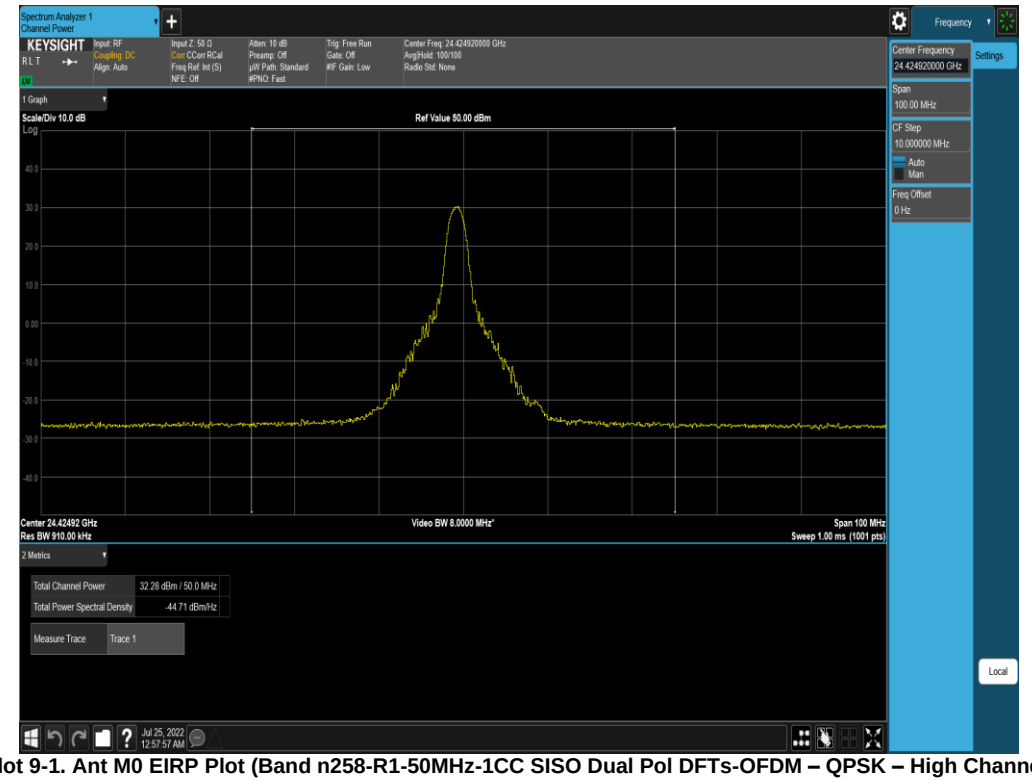
8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2435** complies with all the requirements of Part 30.

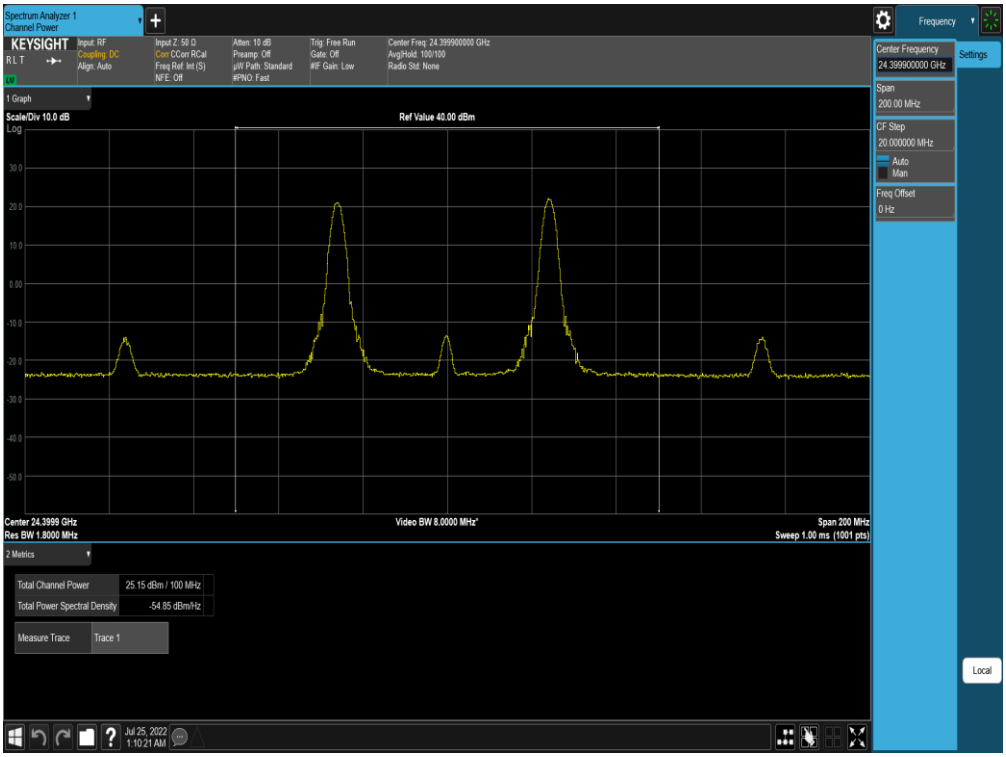
9.0 APPENDIX A

9.1 Equivalent Isotropic Radiated Power Plots

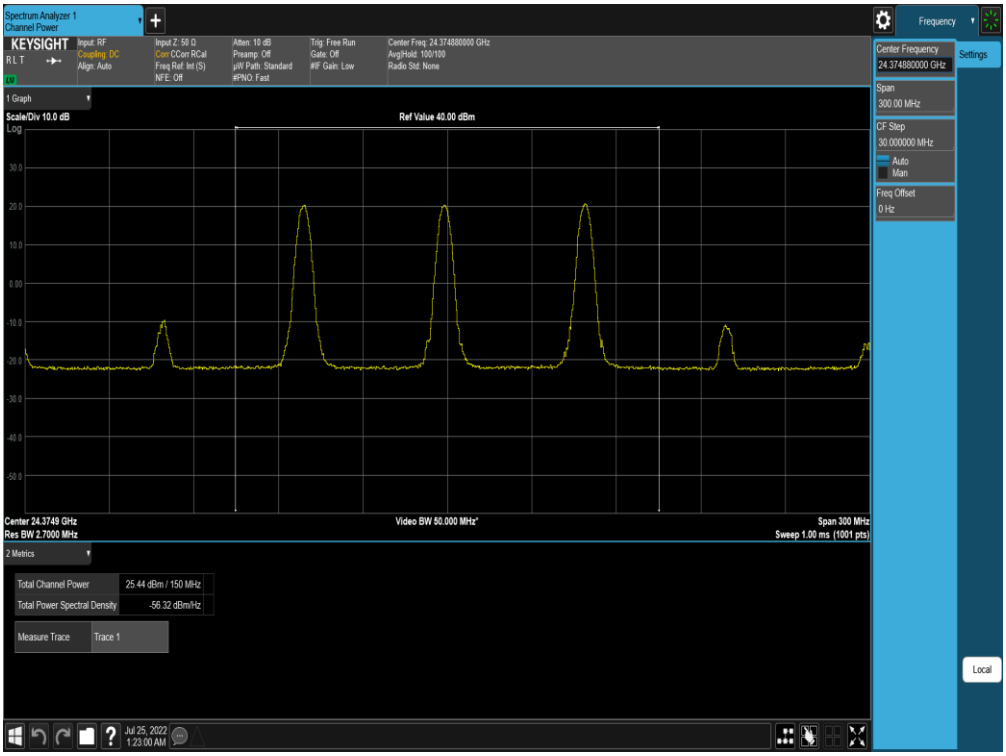
9.1.1 Band n258-R1 – Ant M0



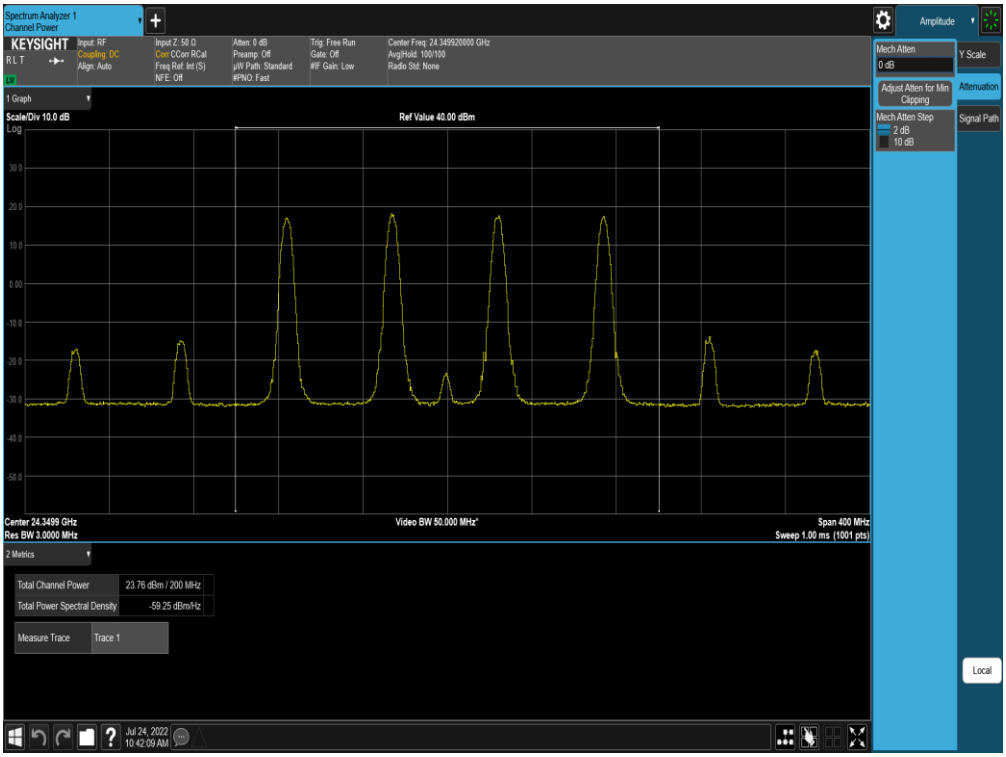
Plot 9-1. Ant M0 EIRP Plot (Band n258-R1-50MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



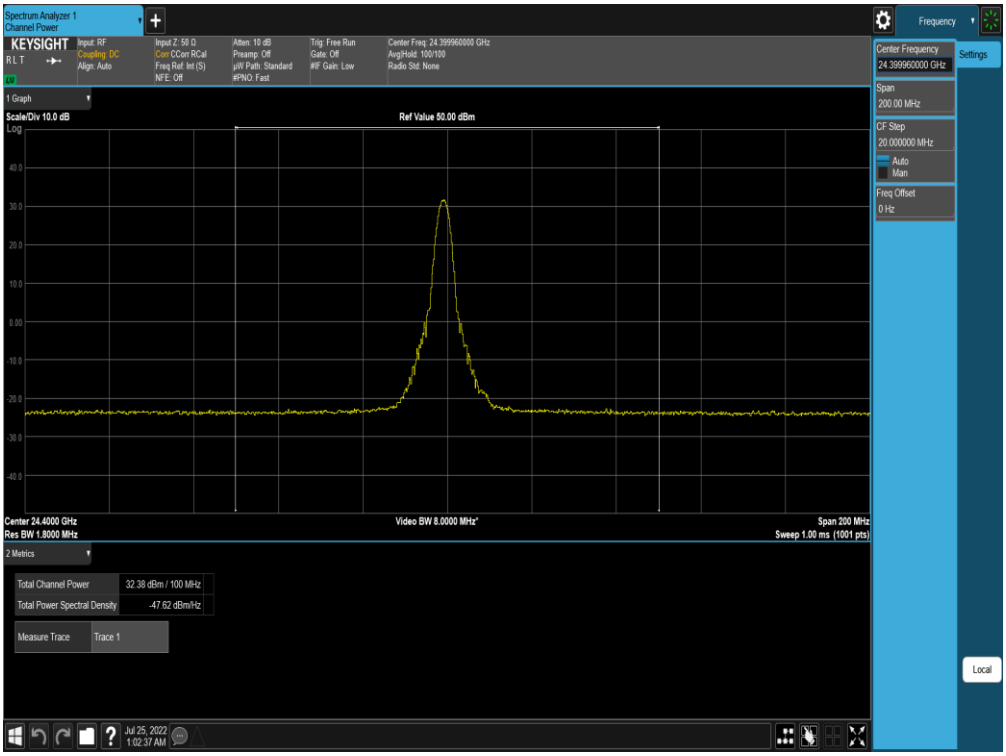
Plot 9-2. Ant M0 EIRP Plot (Band n258-R1-50MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



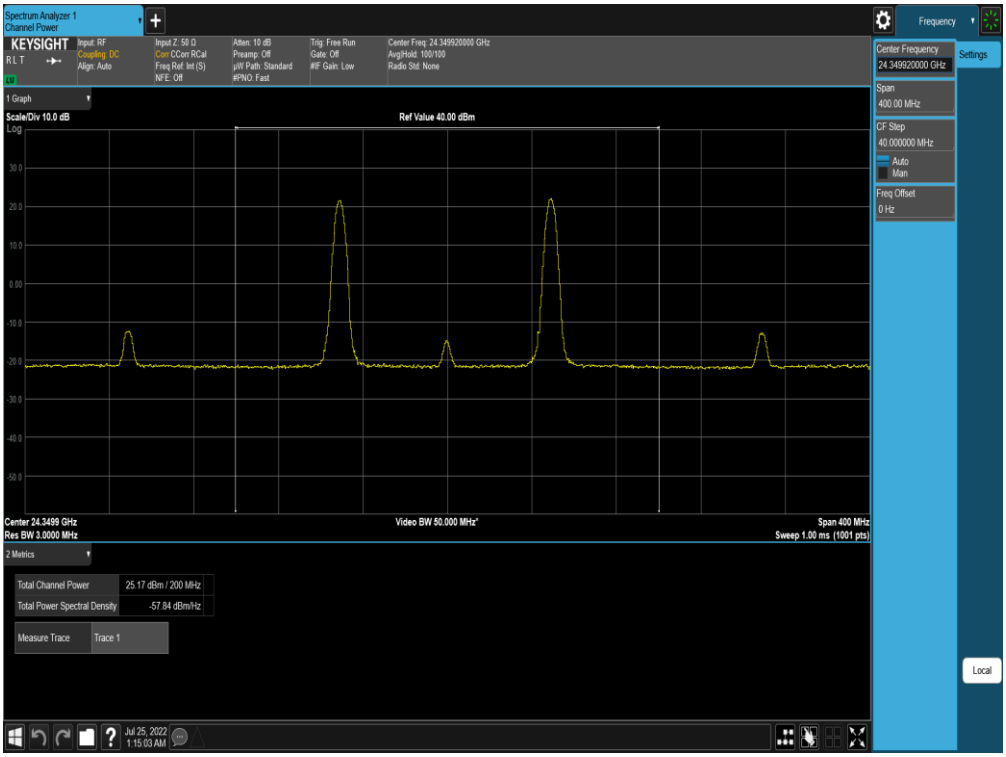
Plot 9-3. Ant M0 EIRP Plot (Band n258-R1-50MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



Plot 9-4. Ant M0 EIRP Plot (Band n258-R1-50MHz-4CC MIMO CP-OFDM – QPSK – Mid Channel)

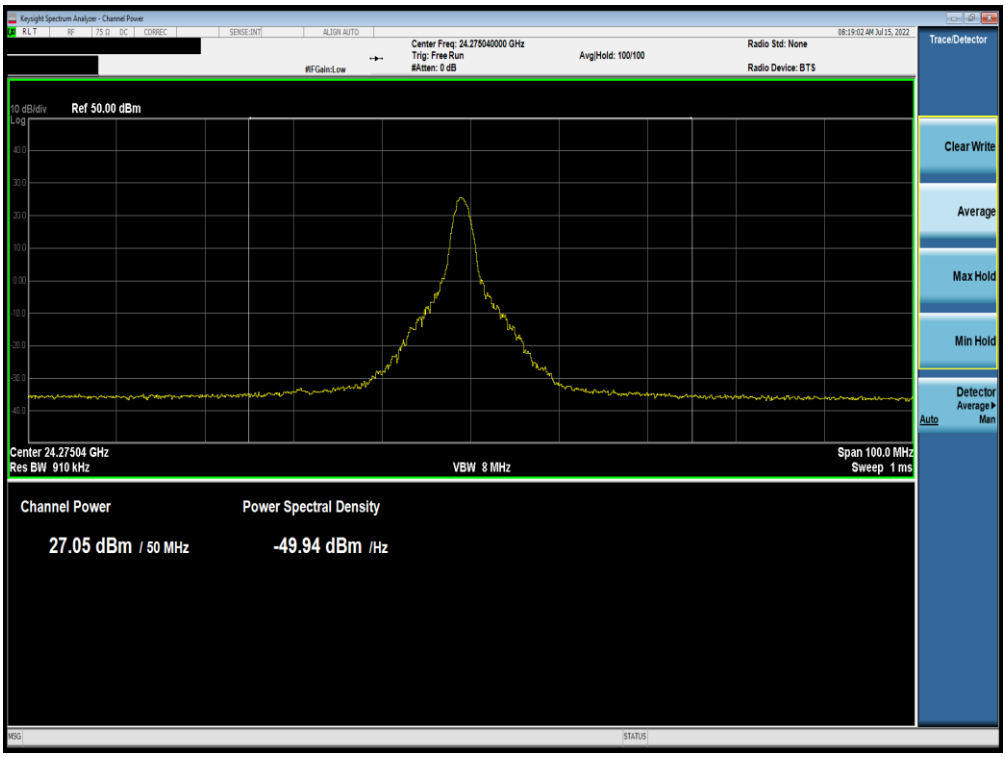


Plot 9-5. Ant M0 EIRP Plot (Band n258-R1-100MHz-1CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – High Channel)

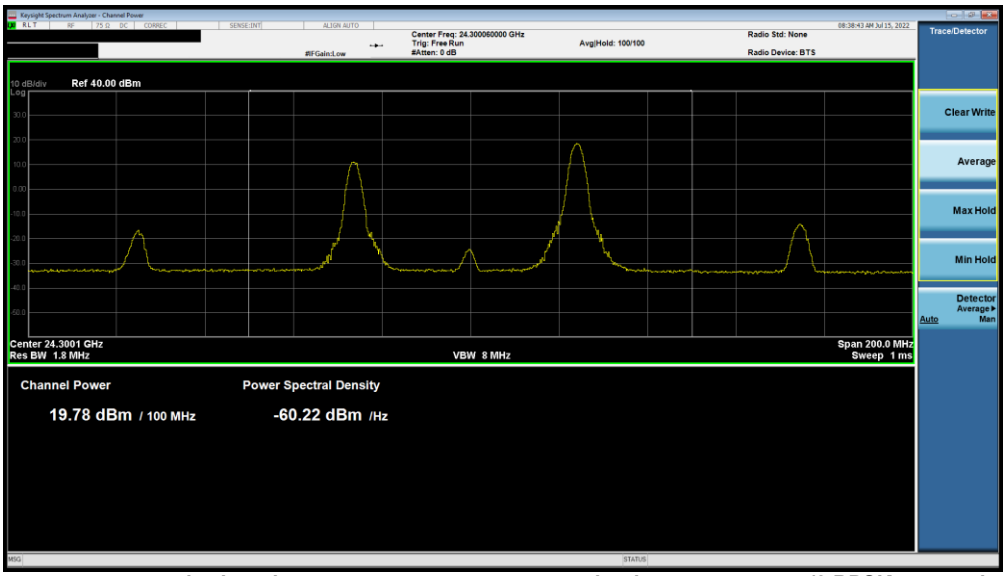


Plot 9-6. Ant M0 EIRP Plot (Band n258-R1-100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – High Channel)

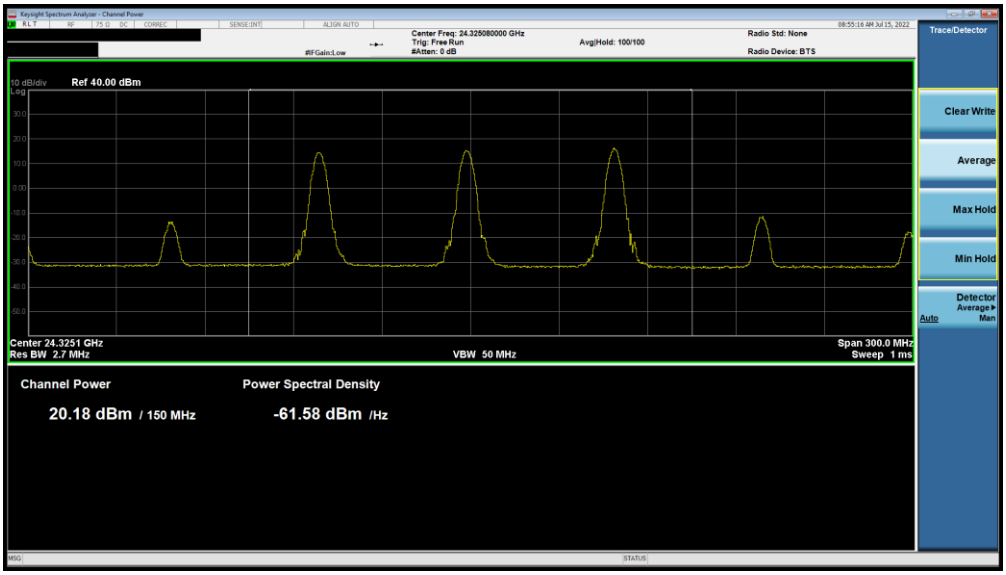
9.1.2 Band n258-R1 – Ant M2



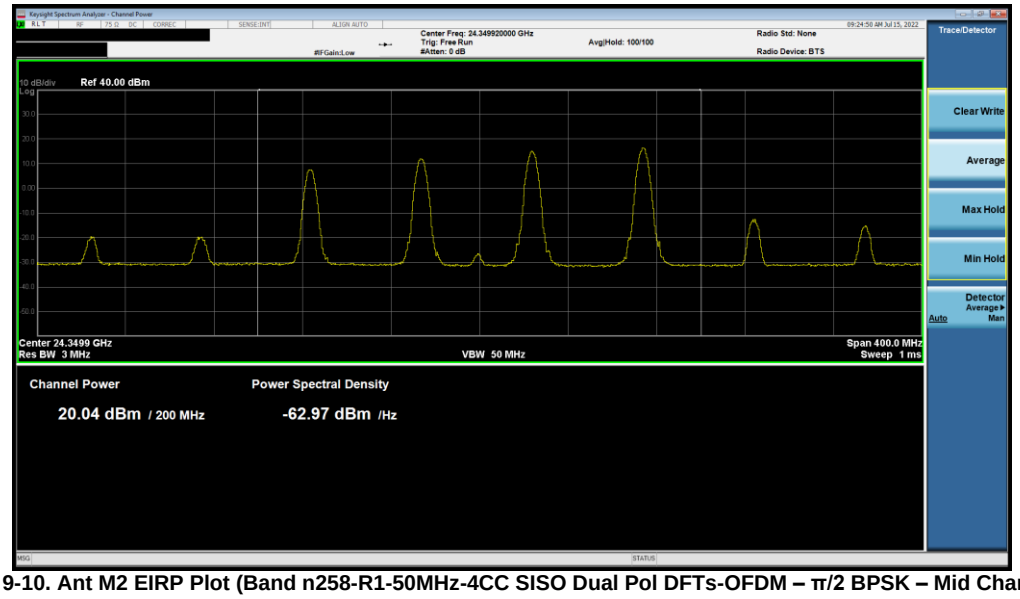
Plot 9-7. Ant M2 EIRP Plot (Band n258-R1-50MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – Low Channel)



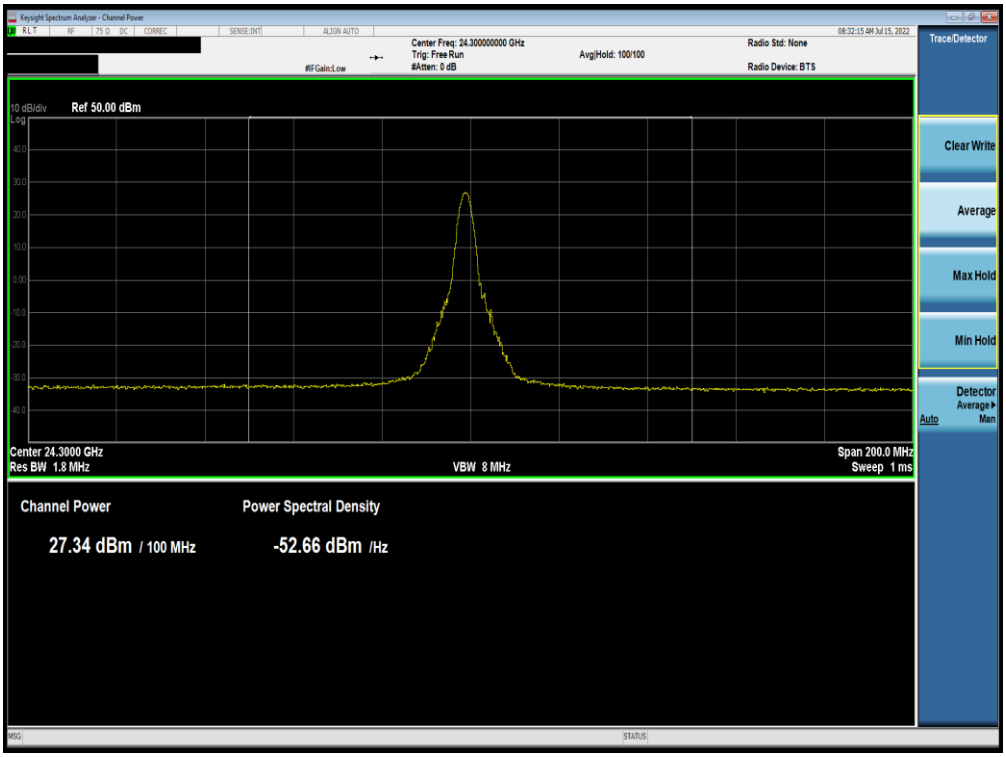
Plot 9-8. Ant M2 EIRP Plot (Band n258-R1-50MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – Low Channel)



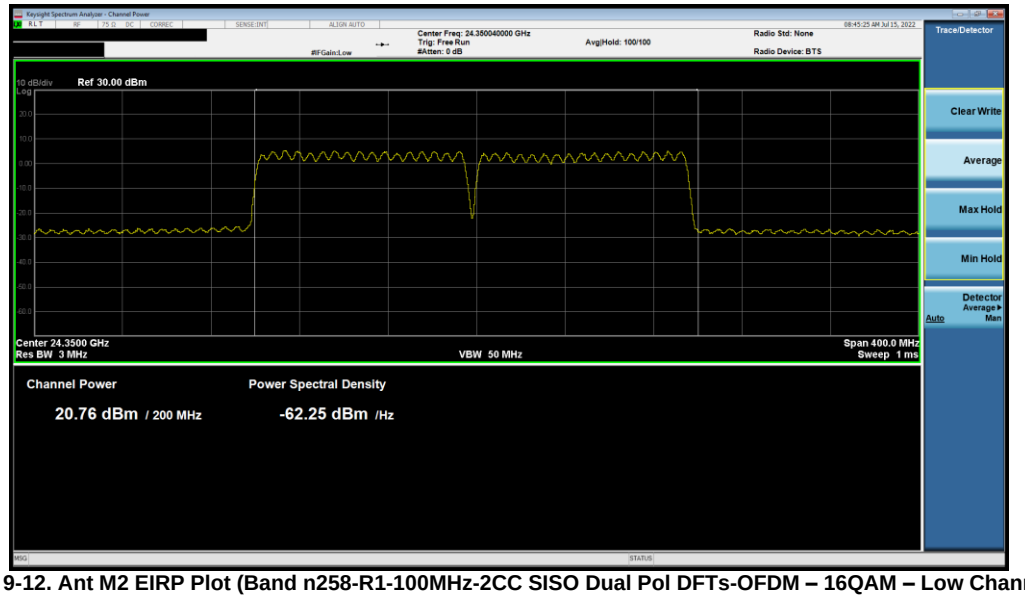
Plot 9-9. Ant M2 EIRP Plot (Band n258-R1-50MHz-3CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – Low Channel)



Plot 9-10. Ant M2 EIRP Plot (Band n258-R1-50MHz-4CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – Mid Channel)

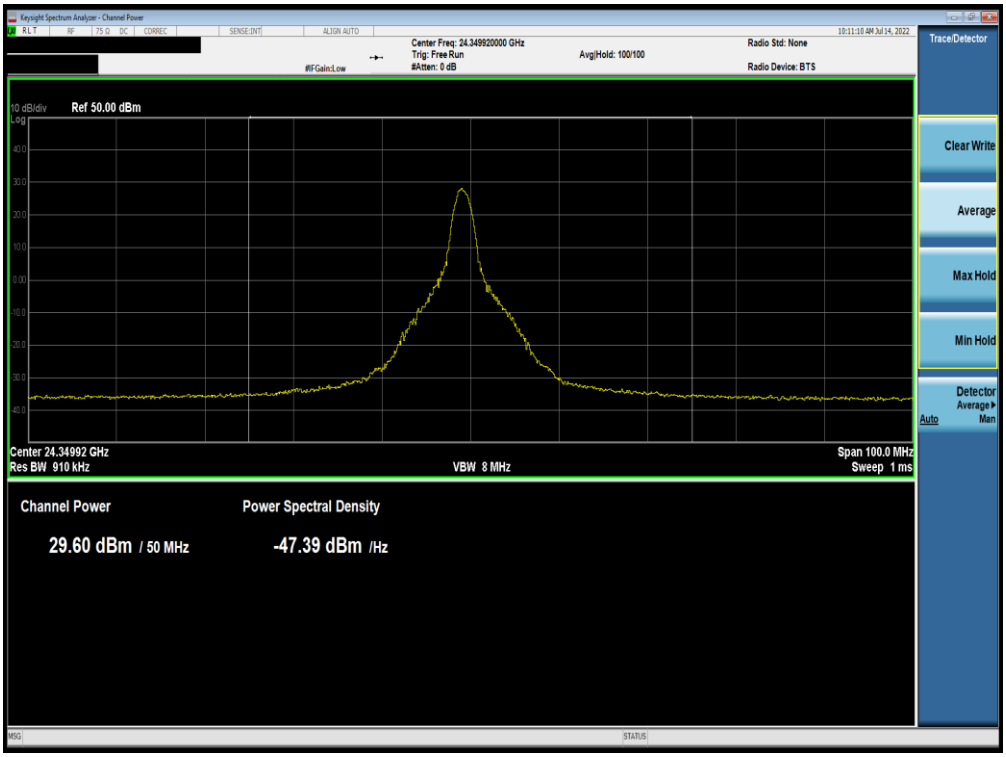


Plot 9-11. Ant M2 EIRP Plot (Band n258-R1-100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – Low Channel)

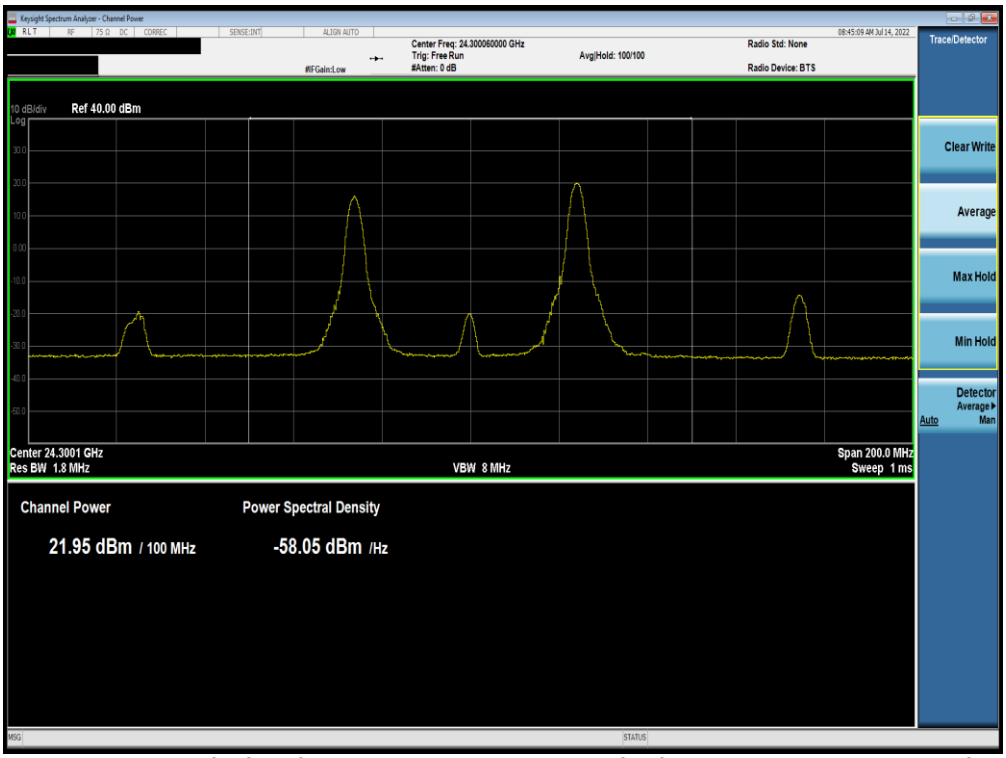


Plot 9-12. Ant M2 EIRP Plot (Band n258-R1-100MHz-2CC SISO Dual Pol DFTs-OFDM – 16QAM – Low Channel)

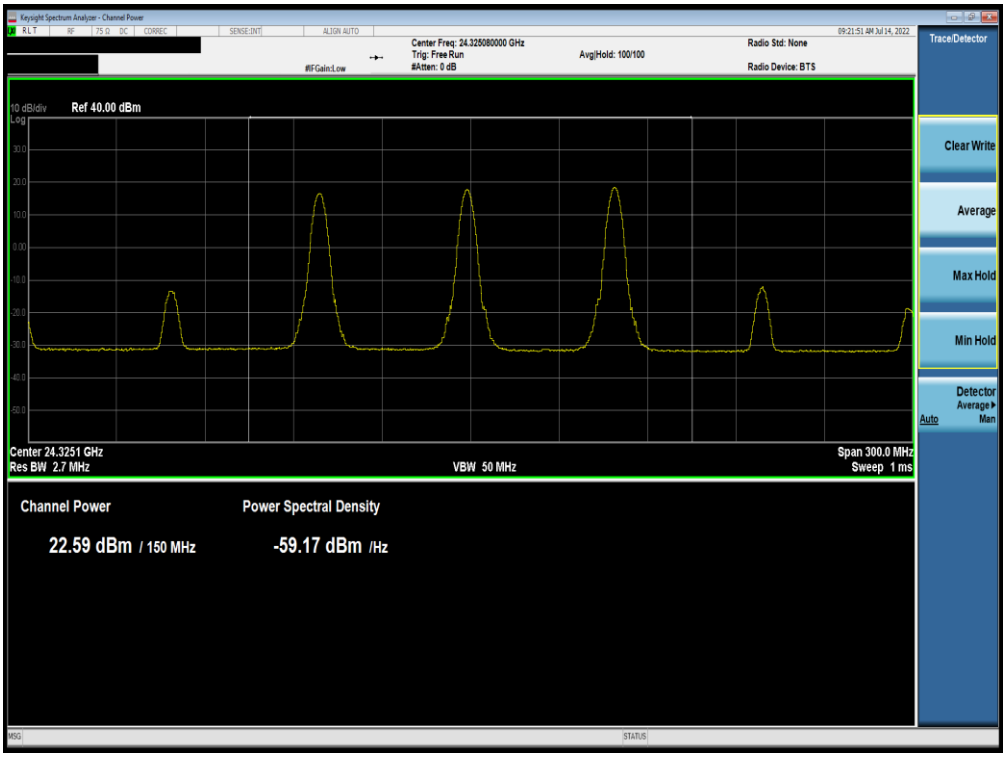
9.1.3 Band n258-R1 Ant M3



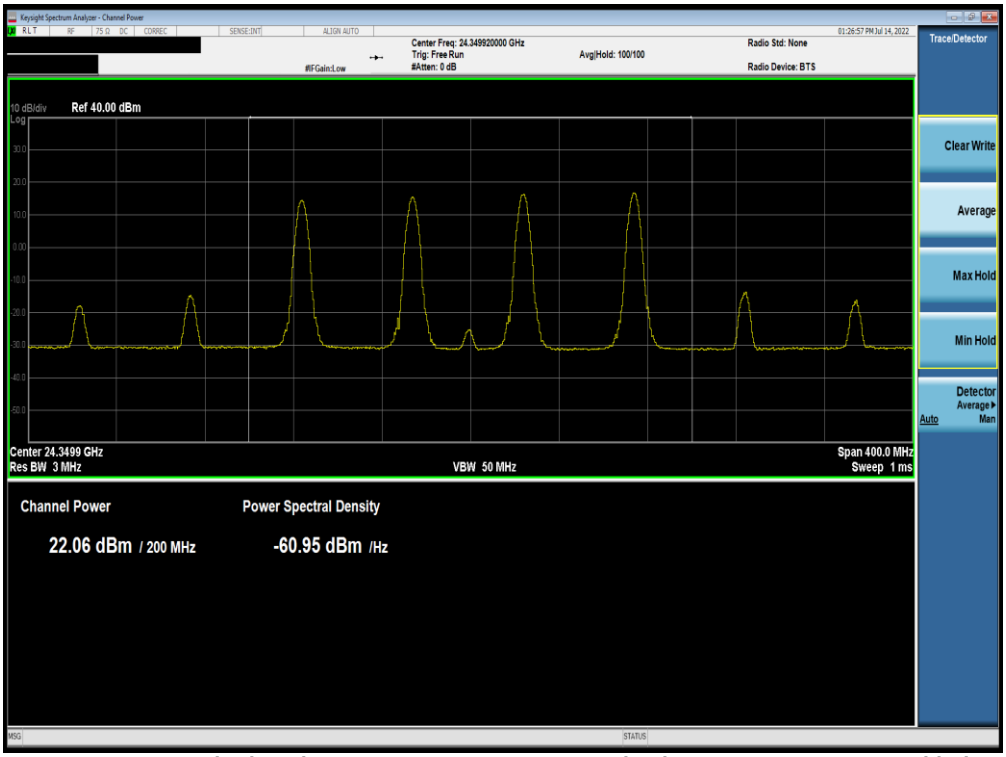
Plot 9-13. Ant M3 EIRP Plot (Band n258-R1-50MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – Mid Channel)



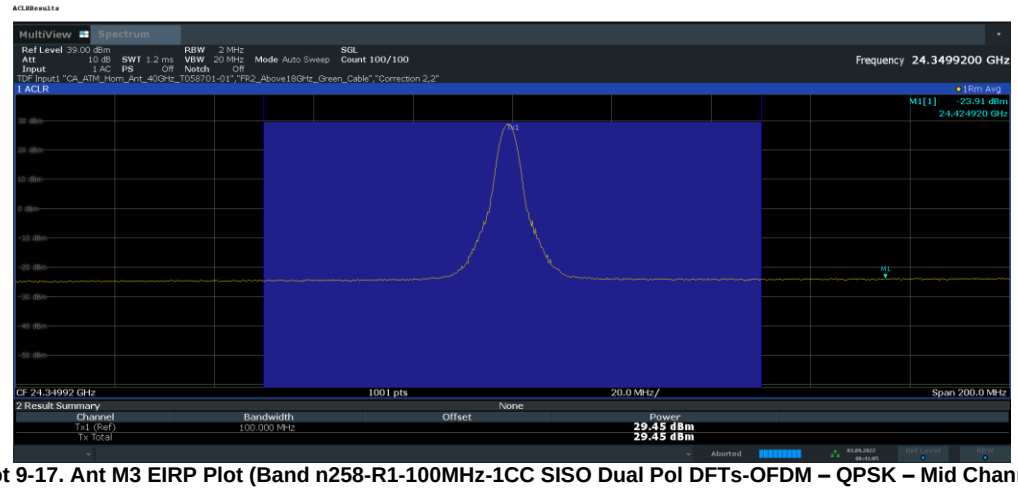
Plot 9-14. Ant M3 EIRP Plot (Band n258-R1-50MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK – Low Channel)



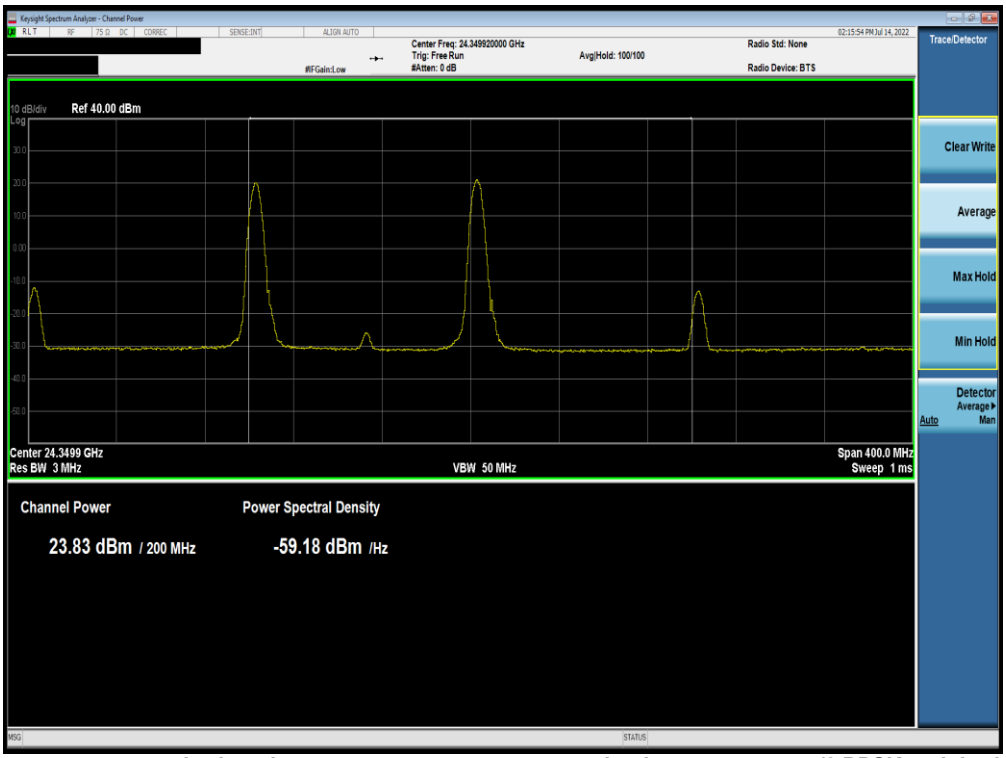
Plot 9-15. Ant M3 EIRP Plot (Band n258-R1-50MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK – Low Channel)



Plot 9-16. Ant M3 EIRP Plot (Band n258-R1-50MHz-4CC SISO Dual Pol DFTs-OFDM – QPSK – Mid Channel)

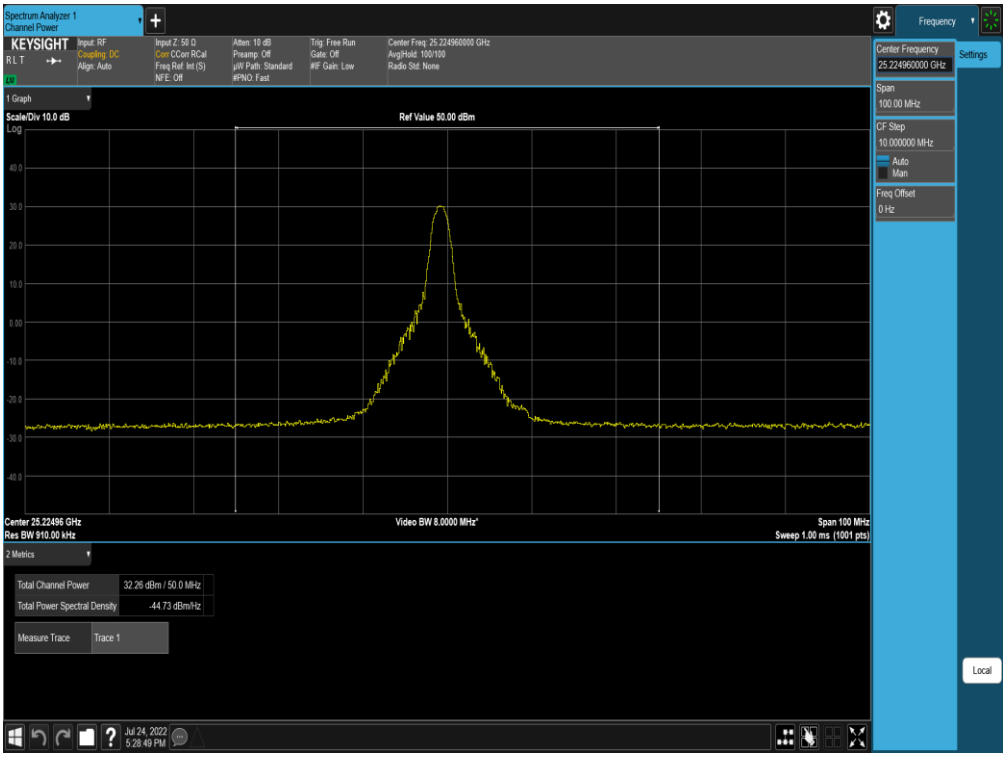


Plot 9-17. Ant M3 EIRP Plot (Band n258-R1-100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – Mid Channel)

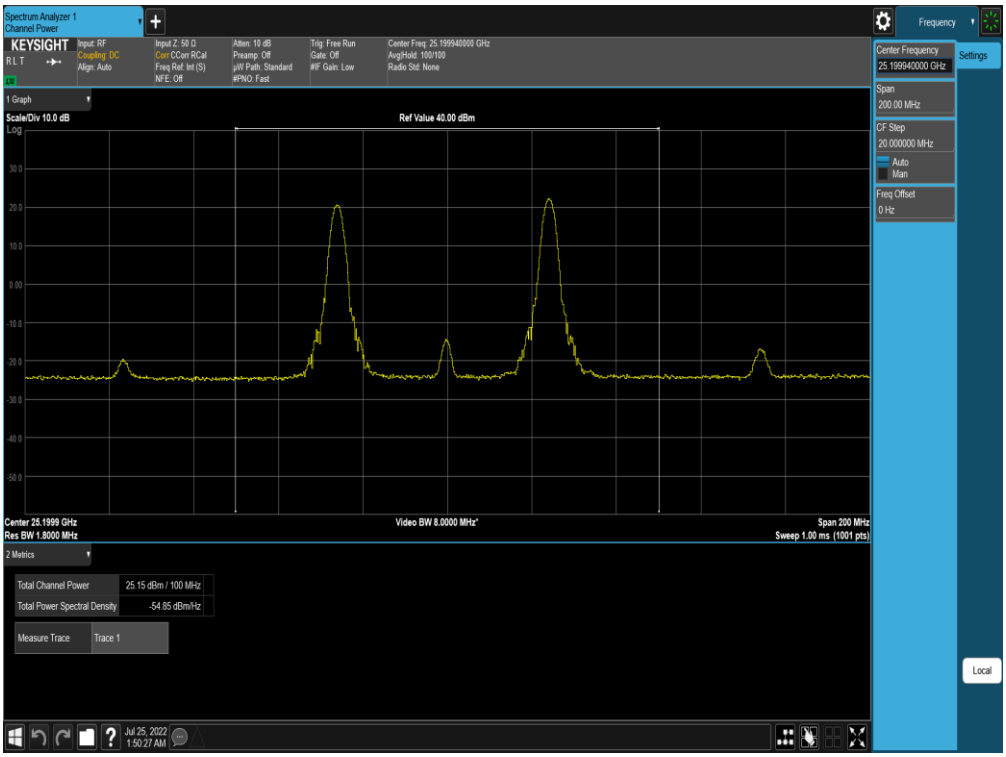


Plot 9-18. Ant M3 EIRP Plot (Band n258-R1-100MHz-2CC SISO Dual Pol DFTs-OFDM – π/2 BPSK – High Channel)

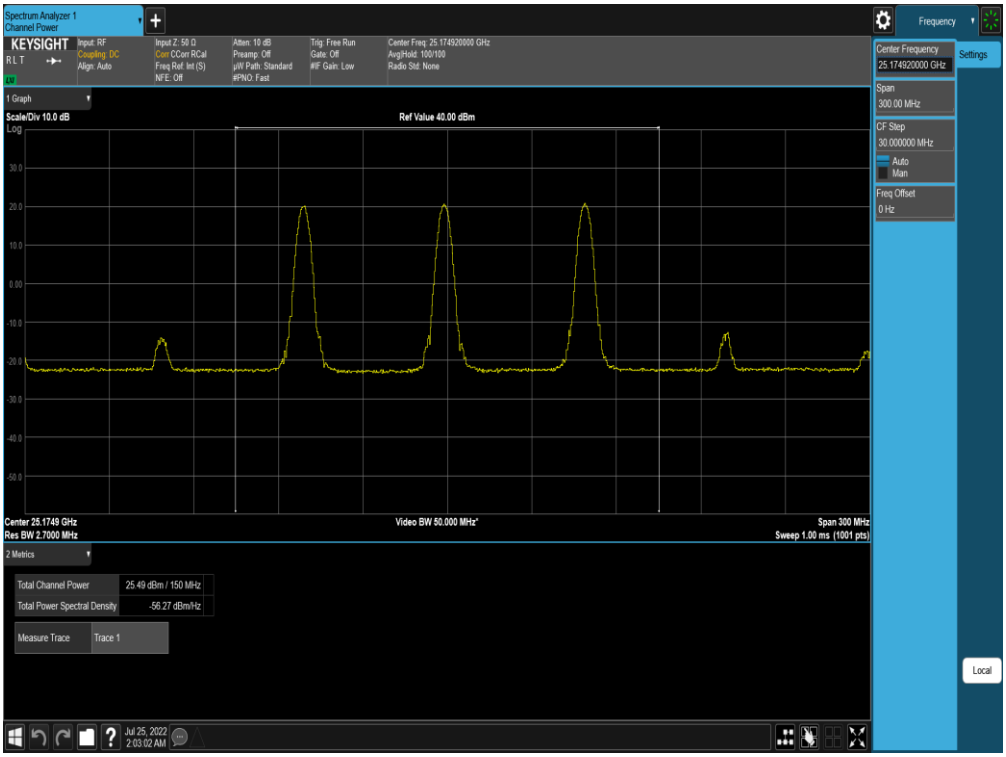
9.1.4 Band n258-R2 – Ant M0



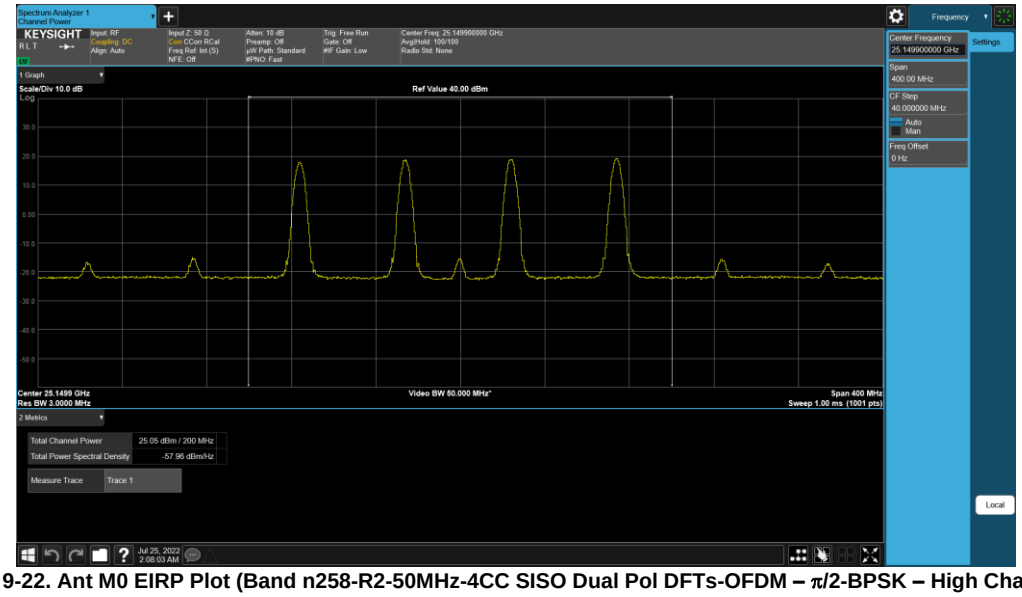
Plot 9-19. Ant M0 EIRP Plot (Band n258-R2-50MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



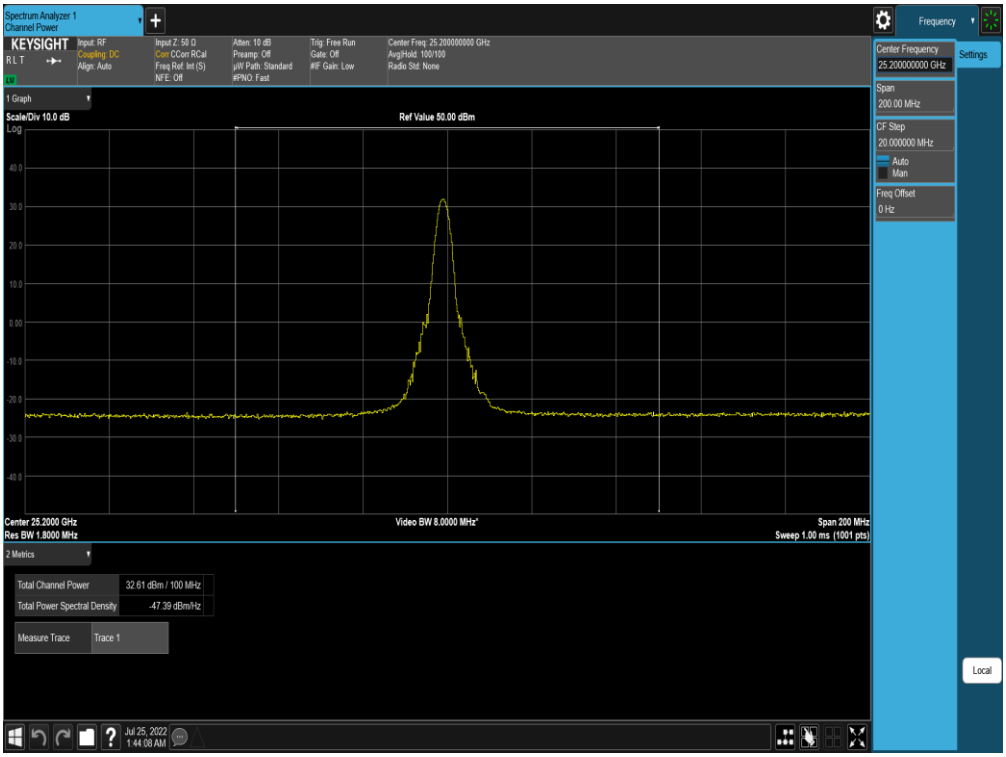
Plot 9-20. Ant M0 EIRP Plot (Band n258-R2-50MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



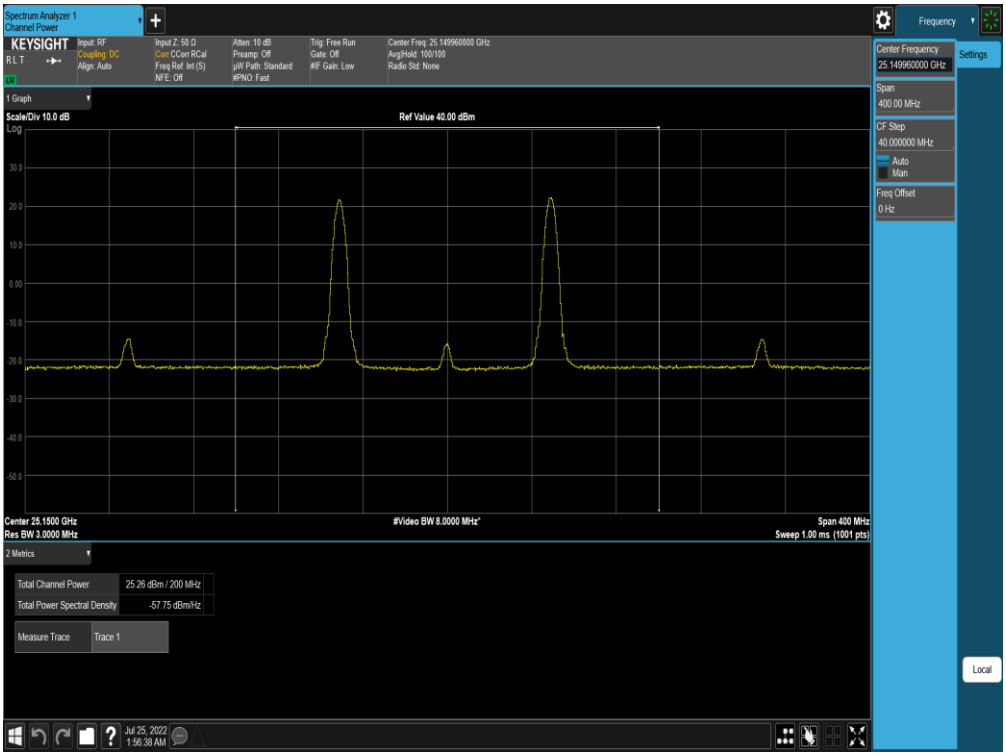
Plot 9-21. Ant M0 EIRP Plot (Band n258-R2-50MHz-3CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



Plot 9-22. Ant M0 EIRP Plot (Band n258-R2-50MHz-4CC SISO Dual Pol DFTs-OFDM – π/2-BPSK – High Channel)



Plot 9-23. Ant M0 EIRP Plot (Band n258-R2-100MHz-1CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)



Plot 9-24. Ant M0 EIRP Plot (Band n258-R2-100MHz-2CC SISO Dual Pol DFTs-OFDM – QPSK – High Channel)