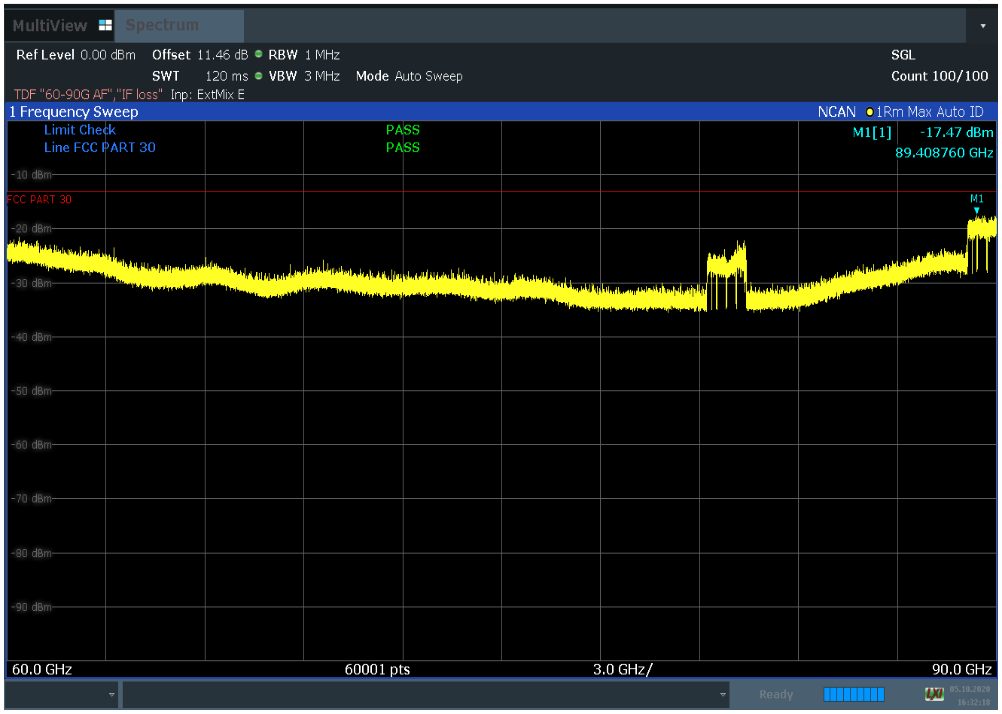
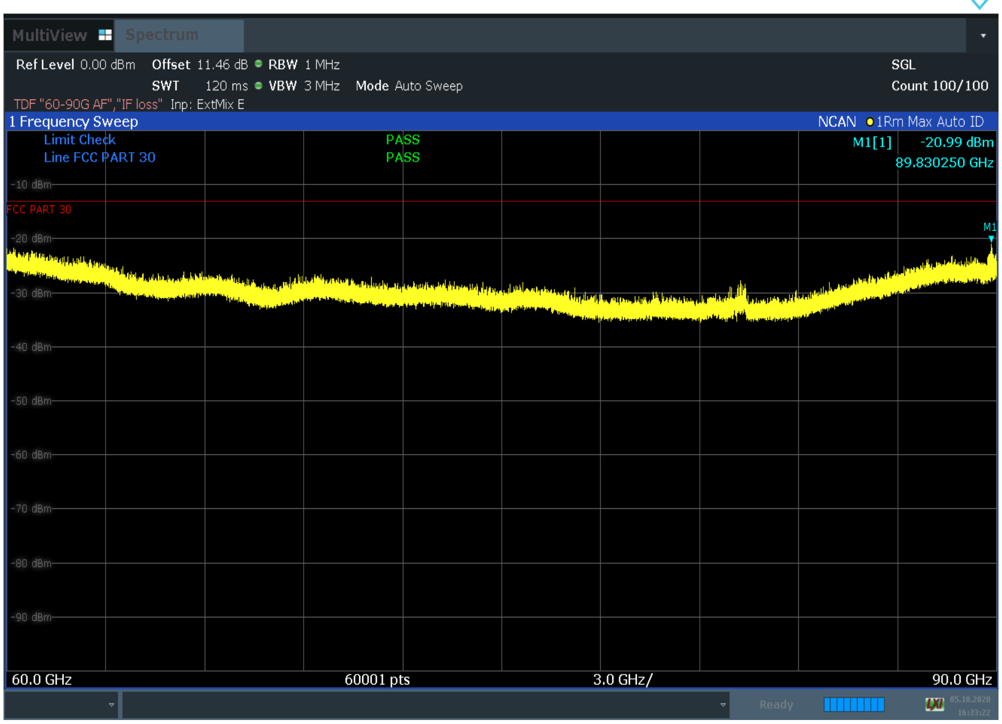
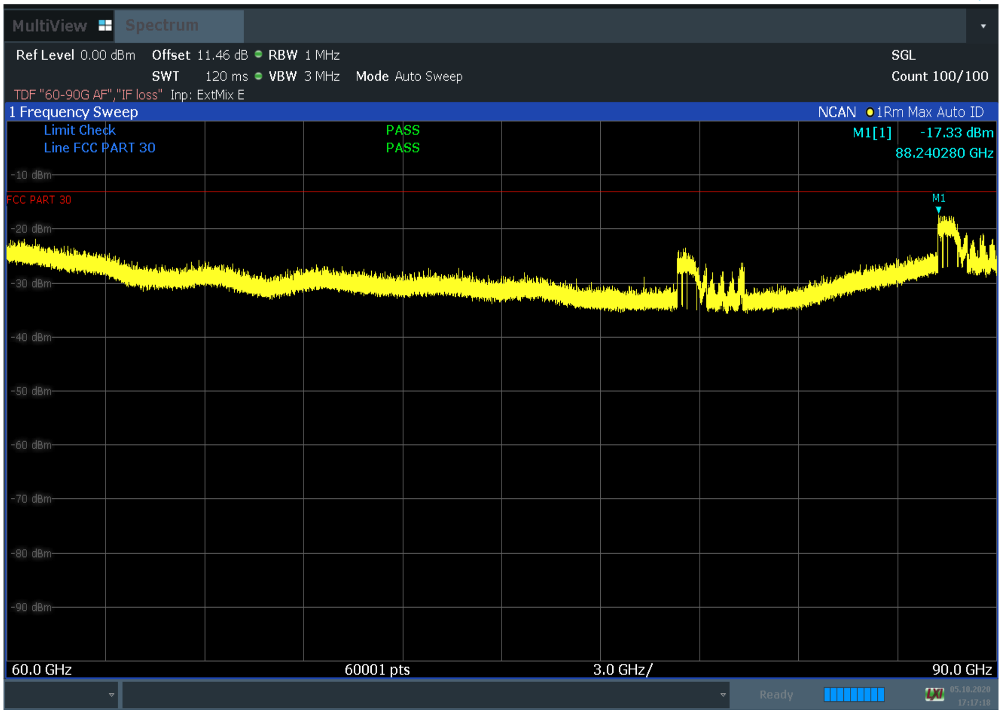


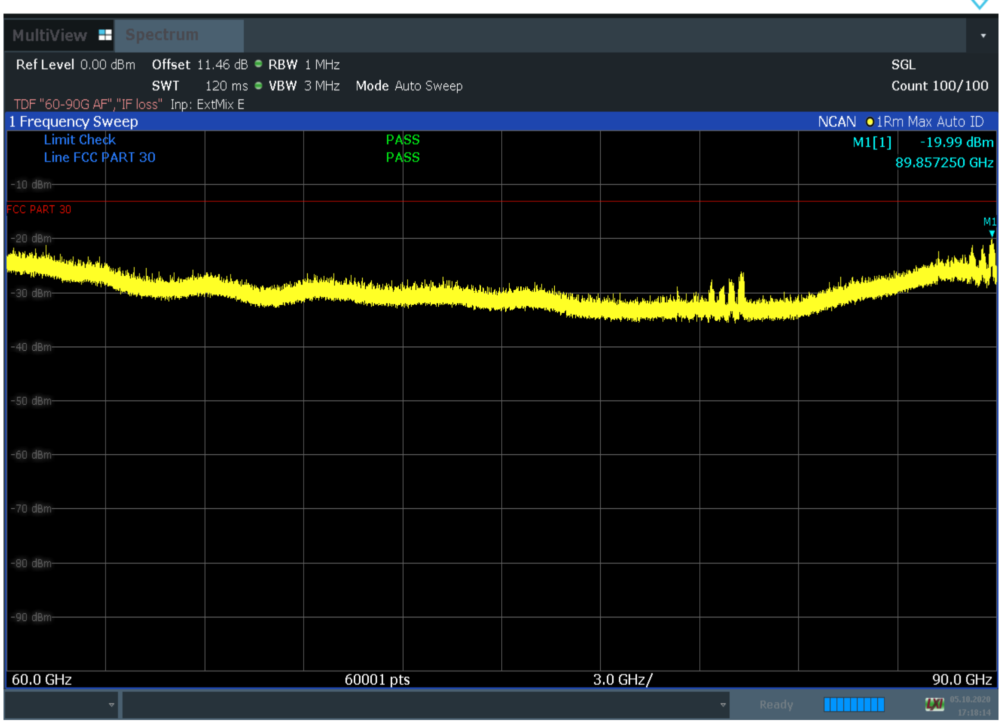
Plot 7-668. RSE 60 GHz – 90 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. H)



Plot 7-669. RSE 60 GHz – 90 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. V)

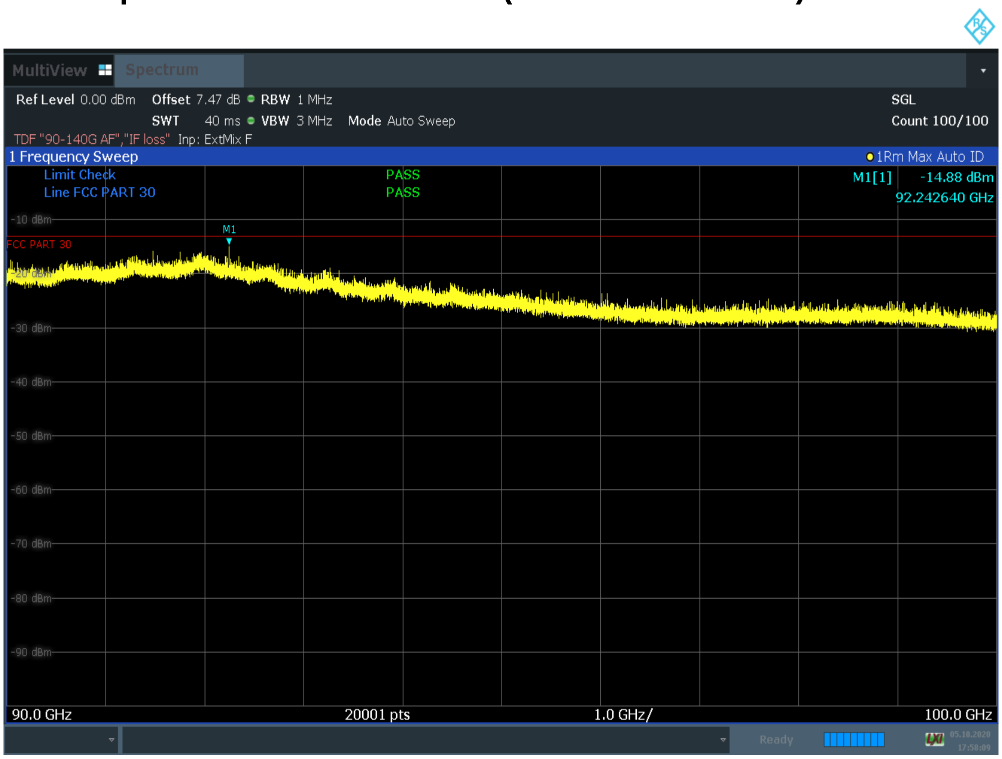


Plot 7-670. RSE 60 GHz – 90 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. H)

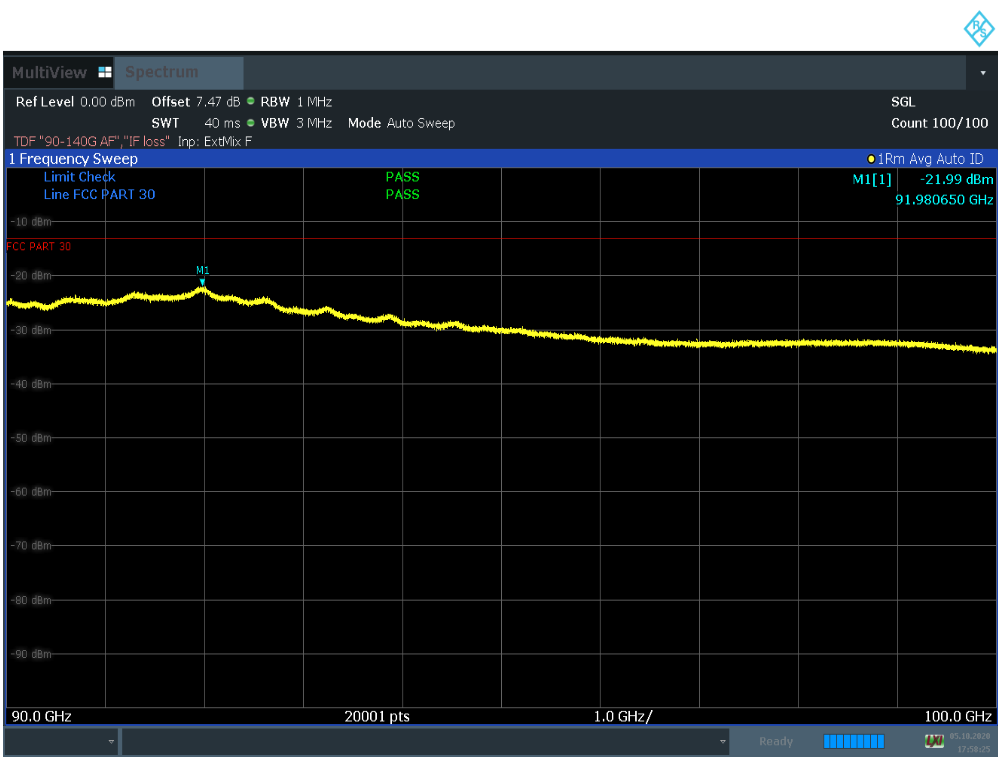


Plot 7-671. RSE 60 GHz – 90 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. V)

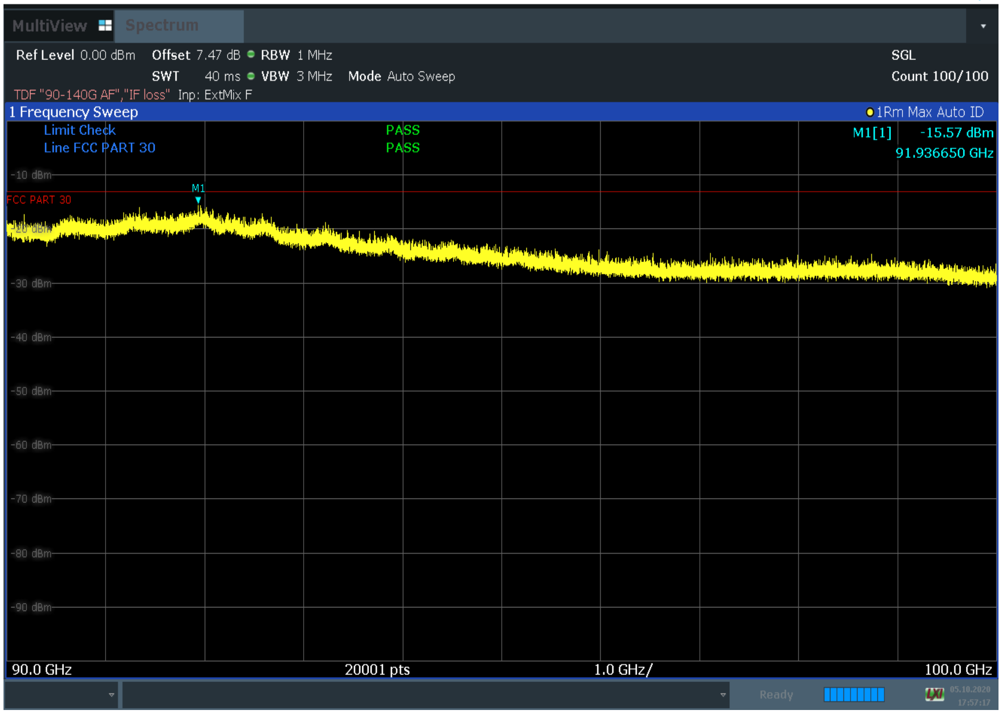
7.5.8 Radiated Spurious Emissions Plots (90 GHz to 100 GHz)



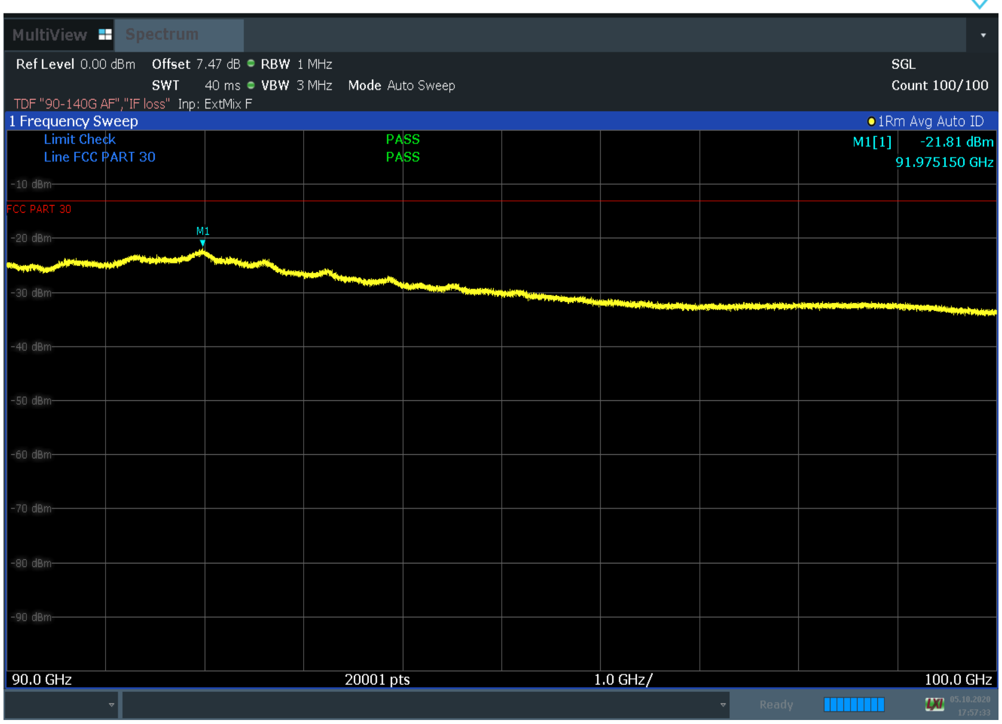
Plot 7-672. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Low Ant. Pol. H)



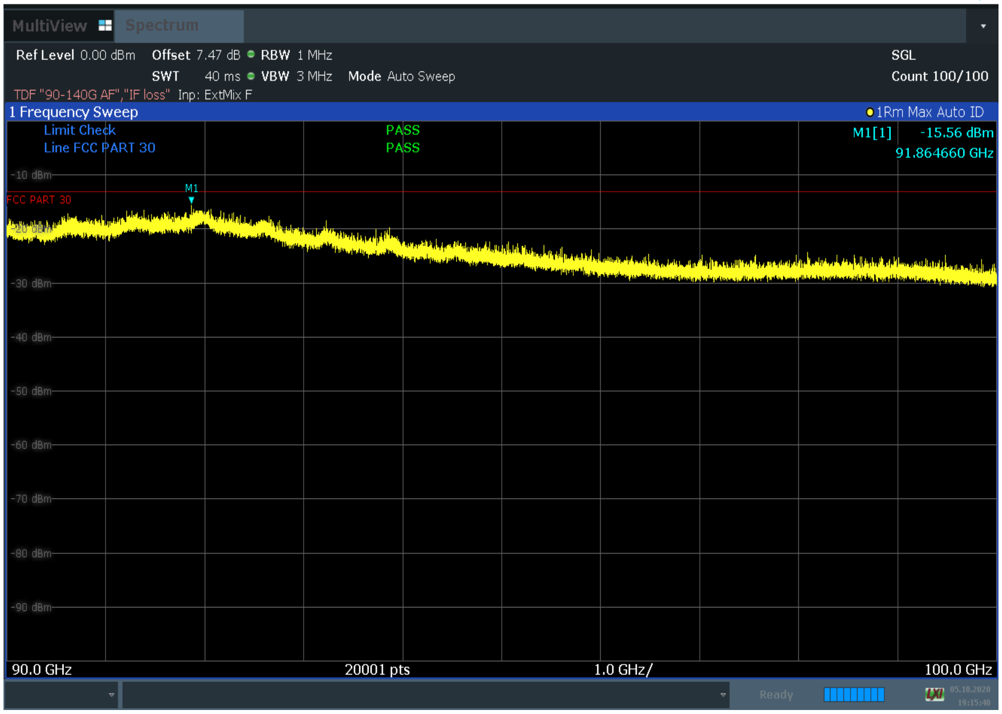
Plot 7-673. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Low Ant. Pol. H, Final)



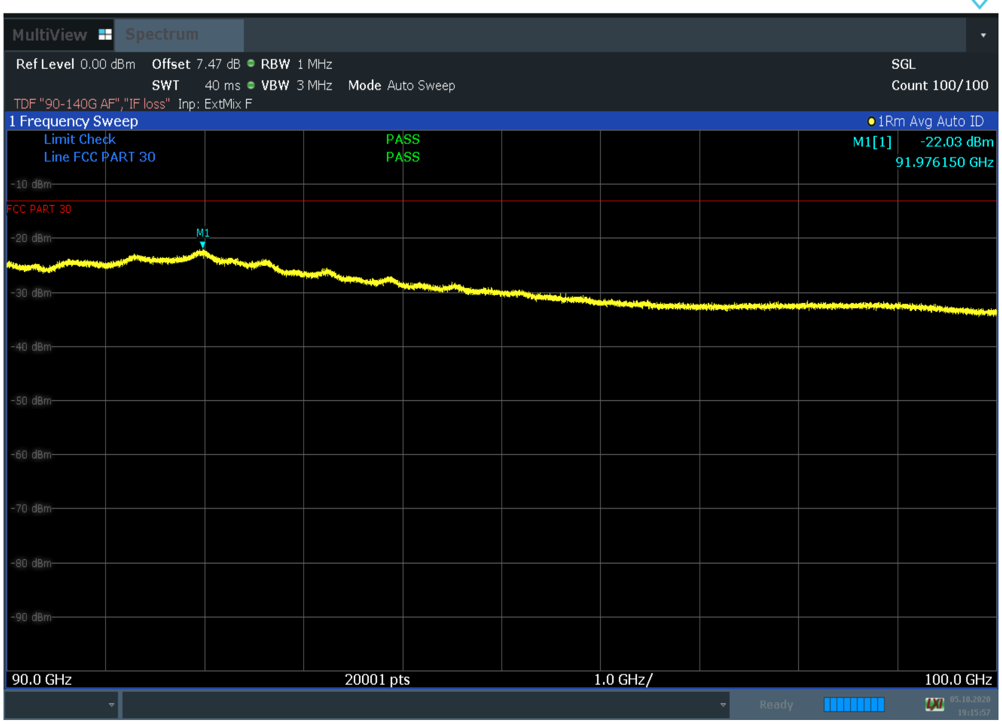
Plot 7-674. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Low Ant. Pol. V)



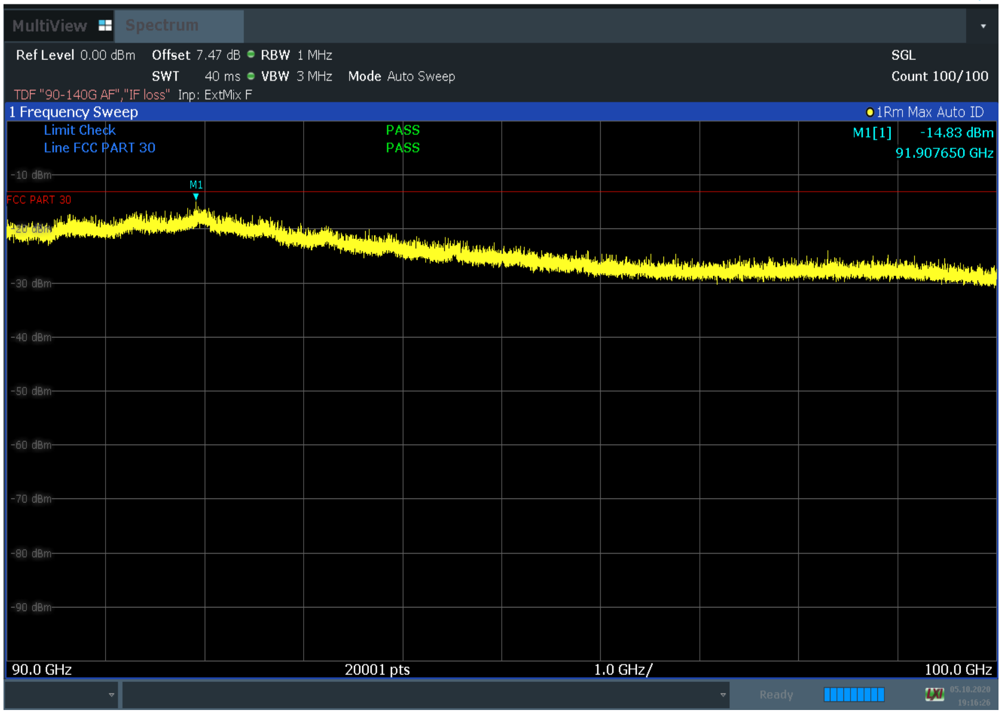
Plot 7-675. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Low Ant. Pol. V, Final)



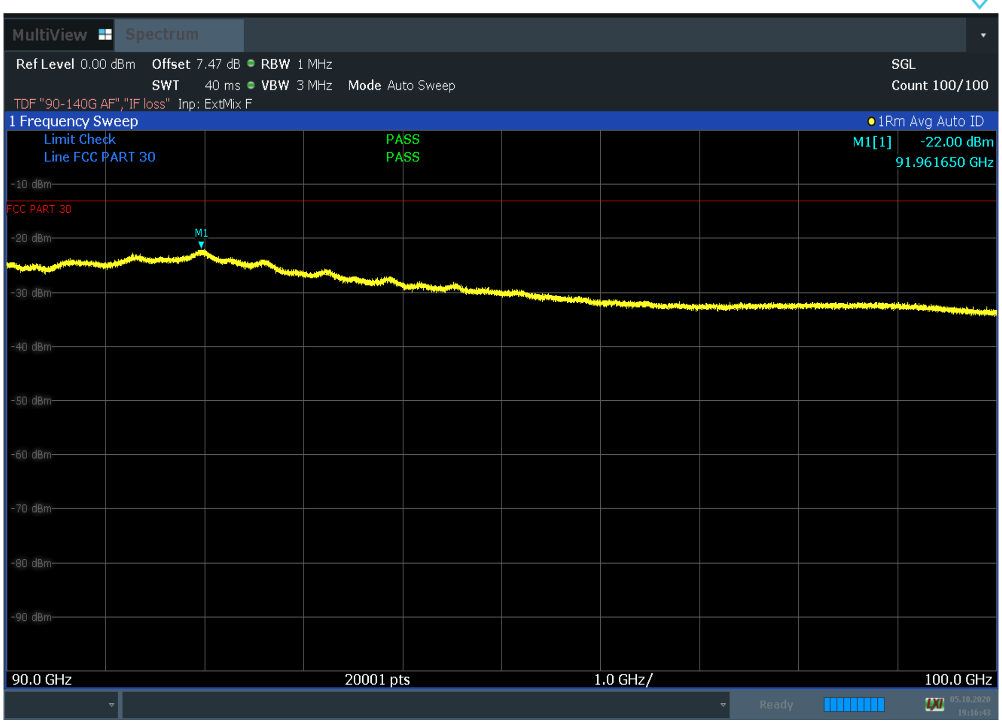
Plot 7-676. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Low Ant. Pol. H)



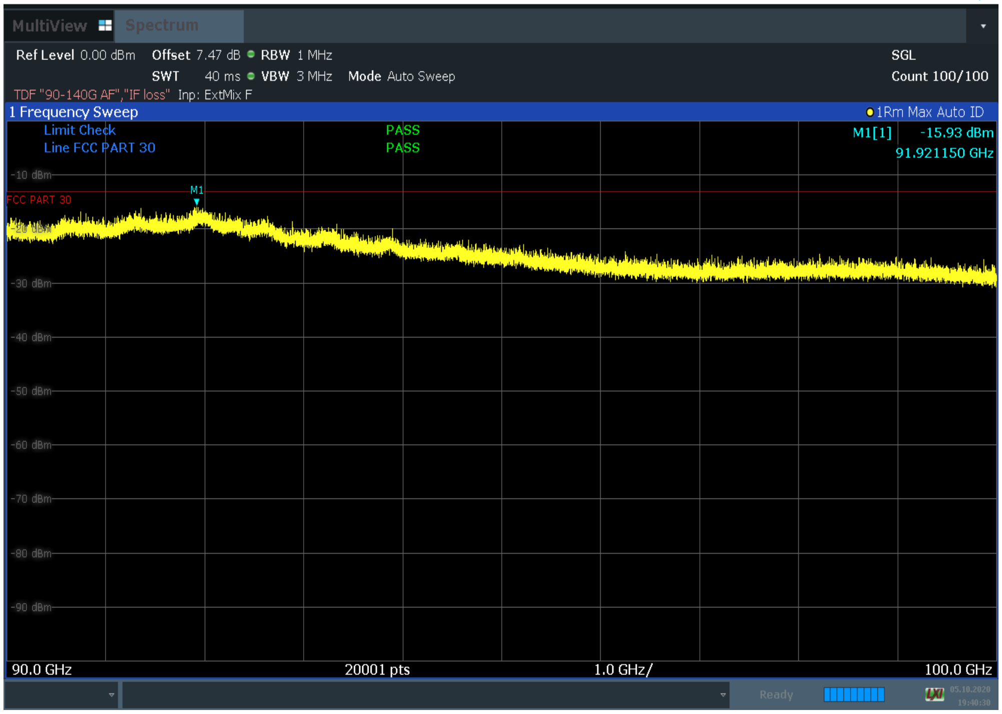
Plot 7-677. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Low Ant. Pol. H, Final)



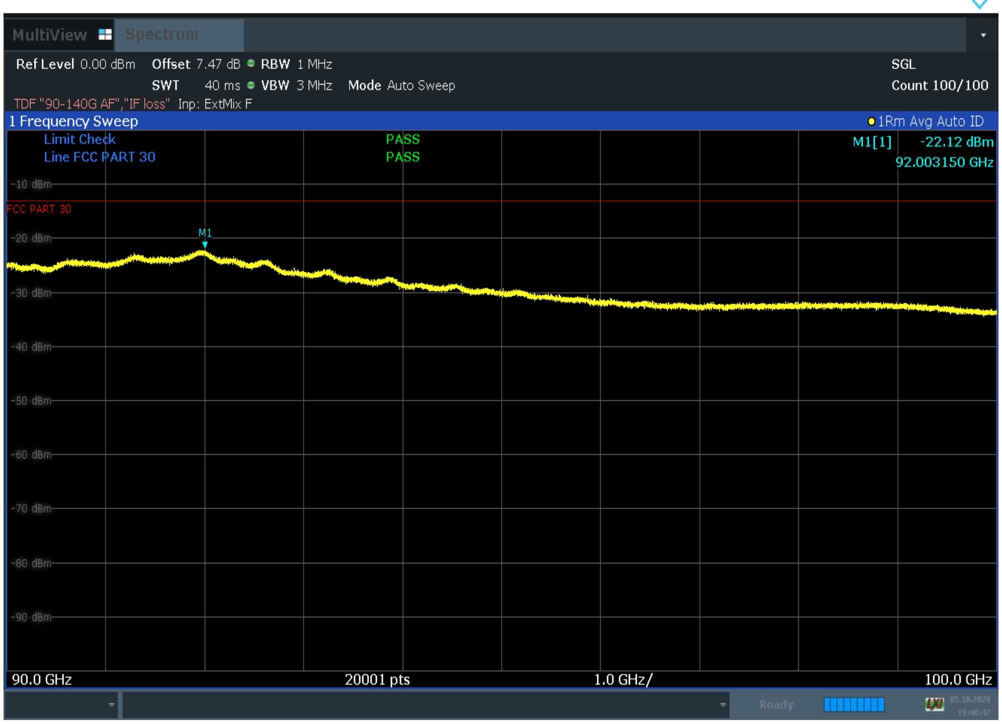
Plot 7-678. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Low Ant. Pol. V)



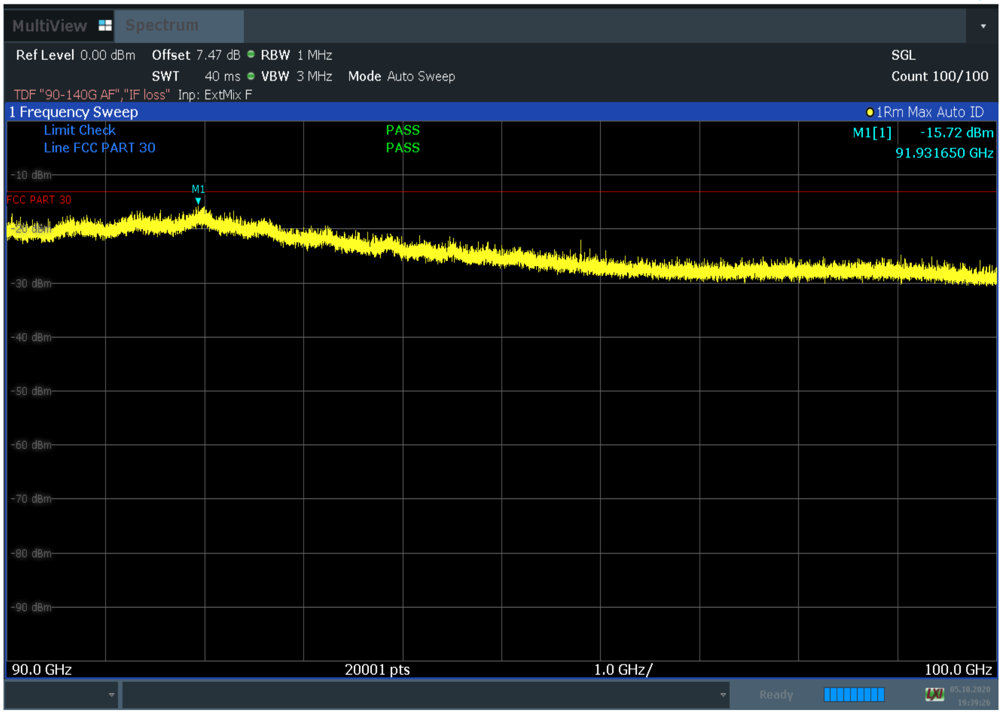
Plot 7-679. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Low Ant. Pol. V, Final)



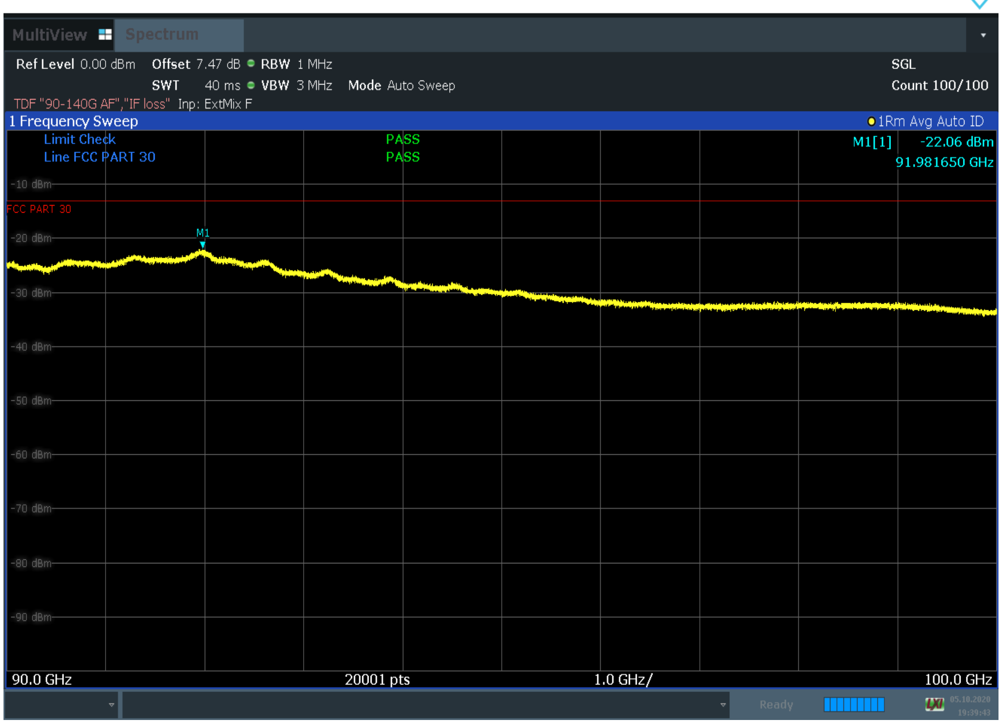
Plot 7-680. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low Ant. Pol. H)



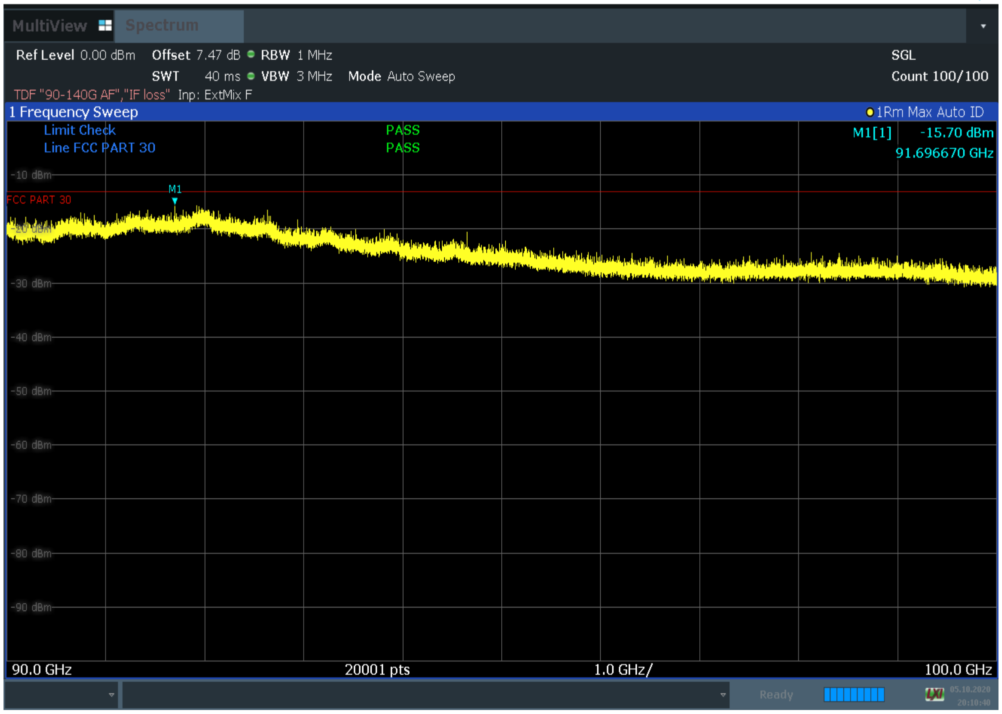
Plot 7-681. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low Ant. Pol. H, Final)



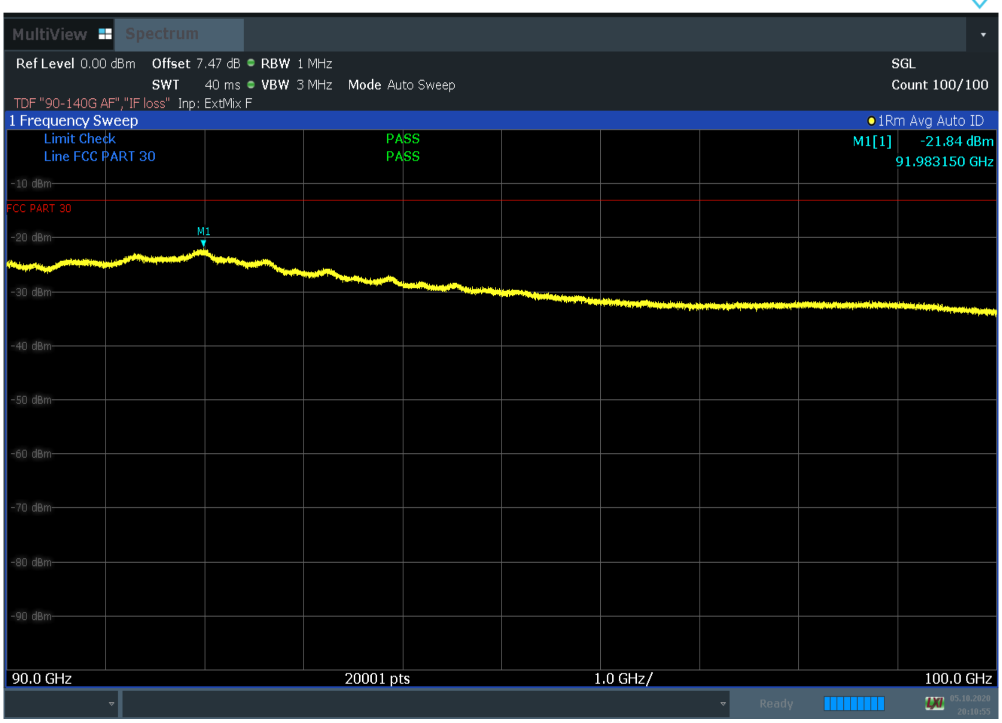
Plot 7-682. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low Ant. Pol. V)



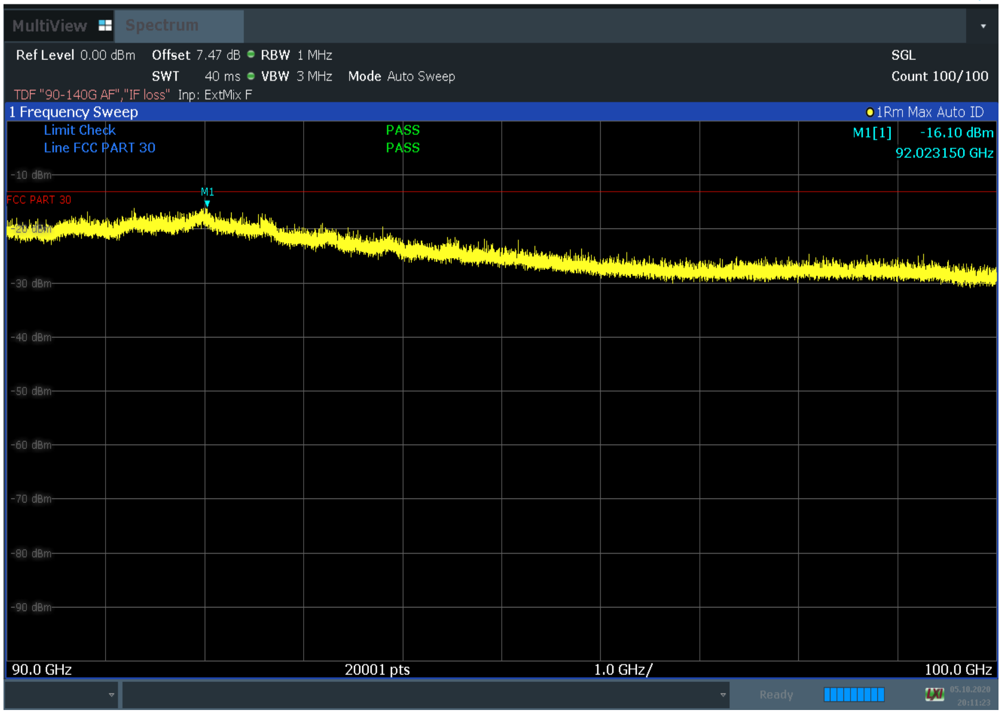
Plot 7-683. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low Ant. Pol. V, Final)



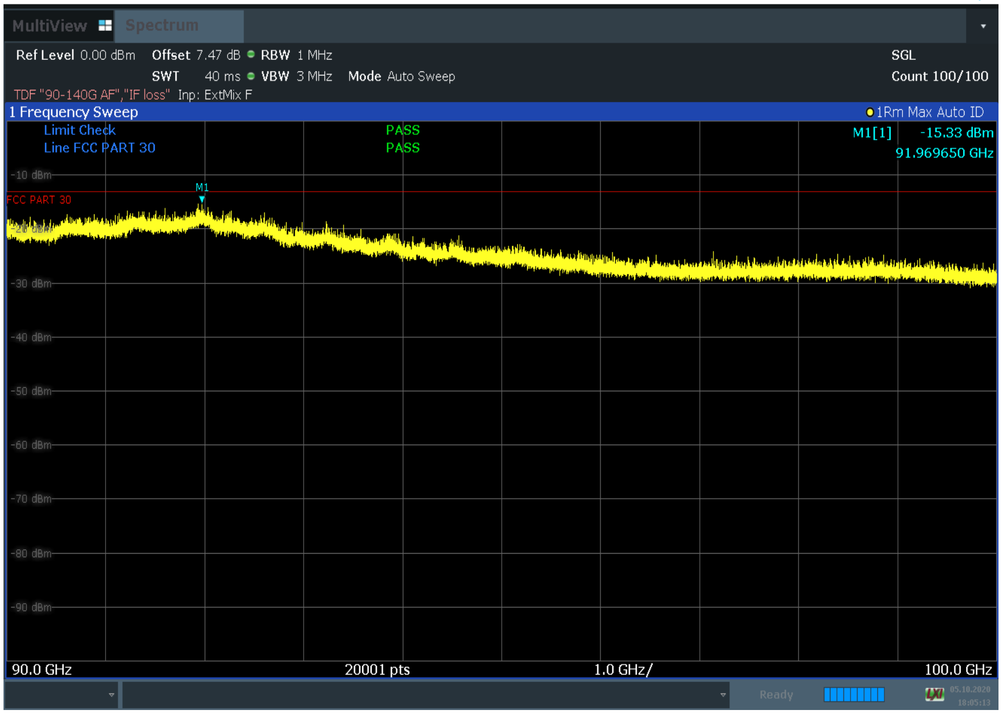
Plot 7-684. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low Ant. Pol. H)



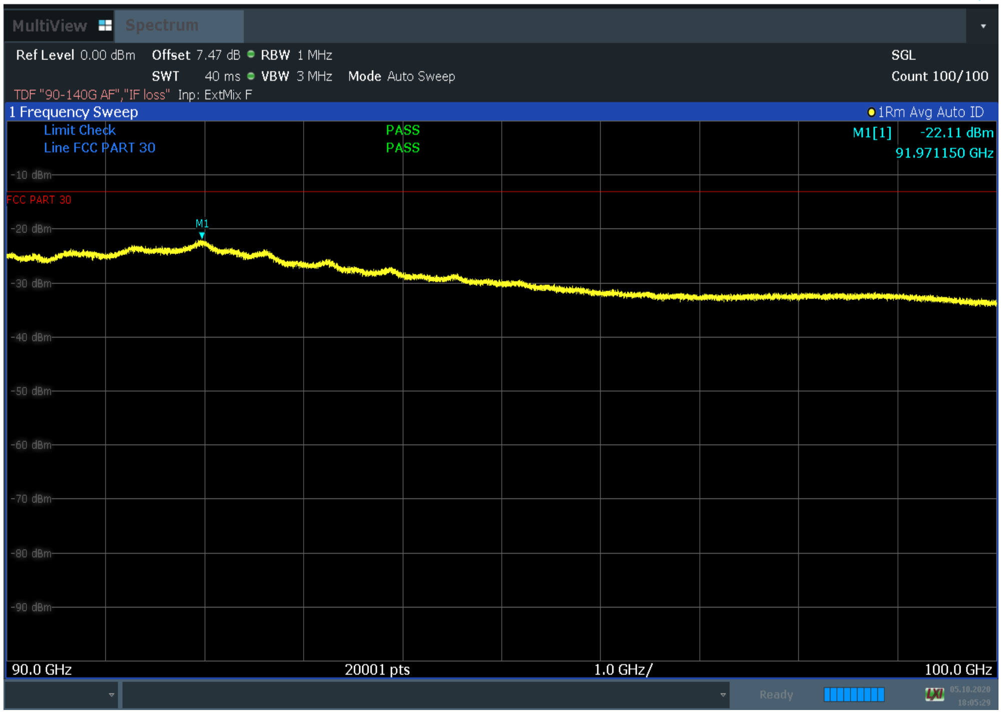
Plot 7-685. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low Ant. Pol. H, Final)



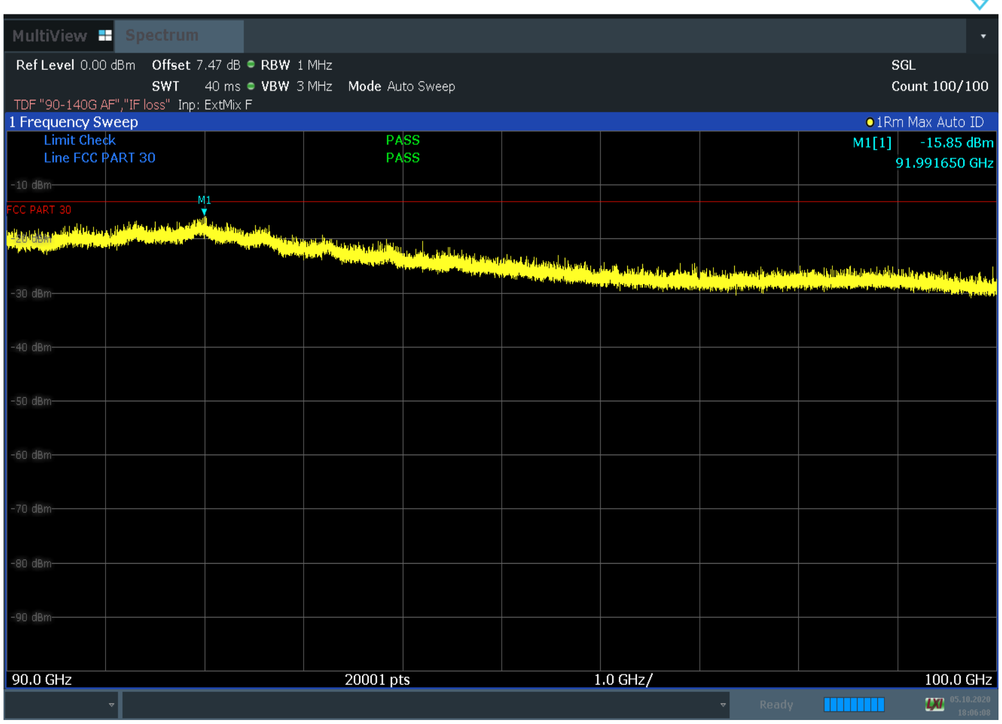
Plot 7-686. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low Ant. Pol. V)



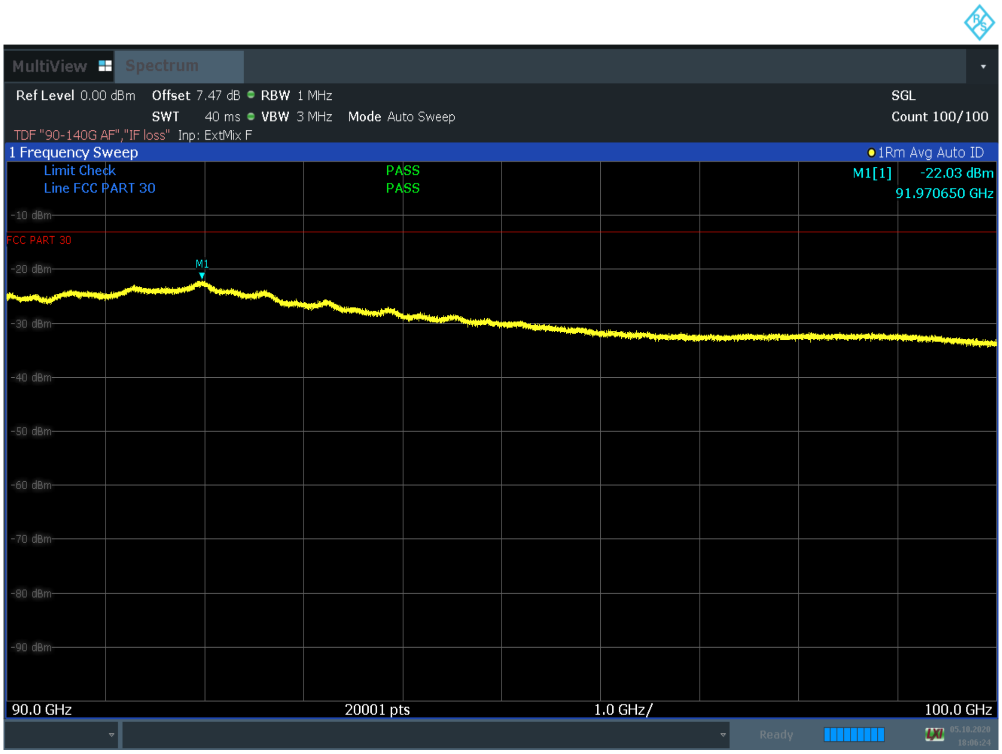
Plot 7-687. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Mid Ant. Pol. H)



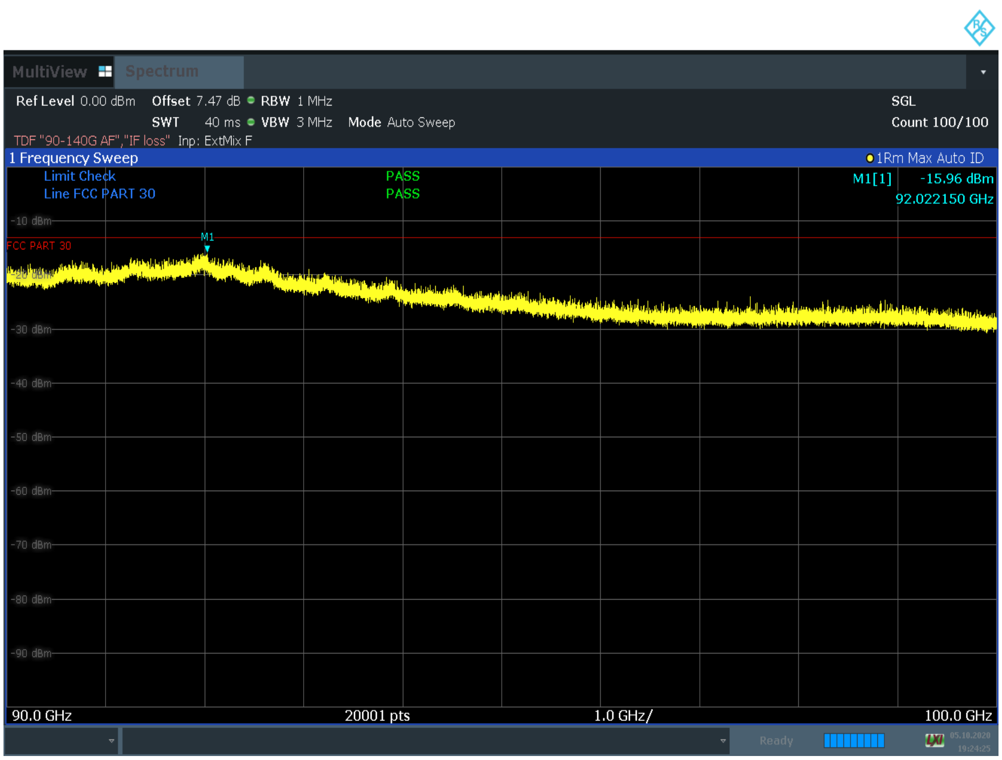
Plot 7-688. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Mid Ant. Pol. H, Final)



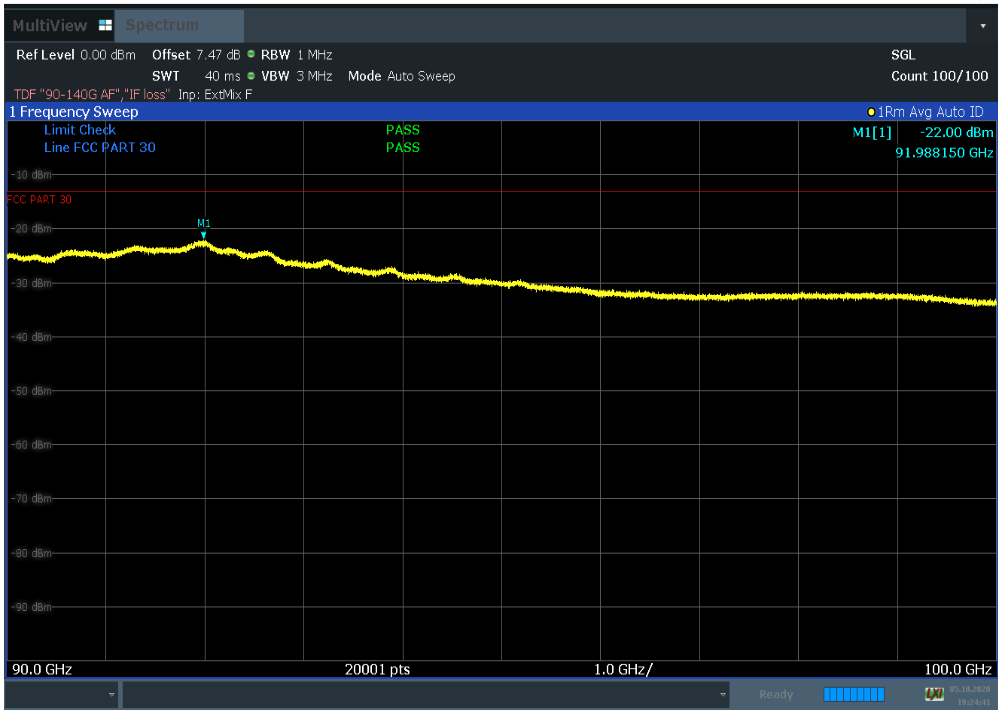
Plot 7-689. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Mid Ant. Pol. V)



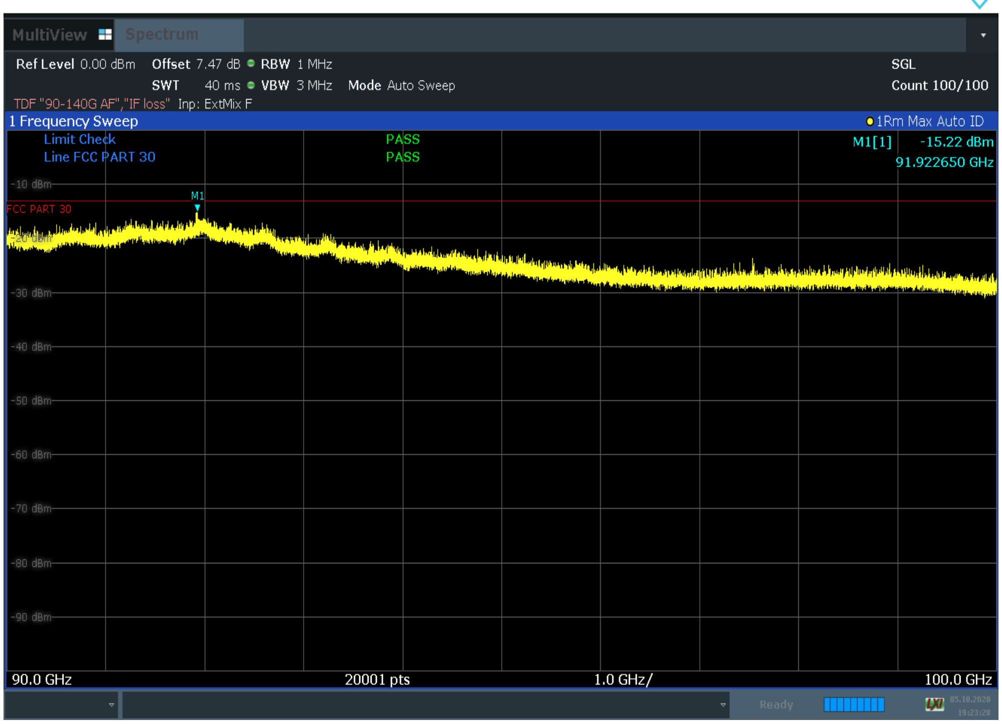
Plot 7-690. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK Mid Ant. Pol. V, Final)



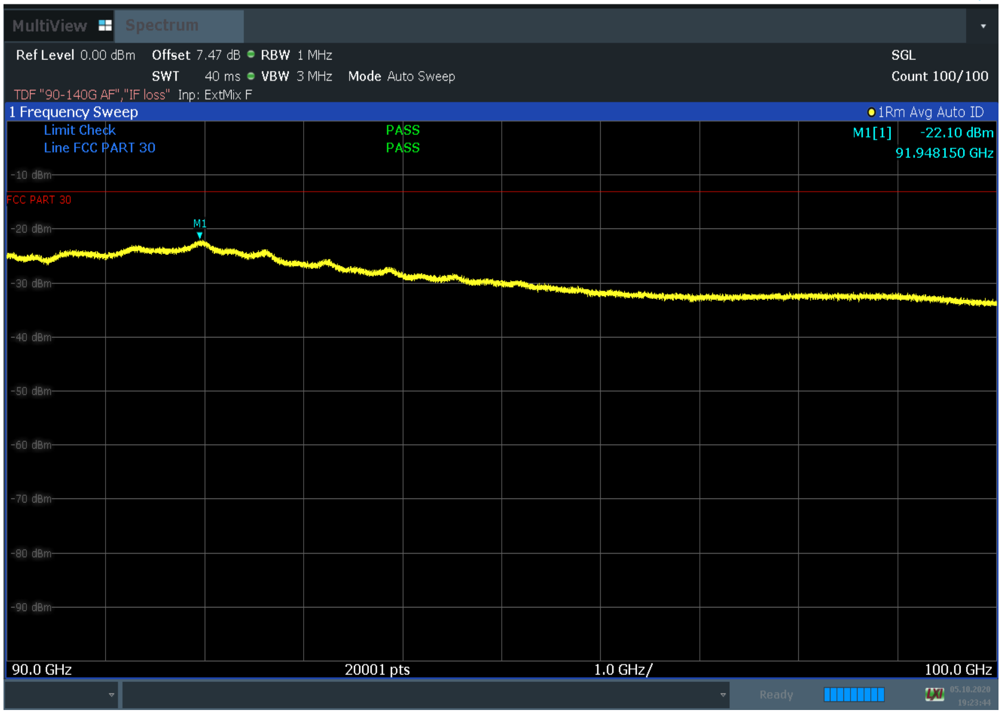
Plot 7-691. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Mid Ant. Pol. H)



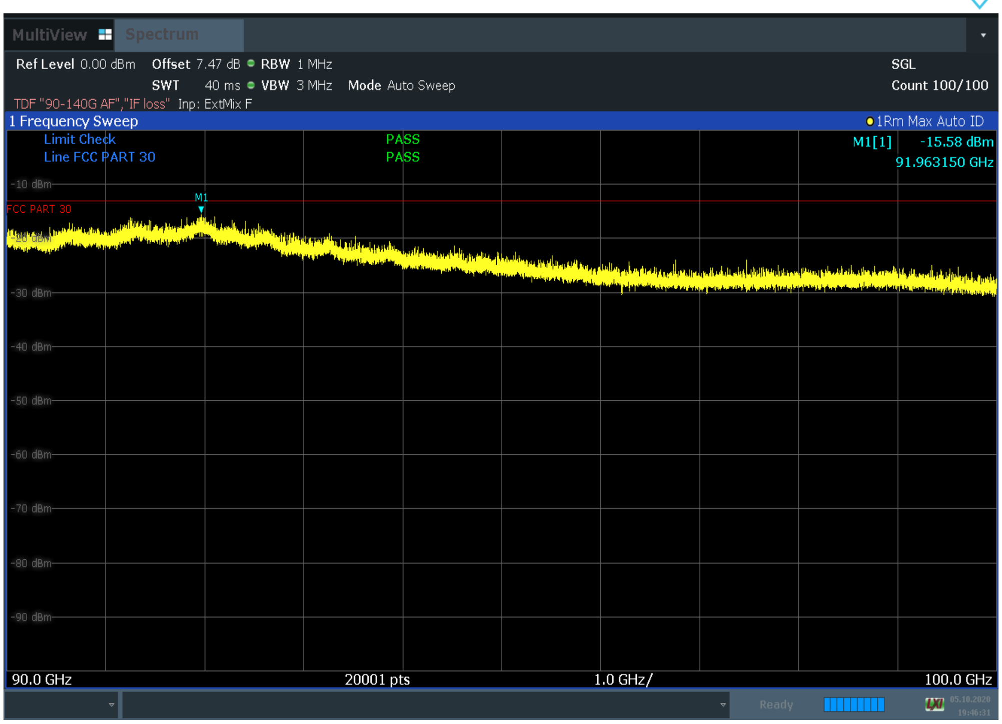
Plot 7-692. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Mid Ant. Pol. H, Final)



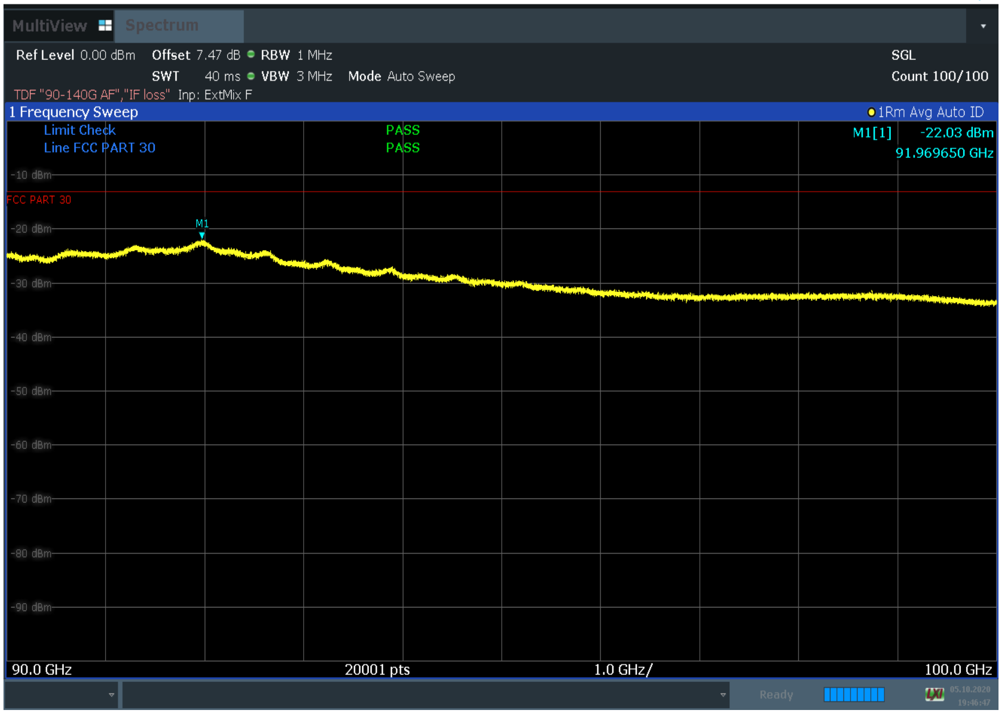
Plot 7-693. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Mid Ant. Pol. V)



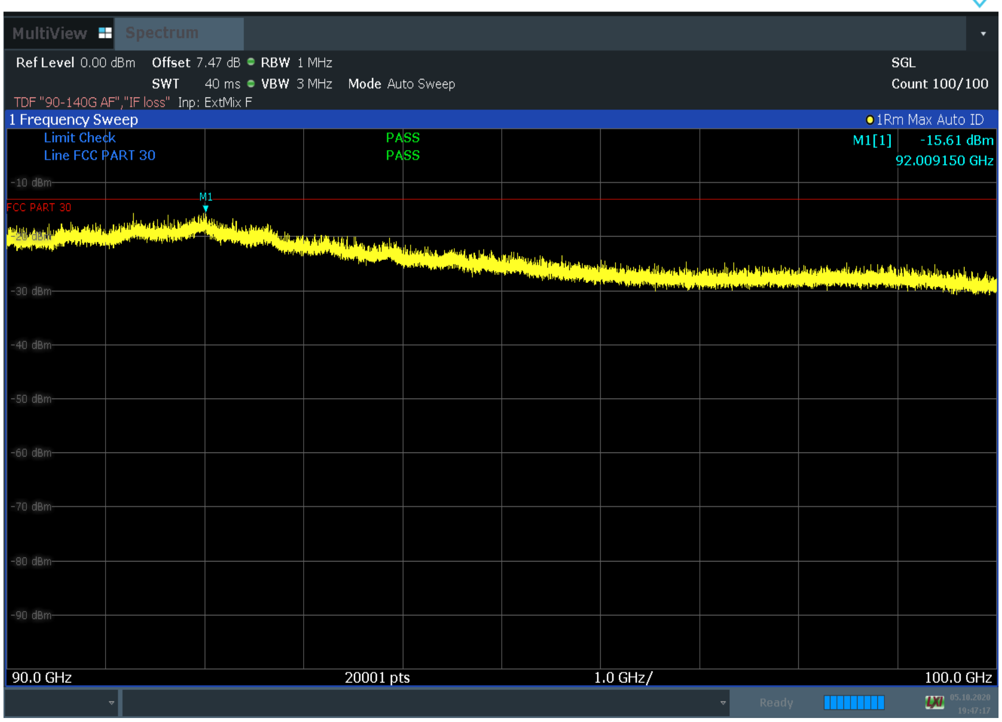
Plot 7-694. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK Mid Ant. Pol. V, Final)



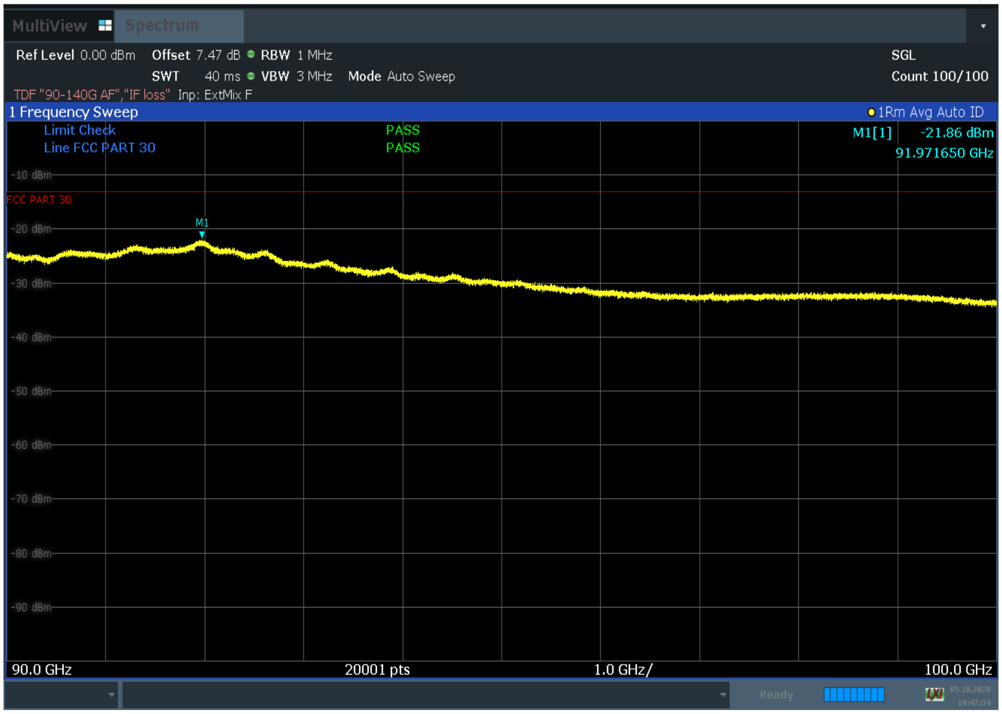
Plot 7-695. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Mid Ant. Pol. H)



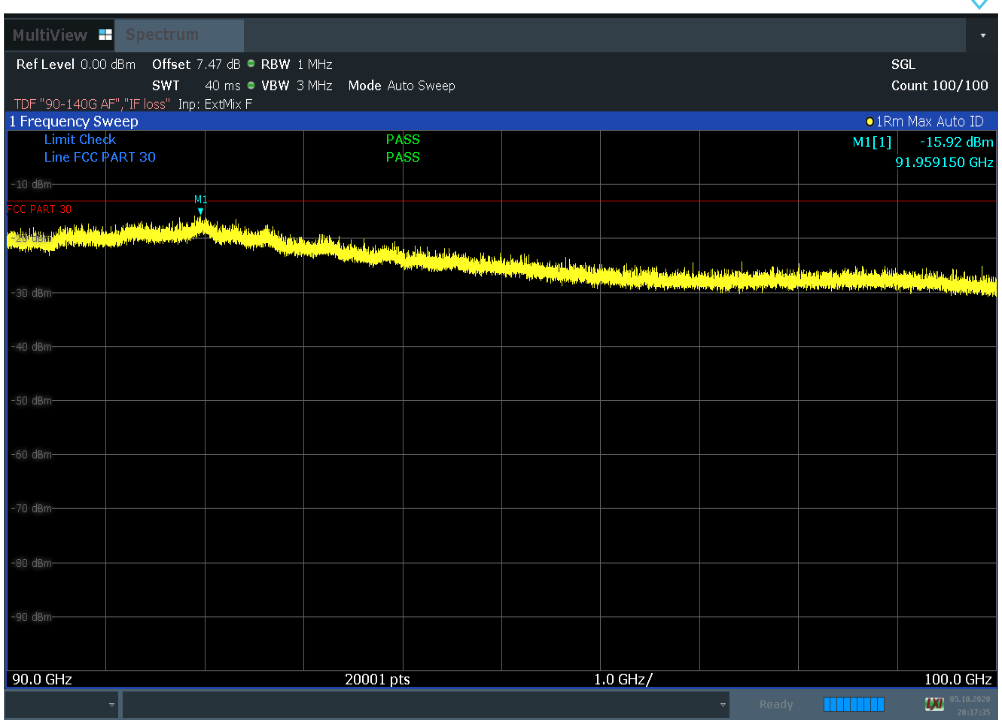
Plot 7-696. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Mid Ant. Pol. H, Final)



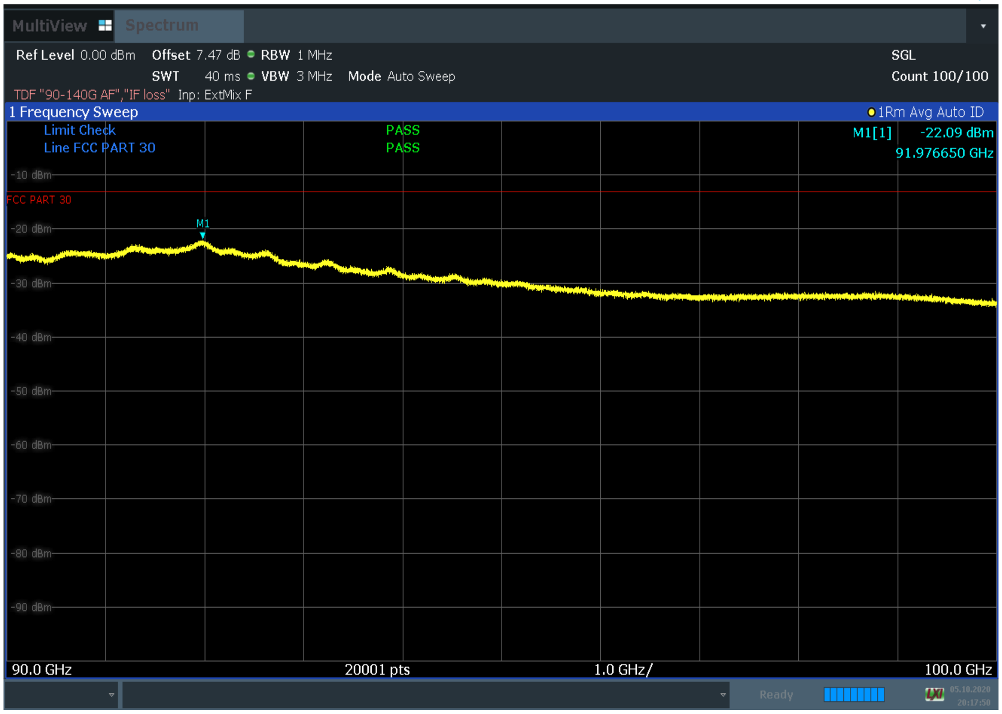
Plot 7-697. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Mid Ant. Pol. V)



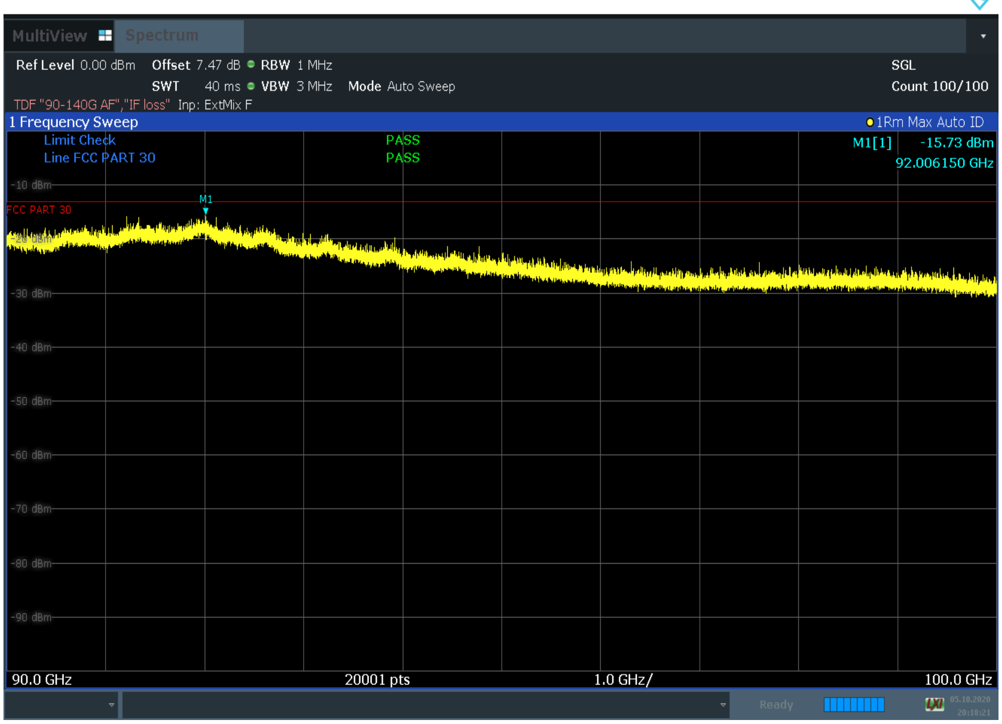
Plot 7-698. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Mid Ant. Pol. V, Final)



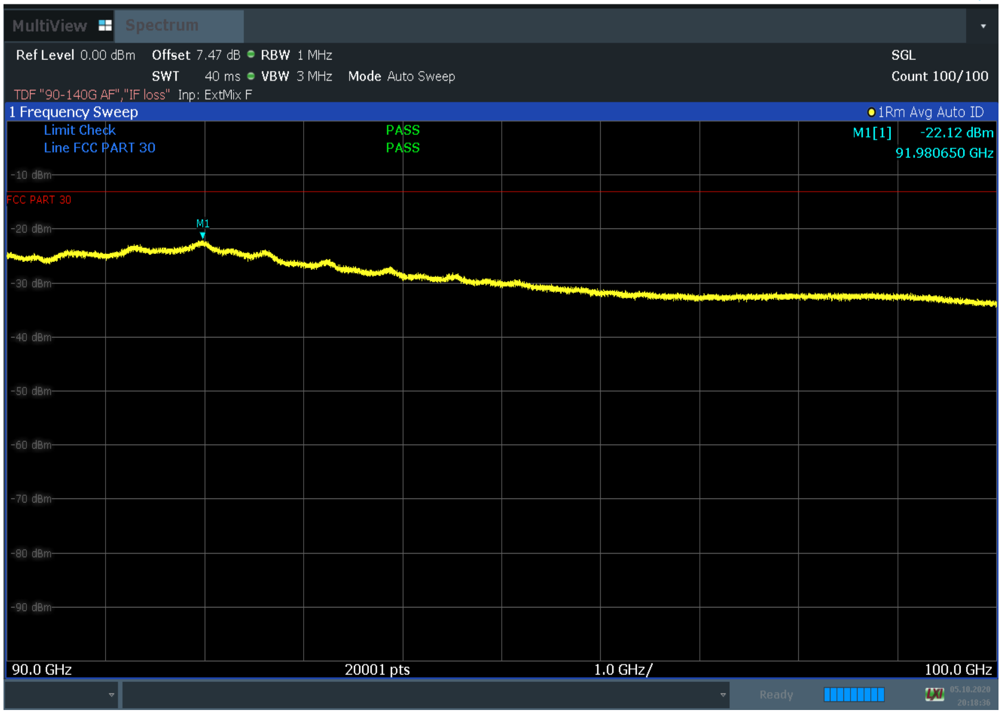
Plot 7-699. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Mid Ant. Pol. H)



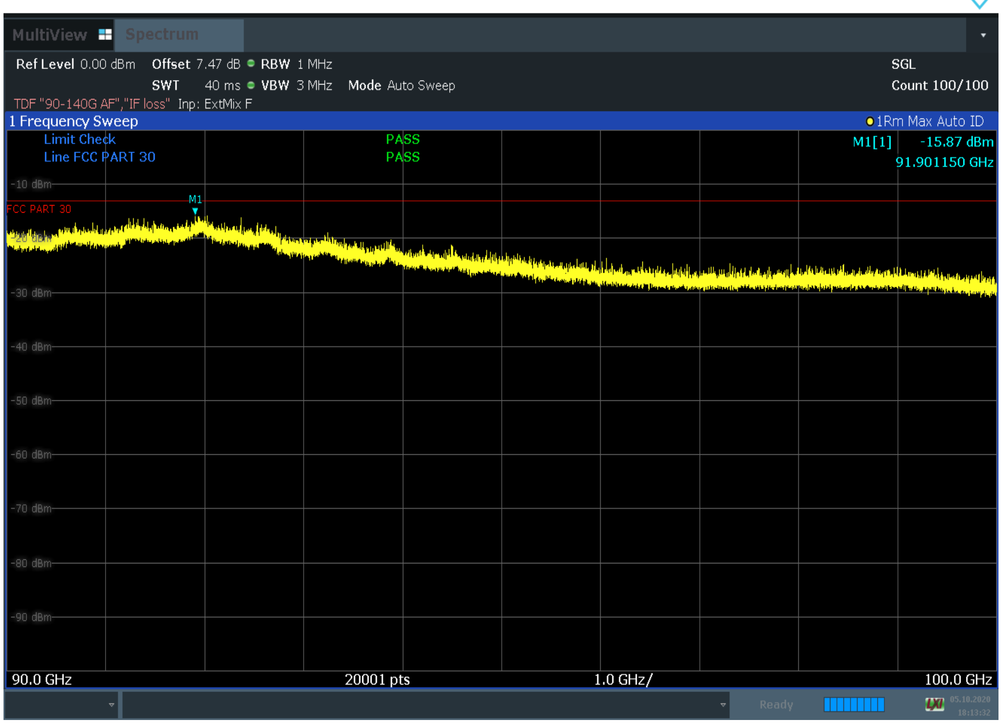
Plot 7-700. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Mid Ant. Pol. H, Final)



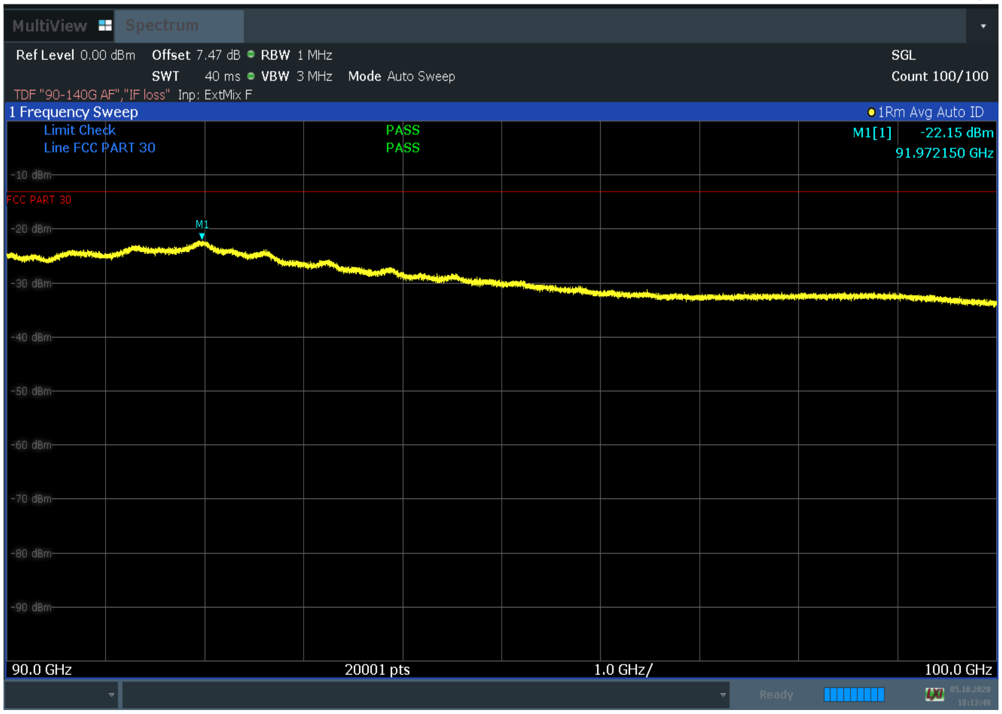
Plot 7-701. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Mid Ant. Pol. V)



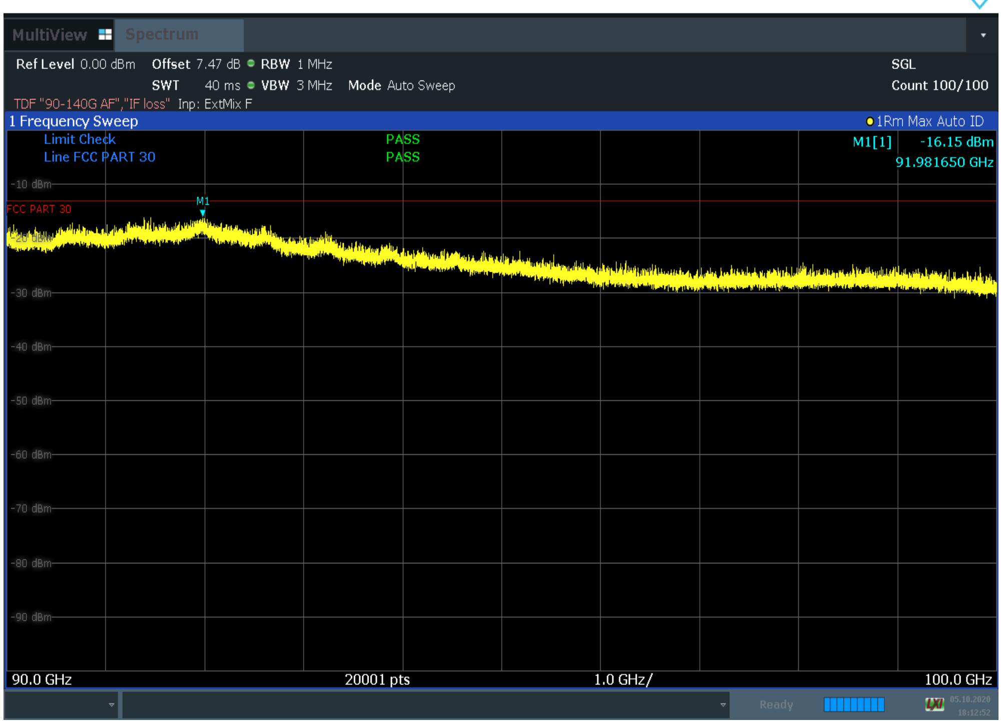
Plot 7-702. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Mid Ant. Pol. V, Final)



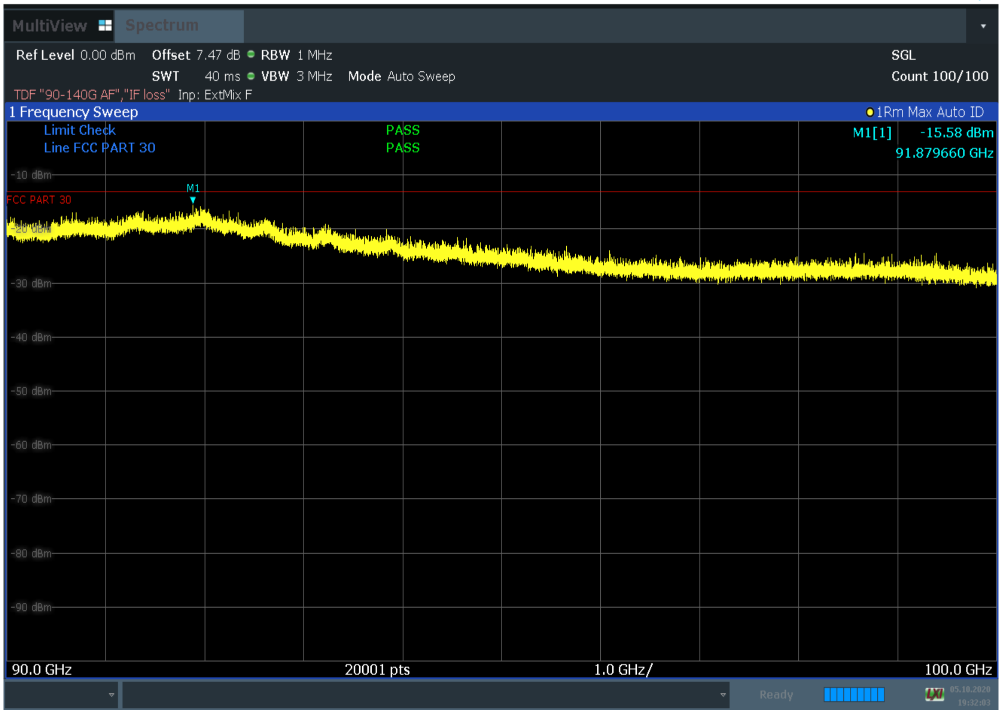
Plot 7-703. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK High Ant. Pol. H)



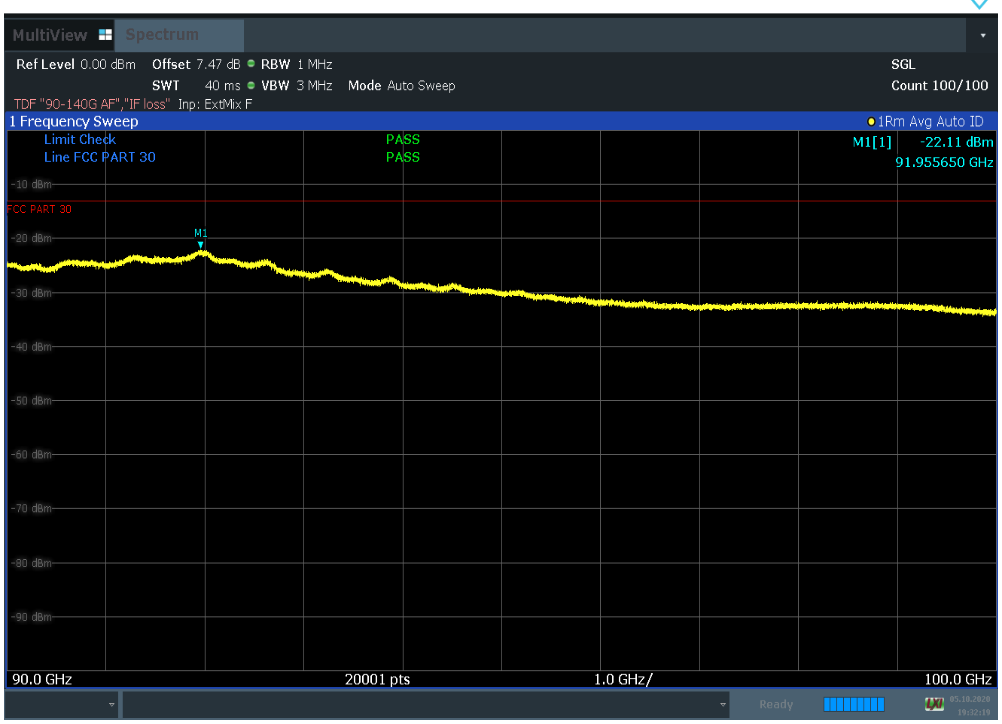
Plot 7-704. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK High Ant. Pol. H, Final)



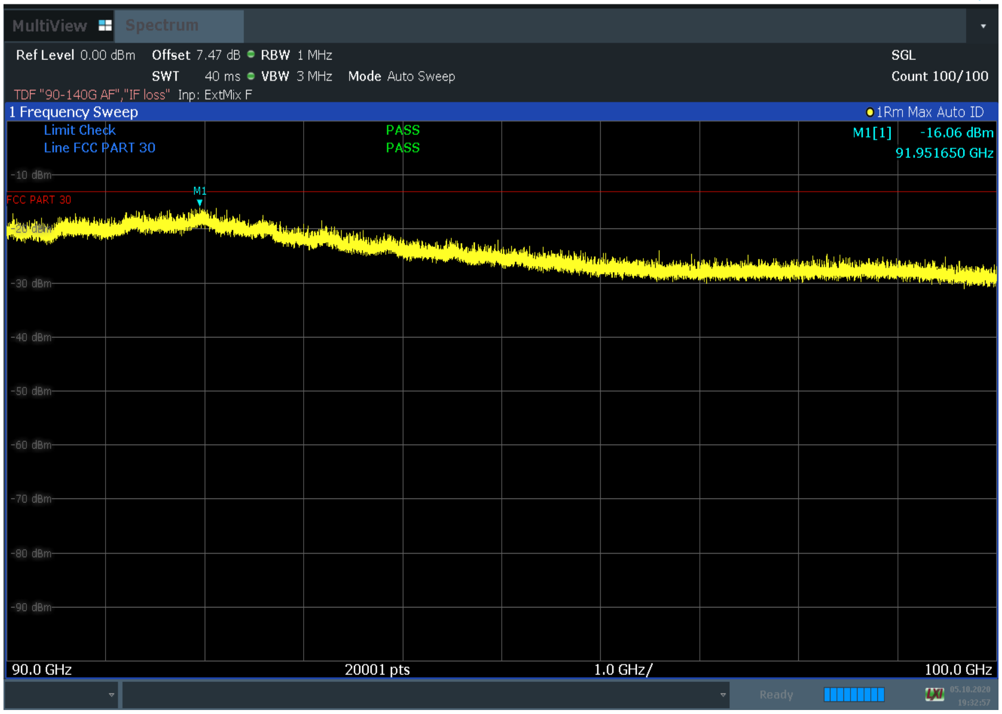
Plot 7-705. RSE 90 GHz – 100 GHz (100 MHz BW 4CC CC QPSK High Ant. Pol. V)



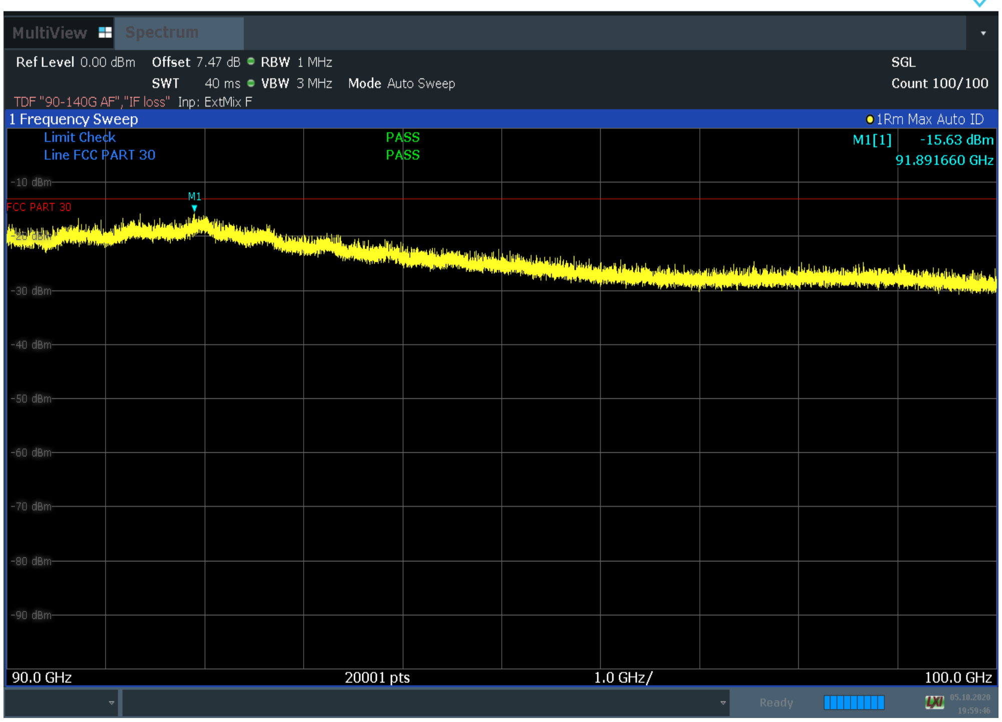
Plot 7-706. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK High Ant. Pol. H)



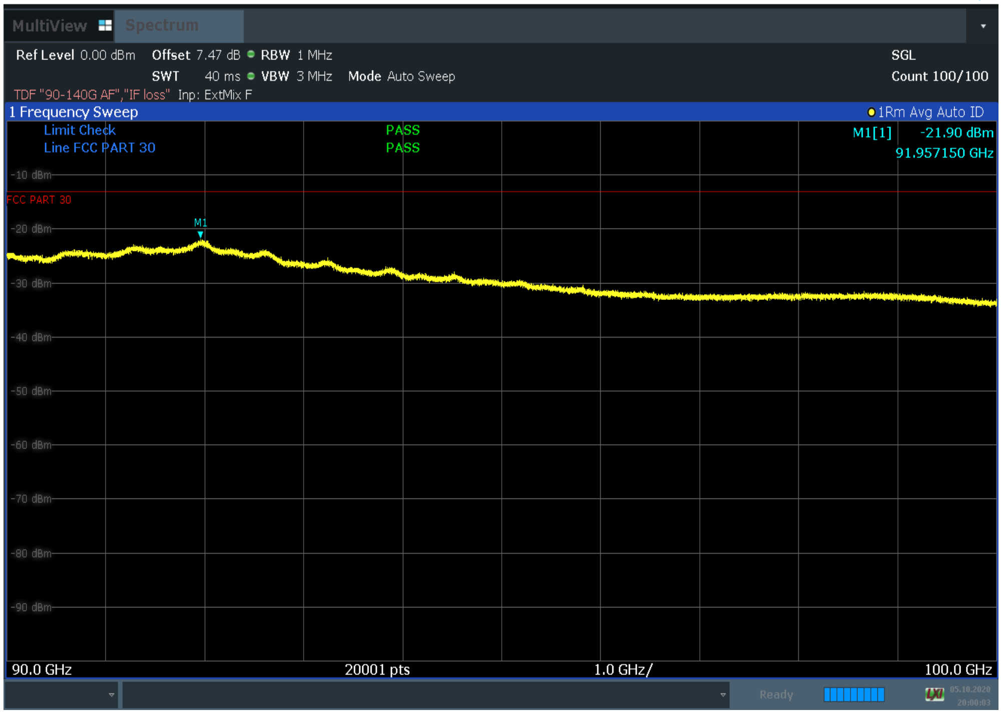
Plot 7-707. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK High Ant. Pol. H, Final)



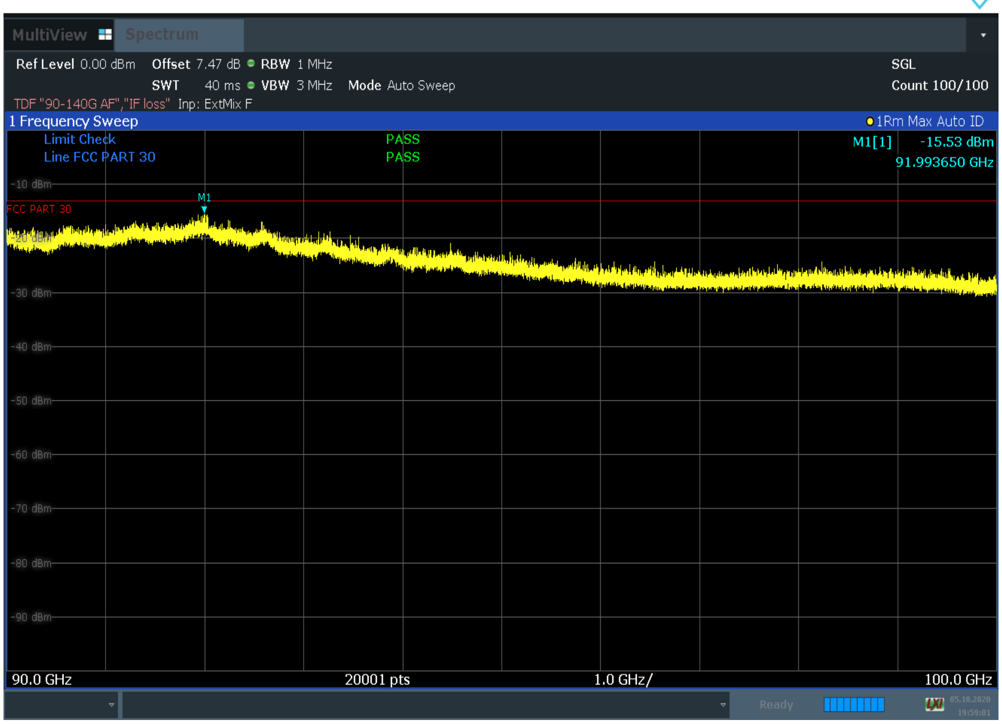
Plot 7-708. RSE 90 GHz – 100 GHz (100 MHz BW 8CC CC QPSK High Ant. Pol. V)



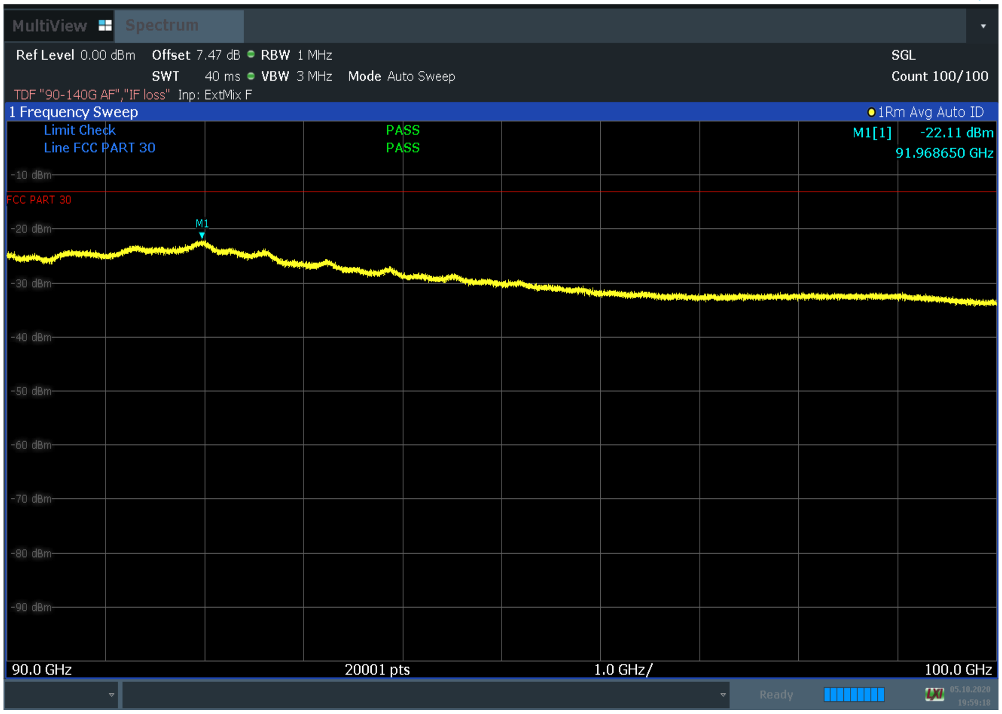
Plot 7-709. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. H)



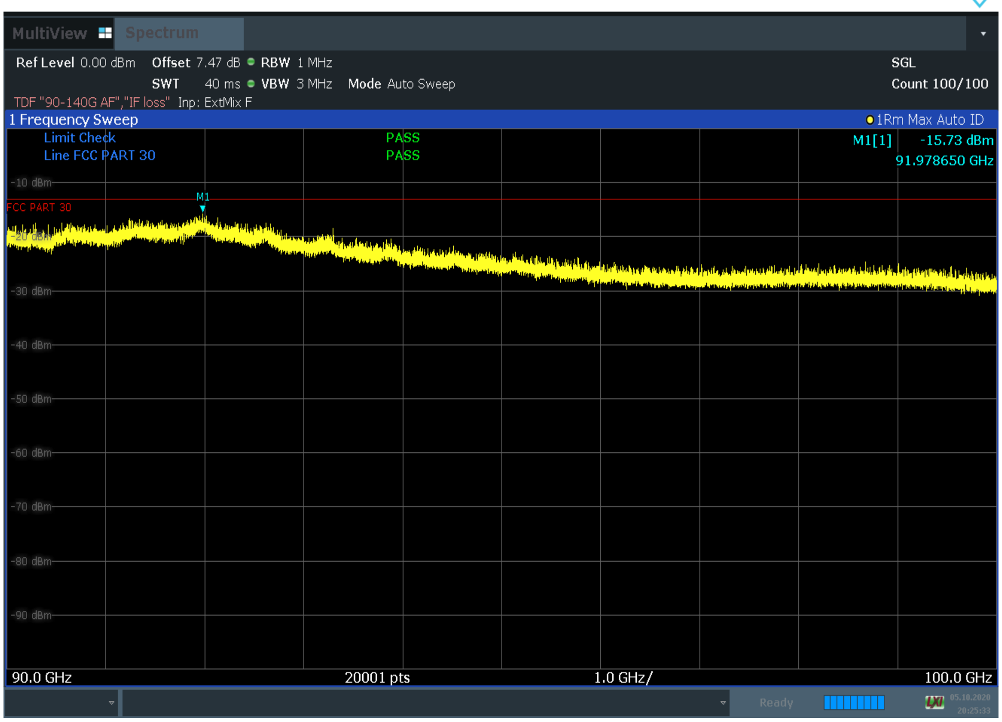
Plot 7-710. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. H, Final)



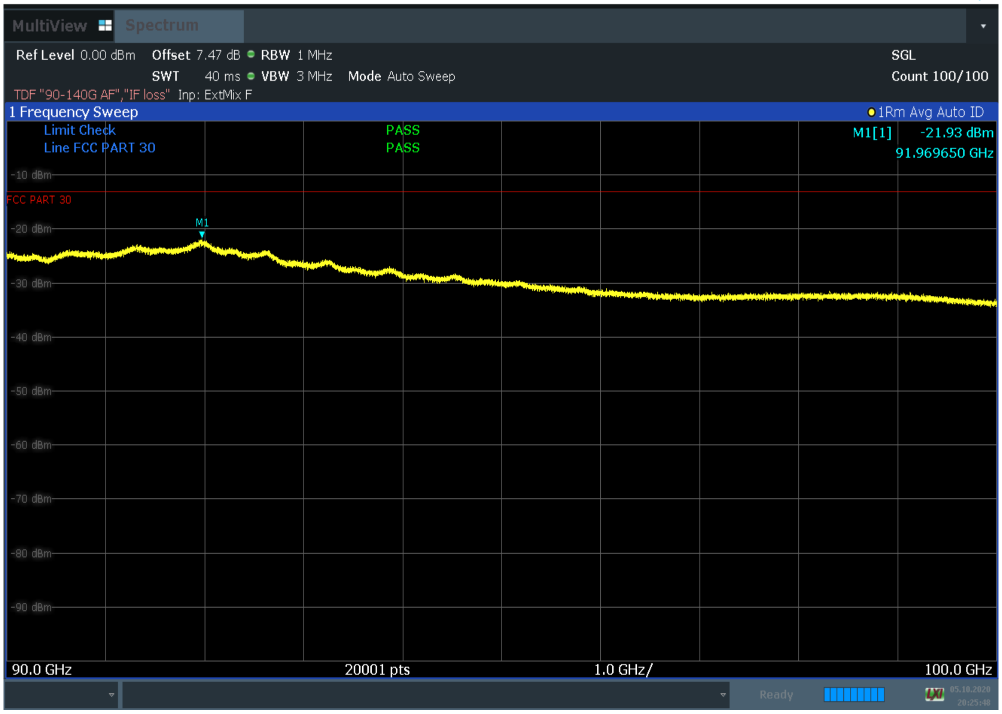
Plot 7-711. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. V)



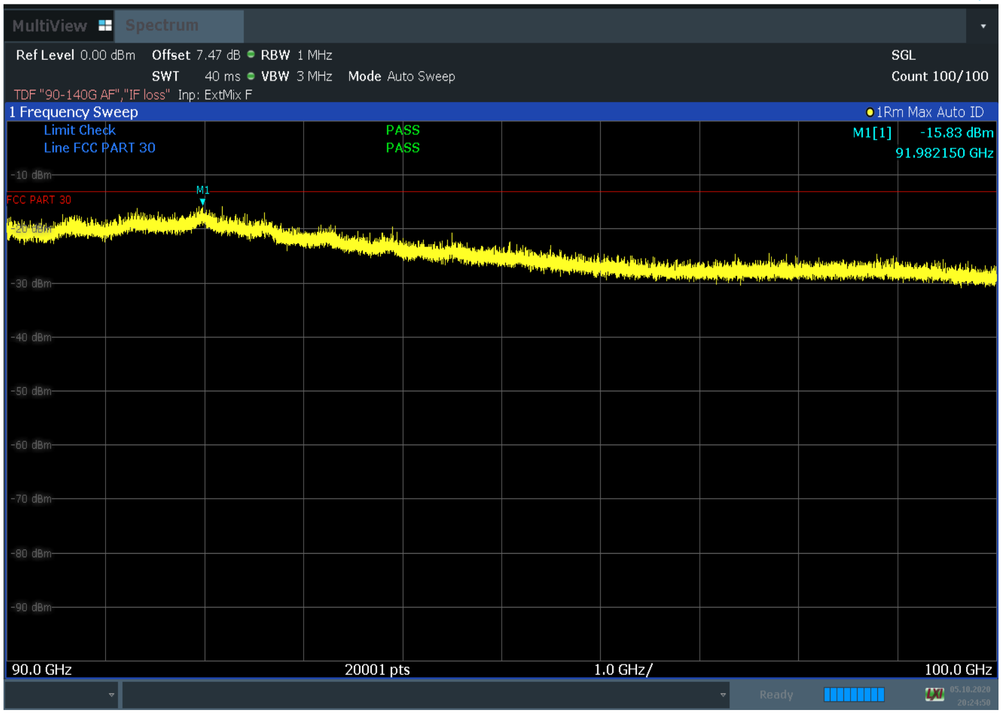
Plot 7-712. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High Ant. Pol. V, Final)



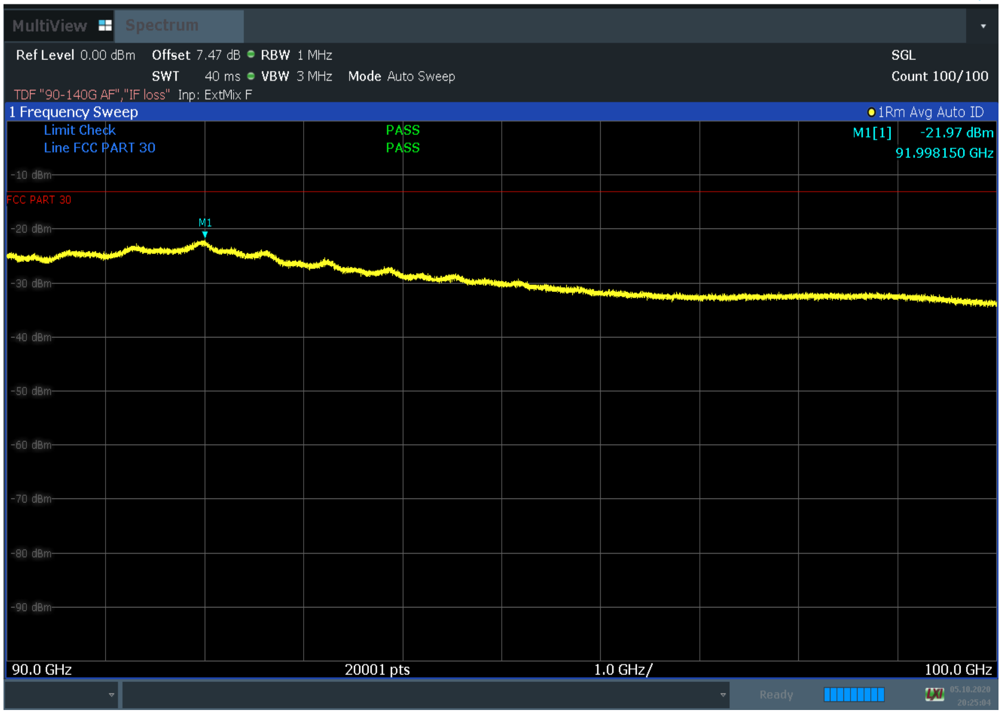
Plot 7-713. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. H)



Plot 7-714. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. H, Final)



Plot 7-715. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. V)



Plot 7-716. RSE 90 GHz – 100 GHz (50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High Ant. Pol. V, Final)

7.6 Band Edge Emissions

§2.1051 §30.203

Test Overview

All out of band emissions are measured in a radiated setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is -13 dBm / 1 MHz. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm / MHz or lower.

Test Procedure Used

ANSI C63.26-2015 Section 5.7.3
ANSI C63.26-2015 Section 6.4
KDB 842590 D01 v01r01 Section 4.4.2.5

Test Settings

1. Start and stop frequency were set such that both upper and lower band edges are measured.
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 1 MHz
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

1) The EUT was tested while positioned upright and mounted on a mast 1.5 m height. The worst case emissions are reported with the EUT in this fixed position and with the modulations and active component carriers shown in the tables below.

2) All measurements in this section was performed in the radiated setup in the far field.

3) All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. Additionally, band Edge measurements in this section are shown as equivalent conductive powers for direct comparison to the 30.203 limit. The conductive power at the band edge is calculated by subtracting the gain of the EUT's antenna from the measured EIRP level. Antenna Gain information is shown on the following page.

4) 1CC = 1 Component Carrier Active, 8CC = 8 Component Carriers Active, and 8CC NC = 8 Non-contiguous Component Carriers Active. Each component carrier's bandwidth is either of 50 MHz or 100 MHz Bandwidth.

5) For band edge measurement of the receive horn antenna was maximized on Antenna A were individually energized and measured while maintaining maximized position on Antenna A. These measurements were saved into a spreadsheet and their spectra were summed to determine the total conducted power for the band edge emissions level shown starting in Section 7.6.5. The same procedure was repeated with the receive horn antenna maximized on Antennas B, C, and D.

6) The MIMO Band Edges were calculated by using the “measure and sum the spectra across the outputs” technique specified in Section 6.4.3.2.2 of ANSI C63.26-2015. The spectra were summed linearly and converted to dBm for comparison with the limit.

7) 10% outside of the channel bandwidth range result to be referred from 7.5 Radiated Spurious and Harmonic Emissions due to EUT Antenna subtraction calculation applying. Thus, some failure results are performed of TRP measurement method.

7.6.1 Antenna Gain Information at the Band Edge

The following antenna gain information is provided to demonstrate the antenna performance of the 27 to 28.85 GHz band. These antenna gains were subtracted from the measured EIRP levels at the lower and upper band edge frequencies to determine an equivalent conductive power that was compared directly with the §30.203 limits.

Frequency [GHz]	Gain [dBi]
27.0	27.75
27.1	27.78
27.2	27.85
27.3	27.9
27.4	28.07
27.5	28.12
27.6	28.142
27.7	28.155
27.8	28.163
27.9	28.181
28.0	28.21

Frequency [GHz]	Gain [dBi]
28.1	28.227
28.2	28.315
28.3	28.321
28.35	28.328
28.4	28.342
28.5	28.287
28.6	28.422
28.7	28.48
28.8	28.512
28.85	28.533

Table 7-22. Antenna Gains at the Band Edges

<u>Sample Analyzer Offset Calculation (at 27.5 GHz)</u>

Measurement Antenna Factor = 39.54 dB/m

Cable Loss = 8.03 dB

Far Field Distance = 3.19 m

EUT Antenna Gain = 28.12 dBi

Duty Cycle Correction Factor = 1.3865 dB

Analyzer Offset (dB) = AF (dB/m) + CL (dB) + 107 + $20\log_{10}$(D) – 104.8 dB – Gain (dBi) + Duty Correction factor (dB)

= 39.54 dB/m + 8.03 dB + 107 + $20\log_{10}$(3.19) – 104.8 dB – 28.12 dBi + 1.3865 dB

= 33.11 dB

<u>Sample Analyzer Offset Calculation (at 28.35 GHz)</u>

Measurement Antenna Factor = 39.74 dB/m

Cable Loss = 8.27 dB

Far Field Distance = 3.19 m

EUT Antenna Gain = 28.328 dBi

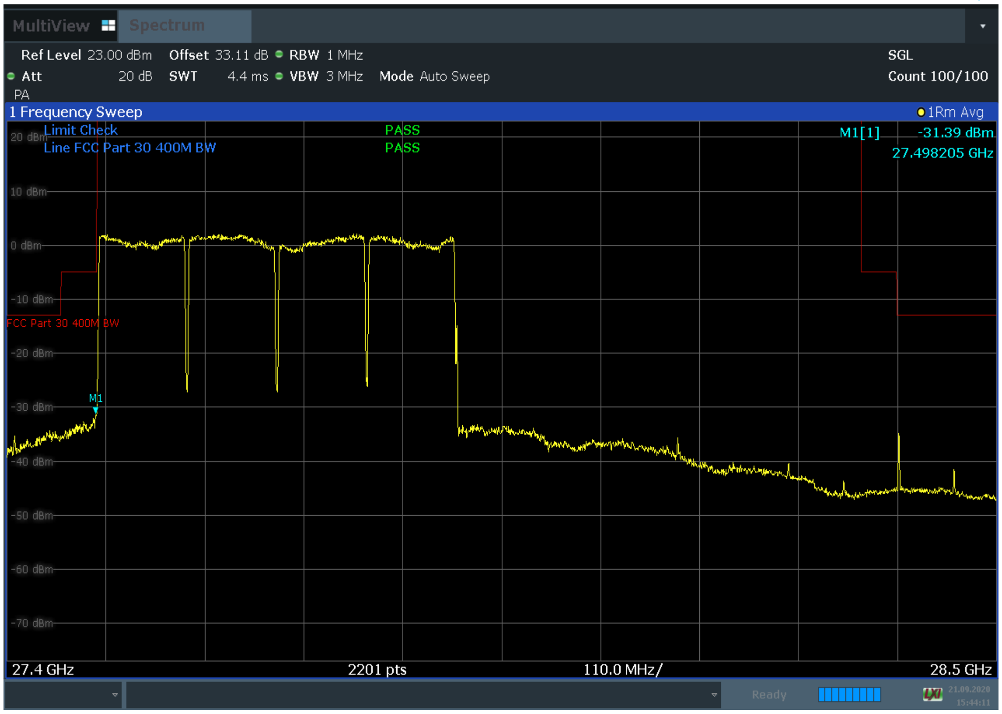
Duty Cycle Correction Factor = 1.3865 dB

Analyzer Offset (dB) = AF (dB/m) + CL (dB) + 107 + $20\log_{10}$(D) – 104.8 dB – Gain (dBi) + Duty Correction factor (dB)

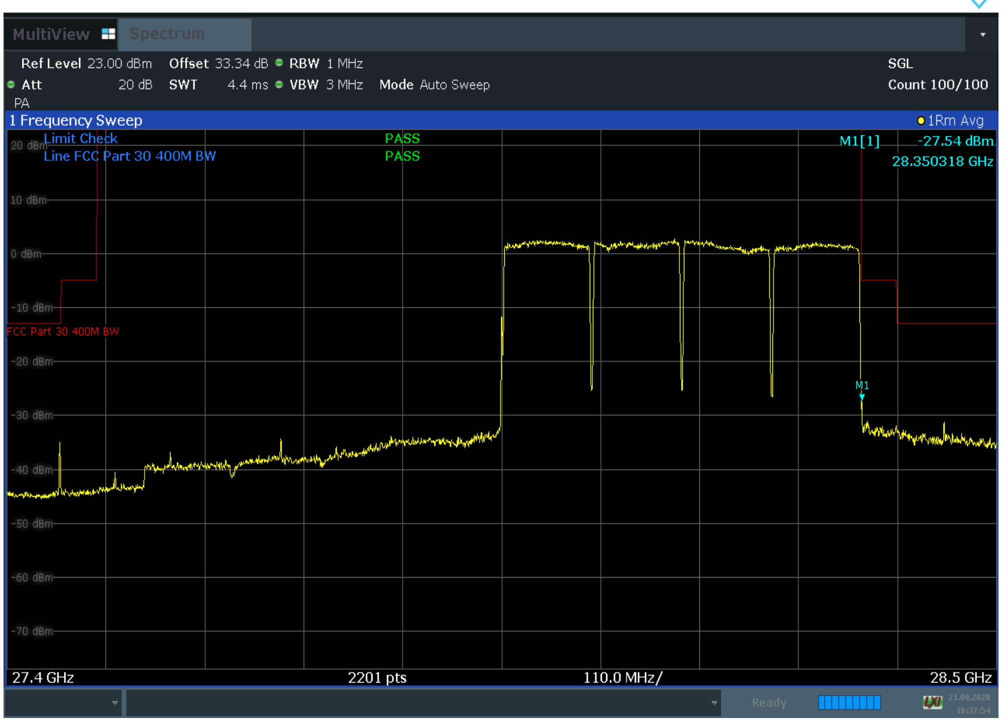
$= 39.74\ \text{dB/m} + 8.27\ \text{dB} + 107 + 20\log_{10}(3.19) - 104.8\ \text{dB} - 28.328\ \text{dBi} + 1.3865\ \text{dB}$

$= 33.34\ \text{dB}$

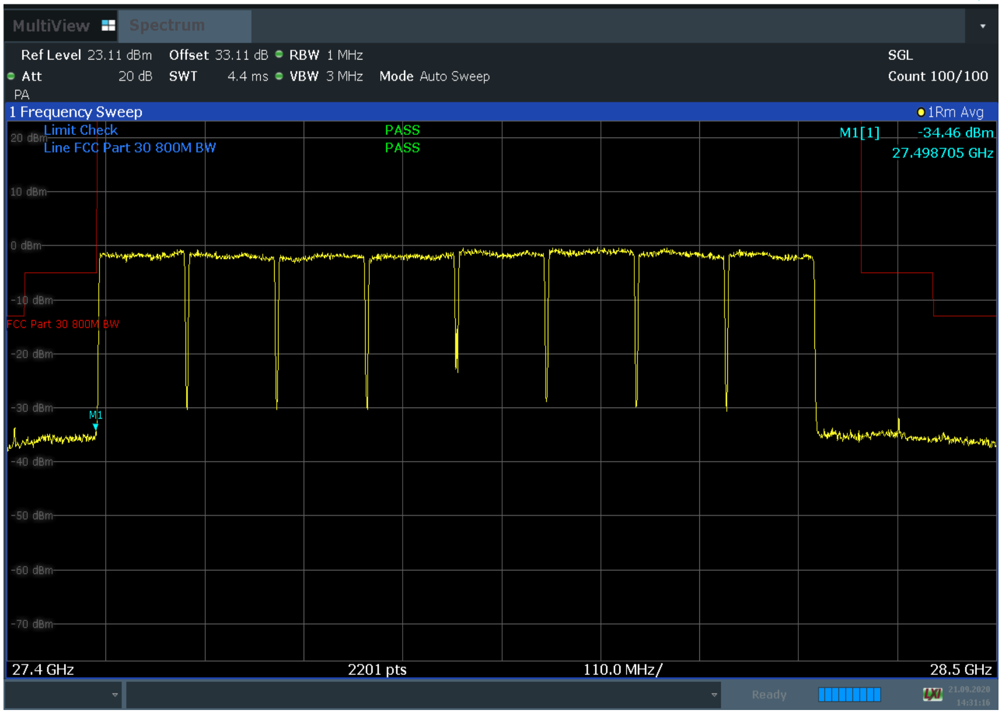
7.6.2 Antenna A Conducted Band Edge Maximized on Antenna A



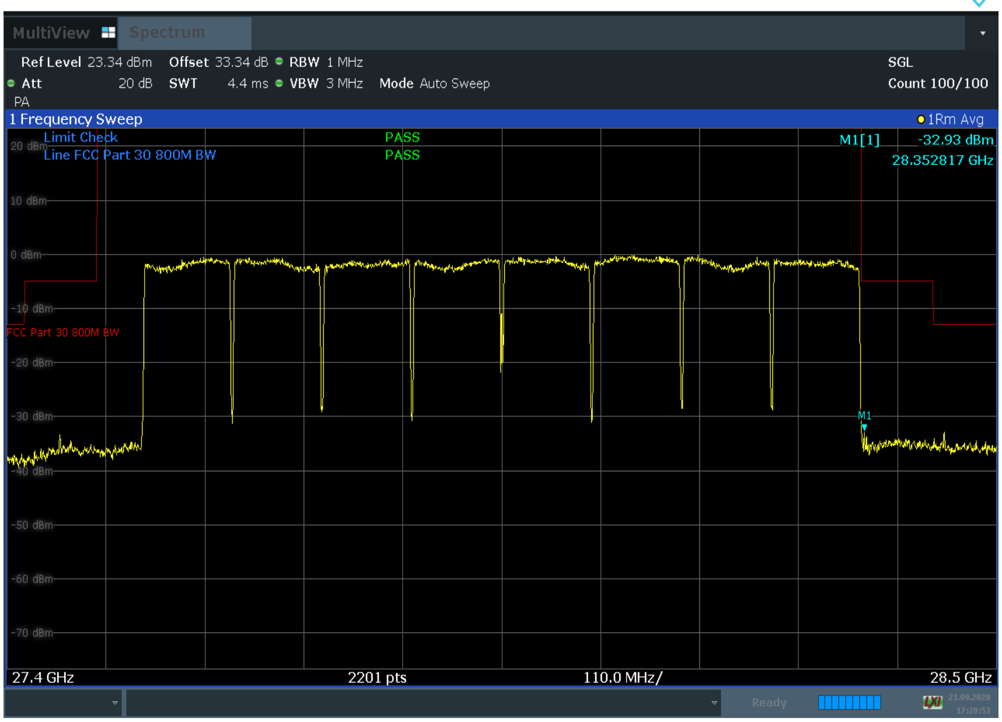
Plot 7-717 Band Edge (Ant A 100 MHz BW 4CC CC QPSK Low)



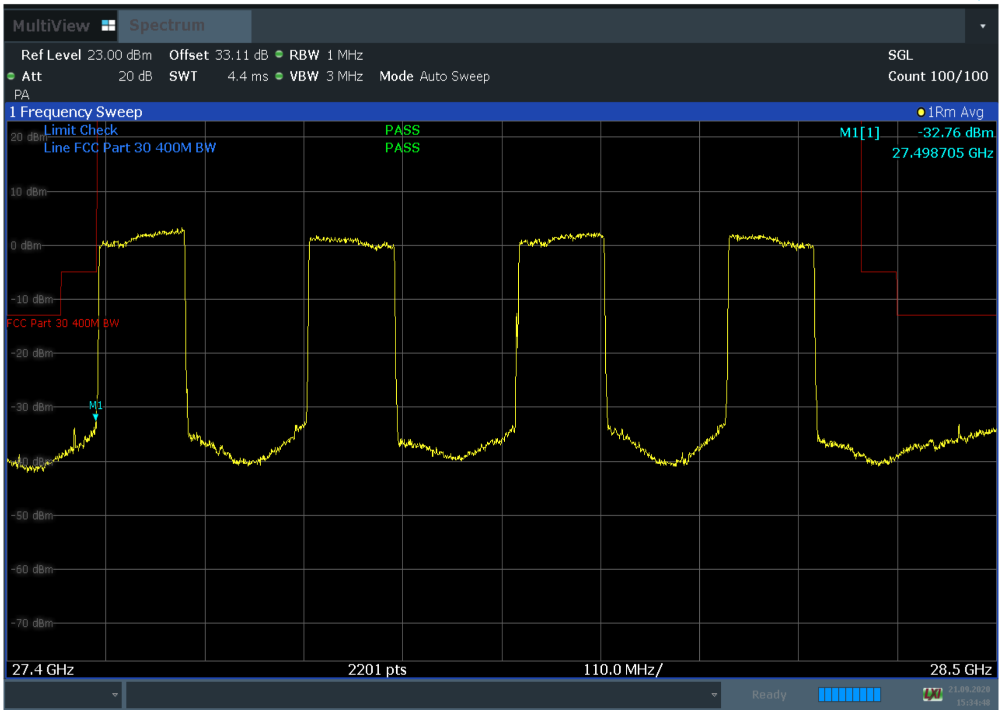
Plot 7-718. Band Edge (Ant A 100 MHz BW 4CC CC QPSK High)



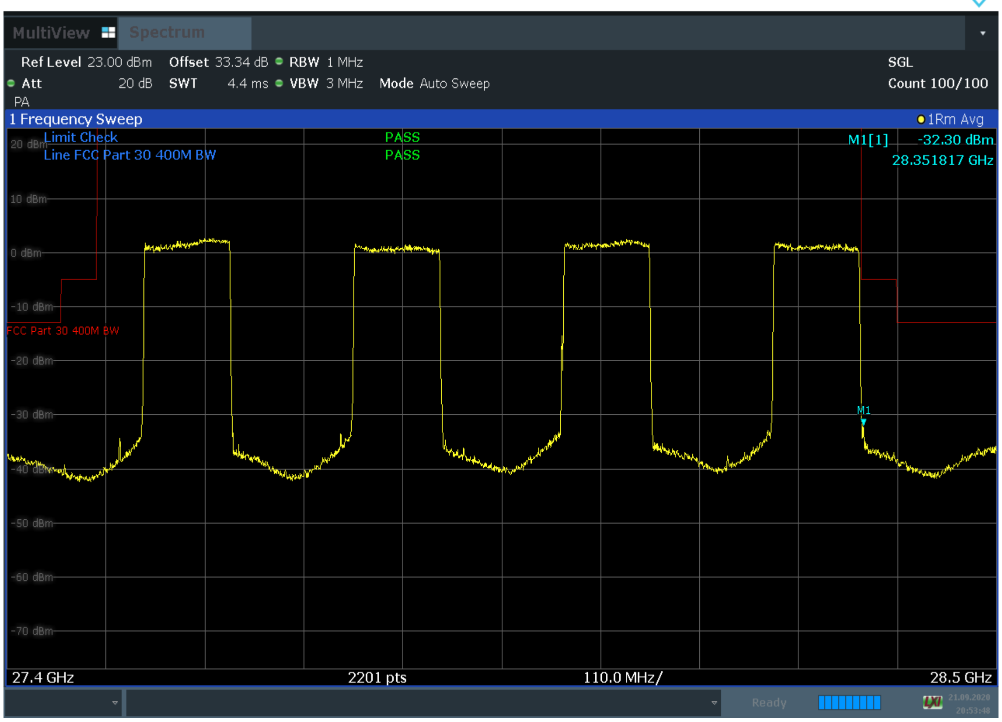
Plot 7-719. Band Edge (Ant A 100 MHz BW 8CC CC QPSK Low)



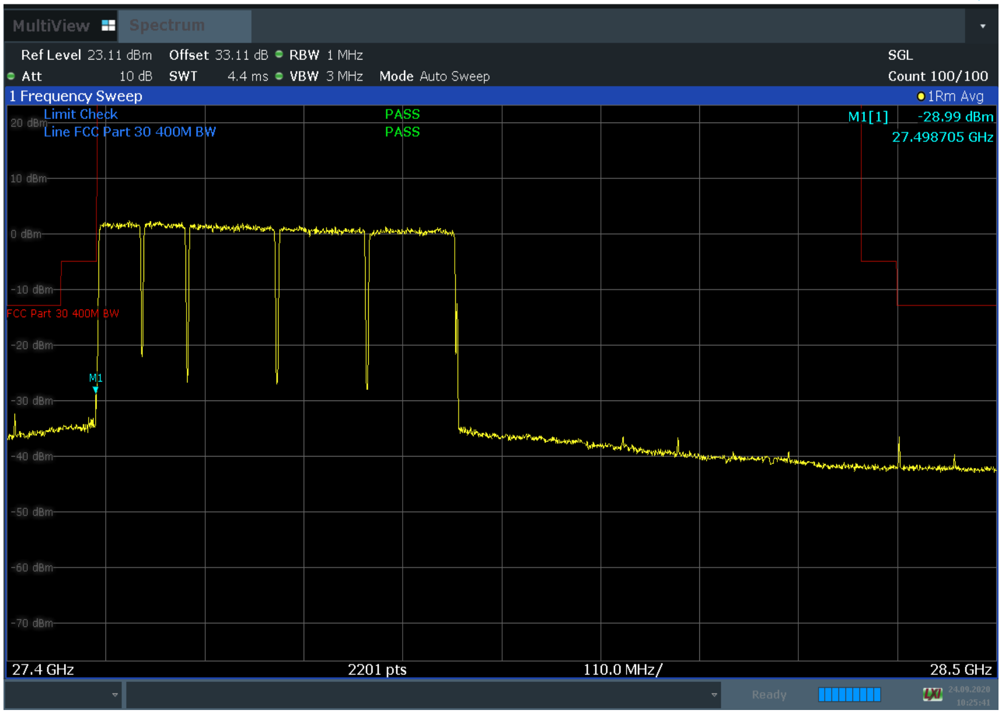
Plot 7-720. Band Edge (Ant A 100 MHz BW 8CC CC QPSK High)



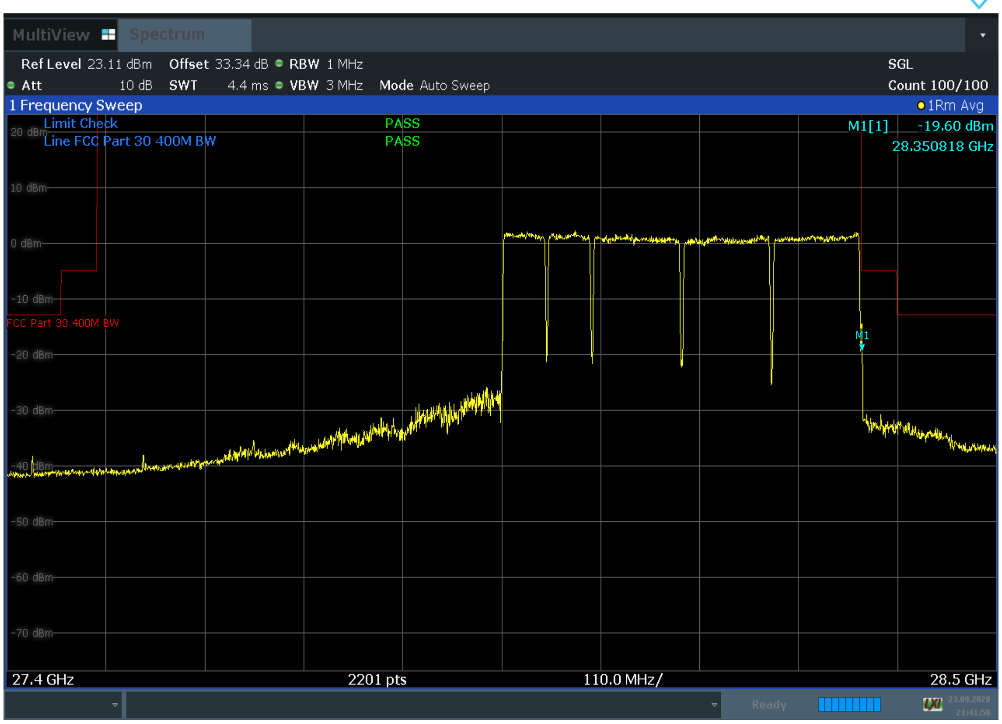
Plot 7-721 Band Edge (Ant A 100 MHz BW 4CC NC QPSK Low)



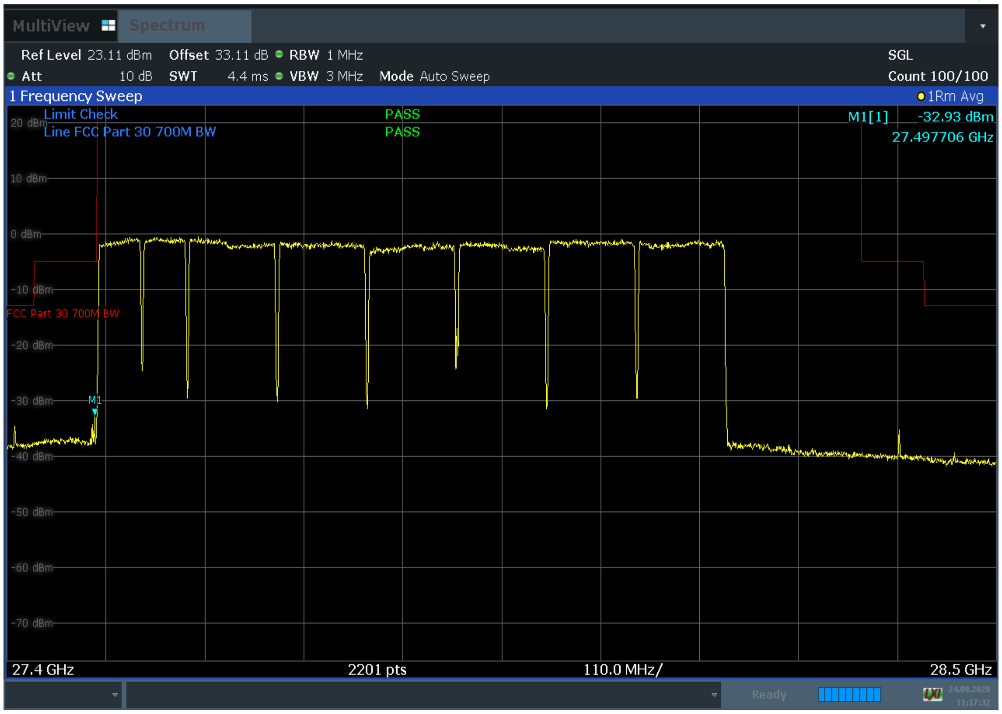
Plot 7-722. Band Edge (Ant A 100 MHz BW 4CC NC QPSK High)



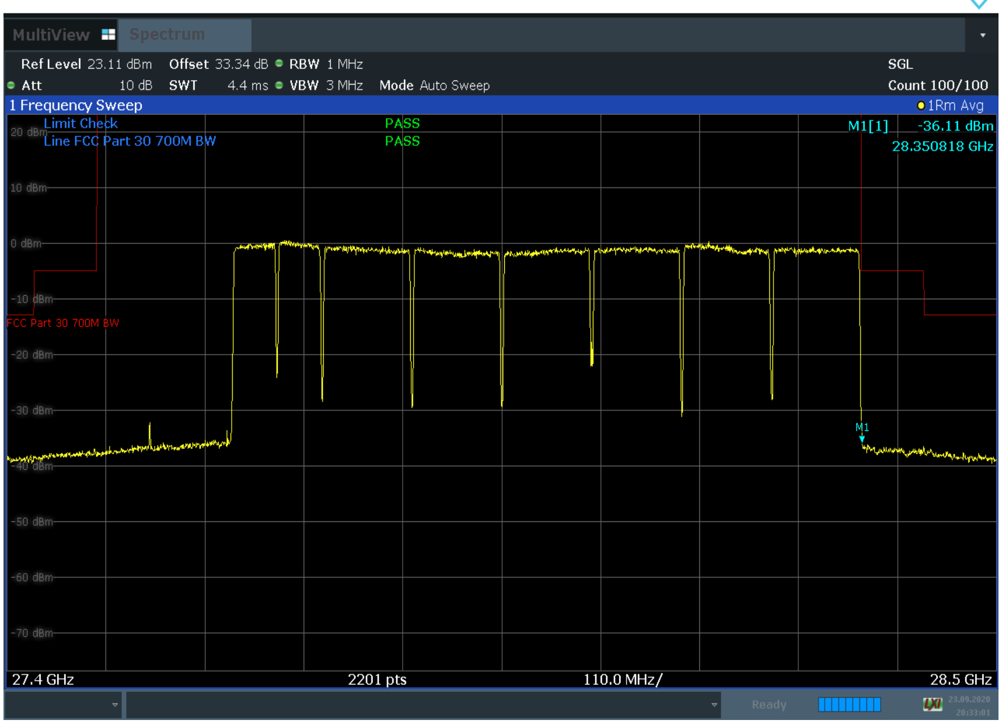
Plot 7-723 Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low)



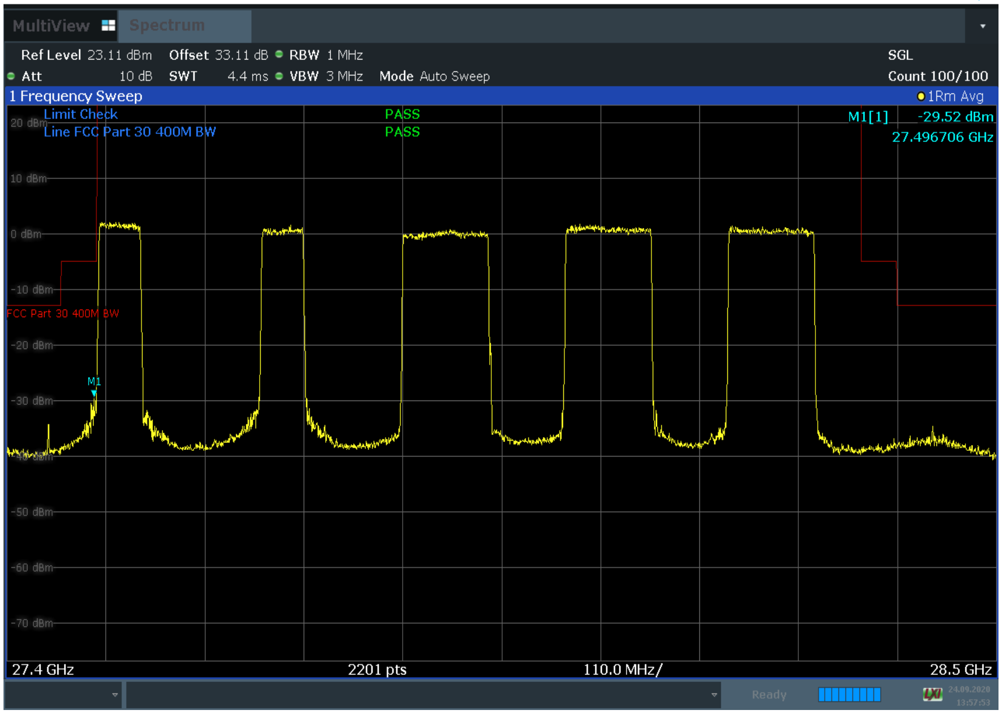
Plot 7-724. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High)



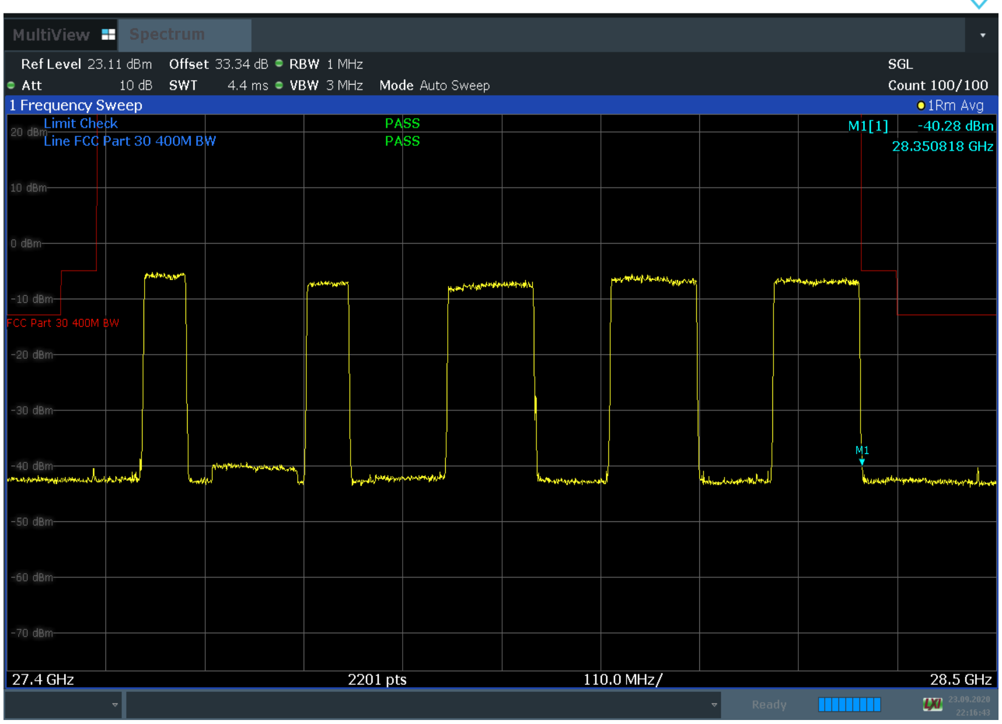
Plot 7-725. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low)



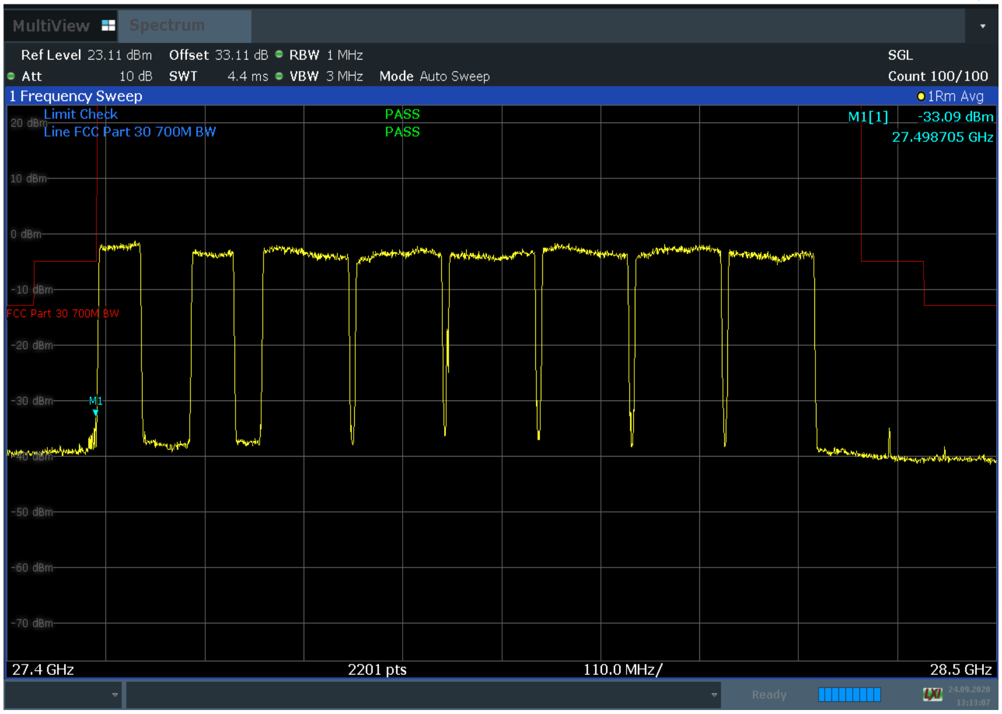
Plot 7-726. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High)



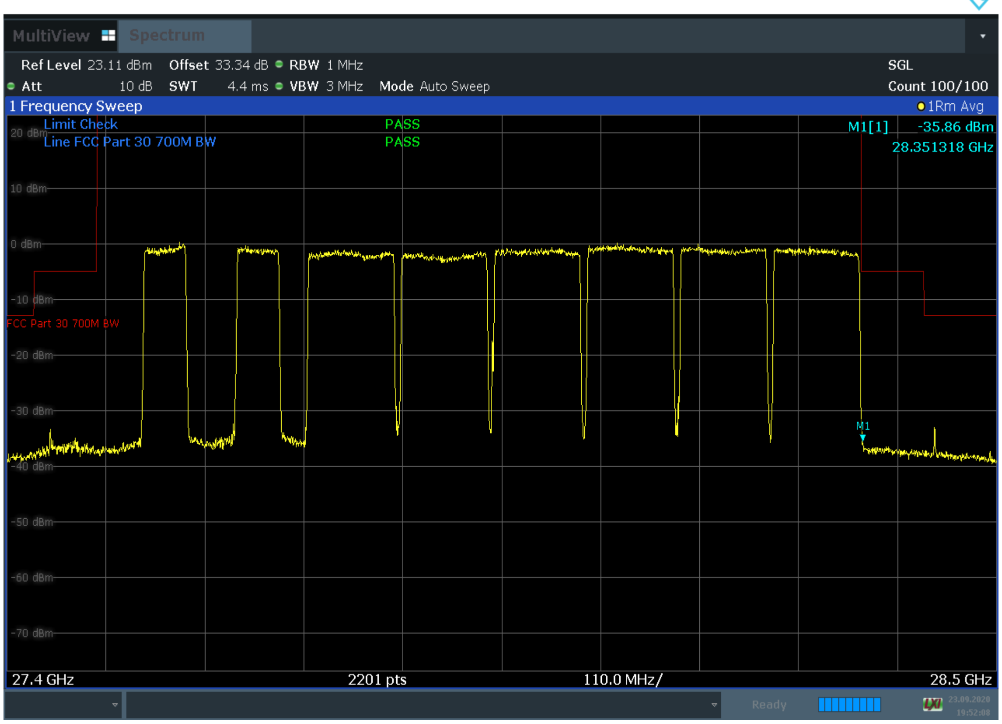
Plot 7-727 Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK Low)



Plot 7-728. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK High)

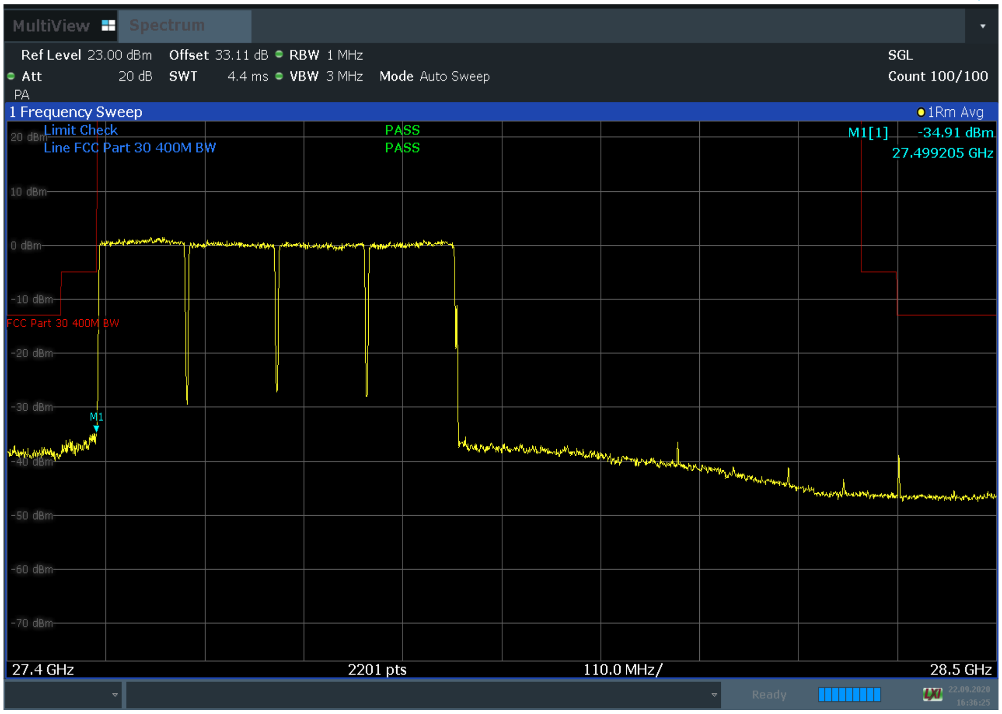


Plot 7-729. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK Low)

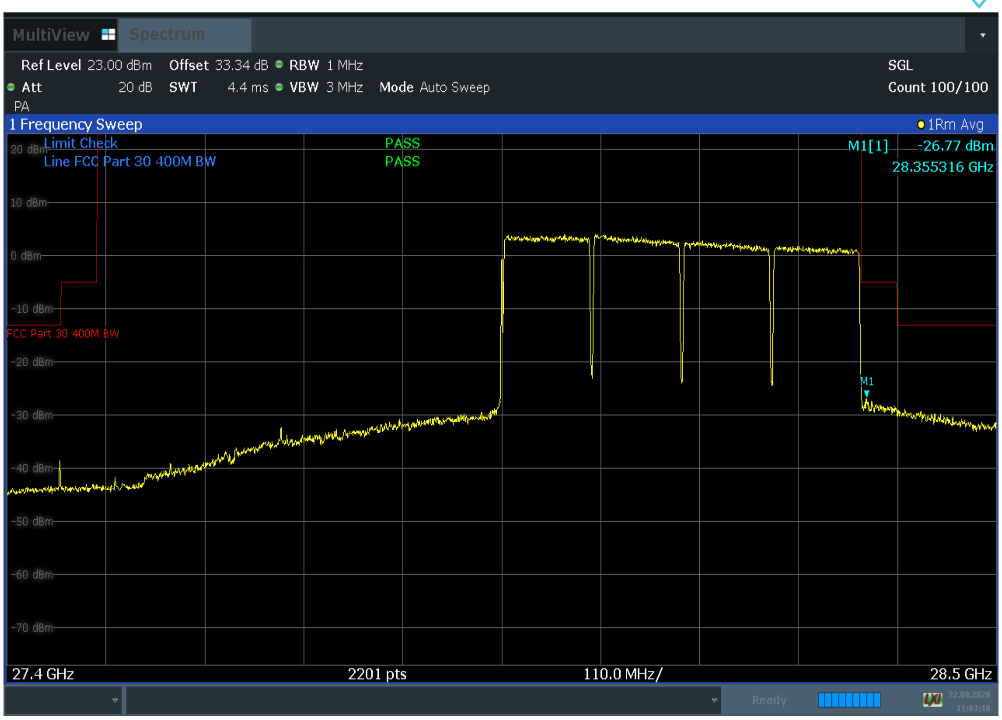


Plot 7-730. Band Edge (Ant A 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK High)

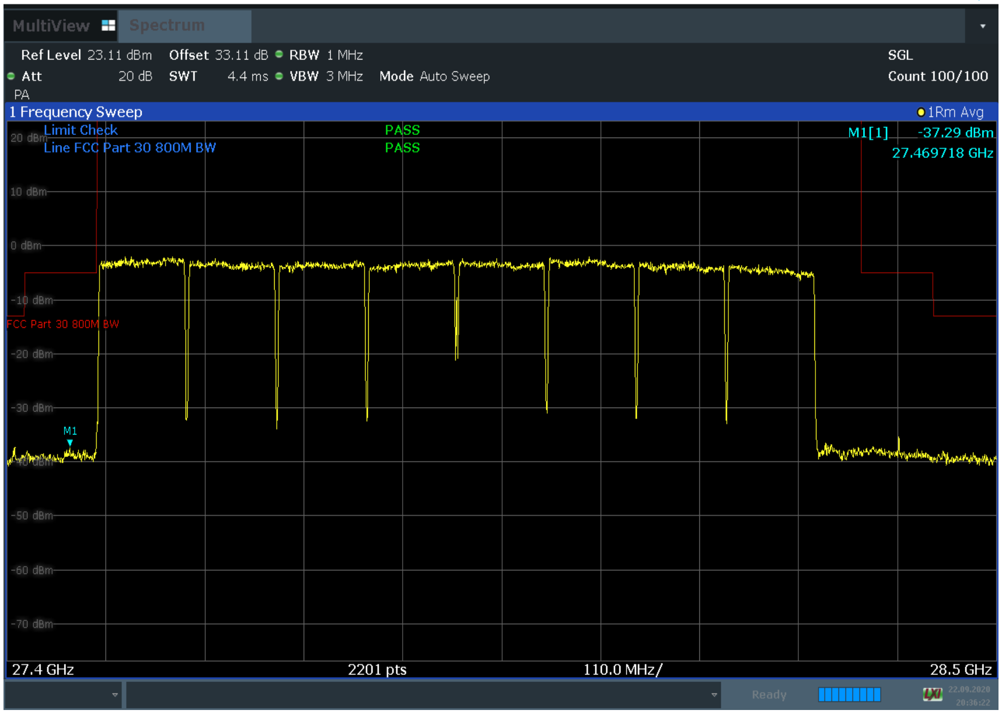
7.6.3 Antenna B Conducted Band Edge Maximized on Antenna B



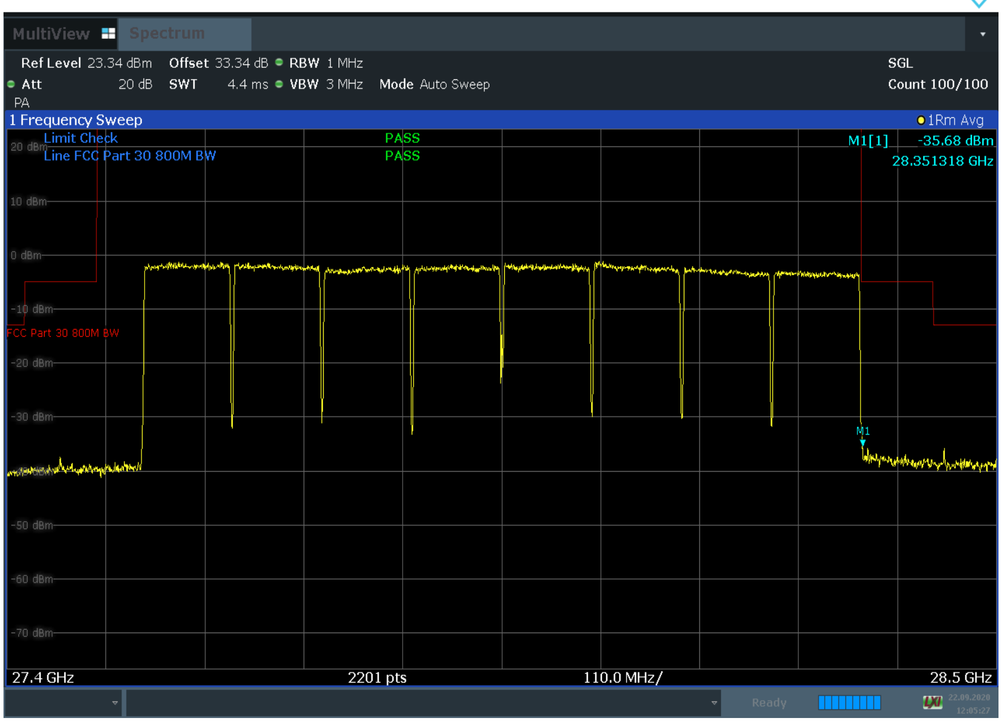
Plot 7-731 Band Edge (Ant B 100 MHz BW 4CC CC QPSK Low)



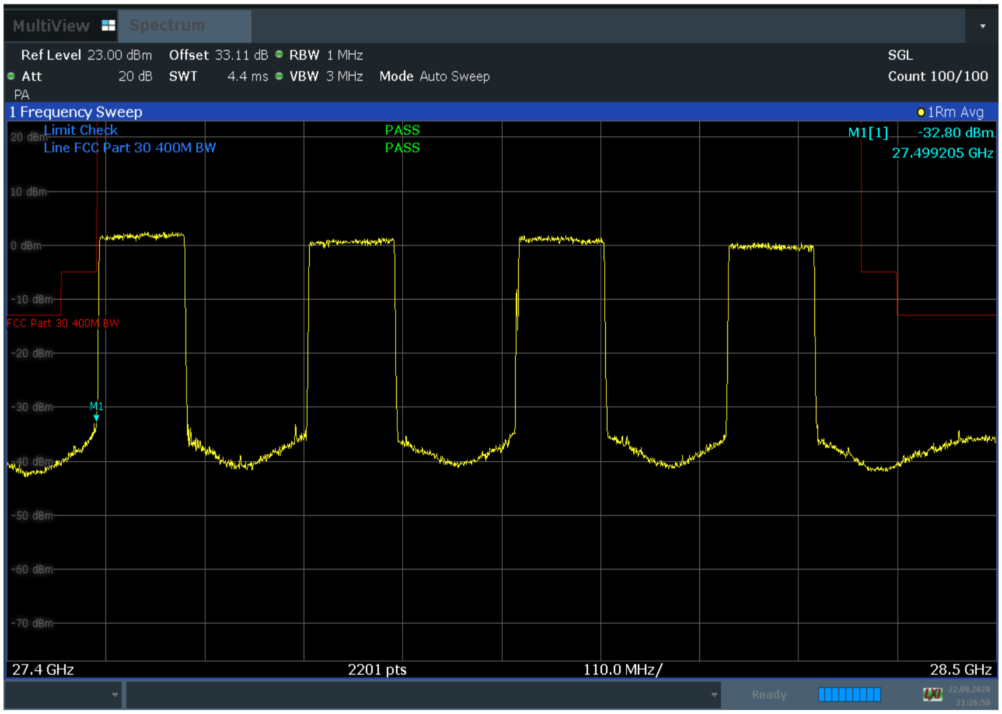
Plot 7-732. Band Edge (Ant B 100 MHz BW 4CC CC QPSK High)



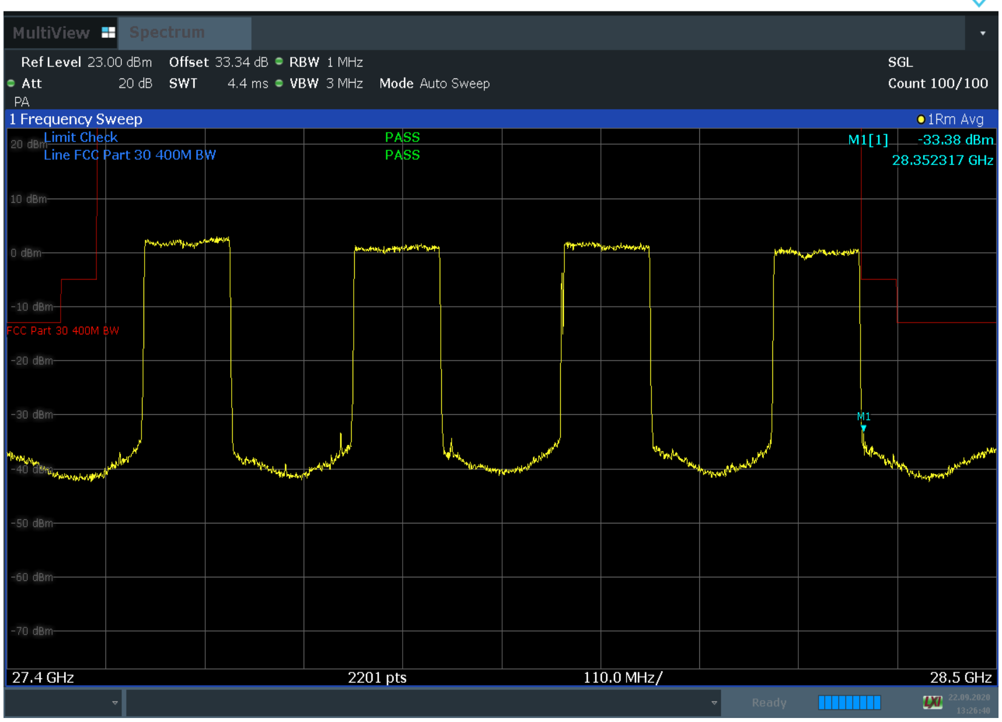
Plot 7-733. Band Edge (Ant B 100 MHz BW 8CC CC QPSK Low)



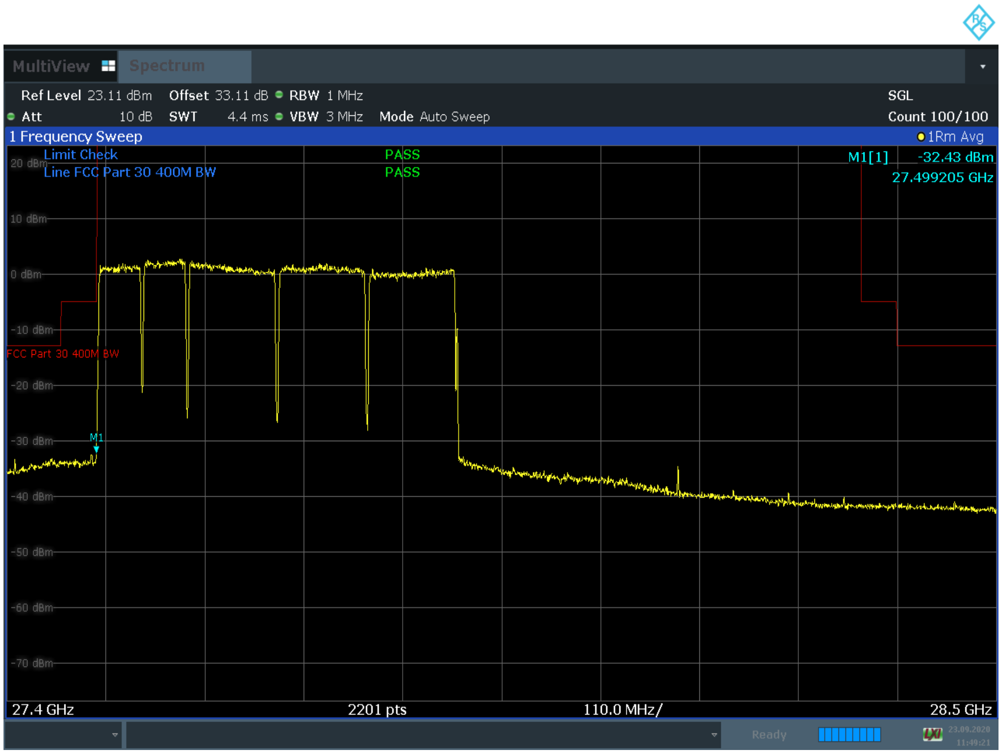
Plot 7-734. Band Edge (Ant B 100 MHz BW 8CC CC QPSK High)



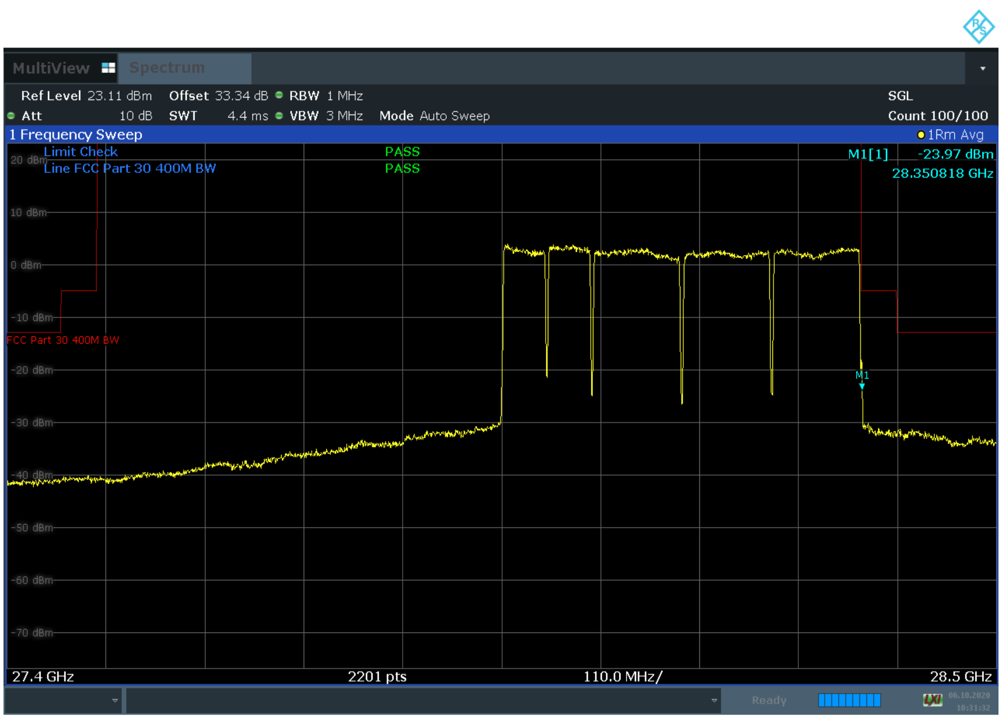
Plot 7-735 Band Edge (Ant B 100 MHz BW 4CC NC QPSK Low)



Plot 7-736. Band Edge (Ant B 100 MHz BW 4CC NC QPSK High)



Plot 7-737 Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low)



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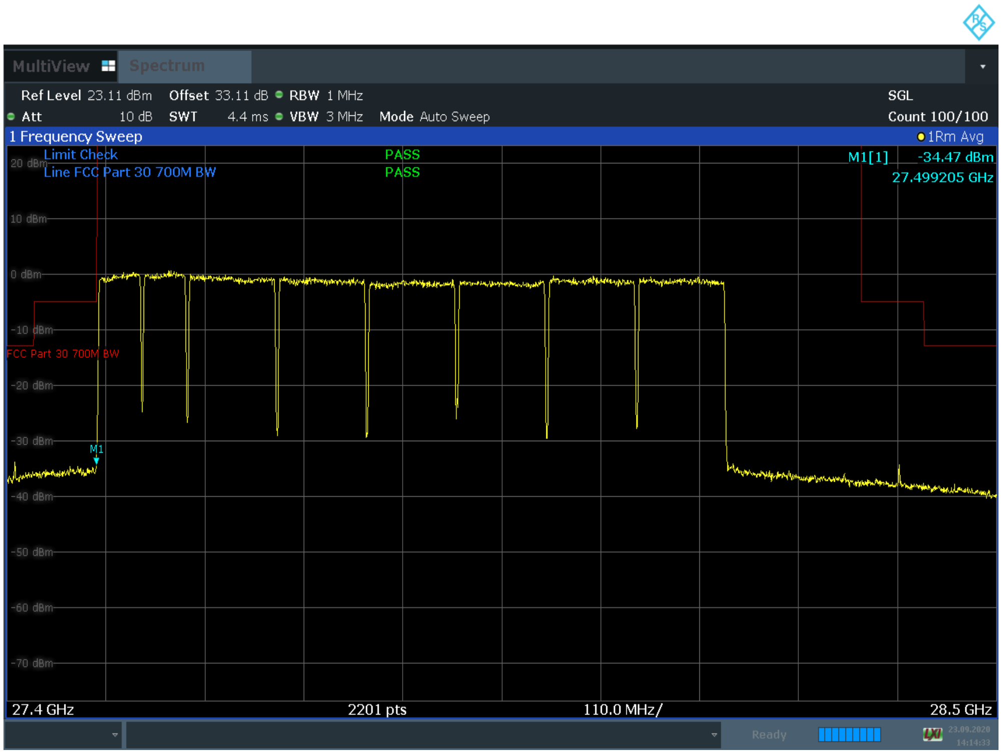
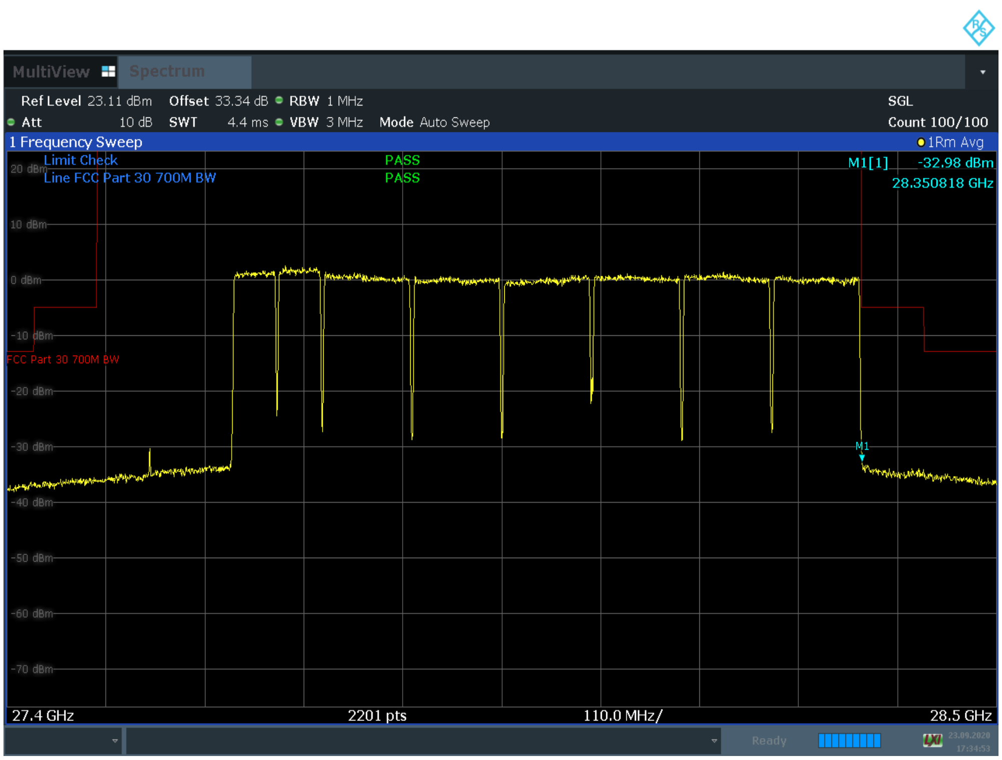
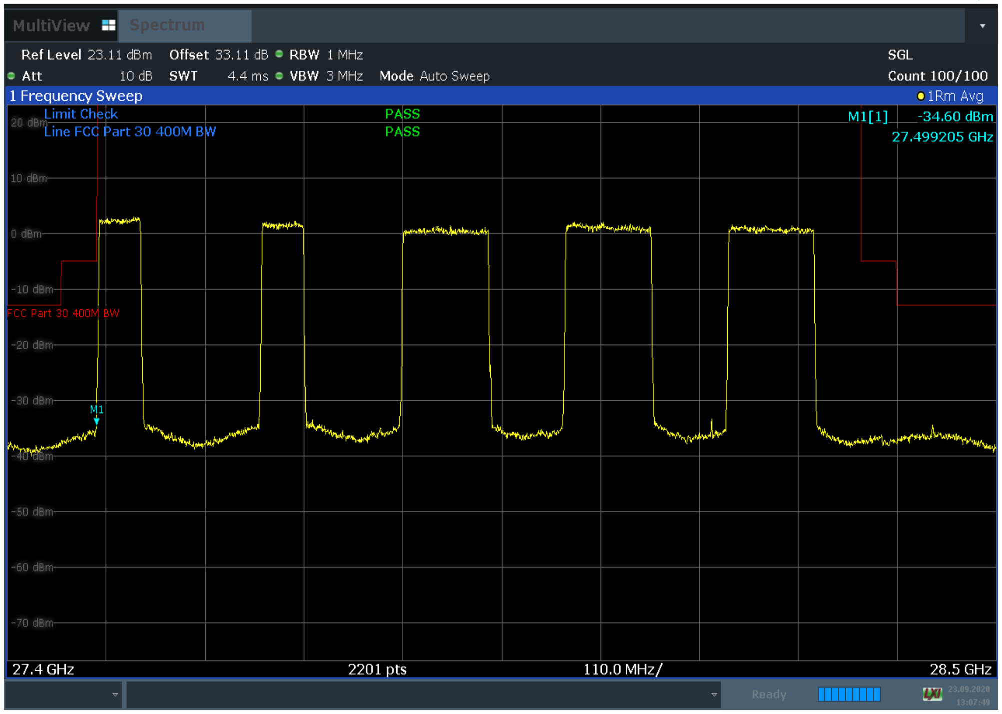
Plot 7-738. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High)



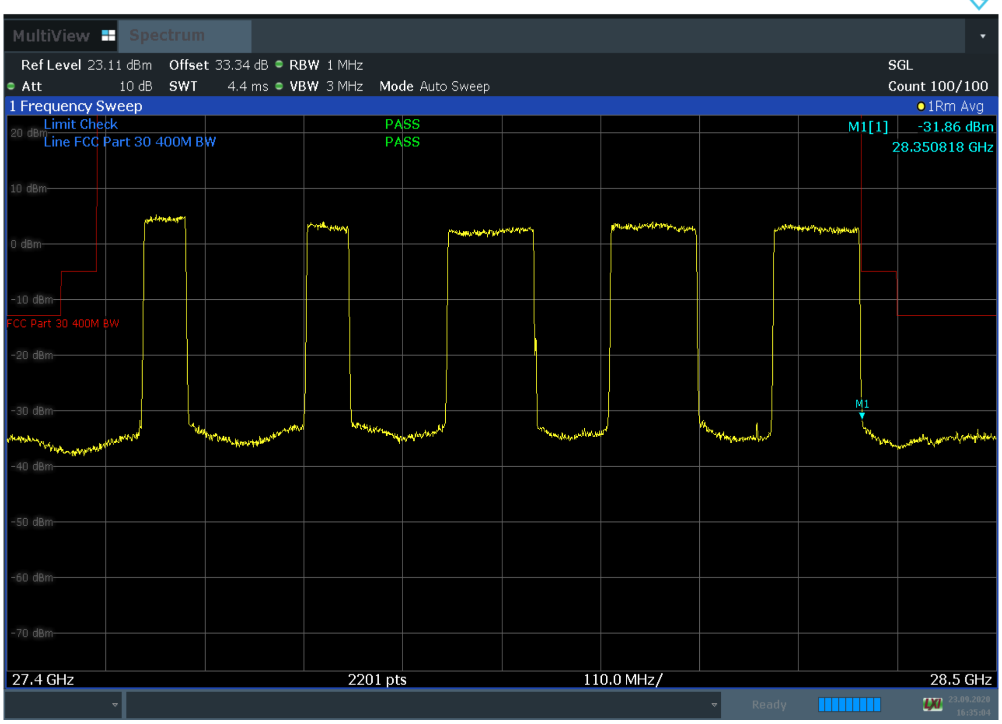
Plot 7-739. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low)



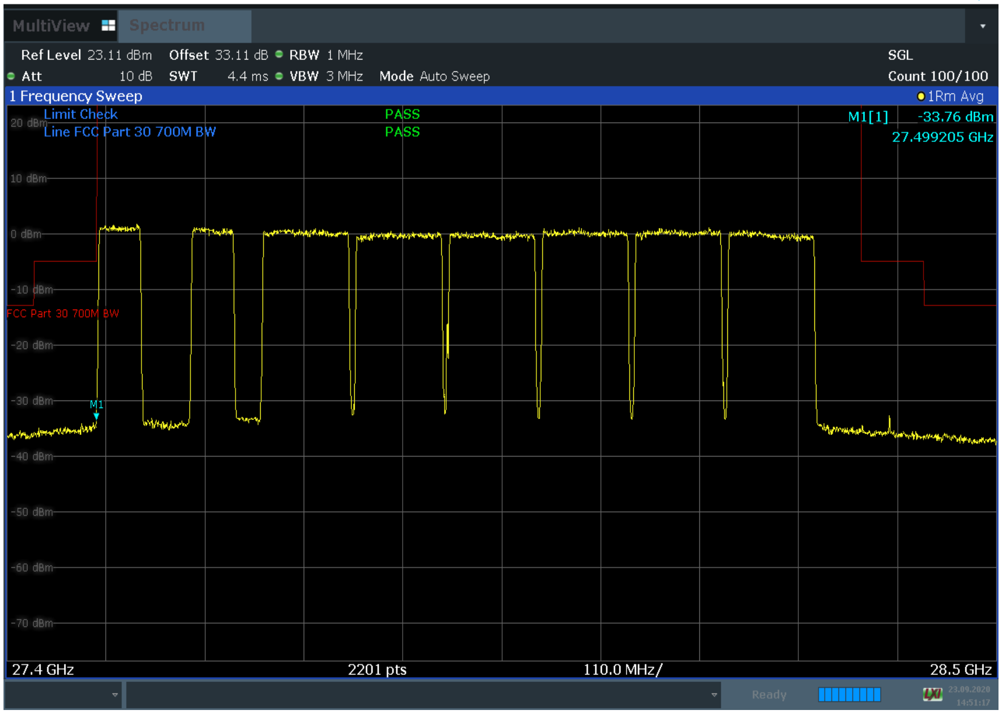
Plot 7-740. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High)



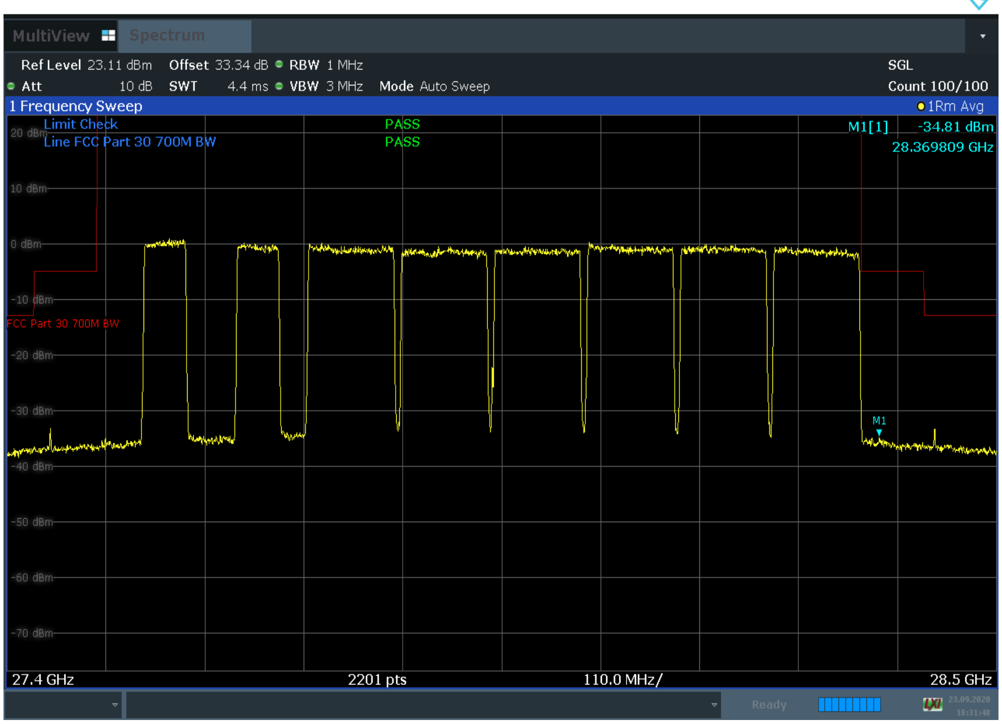
Plot 7-741 Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK Low)



Plot 7-742. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK High)



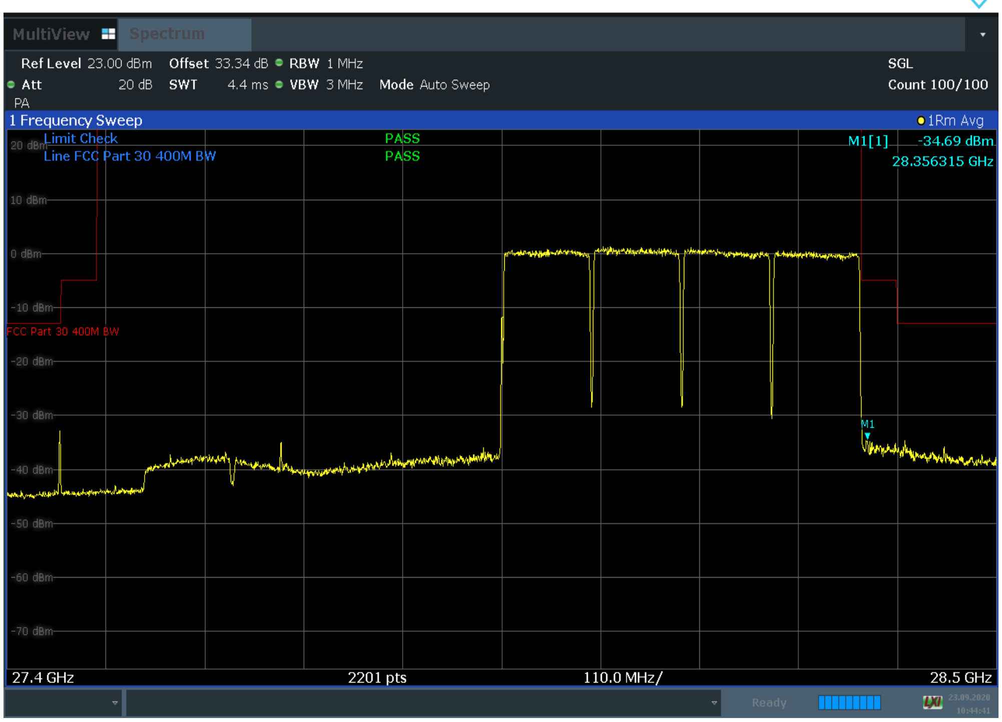
Plot 7-743. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK Low)



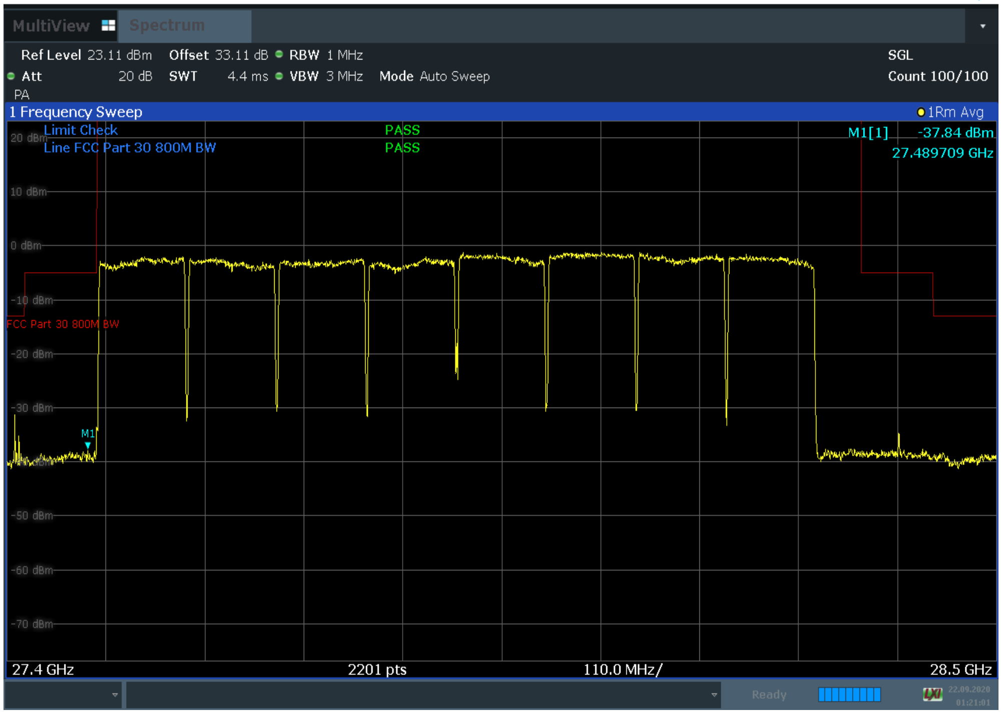
Plot 7-744. Band Edge (Ant B 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK High)

7.6.4 Antenna C Conducted Band Edge Maximized on Antenna C

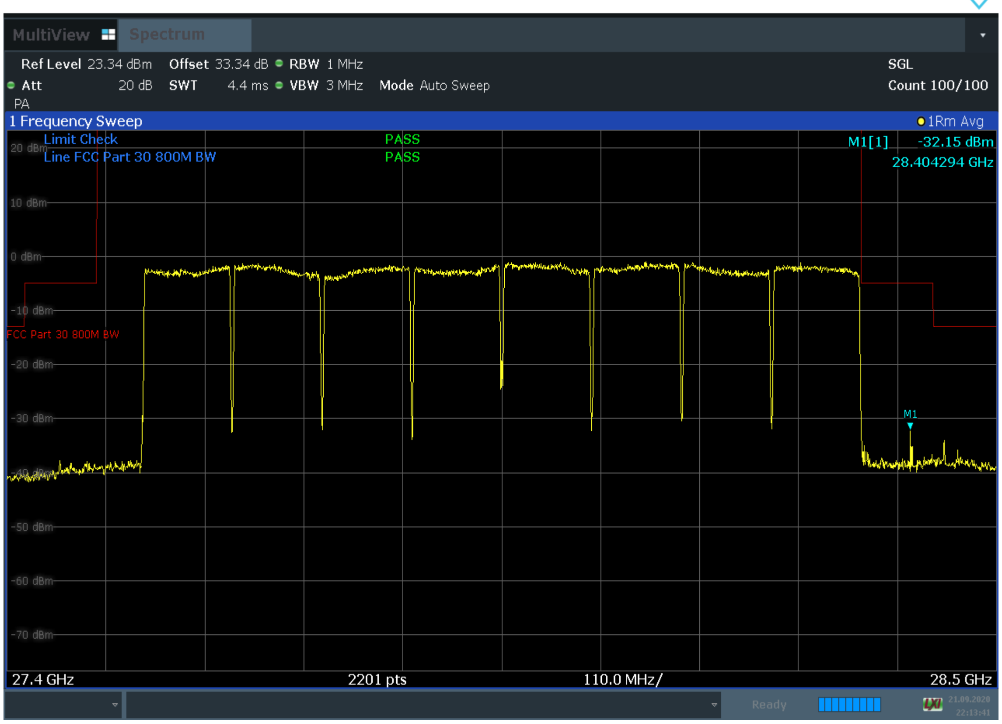
Plot 7-745 Band Edge (Ant C 100 MHz BW 4CC CC QPSK Low)



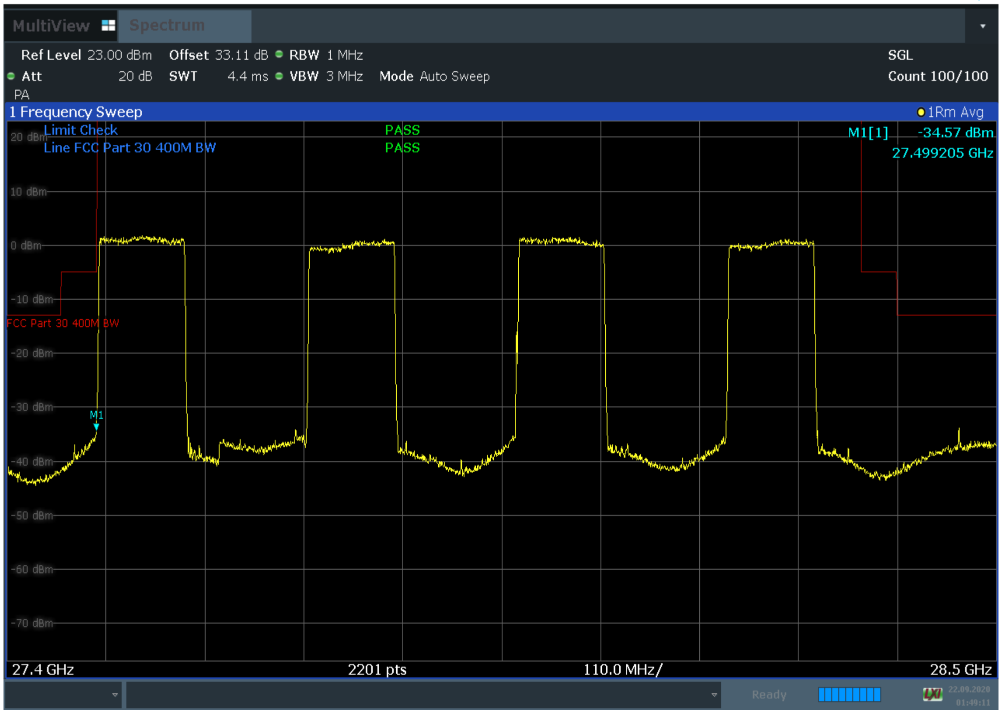
Plot 7-746. Band Edge (Ant C 100 MHz BW 4CC CC QPSK High)



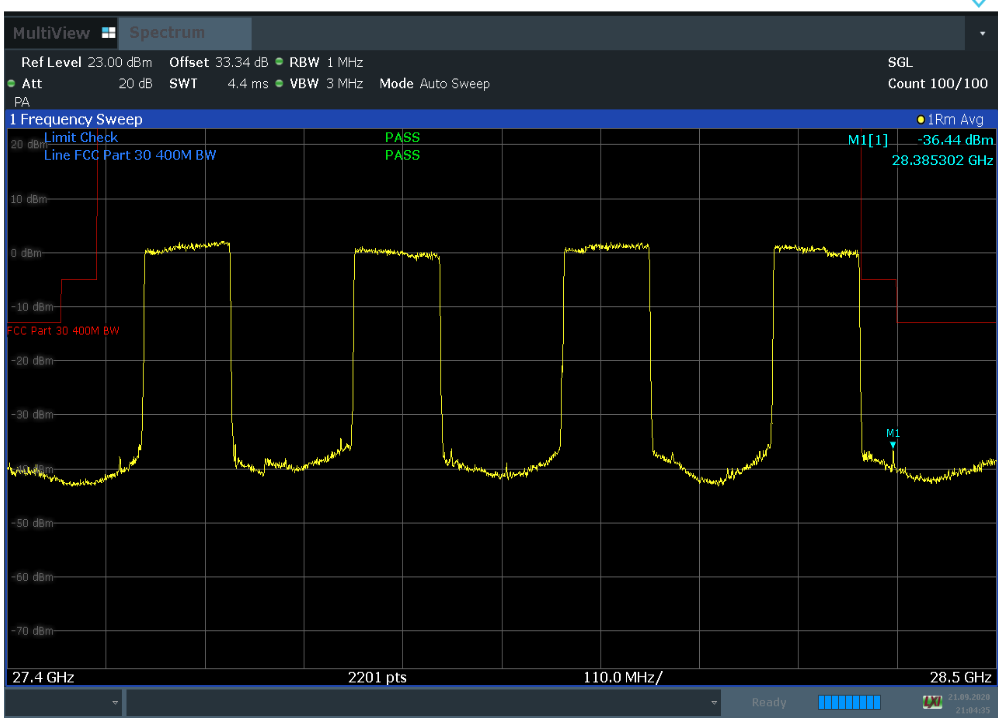
Plot 7-747. Band Edge (Ant C 100 MHz BW 8CC CC QPSK Low)



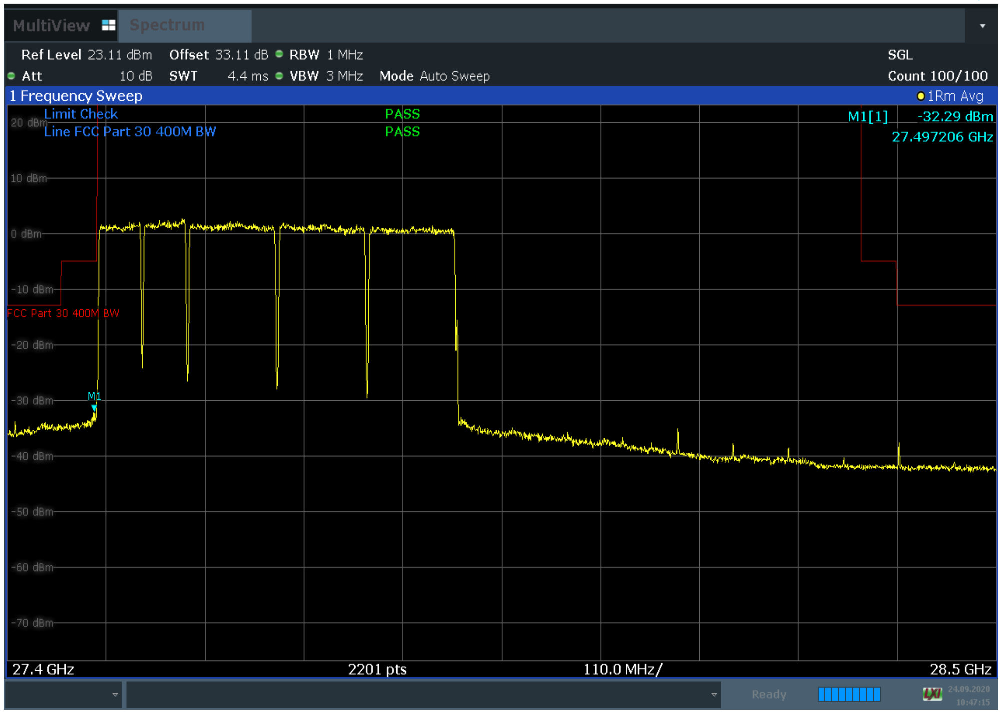
Plot 7-748. Band Edge (Ant C 100 MHz BW 8CC CC QPSK High)



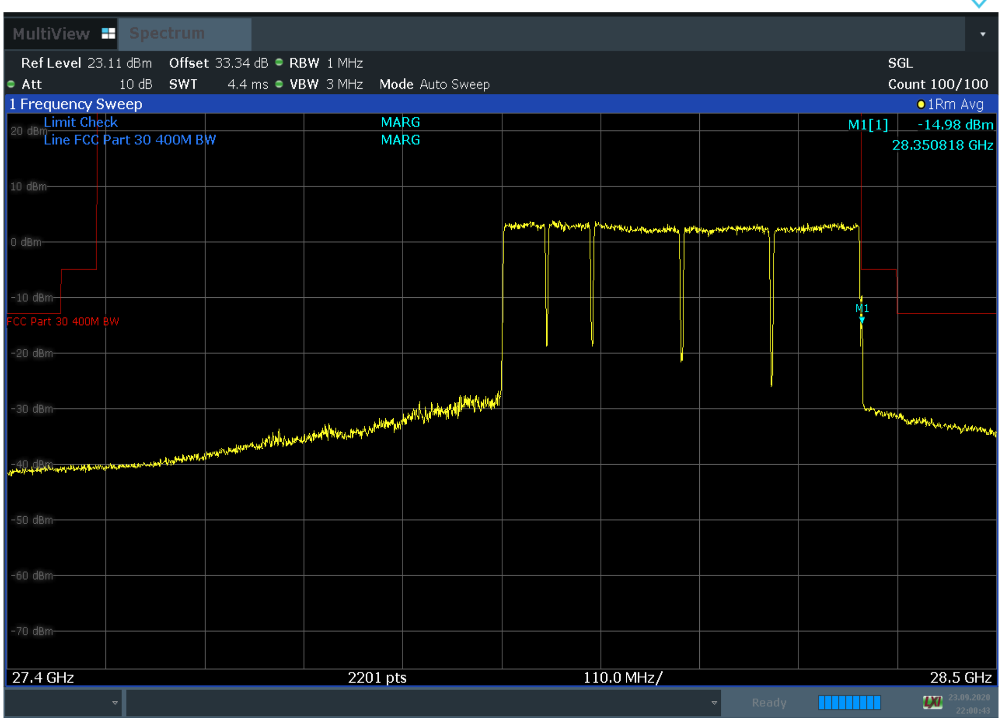
Plot 7-749 Band Edge (Ant C 100 MHz BW 4CC NC QPSK Low)



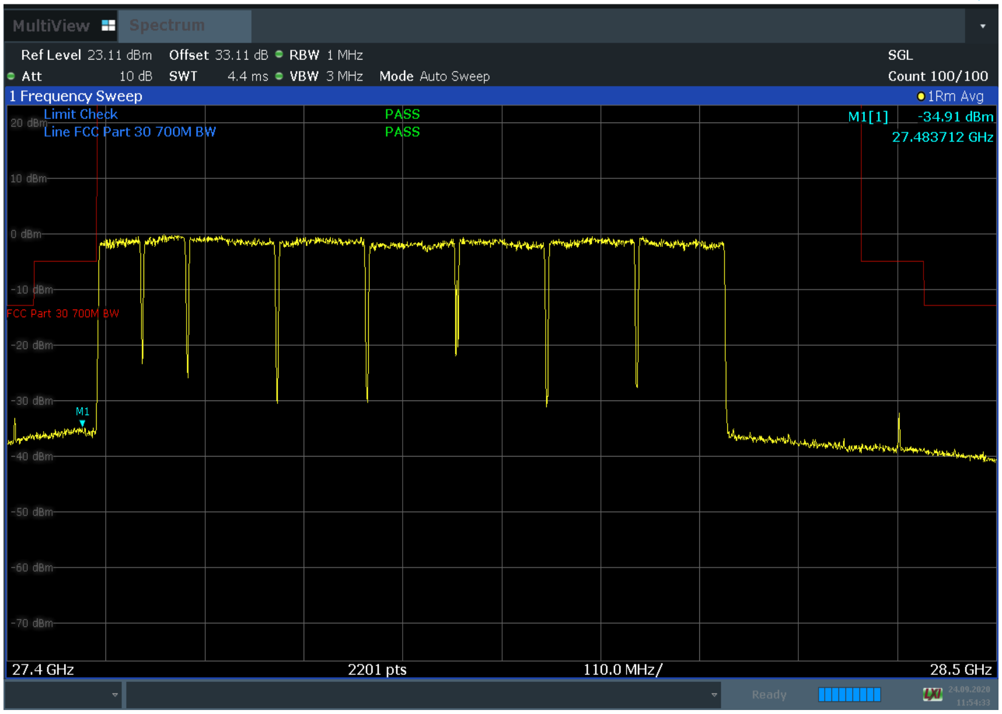
Plot 7-750. Band Edge (Ant C 100 MHz BW 4CC NC QPSK High)



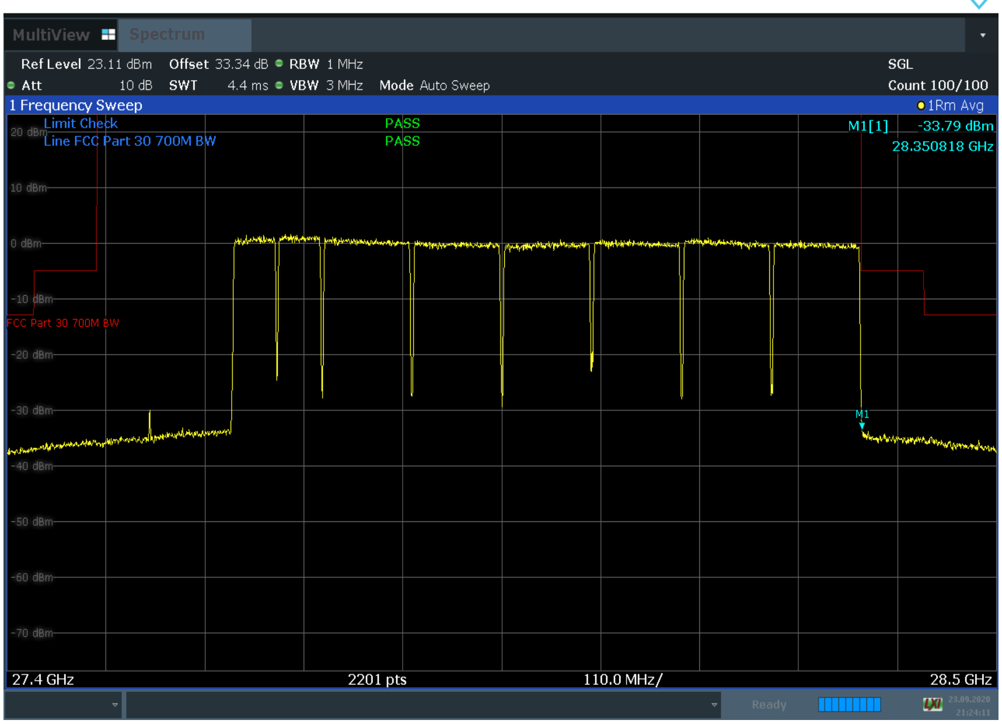
Plot 7-751 Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK Low)



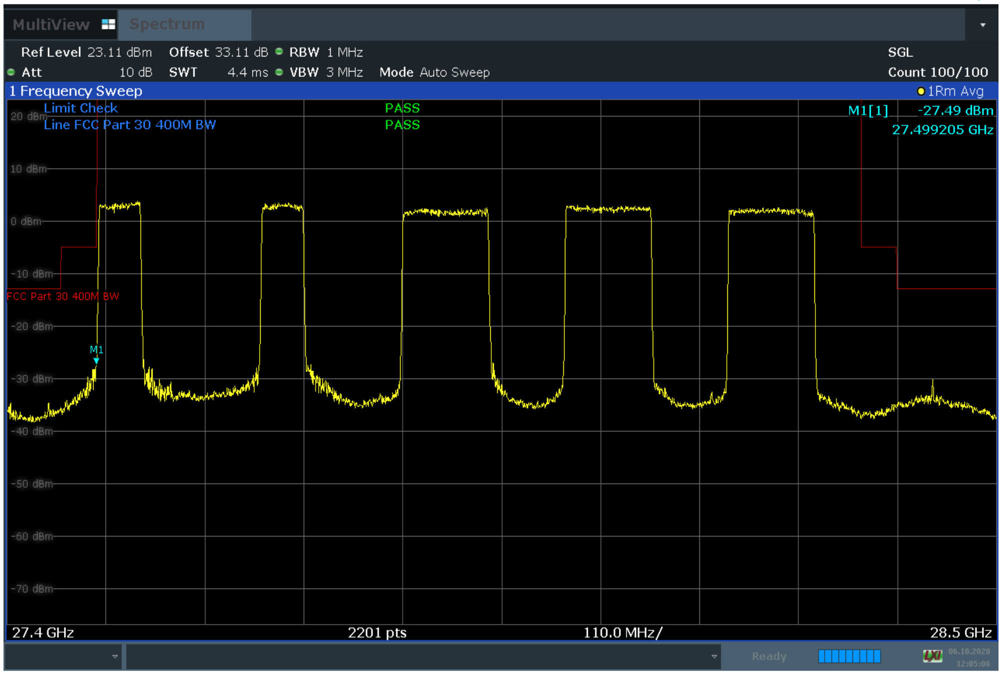
Plot 7-752. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 3CC CC QPSK High)



Plot 7-753. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK Low)



Plot 7-754. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 6CC CC QPSK High)



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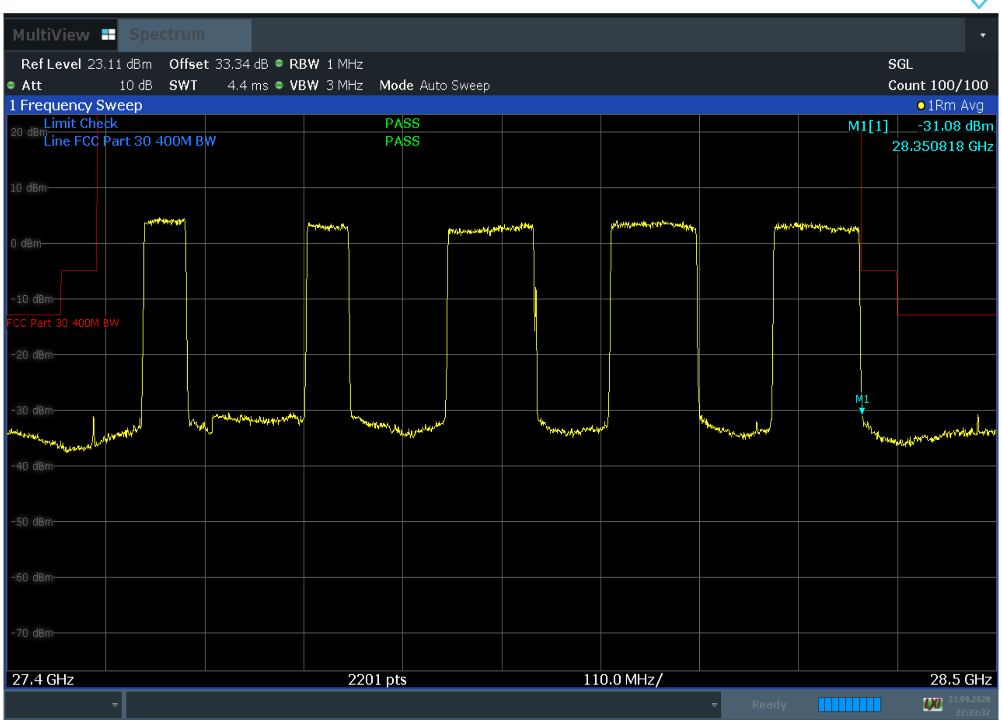
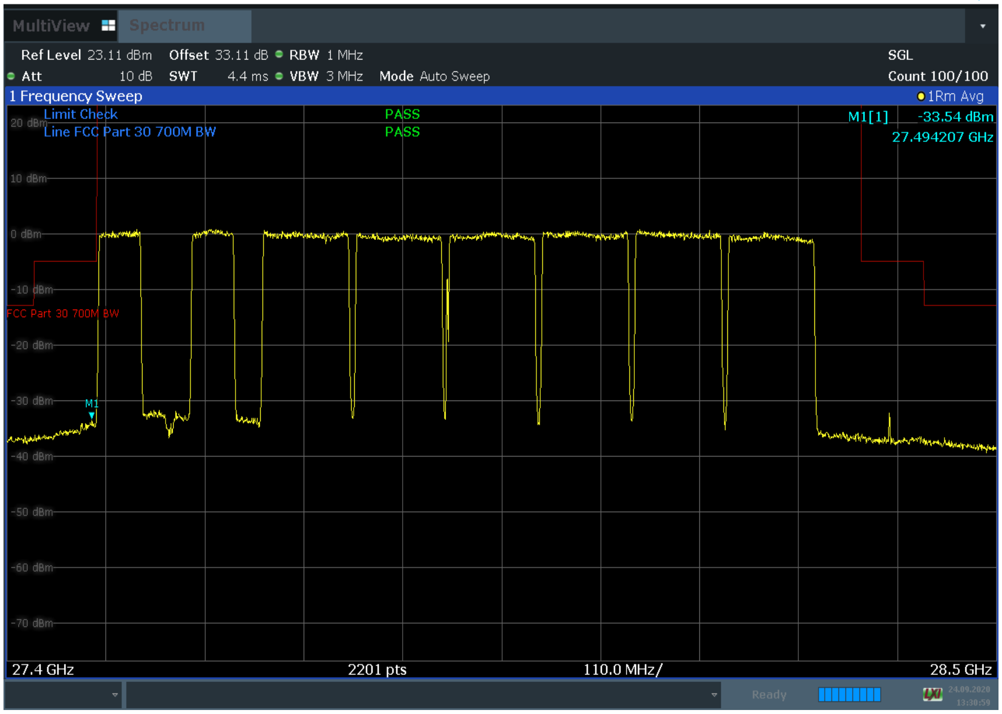
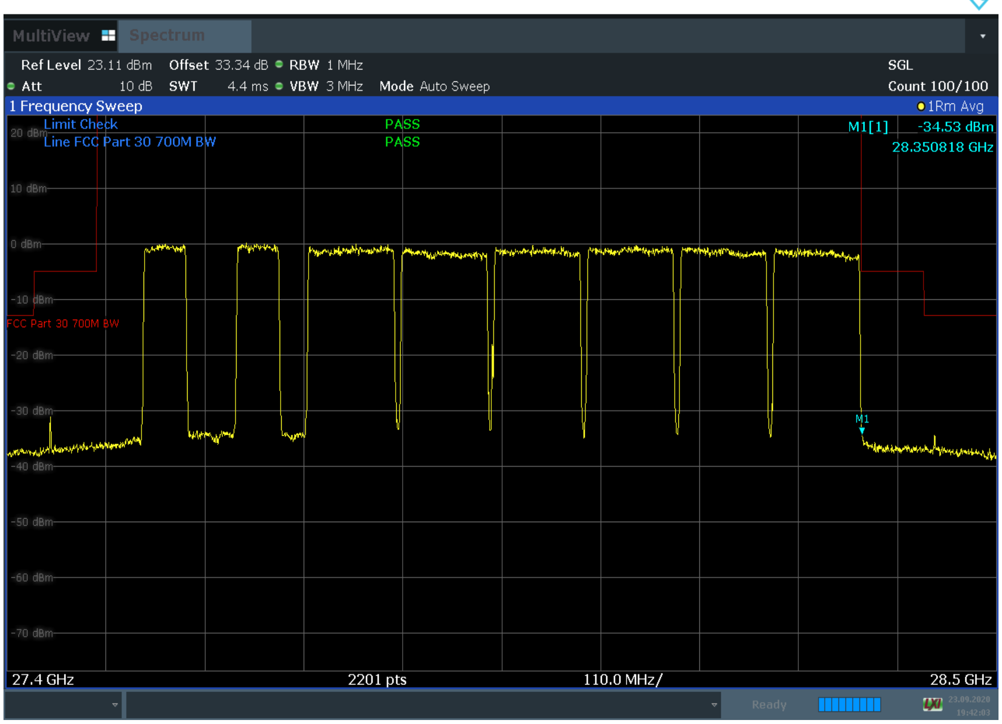
Plot 7-755 Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK Low)



Plot 7-756. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 3CC NC QPSK High)

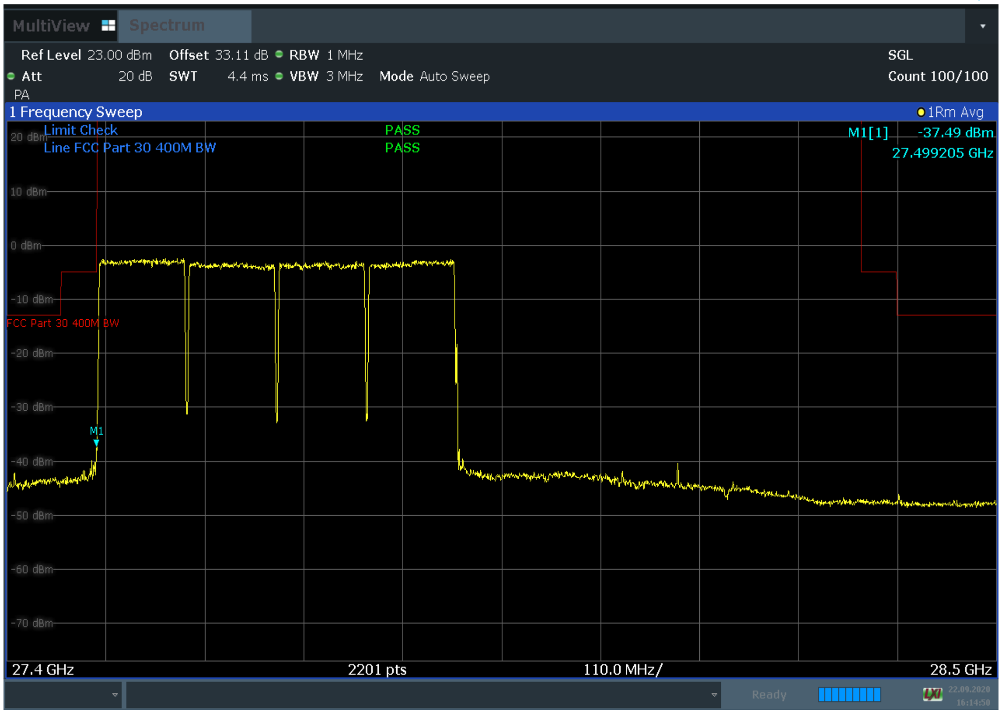


Plot 7-757. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK Low)

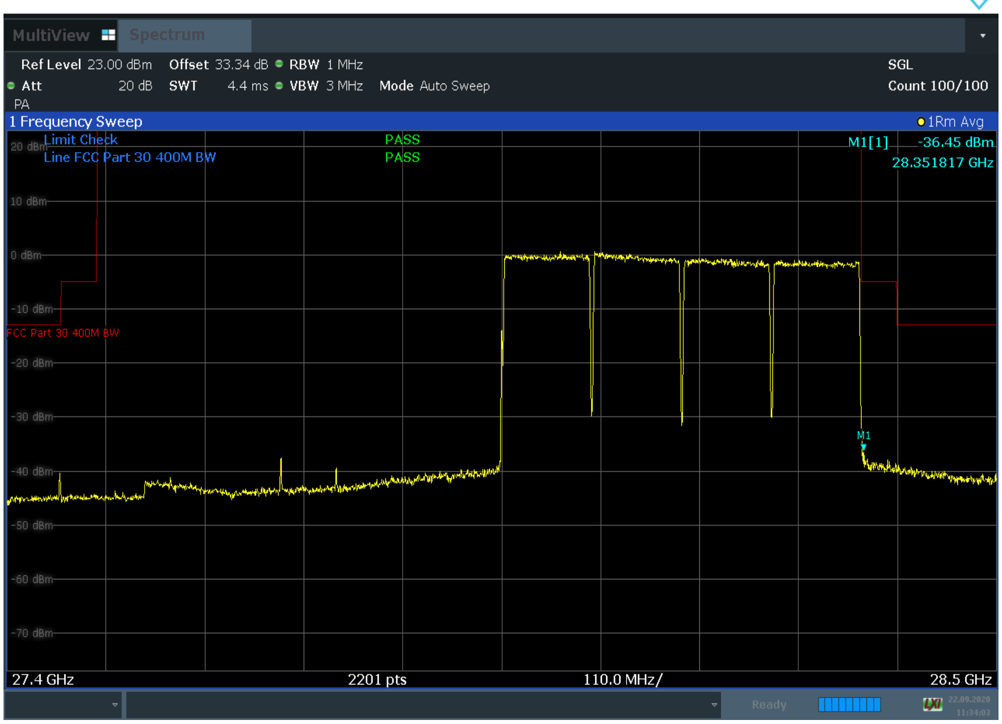


Plot 7-758. Band Edge (Ant C 50 MHz BW 2CC + 100 MHz BW 6CC NC QPSK High)

7.6.5 Antenna D Conducted Band Edge Maximized on Antenna D



Plot 7-759 Band Edge (Ant D 100 MHz BW 4CC CC QPSK Low)



Plot 7-760. Band Edge (Ant D 100 MHz BW 4CC CC QPSK High)