



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(h)(1)(3)
FCC 47 CFR Part 27, Clause 27.53(g)
FCC 47 CFR Part 27, Clause 27.53(m)(4)(6)
FCC 47 CFR Part 27, Clause 27.53(c)(2)(4)(5)(f)
RSS-139, Clause 6.6
RSS-130, Clause 4.7.1
RSS-199, Clause 4.5

2.7.2 Standard Applicable

FCC 47 CFR Part 27.53

(h) AWS emission limits – (1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

(g) For operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC 47 CFR Part 27.53

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.



(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10\log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(f) For operations in the 746-758 MHz and 775-788 MHz and 805-806 MHz bands, emissions in the band 1559-1610 MHz be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

RSS-139, Clause 6.6:

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (dBW), by at least $43 + 10 \log_{10} p$ (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (dBW), by at least $43 + 10 \log_{10} p$ (watts) dB.

RSS-130:

4.7.1 The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

RSS-199, Clause 4.5:

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used.

(b) for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

(i) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away.

(ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and

(iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges

Note: X is 6 MHz or the equipment occupied bandwidth, whichever is greater

In addition, the attenuation shall not be less than $43 + 10 \log(P)$ on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz.

2.7.3 Equipment Under Test and Modification State

Serial No: AT071218B00062 (MIFI8000), AZ280418A00044 (MIFI8800L) / Test Configuration A

2.7.4 Date of Test/Initial of test personnel who performed the test

February 25 and 27, April 08 and 09, May 10, 2019 / XYZ

June 21,23 and July 20, 2018 / XYZ

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions/ Test Location

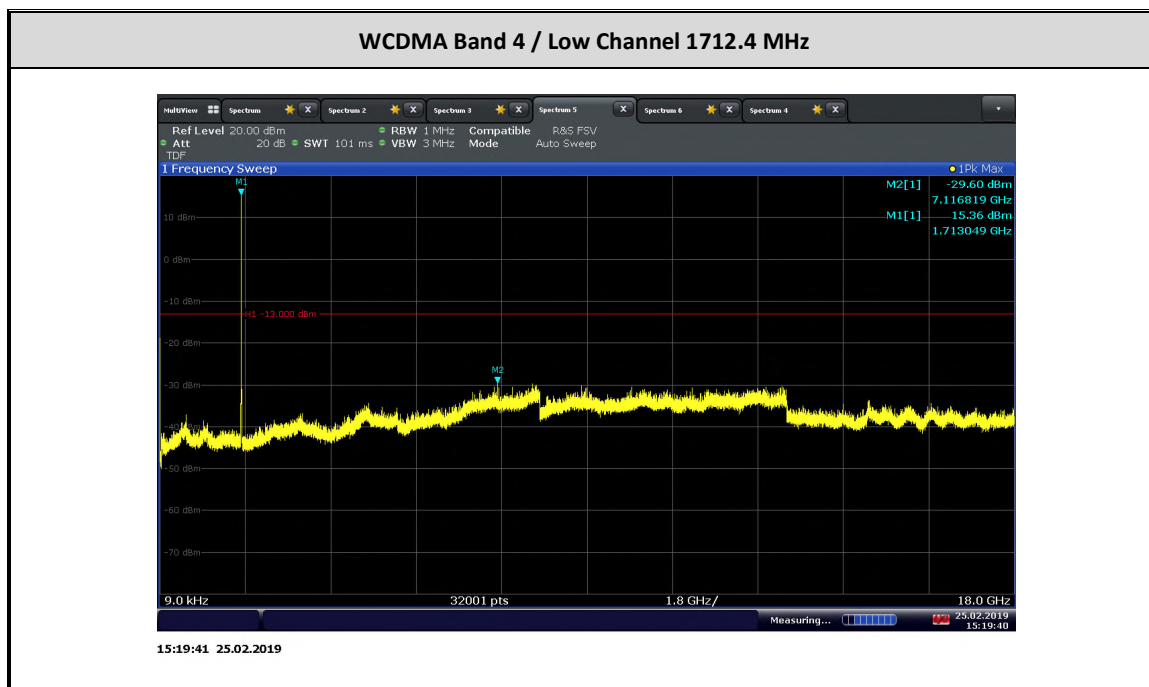
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	21.2 - 26.4°C
Relative Humidity	35.0 - 56.4 %
ATM Pressure	98.5 - 99.6 kPa

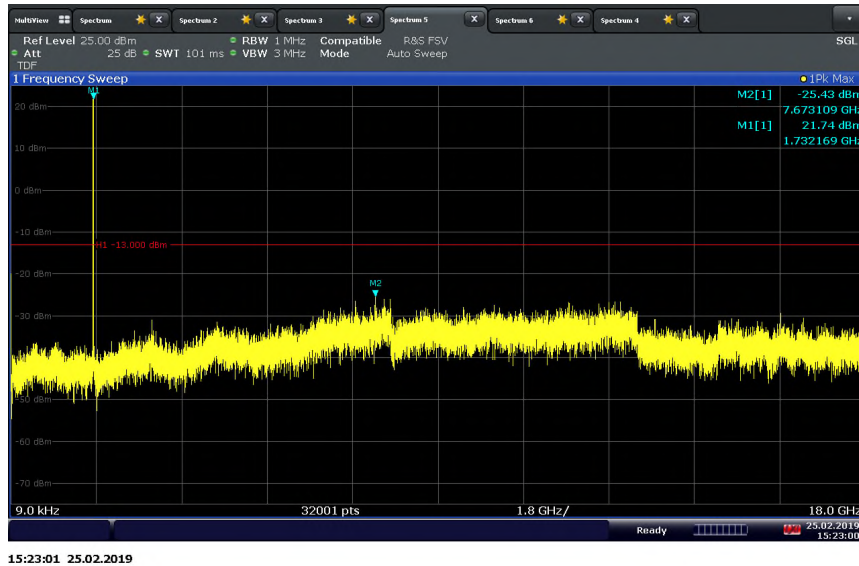
2.7.7 Additional Observations

- This is a conducted test.
- The spectrum was searched from 9 kHz to the 10th harmonic.
- The path loss was measured and entered as a transducer factor (TDF).
- Low, Middle and High channels on all channel bandwidth and modulation are verified. Only the worst case channel of each band presented.

2.7.8 Test Results



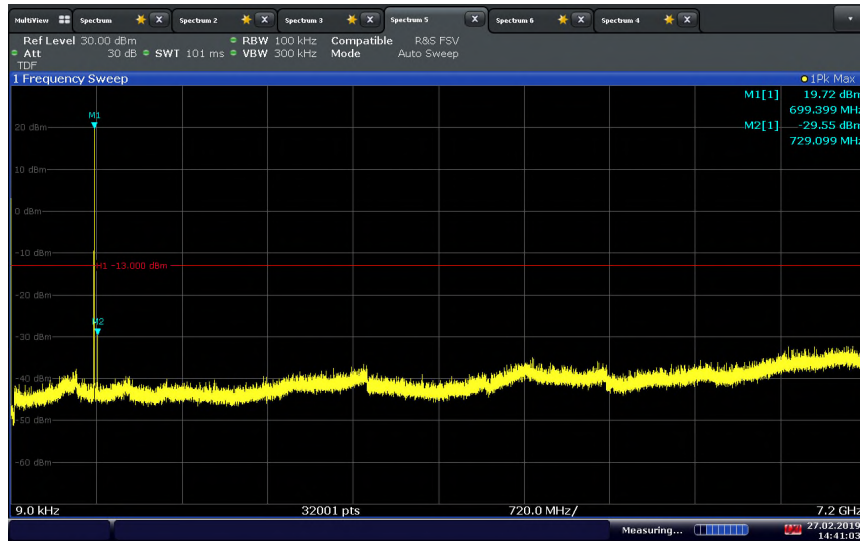
WCDMA Band 4 / Middle Channel 1732.6 MHz



WCDMA Band 4 / High Channel 1752.6 MHz

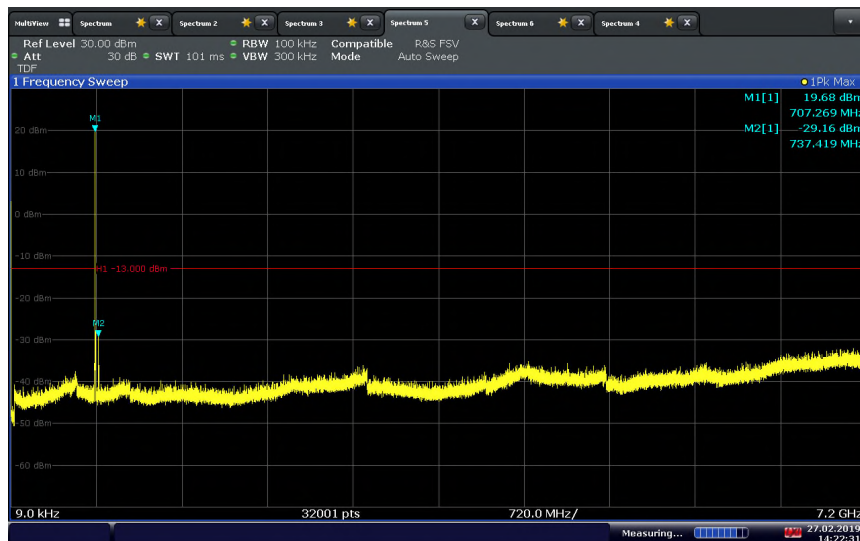


LTE Band 12 (1.4 MHz BW)/QPSK/Low Channel 699.7 MHz



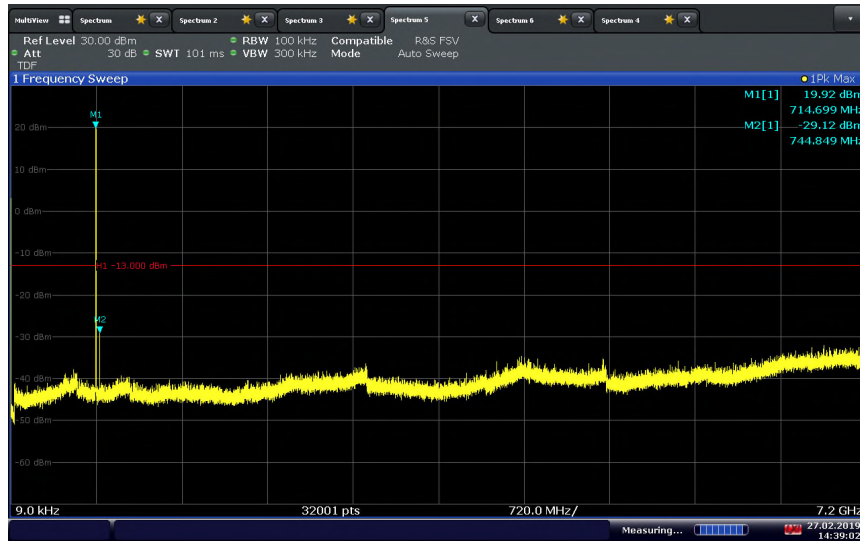
14:41:04 27.02.2019

LTE Band 12 (1.4 MHz BW)/QPSK/Middle Channel 707.5 MHz



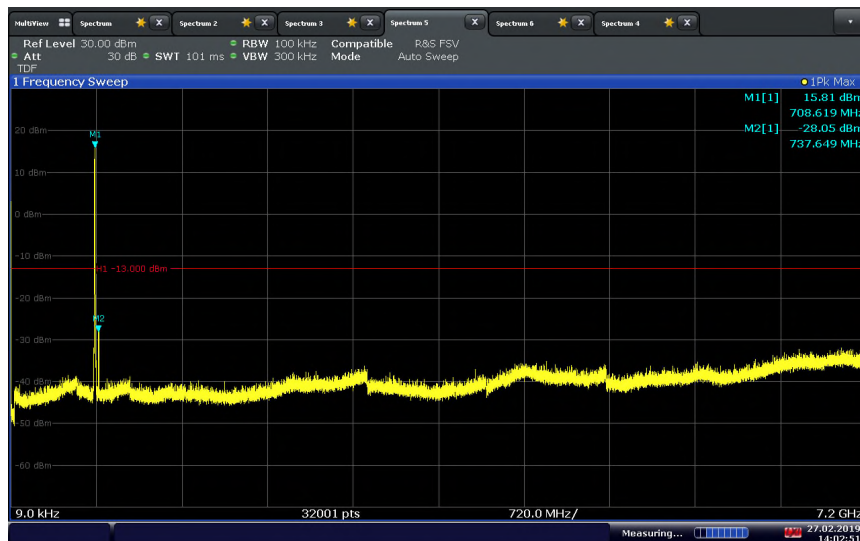
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LTE Band 12 (1.4 MHz BW)/QPSK/High Channel 715.3 MHz



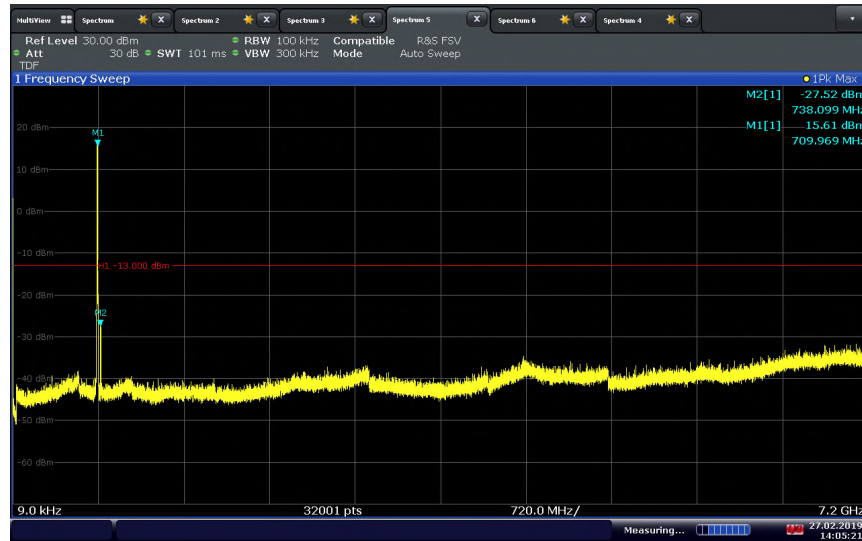
14:39:03 27.02.2019

LTE Band 17 (5 MHz BW)/QPSK/Low Channel 706.5 MHz



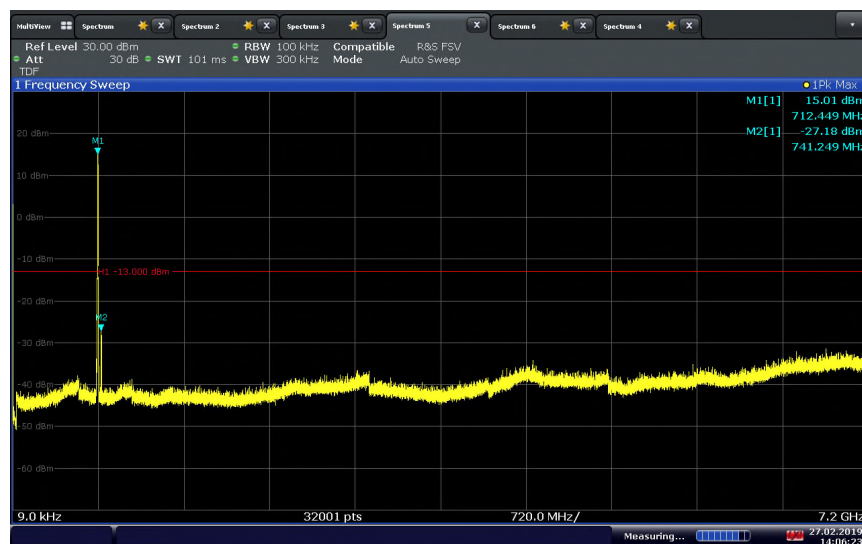
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LTE Band 17 (5 MHz BW)/QPSK/Middle Channel 710 MHz



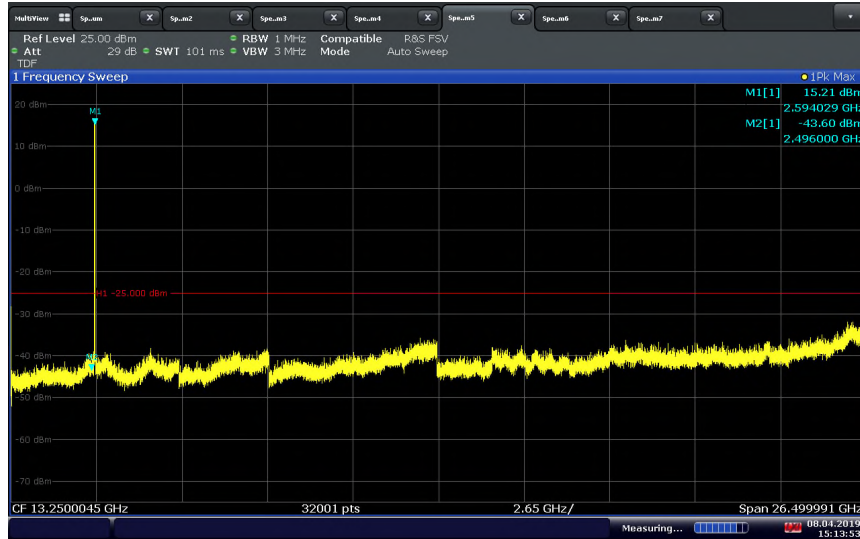
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LTE Band 17 (5 MHz BW)/QPSK/High Channel 713.5 MHz



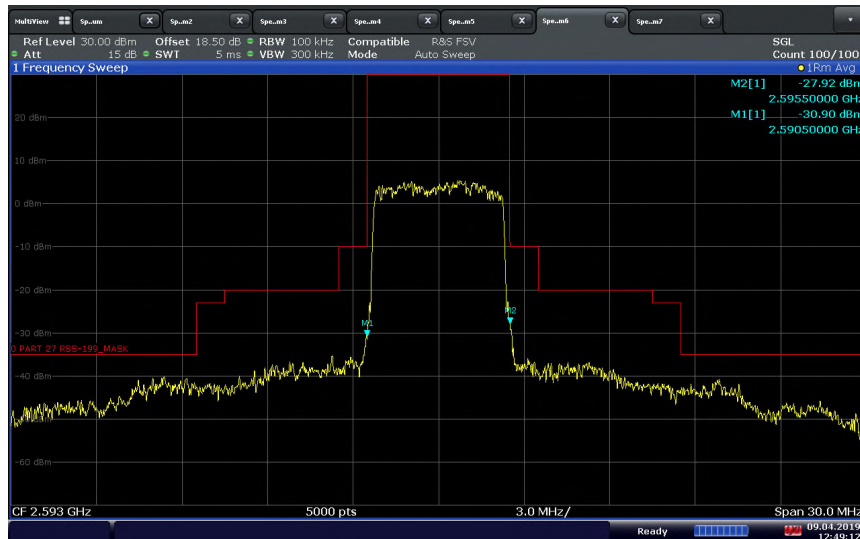
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LTE Band 41 (5 MHz BW)/QPSK/Middle Channel 2593 MHz



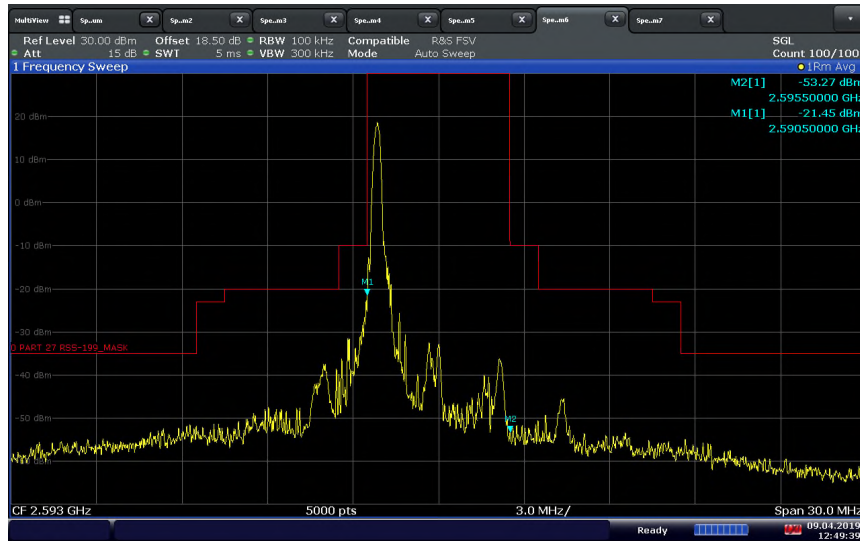
15:13:54 08.04.2019

LTE Band 41 (5 MHz BW)/QPSK/Middle Channel 2593 MHz Full RB Mask

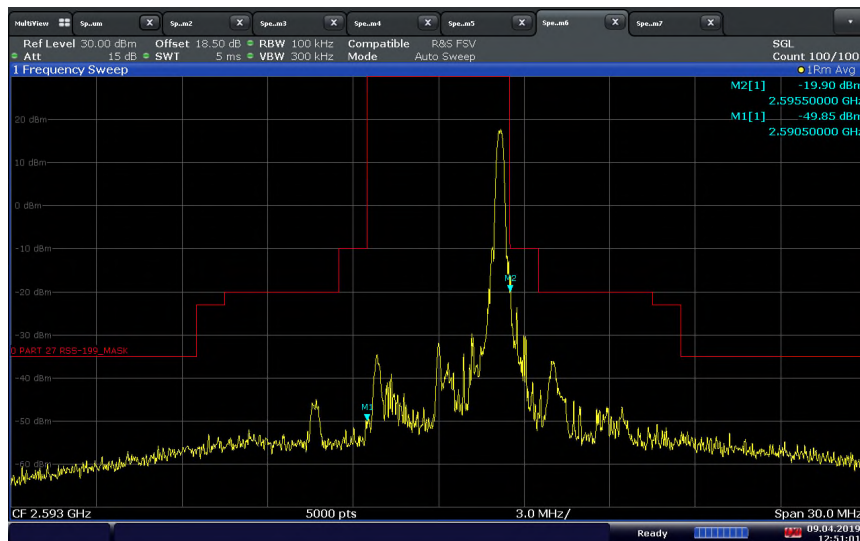


12:49:12 09.04.2019

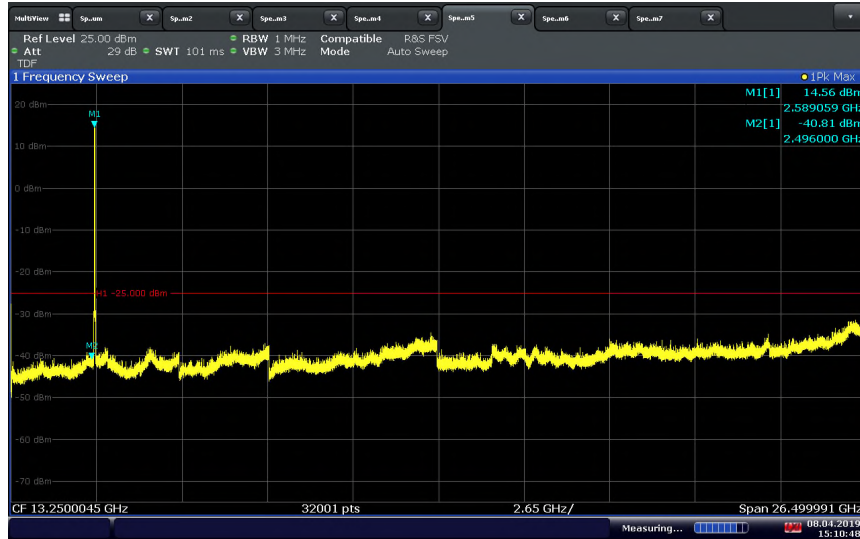
LTE Band 41 (5 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 0 offset Mask



LTE Band 41 (5 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 24 offset Mask

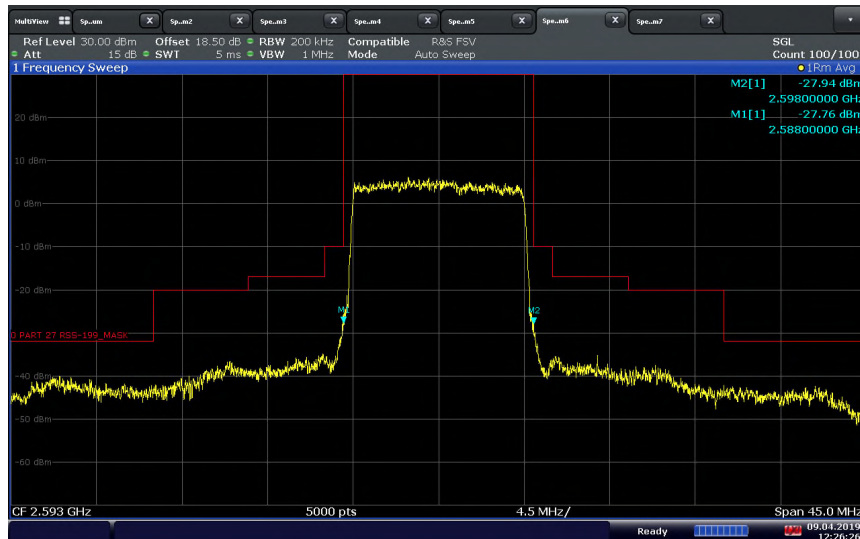


LTE Band 41 (10 MHz BW)/QPSK/Middle Channel 2593 MHz



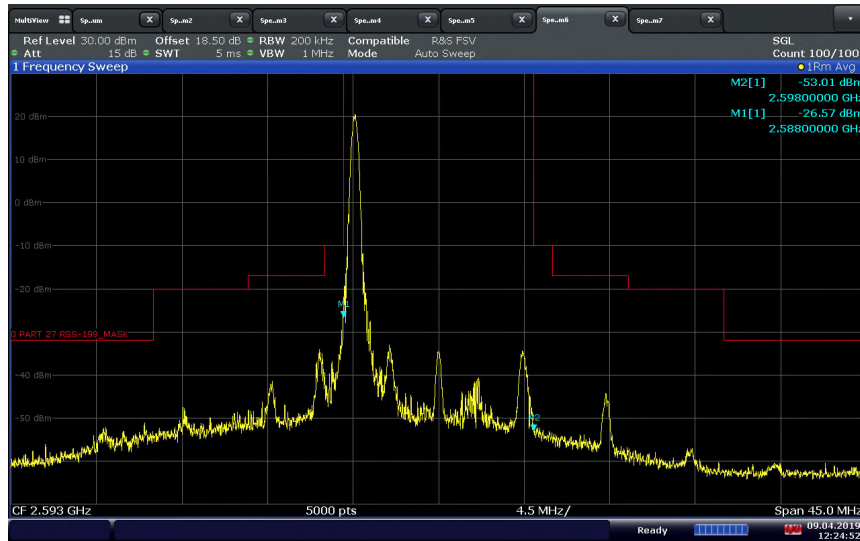
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LTE Band 41 (10 MHz BW)/QPSK/Middle Channel 2593 MHz Full RB Mask

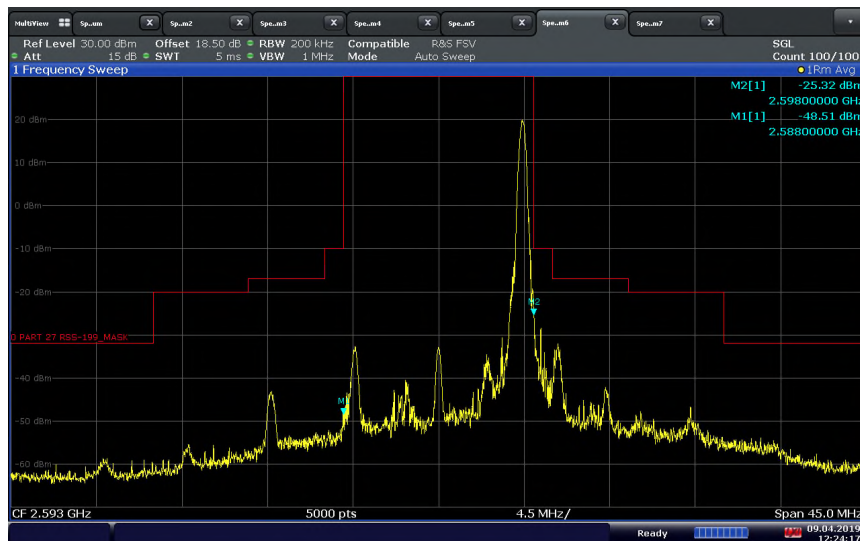


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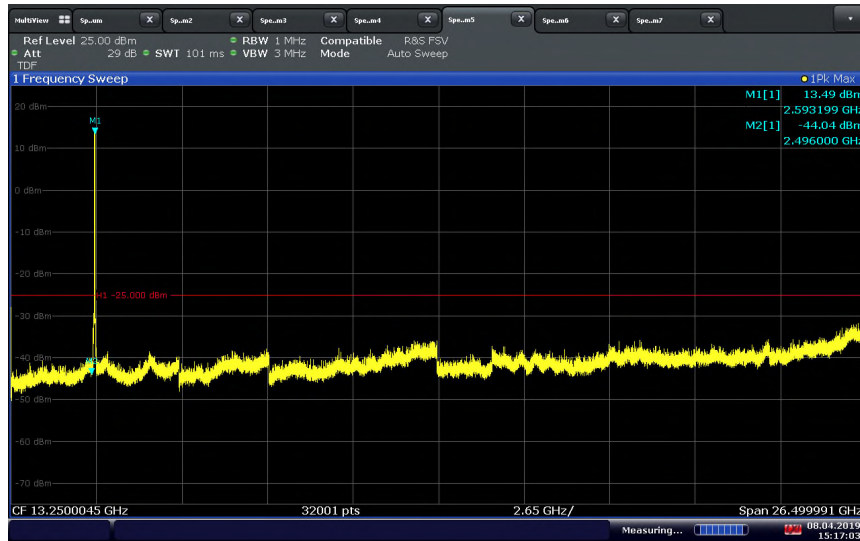
LTE Band 41 (10 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 0 offset Mask



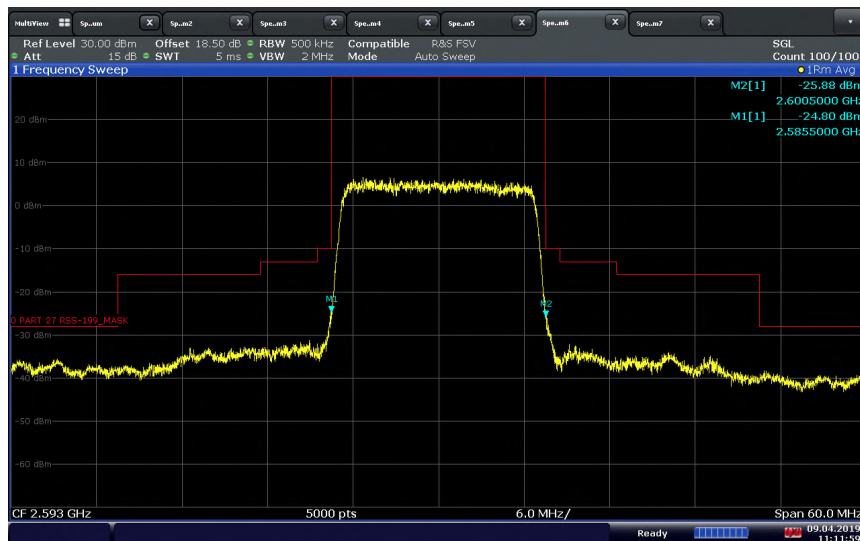
LTE Band 41 (10 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 49 offset Mask



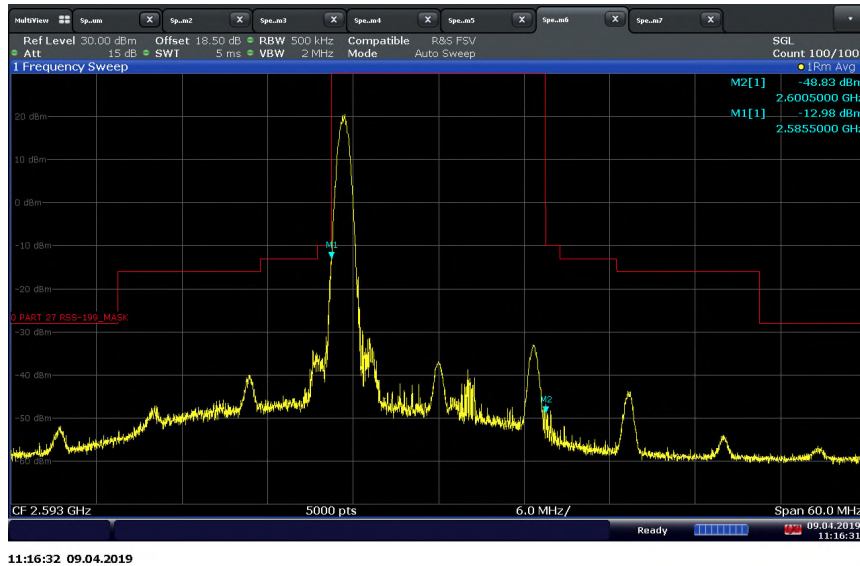
LTE Band 41 (15 MHz BW)/QPSK/Middle Channel 2593 MHz



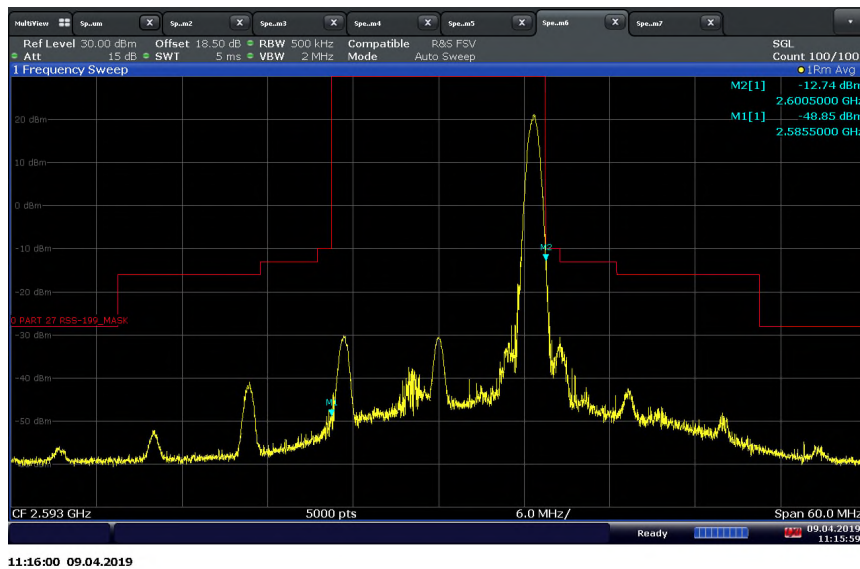
LTE Band 41 (15 MHz BW)/QPSK/Middle Channel 2593 MHz Full RB Mask



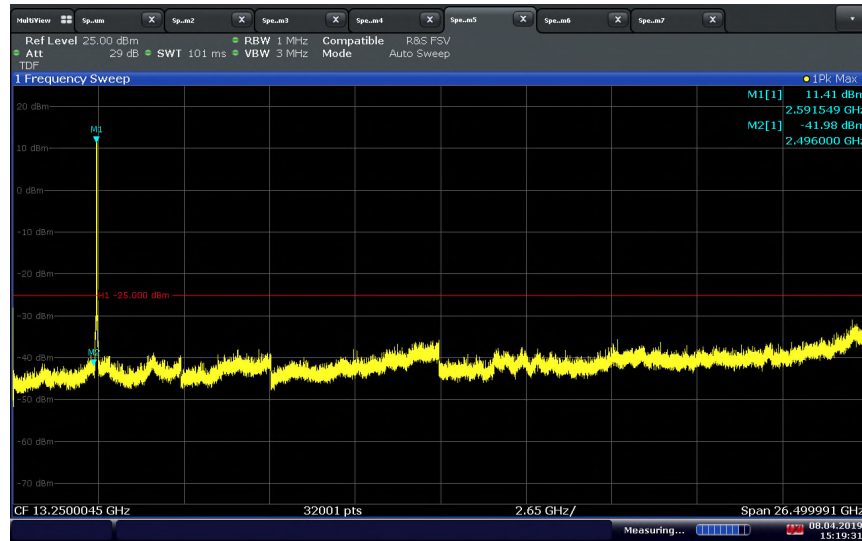
LTE Band 41 (15 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 0 offset Mask



LTE Band 41 (15 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 74 offset Mask

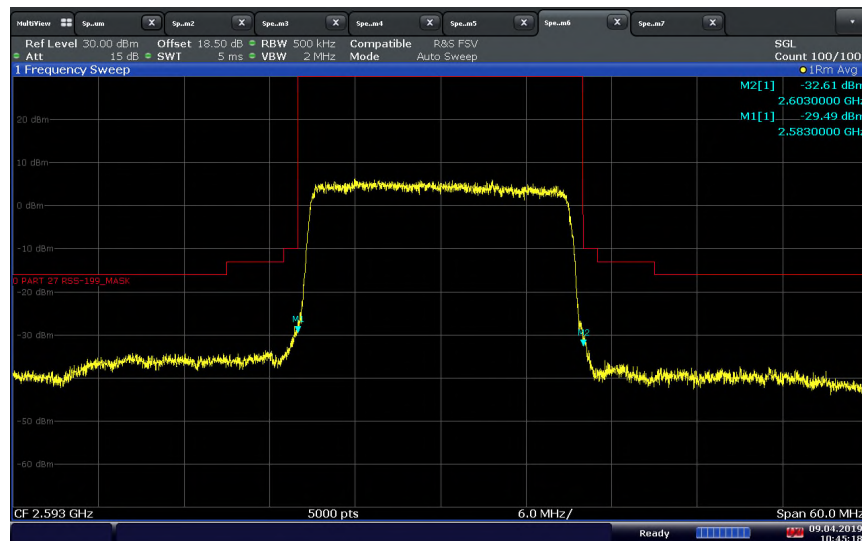


LTE Band 41 (20 MHz BW)/QPSK/Middle Channel 2593 MHz



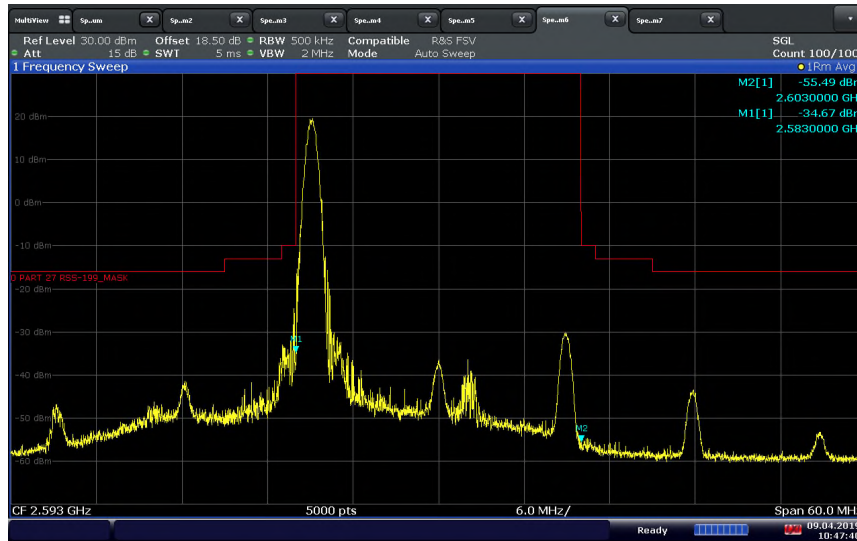
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LTE Band 41 (20 MHz BW)/QPSK/Middle Channel 2593 MHz Full RB Mask

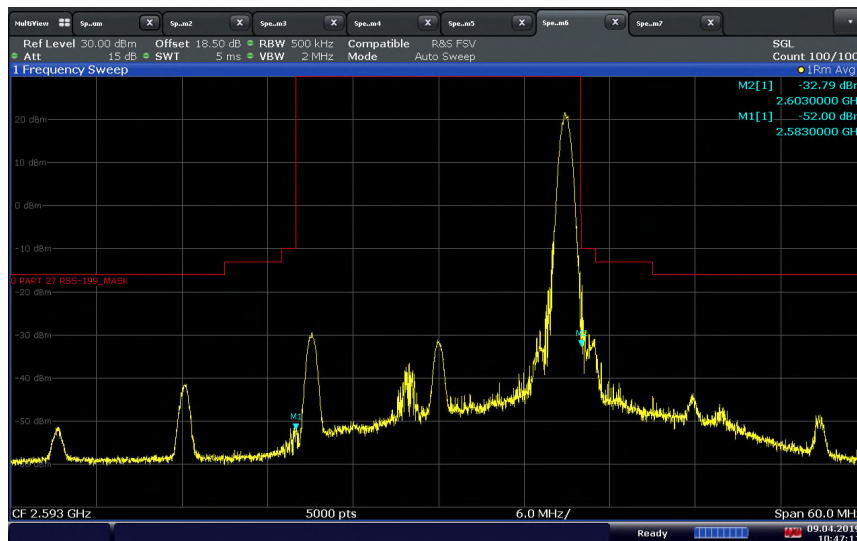


10:45:18 09.04.2019

LTE Band 41 (20 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 0 offset Mask



LTE Band 41 (20 MHz BW)/QPSK/Middle Channel 2593 MHz 1RB 99 offset Mask

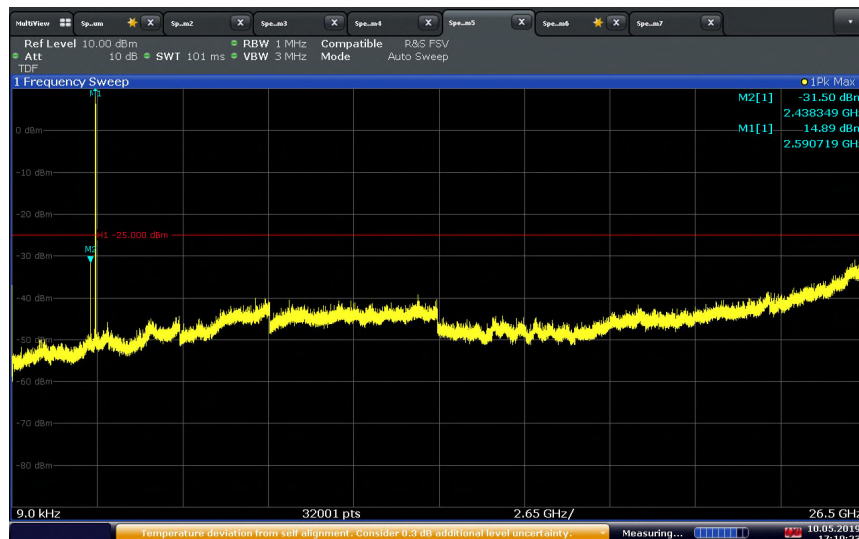


LTE Band 41C_10 MHz BW_2501.3 MHz 1RB49 + 15 MHz BW_2513.3 MHz 1RB0 /QPSK



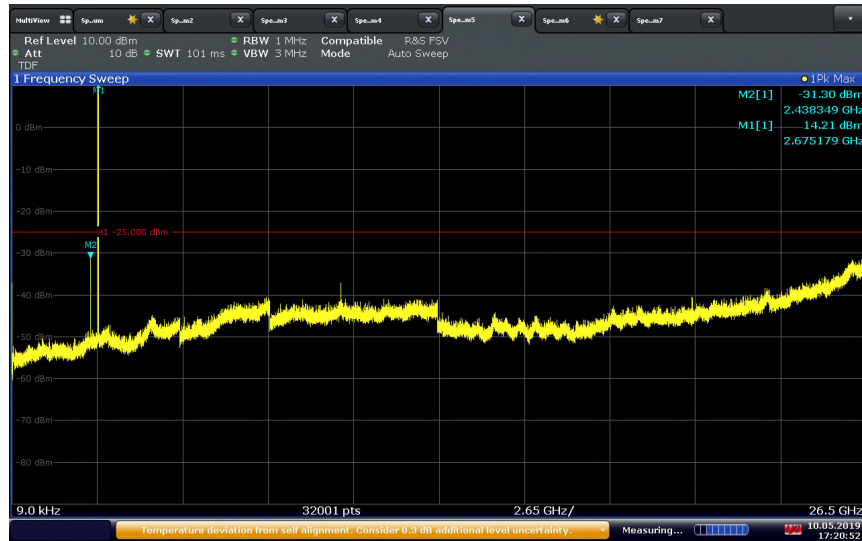
17:14:52 10.05.2019

LTE Band 41C_10 MHz BW_2585.9 MHz 1RB49 + 15 MHz BW_2597.9 MHz 1RB0 /QPSK

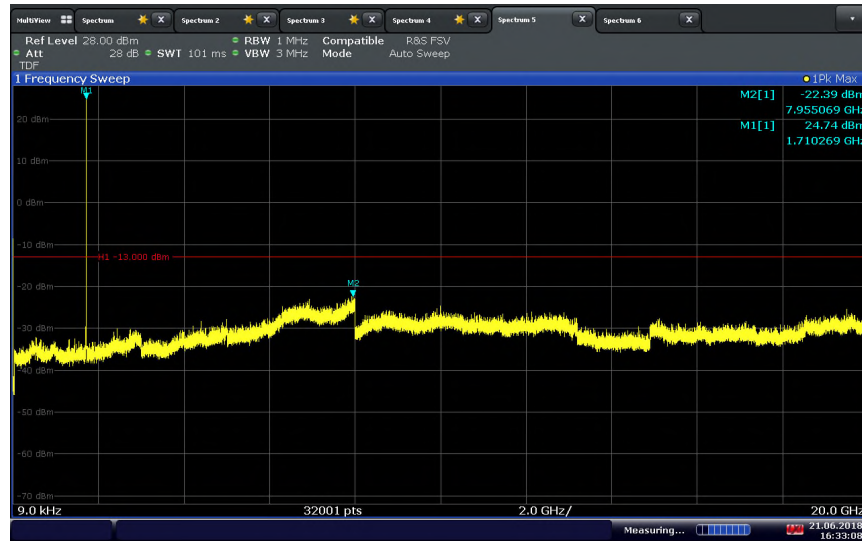


17:19:23 10.05.2019

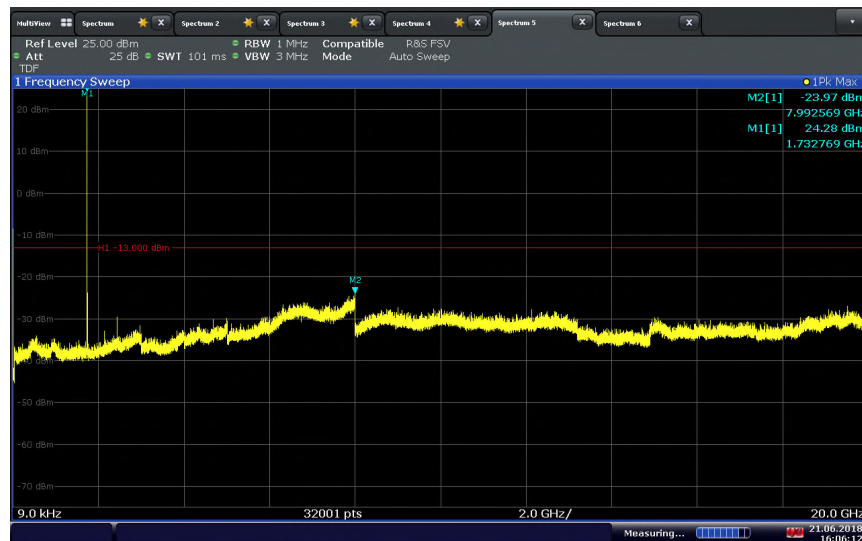
LTE Band 41C_10 MHz BW_2670.5 MHz 1RB49 + 15 MHz BW_2682.5 MHz 1RB0 /QPSK



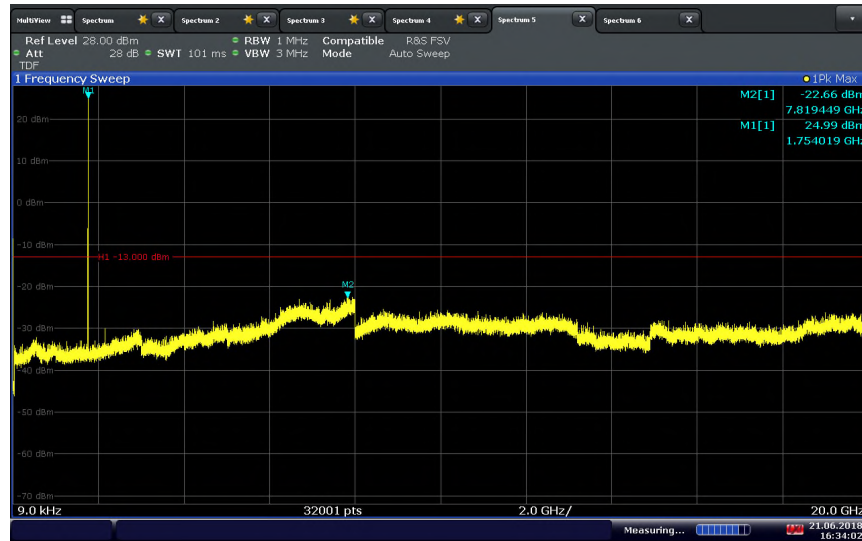
LTE Band 4 (1.4 MHz BW)/QPSK/Low Channel 1710.7 MHz



LTE Band 4 (1.4 MHz BW)/QPSK/Middle Channel 1732.5 MHz



LTE Band 4 (1.4 MHz BW)/QPSK/High Channel 1754.3 MHz

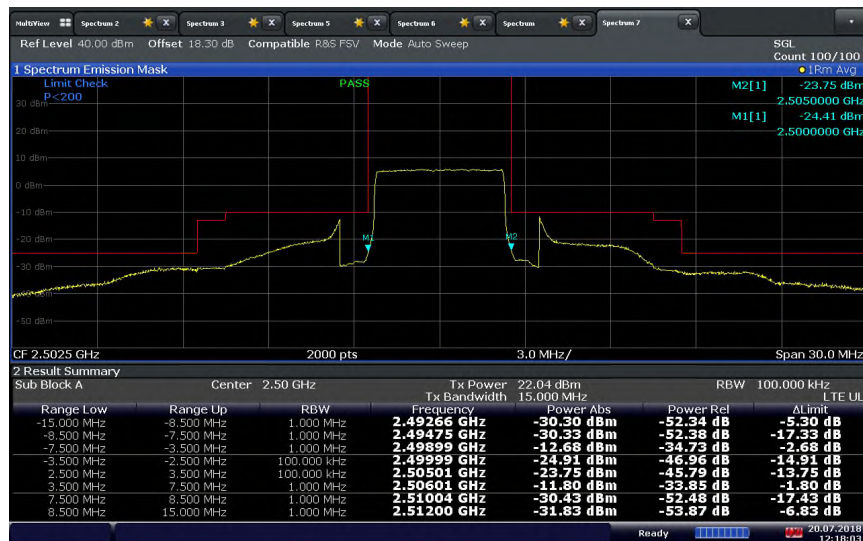


16:34:03 21.06.2018

LTE Band 7 (5 MHz BW)/QPSK/Low Channel 2502.5 MHz



LTE Band 7 (5 MHz BW)/QPSK/Low Channel 2502.5 MHz Mask

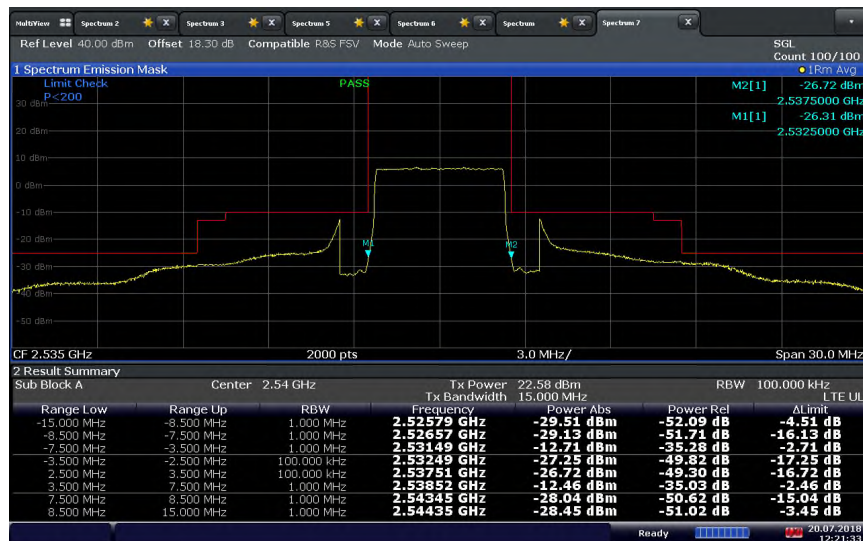


LTE Band 7 (5 MHz BW)/QPSK/Middle Channel 2535 MHz



10:04:08 20.07.2018

LTE Band 7 (5 MHz BW)/QPSK/Middle Channel 2535 MHz Mask



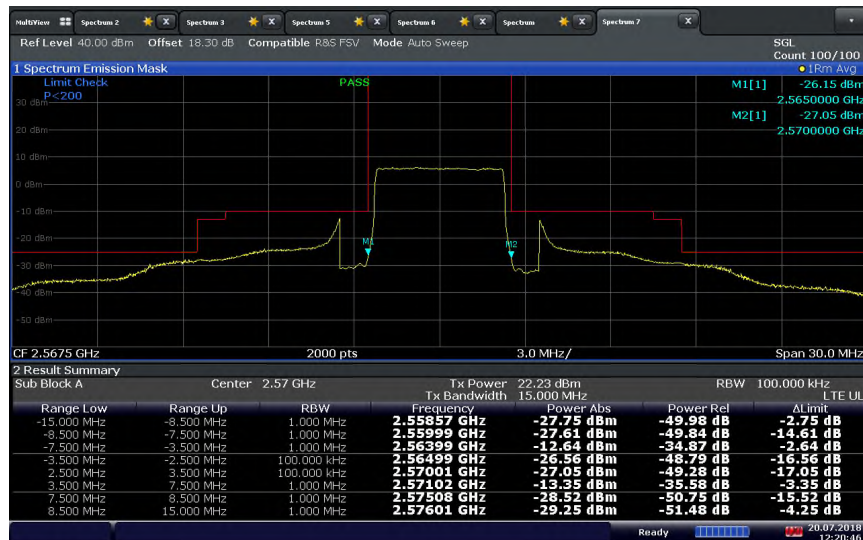
12:21:34 20.07.2018

LTE Band 7 (5 MHz BW)/QPSK/High Channel 2567.5 MHz



10:02:10 20.07.2018

LTE Band 7 (5 MHz BW)/QPSK/High Channel 2567.5 MHz Mask



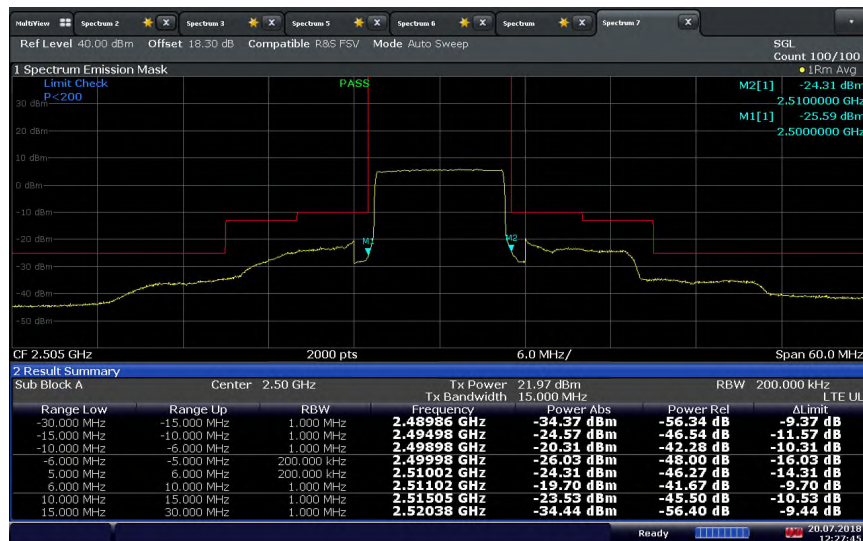
12:20:46 20.07.2018

LTE Band 7 (10 MHz BW)/QPSK/Low Channel 2505 MHz



10:07:24 20.07.2018

LTE Band 7 (10 MHz BW)/QPSK/Low Channel 2505 MHz Mask



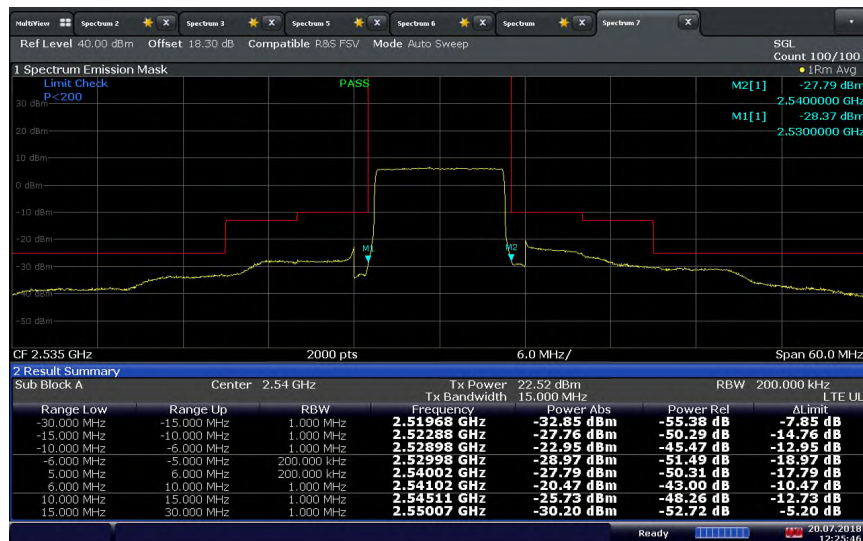
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LTE Band 7 (10 MHz BW)/QPSK/Middle Channel 2535 MHz



10:13:49 20.07.2018

LTE Band 7 (10 MHz BW)/QPSK/Middle Channel 2535 MHz



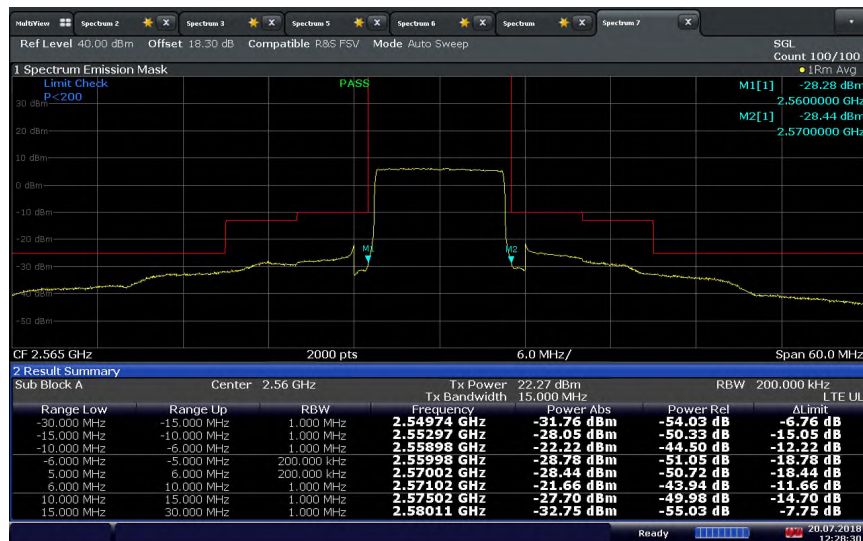
12:25:46 20.07.2018

LTE Band 7 (10 MHz BW)/QPSK/High Channel 2565 MHz



10:12:52 20.07.2018

LTE Band 7 (10 MHz BW)/QPSK/High Channel 2565 MHz



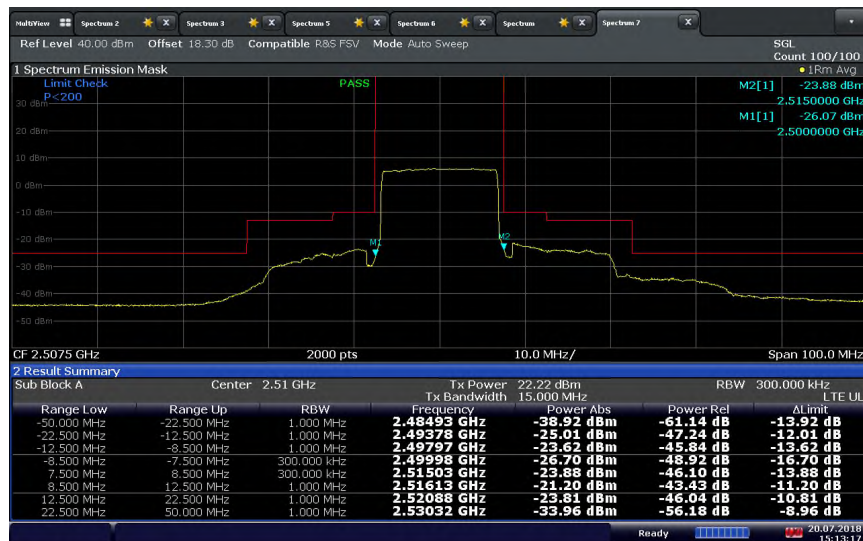
12:28:30 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/Low Channel 2507.5 MHz



10:18:24 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/Low Channel 2507.5 MHz Mask



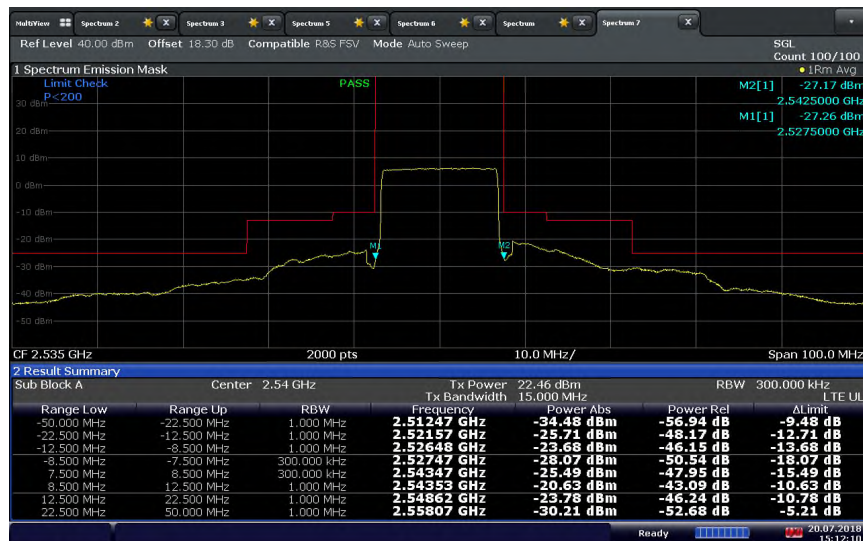
15:13:17 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/Middle Channel 2535 MHz



10:15:14 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/Middle Channel 2535 MHz Mask



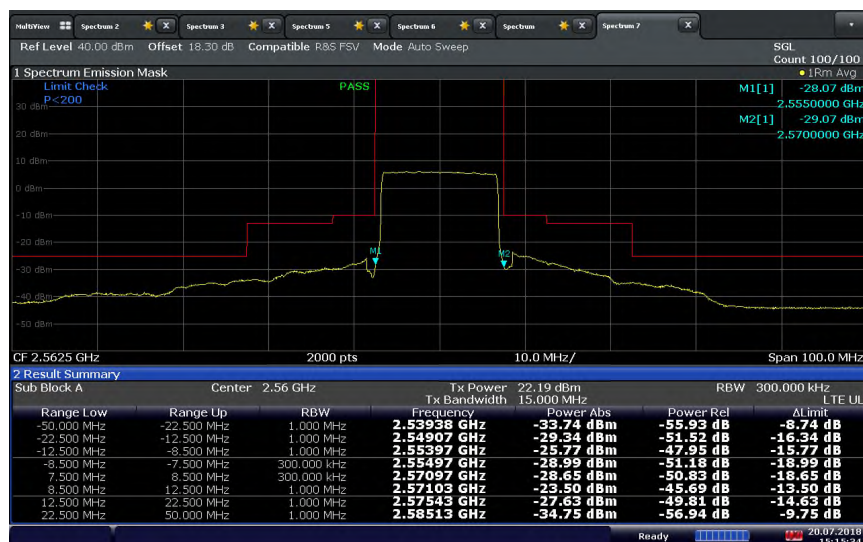
15:12:10 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/High Channel 2562.5 MHz



10:30:27 20.07.2018

LTE Band 7 (15 MHz BW)/QPSK/High Channel 2562.5 MHz Mask



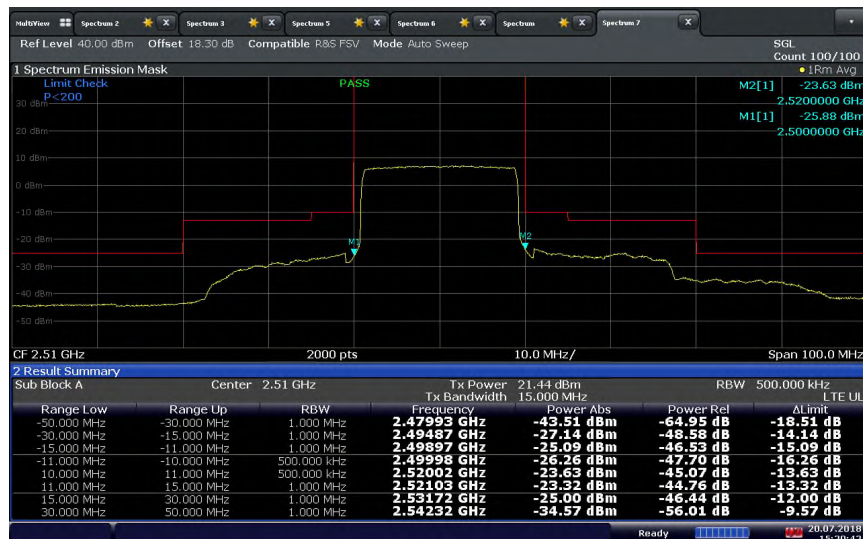
15:15:35 20.07.2018

LTE Band 7 (20 MHz BW)/QPSK/Low Channel 2510 MHz



10:36:08 20.07.2018

LTE Band 7 (20 MHz BW)/QPSK/Low Channel 2510 MHz Mask



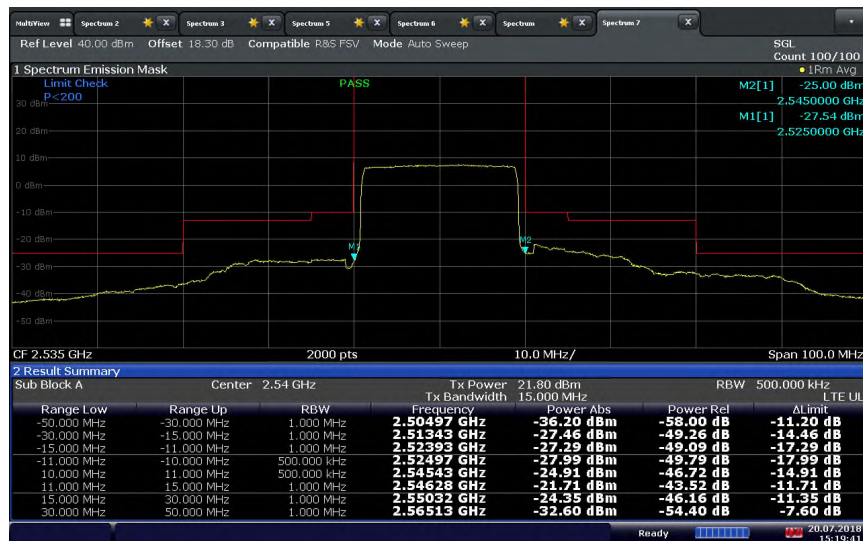
15:20:43 20.07.2018

LTE Band 7 (20 MHz BW)/QPSK/Middle Channel 2535 MHz Mask



10:32:53 20.07.2018

LTE Band 7 (20 MHz BW)/QPSK/Middle Channel 2535 MHz Mask



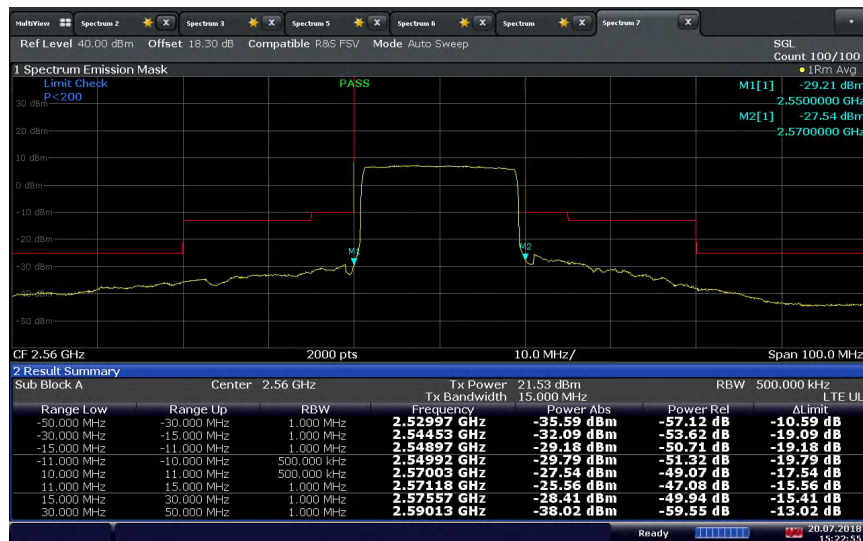
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LTE Band 7 (20 MHz BW)/QPSK/High Channel 2560 MHz



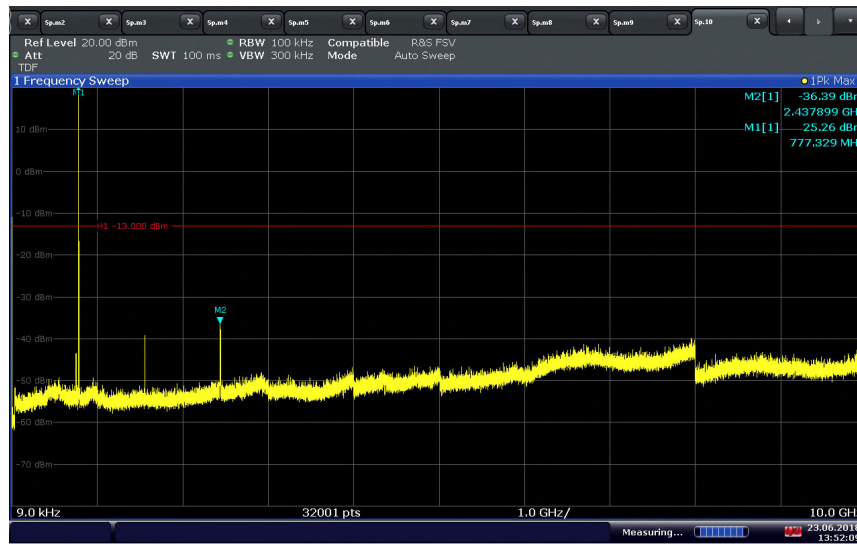
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LTE Band 7 (20 MHz BW)/QPSK/High Channel 2560 MHz Mask



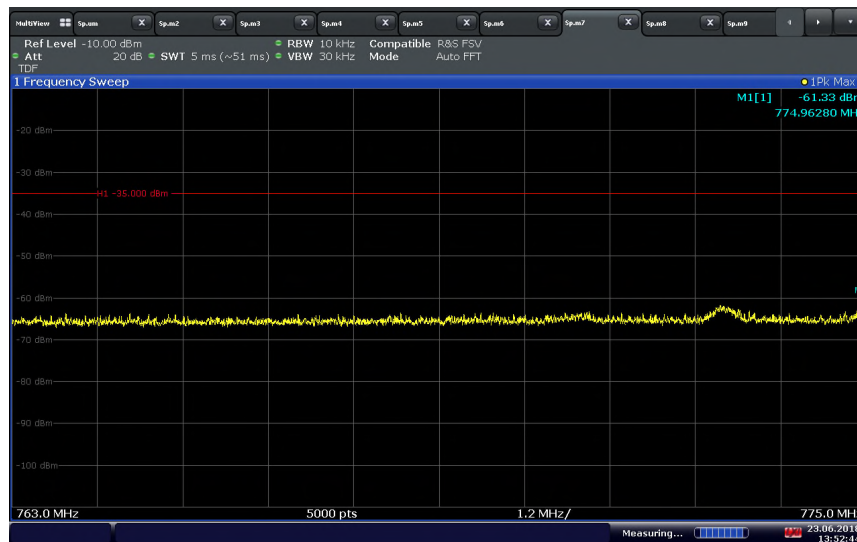
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LTE Band 13 (5 MHz BW)/QPSK/Low Channel 779.5 MHz



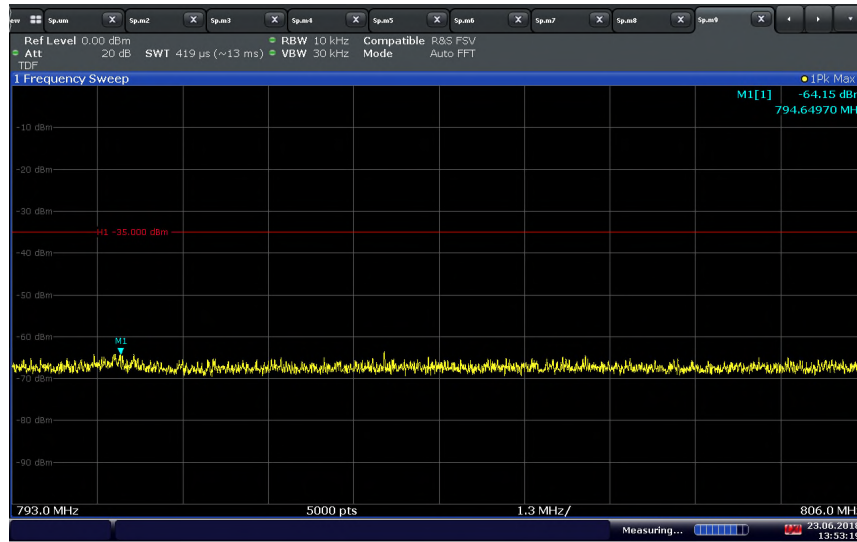
13:52:10 23.06.2018

LTE Band 13 (5 MHz BW)/QPSK/Low Channel 779.5 MHz Conducted Spurious Emissions (763-775 MHz)

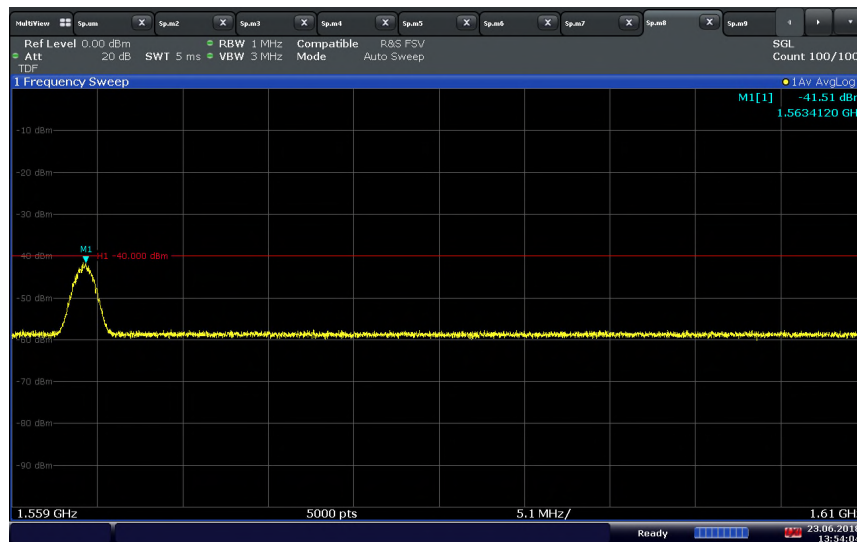


13:52:44 23.06.2018

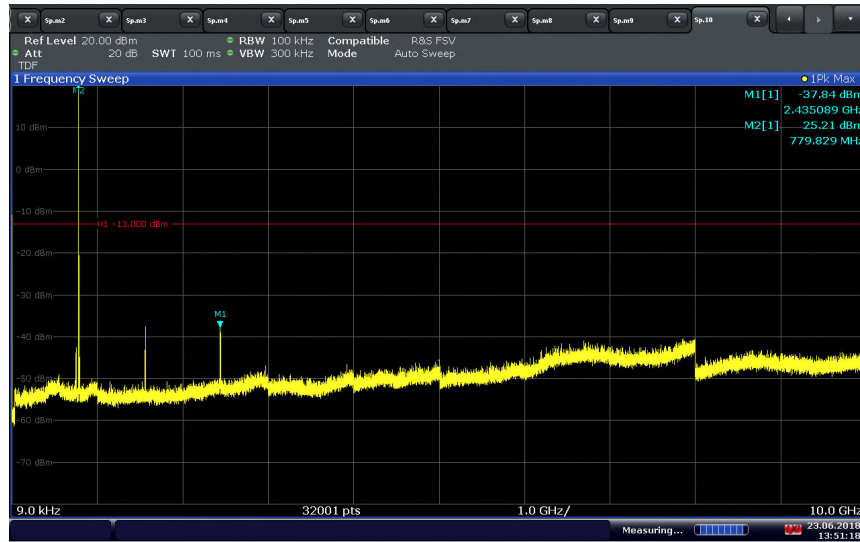
LTE Band 13 (5 MHz BW)/QPSK/Low Channel 779.5 MHz Conducted Spurious Emissions (793-806 MHz)



LTE Band 13 (5 MHz BW)/QPSK/Low Channel 779.5 MHz Conducted Spurious Emissions (1559-1610 MHz)

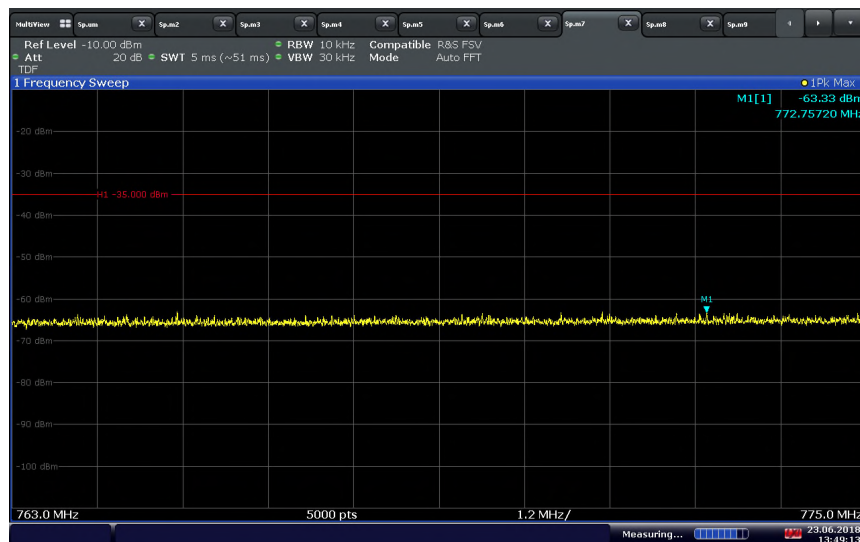


LTE Band 13 (5 MHz BW)/QPSK/Middle Channel 782 MHz



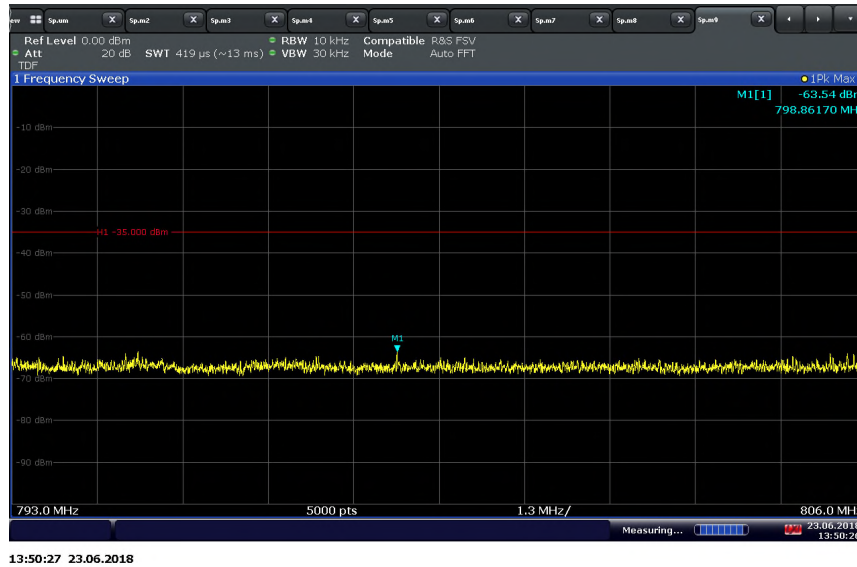
13:51:18 23.06.2018

LTE Band 13 (5 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (763-775 MHz)

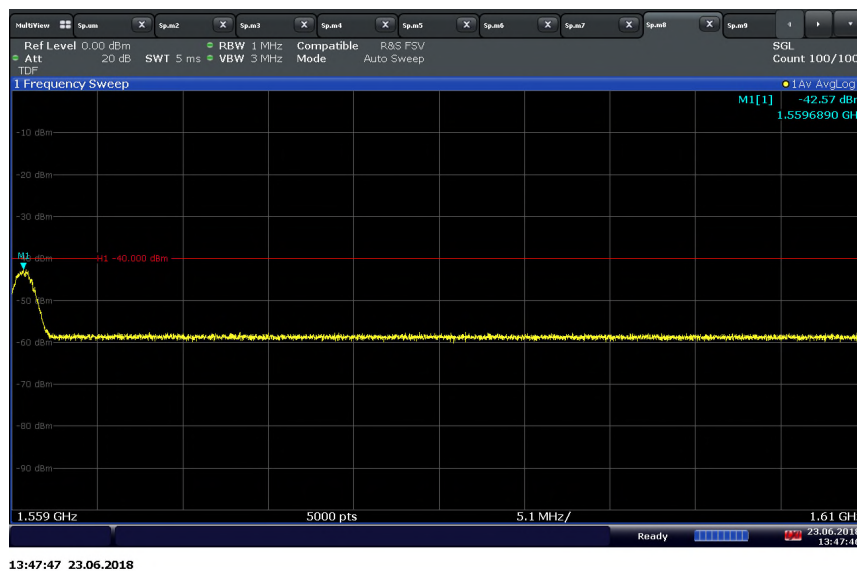


13:49:13 23.06.2018

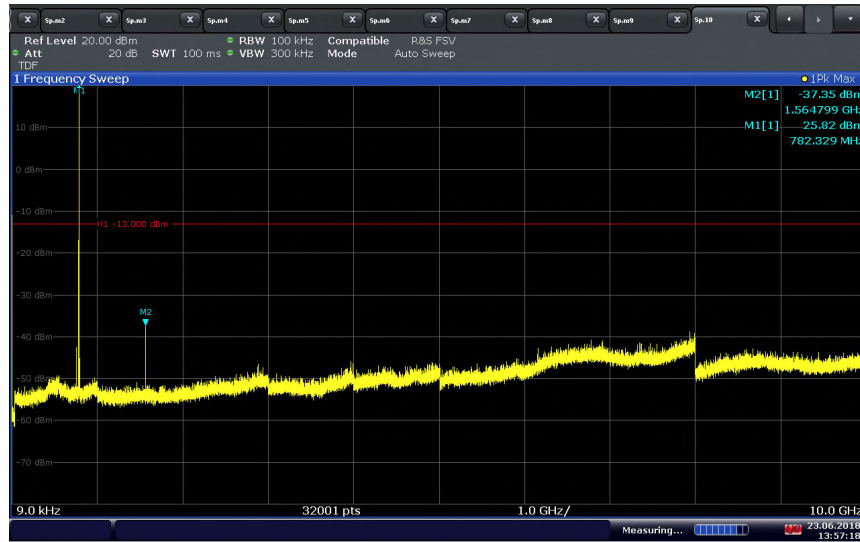
LTE Band 13 (5 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (793-806 MHz)



LTE Band 13 (5 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (1559-1610 MHz)

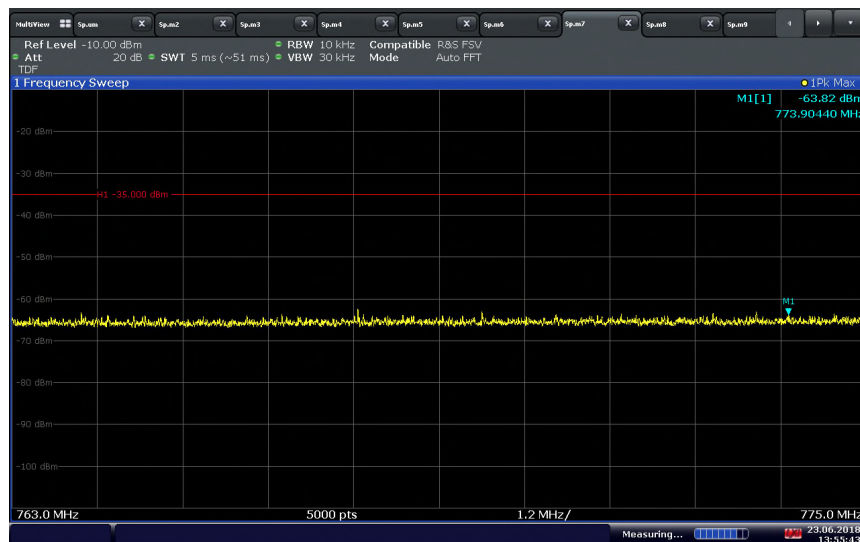


LTE Band 13 (5 MHz BW)/QPSK/High Channel 784.5 MHz



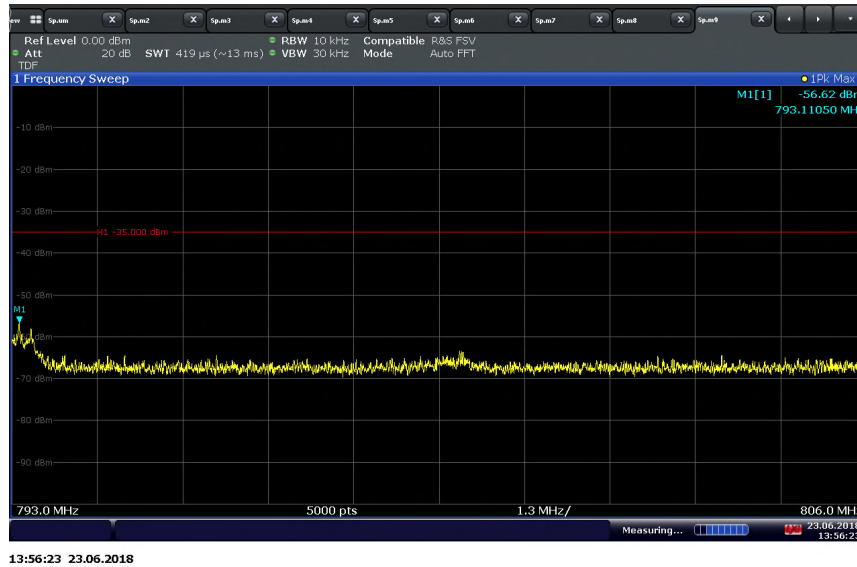
13:57:19 23.06.2018

LTE Band 13 (5 MHz BW)/QPSK/High Channel 784.5 MHz Conducted Spurious Emissions (763-775 MHz)

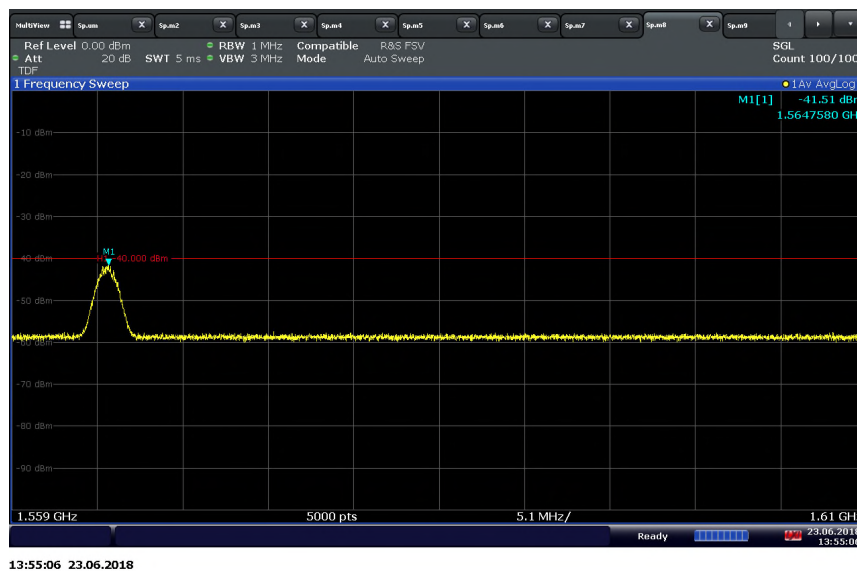


13:55:44 23.06.2018

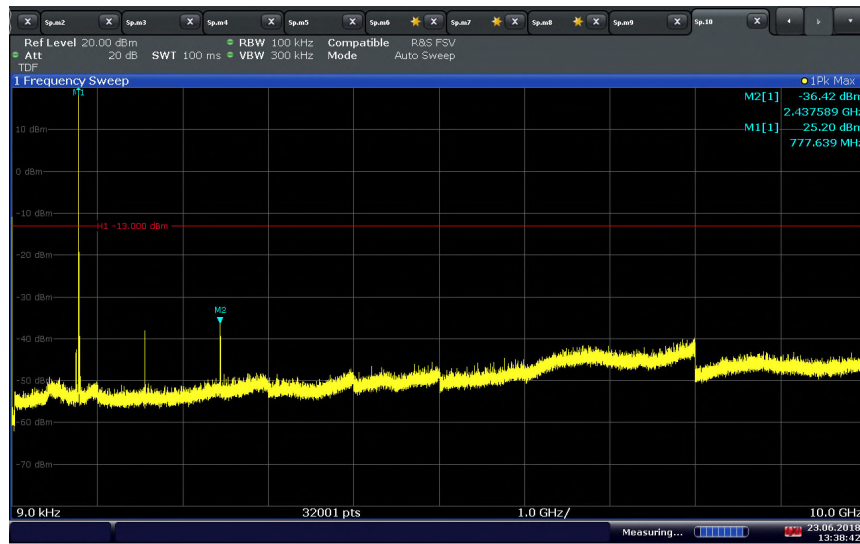
LTE Band 13 (5 MHz BW)/QPSK/High Channel 784.5 MHz Conducted Spurious Emissions (793-806 MHz)



LTE Band 13 (5 MHz BW)/QPSK/High Channel 784.5 MHz Conducted Spurious Emissions (1559-1610 MHz)

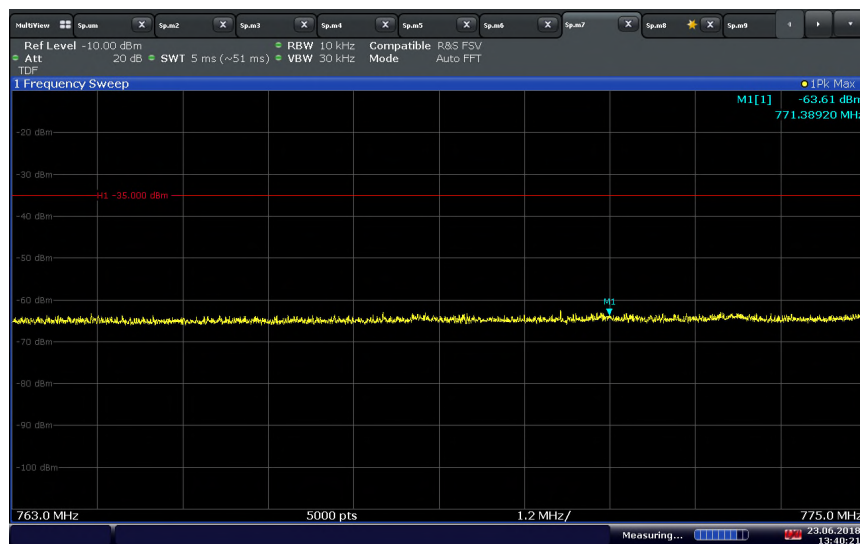


LTE Band 13 (10 MHz BW)/QPSK/Middle Channel 782 MHz



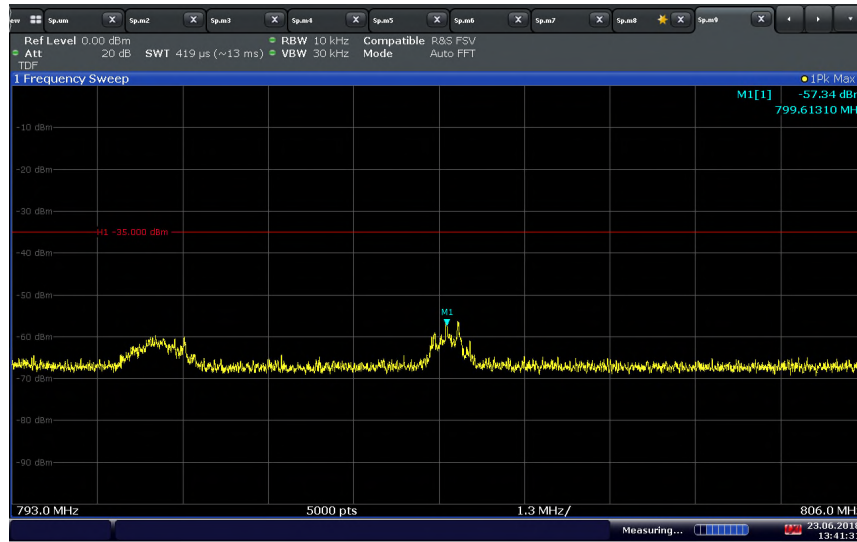
13:38:42 23.06.2018

LTE Band 13 (10 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (763-775 MHz)



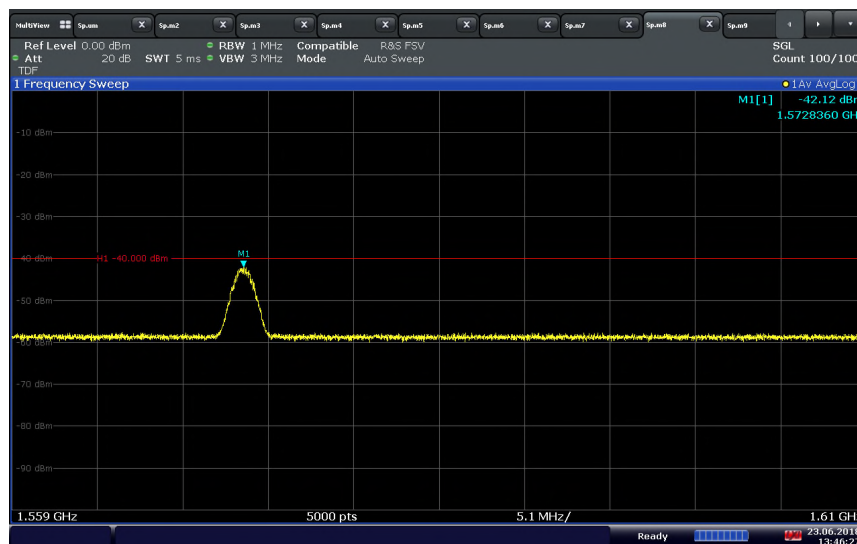
13:40:22 23.06.2018

LTE Band 13 (10 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (793-806 MHz)



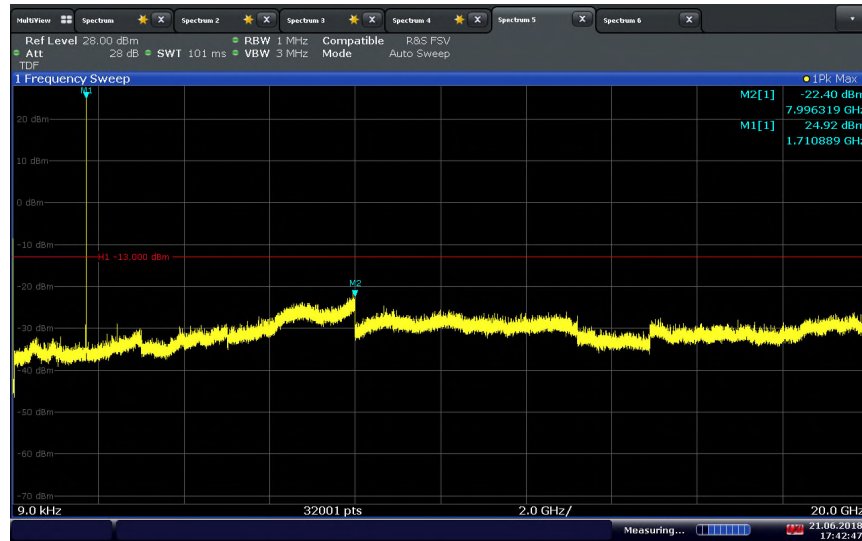
13:41:32 23.06.2018

LTE Band 13 (10 MHz BW)/QPSK/Middle Channel 782 MHz Conducted Spurious Emissions (1559-1610 MHz)



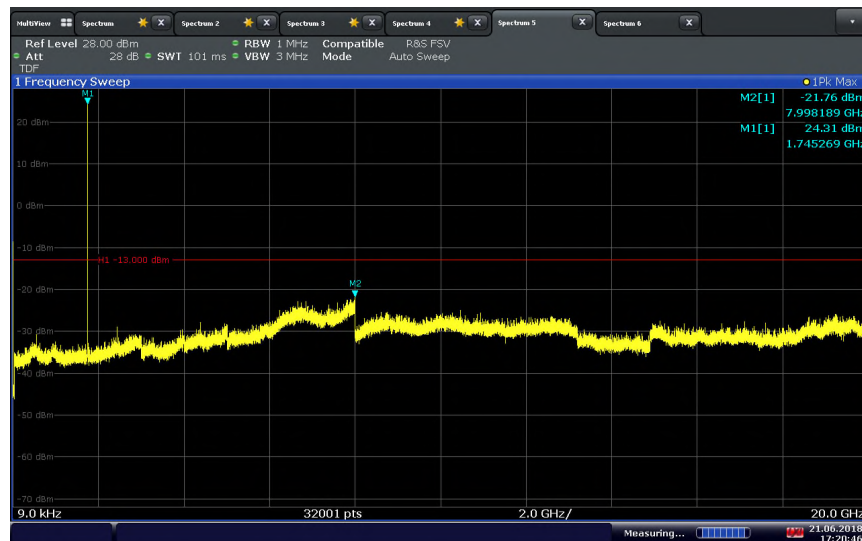
13:46:28 23.06.2018

LTE Band 66 (1.4 MHz BW)/QPSK/Low Channel 1710.7 MHz



17:42:48 21.06.2018

LTE Band 66 (1.4 MHz BW)/QPSK/Middle Channel 1745 MHz



17:20:46 21.06.2018

LTE Band 66 (1.4 MHz BW)/QPSK/High Channel 1779.3 MHz

