2.5 BAND EDGE

2.5.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(m)(2) and (4)
FCC 47 CFR Part 90, Clause 90.691(a)
RSS-199, Clause 4.5

2.5.2 Standard Applicable

FCC 47 CFR Part 27.53(m)(2):
(v) For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

(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 that 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.

FCC 47 CFR Part 90.691(a):
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

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 least 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. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emission limits:

(a) For base station and fixed 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 43 + 10 log10 p.

(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 log10 p from the channel edges to 5 MHz away
(ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
(iii) 55 + 10 log10 p at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.

In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.

2.5.3 Equipment Under Test and Modification State

Serial No: 370920000139 (NU) and 371929000156, 443935000064 (CU) / Test Configuration A and B

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

November 12, 27 and December 02, 2019 / XYZ

2.5.5 Test Equipment Used

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

2.5.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

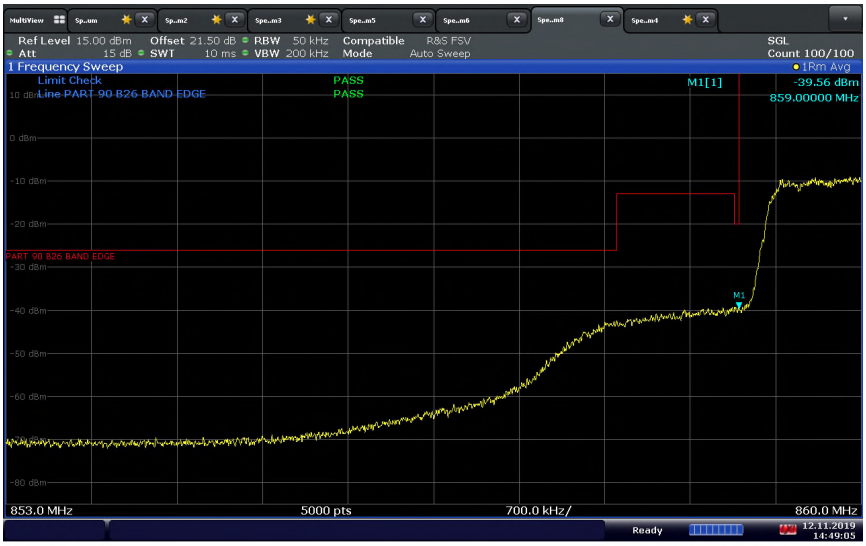
Ambient Temperature	23.4 - 24.8°C
Relative Humidity	36.8 - 44.7%
ATM Pressure	98.0 - 99.1kPa

2.5.7 Additional Observations

- This is a conducted test. Test guidance is per Section 6.1 of KDB971168 (D01 Power Meas License Digital Systems v03r01).
- The path loss was measured and entered as a level offset.
- RBW is set to 1% of Occupied Bandwidth and VBW is set to ≥3 x RBW. For emissions 1 MHz outside and adjacent to the channel edge, the limits are adjusted with the factor $10lg(RBW_{used}/1MHz)$.

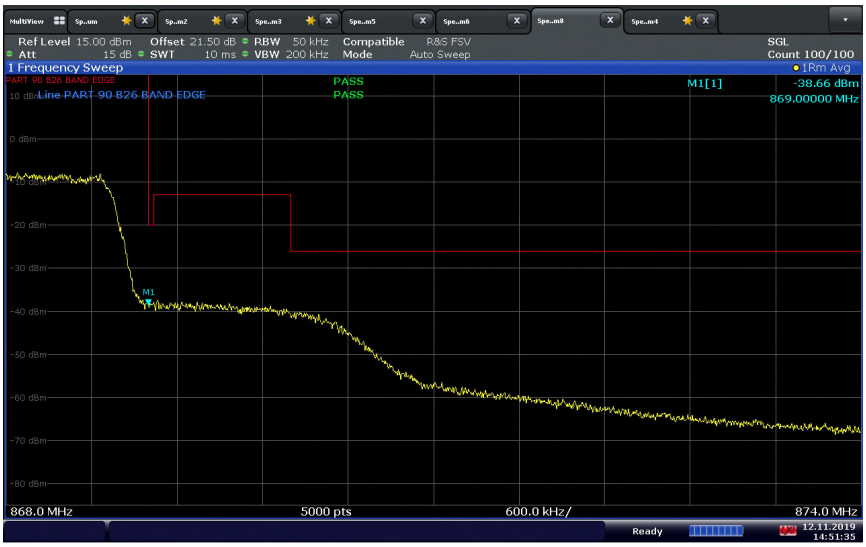
2.5.8 Test Results

LTE Band 26 (859 – 869 MHz) Downlink 5 MHz BW / Low Channel 861.5 MHz Low Band Edge @859 MHz

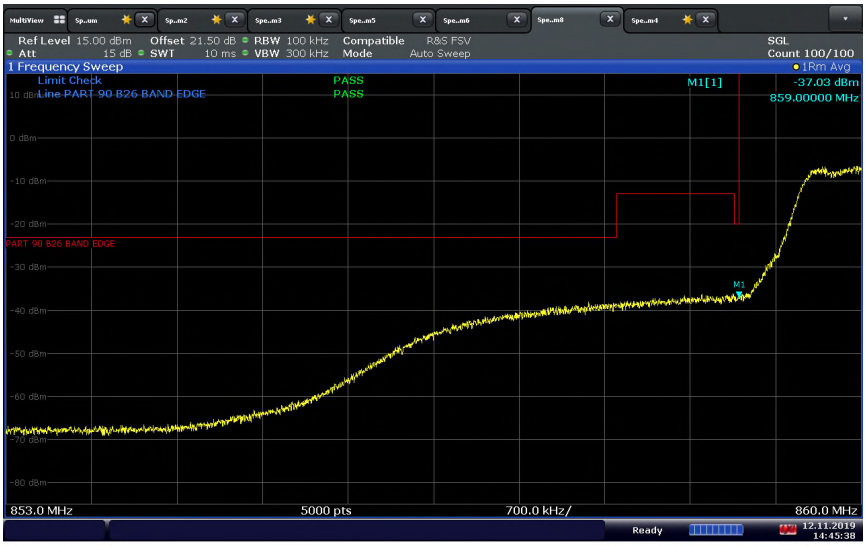


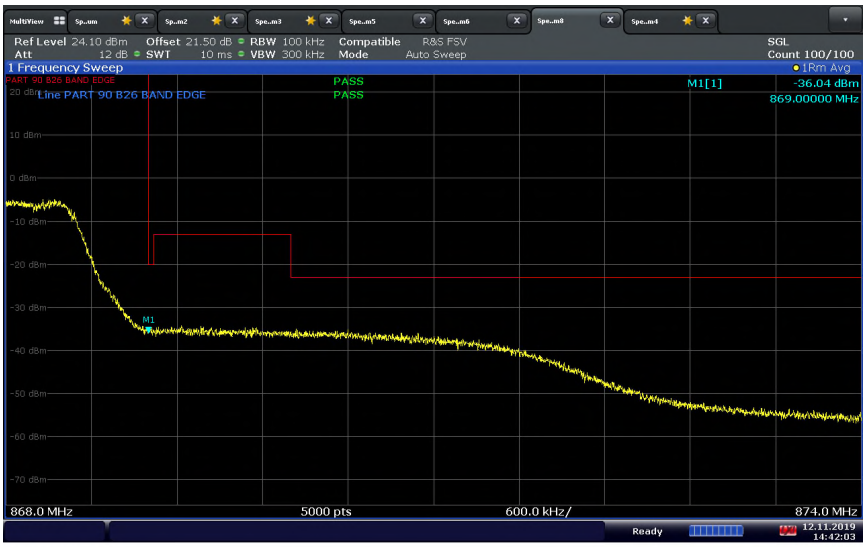
14:49:05 12.11.2019

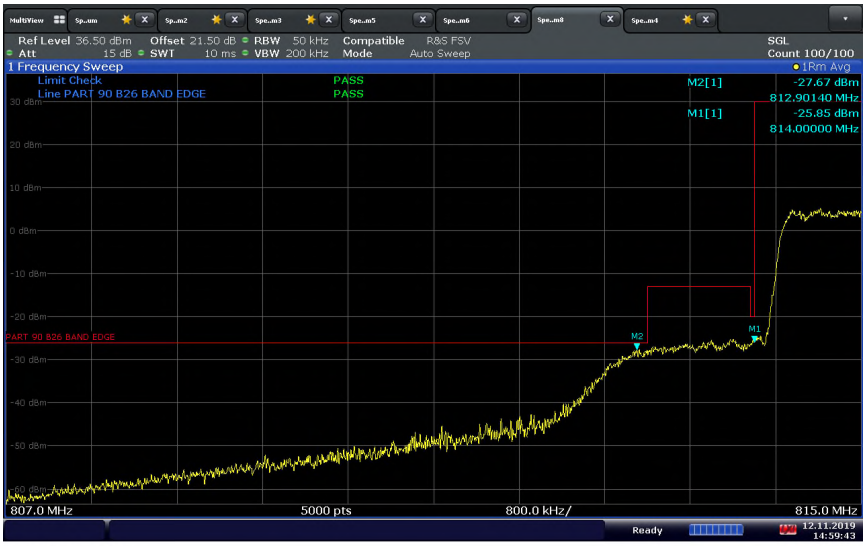
LTE Band 26 (859 – 869 MHz) Downlink 5 MHz BW / High Channel 866.5 MHz High Band Edge @869 MHz



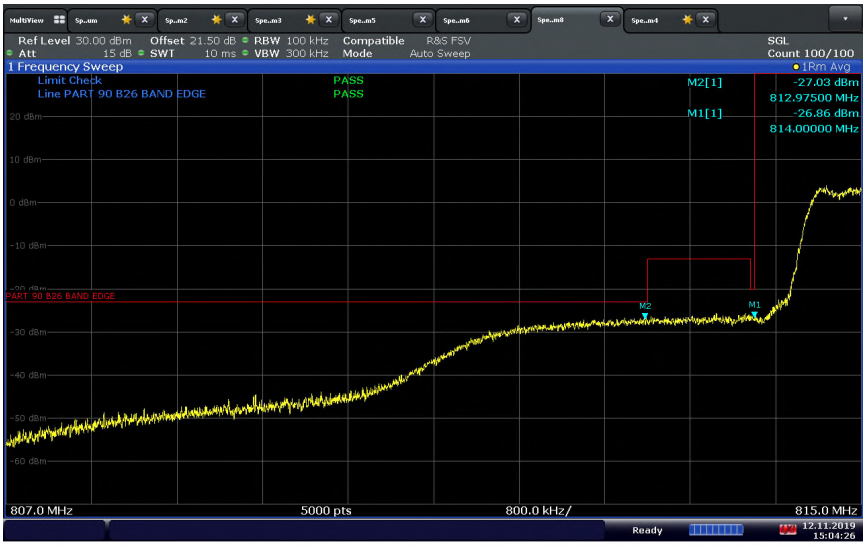
14:51:35 12.11.2019

LTE Band 26 (859 – 869 MHz) Downlink 10 MHz BW / Middle Channel 864 MHz Low Band Edge @859 MHz
 14:45:38 12.11.2019

LTE Band 26 (859 – 869 MHz) Downlink 10 MHz BW / Middle Channel 864 MHz High Band Edge @869 MHz
 14:42:04 12.11.2019

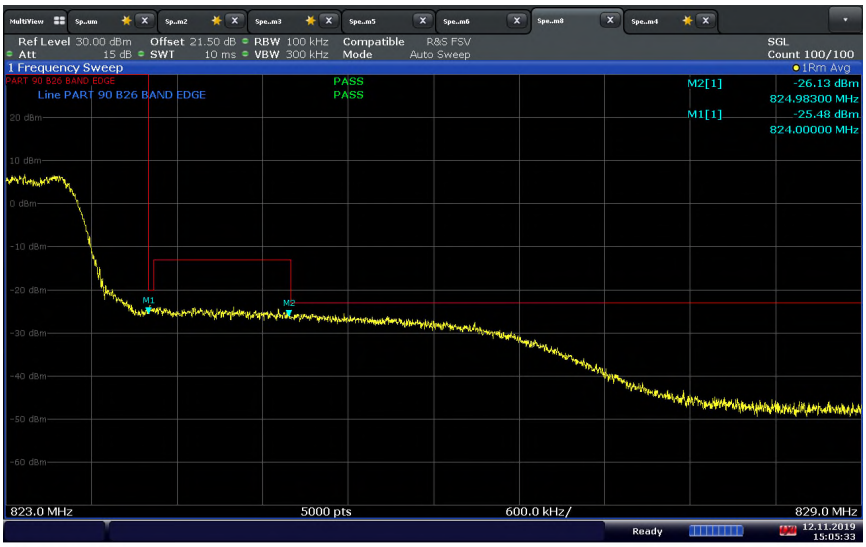
LTE Band 26 (814 – 824 MHz) Uplink 5 MHz BW / Low Channel 816.5 MHz Low Band Edge @814 MHz
 14:59:44 12.11.2019
LTE Band 26 (814 – 824 MHz) Uplink 5 MHz BW / Low Channel 821.5 MHz High Band Edge @869 MHz
 14:55:20 12.11.2019

LTE Band 26 (814 – 824 MHz) Uplink 10 MHz BW / Middle Channel 819 MHz Low Band Edge @814 MHz

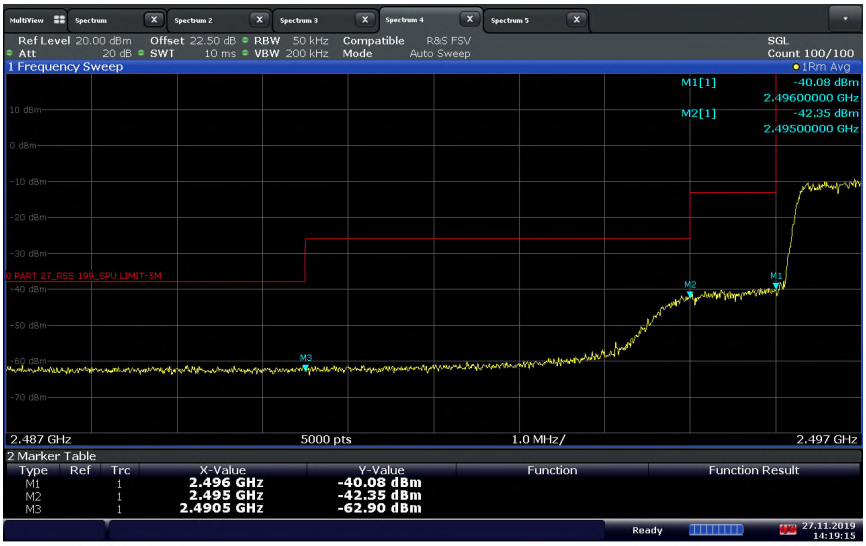


15:04:26 12.11.2019

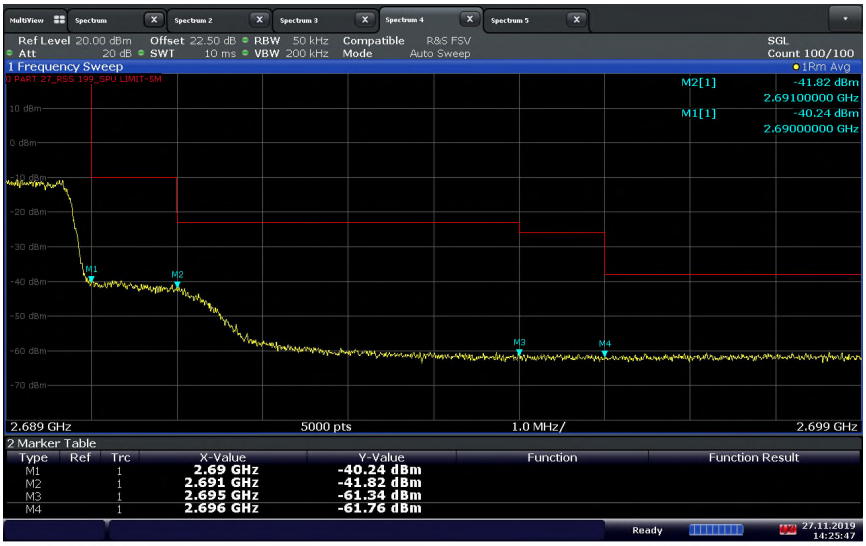
LTE Band 26 (814 – 824 MHz) Uplink 10 MHz BW / Middle Channel 819 MHz High Band Edge @824 MHz



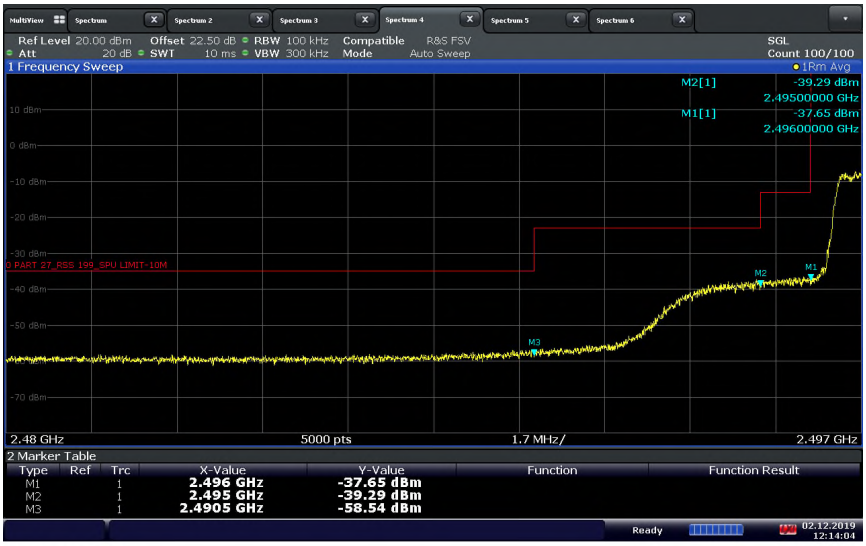
15:05:33 12.11.2019

LTE Band 41 Downlink 5 MHz BW / Low Channel 2498.5 MHz Low Band Edge @2496 MHz


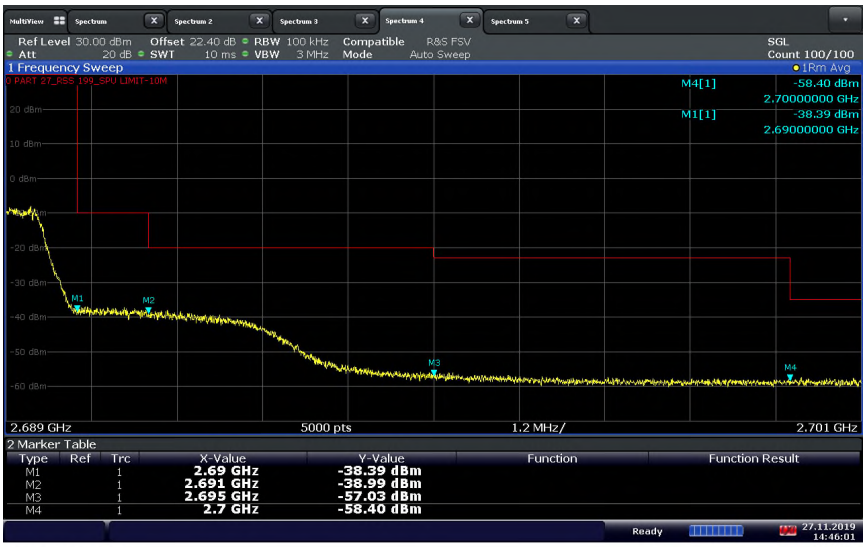
14:19:15 27.11.2019

LTE Band 41 Downlink 5 MHz BW / High Channel 2687.5 MHz High Band Edge @2690 MHz


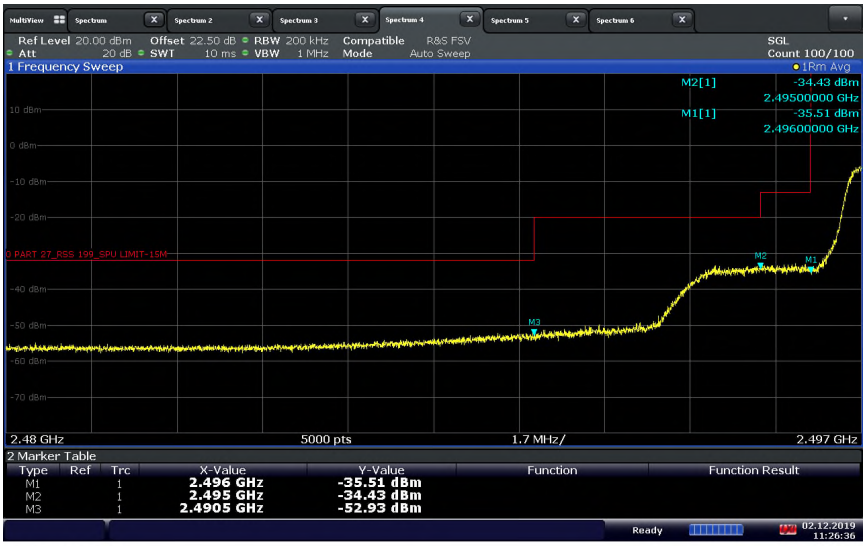
14:25:48 27.11.2019

LTE Band 41 Downlink 10 MHz BW / Low Channel 2501 MHz Low Band Edge @2496 MHz


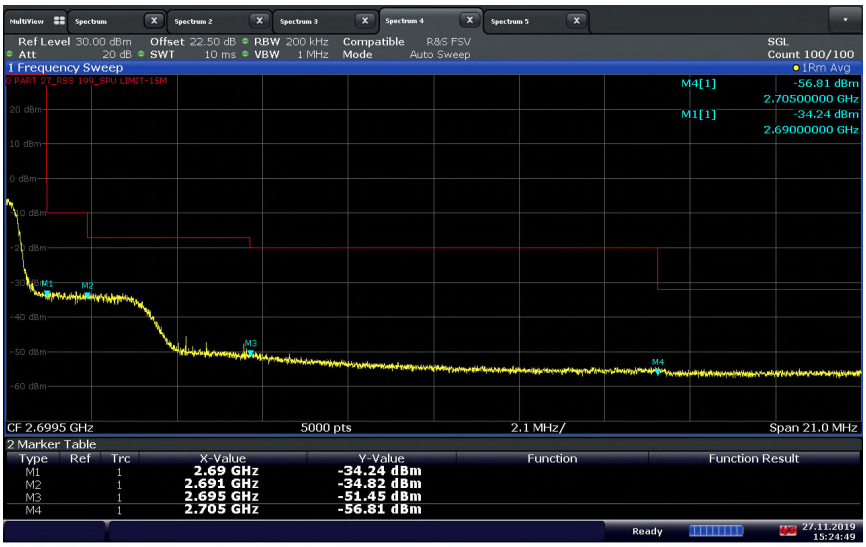
12:14:05 02.12.2019

LTE Band 41 Downlink 10 MHz BW / High Channel 2685 MHz High Band Edge @2690 MHz


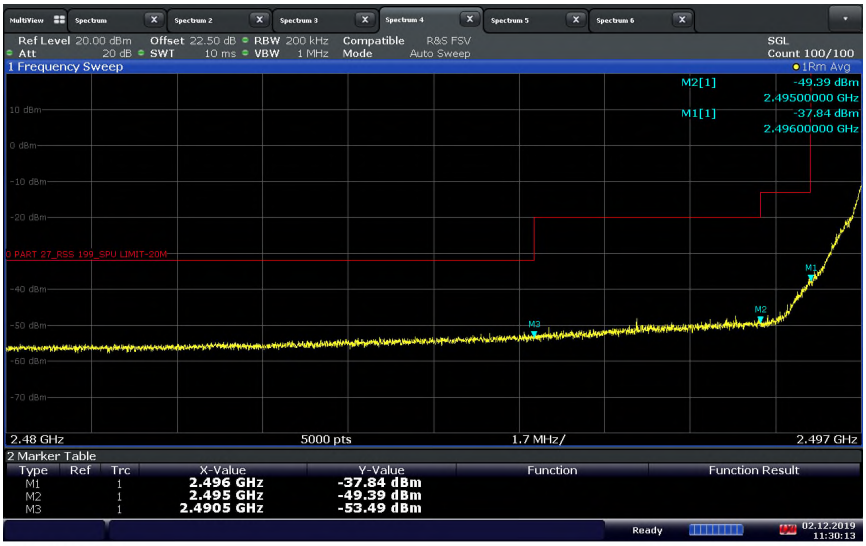
14:46:01 27.11.2019

LTE Band 41 Downlink 15 MHz BW / Low Channel 2503.5 MHz Low Band Edge @2496 MHz


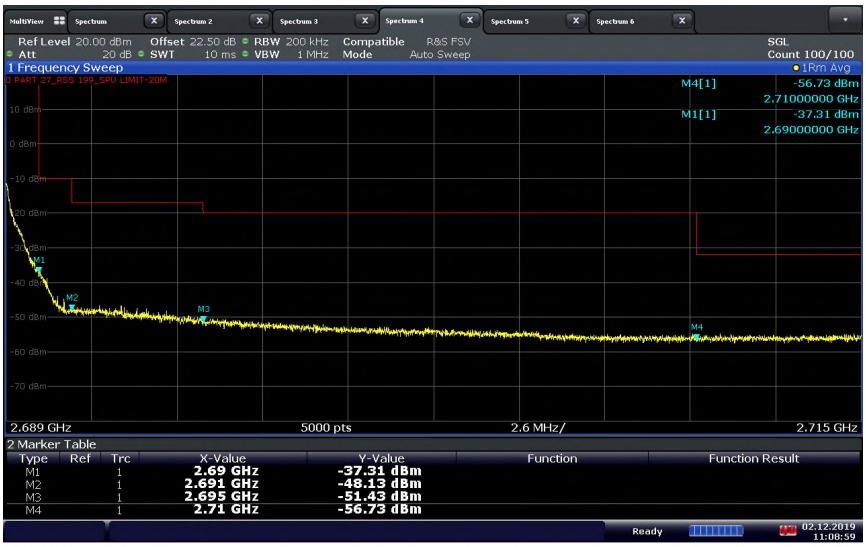
11:26:36 02.12.2019

LTE Band 41 Downlink 15 MHz BW / High Channel 2682.5 MHz High Band Edge @2690 MHz


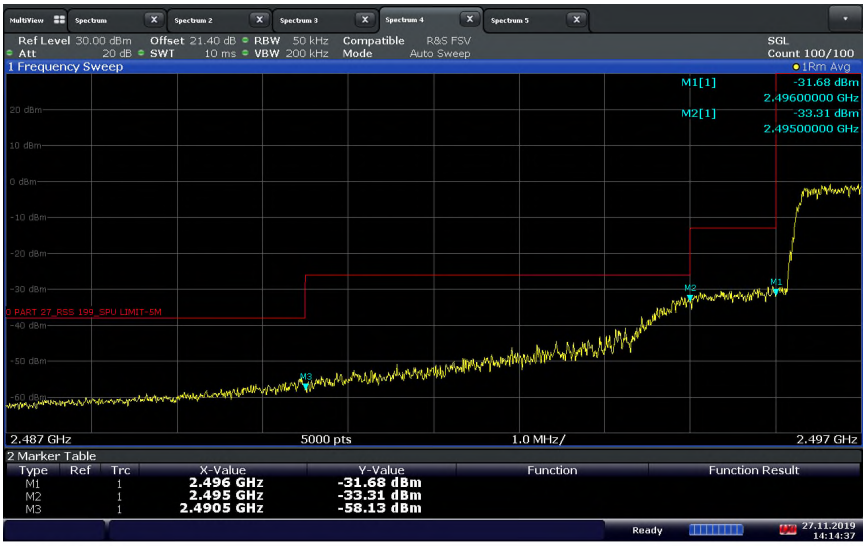
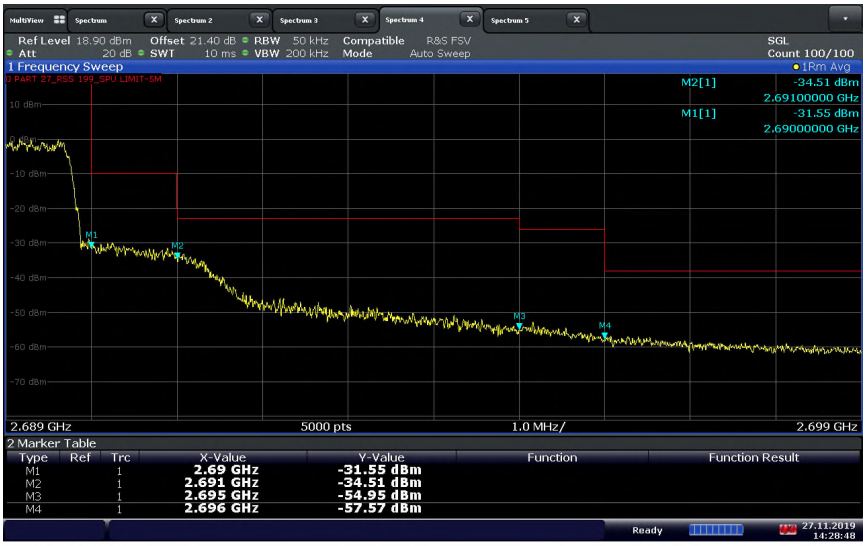
15:24:50 27.11.2019

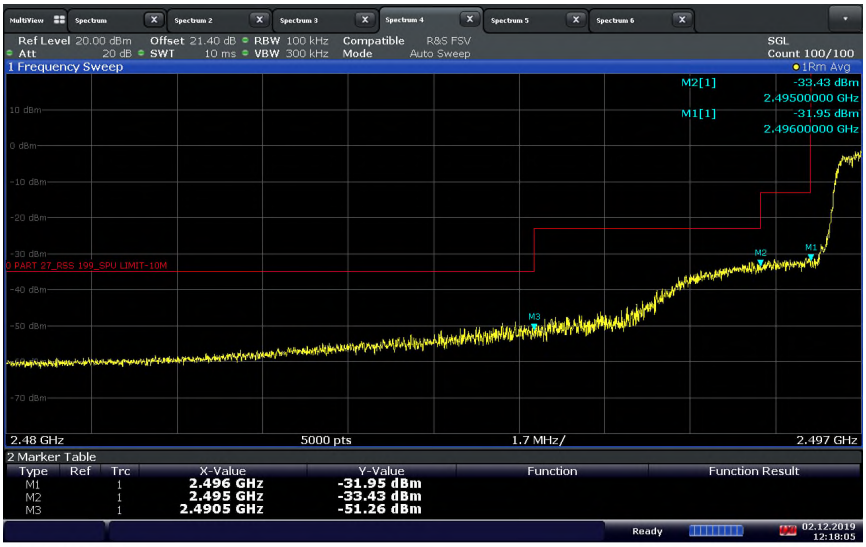
LTE Band 41 Downlink 20 MHz BW / Low Channel 2506 MHz Low Band Edge @2496 MHz


11:30:13 02.12.2019

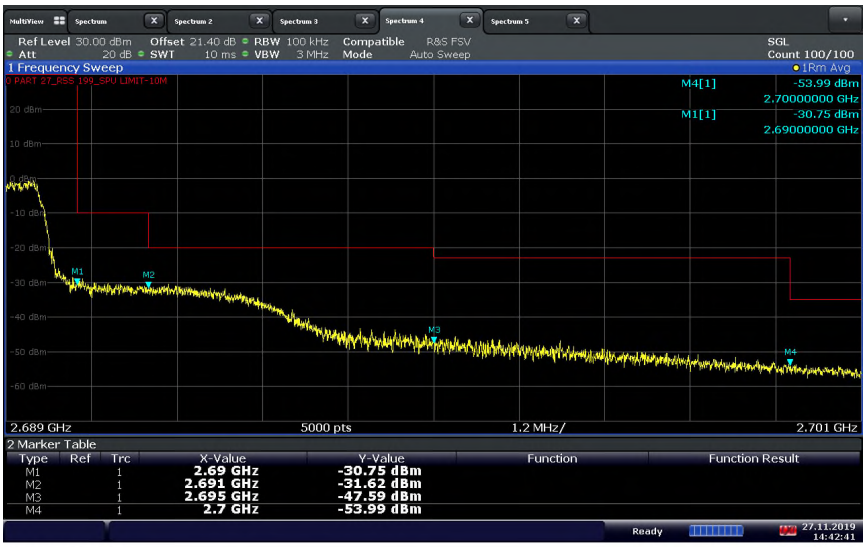
LTE Band 41 Downlink 20 MHz BW / High Channel 2680 MHz High Band Edge @2690 MHz


11:09:00 02.12.2019

LTE Band 41 Uplink 5 MHz BW / Low Channel 2498.5 MHz Low Band Edge @2496 MHz
 14:14:37 27.11.2019
LTE Band 41 Uplink 5 MHz BW / High Channel 2687.5 MHz High Band Edge @2690 MHz
 14:28:48 27.11.2019

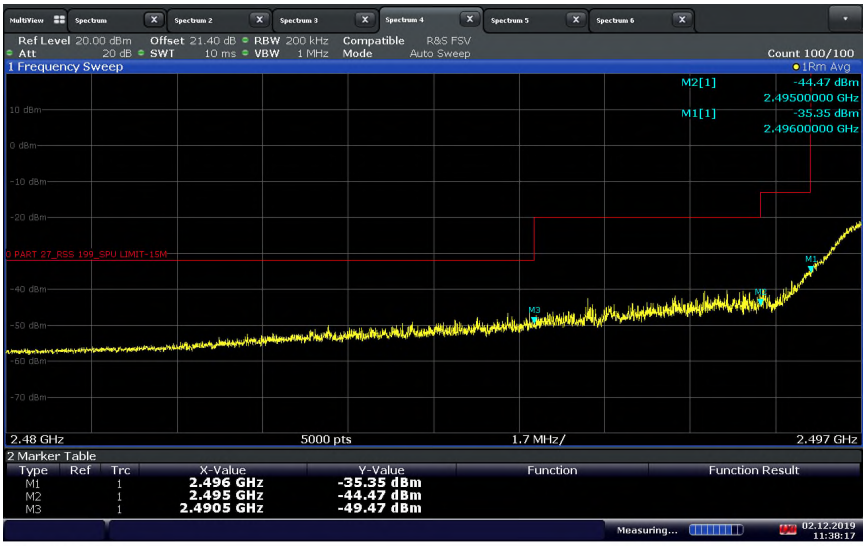
LTE Band 41 Uplink 10 MHz BW / Low Channel 2501 MHz Low Band Edge @2496 MHz


12:18:06 02.12.2019

LTE Band 41 Uplink 10 MHz BW / High Channel 2685 MHz High Band Edge @2690 MHz


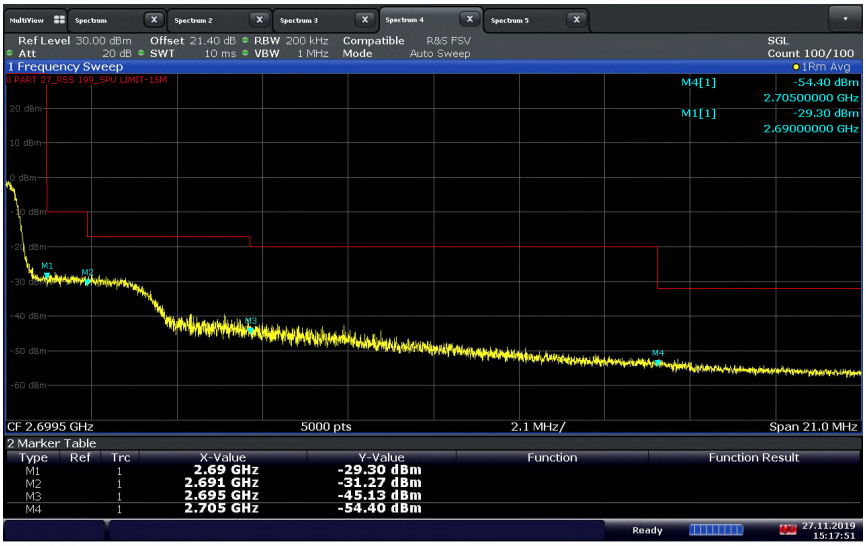
14:42:41 27.11.2019

LTE Band 41 Uplink 15 MHz BW / Low Channel 2503.5 MHz Low Band Edge @2496 MHz



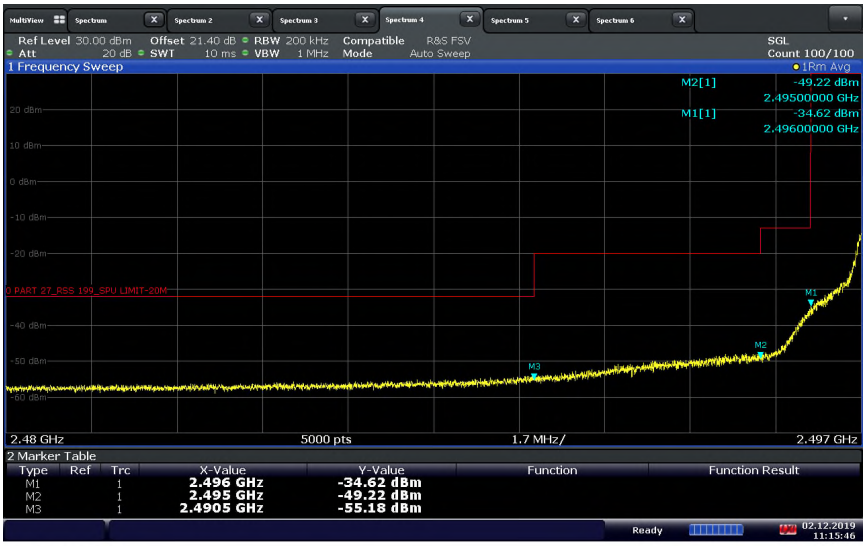
11:38:18 02.12.2019

LTE Band 41 Uplink 15 MHz BW / High Channel 2682.5 MHz High Band Edge @2690 MHz



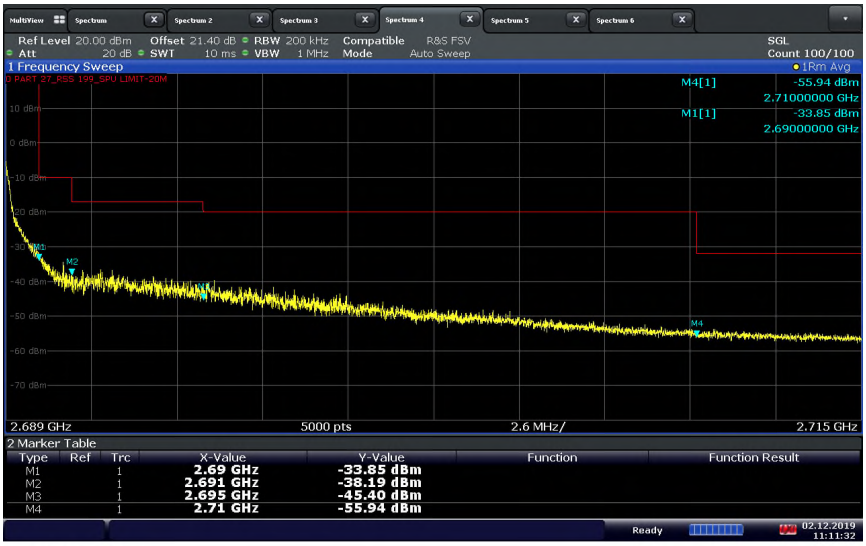
15:17:52 27.11.2019

LTE Band 41 Uplink 20 MHz BW / Low Channel 2506 MHz Low Band Edge @2496 MHz



11:15:46 02.12.2019

LTE Band 41 Uplink 20 MHz BW / High Channel 2680 MHz High Band Edge @2690 MHz



11:11:32 02.12.2019

2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(m)(2) and (4)
FCC 47 CFR Part 90, Clause 90.691(a)
RSS-199, Clause 4.5

2.6.2 Standard Applicable

FCC 47 CFR Part 27.53(m)(2):
(v) For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

(4) For mobile digital stations, the attenudation 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 that 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.

FCC 47 CFR Part 90.691(a):
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

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 least 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. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emission limits:

(a) for base station and fixed 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 43 + 10 log10 p.

(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 log10 p from the channel edges to 5 MHz away
(ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
(iii) 55 + 10 log10 p at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.

In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.

2.6.3 Equipment Under Test and Modification State

Serial No: 370920000139 (NU) and 371929000156, 443935000064 (CU) / Test Configuration A and B

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

November 11, 2019 / ZXY

2.6.5 Test Equipment Used

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

2.6.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

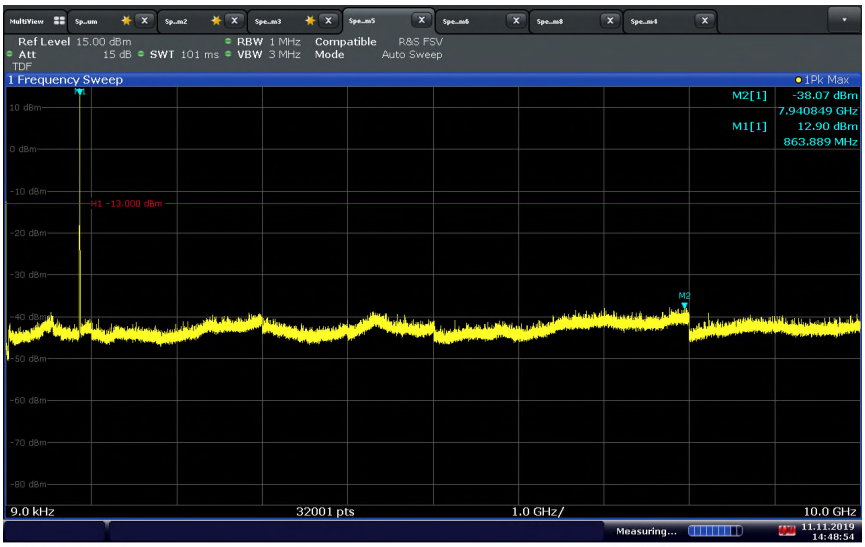
Ambient Temperature	24.8°C
Relative Humidity	44.6%
ATM Pressure	99.2kPa

2.6.7 Additional Observations

- This is a conducted test.
- The path loss was measured and entered as a transducer factor (TDF).
- The spectrum was searched from 30MHz to the 10th harmonic.
- All channels on all channel bandwidth are verified.

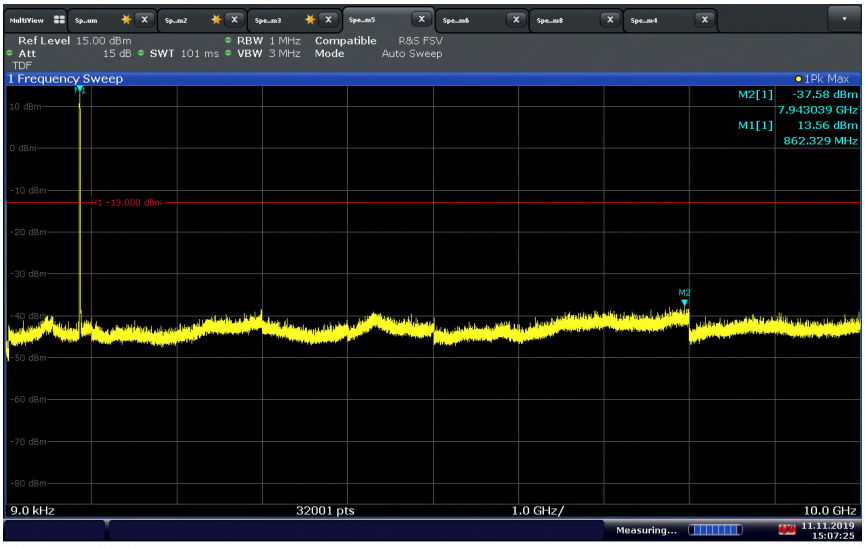
2.6.8 Test Results

LTE Band 26 (859 – 869 MHz) Downlink 5 MHz BW / Middle Channel 864 MHz



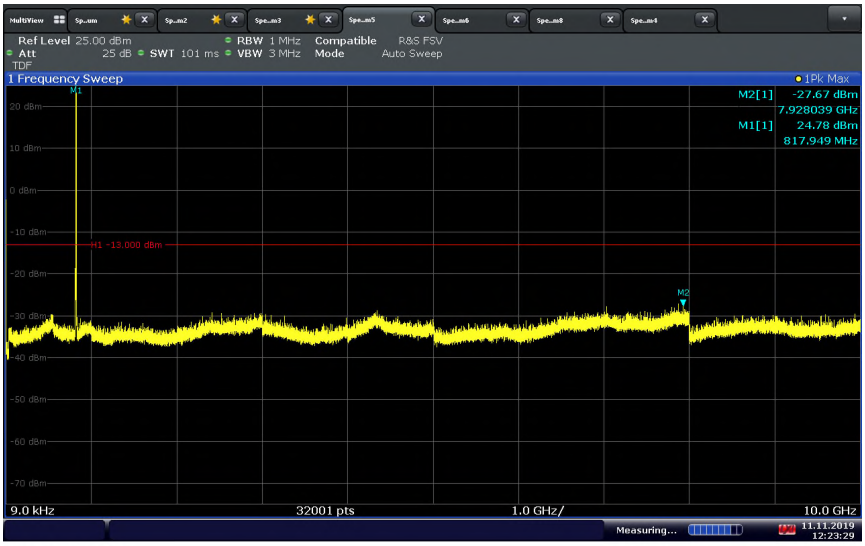
14:48:55 11.11.2019

LTE Band 26 (859 – 869 MHz) Downlink 10 MHz BW / Middle Channel 864 MHz Mask



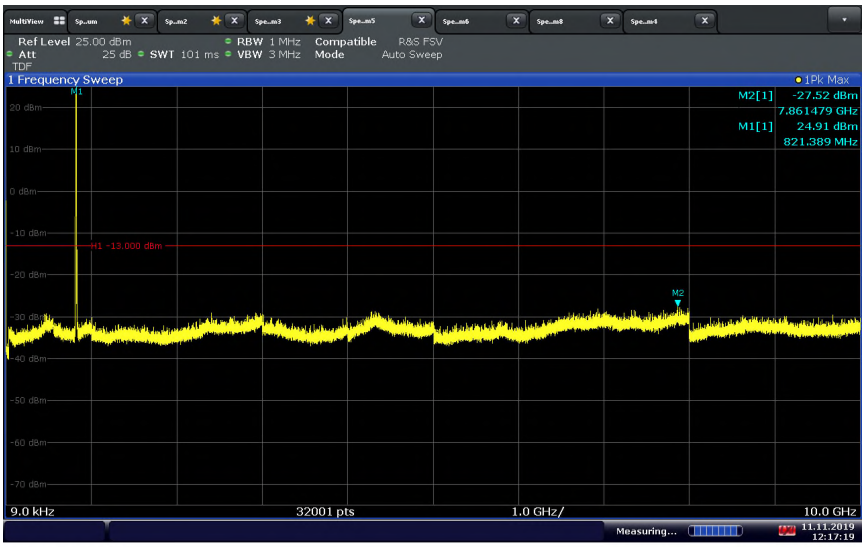
15:07:25 11.11.2019

LTE Band 26 (814 – 824 MHz) Uplink 5 MHz BW / Middle Channel 819 MHz

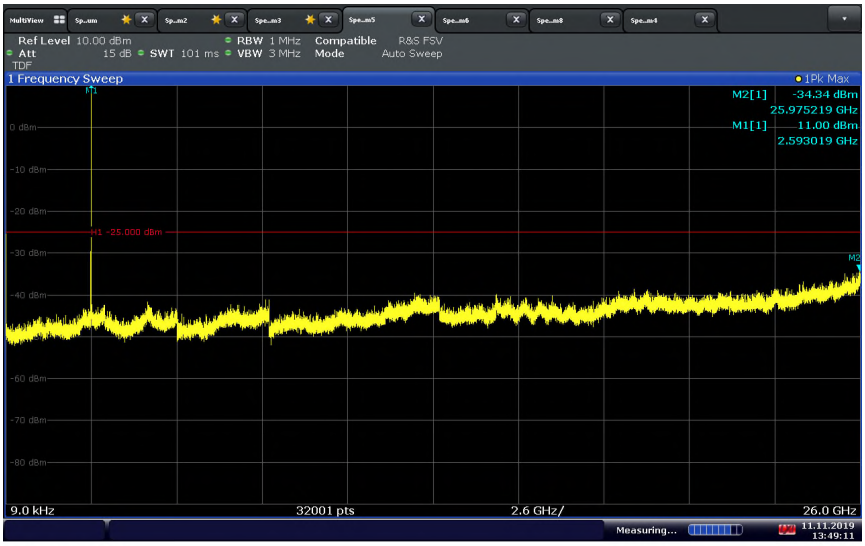


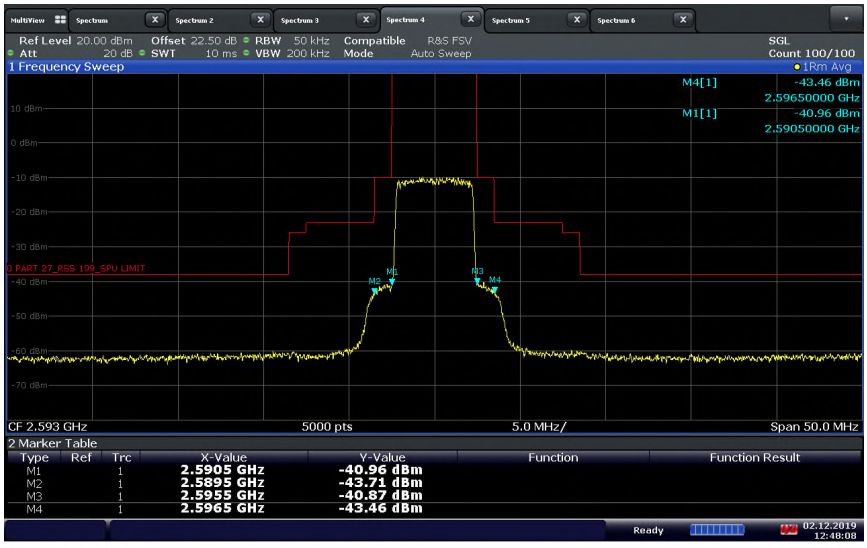
12:23:29 11.11.2019

LTE Band 26 (814 – 824 MHz) Uplink 10 MHz BW / Middle Channel 819 MHz

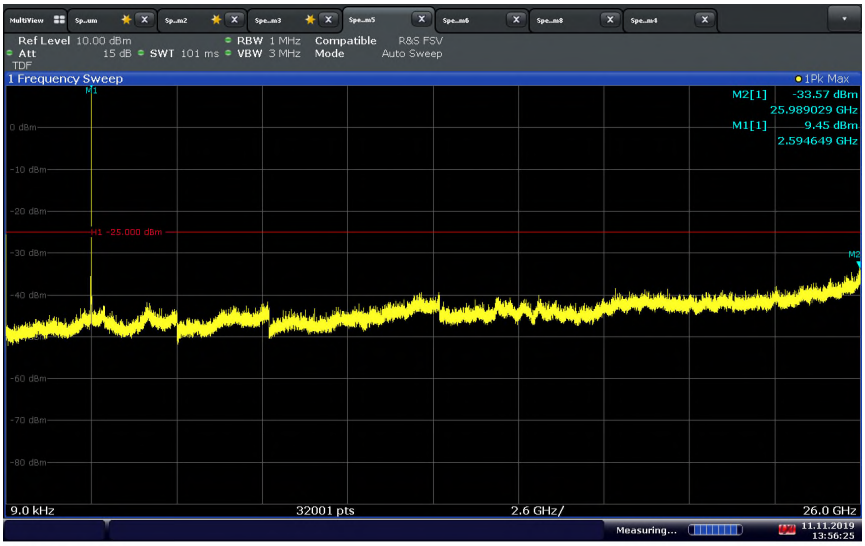


12:17:19 11.11.2019

LTE Band 41 Downlink 5 MHz BW / Middle Channel 2593 MHz
 13:49:11 11.11.2019

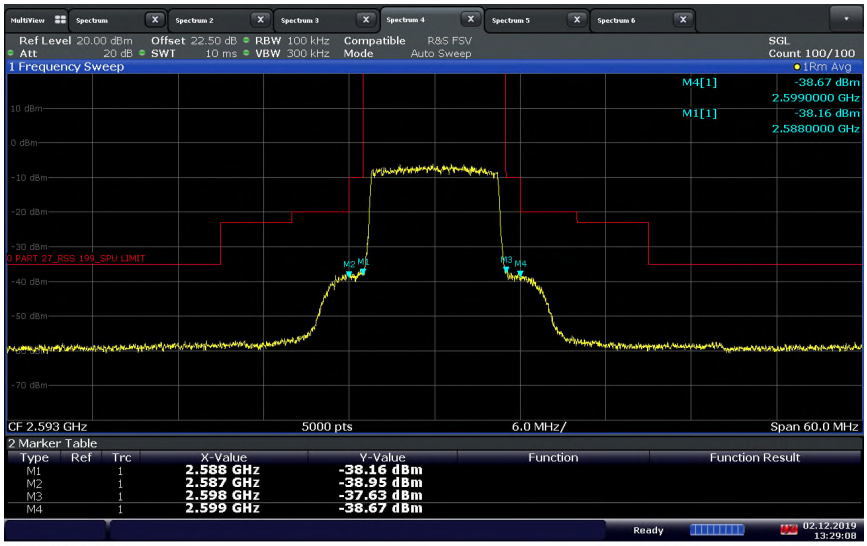
LTE Band 41 Downlink 5 MHz BW / Middle Channel 2593 MHz Mask
 12:48:09 02.12.2019

LTE Band 41 Downlink 10 MHz BW / Middle Channel 2593 MHz



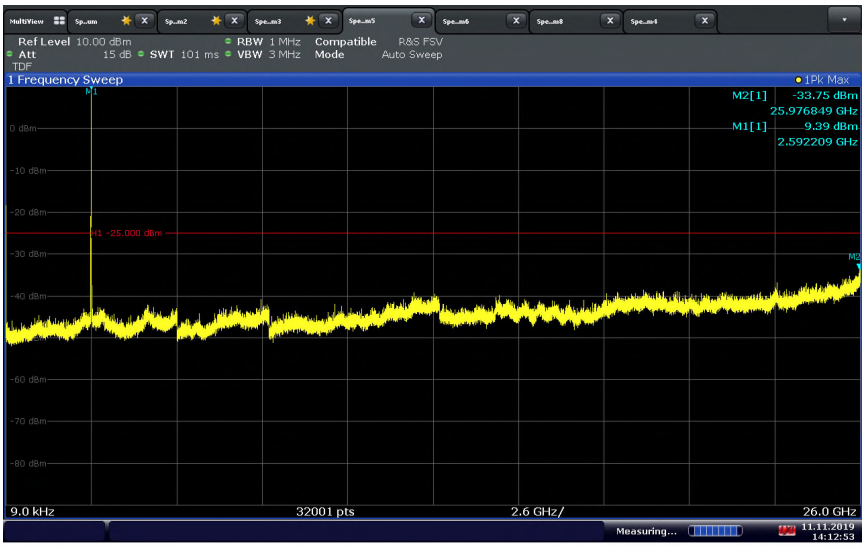
13:56:25 11.11.2019

LTE Band 41 Downlink 10 MHz BW / Middle Channel 2593 MHz Mask



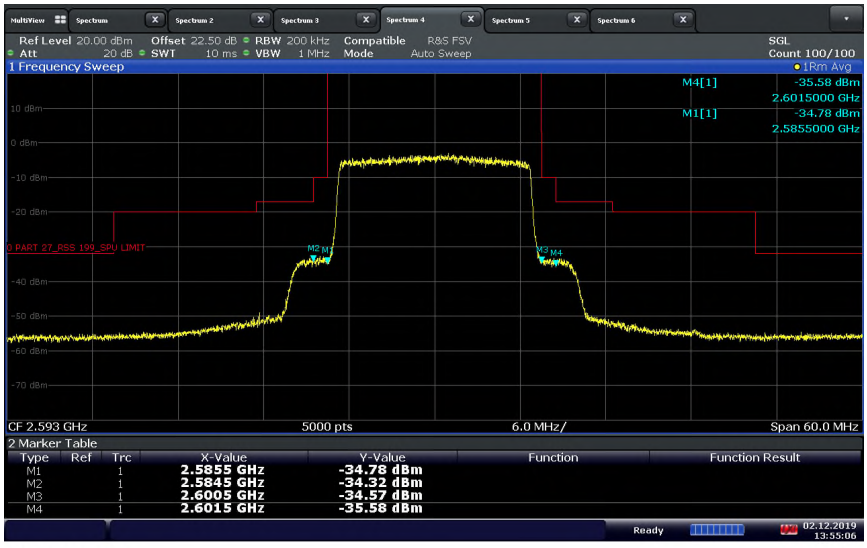
13:29:09 02.12.2019

LTE Band 41 Downlink 15 MHz BW / Middle Channel 2593 MHz



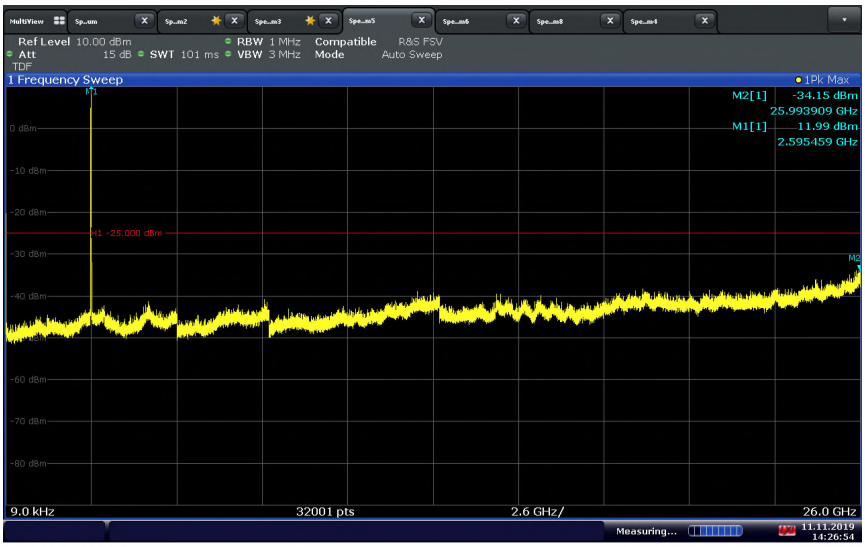
14:12:53 11.11.2019

LTE Band 41 Downlink 15 MHz BW / Middle Channel 2593 MHz Mask



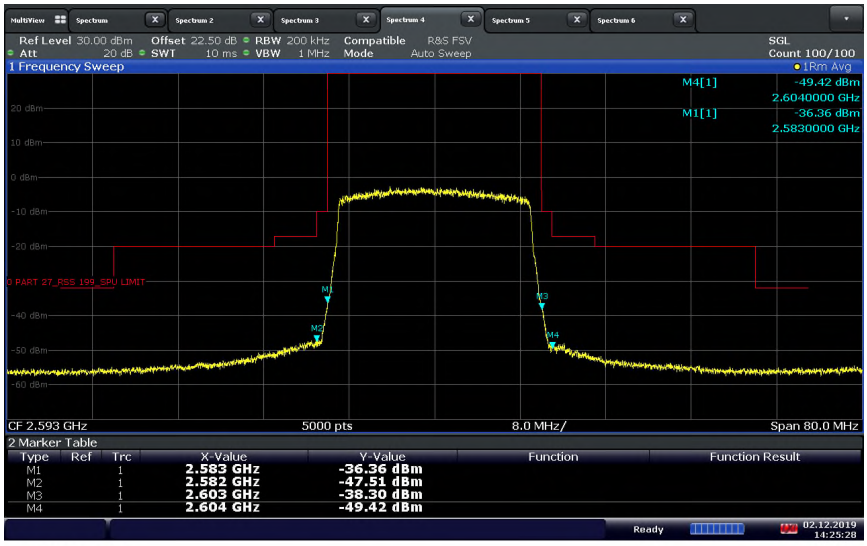
13:55:06 02.12.2019

LTE Band 41 Downlink 20 MHz BW / Middle Channel 2593 MHz



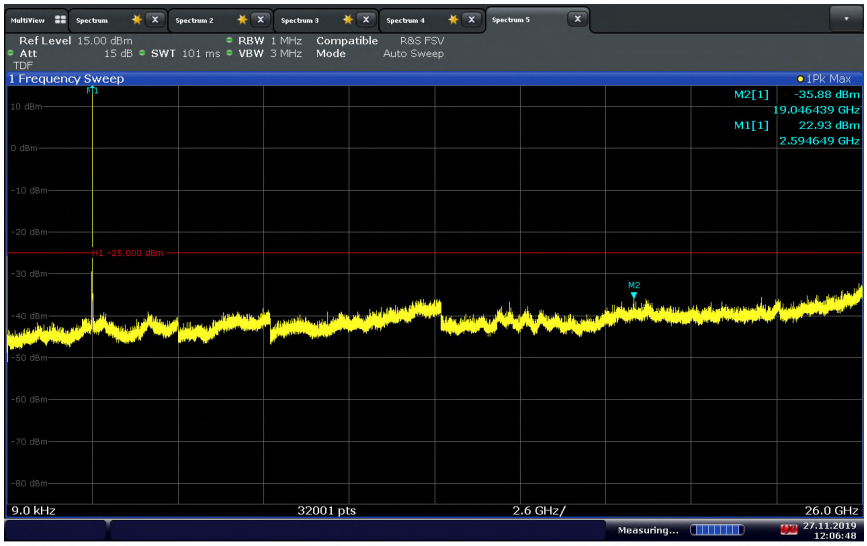
14:26:55 11.11.2019

LTE Band 41 Downlink 20 MHz BW / Middle Channel 2593 MHz Mask



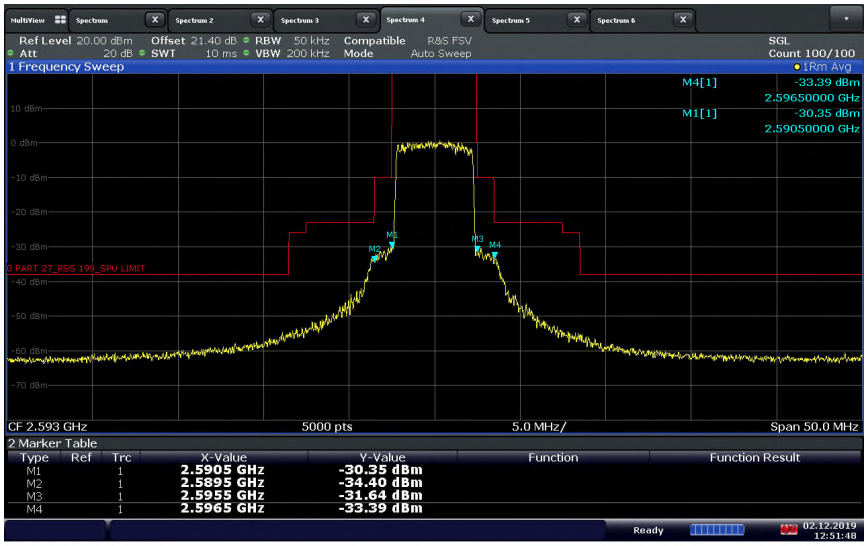
14:25:29 02.12.2019

LTE Band 41 Uplink 5 MHz BW / Middle Channel 2593 MHz



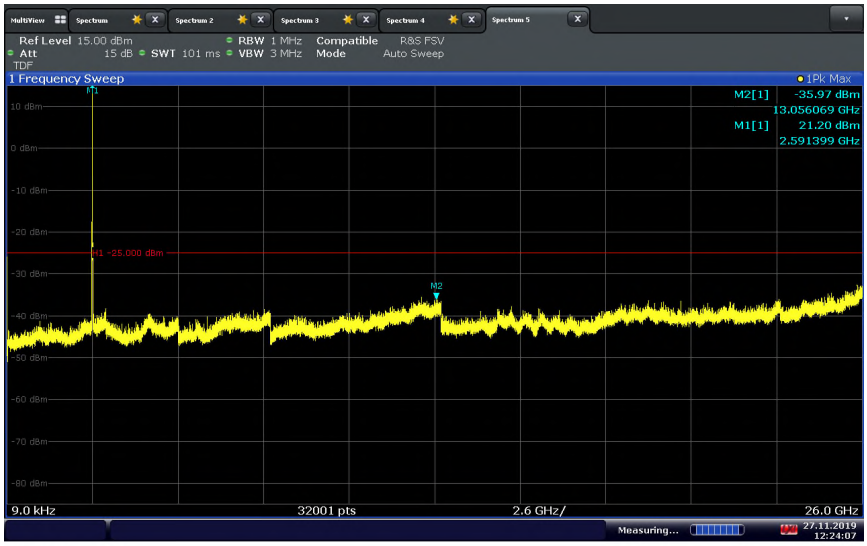
12:06:48 27.11.2019

LTE Band 41 Uplink 5 MHz BW / Middle Channel 2593 MHz Mask



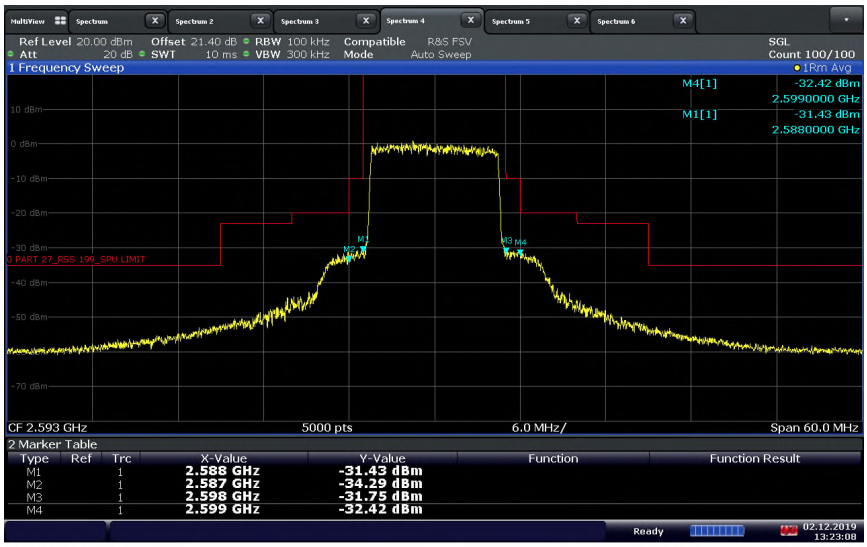
12:51:48 02.12.2019

LTE Band 41 Uplink 10 MHz BW / Middle Channel 2593 MHz



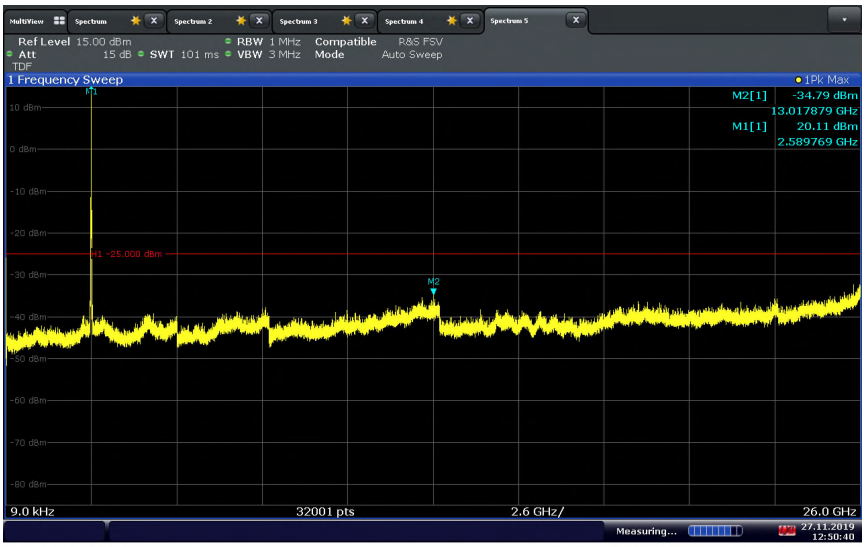
12:24:08 27.11.2019

LTE Band 41 Uplink 10 MHz BW / Middle Channel 2593 MHz Mask



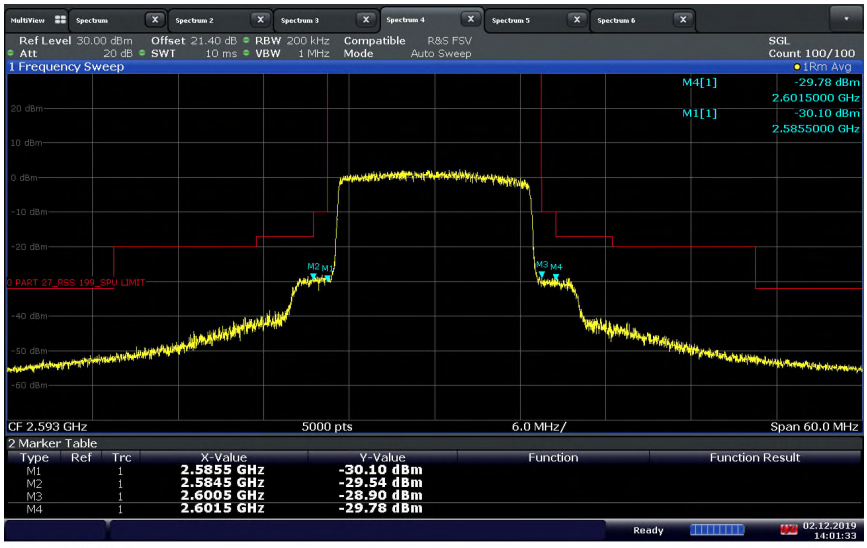
13:23:09 02.12.2019

LTE Band 41 Uplink 15 MHz BW / Middle Channel 2593 MHz



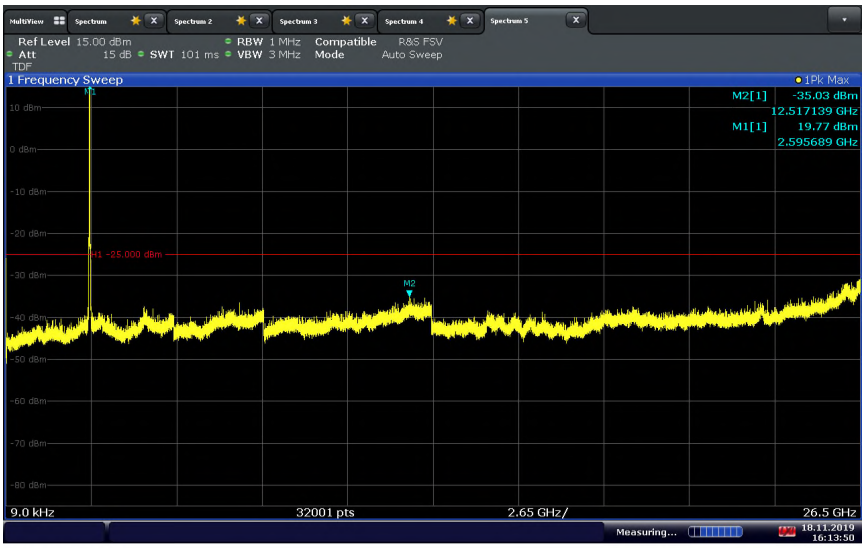
12:50:40 27.11.2019

LTE Band 41 Uplink 15 MHz BW / Middle Channel 2593 MHz Mask



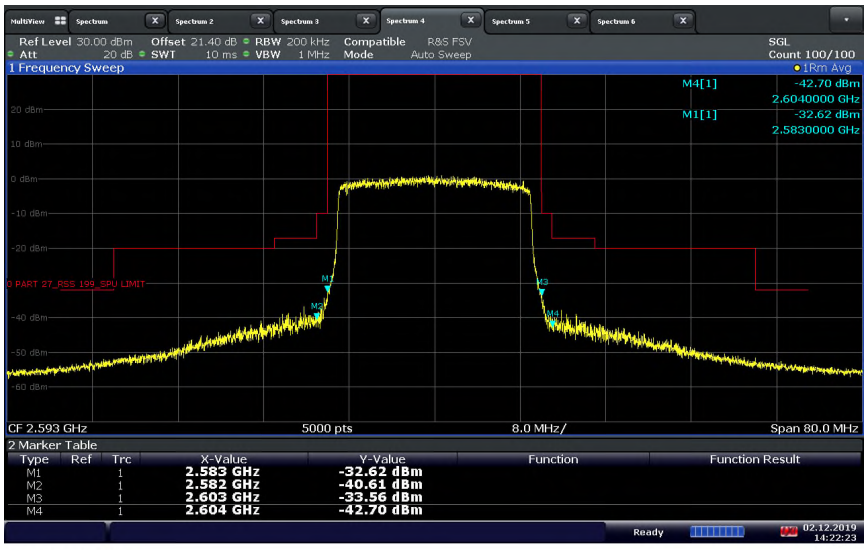
14:01:33 02.12.2019

LTE Band 41 Uplink 20 MHz BW / Middle Channel 2593 MHz

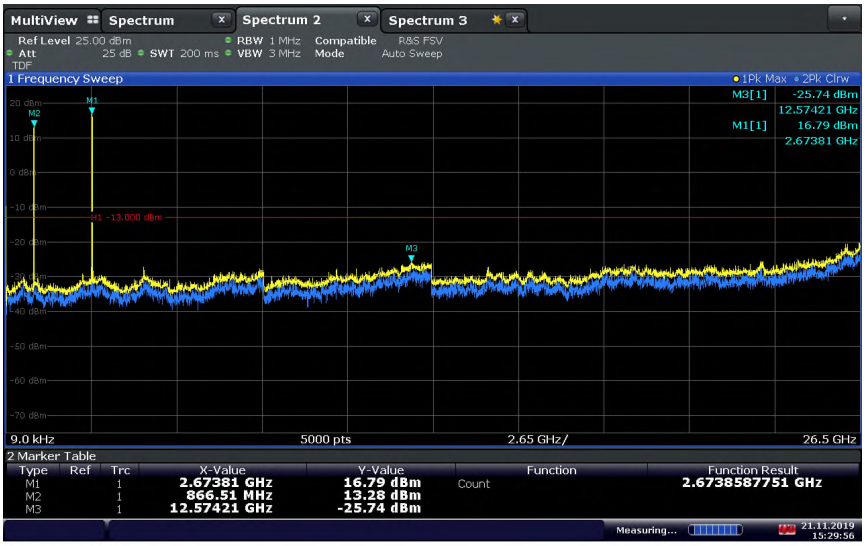
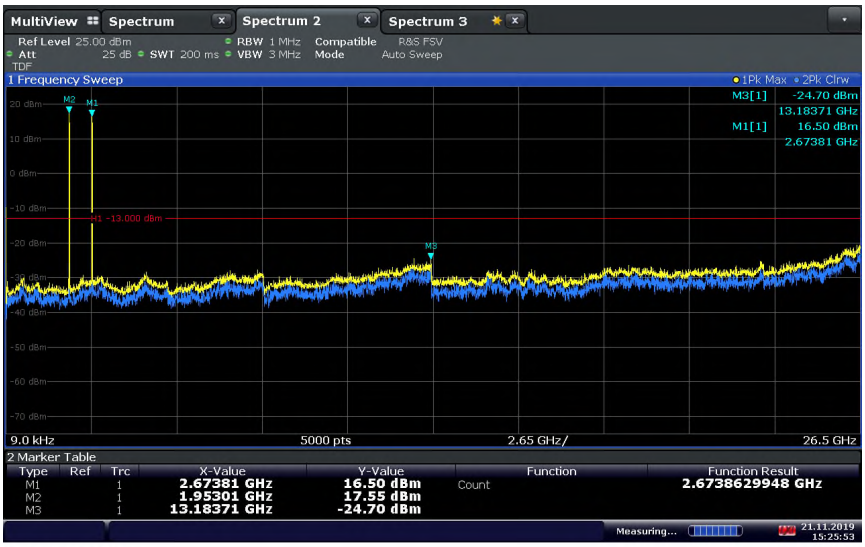


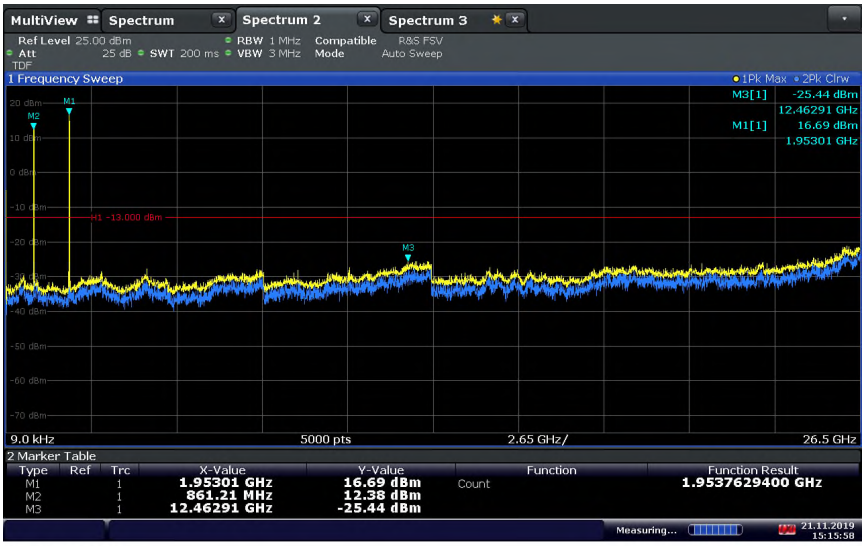
16:13:51 18.11.2019

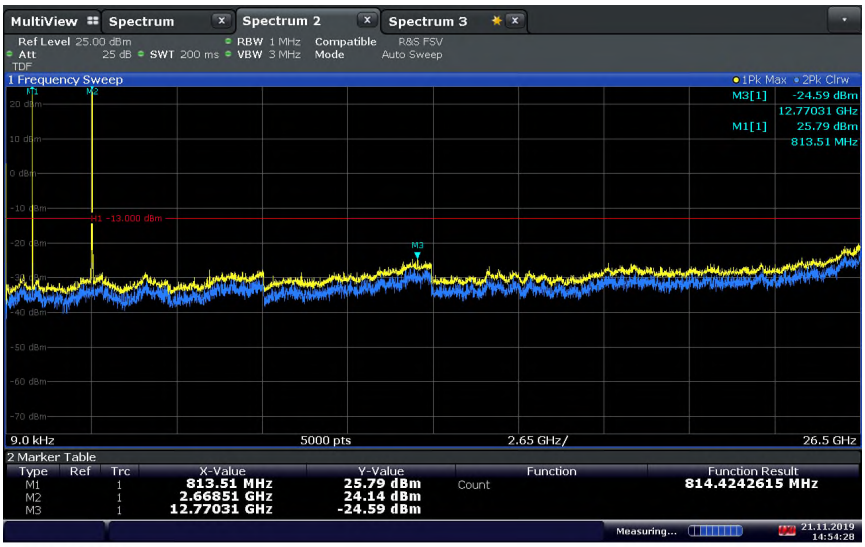
LTE Band 41 Uplink 20 MHz BW / Middle Channel 2593 MHz Mask

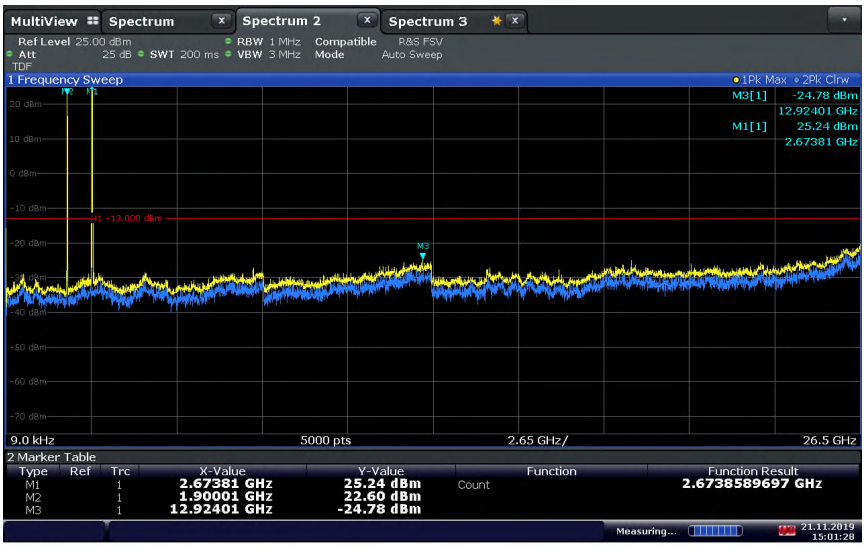


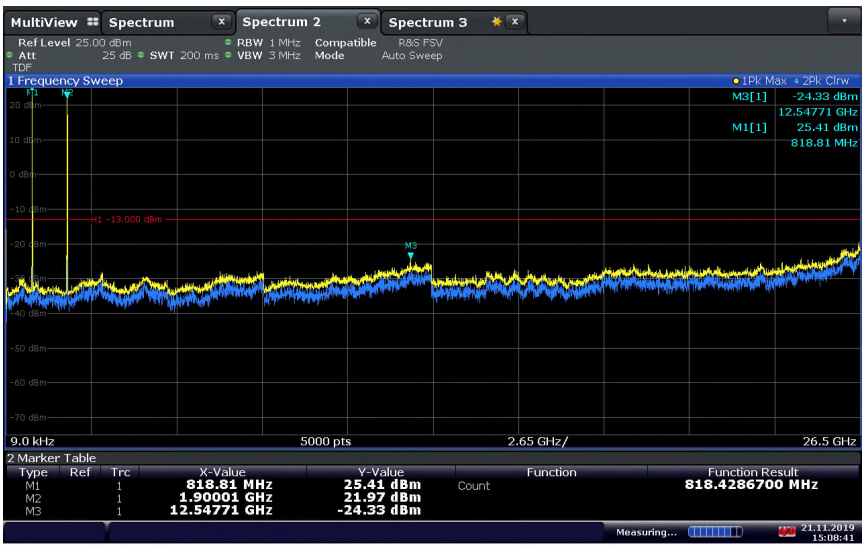
14:22:24 02.12.2019

2 Bands per antenna port Conducted Spurious Emissions Ant Port D Downlink: LTE Band 41 20MHz BW High Ch & LTE Band 26 (859 – 869 MHz) 10MHz BW Mid Ch
   15:29:56 21.11.2019
2 Bands per antenna port Conducted Spurious Emissions Ant Port D Downlink: LTE Band 41 20MHz BW High Ch & LTE Band 25 20MHz BW Mid Ch
   15:25:54 21.11.2019

2 Bands per antenna port Conducted Spurious Emissions Ant Port D Downlink: LTE Band 26 (859 – 869 MHz) 10MHz BW Mid Ch & LTE Band 25 20MHz BW Mid Ch
   15:15:59 21.11.2019

2 Bands per antenna port Conducted Spurious Emissions Ant Port D Uplink: LTE Band 41 20MHz BW High Ch & LTE Band 26 (814 – 824 MHz) 5MHz BW Low Ch
   14:54:29 21.11.2019

2 Bands per antenna port Conducted Spurious Emissions Ant Port D Uplink: LTE Band 41 20MHz BW High Ch & LTE Band 25 20MHz BW High Ch
   15:01:29 21.11.2019

2 Bands per antenna port Conducted Spurious Emissions Ant Port D Uplink: LTE Band 26 (814 - 824 MHz) 5MHz BW Low Ch & LTE Band 25 20MHz BW High Ch
   15:08:41 21.11.2019