

Report No.: T191105W01-RP10

8.5 BAND EDGE MEASUREMENT

LIMIT

Part 27.53c(2) Band 13

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 $43 + 10 \log (P)$ dB;

Part 27.53(m) (4), Band 4 & Band 7

Specifies that “for BRS and EBS stations. 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)(4) 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.

According to RSS-130, Band 13,

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate 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 the equipment’s operating frequency range, a resolution bandwidth of 30 kHz may be employed.

According to RSS-139, Band 4 & Band 7

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

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

p is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

TEST PROCEDURES

KDB 971168 D01 Power Meas License Digital Systems – Section 6.0

1. RBW \geq 1% of the emission bandwidth
2. VBW \geq 3 x RBW
3. Span was set large enough so as to capture all out of emissions near the band edge.

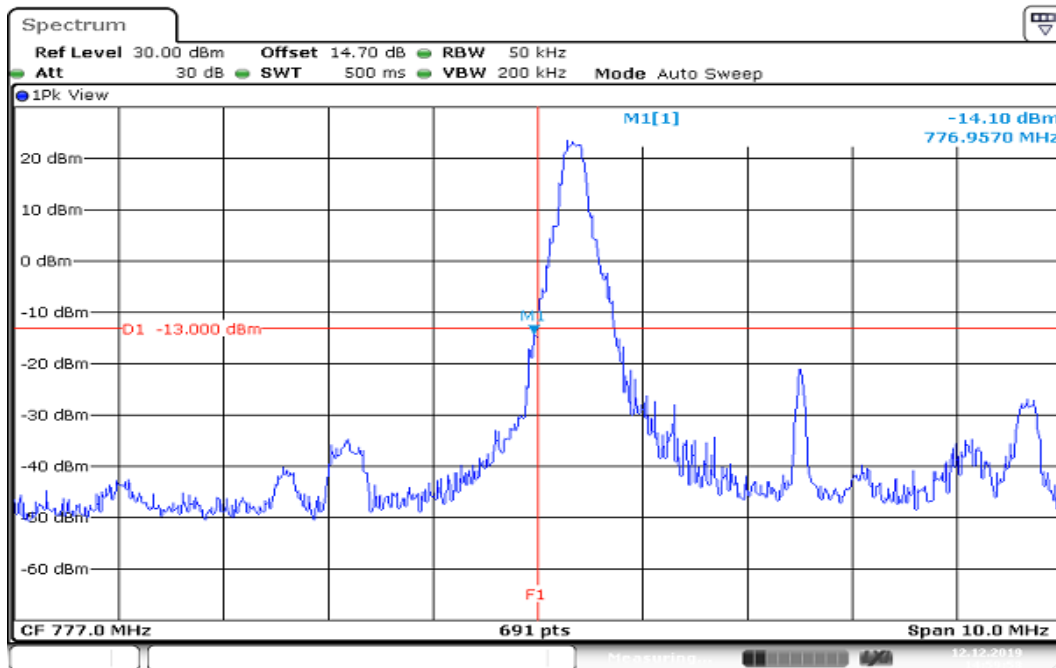
Report No.: T191105W01-RP10

TEST RESULTS:

LTE Band 13

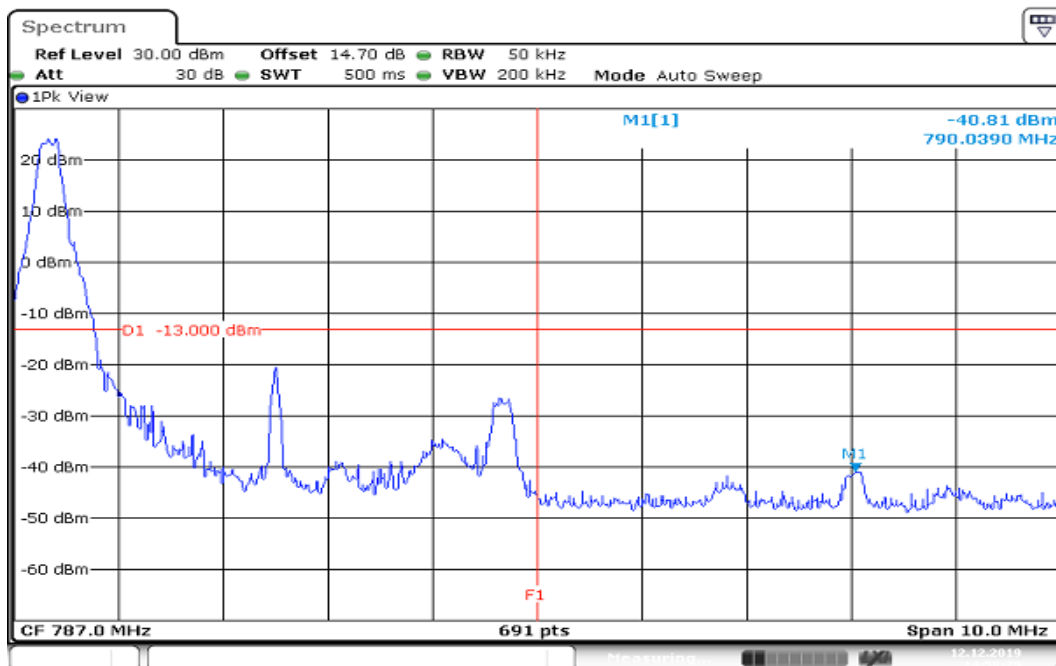
CHANNEL BANDWIDTH: 5MHz / QPSK / 1 RB ALLOCATED

LOWER BAND EDGE



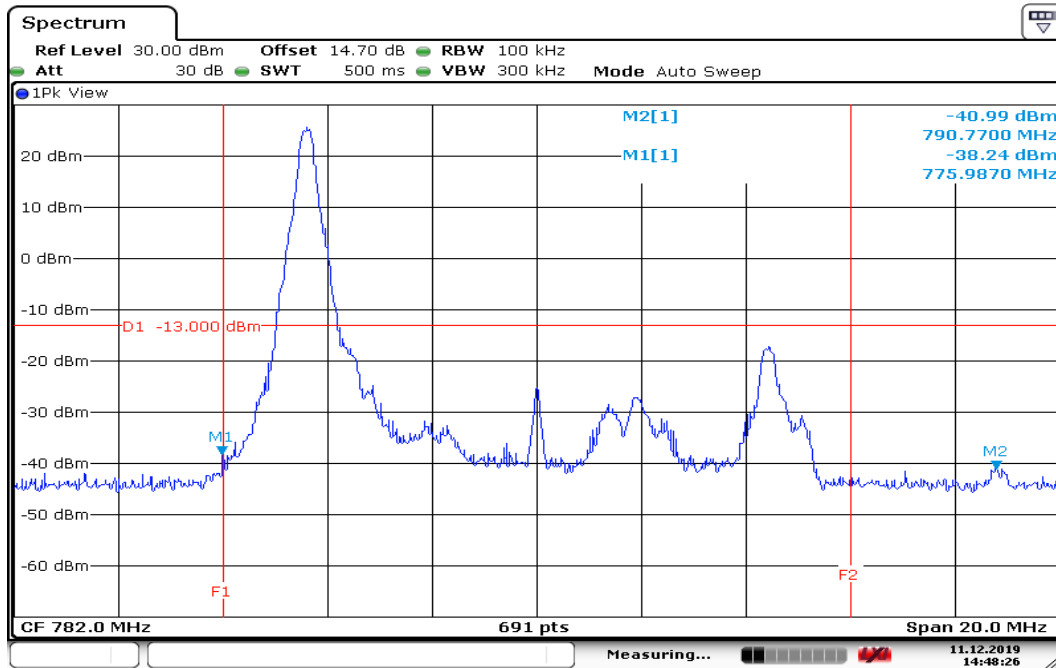
Date: 12.DEC.2019 14:59:58

HIGHER BAND EDGE



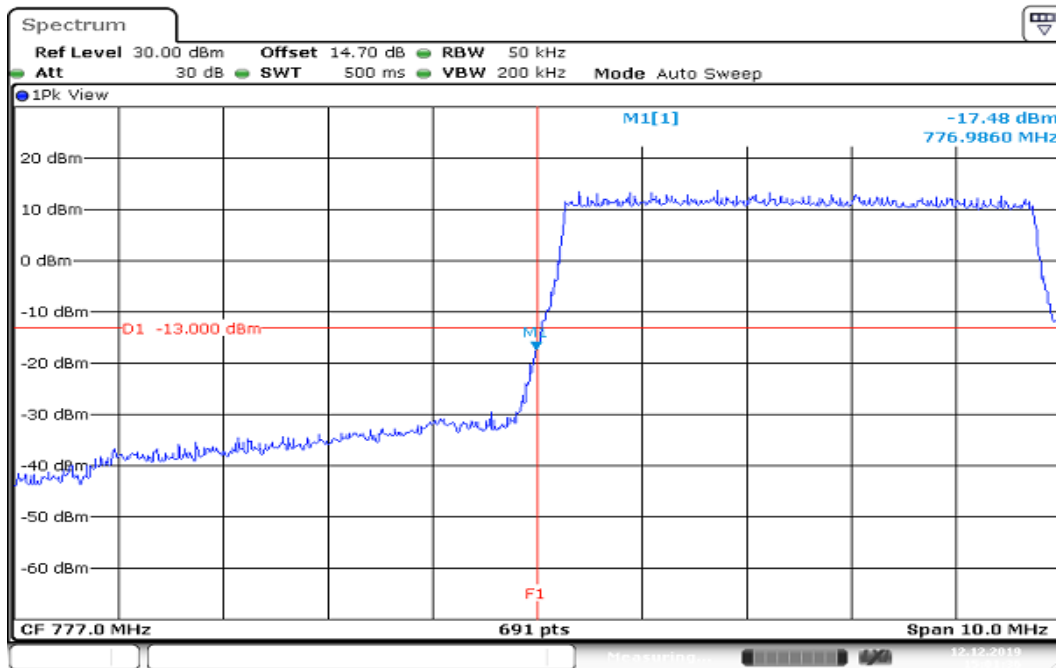
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CHANNEL BANDWIDTH: 10MHz / QPSK / 1 RB ALLOCATED MIDDLE BAND EDGE

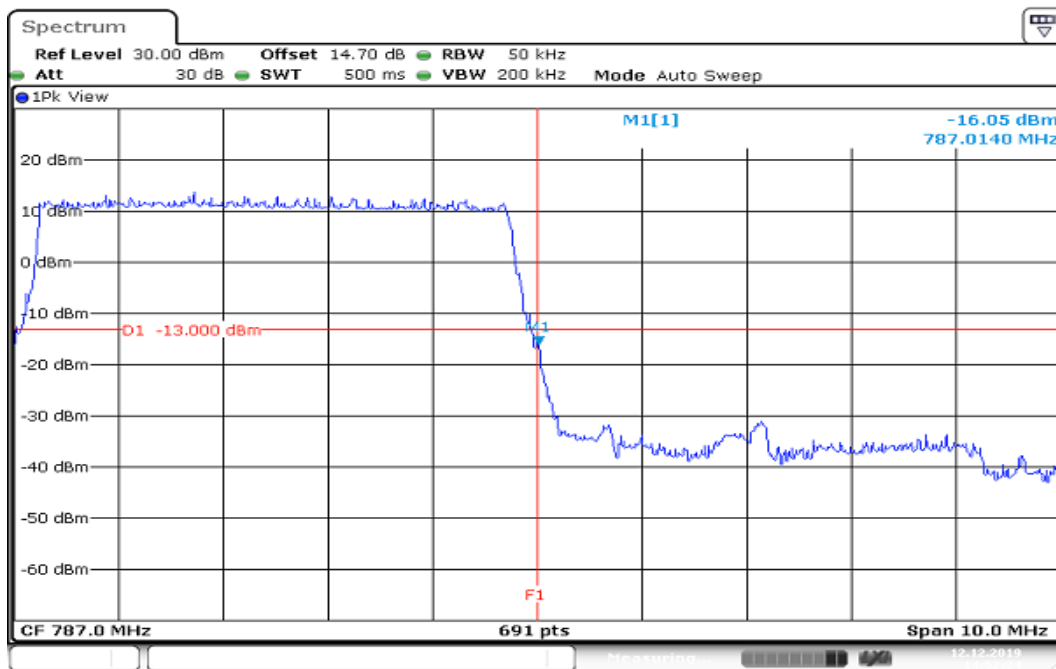


Date: 11.DEC.2019 14:48:26

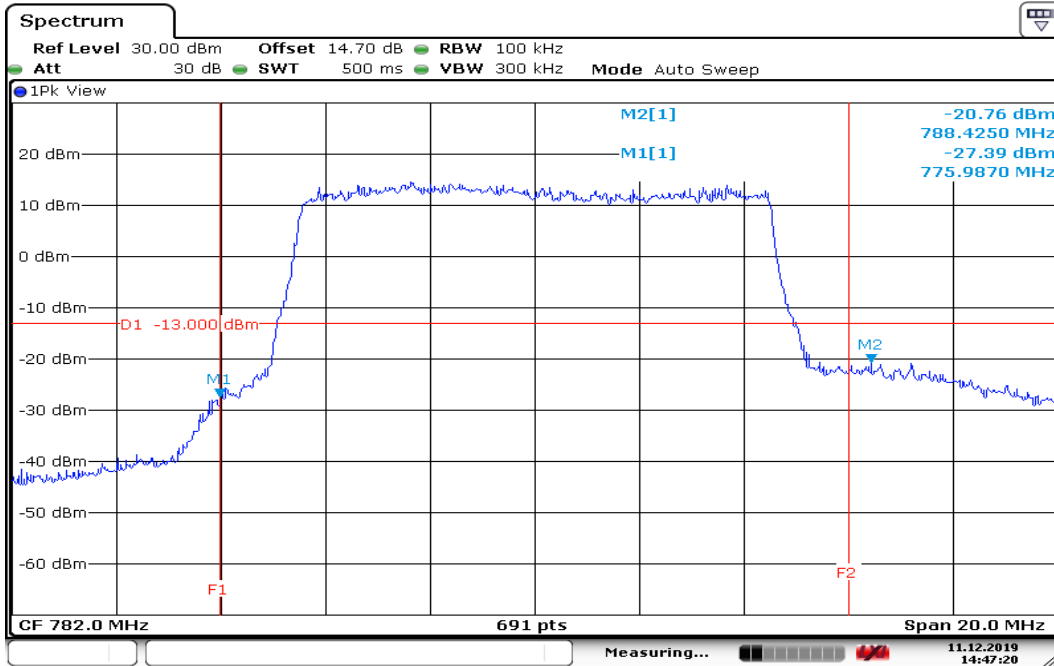
CHANNEL BANDWIDTH: 5MHz / QPSK / FULL RB ALLOCATED LOWER BAND EDGE



HIGHER BAND EDGE

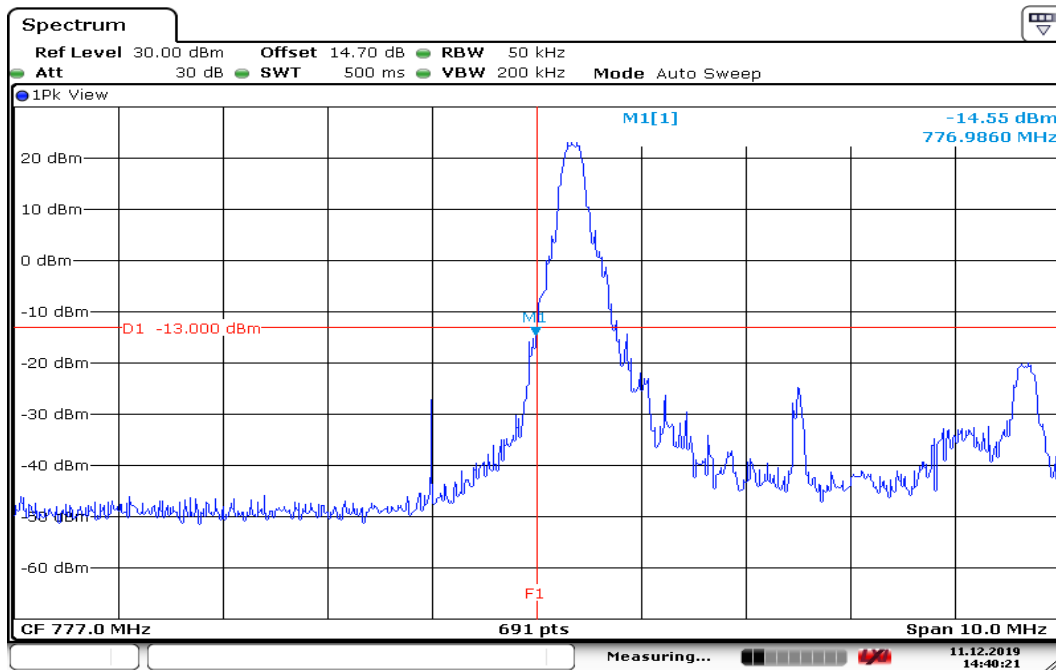


CHANNEL BANDWIDTH: 10MHz / QPSK / FULL RB ALLOCATED MIDDLE BAND EDGE



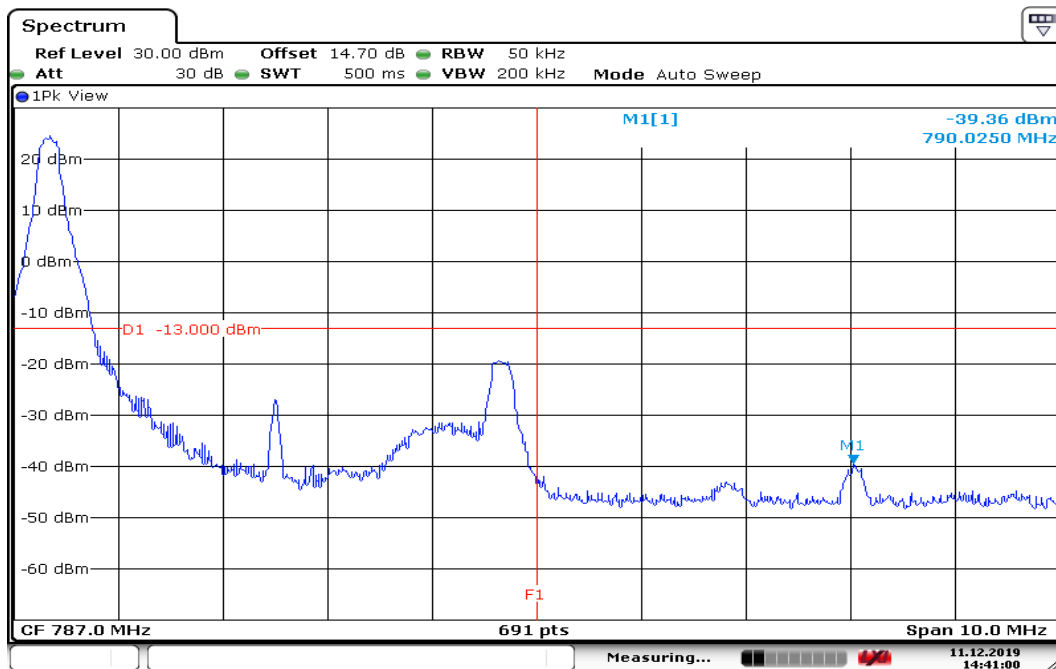
Date: 11.DEC.2019 14:47:20

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE



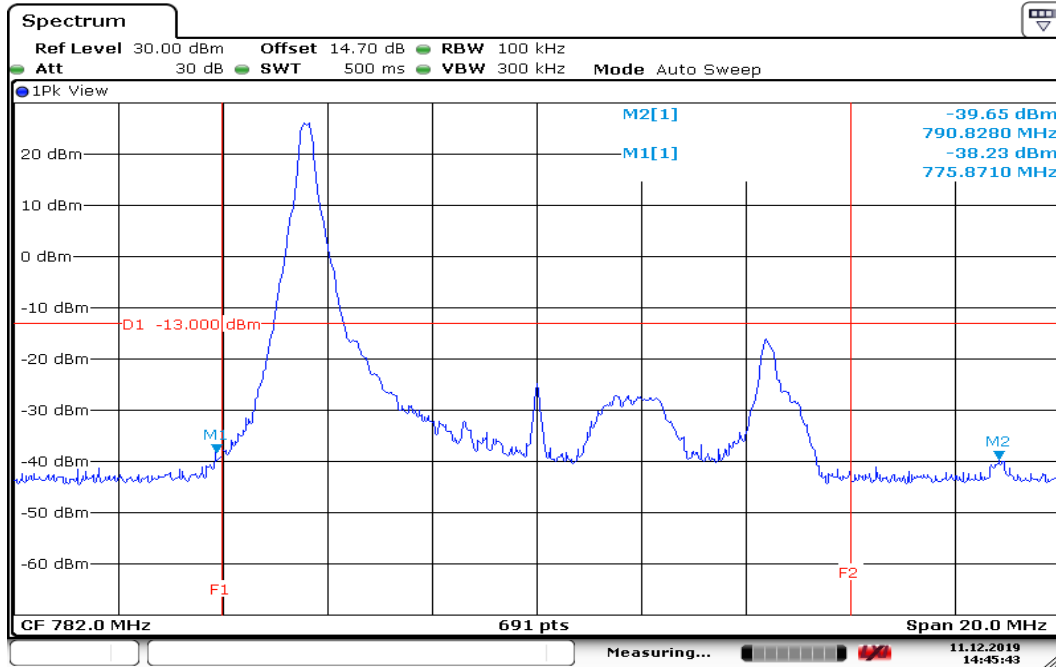
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HIGHER BAND EDGE



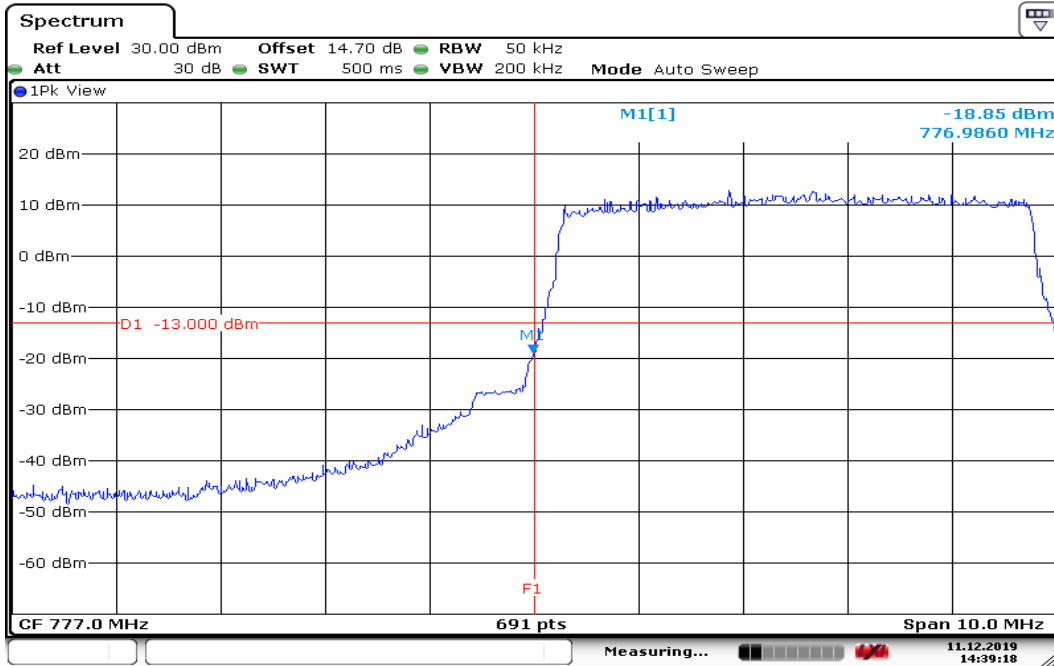
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CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED MIDDLE BAND EDGE



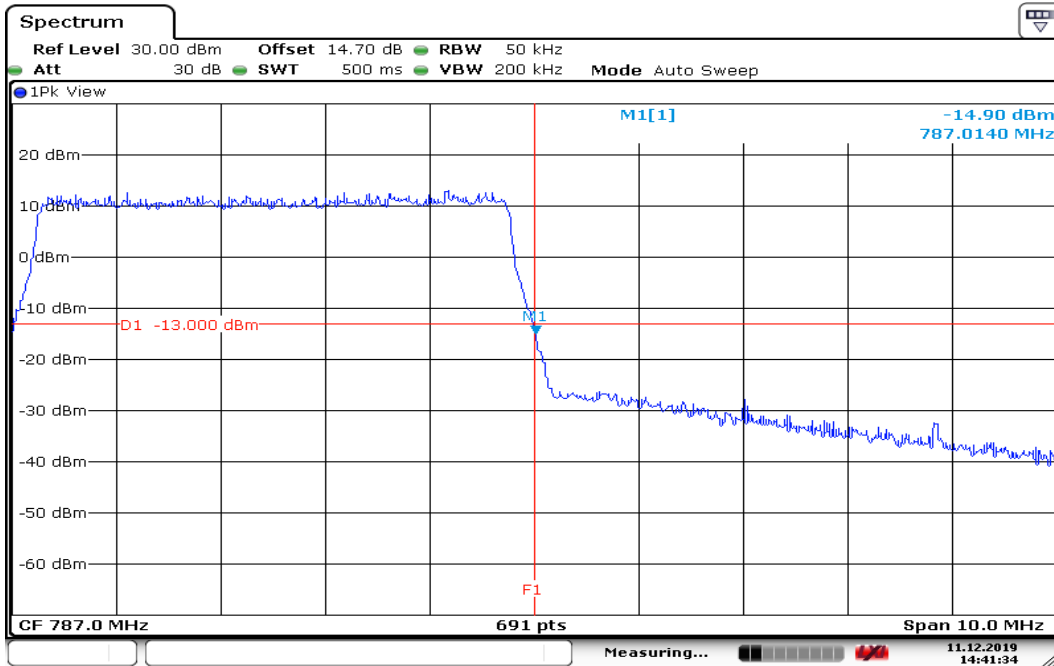
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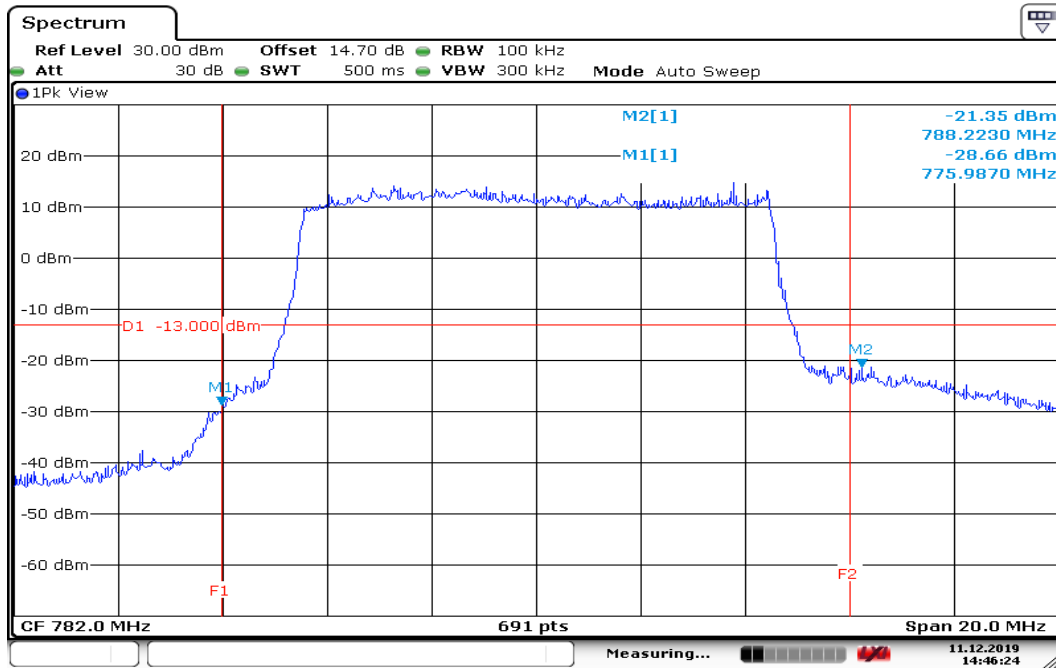
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HIGHER BAND EDGE



Date: 11.DEC.2019 14:41:35

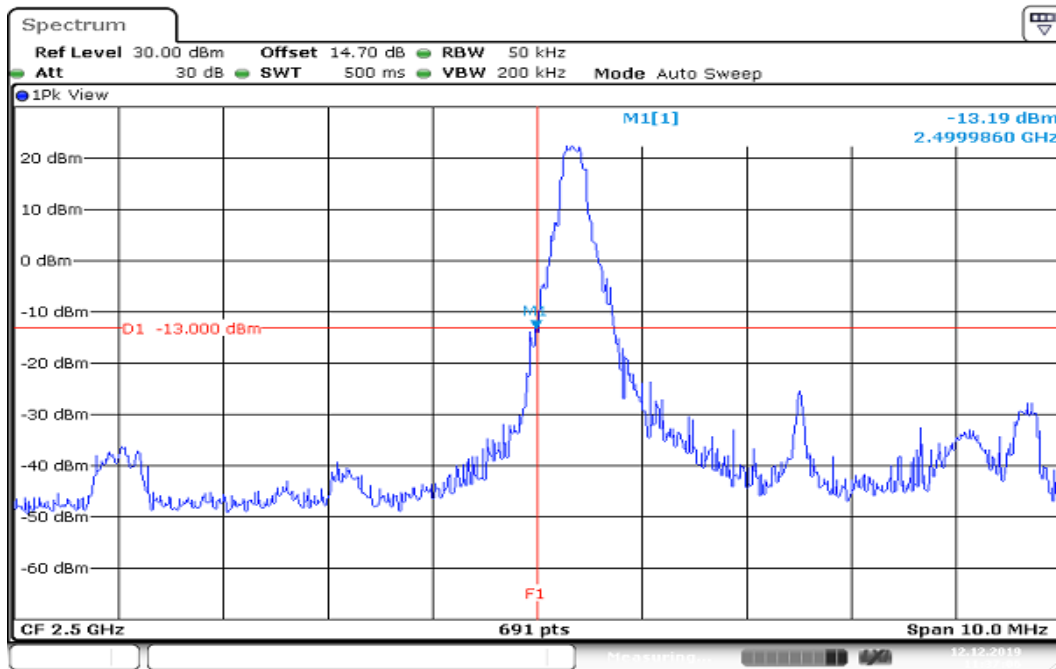
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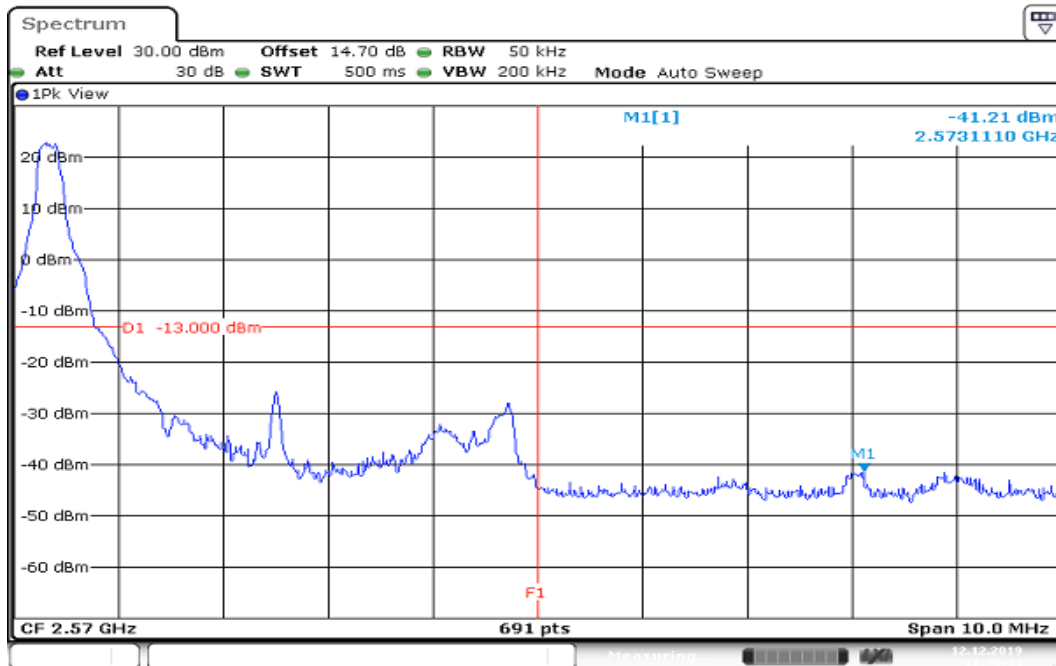
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LTE Band 7 CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



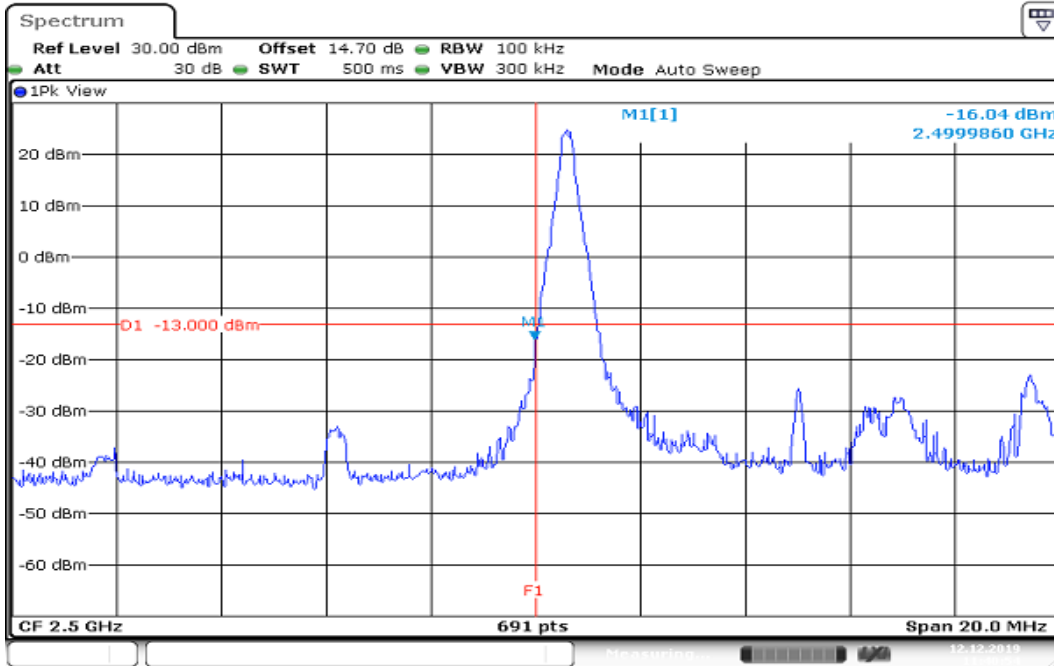
Date: 12.DEC.2019 11:37:07

HIGHER BAND EDGE

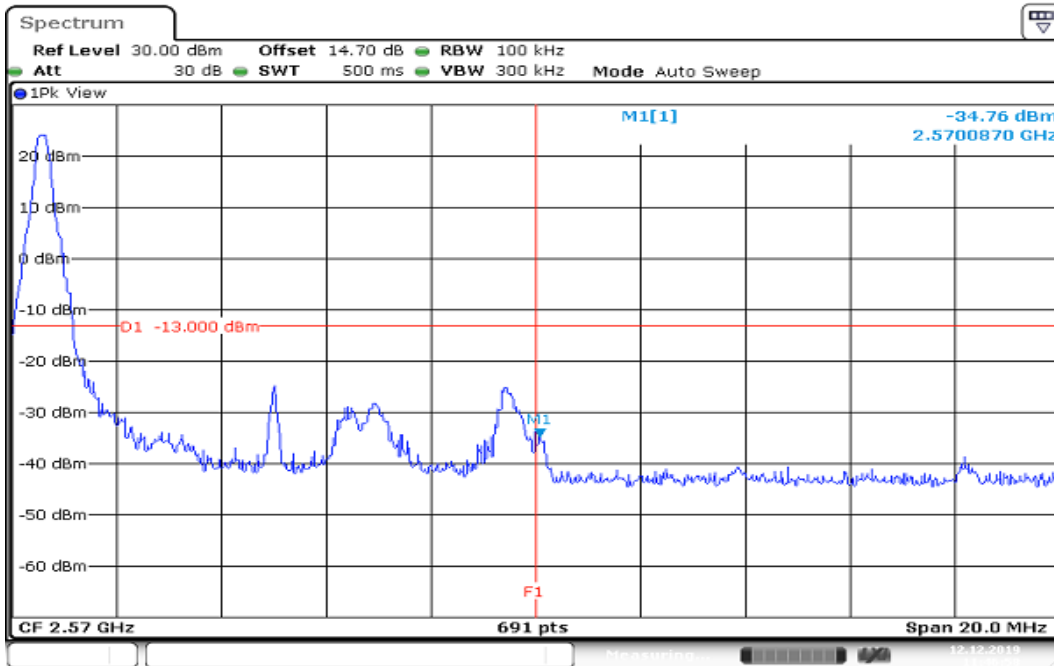


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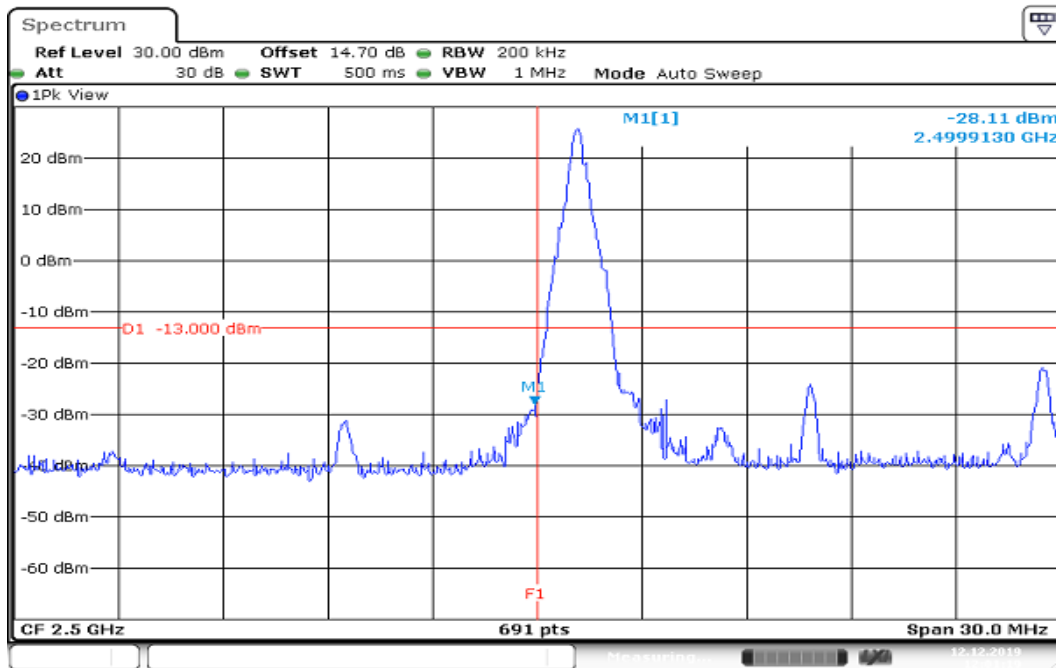
CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



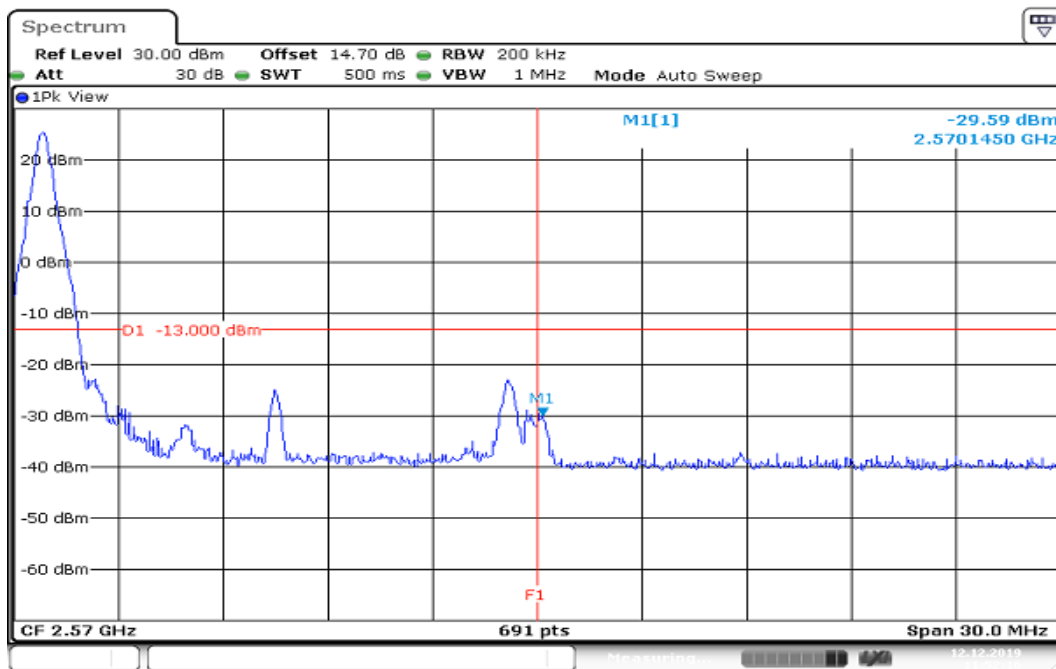
HIGHER BAND EDGE



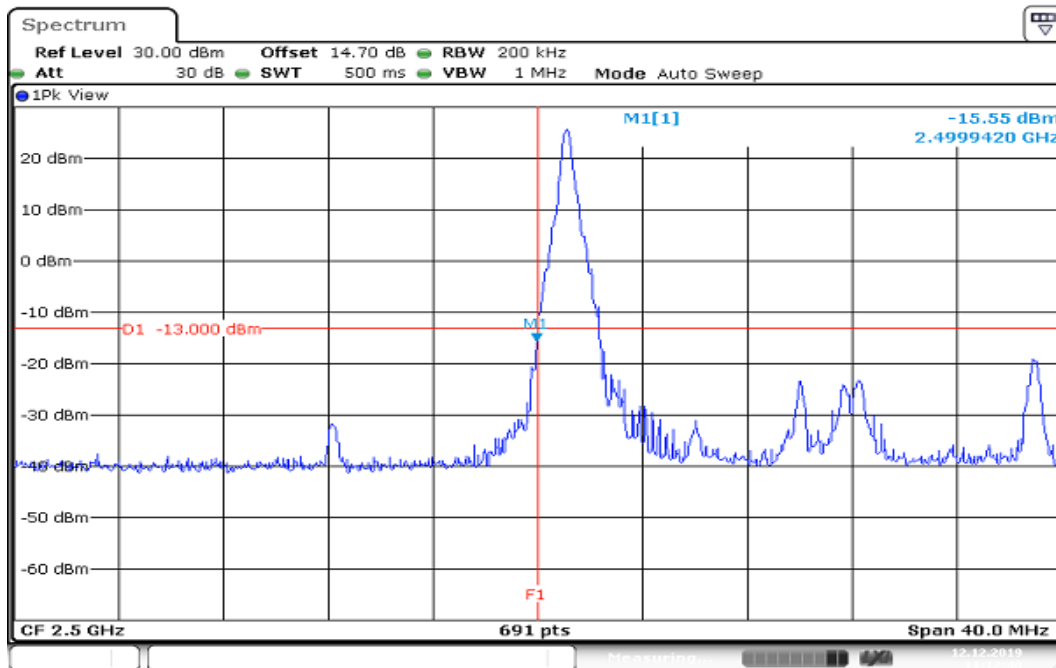
CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



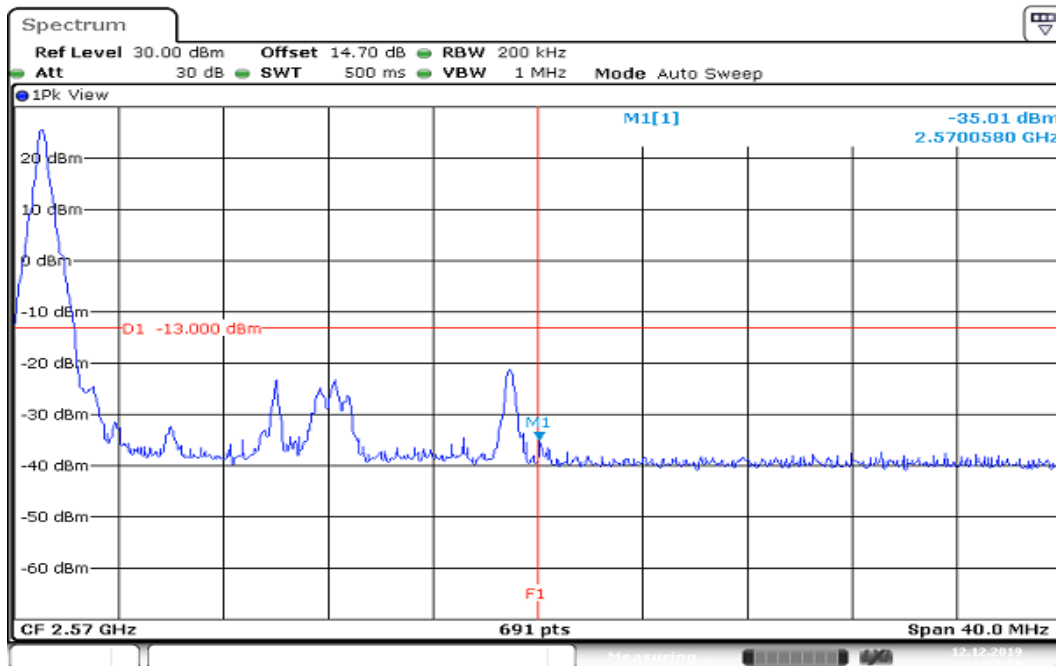
HIGHER BAND EDGE



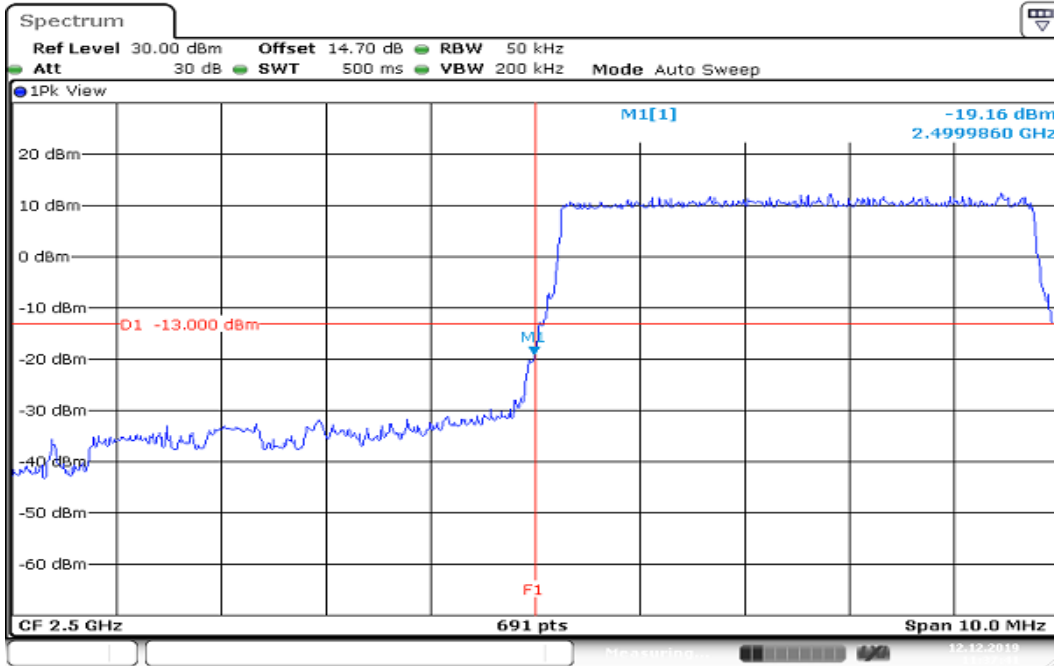
CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



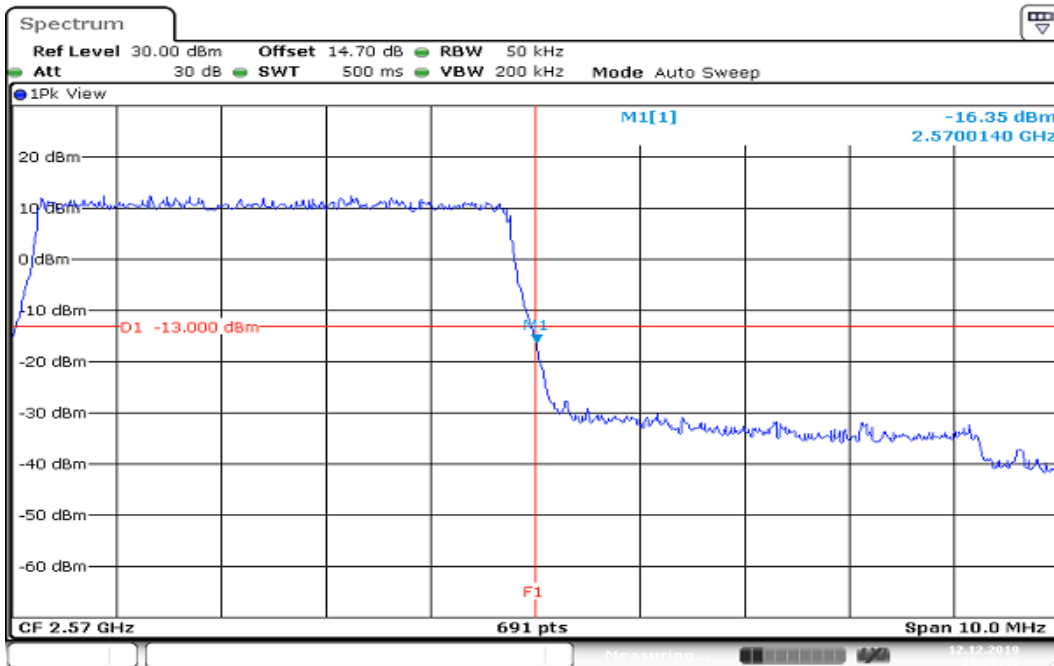
HIGHER BAND EDGE



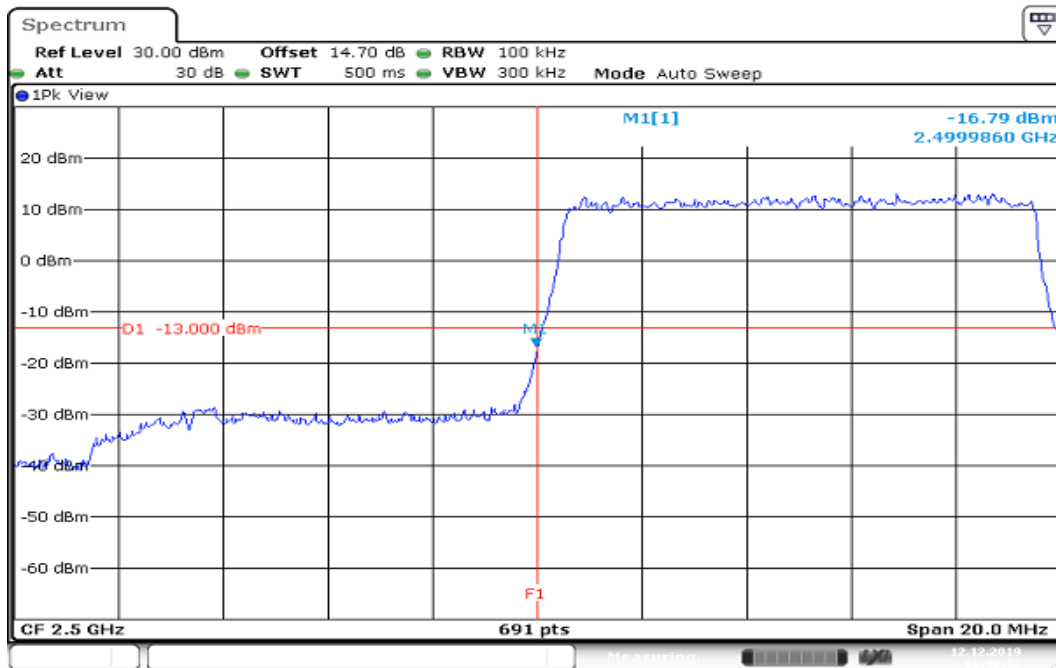
CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



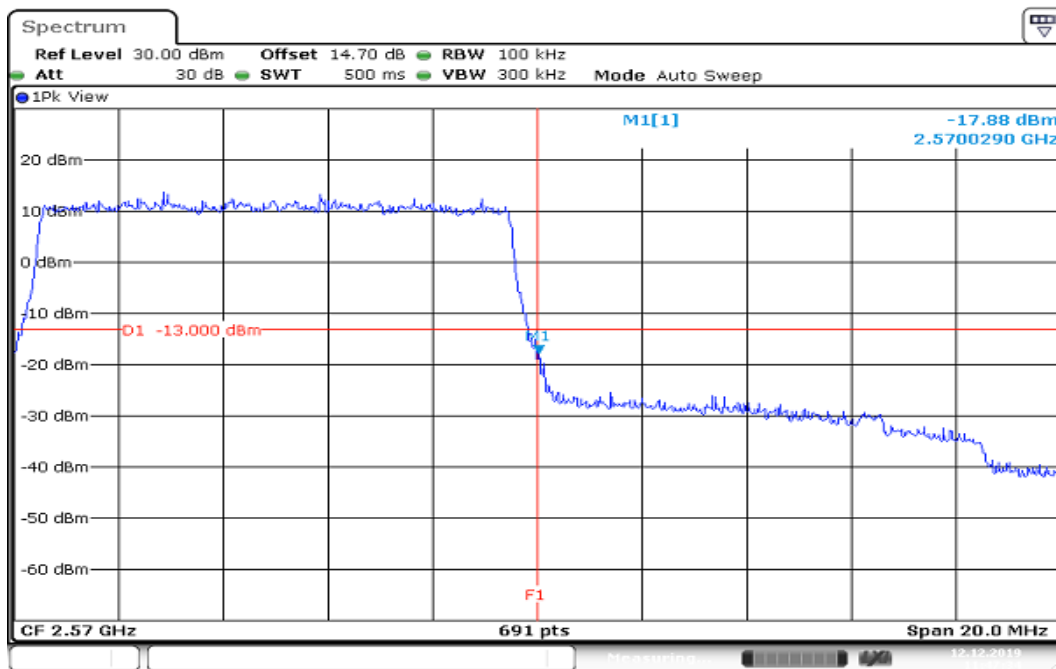
HIGHER BAND EDGE



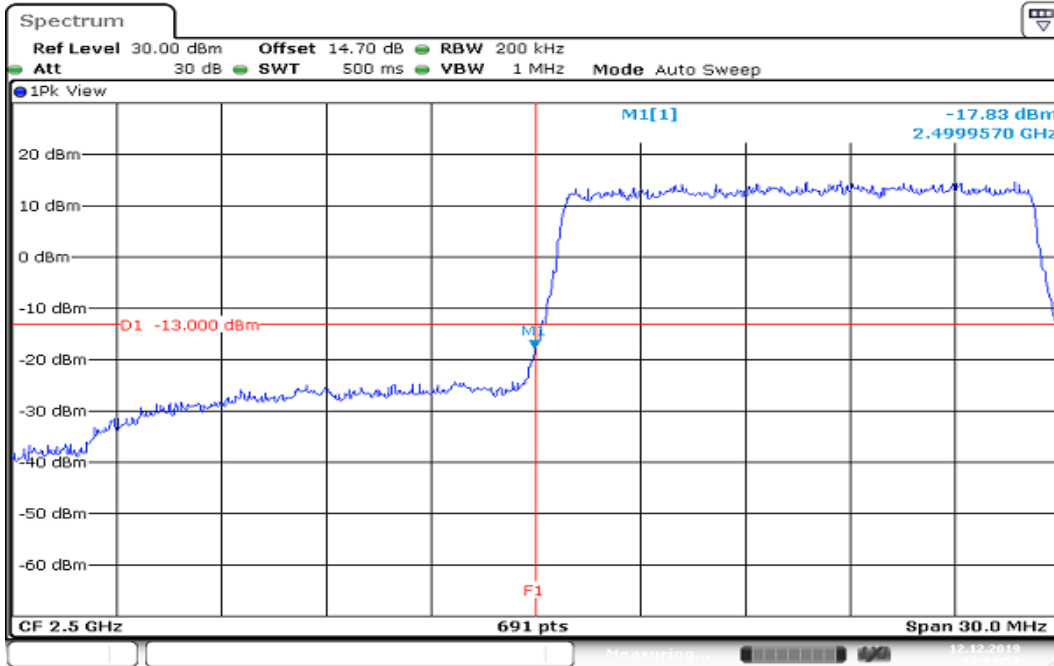
CHANNEL BANDWIDTH: 10MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



HIGHER BAND EDGE

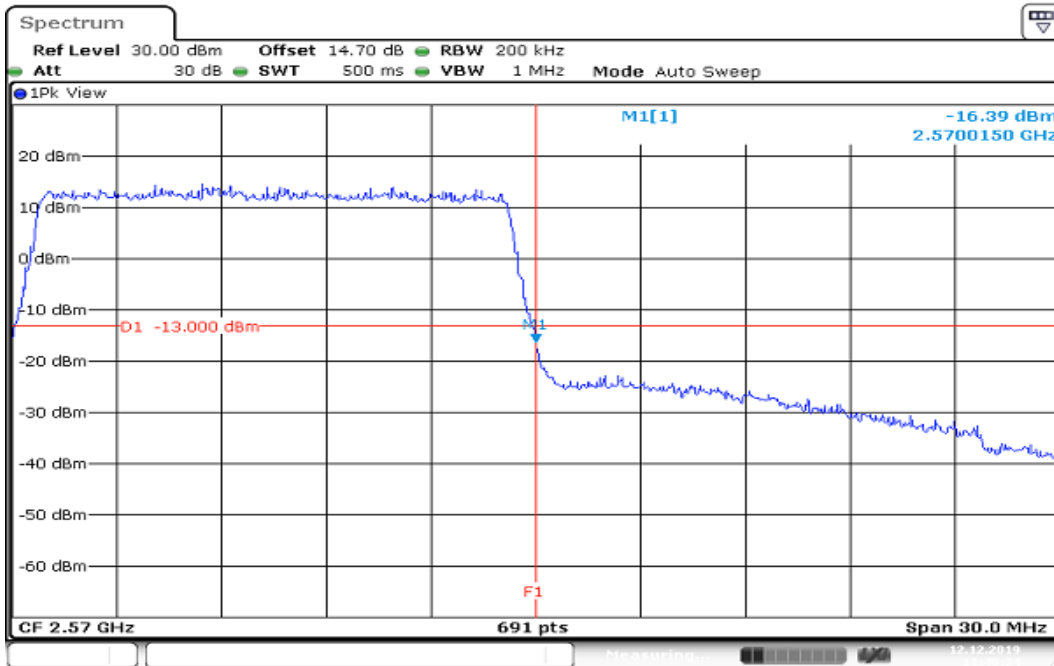


CHANNEL BANDWIDTH: 15MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



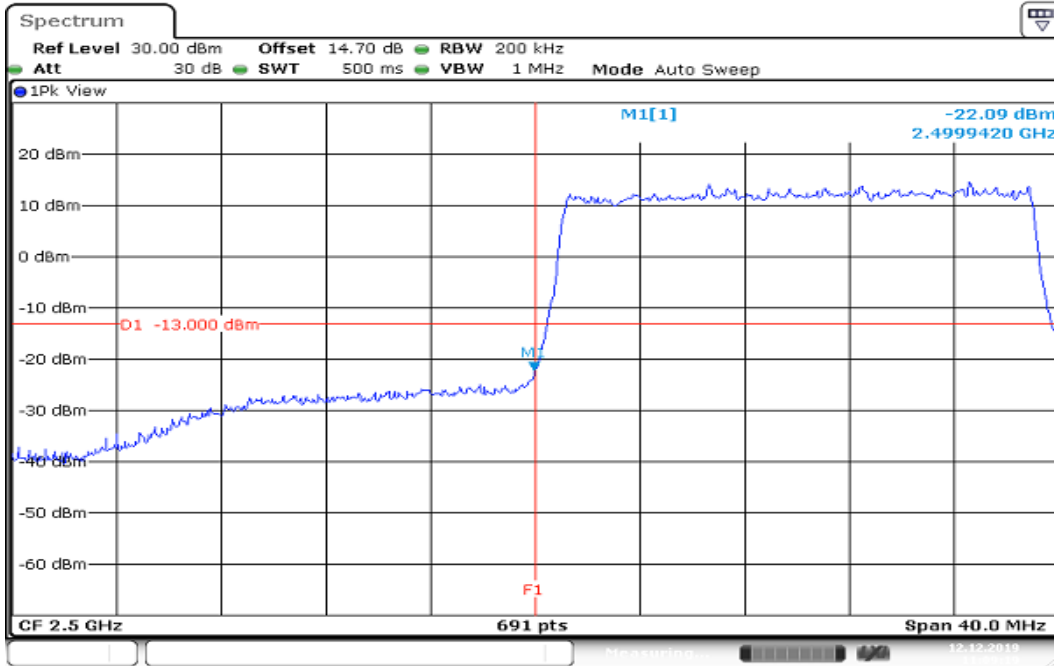
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HIGHER BAND EDGE

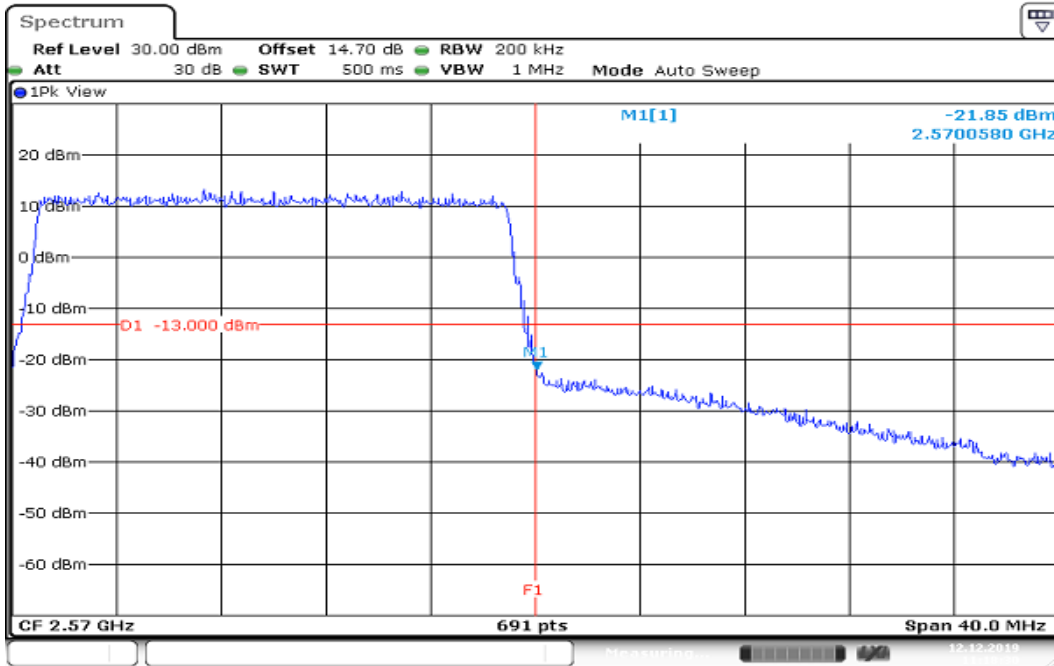


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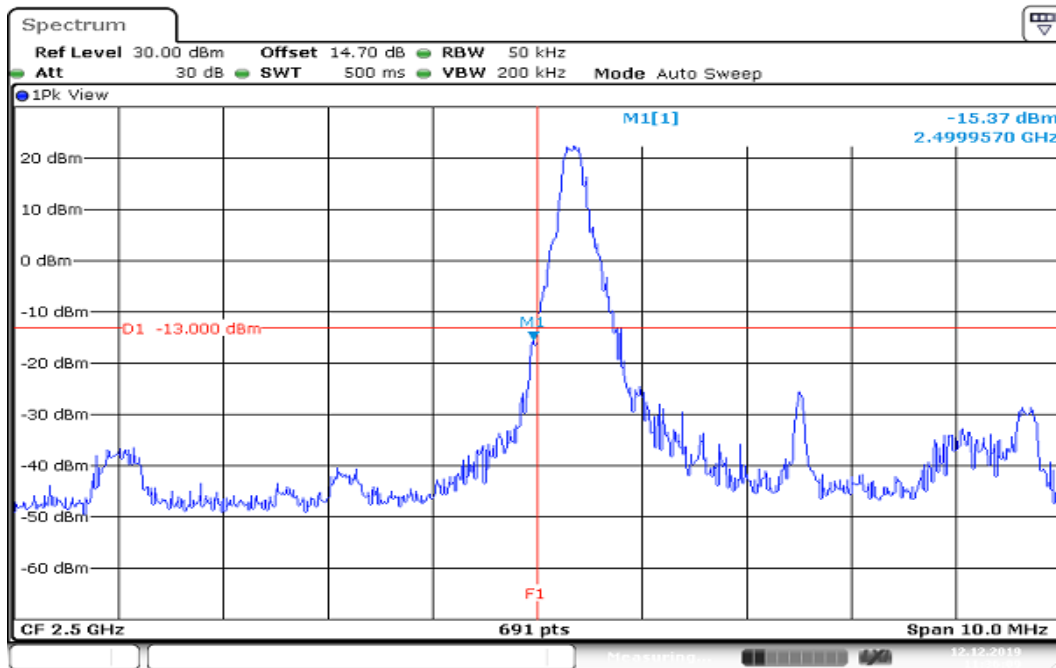
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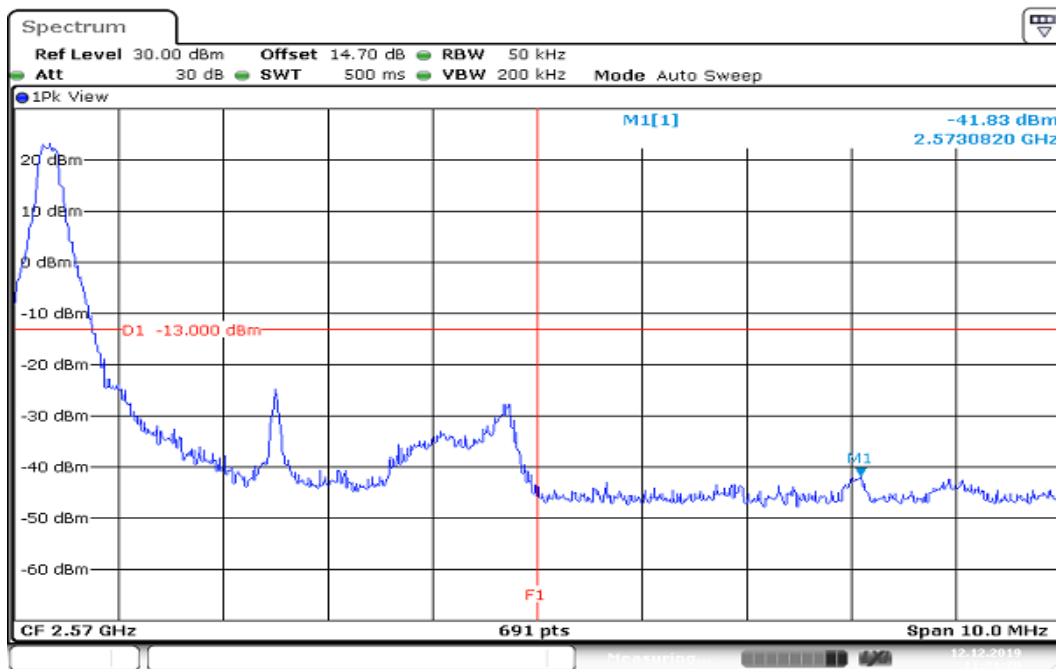
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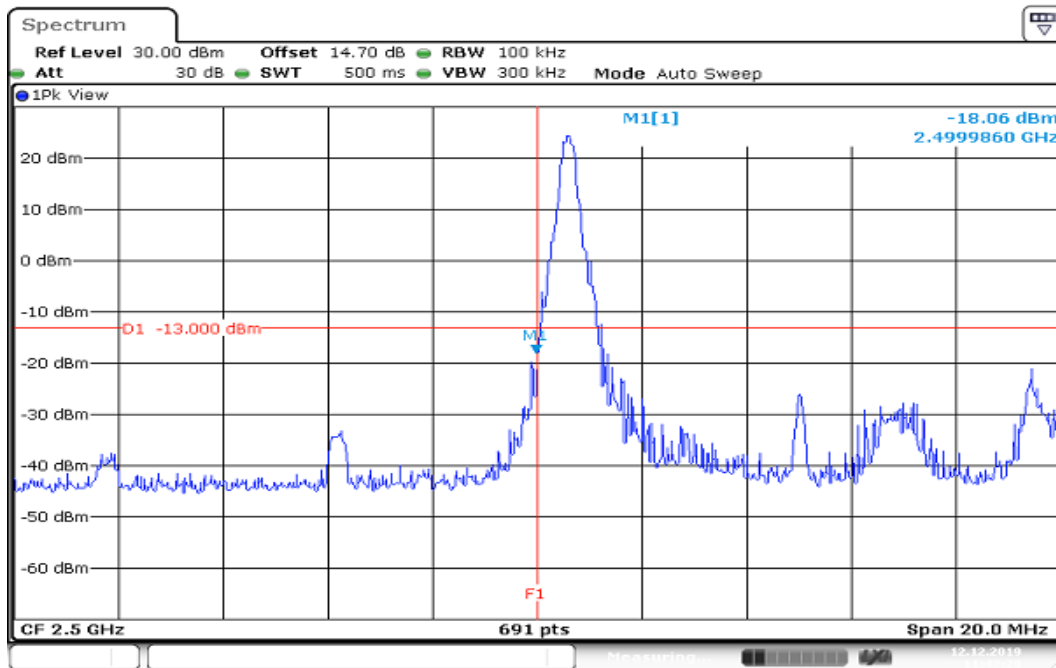
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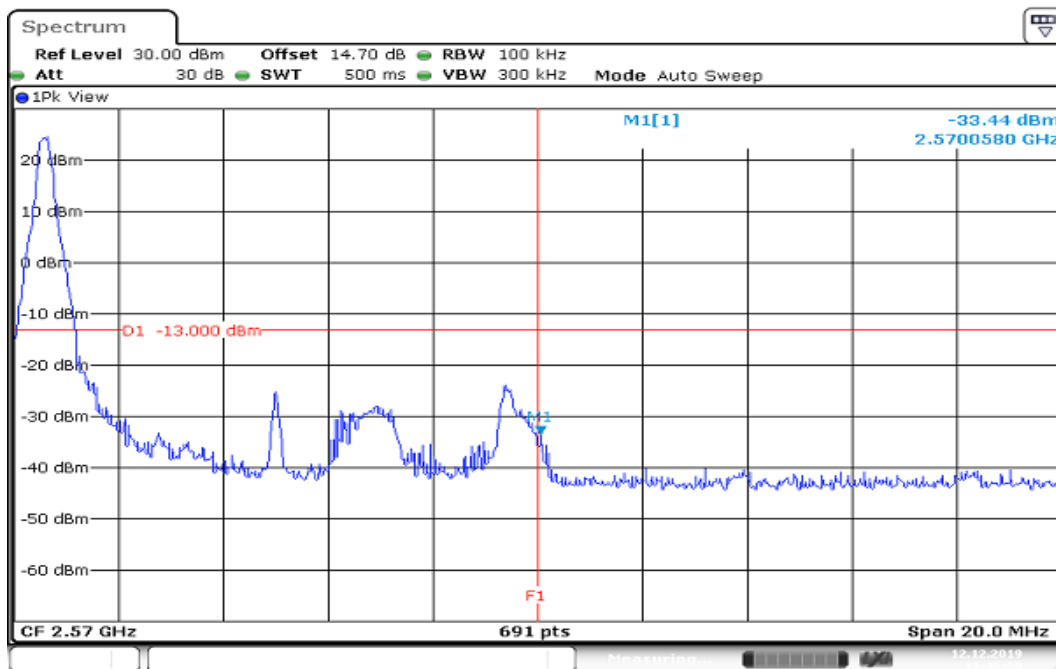
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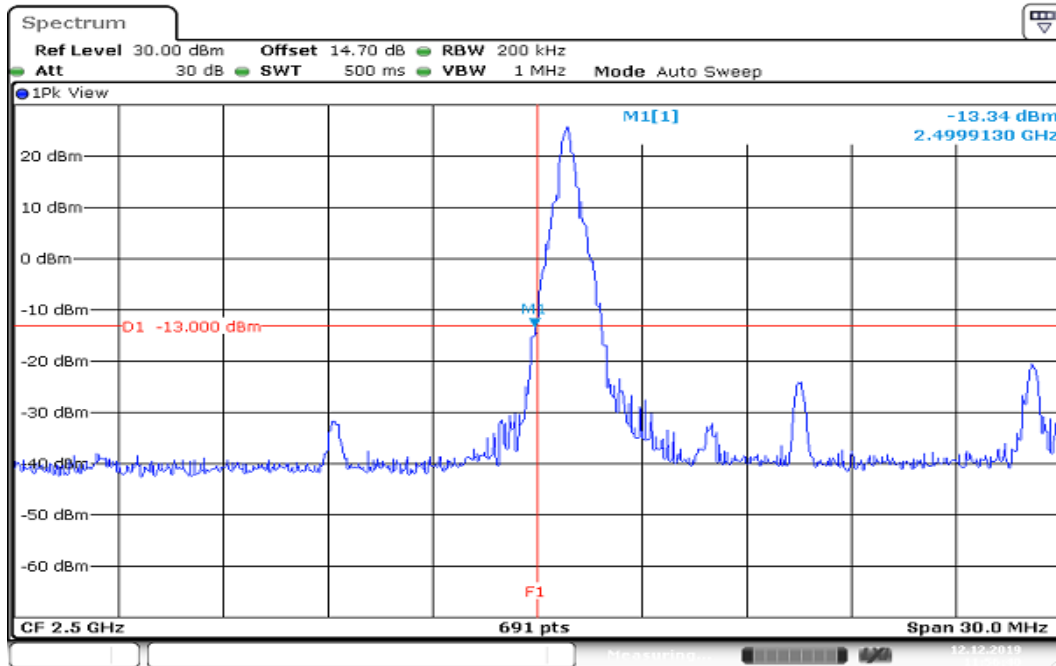
CHANNEL BANDWIDTH: 10MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



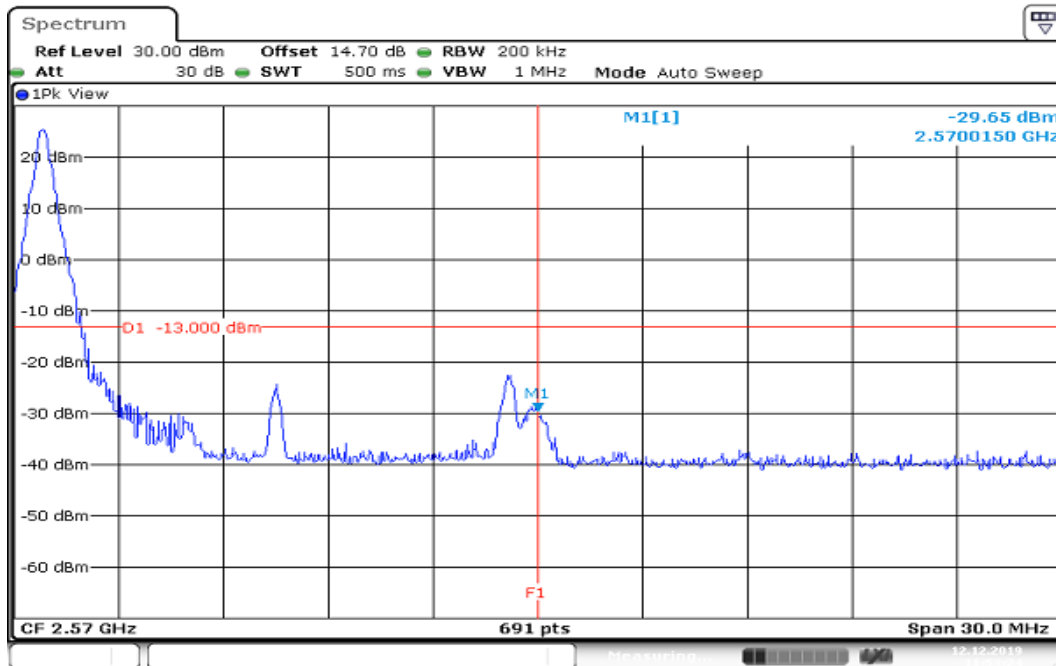
HIGHER BAND EDGE



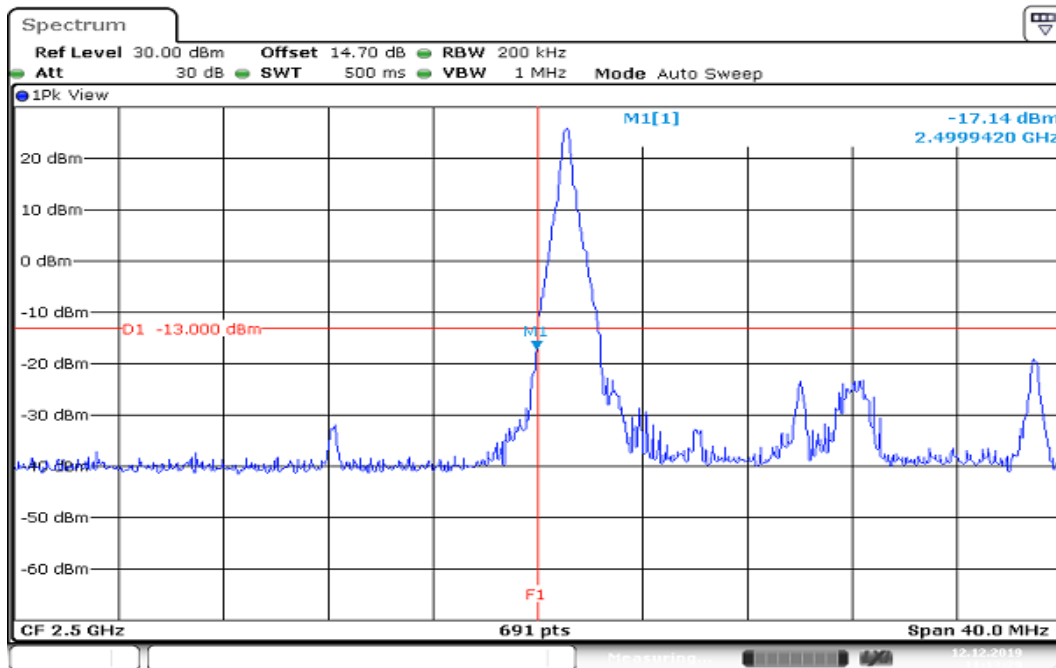
CHANNEL BANDWIDTH: 15MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



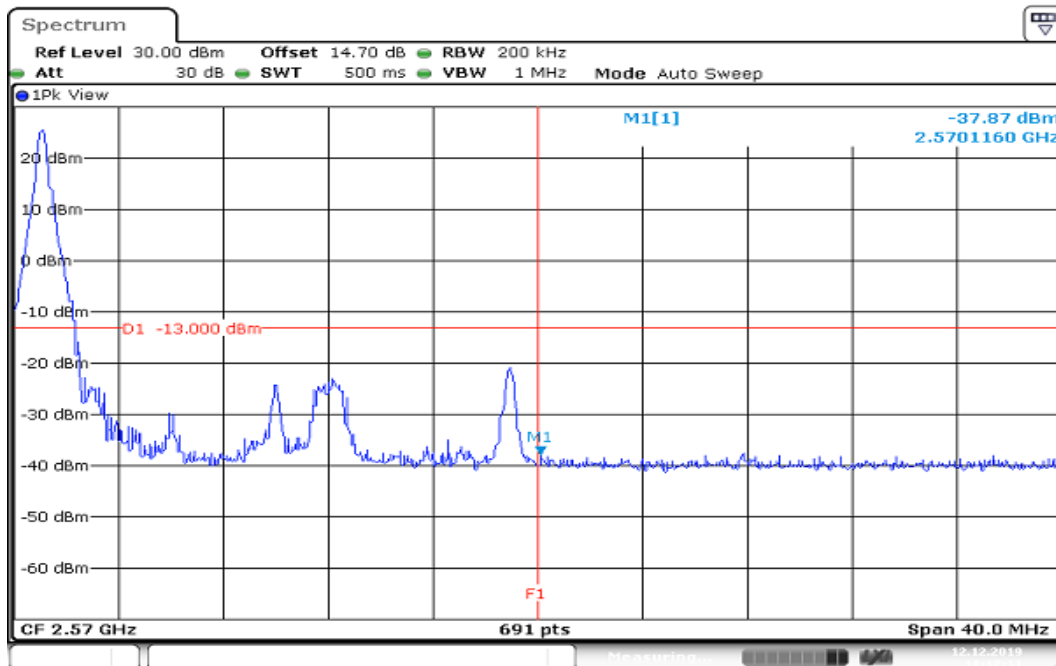
HIGHER BAND EDGE



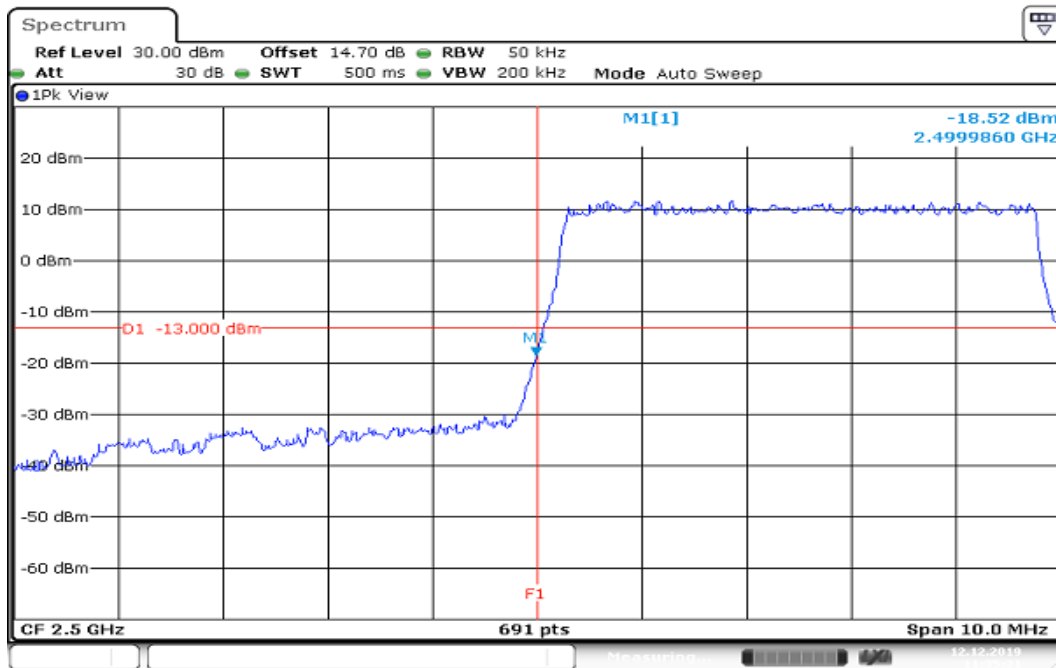
CHANNEL BANDWIDTH: 20MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



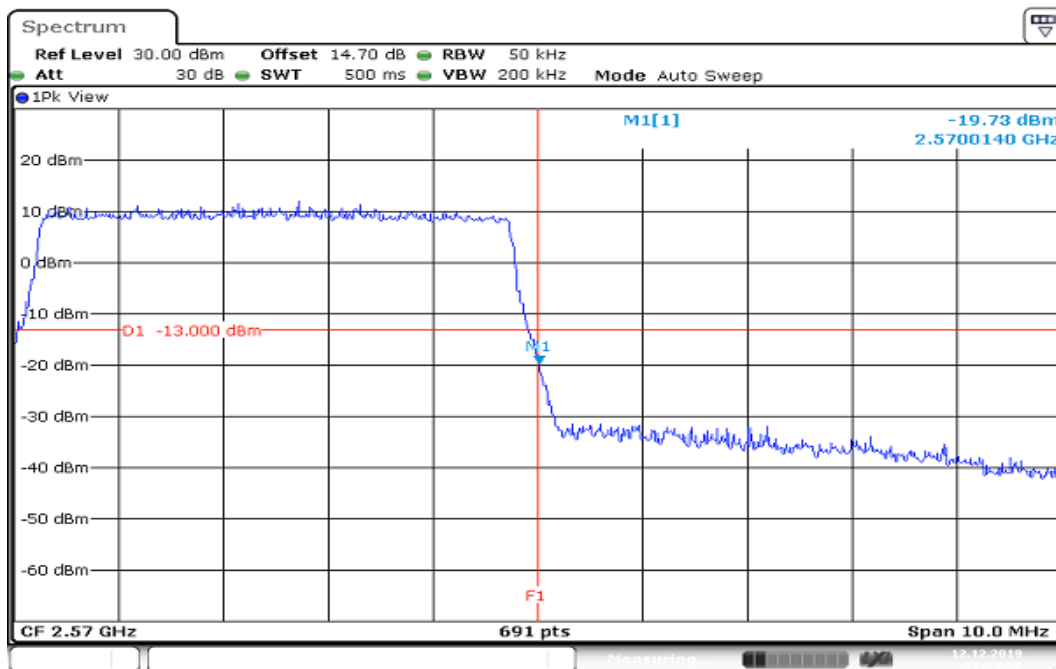
HIGHER BAND EDGE



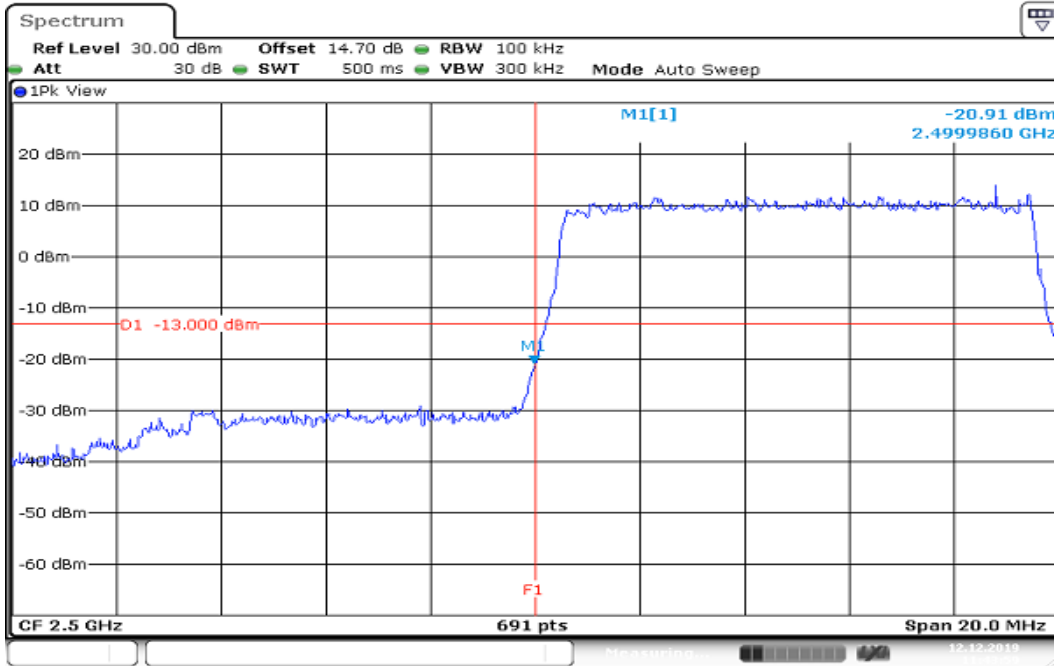
CHANNEL BANDWIDTH: 5MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



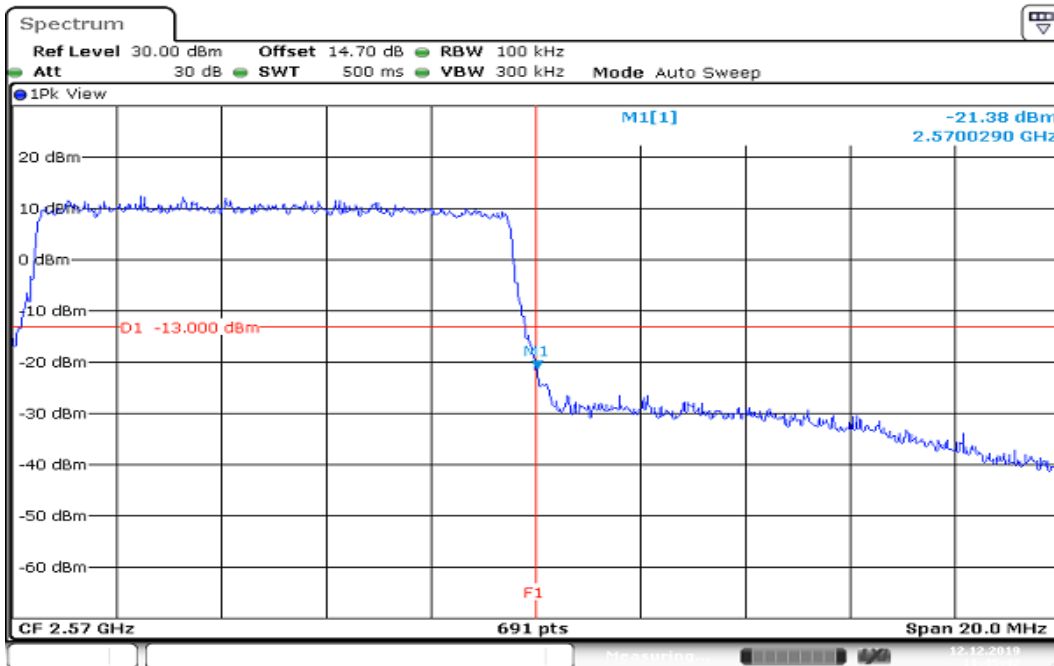
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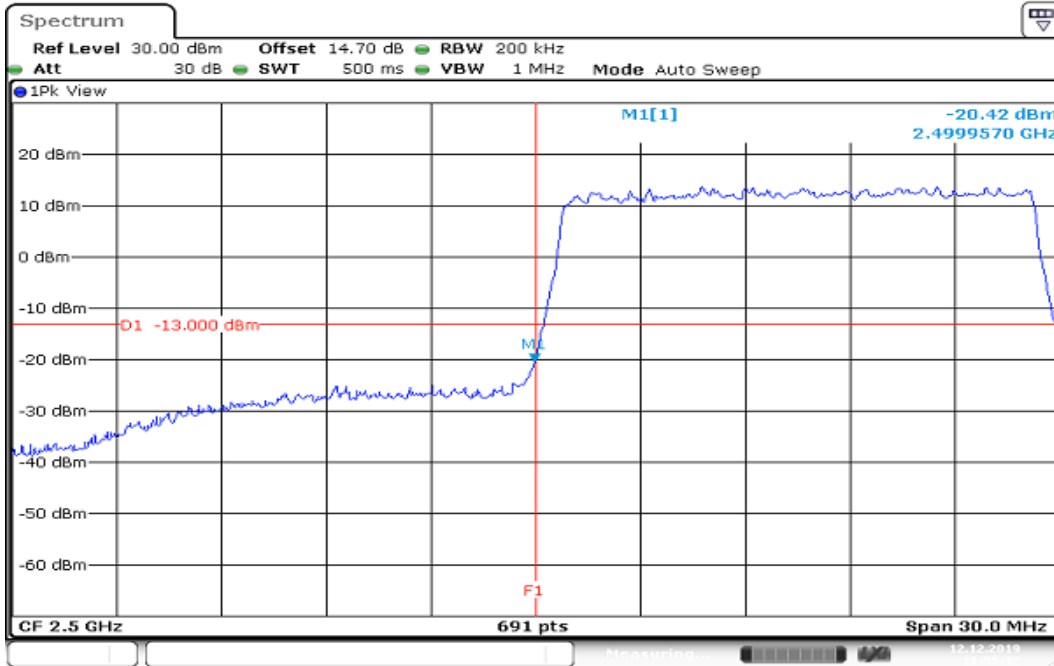
CHANNEL BANDWIDTH: 10MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



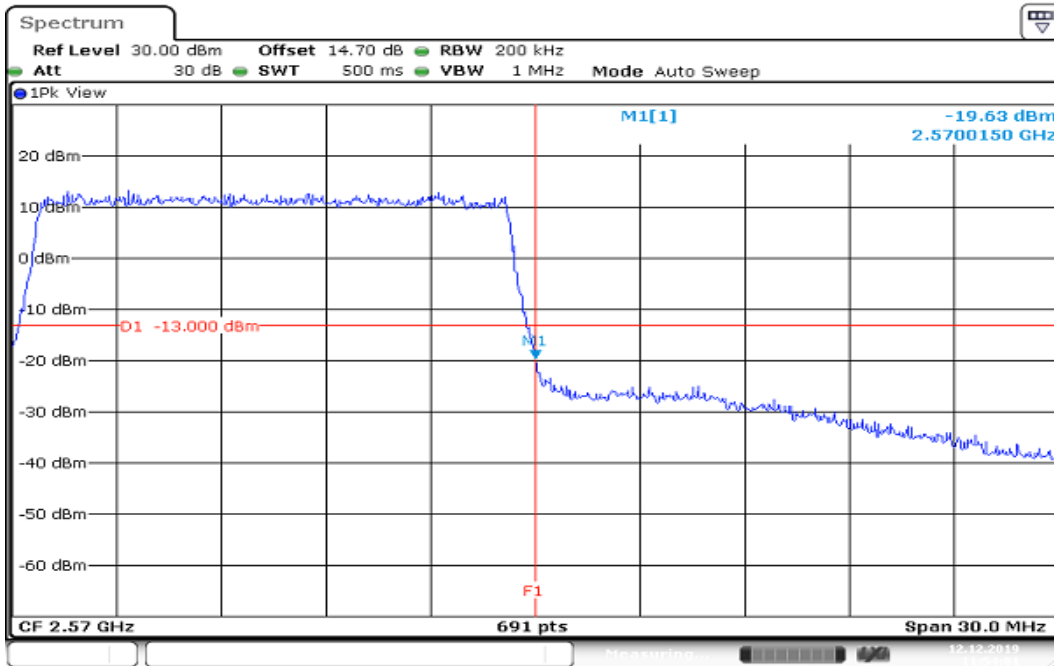
HIGHER BAND EDGE



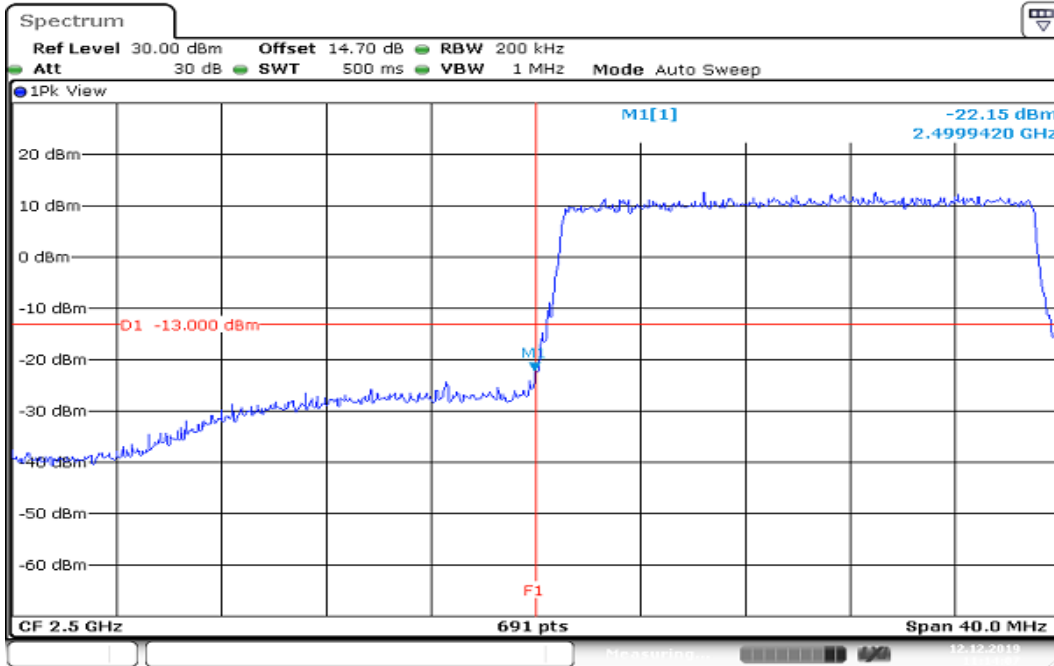
CHANNEL BANDWIDTH: 15MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



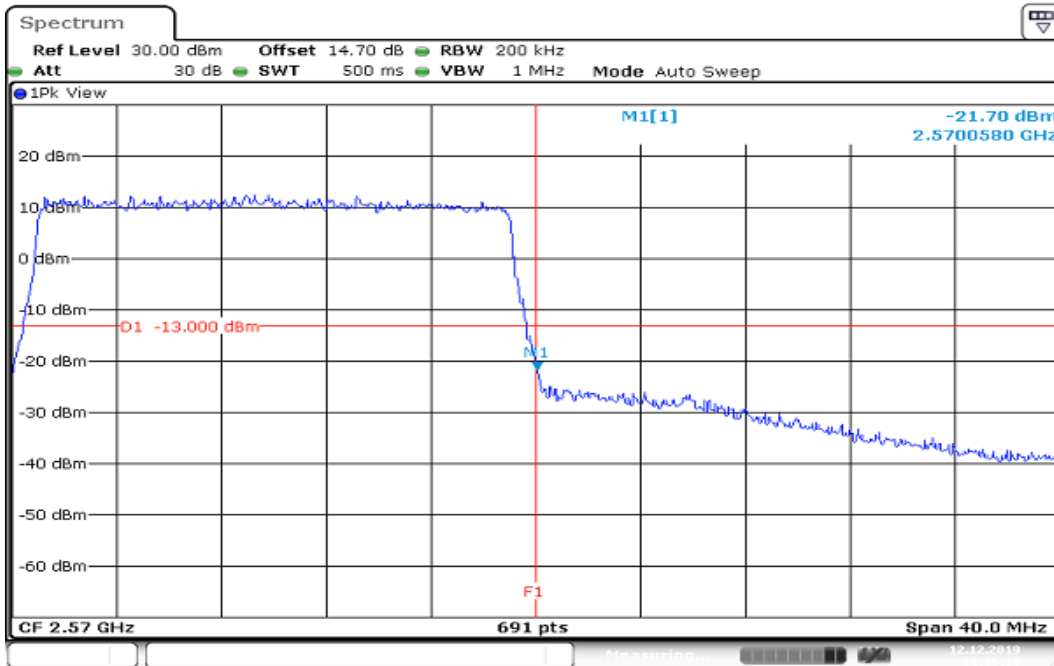
HIGHER BAND EDGE



CHANNEL BANDWIDTH: 20MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



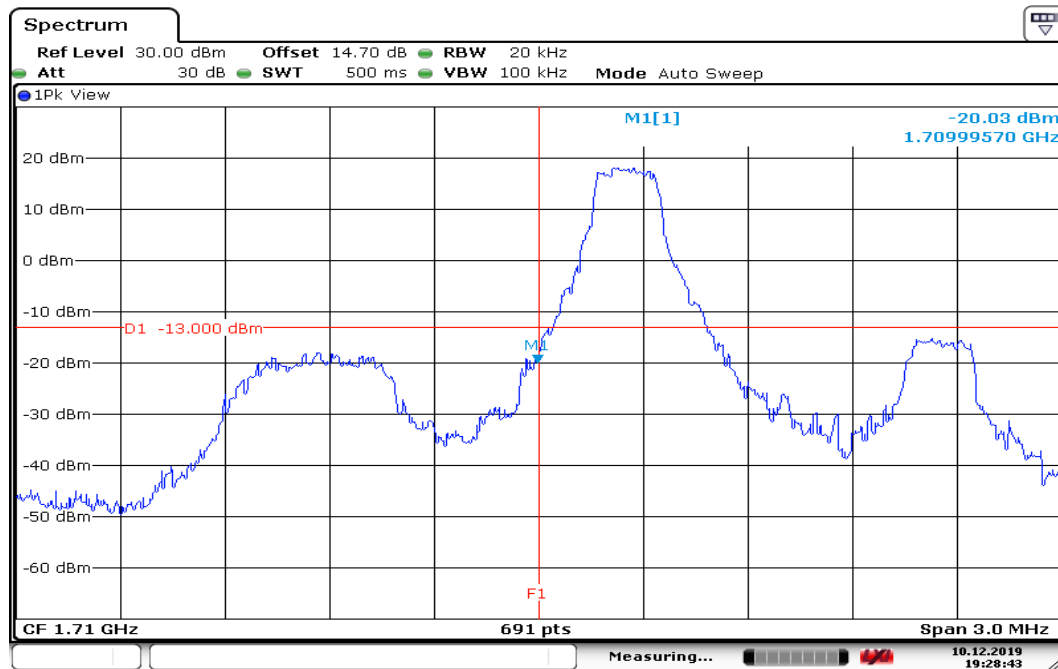
HIGHER BAND EDGE



LTE Band 4

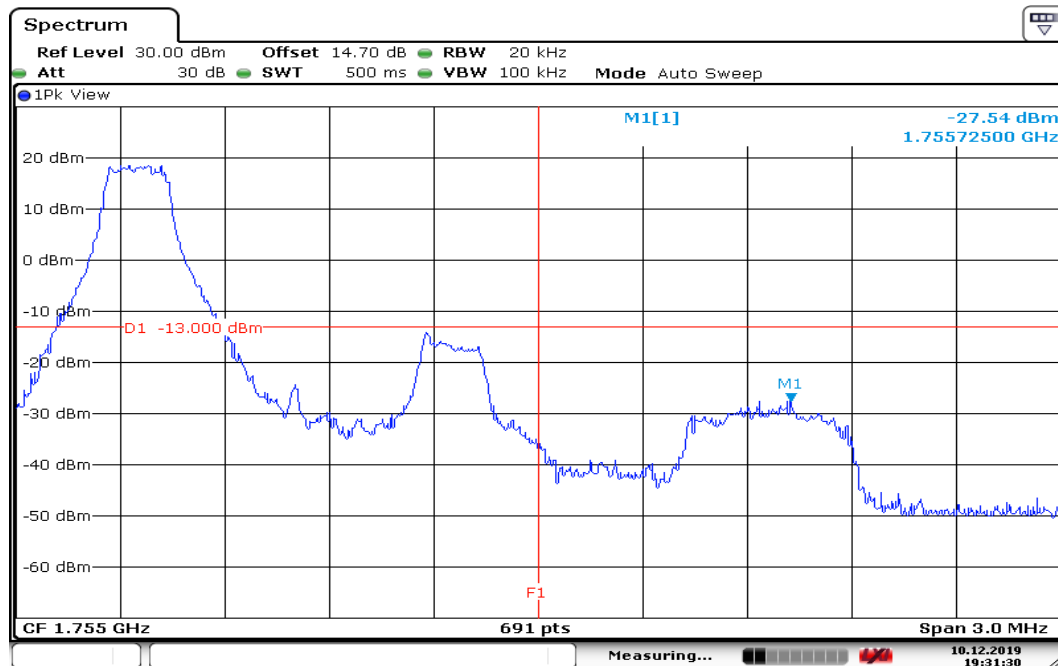
CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



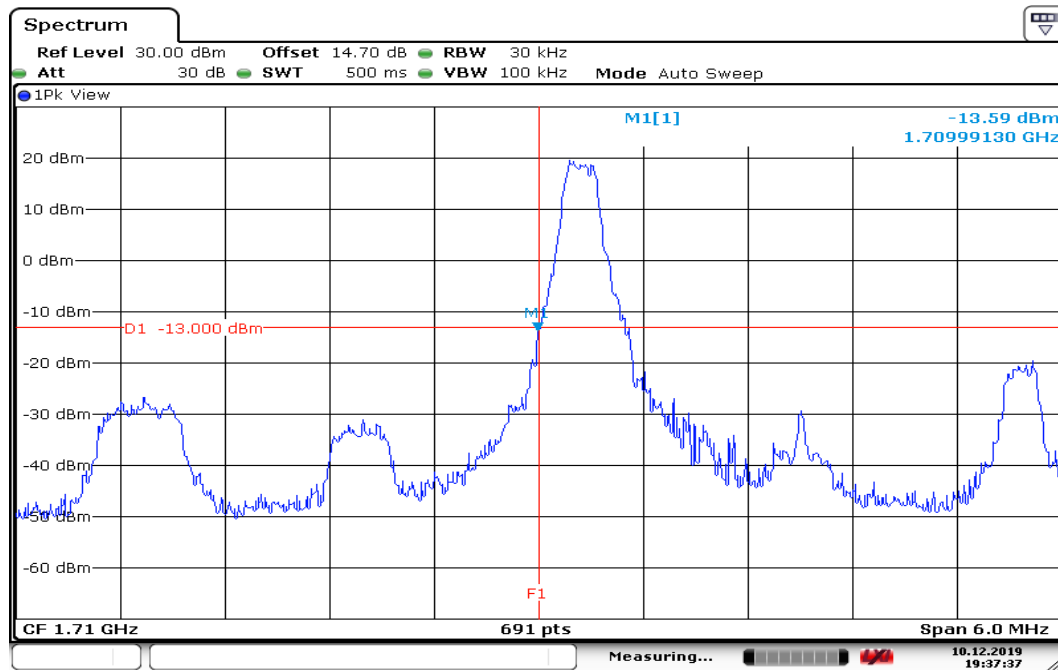
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HIGHER BAND EDGE



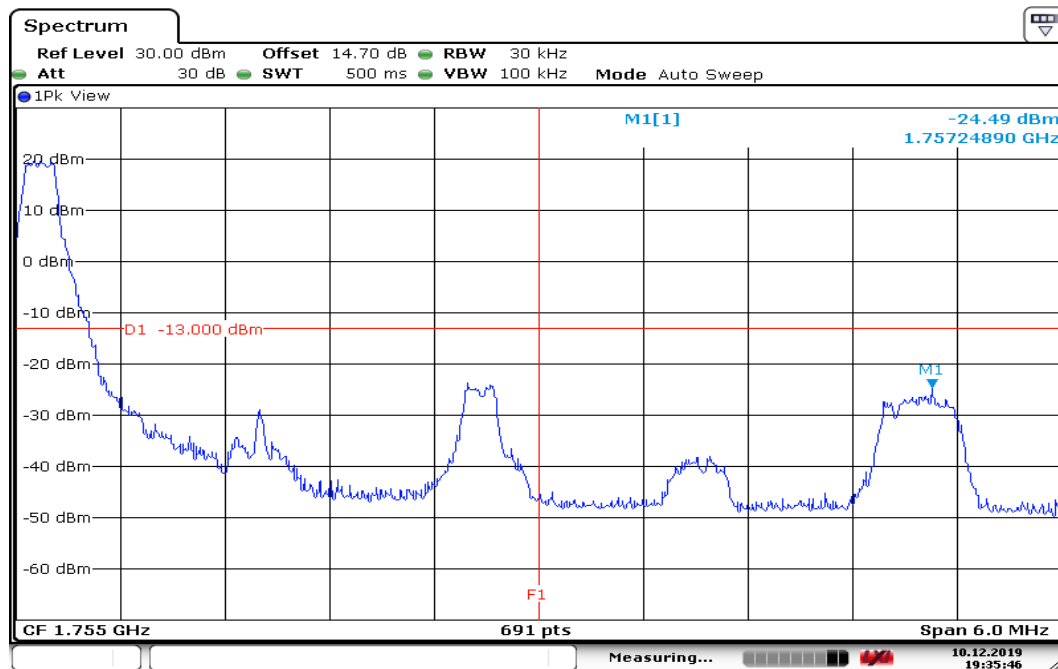
Date: 10.DEC.2019 19:31:30

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



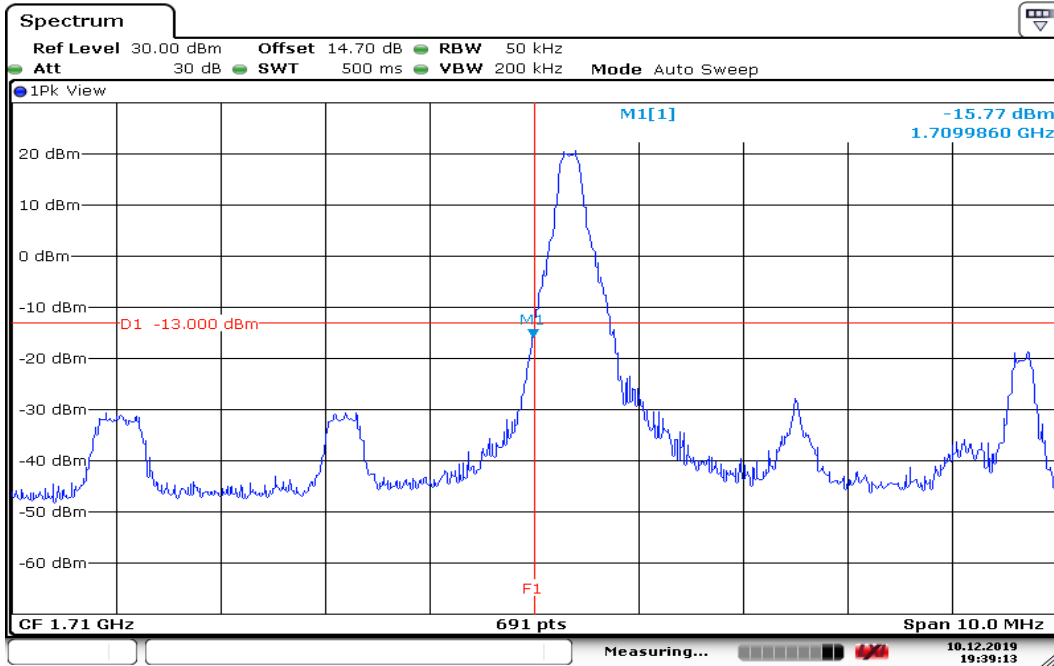
Date: 10.DEC.2019 19:37:38

HIGHER BAND EDGE



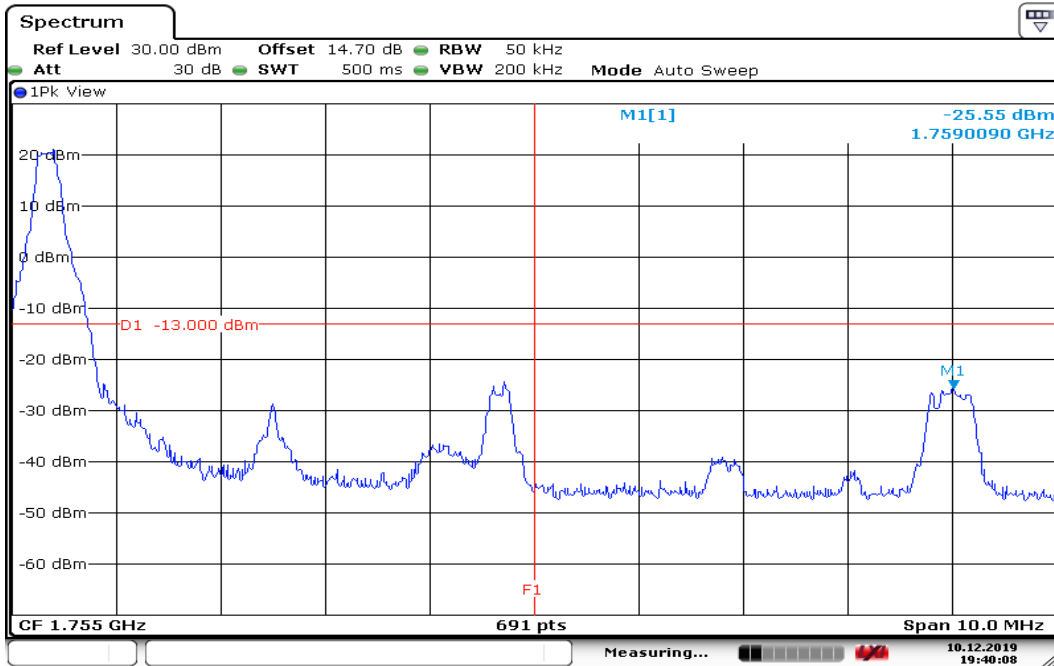
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CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



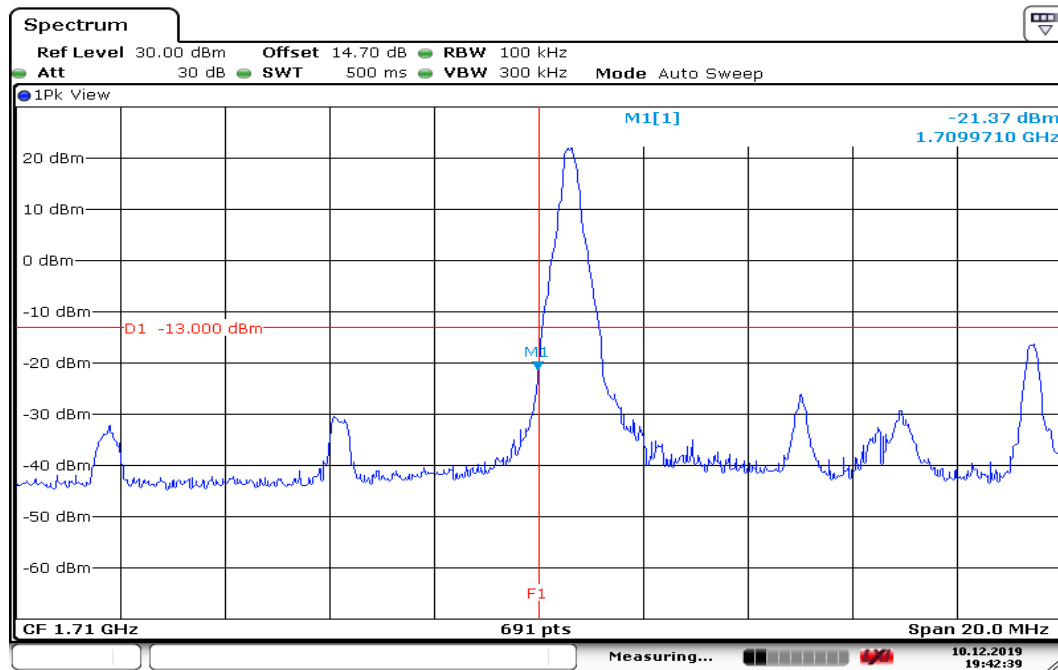
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HIGHER BAND EDGE



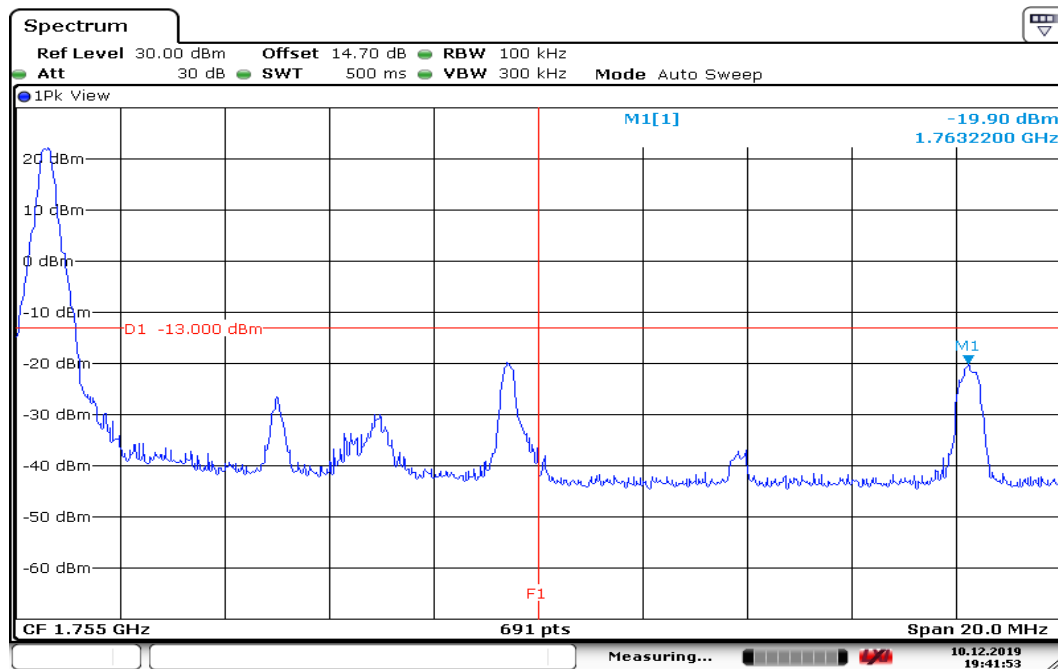
Date: 10.DEC.2019 19:40:08

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



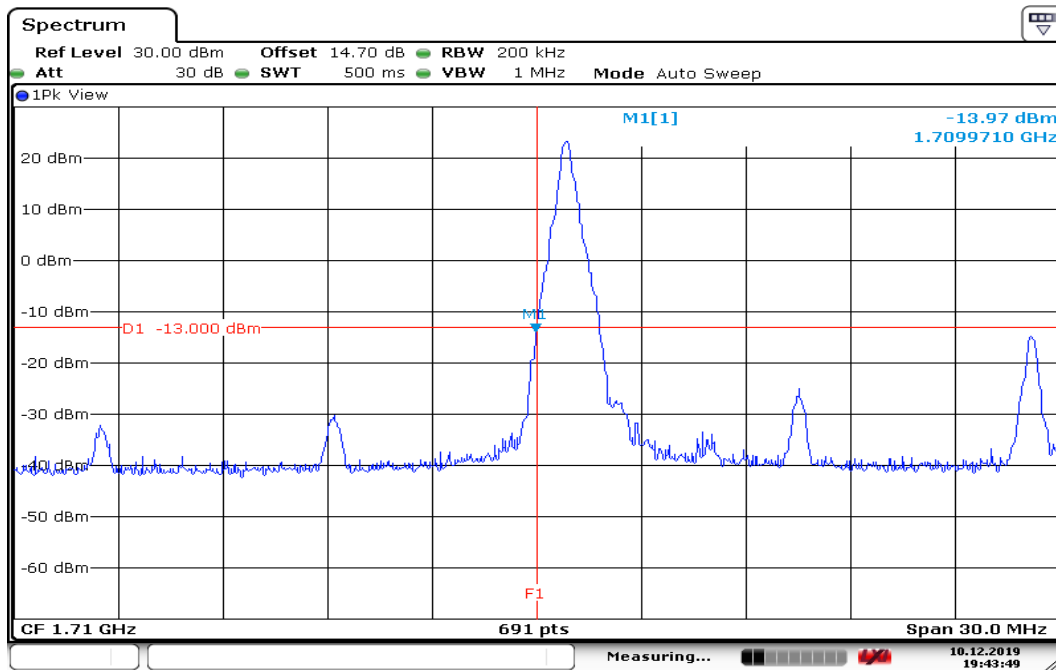
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HIGHER BAND EDGE



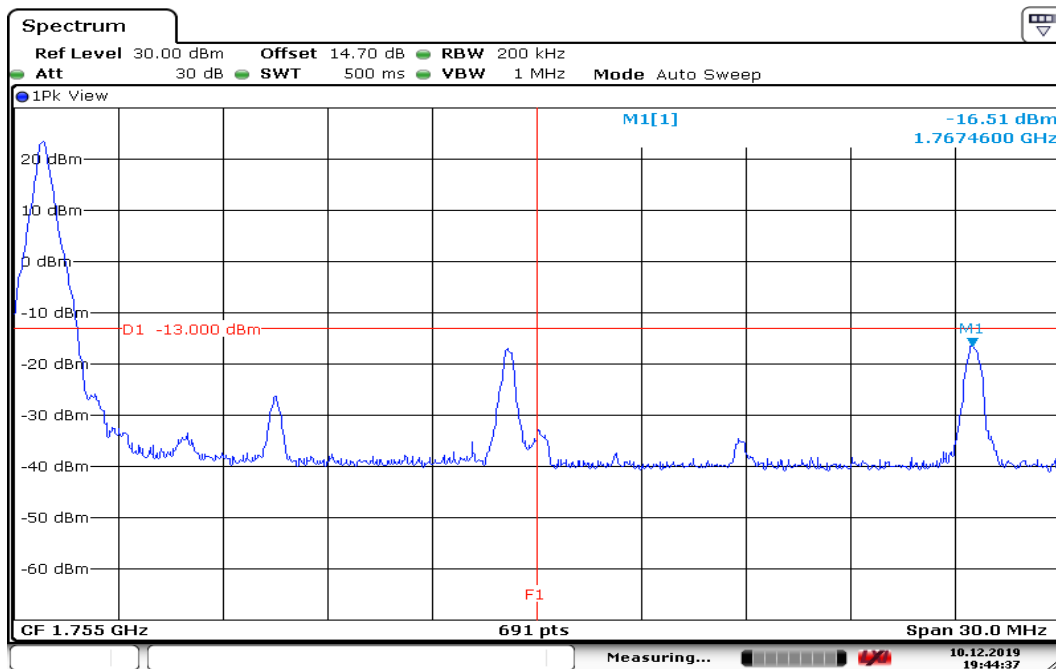
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CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



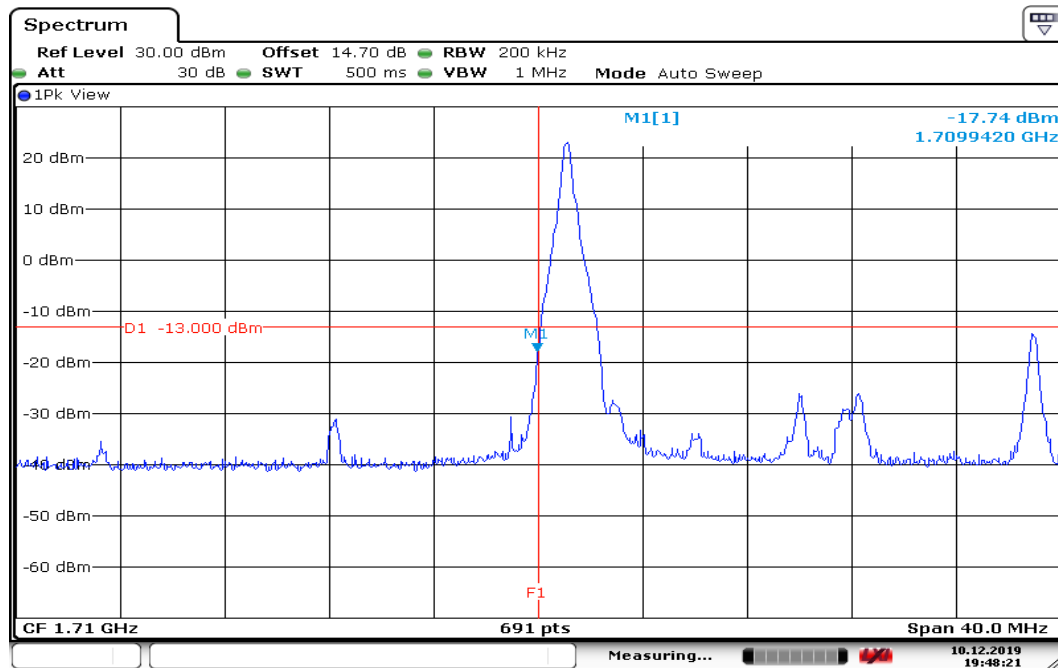
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HIGHER BAND EDGE



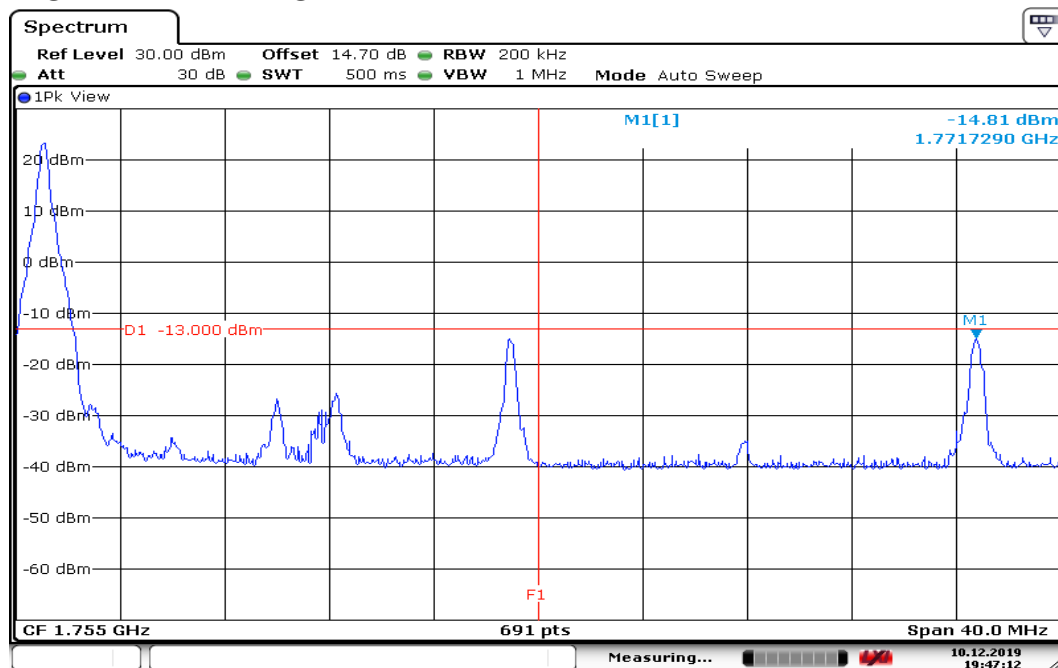
Date: 10.DEC.2019 19:44:38

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



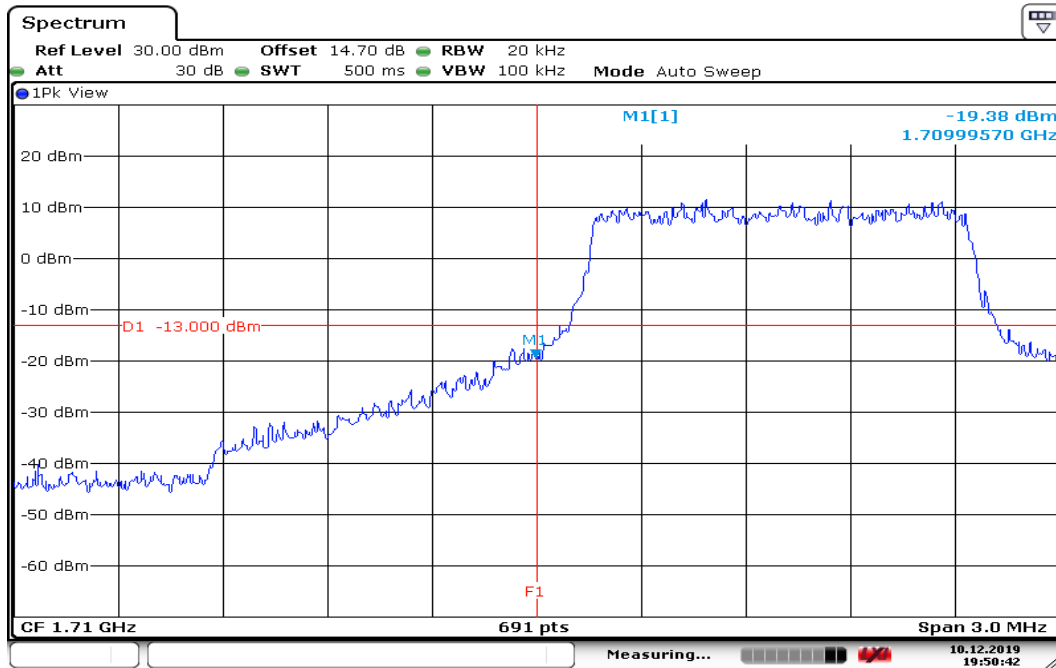
Date: 10.DEC.2019 19:48:22

HIGHER BAND EDGE



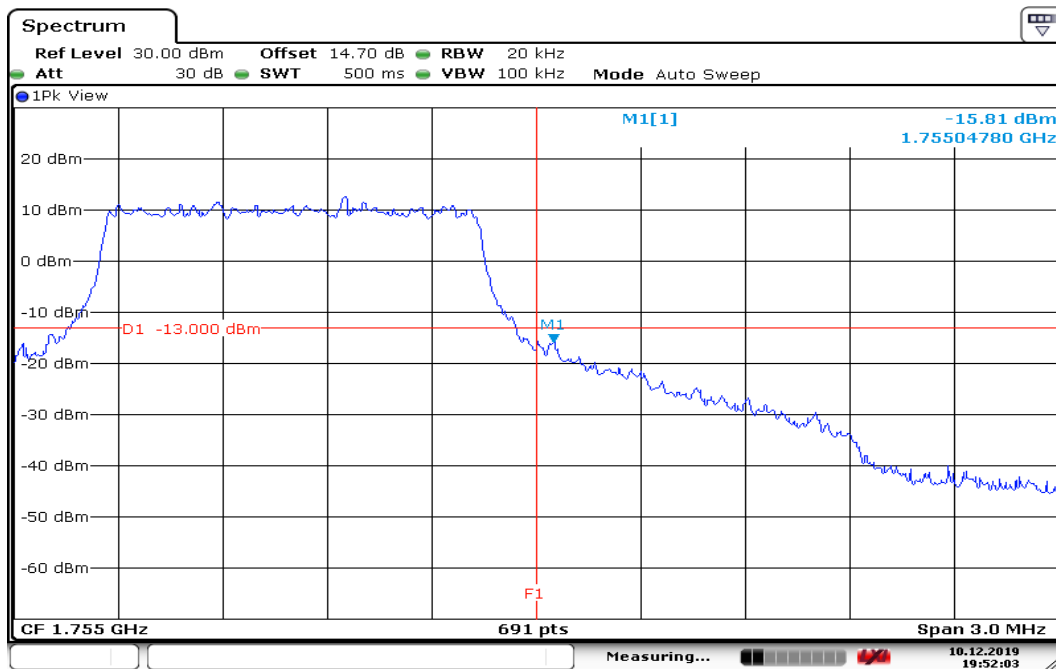
Date: 10.DEC.2019 19:47:12

CHANNEL BANDWIDTH: 1.4MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



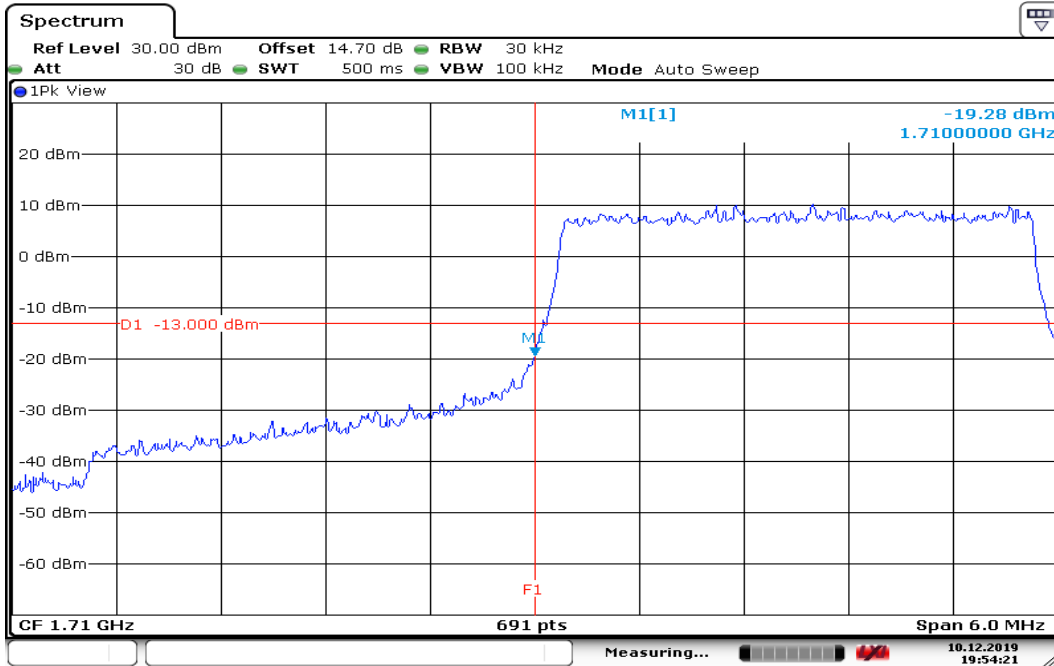
Date: 10.DEC.2019 19:50:43

HIGHER BAND EDGE



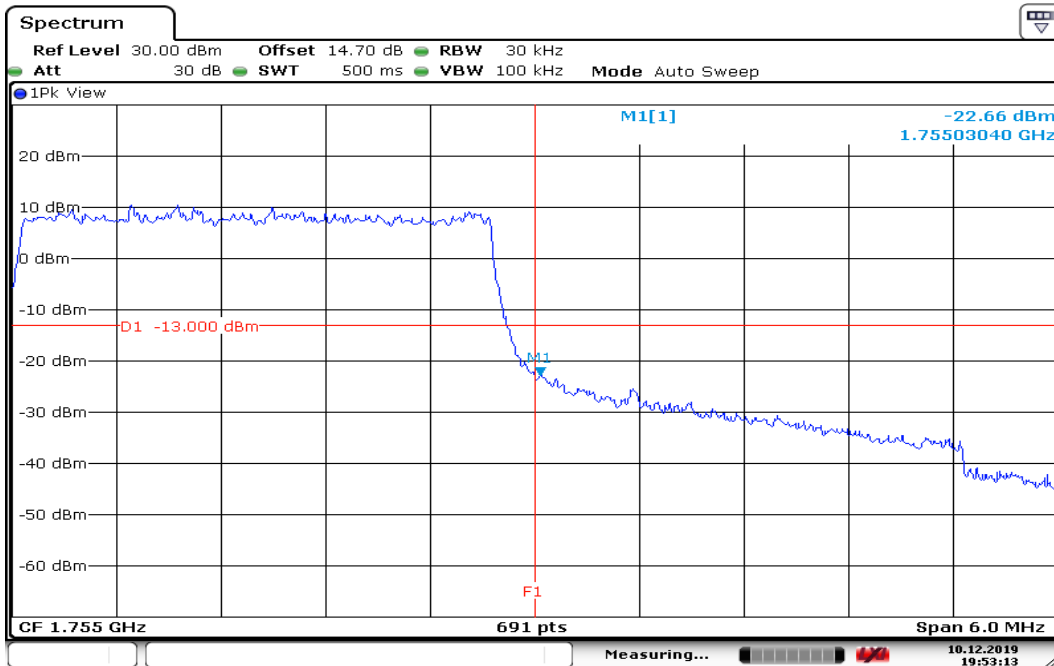
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CHANNEL BANDWIDTH: 3MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



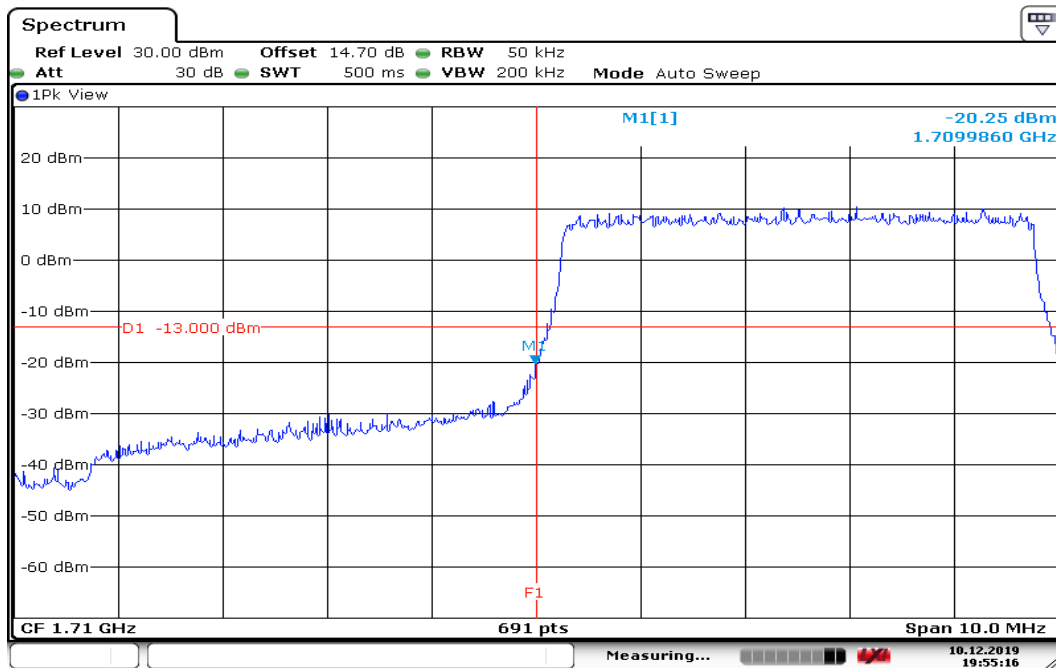
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HIGHER BAND EDGE



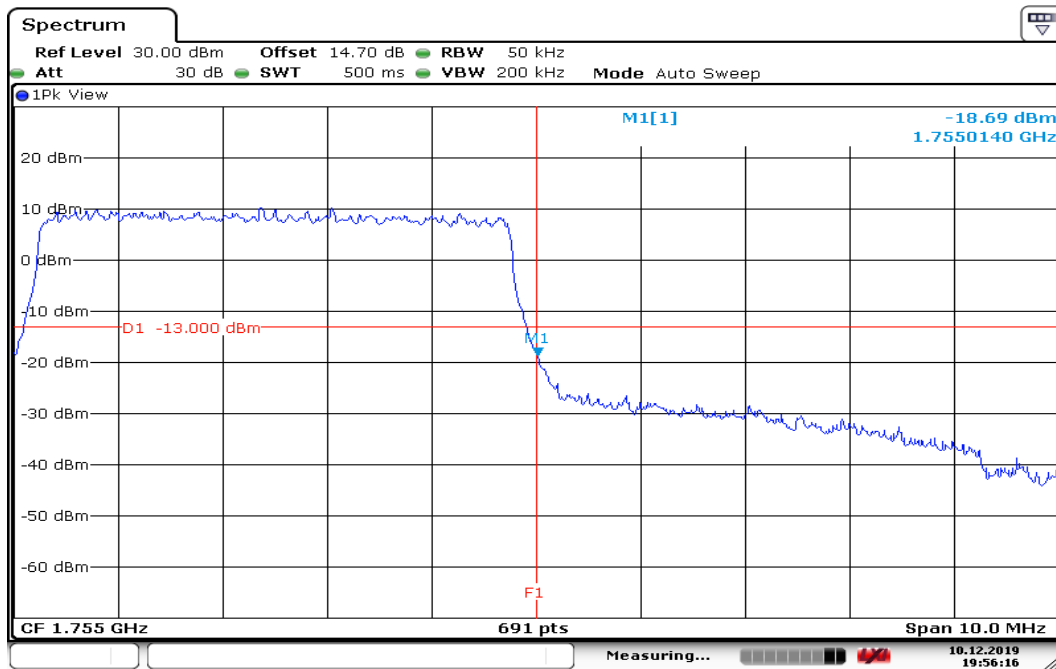
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CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



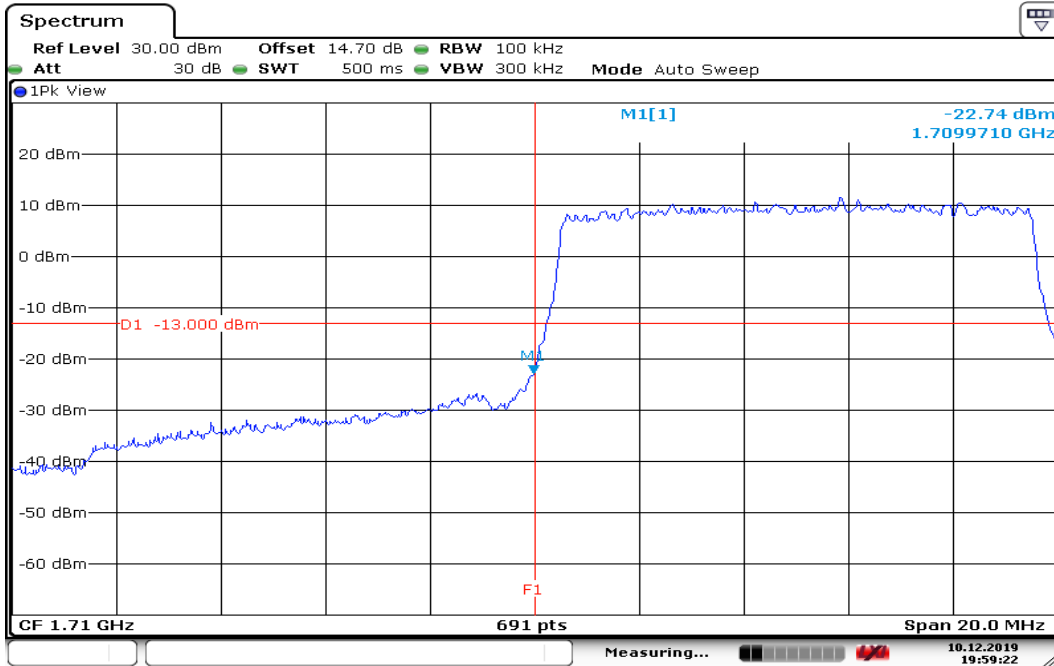
Date: 10.DEC.2019 19:55:17

HIGHER BAND EDGE



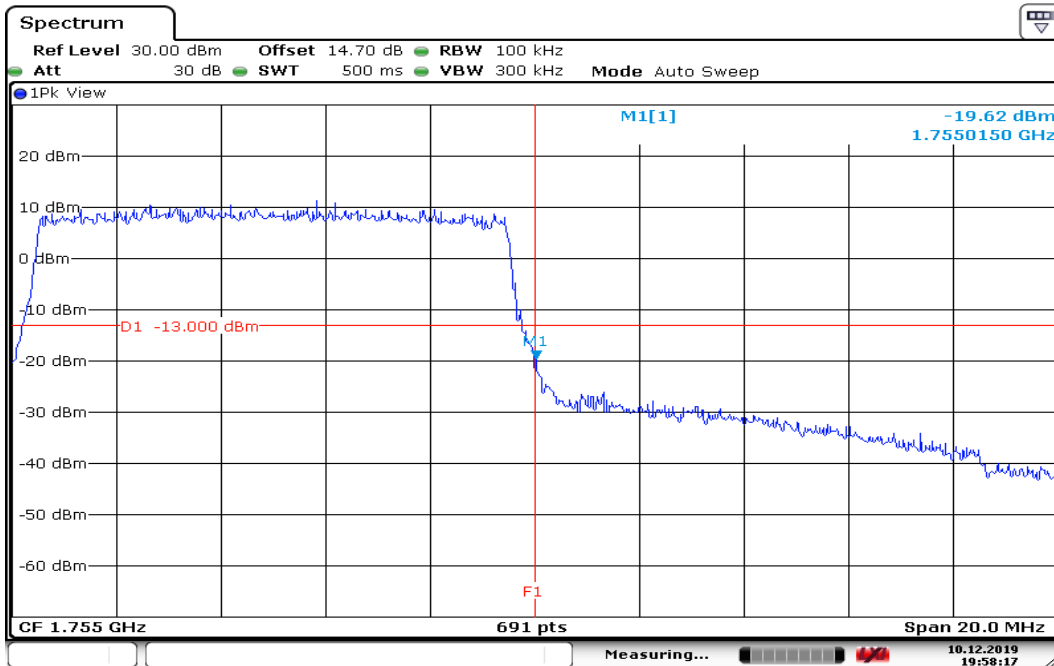
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CHANNEL BANDWIDTH: 10MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



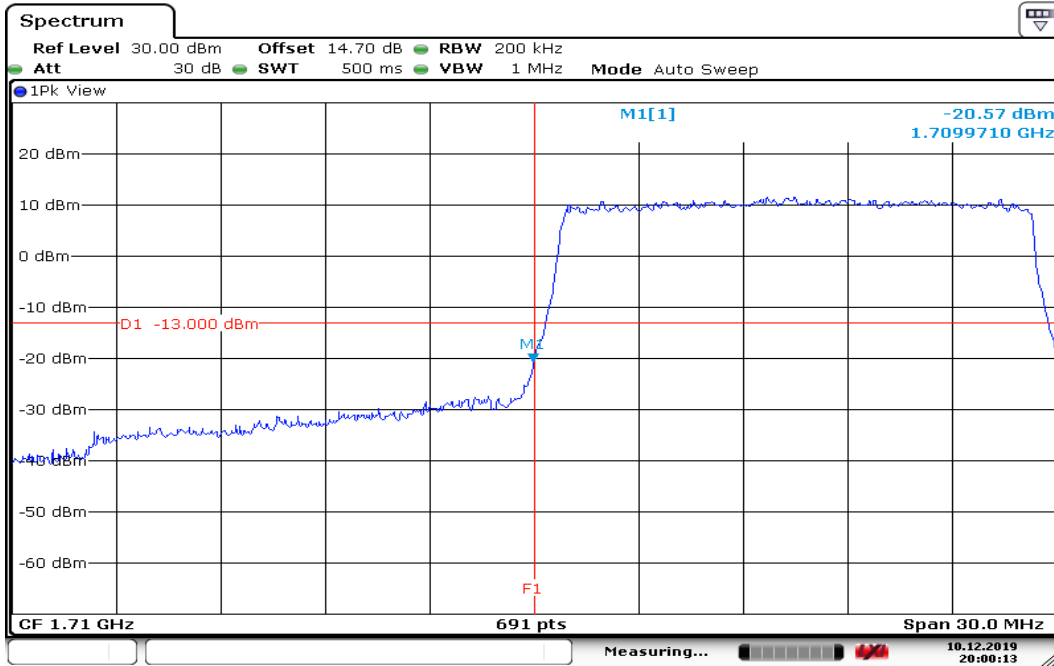
Date: 10.DEC.2019 19:59:23

HIGHER BAND EDGE



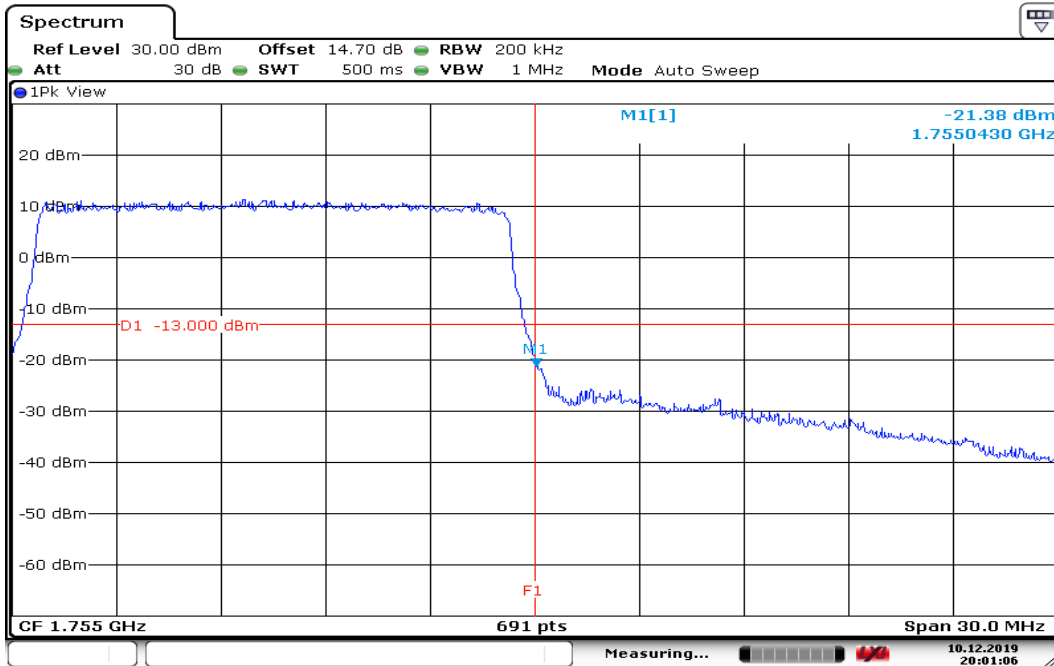
Date: 10.DEC.2019 19:58:18

CHANNEL BANDWIDTH: 15MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



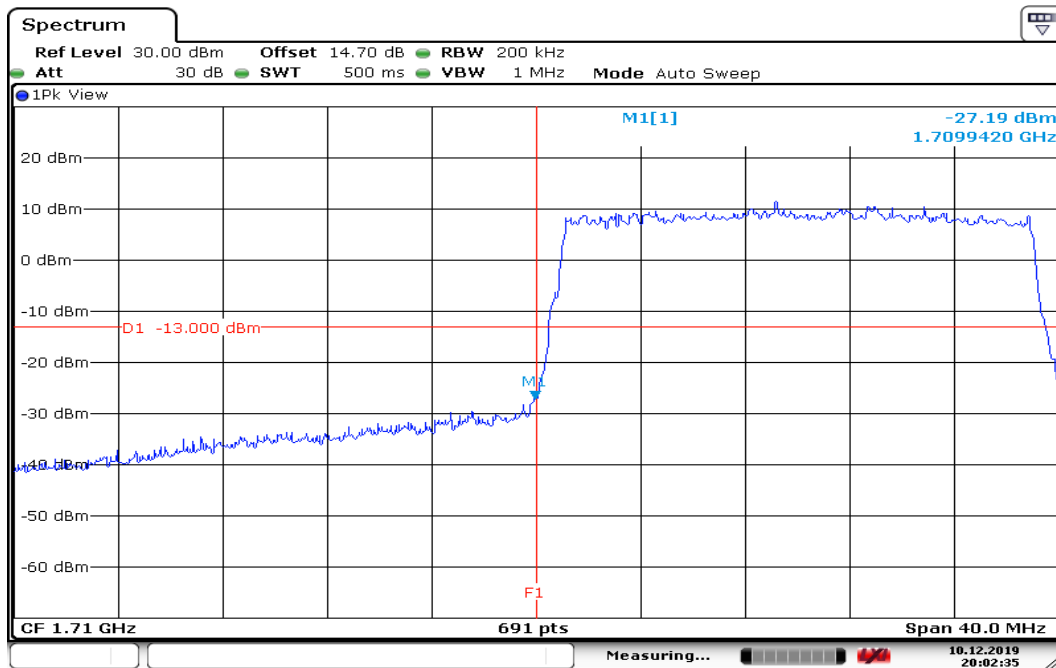
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HIGHER BAND EDGE



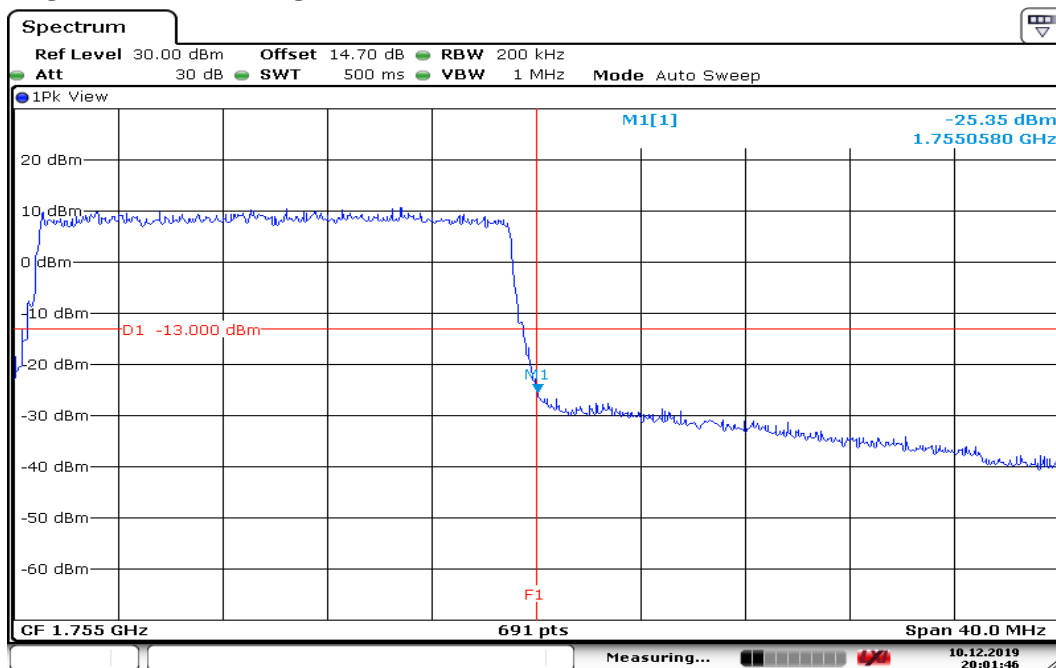
Date: 10.DEC.2019 20:01:07

CHANNEL BANDWIDTH: 20MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



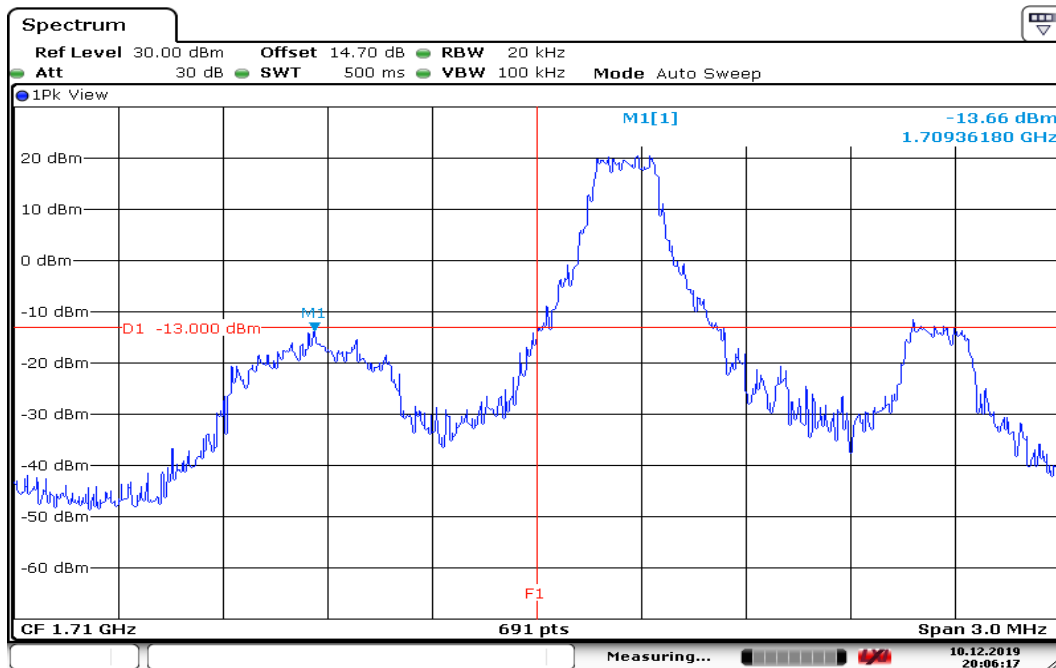
Date: 10.DEC.2019 20:02:35

HIGHER BAND EDGE



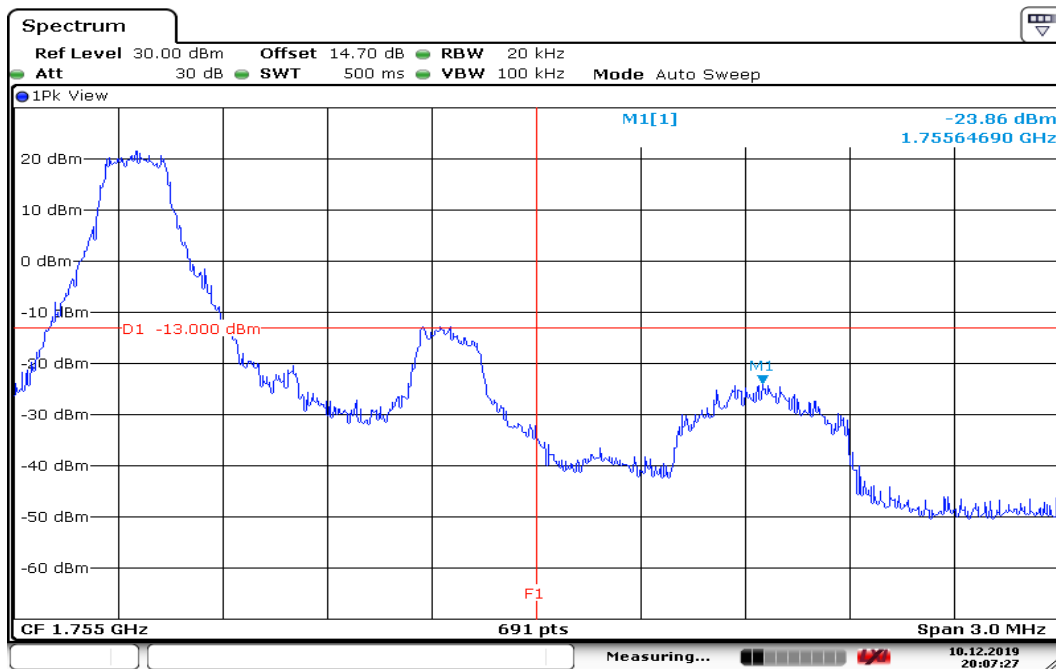
Date: 10.DEC.2019 20:01:46

CHANNEL BANDWIDTH: 1.4MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



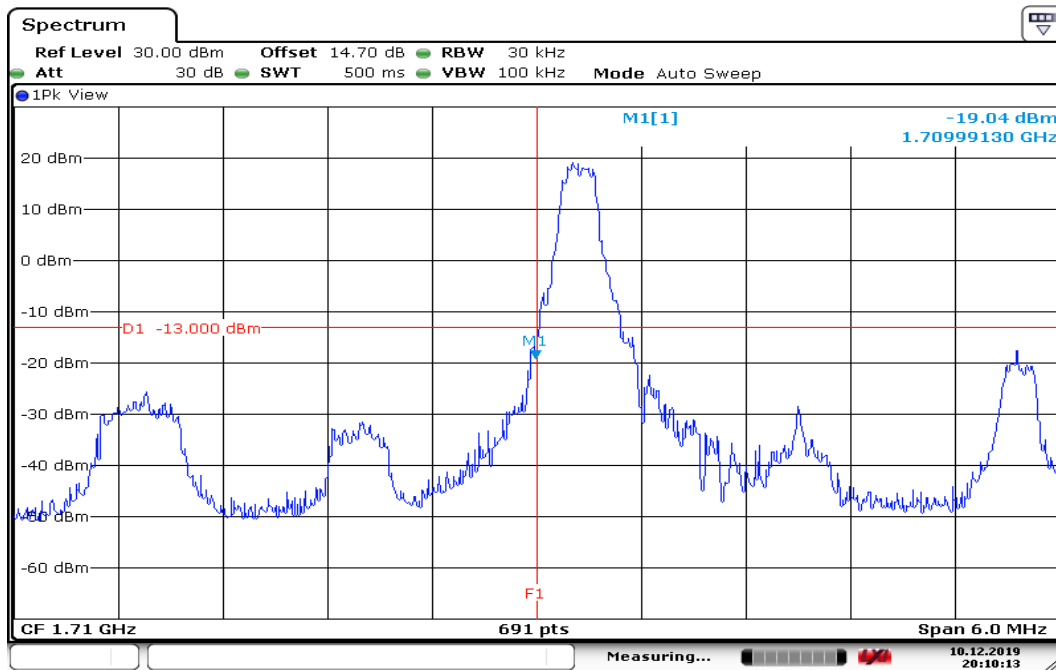
Date: 10.DEC.2019 20:06:17

HIGHER BAND EDGE



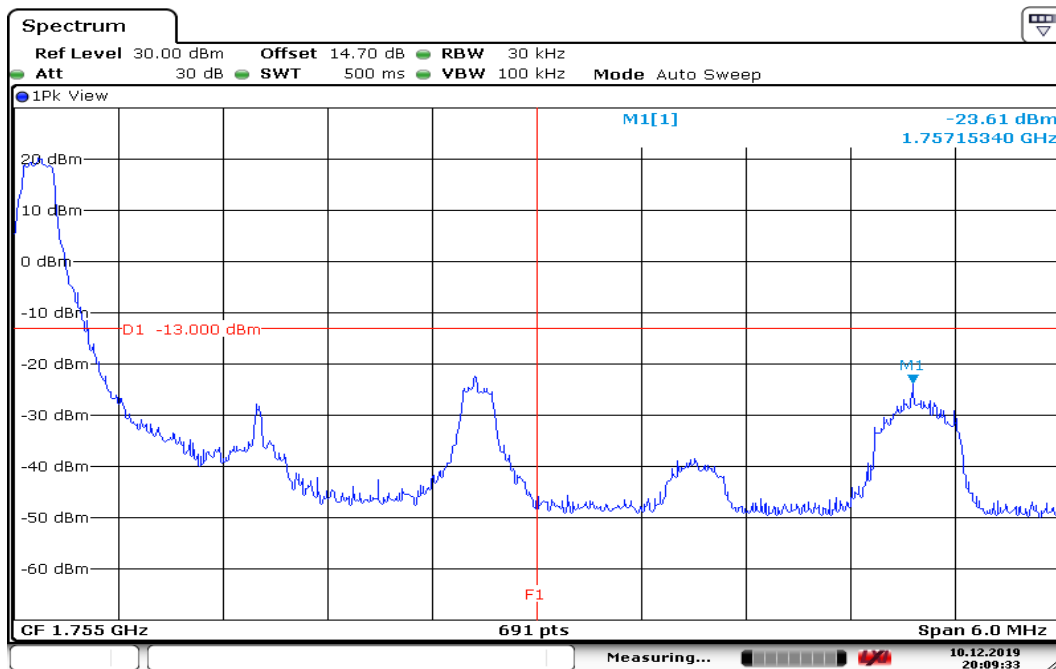
Date: 10.DEC.2019 20:07:28

CHANNEL BANDWIDTH: 3MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



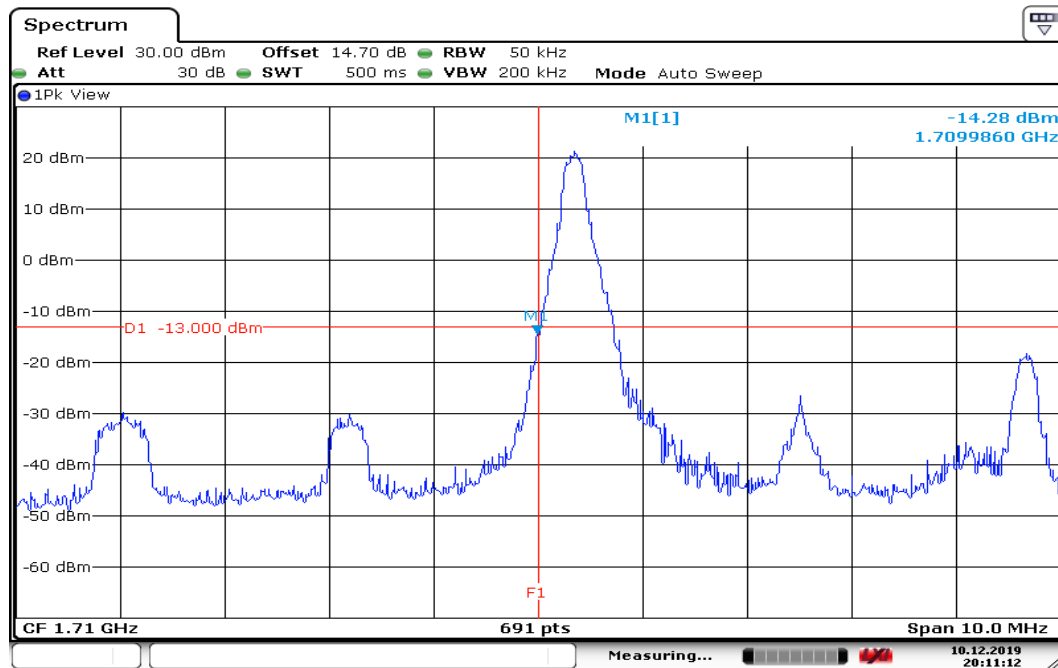
Date: 10.DEC.2019 20:10:13

HIGHER BAND EDGE



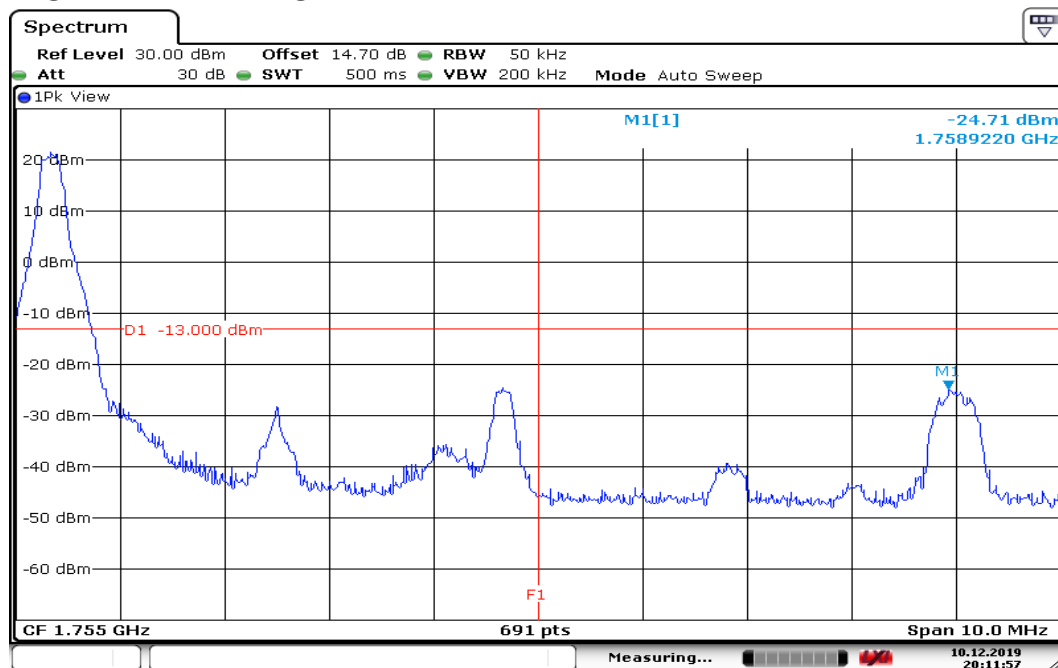
Date: 10.DEC.2019 20:09:33

CHANNEL BANDWIDTH: 5MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



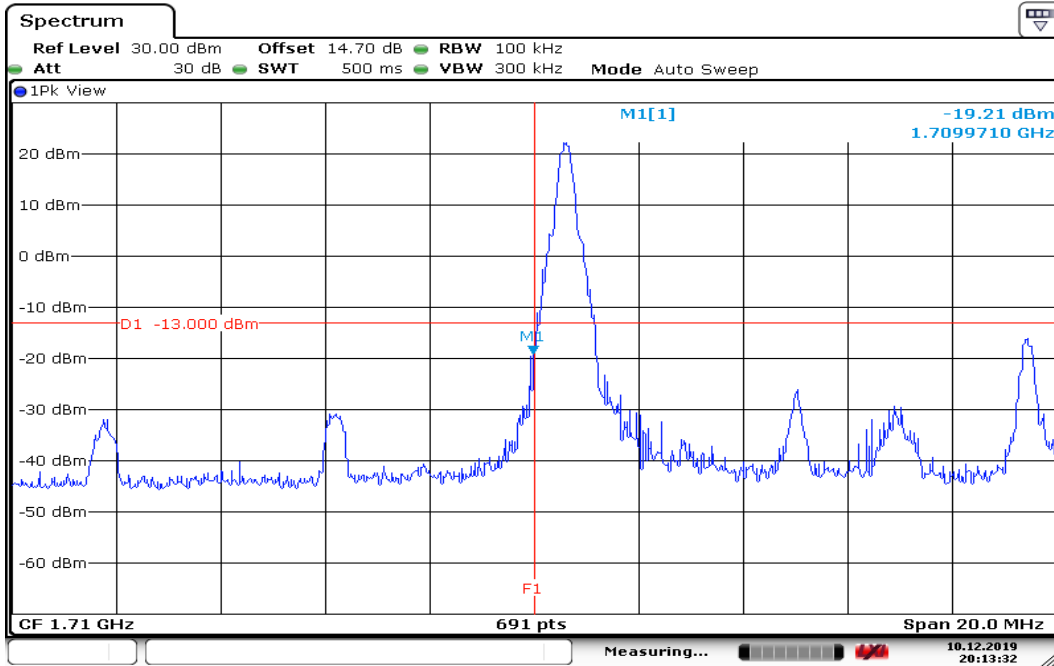
Date: 10.DEC.2019 20:11:13

HIGHER BAND EDGE



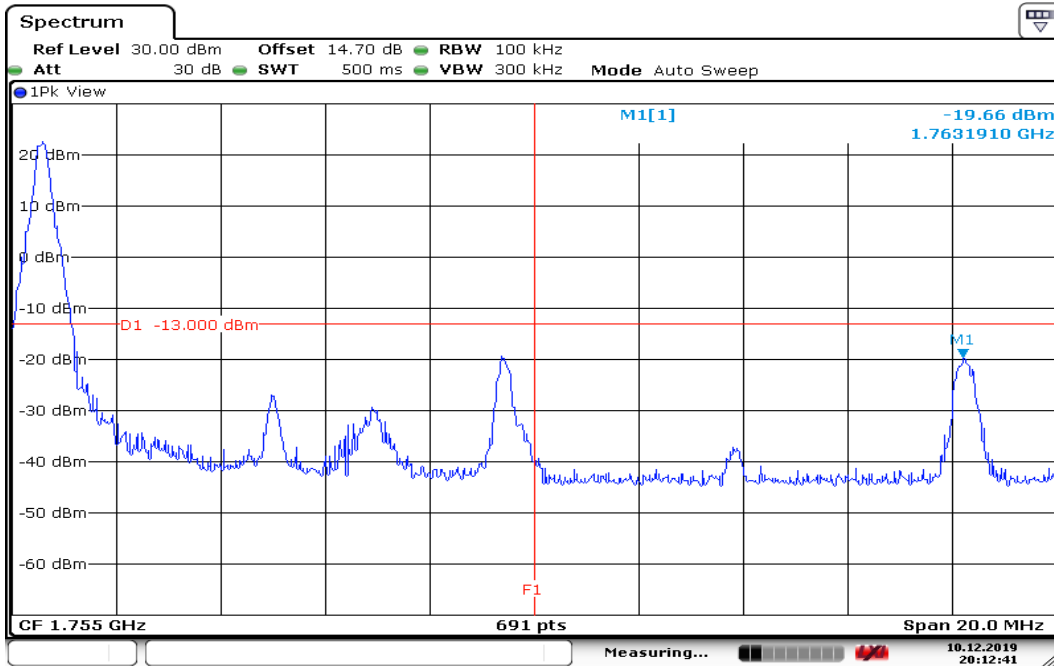
Date: 10.DEC.2019 20:11:57

CHANNEL BANDWIDTH: 10MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



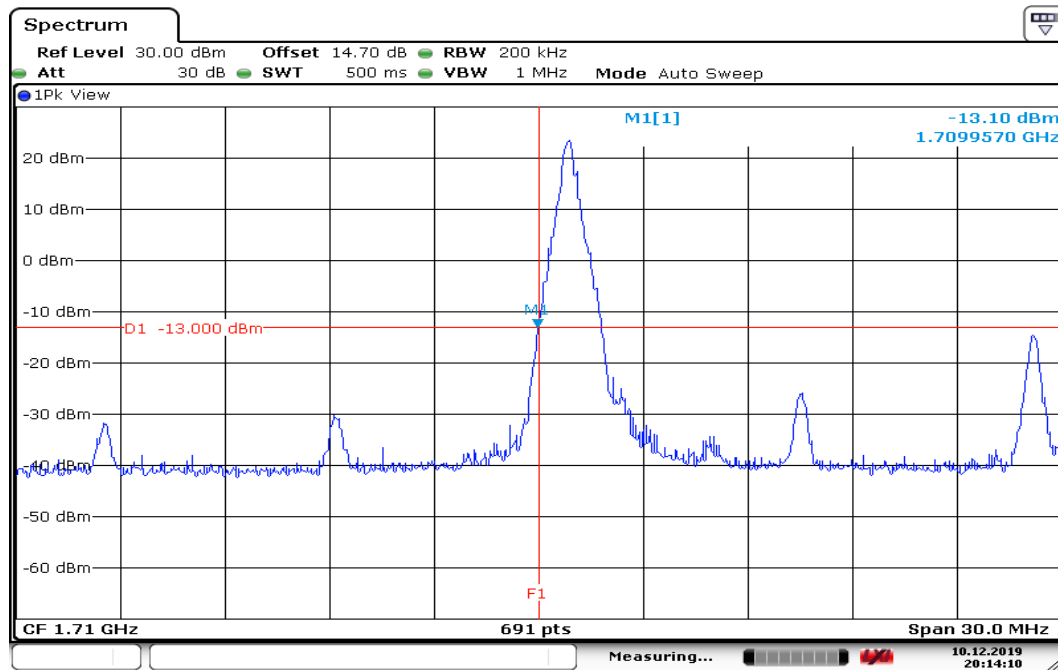
Date: 10.DEC.2019 20:13:32

HIGHER BAND EDGE



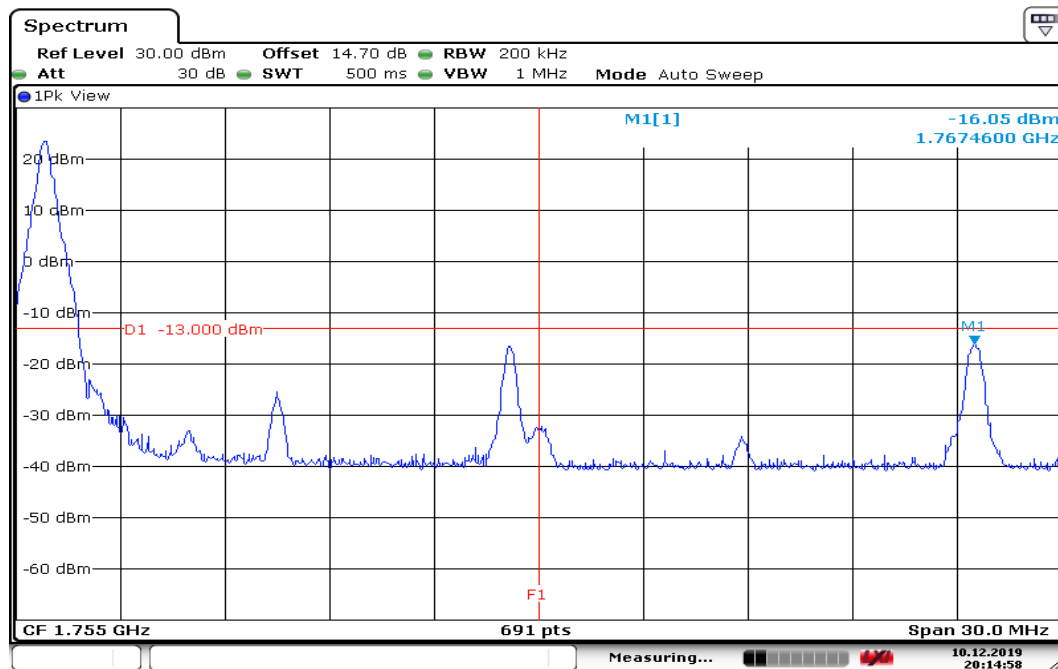
Date: 10.DEC.2019 20:12:42

CHANNEL BANDWIDTH: 15MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



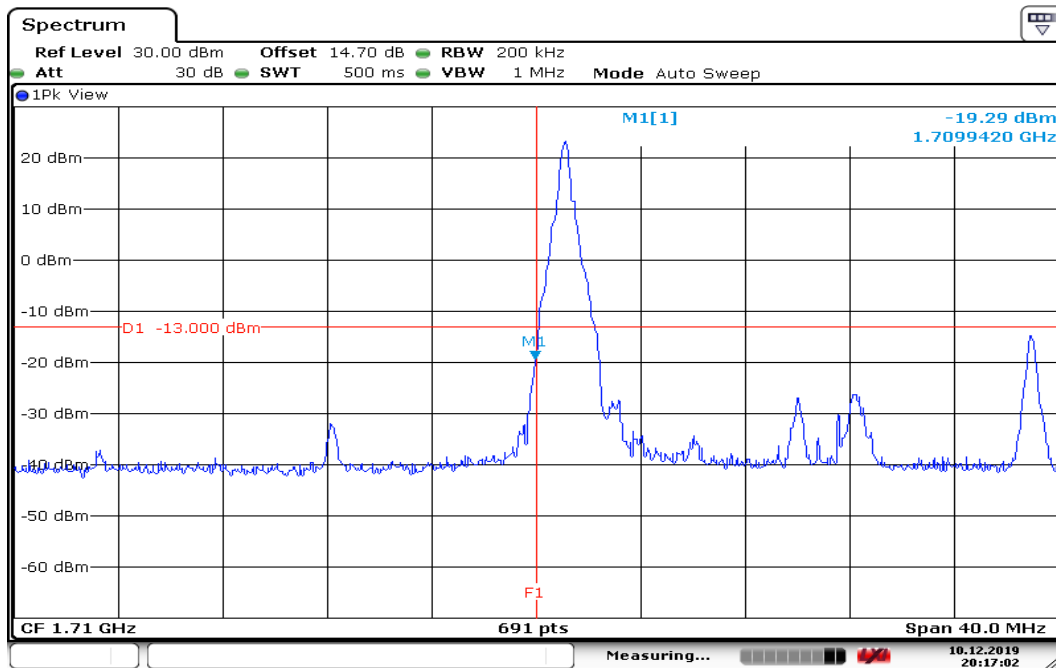
Date: 10.DEC.2019 20:14:11

HIGHER BAND EDGE



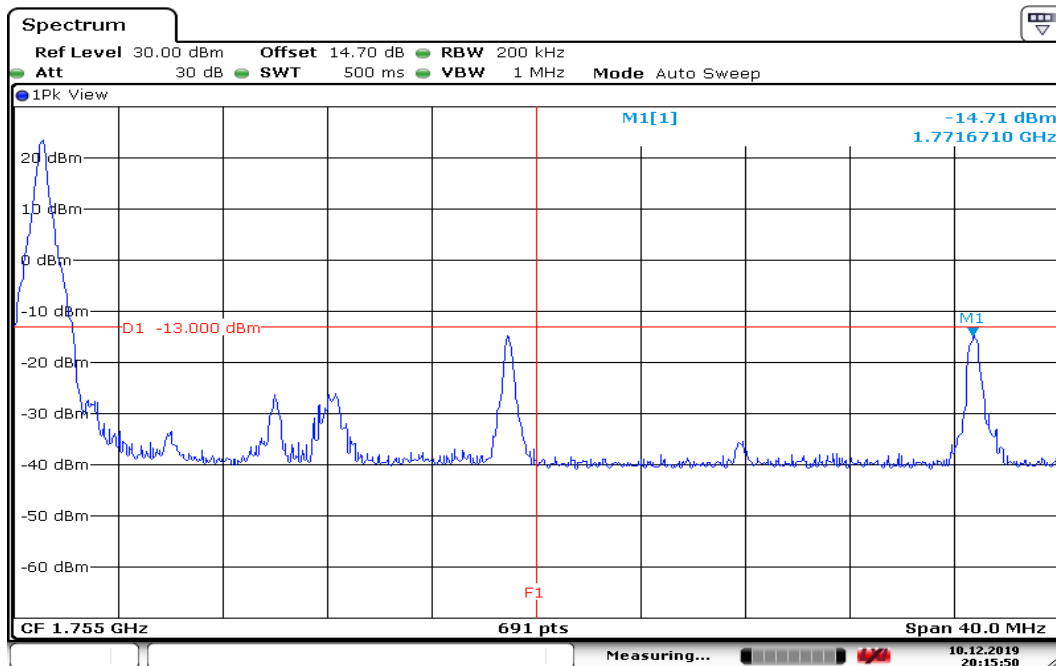
Date: 10.DEC.2019 20:14:59

CHANNEL BANDWIDTH: 20MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



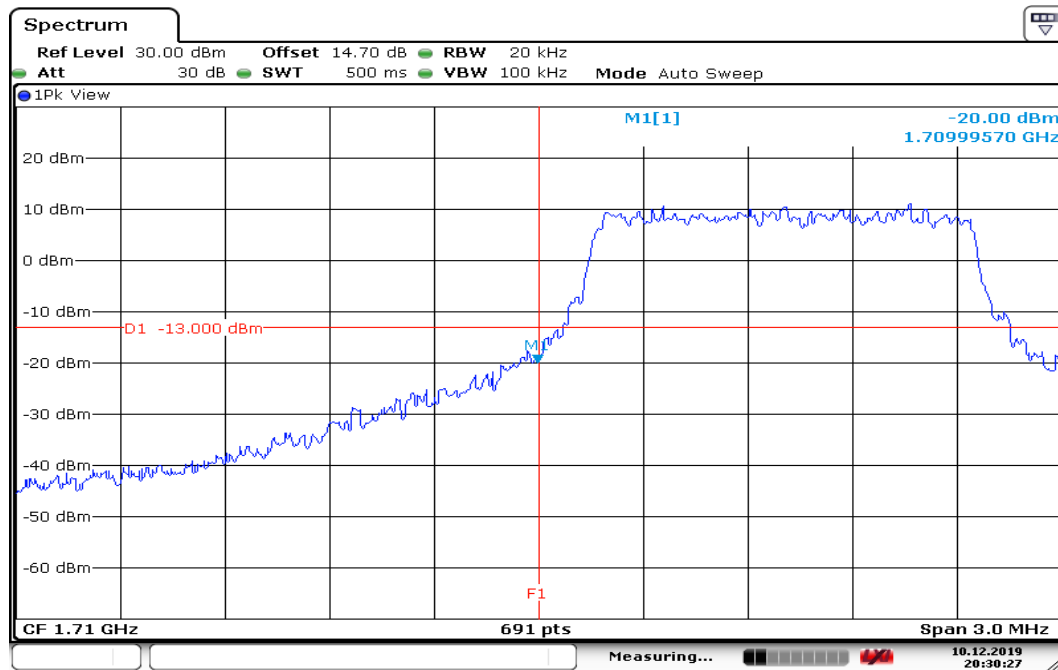
Date: 10.DEC.2019 20:17:03

HIGHER BAND EDGE



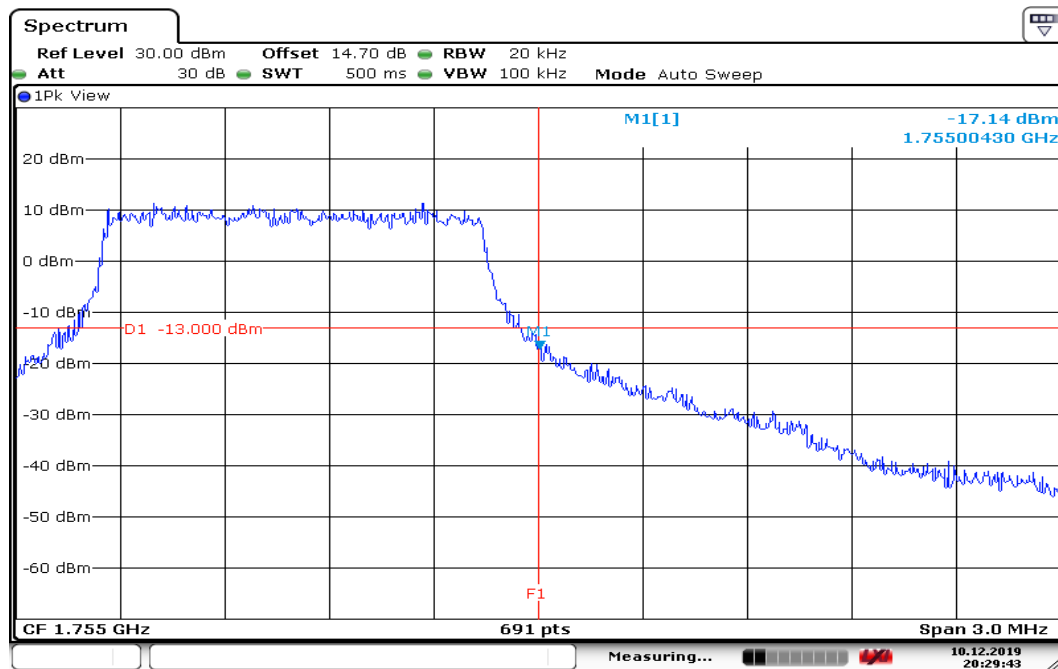
Date: 10.DEC.2019 20:15:51

CHANNEL BANDWIDTH: 1.4MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



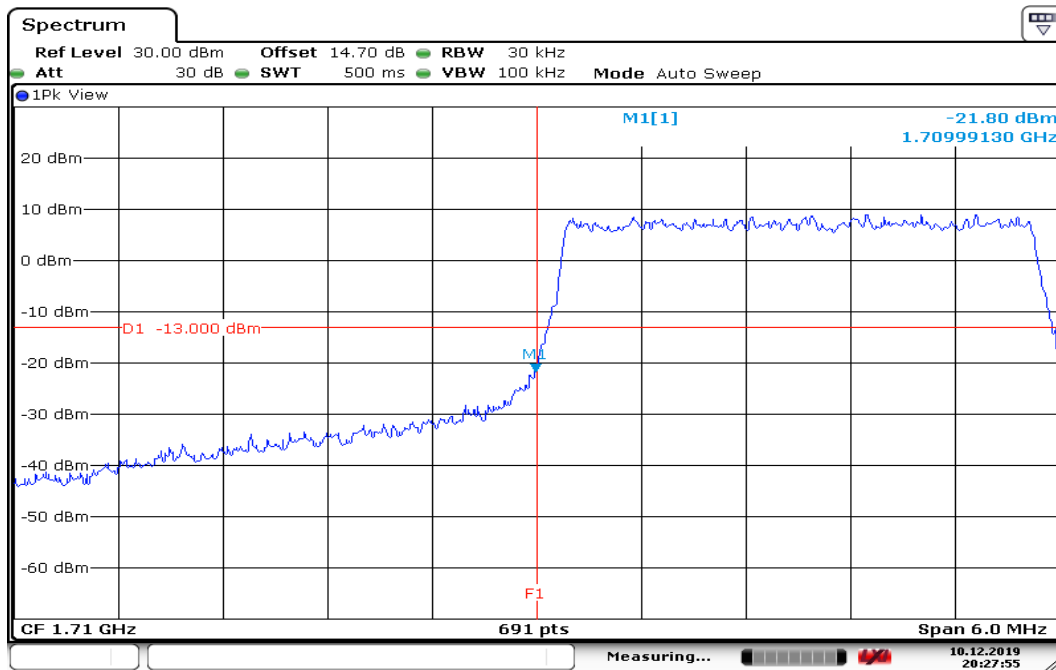
Date: 10.DEC.2019 20:30:27

HIGHER BAND EDGE



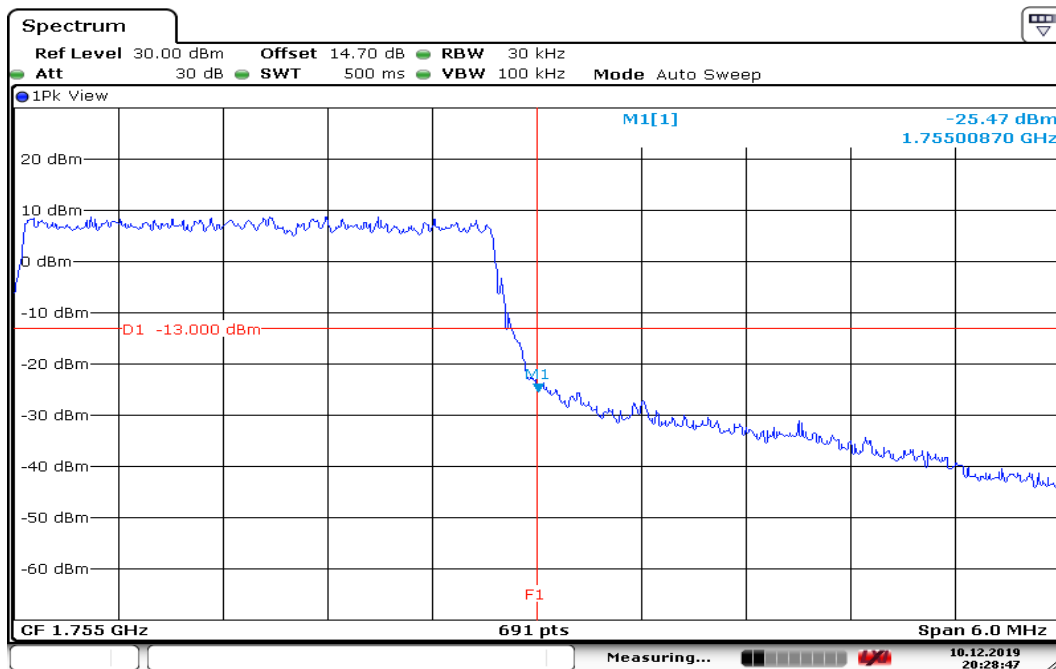
Date: 10.DEC.2019 20:29:44

CHANNEL BANDWIDTH: 3MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



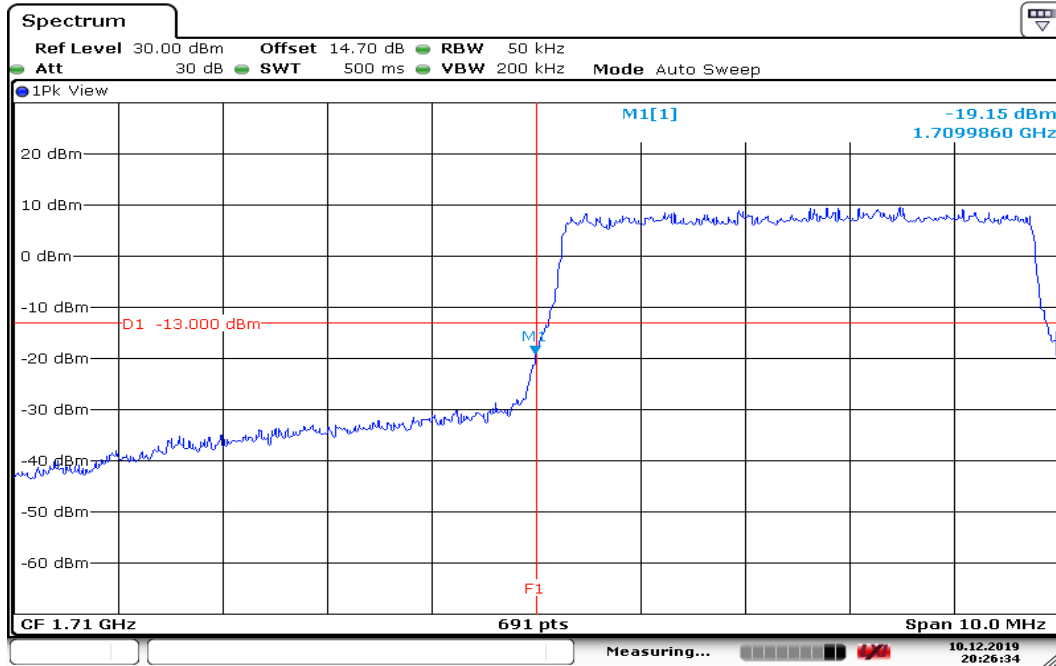
Date: 10.DEC.2019 20:27:56

HIGHER BAND EDGE



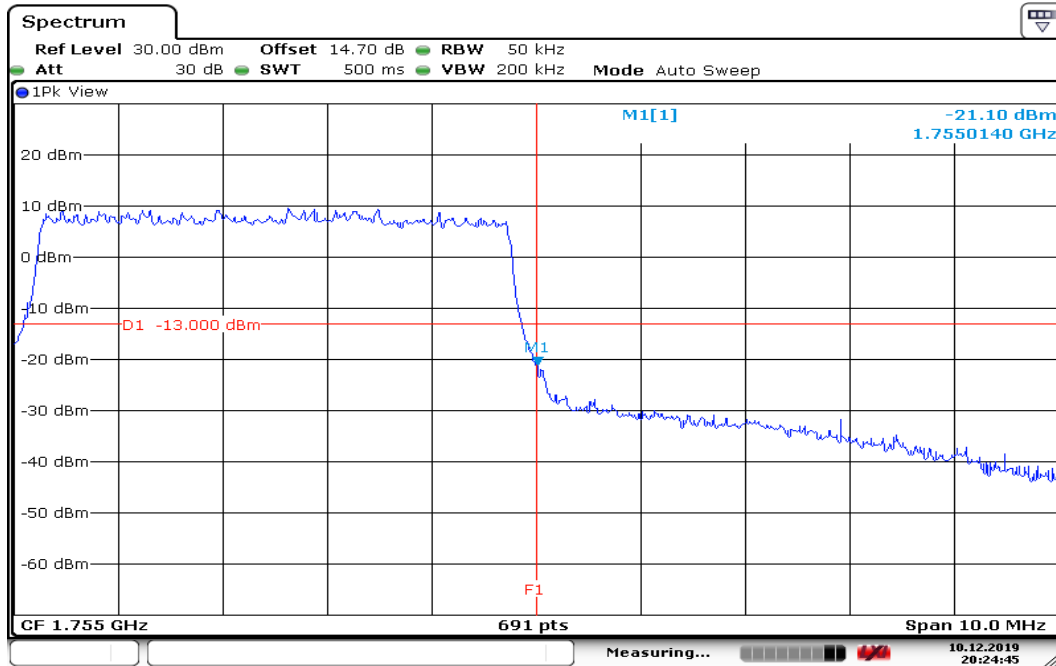
Date: 10.DEC.2019 20:28:48

CHANNEL BANDWIDTH: 5MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



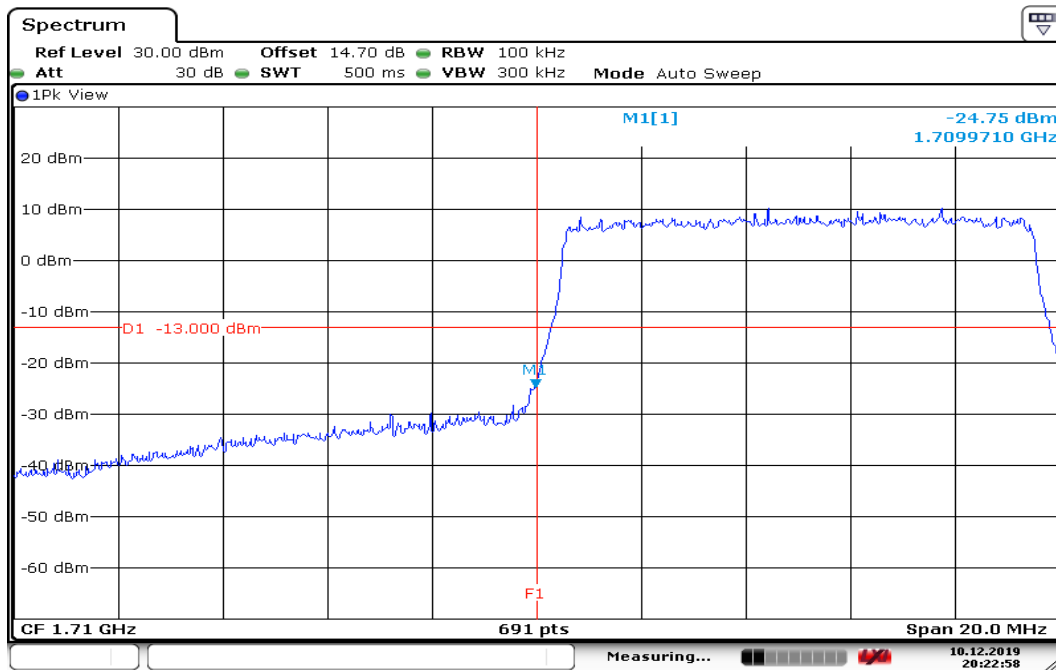
Date: 10.DEC.2019 20:26:34

HIGHER BAND EDGE



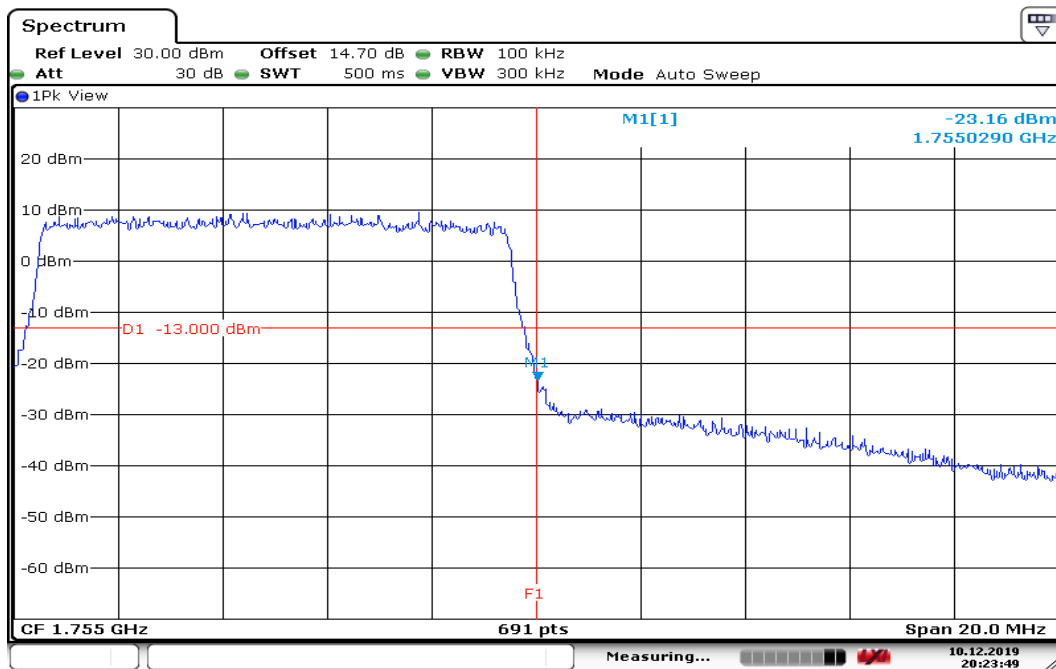
Date: 10.DEC.2019 20:24:46

CHANNEL BANDWIDTH: 10MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



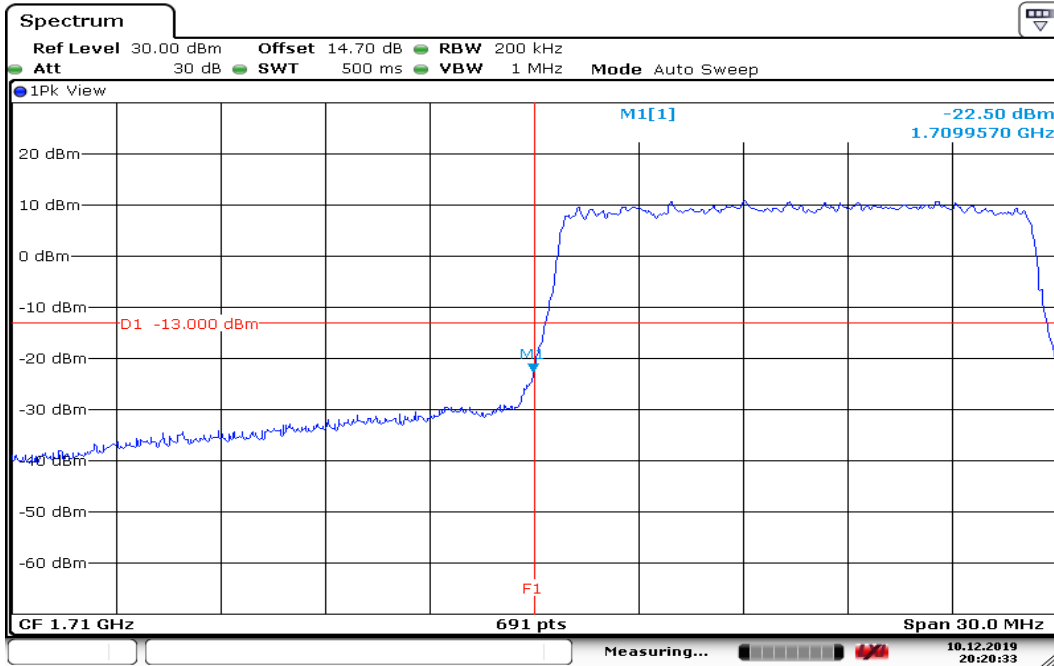
Date: 10.DEC.2019 20:22:58

HIGHER BAND EDGE



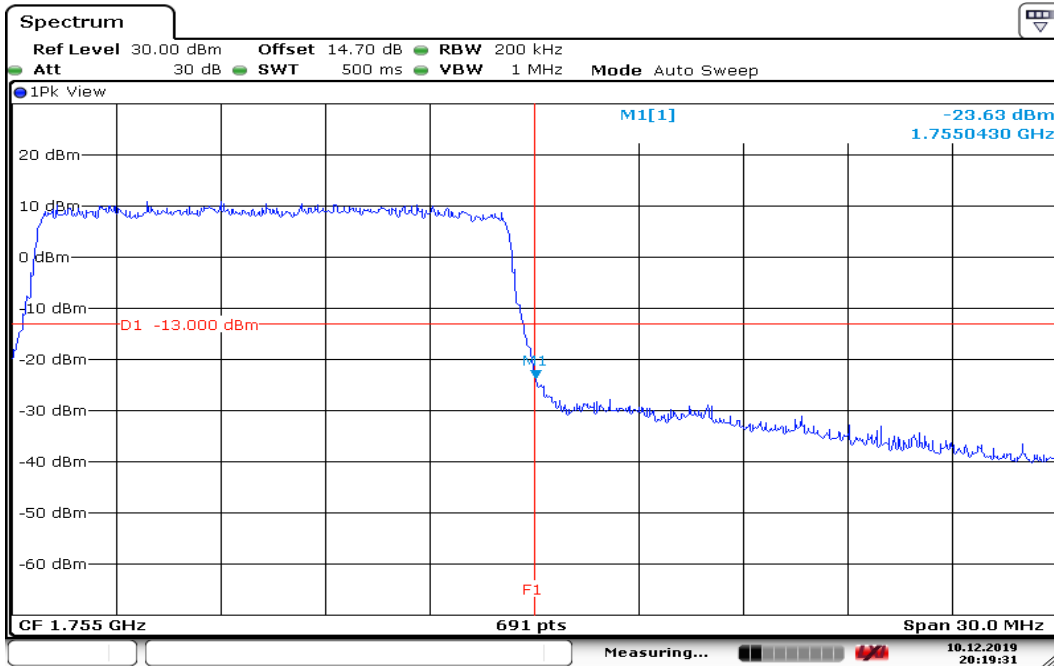
Date: 10.DEC.2019 20:23:50

CHANNEL BANDWIDTH: 15MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



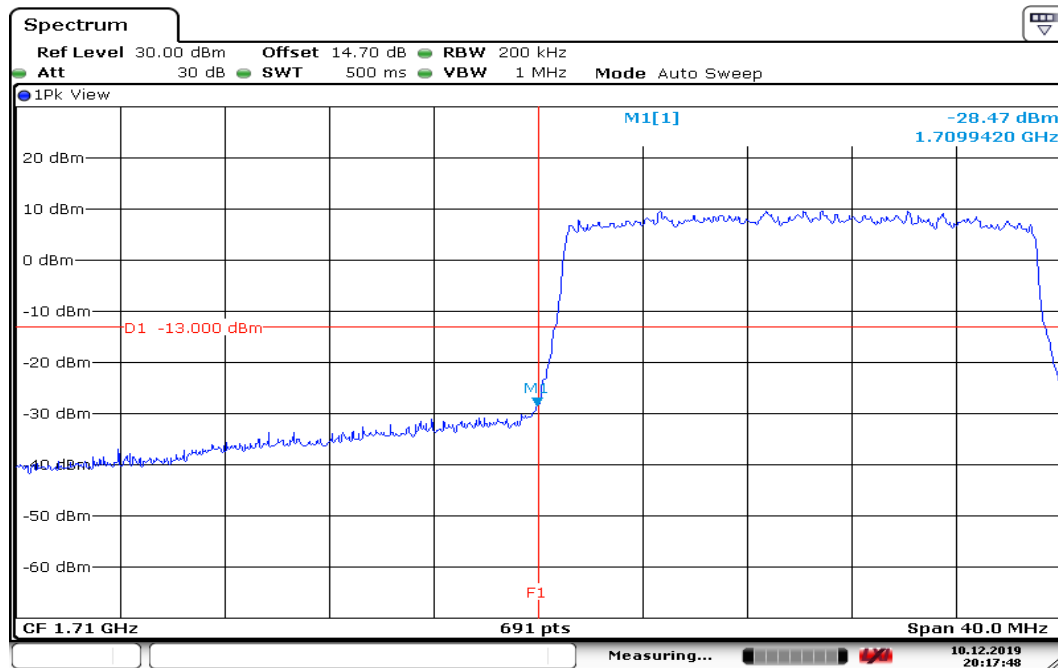
Date: 10.DEC.2019 20:20:33

HIGHER BAND EDGE



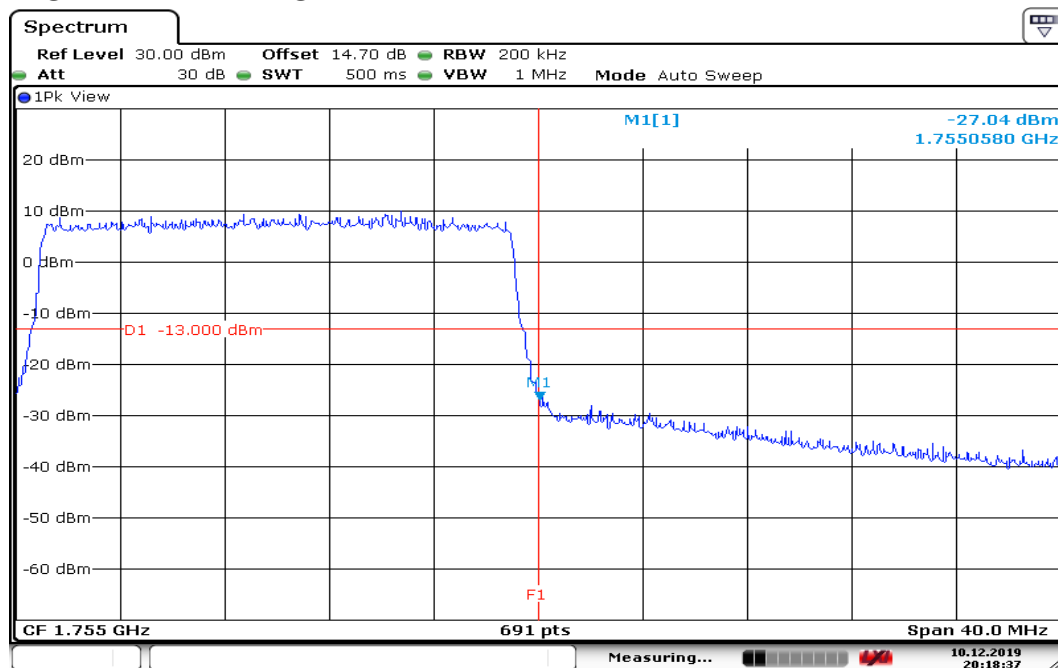
Date: 10.DEC.2019 20:19:31

CHANNEL BANDWIDTH: 20MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



Date: 10.DEC.2019 20:17:49

HIGHER BAND EDGE



Date: 10.DEC.2019 20:18:38

8.6 CONDUCTED SPURIOUS EMISSIONS

LIMITS

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm

TEST PROCEDURES

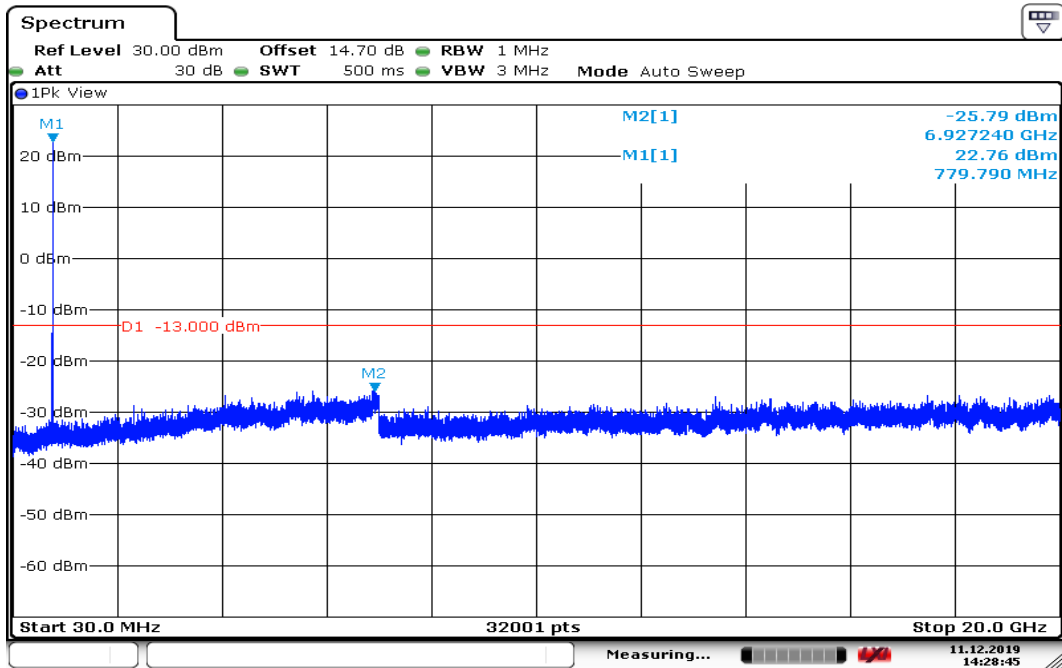
1. According to KDB 971168D01, photograph 6.0
2. The EUT was connect to spectrum analyzer and call box.
3. The RF output of EUT was connected to the spectrum analyzer.
4. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
5. Record the maximum spurious emission.
6. The fundamental frequency should be excluded against the limit in operating band.

TEST RESULTS

LTE Band 13

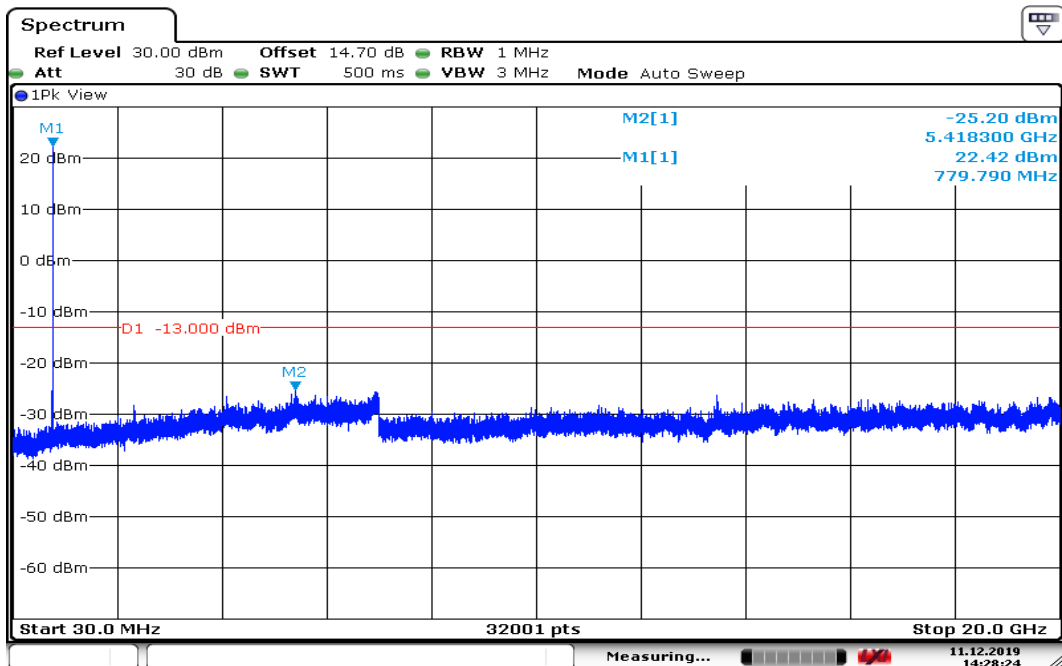
CHANNEL BANDWIDTH: 5MHz / QPSK

CH Low



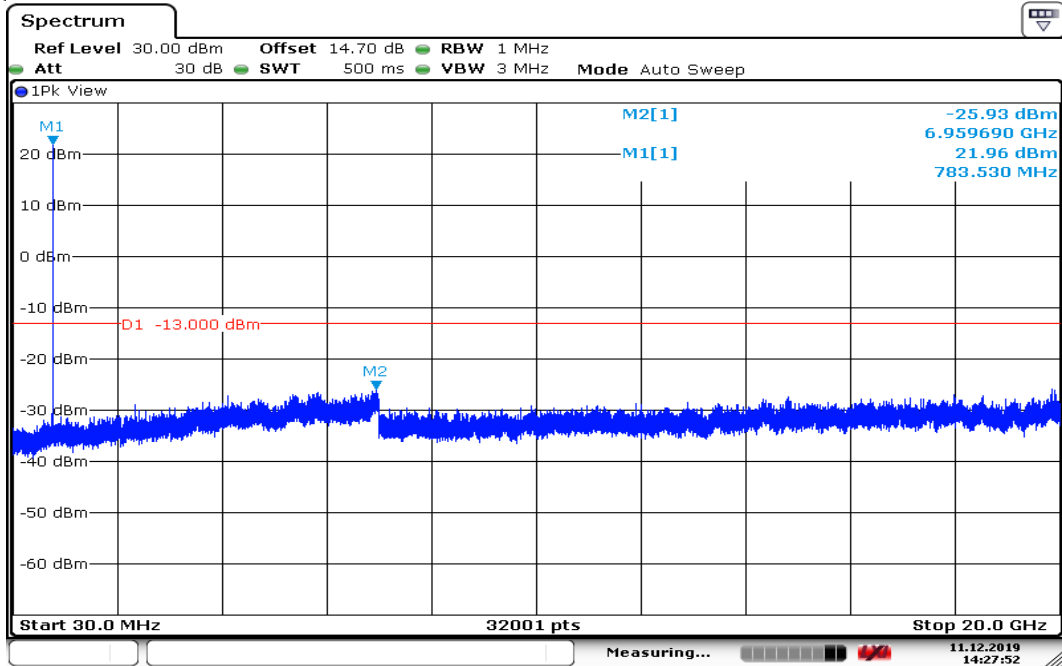
Date: 11.DEC.2019 14:28:45

CH Mid



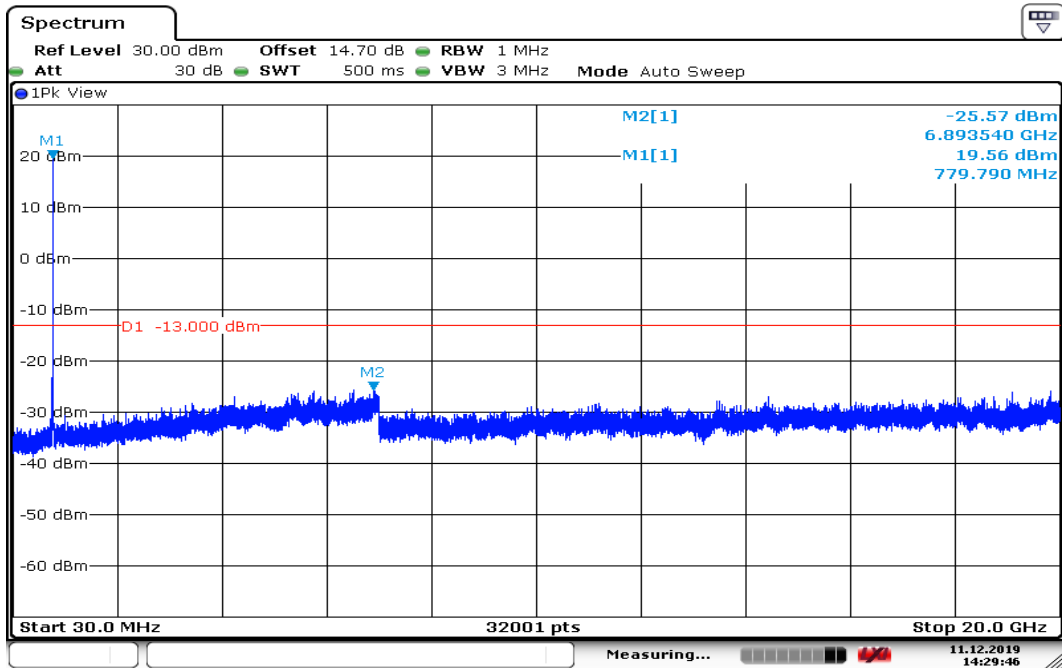
Date: 11.DEC.2019 14:28:25

CH High



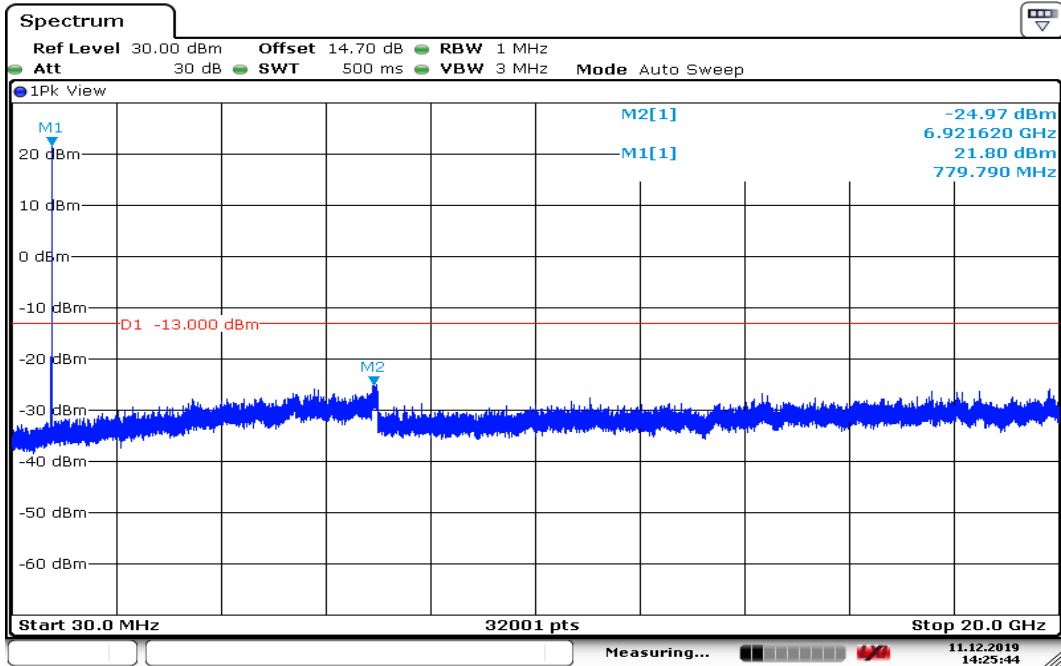
Date: 11.DEC.2019 14:27:52

CHANNEL BANDWIDTH: 10MHz / QPSK
CH Mid



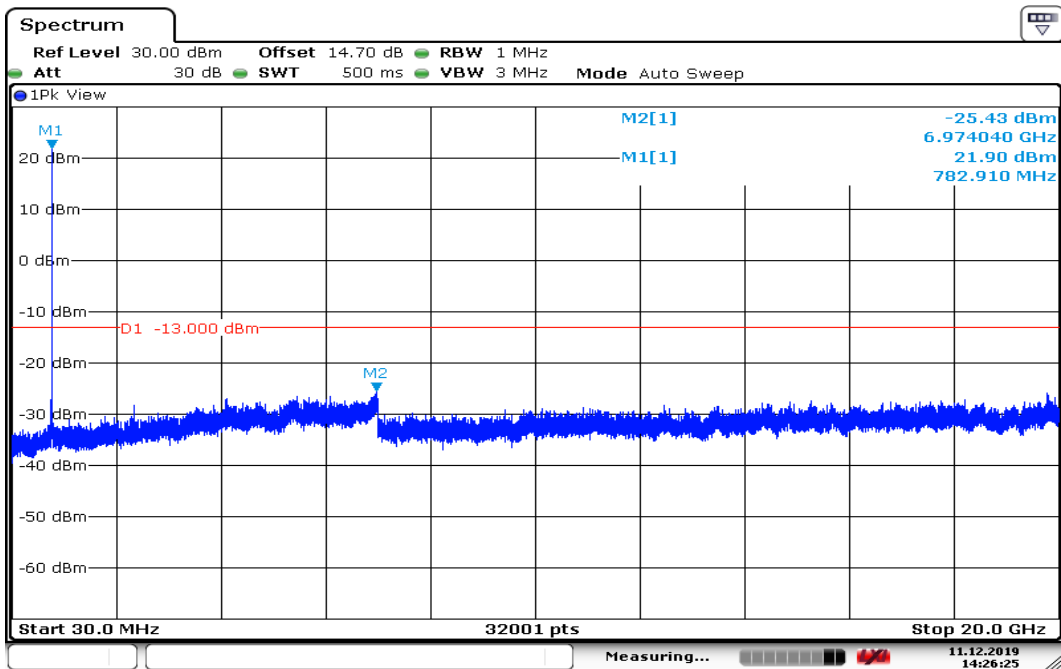
Date: 11.DEC.2019 14:29:46

CHANNEL BANDWIDTH: 5MHz / 16QAM CH Low



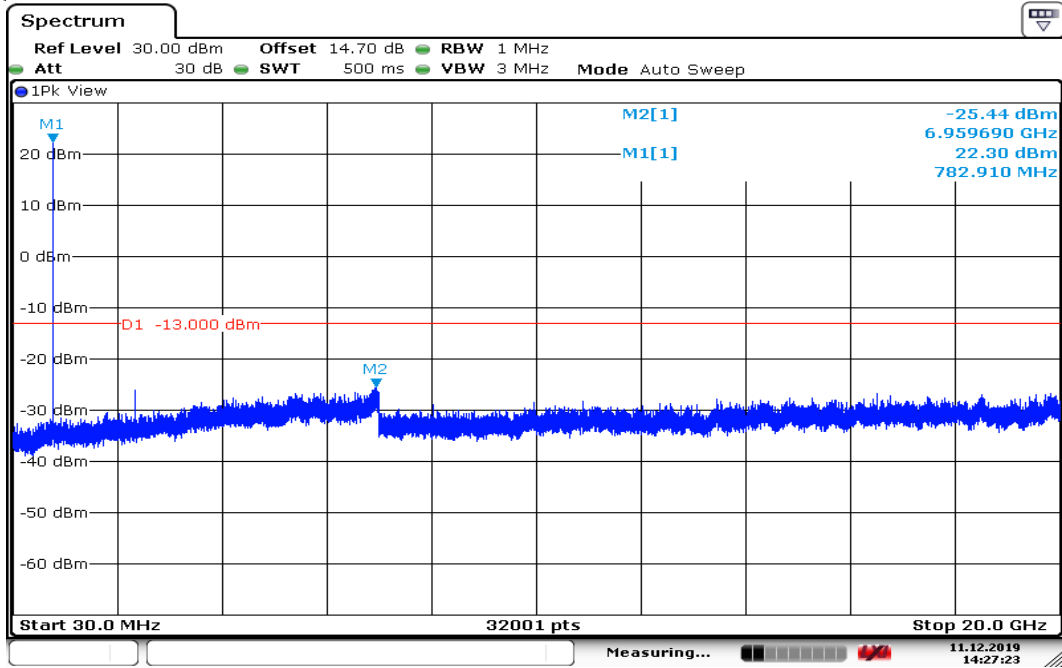
Date: 11.DEC.2019 14:25:44

CH Mid



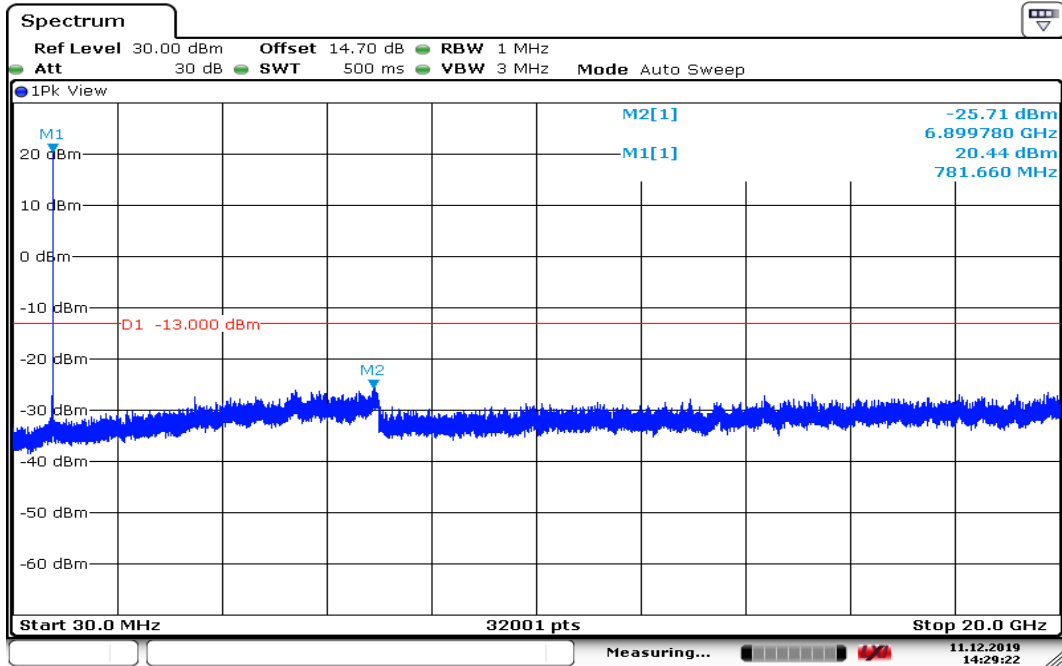
Date: 11.DEC.2019 14:26:25

CH High



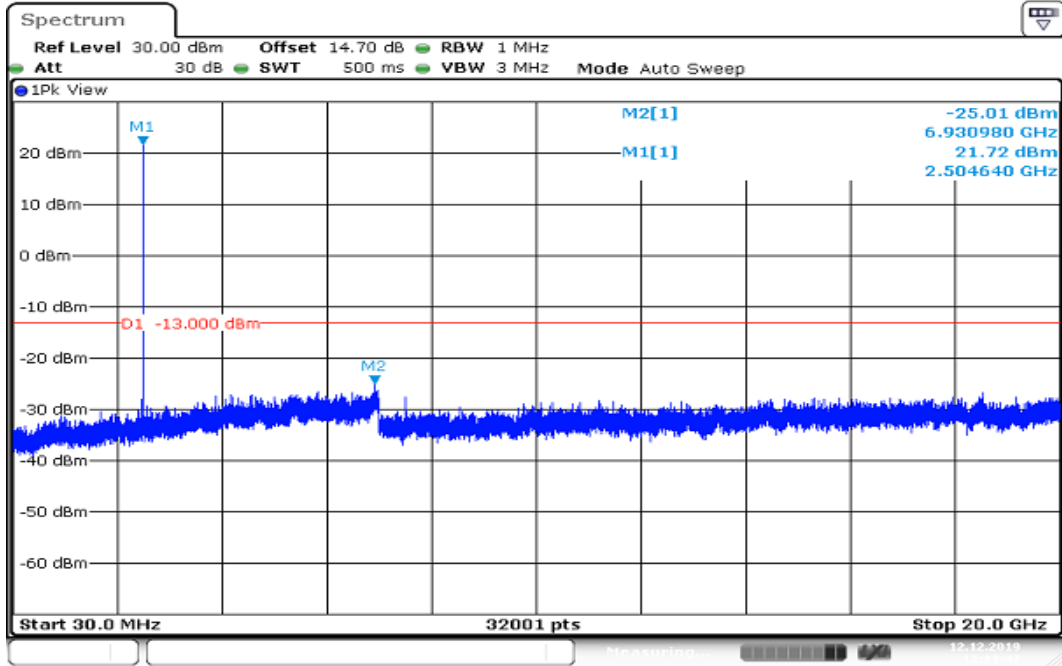
Date: 11.DEC.2019 14:27:23

CHANNEL BANDWIDTH: 10MHz / 16QAM CH Mid

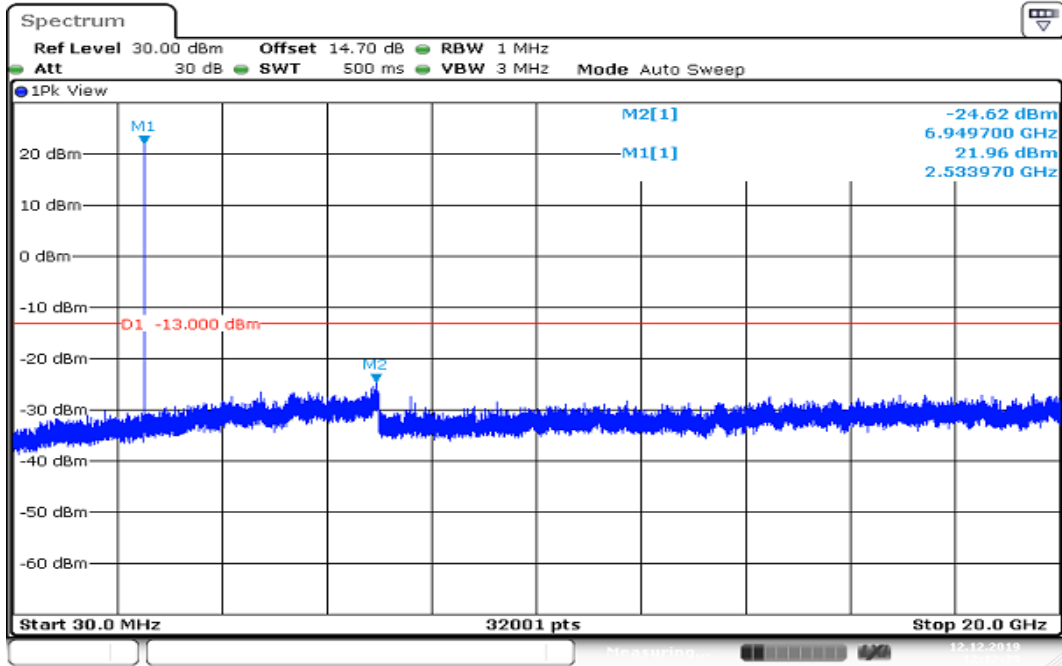


Date: 11.DEC.2019 14:29:22

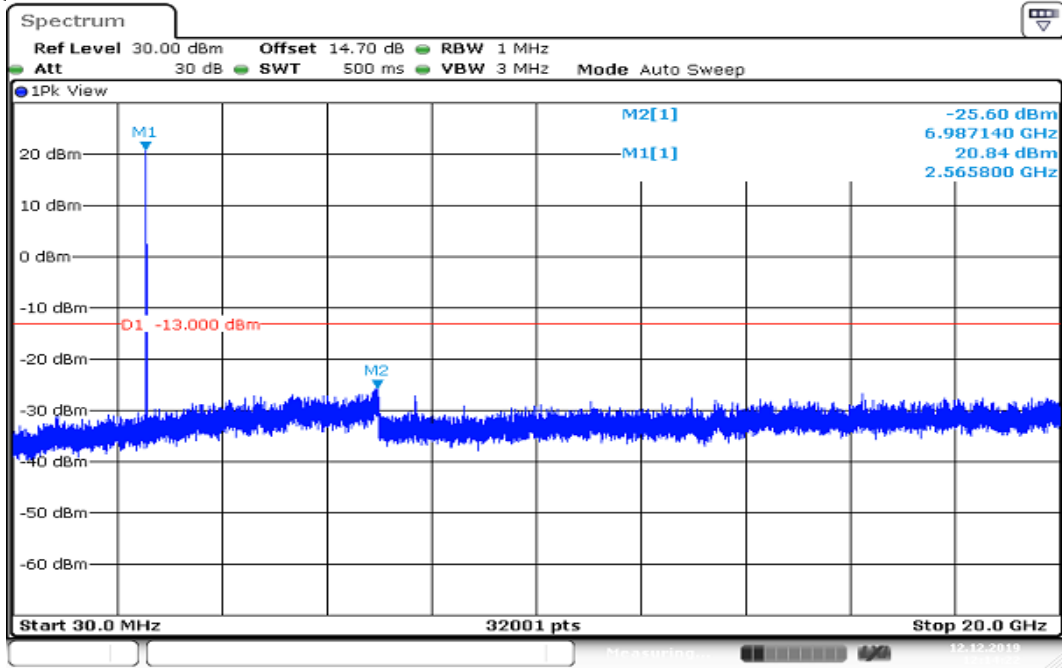
LTE Band 7 CHANNEL BANDWIDTH: 5MHz /QPSK CH Low



CH Mid

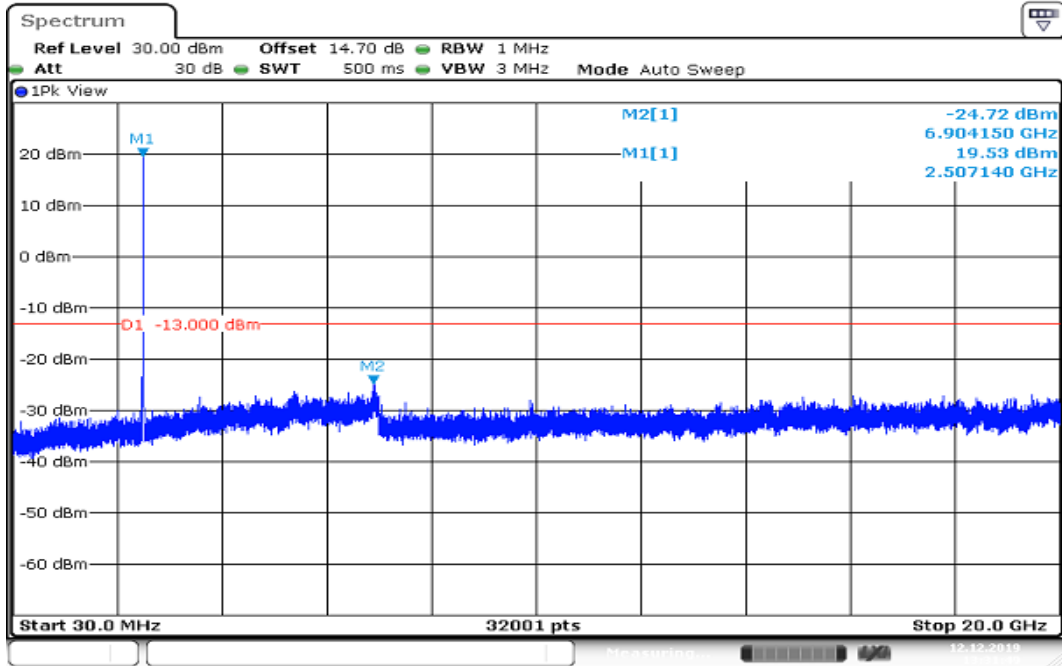


CH High

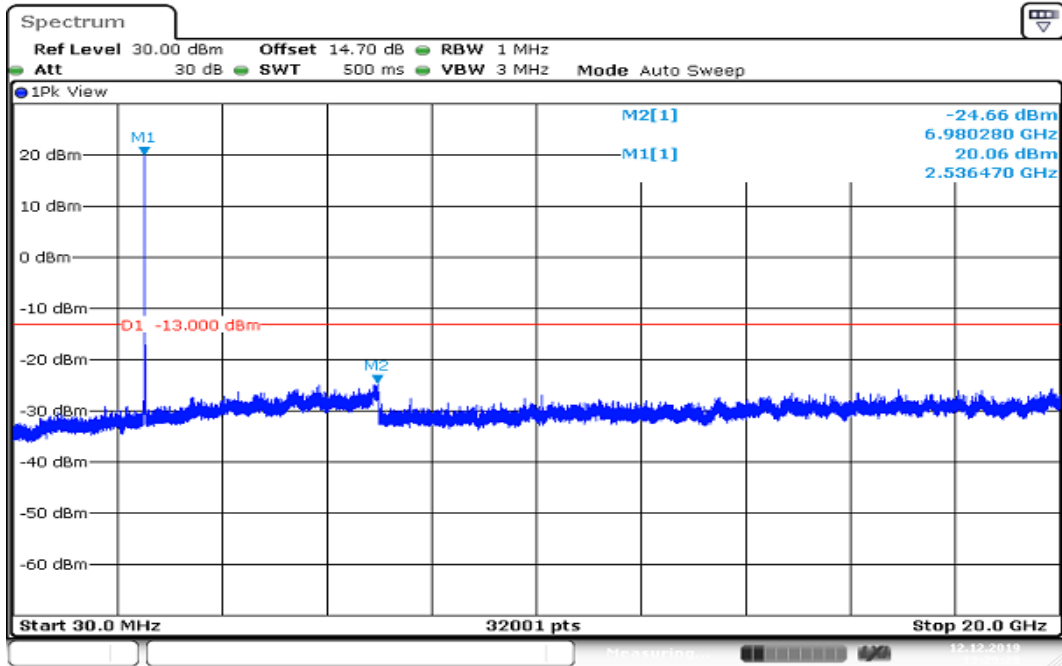


Date: 12.DEC.2019 12:14:22

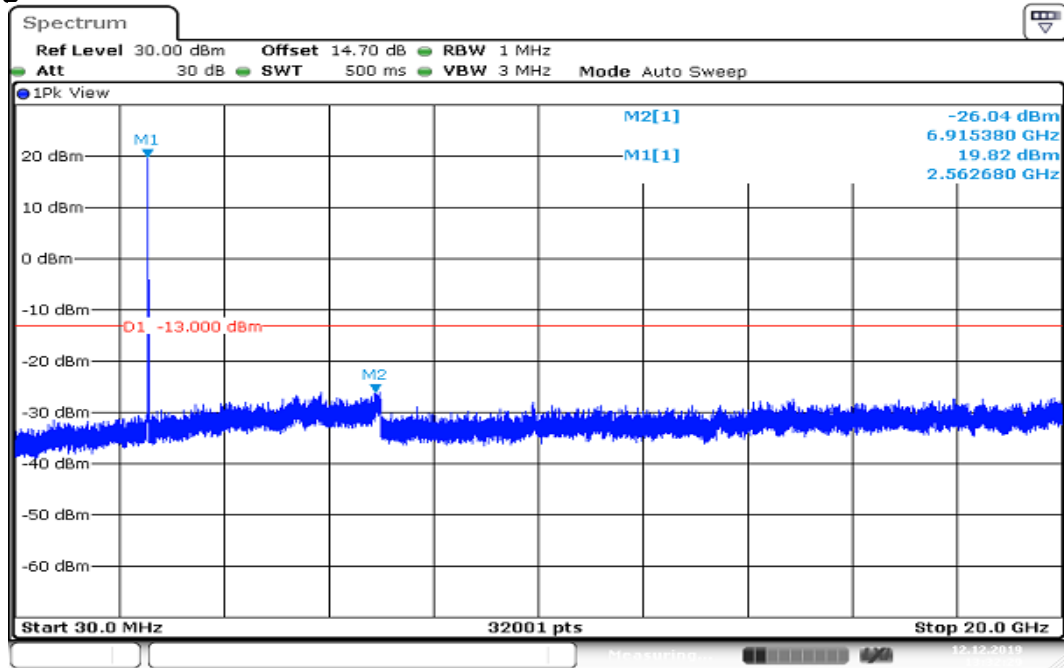
CHANNEL BANDWIDTH: 10MHz /QPSK CH Low



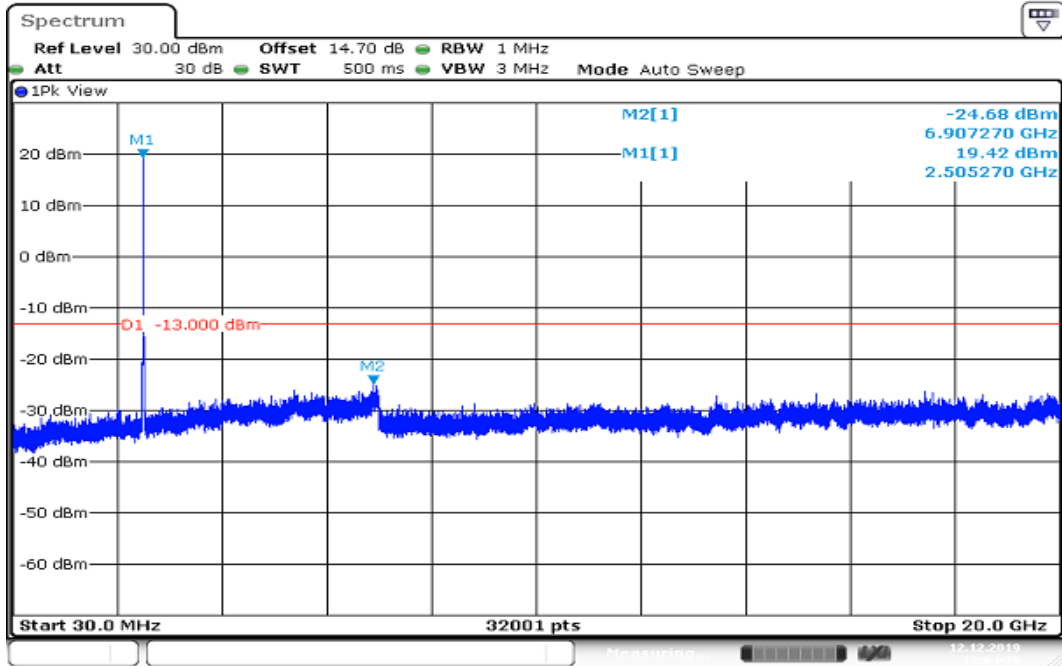
CH Mid



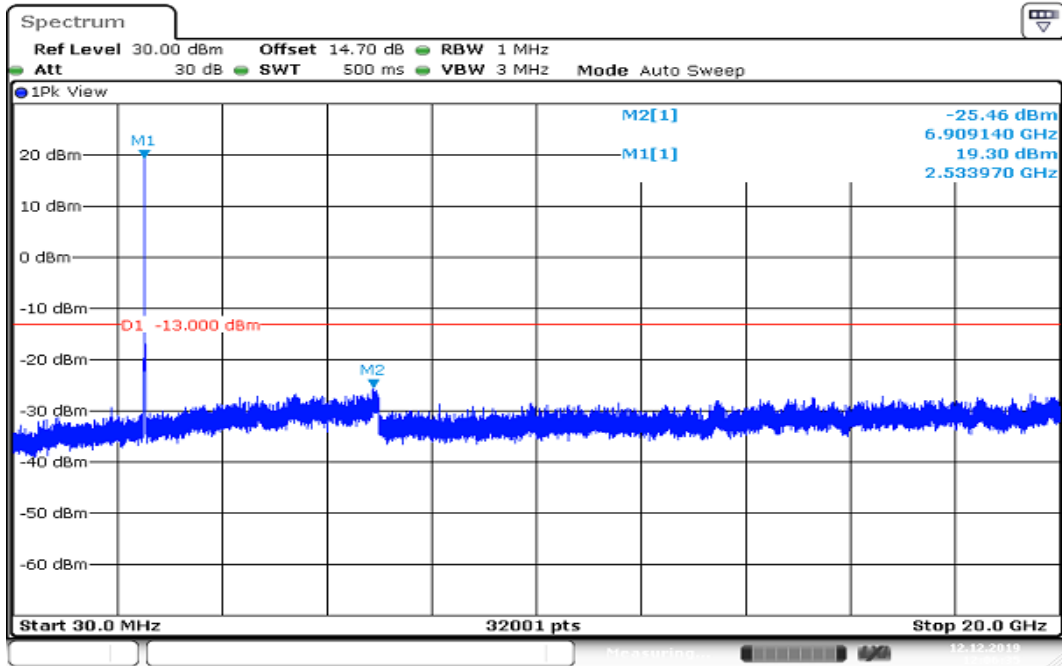
CH High



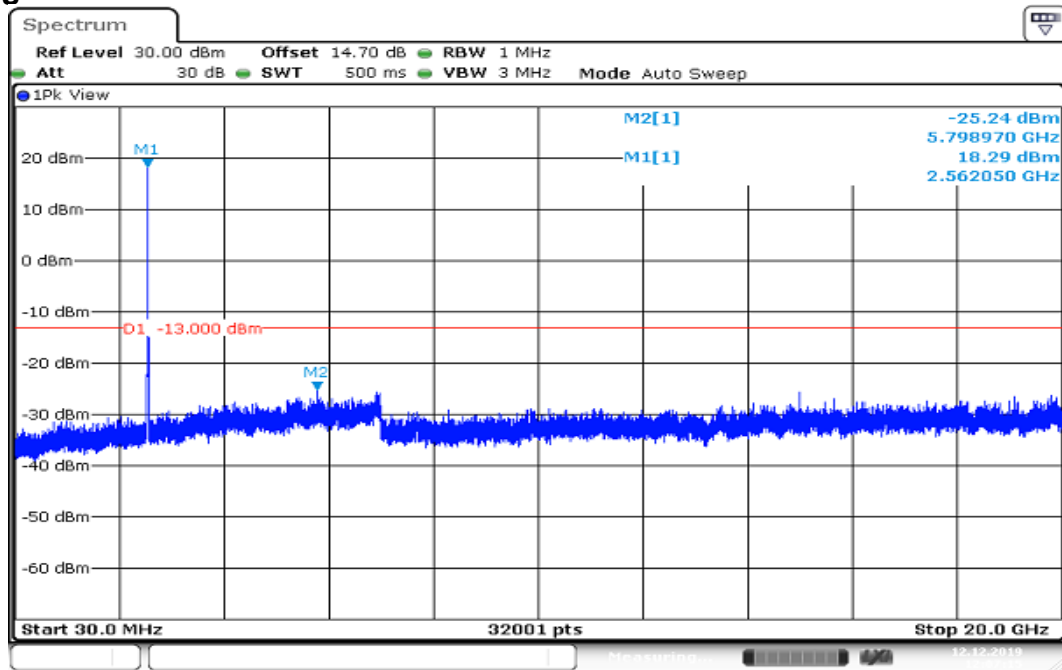
CHANNEL BANDWIDTH: 15MHz /QPSK CH Low



CH Mid

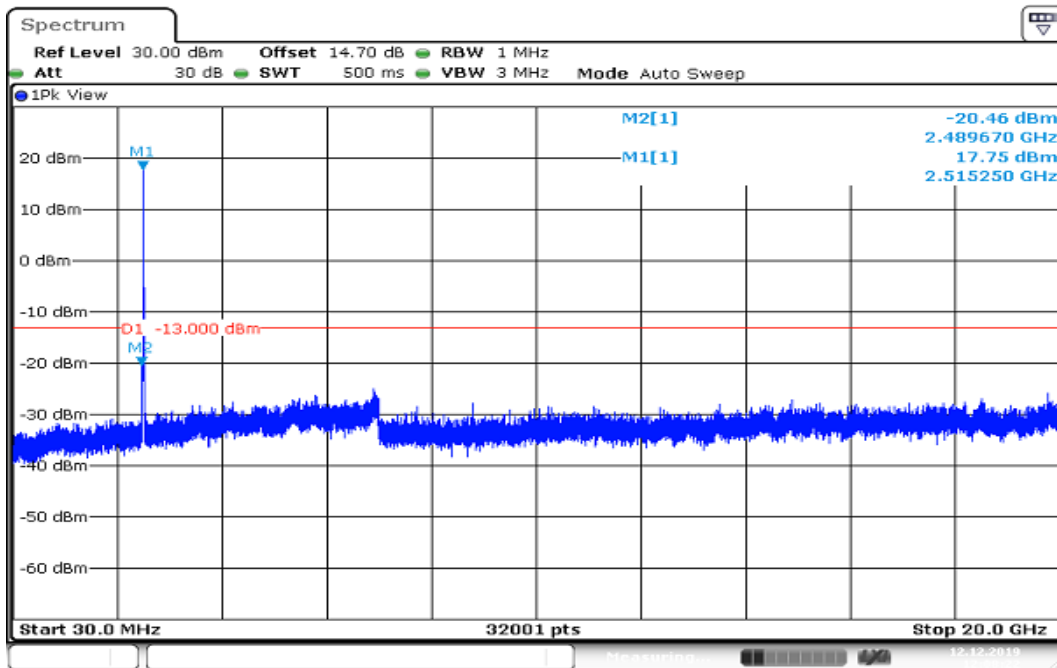


CH High

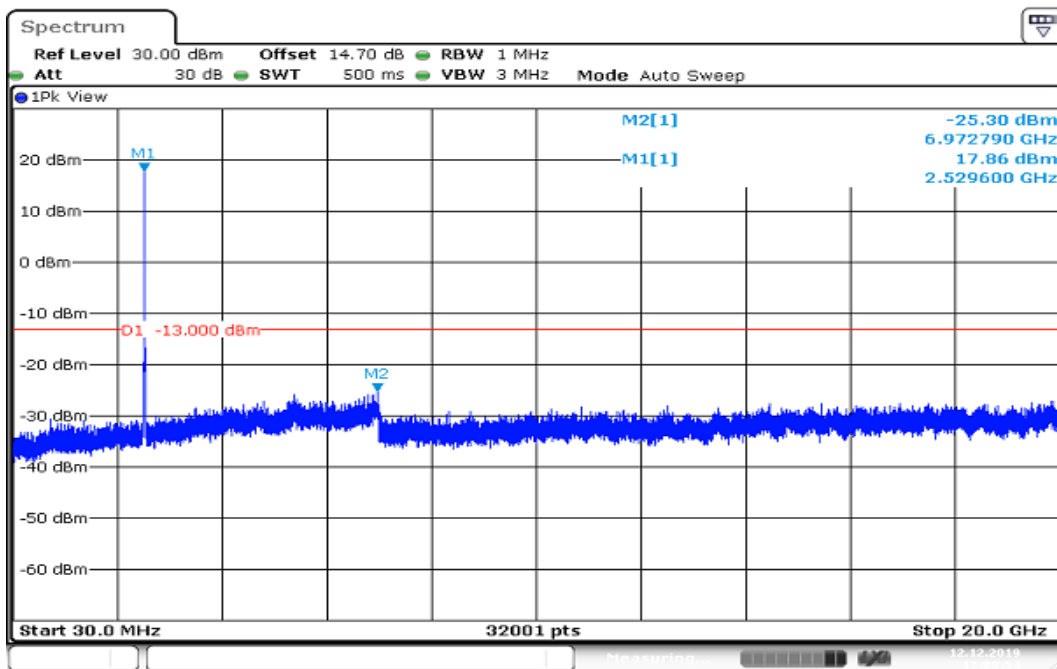


Date: 12.DEC.2019 12:07:16

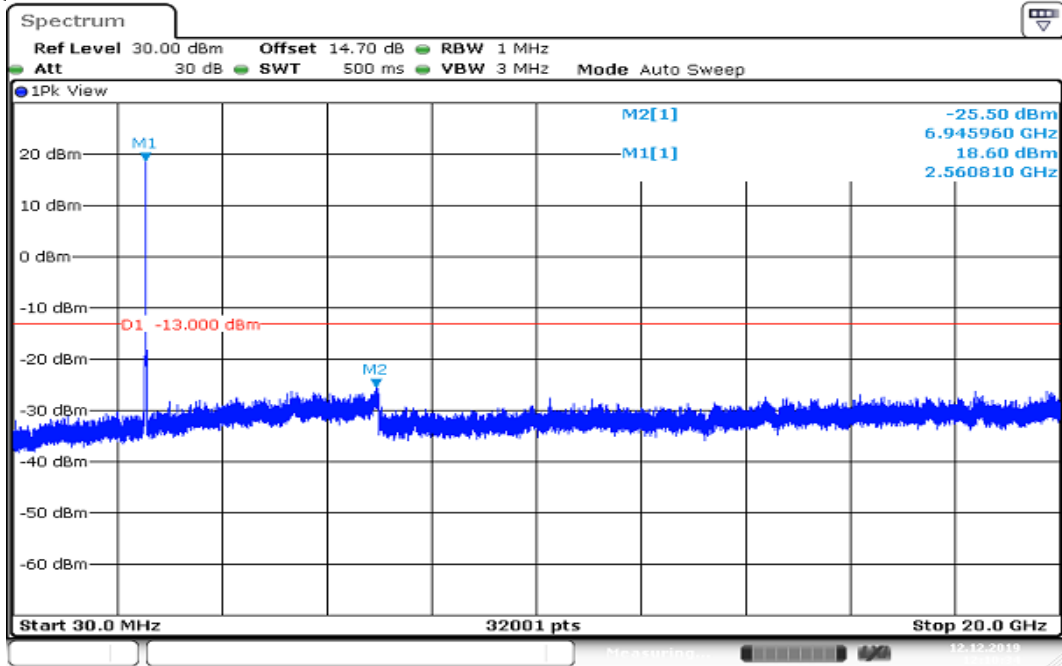
CHANNEL BANDWIDTH: 20MHz /QPSK CH Low



CH Mid

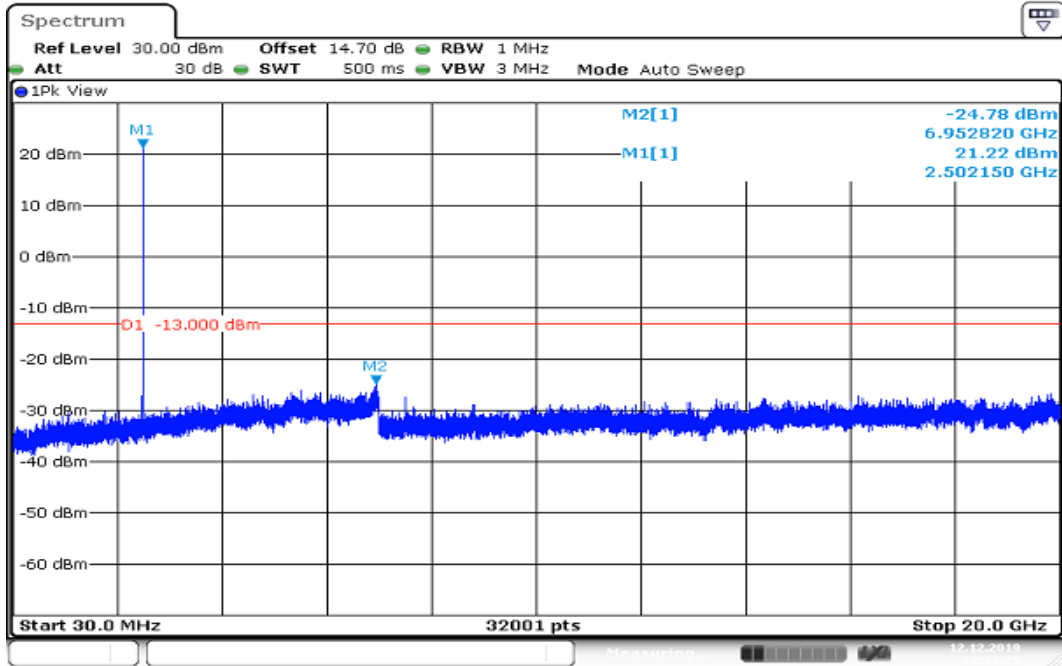


CH High

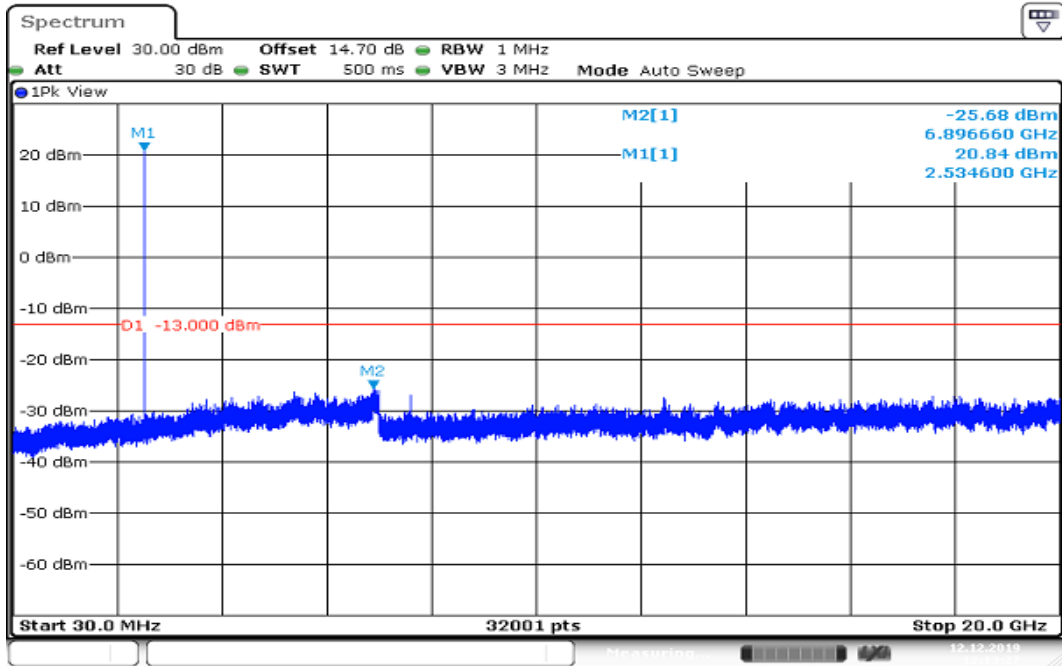


Date: 12.DEC.2019 12:10:35

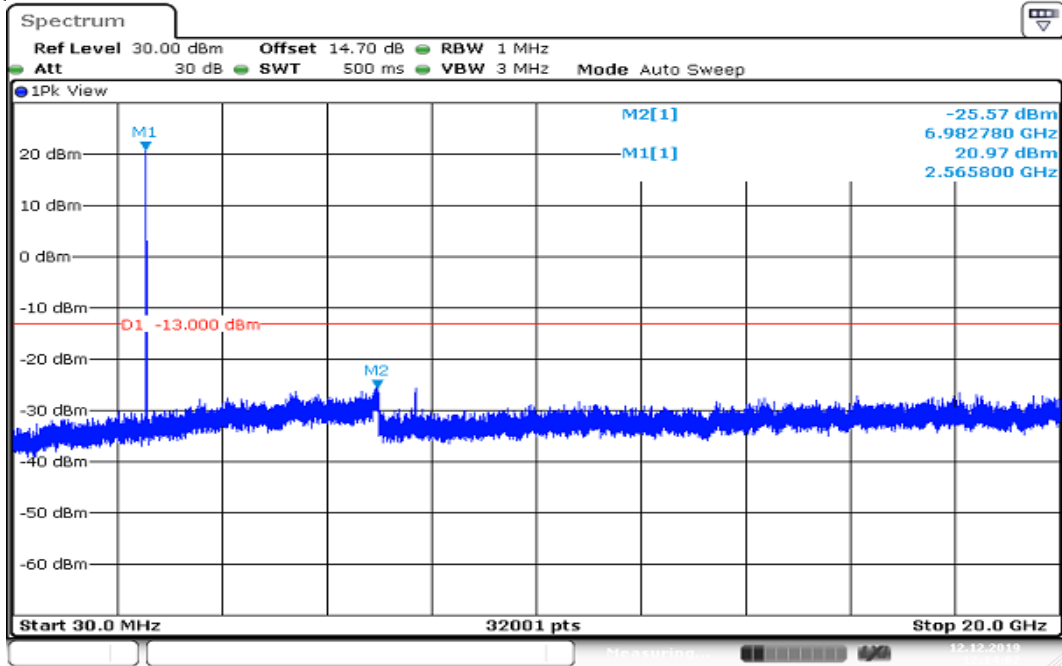
CHANNEL BANDWIDTH:5MHz /16QAM CH Low



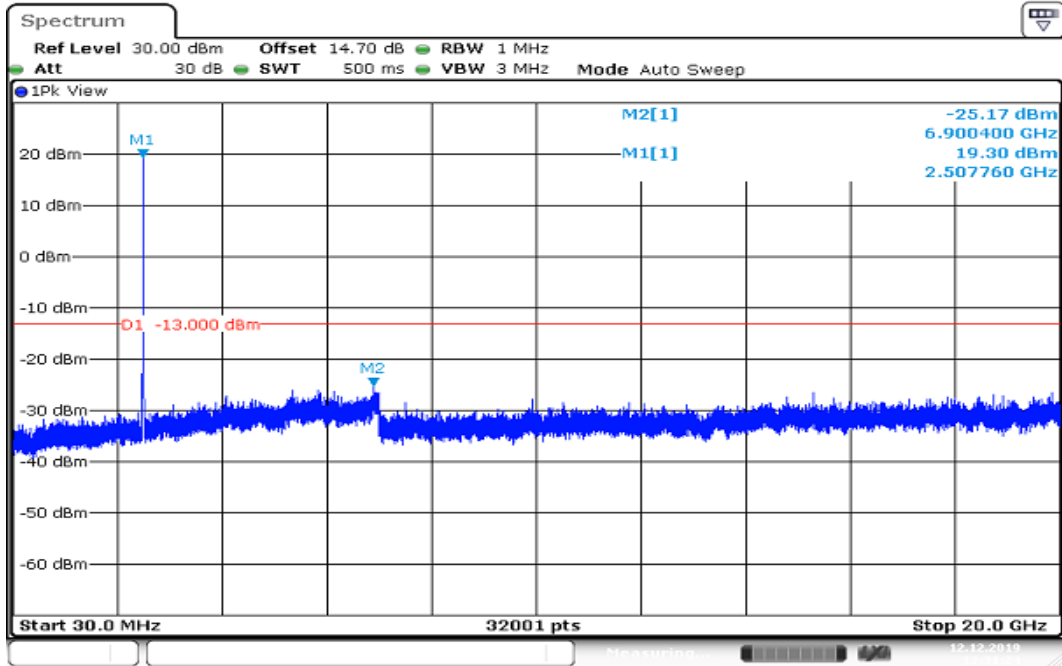
CH Mid



CH High

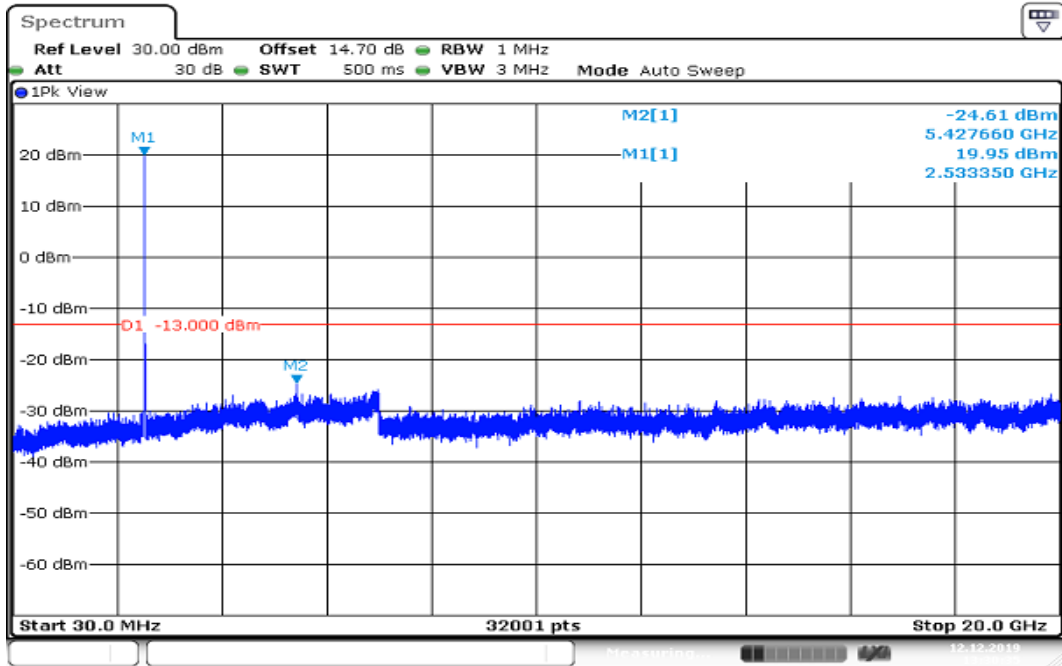


CHANNEL BANDWIDTH:10MHz /16QAM CH Low



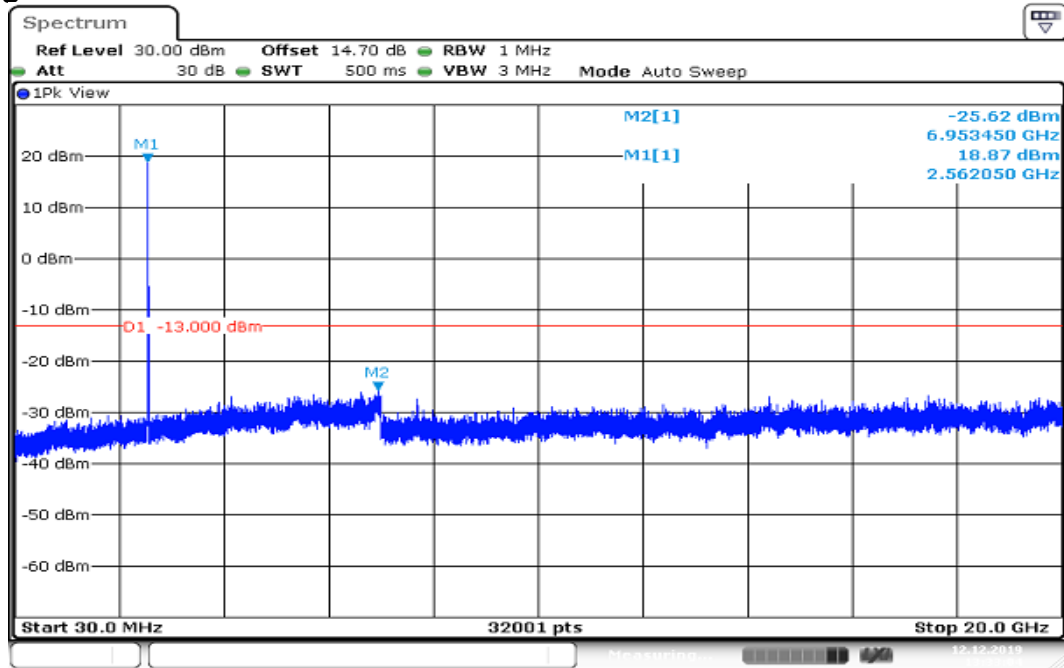
Date: 12.DEC.2019 13:31:24

CH Mid



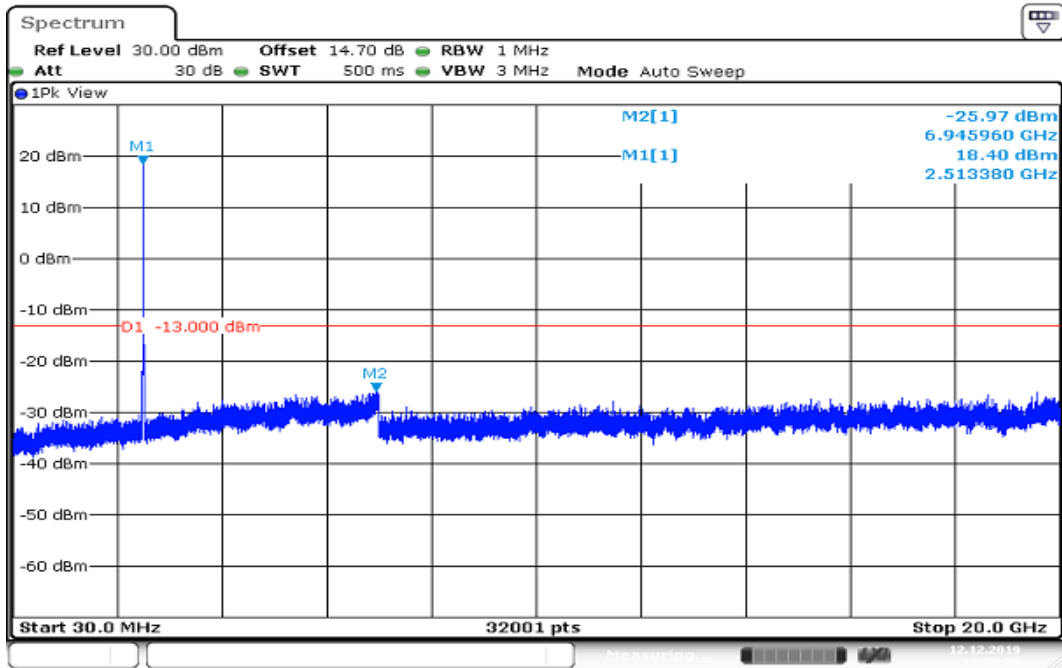
Date: 12.DEC.2019 13:30:35

CH High

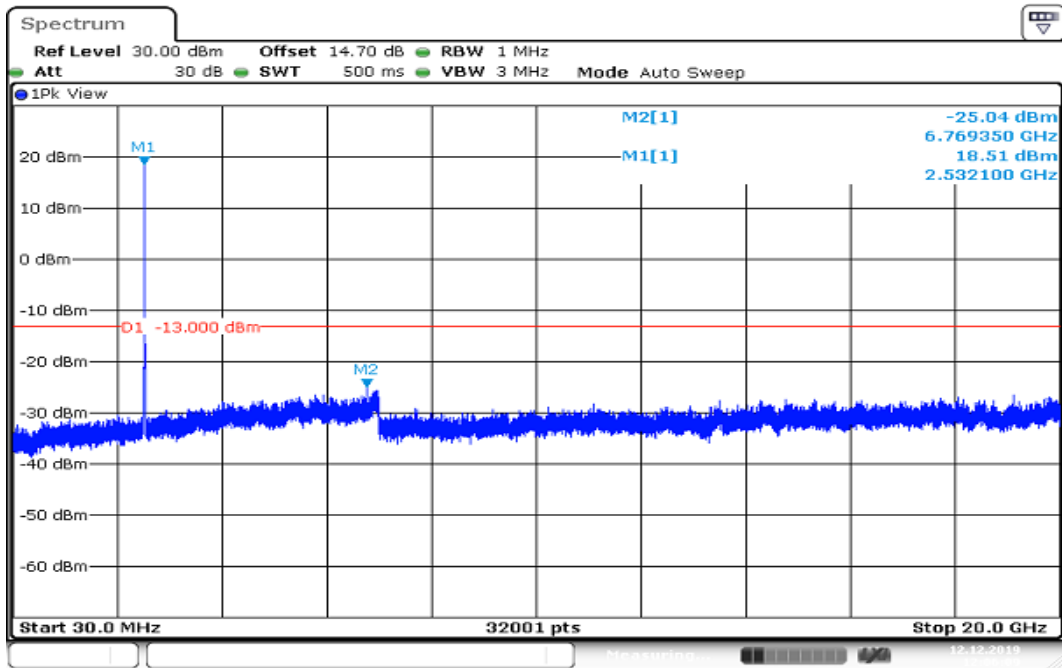


Date: 12.DEC.2019 13:33:04

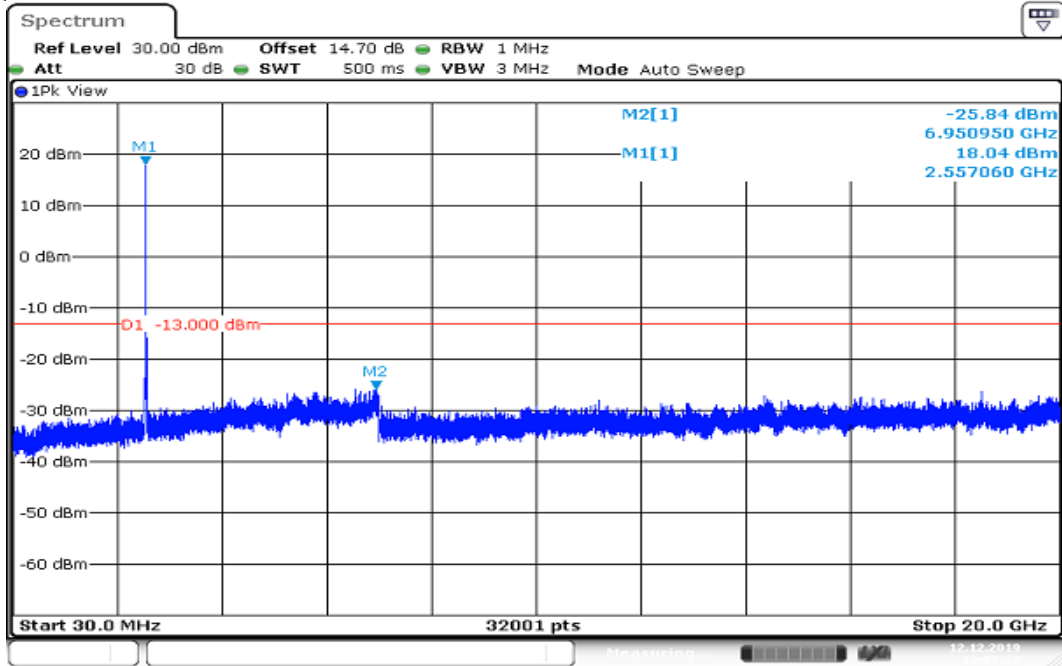
CHANNEL BANDWIDTH:15MHz /16QAM CH Low



CH Mid

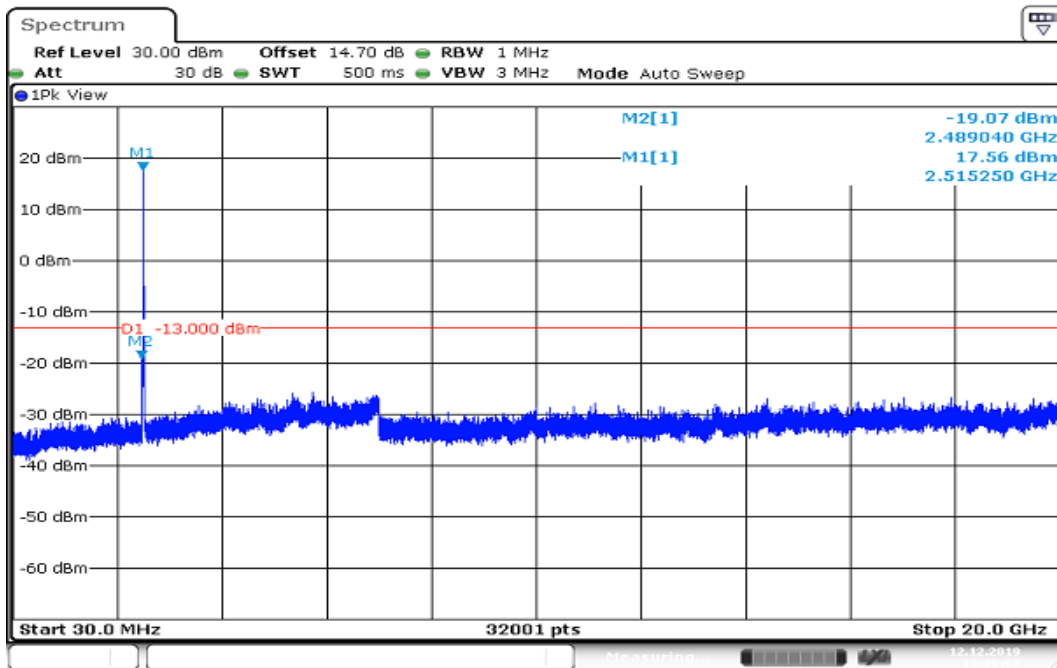


CH High



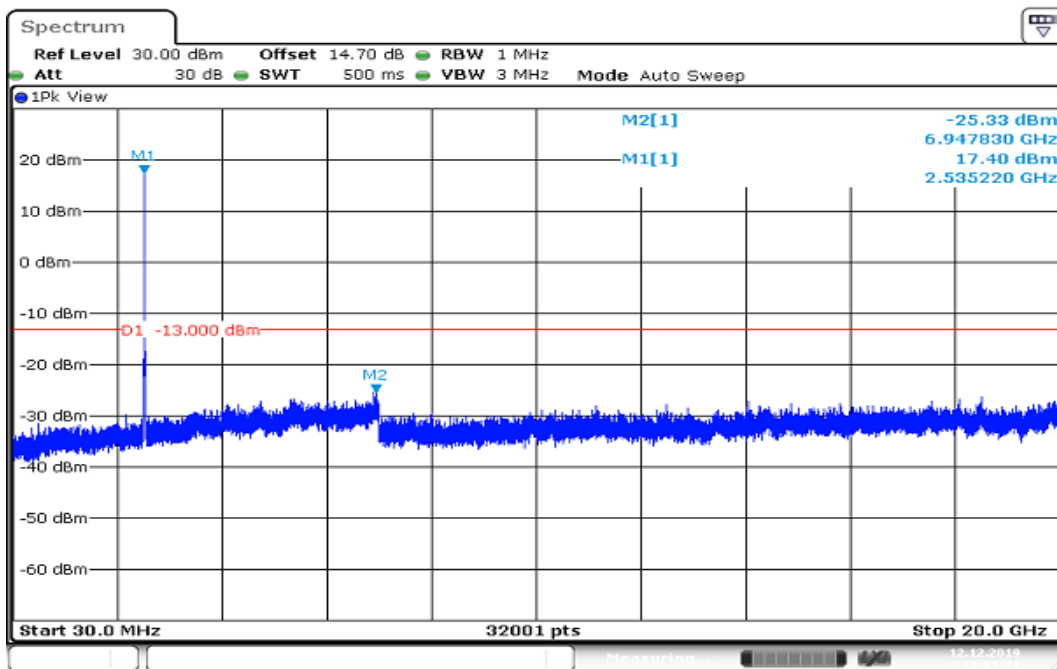
Date: 12.DEC.2019 12:07:37

CHANNEL BANDWIDTH:20MHz /16QAM CH Low



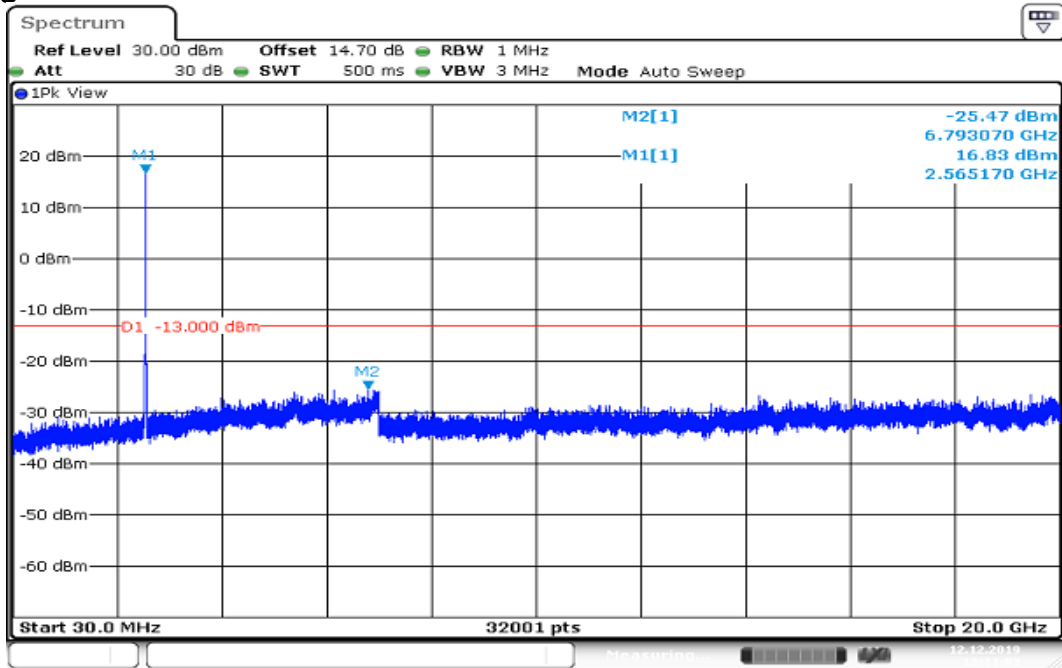
Date: 12.DEC.2019 12:08:52

CH Mid



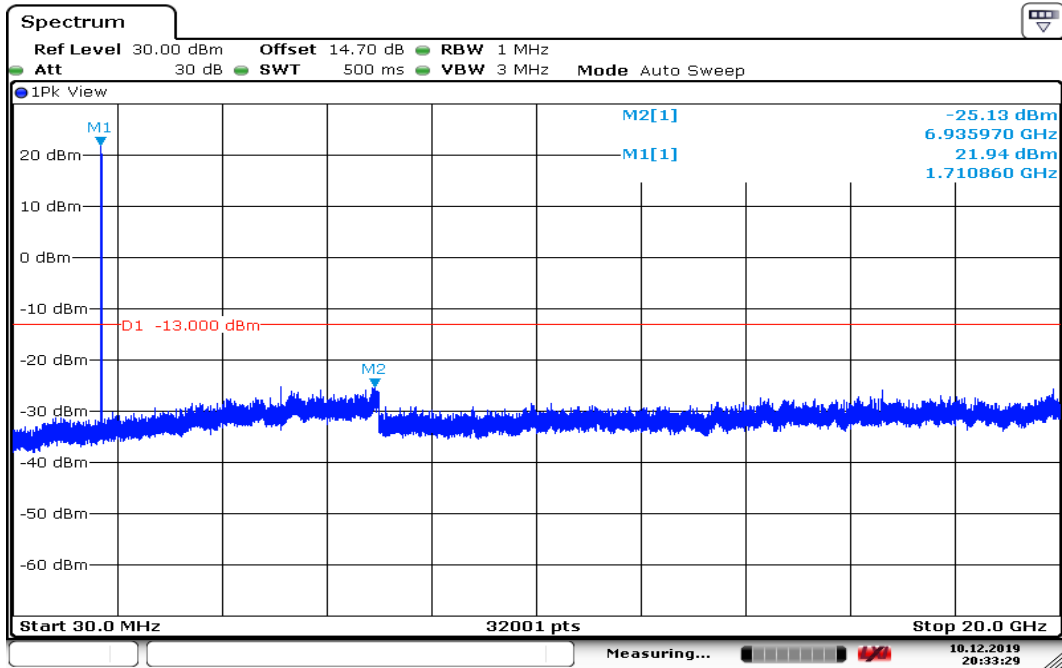
Date: 12.DEC.2019 12:09:31

CH High



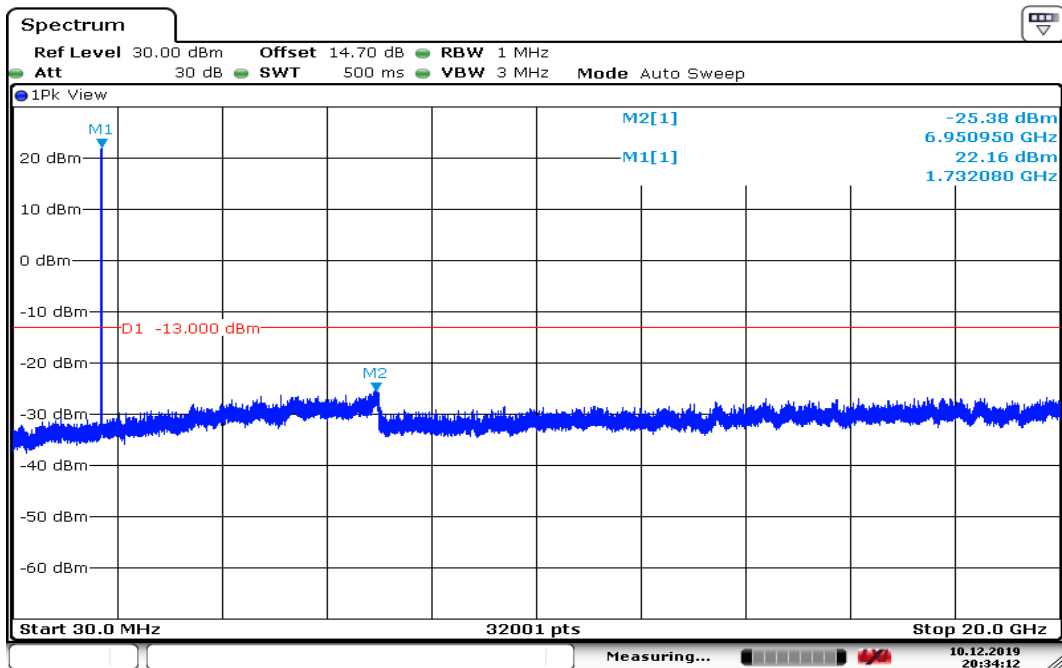
Date: 12.DEC.2019 12:11:03

LTE Band 4 CHANNEL BANDWIDTH: 1.4MHz /QPSK CH Low



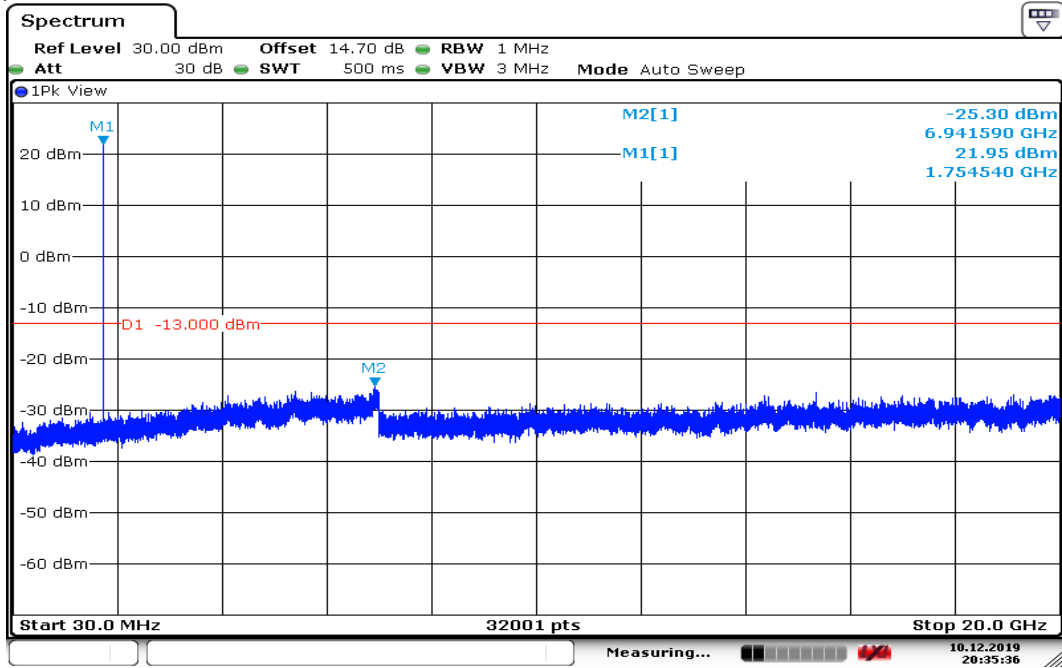
Date: 10.DEC.2019 20:33:29

CH Mid



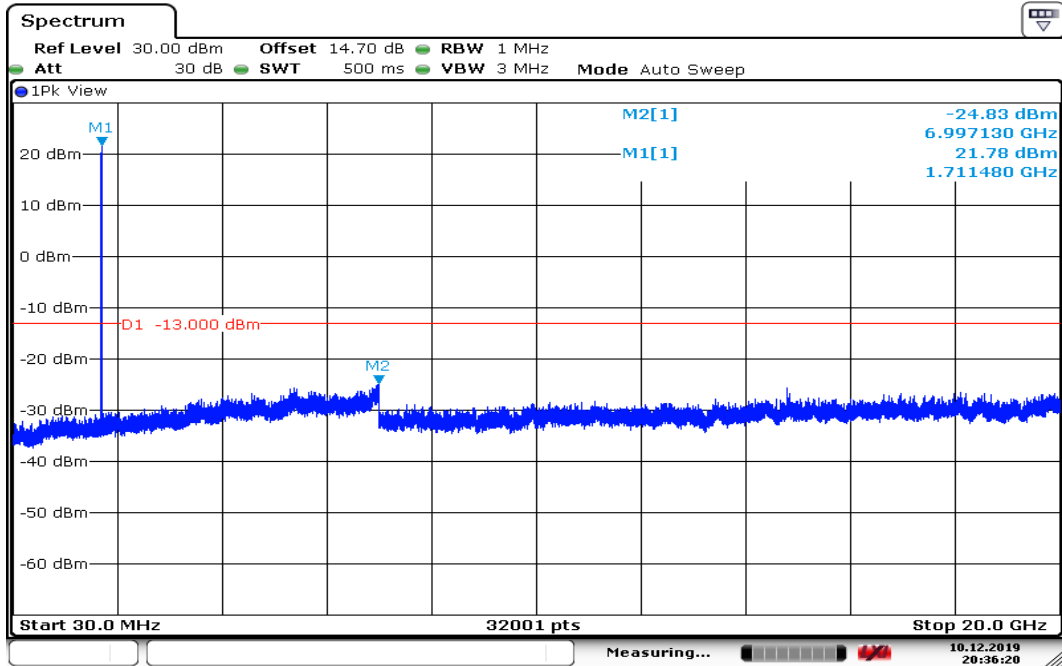
Date: 10.DEC.2019 20:34:13

CH High



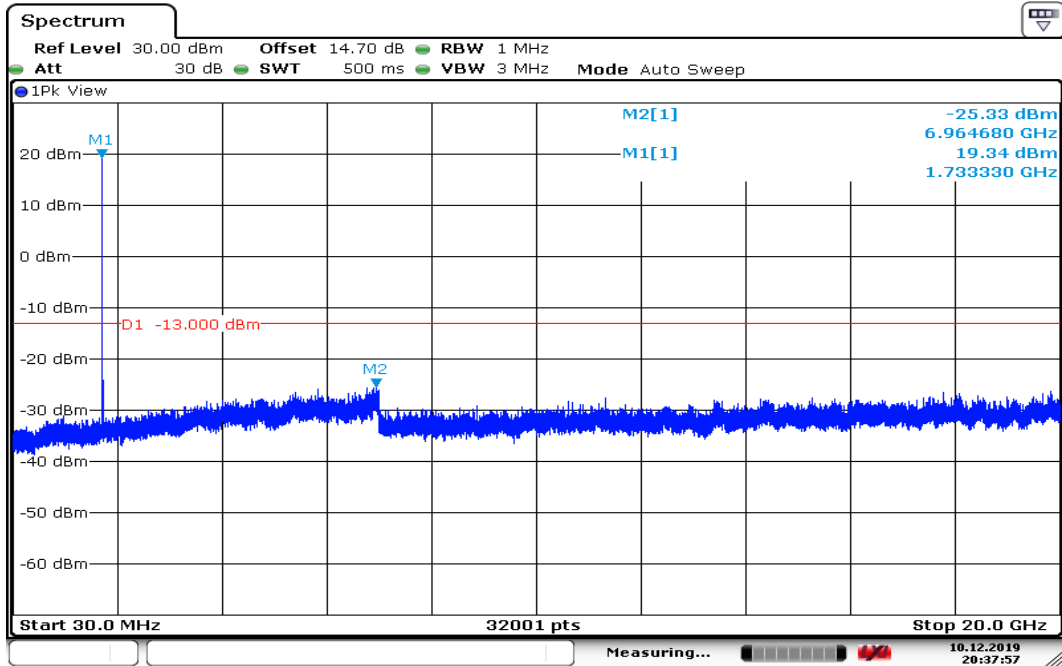
Date: 10.DEC.2019 20:35:37

CHANNEL BANDWIDTH: 3MHz /QPSK CH Low



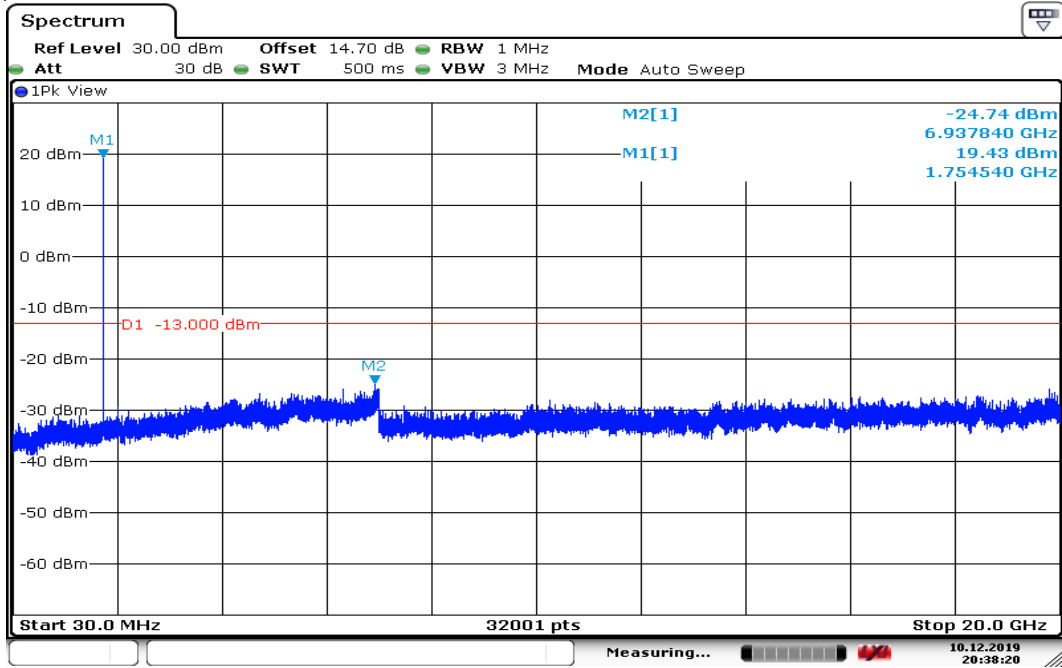
Date: 10.DEC.2019 20:36:21

CH Mid



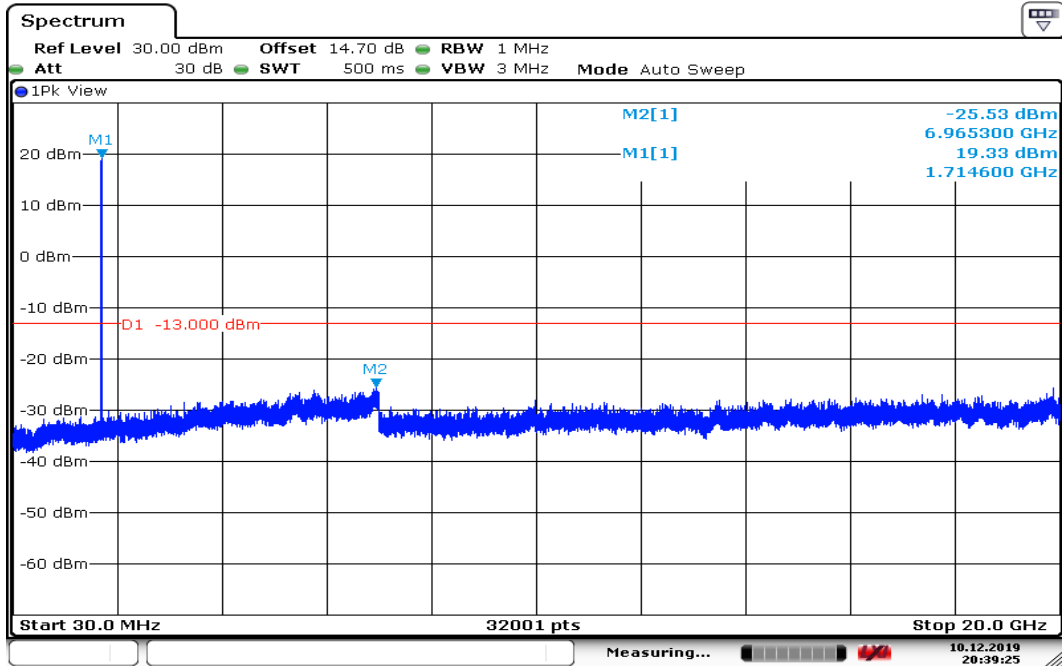
Date: 10.DEC.2019 20:37:58

CH High



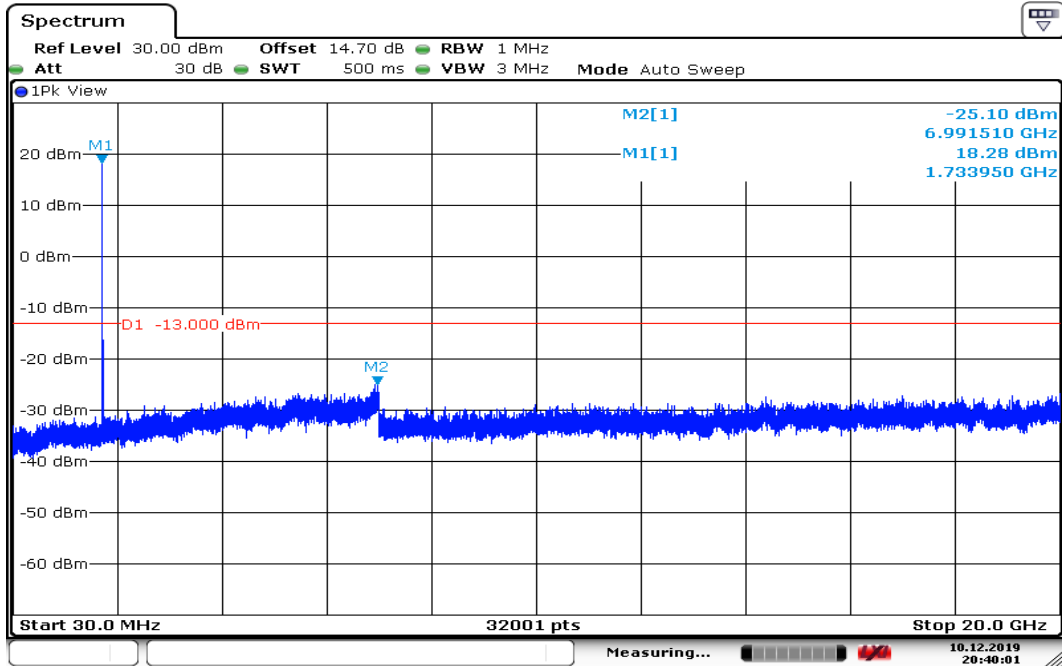
Date: 10.DEC.2019 20:38:20

CHANNEL BANDWIDTH: 5MHz /QPSK CH Low



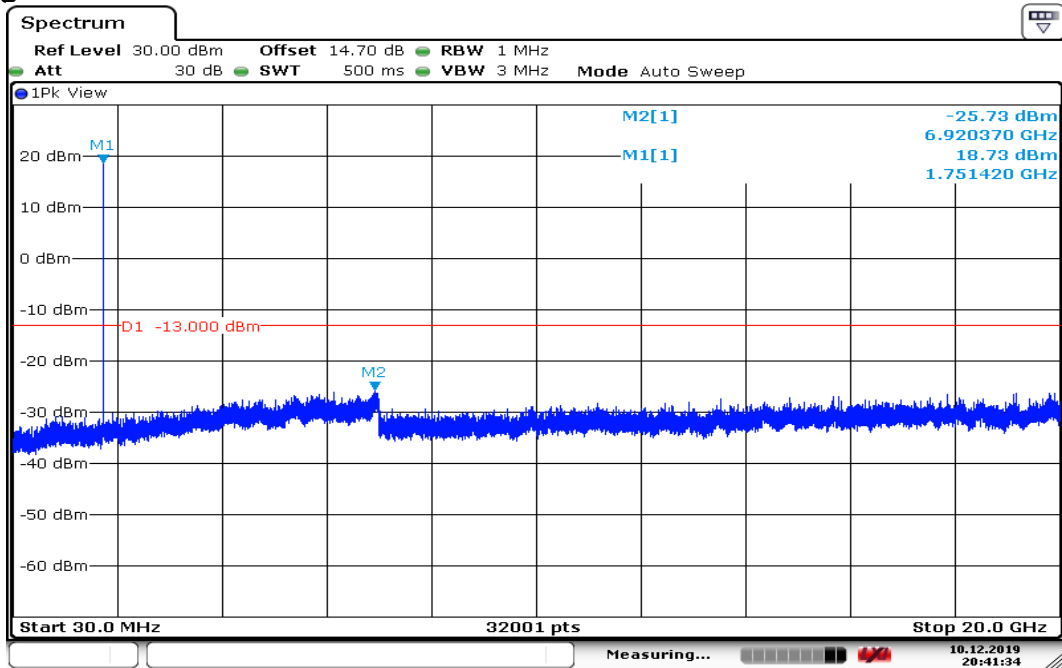
Date: 10.DEC.2019 20:39:26

CH Mid



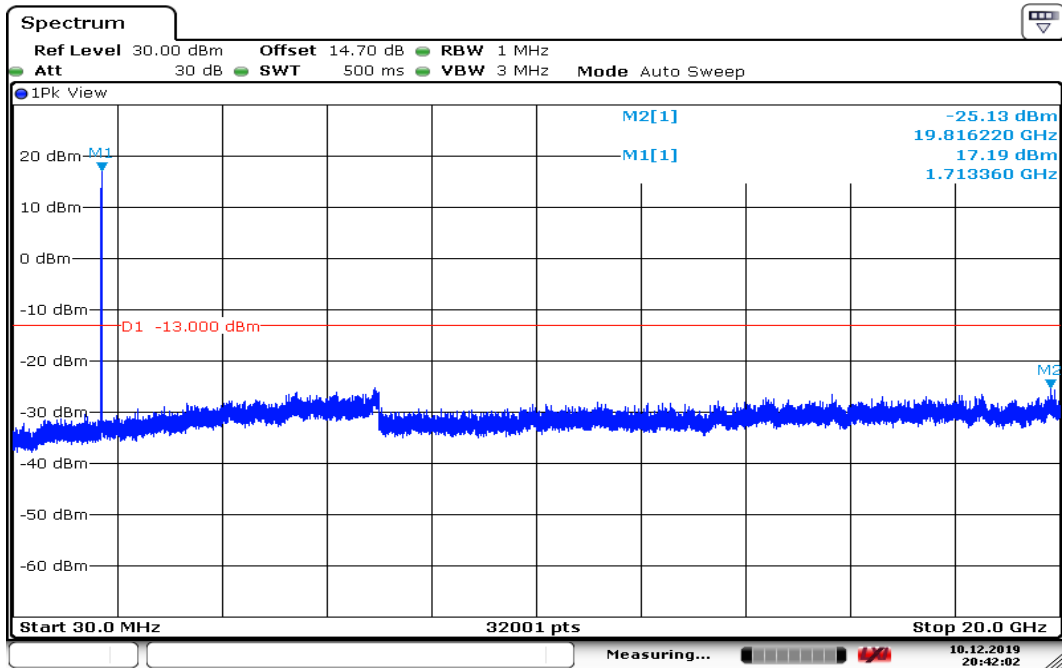
Date: 10.DEC.2019 20:40:01

CH High



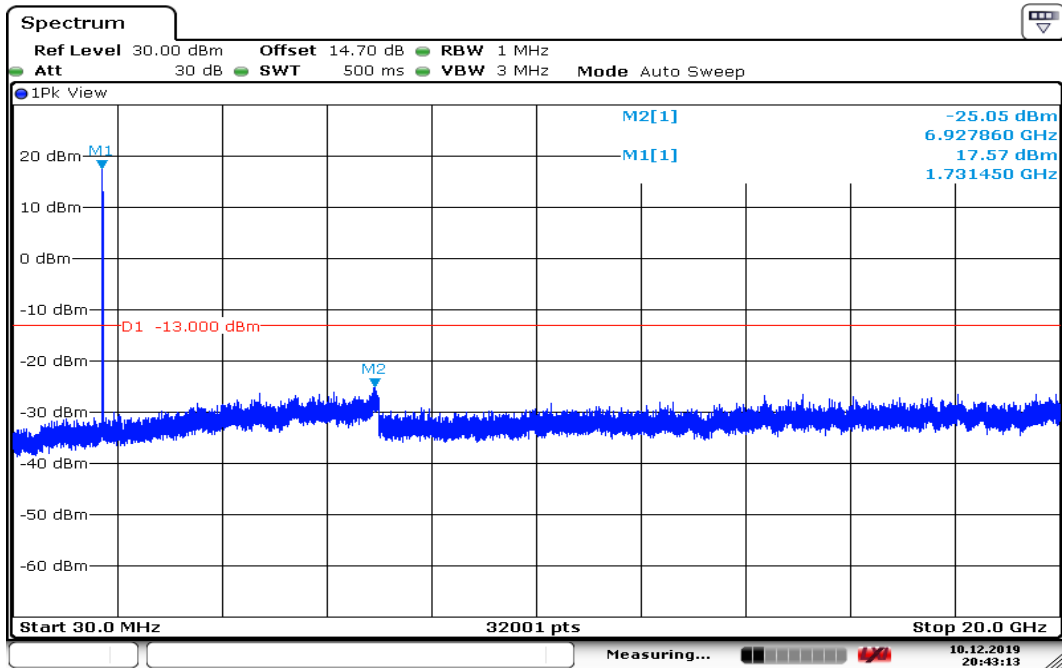
Date: 10.DEC.2019 20:41:35

CHANNEL BANDWIDTH: 10MHz /QPSK CH Low



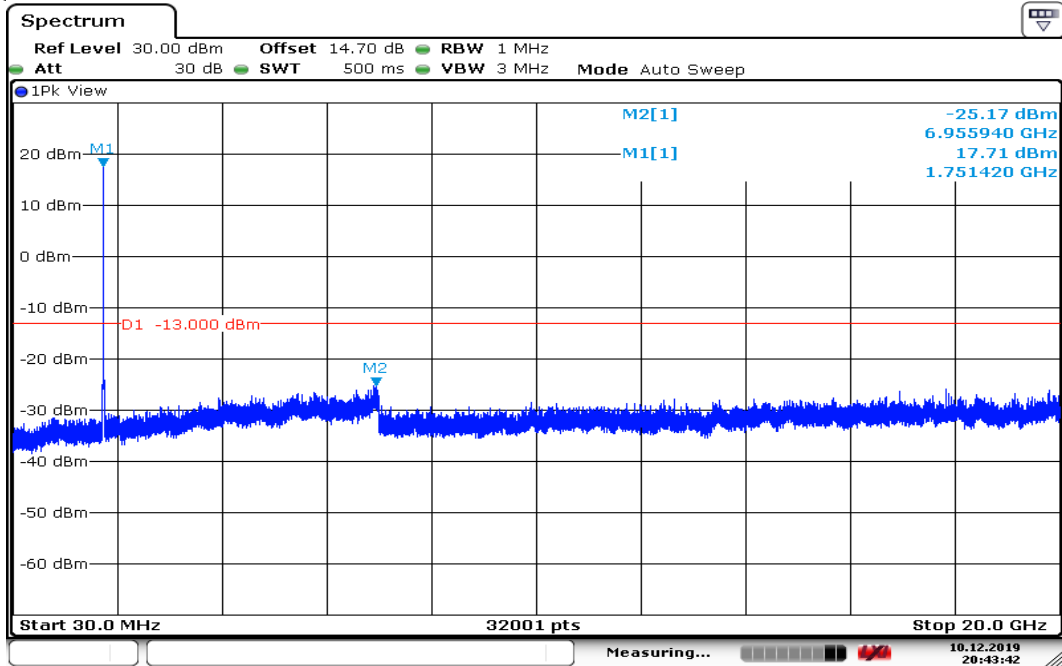
Date: 10.DEC.2019 20:42:02

CH Mid



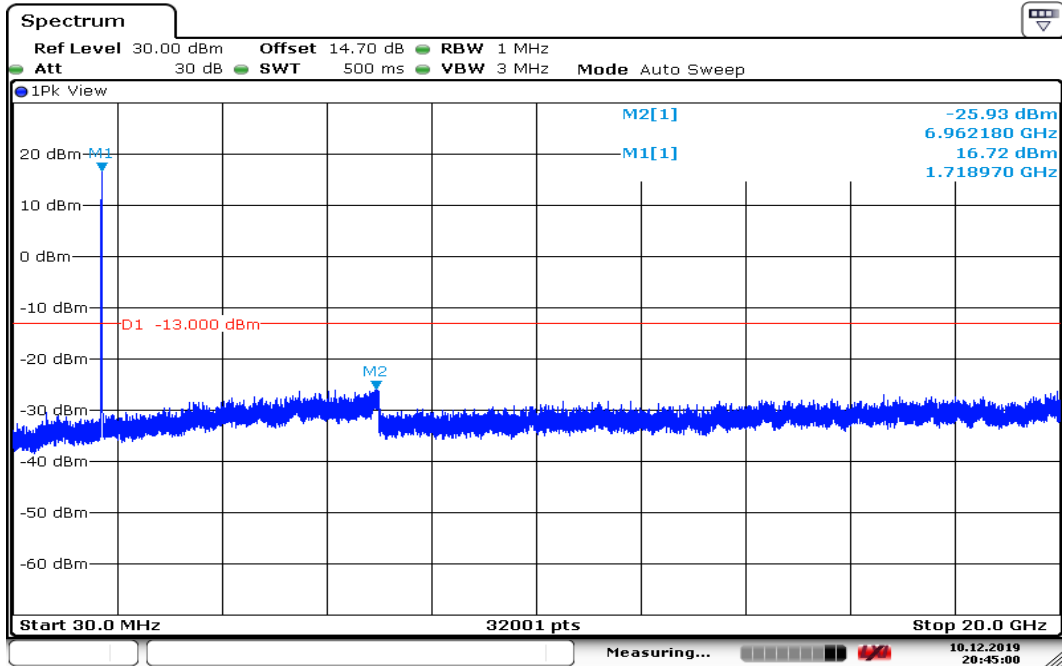
Date: 10.DEC.2019 20:43:14

CH High



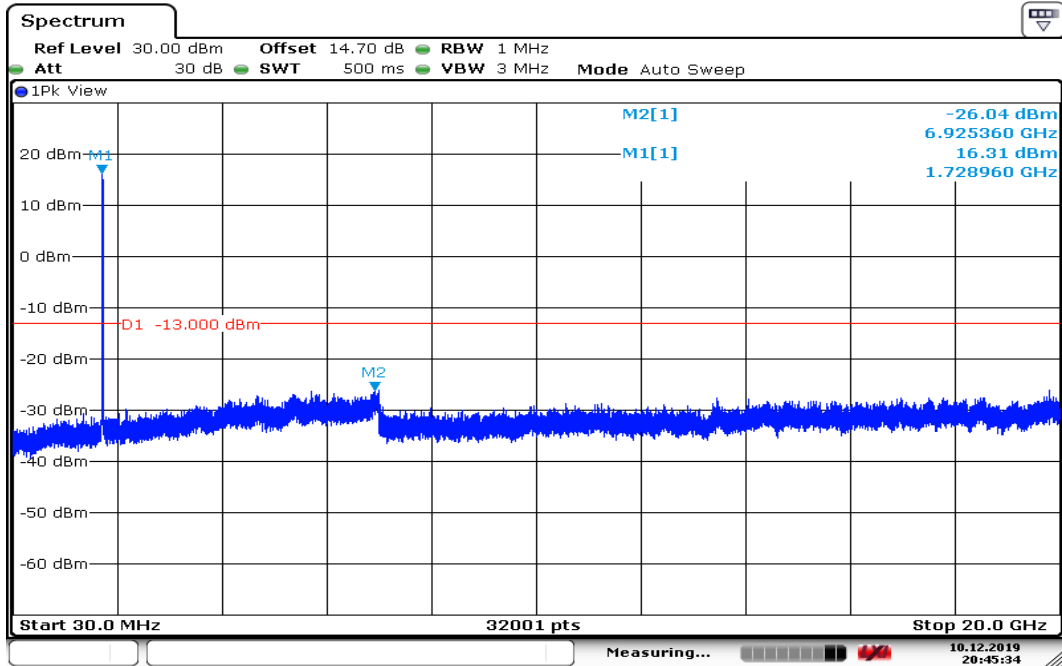
Date: 10.DEC.2019 20:43:42

CHANNEL BANDWIDTH: 15MHz /QPSK CH Low



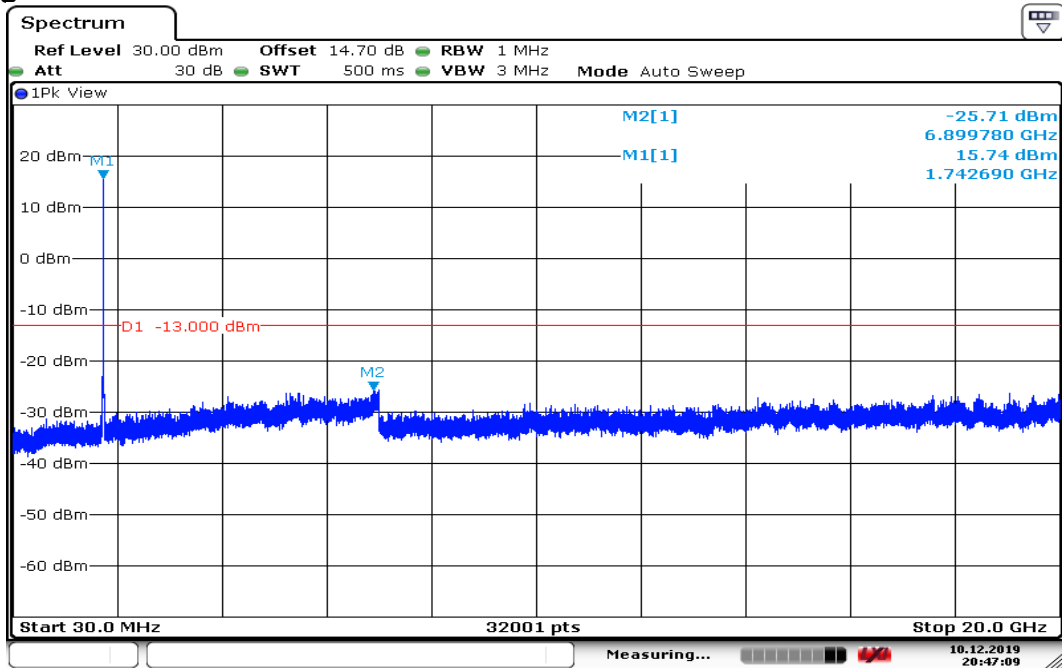
Date: 10.DEC.2019 20:45:01

CH Mid



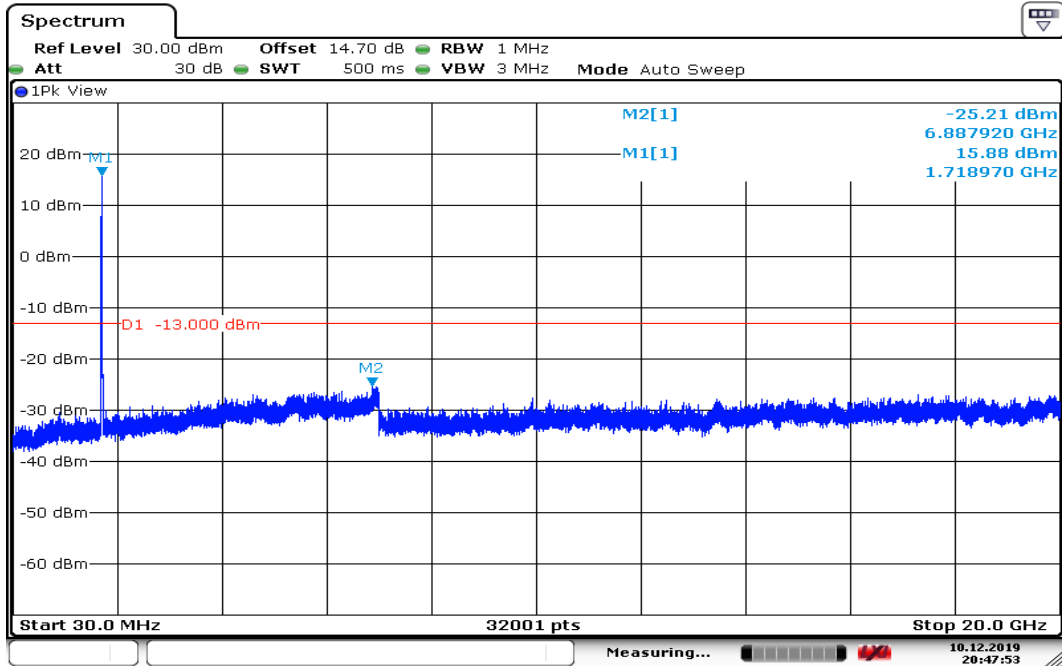
Date: 10.DEC.2019 20:45:35

CH High



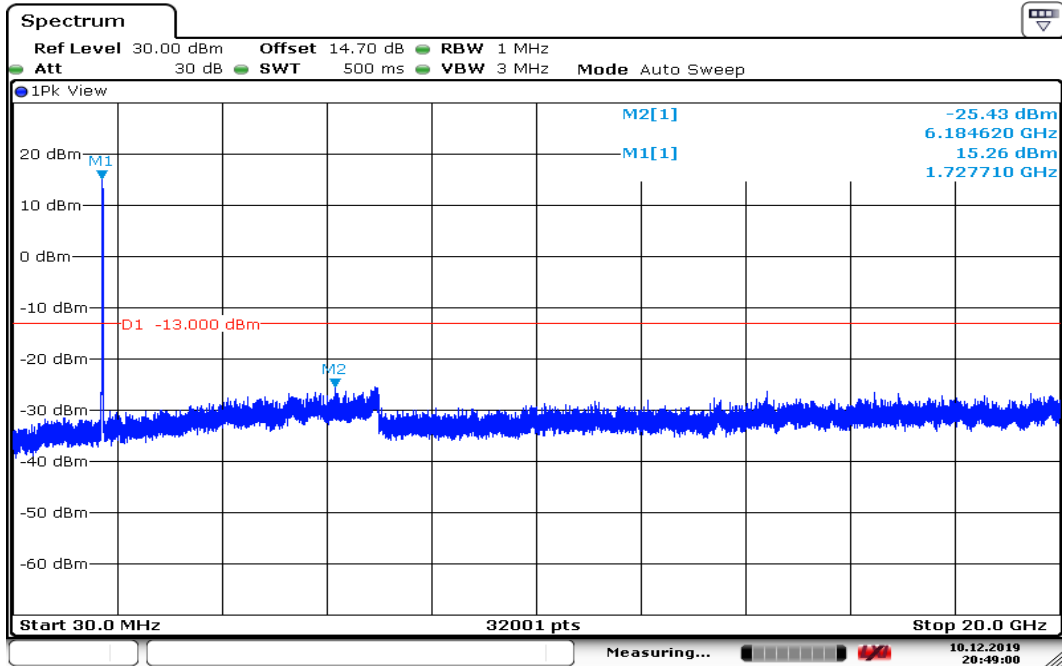
Date: 10.DEC.2019 20:47:09

CHANNEL BANDWIDTH: 20MHz /QPSK CH Low



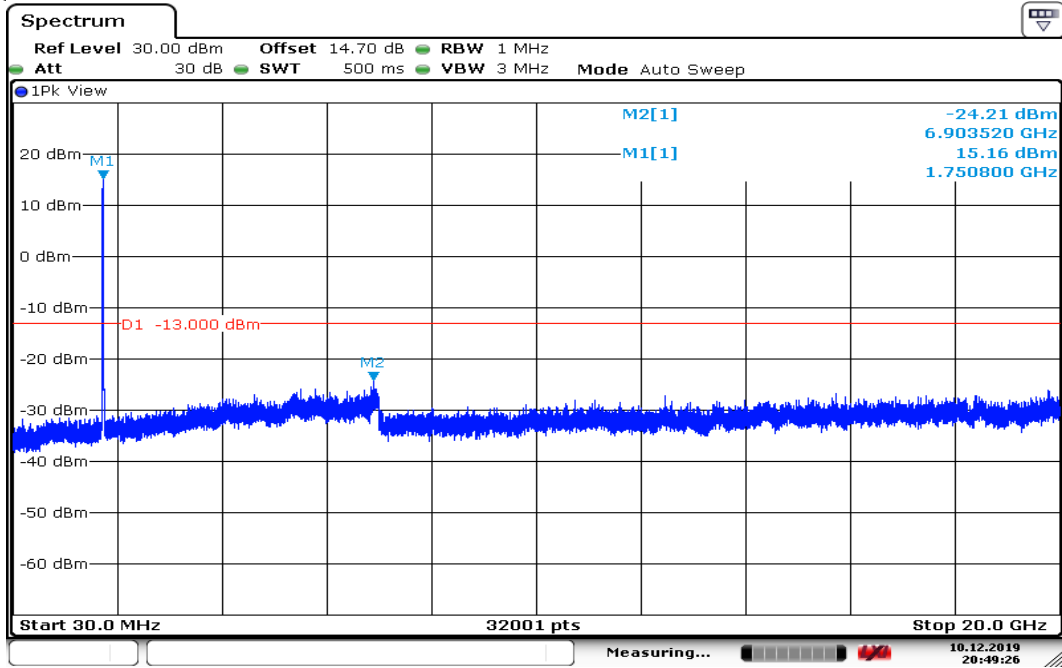
Date: 10.DEC.2019 20:47:53

CH Mid



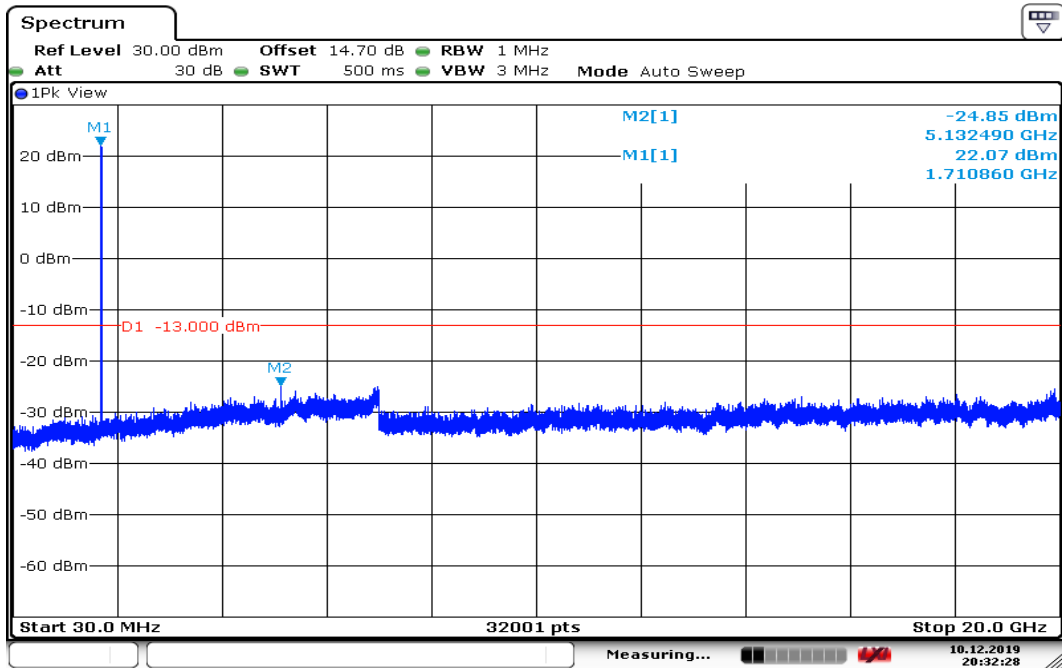
Date: 10.DEC.2019 20:49:01

CH High



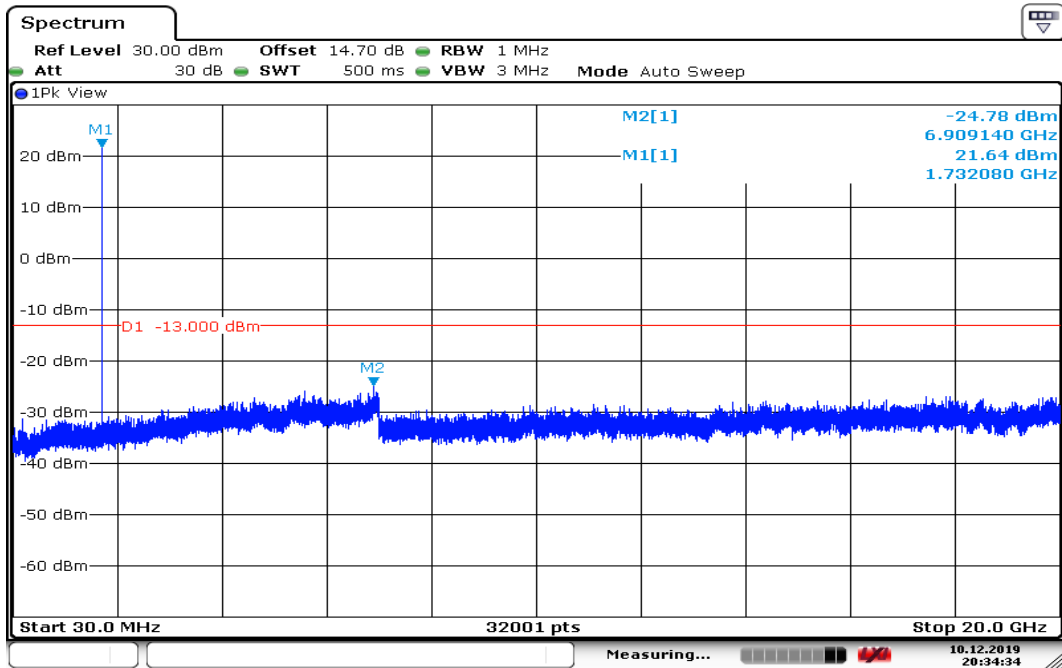
Date: 10.DEC.2019 20:49:26

CHANNEL BANDWIDTH: 1.4MHz /16QAM CH Low



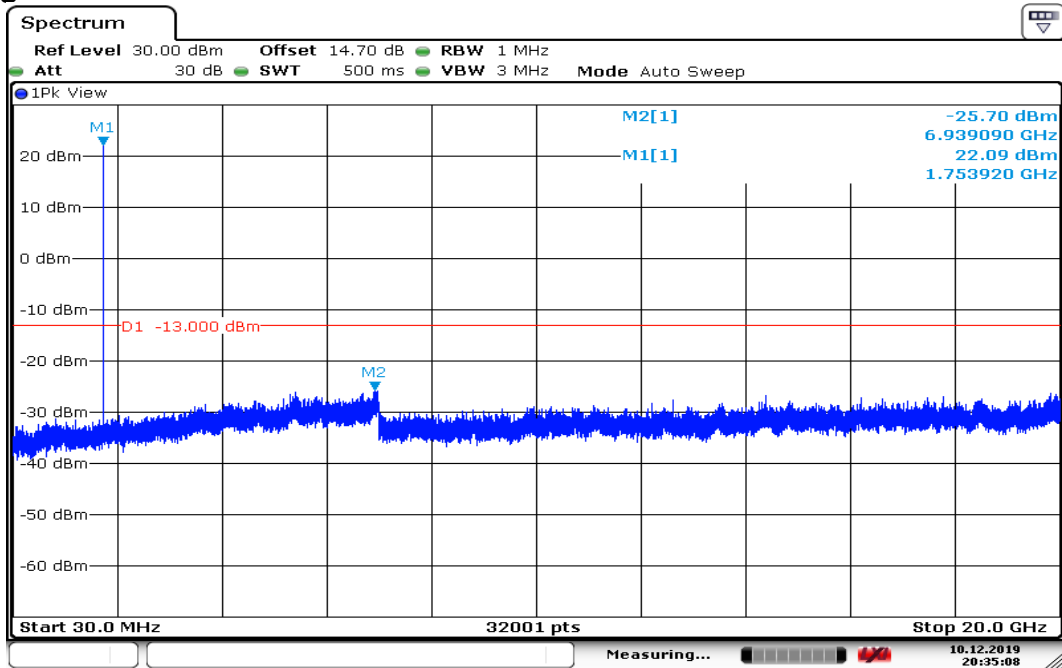
Date: 10.DEC.2019 20:32:29

CH Mid



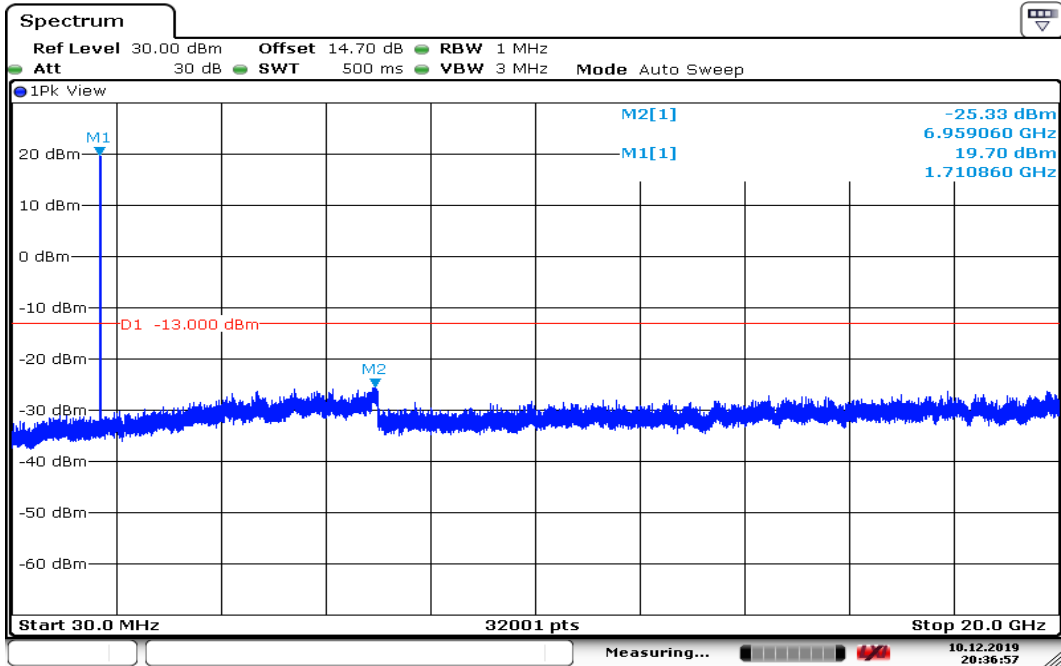
Date: 10.DEC.2019 20:34:34

CH High



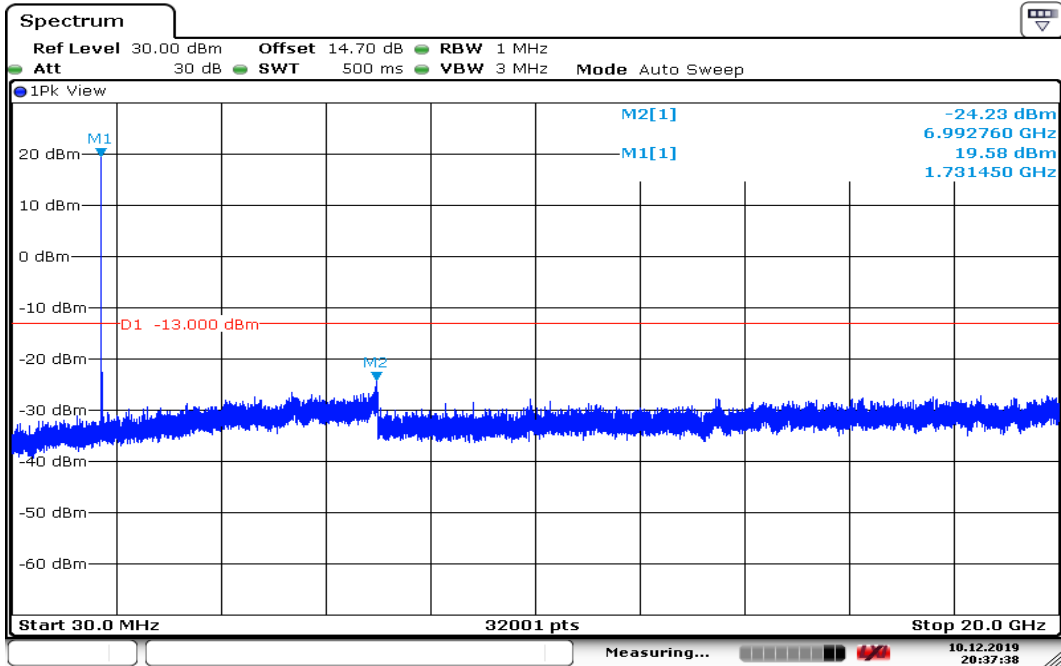
Date: 10.DEC.2019 20:35:09

CHANNEL BANDWIDTH: 3MHz /16QAM CH Low



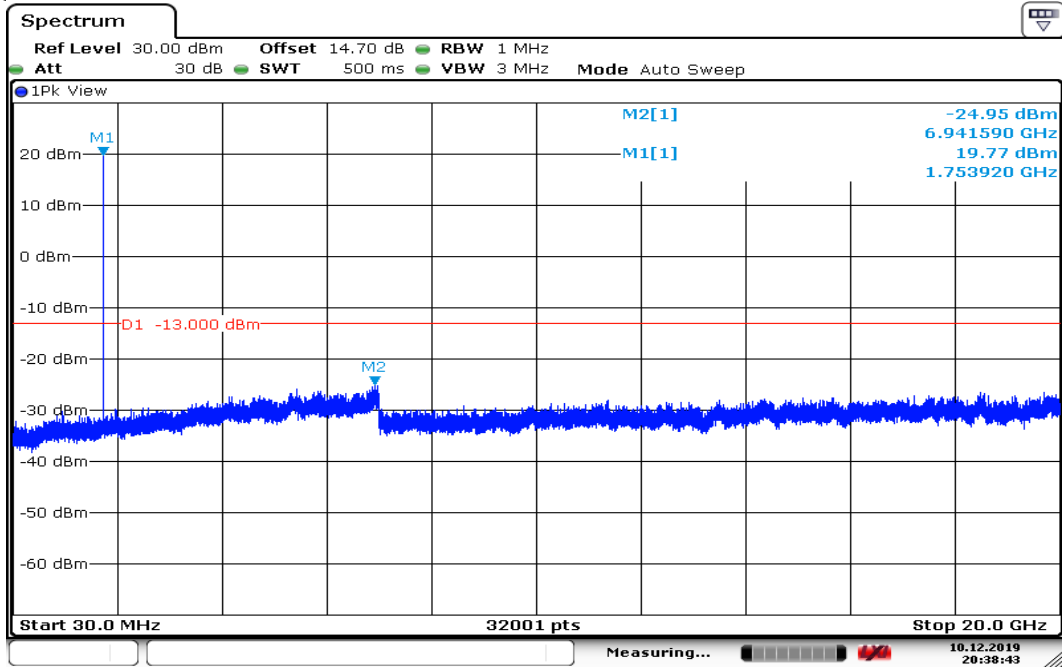
Date: 10.DEC.2019 20:36:57

CH Mid



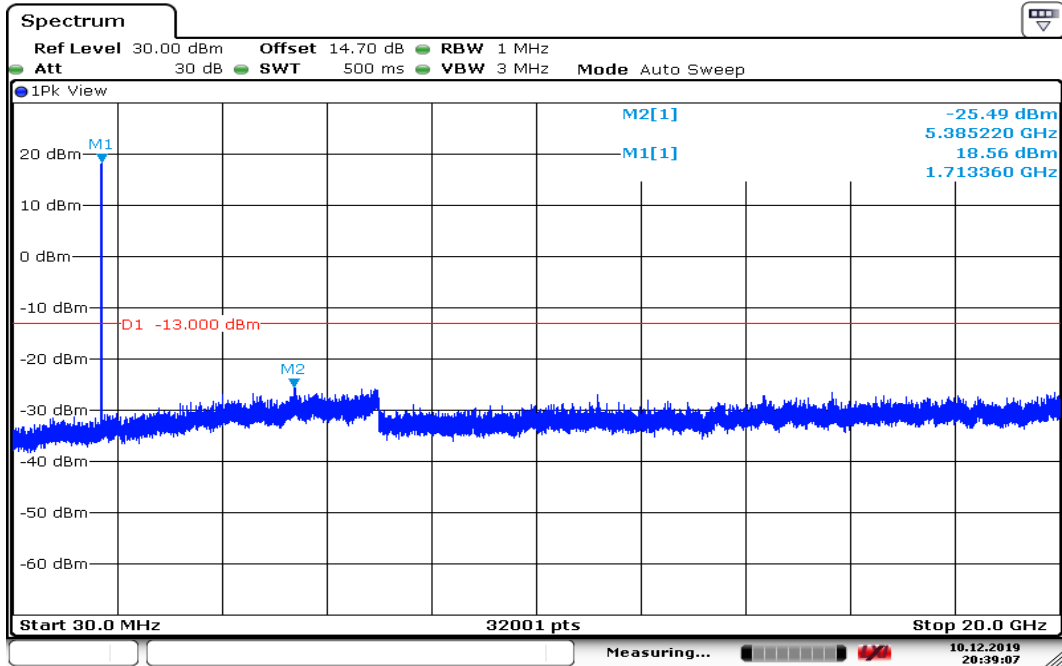
Date: 10.DEC.2019 20:37:39

CH High



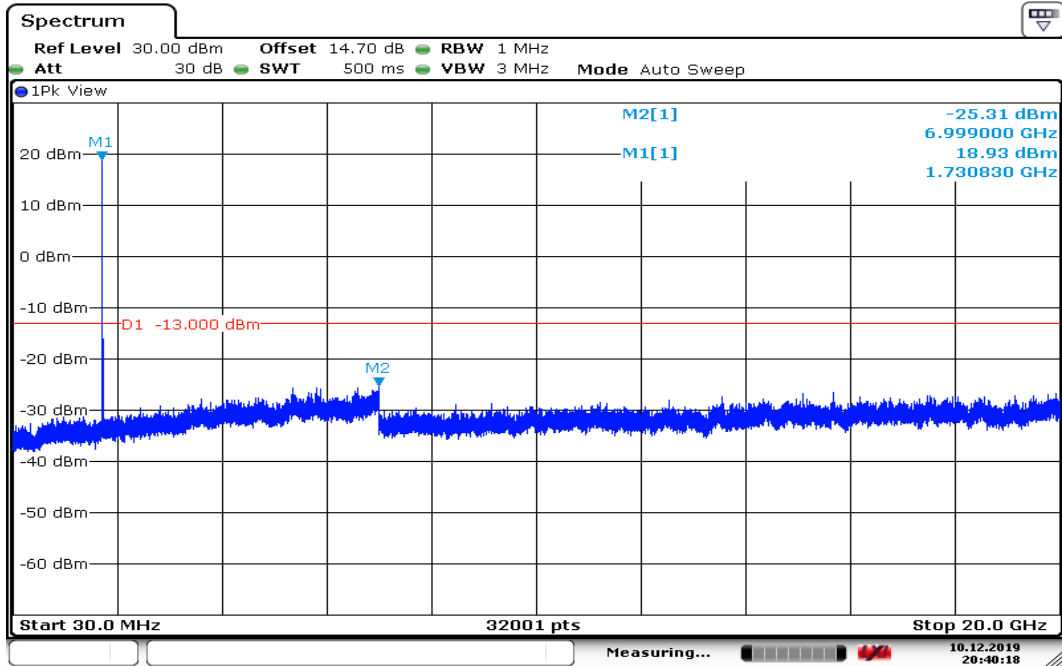
Date: 10.DEC.2019 20:38:44

CHANNEL BANDWIDTH:5MHz /16QAM CH Low



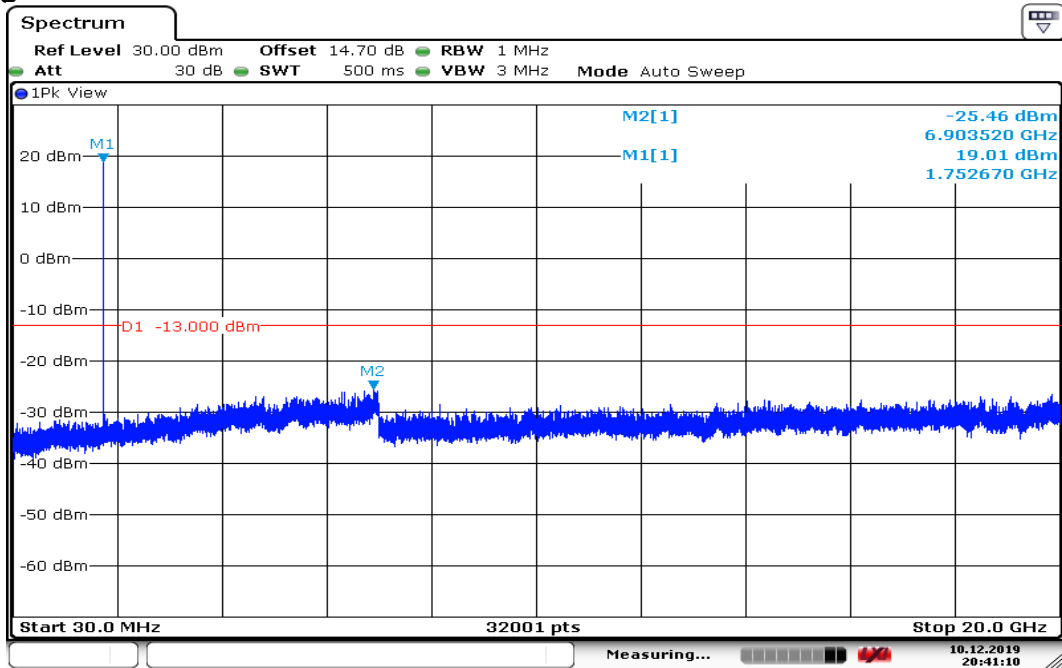
Date: 10.DEC.2019 20:39:07

CH Mid



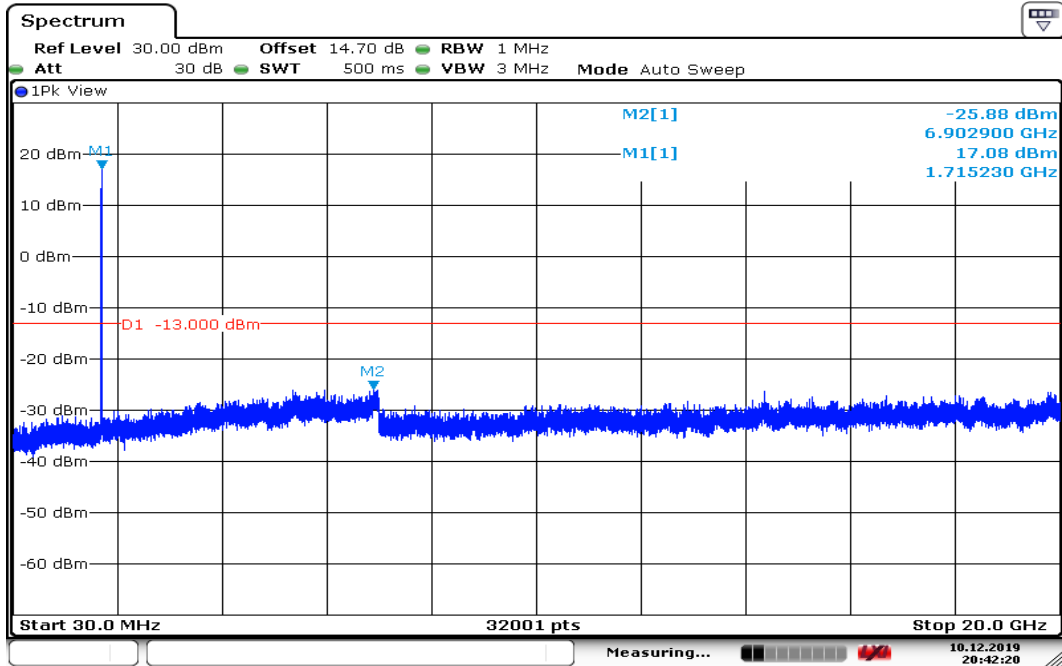
Date: 10.DEC.2019 20:40:19

CH High



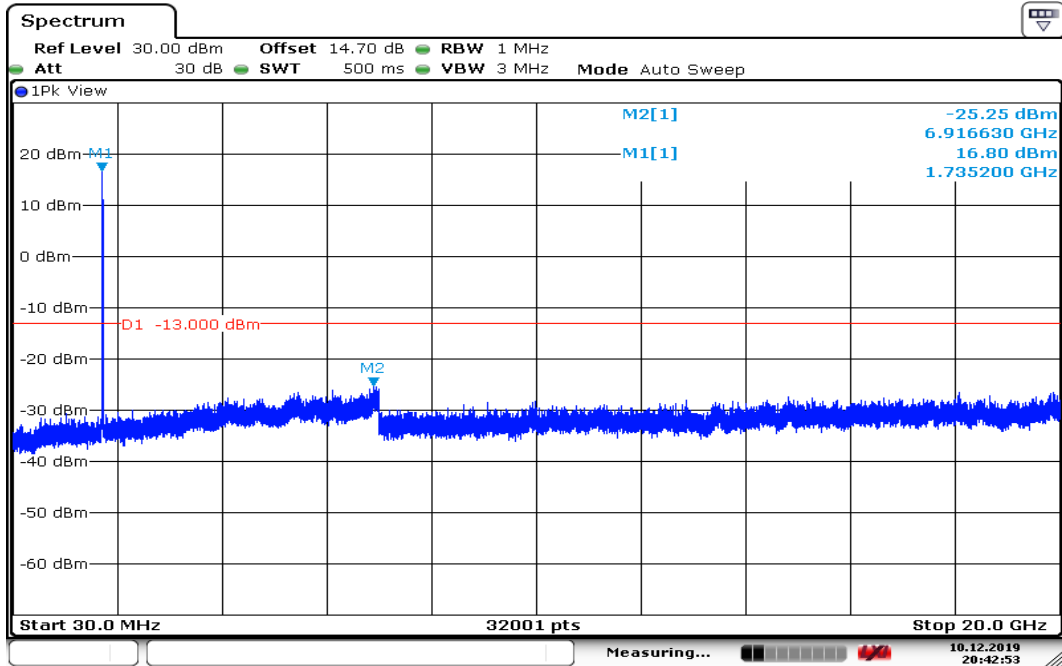
Date: 10.DEC.2019 20:41:11

CHANNEL BANDWIDTH:10MHz /16QAM CH Low



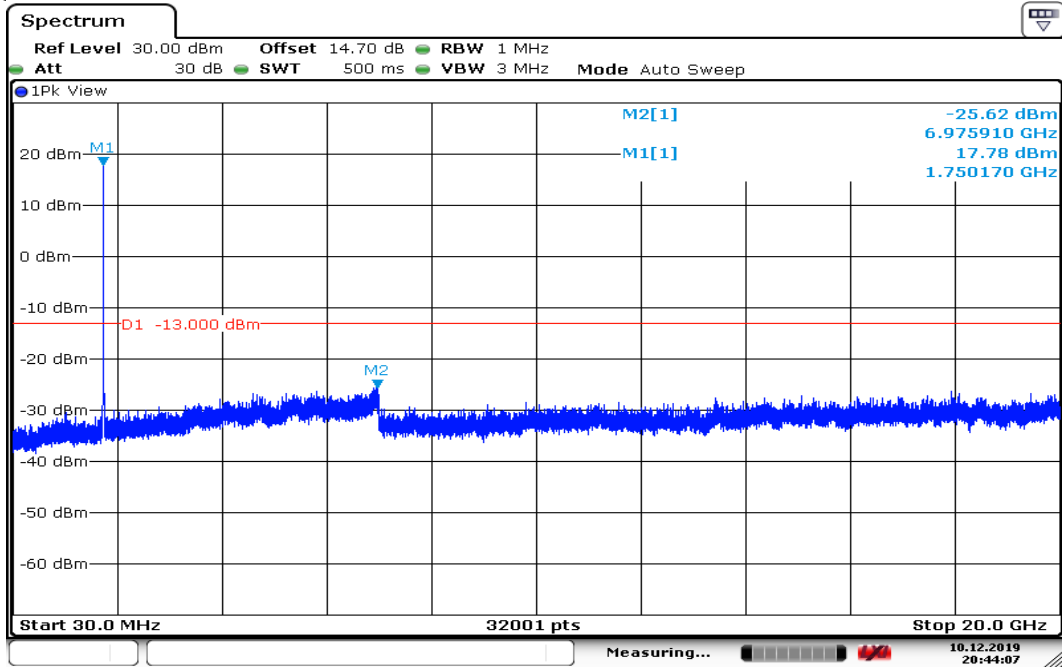
Date: 10.DEC.2019 20:42:21

CH Mid



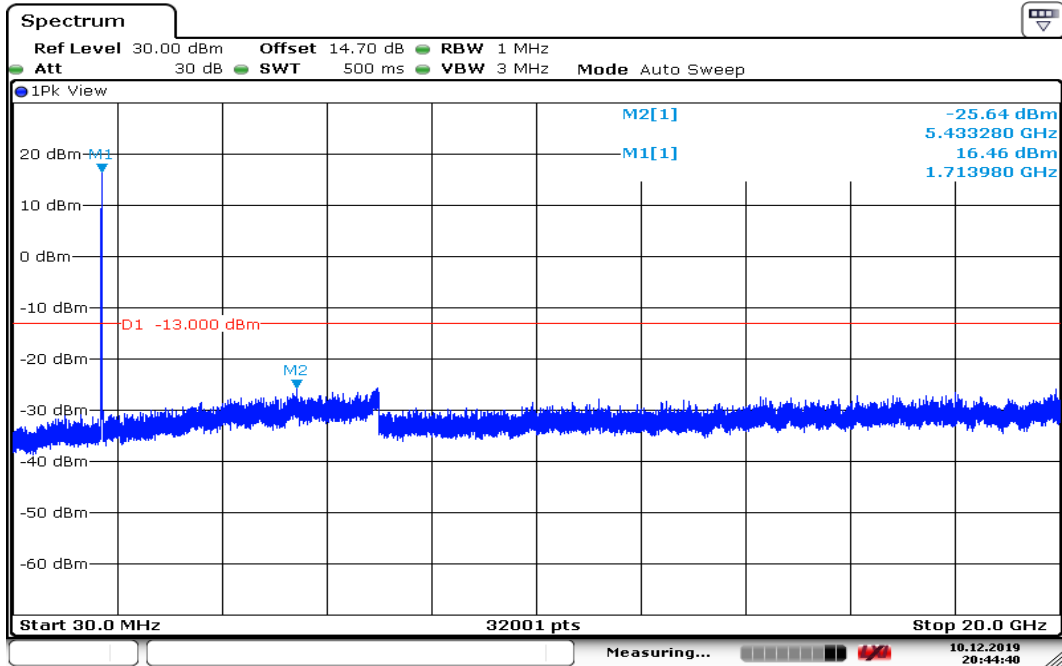
Date: 10.DEC.2019 20:42:54

CH High



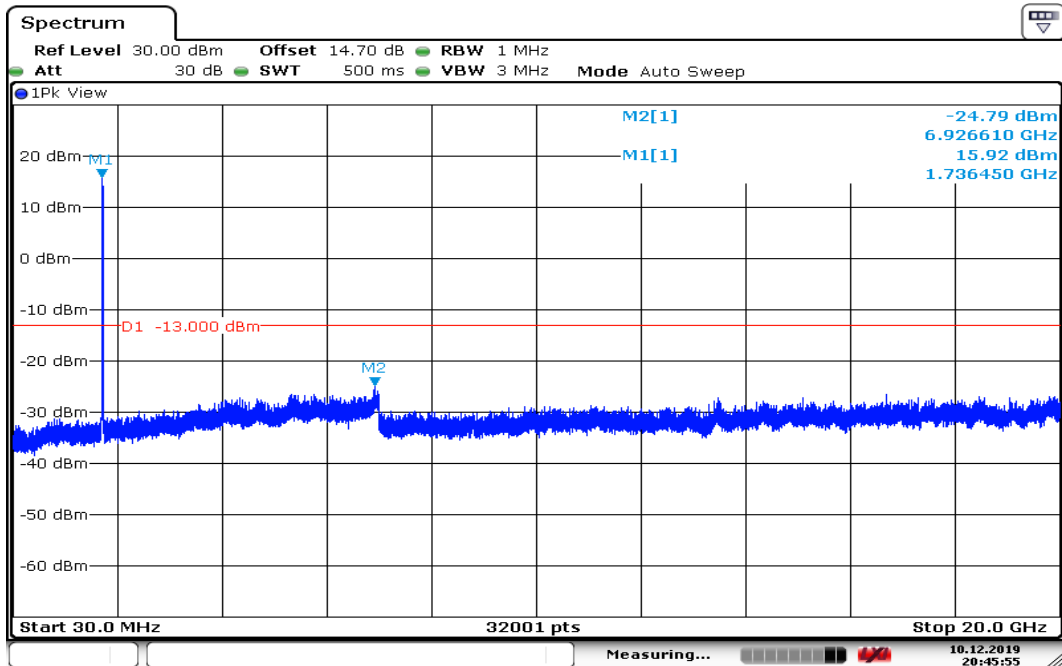
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CHANNEL BANDWIDTH:15MHz /16QAM CH Low



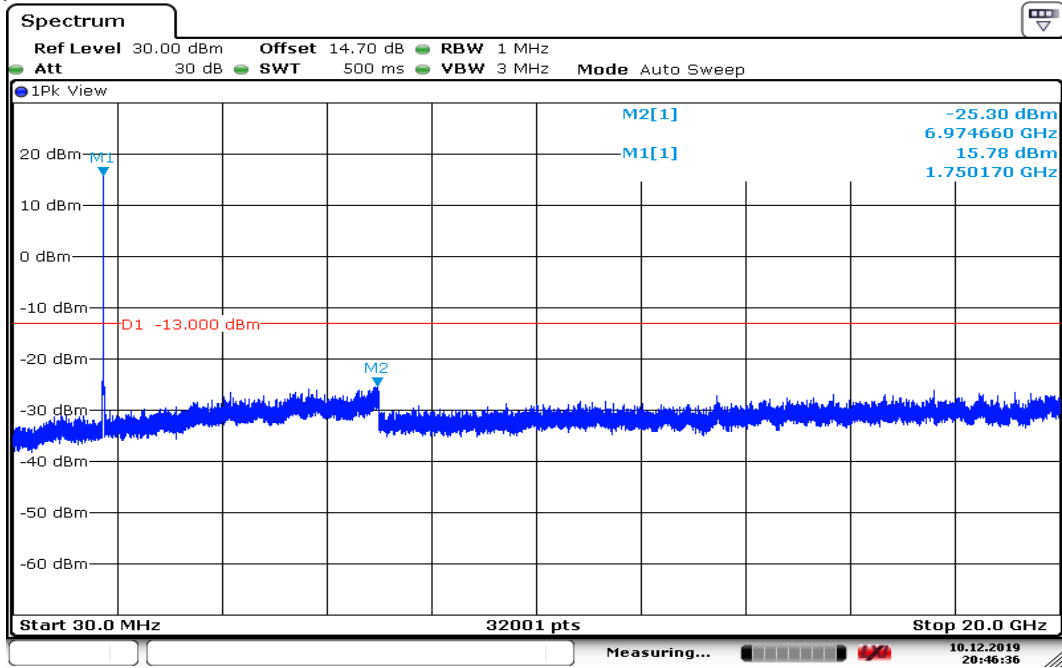
Date: 10.DEC.2019 20:44:40

CH Mid



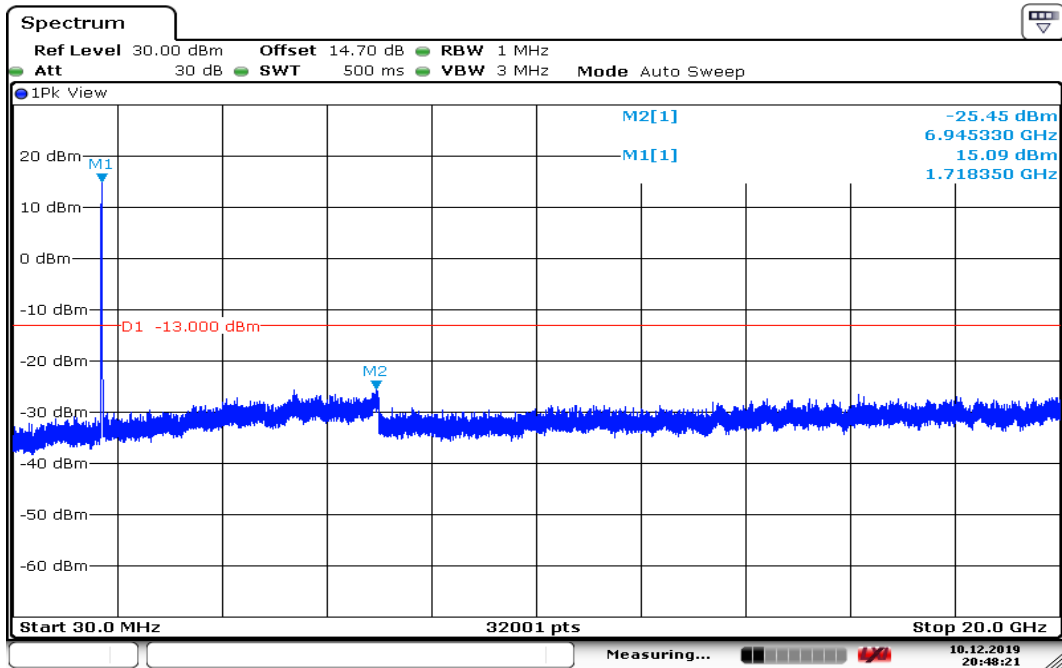
Date: 10.DEC.2019 20:45:55

CH High



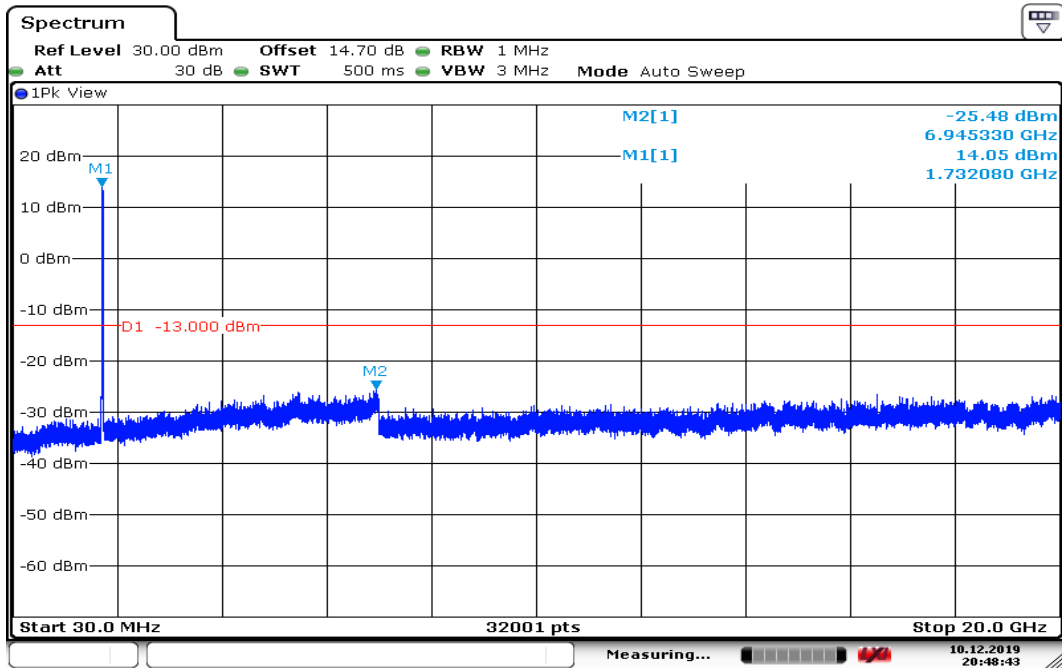
Date: 10.DEC.2019 20:46:36

CHANNEL BANDWIDTH:20MHz /16QAM CH Low



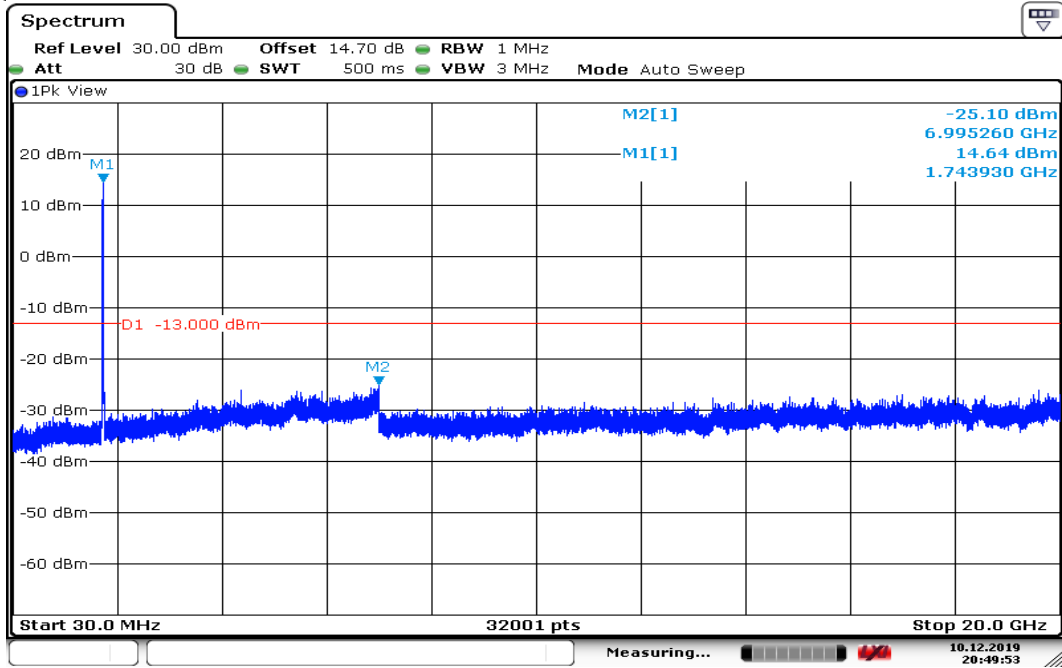
Date: 10.DEC.2019 20:48:21

CH Mid



Date: 10.DEC.2019 20:48:44

CH High



Date: 10.DEC.2019 20:49:53

8.7 RADIATED EMISSION MEASUREMENT

LIMITS

FCC §27.53(h), Band 4 & Band 7

General protection levels. Except as otherwise specified below, for operations in the 1710-1755MHz 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.

27.53(c)(2), Band 13

For operations in the 600 MHz band and the 698-746MHz 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.

Limit Line: -13dBm

According to RSS-130, Band 13,

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate 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 the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

According to RSS-139, Band 4 & Band 7

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

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

p is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

TEST PROCEDURES

1. According to KDB 971168 D01 and TIA-603-E.
2. The EUT was placed on a turntable
 - (1) Below 1G : 0.8m
 - (2) Above 1G : 1.5m
 - (3) EUT set 3m from the receiving antenna
 - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

Report No.: T191105W01-RP10

Test Results

LTE Band 13 / BW: 10MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Tx / Low CH

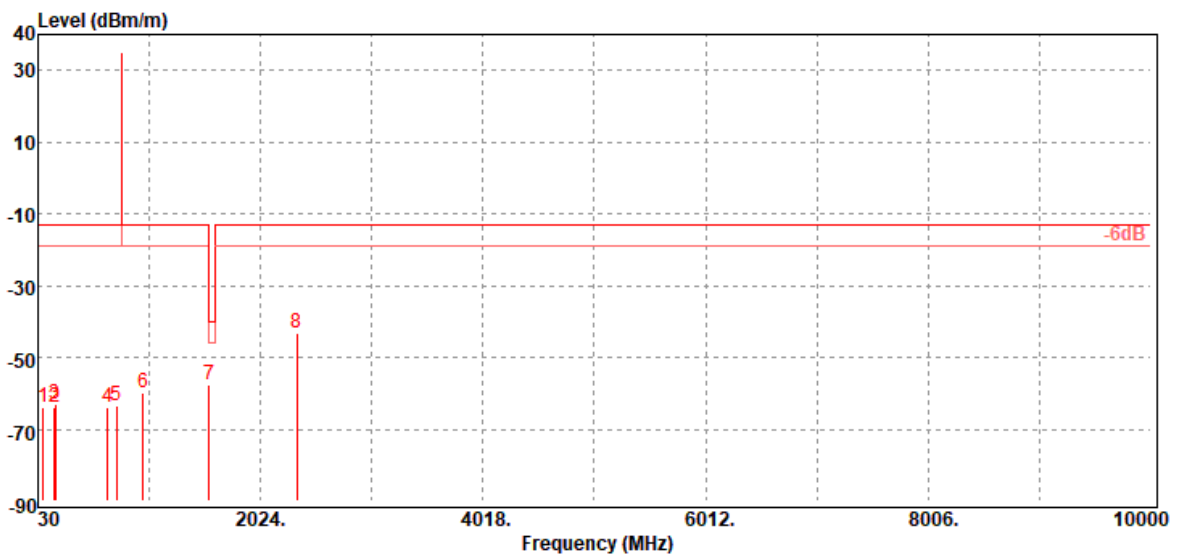
Test Date: December 18, 2019

Temperature: 18.6°C

Tested by: Jerry Chang

Humidity: 59% RH

Polarity: Ver.

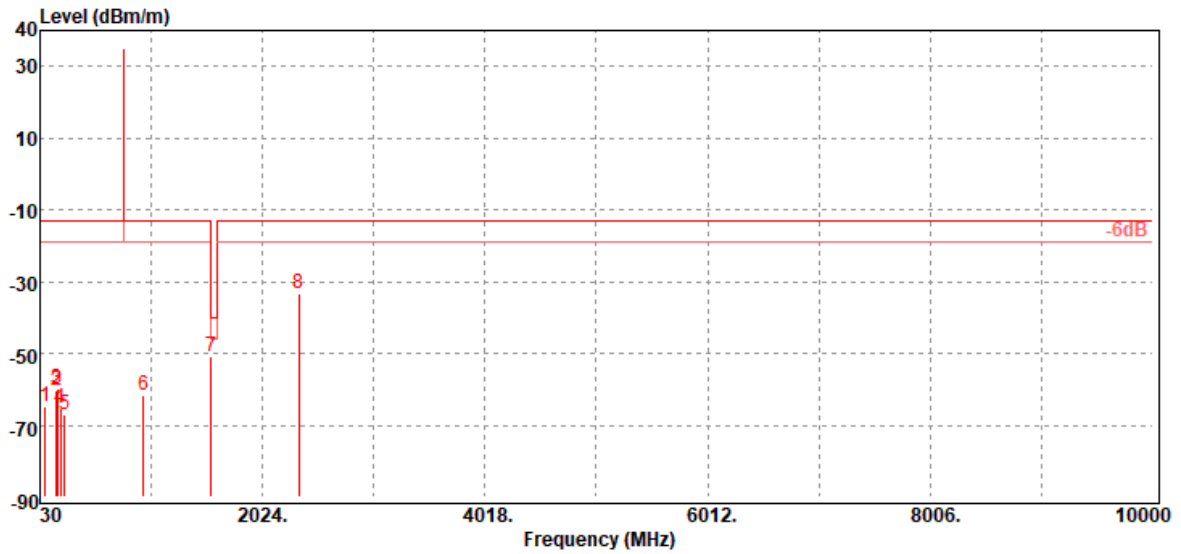


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
78.50	-63.84	-54.56	-8.55	-0.73	-13.00	-50.84	V
177.44	-63.94	-58.19	-4.66	-1.09	-13.00	-50.94	V
188.11	-62.83	-57.8	-3.90	-1.13	-13.00	-49.83	V
652.74	-64.10	-60.3	-1.65	-2.15	-13.00	-51.10	V
736.16	-63.45	-59.86	-1.30	-2.29	-13.00	-50.45	V
968.96	-59.92	-55.98	-1.30	-2.64	-13.00	-46.92	V
1564.00	-57.71	-63.65	9.38	-3.44	-40.00	-17.71	V
2346.00	-43.28	-48.76	9.87	-4.39	-13.00	-30.28	V

Report No.: T191105W01-RP10

Operation Mode: Tx / Low CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 18, 2019
Tested by: Jerry Chang
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
80.44	-64.71	-55.52	-8.46	-0.73	-13.00	-51.71	H
175.50	-60.39	-54.45	-4.85	-1.09	-13.00	-47.39	H
188.11	-59.89	-54.86	-3.90	-1.13	-13.00	-46.89	H
216.24	-65.07	-61.78	-2.08	-1.21	-13.00	-52.07	H
251.16	-67.03	-63.98	-1.75	-1.30	-13.00	-54.03	H
959.26	-61.51	-57.59	-1.29	-2.63	-13.00	-48.51	H
1564.00	-51.00	-56.94	9.38	-3.44	-40.00	-11.00	H
2346.00	-33.39	-38.87	9.87	-4.39	-13.00	-20.39	H

LTE Band 7 / BW: 20MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Tx / Low CH

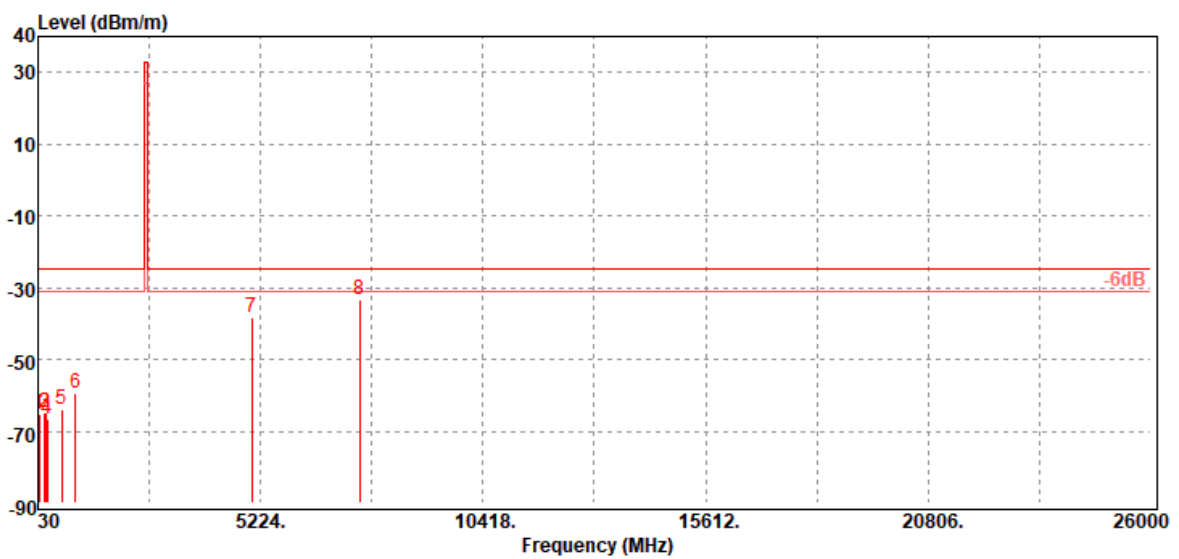
Test Date: December 19, 2019

Temperature: 18.6°C

Tested by: Jerry Chang

Humidity: 59% RH

Polarity: Ver.

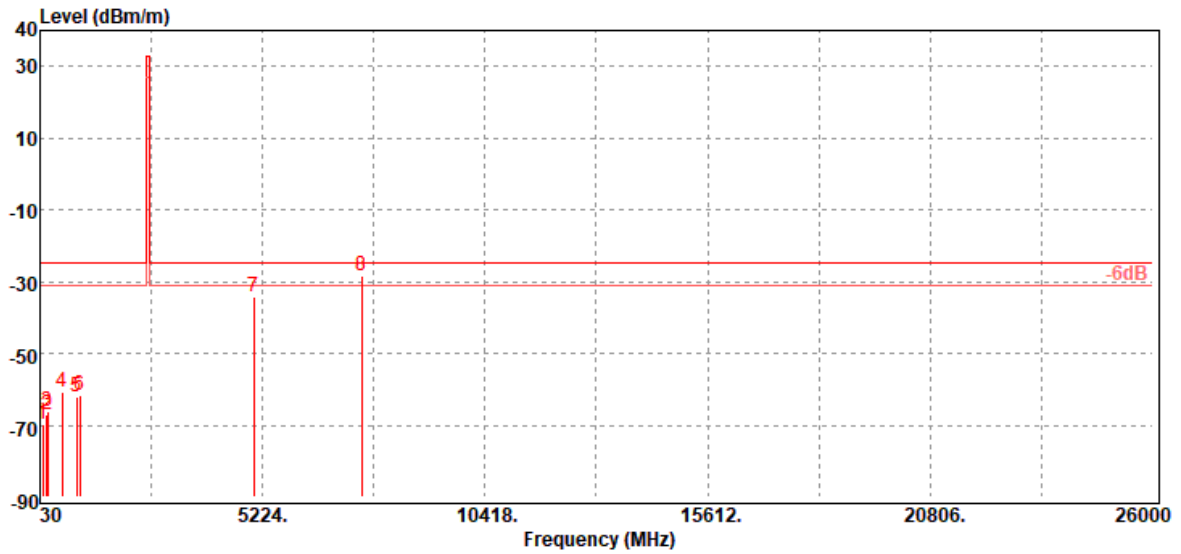


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-65.19	-54.08	-10.50	-0.61	-25.00	-40.19	V
187.14	-64.91	-59.79	-3.99	-1.13	-25.00	-39.91	V
204.60	-64.74	-60.6	-2.96	-1.18	-25.00	-39.74	V
240.49	-66.72	-63.37	-2.08	-1.27	-25.00	-41.72	V
585.81	-63.93	-60.72	-1.17	-2.04	-25.00	-38.93	V
900.09	-59.35	-55.61	-1.20	-2.54	-25.00	-34.35	V
5020.00	-38.30	-44.19	12.46	-6.57	-25.00	-13.30	V
7530.00	-33.12	-35.87	10.86	-8.11	-25.00	-8.12	V

Report No.: T191105W01-RP10

Operation Mode: Tx / Low CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 19, 2019
Tested by: Jerry Chang
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
97.90	-69.80	-61.1	-7.89	-0.81	-25.00	-44.80	H
191.99	-66.88	-61.64	-4.10	-1.14	-25.00	-41.88	H
217.21	-66.29	-63.02	-2.06	-1.21	-25.00	-41.29	H
548.95	-60.86	-57.71	-1.20	-1.95	-25.00	-35.86	H
886.51	-62.22	-58.43	-1.27	-2.52	-25.00	-37.22	H
966.05	-61.45	-57.52	-1.30	-2.63	-25.00	-36.45	H
5020.00	-34.27	-40.16	12.46	-6.57	-25.00	-9.27	H
7530.00	-28.22	-30.97	10.86	-8.11	-25.00	-3.22	H

Report No.: T191105W01-RP10

Operation Mode: Tx / Mid CH

Test Date:

December 19, 2019

Temperature: 18.6°C

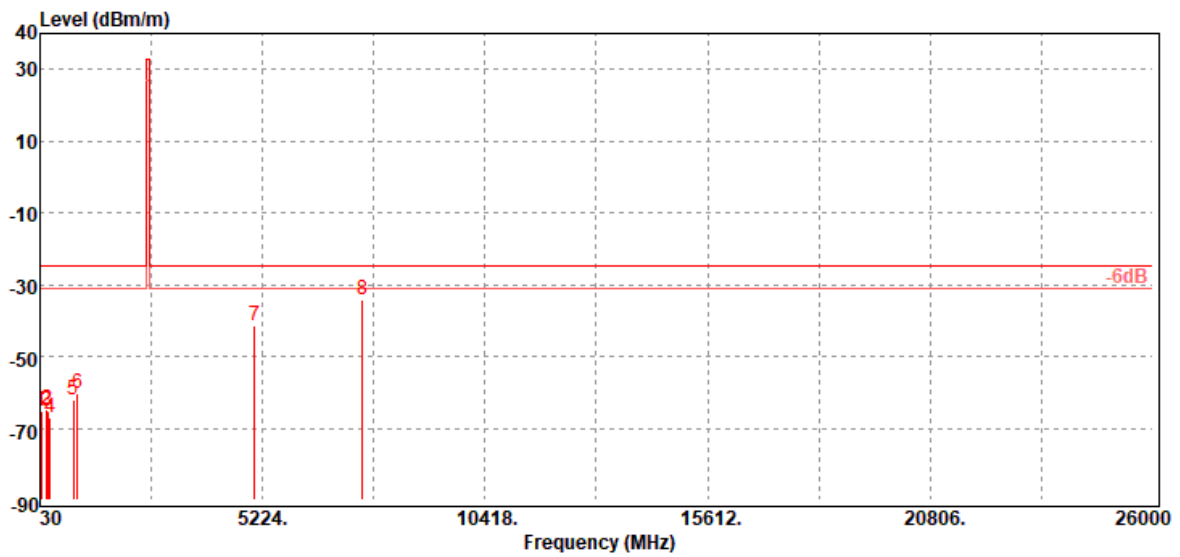
Tested by:

Jerry Chang

Humidity: 59% RH

Polarity:

Ver.

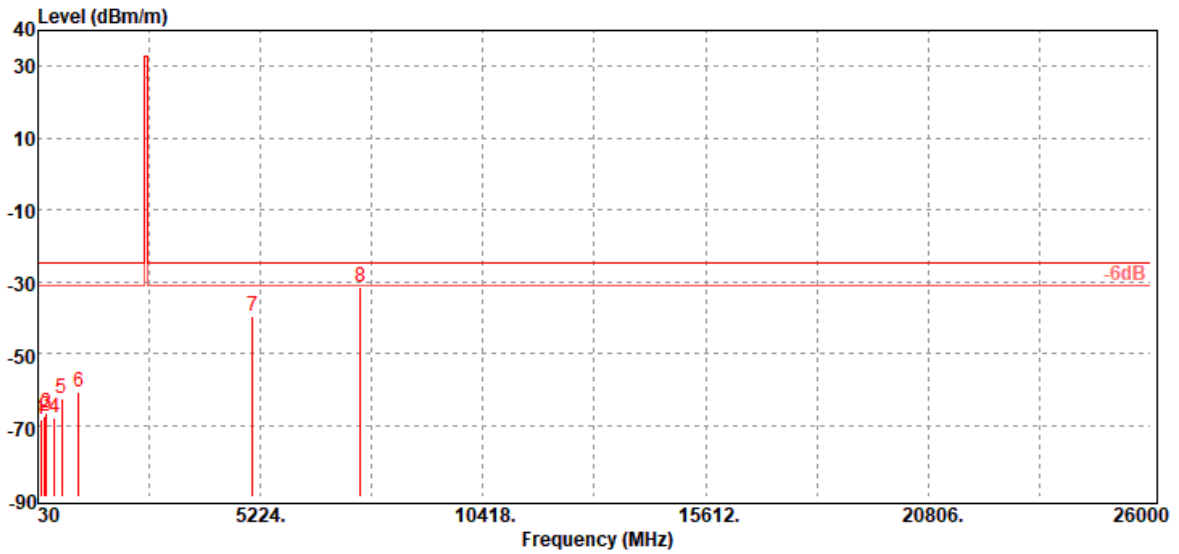


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-65.38	-54.27	-10.50	-0.61	-25.00	-40.38	V
180.35	-64.66	-59.2	-4.36	-1.10	-25.00	-39.66	V
207.51	-65.21	-61.58	-2.45	-1.18	-25.00	-40.21	V
257.95	-67.07	-64.03	-1.72	-1.32	-25.00	-42.07	V
813.76	-61.92	-58.11	-1.42	-2.39	-25.00	-36.92	V
900.09	-60.18	-56.44	-1.20	-2.54	-25.00	-35.18	V
5045.00	-41.50	-47.31	12.41	-6.60	-25.00	-16.50	V
7555.00	-34.28	-37.08	10.93	-8.13	-25.00	-9.28	V

Report No.: T191105W01-RP10

Operation Mode: Tx / Mid CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 19, 2019
Tested by: Jerry Chang
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
104.69	-68.44	-58.36	-9.24	-0.84	-25.00	-43.44	H
183.26	-67.29	-62.01	-4.17	-1.11	-25.00	-42.29	H
224.00	-66.75	-63.6	-1.92	-1.23	-25.00	-41.75	H
416.06	-67.77	-64.18	-1.90	-1.69	-25.00	-42.77	H
575.14	-62.60	-59.19	-1.40	-2.01	-25.00	-37.60	H
973.81	-60.86	-56.84	-1.38	-2.64	-25.00	-35.86	H
5045.00	-39.43	-45.24	12.41	-6.60	-25.00	-14.43	H
7555.00	-31.36	-34.16	10.93	-8.13	-25.00	-6.36	H

Report No.: T191105W01-RP10

Operation Mode: Tx / High CH

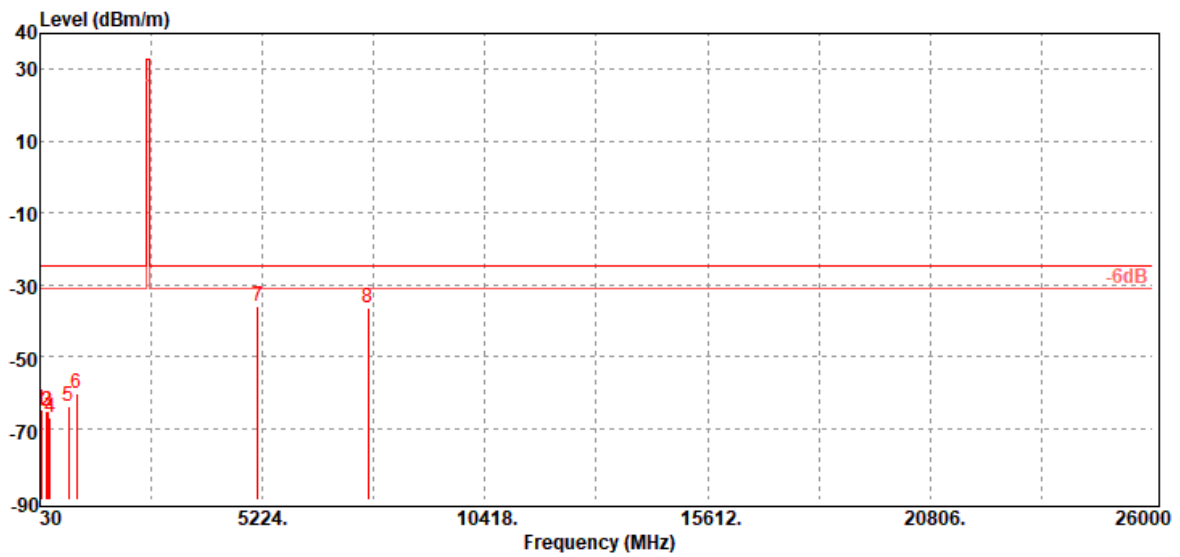
Test Date: December 19, 2019

Temperature: 18.6°C

Tested by: Jerry Chang

Humidity: 59% RH

Polarity: Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-64.59	-53.48	-10.50	-0.61	-25.00	-39.59	V
182.29	-65.35	-60.04	-4.20	-1.11	-25.00	-40.35	V
217.21	-65.21	-61.94	-2.06	-1.21	-25.00	-40.21	V
256.01	-67.18	-64.22	-1.64	-1.32	-25.00	-42.18	V
691.54	-64.03	-60.41	-1.40	-2.22	-25.00	-39.03	V
885.54	-60.40	-56.59	-1.29	-2.52	-25.00	-35.40	V
5120.00	-36.22	-42.19	12.64	-6.67	-25.00	-11.22	V
7680.00	-36.40	-39.4	11.20	-8.20	-25.00	-11.40	V

Report No.: T191105W01-RP10

Operation Mode: Tx / High CH

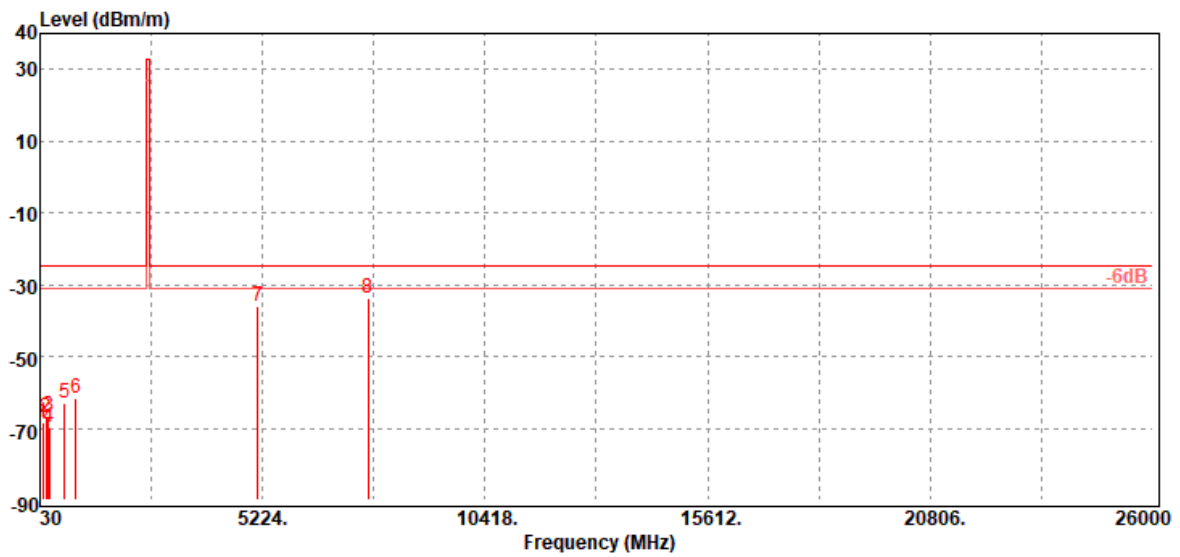
Test Date: December 19, 2019

Temperature: 18.6°C

Tested by: Jerry Chang

Humidity: 59% RH

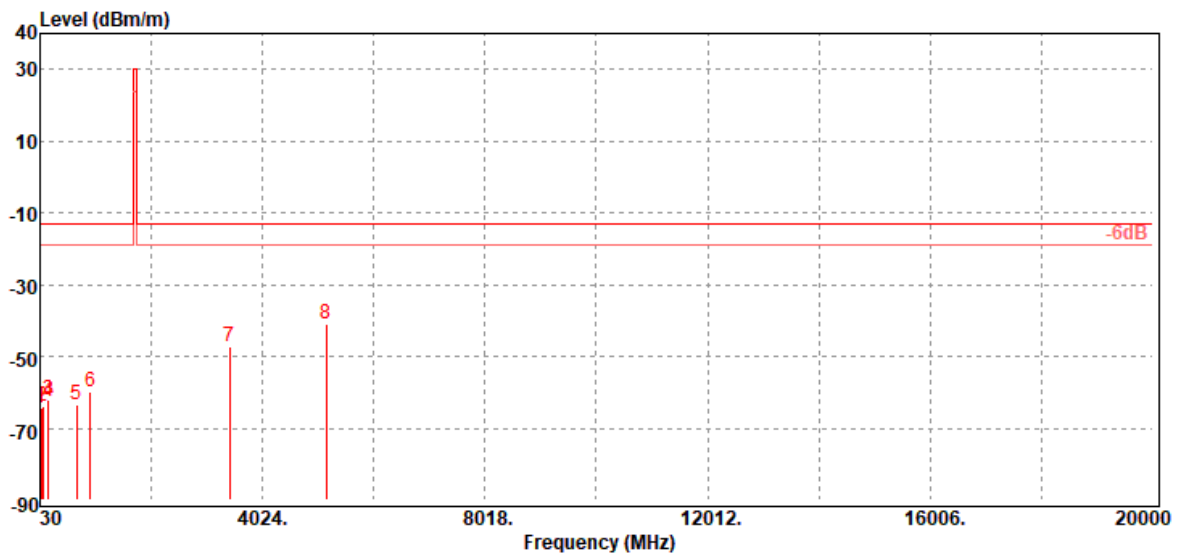
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
99.84	-68.20	-59.13	-8.25	-0.82	-25.00	-43.20	H
177.44	-66.95	-61.2	-4.66	-1.09	-25.00	-41.95	H
221.09	-66.58	-63.38	-1.98	-1.22	-25.00	-41.58	H
243.40	-69.58	-66.34	-1.96	-1.28	-25.00	-44.58	H
599.39	-63.15	-60.19	-0.89	-2.07	-25.00	-38.15	H
870.99	-61.46	-57.75	-1.22	-2.49	-25.00	-36.46	H
5120.00	-35.84	-41.81	12.64	-6.67	-25.00	-10.84	H
7680.00	-33.88	-36.88	11.20	-8.20	-25.00	-8.88	H

LTE Band 4 / BW: 20MHz / QPSK / RB =1, RB Offset = 0

Operation Mode: Tx / Low CH **Test Date:** December 17, 2019
Temperature: 18.6°C **Tested by:** Jerry Chang
Humidity: 59% RH **Polarity:** Ver.

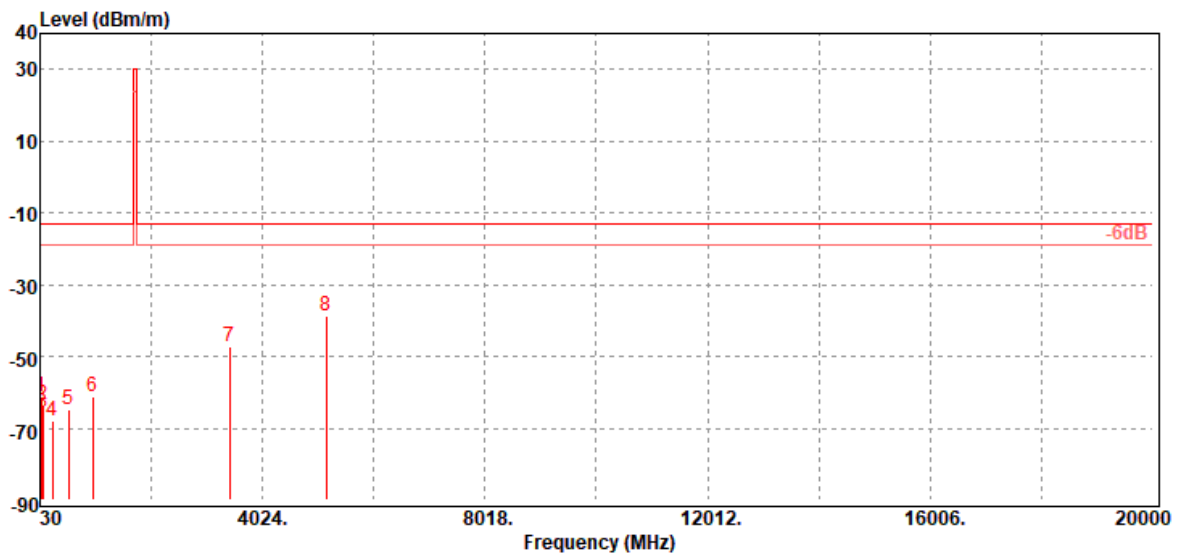


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
58.13	-64.57	-53.65	-10.30	-0.62	-13.00	-51.57	V
78.50	-63.94	-54.66	-8.55	-0.73	-13.00	-50.94	V
175.50	-62.04	-56.1	-4.85	-1.09	-13.00	-49.04	V
188.11	-62.41	-57.38	-3.90	-1.13	-13.00	-49.41	V
686.69	-63.37	-59.83	-1.33	-2.21	-13.00	-50.37	V
932.10	-59.85	-55.96	-1.30	-2.59	-13.00	-46.85	V
3440.00	-47.09	-54.3	12.72	-5.51	-13.00	-34.09	V
5160.00	-41.01	-47.06	12.76	-6.71	-13.00	-28.01	V

Report No.: T191105W01-RP10

Operation Mode: Tx / Low CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 17, 2019
Tested by: Jerry Chang
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-61.02	-49.91	-10.50	-0.61	-13.00	-48.02	H
78.50	-63.46	-54.18	-8.55	-0.73	-13.00	-50.46	H
86.26	-65.64	-57.33	-7.55	-0.76	-13.00	-52.64	H
253.10	-68.13	-65.14	-1.68	-1.31	-13.00	-55.13	H
546.04	-64.88	-61.74	-1.20	-1.94	-13.00	-51.88	H
983.51	-61.04	-57.02	-1.37	-2.65	-13.00	-48.04	H
3440.00	-47.32	-54.53	12.72	-5.51	-13.00	-34.32	H
5160.00	-38.82	-44.87	12.76	-6.71	-13.00	-25.82	H

Report No.: T191105W01-RP10

Operation Mode: Tx / Mid CH

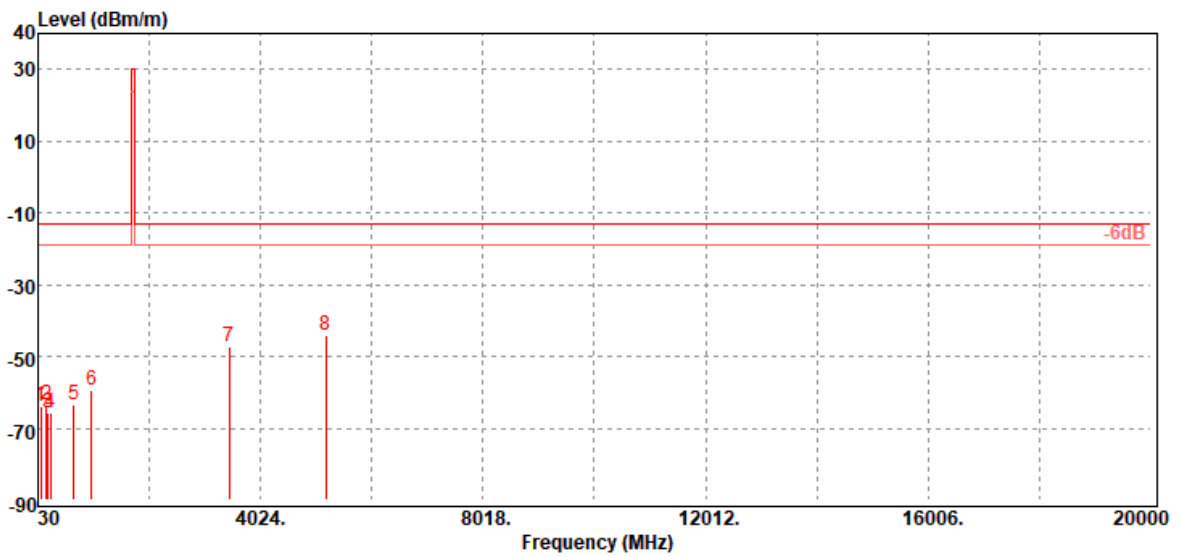
Test Date: December 17, 2019

Temperature: 18.6°C

Tested by: Jerry Chang

Humidity: 59% RH

Polarity: Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
78.50	-64.13	-54.85	-8.55	-0.73	-13.00	-51.13	V
177.44	-63.36	-57.61	-4.66	-1.09	-13.00	-50.36	V
206.54	-65.59	-61.83	-2.58	-1.18	-13.00	-52.59	V
251.16	-65.68	-62.63	-1.75	-1.30	-13.00	-52.68	V
672.14	-63.59	-60.04	-1.36	-2.19	-13.00	-50.59	V
988.36	-59.41	-55.35	-1.40	-2.66	-13.00	-46.41	V
3465.00	-47.43	-54.54	12.64	-5.53	-13.00	-34.43	V
5197.50	-44.05	-50.28	12.98	-6.75	-13.00	-31.05	V

Report No.: T191105W01-RP10

Operation Mode: Tx / Mid CH

Test Date:

December 17, 2019

Temperature: 18.6°C

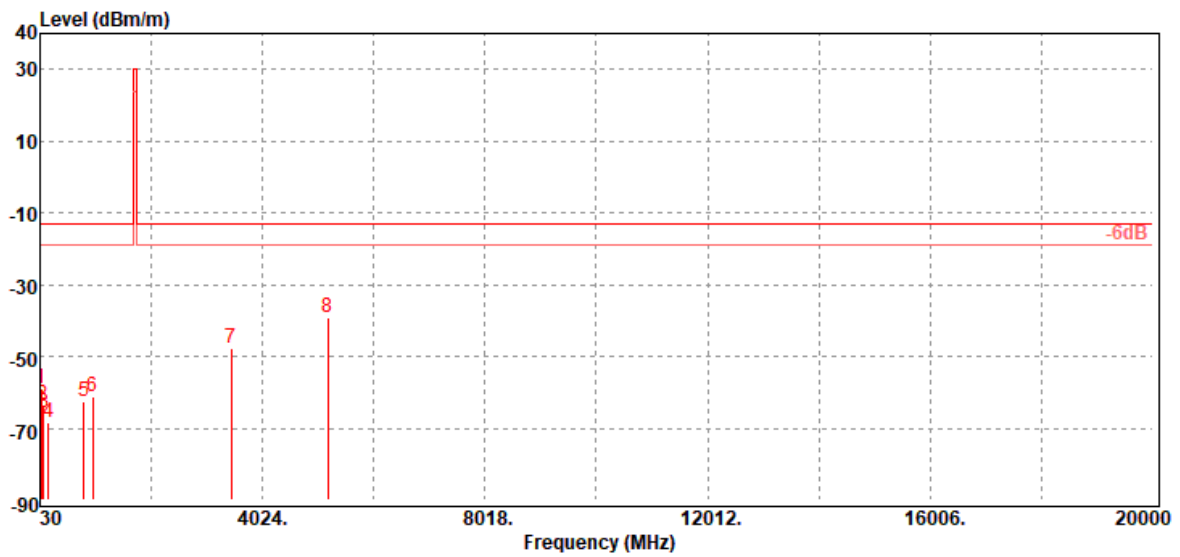
Tested by:

Jerry Chang

Humidity: 59% RH

Polarity:

Hor.

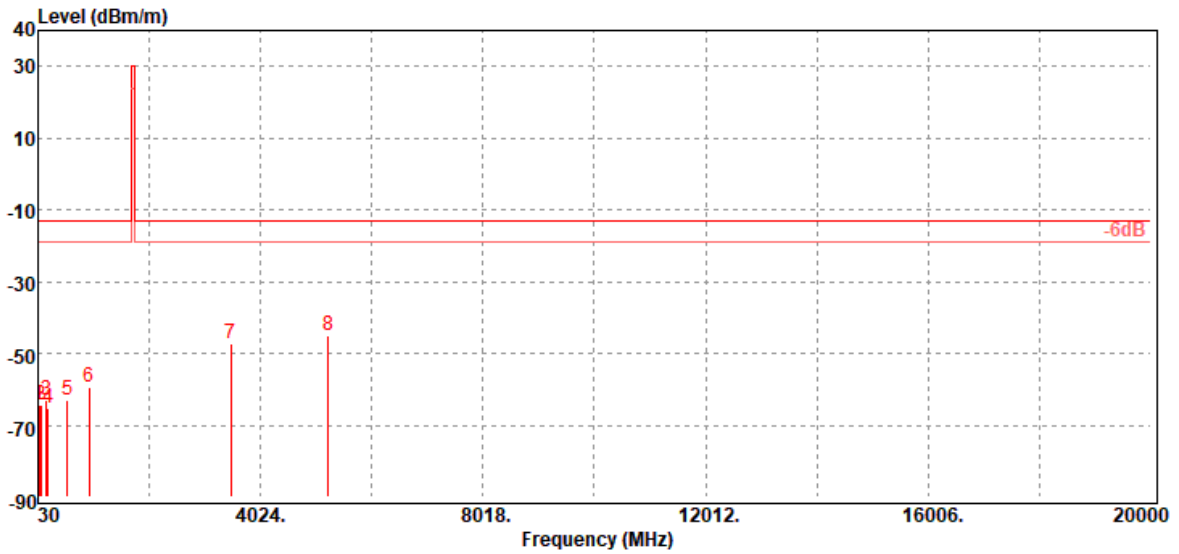


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-59.17	-48.06	-10.50	-0.61	-13.00	-46.17	H
76.56	-63.53	-54.02	-8.79	-0.72	-13.00	-50.53	H
88.20	-65.86	-57.93	-7.16	-0.77	-13.00	-52.86	H
177.44	-68.47	-62.72	-4.66	-1.09	-13.00	-55.47	H
812.79	-62.61	-58.78	-1.44	-2.39	-13.00	-49.61	H
977.69	-61.30	-57.3	-1.35	-2.65	-13.00	-48.30	H
3465.00	-47.80	-54.91	12.64	-5.53	-13.00	-34.80	H
5197.50	-39.23	-45.46	12.98	-6.75	-13.00	-26.23	H

Report No.: T191105W01-RP10

Operation Mode: Tx / High CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 17, 2019
Tested by: Jerry Chang
Polarity: Ver.

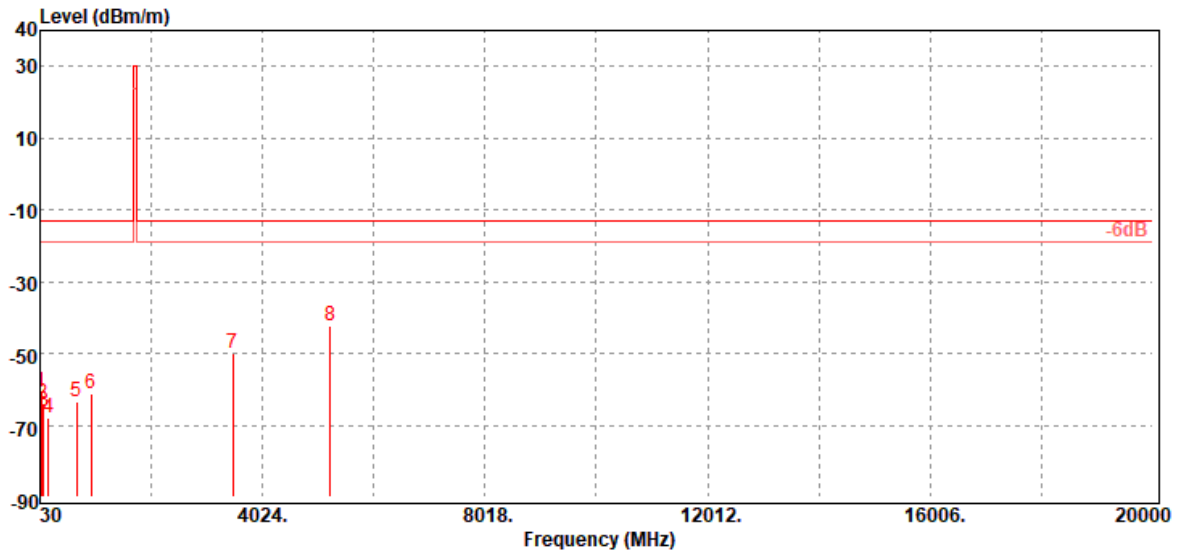


Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
56.19	-64.20	-53.09	-10.50	-0.61	-13.00	-51.20	V
76.56	-64.45	-54.94	-8.79	-0.72	-13.00	-51.45	V
177.44	-62.92	-57.17	-4.66	-1.09	-13.00	-49.92	V
204.60	-65.40	-61.26	-2.96	-1.18	-13.00	-52.40	V
560.59	-63.20	-59.83	-1.40	-1.97	-13.00	-50.20	V
943.74	-59.36	-55.52	-1.23	-2.61	-13.00	-46.36	V
3490.00	-47.40	-54.39	12.54	-5.55	-13.00	-34.40	V
5235.00	-45.20	-51.55	13.14	-6.79	-13.00	-32.20	V

Report No.: T191105W01-RP10

Operation Mode: Tx / High CH
Temperature: 18.6°C
Humidity: 59% RH

Test Date: December 17, 2019
Tested by: Jerry Chang
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
57.16	-60.95	-49.87	-10.47	-0.61	-13.00	-47.95	H
78.50	-63.77	-54.49	-8.55	-0.73	-13.00	-50.77	H
88.20	-66.02	-58.09	-7.16	-0.77	-13.00	-53.02	H
180.35	-68.10	-62.64	-4.36	-1.10	-13.00	-55.10	H
687.66	-63.63	-60.07	-1.35	-2.21	-13.00	-50.63	H
948.59	-61.10	-57.29	-1.20	-2.61	-13.00	-48.10	H
3490.00	-50.07	-57.06	12.54	-5.55	-13.00	-37.07	H
5235.00	-42.15	-48.5	13.14	-6.79	-13.00	-29.15	H

- End of Test Report -