

KCTL Inc.

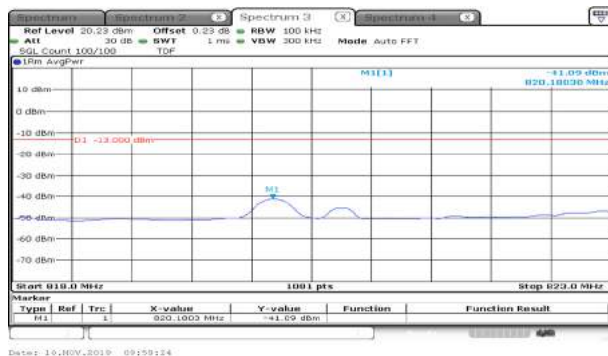
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

Report No.:
KR19-SRF0183-B

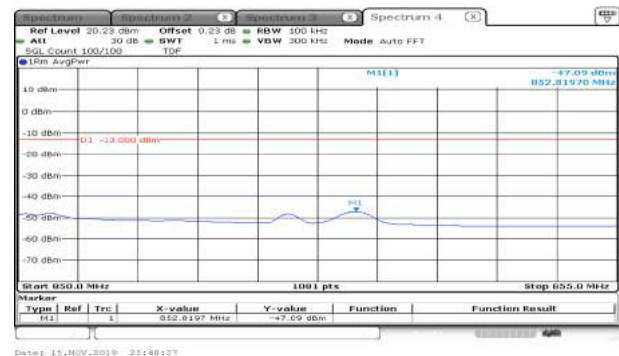
Page (137) of (216)



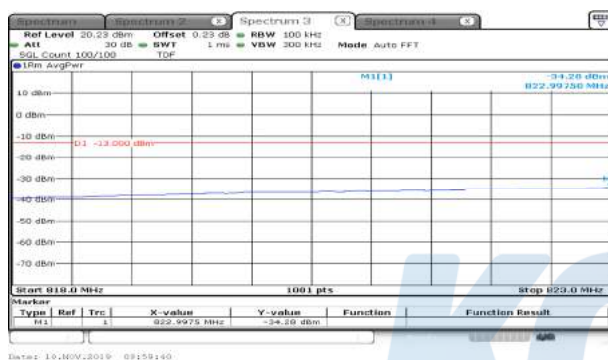
10M BW / QPSK / Lower extended / 1RB



10M BW / QPSK / Upper extended / 1RB



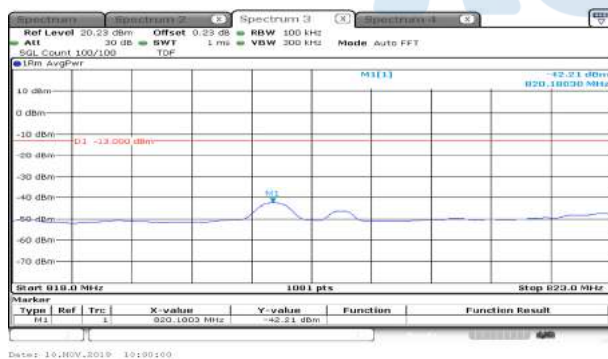
10M BW / QPSK / Lower extended / FRB



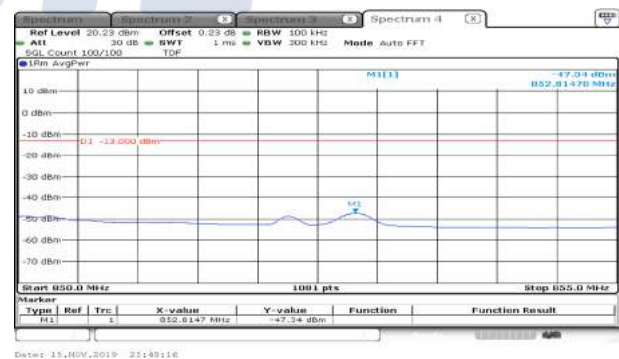
10M BW / QPSK / Upper extended / FRB



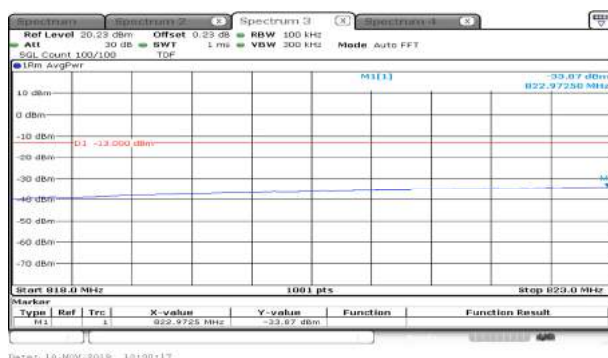
10M BW / 16QAM / Lower extended / 1RB



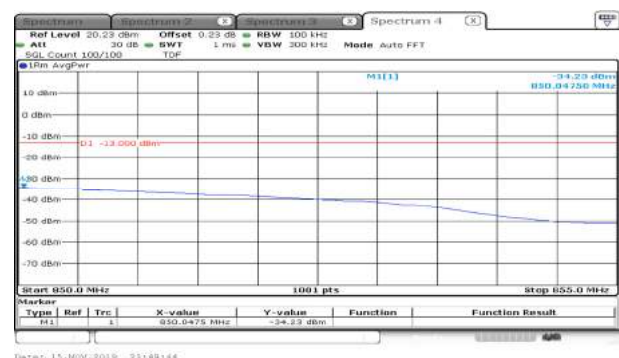
10M BW / 16QAM / Upper extended / 1RB



10M BW / 16QAM / Lower extended / FRB



10M BW / 16QAM / Upper extended / FRB



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Test mode: LTE Band 12

1.4M BW / QPSK / Low ch. / 1RB



1.4M BW / QPSK / High ch. / 1RB



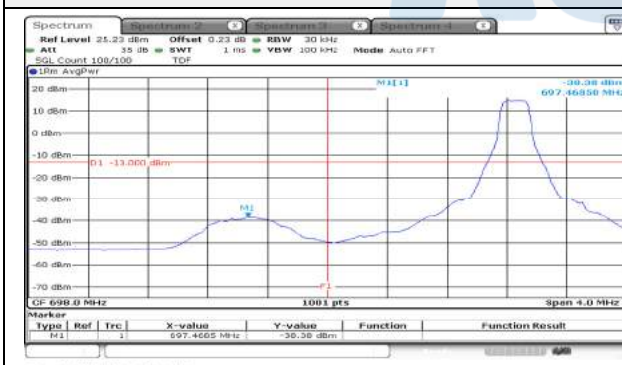
1.4M BW / QPSK / Low ch. / FRB



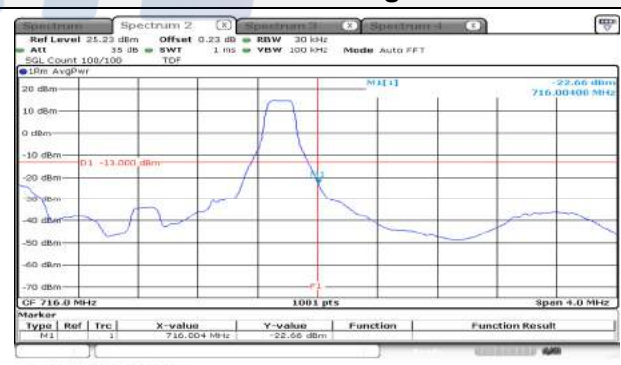
1.4M BW / QPSK / High ch. / FRB



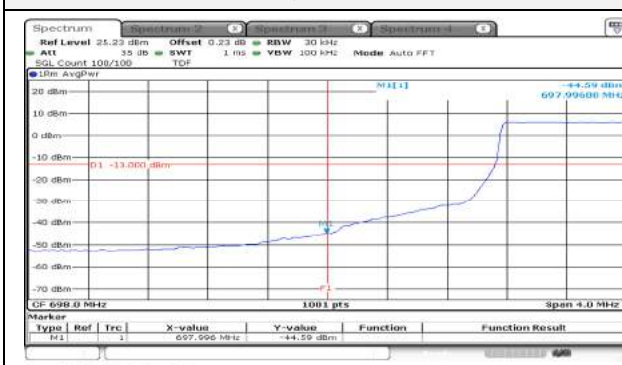
1.4M BW / 16QAM / Low ch. / 1RB



1.4M BW / 16QAM / High ch. / 1RB



1.4M BW / 16QAM / Low ch. / FRB



1.4M BW / 16QAM / High ch. / FRB



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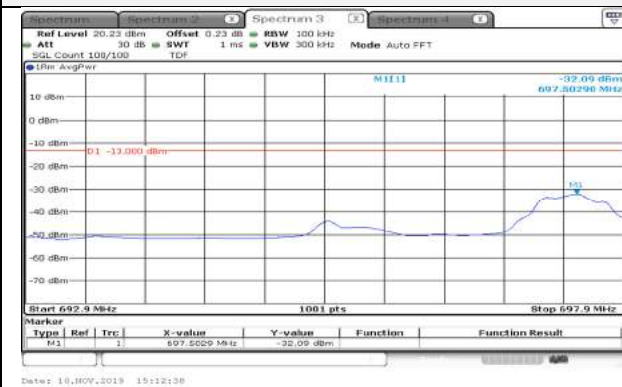
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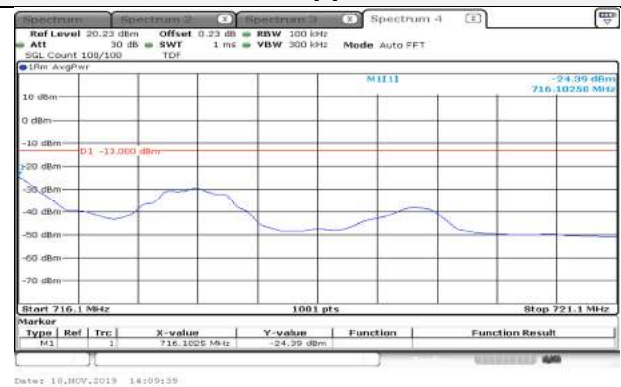
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1.4M BW / QPSK / Lower extended / 1RB



1.4M BW / QPSK / Upper extended / 1RB



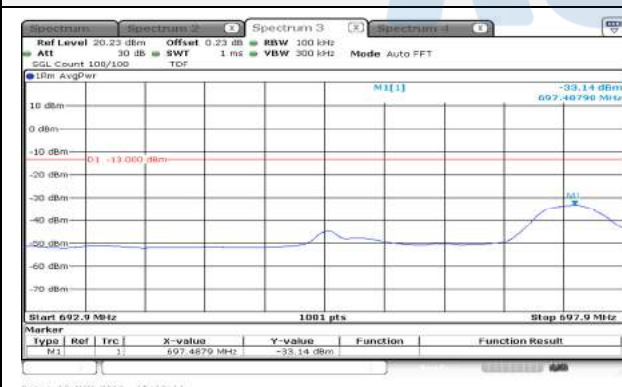
1.4M BW / QPSK / Lower extended / FRB



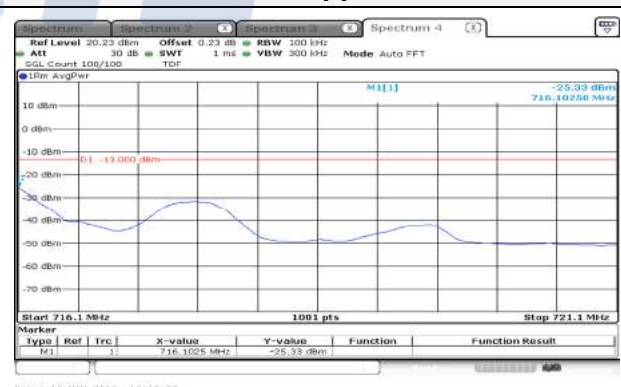
1.4M BW / QPSK / Upper extended / FRB



1.4M BW / 16QAM / Lower extended / 1RB



1.4M BW / 16QAM / Upper extended / 1RB



1.4M BW / 16QAM / Lower extended / FRB



1.4M BW / 16QAM / Upper extended / FRB



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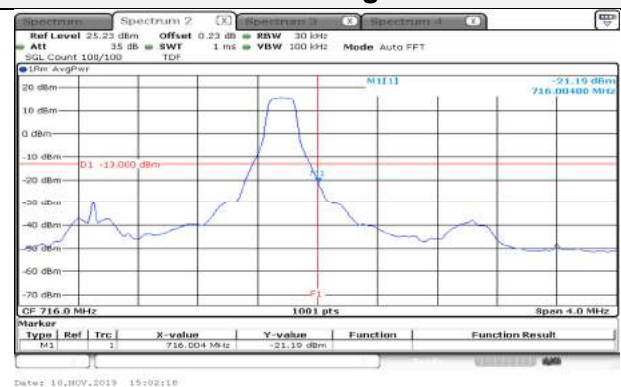


3M BW / QPSK / Low ch. / 1RB



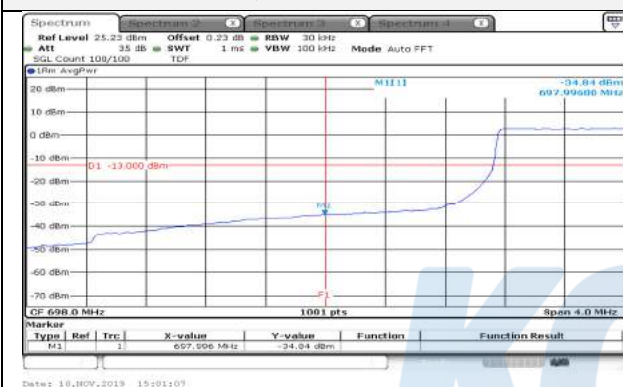
Date: 18, NOV, 2019 15:00:54

3M BW / QPSK / High ch. / 1RB



Date: 18, NOV, 2019 15:02:10

3M BW / QPSK / Low ch. / FRB



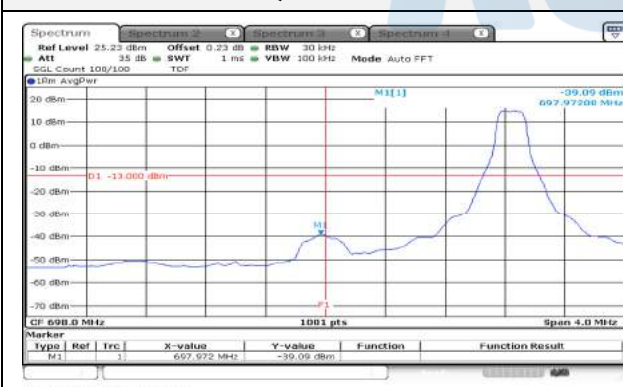
Date: 18, NOV, 2019 15:01:07

3M BW / QPSK / High ch. / FRB



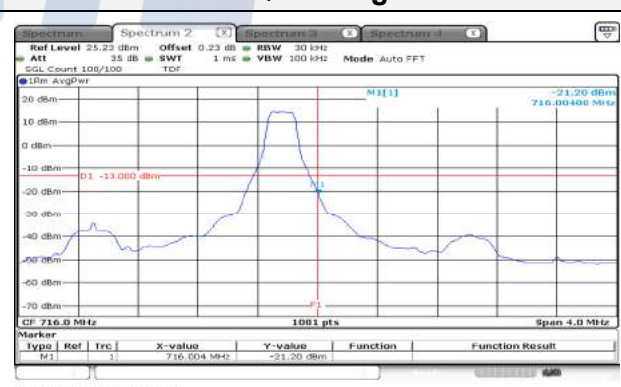
Date: 18, NOV, 2019 15:02:34

3M BW / 16QAM / Low ch. / 1RB



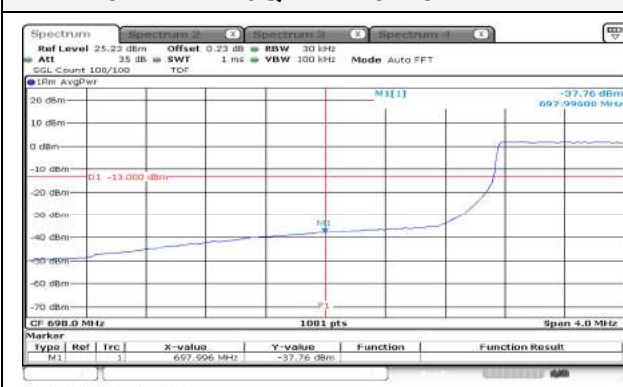
Date: 18, NOV, 2019 15:01:33

3M BW / 16QAM / High ch. / 1RB



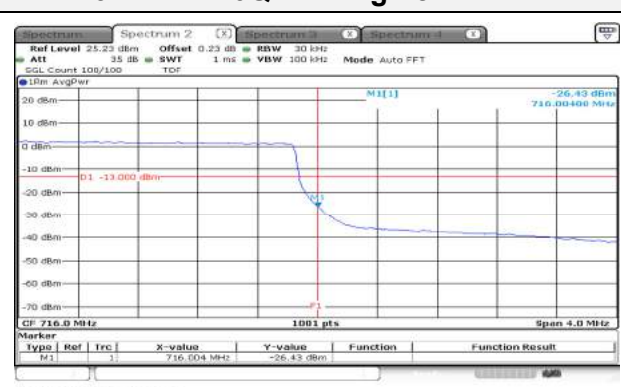
Date: 18, NOV, 2019 15:02:57

3M BW / 16QAM / Low ch. / FRB



Date: 18, NOV, 2019 15:01:47

3M BW / 16QAM / High ch. / FRB



Date: 18, NOV, 2019 15:03:24

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KCTL-TIR001-003/2

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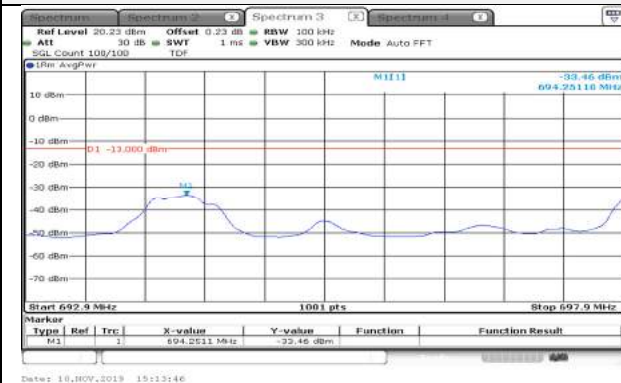
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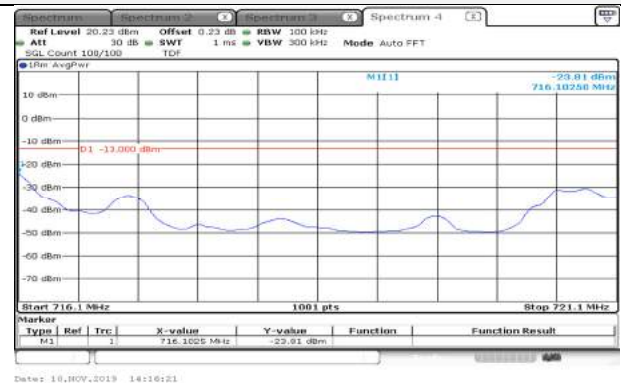


3M BW / QPSK / Lower extended / 1RB



Date: 18, NOV, 2019 15:13:46

3M BW / QPSK / Upper extended / 1RB



Date: 18, NOV, 2019 14:16:21

3M BW / QPSK / Lower extended / FRB



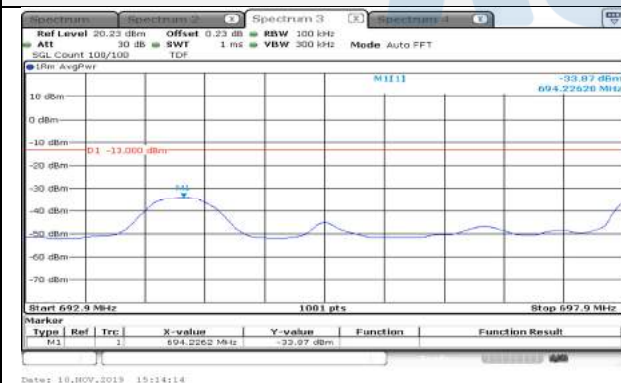
Date: 18, NOV, 2019 15:13:57

3M BW / QPSK / Upper extended / FRB



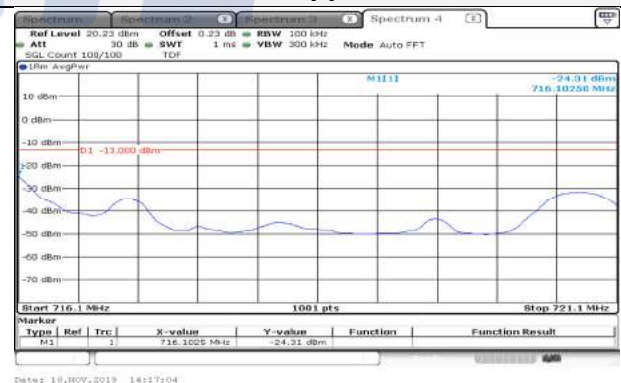
Date: 18, NOV, 2019 14:16:38

3M BW / 16QAM / Lower extended / 1RB



Date: 18, NOV, 2019 15:14:14

3M BW / 16QAM / Upper extended / 1RB



Date: 18, NOV, 2019 14:17:04

3M BW / 16QAM / Lower extended / FRB



Date: 18, NOV, 2019 15:14:30

3M BW / 16QAM / Upper extended / FRB



Date: 18, NOV, 2019 14:17:24

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Test mode: LTE Band 12/17

5M BW / QPSK / Low ch. / 1RB



Date: 19, NOV, 2019 15:04:24

5M BW / QPSK / High ch. / 1RB



Date: 19, NOV, 2019 15:06:00

5M BW / QPSK / Low ch. / FRB



Date: 19, NOV, 2019 15:04:48

5M BW / QPSK / High ch. / FRB



Date: 19, NOV, 2019 15:06:17

5M BW / 16QAM / Low ch. / 1RB



Date: 19, NOV, 2019 15:05:08

5M BW / 16QAM / High ch. / 1RB



Date: 19, NOV, 2019 15:06:38

5M BW / 16QAM / Low ch. / FRB



Date: 19, NOV, 2019 15:05:22

5M BW / 16QAM / High ch. / FRB



Date: 19, NOV, 2019 15:06:53

KCTL Inc.

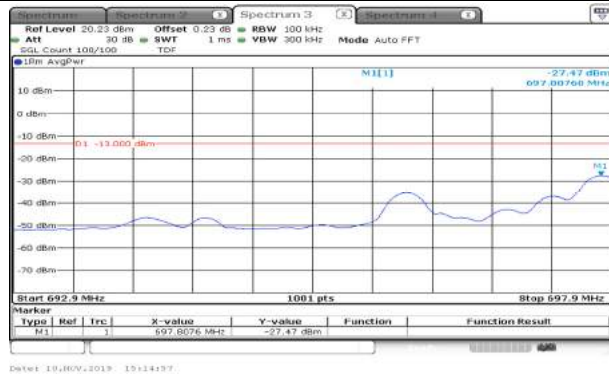
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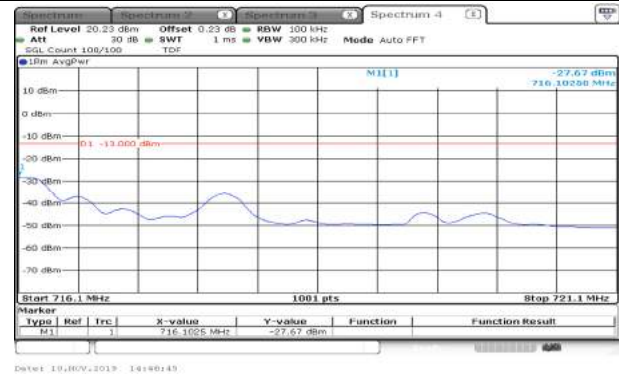
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5M BW / QPSK / Lower extended / 1RB



5M BW / QPSK / Upper extended / 1RB



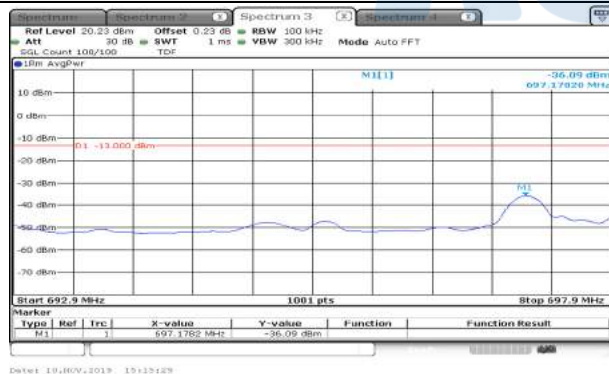
5M BW / QPSK / Lower extended / FRB



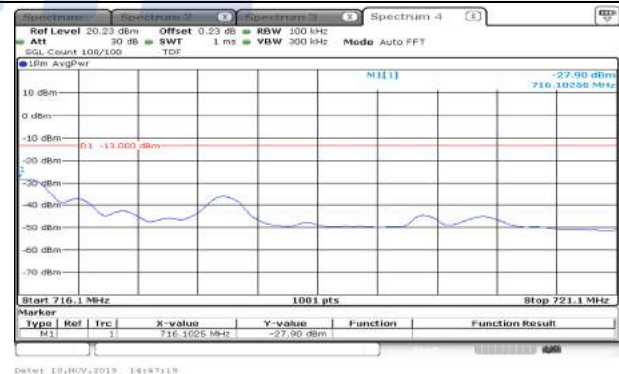
5M BW / QPSK / Upper extended / FRB



5M BW / 16QAM / Lower extended / 1RB



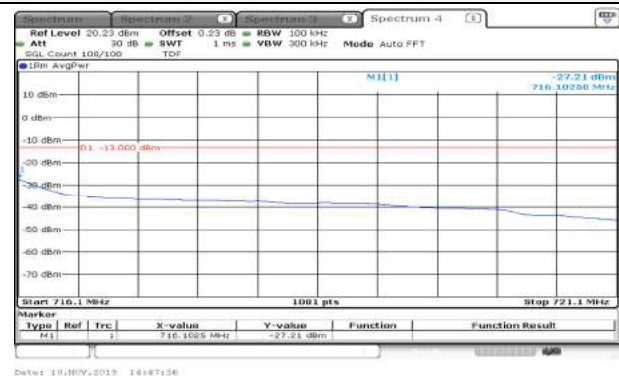
5M BW / 16QAM / Upper extended / 1RB



5M BW / 16QAM / Lower extended / FRB



5M BW / 16QAM / Upper extended / FRB



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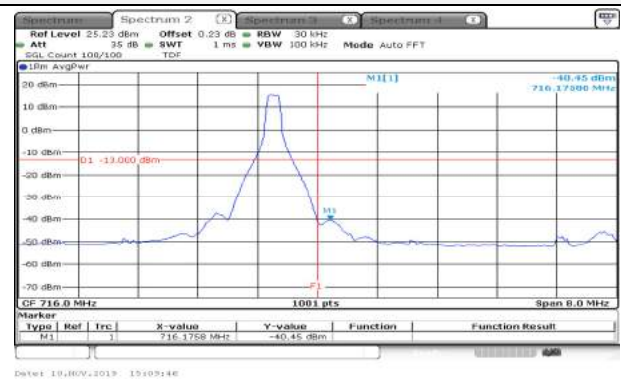
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10M BW / QPSK / Low ch. / 1RB



10M BW / QPSK / High ch. / 1RB



10M BW / QPSK / Low ch. / FRB



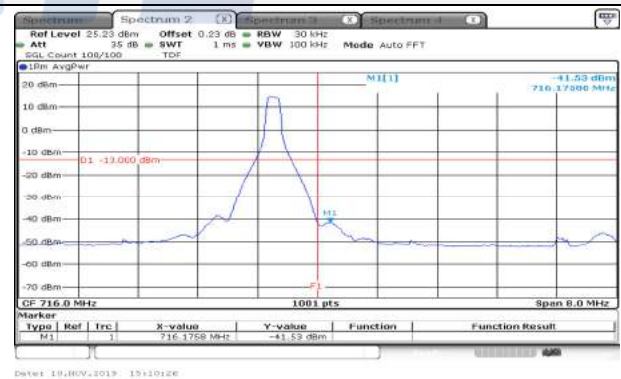
10M BW / QPSK / High ch. / FRB



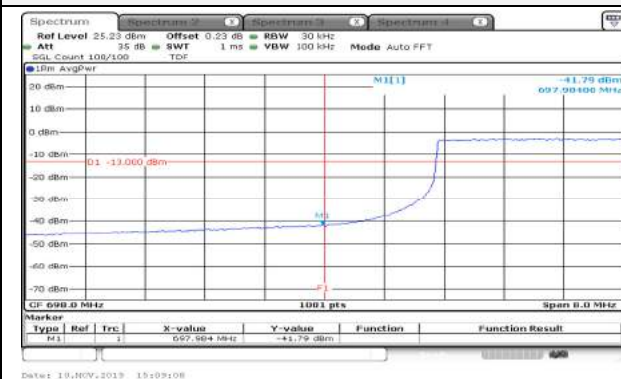
10M BW / 16QAM / Low ch. / 1RB



10M BW / 16QAM / High ch. / 1RB



10M BW / 16QAM / Low ch. / FRB



10M BW / 16QAM / High ch. / FRB



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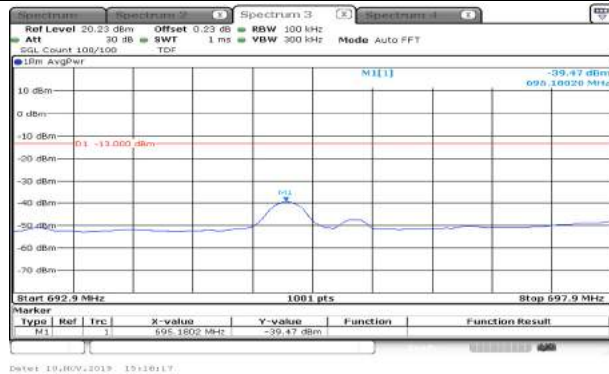
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KR19-SRF0183-B

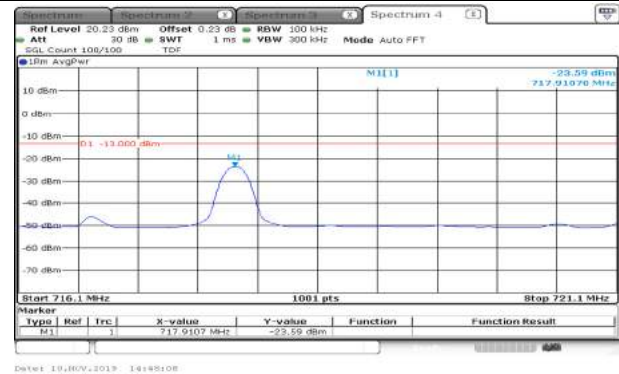
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10M BW / QPSK / Lower extended / 1RB



10M BW / QPSK / Upper extended / 1RB



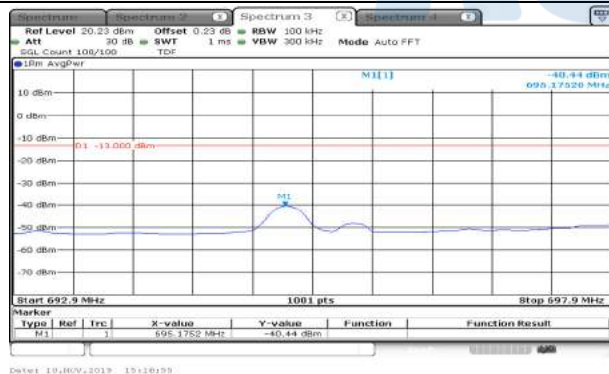
10M BW / QPSK / Lower extended / FRB



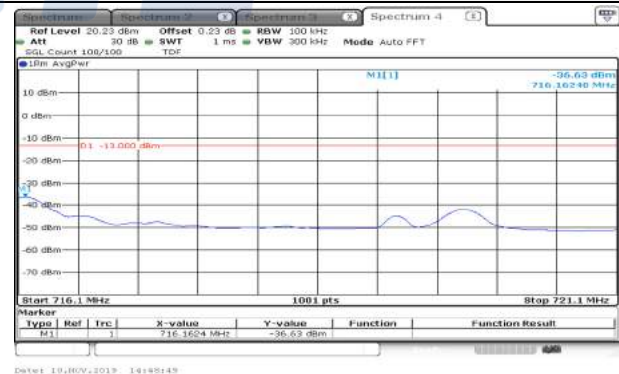
10M BW / QPSK / Upper extended / FRB



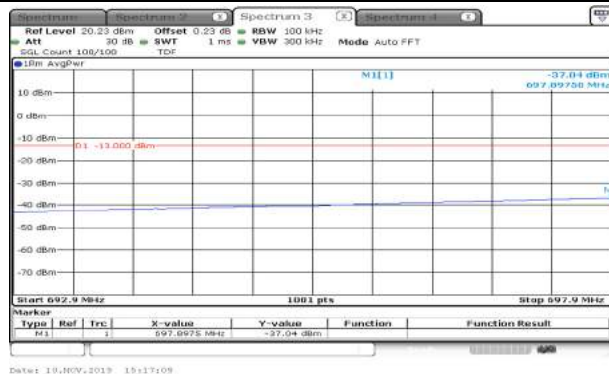
10M BW / 16QAM / Lower extended / 1RB



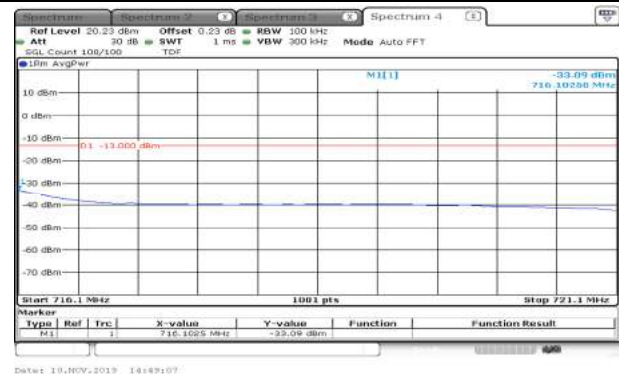
10M BW / 16QAM / Upper extended / 1RB



10M BW / 16QAM / Lower extended / FRB



10M BW / 16QAM / Upper extended / FRB



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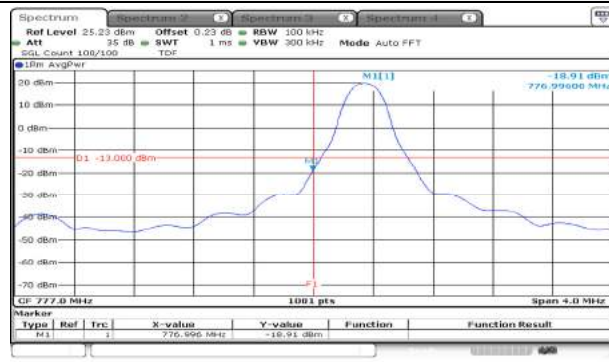
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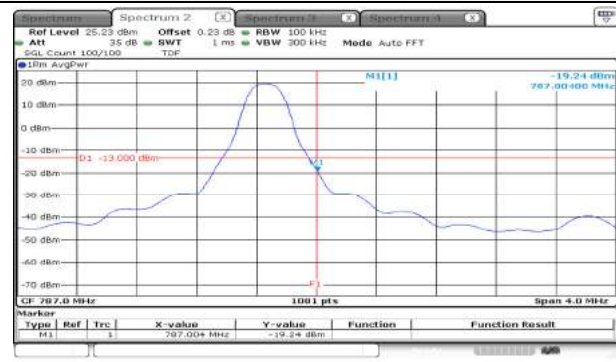
Test mode: LTE Band 13

5M BW / QPSK / Low ch. / 1RB



Date: 19, NOV, 2019 15:32:17

5M BW / QPSK / High ch. / 1RB



Date: 19, NOV, 2019 15:33:47

5M BW / QPSK / Low ch. / FRB



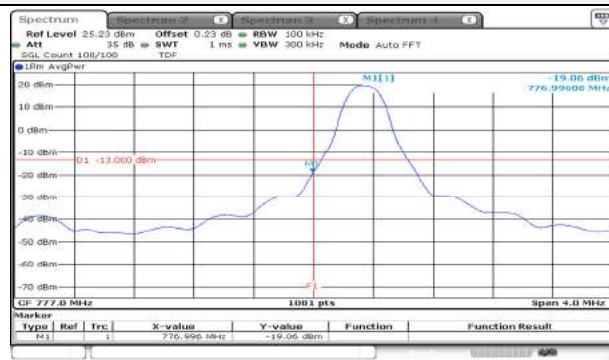
Date: 19, NOV, 2019 15:32:50

5M BW / QPSK / High ch. / FRB



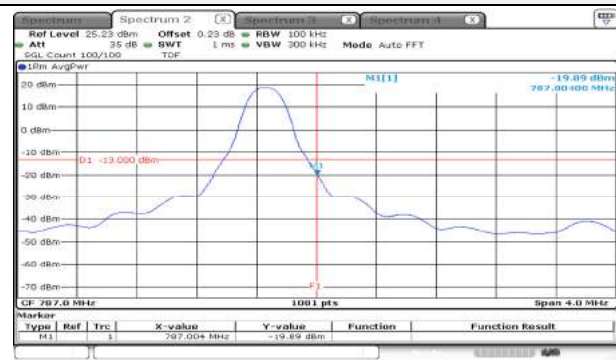
Date: 19, NOV, 2019 15:33:17

5M BW / 16QAM / Low ch. / 1RB



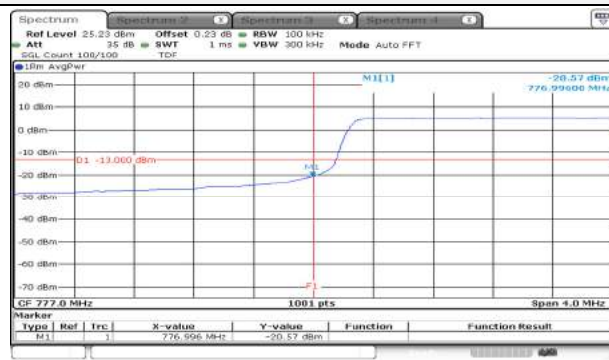
Date: 19, NOV, 2019 15:34:48

5M BW / 16QAM / High ch. / 1RB



Date: 19, NOV, 2019 15:35:48

5M BW / 16QAM / Low ch. / FRB



Date: 19, NOV, 2019 15:35:08

5M BW / 16QAM / High ch. / FRB



Date: 19, NOV, 2019 15:36:03

KCTL Inc.

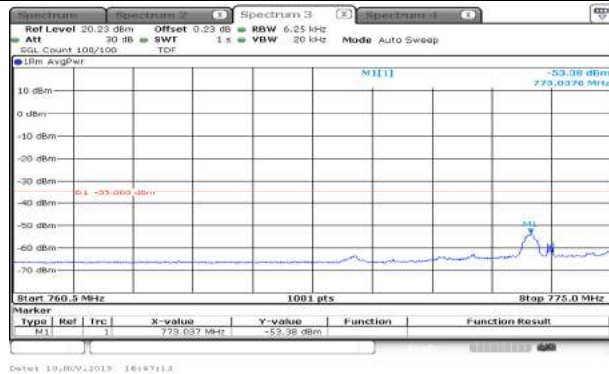
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5M BW / QPSK / Lower extended / 1RB



5M BW / QPSK / Upper extended / 1RB



5M BW / QPSK / Lower extended / FRB



5M BW / QPSK / Upper extended / FRB



5M BW / 16QAM / Lower extended / 1RB



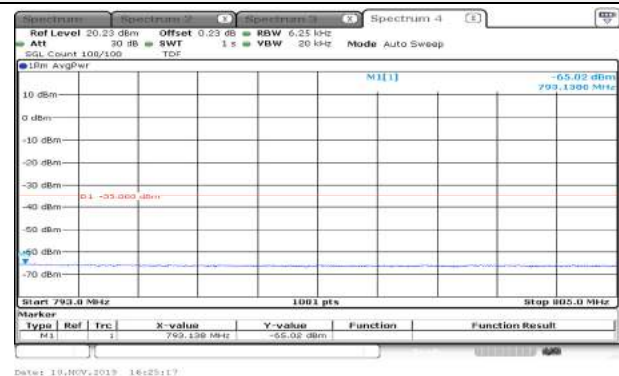
5M BW / 16QAM / Upper extended / 1RB



5M BW / 16QAM / Lower extended / FRB



5M BW / 16QAM / Upper extended / FRB



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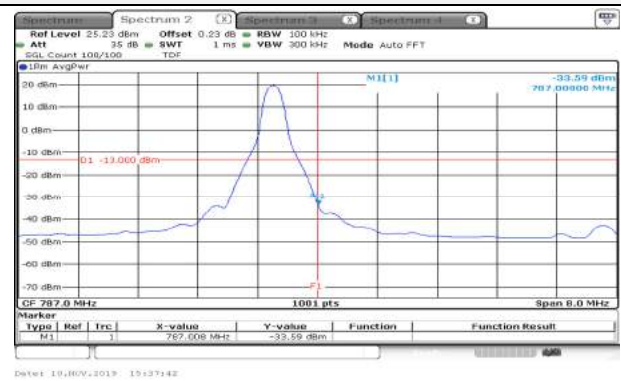
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10M BW / QPSK / Lower / 1RB



10M BW / QPSK / Upper / 1RB



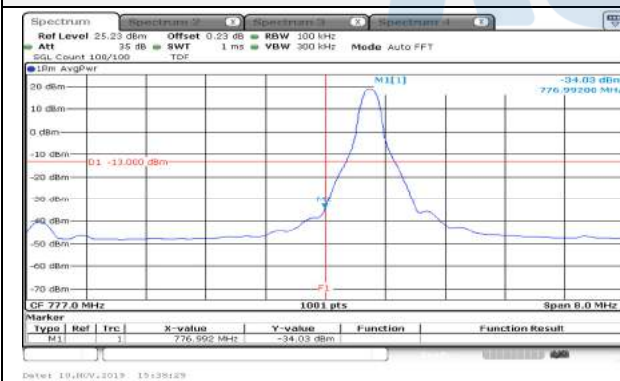
10M BW / QPSK / Lower / FRB



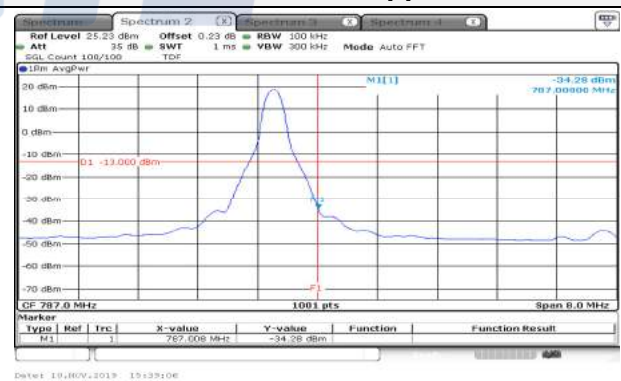
10M BW / QPSK / Upper / FRB



10M BW / 16QAM / Lower / 1RB



10M BW / 16QAM / Upper / 1RB



10M BW / 16QAM / Lower / FRB



10M BW / 16QAM / Upper / FRB



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10M BW / QPSK / Lower extended / 1RB



10M BW / QPSK / Upper extended / 1RB



10M BW / QPSK / Lower extended / FRB



10M BW / QPSK / Upper extended / FRB



10M BW / 16QAM / Lower extended / 1RB



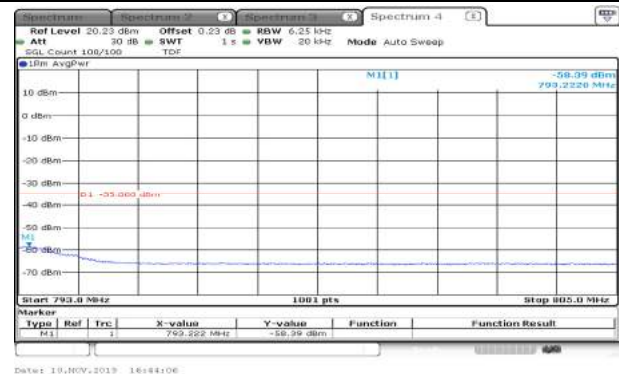
10M BW / 16QAM / Upper extended / 1RB



10M BW / 16QAM / Lower extended / FRB



10M BW / 16QAM / Upper extended / FRB



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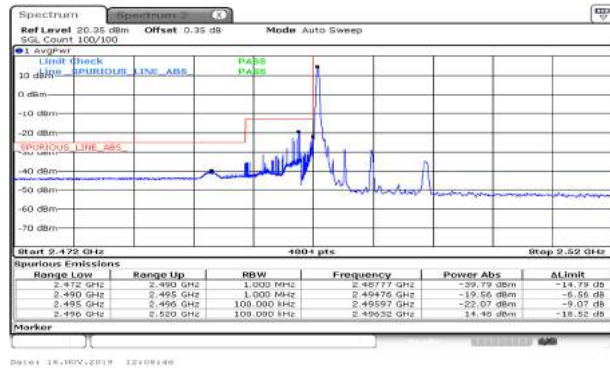
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Test mode: LTE Band 41

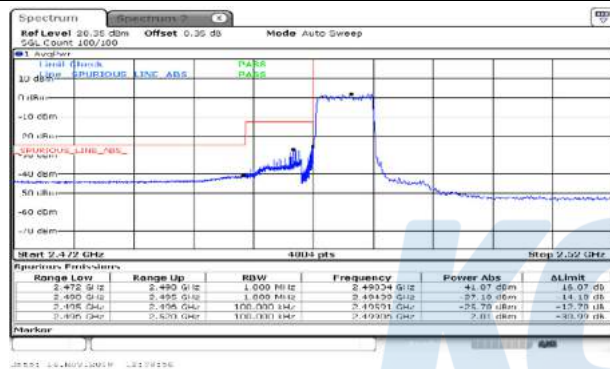
5M BW / QPSK / Low ch. / 1RB



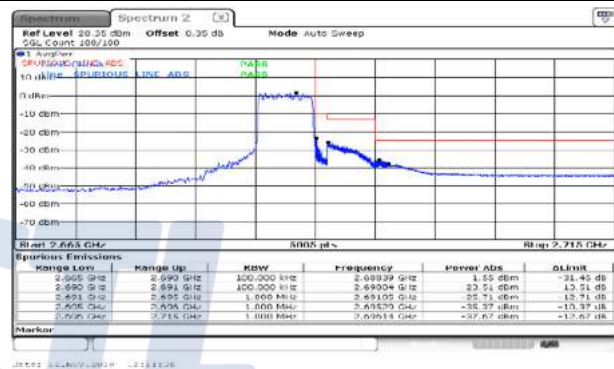
5M BW / QPSK / High ch. / 1RB



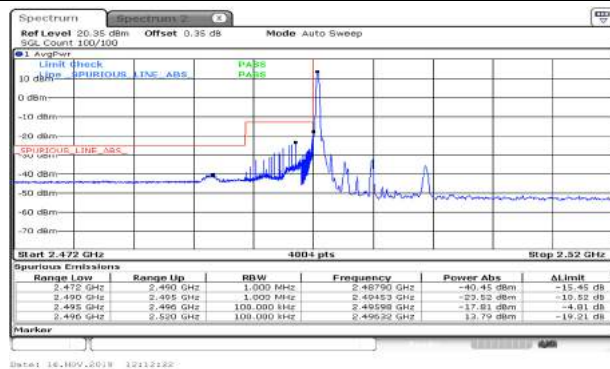
5M BW / QPSK / Low ch. / FRB



5M BW / QPSK / High ch. / FRB



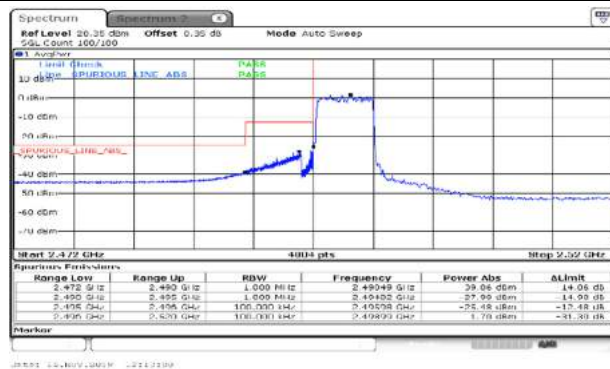
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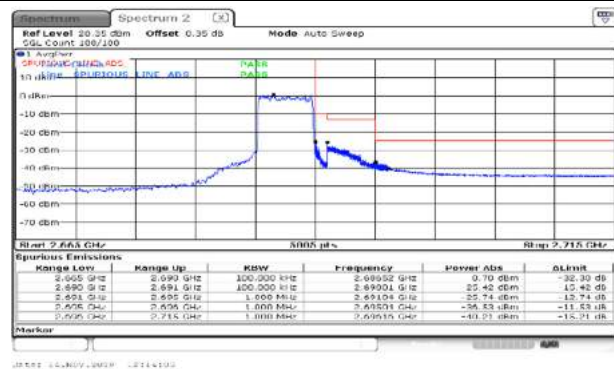
5M BW / 16QAM / High ch. / 1RB



5M BW / 16QAM / Low ch. / FRB



5M BW / 16QAM / High ch. / FRB



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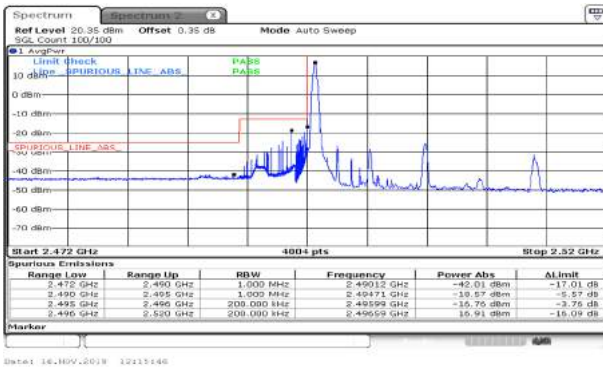
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
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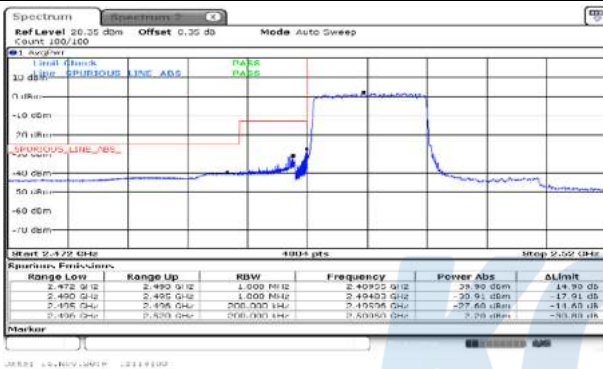
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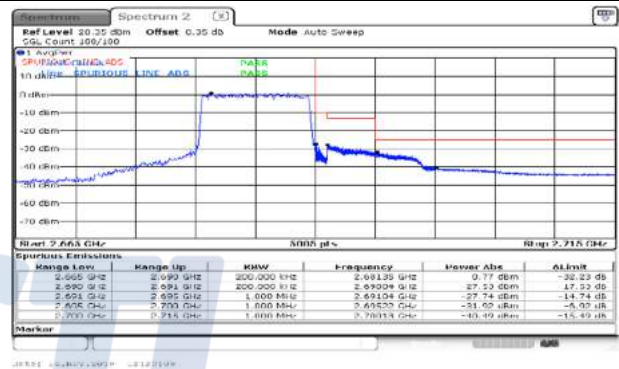
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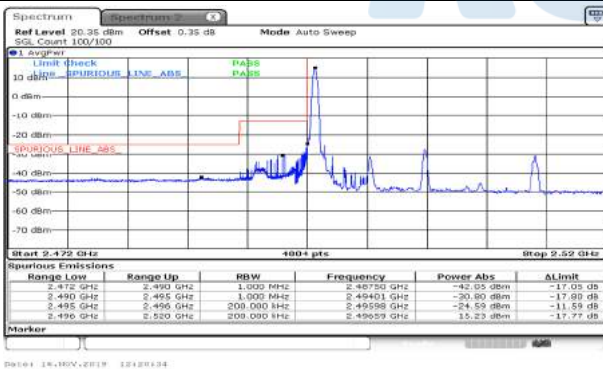
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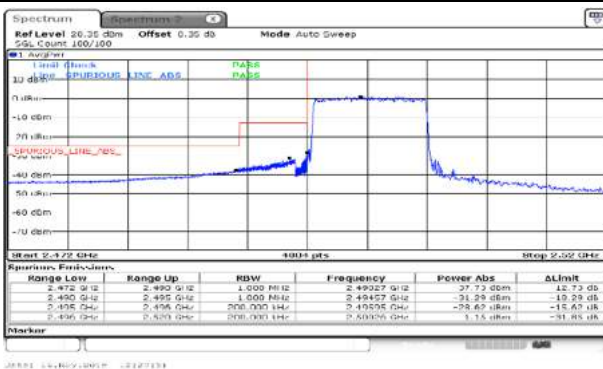
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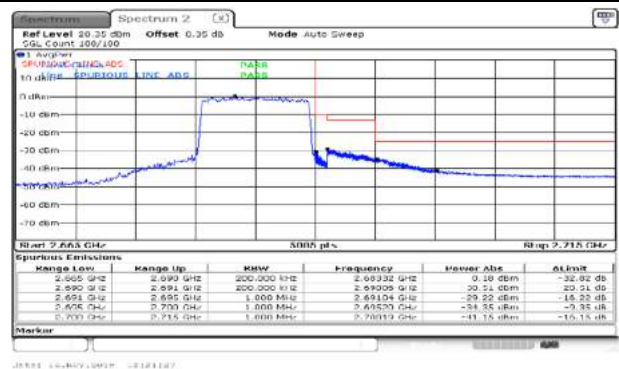
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10M BW / 16QAM / Low ch. / FRB



10M BW / 16QAM / High ch. / FRB



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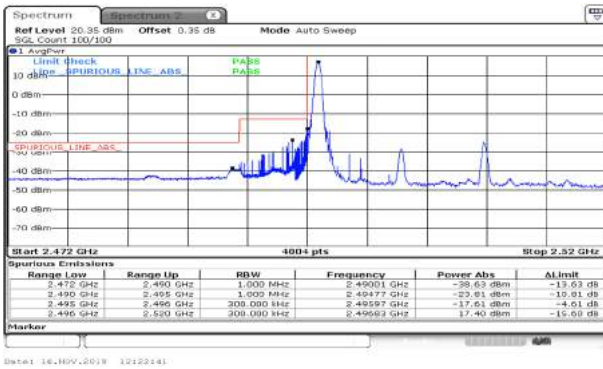
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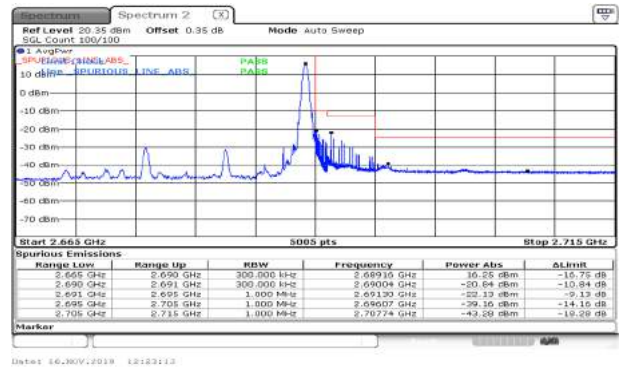
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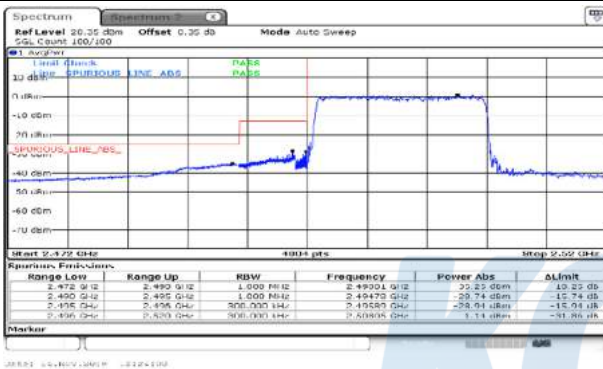
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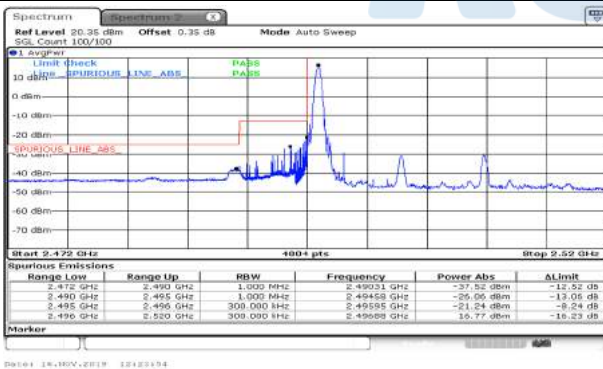
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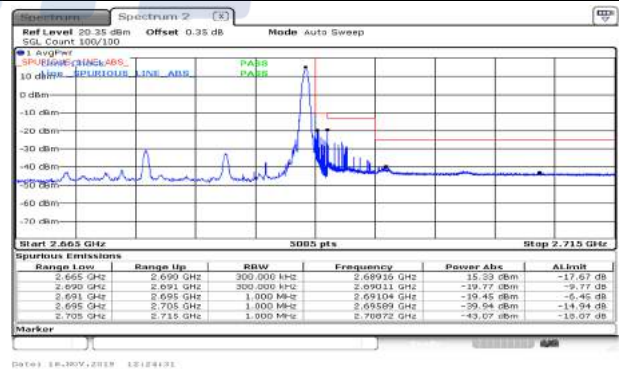
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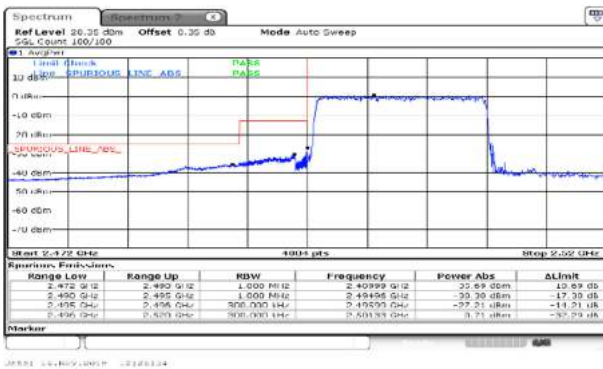
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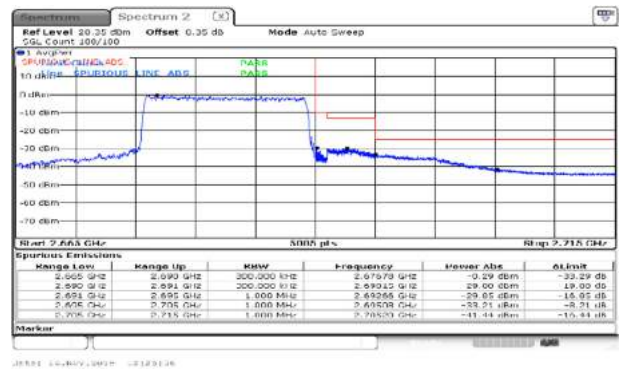
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15M BW / 16QAM / Low ch. / FRB



15M BW / 16QAM / High ch. / FRB



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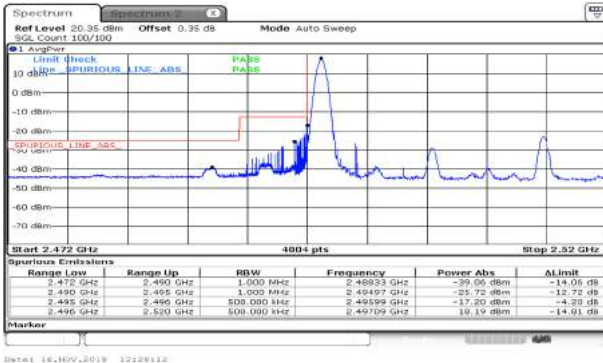
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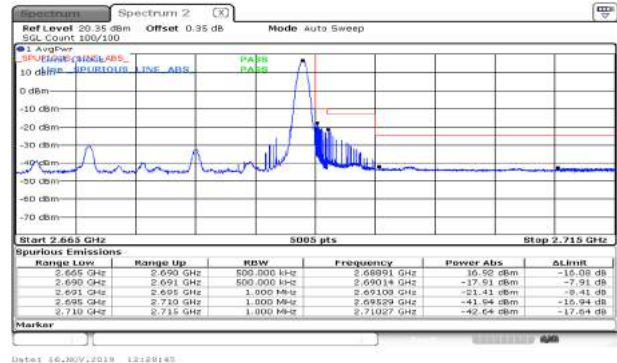
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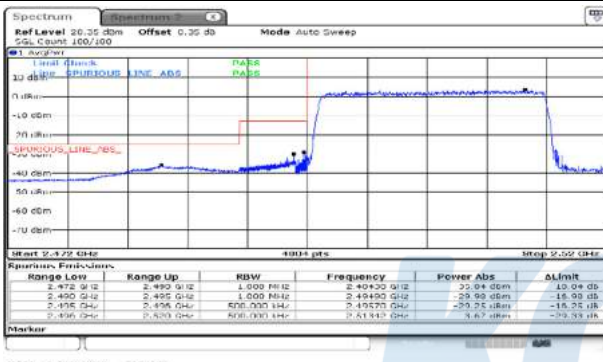
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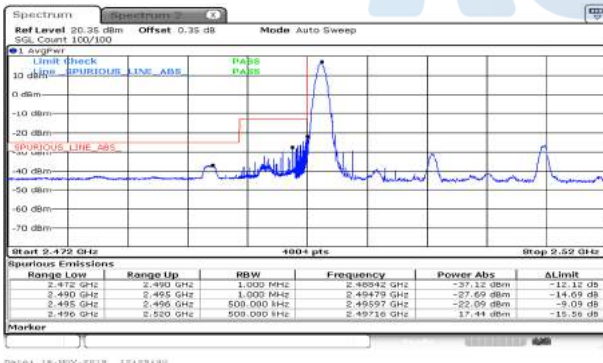
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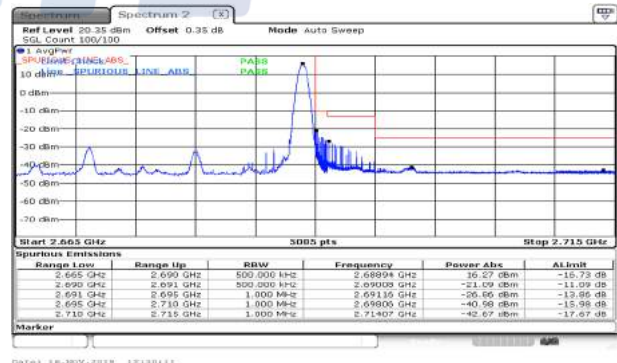
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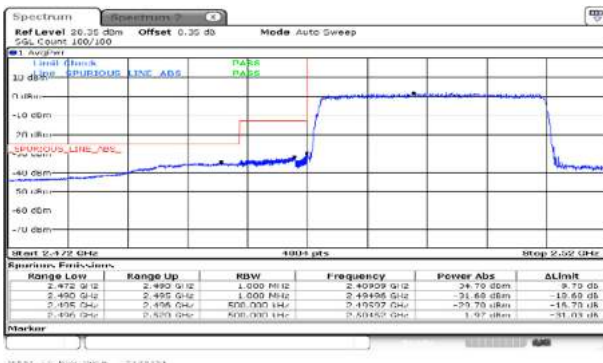
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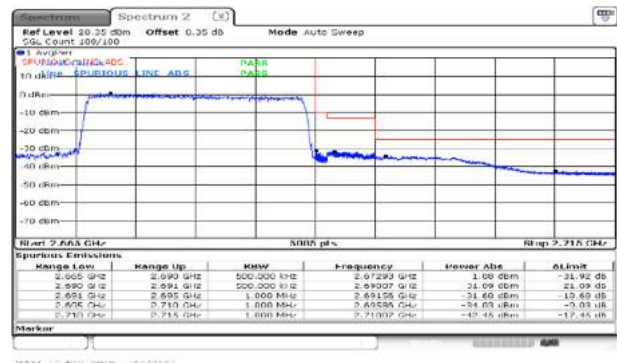
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20M BW / 16QAM / Low ch. / FRB

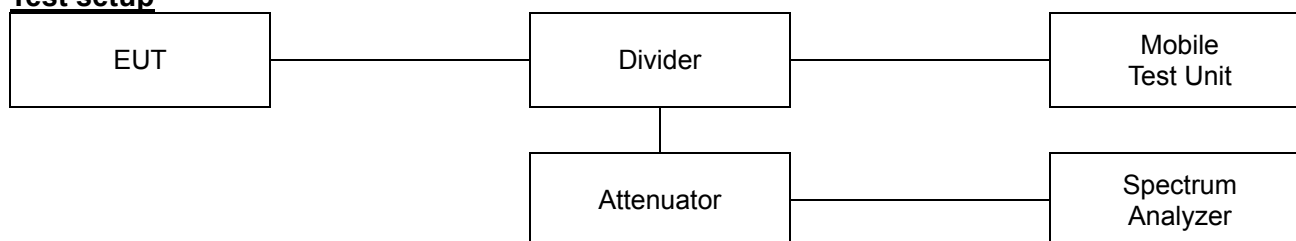


20M BW / 16QAM / High ch. / FRB



7.5. Peak to Average Power Ratio (PAPR)

Test setup



Limit

According to §24.232(d) and §27.50(d)(5), the peak-to-average ratio(PAR) of the transmission must not exceed 13 dB.

Test procedure

971168 D01 v03r01 - Section 5.7.2

ANSI 63.26-2015 – Section 5.2.3.4

Test settings

5.2.3.4 Measurement of peak power in a broadband noise-like signal using CCDF

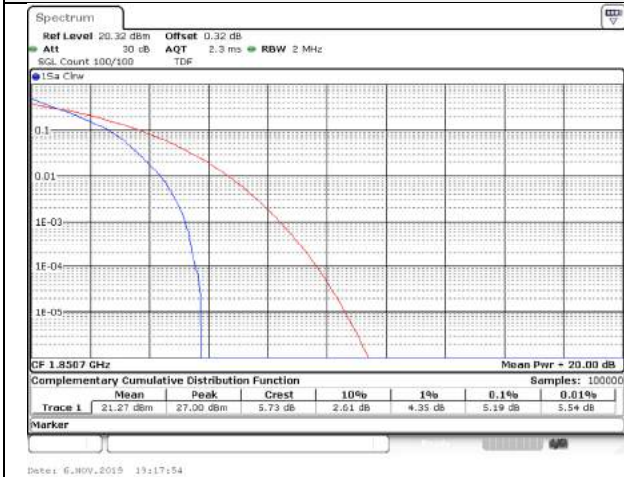
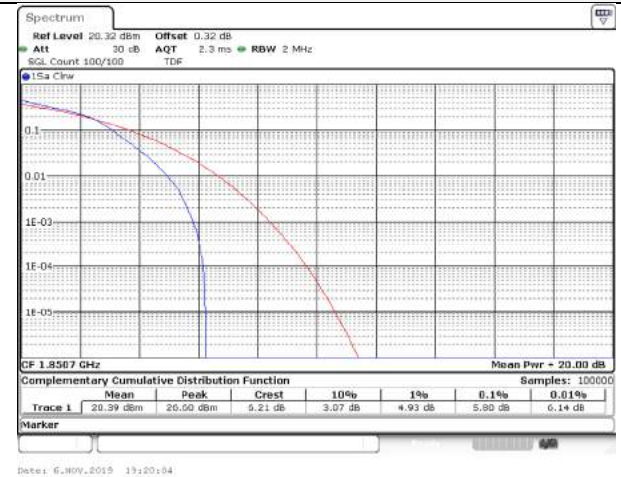
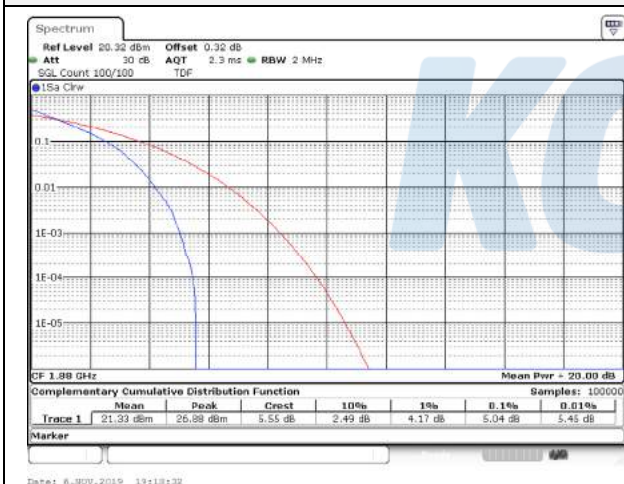
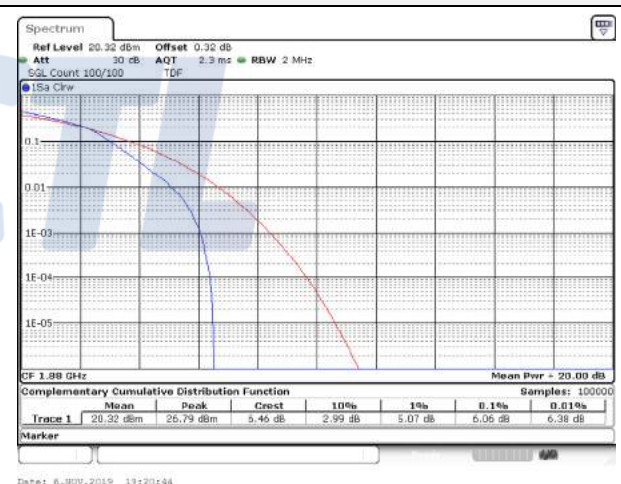
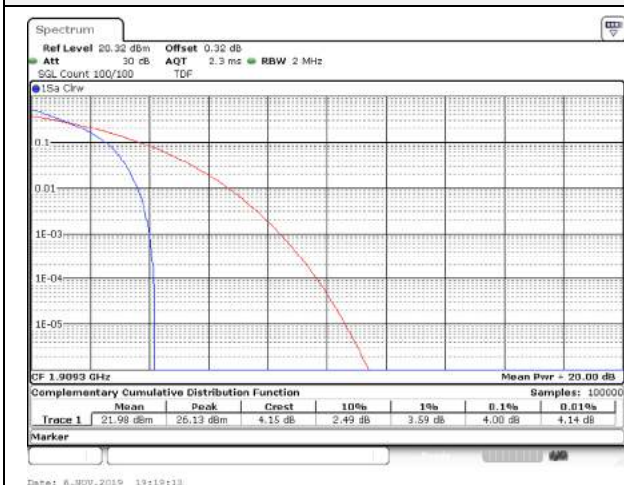
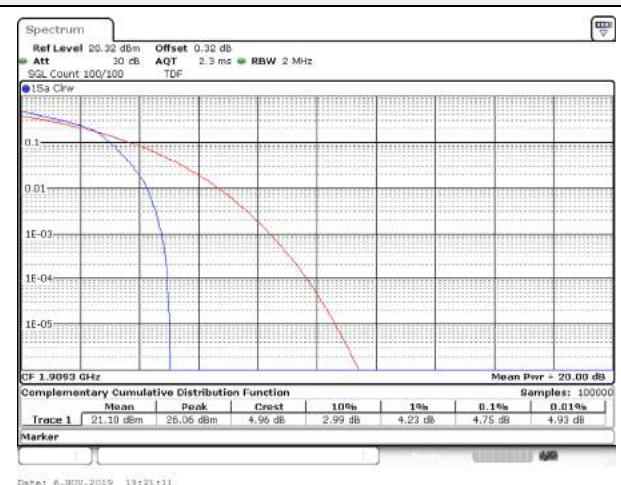
- 1) Set resolution/measurement bandwidth $\geq$ OBW or specified reference bandwidth
- 2) Set the number of counts to a value that stabilizes the measured CCDF curve.
- 3) Set the measurement interval as follows:
 - a) For continuous transmissions, set to the greater of $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ or 1 ms.
 - b) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
 - c) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
- 4) Record the maximum PAPR level associated with a probability of 0.1%

5.2.6 Peak-to-average power ratio

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK} .

Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{AG} . Determine the P.A.P.R from:

$$PAPR(\text{dB}) = P_{PK}(\text{dBm or dBW}) - P_{AG}(\text{dBm or dBW})$$

Test results**Test mode: LTE Band 2****1.4M BW / QPSK / Low ch.****1.4M BW / 16QAM / Low ch.****1.4M BW / QPSK / Mid ch.****1.4M BW / 16QAM / Mid ch.****1.4M BW / QPSK / High ch.****1.4M BW / 16QAM / High ch.**

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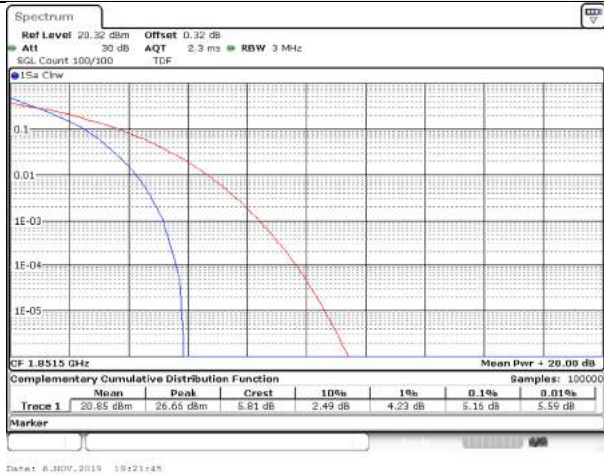
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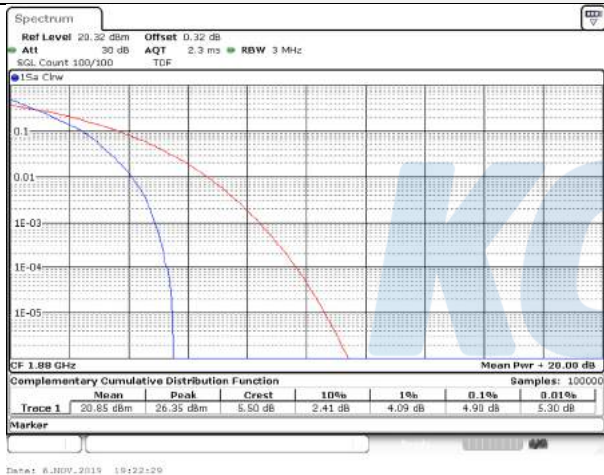
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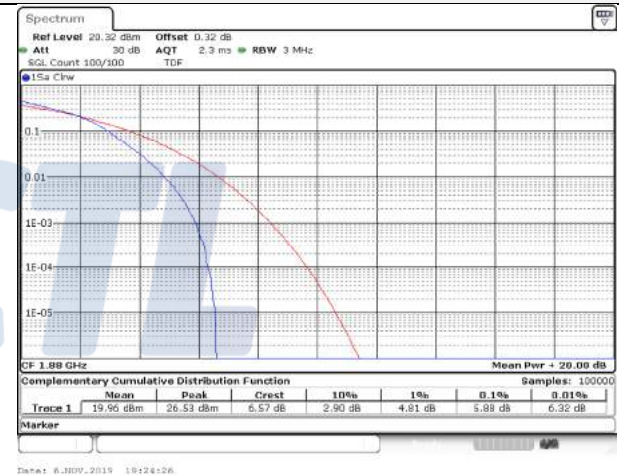
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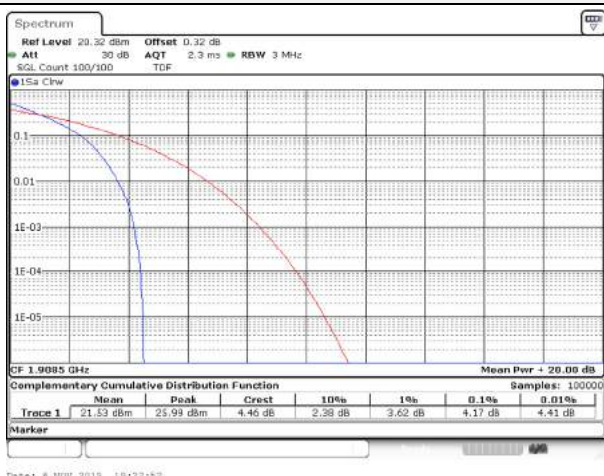
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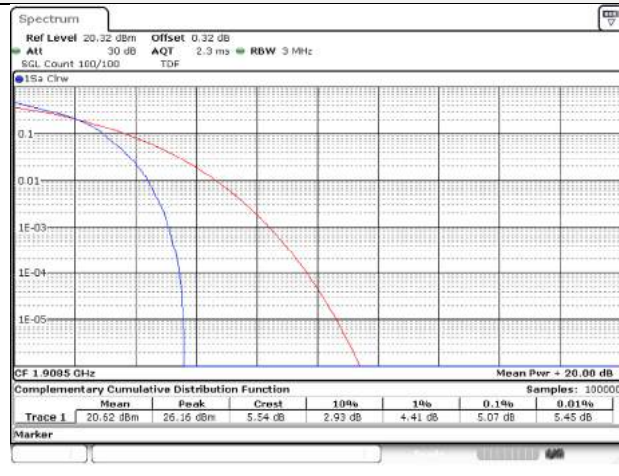
3M BW / 16QAM / Mid ch.



3M BW / QPSK / High ch.



3M BW / 16QAM / High ch.



KCTL Inc.

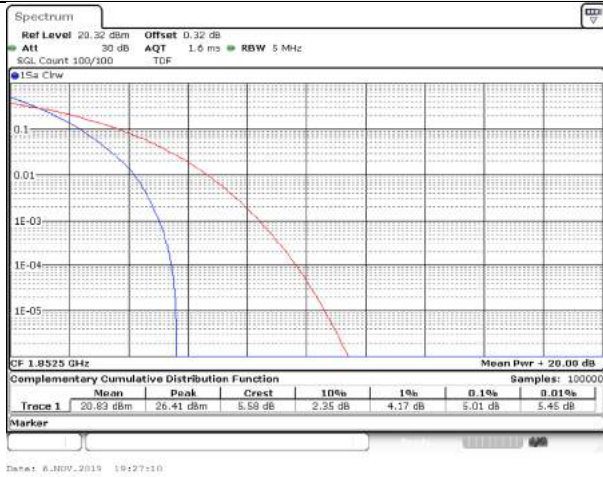
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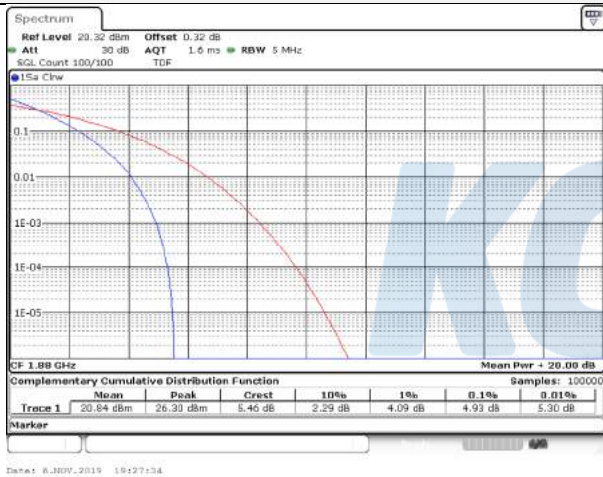
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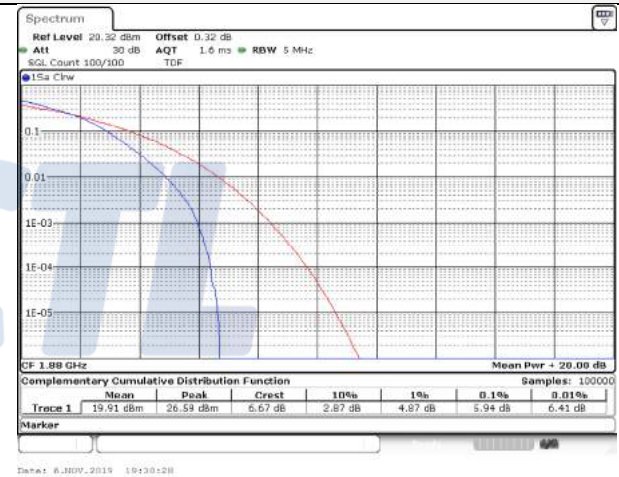
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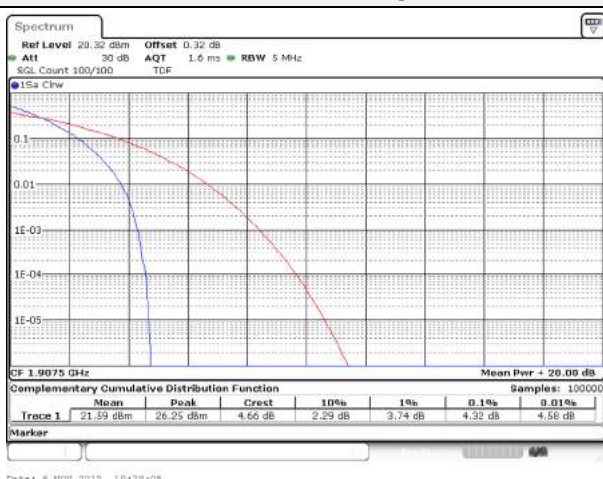
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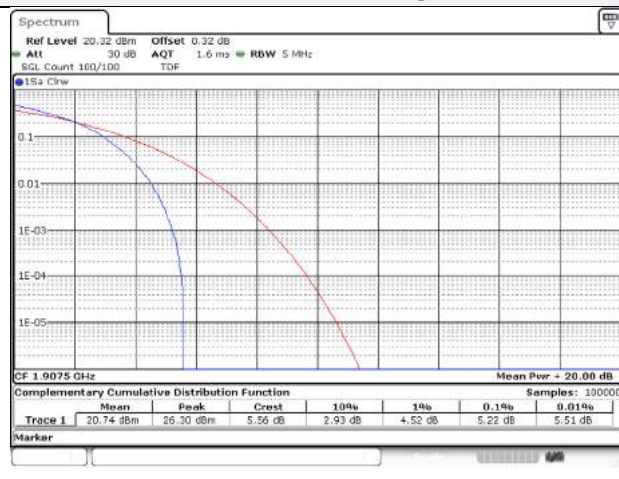
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5M BW / 16QAM / High ch.



KCTL Inc.

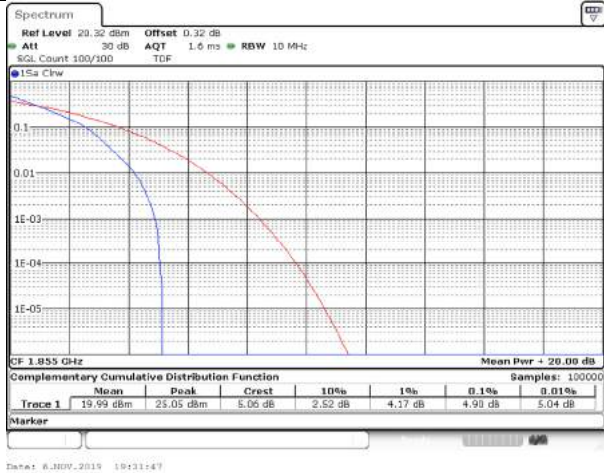
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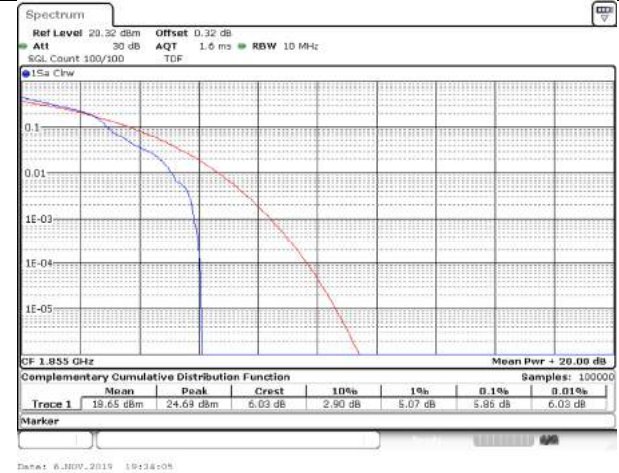
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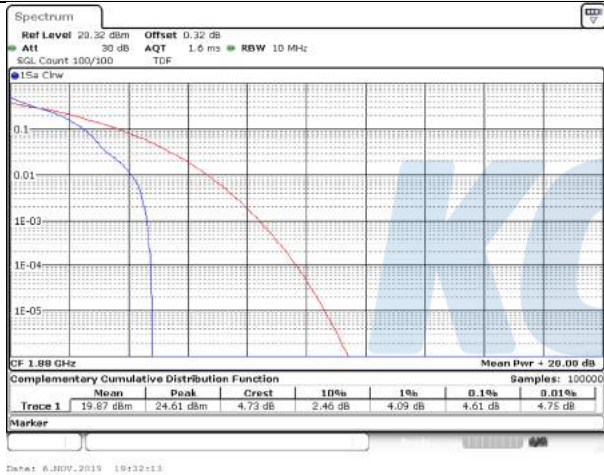
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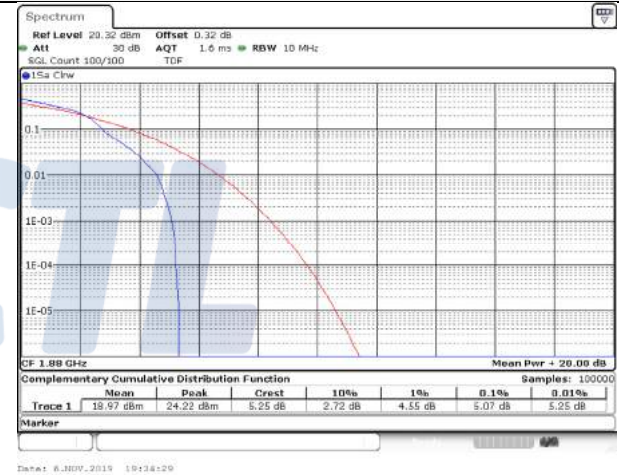
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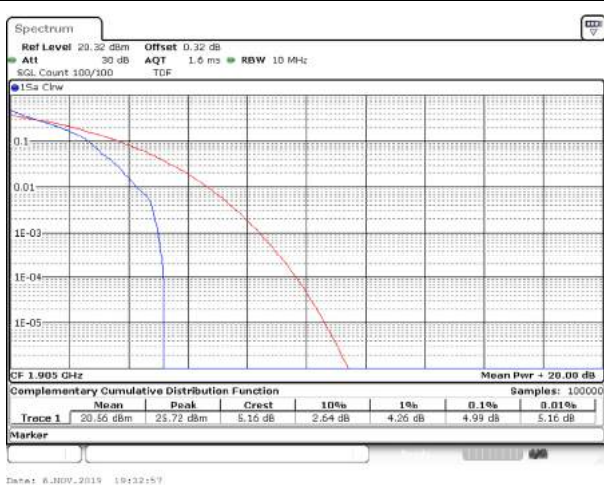
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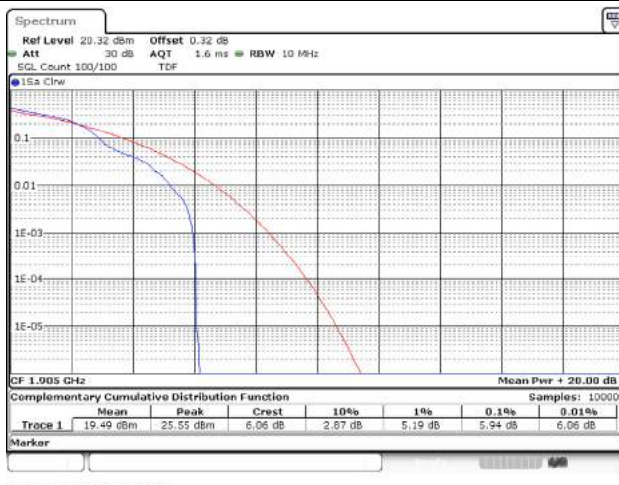
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10M BW / QPSK / High ch.



10M BW / 16QAM / High ch.



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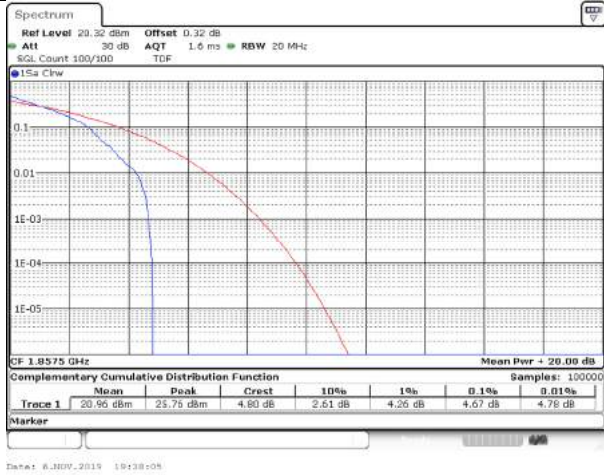
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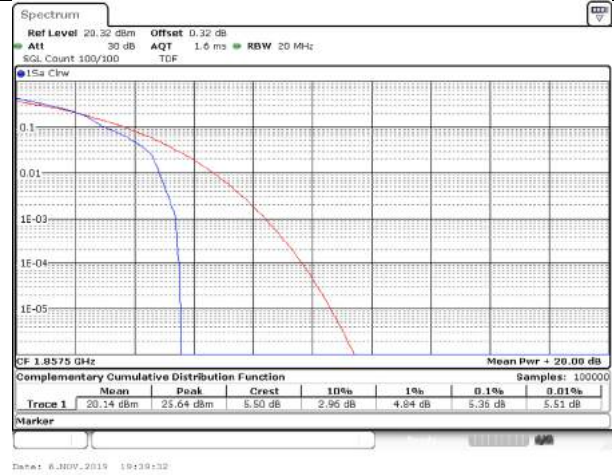
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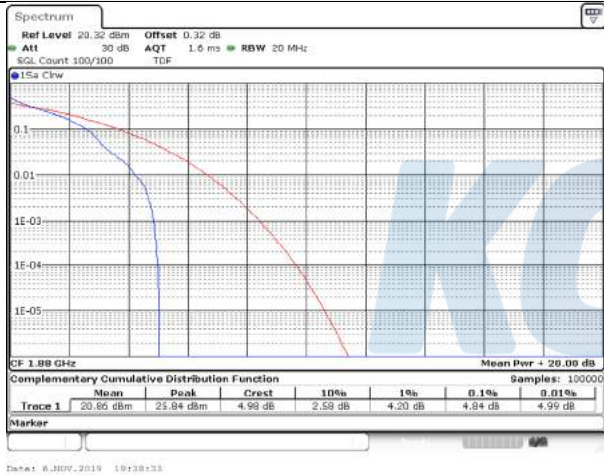
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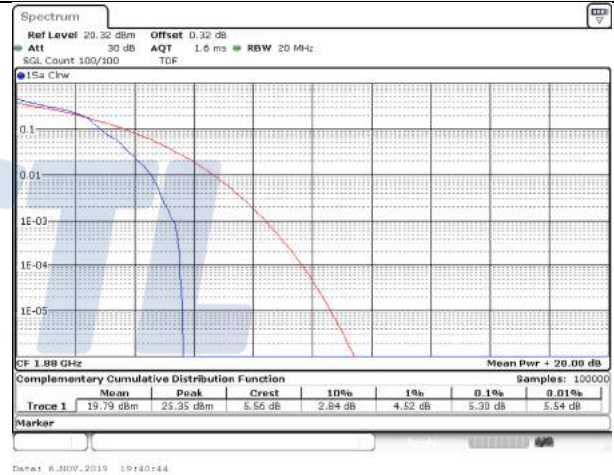
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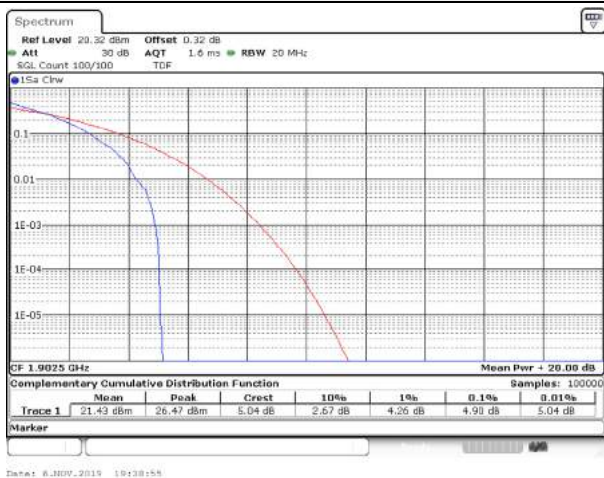
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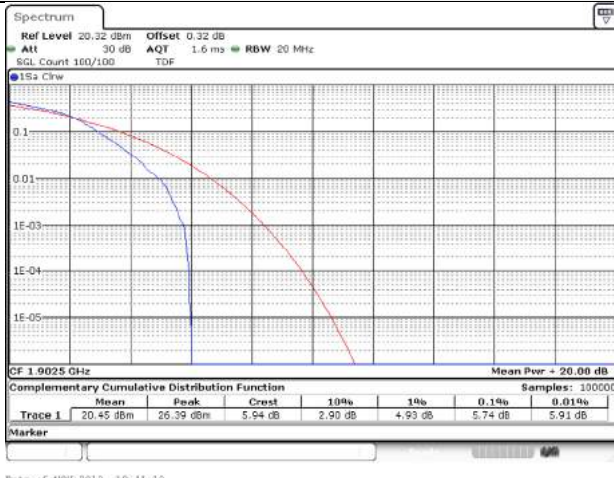
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15M BW / QPSK / High ch.



15M BW / 16QAM / High ch.



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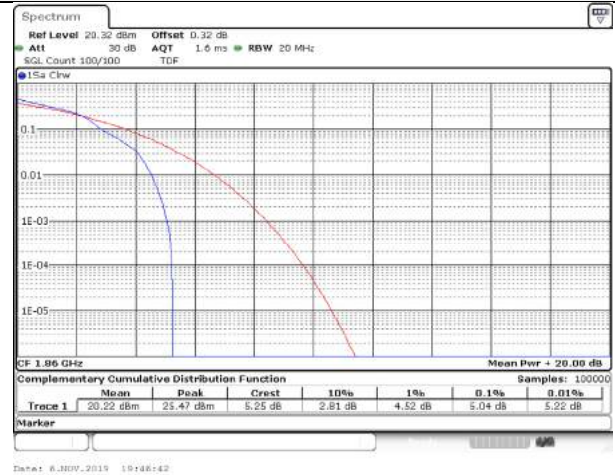
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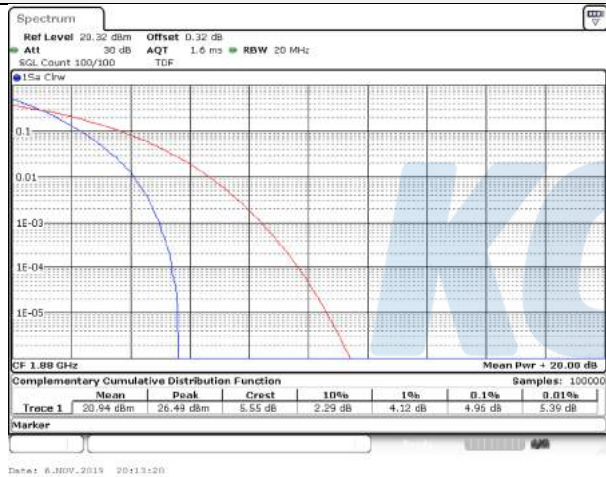
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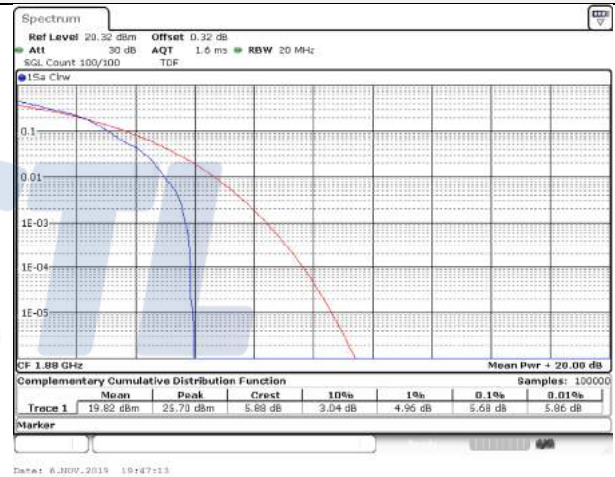
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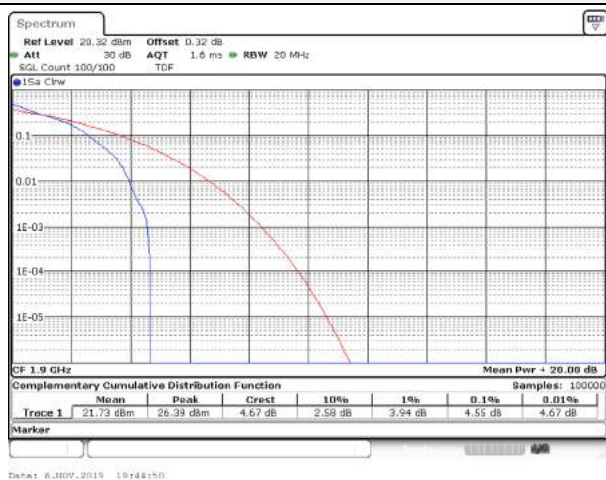
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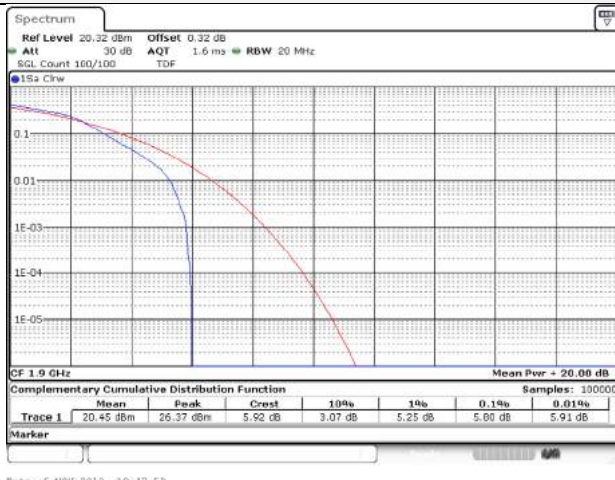
20M BW / 16QAM / Mid ch.



20M BW / QPSK / High ch.



20M BW / 16QAM / High ch.



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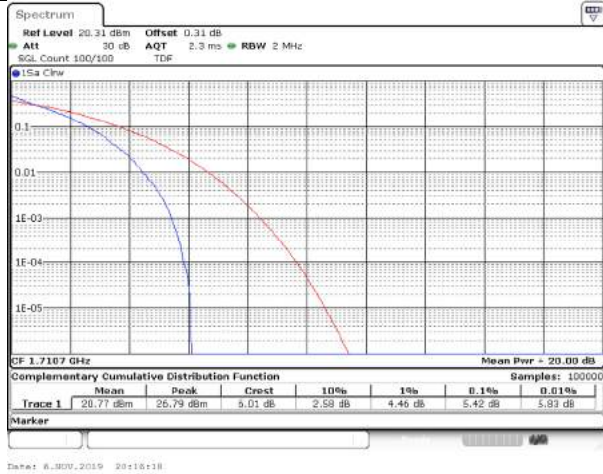
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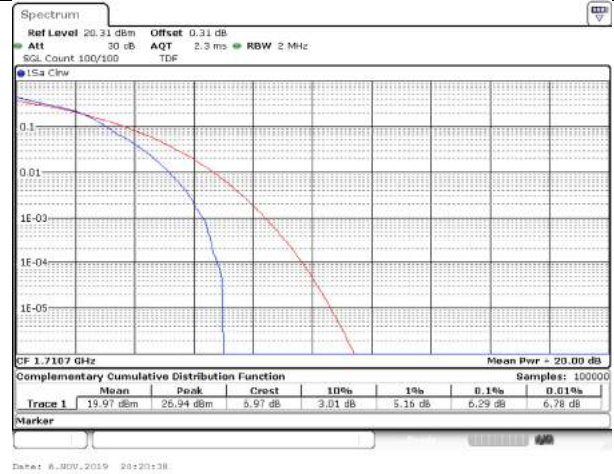


Test mode: LTE Band 4/66

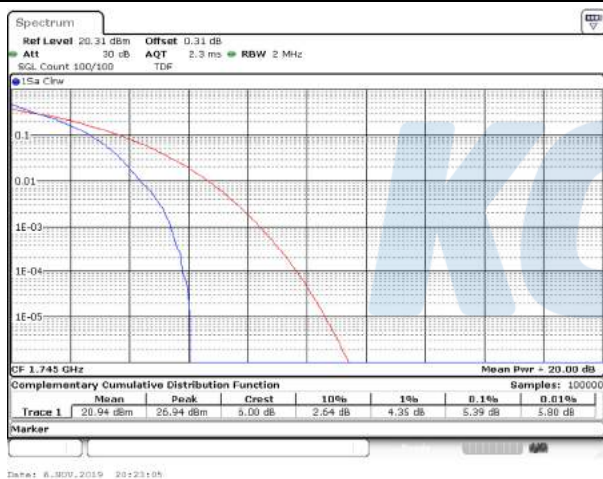
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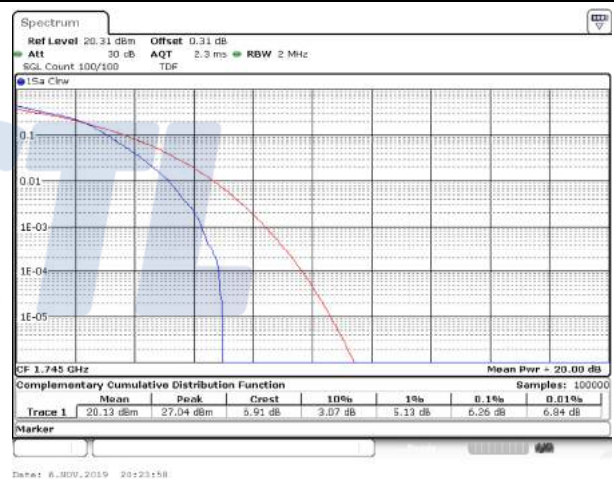
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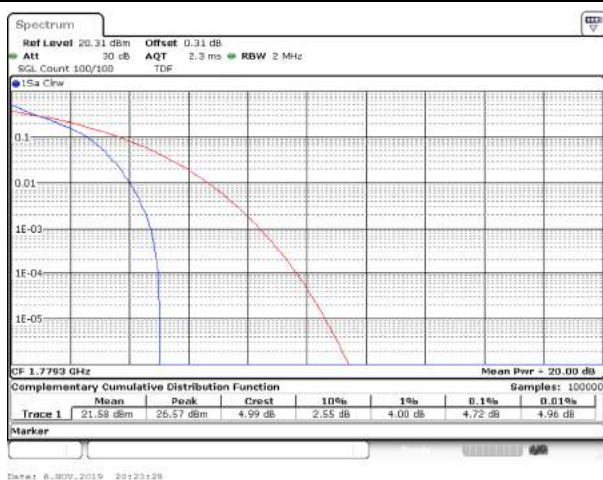
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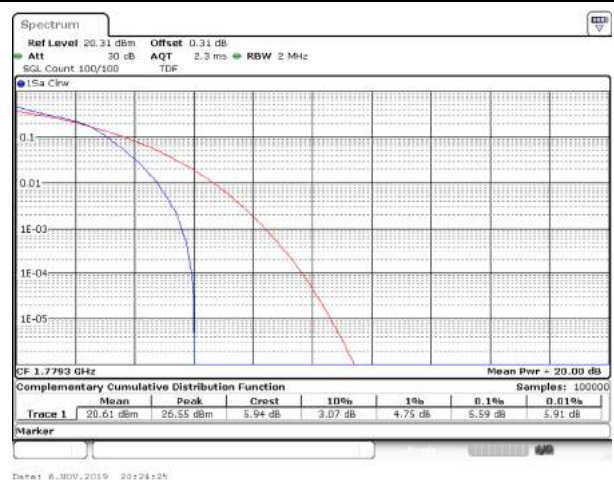
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1.4M BW / QPSK / High ch.



1.4M BW / 16QAM / High ch.



KCTL Inc.

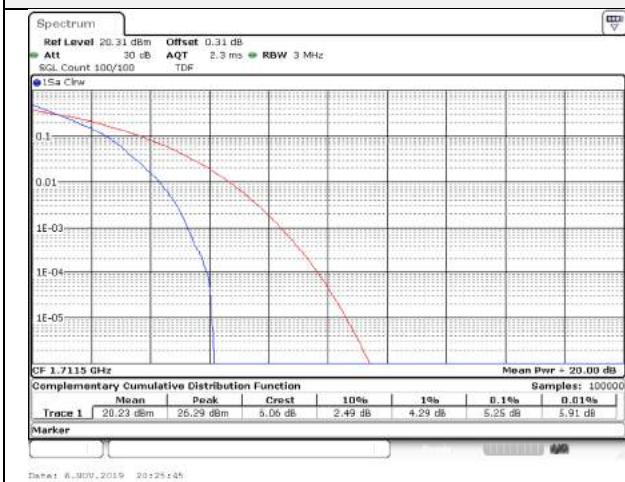
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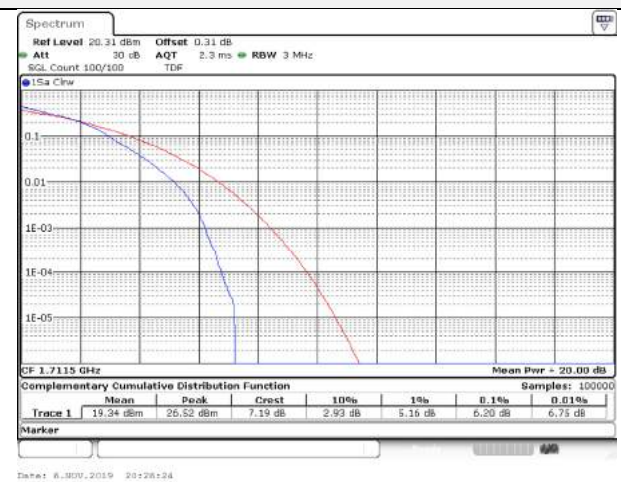
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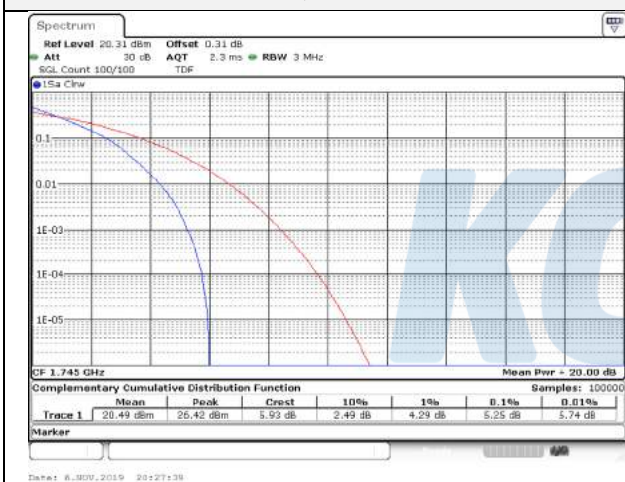
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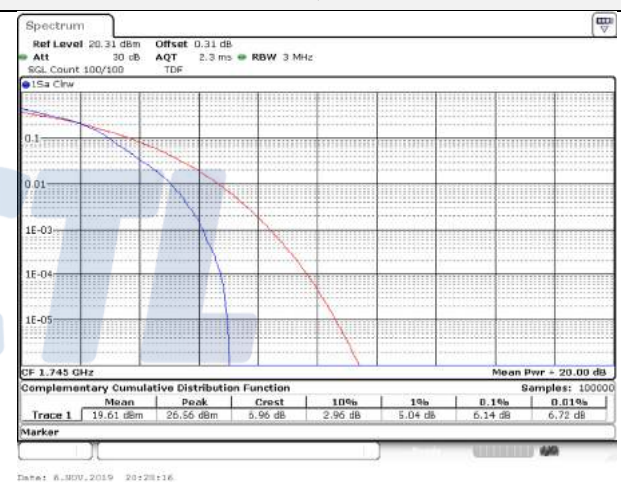
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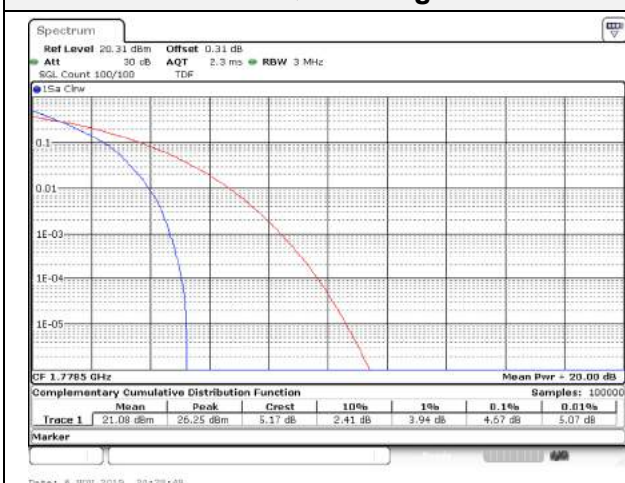
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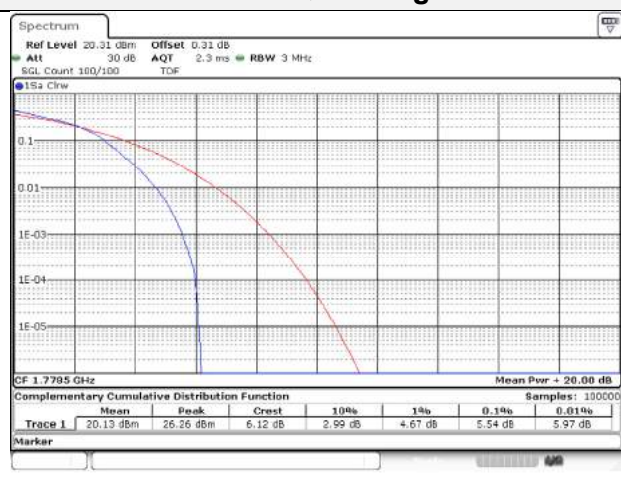
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3M BW / 16QAM / High ch.



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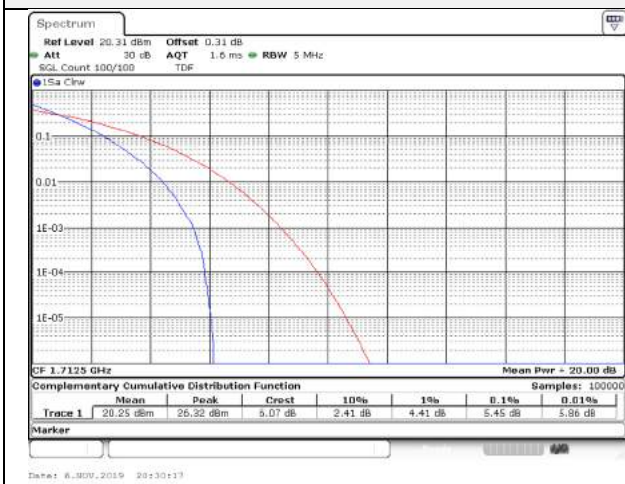
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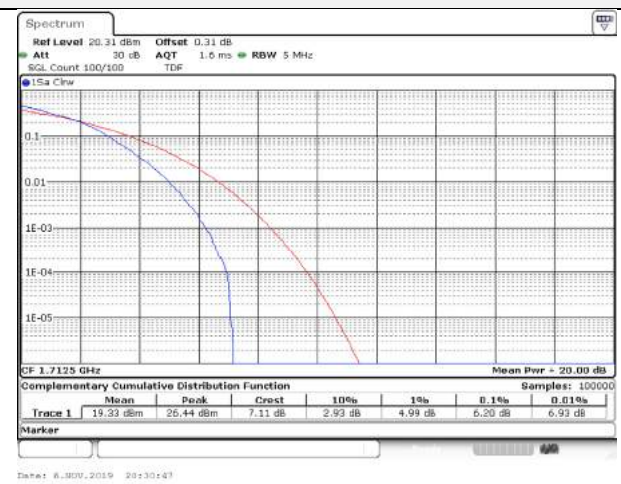
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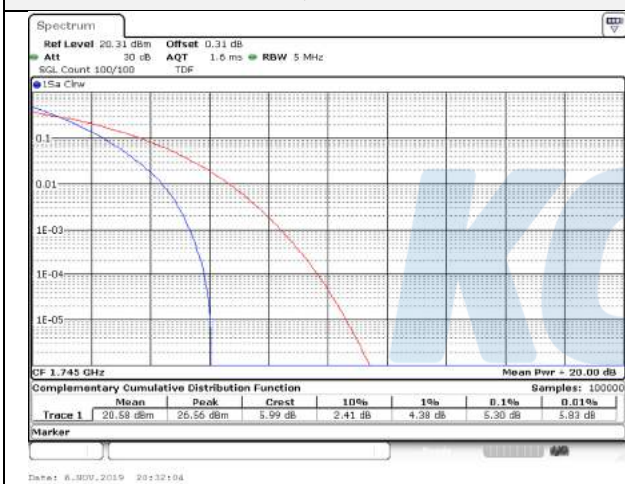
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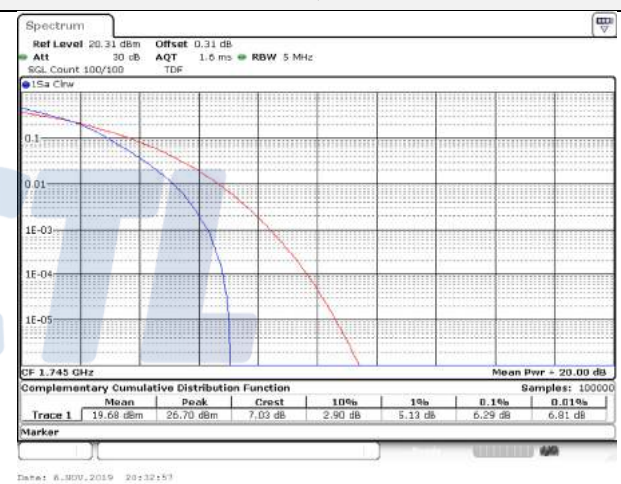
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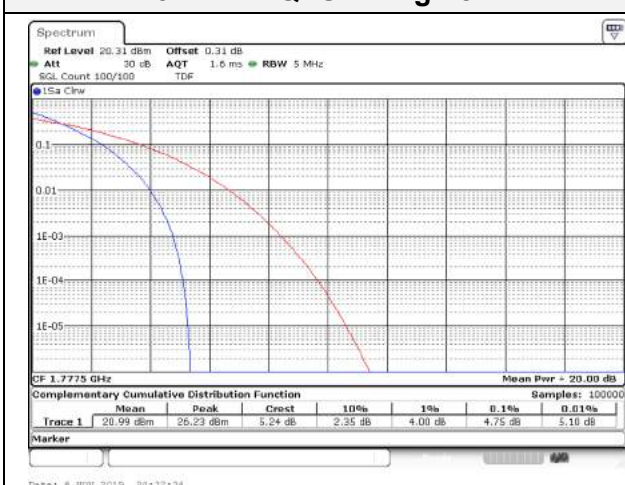
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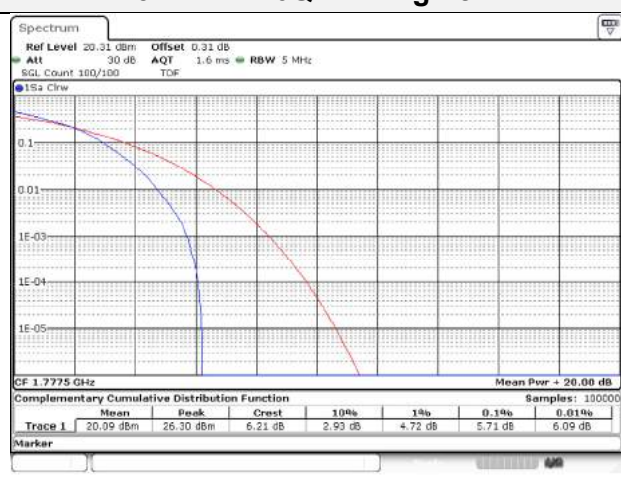
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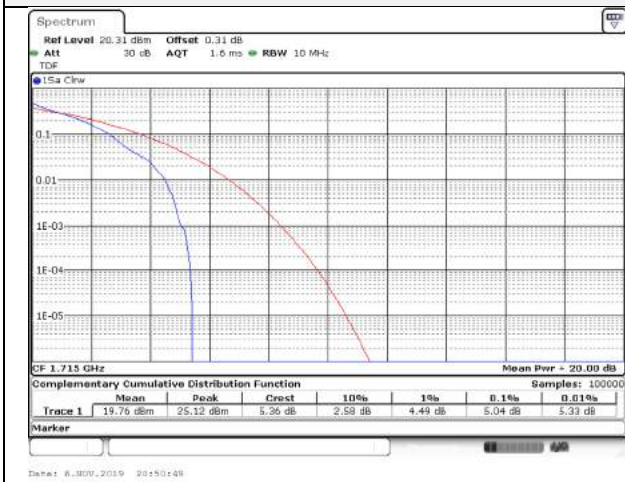
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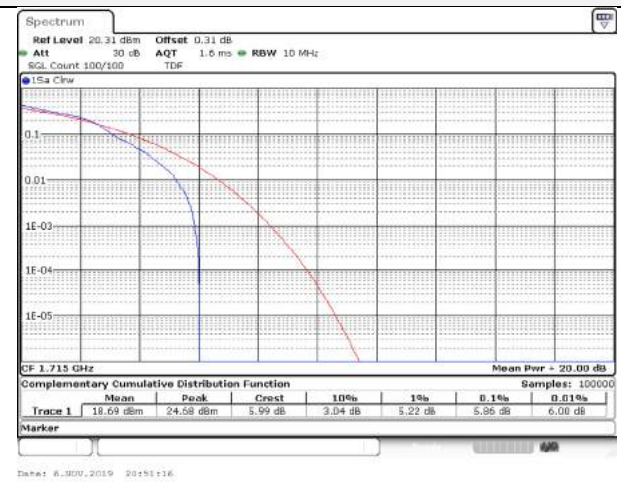
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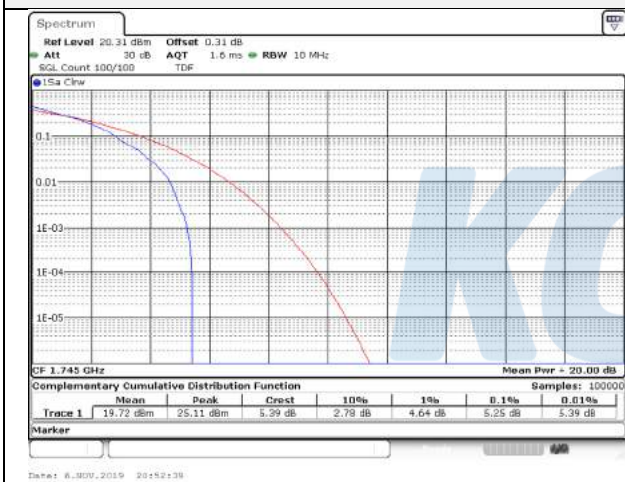
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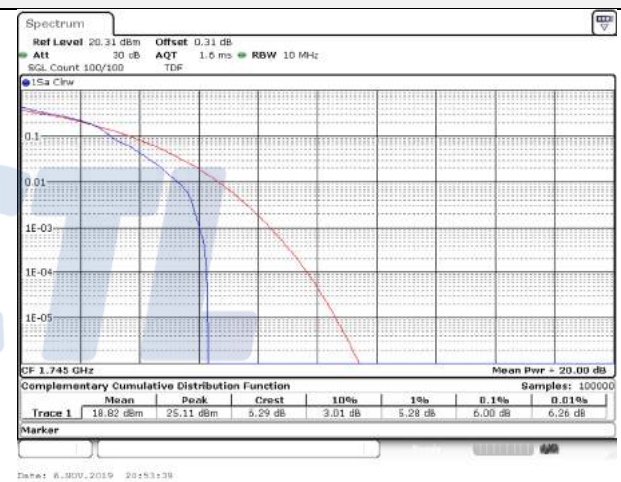
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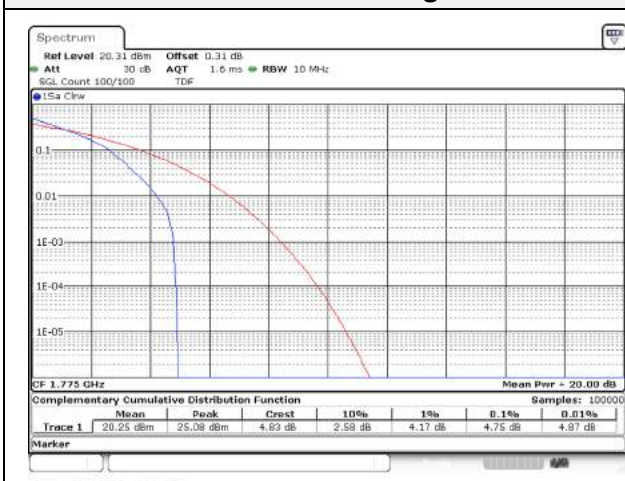
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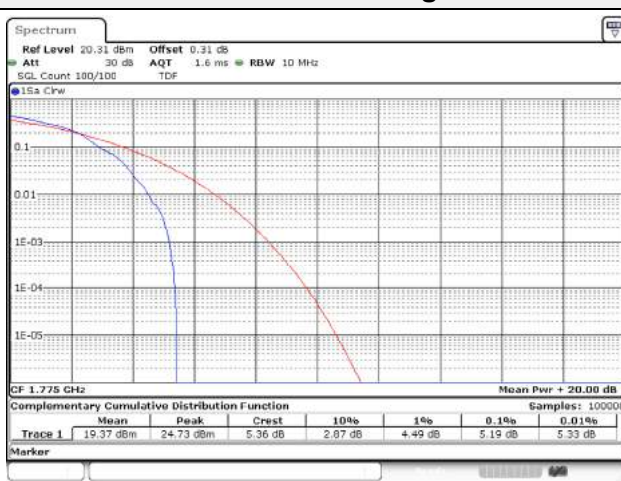
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10M BW / QPSK / High ch.



10M BW / 16QAM / High ch.



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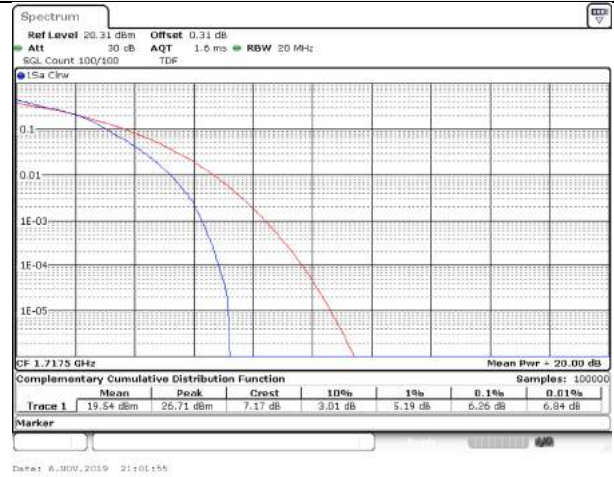
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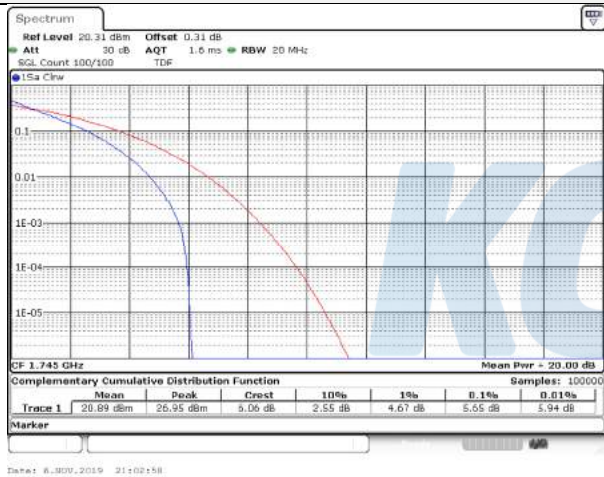
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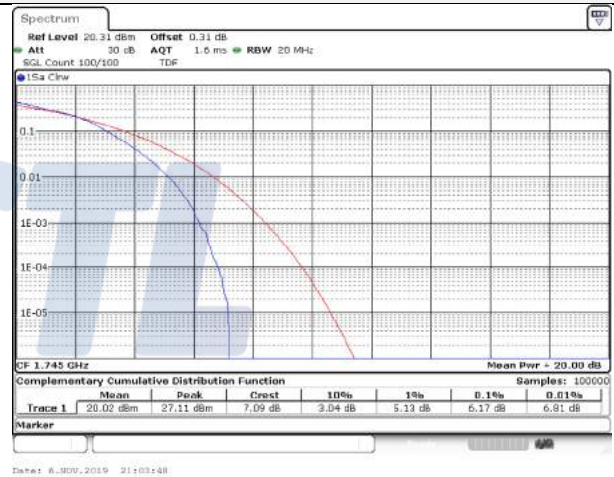
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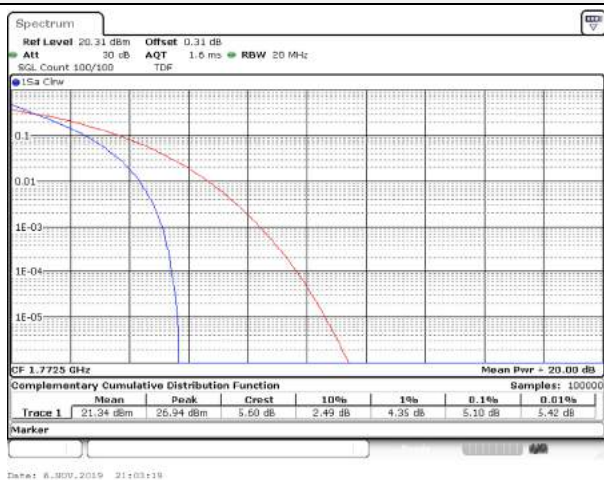
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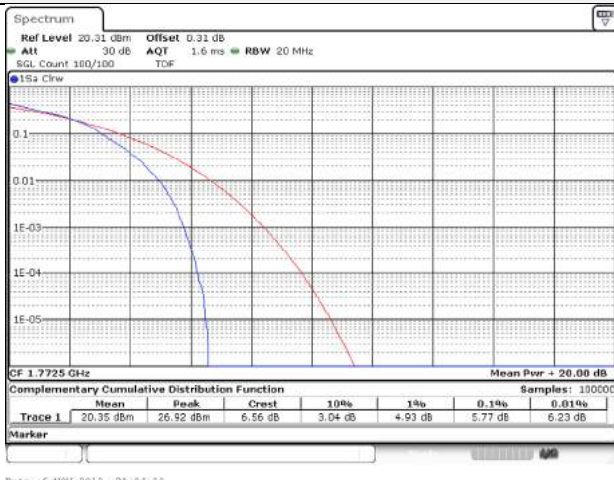
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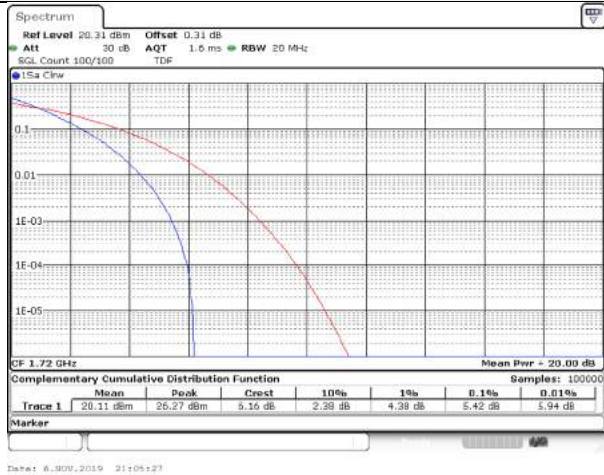
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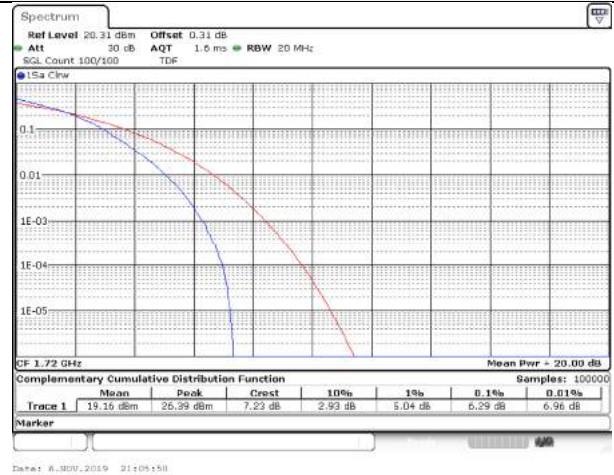
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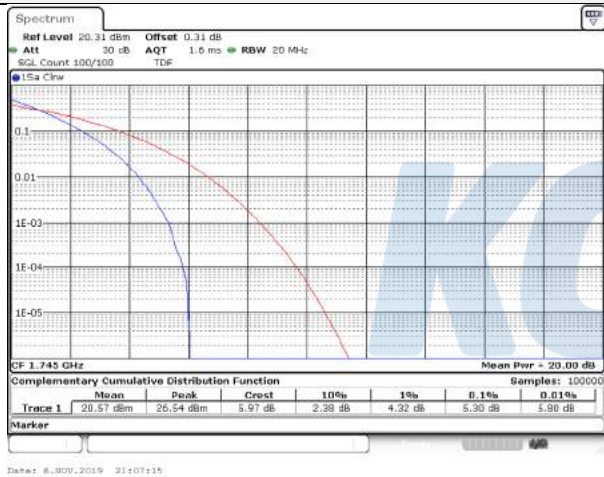
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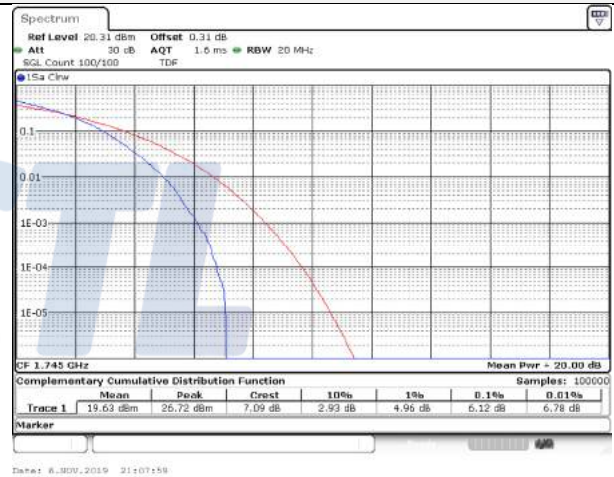
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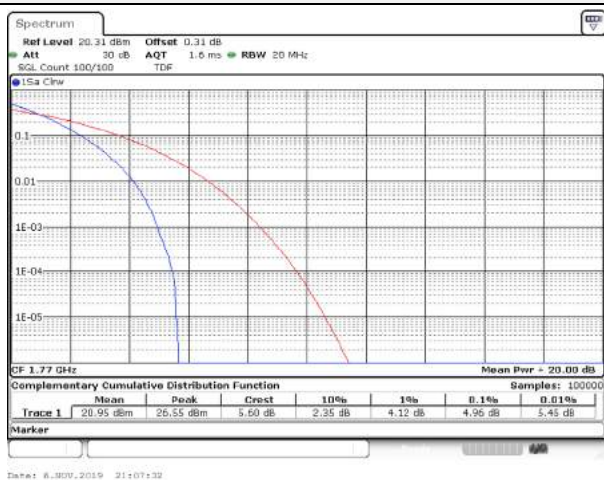
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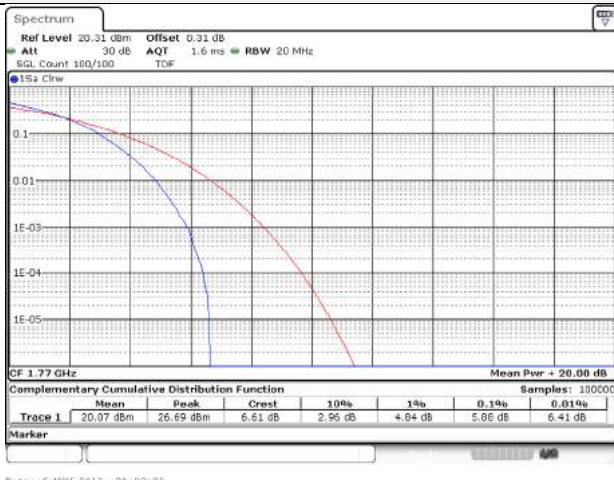
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20M BW / QPSK / High ch.



20M BW / 16QAM / High ch.



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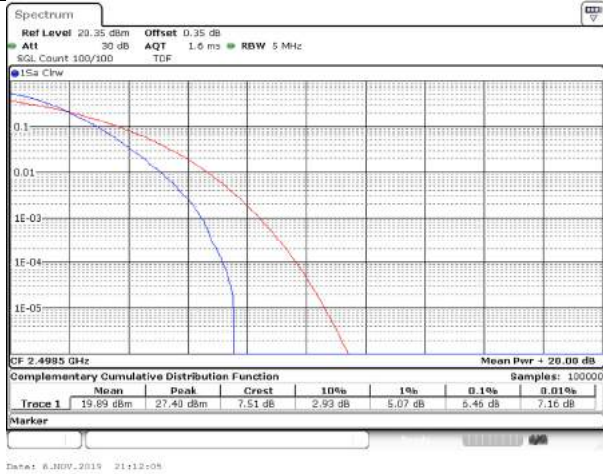
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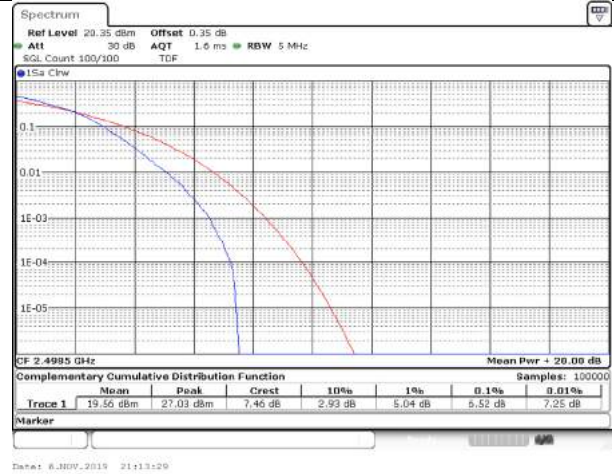


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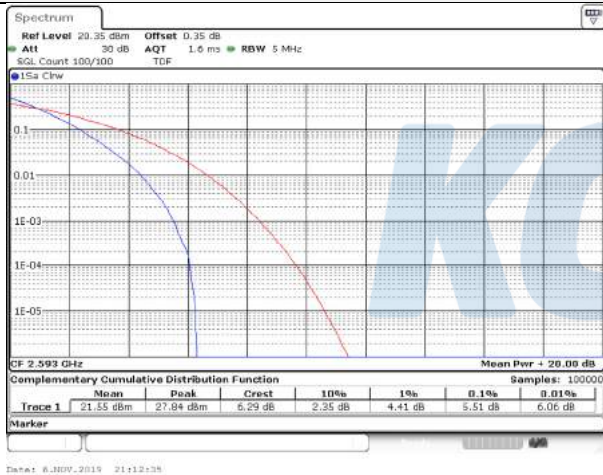
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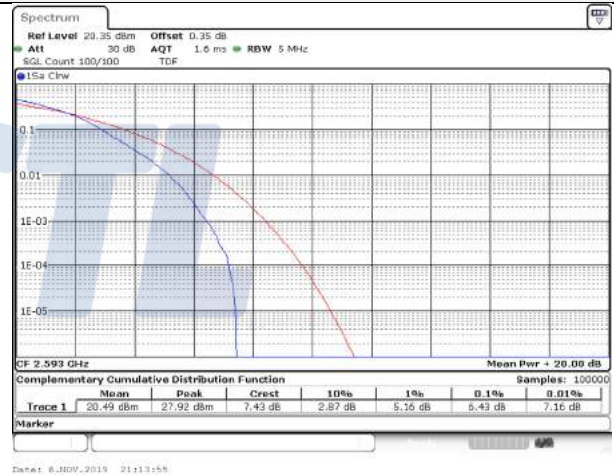
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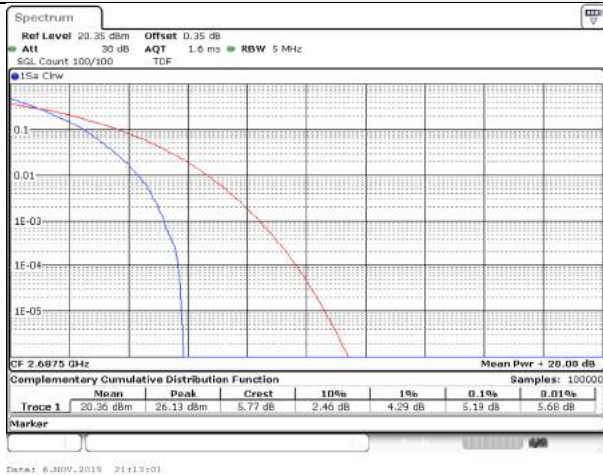
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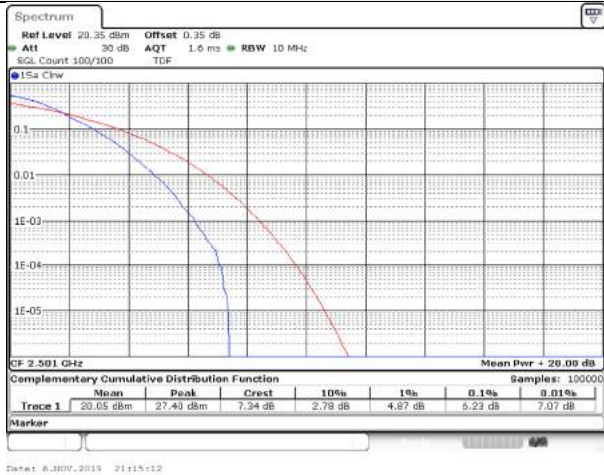
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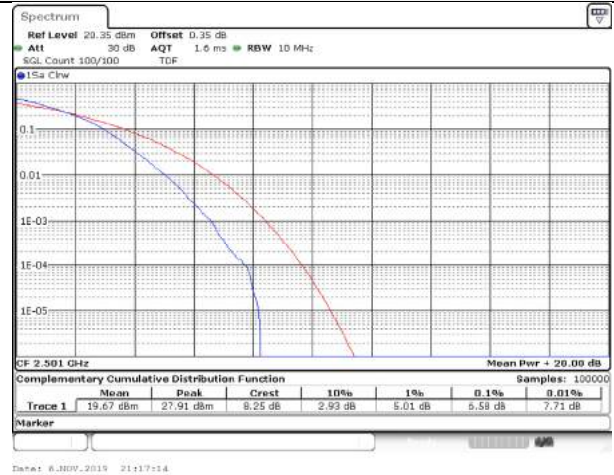
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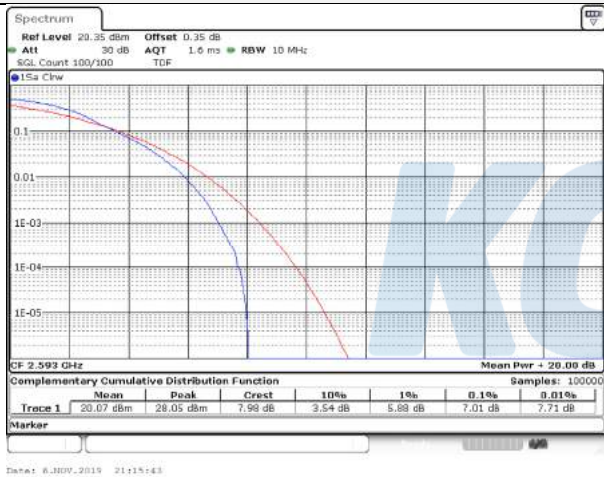
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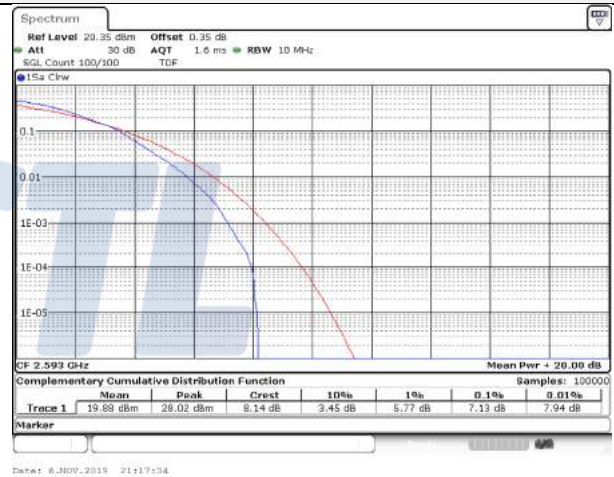
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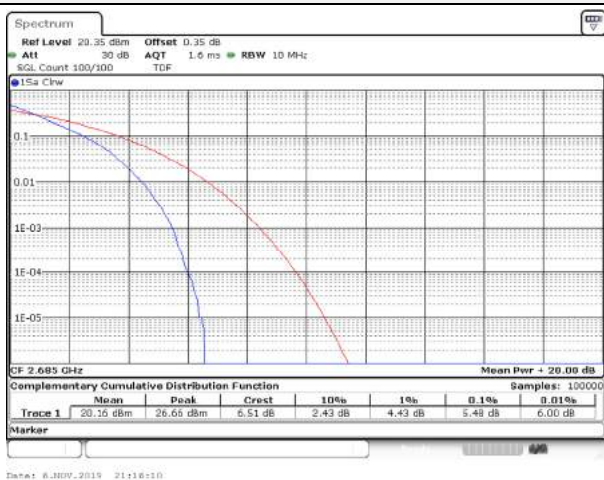
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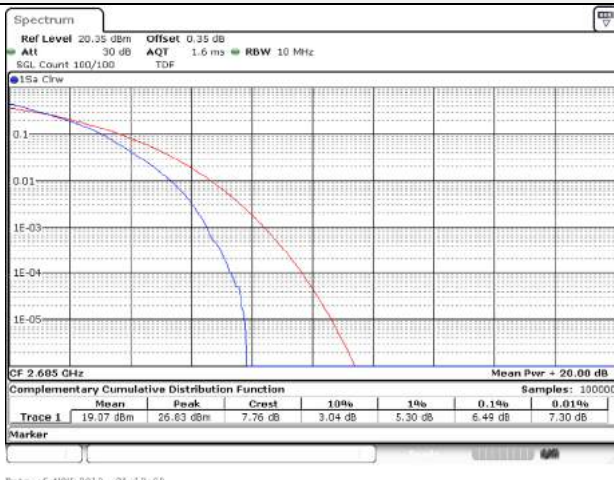
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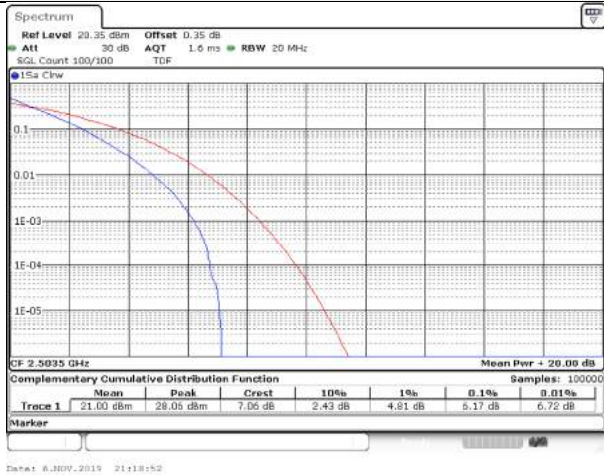
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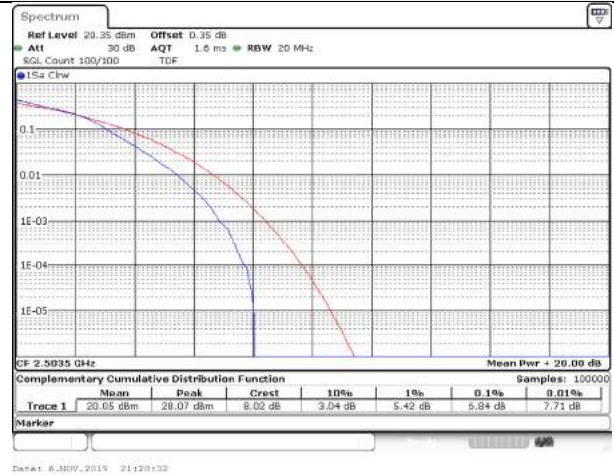
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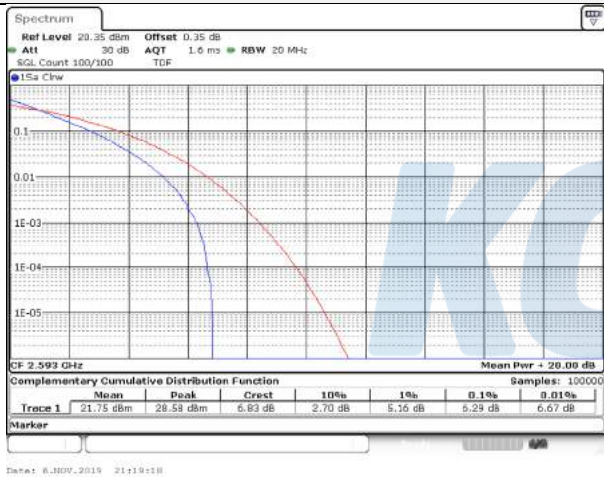
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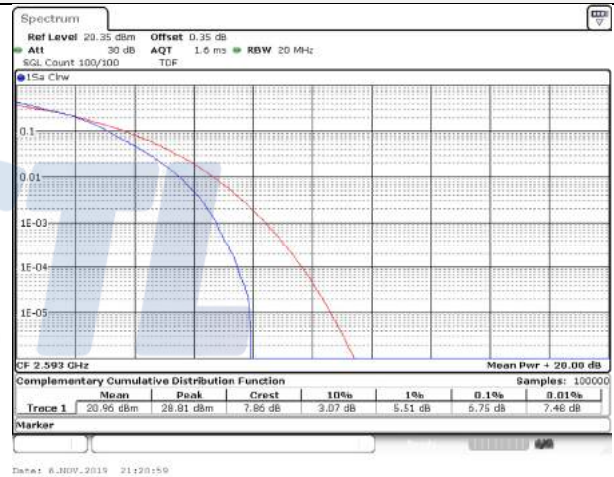
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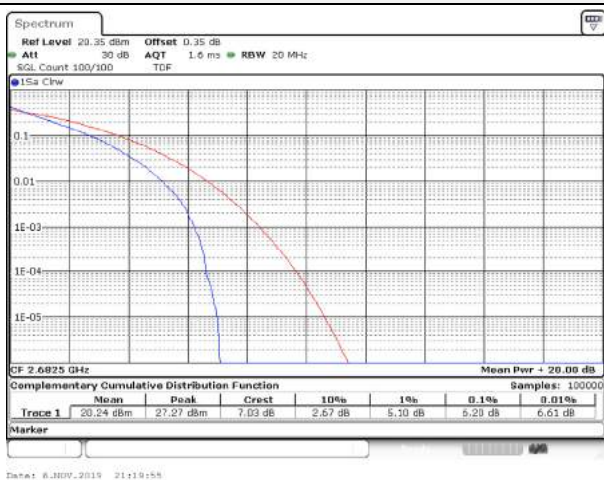
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15M BW / 16QAM / High ch.

