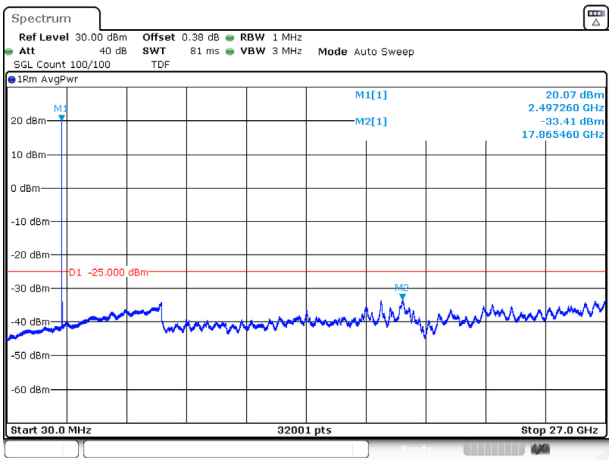
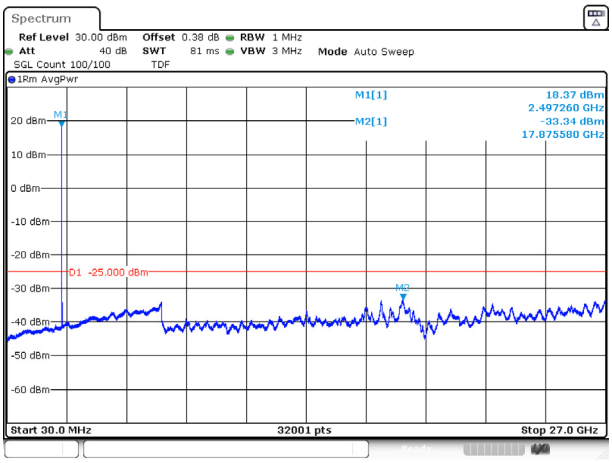
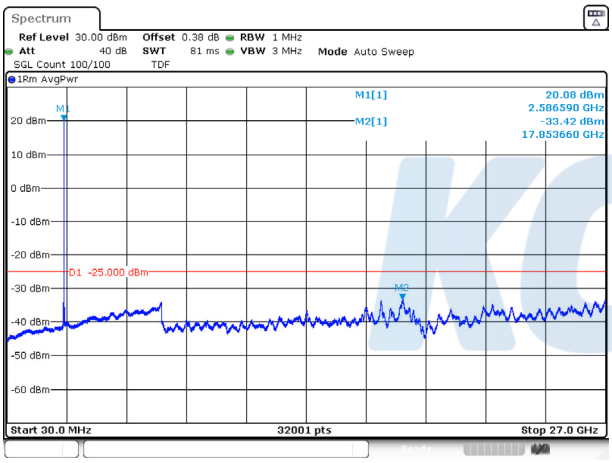
15M BW / QPSK / Low ch.



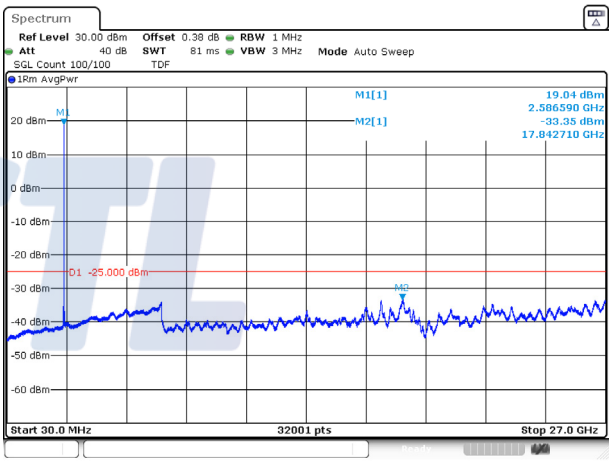
15M BW / 16QAM / Low ch.



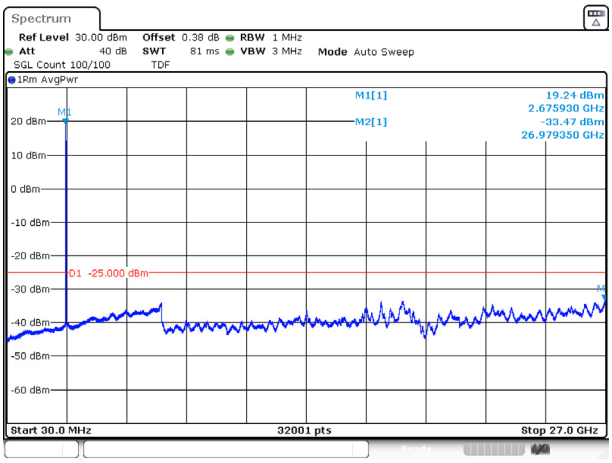
15M BW / QPSK / Mid ch.



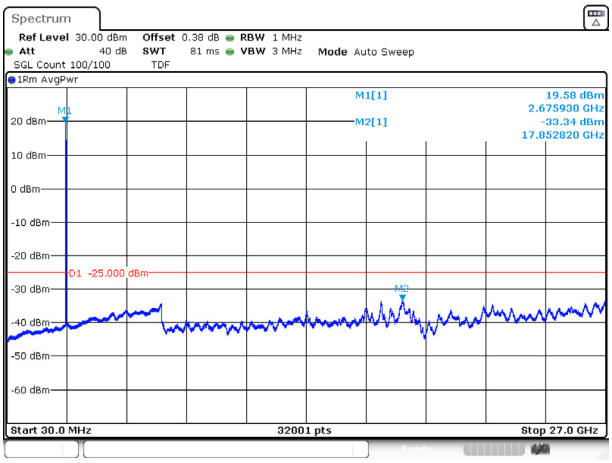
15M BW / 16QAM / Mid ch.



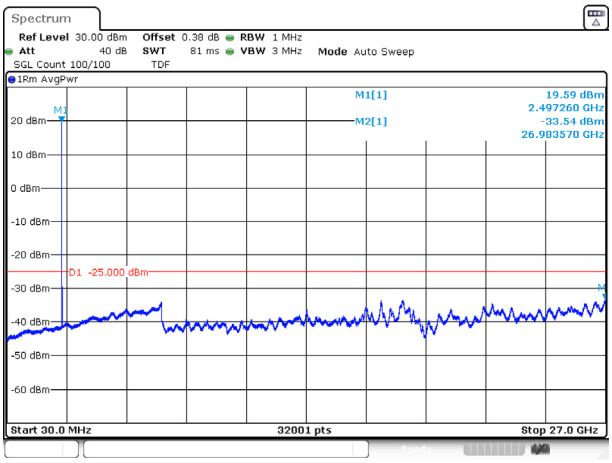
15M BW / QPSK / High ch.



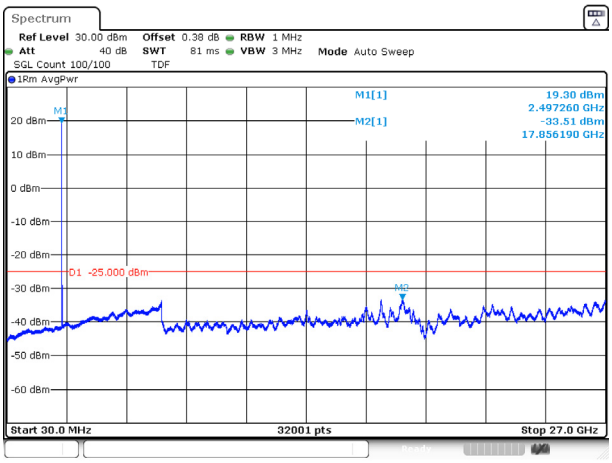
15M BW / 16QAM / High ch.



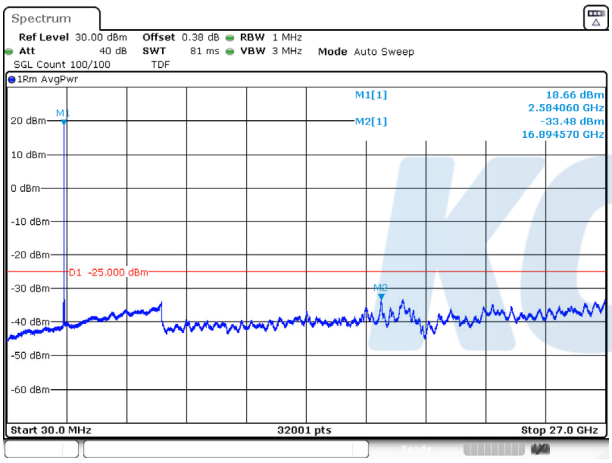
20M BW / QPSK / Low ch.



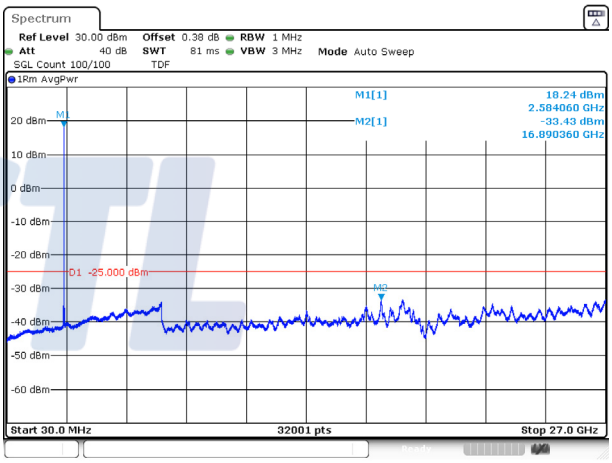
20M BW / 16QAM / Low ch.



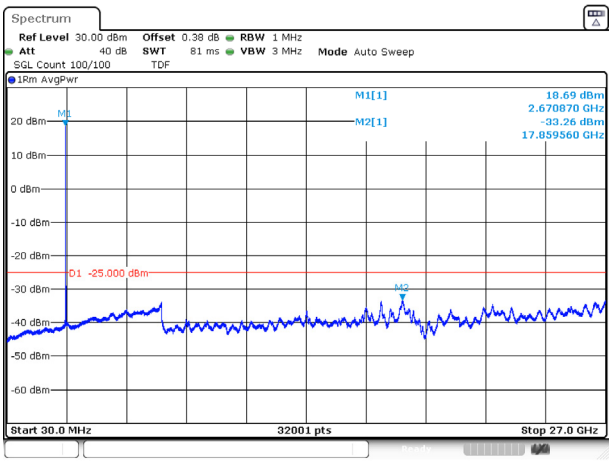
20M BW / QPSK / Mid ch.



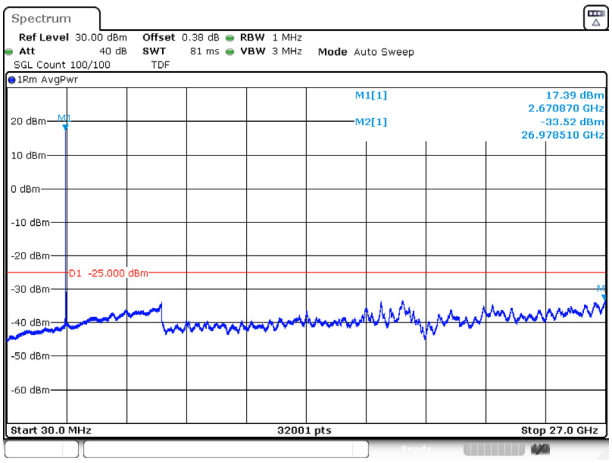
20M BW / 16QAM / Mid ch.



20M BW / QPSK / High ch.

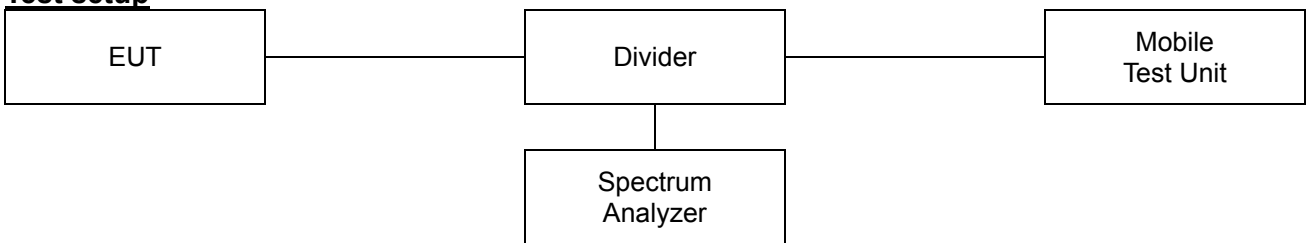


20M BW / 16QAM / High ch.



7.4. Band Edge Emissions at Antenna Terminal

Test setup



Limit

According to §27.53(m)(4), the attenuation factor shall be not less than 40 + 10log($P_{[Watts]}$) ㏈ on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10log($P_{[Watts]}$) ㏈ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10log($P_{[Watts]}$) ㏈ on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10log($P_{[Watts]}$) ㏈ on all frequencies between 2490.5 ㎒ and 2496 ㎒ and 55 + 10log($P_{[Watts]}$) ㏈ at or below 2490.5 ㎒.

Test procedure

971168 D01 v03r01 - Section 6
ANSI C63.26-2015 – Section 5.7

Test settings

1) Start frequency was set to 30 ㎒ and stop frequency was set to at least 10th the fundamental frequency.
2) Span was set large enough so as to capture all out of band emissions near the band edge.
3) Set the RBW > 1% of the emission bandwidth.
4) Set the VBW ≥ 3 x RBW.
5) Set the number of sweep points ≥ 2 x Span/RBW
6) Detector = RMS
7) Trace mode = trace average
8) Sweep time should be auto for peak detection. For RMS detection the sweep time should be set as follows:
   a) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) x (symbol period) (e.g., by a factor of 10 x symbol period x number of points) Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
   b) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) x (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time
   c) If the device cannot be configured to transmit continuously (duty cycle > 98%), and a free-running sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time

> (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

d) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold art necessary to ensure that the maximum power is measured.

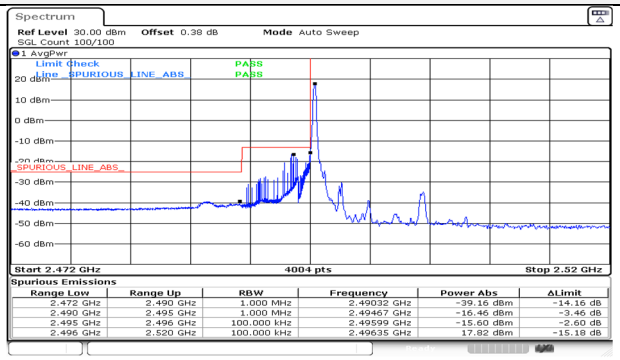
9) Allow trace to fully stabilize.

Notes:

1. Per 27.53(m)(6), in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 ㎒, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 ㎒).
2. The EUT was setup to maximum output power as its lowest and highest channel with all bandwidth, modulation and RB configurations.

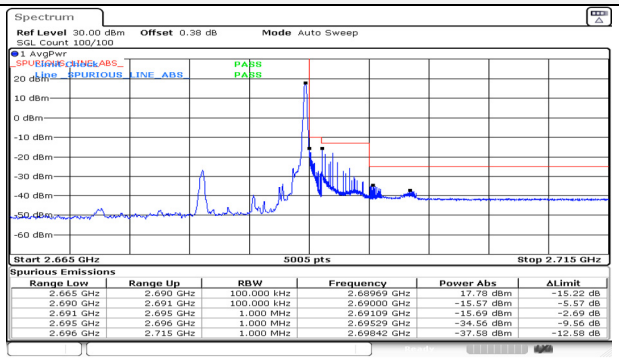
Test results
Test mode: LTE Band 41

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



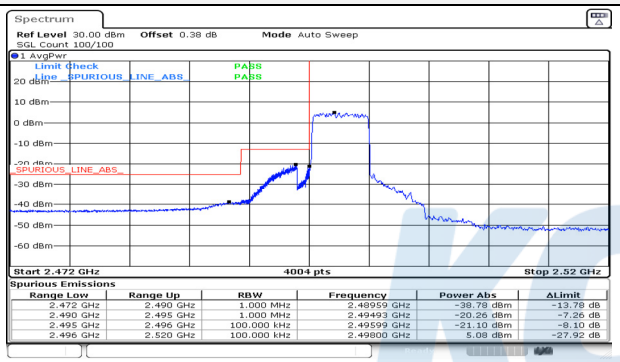
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49032 GHz	-39.16 dBm	-14.16 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49467 GHz	-16.46 dBm	-3.46 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49599 GHz	-15.60 dBm	-2.60 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49635 GHz	17.82 dBm	-15.18 dB

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



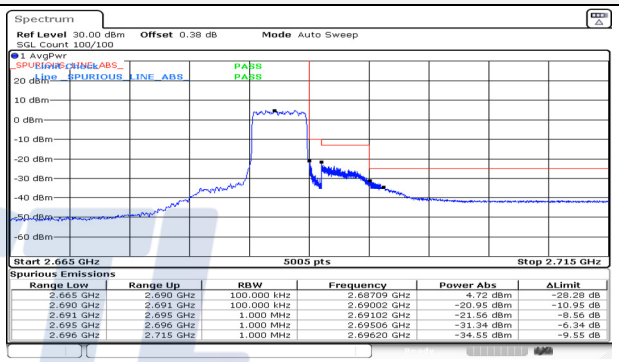
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	100.000 kHz	2.68969 GHz	17.78 dBm	-15.22 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69000 GHz	-15.57 dBm	-5.57 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69109 GHz	-15.69 dBm	-2.69 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69529 GHz	-34.56 dBm	-9.56 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69842 GHz	-37.58 dBm	-12.58 dB

5M BW / QPSK / Low ch. / FRB



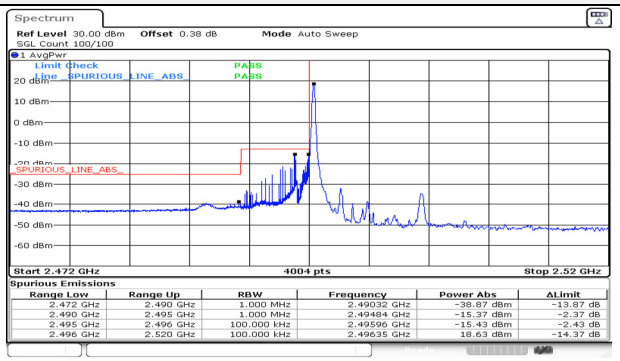
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.48959 GHz	-39.78 dBm	-13.78 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49493 GHz	-20.26 dBm	-7.26 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49599 GHz	-21.10 dBm	-8.10 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49800 GHz	5.08 dBm	-27.92 dB

5M BW / QPSK / High ch. / FRB



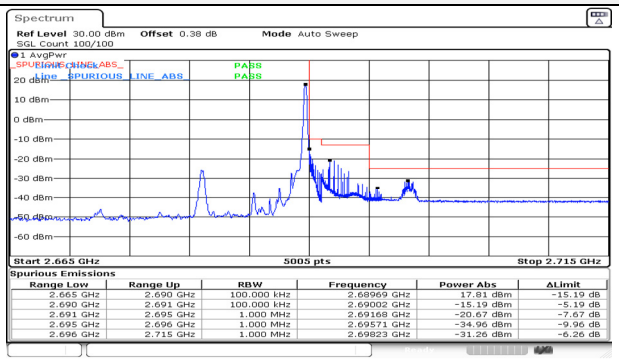
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	100.000 kHz	2.68709 GHz	4.72 dBm	-28.28 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69002 GHz	-20.95 dBm	-10.95 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69102 GHz	-21.56 dBm	-8.56 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69506 GHz	-31.34 dBm	-6.34 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69620 GHz	-34.55 dBm	-9.55 dB

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



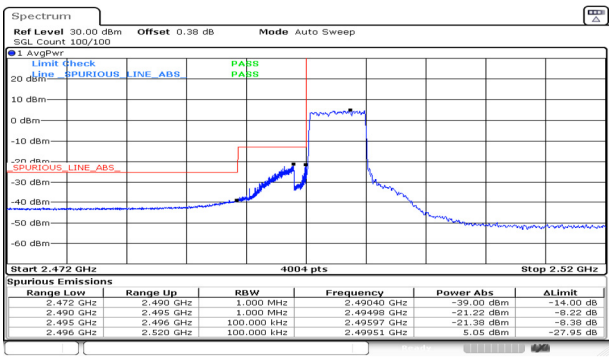
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49032 GHz	-38.87 dBm	-13.87 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49484 GHz	-15.37 dBm	-2.37 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49596 GHz	-15.43 dBm	-2.43 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49635 GHz	18.63 dBm	-14.37 dB

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



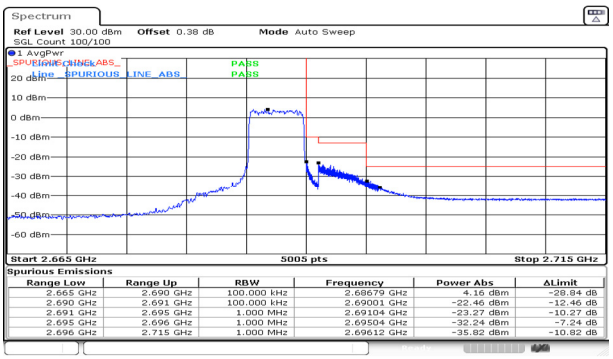
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	100.000 kHz	2.68969 GHz	17.81 dBm	-15.19 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69002 GHz	-15.19 dBm	-5.19 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69168 GHz	-20.67 dBm	-7.67 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69571 GHz	-34.96 dBm	-9.96 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69823 GHz	-31.26 dBm	-6.26 dB

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



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49040 GHz	-39.00 dBm	-14.00 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49498 GHz	-21.22 dBm	-8.22 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49597 GHz	-21.38 dBm	-8.38 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49951 GHz	5.05 dBm	-27.95 dB

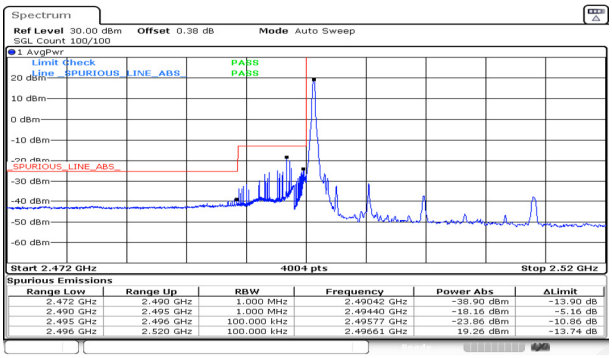
5M BW / 16QAM / High ch. / FRB



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	100.000 kHz	2.68679 GHz	4.16 dBm	-28.84 dB
2.690 GHz	2.691 GHz	100.000 kHz	2.69001 GHz	-22.46 dBm	-12.46 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69104 GHz	-23.27 dBm	-10.27 dB
2.695 GHz	2.696 GHz	1.000 MHz	2.69504 GHz	-32.24 dBm	-7.24 dB
2.696 GHz	2.715 GHz	1.000 MHz	2.69612 GHz	-35.82 dBm	-10.82 dB

This test report shall not be reproduced, except in full, without the written approval

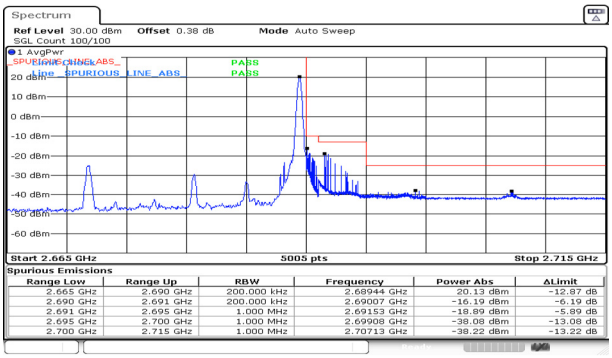
10M BW / QPSK / Low ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49042 GHz	-38.90 dBm	-13.90 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49440 GHz	-18.16 dBm	-5.16 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49577 GHz	-23.86 dBm	-10.86 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49661 GHz	19.26 dBm	-13.74 dB

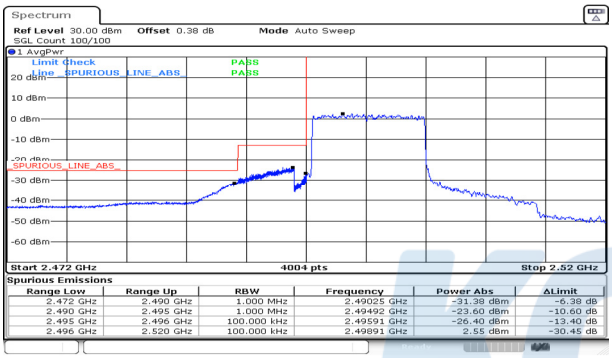
10M BW / QPSK / High ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	200.000 kHz	2.68944 GHz	20.13 dBm	-12.87 dB
2.690 GHz	2.691 GHz	200.000 kHz	2.69007 GHz	-16.19 dBm	-6.19 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69153 GHz	-18.89 dBm	-5.89 dB
2.695 GHz	2.700 GHz	1.000 MHz	2.69908 GHz	-38.08 dBm	-13.08 dB
2.700 GHz	2.715 GHz	1.000 MHz	2.70713 GHz	-38.22 dBm	-13.22 dB

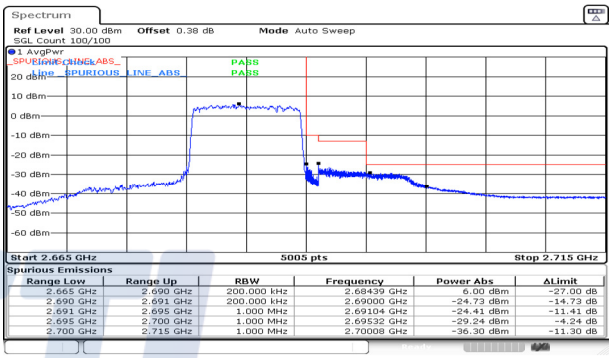
10M BW / QPSK / Low ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49025 GHz	-31.38 dBm	-6.38 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49492 GHz	-23.60 dBm	-10.60 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49591 GHz	-26.40 dBm	-13.40 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49891 GHz	2.55 dBm	-30.45 dB

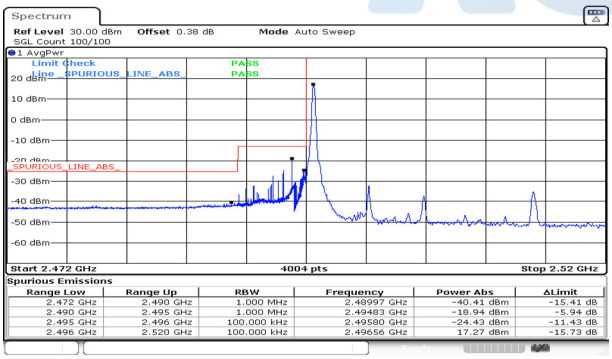
10M BW / QPSK / High ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	200.000 kHz	2.68439 GHz	6.00 dBm	-27.00 dB
2.690 GHz	2.691 GHz	200.000 kHz	2.69000 GHz	-24.73 dBm	-14.73 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69104 GHz	-24.41 dBm	-11.41 dB
2.695 GHz	2.700 GHz	1.000 MHz	2.69532 GHz	-29.24 dBm	-4.24 dB
2.700 GHz	2.715 GHz	1.000 MHz	2.70008 GHz	-36.30 dBm	-11.30 dB

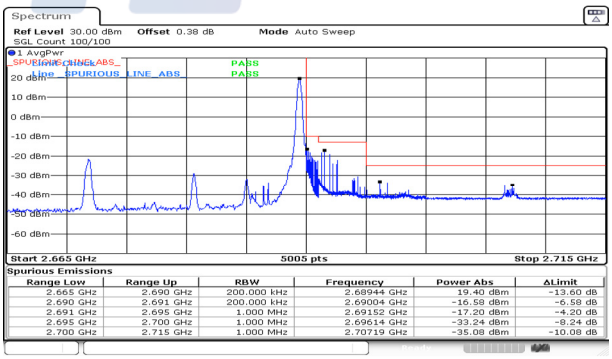
10M BW / 16QAM / Low ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.48997 GHz	-40.41 dBm	-15.41 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49483 GHz	-18.94 dBm	-5.94 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49580 GHz	-24.43 dBm	-11.43 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49656 GHz	17.27 dBm	-15.73 dB

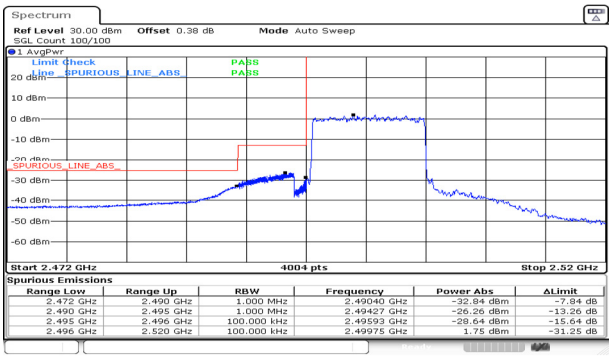
10M BW / 16QAM / High ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	200.000 kHz	2.68944 GHz	19.40 dBm	-13.60 dB
2.690 GHz	2.691 GHz	200.000 kHz	2.69004 GHz	-16.58 dBm	-6.58 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69152 GHz	-17.20 dBm	-4.20 dB
2.695 GHz	2.700 GHz	1.000 MHz	2.69614 GHz	-33.24 dBm	-8.24 dB
2.700 GHz	2.715 GHz	1.000 MHz	2.70719 GHz	-35.08 dBm	-10.08 dB

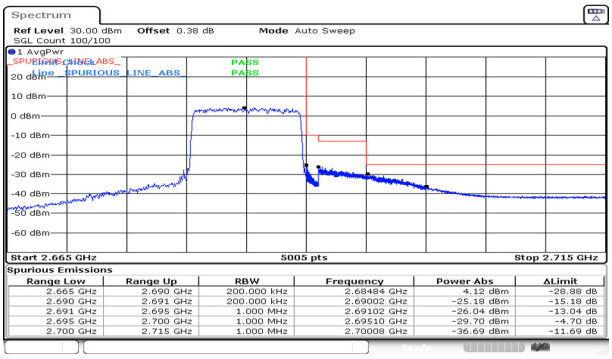
10M BW / 16QAM / Low ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49040 GHz	-32.84 dBm	-7.84 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49427 GHz	-26.26 dBm	-13.26 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49593 GHz	-28.64 dBm	-15.64 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49975 GHz	1.75 dBm	-31.25 dB

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

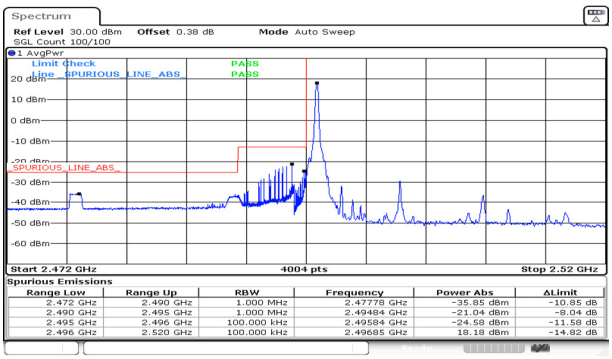


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	200.000 kHz	2.68484 GHz	4.12 dBm	-28.88 dB
2.690 GHz	2.691 GHz	200.000 kHz	2.69002 GHz	-25.18 dBm	-15.18 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69102 GHz	-26.04 dBm	-13.04 dB
2.695 GHz	2.700 GHz	1.000 MHz	2.69510 GHz	-29.70 dBm	-4.70 dB
2.700 GHz	2.715 GHz	1.000 MHz	2.70008 GHz	-36.69 dBm	-11.69 dB

This test report shall not be reproduced, except in full, without the written approval

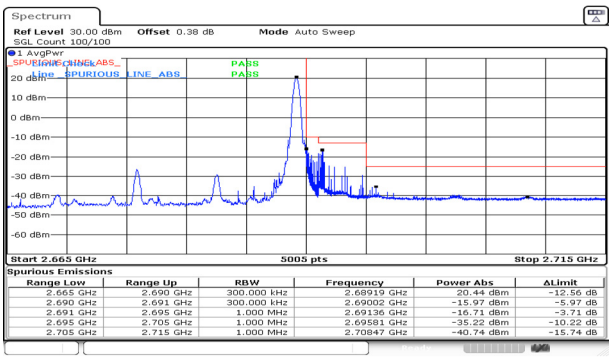
15M BW / QPSK / Low ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.47778 GHz	-35.85 dBm	-10.85 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49484 GHz	-21.04 dBm	-8.04 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49584 GHz	-24.58 dBm	-11.58 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49685 GHz	18.18 dBm	-14.82 dB

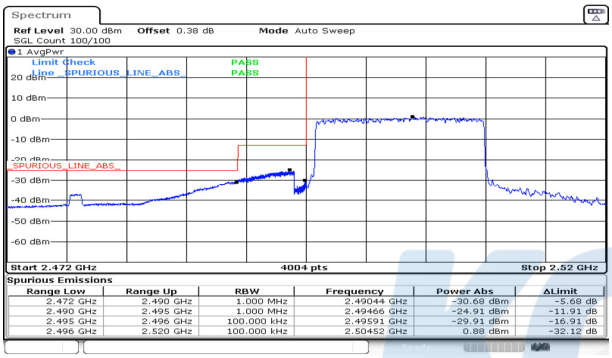
15M BW / QPSK / High ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	300.000 kHz	2.68919 GHz	20.44 dBm	-12.56 dB
2.690 GHz	2.691 GHz	300.000 kHz	2.69002 GHz	-15.97 dBm	-5.97 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69136 GHz	-16.71 dBm	-3.71 dB
2.695 GHz	2.705 GHz	1.000 MHz	2.69581 GHz	-35.22 dBm	-10.22 dB
2.705 GHz	2.715 GHz	1.000 MHz	2.70847 GHz	-40.74 dBm	-15.74 dB

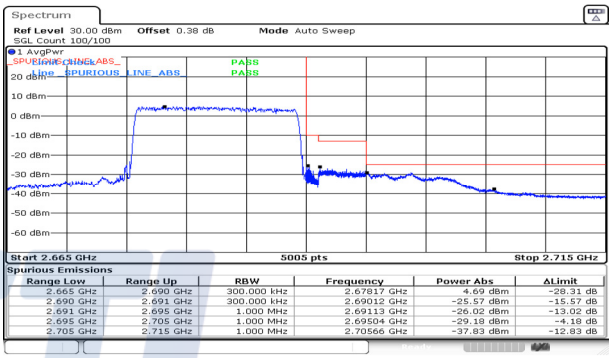
15M BW / QPSK / Low ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49044 GHz	-30.68 dBm	-5.68 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49466 GHz	-24.91 dBm	-11.91 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49591 GHz	-29.91 dBm	-16.91 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.50452 GHz	0.88 dBm	-32.12 dB

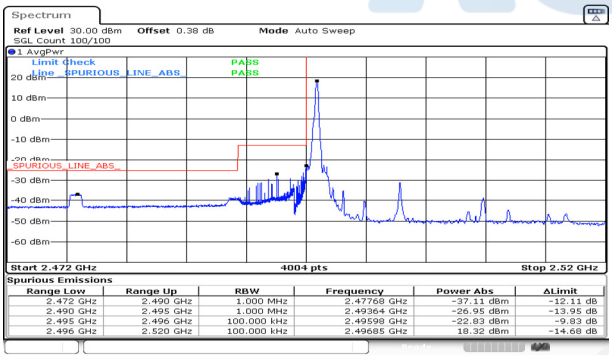
15M BW / QPSK / High ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	300.000 kHz	2.67817 GHz	4.69 dBm	-28.31 dB
2.690 GHz	2.691 GHz	300.000 kHz	2.69012 GHz	-25.57 dBm	-15.57 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69113 GHz	-26.02 dBm	-13.02 dB
2.695 GHz	2.705 GHz	1.000 MHz	2.69504 GHz	-29.18 dBm	-4.18 dB
2.705 GHz	2.715 GHz	1.000 MHz	2.70566 GHz	-37.83 dBm	-12.83 dB

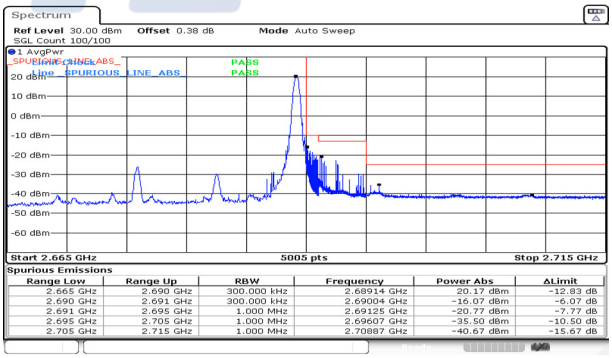
15M BW / 16QAM / Low ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.47768 GHz	-37.11 dBm	-12.11 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49364 GHz	-26.95 dBm	-13.95 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49598 GHz	-22.83 dBm	-9.83 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.49685 GHz	18.32 dBm	-14.68 dB

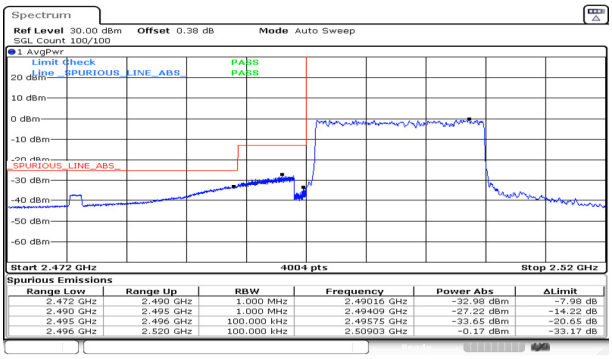
15M BW / 16QAM / High ch. / 1RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	300.000 kHz	2.68914 GHz	20.17 dBm	-12.83 dB
2.690 GHz	2.691 GHz	300.000 kHz	2.69004 GHz	-16.07 dBm	-6.07 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69125 GHz	-20.77 dBm	-7.77 dB
2.695 GHz	2.705 GHz	1.000 MHz	2.69507 GHz	-35.50 dBm	-10.50 dB
2.705 GHz	2.715 GHz	1.000 MHz	2.70887 GHz	-40.67 dBm	-15.67 dB

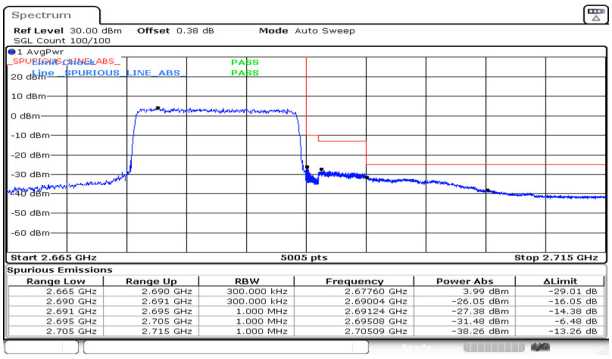
15M BW / 16QAM / Low ch. / FRB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.472 GHz	2.490 GHz	1.000 MHz	2.49016 GHz	-32.98 dBm	-7.98 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49409 GHz	-27.22 dBm	-14.22 dB
2.495 GHz	2.496 GHz	100.000 kHz	2.49575 GHz	-33.65 dBm	-20.65 dB
2.496 GHz	2.520 GHz	100.000 kHz	2.50903 GHz	-0.17 dBm	-33.17 dB

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



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.665 GHz	2.690 GHz	300.000 kHz	2.67760 GHz	3.99 dBm	-29.01 dB
2.690 GHz	2.691 GHz	300.000 kHz	2.69004 GHz	-26.05 dBm	-16.05 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69124 GHz	-27.38 dBm	-14.38 dB
2.695 GHz	2.705 GHz	1.000 MHz	2.69508 GHz	-31.48 dBm	-6.48 dB
2.705 GHz	2.715 GHz	1.000 MHz	2.70509 GHz	-38.26 dBm	-13.26 dB

This test report shall not be reproduced, except in full, without the written approval