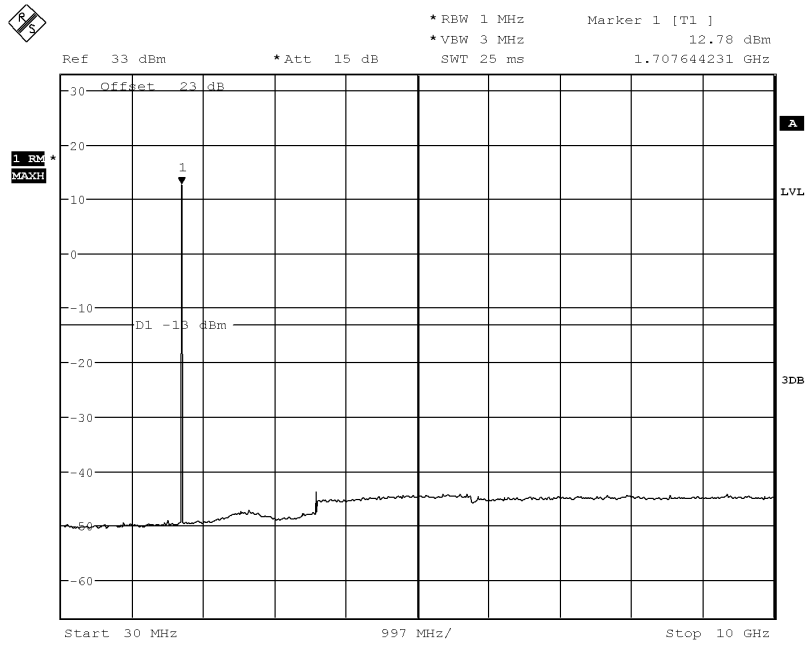


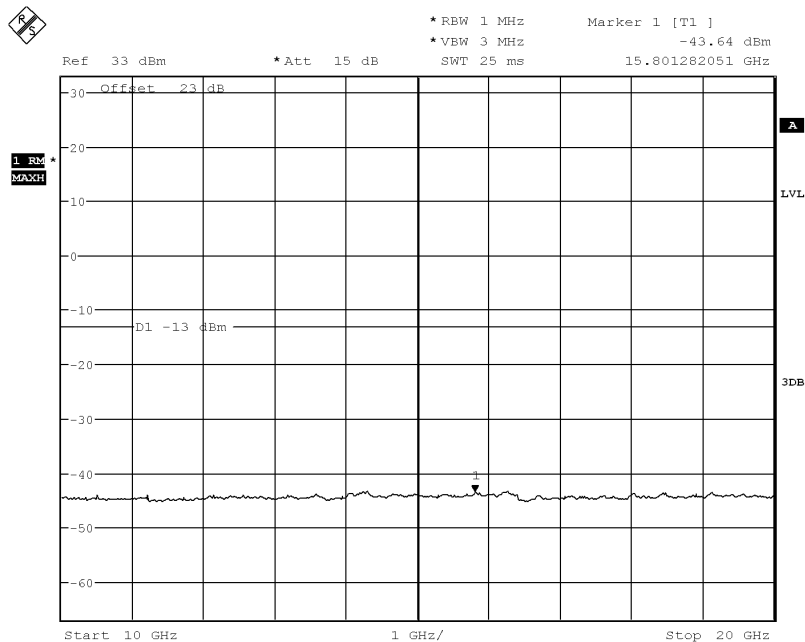
5.3.2 NB-IoT Band 4



Date: 28.DEC.2018 22:28:41

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), QPSK, 1@0

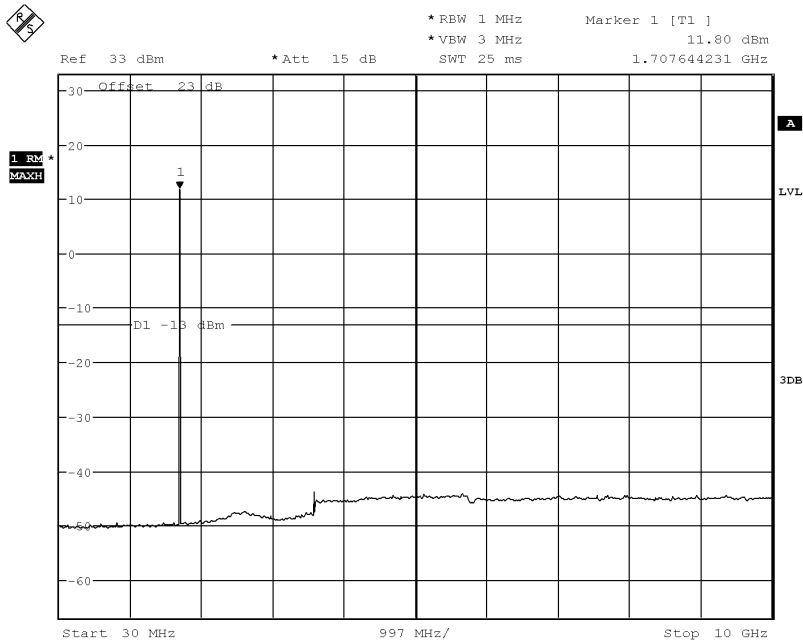
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:28:15

10GHz to 20GHz, Low Channel, Subcarrier (3.75kHz), QPSK, 1@0

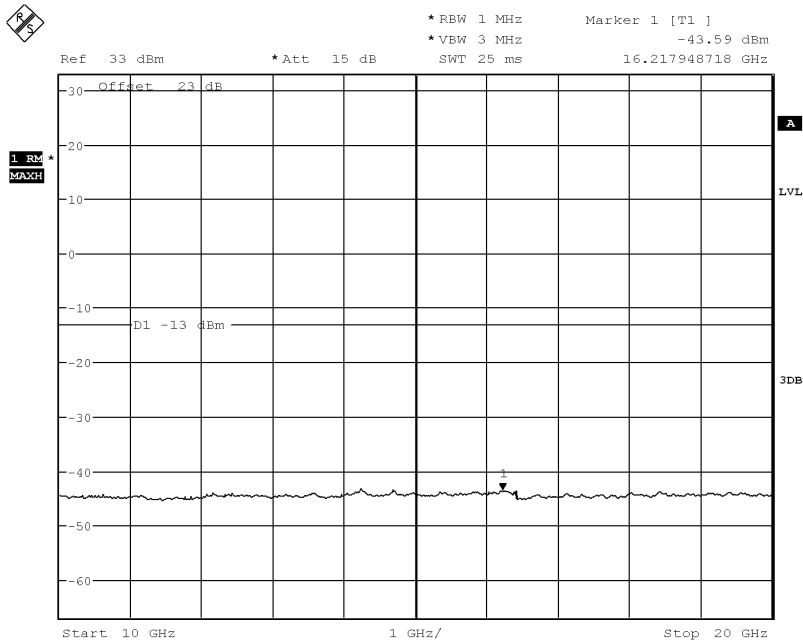
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:28:54

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

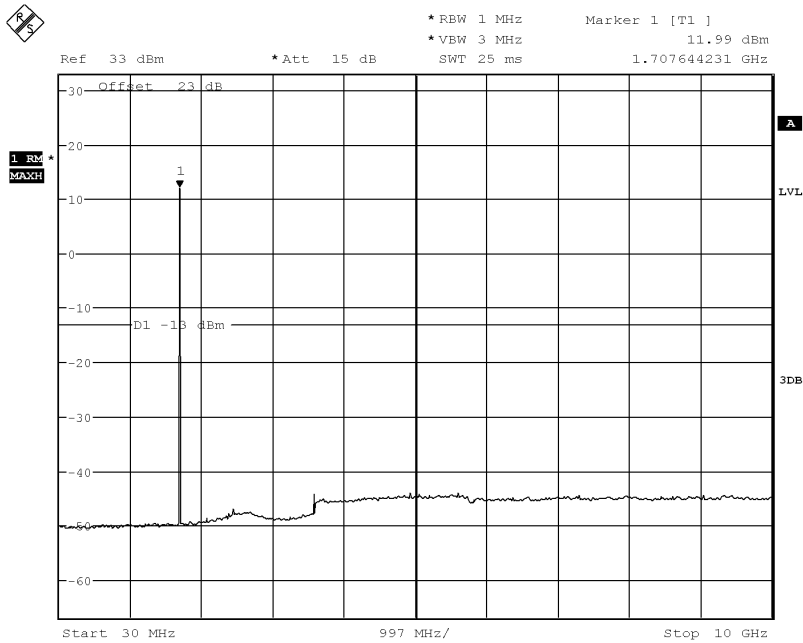
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:27:45

10GHz to 20GHz, Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

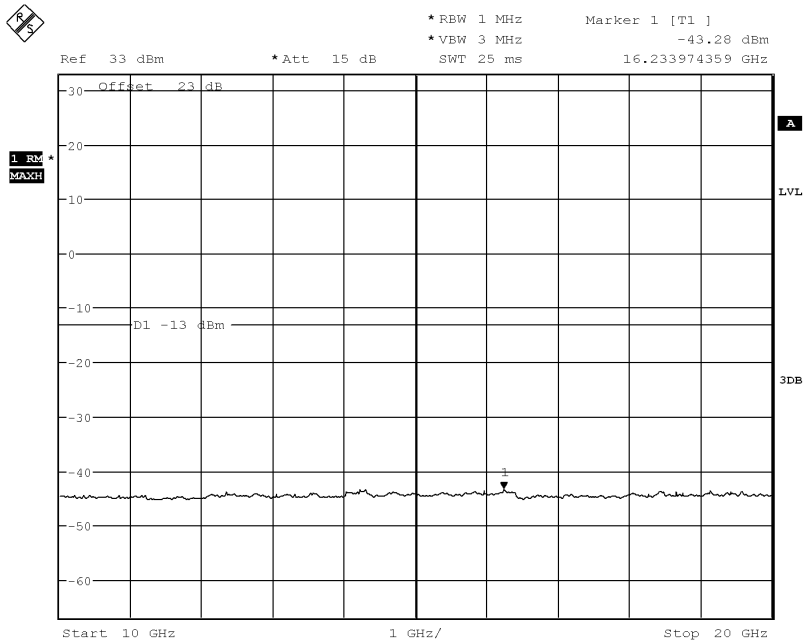
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:24:08

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 1@0

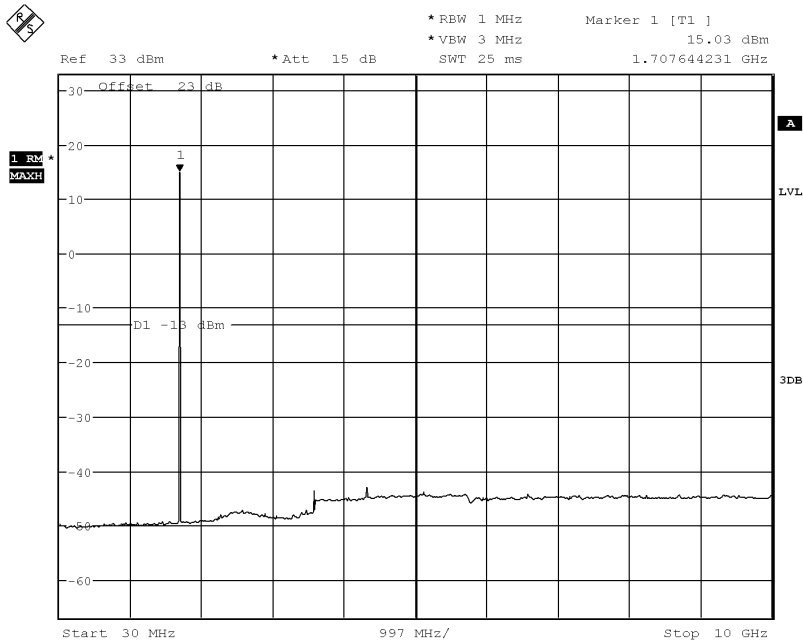
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:26:38

10GHz to 20GHz, Low Channel, Subcarrier (15kHz), QPSK, 1@0

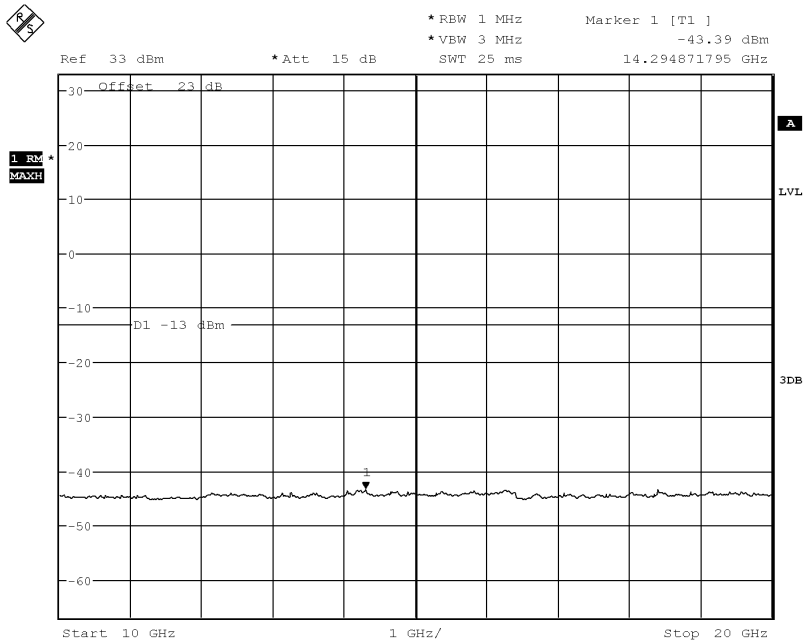
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:25:04

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 12@0

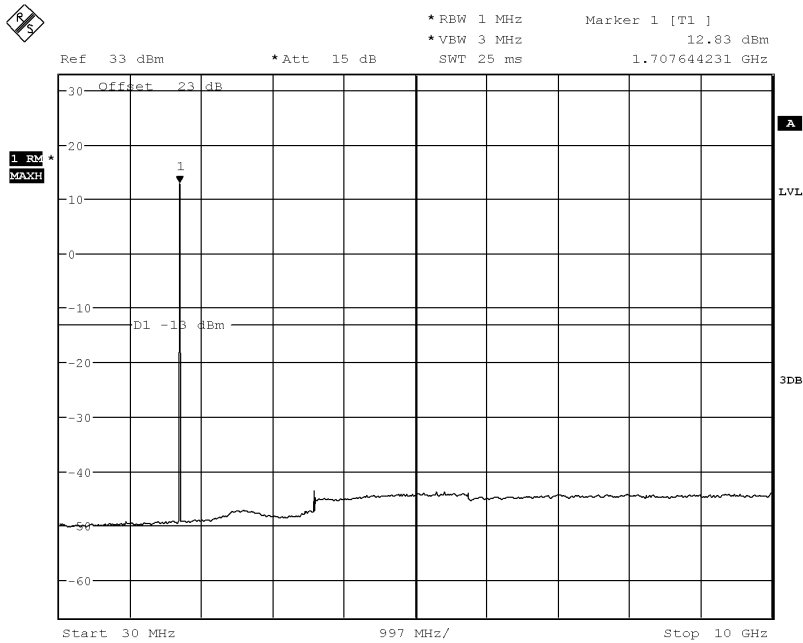
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:26:14

10GHz to 20GHz, Low Channel, Subcarrier (15kHz), QPSK, 12@0

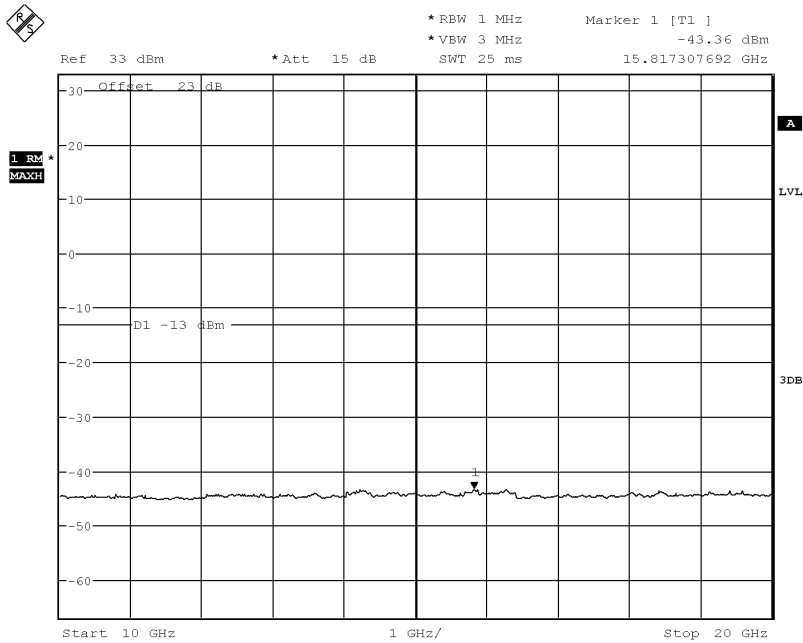
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:23:55

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 1@0

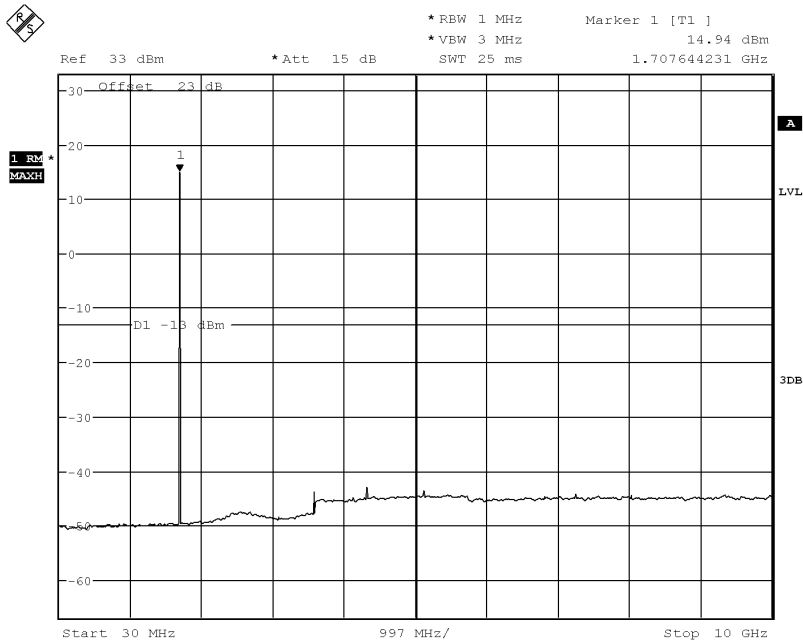
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:26:53

10GHz to 20GHz, Low Channel, Subcarrier (15kHz), BPSK, 1@0

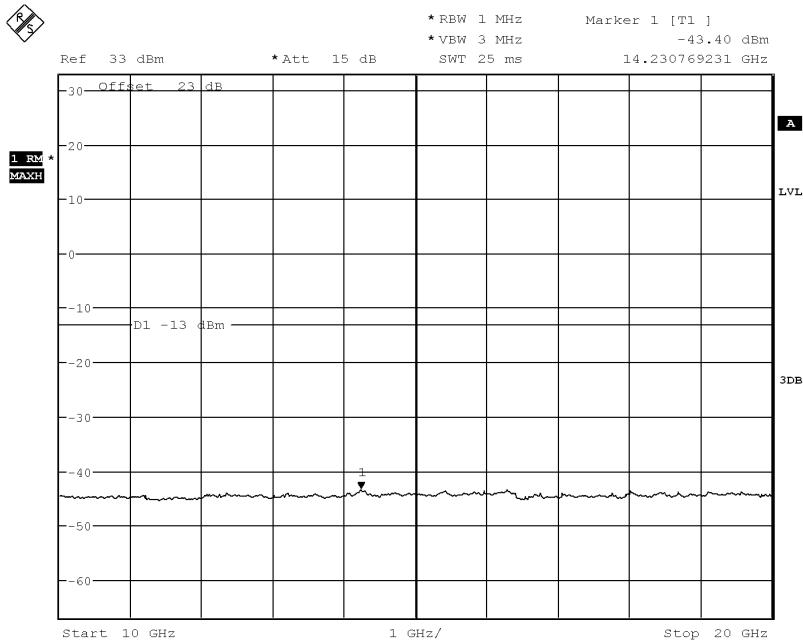
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:25:21

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 12@0

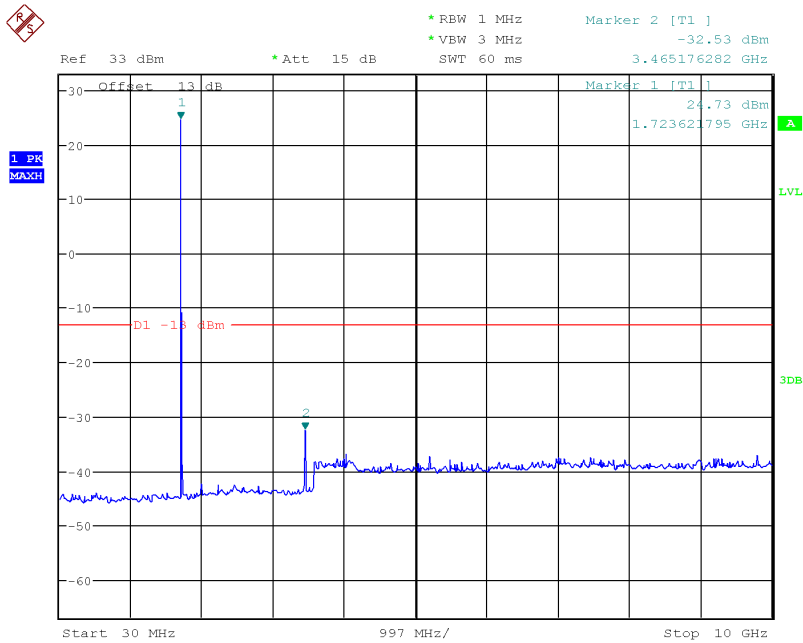
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:25:58

10GHz to 20GHz, Low Channel, Subcarrier (15kHz), BPSK, 12@0

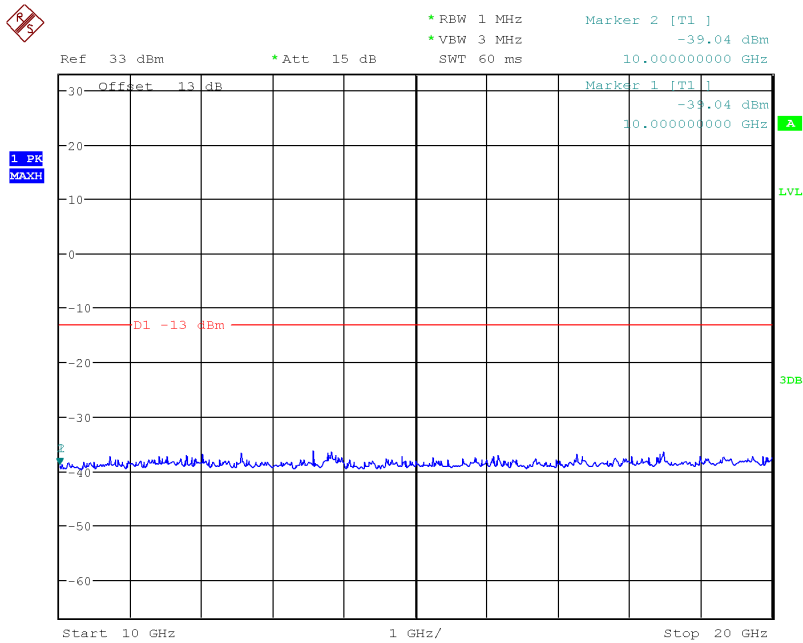
Report No.:B18W50650-WWAN_Rev2



Date: 24.DEC.2018 21:27:12

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), QPSK, 1@0

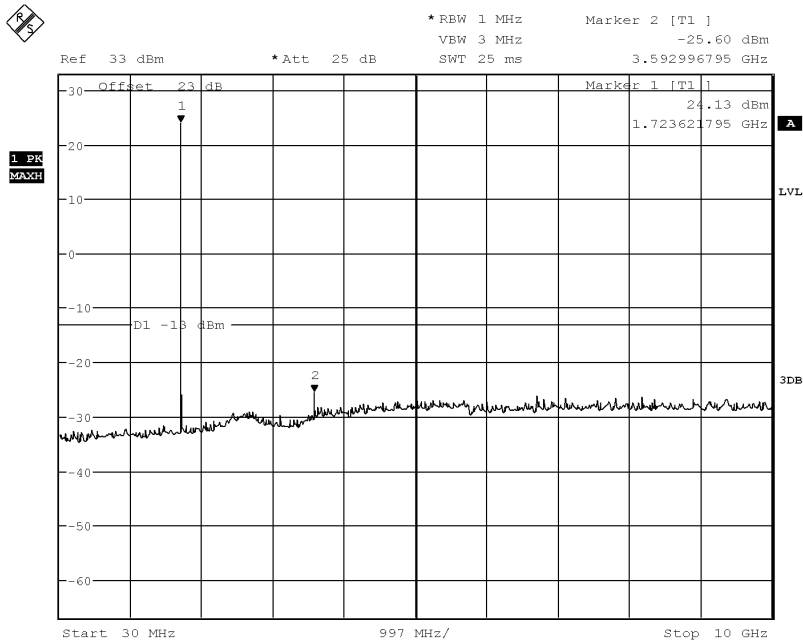
Note: The strong emission shown in each case is the carrier signal.



Date: 24.DEC.2018 21:27:57

10GHz to 20GHz, Mid Channel, Subcarrier (3.75kHz), QPSK, 1@0

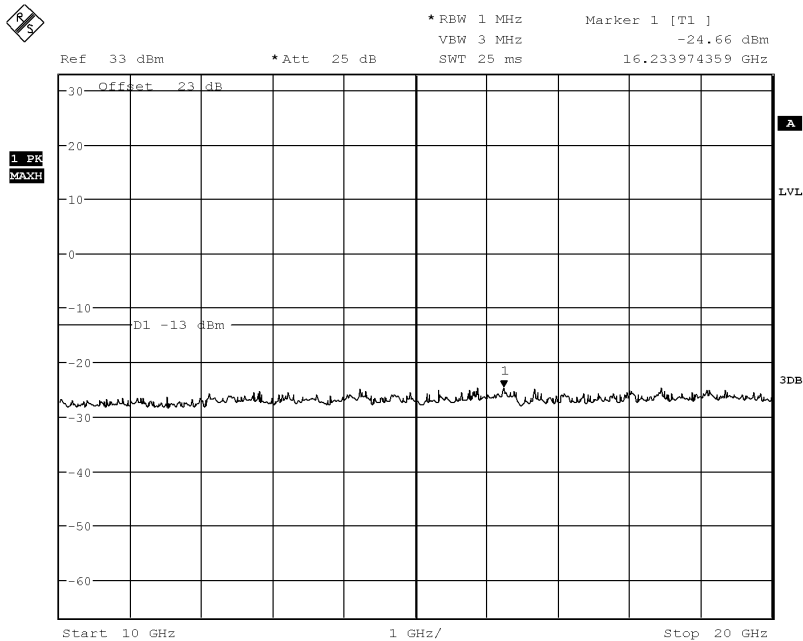
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:35:57

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), BPSK, 1@0

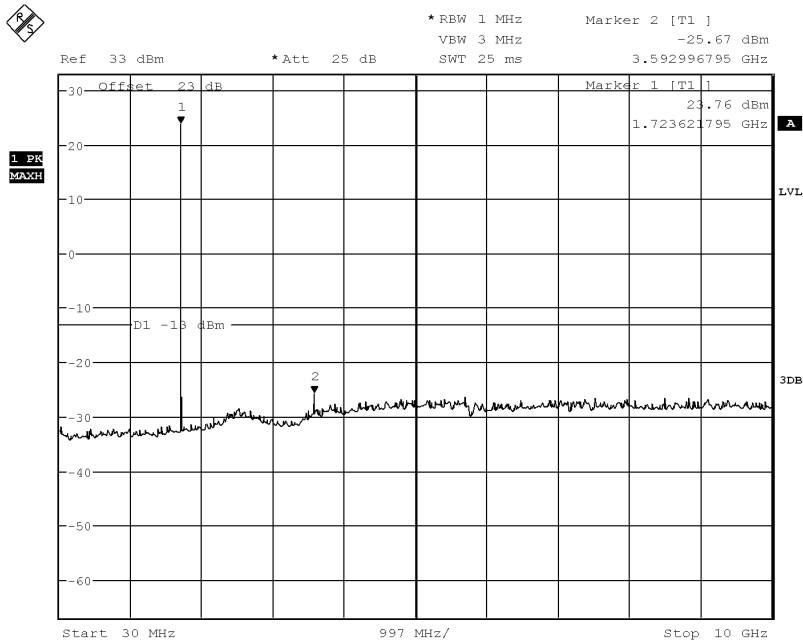
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 18:35:32

10GHz to 20GHz, Mid Channel, Subcarrier (3.75kHz), BPSK, 1@0

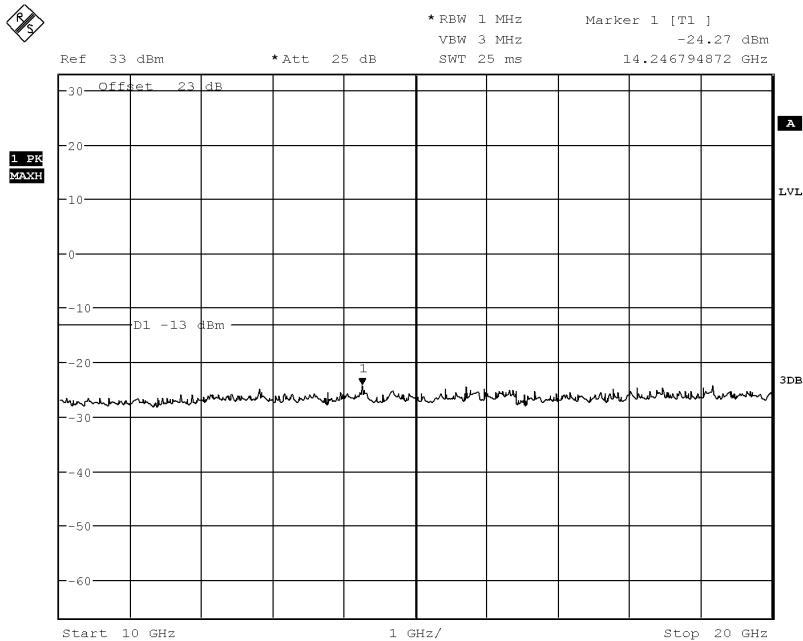
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:39:47

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 1@0

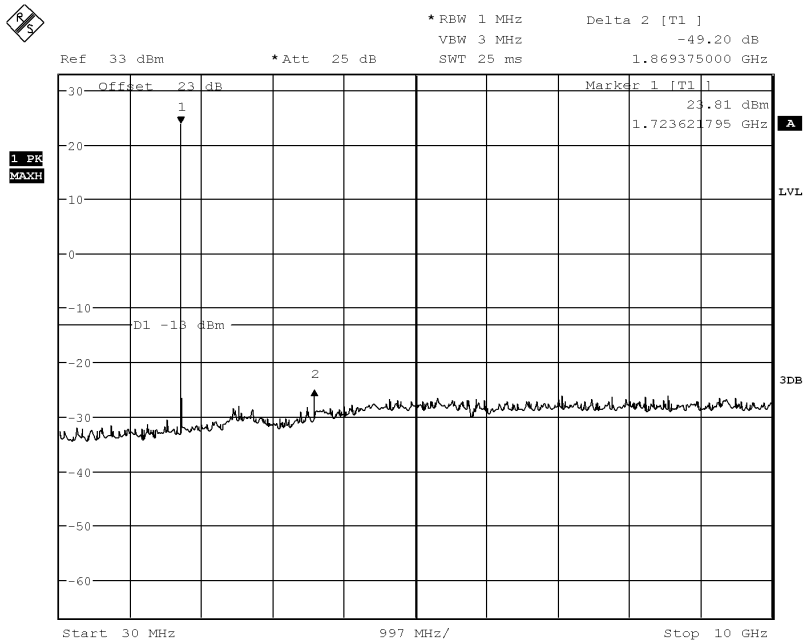
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 18:40:45

10GHz to 20GHz, Mid Channel, Subcarrier (15kHz), QPSK, 1@0

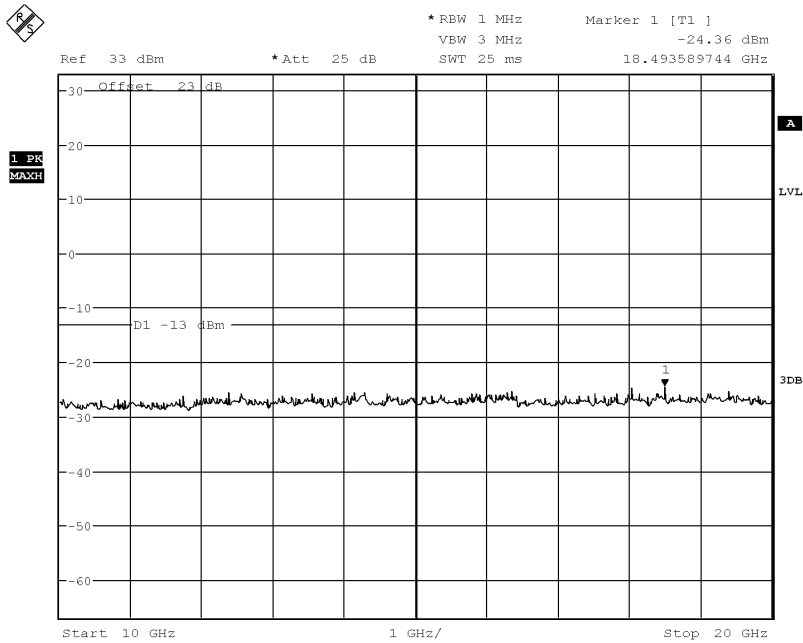
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:42:53

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 12@0

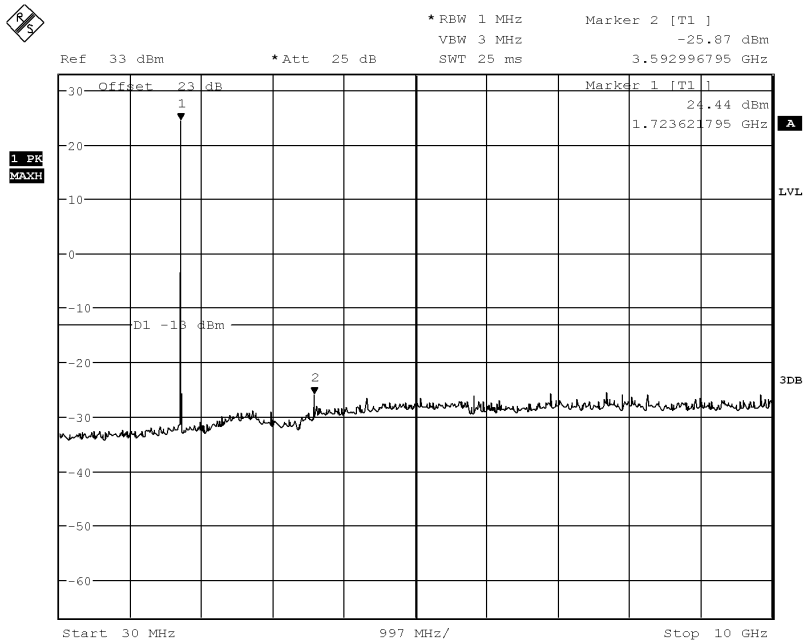
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 18:42:31

10GHz to 20GHz, Mid Channel, Subcarrier (15kHz), QPSK, 12@0

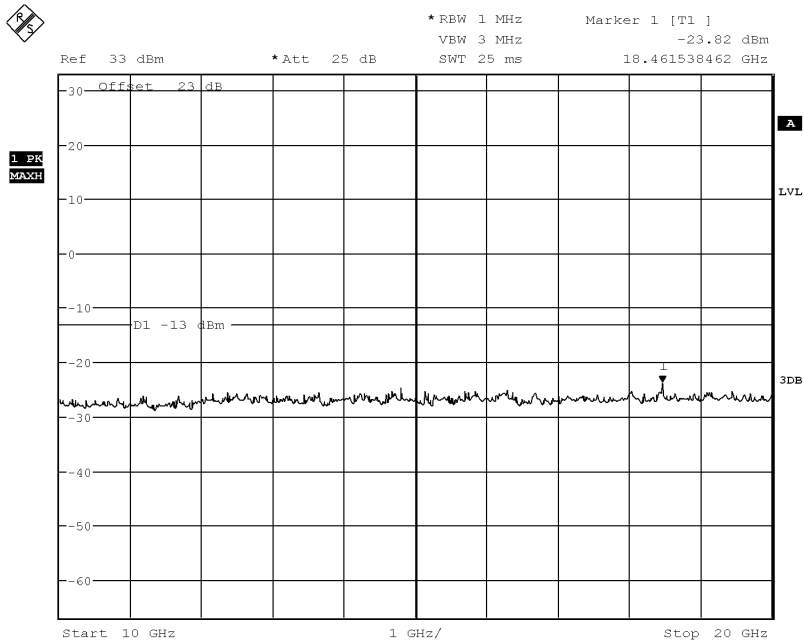
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:38:51

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 1@0

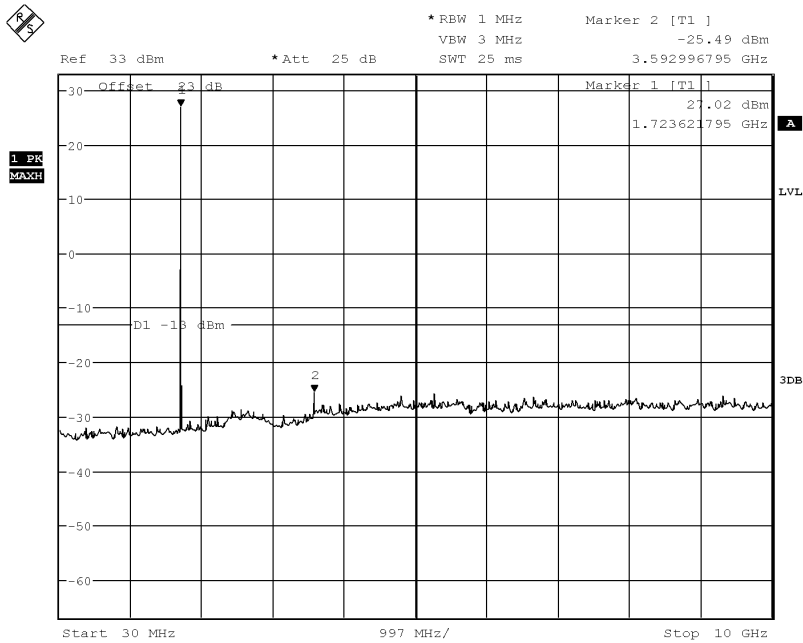
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 18:38:26

10GHz to 20GHz, Mid Channel, Subcarrier (15kHz), BPSK, 1@0

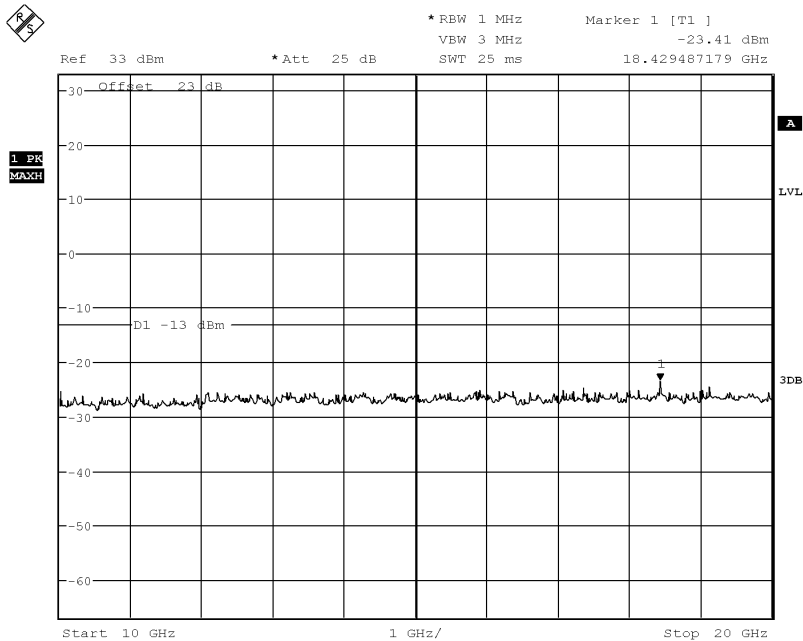
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:37:10

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 12@0

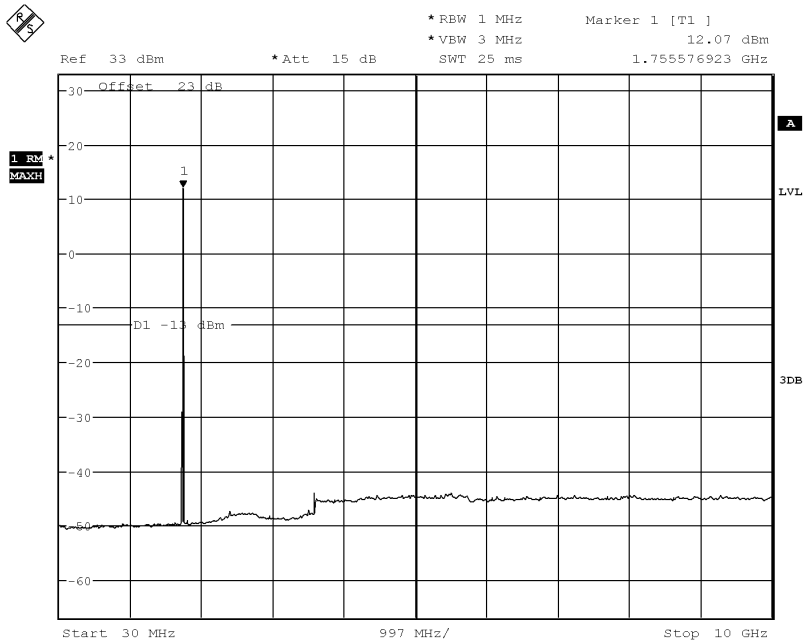
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 18:37:43

10GHz to 20GHz, Mid Channel, Subcarrier (15kHz), BPSK, 12@0

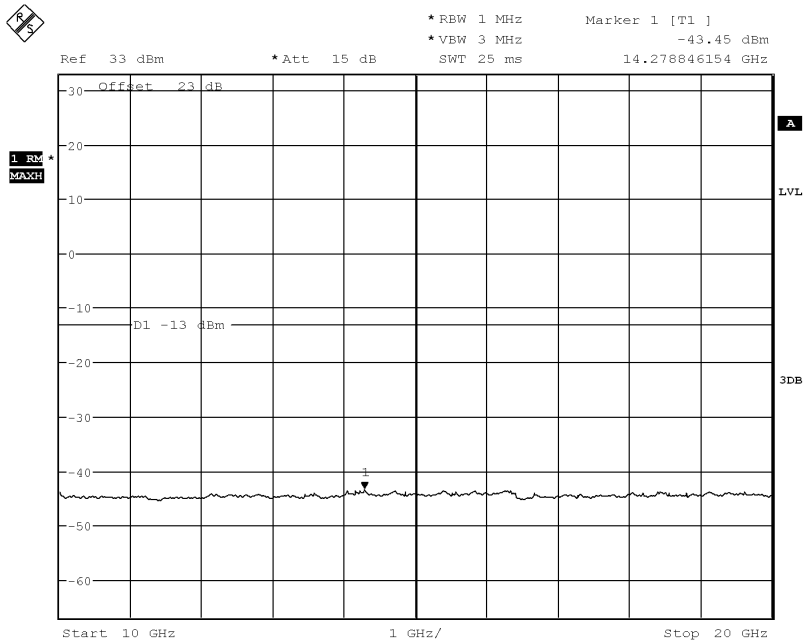
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:30:13

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), QPSK, 1@0

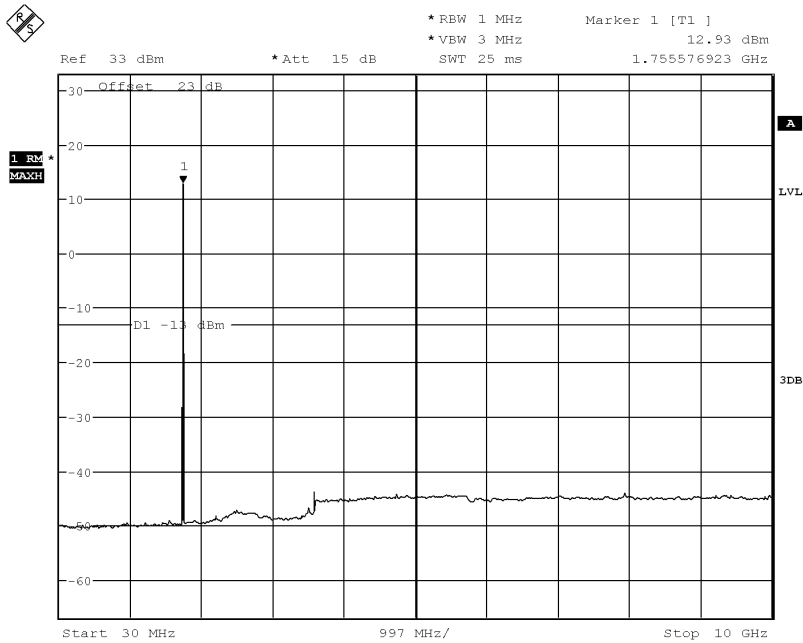
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:30:37

10GHz to 20GHz, High Channel, Subcarrier (3.75kHz), QPSK, 1@0

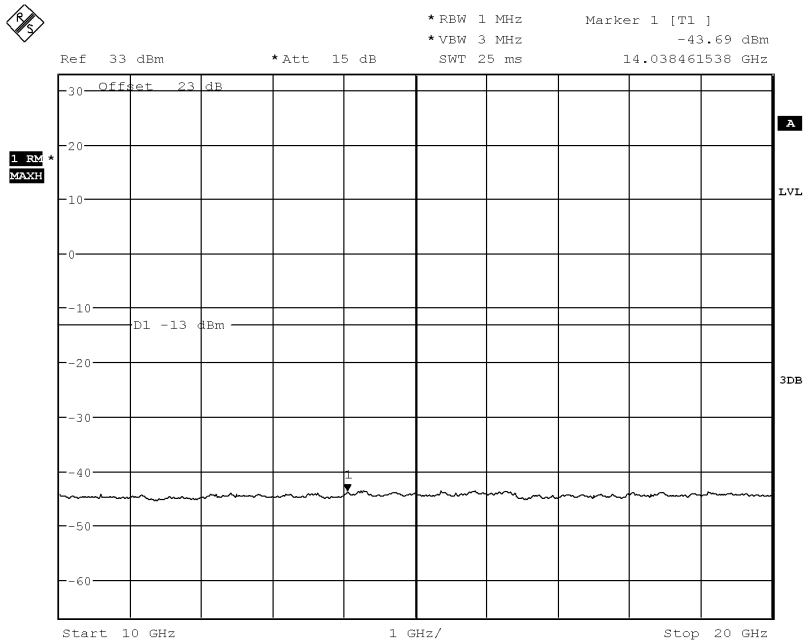
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:30:00

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), BPSK, 1@0

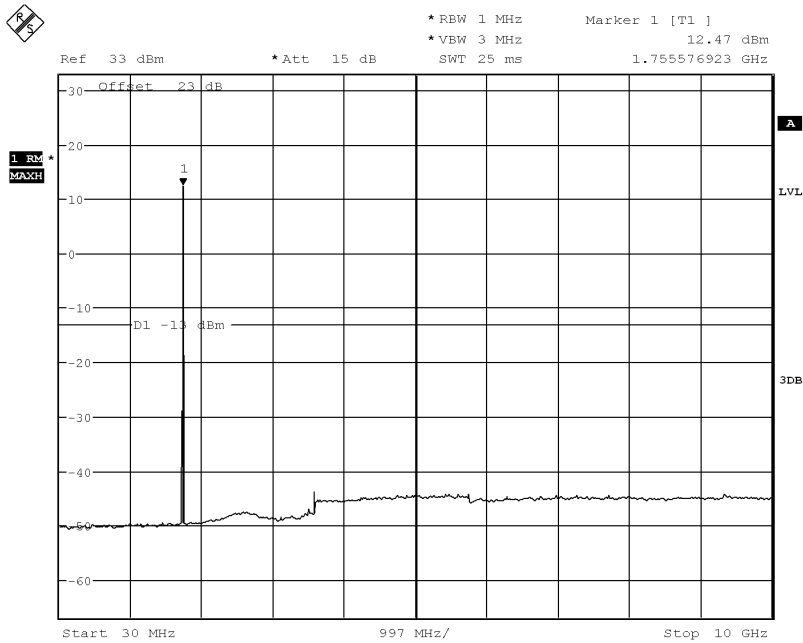
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:30:51

10GHz to 20GHz, High Channel, Subcarrier (3.75kHz), BPSK, 1@0

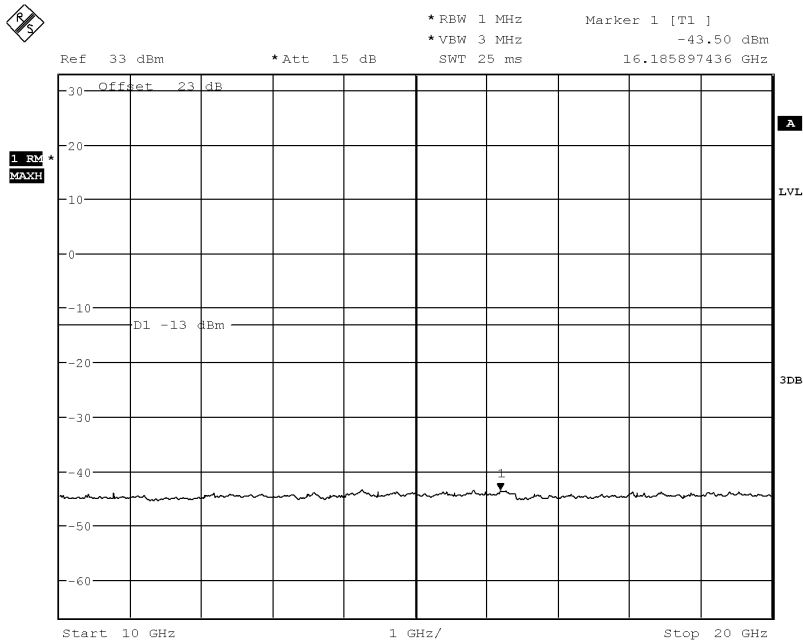
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:33:29

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 1@0

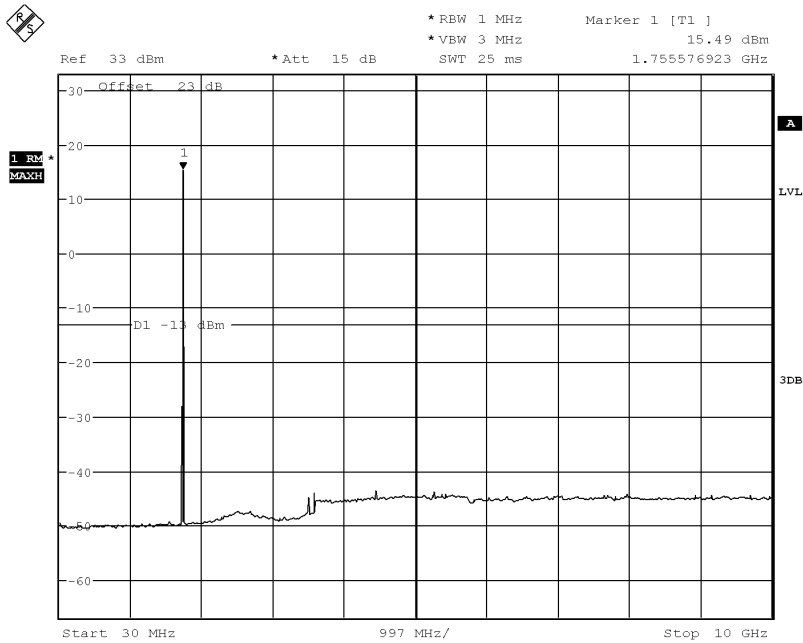
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:31:53

10GHz to 20GHz, High Channel, Subcarrier (15kHz), QPSK, 1@0

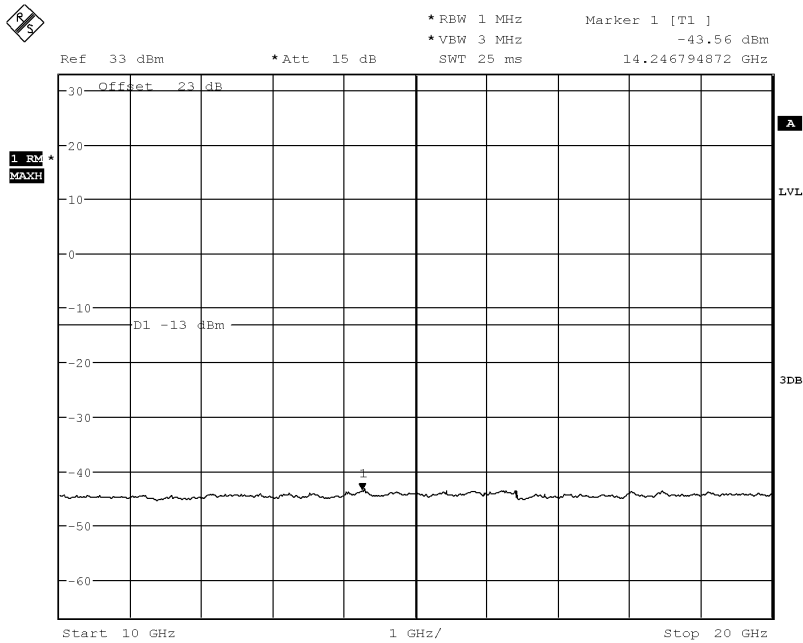
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:33:09

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 12@0

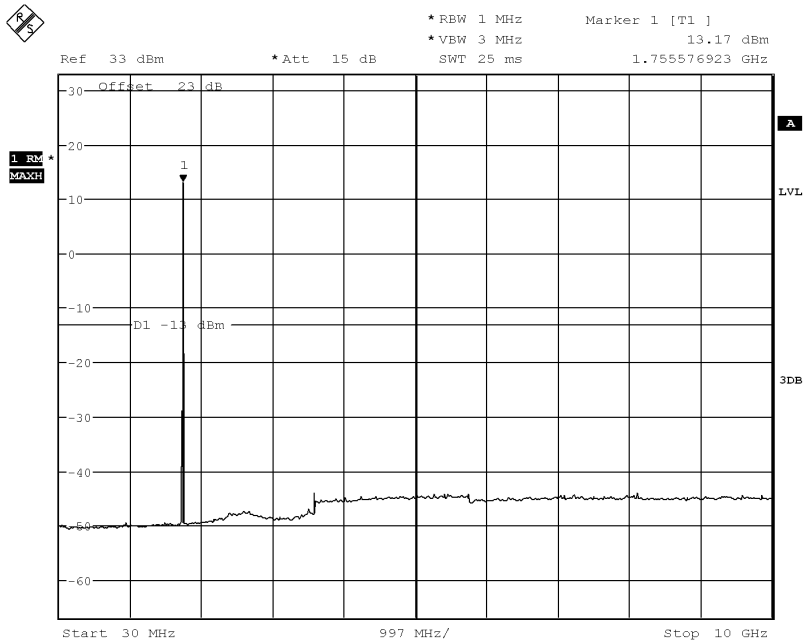
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:32:18

10GHz to 20GHz, High Channel, Subcarrier (15kHz), QPSK, 12@0

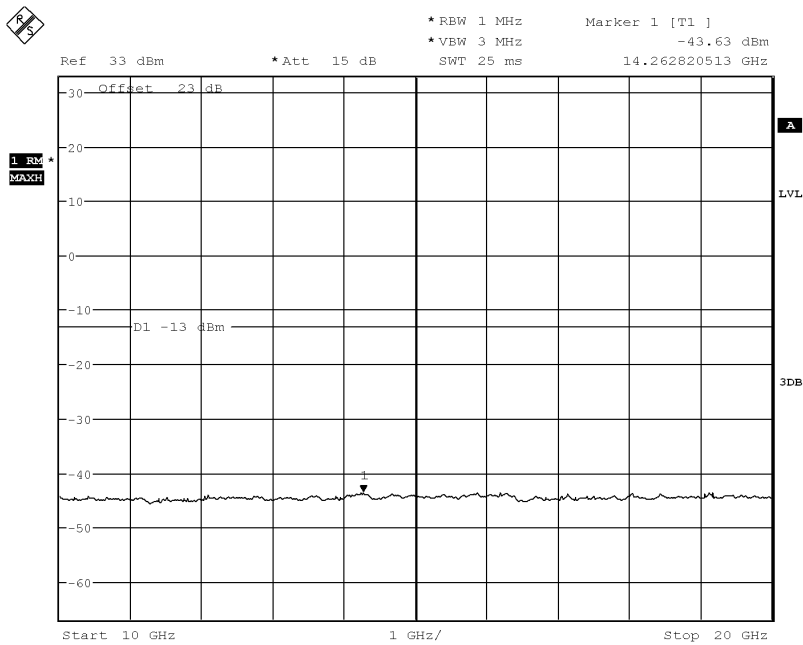
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:33:42

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 1@0

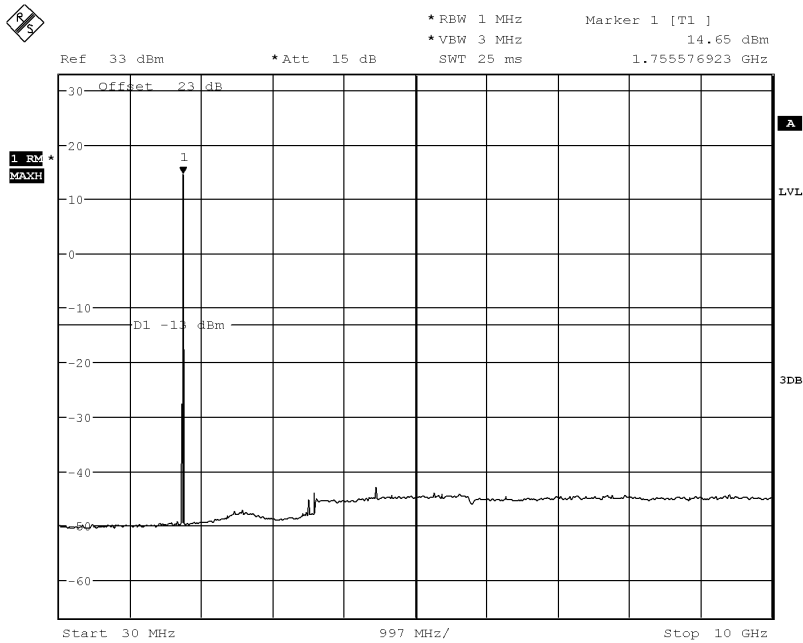
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:31:43

10GHz to 20GHz, High Channel, Subcarrier (15kHz), BPSK, 1@0

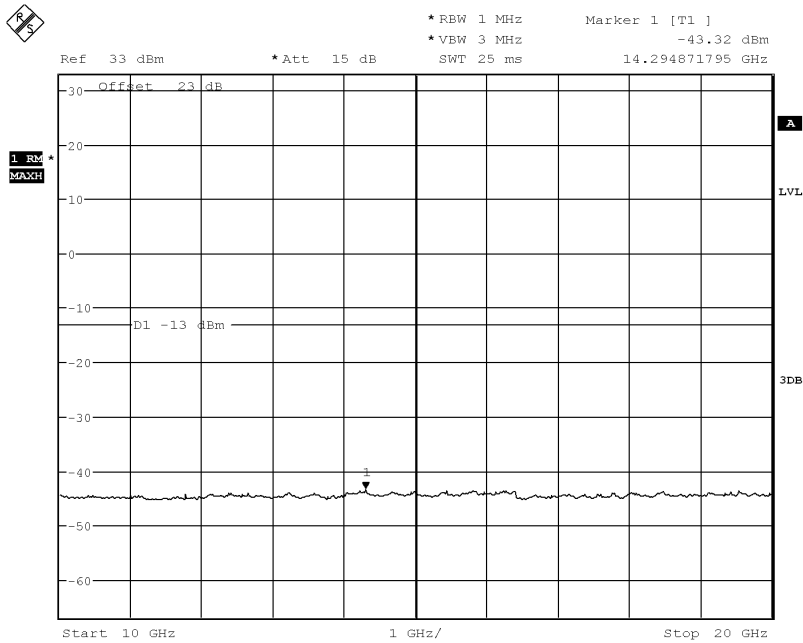
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:32:56

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 12@0

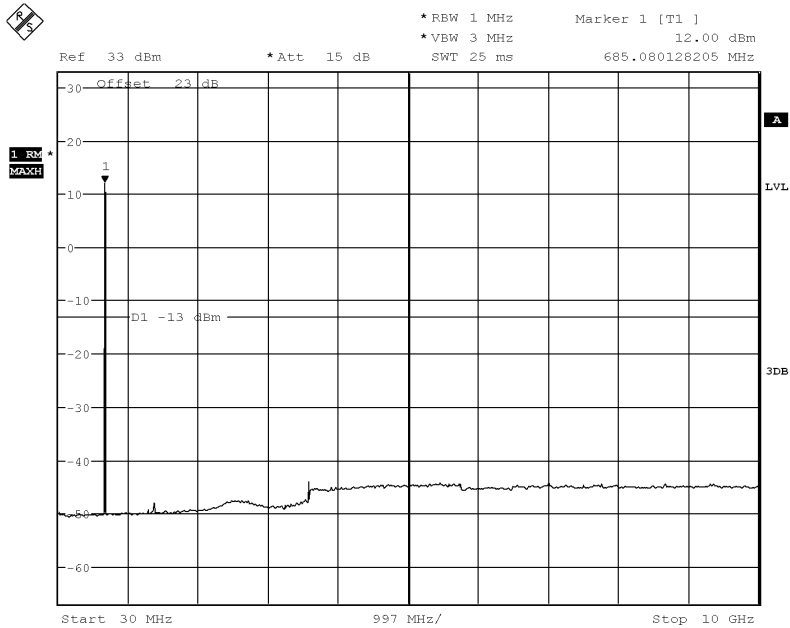
Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:32:33

10GHz to 20GHz, High Channel, Subcarrier (15kHz), BPSK, 12@0

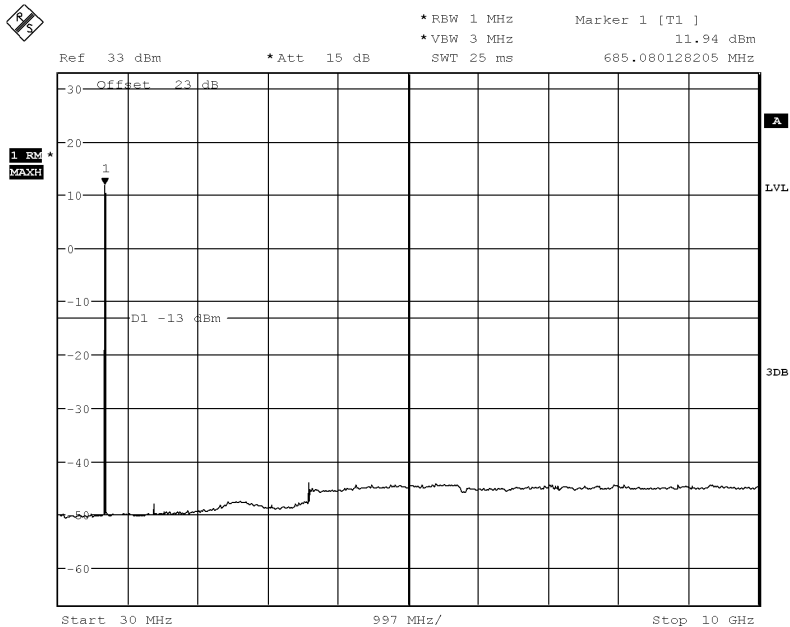
5.3.3 NB-IoT Band 12



Date: 28.DEC.2018 22:39:20

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

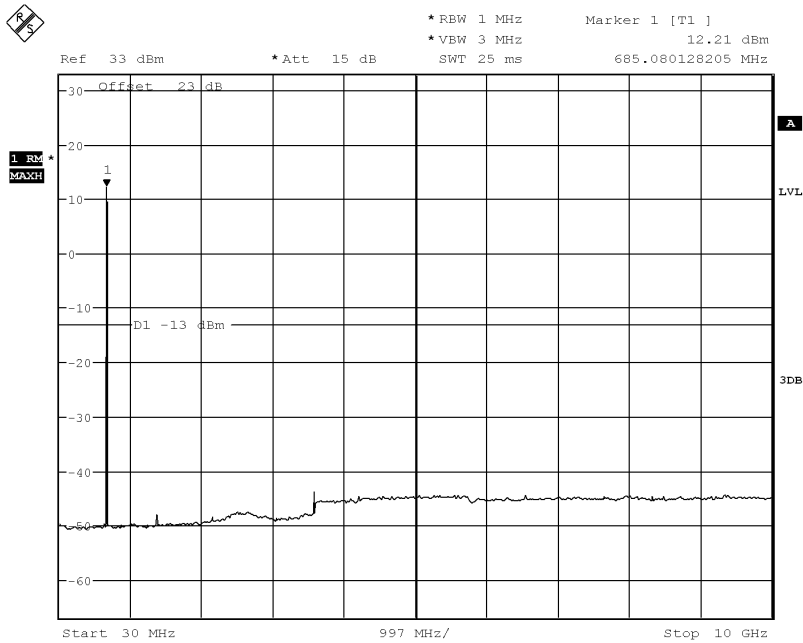


Date: 28.DEC.2018 22:39:05

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

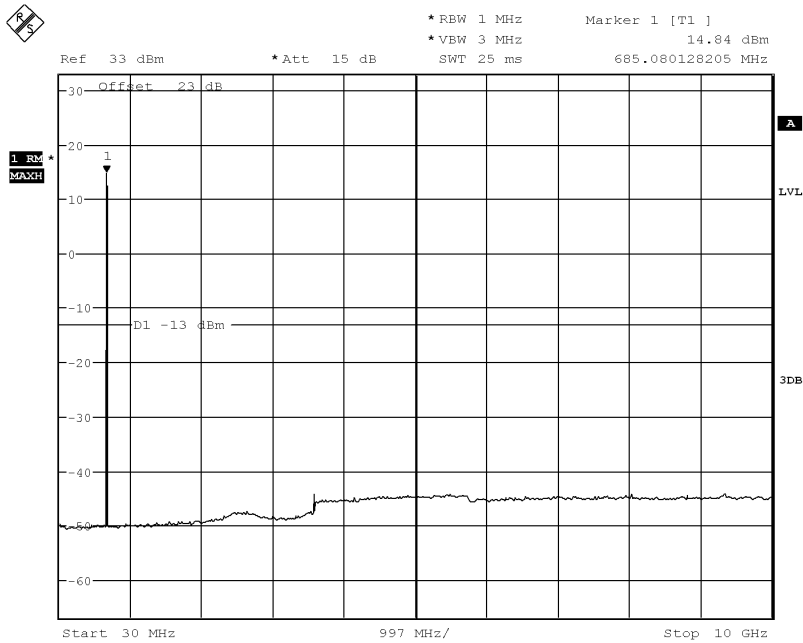
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:37:23

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

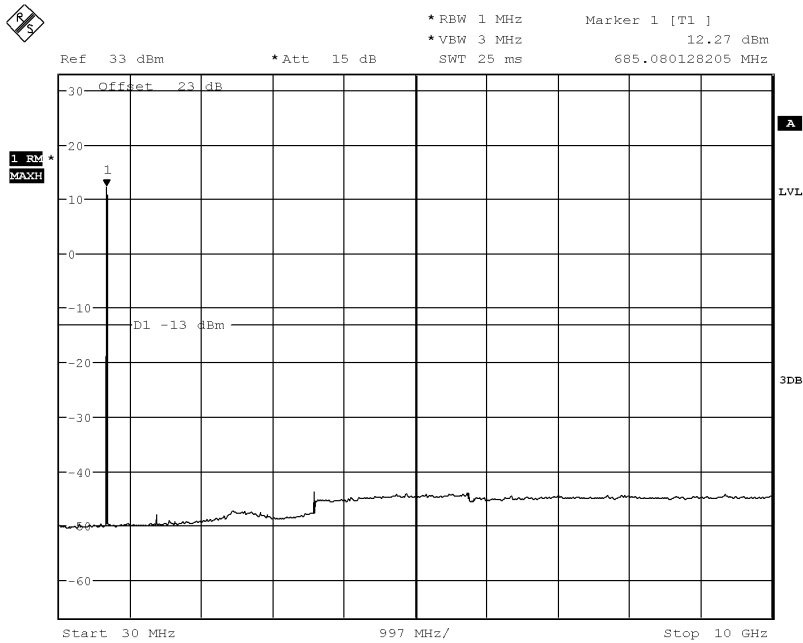


Date: 28.DEC.2018 22:37:46

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

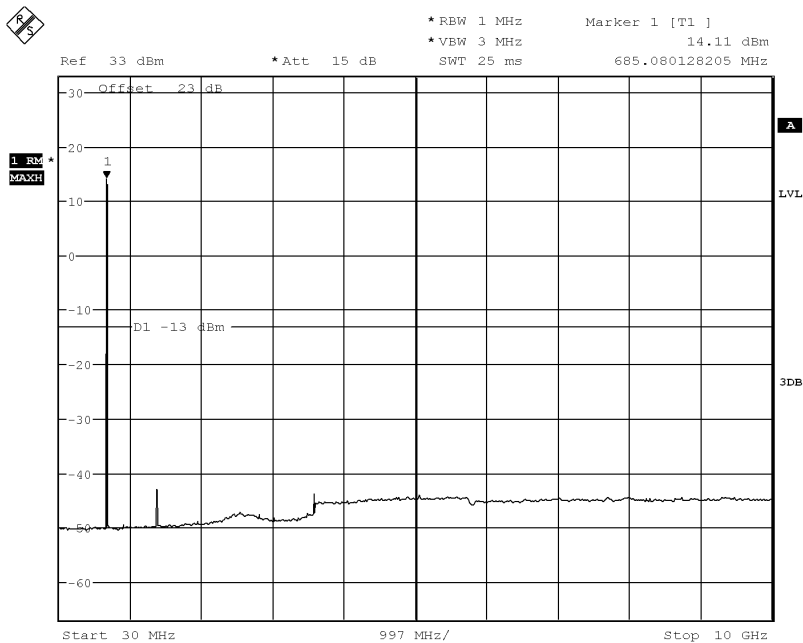
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:37:11

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

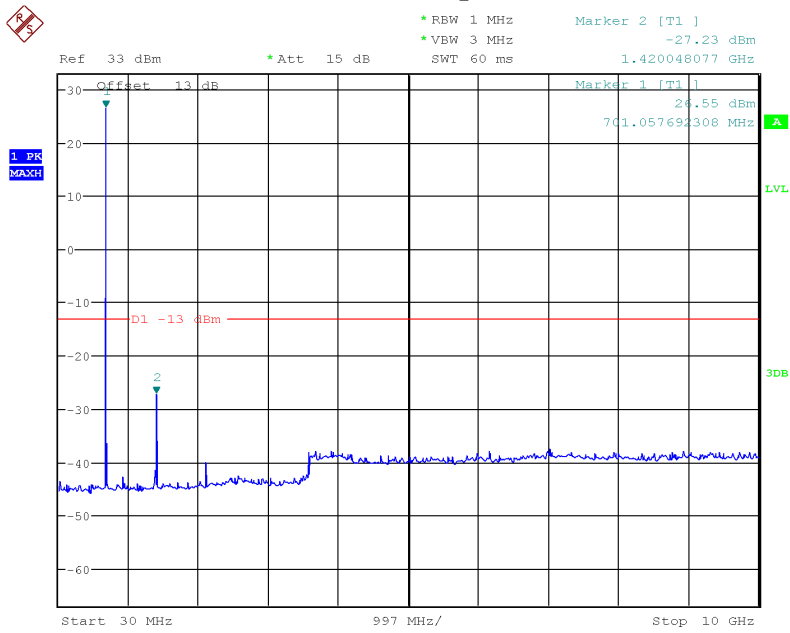


Date: 28.DEC.2018 22:38:09

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

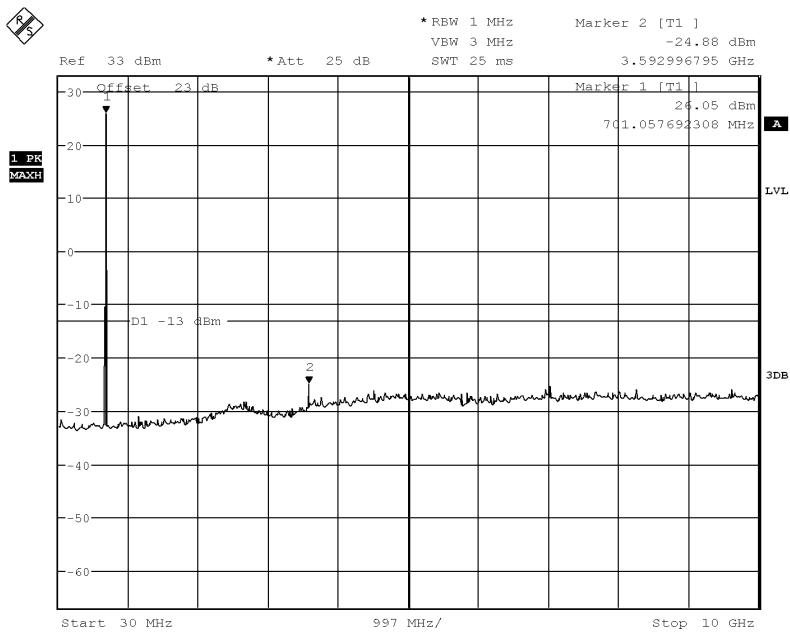
Report No.:B18W50650-WWAN_Rev2



Date: 24.DEC.2018 21:36:57

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

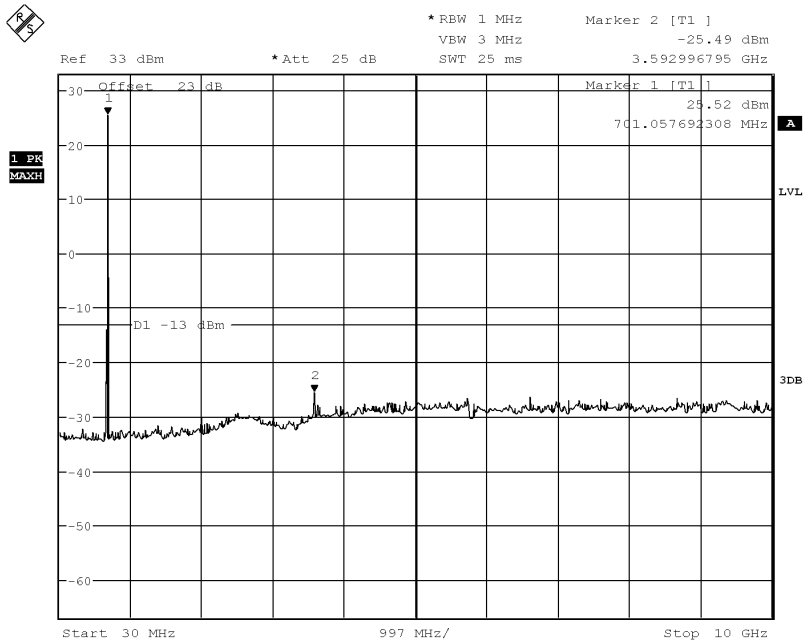


Date: 28.DEC.2018 18:47:44

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

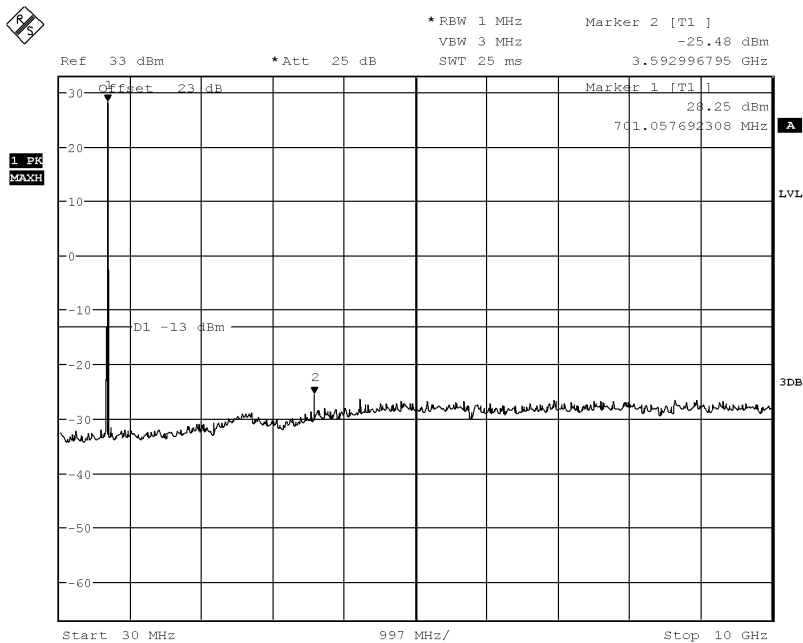
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:50:52

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

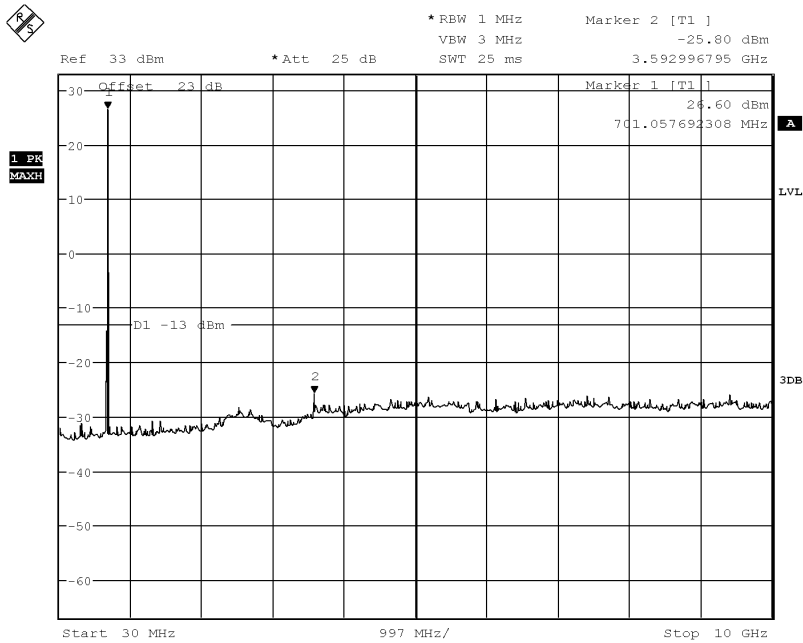


Date: 28.DEC.2018 18:50:33

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

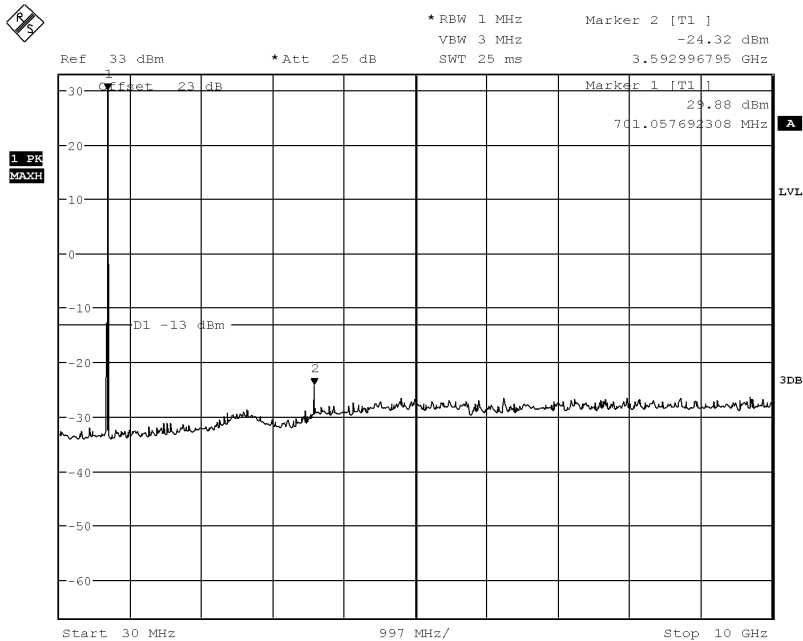
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:49:28

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

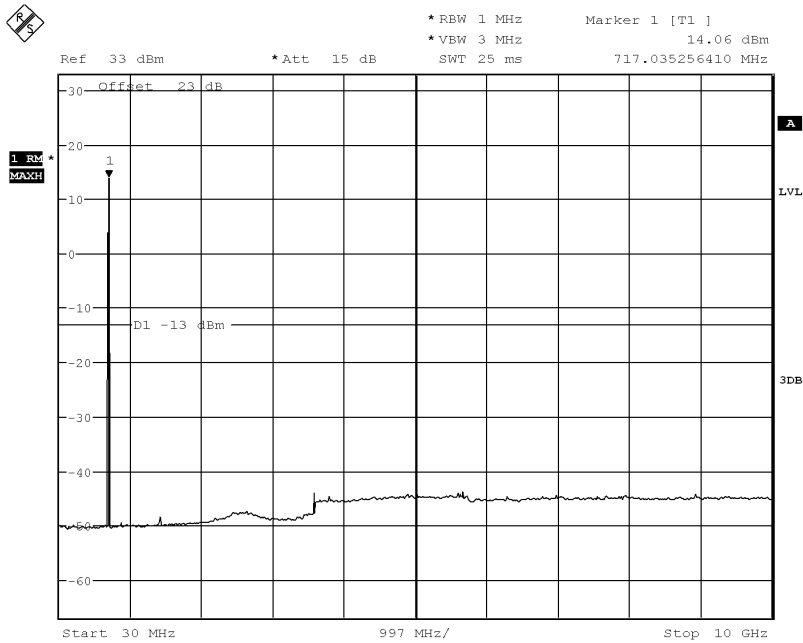


Date: 28.DEC.2018 18:49:58

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

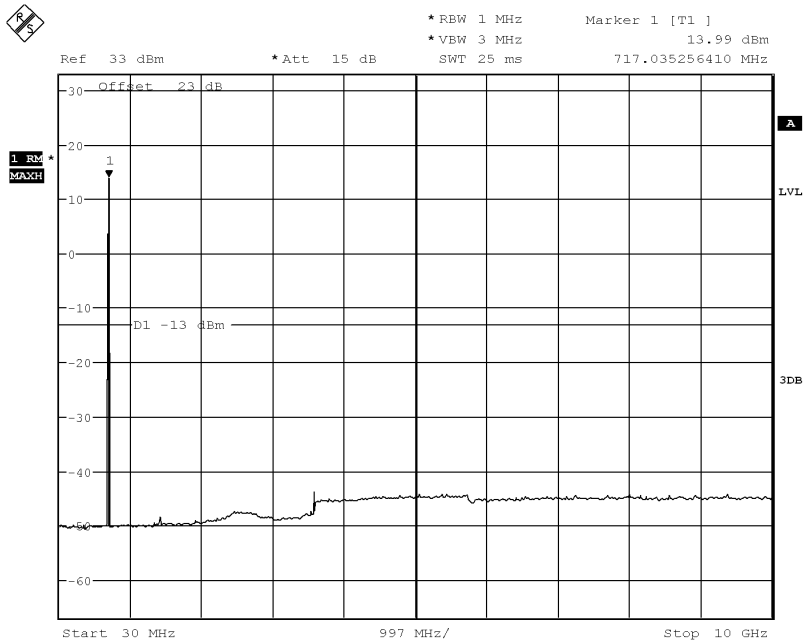
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:42:04

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

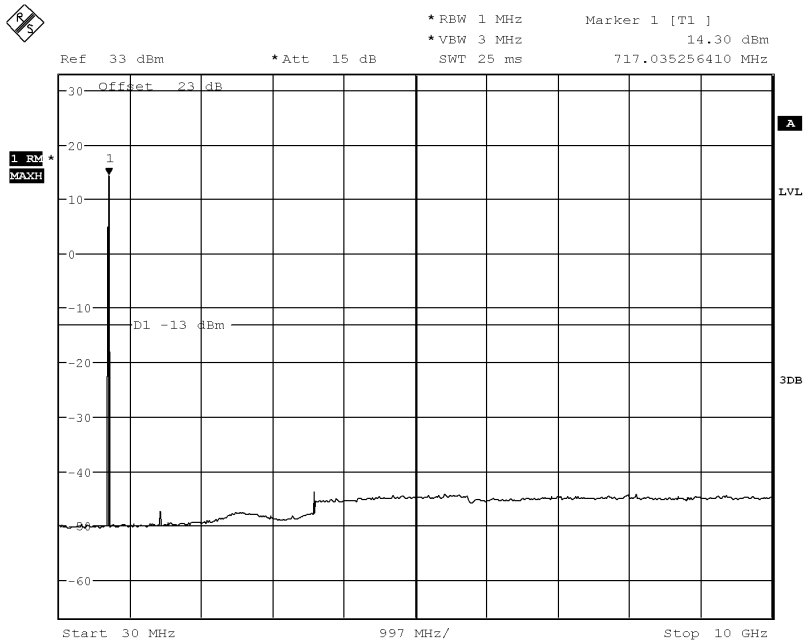


Date: 28.DEC.2018 22:42:20

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

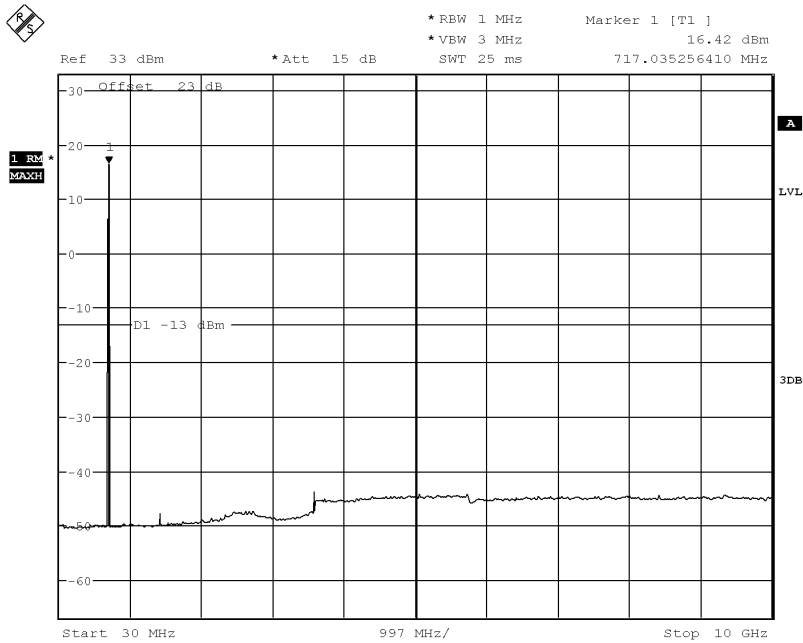
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:44:51

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

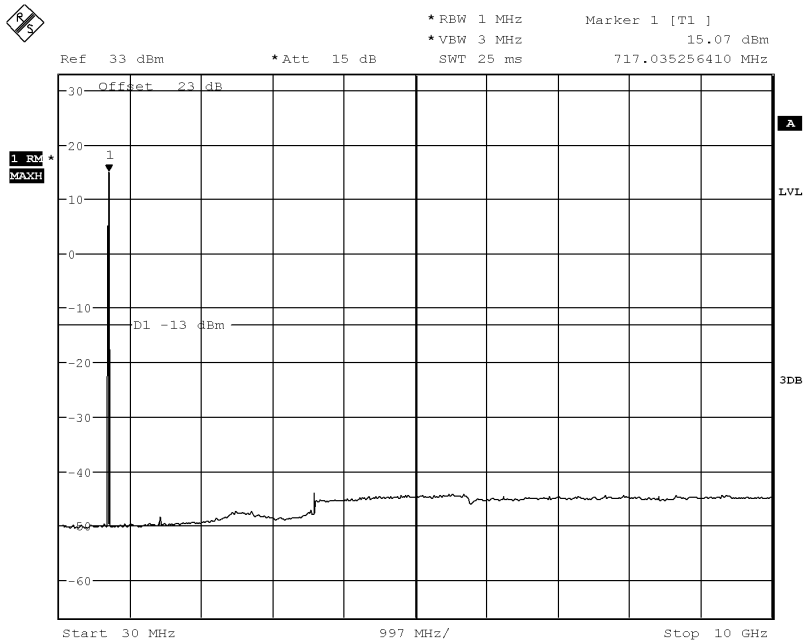


Date: 28.DEC.2018 22:45:15

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

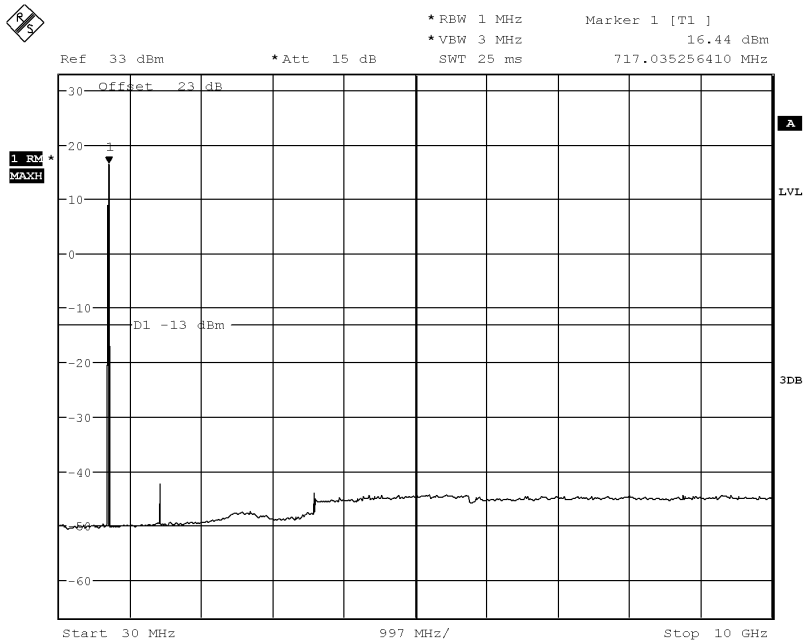
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:44:37

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

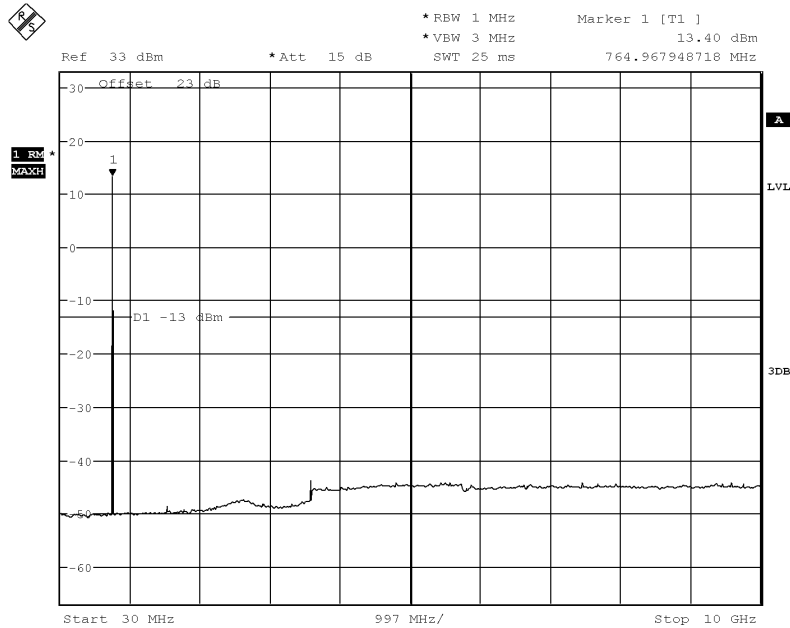


Date: 28.DEC.2018 22:45:31

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

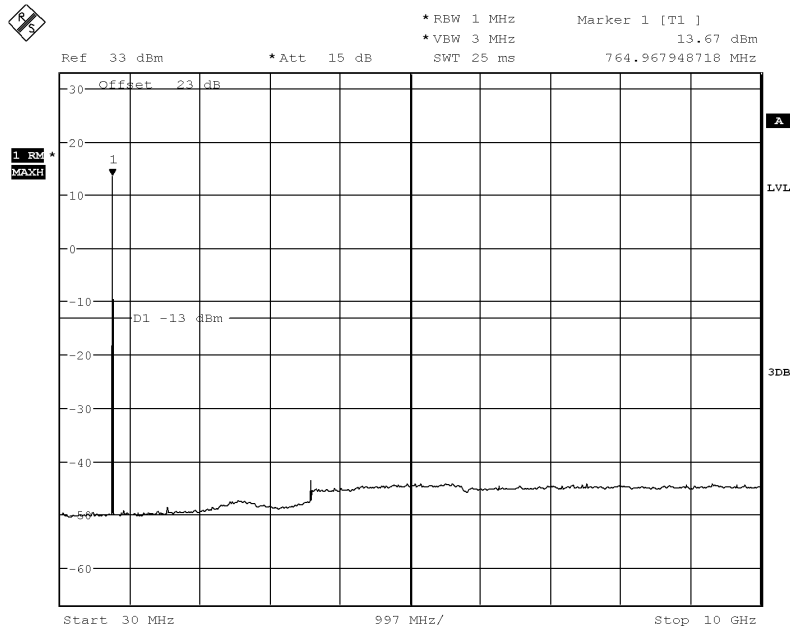
5.3.4 NB-IoT Band 13



Date: 28.DEC.2018 22:51:32

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

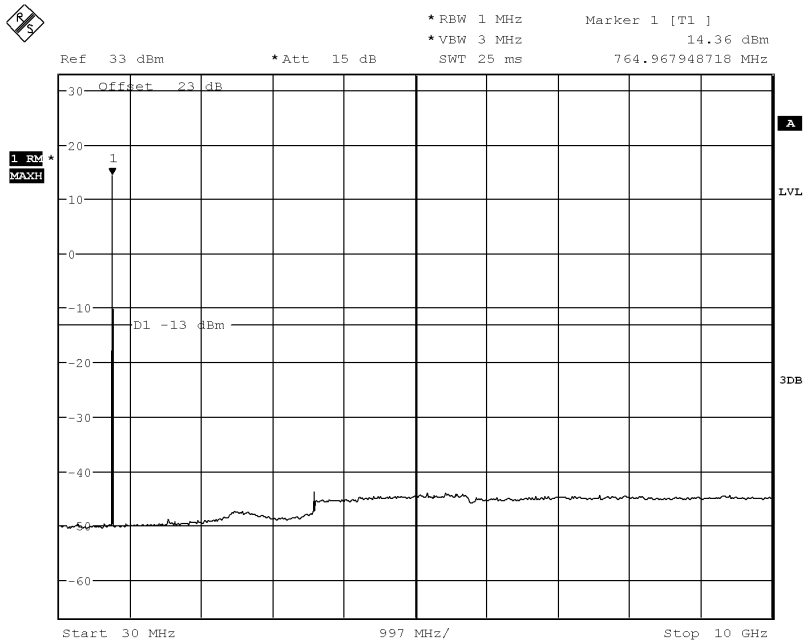


Date: 28.DEC.2018 22:51:18

30MHz to 10GHz, Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

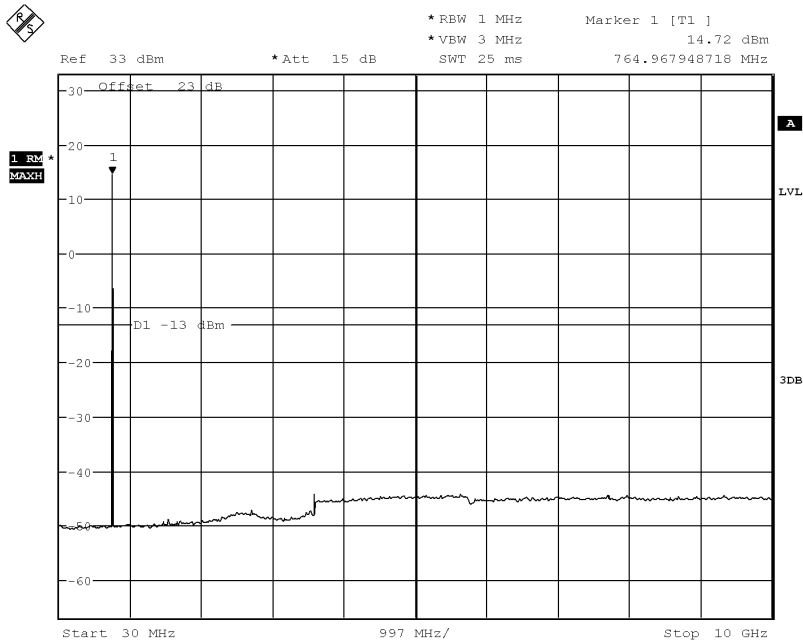
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:49:39

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

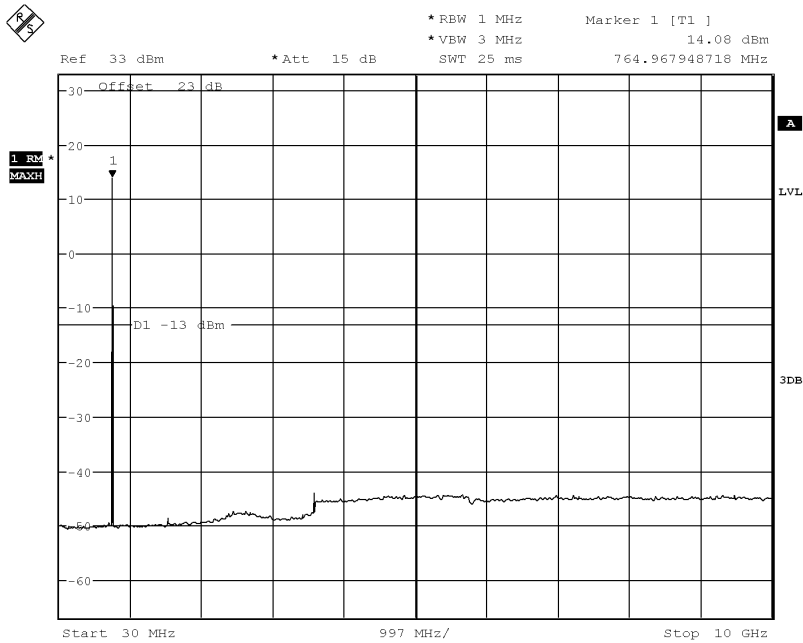


Date: 28.DEC.2018 22:49:08

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

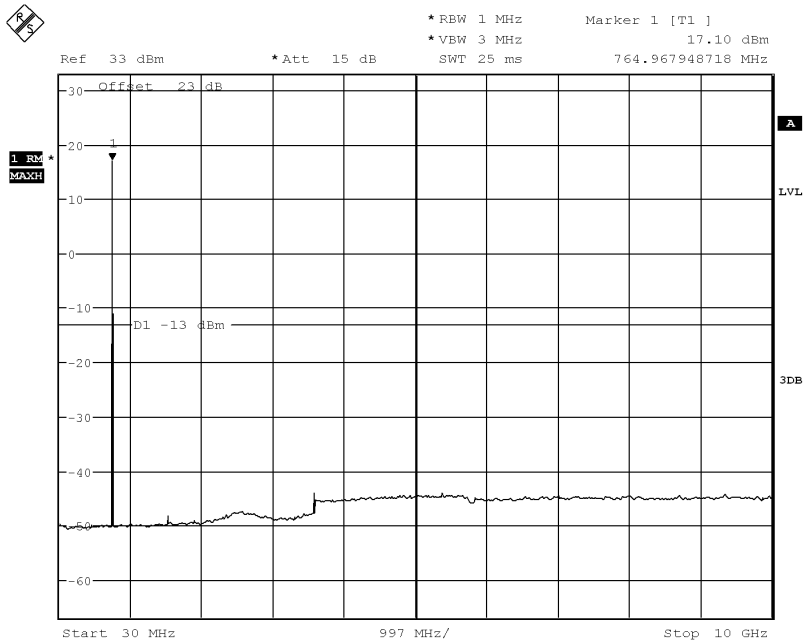
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:49:51

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

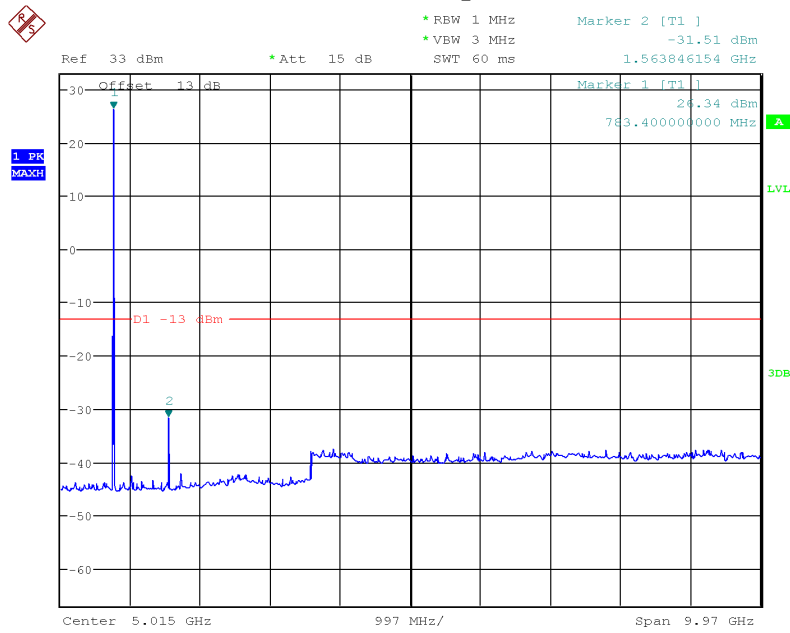


Date: 28.DEC.2018 22:48:56

30MHz to 10GHz, Low Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

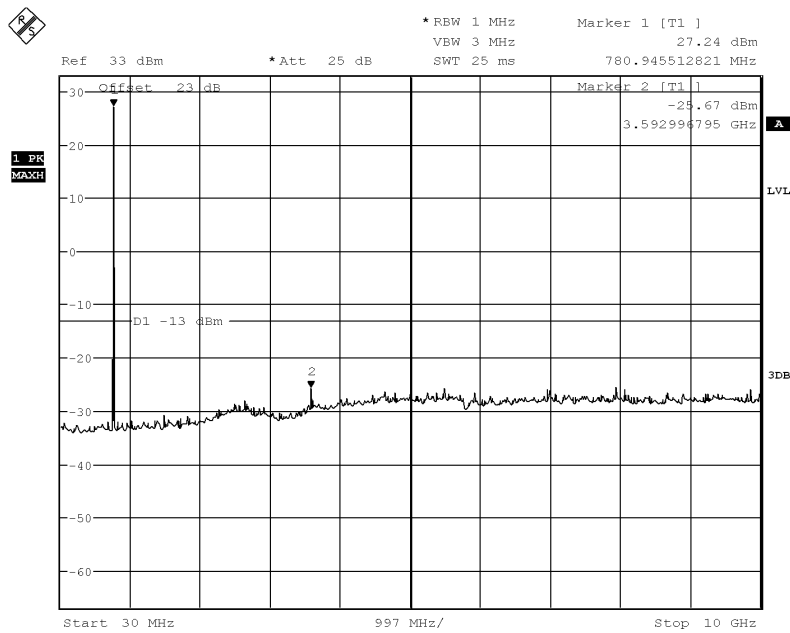
Report No.:B18W50650-WWAN_Rev2



Date: 24.DEC.2018 20:58:18

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

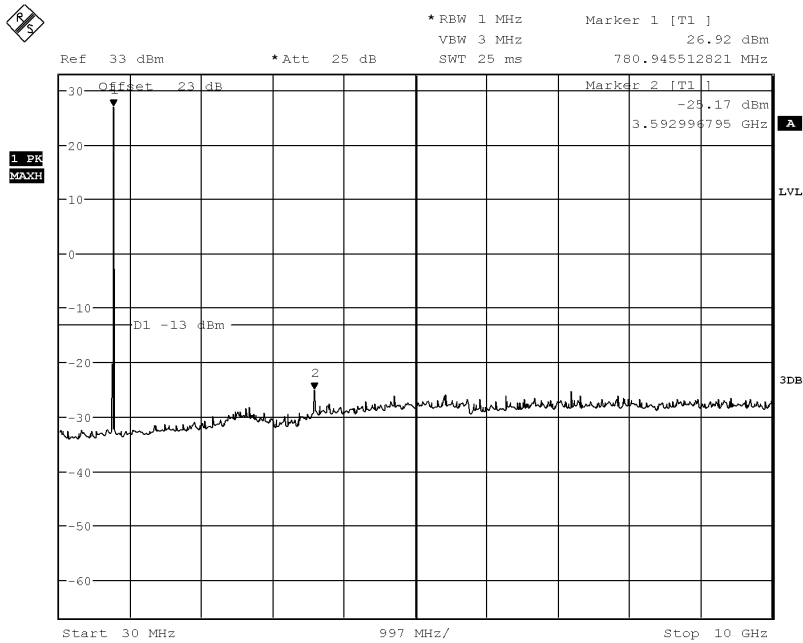


Date: 28.DEC.2018 19:22:33

30MHz to 10GHz, Mid Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

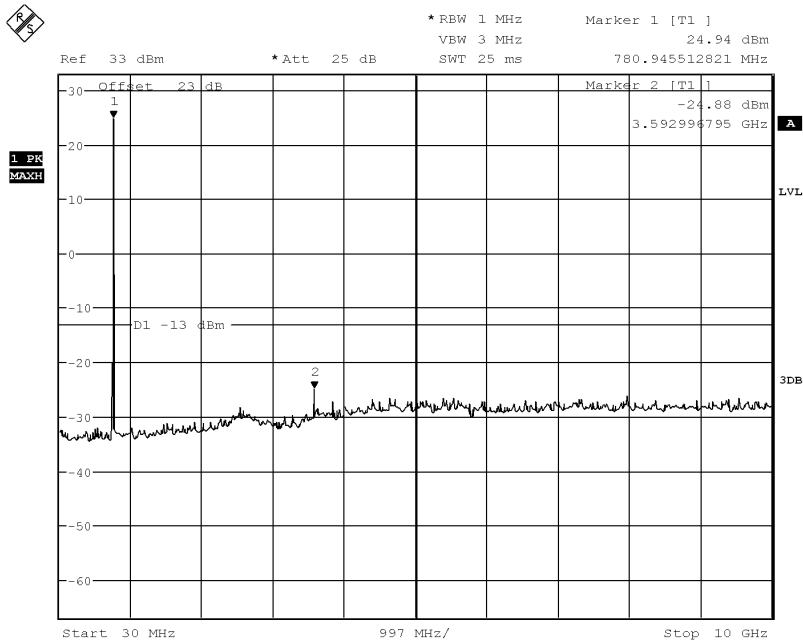
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:53:07

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

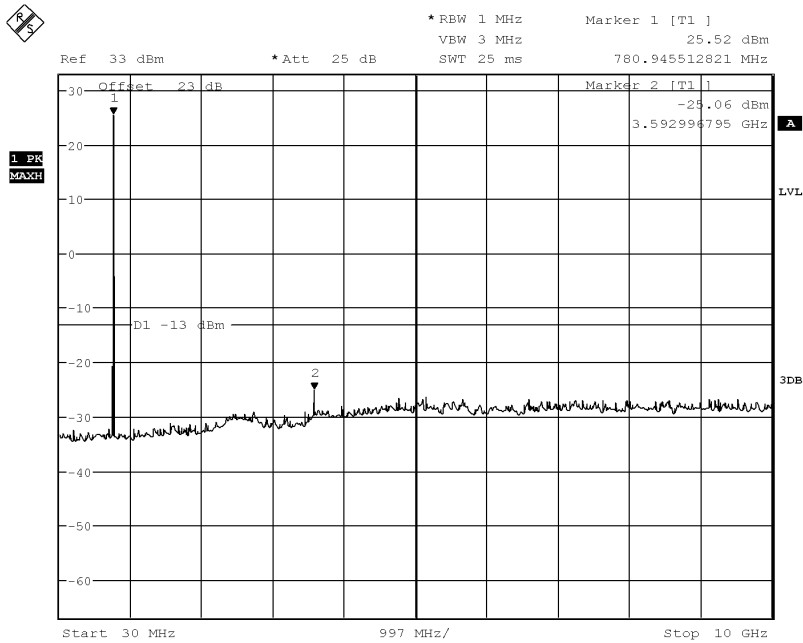


Date: 28.DEC.2018 18:54:50

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

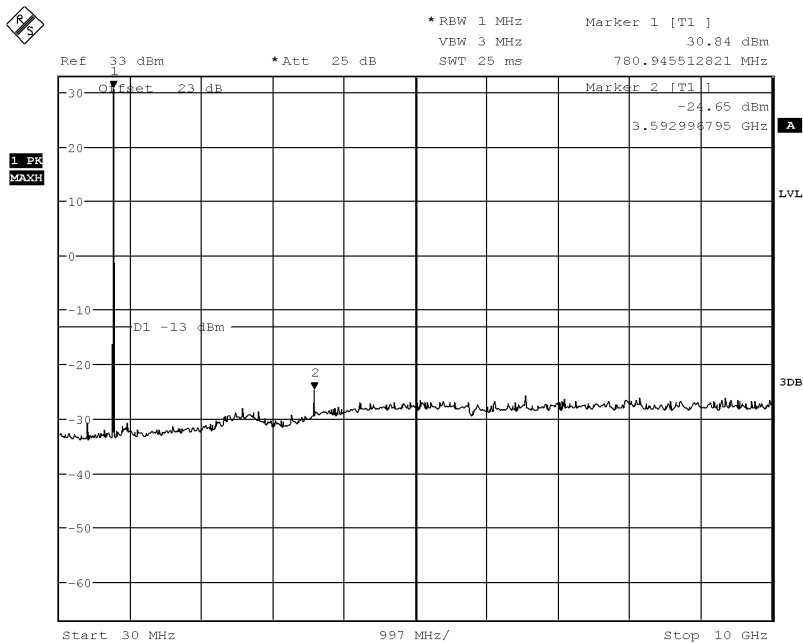
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 18:53:27

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

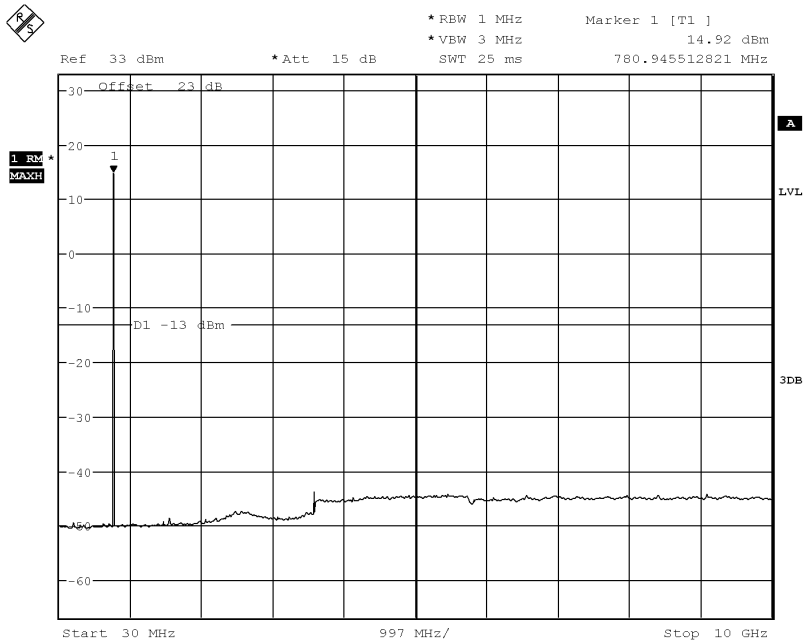


Date: 28.DEC.2018 18:54:26

30MHz to 10GHz, Mid Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

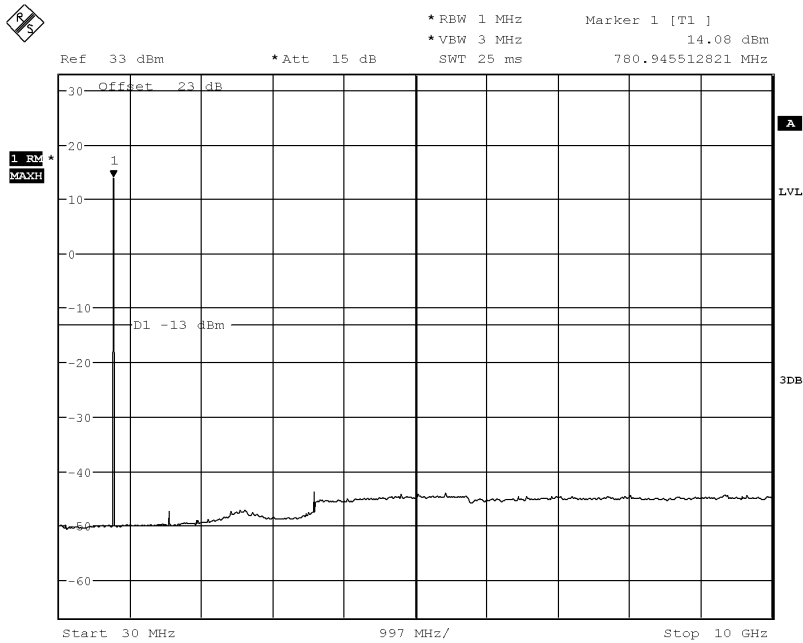
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:52:33

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

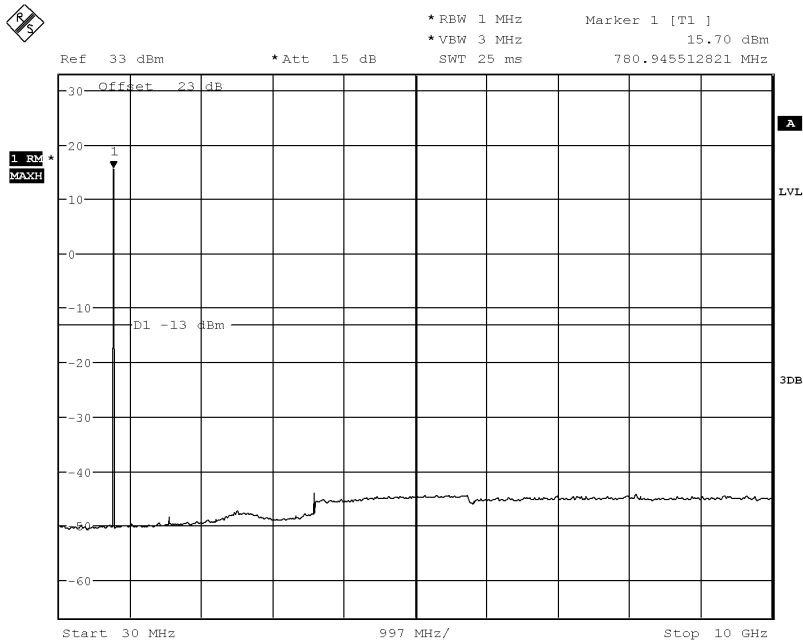


Date: 28.DEC.2018 22:52:48

30MHz to 10GHz, High Channel, Subcarrier (3.75kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

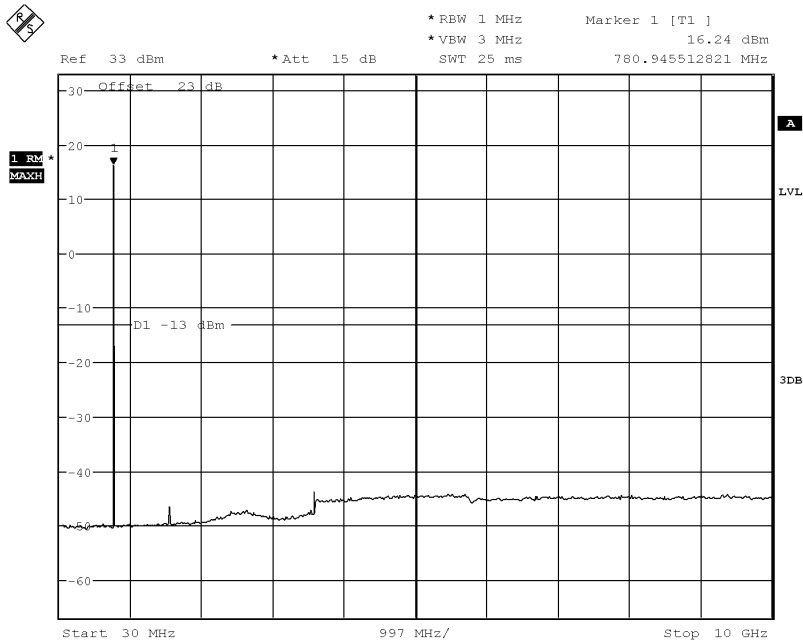
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:54:20

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.

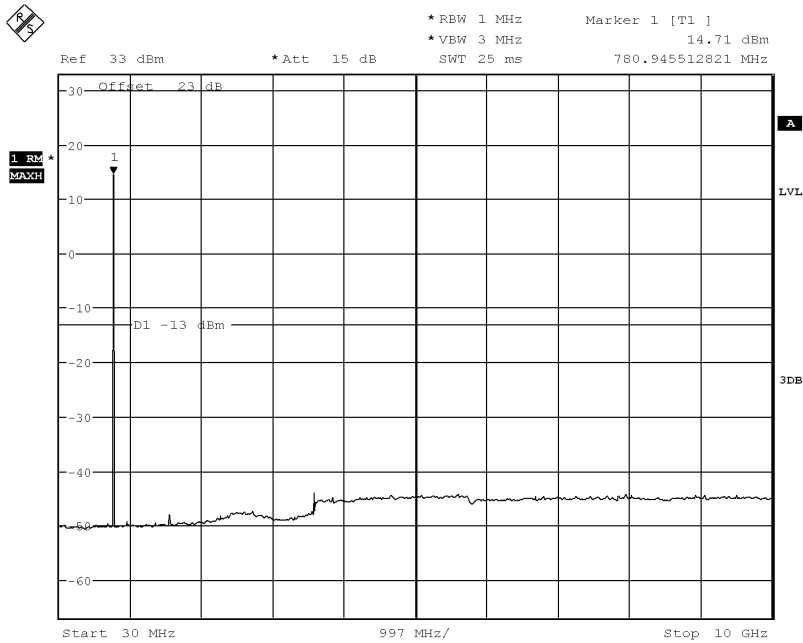


Date: 28.DEC.2018 22:54:04

30MHz to 10GHz, High Channel, Subcarrier (15kHz), QPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

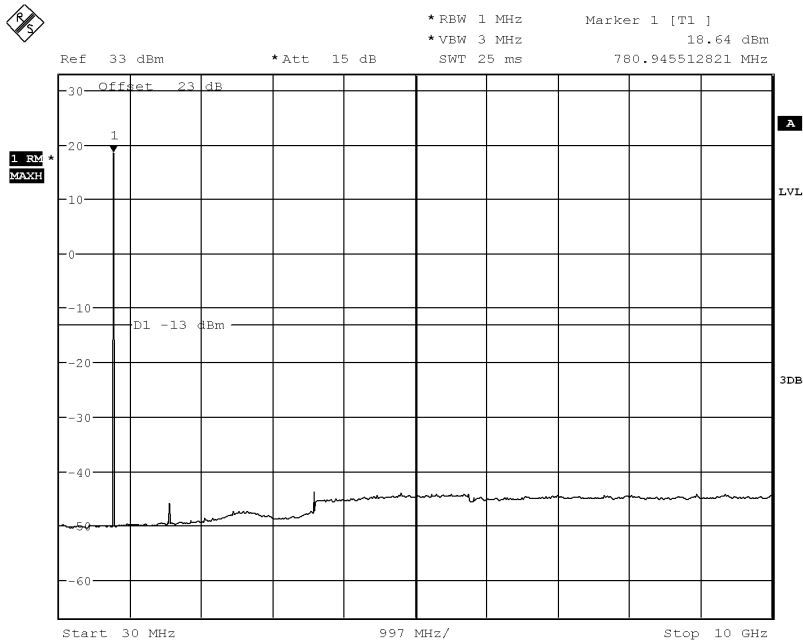
Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 22:54:33

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 1@0

Note: The strong emission shown in each case is the carrier signal.



Date: 28.DEC.2018 22:53:44

30MHz to 10GHz, High Channel, Subcarrier (15kHz), BPSK, 12@0

Note: The strong emission shown in each case is the carrier signal.

5.4 Radiated Spurious Emission

Specifications:	FCC Part 2.1051, 24.238, 2.1053, 27.53
DUT Serial Number:	865235030049031
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

According to Part 24.238 (a), i.e., Out of Band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB, so the limit level is: $P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$.

According to Part 27.53(h):

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 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.

According to Part 27.53(g):

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

Limits for Radiated spurious emissions(UE)	
Frequency range	Limit Level /Resolution Bandwidth
30 MHz to 20000 MHz	-13dBm/1MHz

Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty	5.15 dB (k=2)

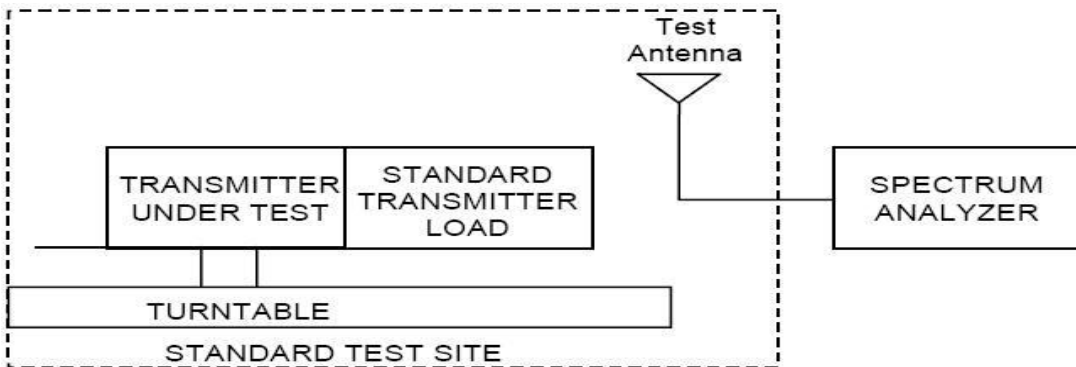
Test Setup:

The EUT was placed in an anechoic chamber. The Wireless Communications Test Set was used to set the TX channel and power level and modulate the TX signal with different bit patterns.

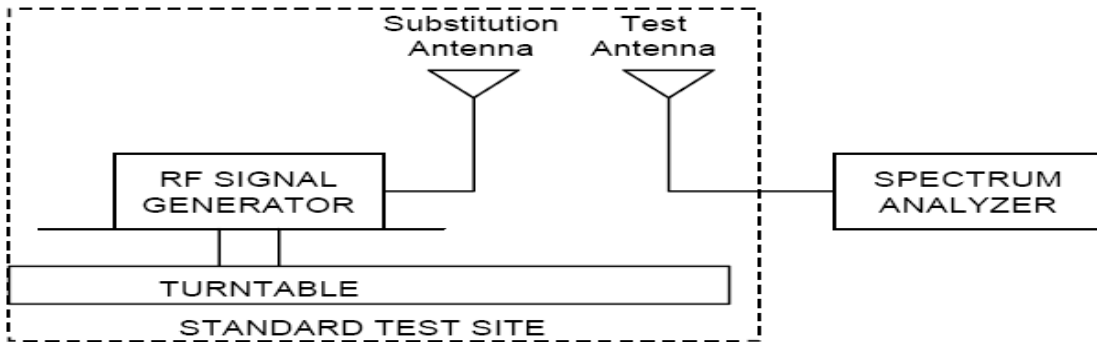
Test Method:

The measurement method is substitution method accordance with section 2.2.12 of ANSI/TIA-603-E: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

(a) Connect the equipment as illustrated and measure the spurious emissions as the method as above. The distance from the device to the antenna is 3 m .



(b) Reconnect the equipment as illustrated.



(c) Remove the transmitter and replace it with a substitution antenna. The center of the substitution antenna should be approximately at the same location as the center of the transmitter.

(d) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

(e) Repeat step d) with both antennas vertically polarized for each spurious frequency.

(f) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the

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readings obtained in steps d) and e) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

where:

P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

Note: Only worst case mode of in-band result is given below, the EUT is working in Sub-carrier Spacing 3.75 kHz, one tone mode.

5.4.1 NB-IoT Band 2 Radiated Spurious Emission Results

Test Data (QPSK Mode channel 18601)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3701.12	-32.5	7.2	8.9	-30.8	V
5551.32	-57.7	2.5	10.5	-49.7	V
7401.07	-61.3	0.9	11.9	-50.3	V
9250.10	-59.4	1.0	11.5	-48.9	V
11100.53	-56.18	0.4	12.1	-44.48	V
12950.72	-72.4	0.4	12.4	-60.4	V

Test Data (QPSK Mode channel 18900)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760.35	-51.8	7.3	9.2	-49.9	V
5640.32	-71.6	1.8	10.5	-62.9	V
7519.59	-70.8	0.9	11.9	-59.8	V
9400.40	-71.7	0.8	11.8	-60.7	V
11280.38	-71.8	0.3	12.1	-60.0	V
13160.19	-71.8	0.4	12.4	-59.8	V

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Test Data (QPSK Mode channel 19199)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3819.45	-52.7	7.4	9.2	-50.9	V
5727.14	-72.0	1.5	10.5	-63.0	V
7636.54	-72.2	1.1	11.9	-61.4	V
9547.67	-72.8	0.9	11.8	-61.9	V
11456.11	-72.0	0.3	12.1	-60.2	V
13362.56	-71.8	0.4	12.4	-59.8	V

Test Data (BPSK Mode channel 18601)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3769.46	-66.5	7.2	8.9	-64.8	V
5550.12	-71.2	2.5	10.5	-63.2	V
7400.48	-67.7	0.9	11.9	-56.7	V
9251.07	-72.1	1.0	11.5	-61.6	V
11100.35	-72	0.4	12.1	-60.3	V
12950.39	-72	0.4	12.4	-60.0	V

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Test Data (BPSK Mode channel 18900)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760.00	-52.6	7.3	9.2	-50.7	V
5641.18	-72.5	1.8	10.5	-63.8	V
7520.76	-72.9	0.9	11.9	-61.9	V
9400.63	-70.0	0.8	11.8	-59.0	V
11280.69	-72.6	0.3	12.1	-60.8	V
13160.74	-71.8	0.4	12.4	-59.8	V

Test Data (BPSK Mode channel 19199)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3818.16	-62.7	7.4	9.2	-60.9	V
5727.76	-72.2	1.5	10.5	-63.2	V
7636.59	-72.5	1.1	11.9	-61.7	V
9547.26	-71.1	0.9	11.8	-60.2	V
11455.75	-73.0	0.3	12.1	-61.2	V
13362.81	-72.3	0.4	12.4	-60.3	V

5.4.2 NB-IoT Band 4 Radiated Spurious Emission Results

Test Data (QPSK Mode channel 19951)

Frequency [MHz]	Generator output power(P _g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P _d) [dBm]	Antenna Polarization [H/V]
3420.2	-56.4	6.9	8.9	-54.4	V
5130.3	-65.7	6.3	9.9	-62.1	V
6840.4	-74.1	0.8	11.9	-63.0	V
8550.5	-71.9	0.9	11.2	-61.6	V
10260.6	-73.4	0.5	12.0	-61.9	V
11970.7	-72.2	0.4	12.2	-60.4	V

Test Data (QPSK Mode channel 20175)

Frequency [MHz]	Generator output power(P _g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P _d) [dBm]	Antenna Polarization [H/V]
3465.0	-60.7	6.9	8.9	-58.7	V
5197.5	-67.9	5.8	9.9	-63.8	V
6930.0	-73.8	0.9	11.9	-62.8	V
8662.5	-71.7	0.9	11.2	-61.4	V
10395.0	-72.4	0.3	12.0	-60.7	V
12127.5	-71.7	0.4	12.2	-59.9	V

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Test Data (QPSK Mode channel 20399)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3509.8	-55.7	7.0	8.9	-53.8	V
5264.7	-68.3	5.0	9.9	-63.4	V
7019.6	-72.6	1.2	11.9	-61.9	V
8774.5	-70.5	1.2	11.2	-60.5	V
10529.4	-72.6	0.6	12.0	-61.2	V
12284.3	-71.4	0.2	12.2	-59.4	V

Test Data (BPSK Mode channel 19951)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3420.2	-61.1	6.9	8.9	-59.1	V
5130.3	-66.3	6.3	9.9	-62.7	V
6840.4	-73.9	0.8	11.9	-62.8	V
8550.5	-71.5	0.9	11.2	-61.2	V
10260.6	-72.6	0.5	12.0	-61.1	V
11970.7	-72.6	0.4	12.2	-60.8	V

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Test Data (BPSK Mode channel 20175)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3465.0	-64.0	6.9	8.9	-62.0	V
5197.5	-67.1	5.8	9.9	-63.0	V
6930.0	-74.6	0.9	11.9	-63.6	V
8662.5	-71.5	0.9	11.2	-61.2	V
10395.0	-72.8	0.3	12.0	-61.1	V
12127.5	-72.2	0.4	12.2	-60.4	V

Test Data (BPSK Mode channel 20399)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3509.8	-55.6	7.0	8.9	-53.7	V
5264.7	-69.0	5.0	9.9	-64.1	V
7019.6	-72.2	1.2	11.9	-61.5	V
8774.5	-70.9	1.2	11.2	-60.9	V
10529.4	-72.2	0.6	12.0	-60.8	V
12284.3	-72.0	0.2	12.2	-60.0	V

5.4.3 NB-IoT Band 12 Radiated Spurious Emission Results

Test Data (QPSK Mode channel 23011)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1298.32	-81.8	4.2	8.0	-78.0	H
2097.11	-76.2	5.4	8.2	-73.4	V
2796.38	-72.6	6.1	7.8	-70.9	V
3495.72	-67.6	7.0	8.9	-65.7	V
4194.78	-66.2	7.8	9.2	-64.8	V
4893.23	-65.0	7.8	9.9	-62.9	V

Test Data (QPSK Mode channel 23095)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1415.39	-83.2	4.4	8.3	-79.3	H
2122.58	-77.3	5.4	8.2	-74.5	H
2830.34	-72.8	6.3	7.9	-71.2	H
3537.71	-67.8	7.0	8.9	-65.9	V
4245.24	-65.8	7.8	9.2	-64.4	V
4952.31	-65.7	7.7	9.9	-63.5	V

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Test Data (QPSK Mode channel 23179)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1432.56	-80.7	4.4	8.2	-76.9	H
2148.62	-76.0	5.4	7.0	-74.4	V
2865.25	-71.9	6.4	8.0	-70.3	V
3581.13	-67.4	7.1	8.9	-65.6	V
4296.21	-64.8	7.8	9.2	-63.4	V
5012.44	-65.6	7.5	9.9	-63.2	V

Test Data (BPSK Mode channel 23011)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1298.19	-80.6	4.2	8.0	-76.8	V
2097.85	-75.7	5.4	8.2	-72.9	H
2795.99	-72.2	6.1	7.8	-70.5	H
3495.28	-67.1	7.0	8.9	-65.2	V
4194.39	-66.5	7.8	9.2	-65.1	V
4893.02	-65.4	7.8	9.9	-63.3	V

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Test Data (BPSK Mode channel 23095)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1415.21	-83.9	4.4	8.3	-80.0	H
2122.08	-76.7	5.4	8.2	-73.9	H
2831.42	-72.4	6.3	7.9	-70.8	H
3537.90	-67.2	7.0	8.9	-65.3	V
4246.02	-65.7	7.8	9.2	-64.3	V
4951.67	-64.9	7.7	9.9	-62.7	V

Test Data (BPSK Mode channel 23179)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1432.45	-80.5	4.4	8.2	-76.7	H
2149.26	-75.7	5.4	7.0	-74.1	H
2865.33	-71.9	6.4	8.0	-70.3	V
3581.01	-67.3	7.1	8.9	-65.5	V
4296.89	-64.3	7.8	9.2	-62.9	V
5013.45	-65.4	7.5	9.9	-63.0	V

5.4.4 NB-IoT Band 13 Radiated Spurious Emission Results

Test Data (QPSK Mode channel 23181)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1554.37	-69.7	4.6	8.6	-65.7	H
2331.92	-66.3	5.6	8.0	-63.9	H
3108.44	-68.3	6.6	8.9	-66.0	V
3884.85	-66.1	7.4	9.2	-64.3	V
4662.64	-65.4	8.1	9.5	-64.0	V
5440.57	-70.6	2.9	10.5	-63.0	V

Test Data (QPSK Mode channel 23230)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1565.25	-72.6	4.6	8.6	-68.6	H
2346.82	-65.8	5.6	8.0	-63.4	V
3128.53	-67.6	6.6	8.9	-65.3	V
3911.83	-65.7	7.4	9.2	-63.9	V
4692.18	-65.2	8.1	9.5	-63.8	V
5475.37	-71.4	2.9	10.5	-63.8	V

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Test Data (QPSK Mode channel 23279)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1574.39	-70.4	4.6	8.6	-66.4	H
2360.43	-65.9	5.6	8.0	-63.5	H
3148.59	-67.4	6.6	8.9	-65.1	V
3935.20	-65.4	7.4	9.2	-63.6	V
4722.14	-65.0	8.1	9.5	-63.6	V
5510.36	55.7	2.9	10.5	63.3	V

Test Data (BPSK Mode channel 23181)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1554.37	-69.4	4.6	8.6	-65.4	H
2331.92	-67.1	5.6	8.0	-64.7	V
3108.44	-68.2	6.6	8.9	-65.9	V
3884.85	-65.6	7.4	9.2	-63.8	V
4662.64	-65.5	8.1	9.5	-64.1	V
5440.57	-70.6	2.9	10.5	-63.0	V

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Test Data (BPSK Mode channel 23230)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1564.99	-71.7	4.6	8.6	-67.7	H
2346.51	-65.8	5.6	8.0	-63.4	H
3128.48	-68.0	6.6	8.9	-65.7	V
3910.38	-65.5	7.4	9.2	-63.7	V
4690.23	-65.1	8.1	9.5	-63.7	V
5475.10	-70.8	2.9	10.5	-63.2	V

Test Data (BPSK Mode channel 23279)

Frequency [MHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1574.19	-71.4	4.6	8.6	-67.4	V
2361.63	-64.4	5.6	8.0	-62.0	V
3149.42	-68.0	6.6	8.9	-65.7	V
3935.53	-65.9	7.4	9.2	-64.1	V
4720.27	-65.4	8.1	9.5	-64.0	V
5509.62	-71.7	2.9	10.5	-64.1	V

5.5 Band Edge

Specifications:	FCC Part 2.1051, 24.238, 2.1053, 27.53
DUT Serial Number:	865235030045922
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

According to Part 24.238 (a), i.e., Out of Band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB, so the limit level is: $P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$.

According to Part 27.53(h):

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 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.

According to Part 27.53(g):

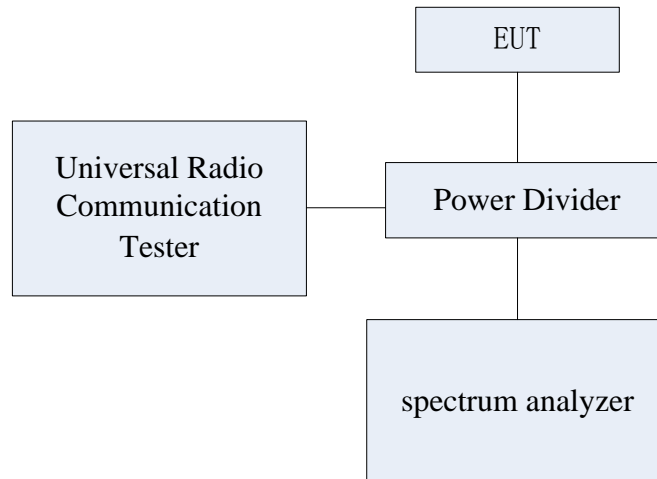
For operations in the 600 MHz Band and the 698-746 MHz Band, the power of any emission outside a licensee's frequency Band(s) of operation shall be attenuated below the transmitter power (P) within the licensed Band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with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

Measurement Uncertainty:

Item	Uncertainty	
Expanded Uncertainty	$9\text{kHz} < f \leq 4\text{GHz}$	0.71 dB (k=2)
	$4\text{GHz} \leq f < 12.75\text{GHz}$	0.74 dB (k=2)
	$12.75\text{GHz} \leq f < 26\text{GHz}$	2.70 dB (k=2)

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.

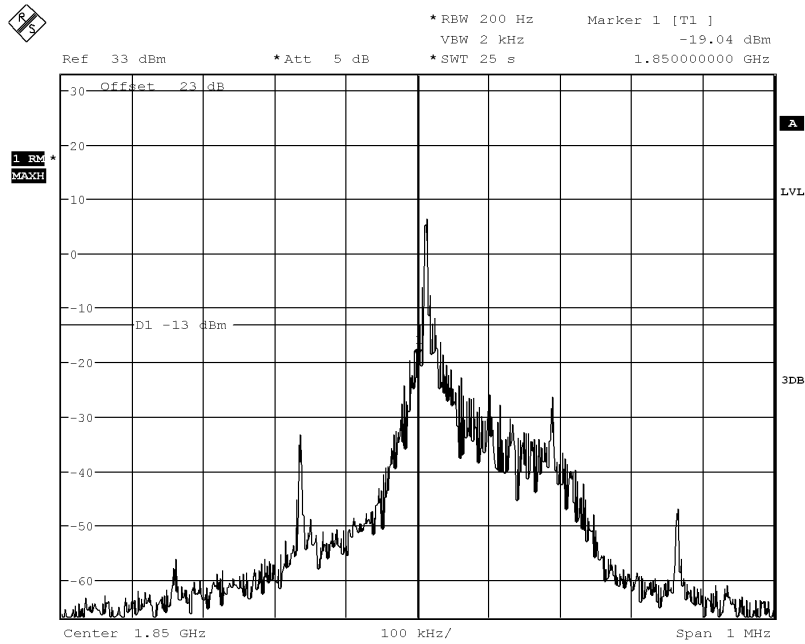


Test Method:

- 1) The EUT was coupled to the EMI test receiver analyzer mode and the base station simulator through a power divider. The loss of the cables the test system is calibrated to correct the readings.
- 2) The spectrum analyzer was set to Average Detector function and Maximum hold mode.
- 3) The resolution Bandwidth of the spectrum analyzer was a little greater than 1% of the 26dB emission Bandwidth.

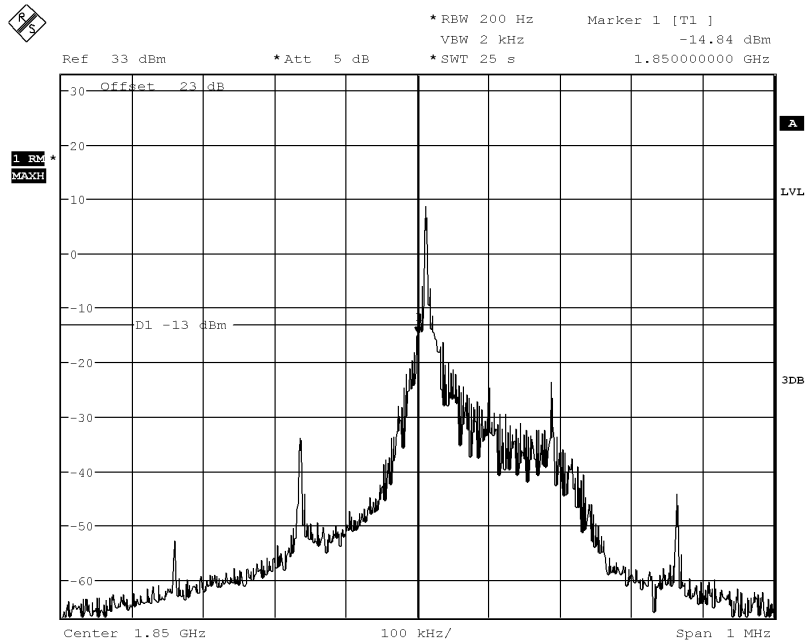
Note: Only worst case mode of in-band result is given below.

5.5.1 NB-IoT Band 2 Edge Results



Date: 28.DEC.2018 21:29:33

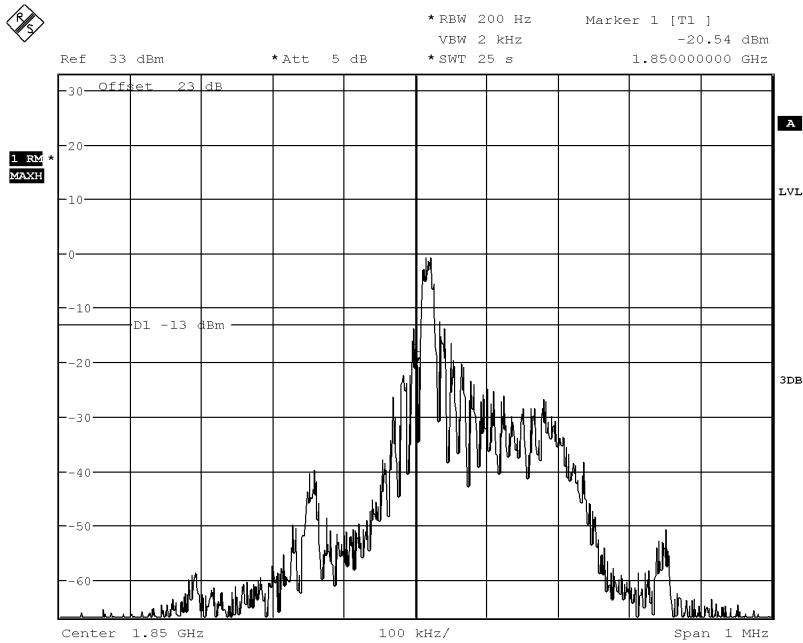
Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



Date: 28.DEC.2018 21:29:04

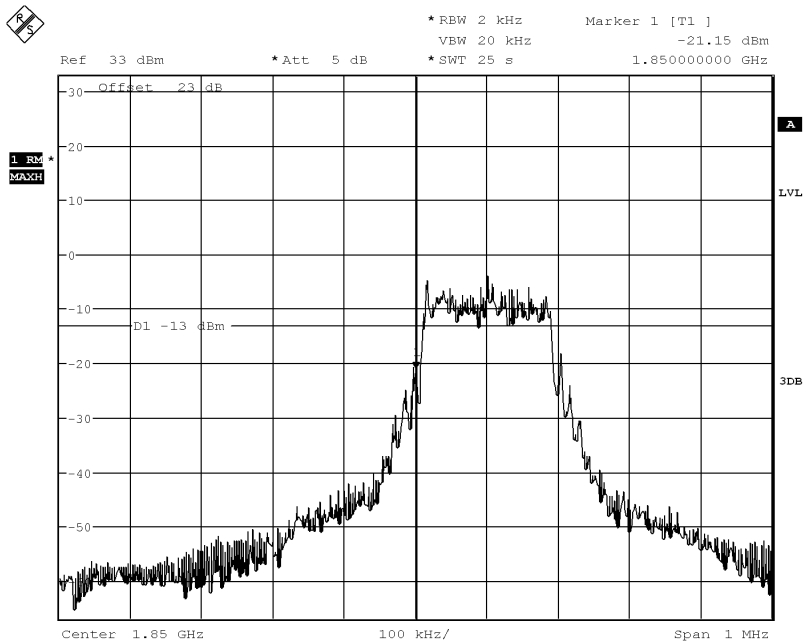
Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:26:57

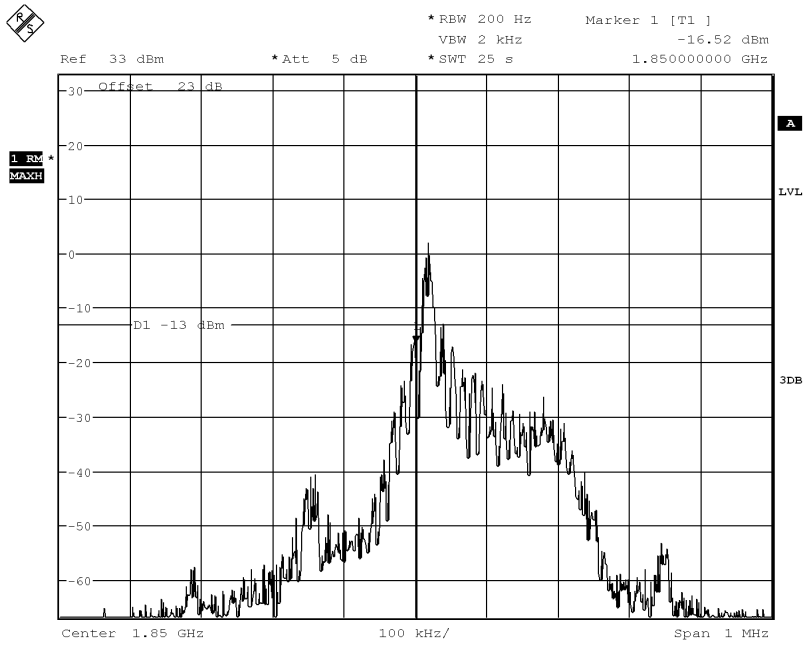
Low Channel, Subcarrier (15kHz), QPSK, 1@0



Date: 28.DEC.2018 21:25:49

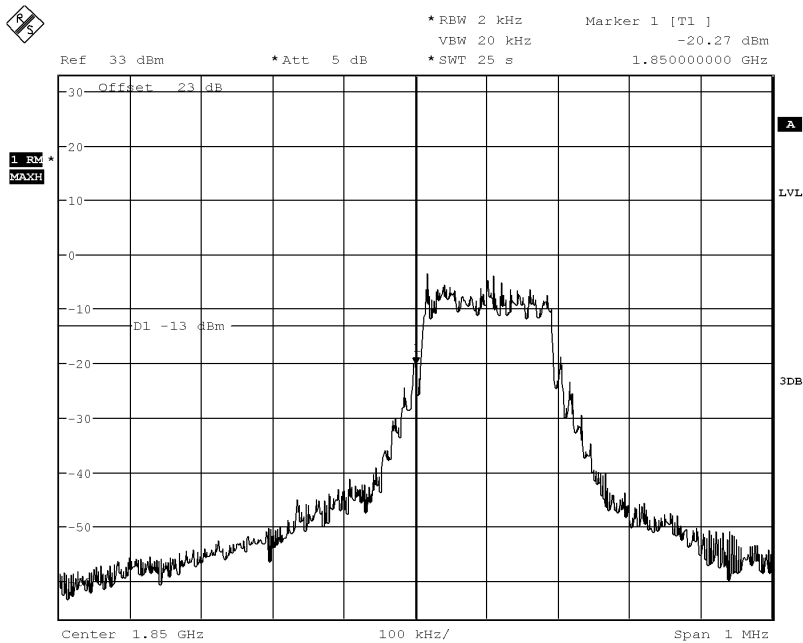
Low Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:27:28

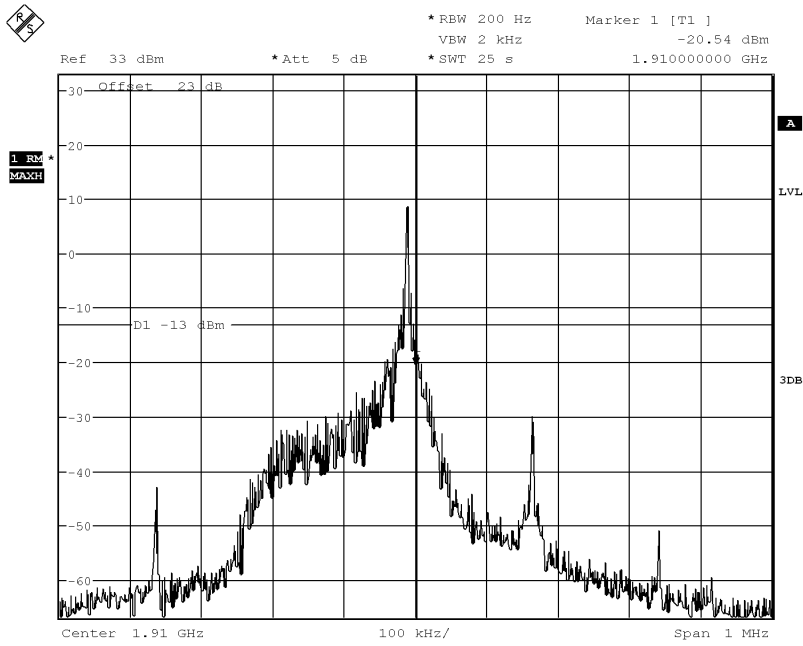
Low Channel, Subcarrier (15kHz), BPSK, 1@0



Date: 28.DEC.2018 21:25:18

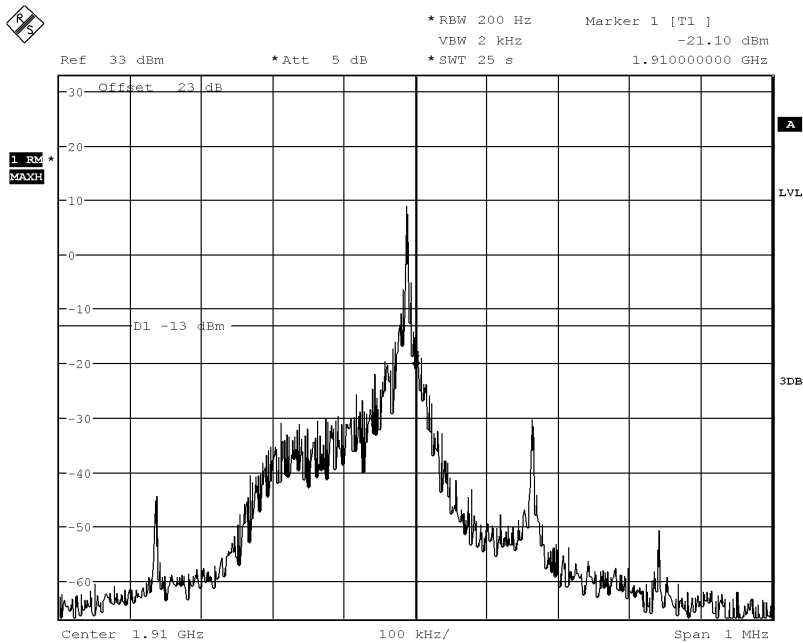
Low Channel, Subcarrier (15kHz), BPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:31:37

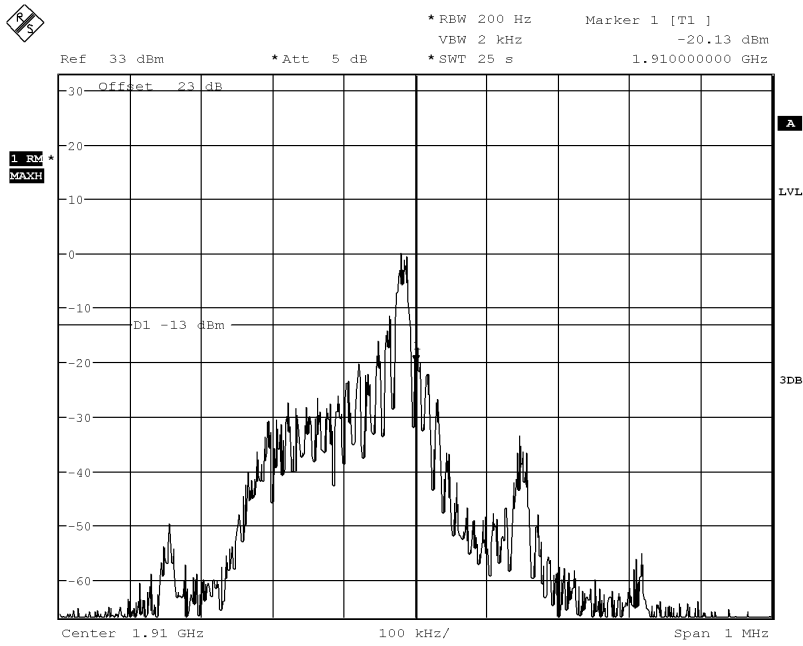
High Channel, Subcarrier (3.75kHz), QPSK, 1@47



Date: 28.DEC.2018 21:32:14

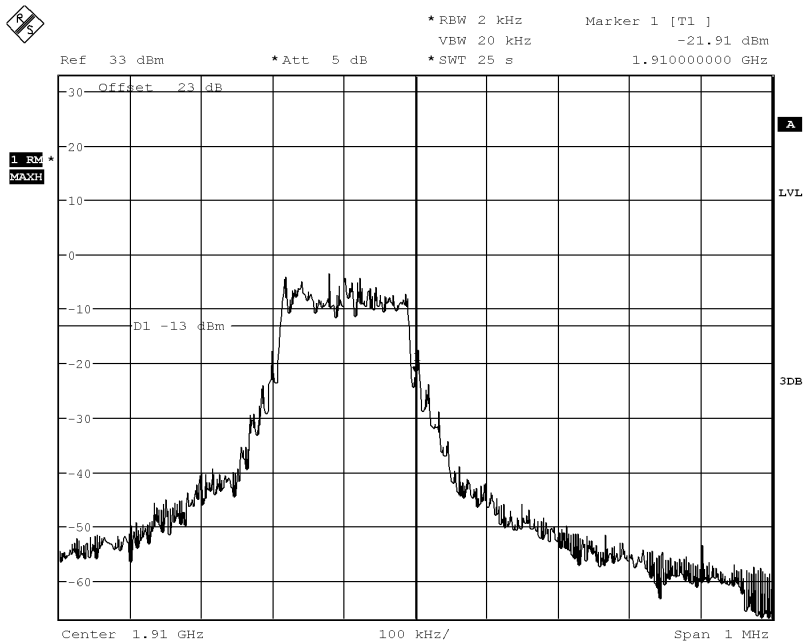
High Channel, Subcarrier (3.75kHz), BPSK, 1@47

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:42:30

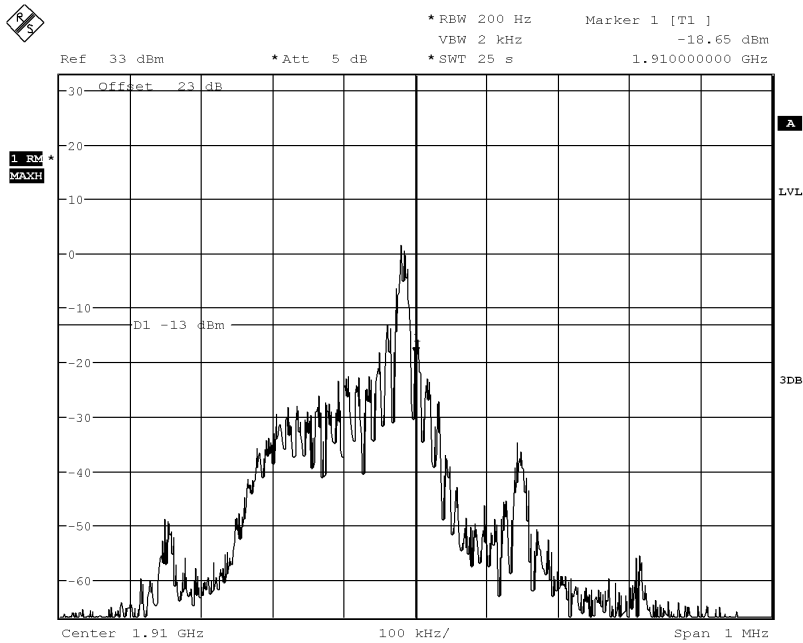
High Channel, Subcarrier (15kHz), QPSK, 1@12



Date: 28.DEC.2018 21:34:13

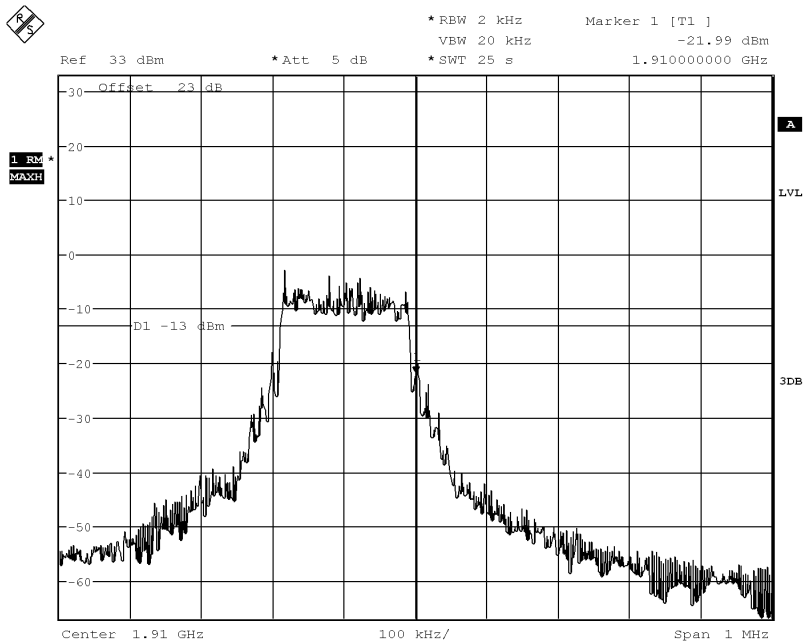
High Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:42:02

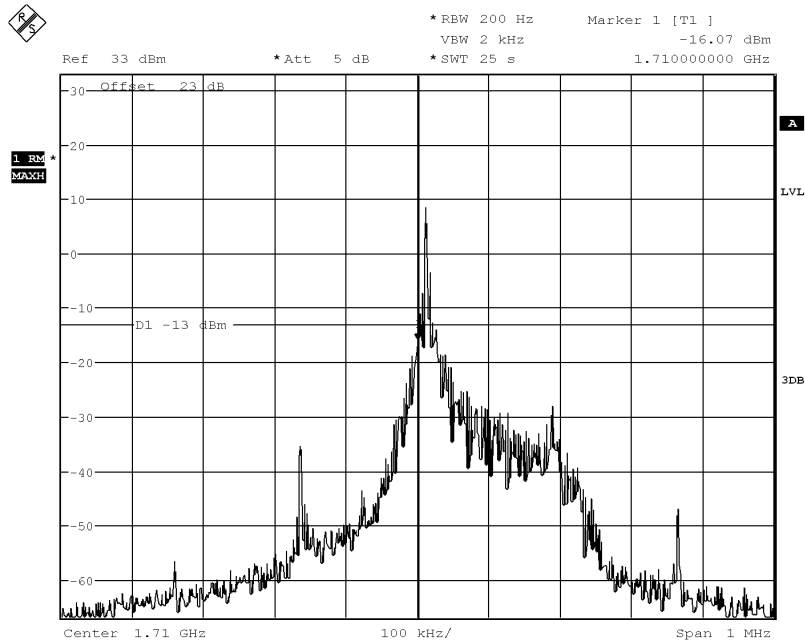
High Channel, Subcarrier (15kHz), BPSK, 1@12



Date: 28.DEC.2018 21:34:43

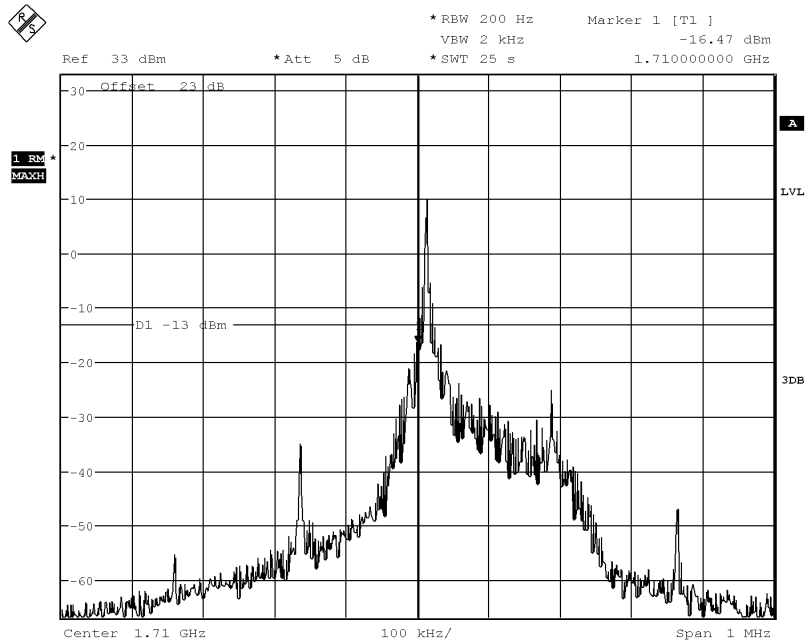
High Channel, Subcarrier (15kHz), BPSK, 12@0

5.5.2 NB-IoT Band 4 Edge Results



Date: 28.DEC.2018 21:14:58

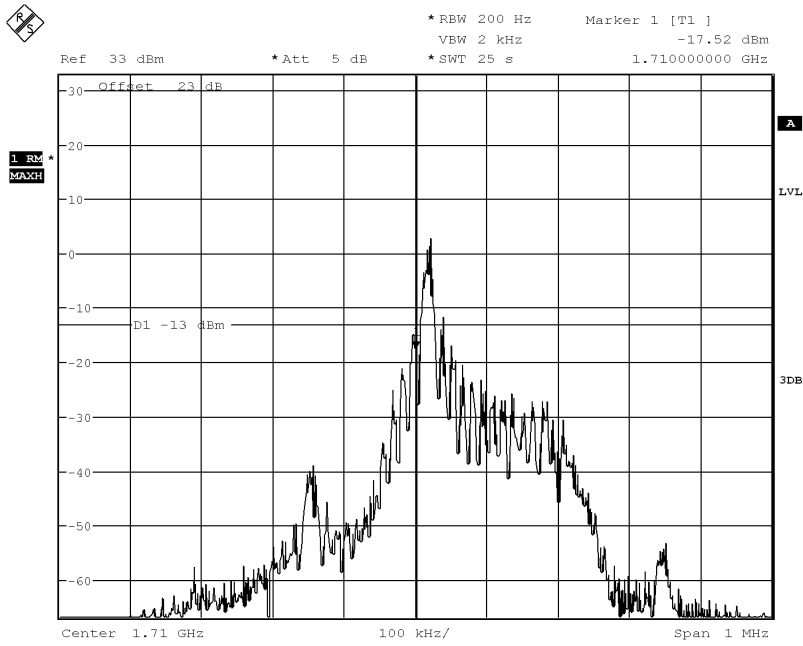
Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



Date: 28.DEC.2018 21:14:27

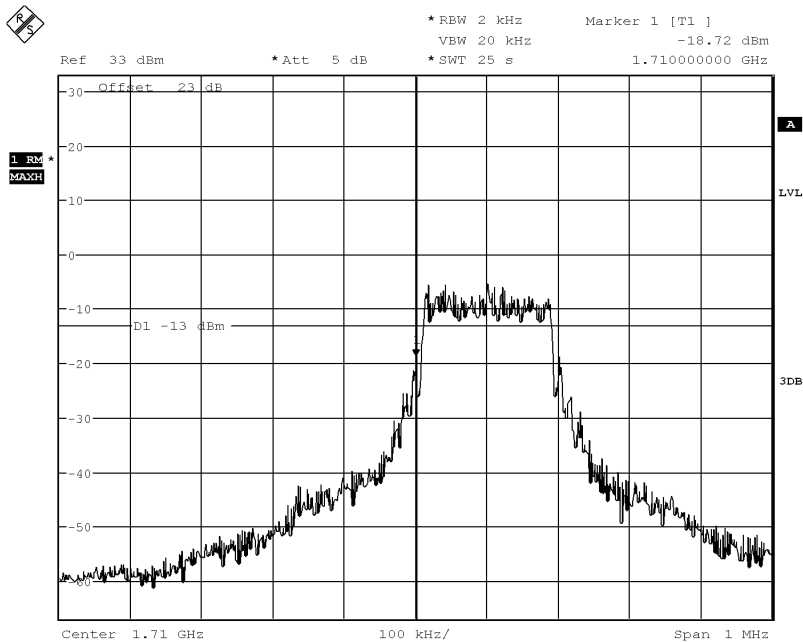
Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:16:25

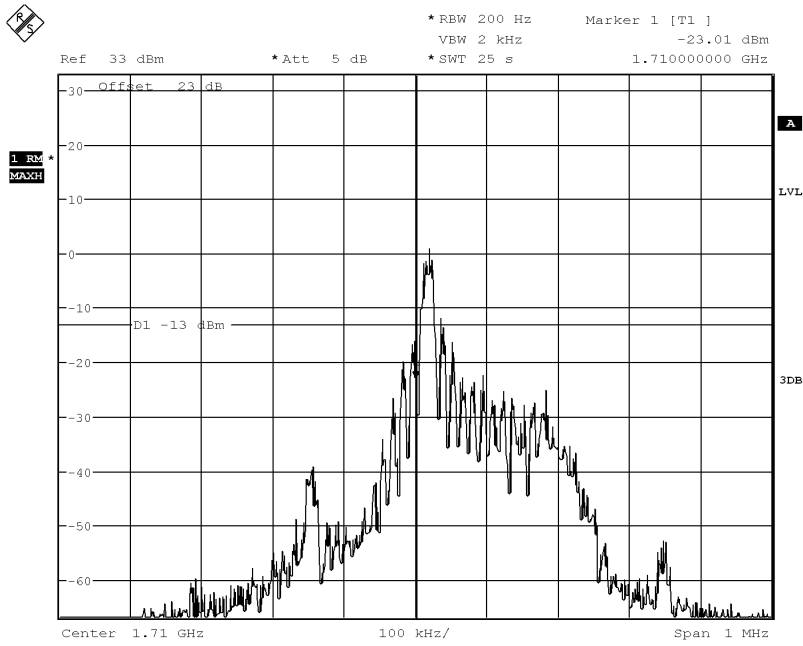
Low Channel, Subcarrier (15kHz), QPSK, 1@0



Date: 28.DEC.2018 21:18:46

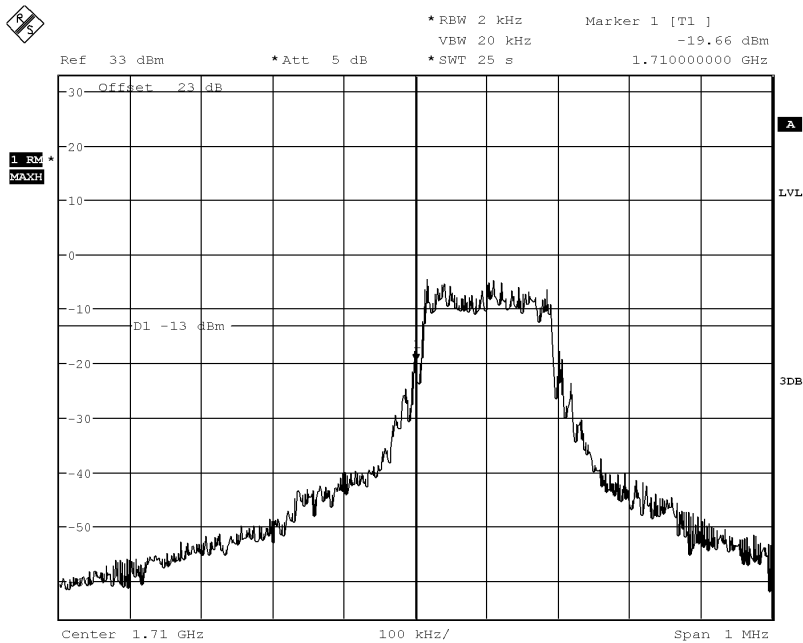
Low Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:16:54

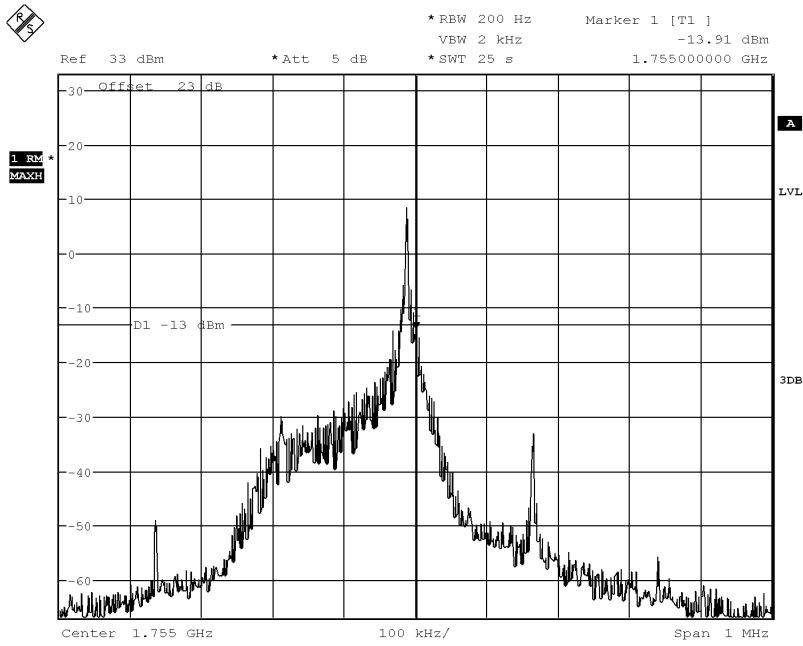
Low Channel, Subcarrier (15kHz), BPSK, 1@0



Date: 28.DEC.2018 21:18:16

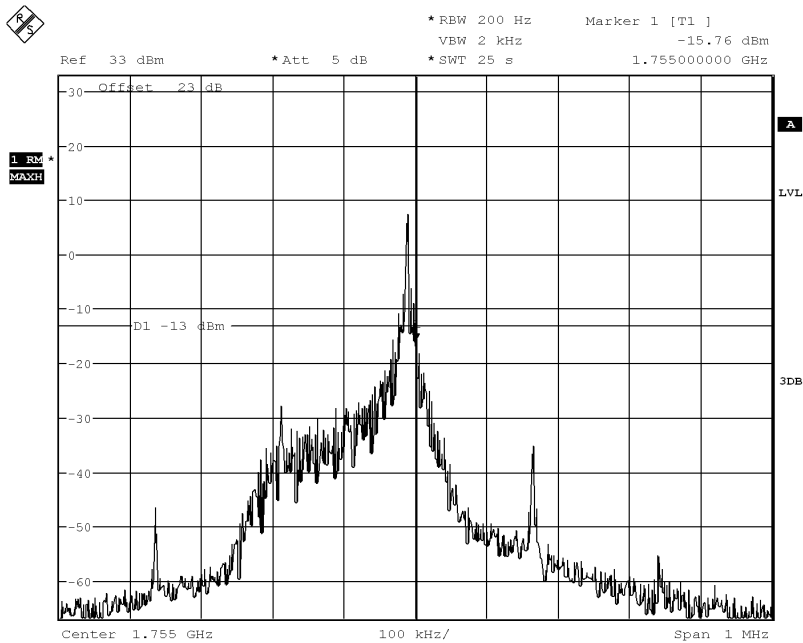
Low Channel, Subcarrier (15kHz), BPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:11:52

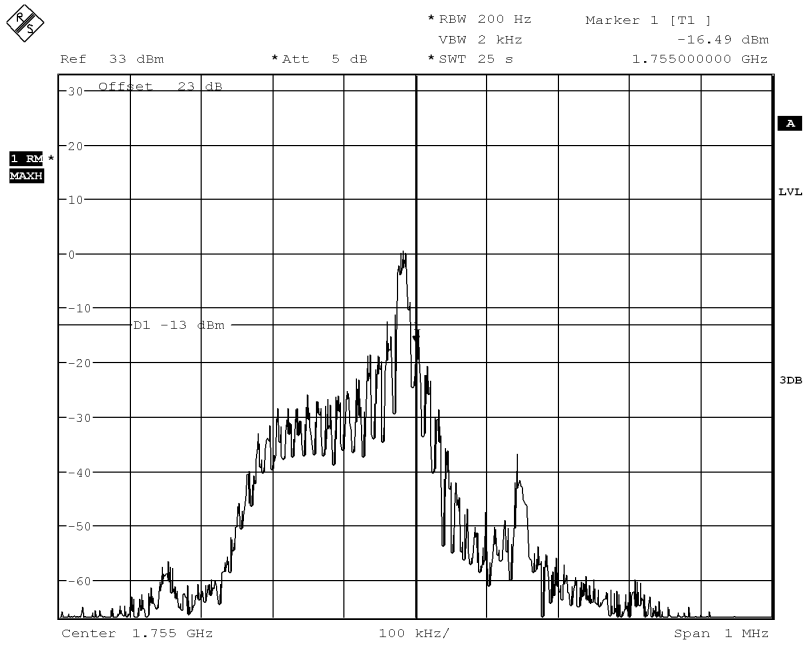
High Channel, Subcarrier (3.75kHz), QPSK, 1@47



Date: 28.DEC.2018 21:12:29

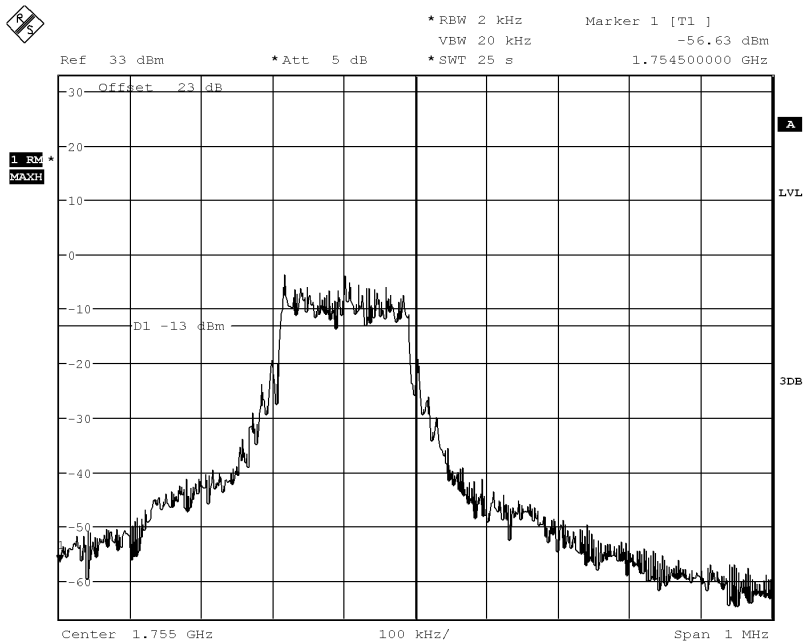
High Channel, Subcarrier (3.75kHz), BPSK, 1@47

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:10:18

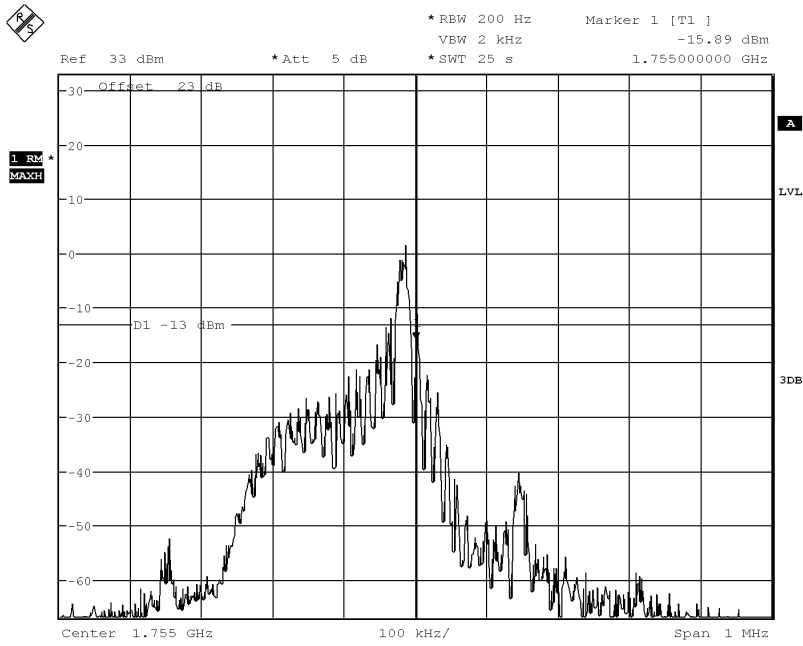
High Channel, Subcarrier (15kHz), QPSK, 1@12



Date: 28.DEC.2018 21:07:39

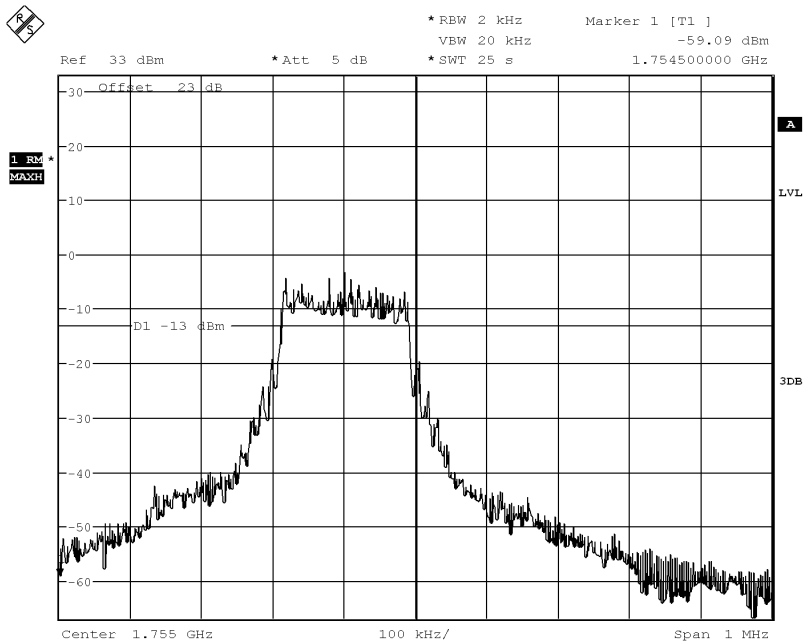
High Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:09:38

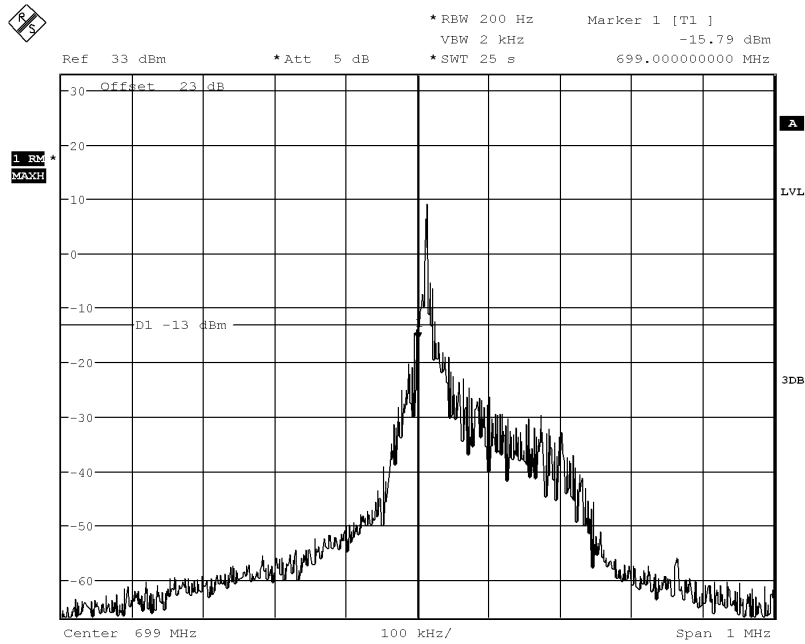
High Channel, Subcarrier (15kHz), BPSK, 1@12



Date: 28.DEC.2018 21:08:16

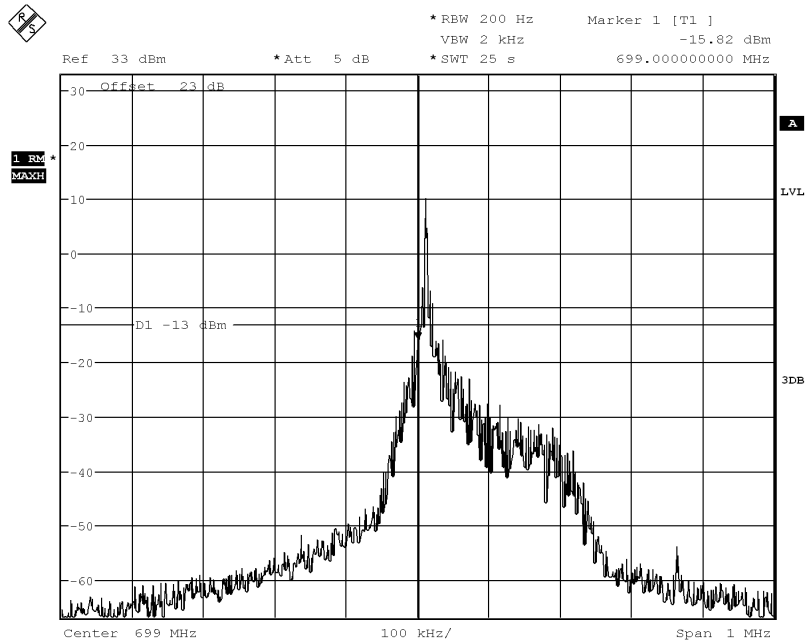
High Channel, Subcarrier (15kHz), BPSK, 12@0

5.5.3 NB-IoT Band 12 Edge Results



Date: 28.DEC.2018 20:55:22

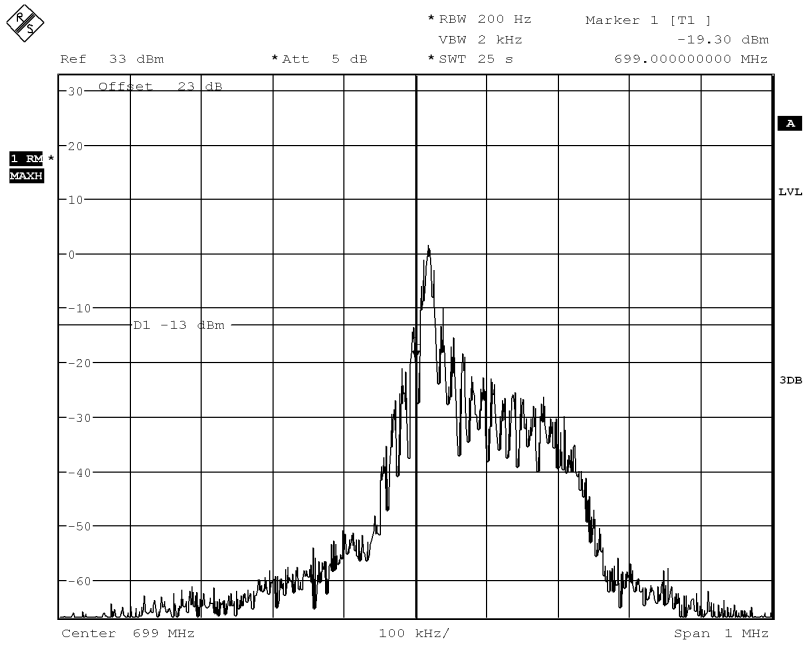
Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



Date: 28.DEC.2018 20:55:53

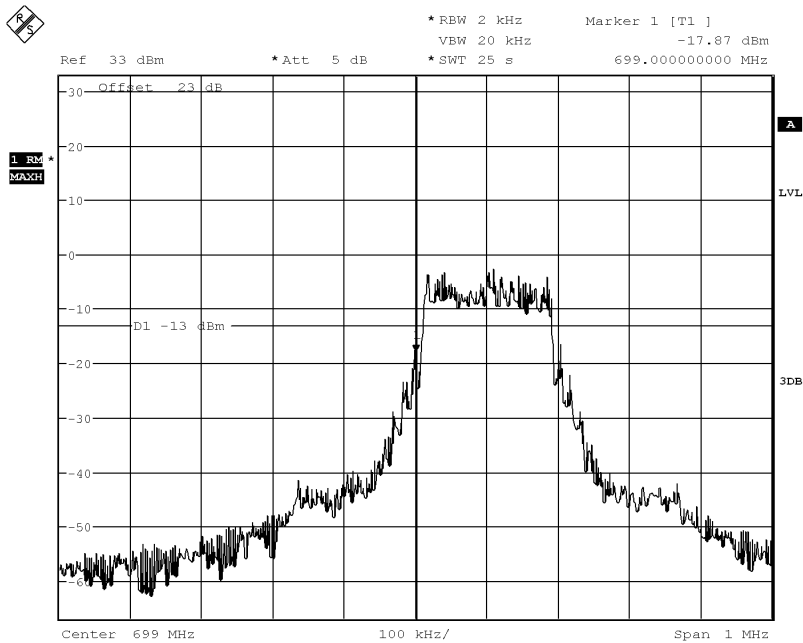
Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:49:49

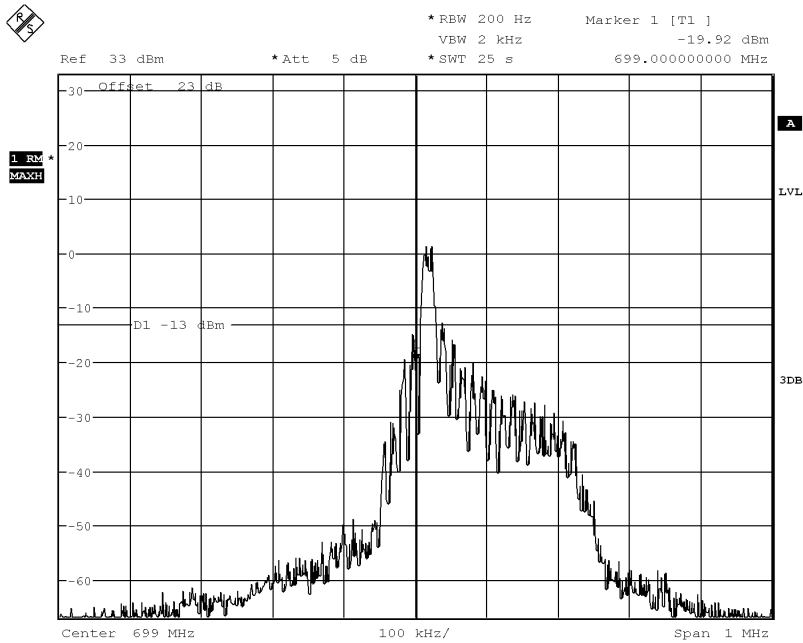
Low Channel, Subcarrier (15kHz), QPSK, 1@0



Date: 28.DEC.2018 20:52:23

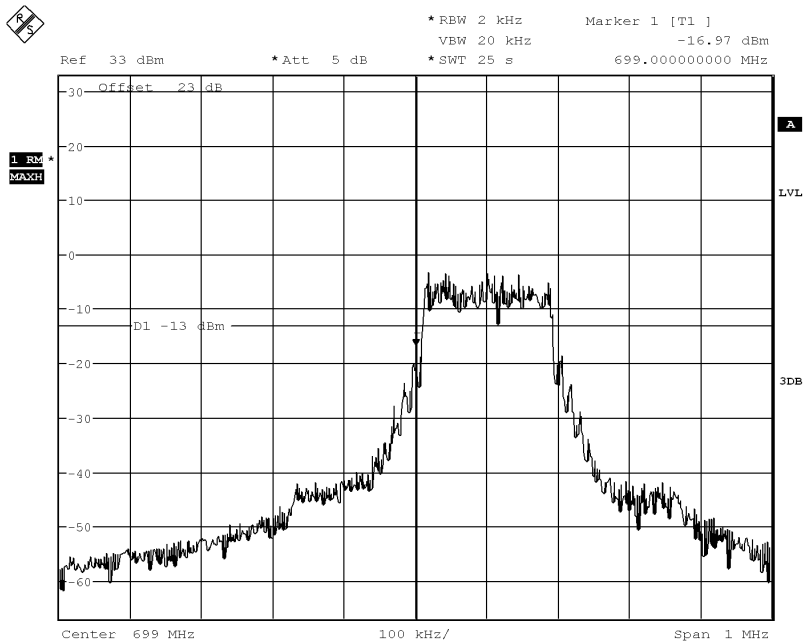
Low Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:50:29

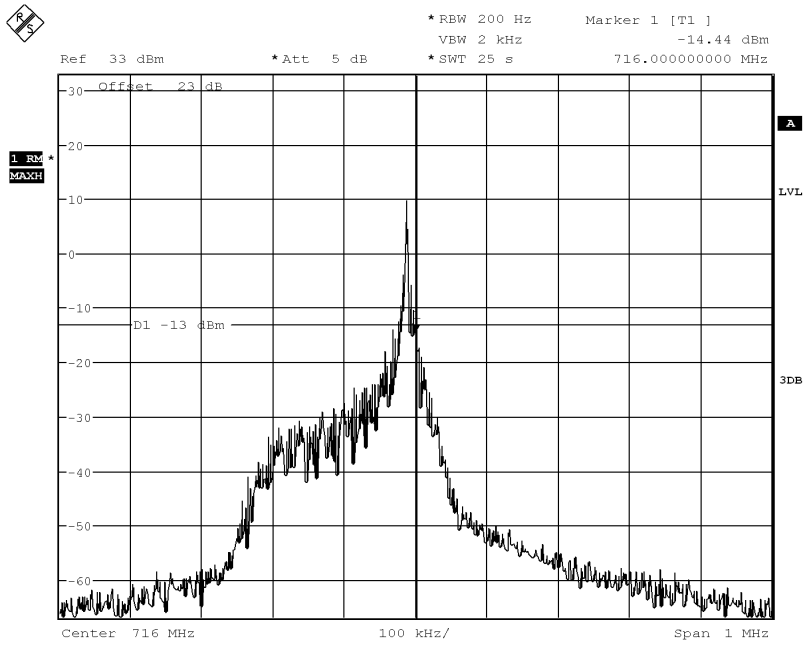
Low Channel, Subcarrier (15kHz), BPSK, 1@0



Date: 28.DEC.2018 20:51:52

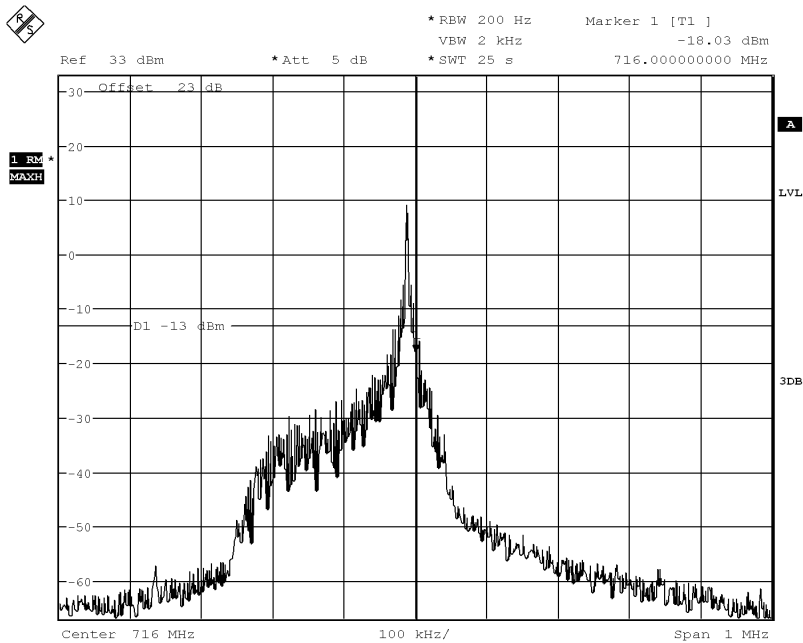
Low Channel, Subcarrier (15kHz), BPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:59:47

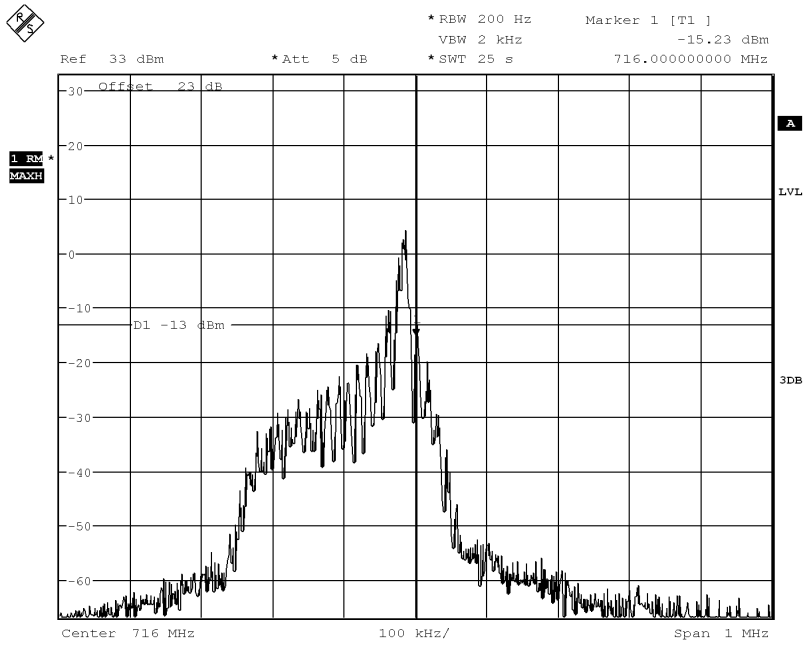
High Channel, Subcarrier (3.75kHz), QPSK, 1@47



Date: 28.DEC.2018 20:59:02

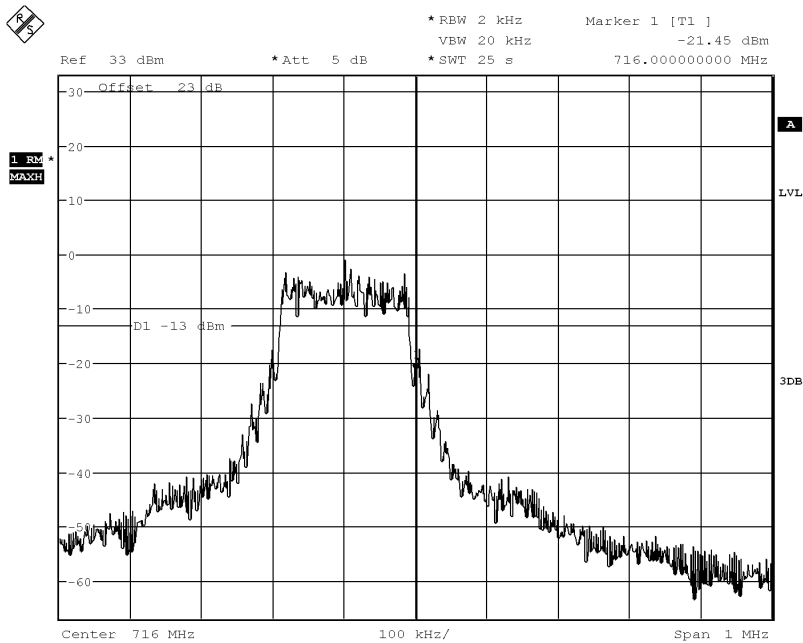
High Channel, Subcarrier (3.75kHz), BPSK, 1@47

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:01:18

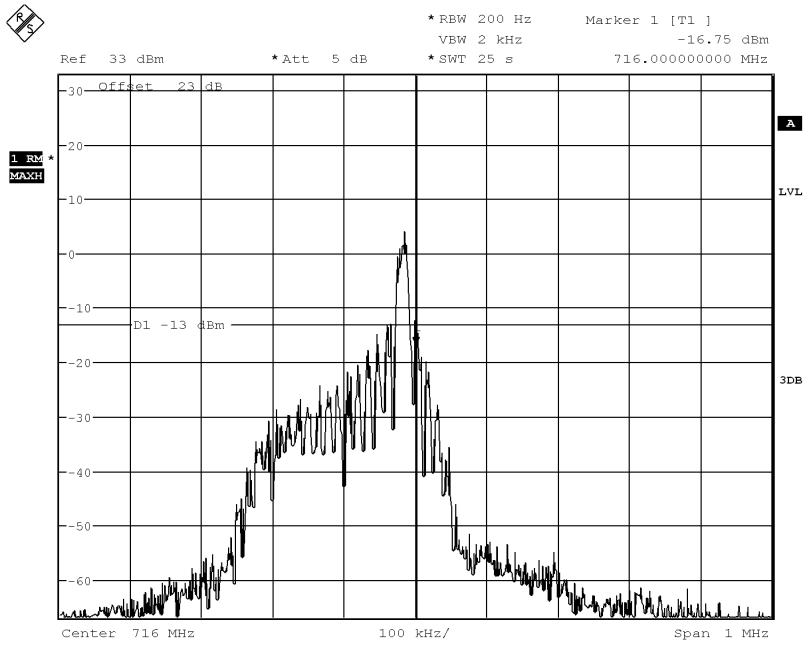
High Channel, Subcarrier (15kHz), QPSK, 1@12



Date: 28.DEC.2018 21:03:33

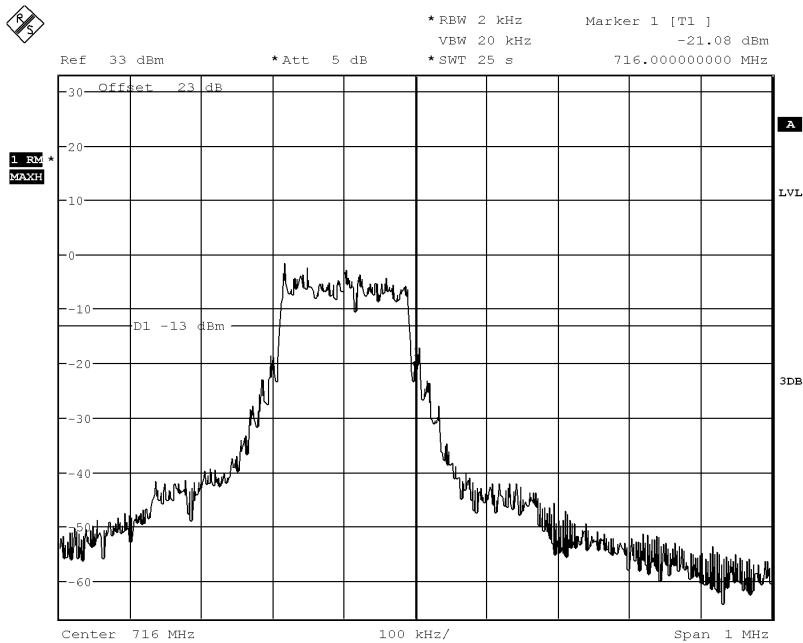
High Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 21:01:48

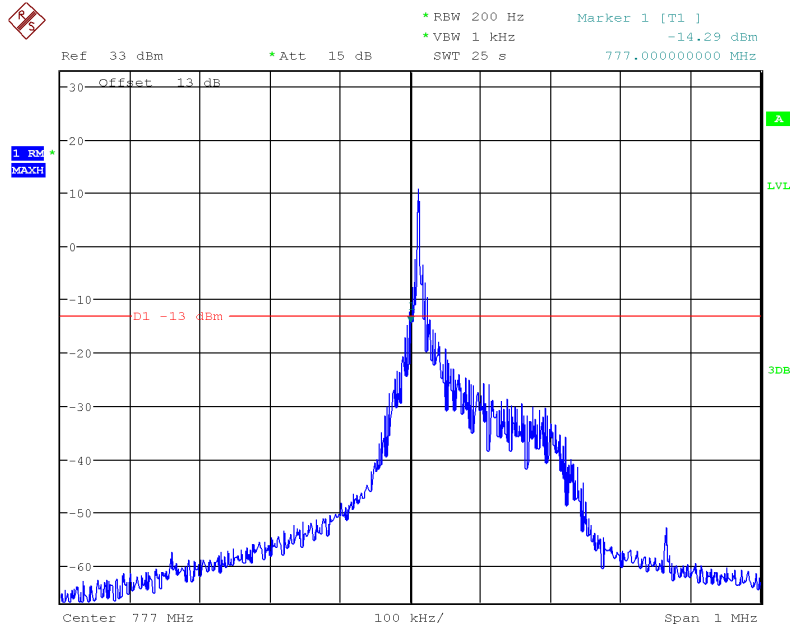
High Channel, Subcarrier (15kHz), BPSK, 1@12



Date: 28.DEC.2018 21:03:03

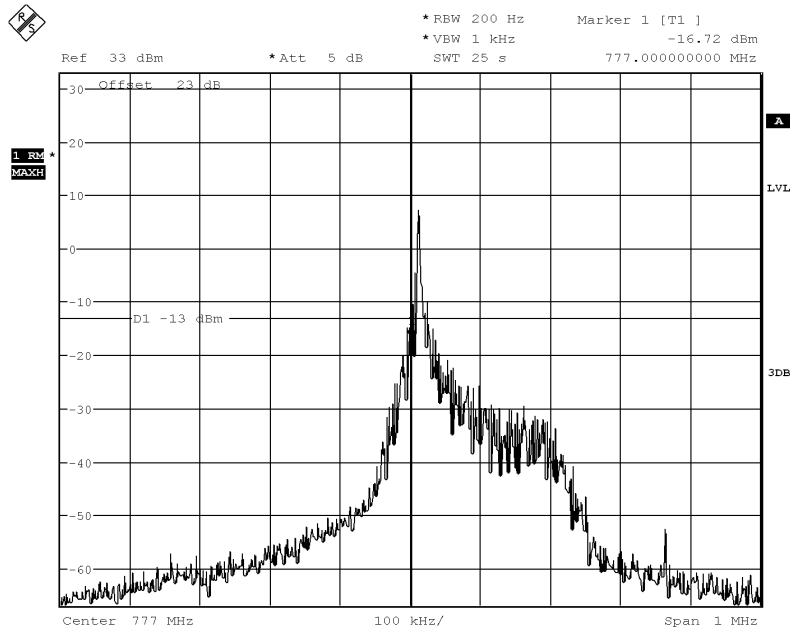
High Channel, Subcarrier (15kHz), BPSK, 12@0

5.5.4 NB-IoT Band 13 Edge Results



Date: 24.DEC.2018 22:11:22

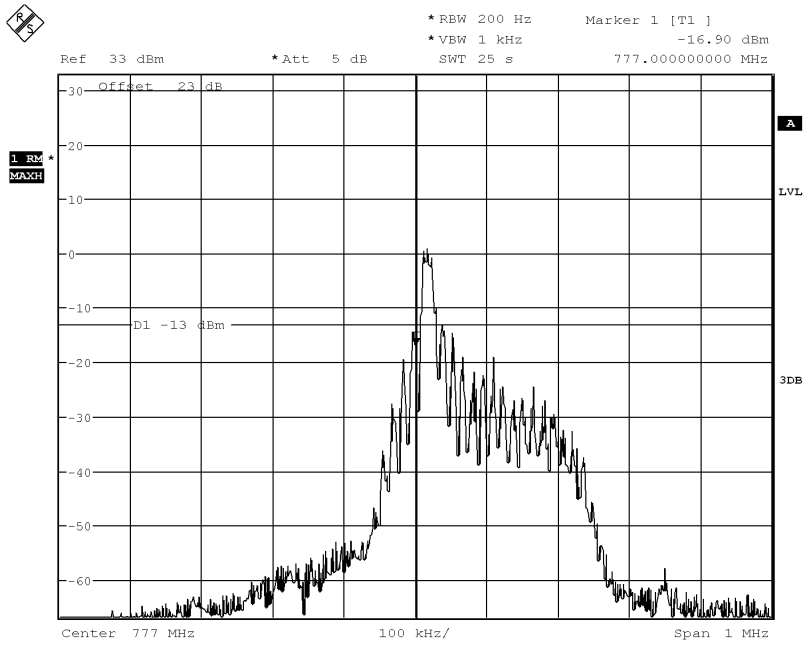
Low Channel, Subcarrier (3.75kHz), QPSK, 1@0



Date: 28.DEC.2018 19:45:51

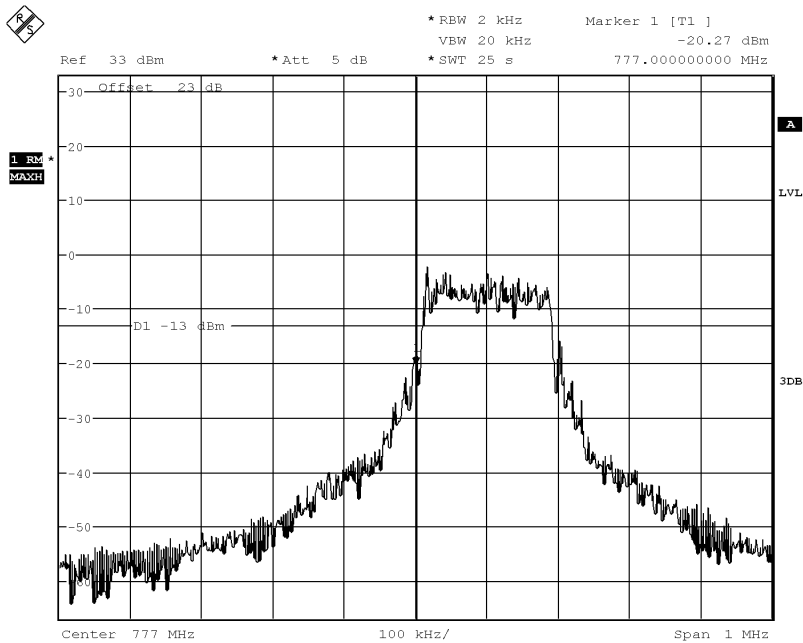
Low Channel, Subcarrier (3.75kHz), BPSK, 1@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 19:42:57

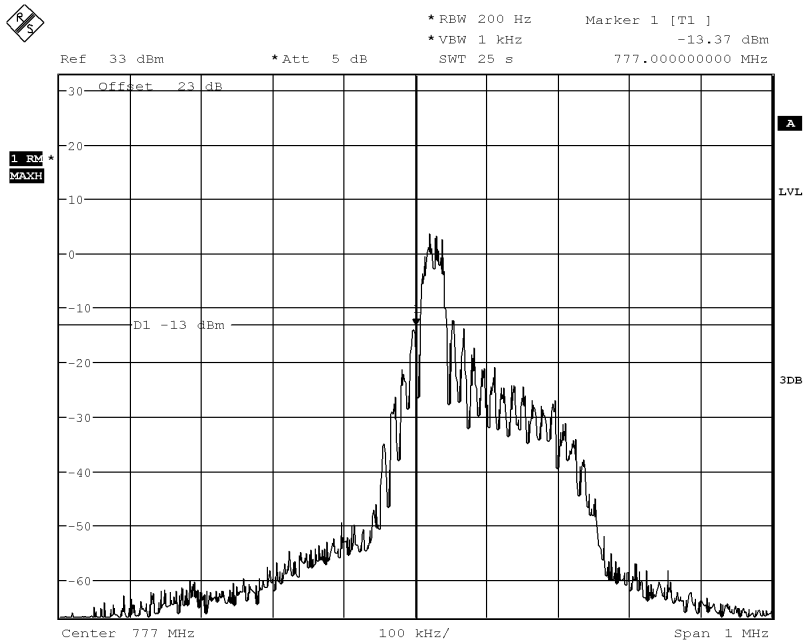
Low Channel, Subcarrier (15kHz), QPSK, 1@0



Date: 28.DEC.2018 20:41:32

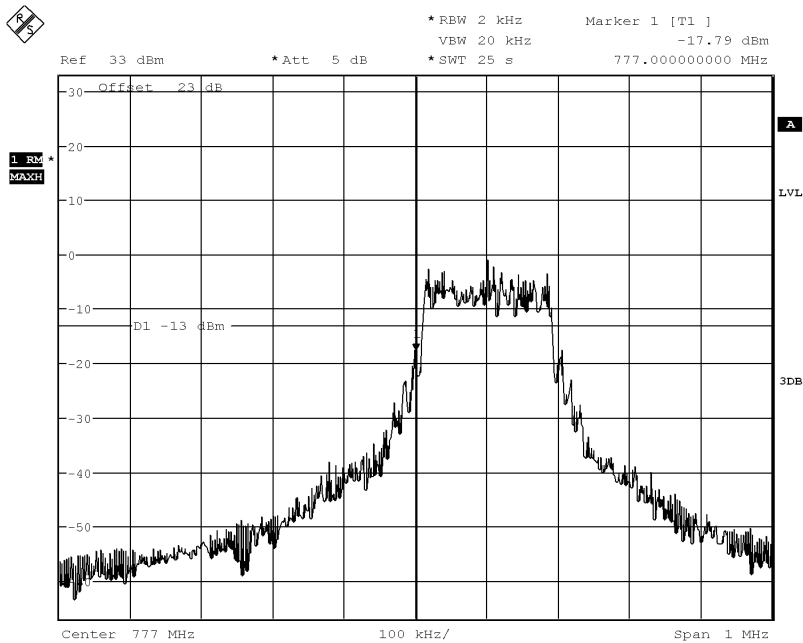
Low Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 19:41:28

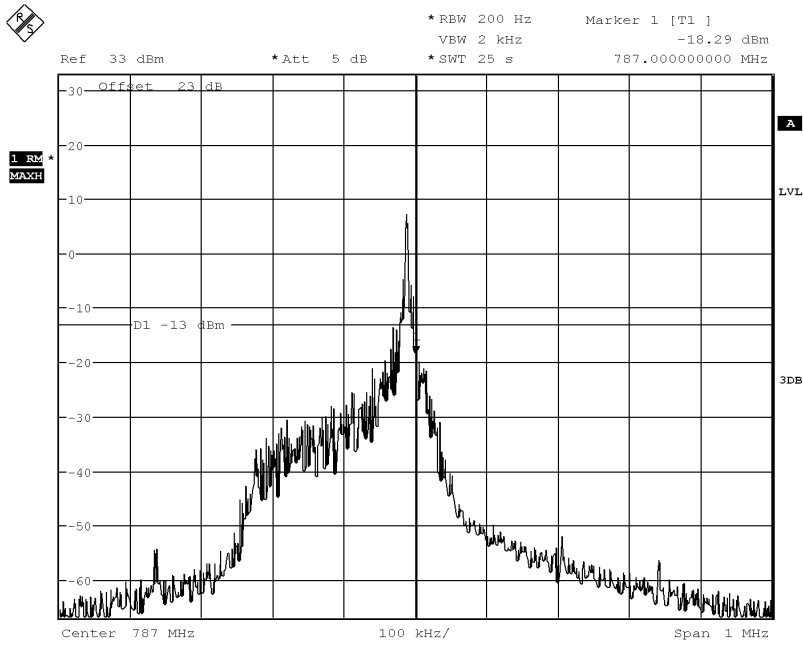
Low Channel, Subcarrier (15kHz), BPSK, 1@0



Date: 28.DEC.2018 20:42:06

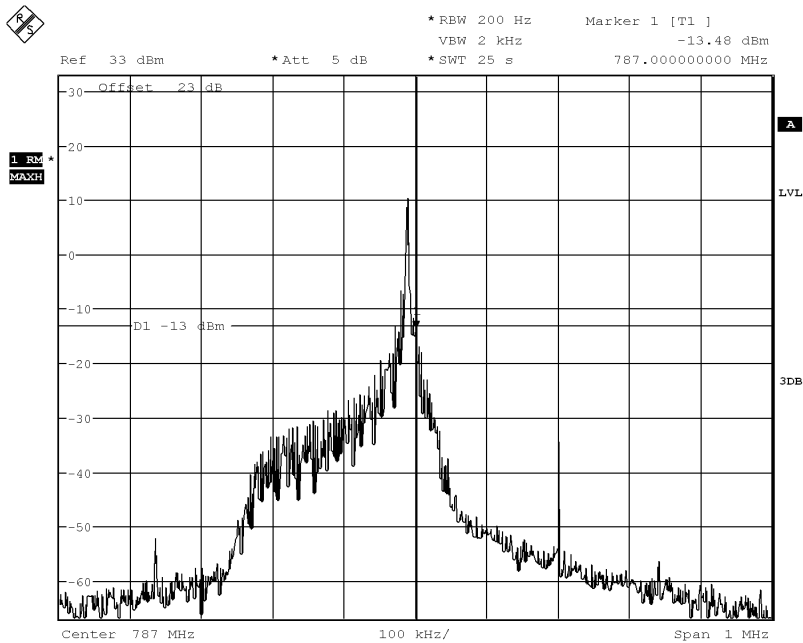
Low Channel, Subcarrier (15kHz), BPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:19:48

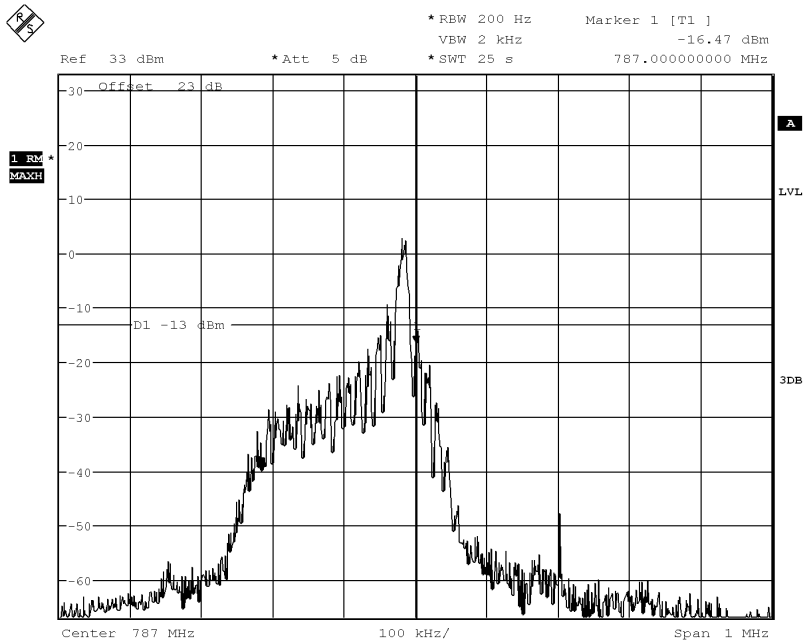
High Channel, Subcarrier (3.75kHz), QPSK, 1@47



Date: 28.DEC.2018 20:19:07

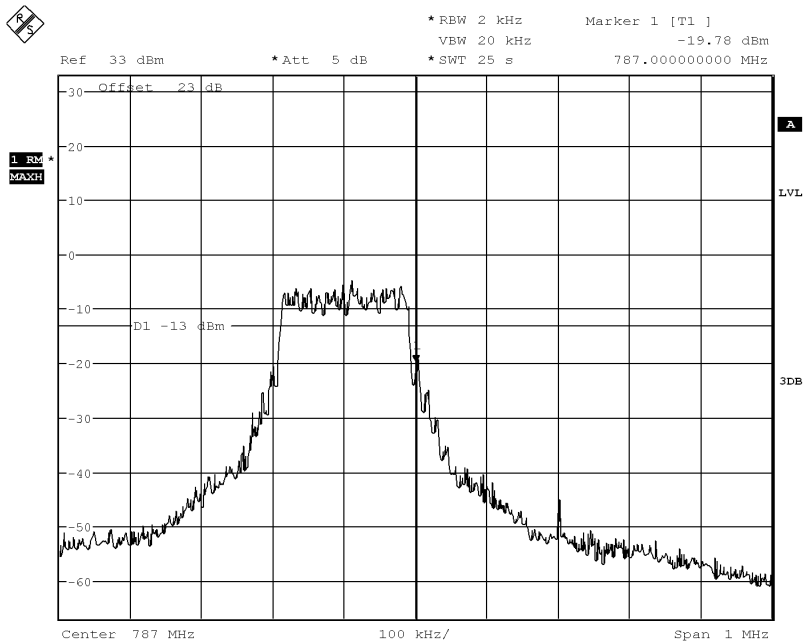
High Channel, Subcarrier (3.75kHz), BPSK, 1@47

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:30:08

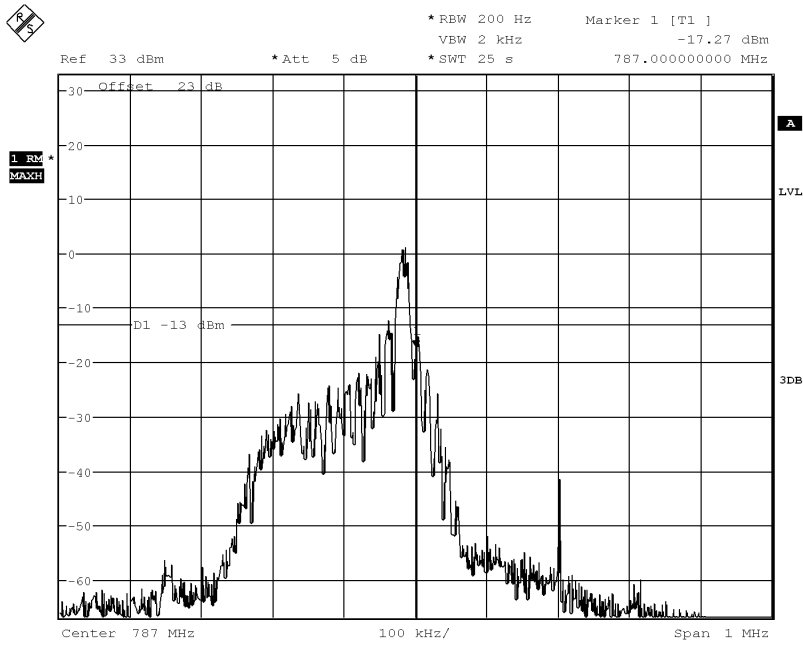
High Channel, Subcarrier (15kHz), QPSK, 1@12



Date: 28.DEC.2018 20:22:52

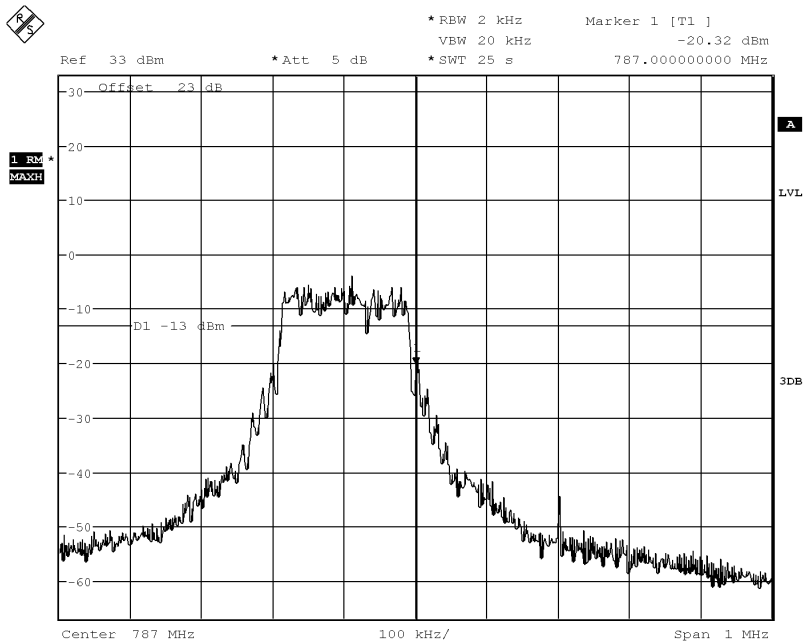
High Channel, Subcarrier (15kHz), QPSK, 12@0

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 20:29:25

High Channel, Subcarrier (15kHz), BPSK, 1@12



Date: 28.DEC.2018 20:23:32

High Channel, Subcarrier (15kHz), BPSK, 12@0

5.6 Frequency Stability over Temperature Variation

Specifications:	FCC Part 2.1055, 24.235, 27.54
DUT Serial Number:	865235030045922
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

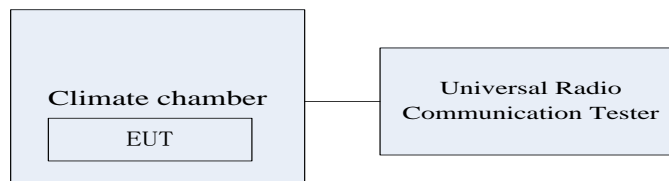
Limit	
Frequency deviation [ppm]	±2.5

Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty	15 Hz (k=2)

Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.



Test Method

- 1、 The EUT was turned off and placed in the temperature chamber.
- 2、 The temperature of the chamber was set to -30°C and allowed to stabilize.
- 3、 The EUT temperature was allowed to stabilize for 45 minutes.
- 4、 The EUT was turned on and set to transmit with Wireless Telecommunications Test Set.
- 5、 The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.
- 6、 The steps 3-5 were repeated for -30°C, -20°C, -10°C, 0°C, 10°C, 20°C, 30°C, 40°C and 50°C.

Note: Only worst case mode of in-band result is given below, the EUT is working in BPSK modulation, Sub-carrier Spacing 15 kHz, full tones, middle channel mode.

5.6.1 NB-IoT Band Frequency Stability over Temperature Variation Results

Band	Offset	Temperature[°C]								
		-30	-20	-10	0	10	20	30	40	50
Band 2	Hz	-23.60	-34.15	-25.32	-19.78	-10.54	-20.48	-24.60	-14.22	-20.48
	ppm	-0.013	-0.018	-0.013	-0.011	-0.006	-0.011	-0.013	-0.007	-0.011
Band 4	Hz	-23.27	-6.04	-9.00	-6.56	-0.81	-18.52	-5.29	-4.50	-3.79
	ppm	-0.013	-0.003	-0.005	-0.004	-0.001	-0.011	-0.003	-0.003	-0.002
Band 12	Hz	-10.18	-1.48	-1.76	-3.13	-1.41	-15.53	-6.15	-4.79	-9.21
	ppm	-0.014	-0.002	-0.002	-0.004	-0.002	-0.021	-0.009	-0.007	-0.013
Band 13	Hz	-12.26	-4.18	-7.57	-1.81	-1.02	-17.64	-3.63	-3.87	-1.72
	ppm	-0.016	-0.005	-0.010	-0.002	-0.001	-0.023	-0.005	-0.005	-0.002

5.7 Frequency Stability over Voltage Variation

Specifications:	FCC Part 2.1055, 24.235, 27.54
DUT Serial Number:	865235030045922
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

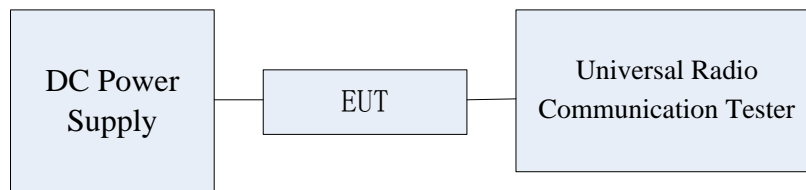
Limit	
Frequency deviation [ppm]	±2.5

Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty	15 Hz (k=2)

Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.



Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

Note: Only worst case mode of in-band result is given below, the EUT is working in BPSK modulation, Sub-carrier Spacing 15 kHz, full tones, middle channel mode.

5.7.1 NB-IoT Band Frequency Stability over Voltage Variation Results

Test data:

Band	Offset	Voltage (V)		
		3.00	3.80	4.30
Band 2	Hz	-20.21	-15.67	-17.87
	ppm	-0.011	-0.008	-0.009
Band 4	Hz	-10.45	-8.65	-12.32
	ppm	-0.006	-0.005	-0.007
Band 12	Hz	-4.42	-4.82	-6.93
	ppm	-0.006	-0.007	-0.010
Band 13	Hz	-4.79	-5.67	-6.21
	ppm	-0.006	-0.007	-0.008

5.8 Peak to Average Ratio

Specifications:	FCC Part 24.232, 27.50,
DUT Serial Number:	865235030045922
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit

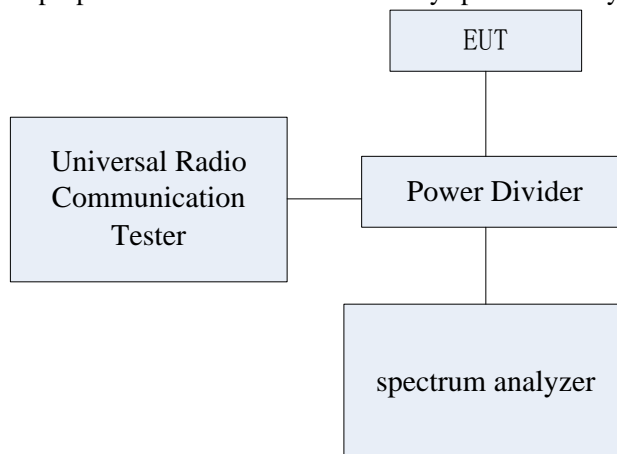
The EUT meets the requirement of having a peak to average ratio of less than 13dB.

Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty	0.52 dB (k=2)

Test Setup

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

The transmitter output was connected to a SP8315 through a coaxial RF cable and directional coupler, and configured to operate at maximum power. The peak to average ratio was measured at the required operating frequencies in each Band on the Spectrum Analyzer.

Note: Only worst case mode of in-band result is given below.

5.8.1 NB-IoT band 2 Peak to Average Ratio Results

Channel	Sub-carrier Spacing [kHz]	Modulation	N _{tones}	Peak to Average Ratio
Low	15	BPSK	1	3.55
		QPSK	1	3.48
			12	4.26
Mid	15	BPSK	1	3.72
		QPSK	1	4.21
			12	4.52
High	15	BPSK	1	2.96
		QPSK	1	2.95
			12	4.39

5.8.2 NB-IoT band 4 Peak to Average Ratio Results

Channel	Sub-carrier Spacing [kHz]	Modulation	N _{tones}	Peak to Average Ratio
Low	15	BPSK	1	5.74
		QPSK	1	3.81
			12	5.37
Mid	15	BPSK	1	3.59
		QPSK	1	3.71
			12	3.58
High	15	BPSK	1	3.55
		QPSK	1	3.61
			12	3.53

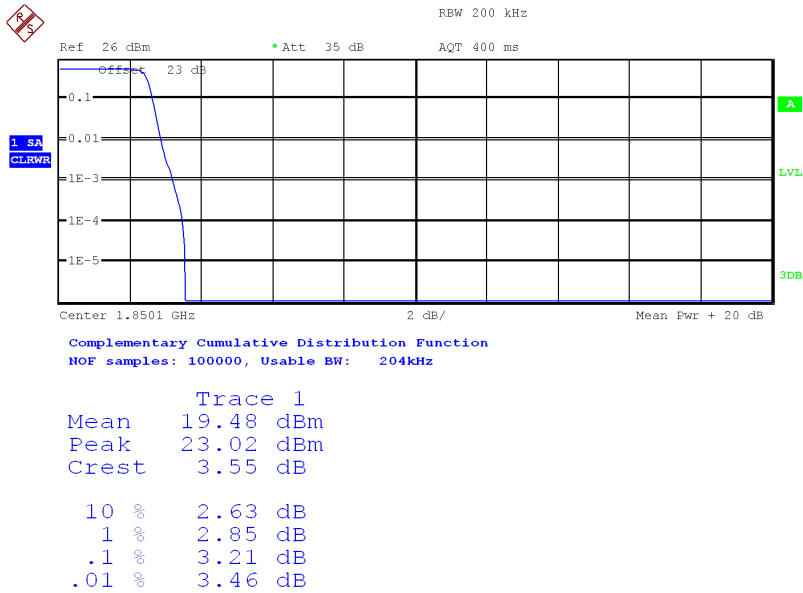
5.8.3 NB-IoT band 12 Peak to Average Ratio Results

Channel	Sub-carrier Spacing [kHz]	Modulation	N _{tones}	Peak to Average Ratio
Low	15	BPSK	1	6.34
		QPSK	1	6.28
			12	8.21
Mid	15	BPSK	1	4.13
		QPSK	1	4.51
			12	8.28
High	15	BPSK	1	4.27
		QPSK	1	4.27
			12	5.84

5.8.4 NB-IoT band 13 Peak to Average Ratio Results

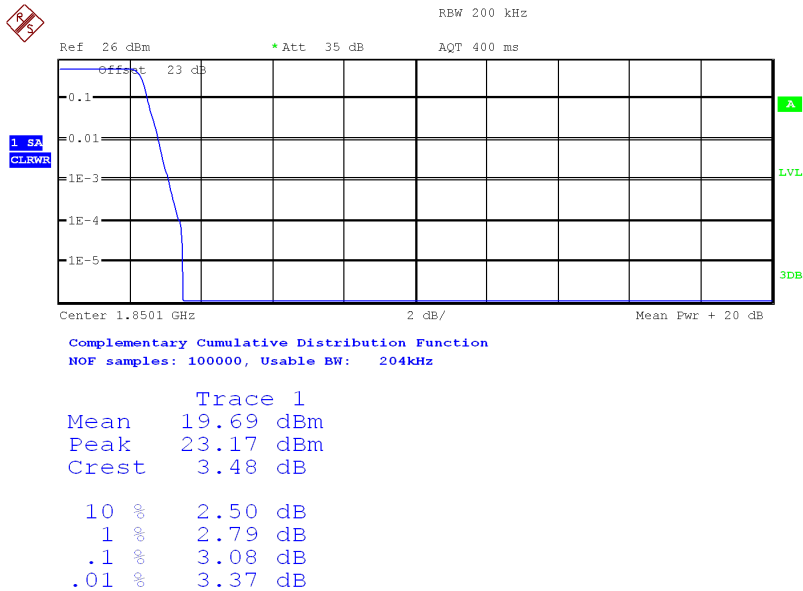
Channel	Sub-carrier Spacing [kHz]	Modulation	N _{tones}	Peak to Average Ratio
Low	15	BPSK	1	5.66
		QPSK	1	5.03
			12	6.36
Mid	15	BPSK	1	4.15
		QPSK	1	4.30
			12	6.48
High	15	BPSK	1	3.12
		QPSK	1	3.33
			12	6.00

Graphical for Peak to Average Ratio Results



Date: 28.DEC.2018 23:28:08

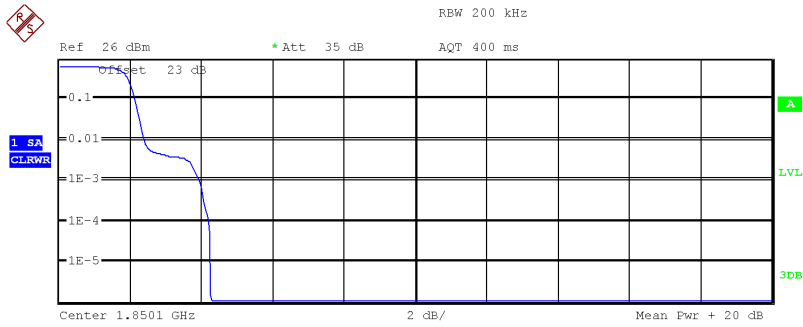
NB-IoT Band 2, Low Channel, BPSK, 1



Date: 28.DEC.2018 23:28:26

NB-IoT Band 2, Low Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



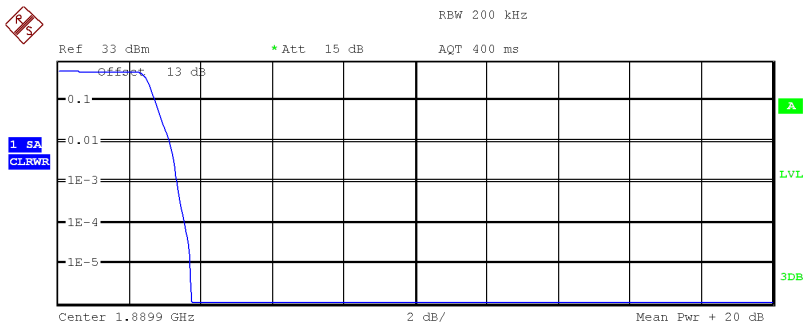
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

Trace 1
 Mean 18.56 dBm
 Peak 22.81 dBm
 Crest 4.26 dB

10 %	2.15 dB
1 %	2.40 dB
.1 %	3.94 dB
.01 %	4.20 dB

Date: 28.DEC.2018 23:28:51

NB-IoT Band 2, Low Channel, QPSK, 12



Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

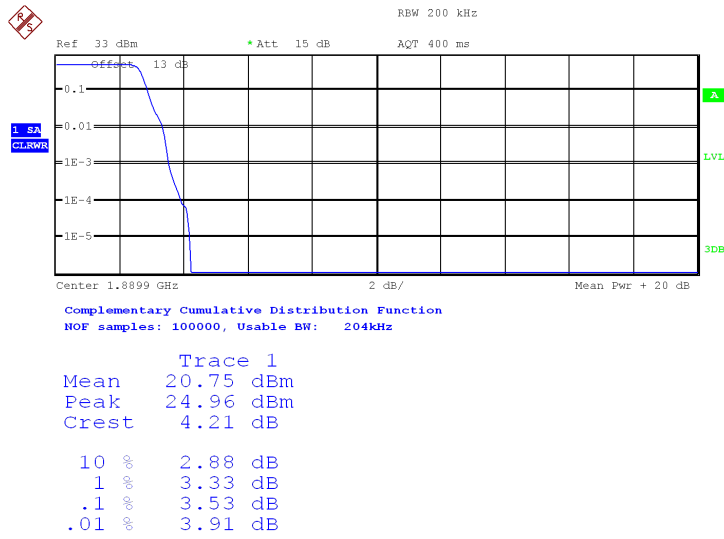
Trace 1
 Mean 20.82 dBm
 Peak 24.54 dBm
 Crest 3.72 dB

10 %	2.72 dB
1 %	3.11 dB
.1 %	3.33 dB
.01 %	3.56 dB

Date: 24.DEC.2018 21:15:44

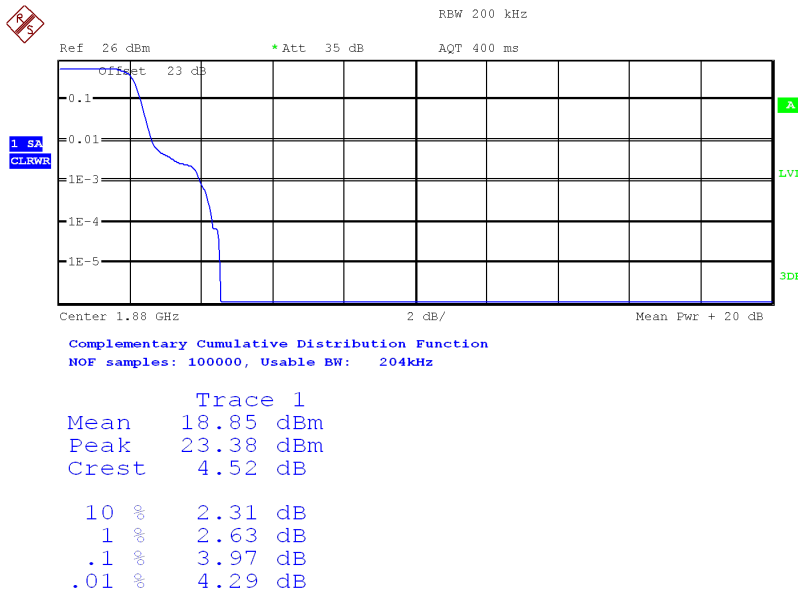
NB-IoT Band 2, Mid Channel, BPSK, 1

Report No.:B18W50650-WWAN_Rev2



Date: 24.DEC.2018 21:15:05

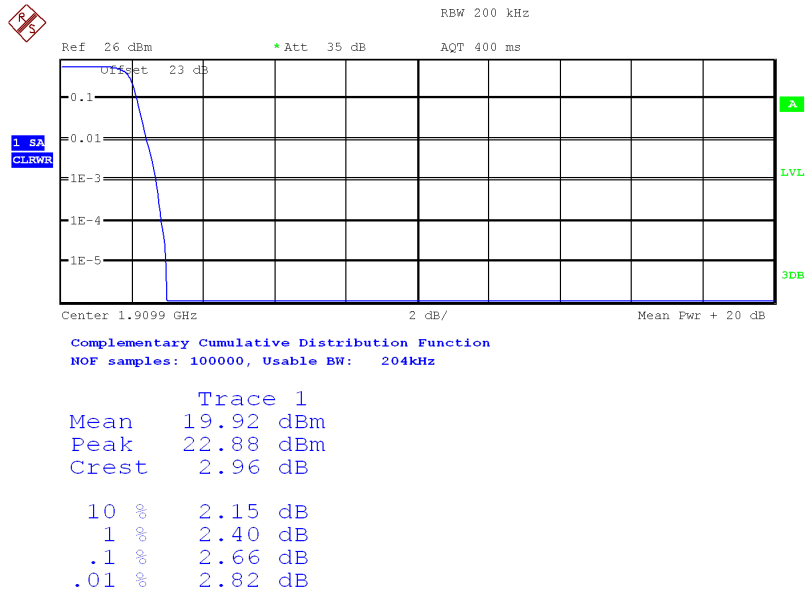
NB-IoT Band 2, Mid Channel, QPSK, 1



Date: 28.DEC.2018 23:29:49

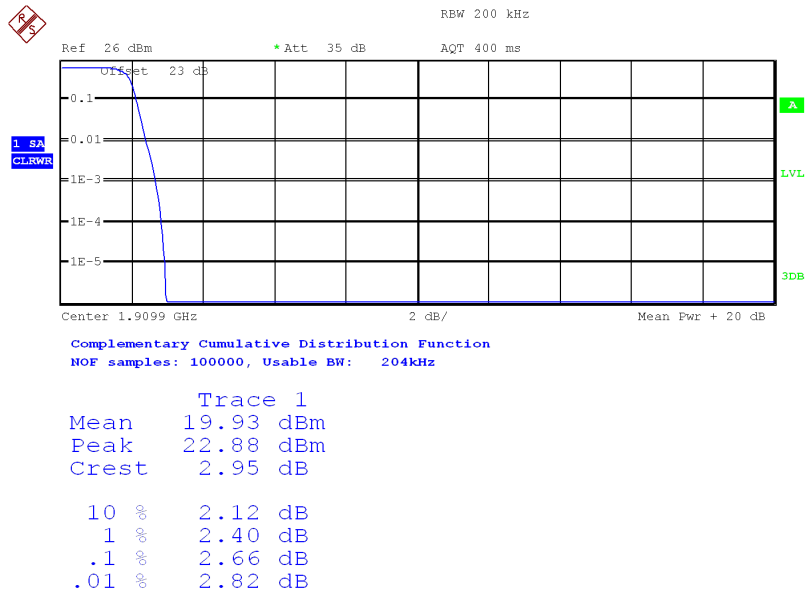
NB-IoT Band 2, Mid Channel, QPSK, 12

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:31:39

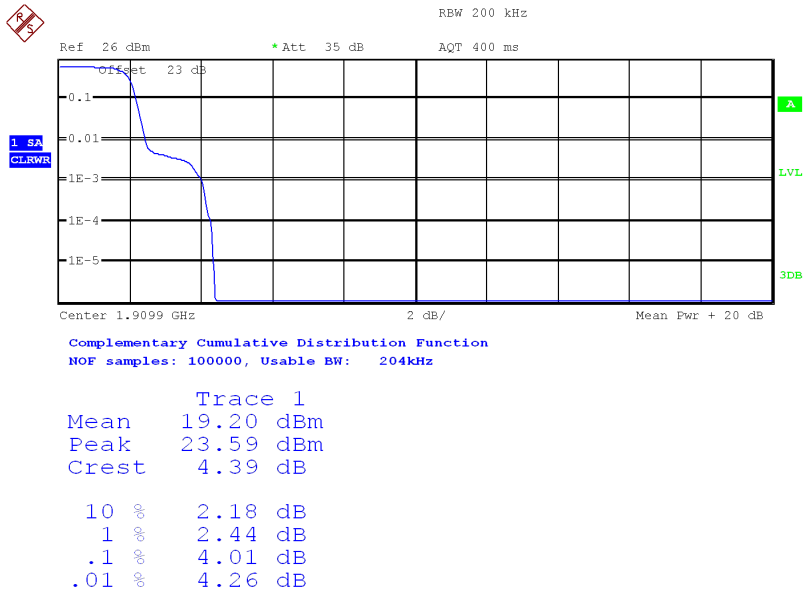
NB-IoT Band 2, High Channel, BPSK, 1



Date: 28.DEC.2018 23:31:34

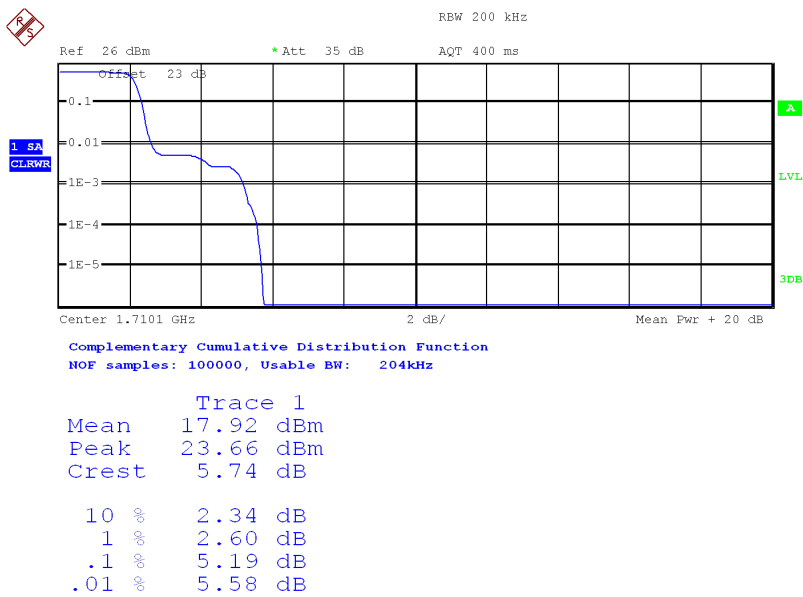
NB-IoT Band 2, High Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:31:03

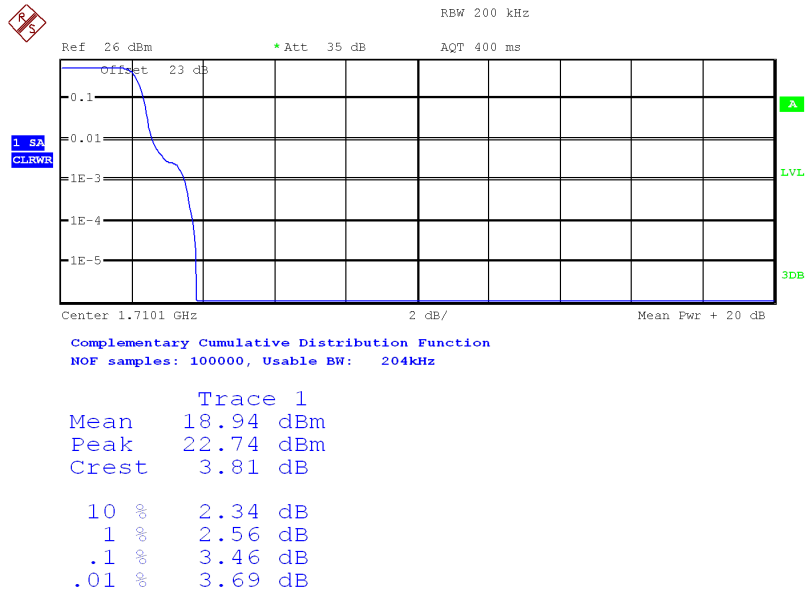
NB-IoT Band 2, High Channel, QPSK, 12



Date: 28.DEC.2018 23:19:26

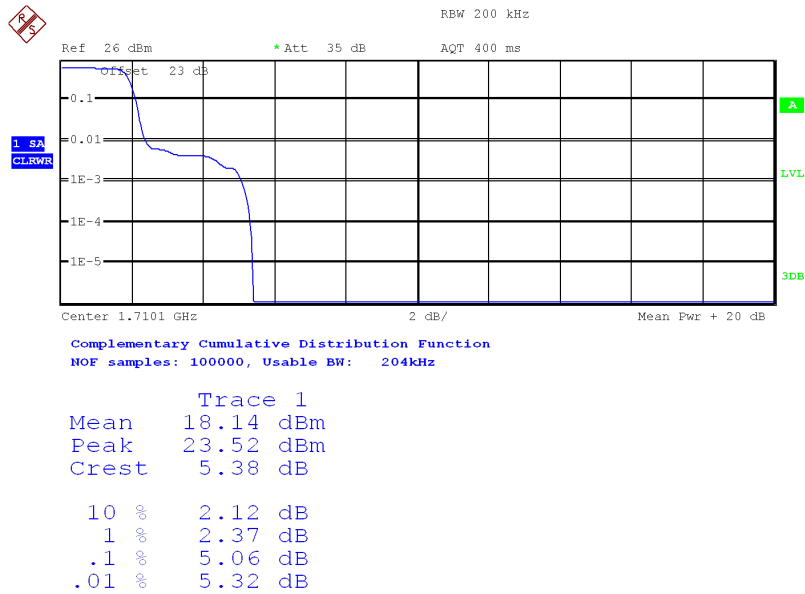
NB-IoT Band 4, Low Channel, BPSK, 1

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:19:50

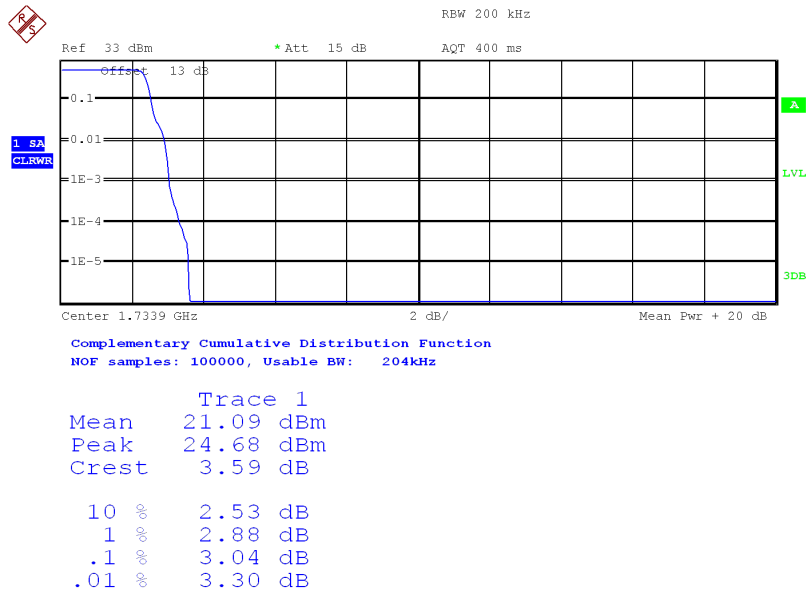
NB-IoT Band 4, Low Channel, QPSK, 1



Date: 28.DEC.2018 23:19:03

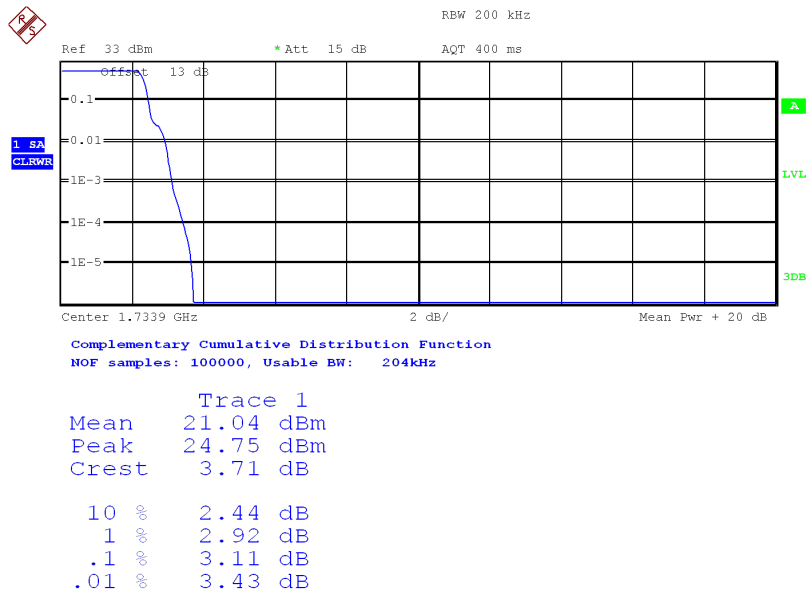
NB-IoT Band 4, Low Channel, QPSK, 12

Report No.:B18W50650-WWAN_Rev2



Date: 24.DEC.2018 21:25:15

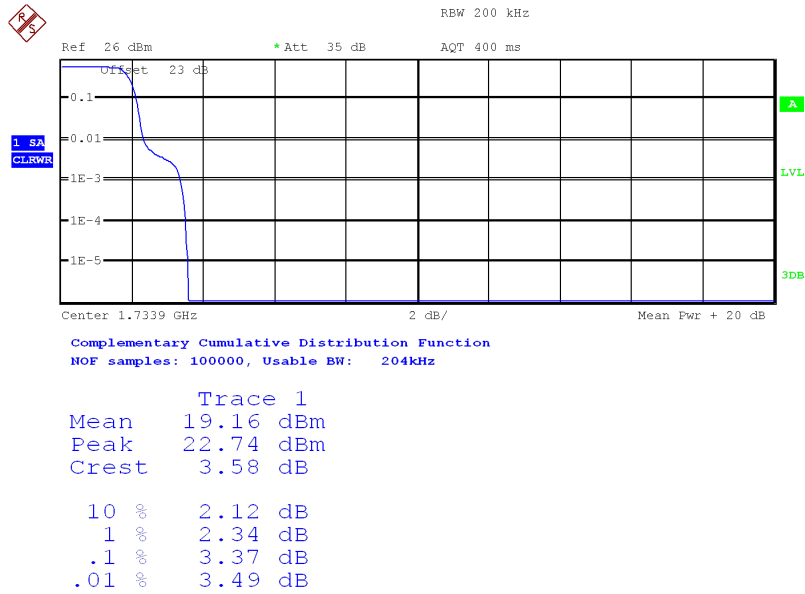
NB-IoT Band 4, Mid Channel, BPSK, 1



Date: 24.DEC.2018 21:25:44

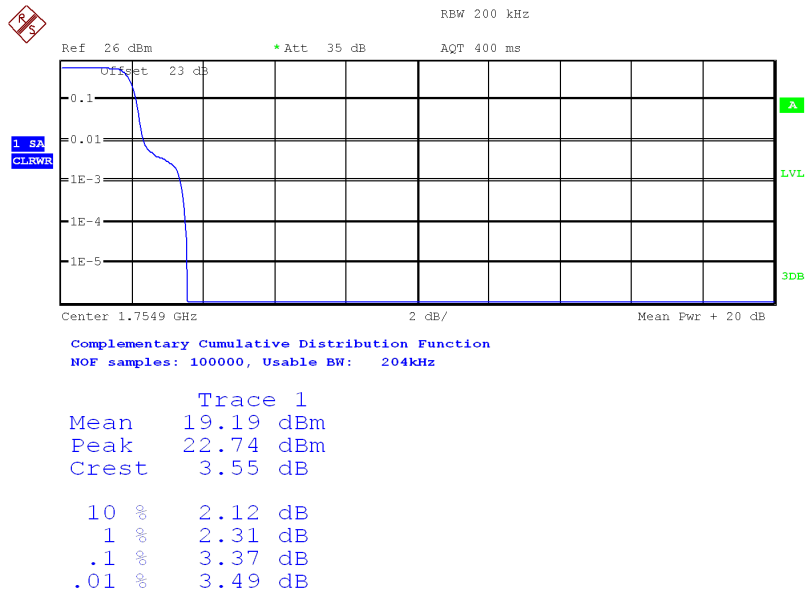
NB-IoT Band 4, Mid Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:21:40

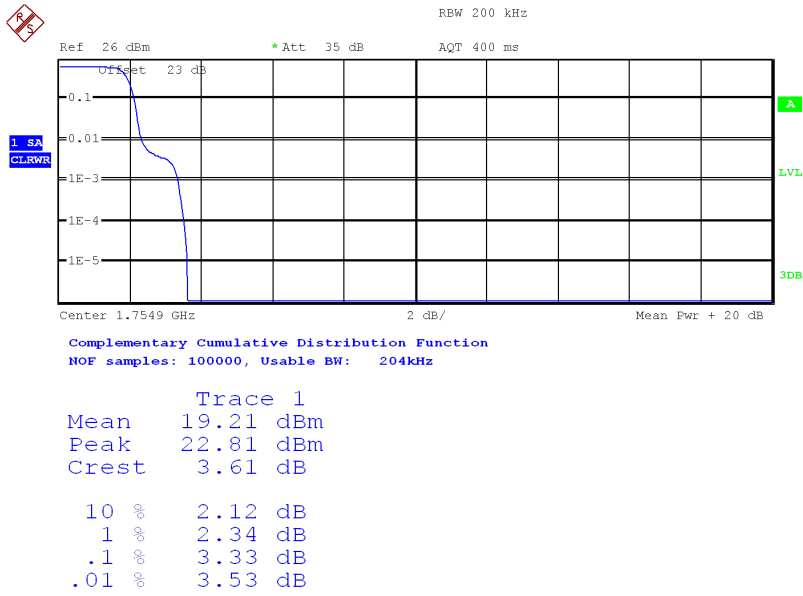
NB-IoT Band 4, Mid Channel, QPSK, 12



Date: 28.DEC.2018 23:24:36

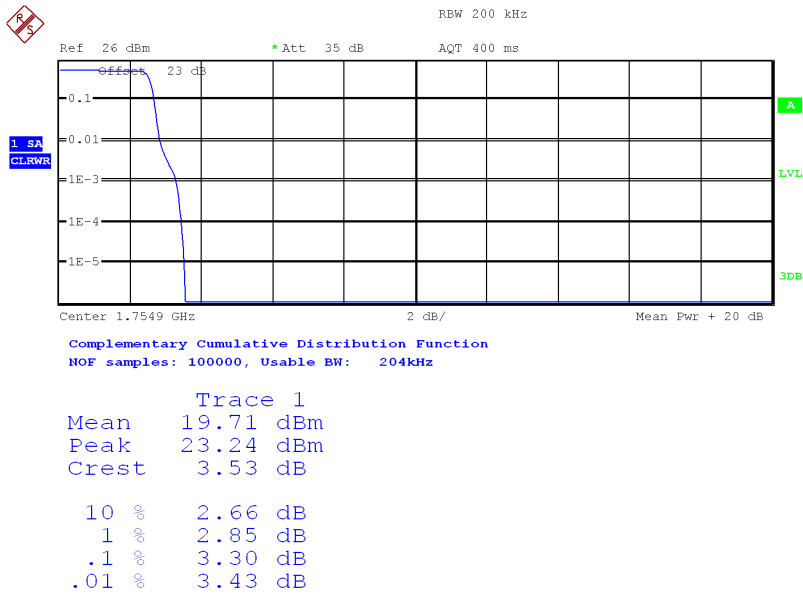
NB-IoT Band 4, High Channel, BPSK, 1

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:24:26

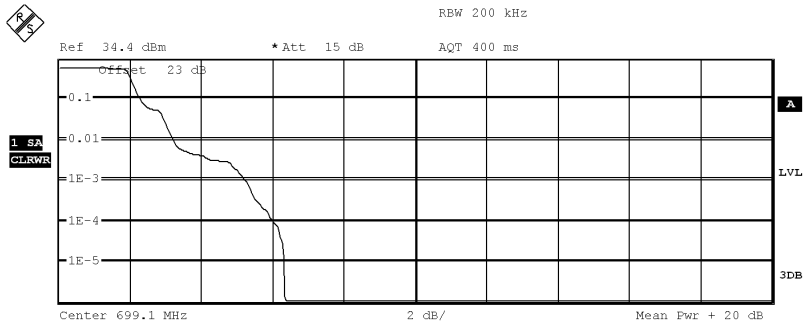
NB-IoT Band 4, High Channel, QPSK, 1



Date: 28.DEC.2018 23:25:12

NB-IoT Band 4, High Channel, QPSK, 12

Report No.:B18W50650-WWAN_Rev2



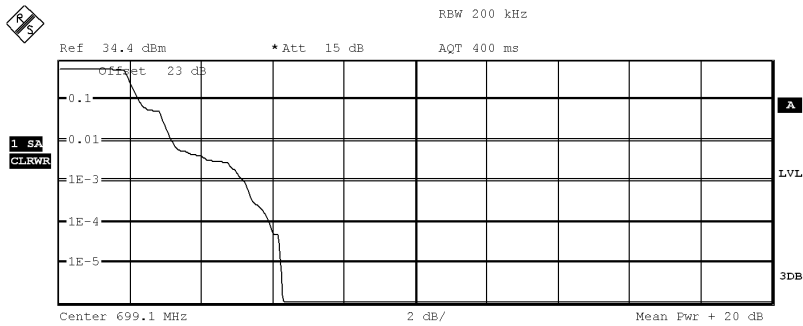
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1
Mean 19.25 dBm
Peak 25.59 dBm
Crest 6.34 dB

10 %	2.28 dB
1 %	3.21 dB
.1 %	5.22 dB
.01 %	5.99 dB

Date: 28.DEC.2018 23:59:13

NB-IoT Band 12, Low Channel, BPSK, 1



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

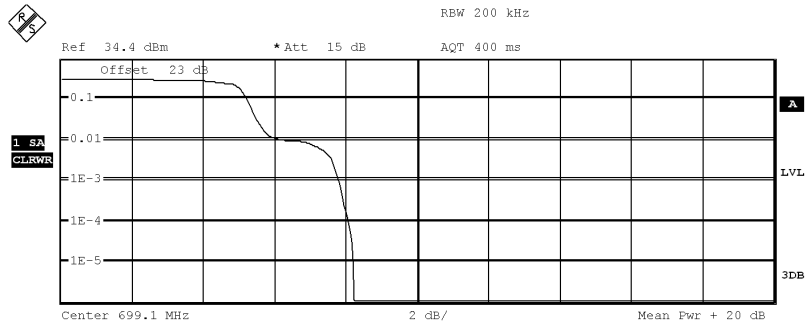
Trace 1
Mean 19.30 dBm
Peak 25.59 dBm
Crest 6.28 dB

10 %	2.24 dB
1 %	3.17 dB
.1 %	5.19 dB
.01 %	5.90 dB

Date: 28.DEC.2018 23:59:28

NB-IoT Band 12, Low Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



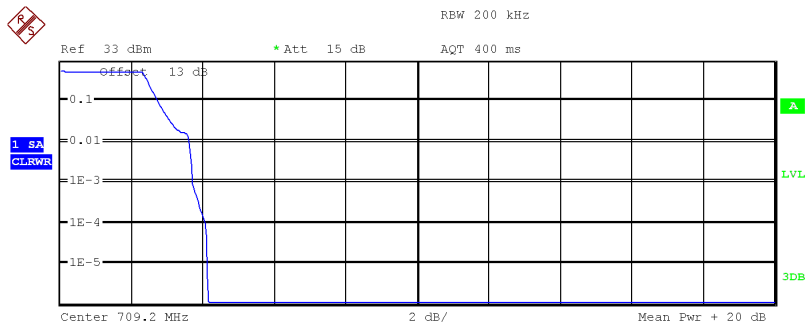
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1
Mean 17.30 dBm
Peak 25.52 dBm
Crest 8.21 dB

10 %	5.22 dB
1 %	6.25 dB
.1 %	7.79 dB
.01 %	8.08 dB

Date: 29.DEC.2018 00:00:23

NB-IoT Band 12, Low Channel, QPSK, 12



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

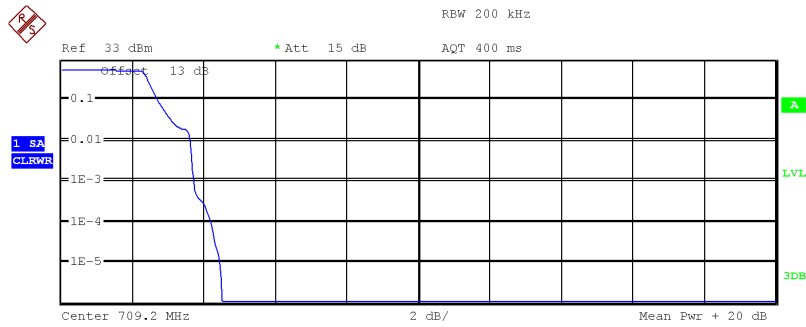
Trace 1
Mean 22.10 dBm
Peak 26.23 dBm
Crest 4.13 dB

10 %	2.72 dB
1 %	3.62 dB
.1 %	3.72 dB
.01 %	4.07 dB

Date: 24.DEC.2018 21:38:53

NB-IoT Band 12, Mid Channel, BPSK, 1

Report No.:B18W50650-WWAN_Rev2



Center 709.2 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

Trace 1
 Mean 22.14 dBm
 Peak 26.65 dBm
 Crest 4.51 dB

10 %	2.72 dB
1 %	3.62 dB
.1 %	3.72 dB
.01 %	4.20 dB

Date: 24.DEC.2018 21:38:21

NB-IoT Band 12, Mid Channel, QPSK, 1



Center 707.5 MHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

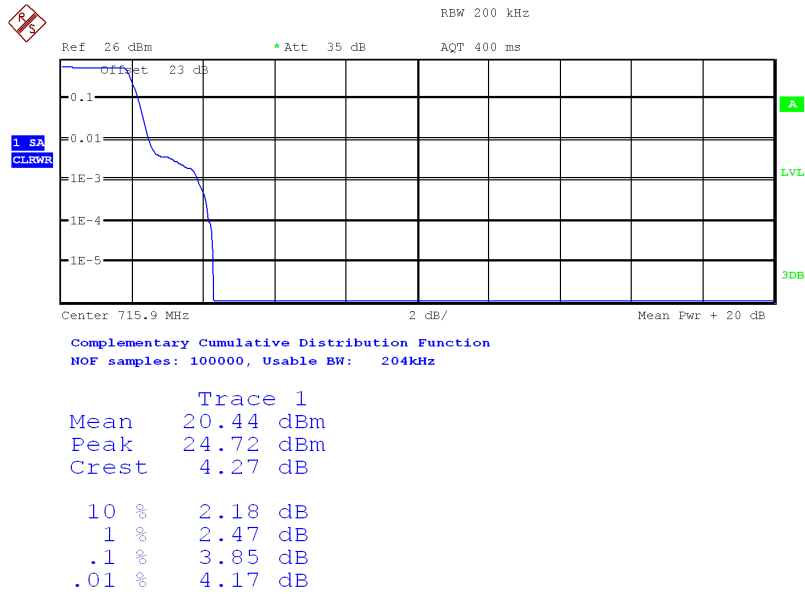
Trace 1
 Mean 17.24 dBm
 Peak 25.52 dBm
 Crest 8.28 dB

10 %	5.22 dB
1 %	6.31 dB
.1 %	7.79 dB
.01 %	8.17 dB

Date: 29.DEC.2018 00:01:33

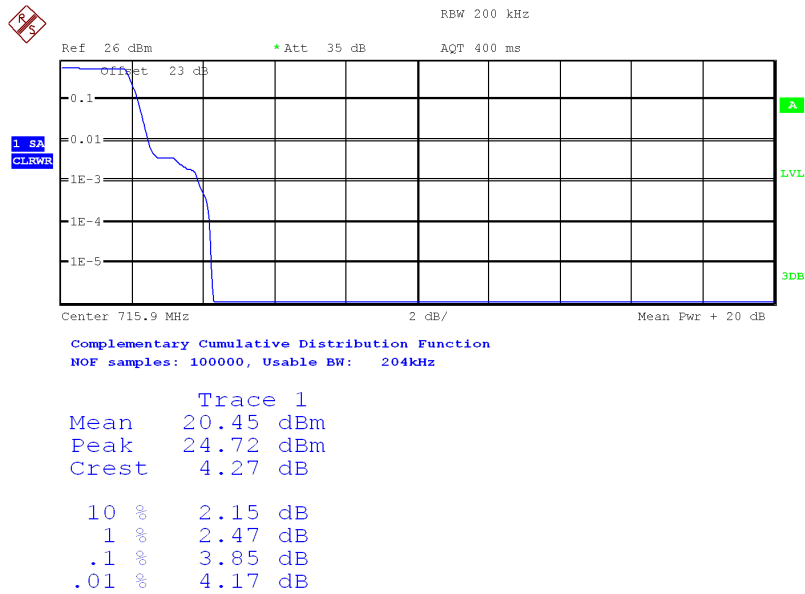
NB-IoT Band 12, Mid Channel, QPSK, 12

Report No.:B18W50650-WWAN_Rev2



Date: 28.DEC.2018 23:13:38

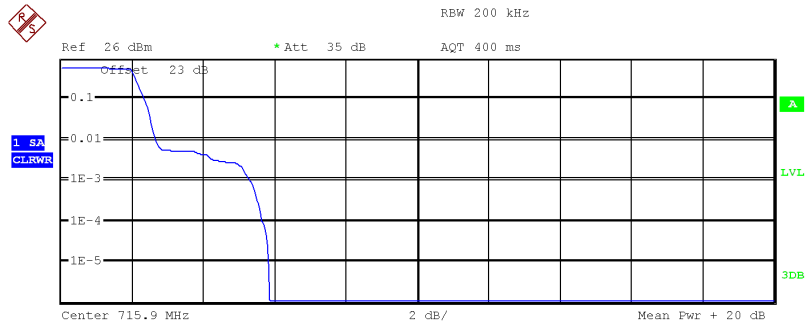
NB-IoT Band 12, High Channel, BPSK, 1



Date: 28.DEC.2018 23:13:34

NB-IoT Band 12, High Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



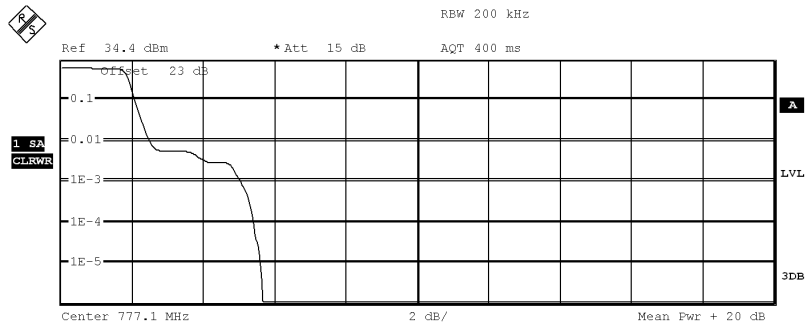
Center 715.9 MHz 2 dB/ Mean Fwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

Trace 1
 Mean 19.44 dBm
 Peak 25.28 dBm
 Crest 5.84 dB

10 % 2.34 dB
 1 % 2.66 dB
 .1 % 5.32 dB
 .01 % 5.64 dB

Date: 28.DEC.2018 23:14:02

NB-IoT Band 12, High Channel, QPSK, 12



Center 777.1 MHz 2 dB/ Mean Fwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

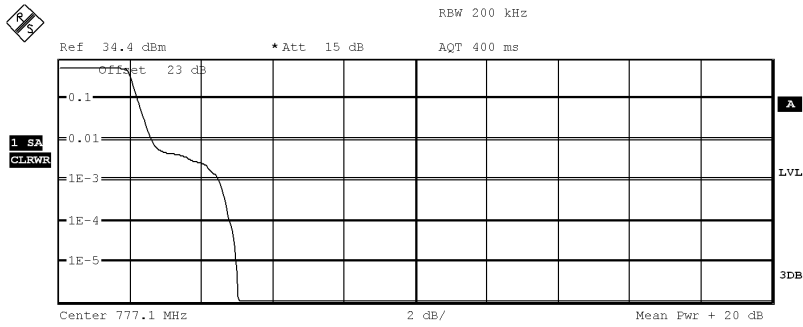
Trace 1
 Mean 19.64 dBm
 Peak 25.30 dBm
 Crest 5.66 dB

10 % 2.08 dB
 1 % 2.50 dB
 .1 % 5.03 dB
 .01 % 5.42 dB

Date: 28.DEC.2018 23:55:14

NB-IoT Band 13, Low Channel, BPSK, 1

Report No.:B18W50650-WWAN_Rev2



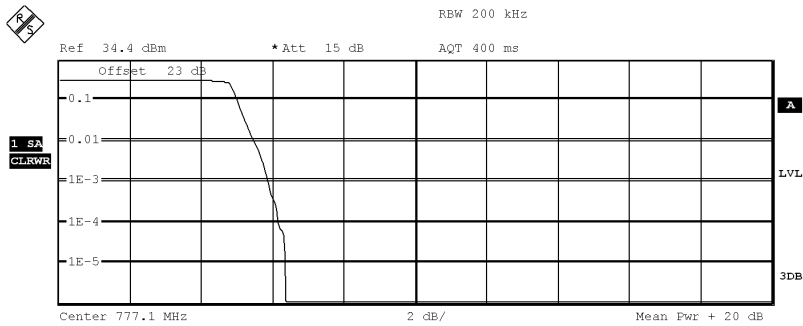
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

Trace 1
 Mean 19.49 dBm
 Peak 24.53 dBm
 Crest 5.03 dB

10 %	2.21 dB
1 %	2.60 dB
.1 %	4.49 dB
.01 %	4.78 dB

Date: 28.DEC.2018 23:54:48

NB-IoT Band 13, Low Channel, QPSK, 1



Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

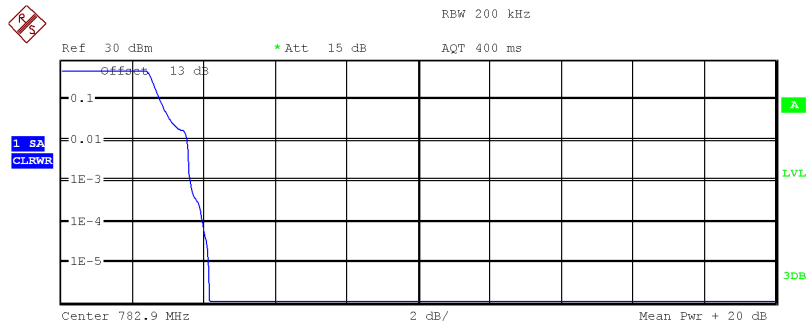
Trace 1
 Mean 20.21 dBm
 Peak 26.57 dBm
 Crest 6.36 dB

10 %	5.00 dB
1 %	5.48 dB
.1 %	5.87 dB
.01 %	6.15 dB

Date: 28.DEC.2018 23:53:57

NB-IoT Band 13, Low Channel, QPSK, 12

Report No.:B18W50650-WWAN_Rev2

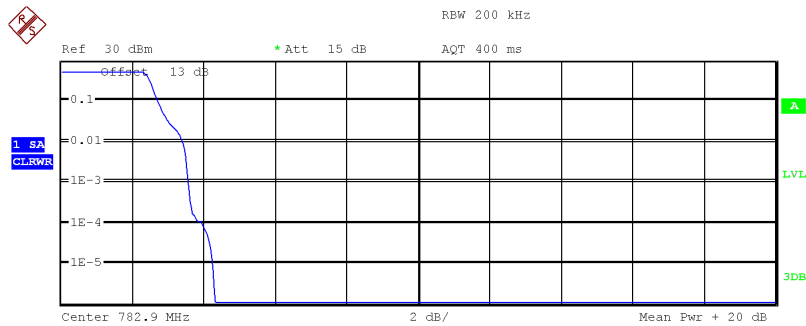


Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1	
Mean	22.12 dBm
Peak	26.27 dBm
Crest	4.15 dB
10 %	2.79 dB
1 %	3.53 dB
.1 %	3.62 dB
.01 %	3.97 dB

Date: 24.DEC.2018 20:50:20

NB-IoT Band 13, Mid Channel, BPSK, 1



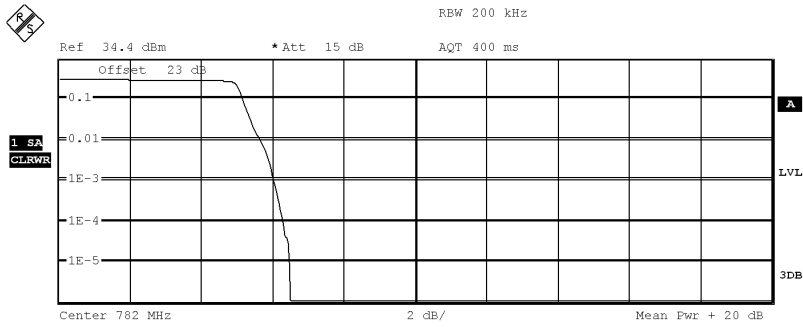
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1	
Mean	22.10 dBm
Peak	26.41 dBm
Crest	4.30 dB
10 %	2.72 dB
1 %	3.40 dB
.1 %	3.56 dB
.01 %	3.91 dB

Date: 24.DEC.2018 20:51:55

NB-IoT Band 13, Mid Channel, QPSK, 1

Report No.:B18W50650-WWAN_Rev2



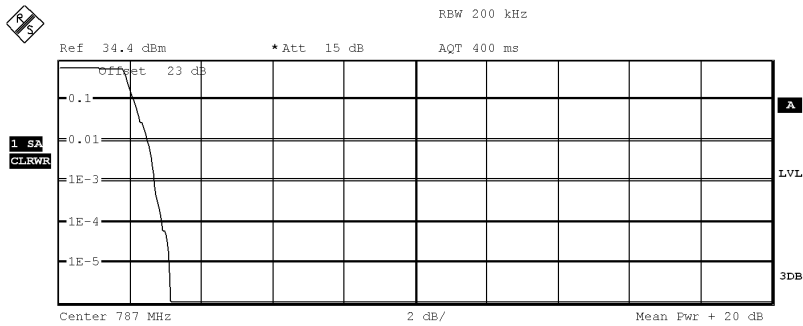
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

Trace 1
 Mean 19.25 dBm
 Peak 25.73 dBm
 Crest 6.48 dB

10 % 5.16 dB
 1 % 5.64 dB
 .1 % 6.03 dB
 .01 % 6.28 dB

Date: 28.DEC.2018 23:52:40

NB-IoT Band 13, Mid Channel, QPSK, 12



Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 204kHz

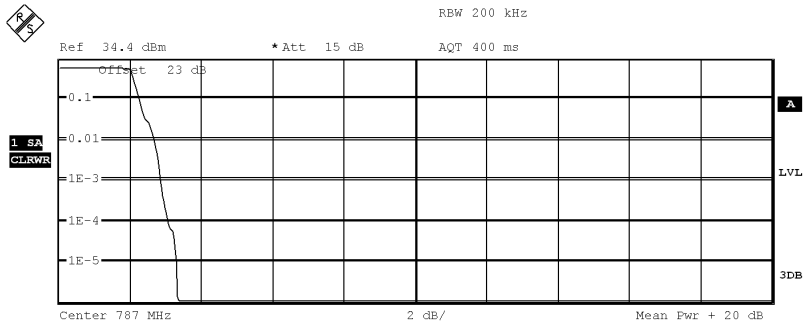
Trace 1
 Mean 21.55 dBm
 Peak 24.67 dBm
 Crest 3.12 dB

10 % 2.12 dB
 1 % 2.50 dB
 .1 % 2.69 dB
 .01 % 2.88 dB

Date: 28.DEC.2018 23:45:22

NB-IoT Band 13, High Channel, BPSK, 1

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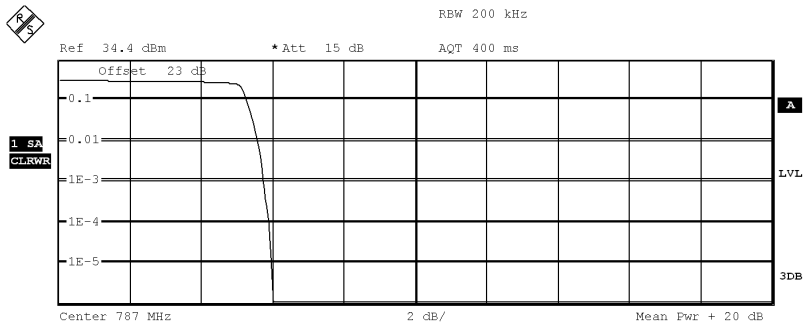
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1
Mean 21.34 dBm
Peak 24.67 dBm
Crest 3.33 dB

10 %	2.28 dB
1 %	2.66 dB
.1 %	2.85 dB
.01 %	3.08 dB

Date: 28.DEC.2018 23:44:45

NB-IoT Band 13, High Channel, QPSK, 1



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 204kHz

Trace 1
Mean 18.88 dBm
Peak 24.88 dBm
Crest 6.00 dB

10 %	5.26 dB
1 %	5.58 dB
.1 %	5.74 dB
.01 %	5.90 dB

Date: 28.DEC.2018 23:43:01

NB-IoT Band 13, High Channel, QPSK, 12

5.9 ERP and EIRP

Specifications:	FCC Part 24.232(b), 27.50(d), 27.50(h)(2), 27.50(c)
DUT Serial Number:	865235030049031
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

This is the test for the maximum radiated power from the EUT.

According to Part 24.232(c), "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

According to Part 27.50(d), "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP".

According to Part 27.50(h)(2) "Mobile stations are limited to 2.0 watts EIRP".

According to Part 27.50(c), specifies "Portable stations (hand-held de-vices) are limited to 3 watts ERP".

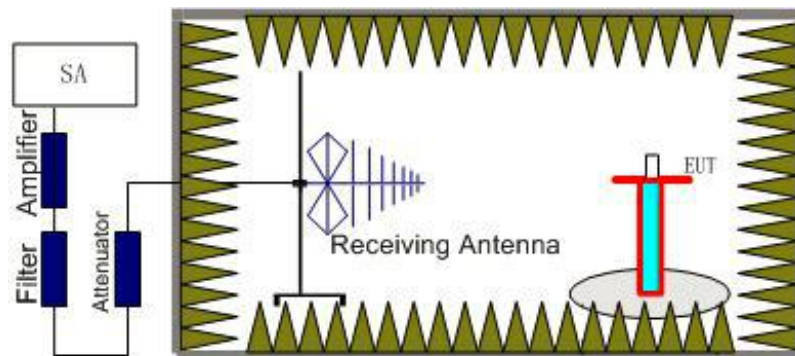
Measurement Uncertainty:

Item	Uncertainty
Expanded Uncertainty	5.15 dB (k=2)

Method of Measurement

The measurements procedures in TIA-603E-2016 are used.

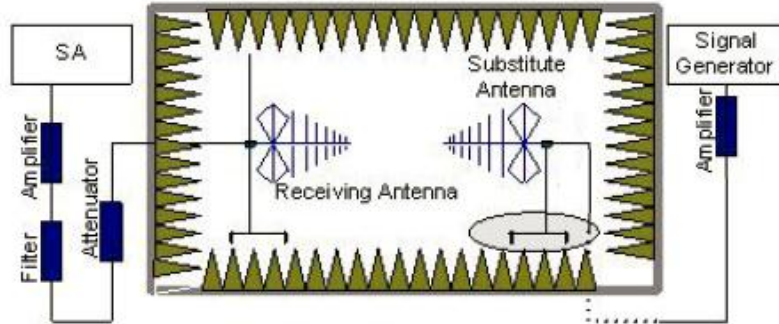
1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



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2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at thereference point of the chamber. An RF Signal source for the frequency band of interest isisconnected to the substitution antenna with a cable that has been constructed to not interferewith the radiation pattern of the antenna. A power (PMea) is applied to the input of thesubstitution antenna, and adjust the level of the signal generator output until the value of thereceiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. Thetest should be performed by rotating the test item and adjusting the receiving antennapolarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should beconnect between the Amplifier and the Substitution Antenna.

The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should berecorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = \text{PMea} + \text{PAg} - \text{Pcl} + \text{Ga}$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole,

$$\text{ERP} = \text{S.G output(dBM)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

$$\text{EIRP} = \text{S.G output(dBM)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

Note: The EUT working in Sub-carrier Spacing 3.75 kHz, one tone mode is the worst mode, only worst mode test result is given below.

5.9.1 NB-IoT Band 2 EIRP

NB-IoT standalone Test frequencies for operating band 2 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	20.41	5.0	7.7	22.82
1880.0	20.74	5.0	7.2	22.66
1909.9	18.88	5.1	6.8	21.78

NB-IoT In-band Test frequencies for operating band 2 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	19.82	5.0	7.7	22.52
1859.2	19.26	5.0	7.2	21.46
1872.5	20.43	5.0	7.2	22.63
1880.0	20.47	5.0	7.2	22.67
1889.9	20.75	5.1	7.0	22.65
1900.2	21.0	5.1	6.8	22.70
1902.5	19.81	5.1	6.8	21.51
1905.2	20.85	5.1	6.8	22.55
1909.9	20.28	5.1	6.8	21.98

NB-IoT Guard-band Test frequencies for operating band 2 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	19.84	5.0	7.7	22.54
1880.0	19.02	5.0	7.2	21.22
1909.9	19.45	5.1	6.8	21.15

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NB-IoT standalone Test frequencies for operating band 2 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	20.41	5.0	7.7	21.67
1880.0	20.74	5.0	7.2	21.58
1909.9	18.88	5.1	6.8	21.23

NB-IoT In-band Test frequencies for operating band 2 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	18.85	5.0	7.7	21.55
1859.2	19.36	5.0	7.2	21.56
1872.5	19.43	5.0	7.2	21.63
1880.0	19.97	5.0	7.2	22.17
1889.9	19.7	5.1	7.0	21.60
1900.2	19.88	5.1	6.8	21.58
1902.5	19.59	5.1	6.8	21.29
1905.2	19.9	5.1	6.8	21.60
1909.9	19.91	5.1	6.8	21.61

NB-IoT Guard-band Test frequencies for operating band 2 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1850.1	18.83	5.0	7.7	21.53
1880.0	19.15	5.0	7.2	21.35
1909.9	19.67	5.1	6.8	21.37

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5.9.2 NB-IoT Band 4 EIRP

NB-IoT standalone Test frequencies for operating band 4 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.35	4.8	8.0	21.55
1732.5	17.38	4.9	7.9	20.38
1754.9	17.02	4.9	8.1	20.22

NB-IoT In-band Test frequencies for operating band 4 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.23	4.8	7.9	21.33
1714.9	18.2	4.8	7.9	21.30
1725.0	18.17	4.8	7.9	21.27
1732.5	18.31	4.8	7.9	21.41
1733.9	18.09	4.8	8.0	21.29
1740.0	18.17	4.9	8.1	21.37
1744.8	18.25	4.9	8.1	21.45
1746.5	18.25	4.9	8.1	21.45
1754.9	17.9	4.9	8.4	21.40

NB-IoT Guard-band Test frequencies for operating band 4 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.34	4.8	7.9	21.44
1732.5	18.29	4.8	7.9	21.39
1754.9	17.96	4.9	8.4	21.46

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NB-IoT standalone Test frequencies for operating band 4 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.38	4.8	8.0	21.58
1732.5	18.49	4.9	7.9	21.49
1754.9	18.42	4.9	8.1	21.62

NB-IoT In-band Test frequencies for operating band 4 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.42	4.8	7.9	21.52
1714.9	18.34	4.8	7.9	21.44
1725.0	18.3	4.8	7.9	21.40
1732.5	18.58	4.8	7.9	21.68
1733.9	18.23	4.8	8.0	21.43
1740.0	18.47	4.9	8.1	21.67
1744.8	18.53	4.9	8.1	21.73
1746.5	18.55	4.9	8.1	21.75
1754.9	18.16	4.9	8.4	21.66

NB-IoT Guard-band Test frequencies for operating band 4 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
1710.1	18.32	4.8	7.9	21.42
1732.5	18.41	4.8	7.9	21.51
1754.9	18.03	4.9	8.4	21.53

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5.9.3 NB-IoT Band 12 ERP

NB-IoT standalone Test frequencies for operating band 12 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	16.83	3.1	8.9	22.63
707.5	16.44	3.1	9.1	22.44
715.9	16.43	3.1	9.1	22.43

NB-IoT In-band Test frequencies for operating band 12 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	15.71	3.1	8.9	21.51
702.2	15.47	3.1	9.1	21.47
706.2	15.49	3.1	9.1	21.49
707.5	15.44	3.1	9.1	21.44
709.2	15.49	3.1	9.1	21.49
709.4	15.5	3.1	9.1	21.50
709.9	15.5	3.1	9.1	21.50
710	15.38	3.1	9.1	21.38
715.9	15.11	3.1	9.1	21.11

NB-IoT Guard-band Test frequencies for operating band 12 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	15.08	3.1	8.9	20.88
707.5	15.47	3.1	9.1	21.47
715.9	15.56	3.1	9.1	21.56

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NB-IoT standalone Test frequencies for operating band 12 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	16.83	3.1	8.9	21.61
707.5	16.44	3.1	9.1	21.44
715.9	16.43	3.1	9.1	21.57

NB-IoT In-band Test frequencies for operating band 12 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	15.97	3.1	8.9	21.77
702.2	15.62	3.1	9.1	21.62
706.2	15.52	3.1	9.1	21.52
707.5	15.5	3.1	9.1	21.50
709.2	15.51	3.1	9.1	21.51
709.4	15.45	3.1	9.1	21.45
709.9	15.47	3.1	9.1	21.47
710	15.32	3.1	9.1	21.32
715.9	15.53	3.1	9.1	21.53

NB-IoT Guard-band Test frequencies for operating band 12 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
699.1	14.51	3.1	8.9	20.31
707.5	15.26	3.1	9.1	21.26
715.9	15.38	3.1	9.1	21.38

5.9.4 NB-IoT Band 13 ERP

NB-IoT standalone Test frequencies for operating band 13 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.14	3.3	8.1	22.94
782.0	18.05	3.3	8.1	22.85
786.9	18.21	3.3	8.0	22.91

NB-IoT In-band Test frequencies for operating band 13 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.12	3.3	8.1	22.92
778.2	18.07	3.3	8.1	22.87
780.1	18.08	3.3	8.1	22.88
782.0	18.08	3.3	8.1	22.88
782.9	18.07	3.3	8.1	22.87
783.1	18.14	3.3	8.1	22.94
784.2	18.05	3.3	8.1	22.85
785.9	18.14	3.3	8.0	22.84
786.9	18.15	3.3	8.0	22.85

NB-IoT Guard-band Test frequencies for operating band 13 QPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.1	3.3	8.1	22.90
782	17.96	3.3	8.1	22.76
786.9	17.45	3.3	8.0	22.15

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NB-IoT standalone Test frequencies for operating band 13 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.16	3.3	8.1	22.96
782	18.07	3.3	8.1	22.87
786.9	18.22	3.3	8.0	22.92

NB-IoT In-band Test frequencies for operating band 13 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.14	3.3	8.1	22.94
778.2	18.05	3.3	8.1	22.85
780.1	18.10	3.3	8.1	22.90
782.0	18.11	3.3	8.1	22.91
782.9	18.07	3.3	8.1	22.87
783.1	18.14	3.3	8.1	22.94
784.2	18.07	3.3	8.1	22.87
785.9	18.16	3.3	8.0	22.86
786.9	18.15	3.3	8.0	22.85

NB-IoT Guard-band Test frequencies for operating band 13 BPSK

Frequency [MHz]	S.G output [dBm]	Cable loss [dB]	Antenna Gain [dB]	EIRP (Pd) [dBm]
777.1	18.07	3.3	8.1	22.87
782	17.99	3.3	8.1	22.79
786.9	17.55	3.3	8.0	22.25

Annex A EUT Photos

See the document "SIM7000A-External Photos".

See the document "SIM7000A-Internal Photos".

Annex B Deviations From Prescribed Test Methods

No deviation from Prescribed Test Methods.

*****End Of Report*****