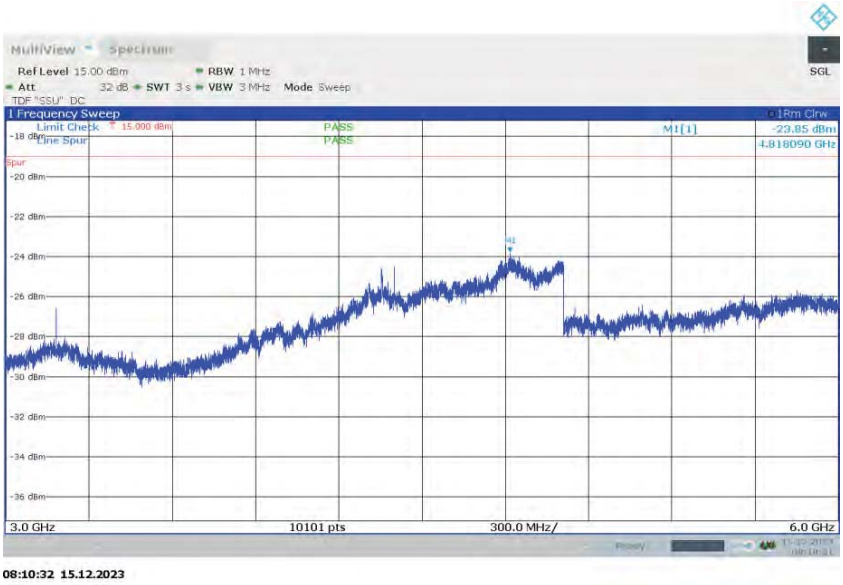
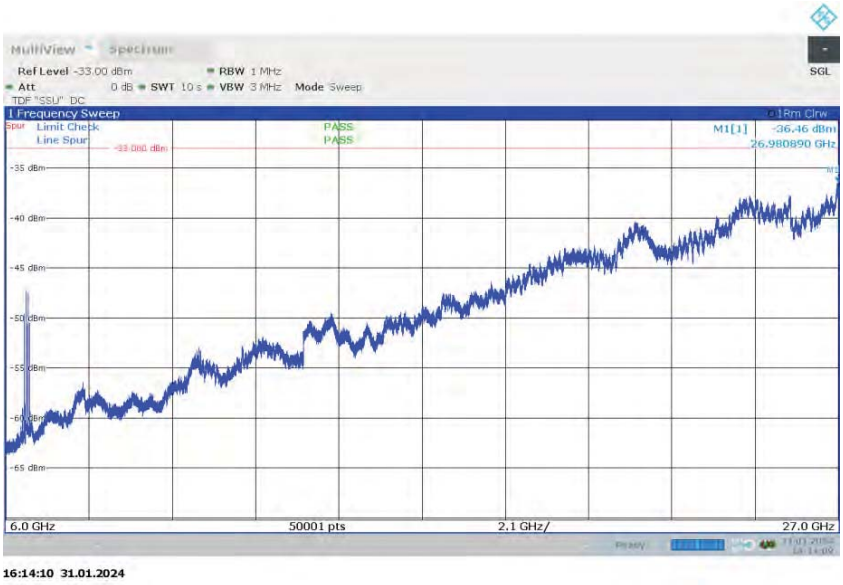
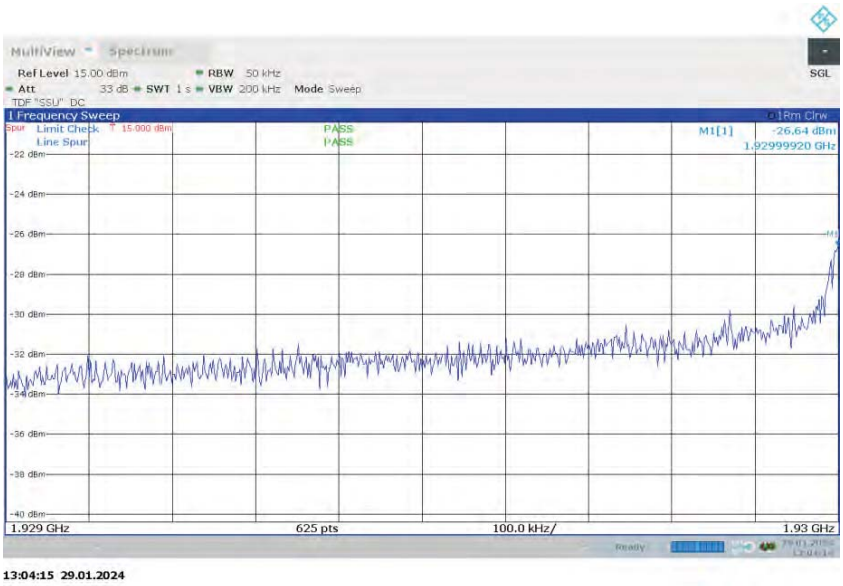


Spurious Emissions (3GHz – 6GHz) - QPSK (2199.8 MHz) (Band 66 NB-IoT SA 200kHz Channel BW)

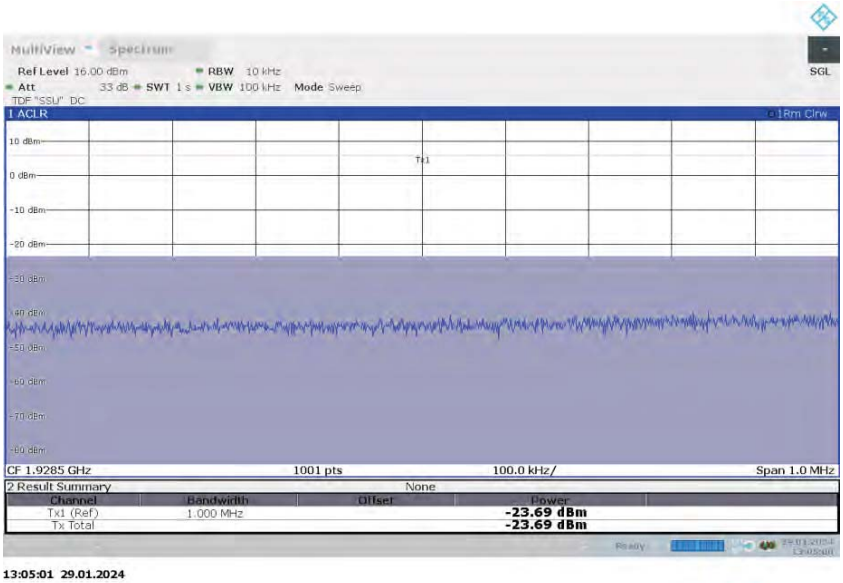


Spurious Emissions (6GHz – 27GHz) - QPSK (2199.8 MHz) (Band 66 NB-IoT SA 200kHz Channel BW)

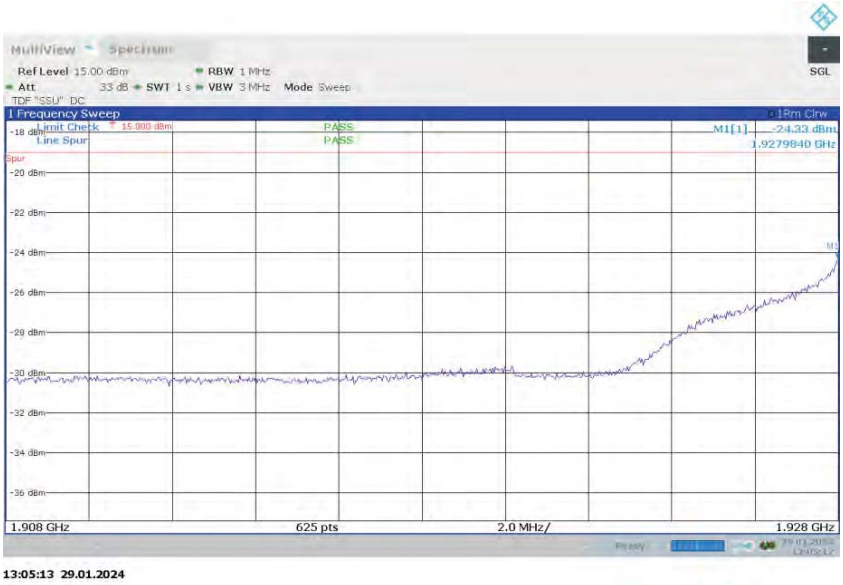
Config N TX port 1:



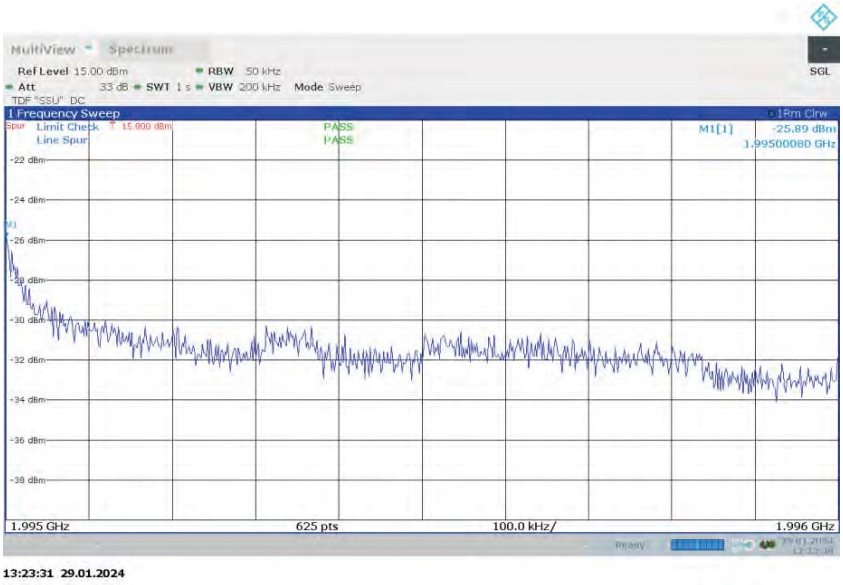
Spurious Emissions (Lower Band Edge 1929-1930MHz) – QPSK (1932.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



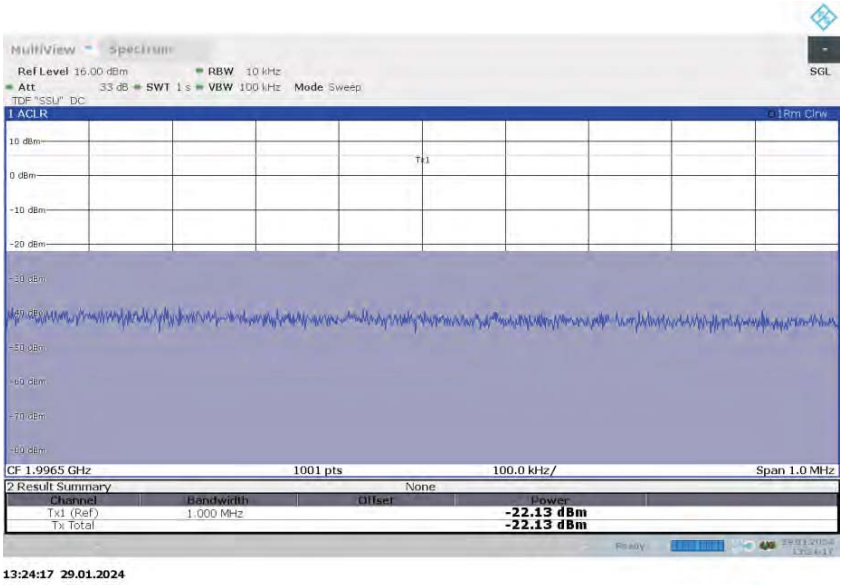
Spurious Emissions (Lower Band Edge 1928-1929MHz) – QPSK (1932.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



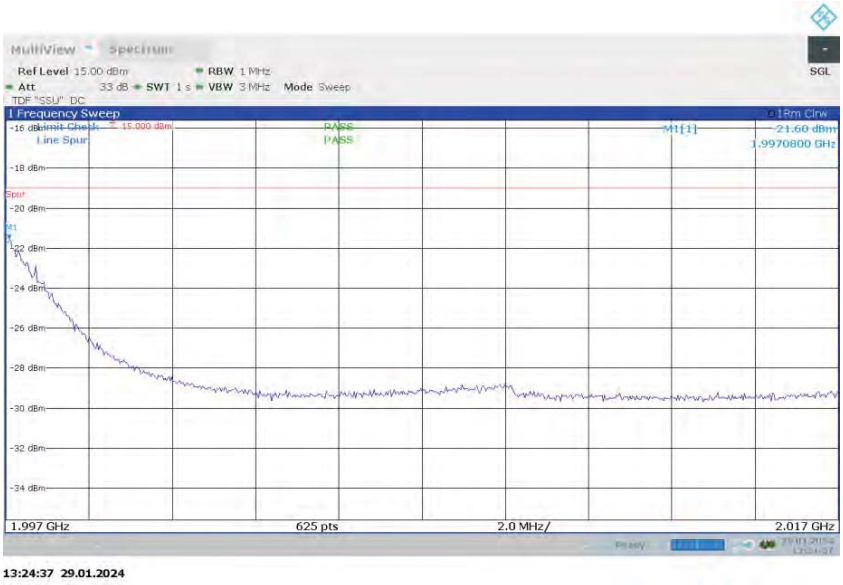
Spurious Emissions (Lower Band Edge 1908-1928MHz) – QPSK (1932.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



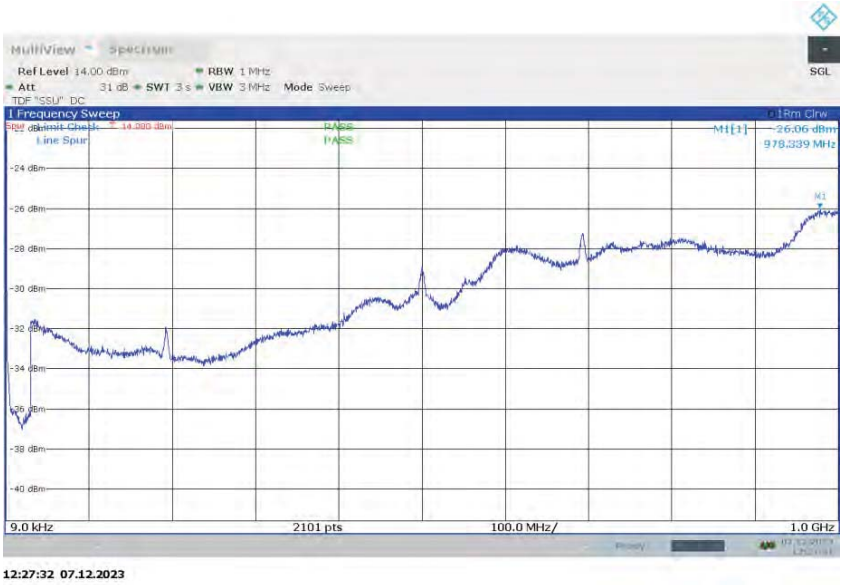
Spurious Emissions (Upper Band Edge 1995-1996MHz) – QPSK (1992.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



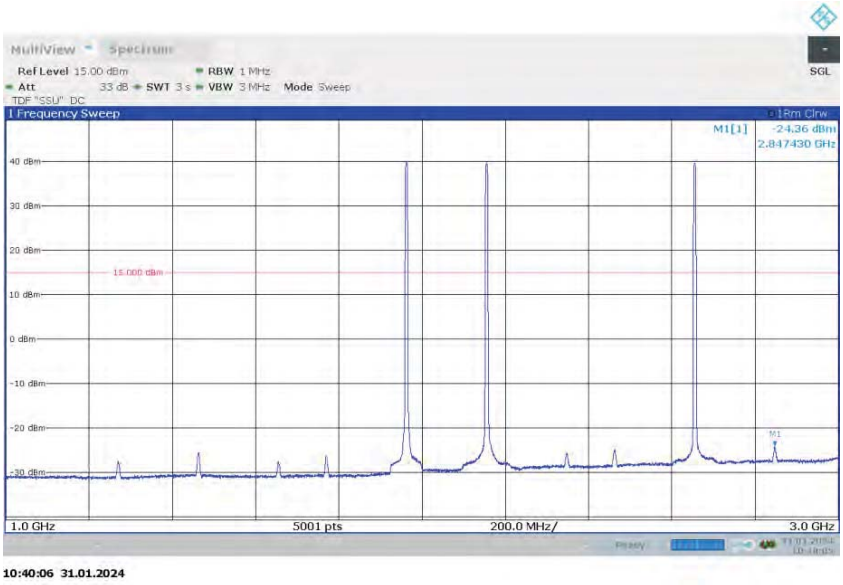
Spurious Emissions (Upper Band Edge 1996-1997MHz) – QPSK (1992.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



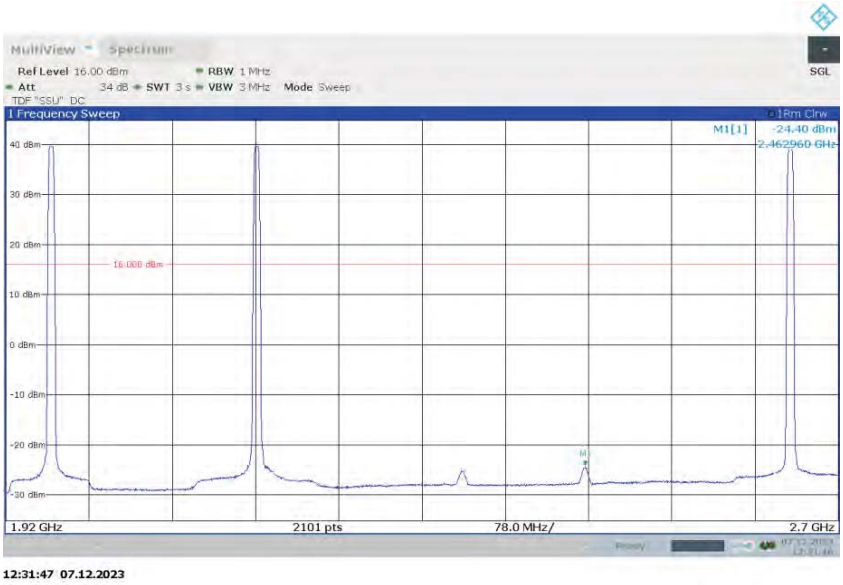
Spurious Emissions (Upper Band Edge 1997-2017MHz) – QPSK (1992.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



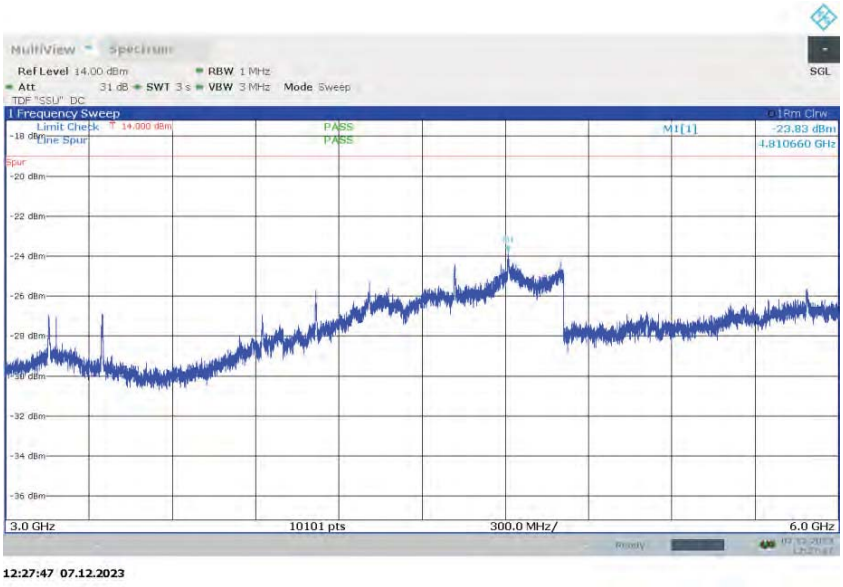
Spurious Emissions (9kHz - 1GHz) - QPSK (1962.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



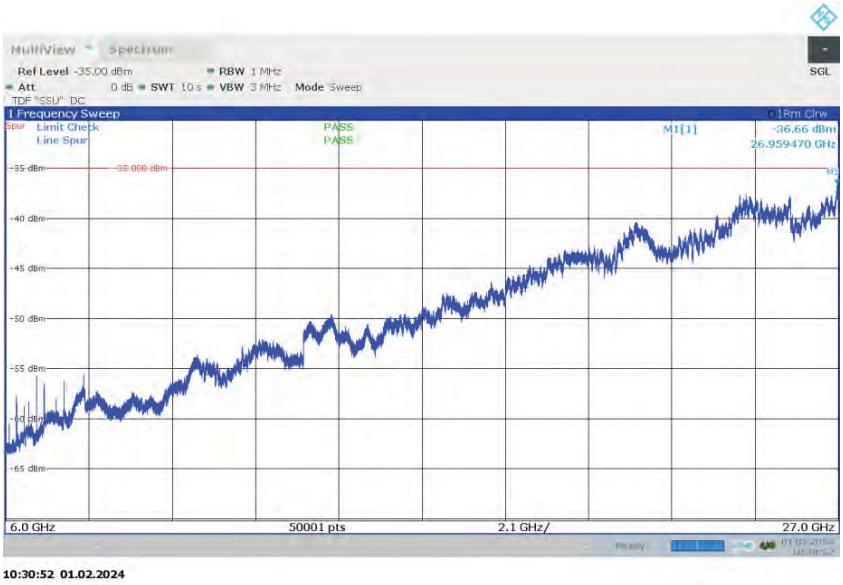
Spurious Emissions (1GHz - 3GHz) - QPSK (1962.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)



Spurious Emissions (1.92GHz - 2.7GHz) - QPSK (1962.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)

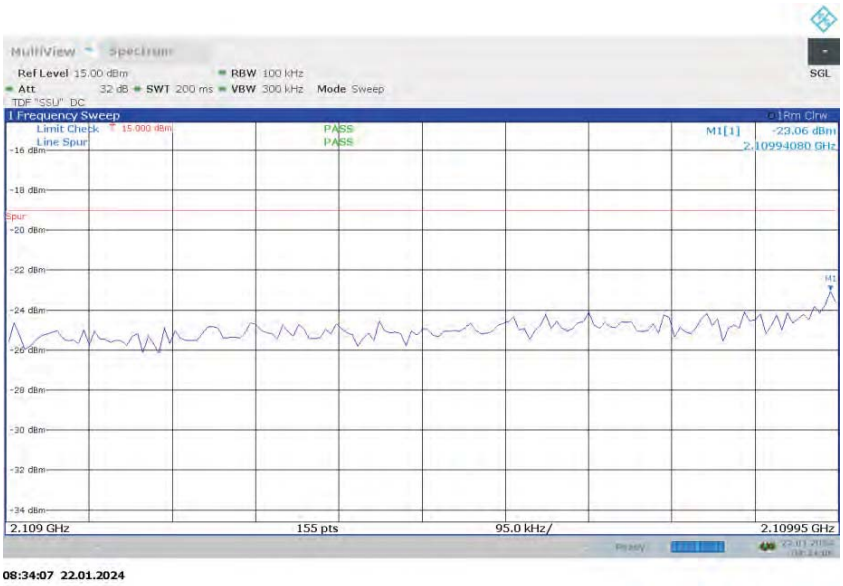


Spurious Emissions (3GHz - 6GHz) - QPSK (1962.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)

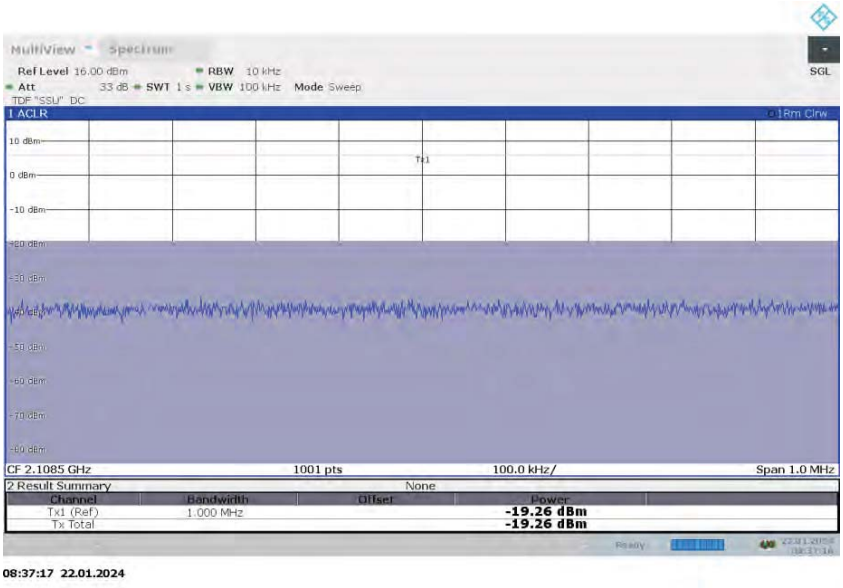


Spurious Emissions (6GHz - 27GHz) - QPSK (1962.5 MHz) (Band 25 NB-IoT IB 5MHz Channel BW)

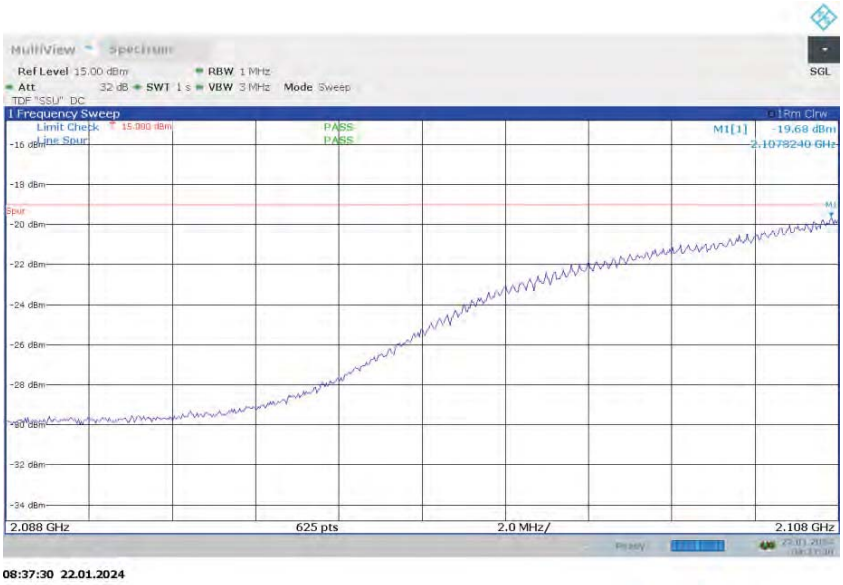
Config R TX port 1:



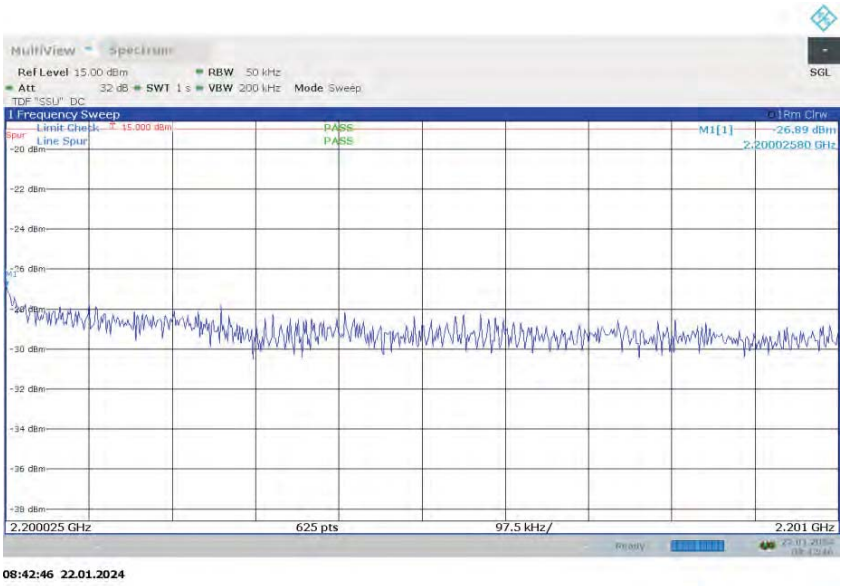
Spurious Emissions (Band 66 Lower Band Edge 2109-2110MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



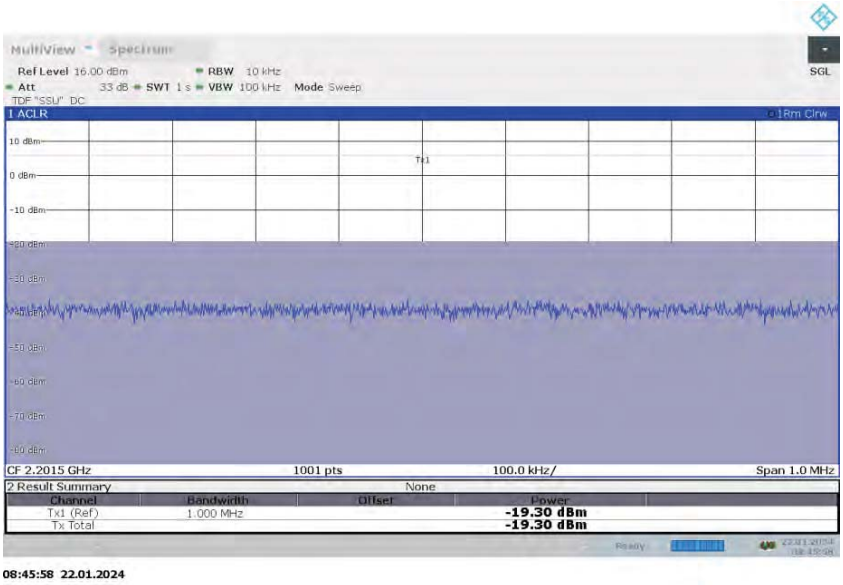
Spurious Emissions (Band 66 Lower Band Edge 2108-2109MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



Spurious Emissions (Band 66 Lower Band Edge 2088-2108MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)

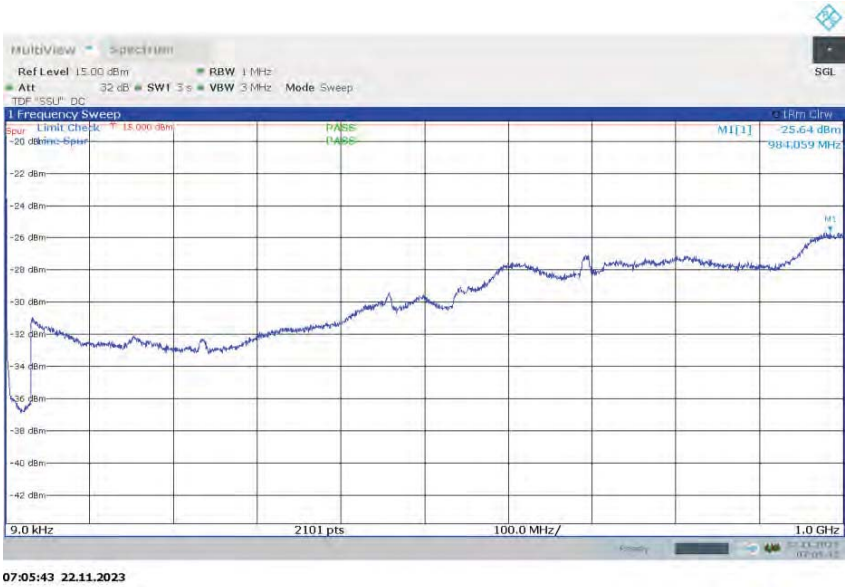


Spurious Emissions (Band 66 Upper Band Edge 2200-2201MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)

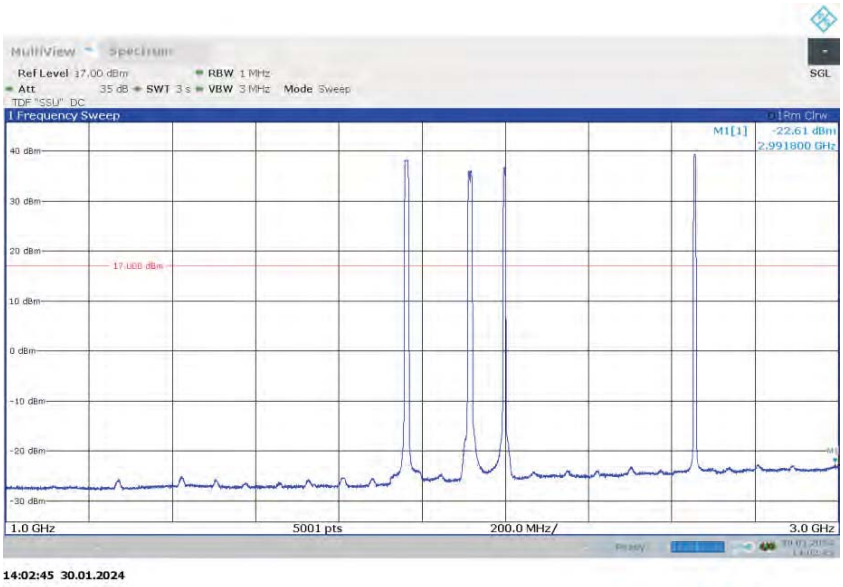


Spurious Emissions (Band 66 Upper Band Edge 2201-2202MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)

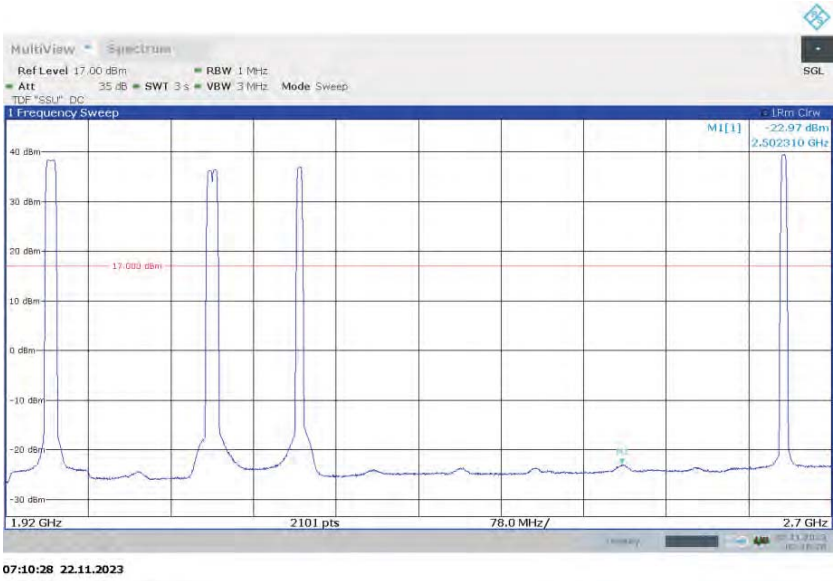
Spurious Emissions (Band 66 Upper Band Edge 2202-2222MHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



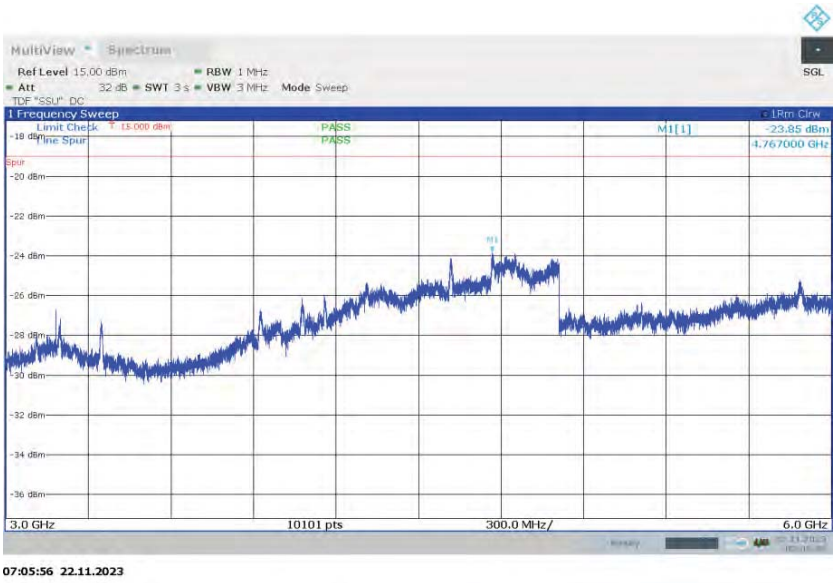
Spurious Emissions (9kHz – 1GHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



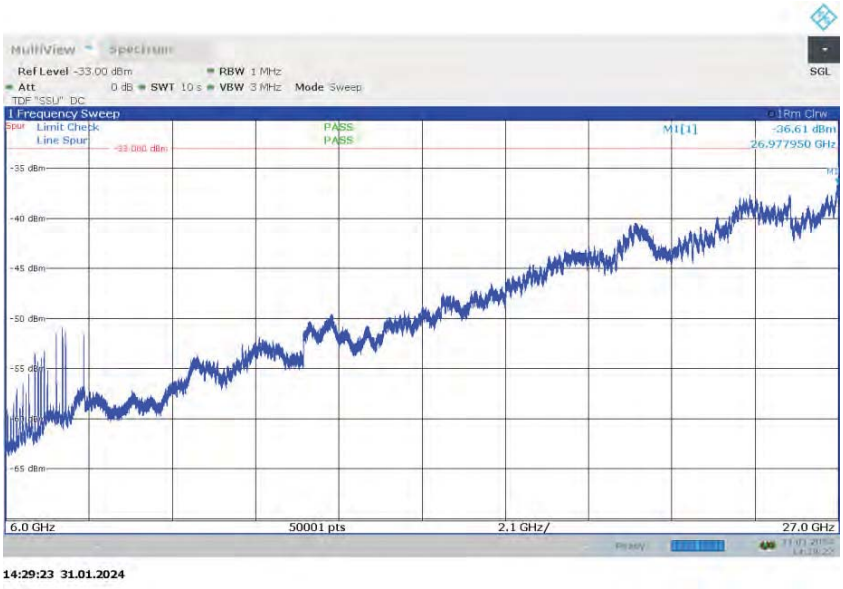
Spurious Emissions (1GHz – 3GHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



Spurious Emissions (1.92GHz – 2.7GHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



Spurious Emissions (3GHz – 6GHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)



Spurious Emissions (6GHz – 27GHz) – QPSK (2112.5 / 2117.5 / 2197.5 / 1962.5 / 2655.0 MHz) (B66: 3x E-UTRA 5MHz + B25 E-UTRA 10MHz + B7 E-UTRA 5MHz Channel BW)

APPENDIX A: AHFIHA E-UTRA MULTICARRIER MULTIBAND CONFIGURATIONS DESCRIPTION

The antenna port power is enabled at maximum (160 watts) for all multicarrier multi-band testing. QPSK modulation type is used for this testing.

Multicarrier test cases have been developed as shown below:

PCS Multicarrier Multiband Test Case 1 ***(Config O)****:* In the PCS band three E-UTRA 5MHz carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (1932.5 & 1937.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (1992.5MHz) at the upper band edge. In the AWS & BRS band single E-UTRA 10MHz & E-UTRA 5MHz carrier at the middle channel (2155.0MHz & 2655.0MHz). The smallest channel bandwidth is selected to maximize carrier power spectral density. The carriers are operated at maximum power (~20W/PCS carrier, 60W/AWS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carriers + 60W for AWS band carrier + 40W for BRS band carrier).

PCS Multicarrier Multiband Test Case 2 ***(Config P)****:* In the PCS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the lower band edge (1940.0 & 1960.0MHz). In the AWS & BRS bands single E-UTRA 20MHz carrier at the middle channel (2155.0MHz & 2655.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/PCS carrier, 60W/AWS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carriers + 60W for AWS band carrier + 40W for BRS band carrier).

PCS Multicarrier Multiband Test Case 3 ***(Config Q)****:* In the PCS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the upper band edge (1965.0 & 1985.0MHz). In the AWS & BRS bands single E-UTRA 20MHz carrier at the middle channel (2155.0MHz & 2655.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/PCS carrier, 60W/AWS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carriers + 60W for AWS band carrier + 40W for BRS band carrier).

AWS Multicarrier Multiband Test Case 1 ***(Config R)***: In the AWS band three E-UTRA 5MHz carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (2112.5 & 2117.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (2197.5MHz) at the upper band edge. In the PCS and BRS bands single E-UTRA 10MHz & E-UTRA 5MHz carrier at the middle channel (1962.5MHz and 2655.0MHz). The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers are operated at maximum power (~20W/AWS carrier, 60W/PCS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for AWS band carriers + 40W for BRS band carrier)

AWS Multicarrier Multiband Test Case 2 ***(Config S)****:* In the AWS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the lower band edge (2120.0 & 2140.0MHz). In the PCS & BRS bands single E-UTRA 20MHz carrier at the

middle channel (1962.5MHz & 2655.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/AWS carrier, 60W/PCS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for AWS band carriers + 40W for BRS band carrier).

AWS Multicarrier Multiband Test Case 3 ***(Config T)****:* In the AWS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the upper band edge (2170.0 & 2190.0MHz). In the PCS & BRS bands single E-UTRA 20MHz carrier at the middle channel (1962.5MHz & 2655.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/AWS carrier, 60W/PCS carrier and 40W/BRS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for AWS band carriers + 40W for BRS band carrier).

BRS Multicarrier Multiband Test Case 1 ***(Config U)***: In the BRS band three E-UTRA 5MHz carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (2622.5 & 2627.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (2687.5MHz) at the upper band edge. In the PCS and AWS bands single E-UTRA 10MHz & E-UTRA 5MHz carrier at the middle channel (1962.5MHz and 2155.0MHz). The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers are operated at maximum power (~20W/BRS carrier, 60W/PCS carrier, and 40W/AWS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for BRS band carriers + 40W for AWS band carrier).

BRS Multicarrier Multiband Test Case 2 ***(Config V)****:* In the BRS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the lower band edge (2630.0 & 2650.0MHz). In the PCS & AWS bands single E-UTRA 20MHz carrier at the middle channel (1962.5MHz & 2155.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/BRS carrier, 60W/PCS carrier and 40W/AWS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for BRS band carriers + 40W for AWS band carrier).

BRS Multicarrier Multiband Test Case 3 ***(Config W)****:* In the BRS band two E-UTRA 20MHz carriers (with minimum spacing between carrier frequencies) at the upper band edge (2660.0 & 2680.0MHz). In the PCS & AWS bands single E-UTRA 20MHz carrier at the middle channel (1962.5MHz & 2155.0MHz). The largest channel bandwidth is selected to maximize carrier OBW. The carriers are operated at maximum power (~30W/BRS carrier, 60W/PCS carrier and 40W/AWS carrier) with a total port power of 160 watts (60W for PCS band carrier + 60W for BRS band carriers + 40W for AWS band carrier).

APPENDIX B: AHFIHA E-UTRA AND NB-IOT EIRP CALCULATIONS

EIRP Calculations for Four Port MIMO Operations for Band 25 Single E-UTRA and NB-IoT Carriers

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon Commscope antenna assembly model "FFV4Q4-65B-R7-V2". The maximum Band 25 gain (17.1dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band 25. Four AHFIHA transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent and a typical loss of 1.0dB for this frequency range was used. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	NB-IoT SA	E-UTRA 1.4 MHz Ch BW	E-UTRA 3 MHz Ch BW	E-UTRA 5 MHz Ch BW	NB-IoT IB 5 MHz Ch BW	E-UTRA 10 MHz Ch BW
Worst Case PSD/Antenna Port	42.73 dBm/MHz	42.07 dBm/MHz	39.26 dBm/MHz	40.09 dBm/MHz	39.47 dBm/MHz	38.77 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	45.73 dBm/MHz	45.07 dBm/MHz	42.26 dBm/MHz	43.09 dBm/MHz	42.47 dBm/MHz	41.77 dBm/MHz
Cable Loss (site dependent) = 1.0dB	44.73 dBm/MHz	44.07 dBm/MHz	41.26 dBm/MHz	42.09 dBm/MHz	41.47 dBm/MHz	40.77 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi
EIRP per Polarization	61.83 dBm/MHz	61.17 dBm/MHz	58.36 dBm/MHz	59.19 dBm/MHz	58.57 dBm/MHz	57.87 dBm/MHz
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	61.83 dBm/MHz	61.17 dBm/MHz	58.36 dBm/MHz	59.19 dBm/MHz	58.57 dBm/MHz	57.87 dBm/MHz
Passing FCC & ISED EIRP Limit	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz

Parameter	NB-IoT IB 10 MHz Ch BW	NB-IoT GB 10 MHz Ch BW	E-UTRA 15 MHz Ch BW	NB-IoT IB 15 MHz Ch BW	NB-IoT GB 15 MHz Ch BW	E-UTRA 20 MHz Ch BW	NB-IoT IB 20 MHz Ch BW	NB-IoT GB 20 MHz Ch BW
Worst Case PSD/Antenna Port	38.30 dBm/MHz	38.48 dBm/MHz	37.62 dBm/MHz	36.51 dBm/MHz	36.92 dBm/MHz	36.00 dBm/MHz	35.32 dBm/MHz	35.54 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	41.30 dBm/MHz	41.48 dBm/MHz	40.62 dBm/MHz	39.51 dBm/MHz	39.92 dBm/MHz	39.00 dBm/MHz	38.32 dBm/MHz	38.54 dBm/MHz
Cable Loss (site dependent) = 1.0dB	40.30 dBm/MHz	40.48 dBm/MHz	39.62 dBm/MHz	38.51 dBm/MHz	38.92 dBm/MHz	38.00 dBm/MHz	37.32 dBm/MHz	37.54 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi
EIRP per Polarization	57.40 dBm/MHz	57.58 dBm/MHz	56.72 dBm/MHz	55.61 dBm/MHz	56.02 dBm/MHz	55.10 dBm/MHz	54.42 dBm/MHz	54.64 dBm/MHz
Number of Polarizations	2	2	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	57.40 dBm/MHz	57.58 dBm/MHz	56.72 dBm/MHz	55.61 dBm/MHz	56.02 dBm/MHz	55.10 dBm/MHz	54.42 dBm/MHz	54.64 dBm/MHz
Passing FCC & ISED EIRP Limit	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
Note 2: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

EIRP Calculation Summary

The worst case AHFIHA Band 25 four port MIMO EIRP levels using antenna assembly model “FFV4Q4-65B-R7-V2” are less than the FCC and ISED (65.16 dBm/MHz and 62.15 dBm/MHz) EIRP Regulatory Limits.

EIRP Calculations for Four Port MIMO Operations for Band 66 Single E-UTRA and NB-IoT Carriers

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon Commscope antenna assembly model "FFV4Q4-65B-R7-V2". The maximum Band 66 gain (17.1dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band 66. Four AHFIHA transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated for four port MIMO (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent and a typical loss of 1.0dB for this frequency range was used. EIRP was calculated as described in SRSP 513 clause 6.1.2 and SRSP 519 clause 6.1.2 "EIRP for non-AAS uncorrelated transmission". Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	NB-IoT SA	E-UTRA 1.4 MHz Ch BW	E-UTRA 3 MHz Ch BW	E-UTRA 5 MHz Ch BW	NB-IoT IB 5 MHz Ch BW	E-UTRA 10 MHz Ch BW
Worst Case PSD/Antenna Port	42.55 dBm/MHz	41.66 dBm/MHz	39.06 dBm/MHz	39.88 dBm/MHz	39.73 dBm/MHz	38.64 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	45.55 dBm/MHz	44.66 dBm/MHz	42.06 dBm/MHz	42.88 dBm/MHz	42.73 dBm/MHz	41.64 dBm/MHz
Cable Loss (site dependent) = 1.0dB	44.55 dBm/MHz	43.66 dBm/MHz	41.06 dBm/MHz	41.88 dBm/MHz	41.73 dBm/MHz	40.64 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi
EIRP per Polarization	61.65 dBm/MHz	60.76 dBm/MHz	58.16 dBm/MHz	58.98 dBm/MHz	58.83 dBm/MHz	57.74 dBm/MHz
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	61.65 dBm/MHz	60.76 dBm/MHz	58.16 dBm/MHz	58.98 dBm/MHz	58.83 dBm/MHz	57.74 dBm/MHz
Passing FCC EIRP Limit	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz
Passing ISED EIRP Limit	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz

Parameter	NB-IoT IB 10 MHz Ch BW	NB-IoT GB 10 MHz Ch BW	E-UTRA 15 MHz Ch BW	NB-IoT IB 15 MHz Ch BW	NB-IoT GB 15 MHz Ch BW	E-UTRA 20 MHz Ch BW	NB-IoT IB 20 MHz Ch BW	NB-IoT GB 20 MHz Ch BW
Worst Case PSD/Antenna Port	38.49 dBm/MHz	38.60 dBm/MHz	37.36 dBm/MHz	36.52 dBm/MHz	37.13 dBm/MHz	35.74 dBm/MHz	35.39 dBm/MHz	35.61 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	41.49 dBm/MHz	41.60 dBm/MHz	40.36 dBm/MHz	39.52 dBm/MHz	40.13 dBm/MHz	38.74 dBm/MHz	38.39 dBm/MHz	38.61 dBm/MHz
Cable Loss (site dependent) = 1.0dB	40.49 dBm/MHz	40.60 dBm/MHz	39.36 dBm/MHz	38.52 dBm/MHz	39.13 dBm/MHz	37.74 dBm/MHz	37.39 dBm/MHz	37.61 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi	17.1 dBi
EIRP per Polarization	57.59 dBm/MHz	57.70 dBm/MHz	56.46 dBm/MHz	55.62 dBm/MHz	56.23 dBm/MHz	54.84 dBm/MHz	54.49 dBm/MHz	54.71 dBm/MHz
Number of Polarizations	2	2	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	57.59 dBm/MHz	57.70 dBm/MHz	56.46 dBm/MHz	55.62 dBm/MHz	56.23 dBm/MHz	54.84 dBm/MHz	54.49 dBm/MHz	54.71 dBm/MHz
Passing FCC EIRP Limit	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz	62.15 & 65.16 dBm/MHz
Passing ISED EIRP Limit	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz	62.0 & 65.0 dBm/MHz

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
Note 2: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

EIRP Calculation Summary

The worst case AHFIHA Band 66 four port MIMO EIRP levels using antenna assembly model "FFV4Q4-65B-R7-V2" are less than the FCC (65.16 dBm/MHz and 62.15 dBm/MHz) and ISED (65 dBm/MHz and 62 dBm/MHz) EIRP Regulatory Limits.

ISED EIRP Calculations for Four Port MIMO Operations for Band 7 Single E-UTRA and NB-IoT Carriers

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon Commscope antenna assembly model "FFV4Q4-65B-R7-V2". The maximum Band 7 gain (17.3dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band 7. Four AHFIHA transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated for four port MIMO (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent and a typical loss of 1.0dB for this frequency range was used. EIRP was calculated as described in SRSP 517 clause 6.1.2. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	NB-IoT SA	E-UTRA 5 MHz Ch BW	NB-IoT IB 5 MHz Ch BW	E-UTRA 10 MHz Ch BW	NB-IoT IB 10 MHz Ch BW	NB-IoT GB 10 MHz Ch BW
Worst Case PSD/Antenna Port	42.65 dBm/MHz	39.73 dBm/MHz	39.57 dBm/MHz	38.43 dBm/MHz	38.33 dBm/MHz	38.37 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	45.65 dBm/MHz	42.73 dBm/MHz	42.57 dBm/MHz	41.43 dBm/MHz	41.33 dBm/MHz	41.37 dBm/MHz
Cable Loss (site dependent) = 1.0dB	44.65 dBm/MHz	41.73 dBm/MHz	41.57 dBm/MHz	40.43 dBm/MHz	40.33 dBm/MHz	40.37 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi
EIRP per Polarization	61.95 dBm/MHz	59.03 dBm/MHz	58.87 dBm/MHz	57.73 dBm/MHz	57.63 dBm/MHz	57.67 dBm/MHz
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	61.95 dBm/MHz	59.03 dBm/MHz	58.87 dBm/MHz	57.73 dBm/MHz	57.63 dBm/MHz	57.67 dBm/MHz
Passing ISED EIRP Limit	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz

Parameter	E-UTRA 15 MHz Ch BW	NB-IoT IB 15 MHz Ch BW	NB-IoT GB 15 MHz Ch BW	E-UTRA 20 MHz Ch BW	NB-IoT IB 20 MHz Ch BW	NB-IoT GB 20 MHz Ch BW
Worst Case PSD/Antenna Port	37.15 dBm/MHz	36.55 dBm/MHz	36.83 dBm/MHz	35.55 dBm/MHz	35.29 dBm/MHz	35.52 dBm/MHz
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total PSD per Polarization 10Log 2 = + 3dB	40.15 dBm/MHz	39.55 dBm/MHz	39.83 dBm/MHz	38.55 dBm/MHz	38.29 dBm/MHz	38.52 dBm/MHz
Cable Loss (site dependent) = 1.0dB	39.15 dBm/MHz	38.55 dBm/MHz	38.83 dBm/MHz	37.55 dBm/MHz	37.29 dBm/MHz	37.52 dBm/MHz
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi
EIRP per Polarization	56.45 dBm/MHz	55.85 dBm/MHz	56.13 dBm/MHz	54.85 dBm/MHz	54.59 dBm/MHz	54.82 dBm/MHz
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	56.45 dBm/MHz	55.85 dBm/MHz	56.13 dBm/MHz	54.85 dBm/MHz	54.59 dBm/MHz	54.82 dBm/MHz
Passing ISED EIRP Limit	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz	62.15 dBm/MHz

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
Note 2: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

EIRP Calculation Summary

The worst case AHFIHA Band 7 four port MIMO EIRP levels using antenna assembly model "FFV4Q4-65B-R7-V2" are less than the ISED (62.15 dBm/MHz) EIRP Regulatory Limits.

FCC EIRP Calculations for Four Port MIMO Operations for Band 7 Single E-UTRA and NB-IoT Carriers

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon CommScope antenna assembly model "FFV4Q4-65B-R7-V2". The maximum Band 7 gain (17.3dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band 7. Four AHFIHA transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated for four port MIMO (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured power for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent and a typical loss of 1.0dB for this frequency range was used. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	NB-IoT SA (Reduced Power)	E-UTRA 5 MHz Ch BW	NB-IoT IB 5 MHz Ch BW	E-UTRA 10 MHz Ch BW	NB-IoT IB 10 MHz Ch BW	NB-IoT GB 10 MHz Ch BW
Worst Case Power Output per Antenna Port	36.74 dBm	45.64 dBm	45.68 dBm	47.32 dBm	47.34 dBm	47.35 dBm
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total Power per Polarization 10Log 2 = + 3dB	39.74 dBm	48.64 dBm	48.68 dBm	50.32 dBm	50.34 dBm	50.35 dBm
Cable Loss (site dependent) = 1.0dB	38.74 dBm	47.64 dBm	47.68 dBm	49.32 dBm	49.34 dBm	49.35 dBm
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi
EIRP per Polarization	56.04 dBm	64.94 dBm	64.98 dBm	66.62 dBm	66.64 dBm	66.65 dBm
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	56.04 dBm	64.94 dBm	64.98 dBm	66.62 dBm	66.64 dBm	66.65 dBm
Passing FCC EIRP Limit See Note 3	56.2 dBm	70.2 dBm	70.2 dBm	73.2 dBm	73.2 dBm	73.2 dBm

Parameter	E-UTRA 15 MHz Ch BW	NB-IoT IB 15 MHz Ch BW	NB-IoT GB 15 MHz Ch BW	E-UTRA 20 MHz Ch BW	NB-IoT IB 20 MHz Ch BW	NB-IoT GB 20 MHz Ch BW
Worst Case Power Output per Antenna Port	47.33 dBm	47.33 dBm	47.63 dBm	47.49 dBm	47.32 dBm	47.34 dBm
Number of Ant Ports per Polarization	2	2	2	2	2	2
Total Power per Polarization 10Log 2 = + 3dB	50.33 dBm	50.33 dBm	50.63 dBm	50.49 dBm	50.32 dBm	50.34 dBm
Cable Loss (site dependent) = 1.0dB	49.33 dBm	49.33 dBm	49.63 dBm	49.49 dBm	49.32 dBm	49.34 dBm
Dir Gain = Max Ant Gain (G_{Ant}) See Note 1	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi	17.3 dBi
EIRP per Polarization	66.63 dBm	66.63 dBm	66.93 dBm	66.79 dBm	66.62 dBm	66.64 dBm
Number of Polarizations	2	2	2	2	2	2
EIRP Total = Y1 ±45°and Y2 ±45° See Note 2	66.63 dBm	66.63 dBm	66.93 dBm	66.79 dBm	66.62 dBm	66.64 dBm
Passing FCC EIRP Limit See Note 3	75.0 dBm	75.0 dBm	75.0 dBm	76.2 dBm	76.2 dBm	76.2 dBm

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
Note 2: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).
Note 3: The EIRP limit is defined by FCC part 27.50(h)(ii) as 33dBW+ 10Log(X/Y) dBW + 10 log(360/beamwidth) dBW where X is the channel width in MHz and Y is 5.5 or 6MHz. The CommScope model FFV4Q4-65B-R7-V2 antenna has a horizontal beamwidth of 57 degrees for the 2490 to 2690MHz frequency range. Y was selected to be 6MHz.

EIRP Calculation Summary

The NB-IoT SA carrier power level was reduced from maximum (20 watts/carrier) to meet the FCC EIRP Regulatory Limit.
The worst case AHFIHA Band 7 four port MIMO EIRP levels using antenna assembly model “FFV4Q4-65B-R7-V2” are less than the FCC EIRP Regulatory Limits.

APPENDIX C: AHFIHA 4G LTE BAND 25/BAND 66/BAND 7 FCC AND ISED EMISSION DESIGNATORS

FCC and ISED Emission Designators for Band 2 (1930MHz to 1990MHz) Single Carrier									
Ch BW	Radio Channel	4G-LTE: QPSK		4G-LTE: 16QAM		4G-LTE: 64QAM		4G-LTE: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
1.4MHz	Low							1M26F9W	1M11F9W
	Mid	1M28F9W	1M11F9W	1M28F9W	1M11F9W	1M25F9W	1M11F9W	1M28F9W	1M11F9W
	High							1M27F9W	1M11F9W
3MHz	Low							2M91F9W	2M70F9W
	Mid	2M93F9W	2M70F9W	2M93F9W	2M70F9W	2M93F9W	2M71F9W	2M92F9W	2M70F9W
	High							2M91F9W	2M70F9W
FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

FCC and ISED Emission Designators for Band 25 (1930MHz to 1995MHz) Single Carrier									
Ch BW	Radio Channel	4G-LTE: QPSK		4G-LTE: 16QAM		4G-LTE: 64QAM		4G-LTE: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
5MHz	Low							4M83F9W	4M49F9W
	Mid	4M86F9W	4M49F9W	4M89F9W	4M48F9W	4M83F9W	4M49F9W	4M84F9W	4M49F9W
	High							4M86F9W	4M49F9W
10MHz	Low							9M67F9W	8M97F9W
	Mid	9M73F9W	8M98F9W	9M71F9W	8M99F9W	9M71F9W	8M97F9W	9M71F9W	8M98F9W
	High							9M71F9W	8M97F9W
15MHz	Low							14M6F9W	13M5F9W
	Mid	14M5F9W	13M5F9W	14M5F9W	13M5F9W	14M6F9W	13M5F9W	14M5F9W	13M5F9W
	High							14M5F9W	13M5F9W
20MHz	Low							19M5F9W	18M0F9W
	Mid	19M5F9W	18M0F9W	19M5F9W	18M0F9W	19M5F9W	18M0F9W	19M5F9W	18M0F9W
	High							19M6F9W	18M0F9W
FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

FCC and ISED Emission Designators for Band 66 (2110MHz to 2200MHz) Single Carrier									
Ch BW	Radio Channel	4G-LTE: QPSK		4G-LTE: 16QAM		4G-LTE: 64QAM		4G-LTE: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
1.4MHz	Low							1M26F9W	1M11F9W
	Mid	1M27F9W	1M12F9W	1M27F9W	1M11F9W	1M27F9W	1M11F9W	1M27F9W	1M11F9W
	High							1M28F9W	1M11F9W
3MHz	Low							2M93F9W	2M70F9W
	Mid	2M93F9W	2M70F9W	2M94F9W	2M70F9W	2M91F9W	2M70F9W	2M90F9W	2M70F9W
	High							2M91F9W	2M70F9W
5MHz	Low							4M87F9W	4M49F9W
	Mid	4M84F9W	4M49F9W	4M83F9W	4M49F9W	4M88F9W	4M49F9W	4M88F9W	4M49F9W
	High							4M86F9W	4M49F9W
10MHz	Low							9M73F9W	8M96F9W
	Mid	9M73F9W	8M97F9W	9M67F9W	8M99F9W	9M73F9W	8M98F9W	9M65F9W	8M97F9W
	High							9M69F9W	8M97F9W
15MHz	Low							14M5F9W	13M5F9W
	Mid	14M6F9W	13M5F9W	14M4F9W	13M4F9W	14M6F9W	13M5F9W	14M5F9W	13M5F9W
	High							14M6F9W	13M5F9W
20MHz	Low							19M5F9W	18M0F9W
	Mid	19M5F9W	18M0F9W	19M6F9W	18M0F9W	19M5F9W	18M0F9W	19M3F9W	18M0F9W
	High							19M5F9W	18M0F9W
FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

FCC and ISED Emission Designators for Band 7 (2620MHz to 2690MHz) Single Carrier									
Ch BW	Radio Channel	4G-LTE: QPSK		4G-LTE: 16QAM		4G-LTE: 64QAM		4G-LTE: 256QAM	
		FCC	ISED	FCC	ISED	FCC	ISED	FCC	ISED
5MHz	Low							4M84F9W	4M49F9W
	Mid	4M88F9W	4M49F9W	4M82F9W	4M45F9W	4M87F9W	4M49F9W	4M84F9W	4M50F9W
	High							4M88F9W	4M50F9W
10MHz	Low							9M69F9W	8M97F9W
	Mid	9M73F9W	8M97F9W	9M57F9W	8M98F9W	9M73F9W	8M98F9W	9M73F9W	8M97F9W
	High							9M63F9W	8M96F9W
15MHz	Low							14M5F9W	13M5F9W
	Mid	14M4F9W	13M5F9W	14M4F9W	13M5F9W	14M6F9W	13M5F9W	14M6F9W	13M5F9W
	High							14M5F9W	13M5F9W
20MHz	Low							19M4F9W	18M0F9W
	Mid	19M4F9W	18M0F9W	19M7F9W	18M0F9W	19M5F9W	18M0F9W	19M4F9W	18M0F9W
	High							19M5F9W	18M0F9W
FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.									

FCC and ISED Emission Designators for Band 25 (1930MHz to 1995MHz) NB-IoT Guard Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
10MHz	Low	9M85F9W	9M21F9W
	Mid	9M83F9W	9M21F9W
	High	9M85F9W	9M21F9W
15MHz	Low	14M7F9W	13M8F9W
	Mid	14M7F9W	13M8F9W
	High	14M7F9W	13M7F9W
20MHz	Low	19M9F9W	18M3F9W
	Mid	19M9F9W	18M3F9W
	High	19M8F9W	18M2F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 66 (2110MHz to 2200MHz) NB-IoT Guard Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
10MHz	Low	9M85F9W	9M21F9W
	Mid	9M83F9W	9M20F9W
	High	9M89F9W	9M20F9W
15MHz	Low	14M8F9W	13M8F9W
	Mid	14M8F9W	13M8F9W
	High	14M8F9W	13M8F9W
20MHz	Low	19M8F9W	18M3F9W
	Mid	19M8F9W	18M3F9W
	High	19M9F9W	18M3F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 7 (2620MHz to 2690MHz) NB-IoT Guard Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
10MHz	Low	9M83F9W	9M19F9W
	Mid	9M87F9W	9M20F9W
	High	9M81F9W	9M21F9W
15MHz	Low	14M8F9W	13M8F9W
	Mid	14M7F9W	13M7F9W
	High	14M7F9W	13M8F9W
20MHz	Low	19M9F9W	18M3F9W
	Mid	19M9F9W	18M3F9W
	High	19M9F9W	18M3F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 25 (1930MHz to 1995MHz) NB-IoT Stand Alone			
Ch BW	Radio Channel	4G-LTE: N-TM	
		FCC	ISED
200KHz	Low	280KG7D	202KG7D
	Mid	244KG7D	200KG7D
	High	292KG7D	204KG7D
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 66 (2110MHz to 2200MHz) NB-IoT Stand Alone			
Ch BW	Radio Channel	4G-LTE: N-TM	
		FCC	ISED
200KHz	Low	272KG7D	204KG7D
	Mid	232KG7D	205KG7D
	High	246KG7D	205KG7D
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 7 (2620MHz to 2690MHz) NB-IoT Stand Alone			
Ch BW	Radio Channel	4G-LTE: N-TM	
		FCC	ISED
200KHz	Low	260KG7D	200KG7D
	Mid	271KG7D	202KG7D
	High	243KG7D	204KG7D
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 25 (1930MHz to 1995MHz) NB IoT In-Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
5MHz	Low	4M83F9W	4M48F9W
	Mid	4M87F9W	4M49F9W
	High	4M83F9W	4M49F9W
10MHz	Low	9M71F9W	8M97F9W
	Mid	9M67F9W	8M97F9W
	High	9M67F9W	8M97F9W
15MHz	Low	14M6F9W	13M5F9W
	Mid	14M6F9W	13M5F9W
	High	14M6F9W	13M5F9W
20MHz	Low	19M5F9W	18M0F9W
	Mid	19M4F9W	18M0F9W
	High	19M5F9W	18M0F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 66 (2110MHz to 2200MHz) NB IoT In-Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
5MHz	Low	4M83F9W	4M49F9W
	Mid	4M83F9W	4M49F9W
	High	4M86F9W	4M48F9W
10MHz	Low	9M67F9W	8M97F9W
	Mid	9M67F9W	8M97F9W
	High	9M69F9W	8M97F9W
15MHz	Low	14M6F9W	13M5F9W
	Mid	14M5F9W	13M5F9W
	High	14M6F9W	13M5F9W
20MHz	Low	19M5F9W	18M0F9W
	Mid	19M4F9W	18M0F9W
	High	19M5F9W	18M0F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			

FCC and ISED Emission Designators for Band 7 (2620MHz to 2690MHz) NB IoT In-Band			
Ch BW	Radio Channel	4G-LTE: E-TM1.1 with N-TM	
		FCC	ISED
5MHz	Low	4M83F9W	4M49F9W
	Mid	4M82F9W	4M48F9W
	High	4M88F9W	4M49F9W
10MHz	Low	9M67F9W	8M98F9W
	Mid	9M69F9W	8M96F9W
	High	9M69F9W	8M97F9W
15MHz	Low	14M4F9W	13M5F9W
	Mid	14M6F9W	13M5F9W
	High	14M6F9W	13M5F9W
20MHz	Low	19M4F9W	18M0F9W
	Mid	19M4F9W	18M0F9W
	High	19M5F9W	18M0F9W
Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.			