

**EXHIBIT 13**

**RF EXPOSURE ASSESSMENT**

**Section 1.1307 (b) Environmental Assessment Requirement for Equipment Authorization**

Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the preparation of an Environmental Assessment (EA) if the particular facility, operation or transmitter would cause human exposure to levels of radiofrequency radiation in excess of the limits in §§ 1.1310 and 2.1093 of this chapter.

**Section 1.1310 Radio Frequency Radiation Exposure Limits**

The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Section 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC’s OST/OET Bulletin Number 65, “Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.”

Response

The AirScale MAA 64T64R 192AE n78 200W AEQU is typically installed on poles or walls in fixed locations. Therefore, the AEQU is neither a portable nor a mobile wireless device.

The AEQU provides a massive MIMO adaptive antenna (MAA) solution for Band n78. The AEQU has an antenna panel with 192AE (antenna elements) to perform digital beamforming with up to 16 spatial MIMO streams. The maximum antenna gain is 24.5 dBi for 64 ports.

For 53.01dBm output power at 75% duty cycle with 2dB uncertainty and 24.5dBi, the maximum EIRP = 53.01dBm +2dB – 1.25dB + 24.5dBi = 78.26 dBm.

**Table 13.1 Product Specifications on 5G-NR RRH Band n78**

<b>Product</b>	<b>Technologies</b>	<b>Transmitting Frequency (MHz)</b>	<b>Max Total Output Conducted Power (dBm rms)</b>	<b>Max Total Output EIRP Power (dBm rms)</b>
AEQU	5G-NR	Band n78 3450 – 3550	53.01	78.26

The information on Nokia supplied antennas is provided in Table 13.2.

The limits specified in FCC Section 1.1310 Table 1(B) for occupational/controlled exposure and general population/uncontrolled exposure, which are tabulated below in Table 13.2, shall be met.

All of the transmitters installed in the AEQU operate in the frequency range of 3.45 GHz – 3.55 GHz. The maximum power density thus needs to be less than 1.0 mW/cm<sup>2</sup> for general population/uncontrolled environment and 5.0 mW/cm<sup>2</sup> for occupational/controlled environment.

Per FCC’s OST/OET Bulletin Number 65, the appropriate EIRP (equivalent or effective isotropically radiated power) limits can be calculated based on the relationship between power density and EIRP, i.e.,

$$S = \frac{EIRP}{4\pi R^2}, \tag{1}$$

where S is the power density in mW/cm<sup>2</sup>, R is the distance to the center of radiation of the antenna in cm and EIRP is in mW.

**Table 13.2 AEQU Antenna**

Antenna	Model	Antenna Gain (dBi)
Integrated Beam Forming	192 AE & 3450 - 3550-MHz	24.5 dBi for 64 ports

**Table 13.3 Limits for Occupational/Controlled Exposure and General Population/Uncontrolled Exposure (FCC Section 1.1310 Table 1(B))**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Average Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
300 - 1500			F/300	6
1500 – 100,000			5.0	6
(B) Limits for General Population/Uncontrolled Exposure				
300 - 1500			F/1500	30
1500 – 100,000			1.0	30

Note: f = frequency om MHz; \*Plane-wave equivalent power density.

When all transmitters operate simultaneously, the EIRP and thus power density from all transmitters gives the worst-case scenario.

**Table 13.4 (a) Minimum RF Safety Distances for Uncontrolled Exposure**

Module	Freq Band (GHz)	Maxi Total P <sub>out</sub> (64x64) (dBm)	Antenna Gain (dBi)	Maximum Total EIRP (dBm)	Maximum Total EIRP (mW)	Limit of Power Density S (mW/cm <sup>2</sup> )	RF Safety Distance (cm)
AEQP	3.450	53.01	24.5	78.26	66988460.94	1.0	2309.432

**Table 13.4 (b) Power Density at the Proposed Minimum RF Safety Distance**

Module	Freq Band (GHz)	Maxi Total P <sub>out</sub> (64x64) (dBm)	Antenna Gain (dBi)	Maximum Total EIRP (dBm)	Maximum Total EIRP (mW)	Limit of Power Density S (mW/cm <sup>2</sup> )	RF Safety Distance (cm)
AEQP	3.450	53.01	24.5	78.26	66988460.94	0.9999	2309.5

**Table 13.5 (a) Minimum RF Safety Distances for Controlled Exposure**

Module	Freq Band (GHz)	Maxi Total P <sub>out</sub> (64x64) (dBm)	Antenna Gain (dBi)	Maximum Total EIRP (dBm)	Maximum Total EIRP (mW)	Limit of Power Density S (mW/cm <sup>2</sup> )	RF Safety Distance (cm)
AEQP	3.450	53.01	24.5	78.26	66988460.94	5.0	1032.81

**Table 13.5 (b) Power Density at the Proposed Minimum RF Safety Distance**

Module	Freq Band (GHz)	Maxi Total P <sub>out</sub> (64x64) (dBm)	Antenna Gain (dBi)	Maximum Total EIRP (dBm)	Maximum Total EIRP (mW)	Limit of Power Density S (mW/cm <sup>2</sup> )	RF Safety Distance (cm)
AEQP	3.450	53.01	24.5	78.26	66988460.94	4.999	1032.9

**Results**

The results are summarized below in Tables 13.6.

**Table 13.6 Minimum RF Safety Distances for AEQU**

<b>Exposure</b>	<b>RF Safety Distance (cm)</b>	<b>Total Power Density S (mW/cm<sup>2</sup>)</b>	<b>Limit of Power Density S (mW/cm<sup>2</sup>)</b>
Occupational/Controlled	1032.9	4.999	5
General Population/Uncontrolled	2309.5	0.9999	1

Therefore, the RF safety distance for the Nokia AirScale MAA 64T64R 192AE n78 200W AEQU shall be larger than 1032.9 cm (10.33 m) for occupational/controlled exposure and larger than 2309.5 cm (23.1 m) for general population/uncontrolled exposure.