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 **AWHQU AirScale Micro 4T4R n48 CBRS 20W** (AWHQU) is typically installed on poles or walls in fixed locations. Therefore, the AWHQU is neither a portable nor a mobile wireless device. The maximum antenna gain is up to 18.0 dBi for 4 ports

The information on Nokia supplied antennas is provided in Table 13.1.

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 AWHQU operate in the frequency range of 3.55 GHz – 3.70 GHz. The maximum power density thus needs to be less than 1.0 mW/cm^2 for general population/uncontrolled environment and 5.0 mW/cm^2 for occupational/controlled environment.

SUMMARY OF THE TEST RESULTS

Applied Standard(s): FCC Section 1.1310		
AWHQU Configuration	**Exposure Environement**	**Proposed RF Safety Distance (cm)**
AWHQU equipped with Directional Antenna	General Population/Uncontrolled*	178.3
AWHQU equipped with Directional Antenna	Occupational/Controlled	79.75

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.,

$$S = \frac{EIRP}{4\pi R^2}, \qquad (1)$$

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

Table 13.1(a) AWHQU Antenna

Antenna	Model	Maximum Antenna Gain (dBi)
Directional	CBRS & 3550 – 3700 MHz	18.0

Note: Per FCC Part 96.41, the maximum EIRP is 47dBm/10MHz for Category B CBSD. An antenna with the maximum gain of 18 dBi can only be used if the power is reduced such that the maximum EIRP output power does not exceed EIRP 47dBm/10MHz limit.

Table 13.1(b) AWHQU Maximum Output Power

Signal Bandwidth (MHz)	Maxi Conducted Output Power Per Port	Maxi Conducted Output Power Total (4x4)	Antenna Gain	Maximum EIRP Total
80	37.0 dBm	43.01 dBm	13.0 dBi	56.01 dBm

The maximum EIRP Output 56.01 dBm for 80MHz carriers was derived from Maximum Conducted Output Power Total + Maximum Antenna Gain Used + Δ (due to cable loss, duty cycle and power uncertainty).

For 43.01 dBm output power, the maximum antenna gain used + Δ should be equal or less than 13 dB.

Table 13.2 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)	Magentic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Average Time $\|E\|^2$, $\|H\|^2$ 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 in MHz; *Plane-wave equavalent power density.

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

Table 13.3 (a) Minimum RF Safety Distances for Uncontrolled Exposure

LTE Band	Freq (GHz)	Maxi Total EIRP (dBm)	Maxi Total EIRP (mW)	Limit of Power Density S (mW/cm^2)	RF Safety Distance (cm)
B48	3.550	56.01	399024.90	1	178.24

Table 13.3 (b) Power Density at the Proposed Minimum RF Safety Distance 178.3 cm

LTE Band	Freq (GHz)	Maxi Total EIRP (dBm)	Maxi Total EIRP (mW)	RF Safety Distance (cm)	Power Density S (mW/cm^2)
B48	3.550	56.01	399024.90	178.3	0.9993

Table 13.4 (a) Minimum RF Safety Distances for Controlled Exposure

LTE Band	Freq (GHz)	Maxi Total EIRP (dBm)	Maxi Total EIRP (mW)	Limit of Power Density S (mW/cm^2)	RF Safety Distance (cm)
B48	3.550	56.01	399024.90	5	79.71

Table 13.4 (b) Power Density at the Proposed Minimum RF Safety Distance 79.75cm

LTE Band	Freq (GHz)	Maximum Total EIRP (dBm)	Maximum Total EIRP (mW)	RF Safety Distance (cm)	Power Density S (mW/cm^2)
B48	3.550	56.01	399024.90	79.75	4.995

Results

The results are summarized below in Tables 13.5.

Table 13.5 Minimum RF Safety Distances for AWHQU

Exposure	RF Safety Distance (cm)	Total Power Density S (mW/cm^2)	Limit of Power Density S (mW/cm^2)
Occupational/Controlled	79.75	4.995	5
General Population/Uncontrolled	178.3	0.9993	1

Therefore, the RF safety distance for the Nokia **AWHQU AirScale Micro 4T4R n48 CBRS 20W** (AWHQU) shall be larger than 79.75 cm for occupational/controlled exposure and larger than 178.3 cm for general population/uncontrolled exposure.