June 27, 2018

Nokia Solutions and Networks
US LLC

Address:
600 Mountain Ave
Murray Hill, NJ 07974

RE: Antenna Registration: Directional Antenna Information
License Service Application, File No. 1149-EX-ST-2018

This is the exhibit for the directional antenna Fixed/Base Stations:

Fixed/Base Stations:

- Access Point (AP) will use multiple antennas:
  - Vertical steering angle (1.5dB) is 22.5 degrees
  - Mechanical downtilt may vary between 0~15 degrees
  - Azimuth may cover three sectors to cover 360 degrees
  - Horizonal beamwdith is 6.5 degrees (boresight)
  - Veritical beamwidth is 8.6 degrees (boresight)
  - Horizontal steering angle (3dB) is 90 degrees
  - Horizontal steering angle (8dB) is 120 degrees
  - Beam direction perpendicular to antenna array surface

User Device:

- User Device (AP) will use multiple antennas:
  - Up tilt will be 15 degrees
  - Mechanical tilt may add additional tilt up
  - Azimuth beamwidth is -20 degrees to +20 degrees.
  - Beam direction perpendicular to disc antenna surface

Nokia proposes to operate using BPSK, QPSK, 16QAM and 64QAM modulation.

Transmit bandwidths are: 400MHz and 800MHz.

The primary emission designators are:
400MW7W and 800MW7W

The equipment is configured to operate at a Maximum Transmit power of 54 dBm EIRP.
Nokia will vary the actual powers within the maximums noted above to test coverage results.

Yours Sincerely,

Glenn A. Steitz
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