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Timco Engineering Inc.
FCC Authorized
Telecommunication Certification Body (TCB)
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September 6, 2018

Subject: Application for C2PC Equipment Authorization under FCC ID: 2AD8UAZRBRH1 for Nokia Low Power AirScale Micro LAA RRH with New Antenna FA2RA, Operating in the Band 46 UNII-1/3 Bands

Dear Examiner:

The Nokia AirScale Micro Remote Radio Head (RRH) (hereinafter referred to as “AZRB”) is a low power RRH operating in the Band 46 unlicensed spectrum of 5.18-5.24 GHz (UNII-1) and 5.745-5.825 MHz (UNII-3) under the regulations of FCC Title 47 Part 15 Subpart E, Unlicensed National Information Infrastructure (UNII) Devices. The AZRB received its initial FCC certification on April 25, 2018 under FCC ID: 2AD8UAZRBRH1 for operation in the UNII-1 and UNII-3 frequency spectrums as a Point-to-Multipoint Master Device.

The AZRB supports LTE (Long Term Evolution) License Assisted Access (LAA) technology and one to three 20MHz carriers with (aggregated) bandwidth of 20/40/60MHz and a maximum RF power of 0.5W at each of its two MIMO transmit ports.

In the original certification, two omni-directional antennas and three directional antennas have been approved. Among them, two antennas which have the highest gains of each type, i.e., GQ2410-06645 omni-directional antenna with a maximum gain of 5.9dBi and 2205 directional antenna with a maximum gain of 9.5dBi, were tested with the AZRB. In a C2PC filing dated June 14, 2018, an omni-directional antenna GO4806-06664 with a maximum gain of 6.0 dBi was tested and authorized. Now a new omni-directional antenna FA2RA with a maximum gain of 7.5 dBi is added which is 1.5dB higher than that of GO4806-06664 omni-directional antenna authorized. There is no change on the maximum total power output, the software and the hardware of AZRB. There are no modifications in the transmitting and receiving frequency ranges.

Per FCC Section 15.204(c) and KDB 178919 D01 (Permissive Change Policy) Section II.A, any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator. No retesting of this system configuration is required. The marketing or use of a system configuration that employs an antenna of a different type, or that operates at a higher gain, than the antenna authorized with the intentional radiator is not permitted unless the procedures specified in Section 2.1043 are followed. The antenna type refers to antennas that have similar in-band and out-of-band radiation patterns. Any new antenna type, or higher gain antenna, approved under Part 15 requires a Class II permissive change, and the requirements of Section 15.203 must be met.

A Class II permissive authorization is thus requested to authorize the new antenna FA2RA for AZRB under the existing FCC ID 2AD8UAZRBRH1. Per FCC 2.1041(a), the technical requirements specified in FCC 15 Subpart E

Section 15.407 needs to be met. Per 2.1043(b)(2), when a Class II permissive change is made by the grantee, the grantee shall provide complete information and the results of tests of the characteristics affected by such change. Therefore, only the technical requirements in 15.407 affected were evaluated. The guidelines and guidance provided in the KDB 789033 D02 v02r01 (Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices, Part 15, Subpart E) and ANSI C63.10-2013 were followed for measurement procedures and methods.

Enclosed in this application package are FCC 731 Form, the required measurement data and other required exhibits specific to this request for authorization of the subject product. The measurement exhibits attached to this application demonstrate full compliance with FCC Part 15.407 following the procedural requirements specified in FCC Part 2 Subpart J – Equipment Authorization Procedures.

The key data are summarized below.

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|-------------------------|--|
| FCC ID: | 2AD8UAZRBRH1 |
| FCC Rules: | Part 15 Subpart E Section 15.407 – UNII Devices |
| Frequency Range: | E-UTRAN Band 46, 5.18-5.24GHz (UNII-1) & 5.745-5.825 GHz (UNII-3) |
| Output Power: | Up to 1W |
| Operation Mode: | Master Device, Point to Multipoint |
| Carriers: | 1~3 20MHz Carriers with (Aggregated) Bandwidth 20/40/60MHz |
| Changes: | New Omni-Directional Antenna FA2RA |

The updated antenna list per 1.1033(b)(4), KDB 353028 D01 and KDB 178919 D01 Section II requirements includes the information of the newly added antenna and was provided in Exhibit 2.

The supporting exhibits are assembled and presented in accordance with the *Table of Contents* attached below.

Should there be any questions or procedural issues please feel free to contact me by email and/or phone. The contacts at Nokia will comply with any request for additional information should the need arise.

Sincerely,



Terry Schwenk

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Confidentiality Request Letter

Required Exhibits*:

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| Exhibit 1 | Section 2.1033(a) | TCB Application Form 731 |
| Exhibit 2 | Sections 2.1033 (b)(4), 15.203 & 15.204, KDB 353028 D01 & 178919 D01 II | Description of Antennas |
| Exhibit 3 | Section 2.1033 (b)(14) | Setup Drawings or Photographs |
| Exhibit 4 | Section 2.1033 (b)(3) | Installation and Operating Instructions → Confidential |
| Exhibit 5 | Sections 2.1033 (b)(6), 2.911 (e) & 15.407 | Test Report |
| Exhibit 6 | Sections 1.1307 & 1.1310 | RF Exposure Assessment |

*The information in the exhibits submitted in the original filing about Certification and Qualification of Engineers, Manufacturer, Applicant and Identifier, Descriptions of Operation and Security, Block Diagrams, Schematics and Parts List, Photos and Product Label are still valid and will not be resubmitted here.