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October 31, 2023

Timco Engineering Inc.
FCC Authorized
Telecommunication Certification Body (TCB)
13146 NW 86th Drive
Suite 400
Alachua, Florida 32615

Subject: Application for Original Equipment Certification for Nokia Drone Networks Electric Drone under FCC ID: 2BC99NDNUAV1

Dear Examiner:

Nokia Drone Networks (NDN) comprises a NDN Electric Drone and a NDN Docking Station. The NDN Electric Drone is an Unmanned Aircraft System (UAS) which creates value to customers by providing airborne missions, such as terrain mapping, area monitoring, gas measurement and structure inspection etc.

NDN Electric Drone P591013 is equipped with two RF modules P638893 and one WiFi module P632592 for communication. The drone is also equipped with an onboard computer that provides intelligent functionality, such as controlling the operation of the payload, obtaining relevant data from it, communicating with other subsystems in the network, uploading flight commands to the flight controller depending on real-time conditions and evaluating surrounding terrain, etc.

The NDN Docking Station provides a platform for drone's taking off, landing and charging.

The RF module P638893 was FCC certified on 8/1/2022 and 8/31/2022 & 5/15/2023 (C2PC) as single-modular transmitter under FCC ID: XMR2022RM520NGL. It supports both LTE and 5G NR technologies in multiple bands with multiple bandwidths. It uses external antennas. The NDN Electric Drone P591013 is equipped with eight antennas: two External Antennas P567162 (ANT0) with peak gain +3.0 ~ +5.0dBi and six Internal Antennas (inside the drone cover) P601003 (ANT1, ANT2 and ANT3) with peak gain -1.7 ~ +3.7dBi. Two RF modules RM520N-GL will not transmit simultaneously on the same channel.

The WiFi module P632592 with integrated antenna was FCC certified as a single-modular transmitter on 2/28/2022 under FCC ID: 2AC7Z-ESPS3MINI1 for supporting 2.4GHz DTS (2400-2483.5MHz Digital Transmission System).

There are no changes in both modules. Most of the requirements for RF characteristics are at the antenna ports. Therefore, the test reports with the RF test results evaluated at the antenna ports in their stand-alone modular approve are still valid, except the radiated and EMC related tests due to the new host environment. The radiated and EMC related tests have been evaluated for the NDN. The selected conducted tests were evaluated as well for verification purpose.

Per KDB 996369 D04 Mobile Integration Guide, host product manufacturers are responsible to follow the integration guidance and to perform a limited set of transmitter module verification testing, to ensure the

end product is in compliance with the FCC rules. Also host product manufacturers are responsible for all additional equipment authorization and testing for technical requirements not covered by the module grant (e.g., unintentional radiator Part 15 Subpart B requirements, or transmitters used in the host that are not certified modules).

Nokia hereby requests a new certification for the above NDN Electric Drone with two RF modules P638893 and one WiFi module P632592 installed under FCC ID: 2BC99NDNUAV1 in accordance with KDB 996369 D02 Frequently Asked Questions and Answers about Modules.

KDB 996369 D04 Mobile Integration Guide recommended the composite investigation test for the Host with all the transmitters installed to verify the composite system meets all the applicable FCC rules. The ANSI C63.26-2015 was followed for measurement methods and procedures.

The key data of the subject equipment are summarized below:

FCC ID	2BC99NDNUAV1
Manufacturer	Nokia Solutions and Network
Subject Equipment	NDN Electric Drone
Equipment Type	Transceiver
Frequency Band	Licensed bands: b2/n2, b4, b7/n7, b12/n12, b13/n13, b14/n14, b17, b25/n25, b30/n30, b38/n38, b41/n41, b42, b43, b48/n48, b66/n66, n70, b71/n71, n77, n78 Unlicensed band: 2.4GHz.
Maximum Rated Output Power	P638893: Class 3: 23dBm \pm 1dB (0.251W), Class 2 HPUE: 26dBm \pm 1dB (0.501W) in B38/B41/B42/B43 and n38/n41/n77/n78 bands. P632592: 25.3dBm (0.3365W) for 2.4GHz.
Frequency Tolerance	\pm 0.05 ppm
FCC Rules	Parts 15C, 24E, 27, 90, 96

Enclosed in this application package are FCC 731 Form, a letter of Request for Confidentiality, 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 Parts 15C, 24E, 27, 90 and 96 and KDB 996369 D01/D02/D04 following the procedural requirements specified in FCC Part 2 Subpart J – Equipment Authorization Procedures.

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,



Raymond Johnson



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Exhibit 2	Sections 2.911 (d)(1, 2) & 2.911 (e, f)	Certifications and Qualification
Exhibit 3	Sections 2.1033 (b)(2,3), 2.1033 (c)(2,3), 2.903, 2.911(d)(5), KDB 986446 D01	Attestation Statement on the Covered Equipment and List
	Sections 2.1033(b)(4), 2.1033(c)(4), 2.911(d)(7), KDB 986446 D01	Attestation Statement on US Agent Certification Designation Letter for Service of Process applicant and agent both sign
Exhibit 4	Sections 2.1033 (b)(1, 5), 2.1033 (c)(1, 5, 7, 8, 10)	Manufacturer, FCC Identifier, Emission Types, Frequency Range, Power Range, Maximum Power Rating,
Exhibit 5	Sections 2.1033 (b)(6), 2.1033 (c)(6)	Installation and Operating Instructions → Confidential
Exhibit 6	Section 2.1033 (c)(13), Section 2.1033 (b)(8)	Block Diagrams → Confidential
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