REPORT No.: SZ23090086S01

RF EXPOSURE EVALUATION REPORT

APPLICANT	:	Ubiik Inc.
PRODUCT NAME	:	goRAN LTE Base Station
MODEL NAME	:	BS1AN-DA3US
BRAND NAME	:	UBIIK
FCC ID	:	2AXTDBS1ANDA3US
STANDARD(S)	:	FCC 47 CFR Part 2(2.1091) FCC 47 CFR Part 27(27.52)
RECEIPT DATE	:	2023-09-13
TEST DATE	:	2023-09-26 to 2023-10-19
ISSUE DATE	:	2023-12-19

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DIRECTORY

Change History		
Version	**Date**	**Reason for Change**
1.0	2023-12-19	First edition

1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Ubiik Inc.
Applicant Address:	19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)
Manufacturer:	Ubiik Inc.
Manufacturer Address:	19F., No. 17, Sec. 1, Chengde Rd., Datong Dist., Taipei City 103, Taiwan (R.O.C.)

1.2 Equipment under Test (EUT) Description

Product Name:	goRAN LTE Base Station	
Sample No.:	(N/A, marked 1# by test site)	
Hardware Version:	N/A	
Software Version:	N/A	
Frequency Bands:	NB-IOT: 757 MHz ~ 758 MHz	
sub-carrier spacing:	3.75 KHz; 15 KHz	
Modulation Type:	QPSK	
Channel Bandwidth:	200 KHz	
Antenna Type:	NB-IOT: Panel Antenna & Fixed External Antenna	
Antenna Gain:	Panel Antenna	12.00 dBi
		16.00 dBi
	Fixed External Antenna	3.83 dBi
		7.80 dBi

Note: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method Determination /Remark
FCC 47 CFR Part 2(2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	No deviation
FCC 47 CFR Part 27(27.52)	RF Exposure	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		

2. RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz* = Plane-wave equivalent power density

3. RF Output Power

NB-IOT 757MHz ~ 758 MHz					
Sub-carrier Spacing (KHz)	Modulation	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel		70647	70651	70655	
Frequency (MHz)		757.1	757.5	757.9	
15	QPSK	29.54	**29.58**	29.52	30.50
Channel		70647	70651	70655	Tune-up limit (dBm
Frequency (MHz)		757.1	757.5	757.9	
3.75	QPSK	29.56	29.53	29.49	30.50

Note 1: According to KDB 447498 Section 4.3, MPE assessment is based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Note 2: The output power refers to report (Report No.: SZ23090086W01).

4. RF Exposure Assessment

➢ **Requirement**

1. Per 47 CFR Part 1.1310 transmitters are required to be operated in a manner that ensures the public is not exposed to RF energy levels in accordance with OST/OET Bulletin Number 65.
2. General Population/Uncontrolled RF exposure should be limited to **0.505 mW/cm^2→5.05 W/m^2** (f/1500 = 757.5 MHz/1500) for this device according to 47 CFR Part 1.1310, and the power density calculation should be followed **S (W/m^2) = E^2/377**, **E= 43.63 V/m**.
3. The minimum distance from the antenna at which the MPE is met and calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in meters: **E(V/m) = [√(30 * P * G)] / d**.
4. A duty cycle of 100% as the transmitter means a base station could possibly be operated for long periods of time, therefore the duty cycle factor of 1.0 should be applied.

➢ **Radio Safety**

The client has declared that this transmitter can be operated using a range of antennas with various gains, as detailed in the table below:

Frequency Bands	Maximum Power (dBm)	Antenna Gain (dBi)	Safe Distance (m)	Safe Distance (cm)
757.5 MHz	30.50	12.00	0.53	53
757.5 MHz	30.50	16.00	0.84	84
757.5 MHz	30.50	3.83	0.21	21
757.5 MHz	30.50	7.80	0.33	33

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. The safe distance calculation should be followed:

E (V/m) = [√(30 * P * G*Duty Cycle Factor)] / d, (E = 43.63 V/m)

➢ **Conclusion**

This device complies with the human exposure basic restrictions according to 47 CFR Part 1.1310 and 47 CFR Part 2.1091 when usage distance meets the safe distance defined above.

Annex A Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

END OF REPORT