

RF Exposure Report

Report No.: SA150326E02M

FCC ID: 2AD8UFZPFWID01

Test Model: FWID

Received Date: Oct. 12, 2017

Test Date: Dec. 15, 2017

Issued Date: Feb. 08, 2018

Applicant: Nokia Solutions and Networks

Address: 2000 W. Lucent Lane, Room 8F-050B, Naperville, IL 60563 USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	3
1 Certificate of Conformity.....	4
2 RF Exposure.....	5
2.1 Limits for Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
3 Antenna Gain.....	6
4 Calculation Result.....	7
5 Brief Summary of results	9



A D T

Release Control Record

Issue No.	Description	Date Issued
SA150326E02M	Original release.	Feb. 08, 2018

1 Certificate of Conformity

Product: Flexi Zone Indoor Pico BTS

Brand: Nokia

Test Model: FWID

Test Sample S/N: EA153610017

Hardware Version: X33

Sample Status: MASS-PRODUCTION

Applicant: Nokia Solutions and Networks

Test Date: Dec. 15, 2017

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

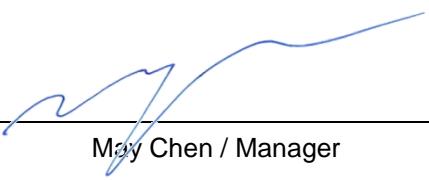
IEEE C95.1

FCC Part 1 (Section 1.1310)

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Feb. 08, 2018

Claire Kuan / Specialist

Approved by :  , **Date:** Feb. 08, 2018

May Chen / Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
300-1500	F/300	6
1500-100,000	5	6
(B)Limits For General Population / Uncontrolled Exposure				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$$Pd = (Pout*G) / (4*pi*r^2)$$

where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as fixed station and installations by professional service personnel device.

3 Antenna Gain

The antennas provided to the EUT, please refer to the following table:

WCDMA / LTE Antenna Spec.							
Antenna No	Brand	Model	Antenna Type	Antenna Connector	Gain(dBi) <Including cable loss>	Cable Length (mm)	Frequency (MHz)
Internal LTE (Main)	TongDa	T-543-8141050-6	PIFA	i-pex(MHF)	4.9	50	1710~2390 (Band 4)
Internal LTE (Aux)		T-543-8141050-7			4.6	190	1710~2390 (Band 4)
GPS Antenna Spec.							
Antenna No	Brand	Model	Antenna Type	Antenna Connector	Gain(dBi) <Including cable loss>	Cable Length (mm)	Frequency (MHz)
External GPS Ant	TongDa	T-543-8141037-9	ElecPatch	SMA Male	4.0	9140 ± 100	GPS : 1575.42 ± 3 MHz Glonass : 1602 ± 8 MHz
BT Antenna Spec.							
Antenna No	Brand	Model	Antenna Type	Antenna Connector	Gain(dBi) <Including cable loss>	Cable Length (mm)	Frequency (MHz)
Internal BT Ant	INPAQ	Fz PICO	Chip	NA	-1.22	NA	2400~2500

4 Calculation Result

The LET Maximum EIRP power was refer to the original test report (Report No.: SA150326E02C).

Calculation for Maximum Conducted Power

For General Population

For Bluetooth

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	8.73	-1.22	20	0.00131	1

For LTE

Frequency Band (MHz)	EIRP Power (mW)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2112.5-2152.5	1183.9	20	0.236	1

For WCDMA

Frequency Band (MHz)	EIRP Power (mW)	Distance (cm)	Power Density (mW/m ²)	Limit (mW/cm ²)
2112.4-2152.6	1016.25	20	0.20218	1

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

$$BT + LTE = 0.00131 / 1 + 0.236 / 1 = 0.23731$$

$$BT + WCDMA = 0.00131 / 1 + 0.20218 / 1 = 0.20349$$

Therefore the maximum calculations of above situations are less than the "1" limit.

**For Occupational Population
For Bluetooth**

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	8.73	-1.22	20	0.00131	5

For LTE

Frequency Band (MHz)	EIRP Power (mW)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2112.5-2152.5	1183.9	20	0.236	5

For WCDMA

Frequency Band (MHz)	EIRP Power (mW)	Distance (cm)	Power Density (mW/m ²)	Limit (mW/cm ²)
2112.4-2152.6	1016.25	20	0.20218	5

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

$$BT + LTE = 0.00131 / 5 + 0.236 / 5 = 0.047462$$

$$BT + WCDMA = 0.00131 / 5 + 0.20218 / 5 = 0.040698$$

Therefore the maximum calculations of above situations are less than the "1" limit.

5 Brief Summary of results

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields for both General public and Occupational. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s)

Configuration	Required Compliance Boundary(m)	
	Occupational	General Population
Bluetooth + LTE	20	20
Bluetooth + WCDMA	20	20

--- END ---