RF Exposure Evaluation Report

APPLICANT	:	Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	:	FastMile 4G Receiver
BRAND NAME	:	NOKIA
MODEL NAME	:	4G05-A
FCC ID	:	2ADZR4G05A
STANDARD	:	47 CFR Part 2.1091 FCC KDB 447498 D01 v06

We, Sporton International (Kunshan) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Rose Wang

Reviewed by: Rose Wang / Supervisor

Kat Yin

Approved by: Kat Yin / Manager

ACCREDITED Cert #5145.02

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Table of Contents

1. ADMINISTRATION DATA 4
1.1. Testing Laboratory 4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) 5
3. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS 6
4. RF EXPOSURE LIMIT INTRODUCTION 7
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION 8
5.1. Standalone Power Density Calculation 8

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA951001	Rev. 01	Initial issue of report	Aug. 30, 2019

1. Administration Data

1.1. Testing Laboratory

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory		
Test Firm	Sporton International (Kunshan) Inc.	
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958	
Test Site No.	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CN1257	314309

Applicant	
Company Name	Nokia Shanghai Bell Co., Ltd.
Address	388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

Manufacturer	
Company Name	Nokia Shanghai Bell Co., Ltd.
Address	388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	FastMile 4G Receiver
Brand Name	NOKIA
Model Name	4G05-A
FCC ID	2ADZR4G05A
Wireless Technology and Frequency Range	LTE Band 41: 2498.5 MHz ~ 2687.5 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	LTE: QPSK, 16QAM, 64QAM Bluetooth BR/EDR/LE
Antenna Gain	WWAN antenna with 11dBi Bluetooth antenna with 5dBi
HW Version	3TG00171AA
SW Version	FMR2003 E0115
EUT Stage	Identical Prototype
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. This device does not support voice function.	

Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

3. Maximum RF average output power among production units

<LTE>

Mode		Maximum Average power(dBm)
LTE	Band 41 MIMO	23.50

<Bluetooth>

Mode	Maximum Average Power (dBm)
Bluetooth BR/EDR	11.00
Bluetooth LE	5.50

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(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/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
LTE Band 41	2498.5	11.00	23.50	34.500	2.818	2818.383	0.561	1.000	0.561
Bluetooth	2402.0	5.00	11.00	16.000	0.040	39.811	0.008	1.000	0.008

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

5.2. Collocated Power Density Calculation

Power Density / Limit		Σ(Power Density / Limit) of WWAN + Bluetooth
WWAN	Bluetooth	
0.561	0.008	0.569

Remark: The simultaneously analysis above of 2 transmitters is less than 1.0 and compliant.

Conclusion:

According to 47 CFR §2.1091, the MPE was calculated at **20 cm** to show compliance with the power density limit.

RF exposure analysis concludes that the RF Exposure is FCC compliant.