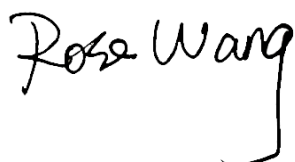


RF Exposure Evaluation Report

APPLICANT : Nokia Shanghai Bell Co., Ltd.
EQUIPMENT : FastMile 4G Receiver
BRAND NAME : NOKIA
MODEL NAME : 4G06-A
FCC ID : 2ADZR4G06A
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.



Reviewed by: Rose Wang / Supervisor



Approved by: Kat Yin / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China



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
FA950922	Rev. 01	Initial issue of report	Feb. 28, 2020



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	4G06-A
FCC ID	2ADZR4G06A
Wireless Technology and Frequency Range	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 66: 1710.7 MHz ~ 1754.3 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	LTE: QPSK, 16QAM, 64QAM Bluetooth BR/EDR
Antenna Type/ Single Antenna Gain	Dipole Antenna LTE Band 2: 9.50 dBi LTE Band 4: 9.50 dBi LTE Band 7: 11.00 dBi LTE Band 25: 9.50 dBi LTE Band 66: 9.50 dBi Bluetooth: 5.00 dBi
MIMO Directional Gain	LTE Band 2: 12.51 dBi LTE Band 4: 12.51 dBi LTE Band 7: 14.01 dBi LTE Band 25: 12.51 dBi LTE Band 66: 12.51 dBi
HW Version	3TG00171AB
SW Version	FMR2003 E0115
EUT Stage	Identical Prototype
Remark: 1. The EUT is a fixed station. 2. The EUT supports CDD Mode.	

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) SISO
LTE	Band 2	22.00
	Band 4	20.50
	Band 7	22.00
	Band 25	22.50
	Band 66	20.50

Mode		Maximum Average power(dBm) MIMO(2X2)
LTE	Band 2	20.50
	Band 4	17.45
	Band 7	18.00
	Band 25	20.00
	Band 66	17.45

<Bluetooth>

Mode	Maximum Average Power (dBm)
Bluetooth BR/EDR	3.00



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/f ²)	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/f ²)	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

For SISO

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 2	1850.7	9.50	22.00	31.500	1.413	1412.538	0.281	1.000	0.281
LTE Band 4	1710.7	9.50	20.50	30.000	1.000	1000.000	0.199	1.000	0.199
LTE Band 7	2502.5	11.00	22.00	33.000	1.995	1995.262	0.397	1.000	0.397
LTE Band 25	1850.7	9.50	22.50	32.000	1.585	1584.893	0.315	1.000	0.315
LTE Band 66	1710.7	9.50	20.50	30.000	1.000	1000.000	0.199	1.000	0.199
Bluetooth	2402.0	5.00	3.00	8.000	0.006	6.310	0.001	1.000	0.001

For MIMO

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 2	1850.7	12.51	20.50	33.010	2.000	1999.862	0.398	1.000	0.398
LTE Band 4	1710.7	12.51	17.45	29.960	0.991	990.832	0.197	1.000	0.197
LTE Band 7	2502.5	14.01	18.00	32.010	1.589	1588.547	0.316	1.000	0.316
LTE Band 25	1850.7	12.51	20.00	32.510	1.782	1782.379	0.355	1.000	0.355
LTE Band 66	1710.7	12.51	17.45	29.960	0.991	990.832	0.197	1.000	0.197

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. The EUT is a fixed station.
3. The EUT supports CDD Mode.
MIMO Gain=SISO gain+10log N (N=2)

5.2. Collocated Power Density Calculation

Power Density / Limit		Σ (Power Density / Limit) of WWAN + Bluetooth
WWAN	Bluetooth	
0.398	0.001	0.399

Remark:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for LTE + Bluetooth.
2. Chose the worst WWAN power density(SISO/MIMO) to do co-located with Bluetooth.
3. Considering the WWAN module collocation with the LTE and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is 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.