RF Exposure Evaluation Declaration

FCC ID:	SFK-140W
APPLICANT:	CIG Shanghai Co., Ltd.

Application Type:	Certification
Product:	G140WC
Model No.:	G-140W-C
Brand Name:	Shanghai Nokia bell
Test Procedure(s):	KDB 447498 D01
FCC Classification:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (UNII)
Test Date:	December 10, 2017 ~ February 28, 2018

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ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
1708RSU021-U4	Rev. 01	Initial Report	02-28-2018	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	G-140W-C
Model No.:	G-140W-C
Brand Name:	Shanghai Nokia bell
Wi-Fi Specification	802.11a/b/g/n/ac

1.2. Antenna Description

Antenna	Frequency	TX Paths	Max Peak Gain (dBi)	CDD Directional Gain (dBi)	
				For Power	For PSD
PCB Antenna	2.4GHz	2	3.0	3.0	6.01
	5GHz	2	3.0	3.0	6.01

Note1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac mode, and CDD signals are correlated.

Note2: For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

Three antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,
  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
- For power measurements on IEEE 802.11 devices,
  Array Gain = 0 dB for $N_{ANT} \leq 4$;

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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 Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

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

Where
Pd = power density in mW/cm^2
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

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	G-140W-C
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
802.11b/g/n	2412 ~ 2462	24.92	0.0618	1
802.11a/n/ac	5180 ~ 5825	28.75	0.1492	1

CONCLUSION:

The WLAN 2.4GHz and WLAN 5GHz can transmit simultaneously. Therefore, the Max Power Density at R (20 cm) = $0.0618mW/cm^2 + 0.1492mW/cm^2 = 0.2110mW/cm^2 < 1mW/cm^2$.
So the EUT complies with the requirement.

The End