

RF Exposure Evaluation Report

APPLICANT : Shenzhen Neoway Technology Co.,Ltd.
EQUIPMENT : LTE Module
BRAND NAME : Neoway
MODEL NAME : N75-NA
FCC ID : PJ7-N75-NA
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

We, Sporton International (Shenzhen) 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.



Approved by: Mark Qu / Manager



Sporton International (Shenzhen) Inc.

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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA930506	Rev. 01	Initial issue of report	Apr. 24, 2019



1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	Sporton International (Shenzhen) Inc.
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Shenzhen Neoway Technology Co.,Ltd.
Address	4F-2#, Lianjian Science&Industry Park, Huarong Road, Dalang, Longhua District, Shenzhen City, Guangdong Province, P.R.China

Manufacturer	
Company Name	Shenzhen Neoway Technology Co.,Ltd.
Address	4F-2#, Lianjian Science&Industry Park, Huarong Road, Dalang, Longhua District, Shenzhen City, Guangdong Province, P.R.China

**2. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	LTE Module
Brand Name	Neoway
Model Name	N75-NA
IMEI	866643040000911
FCC ID	PJ7-N75-NA
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz LTE Band 71: 665.5 MHz ~ 695.5 MHz
Mode	GPRS/EGPRS RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM downlink only) LTE: QPSK, 16QAM
Antenna Type	Fixed External Antenna
HW Version	V1.0
SW Version	N75_EAB0CM_BZ_V003
EUT Stage	Production Unit
Remark: 1. This device does not support voice function. 2. This device supports GRPS/EGRPS mode up to multi-slot class 12.	

3. Maximum RF average output power among production units

<GSM>

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	33.00	30.00
GPRS (GMSK, 2 Tx slots)	31.00	28.00
GPRS (GMSK, 3 Tx slots)	28.00	26.00
GPRS (GMSK, 4 Tx slots)	26.00	23.50
EDGE (8PSK, 1 Tx slot)	26.00	26.00
EDGE (8PSK, 2 Tx slots)	26.00	25.00
EDGE (8PSK, 3 Tx slots)	25.00	24.50
EDGE (8PSK, 4 Tx slots)	25.00	24.00

<WCDMA>

Mode	Average Power (dBm)		
	WCDMA Band II	WCDMA Band IV	WCDMA Band V
RMC 12.2Kbps	24.00	24.00	24.00
HSDPA Subtest-1	23.50	23.50	23.50
HSDPA Subtest-2	23.50	23.50	23.50
HSDPA Subtest-3	23.00	23.00	23.00
HSDPA Subtest-4	23.00	23.00	23.00
DC-HSDPA Subtest-1	23.50	23.50	23.50
DC-HSDPA Subtest-2	23.50	23.50	23.50
DC-HSDPA Subtest-3	23.00	23.00	23.00
DC-HSDPA Subtest-4	23.00	23.00	23.00
HSUPA Subtest-1	23.50	23.00	23.50
HSUPA Subtest-2	21.50	21.00	21.50
HSUPA Subtest-3	22.50	22.00	22.50
HSUPA Subtest-4	21.50	21.00	21.50
HSUPA Subtest-5	23.50	23.00	23.50



Average Power (dBm)											
Modulation	BW (MHz)	RB size	MPR	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	LTE Band 13	LTE Band 14	LTE Band 25
QPSK	20	≤ 18	0	23.50	23.50		23.50				23.50
QPSK	20	> 18	0-1	22.50	22.50		22.50				22.50
16QAM	20	≤ 18	0-1	22.50	22.50		22.50				22.50
16QAM	20	> 18	0-2	21.50	21.50		21.50				21.50
QPSK	15	≤ 16	0	23.50	23.50		23.50				23.50
QPSK	15	> 16	0-1	22.50	22.50		22.50				22.50
16QAM	15	≤ 16	0-1	22.50	22.50		22.50				22.50
16QAM	15	> 16	0-2	21.50	21.50		21.50				21.50
QPSK	10	≤ 12	0	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
QPSK	10	> 12	0-1	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
16QAM	10	≤ 12	0-1	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
16QAM	10	> 12	0-2	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50
QPSK	5	≤ 8	0	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
QPSK	5	> 8	0-1	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
16QAM	5	≤ 8	0-1	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
16QAM	5	> 8	0-2	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50
QPSK	3	≤ 4	0	23.50	23.50	23.50		23.50			23.50
QPSK	3	> 4	0-1	22.50	22.50	22.50		22.50			22.50
16QAM	3	≤ 4	0-1	22.50	22.50	22.50		22.50			22.50
16QAM	3	> 4	0-2	21.50	21.50	21.50		21.50			21.50
QPSK	1.4	≤ 5	0	23.50	23.50	23.50		23.50			23.50
QPSK	1.4	> 5	0-1	22.50	22.50	22.50		22.50			22.50
16QAM	1.4	≤ 5	0-1	22.50	22.50	22.50		22.50			22.50
16QAM	1.4	> 5	0-2	21.50	21.50	21.50		21.50			21.50



Average Power (dBm)						
Modulation	BW (MHz)	RB size	MPR	LTE Band 26	LTE Band 66	LTE Band 71
QPSK	20	≤ 18	0	23.50	23.00	23.50
QPSK	20	> 18	0-1	22.50	22.00	22.50
16QAM	20	≤ 18	0-1	22.50	22.00	22.50
16QAM	20	> 18	0-2	21.50	21.00	21.50
QPSK	15	≤ 16	0	23.50	23.00	23.50
QPSK	15	> 16	0-1	22.50	22.00	22.50
16QAM	15	≤ 16	0-1	22.50	22.00	22.50
16QAM	15	> 16	0-2	21.50	21.00	21.50
QPSK	10	≤ 12	0	23.50	23.00	23.50
QPSK	10	> 12	0-1	22.50	22.00	22.50
16QAM	10	≤ 12	0-1	22.50	22.00	22.50
16QAM	10	> 12	0-2	21.50	21.00	21.50
QPSK	5	≤ 8	0	23.50	23.00	23.50
QPSK	5	> 8	0-1	22.50	22.00	22.50
16QAM	5	≤ 8	0-1	22.50	22.00	22.50
16QAM	5	> 8	0-2	21.50	21.00	21.50
QPSK	3	≤ 4	0	23.50	23.00	
QPSK	3	> 4	0-1	22.50	22.00	
16QAM	3	≤ 4	0-1	22.50	22.00	
16QAM	3	> 4	0-2	21.50	21.00	
QPSK	1.4	≤ 5	0	23.50	23.00	
QPSK	1.4	> 5	0-1	22.50	22.00	
16QAM	1.4	≤ 5	0-1	22.50	22.00	
16QAM	1.4	> 5	0-2	21.50	21.00	

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

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
GPRS 850 (1 Tx slot)	824.2	5.00	33.00	38.00	794.33	0.158	0.549
GPRS 850 (2 Tx slots)	824.2	5.00	31.00	36.00	995.27	0.198	0.549
GPRS 850 (3 Tx slots)	824.2	5.00	28.00	33.00	748.17	0.149	0.549
GPRS 850 (4 Tx slots)	824.2	5.00	26.00	31.00	630.96	0.126	0.549
EGPRS 850 (1 Tx slot)	824.2	5.00	26.00	31.00	158.49	0.032	0.549
EGPRS 850 (2 Tx slots)	824.2	5.00	26.00	31.00	314.73	0.063	0.549
EGPRS 850 (3 Tx slots)	824.2	5.00	25.00	30.00	375.00	0.075	0.549
EGPRS 850 (4 Tx slots)	824.2	5.00	25.00	30.00	500.00	0.100	0.549
GPRS 1900 (1 Tx slot)	1850.2	3.00	30.00	33.00	251.19	0.050	1.000
GPRS 1900 (2 Tx slots)	1850.2	3.00	28.00	31.00	314.73	0.063	1.000
GPRS 1900 (3 Tx slots)	1850.2	3.00	26.00	29.00	297.85	0.059	1.000
GPRS 1900 (4 Tx slots)	1850.2	3.00	23.50	26.50	223.87	0.045	1.000
EGPRS 1900 (1 Tx slot)	1850.2	3.00	26.00	29.00	100.00	0.020	1.000
EGPRS 1900 (2 Tx slots)	1850.2	3.00	25.00	28.00	157.74	0.031	1.000
EGPRS 1900 (3 Tx slots)	1850.2	3.00	24.50	27.50	210.88	0.042	1.000
EGPRS 1900 (4 Tx slots)	1850.2	3.00	24.00	27.00	250.59	0.050	1.000
WCDMA Band II	1852.4	3.00	24.00	27.00	501.19	0.100	1.000
WCDMA Band IV	1712.4	5.00	24.00	29.00	794.33	0.158	1.000
WCDMA Band V	826.4	5.00	24.00	29.00	794.33	0.158	0.551
LTE Band 2	1850.7	3.00	23.50	26.50	446.68	0.089	1.000
LTE Band 4	1710.7	5.00	23.50	28.50	707.95	0.141	1.000
LTE Band 5	824.7	5.00	23.50	28.50	707.95	0.141	0.550
LTE Band 7	2502.5	7.00	23.50	30.50	1122.02	0.223	1.000
LTE Band 12	699.7	10.00	23.50	33.50	2238.72	0.446	0.466
LTE Band 13	779.5	10.00	23.50	33.50	2238.72	0.446	0.520
LTE Band 14	790.5	10.00	23.50	31.35	2238.72	0.446	0.527
LTE Band 25	1850.7	3.00	23.50	26.50	446.68	0.089	1.000
LTE Band 26	814.7	5.00	23.50	28.50	707.95	0.141	0.543
LTE Band 66	1710.7	5.00	23.00	28.00	630.96	0.126	1.000
LTE Band 71	665.5	10.00	23.50	33.50	2238.72	0.446	0.444

5.2. Collocated Power Density Calculation

General Note:

1. This MPE analysis is applicable to any collocated transmitters with EIRP for WLAN is less than or equal to 29.5dBm and EIRP for Bluetooth is less than or equal to 29.5dBm.
2. A maximum antenna gain of 6dBi for WLAN/BT has been assumed for all collocated antennas.

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
GPRS 850 (1 Tx slot)	824.2	4.50	33.00	37.5	707.95	0.141	0.549	0.256
GPRS 850 (2 Tx slots)	824.2	4.50	31.00	35.5	887.03	0.177	0.549	0.321
GPRS 850 (3 Tx slots)	824.2	4.50	28.00	32.5	666.81	0.133	0.549	0.242
GPRS 850 (4 Tx slots)	824.2	4.50	26.00	30.5	562.34	0.112	0.549	0.204
EGPRS 850 (1 Tx slot)	824.2	4.50	26.00	30.5	141.25	0.028	0.549	0.051
EGPRS 850 (2 Tx slots)	824.2	4.50	26.00	30.5	280.50	0.056	0.549	0.102
EGPRS 850 (3 Tx slots)	824.2	4.50	25.00	29.5	334.22	0.067	0.549	0.121
EGPRS 850 (4 Tx slots)	824.2	4.50	25.00	29.5	445.63	0.089	0.549	0.161
GPRS 1900 (1 Tx slot)	1850.2	3.00	30.00	33.0	251.19	0.050	1.000	0.050
GPRS 1900 (2 Tx slots)	1850.2	3.00	28.00	31.0	314.73	0.063	1.000	0.063
GPRS 1900 (3 Tx slots)	1850.2	3.00	26.00	29.0	297.85	0.059	1.000	0.059
GPRS 1900 (4 Tx slots)	1850.2	3.00	23.50	26.5	223.87	0.045	1.000	0.045
EGPRS 1900 (1 Tx slot)	1850.2	3.00	26.00	29.0	100.00	0.020	1.000	0.020
EGPRS 1900 (2 Tx slots)	1850.2	3.00	25.00	28.0	157.74	0.031	1.000	0.031
EGPRS 1900 (3 Tx slots)	1850.2	3.00	24.50	27.5	210.88	0.042	1.000	0.042
EGPRS 1900 (4 Tx slots)	1850.2	3.00	24.00	27.0	250.59	0.050	1.000	0.050
WCDMA Band II	1852.4	3.00	24.00	27.0	501.19	0.100	1.000	0.100
WCDMA Band IV	1712.4	5.00	24.00	29.0	794.33	0.158	1.000	0.158
WCDMA Band V	826.4	4.50	24.00	28.5	707.95	0.141	0.551	0.256
LTE Band 2	1850.7	3.00	23.50	26.5	446.68	0.089	1.000	0.089
LTE Band 4	1710.7	5.00	23.50	28.5	707.95	0.141	1.000	0.141
LTE Band 5	824.7	4.50	23.50	28.0	630.96	0.126	0.550	0.228
LTE Band 7	2502.5	7.00	23.50	30.5	1122.02	0.223	1.000	0.223
LTE Band 12	699.7	8.00	23.50	31.5	1412.54	0.281	0.466	0.603
LTE Band 13	779.5	8.00	23.50	31.5	1412.54	0.281	0.520	0.541
LTE Band 14	790.5	8.00	23.50	31.5	1412.54	0.281	0.527	0.534
LTE Band 25	1850.7	3.00	23.50	26.5	446.68	0.089	1.000	0.089
LTE Band 26	814.7	4.50	23.50	28.0	630.96	0.126	0.543	0.231
LTE Band 66	1710.7	5.00	23.00	28.0	630.96	0.126	1.000	0.126
LTE Band 71	665.5	8.00	23.50	31.5	1412.54	0.281	0.444	0.634
WLAN2.4GHz Band	2412	6.0	23.5	27.0	891.25	0.177	1.000	0.177
WLAN5GHz Band	5180	6.0	23.5	27.0	891.25	0.177	1.000	0.177
Bluetooth	2402	6.0	23.5	26.0	891.25	0.177	1.000	0.177

**<Collocated analysis>****General Note:**

1. For colocation analysis, LTE Band 71 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth
3. Considering the WWAN module collocation with the other transmitters of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant.

Max WWAN Power Density / Limit	Max WLAN Power Density / Limit	Max Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN + WLAN + Bluetooth
0.634	0.177	0.177	0.988

**Conclusion:**

Based on 47 CFR §2.1091 and FCC KDB 447498 D01 v06, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Frequency (MHz)	Maximum Conducted Power (dBm)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
N75-NA	GSM	824	33.00	5.00	4.50
		1850	30.00	3.00	3.00
	WCDMA	1852.4	24.00	3.00	3.00
		1712.4	24.00	5.00	5.00
		826.4	24.00	5.00	4.50
	LTE Band 2	1850.7	23.50	3.00	3.00
	LTE Band 4	1710.7	23.50	5.00	5.00
	LTE Band 5	824.7	23.50	5.00	4.50
	LTE Band 7	2502.5	23.50	7.00	7.00
	LTE Band 12	699.7	23.50	10.00	8.00
	LTE Band 13	779.5	23.50	10.00	8.00
	LTE Band 14	790.5	23.50	10.00	8.00
	LTE Band 25	1850.7	23.50	3.00	3.00
	LTE Band 26	814.7	23.50	5.00	4.50
	LTE Band 66	1710.7	23.00	5.00	5.00
	LTE Band 71	665.5	23.50	10.00	8.00
Collocated Transmitters	WLNA 2.4GHz Band	2412	23.50		6.0
	WLNA 5GHz Band	5180	23.50		6.0
	Bluetooth	2402	23.50		6.0