

RF Exposure Evaluation Report

APPLICANT : ASKEY COMPUTER CORP.
EQUIPMENT : Module
BRAND NAME : ASKEY
MODEL NAME : NMQ2210
FCC ID : H8NNMQ2210-D187
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product evaluation date was started from Sep. 18, 2024 and completed on Dec. 02, 2024. We, Sporton International Inc. (Shenzhen), 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 Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

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People's Republic of China



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA471806	Rev. 01	Initial issue of report.	Jan. 21, 2025



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	ASKEY COMPUTER CORP.
Address	10F, No.119, Jiankang Rd., Zhonghe Dist., New Taipei City, Taiwan

Manufacturer	
Company Name	ASKEY COMPUTER CORP.
Address	10F, No.119, Jiankang Rd., Zhonghe Dist., New Taipei City, Taiwan



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Module
Brand Name	ASKEY
Model Name	NMQ2210
FCC ID	H8NNMQ2210-D187
Wireless Technology and Frequency Range	LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n70 : 1695 MHz ~ 1710 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz
Mode	LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Gain	LTE Band 2 : 2.71 dBi LTE Band 4 : 2.71 dBi LTE Band 5 : 0.93 dBi LTE Band 12 : 0.93 dBi LTE Band 13 : 0.93 dBi LTE Band 14 : 0.93 dBi LTE Band 30 : 0.06 dBi LTE Band 66: 2.71 dBi LTE Band 71: 0.93 dBi LTE Band 41: 2.71 dBi LTE Band 48: -1.29 dBi 5G NR n2: 2.71 dBi 5G NR n5: 0.93 dBi 5G NR n12: 0.93 dBi 5G NR n14: 0.93 dBi 5G NR n25: 2.71 dBi 5G NR n30: 0.06 dBi 5G NR n41 ant0/3: 2.71 dBi 5G NR n48: -1.29 dBi 5G NR n66: 2.71 dBi 5G NR n70: 2.71 dBi 5G NR n71: 0.93 dBi 5G NR n77 ant0/3: -0.5 dBi
Antenna Type	Dipole Antenna
HW Version	REV3
SW Version	NMQ2210_NA_V4.2.25.1
EUT Stage	Production Unit

**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. 5GNR n2/5/25/30/41/66/71/77 supports NSA mode, and 5GNR n2/5/12/14/25/30/41/48/66/70/71/77 supports SA mode.
3. This device supports intra-band ULCA, due to intra-band ULCA and non-CA power is same, so non-CA MPE analysis can represent ULCA MPE analysis.
4. The intra-band/inter-band ULCA and EN-DC mode combination could be referred to the product spec.
5. This device supports HPUE mode for 5GNR n41/77 with high power, so HPUE has been performed to do MPE analysis.
6. The device supports HPUE (power class 2) under SISO mode and HPUE (power class 1.5) under UL MIMO mode for 5G NR n41/n77, so HPUE (power class 1.5) has been performed MPE calculation.
7. 5GNR n41 /n77 support SISO/MIMO mode, only MIMO tune up power was chosen to perform MPE calculation conservatively for MIMO power is higher.

Comments and Explanations:

1. 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.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

**3. Maximum RF average output tune up power among production units****<LTE>**

Mode		Maximum Average power(dBm)
LTE	Band 2	25.0
	Band 4	25.0
	Band 5	25.0
	Band 12	25.0
	Band 13	25.0
	Band 14	25.0
	Band 30	25.0
	Band 41	25.0
	Band 48	25.0
	Band 66	25.0
	Band 71	25.0

<5G NR>

Mode		Maximum Average power(dBm)
5G NR	n2	25.0
	n5	25.0
	n12	25.0
	n14	25.0
	n25	25.0
	n30	25.0
	n41 PC3	25.0
	n41 PC2	28.0
	n48	25.0
	n66	25.0
	n70	25.0
	n71	25.0
	n77 PC3	25.0
	n77 PC2	28.0

<MIMO>

Mode	Maximum Average power(dBm)
n41 PC2	28.0
n41 PC1.5	30.0
n77 PC2	28.0
n77 PC1.5	30.0

Note: WWAN support SISO/MIMO mode, only MIMO tune up power was chosen to perform MPE calculation conservatively for MIMO power is higher.

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)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
LTE Band 2	1850.0	2.71	25.00	27.710	590.201	0.117	1.000	0.117
LTE Band 4	1710.0	2.71	25.00	27.710	590.201	0.117	1.000	0.117
LTE Band 5	824.0	0.93	25.00	25.930	391.742	0.078	0.549	0.142
LTE Band 12	699.0	0.93	25.00	25.930	391.742	0.078	0.466	0.167
LTE Band 13	777.0	0.93	25.00	25.930	391.742	0.078	0.518	0.151
LTE Band 14	788.0	0.93	25.00	25.930	391.742	0.078	0.525	0.148
LTE Band 30	2305.0	0.06	25.00	25.060	320.627	0.064	1.000	0.064
LTE Band 41	2496.0	2.71	25.00	27.710	590.201	0.117	1.000	0.117
LTE Band 48	3550.0	-1.29	25.00	23.710	234.963	0.047	1.000	0.047
LTE Band 66	1710.0	2.71	25.00	27.710	590.201	0.117	1.000	0.117
LTE Band 71	663.0	0.93	25.00	25.930	391.742	0.078	0.442	0.176
5G NR n2	1850.00	2.71	25.00	27.710	590.201	0.117	1.000	0.117
5G NR n5	824.00	0.93	25.00	25.930	391.742	0.078	0.549	0.142
5G NR n12	699.00	0.93	25.00	25.930	391.742	0.078	0.466	0.167
5G NR n14	788.00	0.93	25.00	25.930	391.742	0.078	0.525	0.148
5G NR n25	1850.00	2.71	25.00	27.710	590.201	0.117	1.000	0.117
5G NR n30	2305.00	0.06	25.00	25.060	320.627	0.064	1.000	0.064
5G NR n41	2496.00	2.71	28.00	30.710	1177.606	0.234	1.000	0.234
5G NR n48	3550.00	-1.29	25.00	23.710	234.963	0.047	1.000	0.047
5G NR n66	1710.00	2.71	25.00	27.710	590.201	0.117	1.000	0.117
5G NR n70	1695.00	2.71	25.00	27.710	590.201	0.117	1.000	0.117
5G NR n71	663.00	0.93	25.00	25.930	391.742	0.078	0.442	0.176
5G NR n77	3450.00	-0.50	28.00	27.500	562.341	0.112	1.000	0.112

<NR MIMO>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
5G NR n41	2496.00	2.71	30.00	32.710	1866.380	0.371	1.000	0.371
5G NR n77	3450.00	-0.50	30.00	29.500	891.251	0.177	1.000	0.177

Note:

- For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
- Chose the maximum RF output tune up power and the maximum antenna gain of all antennas among same frequency WWAN bands to perform MPE calculation conservatively.
- The MIMO mode is chose the higher SISO gain as MIMO gain to perform MPE calculation.

**5.2. Collocated Power Density Calculation****<EN-DC>**

LTE Power Density / Limit	5GNR Power Density / Limit	$\Sigma(\text{Power Density / Limit})$ of LTE + 5GNR
0.176	0.234	0.410

<LTE inter-band ULCA>

LTE Power Density / Limit	LTE Power Density / Limit	$\Sigma(\text{Power Density / Limit})$ of LTE + LTE
0.176	0.176	0.352

Note:

1. For 5GNR EN-DC mode, always chose the highest LTE power density and the highest 5GNR power density to sum as EN-DC conservatively.
2. $\Sigma(\text{Power Density / Limit})$: This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for LTE + 5GNR/ LTE inter-band ULCA.
3. Considering all transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the equipment at least 20 cm to show compliance with the power density limit, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----