

RF EXPOSURE EVALUATION REPORT

FCC ID : XMR2020RM505QAE
Equipment : 5G Sub-6 GHz M.2 Module
Brand Name : Quectel
Model Name : RM505Q-AE
Applicant : Quectel Wireless Solutions Company Limited
Building 5, Shanghai Business Park Phase III (Area B),
No.1016 Tianlin Road, Minhang District
Shanghai, China 200233
Manufacturer : Quectel Wireless Solutions Company Limited
Building 5, Shanghai Business Park Phase III (Area B),
No.1016 Tianlin Road, Minhang District
Shanghai, China 200233
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA251901	Rev. 01	Initial issue of report	Aug. 10, 2022

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

Product Feature & Specification	
EUT Type	5G Sub-6 GHz M.2 Module
Brand Name	Quectel
Model Name	RM505Q-AE
FCC ID	XMR2020RM505QAE
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 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: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 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 n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz
Mode	RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink) LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM
HW Version	R1.0
SW Version	RM505QAEAR11A03M4G
EUT Stage	Production Unit
Remark:	
1. Based on original RF Exposure Report to extend 5G FR1 n77 frequency range for part27Q, other transmit band refer to MRT Technology RF Exposure Report, Report No.:2101RSU006-U8 and the result used perform Sim-Tx analysis.	

Reviewed by: Jason WangReport Producer: Paula Chen

2. Maximum RF average output power among production units

Mode		Maximum Average power(dBm)
NR	n77	28

3. 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

4. RF Exposure Evaluation

4.1. Standalone assessment

Band	Maximum Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
FR1 Band n77	28.00	5.00	33.00	0.397	1.0000

4.2. Collocated assessment

Band	Maximum Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
FR1 Band n77	28.00	5.00	33.0	0.397	1.000	0.397

WWAN Power Density / Limit	WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN+Bluetooth
0.397	0.1989	0.0199	0.6158

Note:

1. The WLAN/BT power density / limit results were refer to MRT Technology RF Exposure Report, Report No.:2101RSU006-U8, and using for Sim-Tx analysis.
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 WLAN and Bluetooth transmitter 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.

Conclusion:

According to 47 CFR §2.1901, the RF exposure analysis concludes that the RF Exposure is FCC compliant.