

MPE TEST REPORT

Applicant Quectel Wireless Solutions Co., Ltd

FCC ID XMR201703FC20

Product Wi-Fi&BT module

Brand Quectel

Model FC20

Report No. R2108A0710-M1

Issue Date September 7, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310.** The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Guangchang Fan

Guangchang Fan

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1 Test Laboratory

1.1 Notes of the Test Report

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regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.

Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

City: Shanghai

Post code: 201201

Country: P. R. China

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1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C		
Relative humidity	Min. = 30%, Max. = 70%		
Ground system resistance $< 0.5 \Omega$			
Ambient noise is checked and found very low and in compliance with requirement of stand Reflection of surrounding objects is minimized and in compliance with requirement of stand			

TA Technology (Shanghai) Co., Ltd.



2 Description of Equipment under Test

Client Information

Applicant	Quectel Wireless Solutions Co., Ltd		
Applicant address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233		
Manufacturer	Quectel Wireless Solutions Co., Ltd		
Manufacturer address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233		

General Technologies

Model FC20	
SN	MO820KK1D000044
Hardware Version	R1.1
Software Version	FC20-Q93
Date of Testing:	March 20, 2021

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

2. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

FC20 (Report No.: R2108A0710-M1) is a variant model of FC20 (Report No.: R2105A0465-M1V2). The differences between the two products are shown below.

	Product Change Description					
Item	Original	Variant				
Chip	QCA1023-0	QCA9377-3				
MCN	QCA-1023-0-115WLNSP-TR/SR/HR-03-0	QCA-9377-3-115WLNSP-TR/SR/HR-03-0				
MU-MIMO and TxBF client mode	Disable	Support				
HW Version	R1.0	R1.1				
SW Version	FC20TEA-Q73	FC20-Q93				
Others	The same	The same				

There is no tested in the report. The detailed product change description please refers to the Difference Declaration Letter.



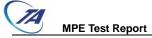


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3 Maximum conducted output power (measured) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by Numeric gain (G)=10^(antenna gain/10)

Band	Maximum Cond Pow	•	Max Antenna Gain	Numeric gain	
	(dBm)	(mW)	(dBi)		
Wi-Fi 2.4GHz	16.0	39.811	5.0	3.162	
Wi-Fi 5GHz	12.5	17.783	5.0	3.162	
Bluetooth	7.0	5.012	5.0	3.162	



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4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUN PERMISSIBLE EXPOSURE (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time			
(MHz)	Strength	Strength		25 35			
A4500 400	(V/m)	(AVm)	(mW/cm2)	(minutes)			
	(A) Limits for Occu	upational/Controlle	d Exposures				
0.3-3.0	614	1.63	*(100)	6			
3-30	1842/f	4.89/f	*(900/f2)	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/f2)	30			
30-300	27.5	0.073	0.2	30			
300-1500			f/1500	30			
1500-100,000			1.0	30			

f = frequency in MHz

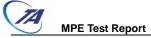
Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

The maximum permissible exposure for 1500~100,000MHz is 1.0.So

Band	The maximum permissible exposure (mW/cm²)
Wi-Fi 2.4GHz	1.000
Wi-Fi 5GHz	1.000
Bluetooth	1.000

^{* =} Plane-wave equivalent power density



RF Exposure Calculations:

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	PG (mW)	Test Result (mW/cm²)	Limit Value (mW/cm²)
Wi-Fi 2.4GHz	5.0	16.0	21.000	125.893	0.025	1.000
Wi-Fi 5GHz	5.0	12.5	17.500	56.234	0.011	1.000
Bluetooth	5.0	7.0	12.000	15.849	0.003	1.000

Note: R = 20cm $\pi = 3.1416$

BT antenna and Wi-Fi 2.4G antenna and Wi-Fi 5G antenna can't transmit simultaneously.

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

******END OF REPORT ******



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Product Change Description

The Product Change Description are submitted separately.