RF Exposure Evaluation Declaration

FCC ID:	XMR2021SC20AD
Application:	Quectel Wireless Solutions Co., Ltd
Application Type:	Certification
Product:	LTE Module
Model No.:	SC20-AD
Brand Name:	Quectel
Test Procedure(s):	KDB 447498 D01v06
Test Date:	December 21 ~ 27, 2021

Reviewed By: Sunny Sun

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2112RSU024-U6	Rev. 01	Initial Report	01-13-2022	Valid

1. GENERAL INFORMATION

1.1. Applicant

Quectel Wireless Solutions Company Limited

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.2. Manufacturer

Quectel Wireless Solutions Company Limited

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.3. Testing Facility

☒	**Test Site - MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site - MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site - MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	LTE Module
Model No.	SC20-AD
Serial No.	D1Y21L22E000063
Brand Name	Quectel
Operating Temperature	-35 ~ 75°C
Wi-Fi Specification	802.11a/b/g/n
Bluetooth Specification	V4.1 dual mode
E-UTRA Band	Band 2, 4, 5, 7, 12, 13, 25, 26
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

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	LTE Module
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Tune-up Power (dBm)	Antenna Gain (dBi)	EIRP or ERP (dBm)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
LTE B2	1850 ~ 1910	25.00	2.00	27.00	0.0997	1.0000
LTE B4	1710 ~ 1755	25.00	2.00	27.00	0.0997	1.0000
LTE B5	824 ~ 849	25.00	2.00	24.85	0.0608	0.5493
LTE B7	2500 ~ 2570	25.00	3.00	28.00	0.1255	1.0000
LTE B12	699 ~ 716	25.00	3.00	25.85	0.0765	0.4660
LTE B13	777 ~ 787	25.00	4.00	26.85	0.0963	0.5180
LTE B25	1850 ~ 1915	25.00	2.00	27.00	0.0997	1.0000
LTE B26	814 ~ 849	25.00	2.00	24.85	0.0608	0.5427
Bluetooth	2402 ~ 2480	7.32	3.0	10.32	0.0021	1.0000
2.4G Wi-Fi	2412 ~ 2462	21.81	3.0	24.81	0.0602	1.0000
5G Wi-Fi	5180 ~ 5825	11.96	4.0	15.96	0.0078	1.0000

WWAN Power Density / Limit	Bluetooth Power Density / Limit	Wi-Fi Power Density / Limit	Σ (Power Density / Limit)
0.1255	0.0021	0.0602 + 0.0078	0.1956

Note:

1. For colocation analysis, LTE Band 7 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 + Bluetooth + Wi-Fi

Appendix A – EUT Photograph

Refer to “2112RSU024-UE” file.

The End