MPE TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
FCC ID	XMR202012BG95MF
Product	LTE Cat M1 & Cat NB2 &WIFI Module
Brand	Quectel
Model	BG95-MF
Report No.	R2012A0839-M1
Issue Date	January 19, 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.

Yu Wang

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1 Test Laboratory

1.1 Notes of the Test Report

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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
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1.4 Laboratory Environment

Temperature	Min. = 18℃, Max. = 25 ℃
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

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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	BG95-MF
IMEI	860612040005002
Hardware Version	R1.1
Software Version	BG95MFLAR02A01
Date of Testing:	December 7, 2020 ~ January 14, 2021
Date of Sample Received:	December 4, 2020
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.	

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3 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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled 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
* = Plane-wave equivalent power density

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.

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The maximum permissible exposure for 300~1500 MHz is f/1500, for 1500~100,000MHz is 1.0.So

Band	The maximum permissible exposure(mW/cm^2)
NB-IOT Band 2	1.00
NB-IOT Band 4	1.00
NB-IOT Band 5	0.55
NB-IOT Band 12	0.47
NB-IOT Band 13	0.52
NB-IOT Band 25	1.00
NB-IOT Band 66	1.00
NB-IOT Band 71	0.44
NB-IOT Band 85	0.47
LTE Band 2	1.00
LTE Band 4	1.00
LTE Band 5	0.55
LTE Band 12	0.47
LTE Band 13	0.52
LTE Band 25	1.00
LTE Band 26(814 ~ 824)	0.54
LTE Band 26(824 ~ 849)	0.55
LTE Band 66	1.00
LTE Band 85	0.47

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Band	Maximum Conducted Output Power (dBm)	EIRP limit (dBm)	Margin1 (dB)	Power density Limit		Margin2 (dB)	Final Margin (dB)
				(mW/cm^2)	(dBm)		
NB-IOT Band 2	22.7	33.00	10.300	1.00	37.013	14.313	10.300
NB-IOT Band 4	22.7	30.00	7.300	1.00	37.013	14.313	7.300
NB-IOT Band 5	22.7	40.60	17.900	0.55	34.416	11.716	11.716
NB-IOT Band 12	22.7	36.92	14.220	0.47	33.734	11.034	11.034
NB-IOT Band 13	22.7	36.92	14.220	0.52	34.173	11.473	11.473
NB-IOT Band 25	22.7	33.00	10.300	1.00	37.013	14.313	10.300
NB-IOT Band 66	22.7	30.00	7.300	1.00	37.013	14.313	7.300
NB-IOT Band 71	22.7	36.92	14.220	0.44	33.447	10.747	10.747
NB-IOT Band 85	22.7	36.92	14.220	0.47	33.734	11.034	11.034
LTE Band 2	22.7	33.00	10.300	1.00	37.013	14.313	10.300
LTE Band 4	22.7	30.00	7.300	1.00	37.013	14.313	7.300
LTE Band 5	22.7	40.60	17.900	0.55	34.416	11.716	11.716
LTE Band 12	22.7	36.92	14.220	0.47	33.734	11.034	11.034
LTE Band 13	22.7	36.92	14.220	0.52	34.173	11.473	11.473
LTE Band 25	22.7	33.00	10.300	1.00	37.013	14.313	10.300
LTE Band 26(814 ~ 824)	22.7	52.15	29.450	0.54	34.337	11.637	11.637
LTE Band 26(824 ~ 849)	22.7	40.60	17.900	0.55	34.416	11.716	11.716
LTE Band 66	22.7	30.00	7.300	1.00	37.013	14.313	7.300
LTE Band 85	22.7	36.92	14.220	0.47	33.734	11.034	11.034

Note: 1. The Maximum allowed antenna gain per Band should be less than or equal to the **Final Margin** which is the allowable maximum gain value to comply with limits for maximum permissible exposure (MPE).
2. The Final Margin is determined and selected to the worst-case of Margin1 and Margin2.
3. Margin1=EIRP Limit(dBm)-Maximum Conducted Power (dBm). EIRP limit reference standard part22/ part24/part27and part90 for each band, EIRP = ERP + 2.15 (dB).
4. Margin2=Power density Limit(dBm)-Maximum Conducted Power (dBm). Power density Limit(dBm): The max. obtained by MPE with 20cm.

IMPORTANT NOTE: To comply with the FCC RF exposure compliance requirements, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. No change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's authority to operate the device.

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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/cm^2)

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	PG (mW)	Test Result (mW/cm^2)	Limit Value (mW/cm^2)	Conclusion
NB-IOT Band 2	1995.262	0.397	1.00	Pass
NB-IOT Band 4	1000.000	0.199	1.00	Pass
NB-IOT Band 5	2764.394	0.550	0.55	Pass
NB-IOT Band 12	2362.653	0.470	0.47	Pass
NB-IOT Band 13	2613.966	0.520	0.52	Pass
NB-IOT Band 25	1995.262	0.397	1.00	Pass
NB-IOT Band 66	1000.000	0.199	1.00	Pass
NB-IOT Band 71	2211.566	0.440	0.44	Pass
NB-IOT Band 85	2362.653	0.470	0.47	Pass
LTE Band 2	1995.262	0.397	1.00	Pass
LTE Band 4	1000.000	0.199	1.00	Pass
LTE Band 5	2764.394	0.550	0.55	Pass
LTE Band 12	2362.653	0.470	0.47	Pass
LTE Band 13	2613.966	0.520	0.52	Pass
LTE Band 25	1995.262	0.397	1.00	Pass
LTE Band 26(814 ~ 824)	2714.563	0.540	0.54	Pass
LTE Band 26(824 ~ 849)	2764.394	0.550	0.55	Pass
LTE Band 66	1000.000	0.199	1.00	Pass
LTE Band 85	2362.653	0.470	0.47	Pass
Note: **R** = 20cm ∏= 3.1416				

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

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

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ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

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