

# RF EXPOSURE REPORT



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

Manufacturer or Supplier:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Product:	LTE Module
Brand Name:	Quectel
Model Name:	SC66-A
FCC ID:	XMR201908SC66A
Date of tests:	Jul. 13, 2019 ~ Sept. 06, 2019

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- ☒ IEEE C95.1
- ☒ FCC Part 2.1091
- ☒ KDB 447498 D01 General RF Exposure Guidance v06

**CONCLUSION:** The submitted sample was found to COMPLY with the test requirement

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
	
Date: Sept. 29, 2019	Date: Sept. 29, 2019

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Test Report No.: SA190522W005-1

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA190522W005-1	Original release	Sept. 29, 2019

# 1 GENERAL INFORMATION

## 1.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	LTE Module	
<b>MODEL NAME</b>	Quectel	
<b>NOMINAL VOLTAGE</b>	SC66-A	
<b>OPERATING TEMPERATURE RANGE</b>	-35 ~ 65°C	
<b>MODULATION TYPE</b>	<b>WLAN</b>	CCK, DQPSK, DBPSK for DSSS 16QAM, QPSK, BPSK for OFDM
	<b>WCDMA</b>	BPSK/QPSK
	<b>LTE</b>	QPSK, 16QAM
<b>OPERATING FREQUENCY</b>	<b>WIFI 2.4G</b>	2412~ 2462MHz for 11b/g/n(HT20) 2422~ 2452MHz for 11b/g/n(HT40)
	<b>WIFI 5G</b>	5180 ~ 5240MHz, 5260 ~5320MHz, 5500 ~ 5700MHz, 5745 ~ 5805MHz for 11a/n(HT20)/n(HT40)/n(VHT80)
	<b>WCDMA</b>	1852.4-1907.6MHz (FOR WCDMA II) 1712.4-1752.6MHz (FOR WCDMA IV) 826.4-846.6MHz (FOR WCDMA V)
	<b>LTE</b>	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 2502.5MHz-2567.5MHz (FOR LTE Band7) 699.7MHz ~ 715.3MHz (FOR LTE Band12) 779.5MHz-784.5MHz (FOR LTE Band13) 790.5MHz-795.5MHz (FOR LTE Band14) 706.5MHz-713.5MHz (FOR LTE Band17) 1850.7MHz-1914.3MHz (FOR LTE Band25) 814.7MHz-848.3MHz (FOR LTE Band26) 2498.5MHz-2687.5MHz (FOR LTE Band41) 1710.7MHz ~ 1779.3MHz (FOR LTE Band66) 665.5MHz-695.5MHz (FOR LTE Band71)

<b>ANTENNA GAIN</b>	<b>BLUETOOTH/LE</b>	PCB Antenna with 5.16dBi gain
	<b>WLAN 2.4G</b>	PCB Antenna with 5.16dBi gain
	<b>WLAN 5G</b>	PCB Antenna with 4.48dBi gain for 5.15~5.25GHz PCB Antenna with 4.88dBi gain for 5.25~5.35GHz PCB Antenna with 5.05dBi gain for 5.47~5.725GHz PCB Antenna with 4.54dBi gain for 5.725~5.85GHz
	<b>WCDMA II</b>	Fixed External Antenna with 1.38dBi gain
	<b>WCDMA IV</b>	Fixed External Antenna with 1.94dBi gain
	<b>WCDMA V</b>	Fixed External Antenna with 2.13dBi gain
	<b>LTE Band 2</b>	Fixed External Antenna with 1.38dBi gain
	<b>LTE Band 4</b>	Fixed External Antenna with 1.94dBi gain
	<b>LTE Band 5</b>	Fixed External Antenna with 2.13dBi gain
	<b>LTE Band 7</b>	Fixed External Antenna with 2.68dBi gain
	<b>LTE Band 12</b>	Fixed External Antenna with 3.26dBi gain
	<b>LTE Band 13</b>	Fixed External Antenna with 4.45dBi gain
	<b>LTE Band 14</b>	Fixed External Antenna with 3.63dBi gain
	<b>LTE Band 17</b>	Fixed External Antenna with 3.26dBi gain
	<b>LTE Band 25</b>	Fixed External Antenna with 1.38dBi gain
	<b>LTE Band 26</b>	Fixed External Antenna with 2.13dBi gain
	<b>LTE Band 41</b>	Fixed External Antenna with 2.44dBi gain
	<b>LTE Band 66</b>	Fixed External Antenna with 1.94dBi gain
	<b>LTE Band 71</b>	Fixed External Antenna with 1.66dBi gain
<b>HW VERSION</b>	R1.0	
<b>SW VERSION</b>	SC66ANAR01A06	
<b>I/O PORTS</b>	Refer to user's manual	

**NOTE:**

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 2 RF EXPOSURE

### 2.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = Frequency in MHz

### 2.2 MPE CALCULATION FORMULA

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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



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## 2.3 CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

**2.4 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER****WIFI**

Mode	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	Tune-up Power (mW)	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
WIFI 2.4G	2412-2462	11b	5.16	19.5	89.13	0.0582	1.00	PASS
WIFI 5G	5180-5240	11a	4.48	14.0	25.12	0.014	1.00	PASS
WIFI 5G	5260-5320	11a	4.88	13.5	22.39	0.0137	1.00	PASS
WIFI 5G	5500-5700	11a	5.05	14.0	25.12	0.016	1.00	PASS
WIFI 5G	5745-5805	11a	4.54	14.0	25.12	0.0142	1.00	PASS

**BLUETOOTH/LE**

Mode	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	Tune-up Power (mW)	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
BT 2.0	2402-2480	GFSK	5.16	12.0	15.85	0.0103	1.00	PASS
BT LE (1M)	2402-2480	1M	5.16	2.0	1.58	0.001	1.00	PASS
BT LE (2M)	2402-2480	2M	5.16	2.0	1.58	0.001	1.00	PASS

**WCDMA**

Mode	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	Tune-up Power (mW)	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
WCDMA II	1850-1910	RMC12.2K	1.38	23.0	199.53	0.0545	1.00	PASS
WCDMA IV	1710-1755	RMC12.2K	1.94	22.5	177.83	0.0553	1.00	PASS
WCDMA V	824-849	RMC12.2K	2.13	23.0	199.53	0.0648	0.55	PASS



**LTE**

Mode	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	Tune-up Power (mW)	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
<b>Band2</b>	1850-1910	QPSK	1.38	23.5	223.87	0.0612	1.00	PASS
<b>Band4</b>	1710-1755	QPSK	1.94	23.5	223.87	0.0696	1.00	PASS
<b>Band5</b>	824-849	QPSK	2.13	23.0	199.53	0.0648	0.55	PASS
<b>Band7</b>	2500-2570	QPSK	2.68	24.0	251.19	0.0926	1.00	PASS
<b>Band12</b>	699-716	QPSK	3.26	23.0	199.53	0.0841	0.47	PASS
<b>Band13</b>	777-787	QPSK	4.45	23.0	199.53	0.1106	0.52	PASS
<b>Band14</b>	788-798	QPSK	3.63	23.0	199.53	0.0916	0.53	PASS
<b>Band17</b>	704-716	QPSK	3.26	23.0	199.53	0.0841	0.47	PASS
<b>Band25</b>	1850-1915	QPSK	1.38	23.5	223.87	0.0612	1.00	PASS
<b>Band26</b>	814-849	QPSK	2.13	23.0	199.53	0.0648	0.54	PASS
<b>Band41</b>	2496-2690	QPSK	2.44	23.5	223.87	0.0781	1.00	PASS
<b>Band66</b>	1710-1780	QPSK	1.94	23.5	223.87	0.0696	1.00	PASS
<b>Band71</b>	663-698	QPSK	1.66	23.5	223.87	0.0653	0.44	PASS

## 2.5 CONCLUSION OF SIMULTANEOUS TRANSMITTER

Both of the WLAN and plug-in device can transmit simultaneously, the formula of calculated the MPE is:

$$CPD1/LPD1+CPD2/LPD2+.....etc. < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore the worst-case situation is  $0.016/1.00+0.111/1.00=0.127$ , which is less than "1", This confirmed that the device comply with FCC 1.1310 MPE limit.

Band	Frequency ( MHz )	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	Power Density / Limit	Total Power Density / Limit	MPE Limit	PASS / FAIL
WIFI 5G-11a	5500~5700	0.016	1	0.016	0.127	1.000	PASS
LTE Band 13	777-787	0.111	1	0.111			

--END--