



September 29, 2018

TÜV SÜD BABT
 Octagon House, Concorde Way
 Segensworth Rd N, Fareham
 PO15 5RL

Attention: Director of Certification

RE: Analysis of RF Exposure for Portable and Mobile use per KDB 447498 D01 Mobile Portable RF Exposure v06 and RSS-102 Issue 5 March 2015.

FCC ID: 2AH4HATD500S
 IC: 21385-ATD500S

1. Limits:

Limits for General Population/Uncontrolled Exposure (Title 47 Subpart J §2.1091 and KDB 447498 D01 referring to limits under §1.1310)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Electric Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time (minutes)
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

f = frequency in MHz

**Plane-wave equivalent power density*

Limits for Devices Used by the General Public (Uncontrolled Environment (RSS-102 Issue 5 March 2015))

Frequency Range (MHz)	Electric Field Strength (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003 - 10 ²¹	83	90	-	Instantaneous
0.1 - 10	-	0.73/f	-	6**
1.1 - 10	87/f ^{0.5}	-	-	6**
10 - 20	27.46	0.0728	2	6
20 - 48	-58.07/f ^{0.25}	0.1540/f ^{0.25}	8.944/f ^{0.5}	6
48 - 300	22.06	0.05852	1.291	6



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300 - 6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000 - 15000	61.4	0.163	10	6
15000 - 150000	61.4	0.163	10	$616000/f^{1.2}$
150000 - 300000	$0.158f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

f is frequency in MHz

*Based on nerve stimulation (NS)

** Based on specific absorption rate (SAR)

2. Mobile MPE Calculation Summary using a 20cm separation distance:

Mode	Output Power	Power Density (mW/cm ²)
BT 5.0	163 mW EIRP	0.0326
LTE B12 (worst case MPE ratio)	447.92 mW	0.089

Note: The output power and power density presented here are from the MPE reports of the module used (original filing):

Module	FCC ID	IC Number
BT 5.0 (Model: BGM13P22A)	QOQBGM13P	5123A-BGM13P
Quectel BG96 LTE CAT M1 cellular radio	XMR201707BG96	10224A-201709BG96

Note: WiFi module (ESP8285 232016 POS717) is not included since it is configured for receive mode only

3. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
BT 5.0	Cellular
Cellular	BT 5.0

4. Simultaneous Transmission MPE:

Transmitter type	MPE (mw/cm ²)	FCC Limit (mW/cm ²)	IC Limit (mW/cm ²)	FCC MPE ratio (MPE/Limit)	ISED MPE ratio (MPE/Limit)
BT 5.0	0.0326	1.00	0.54689	0.0326	0.0596
Cellular	0.0890	0.46	0.23017	0.1934	0.3866
Sum of the ratios (should be <1.0)				0.2260	0.4462



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Sincerely,

A handwritten signature in black ink, appearing to read 'Ferdie S. Custodio'.

Ferdie S. Custodio

Name

Authorized Signatory

Title: Senior EMC Test Engineer /Wireless Team Lead