



April 13, 2021

TUV SUD America Inc.
10 Centennial Drive
Peabody, MA 01960
USA

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: SGWIPS2019CCDS
IC: 1158A-IPS2019CCDS

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
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 x 10 ⁻⁴ f ^{0.5}	6.67 x 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 20cm separation distance:

Mode	Field Strength / Conducted Power	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)	IC Limit (mW/cm ²)	FCC MPE Ratio (MPE/Limit)	IC MPE Ratio (MPE/Limit)
420 MHz	69.86BμV/m @ 3 meters	0.00000057	0.28	0.162	0.00000204	0.00000352
Bluetooth*** 2402MHz	From original filing	0.0326	1	0.53	0.03260	0.06150943
LTE B5**** 824 MHz - 849 MHz	From original filing	0.07	0.55	0.25	0.12727273	0.28
Sum of the ratios (should be <1.0)					0.15987476	0.34151295

*** BLE data presented is from the power density calculation form the original filing. FCC ID QOQBGM13P

**** LTE data presented is from the power density calculation form the original filing. FCC ID QIPELS61

3. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
420 MHz	BT and LTE
BT	420 MHz and LTE
LTE	BT and 420 MHz

4. Mobile MPE Calculation using a 20cm separation distance (420 MHz radio):

Using Power Density formula:

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to isotropic

R = distance to the center of radiation of the antenna



America

Measured Field Strength --Radiated:	68.86	(dB μ V/m)
Maximum peak output power --Radiated:	0.0029048	(mW)
Antenna gain(typical):	0	(dBi)
Maximum antenna gain:	1	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	420	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency:	0.28	(mW/cm ²)
ISED MPE limit for uncontrolled exposure at prediction frequency:	0.162	(mW/cm ²)
Power density at prediction frequency:	0.000005779	(mW/cm ²)
Power density at prediction frequency:	0.000005779	(W/m ²)
FCC Margin of Compliance:	-58.85	(dB)
ISED Margin of Compliance:	-57.47	(dB)

Sincerely,

Omar Castillo

Name

Authorized Signatory

Title: EMC Test Engineer