Prediction of MPE at a given distance

According to 447498 D04 Interim General RF Exposure Guidance v01

The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form as below. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in §1.1310(e)(1).

RF Source			Minimum Distance			Threshold
Frequency						ERP
f <u>i</u> MHz		<i>f</i> ਜ MHz	λ _L / 2π		$\lambda_{\rm H}/2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	1,920 R ²
1.34	_	30	35.6 m	-	1.6 m	3,450 R ² /f ²
30	—	300	1.6 m	-	159 mm	3.83 R ²
300	-	1,500	159 mm	-	31.8 mm	0.0128 R ² f
1,500	-	100,00 0	31.8 mm	-	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength.						
From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

"f" is in MHz

Simultaneous Transmission with MPE-based Exemptions

For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of following Formula is satisfied.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

As this equipment:

Distance=60*cm BLE:f1* = 2440, WIFI:*f2* = 2437, UHF:*f3*= 469.95 So P_{th1}= P_{th2}=6912.0mW, P_{th3}= 2165.5mW

Where: EIRP = Pm + Gi Pt= $10^{(EIRP/10)} = 10^{(EIRP-2.15/10)}$

Pm = measured transmitter output power in dBm, Pt = transmitter output power in milliwatts, Gi = numeric gain of the transmitting antenna (unit-dBi) Ant gain Gi1=1.56 dBi, Gi2=1.56 dBi, Gi3=4 dBi Pm1=4.09 dBm, Pm2=21.58 dBm, Pm3=29.883 dBm

So BLE: Pt1=10^(5.65/10) mW =3.673 mW<6912.0mW WIFI: Pt2=10^(23.14/10) mW =206.063 mW<6912.0mW UHF: Pt3=10^(33.883-2.15/10) mW =1490.390 mW<2165.5mW

 $\Sigma = Pt1/P_{th1} + Pt2/P_{th2} + Pt3/P_{th3} = 0.72 < 1$

The MPE-based test exemption condition is meets the requirements.