RF EXPOSURE EVALUATION

MPE-Based Exemption

Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 v01 Interim General RF Exposure Guidance

MPE-Based Exemption:
General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(3)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

R is the minimum separation distance in meters
f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

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

Result

Mode	Frequency (MHz)	Tune up conducted power#(dBm)	Antenna Gain#		ERP		Evaluation Distance (m)	ERP Limit (mW)
			(dBi)	(dBd)	(dBm)	(mW)		
For module YL43752								
BLE	2402-2480	7.5	1.39	-0.76	6.74	4.72	0.2	768
2.4G Wi-Fi	2412-2462	17.5	1.62	-0.53	16.97	49.77	0.2	768
5.2G Wi-Fi	5180-5240	11.0	4.10	1.95	12.95	19.72	0.2	768
5.8G Wi-Fi	5745-5825	10.0	4.10	1.95	11.95	15.67	0.2	768
For module YL43456								
2.4G Wi-Fi	2412-2462	22.5	1.08	-1.07	21.43	139.00	0.2	768
5.2G Wi-Fi	5180-5240	10.0	2.80	0.65	10.65	11.61	0.2	768
5.3G Wi-Fi	5260-5320	10.0	2.80	0.65	10.65	11.61	0.2	768
5.6G Wi-Fi	5500-5720	11.0	2.80	0.65	11.65	14.62	0.2	768
5.8G Wi-Fi	5745-5825	11.0	2.80	0.65	11.65	14.62	0.2	768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. 0dBd=2.15dBi
3. For module YL43752, the BLE, 2.4G and 5GWi-Fi cannot transmit at same time.
4. For module YL43456, the 2.4G and 5GWi-Fi cannot transmit at same time.
5. The two Wi-Fi modules can transmit as same time.

Simultaneous transmitting consideration (worst case):

The ratio= $ERP_{Module\ YL43752}$ /limit + $ERP_{Module\ YL43456}$/limit = 49.77/768+ 139.00/768 =0.246<1.0

So simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant