

RF Exposure

Test Requirement:	FCC 47CFR 15.247(i)
FCC ID:	2AI67-TX5601
Test Date:	2024-08-19
Mode of Operation:	BT Tx mode / WIFI mode / RF TX mode

Requirements:

In 15.247(i), an equipment shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the limits in §§ 1.1307.

Applications to the Commission for construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities must contain a statement confirming compliance with the limits unless the facility, operation, or transmitter is categorically excluded, as discussed below. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to KDB447498 D04 General RF Exposure Guidance v01, Appendix B

B.2 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1mW, regardless of separation distance.

Test Result of RF TX mode: PASS

The Maximum EIRP = 0.608mW (at frequency = 433.92MHz) < 1mW

Remark : $EIRP = 97.8 \text{ dBuV/m} + 20 \log 3 - 104.8 - 4.7 = -2.16 \text{ dBm} = 0.608 \text{ mW}$

According to KDB447498 D04 General RF Exposure Guidance v01, Appendix B
Exemptions for Single RF Sources, B.3 MPE-based Exemption

B.3 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)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES
SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	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	—	100,000	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.						

For Multiple RF sources:

FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) 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.

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

Calculated Result

Frequency	Distance	EIRP	Maximum tune-up ERP		Exposure Limit	Ratio	Result
(MHz)	(cm)	(dBm)	(dBm)	(mW)	(mW)		Pass/Fail
2441	20	13.39	12.24	16.749	768	0.021809	Pass
2412	20	29.28	28.13	650.130	768	0.846523	Pass
433.92	20	-2.16	-3.31	0.4667	222.2	0.0021	Pass
Remark: Tune-up: ± 1 Maximum tune-up ERP= EIRP + 1 - 2.15 EIRP=conducted peak power + antenna gain							

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Ratio 3	Simultaneous Ratio	Limit	Result Pass/Fail
Bluetooth +WIFI + RF	0.021809	0.846523	0.0021	0.870432	1	Pass