

RF Exposure

Test Requirement: FCC 47CFR 15.247(i)
FCC ID: 2ASIVPGD699
Test Date: 2023-07-12
Mode of Operation: BT Tx mode / Wireless mode / RFID

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 RFID mode: PASS

The Maximum ERP = 0.00000238mW (at frequency = 13.56MHz) < 1mW

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.

Test Result of BT Tx mode(DTS): PASS

RF Exposure Evaluation

The Maximum ERP = 0.729mW (at frequency = 2.402 GHz)

SAR Test Exclusion Thresholds=768mW,

The test separation distances is 20 cm

Test Result of Wireless mode: PASS

RF Exposure Evaluation

The Maximum ERP = 101.8591mW (at frequency = 2.40301 GHz)

SAR Test Exclusion Thresholds=768mW,

The test separation distances is 20 cm

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 (MHz)	Distance (cm)	EIRP (dBm)	Maximum tune-up ERP		Exposure Limit (mW)	Ratio	Result
			(dBm)	(mW)			Pass/Fail
2402.0	20	-1.373	-2.523	0.5593711	768	0.0007257	Pass
2403.01	20	20.08	18.93	78.1627805	768	0.1017745	Pass
13.56	20	-56.229	-57.379	0.00000238	1	0.00000238	Pass
Remark: Tune-up: ±1 Maximum tune-up ERP= EIRP + 1 - 2.15							

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Ratio 3	Simultaneous Ratio	Limit	Result Pass/Fail
Bluetooth + 2.4G + RFID	0.0007257	0.1017745	0.00000238	0.102503	1	Pass