

EXHIBIT 1. RF EXPOSURE REQUIREMENTS [§§ 15.247(i), 1.1310 & 2.1091]

1.1. Limits

§ 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

1.2. Method of Measurements

Calculation Method of Power Density/RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where,

P: power input to the antenna in mW

EIRP: Equivalent (effective) isotropic radiated power.

S: power density mW/cm²

G: numeric gain of antenna relative to isotropic radiator

r: distance to centre of radiation in cm

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File #: SNSQ-014Q_FCCMPE

June 16, 2022

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

1.3. RF Evaluation

1.3.1. Co-location

Pursuant to KDB 447498 D01 General RF Exposure Guidance v06, Section 7.2:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

The following table addresses the co-location of the transmitters at a minimum 20 cm evaluation separation distance, which consist of EUT (FCC ID: 2A63Y-SQ88SF2) and Espressif Systems Wi-Fi & Bluetooth Module (FCC ID: 2AC7Z-ESPWROOM32).

Co-located MPE for EUT and Wi-Fi & Bluetooth Module							
¹ Radio Module/ Transmitter	Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Evaluation Distance (cm)	Power Density (mW/cm ²)	FCC MPE Limit (mW/cm ²)	MPE Ratio
EUT (FCC ID: 2A63Y-SQ88SF2)	2402.0	7.72	5.916	20	0.0012	1.0	0.0012
Espressif Systems Wi-Fi & Bluetooth Module (FCC ID 2AC7Z- ESPWROOM32)	2412	19.00	79.433	20	0.0158	1.0	0.0158
Sum of MPE ratios :							0.0170
Verdict : Compliant							
¹ The test data of the radio modules represented in this table is the worst-case configuration (maximum MPE ratio) derived from the original radio modules MPE reports. Refer to the reports for detail.							