MAXIMUM PERMISSIBLE EXPOSURE

KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

EUT Specification

FCC ID	2A86W-S1
EUT	Wi-Fi Doorbell Base Station
Frequency band (Operating)	☐ BT: 2.402GHz ~ 2.480GH ☒ WLAN: 2.412GHz ~ 2.462GHz ☒ RLAN: 5.180GHz ~ 5.240GHz ☒ RLAN: 5.260GHz ~ 5.320GHz ☒ RLAN: 5.500GHz ~ 5.700GHz ☒ RLAN: 5.745GHz ~ 5.825GHz ☐ Others:
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ___
Exposure classification	☐ Occupational/Controlled exposure ☒ General Population/Uncontrolled exposure
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	Module: RTL8189FTV WiFi 2.4G: 15.37dBm 0.0344W Module: RTL8731BU WiFi 2.4G: 13.97 dBm 0.0249W WiFi 5.2G: 14.07 dBm 0.0255W WiFi 5.3G: 13.85 dBm 0.0243W WiFi 5.6G: 15.22 dBm 0.0333W WiFi 5.8G: 14.50 dBm 0.0282W
Antenna gain (Max)	Module: RTL8189FTV WiFi 2.4G: 2.42dBi Module: RTL8731BU WiFi 2.4G: 2.42dBi WiFi 5.2G: 3.08dBi

	WiFi 5.3G: 3.08dBi
	WiFi 5.6G: 3.08dBi
	WiFi 5.8G: 3.08dBi
Evaluation applied	☒ MPE Evaluation
	☐ SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	30
1500-100000	--	--	1	30

Friis transmission formula: Pd=(Pout*G)\(4*pi*R2)

Where
Pd= Power density in mW/cm^2
Pout=output power to antenna in Mw
G= gain of antenna in linear scale
Pi=3.1416
R= distance between observation point and center of the radiator in cm
Pd the limit of MPE. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Max Measurement Result

Module	Operating Mode	Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm²)	Power density Limits (mW/cm²)
RTL8189FTV	WiFi 2.4G	15.37	15.37 ±1	16.37	2.42	0.0151	1
RTL8731BU	WiFi 2.4G	13.97	13.97 ±1	14.97	2.42	0.0109	1
	WiFi 5.2G	14.07	14.07 ±1	15.07	3.08	0.0130	1
	WiFi 5.3G	13.85	13.85 ±1	14.85	3.08	0.0124	1
	WiFi 5.6G	15.22	15.22 ±1	16.22	3.08	0.0169	1
	WiFi 5.8G	14.50	14.50 ±1	15.50	3.08	0.0144	1

No.	Applicable Simultaneous Transmission
1.	module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 2.4G
2.	module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 5.2G
3.	module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 5.3G
4.	module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 5.6G
5.	module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 5.8G

The Maximum simultaneous transmission for module RTL8189FTV WiFi 2.4G+module RTL8731BU WiFi 5.6G:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WiFi\ 2.4G}/S_{limit-2.4G}+ S_{WiFi\ 5.8G}/S_{limit-5.8G}$
$=0.0151/1+0.0169/1$
$=0.0320$
< 1.0

Result: No Standalone SAR test is required.