

MPE Calculation

Product:	Mi TV Stick
Model no.:	MDZ-24-AA
FCC ID:	2AIMRMITVMDZ24AA
Brand name	MI
HVIN	MDZ-24-AA
Rating:	5VDC/1000mA (Supplied By AC/DC Adapter)
RF Transmission Frequency:	Bluetooth:2402-2480MHz For Wi-Fi 2.4G: 2412~2462 MHz For Wi-Fi 5GHz: 5.180GHz~5.240GHz; 5.745GHz~5.825GHz
Antenna Type:	Internal Antenna
Max Antenna Gain:	Bluetooth: 1.0dBi Wi-Fi 2.4GHz: 3.0dBi Wi-Fi 5GHz: 5.0dBi
Description of the EUT:	MDZ-24-AA iSTV Stick with Bluetooth, Wi-Fi function.

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
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
300–1,500	/	/	f/1500	30
1,500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

for 5G Wi-Fi

Maximum peak output power at antenna input terminal (dBm):	17.4
Maximum peak output power at antenna input terminal (mW):	54.9
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	5.0
Maximum Antenna Gain (numeric):	5.0
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0546
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For 2.4G Wi-Fi

Maximum peak output power at antenna input terminal (dBm):	20.0
Maximum peak output power at antenna input terminal (mW):	100.0
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	3.0
Maximum Antenna Gain (numeric):	3.0
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0596
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For Bluetooth

Maximum peak output power at antenna input terminal (dBm):	3.03
Maximum peak output power at antenna input terminal (mW):	2.01
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.00040
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For BLE

Maximum peak output power at antenna input terminal (dBm):	5.35
Maximum peak output power at antenna input terminal (mW):	3.42
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.00068
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For simultaneous transmission

Simultaneous transmission configuration	Power density(mW/cm2)	MPE Limit (mW/cm2)
5G Wi-Fi+BT	0.05824	1.0
5G Wi-Fi+BLE	0.05548	1.0
2.4G Wi-Fi+BT	0.06000	1.0
2.4G Wi-Fi+BLE	0.06028	1.0

Result: Compliant

TUV SUD China, Shenzhen Branch

Reviewed by:



Prepared By:

John Zhi/ Project Manager
Date: May 08, 2020Warlen Song/Project Engineer
Date: May 08, 2020