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	2A4D2-MID-3201
EUT	Android tablet
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	BLE: 3.54 dBm (0.0023W) WiFi 2.4G ANT1: 13.93 dBm (0.0247W) WiFi 2.4G ANT2: 13.97 dBm (0.0249W) WiFi 2.4G MIMO: 16.96 dBm (0.0497W) WiFi 5.2G ANT1: 14.22 dBm (0.0264W) WiFi 5.2G ANT2: 13.91 dBm (0.0246W) WiFi 5.2G MIMO: 17.08 dBm (0.0511W) WiFi 5.3G ANT1: 14.36 dBm (0.0273W) WiFi 5.3G ANT2: 14.85 dBm (0.0305W) WiFi 5.3G MIMO: 17.36 dBm (0.0545W) WiFi 5.6G ANT1: 14.02 dBm (0.0252W) WiFi 5.6G ANT2: 14.10 dBm (0.0257W) WiFi 5.6G MIMO: 17.00 dBm (0.0501W) WiFi 5.8G ANT1: 14.90 dBm (0.0309W)

	WiFi 5.8G ANT2: 14.73 dBm (0.0297W) WiFi 5.8G MIMO: 17.83dBm (0.0607W)
Antenna gain (Max)	BLE: -1.76 dBi WiFi 2.4G ANT1: -1.76 dBi WiFi 2.4G ANT2: -1.76 dBi WiFi 5.2G ANT1: -0.77dBi WiFi 5.2G ANT2: -0.77dBi WiFi 5.3G ANT1: 0.26dBi WiFi 5.3G ANT2: 0.26dBi WiFi 5.6G ANT1: -0.19dBi WiFi 5.6G ANT2: -0.19dBi WiFi 5.8G ANT1: -1.86dBi WiFi 5.8G ANT2: -1.86dBi
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

Operating Mode	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
BLE	3.54	3.54 ±1	4.54	-1.76	0.0004	1
WiFi 2.4G ANT1	13.93	13.93 ±1	14.93	-1.76	0.0041	1
WiFi 2.4G ANT2	13.97	13.97 ±1	14.97	-1.76	0.0042	1
WiFi 5.2G ANT1	14.22	14.22 ±1	15.22	-0.77	0.0055	1
WiFi 5.2G ANT2	13.91	13.91 ±1	14.91	-0.77	0.0052	1
WiFi 5.3G ANT1	14.36	14.36 ±1	15.36	0.26	0.0073	1
WiFi 5.3G ANT2	14.85	14.85 ±1	15.85	0.26	0.0081	1
WiFi 5.6G ANT1	14.02	14.02 ±1	15.02	-0.19	0.0061	1
WiFi 5.6G ANT2	14.10	14.10 ±1	15.10	-0.19	0.0062	1
WiFi 5.8G ANT1	14.90	14.90 ±1	15.90	-1.86	0.0050	1
WiFi 5.8G ANT2	14.73	14.73 ±1	15.73	-1.86	0.0049	1

No.	Applicable Simultaneous Transmission
1.	BLE+WiFi 2.4G ANT1
2.	BLE+WiFi 5G ANT1
3.	WiFi 2.4G ANT1+WiFi 2.4G ANT2
4.	WiFi 5G ANT1+WiFi 5G ANT2
5.	WiFi 2.4G ANT1+WiFi 5G ANT2
6.	WiFi 5G ANT1+WiFi 2.4G ANT2

The Maximum simultaneous transmission for WiFi 5.3G ANT1+WiFi 5.3G ANT2:

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

$=S_{WiFi\ 5.3G\ ANT1}/S_{limit\text{-}5G}+ S_{WiFi\ 5.3G\ ANT2}/S_{limit\text{-}5G}$

=0.0073/1+0.0081/1

=0.0154

< 1.0

Result: No Standalone SAR test is required.