

## RF EXPOSURE EVALUATION

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

<b>FCC ID</b>	2BFNC-MP500
<b>EUT</b>	Robotic Lawn Mower
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> BT: 2.402GHz ~ 2.480GH <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> RLAN: 5.180GHz ~ 5.240GHz <input type="checkbox"/> RLAN: 5.260GHz ~ 5.320GHz <input type="checkbox"/> RLAN: 5.500GHz ~ 5.700GHz <input checked="" type="checkbox"/> RLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: FDD Band 2: 1850.7 MHz – 1909.3 MHz FDD Band 4: 1710.7 MHz – 1754.3 MHz FDD Band 5: 824.7 MHz – 848.3 MHz FDD Band 7: 2502.5 MHz – 2567.5 MHz FDD Band 12: 699.7 MHz – 715.3 MHz FDD Band 13: 779.5 MHz – 784.5 MHz FDD Band 25: 1850.7 MHz – 1914.3 MHz FDD Band 26: 814.7 MHz – 848.3 MHz TDD Band 41: 2498.5 MHz – 2687.5 MHz FDD Band 66: 1710.7 MHz-1779.3 MHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Antenna gain (Max)</b>	Wi-Fi 2.4G/BT: 3.07 dBi Wi-Fi 5.2G: 4.54 dBi Wi-Fi 5.8G: 4.32 dBi FDD Band 2: 3.80 dBi

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	FDD Band 4: 3.49 dBi FDD Band 5: 1.82 dBi FDD Band 7: 2.86 dBi FDD Band 12: 8.07 dBi FDD Band 13: 5.09 dBi FDD Band 25: 3.80 dBi FDD Band 26: 1.88 dBi TDD Band 41: 3.43 dBi FDD Band 66: 3.49 dBi
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> 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 <sup>2</sup> )	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	6
1500-100000	--	--	1	30

### Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>. 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
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm2 )	(mW/cm2 )
BDR+EDR	6.07	6.07 ±1	7.07	3.07	0.0021	1.00
BLE	5.55	5.55 ±1	6.55	3.07	0.0018	1.00
WiFi 2.4G	16.87	16.87 ±1	17.87	3.07	0.0247	1.00
WiFi 5.2G	14.30	14.30 ±1	15.30	4.54	0.0192	1.00
WiFi 5.8G	12.76	12.76 ±1	13.76	4.32	0.0128	1.00
FDD Band 2	24.53	24.53 ±1	25.53	3.8	0.1706	1.00
FDD Band 4	23.77	23.77 ±1	24.77	3.49	0.1333	1.00
FDD Band 5	24.62	24.62 ±1	25.62	1.82	0.1104	0.55
FDD Band 7	24.21	24.21 ±1	25.21	2.86	0.1276	1.00
FDD Band 12	24.50	24.50 ±1	25.50	8.07	0.4528	0.47
FDD Band 13	24.45	24.45 ±1	25.45	5.09	0.2254	0.52
FDD Band 25	21.58	21.58 ±1	22.58	3.8	0.0865	1.00
FDD Band 26	21.42	21.42 ±1	22.42	1.88	0.0536	0.54
TDD Band 41	21.33	21.33 ±1	22.33	3.43	0.0750	1.00
FDD Band 66	20.75	20.75 ±1	21.75	3.49	0.0665	1.00

### The Maximum simultaneous transmission for WiFi 2.4G+FDD Band 12:

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

$$= S_{WiFi\ 2.4G} / S_{limit-2.4G} + S_{FDD\ Band\ 12} / S_{limit-FDD\ Band\ 12}$$

$$= 0.0247 / 1 + 0.4528 / 0.47$$

$$= 0.9881$$

$$< 1.0$$

**Result:** No Standalone SAR test is required.

