

## RF EXPOSURE EVALUATION

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)

FCC ID: 2ARN2-21EM10

### EUT Specification

EUT	Car dash cam
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: 2402~2480MHz GSM 850: TX:824.2~848.8 MHz PCS 1900: TX:1850.2~1909.8 MHz UMTS Band 2: TX:1852.4~1907.6 MHz UMTS Band 4: TX: 1710 ~ 1755 MHz UMTS Band 5: TX: 826.4 ~ 846.6 MHz: LTE-FDD Band 2: TX: 1850.7 ~ 1909.3 MHz LTE-FDD Band 4: TX:1710.7 ~ 1754.3 MHz LTE-FDD Band 5: TX: 824.7 ~ 848.3 MHz LTE-FDD Band 12: TX: 699.7 ~ 715.3 MHz LTE-FDD Band 17: TX: 706.5 ~ 713.5 MHz FM: 88.1-107.9MHz
<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 checked="" type="checkbox"/> Single antenna <input 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>	BLE: 2 dBi 2.4G WIFI: 2 dBi GSM 850: 2 dBi PCS 1900: 2 dBi WCDMA Band 2: 2 dBi WCDMA Band 4: 2 dBi WCDMA Band 5: 2 dBi LTE-FDD Band 2: 2 dBi LTE-FDD Band 4: 2 dBi LTE-FDD Band 5: 2 dBi

	LTE-FDD Band 12: 2 dBi LTE-FDD Band 17: 2 dBi FM: 1.2 dBi
<b>Directional Gain (Max)</b>	/
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

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

**Friis transmission formula:  $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$**

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/ cm <sup>2</sup> )	(mW/cm <sup>2</sup> )
2.4G WIFI	14.99	14.99 ±1	15.99	2	0.0125	1
BLE	1.315	1.315 ±1	2.32	2	0.0005	1
GSM 850	33.41	33.41 ±1	34.41	2	0.8709	0.5495
PCS 1900	32.00	32.00 ±1	33.00	2	0.6294	1
UMTS Band 2	24.47	24.47 ±1	25.47	2	0.1112	1
UMTS Band 4	22.42	22.42 ±1	23.42	2	0.0693	1
UMTS Band 5	23.81	23.81 ±1	24.81	2	0.0955	0.5509
LTE BAND 2	25.25	25.25 ±1	26.25	2	0.1330	1
LTE BAND 4	25.06	25.06 ±1	26.06	2	0.1273	1
LTE BAND 5	25.47	25.47 ±1	26.47	2	0.1399	0.5509
LTE BAND 12	25.54	25.54 ±1	26.54	2	0.1422	0.4665
LTE BAND 17	24.93	24.93 ±1	25.93	2	0.1236	0.4710

**Note: BLE & WIFI cannot support simultaneous transmission.**