

## 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: 2ABC5-E0052

### EUT Specification

<b>EUT</b>	<b>Android Tablet</b>
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> WLAN: 5.150GHz ~ 5.250GHz <input checked="" type="checkbox"/> WLAN: 5.725GHz ~ 5.850GHz <input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz BT
<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>Max. output power</b>	BLE: 8.54dBm (0.0071W) BT: 8.53dBm (0.0071W) 2.4G WiFi: ANT 1: 17.98dBm (0.0628W) ANT 2: 18.41dBm (0.0693W) MIMO: 20.28dBm (0.1067W) 5.1G WiFi: ANT 1: 13.67dBm (0.0233W) ANT 2: 12.65dBm (0.0184W) MIMO: 16.17dBm (0.0414W) 5.8G WiFi: ANT 1: 15.79dBm (0.0379W) ANT 2: 15.69dBm (0.0371W) MIMO: 18.66dBm (0.0735W)
<b>Antenna gain (Max)</b>	BLE&BT: 2.66 dBi 2.4G WiFi: ANT 1: 2.90 dBi; ANT 2: 2.66 dBi 5.1G WiFi: ANT 1: 1.52 dBi; ANT 2: 0.83 dBi 5.8G WiFi: ANT 1: 1.33 dBi; ANT 2: 2.87 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
<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.

**Measurement Result**

**2.4GHz WiFi**

**ANT 1:**

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm <sup>2</sup> )
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	
802.11b	2412	17.09	17.09±1	18.09	2.9	0.0250	1
	2437	17.59	17.59±1	18.59	2.9	0.0280	1
	2462	17.45	17.45±1	18.45	2.9	0.0271	1
802.11g	2412	16.12	16.12±1	17.12	2.9	0.0200	1
	2437	16.43	16.43±1	17.43	2.9	0.0215	1
	2462	16.44	16.44±1	17.44	2.9	0.0215	1
802.11n (HT20)	2412	16.29	16.29±1	17.29	2.9	0.0208	1
	2437	16.03	16.03±1	17.03	2.9	0.0196	1
	2462	16.10	16.10±1	17.10	2.9	0.0199	1
802.11ax (HEW20)	2412	17.69	17.69±1	18.69	2.9	0.0287	1
	2437	17.98	17.98±1	18.98	2.9	0.0307	1
	2462	17.92	17.92±1	18.92	2.9	0.0303	1

**ANT 2:**

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm <sup>2</sup> )
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	
802.11b	2412	18.32	18.32±1	19.32	2.66	0.0314	1
	2437	18.41	18.41±1	19.41	2.66	0.0320	1
	2462	18.39	18.39±1	19.39	2.66	0.0319	1
802.11g	2412	14.68	14.68±1	15.68	2.66	0.0136	1
	2437	14.98	14.98±1	15.98	2.66	0.0145	1
	2462	14.63	14.63±1	15.63	2.66	0.0134	1
802.11n (HT20)	2412	14.29	14.29±1	15.29	2.66	0.0124	1
	2437	15.35	15.35±1	16.35	2.66	0.0158	1
	2462	14.84	14.84±1	15.84	2.66	0.0141	1
802.11ax (HEW20)	2412	16.32	16.32±1	17.32	2.66	0.0198	1
	2437	16.41	16.41±1	17.41	2.66	0.0202	1
	2462	16.31	16.31±1	17.31	2.66	0.0198	1

**2.4G WIFI Max MIMO:**

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm <sup>2</sup> )
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	
802.11ax (HEW20)	2437	20.28	20.28±1	21.28	2.78	0.0507	1

## 5GHz WiFi

### ANT 1:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	(mW/cm <sup>2</sup> )
802.11a	5180	13.67	13.67±1	14.67	1.52	0.0083	1
	5200	12.81	12.81±1	13.81	1.52	0.0068	1
	5240	12.99	12.99±1	13.99	1.52	0.0071	1
	5745	15.07	15.07±1	16.07	1.33	0.0109	1
	5785	15.63	15.63±1	16.63	1.33	0.0124	1
	5825	15.26	15.26±1	16.26	1.33	0.0114	1
802.11n (HT20)	5180	13.45	13.45±1	14.45	1.52	0.0079	1
	5200	12.75	12.75±1	13.75	1.52	0.0067	1
	5240	12.93	12.93±1	13.93	1.52	0.0070	1
	5745	15.08	15.08±1	16.08	1.33	0.0110	1
	5785	15.54	15.54±1	16.54	1.33	0.0122	1
	5825	15.11	15.11±1	16.11	1.33	0.0110	1
802.11n (HT40)	5190	11.75	11.75±1	12.75	1.52	0.0053	1
	5230	11.32	11.32±1	12.32	1.52	0.0048	1
	5755	14.10	14.10±1	15.10	1.33	0.0087	1
	5795	14.70	14.70±1	15.70	1.33	0.0100	1
802.11ac (VHT20)	5180	13.62	13.62±1	14.62	1.52	0.0082	1
	5200	12.76	12.76±1	13.76	1.52	0.0067	1
	5240	12.98	12.98±1	13.98	1.52	0.0071	1
	5745	15.33	15.33±1	16.33	1.33	0.0116	1
	5785	15.76	15.76±1	16.76	1.33	0.0128	1
	5825	15.45	15.45±1	16.45	1.33	0.0119	1
802.11ac (VHT40)	5190	12.82	12.82±1	13.82	1.52	0.0068	1
	5230	12.65	12.65±1	13.65	1.52	0.0065	1
	5755	15.08	15.08±1	16.08	1.33	0.0110	1
	5795	15.51	15.51±1	16.51	1.33	0.0121	1
802.11ac (VHT80)	5210	12.53	12.53±1	13.53	1.52	0.0064	1
	5775	14.46	14.46±1	15.46	1.33	0.0095	1

802.11ax (HEW20)	5180	13.61	13.61±1	14.61	1.52	0.0082	1
	5200	13.07	13.07±1	14.07	1.52	0.0072	1
	5240	13.11	13.11±1	14.11	1.52	0.0073	1
	5745	15.46	15.46±1	16.46	1.33	0.0120	1
	5785	15.79	15.79±1	16.79	1.33	0.0129	1
	5825	15.61	15.61±1	16.61	1.33	0.0124	1
802.11ax (HEW40)	5190	13.06	13.06±1	14.06	1.52	0.0072	1
	5230	12.61	12.61±1	13.61	1.52	0.0065	1
	5755	15.14	15.14±1	16.14	1.33	0.0111	1
	5795	15.36	15.36±1	16.36	1.33	0.0117	1
802.11ax (HEW80)	5210	12.70	12.70±1	13.70	1.52	0.0066	1
	5775	14.81	14.81±1	15.81	1.33	0.0103	1

**ANT 2:**

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	(mW/cm <sup>2</sup> )
802.11a	5180	12.38	12.38±1	13.38	0.83	0.0052	1
	5200	11.27	11.27±1	12.27	0.83	0.0041	1
	5240	11.05	11.05±1	12.05	0.83	0.0039	1
	5745	14.11	14.11±1	15.11	2.87	0.0125	1
	5785	15.18	15.18±1	16.18	2.87	0.0160	1
	5825	15.16	15.16±1	16.16	2.87	0.0159	1
802.11n (HT20)	5180	12.38	12.38±1	13.38	0.83	0.0052	1
	5200	11.22	11.22±1	12.22	0.83	0.0040	1
	5240	10.89	10.89±1	11.89	0.83	0.0037	1
	5745	13.89	13.89±1	14.89	2.87	0.0119	1
	5785	15.07	15.07±1	16.07	2.87	0.0156	1
	5825	15.18	15.18±1	16.18	2.87	0.0160	1
802.11n (HT40)	5190	10.00	10.00±1	11.00	0.83	0.0030	1
	5230	9.48	9.48±1	10.48	0.83	0.0027	1
	5755	13.18	13.18±1	14.18	2.87	0.0101	1
	5795	14.12	14.12±1	15.12	2.87	0.0125	1
802.11ac (VHT20)	5180	12.59	12.59±1	13.59	0.83	0.0055	1
	5200	11.40	11.40±1	12.40	0.83	0.0042	1
	5240	11.26	11.26±1	12.26	0.83	0.0041	1
	5745	14.29	14.29±1	15.29	2.87	0.0130	1
	5785	15.27	15.27±1	16.27	2.87	0.0163	1
	5825	15.48	15.48±1	16.48	2.87	0.0171	1
802.11ac (VHT40)	5190	11.41	11.41±1	12.41	0.83	0.0042	1
	5230	10.76	10.76±1	11.76	0.83	0.0036	1
	5755	14.10	14.10±1	15.10	2.87	0.0125	1
	5795	14.85	14.85±1	15.85	2.87	0.0148	1
802.11ac (VHT80)	5210	10.79	10.79±1	11.79	0.83	0.0036	1
	5775	13.66	13.66±1	14.66	2.87	0.0113	1

802.11ax (HEW20)	5180	12.65	12.65 ± 1	13.65	0.83	0.0056	1
	5200	11.62	11.62 ± 1	12.62	0.83	0.0044	1
	5240	11.04	11.04 ± 1	12.04	0.83	0.0039	1
	5745	14.26	14.26 ± 1	15.26	2.87	0.0129	1
	5785	15.28	15.28 ± 1	16.28	2.87	0.0164	1
	5825	15.69	15.69 ± 1	16.69	2.87	0.0180	1
802.11ax (HEW40)	5190	11.25	11.25 ± 1	12.25	0.83	0.0040	1
	5230	10.64	10.64 ± 1	11.64	0.83	0.0035	1
	5755	14.12	14.12 ± 1	15.12	2.87	0.0125	1
	5795	14.93	14.93 ± 1	15.93	2.87	0.0151	1
802.11ax (HEW80)	5210	10.83	10.83 ± 1	11.83	0.83	0.0037	1
	5775	14.00	14.00 ± 1	15.00	2.87	0.0122	1

### 5G WIFI MAX MIMO:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	(mW/cm <sup>2</sup> )
802.11ax (HEW20)	5180	16.17	16.17±1	17.17	1.19	0.0136	1
	5825	18.66	18.66±1	19.66	2.17	0.0303	1



**Max BT&BLE:**

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm <sup>2</sup> )
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm <sup>2</sup> )	
BDR& EDR	2480	8.53	8.53±1	9.53	2.66	0.0033	1
BLE 1M	2480	8.54	8.54±1	9.54	2.66	0.0033	1

**Note: BT and WIFI, 2.4G WIFI and 5G WIFI not support simultaneous transmission.**

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