

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-E0065

EUT Specification

EUT	Android Tablet
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz <input checked="" type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz BLE
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	<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
Max. output power	BLE: 1.02dBm (0.0053W) BDR&EDR: 3.84dBm (0.0010W) 2.4G WiFi: 17.96dBm (0.0618W) 5.1G WiFi: 14.84dBm (0.0448W) 5.8G WiFi: 17.89dBm (0.0951W)
Antenna gain (Max)	BT: 3.39 dBi 2.4G WiFi: ANT1: 3.39 dBi; ANT2: 2.80 dBi 5.1G WiFi: ANT1: 3.72 dBi; ANT2: 3.45 dBi 5.8G WiFi: ANT1: 3.45 dBi; ANT2: 3.00 dBi
Evaluation applied	<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 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	6
1500-100000	--	--	1	30

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

Where

P_d = Power density in mW/cm^2

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, $1mW/cm^2$. 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 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
802.11ax (HEW20)	2462	16.13	16.13±1	17.13	3.39	0.0224	1

ANT 2 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
802.11ax (HEW20)	2462	17.91	17.91±1	18.91	2.80	0.0295	1

MIMO worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
802.11ax (HEW20)	2462	20.12	18.56±1	21.12	3.11	0.0527	1

5.1GHz WiFi

ANT 1 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11ax (HEW80)	5210	16.50	16.50±1	17.50	3.72	0.0263	1

ANT 2 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11ax (HEW80)	5210	16.51	16.51±1	17.51	3.45	0.0248	1

MIMO worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11ax (HEW80)	5210	19.52	19.52±1	20.52	3.59	0.0513	1

5.8GHz WiFi

ANT 1 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11ax (HEW80)	5775	19.78	19.78±1	20.78	3.45	0.0527	1

ANT 2 worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11ax (HEW80)	5775	19.08	19.08±1	20.08	3.00	0.0404	1

MIMO worst case:

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 ²)	(mW/cm ²)
802.11ax (HEW80)	5775	22.45	19.52±1	23.45	3.23	0.0926	1

BLE worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
BLE(2M)	2402	7.23	7.23±1	8.23	3.39	0.0029	1

BT worst case:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
π /4-DQPSK	2441	0.14	0.14±1	1.14	3.39	0.0006	1

Note: 2.4G WiFi MIMO+5.1G WiFi MIMO+5.8G WiFi MIMO+ BLE+BDR&EDR simultaneous:

$$(0.0527+0.0513+0.0926+0.0029+0.0006)/1=0.2001/1=0.2001 < 1$$

Test Result: Pass