Report No.: NTC1706430FV-1 FCC ID: 2AATL-6223E-UUD

## RF EXPOSURE EVALUATION

## **EUT Specification**

EUT	WIFI+BT Module					
Frequency band	⊠WLAN: 2.412GHz ~ 2.462GHz					
(Operating)	□WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz					
	□WLAN: 5.745GHz ~ 5825GHz					
	⊠Others(Bluetooth: 2.402GHz ~ 2.480GHz)					
Device category	☐Portable (<20cm separation)					
	⊠Mobile (>20cm separation)					
	Others					
Antenna diversity	⊠Single antenna					
	☐Multiple antennas					
	☐Tx diversity					
	☐Rx diversity					
	☐Tx/Rx diversity					
Max. output power	19.45dBm(88.10mW)					
Antenna gain	2.99dBi					
Evaluation applied						
	☐SAR Evaluation					

Limits for Maximum Permissible Exposure (MPE)

Frequency	Electric Field	Magnetic Field	Power	Average Time	
Range(MHz)	Strength(V/m)	Strength(A/m)	Density(mW/cm <sup>2</sup> )		
(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	

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## Friis transmission formula: Pd=(Pout\*G)\(4\*pi\*R<sup>2</sup>)

Where

Pd= Power density in mW/cm<sup>2</sup>

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, 1mW/cm2. 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**

		1		_	_	
Channel	Max	Tolerance	Max	Power	Power	
Frequency	Output		Tune-UP	density at	density	
(MHz)	power		power	20cm (mW/	Limits	
	(dBm)		(mW)	cm <sup>2</sup> )	(mW/cm <sup>2</sup> )	
	Tes	t Mode: 802	2.11b			
2412	19.45	±0.5	98.86	0.03915	1	
2437	18.83	±0.5	85.70	0.03394	1	
2462	18.30	±0.5	75.86	0.03004	1	
	Tes	t Mode: 802	2.11g			
2412	18.75	±0.5	84.14	0.03332	1	
2437	18.57	±0.5	80.72	0.03197	1	
2462	18.11	±0.5	72.61	0.02876	1	
Test Mode: 802.11n(HT20)						
2412	17.23	±0.5	59.29	0.02348	1	
2437	17.10	±0.5	57.54	0.02279	1	
2462	16.95	±0.5	55.59	0.02202	1	
Test Mode: 802.11n(HT40)						
2422	16.62	±0.5	51.52	0.02040	1	
2437	16.23	±0.5	47.10	0.01865	1	
2452	16.08	±0.5	45.50	0.01802	1	
	2412 2437 2462 2412 2437 2462 2412 2437 2462 242 2437	Frequency (MHz) Output power (dBm)  2412 19.45 2437 18.83 2462 18.30  Test Mark 19.45 2412 18.75 2437 18.57 2462 18.11  Test Mark 19.45 2412 17.23 2437 17.10 2462 16.95  Test Mark 19.45 Test	Frequency (MHz)         Output power (dBm)           2412         19.45         ±0.5           2437         18.83         ±0.5           2462         18.30         ±0.5           Test Mode: 802           2412         18.75         ±0.5           2437         18.57         ±0.5           2462         18.11         ±0.5           Test Mode: 802.11           2412         17.23         ±0.5           2437         17.10         ±0.5           2462         16.95         ±0.5           Test Mode: 802.11           2422         16.62         ±0.5           2437         16.23         ±0.5	Frequency (MHz)         Output power (dBm)         Tune-UP power (mW)           Test Mode: 802.11b           2412         19.45         ±0.5         98.86           2437         18.83         ±0.5         85.70           2462         18.30         ±0.5         75.86           Test Mode: 802.11g           2412         18.75         ±0.5         84.14           2437         18.57         ±0.5         80.72           2462         18.11         ±0.5         72.61           Test Mode: 802.11n(HT20)           2412         17.23         ±0.5         59.29           2437         17.10         ±0.5         57.54           2462         16.95         ±0.5         55.59           Test Mode: 802.11n(HT40)           2422         16.62         ±0.5         51.52           2437         16.23         ±0.5         47.10	Frequency (MHz)         Output power (dBm)         Tune-UP power (mW)         density at 20cm (mW/cm²)           Test Mode: 802.11b           2412         19.45         ± 0.5         98.86         0.03915           2437         18.83         ± 0.5         85.70         0.03394           2462         18.30         ± 0.5         75.86         0.03004           Test Mode: 802.11g           2412         18.75         ± 0.5         84.14         0.03332           2437         18.57         ± 0.5         80.72         0.03197           2462         18.11         ± 0.5         72.61         0.02876           Test Mode: 802.11n(HT20)           2412         17.23         ± 0.5         59.29         0.02348           2437         17.10         ± 0.5         57.54         0.02279           2462         16.95         ± 0.5         55.59         0.02202           Test Mode: 802.11n(HT40)           2422         16.62         ± 0.5         51.52         0.02040           2437         16.23         ± 0.5         47.10         0.01865	

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Channel	Channel	Max	Tolerance	Max	Power	Power
	Frequency	Output		Tune-UP	density at	density
	(MHz)	power		power	20cm (mW/	Limits
	, ,	(dBm)		(mW)	cm <sup>2</sup> )	(mW/cm <sup>2</sup> )
		To	est Mode: B	BLE		
Low	2402	6.99	±0.5	5.61	0.00222	1
Middle	2440	6.97	±0.5	5.59	0.00221	1
High	2480	7.14	±0.5	5.81	0.00230	1
		Te	st Mode: Gl	FSK		
Low	2402	4.61	±0.5	3.24	0.00128	1
Middle	2441	4.66	±0.5	3.28	0.00130	1
High	2480	5.29	±0.5	3.79	0.00150	1
Test Mode: π4/-DQPSK						
Low	2402	5.94	±0.5	4.41	0.00175	1
Middle	2441	5.94	±0.5	4.41	0.00175	1
High	2480	6.60	±0.5	5.13	0.00203	1
Test Mode: 8DPSK						
Low	2402	6.26	±0.5	4.74	0.00188	1
Middle	2441	6.28	±0.5	4.76	0.00189	1
High	2480	6.90	±0.5	5.50	0.00218	1

Note: For the device consider simultaneous transmission of 2.4G WIFI and BT, the worst MPE evaluation = 0.03915 + 0.00230 = 0.04145 < 1.0