

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: 2AJ22-BW2570PCIE

EUT Specification

EUT	BW2570-PCIE
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.18GHz ~ 5.32GHz ☒ WLAN: 5.745GHz ~ 5.825GHz ☒ Bluetooth: 2.402GHz ~ 2.48GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	18.60dBm (0.0724W)
Antenna gain (Max)	8.01 dBi
Evaluation applied	☒ MPE Evaluation ☐ 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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in Mw

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d 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

ANT 0:

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)	
802.11b	2412	11.75	11.75±1	12.75	5.00	0.0119	1
	2437	12.10	12.10±1	13.10	5.00	0.0128	1
	2462	12.12	12.12±1	13.12	5.00	0.0129	1
802.11g	2412	13.85	13.85±1	14.85	5.00	0.0192	1
	2437	14.34	14.34±1	15.34	5.00	0.0215	1
	2462	14.39	14.39±1	15.39	5.00	0.0218	1
802.11n (HT20)	2412	14.13	14.13±1	15.13	5.00	0.0205	1
	2437	14.40	14.40±1	15.40	5.00	0.0218	1
	2462	14.37	14.37±1	15.37	5.00	0.0217	1
802.11n (HT40)	2422	13.27	13.27±1	14.27	5.00	0.0168	1
	2437	13.74	13.74±1	14.74	5.00	0.0187	1
	2452	13.97	13.97±1	14.97	5.00	0.0198	1

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 ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11b	2412	11.20	11.20±1	12.20	5.00	0.0104	1
	2437	11.76	11.76±1	12.76	5.00	0.0119	1
	2462	11.91	11.91±1	12.91	5.00	0.0123	1
802.11g	2412	13.67	13.67±1	14.67	5.00	0.0184	1
	2437	14.37	14.37±1	15.37	5.00	0.0217	1
	2462	14.29	14.29±1	15.29	5.00	0.0213	1
802.11n (HT20)	2412	13.61	13.61±1	14.61	5.00	0.0182	1
	2437	14.57	14.57±1	15.57	5.00	0.0227	1
	2462	14.80	14.80±1	15.80	5.00	0.0239	1
802.11n (HT40)	2422	13.10	13.10±1	14.10	5.00	0.0162	1
	2437	13.90	13.90±1	14.90	5.00	0.0194	1
	2452	13.82	13.82±1	14.82	5.00	0.0191	1

Antenna 0 Gain= 5 dBi

Antenna 1 Gain= 5 dBi

Array Gain= 8.01 dBi= GANT+10*log(NANT)dBi

Operating Mode	Channel Frequency (MHz)	ANT 0 Power density at 20cm (mW/ cm ²)	ANT 1 Power density at 20cm (mW/ cm ²)	Power density at 20cm (mW/ cm ²)	Power density Limits (mW/cm ²)
802.11n (HT20)	2412	0.0205	0.0182	0.0387	1
	2437	0.0218	0.0227	0.0445	1
	2462	0.0217	0.0239	0.0456	1
802.11n (HT40)	2422	0.0168	0.0162	0.0330	1
	2437	0.0187	0.0194	0.0381	1
	2452	0.0198	0.0191	0.0389	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 ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
Bluetooth 3.0(GFSK)	2402	2.459	2.459 ± 1	3.459	5.00	0.0014	1
	2441	3.431	3.431 ± 1	4.431	5.00	0.0017	1
	2480	3.954	3.954 ± 1	4.954	5.00	0.0020	1
Bluetooth 3.0(π /4DQPSK)	2402	2.280	2.280 ± 1	3.280	5.00	0.0013	1
	2441	2.299	2.299 ± 1	3.299	5.00	0.0013	1
	2480	2.886	2.886 ± 1	3.886	5.00	0.0015	1
Bluetooth 4.0	2402	0.239	0.239 ± 1	1.239	5.00	0.0008	1
	2441	0.006	0.006 ± 1	1.006	5.00	0.0008	1
	2480	1.896	1.896 ± 1	2.896	5.00	0.0012	1

ANT 0:

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)	
802.11n (HT20)	5180	10.96	10.96±1	11.96	5.00	0.0099	1
	5200	10.14	10.14±1	11.14	5.00	0.0082	1
	5240	9.41	9.41±1	10.41	5.00	0.0069	1
802.11n (HT20)	5745	8.84	8.84±1	9.84	5.00	0.0061	1
	5785	8.86	8.86±1	9.86	5.00	0.0061	1
	5825	8.47	8.47±1	9.47	5.00	0.0056	1
802.11n (HT40)	5190	12.00	12.00±1	13.00	5.00	0.0126	1
	5230	10.48	10.48±1	11.48	5.00	0.0088	1
802.11n (HT40)	5755	9.61	9.61±1	10.61	5.00	0.0072	1
	5795	9.27	9.27±1	10.27	5.00	0.0067	1
802.11a	5180	9.95	9.95±1	10.95	5.00	0.0078	1
	5200	9.90	9.90±1	10.90	5.00	0.0077	1
	5240	9.28	9.28±1	10.28	5.00	0.0067	1
802.11a	5745	8.66	8.66±1	9.66	5.00	0.0058	1
	5785	8.68	8.68±1	9.68	5.00	0.0058	1
	5825	8.20	8.20±1	9.20	5.00	0.0052	1
802.11ac (HT20)	5180	10.10	10.10±1	11.10	5.00	0.0081	1
	5200	10.07	10.07±1	11.07	5.00	0.0080	1
	5240	9.33	9.33±1	10.33	5.00	0.0068	1
802.11ac (HT20)	5745	8.84	8.84±1	9.84	5.00	0.0061	1
	5785	8.81	8.81±1	9.81	5.00	0.0060	1
	5825	8.41	8.41±1	9.41	5.00	0.0055	1
802.11ac (HT40)	5190	11.31	11.31±1	12.31	5.00	0.0107	1
	5230	10.70	10.70±1	11.70	5.00	0.0093	1
802.11ac (HT40)	5755	9.77	9.77±1	10.77	5.00	0.0075	1
	5795	9.58	9.58±1	10.58	5.00	0.0072	1
802.11ac (HT80)	5210	11.34	11.34±1	12.34	5.00	0.0108	1
	5775	9.42	9.42±1	10.42	5.00	0.0069	1

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 ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11n (HT20)	5180	10.92	10.92±1	11.92	5.00	0.0098	1
	5200	10.67	10.67±1	11.67	5.00	0.0092	1
	5240	10.34	10.34±1	11.34	5.00	0.0086	1
802.11n (HT20)	5745	7.55	7.55±1	8.55	5.00	0.0045	1
	5785	7.89	7.89±1	8.89	5.00	0.0049	1
	5825	7.09	7.09±1	8.09	5.00	0.0041	1
802.11n (HT40)	5190	10.91	10.91±1	11.91	5.00	0.0098	1
	5230	10.84	10.84±1	11.84	5.00	0.0096	1
802.11n (HT40)	5755	8.43	8.43±1	9.43	5.00	0.0055	1
	5795	7.37	7.37±1	8.37	5.00	0.0043	1
802.11a	5180	11.98	11.98±1	12.98	5.00	0.0125	1
	5200	11.46	11.46±1	12.46	5.00	0.0111	1
	5240	11.02	11.02±1	12.02	5.00	0.0100	1
802.11a	5745	7.39	7.39±1	8.39	5.00	0.0043	1
	5785	7.84	7.84±1	8.84	5.00	0.0048	1
	5825	7.09	7.09±1	8.09	5.00	0.0041	1
802.11ac (HT20)	5180	11.32	11.32±1	12.32	5.00	0.0107	1
	5200	11.54	11.54±1	12.54	5.00	0.0113	1
	5240	11.75	11.75±1	12.75	5.00	0.0119	1
802.11ac (HT20)	5745	7.98	7.98±1	8.98	5.00	0.0050	1
	5785	8.45	8.45±1	9.45	5.00	0.0055	1
	5825	7.66	7.66±1	8.66	5.00	0.0046	1
802.11ac (HT40)	5190	11.76	11.76±1	12.76	5.00	0.0119	1
	5230	11.45	11.45±1	12.45	5.00	0.0111	1
802.11ac (HT40)	5755	8.25	8.25±1	9.25	5.00	0.0053	1
	5795	7.46	7.46±1	8.46	5.00	0.0044	1
802.11ac (HT80)	5210	11.02	11.02±1	12.02	5.00	0.0100	1
	5775	8.81	8.81±1	9.81	5.00	0.0060	1

Antenna 0 Gain= 5 dBi

Antenna 1 Gain= 5 dBi

Array Gain= 8.01 dBi= $G_{ANT} + 10 \cdot \log(N_{ANT})$ dBi

Operating Mode	Channel Frequency (MHz)	ANT 0 Power density at 20cm (mW/ cm ²)	ANT 1 Power density at 20cm (mW/ cm ²)	Power density at 20cm (mW/ cm ²)	Power density Limits (mW/cm ²)
802.11n (HT20)	5180	0.0099	0.0098	0.0197	1
	5200	0.0082	0.0092	0.0174	1
	5240	0.0069	0.0086	0.0155	1
802.11n (HT20)	5745	0.0061	0.0045	0.0106	1
	5785	0.0061	0.0049	0.0110	1
	5825	0.0056	0.0041	0.0097	1
802.11n (HT40)	5190	0.0126	0.0098	0.0224	1
	5230	0.0088	0.0096	0.0184	1
802.11n (HT40)	5755	0.0072	0.0055	0.0127	1
	5795	0.0067	0.0043	0.011	1
802.11ac (HT20)	5180	0.0081	0.0107	0.0188	1
	5200	0.0080	0.0113	0.0193	1
	5240	0.0068	0.0119	0.0187	1
802.11ac (HT20)	5745	0.0061	0.0050	0.0111	1
	5785	0.0060	0.0055	0.0115	1
	5825	0.0055	0.0046	0.0101	1
802.11ac (HT40)	5190	0.0107	0.0119	0.0226	1
	5230	0.0093	0.0111	0.0204	1
802.11ac (HT40)	5755	0.0075	0.0053	0.0128	1
	5795	0.0072	0.0044	0.0116	1
802.11ac (HT80)	5210	0.0108	0.0100	0.0208	1
	5775	0.0069	0.0060	0.0129	1