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: 2A2PW162394

EUT Specification

EUT	Indoor Access Point
Frequency band (Operating)	☐BT: 2.402GHz ~ 2.480GHz ☒BLE: 2.402GHz ~ 2.480GHz ☒WIFI: 2.412GHz ~ 2.462GHz ☒WIFI: 5.180GHz ~ 5.240GHz ☒WIFI: 5.260GHz ~ 5.320GHz ☐WIFI: 5.500GHz ~ 5.700GHz ☒WIFI: 5.745GHz ~ 5.825GHz
Device category	☐Portable (<20cm separation) ☒Mobile (>20cm separation)
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（peak power）	BLE BLE 1M: 1.55 dBm 2.4G WIFI 802.11b: 16.99 dBm 802.11g: 16.29 dBm 802.11n HT20: 14.34dBm 802.11n HT40: 14.18 dBm 802.11ax HE20: 15.2 dBm 802.11ax HE40: 14.95 dBm 5G WIFI U-NII-1 802.11a: 11.9 dBm 802.11n HT20: 14.53 dBm 802.11n HT40: 10.12 dBm 802.11ac VHT20: 14.4 dBm 802.11ac VHT40: 10.06 dBm 802.11ac VHT80: 9.96 dBm 802.11ax HE20: 14.75 dBm

	802.11ax HE40: 10.25 dBm 802.11ax HE80: 10.07 dBm U-NII-1 & U-NII-2A 802.11ac VHT160: 9.27 dBm 802.11ax VHT160: 9.63 dBm U-NII-2A 802.11a: 11.73 dBm 802.11n HT20: 14.99 dBm 802.11n HT40: 9.21 dBm 802.11ac VHT20: 14.9 dBm 802.11ac VHT40: 9.13 dBm 802.11ac VHT80: 9.45 dBm 802.11ax HE20: 15.15 dBm 802.11ax HE40: 9.72 dBm 802.11ax HE80: 9.86 dBm U-NII-3 802.11a: 11.62 dBm 802.11n HT20: 17.1 dBm 802.11n HT40: 16.91 dBm 802.11ac VHT20: 17.1 dBm 802.11ac VHT40: 16.96 dBm 802.11ac VHT80: 8.6 dBm 802.11ax HE20: 17.39 dBm 802.11ax HE40: 17.26 dBm 802.11ax HE80: 8.87 dBm
Antenna gain (Max)	BLE: 3dBi 2.4G WIFI 3 dBi for antenna 1 3 dBi for antenna 2 5G WIFI 4.17 dBi for antenna 1 4.17 dBi for antenna 2 4.17 dBi for antenna 3 4.17 dBi for antenna 4
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: $P_d=(P_{out}*G)\backslash(4*pi*R^2)$

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=20cm
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.

For multiple RF sources: Multiple RF sources are exempt if:
in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation

$$\sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Evaluated$_k$: the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.
Exposure Limit$_k$: either the general population/uncontrolled maximum permissible exposure (MPE) or specific Absorption rate (SAR) limit for each fixed, mobile, or portable RF source k.

Measurement Result

BLE:

Mode	Max Measured Power (dBm)	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/ cm^2)	Power density Limits (mW/ cm^2)
BLE 1M	1.55	1±1	2	1.585	3	1.995	0.00063	1

2.4G WIFI:

Mode	Max Measured Power (dBm)	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/ cm^2)	Power density Limits (mW/ cm^2)
802.11b	16.99	16±1	17	50.119	3	1.995	0.01989	1
802.11g	16.29	16±1	17	50.119	3	1.995	0.01989	1
802.11n HT20	14.34	14±1	15	31.623	3	1.995	0.01255	1
802.11n HT40	14.18	14±1	15	31.623	3	1.995	0.01255	1
802.11ax HE20	15.2	15±1	16	39.811	3	1.995	0.01580	1
802.11ax HE40	14.95	14±1	15	31.623	3	1.995	0.01255	1

5G WIFI:

U-NII-1

Mode	Max Measured Power (dBm)	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/ cm^2)	Power density Limits (mW/ cm^2)
802.11a	11.9	11±1	12	15.849	4.17	2.612	0.00824	1
802.11n HT20	14.53	14±1	15	31.623	4.17	2.612	0.01643	1
802.11n HT40	10.12	10±1	11	12.589	4.17	2.612	0.00654	1
802.11ac VHT20	14.4	14±1	15	31.623	4.17	2.612	0.01643	1
802.11ac VHT40	10.06	10±1	11	12.589	4.17	2.612	0.00654	1
802.11ac VHT80	9.96	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ac VHT160	9.27	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ax HE20	14.75	14±1	15	31.623	4.17	2.612	0.01643	1
802.11ax HE40	10.25	10±1	11	12.589	4.17	2.612	0.00654	1
802.11ax HE80	10.07	10±1	11	12.589	4.17	2.612	0.00654	1
802.11ax HE160	9.63	9±1	10	10.000	4.17	2.612	0.00520	1

U-NII-2A

Mode	Max Measured Power (dBm)	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/ cm^2)	Power density Limits (mW/ cm^2)
802.11a	11.73	11±1	12	15.849	4.17	2.612	0.00824	1
802.11n HT20	14.99	14±1	15	31.623	4.17	2.612	0.01643	1
802.11n HT40	9.21	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ac VHT20	14.9	14±1	15	31.623	4.17	2.612	0.01643	1
802.11ac VHT40	9.13	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ac VHT80	9.45	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ax HE20	15.15	15±1	16	39.811	4.17	2.612	0.02069	1
802.11ax HE40	9.72	9±1	10	10.000	4.17	2.612	0.00520	1
802.11ax HE80	9.86	9±1	10	10.000	4.17	2.612	0.00520	1

U-NII-3

Mode	Max Measured Power (dBm)	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
802.11a	11.62	11±1	12	15.849	4.17	2.612	0.00824	1
802.11n HT20	17.1	17±1	18	63.096	4.17	2.612	0.03278	1
802.11n HT40	16.91	16±1	17	50.119	4.17	2.612	0.02604	1
802.11ac VHT20	17.1	17±1	18	63.096	4.17	2.612	0.03278	1
802.11ac VHT40	16.96	16±1	17	50.119	4.17	2.612	0.02604	1
802.11ac VHT80	8.6	8±1	9	7.943	4.17	2.612	0.00413	1
802.11ax HE20	17.39	17±1	18	63.096	4.17	2.612	0.03278	1
802.11ax HE40	17.26	17±1	18	63.096	4.17	2.612	0.03278	1
802.11ax HE80	8.87	8±1	9	7.943	4.17	2.612	0.00413	1

Maximum Simultaneous transmission MPE Ratio for Bluetooth & 2.4G WIFI & 5G WIFI

Maximum MPE ratio (Bluetooth)	Maximum MPE ratio (2.4G WIFI)	Maximum MPE ratio (5G WIFI)	∑ MPE ratios	Limit	Results
0.00063	0.01989	0.03278	0.05330	1.000	Pass

Signature:

Shawn Wen

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