

FCC RF EXPOSURE REPORT

FCC ID: 2ABZMEW9

Project No. : 1807C083
Equipment : AC1200 Enterprise Mesh WiFi System
Model : EW9, EP9
Applicant : SHENZHEN IP-COM NETWORKS CO.,LTD
Address : Room 101, Unit A, First Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

According: : FCC Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091

B T L I N C .

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MPE CALCULATION METHOD:

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi^2} = \frac{EIRP}{4\pi^2}$$

where:

S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Table for Filed Antenna

2.4G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	N/A	N/A	PCB	N/A	4.5
2	N/A	N/A	PCB	N/A	4.5

Note:

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R), all transmit signals are completely correlated, then,

for Non-beamforming function,

Direction gain = GANT+10log(N)dBi=4.5+10log(2), that is Directional gain=7.51.

So, the out power limit is 30-7.51+6=28.49,

the power density limit is 8-7.51+6=6.49,

for beamforming function,

Beamforming Gain=3 dBi, Direction gain = 7.51,

So, the out power limit is 30-7.51-3+6=25.4

the power density limit is 8-7.51-3+6=3.49

5G

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain(dBi)	Note
1	N/A	N/A	PCB	N/A	4	UNII-1
1	N/A	N/A	PCB	N/A	4.5	UNII-3
2	N/A	N/A	PCB	N/A	4	UNII-1
2	N/A	N/A	PCB	N/A	4.5	UNII-3

Note: The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R), all transmit signals are completely correlated, then, For Non-beamforming function,

Direction gain = $10 \log[(10_{G1/20} + 10_{G2/20})^2/N]$, that are

UNII-1 Directional gain= $10 \log[(10_{4/20} + 10_{4/20})^2/2] = 7.01\text{dBi}$

UNII-3 Directional gain= $10 \log[(10_{4.5/20} + 10_{4.5/20})^2/2] = 7.51\text{dBi}$

The UNII-1 Output Power limit is $30-7.01+6=28.99\text{dBm}$

The UNII-3 Output Power limit is $30-7.51+6=28.49\text{dBm}$

The UNII-1 PSD limit is $17-7.01+6=15.99\text{dBm/MHz}$

The UNII-3 PSD limit is $30-7.51+6=28.49\text{dBm/500kHz}$.

For beamforming function,

Beamforming Gain=3 dBi,

UNII-1 Directional gain = 7.01dBi

UNII-3 Directional gain =7.51dBi

The UNII-1 Output Power limit is $30-7.01-3+6=25.99\text{dBm}$

The UNII-3 Output Power limit is $30-7.51-3+6=25.49\text{dBm}$,

The UNII-1 PSD limit is $17-7.01-3+6=12.99\text{dBm/MHz}$,

The UNII-3 PSD limit is $30-7.51-3+6=25.49\text{dBm/500kHz}$.

TEST RESULTS

EUT :	AC1200 Enterprise Mesh WiFi System	Model Name :	EW9, EP9
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		

WIFI 2.4G Non-Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	28.47	703.0723	0.39441	1	Complies

WIFI 2.4G with Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	25.42	348.3373	0.19541	1	Complies

UNII-1 Non-Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	28.63	729.4575	0.40921	1	Complies

UNII-1 with Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	25.95	393.5501	0.22078	1	Complies

UNII-3 Non-Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	28.26	669.8846	0.37579	1	Complies

UNII-3 with Beamforming:

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
4.5	2.8184	25.25	334.9654	0.18791	1	Complies

For 2.4G+5G simultaneous transmission MPE:

$$0.39170/1+0.40921/1=0.80091$$

Note: the calculated distance is 20 cm.