

FCC RF EXPOSURE REPORT

FCC ID: PJZ2428Z1

Project No. : 1612C280D
Equipment : GE 4 PORT WiFi Gateway,
GPON 4 Port WiFi Gateway
Model Name : (1) ZNID-GE-2428B1
Series Model : (1) ZNID-GE-2426B1
(2) ZNID-GPON-2428B1, ZNID-GPON-2426B1
Applicant : DASAN Zhone Solutions, Inc.
Address : 7195 Oakport Street Oakland, CA 94621 USA
According : FCC Guidelines for Human Exposure IEEE
C95.1 & FCC Part 2.1091

B T L I N C .

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Certificate #5123.02

1. GENERAL SUMMARY

Equipment : GE 4 PORT WiFi Gateway,
GPON 4 Port WiFi Gateway

Brand Name : **DZS**

Test Model : (1) ZNID-GE-2428B1

Series Model : (1) ZNID-GE-2426B1
(2) ZNID-GPON-2428B1, ZNID-GPON-2426B1

Applicant : DASAN Zhong Solutions, Inc.

Manufacturer : DASAN Zhong Solutions, Inc.

Address : 7195 Oakport Street Oakland, CA 94621 USA

Date of Test : Dec. 28, 2016 ~ Apr. 14, 2017
Jan. 21, 2019 ~ May 23, 2019

Test Sample : Engineering Sample No.: D190100606

Standards : FCC Title 47 Part 2.1091, OET Bulletin 65 Supplement C

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-3-1612C280D) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

2. 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

Antenna Specification:

For 2.4G:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	IPEX	3
2	N/A	N/A	PCB	IPEX	3

Note:

This EUT supports MIMO 2X2, any transmit signals are correlated with each other,

So Directional gain = $G_{ANT} + 10\log(N)$ dBi, that is Directional gain = $3 + 10\log(2)$ dBi = 6.01 dBi;

So, the out power limit is $30 - 6.01 + 6 = 29.99$,

the power density limit is $8 - 6.01 + 6 = 7.99$.

When Directional antenna gain is larger than 6 dBi, for every 1 dBi increase in gain, the power limit and power density limit is reduced by 1 dBm.

For 5G:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	IPEX	4
2	N/A	N/A	PCB	IPEX	4
3	N/A	N/A	PCB	IPEX	4

Note:

(1) For Non Beamforming:

This EUT supports MIMO 3X3, any transmit signals are correlated with each other,

so Directional gain = $G_{ANT} + 10\log(N)$ dBi, that is Directional gain = $4 + 10\log(3)$ dBi = 8.77;

So, the UNII-1, UNII-3 output power limit is $30 - 8.77 + 6 = 27.23$.

The UNII-1 power density limit is $17 - 8.77 + 6 = 14.23$,

the UNII-3 power density limit is $30 - 8.77 + 6 = 27.23$.

(2) For Beamforming:

This EUT supports MIMO 3X3, any transmit signals are correlated with each other,

so Directional gain = $G_{ANT} + 10\log(N_{ANT}/N_{SS})$ dBi, The $N_{SS} = 1$,

that is Directional gain = $4 + 10\log(3/1)$ dBi = 8.77;

So, the UNII-1, UNII-3 output power limit is $30 - 8.77 + 6 = 27.23$.

The UNII-1 power density limit is $17 - 8.77 + 6 = 14.23$,

the UNII-3 power density limit is $30 - 8.77 + 6 = 27.23$.

When Directional antenna gain is larger than 6 dBi, for every 1 dBi increase in gain, the power limit and power density limit is reduced by 1 dBm.

3. TEST RESULTS

For 2.4GHz:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
6.01	3.9902	24.78	300.6076	0.23875	1	Complies

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
3	1.9953	27.73	592.9253	0.23548	1	Complies

For 5GHz UNII-1_Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
8.77	7.5336	26.90	489.7788	0.73443	1	Complies

For 5GHz UNII-1_Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
8.77	7.5336	27.03	504.6613	0.75675	1	Complies

For 5GHz UNII-3_Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
8.77	7.5336	26.89	488.6524	0.73274	1	Complies

For 5GHz UNII-3_Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Output Power (dBm)	Max. Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
8.77	7.5336	27.03	504.6613	0.75675	1	Complies

For the max simultaneous transmission MPE:

Power Density (S) (mW/cm ²)	Power Density (S) (mW/cm ²)	Total	Limit of Power Density (S) (mW/cm ²)	Test Result
2.4GHz	5GHz			
0.23875	0.75675	0.9955	1	Complies

Note: The calculated distance is 20 cm.

End of Test Report