

FCC RF EXPOSURE REPORT

FCC ID: PJZ2728Y1

Project No. : 1601C103
Equipment : GPON 4 Port WiFi 802.11ac Gateway, GE 4 Port WiFi 802.11ac Gateway
Model : ZNID-GPON-2728A1-XX, ZNID-GPON-2728A1-NYY, ZNID-GPON-2728A1-XX-NYY, ZNID-GE-2728A1-XX, ZNID-GE-2728A1-NYY, ZNID-GE-2728A1-XX-NYY
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According: : FCC Guidelines for Human Exposure IEEE C95.1

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 WIFI

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	Airgain®))	N2420GS-T-G45U	PCB	U.FL	2.5
2	Airgain®))	N2420GS-T-G140U	PCB	U.FL	2.5
3	Airgain®))	N2420GS-T-G300U	PCB	U.FL	2.5

Note:

(1) The EUT incorporates a MIMO function. Physically, the EUT provides three completed transmitters and receivers (3T3R), all transmit signals are completely uncorrelated, then, **Direction gain = G_{ANT}**, that is Directional gain=2.5.

(2) ANT 1 was the worst case for 1TX.

Operating Mode TX Mode	1TX	3TX
802.11b	V (ANT 1)	-
802.11g	V (ANT 1)	-
802.11n(20MHz)	-	V (ANT 1 + ANT 2+ ANT 3)
802.11n(40MHz)	-	V (ANT 1 + ANT 2+ ANT 3)

5G WIFI

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Airgain [®])))	N5x20B-T-G40U	PCB	U.FL	2.7
2	Airgain [®])))	N5X20B-T-G180U	PCB	U.FL	2.7
3	Airgain [®])))	N5X20B-T-G220U	PCB	U.FL	2.7
4	Airgain [®])))	N5X20B-T-G300U	PCB	U.FL	2.7

Operating Mode TX Mode	1TX	4TX
802.11a	V (ANT 1)	-
802.11n(20MHz)	-	V (ANT 1 + ANT 2+ ANT 3+ ANT 4)
802.11n(40MHz)	-	V (ANT 1 + ANT 2+ ANT 3+ ANT 4)
802.11ac(20MHz)	-	V (ANT 1 + ANT 2+ ANT 3+ ANT 4)
802.11ac(40MHz)	-	V (ANT 1 + ANT 2+ ANT 3+ ANT 4)
802.11ac(80MHz)	-	V (ANT 1 + ANT 2+ ANT 3+ ANT 4)

TEST RESULTS

2.4G WIFI

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX B MODE /CH01, CH06, CH11_ANT 1		

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
2.5	1.7783	20.57	114.0250	0.04035993	1	Complies
2.5	1.7783	24.45	278.6121	0.09861668	1	Complies
2.5	1.7783	20.71	117.7606	0.04168217	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX G MODE /CH01, CH06, CH11_ANT 1		

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
2.5	1.7783	21.93	155.9553	0.05520144	1	Complies
2.5	1.7783	29.83	961.6123	0.34036929	1	Complies
2.5	1.7783	21.18	131.2200	0.04644622	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N20 Mode_CH01/06/11_Total		

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
2.5	1.7783	25.67	368.9776	0.13060216	1	Complies
2.5	1.7783	29.61	914.1132	0.32355668	1	Complies
2.5	1.7783	25.38	345.1437	0.12216600	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N40 Mode_CH03/06/09_Total		

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
2.5	1.7783	22.99	199.0673	0.07046125	1	Complies
2.5	1.7783	27.71	590.2011	0.20890574	1	Complies
2.5	1.7783	24.56	285.7591	0.10114639	1	Complies

UNII-1

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX A MODE_Total / CH36, CH40, CH48		

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
2.7	1.8621	16.91	49.0908	0.01819493	1	Complies
2.7	1.8621	16.3	42.6580	0.01581067	1	Complies
2.7	1.8621	16.77	47.5335	0.01761775	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-20M MODE_Total / CH36, CH40, CH48		

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
2.7	1.8621	22.49	177.4189	0.06575827	1	Complies
2.7	1.8621	21.83	152.4053	0.05648724	1	Complies
2.7	1.8621	22.25	167.8804	0.06222292	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-40M MODE_Total / CH38, CH46		

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
2.7	1.8621	15.91	38.9942	0.01445275	1	Complies
2.7	1.8621	22.69	185.7804	0.06885736	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC20 Mode_Total / CH36, CH40, CH48		

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
2.7	1.8621	22.45	175.7924	0.06515539	1	Complies
2.7	1.8621	21.89	154.5254	0.05727306	1	Complies
2.7	1.8621	22.26	168.2674	0.06236636	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC40 Mode_Total / CH38, CH46		

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
2.7	1.8621	14.20	26.3027	0.00974878	1	Complies
2.7	1.8621	21.19	131.5225	0.04874728	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC80 Mode_Total / CH42		

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
2.7	1.8621	16.34	43.0527	0.01595697	1	Complies

UNII-3

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX A MODE_Total / CH149, CH157, CH165		

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
2.7	1.8621	16.76	47.4242	0.01757723	1	Complies
2.7	1.8621	16.40	43.6516	0.01617895	1	Complies
2.7	1.8621	16.67	46.4515	0.01721672	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N20 Mode_Total / CH149, CH157, CH165		

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
2.7	1.8621	21.87	153.8155	0.05700991	1	Complies
2.7	1.8621	22.49	177.4189	0.06575827	1	Complies
2.7	1.8621	22.64	183.6538	0.06806916	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N40 Mode_Total / CH151, CH159		

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
2.7	1.8621	22.60	181.9701	0.06744509	1	Complies
2.7	1.8621	21.81	151.7050	0.05622771	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC20 Mode_Total / CH149, CH157, CH165		

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
2.7	1.8621	21.98	157.7611	0.05847233	1	Complies
2.7	1.8621	22.48	177.0109	0.06560703	1	Complies
2.7	1.8621	22.66	184.5015	0.06838335	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC40 Mode_Total / CH151, CH159		

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
2.7	1.8621	22.51	178.2379	0.06606179	1	Complies
2.7	1.8621	22.51	178.2379	0.06606179	1	Complies

EUT:	GPON 4 Port WiFi 802.11ac Gateway	Model Name :	ZNID-GPON-2728 A1
Temperature:	24 °C	Relative Humidity:	52%
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC80 Mode_Total / CH155		

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
2.7	1.8621	22.35	171.7908	0.06367228	1	Complies

For 2.4G+5G simultaneous transmission MPE:

$$0.3404/1+0.0689/1=0.4093<1$$

Note: the calculated distance is 20 cm.