

FCC RF EXPOSURE REPORT

FCC ID: Q78-ZXHNF680

Project No. : 1511C185
Equipment : GPON ONT
Model : ZXHN F680
Applicant : ZTE Corporation
**Address : ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen,
Guangdong, P.R.China**

According: : FCC Guidelines for Human Exposure IEEE C95.1

B T L I N C .

No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, China.
TEL: +86-769-8318-3000 FAX: +86-769-8319-6000

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	Airgain	N2430GND	PCB	N/A	3.3
2	Airgain	N2430GNS	PCB	N/A	2.7
3	Airgain	N2430GND	PCB	N/A	3.1

Note:

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 = GANT, that is Directional gain=3.3.

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

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	MEILIE	EDA-1513-25GC 1-A12-EV_V01	Dipole	N/A	2.2
2	MEILIE	EDA-1513-25GC 1-A12-EV_V01	Dipole	N/A	3.2
3	MEILIE	EDA-1513-25GC 1-A11-EV_V02	Dipole	N/A	3.2

Note:

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=3.2.

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

TEST RESULTS

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX B MODE /CH01, CH06, CH11		

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
3.3	2.1380	20.14	103.2761	0.04394914	1	Complies
3.3	2.1380	20.31	107.3989	0.04570360	1	Complies
3.3	2.1380	19.88	97.2747	0.04139524	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX G MODE /CH01, CH06, CH11		

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
3.3	2.1380	24.53	283.7919	0.12076758	1	Complies
3.3	2.1380	25.37	344.3499	0.14653804	1	Complies
3.3	2.1380	22.68	185.3532	0.07887700	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-20M MODE_ Total /CH01, CH06, CH11		

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
3.3	2.1380	26.86	485.2885	0.20651441	1	Complies
3.3	2.1380	26.98	498.8845	0.21230018	1	Complies
3.3	2.1380	27.24	529.6634	0.22539816	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-40M MODE_ Total /CH03, CH06, CH09		

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
3.3	2.1380	27.03	504.6613	0.21475850	1	Complies
3.3	2.1380	26.88	487.5285	0.20746764	1	Complies
3.3	2.1380	26.15	412.0975	0.17536801	1	Complies

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EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
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
3.2	2.0893	21.92	155.5966	0.06470687	1	Complies
3.2	2.0893	27.32	539.5106	0.22436255	1	Complies
3.2	2.0893	27.48	559.7576	0.23278252	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
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
3.2	2.0893	24.36	272.8978	0.11348811	1	Complies
3.2	2.0893	26.93	493.1738	0.20509278	1	Complies
3.2	2.0893	27.58	572.7960	0.23820472	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
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
3.2	2.0893	22.72	187.0682	0.07779476	1	Complies
3.2	2.0893	29.71	935.4057	0.38900069	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-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
3.2	2.0893	23.25	211.3489	0.08789221	1	Complies
3.2	2.0893	27.05	506.9907	0.21083872	1	Complies
3.2	2.0893	28.44	698.2324	0.29036908	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-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
3.2	2.0893	22.78	189.6706	0.07887700	1	Complies
3.2	2.0893	29.59	909.9133	0.37839934	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-80M 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
3.2	2.0893	21.14	130.0170	0.05406925	1	Complies

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EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX A MODE_Total / CH52, CH60, CH64		

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
3.2	2.0893	21.89	154.5254	0.06426143	1	Complies
3.2	2.0893	22.43	174.9847	0.07276966	1	Complies
3.2	2.0893	20.82	120.7814	0.05022852	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-20M MODE_Total / CH52, CH60, CH64		

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
3.2	2.0893	21.95	156.6751	0.06515539	1	Complies
3.2	2.0893	21.25	133.3521	0.05545623	1	Complies
3.2	2.0893	21.59	144.2115	0.05997225	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-40M MODE_Total / CH54, CH62		

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
3.2	2.0893	23.85	242.6610	0.10091376	1	Complies
3.2	2.0893	21.38	137.4042	0.05714133	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-20M MODE_Total / CH52, CH60, CH64		

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
3.2	2.0893	23.68	233.3458	0.09703991	1	Complies
3.2	2.0893	21.52	141.9058	0.05901336	1	Complies
3.2	2.0893	22.59	181.5516	0.07550059	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-40M MODE_Total / CH54, CH62		

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
3.2	2.0893	23.65	231.7395	0.09637189	1	Complies
3.2	2.0893	21.45	139.6368	0.05806981	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-80M MODE_Total / CH58		

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
3.2	2.0893	21.85	153.1087	0.06367228	1	Complies

UNII-2C

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX A MODE_ Total / CH100, CH116, CH140		

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
3.2	2.0893	22.14	163.6817	0.06806916	1	Complies
3.2	2.0893	23.38	217.7710	0.09056291	1	Complies
3.2	2.0893	18.69	73.9605	0.03075745	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-20M MODE_ Total / CH100, CH116, CH140		

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
3.2	2.0893	22.09	161.8080	0.06728998	1	Complies
3.2	2.0893	22.43	174.9847	0.07276966	1	Complies
3.2	2.0893	21.04	127.0574	0.05283849	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-40M MODE_ Total / CH102, CH110, CH134		

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
3.2	2.0893	21.79	151.0080	0.06279866	1	Complies
3.2	2.0893	23.67	232.8091	0.09681672	1	Complies
3.2	2.0893	22.29	169.4338	0.07046125	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-20M MODE_Total / CH100, CH116, CH140		

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
3.2	2.0893	23.20	208.9296	0.08688611	1	Complies
3.2	2.0893	22.49	177.4189	0.07378199	1	Complies
3.2	2.0893	22.07	161.0646	0.06698081	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-40M MODE_Total / CH102, CH110, CH134		

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
3.2	2.0893	21.76	149.9685	0.06236636	1	Complies
3.2	2.0893	23.50	223.8721	0.09310015	1	Complies
3.2	2.0893	23.13	205.5891	0.08549690	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-80M MODE_Total / CH106, CH122		

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
3.2	2.0893	17.73	59.2925	0.02465758	1	Complies
3.2	2.0893	22.47	176.6038	0.07344299	1	Complies

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EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
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
3.2	2.0893	20.63	115.6112	0.04807844	1	Complies
3.2	2.0893	26.08	405.5085	0.16863603	1	Complies
3.2	2.0893	20.54	113.2400	0.04709235	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-20M 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
3.2	2.0893	22.95	197.2423	0.08202578	1	Complies
3.2	2.0893	27.98	628.0584	0.26118629	1	Complies
3.2	2.0893	24.15	260.0160	0.10813104	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N-40M 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
3.2	2.0893	21.38	137.4042	0.05714133	1	Complies
3.2	2.0893	23.75	237.1374	0.09861668	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-20M 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
3.2	2.0893	22.70	186.2087	0.07743733	1	Complies
3.2	2.0893	28.05	638.2635	0.26543022	1	Complies
3.2	2.0893	23.17	207.4914	0.08628799	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-40M 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
3.2	2.0893	21.08	128.2331	0.05332740	1	Complies
3.2	2.0893	23.86	243.2204	0.10114639	1	Complies

EUT :	GPON ONT	Model Name :	ZXHN F680
Temperature:	28 °C	Relative Humidity:	56 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX AC-80M 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
3.2	2.0893	18.01	63.2412	0.02629967	1	Complies

For 2.4G+5G simultaneous transmission MPE:

$$0.2254/1+0.3890/1=0.6144<1$$

Note: the calculated distance is 20 cm.