

FCC RF EXPOSURE REPORT

FCC ID: 2ADZRG240W-C

Project No. : 1712C022
Equipment : GPON ONU
Model : G-240W-C
Applicant : Nokia Shanghai Bell Co. Ltd.
Address : No. 388, Ningqiao Rd. Pilot Free Trade Zone,
Shanghai, China

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 for 2.4G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)	Note
1	N/A	N/A	PCB	IPEX	2.1	2.4G
2	N/A	N/A	PCB	IPEX	2.1	2.4G

(1) The EUT incorporates a MIMO function. Physically, the EUT provides two completed two transmitters and two receivers (2T2R), all transmit signals are completely uncorrelated, then, Direction gain = GANT, that is Directional gain=2.1.

Table for Filed Antenna for 5G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)	Note
1	N/A	N/A	PCB	IPEX	2.8	5G
2	N/A	N/A	PCB	IPEX	2.8	5G
3	N/A	N/A	PCB	IPEX	2.8	5G
4	N/A	N/A	PCB	IPEX	2.8	5G

Note:

- This EUT supports MIMO 4X4, for Beamforming function , Directional gain = $G_{ANT} + \text{Beamforming Gain}$, that is Directional gain=2.8+6=8.8; So, the UNII-1, UNII-3 output power limit is 30-8.8+6=27.20 and the UNII-2A, UNII-2C output power limit is 24-8.8+6=21.20. The UNII-1 power density limit is 17-8.8+6=14.20. The UNII-3 power density limit is 30-8.8+6=27.20. The UNII-2A, UNII-2C power density limit is 11-8.8+6=8.20.
- This EUT supports MIMO 4X4, for Non Beamforming function all transmit signals are completely uncorrelated , so Directional gain=Gant, that is Direction Gain= $G_{Ant} + 10\log(N_{Ant}/N_{ss})$ NSS=1, Direction Gain=2.8+10log(4/1)=8.82 So, the UNII-1, UNII-3 output power limit is 30-8.82+6=27.18. The UNII-1 power density limit is 17-8.82+6=14.18. The UNII-3 power density limit is 30-8.82+6=27.18. The UNII-2A, UNII-2C output power limit is 24-8.82+6=21.18. The UNII-2A, UNII-2C power density limit is 11-8.82+6=8.18.

TEST RESULTS

EUT :	GPON ONU	Model Name :	G-240W-C
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		

2.4G WIFI

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
2.1	1.6218	29.45	881.0489	0.28441	1	Complies

5G Band UNII-1(Beamforming function)

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
8.8	7.5858	21.44	139.3157	0.21035	1	Complies

5G Band UNII-1(Non Beamforming function)

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
8.82	7.6208	23.84	242.1029	0.36724	1	Complies

5G Band UNII-2A(Beamforming function)

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
8.8	7.5858	21.01	126.1828	0.19052	1	Complies

5G Band UNII-2A(Non Beamforming function)

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
8.82	7.6208	21.01	126.1828	0.19140	1	Complies

5G Band UNII-2C(Beamforming function)

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
8.8	7.5858	20.97	125.0259	0.18878	1	Complies

5G Band UNII-2C(Non Beamforming function)

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
8.82	7.6208	20.98	125.3141	0.19009	1	Complies

5G Band UNII-3(Beamforming function)

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
8.8	7.5858	22.61	182.3896	0.27539	1	Complies

5G Band UNII-3(Non Beamforming function)

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
8.82	7.6208	22.61	182.3896	0.27666	1	Complies

For 2.4G+5G simultaneous transmission MPE:

$$0.28441/1+0.36724/1=0.65165$$

Note: the calculated distance is 20 cm.