FCC RF EXPOSURE REPORT

FCC ID: 2AX3BKX45

Project No.	:	2105C129
Equipment	:	AX1800 Dual Band Gigabit WiFi Router
Brand Name	:	Speedefy
Test Model	:	KX450
Series Model	:	K450X(X can be A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z and blank.)
Applicant	:	SHENZHEN TENO NETWORK TECHNOLOGIES CO.,LTD
Address	:	NO.415, 4F, ZHONGZHI NEXONE BUILDING, SANLIAN COMMUNITY, LONGHUA STREET, LONGHUA DISTRICT, SHENZHEN, CHINA
Manufacturer	:	SHENZHEN TENO NETWORK TECHNOLOGIES CO.,LTD
Address	:	NO.415, 4F, ZHONGZHI NEXONE BUILDING, SANLIAN COMMUNITY, LONGHUA STREET, LONGHUA DISTRICT, SHENZHEN, CHINA
Date of Receipt	:	Jun. 11, 2021
Date of Test	:	Jun. 11, 2021~Jun. 23, 2021
Issued Date	:	Jul. 09, 2021
Report Version	:	R01
Test Sample	:	Engineering Sample No.: DG2021052031 for Radiated; DG2021052032 for conducted.
Standard(s)	:	FCC Part 2.1091 FCC Title 47 Part 2.1091 KDB 447498 D01 General RF exposure guidance v06

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

Maker Qi

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TESTING CERT #5123.03

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 29, 2021
R01	Revised report to address TCB's comments.	Jul. 09, 2021

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

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

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)
1	N/A	N/A	Dipole	N/A	5
2	N/A	N/A	Dipole	N/A	5

Note:
1.This EUT supports Beamforming and CDD, all antennas have the same gain, any transmit signals are correlated with each other, so

1) Beamforming:

Directional gain = $10\log[(10^{G1/20}+10^{G2/20+....+}10^{GN/20})^2/N_{ANT}]$dBi,

that is Directional gain=$10\log[(10^{G1/20}+10^{G2/20+....+}10^{GN/20})^2/N_{ANT}]$dBi =8.01;

So output power limit is 30-8.01+6=27.99, the power spectral density limit is 8-8.01+6=5.99.

2) CDD:

For power spectral density measurements, the Directional gain=G_{ANT}+Array Gain,
that is Directional gain=5+10log(2/1) =8.01;So power spectral density limit is 8-8.01+6=5.99.
For power meansurements, Directional gain =$G_{ANT\ MAX.}$+Array Gain, Array Gain=0dB($N_{ANT}\leq4$), so the Directional gain=5.

2. The antenna gain and beamforming gain are provided by the manufacturer.

Operating Mode / TX Mode	Ant. 1	Ant. 2	Ant. 1+2
IEEE 802.11b	✓	✓	×
IEEE 802.11g	✓	✓	×
IEEE 802.11n(HT20)	✓	✓	✓
IEEE 802.11n(HT40)	✓	✓	✓
IEEE 802.11ax(HE20)	✓	✓	✓
IEEE 802.11ax(HE40)	✓	✓	✓

For 5G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	N/A	N/A	Dipole	N/A	5
2	N/A	N/A	Dipole	N/A	5

Note:

1.This EUT supports Beamforming and CDD, all antennas have the same gain, any transmit signals are correlated with each other, so

1) Beamforming:
Directional gain = $10\log[(10^{G1/20}+10^{G2/20}+\ldots.+10^{GN/20})^2/N_{ANT}]$dBi,
that is Directional gain=$10\log[(10^{G1/20}+10^{G2/20}+\ldots.+10^{GN/20})^2/N_{ANT}]$dBi =8.01;
Then, the UNII-1, UNII-3 output power limit is 30-8.01+6=27.99.
The UNII-1 power spectral density limit is 17-8.01+6=14.99,
the UNII-3 power spectral density limit is 30-8.01+6=27.99.

2) CDD:
For power spectral density measurements, the Directional gain=G_{ANT}+Array Gain,
that is Directional gain=5+10log(2/1) =8.01;
Then, the UNII-1 power spectral density limited is 17-8.01+6=14.99,
the UNII-3 power spectral density limit is 30-8.01+6=27.99.
For power meansurements, Directional gain= $G_{ANT\ MAX.}$+Array Gain.
Array Gain=0dB($N_{ANT}\leq 4$), so the Directional gain=5.

2. The antenna gain and beamforming gain are provided by the manufacturer.

Operating Mode / TX Mode	Ant. 1	Ant. 2	Ant. 1+2
IEEE 802.11a	✓	✓	×
IEEE 802.11n(HT20)	✓	✓	✓
IEEE 802.11n(HT40)	✓	✓	✓
IEEE 802.11ac(VHT20)	✓	✓	✓
IEEE 802.11ac(VHT40)	✓	✓	✓
IEEE 802.11ac(VHT80)	✓	✓	✓
IEEE 802.11ax(HE20)	✓	✓	✓
IEEE 802.11ax(HE40)	✓	✓	✓
IEEE 802.11ax(HE80)	✓	✓	✓

2. TEST RESULTS

For 2.4GHz:

Beamforming：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
8.01	6.32410	28.00	630.9573	0.656058	1	Complies

CDD：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
5.00	3.1623	30.00	1000.0000	0.519932	1	Complies

For 5GHz :

Beamforming：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
8.01	6.3241	24.00	251.1886	0.261182	1	Complies

CDD：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
5.00	3.1623	24.00	251.1886	0.130601	1	Complies

For the max simultaneous transmission MPE:

2.4G+5G

Power Density (S) (mW/cm^2) 2.4GHz	Power Density (S) (mW/cm^2) 5GHz	Total	Limit of Power Density (S) (mW/cm^2)	Test Result
0.656058	0.261182	0.91724	1	Complies

Note: The calculated distance is 22 cm.
Output power including tune up tolerance.

End of Test Report