

RF EXPOSURE Test Report

FCC ID:	2BN7W-LNN788
Applicant	TIANZHI TRADING INC
Address	1624 Market St Ste 226, #30327 Denver CO 80202 US
Manufacturer	TIANZHI TRADING INC
Address	1624 Market St Ste 226, #30327 Denver CO 80202 US
Product Name:	Dual Band Wireless Router
Model/Type reference:	LNN788
Power supply:	DC 12V
Adapter information	N/A
Hardware version:	V1.0
Software version:	V1.0
Standards:	N/A
Test procedure :	KDB 447498 D01 v06
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Mobile Device
Date of Test	
Date of tests	February 20, 2025~March 6, 2025
Test Result.	Pass
This device described above has been tested by MAXLAB Testing Co.,Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

RF Exposure Evaluation

Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

According to KDB 447498 D01 General RF Exposure Guidance v06, Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied.

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

Friis transmission formula: $Pd = (P_{out} * G) / (4 * \pi * r^2)$

Where

Pd = power density in mW/cm², **P_{out}** = output power to antenna in mW;

G = gain of antenna in linear scale, **Pi** = 3.1416;

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

Test Result of RF Exposure Evaluation

2.4GWiFi:

Antenna Type: External Antenna

Antenna gain: ANT 1/ ANT 2 : 6.0dBi

R=20cm

mW= $10^{(dBm/10)}$

WiFi 2.4G mode: ANT1+ANT2 MIMO

Channel	Frequency (MHz)	Output power to antenna (dbm)			Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
		ANT 1	ANT 2	ANT 1+2			
802.11b	2412	15.954	11.652	/	0.0116	1.0	PASS
	2437	15.562	11.254	/	0.0106	1.0	PASS
	2462	15.326	11.124	/	0.0103	1.0	PASS
802.11g	2412	14.563	10.865	/	0.0097	1.0	PASS
	2437	14.652	10.654	/	0.0092	1.0	PASS
	2462	14.235	10.213	/	0.0083	1.0	PASS
802.11n (HT20)	2412	13.542	9.562	15.003	0.0251	1.0	PASS
	2437	13.654	9.542	15.078	0.0255	1.0	PASS
	2462	13.562	9.324	14.951	0.0248	1.0	PASS
802.11n (HT40)	2422	11.986	8.452	13.579	0.0181	1.0	PASS
	2437	11.652	8.352	13.318	0.0170	1.0	PASS
	2452	11.234	8.632	13.135	0.0163	1.0	PASS
802.11 ax20	2412	12.212	8.565	13.771	0.0189	1.0	PASS
	2437	12.141	8.426	13.679	0.0185	1.0	PASS
	2462	12.056	8.234	13.563	0.0180	1.0	PASS
802.11 ax40	2422	9.895	5.652	11.283	0.0106	1.0	PASS
	2437	9.542	5.456	10.973	0.0099	1.0	PASS
	2452	9.234	5.234	10.689	0.0093	1.0	PASS

Remark: The best case gain of the antenna is 6.0dBi.

6.0dBi logarithmic terms convert to numeric result is nearly 3.98

WiFi 5G UNII-1

Channel	Frequency (MHz)	Output power to antenna (dBm)				Output power to antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
		ANT 1	ANT 2	ANT 3	ANT 1+2+3				
802.11a	5180	10.895	8.462	5.631	/	5.631	0.0029	1.0	PASS
	5200	10.632	8.241	5.264	/	5.264	0.0027	1.0	PASS
	5240	10.254	8.124	5.212	/	5.212	0.0026	1.0	PASS
802.11n (HT20)	5180	9.563	7.563	4.231	12.405	17.40	0.0138	1.0	PASS
	5200	9.345	7.342	4.124	12.203	16.61	0.0132	1.0	PASS
	5240	9.124	7.241	4.024	12.040	16.00	0.0127	1.0	PASS
802.11n (HT40)	5190	7.895	5.265	3.241	10.656	11.63	0.0092	1.0	PASS
	5230	7.265	5.124	3.124	10.267	10.63	0.0084	1.0	PASS
802.11ac (HT20)	5180	8.241	6.124	3.241	11.098	12.88	0.0102	1.0	PASS
	5200	8.124	6.024	3.121	10.985	12.55	0.0099	1.0	PASS
	5240	8.243	6.245	3.024	11.103	12.89	0.0102	1.0	PASS
802.11ac (HT40)	5200	6.421	4.265	2.212	9.405	8.72	0.0069	1.0	PASS
	5240	6.241	4.241	2.124	9.291	8.49	0.0067	1.0	PASS
802.11ac (HT80)	5210	5.234	3.865	1.652	8.595	7.24	0.0057	1.0	PASS
802.11ax (HT20)	5180	7.124	5.241	1.162	9.915	9.81	0.0078	1.0	PASS
	5200	6.865	5.124	1.523	9.792	9.53	0.0076	1.0	PASS
	5240	6.421	4.935	2.412	9.659	9.24	0.0073	1.0	PASS
802.11ax (HT40)	5200	5.421	3.562	1.214	8.499	7.08	0.0056	1.0	PASS
	5240	5.632	3.242	1.021	8.471	7.03	0.0056	1.0	PASS
802.11ax (HT80)	5210	4.635	2.121	0.865	7.602	5.76	0.0046	1.0	PASS

UNII-3

Channel	Frequency (MHz)	Output power to antenna (dBm)				Output power to antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
		ANT 1	ANT 2	ANT 3	ANT 1+2+3				
802.11a	5745	10.124	8.135	5.236	/	3.34	0.0026	1.0	PASS
	5785	10.056	7.865	5.124	/	3.25	0.0026	1.0	PASS
	5825	10.241	7.425	5.024	/	3.18	0.0025	1.0	PASS
802.11n (HT20)	5745	9.234	7.425	5.212	12.363	17.23	0.0137	1.0	PASS
	5785	9.124	7.124	5.124	12.197	16.58	0.0131	1.0	PASS
	5825	9.015	6.982	4.635	12.006	15.87	0.0126	1.0	PASS
802.11n (HT40)	5755	7.635	5.654	3.452	10.679	11.69	0.0093	1.0	PASS
	5795	7.215	5.242	3.652	10.385	10.93	0.0087	1.0	PASS
802.11ac (HT20)	5745	8.634	6.595	3.242	11.454	13.98	0.0111	1.0	PASS
	5785	8.424	6.423	3.241	11.289	13.46	0.0107	1.0	PASS
	5825	8.234	6.124	3.321	11.107	12.90	0.0102	1.0	PASS
802.11ac (HT40)	5755	6.542	4.562	2.652	9.643	9.21	0.0073	1.0	PASS
	5795	6.354	4.241	2.242	9.370	8.65	0.0069	1.0	PASS
802.11ac (HT80)	5775	4.524	2.632	0.865	7.699	5.89	0.0047	1.0	PASS
802.11ax (HT20)	5745	6.658	4.562	2.426	9.656	9.24	0.0073	1.0	PASS
	5785	6.542	4.212	2.362	9.479	8.87	0.0070	1.0	PASS
	5825	6.342	4.214	2.456	9.398	8.71	0.0069	1.0	PASS
802.11ax (HT40)	5755	5.421	3.245	1.124	8.383	6.89	0.0055	1.0	PASS
	5795	5.241	3.124	1.241	8.278	6.73	0.0053	1.0	PASS
802.11ax (HT80)	5775	3.654	1.635	0.068	6.806	4.79	0.0038	1.0	PASS

Note1: The estimation distance is 20 cm

Simultaneous transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\sum$ of MPE ratios ≤ 1.0

Mode	WIFI 2.4G MPE (mW/cm ²)	WIFI 5.1G MPE (mW/cm ²)	WIFI 5.8G MPE (mW/cm ²)	$\sum$ MPE ratios	Limit	Results
2.4G WIFI+5.1G WIFI+5.8G WIFI	0.0255	0.0138	0.0137	0.1763	1.0	PASS

Conclusion: MPE evaluation required since transmitter power is below FCC threshold

---END OF REPORT---