



RF EXPOSURE Test Report

Report No.: MTi230606005-02E3
Date of issue: 2023-09-26
Applicant: Ten-Tronics Co., Ltd.
Product: 150M HDMI Wireless Extender
Model(s): A-1488
FCC ID: 2ACIA-TTBT016

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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Test Result Certification	
Applicant:	Ten-Tronics Co., Ltd.
Address:	No. 33, Lane 347, Chung-San S. Road, Young-Kang City, Tainan, Taiwan
Manufacturer:	Ten-Tronics Co., Ltd.
Address:	No. 33, Lane 347, Chung-San S. Road, Young-Kang City, Tainan, Taiwan
Product description	
Product name:	150M HDMI Wireless Extender
Trademark:	N/A
Model name:	A-1488
Serial Model:	N/A
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2023-08-09 to 2023-09-26
Test result:	Pass

Test Engineer :

Maleah Deng

(Maleah Deng)

Reviewed By: :

Leon Chen

(Leon Chen)

Approved By: :

Tom Xue

(Tom Xue)

RF EXPOSURE EVALUATION

According to FCC 1.1310: 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)

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 Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

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

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm (20cm)

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

Measurement Result

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz, n HT40: 2422-2452

Power density limited: 1mW/ cm²

5GWiFi:

802.11a: 20 MHz

802.11n: 20 MHz, 40 MHz

802.11ac: 20 MHz, 40 MHz, 80MHz

Antenna Type: FPC Antenna;

Antenna gain:

2.4G: ANT1: 2.32dBi; ANT2: 2.32dBi; ANT1+ANT2: 5.33dBi;

5G: 2.43dBi; ANT2: 2.43dBi; ANT1+ANT2: 5.44dBi

R=20cm

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

2.4G: antenna gain Numeric= $10^{(dBi/10)}= 10^{(2.32/10)}= 1.71$

ANT1+ANT2: antenna gain Numeric= $10^{(dBi/10)}= 10^{(5.33/10)}= 3.41$

5G: antenna gain Numeric= $10^{(dBi/10)}= 10^{(2.43/10)}= 1.75$

ANT1+ANT2: antenna gain Numeric= $10^{(dBi/10)}= 10^{(5.44/10)}= 3.50$

2.4GWiFi:

SISO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm ²)			(mW/cm ²)
		Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Numeric	Ant A	Ant B	Sum		
2412	802.11b	15.19	16.51	15±1	16±1	16	17	39.810717	50.119	1.71	1.71	0.01351	0.01701	/	1
2437		14.19	17.04	14±1	17±1	15	18	31.622777	63.096	1.71	1.71	0.01073	0.02142	/	1
2462		14.15	16.50	14±1	16±1	15	16	31.622777	39.811	1.71	1.71	0.01073	0.01351	/	1
2412	802.11g	16.93	16.60	17±1	16±1	18	17	63.095734	50.119	1.71	1.71	0.02142	0.01701	/	1
2437		16.48	17.03	16±1	17±1	17	18	50.118723	63.096	1.71	1.71	0.01701	0.02142	/	1
2462		15.70	16.60	15±1	16±1	16	17	39.810717	50.119	1.71	1.71	0.01351	0.01701	/	1
2412	802.11n H20	12.95	13.68	13±1	13±1	14	14	25.118864	25.119	1.71	1.71	0.00853	0.00853	/	1
2437		13.25	14.00	13±1	14±1	14	15	25.118864	31.623	1.71	1.71	0.00853	0.01073	/	1
2462		12.79	13.91	12±1	14±1	13	15	19.952623	31.623	1.71	1.71	0.00677	0.01073	/	1
2422	802.11n H40	13.48	12.36	13±1	12±1	14	13	25.118864	19.953	1.71	1.71	0.00853	0.00677	/	1
2437		13.71	12.49	13±1	12±1	14	13	25.118864	19.953	1.71	1.71	0.00853	0.00677	/	1
2452		13.65	12.73	13±1	12±1	14	13	25.118864	19.953	1.71	1.71	0.00853	0.00677	/	1



MIMO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max		Antenna		Evaluation result at 20cm		Power density Limits
		(dBm)		(dBm)		tune-up power		Gain		Power density(mW/cm2)		(mW/cm2)
		Ant A+B		Ant A+B		(dBm)	(mW)	Numeric		Ant A+B		
2412	802.11n H20	15.18		15±1		16	39.811	3.41		0.02702		1
2452	802.11n H40	15.37		15±1		16	39.811	3.41		0.02702		1

5G WIFI: UNII-1

SISO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
		Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Sum	
5180	11a	12.32	10.72	12±1	10±1	13	11	19.953	12.589	1.75	1.75	0.00695	0.00438	/	1
5200		13.62	11.11	13±1	11±1	14	12	25.119	15.849	1.75	1.75	0.00874	0.00552	/	1
5240		11.17	10.31	11±1	10±1	12	11	15.849	12.589	1.75	1.75	0.00552	0.00438	/	1
5180	11ac (HT20)	9.92	10.56	9±1	10±1	10	11	10.000	12.589	1.75	1.75	0.00348	0.00438	/	1
5200		9.64	13.40	9±1	13±1	10	14	10.000	25.119	1.75	1.75	0.00348	0.00874	/	1
5240		8.64	12.55	8±1	12±1	9	13	7.943	19.953	1.75	1.75	0.00277	0.00695	/	1
5190	11ac (HT40)	9.88	10.94	9±1	10±1	10	11	10.000	12.589	1.75	1.75	0.00348	0.00438	/	1
5230		9.37	11.08	9±1	11±1	10	12	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5210	11ac (HT80)	13.62	10.79	13±1	10±1	14	11	25.119	12.589	1.75	1.75	0.00874	0.00438	/	1
5180	11n (HT20)	10.77	12.91	10±1	13±1	11	14	12.589	25.119	1.75	1.75	0.00438	0.00874	/	1
5200		10.53	13.34	10±1	13±1	11	14	12.589	25.119	1.75	1.75	0.00438	0.00874	/	1
5240		9.39	12.53	9±1	12±1	10	13	10.000	19.953	1.75	1.75	0.00348	0.00695	/	1
5190	11n (HT40)	9.96	10.84	9±1	10±1	10	11	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5230		9.37	11.03	9±1	11±1	10	12	10.000	10	1.75	1.75	0.00348	0.00348	/	1

MIMO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max		Antenna		Evaluation result at 20cm		Power density Limits
		(dBm)		(dBm)		tune-up power		Gain		Power density(mW/cm2)		(mW/cm2)
		Ant A+B		Ant A+B		(dBm)	(mW)	Numeric		Ant A+B		
5180	802.11ac (VHT20)	15.27		15±1		16	39.811	3.50		0.02772		1
5230	802.11ac (VHT40)	14.32		14±1		15	31.623	3.50		0.02202		1
5210	802.11ac (VHT80)	13.71		13±1		14	25.119	3.50		0.01749		1
5240	802.11n (HT20)	13.44		13±1		14	25.119	3.50		0.01749		1
5190	802.11n (HT40)	16.07		16±1		17	50.119	3.50		0.03489		1



5G WIFI: UNII-3

SISO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
						(dBm)		(mW)		Numeric					
		Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Ant A	Ant B	Sum	
5745	11a	11.31	11.53	11±1	11±1	12	12	15.849	15.849	1.75	1.75	0.00552	0.00552	/	1
5785		10.56	11.99	10±1	11±1	11	12	12.589	15.849	1.75	1.75	0.00438	0.00552	/	1
5825		11.20	12.96	11±1	12±1	12	13	15.849	19.953	1.75	1.75	0.00552	0.00695	/	1
5745	11ac (HT20)	9.85	11.52	9±1	11±1	10	12	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5785		9.34	11.96	9±1	11±1	10	12	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5825		10.31	12.98	10±1	12±1	11	13	12.589	19.953	1.75	1.75	0.00438	0.00695	/	1
5755	11ac (HT40)	10.09	12.20	10±1	12±1	11	13	12.589	19.953	1.75	1.75	0.00438	0.00695	/	1
5795		10.68	12.57	10±1	12±1	11	13	12.589	19.953	1.75	1.75	0.00438	0.00695	/	1
5775	11ac (HT80)	10.94	12.83	10±1	12±1	11	13	12.589	19.953	1.75	1.75	0.00438	0.00695	/	1
5745	11n (HT20)	10.05	11.56	10±1	11±1	11	12	12.589	15.849	1.75	1.75	0.00438	0.00552	/	1
5785		9.74	11.89	9±1	11±1	10	12	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5825		10.46	12.95	10±1	12±1	11	13	12.589	19.953	1.75	1.75	0.00438	0.00695	/	1
5755	11n (HT40)	10.29	12.12	10±1	12±1	11	13	10.000	15.849	1.75	1.75	0.00348	0.00552	/	1
5795		9.95	12.48	9±1	12±1	10	13	10.000	10	1.75	1.75	0.00348	0.00348	/	1

MIMO

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
						(dBm)		(mW)		Numeric					
		Ant A+B		Ant A+B		Ant A+B		Ant A+B		Ant A+B		Ant A+B			
5825	802.11ac (VHT20)	11.64		11±1		12		15.849		3.50		0.01103			1
5795	802.11ac (VHT40)	11.08		11±1		12		15.849		3.50		0.01103			1
5775	802.11ac (VHT80)	10.44		10±1		11		12.589		3.50		0.00876			1
5825	802.11n (HT20)	15.51		15±1		16		39.811		3.50		0.02772			1
5755	802.11n (HT40)	14.40		14±1		15		31.623		3.50		0.02202			1

Conclusion:

Note: 2.4GWIFI and 5GWIFI cannot work at the same time

For the max result: $0.03489 \leq 1.0$ SAR, No SAR is required.

----END OF REPORT----