MPE Report

Applicant	:	Meter Inc
Product Type	:	Meter wireless access point
Trade Name	:	meter
Model Number	:	MW06
Applicable Standard	:	47 CFR § 2.1091
Received Date	:	Nov. 30, 2021
Issue Date	:	Jan. 28, 2022

Issued by

Approved By : Kris Pan

(Kris Pan)

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 334025, Taiwan (R.O.C.)
Tel：+886-3-2710188 / Fax：+886-3-2710190

Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
2. This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Revisions	Revised By
00	Jan. 28, 2022	Initial Issue	Emma Chao

Contents

1. General Information

1.1 Reference Applicable Standard

Standard	Description	Version
IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992
47 CFR Part §2.1091	Radiofrequency radiation exposure evaluation: mobile devices.	-
47 CFR Part §1.1310	Radiofrequency radiation exposure limits.	-

2. Description of Equipment under Test (EUT)

Applicant	Meter Inc 548 Market St., PMB 22716, San Francisco, CA 94104-5401			
Product Type	Meter wireless access point			
Trade Name	meter			
Model Number	MW06			
FCC ID	2AVVV-MW06			
Frequency Range	WLAN 2.4 GHz Band：2412 - 2472 MHz WLAN 5.2 GHz Band：5150 - 5250 MHz WLAN 5.8 GHz Band：5745 - 5825 MHz			
Supported Modulations	WLAN 2.4 GHz : 802.11b/g/n HT20/HT40			
	WLAN 5 GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80			
Antenna Information	Model	Type	Max. Gain (dBi)	
	5718A0346300	PIFA Antenna	2412 - 2472	2.86
	5718A0347300	PIFA Antenna	2412 - 2472	3.12
	5718A0348300	PIFA Antenna	2412 - 2472	3.14
	5718A0349300	PIFA Antenna	2412 - 2472	3.29
	G_{ANT}			3.11
	Directional			9.12

Antenna Information	Model	Type	Max. Gain (dBi)	
	5718A0350300	Metal PIFA Antenna	5150 - 5250	4.78
			5725 - 5850	5.07
	5718A0351300	Metal PIFA Antenna	5150 - 5250	4.61
			5725 - 5850	5.50
	5718A0352300	Metal PIFA Antenna	5150 - 5250	4.31
			5725 - 5850	5.36
	5718A0353300	Metal PIFA Antenna	5150 - 5250	4.15
			5725 - 5850	5.84
	G_{ANT}		5150 - 5250	4.47
			5725 - 5850	5.45
	Directional		5150 - 5250	10.49
			5725 - 5850	11.47
Antenna Delivery	IEEE 802.11b / IEEE 802.11g: 4TX (CDD) IEEE 802.11n 2.4 GHz 20 MHz / 40 MHz: 4TX (STBC / Beamforming on) IEEE 802.11a: 4TX (CDD) IEEE 802.11an 20 MHz / 40 MHz: 4TX (STBC / Beamforming on) IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 4TX (STBC / Beamforming on)			
RF Evaluation	0.424 mW/cm^2			

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

3. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. ” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation
$$S_{eirp} = \frac{EIRP}{4\pi d^2} = \frac{PG}{4\pi d^2}\left(W/m^2\right)$$

Where

S: is the input power (W);

G: is the antenna gain;

d : is the distance between antennas and evaluation point (m).

4. Power Density Limit – RF Exposure Evaluation

Thv In 47 CFR § 1.1310, use of the device as based upon the user's awareness and ability to exercise control over human exposure. The two categories defined are Occupational / Controlled Exposure and General Population / Uncontrolled. These two categories are defined as follow:

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time|E|²,|H|² or S (minutes)
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 / 1,500	30
1,500-100,000	-	-	1.0	30
Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time|E|²,|H|² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1,842 / 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

5. Conducted Power

Band	Date Rate or Sub-test	CH	Frequency (MHz)	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power
				ANT-0	ANT-0	ANT-1	ANT-1	ANT-2	ANT-2	ANT-3	ANT-3	All ANT	ALL ANT
				dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm
802.11b	1M	1	2412	18.01	19.00	17.94	19.00	17.71	19.00	17.91	19.00	23.91	24.50
		6	2437	17.33	19.00	17.73	19.00	18.30	19.00	17.76	19.00	23.81	24.50
		11	2462	17.62	19.00	17.41	19.00	17.39	19.00	17.56	19.00	23.52	24.50
802.11g	6M	1	2412	16.19	17.00	16.42	17.00	16.39	17.00	16.35	17.00	22.36	23.00
		6	2437	16.01	17.00	16.33	17.00	16.25	17.00	16.17	17.00	22.21	23.00
		11	2462	15.71	17.00	16.17	17.00	16.18	17.00	15.82	17.00	22.00	23.00
802.11n_HT20	26M	1	2412	15.85	17.00	16.08	17.00	16.03	17.00	16.26	17.00	22.08	22.50
		6	2437	15.30	17.00	15.29	17.00	15.37	17.00	15.53	17.00	21.39	22.50
		11	2462	14.09	15.00	14.23	15.00	14.41	15.00	14.22	15.00	20.26	21.00
802.11n_HT40	54M	3	2422	14.02	15.00	14.40	15.00	14.57	15.00	14.33	15.00	20.36	21.00
		6	2437	16.49	17.00	16.47	17.00	16.87	17.00	16.72	17.00	22.66	23.00
		9	2452	13.19	15.00	13.57	15.00	13.38	15.00	13.43	15.00	19.42	21.00
802.11n_HT20 (256-QAM)	26M	1	2412	15.96	17.00	16.22	17.00	16.16	17.00	16.28	17.00	22.18	23.00
		6	2437	15.33	17.00	15.41	17.00	15.47	17.00	15.61	17.00	21.48	23.00
		11	2462	14.13	15.00	14.33	15.00	14.47	15.00	14.25	15.00	20.32	21.00
802.11n_HT40 (256-QAM)	54M	3	2422	14.13	15.00	14.42	15.00	14.63	15.00	14.35	15.00	20.41	21.00
		6	2437	16.59	17.00	16.60	17.00	16.89	17.00	16.79	17.00	22.74	23.00
		9	2452	13.23	15.00	13.69	15.00	13.41	15.00	13.49	15.00	19.48	21.00

Beamforming on

Band	Date Rate or Sub-test	CH	Frequency (MHz)	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power	Average Conducted power	Tune-up Power
				ANT-0	ANT-0	ANT-1	ANT-1	ANT-2	ANT-2	ANT-3	ANT-3	All ANT	All ANT
				dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm
802.11n_HT20	26M	1	2412	9.44	10.50	9.67	10.50	9.77	10.50	9.64	10.50	15.65	16.50
		6	2437	8.75	9.00	8.88	9.00	9.01	10.50	9.01	10.50	14.93	15.00
		11	2462	8.03	9.00	8.12	9.00	8.17	9.00	7.97	9.00	14.09	15.00
802.11n_HT40	54M	3	2422	7.41	9.00	7.68	9.00	8.02	9.00	7.65	9.00	13.72	15.00
		6	2437	9.97	10.50	9.97	10.50	10.30	10.50	10.11	10.50	16.11	16.50
		9	2452	6.96	8.00	7.25	8.00	7.30	8.00	7.33	8.00	13.23	15.00
802.11n_HT20 (256-QAM)	26M	1	2412	9.48	10.50	9.68	10.50	9.83	10.50	9.72	10.50	15.70	16.50
		6	2437	8.85	9.00	8.91	9.00	9.10	10.50	9.02	10.50	14.99	16.50
		11	2462	8.11	9.00	8.19	9.00	8.25	9.00	8.09	9.00	14.18	15.00
802.11n_HT40 (256-QAM)	54M	3	2422	7.53	8.00	7.78	8.00	8.04	8.00	7.73	8.00	13.79	15.00
		6	2437	10.04	10.50	10.07	10.50	10.39	10.50	10.14	10.50	16.18	16.50
		9	2452	7.08	9.00	7.32	9.00	7.39	9.00	7.42	9.00	13.33	15.00

Band	Date Rate or Sub-test	CH	Frequency (MHz)	ANT-0	ANT-0	ANT-1	ANT-1	ANT-2	ANT-2	ANT-3	ANT-3	ANT-(Total)	ANT-(Total)
				Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power
				dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm
802.11a	6M	36	5180	16.91	17.50	16.36	17.50	16.69	17.50	15.31	17.50	22.38	23.00
		40	5200	16.97	17.50	16.42	17.50	17.01	17.50	15.41	17.50	22.52	23.00
		44	5220	16.92	17.50	16.39	17.50	16.96	17.50	15.36	17.50	22.47	23.00
		48	5240	17.16	17.50	16.46	17.50	16.91	17.50	15.49	17.50	22.57	23.00
		149	5745	19.27	20.00	19.18	20.00	19.76	20.00	18.55	20.00	25.23	26.00
		153	5765	19.06	20.00	19.02	20.00	19.72	20.00	18.56	20.00	25.13	26.00
		157	5785	19.11	20.00	19.08	20.00	19.79	20.00	18.61	20.00	25.19	26.00
		161	5805	19.03	20.00	19.03	20.00	19.73	20.00	18.58	20.00	25.13	26.00
		165	5825	19.02	20.00	18.91	20.00	19.71	20.00	18.42	20.00	25.06	26.00
802.11n_5G_HT20	26M	36	5180	18.61	19.00	18.18	19.00	18.30	19.00	17.30	19.00	24.14	25.00
		40	5200	18.59	19.00	17.99	19.00	18.38	19.00	17.39	19.00	24.13	25.00
		44	5220	18.56	19.00	18.07	19.00	18.35	19.00	17.27	19.00	24.11	25.00
		48	5240	18.74	19.00	18.04	19.00	18.52	19.00	17.42	19.00	24.23	25.00
		149	5745	18.46	19.00	18.23	19.00	18.71	19.00	17.74	19.00	24.32	25.00
		153	5765	18.26	19.00	18.17	19.00	18.78	19.00	17.51	19.00	24.22	25.00
		157	5785	18.38	19.00	18.27	19.00	18.91	19.00	17.57	19.00	24.33	25.00
		161	5805	18.31	19.00	18.14	19.00	18.76	19.00	17.58	19.00	24.24	25.00
		165	5825	18.27	19.00	18.16	19.00	18.62	19.00	17.65	19.00	24.21	25.00
802.11n_5G_HT40	54M	38	5190	15.66	16.50	16.02	16.50	16.17	16.50	18.01	18.50	22.59	25.00
		46	5230	18.56	19.00	17.91	19.00	18.33	19.00	17.02	18.50	24.01	25.00
		151	5755	17.52	19.00	17.60	19.00	18.05	19.00	17.16	18.50	23.61	25.00
		159	5795	17.37	19.00	17.49	19.00	18.05	19.00	16.95	18.50	23.50	25.00
802.11ac_VHT20	26M	36	5180	18.66	19.00	18.29	19.00	18.39	19.00	17.33	18.50	24.22	25.00
		40	5200	18.71	19.00	18.11	19.00	18.51	19.00	17.41	18.50	24.23	25.00
		44	5220	18.68	19.00	18.09	19.00	18.45	19.00	17.34	18.50	24.19	25.00
		48	5240	18.85	19.00	18.13	19.00	18.59	19.00	17.56	18.50	24.33	25.00
		149	5745	18.58	19.00	18.36	19.00	18.78	19.00	17.78	18.50	24.41	25.00
		153	5765	18.33	19.00	18.23	19.00	18.89	19.00	17.61	18.50	24.31	25.00
		157	5785	18.39	19.00	18.29	19.00	18.92	19.00	17.66	18.50	24.36	25.00
		161	5805	18.36	19.00	18.25	19.00	18.90	19.00	17.63	18.50	24.33	25.00
		165	5825	18.29	19.00	18.17	19.00	18.73	19.00	17.70	18.50	24.26	25.00
802.11ac_VHT40	54M	38	5190	15.79	16.50	16.14	16.50	16.31	16.50	18.08	18.50	22.70	25.00
		46	5230	18.62	19.00	18.02	19.00	18.43	19.00	17.13	18.50	24.11	25.00
		151	5755	17.59	19.00	17.63	19.00	18.11	19.00	17.19	18.50	23.66	25.00
		159	5795	17.41	19.00	17.51	19.00	18.07	19.00	16.97	18.50	23.53	25.00
802.11ac_VHT80	117.2M	42	5210	10.80	11.50	10.76	11.50	11.05	11.50	12.61	13.00	17.40	18.00
		155	5775	18.33	19.00	18.37	19.00	18.79	19.00	17.77	18.50	24.35	25.00

Beamforming on

Band	Date Rate or Sub-test	CH	Frequency (MHz)	ANT-0	ANT-0	ANT-1	ANT-1	ANT-2	ANT-2	ANT-3	ANT-3	ANT-(Total)	ANT-(Total)
				Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power	Average power	Tune-up Power
				dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm
802.11n_5G_HT20	26M	36	5180	12.15	13.00	11.70	12.00	12.03	13.00	10.55	11.00	17.67	18.00
		40	5200	12.19	13.00	11.72	12.00	12.09	13.00	10.57	11.00	17.71	18.00
		44	5220	12.15	13.00	11.65	12.00	12.01	13.00	10.56	11.00	17.66	18.00
		48	5240	12.33	13.00	11.81	12.00	12.29	13.00	10.86	11.00	17.88	18.00
		149	5745	11.60	13.00	11.72	12.00	12.62	13.00	10.74	11.00	17.74	18.00
		153	5765	11.41	13.00	11.49	12.00	12.56	13.00	10.38	11.00	17.55	18.00
		157	5785	11.49	13.00	11.51	12.00	12.61	13.00	10.45	11.00	17.60	18.00
		161	5805	11.44	13.00	11.48	12.00	12.56	13.00	10.34	11.00	17.55	18.00
		165	5825	11.02	13.00	11.23	12.00	12.44	13.00	10.03	11.00	17.29	18.00
802.11n_5G_HT40	54M	38	5190	9.74	10.00	9.91	10.00	10.15	10.50	12.01	13.00	16.58	18.00
		46	5230	12.17	13.00	11.63	12.00	11.96	13.00	10.46	11.00	17.62	18.00
		151	5755	11.29	13.00	11.38	12.00	12.26	13.00	10.56	11.00	17.44	18.00
		159	5795	11.12	13.00	11.29	12.00	12.23	13.00	10.30	11.00	17.31	18.00
802.11ac_VHT20	26M	36	5180	12.25	13.00	11.81	12.00	12.06	13.00	10.58	11.00	17.74	18.00
		40	5200	12.29	13.00	11.78	12.00	12.19	13.00	10.64	11.00	17.79	18.00
		44	5220	12.23	13.00	11.75	12.00	12.13	13.00	10.59	11.00	17.74	18.00
		48	5240	12.42	13.00	11.93	12.00	12.36	13.00	10.98	11.00	17.98	18.00
		149	5745	11.63	13.00	11.75	12.00	12.71	13.00	10.81	11.00	17.80	18.00
		153	5765	11.49	13.00	11.60	12.00	12.62	13.00	10.47	11.00	17.63	18.00
		157	5785	11.51	13.00	11.62	12.00	12.67	13.00	10.50	11.00	17.66	18.00
		161	5805	11.48	13.00	11.59	12.00	12.61	13.00	10.45	11.00	17.62	18.00
		165	5825	11.10	13.00	11.33	12.00	12.55	13.00	10.15	11.00	17.39	18.00
802.11ac_VHT40	54M	38	5190	9.82	10.00	9.99	10.00	10.21	10.50	12.08	13.00	16.65	18.00
		46	5230	12.21	13.00	11.75	12.00	12.09	13.00	10.53	11.00	17.71	18.00
		151	5755	11.40	13.00	11.46	12.00	12.39	13.00	10.61	11.00	17.53	18.00
		159	5795	11.18	13.00	11.43	12.00	12.37	13.00	10.42	11.00	17.43	18.00
802.11ac_VHT80	117.2M	42	5210	4.60	5.00	4.83	5.00	4.88	5.00	6.32	7.00	11.23	12.00
		155	5775	11.75	13.00	11.90	12.00	12.89	13.00	11.02	11.50	17.96	18.00

6. Test Result

Antenna	Band	Frequency (MHz)	Limit (mW)/cm^2	Distance (cm) [R]	Tune-up Power (dBm) [P]	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle (mW) [P]x[G]	Power Density (mW)/cm^2 [S]
Wi-Fi Antenna MIMO	2.4GHz	2412-2462	1.0	20	24.50	3.29	2.13	1	600.32	0.119
	5GHz	5150-5250	1.0	20	25.00	4.78	3.01	1	951.85	0.189
		5725-5850	1.0	20	26.00	5.84	3.84	1	1528.73	0.304
Wi-Fi Antenna MIMO (Beamforming)	2.4GHz	2412-2462	1.0	20	16.50	9.12	8.17	1	364.94	0.073
	5GHz	5150-5250	1.0	20	18.00	10.49	11.19	1	706.04	0.140
		5725-5850	1.0	20	18.00	11.47	14.03	1	885.23	0.176

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. The maximum power and gain was appiled to provide MPE results.
3. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).
4. The MPE results are evaluated by lowest data rate for WLAN.

Simultaneous Transmitting：

Total MPE = 0.119 + 0.304 = 0.424 (mW)/cm^2 < 1 (mW)/cm^2

---END---