
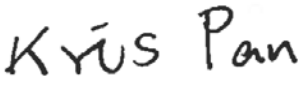


MPE Report

Applicant : Edimax Technology Co., Ltd.
Product Type : AC1200 Wireless LAN Dual-Band Concurrent Repeater
Trade Name : EDIMAX
Model Number : RE-7478MK1, RG113KC, Mesh 1-2-3 Plus, Mesh 1-2-3 Plus +1
Applicable Standard : IEEE Std.C95.1
47 CFR § 2.1091 / 47 CFR § 1.1310
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Issued by

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

Note:

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Revision History

Rev.	Issued Date	Revisions	Revised By
00	Jan. 16, 2020	Initial Issue	Jennifer Liu



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1. Reference Applicable Standard

Standard	Description	Version
ANSI/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	Edimax Technology Co., Ltd. No.278, Xinhua 1st Rd., Neihu Dist., Taipei City, Taiwan	
Manufacturer	Edimax Technology Co., Ltd. No.278, Xinhua 1st Rd., Neihu Dist., Taipei City, Taiwan	
Product Type	AC1200 Wireless LAN Dual-Band Concurrent Repeater	
Trade Name	EDIMAX	
Model Number	RE-7478MK1, RG113KC, Mesh 1-2-3 Plus, Mesh 1-2-3 Plus +1	
Difference description of model number	Difference is due to selling region.	
FCC ID	NDD9574781905	
Frequency Range	Operate Band	Frequency Range (MHz)
	IEEE 802.11b / 802.11g / 802.11n 2.4 GHz 20 MHz	2412 - 2462
	IEEE 802.11n 2.4 GHz 40 MHz	2422 - 2452
	IEEE 802.11a U-NII Band I	5180 - 5240
	IEEE 802.11a U-NII Band III	5745 - 5825
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band I	5180 - 5240
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band III	5745 - 5825
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band I	5190 - 5230
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band III	5775 - 5795
	IEEE 802.11ac 80 MHz U-NII Band I	5210
	IEEE 802.11ac 80 MHz U-NII Band III	5775



	Antenna	Model	Type	Max. Gain (dBi)		
Antenna Information	ANT-0	ALX19M-222AA5-00	PIFA Antenna	2412 - 2462	4.20	
				5150 - 5250	4.20	
				5725 - 5850	4.20	
	ANT-1	ALX19M-222AA6-00	PIFA Antenna	2412 - 2462	4.10	
				5150 - 5250	4.30	
				5725 - 5850	4.30	
	G _{ANT}				2412 - 2462	4.15
					5150 - 5250	4.25
					5725 - 5850	4.25
	Directional Gain				2412 - 2462	7.16
					5150 - 5250	7.26
					5725 - 5850	7.26
Antenna Delivery	IEEE 802.11b / 802.11g: 2TX (CDD) IEEE 802.11n 2.4 GHz 20 MHz / 40 MHz: 2TX (MIMO) IEEE 802.11a: 2TX (CDD) IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 2TX (MIMO)					
RF Evaluation	0.396 mW/cm ²					
Operate Temp. Range	0 ~ 40°C					

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

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

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



4.1 Conducted Power

Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11b	1	2412.0	16.92	15.72	19.37
		2437.0	18.81	17.42	21.18
		2462.0	16.72	15.62	19.22
IEEE 802.11g	6	2412.0	16.41	16.61	19.52
		2437.0	20.02	19.15	22.62
		2462.0	15.67	14.94	18.33
IEEE 802.11n 2.4 GHz 20 MHz	13	2412.0	15.24	14.79	18.03
		2437.0	18.88	18.57	21.74
		2462.0	15.91	15.16	18.56
IEEE 802.11n 2.4 GHz 40 MHz	27	2422.0	13.96	13.59	16.79
		2437.0	15.96	15.19	18.60
		2452.0	15.18	14.49	17.86



Band	Data Rate (Mbps)	Frequency (MHz)	Average Power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11a	6	5180.0	18.53	18.51	21.53
		5200.0	18.59	18.44	21.53
		5220.0	18.73	18.52	21.64
		5240.0	18.83	18.64	21.75
		5745.0	18.85	18.63	21.75
		5765.0	18.56	18.42	21.50
		5785.0	18.55	18.60	21.59
		5805.0	18.84	18.40	21.64
IEEE 802.11ac 20 MHz	13	5180.0	18.11	18.16	21.15
		5200.0	18.65	18.68	21.68
		5220.0	18.56	18.73	21.66
		5240.0	18.86	18.82	21.85
		5745.0	18.51	18.41	21.47
		5765.0	18.79	18.50	21.66
		5785.0	18.75	18.56	21.67
		5805.0	18.66	18.70	21.69
IEEE 802.11ac 40 MHz	27	5190.0	15.06	15.11	18.10
		5230.0	18.90	18.85	21.89
		5755.0	18.79	18.53	21.67
		5795.0	18.81	18.80	21.82
IEEE 802.11ac 80 MHz	58.6	5210.0	15.31	14.81	18.08
		5775.0	18.52	18.43	21.49



5. Test Result

Antenna	Band	Frequency (MHz)	Limit (w)/m ²	Distance (m) [d]	Max Tune-up Power [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (W)	Power Density [S] (w)/m ²
Wi-Fi Antenna	2.4 GHz	2412-2462	1.000	20	23.12	7.16	5.20	1	1066.60	0.212
	5 GHz	5150-5250	1.000	20	22.39	7.26	5.32	1	922.38	0.184
		5725-5850	1.000	20	22.32	7.26	5.32	1	907.64	0.181

Note:

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

Simultaneous Transmitting :

$$\text{Total MPE} = 2.4\text{GHz MPE} + 5\text{GHz MPE} = 0.212 + 0.184 = 0.396 \text{ (mw)/cm}^2 < 1 \text{ (mw)/cm}^2$$

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