



FCC RADIO EXPOSURE TEST REPORT

FCC ID : RSE-OWA3111
Equipment Name : MESH Extender
Trade Name : Technicolor
Model Number : OWA3111, GFEX310
Product Code : MESH Extender
Applicant : Technicolor Delivery Technologies Belgium
Prins Boudewijnlaan 47 Edegem B-2650 Belgium
Standard : 47 CFR Part 2.1091

The product was received on Jun. 08, 2020, and testing was started from Jun. 08, 2020 and completed on Jul. 17, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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Photographs of EUT v01	



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: **Sam Chen**

Report Producer: **Cindy Peng**



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)

1.2 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Number	Description
OWA3111	For marketing reason the same product will be covered by different name.
GFEX310	

From the above models, model: OWA3111 was selected as representative model for the test and its data was recorded in this report.

1.3 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) 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	1842 / f	4.89 / f	(900 / f)*	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

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)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

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

2.2 MPE Calculation Method

The MPE was calculated at 30 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Antenna Type: PCB Antenna

Conducted Power for IEEE 802.11ax 20MHz, 1S2T, TXBF: 24.90 dBm

Test Freq (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	EIRP (dBm)	EIRP (W)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2437	5.01	3.16957	24.90	309.02954	29.91	0.30903	0.08661	1

Note:

1. $G = \text{Antenna Gain (numeric)} \gg 10^{(5.01/10)} = 3.16957$
2. $P = \text{dBm to mW} \gg 10^{(24.90/10)} = 309.02954 \text{ mW}$
3. $D = \text{Distance} \gg 0.30 \text{ m}$
4. $E = \sqrt{(30 * P * G) / d} = \sqrt{(30 * 979.48999) / 0.30} = 857.09830 \text{ V/m}$
5. $PD(S) = (E^2/377) / 10000 = ((857.09830^2) / 377) / 10000 = 0.08661 \text{ mW/cm}^2$

Antenna Type: PCB Antenna

Conducted Power for IEEE 802.11ax 40MHz, Nss 1 MCS0, 1S2T, TXBF: 27.62dBm

Test Freq (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	EIRP (dBm)	EIRP (W)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
5230	5.96	3.94457	27.62	578.09605	33.58	2.28034	0.20163	1

Note:

1. $G = \text{Antenna Gain (numeric)} \gg 10^{(5.96/10)} = 3.94457$
2. $P = \text{dBm to mW} \gg 10^{(27.62/10)} = 578.09605 \text{ mW}$
3. $D = \text{Distance} \gg 0.30 \text{ m}$
4. $E = \sqrt{(30 * P * G) / d} = \sqrt{(30 * 2280.34207) / 0.30} = 871.84518 \text{ V/m}$
5. $PD(S) = (E^2/377) / 10000 = ((871.84518^2) / 377) / 10000 = 0.20163 \text{ mW/cm}^2$



Antenna Type: PCB Antenna and Metal Antenna

Conducted Power for IEEE 802.11ax 20MHz, Nss 1 MCS0, 1S4T, TXBF: 28.84 dBm

Test Freq (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	EIRP (dBm)	EIRP (W)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
5745	6.81	4.79733	28.84	765.59661	35.65	3.67282	0.32475	1

Note:

1. $G = \text{Antenna Gain (numeric)} \gg 10^{(6.81/10)} = 4.79733$
2. $P = \text{dBm to mW} \gg 10^{(28.84/10)} = 765.59661\text{mW}$
3. $D = \text{Distance} \gg 0.30 \text{ m}$
4. $E = \sqrt{(30 * P * G)} / d = \sqrt{(30 * 3672.82300)} / 0.30 = 1106.46931 \text{ V/m}$
5. $PD(S) = (E^2/377)/10000 = ((1106.46931^2)/377)/10000 = 0.32475 \text{ mW/cm}^2$

Conclusion:

Both of the WLAN 2.4GHz function, WLAN 5GHz Band 1 function and WLAN 5GHz Band 4 function can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.08661 / 1 + 0.20163 / 1 + 0.32475 / 1 = 0.61299$, which is less than "1".

This confirmed that the device complies.

Note 1: The above antenna gain was declared by manufacturer.

Note 2: The above evaluated result include the power tolerance.

————THE END————