Testing Laboratory 3787

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. 14, 2020. We, Sporton International Inc. Hsinchu 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 variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FA071024-01	01	Initial issue of report	Sep. 28, 2020
FA071024-01	02	1. Adding one equipment name “JioExtender JMB43”. 2. Adding one model number “JMB43”. 3. Adding one product code “JioExtender JMB43”.	Sep. 29, 2020
FA071024-01	03	1. Removing one equipment name “JioExtender JMB43”. 2. Removing one model number “JMB43”. 3. Removing one product code “JioExtender JMB43”.	Feb. 26, 2021
FA071024-01	04	Revising the information on section 1.3	May 25, 2021

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 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 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)

1.1 Table for Multiple Listing

1. The model numbers 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 model numbers, model number: OWA3111 was selected as representative model for the test and its data was recorded in this report.

1.2 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA071024

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding the 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device. 2. Adding the 160MHz (5570 MHz).	Maximum Permissible Exposure

Note: Maximum Permissible Exposure of 5GHz band 1, 5GHz band 4 and 2.4GHz band are based on original test report

1.3 Testing Location

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

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/ cm²)	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/ cm²)	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 (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

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/cm²)	Limit of Power Density (S) (mW/cm²)
2437	5.01	3.16957	24.90	309.02954	29.91	0.97949	0.08661	1

Note:

1. G = Antenna Gain (numeric) >> 10^(5.01/10) = 3.16957
2. P = dBm to mW >> 10^(24.90/10) = 309.02954 mW
3. D = Distance >> 0.30 m
4. E = $\sqrt{(30*P*G)}/d$ = $\sqrt{(30*979.48999}/0.30$ = 857.09830 V/m
5. PD(S) = (E²/377)/10000 = ((857.09830^2)/377)/10000 = 0.08661 mW/cm²

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/cm²)	Limit of Power Density (S) (mW/cm²)
5230	5.96	3.94457	27.62	578.09605	33.58	2.28034	0.20163	1

Note:

1. G = Antenna Gain (numeric) >> 10^(5.96/10) = 3.94457
2. P = dBm to mW >> 10^(27.62/10) = 578.09605 mW
3. D = Distance >> 0.30 m
4. E = $\sqrt{(30*P*G)}/d$ = $\sqrt{(30*2280.34207}/0.30$ = 871.84518 V/m
5. PD(S) = (E²/377)/10000 = ((871.84518^2)/377)/10000 = 0.20163 mW/cm²

Antenna Type: PCB Antenna

Conducted Power for IEEE 802.11ax 40MHz, Nss 1 MCS0, 1S2T, TXBF: 23.94dBm

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/cm²)	Limit of Power Density (S) (mW/cm²)
5270	5.73	3.7411	23.94	247.74221	29.67	0.92683	0.08195	1

Note:

1. G = Antenna Gain (numeric) >> 10^(5.73/10) = 3.7411
2. P = dBm to mW >> 10^(23.94/10) = 247.74221 mW
3. D = Distance >> 0.30 m
4. E = $\sqrt{(30*P*G)}/d$ = $\sqrt{(30*926.82982}/0.30$ = 555.82666 V/m
5. PD(S) = (E²/377)/10000 = ((555.82666^2)/377)/10000 = 0.08195 mW/cm²

Antenna Type: PCB Antenna and Metal Antenna

Conducted Power for IEEE 802.11ax 160MHz, Nss 1 MCS0, 1S4T, TXBF: 23.21dBm

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/cm²)	Limit of Power Density (S) (mW/cm²)
5570	6.75	4.73151	23.21	209.41125	29.96	0.99083	0.08761	1

Note:

1. G = Antenna Gain (numeric) >> 10^(6.75/10) = 4.73151
2. P = dBm to mW >> 10^(23.21/10) = 209.41125 mW
3. D = Distance >> 0.30 m
4. E = $\sqrt{(30*P*G)}/d$ = $\sqrt{(30*990.83194}/0.30$ = 574.69759 V/m
5. PD(S) = (E²/377)/10000 = ((574.69759^2)/377)/10000 = 0.08761 mW/cm²

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/cm²)	Limit of Power Density (S) (mW/cm²)
5745	6.81	4.79733	28.84	765.59661	35.65	3.67282	0.32475	1

Note:

1. G = Antenna Gain (numeric) >> 10^(6.81/10) = 4.79733
2. P = dBm to mW >> 10^(28.84/10) = 765.59661mW
3. D = Distance >> 0.30 m
4. E = $\sqrt{(30*P*G)}/d$ = $\sqrt{(30*3672.82300}/0.30$ = 1106.46931 V/m
5. PD(S) = (E²/377)/10000 = ((1106.46931^2)/377)/10000 = 0.32475 mW/cm²

Conclusion:

Both of the WLAN 2.4GHz function, WLAN 5GHz Band 1~2 function and WLAN 5GHz Band 3~4 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————