



RADIO EXPOSURE TEST REPORT

FCC ID : TLZ-AM457-D
Equipment : IEEE 802.11 1X1 a/b/g/n Wireless LAN + Bluetooth 5.1 Combo LGA Module
Brand Name : AzureWave
Model Name : AW-AM457-D
Applicant : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New Taipei City , Taiwan 231
Manufacturer : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New Taipei City , Taiwan 231
Standard : 47 CFR Part 2.1091

The product was received on Dec. 26, 2020, and testing was started from Dec. 26, 2020 and completed on Feb. 23, 2021. 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 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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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: **Wendy Pan**



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)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: GFSK

1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	Molex	1461531050	Dipole	I-PEX	Note 1
Ant.	Port	Brand Holder	Model Name	Antenna Type	Connector	Gain (dBi)
2	1	MAG. LAYERS SCIENTIFIC-TECHNI CS CO., LTD	MSA-4008-25GC1-A2	PIFA	I-PEX	Note 1

Note1:

Ant.	Antenna Gain (dBi)		
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	3.2	4.25	3.2
2	2.98	5.16	2.98

Note2: The above information was declared by manufacturer.

Only the highest antenna gain has been tested and recorded in the test report.



1.3 Table for Multiple Listing

The difference for each EUT is shown as below:

Model Name	EUT	Diplexer Brand	Low power filter Brand
AW-AM457-D	EUT 1	Murata	Murata
	EUT 2	Murata	Walsin
	EUT 3	Walsin	Murata
	EUT 4	Walsin	Walsin

1.4 Accessories

N/A

1.5 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.
	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 ²)	<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 ²)	<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 20 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

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;BT-EDR	3.20	3.95	7.15	0.50	7.65	0.00582	20	0.00116	1.00000
2.4G;BT-LE	3.20	3.73	6.93	0.50	7.43	0.00553	20	0.00110	1.00000
2.4G;D1D	3.20	19.61	22.81	0.50	23.31	0.21429	20	0.04263	1.00000
5.2G;D1D	5.16	20.27	25.43	0.50	25.93	0.39174	20	0.07793	1.00000
5.3G;D1D	5.16	21.07	26.23	0.50	26.73	0.47098	20	0.09370	1.00000
5.6G;D1D	5.16	18.71	23.87	0.50	24.37	0.27353	20	0.05442	1.00000
5.8G;D1D	5.16	23.71	28.87	0.50	29.37	0.86497	20	0.17208	1.00000

Simultaneous Transmission Analysis Mode:

Test Mode: Mode 1 Bluetooth + WLAN 2.4GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	3.20	19.61	22.81	0.50	23.31	0.21429	20	0.04263	1.00000	0.04263
2.4G;BT-EDR	3.20	3.95	7.15	0.50	7.65	0.00582	20	0.00116	1.00000	0.00116
									Sum Ratio	0.04379
									Ratio Limit	1

Test Mode: Mode 2 Bluetooth + WLAN 5GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
5.8G;D1D	5.16	23.71	28.87	0.50	29.37	0.86497	20	0.17208	1.00000	0.17208
2.4G;BT-EDR	3.20	3.95	7.15	0.50	7.65	0.00582	20	0.00116	1.00000	0.00116
									Sum Ratio	0.17324
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————