Radio Exposure Evaluation Report

FCC ID	:	**A8J-ENS500-ACV2**
Equipment	:	**Outdoor Long Range Wireless Access Point**
Brand Name	:	**EnGenius emplus**
Model Name	:	**ENS500-ACv2,ENS500EXT-ACv2, EnStation5-ACv2, EAS100-14v2, EAS100EXTv2, EAS100-19v2**
Applicant	:	**EnGenius Technologies 1580 Scenic Avenue, Costa Mesa, CA92626**
Manufacturer	:	**Senao Networks Inc. No.500, Fusing 3rd Rd., Hwa Ya Technology Park, Kuei-shan District, Taoyuan City 333, Taiwan**
Standard	:	**47 CFR Part 2.1091**

The product was received on Jun. 17, 2019, and testing was started from Jun. 21, 2019 and completed on Jun. 24, 2019. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of United States government.

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.

Allen Lin

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

HISTORY OF THIS TEST REPORT 3
1 GENERAL DESCRIPTION 5
1.1 EUT General Information 5
1.2 Table for Multiple Listing 5
1.3 Testing Location 5
2 MAXIMUM PERMISSIBLE EXPOSURE 6
2.1 Limit of Maximum Permissible Exposure 6
2.2 MPE Calculation Method 6
2.3 Calculated Result and Limit 7
Photographs of EUT V01

History of this test report

Report No.	Version	Description	Issued Date
FA961714	01	Initial issue of report	Aug. 14, 2019

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:
None.

Reviewed by: Jackson Tsai

Report Producer: Amber Chiu

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 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)

1.2 Table for Multiple Listing

Brand Name	Model Name	Description
EnGenius	ENS500-ACv2	Internal direct 14dBi antenna
	ENS500EXT-ACv2	Accessory with external dipole 5dBi*2 antenna
	EnStation5-ACv2	Internal direct 19dBi antenna
emplus	EAS100-14v2	Internal direct 14dBi antenna
	EAS100EXTv2	Accessory with external dipole 5dBi*2 antenna
	EAS100-19v2	Internal direct 19dBi antenna
Note. For more detailed features description, please refer to the specifications or user's manual.		

1.3 Testing Location

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

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^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/ 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^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 (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

Exposure Environment: General Population / Uncontrolled Exposure

2.4GHz WLAN

ENS500-ACv2

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;G1D	3.22	9.20	12.42	0.50	12.92	0.01959	20	0.00390	1.00000
2.4G;D1D	3.22	15.01	18.23	0.50	18.73	0.07464	20	0.01485	1.00000

ENS500EXT-ACv2

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;G1D	3.22	9.55	12.77	0.50	13.27	0.02123	20	0.00422	1.00000
2.4G;D1D	3.22	15.16	18.38	0.50	18.88	0.07727	20	0.01537	1.00000

EnStation5-ACv2

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;G1D	3.22	11.62	14.84	0.50	15.34	0.03420	20	0.00680	1.00000
2.4G;D1D	3.22	15.15	18.37	0.50	18.87	0.07709	20	0.01534	1.00000

5GHz WLAN

ENS500-ACv2_Non-Beamforming

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)
5.2G;D1D	5.46	15.50	20.96	0.50	21.46	0.13996	20	0.02784	1.00000
5.8G;D1D	13.42	22.07	35.49	0.50	35.99	3.97192	20	0.79019	1.00000

ENS500-ACv2_Beamforming

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)
5.2G;D1D	8.47	12.51	20.98	0.50	21.48	0.14060	20	0.02797	1.00000
5.8G;D1D	16.43	19.04	35.47	0.50	35.97	3.95367	20	0.78656	1.00000

ENS500EXT-ACv2_Non-Beamforming

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)
5.2G;D1D	4.31	16.68	20.99	0.50	21.49	0.14093	20	0.02804	1.00000
5.8G;D1D	5.17	26.79	31.96	0.50	32.46	1.76198	20	0.35053	1.00000

ENS500EXT-ACv2_Beamforming

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)
5.2G;D1D	7.32	13.63	20.95	0.50	21.45	0.13964	20	0.02778	1.00000
5.8G;D1D	8.18	24.41	32.59	0.50	33.09	2.03704	20	0.40526	1.00000

EnStation5-ACv2_Non-Beamforming

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)
5.2G;D1D	14.42	5.53	19.95	0.50	20.45	0.11092	20	0.02207	1.00000
5.8G;D1D	15.50	19.99	35.49	0.50	35.99	3.97192	20	0.79019	1.00000

EnStation5-ACv2_Beamforming

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)
5.2G;D1D	17.43	2.52	19.95	0.50	20.45	0.11092	20	0.02207	1.00000
5.8G;D1D	18.51	16.95	35.46	0.50	35.96	3.94457	20	0.78475	1.00000

ENS500-ACv2 - WLAN 2.4G + 5G

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	3.22	15.01	18.23	0.50	18.73	0.07464	20	0.01485	1.00000	0.01485
5.8G;D1D	13.42	22.07	35.49	0.50	35.99	3.97192	20	0.79019	1.00000	0.79019
									Sum Ratio	0.80504
									Ratio Limit	1

ENS500EXT-AC - WLAN 2.4G + 5G

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	3.22	15.16	18.38	0.50	18.88	0.07727	20	0.01537	1.00000	0.01537
5.8G;D1D	8.18	24.41	32.59	0.50	33.09	2.03704	20	0.40526	1.00000	0.40526
									Sum Ratio	0.42063
									Ratio Limit	1

Enstation5-AC- WLAN 2.4G + 5G

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	3.22	15.15	18.37	0.50	18.87	0.07709	20	0.01534	1.00000	0.01534
5.8G;D1D	15.50	19.99	35.49	0.50	35.99	3.97192	20	0.79019	1.00000	0.79019
									Sum Ratio	0.80553
									Ratio Limit	1

————THE END————