RF Exposure Evaluation Declaration

FCC ID:	2AI9TOAW-AP143X
Applicant:	ALE USA Inc.
Product:	OmniAccess Stellar
Model No.:	OAW-AP1431, OAW-AP1411
Brand Name:	Alcatel-Lucent Enterprise
FCC Classification:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII) 6GHz Low Power Indoor Access Point (6ID)
FCC Rule Part(s):	FCC Part 2.1091
Test Procedure(s):	KDB 447498 D04v01
Date of Evaluation:	2023-06-30

Reviewed By: Jame Yuan

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2303RSU028-U6	V01	Initial Report	2023-08-02	Valid

CONTENTS

1. General Information

1.1. Applicant

ALE USA Inc.

2000 Corporate Center Drive Thousand Oaks, CA 91320

1.2. Manufacturer

ALE USA Inc.

2000 Corporate Center Drive Thousand Oaks, CA 91320

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☒	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	OmniAccess Stellar
Model No.	OAW-AP1431, OAW-AP1411
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	V5.1 Single Mode
Antenna Information	Refer to Section 1.7
Power Type	AC Adapter Input or PoE Input
Operating Environment	Indoor Use
Accessories	
AC Adapter (For both OAW-AP1431 and OAW-AP1411)	Model: ADP-50GR B Input: 100-240V ~ 50/60Hz, 1.3A Output: 48.0V, 1.042A, 50.1W MAX
PoE Injector (For OAW-AP1431)	Model: POE60U-1BT-X (ALE P/N: POE60U-1BT-X-R) Input: 100-240V ~ 1.5A, 50/60Hz Output: 56.0V, 0.535A, 30W PIN 3, 6+ PIN 1, 2 Return Output: 56.0V, 0.535A, 30W PIN 4, 5+ PIN 7, 8 Return
PoE Injector (For OAW-AP1411)	Model: PD-9001GR/AT/AC Input: 100-240V ~ 0.67A, 50/60Hz Output: 55.0V, 0.6A

Remark:

1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. AC Power Adapter and PoE Injector are not sold with Product.
3. Based on OAW-AP1431, OAW-AP1411 removed TPM (Trusted Platform Module), removed Eth1(LAN port) PoE function and modified the maximum data rate from 2.5Gbps to 1Gbps.
   USB 3.0 ports have different output current. For OAW-AP1431, the max current is 1A. For OAW-AP1411, the max current is 500mA.

1.5. Antenna Details

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)	Directional Gain (dBi)		Beamforming Directional Gain (dBi)
				For Power	For PSD	
Wi-Fi Antennas						
PIFA	2400 ~ 2483.5	2	4.15	4.15	7.16	7.16
PIFA	5150 ~ 5250	2	4.57	4.57	7.58	7.58
PIFA	5250 ~ 5350	2	4.55	4.55	7.56	7.56
PIFA	5470 ~ 5725	2	4.31	4.31	7.32	7.32
PIFA	5725 ~ 5850	2	4.30	4.30	7.31	7.31
PIFA	5925 ~ 6425	2	4.33	4.33	7.34	7.34
PIFA	6425 ~ 6525	2	4.77	4.77	7.78	7.78
PIFA	6525 ~ 6875	2	4.59	4.59	7.60	7.60
PIFA	6875 ~ 7125	2	4.01	4.01	7.02	7.02
Bluetooth Antenna						
PIFA	2400 ~ 2483.5	1	4.13	--	--	--

Remark:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows.

Directional gain = $G_{ANT\ Max}$ + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB;

- For power measurements on IEEE 802.11 devices,

  Array Gain = 0 dB for $N_{ANT} \leq 4$;

2. The EUT also supports Beam Forming mode, and the Beam Forming supports 802.11n/ac/ax, not include 802.11a/b/g. Beamforming Directional gain = $G_{ANT\ Max}$ + 10 log (N_{ANT}/ N_{SS}).

2. RF Exposure Evaluation

2.1. Test Limits

According to §1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
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
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
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
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f= frequency in MHz. * = Plane-wave equivalent power density.

2.2. Test Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.
Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1920R^2$
1.34-30	$3450R^2/f^2$
30-300	$3.83R^2$
300-1,500	$0.0128R^2/f$
1,500-100,000	$19.2R^2$

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th}, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

$\boldsymbol{P_i}$ = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source *i* at a distance between 0.5 cm and 40 cm (inclusive).

$\boldsymbol{P_{th,i}}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source *i*.

ERP$_j$ = the ERP of fixed, mobile, or portable RF source *j*.

ERP$_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source *j*, at a distance of at least λ/2π according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

Evaluated$_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source *k* either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit$_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source *k*, as applicable from §1.1310 of this chapter.

2.3. Test Result

Product	OmniAccess Stellar
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Antenna Gain (dBi)	Max EIRP (dBm)	Max ERP (dBm)	Max. Tune-up ERP (dBm)
802.11b/g/n/ax (CDD Mode)	2412 ~ 2462	21.30	4.15	25.45	23.30	24
802.11a/n/ac/ax (CDD Mode)	5180 ~ 5825	21.49	4.55	26.04	23.89	24
802.11ax (CDD Mode)	5955 ~ 7095	--	--	23.98	21.83	22
Bluetooth	2402 ~ 2480	9.98	4.13	14.11	11.96	12

Note:

1. The level of max power was from RF report 2303RSU028-U1, 2303RSU028-U2, 2303RSU028-U3, and 2303RSU028 -U5.
2. Tune-up power declared by manufacturer.
3. The ERP of beamforming mode is lower than CDD mode, so only CDD mode showed in this report.

For multiple RF sources

Frequency (MHz)	Max ERP (Watts)	λ / 2 π (cm)	R (cm)	Option C (Watts)
2412 ~ 2462	0.251	1.98	20	0.768
5180 ~ 5825	0.251	0.92	20	0.768
5955 ~ 7095	0.158	0.80	20	0.768
2402 ~ 2480	0.016	1.99	20	0.768

Note: R is from user manual.

For multiple RF sources

2.4G, 5G, 6G Wi-Fi and Bluetooth could transmit simultaneously.

So the Max Simultaneous Transmission = 0.251 / 0.768 + 0.251 / 0.768 + 0.158 / 0.768 + 0.016 / 0.768 = 0.880 < 1

CONCLUSION:

Therefore, the device qualifies for RF exposure test exemption.

The End