DEKRA Testing and Certification (Suzhou) Co., Ltd.
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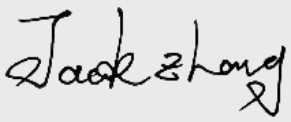
Test report No:
2360694R-RF-US-P20V01

FCC EXPOSURE TEST REPORT

Product Name	POS
Trademark	Elo
Model and /or type reference	ESY07P1
FCC ID	RBWESY07P1
Applicant´s name / address	Elo Touch Solutions, Inc 670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Test method requested, standard	FCC 47CFR §2.1091
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Jun Xu/ Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2023-11-15
Report Version	V1.0
Report template No	Template_FCC-MPE-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Aug. 14, 2023
Date (start test)	Aug. 19, 2023
Date (finish test)	Oct. 16, 2023

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
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ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2360694R-RF-US-P20V01	V1.0	Initial issue of report.	2023-11-15

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with FCC 47CFR §2.1091.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results relate only to the samples tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

- Chapter 1.1 General Description of the Item(s);
- Chapter 1.2 Antenna Informaion;

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name.....:	POS
Model No. .....:	ESY07P1
Trademark .....:	Elo
FCC ID.....:	RBWESY07P1
Hardware Version.....:	V1.05
Software Version .....:	T14
Manufacturer.....:	Elo Touch Solutions, Inc
Manufacturer address.....:	670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Factory.....:	ShuoGe Intelligent Technology Co.,Ltd.
Factory address .....:	Room 308-310, Building 1, No.2 8th Road, Baiyang Street, Qiantang New Area,Hangzhou City, Zhejiang Province, P.R. China(310018)

Wireless specifiction .....:	WIFI	
Operating frequency range(s).....:	2412~2462MHz	
Number of channel .....:	802.11b/g/n(20MHz) : 11 802.11n(40MHz) : 07	
Device category .....:	☐	Fixed point-to-point
	☐	Emit multiple directional beams, simultaneously or sequentially
	☒	Other cases

Wireless specification .....:	Bluetooth (BR/EDR)					
Operating frequency range(s).....:	2402~2480MHz					
Type of Modulation .....:	GFSK					
PHYs.....:	☒	GFSK	☒	Pi/4 DQPSK	☒	8DPSK
Data Rate.....:	☒	1Mbit/s	☒	2Mbit/s	☒	3Mbit/s
Number of channel .....:	79					

Wireless specifiction .....:	Bluetooth (LE)					
Operating frequency range(s)	2402~2480MHz					
Type of Modulation .....:	GFSK					
PHYs.....:	☒	LE 1M	☒	LE 2M	☐	LE Coded S=2/8
Data Rate.....:	☒	1Mbit/s	☒	2Mbit/s	☐	500/125 Kbit/s
Number of channel .....:	40					

Wireless Specification.....:	NFC
Operating frequency range(s).....:	13.56 MHz
Type of modulation .....:	ASK
Number of channel .....:	1

Wireless specifiction .....:	WIFI					
Transmit modes .....:	☒	802.11a	☒	802.11n(20MHz)	☒	802.11n(40MHz)
	☒	802.11ac(20MHz)	☒	802.11ac(40MHz)	☒	802.11ac(80MHz)
Frequency Range .....:		802.11a/n/ac(20MHz):5180MHz~5240Mz 802.11n/ac(40MHz):5190MHz~5230Mz 802.11ac(80MHz):5210Mz				
	☒	☐ Ooutdoor access point				
		☐ RF Module				
		☐ Fixed point-to-point AP				
		☒ Mobile and Portable Client				
	☒	802.11a/n/ac(20MHz):5260MHz~5320Mz 802.11n/ac(40MHz):5270MHz~5310Mz 802.11ac(80MHz):5290Mz				
	☒	802.11a/n/ac(20MHz):5500MHz~5700MHz 802.11n/ac(40MHz):5510MHz~5670Mz 802.11ac(80MHz):5530~5610Mz				
	☒	802.11a/n/ac(20MHz):5745MHz~5825MHz 802.11n/ac(40MHz):5755MHz~5805Mz 802.11ac(80MHz):5775Mz				
Number of channels.....:	802.11a/n/ac(20MHz): 24 802.11n/ac(40MHz): 11 802.11ac(80MHz): 5					

Rated power supply .....:	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 V, 50/60 Hz
	☐	DC: 24 Vdc
	☐	Poe:
	☒	Adapter:
Brand of adapter .....:	BJD	
Adapter model .....:	AT-803A-090200A	
	Input: 100-240V ~0.5A, 50/60Hz Output: 5V/3.0A, 9V/2.0A PPS: 3.3-5.9V/3A, 3.3V-11V/1.65A Max WATT: 18W Max	
Brand of adapter .....:	BILLION	
Adapter model .....:	BQ018-090200CXX	

	Input: 100-240V ~0.5A, 50/60Hz Output: 5V/3.0A, 9V/2.0A PPS: 3.3-5.9V/3A, 3.3V-11V/2.0A Max WATT: 18W Max	
Mounting position.....:	☒	Tabletop equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held/Portable equipment
	☐	Other:
Note: The customer used two adapter models, AT-803A-090200A and BQ018-090200CXX. We verified the two adapters and there was no difference in the test results. Finally, we used the AT-803A-090200A adapter for all tests.		

1.2 Antenna Informaion

WIFI 2.4G Antenna:

Antenna model / type number .....:	N/A			
Antenna serial number.....:	N/A			
Antenna Delivery .....:	☒	1TX + 1RX		
	☒	2TX + 2RX		
	☐	Others:……		
Antenna technology.....:	☒	SISO		
	☒	MIMO	☒	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☒	FPC
			☐	PCB
			☐	Metal Monopole Antenna
			☐	Ceramic chip
			☐	Others……..

Antenna Gain.....:	SISO:	Antenna1	1.4dBi
		Antenna2	2.0dBi
	CDD:	2.0dBi for Power; 5.01dBi for PSD	

BT Antenna:

Antenna model / type number .....:	N/A			
Antenna serial number.....:	N/A			
Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others: ……		
Antenna technology.....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	Ceramic Chip
			☐	PIFA
			☒	FPC
			☐	Others……..
Antenna Gain.....:	1.40dBi			

WIFI 5G Antenna:

Antenna model / type number .....:	N/A			
Antenna serial number.....:	N/A			
Antenna Delivery .....:	☒	1TX + 1RX		
	☒	2TX + 2RX		
Antenna technology.....:	☒	SISO		
	☒	MIMO	☒	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	PIFA
			☒	FPC
			☐	Others……..

SISO Antenna Gain .....:	Antenna1:	5150-5350: 2.9dBi 5470-5725: 3.7dBi 5725-5850: 3.3dBi
	Antenna2:	5150-5350: 3.4dBi 5470-5725: 3.6dBi 5725-5850: 2.1dBi
CDD directional gain.....:	For Power:	5150-5350: 3.4dBi 5470-5725: 3.7dBi 5725-5850: 3.3dBi
	For PSD:	5150-5350: 6.41dBi 5470-5725: 6.71dBi 5725-5850: 6.31dBi

RFID Antenna:

Antenna model.....:	N/A			
Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others:……		
Antenna technology.....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	Ceramic Chip
			☐	PIFA
			☒	LOOP
			☐	Others:
Antenna Gain.....:	N/A			

2. RF Exposure Evaluation

2.1. Limits: KDB 447498 D04

B.2 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1 mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph § 1.1307(b)(3)(ii)(A).

The 1 mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

B.3 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			**Minimum Distance**			**Threshold ERP**
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R^2
1.34	–	30	35.6 m	–	1.6 m	3,450 R^2/f^2
30	–	300	1.6 m	–	159 mm	3.83 R^2
300	–	1,500	159 mm	–	31.8 mm	0.0128 R^2f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R^2
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at

least λ/2π. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.
For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\,\text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B. 1)}$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only 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.
SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

B.4 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum timeaveraged power or maximum time-averaged ERP, whichever is greater.
If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of λ/4.
As for devices with antennas of length greater than λ/4 where the gain is not well defined, but always less than that of a half-wave dipole (length λ/2), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.
The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.
The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).
This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

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

where

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

and f is in GHz, d is the separation distance (cm), and ERP20cm is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Simultaneous Transmission SAR Test Exemption with Respect to Multiple Exemption Criteria

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a}\frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1 \qquad (C.1)$$

a. number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for Pth, including existing exempt transmitters and those being added.

b. number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula 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.

Pi ◦ 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).

$P_{th,i.}$ the exemption threshold power (Pth) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i.

$ERP_{j.}$ the available maximum time-averaged power or the ERP, whichever is greater, 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 § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

$Evaluated_{k.}$ 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.

Exposure Limit$k.$ either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18℃and 78% RH.

2.3. Test Result of RF Exposure Evaluation

Product	:	POS
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

B.2 Blanket 1 mW Blanket Exemption

Test Mode	Frequency Band (MHz)	Maximum conducted Power (dBm)	Maximum ERP Power (dBm)	Maximum (mW)	Limit (mW)	Result
2.4G BT	2402 ~ 2480	10.61	9.86	9.68	1	Fail
2.4G WIFI	2412 ~ 2462	17.51	17.32	53.95	1	Fail
5G WIFI	5180 ~ 5320	16.63	17.88	61.38	1	Fail
5G WIFI	5500 ~ 5700	16.68	18.23	66.53	1	Fail
5G WIFI	5745 ~ 5825	16.50	17.65	58.21	1	Fail
RFID	13.56	N/A	-35.659	0.00027	1	Pass

Note: 2.4G WIFI BT& 5G WIFI does not comply with B.2 Blanket 1 mW Blanket Exemption, we use B.3 MPE-based Exemption for evaluation.

B.3 MPE-based Exemption

Test Mode	Frequency Band (MHz)	Maximum conducted Power (dBm)	Maximum ERP Power (dBm)	Maximum (mW)	Limit (mW)	Result
2.4G BT	2402 ~ 2480	10.61	9.86	11.51	768	Pass
2.4G WIFI	2412 ~ 2462	17.51	17.32	56.36	768	Pass
5G WIFI	5180 ~ 5320	16.63	17.88	61.38	768	Pass
5G WIFI	5500 ~ 5700	16.68	18.23	66.53	768	Pass
5G WIFI	5745 ~ 5825	16.50	17.65	58.21	768	Pass

Power Density：

Standalone modes:

Test Mode	Frequency Band (MHz)	Maximum conducted Power (dBm)	Maximum ERP Power (dBm)	Power Density at R = 20 cm (W/m^2)	Power Density Limit (W/m^2)	Result
2.4G BT	2402 ~ 2480	10.61	9.86	0.023	10	Pass
2.4G WIFI	2412 ~ 2462	17.51	17.32	0.112	10	Pass
5G WIFI	5180 ~ 5320	16.63	17.88	0.122	10	Pass
5G WIFI	5500 ~ 5700	16.68	18.23	0.132	10	Pass
5G WIFI	5745 ~ 5825	16.50	17.65	0.116	10	Pass
RFID	13.56	N/A	-35.659	5.40543E-08	0.1	Pass

Simultaneous transmission:BT+2.4G WIFI+ RFID

Wireless Configure	Frequency Range (MHz)	Maximum conducted Power (dBm)	Maximum ERP Power (dBm)	Limit of Power Density S(W/cm^2)	Power Density S at R = 20cm (W/m^2)	Rate	Limit	Result
2.4G BT	2402 ~ 2480	10.61	9.86	10	0.0023	0.0135	1	Pass
2.4G WIFI	2412 ~ 2462	17.51	17.32	10	0.0112			
RFID	13.56	N/A	-35.659	0.1	5.40543E-07			

Simultaneous transmission:BT+5G WIFI+RFID

Wireless Configure	Frequency Range (MHz)	Maximum conducted Power (dBm)	Maximum ERP Power (dBm)	Limit of Power Density S(W/cm^2)	Power Density S at R = 20cm (W/m^2)	Rate	Limit	Result
2.4G BT	2402 ~ 2480	10.61	9.86	10	0.0023	0.0155	1	Pass
5G WIFI	5180 ~ 5825	16.68	18.23	10	0.0132			
RFID	13.56	N/A	-35.659	0.1	5.40543E-07			

Note：So the safe use distance of the EUT is 20cm, without any other radio equipment.

The End