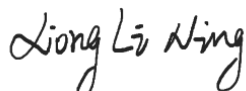


TEST REPORT

Applicant: Senic GmbH
Address: Senic GmbH, Leipziger Platz 15, 10117 Berlin, Germany.
Equipment Type: MoodPlay
Model Name: C-0004 (refer to section 2.3)
Brand Name: MoodPlay
FCC ID: 2BEJS-5JW7L94
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Dec. 27, 2023
Test Date: Jan. 09, 2024
Date of Issue: Mar. 06, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining**Checked by:** Xu Rui**Approved by:** Tolan Tu

(Testing Director)



Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Feb. 20, 2024</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Mar. 06, 2024</u>	<u>Update the address of applicant and manufacturer</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Senic GmbH
Address	Senic GmbH, Leipziger Platz 15, 10117 Berlin, Germany.

2.2 Manufacturer Information

Manufacturer	Senic GmbH
Address	Senic GmbH, Leipziger Platz 15, 10117 Berlin, Germany.

2.3 General Description for Equipment under Test (EUT)

EUT Name	MoodPlay
Model Name Under Test	C-0004
Series Model Name	C-0004-003, C-0004-014
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in case color. (this information provided by the applicant)
Hardware Version	MoodPlay_V1_RevB
Software Version	v1.0.45
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth, WIFI, NFC
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth, WIFI, NFC	
Frequency Range	Bluetooth	2400 ~ 2483.5 MHz
	WIFI	2400 ~ 2483.5 MHz
	NFC	13.56 MHz
Antenna Type	Bluetooth	PCB Antenna
	WIFI	PCB Antenna
	NFC	Coil Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Type	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 Devices:

According with FCC KDB 447498 D04, Appendix A, Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

When maximum available power each individual transmitting antenna within the same time averaging period is ≤ 1 mW, and the nearest parts of the antenna structures of the simultaneously operating transmitters are separated by at least 2 cm.

When the aggregate maximum available power of all transmitting antennas is ≤ 1 mW in the same time-averaging period.

For 300MHz to 6000Mhz

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

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 $\lambda/4$ 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.

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 P_{th} (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). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

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 $ERP_{20 \text{ cm}}$ 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

For 6000MHz to 10000Mhz

Frequencies above 300 kHz but at distances $R > \lambda/2\pi$, R is the antenna-person separation distance.
 λ =wavelength of transmitted signal.

Can calculate from the frequency of operation using $v=f*\lambda$

v =speed of light= $3*10^8$ m/s

f =frequency(Hz)

Primarily an MPE-based exclusion but also SAR-based where $\lambda/2\pi$ is $< 20\text{cm}$.

**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 ² / f
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.						

5 ASSESSMENT RESULT

5.1 Output Power

Mode	NFC
Field Strength (dBuV/m)	54.03
Conducted Power (dBm)	-24.77
Antenna Gain (dBi)	0.00
EIRP (dBm)	-24.77

Note 1: This table listed the worst case power value, please refer to BL-SZ23C1352-402 report for more details.

Note 2: Add the appropriate maximum ground reflection factor to the EIRP level (6dB for frequencies ≤ 30 MHz, 4.7dB for frequencies between 30MHz and 1000MHz, inclusive and 0dB for frequencies > 1000 MHz).

Note 3: Convert the resultant EIRP level to an equivalent electric field strength using the following relationship: $E = \sqrt{EIRP \cdot 20 \log D + 104.8}$ + maximum ground reflection factor

where:

E=electric field strength in dBuV/m

EIRP =equivalent isotropic radiated powerin dBm

D=specified measurement distance in meters

Mode	Bluetooth
Burst Conducted Power (dBm)	7.00
Duty Cycle	0.72%
Frame Conducted Power (dBm)	-14.43
Antenna Gain (dBi)	3.40
EIRP (dBm)	-11.03

Note: This table listed the worst case power value, please refer to POLV0172 Rev.2 report for more details.

Mode	WIFI
Peak Conducted Power (dBm)	27.00
Duty Cycle	0.20%
Conducted Power (dBm)	0.01
Antenna Gain (dBi)	3.40
EIRP (dBm)	3.41

Note: This table listed the worst case power value, please refer to POLV0172 Rev.2 report for more details.

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
NFC	[-26.00, -24.00]	[-26.00, -24.00]	[-28.15, -26.15]
Bluetooth	[-16.00, -14.00]	[-12.60, -10.60]	[-14.75, -12.75]
WIFI	[-1.00, 1.00]	[2.40, 4.40]	[0.25, 2.25]

Note 1: ERP= EIRP -2.15dB

Note 2: According KDB 447498 D04, used the greater of maximum conducted power or ERP to compare with the threshold value Pth.

5.3 RF Exposure Evaluation Result

Mode	Calculation Frequency (GHz)	Distance (mm)	Maximum power (dBm)	Maximum power (mw)	Threshold Power (mW)	Power / Limit	Verdict
NFC	0.01356	200	-24.00	0.004	1.00	0.00400	Pass
Bluetooth	2.48	200	-12.75	0.053	3060.00	0.00002	Pass
WIFI	2.462	200	2.25	1.679	3060.00	0.00055	Pass

5.4 Collocated Power Calculation

Mode	Calculation Frequency (GHz)	Power /Limit	$\Sigma(\text{Power / Limit})$ of NFC + Bluetooth + WIFI	Verdict
NFC	0.01356	0.00400	0.00457	Pass
Bluetooth	2.48	0.00002		
WIFI	2.462	0.00055		

Note:

- $\Sigma(\text{Power / Limit})$: This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for NFC + Bluetooth + WIFI.
- Both of the 2.4GHz/0.01356GHz can transmit simultaneously, the formula of calculated the Power is $CP1 / LP1 + CP2 / LP2 + \dots \text{etc.} < 1$
 CP = Calculation power
 LP = Limit of power
- The worst-case situation is 0.00457, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
- The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz, 13.56 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

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--END OF REPORT--