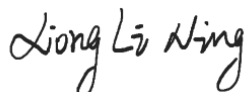


TEST REPORT

Applicant: TONDO SMART US INC.
Address: 2815 Elliott Avenue Suite 100, Seattle, Washington,
98121, United States
Equipment Type: SC220
Model Name: SC220-NS
Brand Name: Tondo
FCC ID: 2BK2F-SC220N
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Sep. 19, 2024
Test Date: Sep. 21, 2024 - Feb. 28, 2025
Date of Issue: May 16, 2025

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>May 12, 2025</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>May 16, 2025</u>	<u>Update manufacturer information</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	☐ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☒ 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	TONDO SMART US INC.
Address	2815 Elliott Avenue Suite 100, Seattle, Washington, 98121, United States

2.2 Manufacturer Information

Manufacturer	Tondo Smart Ltd
Address	5 HAYOTZRIM STREET 3rd floor OR-YEHUDA,6021819 ISRAEL

2.3 General Description for Equipment under Test (EUT)

EUT Name	SC220
Model Name Under Test	SC220-NS
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	SC220 Rev 1.1
Software Version	Modem is BG95-M3, with Quectel firmware version BG95M3LAR02A03_01.014.01.014 Nordic is nRF52840 with Tondo firmware 1.1.200
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	2G Network GPRS/EDGE 850/1900 4G Network FDD LTE-M1 Band 2/4/5/12/13/25/26/66/85 Bluetooth BLE GPS, GLONASS
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM, LTE, Bluetooth		
Frequency Range	GSM 850	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	GSM 1900	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE-M1 B2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE-M1 B4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE-M1 B5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE-M1 B12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE-M1 B13	TX: 777 ~ 787MHz	RX: 746 ~ 756 MHz
	LTE-M1 B25	TX: 1850 ~ 1915 MHz	RX: 1930 ~ 1995 MHz
	LTE-M1 B26	TX: 814 ~ 824 MHz	RX: 859 ~ 869 MHz
		TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE-M1 B66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2180 MHz
	LTE-M1 B85	TX: 698 ~ 716 MHz	RX: 728 ~ 746 MHz
	Bluetooth	2400 ~ 2483.5 MHz	
Antenna Type	WWAN	PIFA	
	Bluetooth	Ceramic antenna	
Exposure Category	General Population/Uncontrolled Exposure		
Product Type	Mobile Device		

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

3.2 Limit Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Devices:

CFR Title 47 §2.1091(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 D04 General RF Exposure Guidance v01 Limit

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).

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

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

5 ASSESSMENT RESULT

5.1 Output Power

GSM							
GSM850 Band	Burst Average Power(dBm)			Division Factors	Frame-Averaged power (dBm)		
Channel	128	190	251		128	190	251
GSM	32.71	32.38	32.59	9.19	23.52	23.19	23.40
GPRS (GMSK, 1-Slot)	32.71	32.38	32.59	9.19	23.52	23.19	23.40
GPRS (GMSK, 2-Slots)	31.32	30.96	31.22	6.13	25.19	24.83	25.09
GPRS (GMSK, 3-Slots)	29.06	29.41	29.29	4.42	24.64	24.99	24.87
GPRS (GMSK, 4-Slots)	28.30	28.06	28.54	3.18	25.12	24.88	25.36
EGPRS (8PSK, 1-Slot)	29.04	28.98	29.00	9.19	19.85	19.79	19.81
EGPRS (8PSK, 2-Slots)	28.13	27.99	28.07	6.13	22.00	21.86	21.94
EGPRS (8PSK, 3-Slots)	26.38	26.04	26.29	4.42	21.96	21.62	21.87
EGPRS (8PSK, 4-Slots)	25.03	24.76	24.94	3.18	21.85	21.58	21.76
GSM1900 Band	Burst Average Power(dBm)			Division Factors	Frame-Averaged power(dBm)		
Channel	512	661	810		512	661	810
GSM	29.23	29.52	30.20	9.19	20.04	20.33	21.01
GPRS (GMSK, 1-Slot)	29.23	29.52	30.20	9.19	20.04	20.33	21.01
GPRS (GMSK, 2-Slots)	28.21	28.47	28.70	6.13	22.08	22.34	22.57
GPRS (GMSK, 3-Slots)	26.15	26.44	26.76	4.42	21.73	22.02	22.34
GPRS (GMSK, 4-Slots)	24.75	25.00	25.35	3.18	21.57	21.82	22.17
EGPRS (8PSK, 1-Slot)	26.68	28.84	29.16	9.19	17.49	19.65	19.97
EGPRS (8PSK, 2-Slots)	27.22	27.46	27.84	6.13	21.09	21.33	21.71
EGPRS (8PSK, 3-Slots)	25.04	25.20	25.73	4.42	20.62	20.78	21.31
EGPRS (8PSK, 4-Slots)	23.79	23.95	24.42	3.18	20.61	20.77	21.24
Note: This table listed the worst case power value, please refer to BL-SZ2410552-501 report for more details.							

Mode	GSM	
	GSM850	GSM1900
Conducted Power (dBm)	25.36	22.57
Antenna Gain (dBi)	-1.01	-0.32
ERP/EIRP(dBm)	22.2	22.25
Note: This table listed the worst case power value, please refer to BL-SZ2410552-501 report for more details.		

LTE M1					
Mode	B2	B4	B5	B12	B13
Conducted Power (dBm)	21.13	21.03	21.04	21.05	20.64
Antenna Gain (dBi)	-0.32	-0.68	-1.01	-0.35	-1.70
ERP/EIRP (dBm)	20.81	20.35	17.88	18.55	16.79
Note: This table listed the worst case power value, please refer to BL-SZ2410552-501 report for more details.					

LTE M1					
Mode	B25	B26 (Part22)	B26 (Part90)	B66	B85
Conducted Power (dBm)	20.86	20.56	20.36	20.94	20.62
Antenna Gain (dBi)	-0.32	-1.01	-1.01	-0.45	-0.35
ERP/EIRP (dBm)	20.54	17.4	17.2	20.49	18.12
Note: This table listed the worst case power value, please refer to BL-SZ2410552-501 report for more details.					

Mode	Bluetooth
	BLE
Conducted Power (dBm)	2.32
Antenna Gain (dBi)	-1.35
ERP/EIRP(dBm)	0.97
Note: This table listed the worst case power value, please refer to BL-SZ2410552-601 report for more details.	

5.2 Tune-up power

Mode		Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
GSM	850	[24.00,26.00]	/	[20.85,22.85]
	1900	[22.00,24.00]	[21.00,23.00]	[18.85,20.85]
LTE M1	Band 2	[20.00,22.00]	[19.00,21.00]	[16.85,18.85]
	Band 4	[20.00,22.00]	[19.00,21.00]	[16.85,18.85]
	Band 5	[20.00,22.00]	/	[16.85,18.85]
	Band 12	[20.00,22.00]	/	[16.85,18.85]
	Band 13	[19.00,21.00]	/	[15.85,17.85]
	Band 25	[20.00,22.00]	[19.00,21.00]	[16.85,18.85]
	Band 26(Part22)	[19.00,21.00]	/	[15.85,17.85]
	Band 26(Part90)	[19.00,21.00]	/	[15.85,17.85]
	Band 66	[20.00,22.00]	[19.00,21.00]	[16.85,18.85]
	Band 85	[19.00,21.00]	/	[16.85,18.85]
Bluetooth		[1.00,3.00]	[0.00,2.00]	[-2.15,-0.15]
Note1: ERP= EIRP -2.15dB.				
Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.				

5.3 RF Exposure Evaluation Result

Evolution mode	Frequency (MHz)	Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
GSM850	849	26.00	398.11	200	1731.96	0.230	Pass
GSM1900	1910	24.00	251.19	200	3060.00	0.082	Pass
LTE M1 Band 2	1910	22.00	158.49	200	3060.00	0.052	Pass
LTE M1 Band 4	1755	22.00	158.49	200	3060.00	0.052	Pass
LTE M1 Band 5	849	22.00	158.49	200	1731.96	0.092	Pass
LTE M1 Band 12	716	22.00	158.49	200	1460.64	0.109	Pass
LTE M1 Band 13	787	21.00	125.89	200	1605.48	0.078	Pass
LTE M1 Band 25	1915	22.00	158.49	200	3060.00	0.052	Pass
LTE M1 Band 26(Part22)	849	21.00	125.89	200	1731.96	0.073	Pass
LTE M1 Band 26(Part90)	824	21.00	125.89	200	1680.96	0.075	Pass
LTE M1 Band 66	1780	22.00	158.49	200	3060.00	0.052	Pass
LTE M1 Band 85	716	21.00	125.89	200	1460.64	0.086	Pass
Bluetooth	2480	3.00	2.00	200	3060.00	0.001	Pass

5.1 Collocated Power Calculation

Evolution mode	Frequency(MHz)	Power /Limit	$\Sigma(\text{Power / Limit})$ of WWAN + Bluetooth	Verdict
GSM 850	824 ~ 849MHz	0.230	0.231	Pass
Bluetooth	2400 ~ 2483.5 MHz	0.001		

Note:

1. $\Sigma(\text{Power / Limit})$: This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for WWAN+ Bluetooth.
2. Both of the WWAN/Bluetooth 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
3. The worst-case situation is 0.231, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz and 824 MHz ~ 849 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.

5.2 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--