

FCC RF Exposure Evaluation Report

Test Report Number SUB-24041751-C-FCC-MPE

FCC ID 2AS4H-BLINC3

Applicant Subeca, Inc.

Applicant Address 4514 Cole Avenue Suite 600, Dallas, TX 75205

Product Name Subeca BLINC S2

Model (s) BLINC S2

Date of Receipt 06/11/2024

Date of Test 06/15/2024- 08/08/2024

Report Issue Date 08/16/2024

Test Standards 47 CFR §1.1307(b), 47 CFR §1.1310

Test Result PASS



Issued by:

Vista Compliance Laboratories

1261 Puerta Del Sol, San Clemente, CA 92673 USA

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REVISION HISTORY

Report Number	Version	Description	Issued Date
SUB-24041751-C-FCC-MPE	01	Initial report	08/16/2024

TABLE OF CONTENTS

1	GENERAL INFORMATION.....	4
1.1	Applicant.....	4
1.2	Product information.....	4
1.3	Test standard and method	4
2	TEST SITE INFORMATION.....	5
3	TEST RESULTS.....	6
3.1	Limits for Maximum Permissible Exposure (MPE).....	6
3.2	MPE Calculation Formula	6
3.3	Classification	6
3.4	Antenna Gain	6
4	TEST RESULTS FOR EXTERNAL ANTENNA.....	7
4.1	Test Results for Chip Antenna.....	7

1 General Information

1.1 Applicant

Applicant	Subeca, Inc.
Applicant address	4514 Cole Avenue Suite 600, Dallas, TX 75205
Manufacturer	Subeca, Inc.
Manufacturer Address	4514 Cole Avenue Suite 600, Dallas, TX 75205

1.2 Product information

Product Name	Subeca BLINC S2
Product Description	Subeca BLINC S2
Model Number	BLINC S2
Family Models	N/A
Serial Number	N/A
Frequency Band	BLE: 2402-2480MHz LoRA: 902.3-914.9MHz Sidewalk:902.5-926.5 MHz
Type of modulation	GFSK (BLE), LoRA, SubG-CSS (Sidewalk)
Equipment Class	DTS, DSS
Antenna Information	For BLE: P/N: Molex 1461530100 (BLE Balance Flex antenna), peak gain: 3 dBi P/N: Abracon AMCA31-2R450G-S1F-T3 (Chip Antenna), Peak gain: 2.3dBi For 900MHz: P/N: Taoglas PC91.07.0100A, db(915 MHz PCB antenna), peak gain: 2.67 dBi P/N: Taoglas iLA.09 (915 MHz Ceramic loop antenna), Chip Antenna, Peak gain: 1.57 dBi
Clock Frequencies	N/A
Input Power	DC 3.6V
Power Adapter Manufacturer/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	BLE and 900MHz can transmit simultaneously
Additional Info	EUT supports BLE and 900 MHz LoRA/Sidewalk protocols. The 900MHz LoRA is under DSS equipment class as hopping device; the 900MHz Sidewalk is under DTS equipment class as digital modulation device. EUT is soldered onto a development board for testing purpose.

1.3 Test standard and method

Test standard	47 CFR §1.1307(b), 47 CFR §1.1310
Test method	47 CFR §1.1307(b), 47 CFR §1.1310

2 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
RF Testing	23.5°C	55.1%	996 mbar
Radiated Emission Testing	23.5°C	55.1%	996 mbar

3 Test Results

3.1 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)
Limits For General Population / Uncontrolled Exposure				
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

f = Frequency in MHz; *Plane-wave equivalent power density

3.2 MPE Calculation Formula

Equation: $S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

Where, S = Power Density

P = Power Input to Antenna

G = Antenna Gain

R = distance to the center of radiated antenna in cm

3.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as a Mobile Device.

3.4 Antenna Gain

EUT has two types of antennas: one is an FPC antenna, which connects to the main board through unique U.FL RF connectors. One is a chip antenna, which is assembled to the PCB.

For BLE:

P/N: Molex 1461530100 (BLE Balance Flex antenna), peak gain: 3 dBi

P/N: Abracon AMCA31-2R450G-S1F-T3 (Chip Antenna), Peak gain: 2.3 dBi

For 900MHz:

P/N: Taoglas PC91.07.0100A, db(915 MHz PCB antenna), peak gain: 2.67 dBi

P/N: Taoglas iLA.09 (915 MHz Ceramic loop antenna), Chip Antenna, Peak gain: 1.57 dBi

4 Test Results

4.1 Result for External Antenna

Radio	Frequency (MHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	Separation distance (cm)	Power Density (mW/ cm ²)	MPE Limit (mW/ cm ²)
BLE	2440	9.131	3	20	0.00325	1.627
LoRA	902.3	20.45	2.67	20	0.04081	0.6015
Sidewalk	902.5	20.30	2.67	20	0.03942	0.6016

4.2 Results for Chip Antenna

Radio	Frequency (MHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	Separation distance (cm)	Power Density (mW/ cm ²)	MPE Limit (mW/ cm ²)
BLE	2440	9.131	2.3	20	0.00277	1.627
LoRA	902.3	20.45	1.57	20	0.03168	0.6015
Sidewalk	902.5	20.30	1.57	20	0.03060	0.6016

BLE and LoRa can transmit simultaneously.

The ratio = $0.00277/1 + 0.02414/0.6015 = 0.042903 < 1.0$

The above results show that the device complies with the MPE requirement. Considering the gain values for external antenna are greater than the chip antennas, the MPE results for external antenna is the worst case scenario and covers the the mixed use of external antenna and chip antenna.

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