

**COMPLIANCE WORLDWIDE INC.
TEST REPORT 185-22RF**

In Accordance with the Requirements of
Federal Communications Commission CFR Title 47 Part 2.1091:2021
Radio Frequency Exposure Evaluation: Mobile Devices
Innovation, Science and Economic Development Canada
RSS-102, Issue 5 + Amendment 1:2021
Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus

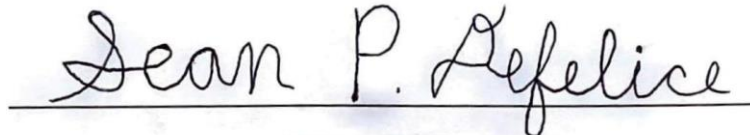
Issued to
SimpliSafe Inc
294 Washington Street, 9th Floor
Boston, MA 02108

for the
Base Station
Model: SSBS3
433.42 MHz

FCC ID: U9K-BS3001
IC: 29902-BS3001

Report Issued on May 6, 2022

Tested by



Sean P. Defelice

Reviewed by



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1. Scope

This test report certifies that the Simplisafe, Inc, Base Station Model SSBS3 with 433.42 MHz Transmitter, as tested, meets the FCC Part 2.1091 requirements and the ISED RSS-102, Issue 5 Section 2.5.2 requirements exempting the device from a SAR Evaluation.

The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

2. Product Details

- 2.1. Manufacturer:** SimpliSafe
- 2.2. Model Number:** SSBS3
- 2.3 Serial Number:** 0045D022
- 2.4 Description of EUT:** The Base Station is the brains of your system. When one sensor or camera detects danger, it sends a signal to the Base Station, which sounds the siren and notifies you immediately. If it's unplugged or the power goes out, the 24-hour backup battery keeps you covered.
- 2.5 Power Source:** Battery 4.8 VDC, External AC Power Supply 6.5 VDC
- 2.6 Hardware Revision:** C
- 2.7 Software/Firmware Revision:** 2.9.16
- 2.8. Modulation Type:** Frequency Shift Keying (2FSK)
- 2.9. Operating Frequency:** 433.42 MHz
- 2.10. EMC Modifications:** None

3. Product Configuration

3.1. Operational Characteristics & Software

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Volts	Freq (Hz)	Description/Function
SimpliSafe	SSBS3	0045D022	6.5	VDC	Base Station
GangQi Electronic Co	GQ12-065160-FU	None	120	60	Switching Power Supply
Espressif Systems	ESP32-WROOM32				FCC ID: 2AC7Z-ESPWROOM32 IC: 21098-ESPWROOM32
Quectel Wireless Solutions	BG95-M1				FCC ID: XMR2020BG95M1 IC: 10224A-2020BG95M1

3.3. Support Equipment

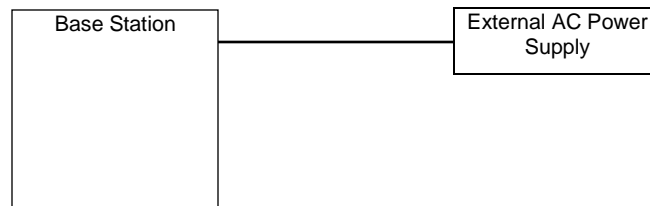
Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
None					

3. Product Configuration (continued)

3.4. Equipment Cables

Cable Type	Length	Shield	From	To
Power Cable	3M	No	EUT	Power Supply

3.5. Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment and Software Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz - 7GHz ¹	Rohde & Schwarz	ESR7	101156	10/26/2023	2 Years
EMI Test Receiver, 10 Hz - 7GHz ¹	Rohde & Schwarz	ESR7	101770	7/23/2023	2 Years
Spectrum Analyzer, 2 Hz to 26.5 GHz ²	Rohde & Schwarz	FSW26	102057	6/24/2023	2 Years
Spectrum Analyzer, 9 kHz to 40 GHz ³	Rohde & Schwarz	FSV40	100899	8/12/2022	2 Years
Spectrum Analyzer 10 Hz – 40 GHz ⁴	Rohde & Schwarz	FSVR40	100909	9/18/2022	2 Years
Biconilog Antenna, 30 MHz - 2 GHz	Sunol Sciences	JB1	A050913	7/1/2023	2 Years
Digital Barometer	Control Company	4195	ID236	1/27/2024	2 Years

¹ ESR7 Firmware revision: V3.48 SP3, Date installed: 09/30/2020

² FSW26 Firmware revision: V4.71 SP1, Date installed: 11/16/2020

³ FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016

⁴ FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016

Previous V3.48 SP2, installed 07/23/2020.

Previous V4.61, installed 08/11/2020.

Previous V2.30 SP1, installed 10/22/2014.

Previous V2.23, installed 10/22/2014.

4. Measurements Parameters (continued)

4.2. Software Used to Perform Test

Manufacturer	Software Description	Title or Model #	Rev.	Report Sections
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0	Used to process conducted emissions data

4.3 Measurement & Equipment Setup

Test Dates:	5/2/2022, 5/3/2022
Test Engineer:	Sean Defelice
Site Temperature (°C):	19.5
Relative Humidity (%RH):	32
Frequency Range:	30 kHz to 5 GHz
Measurement Distance:	3 Meters and 1 Meter
EMI Receiver IF Bandwidth:	200 Hz (30 kHz – 150 kHz) 9 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1 GHz) 1 MHz (>1 GHz)
EMI Receiver Avg Bandwidth:	≥ 3 * RBW or IF(BW)
Detector Functions:	Peak, Quasi-Peak and Average

4.4 Test Procedure

Test measurements were made in accordance FCC Part 15.231: Periodic operation within the bands 40.66 – 40.70 MHz and above 70 MHz using ANSI C63.10: 2013, American National Standard for Methods for Unlicensed Wireless Devices.

In addition, FCC KDB 447498 D01 General RF Exposure Guidance v06, October 23, 2015 are referenced for the testing and requirements detailed in this report.

Testing was performed in accordance with the requirements detailed in ISED RSS-210, Annex II using ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and ISED RSS-GEN, Issue 5 Amendment 1 (March 2019) and Amendment 2 (February 2021).

In addition, ISED RSS-102, Issue 5, Amendment 1 (February 2, 2021) are referenced for the testing and requirements detailed in this report.

5. Choice of Equipment for Test Suits

5.1. Choice of Model

This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.2. Presentation

The test sample was tested complete with all required ancillary equipment. Refer to Section 3 of this report for the product equipment configuration.

5.3. Choice of Operating Frequencies

The transmitter in the unit under test utilizes a single operating frequency at approximately 433.42 MHz

Test Mode Mode 1: Transmit mode
Description: Automatic FSK message every 2 seconds
Radio PA Setting: -20dB
Data Rate: 4.8kbps
Frequency Deviation: 26 kHz
Modulation: 2FSK
Maximum Packet Length (ms): 570

Mode 2: Normal mode
Description: Representative of Production FW
Radio PA Setting: -20dB
Data Rate: 4.8kbps
Frequency Deviation: 26 kHz
Modulation: 2FSK
Typical Packet Length (ms): 570

6. Measurement Data (continued)

6.1. Radiated Field Strength of Fundamental (15.231, Section (b), RSS-210 A1.1.2(a))

Requirement: The 3 meter field strength of the fundamental emissions from intentional radiators operating within the 260-470 MHz frequency bands shall comply with the limits specified in FCC Part 15.231, Section (b). The limit is based on a linear interpolation of the following field strength:

Fundamental Frequency (MHz)	Field Strength of Fundamental (µV/m)
260-470	3,750 to 12,500 µV/m

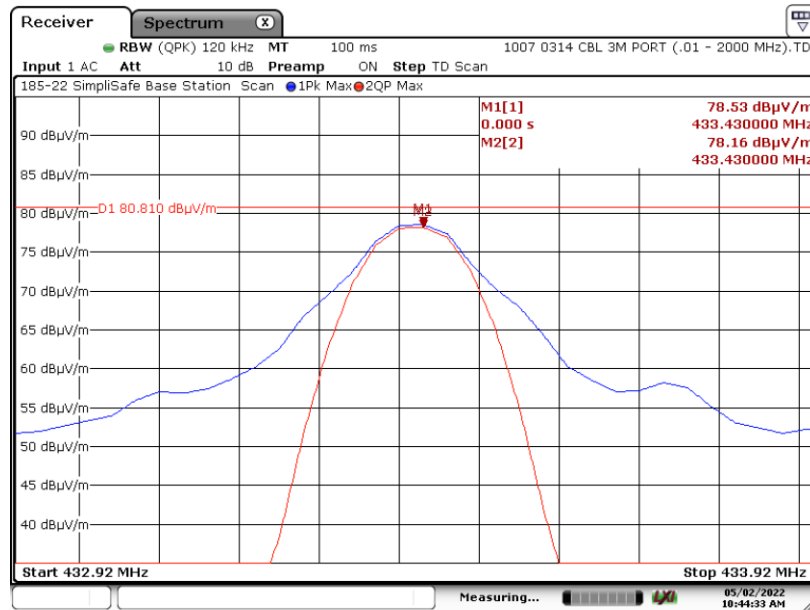
Fundamental Limit at 433.42 MHz = 10,976 µV/m = 80.81 dBµV/m

Test Note: A Quasi Peak Detector was used to compare against the average limits due to the longest duration of a digital transmission.

Conclusion: Compliant - The radiated field strength of the device under test complies with the requirements detailed in FCC Part 15.231, Section (b) and RSS-210 A1.1.2(a).

6.1.1. Worst Case Radiated Field Strength of Fundamental

Frequency (MHz)	Amplitude ¹ (dBµV/m)		Limit (dBµV/m)		Margin (dB)		Ant Polarity	Ant Height	Turntable Azimuth	Result
	Peak	Avg	Peak	Avg	Peak	Avg				
433.43	78.53	78.16	100.81	80.81	-27.28	-2.65	V	111	324	Compliant



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6. Measurement Data (continued)

6.2. Public Exposure to Radio Frequency Energy Levels (FCC Part 2.1091:2020)

6.2.1. 2.1091 Requirements

Requirement: Reference CFR 2.1091: 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.

RF Exposure of simultaneously operated radios within the host which is considered a Mobile Device.

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0 , according to calculated/estimated, numerically modeled, or measured field strengths or power density. The MPE ratio of each antenna is determined at the minimum *test separation distance* required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to the MPE limit at the test frequency

FCC Part 1.1310:2020 Table 1 Limits for General Population / Uncontrolled Exposure

Power Density Limit from 300 to 1500 MHz is $f/1500$, where f is in MHz

Power Density Limit from 1500 to 100,000 MHz is 1.0

In addition to the EUT, the device contains and Espressif ESP32-WROOM-32 802.11b/g/n and BLE Radio and a Quectel BG95-M1 CAT-M1 Radio. The highest powers from each of these radios including tune up tolerances were used in the table below.

	Frequency (MHz)	MPE Distance (cm)	DUT Field Strength at 3M (dB μ V/m)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	DUT Output Power (mW)	Power Density	Limit (mW/cm ²)	Result
							(mW/cm ²)		
		(1)		(2)	(3)		(4)	(5)	
EUT	433.42	20	73.53	-21.67		0.00681	0.00000135	0.29	Compliant
CAT-M1	1914.30	20		22.00	2	158.489	0.04997239	1.00	Compliant
WiFi	2412	20		17.00	1	50.12	0.01255250	1.00	Compliant
						SUM	0.0625	1.00	Compliant

Result: Compliant - The device under test meets the exclusion requirement detailed in FCC OET 447498, dated October 23, 2015 Clause 7.2 for simultaneous operation.

6. Measurement Data (continued)

6.3. Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (RSS-102, Issue 5 + A1:2021)

6.3.1. RSS-102 Issue 5 Requirements

Requirement: RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834W}$ (adjusted for tune-up tolerance), where f is in MHz

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.2. If the equipment under test (EUT) meets the requirements of sections 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power.

In addition to the EUT, the device contains and Espressif ESP32-WROOM-32 802.11b/g/n and BLE Radio and a Quectel BG95-M1 CAT-M1 Radio. The highest powers from each of these radios including tune up tolerances were used in the table below.

	Frequency	Separation Distance	Maximum Power	Maximum Power	RSS-102 Exemption Limit	Result
	(MHz)	(cm)	(mW)	(W)	(W)	
EUT	433.42	≥ 20	0.00681	0.00000681	0.83	Compliant
CAT-M1	700.50	≥ 20	134.00	0.13400000	1.15	Compliant
WiFi	2412	≥ 20	152.00	0.15200000	2.68	Compliant
			SUM	0.20861485		

Result: Compliant, the sum of the three radios is less than the lowest exemption level in RSS-102.