Reliant MSO, LLC

RF EXPOSURE TEST REPORT

SCOPE OF WORK
EMISSIONS TESTING – SAFEST

REPORT NUMBER
105935432BOX-002_RF Exposure

ISSUE DATE
10/07/2024

[REVISED DATE]
Original Issue

DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. October 2022

RF EXPOSURE TEST REPORT

(FULL COMPLIANCE)

Report Number: 105935432BOX-002_RF Exposure
Project Number: G105935432

Report Issue Date: 10/07/2024

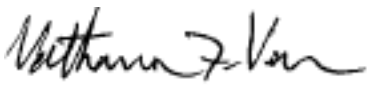
Model(s) Tested: V1.1
Model(s) Partially Tested: None
Model(s) Not Tested but declared equivalent by the client: None

Standards: FCC Title 47 CFR Part 1.1310(e)(1) Limits for Maximum Permissible Exposure (MPE)

Tested by:
Intertek
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
Reliant MSO, LLC
100 Front Street
Worcester, MA 01608
USA

Report prepared by



Vathana Ven / Sr. EMC Staff Engineer

Report reviewed by

Kouma Sinn / Sr. EMC Staff Engineer

Table of Contents

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	Power Density Calculation FCC Title 47 CFR Part 1.1310(e)(1) Limits for Maximum Permissible Exposure (MPE) (Limits for General Population / Uncontrolled Exposure)	Pass
6	Revision History	--

3 Client Information

This EUT was tested at the request of:

Client: Reliant MSO, LLC
100 Front Street
Worcester, MA 01608
USA

Contact: Larry Garber
Telephone: 508-527-3803
Fax: 774-261-1108
Email: Lawrence.Garber@ReliantMedicalGroup.org

4 Description of Equipment Under Test and Variant Models

Manufacturer: Violet Manufacturing Department, Reliant MSO, LLC
100 Front Street
Worcester, MA 01608
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
SAFEST	Violet Manufacturing Department, Reliant MSO, LLC	V1.1	1

Receive Date:	09/26/2024
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
64GHz mmWave wall-mounted radar device to monitor and wirelessly report activity of people exclusive in dry indoor locations. The device contained the wireless radio module, FCC ID: 2AC7Z-ESPWROOMDA

Radio/Receiver Characteristics	
Frequency Band(s)	60.75-63.98 GHz
Modulation Type(s)	FMCW
Peak Equivalent Isotropic Radiated Power (EIRP)	-3.77 dB(m)
Peak Conducted Output Power	-11.51 dB(m)
Test Channels	Continuous Sweep
Occupied Bandwidth	3.198 GHz
Frequency Hopper: Number of Hopping Channels	N/A
Frequency Hopper: Channel Dwell Time	N/A
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	N/A
Equipment Type	Standalone
Antenna Type and Gain	Integral antenna, 7.74 dBi

5 Power Density Calculation

5.1 FCC RF Exposure Limits

Title 47 CFR Part 1.1310(d)(3):

At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b) of this part.

TABLE 1 TO § 1.1310(E)(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)	Averaging time (minutes)
(i) LIMITS FOR OCCUPATIONAL/CONTROLLED EXPOSURE				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

*f = frequency in MHz. * = Plane-wave equivalent power density.*

5.2 Method

An MPE evaluation was performed in order to show that the device was compliant with FCC §2.1091. The maximum power density was calculated for each transmitter at a separation distance of 20 cm. The calculation was performed using the maximum gain from the internal and external antennas declared by the manufacturer.

The maximum permissible exposure (MPE) is predicted by using the following equation:

$$S = PG/4\pi R^2$$

where: S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

5.3 Results

The calculated maximum power density at 20cm was less than or equal to the limits for general population exposure in FCC Title 47 CFR Part 1.1310(e)(1).

Additionally, to demonstrate compliance during simultaneous transmission, the worst-case power density to limit ratios for each transmitter were summed. Since the sum was less than 1 that combination of transmitters is deemed to comply with the simultaneous transmission RF exposure criteria.

Band	Highest Output Power (dBm)	Highest Output Power (mW)	Antenna gain (dBi)	Numeric antenna gain	Power density at 20cm (mW/cm^2)	Limit (mW/cm^2)	**MPE / Limit Ratio (for Co-Location)**
Simultaneous transmission							
60 GHz Radio*	-11.51	0.070632	7.74	5.943	0.000084	1.0	0.000084
WiFi 2.4 GHz**	19.5	89.13	1.06	1.276	0.024000	1.0	0.023000
							Total = 0.02308
Simultaneous transmission							
60 GHz Radio*	-11.51	0.070632	7.74	5.943	0.000084	1.0	0.000084
BT4.2, 2.4 GHz**	9.0	7.94	1.06	1.276	0.002	1.0	0.002
							Total = 0.002084
Simultaneous transmission							
60 GHz Radio*	-11.51	0.070632	7.74	5.943	0.000084	1.0	0.000084
BLE, 2.4 GHz**	9.0	7.94	1.06	1.276	0.002	1.0	0.002
							Total = 0.002084

Note 1: *The information was taken from test report #105935432BOX-002.
Note 2: ** The information was taken from the client's test report #C21T00111-SAR01-V02.
Note 3: Only the 60 GHz radio and either one of the above radios can transmit simultaneously.

Product Standard: FCC Title 47 CFR Part 1.1310(e)(1)				Limit applied: 1.0 mW/cm^2 Pretest Verification w/BB source: Yes			
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
09/26/2024	Vathana Ven	N/A	120VAC 60Hz	Continuous sweep	24	48	1010

Deviations, Additions, or Exclusions: None

6 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	10/07/2024	105935432BOX-002_RF Exposure	VFV	KPS	Original Issue