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Intertek
731 Enterprise Drive
Lexington, KY 40510

Tel 859 226 1000
Fax 859 226 1040

www.intertek.com

Ademco Inc. MPE REPORT

SCOPE OF WORK

MPE CALCULATION
ON THE SMOKE / CO DETECTOR

REPORT NUMBER

104486676LEX-003.1

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MPE TEST REPORT

Report Number: 104486676LEX-003.1

Project Number: G104486676

Report Issue Date: 9/23/2021

Product Tested: Smoke / CO Detector

Model Number Tested: PROSIXCMBOVC

Models Not Tested but Declared Equivalent

by Client: SIXCOMBOVA, PROSIXCMBOV

Standards: FCC Part 1.1310 Limits for Maximum
Permissible Exposure (MPE)

RSS-102 Issue 5 RF Field Strength Limits for
Devices Used by the General Public

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510
USA

Client:
Ademco Inc.
2 Corporate Center Drive
Suite 100
Melville, NY 11747
USA

Report prepared by



Bryan Taylor, Team Leader

Report reviewed by



Brian Lackey, Staff Engineer

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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
8	FCC Part 1.1310 Limits for Maximum Permissible Exposure (MPE) (Limits for General Population / Uncontrolled Exposure)	Pass
	RSS-102 Issue 5 RF Field Strength Limits (For Devices Used by the General Public)	Pass



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Ademco Inc.
Address:	2 Corporate Center Drive Suite 100 Melville, NY 11747 USA
Contact:	Divya Venkat
Telephone:	+1(763) 954-4816
Email:	Divya.venkat@resideo.com
Manufacturer Information	
Manufacturer Name:	Ademco Inc.
Manufacturer Address:	2 Corporate Center Drive Suite 100 Melville, NY 11747 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Smoke / CO Detector
Model Number	PROSIXCMBOVC
Supported Transmit Bands	RF6 2405 – 2475MHz
Receive Date	7/10/2021
Test Start Date	7/14/2021
Test End Date	8/1/2021
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	3V Battery
Antenna	PCB Trace Antennas. Ant1 Gain: 2.75dBi Ant2 Gain: 2.49dBi The Antenna gains used in the MPE calculations were provided by Ademco Inc. and may affect compliance
Test Channels / Frequencies	Channel 11 2405MHz Channel 19 2445MHz Channel 25 2475MHz
Description of Equipment Under Test (provided by client)	
The Smoke / CO Detector is a battery powered device with wireless (RF6) connectivity to home security panels.	

4.1 Variant Models:

The following variant SKUs were covered by the testing shown in this report: SIXCOMBOVA, PROSIXCMBOV and PROSIXCMBOVC. According to Ademco Inc. all three SKUs are electrically identical with the only difference being purely marketing and ordering purposes.



5 FCC Limits

§ 1.1310: The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Part 1.1310 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)
(A) Limits for Occupational/Controlled Exposures				
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
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) 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

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

**6 RSS-102 Issue 5 Exposure Limits:**

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).



7 Test Procedure

An MPE evaluation for was performed in order to show that the device was compliant with the general population exposure limits from FCC §2.1091 and RSS-102 Issue 5. The maximum power density was calculated for each transmitter band at a separation distance of 20cm using the maximum declared output power including tune up tolerance.

For each transmitter the maximum RF exposure at a 20 cm distance using the formula:

$$\text{Conducted Power}_{mW} = 10^{\text{Conducted Power}(dBm)/10}$$

$$\text{PowerDensity} = \frac{\text{Conducted Power}_{mW} \times \text{Ant.Gain}}{4\pi \times (20_{cm})^2}$$

The Smoke / CO Detector has two transmit paths that do not transmit simultaneously. The MPE calculation was performed on each transmit path an the results for each presented below.

**8 Results:**

The calculated maximum power density at 20cm distance was equal to or less than the required limits for general population exposure for FCC Part 1.1310 and RSS-102 Issue 5.

FCC MPE Data

Duty Cycle	100 (%)						
Separation Dist.	20 (cm)						
Operating Mode	Frequency (MHz)	Declared Max Cond. Power (Inc. Tolerance) (dBm)	Duty Cycle Adjusted Cond. Output Power (dBm)	Antenna Gain (dB)	MPE Value (mW/cm ²)	MPE Limit (mW/cm ²)	Margin to Limit (mW/cm ²)
RF6 Antenna Path 1	2405	20.78	20.78	2.75	0.0448	1.0000	0.9552
RF6 Antenna Path 2	2405	20.13	20.13	2.49	0.0364	1.0000	0.9636

RSS-102 Issue 5 MPE Data

Duty Cycle	100 (%)						
Separation Dist.	20 (cm)						
Operating Mode	Frequency (MHz)	Declared Max Cond. Power (Inc. Tolerance) (dBm)	Duty Cycle Adjusted Cond. Output Power (dBm)	Antenna Gain (dB)	MPE Value (W/m ²)	MPE Limit (W/m ²)	Margin to Limit (W/m ²)
RF6 Antenna Path 1	2405	20.78	20.78	2.75	0.4485	5.3554	4.9069
RF6 Antenna Path 2	2405	20.13	20.13	2.49	0.3637	5.3554	4.9917



9 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	9/23/2021	104486676LEX-003.1	BCT	BZ	Original Issue