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Assessment Report

REP015384-11ARFWL

Type of assessment:

MPE Calculation report

Manufacturer:

Alarm.com, Inc.

Model:

ADC-VDB755P

Product Marketing Name (PMN):

PoE Video Doorbell

FCC ID:

YL6VDB755P

IC certification number:

9111A-VDB755P

Specification:

- ◆ FCC 47 CFR Part 1 Subpart I, §§1.1307, 1.1310
- ◆ FCC 47 CFR Part 2 Subpart J, §2.1091
- ◆ FCC KDB 447498 D01 General RF Exposure Guidance v06
- ◆ ISED Canada RSS-102 Issue 5 Amendment 1, (February 2021)

RSS-102 Annex B - Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex A is correct; that the Technical Brief was prepared, and the information contained therein is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed; and that the device meets the SAR and/or RF field strength limits of RSS-102.

Date of issue: December 13, 2023

James Cunningham, EMC/WL Manager

Prepared by

Signature



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ISED Test Site	2040B-3

Prepared by	James Cunningham, EMC/WL Manager
Date	December 13, 2023
Signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

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Section 1 Evaluation summary

1.1 MPE calculation for simultaneous transmission

1.1.1 References, definitions, and limits

FCC §2.1091(d)

- (2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part, except for portable devices as defined in §2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in §2.1093.

Table 1.1-1: 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
300–1500			f / 300	<6
1500–100000			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
300–1500			f / 1500	<30
1500–100000			1.0	<30

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

RSS-102, Section 2.5.2

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:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- 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 $0.0131 f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
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 (cm or m)

1.1.2 EUT technical information

	Transmitter 1 (NFC)	Transmitter 2 (Bluetooth Low Energy)	Transmitter 3 (Radar)
Prediction frequency	13.56 MHz	2402 MHz	24.00 GHz
Antenna type	Integrated	Integrated	Integrated
Antenna gain	0 dBi ¹	2.5 dBi	2 dBi
Maximum transmitter conducted power	-47.61 dBm (0.000017338 mW) ²	6.4 dBm (4.365 mW) ³	21.37 dBm (137.0882 mW) ⁴
Prediction distance	20 cm	20 cm	20 cm

Notes:

- NFC antenna gain is unknown. Measured data is radiated so strictly, the gain is not required for the assessment.
- Maximum transmitter power for NFC transmitter computed from measured field strength in report REP015384-1R1TRFWL. 49.77 dBμV/m at 3m measurement distance. Converted to dBm as: ERP (dBm) = Field strength at 3m (dBμV/m) – 97.38 = 49.77 dBμV/m – 97.38 = -47.61 dBm.
- Maximum transmitter power for BLE transmitter taken from report REP015384-8TRFWL.
- Maximum transmitter power for radar transmitter computed from measured field strength in report REP015384-5R1TRFWL. 118.60 dBμV/m at 3m measurement distance. Converted to dBm as: EIRP (dBm) = Field strength at 3m (dBμV/m) – 95.23 = 118.60 dBμV/m - 95.23 = 23.37 dBm EIRP. Conducted power = EIRP – Antenna gain = 23.37 – 2 = 21.37 dBm

1.1.3 MPE calculation

	Transmitter 1	Transmitter 2	Transmitter 3
Fundamental transmit (prediction) frequency:	13.56 MHz	2402 MHz	24000 MHz
Maximum measured conducted peak output power:	-47.61 dBm	6.4 dBm	21.37 dBm
Cable and/or jumper loss:	0 dB	0 dB	0 dB
Maximum peak power at antenna input terminal:	-47.61 dBm	6.4 dBm	21.37 dBm
Tx On time:	1.000 ms	1.000 ms	1.000 ms
Tx period time:	1.000 ms	1.000 ms	1.000 ms
Average factor:	100 %	100 %	100 %
μm calculated average power at antenna input terminal:	1.7E-05 mW	4.36516 mW	137.088 mW
Single Antenna gain (typical):	0 dBi	2.5 dBi	2 dBi
Number of antennae:	1	1	1
Total system gain:	0.00 dBi	2.50 dBi	2.00 dBi
Limit for uncontrolled exposure at prediction frequency:	ISSED limit: 0.200000 mW/cm ² FCC limit: 1.000000 mW/cm ²	ISSED limit: 0.535080 mW/cm ² FCC limit: 1.000000 mW/cm ²	ISSED limit: 1.000000 mW/cm ² FCC limit: 1.000000 mW/cm ²
Minimum calculated prediction distance for compliance:	20 cm	20 cm	20 cm
Typical (declared) distance:	20 cm	20 cm	20 cm
Average power density at prediction frequency:	0.000000 mW/cm ² 0.000000 W/m ²	0.001544 mW/cm ² 0.015443 W/m ²	0.043225 mW/cm ² 0.432245 W/m ²
Combined MPE compliance:	77.63 dB	25.40 dB	13.64 dB
Margin of Compliance:	77.63 dB	25.40 dB	13.64 dB
Maximum allowable antenna gain:	77.63 dBi	27.90 dBi	15.64 dBi
Average power density to MPE limit ratio:	0.000	0.003	0.043
Total sum of ratios for FCC:	0.045		
Total sum of ratios for ISSED:	0.046		
Maximum allowed sum of ratios:	1		

1.1.4 Verdict

The calculation is below the limit; therefore, the product is passing the RF Exposure requirements for the declared distance.

End of the test report