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RF Exposure Compliance – MPE Calculation Report

Applicant company:	Zoll Manufacturing, Corporation
Model:	LifeVest LV5100
FCC Identification:	FCC ID: W56LV51C2BW0
Product type:	Mobile or Fixed Device
Device category:	Consumer Device for General Population/Uncontrolled Exposure
Date of issue:	March 13, 2026
Compliance Specifications:	FCC 47 CFR Part 1 Subpart I, §§1.1307, 1.1310 FCC 47 CFR Part 2 Subpart J, §§2.1091, 2.1093 FCC KDB 447498 D01 General RF Exposure Guidance v06 FCC KDB 865664 D01 RF Exposure Procedures and Equipment Authorization Policies

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The test results included in this report are within the scope of this accreditation.
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Test locations of Nemko Canada Inc.

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Test site identifier - FCC	CA2040	CA2041	CA0101
Test site identifier – ISED Canada	2040A-4	2040G-5	24676
ANAB File Number	AT-3195	AT-3193	AT-3194

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Limits of responsibility

The results presented in this report apply solely to the specific device model tested and are valid only for the operating conditions and installation requirements specified herein. Testing was conducted in accordance with ISO/IEC 17025:2017 requirements, and all results fall within the scope of Nemko Canada's accreditation.

This MPE evaluation is based on the maximum power levels and operating conditions specified. Any modifications to the device hardware, software, or installation that could affect RF output power or antenna characteristics may invalidate this compliance demonstration.

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1. Executive Summary

This report presents the Maximum Permissible Exposure (MPE) analysis to demonstrate compliance with FCC RF exposure requirements. The evaluation considers both single transmitter operation and simultaneous multi-transmitter scenarios where applicable.

2. Key Findings

Compliance status	Complies
Critical separation distances	20 cm
Special conditions or limitations	N/A

MPE calculations for stand-alone transmission

Device Classification Requirements

Portable Device Definition (§2.1093)	Devices designed for use by a person where the radiating structure is within 20 cm of the user's body require SAR evaluation rather than MPE calculation.
Mobile Device Definition	Devices installed in vehicles or with permanently installed antennas may use MPE calculations if minimum separation distances can be established.
Fixed/Base Station Definition	Stationary transmitters with controlled access to antenna locations may use MPE calculations for both occupational and general population exposure scenarios.

3. References, definitions and limits for FCC

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: §1.1310(e)(1)—Power Density Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure		
0.3–3.0	*(100)	≤6
3.0–30	*(900 / f ²)	<6
30–300	1.0	<6
300–1500	f / 300	<6
1500–100000	5	<6
(ii) Limits for General Population/Uncontrolled Exposure		
0.3–1.34	*(100)	<30
1.34–30	*(180 / f ²)	<30
30–300	0.2	<30
300–1500	f / 1500	<30
1500–100000	1.0	<30

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

4. Power density calculation formula

The fundamental equation (from page 18 of OET Bulletin 65, Edition 97-01) for calculating power density at a specified distance from an RF source is derived from the far-field assumption:

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

where:

- S = Power density (mW/cm² or W/m²)
- P = Power input to antenna (mW or W)
- G = Antenna gain (linear ratio, not dB)
- R = Distance from radiation center (cm or m)

This equation assumes:

- Far-field conditions ($R > 2D^2/\lambda$, where D is largest antenna dimension) are assumed at the evaluation distance of 20 cm
- Isotropic power distribution (conservative approach)
- Free-space propagation conditions
- Worst-case antenna orientation

Multiple Transmitter Analysis (if applicable)

Total Exposure Ratio (TER) Calculation: $TER = \sum(S_i/L_i) \leq 1.0$

Where:

- S_i = Power density from transmitter i
- L_i = Applicable limit for transmitter i

5. Verdict

The calculated power density at the declared separation distance is below the applicable regulatory limits. Therefore, the product **COMPLIES** with FCC RF exposure requirements for single transmitter operation.

6. Test Results of RF Exposure Calculations based on Specific Antenna for FCC

Operating Mode	Band	Max incl. tune-up (dBm)	Max incl. tune-up (mW)	Antenna Gain (dBi)	Numeric Gain G_{num}	Distance R (cm)	MPE Pd (mW/cm ²)	Limit (mW/cm ²)	Verdict
eMTC	2	23.52	224.91	2.14	1.64	20	0.073	1.0	Pass
eMTC	4	23.46	221.82	2.14	1.64	20	0.072	1.0	Pass
eMTC	5	24.16	260.62	2.14	1.64	20	0.085	0.55	Pass
eMTC	8	23.43	220.29	2.14	1.64	20	0.072	0.60	Pass
eMTC	12	23.77	238.23	2.14	1.64	20	0.078	0.47	Pass
eMTC	13	23.59	228.56	2.14	1.64	20	0.075	0.52	Pass
eMTC	14	23.43	220.29	2.14	1.64	20	0.072	0.53	Pass
eMTC	25	23.53	225.42	2.14	1.64	20	0.074	1.0	Pass
eMTC	26	23.93	247.17	2.14	1.64	20	0.081	0.54	Pass
eMTC	66	23.16	207.01	2.14	1.64	20	0.068	1.0	Pass
eMTC	85	23.68	233.35	2.14	1.64	20	0.076	0.47	Pass

7. Test Results of RF Exposure Calculations based on Maximum Permissible Gain for FCC

Operating Mode	Band	Max Conducted Output Power (dBm)	Max Conducted Output Power (mW)	Antenna Gain, MAX (dBi)	Numeric Gain G_{num}	Distance R (cm)	MPE Pd (mW/cm ²)	Limit (mW/cm ²)	Verdict
eMTC	2	23.52	224.91	8.0	6.31	20	0.282	1.0	Pass
eMTC	4	23.46	221.82	5.0	3.16	20	0.140	1.0	Pass
eMTC	5	24.16	260.62	9.4	8.71	20	0.452	0.55	Pass
eMTC	8	23.43	220.29	9.8	9.55	20	0.419	0.60	Pass
eMTC	12	23.77	238.23	8.7	7.41	20	0.351	0.47	Pass
eMTC	13	23.59	228.56	9.2	8.32	20	0.379	0.52	Pass
eMTC	14	23.43	220.29	9.3	8.51	20	0.373	0.53	Pass
eMTC	25	23.53	225.42	8.0	6.31	20	0.283	1.0	Pass
eMTC	26	23.93	247.17	9.4	8.71	20	0.429	0.54	Pass
eMTC	66	23.16	207.01	5.0	3.16	20	0.130	1.0	Pass
eMTC	85	23.68	233.35	8.7	7.41	20	0.344	0.47	Pass

8. Permissive Gain Calculations for FCC

Band	Maximum Conducted Output Power Meas. (dBm)	Max incl. tune-up (dBm)	E.I.R.P Limit (dBm)	Allowed Antenna Gain_Power (dBi)	MPE Limit (mW/cm ²)	Maximum Permitted EIRP (dBm)	Allowed Antenna Gain_MPE (dBi)	Final Permissive Antenna Gain (dBi)
2	23.52	25	33.01	8.0	1.00	37.0	12.0	8.0
4	23.46	25	30.00	5.0	1.00	37.0	12.0	5.0
5	24.16	25	40.60	15.6	0.55	34.4	9.4	9.4
8	23.43	25	42.15	17.15	0.60	34.8	9.8	9.8
12	23.77	25	36.92	11.9	0.47	33.7	8.7	8.7
13	23.59	25	36.92	11.9	0.52	34.2	9.2	9.2
14	23.43	25	46.91	21.91	0.53	34.3	9.3	9.3
25	23.53	25	33.01	8.0	1.00	37.0	12.0	8.0
26	23.93	25	40.60	15.6	0.55	34.4	9.4	9.4
66	23.16	25	30.00	5.0	1.00	37.0	12.0	5.0
85	23.68	25	36.92	11.9	0.47	33.7	8.7	8.7

9. Operating Frequency Range of EUT

Frequency Band(s)	Transmitting f _{UL} (MHz)	Receiving f _{DL} (MHz)	Channel Bandwidth (MHz)
Band 2	1850 ~ 1910	1930 ~ 1990	1.4, 3, 5, 10, 15, 20
Band 4	1710 ~ 1755	2110 ~ 2155	1.4, 3, 5, 10, 15, 20
Band 5	824 ~ 849	869 ~ 894	1.4, 3, 5, 10
Band 8_39d	897.5 ~ 900.5	936.5 ~ 939.5	1.4, 3
Band 12	699 ~ 716	729 ~ 746	1.4, 3, 5, 10
Band 13	777 ~ 787	746 ~ 756	5, 10
Band 14	788 ~ 798	758 ~ 768	5, 10
Band 25	1850 ~ 1915	1930 ~ 1995	1.4, 3, 5, 10, 15, 20
Band 26	814 ~ 849	859 ~ 894	1.4, 3, 5, 10, 15
Band 66	1710 ~ 1780	2110 ~ 2200	1.4, 3, 5, 10, 15, 20
Band 85	698 ~ 716	728 ~ 746	5, 10

End of the test report