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Test Letter #: 18510-01 REV 0 (Created with Reference to WL Report # 18508)

Applicant: Stanley Black & Decker, Inc.

Exempt RF Device: Battery Pack Module (NA091171) (BLE, Single Limited Module)

FCC ID: YJ7-NA091171

ISED ID: 9082A-NA091171

EUT Summary: The NA091171 Battery Pack Module is categorically excluded from SAR testing.

Time-Averaged Exclusion Threshold for FCC:

Reference: KDB 447498 DO1 General RF Exposure Guidance v06. -- SAR evaluation for general population exposure conditions, by measurement or simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, are satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

In accordance with Section 4.3.1, of the referenced document, the following formula may be used to calculate the exclusion of SAR Testing:

$$[(\textit{max. power of channel, including tune-up tolerance, mW}) / (\textit{min. test separation distance, mm})] \cdot [\sqrt{f_{(GHz)}}] \leq 3.0 \text{ for 1-g SAR, and} \leq 7.5 \text{ for 10-g extremity SAR}$$

where,

a) $f_{(GHz)}$ is the RF channel transmit frequency in GHz
b) power and distance shall be rounded to the nearest mW and mm before calculation.
c) the result is rounded to the nearest mW and mm before calculation.
d) when the minimum test separation distance is < 5mm, a distance of 5mm is used
e) the values of 3.0 and 7.5 are the final numerical thresholds, these values are unitless.

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Time-Averaged Exclusion Threshold for ISED Canada:

Reference: RSS-102, Issue 6 (12/2023) Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands). -- SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in RSS-102. These limits are provided below.

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Exclusion Limit for ISED Canada, Interpolated:

The limits of Table 1, as provided in RSS-102, Issue 5 are based on RF port conducted power, or EIRP, whichever is higher. The EUT transmitter has a frequency of range of 2402 MHz to 2480 MHz As such, the interpolated limit shall be calculated from 2480 MHz, as this frequency produces the strictest limit. Additionally, the following equation shall by employed to interpolate the proper exclusion threshold:

$$y = y_1 + (x - x_1)\frac{(y_2 - y_1)}{(x_2 - x_1)}$$

where,

x_1 and y_1	is the first set of coordinates (e.g., 2450 MHz and 3 mW, respectively).
x_2 and y_2	is the second set of coordinates (e.g., 3500 MHz and 2 mW, respectively).
x	is the EUT transmit frequency of 2480 MHz
y	is the final limit (e.g., interpolated value).

therefore,

y = 3 + (2480 – 2450) * ((2 – 3) ÷ (3500 – 2450))
y = 2.97 mW

further,

2.97 mW is the final exclusion limit for the BLE transmitter
2.97 mW = 4.73 dBm

where,

dBm = 10LOG(mW)
dBm = 10LOG(2.97)
dBm = 4.73

finally,

2.97 mW is the SAR testing exemption limit for ISED Canada (time-averaged power)
4.73 dBm is the SAR testing exemption limit for ISED Canada (time-averaged power)

Exclusion Threshold Summary (for both markets):

FCC = 3.0 (unitless)

ISED = 2.97 mW

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EUT Transmitter Details:

The EUT has a peak output power, conducted at the antenna port, that measured +1.25 dBm.

The manufacturer has declared a tune-up tolerance of ± 1.0 dB.

The EUT employes a PCB trace antenna with a peak gain of -5.44 dBi.

As a worst-case evaluation, the antenna gain value of 0.0 dBi shall be used.

as such,

1.25dBm + 1.0dB + 0.0dBi = 2.25 dBm EIRP

where,

2.25 dBm = the peak EIRP of the transmitter, not time-average

mW = $10^{(dBm \div 10)}$

therefore,

2.25 dBm = 1.68 mW (shall be rounded to 2 mW).

2 mW = maximum power of RF channel, including tune-up tolerance

Exclusion Results for FCC:

The earlier noted compliance formula, referenced to KDB 447498 DO1, shall be employed:

$[(\textit{max. power of channel, including tune-up tolerance, mW}) / (\textit{min. test separation distance, mm})] \cdot [\sqrt{f_{(GHz)}}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR

as such,

$(2mW \div 5mm) \cdot (\sqrt{2.48GHz}) = 0.53$

finally,

because 0.53 is less than 3.0, the EUT is categorically excluded from SAR testing.

Exclusion Results for ISED Canada:

The EUT transmitter has a peak EIRP of +2.25 dBm (not time-averaged), which is equal to 1.68 mW. IN this case 1.68 mW shall be rounded to 2mW.

therefore,

2.25 dBm = 1.68 mW (shall be rounded to 2 mW).

2 mW = maximum power of RF channel, adjusted tune-up tolerance

The ISED Canada limitation for SAR exclusion is: 2.97 mW (time-averaged threshold).

finally,

because 2 mW is less than 2.97 mW, the EUT is categorically excluded from SAR testing.

Conclusion:

The FCC time-averaged SAR Exclusion limit is 3.0 (numerical)

The EUT has a calculated numerical value of 0.53.

Because 0.53 is less than 3.0, the EUT is categorically excluded from SAR testing.

The ISED Canada time-averaged SAR Exclusion limit is 2.97 mW.

The EUT has a peak EIRP of 2.0 mW

Because 2.0 mW is less than 2.97 mW, the EUT is categorically excluded from SAR testing.

Overall, the NA091171 Battery Pack Module is categorically excluded from SAR testing.

In both cases, the transmitter peak power meets the average exclusion limit.

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The Washington Laboratories, Ltd., test facility is located at 4840 Winchester Boulevard, Frederick MD 21703 (USA). Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent test laboratory. These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1448.

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