

SAR Exclusion Calculation**Project: C9968****Report number: C16750TR2****Date: 13th July 2026****Customer Details**

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Equipment Under Test: PV1525-IV (915MHz) Installation Analyser
FCC ID: 2BV6F-PV1525
Operating frequency bands: BLE: 2400MHz to 2483.5MHz
SRD: 902MHz to 928MHz
RF Modules: Bluetooth Low Energy: ESP32-S3-WROOM-1: FCC ID: 2AC7Z-ESPS3WROOM1
SRD, 902 to 928MHz Module

SAR Exclusion Calculation - FCC

The calculation is according to the FCC Knowledge Database (KDB) document KDB 447498 D01 General RF Exposure Guidance V06.

Section 4.3.1 General SAR Test Exclusion Bands was applied.

Section 4.3.1 a) for 100MHz to 6GHz and test separation distances $\leq 50\text{mm}$ was specifically applied where applicable. According to this section the SAR test exclusion thresholds are determined by the following:

$$\text{Threshold} = \left[\frac{P(\text{mW})}{d(\text{mm})} \right] \cdot \sqrt{f(\text{GHz})}$$

Where

P is the maximum power of the channel including tune-up tolerance in mW

d is the minimum test separation distance in mm

f is the RF channel frequency in GHz

This evaluation of the threshold is compared to the threshold limit.

- a. Limit for 1-g head or body worn devices: threshold limit ≤ 3
- b. Limit for 10-g extremity worn devices: threshold limit ≤ 7.5

Since the device is hand-held the limit b applies.

Section 4.3.1 b)(1) for 100MHz to 1500MHz and test separation distances $> 50\text{mm}$, was specifically applied where applicable. According to this section the SAR test exclusion thresholds are determined by the following:

$$\text{Threshold (mW)} = \left[\left[\frac{x}{\sqrt{f(\text{GHz})}} \right] \cdot 50 \right] + \left[(d(\text{mm}) - 50) \cdot \left(\frac{f(\text{MHz})}{150} \right) \right]$$

When separation distance $> 50\text{ mm}$ and the device output power is less than the calculated result (power threshold, mW) shown in the above equation, the SAR testing exclusion is applied.

where x is 3 for head or body worn devices and x is 7.5 for extremity worn devices.

Section 4.3.1 b)(2) for 1500MHz to 6GHz and test separation distances >50mm, was specifically applied where applicable. According to this section the SAR test exclusion thresholds are determined by the following:

$$\text{Threshold (mW)} = \left[\left[\frac{x}{\sqrt{f(\text{GHz})}} \right] \cdot 50 \right] + [(d(\text{mm}) - 50) \cdot 10]$$

When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in the above equation, the SAR testing exclusion is applied.

The minimum test separation distance was considered to be 2.5mm for the SRD & 11.0mm for the BLE (distance from the antenna to users hand) as declared by the customer and in consultation with Section 4.2.2 *Body-worn accessory exposure conditions*.

Short Range Device – 902MHz to 928MHz

The device is a hand-held device with a declared interaction distance of 2.5mm, as such the device is to be assessed as a portable device in accordance with section 4.3.1a) of KDB 447498 D01 General RF Exposure Guidance V06.

When the minimum test separation distance is <5mm a distance of 5mm is applied.

For this apparatus, the calculated threshold was evaluated using a distance of 5.0mm, and the results are tabulated in the table below.

The power level values taken from the results obtained in test report: C16749TR3 with antenna gain value of 4.07dBi taken from Antenova SRFC025 data sheet.

Frequency (GHz)	Power (mW)	Dist (mm)	Calculated Threshold	Threshold Limit
0.915	5.68	5.0	1.09	7.5
0.920	5.31	5.0	1.02	7.5
0.924	5.12	5.0	0.98	7.5

Table 1 Calculation of threshold SRD

2.4GHz BLE

For this apparatus, the calculated threshold was evaluated using a distance of 11mm, and the results are tabulated in the table below.

Power level value taken from the RF Exposure test report contained in the FCC submission for FCC ID: 2AC7Z-ESPS3WROOM1

Frequency (GHz)	Max EIRP (dBm)	Max EIRP (mW)	Dist (mm)	Calculated Threshold	Threshold Limit	SAR Test required
2.4	13.3	21.4	11.0	3.0	7.5	No

Table 2 Calculation of threshold BLE

Determination of the SAR test exclusion for simultaneous transmission

Simultaneous transmission SAR test exclusion considerations are calculated according to according to KDB 447498 4.3.2 b)

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$

for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR

Alternatively, 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is $> 50 \text{ mm}$.

SRD

$[(5.68 \text{ mW}) / 5 \text{ mm}] \cdot [\sqrt{f(0.915\text{GHz})/18.75}] = 0.058 \text{ W/kg}$

BLE

$[(21.4 \text{ mW}) / 11 \text{ mm}] \cdot [\sqrt{f(2.480 \text{ GHz})/18.75}] = 0.163 \text{ W/kg}$

SRD + BLE = 0.221 W/kg

0.221 W/kg is under the limit of 4 W/kg for 10-g SAR* therefore simultaneous transmission SAR further assessment is not required.

*Reference CFR47 Rule section 1.1310 (c)

Conclusion

For the required stated distances, the apparatus met the exclusion requirements for SAR testing (FCC). A further SAR assessment will not be required.

SAR Exclusion Calculation - ISED**Standard:****RSS-102 Radio Frequency (RF) ~Exposure Compliance of Radio communication Apparatus (All Frequency Bands)**

Issue 6 December 2023

From RSS-102: 6.3 SAR exemption limits

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 Table 11.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

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

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 5.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed.

SRD

The power level values taken from the results obtained in test report: C16749TR3 with antenna gain value of 4.07dBi taken from Antenova SRFC025 data sheet

Frequency (GHz)	Max EIRP (dBm)	Max EIRP (mW)	Dist (mm)	Exemption Limit (mW)*	SAR Test required
0.915	7.54	5.68	≤ 5	19.9	No
0.920	7.25	5.31	≤ 5	19.8	No
0.924	7.09	5.12	≤ 5	19.7	No

*21mW at 835MHz, 6mW at 1900MHz, values are interpolated.

BLE

Power level value taken from the RF Exposure test report contained in the FCC submission for FCC ID: 2AC7Z-ESPS3WROOM1

Frequency (GHz)	Max EIRP (dBm)	Max EIRP (mW)	Dist (mm)	Exemption Limit (mW)*	SAR Test required
2.4	13.3	21.4	11.0	38.5	No

*7.3mW at 1900MHz, 16.2mW at 2450MHz, values are interpolated.

Simultaneous transmission of SRD and BLE

The SAR exemption limits outlined in clause 5.2.2 of RSS-102 have been derived based on an approximate SAR value of 0.4 W/kg using half-wave dipole antennas. As such, when simultaneous transmitter SAR evaluations include transmitters that have been exempt from routine SAR evaluation, the SAR must be estimated based on the ratio between the maximum tune-up tolerance limit of the transmitter that has been exempt and the exemption limit at the specific distance and frequency for that transmitter. This ratio must be multiplied by 0.4 W/kg (2.0 W/kg for controlled use and 1.0 W/kg for limb worn devices) in order to calculate the estimated SAR level.

The estimated SAR value is calculated based the following equation for limb worn devices:
(maximum power level including tune-up tolerance for transmitter A / maximum power level of exemption at the same frequency and distance) * (1W/kg)

The SAR limit for Localized Limbs is 4 W/kg.*

Maximum ratio SRD (W/kg)	Maximum ratio BLE (W/kg)	Sum of exposure ratios (W/kg)	Limit of exposure ratios (W/kg)	Simultaneous SAR Test required
0.29	0.56	0.85	4	No

*Reference Health Canada's Safety Code 6 section 2.1.2

Conclusion

For the required stated distances, the apparatus met the exclusion requirements for SAR testing (ISED). A further SAR assessment will not be required.

Prepared by:



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-----**END OF REPORT**-----