1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX 78665
e-mail: info@ptitest.com
(512) 244-3371 Fax: (512) 244-1846

1.0 Maximum Permissible Exposure Evaluation (Supplements the test report.)

The measured power is considered for the intended use of the device and resulting RF exposure to the user.

1.2 Criteria

Section Reference	Date
447498 D01 General RF Exposure Guidance v06 // RSS-102 Issue 5	21 Sep 2021

1.3 Procedure

Using measurement of peak power and considering the intended application, determine the permissible exposure level, applicability of exclusion, or whether additional exposure tests (SAR) are indicated. When applicable justify conclusion for selected exposure level and separation distance.

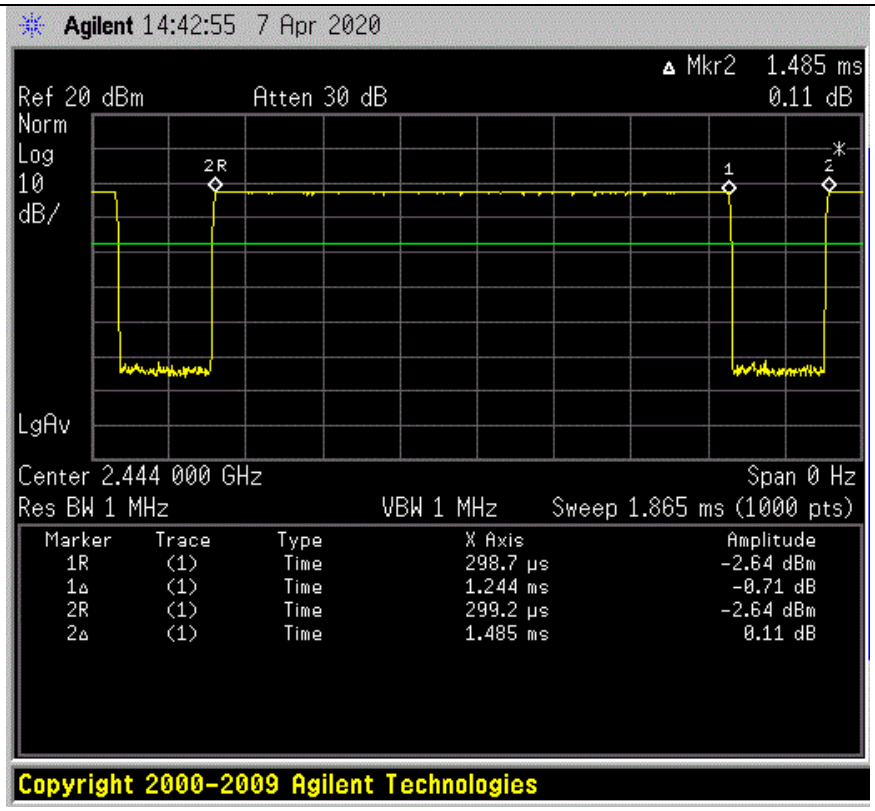
The NXSW-WRS-WH is a wall mounted rocker switch designed to control lighting systems. The device features an integrated 2.4GHz BLE radio. The device features several buttons with which the user may control various lighting functions. Typically, the user will use their fingers to actuate the buttons for brief moments. Some features require holding the buttons down for at least 10 seconds. No other parts of the body are expected to contact the switch. Due to the direct contact with user limbs (hands), exposure distance will be set at 5mm from the user limbs as radio is internal to the device separated from the user by the plastic housing. Exposure to head/trunk will be >20cm.

Adjustment is infrequent and is usually done by using the intended wireless feature remotely from a smartphone with no contact with actual device.

Duty Cycle was measured on the device using a continuous packet transmission mode (worst-case), which resulted in a Duty Cycle correction factor of -0.78 dB.

Duty Cycle Correction Factor Measurement:

Measurement is based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is converted to dB and applied as needed to peak measurements of transmitter harmonics to determine average power. This is not a pass/fail measurement.



Transmit time: 1.244 ms
Period: 1.485 ms

DC = 1.244 / 1.485 = 0.8377 = 83.77 %

Weighting factor for exposure: 10 log (0.8377) = -0.78 dB

1.4 Power to Exposure Calculation

For 2.4 GHz radio power is determined by conducted measurement. Safe exposure distance was calculated for the allowed maximum uncontrolled public exposure limit.

Table 1.4.1 Power Calculation for Exposure, 2.4 GHz Radio (Highest frequency 2.480 GHz)

Measured Radiated Peak Power (EIRP) dBm	Source Duty Cycle Factor dB	Antenna Gain[1] dBi	Calculated EIRP dBm	EIRP In Linear Terms mW
8.4	-0.78	N/A	7.62	5.78

[1]Peak power was measured radiated, so the antenna gain was included in the measurement.

1.5 SAR Exemption Calculation – FCC

Applicable requirement: KDB 447498 Clause 4.3.1 Section 1

Calculated power (max power including tune up tolerance = 5.78 mW):

$[(5.78\ mW)/(5\ mm)] \cdot [\sqrt{2.4}\ (GHz)] = 1.79$

$1.79 \leq 6.0$ (Limb exposure)
$1.79 \leq 3.0$ (Non-Limb exposure)

1.6 SAR Exemption Calculation – IC

Applying Table 1 of RSS-102 Clause 2.5.1 using 0.5 cm or 5 mm spacing column and row 2450 MHz. The exemption limit is 4 mW. Since the exposure is to the limbs (hand in this case), the exposure allowance is multiplied by 2.5, yielding an exemption limit of 10mW.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

5.78 mW < 10 mW for limb exposure

1.7 Conclusion

The exposure limit is satisfied.

Signed:

Larry Finn

***