

RF Exposure / SAR / Health Hazard Statement

Requirement:

According to USA CFR 15 §1.1307 (b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy level in excess of the Commission's guideline. For Canada, RSS-102 Tests out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radiocommunication apparatus designed to be used within the vicinity of the human body.

SAR Testing Exclusion:

Per FCC 447498 General RF Exposure Guidance v05, Section 4.3.1, the 1-g (body) and 10-g (extremity) SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances 50 mm are determined by the following formula

$$SAR = \frac{P_c}{d} \sqrt{f_{GHz}}$$

where d = minimum test distance and Pc is the source-based time-averaged maximum conducted output power, or EIRP for a device without a removable antenna.

For IC RSS-102, the SAR threshold is based on the higher of conducted output power and EIRP and is based on a power rating set for 1-g and 10-g SAR.

Exposure Duty Cycle:

The maximum power duty cycle was measured to be 0.089% as detailed in the EUT test report.

Thus, power (exposure) duty cycle is computed to be:

$$\text{Power Duty Cycle} = 10 * \text{Log}_{10}(0.00089) = -30.5 \text{ dB}$$

This duty cycle is the worst case SOURCE-BASED TIME-AVERAGED duty cycle for this product.

Power Rating:

The chipset manufacturer's most recent datasheet states a maximum power rating for the chipset of 20 dBm. However, the EUT manufacturer has set the chipset power level to +13.3 dBm to conserve battery life. The measured antenna gain for the EUT is -6.2 dBi, implying that the measured output power (13.3 dB) is greater than the peak EIRP, and is thus employed in computing health hazard below. Average power rating is computed from the peak value and the power duty cycle detailed above.

SAR Threshold:

The SAR threshold at a minimum test distance of <5 mm are thus computed to be:

USA REF: 2.1091/1093, 447498 D01 General RF Exposure Guidance v06
IC REF: RSS-102 Issue 5
Min. Sep. Distance: <5mm

Test Date: 17-Feb-16
Test Engineer: Joseph Brunett
EUT: Nutek HHU
EUT Mode: Hopping
Meas. Distance: 3 meters

Freq. MHz	Pout* Pk dBm	EIRP*** Pk dBm	Exposure Duty dB	Worst Case Po/EIRP**		Canada			USA		
						Calculated SAR Threshold (Avg) mW	1-g SAR Body Power Threshold Exclusion Limit (Avg) mW	10-g SAR Extremity Power Threshold Exclusion Limit (Avg) mW	Calculated SAR Threshold (Avg)	1-g SAR Body Power Threshold Exclusion Limit (Avg)	10-g SAR Extremity Power Threshold Exclusion Limit (Avg)
904.0	13.3	7.2	-30.5	-17.2	.019	0.019	24.8	62.1	.004	3.0	7.5
914.0	13.3	6.0	-30.5	-17.2	.019	0.019	24.8	62.1	.004	3.0	7.5
923.6	13.2	5.7	-30.5	-17.4	.018	0.018	24.8	62.1	.004	3.0	7.5

*As Measured / Computed from fundamental emission, see fundamental emission section of this report.

**RMS/6min << Pk/6min, Peak emission + Exposure Duty employed to demonstrate compliance.

Thus the EUT meets the test exclusion thresholds for 1-g and 10-g SAR evaluation.