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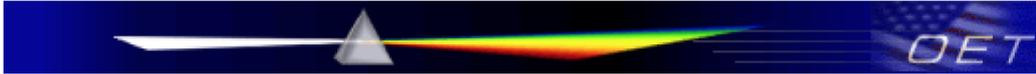
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This document details the SAR considerations for the Novii System.

For the FCC non ionising radiation limits are given;

see extract from FCC publication section 4.3 a)



Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

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RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

Section 4.3

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{\text{GHz}}}] \leq 3.0$
for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,³⁰ where

□ f_{GHz} is the RF channel transmit frequency in GHz

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1 SAR Evaluation

1.1 RF Exposure Compliance Requirement

1.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

1.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

1.1.3 EUT RF Exposure

For BLE:

Measurement Data

GFSK mode	
Test channel	Peak Output Power (dBm)
Lowest	-0.55
Middle	0.59
Highest	0.88

The Max Conducted Peak Output Power is 0.88dBm in Highest channel(2.480GHz);

The best case gain of the antenna is 1.0dBi.

$$\text{EIRP} = 0.88\text{dBm} + 1.0\text{dBi} = 1.88\text{dBm}$$

1.88dBm logarithmic terms convert to numeric result is nearly 1.54mW

According to the formula. calculate the EIRP test result:

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

$$\text{General RF Exposure} = (1.54\text{mW} / 5 \text{ mm}) \times \sqrt{2.480\text{GHz}} = 0.485 \text{ ①}$$

SAR requirement:

$$S = 3.0$$

② ;

$$\text{①} < \text{②}.$$

So the SAR report is not required.

Remark: The Max Conducted Peak Output Power data refer to report CQASZ170701391EW-01.

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POD

For the POD, from the FCC extract the calculation is:

Power/Separation * sqrt (frequency) < 3 (SAR requirement) 1-g

The Panasonic module data sheet states a maximum power of 10.5 dBm (11.22 mW).

Frequency is 2.441 GHz, sqrt (2.441GHz) = 1.56

Separation is 7mm (measured using Vernier gauge from the antenna on the PCB to the part in contact with the skin)

Calculation is $11.22\text{mW} / 7\text{mm} * \text{sqrt}(2.48\text{GHz}) = 2.52$.

The POD is therefore SAR test excluded because it is less than 3.0.

It would also meet SAR test exclusion at 6mm separation.

Interface Unit

For the Interface, from the FCC extract the calculation is:

Power/Separation * sqrt (frequency) < 7.5 (SAR requirement) 10-g

Assume the power is 2 x POD power = 22.5mW (excluding wireless charger)

Frequency is 2.441 GHz, sqrt (2.441GHz) = 1.56

Separation is 5mm

$22.5/5*1.56 = 7.02$ therefore SAR exempt < 7.5 (SAR 10-g requirement)

Also, for the Interface Unit, we state that the user is > 20cm away in the Instructions for Use and is therefore SAR exempt.

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