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RF Exposure Evaluation Report

Report No. : CQASZ20200200071E-02
Applicant: RF Networks Ltd.
Address of Applicant: 19a, Sheshet Hayamim St'. Binyamina, Israel
Equipment Under Test (EUT):
Product: Gateway
Model No.: RFN-SMART433T-4NQ-xyz
Brand Name: N/A
FCC ID: 2AR6S-SMART443
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-02-21
Date of Test: 2020-02-21 to 2020-02-27
Date of Issue: 2020-02-28
Test Result : **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By:

Tom Chen

(Tom Chen)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200200071E-02	Rev.01	Initial report	2020-02-28

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3 General Information

3.1 Client Information

Applicant:	RF Networks Ltd.
Address of Applicant:	19a, Sheshet Hayamim St'. Binyamina, Israel
Manufacturer:	RF Networks Ltd.
Address of Manufacturer:	19a, Sheshet Hayamim St'. Binyamina, Israel

3.2 General Description of EUT

Product Name:	Gateway
Model No.:	RFN-SMART433T-4NQ-xyz
Trade Mark:	N/A
Hardware Version:	A
Software Version:	2.0.0
Operation Frequency:	433.32~434.72MHz
Channel Numbers:	8
Modulation Type:	GFSK
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
Antenna Type:	External antenna
Antenna Gain:	3dBi
Power Supply:	DC24V

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 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:

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

$f(\text{GHz})$ 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

4.2 EUT RF Exposure Evaluation

$$e_{irp} = p_t \times g_t = (E \times d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $10^{((dB\mu V/m)/20)/10^6}$,

d = measurement distance in meters (m)---3m,

$$\text{So } p_t = (E \times d)^2 / 30 / g_t$$

The worst case (refer to report CQASZ20200200071E-01) is below:

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	78.73	Peak
433.92	78.73	Average

For 433.92MHz wireless:

Field strength = 78.73dBuV/m @3m

Ant. gain 3dBi; so Ant numeric gain=2.0

$$\text{So } p_t = \{ [10^{(78.73/20)/10^6} \times 3]^2 / 30 / 1.0 \} \times 1000 \text{mW} = 0.011 \text{mW}$$

$$\text{So } (0.022 \text{mW} / 5 \text{mm}) \times \sqrt{0.43392 \text{GHz}} = 0.0015$$

$$0.0015 < 3.0 \text{ for 1-g SAR}$$

So the SAR report is not required.