

Assessment report

467685-1R2ARFWL

Date of issue: August 29, 2022

Applicant:

Fujitsu Network Communications, Inc.

Product:

Gen2 Dual Band RU for North America

Model

G2_N70N66-RU

Type of assessment:

MPE Calculation Report

Specifications:

- ◆ FCC 47 CFR Part 1 Subpart I, §§1.1307, 1.1310
- ◆ FCC 47 CFR Part 2 Subpart J, §2.1091
- ◆ KDB 447498 D01 General RF Exposure Guidance v06

Lab and test locations

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Date	August 29, 2022
Signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

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Section 1 Evaluation summary

1.1 MPE exemption for stand-alone transmission

1.1.1 References, definition, and limits

FCC §2.1091(d)

- (2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from the whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part, except for portable devices as defined in §2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in §2.1093.

Table 1.1-1: Table 1 to §1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	*(100)	≤6
3.0–30	1842 / f	4.89 / f	*(900 / f ²)	<6
30–300	61.4	0.163	1.0	<6
300–1500			f / 300	<6
1500–100000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	<30
1.34–30	824 / f	2.19 / f	*(180 / f ²)	<30
30–300	27.5	0.073	0.2	<30
300–1500			f / 1500	<30
1500–100000			1.0	<30

Notes: f = frequency in MHz. * = Plane-wave equivalent power density.

Equation from Page 18 of OET Bulletin 64, Edition 97-01:

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

1.1.2 EUT technical information

Operational frequency	2110 – 2200 MHz (Band n66) 1995 – 2020 MHz (Band n70)
Antenna type	External (The EUT is professionally installed)
Antenna gain	See below
Number of antennas	4
Maximum transmitter conducted power	45.86 dBm (Band n66) (38.55 Watts) 44.30 dBm (Band n70) (26.92 Watts)
Max power across four ports	51.88 dBm (Band n66) (154.17 Watts) 50.32 dBm (Band n70) (107.65 Watts)

The maximum permitted antenna gain is calculated based on the transmitter conducted power density and the maximum permitted EIRP density.

Band n66:

Maximum permitted EIRP density: 3280 W/MHz (65.16 dBm/MHz). From measurement data, the maximum measured power density is 41.98 dBm/MHz therefore the maximum permitted antenna gain is $(65.16 - 41.98) = 23.18$ dBi.

Band n70:

Maximum permitted EIRP density: 3280 W/MHz (65.16 dBm/MHz). From measurement data, the maximum measured power density is 40.25 dBm/MHz therefore the maximum permitted antenna gain is $(65.16 - 40.25) = 24.91$ dBi. However, so as to comply with additional emissions limits of Part 27.53(2)(h), the maximum permitted antenna gain is limited to 21.64 dBi.

1.1.3 MPE exemption calculations

Note: In the calculations below, “number of antennas = 4” adds the correct $10\log(4)$ correction to account for the correlated output of 4 antenna ports. For example, in band n66, the maximum single antenna gain is 23.18 dBi but the total system gain is 29.20 dBi reflecting the addition of $10\log(4)=6.02$ dB for the 4 antennas.

Band n66:

Fundamental transmit (prediction) frequency:	2200 MHz
Maximum measured conducted peak output power:	45.86 dBm
Cable and/or jumper loss:	0 dB
Maximum peak power at antenna input terminal:	45.86 dBm
Tx On time:	1.000 ms
Tx period time:	1.000 ms
Average factor:	100 %
Maximum calculated average power at antenna input terminal:	38548 mW
Single Antenna gain (typical):	23.18 dBi
Number of antennas:	4
Total system gain:	29.20 dBi
FCC limit:	
MPE limit for uncontrolled exposure at prediction frequency:	1.000000 mW/cm ²
	10.000000 W/m ²
Minimum calculated prediction distance for compliance:	120 cm
Typical (declared) distance:	1600 cm
Average power density at prediction frequency:	0.996805 mW/cm ²
	9.968049 W/m ²
Margin of Compliance:	
Maximum allowable antenna gain:	29.21 dBi

Band n70:

Fundamental transmit (prediction) frequency:	2020 MHz
Maximum measured conducted peak output power:	44.30 dBm
Cable and/or jumper loss:	0 dB
Maximum peak power at antenna input terminal:	44.3 dBm
Tx On time:	1.000 ms
Tx period time:	1.000 ms
Average factor:	100 %
Maximum calculated average power at antenna input terminal:	26915 mW
Single Antenna gain (typical):	21.64 dBi
Number of antennas:	4
Total system gain:	27.66 dBi
FCC limit:	
MPE limit for uncontrolled exposure at prediction frequency:	1.000000 mW/cm ²
	10.000000 W/m ²
Minimum calculated prediction distance for compliance:	120 cm
Typical (declared) distance:	1118 cm
Average power density at prediction frequency:	0.999923 mW/cm ²
	9.999229 W/m ²
Margin of Compliance:	
Maximum allowable antenna gain:	27.66 dBi

1.1.4 Verdict

The calculation is below the limit; therefore, the product is compliant with the RF exposure requirements for the declared distance.

End of test report