RF Exposure Statement: JP22FI0Z 001

Client:	Nisshinbo Micro Devices Inc. 1-1, Fukuoka 2-Chome, Fujimino-City, Saitama, 356-8510 Japan
Test item:	60GHz Smart Sensor
Identification:	NJR4652F2S1, NJR4652F2S2

FCC Requirement

According to FCC §2.1093 (d)(1), Portable Devices that transmit at frequencies above 6 GHz must comply with the following applicable limit for maximum permissible exposure (MPE) specified in FCC §1.1310 (e)(1), Table 1:

Equipment Use	Frequency Range [MHz]	Power Density Limit	Average Time [min]
General Population / Uncontrolled Exposure	1,500 – 100,000	1.0 [mW/cm^2]	<30

Note: This evaluation was conducted at 2.0cm test separation distance (variable r in the statement). The distance was specified by the customer.

Moreover, according to §1.1307 (b)(1)(i)(A), transmitter device is qualified as exemption of RF human exposure, when the transmitter power is below a threshold calculated by its relevant formula defined in§1.1307 (b)(3)(i)(C), Table 1:

RF Sources	Frequency Range [MHz]	Threshold ERP [W]	Minimum Separation Distance R [m]	Threshold ERP [mW]	Threshold EIRP [mW]
Single RF Sources	1,500 – 100,000	19.2R^2	0.02	7.68	12.59

Note: EIRP is calculated from ERP (1.64 x ERP).

Measurement Result

The maximum measured E-field strength and corresponded estimated EIRP from the transmitter are given in the following table:

Freq. [GHz]	Wave Length [cm]	Measured Average EIRP (*)		Highest Operational Duty Cycle (**)	Expected EIRP	Test Distance r [cm]	Calculated Power Density S [mW/cm^2]
		[dBm]	[mW]	[%]	[mW]		
61.020	0.4916	5.41	3.475	21.84	**0.75894**	**2.0**	**0.015099**

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Note: **(*)** Measured value at its test mode (100% Duty cycle)

(**) The operational highest duty cycle is considered for this evaluation.

The power density S in mW/cm^2 is calculated in conjunction with the next formula:

$S = (EIRP \times Duty\ Cycle) / (4 \times \pi \times r^2) = (3.475 \times 0.2184) / (4 \times \pi \times 2.0^2) =$ **0.015099 [mW/cm^2]**

Since the shortest wave length λ of transmitter is 0.49cm, above mentioned calculations are considered in far field condition.

Normal mode is the worst case configuration of this transmitter, therefore above mentioned condition is considered as the most severe estimation. For details, refer to the relevant sections that is submitted test report, JP22QYUI 001.

Conclusion

This transmitter module is classified as Portable Devices by the client.

SAR evaluation is not required since the nominal frequency of the transmitter is higher than 6GHz, therefore, RF exposure evaluation (MPE) was conducted by the above-mentioned calculated method.

As a result, calculated Power Density S is below FCC limit at the separation distance of 2.0cm

Further, the estimated average EIRP is below exemption threshold ERP as per §1.1307 (b)(3)(i)(C), Table 1.

Hence, the device can be qualified as exemption from Routine Environmental Evaluation.