RF Exposure Statement: 50036571 004

Client:	**Kpnetworks Ltd.** 4-5-11 10F Shiba Minato-ku, Tokyo 108-0014, Japan
Test item:	**Gateway Board**
Identification:	**ISH-1101-003**

FCC Requirement

According to FCC 2.1091, mobile equipment must comply with the following applicable limit for maximum permissible exposure (MPE) specified in FCC 1.1310:

Equipment Use	Frequency Range	Power Density [mW/cm^2]	Average Time [min]
General Population / Uncontrolled Exposure	300MHz – 1.5GHz	0.549 **(*)**	30
	1.5 – 100GHz	1	30

Note:

(*) Power Density mentioned above is calculated according to the following formula:
Power density = f / 1500 [mW/cm^2], f = frequency in MHz
f is used as the smallest operation frequency of PCS transmitter (824MHz, corresponding to worst case).
824 /1500 = **0.549** [mW/cm^2]

ISED Requirement

According to RSS-102 (Issue 5), clause 2.5.2, no routine RF exposure evaluation is required if the transmitter has a minimum separation distance to the user greater than 20cm and has an output power (e.i.r.p.) below the following thresholds:

Transmitter Frequency Range	Transmitter	Operating Frequency Range [MHz]	RF Exp. Evaluation Threshold (*) [W]
300MHz – 6GHz	Wireless LAN	2412 – 2462	2.68
	Bluetooth	2402 – 2480	2.68
	850MHz band PCS	824 - 849	1.29
	1900MHz band PCS	1850 -1910	2.24

Note:

(*) RF Exposure Evaluation Threshold mentioned above is calculated according to the following formula:
RF Exposure Evaluation Threshold $= 1.31 \times 10^{-2} f^{0.6834}$ [W]
f is used as the lowest frequency in each Operating Frequency Range as worst case.

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Measurement Result

Maximum measured transmitter powers are given in the following tables, gray shading data show the worst case at each transmitter:

Transmitter		Cond. Output Power Pout [mW]	Max. Antenna Gain [dBi]	EIRP Output Power [mW]	EIRP: MPE Ratio to ISED Limit	Power Density at 20cm [mW/cm2]	Power Density: MPE Ratio to FCC Limit
Unlicensed Transmitter	Wireless LAN	84.53	2.10	136.94	0.051	0.02724	0.02724
	Bluetooth	0.83	2.10	1.34	0.001	0.00027	0.00027
PCS Transmitter	850MHz band	692 **(*)**	0.33	747.36	0.579	0.14868	0.27082
	1900MHz band	676 **(*)**	2.05	1081.60	0.483	0.21518	0.21518
Sum of worst case values of unlicensed and PCS transmitters				**1218.54**	**0.630**	**0.24242**	**0.29806**

Note:

(*) Conducted output power specified by the grants of the PCS module (FCC ID: QIPPHS8-P and IC: 7830A-PHS8P).

The power density S in mW/cm^2 is calculated according to the following formula:
$S = (P_{out} \cdot G) / (4\pi \cdot D^2)$, where
P_{out} = antenna conducted output power in mW,
G = antenna gain in linear scale (here: 2.1dBi = 1.62 linear, 0.33dBi = 1.08 linear, 2.05dBi = 1.60 linear)
D = distance between observation point and radiating structure in cm (here: 20cm).

Conclusion

This device is classified as a mobile device by the customer.

Since the device has two transmitters (Wireless LAN / Bluetooth and PCS) which operate simultaneously, worst total output power corresponding to simultaneous operation was evaluated. In additions, MPE ratios were calculated according to the KDB 447498 D01 (v06).

As a result, the device complies with the FCC and ISED RF exposure requirements, since the sum of the power density MPE ratios is less than 1 (i.e. 0.29806) at the highest possible transmitter power density for FCC, and the sum of the EIRP MPE ratios is less than 1 (i.e. 0.630) at the highest possible EIRP output power for ISED.

Refer to test reports 50036571 001, 002 and 003 for more details.

And also refer to application FCC ID: QIPPHS8-P for details on the RF exposure assessment performed on the PCS module.