RF EXPOSURE REPORT

CERTIFICATE OF CONFORMITY

FCC Rule Part:	**FCC Part 2 (Section 2.1091 and 2.1093)**
Report No.:	MFBBQJ-WTW-P24040202
FCC ID:	ACJ9TGWW23C
Product:	Radio Module
Brand:	Panasonic
Model No.:	WW23C
Received Date:	2024/4/10
Test Date:	2024/5/3
Issued Date:	2024/7/31
Applicant:	Panasonic Corporation of North America
Address:	Two Riverforont Plaza,Newark, NJ 07102-5490, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kewi Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Approved by: Jeremy Lin , **Date:** **2024/7/31**

Jeremy Lin / Project Engineer

This test report consists of 8 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.

Prepared by : Gina Liu / Specialist

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
MFBBQJ-WTW-P24040202	Original release.	2024/7/31

1 Certificate

Product:	Radio Module
Brand:	Panasonic
Test Model:	WW23C
Sample Status:	Engineering sample
Applicant:	Panasonic Corporation of North America
Test Date:	2024/5/3
FCC Rule Part:	FCC Part 2 (Section 2.1091 and 2.1093)
Standard:	KDB 447498 D01 General RF Exposure Guidance v06

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
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
1500-100,000	…	…	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

pi = 3.1416

r = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Test Results

Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

Band	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA II	1850-1910	24	0.1	20	0.051	1.00
WCDMA IV	1710-1755	24	1.16	20	0.065	1.00
WCDMA V	824-849	24	-0.65	20	0.043	0.55
LTE 2	1850-1910	24	0.1	20	0.051	1.00
LTE 4	1710-1755	24	1.16	20	0.065	1.00
LTE 5	824-849	24	-0.65	20	0.043	0.55
LTE 7	2500-2570	24	-0.24	20	0.047	1.00
LTE 12	699-716	24	0.36	20	0.054	0.47
LTE 13	777-787	24	-0.26	20	0.047	0.52
LTE 14	788-798	24	-0.26	20	0.047	0.53
LTE 25	1850-1915	24	0.1	20	0.051	1.00
LTE 26	814-849	24	-0.65	20	0.043	0.54
LTE 42	3452-3597.5	19	2.82	20	0.030	1.00
LTE 48	3552.5-3697.5	19	3.65	20	0.037	1.00
LTE 66	1710.7-1779.3	24	1.16	20	0.065	1.00
WLAN	2412-2462	23.87	2.99	20	0.097	1.00
	5180-5240	22.61	2.33	20	0.062	1.00
	5260-5320	22.87	2.33	20	0.066	1.00
	5500-5720	23.96	1.8	20	0.075	1.00
	5745-5825	24.1	1.78	20	0.077	1.00
	5925-7125	13.15	3.15	20	0.008	1.00
BT	2402-2480	10.5	2.66	20	0.004	1.00
BLE	2402-2480	8.72	2.66	20	0.003	1.00

Note:

1. The EUT is authorized for use in specific End-product. Please refer to below for more details.

Product	Brand	Model
Personal Computer	Panasonic	FZ-55

2. The EUT contains certified WLAN module (Model: WL23A, FCC ID: ACJ9TGWL23A), Refer to WLAN module report: 200611-01.TR01, 200611-01.TR02, 200611-01.TR03, 200611-01.TR04, 200611-01.TR05 and 200611-01.TR38. for WLAN power.
3. The WWAN Max Power is Tune-up Power.
4. The above Antenna information refers to the manufacturer's antenna specifications, the laboratory shall not be held responsible.
5. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

<SAR Exemption Analysis>

A single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Mode	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Ant. to Surface (mm)	Power Threshold (mW)	Require SAR Testing?
RFID-RI18A	0.01356	-26.83	0.00207	5	1	NO
RFID-RI23B	0.01356	-35.93	0.00026	5	1	NO

<Estimated SAR Calculation>

For instance, a given antenna may qualify for a SAR-based exemption according to <**SAR Exemption Analysis>**, with Pant < Pth, where Pant is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and Pth is SAR exemption threshold.

The estimate SAR value is calculated based the following equation:

$$SAR_{est} = 1.6 \cdot P_{ant} / P_{th} \ [\mathrm{W/kg}]$$

Mode / Band	Frequency (GHz)	Max.Tune-up Power (dBm)	Max. Tune-up Power (mW)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
RFID-RI18A	0.01356	-26.83	0.00207	Body	0	0.003312
RFID-RI23B	0.01356	-35.93	0.00026	Body	0	0.000416

Note:

1. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

Conclusion:

Both of the WWAN and WLAN and NFC can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WWAN + WLAN 2.4GHz + BT + MAX. RFID = 0.054/0.47 + 0.097/1 + 0.004/1 + 0.003312/1.6 = 0.2179

WWAN + WLAN 5GHz + BT + MAX. RFID = 0.054/0.47 + 0.062/1 + 0.004/1 + 0.003312/1.6 = 0.1829

WWAN + WLAN 6GHz + BT + MAX. RFID = 0.054/0.47 + 0.008/1 + 0.004/1 + 0.003312/1.6 = 0.1289

Therefore, the maximum calculations of above situations are less than the "1" limit.

--- END ---