RF Exposure Report

Report No.:	SA160330C17E
FCC ID:	BKMAE-WLU5000
Test Model:	WLU5000-D101(RoHS)
Received Date:	Mar. 30, 2016
Issued Date:	Aug. 19, 2016
Applicant:	SEIKO EPSON CORPORATION
Address:	3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
SA160330C17E	Original release.	Aug. 19, 2016

1 Certificate of Conformity

Product: Wireless LAN Module

Brand: EPSON

Test Model: WLU5000-D101(RoHS)

Sample Status: DV sample

Applicant: SEIKO EPSON CORPORATION

Standards: FCC Part 2 (Section 2.1091)
KDB 447498 D01 (October 23, 2015)
IEEE C95.1

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 EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Aug. 19, 2016
Ivy Lin / Specialist

Approved by : _____ , **Date:** Aug. 19, 2016
Ken Liu / Senior Manager

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				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

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 Calculation Result of Maximum Conducted Power

Module 1: WLU5000-D101(RoHS), FCC ID: BKMAE-WLU5000

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	26.16	4.71	20	0.243	1
5180-5240	19.24	5.69	20	0.062	1
5745-5825	19.25	5.72	20	0.062	1

* The 2.4 and 5GHz cannot transmit simultaneously.

Note:

2412-2462MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / 2] = 4.71$dBi

5180-5240MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / 2] = 5.69$dBi

5745-5825MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / 2] = 5.72$dBi

Module 2: WN7122BEP, FCC ID: BKMAE-7122

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	19.42	3.33	20	0.037	1

Note: Directional gain = 0.32dBi + 10log(2) = 3.33dBi

CONCULSION:

Three modules 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

1. Modeul 1 (WLAN 2.4G) + Modeul 2 (WLAN 2.4G) = 0.243 + 0.037 = 0.280

2. Modeul 1 (WLAN 5G) + Modeul 2 (WLAN 2.4G) = 0.062 + 0.037 = 0.099

Therefore, the maximum calculation of this situation is 0.281, which is less than the “1” limit.

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