RF Exposure Report

Report No.:	SA180222C25
FCC ID:	SLE-ELS61-US
Test Model:	ELS61-US
Received Date:	Oct. 09, 2014
Test Date:	Dec. 16, 2014 ~ Apr. 20, 2018
Issued Date:	Apr. 20, 2018
Applicant:	MOXA Inc.
Address:	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST., NEW TAIPEI CITY, TAIWAN
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.)
FCC Registration / Designation Number:	788550 / TW0003

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
SA180222C25	Original release.	Apr. 20, 2018

1 Certificate of Conformity

Product:	LTE/WCDMA Module
Brand:	MOXA
Test Model:	ELS61-US
Sample Status:	Engineering sample
Applicant:	MOXA Inc.
Test Date:	Dec. 16, 2014 ~ Apr. 20, 2018
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 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 RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Apr. 20, 2018

Suntee Liu / Specialist

Approved by : _____ , **Date:** Apr. 20, 2018

Bruce Chen / Project Engineer

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

Note:

1. This report is prepared for FCC class II permissive change to add host device.
2. The WLAN module (FCC ID: Z64-WL18DBMOD, Brand: Texas Instruments, Model: WL18MODGI) is collocated in the host device.
3. The host device's models are listed as below. Model UC-3121-T-US-LX is the representative for final test.

Model	Definition
UC-3nnn-v-w-x-y-zzzzzz and OnCell 31nn-LTE-n-x-w-zzzzzz	n = 0-9 (standards for different model issue) v = CT or blank (standards for coating issue) w = T or blank (standard for temperature issue) x = US, EU, AU, VZW or blank (standards for regional issue) y = CE, LX or blank (standards for OS issue) z = 0-9, A-Z, or blank (standards for marketing issue)

Brand	Product Name	Model	Difference
MOXA	UC-3100 Series wireless computer	UC-3101-T-US-LX	1 GHz CPU, 512MB RAM, 4 GB eMMC, 2 Ethernet ports, 1 serial port, 1 USB port, onboard LTE-US cat.1 module and Debian 9 (kernel 4.4) pre-installed, -30 to 70°C operating temperature
		UC-3111-T-US-LX	1 GHz CPU, 512MB RAM, 4 GB eMMC, 2 Ethernet ports, 1 serial port, 1 USB port, 1 SD slot, onboard LTE-US cat.1 module and Debian 9 (kernel 4.4) pre-installed, -30 to 70°C operating temperature
		UC-3121-T-US-LX	1 GHz CPU, 512MB RAM, 4 GB eMMC, 2 Ethernet ports, 1 serial port, 1 USB port, 1 CAN port, onboard LTE-US cat.1 module and Debian 9 (kernel 4.4) pre-installed, -30 to 70°C operating temperature
	OnCell 3100 Series cellular gateway	OnCell 3120-LTE-1-US-T	Industrial LTE Cat 1 cellular gateway, B2/B4/B5/B12, 1 x RS232/422/485 serial port, 2 x 10/100BaseT(X) RJ45 ports, -30 to 70°C
		OnCell 3120-LTE-1-US	Industrial LTE Cat 1 cellular gateway, B2/B4/B5/B12, 1 x RS232/422/485 serial port, 2 x 10/100BaseT(X) RJ45 ports, 0 to 55°C

* OnCell 3120 and UC-3101: The only difference is UI interface.

Function	Frequency (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN	2412~2462	23.87	1.8	20	**0.073**	1
WLAN	5180~5240	16.98	1.8	20	0.015	1
WLAN	5260~5320	17.20	1.8	20	0.016	1
WLAN	5500~5700	18.44	1.8	20	0.021	1
WLAN	5745~5825	17.88	1.8	20	0.018	1
WCDMA Band 2	1852.4~1907.6	22.85	2	20	0.061	1
WCDMA Band 4	1712.4~1752.6	23.03	2	20	0.063	1
WCDMA Band 5	826.4~846.6	23.37	2	20	**0.069**	0.551
LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7~1909.3	21.35	2	20	0.043	1
LTE Band 2 (Channel Bandwidth 3MHz)	1851.5~1908.5	21.24	2	20	0.042	1
LTE Band 2 (Channel Bandwidth 5MHz)	1852.5~1907.5	21.26	2	20	0.042	1
LTE Band 2 (Channel Bandwidth 10MHz)	1855.0~1905.0	21.53	2	20	0.045	1
LTE Band 2 (Channel Bandwidth 15MHz)	1857.5~1902.5	21.64	2	20	0.046	1
LTE Band 2 (Channel Bandwidth 20MHz)	1860.0~1900.0	21.66	2	20	0.046	1
LTE Band 4 (Channel Bandwidth 1.4MHz)	1710.7~1754.3	21.60	2	20	0.046	1
LTE Band 4 (Channel Bandwidth 3MHz)	1711.5~1753.5	21.57	2	20	0.045	1
LTE Band 4 (Channel Bandwidth 5MHz)	1712.5~1752.5	21.58	2	20	0.045	1
LTE Band 4 (Channel Bandwidth 10MHz)	1715~1750	21.46	2	20	0.044	1
LTE Band 4 (Channel Bandwidth 15MHz)	1717.5~1747.5	21.70	2	20	0.047	1
LTE Band 4 (Channel Bandwidth 20MHz)	1720~1745	21.63	2	20	0.046	1

Function	Frequency (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
LTE Band 5 (Channel Bandwidth 1.4MHz)	824.7~848.3	22.22	2	20	0.053	0.550
LTE Band 5 (Channel Bandwidth 3MHz)	825.5~847.5	22.10	2	20	0.051	0.550
LTE Band 5 (Channel Bandwidth 5MHz)	826.5~846.5	22.09	2	20	0.051	0.551
LTE Band 5 (Channel Bandwidth 10MHz)	829.0~844.0	22.17	2	20	0.052	0.553
LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7~715.3	22.12	2	20	0.051	0.466
LTE Band 12 (Channel Bandwidth 3MHz)	700.5~714.5	21.79	2	20	0.048	0.467
LTE Band 12 (Channel Bandwidth 5MHz)	701.5~713.5	21.85	2	20	0.048	0.468
LTE Band 12 (Channel Bandwidth 10MHz)	704~711	22.05	2	20	0.051	0.469

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Max. WLAN + WWAN = 0.073/1 + 0.069/0.551 = 0.208 + 0.203 = 0.198 < 1

---END---