

RF Exposure Report

Report No.: SA190401E07

FCC ID: NKR-LVSK-ODU

Test Model: LVSKODU

Received Date: Apr. 01, 2019

Test Date: May 21, 2019

Issued Date: June 12, 2019

Applicant: Wistron NeWeb Corp.

Address: 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA190401E07	Original release.	June 12, 2019

1 Certificate of Conformity

Product: LVSKODU

Brand: WNC

Test Model: LVSKODU

Sample Status: ENGINEERING SAMPLE

Applicant: Wistron NeWeb Corp.

Test Date: Apr. 01 to 26, 2018

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

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.

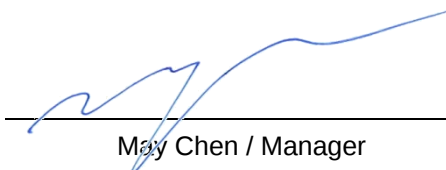
Prepared by :



Date: June 12, 2019

Claire Kuan / Specialist

Approved by :



Date: June 12, 2019

May Chen / 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				
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

2.2 MPE Calculation Formula

$$Pd = (P_{out} * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm²

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**.

2.4 Antenna Gain

LTE					
Ant. No.	Ant. Net Gain (dBi)	Freq. range (MHz)	Ant. Type	Connector Type	Cable Length (mm)
1.ODU-LH1 (Ant. 0)	3.86	746~894	IFA	NA	NA
		1710~2200			
2.ODU-LH2 (Ant. 2)	4.55	746~894	IFA	NA	NA
		1710~2200			
3.ODU-H1 (Ant. 3)	3.58	1710~2200	IFA	i-pex (MHF)	62
4.ODU-H2 (Ant. 4)	2.27	1710~2200	IFA	i-pex (MHF)	66
Bluetooth					
Ant. No.	Ant. Net Gain (dBi)	Freq. range (GHz)	Ant. Type	Connector Type	
5.ODU-BT (Ant. 1)	2.69	2.4~2.4835	IFA	NA	
5GNR					
Ant. No.	Freq. range (MHz)		Ant. Type	Connector Type	
5GNR Antenna	27500~28350 37000~40000		Smart patch array Antenna	NA	

2.5 Calculation Result

WWAN 1Tx:

Operation Mode	Evaluation Frequency (MHz)	Max.Conducted Power		Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
		(mW)	(dBm)				
LTE B2	1850.7	354.813	25.50	3.86	20	0.17168	1
LTE B4	1710.7	354.813	25.50	3.86	20	0.17168	1
LTE B5	824.7	354.813	25.50	3.86	20	0.17168	0.5498
LTE B13	779.5	354.813	25.50	3.86	20	0.17168	0.5197
LTE B66	1710.7	354.813	25.50	3.86	20	0.17168	1
LTE CA_ ANT0 off / ANT2 uplink for Band 2	1850.7	251.189	24.00	4.55	20	0.14247	1
LTE CA_ ANT0 off / ANT2 uplink for Band 4	1712.5	251.189	24.00	4.55	20	0.14247	1
LTE CA_ ANT0 off / ANT2 uplink for Band 66	1712.5	354.813	25.50	4.55	20	0.20125	1

Note:

1. Limit of Power Density = F/1500 (For frequency below 1500MHz)
2. This power include tune-up tolerance range that specified in LVSKODU Tune Up power table.

WWAN CA 2Tx <Worst case>:

Operation Mode	Evaluation Frequency (MHz)	Max.Conducted Power		Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
		(mW)	(dBm)				
LTE CA_13A ANT0 / 66A_ANT2	779.5	354.813	25.50	3.86	20	0.17168	0.5197
	1712.5	354.813	25.50	4.55	20	0.20125	1

5G NR:

Operation Mode	Evaluation Frequency (MHz)	Max.EIRP		Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
		(mW)	(dBm)			
5G NR n261	27500	354.813	25.50	20	0.07059	1
5G NR n260	37000	223.872	23.50	20	0.04454	1

Note:

1. This power include tune-up tolerance range that specified in LVSKODU Tune Up power table.

BT-LE:

Operation Mode	Evaluation Frequency (MHz)	Max.Conducted Power		Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
		(mW)	(dBm)				
BT-LE (1M)	2402	10	10	2.69	20	0.00370	1

Note:

1. This power include tune-up tolerance range that specified in LVSKODU Tune Up power table.

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

$BT\text{-}LE + 5G\ NR\ n261 + WWAN\ (CA_B13A_ANT\ 0) + WWAN\ (CA_B66A_ANT\ 2) = 0.0037 / 1 + 0.07059 / 1 + 0.17168 / 0.5197 + 0.20125 / 1 = 0.60588$

$BT\text{-}LE + 5G\ NR\ n260 + WWAN\ (CA_B13A_ANT\ 0) + WWAN\ (CA_B66A_ANT\ 2) = 0.0037 / 1 + 0.04454 / 1 + 0.17168 / 0.5197 + 0.20125 / 1 = 0.57983$

Therefore the maximum calculations of above situations are less than the “1” limit.

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