RF Exposure Report

Report No.:	SA151005E12
FCC ID:	MCQ-50M1899
Test Model:	50001899-03
Series Model:	50001899-XX (X=0~9)
Received Date:	Oct. 05, 2015
Test Date:	Jan. 06, 2016
Issued Date:	May 16, 2016
Applicant:	Digi International Inc.
Address:	11001 Bren Road East, Minnetonka, MN 55343
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 (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA151005E12	Original release.	May 16, 2016

1 Certificate of Conformity

Product:	TransPort LR54
Brand:	Digi International
Test Model:	50001899-03
Series Model:	50001899-XX (X=0~9)
Sample Status:	ENGINEERING SAMPLE
Applicant:	Digi International Inc.
Test Date:	Jan. 06, 2016
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1-2005

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:** May 16, 2016

Claire Kuan / Specialist

Approved by : _____ , **Date:** May 16, 2016

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				
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 27cm away from the body of the user.

2.4 Antenna Gain

WLAN Antenna Spec.				
Transmitter Circuit	Antenna Type	Antenna Connecter	Gain(dBi) including cable loss	Frequency (MHz to MHz)
Chain (0)	Dipole	R-SMA	4.6	2400~2483.5
			6.3	5150~5850
Chain (1)	Dipole	R-SMA	5	2400~2483.5
			7.4	5150~5850
WWAN Antenna Spec.				
Transmitter Circuit	Antenna Type	Antenna Connecter	Gain(dBi) including cable loss	Frequency (MHz to MHz)
Chain (0)	Dipole	SMA	4.18	1850 to 1915
			2.59	824 to 849
			5.12	1710 to 1785
			3.33	816 to 824
			2.22	777 to 787
			1.97	699 to 716
			1.0	2300 to 2325
			4.11	2496 to 2690
Chain (1)	Dipole	SMA	3.6	1850 to 1915
			2.47	824 to 849
			5.14	1710 to 1785
			3.2	816 to 824
			1.6	777 to 787
			1.6	699 to 716
			1.0	2300 to 2325
			3.56	2496 to 2690

3 Calculation Result Of Maximum Conducted Power

WLAN

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	651.784	7.81	27	0.42970	1
5180-5240	307.971	9.88	27	0.32702	1
5745-5825	351.295	9.88	27	0.37302	1

NOTE:
2.4GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 7.81$dBi
5.GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 9.88$dBi

WWAN(3G) , LTE(4G)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
814-849	250	3.33	27	0.0588	0.54266

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN(2.4GHz)+WLAN(5GHz)+WWAN (3G) or LTE (4G) = 0.42971/1 + 0.37302/1 + 0.0588/0.54266 = 0.911
Therefore the maximum calculations of above situations are less than the "1" limit.

Appendix

3G/LTE
MPE Evaluation for FCC ID: N7NMC7455 Radio Module:

Mode	Transmitter Range (MHz)		Maximum Conducted Power (dBm)		Antenna Gain (dBi)	Power Density (mW/cm2)		Ratio	Distance to Human Body (cm)
	Start	Stop	(dBm)	(W)		Vaule	Limit		
WCDMA Band II LTE Band 2	1850	1910	24	0.25	4.18	0.0715	1	0.07145	27
WCDMA Band IV LTE Band 4	1710	1755	24	0.25	5.14	0.0891	1	0.08913	27
WCDMA Band V LTE Band 5	824	849	24	0.25	2.59	0.0496	0.54933	0.090201	27
LTE Band 7	2500	2570	23	0.2	4.11	0.0563	1	0.05625	27
LTE Band 12	699	716	24	0.25	1.97	0.043	0.466	0.092167	27
LTE Band 13	777	787	24	0.25	2.22	0.0455	0.518	0.087838	27
LTE Band 25	1850	1915	24	0.25	0	0.0273	1	0.02729	27
LTE Band 26	814	849	24	0.25	3.33	0.0588	0.54266	0.108263	27
LTE Band 30	2305	2315	23	0.2	1	0.0275	1	0.02748	27
LTE Band 41	2496	2690	23	0.2	4.11	0.0563	1	0.05625	27

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