

## RF Exposure Report

**Report No.:** SA160322E08A

**FCC ID:** 2ABTEG2100

**Test Model:** Fios-G2100

**Received Date:** Mar. 22, 2016

**Test Date:** June 08 to July 07, 2016

**Issued Date:** Nov. 21, 2016

**Applicant:** Verizon Online LLC

**Address:** 1300 I Street NW, Room 400W, Washington, District of Columbia, 20005  
United State

**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.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

## Table of Contents

<b>Release Control Record .....</b>	<b>3</b>
<b>1      Certificate of Conformity.....</b>	<b>4</b>
<b>2      RF Exposure.....</b>	<b>5</b>
2.1    Limits For Maximum Permissible Exposure (MPE).....	5
2.2    MPE Calculation Formula .....	5
2.3    Classification .....	5
2.4    Antenna Gain .....	6
2.5    Calculation Result Of Maximum Conducted Power .....	8

### Release Control Record

Issue No.	Description	Date Issued
SA160322E08A	Original release.	Nov. 21, 2016

## 1 Certificate of Conformity

**Product:** Fios-G2100

**Brand:** Verizon

**Test Model:** Fios-G2100

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Verizon Online LLC

**Test Date:** June 08 to July 07, 2016

**Standards:** FCC Part 2 (Section 2.1091)

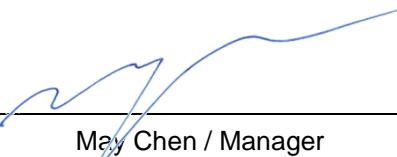
KDB 447498 D01 General RF Exposure Guidance v06

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:** Nov. 21, 2016

Claire Kuan / Specialist

**Approved by :**  , **Date:** Nov. 21, 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 <sup>2</sup> )	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<sup>2</sup>

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 24cm away from the body of the user.

So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

WLAN					
5GHz					
Antenna No.	Transmitter Circuit	Antenna Gain(dBi)	Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
1	Chain (0)	4.37	5150~5250	PCB	i-pex(MHF)
		4.92	5250~5350		
		4.23	5470~5725		
		4.23	5725~5850		
2	Chain (1)	4.13	5150~5250	PCB	i-pex(MHF)
		4.06	5250~5350		
		4.03	5470~5725		
		4.03	5725~5850		
3	Chain (2)	3.01	5150~5250	PCB	i-pex(MHF)
		3.72	5250~5350		
		4.79	5470~5725		
		4.71	5725~5850		
4	Chain (3)	3.87	5150~5250	PCB	i-pex(MHF)
		4.26	5250~5350		
		4.61	5470~5725		
		4.3	5725~5850		
2.4GHz					
Antenna No.	Transmitter Circuit	Antenna Gain(dBi)	Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
5	Chain (0)	3.9	2400~2483.5	PCB	i-pex(MHF)
6	Chain (1)	5.1			
7	Chain (2)	3.95			
8	Chain (3)	3.51			
DECT					
Antenna No.	Antenna Gain(dBi)		Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
9	5.46		1920~1930	Embedded	NA
10	5.46		1920~1930	Embedded	NA
Z-wave					
Antenna No.	Antenna Gain(dBi)		Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
11	1.02		908~916	On Board Printed	NA
Zigbee					
Antenna No.	Antenna Gain(dBi)		Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
12	4.23		2400~2483.5	On Board Printed	NA

Note 1. For WLAN 2.4GHz will fix transmission on Chain (0), Chain (1) and Chain (2).

The Directional gain table:

Frequency	Max Gain (dBi)
2.4GHz	5.85
5GHz	4.61

Note:

1. Non-TxBF mode & TxBF mode antenna gain refer to KDB 662911 F 2) f) (ii)

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

$N_{SS}$  = the number of independent spatial streams of data;

$N_{ANT}$  = the total number of antennas

$g_{j,k} = 10^{G_k/20}$  if the  $k$ th antenna is being fed by spatial stream  $j$ , or zero if it is not;  
 $G_k$  is the gain in dBi of the  $k$ th antenna.

## 2.5 Calculation Result Of Maximum Conducted Power

### WLAN

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412-2462	985.723	5.85	24	0.52375	1
5180-5240	813.01	4.61	24	0.32469	1
5260-5320	246.747	4.61	24	0.09854	1
5500-5720	229.5	4.61	24	0.09165	1
5745-5825	675.244	4.61	24	0.26967	1

NOTE:

2.4GHz:

The directional gain is 5.85dBi.

5GHz:

The directional gain is 4.61dBi.

### Zigbee

Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2405-2475	6.776	4.23	24	0.00248	1

### Z-Wave

Frequency Band (MHz)	Field Strength of Fundamental (dBuV/m) @3m	Pout EIRP (dBm)	Pout EIRP (mW)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
908.4	93.9	-1.33	0.736	24	0.0001	0.6056

Note:

1. Limit of Power Density =F/1500

2. Pout EIRP (dBm) = Field Strength of Fundamental (dBuV/m) @3m – 95.23 (dB)

### DECT

Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
80.91	5.46	24	0.03930	1

**Conclusion:**

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz} + \text{Zigbee} + \text{Z-Wave} + \text{DECT} = 0.52375 / 1 + 0.32469 / 1 + 0.00248 / 1 + 0.0001 / 0.6056 + 0.03930 / 1 = 0.89039$$

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

--- END ---