RF EXPOSURE REPORT

REPORT NO.: SA981104H02

MODEL NO.: RG211-2.5, RG211-2.5-1D1V, RG211-2.5-1D

ACCORDING: FCC Guidelines for Human Exposure

IEEE C95.1

APPLICANT: Accton Wireless Broadband Corp.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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RF Exposure Measurement

1. Introduction

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in our lab, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

2. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

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)
(A)Limits For Occupational / Control Exposures				
300-1500	…	…	F/300	6
1500-100,000	…	…	5	6
(B)Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

3. Friis Formula

Friis transmission 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

Pd is the limit of MPE, 1 mW/cm^2. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance 20cm.

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition,
Page 640, Eq. (11-133).

4. EUT Operating condition

The software provided by client enabled the EUT to transmit and receive data at specific channel frequencies individually.

5. Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. So, this device is classified as **Temporary Fixed Device**

6. Test Results

6.1 Antenna Gain

There are two sets of antennas provided to this EUT, please refer to the following table:

Chain	Antenna Type	Antenna Connector	Net Gain (dBi)	Cable Length (mm)	Cable loss (dB)	Frequency range (MHz)
0	External Omni-dipole	SMA	4.7	195	0.3	2500~2700
1				90		

6.2 Output Power Into Antenna & RF Exposure value at distance 20cm:

CHANNEL BANDWIDTH: 5MHz

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
Low	2502.5	347.7	0.204	1.0
Middle	2600	355.8	0.209	1.0
High	2687.5	324.4	0.190	1.0

CHANNEL BANDWIDTH: 10MHz

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
Low	2505	339.7	0.199	1.0
Middle	2600	328.3	0.193	1.0
High	2685	328.3	0.193	1.0

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