



RF Exposure Report

Report No.: SA160120E04

FCC ID: HDC434RG

Test Model: 434RG

Received Date: Jan. 20, 2016

Test Date: Feb. 02, 2016

Issued Date: Mar. 07, 2016

Applicant: Adtran

Address: 901 Explorer Boulevard, Huntsville Alabama, United States, 35806-2807

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.

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

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits For Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	6
3 Calculation Result Of Maximum Conducted Power	7



A D T

Release Control Record

Issue No.	Description	Date Issued
SA160120E04	Original release.	Mar. 07, 2016

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/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

The antennas provided to the EUT, please refer to the following table:

For 2.4GHz						
Antenna No.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Cable(mm)
Ant 1	WHAYU	C1597-510085-A	PCB	Soldering	2.8	47.7
Ant 2	WHAYU	C1597-510083-A	PCB	Soldering	2.4	98.7
For 5GHz						
Antenna No.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Cable(mm)
Ant 3	WHAYU	C1597-510086-A	PCB	I-PEX	3.3	84.8
Ant 4	WHAYU	C1597-510084-A	PCB	I-PEX	3.4	74.8
Ant 5	WHAYU	C1597-510082-A	PCB	I-PEX	3.5	186.8

3 Calculation Result Of Maximum Conducted Power

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2462	573.758	5.61	20	0.41539	1
5180-5240	260.004	8.17	20	0.33940	1
5745-5825	161.693	8.17	20	0.21107	1

NOTE:

2.4GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.61\text{dBi}$

5GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.17\text{dBi}$

Conclusion:

Both of the 2.4GHz and 5GHz WLAN can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = $0.41539 / 1 + 0.33940 / 1 = 0.75479$

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

--- END ---