



## RF Exposure Evaluation Declaration

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**FCC ID:** 2AC9MDSL2401HNT1C

**APPLICANT:** Wuxi Mitrastar Technology Co., Ltd

**Application Type:** Certification

**Product:** BHS VDSL VoIP

**Model No.:** DSL-2401HNU-T1C, DSL-2401HN-T1C

**Trademark:** MitraStar

**FCC Classification:** Digital Transmission System (DTS)

Reviewed By :

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Approved By :

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The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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## Revision History

Report No.	Version	Description	Issue Date
1504RSU00102	Rev. 01	Initial report	04-21-2015
1504RSU00102	Rev. 02	Corrected the direction gain	04-22-2015

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

Product Name	BHS VDSL VoIP
Model No.	DSL-2401HNU-T1C, DSL-2401HN-T1C
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462MHz 802.11n-HT40: 2422 ~ 2452MHz
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Maximum Average Output Power	802.11b: 19.45dBm 802.11g: 17.87dBm 802.11n-HT20: 20.35dBm 802.11n-HT40: 19.90dBm

Note: There are different of USB Port between models, and evaluated the different models in “FCC DoC report”

### 1.2. Antenna Description

Antenna Type	Frequency Band (GHz)	T <sub>x</sub> Paths	Max Peak Gain (dBi)	Directional Gain (dBi)
PCB Antenna	2.4	2	Ant 0: 3.5 Ant 1: 3.7	3.6

Note: Directional gain =  $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10})/N_{ANT}]$  dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment 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 <sup>2</sup> )	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 Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

## 2.2. Test Result of RF Exposure Evaluation

Product	BHS VDSL VoIP
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6dBi for 2.4GHz in logarithm scale.

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	2412 ~ 2462	19.45	0.0402	1
802.11g	2412 ~ 2462	17.87	0.0279	1
802.11n-HT20	2412 ~ 2462	20.35	0.0494	1
802.11n-HT40	2422 ~ 2452	19.90	0.0445	1

**CONCLUSION:**

The WLAN 2.4GHz Band can transmit simultaneously. Therefore, the Max Power Density at R (20 cm) =  $0.0494\text{mW}/\text{cm}^2 < 1\text{mW}/\text{cm}^2$ .

So the EUT complies with the requirement.