

# RF Exposure Report

**FCC ID: PX9WINDY001**

## RF Exposure Measurement

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The gain of the antennas used in the product is extracted from the Antenna data sheets provided 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 far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

## RF Exposure Limit

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

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

Limits for Maximum Permissible Exposure (MPE)

F= Frequency in MHz

## Friss Formula

Friss Transmission 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 the center of radiator in cm

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.

## EUT Operation condition

EUT was enabled to transmit and receive at lowest, middle and highest channels.

## 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 from the antenna should be included in the User manual. So, this device is classified as Mobile device.

## BT5.0+EDR

Mode	2402-2480MHz
Detector	PEAK
GFSK	9±1dBm
$\pi/4$ -DQPSK	5±1dBm
8DPSK	5±1dBm

## Antenna gain : 5.7dBi (gain of antenna in linear scale=3.72)

Protocol	ANT Gain(gain of antenna in linear scale)	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
GFSK	3.72	2441	10	10.00000	0.007401	1
$\pi/4$ -DQPSK	3.72	2441	6	3.981072	0.002946	1
8DPSK	3.72	2441	6	3.981072	0.002946	1

## 5G WIFI

Mode	802.11a/n20/n40/ac20/ac40/ac80: 5.15-5.25GHz
Detector	AV
802.11a Low	11±1dBm
802.11a Mid	13±1dBm
802.11a High	14±1dBm
802.11n20 Low (mimo)	14±1dBm
802.11n20 Mid (mimo)	16±1dBm
802.11n20 High (mimo)	17±1dBm
802.11 n40 Low (mimo)	14±1dBm
802.11 n40 High (mimo)	16±1dBm
802.11ac20 Low (mimo)	14±1dBm
802.11ac20 Mid (mimo)	16±1dBm
802.11ac20 High (mimo)	17±1dBm
802.11 ac40 Low (mimo)	14±1dBm
802.11 ac40 High (mimo)	16±1dBm
802.11ac80 (mimo)	17±1dBm

### ANT Gain (G)

Antenna number: 2

Antenna A gain : 5.7dBi

Antenna B gain : 5.7dBi

Mimo Antenna gain : 8.71dBi (gain of antenna in linear scale=7.43)

Protocol	ANT Gain(gain of antenna in linear scale)	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11 a	3.72	5200	15	31.6228	0.02341	1
802.11 n20(mimo)	7.43	5180	18	63.0957	0.04672	1
802.11 n40(mimo)	7.43	5230	17	50.1187	0.07412	1
802.11 ac20(mimo)	7.43	5240	18	63.0957	0.09331	1
802.11 ac40(mimo)	7.43	5230	17	50.1187	0.07412	1
802.11 ac80(mimo)	7.43	5210	17	50.1187	0.07412	1

According to the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know max MPE value 0.09331 at distance 20cm. This is less than the limit 1, So Compliance the RF exposure requirement.