NTE310AG User Manual

Wireless Access Point AP7215

Table of Content

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.   These limits are designed to provide reasonable protection against harmful interference in a residential installation.   This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.   However, there is no guarantee that interference will not occur in a particular installation.   If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two

conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

For operation within 5.15 ~ 5.25GHz frequency range, it is restricted to indoor environment.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada Statement

Operation is subject to the following two conditions:
1) this device may not cause interference and
2) this device must accept any interference, including interference that may cause undesired operation of the device

This device has been designed to operate with an antenna having a maximum gain of 14dBi.
Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP is not more than required for successful communication.

Because high power radars are allocated as primary users (meaning they have priority) in 5250-5350 MHz, these radars could cause interference and/or damage to license exempt LAN devices.

1. Introduction

This document provides a description of how to use the software test mode in the context of performing regulatory testing for the Wireless AP 7215. AP7215 delivers a special software test mode providing the necessary commands to setup the internal radio for the required regulatory testing as part of product certification. The present document describe how to setup the Wireless AP 7215 in that special test mode and provides the detailed step-by-step commands relevant in conducting Radio and Electro-magnetic Compatibility (EMC) regulatory testing.

The document will be updated as required during the development cycle in order to redefine any major changes in the product offering. Any updates in the document will be agreed by the appropriate responsible engineering authority (REA).

Notice: *The product is only for professional installation.*

2 Wireless AP7220 Hardware Overview

The product includes two radio sub-systems. One is the access radio (Access Link – AL) operating at 2.4GHz compliant to the IEEE 802.11b/g standard. The second radio is used for traffic back-haul (i,e, Transit Link – TL) operating in the 5.GHz band compliant to IEEE 802.11a standard.

Figure 1 shows a simplified functional block diagram of the Wireless AP7215.

2.1 Operating Frequencies

This section provides the full set of operating frequencies for both IEEE 802.11b/g and IEEE802.11a radios.

Table1. Operating 5GHz frequencies

IEEE Channel Number	Centre Frequency (GHz)	Environmental	IEEE Channel Number	Centre Frequency (GHz)	Environmental
36	5.180	Indoor only	148	5.740	In/Outdoor FCC
40	5.200	Indoor only	152	5.760	In/Outdoor FCC
44	5.220	Indoor only	156	5.780	In/Outdoor FCC
48	5.240	Indoor only	160	5.800	In/Outdoor FCC
56	5.280	In/Outdoor FCC Indoor ETSI	164	5.820	In/Outdoor FCC
60	5.300	In/Outdoor FCC Indoor ETSI	168	5.840	In/Outdoor FCC
64	5.320	In/Outdoor FCC Indoor ETSI			
100	5.500	In/Outdoor FCC Indoor ETSI			
104	5.520	In/Outdoor FCC Indoor ETSI			
108	5.540	In/Outdoor FCC Indoor ETSI			
112	5.560	In/Outdoor FCC Indoor ETSI			
116	5.580	In/Outdoor FCC Indoor ETSI			
120	5.600	In/Outdoor FCC Indoor ETSI			
124	5.620	In/Outdoor FCC Indoor ETSI			
128	5.640	In/Outdoor FCC Indoor ETSI			
132	5.660	In/Outdoor FCC Indoor ETSI			
136	5.680	In/Outdoor FCC Indoor ETSI			
140	5.700	In/Outdoor FCC Indoor ETSI			

FOXCONN® *Network System Group*

Table2. Operating 2.4GHz frequencies

| IEEE channel Number	Channel Centre Frequency (MHz)	Regulatory domain
1	2412	FCC/IC/ETSI
2	2417	FCC/IC/ETSI
3	2422	FCC/IC/ETSI
4	2427	FCC/IC/ETSI
5	2432	FCC/IC/ETSI
6	2437	FCC/IC/ETSI
7	2442	FCC/IC/ETSI
8	2547	FCC/IC/ETSI
9	2452	FCC/IC/ETSI
10	2457	FCC/IC/ETSI
11	2462	FCC/IC/ETSI
12	2467	ETSI
13	2472	ETSI

3 Regulatory Testing Setup and Steps

In order setup the unit for Radio and EMC testing, the followings are required:

- Ethernet CAT5 cable (crossover cable if direct connection to AP)
- PC
- Mounting accessories
- External antenna accessories
    1) External 5GHz antenna gain: 14dBi
    2) The fixed dual band antenna:
        Antenna gain for 5GHz: 6.5dBi
        Antenna gain for 2.4GHz: 4dBi

Figure 3 Show the connectivity testing setup.

Figure 3.   AP7215 connectivity testing setup.

CAT5 Ethernet cable

192.168.10.2

192.168.10.1
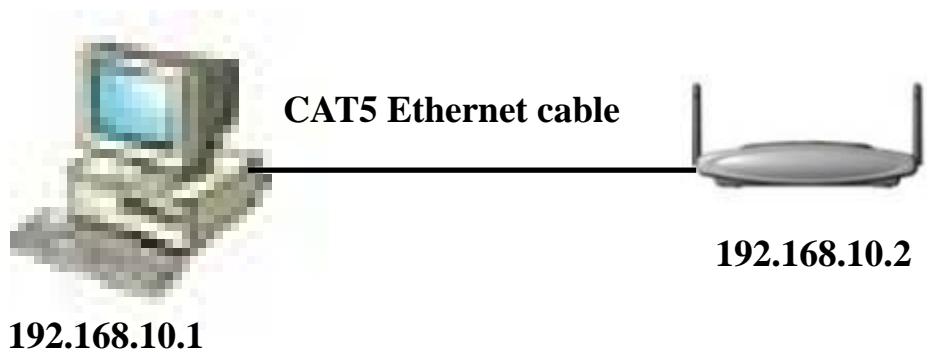
3.1 Instruction to get setup

1) Download the PC_Art.zip file and unzip to your PC's hard drive.

    a) For example, unzip to d:\art folder

2) Download the vxWorks-wdb file into your FTP server's home directory. Configure the FTP server to accept connections based on the following:

    a)   Username: tl

    b)   Password: testing

    c)   Server IP address: 192.168.10.1

    d)   Filename: vxWorks-wdb

3) Powerup the WARP module and check to see if it downloads the vxWorks-wdb file from the FTP server. The default IP address on the WARP is 192.168.10.2

4) Create a shortcut on your desktop that points to the art_mb31.bat file found in the folder where PC_Art.zip was unzipped. Clicking on this shortcut should start ART communicating with the 11b/g card. Note that the card defaults to '11g' mode and can be changed by following the instructions on the menu to toggle the mode.

5) Create another shortcut on your desktop that points to the art_mb23.bat file found in the folder where PC_Art.zip was unzipped. Clicking on this shortcut should start ART communicating with the 11a card.

3.2 Instruction to ART function

After you getting into ART via art_mb23 (11a card), you can see the image as following :

```
=============================================
: Test Harness Main Options:                :
:   e - Ignore (E)EPROM Calibration         :
:   c - (C)ontinuous transmit mode          :
:   r - Continuous RF (R)eceive mode        :
:   l - (L)ink test menu                    :
:   t - (T)hroughput test menu              :
:   p - EE(P)ROM function                   :
:   s - (S)witch test card                  :
:   m - (M)anufacturing/Calibration Test    :
:   g - Enable lo(g)ging                    :
:   u - (U)tility Menu                      :
:   i - (N)oise Immunity Menu               :
:  ^R - (R)eboot Target                     :
:   q - (Q)uit                              :
=============================================
```

Press "c" to 'Continuous transmit mode' , then you can see the image as following :

```
================================================================
: Continuous Transmit Options                                  :
:   p - Increase Center Frequency by 10 MHz (P inc by 100 MHz) :
:   l - Decrease Center Frequency by 10 MHz (L dec by 100 MHz) :
:   o - Increase Data Rate                                     :
:   k - Decrease Data Rate                                     :
:   i - Increase pcdac (I inc by 10)                           :
:   j - Decrease pcdac (J dec by 10)                           :
:   f - Increase power output by 0.5dBm (F inc by 5dBm)        :
:   c - Decrease power output by 0.5dBm (C dec by 5dBm)        :
:   u - Increase ob by 1 (w - increase b-ob)                   :
:   h - Increase db by 1 (q - increase b-db)                   :
:   v - Toggle power override (ovr)                            :
:   x - Toggle external power                                  :
:   n - Step xpd gain by 6dB                                   :
:   s - Toggle output mode (tx100 : tx99 : single carrier)     :
:   b - Toggle turbo mode                                      :
:   a - Toggle antenna                                         :
:   < - Decrement 'P' antenna port                             :
:   > - Increment 'P' antenna port                             :
:   [ - Decrement 'N' antenna port                             :
:   ] - Increment 'N' antenna port                             :
:   d - Toggle Data Pattern                                    :
:   z - Toggle Scramble mode                                   :
:   9 - Toggle dynamic optimization                            :
: ESC - exit                                                   :
================================================================

Operating in 11a at channel 5.740GHz

Power control mode:
Output power = 11.5, ext power detector = 1, xpdGain = 18,
ob = 2, db = 2, b_ob = 2, b_db = 2, antennaPort(p,n) = (0,0)
ANT_A, [TX99], Rate =  6 Mbps, PN9 Gainf = 37 [FG6]
```

All the function that ART can be done has shown on the image.

The most basic function and it's operating parameter are listed as following :

1) Press "P" to increase 5 MHz .

   Press "L" to decrease 5 MHz .

   Press "Shift + P" to increase 100 MHz .

   Press "Shift + L" to decrease 100 MHz .

2) Press "F" to increase output power 0.5 dBm .

   Press "C" to decrease output power 0.5 dBm .

   Press "Shift + F" to increase output power 5 dBm .

   Press "Shift + C" to decrease output power 5 dBm .

3) Press "O" to increase datarate .(6Mbps to 54Mbps)

   Press "K" to decrease datarate . (54Mbps to 6Mbps)

4) Press "a" to select the antenna port . (Main or Aux)

5) **About the antenna port parameter (p,n) , "p" is the parameter used to control the Main antenna port and "n" is the parameter used to control the Aux antenna port . The moment when you get into 'Continuous transmit mode', the default setting of (p,n) is (0,0) and the output port is the internal Main antenna port. Once you change the "p", the relationship between (p,n) and antenna port will return to the normal setting . That is when "p(or n)" is 0 and 7, the path is switched to external antenna port, either Main or Aux. When "p(or n)" is 1 to 6, the path is switched to internal antenna port.** (When you face to the side with 2 antenna port ,Ethernet port and power supply port of AP7215, the right antenna port is the Main port.)

Press "Shift + { " to increase "p" .(0~7)

Press "Shift + } " to decrease "p" .(0~7)

Press " { " to increase "n" .(0~7)

Press " } " to decrease "n" .(0~7)

After you getting into ART via art_mb22 (11b/g card), all the function and it's operating parameter are the same with 11a card, besides the switch of antenna and the change beween 11b or 11g mode.(11b/g card can only output the power from internal antenna port.) **The change between 11b or 11g mode , please press "o". Three variation will make a cycle, that is 11g, 11g OFDM and 11b mode.**

3.3 Compliance test failure

In case of compliance test failure (not meet required EIRP or emission mask, etc), it is possible
to correct the radio parameters in real-time during regulatory lab testing. In this case, Foxconn technical
person will be on-site to assist in such a case to tuned the required radio parameters and record the profile that passes the test. The corrected profile will be recorded for subsequent version control issuance of the radio firmware.

3.4 Regulatory testing priorities

In the spirit of getting quickly the confidence level that the product is aimed at passing all
regulatory rules, the followings shall be tested first:

· Test Access Link (2.4GHz) on edge channels (i.e CH1 and CH11 for FCC, CH1 and CH13 for ETSI)
· Concentrate initial testing on all edge channels in 5GHz band (FCC: U-NII, ISM, ETSI: 5500-5700MHz)

FOXCONN® *Network System Group*

4 Appendix –A: PC Static IP Configuration

To setup PC running Windows 2000 or up with static IP address configuration (192.168.10.1),
the following steps are required:

- Right Click on Start,
- Point to "Settings", "Network and Dial-up Connections", and Right Click and select
"Open"
- Double Click on the appropriate LAN connection, "Local Area Connection"
- Select "Properties"
- Double click on "Internet Protocol (TCP/IP)"
- Select "Use the following IP address" and Enter

o 192.168.10.1 for the IP address

o 255.255.255.0 for the Subnet mask

- Select "OK "and close down the windows
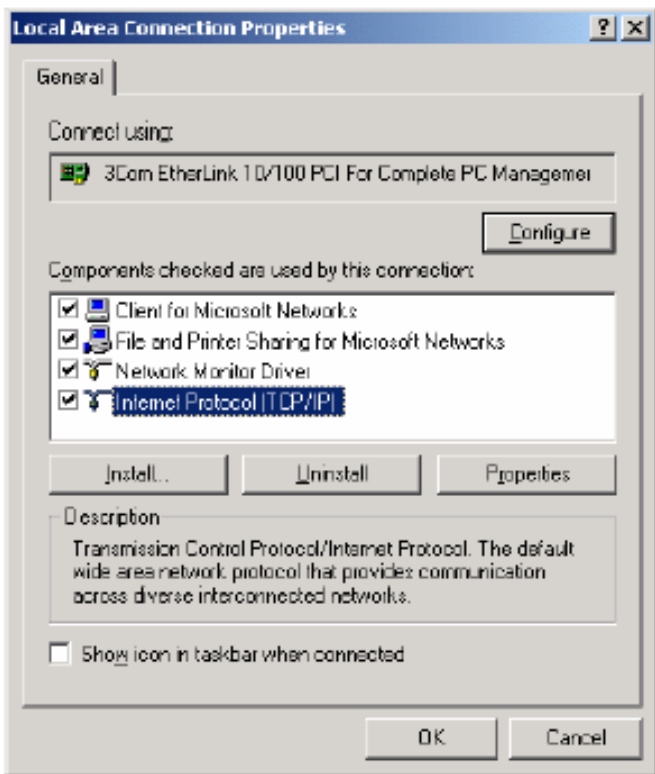
- Select "Use the following IP address" and Enter

o 192.168.10.1 for the IP address

o 255.255.255.0 for the Subnet mask

- Select "OK "and close down the windows
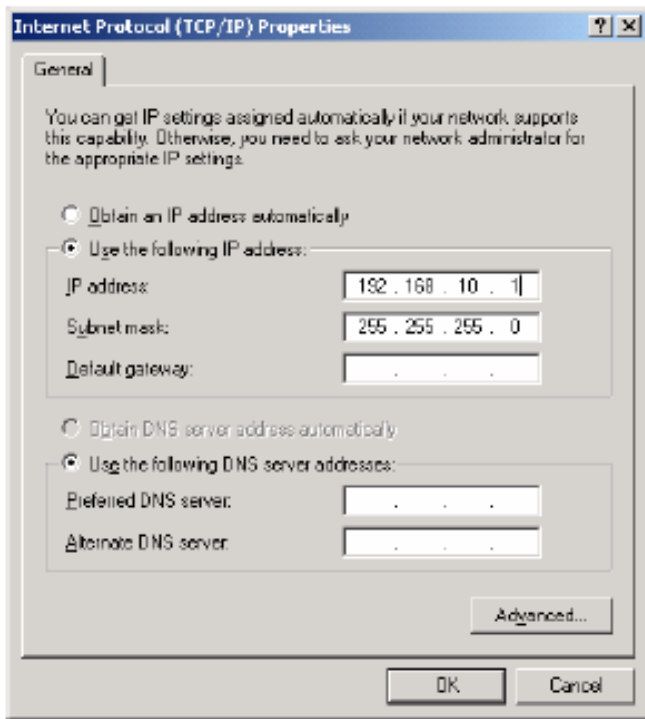
- Go to Network and Dial-up Connections window
- Right click on the Local Area Connection,
- Select Disable
- Right click on the Local Area Connection,
- Select Enable

5 Appendix-B: ISO Country Codes

The list below provides the target list of countries for product certification for phase 1 and phase 2 regulatory testing.

Country Name	Region	ISO Code
Canada	NA	CA
USA	NA	US
Taiwan	Greater China	TW
China	Creater China	CN
United Kingdom	EMEA	GB
Italy	EMEA	IT
Germany	EMEA	DE
Netherlands	EMEA	NL
France	EMEA	FR
Spain	EMEA	ES
Finland	EMEA	FI
Denmark	EMEA	DK
Norway	EMEA	NO
Sweden	EMEA	SE
Poland	EMEA	PL
Egypt	EMEA	EG
South Africa	EMEA	ZA
Switzerland	EMEA	CH
Turkey	EMEA	TR
Belgium	EMEA	BE
Estonia	EMEA	EE
Ireland	EMEA	IE
Portugal	EMEA	PT
Mexico	CALA	MX
Venezuela	CALA	VE
Brazil	CALA	BR
Korea Republic	APAC	KR
Australia	APAC	AU
New Zealand	APAC	NZ