

Wireless Video Module

User Manual

Draft

Table of Contents

1. Introduction	3
1.1 Purpose and Scope	3
1.2 Terms and Abbreviations	3
2. References	3
3. Configuration and Status Registers	3
3.1 General Description	3
3.2 Register Details	3
3.2.1 Introduction	3
3.2.2 Register Summary	4
3.2.3 System Version	5
3.2.4 Video standard	5
3.2.5 Video input port	6
3.2.6 Video rate	6
3.2.7 Country Code	7
3.2.8 WLAN channel	7
3.2.9 Operation mode – local unit	8
3.2.10 Operation mode – remote unit	8
3.2.11 Timeout and Status of the Wireless I2C	9
3.2.12 IR enable/disable	9
3.2.13 Discrete Inputs Status	10
3.2.14 Wireless ID	10
3.2.15 RSSI Status	10
3.2.16 PER Status	10
3.2.17 Do Installation Process	11
3.2.18 Discrete I/O Test Mode	11
3.2.19 Reset unit	11

1. Introduction

1.1 Purpose and Scope

The Wireless Video Module product (WVM-1101) delivers video over wireless channel. It enables a wireless connection between a video source (DVD, VCR, PVR, STB, BS or PC) and a video display (standard TV, flat screen TV or video monitor).

This document guides the user how to configure the WVM via a set of configuration and status registers.

1.2 Terms and Abbreviations

BS	Base Station
CPU	A microprocessor or microcontroller device
DVD	Digital Video Disk
MPEG	Motion Picture Expert Group
N/A	Not Applicable
PVR	Personal Video Recorder
STB	Set Top Box
VCR	Video Cassette Recorder
WLAN	Wireless Local Area Network
WVM	Wireless Video Module

2. References

- [1] WVM - Frequency Channel Tables

3. Configuration and Status Registers

3.1 General Description

The WVM provides a set of internal registers, which can be modified or read via I2C interface. The values of these registers determine the behavior of the WVM. Each register has a unique sub-address.

3.2 Register Details

3.2.1 Introduction

This section describes the internal registers.

- Byte order: Byte0 is the first byte in a read/write operation.
- Bit order: Bit 7 is the most significant bit within a byte.
- 0x... is a hexadecimal number.

3.2.2 Register Summary

Sub-address	Name	Side	Read/ Write	Size [bytes]	Function
0x00	System Version	Tx, Rx	R	4	System version ID
0x01	Set video standard	Tx	R/W	2	Set NTSC/PAL/SECAM/Auto.
0x02	Video standard status	Tx, Rx	R	1	Actual status of video standard
0x03	Select video input port	Tx	R/W	2	Select Composite-video, S-Video, Component-video or Auto. Applicable only to WVM1103.
0x04	Video input port status	Tx, Rx	R	1	Actual status of video input port. Applicable only to WVM1103.
0x05 – 0x08	Reserved	----	----	----	
0x09	Set video rate	Tx	R/W	2	Set video bit rate
0x0A	Video rate status	Tx, Rx	R	1	Actual status of video bit rate
0x0B – 0x0F	Reserved	----	----	----	
0x10	Country Code	Tx, Rx	R/W	2	Set Country code for WLAN
0x11	Set WLAN channel	Tx	R/W	2	Set frequency channel for WLAN
0x12	WLAN channel status	Tx, Rx	R	2	Actual status of WLAN channel
0x13	Change operation mode	Tx, Rx	W	1	Change the operation mode at the local unit
0x14	Operation mode status	Tx, Rx	R	1	Actual operation mode at the local unit
0x15	Wireless I2C timeout	Tx	R/W	1	Set timeout for error conditions
0x16	Wireless I2C status	Tx	R	1	Status of last transaction
0x17	IR Enable/Disable	Rx	R/W	1	Enable/Disable the IR function
0x18	Reserved	----	----	----	
0x19	Discrete Inputs status	Rx	R	1	Status of Discrete Inputs of the Tx unit.
0x1A	Wireless ID	Rx	R	16	Value of wireless ID string
0x1B	RSSI status	Tx, Rx	R	1	Status of signal strength
0x1C – 0x1E	Reserved	----	----	----	
0x1F	PER status	Tx, Rx	R	1	Status of Packet Error Rate
0x20	Remote operation mode change request	Tx, Rx	W	1	Request a change of the operation mode at the remote unit
0x21	Change request status	Tx, Rx	R	1	Status of change request
0x22	Do installation process	Tx	W	1	Initiate installation process (Tx-Rx synchronization)
0x23	Discrete I/O test	Tx, Rx	R/E	1	Test mode for the Discrete I/O's
0x24 – 0x50	Reserved	----	----	----	
0x51	Reset unit	Tx, Rx	W	1	Unit reset command

Notes:

- The Side column designates if the register is applicable to both Tx and Rx units, Tx only or Rx only.
- The Read/Write column designates if the register is Read only (R), Read and Write (R/W) or Write only (W).
- The Size column designates the number of bytes in the register, e.g. 1, 2 or 4.

3.2.3 System Version

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x00	System Version	R	4	Byte0: V1 Byte1: V2 Byte2: V3 Byte3: V4 Byte values are 0-0xFF	N/A

The System version is presented as: V1.V2.V3.V4.

V1 – Product type

V2 – Major version ID

V3, V4 – Minor version ID

3.2.4 Video standard

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x01	Set video standard (Tx only)	R/W	2	Byte0 = 1: NTSC Byte0 = 2: PAL Byte0 = 3: SECAM Byte0 = 0xFF: N/A (only on Read)	1 (NTSC)
				Byte1 = 0: Fixed Byte1 = 1: Automatic (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Automatic)
0x02	Video standard status	R	1	Byte0 = 0: No video signal Byte0 = 1: NTSC Byte0 = 2: PAL Byte0 = 3: SECAM	N/A

The video standard at the video input can be set to NTSC, PAL or SECAM, or can be set to Automatic. When set to Automatic, the system will select automatically the appropriate video standard, according to the actual input signal.

Writing to register 0x01 commands the system to a desired video standard.

Reading from register 0x02 presents the video standard that is currently active.

3.2.5 Video input port

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x03	Select video input port (Tx only)	R/W	2	Byte0 = 1: Composite video Byte0 = 2: S-Video Byte0 = 3: YPbPr-interlaced video Byte0 = 0xFF: N/A (only on Read) Byte1 = 0: Fixed Byte1 = 1: Automatic (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Composite video) 1 (Automatic)
0x04	Video input port status	R	1	Byte0 = 0: No video signal Byte0 = 1: Composite video Byte0 = 2: S-Video Byte0 = 3: YPbPr-interlaced video	N/A

The video input can be selected among YPbPr (component) input with interlaced video, S-Video and Composite video, or set to Automatic.

When set to Automatic the Tx unit will perform automatic detection of a video signal in the following order of precedence:

- YPbPr-interlaced video
- S-Video
- Composite Video.

Writing to register 0x03 commands the system to a desired video input port.

Reading from register 0x04 presents the video input port that is currently active.

Note: Register 0x03 and 0x04 are applicable only to WVM1103 model.

3.2.6 Video rate

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x09	Set video rate (Tx only)	R/W	2	Byte0 = 1: 4 Mbps Byte0 = 2: 8 Mbps Byte0 = 3: 14 Mbps Byte0 = 4-7: reserved Byte0 = 0xFF: N/A (only on Read) Byte1 = 0: Fixed rate Byte1 = 1: Limited Automatic rate (up to the rate set by Byte0) Byte1 = 2: Fully Automatic rate (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	3 (14 Mbps) 2 (Fully Automatic)
0x0A	Video rate status	R	1	Byte0 = 0: No video transfer Byte0 = 1: 4 Mbps Byte0 = 2: 8 Mbps Byte0 = 3: 14 Mbps	N/A

The video transmission rate can be set to 4, 8 or 14 Mbps, or can be set to Limited Automatic or Fully Automatic.

When set to Limited Automatic, the system will select automatically the highest possible video rate, up to the value set in Byte0 of register 0x09. This setting may be used when the user wants to limit the system to 4 or 8 Mbps only, without trying to go to 14 Mbps.

When set to Fully Automatic, the system will select automatically the highest possible video rate.

Writing a value to register 0x09 commands the system to a desired video rate.

Reading from register 0x0A presents the video rate currently used by the system (i.e., the fixed video rate set by the user or the video rate selected automatically by the system).

3.2.7 Country Code

Sub-addr	Name	R/W	Size [bytes]	Value	Factory Setup
0x10	Set Country	R/W	2	Byte1:Byte0 = 0x8000 – 0x8FFF: see [1] - Country Code table	According to target country

Text convention: If Byte1:Byte0 = 0x1234 then Byte0 is 0x34 and Byte1 is 0x12.

The WLAN Country code can be set to one of the permitted values.

Writing to register 0x10 commands the system to a desired Country code. The Country code must be set both at the Tx and Rx unit.

Note: Trying to write an illegal Country Code will be ignored, the value of the register will not change.

3.2.8 WLAN channel

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x11	Set WLAN channel (Tx only)	R/W	2	Byte0 = 1, 2, ... : Index of a fixed channel in the list of permitted channels, according to configured Country code. Byte0 = 0xFF: N/A (only on Read)	1
				Byte1 = 0: Fixed channel Byte1 = 1: Automatic channel (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Automatic)
0x12	WLAN channel status	R	2	Byte0 = Channel number, according to Channel Table below, of actual channel.	N/A
				Byte1 = Index of actual channel in the list of permitted channels, according to configured Country code.	N/A

The WLAN frequency channel can be set to one of the permitted channels, according to configured Country code, or can be set to Automatic.

When set to Automatic, the system will select automatically the best available channel.

Writing to register 0x11 commands the system to a desired mode and channel.

Reading from register 0x12 presents the channel currently used by the system.

Channel Table

FCC Channel Number	FCC Frequency (MHz)
01	5180
02	5200
03	5220
04	5240
05	5260
06	5280
07	5300
08	5320
ETSI Channel Number	ETSI Frequency (MHz)
01	5180
02	5200
03	5220
04	5240
MKK Channel Number	MKK Frequency (MHz)
01	5180
01	5200
03	5220
04	5240

3.2.9 Operation mode – local unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x13	Change operation mode	W	1	Byte0 = 0: Enter Sleep mode Byte0 = 1: Exit Sleep mode	N/A
0x14	Operation mode status	R	1	Byte0 = 0: Sleep mode Byte0 = 1: Idle mode Byte0 = 2: Work mode	N/A

Notes:

- Enter Sleep Mode command is applicable only when the unit is in Idle or Work mode. Entering Sleep mode stops any video and audio transfer.
- Exit Sleep Mode command is applicable only when the unit is in Sleep mode. The unit will switch to Idle mode.

3.2.10 Operation mode – remote unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x20	Remote operation mode change request	W	1	Byte0 = 0: Request to enter Sleep mode on the remote unit Byte0 = 1: Request to exit Sleep mode on the remote unit	N/A
0x21	Change request status	R	1	Byte0 = 0: Success of change request Byte0 = 1: Failure of change request Byte0 = 2: Request in progress	N/A

Notes:

- Enter Sleep mode request is applicable only when the remote unit is in Idle or Work mode. Entering Sleep mode stops any video and audio transfer.
- Exit Sleep mode request is applicable only when the remote unit is in Sleep mode. The unit will switch to Idle mode.
- Register 0x21 shows the status of the last change request.
When the request is in progress, the register will be set to 2.
In case of failure in executing the command (e.g., the remote unit is off), the register will be set to 1. It may take approximately 1 sec. to set the register to Failure value.
In case of successful execution the register will be set to 0.
The Success/Failure condition will remain set until the next request will start.

3.2.11 Timeout and Status of the Wireless I2C

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x15	Wireless I2C timeout (Tx only)	R/W	1	Byte0 = 0-0xFE: timeout, in 10 mSec units Byte0 = 0xFF: N/A (only on Read)	0x1E (300 mSec)
0x16	Wireless I2C status (Tx only)	R	1	Byte0 = 0: Success Byte0 = 1: Failed Byte0 = 0xFF: N/A	N/A

Register 0x15 sets the timeout of the Wireless I2C function. It is applicable only to the Tx unit.
In case of failure in the Wireless I2C, while the SCL line is held low by the Tx unit, the unit will release the SCL line after that timeout.

Register 0x16 presents the status of the last transaction. It is applicable only to the Tx unit.
In case of failure in the Wireless I2C transaction, this register will be set to 1. In case of a complete and successful Wireless I2C transaction this register will be set to 0.

Note: The master should read this register only at the end of a Wireless I2C transaction. The Success/Failed condition will remain set until the next transaction will start.

3.2.12 IR enable/disable

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x17	IR Enable/Disable (Rx only)	R/W	1	Byte0 = 0: Disabled Byte0 = 1: Enabled Byte0 = 0xFF: N/A (only on Read)	1 (Enabled)

The IR function can be enabled or disabled.

3.2.13 Discrete Inputs Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x19	Discrete Inputs Status (Rx only)	R	1	Byte0 = 0-7: Status of Discrete Input 1, 2, 3 at the Tx unit. Bit 0 is 1 when Discrete Input 1 is low; bit 1 corresponds to Discrete Input 2 and bit 3 corresponds to Discrete Input 3.	N/A

The Discrete Inputs Status is updated when there is a change in the input status at the Tx unit.

3.2.14 Wireless ID

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1A	Wireless ID (Rx only)	R	16	Byte0-15 = Value of wireless ID string.	N/A

The Wireless ID string is a 128-bits (16-bytes) string, which identifies the Rx unit. It is used for communicating to the Rx unit from a PC equipped with PC Connectivity product.

3.2.15 RSSI Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1B	RSSI status	R	1	Byte0 = 0-0x46 (0-70): RSSI in dB units	N/A

RSSI is an acronym for Received Signal Strength Indication. The RSSI value measures the signal relative to a calibrated noise floor. The noise floor is measured over the relevant bandwidth over a long time, and the minimum value establishes the calibrated noise floor.

The RSSI on the Rx side relates to the video stream direction; the RSSI on the Tx side relates to the Acknowledge packets direction.

The RSSI is updated every 100 mSec.

3.2.16 PER Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1F	PER status	R	1	Byte0 = 0-0xC7 (0-199): PER in 0.5% units (e.g., 2 means PER of 1%) Byte0 = 0xC8 (200): the unit is not connected to a peer unit.	N/A

PER is an acronym for Packet Error Rate. While in video transmission, the PER is measured and updated at the Tx unit every 300 mSec.

Special values of the PER status register:

- When the unit is not connected, waiting for a peer unit to connect, PER status register is 200.
- When the unit is in sleep mode and connected to a peer unit, PER status register is 0.

3.2.17 Do Installation Process

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x22	Do Installation Process (Tx only)	W	1	Byte0 = 1: Do normal installation process Byte0 = 2: Do temporary installation process	N/A

The Installation Process is required for sending MAC and Wireless ID parameters from a Tx unit to a Rx unit. After the two units are “synchronized”, video/audio transfer can be done.

The normal installation process writes the Tx details in the Rx, in a list of recognized Tx units. (The Normal process is usually done by pressing the Installation button at the Tx unit).

The temporary installation process is for testing while in production. The Rx writes the Tx details in the list of recognized Tx units, but deletes the details when the Tx-Rx wireless link is cut off.

3.2.18 Discrete I/O Test Mode

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x23	Discrete I/O Test	R/W	1	Byte0 = 0: Normal operation of the Discrete I/O port Byte0 = 1: Enter Discrete I/O test mode	0 (Normal operation)

The Discrete I/O Test Mode is required for production testing of Tx and Rx units.

When in Discrete I/O test mode, the 4 LEDs (pin 1, 2, 3, 4 of the Discrete I/O port) are turned on.

When pin 5, 6, 7 or 8 of the Discrete I/O port is shorted to GND, the LED of pin 1, 2, 3 or 4, respectively, is turned off. All 4 input pins can be shorted to GND in any combination.

3.2.19 Reset unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x51	Reset unit	W	1	Byte0 = 1: Reset unit	N/A

Writing 1 to register 0x51 will cause the WVM to reset and restart into Idle mode.

Regulatory Information

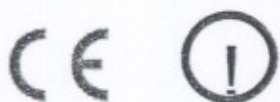
Integrator must follow below instructions:

The WVM1101 Wireless Video Module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. This device complies with the following radio frequency and safety standards.

Operation will be restricted to 5.15-5.25GHz and 5.25-5.35GHz frequency band.

This device is restricted to indoor use only. Industry Canada and FCC requires this product to be used indoors due to its operation in the frequency range 5.15 to 5.25 GHz"

Europe – EU Declaration of Conformity



Marking by the above symbol indicates compliance with the Essential Requirements of the R&TTE Directive of the European Union (1999/5/EC). This equipment meets the following conformance standards: EN301 893, EN301 489-17,1

NOTE: Due to frequency restrictions, it is necessary to select your country before using this radio device. Refer to your WVM-1101 online help for details.

Europe - Declaration of Conformity in Languages of the European Community

English	Hereby, _____ orporation Company, declares that this Radio LAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Finnish	Valmistaja _____ Incorporation Company vakuuttaa täten että Radio LAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Dutch	Hierbij verklaart _____ Incorporation Company dat het toestel Radio LAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG
	Bij deze _____ Incorporation Company dat deze Radio LAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

French	Par la présente IncorporationNetwork Company déclare que l'appareil Radio LAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE
	Par la présente, Incorporation Company déclare que ce Radio LAN device est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables
Swedish	Härmed intygar Incorporation Company att denna Radio LAN device står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Danish	Undertegnede Incorporation Company erklærer herved, at følgende udstyr Radio LAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF
German	Hiermit erkläre Incorporation Company, dass sich dieser/diese/dieses Radio LAN device in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMW)
	Hiermit erkläre Incorporation Company die Übereinstimmung des Gerätes Radio LAN device mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien)
Greek	? ? ??? ?????S? Incorporation Company ???O??? ??? Radio LAN device S?? ? ? ?FO????? ???S ???S?O????S ?????S??S ??? ??S ?????S S??????S ? ? ? ? ? ?S ?? S ? ? ? G? S 1999/5/??
Italian	Con la presente Incorporation Company dichiara che questo Radio LAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Spanish	Por medio de la presente Incorporation Company declara que el Radio LAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE
Portuguese	Incorporation Company declara que este Radio LAN device está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Europe - Copy of Original Declaration of Conformity

Decleration of Conformity

Draft

Europe – Restrictions for Use of 5GHz Frequencies in European Community Countries

European Community Countries	5150-5250 MHz Channels: 36, 40, 44, 48 Indoor Only
Austria	?
Belgium, France, Switzerland/Liechtenstein	?
Denmark, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, UK	?
Iceland, Spain	?

? : allowed x : not allowed

- To remain in conformance with European spectrum usage laws for Wireless LAN operation, 5GHz channel limitations apply. The user should use the wireless LAN utility to check the current channel of operation. If operation is occurring outside of the allowable frequencies as listed above, the user must cease operating the Wireless LAN at that location and consult the local technical support staff responsible for the wireless network.
- The 5GHz Turbo mode feature is not allowed for operation in any European Community country.
- This device must not be operated in ad-hoc mode using channels in the 5GHz bands in the European Community. Ad-hoc mode provides a direct communication between two client devices without a Wireless LAN Access Point.
- This device must be used with Access Points that have employed and activated a radar detection feature required for European Community operation in the 5GHz bands. This device will operate under the control of the Access Point in order to avoid operating on a channel occupied by any radar system in the area. The presence of nearby radar operation may result in temporary interruption of operation of this device. The Access Point's radar detection feature will automatically restart operation on a channel free of radar. You may consult with the local technical support staff responsible for the wireless network to ensure the Access Point device(s) are properly configured for European Community operation.

USA-Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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. If not installed and used in accordance with the instructions, it 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 tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver.

- Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this WVM-1101 Wireless Video Module or the substitution or attachment of connecting cables and equipment other than specified by

The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

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.

4.1

Integrator must label their product per below:

Contains FCC ID: **N7Z WVM-1101**
Model: WVM-1101

Caution: Exposure to Radio Frequency Radiation.

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Module WVM-1101 and antenna it tested with must be integrated in the end product in such a way that the end user cannot access the either the module, cables or antennas. End user or installer will only be allowed to use antenna with which module is tested with.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

Caution: Radio Frequency Interference Requirements.

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High power radars are allocated as primary users of the 5.25 to 5.35 GHz bands. These radar stations can cause interference with and/or damage this device.

FCC 15.407 Requirements

Frequency Stability (15.407 (g))

FCC 15.407(g) states: "Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual."

The device operates in 5.15GHz and 5.35GHz. The carrier is 20MHz wide. For example, IEEE Channel #36 (5.18GHz) has Fc centered at 5.18GHz with a bandwidth of 20Mhz or 5.17 to 5.19 GHz. This provides a guard band of 20 MHz (5.17 GHz - 5.15 GHz).

The device also requires a +/- 20 ppm XTAL over temperature and with aging. This is required per the 802.11 specification. Based on the tolerance of the XTAL and the 20 MHz guard band, the device will maintain emissions within the UNII bands under normal operating conditions.

Ensuring Indoor Use in 5.15-5.25 GHz Band (15.407 (e))

FCC 15.407(e) states: "Within the 5.15-5.25 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations."

The user manual includes the following statement:

"Radio Frequency interference requirements: This device is restricted to indoor use only. Industry Canada and FCC requires this product to be used indoors due to its operation in the frequency range 5.15 to 5.25 GHz"

Discontinue Transmitting with absence of Data or operational failure (15.407 (c))

FCC 15.407(e) states: "The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure."

Data transmission is always initiated by software, which is then passed through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets (ACKs, CTS, PSpoll, etc...) are initiated by the MAC. These are the only ways by which the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted.

Information to User (15.21):

This product does not contain any user serviceable components. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals. This product must be installed by a professional technician/installer