CyberTAN Technology, Inc.

Model Name	WD105
Description	802.11n LGA IoE Module
Version	Release 0.3a
Date	March 20, 2014
Author	Cindy Fan

Revision History

Date	Release	Author	Description
2013-06-11	0.1	Cindy Fan	First preliminary release.
2013-06-18	0.2	Cindy Fan	Engineering Release.
2013-08-23	0.2a	Cindy Fan	Temporary Engineering Revision.
2014-03-18	0.3	Cindy Fan	Update §4. Mechanical Characteristics.
2014-03-20	0.3a	Cindy Fan	Add §8. Regulatory Information

Related Documents

Date	Author	Description
		Qualcomm Atheros QCA4002 datasheet
	IEEE.org	IEEE 802.11b/g/n specifications

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1. Introduction

WD105 is IoE Smart Network module that enables wireless internet connectivity for any device wishing to be monitored or managed remotely. The WD105 is architected for ultra-low power consumption, with near-zero power consumption in power down modes with fast wakeup.

2. Features

- Fast wake up when loading firmware from inexpensive external NVMEM (SPI flash device)
- Direct connect to a 50-Ω antenna
- Standard interfaces: SPI slave and GPIO
- On-SIP integrated IPv4/Ipv6 stack reduces CPU and Flash requirements on host microcontroller.
- On-Board 4Mb flash to accommodate firmware.
- BSD-like interface provides a common easy interface across different operating systems, simplifying porting of the IP Stack offload
- TCP or UDP operation
- Compatible with IEEE 802.11b/g and 802.11n standard.

3. Specification

Model Number	WD105
Product Type	802.11n perforation IoE module
Memory Size	4Mbit of Flash
Host Interface(s)	SPI, HSIC, USB2.0, SDIO (selectable, see Table 1-5)
Embedded MAC Address	Yes
WiFi Chip(s)	Qualcomm Atheros QCA4002
Package	27-pin perforation
Wireless Standard(s)	IEEE 802.11b/g/n
Spreading	IEEE 802.11b DSSS and 802.11g/n OFDM
Operating Frequency	2412~2484MHz ISM band
Antenna	On-board PCB antenna. (On request an I-PEX plug leading to an external antenna can be made available)
Number of Channels	11 (US), 13 (EU), 14 (Japan)
Data Rates	802.11n: up to 72.2Mbps 802.11g: 54Mbps with fallback to 48,36,24,18,12,9 and 6Mbps 802.11b: 11Mbps with fallback to 5.5, 1 and 1Mbps
Modulation Schemes	802.11g/n: 64QAM (up to 72.2Mbps), 16QAM (39/36/26/24Mbps), QPSK (19.5/18/13/12Mbps), BPSK (9/6.5/6Mbps) 802.11b: CCK (11/5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Tx Power (average)	18dBm for 802.11b 14dBm for 802.11g 13dBm for 802.11n (MSC7)
Rx Sensitivity (typical)	-92dBm for 1Mbps @ 8% PER -85dBm for 11Mbps @ 8% PER -72dBm for 54Mbps @ 10% PER -69dBm for HT20, MCS7 @ 10% PER
Media Access Protocol	CSMA/CA with ACK
Operating System Support	Not Applicable. Controlled with a command set.

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Power Requirements (typical)	Tx mode :
	   11Mbps: 240mA
	   54Mbps: 210mA
	   72.2Mbps: 220mA
	 Rx mode :
	   11Mbps: 62mA
	   54Mbps: 62mA
	   72.2Mbps: 62mA

Dimensions	25 x 20 x 2.6 ±0.25 mm (typical)
Regulatory Conformance	FCC Part 15b, Part 15c
RoHS Compliance	Yes
Operating Temperatures	$0 \sim 70^{\circ}C$
Software Functions	n/a

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4. Mechanical Characteristics

4.1 Module Dimensions

Figure 1: PCB Outline Top View (Unit: mm)
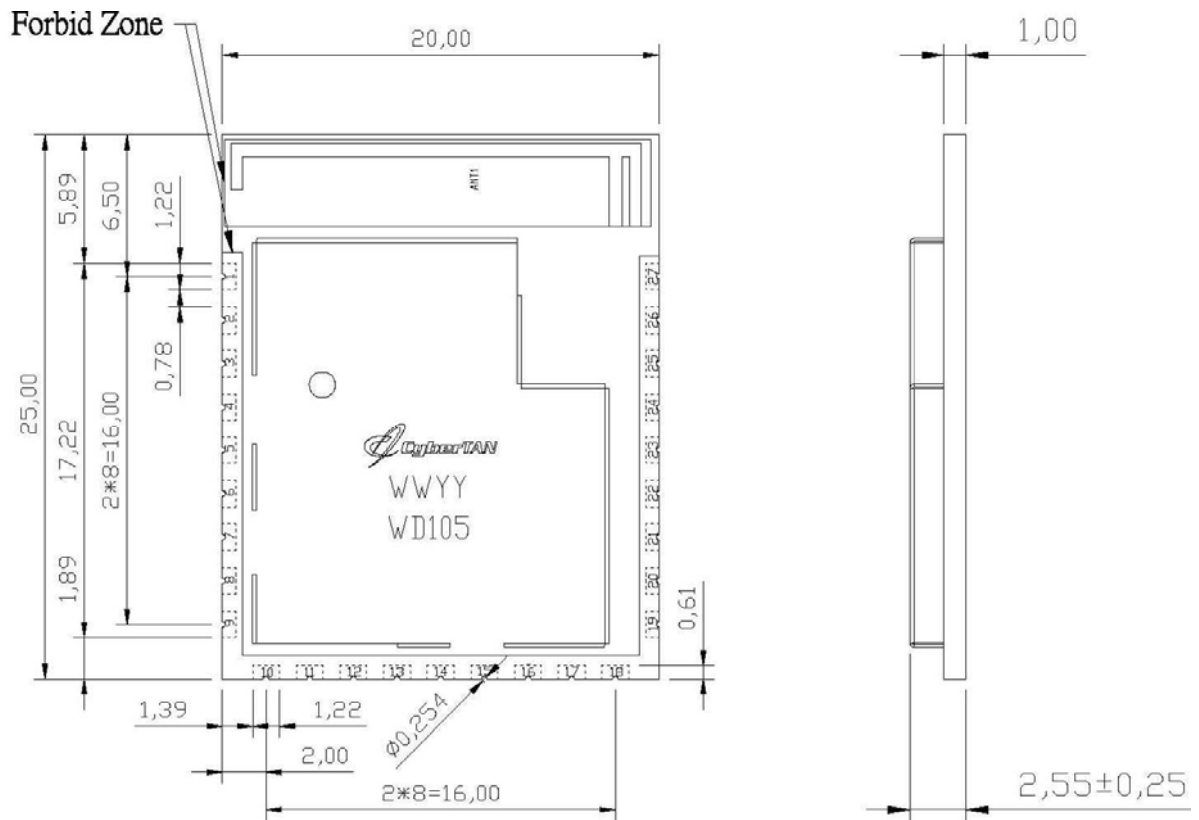
4.2 Pin Out Definitions

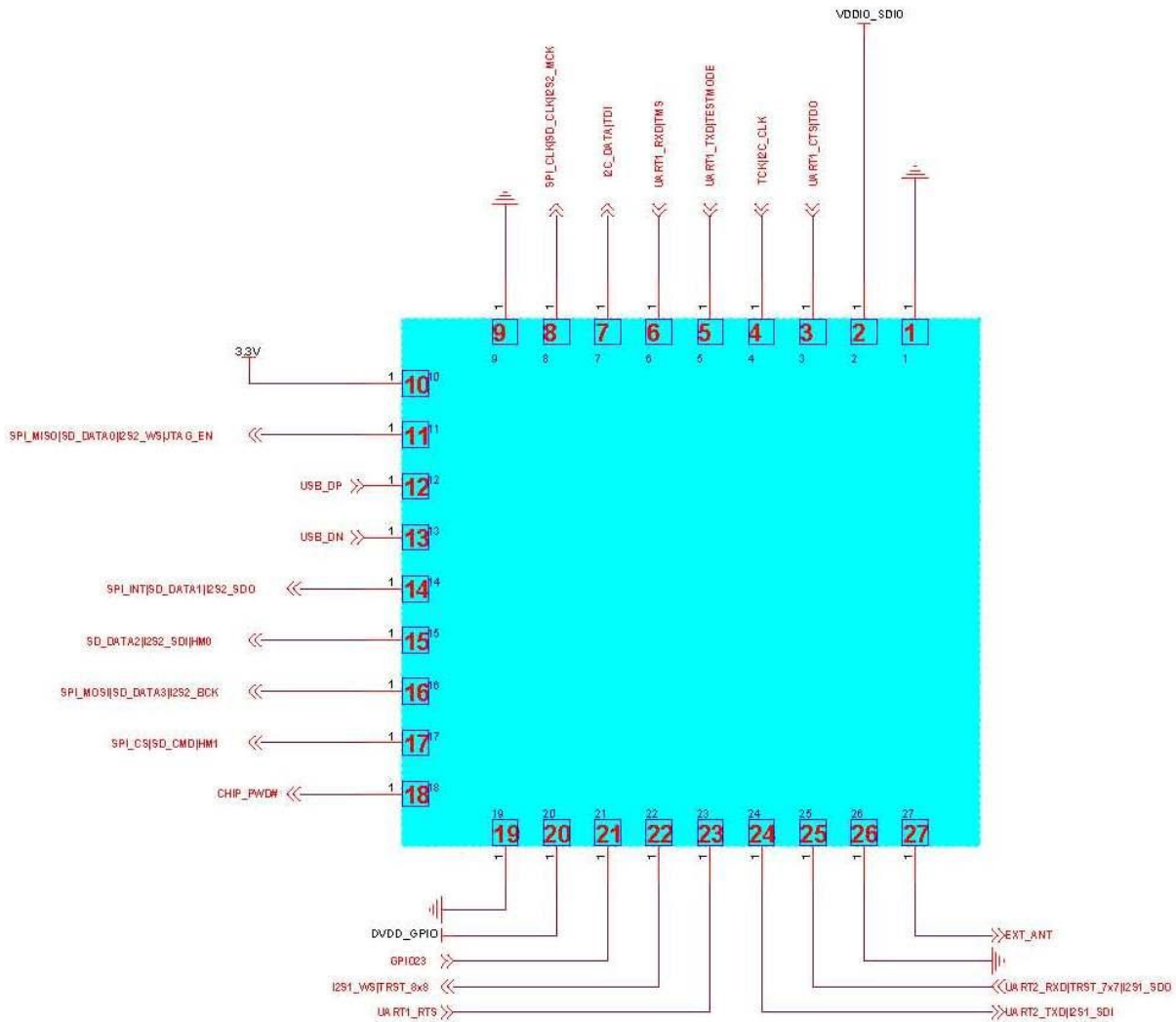The logical definitions of the module's pins are depicted below.

Figure 2: Pin out Configuration

4.3 Pad Numberings

Pin numbers are defined according to the following map.
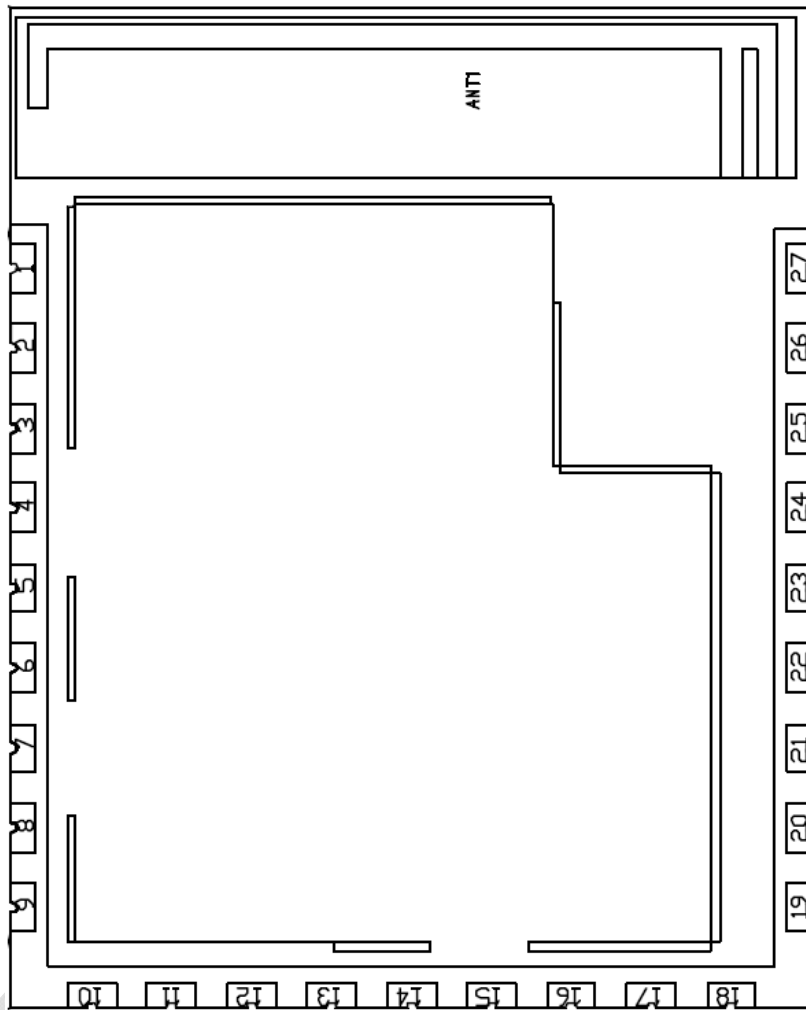
Figure 3: Pad Layout (Top View)

4.4 Pad Size

Pin numbers are defined according to the following map.
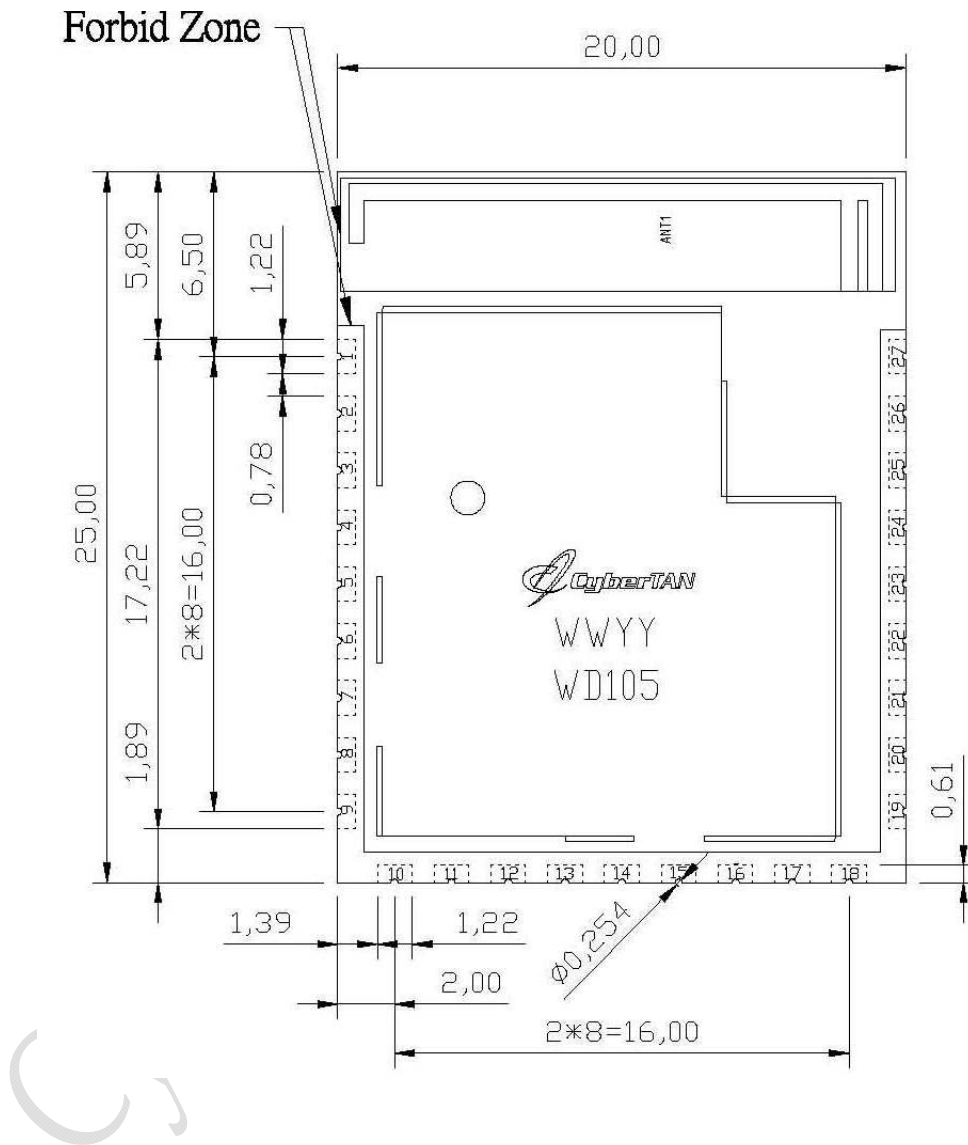
Figure 4: Pad Size Top View (Unit: mm)

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4.5 Pin Definitions

This section describes module signals and the associated pins.

Table 1: Pin Definitions

Pin No.	Pin name	Description	Genernal Type
1	Ground	Ground	P
2	VDDIO_SDIO	Connect to 3.3V host I/O supply or 1.8V peripheral I/O supply	P
3	UART1_CTS|TDO	UART Clear to Send	O
4	TCK|I2C_CLK	I2C Clock	I/O
5	UART1_TXD|TESTMODE	UART1 Series Output.	O
6	UART1_RXD|TMS	UART1 Series intput.	I
7	I2C_DATA|TDI	I2C DATA	I/O
8	SPI_CLK|SD_CLK|I2S2_MCK		
9	Ground	Ground	P
10	3.3V	Connect to 3.3V supply	P
11	SPI_MISO|SD_DATA0|I2S2_WS|JTAG_EN		
12	USB_DP	USB D+ signal; carries USB data to and from the USB 2.0 PHY	IA/OA
13	USB_DN	USB D- signal; carries USB data to and from the USB 2.0 PHY	IA/OA
14	SPI_INT|SD_DATA1|I2S2_SDO		
15	SD_DATA2|I2S2_SDI|HM0		
16	SPI_MOSI|SD_DATA3|I2S2_BCK		
17	SPI_CS|SD_CMD|HM1		
18	CHIP_PWD#	Chip power-down control	I
19	Ground	Ground	P
20	DVDD_GPIO	Connect to 3.3V host I/O supply or 1.8V peripheral I/O supply	P
21	GPIO23	General purpose input/output 23	I/O
22	I2S1_WS|TRST_8x8		
23	UART1_RTS	Bluetooth UART Request to Send.	O

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Pin No.	Pin name	Description	Genernal Type
24	UART2_TXD|I2S1_SDI	UART2 Series Output.	O
25	UART2_RXD|TRST_7x7|I2S1_SDO	UART2 Series Input.	I
26	Ground	Ground	P
27	EXT_ANT	option for external RF path, default not enable	RF I/O

Table 1-1: Pin Definitions : SPI

Pin No.	Pin name	Host Interface function1-SPI	function1 type
8	SPI_CLK|SD_CLK|I2S2_MCK	SPI Clock	I/O
11	SPI_MISO|SD_DATA0|I2S2_WS|JTAG_EN	SPI MISO	O
14	SPI_INT|SD_DATA1|I2S2_SDO	SPI INT	I/O
16	SPI_MOSI|SD_DATA3|I2S2_BCK	SPI MOSI	I
17	SPI_CS|SD_CMD|HM1	SPI CS	I

Table 1-2: Pin Definitions : SDIO

Pin No.	Pin name	Host Interface function1-SDIO	function2 type
8	SPI_CLK|SD_CLK|I2S2_MCK	SDIO Clock	I/O
11	SPI_MISO|SD_DATA0|I2S2_WS|JTAG_EN	SDIO Data Line 0.	I/O
14	SPI_INT|SD_DATA1|I2S2_SDO	SDIO Data Line 1.	I/O
15	SD_DATA2|I2S2_SDI|HM0	SDIO Data Line 2.	I/O
16	SPI_MOSI|SD_DATA3|I2S2_BCK	SDIO Data Line 3.	I/O
17	SPI_CS|SD_CMD|HM1	SDIO command line	I/O

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Table 1-3: Pin Definitions : I2S

Pin No.	Pin name	Interface function3	function3 type
8	SPI_CLK|SD_CLK|I2S2_MCK	I2S2 MCK	I/O
11	SPI_MISO|SD_DATA0|I2S2_WS|JTAG_EN	I2S2 WS	
14	SPI_INT|SD_DATA1|I2S2_SDO	I2S2_SDO	O
15	SD_DATA2|I2S2_SDI|HM0	I2S2_SDI	I
16	SPI_MOSI|SD_DATA3|I2S2_BCK	I2S2_BCK	I/O
22	I2S1_WS|TRST_8x8	I2S1_WS	I
24	UART2_TXD|I2S1_SDI	I2S1_SDI	I
25	UART2_RXD|TRST_7x7|I2S1_SDO	I2S1_SDO	O

Table 1-4: Pin Definitions : JTAG

Pin No.	Pin name	debug function4	function4 type	Bootstrap function4
3	UART1_CTS|TDO	TDO	I	
4	TCK|I2C_CLK	TCK	I/O	
5	UART1_TXD|TESTMODE			JTAG mode: TESTMODE,pull high through 10 kohm to VDDIO_SDIO for JTAG mode enable
6	UART1_RXD|TMS	TMS	I	
7	I2C_DATA|TDI	TDI	I	
11	SPI_MISO|SD_DATA0|I2S2_WS|JTAG_EN			JTAG mode: JTAG_EN ,pull high through 10 kohm to VDDIO_SDIO for JTAG mode enable

Table 1-5: Pin Definitions : Host Interfaces

Pin No.	Pin name	debug function4	function4 type	Bootstrap function4
15	SD_DATA2|I2S2_SDI|HM0			HM0: Host selection mode0
17	SPI_CS|SD_CMD|HM1			HM1: Host selection mode1

6. Warranty
One year limited warranty.

7. Package and Assembly Notes

7.1 Reel Specifications

The following diagram depicts the reel specifications in shipping WD105.

(TBD)

Figure 6: Reel Specifications

7.2 Carrier Specifications

The following diagram depicts the carrier specifications in shipping WD105.

(TBD)

Figure 7: Carrier Specifications

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7.3 Tape PET Cover Specification

The following diagram depicts the Tape PET Cover specification in shipping WD105.

(TBD)

Figure 8: Tape PET Cover Specification

7.4 Tape Protection Ribbon

The following diagram depicts the Tape Protection Ribbon specification in shipping WD105.

(TBD)

Figure 9: Tape Protection Ribbon

7.5 Packing Instruction

The following diagram depicts the packing instruction specification in shipping WD105.
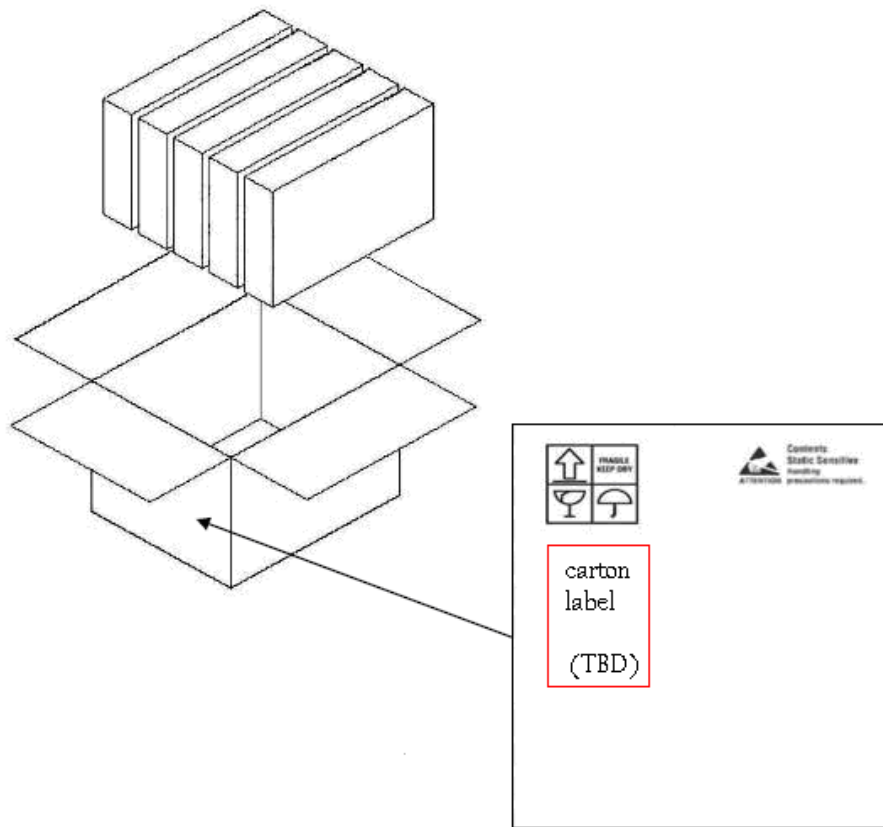
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carton
label

(TBD)

Figure 10: Packing Instruction

7.6 Aluminum Bag Label

The following diagram depicts the Aluminum bag label specification in shipping WD105.

(TBD)

Figure 11: Aluminum Bag Label 1

7.7 White Box Label and Aluminum Bag Label

(TBD)

Figure 12: Box Label

Table 2: White Box Label Specification (TBD)

7.8 Carton Label

(TBD)

Figure 13: Carton Label

Table 3: Carton Label Specification (TBD)

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7.9 Pallet Specification

7.9.1 Pallet Dimensions

The following table the pallet specification in shipping WD105.

Table 4: Pallet Dimensions Specification

Shipping ways	Pallet Size W x L x H
Air Shipment	113cm x 120cm x 12cm (recommended)
Sea Shipment	113cm x 120cm x 12cm (recommended)

7.9.2 Max. Height

The following table the max. height specification in shipping WD105.

Table 5: Max. Height Specification

Shipping ways	Height Limitation (including pallet height)
Air Shipment	Less than150cm
Sea Shipment	Less than190cm

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7.9.3 Pallet Packaging

a). V-boards and strapping:
  a-1. Put 4 V-boards on the four side corners to prevent cartons collapse.
  a-2. Put 4 V-boards on the four top edges.
  a-3. Fix the unit by at least 2 pieces of PP straps.

b). Wrapping:
  b-1. Put 3 layers at least on each surface.
  b-2. Carton logo need to be recognized
      if over 3 layers.
  b-3. Make sure not to tighten too much
      as it can damage he loads.
  b-4. Need to seal the top layer with wrap.

4-way strapping, V-boards on side
corner and top edges

V-boards and Strapping

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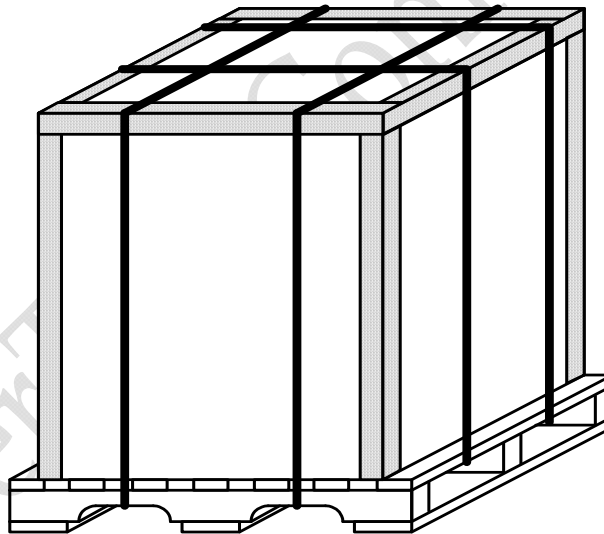
8. Regulatory Information

8.1 FCC Notice (USA)

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.

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.

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.

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

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 device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further <u>transmitter</u> test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions <u>can not be met</u> (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID <u>can not</u> be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: N89-WD105". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

8.4 Industry Canada Notice

(TBD)