Wireless Imaging System
WIS1000

User’s Guide

60GHz WirelessHD Transceivers

Caution: Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.
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WIS1000 Wireless Imaging System

Carefully read all instructions prior to use. Observe all contraindications, warnings and precautions noted in these directions. Failure to do so may result in patient complications.

1. Device Description

The 60Ghz WIS1000 transmitter wirelessly transmits high quality audio and video (up to 1080p/60hz) to a paired WIS1000 receiver in a typical operating room. The transmitter is designed to be connected via an HDMI or HDMI-to-DVI cable to a video source (such as an endoscopic camera) with the receiver connected via an HDMI or HDMI-to-DVI cable to a video monitor.

Up to six pairs of the WIS1000 transmitter/receiver combinations operating at different frequencies within the 60Ghz band can be used simultaneously within the same room.

The WIS1000 is designed to be unaffected by cell phones, RFID, wireless 802.11 b/g/n. The 60Ghz operating frequency cannot pass through walls and will work within a 10m radius. 128-bit AES encryption ensures that no other devices can speak with the WIS1000.
The WIS1000 transmitter is 162.0mm x 86.0mm x 50.0mm and weighs approximately 242g. The WIS1000 receiver is 162.0mm x 86.0mm x 50.0mm and weighs approximately 242g. Both components are mains powered (120 – 240 V).

The WIS1000 wireless device is a non-sterile reusable device not intended for use in the sterile field.
2. Package Contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Standard Pack Qty (WIS1000)</th>
<th>DC Splitter Pack Qty (WIS1000-DC)</th>
<th>WIS1001 Pack Qty (WIS1000-DC-1001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wireless HD transmitter (WIS1000 Tx) unit</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wireless HD receiver (WIS1000 Rx) unit</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>User Guide</td>
<td></td>
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<tr>
<td>4</td>
<td>HDMI to DVI-D cables</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Medical grade power cord</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Medical power adaptor (5V/2A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1x Bracket (Standard type for installing) and screw</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bracket (Medical type for installing) and screw</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Wireless mounting bracket (BkTWA007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>DC splitter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>DVI to HDMI signal converter (WIS1001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>HDMI to HDMI cable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Power cable for WIS1001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Cable guides and extra screws</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Verify that you received all components of your respective package.
2. Inspect each component and verify that none of the components have been tampered with in any way.
3. Optional: Install the corresponding mount to the wall/monitor bezel as desired. Mount the WIS1000 Rx onto the desired mounting bracket. See mounting instructions in installation section.
3. Indications for Use

The Foreseeson Custom Displays WIS1000 transmitter and receiver wirelessly transmit (60GHz) high quality audio and video (up to 1080p/60Hz) to displays during endoscopic and surgical procedures including arthroscopy (orthopedic surgery), laparoscopy (general and gynecological surgery), thoracoscopy, endoscopy (general, gastroenterological and ENT surgery) and general surgery. The WIS1000 wireless components are non-sterile reusable devices not intended for use in the sterile field.

4. Warnings

Do not use in MR environments.

External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC standard (e.g., IEC 60950 for IT equipment and IEC 60601 series for medical electrical equipment). In addition, all such combination systems shall comply with the standard IEC 60601-1-1, safety requirements for medical electrical systems. Any person who forms a system is therefore responsible for the system to comply with the requirements of IEC 60601-1-1. If in doubt, contact a qualified technician or your local representative.

Before connecting the AC power cord to the system, make sure the recommended voltage designation on the cord corresponds to the available power source.

Never use this system with a damaged power cord. Do not allow anything to rest on the power cord. Keep the power cord away from areas where it may cause tripping.

Be sure to hold the plug, not the power cord, when disconnecting from an electric socket.

If this system does not operate normally, in particular, if there are any unusual sounds or smells coming from it unplug it immediately and contact an authorized dealer or service center.

Put this system in a location with low humidity and a minimum amount of dust. Locate it near an easily accessible AC outlet.

Openings in this system’s cabinet are provided for ventilation. To prevent overheating, these openings should not be blocked or covered. If placed in an enclosed space, be sure to provide adequate ventilation.

Do not attempt to disassemble or modify this product. Only authorized personnel should perform service. Never insert anything metallic into the cabinet openings and vents. Doing so may create the danger of electrical shock.

Do not touch signal input, signal output or other connectors, and the patient simultaneously.

To reduce the risk of electrical shock, do not remove cover. No user-serviceable parts inside. Only a qualified technician should open the case of this system.
This system is for indoor use only.

This system should be installed and operated with a minimum distance of 20 cm between equipment and body.

**Power**

Use only a properly grounded plug and voltage.
- An improper ground may cause electric shock or equipment damage

**WARNING:** This is a radio-frequency (RF), radiation emitting device that has non-thermal biological effects for which no safety guidelines have yet been established. Controversy exists as to whether these effects are harmful to humans. Exposure to RF radiation may be reduced by limiting your use of this device and keeping away from the head and body.

**5. Precautions**

Always treat the product with care and keep it in a clean and dust-free environment.

⚠️ Do not expose the product to liquid, moisture, or humidity.

Do not use your product in temperatures above 40°C when unit is operational.

🚫 Do not drop or throw the product.

🚫 Do not attempt to disassemble or modify the product. Only authorized personnel should perform service on the product.

Do not use different AC adapters.

Replace damaged equipment. If damage is found call your COMPANY representative. Do not attempt to operate the system before thoroughly reading these Instructions for Use. For future reference, keep these documents in a convenient, easily accessible place.

**Installation**

Do not connect any other wires or accessories which don’t comply with this system to this system.

An improper wire may cause electric shock or equipment damage. Insert wire connections firmly so that they do not come loose.

A bad connection may cause a fault. Do not stack and locate close to other equipment.
To prevent fire or shock hazards, do not expose this unit to rain or moisture. Do not use this unit’s polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. This device is designed to meet the medical safety requirements for a patient vicinity device.

This device may not be used in connection with life support equipment.

Operating Environment

Be sure to contact this equipment’s supplier if it is to be installed in a location with heavy dust, high or low temperatures, high humidity, or chemical substances.

Others

Please contact this equipment’s supplier when you want to use this system with unknown equipment. Please power off and pull out the power cord when you want to move this system to another place.

Underwriters Laboratories (UL) Classification:

UL safety Compliance:

This system is U.L. Classified WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1/CAN/CSA C22.2 NO. 601.1

EEC Safety Compliance:

This system meets the requirements of EN-60601-1 so as to conform to the Medical Device Directive 93/42/EEC (general safety information).

This unit uses plug for US: 120V rating 5-15P type only.

This system complies to the above standards only when used with the supplied medical grade power supply.

Caution: Make sure the power cord is the correct type that is required in your area.

This system has a universal power supply that allows operation in either 100-120V AC or 200-240V AC voltage areas (no user adjustment is required).

Use the proper power cord with correct attachment plug type. If the power source is 120V AC, use a Hospital Grade Power Cord with NEMA 5-15 style plug, labeled for 125 volts AC with UL and C-UL approvals.

If the power source is a 240 V AC supply, use the tandem (T blade) type attachment plug with ground conductor power cord that meets the respective European country’s safety regulations.
6. Installation

Receiver Installation

Monitor Mount Option

1) Choose a position 1 or 2
2) Remove two mounting screws, place the bracket in position and reinstall the screws.
3) Connect DVI to HDMI cable between the monitor and WIS1000 Rx.
4) Connect DC splitter between the DC power adapter and monitor.
5) Connect the 5volt cable of the DC splitter to the WIS1000 Rx.
6) Align the cables.

Wall Mount Option

1) Position the wall mount bracket on the wall and mark the screw locations.
2) Insert the two screws into the wall.
3) Slide the Rx or Tx onto the bracket and lock in place with a screw from the underside.
4) Align the bracket holes with the wall screws push and slide down into position.
7. Directions for Use

WIS1000 options/additions:

**WIS1001 Scalar/Converter**

Some medical device manufacturers prefer not to use the normal standardized timings for HD resolutions. If this is the case with your intended source, then the WIS1000 will be unable to successfully transmit video from your source to the desired display. In this situation, the WIS1001 scalar/converter can be used to regulate the signal from the source into a standardized video signal that the WIS1000 system can understand.

**WIS1000 DC Splitter**

There are times in the operating room when finding enough power outlets is an issue. In order to minimize the amount of power outlets used by the WIS1000 pair, the DC Splitter option can be used in order to draw power from the monitor cable to be used for the WIS1000 receiver. This DC Splitter will work only with Foreseeson monitors, and has been tested to have no effect on the performance of either the monitor or the WIS1000 receiver.

Please note Tx=Transmitter, Rx=Receiver

a. If you are not using the DC splitter:

Connect the power cord into an available electrical outlet and plug in the power cord into the power adaptor. Connect the power adaptor to the WIS1000 Rx power input.

![Diagram of WIS1000 DC Splitter connection](image)

b. If you are using the WIS1001 scalar/converter:

Connect the power cord into an available electrical outlet and plug in the power cord into the power adaptor. Connect the power adaptor to the WIS1001 power input. Connect the WIS1001 power cable between the WIS1001 power output and the WIS1000 Tx power input.
c. If you are not using the WIS1001 scalar/converter:

Connect the power cord into an available electrical outlet and plug in the power cord into the power adaptor. Connect the power adaptor to the WIS1000 Tx power input.

d. Turn on the WIS1000 Rx

e. If you are using the WIS1001 scalar/converter:

Connect one end of the HDMI cable to the WIS1000 Tx, and the other end of the HDMI cable to the WIS1001 HDMI output. Use one of the HDMI to DVI-D cables to connect your source to the WIS1001 scalar/converter.

f. If you are not using the WIS1001 scalar/converter:

Connect the HDMI end of the connection cable to the WIS1000 Tx and the DVI-D end to your monitor.

g. Use the remaining HDMI to DVI-D cable to connect the WIS1000 Rx to the monitor.

h. If you are using the DC splitter:

Connect the DC splitter between the monitor’s power cable and the monitor. Plug in the power cable into the WIS1000 Rx power input.

i. Connect the WIS1000 transmitter (Tx) to the output source such as an Endoscope system.

Note: Remember to turn on your monitor and select the appropriate DVI input that is connected to the WIS1000 receiver (Rx).

The 60GHz Wireless HD WIS1000 Transceivers will sync and begin transmitting media.

Please refer the location setups below to arrange your units in the room. It’s recommended the transmitter (Tx) and Receiver (Rx) face each other for the best performance.
j. Verify that your monitor is showing the intended image from the source.

For best results, verify the following:

The Tx and Rx are facing each other.
The Tx and Rx are no more than 10 meters (33ft.) apart.
The Tx and Rx are between 1.8-3 meters (6-10 ft.) above the floor.
The Tx and Rx are not in a confined location.

Multiple Tx and Rx

In the diagram below, there are 6 Tx and 6 Rx transmitting and receiving video simultaneously. Each Tx has synchronized with a Rx on its own channel. When the wireless transmitter is first turned on, it searches for a wireless receiver in its WVAN (Wireless Video Area Network). When the Tx synchronizes with a Rx, the WVAN ID of the Rx is stored in the memory of the Tx as a preferred ID. The next time the Tx is turned on, it will search for the preferred WVAN ID of the Rx.

It is possible to change an existing connection between Tx and Rx. This is done by pushing and holding down the “Pairing Switch” button for 4-5 seconds or until the LED flashes. This will enable the Tx to connect to the next available Rx in the network.

In order to pair the proper transmitter and receiver, turn on only one unpaired Transmitter and one unpaired Receiver at a time. After the devices are paired, you can leave them on as you synchronize the next Transmitter/Receiver pair.
Note: Since each transmitter is locked to a specific receiver, there is no potential for crosstalk.

**One Tx to Multiple Potential Rx**

In the diagram below, there is 1 Tx and 6 Rx devices running in a single room. In this case, the Tx has the option to synchronize with any one of the 6 Rx on itsWVAN.

Please note that any Transmitter can synchronize with only one Receiver at a time.
8. Maintenance of Quality of Service

The WIS1000 is designed to maintain an adequate Quality of Service during its use in a hospital operating room environment.

a. Design Characteristics: Interference from other WIS1000 Devices

The WIS1000 uses Beam Forming Non Line Of Sight technology (BFNLOS). As a result, WIS1000 pairs in one location will NOT transmit through solid walls or doors with WIS1000 devices in another location. Using BFNLOS, the WIS1000 has been tested to work consistently within a 10m radius of the transmitter.

Also, only a single WIS1000 Transmitter can be paired with a single WIS1000 Receiver at a time. It’s HDCP protocol not only blocks hackers from high jacking or altering a signal, but it also stops other WIS1000 Transmitters/Receivers from breaking into the communication between a paired Transmitter and Receiver. If more than one WIS1000 Transmitters/Receiver pairs are operating simultaneously in the same room, each will be on a separate frequency within the 60GHz band. The WIS1000 System can operate on one of six different frequencies in the 60GHz band. This limits the maximum number of pairs of WIS1000 Transmitters/Receivers that can operate simultaneously in the same room to six.

As a result of these design considerations, it is not possible for one WIS1000 System to interfere with another WIS1000 System.

b. Design Characteristics: Accommodation of Diminished Video Signal Quality

Like all digital monitor Transmitters/Receivers, a certain quality of signal is necessary to produce an image. Unlike analog devices that can accommodate a continuum of visual quality, digital displays require a certain amount of data, or else no picture is available.

In the event wireless degradation occurs, The WIS1000 Systems takes steps to minimize any potential negative effects. In instances of wireless signal degradation, the WIS1000 device will continue to display a complete image, however at a lower visual resolution (the physical resolution remains the same).

Beam-forming technology allows for multiple angles to be used during transmission; thus, if one angle is blocked (e.g. – a person walks in front of the line-of-sight), a different angle can be used by bouncing the signal off the interior walls in order to maintain the transmission. When a cleaner path is found, the WIS1000’s image quality will revert back to the full visual resolution.
The figure below depicts the difference seen between full resolution and lower visual resolution. A lower visual resolution image can manifest itself in different forms; however, oftentimes this lower visual resolution results in pixilation of the image, and some lines may be noticeably thicker than normal. Please note that this view is a magnification of the display screen. It is unlikely that the observer will notice any display degradation. Any degradation that does occur will not be clinically significant.

![Image: Full Resolution and Lower Visual Resolution]

**c. Design Considerations: Interference from other Devices**

The WIS1000 is validated to be compatible with other devices that are commonly found in an operating environment, in accordance with IEC 60601-1-2. In that testing, the WIS1000 needed to maintain the following Essential Performance to ensure that its performance was adequate when the System was exposed to other electronic equipment. WIS1000 Essential Performance requires that a viewable image shown on a secondary monitor via a WIS1000 pair be consistent with the following criteria:

1. A viewable image is generated
2. There is no flickering of the image
3. There is no clipping of any edges
4. Brightness and detail of image remains consistent across the whole image

These criteria ensure that no resultant video degradation could be judged to be clinically significant.

**For best results, verify the following:**
The Tx and Rx are facing each other.
The Tx and Rx are no more than 10 meters apart.
The Tx and Rx are between 6-10 ft above the floor.
The Tx and Rx are not in a confined location.
Noninterference Distances

The following minimum distances have been tested to demonstrate noninterference between the listed devices and the WIS1000. If the WIS1000 is thought to be causing or receiving interference with the following devices, then move the devices away from each other, maintaining at least the following separations:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Transmitter</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrocautery</td>
<td>&gt; 2 feet</td>
<td>&gt; 1 foot</td>
</tr>
<tr>
<td>RFID</td>
<td>&gt; 1 cm</td>
<td>&gt; 1 cm</td>
</tr>
<tr>
<td>2.4GHz Wireless</td>
<td>&gt; 6 inches</td>
<td>&gt; 6 inches</td>
</tr>
<tr>
<td>5.8 GHz Wireless</td>
<td>&gt; 6 inches</td>
<td>&gt; 6 inches</td>
</tr>
<tr>
<td>Cell Phone</td>
<td>&gt; 1 cm</td>
<td>&gt; 1 cm</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>&gt; 1 cm</td>
<td>&gt; 1 cm</td>
</tr>
</tbody>
</table>

The WIS1000 is not intended to be used in the vicinity of diathermy equipment. If diathermy equipment is operated around the WIS1000 and interference is suspected, turn off the WIS1000 Transmitter and Receiver.

d. Design Consideration: Device Security

The atmospheric absorption of 60 GHz energy by oxygen molecules limits undesired propagation over long distances and helps control intersystem interference and long distance reception. As a result, the WIS1000 transmitter is only able to transmit signal within a 10m radius and cannot penetrate walls or surfaces, thus minimizing the area where the signal exists. This limits the distance from which the signal can be intercepted.

Using its unique mating procedure, the WIS1000 transmitter is constructed to work only with the WIS1000 receiver. In order to ensure that the data being sent wirelessly is not intercepted, the WIS1000 employs a 128-bit AES encryption scheme based on a 4x4 matrix of bytes. Using brute force on a 128-bit AES encryption key, an attacker would require 2^128 (3.4 x 10^38) iterations to discover the key used. The HDCP protocol utilizes an authentication protocol that utilizes a 128-bit global constant and 1024-bit RSA public and private keys. Once the receiver has been authenticated via the authentication protocol, encrypted HDCP content is transmitted from the transmitter to the receiver based on shared secrets established during the authentication protocol. This prevents eavesdropping devices from utilizing the content, and allows for constant real-time verification.

Finally, in the event that legitimate devices are compromised, renewability allows the transmitter to identify these compromised devices and stop transmission of content to the compromised device. The HDCP protocol is not an ANSI-certified standard; however, the protocol has been recognized by the FCC as an approved Digital Output Protection Technology.
9. Troubleshooting

**Symptom:**
Receiver will not link to transmitter

**Possible Solutions:**
- The power LED on the transmitter and the receiver will blink continuously while the transmitter is not linked to the receiver. This can be caused by the receiver being located too far away from the transmitter. The maximum non-line-of-sight range is approximately 33ft. (10m). Try re-positioning the transmitter and receiver units so they are within the specified operating range. First try to get the units to link with each other at 3 ft. (1 m) (to prove that they are working properly with your equipment). Then try moving them further apart to the desired locations.

- Materials may be blocking the 60 GHz radio frequency beam from the transmitter to the receiver. This beam can pass through many cabinet materials such as glass and wood (depending on thickness and density of the materials), but it cannot pass through doors, shelves, or components that are made of metal. Try positioning the transmitter and receiver so that they are not blocked by metal.

- Either the receiver or transmitter is not powered on. Be sure the AC adapter is securely connected and each unit is powered on correctly.

- Power cycle both the transmitter and receiver by unplugging then plugging them back in.

**Symptom:**
No video and/or audio

**Possible Solutions:**
- If the power LEDs on the transmitter and receiver are blinking, the adapters are not linked. See “Receiver will not link to Transmitter” troubleshooting steps above.

- If the power LED on the transmitter and receiver are solid (not blinking), the adapters are linked such that video and audio sent into the transmitter should be output from the receiver. Therefore, the display/monitor may not be set to the HDMI input jack that the WIS1000 Receiver unit is connected to. Refer to the documentation provided with your display/monitor for information on how to select the correct input.

- The source component is not powered on and/or does not have the HDMI output enabled. Refer to the documentation provided with your source component for information on switching that component to the HDMI output.

- The transmitter is set to the incorrect HDMI port. Switch the transmitter to the correct HDMI port for the component you want to view with the HDMI/WVAN switch on the back of the transmitter.

- Make sure that you are using high speed certified HDMI cables for all connections and that all cable connections are secure. We recommend high quality HDMI cables.
• Troubleshoot by connecting the HDMI cable directly from the HDMI source to the HDMI display (bypassing the WIS1000) to verify that audio/video is available. Try both the HDMI source side cable (connected originally to the transmitter) as well as the display side cable (connected originally to the receiver) to verify that you do not have a defective cable.

• Make sure that your audio/video content is original. HDMI includes HDCP copy protection, which prevents playback of illegally copied content.

• If you have multiple receivers in your WVAN, make sure that the correct receiver is selected. See “Multiple Tx and Rx” in the “Directions for Use” section for more details.

10. Storage

Store at normal room temperature, keep dry.

11. Servicing & Repair

a. Recycling

Follow local governing ordinances and recycling plans regarding the recycling or disposal of this requirement.

b. Cleaning Instructions

Follow your hospital protocol for the handling of blood and body fluids. Clean the unit carefully with a diluted mixture of mild detergent and water. Use a soft towel or swab. Use of uncertain cleaners may cause degradation to the labels and plastic components of the product. Consult cleanser manufacturer to see if cleaning agents used are compatible with the unit. Do not allow liquid enter the unit’s housing.

c. Servicing

⚠️ Do not attempt to service the apparatus yourself as opening or removing covers may expose you to dangerous voltages or other hazards, and will void the warranty. Refer all servicing to qualified service personnel.

Unplug the apparatus from its power source and refer servicing to qualified personnel under the following conditions:
• If the power cord or plug is damaged or frayed.
• If liquid has been spilled into the apparatus.
• If objects have fallen into the apparatus.
• If the apparatus has been exposed to rain or moisture.
• If the apparatus has been subjected to excessive shock by being dropped.
• If the cabinet has been damaged.
• If the apparatus seems to be overheated.
• If the apparatus emits smoke or abnormal odor.
• If the apparatus fails to operate in accordance with the operating instructions.
d. Accessories

Use only accessories specified by the manufacturer, or sold with the apparatus.

e. Serial Number Format

YY: year
MM: month
WW: week
XXXX: serial number

Example: 1304150001 (YY: 2013, MM: 04, WW: 15, serial number: 0001)

12. Technical Specifications & Symbol Descriptions

a. General Specification

<table>
<thead>
<tr>
<th>Standards</th>
<th>WIS1000WirelessHD, HDMI(V1.4a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>60 GHz</td>
</tr>
<tr>
<td>Input/Output Interface</td>
<td>HDMI interface</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>32 Antenna Array (Integrate Ceramic)</td>
</tr>
<tr>
<td>Range</td>
<td>10 meters in-room usage</td>
</tr>
<tr>
<td>Maximum EIPR Output Power of Test Frequency:</td>
<td></td>
</tr>
<tr>
<td>LRP 62.80GHz</td>
<td>Average EIRP Output Power:</td>
</tr>
<tr>
<td>HRP 60.48GHz</td>
<td>16.1821 mW</td>
</tr>
<tr>
<td></td>
<td>3379.2474 mW</td>
</tr>
<tr>
<td>AV Port</td>
<td>Transmitter: 1 Port (CEC pass through)</td>
</tr>
<tr>
<td></td>
<td>Receiver: 1 Port (CEC pass through)</td>
</tr>
<tr>
<td>Physical Specifications</td>
<td>Weight: 242 g (TX) / 242 g (RX)</td>
</tr>
<tr>
<td></td>
<td>Dimension: 162.0 * 86.0 * 50.0 mm (Tx) and (Rx)</td>
</tr>
<tr>
<td>Adapter Power</td>
<td>AC/DC adapter, BPM010S05F02</td>
</tr>
<tr>
<td></td>
<td>(Mfr. : Bridgepower Corp.)</td>
</tr>
<tr>
<td></td>
<td>AC 90-240~ ,50-60Hz input, DC +5V 2.0A</td>
</tr>
<tr>
<td>LED Indicators</td>
<td>One LED display, power indication</td>
</tr>
<tr>
<td>Environment</td>
<td>Operating Conditions Temperature: 0°C ~ 40°C (32° ~ 104°F) Humidity: 5% ~ 85%</td>
</tr>
<tr>
<td>Specification</td>
<td>Transportation Conditions</td>
</tr>
<tr>
<td></td>
<td>Temperature: -20°C ~ 60°C (-4° ~ 140°F), Humidity: 5% ~ 95%</td>
</tr>
<tr>
<td></td>
<td>Atmospheric Pressure: 500 to 1060 hPa</td>
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<tr>
<td></td>
<td>Storage Conditions, Temperature: -20°C ~ 60°C (-4° ~ 140°F) Humidity: 10% ~ 85%</td>
</tr>
</tbody>
</table>
Power consumption

<table>
<thead>
<tr>
<th>Mode</th>
<th>WIS1000 Tx</th>
<th>WIS1000 Rx</th>
<th>Power Consumption (Watt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>On</td>
<td>On</td>
<td>&lt; 15W</td>
</tr>
<tr>
<td>Standby</td>
<td>Blinking</td>
<td>Blinking</td>
<td>&lt; 10W</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>&lt; 1W</td>
</tr>
</tbody>
</table>

b. Input / Output connector specification

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Assignment</th>
<th>Pin</th>
<th>Signal Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TMDS Data2+</td>
<td>2</td>
<td>TMDS Data2 Shield</td>
</tr>
<tr>
<td>3</td>
<td>TMDS Data2-</td>
<td>4</td>
<td>TMDS Data1+</td>
</tr>
<tr>
<td>5</td>
<td>TMDS Data1 Shield</td>
<td>6</td>
<td>TMDS Data1-</td>
</tr>
<tr>
<td>7</td>
<td>TMDS Data0+</td>
<td>8</td>
<td>TMDS Data0 Shield</td>
</tr>
<tr>
<td>9</td>
<td>TMDS Data0-</td>
<td>10</td>
<td>TMDS Clock+</td>
</tr>
<tr>
<td>11</td>
<td>TMDS Clock Shield</td>
<td>12</td>
<td>TMDS Clock-</td>
</tr>
<tr>
<td>13</td>
<td>NC</td>
<td>14</td>
<td>NC</td>
</tr>
<tr>
<td>15</td>
<td>DDC SCL</td>
<td>16</td>
<td>DDC SDA</td>
</tr>
<tr>
<td>17</td>
<td>DDC Ground</td>
<td>18</td>
<td>+5V Power</td>
</tr>
<tr>
<td>19</td>
<td>Hot Plug Detect</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
### c. Video Input Timing

<table>
<thead>
<tr>
<th>Video Format</th>
<th>Vertical Refresh</th>
<th>Color Space</th>
<th>Sampling</th>
<th>Bits/Pixel</th>
</tr>
</thead>
<tbody>
<tr>
<td>480i</td>
<td>59.94/60Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>4:4</td>
</tr>
<tr>
<td>480p</td>
<td>59.94/60Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>4:30-bits</td>
</tr>
<tr>
<td>576i</td>
<td>50Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>576p</td>
<td>50Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>720p</td>
<td>50Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td>59.94/60Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>1080i</td>
<td>50Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td>59.94/60Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>1080p</td>
<td>50Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td>23.976/24Hz</td>
<td>YCbCr</td>
<td>4:2:2</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RGB</td>
<td>4:4:4</td>
<td>24-bits</td>
</tr>
<tr>
<td>VGA</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>WVGA</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>SVGA</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>XGA</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>SXGA</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
<tr>
<td>WSXGA+</td>
<td>60Hz</td>
<td>RGB</td>
<td>4:4:4</td>
<td>24/30-bits</td>
</tr>
</tbody>
</table>
d. Classification

- Protection against electrical shock: Class I including AC/DC power.
- Applied parts: no applied parts.
- Degree of safety in the presence of flammable anesthetics mixture with air or with oxygen or with nitrous oxide. Not suitable for use in the presence of a flammable anesthetics mixture with oxygen or with nitrous oxide.
- Mode of operation: continuous

e. FCC Warnings

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference. This system can radiate radio frequency energy and, if not installed and used in accordance with the instructions, it may interfere with other radio communications equipment.

There is no guarantee that interference will not occur in a particular installation. If this equipment is found to cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by carrying out one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between this system and the subject of interference.
3. Plug this system into an outlet on a different electrical circuit than that to which the subject of interference is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

NOTICES TO USER:

This device complies with the requirements of IEC 60601-1-2 and part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

However, if used incorrectly, RF interference could hamper its operation or the operation of other nearby electrical devices. If you suspect either of these conditions, move the conflicting equipment farther apart, separate the equipment with an RF barrier, or discontinue use of the system.

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose authority to operate this equipment if an unauthorized change or modification is made.
The Foreseeson WIS1000 wireless HD video transfer system is intended to be used as a pair (transmitter and receiver) to redundantly display HD video where needed. The WIS1000 wireless device is a non-sterile, reusable device, not intended for use in the sterile field.

**FCC Appendix**

Manufacturer's declaration - electromagnetic emission

<table>
<thead>
<tr>
<th>Emission test</th>
<th>Compliance</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Emissions</td>
<td>Group 1</td>
<td>The WIRELESS IMAGE system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td>CISPR 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF Emissions</td>
<td>Class A</td>
<td>The WIRELESS IMAGE system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td>
</tr>
<tr>
<td>CISPR 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonic emissions</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-3-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage fluctuations</td>
<td>Complies</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-3-3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Manufacturer's declaration - electromagnetic immunity

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 Test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment-guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge(ESD) IEC 61000-4-2</td>
<td>6 kV contact</td>
<td>6 kV contact</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%</td>
</tr>
<tr>
<td></td>
<td>8 kV air</td>
<td>8 kV air</td>
<td></td>
</tr>
<tr>
<td>Electrical fast transient/burst IEC 61000-4-4</td>
<td>2 kV for power supply lines</td>
<td>2 kV for power supply lines</td>
<td>Main power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>1 kV for input/output lines</td>
<td>1 kV for input/output lines</td>
<td></td>
</tr>
<tr>
<td>Surge IEC 61000-4-5</td>
<td>1 kV differential mode</td>
<td>1 kV differential mode</td>
<td>Main power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>2 kV common mode</td>
<td>2 kV common mode</td>
<td></td>
</tr>
<tr>
<td>Power frequency (50/60Hz) Magnetic field IEC 61000-4-8</td>
<td>3.0 A/m</td>
<td>3.0 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Voltage dips, short Interruptions and voltage variations on power supply input lines IEC 61000-4-11</td>
<td>&lt;5% (U_t) (&gt;95% dip in (U_t)) for 0.5 cycle 40% (U_t) (60% dip in (U_t)) for 5 cycle 70% (U_t) (30% dip in (U_t)) for 25 cycle &lt;5% (U_t) (&lt;95% dip in (U_t)) for 5 sec.</td>
<td>&lt;5% (U_t) (&gt;95% dip in (U_t)) for 0.5 cycle 40% (U_t) (60% dip in (U_t)) for 5 cycle 70% (U_t) (30% dip in (U_t)) for 25 cycle &lt;5% (U_t) (&lt;95% dip in (U_t)) for 5 sec.</td>
<td>Main power quality should be that of a typical commercial or hospital environment. If the user of WIRELESS IMAGE system requires continued operation during power mains interruptions, it is recommended that WIRELESS IMAGE system be powered from an uninterruptible power supply or a battery.</td>
</tr>
</tbody>
</table>

Note: \(U_t\) is the A.C. mains voltage prior to application of the test level.
This WIRELESS IMAGE system is intended for use in the electromagnetic environment specified below. The customer or the user of this WIRELESS IMAGE system should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 Test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment-guidance</th>
</tr>
</thead>
</table>
| Conducted RF      | IEC 61000-4-6        | 3 Vrms 150 kHz to 80MHz | 3 Vrms 150 kHz to 80MHz | Portable and mobile RF communications equipment should be used no closer to any part of the WIRELESS IMAGE system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: 
\[
d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}
\]
| Radiated RF       | IEC 61000-4-3        | 3 V/m 80.0 MHz to 2.5 GHz | 3 V/m 80.0 MHz to 2.5 GHz | Recommended separation distance
\[
d = \left[ \frac{3.5}{E_1} \right] \sqrt{P}
\]
\[
d = \left[ \frac{7}{E_1} \right] \sqrt{P}
\]
|                   |                      | 80 MHz to 800 MHz   | 80 MHz to 2.5 GHz |
Where \( P \) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and \( d \) is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, (a) Should be less than the compliance level in each frequency range (b).

Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1) \( U_t \) is the A.C. mains voltage prior to application of the test level.
Note 2) At 80MHz and 800 MHz, the higher frequency range applies.
Note 3) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re orienting or relocating the EUT.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than \([V1] V/m\).
Recommended separation distances between portable and mobile RF communications equipment and the WIRELESS IMAGE system.

The WIRELESS IMAGE system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the WIRELESS IMAGE system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the WIRELESS IMAGE system as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Rated maximum output power [W] of transmitter</th>
<th>Separation distance according to frequency of transmitter [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150kHz to 80MHz</td>
</tr>
<tr>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>0.1</td>
<td>0.37</td>
</tr>
<tr>
<td>1</td>
<td>1.17</td>
</tr>
<tr>
<td>10</td>
<td>3.70</td>
</tr>
<tr>
<td>100</td>
<td>11.70</td>
</tr>
</tbody>
</table>

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**Note 1)** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

**Note 2)** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
Guidance and manufacturer’s declaration - electromagnetic immunity

This WIRELESS IMAGE system is intended for use in the electromagnetic environment specified below. The customer or the user of this WIRELESS IMAGE system should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 Test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment-guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF</td>
<td>IEC 61000-4-6</td>
<td>3 Vrms 150 kHz to 80MHz</td>
<td>3 Vrms 150 kHz to 80MHz</td>
</tr>
<tr>
<td>Radiated RF</td>
<td>IEC 61000-4-3</td>
<td>3 V/m 80.0 MHz to 2.5 GHz</td>
<td>3 V/m 80.0 MHz to 2.5 GHz</td>
</tr>
</tbody>
</table>

**Note 1)** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

**Note 2)** It is essential that the actual shielding effectiveness and filter attenuation of the shielded location be verified to assure that they meet the minimum specification.

Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength outside the shielded location in which the EUT is used exceeds 3V/m, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as relocating the EUT or using a shielded location with a higher RF shielding effectiveness and filter attenuation.
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.

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.

IC Class B Statement (Canada)
This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Cet appareil numérique de la classe B conforme à la norme NMB-003 et RSS-210 du Canada. 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.

EU Declaration of Conformity (DoC)
Hereby declares that this device is in compliance with the essential requirements and other relevant provisions of the R&TTE Directive 1999/5/EC, and European RoHS2 Directive 2011/65/EU.

Notified Body: TÜV SÜD BABT
Octogon House, Concorde Way, Fareham, Hampshire, PO15 5RL, United Kingdom

LVD, EMC, EMF, Radio as attested by conformity with the following harmonized standards:
EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-17 V2.2.1 (2012-09)
EN 302 567 V1.2.1(2012-01)
EN 302 567 V1.2.1(2012-01)
EN 62311:2008
13. Warranty and Limitations

One year, parts and labor.

Customer service contact:

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Fax: 714-300-0546

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Fax: +82-42-360-8005