



Inherently Secure:

Infrared light as a medium for wireless audio and data transmission

This document discusses the physical properties of Infrared Light as used in the TAIDEN 5300 Series Digital Infrared Wireless Conference System. We relate the importance of security when using a wireless conference system and compare the technology of Infrared to that of competing methods in Radio Frequency.

Inherently Secure:

Infrared light as a medium for wireless audio and data transmission

Line of Sight

Infrared light, as a wireless medium, is referred to as being “Inherently Secure” because the signal does not pass thru walls or physical obstructions; thereby eliminating the possibility of recovering the signal from another room. Infrared Wireless Conference Systems are similarly referred to as a “line of sight” technology because the IR transmitter and receiver cannot have physical objects between them. This “line of sight” characteristic is what makes the Infrared Conference System “Inherently Secure” and is unique to Infrared as a wireless technology, all because of the physical properties of Infrared light.

IR at 870nm

The TAIDEN 5300 Series Digital Wireless Conference System uses an 870nm wavelength at frequencies between 2MHz and 8MHz. At this small size the transmission is obstructed at the particle level by walls and other “solid” surfaces. The IR signal can travel thru our atmosphere but is reflected (or refracted) when in contact with other objects.

Compare this to Radio Frequencies; RF signals at 2.4GHz and even 5.6GHz use a wavelength of 125mm and 59.98mm respectively, which is large enough to pass thru physical objects without distortion to the original signal. This can be a positive attribute when positioning antennae but unfortunately makes the system vulnerable to eavesdropping due to non-participants receiving the RF signal outside of the meeting space. In fact, one using RF as a means of transmission must develop sophisticated algorithms to encrypt the signal before transmission, with varying degrees of success.

Media Vision

www.media-vision.com
info@media-vision.com

San Francisco
Washington, D.C.
New York
Toronto
Paris
Geneva
Copenhagen
London
Brussels

dirATC and DQPSK

Infrared light does not need encryption, however the conference system must use some form of encoding process as well as a frequency modulation to transmit digital data over the analog format of Infrared light. The TAIDEN 5300 Series Digital Wireless Conference System uses a proprietary encoding and decoding process called dirATC (Digital Infrared Audio Transmitting and Control) and allows for the analog to digital conversion of the audio signal originating from the delegate electret condenser microphone. This process maintains a frequency response of 20Hz to 20kHz and is now in a format ready for frequency modulation in preparation of transmission over the Infrared medium.

DQPSK (Differential Quadrature Phase Shift Keying) is the standard modulation process for higher bandwidth transmission over infrared light. The process allows the TAIDEN 5300 Series Digital Wireless Conference System to maintain the 20Hz to 20kHz frequency response, even after transmitting and receiving the infrared signal. The process is compliant with IEC-61603-7.

Brand	Transmission Frequency	Frequency Type	Wavelength
Televic Confidea Wireless Conference System	2.4GHz / 5 GHz	Radio	125mm / 59.98mm
Bosch Digital Wireless Conference System	2.4GHz	Radio	125mm
DIS Microflex Wireless System	1920-1930 MHz	Radio	156.25mm / 155.44mm
Revolabs Wireless Microphone System	1920-1930 MHz	Radio	156.25mm / 155.44mm
Beyerdynamic Wireless Quinta	2.4 / 5.2 / 5.8 GHz	Radio	57.69mm / 51.72mm
TAIDEN Digital Infrared Wireless Conference System	2-8MHz	Infrared	870 nanometers

Table 1: Manufacturer comparison

About Media Vision

Media Vision is a leading provider of professional wired and wireless conferencing solutions for multipurpose meeting rooms, VTC boardrooms, training centers, council chambers and auditoriums. Supported by feature-rich, flexible technologies, powerful software, and a dedicated product engineering team, we work with system integrators and consultants to design conferencing solutions that improve the audio intelligibility in the room and on the far end for distance communication. Additional information can be found at www.media-vision.com

Media Vision

www.media-vision.com
info@media-vision.com

San Francisco
Washington, D.C.
New York
Toronto
Paris
Geneva
Copenhagen
London
Brussels