Digital UHF Wireless System Introduce for Acoustic Measurement

Système sans fil numérique UHF : présentation pour les mesures acoustiques

Se presenta el sistema inalámbrico digital UHF para medición acústica

无线系统针对声学测量场景的特点介绍

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GAODIMIC is an emerging wireless audio brand that is providing FOH engineers worldwide with more efficient digital audio UHF wireless products and solutions, and is gaining increasing recognition from users.

For sound measurement scenarios, GAODIMIC can provide AT 210 P Series (Base on AT210 TECH, the 3rd Plus Gen Technology Platform) and DT 228 Series (Base on DT220 TECH, the 4th Gen Technology Platform).

1 AT210P Series

This series represents GAODIMIC's most classic digital UHF wireless products, making it ideal for sound measurement scenarios.

The general wireless technical specifications are as follows:

Frequency range	20 Hz ~ 20 kHz
Frequency Attenuation	< 2dB (20Hz~20kHz) (2.5dB with 24V Phantom, 3.5dB with 48V Phantom.) (This result is related to the microphone's impedance; higher impedance generally results in better performance, but may introduce more floor distortion.)
Phase Drift	+30° ~ 60° (20Hz~20kHz)
SN	102dB (Latest version)
Dynamic Range	102dB
Latency	4ms
Floor Noise	20uV (In digital communications, this noise primarily originates from chips and circuitry, and is almost entirely unrelated to wireless transmission.)
Thd	< 0.03% (@1KHz)
Phantom Power	OFF / 24V / 48V
MAX Concurrency	24CH/100Mhz Band
TX Battery Life	> 4h (@48V phantom power) > 5h (@24V phantom power)

AT 210 P Series offers customers a variety of kits suitable for various sound measurement scenarios:

	Distance	illustrate	
AT 210 PG - P	50 M	Single CH Portable Kit Extremely small and easy to carry. TX and RX come with built-in Li-batteries. Suitable for indoor sound measurement and outdoor wireless audio transmission. Popular models worldwide	
AT 210 PG - R	100 M	Single CH Rack mounted Kit Small in size and easy to carry. TX and RX come with built-in Li-batteries. Suitable for sound measurement even in large venue, and for wireless audio transmission outdoors. Popular models worldwide.	

AT210PG-R-2	7 0 M	2CH Rack Mounted Kit Suitable for sound measurement in indoor and venue scenarios, and for wireless audio transmission outdoors. High cost performance	
AT210PG-R-4	7 0 M	4CH Rack Mounted Kit Suitable for sound measurement in indoor and venue scenarios, and for wfireless audio transmission outdoors. High cost performance	
AT210PG-R-2ST	80 M	2CH Rack Mounted Kit (True Diversity RX) Suitable for sound measurement in indoor and venue scenarios and for wireless audio transmission outdoors.	
AT210PG-R-4ST	80 M	4CH Rack Mounted Kit (True Diversity RX) Suitable for sound measurement in indoor and venue scenarios, and for wireless audio transmission outdoors. Receiver is 2U	

* In GAODIMIC models, the "G" at the end of the first part stands for "Group," meaning it's a kit with TX & RX.

2 DT228 Series

This series represents GAODIMIC's most popular digital UHF wireless products, providing users with excellent sound measurement and wireless audio transmission capabilities.
the DT 228 series products:

1. The SN ratio has been improved to >123dB ;
2. Dynamic range improved to >120dB ;
3. Floor Noise is reduced to <6uV, reaching the monitoring level.
4. Employing "Hybrid Battery" technology, it supports AA, 14500 , and 18650 batteries simultaneously. At 48V , the transmitter's runtime is > 12 hours.
5. in frequency response attenuation. The frequency response attenuation below 100 Hz is 1 to 1.5 dB more (this value is related to microphone impedance).

The general wireless technical specifications are as follows:

Frequency Range	20 Hz ~ 20 kHz
Frequency Attenuation	< 3dB (20Hz~20kHz) (3.5dB with 24V phantom enabled , 4.5dB with 48V phantom enabled.) (This result is related to the microphone's impedance; higher impedance generally results in better performance, but may introduce more floor noise .). It will improve in the future.
Phase Drift	+30° ~ 60° (20Hz~20kHz)
SN	123dB
Dynamic Range	120dB
Latency	4ms
Floor Noise	6uV (In digital communications, this noise primarily originates from chips and circuitry, and is almost entirely unrelated to wireless transmission.)
Thd	< 0.03% (@1KHz)
Phantom Power	OFF / 24V / 48V

MAX Concurrency	24CH/100Mhz Band
TX Battery Life	> 12h (@18650 lithium battery & 48V) > 5h (@14500 lithium battery & 48V) > 3h (@AA battery & 48V)

The DT228 Series also offers a variety of kits to suit various sound measurement scenarios:

	Distance	illustrate	
DT 228 G - P	50 M	Single-CH Portable Kit Extremely small and easy to carry. TX and RX come with built-in Li-batteries. Suitable for indoor scenarios. Hot in the world	
DT 228 G - R	100 M	Single-CH Rack Mounted Kit Small in size and easy to carry TX and RX come with built-in Li-batteries. Suitable for indoor and venue scenarios. Hot in the world	
DT 228 G -R-2ST	80 M	2CH Rack Mounted Kit (True Diversity RX) Suitable for indoor and stadium scenarios	
DT 228 G -R-4ST	80 M	4CH Rack Mounted Kit (True Diversity RX) Suitable for indoor and venue scenarios Receiver 2U	

* In GAODIMIC models, the "G" at the end of the first part stands for "Group," meaning it's a kit with TX & RX.

3 DT 225 Series

For ultra-long-distance digital audio wireless transmission scenarios, GAODIMIC also offers the DT225 series as a considerable option.

the TX of this series is the DTT225-R, a rack-mounted transmitter.

With its external antenna, the DT225 kit offers a wireless transmission range of over 300m. Its performance is closer to the AT 210 P series, making it ideal for scenarios such as scenic spots and large outdoor events, providing speakers with ultra-long-range wireless audio transmission.

The DT225 has been applied in numerous football and marathon matches, eliminating the need for fiber optic cable installation and significantly reducing project costs. Its signal stability has earned high praise from users.

The DTR 225-1TE is a single-channel receiver with a relay switch module, enabling intelligent control of speakers in two modes:

The speaker automatically turns on and off based on wireless signals (RF).

The speaker is automatically turned on and off based on the sound signal (AF).

4 Regarding how to choose

For comparison data on the AT210P and DT228 series products, please refer to the information on the GAODIMIC website:

http://www.gaodimic.com/detail_page?article_id=263

For users:

- If you have a limited budget, are not pursuing excellent sound quality, and only consider sound measurements in the 50M ~ 70M range, you can choose the AT210PG-P, 3.5th Gen Portable Kit.
- If you're looking for a device that can perform sound measurement and audio wireless transmission during performances, then you should consider the DT228 series.
- If used outdoors or in a venue, consider the Rack Mounted Kit.
- If you require multi-channel Kit, and you already have an antenna splitter, you can consider the “AT210PG-R-2” or “AT210 PG-R-4”. This is the lowest-priced digital UHF wireless kit for professional sound measurement known globally. Just shipping costs and triff must be aware.
- If you need ultra-long-range wireless audio transmission, you should consider the DT225 series.

5 Regarding frequency bands

the AT210P and DT228 series products support 500MHz ~ 698MHz, ultra-wide wireless frequency band.

Unique Feature: GAODIMIC's main product models currently support “Region” settings, which can restrict the 608-698MHz frequency band at the hardware level, thereby meeting the wireless requirements of different countries.

With this function, in the future, GAODIMIC will be able to provide users with more customized frequency planning options based on the wireless conditions in various countries.

6 Regarding the transmitter antenna

As a professional wireless transmitter, the antenna design must meet the following requirements simultaneously:

- The device should be as small, robust, and aesthetically pleasing as possible, with a built-in antenna being a priority.
- The antenna can radiate energy efficiently.
- Ensure that the PCBA does not receive wireless power and generate noise.

These requirements pose significant challenges to hardware development, leading many companies to abandon them and instead solve the problem by installing an external antenna on the transmitter. This, in turn, leads to other issues:

1. If a fixed external antenna is used, it is inconvenient to carry.

2. If a detachable external antenna is used, prolonged use may lead to poor contact at the BNC interface.
3. When used for performances, external antennas are extremely unsightly.

7 Regarding transmission distance

GAODIMIC's official specifications and instruction manuals tend to be conservative in their ratings of wireless transmission distance. In actual use, the wireless transmission distance will generally exceed the stated specifications.

210PG-P in a stadium scenarios. Portable kit, achieving a transmission distance of up to 140 meters.

Of course, the transmission distance of a device is related to many factors, including but not limited to:

1. Wireless environment.

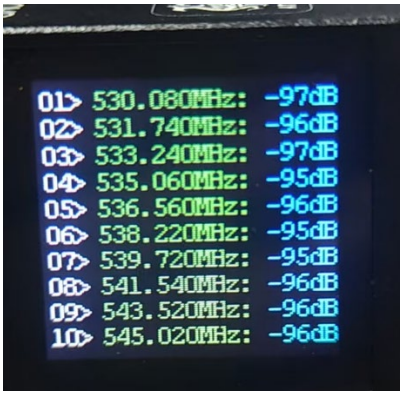
   Stable and long-distance transmission is independent of the wireless environment; the following situations should be avoided as much as possible:

   A、Equipment should be kept away from LEDs. LEDs have numerous boost circuits, and many LED display power supply modules lack proper wireless shielding, which can cause severe interference.

   B、Avoid having vehicles, especially electric vehicles, running between the transmitter and receiver.

   C、Try to avoid crowds between the transmitter and receiver, and ensure that the TX and RX signals are visible to each other as much as possible.

2. Select a suitable frequency. It is recommended to first scan the wireless environment using a receiver. The system will display the RF signals for each available frequency. RF Power values are shown in the image below:



   If the value is >-80dB , it means there is interference at that frequency, and its use is not recommended.

   If it is >-70dB , there is significant interference, which will severely reduce the effective transmission distance.

   It is recommended to use a frequency with a value <-90dB .

3. When using multiple devices simultaneously, try to select frequencies within the same group.

   All frequencies within the same group have been designed to avoid the problem of higher-order frequencies interference.

   If used frequently across groups or using Customized Frequency needs to be planned in advance.

4. For rack-mount receivers, GAODIMIC provides two sets of antennas: 500 MHz and 600 MHz. The correct external antenna should be selected during use.

   Because antennas have a center frequency, frequencies near the antenna's center frequency should be prioritized for operation.

   500 MHz antenna: center frequency is 550 MHz, preferred frequency band: 535 MHz ~ 565 MHz.

   600 MHz antenna: center frequency is 660 MHz, priority frequency: 645 MHz ~ 680 MHz.

5. Reasonable use of transmitter RP In the Power settings, if you don't need an ultra-long distance, you

can select the Middle option.

8 Regarding OTA upgrades

The AT210PG-R and DT228G-R Single-CH Rack Mounted Kits support OTA upgrade, providing users with a better product experience.
The relevant firmware and operation guide can be obtained from the website.
OTA upgrades only support Android phones and cannot be performed on iOS phones.

9 Regarding authentication

Currently, the AT210P series and DT228 series products have passed China's MA and CNAS certifications and the European CE certifications.
For more details, please visit the GAODIMIC website.

10 Regarding precautions.

There are also some operational points to note regarding GAODIMIC, such as:

1. AT 210 PG series Floor The noise can be heard in a quiet indoor environment, and of course, it does not affect the sound measurement at all.
2. Holding the transmitter in your hand may produce noise.
   Because the GAODIMIC transmitter simplifies its casing design to achieve an extremely small size, the distance between the antenna and the PCBA is minimal. If you hold the transmitter in your hand, it will reflect radio energy back to the PCBA, causing noise.
   On the other hand, under normal circumstances, when using a transmitter, one would not hold the transmitter in their hand.
3. When used with some wired microphones, it can produce noise.
   Some wired microphones are designed only for wired use and do not adequately shield against radio waves. This can cause the microphone to sense noise from the transmitter. In such cases, reducing the transmitter's RF shielding can help. Power, or use XLR cables or XLR extension tubes to solve or optimize.

GAODIMIC has been officially maintaining a document "Technical Guide" compiles and organizes common problems and solutions encountered during use.
Users can download it from the official website: http://www.gaodimic.com/detail_page?article_id=259

11 Regarding UHF and 2.4G, 5.8G.

In the definition of wireless communication, the UHF band includes the 2.4 GHz frequency range. However, when people mention UHF, they usually think of the 400MHz ~ 900MHz radio frequency band, because most of the world's civilian-use radio frequency bands fall within this range.

From a wireless communication perspective, for long-distance wireless transmission of audio, the frequency band is typically 400MHz ~ 900MHz. It is the most ideal wireless frequency band. In the field of mobile communications, it is called the "golden frequency band":

1. It has excellent wavelength and excellent diffraction and reflection properties, making it suitable for crossing obstacles such as walls.
2. It has good vacuum attenuation performance and is suitable for long-distance transmission.
3. Its matching 1/2 wavelength antenna is within a range that is easy to carry.

4. It avoids the frequency bands used by Bluetooth and Wi-Fi, making the user environment more stable.
5. This perfectly meets the frequency bandwidth requirements for wireless audio transmission.

2.4GHz band was initially planned for mobile communication wearable products, emphasizing shorter antennas to provide wider bandwidth for video signals and solve the "last 10 meters" problem of mobile communication wireless transmission .

5.8GHz band is an extension of 2.4GHz band, designed to address the problem of limited wireless frequency resources caused by the increasing number of Bluetooth and Wi-Fi devices.
from 2.4GHz band to 5.8 GHz band took nearly 20 years, and many wireless frequency resources were allocated by governments to mobile communications, military communications, satellite communications, and RFID communications. Considering the future expansion requirements of communication networks, only 5.8GHz remains as a relatively unused wireless frequency resource for civilian use in various countries .
The biggest weakness of 5.8GHz wireless band is that its wavelength is only 5.2cm, which has too weak penetration and poor vacuum attenuation, making it unsuitable for PA scenarios.

This also explains why, in recent years, many governments have been or try to reclaiming radio frequency resources in the 400MHz to 900MHz range.

12 Regarding the supporting software and hardware.

Since 2024 , the GAODIMIC digital UHF wireless system has been deployed in over 50 countries and regions worldwide, gaining a substantial user base and numerous case studies. Most users of GAODIMIC also utilize the following software and test microphones:

- **SMAART**
  The globally renowned acoustic software. GAODIMIC‘s system works very well with it.
- **RiTA**
  The renowned acoustic software from Spain is frequently seen around the world alongside the GAODIMIC digital UHF wireless system.
- **Open Sound Meter**
  A highly distinctive acoustic software, is also a rare open-source and free software recommended by GAODIMIC.
- **MELlab**
  Measurement microphones are the most common hardware companions to GAODIMIC products. Their MYc -3 measurement microphone, like other GAODIMIC products, offers excellent value for money.

13 Regarding partners.

GAODIMIC has partnered with numerous companies and individuals worldwide to provide users with more convenient services and technical support.

If you wish to purchase GAODIMIC products, please contact your nearest business partners.

You can visit the GAODIMIC website to learn about our global business. Information about partners:
http://www.gaodimic.com/BizPartner

GAODIMIC has many businesses Our partners are excellent FOH experts and experienced certified trainers, and GAODIMIC users can get very professional guidance and advice from our business partners.

14 Grateful

Thank you to GAODIMIC's loyal users and fans. Friends from all over the world have provided GAODIMIC with a perfect stage and given it a lot of understanding, support, and help, allowing GAODIMIC to listen the beautiful sounds from the world.

infoSVC LLC
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PS：Digital UHF Wireless System Comparison

GAODIMIC®

Jan,2026

Digital UHF Wireless System Comparison (Gen3.5, Gen4)

Series	AT210 (Classical)	DT228 (Hot)
TECH Platform	AT210 Tech™ AT210 [Plus] Digital UHF Wireless Tech Platform (Gen 3.5)	DT220 TECH GEN 4TH™ DT220 Digital UHF Wireless Tech Platform (Gen4)
Carrier Band	510~698Mhz (varies from countries)	Same as left
Bit Depth	18bit	20bit
SN	102dB	123dB
Dynamic Range	102dB	120dB
Floor Noise	<20uV	≈6uV [Monitoring Class]
Distance	Portable Kit:50~60m / Rack Mounted Kit:100~120m	Same as left
Freq. Response Attenuation	<2dB (20Hz~20KHz) (Related to MIC impedance and phantom power)	<3dB (20Hz~20KHz) (Related to MIC impedance and phantom power)
Phase Drift	30°~-60°(20Hz~20KHz)	Same as left
T.H.D	<0.03% (@1KHz)	Same as left
Latency	<4ms	4.17ms
Antenna	Portable Tx: FPC Dual-Mode Antenna Portable Rx: FPC Dual-Mode Antenna Rack Rx: 600Mhz&500Mhz Stick antenna	Portable Tx: FPC Dual-Mode Antenna Portable Rx: FPC Dual-Mode Antenna Rack Rx: 600Mhz&500Mhz Stick antenna
TX Battery Life (@48V)	>6h(14500 Li-battery) >8h(Customized 14500Li-battery)	>12h(18650 Li-battery) / >6h(14500 Li-battery) >8h(Customized 14500Li-battery) / >2h(AA battery)
Power Supply	14500 Li-battery	[Hybrid Tech] 14500 Li-battery / 18650 Li-battery / AA battery
Screen	Portable Tx: OLED Portable Rx: OLED Rack Rx: TFT	TFT High-resolution Screen
3D Gyroscope	√	×
Laser Pointing	√	×
UI	V2.0	V3.0
Rx Overvoltage Protection	√	√
OTA	Portable Tx: Support Portable Rx: Not Support / Rack Rx: Support	Same as left
Others	Rack Rx: DIP Switch	Portable Tx: Slightly larger & longer. Portable Rx: Slightly larger & longer. Rack Rx: unchanged in size, push button switch. The Freq.(<60Hz) attenuation is 1dB larger.