XK-M503E Airborne Mesh Radio

Airborne Mesh Radio

MIMO 2Watts x2

Shenzhen Xingkai Technology Co., Ltd

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www.xingkaitech.com

■ Disclaimer

Thank you very much for using our products!

Please use this product in accordance with the local laws and regulations. We will not bear any legal liability for any result or loss caused by unauthorized use, installation or refit of this product, etc. Please use this product carefully according to the procedures and precautions mentioned in this manual. No any refund or exchange support and free-maintenance services will be provided if this product is damaged due to disassembly, impact, misoperation and other reasons.

■ Precautions

In order to ensure the correct and best use of this product, before operation, please read this manual carefully and follow the relevant procedures and precautions for fear of damage to the device or poor performance due to misoperation or improper use. The operator should have some basic knowledge on communication electronics. When installing and using this product, please pay attention to the followings.

Installation precautions:

1. Before the XK-M503E device is powered on, loads such as an antenna or an attenuator must be installed to the antenna interface, otherwise the power amplifier module inside the device will be damaged.
2. When replacing the antenna, the power must be cut off first, otherwise the power amplifier module inside the device will be damaged.
3. The antenna connection matching the device frequency should be selected, otherwise the power amplifier module inside the device may be damaged.
4. Please use DC power supply of dc12v ~ dc26v to supply power to the device, otherwise the circuit may be damaged or the device may work abnormally.
5. The antenna of the device should be exposed in the air as far as possible and obstacles should be avoided in order to prevent shortened

communication distance.

6. The antenna should be installed as far away from large metal parts as possible.
7. The device should be kept a certain distance from other electronic device as far as possible to reduce electromagnetic interference between devices.

1. Product Overview

The broadband mimo mesh networking is a mobile broadband multimedia communication system designed with the new concept of "wireless grid network". The system with powerful functions and excellent performance; All nodes can realize real-time interaction of multi-channel voice, data, image and other multimedia information by adopting distributed network architecture without central AD hoc network under the condition of non-line-of-sight and fast movement. Supports any network topology, such as point-to-point, point-to-multipoint, chain-like relay, mesh network and hybrid dynamic topology.

The network adopts the same frequency networking and multi-hop relay. Each node device can move quickly and randomly, and the network topology can be changed and updated quickly without affecting the network transmission.The whole network is convenient to deploy, flexible to use, simple to operate and easy to maintain. It can provide users with reliable, timely, efficient and secure full IP clear voice, broadband data, high-definition video and visual command and scheduling and other multimedia integrated services under complex application scenarios such as fast movement and non-line-of-sight shielding.

The broadband self-organizing network can be widely used in the military, public security, armed police, fire protection, civil air defense, electric power, petroleum, mining, transportation, water conservancy, forestry, radio and television, medical, water and air communications and other sectors, providing users with reliable, timely, Rich integrated services such as safe and efficient voice, data, video and visual command and dispatch can meet users' wireless broadband communication needs in normal or emergency situations to the greatest extent, and truly achieve "anytime, anywhere on demand".

Performance:

- Mesh network (self-forming, self-healing, self-adapting), high-speed throughput
- Non-visual urban construction jungle multi-path transmission terrain, effective connection
- High-speed movement of ground, water and air, effective connection
- Multiple antenna settings, omnidirectional, high gain orientation or mixing
- GPS and Multicast Support

Advantages:

- Increased 4.5 times coverage in densely populated areas
- The same communication range and transmission volume, reducing transmission power by 10 times
- Increase the distance by 2 times in the visible limit environment
- Increase 2-4 times transmission rate

Significant applications in Non Line of Sight /Multipath Fading environments, video/data/voice critical ommunications:

- Robot / Unmanned Vehicle, Reconnaissance / Surveillance / Anti-Terrorism / Monitoring
- Air-to-air & air-to-ground & ground-to-ground, public safety / special operations
- Urban network, emergency support / normal patrol / traffic management
- Inside and outside the building, fire fighting / rescue and disaster relief / forest / civil air defense / earthquake
- TV broadcast wireless audio / video / live broadcast
- Marine communication / high speed transmission on the opposite side of the ship
- Low deck wireless network / ship landing

2. Product Features and Functions

2.1 Product Features

- Decentralized, self-organizing network;
- Immunity to interference and multipath effects;
- Easy to deploy, flexible to use, and simple to operate;
- Outstanding dynamic networking capabilities;
- Strong ability to adapt to complex environments;

- Supports basic configuration and device information checks via the web UI.
- MIMO technologies such as time-division, spatial diversity, and spatial multiplexing.

2.2 Product Features

- Operating frequency range: 70 MHz to 6 GHz (customizable), FHSS hopping;
- Adjustable bandwidth, supporting 2.5 MHz, 5 MHz, 10 MHz, and 20 MHz (optional);
- Supports up to 256 nodes on the same frequency;
- Supports multicast and broadcast services;
- Enhanced operating modes such as intelligent frequency selection and adaptive frequency hopping;
- Data encryption: Supports various channel encryption methods, including AES-128, AES-256, and EDS;
- Flexible networking;
- Supports multiple serial ports;

3. Performance Metrics

General	
Waveform	Mobile Network MIMO (MN-MIMO)
MIMO Technology	Space-time coding、Space Diversity、TX /RX beamforming、Spatial multiplexing
Receive Sensitivity	-103dBm@5MHz BW
Channel Bandwidth	1.25/2.5/5/10MHz （20MHz Optional）
Data Rate	63Mbps(10MHz BW); 1-100Mbps(20MHz BW) Adaptive,QoS
Modulation Mode	TD-COFDM,BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM Adaptive(Fixed setting optional)
RF Output Power	2Watts x2
Single Hop Communication Distance	100-200 KM (visible), 1-30 KM (urban area)
Mode	Distributed centerless Point-to-point/Point-to-multipoint/Multipoint-to-multipoint, Layer 2 or 3 of Dynamic routing、Multi-hop relay, Star/Line/Network/Hybrid
Single Hop	Average 7mS (20MHz BW)

General			
Waveform	Mobile Network MIMO (MN-MIMO)		
Delay			
Encryption	DES, AES128/256, SNOW3G/ZUC optional, Chip/TF card encryption customized or external encryption machine		
Anti-jamming Mode	Manual spectrum scanning channel selection, Full band enhanced intelligent frequency selectting(spectrum awareness)/Full band adaptive frequency hopping/ Roaming mode optional		
Local/Remote Management	Operating frequency, channel bandwidth, network ID, transmit power and other parameter settings, spectrum scanning, real-time display and statistical records of network topology, link field strength signal-to-noise ratio, upload and download traffic,node distance, GPS/Beidou electronic map, temperature/voltage/jamming Monitoring, software upgrade. Remote silence and wake-up optional		
Others	The startup time is less than 28 seconds, and the network access/update/switchover time is less than 1 second. There is no limit on the user capacity of a single system (256 nodes or more) and the number of hops in Mesh networks (Data 15+ hops, voice 10+ hops, video 8+ hops). The total bandwidth loss of multiple hops is less than 70%. Automatic carrier tracking, adapted to a Doppler frequency deviation of ± 6kHz frequency offset, supports mobile communication at speeds above 7200 kilometers per hour (6 Mach, 2000 meters per second).		
Bands(70M-6GHz. 2T2R at single band, or 1T2R at dual band selectable/smart change*)			
BAND	Frequency range (MHz)	BAND	Frequency range (GHz)
UHF	430-550/570-700/800-950,225-400/320-470*	S Band	1.6-1.8/1.8-2.0/2.0-2.2/2.2-2.5/ 2.5-2.7/2.7-2.9,1.6-2.3/1.9-2.7*
L Band	1000-1200/1300-1500, 1200-1700*	C Band	4.4-5.0/5.25-5.85, 4.2-5.2/5.5-6.0*
MIIT	336-344/512-582/566-626/606-678/1420-1520/1430-1444		
Environmental			
Operation Temperature	-40℃ ~+80℃		
Protection Level	IP55, IP67/IP68 Customized		

Mechanicl	
Size/Weight	12.5x10.5x3.5cm/520g (2Watts×2 Airborne Radio)
Color	black
Installation	4 Mounting Holes
Power	
Supply Voltage	12-26VDC (2Watts×2)
Power consumption	Operation 1-2.5A/Standby 0.3-0.5A@16.8V (2Watts×2)
Interface	
Basic interface	2xSMA RF, 1xRJ45 Ethernet 100/1000BaseT, 1xRS232,2xTTL(UART) , 1XDC Input
RSSI Link Indicator	Steady green - The link quality is good Steady yellow - The link quality is medium Steady red - The link quality is poor Led going out - The link is down
Management Interface/Control Interface	Web-based network management/GUI, API for secondary development interface/ SNMP

4. Physical Components and Interface Descriptions

4.1 Photographs and Dimensions of Wireless Ad-hoc Network Equipment

Figure 4.1: XK-M503E Product Image and Dimensions

4.2 Device Interface Description

Figure 4.2 XK-M503E Physical Interfaces

①RF1 antenna connector;

②RF2 antenna connector;

③J30 Connector Specifications:

Interface	pin	Definition
DC	1、2、3、4、5	VCC
	14、15、16、17、18	GND
ETH	19	TX+
	20	TX-
	21	RX+
	22	RX-
UART0	23	TX
	24	RX
	25	GND
	12	5V
UART1	6	TX
	7	RX
	8	GND
UART2	9	TX
	10	RX
	11	GND

④ Power indicator: A steady light indicates normal power supply; a dark indicator indicates a power supply issue;

⑤Signal status indicator: A steady green light indicates good signal quality, a steady yellow light indicates fair signal quality, a steady red light indicates poor signal quality, and a dark indicator indicates a lost connection;

⑥Link indicator: A steady green light indicates a normal network connection; a steady red light indicates no connection.