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## VM5G 1.0 Product Specification

VM5G is a professional dual band WiFi bridge, repeater and router module carefully developed by HouTian network, can work in 5G and 2.4G band at the same time, adopt temperature compensated auto frequency control technology (TAFC), WiFi signal is more stable and not easy to drop, its main features as below:

### Hardware Features:

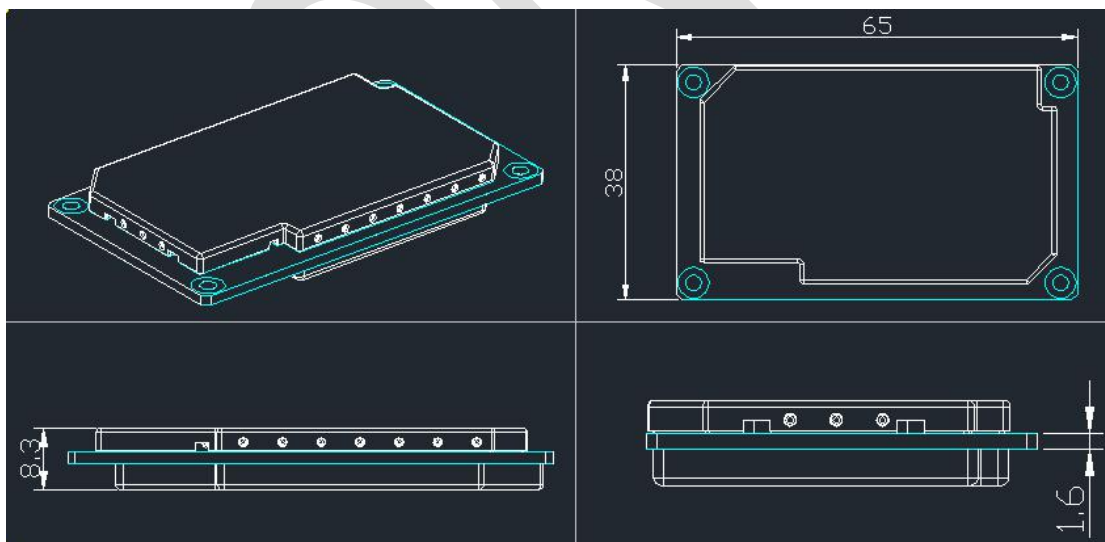
- Support wide voltage DC5-15V power supply, two-stage automatic overvoltage protection (Protection voltage upper limit 15.5V);
- The output power of the power supply is not less than 10W (typical power supply 5V/2A, ripple less than 100mV);
- Module power supply: 1.3W -- 3.75W;
- WiFi Work Band: 2.4G + 5G;
- WiFi transmission rate: 300Mbps(2.4G)+900Mbps(5G);
- RF Power: 2.4G is 14.5dBm, 5G is 19dBm/23dBm adjustable;
- The transmission distance (5G without obstacle): 500 meters;
- The module built-in LNA, the receiving sensitivity is 14dBi;
- Standard package external antenna: 2\*4dBi 5G antenna, 2\*2.5dBi 2.4G antenna;
- Provide a TTL level UART data transparent transmission interface;
- Adopt temperature compensated auto frequency control technology, WiFi signal is more stable and not easy to drop;
- Work Environment temperature: -40°C to 55°C.

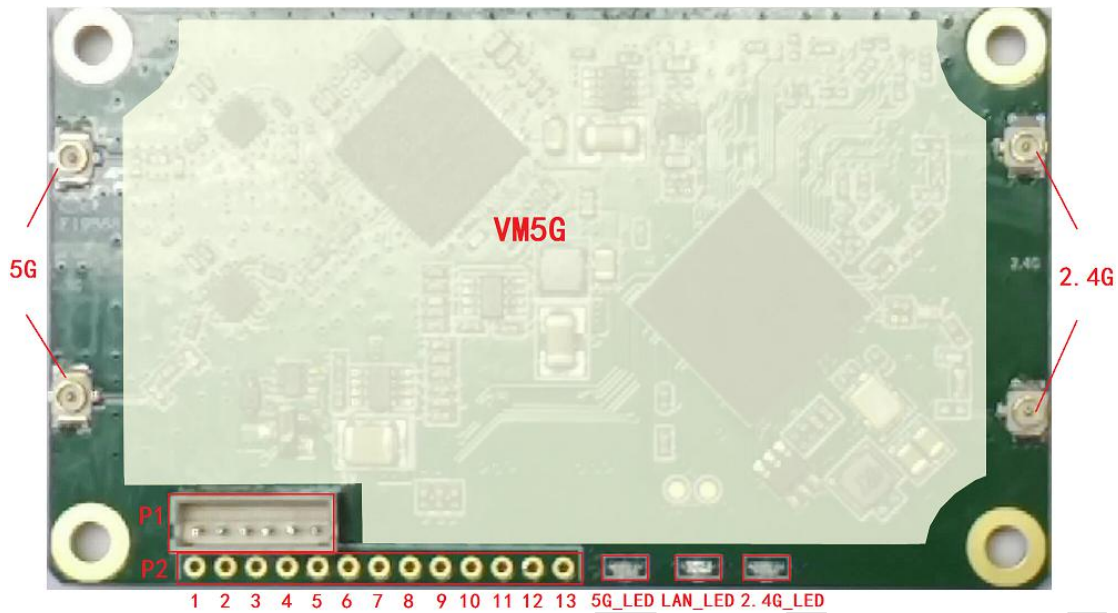
### Function Features:

- Support router and bridge repeater mode;
- In router mode, support WiFi WAN access;
- In router mode, support WAN/LAN switching of wired network ports;
- Support WiFi intelligent bridge repeater, can achieve WiFi to wired, wired to WiFi function;
- Support 802.11ac, 802.11a, 802.11n and so on transmission protocol;
- Support UART/UDP data transmission;
- Support WiFi hotspot automatic reconnection, two hotspot matching methods: Full match authentication mode, SSID and password authentication mode;
- WiFi hotspot memory, maximum memory 10 hotspots;
- Support connecting more than 20pcs WiFi terminal at the same time;
- Support SSA protocol, built-in hot spot signal strength detection and reporting function to realize WiFi mobile positioning;

- Support hotspot forced disable, WiFi hardware forced disable;
- Hotspot connection parameter import and export function;
- Adopt VDNS virtual domain configuration technology to solve the user' s trouble of configuration;
- Support WEB management, Chinese and English configuration interface;
- Support upgrade online;
- Support IP layer transparent transmission and MAC layer transparent transmission two bridge modes to meet various bridge applications:  
**IP layer transparent transmission** (factory default), transparent transmission of IP layer data, can meet most of the bridge applications;  
**MAC layer transparent transmission** all data above the MAC layer (link layer) and the MAC layer, including IP layer data; MAC transparent transmission can solve some special applications for MAC layer encryption, such as GoPro camera, Cisco AP, Hikvision monitoring system, etc.

**One: Module Diagram (mm):**





## Two: P1, P2 interface Definition Form

PIN Number		PIN Definition	Function Description
P1	P2		
1	1	RX-	<ul style="list-style-type: none"> <li>Ethernet Port;</li> <li>The factory default is LAN port, in router mode, you can also log in to the configuration page for WAN/LAN interchange;</li> <li>The 1 to 4 PIN of P2 and P1 are connected in parallel, which is actually the same network port.</li> </ul>
2	2	RX+	
3	3	TX-	
4	4	TX+	
5	5	GND	Module Power Ground
6	6	VIN+	DC5V--15V, Power supply
	7	LAN_LED_N	<ul style="list-style-type: none"> <li>Status Indicator of Ethernet port signal output;</li> <li>Open collector output, built-in 330Ω current limiting resistor, output current is no more than 10mA.</li> </ul>
	8	5G_LED_N	<ul style="list-style-type: none"> <li>5G Status Indicator signal output;</li> <li>Open collector output, built-in 330Ω current limiting resistor, output current is no more than 10mA.</li> </ul>
	9	2.4G_LED_N	<ul style="list-style-type: none"> <li>2.4G Status Indicator signal output;</li> <li>Open collector output, built-in 330Ω current limiting resistor, output current is no more than 10mA.</li> </ul>
	10	UART_TX	<ul style="list-style-type: none"> <li>UART/UDP data transparent transmission interface (UART to UDP);</li> <li>TTL level.</li> </ul>
	11	UART_RX	
	12	GND	Module Power Ground

	13	Reset	<ul style="list-style-type: none"> <li>Reset signal input, after module starts normally, keep this input pin low for more than 3 seconds, module will restore factory parameters;</li> <li><b>Do not power off during the factory reset, otherwise the module may be damaged.</b></li> </ul>
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### Three: Hardware Spec

Interface P1	<p>1) It is used to connect the professional power supply and network two-in-one dedicated cable provided by us;</p> <p>2) Using a dedicated cable, can direct power and network connection testing;</p>
Interface P2	<u>P2 interface Definition Form</u>
LED	<p>Status Indication:</p> <p>Ethernet Port Status Light (Yellow);</p> <p>2.4G WiFi Connection Status Light (Blue);</p> <p>5G WiFi Connection Status Light (Green);</p>
Antenna Interface	<p>2*2.5dBi 2.4G Whip antenna</p> <p>2*4dBi 5G Whip antenna</p>
Module Size	65mm x 38mm x 8.3mm (L x W x H)
Module Weight(Including Antennas)	115g

### Four: WiFi Related

Protocol Standard	IEEE 802.11ac, IEEE 802.11a; IEEE 802.11n, IEEE 802.11g, IEEE 802.11b;
WiFi Transmission rate	<p>2.4GHz band: 300Mbps</p> <p>5GHz band: 900Mbps</p>
Basic Function	<p>1) Router mode, support WiFi WAN access and WAN/LAN exchange;</p> <p>2) Transparent bridge (IP layer transparent, MAC layer transparent);</p> <p>3) WiFi Hotspot switch, WiFi hardware switch;</p> <p>4) 2.4G WiFi mode option: 11B/G/N, 11B/G, 11N, 11G, 11B;</p>

	<p>5G WiFi mode option: 11AC/AN/A, 11AC/AN, 11A/N, 11A, 11N;</p> <p>5) WiFi hotspot automatic reconnection, two hotspot matching methods: Full match authentication mode, SSID and password authentication mode;</p> <p>6) WiFi hotspot memory, maximum memory 10 hotspots;</p> <p>7) SSA signal strength detection and reporting function ;</p> <p>8) Hotspot connection parameter import and export function;</p>
Supported Band	<p>2.4G band channel: 1-14;</p> <p>5G band channel: 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153,157,161, 165</p>
WiFi RF Power	<p>2.4G: 14.5dBm;</p> <p>5G: Normal Power: 19dBm; Enhanced Power: 23dBm.</p>
Compliance acceptance sensitivity	<p>-69dbm (2.4G)</p> <p>-75dbm (5G)</p>
LNA Sensitivity	14dBi
Application Method	<p>WiFi Repeater (WiFi signal repeater), can extend WiFi transmission distance;</p> <p>WiFi Bridge: IP layer transparent transmission, MAC layer transparent transmission;</p> <p>WiFi access point (AP);</p>
WiFi Security	<p>64/128/WEP security;</p> <p>WPA-PSK/WPA2-PSK, WPA/WPA2 Security mechanism;</p>
System Function	<p>Firmware Upgrade</p> <p>Reboot device</p> <p>Reset factory</p> <p>Account and password revise</p>


### Five: Electrical performance parameters

1.Power supply parameters			
Supply Voltage Range	Input Power	Typical Power Supply	Ripple
DC5-15V	≥10W	5V/2A	<100mV

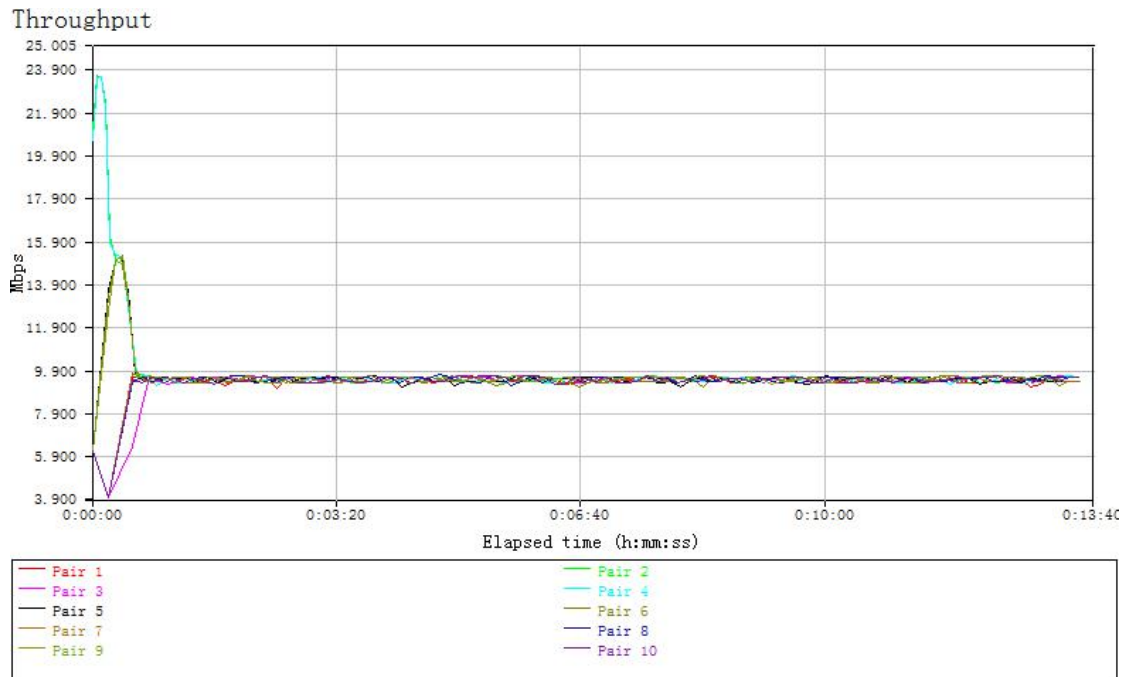
2. Working Electrical Performance Parameter Measurement Form (Environment Temperature: 25℃)

Work Band	Supply Voltage	Work Stage	Work Current(mA)	Main chip temperature (°C)
2.4G	5V	Booting Up	160-280	25-38
		Standby	260-280	40
		Transfer Data	400-450	43
5G	5V	Booting Up	160-380	25-40
		Standby	360-380	42
		Transfer Data	420-470	44
Dual Band	5V	Booting Up	160-480	25-45
		Standby	460-480	48
		Transfer Data(2.4G)	590-690	50
		Transfer Data(5G)	550-610	50
		Transfer Data (Dual Band)	650-750	53

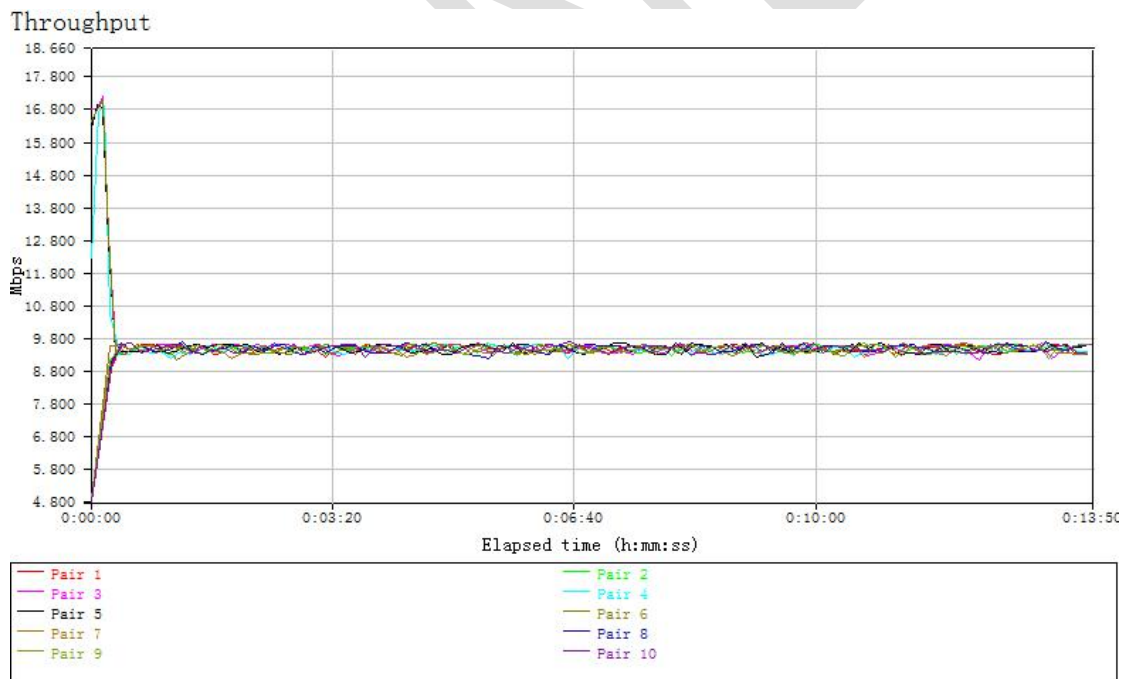
**Six: Network Throughput Test Report**

Device	2pcs VM5G, 2pcs computers	
Test Tool	IxChariot Software	
Top relationship	 <pre> graph LR     PC1[PC] --- Wired  VM5G1[VM5G]     VM5G1 -.- WiFi (2.4G/5G)  VM5G2[VM5G]     VM5G2 --- Wired  PC2[PC]             </pre>	
Test Result:		
Band	WiFi Protocol	Throughput (Mbps)
2.4G	B/G/N	94
5G	AC/A/N	80
	N	94
	A	29

## 2.4G (B/G/N) Throughput Test Fluctuation Chart:



## 5G (AC/A/N) Throughput Test Fluctuation Chart:



## Seven: RF Test Report

### 2.4G RF Parameters Form (Hardware Version: 1.0)

Channel (Band)	1 (2412M)	6 (2437M)	7 (2442M)	9 (2452M)	11 (2462M)	13 (2472M)
Transmit power	14.6	14.4	14.6	14.4	14.5	14.6
EVM	-33	-33	-33.5	-33	-33.5	-33.5

### 5G RF Parameters Form (Hardware Version: 1.0)

Channel(Band)	36 (5180M)	52 (5260M)	64 (5320M)	100 (5500M)	128 (5640M)	149 (5745M)	157 (5785M)	165 (5825M)
Transmit Power 1	20.4	20.3	20.3	20.5	20.67	20.3	20.4	20.5
EVM1	-33	-33	-33.5	-33	-31	-31.5	-31	-31.5
Transmit Power 2	23.5	23.6	23.5	23.5	23.2	22.7	22.8	22.7
EVM2	-30	-30.5	-30	-29.5	-28.5	-28	-28	-28

## Eight: Antenna Matching Test Report:

Standing Wave Ratio Parameters Form (Hardware Version: 1.0)					
Band	2.412GHz	2.432GHz	2.452GHz	2.462GHz	2.477GHz
ANT Channel					
ANT1	1.23	1.2	1.32	1.26	1.2
ANT2	1.26	1.23	1.32	1.25	1.22
Band	5.180GHz	5.350GHz	5.550GHz	5.700GHz	5.825GHz
ANT Channel					
ANT1	1.65	1.63	1.2	1.56	1.68
ANT2	1.68	1.63	1.22	1.55	1.66



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## Nine : Accessories

- 2\*2.5dBi 2.4G Whip antenna; 2\*4dBi 5G Whip antenna



- A professional power supply and network two-in-one dedicated cable

