

Hisense Wi-Fi Module specification

MWH516B.01 DATASHEET

客户 Customer	客户承认 Approve (请盖印章)	日期 Date

拟制 Design	审核 Check	批准 Approve	版本 Version	日期 Date
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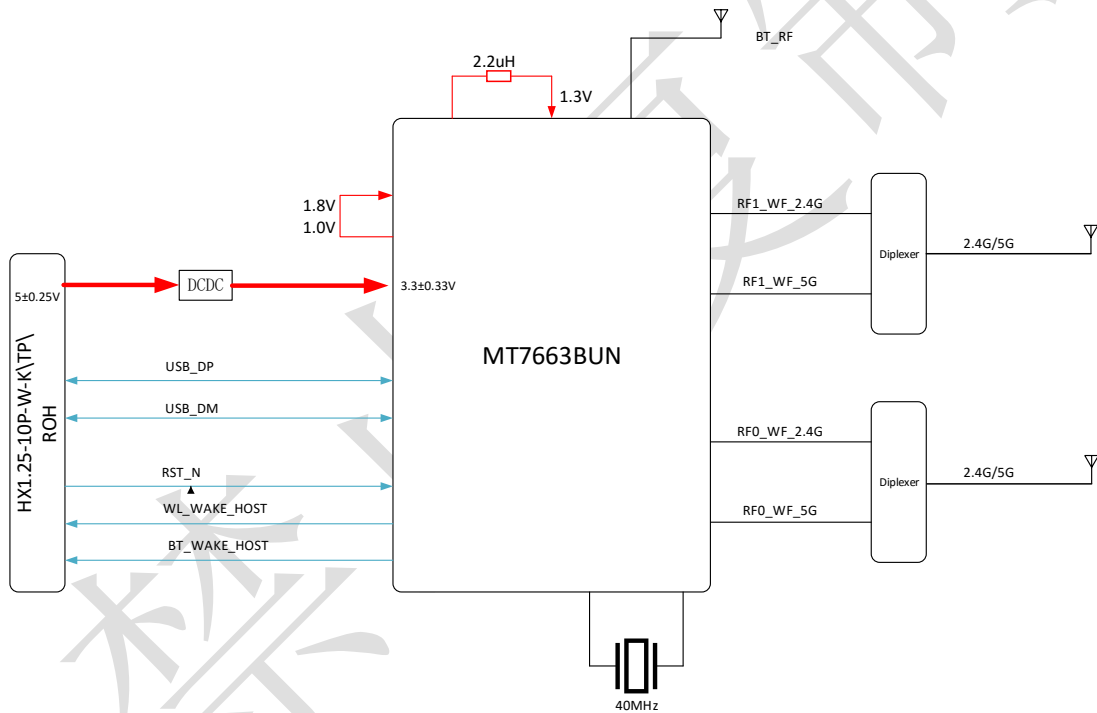
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1 产品概述 General Description

MWH516B.01 模块项目是一款用于物联互通的低功耗高可靠性 Wi-Fi 数传模组。本项目选用 MTK WIFI&BT Combo 方案, 支持 BT5.1; 支持 802.11a/b/g/n/ac, 2T2R MIMO, WIFI/BT 天线采用板载天线方案, 支持 USB2.0 接口。

MWH516B.01 module project is a Wi-Fi data transmission module with low power consumption and high reliability for interconnection of things. The project adopts MTK WIFI&BT Combo scheme, which supports BT5.1. Support 802.11a/B/G/N/AC, 2T2R MIMO, WIFI/BT antenna using onboard antenna scheme, support USB2.0 interface



原理框图 FunctionalBlockDiagram

2 产品特点 Features

2.1 系统功能 System function

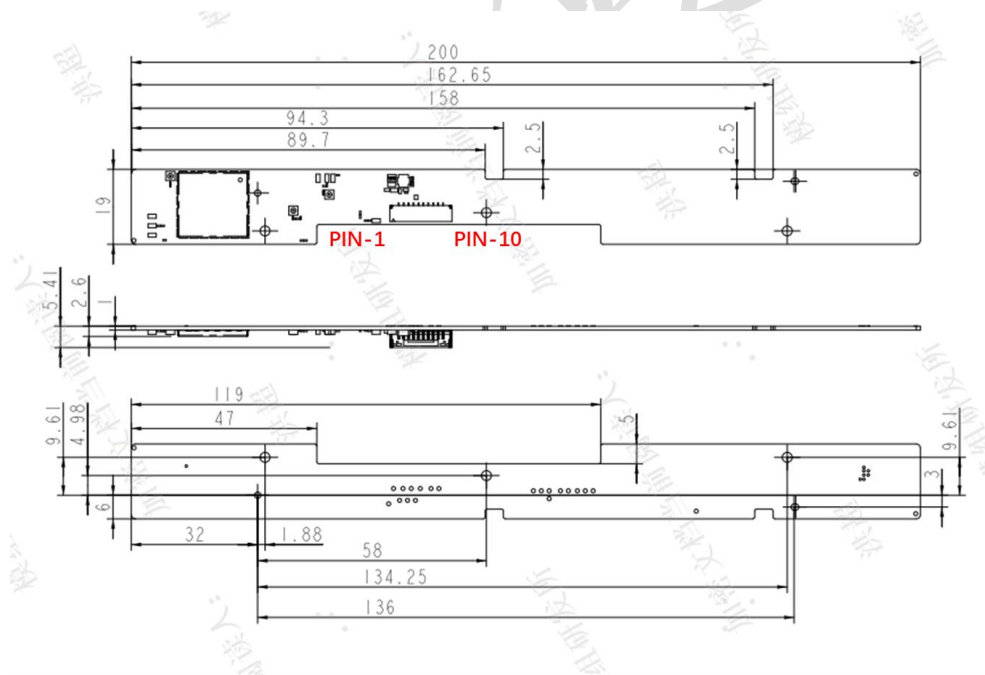
芯片平台 Main Chipset	MTK MT7663BU
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工作频率 Operating Frequency	2.400 ~ 2.4835 GHz, 5.150 ~ 5.85GHz
Wi-Fi 标准 Wi-Fi Standard	IEEE2.11a/b/g/n/ac 2T2R
蓝牙 Bluetooth	Bluetooth specification 2.1+EDR Bluetooth 4.2 Low Energy (LE) Bluetooth 5.1.
调制类型 Modulation	WiFi: 802.11b:DBPSK, DQPSK, CCK for DSSS 802.11g:BPSK, QPSK, 16QAM, 64QAM for OFDM 802.11n:BPSK, QPSK, 16QAM, 64QAM for OFDM 802.11ac:BPSK, QPSK, 16QAM, 64QAM, 256QAM for OFDM Bluetooth:GFSK, $\pi/4$ -DQPSK and 8-DPSK
接口类型类型 interface definition	10Pin 接线端子
主控接口 Host interface	High speed USB 2.0 interface
外形尺寸 Dimension	200 (mm) *19 (mm) *5.41 (mm)
天线形态 Antenna	MTK MT7663BU WiFi/BT 板载三天线
工作温度 Ambient Operating Temperature	0°C——70°C
存储温度 storage Temperature	-40°C——85°C
工作电压 Operation Temperature	5.0±0.2V

2.2 产品图片 Product Picture



2.3 尺寸及接口管脚定义 Size&Pin define&Power on Sequence



序号	定义	描述
1	DC_EN	通过控制 DCDC 使能脚复位模块, 低电平复位 Reset the low level by controlling the DCDC enabling

		pin reset module
2	BT_WAKE_HOST	蓝牙唤醒，低电平有效，内部 10K 上拉到 3.3V Bluetooth wake up, low active, internal 10K pull-up to 3.3V
3	VCC	模组供电，5V 输入，需要 1A 以上负载能力 Module powered, 5V input, requires more than 1A load capacity
4	USB DM	USB Data-
5	USB DP	USB Data+
6	GND	Ground
7	GND	Ground
8	NC	NC
9	RESET	模组复位脚，低电平有效，内部 10K 上拉到 3.3V Module reset pin, active low level, internal 10K pull up to 3.3V
10	WL_WAKE_HOST	WLAN 唤醒 HOST，低电平有效，内部 10K 上拉到 3.3V WLAN wake up HOST, active low level, internal 10K pull-up to 3.3V

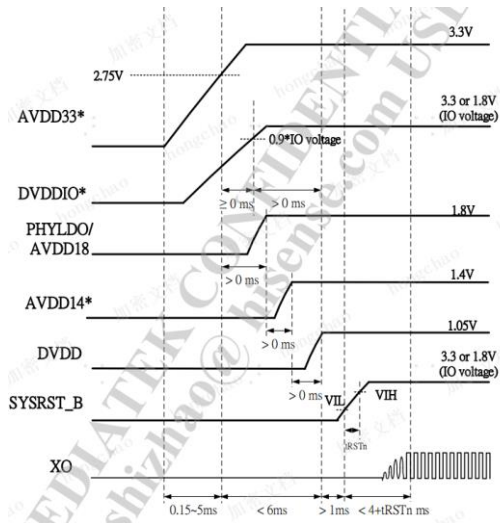
Note:

请确保 HOST 与模组通过 RST 信号连接，以保证模组的正常复位机制。

Ensure that the HOST is connected to the module by RST signal to ensure the normal reset mechanism of the module.

Power on Sequence:

MT7663BUN



2.4 功耗 Power dissipation

工作模式 Working mode	Single transmission current (mA)	Dual transmission current (mA)
11b 2.4G/Rate(min)/20M	187	354
11a 5G/Rate(min)/20M	226	505
11n 2.4G/Rate(min)/20M	131	193
11ac 5G/Rate(min)/20M	166	282
工作模式 Working mode	Single transmission current (mA)	Dual transmission current (mA)
11ac 80M	52	58

3 射频规格 RF Specification

3.1 IEEE802.11b Section

Item	Feature	Detailed Description
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3.1.1	技术标准 Standard	IEEE802.11b
3.1.2	调制类型 Radio and Modulation Schemes	DQPSK, DBPSK and CCK with DSSS
3.1.3	工作频率 Operating Frequency	2400~2483.5MHz ISM band
3.1.4	信号道 Channel Numbers	13 channels for Worldwide
3.1.5	数据速率 Data Rate	at most 11Mbps@1T1R
3.1.6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
3.1.7	发射输出功率 Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, and at room Temp. 25°C 17±2dBm at 11Mbps
3.1.8	接收灵敏度 Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs) -88dBm for 11Mbps
3.1.9	发射频谱掩模 Emission spectral mask	802.11b at ±11MHz Offset -30 802.11b at ±22MHz Offset -50

3.2 IEEE802.11g Section

Item	Feature	Detailed Description
3.1.1	技术标准 Standard	IEEE802.11g
3.1.2	调制类型 Radio and Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM for OFDM
3.1.3	工作频率 Operating Frequency	2400~2483.5MHz ISM band
3.1.4	信号道 Channel Numbers	13 channels for Worldwide
3.1.5	数据速率 Data Rate	at most 54Mbps@1T1R

3.1.6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
3.1.7	发射输出功率 Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, andat room Temp. 25°C 15±2dBm at 54Mbps@EVM -32dB
3.1.8	接收灵敏度 Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs) -74dBm for 54Mbps
3.1.9	发射频谱掩模 Emission spectral mask	802.11a/g at±9MHz Offset 0 802.11a/g at±11MHz Offset -20 802.11a/g at±20MHz Offset -28 802.11a/g at±30MHz Offset -40

3.3 IEEE802.11n Section

Item	Feature	Detailed Description
3.1.1	技术标准 Standard	IEEE802.11n, HT20, HT40
3.1.2	调制类型 Radio and Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM for OFDM
3.1.3	工作频率 Operating Frequency	2400~2483.5MHz ISM band 5.1G~5.8GHz ISM band
3.1.4	信道号 Channel Numbers	13channels @2.4GHz 24 channels @5GHz
3.1.5	数据速率 Data Rate	at most 150Mbps @1T1R, 300Mbps@2T2R
3.1.6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
3.1.7	发射输出功率 Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, andat room Temp. 25°C 14±2dBm at MCS7@ EVM -32
3.1.8	接收灵敏度 Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs) -73dBm for MCS7 HT20 -71dBm for MCS7 HT40

3.1.9	发射频谱掩模 Emission spectral mask	802.11n at±9MHz Offset 0 802.11n at±11MHz Offset -20 802.11n at±20MHz Offset -28 802.11n at±30MHz Offset -45
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3.4 IEEE802.11a Section

Item	Feature	Detailed Description
3.1.1	技术标准 Standard	IEEE802.11a
3.1.2	调制类型 Radio and Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM for OFDM
3.1.3	工作频率 Operating Frequency	5.1G~5.8GHz ISM band
3.1.4	信号道 Channel Numbers	24 channels for Worldwide
3.1.5	数据速率 Data Rate	at most 54Mbps@1T1R
3.1.6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
3.1.7	发射输出功率 Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, and at room Temp. 25°C 14±2dBm at 54Mbps@EVM -32dB
3.1.8	接收灵敏度 Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs) -74dBm for 54Mbps
3.1.9	发射频谱掩模 Emission spectral mask	802.11a/g at±9MHz Offset 0 802.11a/g at±11MHz Offset -20 802.11a/g at±20MHz Offset -28 802.11a/g at±30MHz Offset -40

3.5 IEEE802.11ac Section

Item	Feature	Detailed Description
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3.1.1	技术标准 Standard	IEEE802.11ac HT20, HT40, HT80
3.1.2	调制类型 Radio and Modulation Schemes	BPSK, QPSK, 16QAM, 64QAM, 256QAM for OFDM
3.1.3	工作频率 Operating Frequency	5.1G~5.8GHz ISM band
3.1.4	信道 Channel Numbers	24 channels for Worldwide
3.1.5	数据速率 Data Rate	at most 433Mbps@1T1R, 866Mbps@2T2R
3.1.6	媒体访问协议 Media Access Protocol	CSMA/CA with ACK
3.1.7	发射输出功率 Transmitter Output Power at Antenna Connector	Typical RF Output Power at each RF chain, and at room Temp. 25°C 15±2dBm at HT20 MCS8@ EVM -35dB 14±2dBm at HT40 MCS9@ EVM -34dB 14±2dBm at HT80 MCS9@ EVM -33dB
3.1.8	接收灵敏度 Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) -69dBm for MCS8 HT20 -65dBm for MCS9 HT40 -62dBm for MCS9 HT80
3.1.9	发射频谱掩模 Emission spectral mask	802.11ac at ±9MHz Offset 0 802.11ac at ±11MHz Offset -20 802.11ac at ±20MHz Offset -28 802.11ac at ±41MHz Offset -40

3.6 蓝牙性能指标 Bluetooth Section

3.6.1 BT1.2、BT2.0 Index

序号	项目	信道	包类型	指标
1	输出功率 Output Power	0, 39, 78	DH5	9dBm 1. PAV < 100 mW (20 dBm) EIRP (class 1 : PAV > 1 mW (0 dBm)); class 2 : 0.25 mW (-6 dBm) < PAV < 2.5 mW (4 dBm); class 3: PAV < 1 mW (0 dBm)) 2. PPK < 200 mW (23 dBm) EIRP

2	功率控制 Power Control	0, 39, 78	DH1	$2\text{dB} \leq \text{step size} \leq 8 \text{ dB}$
3	调制特性 Modulation Characteristic	0, 39, 78	DH5	$\text{Min } \Delta f_{\text{avg}} \geq 140\text{kHz};$
				$\text{Max } \Delta f_{\text{avg}} \leq 175\text{kHz};$
				$\text{Min } \Delta f_{2\text{avg}} \geq 115\text{kHz};$
				$\text{Min } \Delta f_{2\text{avg}} / \Delta f_{\text{avg}} \geq 0.8$
4	初始载波频率公差 Initial carrier frequency tolerance	0, 39, 78	DH1	$\text{Min Fre Offset} \leq \pm 75\text{kHz};$
				$\text{Max Fre Offset} \leq \pm 75\text{kHz}$
5	载波频偏 (频率 漂移) Carrier frequency offset (frequency drift)	0, 39, 78	DH1	$\text{Min Drift} \leq \pm 25\text{kHz}$
				$\text{Max Drift} \leq \pm 25\text{kHz}$
				$\text{Max Drift Rate} < 20\text{kHz}/50 \mu\text{s}$
			DH3	$\text{Min Drift} \leq \pm 40\text{kHz}$
				$\text{Max Drift} \leq \pm 40\text{kHz}$
				$\text{Max Drift Rate} < 20\text{kHz}/50 \mu\text{s}$
DH5	$\text{Min Drift} \leq \pm 40\text{kHz}$			
	$\text{Max Drift} \leq \pm 40\text{kHz}$			
	$\text{Max Drift Rate} < 20\text{kHz}/50 \mu\text{s}$			
8	单时隙灵敏度 Single time slot sensitivity	0, 39, 78	DH1	$\leq -89\text{dbm}$ BER $\leq 10^{-3}$
9	多时隙灵敏度 Multislot sensitivity	0, 39, 78	DH5	$\leq -84\text{dbm}$ BER $\leq 10^{-3}$
10	最大输入电平 Max Input level	0, 39, 78	2DH1\3DH1	$\geq 0\text{dBm}$ BER $\leq 0.1 \%$

3.6.2 BT2.0+EDR Index

序号	指标	信道	包类型	指标要求
1	EDR 相对发射 功率 EDR Relative transmitted power	0, 39, 78	2DH5\3DH5	9dBm (PGFSK - 4dB) < PDPSK < (PGFSK + 1dB)
2.1	EDR 调制载波 频率的稳定性 和准确性	0, 39, 78	2DH5	$-75 \text{ kHz} < \omega_i < +75 \text{ kHz},$ $-75 \text{ kHz} < (\omega_i + \omega_0) < +75 \text{ kHz},$ $-10 \text{ kHz} < \omega_0 < +10 \text{ kHz},$

	EDR Stability and accuracy of modulated carrier frequency			RMS DEVM < 0.20, $\pi/4$ -DQPSK DEVM Peak < 0.35, $\pi/4$ -DQPSK (99% DEVM $\leq 30\%$) $\geq 99\%$
2.2			3DH5	-75 kHz < ω_i < +75 kHz, -75 kHz < ($\omega_i + \omega_0$) < +75 kHz, -10 kHz < ω_0 < +10 kHz, RMS DEVM < 0.13, 8DPSK DEVM Peak < 0.25, 8DPSK (99% DEVM $\leq 20\%$) $\geq 99\%$
3	EDR 微分相位编码 EDR Differential phase coding	0, 39, 78	2DH1\3DH1	Packets with 0 errors $\geq 99\%$
4	EDR 灵敏度 EDR sensitivity	0, 39, 78	2DH5	(Max.): -85 dBm, (Typical): -92 dBm (BER < 0.1%)
			3DH5	(Max.): -82 dBm, (Typical): -86 dBm (BER < 0.10%)
5	EDR 最大输入电平 EDR Max Input level	0, 39, 78	2DH5\3DH5	≥ -5 dBm BER $\leq 0.1\%$

3.6.3 BT5.X+BLE Index

序号	指标	信道	指标要求
1	NOC\ EOC 输出功率 NOC\ EOC Output Power	0, 19, 39	8dBm -20dBm \leq PAVG \leq 10dBmEIRP; PPK \leq PAVG+3dB
2	NOC\ EOC 发射 NOC\ EOC emission	0, 19, 39	PTX \leq -20dBm ($f_{tx} \pm 2$ MHz) PTX \leq -30dBm ($f_{tx} \pm [3+n]$ MHz) n=0, 1, 2...
3	调制特性 Modulation Characteristic	0, 19, 39	225kHz \leq Δf_{1avg} \leq 275 kHz; 99% Δf_{2avg} \geq 185 kHz; $\Delta f_{2avg} / \Delta f_{1avg} \geq 0.8$
4	载波频率偏移和漂移 Carrier frequency offset (frequency drift)	0, 19, 39	$f_{tx} - 150$ kHz \leq $f_n \leq$ $f_{tx} + 150$ kHz; n=0, 1, 2... $f_1 - f_n$ \leq 50 kHz; n=2, 3, 4 $f_1 - f_0$ \leq 20 kHz; $f_n - f_{n-5}$ \leq 50 kHz; n=6, 7, 8...
5	接收灵敏度 Receive Sensitivity	0, 19, 39	(Max.): -90dBm (PER < 30.8%) (Typical): -96dBm (PER < 30.8%)

3.7 天线特性 Antenna Specification

输入阻抗 input impedance	50Ω
工作频段 frequency band	2.4GHz~2.5GHz, 5.15~5.85GHz
VSWR	2.4GHz~2.5GHz: VSWR≤2, 5.15~5.85GHz: VSWR≤3
回波损耗 RL	2.4GHz~2.5GHz: RL≤-10dB, 5.15~5.85GHz: RL≤-7dB
隔离度要求 Isolation requirement	2T2R WiFi ANT0 and ANT1: ≤-15dB (2.4G), ≤-17dB(5 G),WiFi and BT≤-20dB
增益 Gain	2.4G:Gain≤5dBi, 5G: Gain≤7dBi

MTK7663 WiFi/BT PCB Three Antenna:

Frequency	eff_dB	eff-percent	Insertion Loss	RL, dB	Gain(dBi)
2400	-3.74	42.26	0.10	1.0	0.0
2420	-3.37	46.07	0.10	0.1	0.0
2440	-3.37	45.99	0.10	0.1	0.0
2460	-3.19	47.98	0.10	0.1	0.0
2480	-3.37	46.04	0.10	0.1	0.0
2500	-3.51	44.6	0.10	0.1	0.0
5150	-2.43	57.17	0.10	0.1	0.0
5200	-2.78	52.87	0.10	0.1	0.0
5250	-2.93	50.12	0.10	0.1	0.0
5300	-2.92	51.06	0.10	0.1	0.0
5350	-2.65	54.28	0.10	0.1	0.0
5400	-2.76	53.98	0.10	0.1	0.0
5450	-2.64	54.48	0.10	0.1	0.0
5500	-2.67	54.12	0.10	0.1	0.0
5550	-2.77	52.83	0.10	0.1	0.0
5600	-2.47	54.01	0.10	0.1	0.0
5650	-2.72	53.81	0.10	0.1	0.0
5700	-2.7	53.65	0.10	0.1	0.0
5750	-3.27	47.11	0.10	0.1	0.0
5800	-2.77	52.8	0.10	0.1	0.0
5850	-2.95	50.67	0.10	0.1	0.0

Gain:
ANT1 (WiFi) : 2.4G -0.3 dBi ; 5G: 0.5dBi

Frequency	eff_dB	eff-percent
2400	-4.88	32.48
2420	-4.48	35.66
2440	-3.98	40.04
2460	-3.81	41.59
2480	-3.94	40.34
2500	-4.15	38.49
2520	-4.33	36.91

Gain:
BT: -0.5dBi

3.8 抗静电特性 Antistatic Specification

测试项 Test item	指标说明 Definition of Indicator	是否满足 Pass/Fail
测试无线模块的屏蔽罩、螺钉固定孔、天线、RF Connector 处的抗 ESD 能力 Test the ESD resistance of the shielding cover, screw fixing hole, antenna, and RF Connector of the wireless module	要求以上测试点处可以抗+/-8 kV 静电, 即用静电枪打+/-8 kV 接触放电情况下, 模块的 RF 性能仍然在合格范围内。 It is required that the above test points can resist +/-8 kV static electricity, that is, the RF performance of the module is still within the qualified range when the +/-8 kV contact discharge is fired with an electrostatic gun.	合格 Pass

4 环保标准

零部件所用原材料、包装材料等, 符合海信 Q/RSAG J15.002 化学物质限制要求。

The raw materials and packaging materials used in the parts are in line with the chemical substance limit requirements of Hisense Q/RSAG J15.002.

5 关键器件清单 Key Component List

序号 Num	关键器件名称 Key Device	型号 model	规格/材料 Material/ spec	生产者 manufacturer	备注 Note
1	集成电路 integrated circuit	MT7663BU	QFN	MTK	
2	PCB	MWH516B printed board	4LAY	BM	
3	双工器 duplexer	LD18D2450LAN-D43	2.4GHz/5GHz	佳利	

4	晶体振荡器 crystal oscillator	CF4040M00011T1072040	40MHz	晶威特	
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6 安全提醒 Warning

U.S. FCC Part 15 Regulatory Information

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: 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 or more 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.

The device is going to be operated in 5150–5350MHz frequency range. It is restricted indoor environment only.

The end product must carry a label stating "Contains FCC ID: BBP-WLPIN01" or shall use e-labeling.

The device shall automatically discontinue transmission in cases of absence of information to transmit, or operational failure. Then it will scan the available radio signals. If this signal is connected before, it will be automatically connected, otherwise manual connections will be necessary.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

The module must be installed in Host.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

This device complies with FCC part 15C: 15.247 and 15.407.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. The module should be installed at a minimum distance of 20 cm away from a person nearby. The host product manufacturer should state this information to the host instruction manual.

Trace antenna designs - not applicable.

Any final host product with the modular transmitter installed should be under test according to guidance given in KDB 996369 D04. To enter test mode for module, secure CRT command is necessary. When something wrong happens in configuring test modes for host product with module, host product manufacturer should coordinate with module manufacturer for technical support. It is recommended that some investigative measurements should be taken to confirm that host product with module installed does not exceed the spurious emissions limits or band edge limits.

The modular complies with FCC authorised for the specific rule parts (FCC Part 15.247 and 15.407) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

Canada Regulatory Information

This equipment should be installed and operated with minimum distance 7.9 inches (20 cm) between the radiator & your body.

Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm (7,9 pouces) entre le radiateur et votre corps.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device

L' émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d' Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L' exploitation est autorisée aux deux conditions suivantes:

- 1) L' appareil ne doit pas produire de brouillage;
- 2) L' appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d' en compromettre le fonctionnement.

The device for operation in the band 5150 - 5350 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Le dispositif utilisé dans la bande 5150-5350 MHz est réservé à une utilisation en intérieur afin de réduire le risque de brouillage préjudiciable aux systèmes mobiles par satellite dans le même canal.

A host product shall use a physical label stating "Contains IC: 144D-WLPIN01" or shall use e-labeling

Un produit hôte doit utiliser une étiquette physique indiquant "Contient IC: 144D-WLPIN01" ou doit utiliser un étiquetage électronique.

This radio transmitter (IC: 144D-WLPIN01) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet émetteur radio (IC: 144D-WLPIN01) a été approuvé par Industrie Canada pour fonctionner avec les types d' antenne énumérés ci-dessous avec le gain maximal admissible indiqué. Les types d' antennes non inclus dans cette liste, dont le

gain est supérieur au gain maximal indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil

Antenna Type	RF Function	Frequency	Antenna Gain	
			Ant 0	Ant 1
PCB Antenna	BT	2402 MHz to 2480 MHz	-0.5 dBi	/
	Wi-Fi	2412 MHz to 2462 MHz	0.3 dBi	0.2 dBi
		5150 MHz to 5250 MHz	0.50 dBi	0.45 dBi
		5250 MHz to 5350 MHz	0.50 dBi	0.45 dBi
		5470 MHz to 5725 MHz	0.38 dBi	0.32 dBi
		5725 MHz to 5850 MHz	0.44 dBi	0.30 dBi

CAN ICES-3(B)/NMB-3(B)