



Module Name: FWM
Module Model: FWM-4A25
Revision: V1.0

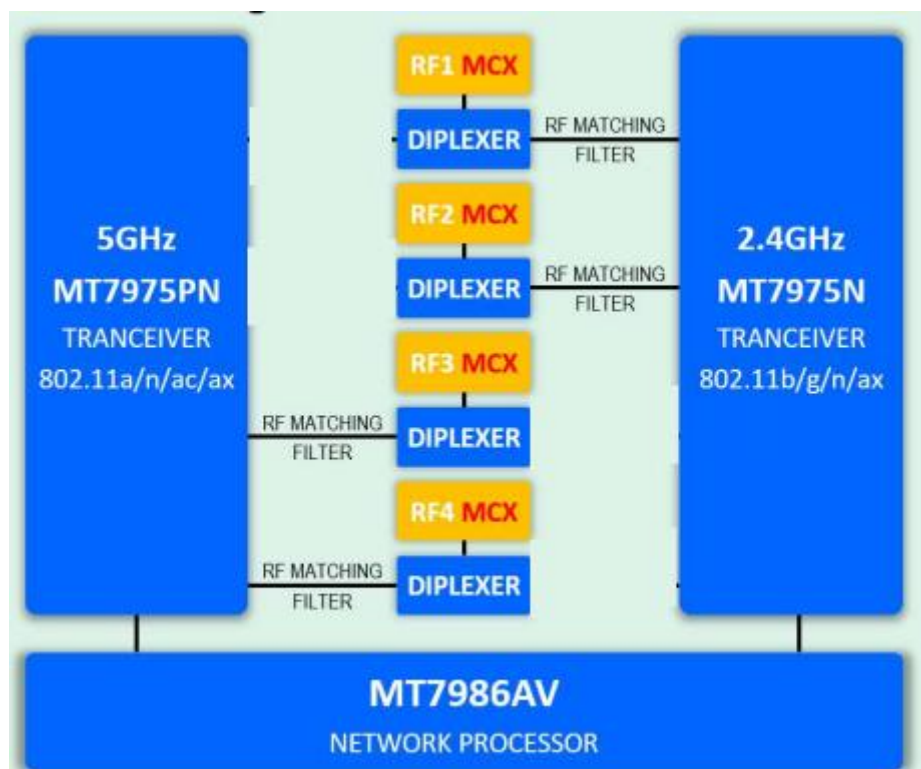
1. Introduction

FWM-4A25 is a highly integrated Dual-band WLAN Combo module. It combines a 2T2R Dual-band WLAN subsystem with connector interface controllers. The module is compatible with IEEE 802.11a/b/g/n/ac/ax standard and provides the maximum PHY rate up to 2401.9Mbps. The module provides a complete solution for high-performance integrated WLAN devices such as OTT Boxes, Set-top Boxes, Router, etc.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHz
- Support Dual-band 2T2R mode with 20/40/80/160Mhz bandwidth
- Support 802.11ax with OFDMA and MU-MIMO

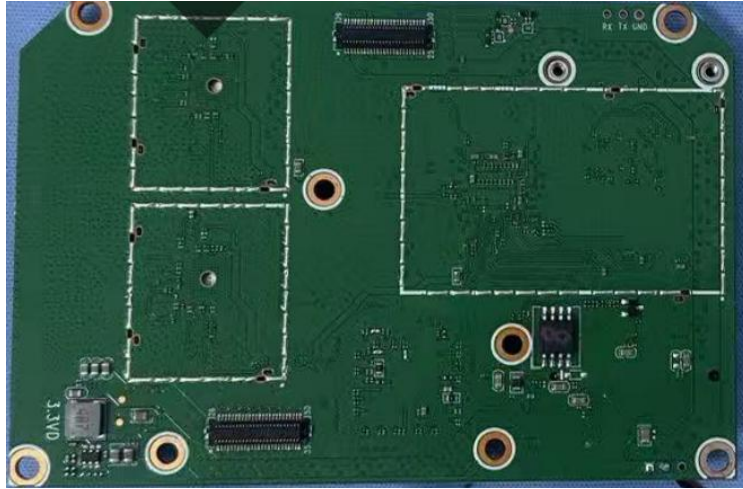
1.2 Block Diagram



1.3 General Specifications

Chipset	MT7986AV、MT7975PN、MT7975N、MT7531AE
WLAN Standards	IEEE802.11a/b/g/n/ac/ax
Host Interface	Connect through the connector
Antenna	Connect to the external antenna through half hole pads
Power Supply	DC12V
Operation Temperature	0°C to +50°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top View)

2.1 Pin Definition

Connector HIROSE DF12NB(5.0)-50DP-0.5V(51) Pin Assignment

CONNECTOR 1 DF12NB(5.0)-50DP-0.5V(51)			
	WAN (POE)	LAN1	
1	GROUND	GROUND	26
2	TXP0_0	TXP0_0	27
3	TXN0_0	TXN0_0	28
4	GROUND	GROUND	29
5	TXP0_1	TXP0_1	30
6	TXP0_1	TXP0_1	31
7	GROUND	GROUND	32
8	TXN0_2	TXN0_2	33
9	TXN0_2	TXN0_2	34
10	GROUND	GROUND	35
11	TXP0_3	TXP0_3	36
12	TXN0_3	TXN0_3	37
13	GROUND	GROUND	38
	LAN2	LAN3	
14	TXP0_0	TXP0_0	39
15	TXN0_0	TXN0_0	40
16	GROUND	GROUND	41
17	TXP0_1	TXP0_1	42
18	TXP0_1	TXP0_1	43
19	GROUND	GROUND	44
20	TXN0_2	TXN0_2	45
21	TXN0_2	TXN0_2	46
22	GROUND	GROUND	47
23	TXP0_3	TXP0_3	48
24	TXN0_3	TXN0_3	49
25	GROUND	GROUND	50

CONNECTOR 2 DF12NB(5.0)-50DP-0.5V(51)			
POWER			
1	GROUND	GROUND	26
2	GROUND	GROUND	27
3	V_BAT	V_BAT	28
4	V_BAT	V_BAT	29
5	V_BAT	V_BAT	30
6	V_BAT	V_BAT	31
7	V_BAT	V_BAT	32
8	GROUND	GROUND	33
9	GROUND	GROUND	34
10	V_3V3	V_BAT	35
11	GROUND	GROUND	36
LED & SWITCH & INTERFACE			
12	SWITCH : MESH	SWITCH : RESET	37
13	GROUND	GROUND	38
14	LED : WAN	LED : LAN1	39
15	LED : LAN2	LED : LAN3	40
16	LED : WIFI_EN	GROUND	41
17	GROUND	USB TXP	42
18	GROUND	USB TXN	43
19	GROUND	GROUND	44
20	GROUND	USB RXP	45
21	GROUND	USB RXM	46
22	GROUND	GROUND	47
23	UART-RX	USB DP	48
24	UART-TX	USB DM	49
25	GROUND	GROUND	50

FCC Statement

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.

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 important announcement

Important Note:

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Important Note:

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.

End Product Labeling

The final end product must be labeled in a visible area with the following"

Contains FCC ID:2AL6KFWM-4A25"

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

2.7 Antennas

This radio transmitter **FCC ID:2AL6KFWM-4A25** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)		Frequency range:
			Antenna 1	Antenna 2	
2.4G Wi-Fi	/	External Antenna	9.15	9.15	2412-2462MHz
U-NII-1	/	External Antenna	5.39	5.39	5180-5240MHz
U-NII-2A	/	External Antenna	5.39	5.39	5260-5320MHz
U-NII-2C	/	External Antenna	5.39	5.39	5500-5700MHz
U-NII-3	/	External Antenna	5.39	5.39	5745-5825MHz

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains **FCC ID:2AL6KFWM-4A25**".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

2.11 Note EMI Considerations

Host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. According to the KDB 996369 D02 Q&A Q12, that a host manufacture only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite. The host manufacturer must fix any failure.