Product Specification

IEEE 802.11 b/g/n 2.4GHz 1T1R WiFi Module

Project Name	RTL8711AM IoT Module
Model NO	F11AMIM13-B1
Customer	
Customer's Part NO	

Approved: William Tan	Checked: Jim Hu	Drafted: Neal Yu

Feedback of customer's Confirmation		
We accept the specification after Confirmed.		
Customer	Customer signature	Approved Date

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0. Revision History

REV NO	Date	Modifications	Draft	Approved
Rev0.1	2015-03-20	First Released	Neal Yu	William Tan

1. Introduction

1.1 Overview

F11AMIM13-B1 is a highly integrated module with low power 802.11n Wireless LAN(WLAN) network controller. It combines an ARM-CM3 MCU, WLAN MAC, a 1T1R capable WLAN baseband, and RF function. It also provides a bunch of configurable GPIOs which are configured as digital peripherals for different applications and control usage.

F11AMIM13 integrates internal memories for complete WIFI protocol functions.

1.2 Product Features

General
- 24mm*18mm*1.6mm
- CMOS MAC, Baseband PHY, and RF in the module for 802.11b/g/n compatible WLAN
- Complete 802.11n solution for 2.4G band
- 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth

Standards Supported
- 802.11b/g/n compatible WLAN
- 802.11e QoS Enhancement(WMM)
- 802.11i(WPA,WP2). Open, shared key, and pair-wise key authentication services
- WiFi Direct support
- Light Weight TCP/IP protocol

WLAN PHY Features
- 802.11n OFDM
- One Transmit and one Receive path(1T1R)
- 20MHz and 40MHz bandwidth transmission
- Short Guard Interval(400ns)
- Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n

Host Interface
- 2 x UART
- 1x I2C
- 1x SPI
- 3x PWM
- 1x ADC
- GPIO

2. Block diagram

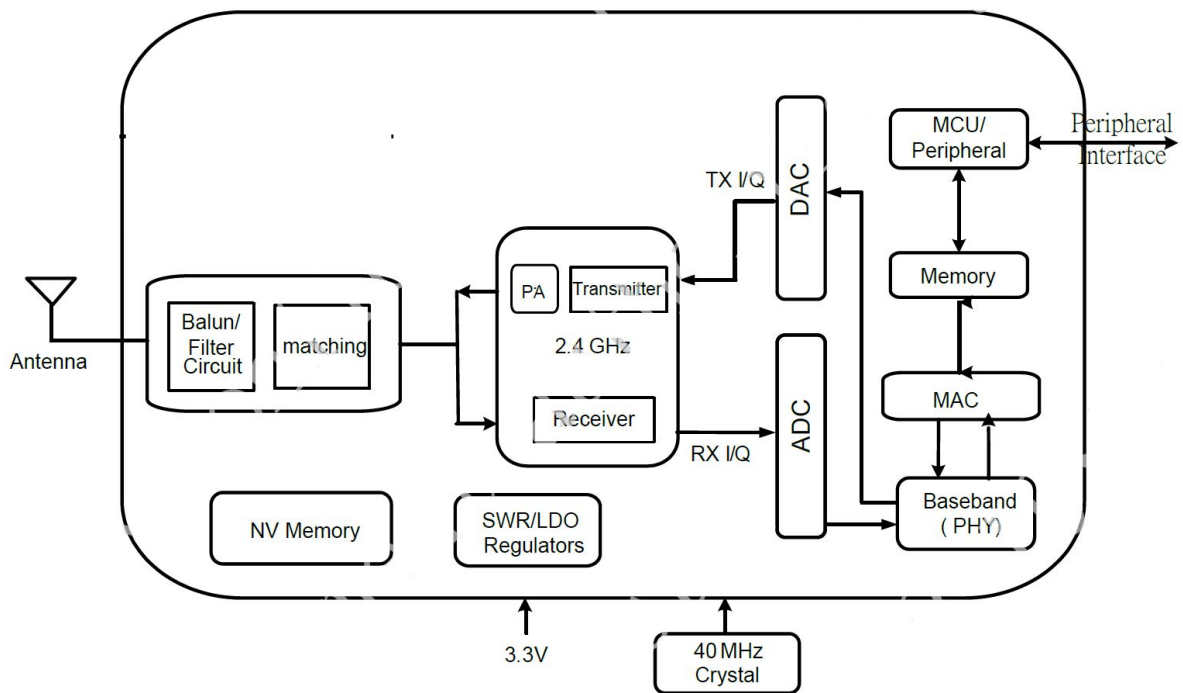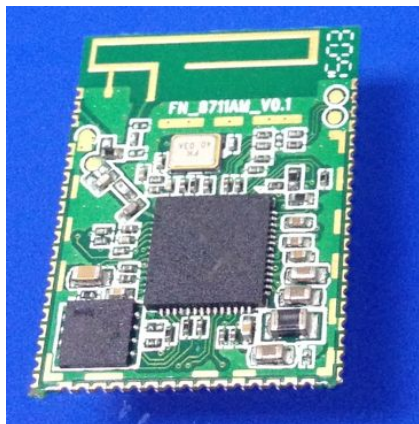The general block diagram for the module is shown in Figure 1

Figure 1

3. General specification

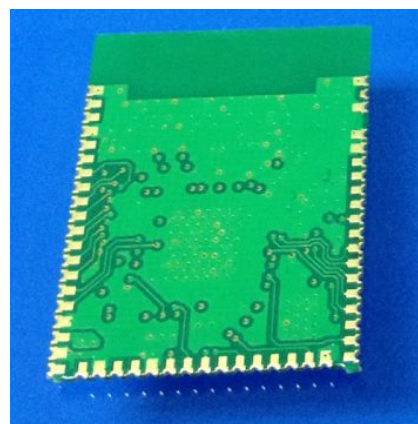| General features	
Main Chipset	Realtek RTL8711AM
Host Interface	UART,I2C,SPI,PWM,ADC
WiFi Standards	802.11b/g/n
Other RF Standards	None
Dimension	L24.0mm*W18.0mm*H0.8mm
Operating conditions	
Operating Voltage	3.3±10% Vdc
Operating Temperature	0°C to +70°C
Storage Temperature	-40°C to +80°C
RF features	
Operating Frequency	2.400～2.4835GHz
Channels	**WiFi:** USA/Canada: channel 1~11; Europe/China/Australia: channel 1~13; Japan: channel 1~14
Modulation	**WiFi:** 802.11b(DSSS): CCK(11, 5.5Mbps), DQPSK(2Mbps), DBPSK(1Mbps); 802.11g(OFDM): BPSK(9,6Mbps), QPSK(18,12Mbps), 　　　　　　16QAM(36,24Mbps), 64QAM(54,48Mbps); 802.11n(OFDM): BPSK, QPSK, 16QAM, 64QAM(150Mbps)
PHY Data rates	**WiFi:** 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps
Output Power	**WiFi:** 802.11b 16**±2**dBm 802.11g 14**±2**dBm 802.11n 13**±2**dBm
EVM	802.11b EVM≦35% 802.11g EVM≦-25dB 802.11n EVM≦-28dB

Sensitivity	**WiFi:** **802.11b@8% PER** 1Mbps -88dBm 2Mbps -87dBm 5.5Mbps -85dBm 11Mbps -82dBm **802.11g@10% PER** 6Mbps -86dBm 9Mbps -85dBm 12Mbps -84dBm 18Mbps -82dBm 24Mbps -80dBm 36Mbps -77dBm 48Mbps -73dBm 54Mbps -71dBm **802.11n_HT20@10% PER** MCS 0 -83dBm MCS 1 -82dBm MCS 2 -80dBm MCS 3 -78dBm MCS 4 -75dBm MCS 5 -71dBm MCS 6 -69dBm MCS 7 -67dBm
Other features	
Antenna	Internal Antenna
Network Architecture	**WiFi:** Ad-hoc mode (Peer-to-Peer) Infrastructure mode WiFi Direct
Security	802.11i(WPA,WP2). Open, shared key, and pair-wise key authentication services

4. Mechanical and Electrical Specification

4.1 Outline Drawing(Unit: mm)

Top Side
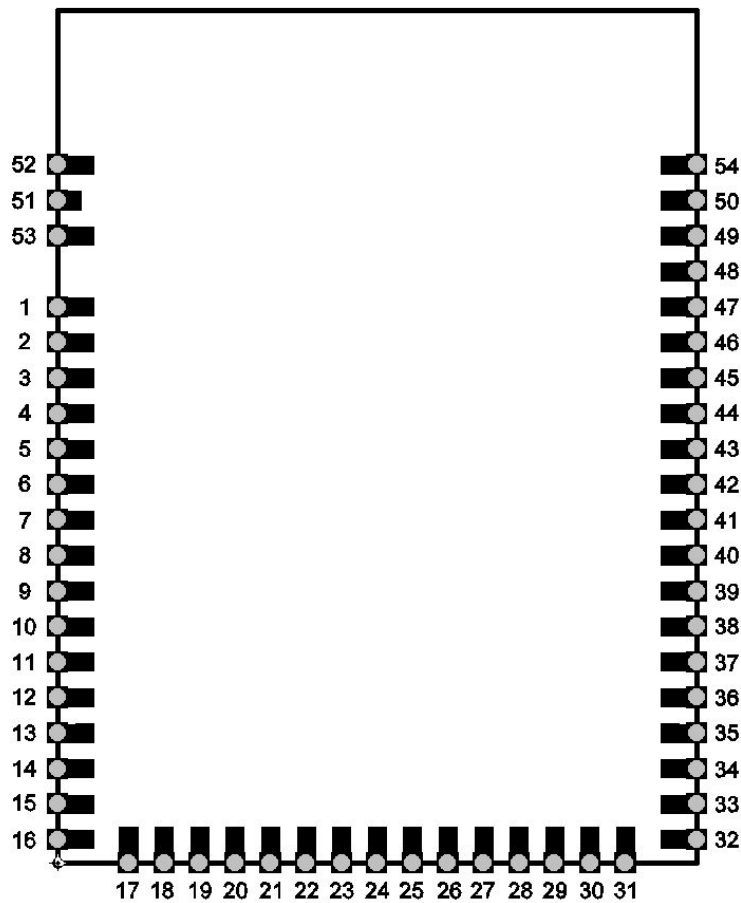

Bottom Side

Note:There Will be Changes in Layout ,But the Outline Will not Change,The Follow-up Will be Updated

(Top View)

18.0mm

4.4mm

0.5mm

1.3mm

1.0mm

1.0mm

24.0mm

0.6mm

1.0mm

1.0mm

1.0mm

0.6mm

0.6mm

2.0mm

1.0mm

0.6mm

4.2 Pin Definition(Top View)

Pin Assignment

Pin#	Name	Description
1	GND	Ground
2	GND	Ground
3	NC	Not Connected
4	NC	Not Connected
5	NC	Not Connected
6	NC	Not Connected
7	VDDIO	GPIOE and GPIOC group IO power
8	NC	Not Connected
9	GPIO_4	GPIO Pin
10	GPIO_3	GPIO Pin
11	GPIOE_2/PWM2	GPIO Pin, PWM(multiplexing)
12	GPIOE_1/PWM1	GPIO Pin, PWM(multiplexing)
13	GPIOE_0	GPIO Pin
14	NC	Not Connected
15	ADC_CH2	AD converter input
16	NC	Not Connected
17	GND	Ground
18	CHIP_EN	1: Enable Chip 0: Disable chip in shutdown mode
19	NC	Not Connected

20	NC	Not Connected
21	NC	Not Connected
22	GPIOA_3	GPIO Pin
23	NC	Not Connected
24	GPIOA_5	GPIO Pin
25	GPIOA_6/UART0_RXD	GPIO Pin, UART0_IN(multiplexing)
26	GPIOA_7/UART0_TXD	GPIO Pin, UART0_OUT(multiplexing)
27	GND	Ground
28	NC	Not Connected
29	NC	Not Connected
30	GND	Ground
31	NC	Not Connected
32	NC	Not Connected
33	GND	Ground
34	VD33	3.3V Power Supply
35	GND	Ground
36	GPIOC_3/SPI0_MISO	GPIO Pin, SPI0_MISO(multiplexing)
37	GPIOC_2/SPI0_MOSI	GPIO Pin, SPI0_MOSI(multiplexing)
38	GPIOC_1/SPI0_CLK	GPIO Pin, SPI0_CLK(multiplexing)
39	GPIOC_0/PWM0	GPIO Pin, PWM(multiplexing)
40	GPIOC_4/SPI0_CS1	GPIO Pin, SPI0_CS1(multiplexing)
41	GPIOC_5	GPIO Pin
42	GPIOB_3/I2C_SDA	GPIO Pin
43	GPIOB_2/I2C_SCL	GPIO Pin
44	GPIOB_1/UART1_RXD	GPIO Pin, UART1_IN(multiplexing)
45	GPIOB_0/UART1_TXD	GPIO Pin, UART1_OUT(multiplexing)
46	NC	Not Connected
47	NC	Not Connected
48	GND	Ground
49	NFCIP_1	NFC input differential signal
50	NFCIN_1	NFC input differential signal
51	RF_1	WL RF signal
52	GND	Ground
53	GND	Ground
54	GND	Ground

4.3 PCB Lay-out Reference
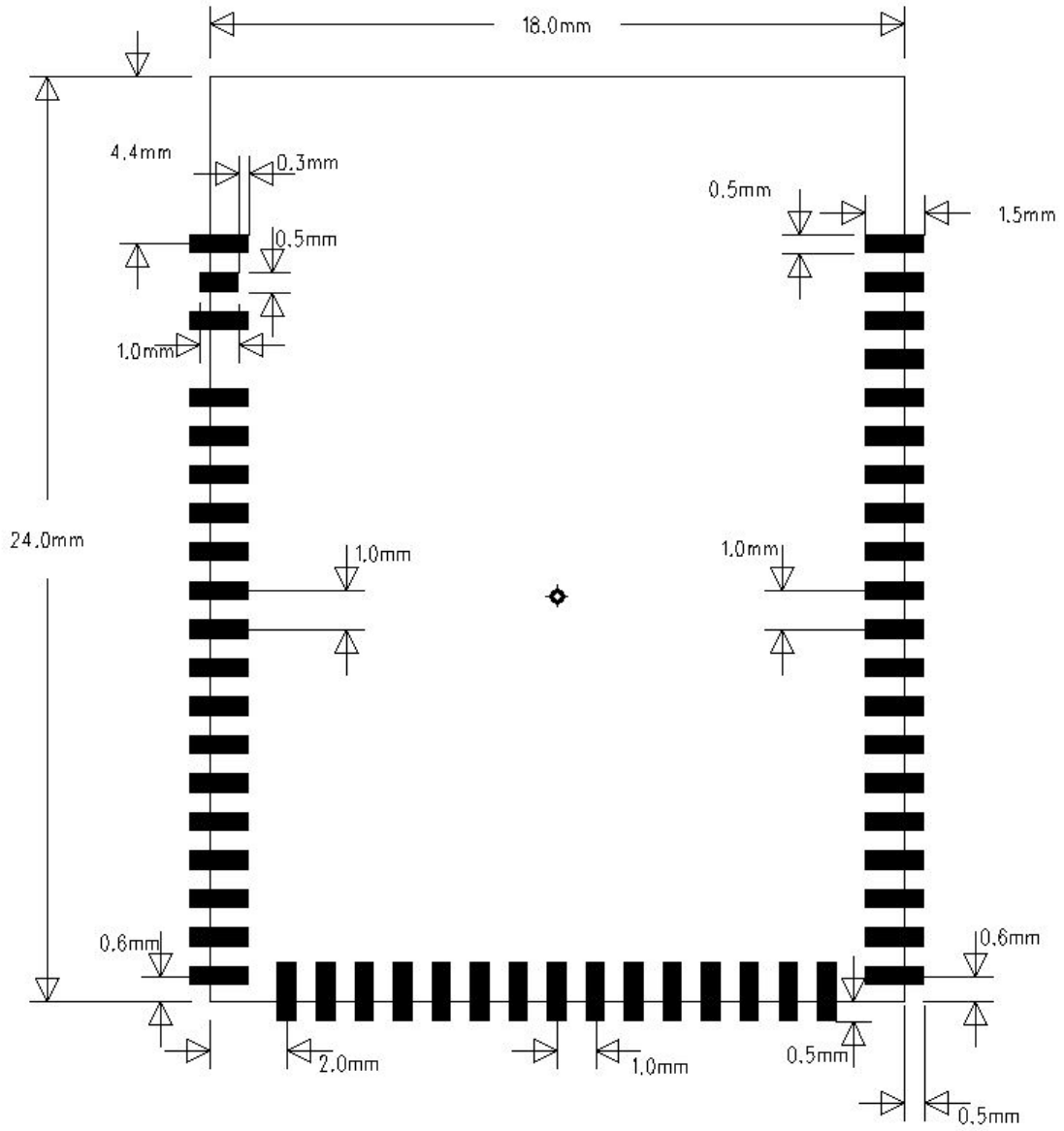
4.4 Recommended Reflow Profile
Referred to IPC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : ≤2 times

Slope: 1~2℃/sec max.
(217℃ to peak)

peak: 245+0/-5℃

Ramp down rate :
Max. 2.5℃/sec.

217℃

Preheat: 150~200℃

60 ~ 120 sec.

40 ~60sec

25℃

Ramp up rate :
Max. 2℃/sec.

Time (sec)
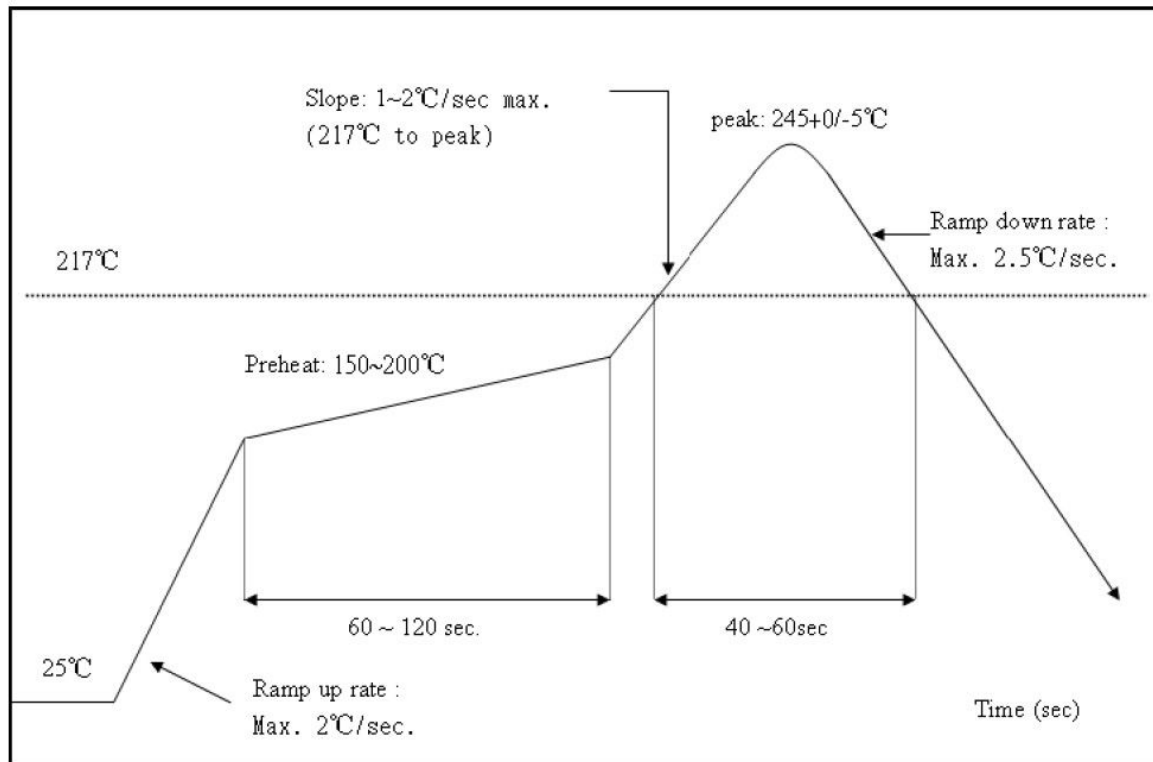
4.5 Patch WIFI modules installed before the notice:

WIFI module installed note:
1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 ℃ for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:
1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 ℃, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly:
Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.
2.) factory environmental temperature humidity control: ≦ 30 ℃, ≦ 60% r.h..
3). Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
1). The module must be again to remove the module moisture absorption.
2). The baking temperature: 125 ℃, 8 hours.
3.) After baking, put the right amount of desiccant to seal packages.

WARING:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This devic e ma y n ot ca use h armful interference. (2) T his device must accept any interfer ence received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital dev ice, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interfe rence in a residential installation. This equipment generates uses and can rad iate r adio 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 ha rmful interference to radio or televi sion rece ption, 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.

WARNING: Changes or modifications not expressly approved by the party responsible for comp liance could void the user's authority to operate the equipment.

LABEL OF THE END PRODUCT:

The final end prod uct must be lab elled in a visible are a with the foll owing "Co ntains TX F CC ID: 2AATL-F11AMIM13-B1". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of the FCC Rules. Operati on is sub ject to the following two conditions: (1) this d evice may not cause harmfu l interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure

This device has been eval uated and sho wn compli ant with the F CC R F Exposur e limits under fix ed exposure conditions (antennas are greater than 20cm fro m a p erson's body) when installed in certa in specific OEM configurations.

IMPORTANT NOTE:

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

(1) According to F CC Part 15 Subpart C Se ction 15.2 12, the rad io elements of the mod ular transmitter must have the ir o wn s hielding. Ho wever, d ue to t here is no shiel ding for this W IFI/BT module, this module is granted as a Limited Modular Approval.

(2) This modul e has be en d esigned to op erate with E xternal anten na（I-PEX connector） havi ng a maximum gain of 0dBi. The module is only certif ied with the installed antenna. An y change of the antenna will void the certification.

(3) Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee . The modul e will be res ponsible to satisfy SAR/RF Exp osure req uirements, when the module int egrated into any (portable, mob ile, fix ed) h ost device. T his modu le is int ended for OEM integrator on ly and the OEM integr ators an d instructe d to ensure th at the e nd us er h as no ma nual instructions to remove or install the device. T he OEM i ntegrator is still res ponsible for the FC C compliance requirement of the end product, which integrates this module.

The module has no sh ielding and tested s tand alone. This modu le is te sted and approved as Limited modular ap proval with stand alon e configuration, an y OE M incorpor ated this radio m odule into a ny system are require additional testing and evaluation.

EU Regulatory Conformance

Hereby, we (F N-Link T echnology Limited) declared that this device is in compliance with the essenti al requirements and other relevant provisions of Directive 1999/5/EC.

CE0681