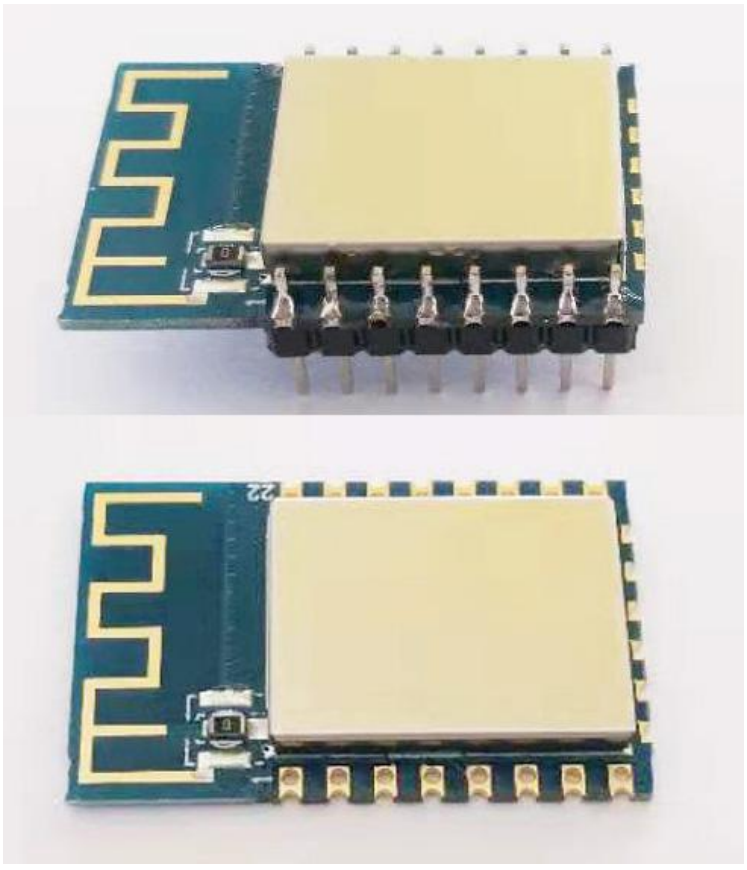
Shenzhen Hi-Link Electronic Co., Ltd.

HLK-M20 specifications



Version：V1.0 Revise date：2020-4-13

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1.Product Brief

- Applications: IOT, IPTV, TV, surveillance, etc.
- Integration: single chip integrating BB/PMIC/RF/PA/Memory/LNA/Balun
- Advantages: lower power consumption, better performance, larger memory
- Specifications:

  802.11 b/g/n 150Mbps

  2.4GHz

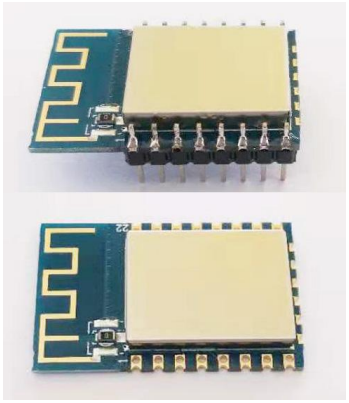
  Integrated MCU, 160MHz

  Interface (I2C, I2S, 3*UART, 2*SPI, SDIO, 6*hard PWM, 4*ADC, 14*GPIO)

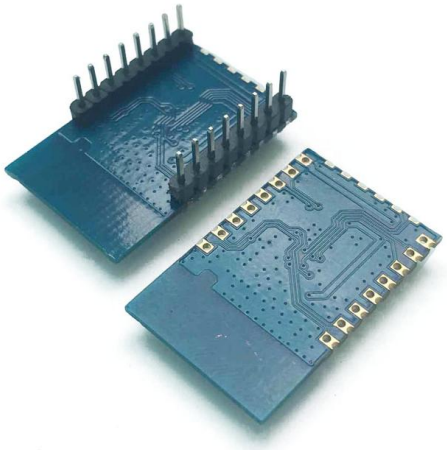
  Support FreeRTOS

1.1. HLK-M20 module type

The module hardware type is shown below：



Pic 1 Pin and SMD models front



Pic 2 Pin and SMD models on the back

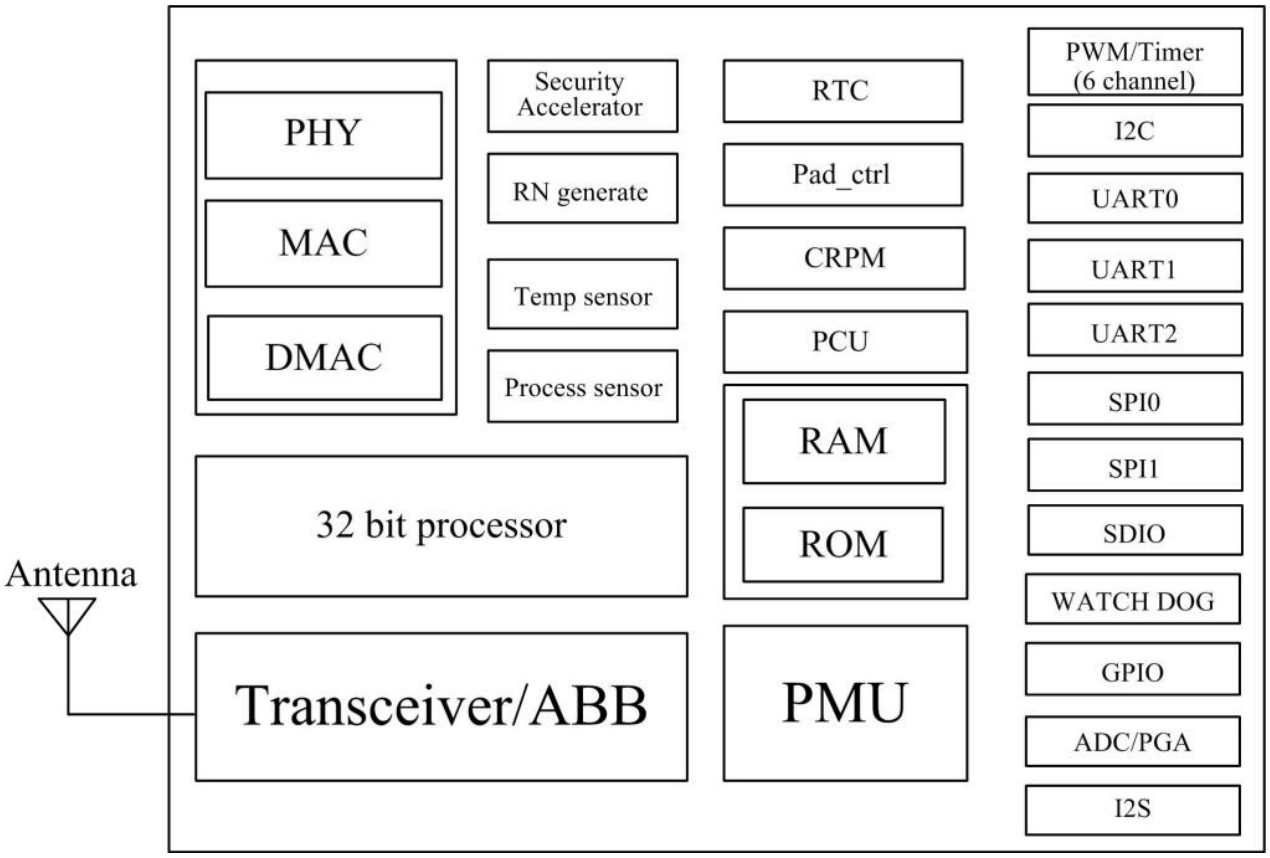
1.2. WLAN features

- Single chip integration MAC/PHY/DMAC
- Support 2.4GHz IEEE 802.11b/g/n
- 20/40MHz bandwidth, maximum 150Mbps
- Support (WPA)/WPA2/WPA2-Enterprise/Wi-Fi
- Support softAP
- Support A-MPDU, A-MSDU

1.3. MCU features

- 32-bit, the highest clock frequency is 160MHz
- Built -in 8Mbit flash
- Programmable function pin position
- GPIO that can be interrupted or awakened by external rising/falling edges

2. Functional block diagram



Pic 3 Module functional block diagram

3. Specifications

3.1. System memory

Project		Parameter
Memory system	Built-in RAM	User SRAM 128K Bytes
	Built-in Flash	Built-in 8Mbit flash

Form 1 System memory

3.2. Interface

Project	Parameter
Serial port performance	Support up to 3 serial ports, baud rate can be configured from 1200bps-500000bps
I2S interface performance	Support 1 channel I2S interface; BCLK of I2S host support 8/32/44.1/48/ 88.2/96KHz; support 16/32 bit per channel, data format can be configured as 8/16/20/24/32bit
I2C interface performance	Support an I2C standard interface. Support master or slave operation
PWM interface performance	Support up to 6 PWM interfaces; PWM period and duty cycle are programmable
SPI interface	As SPI master, support up to 2 SPI slaves
SDIO	Support 1 SDIO interface

Form 2 System interface introduction

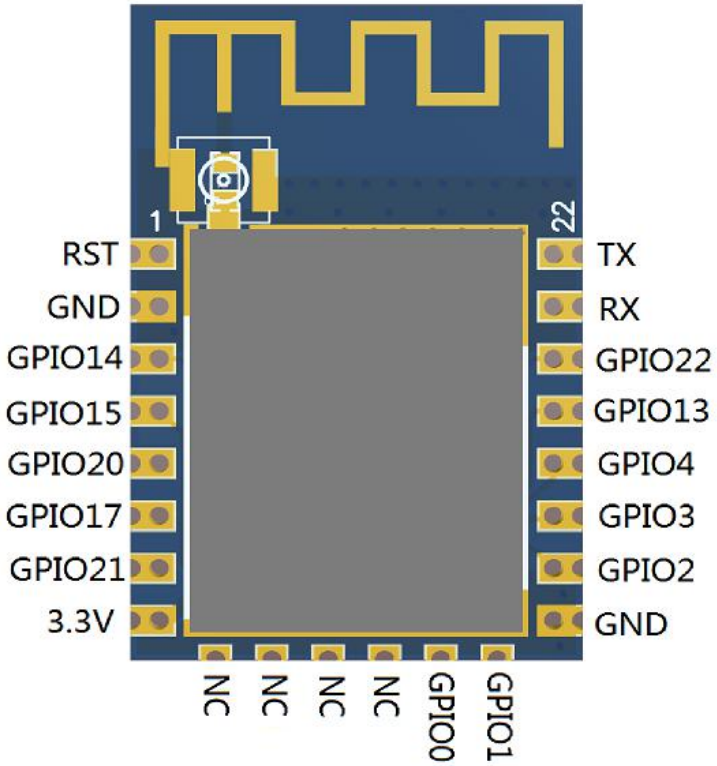
3.3. Power supply

symbol	function	Minimum voltage（V）	Typical voltage（V）	Maximum voltage（V）	Current（mA）
VBAT	Supply voltage range	3.0	3.3	3.6	≥380mA
I/O	I/O Input voltage range	1.8	3.3	3.5	≤10mA

Form 3 Introduction of power supply

4. Module pin definition

4.1. Pin definition diagram



Pic 4 Pin definition diagram

Notes：

1，The picture is defined by default, the multiplexing function is not listed。

2，Please leave the unused functions. do not pull up and down at will, so as not to cause the module to start abnormally

4.2. Pin description

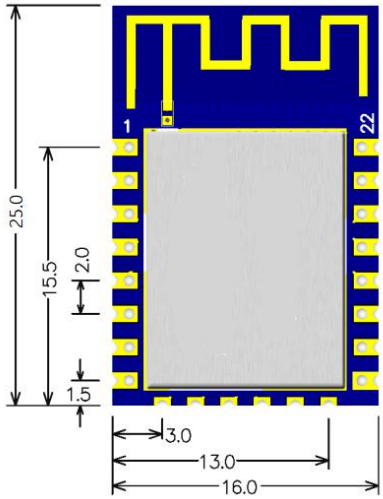
Pin number	Pin name	Type	Direction
1	**RST**	I	RESET signal of the chip
2	**GND**	I/O	buck ground
3	**GPIO14**	I/O	General purpose input/output
4	**GPIO15**	I/O	General purpose input/output
5	**GPIO20**	I/O	General purpose input/output
6	**GPIO17**	I/O	General purpose input/output
7	**GPIO21**	I/O	General purpose input/output
8	**3.3V**	PWR	power supply
9	**NC**	I/O	
10	**NC**	I/O	
11	**NC**	I/O	
12	**NC**	I/O	
13	**GPIO0**	I/O	General purpose input/output
14	**GPIO1**	I/O	General purpose input/output
15	**GND**	GND	buck ground
16	**GPIO2**	I/O	General purpose input/output
17	**GPIO3**	I/O	General purpose input/output
18	**GPIO4**	I/O	General purpose input/output
19	**GPIO13**	I/O	General purpose input/output
20	**GPIO22**	I/O	General purpose input/output
21	**RX**	I/O	UART_RX
22	**TX**	I/O	UART_TX

Form 4 Pin description

Pin type definition：

- *I/O → Digital input/output；*
- *A,I/O → Analog input/output*
- *PWR → Power*
- *GND → Ground*

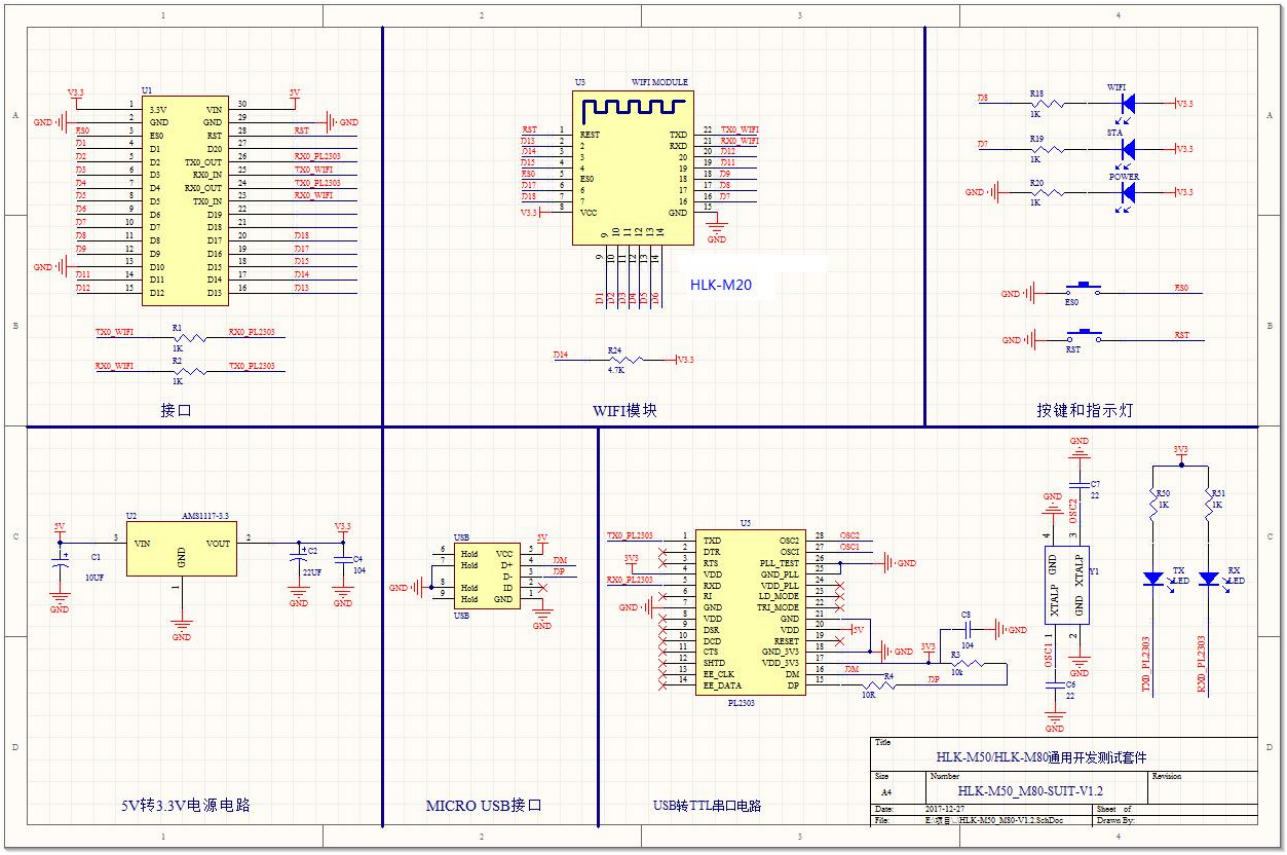
5. Module dimension drawing



unit：mm

Pic 5　Dimensional drawing of the module

6. Typical application circuit



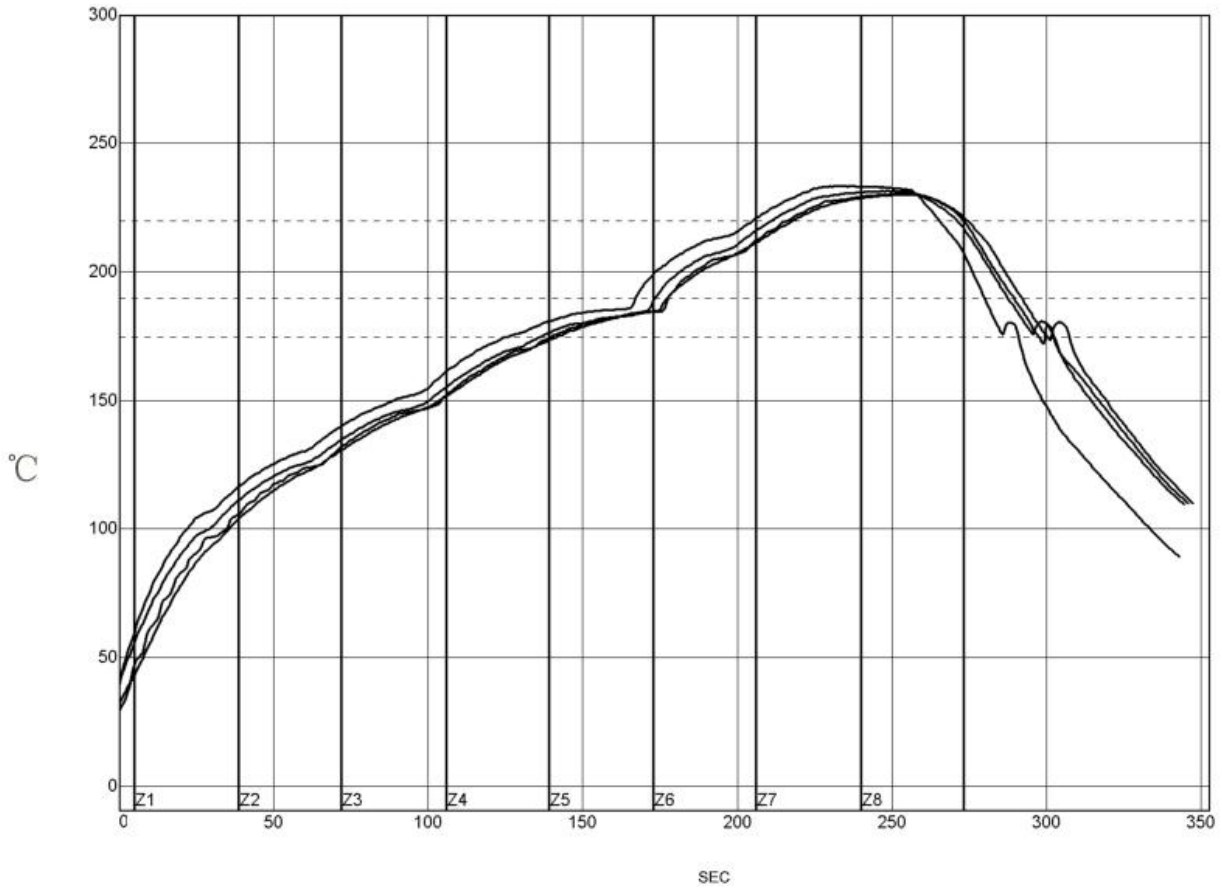
Pic 6　Test board schematic

Note: This is a schematic diagram of the M20 development test suite. Please obtain the schematic diagram and PCB source files from the sales.

7. Recommended reflow temperature

When the module passes the furnace for the second time, please strictly follow this temperature curve. If the temperature deviation of reflow soldering is too higher, the module will be damaged!.

Temperature zone	1	2	3	4	5	6	7	8
Upper temperature zone	125	135	155	185	195	225	240	230
Lower temperature zone	125	135	155	185	195	225	240	230



PWI= 94%	Constant temperature time 175 to 190℃		Reflow time/220℃		Maximum temperature	
<TC2>	35.53	-82%	55.58	-72%	230.28	-94%
<TC3>	37.66	-74%	58.66	-57%	230.56	-89%
<TC4>	41.52	-62%	60.63	-47%	233.62	-28%
<TC5>	37.07	-76%	60.44	-48%	231.67	-67%
温差	5.99		5.05		3.34	

Process interface

Solder paste:	System Default for Reflow		
Statistics name	Minimum interface	Highest interface	unit
Constant temperature time 175-190℃	30	90	sec
Time above reflow -220℃	50	90	sec
Maximum temperature	230	240	℃

8. Revisition

Date	Version	Revised content
2020/4/13	1.0	initial version
2020/5/28	1.1	Modify the module dimension drawing

2.2 List of applicable FCC rules

FCC Part 15.247

2.6 RF exposure considerations

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

2.8 Label and compliance information

Remind end customers to FCC ID label on the final system must be labeled with “Contains FCC ID: 2AD56HLK-M20” or “Contains transmitter module FCC ID: 2AD56HLK-M20”.

2.9 Information on test modes and additional testing requirements

Contact ShenZhen HaiLingKe Electronic co.,Ltd will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

2.10 Additional testing, Part 15 Subpart B disclaimer

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier’s Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, ShenZhen HaiLingKe Electronic co.,Ltd shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

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

FCC Warning

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.

NOTE 1: This product 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 product 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 product 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.

NOTE 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

NOTE 3: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

NOTE 4: For all products market in US, OEM has to limit the operation channels to CH1 to CH11 for 802.11b/g/n-HT20 and CH3 to CH9 for 802.11n-HT40 by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.