



WM05_AN WiFi Module

Product Specification

Model Name	WM05_AN
Project code	
Description	WiFi Module
Revision	0.2
Issue Date	

Approved by	Reviewed by	Issued by
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Revision History

Revision	Released Date	Comments/Remark	Author
0.1	2015/4/2	Initial release	Jimmy Chen
0.2	2015/5/27	Update format and add product photo	Sky He

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1. OVERVIEW

1.1. Features

WM05_AN device has a rich set of peripherals for diverse application requirements. The device optimizes bus matrix and memory management to give the application developer the needed advantage. This section briefly highlights the internal details of the CC3200 device and offers suggestions for application configurations.

1.2. Description

- Applications Microcontroller Subsystem
 - ARM Cortex-M4 Core at 80 MHz
 - Embedded Memory Options
 - Integrated Serial
 - RAM (up to 256KB)
 - Peripheral Drivers in ROM
 - Hardware Crypto Engine for Advanced Hardware Security Including
 - AES, DES, and 3DES
 - SHA and MD5
 - CRC and Checksum
 - 8-Bit, Fast, Parallel Camera Interface
 - 1 Multichannel Audio Serial Port (McASP) Interface With Support for I2S Format
 - 1 SD (MMC) Interface
 - 32-Channel Micro Direct Memory Access (μ DMA)
 - 2 Universal Asynchronous Receivers/Transmitters (UARTs)
 - 2 Serial Peripheral Interfaces (SPIs)
 - 1 Inter-integrated Circuit (I²C)
 - 4 General-Purpose Timers (GPTs)
 - 16-Bit Pulse-Width Modulation (PWM) Mode
 - 1 Watchdog Timer Module
 - 4-Channel 12-Bit Analog-to-Digital Converters (ADCs)
 - Up to 25 Individually Programmable GPIO Pins
- Wi-Fi Network Processor Subsystem
 - 802.11b/g/n Radio, Baseband, and Medium Access Control
 - TCP/IP Stack
 - 8 Simultaneous TCP, UDP, or RAW Sockets
 - 2 Simultaneous TLS v1.2 or SSL 3.0 Sockets
 - Powerful Crypto Engine for Fast, Secured WLAN Connections With 256-Bit Encryption
 - Station, Access Point, and Wi-Fi Direct™ Modes

- WPA2 Personal and Enterprise Security
- SimpleLink Connection Manager for Managing Wi-Fi Security States
- TX Power
 - 17 dBm at 1 DSSS
 - 17.25 dBm at 11 CCK
 - 13.5 dBm at 54 OFDM
- RX Sensitivity
 - -94.7 dBm at 1 DSSS
 - -87 dBm at 11 CCK
 - -73 dBm at 54 OFDM
- Application Throughput
 - UDP: 16 Mbps
 - TCP: 13 Mbps
- Power-Management Subsystem
 - Integrated DC-DC Converter With a Wide-Supply Voltage:
 - VBAT: 2.3 to 3.6 V
 - Low-Power Consumption at 3.6 V
 - Hibernate With Real-Time Clock (RTC): 7 μ A
 - Low-Power Deep Sleep: <275 μ A
 - RX Traffic: 59 mA at 54 OFDM
 - TX Traffic: 229 mA at 54 OFDM
 - Additional Integrated Components
 - 40.0-MHz Crystal
 - 32.768-kHz Crystal (RTC)
 - 8-Mbit SPI Serial Flash RF Filter and Passive Components
- Module dimension 20.5mm(L) x 24mm(W) x 2.3mm(H)
- Operating temperature: -40°C to 85°C

2. FUNCTIONAL FEATURES

2.1. Block Diagram

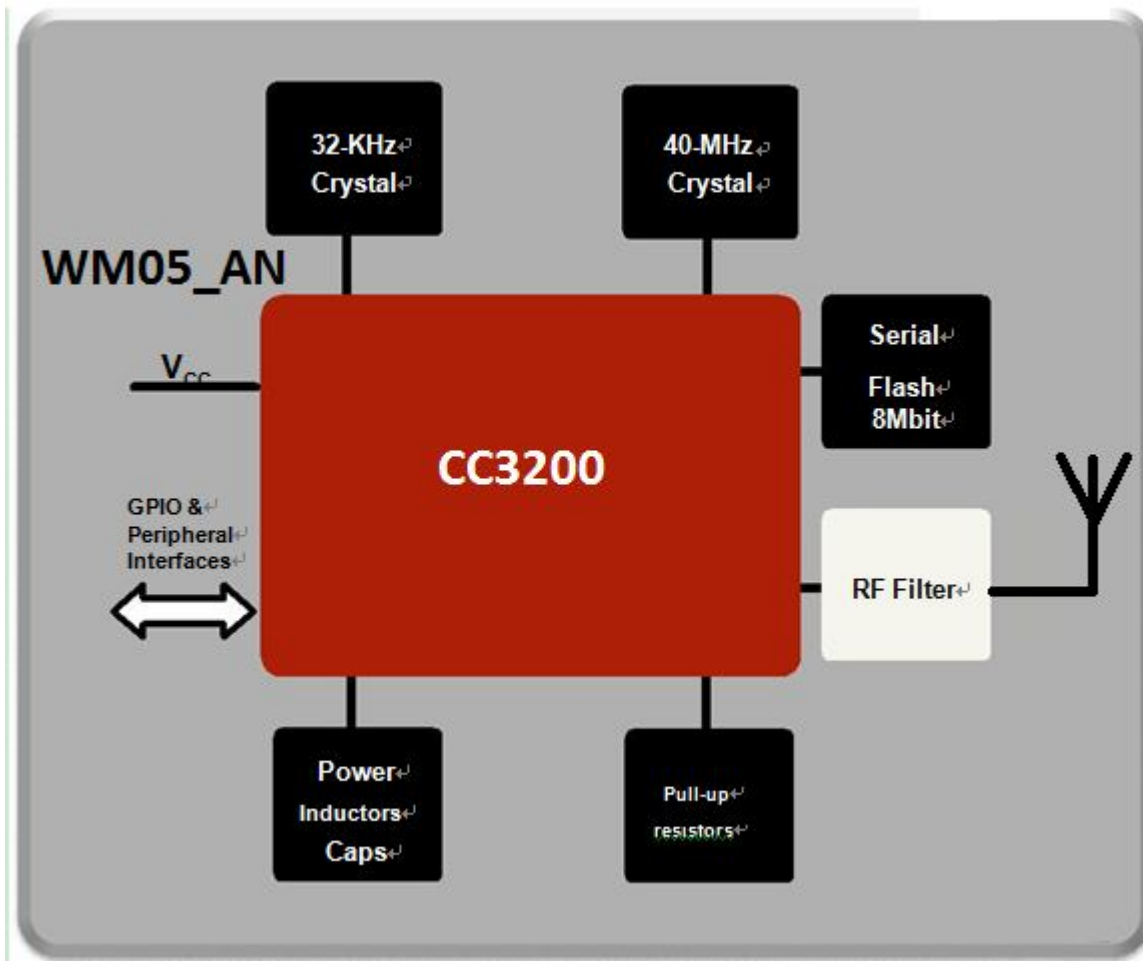


Figure 2-1. Block Diagram

2.2. PIN Diagram

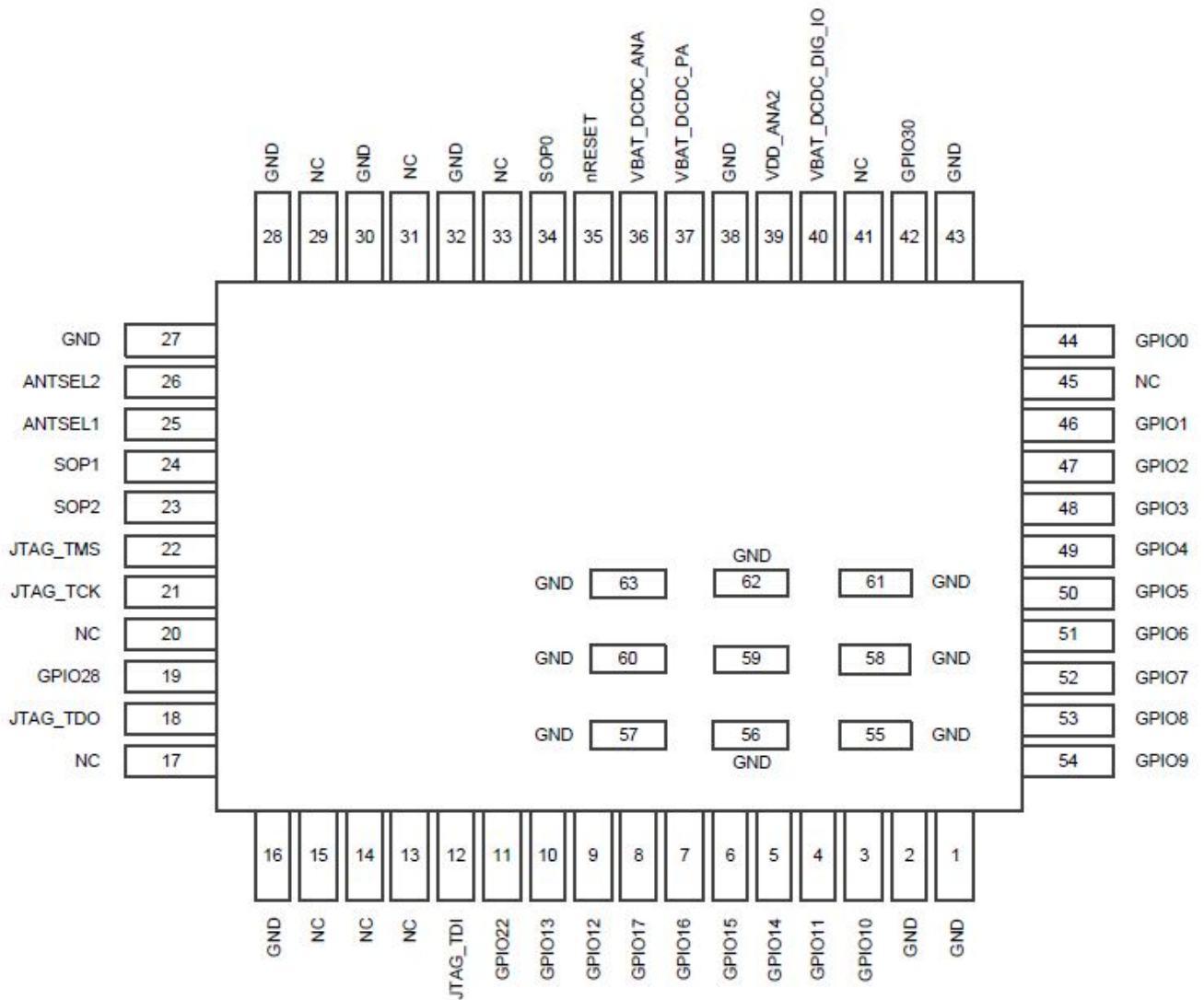


Figure 2-2. PIN Diagram(Bottom View)

3. Pin Description

Table 3-1 lists the pin descriptions of the WM05_AN module. "DEVICE PIN NO" refers to the pin number of the QFN part CC3200. This is stated here because the QFN pin is referred to in the SDK.

Table 3-1. Pin Attributes

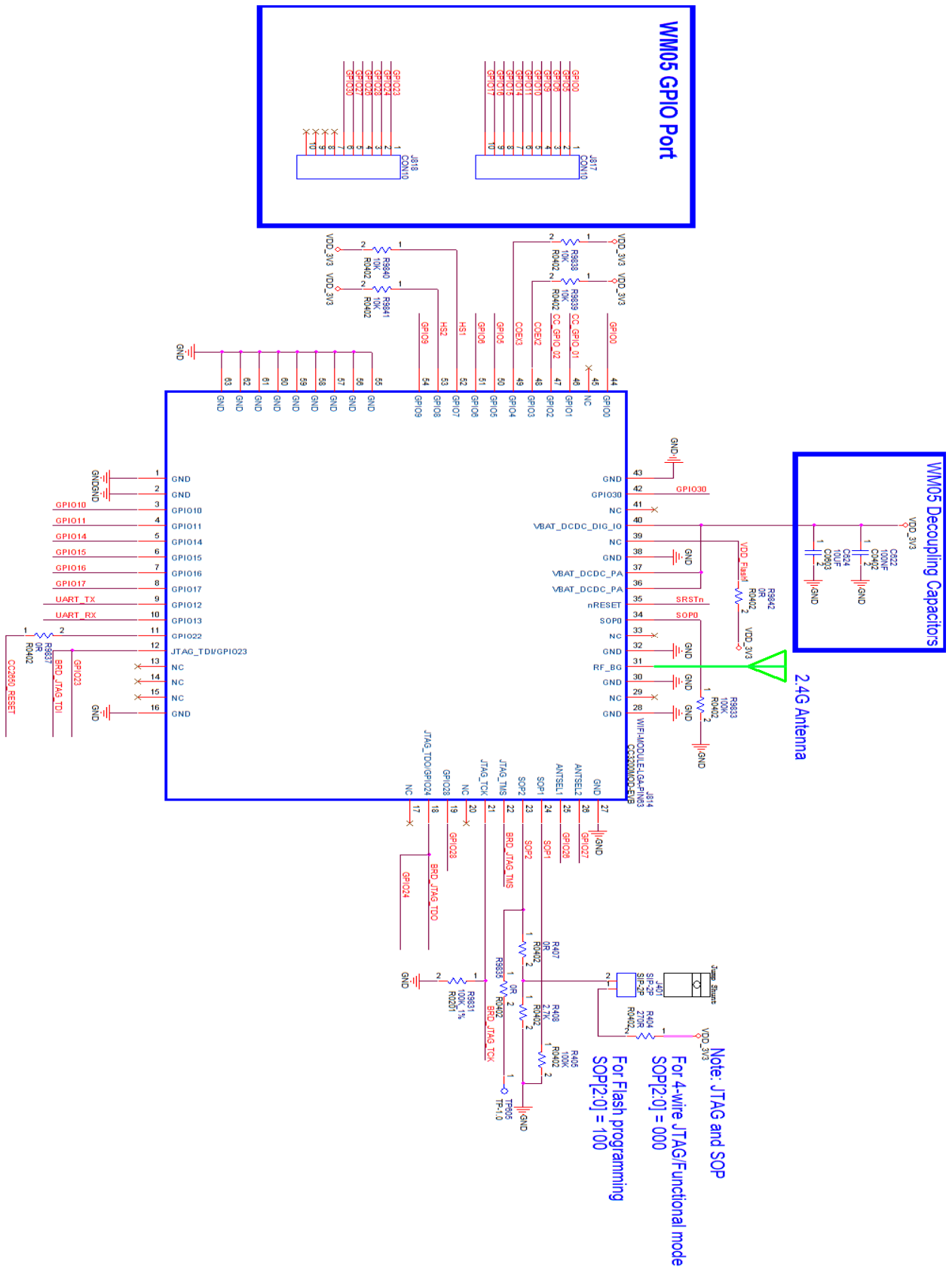
MODULE PIN NO.	MODULE PIN NAME	TYPE	CC3200 PIN NO	MODULE PIN DESCRIPTION
1	GND	-		Ground
2	GND	-		Ground
3	GPIO10	I/O	1	GPIO ⁽¹⁾
4	GPIO11	I/O	2	GPIO ⁽¹⁾
5	GPIO14	I/O	5	GPIO ⁽¹⁾
6	GPIO15	I/O	6	GPIO ⁽¹⁾
7	GPIO16	I/O	7	GPIO ⁽¹⁾
8	GPIO17	I/O	8	GPIO ⁽¹⁾
9	GPIO12	I/O	3	GPIO ⁽¹⁾
10	GPIO13	I/O	4	GPIO ⁽¹⁾
11	GPIO22	I/O	15	GPIO ⁽¹⁾
12	JTAG_TDI	I/O	16	GPIO ⁽¹⁾
13	NC	-	13	Reserved for TI
14	NC	-	14	Reserved for TI
15	NC	-	11	Reserved for TI
16	GND	-		Ground
17	NC	-	12	Reserved for TI
18	JTAG_TDO	I/O	17	GPIO ⁽¹⁾
19	GPIO28	I/O	18	GPIO ⁽¹⁾
20	NC	-	23	Unused. Do not connect.
21	JTAG_TCK	I/O	19	JTAG TCK input. Needs 100-kΩ pulldown resistor to ground. ⁽¹⁾
22	JTAG_TMS	I/O	20	JTAG TMS input. Leave unconnected if not used on product. ⁽¹⁾
23	SOP2	-	21	Add 2.7-kΩ pulldown resistor to ground needed for functional mode. Add option to pullup required for entering the UART load mode for flashing.
24	SOP1	-	34	Reserved. Do not connect.
25	ANTSEL1	I/O	29	Antenna selection control ⁽¹⁾
26	ANTSEL2	I/O	30	Antenna selection control ⁽¹⁾
27	GND	-		Ground
28	GND	-		Ground
29	NC	-	27, 28	Reserved for TI
30	GND	-		Ground
31	NC	-		
32	GND	-		Ground
33	NC	-	38	Reserved for TI

34	SOP0	-	35	Optional 10-kΩ pullup if user chooses to use SWD debug mode instead of 4-wire JTAG
35	nRESET	I	32	Power on reset. Does not require external RC circuit
36	VBAT_DCDC_ANA	-	37	Power supply for the device, can be connected to battery (2.3 V to 3.6 V)
37	VBAT_DCDC_PA	-	39	Power supply for the device, can be connected to battery (2.3 V to 3.6 V)
38	GND	-		Ground

MODULE PIN NO.	MODULE PIN NAME	TYPE	CC3200 PIN NO	MODULE PIN DESCRIPTION
39	VDD_ANA2	-	47	Power supply for the device, can be connected to battery (2.3 V to 3.6 V)
40	VBAT_DCDC_DIG_IO	-	10, 44, 54	to 3.6 V to 3.6 V
41	NC	-	25, 36, 48	Reserved for TI
42	GPIO30	I/O	53	GPIO ⁽¹⁾
43	GND	-		Ground
44	GPIO0	I/O	50	GPIO ⁽¹⁾
45	NC	-	51	Reserved for TI
46	GPIO1	I/O	55	GPIO ⁽¹⁾
47	GPIO2	I/O	57	GPIO ⁽¹⁾
48	GPIO3	I/O	58	GPIO ⁽¹⁾
49	GPIO4	I/O	59	GPIO ⁽¹⁾
50	GPIO5	I/O	60	GPIO ⁽¹⁾
51	GPIO6	I/O	61	GPIO ⁽¹⁾
52	GPIO7	I/O	62	GPIO ⁽¹⁾
53	GPIO8	I/O	63	GPIO ⁽¹⁾
54	GPIO9	I/O	64	GPIO ⁽¹⁾
55	GND	-		Thermal Ground
56	GND	-		Thermal Ground
57	GND	-		Thermal Ground
58	GND	-		Thermal Ground
59	GND	-		Thermal Ground
60	GND	-		Thermal Ground
61	GND	-		Thermal Ground
62	GND	-		Thermal Ground
63	GND	-		Thermal Ground

(1) For pin multiplexing details, refer to CC3200R device data sheet

4. Reference Circuit



5. ELECTRICAL CHARACTERISTICS

5.1. Absolute Maximum Rating

These specifications indicate levels where permanent damage to the module can occur. Functional operation is not ensured under these conditions. Operation at absolute maximum conditions for extended periods can adversely affect long-term reliability of the module.

SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
VBAT and VIO	Respect to GND	-0.5	3.3	3.8	V
Digital I/O	Respect to GND	-0.5	-	VBAT + 0.5	V
RF pins		-0.5		2.1	V
Analog pins		-0.5		2.1	V
Temperature		-40		+85	°C

5.2. Recommended Operation Condition

Function operation is not ensured outside this limit, and operation outside this limit for extended periods can adversely affect long-term reliability of the module.⁽¹⁾

SYMBOL	CONDITION ⁽²⁾	MIN	TYP	MAX	UNIT
VBAT and VIO	Battery mode	2.3	3.3	3.6	V
Operating temperature	-	-40	25	85	°C
Ambient thermal slew		-20		20	°C/minute

(1) Operating temperature is limited by crystal frequency variation.

(2) To ensure WLAN performance, the ripple on the power supply must be less than ±300 mV.

5.3. WLAN RF Performance

5.3.1. WLAN Receiver Characteristics

T_A = +25°C, V_{BAT} = 2.3 to 3.6 V. Parameters measured at module pin on channel 7 (2442 MHz)

PARAMETER	CONDITION (Mbps)	MIN	TYP	MAX	UNITS
Sensitivity (8% PER for 11b rates, 10% PER for 11g/11n rates)(10% PER) ⁽¹⁾	1 DSSS		-94.7		dBm
	2 DSSS		-92.6		
	11 CCK		-87.0		
	6 OFDM		-89.0		
	9 OFDM		-88.0		
	18 OFDM		-85.0		
	36 OFDM		-79.5		
	54 OFDM		-73.0		
	MCS7 (Mixed Mode)		-69.0		

Maximum input level (10% PER)	802.11b		-3.0		
	802.11g		-9.0		

(1) Sensitivity is 1-dB worse on channel 13 (2472 MHz).

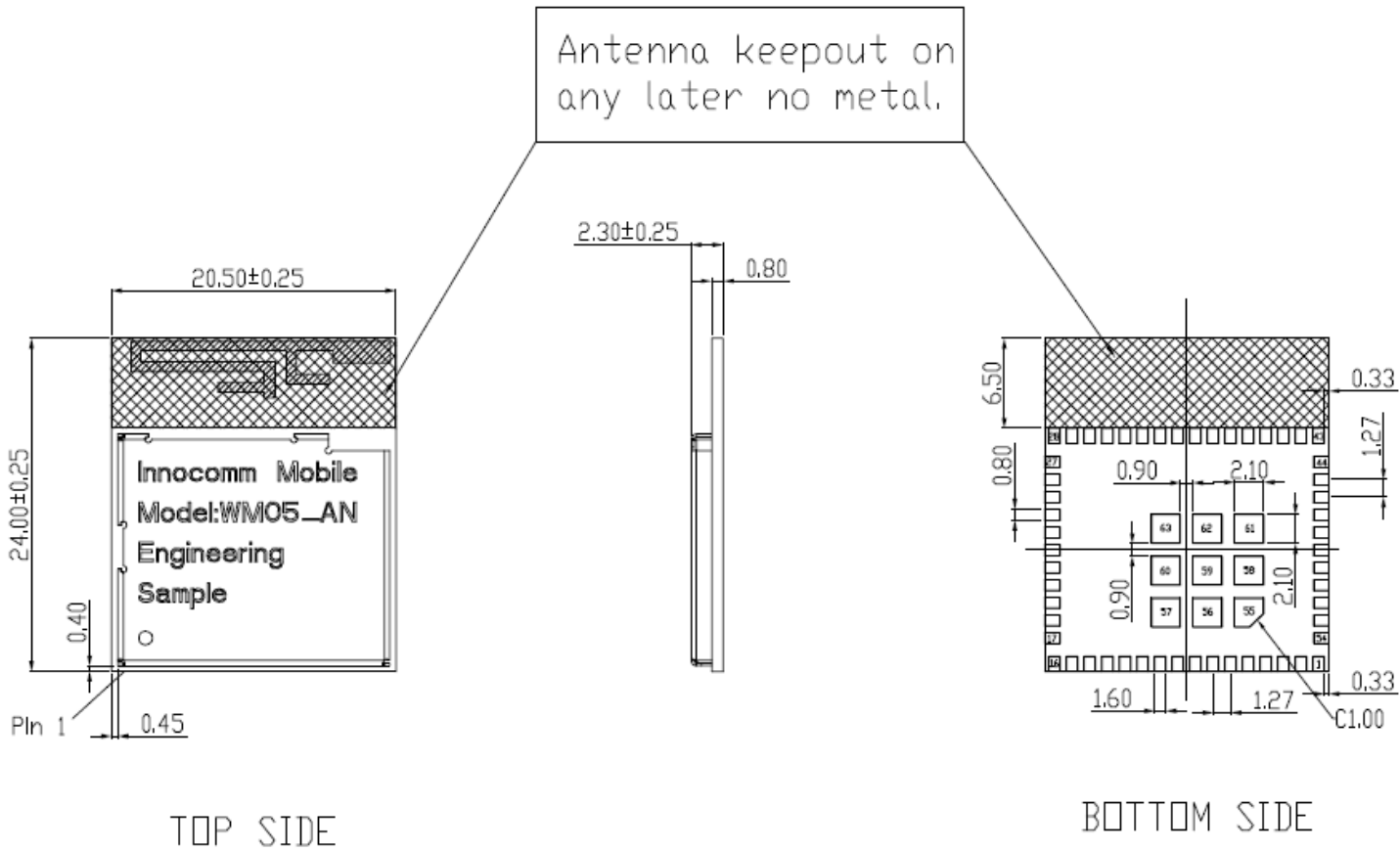
5.3.2.WLAN Transmitter Characteristics

$T_A = +25^{\circ}\text{C}$, $V_{BAT} = 2.3$ to 3.6 V. Parameters measured at module pin on channel 7 (2442 MHz)

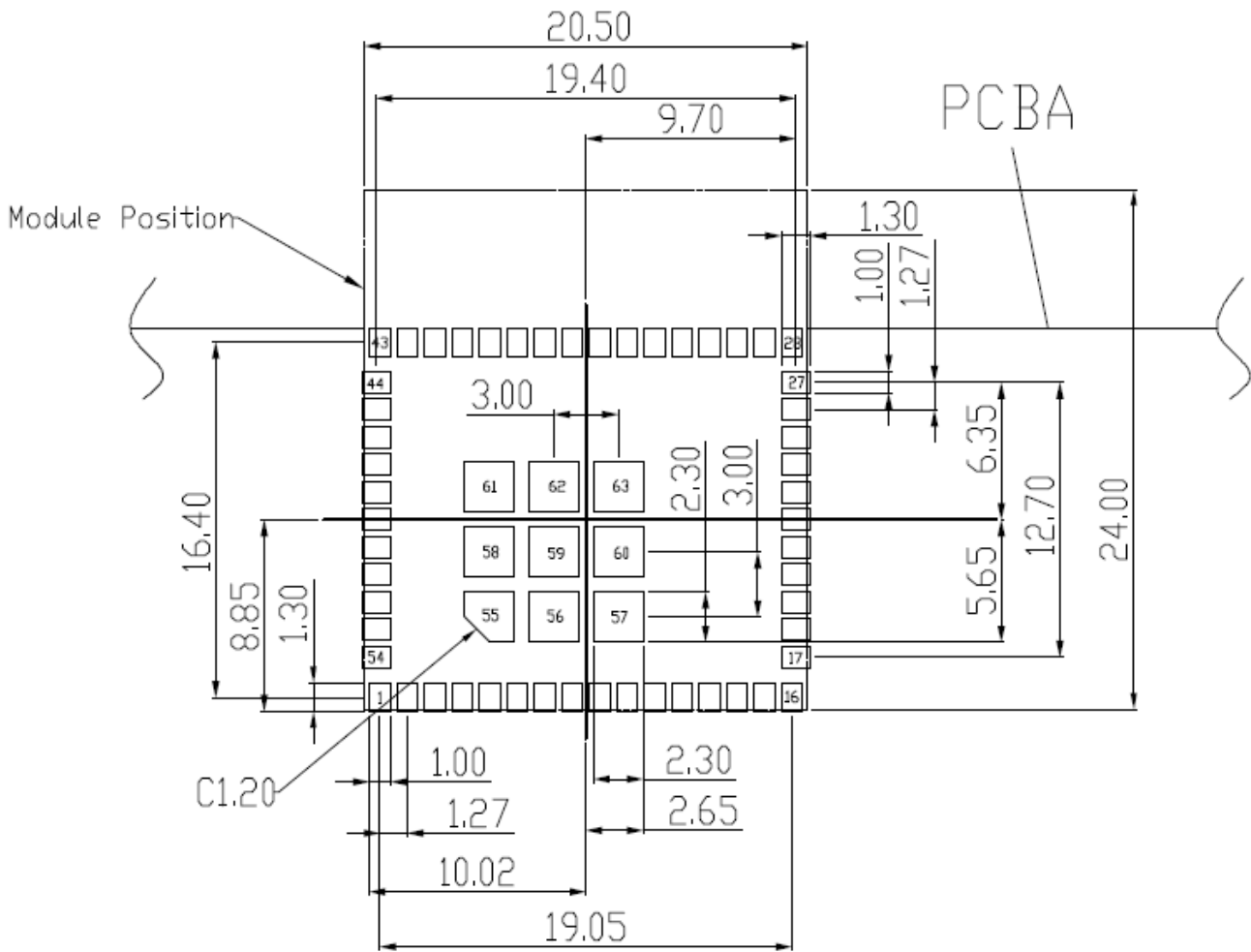
PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNIT
Max RMS Output Power measured at 1 dB from IEEE spectral mask or EVM	1DSSS		17		dBm
	2DSSS		17		
	11CCK		17.25		
	6OFDM		16.25		
	9OFDM		16.25		
	18OFDM		16		
	36OFDM		15		
	54OFDM		13.5		
	MCS7 (Mixed Mode)		12		
Transmit center frequency accuracy		-20		20	ppm

(1) Channel-to-channel variation is up to 2 dB. The edge channels (2412 and 2472 MHz) have reduced TX power to meet FCC emission limits.

6. Mechanical Information



7. Recommended PCB Layout Footprint

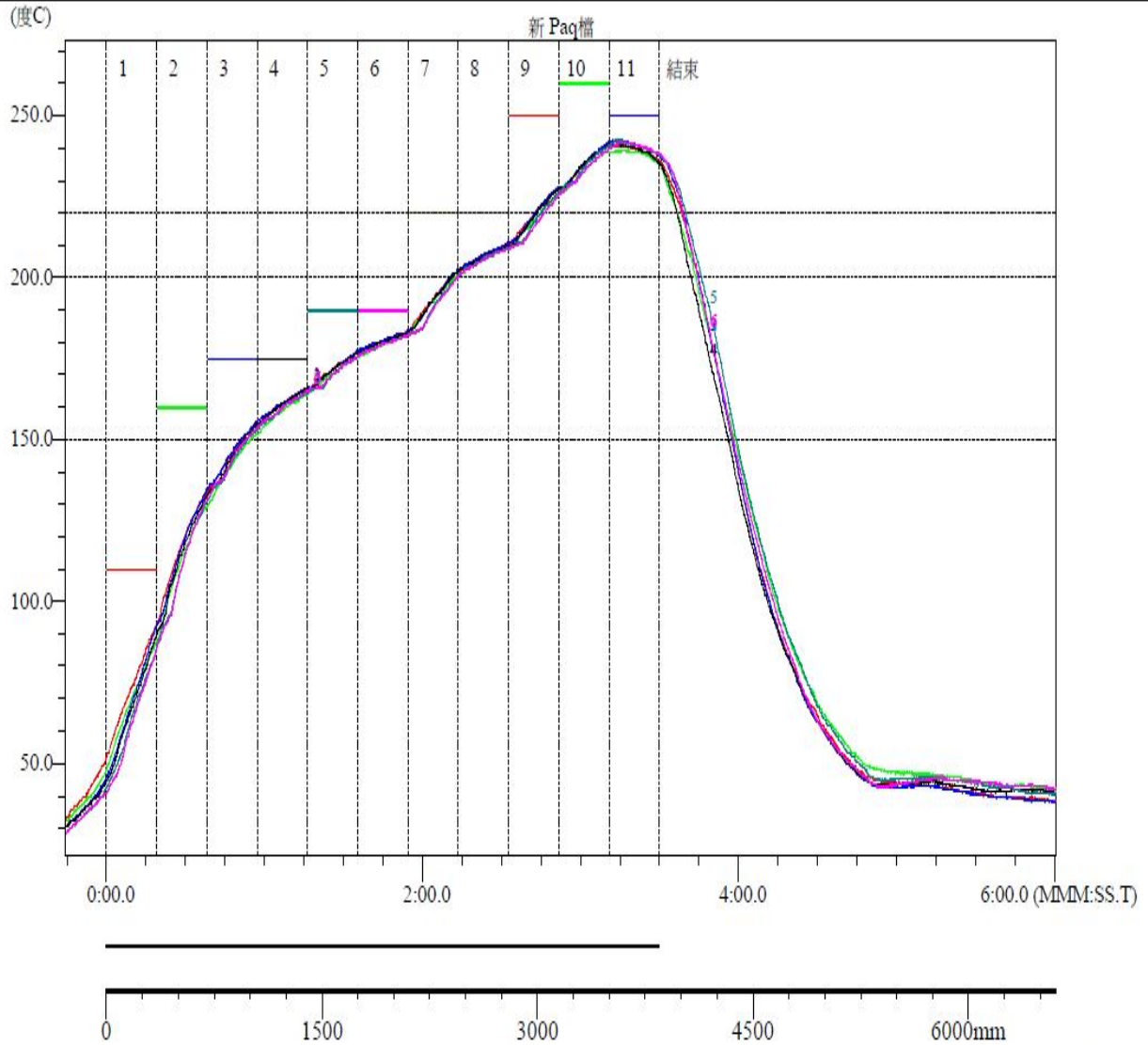


TOP SIDE

RECOMMENDED P.C.B PATTERN LAYOUT

8. SMT Solder Reflow Recommendation:

公司全銜	Domextw	製程	CM01_EP1	印列	2014/09/04
座落於	SMT LINE3	產品	CM01_EP1	生產線速度	1100.0 (mm/min)



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