



COMPAL Electronics, INC.



5G CXC-N3 Module User Manual

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1. Foreword

1.1 Introduction

This document describes the hardware of the COMPAL® 5G LCC Module product. It helps you quickly retrieve interface specifications, electrical and mechanical details, and information on the requirements to be considered for integrating further components. **All relevant LCC HW spec、figures and design guidelines in this document are common specification for All 5G LCC mode.**

1.2 Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any cellular terminal or mobile incorporating with 5G LCC module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. If not so, we assume no liability for customers' failure to comply with these precautions.



Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a handsfree kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the cellular terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If the device offers an Airplane Mode, then it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on boarding the aircraft.



Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.



Cellular terminals or mobiles operating over radio signals and cellular network cannot be guaranteed to connect in all possible conditions (for example, with unpaid bills or with an invalid SIM card). When emergent help is needed in such conditions, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.



The cellular terminal or mobile contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer or other electric- equipment.



In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.



Safety of Children

Do not allow children to use the wireless device without guidance. Small and sharp components of the wireless device may cause danger to children or cause suffocation if children swallow the components.

Environment Protection

Observe the local regulations regarding the disposal of your packaging materials, used wireless device and accessories, and promote their recycling.

WEEE Approval

The wireless device is in compliance with the essential requirements and other relevant provisions of the Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE Directive).

RoHS Approval

The wireless device is in compliance with the restriction of the use of certain hazardous substances in electrical and electronic equipment Directive 2011/65/EU (RoHS Directive).



1.3 Reference Standard (Under testing)

The design of the product complies with the following standards:

Table 1-1 3GPP Standards

3GPP TS specification reference	Title	3GPP Release used as the basis for this declaration
23.122	Non-Access-Stratum functions related to Mobile Station (MS) in idle mode	11.4.0
24.008	Mobile radio interface Layer 3 specification; Core network protocols; Stage 3	11.5.0
25.331	Radio Resource Control (RRC); protocol specification	9.0.0
25.133	Requirements for Support of Radio Resource Management (FDD)	13.2.0
25.101	Radio Transmission and Reception (FDD)	14.0.0
24.301	(NAS) protocol for Evolved Packet System (EPS); Stage 3	11.7.0
36.101	(E-UTRA); User Equipment (UE) radio transmission and reception	12.14.1
36.133	(E-UTRA); Requirements for support of radio resource management	14.14.0
36.213	(E-UTRA) Physical layer procedures	12.11.0
36.214	(E-UTRA) Physical layer measurements	12.3.0
36.304	(E-UTRA); User Equipment (UE) procedures in idle mode	12.8.0
36.321	(E-UTRA); Medium Access Control (MAC) protocol specification	12.9.0
36.322	(E-UTRA); Radio Link Control (RLC) protocol specification	12.4.0
36.323	(E-UTRA); Packet Data Convergence Protocol (PDCP) specification	12.6.0
36.331	(E-UTRA); Radio Resource Control (RRC); Protocol specification	15.3.0
24.501	Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3	15.1.0
38.331	NR;Radio Resource Control (RRC) protocol specification	15.3.0
38.133	NR; Requirements for support of radio resource management	15.3.0
38.213	NR; Physical layer procedures for control	15.3.0
38.323	NR; Packet Data Convergence Protocol (PDCP) protocol specification	15.3.0
37.324	Service Data Adaptation Protocol (SDAP) specification	15.1.0
11.11/51.011	Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) Interface	4.15.0
31.102	Characteristics of the Universal Subscriber Identity Module (USIM) application	12.11.0
31.103	Characteristics of the IP Multimedia Services Identity Module (ISIM) application	12.2.0
31.101	UICC-terminal interface; Physical and logical characteristics	12.2.0
27.007	AT command set for 3GPP User Equipment (UE)	9.9.0
36.355	(E-UTRA); LTE Positioning Protocol (LPP)	14.2.0
44.031	Location Services (LCS)– MS-SMLC Radio Resource LCS Protocol (RRLP)	14.3.0

Non-3GPP documentation:

Table 1-2 ETSI

Document Source	Title	Version
ETSI	TS 102 221: "UICC-Terminal interface; Physical and logical characteristics".	12.1.0
ETSI	TS 102 223: "Smart Cards; Card Application Toolkit".	12.3.0

Table 1-3 GSMA

Document Source	Title	Version
GSMA	IR.92 IMS Profile for Voice and SMS	8.0.0
GSMA	IR.94 IMS Profile for Conversational Video Service	7.0.0

Table 1-4 OMA

Document Source	Title	Version
OMA	OMA-AD-SUPL-V1	
OMA	OMA-AD-SUPL-V2	



2. Overview

2.1 Introduction

CXC-N3 MODULE is a highly integrated 5G NR wireless communication module that adopts LCC pin with standard USB interface and backward supports with LTE system. It is applicable to most broadband communication networks of the mobile operator across the world. **All relevant LCC HW spec、figures and design guidelines in this document are common specification for All 5G LCC mode.**

2.2 Specification

Table 2-1 LCC module features

Specification		
Platform	QCT SDX35	
Memory	Support LPDDR4X 4Gb, NAND 4Gb	
Operating Band	5G Refarmed Sub6 : n2, n5, n7, n12, n13, n14, n25, n26, n30, n38, n41, n48, n66, n71 New Sub6: n77,n78	
	LTE FDD: B2, B4, B5, B7, B12, B13, B14, B25, B26, B30, B66, B71	
	LTE TDD: B38, B41,B42,B43, B48	
	Simultaneous GPS: L1/L5, GPS, GLONASS, Galileo, NavIC, and BeiDou (option)	
Network option	SA	Option 2
Downlink	LTE	LTE CAT.13
	5G sub-6	1CC; Max BW 20MHz; MIMO 2x2
Uplink	LTE	LTE CAT.5
	5G sub-6	1CC; Max BW 20MHz; SISO
HPUE	B41	
DL 2x2 MIMO	B2, B4, B5, B7, B12, B13, B14, B25, B26, B30, B38, B41 ,B42,B43, B48, B66, B71 n2, n5, n7, n12, n13, n14, n25, n26, n30, n38, n41, n48, n66, n71, n77,n78	
Power Supply	DC 3.8 (typical) (3.4~4.4V)	
Temperature	Operating temperature ^[1] :-30°C ~+75°C	



	Extended temperature ^[2] : -40°C ~+85°C
	Storage temperature: -40°C ~+85°C
Physical characteristics	Dimension:32x29mm, Thickness=2.5mm(typ.)
	Weight: TBD
Interface	
Antenna Port	4G/Sub6G/GPS Antenna x 3
	Support 2x2 MIMO
Function Interface	Option 1 : Single USIM 1.8/ 3V *1 and eSIM design internally Option 2 : Single USIM 1.8/ 3V *2 (CXC-N3 default not support internal eSIM)
	PCM interface for Audio x 1
	USB 2.0 HS
	2-wire UART for Debug 2-wire Coex UART for LTE/WLAN &coexistence 4-wire BT-UART interface
	Power on/off switch key 1 pin
	Hardware reset pin x1 WLAN Disable pin x1
	LED SINK control pin x1 (Support up to 8.5 mA)
	I2C Interface x1
	SGMII x1 (Support max speed 1.25Gbps Ethernet interface)
	Others Interface: (The trigger and read control de-pend on SW) AMUX (PMIC) x 2pin
	Power supply: (Reserve) a. Dual Voltage Support LV 1.8V/HV 3V IF for SIM Card Power.
	PCIe Gen2_1-lane
	Tunable antenna(1xMIPI)
	EBI 8bit parallel LCD interface
	GPIO (General-Purpose I/O) x 11
	SPI interface x1



Software	
Driver	Linux kernel [3]
Protocol Stack	IPV4/IPV6
AT commands	3GPP TS 27.007 and 27.005
Firmware update	FOTA
	Support 5G NR R17 RedCap Support R16 LTE
	AGNSS
Management tool	WebUI for user (Monitor data usage, manage device & network settings), and Debug screen for engineer

 Note

[1] To meet this operating temperature range, you need to ensure effective thermal dissipation, for example, by adding passive or active heatsinks, heat pipes, vapor chambers, etc. Within this range, the module can meet 3GPP

[2] To meet this extended temperature range, you need to ensure effective thermal dissipation, for example, by adding passive or active heatsinks, heat pipes, vapor chambers, etc. When the LCC module works at this temperature, the module remains the ability to establish and maintain functions such as voice, SMS, emergency call, etc. Radio spectrum and radio network are not influenced, while one or more specifications, such as Pout, may undergo a reduction in value, exceeding the specified tolerances of 3GPP.

[3] SW driver plan to support Android platform.

2.3 Operating Band

The 5G LCC Module operating bands of the antennas are as follows Table 2-2:

Table 2-2 tunable antenna control pin

Band name	Tx (MHz)	Rx (MHz)	LTE	5G NR
PCS (1900)	1850 - 1910	1930 - 1990	B2	n2
AWS	1710 - 1755	2110 - 2155	B4	-
Cell (850)	824 - 849	869 - 894	B5	n5



IMT-E	2500 – 2570	2620 – 2690	B7	n7
700 lower A–C	699 – 716	729 – 746	B12	n12
Upper SMH	777 – 787	746 – 756	B13	n13
Upper SMH	788 – 798	758 – 768	B14	n14
PCS + G	1850 - 1915	1930 - 1995	B25	n25
Extended Cellular	814 – 849	859 – 894	B26	n26
WCS	2305 – 2315	2350 – 2360	B30	n30
IMT-E	2570 – 2620		B38	n38
BRS (US)	2496 - 2690		B41	n41
BRS	3400 – 3600		B42	-
C-Band	3600 – 3800		B43	-
CBRS (US)	3550 - 3700		B48	n48
Extended AWS	1710 - 1780	2110 - 2200	B66	n66
Digital Dividend (US)	663 - 698	617 - 652	B71	n71
C-Band	3300 - 4200		-	n77
C-Band	3300 – 3800		-	n78

2.4 Transmitting Power

The transmitting power for each band of the LCC module as shown in the following table:

Table 2-3 LTE FDD

Mode	Band	Typical Value (dBm)	Note
LTE FDD	Band 2	23	±2
	Band 4	23	±2
	Band 5	23	±2
	Band 7	23	±2
	Band 12	23	±2
	Band 13	23	±2
	Band 14	23	±2
	Band 25	23	±2
	Band 26	23	±2



	Band 30	23	±2
	Band 66	23	±2
	Band 71	23	±2

Table 2-4 LTE TDD

Mode	Band	Typical Value (dBm)	Note
LTE TDD	Band 38	23	±2
	Band 41	26	±2
	Band 42	23	±2
	Band 43	23	±2
	Band 48	23	+1-2



Table 2-5 NR-FR1 FDD

Mode	Band	Typical Value (dBm)	Note
NR-FR1 FDD	n2	23	±2
	n5	23	±2
	n7	23	±2
	n12	23	±2
	n13	23	±2
	n14	23	±2
	n25	23	±2
	n26	23	±2
	n30	23	±2
	n66	23	±2
	n71	23	±2

Table 2-6 NR-FR1 TDD

Mode	Band	Typical Value (dBm)	Note
NR-FR1 TDD	n38	23	±2
	n41	23	±2
	n48	23	+1-2
	n77	23	±2
	n78	23	±2

 Note

If device is operated in EN-DC mode, total TX power would be “LTE + NR $\cong$ 23 ± 2” due to power sharing algorithm.



2.5 RF Antenna Interface

The LCC module provides three antenna pads (as shown below) for connecting the external antennas.

The RF pad difference is the most important difference between LCC modules; please refer to 29 mm x 32 mm LCC Module Hardware Migration Guide.

Route the antenna pad as close as possible to antenna connector. In addition, the impedance of RF signal traces must be 50 Ω .

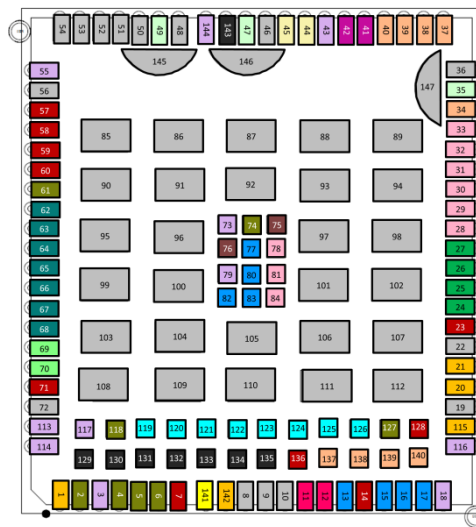


Table 2-7 Definition of the antenna port mapping

Band	Frequency	ANT_MAIN	ANT_DIV	ANT_GNSS
LB	617-960MHz	TRX	DRx	
MHB	1427-2690MHz	TRX	DRx	
n77/n78	3300-4200MHz	TRX	DRx	
GPS L1	1559-1607MHz			Rx
GPS L5	1166~1186MHz			Rx

Supported air Interfaces for each of band groups are listed in the following Table 2-8:

Table 2-8

Band Group	Fmin (MHz)	Fmax (MHz)	Air Interface
LB	600	960	LTE FDD: B5/12/13/14/26/71 5G NR FR1 FDD: n5/12/13/14/26/71
MB	1710	2170	LTE FDD: B2/4/25/66 5G NR FR1 FDD: n2/25/66
HB	2300	2690	LTE TDD: B7/30/38/41 5G NR FR1 TDD: n7/30/38/41



UHB	3300	4200	LTE TDD: B48 5G NR FR1 TDD: n48/77/78
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For the PCB designed by the user, the impedance of all the RF signal tracks must be $50\ \Omega$. Generally, the impedance depends on the medium factor, track width, and distance from the floor.

In order to reflect the rules of design, the following figures indicate the complete structure of the microstrip and stripline with an impedance of $50\ \Omega$ as well as the reference design for stack.

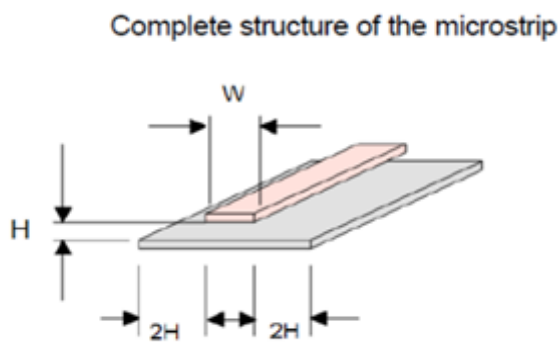


Figure 2-1 Complete structure of the microstrip

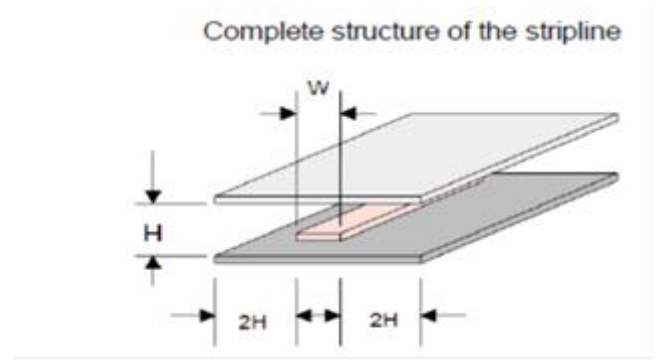


Figure 2-2 Complete structure of the stripline

Please use impedance simulation tool to calculate RF MAIN pad impedance. The RF MAIN pad dimension of LCC module is $\Phi\ 0.8\text{mm}$. You can get the impedance with lower than $50\ \Omega$ calculated by the impedance simulation tool. Since the target impedance is $50\ \Omega$ for RF trace, the recommended solution is that to carve out the copper area of the second layer that projected by the RF MAIN pad at top layer. How many layers should be carved out depend on the PCB permittivity, track width, and distance from the floor of your own PCB. Our target is to make the RF MAIN pad impedance as closer to $50\ \Omega$ as possible.

2.6 Receiver Sensitivity

The receiver sensitivity for each band of the 5G LCC Module as shown in the following table:

Table 2-9 LTE band

Mode (10MHz)	Band	Single Port (Typ.)		Combined Port	
		PRx	DRx	2Rx	3GPP spec
	B2	-98	-98	-101	-95
	B4	-96	-99	-102	-97
	B5	-99	-99	-102	-95



	B7	-97	-97	-100	-95
	B12	-99	-99	-102	-94
	B13	-99	-99	-102	-94
	B14	-99	-99	-102	-94
	B25	-98	-98	-101	-93.5
	B26	-99	-99	-102	-94.5
	B30	-97	-97	-100	-96
	B38	-97	-97	-100	-97
	B41	-97	-97	-100	-95
	B42	-99	-99	-102	-96
	B43	-98	-98	-101	-96
	B48	-98	-98	-101	-96
	B66	-98	-98	-101	-96.5
	B71	-99	-99	-102	-94.2

Table 2-10 NR band

Mode	Band	Single Port		Combined Port	
FDD 10MHZ,15K TDD (n41,n48,n77,n78 20MHZ,30K)		PRx	DRx	2Rx	3GPP spec
NR	n2	-98	-98	-101	-94.8
	n5	-99	-99	-102	-94.8
	n7	-97	-97	-100	-94.8
	n12	-99	-99	-102	-93.8
	n13	-99	-99	-102	-93.8
	n14	-99	-99	-102	-93.8
	n25	-98	-98	-101	-93.3
	n26	-99	-99	-102	-94.5
	n30	-97	-97	-100	-95.8
	n38	-97	-97	-100	-97.1
	n41	-97	-97	-100	-95.1
	n48	-98	-98	-101	-96.1
	n66	-98	-98	-101	-96.3
	n71	-99	-99	-102	-94
	n77	-98	-98	-101	-95.6
	n78	-98	-98	-101	-96.1



Note

The above values are measured in one antenna situation.



3. Application Interface

3.1 LCC Interface

The CXC-N3 module uses a 147-pin LCC as its external interface.

3.1.1 Pin Map

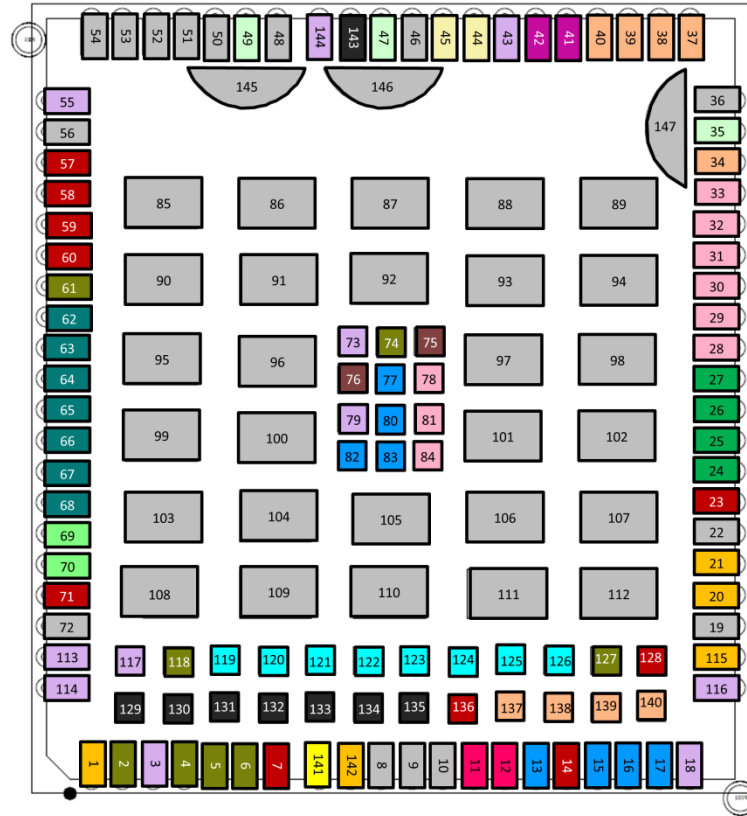


Figure 3-1 PAD Sequence of LCC module (Perspective View from TOP Side)

3.1.2 Pin Definition

The pin definition is as follows Table 3-1

Table 3-1 pin definition

Pin NO.	Pin Name	I/O	Pin Description	Type(V)
1	WAKEUP_IN	DI	Sleep mode control	1.8V
2	AP_READY	DI	Application processor sleep state detection	1.8V
3	*WAKEUP_OUT_N	DIO	GPIO function	1.8V
4	W_DISABLE#	DI	Airplane mode control	1.8V
5	NET_MODE	DO	Indicate the module's network registration mode	1.8V
6	NET_STATUS	DO	Indicate the module's network activity status	1.8V
7	VDD_EXT	PO	Provide 1.8 V for external circuit	1.8V
11	DBG_RXD	DI	Debug UART receive	1.8V
12	DBG_TXD	DO	Debug UART transmit	1.8V



13	USIM_PRESENCE	DI	(U)SIM card hot plug detects (Internal pull high)	1.8V
14	USIM_VDD	PO	(U)SIM card power supply	1.8V/3V
15	USIM_DATA	DIO	(U)SIM card data	1.8V/3V
16	USIM_CLK	DO	(U)SIM card clock	1.8V/3V
17	USIM_RST	DO	(U)SIM card reset	1.8V/3V
18	*GRFC15_Bkp_for_n79_Tx_EN	DIO	GPIO function	1.8V
20	RESET_N	DI	Reset the module	1.8V
21	CBL_PWR_N		Initiate the power-on sequence when grounded.	1.8V
23	VREG_S2_1P224	PO	Power supply for WiFi part	1.28V
24	PCM_IN	DI	PCM data input	1.8V
25	PCM_OUT	DO	PCM data output	1.8V
26	PCM_SYNC	DIO	PCM frame sync	1.8V
27	PCM_CLK	DIO	PCM clock	1.8V
28	PCIE_TX_P	O	PCIE TX Differential signals Positive	
29	PCIE_TX_M	O	PCIE TX Differential signals Negative	
30	PCIE_RX_P	I	PCIE RX Differential signals Positive	
31	PCIE_RX_M	I	PCIE RX Differential signals Negative	
32	PCIE_REFCLK_P	I	PCIE Reference Clock signal Positive	
33	PCIE_REFCLK_N	I	PCIE Reference Clock signal Negative	
34	WLAN_EN	DO	WLAN function enable	1.8V
35	ANT_DIV	AI	Diversity antenna interface	-
37	BT_RTS	DI	DTE request to send signal from DCE	1.8V
38	BT_TXD	DO	Bluetooth UART transmit	1.8V
39	BT_RXD	DI	Bluetooth UART receive	1.8V
40	BT_CTS	DO	DTE clear to send signal from DCE	1.8V
41	I2C_SCL	OD	I2C serial clk. (for external codec)	Internal pull up 1.8V
42	I2C_SDA	OD	I2C serial data. (for external codec)	Internal pull up 1.8V
43	*WCN_SW_CTRL	DIO	GPIO function	1.8V
44	ADC1	AI	General-purpose ADC interface	0.3~VBAT_BB
45	ADC0	AI	General-purpose ADC interface	0.3~VBAT_BB
47	ANT_GNSS	AI	GNSS antenna interface	-
49	ANT_MAIN	AIO	Main antenna interface	-
55	*QCA_INTN_WOL	DIO	GPIO function	1.8V
57	VBAT_RF	PI	Power supply for module's RF part	3.8V
58	VBAT_RF	PI	Power supply for module's RF part	3.8V
59	VBAT_BB	PI	Power supply for module's baseband part	3.8V
60	VBAT_BB	PI	Power supply for module's baseband part	3.8V
61	STATUS	DO	Indicate the module's operation status	
62	*RI	DI	GPIO function	1.8V
63	*DCD	DI	GPIO function	1.8V
64	CTS	DIO	SPI MISO	1.8V
65	RTS	DI	SPI MOSI	1.8V
66	*DTR	DI	GPIO function	1.8V
67	TXD	DIO	SPI CLK	1.8V



68	RXD	DIO	SPI CS	1.8V
69	USB_DP	AIO	USB differential data (+)	
70	USB_DM	AIO	USB differential data (-)	
71	USB_VBUS	PI	USB connection detection	5V
73	*GRFC14_PA_MUTE	DIO	GPIO function	1.8V
74	CLK2_WCN	DIO	WCN clock	
75	RFFE6_CLK	O	MIPI Interface for Tunable ANT, RFFE1 clock, Open Drain output.	1.8V
76	RFFE6_DATA	O	MIPI Interface for Tunable ANT, RFFE1 data, Open Drain output.	1.8V
77	UIM2_PRESENCE	DI	(U)SIM2 card hot plug detect	1.8V
78	PCIE_WAKE_M	OD	PCIE WAKE#. Open Drain design. Active Low	1.8V
79	GPIO_89	DIO	GPIO function	1.8V
80	UIM2_CLK	DO	(U)SIM2 card clock	1.8V/3V
81	PCIE_RST_M	I	PCIE -Reset is a functional reset to the card. Active low	1.8V
82	UIM2_RESET	DO	(U)SIM2 card reset	1.8V/3V
83	UIM2_DATA	DIO	(U)SIM2 card data	1.8V/3V
84	PCIE_CLK_REQ_M	OD	Clock Request is a reference clock .Open Drain design . Active Low.	1.8V
113	GPIO_16	DIO	1.GPIO function 2. I2S WS for BT	1.8V
114	GPIO_17	DO	1.GPIO function 2. I2S DATA0 for BT	1.8V
115	USB_BOOT	DI		
116	*CDC_I2S_MCLK	DIO	GPIO function	1.8V
117	GPIO_93	DIO	GPIO function	1.8V
118	WLAN_SLP_CLK	DO	WLAN sleep clock	1.8V
119	EPHY_RST_N	DO	Ethernet PHY reset	1.8V
120	EPHY_INT_N	DI	Ethernet PHY interrupt	1.8V
121	SGMII_MDATA	DIO	SGMII MDIO data	1.8V
122	SGMII_MCLK	DO	SGMII MDIO clock	1.8V
123	SGMII_TX_M	AO	SGMII transmit Negative	
124	SGMII_TX_P	AO	SGMII transmit Positive	
125	SGMII_RX_P	AI	SGMII receive Positive	
126	SGMII_RX_M	AI	SGMII receive Negative	
127	PM_ENABLE	DI	WLAN power control	1.8V
128	USIM2_VDD	PO	(U)SIM 2 card power supply	1.8V/3V
129	NC		NC	
130	NC		NC	
131	NC		NC	
132	NC		NC	
133	NC		NC	
134	NC		NC	
135	NC		NC	
136	VREG_S4_1P8	PO	Power supply for WiFi part	1.8V
137	COEX_UART_RX	DI	LTE/WLAN & Bluetooth coexistence receive	1.8V
138	COEX_UART_TX	DO	LTE/WLAN & Bluetooth coexistence transmit	1.8V
139	BT_EN	DO	Bluetooth function enable	1.8V
140	WAKE_ON_WIRELESS	DO	WLAN wake up the module	1.8V



141	ISINK1	O	System status LED control pin	Support 8.5mA
142	PWRKEY	DI	Turn on/off the module	
143	NC		NC	
144	GPIO_88	DIO	GPIO function	1.8V
85~112	PAD GND		PAD GND	GND
8~10,19,22,36,46, 48,50~54,56,72,145~147	GND		GND	GND

AI : Analog input
AO : Analog output
B : Bidirectional digital with CMOS input
PD: Pull-Down
PU: Pull-Up
T: Tristate
OD: Open Drain
PP: Push-Pull
PI: Power Input
PO: Power Output
Z: High-impedance (Hi-Z) output

 Note

The unused pins can be left floating

- **P** indicates power pins; **I** indicate pins for digital signal input; **O** indicates pins for digital signal output; **PO** indicates power output pins; **PI** indicates power input pins.
- **VIL** indicates Low-level Input voltage; **VIH** indicates High-level Input voltage; **VOL** indicates Low-level Output voltage; **VOH** indicates High-level Output voltage.
- The **NC** pins are not connected, therefore, before you deal with these pins; please refer to the corresponding hardware guide.
- The **Reserved** pins are internally connected to the module. Therefore, these pins should not be used, otherwise they may cause problems. Please contact with us for more details about this information.
- “*” is follow Pin Description design



4. FCC Notice

Model: CMC-N3

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.

2. List of applicable FCC rules: 47 CFR Part 22/24/27/90/96

3. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b). 3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations 4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

4. Note EMI Consideration: KDB 996369 D04 Module Integration Guide has been considered as “best practice” for RF design engineering testing and evaluation of non-linear interactions which can generate additional non-compliant limits due to module placement to host components or properties.

5. How to make changes: Only Grantees are permitted to make permissive changes. Please contact us if the host integrator expects the module to be used differently than as granted:

Compal Electronics Inc

Miranda Wu

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Antenna Installation

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users.
- (2) The transmitter module may not be co-located with any other transmitter or antenna.
- (3) To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile exposure condition must not exceed:

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.

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.

Module Warning statements

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
- (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.

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.

RF Exposure

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure. The antenna(s) used for this transmitter should be installed and operated with minimum distance 20 cm between the radiator & your body.

Label requirements

Any device incorporating this module must include an external, visible, permanent marking or label which states:

“Contains FCC ID: GKRCXCN3”

Radiation Exposure Statement

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

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC/IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

OEM integrators must identify all possible combinations of simultaneous transmission configuration for all transmitters and antennas installed in the host platform. When there are multiple transmitting devices installed in a host platform, an RF exposure evaluation for the simultaneous transmission condition must be performed.



Max. allowable antenna gain

Bands	Freq.	Monopole
	Uplink(MHz)	Gain(dBi)
B71 / n71	663~698	8.4
B12 / n12	698~716	8.6
B13/n13	777~787	9.1
B14/n14	788~798	9.2
B30/n30	2305~2315	-1.0
B26/n26	814~849	9.4
B5 / n5	824~849	9.4
B4	1710~1755	5
B66 / n66	1710~1780	5
B2 / n2	1850~1910	8
B25 / n25	1850~1915	8
B41/n41(HPUE)	2496~2690	5
B7 / n7	2500~2570	8
B38 / n38	2570~2620	5
n78 Part 27O	3700~3800	5
n78 Part 27Q	3450~3550	5
n77 Part 27O	3700~3980	5
n77 Part 27Q	3450~3550	5
B42 CBRS	3550~ 3600	-2
B42	3400 ~ 3550	5
B48	3550~3700	-1
n48	3550~3700	-1



B43 CBRS	3600~3700	-2
B43	3700~3800	5