BC66-NA&BC66

Difference Introduction

NB-IoT Module Series

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About the Document

Revision History

Version	Date	Author	Description
1.0	2020-04-09	Speed SUN/ Lewis SHEN/ Jacobi RAO	Initial

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1 Introduction

This document mainly introduces the major differences between Quectel LTE Cat NB2 module BC66-NA and Quectel LTE Cat NB1 module BC66, in terms of both hardware and software designs.

2 Hardware Comparison

2.1. Pin Assignment

BC66-NA is pin-to-pin compatible with BC66, and they share the same pin assignment and pin definitions. For more detailed pin definition and pin description, please refer to BC66-NA/BC66 hardware design manuals.

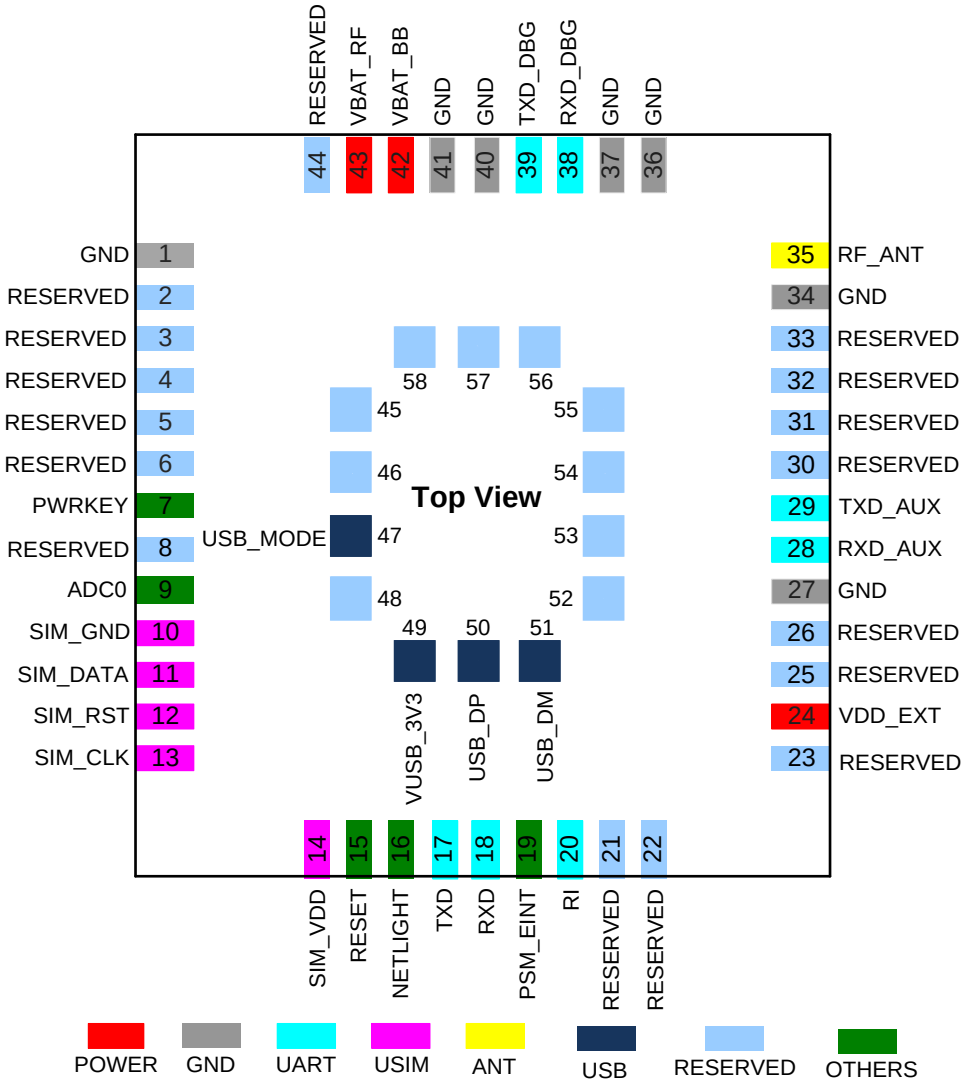

Figure 1: BC66-NA/BC66 Pin Assignment

2.2. RF Features

As compared with Quectel LTE Cat NB1 module BC66, Quectel LTE Cat NB2 module BC66-NA additionally supports Band 71 and Band 85.

Table 1: RF Features Comparison

Feature	Details
Frequency Bands	● **BC66-NA:** **LTE Cat NB2:** B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26*/B28/B66/B71/B85 ● **BC66:** **LTE Cat NB1:** B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26*/B28/B66
Data Transmission Features	● **BC66-NA:** Single-tone: Max. 103 kbps (DL)/18 kbps (UL) Multi-tone: Max. 103 kbps (DL)/151 kbps (UL) ● **BC66:** Single-tone: Max. 25.5 kbps (DL)/16.7 kbps (UL) Multi-tone: Max. 25.5 kbps (DL)/62.5 kbps (UL)

NOTE

"*" means under development.

2.3. Current Consumption

The current consumption values of BC66-NA and BC66 are provided in the tables below.

Table 2: BC66-NA Module Current Consumption

Power OFF (AT+QPOWD=0)					
AP Mode	**Modem Mode**	**Min.**	**Typ.**	**Max.**	**Unit**
/	/		2.7		µA
Deep Sleep					

AP Mode	Modem Mode		Min.	Typ.	Max.	Unit
Idle	PSM			3.5		μA
Light Sleep						
AP Mode	**Modem Mode**		**Min.**	**Typ.**	**Max.**	**Unit**
Idle	@ eDRX = 81.92 s, PTW = 40.96 s			130		μA
	@ DRX = 1.28 s			520		μA
	@ DRX = 2.56 s			250		μA
Active [1)]						
AP Mode	**Modem Mode**		**Min.**	**Typ.**	**Max.**	**Unit**
Normal	Connected @ Single-tone (15 kHz subcarrier spacing)	B1 @ 23 dBm		95	265	mA
		B2 @ 23 dBm		95	265	mA
		B3 @ 23 dBm		100	280	mA
		B4 @ 23 dBm		100	280	mA
		B5 @ 23 dBm		95	270	mA
		B8 @ 23 dBm		100	290	mA
		B12 @ 23 dBm		85	240	mA
		B13 @ 23 dBm		90	250	mA
		B17 @ 23 dBm		85	240	mA
		B18 @ 23 dBm		95	270	mA
		B19 @ 23 dBm		95	270	mA
		B20 @ 23 dBm		95	270	mA
		B25 @ 23 dBm		95	270	mA
		B26* @ 23 dBm		TBD	TBD	mA
		B28 @ 23 dBm		85	240	mA
		B66 @ 23 dBm		100	280	mA

		B71 @ 23 dBm	85	240	mA
		B85 @ 23 dBm	85	235	mA
Normal	Connected @ Single-tone (3.75 kHz subcarrier spacing)	B1 @ 23 dBm	210	270	mA
		B2 @ 23 dBm	205	270	mA
		B3 @ 23 dBm	210	280	mA
		B4 @ 23 dBm	215	280	mA
		B5 @ 23 dBm	200	280	mA
		B8 @ 23 dBm	220	290	mA
		B12 @ 23 dBm	180	230	mA
		B13 @ 23 dBm	190	250	mA
		B17 @ 23 dBm	180	240	mA
		B18 @ 23 dBm	195	260	mA
		B19 @ 23 dBm	205	270	mA
		B20 @ 23 dBm	205	270	mA
		B25 @ 23 dBm	205	270	mA
		B26* @ 23 dBm	TBD	TBD	mA
		B28 @ 23 dBm	185	240	mA
		B66 @ 23 dBm	215	280	mA
		B71 @ 23 dBm	180	240	mA
		B85 @ 23 dBm	180	240	mA

Table 3: BC66 Module Current Consumption

Power OFF (AT+QPOWD=0)					
AP Mode	**Modem Mode**	**Min.**	**Typ.**	**Max.**	**Unit**
/	/		2.7		µA

Deep Sleep						
AP Mode	**Modem Mode**		**Min.**	**Typ.**	**Max.**	**Unit**
Idle	PSM			3.5		μA
Light Sleep						
AP Mode	**Modem Mode**		**Min.**	**Typ.**	**Max.**	**Unit**
Idle	@ eDRX = 81.92 s, PTW = 40.96 s			288		μA
	@ DRX = 1.28 s			541		μA
	@ DRX = 2.56 s			434		μA
Active [1]						
AP Mode	**Modem Mode**		**Min.**	**Typ.**	**Max.** [2]	**Unit**
Normal	Connected @ Single-tone (15 kHz subcarrier spacing)	B1 @ 23 dBm		100	285	mA
		B2 @ 23 dBm		103	294	mA
		B3 @ 23 dBm		107	308	mA
		B4 @ 23 dBm		107	307	mA
		B5 @ 23 dBm		107	303	mA
		B8 @ 23 dBm		113	325	mA
		B12 @ 23 dBm		134	393	mA
		B13 @ 23 dBm		111	319	mA
		B17 @ 23 dBm		133	392	mA
		B18 @ 23 dBm		110	316	mA
		B19 @ 23 dBm		109	311	mA
		B20 @ 23 dBm		109	301	mA
		B25 @ 23 dBm		103	293	mA
		B26* @ TBD		TBD	TBD	mA
		B28 @ 23 dBm		128	375	mA

		B66 @ 23 dBm	109	312	mA
	Connected @ Single-tone (3.75 kHz subcarrier spacing)	B1 @ 23 dBm	193	302	mA
		B2 @ 23 dBm	187	296	mA
		B3 @ 23 dBm	215	335	mA
		B4 @ 23 dBm	237	311	mA
		B5 @ 23 dBm	215	330	mA
		B8 @ 23 dBm	224	344	mA
		B12 @ 23 dBm	250	395	mA
		B13 @ 23 dBm	203	316	mA
		B17 @ 23 dBm	258	409	mA
		B18 @ 23 dBm	198	313	mA
		B19 @ 23 dBm	198	314	mA
		B20 @ 23 dBm	215	329	mA
		B25 @ 23 dBm	187	297	mA
		B26* @ TBD	TBD	TBD	mA
		B28 @ 23 dBm	250	398	mA
		B66 @ 23 dBm	200	316	mA

NOTES

1. [1)] Power consumption under instrument test condition.
2. [2)] The “maximum value” in “Active” mode refers to the maximum pulse current during RF emission.
3. “*” means under development.

3 Software Comparison

This chapter introduces the software differences between BC66-NA and BC66 based on firmware versions listed below.

3.1. Chipset

Table 4: Chipset Comparison

Module	Chipset	Firmware	Supported Bands
BC66-NA	MTK2625DP	BC66NADAR01Axx	B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26*/B28/B66/B71/B85
BC66	MTK2625DA	BC66NBR01Axx	B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26*/B28/B66

NOTE

"*" means under development.

3.2. Modem Capability

BC66 only supports 3GPP Rel-13, while BC66-NA supports 3GPP Rel-14 which additionally provides features listed below:

- Two HARQ process in UL/DL
- Support for maximum UL/DL TBS of 2536 bits (Cat NB2)
- RRC re-establishment for CP data
- ECID positioning and OTDOA positioning
- Non-anchor carrier enhancements for random access and paging

Due to the inaccessibility of practical test environments, none of the above features have been tested in detail.

4 Appendix A References

Table 5: Related Documents

SN	Document Name	Remark
[1]	Quectel_BC66-NA_Hardware_Design	BC66-NA hardware design manual
[2]	Quectel_BC66_Hardware_Design	BC66 hardware design manual
[3]	Quectel_BC66&BC66-NA_AT_Commands_Manual	BC66-NA/BC66 AT commands manual

Table 6: Terms and Abbreviations

Abbreviation	Description
CP	Control Plane
DL	Downlink
DRX	Discontinuous Reception
ECID	Enhanced Cell Identity (a positioning method)
eDRX	extended Discontinuous Reception
HARQ	Hybrid ARQ (Automatic Repeat Request)
LTE	Long Term Evolution
NB-IoT	Narrowband Internet of Things
OTDOA	Observed Time Difference Of Arrival (a positioning method)
PSM	Power Saving Mode
PTW	Paging Time Window
RF	Radio Frequency

RRC	Radio Resource Control
TBS	Transport Block Size
UL	Uplink