

Jio NB-IOT NIC card Integration Document

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Scope

Integrating end-user sensor device with JIO NB IOT network using NIC.

Integration and Test Activities

1. Make device connection to JIO NIC
 - a. Connect Modem/NIC Card to controller following pin mapping provided.
 - i. NIC VCC-> 3.7V ~ 4.1V
 - ii. NIC GND -> Device GND
 - iii. NIC Rx -> Device TX
 - iv. NIC Tx -> Device RX
 - b. Result: Power indicator on NB-IOT Modem is active and serial interface is ready to check the AT commands.
2. Set serial interface
 - a. Serial interface was configured with the following parameters
 - i. Baud Rate: 115200
 - ii. Data Bits: 8
 - iii. Parity: None
 - b. Result: Serial interface configured to interface with the Modem.
3. Check AT commands
 - a. Sent Command: AT
 - i. Expected Response: OK
 - ii. Received Response: OK
 - b. Sent Command: AT+SYSINFO?
 - i. Expected Response: +SYSINFO: JNM1260,01,311,0102
 - ii. Received Response: +SYSINFO: JNM2550,MT2625_MODULE_20190,200.00.03,JUS_V_010007_02082021
 - c. Sent Command: AT+NWKINFO?
 - i. Expected Response: +NWKINFO:1,-120,34,52,1627915953
 - ii. Received Response:
 - d. Sent Command: AT+RAWPUB=alerts,IIITH,user data
 - i. Expected Response: +RAWPUB: SENT
 - ii. Received Response: +RAWPUB: SENT

Result: All AT commands transmitted were acknowledged with the right response.
4. Transmit data: send data every 15 minutes of Interval
 - a. Result: Data is transmitted at the end of 15min cycle
 - i. Sample Data: AT+RAWPUB=alerts,IIITH,test data
 - ii. Sample Response: +OK+RAWPUB: ALREADY CONN+RAWPUB: SENT
5. Check signal strength
 - a. Signal at the Office: (RSRP,RSRQ,SNR:)
 - b. Signal at Urban Location1: (RSRP,RSRQ,SNR: -115dBm,-10dB,0dB)
 - c. Signal at Urban Location2: (RSRP,RSRQ,SNR: -133dBm,-18dB,-7dB)
 - d. Signal at Rural Location: (RSRP,RSRQ,SNR: -102dBm,-7dB,4dB)
 - e. Notation
 - i. RSRP: Signal Power (dBm)
 - ii. RSRQ: Signal Quality (dB)

- iii. SNR: Signal to Noise Ratio (dB)
- iv. Signal Quality Chart

		RSRP (dBm)	RSRQ (dB)	SINR (dB)
RF Conditions	Excellent	>=-80	>=-10	>=20
	Good	-80 to -90	-10 to -15	13 to 20
	Mid Cell	-90 to -100	-15 to -20	0 to 13
	Cell Edge	<=-100	<-20	<=0

- 6. Check data transmission in low signal areas
 - a. Data Transmission in Low Signal Areas: 15-20% retransmission observed when used in areas with low signal strength
- 7. Response Timeout:
 - a. Response is received in 5seconds in ideal cases.
 - b. The response can take a long time before timing out in areas with poor or no signal.

Serial Test Logs

- 1. Data transfer test

```

2021-11-01 11:00:20 --> AT
2021-11-01 11:00:21 --> OK
2021-11-01 11:00:35 --> AT+NWKINFO?
2021-11-01 11:00:36 --> +NWKINFO:1,-128,-13,-3,1635744636
2021-11-01 11:02:47 --> AT+SYSINFO?
2021-11-01 11:02:48 -->
+SYSINFO:JNM2550,MT2625_MODULE_20190,200.00.04,JUS_V_010008_25082021
2021-11-01 11:03:01 --> AT+RAWPUB=alerts,IITH,user data
2021-11-01 11:03:02 --> +OK
2021-11-01 11:03:02 --> +RAWPUB: ALREADY CONN
2021-11-01 11:03:34 --> +RAWPUB: SENT
2021-11-01 11:03:35 --> +RAWPUB: DISCONN
2021-11-01 11:03:36 --> +RAWPUB: CONN
  
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