

## **Sub 1-Ghz Narrowband Transceiver**

### **USER GUIDE**

**TABLE OF CONTENTS**

TABLE OF CONTENTS.....2  
SUB 1-GHZ NARROWBAND TRANSCIEVER MODUKLE USE AND PIN DEFINITIONS.....3  
PIN DESCRIPTION.....3  
ELECTRICAL SPECIFICATIONS.....4  
BLOCK DIAGRAM.....5  
FCC & IC STATEMENTS.....6  
RF EXPOPSURE INFORMATION.....7

## SUB 1-GHZ NARROWBAND TRANSCIEVER USE AND PIN DEFINITIONS

The Sub 1-Ghz Narrowband Transceiver RF module is a radio chip transceiver designed for high performance at very low-power and very-low voltage that uses the Texas Instrument's cc1120 System -on-a-chip.

The device can be powered directly using 2.0-3.6 V supplied to the VIN signal listed in Table 1.

In order to use the Sub 1-Ghz Narrowband Transceiver, It is important to use the module pins in your application as they are designated in the table below.

To design, develop and program the device you will need to use host board to communicate RF module via spi protocol.

For detailed Information regarding cc1120, please visit the Texas Instrument website and navigate to the cc1120 product page.

### PIN DESCRIPTION

Table 1 Sub 1-Ghz Narrowband Transceiver Pinout:

| PIN | NAME   | TYPE          | DESCRIPTION                            |
|-----|--------|---------------|--|
| 1   | GND    | Ground pad    | Ground connection                      |
| 2   | RESET  | Digital Input | Asynchronous, Active-low digital reset |
| 3   | RF CSN | Digital Input | Active-low chip select                 |
| 4   | GPIO2  | Digital I/O   | General purpose I/O                    |
| 5   | MOSI   | Digital I/O   | Master-out slave-in                    |
| 6   | SCLK   | Data Input    | Serial data clock                      |
| 7   | MISO   | Data I/O      | Master-in slave-out                    |
| 8   | GPIO0  | Digital I/O   | General purpose I/O                    |
| 9   | GPIO3  | Digital I/O   | General purpose I/O                    |
| 10  | VIN    | Power         | Input Voltage supply                   |
| 11  | SCL    | Analog        | Clock synchronization                  |
| 12  | SDA    | Data I/O      | Serial data                            |

All digital I/O signals use logic based on the supply voltage. If the external circuitry does not support this logic level , then level shifters MUST be used.

## ELECTRICAL SPECIFICATIONS

### Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

| Parameter                             | Min  | Max     | Unit |
|---------------------------------------|------|---------|------|
| Supply Voltage (VDD, AVDD_X)          | -0.3 | 3.9     | V    |
| Input RF level                        |      | +10     | dBm  |
| Voltage on any digital pin            | -0.3 | VDD+0.3 | V    |
| Voltage on analog pins                | -0.3 | 2.0     | V    |
| Storage temperature, T <sub>stg</sub> | -40  | 125     | °C   |

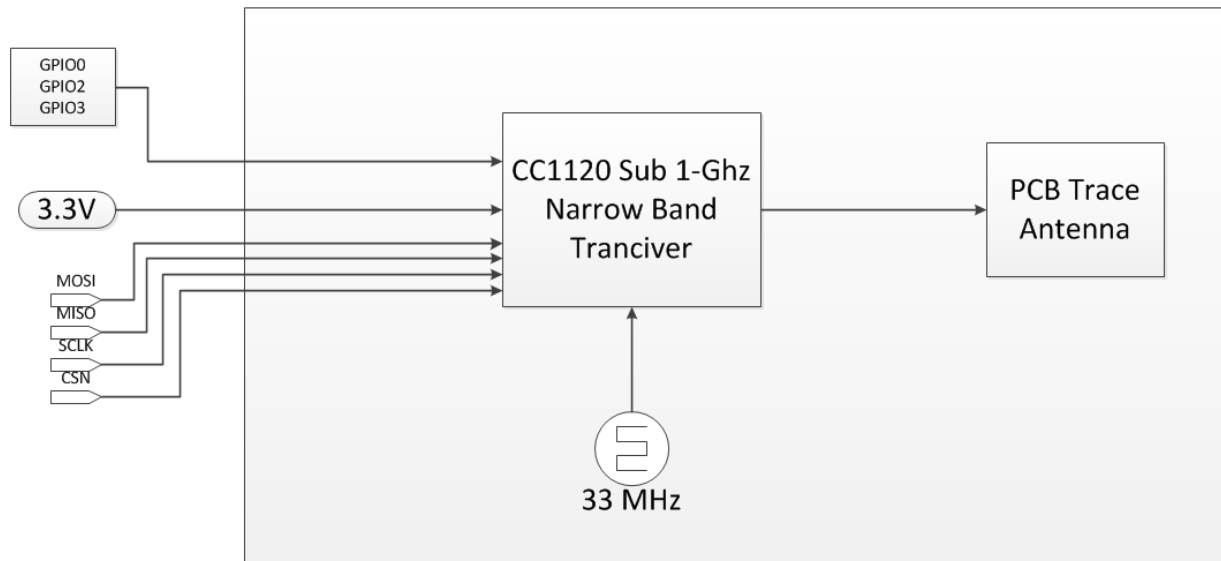
### General Characteristics

Table 3 General RF Characteristics

| Parameters           | Min | TYPE             | Max | Unit |
|----------------------|-----|------------------|-----|------|
| Frequency bands      | 903 |                  | 927 | MHz  |
| Frequency Resolution | 903 | 30               | 927 | Hz   |
| Data Rate            | 0   | Packet mode      | 200 | Kbps |
|                      | 0   | Transparent mode | 100 |      |
| Data rate step size  |     | 1e-4             |     | bps  |

## BLOCK DIAGRAM

FIGURE 1 BLOCK DIAGRAM



## IC & FCC Information to Users

IC: 20641-NRWRANGEX

*This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:*

- (1) This device may not cause interference; and*
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :*

- 1) l'appareil ne doit pas produire de brouillage;*
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

FCC ID: 2AFYY-NRWRANGEX

*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.*

*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.

*Changes or modifications made to this equipment not expressly approved by Embedded Sense Inc. could void the user's authority to operate the equipment.*

## OEM Labelling Requirements

**WARNING:** The Original Equipment Manufacturer (OEM) must ensure that FCC/IC labelling requirements are met. This includes a clearly visible label on the outside of the final product enclosure that displays the contents shown in the figure below.

Required FCC/IC Label for OEM products containing the Sub 1-GHz Narrowband Transceiver

*Contains FCC ID: 2AFYY-NRWRANGEX & IC: 20641-NRWRANGEX*

*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 interferences that may cause undesired operation*

**IMPORTANT:** OEMs must test final product to comply with unintentional radiators (FCC section 15.107 & 15.109, ICES-003) before declaring compliance of their final product to Part 15 of FCC Rules and ICES-003.