FEATURES

- +20dBm (100mW) Maximum Transmit Power FCC/IC
- +10dBm (10mW) Maximum Transmit Power CE/MIC
- Micro 27mm x 14mm x 10mm form factor
- Long range 1Km LoS @ +20dBm
- Worldwide 2.4GHz ISM band operation
- 250Kbps / 1Mbps / 2Mbps selectable data rate
- 79 Selectable RF channels
- Enhanced ShockBurst hardware accelerator
- Automatic Packet Handling
- Nordic Gazell Protocol Stack
- Low power modes (<2μA in sleep mode)
- 4KV HBM Ruggedized
- Nordic Radio plus PA/LNA
- SMT or right angle through-hole mounting
- -40C to +85C Operation
- 1.8v to 3.6v Operation
- RoHS Compliant
- FCC/IC/CE/MIC Certified

APPLICATIONS

- IoT
- JPEG
- M2M
- Long Range Monitoring
- Industrial Control
- Commercial Automation
- Lighting Control
- Asset Tracking

DESCRIPTION

Tango Sky is a low power, high over the air data rate, worldwide FCC/IC/CE/MIC certified 2.4GHz RF Module with a 100mW PA/LNA for extended range operations. Tango Sky is based on the Nordic nRF24L01+ radio incorporating an Enhanced ShockBurst™ hardware protocol accelerator which offloads time critical protocol functions from the application microcontroller enabling the implementation of advanced and robust wireless connectivity with low cost 3rd-party microcontrollers.

Tango can be used with the nRFgo SDK for easy code development. The nRFgo SDK is a fully featured Software Development Kit for Nordic nRF24L Series 2.4GHz RF System-on-Chips (SoCs). Used in conjunction with the nRFgo Starter Kit and nRFgo Studio, it contains everything needed for code development and debugging, including integration with Keil μVision™ IDE, a comprehensive library of hardware abstraction layers (HAL), Nordic Gazell 2.4GHz RF protocol stack, USB stack, and example applications.

The module brings out all the functional pins of the nRF24L01+ and PA for maximum usability and flexibility including:

- SPI Bus and Interrupt for Nordic nRF24L01+ control
- Power Amplifier software controlled TX, RX, Bypass and Sleep modes for complete PA control
- Power Amplifier automatic PA control via Nordic radio - No extra software required

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TANGO SKY PINOUT and PA TRUTH TABLE

MODULE PIN #	nRF24L01+ PIN #	PIN NAME	TYPE	DESCRIPTION
P1	7,15,18,19	VDD	POWER	1.8 - 3.6V power supply 3.3v Typical
P2	8,14,17,20	GND	POWER	GROUND
P3	1	CE	DIGITAL INPUT	CHIP ENABLE ACTIVATES TX or RX, +5.0v Max.
P4	2	CSN	DIGITAL INPUT	SPI CHIP SELECT (ACTIVE LOW) , +5.0v Max.
P5	3	SCK	DIGITAL INPUT	SPI SERIAL DATA CLOCK, +5.0v Max.
P6	4	MOSI	DIGITAL INPUT	SPI SLAVE DATA INPUT, +5.0v Max.
*P7	N/A	BYPASS	DIGITAL INPUT	BYPASS = 1 PA ON BYPASS = 0 PA is bypassed (See below for Truth Table)
P8	6	IRQ	DIGITAL OUTPUT	MASKABLE INTERRUPT (ACTIVE LOW)
P9	5	MISO	DIGITAL OUTPUT	SPI SLAVE DATA OUTPUT (TRISTATE OPTION)
P10	11	VDD_PA	POWER	For "auto PA control" CONNECT P10 to P11 then add 10K pullup to P12 SLEEP_N.
*P11	N/A	TXEN_RXEN_N	DIGITAL INPUT	POWER AMPLIFIER TRANSMIT = 1, RECEIVE = 0 (See below for Truth Table)
*P12	N/A	SLEEP_N	DIGITAL INPUT	POWER AMPLIFIER power OFF when = 0 (See below for Truth Table)
P13	8,14,17,20	GND	POWER	GROUND

*These PA/LNA signals have changed from the original Tango Module per Truth Table below

Description	SLEEP_N	BYPASS MODE	TXEN_RXEN_N
All off (sleep mode)	0	X	X
Receive LNA mode	1	0	0
Transmit linear mode	1	0	1
Receive bypass mode	1	1	0
Transmit bypass mode	1	1	1

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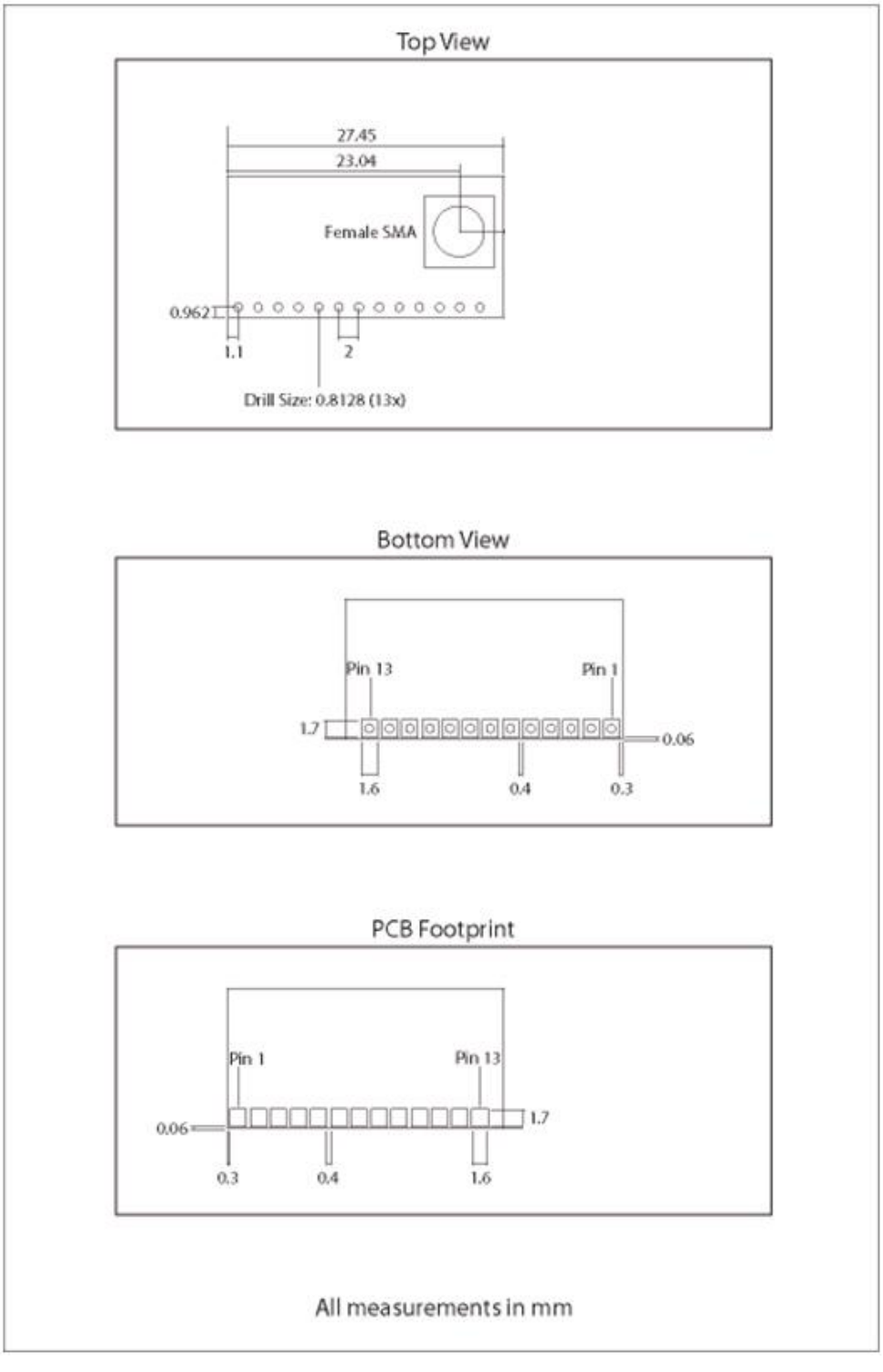
TANGO MODULE DIMENSIONS / PADS



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Tango Sky Ordering Information

MODULE	RF CONNECTOR
TCI-24SKY-RPSMA-RA TCI-24SKY-RPSMA-ST	Right Angle RP-SMA Straight RP-SMA

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FCC OPERATING NOTES

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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.**

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.

Antenna Type: Removable antenna
Antenna Gain: 2dBi

FCC RF Radiation Exposure Statement Caution: To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons.

Label and compliance information:

A host product shall use a physical label stating "Contains FCC ID: A7D-TCI-24SKY" and bear the following statement in a conspicuous location on the device. **"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."**

Limited Module Procedures: This transmitter can be installed in different end-use products (referred to as a host, host product, or host device) by the grantee or other equipment manufacturer, and each host is not required to obtain a separate certification for that specific transmitter module.

Information on test modes and additional testing requirements: This transmitter does not require any special pairing or test modes. Any receiver of the same module that is set to the same RF channel and data rate may receive the transmitted signal.

Additional testing, Part 15 Subpart B disclaimer
The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing (when it also contains unintentional-radiator digital circuitry) with the modular transmitter installed when contains digital circuitry.

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2.2 List of applicable FCC rules
The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant.

2.3 Summarize the specific operational use conditions
The modular transmitter is only FCC authorized for the specific antenna type such as the Pulse W1030 stick antenna with gain of 2.0dBi and RP SMA connector. There are no transmit power limits.

2.4 Limited module procedures
Not applicable. This is not a "limited module".

2.5 Trace antenna designs
Not applicable.

2.6 RF exposure considerations
There are no additional RF exposure limitations.

2.7 Antennas
The modular transmitter is only FCC authorized for the specific antenna type such as the Pulse W1030 stick antenna with gain of 2.0dBi and RP SMA connector. Antenna types having a gain greater than the maximum gain indicated for this type, are strictly prohibited for use in this device.

2.8 Label and compliance information
A host product shall use a physical label stating "Contains FCC ID: A7D-TCI-24SKY" and bear the following statement in a conspicuous location on the device. **"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."**

2.9 Information on test modes and additional testing requirements[5]
This transmitter does not require any special pairing or test modes. Any receiver of the same module that is set to the same RF channel and data rate may receive the transmitted signal.

2.10 Additional testing, Part 15 Subpart B disclaimer
The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing (when it also contains unintentional-radiator digital circuitry), with the modular transmitter installed when contains digital circuitry.

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Industry Canada OPERATING NOTES

This device contains licence-exempt transmitter(s)/receiver that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

L'émetteur/récepteur exempt de licencecontenu dans le présentappareilestconforme aux CNR d'Innovation, Sciences et Développementéconomique Canada applicables aux appareils radio exempts de licence. L'exploitationestautorisée aux deux conditions suivantes :

1) L'appareil ne doit pas produire de brouillage;
2) L'appareil doit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

Module (Category I) and host product labeling requirements:

The Host Marketing Name (HMN) shall be displayed according to the e-labeling requirements of RSS-GEN section 4.4 or indicated on the exterior of the host product or on the product packaging, or in the product literature, which shall be supplied with the host product or readily available online. The host product shall be properly labeled to identify the modules within the host product. The ISED certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labeled to display the ISED certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:

Contains IC: 10593A-TCI24SKY

For each certified module, the applicant shall provide the user with a host label as described above, or a description of the host product labeling requirements.

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European OPERATING NOTES

"Hereby, Talon Communications, Inc., declares that this radio module is in compliance with the essential requirements and other relevant provisions of 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: *www.taloncom.com/EU_Declaration.pdf*"

"The device meets RF exposure guidelines when used against the head or when positioned at least xx mm away from the body. When a carry case, belt clip or other form of device holder is used for body-worn operation, it should not contain metal and should provide at least the above stated separation distance from the body."

Transmitting frequency bands: 2.4GHz

Maximum allowed power: 10dBm

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Talon Communications, Inc. (TCI) does not assume any responsibility for the use of the described radio module ("the Module(s)"). TCI makes no representation with respect to the adequacy of the module in low-power wireless data communications applications or systems. Any Products using the Module must be designed so that a loss of communications due to radio interference or otherwise will not endanger either people or property, and will not cause the loss of valuable data. TCI assumes no liability for the performance of products which are designed or created using the Modules.

The Modules are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Module could create a situation where personal injury or death may occur. If you use the Modules for such unintended and unauthorized applications, you do so at your own risk and you shall indemnify and hold TCI and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that TCI was negligent regarding the design or manufacture of the Product.

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