

TWN4 MultiTech Nano Plus M

INTEGRATION MANUAL

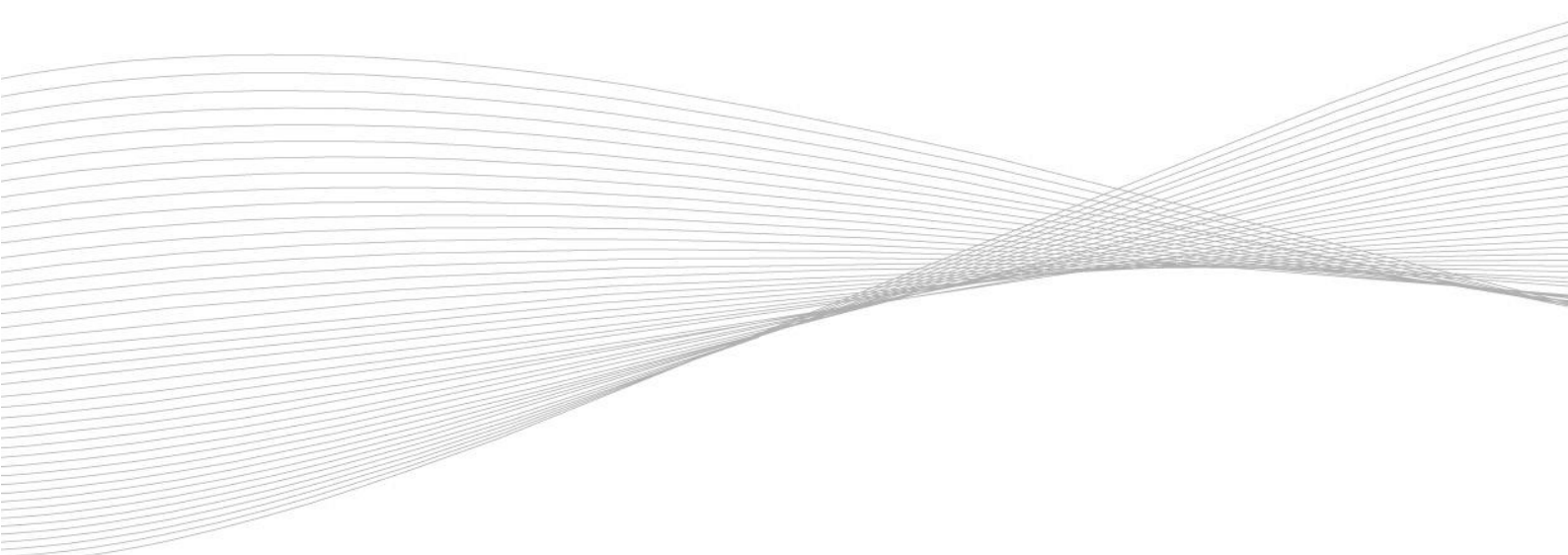


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1 INTRODUCTION

1.1 ABOUT THIS MANUAL

This integration manual explains how to integrate ELATEC RFID module TWN4 MultiTech Nano Plus M into a host device and is mainly intended for integrators and host manufacturers. Before installing the product, the integrators should read and understand the content of this manual and other relevant installation documents.

The content of this manual is subject to changes without prior notice and printed versions might be obsolete. Integrators and host manufacturers are required to use the latest version of this manual.

For the sake of better understanding and readability, this manual might contain exemplary pictures, drawings and other illustrations. Depending on your product configuration, these pictures might differ from the actual design of your product.

The original version of this manual has been written in English. Wherever the manual is available in another language, it is considered as a translation of the original document for information purposes only. In case of discrepancy, the original version in English will prevail.

1.2 ELATEC SUPPORT

In case of any technical questions or product malfunction, refer to the ELATEC website (www.elatec.com) or contact ELATEC technical support at **support-rfid@elatec.com**.

2 SAFETY INFORMATION

- Before unpacking and installing the product, this manual and all relevant installation instructions must be read carefully and understood.
- The product is an electronic device whose installation requires specific skills and expertise.
The installation of the product should be done by trained and qualified personnel only.
- Before installing the product into a host device, the integrator should make sure that he/she has read and understood the ELATEC technical documentation related to the product, as well as the technical documentation related to the host device. In particular, the instructions and safety information given in the user manual of the TWN4 MultiTech Nano family should be read carefully and listed in the technical documentation of the host manufacturer as well, as soon as these instructions and safety information are required for a safe and proper use of the host device containing TWN4 MultiTech Nano Plus M.
- ELATEC also recommends the integrators to follow general ESD protective measures during the installation of the product into a host device, e.g. the use of an antistatic wristband or special gloves.
- The product might show sharp edges or corners and requires a particular attention during the unpacking and installation.
Unpack the product carefully and do not touch any sharp edges or corners, or any sensitive components on the product.
If necessary, wear safety gloves.
- The integrator should not touch the antennas (if not shielded), printed circuit boards, connectors or other sensitive components on the product.
- Metallic materials on or in direct vicinity to the product might reduce the reading performance of the product. Refer to the installation instructions or contact ELATEC for more information.
- In case the product is equipped with a cable, do not twist or pull the cable excessively.
- In case the product is equipped with a cable, the cable may not be replaced or extended.
ELATEC excludes any liability for damages or injuries resulting from the use of the product with a cable extension or a replaced cable.
- To comply with the applicable RF exposure requirements, the product should be installed and operated with a minimum distance of 20 cm to any user's/nearby person's body at all times. Refer to Chapter "RF exposure considerations" for further information about RF exposure compliance.
- The use of other RFID readers or modules in direct vicinity to the product, or in combination with the product might damage the product or alter its reading performance. In case the host device already contains other RFID devices, observe a minimum distance of 30 cm between all RFID devices to achieve the best performance for each device. In case of doubts, contact ELATEC for more information.
- Before installing the product into the host device, the power supply of the host device must be turned off.

**Warning**

Powering the product with more than one power source at the same time or using the product as a power supply for other devices may lead to injuries or property damage.

- Do not power the product via more than one power source at the same time.
- Do not use the product as a power supply for other devices.

If you are unsure about any part of the safety information above, contact ELATEC support.

Any failure to comply with the safety information given in this document is considered improper use. ELATEC excludes any liability in case of improper use or faulty product installation.

3 INTEGRATION INSTRUCTIONS

3.1 GENERAL

TWN4 MultiTech Nano Plus M may be installed into any host device, as long as it is operated under the operational conditions stated in the product user manual and other technical documents (e.g. data sheet).

3.2 LIST OF APPLICABLE RULES

Refer to the approval certificates, grants and declarations of conformity issued for TWN4 MultiTech Nano Plus M, and to the following rules applicable to TWN4 MultiTech Nano Plus M:

- 47 CFR 15.209
- 47 CFR 15.225
- RSS-Gen
- RSS-102
- RSS-210

3.3 SPECIFIC OPERATIONAL USE CONDITIONS

TWN4 MultiTech Nano Plus M is an RFID module without antenna that can be connected to an external antenna through a printed circuit board (125 kHz/134.2 kHz, 13.56 MHz or both). The module has been tested with a printed circuit board equipped with specific antennas (refer to Chapter “Antennas” for detailed information). The use of the module with other antennas is technically possible. However, such use conditions require additional testing and/or approval.

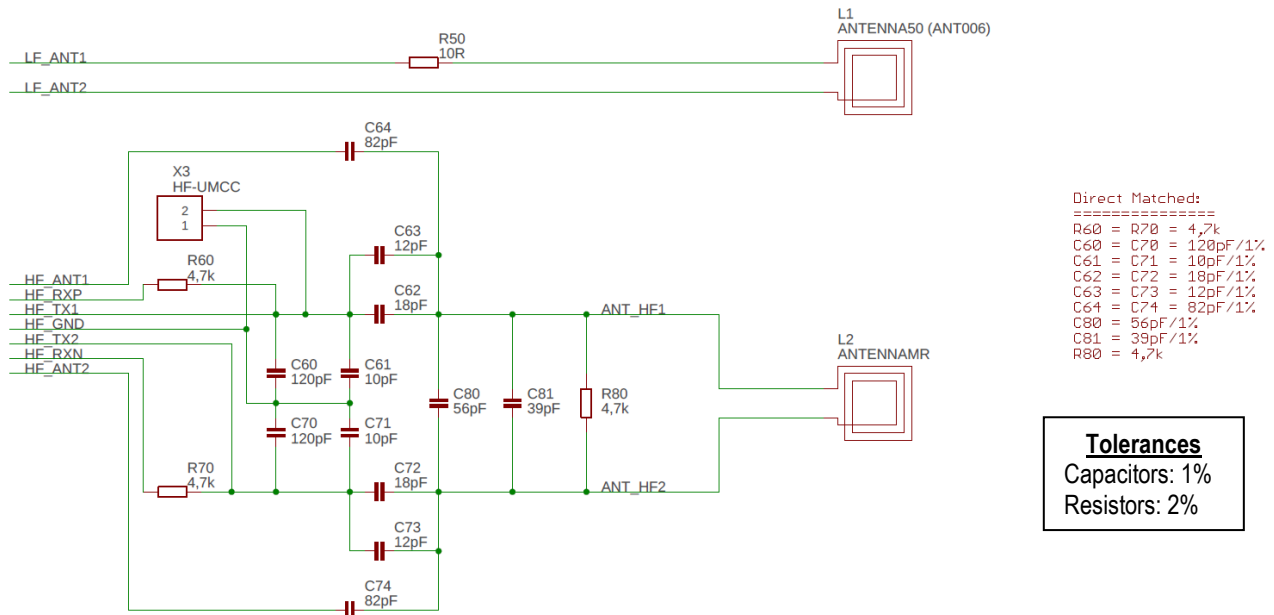
If TWN4 MultiTech Nano Plus M is used with antennas as described under Chapter “Antennas”, there are no specific operational use conditions other than the conditions mentioned in the user manual and data sheet of the module. The host manufacturer or integrator must ensure that these use conditions comply with the use conditions of the host device. In addition, these use conditions must be stated in the user manual of the host device.

3.4 LIMITED MODULE PROCEDURES

TWN4 MultiTech nano Plus M has no own RF shielding and has been granted a limited modular approval (LMA). As grantee of the LMA, ELATEC is responsible for approving the host environment that TWN4 MultiTech Nano Plus M is used with. Thus, the host manufacturer must observe the following procedure to ensure host compliance when TWN4 MultiTech Nano Plus M is installed in the host device:

1. ELATEC must review and release the host environment prior to giving the host manufacturer approval.
2. TWN4 MultiTech Nano Plus M is to be installed by trained and qualified personnel only, and according to the instructions provided by ELATEC.
3. The host integrator installing TWN4 MultiTech Nano Plus M into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules.
4. A Class II Permissive Change is required for each specific host installation (see Chapter 4.1 Authorization requirements).

3.5 TRACE ANTENNA DESIGN



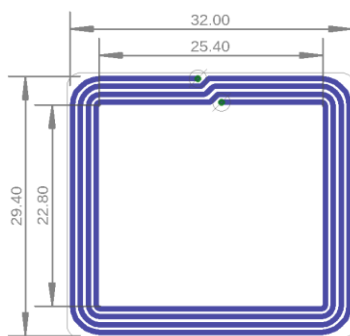
For antenna information, refer to Chapter "Antennas".

3.6 RF EXPOSURE CONSIDERATIONS

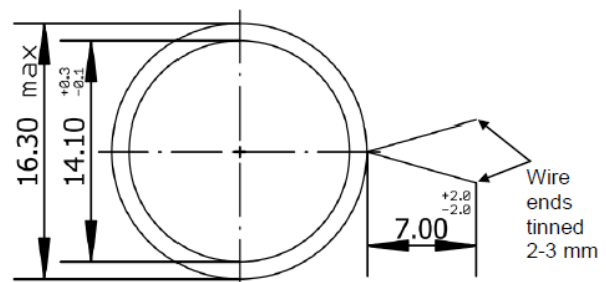
The antennas of TWN4 MultiTech Nano Plus M must be installed to meet the applicable RF exposure compliance requirements and any additional testing and authorization process as required. Refer to Chapter "Safety information" for detailed information about the radio frequency exposure conditions applicable to the product. These RF exposure conditions must be stated in the end-product manual(s) of the host device manufacturer.

3.7 ANTENNAS

TWN4 MultiTech Nano Plus M has been tested with an external printed circuit board equipped with the following antennas:



HF antenna on external PCB, printed, one-sided



LF antenna on external PCB, glued and soldered

HF antenna (13.56 MHz)

Outer dimensions: 32 x 29.4 mm / 1.26 x 1.16 inch \pm 1%

Number of turns: 4

Inductance: : 950 nH \pm 5%

Width of wire: 0.6 mm / 0.02 inch

LF antenna (125 kHz/134.2 kHz)

Outer diameter: max. 16.3 mm / 0.64 inch
 Number of turns: about 144 (max. 150)
 Inductance: 490 μ H \pm 5%
 Wire diameter: 0.10 mm / 0.0039 inch
 Lead free, coil fixed by using backed wire

Please note that the use of TWN4 MultiTech Nano Plus M with other antennas than the ones described above is not part of the approvals granted to the module. In case TWN4 MultiTech Nano Plus M is used with other antennas, a separate approval, additional testing or new authorization for a use with these specific antennas is required.

For more information, refer to the related product data sheet or other relevant technical documents.

3.8 LABEL AND COMPLIANCE INFORMATION

Refer to Chapter “Compliance statements” in the user manual of the TWN4 MultiTech Nano family and to Chapter “Integrator and host requirements” in this integration manual for detailed label and compliance information.

3.9 TEST MODES AND ADDITIONAL TESTING REQUIREMENTS

As described in the test plan defined by ELATEC for TWN4 MultiTech Nano Plus M, the module integrator shall confirm and demonstrate compliance with the following test plan:

Test Plan:

- Demonstrate compliance for the fundamentals for each band under each specific rule part granted for the module.
 - Perform Transmitter output power test (radiated) according to Part 15.209 for 125 kHz (RFID Tag search)
 - Perform Transmitter output power test (radiated) according to Part 15.209 for 134.2 kHz (RFID Tag search)
 - Perform Transmitter output power test (radiated) according to Part 15.225 for 13.56 MHz (RFID Tag search)
- Perform radiated spurious emissions with the antenna connected.
 - Perform radiated spurious emission test (frequency range 9 kHz – 2 GHz) according to Part 15.209 for 125 kHz (RFID Tag search)
 - Perform radiated spurious emission test (frequency range 9 kHz – 2 GHz) according to Part 15.209 for 134.2 kHz (RFID Tag search)
 - Perform radiated spurious emission test (frequency range 9 kHz – 2 GHz) according to Part 15.225 for 13.56 MHz (RFID Tag search)

The module has been certified originally with the following field strength:

125 kHz: -15.5 dB μ V/m @ 300 m
 134.2 kHz: -17.4 dB μ V/m @ 300 m
 13.56 MHz: 23.52 dB μ V/m @ 30 m

Remark: Perform radiated spurious emission test with all transmitters active which can operate simultaneously.
- Demonstrate compliance with human exposure requirements according to 47 CFR Part 2

3.10 ADDITIONAL TESTING, PART 15 SUBPART B DISCLAIMER

TWN4 MultiTech Nano Plus M is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and the host device manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. In

addition, the final host system still requires Part 15 Subpart B compliance testing with TWN4 MultiTech Nano Plus M installed.

3.11 INSTALLATION

TWN4 MultiTech Nano Plus M is available in two different versions: C0 and C1



Version C0 (SMT)

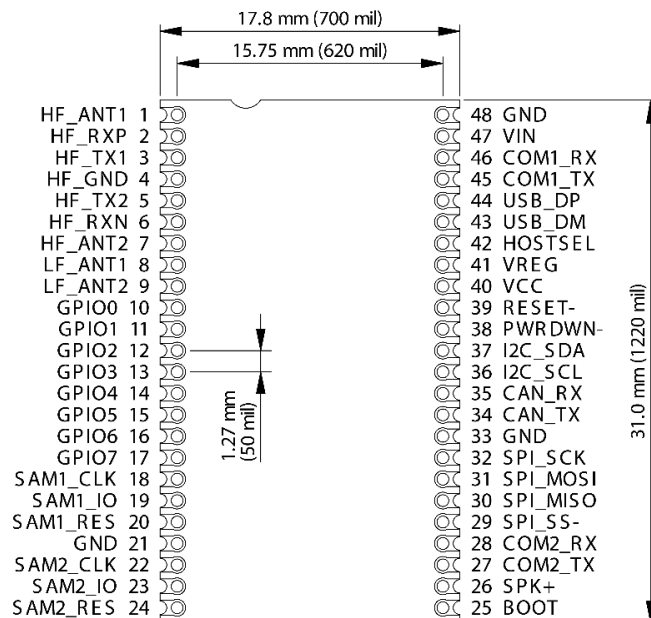


Version C1 (THT)

The C0 version is equipped with solder pads on both sides that enable to integrate (i.e. solder) the module directly onto the PCB or host device using the SMT technology, whereas the pin connectors on the C1 version are suitable for THT mounting.

For both versions, the components are mounted only on one side of the module to allow an easy integration into the host device.

3.12 ELECTRICAL CONNECTION



4 INTEGRATOR AND HOST REQUIREMENTS

4.1 AUTHORIZATION REQUIREMENTS

TWN4 MultiTech Nano Plus M has been certified as a limited module¹, as it has no own RF shielding. The host manufacturer is required to request to ELATEC an Authorization Letter that enables the host manufacturer to file a Change in ID, as per §2.933 of the FCC rules, and to certify the limited module under their own FCC ID, before they may file an application for a Class II Permissive Change (CIIPC) that authorize the limited module in their host device(s).

In addition, the host manufacturer must ensure that the host device still complies with all applicable regulations after the module integration.

4.2 LABELING REQUIREMENTS

4.2.1 FCC AND ISED CANADA

Using a permanently affixed label, TWN4 MultiTech Nano Plus M must be labeled with its own FCC and IC identification numbers.

In case this label is not visible anymore after integration into the host device, it is necessary to bring a label on the host device (on a visible and accessible place) stating the FCC and IC identification numbers of the integrated TWN4 MultiTech nano Plus M, e.g. with the words "Contains FCC ID:" and "Contains IC:" followed by the respective identification numbers.

In case several modules have been integrated into the host device, the label should state all FCC and IC identification numbers of the integrated modules.

Example:

"Contains FCC IDs: XXX-XXXXXXX, YYY-YYYYYYY, ZZZ-ZZZZZZ"

"Contains transmitter modules IC: XXXXX-XXXXXX, YYYYY-YYYYYY, ZZZZZ-ZZZZZZ"

4.3 SPECIAL ACCESSORIES

Where special accessories, such as shielded cables and/or special connectors, are required to comply with the emission limits, the instruction manual shall include appropriate instructions on the first page of the text describing the installation of the device.

4.4 SIMULTANEOUS TRANSMISSION

When the host product supports simultaneous-transmission operations, the host manufacturer needs to check if there are additional RF exposure filing requirements due to the simultaneous transmissions. When additional application filing for RF exposure compliance demonstration is not required (e. g. the RF module in combination with all simultaneously operating transmitters complies with the RF exposure simultaneous transmission SAR test exclusion requirements), the host manufacturer may do his own evaluation without any filing, using reasonable engineering judgment and testing for confirming compliance with out-of-band, restricted band, and spurious emission requirements in the

¹ Please note that the use of TWN4 MultiTech Nano Plus M with other antennas than the ones described in this document is not part of the approvals granted to the module. In case TWN4 MultiTech Nano Plus M is used with other antennas, a separate approval, additional testing or new authorization for a use with these specific antennas is required.

simultaneous-transmission operating modes. If additional filing is required, please contact the person at ELATEC GmbH responsible for certification of the RF module.

APPENDIX

A – RELEVANT DOCUMENTATION

ELATEC documentation

- TWN4 MultiTech Nano family, user manual/instructions for use
- TWN4 MultiTech Nano family, user manual/online user guide
- TWN4 MultiTech Nano Plus M data sheet

External documentation

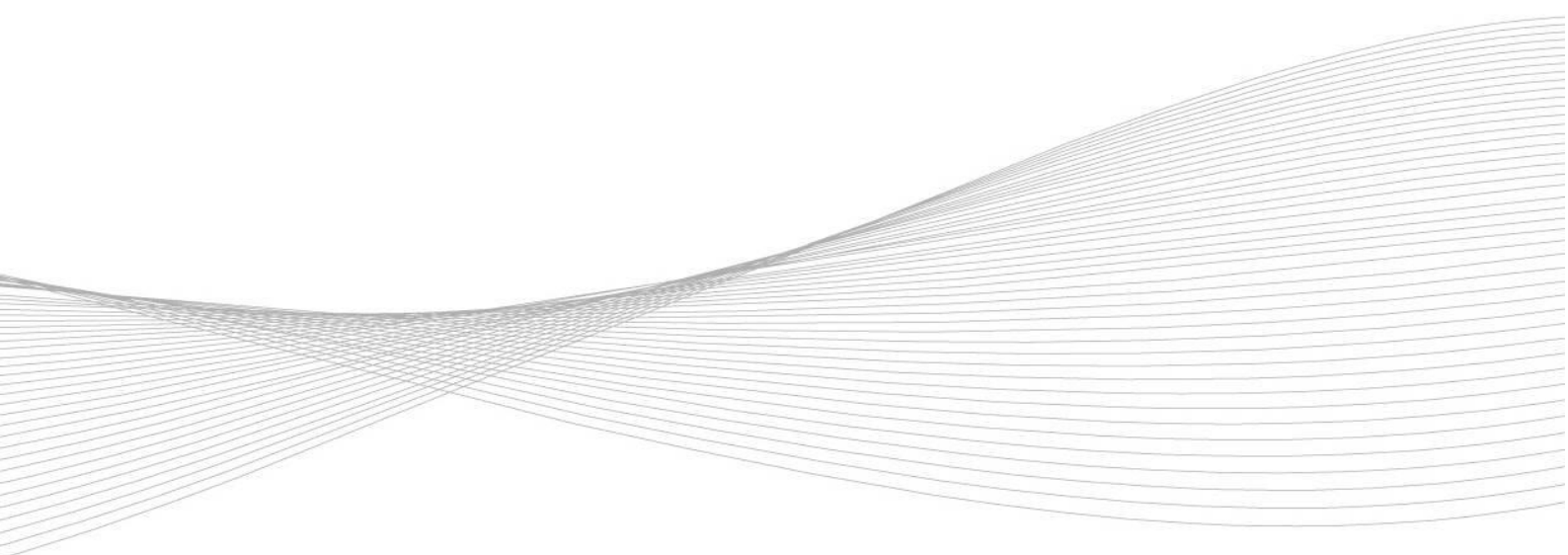
Document name	Document title/description	Source
n/a	Technical documentation related to the host device	Host device manufacturer
784748 D01 General labeling and Notification	General Guidelines for Labeling and Other Information Required to be Provided to Users	Federal Communications Commission Office of Engineering and Technology Laboratory Division
996369 D01 Module Equip Auth Guide	Transmitter Module Equipment Authorization Guide	Federal Communications Commission Office of Engineering and Technology Laboratory Division
996369 D02 Module Q and A	Frequently Asked Questions and Answers about Modules	Federal Communications Commission Office of Engineering and Technology Laboratory Division
996369 D03 OEM Manual	Guidance for Modular Transmitter Instruction Manuals and TCB Certification Application Reviews	Federal Communications Commission Office of Engineering and Technology Laboratory Division
996369 D04 Module Integration Guide	Modular Transmitter Integration Guide—Guidance for Host Product Manufacturers	Federal Communications Commission Office of Engineering and Technology Laboratory Division
RSS-Gen	General Requirements for Compliance of Radio Apparatus	Innovation, Science and Economic Development Canada
RSS-102	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)	Innovation, Science and Economic Development Canada
RSS-210	Licence-Exempt Radio Apparatus: Category I Equipment	Innovation, Science and Economic Development Canada
Title 47 of the Code of Federal Regulations (CFR)	FCC's rules and regulations	Federal Communications Commission

B – TERMS AND ABBREVIATIONS

TERM	EXPLANATION
ESD	electrostatic discharge
HF	high frequency
LF	low frequency
n/a	not applicable
RFID	radio frequency identification
SMT	Surface Mount Technology
THT	Through Hole Technology

C – REVISION HISTORY

VERSION	CHANGE DESCRIPTION	EDITION
01	First edition	05/2025

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