

AT&T Radiated Performance Requirements for IoT Devices

For Public Release at www.att.com/iotdevices; TRP and TIS requirements for IoT devices.

Forward

The tables below describe the TRP and TIS radiated performance requirements which must be met for devices undergoing AT&T approval. Not all bands listed in these tables are mandatory for IoT devices. However, devices are required to meet the requirements for all bands supported by the wireless module being used.

All testing must be performed in accordance with the current “CTIA Test Plan for Wireless Device Over-The-Air Performance” as specified by the requirements defined in PTCRB. A copy of the CTIA test plan may be obtained by following the instructions on the following CTIA web site: <https://www.ctia.org/about-ctia/test-plans/>

Note that all Internet of Things (IoT) devices are required to support a minimum of LTE Bands 2, 4 and 12. Absence of any of these bands will lead to the device being unable to receive certification and coverage gaps on the network.

Devices using a module that supports LTE bands beyond 2, 4 and 12 may, at the discretion of the device maker, disable the use of those additional bands for PTCRB and AT&T certification. Note that bands must be disabled in the device and the certification records must reflect the bands left enabled for both PTCRB and AT&T.

All requirements accurate according to 13340 v19.2.

LTE Category 1 and Above Antenna Performance Requirements

Table 1: LTE Requirements Category 1 and higher: Free-Space

Band	Minimum TRP Requirement	Minimum C-TIS Requirement	Minimum TIS Requirement	Minimum TIS Requirement (Secondary Antenna) ^{1,2}
2	+20.0 dBm	-91 dBm/10 MHz	-91 dBm/10 MHz	-87 dBm/10 MHz
4	+20.0 dBm	-93 dBm/10 MHz	-93 dBm/10 MHz	-89 dBm/10 MHz
5	+18.0 dBm	-89 dBm/10 MHz	-89 dBm/10 MHz	-85 dBm/10 MHz
12	+18.0 dBm	-91 dBm/5 MHz	-91 dBm/5 MHz	-87 dBm/5 MHz
14	+17.0 dBm	-87 dBm/10 MHz	-87 dBm/10 MHz	-83 dBm/10 MHz
17	+18.0 dBm	-88 dBm/10 MHz	-88 dBm/10 MHz	-84 dBm/10 MHz
29 ³	--	-88 dBm/10 MHz	-88 dBm/10 MHz	-84 dBm/10 MHz
30	+19.0 dBm	-91 dBm/10MHz	-91 dBm/10 MHz	-87 dBm/10 MHz
66	+20.0 dBm	-93 dBm/10 MHz	-93 dBm/10 MHz	-89 dBm/10 MHz

Note: Primary and Secondary TIS are only provided for devices certified prior to the introduction of C-TIS testing.

Note: Devices supporting Carrier Aggregation should reference 13340 Requirement CDR-LTE-797 for guidance on bands and combinations to be tested.

Reference 13340 for details of MIMO antenna performance requirements.

Table 2: LTE Requirements, Category 1 and higher: Wearables ⁽⁹⁾

Band	Minimum TRP Requirement	Minimum TIS Requirement	Minimum TIS Requirement (Secondary Antenna) ^{7,8}
2	+12.0 dBm	-83 dBm/10 MHz	-78 dBm/10 MHz
4	+12.0 dBm	-83 dBm/10 MHz	-78 dBm/10 MHz
5	+10.0 dBm	-81 dBm/10 MHz	-76 dBm/10 MHz
12	+10.0 dBm	-83 dBm/5 MHz	-78 dBm/5 MHz
14	+9.0 dBm	-79dBm/10MHz	-74dBm/10MHz
17	+10.0 dBm	-80 dBm/10 MHz	-75 dBm/10 MHz

Note: Primary and Secondary TIS are only provided for devices certified prior to the introduction of C-TIS testing.

Low Power Wide Area (LPWA) Antenna Performance Requirements

Table 3: LTE-M Requirements: Free-Space ⁽⁴⁾

Band	Minimum TRP Requirement Power Class 3	Minimum TRP Requirement Power Class 5	Minimum TIS Requirement
2	+20.0 dBm	+17.0 dBm	-96 dBm
4	+20.0 dBm	+17.0 dBm	-98 dBm
12	+18.0 dBm	+15.0 dBm	-93 dBm

Table 4: Small Form Factor ⁽⁵⁾ Devices: LTE-M Requirements: Free-Space ⁽⁶⁾

Band	Minimum TRP Requirement Power Class 3	Minimum TRP Requirement Power Class 5	Minimum TIS Requirement (Primary Antenna)
2	+12.0 dBm	+9.0 dBm	-88 dBm
4	+12.0 dBm	+9.0 dBm	-90 dBm
12	+10.0 dBm	+7.0 dBm	-85 dBm

Table a: NB-IoT Requirements: Free Space¹⁰

Table 5: NB-IoT Requirements: Free Space ⁽¹⁰⁾

Band	Minimum TRP Requirement Power Class 3	Minimum TRP Requirement Power Class 5	Minimum TIS Requirement
2	+20.0 dBm	+17.0 dBm	-105 dBm
4	+20.0 dBm	+17.0 dBm	-105 dBm
12	+18.0 dBm	+15.0 dBm	-103 dBm

 Table 6: Small Form Factor5 Devices: NB-IoT Requirements: Free-Space ^(6,10)

Band	Minimum TRP Requirement Power Class 3	Minimum TRP Requirement Power Class 5	Minimum TIS Requirement
2	+12.0 dBm	+9.0 dBm	-97 dBm
4	+12.0 dBm	+9.0 dBm	-97 dBm
12	+10.0 dBm	+7.0 dBm	-95 dBm

Notes

1. Secondary antenna branch TIS must be no more than 4 dB below primary antenna
2. Secondary antenna branch is mandatory for LTE Category 1 and higher devices, review 20059 for further details.
3. Devices supporting Carrier aggregation and Band 29, must test at least one CA band combination which includes Band 29 (e.g. CA_2A-29A, CA_4A-29A, etc.)
4. TRP/TIS is applicable for all LTE-M devices with: (1)An embedded antenna or (2) An external antenna cabled less than 20cm. Testing shall be performed according to the requirements of CTIA Test Plan for Wireless Device Over-The-Air Performance version 3.8 or later. Testing is required for AT&T certification even if it isn't yet mandatory for PTCRB.
5. Small Form Factor device is a device under 107mm in the longest direction.
6. LTE-M Wearable Devices shall comply with the Small Form Factor radiated performance limits. Wearable devices shall be tested using the wrist phantom for wrist worn devices, or the body phantom for all other wearable device types.
7. Secondary antenna branch TIS must be no more than dB below primary antenna



8. Receive diversity is not required for wrist worn devices that do not support VoLTE. For wearables supporting VoLTE, seek guidance from ATT SME concerning the Envelope Correlation Coefficient (ECC) requirements for receive diversity primary and secondary antennas.
9. To be tested using the wrist phantom for wrist worn devices.
10. TRP/TIS applicable for all NB-IoT devices with an embedded antenna or external antenna cabled less than 20cm. Testing shall be performed according to the requirements of CTIA Test Plan for Wireless Device Over-The-Air Performance version 3.9 or later. Testing is required for AT&T certification even if it isn't yet mandatory for PTCRB.

Contact

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History

Version 1.6: Updated format. Updated to C-TIS

Version 1.5: 7/15/2019 Updated requirements on wearable device testing. Added Band 14 for wearables

Added TRP & TIS requirements for NBIOT in table 4

Updated table 3 to add band 14 TRP and TIS requirements

Version 1.4: 9/27/2018: clarified Cat M1 requirements. Added Band 29. Removed UMTS requirements. Clarified Wearable requirements

Version 1.3: 5/18/2018: added small form factor.

Version 1.2: 12/8/2017: Initial public release

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