

Act No. 3153, of June 12, 2020

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THE SUPERINTENDENT OF GRANT AND RESOURCES TO PROVISION - ANATEL , in the use of the powers conferred on him by Resolution No. 715, of October 23, 2019 , and

WHEREAS the competence given by Items XIII and XIV of art. 19 of Law No. 9,472 / 97 - General Telecommunications Law;

WHEREAS the Technical Requirements establish the parameters and technical criteria verified in the Conformity Assessment of one or more types of telecommunications product, pursuant to art. 22 of the Regulations for Conformity Assessment and Homologation of Telecommunications Products, approved by Resolution No. 715, of October 23, 2019;

CONSIDERING the need to publish minimum requirements for quality, safety, interoperability and protection of the radio spectrum applied to devices to be inserted into the country's fifth generation mobile networks (5G), considered essential to meet the growing demand for increasing the capacity of mobile networks, with high data transmission rates and low latency, for emerging applications such as: industry 4.0, intelligent transport systems (ITS) and smart cities; and

WHEREAS the case file of process no. 53500.005609 / 2020-52

RESOLVES:

Art. 1 To approve the updating of the technical requirements for assessing the conformity of Transceiver for Radio Base Station in the form of the Attachment to this Act.

Art. 2 This Act enters on the date of its publication in Anatel's Electronic Service Bulletin.

VINICIUS OLIVEIRA CARAM GUIMARÃES

Superintendent of Granting and Provision of Resources

APPENDIX TO ACT No. 3153, OF JUNE 12, 2020

TECHNICAL REQUIREMENTS FOR ASSESSMENT OF TRANSCEPTOR CONFORMITY FOR RADIO BASE STATION

1. OBJECTIVE

1.1. Establish minimum technical requirements for conformity assessment with the National Telecommunications Agency from Transceiver to Radio Base Station.

2. NORMATIVE REFERENCES

2.1. Act No. 944, of February 8, 2018 , which approves the Technical Requirements for assessing the conformity of transmitters and transceivers of base stations and repeater stations.

2.2. Act No. 946, of February 8, 2018 , which approves the Technical Requirements for assessing the conformity of digital transmitters and transceivers for fixed service in point-multipoint applications in the frequency bands below 1 GHz.

2.3. Act No. 934, of February 8, 2018 , which approves the Technical Requirements for assessing the conformity of digital transmitters and transceivers for fixed service in point-multipoint applications in the frequency bands above 1 GHz.

2.4. Act No. 1120, of February 19, 2018 , which approves the Technical Requirements for Electromagnetic Compatibility for the Conformity Assessment of Telecommunications Products.

2.5. Act No. 950, of February 8, 2018 , which approves the Technical Requirements for Electrical Safety for Conformity Assessment of Telecommunications Products.

2.6. Act No. 14098, of November 23, 2017 , which approves the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of products for telecommunications.

2.7. ETSI EN 301 502 V9.2.1 (2010-10) - *Global System for Mobile communications (GSM); Harmonized EN for Base Station Equipment covering the essential requirements of article 3.2 of the R & TTE Directive*.

2.8. ETSI TS 136 141 V15.3.0 (2018-07) - *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing (3GPP TS 36.141 version 15.3.0 Release 15)*.

2.9. ETSI TS 137 145-1 V15.2.0 (2019-04) - *Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 1: conducted conformance testing - 3GPP TS 37.145-1 version 15.2.0 (Release 15)*.

2.10. ETSI TS 137 145-2 V15.2.0 (2019-04) - *Universal Mobile Telecommunications System (UMTS); LTE; Active Antenna System (AAS) Base Station (BS) conformance testing; Part 2: radiated conformance testing - 3GPP TS 37.145-2 version 15.2.0 (Release 15)*.

2.11. 3GPP TS 38.141-1 V16.2.0 (2019-12) - *Technical Specification Group Radio Access Network; NR; Base Station (BS) conformance testing - Part 1: Conducted conformance testing (Release 16)*.

2.12. 3GPP TS 37.141 V16.4.0 (2019-12) - *Technical Specification Group Radio Access Network; NR, E-UTRA, UTRA and GSM / EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing (Release 16)*.

3. DEFINITIONS

3.1. The definitions contained in the normative references listed in the previous item apply.

4. GENERAL REQUIREMENTS

4.1. The requirements established in this document are complemented by those contained in the current regulation on channeling and conditions of use of the radio spectrum and the Plan for the Assignment, Destination and Distribution of Frequency Bands in Brazil, in the frequency bands of operation of the equipment.

4.1.1. The equipment under conformity assessment must meet the limits of power, spurious emissions, emissions outside the range, the authorized frequency bands and other conditions contained in the respective regulations in force on channeling and conditions of use of the spectrum, even if the normative references point to different limits.

5. REQUIREMENTS FOR TRANSMITTERS AND DIGITAL TRANSCEIVERS FOR FIXED SERVICE IN POINT-MULTIPONT APPLICATIONS

5.1. Normative references:

a) Technical requirements for conformity assessment of digital transmitters and transceivers for fixed service in point-multipoint applications in frequency bands below 1 GHz; and

b) Technical requirements for conformity assessment of digital transmitters and transceivers for fixed service in point-multipoint applications in the frequency bands above 1 GHz.

6. REQUIREMENTS FOR GSM / GPRS / EDGE TECHNOLOGIES

6.1. Normative reference:

- a) Technical requirements for conformity assessment of transmitters and transceivers of base stations and repeater stations.

6.2. Normative reference for Multiport stations:

- a) ETSI EN 301 502 V9.2.1 (2010-10).

6.2.1. Meet the following items of technical requirements for conformity assessment of transmitters and transceivers of base stations and repeater stations:

- a) 5. Transmitter Features:

- 5.1. RF output power.
- 5.4. Frequency stability.

- b) 6. Receiver characteristics:

- 6.1. Spurious emissions conducted.

6.2.2. Meet the following items of the ETSI EN 301 502 V9.2.1 (2010-10) standard:

- a) 4.2.4.1 *Spectrum due to modulation and wideband noise;*

- b) 4.2.5.1 *Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band; and*

- c) 4.2.5.2 *Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band .*

6.3. Test procedures:

6.3.1. For technical requirements for evaluating the conformity of transmitters and transceivers of base stations and repeater stations, see the respective Act.

6.3.2. For the requirements of ETSI EN 301 502 V9.2.1 (2010-10), apply the following items:

- a) 5.3.4.1 *Spectrum due to modulation and wideband noise* (with the exception of item e);

Test configurations:

- *Single carrier operation* .
- Carrier configured to operate at maximum power with all active *timeslots* .
- Tests carried out in the initial, central and final channels.
- GMSK and 8PSK modulations.
- Room temperature.
- Tests performed on one of the RF ports of the equipment under test.

- b) 5.3.5.1 *Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band; and*

Test configurations:

- *Single carrier operation* .
- Carrier configured to operate at maximum power with all active *timeslots* .
- Tests carried out in the initial, central and final channels.
- GMSK and 8PSK modulations.
- Room temperature.
- Tests performed on one of the RF ports of the equipment under test.

- c) 5.3.5.2 *Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band* (sub item 5.3.5.2.2 *Multicarrier BTS*).

Test configurations:

- *Multicarrier operation* with the maximum number of active carriers operating at maximum power and with uneven carrier spacing including the initial channel.
- *Multicarrier operation* with the maximum number of active carriers operating at maximum power and with uneven carrier spacing including the final channel.
- *Multicarrier operation* with the maximum number of active carriers operating at maximum power and with minimum spacing between carriers (600 kHz) including the initial channel.
- *Multicarrier operation* with the maximum number of active carriers operating at maximum power and with minimum carrier spacing (600 kHz) including the final

- channel.
 - GMSK modulation.
 - Room temperature.
 - Tests performed on one of the RF ports of the equipment under test.
- Configuration of the equipment under test:
- B.2.10 *Multicarrier* BTS.

7. REQUIREMENTS FOR CDMA IS-95, WCDMA and CDMA2000 TECHNOLOGY

7.1. Normative reference:

- a) Technical requirements for conformity assessment of transmitters and transceivers of base stations and repeater stations.

8. REQUIREMENTS FOR LTE TECHNOLOGY

8.1. Normative reference:

- a) ETSI TS 136 141 V15.3.0 (2018-07).

8.2. Requirements:

8.2.1. Compliance with the following items of the standard in reference, except for tests related to *Multi-Carrier* and *Carrier-Aggregation technologies*:

- a) 6.2 *Base station output power.*
- b) 6.3.3 *NB-IoT RB power dynamic range for in-band or guard band operation.*
- c) 6.4 *Transmit ON / OFF power (TDD).*
- d) 6.5.1 *Frequency error.*
- e) 6.6.1 *Occupied bandwidth.*
- f) 6.6.2 *Adjacent Channel Leakage power Ratio (ACLR).*
- g) 6.6.3.5.2 *Test requirements for Wide Area BS (Category B)* and its sub-items as applicable.
- h) 6.6.4.5.2 *Transmitter spurious emissions.*
- i) 7.7 *Receiver spurious emissions.*

8.3. Test procedures:

8.3.1. The test procedures are found in the normative document itself.

8.3.2. For the transmission power test, the maximum output power tolerance must be ± 2.7 dB for carrier frequency $f \leq 3.0$ GHz and ± 3.0 dB for carrier frequency $f > 3.0$ GHz. The assessment must be carried out under the conditions of relative temperature and humidity ranges defined in the Climatic Cycle test defined in the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of products for telecommunications. The class of environment to be used must be that indicated by the manufacturer for operating the equipment.

9. REQUIREMENTS FOR ACTIVE ANTENNA SYSTEM (AAS) BASE STATION (BS) TECHNOLOGY - CONDUCTED TESTS

9.1. Normative reference:

- a) ETSI TS 137 145-1 V15.2.0 (2019-04).

9.2. Requirements:

9.2.1. Compliance with the following items of the standard in reference, except for tests related to Multi-Carrier and Carrier-Aggregation technologies.

- a) 6.2 *Base station output power.*
- b) 6.4 *Transmit ON / OFF power (TDD).*
- c) 6.5.2 *Frequency error.*

- d) 6.6.2 *Occupied bandwidth.*
- e) 6.6.3 *Adjacent channel leakage power ratio (ACLR).*
- f) 6.6.5 *Operating band unwanted emissions.*
- g) 6.6.6 *Spurious emissions.*
- h) 6.7 *Transmitter intermodulation.*
- i) 7.6 *Receiver spurious emission.*

9.3. Test procedures:

- a) The test procedures are found in the normative document itself and must be carried out in accordance with the guidelines contained in chapter 4 (*General test conditions and declarations*) and in chapter 5 (*Applicability of Requirements*).
- b) For the transmission power test, the maximum output power tolerance must be ± 2.7 dB for carrier frequency $f \leq 3.0$ GHz and ± 3.0 dB for carrier frequency $f > 3.0$ GHz. The evaluation must be carried out in the conditions of temperature and relative humidity ranges defined in the Climatic Cycle test defined in the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of telecommunications products. The class of environment to be used must be that indicated by the manufacturer for operating the equipment.

10. REQUIREMENTS FOR ACTIVE ANTENNA SYSTEM (AAS) BASE STATION (BS) TECHNOLOGY - RADIATED TESTS

10.1. Normative reference:

- a) ETSI TS 137 145-2 V15.2.0 (2019-04).

10.2. Requirements:

10.2.1. Equipment that does not allow tests to be conducted in a conducted manner must be evaluated in a radiated manner, according to the requirements referenced below, except for tests related to *Multi-Carrier* and *Carrier-Aggregation technologies*:

- a) 6.2 *Radiated transmit power.*
- b) 6.3 *OTA Base station output power.*
- c) 6.5 *OTA Transmit ON / OFF power.*
- d) 6.6.2 *OTA Frequency error.*
- e) 6.7.2 *OTA Occupied bandwidth.*
- f) 6.7.3 *OTA Adjacent channel leakage power ratio.*
- g) 6.7.5 *OTA Operating band unwanted emissions.*
- h) 6.7.6 *OTA Spurious emission.*
- i) 6.8 *OTA Transmitter intermodulation.*
- j) 7.7 *OTA Receiver spurious emission.*

10.3. Test procedures:

- a) The test procedures are found in the normative document itself and must be carried out in accordance with the guidelines contained in chapter 4 (*General test conditions and declarations*) and in chapter 5 (*Applicability of Requirements*).
- b) For the transmission power test, the maximum output power tolerance must be ± 2.7 dB for carrier frequency $f \leq 3.0$ GHz and ± 3.0 dB for carrier frequency $f > 3.0$ GHz. The evaluation must be carried out in the conditions of temperature and relative humidity ranges defined in the Climatic Cycle test defined in the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of telecommunications products. The class of environment to be used must be that indicated by the manufacturer for operating the equipment.

11. REQUIREMENTS FOR 5G NR TECHNOLOGY (NEW RADIO) FREQUENCY RANGE 1 - CONDUCTED TESTS

11.1. Normative reference:

- a) 3GPP TS 38.141-1 V16.3.0 (2020-03).

11.2. Requirements:

11.2.1. Compliance with the following items of the standard in reference:

- a) 6.2 *Base Station Output Power.*
- b) 6.4 *Transmit ON / OFF power.*
- c) 6.5.2 *Frequency Error.*
- d) 6.6.2 *Occupied Bandwidth.*
- e) 6.6.3 *Adjacent Channel Leakage Power Ratio (ACLR).*
- f) 6.6.4 *Operating Band Unwanted Emissions.*
- g) 6.6.5 *Spurious Emissions Transmitter.*
- h) 7.6 *Receiver spurious emissions.*

11.3. Testing procedure:

a) The test procedures are found in the normative document itself and must be carried out in accordance with the guidelines contained in chapter 4 (*General conducted test conditions and declarations*).

b) For the transmission power test, the maximum output power tolerance must be ± 2.7 dB for carrier frequency $f \leq 3.0$ GHz and ± 3.0 dB for carrier frequency $f > 3.0$ GHz. The evaluation must be carried out in the conditions of temperature and relative humidity ranges defined in the Climatic Cycle test defined in the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of telecommunications products. The class of environment to be used must be that indicated by the manufacturer for operating the equipment.

12. REQUIREMENTS FOR 5G NR TECHNOLOGY (NEW RADIO) FREQUENCY RANGE 1 - RADIATED TESTS

12.1. Normative reference:

- a) 3GPP TS 38.141-2 V16.3.0 (2020-03).

12.2. Requirements:

12.2.1. Compliance with the following items of the standard in reference:

- a) 6.2 *Radiated Transmit Power.*
- b) 6.3 *OTA Base Station Output Power.*
- c) 6.5.1 *OTA Transmitter OFF Power.*
- d) 6.6.2 *OTA Frequency Error.*
- e) 6.7.2 *OTA Occupied Bandwidth.*
- f) 6.7.3 *OTA Adjacent Channel Leakage Power Ratio (ACLR).*
- g) 6.7.4 *OTA Operating Band Unwanted Emissions.*
- h) 6.7.5 *OTA Transmitter Spurious emissions.*
- i) 7.7 *OTA Receiver spurious emissions.*

EIRP: *Effective (or Equivalent) Isotropic Radiated Power.*

TRP: *Total Radiated Power.*

12.3. Testing procedure:

- a) The test procedures are found in the normative document itself and must be carried out in accordance with the guidelines contained in chapter 4 (*General radiated test conditions and declarations*).
- b) For the transmission power test, the maximum output power tolerance must be ± 2.7 dB for carrier frequency $f \leq 3.0$ GHz and ± 3.0 dB for carrier frequency $f > 3.0$ GHz. The evaluation must be carried out in the conditions of temperature and relative humidity ranges defined in the Climatic Cycle test defined in the Technical Requirements regarding the environmental conditions and tests applicable in the evaluation of the conformity of telecommunications products. The class of environment to be used must be that indicated by the manufacturer for operating the equipment.

13. REQUIREMENTS FOR RADIO BASE MULTI-TECHNOLOGY STATIONS (NR, E-UTRA, UTRA, GSM / EDGE and NB-IoT MSR)

13.1. Normative reference:

- a) 3GPP TS 37.141 V16.5.0 (2020-03).

13.2. Requirements:

13.2.1. Compliance with the following items of the standard in reference:

- a) 6.2.1 *Base Station Maximum Output Power* .
- b) 6.4 *Transmit ON / OFF Power* .
- c) 6.5.2 *Frequency Error* .
- d) 6.6.1 *Spurious Emissions Transmitter* .
- e) 6.6.2 *Operating Band Unwanted Emissions* .
- f) 6.6.3 *Occupied Bandwidth* .
- g) 6.6.4 *Adjacent Channel Leakage Power Ratio (ACLR)* .
- h) 7.6 *Receiver spurious emissions* .

13.3. Test procedures:

- a) The test procedures are found in the normative document itself and must be carried out in accordance with the guidelines contained in chapter 4 (*General test conditions and declarations*) and chapter 5 (*Applicability of requirements and test configurations*).
- b) The homologation applicant must declare which set of technologies and modes of operation will be under certification, according to item 4.7 of the normative reference (*Capability set definition and manufacturer's declarations of supported RF configurations*). The tests will be applied to the technologies and modes of operation declared by the applicant.
- c) This set of requirements is applicable to transceivers that, despite being enabled to operate with a single technology, have *hardware* capable of operating in multi-technologies.