

Troubleshooting the Globe

Common International Test Failures

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Focus Countries

Brazil

Japan

Mexico

South Korea

a

Taiwan



Technical Failures

EMC, Mainly for the following tests:

- a. ESD (ANATEL asks the lab to apply disturbances of 6kV for contact discharges and 8kV for air discharges).
- b. Resistibility against disturbance applied to the mains port (power supply). This is similar to, but not the traditional surge test.
- c. Radiated emissions





Sample Setup/Documentation

- ✓ Samples not set up correctly (Radiated, Conducted, Normal samples). Outputs are not comparable to the product's specifications. *
- ✓ Incomplete or incorrect sample testing/operational instructions. (Understanding in advance how the samples should be configured and then pre-test those setups using the instructions)
- ✓ Test tools, drivers, software, cables, auxiliary boards, power supplies and other accessories missing.
- ✓ For RF devices operating with 5Ghz: max antenna gain is required
- ✓ Lack of reference power levels
- ✓ ISO certificate
- ✓ Lack of high-resolution internal photos without shielding





Special Country Requirements

- EMC tests may or may not apply to the **HOST** device depending on the specs, device application, or how it is powered.
- ANATEL requires the samples/packaging to have minimum data: model name, name of the manufacturer, CoO and traceability (Serial Number)
- ANATEL no longer allows use of IPv4 for 3G and 4G devices, so for these devices, mainly, ANATEL requires IPv6 tests per standards below:

3GPP TS 36.523-1

ETSI TS 102 514

RFC 2460



Technical Failures

If the device is configured properly and the device is operating under the technical spec imposed by the regulation, we do not see many technical failures.

Sample Setup/Documentation

Application document with technical information is not provided or is incomplete:

- a. Manufacturers need to have their RF technical personnel provide this information. It is not information that is typically found in manuals or product specification sheets.
- b. Projects cannot be opened, or testing started until this document is submitted.

Test reports:

- a. Poorly written or translated reports.
- b. Converted EN/FCC test reports with the title page replaced

Equipment not set up or configured properly.



Special Country Requirements

Antennas:

- a. Linked to the certificate even if they are not always listed in the certificate itself.
- b. Need to be careful not to use antennas that are not linked to the certification.
- c. Antenna test data is required (not just the antenna specs).

Cellular device approval:

- a. Japan has unique and specific carrier frequency bands that typically do not coincide with other countries.
- b. Each carrier has their own specific frequency band - even when sharing the same band, the actual frequency range can differ from carrier to carrier.





Technical Failures

NOM-208

Channel bandwidths are too large

Channels are outside the regulated frequency
bands

Output powers are too high.





Sample Setup/Documentation

- ❖ Samples not set up correctly (Radiated, Conducted, Normal samples).
- ❖ Incomplete or incorrect sample testing/operational instructions. (Understanding in advance how the samples should be configured and then pre-test those setups using the instructions)
- ❖ Test tools, drivers, software, cables, auxiliary boards, power supplies and other accessories missing.*
- ❖ Labels do not match certificate information.
- ❖ Full list of manufacturing sites and countries of shipment into Mexico not complete.
- ❖ Data/Spec sheets have missing data. (Band specifications, operating modes, BT or BLE versions)





Special Country Requirements

- ✓ Tariff codes for devices are mandatory and listed on the certificate.
- ✓ An **authorized** Spanish name of the product (approved by the certificate body) is required to be printed in the certificates and test reports.
- ✓ **Need manuals in Spanish**
- ✓ Sample requirements may vary according to the NOM that applies to the product.





Technical Failures

RX spurious test. (Limit at -54dBm)

Frequency Tolerance

a. 2.4 GHz including BT: Tx freq MHz \pm (Tx freq MHz X 50×10^{-6})

b. 5GHz: Tx freq MHz \pm (Tx freq MHz X 20×10^{-6})

Spectral Density.

a. Limit is 10mW/MHz but a +20% margin is allowed. (max up to 12mW/MHz)

b. Too high of antenna gain.

Temperature Testing

a. Test jig does not operate from -10 or +50 degrees C.





Sample Setup/Documentation

- Samples not set up correctly (Radiated, Conducted, Normal samples).
- Incomplete or incorrect sample testing/operational instructions. (Understanding in advance how the samples should be configured and then pre-test those setups using the instructions)
- Missing accessories: all active ports should be connected during the EMC testing.
- **Language Barrier: It can be difficult to translate test instructions into Korean. (an accompanying video is very helpful)**



Special Country Requirements

- ✓ Antenna gain must have a radiated pattern and it must be matched to the antenna gain.
- ✓ Component layouts must have part location numbers.
- ✓ Korea does a power variance test. $\pm 10\%$. Samples must have power wires accessible to directly connect a variable power supply.
- ✓ Korea requires a Dynamic Frequency Selection (DFS) test with a conducted sample.



Technical Failures

Radiated spurious emission

EUT cannot achieve a continuous transmission for required time period

Radiation emissions from 30MHz ~ 1GHz are over the limits.

Conducted emissions

Output TX power too low/high but lab can not adjust the sample directly

ESD

The EUT shut down and did not self recover.



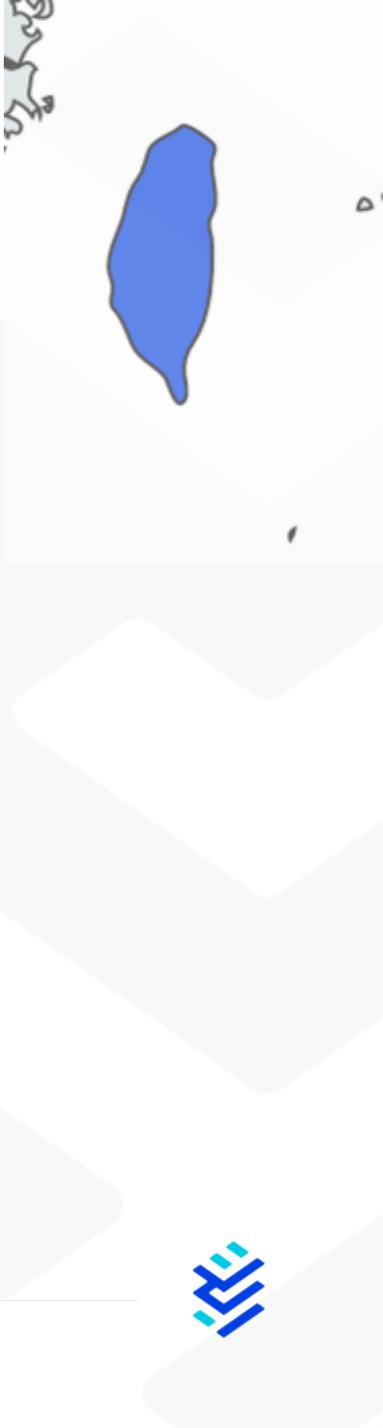
Sample Setup/Documentation

- Samples not set up correctly (Radiated, Conducted, Normal samples).
- Incomplete or incorrect sample testing/operational instructions.
(Understanding in advance how the samples should be configured and then pre-test those setups using the instructions).
- Incorrect HS Codes that identify incorrect standards/approval schemes.
- Lack of documents needed to start testing.
- Incorrect or no accessories provided.



Special Country Requirements

- ❖ Antenna gain must have a radiated pattern and it must be matched to the antenna gain.
- ❖ A copy of your business license may be required.
- ❖ NCC application requires the foreign applicant (manufacturer) to provide the nationality and passport number of the "Person in charge or authorized manager".
- ❖ Frequency allocation may not be the same as FCC or CE. (I.E. 915MHz is not allowed in Taiwan)



Combined Equipment

Products that may have a radio as an
"add-on"



Language Barriers

- Translations
- Technical Communications
- Standards Not In Your Language
- Applications for Approval



Future Proofing Your Design

- Test beyond the specs
- Monitor standard's working groups
- Be directly involved in the creation/revision of a standard
- Track trends in standards discussions/presentations



Clearly Define Your Products “Modes”
of Operation.



Power Plugs

Gauge

Style

Length



Summary

Technical Failures

Generally speaking, the issues come from the manufacturer not investigating the technical differences in requirements from the FCC or EU standards to the country of interest. This most often appears in the spurious emissions and output power limits of the testing.

Sample Setup/Documentation

Samples not set up correctly (Radiated, Conducted, Normal samples).

Incomplete or incorrect sample testing/operational instructions. (Understanding in advance how the samples should be configured and then pre-test those setups using the instructions).

Special Country Requirements

Minor differences/requirements can cause major delays. Although many frequency bands and test methods are globally similar, the performance and documentation requirements are dynamic and vary widely.



Thank You!



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Sources

Approve-IT utilized many internal and external resources preparing this presentation. The information was prepared and confirmed mainly by reviewing local standards/regulations, conversing with local regulatory authorities, local test labs & our international staff. Additional sources:

[MapChart](#) (slides 2-7) for visual representation

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