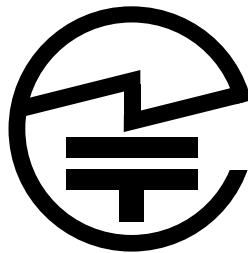


Guideline for Radio Equipment Certification in Japan



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1. Scope

The purpose of this document is to describe the outline of Type Certification of Radio Equipment in Japan.

2. Type certification process

Here is the general process flow for Type certification.

It is possible that testing can be done at customer's site under some conditions. Please contact TUV for more details.

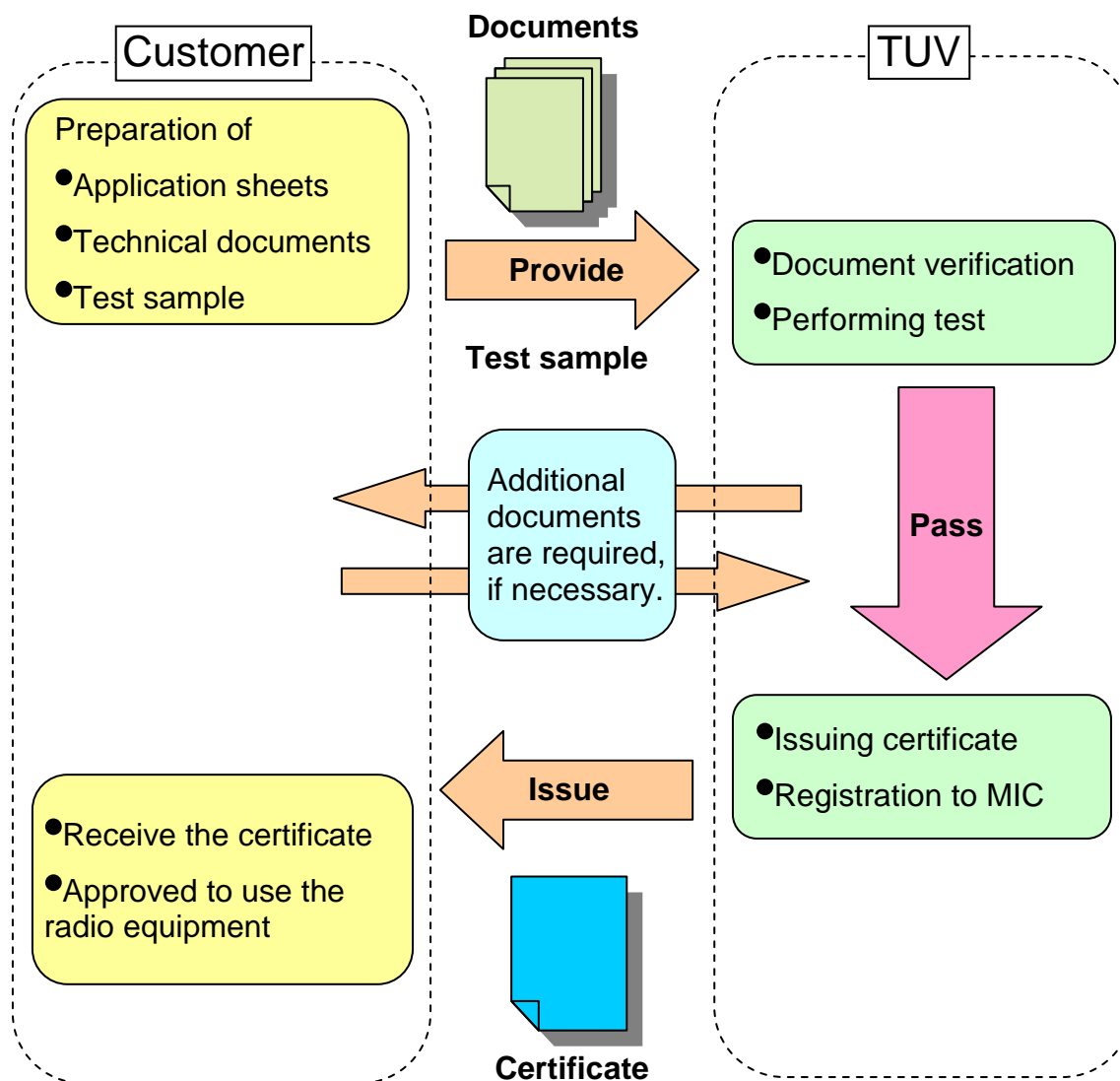


Figure 1: Certification Flow

3. Japan Specific Issues

There are some very specific items in Japan regarding radio equipment configuration.

3.1. Tamperproof structure

Some consumer equipment, such as WLAN, Bluetooth, ZigBee, femtocell station, etc. are required to protect mechanically the relevant circuits from being accessed by the user. In case this tamperproof structure is required by law, its method shall be stated in the Application Form 2-5.

Examples:

- The RF part is sealed in box and soldered on the PCB.
- A special type of screw is used to seal the enclosure.

For more detail, please contact us.

3.2. Module requirements

There is no specific modular approval process in Japan. Modules are treated in the same way as complete products and can be approved under the following conditions:

- The module meets all requirements like a complete radio product. That means it shall consist of RF part, modulation part, control part, tamperproof structure (see above), power port and has specified antenna(s).
- The interface must be clearly defined. It shall have no influence on the radio parameters. Only data transfer and power supply is acceptable.
- The module shall not intended to be soldered to a host, only a detachable connection by a connector is acceptable

For more detail, please contact us.

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4. Technical Document Requirements

Here is the summary of general required documents for Type certification. Please see the following pages for more details. Other documents are required, if necessary.

Item #	Document	Comment	Check
1.	Application Form 2-1	Power of Attorney	
2.	Application Form 2-2	Power of administrative attorney	
3.	Application Form 2-3	Application top sheet	
4.	Application Form 2-4	Annex	
5.	Application Form 2-5	Summary of Equipment	
6.	Application Form 2-6	Design Specification	
7.	Function Block Diagram	Indicate frequency and power transition.	
8.	Product Design Description	Data sheets of major ICs can be used.	
9.	Circuit Diagram	In case block diagram is not in detailed.	
10.	BOM		
11.	Parts Location Diagram	Silkscreen on PCB or photo with indicating major ICs.	
12.	External view	Indicate product size (width, depth and height)	
13.	Tamperproof Explanation	If applicable: Description how the equipment is made tamperproof	
14.	Antenna data	Size of antenna and electric characteristic.	
15.	Manual or specification	If available	
16.	Label drawing	Artwork of the label including the model name and certification mark.	
17.	Label location drawing	Indicate the location where the label is placed.	
18.	Quality Assurance Statement	Describe responsibility of manufacturing.	
19.	Copy of ISO9001 certification	ISO9001 certificate of the factory	
20.	Declaration letter	In case ISO certificate scope doesn't cover radio equipment.	
21.	Data sheet of major ICs	CPU	
		Memory	
		Modem	
		RF IC	
		Crystal	
		Power regulator	

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1) Form 2-1 : Power of Attorney

2) Form 2-2 : Power of administrative attorney

In case the applicant is not the license holder, one of these forms is required. TUV has a format and can provide a draft, if necessary.

3) Form 2-3 : Application top sheet

4) Form 2-4 : Annex

5) Form 2-5 : Summary of Equipment

6) Form 2-6 : Design Specification

Those four sheets are a set of application form for Type certification. In the application form, radio equipment classification, applicant, factory name, and contact information will be filled. Also, design specification is required, such as electrical specification, configuration, size of the equipment, and antenna specification. TUV has formats and can provide a draft by each product classification, if necessary.

Please contact TUV for more details. Depending on product category, requirements are different.

In Form 2-5 item 9 please describe how the equipment is made tamperproof. This shall match with the technical details described in section 13 below.

7) Function block diagram

This diagram shall indicate TX and RX functions including major IC part name, such as CPU, memory, modem, RF IC, crystal, and power regulator together with transition of RF frequency and voltage.

In case an RF module is used, provide a function diagram for the RF module and indicate the part name for major ICs in the same way as in the function block diagram.

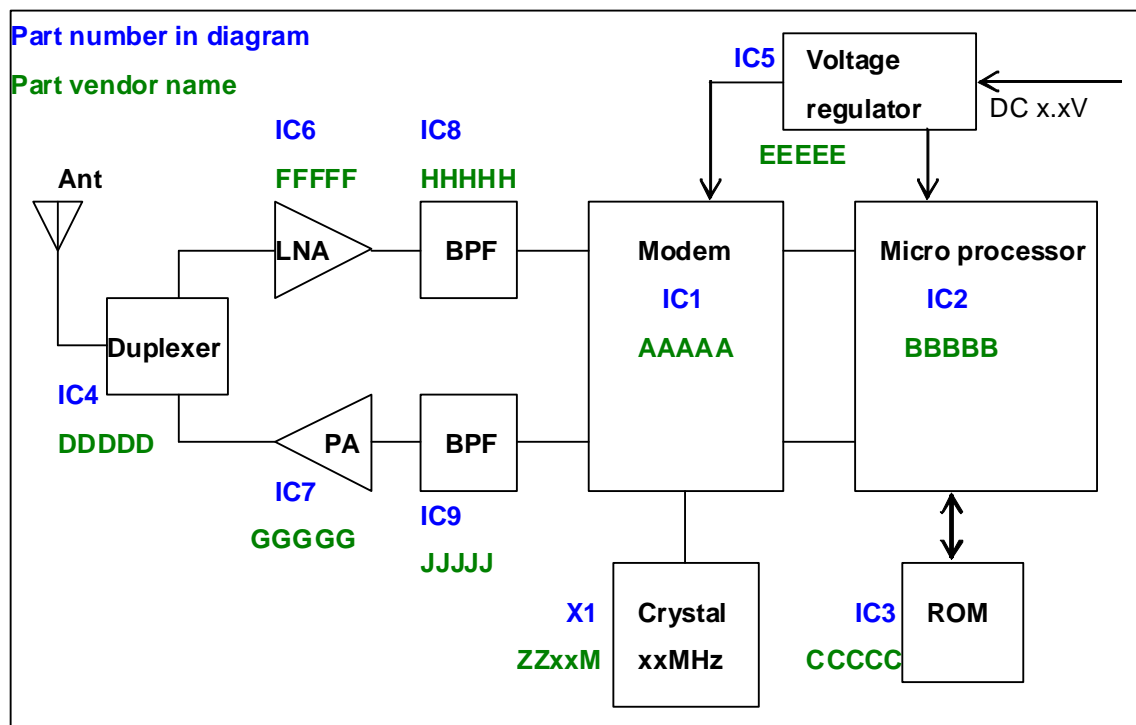


Figure 2: Example of a Block Diagram

8) Product Design Description

Based on the function block diagram, please explain each detail function including part number. If you can provide each major IC data sheet, we can accept them instead of the Product Design Description.

9) Circuit diagram

In case the block diagram is not enough, please provide circuit diagram as reference. It is helpful for us to understand the product.

10) BOM (Bill of Material)

In case the block diagram is not enough, please provide BOM as reference. It is helpful for us to understand the product.

11) Parts Location Diagram

This diagram shall show the part location on the PBC. Silkscreen layout may be a good drawing or photo which indicates the location of major ICs.

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In case an RF module is used, provide a location diagram for the RF module and indicate the part name and location for major ICs in the same way as in the parts location diagram.

12) External view

This shall show external views of the product together with size (width, depth and height). Alternatively clear photos showing the product in all dimensions with a scale are acceptable.

13) Tamperproof Explanation

If the equipment is required to be tamperproof describe in detail how this is achieved. Support the description with pictures and drawings as necessary. See also section 3.1 above.

14) Antenna data

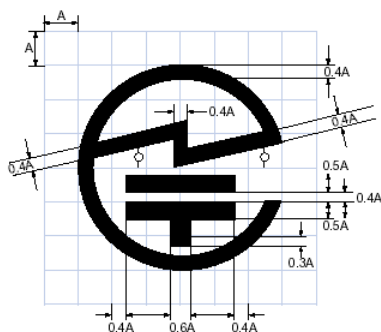
An antenna data sheet with the maximum antenna gain and external view of antenna with its size is required.

15) Manual or specification

If it's available, it's helpful for us to understand the product and will speed up certification.

16) Label drawing

Certificate mark



Example of Label

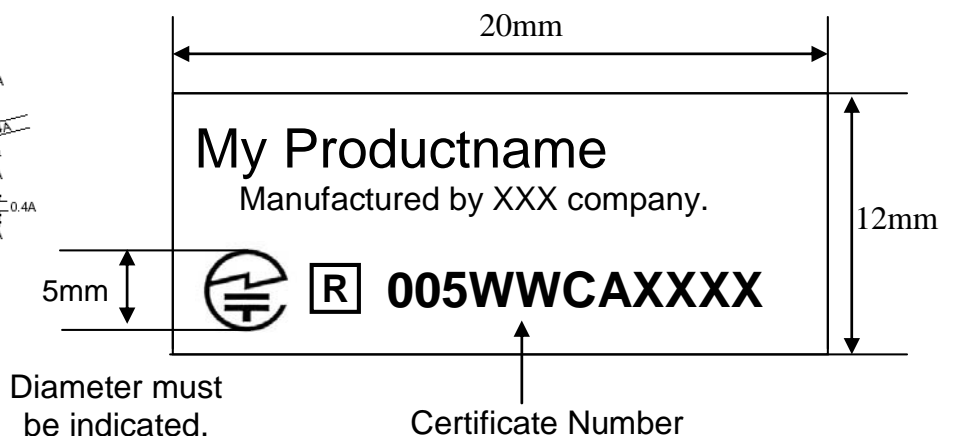


Figure 3-1: Certification Mark and Label

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Certificate mark

Example of Label

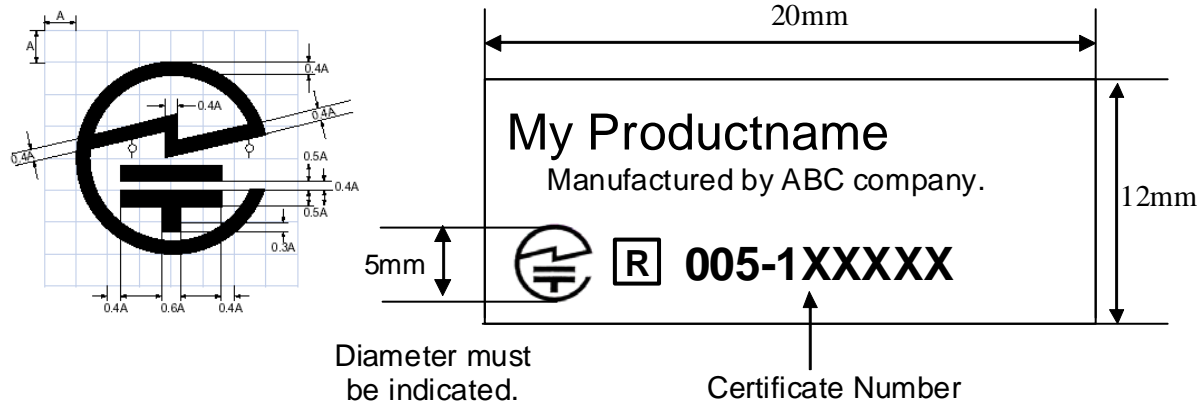


Figure 4-2: Certification Mark and Label(New)

The certificate number shall be indicated following the certificate mark and \boxed{R} (with square) as shown above.

- The diameter of the certificate mark must be 5mm or more. In case the volume of the product is less than 100cc, the diameter can be reduced to 3mm.
- The label material shall not be easily damaged.
- All of the letters must be clearly readable.

17) Label location drawing

Drawing which indicates the location of the label on the product or photo which shows the label location is required.

18)Quality Assurance Statement

Please describe the methods of quality assurance and responsibility of manufacturing. TUV can provide the sample statement.

19)Copy of ISO9001 certification

Please provide ISO9001 certificate of the factory. Confirm the date of validity. In the application form 2-3 and 2-4, please write the exact same factory name as written on the certificate.

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20)Declaration letter

In case the scope of the ISO9001 doesn't cover radio equipment, the declaration letter is required as stated actual production performance. TÜV can provide a sample letter.

21)Data sheet of major ICs

Please provide major IC data sheets, such as modem, RF IC, crystal, and power regulator.

Also helpful to understand the product are data for the CPU and memory. They may be requested in certain cases.

5. Test sample general requirements

5.1. General

At least one test sample which covers all of the following points is required. Please confirm all of the test modes available before shipping the sample to TÜV Rheinland Japan. The test sample shall implement specific test modes which are described below.

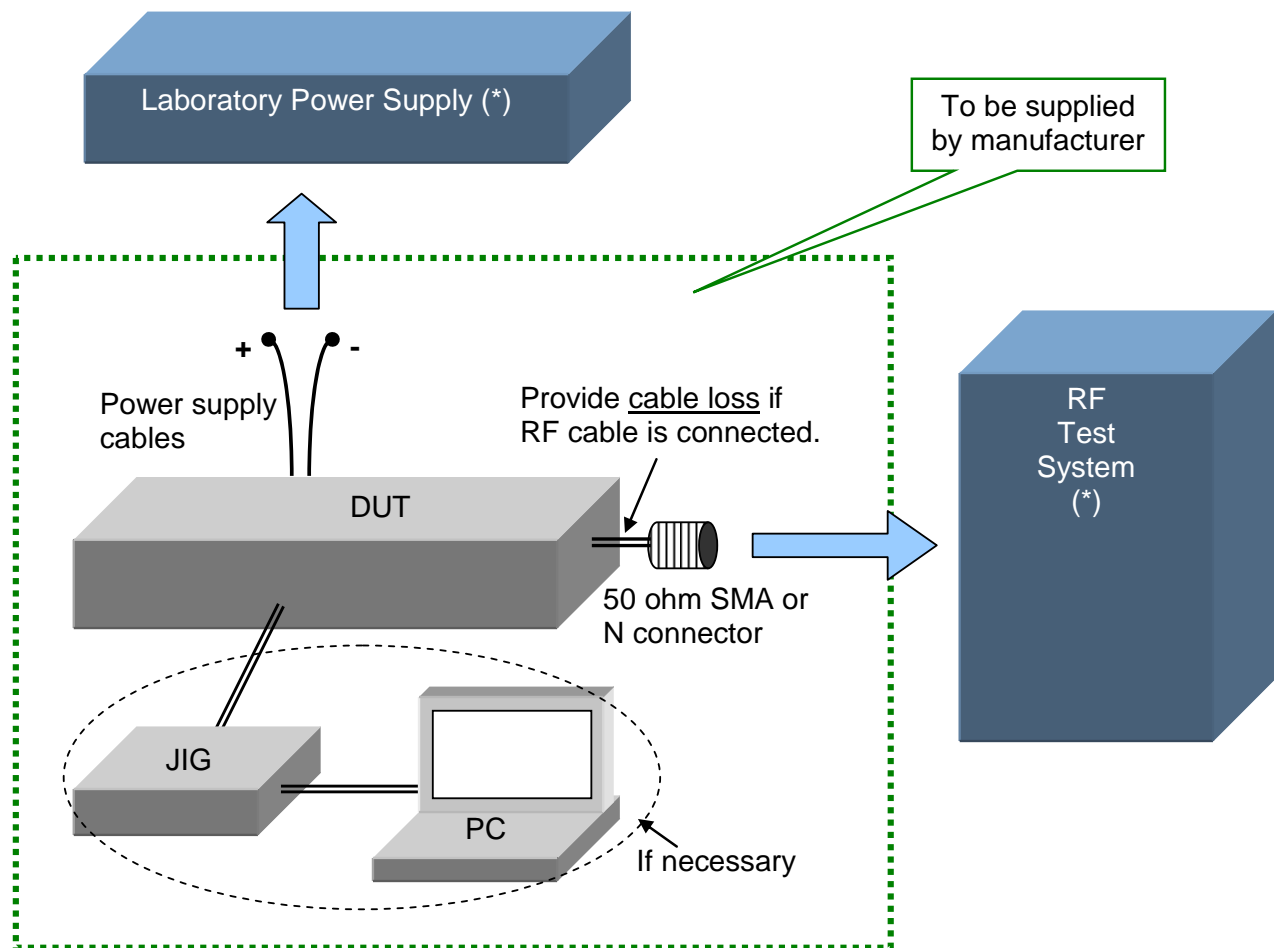
- 1) The test will be done as conducted. That means the antenna must be removed and replaced by a 50 Ohm SMA connector. If the impedance of the antenna is not 50 Ohm then also an impedance adaptor must be provided. In that case the insertion of the adapter loss shall be stated.
- 2) The cable loss of any RF adapter cable (if used) shall be stated.
- 3) Supplied power will be changed by nominal and +/-10%, and test is performed respectively (three times). In case of DC voltage please provide a power cable with connector.
- 4) In order to realize below test modes, other materials such as jigs, adapters, driver, and software shall be provided. Please supply them with the test sample.
- 5) Please provide a detailed description how to set up each required test mode (see also the next section). All commands and parameters shall be explicitly stated.
- 6) Generally the following test modes are required. For examples of specific products please refer to the next section.
These test modes shall be easy to setup since they need to be changed various times during the test.
 - A. Continuously transmitting only carrier signal with maximal power at highest, middle and lowest frequency channel.
 - B. Continuously transmitting test signal with random data modulation with maximal power at highest, middle and lowest frequency channel.
Including the capability to switch between all supported data rate.
 - C. In case of frequency hopping devices: Same as mode B but hopping on all or selected channels.
 - D. Continuous receive mode at highest, middle and lowest frequency channel.
 - E. Product specific test modes depending on the test specification.

If your product does not support continuous transmission please contact us for alternative test modes.

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Please be aware that all adjustments shall be done prior to submitting the test sample. The test lab will not perform any adjustments, calibrations or other settings on the product.

Please ensure that the test sample is working properly in all required test modes before submitting them for testing.



DUT = Device Under Test (test sample)

(*) = Provided by the laboratory.

A PC may be provided on request.

Figure 5: Example configuration of a test sample

5.2. Requirements for products with Bluetooth®

At least one test sample which covers all of the following points is required. Please refer to section 5.1 for the general requirements.

Specific requirements for Bluetooth products:

Any of the operation modes BR, EDR and LE below which is supported by the product shall be tested and the corresponding test modes below must be available.

1	BR (Basic Rate)		check
a	CW	No modulation, single frequency (2441MHz) to measure frequency error.	
b	TX single frequency	Permanent transmission of DH5 packets (selectable) at 2441MHz (without frequency hopping) with modulation (PRBS9 data). The output power must be the same as the maximum level in normal operation. See also notes 1 and 2.	
c	TX hopping	Same as mode 1b, but with full hopping on 79 channels.	
d	TX AFH	Same as mode 1b, but with adaptive frequency hopping (AFH) on 20 consecutive channels at 2441MHz center.	
e	RX	Receive mode, receiver must operate continuously, no transmission shall appear. See also note 3.	
2	EDR (Enhanced Data Rate)		
a	CW	Same as mode 1a	
b	TX single frequency	Permanent transmission of 2-DH5 and 3-DH5 packets (selectable) at 2441MHz (without frequency hopping) with modulation (PRBS9 data). The output power must be the same as the maximum level in normal operation. See also notes 1 and 2.	
c	TX hopping	Same as mode 2b, but with full hopping on 79 channels.	
d	TX AFH	Same as mode 2b, but with adaptive frequency hopping (AFH) on 20 consecutive channels at 2441MHz center.	
e	RX	Receive mode for EDR, receiver must operate continuously, no transmission shall appear. See also note 3.	

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3	LE (Low Energy)		
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

For an example of the test sample please refer to section 5.1"General"

Note 1: Longest TX packet types such as DH5 are requested. DH3 or DH1 are acceptable only if no longer packet type is available.

Note 2: The pause between two TX packets shall be as short as possible, preferred is a single slot (i.e. single slot RX).

Note 3: RX mode may be achieved in BR mode by using scan modes and set (scan interval = scan window). This is not applicable for EDR mode where the receiver shall operate as if receiving EDR modulated packets.

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5.3. Requirements for WLAN products

At least one test sample which covers all of the following points is required. Please refer to section 5.1 for the general requirements.

Specific requirements for WLAN products:

Any of the operation modes 802.11a, b, g, and n below which is supported by the product shall be tested and the corresponding test modes below must be available.

1	802.11a (5GHz)		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	
d	DFS	For Access Points (AP) only. Please refer to the note 1 below this table.	

2	802.11b (ch1 – ch13)		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

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3	802.11b (ch14)		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

4	802.11g (ch1 - ch13)		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

5	802.11n, 2.4GHz band, 20MHz bandwidth		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

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6	802.11n, 2.4GHz band, 40MHz bandwidth		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

7	802.11n, 5GHz band, 20MHz bandwidth		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	
d	DFS	For Access Points (AP) only. Please refer to the note 1 below this table.	

8	802.11n, 5GHz band, 40MHz bandwidth		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	
d	DFS	For Access Points (AP) only. Please refer to the note 1 below this table.	

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For an example of the test sample please refer to section 5.1 "General"

Note 1: For **DFS** testing (AP only) a separate test sample is required. It shall have an antenna connector (same as specified above) and it shall operate in following modes in the same way as the final product:

1. Beaconsing
2. Communicating with a WLAN station with at least 50% duty cycle for transmission. The WLAN station shall have also an SMA connector and shall be provided for testing. TÜV may be able to supply it, please contact us for details.



Important: In normal operation conditions a minimum waiting time must be observed before the AP continues using the selected frequency. However, for testing **this waiting time must be disabled**. It must be possible to (manually) quickly reset the AP after each test so that the test frequency is used again. The reset shall take no longer than a few seconds. Please note that this action has to be performed a number of times. Long waiting periods would lead to excessive test duration.

Please contact us for details.

5.4. Requirements for IEEE802.15.4 products (incl. ZigBee)

At least one test sample which covers all of the following points is required. Please refer to section 5.1 for the general requirements.

1	802.15.4		check
a	CW	No modulation, at lowest, middle and highest frequency channel to measure frequency error.	
b	TX	Permanent transmission at lowest, mid, and highest frequency channel with modulation (PN9 data). The output power must be the same as the maximum level in normal operation. Supported data rate must be selectable.	
c	RX	Receive mode, receiver must operate continuously, no transmission shall appear.	

For an example of the test sample please refer to section 5.1 "General"