

Recommended Practice

Status Indicator for and Control of Transmitters in Portable Electronic Devices (PEDs)

Version 1.0
October 2004

Developed by
CEA PEDs Working Group



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Developed by

CEA PEDs Working Group

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Foreword

Conformance to this Recommended Practice is voluntary.

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This document was prepared in liaison with RTCA Special Committee 202, the European Telecommunications Standards Institute (ETSI), and members of the air transport and consumer electronics industries.

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Recommended Practice – Status Indicator for and Control of Transmitters in Portable Electronic Devices (PEDs)

1 Introduction

1.1 Scope

This Recommended Practice details recommended industry practices that can be used to address:

1. A consistent and easily identifiable indicator for all-transmitters-disabled in transmitting portable electronic devices (T-PEDs);
2. Ease of turning off all transmitters in T-PEDs; and
3. Associated terminology used to convey information about electronic devices capable of transmitting, device operation, and passenger use.

The scope of this effort also includes other issues for consideration that take the form of recommendations to outside groups.

This Recommended Practice covers portable electronic devices that contain radio transmitters (T-PEDs), including devices that typically use a transmitter while operating, as well as devices that can operate without transmitting. This Recommended Practice provides a simplified enabling mechanism for switching off the radio transmitter(s) in T-PEDs and also provides a uniform indication of that mode of operation. While this Recommended Practice facilitates the managed use of wireless PEDs on board aircraft, it does not attempt to set policies concerning the use of PEDs on board aircraft.

This Recommended Practice is intended for use by portable electronic device manufacturers, related component and software companies, and the air transport industry.

This Recommended Practice may have application in various other areas unrelated to the use of T-PEDs aboard aircraft, including scenarios where the use of T-PEDs is permitted but wireless transmitters are not.

Infrared transmitters and receivers are not covered by this Recommended Practice.

1.2 Background and Purpose

It is recognized that during certain phases of commercial flight, present regulations and airline policy typically require all PEDs to be turned off and stowed. It is foreseeable that during non-critical phases of flight, some wireless technologies might be permitted for use on board some commercial aircraft in the future. Notwithstanding future changes in policy, it is useful to create a consistent approach for indicating whether a T-PED transmitter is disabled, and to facilitate the disabling of a T-PED transmitter.

1.3 Future Considerations

This Recommended Practice can be amended as products and technology evolve and mature. Such amendments might address:

- Additional symbols representing specific implementations of technology;
- Changes in airline policy, other standards and recommended practices, prevailing law, etc.;
- New device types;
- New terminology associated with the above.

2 References

2.1 Normative

There are no other documents required for implementation of this Recommended Practice.

2.2 Informative

The following documents are not required for implementation of this Recommended Practice but provide useful information related to the subject matter covered in this Recommended Practice.

IEEE P1621

“Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments”

PCI Express

“PCI Express Specifications”

PCMCIA

“PC Card Standard”

RTCA Special Committee 202 guidance documents

“Phase I – Near-Term PED Technology Assessment”; “Phase II – Longer Term Technology Assessment”

USB

“Universal Serial Bus Revision 2.0 Specification”

Documents related specifically to symbol design include:

ETSI EG 201 379-v1.1.1-1998

“Framework for the development, evaluation and selection of graphical symbols”

ETSI ETR 070

“The multiple index approach [MIA] for the evaluation of pictograms”

ETSI ETR 113

“Results of an evaluation study of pictograms for point-to-point videotelephony”

ETSI ETS 300 375-Edition 1-1994

“Pictograms for point-to-point videotelephony”

IEC 80416-1 Ed. 1.0 - 2001

“Basic principles for graphical symbols for use on equipment – Part 1: Creation of symbol originals”

ISO 9186: 2001

“Graphical symbols – Test methods for judged comprehensibility and for comprehension”

ITU-T Recommendation F.910

“Procedures for designing, evaluating and selecting symbols, pictograms and icons”

2.3 Reference Acquisition

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USB

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www.usb.org

3 Definitions and Conventions

3.1 Abbreviations and Acronyms

The following abbreviations and acronyms are used in this Recommended Practice and **shall** be used wherever applicable when referring to PEDs. Alternative abbreviations should not be used.

LAN	Local area network
PCI	Peripheral Component Interconnect
PCMCIA	Personal Computer Memory Card International Association
PED(s)	Portable electronic device(s)
RF	Radio frequency
TBD	To be determined
T-PED(s)	Transmitting portable electronic device(s)
USB	Universal Serial Bus

3.2 Terms

The following terms **shall** be used wherever applicable when referring to T-PEDs. Alternative terms should not be used.

Active mode - powered and in use; part of the “on” state; refers to a device

Delayed active mode - not in current use but programmed to go into some state of use (such as turning on a transmitter) at a later time or based on a later event; refers to a device

Disabled - not capable of transmitting or being turned on; refers to a transmitter

Enabled - capable of transmitting or being turned on; refers to a transmitter

Off - not powered; refers to a device or a transmitter; a state in which minimal or no power is being used by a device; a device in the “off” state does not transmit

On - powered and in use; refers to a device or a transmitter

Partially active mode - some parts or functions are in use; refers to a device

Portable electronic device(s) - transportable devices for audio, video, communication, information and entertainment, including but not limited to notebook (laptop) computers, personal digital assistants (PDAs), and mobile phones

Receiver - radio receiver or wireless receiver

Sleep - a reduced state of operation, especially with regard to power, in which settings and prior-state information are retained; refers to a device; a mode in which a device might appear to be off but is capable of quickly resuming a more active state with minor user action

Transmitting portable electronic device(s) - T-PED; a wireless portable electronic device that contains one or more transmitters, which might be enabled or disabled

Transmitter - radio transmitter or wireless transmitter, also known as an “intentional radiator”; a component of a device that is capable of sending radio waves to communicate

Transmitters Disabled - the state of a transmitting portable electronic device where the normal operation of all transmitters is deliberately inhibited; power is removed from all transmitters, but non-RF energy emitting functions of wireless components might be powered

3.3 Conventions

The term “**shall**” is used to denote requirements for conformance to this Recommended Practice.

The term “**should**” is used to denote practices that are desirable or advantageous, but not required; sometimes referred to as “recommended.”

The term “**may**” is used to denote practices that are specifically allowed, but not required. It is assumed that any other practices not mentioned in this Recommended Practice are also allowed, as long as they do not compromise conformance.

The term “**might**” is used to denote the possibility of a condition or event, but does not relate to conformance.

4 Ease-of-Use Requirements

Section 4 details requirements for user interaction with T-PEDs to disable their transmitters.

4.1 Disabling and Enabling Transmitters

A simple and obvious method **shall** be provided to disable all transmitters while the T-PED is in the on state. The term associated with this function **shall** be “Transmitters Disabled,” or the foreign language equivalent. When all transmitters are disabled, power **shall** be removed from all transmitters, but non-RF energy emitting functions of wireless components may be powered.

It is foreseeable that the use of some wireless technologies might be permitted on board some commercial aircraft in the future. Therefore, a simple and obvious method should be provided to enable or disable a specific type of transmitter.

Receivers may remain enabled, regardless of the status of transmitters.

One simple and obvious method to disable all transmitters is to manually place the device into the off state. To the extent this method meets all the technical requirements described in sections 4.1, 4.2 and 4.3 related to the “Transmitters Disabled” function, this method may continue to be used in lieu of an additional “Transmitters Disabled” mode for such devices. If a T-PED’s power switch is the only way to disable the transmitters, then the device cannot be used when wireless transmitters are not allowed. If a device is in the off state, there is no delayed active mode that will turn on the device from the off state.

Software programs that interface with transmitters on a device **shall** follow this Recommended Practice.

4.2 Dominance of All Transmitters Disabled

When all transmitters are disabled, they **shall** go into an off state and remain off until the user enables them. This all-transmitters-disabled status **shall** remain in effect through system boot-up, sleep state and programmable timed events such as alarms or automatic updates. When all transmitters are disabled, the T-PED may warn the user about delayed programmable events involving use of the transmitter that will be disabled, but the transmitters **shall** remain disabled regardless of programmable events. Receivers may be programmed with delayed active features, regardless of the status of transmitters.

4.3 Wireless Peripherals and Add-on Devices

Peripheral and add-on devices that employ transmitters might take the form of cards that connect directly into a PED (through interfaces such as USB, PCMCIA, PCI Express, etc.), peripheral devices that are wirelessly connected to a PED (e.g. wireless headsets), or combinations of the preceding. If the host PED is to be used in an environment where wireless transmissions are restricted or not allowed, it is recommended that all wireless add-on devices and peripherals be switched off, disabled by the host PED, or removed from the host PED. If the host PED is not capable of turning off the wireless add-on device or peripheral, and the wireless add-on device or peripheral does not have its own on-off switch, then the wireless add-on device or peripheral should be removed from the host PED.

Manufacturers of wireless peripheral and add-on devices, and standards-setting groups relevant to these devices, should consider making such devices respond to a “Transmitters Disabled” control on the host PED, or providing the host PED or user with a “Transmitters Disabled” control.

5 Indicator Requirements

Section 5 details requirements for the symbol used to indicate the disabled state of T-PED transmitters and the display, location and visibility of the symbol.

5.1 Transmitters Disabled/Enabled

5.1.1 Transmitters Disabled

The following symbol **shall** be used to indicate that all transmitters are disabled:



The “Transmitters Disabled” symbol may be paired with a light-based indicator of any color, such as an LED.

5.1.2 Transmitters Enabled

The following symbol may be used to indicate that any or all transmitters are enabled:



When one or more transmitters are enabled, the T-PED manufacturer may employ additional common symbols different from those in Section 5.1 to indicate that one or more transmitters are enabled. If this approach is used, the status of each enabled transmitter **shall** be displayed with a separate symbol.

The “Transmitters Enabled” symbol may be paired with a light-based indicator of any color, such as an LED.

5.2 Transmitters/T-PED Mode Dependence

When a T-PED is in an active mode and the device’s transmitters are disabled, the symbol representing “Transmitters Disabled” **shall** be displayed.

When a T-PED is in an active mode and the device’s transmitters are enabled, it is recognized that some T-PED manufacturers might choose to display other symbols, e.g. signal strength of an individual transmitter.

For T-PEDs operating in a sleep state with transmitters disabled, the symbol representing “Transmitters Disabled” **shall** be visible upon “waking up” the device.

If a device can transmit when in a sleep state, then a visual indication should be provided.

Table 1 summarizes the requirements for the display of the “Transmitters Disabled” symbol. It also illustrates the relationship between the operating state of the T-PED and state of the transmitters.

Table 1 – Indicator Requirements for Different PED States/Modes

PED State/Mode*	Indicator Representing “Transmitters Disabled”	Indicator Representing “Transmitters Enabled”	Indicator Representing “Individual Transmitter 1 Enabled/Disabled”	Indicator Representing “Individual Transmitter n Enabled/Disabled”
	Symbol from 5.1.1	Symbol from 5.1.2	Manufacturer determined	Manufacturer determined
On	Mandatory	Allowed	Allowed	Allowed
Sleep	Allowed	Recommended	Allowed	Allowed
Off	Allowed	Allowed	Allowed	Allowed
Transition from On to Off	Recommended	N/A	N/A	N/A

Table 1 is not an exhaustive list of all possible states of operation. “Mandatory,” “recommended” and “allowed” are defined as follows:

Mandatory: For compliance with this recommended practice;

Recommended: An optional feature of the device;

Allowed: Some devices may implement this and others may not.

*NOTE: Definition of PED power states and operational modes are included in Section 3.

5.3 Symbol Location and Visibility

It is recognized that the shape and size of devices to which this Recommended Practice applies varies from small (in the case of mobile phones and handheld devices) to large (in the case of notebook computers). Consequently, the amount of area on a PED's external case or display screen will vary accordingly. It is assumed that the symbols described in this Recommended Practice could be depicted on either the PED's external case or display screen.

The size and brightness of the symbol described in this Recommended Practice should be sufficient to allow positive identification by an individual with normal vision from a distance of 6 feet (1.8 meters). This is approximately the distance from the eye level of a cabin crewmember standing in the aisle, to a position in the middle of a passenger's lap who is seated at the window of a typically configured 747*.

5.4 Symbol Use

The use of the symbols identified in Section 5, according to the terms set forth in this Recommended Practice, is intended to apply to manufacturers of all T-PEDs.

The air transport industry should consider using the symbols identified in Section 5 in materials, notices and placards related to the use of PEDs aboard aircraft.

The symbols identified in Section 5 **shall not** be modified or adapted to serve purposes other than to represent what is described in Sections 4 and 5 of this Recommended Practice. For example, the symbol representing "Transmitters Disabled" **shall not** double as an indicator for another parameter or function.

5.5 Wireless Peripherals and Add-on Devices

Wireless peripherals and add-on devices as described in section 4.3 which are not controlled by the host device should have a separate indicator for "Transmitters Disabled."

* See <<http://www.boeing.com/commercial/747family/technical.html>>. This analysis assumes three seat widths of 17.2 inches each, a 72-inch tall crewmember standing in the center of the aisle, and the PED positioned approximately 20 inches above the floor.

6 Terminology Requirements

Section 6 details requirements for the use of terms associated with PEDs, including preferred terms, defined meanings of terms and where the terms are to be used.

The terms described in Section 3 **shall** be used wherever applicable when referring to PEDs. Alternative terms should not be used, such as “airplane mode,” “flight mode,” “flight safe mode” and the like.

This Recommended Practice supports consistent use of the term “Transmitters Disabled” as opposed to “airplane mode,” “flight mode,” “flight safe mode” and the like. Alternative terms such as “airplane mode,” “flight mode,” “flight safe mode” and the like should not be used, particularly since:

- T-PEDs using such alternative terms could perform in different ways;
- Some wireless technologies might be permitted for use on board some commercial aircraft in the future, which would thwart use of terms such as “flight mode,” “airplane mode” and the like; and
- There could be other environments, such as certain sensitive areas of hospitals, where use of wireless transmitters might be restricted.

6.1 Use of Terms

This Recommended Practice describes where and how terms should be used. It does not provide exact statements that are to be made, but it does list known points of consumer and airline passenger exposure to information about T-PEDs.

To facilitate passenger understanding of and compliance with various airline policies on the use of T-PEDs aboard aircraft, it is desirable to use common terminology when referring to T-PEDs and their wireless transmitting capabilities.

6.1.1 PEDs and Product Literature

A PEDs manufacturer **shall** use the terms outlined in this Recommended Practice for all references to the “Transmitters Disabled” function of T-PEDs. These references might appear in materials such as:

- Help screens and menus;
- User manuals;
- Online materials;
- Product packaging and sales literature.

6.1.2 Airline Information Dissemination

An airline **shall** use the terms outlined in this Recommended Practice for all references to the “Transmitters Disabled” function of T-PEDs. These references might appear in materials such as:

- In-flight magazines and other passenger-oriented literature;
- Internet sites and other locations where airline PED policies are found;
- Airport and aircraft signage;
- Crewmember safety instructions.

In particular, airlines **shall** refer to either the “Transmitters Disabled” feature and indicator, or reference individual transmitter types that are permissible on a given aircraft.

Airlines should encourage passengers to disable transmitters on the wireless devices they intend to carry aboard and/or use during flight, either before they board the aircraft, and/or before they stow devices for takeoff.

Annex A

Use Cases and User Scenarios

Case #1: Use of a game player on a mobile phone aboard an aircraft, during a phase of flight when the use of electronics is permitted

A short while after takeoff, an announcement is made that the use of certain electronic devices is permitted until further notice. Passengers are reminded that the transmitters on any of their wireless devices must be disabled. Mr. Jones, seated in the economy section at the window (third seat from the aisle) removes a mobile phone from a carry-on bag. As Mr. Jones switches on the phone, he selects “Transmitters Disabled” mode and proceeds to play one of the new games on the phone. A few minutes later, a flight attendant stops by to ask whether the phone’s transmitter is actually switched off. Mr. Jones pauses the game on the phone to return to the phone’s main screen, where he points out the symbol representing the “Transmitters Disabled” mode. The symbol is easily visible and clearly identifiable to the flight attendant.

Case #2: Use of the electronic organizer function of a PDA/phone aboard an aircraft, during a phase of flight when the use of electronics is permitted

During the middle of a flight, Ms. Brown is finished checking the calendar on her new PDA/phone, switches off the device, and lays it on the empty seat next to her. Later, Ms. Brown is browsing the in-flight magazine and finds an announcement in the back of the magazine explaining the airline’s policy on portable electronic devices. In the announcement, Ms. Brown notices a symbol, which is said to appear on new devices, that indicates when the transmitters on a wireless device are disabled. Ms. Brown double-checks the status of her device’s transmitter by briefly switching on the PDA/phone and glancing at the activity bar on the screen. Ms. Brown sees the symbol representing the “Transmitters Disabled” mode and switches off the device.

Case #3: Use of a notebook computer to access a wireless LAN aboard an aircraft, during a phase of flight when the use of electronics is permitted

As the aircraft reaches cruising altitude, an announcement is made that the flight offers Internet access via a wireless network connection. Passengers are reminded that other types of wireless transmissions are not allowed and must be disabled. Ms. Smith takes out her notebook computer to log on to the wireless network. However, since Ms. Smith’s connecting flight did not offer such access, Ms. Smith first clicks on the icon representing “Transmitters Disabled” at the bottom of the notebook’s screen and exits the “Transmitters Disabled” mode. Ms. Smith then turns on her permitted wireless connection and registers with the aircraft’s wireless network, leaving the device’s other transmitters off.

Case #4 Use of a notebook computer with a wireless mouse during a phase of flight when the use of electronics is permitted

Passengers are boarding a flight. Once on board, Mr. Williams sits down to complete a document on a notebook computer, using a wireless mouse. An announcement is made that the cabin is being prepared for take-off and that all PEDs must be turned off and stowed. Passengers are reminded that wireless transmissions are not allowed during the

flight and must be disabled. Mr. Williams knows he wants to use his notebook computer during the flight but recognizes that he will not be able to use any wireless device. Before Mr. Williams turns off and stows his notebook computer, he clicks on an icon on the screen and disables all wireless transmitters, including the wireless mouse.

Later on in his journey, Mr. Williams takes a connecting flight and is told devices such as a wireless mouse compliant with a particular class of low power radio can be used during this flight. Once airborne, after the airline crew makes the announcement that such wireless transmitters can be used, Mr. Williams enables the Bluetooth* transmitter on his notebook computer, activates his wireless mouse, and enables the Bluetooth transmitter on his mobile phone. Using this wireless connection, Mr. Williams is then able to transfer from his phone to his notebook computer the pictures he took during the trip.

Case #5 **Use of the electronic organizer function of a PDA/phone aboard an aircraft, before take-off when the use of electronics is permitted**

Passengers are boarding a flight. Once on board, Mr. Davis sits down to complete an appointment on his PDA/phone. An announcement is made that the cabin is being prepared for take-off and that all PEDs must be turned off and stowed. Passengers are reminded that wireless transmissions are not allowed during the flight and must be disabled. Mr. Davis knows he wants to use his PDA/phone during the flight. Before Mr. Davis turns off and stows his PDA/phone, he disables all transmitters on his wireless device and confirms the symbol on the screen showing that all wireless transmitters are disabled.

Case #6 **Use of the electronic organizer function of a PDA/phone aboard an aircraft, before take-off when the use of electronics is permitted**

Passengers are boarding a flight. Once on board, Ms. Wilson remembers that she has to complete some work and has an alarm set to wake her in the middle of the flight. An announcement is made that the cabin is being prepared for take-off and that all PEDs must be turned off and stowed. Passengers are reminded that wireless transmissions are not allowed during the flight and must be disabled. Ms. Wilson knows that when the reminder alarm goes off, it turns on her PDA/phone and that the PDA/phone will try to access the network. So before Ms. Wilson turns off and stows her PDA/phone, she disables all transmitters and confirms the symbol on the screen showing that all wireless transmitters are disabled.

Case #7 **Use of a game player on a mobile phone aboard an aircraft, during a phase of flight when the use of electronics is permitted**

Passengers are boarding a flight. Once on board, Ms. Jones realizes that she has the opportunity to get the high score on a game on her mobile phone. An announcement is made that the cabin is being prepared for take-off and that all PEDs must be turned off and stowed. Passengers are reminded that wireless transmissions are not allowed during the flight and must be disabled. Ms. Jones knows that when she turns on her phone that the phone will try to access the network. Therefore, before Ms. Jones turns off and stows her phone, she disables all transmitters and confirms the symbol on the screen that shows that all wireless transmitters are disabled.

* Bluetooth is a registered trademark of Bluetooth SIG, Inc.

Case #8

Use of a notebook computer aboard an aircraft, during a phase of flight when the use of electronics is permitted

Passengers are boarding a flight. Once on board, Mr. Williams remembers that he has to complete some work on his notebook computer during the flight. An announcement is made that the cabin is being prepared for take-off and that all PEDs must be turned off and stowed. Passengers are reminded that wireless transmissions are not allowed during the flight and must be disabled. Mr. Williams notices that the “Transmitters Disabled” symbol is stenciled on his power button. Realizing that that the transmitters can only be disabled when the notebook computer is powered off, he turns off and stows his computer knowing that he cannot use it during the flight.

Case #9

Use of a mobile phone’s camera inside a hospital, in an area where wireless transmissions are not permitted

Ms. Johnson has arrived at the hospital to visit her relatives and their newborn baby. As she enters the hospital and proceeds down a corridor, Ms. Johnson notices a sign informing visitors that the wireless part of any electronic devices must be disabled in certain sensitive areas of the hospital, including the area where the mother and baby are currently being cared for. Knowing she would really like to keep her camera phone on to take pictures of the baby, Ms. Johnson takes the phone out of her purse and selects the “Transmitters Disabled” mode. Later, when visiting with her relatives and the baby, Ms. Johnson uses her mobile phone in “Transmitters Disabled” mode to take pictures. After she leaves the controlled area within the hospital, Ms. Johnson switches back on the wireless part of her phone and transmits the pictures to friends and family back home.

Annex B

Example Combinations of PEDs/T-PEDs and Wireless Add-On Peripheral Devices

This section includes examples that illustrate section 4.3 concerning peripherals and add-on devices.

Note that a T-PED might be able to provide a “Transmitters Disabled” signal to some external devices, depending on the interface, but a PED (with no internal transmitters) will not be able to send a “Transmitters Disabled” signal to an external device, regardless of the interface.

PED: Notebook, no wireless capability
Add-on Device: PCMCIA card, Wi-Fi* capability
Transmitters Disabled: By add-on Device

T-PED: Notebook, internal Wi-Fi radio
Add-on Device: USB2 port, proprietary wireless mouse
Transmitters Disabled: From T-PED or by add-on device

T-PED: Notebook, internal Wi-Fi and Bluetooth radios
Add-on Device: Audio port, proprietary wireless headset
Transmitters Disabled: From T-PED or by add-on device

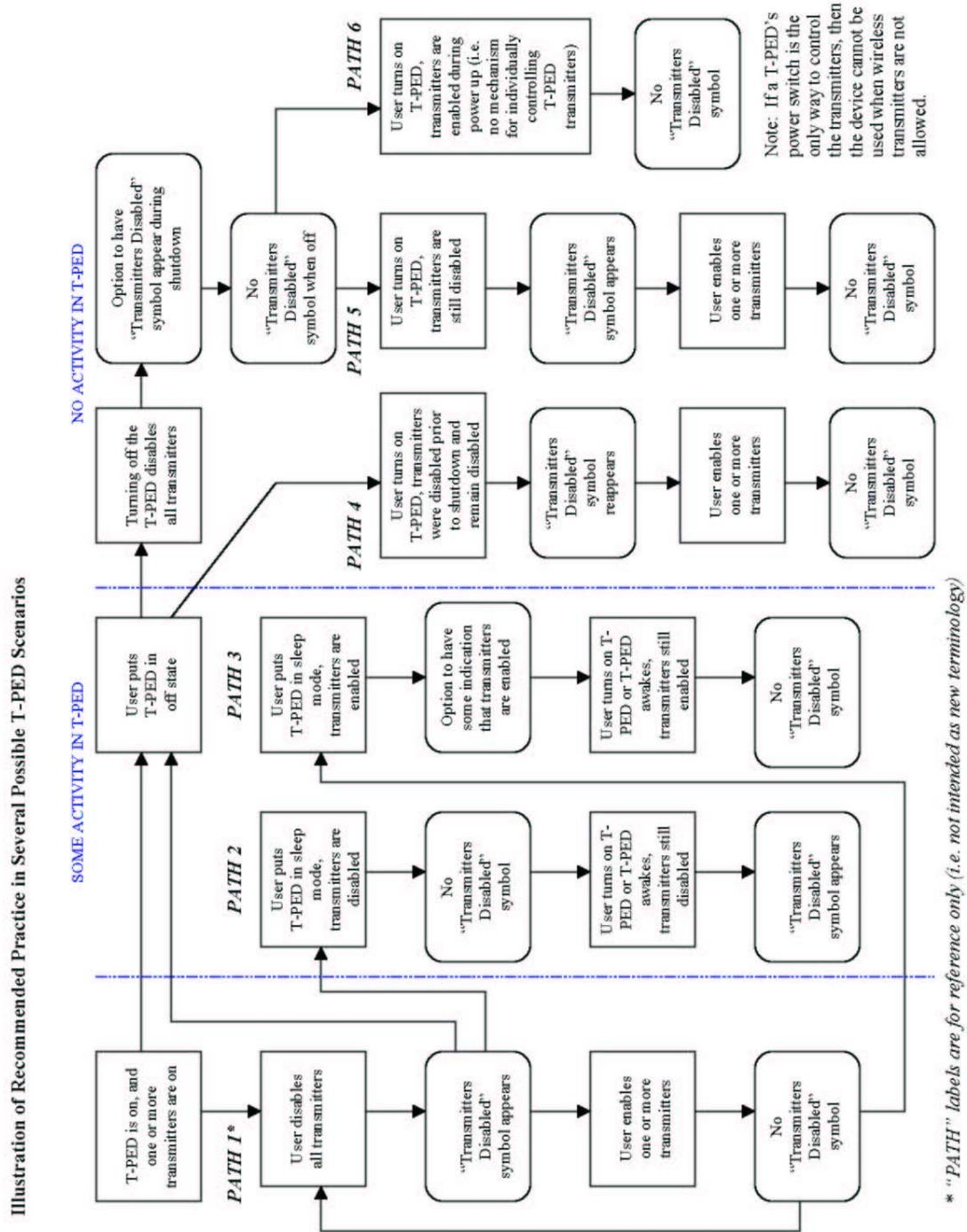
T-PED: Notebook, internal Wi-Fi and Bluetooth radios
Add-on Device: No base unit, Bluetooth remote control
Transmitters Disabled: From T-PED or by add-on device

PED: CD player
Add-on Device: Audio port, Bluetooth wireless headset
Transmitters Disabled: By add-on device

* Wi-Fi is a registered trademark of the Wi-Fi Alliance.

Annex C

Illustration of Recommended Practice in Several Possible T-PED Scenarios



Note: If a T-PED's power switch is the only way to control the transmitters, then the device cannot be used when wireless transmitters are not allowed.

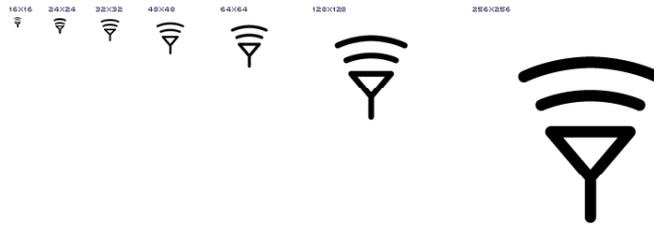
Annex D

Various Renditions of Transmitters Disabled/Enabled Symbols

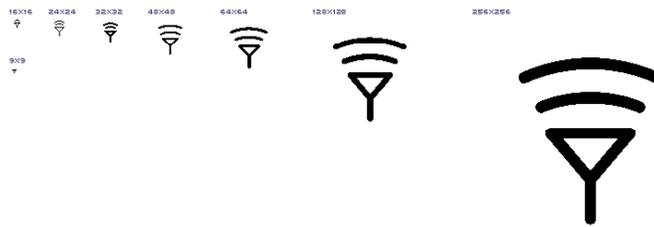
NOTE – Symbols referenced in this Recommended Practice can be downloaded in various graphics and camera-ready formats from www.ce.org.

Recommended Practice - Status Indicator for and Control of Transmitters in Portable Electronic Devices (PEDs)
Version 1.0 - October 2004

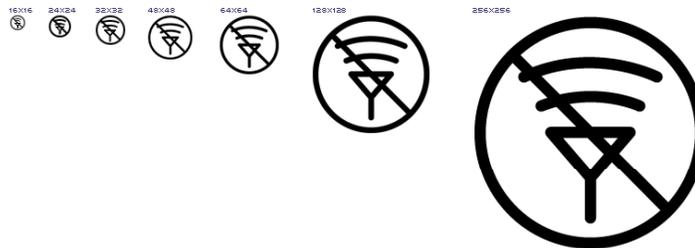
Transmitters Enabled (Anti-aliased Versions)



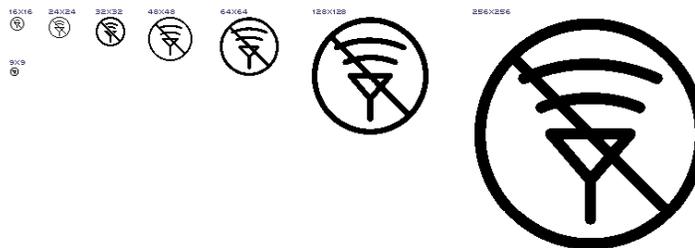
Transmitters Enabled (Aliased Versions)



Transmitters Disabled (Anti-aliased Versions)



Transmitters Disabled (Aliased Versions)





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