



ETSI GUIDE

**Guide to the application of harmonised standards covering
articles 3.1b and 3.2 of the Directive 2014/53/EU (RED)
to multi-radio and combined radio and non-radio equipment**

Reference

DEG/ERM-531

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Foreword

This final draft ETSI Guide (EG) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the ETSI standards Membership Approval Procedure.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document provides guidance on the application of harmonised standards to multi-radio and combined equipment to demonstrate conformity with article 3.1b (EMC) and article 3.2 (effective and efficient use of the radio spectrum) of the Radio Equipment Directive (RED) [i.1]. In particular it:

- provides guidance for the conformity assessment of this type of equipment;
- provides guidance on how to make use of assessment(s) already performed on each constituent product of the multi-radio or combined equipment and to, whenever possible, identify the additional assessment necessary (Δ) to complete the conformity assessment procedure (CAP) of this type of equipment;
- provides guidance upon the selection of the appropriate limits and/or test conditions where different limits and/or test conditions exist in the standards applicable to each constituent product of the multi-radio or combined equipment;
- helps to avoid duplication of testing wherever possible.

The type of equipment covered by the present document is equipment consisting of the combination of two or more products where at least one of them is a radio equipment as defined in the RED [i.1]. Such type of equipment (i.e. multi-radio equipment or combined equipment) falls under the scope of the RED [i.1] as a result of this product combination.

Examples of equipment to be covered by the present document include, but are not limited to, combination of multiple radio products in one radio equipment, combination of radio and IT or electro-technical equipment, RLAN enabled domestic appliance, radio controlled heating system, radio controlled lighting system, etc.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC, (OJ L153, 22.5.2014, p62).

- [i.2] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility, (OJ L 96, 29.3.2014, p. 79).
- [i.3] ETSI EN 301 489-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [i.4] CENELEC EN 55032: "Electromagnetic compatibility of multimedia equipment - Emission requirements".
- [i.5] CENELEC EN 61000-3-2: "Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)".
- [i.6] CENELEC EN 61000-3-3: "Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection".
- [i.7] CENELEC EN 61000-3-11: "Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems. Equipment with rated voltage current ≤ 75 A and not subject to conditional connection".
- [i.8] CENELEC EN 61000-3-12: "Electromagnetic compatibility (EMC). Limits. Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase".
- [i.9] ETSI EN 301 489 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in article 2 of the RED [i.1] and the following apply:

combined equipment: equipment consisting of two or more products where at least one of which is radio communication or radio determination equipment (i.e. radio equipment as defined in the RED [i.1])

equivalent assessment conditions: those assessment conditions applied to a product during the conformity assessment procedure with the aim to transfer the same product into a different but equivalent environment

NOTE: Those conditions may cover operational temperature range, material of housing, form factor, supply voltage, cycle time, nominal RF output power, antenna performance, antenna connector, application and control software, I/O lines, etc.

function: functionality that cannot be identified as a separate product and is embedded in one of the constituent products of the combined equipment

NOTE: This function can be a radio function or non-radio function.

multi-radio equipment: combined equipment consisting of two or more radio products (transmitters, receivers or transceivers)

product: constituent part of a combined equipment (i.e. radio product or non-radio product)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
CAP	Conformity Assessment Procedure
DC	Direct Current

EMC	ElectroMagnetic Compatibility
HS	Harmonised Standard
I/O	Input/Output
IT	Information Technology
NRP	non-radio product
RE	Radio Equipment
RED	Radio Equipment Directive (2014/53/EU [i.1])
RF	Radio Frequency
RLAN	Radio Local Area Network
RP	radio product

4 Type of equipment considered in the present document

The combination of radio and non-radio products as well as the integration of several radios into a single equipment require care in assessing conformity against the essential requirements of the RED [i.1].

For example, the wanted signal from a radio transmitter can generate harmonics in other parts of the circuitry and can generate intermodulation products with other RF sources. These RF sources can be internal clock oscillators not intended to radiate. They can be local oscillators of radio receivers as well as RF generators of radio transmitters.

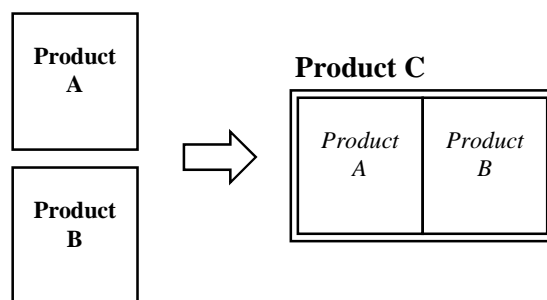


Figure 1: Concept of combined equipment (Product C)

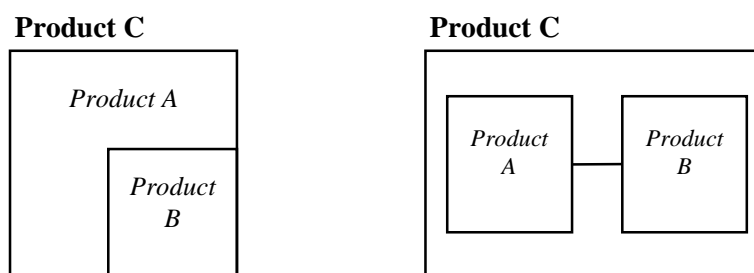


Figure 2: Example configurations of combined equipment (Product C)

Figure 1 represents the concept of "combined equipment" covered by the present document (see scenario #1 in Table 1). Figure 2 illustrates some examples of configurations.

NOTE 1: Product C can be constructed by the combination of more than one Product A and/or Product B.

Product A and Product B are products in their own right. At least one of these is a radio product as defined in the RED [i.1] (i.e. transmitter, receiver or transceiver). Both Product A and Product B could have been assessed and placed on the EU market individually according to the applicable EU Directive(s).

Product C is a new product constructed by the combination of Product A and Product B (e.g. Product B installed in Product A, Product A and Product B installed in a common enclosure, etc.) and falls under the scope of the RED [i.1] as a result of the combination.

On the other hand, if a given equipment cannot be separated into radio and non-radio constituent products that can be assessed individually, then such equipment would not qualify as combined equipment in the context of the present document. Therefore, the guidance provided in the present document would not address that equipment, as ETSI EMC and Radio harmonised standards would apply to the equipment as a whole (see scenario #2 in Table 1).

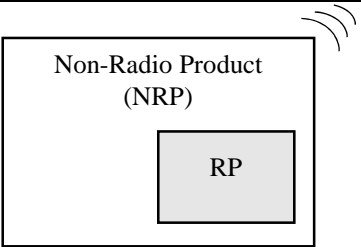
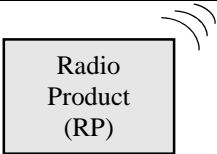
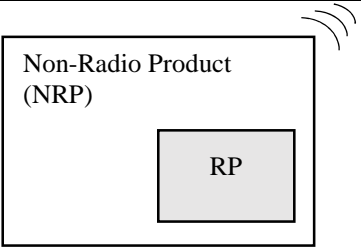
NOTE 2: The manufacturer of this kind of equipment can, however, use parts of the present document as appropriate and under his responsibility for the assessment of such equipment.

Furthermore, if a manufacturer of a combined equipment does not wish to follow the guidance provided by the present document for the combined equipment, then a full assessment of the combination would be necessary by applying ETSI EMC and Radio harmonised standards applicable to the combined equipment (see scenario #3 in Table 1).

NOTE 3: At the moment of publication of the present document, ETSI ERM WG EMC was in the process of creating one or more new standards to address combined equipment not covered by the present document. Therefore, applicable ETSI EMC standards may not be available for all types of combined equipment at the present time.

In order to ensure reproducibility of the results, the selection of the CAP for the combined equipment done by the manufacturer (e.g. use of the guidance provided in the present document or application of ETSI EMC and Radio standards) should be properly documented in the technical documentation of the combined equipment.

Table 1: Overview of possible RED conformity assessments for a "radio equipment" and a "combined equipment"

Scenario #	Equipment under the RED [i.1]	Conformity Assessment Procedure(s) (CAP) available	Reference available to demonstrate conformity with articles 3.1b and 3.2 of the RED
1		RED CAP (for the RP) EMC DIRECTIVE CAP (for the NRP) Δ (for the combination) (see note)	ETSI EG 203 367
2		RED CAP (for the RP)	Applicable ETSI EMC and Radio HS
3		RED CAP (for the combination)	Applicable ETSI EMC and Radio HS
NOTE: Δ is the additional assessment necessary for the combination. An assessment needs not necessarily lead to testing.			

5 Application of harmonised standards covering article 3.1b of the RED

5.1 Non-radio products combined with a radio product

5.1.1 Introduction

5.1.1.1 General

The manufacturer of the combined equipment is responsible to ensure the conformity of the equipment against the RED.

Under certain conditions, the conformity assessments performed on the individual products that constitute a combined equipment can be used as part of the conformity assessment of that combination of a radio product with a non-radio product.

5.1.1.2 Re-use of existing assessment

The manufacturer of the combined equipment should install the radio product in a host non-radio product in equivalent assessment conditions (i.e. host equivalent to the one used for the initial assessment of the radio product) and according to the installation instructions for the radio product.

- i) In this case, no additional assessment of the radio function of the combined equipment against ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable to that radio function according to clause 5.1.2 is required. Assessment of the non-radio function of the combined equipment according to clause 5.1.2 of the present document would still need to be carried out.
- ii) Furthermore, if the constituent radio product and the constituent non-radio product of the combined equipment never operate at the same time during normal operation of the combined equipment, then no additional assessment of the combined equipment against article 3.1b of the RED [i.1] is required. In this case, following sub-clauses under clause 5 of the present document would not apply for this combined equipment.

However, manufacturers should take care to ensure that where common wiring is used for multiple elements of the combined equipment, this does not introduce unexpected disturbances and/or negatively influences the operation of other functions which would make the re-use of the original assessments of the constituent products no longer possible.

5.1.1.3 Need for full re-assessment

On the other hand, if the manufacturer of the combined equipment does not install the radio product in a host non-radio product in equivalent assessment conditions and according to the installation instructions for the radio product, or if during normal operation of the combined equipment the constituent radio product and the constituent non-radio product of the combined equipment operate at the same time, then the combined equipment would need a re-assessment against article 3.1b of the RED.

In order to perform this re-assessment, test conditions of ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] and from the applicable harmonised standards listed under the EMC Directive [i.2] apply as appropriate. The selection of the requirements applicable for the assessment of the combined equipment is specified in the following sub-clauses of clause 5 on a phenomenon by phenomenon basis.

- NOTE: The assessment carried out on a combined equipment could be used by the manufacturer under his responsibility for the assessment of an equivalent combination if equivalent assessment conditions are met (e.g. same radio product combined with another non-radio product from the same product family with differences not affecting the assessment of the original combination).

5.1.2 Requirements

5.1.2.1 General

The combined equipment should consider the following requirements:

- those from ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable to the radio function of the combined equipment;
- those from the harmonised standards listed under the EMC Directive [i.2] applicable to the non-radio function of the combined equipment.

During the assessment of the combined equipment, the operation modes of the combined equipment most likely to cause maximum emissions and immunity responses should be the ones considered. These operation modes should reflect the normal operation of the combined equipment as intended by the manufacturer.

NOTE: These operation modes may be different for the assessment of the radio function and the non-radio function of the combined equipment.

During this assessment, the manufacturer should be able to judge which phenomena are fully covered by which harmonised standard in order to avoid double testing.

5.1.2.2 Emissions requirements

5.1.2.2.1 Introduction

The EMC assessment requirements for emissions from radio products are usually derived from EN 55032 [i.4] Class B. However, if the intended environment for the combined equipment has different requirements, as specified by the harmonised standards listed under the EMC Directive [i.2] applicable to the non-radio function, then those requirements should apply to the combined equipment whilst still respecting applicable exclusion bands.

During emission measurements of the combined equipment, if the radio function is set into non-transmit mode, no exclusion bands are applied. In case the non-transmit mode is not selected, then the following should be taken into account:

- harmonics and spurious disturbances associated with the wanted transmit signal should be ignored;
- emissions within the exclusion bands should be ignored.

5.1.2.2.2 Radiated Emissions

The combined equipment should be assessed for radiated emissions to the provisions outlined in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable to its radio function. For radiated emission from the enclosure port of the combined equipment, this is already covered by the relevant harmonised standard covering article 3.2 of the RED [i.3] (see clause 6 of the present document).

The combined equipment should be assessed against the harmonised standards listed under the EMC Directive [i.2] applicable to its non-radio function.

NOTE: An assessment needs not necessarily lead to testing.

5.1.2.2.3 Conducted Emissions

The combined equipment would need to be assessed for conducted emissions on all wired ports. In the majority of cases, this would be fully covered by an assessment against the harmonised standards listed under the EMC Directive [i.2] applicable to its non-radio function. In these cases, tests according to requirements in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] need not be carried out.

However, in those cases where the above assessment is deemed not to cover all the applicable requirements in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable to its radio function, the relevant parts of the ETSI EN 301 489 series [i.9] should be applied to the combined equipment.

In industrial environment, where there is no requirement in the applicable harmonised standards listed under the EMC Directive [i.2] for emissions from DC Power Ports, no assessment should be carried out on the combined equipment for these ports.

5.1.2.2.4 Harmonic current emissions (AC mains input port)

For combined equipment with an AC mains port intended to be connected to the public low voltage network, the requirements of EN 61000-3-2 [i.5] or equipment drawing an input current less than or equal to 16A, or EN 61000-3-12 [i.8] or equipment drawing more than 16A, but less than 75A input current, should be considered during the assessment of the combined equipment.

The requirements on harmonic current emissions (AC mains input port) included in ETSI EN 301 489-1 [i.3] covers the above assessment.

5.1.2.2.5 Voltage fluctuations and flicker (AC mains input port)

For combined equipment with an AC mains port intended to be connected to the public low voltage network, the requirements of EN 61000-3-3 [i.6] for equipment drawing an input current less than or equal to 16A, or EN 61000-3-11 [i.7] or equipment drawing more than 16A, but less than 75A input current, should be considered during the assessment of the combined equipment.

The requirements on voltage fluctuations and flicker (AC mains input port) included in ETSI EN 301 489-1 [i.3] covers the above assessment.

5.1.2.3 Immunity requirements

5.1.2.3.1 Selection of Performance Criteria

When assessing the immunity of the radio function of the combined equipment, the performance criteria from the relevant part of ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] should be used, unless for some phenomena specific performance criteria are defined in the following clauses.

When assessing the immunity of the non-radio function of the combined equipment, the performance criteria from the relevant harmonised EMC standard should be used. In most cases these will be contained within the harmonised standard that the non-radio part of the combined equipment would have found itself falling under.

5.1.2.3.2 Selection of test levels

Where the different harmonised standards used to assess the combined equipment against article 3.1b of the RED [i.1] contain different test levels for the various immunity requirements, the selection of the level(s) applicable to the combined equipment should take into account the intended environment of the combined equipment.

The reasoning behind the selection done by the manufacturer of the specific test levels for each immunity test on the combined equipment should be properly documented in the technical documentation.

For example, in the industrial environment it is usually expected that the higher test levels are selected. In a similar manner, in a domestic environment, it is usually expected that the lower test levels are selected.

5.1.2.3.3 Radiated Immunity

The minimum frequency range to be considered is 80 MHz to 6 GHz as defined in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9].

NOTE: The applicable exclusion bands are defined in the above standards and should be considered in the assessment of the combined equipment.

The tests levels to be considered should be as detailed in clause 5.1.2.3.2 of the present document. If the applicable harmonised standard listed under the EMC Directive [i.2] does not cover the entire frequency range above, then the levels given in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] should be used in the remaining frequency range.

The performance criteria for this test are detailed in clause 5.1.2.3.1 of the present document. Where the non-radio function is subject to testing over a smaller frequency range than the one defined above, the performance criteria used to assess the non-radio function in the remaining frequency range should be performance criterion C from that harmonised standard listed under the EMC Directive [i.2].

During the assessment of the combined equipment, in addition to the performance criteria specified above, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.4 Electrostatic discharge

The combined equipment should be assessed for electrostatic discharge to the provisions outlined in the EMC harmonised standard applicable to constituent product that provides the enclosure of the combined equipment.

In cases of a new common enclosure for the combined equipment, the EMC harmonised standard applicable to the non-radio product of the combined equipment for the appropriate environment should be selected for the assessment of electrostatic discharge.

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.5 Fast transients, Common mode

The combined equipment should be assessed for fast transients, common mode to the provisions outlined in the EMC harmonised standard applicable to constituent product that provides the enclosure of the combined equipment.

In cases of a new common enclosure for the combined equipment, the EMC harmonised standard applicable to the non-radio product of the combined equipment for the appropriate environment should be selected for the assessment of fast transients, common mode.

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.6 Radio frequency, common mode

The combined equipment should be assessed for radio frequency, common mode to the provisions outlined in the EMC harmonised standard applicable to constituent product that provides the enclosure of the combined equipment.

In cases of a new common enclosure for the combined equipment, the EMC harmonised standard applicable to the non-radio product of the combined equipment for the appropriate environment should be selected for the assessment of radio frequency, common mode.

The applicable exclusion bands defined in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] should be considered in the assessment of the combined equipment

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.7 Transients and surges in the vehicular environment

This requirement only applies in cases where the combined equipment is intended to be connected to a vehicle power supply as specified in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9].

In this case, the combined equipment should be assessed for transients and surges in the vehicular environment to the provisions outlined in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9].

Where the constituent radio product of the combined equipment is the one connected to the vehicle power supply, and has been assessed to ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9], then no further assessment of these phenomena for the combined equipment is needed.

5.1.2.3.8 Voltage dips and interruptions

The combined equipment should be assessed for voltage dips and interruptions to the provisions outlined in the EMC harmonised standard applicable to constituent product that provides the input power port to the combined equipment.

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.9 Surges

The combined equipment should be assessed for surges to the provisions outlined in the EMC harmonised standard applicable to constituent product that provides the input power port to the combined equipment.

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit and, where specified in the ETSI EN 301 489 series [i.9], lose stored data relevant for the operation of the combined equipment as intended by the manufacturer.

5.1.2.3.10 Other disturbance phenomena

The combined equipment should be assessed for any other disturbance phenomena not included in clause 5.1.2.3 of the present document but contained within the EMC harmonised standard applicable to the constituent product that provides the enclosure of and/or the input power port to the combined equipment.

NOTE: The applicable exclusion bands defined in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9], should be considered in the assessment of the combined equipment.

During the assessment of the combined equipment, in addition to the performance criteria specified in the standard selected in the above paragraph, the radio function of the combined equipment should not unintentionally transmit.

5.2 Multi-radio equipment

5.2.1 Introduction

The manufacturer of the multi-radio equipment is responsible to ensure the conformity of the equipment against the RED [i.1].

This clause details the considerations to be taken into account for the assessment of multi-radio equipment against article 3.1b of the RED [i.1].

The manufacturer of the multi-radio equipment should define the typical operation conditions of the equipment (e.g. number of transmitters operational at the same time).

5.2.2 Multi-radio equipment only capable of independent transmission

If the constituent radio products of the multi-radio equipment never operate at the same time during normal operation, then no additional assessment of the multi-radio equipment against article 3.1b of the RED [i.1] is required as a result of the multi-radio combination.

However, manufacturers should take care to ensure that where common wiring is used for multiple elements of the multi-radio equipment, this does not introduce unexpected disturbances and/or negatively influences the operation of other functions which would make the re-use of the original assessments no longer possible.

5.2.3 Multi-radio equipment capable of simultaneous transmission

However, if during normal operation of the multi-radio equipment the constituent radio products operate at the same time, then the multi-radio equipment would need a re-assessment against article 3.1b of the RED.

In this case an overall performance criteria is required for the multi-radio equipment. This may be developed by examining the individual performance criteria of the various constituent radio products involved. The performance criteria used should be properly documented by the manufacturer in the technical documentation.

Where multiple operational frequencies are used, exclusion bands can be found in ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable for each of the constituent radio products and all of these should be used during testing.

5.2.4 Multi-radio equipment comprising of numerous identical radio equipment

Typically this situation exists where a baseband amplifier is used to feed multiple radio front ends that can be located in a different location to the baseband amplifier. In this situation the constituent parts may be assessed separately to the appropriate ETSI EN 301 489-1 [i.3], together with those from the particular technology part(s) from the ETSI EN 301 489 series [i.9] applicable to that product part.

6 Application of harmonised standards covering article 3.2 of the RED

6.1 Non-radio products combined with a radio product

The manufacturer of the combined equipment is responsible to ensure the conformity of the equipment against the RED [i.1].

The conformity assessment performed on a radio product can be used as part of the conformity assessment of the combination of that radio product with a non-radio product.

If the manufacturer of the combined equipment installs the radio product in a host non-radio product in equivalent assessment conditions (i.e. host equivalent to the one used for the assessment of the radio product) and according to the installation instructions for the radio product, then no additional assessment of the combined equipment against article 3.2 of the RED [i.1] is required.

However, if the conditions in which the radio product is used in the combined equipment deviate from the assessment conditions, then the manufacturer of the combined equipment should re-assess the combined equipment against article 3.2 of the RED [i.1] using the applicable radio harmonised standard(s).

NOTE 1: Examples of deviations include, but are not limited to, host not equivalent to the one used for the assessment of the radio product, use of an antenna not included in the original assessment and not following the installation instructions for the radio product.

Furthermore, if the manufacturer of the combined equipment changes any other aspect of the original radio product design and/or physical layout, then the manufacturer of the combined equipment should perform a re-assessment of the combined equipment against article 3.2 of the RED [i.1] using the applicable radio harmonised standard.

NOTE 2: An assessment needs not necessarily lead to testing.

NOTE 3: The assessment carried out on a combined equipment could be used by the manufacturer under his responsibility for the assessment of an equivalent combination if equivalent assessment conditions are met (e.g. same radio product combined with another non-radio product from the same product family with differences not affecting the original assessment).

6.2 Multi-radio equipment

The manufacturer of the multi-radio equipment is responsible to ensure the conformity of the equipment against the RED [i.1].

The conformity assessment performed on each constituent radio product can be used as part of the conformity assessment of the multi-radio equipment.

If the manufacturer of the multi-radio equipment installs the radio products in equivalent assessment conditions (i.e. host equivalent to the one used for the assessment of the radio products) and according to the installation instructions for the radio products, then no additional assessment of the multi-radio equipment against article 3.2 of the RED [i.1] is required. In cases of more than one transmitter operating at the same time then a re-assessment of the spurious emissions and consideration of potential effects of intermodulation should be performed.

The manufacturer of the multi-radio equipment should define the typical operation conditions of the equipment (e.g. number of transmitters operational at the same time). The assessment of the spurious emissions of the multi-radio equipment should be carried out as set out in the relevant radio harmonised standards applicable to each radio product and according to these typical operation conditions.

The applicable spurious emissions requirements and limits for multi-radio equipment are those specified in the relevant radio harmonised standards applicable to each radio product.

NOTE 1: In the majority of cases the requirements and limits for spurious emissions set out in radio harmonised standards are identical.

If the applicable harmonised radio standards contain different limits and measuring conditions, then the multi-radio equipment should be assessed to the harmonised radio standard that specifies the least stringent limits for the common part of the frequency measurement ranges, in those cases where more than one transmitter operates at the same time. To assess the remaining parts of the frequency measurement ranges, the limits from the relevant harmonised radio standard should be used.

If the conditions in which the radio products are used in the multi-radio equipment deviate from their assessment conditions, then the manufacturer of the multi-radio equipment should re-assess the multi-radio equipment against article 3.2 of the RED [i.1] using the applicable radio harmonised standard(s).

NOTE 2: Examples of deviations include, but are not limited to, host not equivalent to the one used for the assessment of the radio product, use of an antenna not included in the original assessment and not following the installation instructions for the radio product.

NOTE 3: An assessment needs not necessarily lead to testing.

History

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