EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education

MINISTRY OF EDUCATION,
YOUTH AND SPORTS

RED – Radio Equipment Directive

Study material for the subject KEI/EMC2

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Version EN_09. 09. 2021

ESF II project of the University of West Bohemia in Pilsen,

reg. number: CZ.02.2.69/0.0/0.0/18_056/0013239

Radio equipment are not covered by the directive 2014/30EU [1] and they are covered by the directive 2014/53/EU [2] (this directive replaced the original directive 1999/5/EC [3].

'radio equipment' means [2]: „ an electrical or electronic product, which intentionally emits and/or receives radio waves for the purpose of radio communication and/or radiodetermination, or an electrical or electronic product which must be completed with an accessory, such as antenna, so as to intentionally emit and/or receive radio waves for the purpose of radio communication and/or radiodetermination ".

The organisation ETSI publish harmonized standards for radio equipment area. These standards are focused especially to the transmitter where is observed for example maximum radiated power, bandwidth of signals, frequency range, etc.

The series ETSI EN 301 489 is important in the terms of EMC. There exist a lot of parts of this standard (parts marked with a number and separated by a dash after the name of the standard:

- Part 1: "Common technical requirements";
- Part 2: "Specific conditions for radio paging equipment";
- Part 3: "Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz";
- Part 4: "Specific conditions for fixed radio links and ancillary equipment";
- Part 5: "Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech) and Terrestrial Trunked Radio (TETRA)";
- Part 6: "Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment";
- Part 9: "Specific conditions for wireless microphones, similar Radio Frequency (RF) audio link equipment, cordless audio and in-ear monitoring devices";
- Part 12: "Specific conditions for Very Small Aperture Terminal, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)";
- Part 13: "Specific conditions for Citizens' Band (CB) radio and ancillary equipment (speech and non-speech)";
- Part 15: "Specific conditions for commercially available amateur radio equipment";
- Part 17: "Specific conditions for Broadband Data Transmission Systems";
- Part 19: "Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band (ROGNSS) providing positioning, navigation, and timing data";
- Part 20: "Specific conditions for Mobile Earth Stations (MES) used in the Mobile Satellite Services (MSS)";
- Part 22: "Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment";
- Part 27: "Specific conditions for Ultra Low Power Active Medical Implants (ULP-AMI) and related peripheral devices (ULP-AMI-P) operating in the 402 MHz to 405 MHz bands"; Part 28: "Specific conditions for wireless digital video links";

- Part 29: "Specific conditions for Medical Data Service Devices (MEDS) operating in the 401 MHz to 402 MHz and 405 MHz to 406 MHz bands";
- Part 31: "Specific conditions for equipment in the 9 kHz to 315 kHz band for Ultra Low Power Active Medical Implants (ULP-AMI) and related peripheral devices (ULP-AMI-P)";
- Part 33: "Specific conditions for Ultra-WideBand (UWB) devices";
- Part 34: "Specific conditions for External Power Supply (EPS) for mobile phones";
- Part 35: "Specific requirements for Low Power Active Medical Implants (LP-AMI) operating in the 2 483,5 MHz to 2 500 MHz bands";
- Part 50: "Specific conditions for Cellular Communication Base Station (BS), repeater and ancillary equipment";
- Part 51: "Specific conditions for Automotive, Ground based Vehicles and Surveillance Radar Devices using 24,05 GHz to 24,25 GHz, 24,05 GHz to 24,5 GHz, 76 GHz to 77 GHz and 77 GHz to 81 GHz";
- Part 52: "Specific conditions for Cellular Communication Mobile and portable radio and ancillary equipment";
- Part 53: "Specific conditions for terrestrial sound broadcasting and digital TV broadcasting service transmitters and associated ancillary equipment";
- Part 54: "Specific conditions for ground based aeronautical and meteorological radars".
- NOTE: Parts 7, 8, 10, 11, 14, 16, 18, 23, 24, 25, 26 and 32 of this multi-part deliverable have been removed from this listing as they do not cover the new Directives in force, Directive 2014/53/EU [i.1] and Directive 2014/30/EU [i.2].

There are usually cited the basic EMC standards (or generic for different environment – industry, home, automotive,…) where the frequency range used for the service is removed from the limits for radiating emission measurement (transmitting / receiving frequency range of the device). This exception does not apply for the stand-by mode of the equipment.

Phenomenon	Port	Applicability			Reference clause
		Fixed-Use	Vehicle Use	Portable Use	
radiated emission	enclosure port of ancillary equipment	applicable	applicable	applicable	8.2
conducted emission	DC power input/output port	applicable	applicable	not applicable	8.3
conducted emission	AC mains input/output port	applicable	not applicable	not applicable	8.4
harmonic current emissions	AC mains input port	applicable	not applicable	not applicable	8.5
voltage fluctuations and flicker	AC mains input port	applicable	not applicable	not applicable	8.6
conducted emission	wired network port	applicable	not applicable	not applicable	8.7

Tab 1: Emission tests

Phenomenon	Port	Applicability			Reference clause
		Fixed-Use	Vehicle Use	Portable-Use	
RF electromagnetic field (80 MHz to 6 000 MHz)	enclosure port	applicable	applicable	applicable	9.2
electrostatic discharge	enclosure	applicable	not applicable	applicable	9.3
fast transients common mode	signal, wired network and control ports, DC and AC power ports	applicable	not applicable	not applicable	9.4
RF common mode 0,15 MHz to 80 MHz	signal, wired network and control ports, DC and AC power ports	applicable	not applicable	not applicable	9.5
Vehicular transients and surges	DC power input ports	not applicable	applicable	not applicable	9.6
voltage dips and interruptions	AC mains power input ports	applicable	not applicable	not applicable	9.7
surges, line to line and line to ground	AC mains power input ports, wired network ports	applicable	not applicable	not applicable	9.8

Tab 2: Immunity tests

References

[1] SMĚRNICE EVROPSKÉHO PARLAMENTU A RADY 2014/30/EU ze dne 26. února 2014 o harmonizaci právních předpisů členských států týkajících se elektromagnetické kompatibility (přepracované znění), In: EUR-Lex[právní informační systém]. Úřad pro publikace Evropské unie [cit. 24. 7. 2018]. Dostupné z: https://eur-lex.europa.eu/legal-content/CS/ALL/?uri=celex:32014L0030

[2] SMĚRNICE 2014/53/EU EVROPSKÉHO PARLAMENTU A RADY ze dne 16. dubna 2014 o harmonizaci právních předpisů členských států týkajících se dodávání rádiových zařízení na trh a zrušení směrnice 1999/5/ES, In: EUR-Lex[právní informační systém]. Úřad pro publikace Evropské unie [cit. 24. 7. 2018]. Dostupné z: https://eur-lex.europa.eu/legal-content/CS/TXT/?uri=CELEX%3A32014L0053

[3] Směrnice Evropského parlamentu a Rady 1999/5/ES ze dne 9. března 1999 o rádiových zařízeních a telekomunikačních koncových zařízeních a vzájemném uznávání jejich shody, In: EUR-Lex[právní informační systém]. Úřad pro publikace Evropské unie [cit. 24. 7. 2018]. Dostupné z: https://eur-lex.europa.eu/legal-content/CS/TXT/?uri=CELEX%3A31999L0005