IR 2088 – UK Interface Requirement 2088

White space devices operating in the 470 MHz to 790 MHz band

Draft

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Contents

Section 1

References

[1]	VNS 2188	Voluntary National Specification 2188, White space devices operating in the 470 MHz to 790 MHz band
[2]	Draft EN 301 598	White space devices (WSDs): Wireless access systems operating in the 470MHz to 790MHz frequency band

Note: ETSI standards can be obtained from the ETSI website at:
http://www.etsi.org/WebSite/Standards/Standard.aspx

Section 2

Foreword

2.1 The Radio Equipment and Telecommunications Terminal Equipment Directive 99/5/EC (R&TTE Directive) was implemented in the United Kingdom (UK) on the 8 April 2000 by The Radio Equipment and Telecommunications Terminal Equipment Regulations 2000, Statutory Instrument 2000 No. 730.

2.2 In accordance with Articles 4.1 and 7.2 of Directive 1999/5/EC, this UK Interface Requirement contains minimum requirements for the establishment, installation and use of licence exempt white space devices (WSDs) in the UK in the 470 MHz to 790 MHz band.

2.3 Nothing in this UK Radio Interface Requirement shall preclude the need for equipment to comply with Directive 1999/5/EC.

2.4 It is required by the Wireless Telegraphy Act 2006 that no radio equipment is installed or used in the UK except under the authority of a licence granted by or otherwise exempted by regulations made by Ofcom. It is a condition of such a licence or exemption regulations as appropriate that, in order to be installed or used in the UK, the equipment must meet the minimum requirements specified in this UK Interface Requirement for the stated equipment types and for the stated frequency bands. Nothing in this UK Interface Requirement shall preclude equipment from being placed on the market in the UK that complies with the 'essential requirements' specified in Directive 1999/5/EC.

2.5 The requirements given in the main body of this UK Radio Interface Requirement will apply to the licence exemption of WSDs in the 470 MHz to 790 MHz band.

2.6 This UK Radio Interface Requirement will be revised as necessary, for example to follow

i) future technology developments for reasons related to the effective and appropriate use of the spectrum in particular maximising spectrum utilisation; and

ii) changes to the available spectrum for WSDs.

2.7 All UK Radio Interface Requirements notified under Directive 1998/34/EC will be published and will be made available free of charge from the Ofcom web-site at http://stakeholders.ofcom.org.uk/spectrum/spectrum-management/research-guidelines-tech-info/interface-requirements/.

2.8 Further information on this UK Radio Interface Requirement can be obtained from the technical enquiry contact given at the back of this document.

Section 3

Minimum requirements for operation of WSDs within the UK

3.1 The minimum requirements in this document are made for reasons related to the effective and appropriate use of the radio spectrum, in particular maximising spectrum utilisation and avoidance of harmful interference.

3.2 This UK Radio Interface Requirement gives a high level description of how the radio spectrum in the UK is used by WSDs in the 470 MHz to 790 MHz band. It does not prescribe technical interpretation of the 'essential requirements' of Directive 1999/5/EC.

3.3 This UK Radio Interface Requirement therefore stipulates the necessary equipment parameters for the licence exemption of WSDs in the 470 MHz to 790 MHz band within the UK. Table 3.1, Table 3.2, Section 4 and Section 5 contain the relevant equipment parameters. These taken together with the 'essential requirements' detailed in Article 3.2 of Directive 1999/5/EC constitute the minimum requirements for the use of WSDs in the 470 MHz to 790 MHz band within the UK. Nothing in this UK Interface Requirement shall preclude equipment from being placed on the market in the UK that complies with the 'essential requirements' specified in Directive 1999/5/EC.

3.4 The minimum requirements specified in the UK Radio Interface Requirement are applied to achieve the desired level of compatibility within the 470 MHz to 790 MHz band and with other radiocommunication services, whilst promoting enterprise, innovation and competition.

3.5 This UK Radio Interface Requirement provides the necessary minimum requirements which facilitate access to the 470 MHz to 790 MHz band by the use of a white space database (WSDB).

3.6 In this document, the following terms shall have the following meanings:

- "device parameters" means the parameters that relate to a specific WSD and includes both the master device parameters and the slave device parameters;
- "geo-located" means the ability of a WSD to determine and report its latitude and longitude coordinates. Some WSDs may also have the ability to determine and report their altitude which is the height of their antenna above sea level;
- "geographic validity" means the geographic area within which the operational parameters for a geo-located WSD are valid. The geographic area is the area within a 50 metre radius of the latitude and longitude coordinates of the geo-located WSD determined at the time at which that geo-located white space device last reported its latitude and longitude coordinates to a qualifying white space database;
- "in-block" means emissions that fall within a DTT channel that is used by a WSD for purposes of transmitting information to a receiver. For a WSD which transmits simultaneously in k DTT channels, the in-block emissions fall within k segments

of the signal's frequency spectrum, each 8 MHz wide. Emissions are specified here as equivalent isotropic radiated power (EIRP);

- "master WSD" means a geo-located device that obtains master operational parameters and slave operational parameters directly from a white space database;

- "master operational parameters" means the parameters which a master WSD receives from a WSDB for the purposes of the master WSD's transmissions in the frequency band 470 MHz to 790 MHz;

- "qualifying WSDB" means a white space database which has qualified to communicate with white space devices and to provide operational parameters to those white space devices under the terms of a contract between Ofcom and the person providing the white space database and which white space database is listed in Schedule 1 of Statutory Instrument 2012 No. xx, Electronic Communications, The Wireless Telegraphy (White Space Devices) (Exemption) Regulations [●];

- "slave WSD" means a device that obtains slave operational parameters directly from a master WSD;

- "slave operational parameters" means the parameters which a master WSD receives from a WSDB and then communicates to a slave WSD for the purposes of the slave WSD's transmissions in the frequency band 470 MHz to 790 MHz;

- "TV white spaces" means frequencies within the band 470 MHz to 790 MHz which have been identified by a WSDB for use by a WSD under the operational conditions specified by the WSDB;

- "WSD" means wireless telegraphy equipment which operates in the TV white spaces;

Mandatory (1-10)		
1	Frequency band	470 MHz to 790 MHz
2	Radiocommunication service	Fixed / Mobile
3	Application	Terrestrial radio applications capable of providing Electronic Communications Services (TRA-ECS).
4	Channelling	Master operational parameters specified by a qualifying WSDB as contained in Section 4.
5	Modulation / occupied bandwidth	Not specified
6	Direction / separation	Not specified
7	Maximum transmit power / Power density	Master operational parameters specified by a qualifying WSDB as contained in Section 4.
8	Channel access and occupation rules	A master WSD must cease all transmissions in the 470 MHz to 790 MHz band within 60 seconds of receiving instructions to do so from a qualifying WSDB.
9	Authorisation regime	Licence exempt
10	Additional essential requirements	Not specified
Informative (11-15)		
11	Frequency planning assumptions	Not specified
12	Planned changes	Not specfied
13	Reference	VNS 2188 / EN 301 598
14	Notification	2012/xxx/UK
15	Remarks	See Section 6

Table 3.1. Minimum requirements for the use of master WSDs.

Mandatory (1-10)		
1	Frequency band	470 MHz to 790 MHz
2	Radiocommunication service	Fixed / Mobile
3	Application	Terrestrial radio applications capable of providing Electronic Communications Services (TRA-ECS).
4	Channelling	Slave operational parameters specified by a qualifying WSDB through a master WSD as contained in Section 5.
5	Modulation / occupied bandwidth	Not specified
6	Direction / separation	Not specified
7	Maximum transmit power / Power density	Slave operational parameters specified by a qualifying WSDB through a master WSD as contained in Section 5.
8	Channel access and occupation rules	A slave WSD must cease all transmissions in the 470 MHz to 790 MHz band • within one second of receiving instructions from a serving master WSD to do so; or • if it loses communications for more than five seconds with the master WSD from which it has received its slave operational parameters.
9	Authorisation regime	Licence exempt
10	Additional essential requirements	Not specified
Informative (11-15)		
11	Frequency planning assumptions	Not specified
12	Planned changes	Not specified
13	Reference	VNS 2188 / EN 301 598
14	Notification	2012/xxx/UK
15	Remarks	See Section 7

Table 3.2. Minimum requirements for the use of slave WSDs.

Section 4

Additional minimum requirements for master WSDs

Master device parameters

4.1 A master WSD must communicate the master device parameters[1] listed in Table 4.1 to a qualifying WSDB in order to receive master operational parameters from that WSDB.

Unique device identifier.
Device emission class.
Technology identifier.
Device type.
Device model identifier.
Device category (master or slave).
Antenna latitude and longitude coordinates.
Antenna latitude and longitude coordinate accuracies.

Table 4.1. Master device parameters.

Master operational parameters

4.2 A master WSD must not request master operational parameters or slave operational parameters other than from a qualified WSDB**.**

4.3 A master WSD must only transmit in the 470 MHz to 790 MHz band

- in accordance with the master operational parameters listed in Table 4.2 which it has received from a qualifying WSDB; and
- in a geographic area which does not exceed the geographic validity of those master operational parameters.

[1] These terms are explained in Table 4 of VNS 2188 published by Ofcom on 22 November 2012.

Lists of lower and upper frequency boundaries within which a master WSD is permitted to operate, specified as (470 + 8k) MHz and (470 + 8k + 8) MHz, respectively, where 0 ≤ k ≤ 39.
Maximum permitted in-block EIRP spectral densities specified in dBm/(100 kHz) and dBm/(8 MHz) between each lower frequency boundary and its corresponding upper frequency boundary.
Limits on the maximum total number of DTT channels that may be used at any given time and the maximum number of contiguous DTT channels that may be used at any given time.
Time validity for the above parameters.

Table 4.2. Master operational parameters.

Master channel usage parameters

4.4 After the master WSD has received operational parameters for its own transmissions in the 470 MHz to 790 MHz band from a qualifying WSDB and before transmission in the 470 MHz to 790 MHz band, that master WSD must report the master channel usage parameters listed in Table 4.3 to a qualifying WSDB.

Intended lower and upper frequency boundaries of the in-block emissions, specified as (470 + 8k) MHz and (470 + 8k + 8) MHz, respectively, where 0 ≤ k ≤ 39.
Maximum intended in-block EIRP spectral densities specified in dBm/(100 kHz) and dBm/(8 MHz) between each reported lower frequency boundary and its corresponding upper frequency boundary.

Table 4.3. Master channel usage parameters.

Requirements for master WSDs serving slave WSDs

4.5 A master WSD must not communicate slave operational parameters listed in Table 5.2 to a slave WSD unless those slave operational parameters have been communicated to the master WSD by a qualifying WSDB.

4.6 A master WSD must report to a qualifying WSDB the slave device parameters listed in Table 5.1 and the channel usage parameters listed in Table 5.3 for the transmissions of any slave WSD which it is serving.

Section 5

Additional minimum requirements for slave WSDs

Slave device parameters

5.1 When associating with a master WSD, a slave WSD must communicate the slave device parameters[2] listed in Table 5.1 to that master WSD.

Unique device identifier.
Device emission class.
Technology identifier.
Device type.
Device model identifier.

Table 5.1. Slave device parameters.

5.2 If the slave WSD is a geo-located slave WSD, it must communicate the additional device parameters listed in Table 5.2 to the master WSD with which it is associating.

Antenna latitude and longitude coordinates.
Antenna latitude and longitude coordinate accuracies.

Table 5.2 Additional slave device parameters for geo-located slave WSDs.

Slave operational parameters

5.3 A slave WSD must only transmit in the 470 MHz to 790 MHz band

- in accordance with the slave operational parameters listed in Table 5.3 which it has received from a master WSD; and
- if the slave WSD is a geo-located slave, in a geographic area which does not exceed the geographic validity of those slave operational parameters.

[2] These terms are explained in Table 4 of VNS 2188 published by Ofcom on 22 November 2012.

Lists of lower and upper frequency boundaries within which a slave WSD is permitted to operate, specified as (470 + 8k) MHz and (470 + 8k + 8) MHz, respectively, where 0 ≤ k ≤ 39.
Maximum permitted in-block EIRP spectral densities specified in dBm/(100 kHz) and (dBm/8 MHz) between each lower frequency boundary and its corresponding upper frequency boundary.
Limits on the maximum total number of DTT channels that may be used at any given time and the maximum number of contiguous DTT channels that may be used at any given time.
Time validity for the above parameters.

Table 5.3. Slave operational parameters.

Slave channel usage parameters

5.4 After a slave WSD has received slave operational parameters for its transmissions in the 470 MHz to 790 MHz band from a master WSD, that slave WSD must report the slave channel usage parameters listed in Table 5.4 to its serving master WSD.

Intended lower and upper frequency boundaries of the in-block emissions, specified as (470 + 8k) MHz and (470 + 8k + 8) MHz, respectively, where 0 ≤ k ≤ 39.
Maximum intended in-block EIRP spectral densities specified in dBm/(100 kHz) and dBm/(8 MHz) between each reported lower frequency boundary and its corresponding upper frequency boundary.

Table 5.4. Slave channel usage parameters.

Section 6

Additional minimum requirements for master WSDs (informative)

6.1 This section identifies requirements which are contained in the VNS and which Ofcom considers to be key features of the device to achieve compliance with the essential requirements of the R&TTE Directive, specifically to avoid harmful interference.

Database discovery

6.2 Database discovery mechanism (see NOTE 1) as specified in VNS 2188 published by Ofcom on 22 November 2012 is assumed to be implemented.

6.3 NOTE 1: A master WSD must obtain a list of qualifying WSDBs which are currently operational in the UK at https://TVWS-DB.ofcom.org.uk ('website'). A master WSD must be able to receive and interpret a value N which is returned by the same website. N is the periodicity with which a master WSD must re-consult the website. A master WSD must not request operational parameters from a WSDB that is not on the website. A master WSD must cease communications within the UHF TV band if more than N hours have elapsed since it previously successfully discovered an operational WSDB listed in the website.

The WSDBs listed in https://TVWS-DB.ofcom.org.uk will be specified in xml format, with UTF-8 encoding.

Communication protocol and security requirements

6.4 Communications between a master WSD and an approved WSDB must be performed using secure protocols[3] that avoid malicious corruption or unauthorized modification of data.

6.5 Communications between a master WSD and a slave WSD for purposes of relaying operational parameters and device parameters must be performed using secure protocols[3] that avoid malicious corruption or unauthorized modification of data.

[3] Secure protocols as defined in the relevant technology standards are assumed to be implemented.

Section 7

Additional minimum requirements for slave WSDs (informative)

7.1 This section identifies requirements which are contained in the VNS and which Ofcom considers to be key features of the device to achieve compliance with the essential requirements of the R&TTE Directive, specifically to avoid harmful interference.

Communication protocol and security requirement

7.2 Communications between a master WSD and a slave WSD for purposes of relaying operational parameters and device parameters must be performed using secure protocols[4] that avoid malicious corruption or unauthorized modification of data.

[4] Secure protocols as defined in the relevant technology standards are assumed to be implemented.

Section 8

Contact details

8.1 Please direct any enquiries to Siew Yoon Tan / Reza Karimi.

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Section 9

Document history

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1.0	22 November 2012	Draft published