
UK Interface Requirements 2102 2102.1 to 2102.2

Licence exempt static indoor and low gain
mobile phone repeaters

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1. References

- 1.1 EN 303 609: Global System for Mobile communications (GSM); GSM Repeaters; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
- 1.2 EN 301 908-11: Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 11: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD and E-UTRA FDD) (Repeaters) covering the essential requirements of article 3.2 of the R&TTE Directive
- 1.3 EN 301 908-15: IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 15: Evolved Universal Terrestrial Radio Access (E-UTRA FDD) Repeaters

2. Foreword

- 2.1 In accordance with Articles 7 and 8 of the Radio Equipment Directive (Directive 2014/53/EU), this UK Interface Requirement contains the requirements for the licensing (via licence-exemption) and establishment, installation and use of (i) static mobile phone repeaters for indoor use and (ii) low gain mobile phone repeaters for in-vehicle use in the specified frequency bands.
- 2.2 Nothing in this UK Radio Interface Requirement shall preclude the need for equipment to comply with Directive 2014/53/EU.
- 2.3 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 established, 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 2014/53/EU.
- 2.4 The requirements given in the main body of this UK Radio Interface Requirement will apply to the licensing (via licence-exemption) to use the relevant spectrum of (i) static mobile phone repeaters for indoor use and (ii) low gain mobile phone repeaters for in-vehicle use.
- 2.5 This UK Radio Interface Requirement will be revised as necessary, for example to follow:
 - i) current technology developments for reasons related to the effective, efficient and appropriate use of the spectrum in particular maximising spectrum utilisation; and
 - ii) changes to the available spectrum allocated for mobile radiocommunication services.
- 2.6 All UK Radio Interface Requirements notified under Directive 2015/1535/EU will be published and will be made available free of charge from the Ofcom web-site at <http://www.ofcom.org.uk>.
- 2.7 Further information on this UK Radio Interface Requirement can be obtained from the technical enquiry contact given at the back of this document.

3. Minimum requirements for operation within the UK

- 3.1 The minimum requirements in this document are made for reasons related to the effective, efficient and appropriate use of the radio spectrum, in particular maximising spectrum utilisation.
- 3.2 This UK Radio Interface Requirement gives a high level description of how the relevant spectrum in the UK is used for (i) static mobile phone repeaters for indoor use and (ii) low gain mobile phone repeaters for in-vehicle use in the specified frequency bands. It does not prescribe technical interpretation of the 'essential requirements' of Directive 2014/53/EU.
- 3.3 This UK Radio Interface Requirement therefore stipulates the necessary equipment parameters for the licensing (via licence exemption) of the use of the relevant spectrum by such mobile phone repeaters in the UK. The tables in IR2102.1, IR2102.2, Table A1 and Table A2 of this document contain the relevant equipment parameters. These taken together with the 'essential requirements' detailed in Article 3.2 of Directive 2014/53/EU constitute the minimum requirements for the use of the spectrum by the repeaters 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 2014/53/EU.
- 3.4 The technical parameters specified in the UK Radio Interface Requirement are applied to achieve the desired level of compatibility within the spectrum used for mobile radiocommunication services and with other radiocommunications services, whilst promoting enterprise, innovation and competition.
- 3.5 This UK Radio Interface requirement provides the necessary technical information which facilitates access to the relevant spectrum by making clear the assumptions that are made in planning the use of the that spectrum by (i) static mobile phone repeaters for indoor use and (ii) low gain mobile phone repeaters for in-vehicle use in the UK. It is not the intention of this UK Radio Interface Requirement to duplicate or impose any additional 'essential requirements' of the Directive 2014/53/EU on products. Any specified parameters within this document are for the purpose of identifying product options and not as a national de facto product requirement.

IR2102.1: Minimum requirements for the use of: static mobile phone repeaters for indoor use		
Mandatory (1-11)		
1	Radiocommunication Service	Mobile
2	Application	Static mobile phone repeaters for indoor use
3	Frequency band	<p>800 791-721 MHz (Downlink) 832-862 MHz (Uplink)</p> <p>900 880-915 MHz (Uplink) 925-960 MHz (Downlink)</p> <p>1800 1710-1785 MHz (Uplink) 1805-1880 MHz (Downlink)</p> <p>2100 1920-1980 MHz (Uplink) 2110-2170 MHz (Downlink)</p>
4	Channelling	Not specified
5	Modulation/Occupied bandwidth	Not specified
6	Direction/Separation	Repeater transmit/receive
7	Transmit power/Power density	See Table A1 (which is part of this section IR2102.1)
8	Channel access and occupation rules	<p>Transmit Gain Control</p> <p>The uplink and downlink system gain in dB of a repeater, referenced to its input and output ports, shall not exceed BSCL-30, where BSCL (base station coupling loss) is the path loss between the base station and the repeater. Where BSCL cannot be determined, the repeater must not transmit.</p> <p>The uplink and downlink system gain of a repeater, referenced to its uplink and downlink antennas, shall not exceed 100 dB.</p> <p>The apparatus shall determine the value of BSCL by calculating the difference between the carrier power received at the repeater and the carrier power transmitted from the base station. The carrier power transmitted by the base station may be determined from the</p>

		<p>system information messages sent by the base station on its control channels.</p> <p>Automatic Standby</p> <p>When the repeater is no longer serving an active device connection it must, after no more than 5 minutes, reduce any uplink noise power to no more than -70 dBm/MHz EIRP.</p> <p>Anti-Oscillation</p> <p>Repeaters must detect and mitigate (i.e. by automatic gain reduction or shut down) any oscillations in uplink and downlink bands. Oscillation detection and mitigation must occur automatically within:</p> <ul style="list-style-type: none"> • 0.3 seconds in the uplink band; and • 1 second in the downlink band. <p>In cases where oscillation is detected, the repeater must continue this mitigation for at least one minute before restarting. After five such restarts, the repeater must not resume operation until manually reset.</p> <p>Single Operator configuration</p> <p>The amplified frequencies shall be limited to those licensed to a single mobile network operator.</p> <p>The equipment may be re-configured to alternate frequencies, but may only operate using frequencies licensed to a single operator when configured.</p> <p>Noise figure</p> <p>The repeater system noise figure shall not exceed 7 dB</p>
9	Authorisation regime	Licence Exempt ¹
10	Additional essential requirements	Nil
11	Frequency planning assumptions	Not specified

¹ See remarks

Informative (12-15)		
12	Planned changes	Nil
13	Reference	EN 303 609 EN 301 908-11 EN 301 908-15
14	Remarks	The deployment of 4G only repeaters is not permitted. All repeaters must also amplify a 2G and/or a 3G signal.
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Table A1

Band	Technology	Maximum Uplink Power	Maximum Downlink power (indoor use only)
800	Technology Neutral	23 dBm EIRP	PSD 10 dBm / 5 MHz EIRP; and Total 17 dBm EIRP
900	GSM	33 dBm EIRP	10 dBm EIRP
1800	GSM	30 dBm EIRP	10 dBm EIRP
900, 1800 & 2100	3G	24 dBm EIRP	PSD: 10 dBm / 5 MHz EIRP; and Total: 17 dBm EIRP
900 & 1800	LTE & WiMAX	23 dBm EIRP	PSD: 10 dBm / 5 MHz EIRP; and Total: 17 dBm EIRP
2100	Technology Neutral	24 dBm EIRP	PSD: 10 dBm / 5 MHz EIRP; and Total: 17 dBm EIRP
Where PSD is power spectral density			

IR2102.2: Minimum requirements for the use of: low gain mobile phone repeaters for in-vehicle use

Mandatory (1-11)		
1	Radiocommunication Service	Mobile
2	Application	Low gain mobile phone repeaters for in-vehicle use; no fixed installations
3	Frequency band	<p>800 791-721 MHz (Downlink) 832-862 MHz (Uplink)</p> <p>900 880-915 MHz (Uplink) 925-960 MHz (Downlink)</p> <p>1800 1710-1785 MHz (Uplink) 1805-1880 MHz (Downlink)</p> <p>2100 1920-1980 MHz (Uplink) 2110-2170 MHz (Downlink)</p>
4	Channelling	Not specified
5	Modulation/Occupied bandwidth	Not specified
6	Direction/Separation	Repeater transmit/receive
7	Transmit power/Power density	See Table A2 (which is part of this section IR2102.2)
8	Channel access and occupation rules	<p>Maximum permitted Gain</p> <p>In both the Uplink and the Downlink the maximum permitted system gain, referenced between the external antenna and the input port to the cradle, is:</p> <ul style="list-style-type: none"> • 21 dB in relevant frequency bands above 1 GHz; and • 15 dB in relevant frequency bands below 1 GHz.
		<p>Automatic Standby</p> <p>When the repeater is no longer serving an active device connection it must, after no more than 5 minutes, reduce any uplink noise power to no more than -70 dBm/MHz TRP.</p>

9	Authorisation regime	Licence Exempt
10	Additional essential requirements	Nil
11	Frequency planning assumptions	Not specified
Informative (12-15)		
12	Planned changes	
13	Reference	EN 303 609 EN 301 908-11 EN 301 908-15
14	Remarks	
15	Notification Number	2017/509/UK

Table A2

Band	Technology	Maximum Uplink Power	Maximum Downlink power (in-vehicle use only)
800	Technology Neutral	23 dBm TRP	PSD 10 dBm / 5 MHz TRP; and Total 17 dBm TRP
900	GSM	33 dBm TRP	10 dBm TRP
1800	GSM	30 dBm TRP	10 dBm TRP
900, 1800 & 2100	3G	24 dBm TRP	PSD: 10 dBm / 5 MHz TRP; and Total: 17 dBm TRP
900 & 1800	LTE & WiMAX	23 dBm TRP	PSD: 10 dBm / 5 MHz TRP; and Total: 17 dBm TRP
2100	Technology Neutral	24 dBm TRP	PSD: 10 dBm / 5 MHz TRP; and Total: 17 dBm TRP
Where PSD is power spectral density			

4. Additional performance parameters

(informative)

4.1 None specified

5. Contact details

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6. Document history

Version	Date	Changes
0.1	24 October 2017	Draft Published
1.0	22 March 2018	Document published