

Ofcom's EMF licence condition - What you need to know as a ship radio licensee

This guide provides an overview of what you need to do to comply with Ofcom's EMF¹ licence condition for equipment covered by your Ship Radio licence. More detail is provided in our ["Guidance on EMF Compliance and Enforcement"](#).

Please note: The Maritime and Coastguard Agency (MCA) has produced an information notice regarding the EMF licence condition: "[MIN 662 \(M+F\) Ofcom requirement for protecting the general public from radio emissions: General information for vessels \(ship station licence holders\)](#)".

Step 1 - Do I need to comply?

The purpose of the EMF licence condition is to ensure that your antenna is sufficiently far away from areas where members of the general public may be present when you are transmitting. It does not require you to protect yourself or workers from EMF.²

Please note: In the vast majority of cases, compliance should be a simple matter to demonstrate. You should never consider removing safety radio equipment as an alternative. This may hinder the ability to call for help, result in a loss of navigational information and consequently it could jeopardise the overall safety of everyone on board.

Do you currently have any of the following installed on board? If yes, **you are likely to need to carry out a compliance check:**

- Fixed marine band VHF Radiotelephone with or without DSC – **proceed to Step 2a (page 3)**
- Marine band MF/HF radio – **proceed to Step 2b (page 5)**
- GMDSS Satellite Earth Station - Inmarsat *OR* Iridium (this refers to the fixed transceiver and not to handheld satellite phones) – **proceed to Step 2c (page 6)**
- Radar – **proceed to Step 2d (page 7)**

You don't need to provide evidence of compliance for any of the following:

Table 1 – Equipment with average radiated power below threshold³

AIS-SART (Automatic Identification System - Search and Rescue Transmitter)
EPIRB (Emergency position indicating radio beacon)
Fixed AIS Class A
Portable or fixed AIS Class B
Licence exempt devices, e.g. Wi-Fi or mobile phones
MOB devices (Man Overboard)/survivor locating devices
PLB (Personal locating beacons)
Portable marine band VHF Radiotelephone with or without DSC
Portable VHF Survival Craft Radiotelephone
Radar Target Enhancer (RTE)

¹ Electromagnetic fields (EMF)

² We provide further information on who needs to be protected in step 3 (page 8) of this guide.

³ The average radiated power threshold is 6.1 Watts ERP (Effective radiated power). This is equivalent to 10 Watts EIRP (Equivalent isotropic radiated power).

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V2.1

SART (Search and rescue transponder)
Portable UHF radiotelephones
Long Range Identification and Tracking (LRIT)
Portable Airband Radiotelephone
Ship Security Alerting System
Vessel Monitoring System (VMS)

For any other equipment, please refer to our other [guidance](#) documents as appropriate.

Step 2a - Carrying out a compliance check - Fixed marine band VHF Radiotelephone with or without DSC

The purpose of a compliance check is to understand whether the antenna of your equipment is far enough away from the general public when you are transmitting. You can find this out by referring to:

- i. Manufacturer instructions on EMF compliance OR
- ii. The compliance distance table in this section OR
- iii. Ofcom's EMF calculator

Please note: You do not need to comply when using the radio in low power mode (1 Watt).

The three methods included in this guide are the simplest methods and require no detailed specialist knowledge. Other methods for checking compliance are presented in section 6 of our detailed "[Guidance on EMF Compliance and Enforcement](#)". However, these require a more detailed technical understanding of the radio equipment and EMF.

i. Using manufacturer instructions on EMF compliance (manuals or labels)

The manufacturer may provide instructions on how to ensure compliance with the general public EMF limits (in the ICNIRP Guidelines), either in the documentation originally provided with the equipment or on their website.

If the instructions include information on EMF compliance:



You should review and follow these instructions and **proceed to Step 3 (page 8)**.

ii. Checking compliance distance tables

You can check the compliance distance for your equipment in the table below. If you use different antenna gain or transmission times, you can use Ofcom's EMF calculator (see point iii below).

If the cell is shaded grey, this means that the average power is below the threshold and you do not need to maintain a compliance distance.

Table 2: Example compliance distances in metres for VHF radiotelephones operating at high power (see note below the table)

Maximum time transmitting in any 6 minute period ⁴ is less than or equal to:	Antenna length: 3-4 feet (0.9-1.2m) – typically 3dB gain	Antenna length: 8 feet (2.4m) – typically 6dB gain	Antenna length: more than 12 feet (3.6m) – typically 9dB gain
6 minutes (100% of the time)	2.25	3.18	4.50
4.5 minutes (75%)	1.95	2.76	3.89
3 minutes (50%)	1.59	2.25	3.18
1.5 minutes (25%)	1.13	1.59	2.25
1 minute (17%)		1.30	1.84
0.5 minutes (30 secs)			1.30

⁴ For an explanation of what 'maximum transmission time in any 6 minute period' means please see page 11

0.25 minutes (15 secs)

0.92

Note: VHF radios on boats usually transmit with a maximum transmitter output power of 25 Watts. However, to calculate the radiated power, you need to take into account the gain of the antenna. For example, a 3-4 foot antenna would typically have an antenna gain of 3dB. This results in a radiated power of 50 Watts. You can use the 'Power calculation tool' tab in Ofcom's EMF calculator to calculate the radiated power.

If the table provides you with a compliance distance for your equipment:



Proceed to Step 3 (page 8)

If the result for your equipment is in a part of the table shaded grey:



Make a note of the antenna gain and maximum time transmitting you used for your compliance check and keep this with your licence document. (e.g. maximum time transmitting: 0.5 minutes, with 3 dB gain antenna). **No further action is required.**

iii. Using Ofcom's EMF calculator

Another simple way to check compliance is to use [Ofcom's EMF calculator](#).

The calculator requires the following information:

- Maximum radiated power⁵
- Maximum transmission time in any 6 minute period⁶
- Frequency of operation (MHz)

If you know these parameters, enter them in the calculator.

If you do not know the maximum radiated power or the frequency of operation in relation to your radio equipment, you can use the following information as an input for the calculator⁷.

This may produce a conservative compliance distance. For a less conservative compliance distance, you should try to obtain the operating parameters of your equipment from your equipment manual / the manufacturer / a radio installer.

Radiated power for antennas around 3-4 feet (0.9-1.2m) long	50 Watts EIRP
Radiated power for antennas around 8 feet (2.4m) long	100 Watts EIRP
Radiated power for antennas more than 12 feet (3.6m) long	199 Watts EIRP
Frequency	156 MHz

If the calculator provides you with a compliance distance:



Proceed to Step 3 (page 8)

If the calculator indicates that 'No assessment is required':



You should save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document. **No further action is required.**

⁵ To calculate the radiated power, you need to take into account the gain of the antenna. See note below table 2 for an explanation of this point.

⁶ For an explanation of what 'maximum transmission time in any 6 minute period' means please see page 11

⁷ If you know the output power and the antenna gain of your equipment but not the maximum radiated power (ERP or EIRP), you can use the Power Calculation Tool sheet in Ofcom's EMF calculator to calculate the maximum radiated power. You can then use this in the main calculator sheet of the calculator for your compliance assessment.

Step 2b - Carrying out a compliance check - Marine band MF/HF radio

Ofcom's EMF calculator does not currently cover some of the frequencies used by Marine MF/HF band radio. Because of this, Ofcom is providing a longer period of time to demonstrate compliance in these frequencies, i.e. you will need to have compliance records available by **18 May 2022**.

Ofcom intends to provide further guidance on compliance for these frequencies in a future version of this guide. You can [sign up to receive updates on Spectrum issues](#) (including updates on this guide and other EMF matters).

Step 2c - Carrying out a compliance check - GMDSS Satellite Earth Station (Inmarsat OR Iridium)

The purpose of a compliance check is to understand whether the antenna of your equipment is far enough away from the general public when you are transmitting. You can find this out by referring to:

- i. Manufacturer instructions on EMF compliance OR
- ii. Ofcom's EMF calculator

Other methods for checking compliance are presented in section 6 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

i. Using manufacturer instructions (manuals or labels)

The manufacturer may provide instructions on how to ensure compliance with the general public EMF limits (in the ICNIRP Guidelines).

If the instructions include information on EMF compliance:



You should review and follow these instructions and **proceed to Step 3 (page 8)**.

ii. Using Ofcom's EMF calculator

A simple way to check compliance is to use [Ofcom's EMF calculator](#).

The calculator requires the following information:

- Maximum transmit power
- Maximum transmission time in any 6 minute period⁸
- Frequency of operation (MHz)

If you know these parameters, enter them in the calculator.

If you do not know these parameters in relation to your radio equipment, you can use the following conservative compliance distances. For a less conservative compliance distance (or if your equipment type is not listed below), you should try to obtain the operating parameters of your equipment from your equipment manual / the manufacturer / a radio installer.

Equipment type	Compliance distance (m)
Inmarsat-C	1

Information for other services is not presently available but may be included in a future version of this guide.

If the calculator provides you with a compliance distance:



Proceed to Step 3 (page 8)

If the calculator indicates that 'No assessment is required':



You should save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document. **No further action is required.**

⁸ For an explanation of what 'maximum transmission time in any 6 minute period' means please see page 11

Step 2d – Carrying out a compliance check – Radar

The purpose of a compliance check is to understand whether the antenna of your equipment is far enough away from the general public when the radar is in operation.

You can find this out by referring to:

- i. Manufacturer instructions on EMF compliance OR
- ii. Ofcom's EMF calculator

Other methods for checking compliance are presented in section 6 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

i. Using manufacturer instructions (manuals or labels)

The manufacturer may provide instructions in the equipment manual (or on equipment labelling) on how to ensure compliance with the general public EMF limits (in the ICNIRP Guidelines). Manuals often contain a safety instructions section which sets out separation distances for a number of different thresholds, e.g. 10 W/m², 50 W/m² and 100 W/m². The relevant threshold for protection of the general public in relation to marine radar frequencies is 10 W/m².

If the instructions include information on EMF compliance:



You should review and follow these instructions and **proceed to Step 3 (page 8)**.

ii. Using Ofcom's EMF calculator

A simple way to check compliance is to use [Ofcom's EMF calculator](#).

The calculator requires the following information:

- Maximum transmit power
- Maximum transmission time in any 6 minute period⁹
- Frequency of operation (MHz)

If you are sure you know these parameters for your radar, you can enter them in the calculator.

If you do not know these parameters or are unsure, you should obtain information on safety distances from your radar equipment manual or from the manufacturer.

If the calculator provides you with a compliance distance:



Proceed to Step 3 (page 8)

If the calculator indicates that 'No assessment is required':



You should save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document. **No further action is required.**

⁹ For an explanation of what 'maximum transmission time in any 6 minute period' means please see page 11

Step 3 - Maintaining the compliance distance

You need to ensure that your antenna is sufficiently far away from areas where members of the general public may be present when you are transmitting, i.e. greater than the compliance distance.

The general public can include family, friends, visitors, passengers and paying customers as well as other members of the general public of all ages. None of these individuals should be exposed to EMF above the general public EMF limits. The general public may be on both public and private property including on board a ship or other vessel or on land (e.g. in a quayside area, harbour, marina, port or dock).¹⁰

No further action is required if the only people able to get within the compliance distance are either:

- i) you (i.e. the licensee) or the owner, operator or installer of the equipment;
- ii) workers (i.e. persons already protected under health and safety legislation) e.g. Harbour Masters, marina managers, workers on commercial or fishing vessels and other paid crew; or
- iii) certain volunteers that are already protected under health and safety legislation e.g. volunteers directly involved in carrying out rescue operations under a Declared Facility authorised by the MCA (including the RNLI and other independent rescue boats).¹¹

For information on compliance in emergency or distress situations, please see page 11.

In most cases, the compliance distance is likely to be relatively small and it may not be possible for members of the general public to get within the compliance distance. For example, you might have an antenna on the top of the mast of a ship.

Maintaining compliance while in port or tied-up alongside

When in port or tied-up alongside, it may be possible for members of the general public to get close to your antenna. In this case, you may need to take the following steps to ensure compliance:

- Only transmit at low power on your VHF radio
- Turn your radar off or on standby
- Do not transmit using your Marine band MF/HF radio (except for brief test transmissions)

We have included this checklist on page 12 of this guide. You can print this checklist and affix it to a suitable part of your boat.

Can you maintain the compliance distance without any further action?

YES – Proceed to step 4

NO – Proceed to step 3A

¹⁰ Further information on what we mean by the general public and the areas in which they may be present is set out in sections 4 and 5 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

¹¹ Whether other volunteers are already protected under health and safety legislation will depend on the circumstances. Licensees can refer to HSE's website for guidance on the scope of health and safety legislation (see: <https://www.hse.gov.uk/event-safety/volunteers.htm>; <https://www.hse.gov.uk/event-safety/voluntary-organisation.htm>; <https://www.hse.gov.uk/voluntary/manage-low-risk.htm>; <https://www.hse.gov.uk/voluntary/when-it-applies.htm>). If you are unsure whether an individual should already be protected under health and safety legislation then you should comply with Ofcom's EMF licence condition in relation to those individuals.

Step 3A – What should I do if I can't maintain the compliance distance?

There are a number of actions you can take:

- i) Preventing members of the general public getting too close to the antenna.
- ii) Switching off equipment, switching to low power, or reassessing transmission time.
- iii) Moving the antenna to a different location further away from the general public

i. Preventing people getting too close

Where it may be possible for a member of the general public to get closer to the antenna than the compliance distance, you could consider using:

- appropriate warning signs directing people where not to sit or stand when you are transmitting
- warning signs on the equipment to prevent it being used for longer than the time assumed in your compliance calculation
 - For example: "This radio must not be used for more than a total of [insert number] minutes in any six minute period except when being used for emergency communications".
- Placing physical barriers between the public and the antenna

ii. Switching off equipment, switching to low power, or reassessing transmission time

- You don't need to restrict power or transmission time in an emergency situation (please see page 11 for further information).
- Placing a notice by the operating station directing the operator not to use the equipment when there are members of the general public within the compliance distance.
- Using warning signs on the equipment to prevent it being used at powers higher than the power assumed in your compliance calculation.

Reducing power: Some users may be able to use a lower radiated power without impacting the practical usage of their radio. If you think it is possible to reduce your transmit power, you can try entering the reduced transmit power in the calculator to understand the impact this has on the compliance distance.

Reducing transmission time: Some users who are using the radio for routine communications may be able to reduce the amount of time transmitting. A reduction in the maximum amount of time that you transmit can also reduce the compliance distance or may even mean that you do not need to maintain a compliance distance at all. This is because reducing the transmission time will also reduce the average power. (See page 11 for an explanation of maximum transmission time). If you think it is possible to reduce your transmission time, you can try entering a different transmission time in the calculator to understand the impact this has on the compliance distance.

iii. Moving the antenna

Another option that may be possible in some circumstances is to move the antenna to a different location, e.g. to a higher point on the boat or to a position which is compliant or moving the vessel.

If moving the antenna involves making structural alterations or alterations which may affect the stability of the boat, please seek professional advice.

Proceed to Step 4

Step 4 – Keeping an appropriate compliance record

1. If you have used manufacturer instructions

You should keep the manufacturer's instructions on EMF compliance that you have followed with your licence document. You should also be able to demonstrate how you have followed the instructions.

If you have used any of the actions mentioned in step 3A, you should also keep a record of this.

2. If you have used the example compliance tables in this guide

You should save a screenshot of the relevant table (or print a copy and circle the relevant result for your equipment) and keep it with your licence document.

If you have used any of the actions mentioned in step 3A, you should also keep a record of this.

3. If you have used Ofcom's EMF calculator

You should save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document.

If you have used any of the actions mentioned in step 3A, you should also keep a record of this.

Once you have carried out your compliance assessment and kept (or saved) your record(s), **no further action is required.**

For most equipment types, you need to have compliance records available by **18 November 2021.**

For Marine band MF/HF radio (for frequencies between 10 MHz and 30 MHz), you need to have compliance records available by **18 May 2022.**

For Marine band MF/HF radio (for frequencies below 10 MHz), you need to have compliance records available by **18 November 2022.**

Further information on the type of records that can be used to demonstrate compliance are set out in section 12 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

Emergency situations

If your equipment is being used for either seeking help in an emergency, or responding to an emergency, you do not need to worry about compliance whilst the emergency is unfolding. This means you don't need to comply if you need to use your equipment in a distress situation.

You will however need to make sure you comply when your equipment is being used in other non-emergency situations. Training exercises, for example, are not emergency situations. You will therefore need to ensure you comply with the general public EMF limits during any training exercises (if members of the general public may be present or in the vicinity).

Further information on when the emergency exemption applies is set out in section 13 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

Understanding your maximum transmission time

The 'maximum transmission time in a six minute period' is used to calculate the average radiated power of your radio equipment. We use six minutes because this is the averaging period defined in the relevant EMF guidelines published by ICNIRP. You should estimate how much time you would typically transmit for during a busy period¹². For example, if you usually transmit short messages of up to ten seconds but may do this up to e.g. six times in a busy six minute period, you should use a maximum transmission time of 1 minute (6 x 10 seconds).

¹² In some types of radio equipment (e.g. radar), the transmission time is automatic and not controlled by the end user. These types of radio often have a built-in duty cycle (or percentage of time transmitting) specified by the manufacturer, e.g. 5%. This may be specified in the equipment manual. If you know what this is, you can use this as the maximum transmission time. For example, a duty cycle of 5% would equate to a maximum transmission time of 0.3 minutes.

Checklist for EMF compliance while in port or tied-up alongside

This checklist provides simple instructions for achieving compliance for small boats when in port or tied-up alongside. You can print this checklist and affix it in a suitable location on your boat.

To ensure compliance with the general public EMF limits while in port or tied-up alongside, please:

- a) Only transmit in low power mode on your VHF radio
- b) Turn your radar off or put it on standby
- c) Do not transmit using your Marine band MF/HF radio (except for brief test transmissions)

Other questions about EMF compliance

How often do I need to check my equipment complies with the new rules?

You will only need to reassess compliance if you make changes to your equipment which is likely to increase the EMF exposure levels in any area where a member of the general public may be present. This could happen if, for example, you change or adjust the antenna or make other permanent technical changes to the equipment. If your equipment is mobile, this doesn't mean you need to repeat this assessment every time it moves from one location to another. However, you should always make sure that members of the general public are being kept beyond the compliance distance from the equipment's antenna when it is transmitting.

I have two or more antennas which transmit towards areas where members of the general public may be present – how do I take account of this?

You should calculate the aggregate EMF from all of your own equipment on the same site that transmits at powers higher than 6.1 Watts ERP (or 10 Watts EIRP). However, you do not need to do this if your transmitters do not have overlapping target coverage areas or where your transmitters do not transmit simultaneously. (For example, you do not need to do this for satellite earth stations or marine radars). Further information on this is provided in paragraph 7.2 of our detailed "[Guidance on EMF Compliance and Enforcement](#)". The additional usage notes in Ofcom's EMF calculator provide a conservative approach for calculating the compliance distance for multiple transmitters. Ofcom may provide an additional calculator in the future with a less conservative approach for multiple transmitters.

What if I offer my boat for hire or am not present when equipment is used?

Just like any other licence condition, it is your responsibility to make sure you comply.

If you let a third party control radio equipment which you are responsible for under the terms of your licence, then you should consider how you can make sure they comply with the general public EMF limits. For example, you should consider if they need any specific training on EMF risks or whether you should use control measures outlined in Step 3A of this guide. You could also include contractual clauses relating to EMF compliance in any agreement you enter into authorising a third party to use your radio equipment.

Ofcom can take action against the licensee or captain or another person in charge of a ship for breach of the general public EMF limits.

What if I buy a boat? Can I presume any equipment is compliant?

If you buy a boat from someone who provides you with documentation relating to EMF compliance, you should make your own assessment of whether you consider it sufficient for you to comply with the general public EMF limits. You should take into account whether you intend to set up and operate the radio equipment in the same way as the previous owner and whether you intend to install any other radio equipment which may affect the compliance distance. You should also consider whether the previous owner's documentation is up to date and reflects the current setup and operation of the radio equipment.

What will Ofcom do to assess compliance?

Ofcom's Spectrum Engineering Officers carry out spot checks to ensure that radio equipment is being operated in accordance with all the terms and conditions of licences.

The checks could come at any time, so it's important for you to make sure you can provide information which demonstrates you're complying with the rules.

If Ofcom finds the EMF from your equipment is above the general public EMF limits or if you cannot provide appropriate records demonstrating compliance to Ofcom, we may take enforcement action.

Further information on potential enforcement action and our approach to enforcement is set out in section 15 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

Feedback on this guide

This guide provides simplified guidance on how to check and demonstrate compliance with Ofcom's EMF licence condition. More detail is provided in our "[Guidance on EMF Compliance and Enforcement](#)".

If you think that any part of this guide is unclear or you have general feedback on this guide, you can email us at EMFImplementation@ofcom.org.uk. We will then review your feedback and may take account of this in future versions of this guide. However, we cannot provide individual responses to emails or provide bespoke advice on individual compliance queries.

Version History

The table below shows the version history of this guide. You should always check that you are using the most recent version of this guide when carrying out a compliance check. The most recent version of this guide will be the one published on the [EMF compliance and enforcement guidance webpage](#).

Version number	Description	Changes	Publication date
V1.0	Original draft version		11 March 2021
V2.0	First live version	Comprehensive update following feedback on the draft version	17 June 2021
V2.1	This version	Edited table 2, changed ERP to EIRP in the table on page 4. Edited answer to multiple antennas question on page 7.	September 2021