Emergency communications when the power and phones are down

A UK-wide blackout: no mains power, mobile masts dead within hours, no gas, no fuel, empty shops and streets that aren't safe to walk. This page covers what still works, what to buy, how far it reaches, how to keep it powered through a cold winter, and what to do before and during.

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PART 1

Start here

What still works, what fails and when, and the plan that ties it together.

If the whole country went dark tonight

The scenario: no mains power anywhere, mobile masts flat within the hour, no gas, no fuel for cars, nothing in the shops, streets that aren't safe, and it may be cold. Here's what would still let you hear the news and reach the people you care about.

WORKS

Battery or wind-up FM radio

Your main source of official news, while the transmitters' generators have fuel. Write your local FM frequencies down now.

WORKS

Shortwave receiver

News from abroad when UK stations go quiet: the BBC at dawn, Radio Romania, others.

WORKS

PMR446 walkie-talkies

No licence. A household and a street, about 1 km in town, 2–5 km in the open.

WORKS

Mesh texting (Meshtastic)

No licence. Text messages hop node to node across a town, on a battery that lasts days.

WORKS

CB radio

No licence. House to house and village to village, 5–30 km, from a car battery.

LICENCE

Amateur radio

The only legal way to talk across the whole UK and abroad. Take the exam before you need it.

PROBABLY

Starlink

Likely keeps working via gateways abroad if you can power the dish (25–40 W for a Mini). Reaches the internet, not UK phones.

WORKS

Garmin inReach

No UK ground stations involved. Messenger to messenger, and email to anyone with internet.

UNKNOWN

iPhone and Pixel satellite SOS

The alert gets out via France or Spain. Whether UK 999 could act on it in a total blackout is untested.

FAILS

Mobile phones

Only about 1 mast in 5 has an hour of battery. Calls and texts fail within minutes to hours.

FAILS

Landline, broadband, Wi-Fi calling

Digital landlines need power: the old copper network is switched off by 31 January 2027.

FAILS

Emergency Alerts on your phone

They're broadcast by mobile masts. No mast, no alert.

The six things to do this month

1. Buy a **battery FM radio that takes AA cells** and a pack of lithium AA cells, and write your local BBC and commercial FM frequencies on it.
2. Buy a **pair of PMR446 walkie-talkies** (AA-powered if you can) and agree a channel with your household and next-door neighbours.
3. Buy **two 20,000 mAh power banks** and keep them charged: that's two weeks of basic comms.
4. Print the frequency card and a family emergency plan, and agree where you'll meet if you can't talk.
5. Save this page for offline use, or download it as a PDF and print it: it won't load once the internet is down.
6. Decide whether you want to go further: a mesh node for your street, an amateur licence, or a satellite messenger for family who travel.

What fails, and when

Nothing in Britain's phone and internet networks is built to run for days without mains power. Spain and Portugal showed what happens: in the blackout of 28 April 2025, mobile data lasted about 2 hours and calls about 4, and only national radio and TV, hospitals, airports and network cores stayed up. What finally stopped things was fuel: petrol stations couldn't pump, tankers couldn't get through, and generators ran dry.

THE FIRST SECOND

Broadband routers, Wi-Fi, cordless phones and digital landlines go dead unless they have a battery unit. Providers must offer a free one, lasting at least an hour, to people who depend on their landline. The old copper network, which carried its own power, is switched off by **31 January 2027**.

MINUTES TO AN HOUR

Most mobile masts go silent. Ofcom found only about **20% of mast sites have an hour** of battery and about 5% six hours or more. Because 999 calls can use any network, about two-thirds of people could still reach 999 for roughly an hour. **Emergency Alerts stop**: they're sent from the masts.

HOURS

Street cabinets and exchanges run down (3–4 hours is good practice for new cabinets). Amateur repeaters and internet-linked radio networks fall silent. Data centres, studios and transmitters run on generators for as long as their fuel lasts. In Spain, national radio stayed on air while regional stations failed as fuel ran out, and engineers carried diesel to the roof by hand.

THE FIRST DAY

The National Grid's restoration standard requires power back to **60% of each region within 24 hours** and the whole country within 5 days, from 31 December 2026. Its own modelling in December 2024 gave 34 hours and 97 hours. Small pockets come back first; rural and northern areas may return sooner than cities.

DAYS TO WEEKS

The government's National Risk Register says full restoration could take up to 7 days, and some critical services months if equipment is damaged, with water, sewage, fuel and communications failing in a chain. Satellite systems (Starlink, Iridium) and your own radios keep working as long as you can power them.

So plan for a week with no phone at all, and a few days with no broadcasts in your area, while keeping a way to listen to the news, a way to reach your household and street, and a fallback plan for when nothing works.

Sources: Ofcom, "Mobile RAN power resilience" technical report (February 2025) and resilience guidance (June 2026); Ofcom, "Future of landline calls"; gov.uk, "How alerts work"; RIPE 90, "The Iberian blackout" (May 2025); RSF and The Local on Spanish radio; NESO, Electricity System

Restoration Standard and Assurance Framework 2025/26; Cabinet Office, National Risk Register 2025 and 2026.

Your comms plan: primary, alternate, contingency, emergency

Equipment fails, batteries go flat, and the person you need may be out of range. Soldiers and rescue teams plan for that with **PACE**: a primary way to talk, an alternate, a contingency and a last-resort emergency method. Agree it with your household and neighbours *before* anything happens, write it down, and put a copy in every go bag.

Inside your area (up to 2–5 km)

- **Primary:** PMR446 walkie-talkies on your agreed channel and code.
- **Alternate:** a private Meshtastic or MeshCore channel. Text messages hop from node to node across town.
- **Contingency:** a written note at an agreed message drop, or a runner. Send runners in pairs and in daylight.
- **Emergency:** whistle or torch signals, or a "HELP" card in the front window. If all else fails, meet at the rally point at the agreed time.

Family further away

- **Primary:** phone and text, while any network works. Texts get through when calls don't.
- **Alternate:** a satellite messenger such as a Garmin inReach (a messenger to a messenger works with no UK networks at all).
- **Contingency:** amateur radio, through a licensed friend or the local RAYNET group.
- **Emergency:** a fixed fallback: "if we haven't spoken by day 3, we each go to Gran's", agreed in advance.

Agree a schedule and keep radios off between calls

A radio left on all day in receive drains its batteries in a day or two. A schedule saves power and stops people worrying when they hear nothing. For example:

- **Check-ins:** 08:00, 12:00, 18:00 and 21:00 for ten minutes, on your primary channel. Miss one, and the next is the fallback.
- **The news:** radio news is on the hour. Listen for five minutes at the top of a few hours, and write down what you hear with the time.
- **The "3-3-3" idea** from American prepper groups (channel 3, for 3 minutes, every 3 hours) works just as well in the UK on PMR446 channel 3. Anyone who has heard of it knows where to listen.
- **Mesh nodes** can stay on all the time: they use very little power and keep messages for you.

Say it short, clear and safe

A message that works

1. **Who** is calling, and who for ("Red 2 for Red 1").
2. **Where** you are: a landmark you agreed, or a 6-figure grid reference from a paper OS map.
3. **What** has happened.
4. **What you need**, if anything.
5. **When** you'll call next.

Write it down before you press the button, and ask the other end to read numbers back.

Codewords to agree now

- "All well": everyone is safe, nothing needed.
- "Need help": come, or send someone, when it's safe.
- "On the move": leaving now, using the agreed route.
- "Stay away": danger here. Don't come, and don't ask why on the radio.
- A word that means "I'm being made to say this".
- Names for places (Place 1, Place 2) instead of addresses.

LETTER	SAY	LETTER	SAY	LETTER	SAY	LETTER	SAY
A	Alpha	**H**	Hotel	**O**	Oscar	**V**	Victor
B	Bravo	**I**	India	**P**	Papa	**W**	Whiskey
C	Charlie	**J**	Juliett	**Q**	Quebec	**X**	X-ray
D	Delta	**K**	Kilo	**R**	Romeo	**Y**	Yankee
E	Echo	**L**	Lima	**S**	Sierra	**Z**	Zulu

LETTER	SAY	LETTER	SAY	LETTER	SAY	LETTER	SAY
F	Foxtrot	**M**	Mike	**T**	Tango		
G	Golf	**N**	November	**U**	Uniform		

Say numbers digit by digit ("one-five-three-zero"), use the 24-hour clock, and say "over" when you finish so the other person knows to talk. Keep a log: the time, who, which channel and what was said.

PART 2

Listening

UK radio, shortwave from abroad, and the weather and safety broadcasts for aircraft and ships.

UK radio in a blackout

Radio is the lifeline. In Spain's blackout people gathered round car radios and street loudspeakers, and portable radios and batteries sold out in hours. In the UK, a minister can require the BBC to broadcast any emergency announcement or programme (BBC Framework Agreement, clause 67), and can have Ofcom direct commercial stations to do the same (Communications Act 2003, s.336). The government's advice is "go in, stay in, tune in".

What's on air in late 2026

BAND	STATUS	WHAT TO DO
FM (88–108 MHz)	The BBC's main network, from big transmitter sites with standby generators (their fuel endurance isn't published).	Your first choice. Write your local BBC station's FM frequency and Radio 4's on the radio itself.
DAB digital radio	BBC national stations on block 12B; Digital One (talkSPORT, Classic FM and others) on 11D; Sound Digital on 11A. Small local DAB transmitters may have little or no backup power.	Good, but DAB radios drain batteries faster than FM.
Long wave	**Gone.** Radio 4 on 198 kHz ended at 01:00 on 27 June 2026, and Droitwich was switched off for good on 30 June. Only Poland (225 kHz), Algeria, Romania and Mongolia still use long wave: nothing in English.	Ignore old advice to tune to 198 kHz.
Medium wave (AM)	BBC local radio leaves medium wave at the end of November 2026. Radio 5 Live (693 / 909 kHz) is closing transmitter by transmitter, finishing by the end of 2027. Radio Scotland (810 kHz) and Radio Wales (882 kHz) have no closure date yet. talkSPORT (1053 / 1089 kHz) was allowed in 2025 to switch off 7 of its 18 sites. Radio Caroline (648 kHz) covers the south-east, and Lyca Radio (1458 kHz) London.	Don't count on any BBC AM service. A medium wave set is still worth having for talkSPORT and stations abroad at night.
Satellite radio	BBC and other UK national stations are carried on the Freesat/Sky satellites, while their UK uplinks have power.	A satellite box plays radio without a TV: see satellite.

FM frequencies to write down

STATION	BAND	WROTHAM (LONDON, SE)	SUTTON COLDFIELD (MIDLANDS)	HOLME MOSS (NORTH)
BBC Radio 4	92.4–96.1, 103.5–104.9	93.5	92.7	93.7
BBC Radio 2	88.1–90.2	89.1	88.3	89.3
BBC Radio 3	90.2–92.6	91.3	90.5	91.5

Elsewhere: BBC Radio Scotland 92.5–94.7 MHz, Radio Wales 90.2–96.1 and 103.9 MHz, Radio Ulster 92–95 MHz. Look up the exact frequencies for your postcode at **bbc.co.uk/reception** and note your **local BBC station** too: it carries local emergency information. Overnight, Radio 4 carries the BBC World Service.

The Shipping Forecast

Now on FM and DAB only (Radio 4): **00:48** and **05:34** daily, plus **17:54** at weekends. Useful for wind and weather fronts when nothing else is on.

The government's advice

The "Prepare" campaign is now **Be Ready** (beready.campaign.gov.uk). It asks you to keep a battery or wind-up FM radio, a charged power bank, and a written list of station frequencies, and to plan for 3 days. The power-cut number is **105** (03457 643643 in Northern Ireland).

Listen smart

- News is on the hour: listen for 5–10 minutes, then switch off.
- Write down what you hear, with the time and the station.
- Keep the radio by a window: FM and DAB come in better there.

Sources: BBC Framework Agreement cl.67; Communications Act 2003 s.336; RSGB and Wikipedia on the long-wave closure (June 2026); RadioToday on 5 Live AM and BBC local MW closures (2026); Ofcom on talkSPORT's AM coverage (February 2025); Radio Caroline; Wikipedia list of long-wave broadcasters (September 2026); BBC reception pages; Be Ready (gov.uk); Met Office and Wikipedia on the Shipping Forecast; RSF on Spanish radio in the blackout.

Shortwave: hearing the world

If UK stations go quiet, shortwave brings in news from transmitters hundreds or thousands of kilometres away, needing nothing in Britain to work. A pocket receiver and a few metres of wire is enough.

English-language stations aimed at or heard in the UK (winter 2026–27)

STATION	KHZ AND TIMES (UTC)	NOTES
BBC World Service	`3955` 05:00–06:00 · `9410` 06:00–07:00	From Woofferton in Shropshire: the only BBC shortwave aimed at Europe. Also toward Africa: 15490 (05:00–06:00), 17575 (15:00–16:00), 9915 (06:00–07:00).
Radio Romania International	`17680` 05:30 · `15130 / 21510` 11:00 · `13750 / 15180` 17:00 · `9740 / 15130` 20:30 · `7220 / 9740 / 13580` 22:00	The most reliable English service for the UK; each slot about 27 minutes.
China Radio International	`17490` 07:00–13:00 · `13760` 16:00–19:00 · `9600` 18:00–19:00 · `7415 / 9600 / 11770` 20:00–22:00	Chinese state media, often strong.
Voice of Turkey	`17620` 12:30 · `9750` 18:30 · `11785` 22:00 (each about an hour)	
KBS World Radio (South Korea)	`11795` 10:00–11:00 · `9515` 15:00–17:00 · `11810` 22:00–23:00	Beamed at Europe.
Voice of Vietnam	`9730 / 11885` 16:00, 19:00, 21:30 (30 minutes each)	
Vatican Radio	`17540` 07:00–09:30 · `15565` 16:30 · `9705 / 11870` 20:00	
Radio Exterior de España	`15390 / 15500 / 15520` 14:00–23:00 (Spanish); English Wednesdays 22:00	
US private stations	WTWW `5920` 00:00–14:00, `9475` 14:00–00:00 · WRMI `15770` by day · WWCR `4840` at night	Mostly US religious and talk programmes, but strong and on for long hours.
European hobby stations	Shortwave Radio Gold `6160` 07:00–22:00 and `3975` evenings · Radio Mi Amigo `6085` daytime	Low power, music; good for checking your set works.

Times are UTC: the same as UK time in winter; add an hour in summer. Schedules change at the end of March and October, so check short-wave.info or the stations' sites before printing. Source: short-wave.info database of 29 October 2026 (season B26). All India Radio, Radio Kuwait, NHK and Radio Taiwan no longer broadcast in English to Europe, and the 2025 US cuts silenced most Voice of America services.

Which band, when

- **49 m** (5.9–6.2 MHz): evening and night; the winter workhorse.
- **41 m** (7.2–7.45 MHz): late afternoon to early morning.
- **31 m** (9.4–9.9 MHz): most of the day, best in the evening.
- **25 and 22 m** (11.6–13.9 MHz): day to evening.
- **19 and 16 m** (15.1–17.9 MHz): daytime.
- The sunspot cycle peaked in October 2024 and is falling, so the higher bands open less often; 6–10 MHz will carry most listening.

Getting a good signal

- Clip 5–10 m of insulated wire to the telescopic aerial and run it out of an upstairs window or along a fence, as high as you can. It transforms shortwave.
- For medium wave, turn the radio itself: its internal aerial is directional.
- Never run a wire near power lines; unclip it in thunderstorms.
- Switch off your own solar controller, inverter and LED lights while listening. In a blackout the neighbours' noise disappears, so yours is the last left.

Receivers

RECEIVER	ABOUT	POWER	COVERS	NOTES
Tecsun PL-330	£55–70	BL-5C Li-ion, USB (<45 mA on shortwave)	LW, MW, SW with SSB, FM	Pocket size, best value. Up to 24 hours a charge; buy a spare cell.
Tecsun PL-990	£180–230	18650 Li-ion, up to ~50 hours	LW, MW, SW with SSB and sync AM, FM	Excellent sound and selectivity.
Sangean ATS-909X2	£250–300	**4 × AA**	LW, MW, SW with SSB, FM, airband	Runs on any AA cells: easy to keep going.
Eton Elite Executive	£150–200	4 × AA	LW, MW, SW with SSB, FM, airband	
XHDATA D-808	£60–80	18650 Li-ion	LW, MW, SW with SSB, FM, airband	Cheap; see the law on airband below.
Malahit DSP2 / DSP3 (handheld SDR)	£150–350	Built-in Li-ion	10 kHz–2 GHz, every mode	Covers marine, PMR446 and CB too. Many clones: buy from a known seller.
RTL-SDR Blog V4 dongle	£35–45	USB from a laptop or Android phone (1.3 W)	0.5 MHz–1.7 GHz with free software	Decodes NAVTEX, weather satellites and more, but drains the phone.
SDRplay RSPdx-R2, **Airspy HF+ Discovery**	£170–250	USB to a computer	LW to VHF	Superb on HF; a home-base tool.
Wind-up / solar FM radio	£25–60	Internal cell, crank, small panel	FM (some MW, DAB)	A backup: 90 seconds of cranking gave 5–7 minutes of radio in one test.

Sources: Tecsun manuals and Anon-Co (UK Tecsun dealer) prices; RTL-SDR Blog V4 datasheet; SDRplay; Engadget test of the Eton FRX3; SILSO sunspot data (November 2026). Prices other than Tecsun's are approximate.

Aircraft, ships and weather broadcasts

Pilots and ships get continuous weather and safety broadcasts that keep going whatever happens on land. They can tell you whether a storm is coming and whether anything is flying. But read the law box first.

WHAT	FREQUENCY	WHAT YOU HEAR
Shannon VOLMET (Ireland)	`3413 (night) · 5505 · 8957 · 13264 (day) kHz USB`	Round-the-clock weather for major airports across Europe, including the UK: wind, visibility, cloud, fronts. Needs a receiver with SSB.
RAF VOLMET	`5450 · 11253 kHz USB`	Weather for military airfields (still listed in 2025).
Airband	`118–137 MHz AM`	Air traffic. `121.5 MHz` is the emergency and guard frequency. Airport weather on VHF: London VOLMET Main `135.375`, South `128.600`, North `126.600`, Scottish VOLMET `125.725 MHz`.
Marine VHF channel 16	`156.800 MHz FM`	Distress, safety and calling. HM Coastguard announces its safety broadcasts here, then reads them on working channel 62, 63 or 64 (sometimes 10): short broadcasts every 3 hours and full ones every 12, at local times that vary by Coastguard centre, with gale and navigation warnings on receipt. Range about 30 nautical miles from coastal masts. Channel 70 (156.525) carries digital (DSC) alerts only, no voice.
Coastguard medium wave	`announced on 2182 kHz`	Twice-daily safety broadcasts reaching about 150 nautical miles, read on Cullercoats 1925, Collafirth 1770, Butt of Lewis 1743, Tiree 1883, Gregness 2226 and Scillies 1880 kHz. Needs a receiver with SSB.
NAVTEX	`518 kHz (English) · 490 kHz (UK national)`	Printed text: navigation warnings, gale warnings and forecasts, out to about 300 miles. UK stations: Cullercoats (G / U), Niton (E / I) and Portpatrick (O / C). Needs a NAVTEX receiver (£100+) or an SDR with decoding software.
MSF time signal	`60 kHz`	From Anthorn, Cumbria: sets radio-controlled clocks across the UK. Germany's DCF77 on 77.5 kHz is the backup. (BBC 198 kHz no longer serves as a frequency standard.)

UK LAW

Listening: owning a scanner or receiver is legal. Under the Wireless Telegraphy Act 2006 (s.48) it's an offence to use one to get information from messages you aren't meant to receive, or to pass that information on. Ofcom's guidance is that the public may listen to broadcast radio and TV, amateur radio and CB. Air traffic control, ship-to-shore and ship-to-ship working, business radio and the emergency services are off limits. VOLMET, Coastguard safety broadcasts and NAVTEX are "all stations" broadcasts, so listening on land is a grey area. Use the published forecasts first, and **never repeat what you hear**.

Transmitting on marine VHF needs a ship licence and an operator's certificate, and a handheld is for use on board. Ofcom's new ship licence (from early 2027) says that where there is a **risk to life**, anyone may use the radio, anywhere, to summon help. Internationally, a station in distress may use any means at its disposal (ITU Radio Regulations). That covers genuine distress only, never everyday chat. Inland you're unlikely to reach anyone anyway.

Sources: UK AIP GEN 3.5 (October 2026); DX Info Centre VOLMET list (July 2025); MCA Maritime Safety Information leaflet (January 2026); Wikipedia on NAVTEX; NPL MSF pages; legislation.gov.uk (Wireless Telegraphy Act 2006 s.48); Ofcom scanner guidance (archived); Ofcom maritime licence review and draft ship licence (October 2026).

PART 3

Talking: walkie-talkies, CB, mesh, amateur radio and satellite

What each one is for, the rules, the frequencies and the kit, cheapest first.

PMR446 walkie-talkies NO LICENCE

The cheapest, simplest way to keep a household and a street in touch. Anyone may use them, with no licence or test, in the UK and across Europe. Plan on about **1 km between houses in a town**, and 2–5 km in open country or from an upstairs window with a clear view.

UK LAW

Ofcom's rules (IR 2030, reissued 23 October 2026): **0.5 W ERP**, **hand-held only**, with the radio's own **fixed aerial**. No base stations, no repeaters, no external or bigger aerials, no use from aircraft, kites or balloons. Europe has agreed to allow 1 W (target date February 2027), but the UK hasn't changed yet. Cheap dual-band radios (Baofeng UV-5R, Quansheng UV-K5 and the like) are **never legal on PMR446**, even on low power: they're too powerful and have removable aerials. They're legal to own and listen with.

CH	MHZ	CH	MHZ	CH	MHZ	CH	MHZ
1	446.00625	**5**	446.05625	**9**	446.10625	**13**	446.15625
2	446.01875	**6**	446.06875	**10**	446.11875	**14**	446.16875
3	446.03125	**7**	446.08125	**11**	446.13125	**15**	446.18125
4	446.04375	**8**	446.09375	**12**	446.14375	**16**	446.19375

Analogue FM, 12.5 kHz channels. Channels 9–16 were added in 2018, so older radios only have 1–8. Digital PMR446 radios (dPMR, 32 channels; DMR, 16) can't talk to analogue ones except by switching to analogue.

Channels to know (all informal)

- **Channel 8, code 0**: the usual calling channel in the UK and Europe. Strangers will try here first.
- **Channel 3, code 0**: listed by UK hobbyists as the emergency channel and by preppers for the "3-3-3" plan: listen for 3 minutes on the hour, every 3 hours (09:00, 12:00, 15:00, 18:00, 21:00).
- Your household's own channel and code for everyday use, away from 3 and 8.

"Privacy codes" aren't private

The codes (CTCSS tones 1–38, DCS codes after that) only stop *your* radio playing other people's calls. Anyone with code 0 hears everything on the channel. For emergency calling use **code 0**, or a stranger calling for help won't open your radio.

Getting the most range legally

- Height: upstairs window, hill, bridge, top of a car park.
- Hold it upright, away from your body, above head height.
- Step outside or to a window: a modern insulated house costs up to 30+ dB.
- Ignore "up to 10 km" on the box: that's hilltop to hilltop.

Which to buy

RADIO	PRICE (NOV 2026)	BATTERIES	NOTES
Midland G9 Pro	About £80 each	**4 × AA** (NiMH supplied)	Runs on lithium AA cells from your store: the best choice for a long outage.
Midland XT10 / XT30	£40 / £50 a pair	AAA, or a NiMH pack	Cheap and simple for children and neighbours.
Motorola T82 Extreme	£90–115 a pair	NiMH packs, or 3 × AA cells	Tough, waterproof-ish, popular.
Midland G15 / G18 Pro	£120 / £140	Li-ion pack	IP67 waterproof, but needs its charger or USB.

RADIO	PRICE (NOV 2026)	BATTERIES	NOTES
Kenwood PKT-23, **Icom IC-F29SR2**	£100–170	Li-ion	Professional quality and clear audio; about 15 hours a charge.

Prefer radios that take **AA or AAA cells**. A radio whose battery pack only charges in its own mains cradle becomes useless when the cradle has no power. A set of 3 AAA cells lasts about 18 hours of normal use (mostly listening).

A step up: Business Radio "Simple UK Light" £75 FOR 5 YEARS

For a group that wants more than PMR446 without an exam, Ofcom's light licence (open to individuals, applied for online, issued quickly) allows **5 W ERP** handhelds and vehicle radios anywhere in the UK on 19 shared business frequencies: ten times PMR446's power, with proper commercial radios (Kenwood, Motorola, Hytera, Icom). No base stations; the "Simple Site Light" licence (also £75) allows a 2 W base within 1 km of one site, such as a farm or village hall. The licence says messages must concern "the business of the licensee": how that fits a family or community group hasn't been tested. Get it now: you can't apply with the internet down.

Sources: Ofcom IR 2030 v1.17 (23 October 2026); Ofcom Business Radio guidance (December 2025) and fees page (May 2026); CEPT ECC Decision (15)05 revision work items; Ofcom FOI replies on PMR446 (2021, 2022); Wikipedia PMR446 channel plan; G4NSJ UK PMR446 channel notes; Nevada Radio and onedirect prices (3 November 2026); Kenwood PKT-23 brochure; Motorola T42 datasheet.

CB radio: still legal, still useful, and yes, it runs on 12 V NO LICENCE

Citizens' Band has been licence-free in the UK since 2006. Few people listen any more, so its value in a blackout is between households, farms and villages that **agree in advance** to use it. Its strengths: 27 MHz bends over hills and through woods better than walkie-talkies, a house or car aerial reaches 10–30 km, and a set runs for weeks from a car battery.

BAND	FREQUENCIES (40 CHANNELS EACH)	MODES	POWER LIMIT
UK FM ("27/81")	27.60125–27.99125 MHz	FM only	4 W from the set
EU / CEPT	26.965–27.405 MHz	FM, AM and SSB (single sideband)	FM 4 W; AM 4 W ERP; **SSB 12 W PEP ERP**

Ofcom IR 2027 and IR 2027.2; AM and SSB allowed on the CEPT channels since 2014. The AM and SSB limits are "ERP", so strictly a gain aerial counts against them. Multi-country radios must be set to the UK or EU (CEPT) profile.

Channels to know

- **Channel 9**: emergencies and help. Ofcom is clear that it is only a convention: **nobody official listens**, so CB is not a way to reach 999.
- **Channel 14**: calling. **Channel 19** (UK FM): mobile and trucking.
- CEPT channel 19 AM is the European road channel; CEPT 38 lower sideband (27.385 MHz) is the informal SSB calling channel.

Range on the ground

- Handheld with a short aerial: 1–3 km.
- Car with a full ¼-wave whip (2.6 m): 5–10 km; 10–15 km on SSB.
- House with a ½-wave or ⅝-wave vertical 8–10 m up, to a similar station: **15–30 km**; 25–50 km on SSB.
- With the mains noise gone in a blackout, expect more.

Power

- About 0.25–0.5 A listening and 1.5–2.5 A talking (4 W), 3–4 A on SSB peaks, at 13.8 V.
- That's 3–7 W listening: a car battery used only to its top quarter (about 180 Wh) gives 30–60 hours of listening, and a 100 Ah leisure battery weeks.
- Disconnect the car's own battery lead so the car doesn't drain it too.

Skip: why you may hear Spain but not the next village

From May to August, "sporadic E" clouds in the ionosphere bounce 27 MHz signals 500–2,000 km, filling channels with continental stations while local ones fade. The other kind of long-distance opening, off the ionosphere's F2 layer, follows the 11-year sunspot cycle: cycle 25 peaked in October 2024 and is falling (the October 2026 sunspot number was 46), so in winter

2026–27 expect only patchy midday openings. Skip is fun but useless for local contact. For local work, use FM or AM on the ground wave.

Kit and prices (November 2026)

RADIO OR AERIAL	TYPE	PRICE
Midland M-Mini / 78 Pro / 48 Pro	AM/FM mobile, multi-standard (set to UK or EU)	£70 / £100 / £130
TTI TCB-900 EVO	80 channels, UK and EU	£100
President McKinley or **George II**	AM/FM/**SSB**, UK 40 + CEPT 40; the George is a base set	£300 / £320
Albrecht AE 5900	Small SSB mobile	£200
Midland Alan 42DS, **President Jerry**	Handhelds	£100 / £140
Moonraker GAP-H ½-wave / GAP-F ⅝-wave	House aerials (5.5 m / 6.9 m)	£37 / £40

On sale doesn't mean legal. UK shops openly sell 35–600 W "linear amplifiers" and "10 m export" radios (Anytone AT-5555N, President Washington and others). Using an amplifier on CB is illegal, and an export radio is legal only for a licensed radio amateur on the 10 m amateur band (28–29.7 MHz). Unlocked to 27 MHz, it is illegal converted equipment. Keep aerials well away from power lines, and remember long whips on vehicles at level crossings.

Sources: Ofcom CB pages and guidance 364; IR 2027, IR 2027.2; NOAA SWPC solar cycle indices (November 2026); UKSMG on sporadic E; Midland Alan 48 Plus manual; Nevada Radio prices (3 November 2026).

Mesh texting: Meshtastic and MeshCore NO LICENCE

Small LoRa radios, about the size of a matchbox, that send text messages with no phone network. Each pairs with your phone by Bluetooth (or has its own keyboard), and messages **hop from node to node**, so a few nodes on roofs and hills can join a whole town. An nRF52 node runs for **one to two weeks** on a small battery and costs £15–100.

UK LAW

Licence-free on **869.40–869.65 MHz** under Ofcom IR 2030: up to **500 mW ERP** with a **10% duty cycle** (360 seconds of transmitting an hour; the firmware enforces it), and it may be used airborne. The limit includes aerial gain: a 22 dBm board can use an aerial up to about 7 dBi, but a 27 dBm board (Heltec V4) only about 2 dBi. Some high-power boards (Station G3) are over the limit unless turned down. UK radio amateurs have no 868 MHz allocation, so a licence gives nothing extra here, and Meshtastic's "ham mode" turns encryption off. Messages are text only, up to about 200 characters.

Meshtastic or MeshCore?

	MESHTASTIC	MESHCORE
How messages travel	**Every node relays** (managed flooding, up to 7 hops; 3 by default). Works with no infrastructure at all.	Only fixed **repeaters** relay; handsets don't. Routes are learned, so delivery is more efficient, with up to 64 hops.
UK setting in 2026	EU_868 "LongFast" on 869.525 MHz (235 of 238 UK nodes that report it)	"EU/UK Narrow": 869.618 MHz, 62.5 kHz, SF8, CR8 (81% of UK nodes)
UK network	About 640 nodes visible on public maps in a week	About **1,500 repeaters** heard in a week
In a long blackout	Your own family mesh keeps working, because every handset relays.	Many UK repeaters run on mains with a small battery, so the network would shrink to the solar-powered ones.

	MESHTASTIC	MESHCORE
Stores messages	Only with an ESP32 node with PSRAM running store-and-forward	Room servers keep 32 messages per user
Privacy	Public default channel; private channels (AES-256); encrypted direct messages	Public default channel; private channels and direct messages
Talks to France?	Mostly **no**: French groups use different settings	**Yes**: same setting on both sides

Our suggestion: for a family or street that must keep working with no infrastructure, use **Meshtastic**. To join the UK repeater network while it has power, use MeshCore. The two can't talk to each other, so **pick one for the whole group**. The same hardware runs either; you can reflash it while you have the internet. Use stable releases (Meshtastic 2.7, MeshCore 1.18 in November 2026), not test builds. Reticulum with the Sideband app is the most private option and the hardest to set up. goTenna no longer sells to the public.

Which device

DEVICE	CHIP	BATTERY LIFE	PRICE (NOV 2026)	BEST FOR
Seeed SenseCAP T1000-E	nRF52840	Days to a week+ (700 mAh), IP65, GPS	£38 (The Pi Hut)	Card-sized pocket node paired to a phone. Small internal aerial.
RAK WisMesh Pocket V2	nRF52840	Weeks (3,200 mAh), GPS, screen	About £85	The best pocket node: aerial socket for a better aerial.
Heltec T114, **LilyGO T-Echo**	nRF52840	About 9 days on 1,100 mAh (T114)	£28–40	Cheap low-power handhelds (T-Echo has an e-ink screen and GPS).
Seeed XIAO nRF52840 + Wio-SX1262 kit	nRF52840	Weeks, with your own cell	£13 (The Pi Hut)	Cheapest low-power node, if you can add a battery and case.
RAK WisBlock starter (RAK4631)	nRF52840	About 13 days on 1,100 mAh	About £25	The usual core of a home-made solar repeater.
RAK WisMesh Repeater Mini, **Seeed SenseCAP Solar P1 Pro**	nRF52840	7 days (3,200 mAh) / about 30 days (4 × 18650) with no sun	About £85 / not checked	Ready-made solar repeaters for a roof, tree or hill.
LilyGO T-Deck Plus, **T-Lora Pager**, **M5Stack Cardputer Mesh**	ESP32-S3	About a day: carry a power bank	£46–110	Standalone with a keyboard: no phone needed.
Heltec V3 / V4	ESP32-S3	About 19 hours on 1,100 mAh	About £20	Cheap, but too power-hungry for a battery or small solar panel in winter.

Battery figures at default settings (Nepa Mesh tests); prices from The Pi Hut (UK, incl. VAT) and Hexaspot (converted from euros) on 3 November 2026.

Set it up now, while you have the internet

1. Flash the firmware and install the app (Android, iPhone or the web).
2. Region **EU_868**; keep the default "LongFast" unless your local group uses something else.
3. Keep the public channel as the primary, and add a **private secondary channel** with a random 256-bit key. Share its QR code **in person**.
4. Set **position precision** to 0 (never sent) or about 13 bits (roughly 3 km) on the public channel.
5. Give each node a neutral name. Turn MQTT off.
6. Download offline maps in the app.
7. Print the channel QR code and keep it with the frequency card.

Roles

- **CLIENT:** handhelds (the default).
- **CLIENT_MUTE:** a second node of yours in the same house or bag, so it doesn't add needless relays.
- **CLIENT_BASE:** an attic or roof node that always relays for your favourited family nodes.
- **ROUTER:** only for a fixed, high, strategic site (a hilltop, a tall tree, a balloon). Too many routers clog the mesh.
- **ROUTER_LATE:** fills a dead spot. ("REPEATER" was retired in 2.7.)
- Use direct messages when you need to know it arrived: only they confirm delivery. Lengthen or turn off telemetry to save airtime.

A solar repeater that survives winter

- **nRF52 only.** An nRF52 repeater uses about 1–2 Wh a day; an ESP32 one 5–12 Wh, more than a small panel gives in a UK December.
- A 5 W panel facing south at 60° averages about 7 Wh a day in December in London and 3 Wh in Inverness, much less in a dull week. Size the battery for at least a week.
- Lithium must not charge below 0 °C: use a charger with a low-temperature cut-off, and insulate the box.
- Sealed IP65 box, cable glands facing down, a desiccant sachet, and the aerial outside any metal on a short cable (3–6 dBi collinear, within the ERP limit).

Sources: meshtastic.org (mesh algorithm, LoRa and channel configuration, encryption, device roles, store and forward, 2.8 notes); MeshCore FAQ and blog; Mesh Hub UK map data (3 November 2026); Essex Ham; LocalMesh; NodakMesh and MeshCore Europe repeater guides; Nepa Mesh battery tests; Ofcom IR 2030 v1.17 and amateur licence OFW611; PVGIS.

Amateur (ham) radio: the only legal way to reach the whole UK LICENCE: AN EXAM

With a simple wire aerial and a 5–100 W radio, a licensed amateur can talk across the whole of Britain day or night, and to the rest of the world, with no infrastructure at all. It is a skill as much as a purchase, and the exam needs the internet: **get licensed before anything happens**.

The licence (Ofcom, since 2024)

	FOUNDATION	INTERMEDIATE	FULL
Exam (RSGB)	£35.50; about 10–15 hours' study	£39; a few weeks	£45; a few months (or £95 straight to Full)
Power	25 W	100 W	1,000 W
HF bands	160, 80, 40, 30, 20, 17, 15, 12, 10 m		The same, plus 60 m (the best UK-wide band) and 472 kHz
VHF/UHF	6, 4, 2 m and 70 cm	Plus microwave bands	
Call signs (new)	M7…	M8… / M9…	M0… / M1…

- Exams are taken online at home with a remote invigilator, or at a club. The licence itself is **free** online (£20 on paper) and lasts for life.
- **Family can use your station:** since 2024 anyone, licensed or not, may operate an amateur station under the licensee's direct supervision.
- **In an emergency** (licence condition 6.5) you may use the station to help in a disaster or local or national emergency, or to support a "user service": the Red Cross, St John Ambulance, the Salvation Army, government departments and any emergency responder. For that work the usual bans on passing other people's messages and on encryption are lifted.
- Note too that Ofcom **may restrict or close down amateur stations** if a state of emergency is declared (condition 8.2).
- **RAYNET-UK**, the amateur emergency network founded after the 1953 floods, has 1,600+ licensed volunteers in 99 local groups who work with councils, the emergency services and the Coastguard. Get licensed, then join your local group.

Frequencies to know

USE	FREQUENCY	NOTES
UK emergency traffic, 80 m	`3.663 MHz LSB`	RSGB band plan. Night-time UK coverage.
Region 1 emergency centre of activity, 80 m	`3.760 MHz LSB`	Europe-wide (IARU Region 1)
UK emergency, 60 m (Full licence only)	`5.2785 MHz USB`	The best UK-wide daytime frequency. Never transmit on 5.358–5.362 MHz: it isn't in the UK allocation.
Region 1 emergency, 40 m	`7.110 MHz LSB`	Daytime UK and near Europe
Global emergency centres of activity	`14.300 · 18.160 · 21.360 MHz USB`	International; listen within ±20 kHz
2 m FM calling	`145.500 MHz`	Local simplex; move off to a working channel (145.200–145.5875)
70 cm FM calling	`433.500 MHz`	Simplex 433.400–433.575
APRS (position and short text)	`144.800 MHz`	Radio-to-radio still works with no internet
JS8Call (keyboard messaging, store and forward)	`3.578 · 7.078 · 14.078 MHz`	On 60 m use 5.363 in the UK, not the old default
10 m / 6 m FM calling	`29.600 · 51.510 MHz`	

RSGB band plan 2026 and 5 MHz plan (January 2026); IARU Region 1 emergency frequencies; Ofcom licence conditions OFW611.

NVIS: one wire covers Britain

A horizontal dipole only 4–10 m up fires its signal almost straight up; the ionosphere reflects it back down over a circle 0–500 km across, with no gaps and no line of sight needed. Use 40 m (7 MHz) and, with a Full licence, 60 m (5 MHz) by day, and 80 m (3.6–3.8 MHz) at night. On winter nights near the bottom of the sunspot cycle even 80 m can "skip over" nearby stations: that's when 160 m helps. NVIS signals also arrive from overhead, so they are much harder to trace than VHF.

Expect repeaters and networks to die

There are about 680 voice repeaters and 390 internet gateways in England, with no record of battery backup: assume they go silent within hours. DMR talkgroups, Fusion WIRES-X, D-STAR reflectors, Echolink and hotspots all need the internet. What keeps working: FM, SSB and Morse direct between radios; simplex digital voice; APRS and packet radio-to-radio; JS8Call; and Winlink email over HF to gateways abroad, or radio-only between stations. Intermediate and Full holders may set up a 5 W repeater without extra permission.

Kit, price and power (November 2026)

RADIO	PRICE	WHAT IT DOES	POWER DRAW
Quansheng UV-K5	£20	2 m / 70 cm handheld, 5 W, wide receive coverage	Receive about 0.1–0.2 A at 7.4 V
Yaesu FT-65E	£85	Solid 2 m / 70 cm handheld, 5 W	18 mA with battery saver; 1.5 A talking
Yaesu FT5DE, **Icom ID-52E Plus**, **Kenwood TH-D75**	£380–740	Handhelds with GPS and APRS (digital voice too)	Similar
QRP Labs QMX or **(tr)uSDX**	About £80–120 kit / built	5 W HF, 80–20 m: Morse, data (JS8, FT8) and some SSB	**80 mA** listening: about 1 W
Xiegu G90	£380	20 W HF with a built-in aerial tuner	About 0.55 A listening (7.5 W)

RADIO	PRICE	WHAT IT DOES	POWER DRAW
Xiegu X6100 / X6200	£490 / £750	8–10 W HF portable with internal battery	About 0.4–0.5 A
Icom IC-705	£1,083	10 W HF to 70 cm portable with battery, GPS, SDR display	0.3–0.5 A listening (4–7 W)
Yaesu FT-891	£649	100 W HF mobile	About 1.5–2 A listening
Icom IC-7300MK2	£1,359	100 W HF base station, SDR	0.7 A listening; **21 A** at 100 W
Yaesu FTX-1 Field, **Lab599 TX-500**	£1,100–1,400	Rugged portable HF	Low

SDR transceivers: the IC-705, IC-7300, X6100 and FTX-1 are software-defined radios with their own screens, which is best on battery. A Hermes-Lite 2 or Flex needs a computer running all the time (another 5–30 W). A HackRF One is a test tool: unfiltered, uncertified, a few milliwatts, and legal to transmit with only by a licensed amateur within amateur bands.

Aerials you can make

AERIAL	DIMENSIONS	USE
40 m NVIS dipole (7.110 MHz)	20.0 m total: two 10.0 m legs, 3–8 m up	UK-wide by day
60 m NVIS dipole (5.2785 MHz, Full)	27.0 m total: two 13.5 m legs	UK-wide by day
80 m NVIS dipole (3.663 / 3.760 MHz)	38.9 / 37.9 m total, 4–10 m up	UK-wide at night
End-fed half-wave with a 49:1 transformer	About 20 m for 40/20/15/10 m; 40 m long for 80 m	One support, quick to put up
2 m ground plane	49 cm upright; four 52 cm radials sloping down at 45° on an SO-239 socket	The easiest home-made 2 m base aerial
70 cm ground plane	16.4 cm upright; 17–18 cm radials	

Half-wave dipole length in metres ≈ 142.5 ÷ frequency in MHz; trim with an SWR meter. Sources: Ofcom amateur licence conditions OFW611 and 2024 review; RSGB exam fees; RAYNET-UK; ukrepeater.net (2 November 2026); Winlink; Icom and QRP Labs specifications; ARRL lab reviews; Nevada Radio prices (3 November 2026); HackRF documentation.

Satellite: Starlink, Garmin inReach, iPhone and the rest

Every satellite link has three legs: **your device to the satellite** (needs only your own power), **the satellite to a ground station**, and **the ground station to the person you want**. In a UK-wide blackout the first two usually survive, because most of the ground stations involved are abroad. The third is the problem: a text to a UK mobile with no signal, a call to a UK number, Wi-Fi calling, and the hand-over of an SOS to UK 999 all have to come back through UK networks that may be dead.

So satellite kit reliably reaches: people abroad, other satellite users, and internet services hosted abroad (WhatsApp, Signal, email). **It does not reach** UK phones that have no signal. Agree app names and email addresses in advance, not phone numbers, and pick a relative or friend abroad who can pass messages on.

Starlink: would it work with the whole UK blacked out?

Probably yes, if you can power the dish. Your dish talks only to Starlink satellites. They pass traffic down to a ground station ("gateway") and on to the internet at a "point of presence". The

UK has six licensed gateways (Morn Hill near Winchester, Goonhilly, Chalfont, Fawley, Woodwalton and Wherstead) and a London point of presence, all of which would need generators. But the satellites are linked by lasers, so traffic can hop across space to gateways in Ireland, France, the Netherlands or Germany. Ukraine has no Starlink gateway at all and is served from Poland, Lithuania and Turkey.

It has happened. In the Spain and Portugal blackout of 28 April 2025, Starlink's Madrid point of presence went down for 12 hours and Spanish users were moved to London and Milan "without the loss of service" for anyone whose dish had power. A user in Málaga kept 300 Mbps for about 12 hours from a 1,000 Wh power station topped up by a 100 W panel; mobile and broadband across much of Iberia were down for nearly 10 hours. Nobody has tested a whole-UK outage, and Starlink is one company's network: a software fault took it down worldwide for about two and a half hours in July 2025.

Power

- **Starlink Mini:** 25–40 W on average (one measurement: 21 W, 40 W peaks), 12–48 V DC or USB-C PD at **100 W minimum**. A 60 W power bank made it restart over and over. Internet in about 1.5 minutes from switch-on.
- **Starlink Standard:** 75–100 W, mains power supply only, start-up peaks reported up to about 180 W. Through an inverter you lose more.
- Switch it **off** between short sessions: three 20-minute sessions a day on a Mini is 30–40 Wh, so a 1 kWh power station lasts 3–4 weeks. Turn snow-melt off unless the dish is actually covered.

What you can and can't reach

- **Works:** WhatsApp, Signal, email, foreign news sites, contacts abroad, and UK contacts who also have Starlink or other working internet.
- **Doesn't:** calls and texts to UK phones with no signal (they queue until the phone comes back). **Wi-Fi calling won't work**: it runs through your mobile operator's UK network.
- UK websites (banks, councils, many .gov.uk services) go down when their data centres run out of generator fuel.

Account and cost (UK, November 2026)

- The account must already be live: you can't sign up or pay with UK payments down.
- **Standby Mode: £9 a month** for 0.5 Mbps with unlimited data, enough for messages, email and voice notes. Not available on the new V5 dish.
- Residential £32–48 a month (priced by area since October 2026); Roam £55 a month for 100 GB. Mini kit about £198, Standard kit about £318.

Garmin inReach and other satellite messengers

Yes, an inReach works with no UK infrastructure at all. It uses the Iridium network, whose 66 satellites pass messages between themselves across space and down to gateways in Arizona, Alaska, Norway (Svalbard) and Chile. No UK ground station is involved, so the satellite side doesn't care whether Britain has power.

- **inReach to inReach** works end to end. So does a message to someone using the Garmin Messenger app on an internet connection, such as a household on Starlink Wi-Fi. That pairing is the strongest family setup: one Starlink at home, an inReach with each person who's away.
- **A text to a UK mobile** has to go through the UK mobile network, so it won't arrive while masts are down. Email arrives whenever the person has any internet.
- **SOS** goes to Garmin Response in Texas (24/7, 210+ languages), who phone the right local service. In a Scottish case the Coastguard helicopter arrived within three hours. In a UK-wide blackout getting the alert *out* works; getting it *into* a UK control room depends on UK phone lines, and is untested.
- **Devices (UK, late 2026):** inReach Mini 3 (about £390, launched December 2025, about 14 days at 10-minute tracking); Mini 3 Plus (about £440: adds 30-second voice messages and photos); Messenger Plus (about £350: voice and photos, 25+ days). The older Mini 2 still works the same way.
- **Plans:** rolling monthly, from about £8 a month (SOS-only "Enabled", messages extra) to £50, plus a £39.99 activation fee. **Zoleo** (also Iridium) is £17.99–29.99 a month.
- Avoid the Motorola Defy Satellite Link: its maker went into administration in 2024.

iPhone and Android satellite features in the UK

FEATURE	IN THE UK?	WOULD IT WORK IN A UK-WIDE BLACKOUT?
iPhone Emergency SOS via satellite (iPhone 14 and later)	YES since December 2022. Dial 999 with no signal and follow the prompts.	The satellite leg **probably yes**: Apple uses Globalstar, whose satellites must see your phone and a ground station at the same moment, and the nearest ground stations are in **France and Spain**, not the UK. The message goes to an Apple relay centre, which contacts UK emergency services. Whether that last step works in a total blackout is **unknown**. Allow 15 seconds to over a minute per message, outdoors with a clear sky.
iPhone Find My via satellite	YES	**Probably yes**, but your location only reaches family who have internet.
iPhone Messages via satellite (texting friends)	NO US, Canada, Mexico and Japan only	No.
iPhone Roadside Assistance via satellite	YES via Green Flag	No: there'd be no recovery service and no fuel.
Google Pixel Satellite SOS (Pixel 9 and later, not 9a)	YES since March 2025	Satellite leg probably yes; hand-over to UK services unknown, as for the iPhone.
O2 Satellite (Starlink direct to your phone)	YES since February 2026, £3 a month. iPhone 13 and later, Pixel 9 and later, Galaxy S25/S26. Only up to about 58°N (around Inverness).	**Probably not for long.** The satellite acts as a mast in space, but your SIM and messages still go through O2's UK core network. It's built for local mast outages, not a national blackout. Texts to dead phones still won't arrive.
Vodafone with AST SpaceMobile	NOT YET beta planned for early 2027	–

Don't rely on any satellite SOS in a national emergency. iPhone, Pixel and inReach SOS reliably get an alert out of the UK; whether anyone in the UK can act on it when the whole country is dark has never been tested. A 406 MHz personal locator beacon (PLB, about £200–300, no subscription) goes through the Cospas-Sarsat rescue satellites to the UK's rescue centre at Fareham, with centres abroad as backup.

Satellite phones

- **Iridium handsets** (9555, Extreme, GO! exec hotspot): same network as inReach, independent of the UK. They reach other satellite phones and numbers abroad, not UK phones with no signal. About £1,000+ plus airtime.
- **Thuraya** (gateway in the UAE) is independent of the UK. From northern Scotland the satellite is low in the south-east sky.
- **Inmarsat IsatPhone 2**: ground stations in the Netherlands and Italy, but the network has long been run from London, so it's uncertain.

Satellite TV as a news source

The satellites are solar-powered; your dish, receiver and screen need 25–45 W. A normal Sky or Freesat dish (28.2°E) carries BBC News, Sky News and GB News, which stay on only while their UK studios and uplinks run on generators. It also carries **Al Jazeera English, France 24 English, Euronews English and TRT World**. Channels sent up from the continent (13°E Hot Bird and 19.2°E Astra, with DW, CNN International, France 24 and Al Jazeera English) are the safer bet, but need a second or re-pointed dish (60–80 cm in the south, 80–100 cm in Scotland) and a £30–60 free-to-air receiver. **Sky Stream and Sky Glass are internet-only and won't work.** Satellite receivers also play UK national radio stations without a TV.

Satellites for licensed radio amateurs

- **QO-100**, a geostationary amateur transponder at 26°E, covers the whole UK (26° above the south-east horizon in London, 18° in Shetland). With a 75 cm dish and 5–10 W on 2.4 GHz you can reach thousands of amateurs from Brazil to Thailand at any hour, with no UK infrastructure involved. Anyone can listen; transmitting needs an amateur licence.
- **The ISS and FM satellites** (ISS voice 145.800 MHz, APRS 145.825 MHz; SO-50 and AO-123) give 10-minute windows a few times a day with a handheld and a small beam aerial. A supplement, not a plan.
- **Weather pictures:** the old NOAA satellites on 137 MHz were all switched off in 2025. The Russian Meteor-M satellites still send pictures on 137.9 MHz, which an RTL-SDR dongle, a simple V-dipole and free SatDump software can receive.

Sources: Starlink specification sheets (Mini, Standard) and support articles; Kentik, "Lunes sin luz" (Iberian blackout routing); Xataka; ISPreview (UK gateways March 2026, Standby Mode, pricing October 2026, O2 Satellite February 2026); Ofcom gateway licence consultations; DCD (Ukraine gateways); wirelessmoves measurements of the Starlink Mini; Iridium ground station releases; Garmin Response; Garmin, GPS Training and Blacks (inReach Mini 3, Messenger Plus); Zoleo UK plans; Apple support (Emergency SOS via satellite, Find My, Messages via satellite); Globalstar's ground station list (BEREC 2023); Google Pixel help; Virgin Media O2 newsroom; KingOfSat channel listings (3 November 2026); AMSAT-UK; ARISS; AMSAT FM satellite list.

PART 4

Range: how far, and how to get further

Height beats power. Hills, trees, masts, kites and balloons, and a planner to try them.

How far will it reach?

Almost every radio in this guide has the power to reach hundreds of kilometres. A 0.5 W walkie-talkie has enough signal to cross 1,000 km of open space. What stops it is **the curve of the earth, the ground, buildings and trees**. That's why the packet says "up to 10 km" and you get 500 m in town.

Line of sight

VHF and UHF (2 m, PMR446, mesh at 868 MHz) travel in straight lines, bending only a little over hills. The radio horizon from a height *h* metres is about **4.12 × √h km**. Two people standing on flat ground can't be more than about 10 km apart before the earth's curve gets between them, and in practice the ground cuts it to a few kilometres.

Height is the cheapest range

Near the ground, signals fade with the fourth power of distance, so **each doubling of distance costs 12 dB**. Doubling the height of one end adds 6 dB, about 40% more range; doubling both ends doubles it. Going from your hand (1.5 m) to a 12 m pole roughly triples the range on flat ground.

What eats signal

- **Your body**: a hand round a UHF radio costs about 10 dB. Hold it upright, above head height.
- **Walls**: about 14 dB into a traditional house, 31–38 dB into a modern insulated one with foil-backed boards and coated glass. Use a window, or go outside.
- **Woodland**: 0.12 dB per metre at 446 MHz and 0.17 at 868 MHz, up to 18–27 dB. Wet leaves are worse.
- **A ridge** 50 m above the path costs about 10 dB at 27 MHz but 21 dB at 868 MHz. Lower frequencies bend round hills better.
- **Rain**: nothing worth counting below 5 GHz.

Range planner

Interactive: use it on survivalmg.com/emergency-communications.php

Realistic ranges

RADIO	HANDHELD IN TOWN	OPEN COUNTRY	HILL TO HILL	RECORDS
PMR446 (0.5 W)	A few hundred metres	1–3 km	Tens of km with line of sight	536 km, Blyth to the Netherlands, 2003 (freak conditions)
CB (4 W)	About 2–3 km	5–15 km car to car; more from a house aerial	30 km and more	Thousands of km by summer "skip"
2 m amateur (5 W handheld)	Several km	5–15 km	100–200 km mountain to mountain	4,776 km, Skye to Cape Verde, 2020 (sea ducting)
Mesh node (868 MHz)	1–3 km a hop	2–8 km a hop	100 km and more a hop	331 km mountain to mountain; 1,336 km boat to Canary Islands (sea ducting)
HF amateur (NVIS on 3.5–7 MHz)	0–650 km in every direction, with no line of sight needed, from a wire aerial 7–12 m up			Worldwide on higher bands

Unusual help: a quiet country

Most interference on CB and shortwave comes from mains electronics: chargers, LED lights, TVs, broadband and solar inverters (which must shut down when the grid fails). In a national blackout most of that noise stops, so distant stations on CB and HF should be noticeably easier to hear. Just switch off your own solar controller while you listen.

Sources: radio horizon (4/3 earth) and plane-earth models (Montana State, University of Toronto notes); ITU-R P.526 (diffraction), P.833-10 (vegetation), P.2109-2 (building entry); Southern Methodist University and Aalborg studies of handheld body loss; Avalon ARC PMR446 tests; Meshtastic range-test records; The Things Network LoRa records; ARRL VHF/UHF records; UKSMG on sporadic E; Met Office on solar cycle 25 (January 2026).

Getting height: trees, poles, kites, balloons and drones

For a mesh node, height turns a 2 km node into a 20–40 km one. Put the **whole node up high** with its own battery and solar panel, not a long cable to it: 10 m of thin RG-58 coax loses three-quarters of the signal at 868 MHz. (PMR446 radios may not be used this way: they must stay in the hand with their own aerial.)

WAY UP	HEIGHT	HORIZON	TO A PERSON 1.5 M UP	LASTS	NOTES
Upstairs window or roof	5–8 m	9–12 km	14–17 km	Indefinitely	Free. A node on the inside of a loft window loses some signal; outside is better.
Fibreglass telescopic pole (Spiderbeam)	12 m / 18 m	14 / 17.5 km	19 / 22.5 km	Indefinitely	12 m: about £100–120, 3.3 kg. 18 m: £230–250, 6.8 kg. Guy it three ways, at a third and two-thirds of its height.
Tree	15–25 m	16–21 km	21–26 km	Indefinitely, with solar	Throw a weighted line over a high branch (by hand 10–15 m, with a catapult 20 m+). Haul the node up on an endless loop through a pulley so you can lower it without climbing. Put it at or above the canopy edge: leaves eat UHF.

WAY UP	HEIGHT	HORIZON	TO A PERSON 1.5 M UP	LASTS	NOTES
Kite	Up to 60 m without permission	32 km	37 km	While the wind holds	Needs a steady 6–18 mph wind (the opposite of a balloon). An antenna-lifting kite such as the SOTAkite (£45, 61 m of line) lifts a wire or a small node.
Tethered helium balloon	Up to 60 m without permission	32 km	37 km	3–5 days a fill, in light winds	See below: it needs a big balloon, calm weather and a lot of helium.
Drone	Up to 120 m	45 km	50 km	About 25–30 minutes a battery	Good for a scheduled 20-minute message window, not a standing relay. Needs charging power.
High-altitude balloon (free flight)	25–35 km	570–770 km	All of England and Wales	2–3 hours	Then it bursts or drifts away. Needs CAA permission. A Meshtastic balloon node has been heard 206 km away.

A Meshtastic node on a tethered balloon

How big a balloon

- Helium lifts about **1 kg per cubic metre** (a little more in cold air, less with party-grade helium).
- Party balloons are useless: an 11-inch latex balloon lifts 9 g, an 18-inch foil one 2–4 g.
- A complete small node (Heltec V3 with a 1,200 mAh battery, whip aerial and case) weighs about **68 g**; an RAK or T1000-E node less. Add 1 mm Dyneema line at about 0.8 g a metre.
- The smallest sensible lifter is a **4 ft (1.2 m) latex "Cloudbuster"**: about 1 m^3 of helium and 770 g of lift. A 5.5 ft one holds 2.5 m^3 and lifts 2.1 kg.
- One 4 ft fill takes about four disposable "Balloon Time" canisters. A rented gas cylinder is more realistic. Buy before the emergency.

Wind decides the height

A round balloon has no aerodynamic lift, so wind pushes it sideways and down. With a 4 ft balloon, an 80 g node and 100 m of line:

- **5 mph:** flies at about 73°, close to the full 96 m.
- **10 mph:** blown down to about 40°: 64 m.
- **15 mph:** about 20°: 35 m, swinging, and the latex chafes.

So it works **below about 8 mph**. Bring it down before gusts. A "Helikite" (part balloon, part kite; a small one is about £140) keeps lifting in wind up to 25 mph, but loses half its lift in rain.

How long it lasts, and the range

- **Helium:** a 4 ft latex balloon floats 4–5 days indoors, less outdoors and in sun. Plan on 3–5 days a fill.
- **Battery:** an nRF52 node (RAK4631, T1000-E) uses about 1 Wh a day with GPS off, so a 1,200 mAh cell lasts about 4 days and an 18650 (3,000 mAh) 10 days or more. An ESP32 node (Heltec V3) lasts 1–2 days on the same cell.
- **Range at 60 m** to people holding nodes: the horizon is 37 km. Expect **15–30 km in open country**, much less into towns and woods. To another high node (a hilltop or a roof), far more.
- Set the balloon node's role to ROUTER so it relays everything, and keep your private channel key off it in case it comes down somewhere else.
- The 869 MHz mesh band may legally be used airborne. Amateur radio may not: the amateur licence doesn't allow airborne use, and PMR446 must stay in the hand.

UK LAW

Air Navigation Order 2016, article 92: a tethered balloon or kite, including its line, may not go higher than **60 m above the ground** without CAA permission, nor fly at any height inside an airfield's traffic zone without permission. A captive balloon must be securely moored, attended (or fitted with an automatic deflation device), and kept at least 60 m from any vessel, vehicle or building that isn't yours. A balloon over 2 m across is not a "small balloon" and has more rules. Any free-flying balloon carrying a payload needs CAA permission whatever its size.

Drones: no higher than 120 m, within your sight. Since 1 January 2026 you need a Flyer ID for any drone of 100 g or more, and an Operator ID from 250 g (or 100 g with a camera). The CAA may not be reachable in a national emergency; the limits still apply.

Sources: legislation.gov.uk (Air Navigation Order 2016, Part 5 Chapter 4 and Schedule 1); CAA guidance on balloon events, kites and drones (Drone Code, 2026 changes); Qualatex helium capacity chart; Wikipedia on lifting gases; Allsopp Helikites; Public Lab balloon mapping kit; Spiderbeam and Moonraker prices; SOTABEAMS; Muzi Works (node weight); Stratoflights balloon data sheet; Meshtastic range tests; Times Microwave and coax loss tables.

France to the UK: can a mesh node reach across the Channel?

Yes, from the cliffs, if both ends use the same settings. The Strait of Dover is about 33–34 km wide at its narrowest, from South Foreland to Cap Gris-Nez. Both countries allow the same 869.4–869.65 MHz band at 500 mW with a 10% duty cycle, so it is legal on both sides. And if Britain's grid is down, France may still have power and internet. A link to a friend there could pass messages on for you.

PATH	DISTANCE	LINE OF SIGHT?	WHAT TO EXPECT
Beach to beach (2 m each end)	34–41 km	NO the horizons add up to only 12 km	Nothing, except in ducting weather.
Dover cliffs (about 110 m) **to Cap Gris-Nez** (45 m)	34 km	YES horizons add to 71 km; the beam clears the sea by about 62 m halfway	A strong link: about 35–40 dB to spare for LoRa, about 30 dB even for a PMR446 handheld.
Dover cliffs to Cap Blanc-Nez (134 m)	33 km	YES	Strong.
Dover cliffs to a handheld on Calais seafront	41 km	JUST the ground at the French end is in the way of part of the signal	Workable for LoRa, with a few dB extra loss.
Hastings Country Park (North's Seat, about 174 m) **to Cap Gris-Nez**	67 km	JUST horizons add to 82 km	Possible for LoRa with good aerials at both ends.
Leith Hill (Surrey) **to France**	141 km	NO horizons add to about 98 km	Only by ducting.

The catch: different settings

UK Meshtastic users are almost all on "LongFast" at 869.525 MHz. France's main Meshtastic network (Gaulix) deliberately uses "LongModerate" at 869.4625 MHz, and Paris uses "MediumFast". Nodes on different settings don't hear each other at all, so **by default UK and French Meshtastic users can't talk**. **MeshCore** uses the same narrow setting on both sides: Pas-de-Calais repeaters near Wissant and Cap Gris-Nez sit 37–40 km from repeaters around Dover, and there's a beam-aerial repeater at Greatstone. We found no confirmed cross-Channel contact yet.

How to make the link

- Agree the settings with a contact in France beforehand: the same firmware, preset, frequency slot and private channel.
- Both ends high: cliff top, hill or roof, with the node at the aerial (no long cable).
- A small beam aerial (Yagi) pointed across the water helps, but gain counts toward the 500 mW limit: about 7 dBi on a 22 dBm board.
- Test it on a clear day, and log the signal strength (SNR) so you know what "normal" looks like.

When the sea helps

In settled high-pressure weather, especially on spring and summer evenings, warm air over cool sea forms "ducts" that carry VHF and UHF far beyond the horizon. A University of Leicester study across the Channel found strong signal boosts mostly then. PMR446 has been heard from the Blackdown Hills in France (2020), and 536 km from Blyth in the Netherlands (2003). A LoRa signal once crossed 1,336 km of ocean from Portugal to the Canary Islands. Lovely when it happens, but never something to plan on.

Distances are great-circle and heights approximate; horizon and Fresnel figures are calculated as in the range planner. Sources: Mesh Hub UK map data (3 November 2026); Gaulix configuration notes; ARCEP decision 21-1589; Ofcom IR 2030; Wikipedia (Strait of Dover, Cap Gris-Nez, Cap Blanc-Nez); University of Leicester theses on VHF/UHF propagation over sea paths; Avalon ARC PMR446 tests; The Things Network.

PART 5

Power with no grid and no fuel

How much you need, where it comes from, and keeping it going through a cold, dark winter.

Power planner: how much do you need?

Good news: a household's radios need very little power if you choose the right ones. A battery radio for two hours, a phone used sparingly, two walkie-talkies and a mesh node come to about **8–10 Wh a day**. That is two power banks for a fortnight. Long-range radio and satellite internet need ten times as much, and a power station left with its mains socket switched on wastes more than all of it.

Comms power planner

Interactive: use it on survivalmg.com/emergency-communications.php

Where the power comes from when there's no fuel

SOURCE	ENERGY	GOOD FOR	WATCH OUT FOR
Power banks (20,000 mAh)	About 55 Wh delivered each, 3 phone charges	Phones, mesh nodes, USB radios. Cheap: buy several.	Lose 1–2% a month plus their electronics. Top up every 3 months. Never charge below 0 °C.
Portable power station (LiFePO4, 250 Wh–2 kWh)	About 85% of its rating through USB and 12 V	The household's battery: charges everything, takes solar directly, lasts 3,000+ cycles.	Switch the AC (mains) socket **off**: its inverter wastes 7–14 W doing nothing, which is 170–340 Wh a day. Most won't charge below 0 °C.
12 V LiFePO4 leisure battery (100 Ah)	About 1,150 Wh usable	CB, amateur and HF radios run straight from 12–13.8 V, with no inverter.	Needs a charge controller for solar, fuses on every lead, and a warm room to charge.
Car battery (60 Ah lead-acid, engine off)	About 180 Wh if it must still start the car; 360 Wh to half-charge	A CB or 12 V radio for days: an IC-7300 listens for 16 hours, a QMX for 180.	The car's own standby drain flattens it in 3–8 weeks: disconnect the negative lead. A flat battery can freeze and crack at −15 °C.
Electric car with V2L (vehicle-to-load)	A 60 kWh car holds 40–50 times a 1 kWh power station	Refill a power station for an hour every week or two. Kia, Hyundai, MG, BYD, Renault 5, Volvo EX30 and others have a 2.3–3.6 kW socket or adapter.	V2L stops at 15–20% charge. Don't leave it running idle. A home V2H charger normally **shuts down in a power cut** unless it was installed with backup.
E-bike or scooter battery (36 V)	360–630 Wh	12 V radios and USB, through a fused step-down (buck) converter rated for 42 V.	Stop at 20–30%. Charge only when you're awake and nearby, on a hard surface.
Pedal generator (bike on a stand)	A fit adult makes 50–75 Wh in an hour	The strongest no-fuel source after solar and an EV: an hour covers several days of basic comms.	Needs a kit or some DIY; a regulator and battery to charge into.
Wind-up crank	20–35 W at best, and tiring	A backup to get a radio talking.	Tests found 90 seconds of cranking gave 5–7 minutes of radio. Charging a phone by hand is not practical.
Wood-stove charger (BioLite CampStove 2+)	About 3 W while it burns	A slow top-up while cooking.	Outdoors only (carbon monoxide), which may not be safe.

SOURCE	ENERGY	GOOD FOR	WATCH OUT FOR
Small wind turbine	UK roof turbines averaged about 210 Wh a day	Only on an exposed rural or coastal site with a proper mast.	In towns some made less than their own electronics used (Warwick Wind Trials).

Lithium fire safety with no fire brigade

Charge on a hard surface away from exits, with a smoke alarm nearby, in daylight while you're awake. Never charge a battery that is damaged, swollen, frozen or still hot from use, or one on a bed or sofa. Keep a metal bucket and a tray of sand or soil by the charging spot. (London Fire Brigade advice, adapted for when nobody will come.)

Sources: device manuals and datasheets (Motorola, Yaesu, Icom, QRP Labs, Midland, Tecsun, RTL-SDR Blog); ARRL lab reviews of the IC-705 and Xiegu G90; Anker on power bank capacity; Battery University (BU-702, BU-903); The Solar Lab and Outdoor Life measurements of power station idle draw; BestChargers V2L list (July 2026); Warwick Wind Trials; Jansen & Slob, "Human power: comfortable one-hand cranking"; Engadget's Eton FRX3 test; London Fire Brigade.

Batteries and the cold

Pick radios that run on **AA cells** where you can, so torches, radios and walkie-talkies share one stock. Then store the right kind for each job.

BATTERY	ENERGY	SHELF LIFE	IN THE COLD	USE IT FOR
Lithium AA (Energizer Ultimate Lithium L91)	About 3,000–3,500 mAh at low drain, 15 g	**20 years**	Rated to **−40 °C**	The emergency store: go bags, the car, anything used outdoors in frost. Not rechargeable.
Low self-discharge NiMH AA (Panasonic eneloop)	2,000 mAh at 1.2 V	Keeps about 70% after 10 years	Usable to about −20 °C; charge only above 0 °C	The everyday stock you recharge from USB or solar. Some radios show "low battery" early at 1.2 V.
Alkaline AA	About 2,500–2,850 mAh at low drain	10 years	Rated to −18 °C; weak at high drain in frost	Clocks, LED torches, low-drain radios. The type most likely to leak: store them out of devices.
Li-ion 18650 / 21700 cells, phone and radio packs	9–18 Wh a cell	Lose 1–2% a month; store at about 40–60%	About half the capacity at −18 °C, back when warm. **Never charge below 0 °C.**	Mesh nodes, handheld radios, power banks. Beware fakes that claim double their real capacity.
LiFePO4 (power stations, 12 V leisure batteries)	250 Wh to several kWh	Low self-discharge; 3,000–4,000+ cycles	Discharge to −10 to −20 °C; most won't charge below 0 °C unless self-heating	The household store. Safer than other lithium types.
Lead-acid / AGM (car and leisure batteries)	60 Ah = 720 Wh on paper	3–5% a month; recharge at 70%	Loses capacity in cold; a flat one freezes at about −15 °C	12 V radios, using only the top quarter to half.

Cold-weather rules

- Keep the phone and handheld radio in an inside pocket. Run a radio from a power bank in your pocket on a short lead.
- Take power banks and spare cells into your sleeping bag at night.
- **Never charge lithium below 0 °C.** Metal lithium plates inside the cell, which damages it for good and makes a later failure more likely. Warm packs indoors to 5–10 °C first.
- A cold battery that reads empty often comes back when warmed. Don't throw it away.
- Keep lead-acid batteries charged so they can't freeze.

Storing and rotating

- Store loose cells in their packs or a battery box, not in devices. Write the date on the pack and use the oldest first.
- Store lithium packs and power banks at 40–60% charge for the long term, or keep emergency ones at 80–100% and top them up every 3 months.
- A Li-ion cell stored full for a year at room temperature keeps about 80% of its capacity; stored at 40%, 96%.
- Charge Tecsun-type radios every 3 months even if you don't use them, and don't charge them while you listen (it adds noise).
- Ordinary (not "low self-discharge") rechargeables lose 10–15% a month. Avoid them for storage.

How many AA cells?

A PMR446 walkie-talkie on 3 AAA cells lasts about 18 hours of normal use (a little talking, mostly listening). Listening two hours a day for two weeks uses about two sets per radio; leaving it on 12 hours a day uses about ten. Turn radios off between scheduled calls.

Sources: Energizer L91 and E91 datasheets; Panasonic eneloop specification and press material; Battery University BU-410, BU-502, BU-702 and self-discharge articles; Tecsun PL-330 manual; Motorola Talkabout T42 datasheet; EcoFlow River 3 specification.

Solar in a UK winter

Solar works in Britain, but in December a panel gives about a third of what it gives in June in the south, and a sixth in the Highlands. Worse, the average hides long dull spells. Size your batteries for **7–10 days without useful sun**, and treat the panel as a top-up.

Average Wh a day from a 100 W panel, south-facing at 60°	Dec	Jan	Feb	Mar	Apr	Jun	Sep	Oct	Nov
Hastings (south coast)	150	150	230	320	410	410	350	250	180
London	140	150	210	280	350	340	310	240	190
Manchester	110	100	180	250	330	310	260	190	150
Inverness	60	70	160	230	310	310	250	170	100
Lerwick (Shetland)	30	50	110	210	310	330	220	140	70

EU Joint Research Centre PVGIS 5.3 (SARAH3 satellite data 2005–2023), 14% system losses, local horizon included. Retrieved 3 November 2026.

The real December

- In Hastings, half of December days give under **88 Wh** from 100 W, and one day in ten under 15 Wh.
- In Inverness, half give under **40 Wh**, and one in ten under 4 Wh.
- Over 2014–2023 the longest run of days under 50 Wh was **9 days** in Hastings and **13** in Inverness.
- An overcast day gives 5–15% of the average.

Getting the most from a panel

- **Tilt it steeply in winter.** At 60° it beats the usual 35°, and hung flat on a south wall or balcony rail (90°) it does as well as 60° in December.
- **Put it outside.** Window glass costs 30–50%, and some low-emissivity double glazing more. Prop it on a sill or rail, secure it against wind and theft, and run the lead in through a window gap.
- Keep it clear of frost, snow and leaves. Shade on one corner can stop a small panel.
- An MPPT charge controller gets 15–30% more from a 100 W panel than a cheap PWM one, especially on cold days. Most power stations have one built in.

Folding USB panels (20–28 W)

- Expect about 10–20 Wh on an average December day in the south, about one phone charge, and almost nothing when it's dull. Half that in Scotland.
- They cut out when a cloud passes, and many phones won't restart charging. **Charge a power bank from the panel**, then the phone from the bank.
- From March to October they are genuinely useful.

Solar gear can deafen your radio

Charge controllers, inverters and LED lights hiss and buzz on shortwave and HF, especially on the lower bands (80–40 m). The noise grows with charging current and stops when the battery is full. In a blackout the mains-powered noise around you disappears, so this may be the loudest thing left. Fixes, best first:

1. **Switch the controller or inverter off**, or unplug the panel, while you listen. Listen in the evening, when solar is off anyway.
2. Run the radio straight from the battery, not from the controller's load socket, and don't charge the radio while listening.
3. Clip-on ferrite chokes at the controller end on *every* lead (panel, battery, load), with both wires of each pair through the same core.
4. Keep the aerial outdoors and away from the panel wiring.

Sources: PVGIS hourly series analysed for Hastings (50.855, 0.573) and Inverness (57.478, −4.224); Morningstar on MPPT; OH8STN's tests of a Victron MPPT on HF; Palomar Engineers and Victron community notes on solar interference; Tecsun PL-330 manual.

EMP, solar storms and Faraday boxes

A solar storm won't harm your radio

A severe geomagnetic storm threatens big grid transformers, long power and telephone lines, satellites and GPS. It has no fast pulse, so it does **not** damage an unplugged phone, radio or small solar panel. Expect shortwave and HF to black out on the daylit side for hours, and GPS to wander. Forecasters usually give 18–72 hours' warning. The UK grid is less exposed than North America's, but the government puts a severe event within five years at 5–25%.

A high-altitude nuclear EMP might

A nuclear burst high above the atmosphere sends a nanosecond pulse (E1) that drives damaging voltages into **cables and aerials connected to electronics**. The US Cybersecurity and Infrastructure Security Agency (CISA) found small electronics with no cables attached, such as phones and walkie-talkies, "relatively resilient". The networks they depend on are not. So: unplug spares from power, data and aerial leads, take out battery packs, and keep spares in a metal box.

A Faraday box that actually works

- A **metal box or galvanised bin with a lid**, the lid seam sealed with conductive aluminium tape. Two nested layers are better: an item wrapped in foil, inside a tin, inside the bin.
- Wrap each item in cloth, cardboard or a plastic bag first so it can't touch the metal. Fold foil seams over twice: in tests, the seams decided everything.
- Test it: put a phone inside and ring it. If it rings, the box leaks.

- What tests found: anti-static and Mylar bags blocked only 7–9 dB (almost nothing). A biscuit tin 29–43 dB. Carefully folded heavy foil 50–90 dB. CISA treats 30 dB as useful protection.
- Put in it: a spare receiver, a spare handheld, a cheap power bank, a small charge controller, spare mesh nodes. Keep the radios you use every day outside, ready.

Myths: the box doesn't need to be earthed. A microwave oven or fridge is not a reliable Faraday cage (their door seals leak). And you don't need to hide radios from solar storms.

Sources: CISA, "Electromagnetic Pulse (EMP) Protection and Resilience Guidelines for Critical Infrastructure and Equipment" v2.2 (2019); Met Office space-weather impacts; UK National Risk Register 2025; National Audit Office, "The UK's resilience to severe space weather" (March 2026); Matt Blaze's Faraday bag and container measurements (December 2021).

PART 6

Staying safe

What not to say, how transmitters are found, and signals that need no batteries.

Staying safe on the air

Assume everything you say on PMR446, CB or amateur radio is heard by anyone within range who has a £25 scanner or a walkie-talkie. If it isn't safe to walk about, it isn't safe to tell strangers what you have or that the house is empty.

Never say on air

- Your address, or that you're away from home.
- That you have food, water, fuel, a generator, medicines or cash.
- Who is at home, how many, and who is vulnerable.
- Full names. Use first names, nicknames or call names ("Red 1").

You can be found

- Every transmission can be traced by direction-finding: hobbyists do it for fun with a handheld and a small beam aerial ("fox hunting").
- Keep transmissions short and few, at agreed times.
- Use the lowest power that works, and move a little away from the house to transmit if you're worried.
- Screens and torches show at night. Close the curtains or turn the brightness down.

Mesh texting (Meshtastic, MeshCore)

- The default Meshtastic channel ("LongFast") is public: its key is published, so anyone can read it. Use a **private channel with your own key** for anything personal.
- Turn **position sharing off**, or set it to a rough area. By default a node can send its GPS position to everyone.
- Give the node a name that isn't your name or street.

Analogue PMR446 and CB radios have no encryption, and the "scramble" on cheap digital sets is weak. Amateur radio forbids encryption in normal use (it is allowed only when supporting the emergency services under the licence's emergency clause). Treat all of them as public. Mesh devices on the licence-free 868 MHz band encrypt private channels properly.

Signalling with no electronics at all

Batteries die. These cost nothing, work for ever, and rescuers are trained to look for them.

SIGNAL	HOW	MEANS
Whistle or torch	Six long blasts or flashes in a minute, then a minute's pause, then repeat	The UK and European mountain distress signal: "help needed". The reply is three blasts or flashes a minute. Three of anything is widely known as "help" too.
SOS in Morse	Three short, three long, three short: · · · — — — · · ·	Distress, understood everywhere. Use a torch, a whistle, or tapping on a pipe or wall if trapped.

SIGNAL	HOW	MEANS
Arms raised in a Y	Both arms up and apart, facing a helicopter or aircraft	"Yes, we need help". One arm up and one down (an N) means "no, we're fine".
Ground-to-air letters	At least 2.5 m long (3 m is better), in something that stands out against the ground: rocks, logs, clothing, sheets	**V** need help · **X** need medical help · **N** no · **Y** yes · → we went this way
Signal mirror	Aim the flash through a V of two fingers at the target. A CD or phone screen will do.	In sunshine a flash is seen many kilometres away, by aircraft and on the ground.
Three fires or smokes	In a triangle or a line, about 30 m apart	The international distress signal. Green leaves make white smoke by day.
Window card	Agree it with your street now: a green "OK" or a red "HELP" sheet in the front window	Lets neighbours and wardens check a whole street without knocking on every door.
Message drop	A dated note at an agreed place: inside the porch, the church door, the noticeboard	Where you are, when you left, and when you'll be back. Keep it out of view of the street.

Mountain distress signal: Mountain Rescue England and Wales. Ground-to-air symbols: ICAO Annex 12 (Search and Rescue) and the UK Search and Rescue framework.

PART 7

Checklists

What to buy at each budget, what to do before and during, the printable card, and the sources.

What to buy, by budget

Prices are typical UK prices in November 2026. Each level adds to the one before. You can tick these in the survival kit builder too.

About £100: listen and talk next door

- Battery FM/DAB radio that takes AA cells, or a wind-up/solar radio (£25–60)
- Pack of lithium AA cells (20-year shelf life, works in frost)
- A pair of PMR446 walkie-talkies, AA-powered if possible (£40–80)
- One 20,000 mAh power bank and cables
- The printed frequency card and a family plan

About £350: the household and the street

- Tecsun PL-330 shortwave receiver, spare cell, 10 m of wire (£60–75)
- A second power bank, or a 245 Wh LiFePO4 power station (£180–240)
- A folding 20–28 W USB solar panel (summer-useful, winter top-up)
- Two or three nRF52 mesh nodes: T1000-E or WisMesh Pocket (£38–85 each)
- Walkie-talkies for each family member and a spare pair for neighbours
- A metal tin for spares

About £1,000: a neighbourhood hub

- 1 kWh LiFePO4 power station (£380–600 on sale) and a 100 W panel
- A solar mesh repeater for the highest roof, tree or hill (about £85+)
- CB base station and a house aerial (£150–350), or a car CB
- Amateur Foundation exam (£35.50), a 2 m handheld (£20–85) and a home-made ground-plane aerial
- A 12 m fibreglass pole (£100–120)

£1,500 and up: reach the UK and the world

- HF radio: QRP Labs QMX (about £80–120, 1 W on receive), Xiegu G90 (£380), Icom IC-705 (£1,083) or IC-7300MK2 (£1,359)
- Wire NVIS dipole for 40/80 m, and a 100 Ah LiFePO4 battery
- Starlink Mini (kit about £198) on Standby Mode (£9 a month), with a 100 W USB-C PD power bank
- Garmin inReach Mini 3 (about £390) or Messenger Plus (about £350) for family who travel, with a monthly plan

Spend on power and practice before gadgets. A £20 radio with a full battery and a practised plan beats a £1,400 radio with a flat one. Choose devices that share AA cells or charge from USB, and buy two of anything you rely on.

Before: get ready

Almost everything that makes comms work in a crisis has to be done while the internet, the shops and the post still work.

Buy

- [ ] A battery FM (and DAB) radio that takes AA cells, plus lithium AA cells.
- [ ] A shortwave receiver, a spare battery and 10 m of thin insulated wire.
- [ ] PMR446 walkie-talkies: one per person, plus a pair to lend to neighbours.
- [ ] Two or more 20,000 mAh power banks, cables for every device, and a 12 V car USB adaptor.
- [ ] For longer outages: a LiFePO4 power station (250 Wh–1 kWh) and a solar panel with an MPPT controller.
- [ ] A mesh node per household, and a solar repeater node for the street or a high point.
- [ ] A metal tin or bin with spares in it (see Faraday boxes).
- [ ] Optional: CB for the house and car, amateur radio, Starlink Mini on Standby, a satellite messenger.

Set up

- [ ] Write your local FM frequencies on every radio, and print the frequency card. Laminate it or put it in a freezer bag.
- [ ] Label each walkie-talkie with your household channel and code.
- [ ] Set up a private mesh channel, share its QR code with family and neighbours, set the roles and turn position sharing down.
- [ ] Download offline maps and save this page and the guide PDFs to your phone (how).
- [ ] If you depend on a landline, ask your provider for the free battery backup unit.
- [ ] Keep a Starlink or satellite messenger plan active, or on standby, so nothing has to be bought during the emergency.

Agree and practise

- [ ] Your PACE plan, check-in times, codewords and meeting places, in a written family plan.
- [ ] A contact abroad who can pass messages on, and app names and email addresses as well as phone numbers.
- [ ] Walk the area with a walkie-talkie and a neighbour: find the dead spots and the high points that reach everyone.
- [ ] A monthly "radio night" with neighbours: everyone checks in on the agreed channel.
- [ ] Book the amateur Foundation exam and join your local radio club or RAYNET group.
- [ ] Every 3 months: charge power banks and radios, rotate batteries, test everything.

During: what to do, hour by hour

THE FIRST HOUR

Check everyone at home is safe. While masts still work, send **one text** to your out-of-area contact ("All safe at home. Going to plan B.") rather than calling: texts get through when calls don't. Switch the radio on for news. Turn walkie-talkies on and check in with your household. Switch the power station's AC socket off and put phones on low-power mode.

THE FIRST DAY

Start the schedule: check-ins at fixed times (for example 08:00, 12:00, 18:00 and 21:00), and news on the hour for 5–10 minutes, written down. Put a mesh node somewhere high and leave it on. Keep phones in flight mode except at check-in times; a phone searching for a signal drains fast. If someone needs 999, try anyway: a phone can use any network that's still up, and an iPhone 14 or later can text 999 by satellite outdoors.

EVERY DAY

Charge from solar around midday and in daylight while you're awake. Keep batteries warm, and never charge lithium below 0 °C. Rotate batteries, and keep spare radios in their tin until a working one fails. Listen to shortwave if UK stations go quiet (BBC World Service on 3955 kHz at 05:00 and 9410 kHz at 06:00 UTC). Say nothing on air about supplies, who's home or where you live.

THE FIRST WEEK

Help the street get connected: lend a walkie-talkie, set up a noticeboard or message drop, share the mesh channel. If the council opens a rest centre or community hub, that's where official notices go up. Stick to the plan. If you've agreed a fallback ("if we haven't spoken by day 3, we go to Gran's"), carry it out.

WHEN POWER COMES BACK

Networks will be overloaded. Send texts, not calls, and stagger them. Recharge everything, then refill your stores and note what you'd do differently.

Frequency card: print it, fill it in, keep it with the radio

Four cards to print on one A4 sheet. Fill in the blanks by hand, then laminate them or keep them in a freezer bag in your go bag and by the radio.

Listen	survivalmg.com
Local BBC (FM)	_____ MHz
BBC Radio 4 (FM)	_____ MHz
Local commercial (FM)	_____ MHz
BBC national DAB	block 12B
News	on the hour
Shipping Forecast (R4)	00:48 · 05:34
BBC World Service SW	3955 kHz 05–06 · 9410 06–07 UTC
Radio Romania (English)	9740 · 20:30 / 22:00 UTC
Shannon VOLMET (weather)	5505 · 3413 kHz USB
Power cut	105

Talk	survivalmg.com
Our PMR446	ch ____ code ____
PMR446 calling	ch 8, code 0
PMR446 "3-3-3"	ch 3, code 0 · 09 12 15 18 21
Our mesh channel	_____
CB	9 help · 14 calling · 19 road
Our CB	ch ____ UK / EU
Ham 2 m / 70 cm calling	145.500 · 433.500
Ham HF emergency	3.663 · 3.760 · 5.2785 · 7.110
Marine distress (risk to life)	Ch 16 · 156.800
Air emergency	121.5 MHz

Our plan	survivalmg.com
Check-in times	_____
Meet: near home	_____
Meet: out of area	_____
Message drop	_____
Contact abroad	_____
If no contact by day	____ go to _____
Codewords	well ____ help ____ away ____
Our call names	_____

Signals and rules	survivalmg.com
Need help	6 blasts or flashes a minute
Reply	3 a minute
SOS	· · · – – – · · ·
On the ground (2.5 m+)	V help · X medical · → went this way
To aircraft	arms up in a Y = need help
On air never say	address · supplies · who's home
Batteries	keep warm · no lithium charging below 0 °C
Message	who · where · what · need · next call

Things people get wrong

BELIEF	THE TRUTH
"Tune to Radio 4 on long wave in an emergency."	BBC long wave closed for good in June 2026, and BBC local medium wave goes at the end of November 2026. Use FM or DAB.

BELIEF	THE TRUTH
"Emergency Alerts will warn me."	They're sent by mobile masts, which go silent within about an hour. A radio is the warning system.
"No signal means no 999."	A phone can call 999 on any network that's still up, not just its own, and iPhone 14 and later (and Pixel 9 and later) can send an emergency text by satellite.
"A Baofeng is just a better walkie-talkie."	It's an amateur radio. Using it on PMR446 channels, or anywhere without an amateur licence, is illegal. It's fine for listening.
"Channel 9 on CB reaches the emergency services."	Nobody official listens. It's a convention, not a service.
"The box says 10 km."	That's hilltop to hilltop. Plan on about 1 km between houses in town.
"Privacy codes make my walkie-talkie private."	They only filter what you hear. Anyone on code 0 hears you.
"The Meshtastic default channel is encrypted, so it's private."	Its key is published. Set up your own private channel.
"A wind-up radio means I never need batteries."	One test got 5–7 minutes of radio from 90 seconds of cranking. Keep its battery topped up from a power bank or solar panel.
"A solar panel will keep everything charged."	In December a panel gives about a third of its June output in the south and a sixth in the Highlands, with dull spells of 9–13 days. Store a week or more.
"My power station holds 1,000 Wh, so I get 1,000 Wh."	Its mains inverter wastes 7–14 W just being on, about 170–340 Wh a day. Use the USB and 12 V ports, and switch the AC off.
"Satellite messengers can reach anyone."	They reach other satellite devices and anyone with internet. A text to a UK mobile with no signal won't arrive until the masts come back.
"I can use Wi-Fi calling over Starlink."	Wi-Fi calling runs through your mobile operator's UK network, which may be down. Use WhatsApp, Signal or email.
"An anti-static bag is a Faraday bag."	Tests found Mylar and anti-static bags block almost nothing (7–9 dB). Use a metal tin or bin with a taped lid.
"A solar storm will fry every phone and radio."	It threatens the grid, satellites and GPS, not unplugged handheld electronics. Shortwave may black out for hours.
"It's fine to charge batteries in the cold shed."	Charging lithium below 0 °C damages it permanently and can make it fail later. Warm it first.

Sources

Checked on 3 November 2026. Prices, schedules and rules change: check the ones you rely on.

Networks, power cuts and broadcasting

- Ofcom: Mobile RAN power resilience (Feb 2025)
- Ofcom: the future of landline calls
- gov.uk: how Emergency Alerts work
- NESO: Electricity System Restoration Standard
- Cabinet Office: National Risk Register 2026
- RIPE 90: the Iberian blackout (May 2025)
- Be Ready (UK government)
- BBC Framework Agreement
- RSGB: the closure of BBC long wave
- short-wave.info schedules

Radio rules

- Ofcom IR 2030: licence-exempt devices (PMR446, 868 MHz)
- Ofcom: Citizens' Band guidance and IR 2027.2
- Ofcom amateur licence conditions (OFW611)
- RSGB band plans and exams
- RAYNET-UK
- IARU Region 1 emergency frequencies
- Ofcom Business Radio guidance
- Ofcom maritime licence review (Oct 2026)
- Wireless Telegraphy Act 2006, s.48
- Air Navigation Order 2016, art. 92–93

Mesh, satellite and range

- Meshtastic documentation and range records
- MeshCore FAQ
- Mesh Hub UK
- Starlink Mini specification
- Kentik: Starlink in the Iberian blackout
- Apple: Emergency SOS via satellite
- Garmin Response
- ITU-R P.833 (vegetation), P.526 (diffraction), P.2109 (buildings)
- CAA Drone Code

Power and protection

- EU JRC PVGIS (solar figures)
- Battery University: charging in the cold and storage
- Energizer L91 lithium AA datasheet
- CISA: EMP protection guidelines
- Matt Blaze: Faraday container tests
- London Fire Brigade: lithium battery safety
- The Solar Lab: power station tests
- V2L electric cars in the UK

More detail and every source behind each section is in the notes at the end of each section above. Related guides: UK Crisis Survival: communication · Nuclear Event Survival · survival kit builder · family emergency plan.