

MURS band remote Controller Transmitter and Receiver

The MCT1A and MCR1A are a long range (1 watt transmit power) 4 input/output industrial RF Remote Controller system, operating in the unlicensed 154MHz MURS band (a USA/Canada allocation)

Features

- 12 bit Address selection using DIP switch
- 4 Active Low Closing Contact Inputs
- 4 NO/NC Relays 8A 250VAC
- Momentary or Latched Outputs
- Constant or 2-62s repeat transmission
- Transmitter over-voltage protection
- Antenna mismatch survivability
- Multichannel (Two MURS frequencies)
- Easy adjustment of retransmission rate
- LED Transmit Indicator
- LED Valid Decoding Indicator on Receiver
- RSSI Bar Graph
- Simple, intuitive in-the-field setup. No PC required
- Can be supplied with 80x109x30mm Extruded Aluminium Enclosure or without

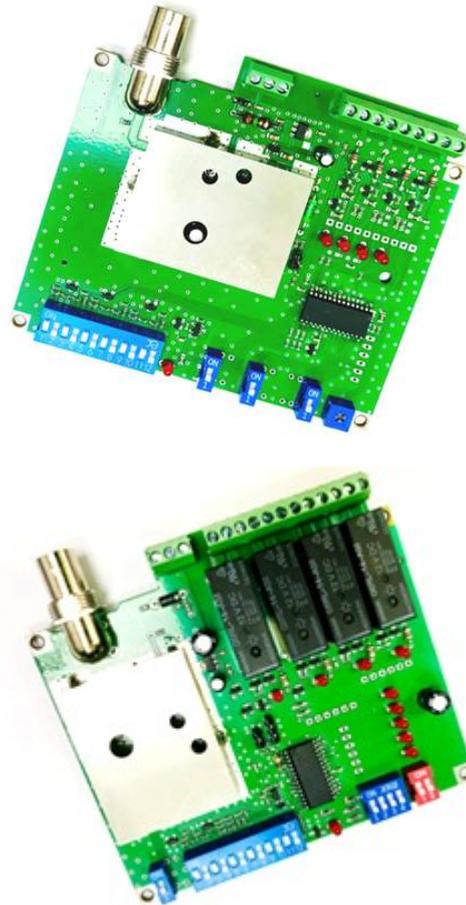


Figure 1: MCT1A (top) and MCR1A (bottom)

Technical Specification

- Frequencies: 154.570MHz, 154.600MHz
- RF Power: +30dBm (1 Watt)
- High performance double superheterodyne receiver
- Receive Sensitivity: -120dBm for 12dB SINAD
- 25kHz channel spacing Narrow Band FM
- High stability TCXO referenced Sigma-Delta Fractional-N PLL Frequency Synthesiser
- TX supply: 11V-14V DC, 290mA TX current consumption
- RX supply: Supply Voltage can be 11.0 - 28.0 VDC or 10.0 - 28.0 VAC
- RX current consumption: 24mA Standby at 12VDC; 180mA if all relays "ON" at 12VDC
- Operates on Multi-Use Radio Service (MURS) band
- Complies with FCC 47 C.F.R. Part 95 Subpart J

Application

- Water Pump Control
- Long range Panic Alarm
- Irrigation Remote Control
- Security Alarm
- Water level Monitoring

MCT1

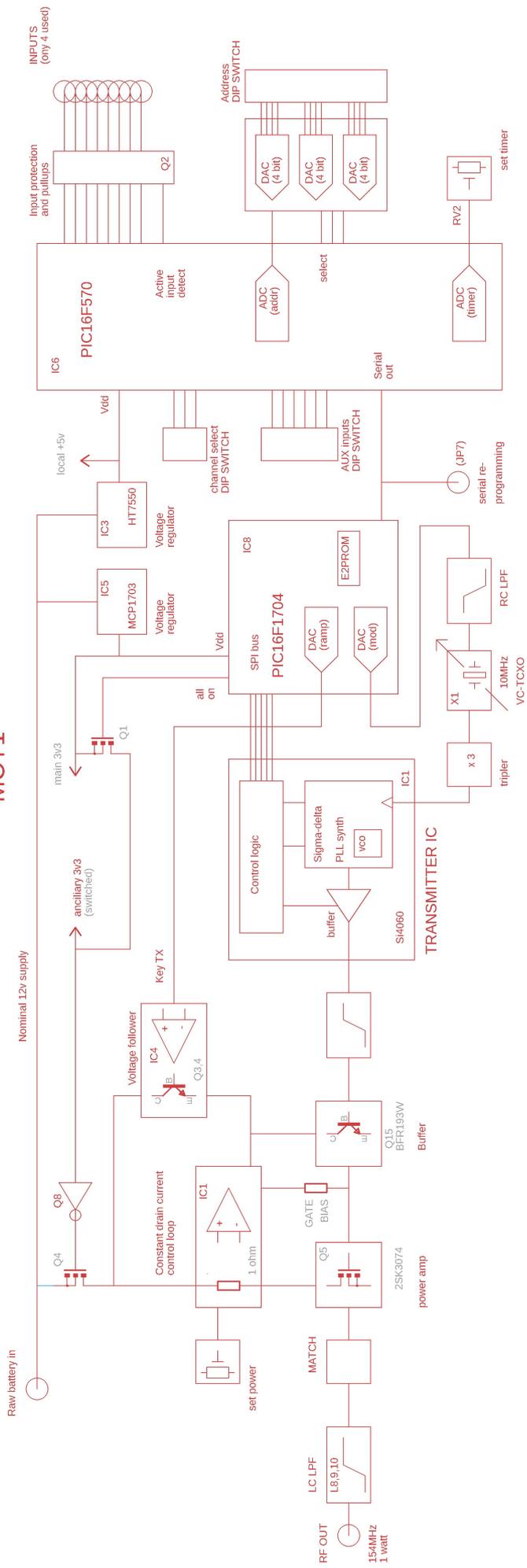


Figure 2: MCT1A Block Diagram

MCR1

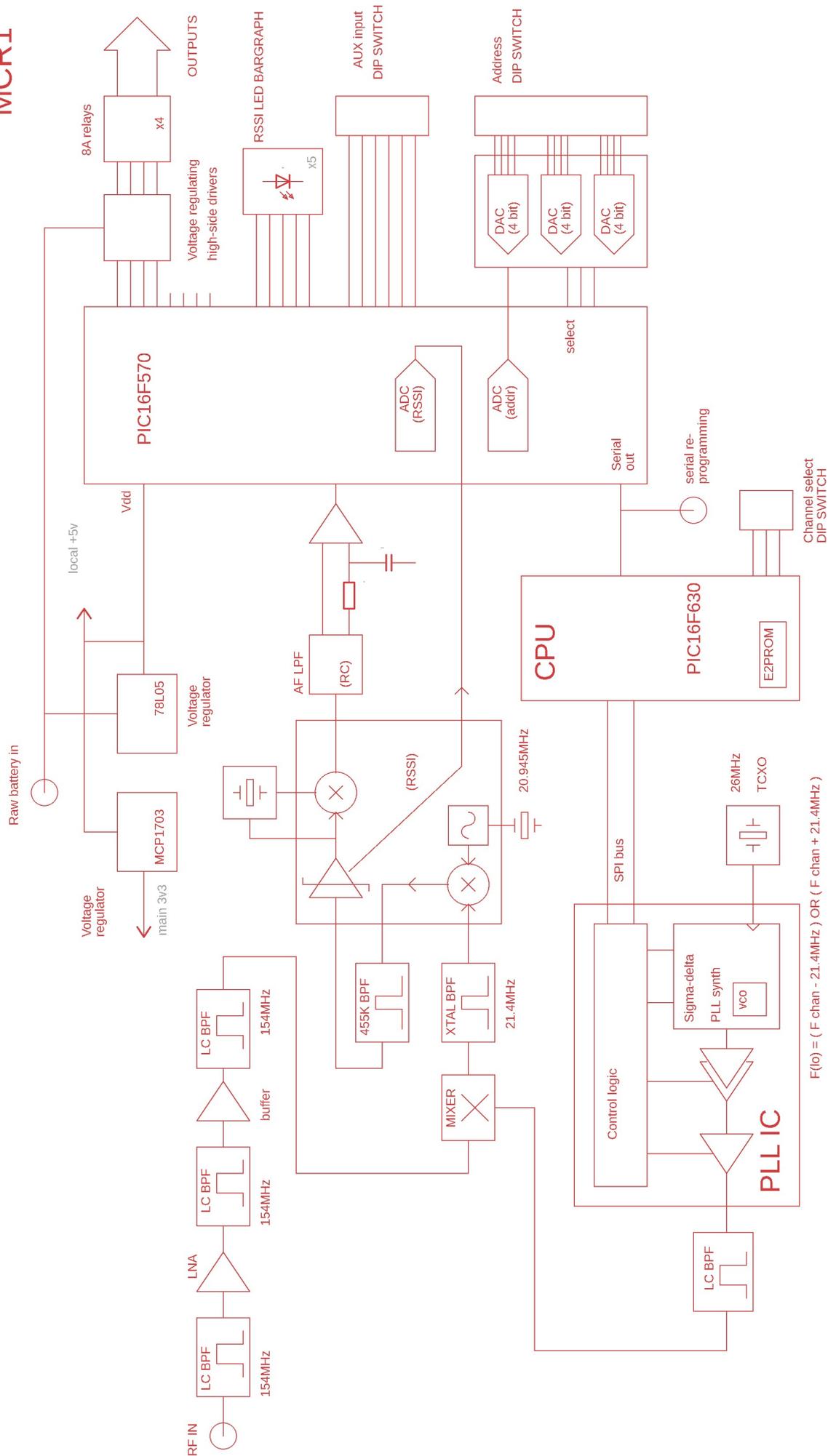


Figure 3: MCR1A Block Diagram

MCT1A Remote Controller Transmitter

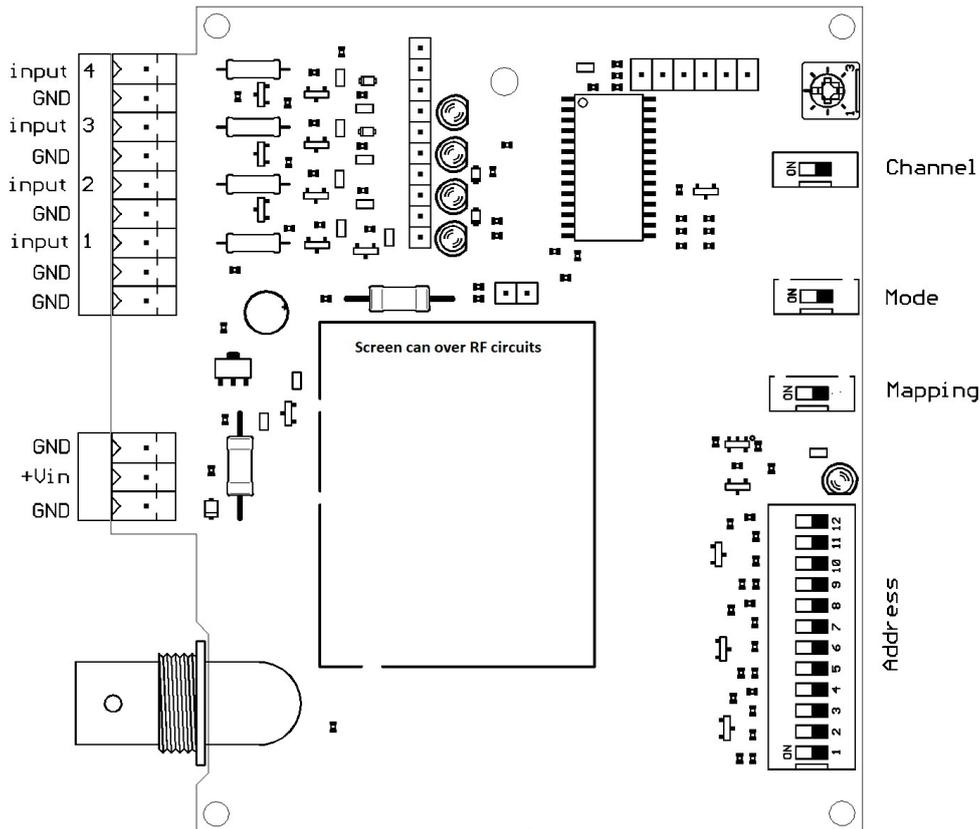


Figure 4: MCT1A Interface and Configuration

Inputs are activated via screw type terminals onto which the user can connect reed switches, toggle switches, push buttons or any form of Normally Open (NO) volt free contact.

Whenever a change on the inputs is detected, then an "update" burst is sent (additional to the regular cyclic transmission)

MODE Switch (S1)

Continuous Transmission – MODE Switch OFF

Transmitter will transmit continuously, if at least one input is activated, and supply is connected. A transmission limit of five minutes is used to comply with local radio regulations. To activate a receiver output for longer than 5 minutes, use the "off delay" mode at the TX, and turn on the variable hold delay (VHT) on the receiver.

Intermittent mode: Off Delay 2 – 62 seconds – MODE Switch ON

Transmitter will transmit a 1.5 second transmission burst and then stop for the "off delay" time selected. The "off delay" time is user selectable between 2 to 62 seconds by adjusting RV2 on the transmitter board. If the inputs change during the "off delay" period, the new code will be transmitted immediately. When the "off delay" time lapses, transmitter will transmit another burst. The transmitter will cycle (transmission and off delay) indefinitely, if at least one input is ON and supply is connected.

Address select (S2)

The 12 way Dip switch is used to set a 12 bit (4096) unit address.

Channel Select (S3)

OFF CH0:154.570MHz
ON CH1:154.600MHz

Output Mapping (S4)

12-way DIP Switch Address on both Transmitter and Receiver should match.

With additional 1-way DIP switch (S4) and 4-inputs

S4	Output 1	Output 2	Output 3	Output 4
OFF	OP1	OP2	OP3	OP4
ON	OP5	OP6	OP7	OP8

MCR1A Remote Control Actuator Receiver

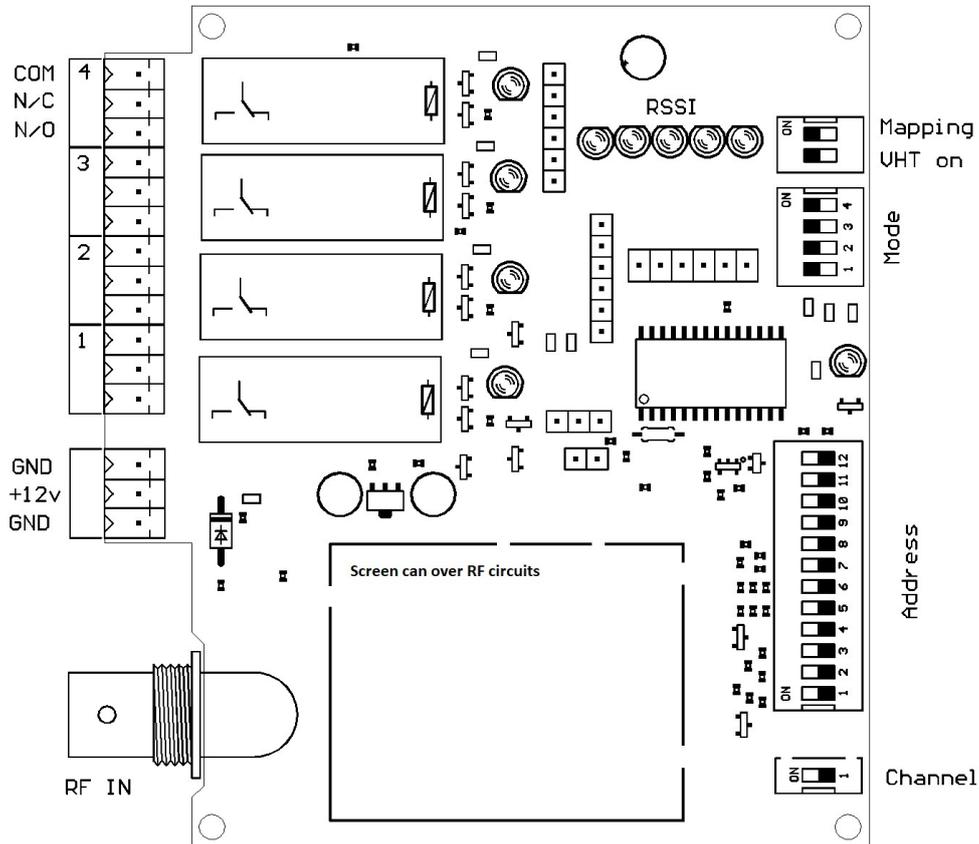


Figure 5: MCR1A Interface and Configuration

Output Modes – Momentary / Latching

Each Relay output on the receiver can be individually set to function in either momentary or latching mode. Momentary Mode (MODE switches OFF) is factory default setting.

Modes selectable from the 4-way DIP switch.

MODE (S3)		Momentary	Latched
DIP Switch 1	Relay 1	OFF	ON
DIP Switch 2	Relay 2	OFF	ON
DIP Switch 3	Relay 3	OFF	ON
DIP Switch 4	Relay 4	OFF	ON

Momentary Output will be activated and remain activated for as long as the transmitter button is pressed.

Latching Output remains active with single transmitter button press. It will be deactivated with subsequent transmitter button press. It is toggled between ON and OFF with each subsequent button press on transmitter.

Mapping (S1) – Output mapping / Variable Hold Time

The "rightmost" (= nearest to the PCB edge) switch controls mapping.

To use a 4 input Transmitter with 4 output Receiver, 12-way (S2) Address + 1-way (S1) Mapping should match on both transmitter and receiver.

The "leftmost" (= nearest to the 4 way mode switch) selects variable hold time.

Variable Hold Time (VHT)

This facility extends the hold time of the "momentary" mode outputs to match the intermittent transmission time (this information is sent from the TX in the form of a modified data burst)

So in intermittent mode, with VHT on, the outputs no longer "pulse"
They match the input states at the transmitter end

VHT is only usable with a TX in intermittent mode

It also cannot be used with outputs in toggling mode (for this function, set all outputs to momentary)

Notes:

- if VHT is selected the MCR1A behaviour on receiving a continuous mode burst is undefined
- Whenever a burst is received, the outputs are updated (irrespective of the cyclic timeout)
- Changes to the address, mode, mapping (etc) switches should be made with the power OFF, or a power down/power up cycle needs to be done after such change. Otherwise there is a risk that the unit can end up in an odd state

Received Signal Strength Indicator (RSSI)

The receivers have five LED's on the board to indicate RSSI level. They perform a decorative flash during power-up

5 LED	-70dBm	Very Strong signal	Very Reliable operating conditions
4 LED	-75dBm	Very Strong signal	Very Reliable operating conditions
3 LED	-80dBm	Very Strong signal	Very Reliable operating conditions
2 LED	-90dBm	Strong signal	Very Reliable operating conditions
1 LED	-100dBm	Good signal	Reliable operating conditions

Ordering Information

Part Number	RF Power Output (Watt)	Channel Frequency (MHz)	Country
MCT1A-154-4	1	CH0:154.570, CH1:154.600	USA
MCT1A-154-4-EBS80	1	CH0:154.570, CH1:154.600	USA
MCR1A-154-4		CH0:154.570, CH1:154.600	USA
MCR1A-154-4-EBS80		CH0:154.570, CH1:154.600	USA

Note: EBS80 Enclosure cannot be added later unless PCBs are ordered with endplates.

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Radio Equipment Directive (RED)

Before it can be placed on the UK market, radio control equipment must first comply with the provisions of the Radio Equipment Directive 2014/53/EU.

To comply, all equipment must meet a set of Essential Requirements that are based on voluntary Harmonised European Standards. Manufacturers can meet the essential requirements by ensuring equipment meets the applicable harmonised standards or by seeking the opinion of a Radio Equipment Directive Notified Body. Once this assessment has been carried out, the manufacturer can declare compliance, affix the CE mark to the equipment and then place it on the market anywhere in the European Community.

<https://www.ofcom.org.uk/spectrum/information>

<https://www.ofcom.org.uk/spectrum/rules/>

<https://ec.europa.eu/docsroom/documents/33162>
