Association For
Audio Visual Professionals

Code of Practice

For the Installation of Aerials/Antennas & Receiving Equipment in the Single Dwelling Unit

CAI COP 2: September 2022





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E&OE

Code of Practice

For the Installation of Aerials/Antennas & Receiving Equipment in the Single Dwelling Unit

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This document has been prepared by the Board of Directors of CAI Ltd and they wish to thank the efforts of the Technical Committee for their input of time and expertise.

AIMS OF CAI

- To raise standards within the industry.
- To represent its Members to Government, Local Authorities, National Bodies etc.
- To unite the industry on its common aims.
- To keep abreast of technological change.
- To promote the membership to its prospective customers.

SOME SERVICES AVAILABLE

- Information Service.
- Training Courses.
- Technical Advice.

CAI actively encourages all companies in the industry to further its aims and to use the services available.

Full details and application forms to join CAI are available from the Secretary.

This Code of Practice does not purport to include all the necessary provisions of a contract. Users of this Code are responsible for its correct application. CAI Codes of Practice are revised when necessary by the issue either of amendments or of revised editions. It is important that users of CAI Codes of Practice should ascertain that they are in possession of the latest amendments or editions. Every effort has been made to ensure that the information contained within this Code of Practice is correct at the time of going to press. Any person who, when making use of this Code of Practice, encounters any inaccuracy or ambiguity, is requested to notify CAI without delay in order that the matter may be investigated and appropriate action taken.

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Association For Audio Visual Professionals

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1 INTRODUCTION AND SCOPE

1.1 The Code

This Code of Practice is issued by the Confederation of Aerial Industries Ltd (CAI) to all of its Members. The observance of this Code is mandatory for all Members. Any deviation from this Code shall only be permitted as a matter of practicality in a particular situation and must be advised to the Client prior to commencement of the work and a note made on the invoice/receipt of any such deviation. Responsibility for the implementation of this Code rests solely with the Member. The CAI inspectorate examines Members workmanship on any inspection visit or in the case of a dispute.

1.2 Scope and Purpose

This Code of Practice should be read in conjunction with all other CAI Codes (see Annex L) and is based upon British Standards relevant to the industry (also see Annex L for a list of those Standards). The Code covers antennas for the reception of FM radio signals in Band II, Digital Audio Broadcasting in Band III, Digital Terrestrial Television (DTT) signals in Bands IV and V and Digital Satellite Television (DST) at both fundamental and Intermediate Frequency (IF). In addition, it also covers their mechanical supporting structures, reception and distribution equipment, IRS, MATV and SMATV systems located anywhere in the United Kingdom. This Code also applies to any locally generated programming to be carried on these distribution networks insofar as it uses carrier frequencies in the range specified below:-

(a) In respect of satellite transmissions, this Code applies to reception in the 3.7 GHz to 40 GHz range.

(b) In respect of signal distribution by coaxial cable, this Code applies to signals in the range 87.5 MHz to 3850 MHz.

(c) In respect of return paths in coaxial cable, this Code applies to signals in the range 5 MHz to 65 MHz.

This Code also covers the use and installation of data cables where they form an integral part of an antenna installation.

1.3 Health and Safety

A prerequisite to achieving a high standard of safety is that all those engaged on installation work shall be fully conversant with safety procedures, precautions and use of Personal Protective Equipment (PPE). They shall also be fully competent to perform the tasks required of them and be able to recognise potentially hazardous working conditions. These procedures are detailed in the CAI publications: -

- Health & Safety in the Aerial & Satellite Industries
- Guidelines for Safe Operating Procedures
- Code of Practice 3 - Electrical Safety Requirements for Signal Reception Systems (excluding CATV)

It is recommended that before the installation is started or before any work is undertaken on an existing system, a method statement is produced which leads to a risk assessment.

Where an existing system is considered unsafe, the Client shall be notified in writing as soon as possible. See Annex F – Dangerous Situation Report.

1.4 Electromagnetic Compatibility

BS EN 50083-2 'Electromagnetic Compatibility of Equipment for Cabled Distribution Systems for Television and Sound Signals' is mandatory for all types of systems covered by this Code. All active equipment shall conform to the EMC requirements and be CE marked.

BS EN 50083-8 + A11 'Electromagnetic Compatibility for Networks' specifies the radiation limits and measurement from cabled distribution systems operating in the frequency range 0.15 MHz to 3.0 GHz.

1.5 Definitions and Glossary of Terms in relation to this document

8PSK	see Modulations.
64QAM	see Modulations.
256QAM	see Modulations.
AM	Amplitude Modulated/Modulation.
Antenna; antennas	Aerial(s) and dishes designed for the reception of Radio Frequency (RF) signals, however constructed.
BCH	Bose Chaudhuri-Hocquenghem cyclic error correcting code.
BER	Bit Error Ratio.
BS	The relevant Standard currently in force as published by the British Standards Institution (BSI) or the harmonized European Standard, BS EN.
CAI	Confederation of Aerial Industries Ltd.
CAI Approved Systems Installer	A member who has one or more engineers who have a qualification in the design, installation and maintenance of systems. (See System Installer)
CATV	Community Antenna Television. A master antenna and distribution system capable of receiving, amplifying and distributing a television signal via a coper or fibre cable to television receivers in a large community. Also known as "Cable Television".
CE Mark	Conformity Europe. Certification Scheme for equipment compliance.

Client	Person or company purchasing the system.
C/N	Carrier to Noise Ratio, difference between modulated carrier and noise floor generally used with analogue signals see also S/N.
COFDM	see Modulation
Code	This or other CAI Codes of Practice as referred in this document.
CPR	Construction Products Regulation : Sets out the standards required by law for the construction industry which includes cable.
Cross Polar Rejection	Difference in level between wanted signal and signal from opposite polarisation.
DAB	Digital Audio Broadcast.
Dish sharing	A signal reception system that delivers satellite signals only, via a network, to multiple outlets as if connected to own dish.
DOC	Document of Conformity
DSB	Double Side Band.
DCSS / dSCR	See SCR.
DTT	Digital Terrestrial Television.
DVB-S	Digital Video Broadcast – Satellite.
DVB-S2	Digital Video Broadcast – Satellite second generation.
DVB-T	Digital Video Broadcast – Terrestrial.
DVB-T2	Digital Video Broadcast – Terrestrial second generation.
EFLI	Earth Fault Loop Impedance.
EMC	Electromagnetic Compatibility.
Engineer	Person competent to work on installation or maintenance of a signal reception system according to CAI Codes of Practice.
FEC	Forward Error Correction.
FM	Frequency Modulated/Modulation.
Headend	Equipment provided for the purpose of filtering, levelling, processing and launching into a distribution network.
IEC	International Electrotechnical Commission
IF	Intermediate Frequency.
Instructed person	Person who has been instructed and trained by a skilled person, or who is supervised by a skilled person, to identify energy sources that may cause pain and take precautions to avoid unintentional contact with or exposure to those energy sources.
IRS	Integrated Reception System. A signal reception system that delivers terrestrial and satellite signals to multiple outlets as if connected to own dish and aerial array.
ISP	Internet Service Provider.
LDPC	Low density parity check, linear error correcting code.
Legacy	Switched satellite IF 950MHz to 2150MHz (universal LNB)
LNB	Low Noise Block.
LPS	Lightning Protection System.
LSF	Low Smoke and Fume superseded by CPR grades.
LSZH, LS0H, LSNH	Low Smoke Zero/No Halogen superseded by CPR grades.
MATV	Master Antenna Television. A signal reception system that feeds terrestrial signals to multiple points via a network. If in multiple buildings this would be restricted to a local area.
MDU	Multiple Dwelling Unit.
MER	Modulation Error Ratio.
Modulations	
COFDM	Coded Orthogonal Frequency Division Multiplex.
PSK	Phase Shift Keying modulation.
QPSK	Quadrature Phase Shift Keying uses 4 phases in the modulation.
8PSK	Eight Phase Shift Keying uses 8 phases in the modulation.
64QAM	Quadrature Amplitude Modulation 64 possible signal combinations, with each symbol representing six bits.
256QAM	Quadrature Amplitude Modulation 256 possible signal combinations, with each symbol representing eight bits.
Member	Member of CAI.
Multi-path effect	Secondary signal received at an aerial caused by a reflection.

Multiplex	A digital transport stream carrying a number of services within a single broadcast channel.
NPRM	Non-Penetrating roof mount.
PPE	Personal Protective Equipment.
PSK	see Modulations.
Quasi error-free	
QPSK	see Modulations.
Receiver	Equipment designed to receive signals in the range specified in 1.2.
Reed Solomon	Block error correcting code.
RED	Radio Equipment Directive.
RF	Radio Frequency.
RLR	Return Loss Ratio.
RoHS	Restriction of Hazardous Substances.
SCR dSCR / DCSS	Single cable router and digital single cable router / stacking switch.
SSB	Single Side Band (see VSB).
SDU	Single Dwelling Unit, be it detached, semi-detached or terraced. This would also include an individual apartment, flat or maisonette etc.
Skilled Person.	Person who has training or experience in the technology of the equipment, particularly in knowing the various energies and energy magnitudes used in the equipment.
SMATV	Satellite Master Antenna Television. Similar to MATV with the addition of locally modulated signals, commonly satellite programmes.
S/N	Signal to Noise Ratio, the ratio of the wanted signal level to the noise level.
System	A network that feeds RF signals to multiple points. See CATV, MATV, SMATV and IRS.
Systems Installer	A member registered with CAI who has competence in installing systems. (See CAI Approved Systems Installer).
Transponder	The individual transmitting element on a satellite.
UKCA	United Kingdom Conformity Assessment
UKNI	United Kingdom Northern Ireland protocol compliance marked together with CE
UV	Ultraviolet radiation, that part of the electromagnetic spectrum that causes degradation of certain materials.
Viterbi	Convolutional error correcting code.
Voltage, nominal	Voltage by which an installation (or part of an installation) is designated. The following ranges of nominal voltage (RMS values for AC.) are defined: • Extra-low Voltage (ELV) - Not exceeding 50 V AC. or 120 V ripple-free DC., whether between conductors or to earth. • Low Voltage (LV) - Exceeding extra-low voltage but not exceeding 1000 V AC. or 1500 V DC. between conductors, or 600 V AC. or 900 V DC. between conductors and earth. • High Voltage (HV) - Normally exceeding low voltage.
VSB	Vestigial Side Band (see SSB).
WEEE	Waste Electrical and Electronic Equipment.

2 INSURANCE

2.1 Liability Insurance

Members shall comply with current statutory obligations in respect of Public Liability and Employer's Liability Insurance. Notwithstanding the above, Members affected by this Code must carry a minimum of £2,000,000 Public Liability Insurance cover. This minimum must be increased if so required by any Client in respect of any installation covered by this Code.

2.2 Accident Cover

Members are advised to hold personal accident insurance consistent with the hazardous nature of the work involved.

3 SUITABILITY OF SITE

It is the responsibility of the Member Company to determine the suitability of the receiving site prior to the commencement of the project. It may be necessary to consult the customer or his representative, such as an Architect or Structural Engineer regarding the siting of the antennas and soundness of the structure to support it, before any work commences. Customers shall be made aware of the desirability of mounting aerials and satellite antennas clear of surrounding objects and with a clear line of sight towards the appropriate transmitter(s).

4 PLANNING AND PERMISSION

The siting of the antenna shall comply with the local planning regulations. The customer shall be made aware of the provisions of the document entitled "Installation of satellite television dishes: householders planning guide". Copies are available from the CAI website. Refer to Annex G – Planning Regulations. In the event of planning permission being required, it shall be the duty of the installer or his agents to notify the customer without undue delay. The customer shall agree to obtain any necessary permission for the installation. Where the property is not owned by the customer, the customer shall be responsible for obtaining permission from the property owner or landlord. Terrestrial receiving aerial installations are also subject to planning restriction regarding the height of the aerial above the highest point of the property. The actual height allowed depends on local restrictions.

5 CUSTOMER RELATIONS AND REQUIREMENTS

Subject to practicality, due regard shall be given to the customer's requirements on the positioning, installation and siting of the entire system. The installer undertakes to explain to the customer the necessary installation procedure and cable routing. If the customer is unwilling to comply with the recommendations of the installer, it shall be made clear that any guarantees may be invalid or the system performance may be compromised.

Prior to commencement of the work the following should be stated to the customer.

(a) All channels, broadcasts and other services the installation will provide.

(b) The location of the antennas, their types and methods of installation.

(c) The routes of all cable runs, their fixings and their relative visibility.

(d) The location of any other equipment.

(e) The type and number of outlets and their location.

(f) Quality of signals to be provided.

(g) The broadcast programming is beyond the control of the installer and, therefore, he cannot make any claims or accept any responsibility as to the programming available, future scrambling plans, or technical changes.

(h) Programme providers may provide scrambled signals and/or charge for their programmes. Whilst this is the responsibility of the customer, the installer has the duty to point this out as the provider of the installation.

(i) The customer shall be made aware whether the installer is licensed to remove and dispose of any waste generated from carrying out the installation.

Annex E gives an example of a job sheet with required information including door step selling regulations. The customer should also be offered a copy of your terms and conditions of trading as detailed in Annex F

6 GROUNDWORK

Provision for all groundwork, mast plinths, king posts, trenching, cable ducts, mains supplies etc. shall be established at an early stage.

7 INSTALLATION PERSONNEL

7.1 Engineers/Technicians

A suitably trained and experienced installation technician shall be in attendance at all times and be accompanied by an assistant or assistant crews where safety considerations require.

7.2 Identification

All members of staff should carry photographic identity cards. It is preferred that all Members display the CAI emblem on their installation/maintenance vehicles and relevant stationery.

8 INSTALLATION AND TEST EQUIPMENT

8.1 Vehicles

Vehicles shall be adequately equipped to include ladders, roof ladders and tool kits, including PPE, to enable the installation staff to execute an installation conforming to this Code.

8.2 Test Equipment

The minimum requirement for test equipment is as follows:

(a) Inclinometer and compass or other means to identify satellite locations.

(b) Signal meter or preferably a spectrum analyser (see below).

(c) Multimeter.

(d) The Member shall have available the means to demonstrate the quality of the pictures received, which must include the applicable set top box, TV or measuring equipment that can demonstrate picture and sound quality on all signal types received.

8.3 Test Equipment Accuracy

When measuring signals on any type of installation, it is important that the instrument used is within the accuracy limits specified herein and designed for the particular service. Analogue meters will not measure digital terrestrial or satellite signals correctly so it is essential to use measurement instruments designed for the purpose.

A measuring instrument capable of the following is required:

- The ability to scan a full or predefined range of satellite and terrestrial multiplexes, and to record the results for subsequent downloading. Measurements should include signal level, MER, BER before and after correction.
- Absolute level accuracy of ±2 dB
- S/N accuracy of ±1 dB
- Bit Error Ratio (BER) accuracy of ±5%
- Modulation Error Ratio (MER) accuracy of ±1 dB

Within the following bands as appropriate:-

- Measurements in the frequency range specific to the services provided, typically:

  87.5 -108 MHz (FM)

  193-230 MHz (DAB)

  470-862 MHz (UHF)

  290 -2350 MHz (satellite including wideband)
- Return path measurements will require an analyser measuring down to 5 MHz.

A measuring instrument may have many functions in addition to the above, but for a satisfactory installation the options listed are minimum requirements.

8.4 Calibration

It is essential that the accuracy of the meter be checked in accordance with the manufacturer's guidelines. Where applicable a calibration certificate shall be available for inspection.

9 CHOICE OF MATERIALS

Materials used in an installation shall be chosen to have the following characteristics:

- UV stability: the outer covering of all items (e.g. cables, fixings, paint finish, housings) installed externally in a system shall protect those items from the long term degradation effects of ultra-violet light.
- Weather resistance: all materials used externally in the installation of a system shall be resistant to the adverse effects of weather during the normal life expectancy of the product, taking account of the environment in which it is installed.
- Chemical reactivity: all materials used in the installation of a system shall be chemically neutral and non-reactive to any item, whether solid, liquid or gaseous, with which it might reasonably be expected to contact during its lifetime. This includes the degree of acidity found in rainwater.
- EMC/RoHS/WEEE: all electronic items used in the installation of a system shall be compliant with appropriate EMC standards, have been tested to relevant IEC standards, and carry the CE or UKCA mark. All applicable products should be compliant to RoHS and WEEE Directives.
- All materials used must comply with the Construction Products Regulation (CPR).

10 ELECTRICAL SAFETY

It is a requirement that all systems comply with BS EN 60728-11 which is covered by CAI Code of Practice 03 – "Electrical Safety Requirements for Signal Reception Systems (excluding CATV)". Which include the considerations that cover the Low Voltage Directive and precautions against damage and interference from atmospheric electricity.

Where appropriate the readings for EFLI and sub-feed resistance should be recorded.

11 TERRESTRIAL AERIALS/SATELLITE (DISH) ANTENNAS

11.1 General

It is essential that suitable quality materials are used and that the work is carried out with due regard for public safety. As the installation is a metal structure it is elastic to some degree. Whenever it is continually flexed by the action of the wind or other vibration, the metal section that is experiencing most strain is subject to change whereby it becomes work hardened and brittle, it ceases to be elastic and may break. The effect is termed metal fatigue and it can be avoided by ensuring the structure is sufficiently robust to resist excessive flexing.

Many of the metal parts of an installation are made of aluminium alloy, which has a natural protective oxide film on its surface. This film can be destroyed if the installation is exposed to sulphurous or acidic emissions from a chimney. The effects of this corrosion can be minimised by positioning the antenna away from the chimney outlet. Where this is not possible a minimum vertical clearance of 1.25 m between the antenna and the top of the chimney shall be maintained. In extremely difficult reception areas, where the antenna will only receive useable signal if positioned closer than 1.25 m to the top of a chimney, the Client shall be informed of a possible reduction in the life expectancy of the antenna.

If dissimilar metals are brought into contact, they and/or their finishes shall be selected so as to minimise galvanic corrosion.

11.2 Terrestrial Reception

11.2.1 Terrestrial Aerial Selection

For digital transmissions it is essential that the aerial be matched to 75 ohms. Where possible use an aerial that meets the requirements of the CAI Certification Scheme.

When selecting an appropriate aerial group, note:

- Aerials with a narrow bandwidth generally have higher gain than those with a wide bandwidth

- Group W aerials, and others with a frequency response extending above channel 48, should normally be avoided to reduce the level of interference from LTE in the 700 MHz and 800 MHz bands
- It is possible that frequencies presently used for UHF television may be re-allocated to other services in the future

For aerial parameters, see CAI Aerial Certification Scheme, and refer to industry websites for information on possible changes to channel allocations..

11.2.2 Terrestrial Aerial Groups

Table 1

UHF Television

CHANNELS/ FREQUENCY	GROUP/ BAND	COLOUR CODE
21 – 37	A	Red
35 – 53	B	Yellow
48 – 68	C/D	Green*
21 – 48	K	Grey
35 – 68	E	Brown*
21 – 68	W	Black*
21 – 60	T	White**

FM Radio

87.5 – 108 MHz	Band 2

Digital Audio Broadcasting

217.5 – 230 MHz	Part Band 3

KEY

*** Will no longer be applicable during 2022**

**** Not applicable**

11.2.3 Siting of Terrestrial Aerials

11.2.3.1 Safety

In selecting a suitable site and carrying out the installation of terrestrial aerials, the requirements described in CAI document 'Health & Safety in the Aerial & Satellite Industries' shall be met.

In order to avoid unnecessary hazard where practicable, aerials shall not be sited directly above any area to which the public has access. In addition, the position of any overhead power lines shall be noted and their close proximity avoided.

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11.2.3.2 Location

The aerial shall be kept as clear from local obstruction as possible. Where more than one aerial is mounted on a mast, a vertical distance greater than half the wavelength of the lowest frequency being received shall be maintained between aerial dipoles to avoid possible signal degradation.

Table 2

Band	Lowest frequency	Half wavelength
Band II, FM radio	87.5 MHz	1.71 m
Band III, DAB radio	193 MHz	0.77 m
Band IV, DTT	470 MHz	0.32 m

A signal meter or spectrum analyser shall be used to ensure that the optimum receivable signal is obtained. The test instrument should be used not only to locate the direction of maximum signal strength and quality, but also the optimum height and lateral position of the aerial. The MER shall be checked and where possible BER. Additionally, it is recommended that a check of all required services on a suitable receiver be made.

11.2.4 Satellite Reception

11.2.4.1 Satellite Dish Selection

Care shall be taken to select: -

- a dish of the appropriate size and efficiency,
- an LNB and feedhorn that correctly illuminates the dish, with the correct local oscillator(s) and of the appropriate gain, noise figure and phase noise etc. for the chosen satellite link budget.

The assembly of the antenna and LNB shall conform to the manufacturer's instructions.

11.2.4.2 Satellite Bands

For the purpose of this Code, the frequency ranges are as follows: -

Table 3 Satellite frequency range

C Band	4	8	GHz
X Band	8	12	GHz
Ku Band	10.95	14.5	GHz
Ka Band	26.5	40	GHz

11.2.4.3 Siting of Satellite Dishes

In order to avoid unnecessary hazard, where practicable, antennas shall not be sited directly above any area to which the public has access. In addition the position of any overhead power lines shall be noted and their close proximity avoided.

Reference shall be made to CAI document 'Health & Safety in the Aerial & Satellite Industries'. The antenna shall be kept as clear from local obstruction as possible.

A compass and inclinometer, or other suitable means, shall be used to find a suitable position where the antenna has a clear line of sight to the required satellite(s). The installation shall comply with current planning regulations (see section 4 Licensing and Planning). A spectrum analyser shall be used to ensure that the optimum receivable signal is obtained by adjusting elevation, azimuth, polarisation (skew) and, where necessary, focal point positioning for the LNB. In the case of DVB signals check that the quality of the optimum receivable signal is sufficient to allow the signal quality targets described in Section 11 to be met. MER shall be checked and, when appropriate, BER.

11.2.5 Multi-satellite Reception

When reception from more than one satellite is required, it is recommended that a separate dish is used for each satellite. Where the use of individual dishes is not possible, then a dish specifically designed for multi-satellite reception is recommended.

Only when neither of these two options is possible, use of a conventional prime focus reflector with offset feeds may be considered. Note that this arrangement may only be used with closely spaced satellites, and may result in lower gain and higher levels of adjacent satellite interference, requiring an increased dish size to compensate and achieve the desired link budget. Due regard must be given to the mechanical stability of the support structure for the LNBs and feeds, and ease of adjustment.

11.2.6 Cross Polar Rejection

The minimum cross polar rejection of the LNB and dish combination shall be 26 dB.

11.2.7 Painting of Satellite Dishes

Should the antenna require painting to minimise the visual impact, a matt, non-metallic, lead-free paint shall be used.

12 SIGNALS

12.1 Levels

For up to date FEC refer to https://www.ofcom.org.uk/spectrum/information/transmitter-frequency for terrestrial and for satellite use the link www.cai.org.uk

Cloud cover and precipitation can have a significant effect on signal level and quality, particularly with satellite frequencies. It is recommended that the prevailing weather conditions are noted whenever satellite signal measurements are made.

Table 4 – Signal level limits at system outlets under clear sky conditions

Service and frequency range	Minimum level (dBµV)	Typical design target level (dBµV)	Maximum level (dBµV) see note 7
VHF Radio			
FM radio, 87.5 MHz to 108 MHz, mono	40		70
FM radio, 87.5 MHz to 108 MHz, stereo	54		70
DAB radio, 217.5 MHz to 230 MHz (2)	40		65
Digital Terrestrial Television			
DTT, 470 MHz to 790 MHz (4)(5)			
DVB-T QPSK 3/4	30	38	74
DVB-T 64QAM 2/3	45	53	74
DVB-T 64QAM 3/4	48	56	74
DVB-T2 QPSK 2/3	28	36	74
DVB-T2 256QAM 2/3	44	52	74
Digital Satellite Television			
Satellite, 950 MHz to 2150 MHz or			
290 MHz to 2340 MHz (6)			
DVB-S QPSK 2/3	52	65	84 (77)
DVB-S QPSK 3/4	52	65	84 (77)
DVB-S QPSK 5/6	52	65	84 (77)
DVB-S2 QPSK 5/6	52	65	84 (77)
DVB-S2 QPSK 8/9	52	65	84 (77)
DVB-S2 8PSK 2/3	52	65	84 (77)

Notes

(1) This table should be read in conjunction with section [12.1.1] "Signal level differences"

(2) Where a separate amplifier is used for DAB signals (i.e. no amplifier carries both DAB and UHF TV signals), the maximum level may be increased up to 94 dBµV.

Most usually the same amplifier is used for FM, DAB and UHF TV signals. In this case, a check should be made to ensure that intermodulation products and harmonics at and around three times the DAB frequencies are sufficiently low in level at the amplifier output that the MER of TV signals in this frequency range are not significantly affected. For example, DAB signals centred around 215 MHz could cause significant interference to TV channels centred on 645 MHz (channel 43). Note that reducing the DAB signal levels by 1dB should reduce the intermodulation products by about 3dB.

(3 (4) At the time of writing the UHF TV broadcast band covers the frequency range 470 MHz – 790 MHz. After the reallocation of 694 MHz – 790 MHz for mobile communications and the UHF TV broadcast band will be reduced to the range 470 MHz to 694 MHz. Note that locally modulated signals added to systems and using frequencies above the UHF TV broadcast band should be subject to the same signal level limits as off-air signals, described in this table.

(5) Note that minimum and typical design target levels for DTT differ from one mode to the next. For smaller systems without channel equalisation, it is acceptable to reproduce the incoming relative levels, provided they remain between the specified minimum and maximum levels at the outlet.

(6) Wideband systems using the intermediate frequency range 290 MHz to 2350 MHz should use the same signal level limits as systems using the IF range 950 MHz to 2150 MHz.

(7) Level in brackets relates to legacy / wideband signals.

12.1.1 Signal Level Differences

The difference in carrier levels when the carriers are in the ranges VHF, UHF or satellite IF shall not exceed the values given in Table 4.

The difference in carrier levels when carriers are in both the VHF and UHF range shall not exceed 15 dB.

If FM and/or DAB radio signals are present at any system outlet intended for television signals, the level of any FM and DAB carrier shall be at least 3 dB lower than the lowest television signal level at that outlet.

It is normal practice for FM, DAB, DTT and satellite signals to be carried to each outlet on the same cable. In these circumstances it is important to limit differences in signal levels to ensure that:

- no one set of signals dominates
- no set of signals is adversely affected by intermodulation or thermal noise due to being significantly lower in level than the others
- receivers are not presented with unduly high levels of out-of-band signals

Diplexer or triplexer outlet plates should be used, as they can effectively isolate one set of signals from another.

Noting the above, for UHF TV signals the only requirement for level difference is that all signals are within the recommended level range, while simultaneously meeting the requirements for MER.

For IF signals within the range 290 MHz to 2350 MHz, the maximum level difference between any two adjacent satellite multiplexes should not exceed 10 dB and over the whole band there should not be more than 20 dB difference.

For DAB multiplexes carried by the same amplifier as UHF TV multiplexes, the power per DAB multiplex should not exceed the highest TV multiplex power by more than 6 dB. Checks should be made that intermodulation products and harmonics of DAB signals, which can appear in the 600 MHz band, are sufficiently low in level not to cause significant degradation of DTT signals.

Table 5 Maximum level differences at system outlets.

Frequency range	Interval	Maximum level difference (dB)
30 MHz to	Entire range	12
300 MHz (VHF) to	60 MHz range	8
	Adjacent channel	3
300 MHz to	Entire range	15
862 MHz (UHF)	100 MHz range	9
	Adjacent channel	3
290 MHz to 2350 MHz		
950 MHz to 2150 MHz	Entire range	20

12.1.2 Window of Operation

The minimum and maximum signal level limits for each type of service (satellite/terrestrial; analogue/digital) define a Window of Operation (WO) within which all the signal levels shall be maintained. With increasing complexity of systems, the size of the WO can become reduced due to the build-up of effects such as thermal and intermodulation noise, and gain variation with frequency. The size of the WO can normally be increased by equalising the levels of signals. In general, small DTT systems are unlikely to require any equalising. Medium sized systems may require the use of cluster filters or cluster amplifiers, and larger systems may need the use of equalisers on a channel by channel basis.

Fibre optic systems generally have relatively tight requirements for the WO. Refer to the manufacturer's specification for details.

12.1.3 Modulation Error Ratio (MER)

Table 6 MER Terrestrial

MER under normal (i.e. not enhance, lift or atmospherics) propagation conditions

Terrestrial	Minimum MER at any system outlet (dB).
DAB Radio DAB radio, 217.5 MHz to 230 MHz	no value available
Digital Terrestrial Television	
DTT, 470 MHz to 694 MHz	
DVB-T QPSK 3/4	17
DVB-T 64QAM 2/3	23
DVB-T 64QAM 3/4	23
DVB-T2 QPSK 2/3	17
DVB-T2 256QAM 2/3	26

In some instances it may be necessary to use a low power relay transmitter as a signal source for a system. These relays may radiate signals with significantly lower MER than main stations, making it impossible to meet the values shown in the table for high order modulations. In this event, the installer must bring this to the attention of the customer.

Table 7 MER Satellite
MER under clear sky conditions

Digital Satellite Television	Minimum MER at any system outlet (dB).
Satellite, 950 MHz to 2150 MHz or 290 MHz to 2340 MHz	
DVB-S QPSK 2/3	11
DVB-S QPSK 3/4	11
DVB-S QPSK 5/6	11
DVB-S2 QPSK 5/6	11
DVB-S2 QPSK 8/9	11
DVB-S2 8PSK 2/3	11

Note; Care should be taken in the system design to reduce MER degradation delivered to the outlet

12.2 Bit Error Ratio

Bit Error Ratio is the number of bits that are received incorrectly divided by the total number of bits in a given interval of time.

Audio and video compression techniques rely on there being effectively an error-free bit stream, so forward error correction (FEC) codes are added to the transmission to allow the receiver to virtually eliminate received bit-errors under normal reception conditions.

DVB-T and DVB-S use the same forward error correction scheme, involving two error-correcting processes in series. The first process involves a decoding algorithm named after its inventor, Andrew Viterbi, and the second process is named Reed-Solomon after the inventors of the code.

In normal reception conditions, errors after Reed-Solomon decoding are very infrequent, making it impractical to try to measure them in a reasonable time interval. In practice, errors are measured either before or after the Viterbi error corrector, where errors occur at a much higher rate.

For all DVB-T and DVB-S services, a maximum Bit Error Ratio (BER) of 2 x 10-4 (sometimes written as 2e-4), measured after Viterbi error correction, shall be achieved at the outlet. This corresponds to a BER of about 10-11 after the Reed-Solomon decoder.

DVB-T2 and DVB-S2, the second generation standards, similarly use dual error correction schemes, but with more advanced codes known as LDPC and BCH, corresponding to the Viterbi and Reed-Solomon processes for DVB-T and DVB-S.

For all DVB-T2 and DVB-S2 services a maximum Bit Error Ratio of 1 x 10-7, measured after the LDPC decoder, shall be achieved at the outlet.

13 PICTURE QUALITY

Analogue television picture quality was directly affected by the impairments in the RF channel, such as noise, interference, group delay and non-linearity. In contrast, digital television pictures are typically in one of three states:

- the same quality as the source (quasi error-free, meaning not more than one uncorrected error event per hour)
- impaired by some degree of block errors (also known as pixelation), at a rate exceeding one uncorrected error event per hour
- not working at all

The normal targets for picture quality should be quasi error-free.

In order to lessen the likelihood of dispute, installers are recommended to agree the quality grade with their clients before the work takes place.

14 Interference

Systems may suffer from various forms of impairment, resulting in the inability to meet the performance requirements described in this section. It is important that the installer obtains a clear understanding of the cause of the impairment.

The most common causes include:

- High levels of non-broadcast signals in adjacent frequency bands (e.g. LTE base station signals) overloading an amplifier
- Faulty equipment making unintended emissions that are on the same frequency as the wanted signals
- Inadequate protection against ingress of unwanted signals

(electromagnetic compatibility) due to inappropriate materials or installation practices. Systems must be planned and installed in line with the requirements of BS EN 50083-2 ("Cable networks for television signals, sound signals and interactive services. Electromagnetic compatibility for equipment.") and BS EN 50083-8 ("Cable networks for television signals, sound signals and interactive services. Electromagnetic compatibility for networks.")

For further information, refer to Code of Practice 06, "Dealing with interference caused by signal generation into the TV, Radio and Satellite Bands".

To help reduce the ingress of unwanted signals, outlet plates and fly leads should be screened to a minimum of class B specification (see 1.4). Any plugs used must be correctly fitted to the manufacturer's specification. See Annex A of CoP3, Electrical Safety Requirements for Signal Reception Systems (excluding CATV) for the proper procedure for F connectors.

15 INTEGRATED RECEPTION SYSTEM (IRS), UP TO 12 POINTS, IN A SINGLE HOME

15.1 Satellite

15.1.1 Dishes and LNBs

A dish to feed signals to a domestic IRS needs to be slightly larger than that required for a DTH system to achieve the figures quoted in 12.1.3. Generally an increase of double the aperture will be required. However, planning permission may be required for larger dishes or for multiple dish installations on a single dwelling. The minimum cross polar rejection of the LNB and dish combination shall be 26 dB. (See Annex G Planning Regulations For Dish Antennas).

15.1.2 Terrestrial

All terrestrial aerials should cover the band for signals to be received.

15.2 System Architecture

The nature of an integrated reception system means that all cables need to be brought back to a central point (or points). The backbone cables will terminate at this point into a switching unit capable of delivering the signal to the outlets. The number of backbone cables required will be one for terrestrial plus up to four for each satellite. Each switching unit should be capable of switching between bands and between polarisations and this may be determined by a DSCR. Where multiple satellite reception is specified, DiSEqC capability may be required in the switch and receiver. Terrestrial signals may be superimposed on all IF backbone cables or have its own cable.

15.3 Signal Levels and MER

Levels at the receiver should comply with those of 12. Table 4 and differences with 12.1.1 and table 5

The window of operation shall comply with 12. 1.2.

The Modulation Error Ratio (MER) shall comply with 12.2 and tables 6 and 7

15.4 Band identifying colours

A standard colour coding has been adopted for the IRS cable backbone to assist identification of ports and cables carrying individual polarisations and bands, as follows:-

Table 5 port colours

Yellow	Horizontal High Band	HH
Green	Horizontal Low Band	HL
Red	Vertical High Band	VH
Black	Vertical Low Band	VL
White	Terrestrial	T

Table Wideband 3 port colours 1st satellite

Green	Horizontal Band	H
Black	Vertical Band	V
White	Terrestrial	T

Table Wideband 3 port colours 2nd satellite

Yellow	Horizontal Band	H
Red	Vertical Band	V

16 CABLE AND WIRING

16.1 Cable selection

Cables must be rated to the appropriate CPR Classification for the project and be marked in accordance with CAI certification scheme.

Typical cables used in single dwelling units would be type CAI certified types RG6, 065 and 100

If distribution cables are used where their temperature is likely to exceed 50° Celsius or fall below -20° Celsius, advice shall be sought from the cable manufacturer.

16.2 Cable containment

All pipes, conduits, ducts and cable shall be identified in accordance with the requirements of BS 1710. Some plasters and cements have a corrosive effect on metals and precautions against this may be necessary, particularly where cables or conduits are installed in damp situations.

All cables for outdoor runs shall be adequately protected against damage.

16.3 Cable Connections

External cable connections shall be made in such a manner as to prevent any ingress of moisture to either the cable or the component to which it is connected. External cables shall always enter terminal or junction boxes in an upward slope so that any water drains away from the point of entry. Terminations shall be adequately weather protected.

Cable joints shall be avoided wherever possible. However, where a join is unavoidable, it shall be made with a recognised type of coaxial connector (see Section 14.2). Terminations shall be mechanically and electrically sound.

Cables shall not be terminated directly to, or by means of, a different metal where there is a possibility of electrolytic corrosion.

Cable connections shall not be made in a way that exerts strain or pressure on the cable or termination.

16.4 Cable Fixing

Coaxial cables with a diameter equal to or greater than 7 mm shall be fixed at the following spacing:-

- On masts - intervals no greater than 230 mm
- On other vertical runs - intervals no greater than 750 mm
- On horizontal runs - intervals no greater than 460 mm

Coaxial cables and data cables with a diameter less than 7 mm shall be fixed at the following spacing:-

- On masts – intervals no greater than 230 mm
- On vertical runs – intervals no greater than 450 mm
- On horizontal runs – intervals no greater than 300 mm

Fixing shall be such that deformation of the cable does not occur. Staples may be used providing they are specifically designed for the purpose and for the cable being used.

In accordance with section 521.10.202 of the 18th edition of BS7671 (The Wiring Regulations), wiring systems shall be supported such that they will not be liable to premature collapse in the event of a fire.

Where cable clips are used then CAI recommends that a metallic P type clip is used for clipped cables and metal cable ties where cables are fixed beneath cable trays etc. These fixings should be at a maximum of every third fixing and at a maximum separation between metal fixings of 1400 mm either horizontally or vertically.

If plastic trunking or conduit is used then this too must be fixed with suitable metallic fixings.

17 Installation and Routing of Cables

Electrical wiring shall be carried out in accordance with the current IET Wiring Regulations. All electrical work in dwellings shall comply with Part P requirements of the Building Regulations and be carried out by a electrically skilled person or electrically instructed person (see BS EN 60728-11). It may be necessary for the Member to check if and how the installation falls within the Scope of Compliance and Notification parameters of Part P.

Health and safety guidelines shall be considered when planning cable routing.

Cable installation shall be carried out in a neat and professional manner.

Bending radii shall be consistent with good aesthetics and never less than the manufacturer's specifications. In the event of such specifications being absent, the radius of the bend shall be at least 10 times the outside diameter of the cable.

The cable route employed from the aerial/antenna shall be chosen so as to keep the length of cable to a reasonable minimum and conform to the aerial manufacturer's instructions.

If cable entry into a building is through a hole in an exterior wall, the diameter of the hole shall not exceed that of the cable by more than 3 mm. The hole shall be drilled at a slight downward angle towards the exterior of the building. When the cable is installed, a drip loop shall be formed, and the hole sealed against water ingress

Internal cable holes/ducts shall be sealed to meet the appropriate fire regulations. Internal runs of cable shall be routed in as inconspicuous a manner as practicable.

Where cables are routed through joists, consideration shall be given to the positioning of any drilled holes or cut-outs. Limitations may restrict where and how cables are routed with respect to position in the joist and to other services using a similar route. Where doubt exists, it is recommended that the advice of a Structural Engineer be sought.

Cables shall be terminated to the correct length in accordance with the manufacturer's recommendation (see CAI Code of Practice 03 "Electrical Safety Requirements for Signal Reception Systems (excluding CATV)". Drip loops shall always be formed at entry points into buildings and on the output connections of an LNB. It is recommended that where a cable terminates a service loop should be left consisting of one turn greater in diameter than twice the minimum-bending radius of the cable used.

ELV cables (which include signal carrying cables) should be a minimum of 10 mm away from LV cables when installed internally and 20 mm externally. However care should be taken that the screening of the cable is also sufficient to cope with EMC, the use of CAI certified cable would cover this.

18 SIGNAL SPLITTING, COMBINING AND IMPEDENCE MATCHING

18.1 General

Combining and splitting of signals shall be accomplished by the use of a recognised screened device to a minimum of class B screening effectiveness (see Annex D and 1.4).

18.2 Splitting/Combining

Transformer type splitters and combiners are preferred over resistive devices.

Frequency selective devices, with inputs and outputs appropriate to the frequency bands to be combined or split, should have a high degree of rejection of unwanted signals and low through loss for wanted signals.

18.3 Impedance Matching

Where source and load impedances differ, an impedance matching device shall be used. If it is important to minimise the insertion loss of the matching device, it should be a matching transformer. If minimising signal loss is not important, a resistive minimum loss pad may be used. In addition, if a balanced source is to be connected to an unbalanced load, or vice versa, a balun shall be used.

18.4 Stacking/Phasing

The outputs of two or more receiving aerials are sometimes combined to increase gain, improve the polar diagram or in a small number of cases to reduce the level of an interfering signal from another direction. The most common application is to increase gain. In this case it is important to ensure that the cable lengths between the aerials and the combiner are identical, and that the cable and combiner losses are minimised.

18.5 Powering of amplifiers and LNBs

If more than one satellite receiver is used or if an amplifier is fitted, the line power requirements must be considered as follows:

Manufacturer's guidance for each component

Resistance of feeding cable to avoid excessive voltage drop.

Current limits of cable

Current and voltage requirements of line powered amplifier / masthead amplifier or LNB

Source of power and necessity of DC isolation

Where more than one receiver is being used the routing of the power is important to ensure that receiver power supplies do not conflict

19 OUTLETS AND TERMINATIONS

19.1 Outlet Plates

RF outlet plates shall be screened to a minimum of class B screening effectiveness (see Annex D and 1.4).

Data outlet plates shall be punch down or krone type and they must match the cable type installed. (e.g. CAT 5 cable = CAT 5 face plate terminals; UTP Cable = UTP face plates). The same rules apply to patch panels

19.2 Terminations

In preference 'F' connectors should not be screw on and IEC connectors should be of a good quality and correctly made off. All connectors should be the correct size for the cable used.

19.3 Fly leads

Fly leads should be made from a good quality double screened cable to a minimum of class B screening effectiveness (see Annex D and 1.4).

19.4 Data Points for Digital Installations

For CAT5E or CAT6, cables should be terminated using TIA/EIA T568A or T568B standards, ensuring the same standard is used throughout. It should be noted that for HDBaseT and distribution over Ethernet T568B is usually recommended.

20 AERIAL/ANTENNA INSTALLATION

20.1 General

All antenna installations shall remain operational at wind speeds up to 80 km/h (50 mph) and be capable of surviving wind speeds of 100 km/h (62.5 mph). Refer to Appendix E – Mechanical Stability of Outdoor Aerial Systems.

When an aerial or satellite dish is added to an existing installation, the strength and suitability of the installation shall be checked to ensure that it will sustain the additional stresses introduced. Due attention shall also be made to aerial spacing as shown in Table 2.

20.2 Mast brackets and fixings

When installing an aerial, a suitable mast shall be employed so that the complete assembly can withstand wind speeds of at least 100 km/h (62.5 mph). Refer to Annex I – Mechanical Stability of Outdoor Aerial Systems for information on the correct size mast and brackets to be used. Where the size or strength of the structure may be in doubt, it is recommended that a structural report is obtained from a competent person.

Ferrous metals do not have the natural protective coating of aluminium and should have a separate protective finish to BS EN ISO 1461 for galvanisation and BS EN 12329:2000 Fe/Zn5 for passivation/plating.

20.3 Tubular Masts

It is preferred that masts shall be of a non-ferrous metal, e.g. aluminium. If a steel mast is used it shall have a fully galvanised finish, to ensure that the inside is adequately protected.

With all installations, care shall be taken that no water can be trapped inside the mast. Mast diameter alone is no indication of mast strength; the wall thickness shall also be adequate (see Table 8) as shall the method of manufacture and the grade of material used. When aluminium masts are used

they should be of a seam welded construction.

Any tubular mast above 6 m (20') in height shall be guyed to a minimum of 3 equidistant points.

Table 8 - Tubular Mast, tube diameter wall thickness and length

Maximum	Minimum	Minimum wall thickness	
Tube length	Tube diameter	Alloy wall	Steel wall
1.8 m (6')	25 mm (1")	1.2 mm	1.2 mm
2.5 m (8')	32 mm (1.25")	1.6 mm	1.2 mm
3.0 m (10')	38 mm (1.5")	1.6 mm	1.2 mm
6.0 m (20')	50/51 mm (2")	2.0 mm	1.6 mm

20.4 Brackets and Lashings

20.4.1 Installation

Masts are generally secured to buildings by one of 4 methods:-

- A bracket and lashing kit attached to a chimney stack
- A bracket attached to the wall of a building
- By passing a mast through a roof seal into the loft space where it is attached to the roof timber work by appropriate brackets
- Non-Penetrating Roof Mounts (NPRM) for flat roof

For brackets of a welded construction BS EN 15614, it is essential that the welds are of a good quality with a clean surface for final finishing. All brackets shall be galvanised BS EN ISO 1461. Painted brackets shall never be used. All assembly nuts, washers and bolts shall be either stainless steel or plated to BS 7371.

Care shall be taken to ensure that the surface, onto which the aerials are to be mounted, is sufficiently strong and durable to withstand the expected loadings. The use of mortar courses for fasteners shall not be used for fixings. Holes shall always be drilled to the correct diameter and depth for the chosen fastener, e.g. expansion bolt for concrete or plug, washers and coach screw for brick. Where there is doubt about the security of fixing, advice shall be sought from the builder or architect. For exceptionally thin or weak walls, additional support and measures to spread the loading over a large area shall be provided. Guy wires, where used, shall be properly terminated with provision for adjustment of the tension using hooks, eyelets, tensioners and rope grips.

When fitting the mast to the bracket, all nuts shall be spanner tightened. Care shall be taken to avoid distortion of the mast. Distortion can result in metal fatigue and fracture after a period of time.

(Refer to Annex I – WIND LOADING OF STRUCTURE.)

20.4.2 Chimney Mounted Brackets

These are available in several types; the most appropriate for a particular installation will depend on the type of aerial and the mast.

Lashing wire shall not be less than 7 strands of galvanised wire each of 1.2 mm minimum diameter or have the overall equivalent cross sectional area. Lashing wires shall be either pre-terminated, ferruled lashing or terminated by the 'spliced' method. If thimbles are used they should be metal and suitably protected.

Protective corner plates shall be installed between the brickwork and the lashing wire at each corner to protect the structure of the stack.

Chimney fixing kits are also available that use a galvanised, stainless steel or nylon strap with a width of 18 mm to 30 mm. This method can have great strength and may be useful in supporting large chimney mounted installations. Due to the width of the strap, it may not be necessary to use protective corner plates.

The top of the lashing bracket shall be at least 3 courses of brickwork or not less than 250 mm from the top of the stack.

A lashing bracket shall have the minimum vertical spacing between V bolt centres as follows:-

Table 9 Lashing bracket V bolt centres

Masts up to 0.9 m	150 mm spacing
Masts up to 1.8 m	300 mm spacing
Masts up to 3.0 m	500 mm spacing

Masts over 3.0 m shall be fitted with a double lashing with spacing of no less than one-sixth of the mast length.

20.4.3 Wall Mounted Brackets

For wall fitting, only brackets with at least 4 fixings shall be used and all appropriate fixings shall be utilised. When brackets are secured to brickwork, the bolts shall enter the brick and not the mortar joint. The top of any bracket shall be a minimum of 6 brick courses or 500mm from the top of the wall.

Bracket size should be determined by mast length and shall have the minimum vertical spacing between V bolt centres as follows:-

Table 10 Wall bracket V bolt centres

Masts up to 0.9 m	150 mm spacing
Masts up to 1.8 m	300 mm spacing
Masts up to 3.0 m	500 mm spacing

Masts over 3.0 m shall be fitted with a double bracket with spacing of no less than one-sixth of the mast length.

In addition the K bracket shall be at the bottom to spread the load. Where there is a possibility of high bending moments being applied to the top bracket, for example the addition of an extra aerial, then two K brackets shall be used or brackets designed with additional support. Refer to Annex I – Mechanical Stability of Outdoor Aerial Systems.

20.4.4 Pitched Roof Mounts

If the property has no chimney stacks or gable ends, but requires an outdoor installation in an elevated position, it may be possible to pass a mast through a roof seal and support it internally with secure brackets. It is vital to make sure the roof seal is watertight and the top of the mast is capped. If in doubt consult a roofing contractor. Installers should be aware that this method of mounting can exaggerate any resonance characteristics of the mast length or aerial/ antenna used. Maximum mast length will be governed by the available spacing between joists.

Brackets that fix to the roof covering (tiles, slates or felted wood etc.) should not be used for work undertaken within the scope of this document.

20.4.5 Flat-Roof Mounts

When proposing an installation on a flat roof, it is advisable to check the wind loads and roof structure carefully; if necessary, a qualified structural engineer shall be engaged by the Client. No attempt shall be made to pierce the roof structure with fixing bolts. A non-piercing roof mount with suitable ballast is recommended. A suitable membrane should be installed between the mount and roof.

Wind loading specified by the manufacturer shall be taken into account when planning the installation. Exposed areas should be avoided. Refer to Annex 1 – WIND LOADING OF STRUCTURE.

20.4.6 Loft Fixing

It is not recommended to fit aerials, in lofts and the Client shall be made aware that, as far as interference is concerned, Ofcom designate any internally installed aerial as providing an unprotected service.

20.4.7 Wall Fixings

Fixings shall be suitable for the material to which the bracket is to be attached. Generally, coach screws, washers and nylon plugs should be used in brickwork and expansion bolts in concrete. When mounted on wood, care shall be taken to ensure that the timber is thoroughly secure and sound. The fixings shall be coach screws or through-bolted.

For breeze-block, Thermalite or low density materials a resin type anchor should be used.

Due to the possibility of bricks splitting, it is recommended that plug sizes above M10 are not used for brickwork. Avoid over-tightening a wall bolt by following manufacturer's recommended torque settings.

A margin of safety shall be taken into consideration when selecting a fixing by adhering to a safety factor of 7 for nylon plugs and 4 for steel anchors.

20.5 Masthead Amplifiers

Before considering the use of an amplifier, every step shall be taken to increase the signal levels received by adjusting the location of the aerial or by using one of higher gain.

When choosing any amplifier, the following criteria should be considered:-

- Noise figure.
- Maximum output capability.
- Gain.
- Bandwidth and out of band filtering.
- Screening.
- Durability to weather conditions.
- EMC conformity to BS EN 50083-2 (refer to section 1.5).

21 ANTENNA (DISH) INSTALLATION

21.1 General

Care shall be taken to select an antenna for the correct channels or bands required and of an appropriate size for the location of the receive site with respect to the satellite(s) to be received.

Equipment shall be chosen so as to deliver sufficient signal as defined for adequate reception in Section 12 and shall be installed according to manufacturers' instructions.

.For ground mounting of king posts, civil engineering or consultancy advice may be required before the installation, and the installation cleared with the Client. It is also essential that the antenna installation conforms to the general development orders and local planning requirements etc. The visual effects of the siting shall be taken into account, plus the aesthetics of the building such that there is a minimum effect on the environment.

21.2 Structural Supports for Satellite Antennas

The same criteria apply to fixing satellite antennas to buildings as any other antenna. Refer to section 15 for details.

When an additional antenna is added to an existing satellite installation, the strength and suitability of this installation shall be confirmed.

21.3 Ground Level Mounting

Where a satellite antenna is to be mounted at ground level, a suitable base is required depending on dish size and location.

Small dishes, up to 85 cm, may be secured to a patio stand or tripod mount affixed to concrete flags or blocks of adequate weight using appropriate fixings. However if a tripod mount is used it is recommended that a concrete plinth is used.

Large dishes, above 85 cm, shall be secured to a suitable concrete plinth using weatherproof high tensile bolts, locking nuts and washers.

Where a concrete plinth is used it must be constructed in accordance with the appropriate building regulations. If in doubt, a local builder shall be engaged to carry out the work. Planning permission may be required in certain areas - see Annex G.

21.4 Roof Mounting

Where an antenna is to be installed above roof level, the following points shall be considered:-

- Planning Requirements. Site plans, photographs and antenna details are to be provided to the Client
- Building Regulations. Site plans, photographs, structural details, existing roof covering and wind force calculations are to be provided to the Client

For pitched roof installations see section 16.4.

For flat roof installations see section 16.5.

Wind loading specified by the manufacturer shall be taken into account when planning the installation. Exposed areas should be avoided. Refer to Annex I – WIND LOADING OF STRUCTURE.

21.5 Wall Mounted Brackets

See section 16.3.

Dishes above 1.2 m are not recommended for wall mounting, unless specific stress requirements are taken into consideration prior to installation.

Areas exposed to high winds shall be avoided. Refer to Annex I – WIND LOADING OF STRUCTURE.

22 MOTORISED ANTENNA SYSTEMS

22.1 General

A thorough site survey is required, to ensure all the satellites to be received can be viewed from the position chosen, (satellite signals will not pass through buildings or trees etc.). The equipment shall be fitted in accordance with the manufacturer's recommendations. When locating the antenna care shall be taken so that when the antenna is travelling through its arc it is not impeded by any structure.

23 SATELLITE RECEIVERS/ DECODERS/POSITIONERS

23.1 General

The receiver/decoder/positioner shall be fitted in such a manner that they form an integral part of the television and audio system. The installer shall observe that every interconnection is engaged for the relevant receiver.

23.2 Installation

The receiver/decoder/positioner shall not be positioned in such a way so as to run the risk of causing overheating by constricting ventilation. If the customer insists on an unsuitable position, they shall be advised of the invalidation of any guarantees.

23.3 Tuning

The initial tuning of the television, satellite receiver and recorder shall be carried out by the installer making certain there is no interference on the chosen frequencies. On the completion of the installation a functional test of the entire system shall be made, including satellite radio programmes.

24 PRECAUTIONS AGAINST DAMAGE AND INTERFERENCE FROM ATMOSPHERIC ELECTRICITY

Refer to separate CAI CoP3 (ELECTRICAL SAFETY REQUIREMENTS FOR SIGNAL RECEPTION SYSTEMS (excluding CATV))

24.1 SYSTEM SAFETY

Refer to separate CAI CoP3 (ELECTRICAL SAFETY REQUIREMENTS FOR SIGNAL RECEPTION SYSTEMS (excluding CATV))

ANNEX

ANNEX A
CHANNEL EDGE AND CENTRE FREQUENCIES

Table 11 UHF Channel Frequencies

Channel	Frequency range (MHz)			Centre Freq. (MHz)
21	470	-	478	474
22	478	-	486	482
23	486	-	494	490
24	494	-	502	498
25	502	-	510	506
26	510	-	518	514
27	518	-	526	522
28	526	-	534	530
29	534	-	542	538
30	542	-	550	546
31	550	-	558	554
32	558	-	566	562
33	566	-	574	570
34	574	-	582	578
35	582	-	590	586
36	590	-	598	594
37	598	-	606	602
38	606	-	614	610
39	614	-	622	618
40	622	-	630	626
41	630	-	638	634
42	638	-	646	642
43	646	-	654	650
44	654	-	662	658
45	662	-	670	666
46	670	-	678	674
47	678	-	686	682
48	686	-	694	690

ANNEX B
VHF FREQUENCIES

Table 12 VHF Frequencies

Band	Frequency range (MHz)		
II	87.5	-	108
III	174	-	230

ANNEX C
TYPICAL ATTENUATION FIGURES FOR BENCHMARKED CABLE

Typical Attenuation dB/100 m @ 20°C

Frequency (MHz)	Approximate Centre Conductor Size			
	Type 065 0.65 mm	Type 100 1.00 mm	Type RG6 CAI 1.00 mm RG6	Type 125 1.25 mm
5	2.5 dB	1.4 dB	1.4 dB	1.2 dB
50	7.0 dB	4.5 dB	4.5 dB	3.6 dB
100	9.5 dB	6.4 dB	6.4 dB	5.2 dB
200	13.1 dB	9.1 dB	9.1 dB	7.4 dB
450	20.2 dB	13.9 dB	13.9 dB	11.5 dB
600	24.8 dB	16.2 dB	16.2 dB	13.2 dB
860	27.9 dB	19.7 dB	19.7 dB	16.1 dB
1000	30.2 dB	21.0 dB	21.0 dB	17.4 dB
1200	35.6 dB	23.2 dB	23.2 dB	19.2 dB
1400	38.7 dB	25.1 dB	25.1 dB	21.0 dB
1600	41.7 dB	26.9 dB	26.9 dB	22.6 dB
1800	40.5 dB	28.7 dB	28.7 dB	24.1 dB
2000	46.8 dB	30.4 dB	30.4 dB	25.6 dB
2150	45.3 dB	31.6 dB	31.6 dB	26.7 dB
3000	59.9 dB	39.5 dB	39.5 dB	29.5 dB

ANNEX D
EMC

D.1 Passive Equipment

Table 14 Limits of screening effectiveness of passive equipment within the frequency ranges

Frequency Range (MHz)			Limit value dB	
			Class A	Class B
5	to	30	85	75
30	to	300	85	75
300	to	470	80	75
470	to	1000 a	75	65
950 b	to	3500	55	50

D.2 Coaxial Cable Screening Attenuation

Table 15 Coaxial cable screening attenuation

Frequency Range (MHz)			Limit value dB
30	to	300	85
300	to	470	80
470	to	1000	75
1000	to	2150	65

ANNEX E
TABLE 16 STANDARD REPORT FORMS

Terrestrial and Satellite Reception System

Association For Audio Visual Professionals

Standard Report Form

Date Commisioned:				Order/Contract No.			No. of copies
Date Form Completed:				By:			
Client/Customer:				Site Address:			
Address:							
	Postcode:				Postcode:		
Contact:	Tel:			Contact:	Tel:		
Installing Company:				Engineers:			
Address:							
	Postcode:						
Contact:							
E-mail:	Tel:			System planner:			

A	**UHF Aerial(s)**	Details (Manufacturer, Model, Polarity)			
B	**FM/DAB Aerial(s)**	Details (Manufacturer, Model)			
C	**Mast(s)**	Material	Height (m)	Diameter (mm)	Additions
D	**Bracketry**	Details (Type, size etc)			
E	**Satellite Dish(es)**	Orb. Pos.	Make & Size (cm)	Mount	LNB Make, Type (Quad/Quatro/Fibre) & NF
		Orb. Pos.	Make & Size (cm)	Mount	LNB Make, Type (Quad/Quatro/Fibre) & NF
		Orb. Pos.	Make & Size (cm)	Mount	LNB Make, Type (Quad/Quatro/Fibre) & NF
		Orb. Pos.	Make & Size (cm)	Mount	LNB Make, Type (Quad/Quatro/Fibre) & NF
F	**Headend**	Location		Housed	Locked (Yes/No)
	Launch Levels	DTT		Locally Modulated	Satellite IF
G	**System Architecture**	Coax	Fibre	Hybrid	Structured Cable
	Design	Tree/Branch		Star Wired	Switched IF
	Cable types and size	Antenna Feeds		Trunk Feeds	Subsriber Feeds
	Splitter/Tap/Switch/Cable Location	Internal		External	Both
H	**System Safety**	Location of building's main bonding point			
	Positions of sub bonding points				
	Building equipped with LPS (Yes/No)	Type of LPS (Cross bonded/Isolated)			Antennas bonded to LPS (Yes/No/NA)
	Surge Protection Devices fitted (Yes/No)	SPD type and locations (if applicable)			
	EFLI value (Zs) Ω	Cable resistance from furthest point to MET Ω			
I	**Summary Info**	No. Of Outlets		Location of Terrestrial Aerials	
	System plan attached (Yes/No)			Location of Satellite Dish(es)	
	Summary of Signal Parameters attached (Yes/No)				

TABLE 17 CUSTOMER QUOTE AND CONTRACT TO DO WORK

A. N. OTHER AERIALS
CUSTOMER QUOTE AND CONTRACT TO DO WORK

Customer
Name:
Address:

Contract Number:
Date:

Tel:(Home) Tel:(Mob) Email:

Job Description:

Price plus VAT:

NOTICE OF THE RIGHT TO CANCEL

The customer has a right to cancel this contract if they wish and this can be exercised by delivering or sending (including by electronic mail) a WRITTEN CANCELLATION NOTICE to the company whose details are provided below at any time within the period of seven days starting with the day of receipt of this notice. As proof of postage, we would advise recorded delivery when posting a cancellation. The notice of cancellation is deemed to be served as soon as it is posted or sent to the trader, this also applies with electronic communication. You may use our cancellation from if you wish, but your notice of cancellation does not need to be in this format. However, if you decide to cancel this contract you must make this intention clear in any communication

If you cancel this contract outside the seven day cancelation period we have the right to carry out the works quoted for or charge a cancellation fee

~----------cut along line----------~

Cancellation form

If you wish to cancel this contract you **MUST DO SO IN WRITING** and deliver it personally, or send it to the company named below

You may do this by electronic means and may use this form if you wish, but you do not have to.
Complete, detach and return this form **ONLY IF YOU WISH TO CANCEL THE CONTRACT**

To (cancellations) A.N. OTHER AERIALS, XX Any Rd, Any Town, XXxx xXX
Email info@anotheraerials.co.uk

I/We (Delete as appropriate) herby give notice that I/We (Delete as appropriate) wish to cancel My/Our (Delete as appropriate) contract

Signed: ……
Print name: …….. Date:……...
Address: ……
……
……

TABLE 18 INSTALLED SERVICE REPORT FORM

A. N. OTHER AERIALS

INSTALLATION/SERVICE REPORT FORM												No.
Customer Name: Address: Tel:(Home)		Tel:(Mob)		Email:				Date attended: Arrival Time: Departure Time: Time Taken:				
Type of Call	Terrestrial		Satellite		CCTV		Other		Install		Service	Survey
Job Description: (EST. Price £)												
I agree that this is the work required and am happy to have a survey completed, Which will be charged at £xxx if I do not have the work completed today.												Customer signature
Final price plus VAT					A quotation left, £xxx call-out and survey fee charged							see below for cancellation rights
Engineers report Service Complete Yes / No					Outstanding work / engineers recommendations							System earthing Already earthed Earthed certificate issued Earthing not required, certificate issued

Engineer Name: Invoice Number Customer sign & print on completion to satisfaction				CONDITIONS OF TRADING Please ask to see our conditions of trading
Levels/Ratios Transmitter PSB1 PSB2 PSB3 COM4 COM5 COM6		dBuV Level		dB MER
Satellite	Frequency & polarity			
Tp Tp Tp Tp Tp Tp Tp Tp				

NOTICE OF THE RIGHT TO CANCEL

The customer has a right to cancel this contract if they wish and this can be exercised by delivering or sending (including by electronic mail) a WRITTEN CANCELLATION NOTICE to the company whose details are provided below at any time within the period of seven days starting with the day of receipt of this notice. As proof of postage, we would advise recorded delivery when posting a cancellation. The notice of cancellation is deemed to be served as soon as it is posted or sent to the trader, this also applies with electronic communication. You may use our cancellation from if you wish, but your notice of cancellation does not need to be in this format. However, if you decide to cancel this contract you must make this intention clear in any communication

Cancellation of Contract made in a Consumer's home or Place of Work etc. Regulation 2008

I / We agree that A. N. OTHER AERIALS may start work on ..... before my / our cancellation period has expired.

I understand that if I decide to cancel within 7 days I may be asked to pay for any work that has been carried out prior to cancellation

Print Name: ..... Date: .....

Signed: .....

List the eight transponders (tp) with the lowest MER including the frequencies and polarity.

TABLE 18 INSTALLED SERVICE REPORT FORM

Association For Audio Visual Professionals

CAI Dangerous Situation Report

For reporting an observed dangerous situation.

Please complete all the unshaded areas

Job No

Page of

Owner/Occupier/Client

Date

Address

Postcode

Site address if different

Postcode

Inspector

Member No.

Signature

To the owner/occupier/client:

A dangerous situation has been observed. It is recommended that it is rectified immediately/made safe until remedial works can be undertaken. Details of the dangerous situation are recorded below.

Defect details

I have been informed of the dangerous situation Yes No

I give my permission to make the dangerous situation safe Yes No

(In not agreeing to make safe I understand that I take responsibility)

Owner/Occupier/Client

Signature

Method of making safe

CAI, Communications House, 41a Market Street, Watford, WD18 0PN

DANGEROUS SITUATION REPORT

To be used by an engineer to inform a Client of a dangerous situation that the engineer feels needs rectifying, either by himself or a third party. This form enables the engineer to complete his work and also exonerates him if the Client does not wish the situation to be made safe. A copy of this form should be kept for your records and a further copy sent to CAI office.

ANNEX F
STANDARD CONDITIONS OF TRADING

A copy of the latest version of the suggested Standard Conditions of Trading may be downloaded from CAI website

https://www.cai.org.uk/index.php/contact/downloads/members-only/templates/terms-of-trading-cancellation-of-contracts/96-terms-of-trading-systems

Disclaimer

The Conditions suggested are provided as an example only and it is not intended that Members should rely on these Conditions and adopt them entirely as their own, without first obtaining legal advice. Each Member may have different circumstances necessitating different conditions and some of the clauses contained within the standard conditions may not be appropriate for every Member Company.

As an example, these conditions include an arbitration clause that commits both the Company and the Client to arbitration to determine any dispute or difference between them. This then means that the parties are not at liberty to pursue such a matter through the courts. Some Members may prefer to resolve matters through the courts without first either using arbitration or may prefer to have the ability to use the court procedure if the outcome of arbitration is unsatisfactory. We do, however, recommend arbitration.

The CAI will not be held liable for any Member adopting these standard Conditions as their own. The CAI do not represent or warrant that the terms and conditions comply with the Unfair Contract Terms Act 1977 (or any re-enactment thereof or any supplemental regulations) or Trading Standards' requirements nor that they are the most appropriate conditions for each Member Company or organisation.

E&OE

ANNEX G
PLANNING REGULATIONS FOR DISH ANTENNAS

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/830643/190910_Tech_Guide_for_publishing.pdf

Extracted from the above publication

Class H – microwave antenna

This provides permitted development rights for the installation, alteration or replacement of a microwave antenna, such as a satellite dish, on a house or within the curtilage of a house.

H.1 Development is not permitted by Class H if –

- permission to use the dwelling house as a dwelling house has been granted only by virtue of Class M, N, P, PA or Q of Part 3 of this Schedule (change of use)
- it would result in the presence on the dwelling house or within its curtilage of-
    - more than 2 antennas;
    - a single antenna exceeding 1 metre in length;
    - 2 antennas which do not meet the relevant size criteria;
    - an antenna installed on a chimney, where the length of the antenna would exceed 0.6 metres;
    - an antenna installed on a chimney, where the antenna would protrude above the chimney; or
    - an antenna with a cubic capacity in excess of 35 litres
- in the case of an antenna to be installed on a roof without a chimney, the highest part of the antenna would be higher than the highest part of the roof
- in the case of an antenna to be installed on a roof with a chimney, the highest part of the antenna would be higher than the highest part of the chimney, or 0.6 metres measured from the highest part of the ridge tiles of the roof, whichever is the lower; or
- in the case of article 2(3) land, it would consist of the installation of an antenna -
    - on a chimney, wall or roof slope which faces onto, and is visible from, a highway;
    - in the Broads, on a chimney, wall or roof slope which faces onto, and is visible from, a waterway; or
    - on a building which exceeds 15 metres in height

H.2 Development is permitted by Class H subject to the following conditions –

- an antenna installed on a building shall, so far as practicable, be sited so as to minimise its effect on the external appearance of the building; and
- an antenna no longer needed for reception or transmission purposes shall be removed as soon as reasonably practicable

H.3 For the purposes of Class H –

- the relevant size criteria for the purposes of paragraph H.1(b)(iii) are that –
    - only one of the antennas may exceed 0.6 metres in length; and
    - any antenna which exceeds 0.6 metres in length must not exceed 1 metre in length.
- the length of the antenna is to be measured in any linear direction, and shall exclude any projecting feed element, reinforcing rim, mounting or brackets. Guidance on the 'highest part of the roof' is covered under Class A (c) (see page 11)

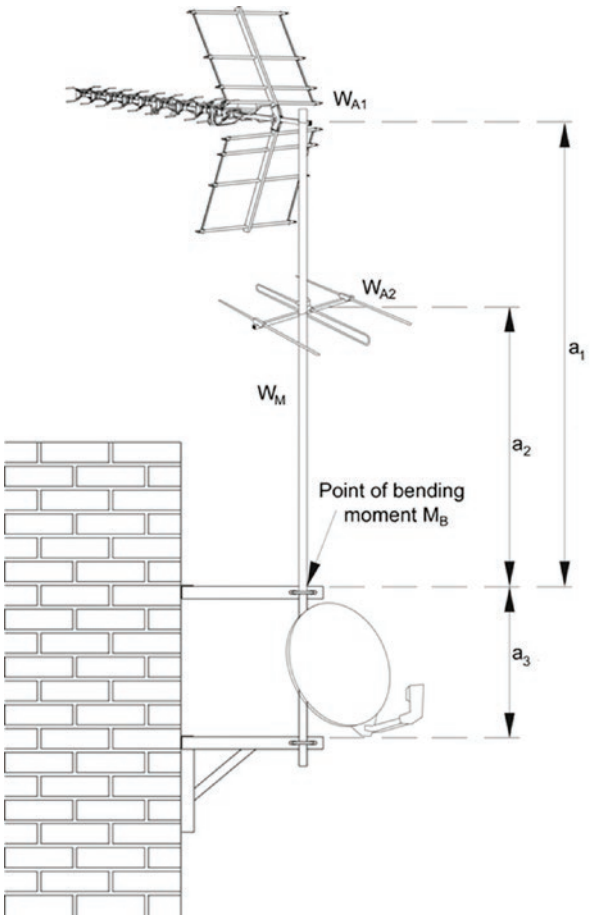
ANNEX H

ELECTRICAL SAFETY REQUIREMENTS FOR MULTIPLE OUTLETS IN A SINGLE DWELLING UNIT

Electrical safety requirement including earthing, lightning protection and example diagrams are provided in detail in CoP 3

ANNEX I

WIND LOADING OF STRUCTURE



M_B	=	Bending Moment (Nm)
W_M	=	Wind loading of Mast (N)
W_{A1}	=	Wind loading of Aerial 1 – UHF (N)
W_{A2}	=	Wind loading of Aerial 2 – FM (N)
a_1	=	Distance from upper bracket to Aerial 1 fixing (m)
a_2	=	Distance from upper bracket to Aerial 2 fixing (m)
a_3	=	Distance between brackets (m)

I.1 General Requirements

All parts of the aerial system shall be so designed that they will withstand the maximum wind forces defined below, without breakage. However, in general terms, it would be wise to limit the antenna mast installation to:-

- Minimum mast wall thickness ≥ 2 mm
- Maximum free length of mast, a_1 ≤ 6 m
- Distance between brackets, a_3 ≥ $^1/_6$ of total mast length

I.2 Bending Moment

Masts have a strength dependent upon their dimensions and materials used. This strength can be transformed into a maximum permitted bending moment (not to be exceeded) that should be forthcoming from mast manufacturers. There will necessarily be a pre-defined safety margin built into these bending moment figures so as to avoid the possibility of mast breakage when loaded in excess of the maximum permitted bending moment.

I.3 Wind Pressure Values

For the purpose of establishing mast loadings, the following values of wind pressure P (in Pascals i.e. Nm^{-2}) shall be used.

In general, where aerial systems are established on buildings with a height of less than 20 m, the value of P shall be assumed to be 800 Nm^{-2} corresponding to a wind speed of 130 km/h (80 mph).

For aerial systems established on buildings with a height greater than 20 m, the value of P shall be assumed to be 1100 Nm^{-2} corresponding to a wind speed of 150 km/h (93 mph).

Where adverse environmental conditions apply, a higher wind pressure value may need to be assumed, e.g.

- for a wind speed of 160 km/h (100 mph), the wind pressure shall be 1250 Nm^{-2}.
- for a wind speed of 200 km/h (124 mph), the wind pressure shall be 1900 Nm^{-2}.

For a mast, the wind loading figure can be calculated from the following formulae:-

$W_M = cPA$

where:-

W_M is the wind loading of the mast (N)

c is the area correction coefficient = 1.2 for mast

P is the wind pressure in Pascals (Nm^{-2})

A is the component area (m^2)

For a mast, the component area, A, is equal to the product of the mast diameter and the free length, i.e. that part of the mast above the topmost bracket (a_1).

$A = a_1 \times D_M$ D_M is the mast diameter (m)

For antennas, the wind-loading figure shall be obtained from the manufacturers for the corresponding wind pressure relevant to the site of the antenna installation.

From the diagram, the bending moment can be calculated from the following formula:-

$$M_B = (W_{A1} \times a_1) + (W_{A2} \times a_2) + (W_M \times a_1/2)^*$$

* Load on mast is taken at mid point of free length

This bending moment, MB, shall not exceed the maximum permitted bending moment for the mast employed.

Note: Additional loadings due to ice formation on the aerials and supporting structure have not been considered.

I.4 Mast Construction

Where the mast is constructed from steel, the steel shall have a guaranteed extension limit and the maximum loading shall not exceed 90% of the extension limit.

I.5 Data to be Published

The aerial and mast manufacturers shall publish the following data for various wind pressures within the range of acceptability for the recommended usage.

(a) Wind loading of aerials and masts.

(b) Maximum permitted bending moments of masts.

1.6 Example: Calculation for Bending Moment on a Mast

Three aerials mounted 1 m apart on a 6 m x 50 mm (0.05 m) mast, 1 m of which is between the brackets, leaving 5 m of mast free.

Wind load of each aerial at a wind speed 150 km/h (93 mph) and wind pressure 1100 Nm^{-2}

UHF aerial (A_1) 185 N

DAB aerial (A_2) 50.2 N

FM aerial (A_3) 157 N

W_M = cPA

= [1.2 x 1100 x (5 x 0.05)] = 330 N

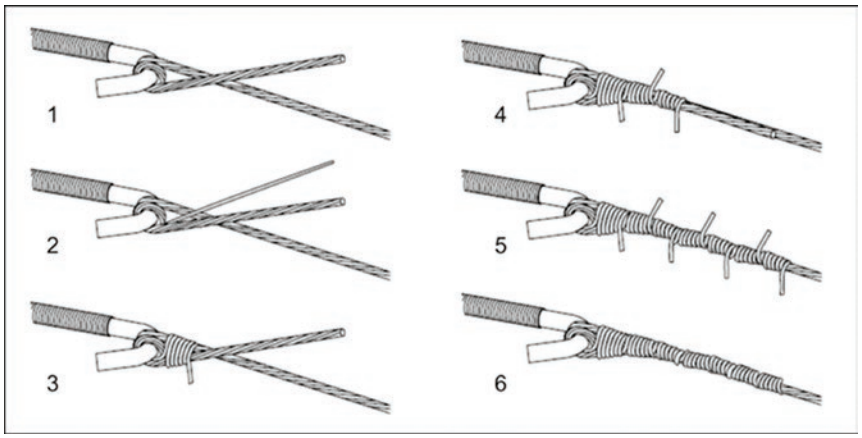
M_B = $(W_{A1} \times a_1) + (W_{A2} \times a_2) + (W_{A3} \times a_3) + (W_M \times a_1/2)$

= (185 x 5) + (50.2 x 4) + (157 x 3) + (330 x 5/2)

= 2421.8 Nm

A mast with 2 mm wall thickness will not withstand this bending moment and the manufacturer/distributor should be contacted to suggest a mast of suitable dimensions and corresponding bracketry.

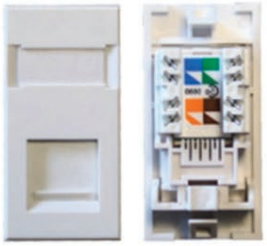
1.7 Correct Method for Terminating Lashing Wire



Splice method - whereby the wire bundle is bent around the thimble and laid back alongside the incoming wire for a minimum of 150 mm.

Where thimbles are not supplied the wire should be wrapped twice around the J bolt. A single strand is unwound from the bundle and wrapped tightly around both wire bundles. The next strand is uncoiled and similarly wound but in the opposite direction around both bundles below the first strand. Each individual strand is treated in the same way until all strands are secured.

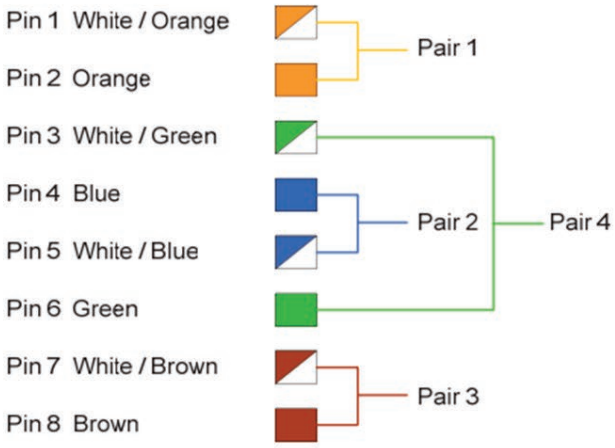
ANNEX J
DATA TERMINATION RJ45



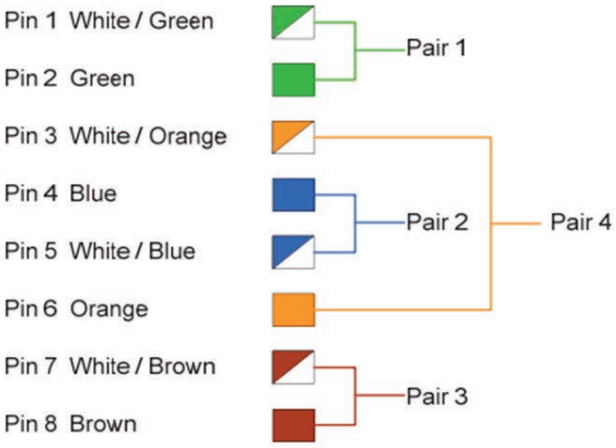
Standard wiring configuration for straight through connections 568B is most commonly used.

For cross-over connection 568B at one end and 568A at the other.

568B



568A



ANNEX K
USEFUL CONTACTS

SES-ASTRA	-	www.ses-astra.com
BBC Reception Advice	Tel:03700100123	www.bbc.co.uk/reception
British Standards Institution	Tel: 0345 080 9000	www.bsigroup.com/en-GB/
Arqiva	Tel: 01962 823434	www.arquiva.com/tv/
DTG	Tel: 020 8891 1830	www.dtg.co.uk
Eutelsat	Tel: 00 33 1 5398 4034	www.eutelsat.com
Ofcom	Tel: 0300 123 3333 or 020 7981 3040	www.ofcom.org.uk
ABB Furse (LPS Engineers)	Tel: 0808 4357365	www.new.abb.com
CAI Certified Products	-	www.cai.org.uk (under information)

ANNEX L
LIST OF RELEVANT STANDARDS AND OTHER REFERENCE DOCUMENTS

BS and BS EN standards are available from the British Standards Institution.

BS EN ISO 1461:2021	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods
BS EN 50083/60728 Series	Cabled distribution systems for television, sound and interactive multimedia signals.
BS EN 60728-11	Part 11: Safety requirements.
BS EN 50083-2	Part 2: Electromagnetic compatibility for equipment.
BS EN 60728-3	Part 3: Active wideband equipment for coaxial cable networks.
BS EN 50083-4	Part 4: Passive wideband equipment for coaxial cable networks.
BS EN 50083-5	Part 5: Headend equipment.
BS EN 60728-6	Part 6: Optical equipment.
BS EN 50083-7	Part 7: System performance.
BS EN 50083-8	Part 8: Electromagnetic compatibility for networks.
BS EN 50083-9	Part 9: Interfaces for CATV/SMATV headends and similar professional equipment for DVB/MPEG-2 transport streams.
BS EN 60728-10	Part 10: System performance for return paths.
BS EN 60728-7-1	Hybrid fibre coax outside plant status monitoring.
BS EN 60728-7-2	Part 7-2: Hybrid fibre coax outside plant status monitoring. Media access control (MAC) layer specification.
BS EN 60728-7-3	Part 7-3: Hybrid fibre coax outside plant status monitoring. Power supply to transponder interface bus (PSTIB). Specification.
EN 50117 Series	Coaxial cables used in cabled distribution networks.
BS EN 50117-1	Coaxial cables. Generic specification.
BS EN 50117-2-1	Coaxial cables. Sectional specification for cables used in cabled distribution networks. Indoor drop cables for systems operating at 5 MHz - 1000 MHz.
BS EN 50117-2-2	Coaxial cables. Part 2-2. Sectional specification for cables used in cabled distribution networks. Outdoor drop cables for systems operating at 5 MHz – 1000 MHz.
BS EN 50117-2-3	Coaxial cables. Part 2-3: Sectional specification for cables used in cabled distribution networks. Distribution and trunk cables for systems operating at 5 MHz - 1000 MHz.
BS EN 50117-2-4	Coaxial cables. Part 2-4: Sectional specification for cables used in cabled distribution networks. Indoor drop cables for systems operating at 5 MHz - 3000 MHz.
BS EN 50117-2-5	Coaxial cables. Part 2-5. Sectional specification for cables used in cabled distribution networks. Outdoor drop cables for systems operating at 5 MHz - 3000 MHz.
BS EN 50117-3	Coaxial cables used in cabled distribution networks. Sectional specification for outdoor drop cables.
BS EN 50117-3-1	Coaxial cables. Sectional specifications for cables used in telecom applications. Miniaturized cables used in digital communication systems.
BS EN 50117-4	Coaxial cables used in cabled distribution networks. Sectional specification for distribution and trunk cables.
BS EN 50117-5	Coaxial cables used in cabled distribution networks. Sectional specification for indoor drop cables for use in networks operating at frequencies between 5 MHz and 2150 MHz.
BS EN 50117-6	Coaxial cables used in cabled distribution networks. Sectional specification for outdoor drop cables for use in networks operating at frequencies between 5 MHz and 2150 MHz.

Miscellaneous Standards and Regulations

BS EN 62368-1	Audio/video, information and communication technology equipment Safety requirements
BS 1710	Specifications for labelling pipe lines
BS 5640-1	Aerials for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz. Specification for electrical and mechanical characteristics.
BS 5640-2	Aerials for the reception of sound and television broadcasting in the frequency range 30 MHz to 1 GHz. Methods of measurement of electrical performance parameters.
BS 7371	Coatings on metal fasteners.
BS 7671	UK wiring regulations
Building Regulations	Part P Electrical Safety.
ETR290	ETSI Document Measurement Guidelines for DVB Systems.

Other Reference Documents

CAI	Code of Practice 02 - Installation of Aerials/Antennas and Receiving Equipment in the SDU (Single Dwelling Unit).
CAI	Health and Safety in the Aerial and Satellite Industries
CAI	Guidelines on Safe Operating Procedures.
CAI	Code of Conduct.
CAI	Method Statements and Risk Assessments.
CAI	Code of Practice 03 - Electrical Safety Requirements for Signal Reception Systems (excluding CATV).
CAI	Aerial Certification Specification.
CAI	Cable Certification Specification.
DTG	R-book 7 - Installing Digital Television (MATV and IRS), available as a download from the DTG website https://dtg.org.uk/publication/r-book/

This link provides the reference transponders used by Sky when testing
http://tech-services-at-sky.neat-url.com/skytransponderinfo/

Ofcom Communications Act 2003, available from:-
http://www.legislation.gov.uk/ukpga/2003/21/contents

Environment Agency for Waste Carriers Registration
http://www.environment-agency.gov.uk/business/sectors/wastecarriers.aspx

VCA for information regarding Waste Electrical and Electronic Equipment (WEEE)
https://data.gov.uk/dataset/abbc9485-bdee-4609-a70c-f9741fb1bc36/weee-enforcement

Note: The above URLs were correct at the time of printing.

Aspire | Learn | Achieve

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