



**Sky Homes Specification for a coaxial
Integrated Reception System**

New Build MDU

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INTRODUCTION: PURPOSE OF THIS DOCUMENT

This document sets out a summary Specification of requirements for communal television aerial systems to be installed in residential or commercial buildings as outlined in the plans accompanying this specification. We recommend that all systems should be designed and installed to meet these standards. However, this does not preclude individual *Builders* from varying the Specifications or adding supplementary requirements to meet local needs.

This document is intended for purposes of preliminary planning and tendering. It may be incorporated in specific legal agreements between individual Landlords and installing Contractors. However it must be used in its entirety, extracts may not be used in isolation. Copyright in this document belongs to British Sky Broadcasting Ltd.

The systems to be installed constitute Integrated Reception Systems as defined by Sky Homes. The intended effect of such a system is to provide a full range of television signals (satellite, terrestrial, analogue and digital where available) and radio (both FM and DAB where available) to every home covered by the system. This broad range is intended to provide the widest possible choice to occupiers in deciding which television services to use. It will also enable the provision of interactive TV services and an infrastructure for local security and information systems.

In order to provide this range of facilities, every IRS must incorporate, besides appropriate aerial, satellite dish and headend equipment, a system of independent cabling to every home and specific outlets, as described in the accompanying plans, within every home. These items are all described in the succeeding pages.

This document also describes in outline the procedures required for planning the individual systems, for reporting and keeping records of work done, and for managing changes agreed while work is in progress. Conformity with these administrative provisions will be an essential part of the contract.

Whilst we have taken considerable care to verify the accuracy and validity of the information contained in this Specification, BSkyB disclaims any responsibility for faults arising in the specified equipment or from the manner of its installation. Every user of this Specification should check the information provided to it hereunder and must take responsibility for the reliance placed on this document and any agreed variation to it. Furthermore we will not be liable to you under any circumstances whatsoever for any, indirect, consequential, or special damages arising from your use of or reliance on this Specification.

GENERAL

The Contractor shall supply, install, test and commission a Five cable Integrated Reception System, comprising four cables providing individual Satellite IF Polarities, see page 5 for the programme requirements, and one cable providing terrestrial frequencies between 88MHz and 862MHz, in the bands indicated on page 5, through switching devices to a minimum of one position via two cables, (see section, Cables and Fixings on page 9) in each dwelling within the buildings listed in the schedule agreed with the *Builder*.

The Contractor will confirm the addresses, including postcodes, which have been attached to the given head-end, once the Installation is complete.

The systems shall comply with the current technical conditions of the Licensing Authorities. It will be the responsibility of the Contractor to determine the requirement for any licences and apply for any licence that a building may require. BSkyB will not be responsible for the non-application of any licence.

The Contractor shall be a member of the Confederation of Aerial Industries and have the relevant qualifications for Television Distribution Systems. Where a non-employed sub-contractor is used, then the primary aerial installation Contractor will remain responsible for the sub-contractor's work.

ERRORS

Where the Contractor believes that these Specifications are incomplete in any respect or that additional details are required for the satisfactory and safe operation of the proposed systems, the Contractor shall notify the *Builder* immediately and shall be responsible for developing the necessary additional Specifications and ensuring that the proposed system can be operated in a satisfactory and safe manner.

SERVICES

The services to be provided using the proposed system are as follows:

<i>SERVICE</i>	<i>PROGRAMMES</i>	<i>FREQUENCY</i>
Terrestrial Analogue	BBC 1	UHF
	BBC 2	UHF
	ITV	UHF
	Channel 4	UHF
	Channel 5	UHF
Terrestrial Digital	Multiplex 1	UHF
	Multiplex 2	UHF
	Multiplex A	UHF
	Multiplex B	UHF
	Multiplex C	UHF
	Multiplex D	UHF
RSL Analogue	Locally advised UHF	UHF
Satellite Digital	All Horizontal and Vertical transmissions , both Low Band and High Band from the 28 degree east orbital position, in the transmission range from 10,700 MHz - 12,750 MHz.	IF
FM Radio	The national and local services, legally transmitted to the general area of the site concerned.	Band II
DAB	The Radio programmes provided by the DAB services.	Band III
Closed Circuit TV Camera	Where applicable	UHF

It should be noted that, in certain parts of the United Kingdom, analogue terrestrial, and some digital terrestrial multiplexes are not available. The Contractor shall indicate which of the above services (if any) will not be available over the proposed system. RSL (Restricted Service License) services do not have a long-term license and cover a small geographical area. Any inclusion of a RSL service should not be seen as permanent.

The Contractor must perform a site test at each location to determine that all the services listed above are available at the levels required for distribution (see below). If any service is, as a result of the site test, found not to be available this must be reported to the *Builder* immediately so that an agreement may be made as to which services will be provided

SPECIFICATIONS

The systems must conform to the following standards and codes of practice:

- BS EN 50083 all relevant parts.
- BSEN 50117 for coaxial cables.
- BS EN 60966 for connecting cables.
- BS 4662:2006+A1:2009 Specification for boxes for the enclosure of
- Electrical Accessories
- BS 5773:2010 – Specification for general requirements for.
- Electrical Accessories.
- The Confederation of Aerials Industries current Codes of Practice for Television Aerials, and TV Systems.
- The requirements of the DTG book 5 in respect of the system for the Digital Terrestrial services (except to the extent that technical differences apply, when this Specification will override DTG book 5).
- IEE regulations (latest edition).

PLANS

All system planning must be undertaken to avoid common analogue interference patterns and particular reference to channel N+/- 1, 5 and 9 must be taken into account when allocating frequencies for additional channels.

A schematic plan representing the installed system in block diagram form, showing locations of equipment, types of cables and earthing arrangements must be submitted to the *Builder* for final approval.

PERFORMANCE OF SYSTEM

It will be the responsibility of the Contractor to familiarise itself with the site and local conditions prior to tendering. The Contractor must satisfy itself that the services stated are available on each of the sites indicated, and that the quality of the signals will enable him to meet the relevant Specification requirements indicated. If any of the services are not available the Contractor must notify the *Builder* in writing.

Should the Contractor believe that the suggested plans, if supplied, do not meet the performance criteria this must be highlighted at the time of tender, together with alternative proposals.

If, in the course of the installation, the Contractor believes that plans will have to be changed, the *Builder* must be notified immediately and any costs etc. agreed between the Contractor and the *Builder* before installation work continues.

SYSTEM LEVELS

All signal levels must comply with the manufactures specification taking into account adequate derating for the number of channels distributed and the number of amplifiers in cascade.

The maximum/minimum levels at each outlet position on the system are as follows.

<i>FREQUENCY BAND</i>	<i>MAXIMUM LEVEL</i>	<i>MINIMUM LEVEL</i>
Band II FM Radio	74 dBuV	54 dBuV
Band III DAB	75 dBuV	45 dBuV
Band IV/V Analogue	80 dBuV	60 dBuV
Band IV/V Digital	65 dBuV*	45 dBuV
Satellite IF Digital	77 dBuV	52 dBuV

* If there is no analogue signals present on the system the maximum Band IV/V digital signal level is 77dBuV

The terrestrial Digital signals will require a minimum Carrier to Noise at the outlets of 26 dB

The BER measurements should be made after Viterbi error correction and should be better than 2×10^{-4}

The Satellite Digital frequencies will require a minimum Carrier to Noise at the outlets of 9 dB.

Measurement of Carrier to Noise should be made against a 'noise floor' and not between transponders.

MATERIALS

All materials must be new and previously unused. All goods and materials used in providing the system shall conform to EU and national standards, where such standards have been established, and to the Codes of practice issued by the relevant industry bodies.

All amplifiers and distribution equipment shall be by a Sky Homes partnering supplier, whose equipment has been tested and passed set top box compatibility testing. See appendix A for details.

All Equipment must be able to cope with the minimum and maximum signal levels, as approved, in the CAI SMATV Code of Practice and those levels listed above for the given frequencies in use.

No departure from the specified and/or approved materials will be accepted.

TELEVISION AND AUDIO AERIALS

The aerials will be from an approved supplier and comply with the CAI Code of Practice.

All UHF antennas must incorporate a Balun to ensure the matching of the dipole to the feeder cables.

The aerial system, mounts, support structures etc. must be capable of withstanding winds of 100mph/160kph.

SATELLITE DISHES

Satellite dishes must be constructed to withstand a wind speed of 60mph/100kph. and be of an adequate size for the system concerned and be able to produce a 15dB carrier to noise level at the installations site, for the given transponders being received.

The *Builder* must agree the final position for aerials and satellite dishes. If more than two satellite dishes are required, planning permission must be obtained.

DISH ALIGNMENT

Dishes should be aligned for maximum signal strength and carrier to noise ratios. The LNB should be aligned so that the horizontal and vertical transponders appear equal and give maximum rejection of the opposite polarity, this is to avoid cross polarisation problems.

HEADEND EQUIPMENT / REPEATER AMPLIFIERS

All equipment should be powered at 230 volts except where line powering of multiswitches etc is required.

If the multiswitch is line powered from a Sky Set Top. Box only and no other power supply is used, care must be taken to ensure that the maximum current drawn, including the LNB, is less than 315mA. The system, in this instance must be able to be run from 1 Set Top Box only.

If the switch also carries terrestrial services, additional precautions must be made to ensure there is continuity of service.

The equipment must be securely mounted and accessible for maintenance purposes in a dry secure location.

No equipment must be mounted in, or accessible from, any dwelling.

Where required, suitable weatherproof housing, of a minimum IP55 rating, to the *Builder's* Specification must be supplied.

CABLES AND FIXINGS

All cables shall be manufactured to the relevant parts of Specification BS EN 50117. All cables must have passed the benchmarking approval test as conducted by the Confederation of Aerial Industries Ltd. and have a certificate issued by the Confederation of Aerials Industries Ltd. that the cable meets with the benchmarking approvals.

All co-axial cables shall be CAI benchmarked approved digital cable and of type 100/125/165 only.

For an update on supplier list please visit www.cai.org.uk.

All coaxial cable shall have a nominal characteristic of 75 ohms and will be suitable for the application concerned. The Contractor should take into account any requirements for special cable constructions such as LSZH (Low Smoke Zero Halogen)

Only PVC cables may be installed within ducts or risers.

If installed underground, the cables must be of the Bonded Shield type or installed within a suitable 110mm (outside diameter) ducting. Bonded Shield cables must contain a water barrier consisting of a polythene-backed aluminium foil tape embedded in the sheath.

All underground cables will be in a separate green duct of 110mm (outside diameter) and of a suitable quantity to take the number of cables involved. The ducting type must be approved by the *Builder*.

The *Builder* must be consulted and approval given for all routes below paths, roads etc. as ducting requirements may vary.

No underground joints in the cables will be allowed. All joints must be made above ground

The cable must be earthed as necessary and at no point on the system must the loop impedance be greater than five ohms.

Where applicable (in general terms this is where the cable needs protections from possible vandalising) external cables shall be protected by conduit, capping or trunking of a suitable size.

Internal cables, located in building risers, must be fixed to a cable tray or located within an enclosed conduit or trunking. All external surface routes must be cleared with the *Builder* before installation.

Vertical spanned cables may be installed where cables are to be located on the outside of a building. Cables should be attached, as a harness, to a suitable catenary of galvanised or stainless steel catenary rope. Which in turn is fixed, by the use of u clamps, using a minimum of two clamps at each fixing point, at the top and bottom of each vertical span and tensioned to prevent displacement.

Where cables are run across a flat roof area, they should be installed on a suitable cable tray of galvanised material. The tray should be fixed, at not less than one metre spacing, to a heavy duty brick or concrete block, by means of a standard screw and plug fixing, two fixings to each brick or block. The brick or block should be laid on a non-penetrating membrane of rubber or on two layers of mineral roofing felt. The substance used should be cut to the size of the brick or block and loose laid on the existing roof surface. Care must be taken should any shingle be located on the roof that the placing of any Bricks or Blocks does not cause penetration of the existing roof surface. Alternatively, a proprietary support unit may be used in place of the brick or block, such unit to be approved by the [Landlord], in writing prior to installation and installed to the manufacturer's instructions.

Cable trays that are fixed vertically should be fixed using a method that locates the tray against a vertical surface, with a minimum spacing off of that surface of 12mm, at no more than one metre spacing so that the tray does not move in any plane.

All cable trays must be earthed in line with the earthing statement of the IEE so that the installation meets 17th (or later) edition regulations.

Overhead spans (of open public spaces) shall not be used unless no other route is available. Even then, they shall only be used with prior consent of the *Builder*. Allowance must be made for likely interference if this method is used.

All cable installation routes must follow a 'Star Wired' or 'Tree & Branch' (Cascade) installation format. For the purposes of this document the above terminology is described below.

A - 'Star Wired' Cable route from the wall socket, uninterrupted, to the Head-End, which will be located in a central position within the designated building.

B - 'Tree & Branch' (Cascade) Cable route from the wall socket, uninterrupted, to a switch position, which may be located away from the Head-End.

In both A and B above, should there be a distribution system, or method of split cables, installed within the dwelling, then the cable route may be interrupted, providing all terminations are correctly made off and any signal losses accounted for.

Cables destined for one dwelling must not be routed through another dwelling. Should this be the only route of access available then the contractor must obtain written permission from the *Builder* prior to any work commencing.

Within the head-end and network, the connection of the coaxial cable will be via 'F' type and IEC connectors only. All 'F' connectors must be crimped or compression and IEC connectors should be of a professional design and correctly made off. All connectors should be the correct size for the cable used and ensure adequate water proofing of connectors where necessary.

All telephone extension cables should be of the "twisted pair" type with a provision for a minimum of three connections. It is recommended that Cat5e is installed to provide for Data transmissions.

All fly leads will be 'Double Screened' and comply with the relevant parts of BS EN 60966. Fly leads should be of a length to achieve a neat and tidy installation.

MOUNTING BOXES

Flush metal boxes shall comply with BS4662 and have a minimum internal depth of 40 mm. All cable exits from the boxes shall be grommets so as to prevent damage to the cable. Flush mounted boxes of insulating material may be used in hollow partition walls of plasterboard and similar material and shall have a minimum internal depth of 40 mm, comply with BS5773 and have mounting centres compliant with BS4662.

Where surface mounted boxes are used, they shall be of moulded insulating material, have a minimum internal depth of 40 mm, comply with BS5773, have mounting centres compliant with BS4662 and be of a style and colour consistent with that of any electrical wiring accessories installed in the same dwelling.

In all cases, care shall be taken to ensure that all cable bending radii are no smaller than those advised by the cable manufacturer.

PASSIVE ACCESSORIES

All accessories must conform to the requirements of CENELEC BS EN 50083.

All passive accessories will be 75 ohms. All satellite IF frequencies will be connected using 'F' type connectors.

External equipment will be housed in suitable waterproof enclosures, conforming to IP55 or greater. All external enclosures must be approved by the *Builder* prior to installation.

SOCKET OUTLETS

The system must be connected to at least one socket outlet in every home. All socket outlets must be fully screened, surface or flush mount type, and have a minimum of four connecting points individual sockets shall be provided for TV, Satellite1, Satellite 2, (Sky+) and Audio (covering both FM and DAB frequencies) Where required, sockets must be capable of passing the Set top box infra-red remote control signals.

Where extra slave RF outlets are provided, within an individual dwelling, then a return path outlet should be provided to enable the connection of a co-axial cable to a distribution amplifier. Any extra outlets should provide sockets for TV and audio signals. All extra outlets and return signal outlets must be capable of passing, unhindered, "digilink" remote control commands.

A standard telephone socket must be located next to the main socket outlet to enable connection of a STB. This should be connected, taking account of total REN,

to a standard telephone line as an extension point. A separate telephone line is not required but may be so if the *builder* indicates a requirement. The RF and telephone outlets may be mounted to the same faceplate. All socket outlets must comply with BS5773.

SKY PLUS

All installations shall be capable of supporting Sky+/Sky+HD Set top box installations.

Additional TV points (Multi-room)

If additional Satellite TV points are required in the dwelling an additional cable will be required for each Satellite tuner i.e. an additional Sky+ point will require 2 additional cables. This needs to be incorporated in to the initial system design.

HOUSE DISTRIBUTION AMPLIFIERS.

Where slave RF outlets are installed then a House Distribution Amplifier should be used to take account of cable and splitting losses. Amplifier gain levels should not be excessive and should provide only enough gain to compensate for any cable, splitting and connection losses employed within the dwelling. The maximum and minimum signal levels previously noted in this document should be taken into account when planning extra outlets. Amplifiers must have a dc path between the Return Signal input and the outlet sockets to enable the use of “digilink” connections.

Amplifiers should be located in a dry secure location accessible for servicing and the location agreed with the *Builder* prior to installation.

If there is only one slave outlet installed then the amplifier may not be required and the Return Signal outlet may be connected directly to the extra outlet, ensuring a dc path between the two to enable the use of a “digilink “ connection.

Cables should be routed, within the dwelling to a common, accessible, location so that servicing and future adaption can occur. The two incoming cables should break at the common point and adapt via in line Connectors, see appendix B for further instruction.

SAFETY

The total system must be installed to comply with the requirements of all relevant Health and Safety legislation and the safety statement as issued by the CAI.

All relevant equipment must be Safety Earth Bonded in compliance with BS EN 50083. All co-axial outer connections must be permanently bonded to the building's PME. It is the responsibility of the Contractor, and in particular the installing or servicing engineer, to ensure the system complies with all safety matters.

Practical Safety Earth Bonding should follow the procedure set out below, however the requirements of the CAI statement, noted above give the technical requirements.

Incoming cables from antennas should be bonded across the outer sheath of all relevant co-axial cables prior to the input of the IF/RF amplifiers. Drop Cables from Multiswitches to outlet plates should be bonded across the outer ports of all drop cables.

All electrical and electronic devices should be bonded to each other by means of an earth tag. Incoming and outgoing earth cables should be fixed in such a manner that should the device be disconnected from the system then the integrity of the earth is maintained. In general terms this would mean the earth cables being crimped together.

The system must be earthed, via a minimum 4mm² earth Cable, taking into account the CAI Code of Practice on Earth Bonding and the requirement to maintain no more than a 5 ohm loop resistance, to the Buildings PME. Where individual buildings share an installation the earth must be connected to the relevant Building PME. The external Aerial Mount should also be connected to the installations earth.

If a Lightning Protection System is installed on the given building then the aerial mount should be connected to the protective strip by use of proper LPS equipment and installed by a competent person.

TEST OF THE INSTALLATIONS

Before the hand-over of each system and before completion of the contract, the whole system must be tested by the Contractor to ensure that the system complies fully with the Specification. The tests will include the maximum and minimum signals for each of the services, measured at the socket outlets as specified by the *Builder*. The Contractor shall provide a printed record of all measurements, either in tabulated or spectrum form, to Sky Homes and to the *Builder*, and shall also keep a set on file.

FINAL COMMISSIONING

The Contractor will have to supply a final commissioning certificate, indicating signals at the inputs and output of the main equipment and levels received at the outlets. The Contractor will have to demonstrate to the *Builder* that the picture quality on all the services stated is to CCIR grade 4 on the analogue television channels and error free ($2e10^{-4}$ BER) on the Digital channels.

The Contractor will provide all certification forms in a format provided by Sky Homes.

Test equipment must be accurate to within +/- 1.5dB (signal level) and suitable for all the services indicated. The minimum requirement is a signal level meter with digital quality measurement capability; a simple signal strength indicator is not sufficient.

DEFECTS LIABILITY AND MAINTENANCE

The Contractor shall maintain the complete system to this Specification, without charge for a period of 12 months from the final date of commissioning. The date from which the warranty period will begin is the date of commissioning, which will be noted on the completion certificate.

The Contractor will attend to faults as reported by the *Builder* or occupier within 24 hours or as otherwise agreed in writing by all parties concerned.

All cables and equipment found to be faulty within the initial 12 month period will be repaired or replaced free of charge to the *Builder and or purchaser/occupier*. If the fault is outside the control of the Contractor, the *Builder and or purchaser/occupier* will accept a reasonable charge by the Contractor to rectify the fault.

MAINTENANCE CONTRACT

The Contractor shall provide with his tender a proposal for a maintenance contract for a given period of years or to be renewed yearly. This contract to pass to any subsequent Property Maintenance organisations or Residents Committees for discussion and agreement to proceed.

Appendix A

Manufactures equipment tested for compatibility:

Mains Powered Stand Alone Multiswitches

Spaun

Teldis (A division of Megalith) Ltd.

Teldis House
29a Mount Ephraim
Tunbridge Wells
Kent
TN4 8AA

Tel: 01892 511411

Email: sales@teldis.com

Website: www.teldis.com

Televes (U K) Ltd.

11 Hill St Industrial Estate
Cwmbran
NP44 7PG (Road Map)
Gwent

Tel: 01633 875821

Email: televes.uk@televes.com

Website: www.televes.com

Fracarro

Unit A Ibex House,
Kelller Close
Kiln Farm
Milton Keynes
Bucks
MK11 3LL

Tel: 01908 571571

Email : info@fracarro.com

Website : www.fracarro.com

Vision

Vision Products (Europe) Limited
Unit 1 Redbourne Park
Liliput Road
Brackmills
Northampton
NN4 7DT

Tel: 0845 017 1010

Email: sales@vision-products.co.uk

Website : www.vision-products.co.uk

Paragon Components

SCC International Ltd,
Unit 3, 11 Fieldings Road
Cheshunt,
Herts EN8 9TL,
United Kingdom

Tel: 08449 802230

Email: trade@paragoncomponents.com

Website: www.paragoncomponents.com

Triax

Abergorki Ind. Est.
Treorchy
Rhondda-Cynon-Taff
South Wales
CF42 6DL

Tel: 01443 778908

Email: sales@traix.co.uk

Website: www.traix.co.uk

Johansson

Unitron NV
Frankrijklaan 27
B-8970 Poperinge
Belgium

Tel: +3257333363

Email: sales@johansson.be

Website: www.johansson.be



Global Invacom

Winterdale Manor
Southminster Road
Althorne
Essex
CM3 6BX

Tel: 01621 743440

Email: sales@globalinvacom.com

Website: www.globalinvacom.com

Cascadeable Multiswitch Ranges**Teldis (A division of Megalith) Ltd.****Teldis switch range**

Contact details as above

Johansson

Unitron NV

Contact details as above

Spaun

Standard Range + Penta Tap Range

Contact details as above

Fracarro

GII Range, XS Range, XS Plus Range

Contact details as above

Paragon Components

Contact details as above

Vision

V5 Range

Contact details as above

Triax (UK) Ltd.

Contact details as above

Televes (U K) Ltd.

Contact details as above



Global Invacom

Contact details as above

Receiver Powered Stand Alone Multiswitches

Fracarro

Contact details as above

Triax

Contact details as above

Vision

Vision V4 range

Contact details as above



