



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

(Incorporating digital Channel Stacking technologies - Sky Q™ compatibility)

## **New Build MDU**

## Table of Contents

<b>INTRODUCTION: PURPOSE OF THIS DOCUMENT .....</b>	<b>3</b>
<b>GENERAL .....</b>	<b>4</b>
<b>ERRORS .....</b>	<b>4</b>
<b>SERVICES .....</b>	<b>5</b>
<b>SPECIFICATIONS.....</b>	<b>6</b>
<b>PLANS .....</b>	<b>6</b>
<b>PERFORMANCE OF SYSTEM .....</b>	<b>6</b>
<b>SYSTEM LEVELS.....</b>	<b>7</b>
<b>MATERIALS.....</b>	<b>7</b>
<b>TELEVISION AND AUDIO AERIALS.....</b>	<b>8</b>
<b>SATELLITE DISHES .....</b>	<b>8</b>
<b>DISH ALIGNMENT .....</b>	<b>8</b>
<b>HEADEND EQUIPMENT .....</b>	<b>9</b>
<b>CABLES AND FIXINGS.....</b>	<b>10</b>
<b>MOUNTING BOXES .....</b>	<b>12</b>
<b>PASSIVE ACCESSORIES .....</b>	<b>12</b>
<b>SOCKET OUTLETS.....</b>	<b>12</b>
<b>SKY Q™ .....</b>	<b>13</b>
<b>SKY PLUS™.....</b>	<b>13</b>
<b>FREESAT .....</b>	<b>13</b>
<b>FREEVIEW.....</b>	<b>13</b>
<b>ADDITIONAL TV POINTS.....</b>	<b>14</b>
<b>SAFETY .....</b>	<b>14</b>
<b>TEST OF THE INSTALLATIONS .....</b>	<b>15</b>
<b>FINAL COMMISSIONING .....</b>	<b>15</b>
<b>DEFECTS LIABILITY AND MAINTENANCE.....</b>	<b>15</b>
<b>MAINTENANCE CONTRACT .....</b>	<b>16</b>

## 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 Developers 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 Sky UK 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, Digital Terrestrial (DTT), and radio (both FM and DAB where available) to every dwelling covered by the system utilising the latest digital channel stacking equipment (dSCR). 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 these specifications, within every dwelling. 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, Sky UK Ltd 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 Sky 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 (Horizontal High, Horizontal Low, Vertical High and Vertical Low), for the programme requirements, and one cable providing terrestrial frequencies between 88mhz and 790mhz, in the bands indicated on [page 5](#), through switching devices to a minimum of one position via two cables, (see section, Cables and Fixings), in each dwelling within the buildings listed in the schedule agreed with the Developer.

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 Licencing 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. Sky UK Ltd 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 Developer 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 at the output of the optical converter unit using the proposed system are as follows:

<b>SERVICE</b>	<b>PROGRAMMES</b>	<b>FREQUENCY</b>
Terrestrial Digital	BBC A	UHF
	D3+4	UHF
	BBC B (HD)	UHF
	SDN	UHF
	ARQ A	UHF
	ARQ B	UHF
	COM 7 (HD)	UHF
	COM * (HD)	UHF
		Additional HD multiplexes may be added up to a maximum of 8 in total
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	Ku
FM Radio	The national 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 by converting to a Digital Mux	UHF

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:

CENELEC BS EN 50083 – all relevant parts

CENELEC BS EN 50117 for coaxial cables – all relevant parts

CENELEC BS EN 60966 for connecting cables – all relevant parts

BS 4662:2006+A1:2009 – Specification for boxes for the enclosure of Electrical Accessories

BS 5773:2010+A1:2014 – General requirements for electrical accessories. Specification The Confederation of Aerials Industries Codes of Practice for Television Aerials, and TV Systems.

The requirements of the DTG R- Book 7 in respect of the system for the Digital Terrestrial services (except to the extent that technical differences apply, when this Specification will override DTG R-book 7)

BS 7671:2018/A1:2020 – Requirements for electrical installations. IET Wiring Regulations SCR Standard (auto detect & switch) - Sky SCR Software v2.6 (May 2015) – requires DiSEqC 1.0 or higher – with Sky proprietary extensions, CENELEC EN 50494:2007, CENELEC EN 50607:2015, Universal LNB Tone & Volts

## PLANS

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

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

<b>FREQUENCY BAND</b>	<b>MAXIMUM LEVEL</b>	<b>MINIMUM LEVEL</b>
Band II FM Radio	74 dB $\mu$ V	54 dB $\mu$ V
Band III DAB	70 dB $\mu$ V	30 dB $\mu$ V
Band IV/V Digital	70 dB $\mu$ V	45 dB $\mu$ V
Satellite IF Digital	77 dB $\mu$ V	52 dB $\mu$ V
Satellite SCR Digital	80 dB $\mu$ V	52 dB $\mu$ V

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

The quality of reception should be assessed by ensuring that the Modulation Error Ratio (MER) meets the following requirement:

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

The Satellite Digital frequencies will require a minimum MER at the outlets of 11dB,

The optical power levels at the input to optical converters should be measured and recorded prior to connecting and should not exceed or fall below those as recommended by the manufacturer.

## MATERIALS

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

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 comply with the CAI Code of Practice. The aerial support structure must be connected to the buildings MET.

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

An 80 or 90 cm satellite dish should be used and must be constructed and mounted to withstand a wind speed of 60mph/100kph or be able to produce a 15dB carrier to noise level at the installations site, for the given transponders being received. Where reception is problematic larger dishes may be considered subject to local planning regulations.

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

The satellite dish should be aligned for maximum signal strength and MER using a dedicated optical TV meter or using a universal output optical converter with 10dB optical attenuator, together with a conventional RF meter. The skew of the LNB should be set by optimising the MER of several transponders.



## HEADEND EQUIPMENT

All equipment should be powered at 230 volts, or via OEM's specified power supply unit. It is the responsibility of the Developer to ensure that a dedicated power supply is brought in and located at each headend (and any remote headend) locations, from the main communal fuse board and rated at 6A or higher and clearly marked "TV System Only" at the circuit breaker and at each socket.

All dSCR equipment should:

Be powered at 230V, or via an OEM's specified Power Supply Unit.

DC pass through on all Satellite trunk lines.

Have the capability for individual ports to be powered via an OEM specified.

### Power Inserter

Where a dSCR port is to be powered via the subscriber cables from a power inserter installed within a dwelling, care must be taken that the maximum current drawn, including the LNB and any other inline powered equipment, does not exceed the specification of the power inserter.

Also, dSCR's used should be switchable and diode protected so that where power inserters are used, chipsets in other dSCR's are not drawing power from any power placed on the trunk lines via any other power inserters.

If the dSCR is to carry terrestrial services, additional precautions must be made to ensure continuity of service.

The equipment must be securely mounted onto wooden backboards and accessible for maintenance purposes in a dry secure location. Equipment is not to be stacked on top of similar or existing equipment and consideration needs to be factored in for adequate space, airflow and ventilation around the equipment.

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

Where required, suitable weatherproof housing, of a minimum IP55 rating, to the Developers Specification must be supplied.

## CABLES AND FIXINGS

All cables shall be manufactured to the relevant parts of Specification BS EN 50117- 1:2019. 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 coaxial 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](http://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 Developer.

The Developer 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 protection 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.

Any cabling that is run across fire escape routes and/or in communal areas which can be deemed as an escape route and used for access or egress in the event of a fire must comply with IET Wiring Regulations (BS 7671:2018/A1:2020).

All external surface routes must be cleared with the Developer 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 Developer, 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 IET 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 Developer. 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 Headend.

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 Developer prior to any work commencing.

Within the headend and network, the connection of the coaxial cable will be via 'F' type and IEC connectors only. All 'F' connectors must be 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 fly leads will be 'Double Screened' and comply with the relevant parts of BS EN 60966-2-4:2016. Fly leads should be of a length to achieve a neat and tidy installation.

## MOUNTING BOXES

Flush metal boxes shall comply with BS 4662:2006+A1:2009 and have a minimum internal depth of 40 mm. All cable exits from the boxes shall be grommeted 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 BS 5773:2010+A1:2014 and have mounting centres compliant with BS 4662:2006+A1:2009.

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 relevant parts.

All passive accessories will be 75 ohms. All satellite IF cables will be connected using 'Compression 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 Developer 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, and Audio (covering both FM and DAB frequencies) and must comply with BS 5773:2010+A1:2014.

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 coaxial cable to a distribution amplifier. Any extra outlets should provide sockets for TV and audio signals.

## SKY Q™

All installations shall be capable of supporting Sky Q™ Set Top Box installations via either one of the coaxial cables and be capable of carrying the 16 userband frequencies below.

<b>UB NUMBER</b>	<b>Centre Fequency (MHz)</b>
3	1680
9	1280
11	1380
14	1480
15	980
16	1030
17	1080
18	1130
19	1530
20	1580
21	1630
22	1730
23	1780
24	1830
25	1880
26	1930

## SKY PLUS™

All installations shall be capable of supporting Sky+/Sky+HD Set top box installations. Any system designed for Sky Q will also support Sky+HD

## FREESAT

All installations shall be capable of supporting Freesat Set Top Box installations with single or twin (PVR) feeds.

## FREEVIEW

All installations shall be capable of supporting Freeview Receivers/Tuners and carry/deliver all digital muxes where available.

## ADDITIONAL TV POINTS

If additional TV points are required in the dwelling, an additional cable(s) will be required for each point. This needs to be incorporated into the initial system design. Sky Q negates this as it utilises WiFi to connect to additional devices from the main STB.

## 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 coaxial 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 coaxial cables prior to the input of the IF/RF amplifiers.

Subscriber Cables from headend equipment to outlet plates should be bonded across the outer ports of all subscriber 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 4mm<sup>2</sup> 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 trained and qualified 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 Developer.

The Contractor shall provide a printed record of all measurements, either in tabulated or spectrum form, to Sky Homes and to the Developer, 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 Developer that the picture quality on all the services stated is quasi error free (QEF) on the Digital channels.

The Contractor will provide all certification showing the installed system is compliant across all platforms and that **all** satellite transponders frequencies carrying Sky content are operating within the set-out parameters as stated in this document. 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 Developer 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 Developer and or purchaser/ occupier. If the fault is outside the control of the Contractor, the Developer 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.