Sky Homes Specification for a Coaxial Integrated Reception System

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

Replacement MDU

IRS Replacement MDU – inc. Sky Q™
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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 buildings owned or managed by local authorities, housing associations and other landlords ("the Landlord"). We recommend that all systems should be designed and installed to meet these standards. However, this does not preclude individual Landlords from 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.

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 and terrestrial) and radio (both FM and DAB) to every home covered by the system. This also encompasses the requirements of digital channel stacking technologies as required for the reception of Sky's 'Sky Q™' platform. This broad range is intended to provide the widest possible choice to occupiers in deciding which broadcast 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 a specific outlet within every home. These items are all described in the succeeding pages.

This document also describes in outline the procedures required for planning the upgrading of 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, 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 (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 Landlord.

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 Landlord 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:

SERVICE	PROGRAMMES	FREQUENCY
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 Landlord 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 Landlord 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 Landlord 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 Landlord must be notified immediately and any costs etc. agreed between the Contractor and the Landlord before installation work continues.

SYSTEM LEVELS

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

FREQUENCY BAND	MAXIMUM LEVEL	MINIMUM LEVEL
Band II FM Radio	74 dBµV	54 dBµV
Band III DAB	70 dBµV	30 dBµV
Band IV/V Digital	70 dBµV	45 dBµV
Satellite IF Digital	77 dBµV	52 dBµV
Satellite SCR Digital	80 dBµV	52 dBµV

The BER measurements should be made after Viterbi error correction and should be better than 2 x 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.

If the replacement system being installed is Fibre, then 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 materials will be accepted.

INSTALLATION PROCESS

The installation process is broken down and shall be completed in accordance with the following order of work. Any deviation from this process may only be taken after consultation with and agreement of [Landlord] and after such agreement has been advised by [Landlord] in writing.

1. Survey - Determine adequate signal levels and advise if one or more component measurements are inadequate. Advise [landlord], in advance of any further work, and which programmes may be affected.
2. Subject to survey - Pre-Installation preparation, e.g. Core drilling.
3. Installation of antennas and dishes.
4. Installation of containment, particularly of any containment required for the network backbone. Installation of Containment for "Subscriber-Cables", within a dwelling, should be completed at stage 8 and must be in accordance to BS 7671:2018/A1:2020
5. Installation of backbone cables in accordance to BS 7671:2018/A1:2020
6. Installation of Head-End, including remote located switches and repeater amplifiers etc.
7. Connection of backbone and commissioning of system.
8. Installation of "Subscriber-Cables" to individual homes, in accordance to BS 7671:2018/A1:2020 and connection of new socket-outlets. Any AV equipment connected to the old system should be connected to the new system and confirmation that the new system is working and delivering the required signals, is made to the resident. The resident should sign a document to that effect. Any dwelling where the contractor is unable to gain access should be noted and the date and time of non-access advised to the landlord.
9. Any old system that has been replaced should be switched off after a period of time, to be determined by [Landlord]. Redundant equipment should be removed and handed to the [Landlord] for disposal.

TELEVISION AND AUDIO AERIALS

The aerials will comply with the CAI Code of Practice. The aerial support structure must be connected to the PME.

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 windspeed 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. All satellite mounts must be connected to the buildings PME.

The Landlord 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 shall be peak aligned for maximum signal strength and MER. The LNB shall be skewed 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, locally i.e. at the headend(s), except where this is not available and the subscriber powering of multiswitches etc. is required.

If the system is to deliver satellite only to residents, and the multiswitch is subscriber powered, the system, including the LNB, must be able to be run from 1 Set Top Box only or from a power inserter or PSU within each property where a Sky Q STB is being installed.

Where SCR technology is being installed alongside existing multiswitches, provisions must be made to ensure that this has its own power supply and that it is electrically isolated from the existing system.

The equipment must be securely mounted onto wooden backboards, except where metal housings are used and have a purpose made metal grid for the sole purpose of securing the equipment, and must accessible for maintenance purposes in a dry secure location.

No equipment (required to feed other parts of the system or other dwellings) must be mounted in, or accessible from, any dwelling – other than equipment needed for that dwelling alone.

Where required, a suitable weatherproof housing to an IP55 specification must be supplied.

CABLES AND FIXINGS

A minimum of two (2) coaxial cables shall be run from the headend to the primary termination point in each dwelling.

The contractor shall endeavour to run the cable as a continuous length of cable from the headend (or switch location) location to each dwelling with no joins in the cable wherever possible. Care shall be taken that the cable is not crushed or damaged anywhere along its length and that the manufacturers minimum bend radii are adherence to.

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

All coaxial cables shall be CAI benchmarked approved digital cable and of type 100/125/165only.
For an update on supplier list please visit www.cai.org.uk.

All coaxial cable shall have a nominal characteristic impedance 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 Landlord.

The Landlord 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 (5) 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. All external surface routes must be cleared with the Landlord 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 the latest edition regulations.

Internal cables, located in building risers, must be fixed to a cable tray or located within an enclosed conduit or trunking.

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 Landlord. 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 topologies 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 [landlord] prior to any work commencing.

Cables can only be installed in roof spaces where no other route exists.

Within the head-end and network, the connection of the coaxial cable will be via 'F' type connectors only. All 'F' connectors must be compression-type 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 waterproofing of connectors where necessary.

The Contractor will supply one 2m fly lead from the outlet point, within each dwelling to the TV. Where a satellite receiver is installed, two (2) 2m fly lead will also be supplied to connect the IF outlet points to the satellite receiver. All fly leads will be 'Double Screened' type 100 cable and comply with the relevant parts of BS EN 60966.

All cables within the head-end shall be clearly identified and labelled as to which dwelling they are running to for ease of installation and for maintenance and servicing identification purposes.

MOUNTING BOXES

In new build or refurbishment work, flush metal boxes shall comply withal relevant parts of BS4662 and have a minimum internal depth of 40 mm. When installed as a stand-alone upgrade existing wiring boxes to BS4662 may be used provided that they have a minimum internal depth of 25 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 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 of 75 ohms impedance. All satellite IF equipment will be connected using compression 'F' type connectors.

External equipment will be housed in suitable waterproof enclosures, conforming to IP55 or greater specification. All external enclosures must be approved by the Landlord 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 Satellite 1, Satellite 2 (SkyQ), TV and Radio (covering both FM and DAB frequencies).

All installations shall be capable of supporting Sky+HD Set Top Box installations and Sky Q™ where dSCR or dCSS equipment has been fitted in the headend.

Additional TV points

If additional TV points for terrestrial or radio are required within the dwelling, an additional cable will be required to be run from the headend for each additional point or a return path needs to be factored in and incorporated into the initial system design from the primary outlet plate.

With the advent of Sky Q, multiroom is achieved wirelessly via WiFi or via a dedicated Ethernet (Cat5e/Cat6) cable connection.

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 Multiswitches to outlet plates should be bonded across the output 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 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 qualified and 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 as set out in this document. The tests will include the maximum and minimum signals for each of the services, measured at the socket outlets. The Contractor shall provide a printed record of all measurements, either in tabulated or spectrum form to the Landlord, and shall also keep a set on file.

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

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 within each dwelling. The Contractor will have to demonstrate to the Landlord that ALL signal strength and quality levels are within the specified parameters and are Quasi Error Free (QEF) on the Digital channels.
The Contractor will provide all certification forms to the Landlord.

DEFECTS LIABILITY AND MAINTENANCE

The Contractor shall maintain the complete system to this Specification, without charge for a minimum period of 12 months from the final date of commissioning, unless otherwise agreed in writing with the Landlord.

At the end of the 12 month defect period the Contractor will submit certification of signal levels on each system as received at an agreed number of outlets, with proof of performance. This document will be taken as the final certificate.

The Contractor will attend to faults as reported by the Landlord 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 Landlord. If the fault is outside the control of the Contractor, the Landlord will accept a reasonable charge by the Contractor to rectify the fault.

Sky Q™

Where Sky have installed a dCSS onto the existing IF ports of a multiswitch, this unit (the dCSS), shall have a lifetime warranty from Sky, ("Lifetime" deemed the full contract period of the Sky Subscriber connected to the dCSS), and not to any non-Sky installed equipment the dCSS is connected to.

MAINTENANCE CONTRACT

The Contractor shall provide with his tender a proposal for a maintenance contract for a given period or to be renewed annually.

RENTAL CONTRACTS

Any proposed rental/lease contract must include full labour and parts maintenance for the given term of the rental or lease.