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**C.L.A.W. ELECTRICAL SPECIFICATION PART EG T.V. SIGNAL DISTRIBUTION SYSTEM
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EG.01.0 GENERAL

- EG.01.01 The work contained herein involves the provision, installation and connection of a television distribution system to incorporate aerials, amplifiers, cables and outlet points.
- EG.01.02 The aerial points are to be sited in the positions shown on the contract drawings, fixing heights for all aerial outlets shall be as indicated in Part EL of the Specification Document.

EG.02.0 SPECIFICATIONS

- EG.02.01 The systems must conform to the following standards and codes of practice
- i. BS EN 50083, all relevant parts
 - ii. BS EN 50117, for coaxial cables
 - iii. BS EN 60966, for fly leads
 - iv. BS 4662:1970 – Specification for boxes for the enclosure of Electrical Accessories
 - v. BS 5773:1995 – Specification for general requirements for. Electrical Accessories
 - vii. The Confederation of Aerial Industries Codes of Practice for both Television Aerials and Distribution Systems (latest edition)
 - viii. The requirements of the DTG book 3 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 3)
 - ix. BS 7671: 2008, Requirements for Electrical Installations Wiring Regulations Seventeenth Edition.

EG.03.0 SYSTEM PERFORMANCE

- EG.03.01 The Specialist Services Installer shall familiarise himself with the site and local conditions prior to tendering, and must satisfy himself that the services stated are available on the site, 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 Specialist Services Installer shall notify the Contract Administrator in writing.
- EG.03.02 If, in the course of the installation, the Specialist Services Installer believes that system will have to be changed, the Contract Administrator must be notified immediately and any costs etc. agreed between the Specialist Services Installer and the Contract Administrator before installation work continues.

EG.04.0 SYSTEM LEVELS

EG.04.01 All signal levels must comply with the maximum provided for by the amplifiers to be installed taking into account adequate derating for the number of channels distributed and amplifiers in cascade

EG.04.02 The maximum/minimum levels at each outlet position on the system are as follows.

FREQUENCY BAND	MAX LEVEL	MIN LEVEL
Band II FM Radio	74 dBuV	54 dBuV
Band III DAB	65 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

EG.04.03 The terrestrial Digital signals will require a minimum Carrier to Noise at the outlets of 26 dB

EG.04.04 The Satellite Digital frequencies will require a minimum Carrier to Noise at the outlets of 9 dB.

EG.04.05 Measurement of Carrier to Noise should be made against a 'noise floor' and not between transponders. The recommended frequencies to set the noise floor are 1970MHz. in the low band and 1070MHz. in the high band.

EG.04.06 Should a transponder signal be present at these frequencies than the 'noise floor' frequency should be adjusted to avoid conflict. The new frequency should be noted and advised on the completion certification.

EG.05.0 MATERIALS

EG.05.01 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

EG.05.02 All amplifiers and distribution equipment shall be by a Sky Homes partnering supplier, See appendix A for details.

EG.05.03 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.

EG.05.04 No departure from the specified and/or approved materials will be accepted.

EG.06.0 TELEVISION AND AUDIO AERIALS

- EG.06.01 The aerials shall be from an approved supplier and comply with the CAI Code of Practice. The aerial support structure must be connected to the common earthing reference point.
- EG.06.02 All UHF antennas must incorporate a Balun to ensure the matching of the dipole to the feeder cables.
- EG.06.03 The aerial system, mounts, support structures etc. must be capable of withstanding winds of 100mph/160kph.
- EG.06.04 Following tests, provided that the signal strength is sufficient to give an acceptable picture on all channels, then the aerial may be sited in the roof space in a position that will be decided during the contract period. If the picture quality is unacceptable, then the aerial shall be sited externally in a position that is acceptable to the Contract Administrator.

EG.07.0 SATELLITE DISHES

- EG.07.01 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. All satellite mounts must be connected to the common earthing reference point.
- EG.07.02 The Contract Administrator must agree the final position for aerials and satellite dishes. If more than two satellite dishes are required, planning permission must be obtained.

EG.08.0 DISH ALIGNMENT

- EG.08.01 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

EG.09.0 SERVICES

EG.09.01 The services to be provided where possible 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
	Multiplex 2	UHF
	Multiplex 3	UHF
	Multiplex 4	UHF
	Multiplex 5	UHF
	Multiplex 6	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

EG.09.02 The Specialist Services Installer shall determine which of the above services can be provided and inform the Contract Administrator accordingly

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EG.10.0 HEADEND EQUIPMENT /REPEATER AMPLIFIERS

- EG.10.01 All equipment should be powered at 230 volts except where line powering of multiswitches etc is required.
- EG.10.02 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.
- EG.10.03 Set Top Box powered multi switches should only be used where there is no requirement for terrestrial signals as the powering arrangement may be insufficient to amplify Terrestrial signals
- EG.10.04 The equipment must be securely mounted and accessible for maintenance purposes in a dry secure location.
- EG.10.05 Where required, suitable weatherproof housing, of a minimum IP55 rating, must be supplied.
- EG.10.06 The locations of all housings and equipment must be agreed with the Contract Administrator before installation

EG.11.0 CABLES AND FIXINGS

- EG.11.01 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 Ltd. that the cable meets with the benchmarking approvals.
- EG.11.02 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).
- EG.11.03 Only LSZH cables may be installed within ducts or risers.
- EG.11.04 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.

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EG.11.0 CABLES AND FIXINGS (Cont'd)

- EG.11.05 All underground cables shall 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 Contract Administrator.
- EG.11.06 The Contract Administrator must be consulted and approval given for all routes below paths, roads etc. as ducting requirements may vary.
- EG.11.07 No underground joints in the cables will be allowed. All joints must be made above ground.
- EG.11.08 The cable must be earthed as necessary and at no point on the system must the loop impedance be greater than five ohms.
- EG.11.09 Where applicable, (in general terms this is where the cable needs protections from possible vandalism) external cables shall be protected by conduit, capping or trunking of a suitable size.
- EG.11.10 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 agreed with the Contract Administrator before installation.
- EG.11.11 Vertical spanned cables may be installed where cables need to be located on the outside of a building only with the written agreement of the Contract Administrator. Cables should be attached, as a harness, to a suitable catenary of galvanised or stainless steel catenary rope, which in turn is to be 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.
- EG.11.12 Where cables are run across a flat roof area, they shall be installed on a suitable cable tray of galvanised material. The tray shall 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 shall be laid on a non-penetrating membrane of rubber or on two layers of mineral roofing felt. The substance used shall 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 Contract Administrator, in writing prior to installation and installed to the manufacturer's instructions.

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EG.11.0 CABLES AND FIXINGS (Cont'd)

- EG.11.13 Cable trays that are fixed vertically shall 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.
- EG.11.14 All cable trays must be earthed in line with BS 7671: 2008, Requirements for Electrical Installations Wiring Regulations Seventeenth Edition.
- EG.11.15 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 Contract Administrator. Allowance must be made for likely interference if this method is used.
- EG.11.16 All cable installation routes must follow a 'Star Wired' or 'Tree & Bush' installation format. For the purposes of this document the above terminology is described below.
- EG.11.17 'Star Wired' An individual cable will route from the wall socket, uninterrupted, to the Head-End, which will be located in a central position within the designated building.
- EG.11.18 'Tree & Bush' An individual cable will route from the wall socket, uninterrupted, to a switch position, which may be located away from the Head-End.
- EG.11.19 In both 17 and 18 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.
- EG.11.20 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 and IEC connectors should be of a professional design and correctly made off. All connectors should be the correct size for the cable used.
- EG.11.21 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 be installed to provide for Data transmissions.
- EG.11.22 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.

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EG.12.0 PASSIVE ACCESSORIES

- EG.12.01 All accessories must conform to the requirements of BS EN 50083 and shall be as specified in Part EL of the Specification Document.
- EG.12.02 All passive accessories will be 75 ohms. All satellite IF frequencies will be connected using 'F' type connectors.
- EG.12.03 External equipment shall be housed in suitable waterproof enclosures, conforming to IP65 Specification. All external enclosures must be approved by the Contract Administrator prior to installation.

EG.13.0 CONNECTORS

- EG.13.01 All IEC coaxial connectors must be fully screened and have as a minimum screw or crimp or compression type connection on both the centre core and braid. Any other type will not be accepted.
- EG.13.02 All F type connectors must be crimp type and suitable for the cable they are fitted to. Screw type F connectors will not be accepted. Where F connectors are fitted externally they must be weatherproof.

EG.14.0 ELECTRICITY SUPPLY

- EG.14.01 An unswitched fused connection unit c/w neon indicator shall be provided and installed at a point adjacent to the TV signal distribution amplifier by the Electrical Services Installer.

EG.15.0 CONDUITS AND TERMINATION BOXES

- EG.15.01 All necessary conduits complete with draw wires and termination boxes shall be installed by the Electrical Services Installer.
- EG.15.02 It will be necessary for both the Electrical Services Installer and TV system Services Installer to liaise to ensure that conduits and outlet boxes etc. are installed in the correct position.
- EG.15.03 Flush metal boxes shall comply with BS 4662 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 and have mounting centres compliant with BS 4662.

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EG.15.0 CONDUITS AND TERMINATION BOXES (Cont'd)

- EG.15.04 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 all other electrical wiring accessories in the same installation.
- EG.15.05 In all cases, care shall be taken to ensure that all cable bending radii are no smaller than those advised by the cable manufacturer.

EG.16.0 OUTLET PLATES

- EG.16.01 Outlet plates shall be provided and installed as indicated in Part EL of the Specification Document.
- EG.16.02 One fly lead to BS EN 60966 must be supplied for each outlet on the system.
- EG.16.03 All socket outlets must be fully screened, surface or flush mount type, and have a minimum of four connecting points.
- EG.16.04 Individual sockets shall be provided for TV, Satellite1, Satellite 2, (Sky+) and Audio (covering both FM and DAB frequencies).
- EG.16.04 Where required, sockets must be capable of passing the Digibox infra-red remote control signals.

EG.17.0 TESTING AND COMMISSIONING

- EG.17.01 Before the hand-over of the system and before completion of the contract, the whole system shall be tested by the Specialist Services Installer to ensure that the system complies fully with the Specification.
- EG.17.02 The tests shall include the maximum and minimum signals for each of the services, measured at the socket outlets as specified by the Contract Administrator.
- EG.17.03 The Specialist Services Installer shall provide a printed record of all measurements, either in tabulated or spectrum form, to the Contract Administrator and shall also keep a set on file.
- EG.17.04 The Specialist Services Installer shall supply a final commissioning certificate, indicating signals at the inputs and output of the main equipment and levels received at the outlets.

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EG.17.0 TESTING AND COMMISSIONING (Cont'd)

EG.17.05 The Specialist Services Installer shall demonstrate to the Contract Administrator that the picture quality on all the services stated is to CCIR grade 4 on the analogue television channels and error free on the Digital channels.

EG.17.06 Test equipment must be accurate to within +/- 3dB and suitable for all the services indicated. The minimum requirement is a Spectrum Analyser a simple signal strength indicator is not sufficient.

EG.18.0 O. & M. MANUAL

EG.18.01 The Electrical Services Installer shall supply three copies of as fitted drawings showing the location of all amplifiers, connections and/or junction boxes, together with schedules detailing all the system equipment and all maintenance recommendations.

EG.18.02 The afore-mentioned shall be bound in hard backed 4 ring manual as detailed in Part EB of the current C.L.A.W. Electrical Specification.

EG.18.03 All the information contained in clause EG.18.01 shall be burnt on to CD-ROM and three copies submitted.

EG.19.0 COMPLETION CERTIFICATE

EG.19.01 On completion of the installation and testing of the TV distribution system a "Completion Certificate" stating that all the works have been carried out in a satisfactory manner in accordance with all relevant standards and to the approval of the Contract Administrator shall be issued by the Specialist Services Installer.

EG.20.0 WARRANTY

EG.20.01 The television aerial system shall include a 12 months warranty period commencing from the date of take over by the Client, which is to include the replacement of any defective equipment and the necessary labour costs.