OPERATIONAL INFORMATION DOCUMENT

A Guide to Unmetered Supplies under the BSC

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1 An Introduction to Unmetered Supplies

1.1 What are Unmetered Supplies under the BSC?

An Unmetered Supply (UMS) means a supply of electricity to a particular inventory of equipment in respect of which a Licensed Distribution System Operator has issued an Unmetered Supply Certificate. For example, this equipment could be any electrical equipment that draws a current and is connected to the Distribution Network without a meter, i.e. there is no meter recording its energy consumption, e.g. street lights, traffic signs, zebra crossings, etc.

1.2 What is the Purpose of this Document?

This Document aims to provide guidance on:

- What Charge Codes are (unique code representing unmetered equipment);
- The meaning of a Charge Code's structure;
- The testing required to obtain a Charge Code;
- How to account for equipment such as traffic signals in customer inventories;
- Switch Regime codes (and Part Night dimming);
- The difference between Non Half Hourly and Half Hourly trading; and
- Other useful operational information relating to Unmetered Supplies under the BSC

1.3 Before reading on, some key roles and terms explained...

The Customer – typically a county, metropolitan, unitary or borough council that has an Unmetered Supply inventory in Great Britain. They are responsible for maintaining a detailed inventory of all their UMS equipment and providing regular updates to their Unmetered Supplies Operator (UMSO). The customer is also responsible for contracting with the Meter Administrator (MA), if the UMS is traded Half Hourly under the BSC. The Supplier will appoint the MA for Settlement purposes. Customers should contact their UMSO if they have any questions on how to submit equipment in their detailed inventory.

The Unmetered Supplies Operator (UMSO) – The UMSO is part of the Licensed Distribution System Operator (LDSO), also known as the Distribution Business or Network Operator. The UMSO is responsible for looking after all of the Unmetered Supplies on its Network. The UMSO makes new connections and decides what equipment is suitable for treatment as an Unmetered Supply. The UMSO provides a summarised inventory to the MA for Half Hourly traded UMS or calculates an Estimated Annual Consumption (EAC) for Non Half Hourly traded UMS.

The Meter Administrator (MA) – is responsible for providing Half Hourly consumption data into Settlement. This is the consumption of a particular customer in kWh, for each half hour of every day. The Supplier will appoint the MA for Settlement purposes.

BSCCo (the Balancing and Settlement Code Company, the role fulfilled by ELEXON) - is responsible for ensuring that the processes within BSCP520 'Unmetered Supplies Registered in SMRS' are carried out effectively. BSCCo is also responsible for issuing Charge Codes and Switch Regimes to customers such as product manufacturers and county councils that have an Unmetered Supply inventory. BSCCo also coordinates the Central Management Systems (CMS) approval process.

Unmetered Supplies User Group (UMSUG) - An expert group reporting to the Supplier Volume Allocation Group (SVG) advising them on the UMS arrangements under the Balancing and Settlement Code (BSC). Their work includes reviewing Charge Code applications, advising on changes to the relevant BSC subsidiary documents (e.g. BSCP520), the resolution of issues and new developments relating to UMS. The UMSUG is chaired by BSCCo and meets on an ad-hoc basis driven by the SVG and business need.

2 What are Charge Codes?

A Charge Code is simply a 13 digit number which represents a specific type of UMS equipment. It is used by UMSOs and MAs to look up the power value (known as circuit watts) associated with the equipment and calculate consumption.

The Charge Code itself also contains information in its structure. The first two digits (first three digits for miscellaneous equipment) provide an indication of the type of equipment, for instance whether it is a new LED street light or a high pressure sodium lamp. The Charge Code also includes the nominal wattage for the equipment. Typically this could be the 'printed value' on the equipment, e.g. the power value on a lamp, 100W SON. For equipment without any 'printed' values, the nominal wattage could be the rating at which the product is marketed by the manufacturer.

2.1 Why do I need one?

Charge Codes are required so that the energy consumption of the equipment can be recorded as accurately as possible. By having a Charge Code it shows that the manufacturer has provided load research for the equipment (as explained below) and the Charge Code has been issued by BSCCo.

Equipment shall not be connected to the Distribution Network without first being issued with a Charge Code. The issue of a Charge Code does not guarantee an unmetered connection to a Distribution Network. Connection to a network is at the discretion of the Distribution Business following its licence conditions and UMS connections policy.

Power Factor

It is historically a standard requirement of Unmetered Connection Agreements that the power factor of connected equipment shall be as near to unity as practicable but in any case not less than 0.85 lagging or 0.95 leading. If the equipment does not meet this standard then a Distribution Business may refuse to connect the equipment. For guidance where an application is made for a piece of equipment with a circuit wattage of less than 25W then lower power factors will be considered.

2.2 The structure explained

The structure of the Charge Code depends on the type of equipment. There are currently three categories, Lamps, Traffic Equipment and Miscellaneous.

2.2.1 Lamps

Standard lighting equipment has the following structure:

Digits	Description
1 and 2	Identifies the lamp type
3, 4, 5 and 6	The nominal lamp wattage (typically the power value printed on the lamp, e.g. a 100W SON) N.B. this is not the same (usually less than) as the circuit watts
7	The control gear type
8, 9 and 10	Allows equipment with the same full circuit watts to have a different charge code
11, 12 and 13	The dimming level, i.e. the percentage of full load (N.B. '100' = full load circuit watts)

Definition of digits 1 and 2:

Code	Description	Definition Letters	Comments
01	General lighting service filament	GLS, GLD	
03	Tungsten Halogen	TH	
11	Low Pressure Sodium	SOX, SOXPLUS	SOX - Low pressure sodium
12	Low Pressure Sodium (Economy)	SOX/E, SOX-PLUS, SOX-HF	SOX E – Low pressure sodium – energy efficient – i.e. lower wattage for same light output and HF would be High Frequency electronic ballast; and
14	High Pressure Sodium	SON, SON/T, SON/+	SON – High pressure sodium that has many suffixes such as T – tubular or PLUS being high output
21	High Pressure Mercury	MBF/U, MBFR/U	MBF - Mercury Blended Fluorescent
23	High Pressure Mercury (Blended)	MBTL/U	
24	High Pressure Mercury (Halide)	MBI	

Code	Description	Definition Letters	Comments
25	High Pressure Mercury (Induction)	QL	
26	High Pressure Mercury (Ceramic Discharge Metal Halide)	CDM-T, CDM-TT, CDO	CDO - Ceramic Discharge Outdoor CDM - Ceramic Discharge Metal
27	High Pressure Mercury (Metal Arc)	MP	
28	Cosmopolis	CPO	CPO - Cosmopolis
29	Cold Cathode		
31	Low Pressure Mercury (Fluorescent Tube) - Single Lamp	MCF/U	MCF - Mercury Coated Fluorescent Codes 31 and 32 are for the same lamps. These lamps are often mounted in a tray as twin lamps and used in traffic sign illumination. The difference is that code 31 is for a single lamp with its own control gear. Two lamps in a tray would therefore require a quantity of 2 in the number of lamps. However it is possible to mount 2 lamps in a tray in series with a single set of control gear.
32	Low Pressure Mercury (Fluorescent Tube) - Twin Lamp (two lamps operated in series on a single ballast)	MCF/U	See Note in 31 above, Code 32 is rated to cover two lamps and the single ballast. In this case the quantity to be entered in the number of lamps is only one.
33	Low Pressure Mercury (Compact) - Single Lamp	SL, PL-S, PL-L	See Note in 31 above, Codes 33 and 34 follow the same principle but for a compact type.
34	Low Pressure Mercury (Compact) - Twin Lamp (two lamps operated in series on a single ballast)	PL-S, PL-L	See Note in 31 above, Codes 33 and 34 follow the same principle but for a compact type.
35	Low Pressure Mercury (Compact) - Single Lamp	PL-C, PL*E/C	
36	Low Pressure Mercury (Compact) - Single Lamp	PL-T	
37	Low Pressure Mercury (2D) - Single Lamp	2D	
39	Low Pressure Mercury – Compact Integral Standard		

Code	Description	Definition Letters	Comments
	Gear		
40	Light Emitting Diodes (LEDs)		LED lights that are used for traffic sign illumination or aesthetic and other purposes, e.g. not set in a lighting column, see code 41.
41	LED Street Lights		LED Street Lights are distinct from other LEDs. This code is for LEDs that are set in a lighting column (or similarly mounted) and are used to illuminate roads and highways. LEDs that are for aesthetics or other purposes use the Code 40.
45	Luminescent		
50	Electronic Ballasts		This code is reserved for electronic ballasts that will drive lamps at a given wattage regardless of the specification of the lamp attached to the ballast.
Codes with higher numbers are covered later in the document			

Definition of digits 3, 4, 5 and 6

These represent the nominal rating of the equipment in watts, i.e. '0250' represents a lamp with a nominal rating of 250 watts.

Definition of digit 7: Control Gear Type

Code	Control Gear Description	Applicable Lamp Types	Explanation
0	No Control Gear	GLS/GLD, TH, MBT, SL, PL*E/C, LED	Lamps which do not require control gear or where the control gear is incorporated into the lamp envelope. LED drivers are incorporated into equipment
1	Standard Control Gear (auto leak)	HPL & HPI, MBF, SOX & SOX/E, SLI, MCF, PL-S, PL-L, PL-C, PL-T & 2D	Consists of a ballast/transformer and capacitor. A starter switch may also be incorporated.
2	Low Loss Control Gear	SOX & SOX/E, SON & SON/T, CDM-T, MP	Consists of a ballast/transformer and capacitor together with an electronic ignitor.
3	High Frequency (H/F) Electronic Ballast	HPL & HPI, MBF, SOX & SOX/E,	Provides the initial ignition

Code	Control Gear Description	Applicable Lamp Types	Explanation
	(Frequencies greater than 1 kHz)	SON & SON/T, SLI, MCF, PL-S, PL-L & PL-C, QL	pulse and the subsequent voltage / current control of the lamp.
4	SOX/E Optimum Gear	SOX/E	Consists of a ballast / transformer and capacitor together with an electronic ignitor to provide the ignition pulse to the lamp.
5	Low Frequency (L/F) Electronic Ballast (Frequencies lower than 1 kHz)		Provides the initial ignition pulse and the subsequent voltage/current control of the lamp.
6	Multi-Level Static Dimming: Dimming Control with stand-by power integral to the ballast		This code is used to identify ballasts that have programmable dimming capability and stand-by power. It is used by the UMSO to ensure the ballast is declared with an appropriate Control Charge Code that accounts for the stand-by power.

Definition of digits 8, 9 and 10

These digits allow equipment with the same first 7 digits but different circuit watts to be uniquely identified. Where equipment has another code with dimmed values, these 3 digits shall be same for the same equipment running undimmed (100% or full brightness), and for each of its dimmed codes.

Where the equipment is set up for reduced operation by the manufacturer, the 3 digits shall be set to a unique value, normally the 3 digits are incremented by 1 (or the next available 3 digits), e.g. '001', '002', '003', etc. If for example a piece of equipment has the 3 digits of '001' and is also indicating 100% operation, if the manufacturer then applies for the same piece of equipment to be set up with reduced operation '002' shall be used.

Definition of digits 11, 12 and 13

The last three digits of the code represent the % of full power that dimming of the equipment will produce.

For example '070' at the end of a code for an LED street lamp would indicate that the equipment dims down to operate at 70% of the full power of the lamp. For equipment without any dimmed circuit watts, or running permanently at reduced operation, or operated by CMS equipment the last 3 digits of the charge code will always be "100" where the actual dimmed levels are determined from the event file.

If the equipment can be run at full power with no dimming by the customer, BSCCo will issue an undimmed version of the code, i.e. 100%. This applies to where a manufacturer is applying for a series of dimmed Charge Codes but no 100% code exists. To calculate the dimming percentage, take the dimmed circuit watts, divide them by the full power circuit watts and then multiply by 100 and finally round to the nearest whole number.

For example; if the equipment had full power circuit watts of 7 and dimmed circuit watts of 3.

The code would end: (3/7) x 100 = 42.8571 = 43% (nearest whole number) = 043.

Please note, that for part night dimming to be used, a part night dimming Switch Regime must be used. Switch Regimes are explained later on in this document.

Example of Lamp charge code

For example, if the lamp is a High Pressure Sodium (SON/T or SON/PLUS) with a nominal rating of 100W then the first 2 digits of the charge code will be '14'. The next 4 digits will be '0100'. If the lamp is controlled by a high frequency electronic ballast the next digit will be '3' and if the ballast is a new type the next 3 digits will be a unique identifier, e.g. '003'. Finally if the lamp is dimmed to 60% energy over part-night then the last 3 digits are '060'.

Thus two codes would be issued, where it is operating at 100% with no dimming, the code will be 14 0100 3003 100, where the equipment is dimming the code will be: 14 0100 3003 060. The spacing is used to better communicate the codes in documents such as this, but the charge code must not contain spaces in the detailed inventory.

Ballasts with 'stand-by' power

Where a ballast draws 'stand-by' power when the lamp is off an uplift of 1 watt shall be applied to the circuit watts to account the power drawn. It is recognised that this will not allow for the correct allocation of the energy but is a pragmatic approach to account for energy drawn by the ballast during daylight hours.

Where the control is not integral to the ballast it will be allocated a separate Control Charge Code and will be required to be declared separately.

50 Series Electronic Ballasts

To qualify for a 50 series the electronic ballasts will drive lamps at a given wattage regardless of the specification of the lamp attached to the ballast. The criteria to be considered in any application are defined as follows:

- That the ballast must be able to drive more than 1 lamp type (e.g. High Pressure Sodium and Metal Halide);
- The 5 test samples per lamp type should be supplied by the applicant;
- Data for full load and minimum power level must be supplied;
- That there can be a maximum divergence from the highest values lamp type at full power of 2%;
- That there can be a maximum divergence from the highest values lamp type at minimum power level of 5%; and
- That the control gear should be identified, in the Charge Code, as being either high or low frequency and should be clearly stated by the applicant.

Where the test data for the lamp / ballast combination diverge from the above criteria Charge Codes shall be provided separately for each lamp / ballast combination.

2.2.2 Traffic Equipment

All traffic codes start with 79 and can be on continually, switched manually and can have more than one brightness level.

Where a traffic signal dims its brightness from dusk to dawn the Customer shall declare the appropriate switch regime, i.e. 821 if switching controlled by an electronic 70/35 Lux photocell. The UMSO and MA will

make the appropriate adjustment using the full and dimmed circuit watts (in this context known as day/night watts) declared for the equipment. Please see guidance on dimming traffic signals in Section 4.2.2.

Digits	Description
1 and 2	Always 79. Traffic signal codes begin with "79" as the first two digits.
3 and 4	Numeric code that represents the type of traffic signal equipment
5, 6 and 7	The nominal wattage (not the same as circuit watts)
8, 9 and 10	A numeric code that allows equipment with the same first seven digits of the charge code but with different circuit watts to be uniquely identified.
11, 12 and 13	Always "100". It should be noted that traffic lights and other non-lighting traffic equipment may have 'day' and 'night' watts. This means that there is no need for a fixed dimming percentage at the end of the code because dimming percentages apply to part night dimming in conjunction with part nigh switching regimes. For a fuller explanation see 4.2.2.

Definition of digits 3 and 4:

Code	Equipment Description	Comments
01	3 lamp aspect (undimmed)	Non LED lights, see below for LED codes
02	3 lamp aspect (dimmed)	Non LED lights, see below for LED codes
03	2 lamp aspect (undimmed)	Non LED lights, see below for LED codes
04	2 lamp aspect (dimmed)	Non LED lights, see below for LED codes
05	Wait Signal/Push Button (undimmed)	Non LED lights, see below for LED codes
06	Controller	
07	Vehicle Detector	
08	Cable less Link Unit (CLU)	
09	Lamp Monitoring Unit (LMU)	
10	Outstation Monitoring Unit (OMU)	
11	Outstation Transmission Unit (OTU)	
12	Detector Power Pack Unit (DPU)	
13	Speed Discrimination Unit (SDU)	
14	Variable Maximum Unit (VMU)	
15	Microprocessor Optimised Vehicle Actuation (MOVA)	
16	Belisha Beacons	Non LED lights, see below for LED codes
17	Regulatory or Box Sign	Non LED lights, see below for LED codes
18	School Crossings	
19	Pole Mounted Responder	
20	Traffic Counter	
21	Speeding / Red Light Camera	
22	Motorway Overhead Gantry	
23	Ticket Machine	
24	Wait Signal/Push Button (dimmed)	

Code	Equipment Description	Comments
25	Speed Warning Signs	
26	Variable Message Signs	See paragraph 3.2 below
27	Vehicle Aspect - Filter lamp (undimmed)	Non LED lights, see below for LED codes
28	Vehicle Aspect - Filter lamp (dimmed)	Non LED lights, see below for LED codes
29	Vehicle Activated Sign (Dimmed Activated)	
30	Weather detection/measurement equipment	
31	Supply cabinet	
32	~~CCTV equipment~~ [discontinued]	See also Miscellaneous codes for CCTV, Code 870
33	Audio equipment	
34	Radio equipment	
35	Telephone equipment	
36	Communications equipment	
37	*[Not currently used]*	
38	LED Wait Signal/Push Button (undimmed)	
39	LED Wait Signal/Push Button (dimmed)	
40	LED 3 lamp aspect (undimmed)	
41	LED 3 lamp aspect (dimmed)	
42	LED 2 lamp aspect (undimmed)	
43	LED 2 lamp aspect (dimmed)	
44	LED filter (undimmed)	
45	LED filter (dimmed)	
46	LED Belisha Beacons (undimmed)	
47	LED School Crossings	
48	LED Regulatory Sign Light:	LED ‘street’ signs should be coded under lamps in the 40 range
49	*[Not currently used]*	
50	LED Belisha Beacons (dimmed)	
51	*[Not currently used]*	
52	Pedestrian Detector	
53	Pedestrian Detector with night light	
54	LED Pedestrian Nearside Wait Signal/Push Button (undimmed)	
55	LED Pedestrian Nearside Wait Signal/Push Button (dimmed)	
56	Continuous Green Aspect (undimmed)	These Codes are for Non-LED Aspects (see below) and see 4.2
57	Continuous Green Aspect (LED) (undimmed)	See 4.2
58	Continuous Green Aspect (dimmed)	These Codes are for Non-LED Aspects (see below) and see 4.2
59	Continuous Green Aspect (LED) (dimmed)	See 4.2

Definition of digits 5, 6 and 7

These represent the nominal rating of the equipment in watts, i.e. “025” may represent a pedestrian detector with a nominal rating of 25 watts.

Definition of digits 8, 9 and 10

These 2 digits allow equipment with the same first seven digits of the charge code, but with different full circuit watts, to be uniquely identified.

Definition of digits 11, 12 and 13

Always “100”. It should be noted that the UMSO and MA systems were designed to take account of any day and night watts associated with traffic lights and other non-lighting traffic equipment. This means that there is no need for a dimming percentage at the end of the code.

2.2.3 Miscellaneous Equipment

The structure of the code is:

Digits	Description
1, 2 and 3	Digit 1 is always 8. Digits 2 and 3 represent the type of Equipment, see below table.
4, 5, 6 and 7	Circuit watts
8, 9 and 10	Same as for traffic signals
11, 12 and 13	Dimming level, i.e. percentage of full load (N.B. '100' = full load circuit watts)

Definition of digits 1, 2 and 3

Code	Description	Comments
802	AA/RAC Boxes	
804	Advertising Hoardings	
806	Alarm System	
807	Automated Number Plate Recognition System	
808	Automatic Railway Crossing	
810	Battery Charger	
811	Bus Information Systems	See 3.2
812	Bus Shelter	
813	Cable Network Pillar	
814	Cathodic Protection	
816	Clock	
817	CMS Equipment	
818	Damp Proof Course	
820	Door Answering Service	
821	Electrical Isolation Device	
822	Fire Warning System	
824	Flood Warning System	
826	Gas Governors	
828	Gauging Flume	
830	Ice Detector	
832	Illuminated Map Cabinets	
834	Lifting Barrier	
835	Information Systems	
836	Navigation Signal	
838	Pay & Display Machine	
839	People Counter/ Traffic Counter	
840	Phone card Phones	
842	Police Boxes	
844	Pump	
846	Radio Transmitter	

Code	Description	Comments
848	Radio Relay Station	
850	Railway Signal	
852	Rain Gauge	
854	~~Security Camera [Discontinued]~~	See Code 870 below and Para.3.4.
856	Septic Tanks	
858	Sewage Flow Recorder	
860	Storm Overflow	
862	Tannoy Alarm System	
863	Telephone Kiosks	
864	Ticket Machine	
866	~~TV Aerial~~ [Discontinued]	See 868
868	TV Amplifier	
870	TV Camera / Equipment	See Paragraph 3.4
871	CCTV illuminator	
872	~~TV Relay~~ [Discontinued]	See 868
873	Trafficmaster Units	
874	Ventilation Unit	
876	Warden Call Equipment	
878	Warning Bell	
880	Water Level Indicator	
882	WiFi Equipment	
899	Other	

Definition of digits 4, 5, 6, and 7:

For miscellaneous equipment, the nominal watts will always equal the circuit watts.

Definition of digits 8, 9 and 10

A numeric code that allows equipment with the same first seven digits of the charge code, but with different full circuit watts to be uniquely identified.

Definition of digits 11, 12 and 13

If there are any dimmed circuit watts, the dimming percentage shall be reflected in the last three digits of the Charge Code (see Digits 11, 12 and 13 for Lamps above).

Issuing of Miscellaneous Charge Codes

UMSOs may issue Miscellaneous Charge Codes without having them published in the BSCCo Charge Code spreadsheet where the equipment is to be used solely within the UMSO's area. This means that it is important that the nominal watts always equal the circuit watts.

Charge Codes for CMS Equipment or unmetered equipment used nationwide

CMS equipment and equipment that will be used nationwide (such as LED bus information signs) will be submitted to BSCCo for Charge Codes to be issued in the usual way. In these cases the Charge Code will continue to be issued by BSCCo and published on the website.

2.2.4 Control Equipment

These have the exact same structure as Lamp codes (please see above)

Definition of digits 1 and 2

Equipment Codes	Description	Comment
91	Time Switch Controllers	Load is continuous
92	Thermal Photocells	Are based on 3 watts when the lamp is switched "OFF" and 0 watts when lamp is switched "ON".
93	Hybrid Photocells	Are based on 3 watts when the lamp is switched "OFF" and 0 watts when lamp is switched "ON".
94	Electronic Photocells	Load is continuous, covers solid state, latching relay and part night photocells
95	~~Electronic Photocells (Latching relay)~~[Discontinued]	See Code 94.
96	Infra Red Photocells	
97	~~Electronic Photo Cell Timeswitch~~ [Discontinued]	See Code 94.
98	Electronic Controls (e.g. CMS devices)	Relates to a controller for CMS equipment. e.g. a node or telecell connected to the lamp/ ballast to facilitate dimming and switching.
99	Multi-level Static Dimming Controls	Relates to:: A standalone dimming control device (not inbuilt as part of a photocell) which also incorporates the load consumed by a separate standard photocell; or A photocell with inbuilt dimming control; or A standard photocell together with an 'uplift' to account for the load consumed by dimming control gear integral to the lamp ballast.

2.2.5 Motorway Signals - Devices with Variable Hours

These are Charge Codes which begin “60” and are currently processed by the UMSO separately. As such they are not contained in the Operational Information Charge Code spreadsheet available on the BSCCo website but are in a separate spreadsheet on the ELEXON website:

Charge Codes and Switch Regimes

Currently, the Highways Agency makes the calculations for Motorway signals. Additionally, Annual motorway operating hours will be calculated by the Highways Agencies based on actual operational information. Three load states for the circuit watts should be submitted with an application for a Charge Codes as follows:

- Quiescent: equipment is on but signal is not illuminated;
- Dim: equipment is on and signal is on at reduced brightness; and
- Bright: equipment is on and at full load.

The Dim and Bright circuit watts will include the quiescent load.

3 How do I apply for a Charge Code?

3.1 Considerations in respect of Charge Code applications

In order to apply for a Charge Code, please contact ELEXON's Unmetered Supplies Operations ums.operations@elexon.co.uk.

Further guidance and application checklist can be found on the ELEXON website (An_overview_of_the_ums_charge_code_process.pdf and Unmetered Supplies).

The applicant shall ensure the provision of the following information or necessary conditions are met:

- Test Data shall be provided along with a clear description of typical operation and installation of the equipment. e.g. brochures, explanation of equipment operation, etc;
- Wherever appropriate photographs of the equipment should be included
- Testing shall be carried out by an ISO 9001 accredited test house or other test house agreed by BSCCo and that the scope of the accreditation covers the testing of the electrical properties of equipment (or other supporting evidence that the testing party is suitably qualified);
- BSCCo reserves the right to witness the tests if so required;
- Both power/voltage and volt-ampere/voltage curves will be required with measurements taken at 210, 220, 230, 240 and 250 volts, 50 hertz. Typically the power measurements provided shall be greater or equal to the nominal wattage stated in the charge code application;
- The accuracy of the measurements shall be stated and the minimum accuracy shall be ±2% of the recorded value;
- The power measurements shall include any voltage transformers, drivers or any other equipment necessary to operate the equipment from the mains. In the case of traffic signals where there are multiple pieces of equipment being supplied by one transformer, the power measurements shall exclude the transformer. Please note that an uplift of 10% will be added to the power measurements in deriving the circuit (and/or dimming) wattages;
- The sample size shall be a minimum sample size of five. Additional samples shall be requested where the test data provided is deemed to be unsatisfactory or insufficient by BSCCo;
- Samples shall be tested after operating for sufficient time to reach their steady load state. If it is likely that the load will vary over the life of the equipment then the tests shall be carried out after at least one hundred hours of operation (See also 3.5 Test Procedure for Constant Light Output LEDs);
- If the equipment consists of both lamps and control gear, then the control gear shall be divided into at least three batches of 5 samples, e.g. 15 samples in total. Each batch is to be tested with lamps supplied by a different major manufacturer. Electronic ballasts that drive more than one lamp type to the same wattage should also be tested with 5 samples of each lamp type that can be operated with the ballast;
- If the equipment includes facilities to dim to a fixed load level, then data for full load as well as each dimmed load is required;

- If the equipment includes a dimmable ballast, then the applicant shall submit load curve data, giving the relationship between the control parameter (e.g. 0-10V or DALI/DSI/MALDI or other control methods) and the power input to the equipment. Additionally the minimum level to which these ballast can operate shall be provided with the Charge Code application
- If the equipment is housed within a cabinet, then clear evidence shall be provided that additional equipment cannot be added (e.g. not scaleable) and that a meter cannot be installed or that it fits the criteria for an unmetered supply as defined in the Unmetered Supply Statutory Instrument (2001 No. 3263);
- If the equipment incorporates heating (e.g. frost heaters) or cooling equipment (e.g. fans) then the estimated operating hours under the different regimes should be reported

BSCCo (with input from UMSUG where appropriate) will consider the test results in recommending an appropriate Charge Code for inclusion in the Operational Information Charge Code spreadsheet. Any questions raised by BSCCo to the applicant shall be answered in full before the application can proceed.

The object of this testing procedure is to provide an accurate indication of the load at the Distribution Network terminals of the particular equipment under normal conditions; i.e. to establish what consumption would be recorded by a standard meter fitted at the supply terminals. The load tests for equipment designed for operation at other voltages MUST include an appropriate transformer (unless directed otherwise by BSCCo).

Brief details of the equipment, including the Product Name and Product Code (and version number if applicable) used by the manufacturer, shall be supplied with the test data to enable the list of agreed ratings to be maintained.

3.2 Test Procedure for LED Variable Message and Bus Information Signs

Charge Codes will only be provided on a case by case basis where the applicant can satisfy the following criteria:

- Bus Information signs will be considered for Charge Codes on a Case by Case basis. For Visual Bus Information Displays with an optional audio player: Separate data provided for just visual and visual plus audio mode (50% of each mode will be included the calculation of the circuit watts);
- Vehicle Activated Signs and Car Park Signs will have the default position of being metered unless a case is made by an applicant why they cannot be metered. This case will be reviewed by the UMSUG and considered by the SVG;
- County Council Traffic Information Signs should be metered only and not considered for UMS Charge Codes; and
- Highways Agency or Transport for Scotland VMS will be considered for UMS Charge Code Applications for legacy connections only. No Charge Codes should be allowed for applications where the heating load exceeds the Heavy Bright Load (including quiescent load + Controller).

Where applications are agreed the test data shall be provided along with a description of typical operation and installation of the equipment. Application for Charge Codes shall be made on a per unit basis, e.g. one charge code per item, such as controller, heating elements, and the message block sign. The message blocks shall be tested with either ‘BBBB’ or ‘8888’ illuminated for the full width of the block. Where a message sign can be dimmed test data shall be provided on the same basis as for full load with the sign dimmed.

The applicant shall provide clear detail on why the load is deemed to be predictable and why the equipment cannot, or is impractical for it to, be metered.

This equipment is deemed to be on continuously. There should be one Charge Code which includes an agreed percentage for all of the elements making up the full installation, such as heater, controller, etc. It will be necessary to determine an average load for the display, taking into consideration any night time dimming.

The equipment shall then be tested in line with the testing requirements described in the section above.

BSCCo will consider the test information provided and consult with the customer as to an appropriate figure for the circuit watts.

3.3 Test Procedure for Belisha Beacons

Belisha Beacons shall be tested at a constant load with the lamp constantly on (i.e. no flashing). BSCCo will then take 62% of the full circuit watts to account for the lamp flashing. Alternatively, the energy consumed over the period of say 10mins will give the average consumption while flashing. When submitting test evidence the method of test should be clearly stated.

3.4 Test Procedure for CCTV Equipment

The following individual components will need the circuit watts / VA measured:

The camera itself; and then where applicable:

Equipment	% of circuit watts used in calculation
Fibre Optic Transmitter (or other communication method)	100%
Microwave link	100%
Tel. Receiver	100%
Cabinet heater 5°C thermostat	13%
Demister 5°C thermostat	13%
Heater 5°C thermostat	13%
Pan & tilt motor	5%
Washer	5%
Wiper	5%
Zoom	10%
N.B. Since these Codes fall in the Miscellaneous 800 range, UMSOs can allocate their own Charge Codes using the table. Nominal Watts must equal Circuit Watts. For HA equipment this must be submitted to BSCCo as used nationwide.	

3.5 Test Procedure for Constant Light Output LEDs

Test data supplied for LEDs that have Constant Light Output shall be provided for the 'beginning of life' and ''end of life 'data. Where, 'end of life' is currently defined as 50,000 hrs. BSCCo with advice from UMSUG will review this 'end of life' definition periodically.

E.G. If the end-of-life current is 20% higher than the beginning-of-life current, then the driver output current should be adjusted to simulate 'end of life' conditions and the appropriate measurements taken.

This may be achieved by using a resistor or other methodology. A clear statement of methodology shall be supplied with the application.

The mid-point of the beginning of life' and ''end of life' data will then be calculated by BSCCo as the circuit watts for the Charge Code.

The nominal Watts for the LED will be given as the mid-point circuit watt value.

3.6 Test Procedure for Multi-level Static Dimming Devices

Multi-Level Static Dimming equipment will have different types of Charge Codes depending on whether the dimming control is integral to the ballast or not. Stand-alone dimming devices will be coded as a control charge code (i.e. 99 xxxx xxxx 100), as will photocells with inbuilt dimming control capability.

Where the dimming control is integral to the ballast, the equipment will be coded as 'Electronic Ballast with integral Multi-level Dimming Equipment ' A dedicated Control Charge Code will be used in conjunction with these ballasts reflecting the increased daytime consumption. These codes can be coded either with specific lamp types or with any lamp type if the ballast will drive the lamps to specific values.

In addition to the requirement for test data set out in 3.1, evidence of the accuracy of the equipment in setting the switching times for on/off and dimming shall be provided. The manufacturer shall also provide evidence of the relationship between the control signal (e.g. 0-10v, DALI/DSI) and the percentage dimming with the application. Where the application is in association with a specific lamp then evidence shall be supplied showing the lamp being dimmed at 10% levels from 50% **energy** to full power. Where the equipment can be used with a range of lamps the manufacturer shall provide appropriate evidence that the product will dim correctly.

The Charge Codes provided will be associated with specific Switch Regimes and 'Valid Dimming Combinations' will be published on the BSC Website: Valid Dimming Combination Spreadsheet

Applications for Switch Regimes shall be made by the customer (or the dimmer / ballast manufacturer) in accordance with the Multi-level Switch Regime application process defined in 6.3.

Manufacturers selling Multi-level Dimming Equipment to customers have a requirement to label the product with its programmed dimming regime at the factory prior to delivery. A letter (electronic) must be provided to BSCCo confirming that this has been done, together with a statement that the product cannot be re-programmed by the customer. Where a dimming device can be reprogrammed remotely the manufacturer or its agent shall provide an undertaking to BSCCo that the customer will not be provided with the ability to re-programme the equipment. Furthermore, the customer will provide an undertaking to BSCCo to declare the Valid Dimming Combination in its inventory following any re-programming which may take place.

4 How are Charge Codes Calculated?

4.1 Equipment that is less than 3 watts

For equipment that is rated as less than 3 watts BSCCo will issue circuit watts to the nearest 1 decimal place, e.g. 2.125 = 2.1 watts (1.d.p.). Please note that control equipment (Charge Codes beginning with '90' and above) will still always be given circuit watts to 2 decimal places.

Miscellaneous equipment is an exception and will always be coded to the nearest watt to allow for the same value to be used as the nominal watts in construction of a miscellaneous Charge Code,

4.2 Traffic signal heads

Cyclically operating lamps are treated as a continuous load and use the following assumed percentage operating times to give a load value per signal aspect. Please see below for an example calculation and how to record traffic signals in your inventory:

Signal Lamp Type	% Operating Times Used in Charge Code Calculation
3 aspects	55% of red lamp + 5% of amber lamp + 45% of green lamp
2 aspects	50% of each lamp for tungsten 80% of red lamp + 20% of green lamp for LED
Pedestrian "Wait" signals	50% of each lamp for tungsten 80% of red lamp + 20% of green lamp for LED
Filter lamps	20% of each lamp
LED Belisha Beacons	62% of each lamp
School Crossings	50% of each lamp
Tungsten dimmed lamps	Shall be rated at the full nominal wattages for the daytime period and at 66% of the nominal wattage for the night-time period.
Continuous Green Aspect	100% of aspect

Example

Let us consider the following example:

For some manufacturers of LED lamp aspects the wattage may vary by the lamp colour. The nominal wattage used in the Charge Code will be the average of the different colour lamp wattages.

A manufacturer contacts BSCCo with a new traffic signal with a 3 aspect head, red of 11.8W, Amber 11.1W and green 14W.

So from the section above, the operating time for each aspect is as follows:

- The red aspect is on 55% of the time 11.8W x 0.55 = 6.49W
- The amber aspect is on 5% of the time 11.1W x 0.05 = 0.56W

- The green aspect is on 45% of the time 14.0W x 0.45 = 6.30W

This accounts for the signal aspects being on for a different amount of time depending on the colour. The total power is 13.35W, but then this figure is then divided by 3, which gives the circuit watts of an individual lamp aspect. In this case it is 4.4W per aspect. This figure is rounded to the nearest watt to give 4W per aspect.

Exactly the same process would apply for calculating the dimmed circuit watts if applicable.

The code would thus be: 79 xx yyy 000 100, circuit watts (day)

(xx is used to represent whether the traffic signal is LED, Tungsten, dimmed/undimmed, etc...)

(yyy is the nominal circuit watts calculated by averaging the LED ratings for each colour aspect)

4.2.1 Continuous Green Aspects

Where the traffic head also contains a continuous green aspect a separate Charge Code at 100% power will be defined thus: 79 56 yyy 000 100 or 79 57 yyy 000 100 (if the aspect is LED)

How do I record traffic signal equipment in my inventory?

For inventory purposes, the Charge Code is for each individual lamp within a head or aspect. From the section above you can see that the circuit watts are calculated for each aspect, taking into account how long each colour aspect is on for. This means that the Charge Code shall be entered as a quantity of 3 for a standard 3 aspect traffic signal. If continuous green aspects are present then the aspect charge code should also be declared with the appropriate quantity.

4.2.2 Dimming Traffic Signals

All Traffic Signals take an electricity supply on a continuous basis and normally in an inventory would be allocated against Switch Regime Code 001. However, large numbers of Traffic Signals can operate in a dimmed mode at night through voltage reduction. The switch to dimmed mode is triggered by the operation of a dusk to dawn PECU (or time switch), which when switched on in the evening, causes the voltage to reduce. This means that the equipment is now operating at the dimmed watts (or night watts) figure shown in the Operational Charge Code table. When the PECU switches off in the morning the voltage increases and the equipment operates at full brightness and circuit watts in the Operational Charge Code table.

When submitting such equipment in an inventory, the switch regime code for the PECU (or time switch) in the Operational Switch Regimes table should be shown against that item.

If the item is traded on a Non Half Hourly basis the operating hours to be used in the EAC calculation for the dimmed (dusk to dawn) operation will be those shown against the relevant Switch Regime in the Operational Switch Regimes table, i.e. 821 for a 70/35 Lux electronic photocell.
For the day time (dawn to dusk) operation the hours to be used will be the continuous hours for switch regime 001 (8,766 hours) minus the dimmed hours. A worked example is shown below:

Take an inventory in the Midlands, which includes 300 x 50 watt Red Amber Green Vehicle Aspects with a charge code of 7902050000100. These are switched to dimmed operation by use of 70/35 Electronic PECUs which is Switch Regime 821.

The calculation will be:

300 items x 12W x 4,150 hours / 1,000 = 14,940.0 kWh allocated to the Dusk to Dawn profile.

300 items x 18W x 4,616 (8,766-4,150) hours / 1,000 = 24,926.4 kWh allocated to the Dawn to Dusk profile.

If the item is traded on a Half Hourly basis the Equivalent Meter will work out bright and dimmed loads based on the hours of operation of the relevant photocell.

4.2.3 Dummy Loads for LED Traffic Lights

A Dummy Load is required for some LED lights to increase the load so that a lamp monitor system would pick up if a lamp fails. The dummy load is to be applied to the lamp circuit watts as part of the test process. Where evidence is provided that different dummy loads are set dependent on equipment types then more than one Charge Code can be constructed using the appropriate uplift.

4.2.4 What are filter signals?

The coding for a traffic light containing four or more aspects depends upon the use of the other aspects.

4 (or more) Signal Aspects

If the fourth aspect is on for the same time as another head, e.g. left arrow on at the same time as the straight ahead signal, then a quantity of 4 must be associated with the corresponding 3 head lamp Charge Code.

If the length of time is the same as (or greater) than the green signal light, it shall be counted as a normal green signal lamp. In this case a quantity of 4 (1 red + 1 amber + 2 green aspects) would be entered on the detailed inventory for the relevant Charge Code.

Part of Green Sequence

If the fourth aspect is only on for part of the time, e.g. a right filter arrow on for part of the time of the straight ahead signal, then a quantity of 3 shall be associated with the specific Charge Code and also a quantity of 1 shall be associated with the correct Charge Code for the filter lamp head.

Traffic filter signals are coded as 20% of the full circuit watts of the lamp to recognise that they are only illuminated for part of the green sequence. The definition of a green filter signal is a green signal indicating movement for a specific amount of time. This amount of time **must** be less than the time that the main green signal light is on for.

5 What is Half Hourly and Non Half Hourly Trading?

Currently Customers can trade their electricity in three ways, either Non Half Hourly, passive Half Hourly or dynamic Half Hourly. The main difference between them is the use of dynamic data.

Dynamic data is actual recorded data such as the switching times of a representative sample of photocells contained in a PECUarray. Data recorded by a Central Management System is also dynamic data, with the switching times of each individual lamp controlled by the system and/or power levels being recorded.

Half Hourly (HH) data is the energy consumption of a customer in kWh, apportioned into the correct half hour of each day.

Dynamic Half Hourly trading achieves this by use of the data obtained from PECU arrays and/or any Central Management System(s).

Passive Half Hourly achieves this by using the calculated sunrise/sunset times. Passive Half Hourly does not use any dynamic data.

In order to trade HH a Meter Administrator (MA) must be appointed. The MA is appointed by the Supplier and contracted by the customer (who may have chosen to operate Half Hourly (HH)).

Non Half Hourly (NHH) trading does not use any dynamic data and instead uses an estimated number of annual hours for each type of photocell. These annual hours are published by BSCCo in the Operational Switch Regime spreadsheet.

6 PECU Array Location and Siting Guidance

If there is disagreement regarding the location and siting of a customer's PECU Array or the number of Arrays required, BSCP520 'Unmetered Supplies registered in SMRS' makes reference to carrying out 'research'.

This section is intended to expand on the type of research can be considered by the MA and UMSO when agreeing proposed locations.

6.1 Location of a single array

1) Weighted latitude and longitude of inventory

If there is latitude and longitude information contained in the customer's detailed inventory, it should be possible for the MA and/or UMSO to perform a weighted longitude/latitude calculation to see where the ideal location of a single PECU Array should be.

2) Weighted latitude and longitude of population

If known, it is possible to perform the calculation described above but using the population figures of the various major towns in the customer's area.

6.2 Deciding on multiple or single Arrays

The number of arrays may be subject to decisions on the number of PECU types that can be populated in the array. More than one array may be required if the population of PECUs for a customer cannot be

reasonably represented on a single array of 30 PECUs. Furthermore, the size of the customer's area might require more than one array to facilitate accurate calculation of Burn Hours. It is possible for the Meter Administrator to calculate the Annual Burn Hours for any latitude and longitude. If the differences between the proposed Array sites are very small (i.e. less than +/- 2%) then this would suggest that one Array should be sufficient. If actual Burn Hours are available for existing Arrays this data could also be used.

6.3 Hosting and Maintenance of the Arrays

It is now common practice for the customers to host PECU Arrays. The MA is responsible ensuring the siting of the array complies with all the considerations of the PECU array siting procedures defined in BSCP520 'Unmetered Supplies registered in SMRS'.

Where PECUs are identified for replacement the MA can direct the customer to replace the PECU with an appropriate PECU, taking into account the type and age and any changes to the customer's population of PECUs (keeping it representative). The MA shall ensure on the next dial that the replaced cell is performing in line with expectations.

7 What are Switch Regimes?

Switch Regimes are 3 digit codes that allow the operating hours for equipment to be determined. This information together with the power information obtained from the Charge Code allows annual consumption (kWh) to be calculated.

The Switch Regime is a component of the Detailed Inventory submitted by the Customer to the UMSO. This is then used by the UMSO (for NHH Customers) or the MA (for HH Customers) to determine the consumption.

The Customer's own records include, in some format, the switching arrangement. The record for each item shall be completed at the initial installation and then updated when any changes take place. The failure to record changes in lamp or Switch Regime is one of the most common sources of inventory errors.
Switching devices are purchased either by the Customer or by the Customer's contractors to the Customer's specification. The Customer specifies the switching arrangement for a particular item on the work order issued to the installer or the repair/maintenance operative.

The Regime Code for a particular device is usually obtained from either the ELEXON website, the manufacturer of the control device or the UMSO.

Customers normally have a definite policy on the use of particular switching regimes and only use a few codes. The current emphasis on energy saving, carbon reduction and cost control has resulted in some customers starting programmes to change areas to part night operation and/or to specify photocells that operate at lower light levels. It is important to use the correct code so as to ensure that the expected cost benefits are actually achieved.

The following Switch Regime Codes provide a standardised listing of switch types. For Non Half Hourly Trading these cross reference to annual burning hours used in the calculation of the Estimate of Annual Consumption (EAC). If an inventory is Half Hourly traded either calculated switching times (passive data) or the switching times from either a PECU array or a Central Management System (dynamic data) will be used to calculate half hourly consumptions.
BSCCo will from time to time review the annual burning hours used for Non Half Hourly EAC calculations and adjust the hours based upon representative data obtained from PECU Arrays. A default value for burning hours will be assigned to a new Switch Regime until 12 months data has been collected and the burn hours can be calculated.

Switch Regime	Switch Regime Description	Examples of Equipment Type
001	No switching – 24 Hour Burning	Traffic signals, traffic signs continuously burning, variable message signs, Pedestrian underpass/subway lighting (although some installations may be under time control), CCTV Systems and various detection equipment, Traffic Counters, and much of the miscellaneous equipment
010-036	Manual Switching Equipment - to be used for equipment which is manually switched on and off for pre-determined periods per day, month or year.	School Patrol Crossing Flashing Lights
040-050	Motorway Control Centre Switching: Message Signs and Signals	
100	Infrared detectors	These are typically in the base of bollards. The hours associated with IR detectors have been derived to be in excess of the most common PEC type (70/35). The offset values to sunrise and sunset is set to negative number.
200-399	Time Switch Control - - to be used for equipment which is controlled by a time switch that has pre-determined on/off periods per day, month or year.	Normal time switch control, Part night lighting controlled by time switch
400-499	Thermal Photo Cells (Positive Differential Switch "ON/OFF")	Thermal photo cell controllers are units in which the output of the photo cell is directly fed to the bi-metallic strip which provides both the switching and the time delay. These units generally have a positive differential for switching. For example, 100 Lux "ON" 200 Lux "OFF" although other switch "ON/OFF" levels are available.
500-599	Electronic Photo Cell Time Switch (Part Night Dimming Controller)	Equipment which is automatically switched on and then to a single preset dimming level for part of the night. These are given in GMT and clock times. Please refer to information given below on part-night dimming.
600-699	Hybrid Photo Cells (Negative Differential Switch "ON/OFF")	Hybrid photo cell controllers are units in which the output of the photo cell is fed to the bi-metallic strip via an electronic circuit which provides the time delay. The bi-metallic thermal strip only acts as switching mechanism. These units generally have a negative differential for switching. For example, 70 Lux "ON" 35 Lux "OFF" although other switch "ON/OFF" levels are available. See further detail on Hybrid/ Thermal PECUs given below.
700-799	Electronic Photo Cell Time Switch (Part Night Controller)	The actual switch "ON" times are controlled by a photo electric cell with the midnight switch “OFF” times being factory preset (alternative factory switching “OFF” times are available). An early morning switch “ON” factory preset for 05.00 (alternative factory switching “ON” times are available) with the switch “OFF” being controlled by the photo electric cell.
800-899	Electronic Photo Cells (Negative Differential Switch "ON/OFF")	Electronic photo cell controllers are units in which the output of a photo cell is fed to a switching mechanism (generally solid state but can be an electro mechanical relay) via an electronic circuit which provides the time delay. These units generally have a negative differential for switching. For example, 70 Lux "ON" 35 Lux "OFF" although other switch "ON/OFF" levels are available.
998-999	CMS Controlled Equipment	CMS controlled equipment only. The Switch Regime code shall be set to 999 to denote the use of switched equipment (i.e. normal operation is dusk to dawn), or 998

Switch Regime	Switch Regime Description	Examples of Equipment Type
		to denote equipment which is normally operating continuous.
A01 to AZZ	Multi-level Dimming Switch Regimes	For use with valid combinations of Multi-level dimming equipment.

A complete list of all Switch Regimes may be found on the BSC website.

7.1 Hybrid/Thermal Photoelectric Control Units (PECUs)

Unlike Electronic PECUs these items only use energy when the PECU is switched off, i.e. between dawn and dusk.

If an inventory is traded Non Half Hourly, in order to calculate an EAC it is necessary to determine the dawn to dusk operating hours. The hours to be used will be the continuous hours of 8,766 less the dusk to dawn hours shown in the Operational Switch Regimes table for a particular type of PECU, the remainder being the dawn to dusk operating hours.

Example
An inventory in the Midlands GSP Group has a total of 10,000 Thermal 70/140 PECUs, Switch Regime 421. The operating hours for this switch regime from dusk to dawn are 4,246, which means that each PECU uses 3 watts of electricity for 4,520 hours (8,766-4,246) annually between dawn and dusk. The EAC calculation is 10,000 items x 3 watts x 4,520 hours / 1,000 = 135,600 kWh allocated to the Dawn to Dusk profile.

If the PECUs are included in a Half Hourly inventory the Equivalent Meter will apply the circuit watts to the energy consumption calculations for those periods when the associated PECU in the Array is in a "switched off" state and zero watts when the PECU is logged as "switched on".

7.2 Part Night Dimming

Part night dimming allows customer to reduce their energy consumption and carbon emissions for part of the night. The power of the lamp will be reduced typically around midnight, returning to full power at the desired time, typically when traffic volumes increase again in the morning.

Under the current arrangements only a single dimming step can be accommodated outside of the Central Management System (CMS) or Multi Level Static Dimming (MLSD) processes as described in this document.

For more information on CMS please refer to the ELEXON CMS fact sheet on the website.

The codes required for single step part night dimming are the "500" Series. These are given in GMT and clock time. These have a calculated number of hours per annum that the lamp will be on at full power and at dimmed power. In order to use these reduced hours, a Charge Code with dimmed circuit watts will also need to be quoted on the customer's inventory (i.e. the last three digits of the Charge Code should be less than 100, such as 060).

Part night cells are a direct plug-in replacement for normal photocells. They can either simply switch the load 'ON', 'OFF', 'ON', 'OFF' during the night or 'ON', 'DIM', 'BRIGHT', 'OFF' according to the type of cell and the particular equipment they are controlling. In the middle of summer, the cells may not switch back 'ON' in the morning.

Typically, they calculate midnight by determining the mid-point of the last 3 on-off cycles then switch the load 'ON', 'DIM' and 'OFF' at the times already programmed into the cell at the time of manufacture.
A more sophisticated version is available that adjusts for the change from GMT to BST and back to GMT. The transition is triggered when the time that the cell is switched 'ON' during 24 hours equals the time the cell is switched 'OFF'.

E.G. Assuming a customer has a SELC 4000 ECONO 100 Watt Part Night Ballast (Dimmed 72% Circuit Watts). The customer wants to benefit from the dimming available. They contact their UMSO to inform them that they are now dimming their lamps from 23:00 to 05:00.

The customer would update the Switch Regime in their inventory to 530. They would also need to quote the correct Charge Code: 14 0100 5004 072.

To calculate the energy consumption (using the NHH hours published for the Eastern GSP Group) the following would apply;

Bright Hours = 1676, Dimmed Hours = 2475, Full Power Circuit Watts = 110, Dimmed Circuit Watts = 79

(1676 x 110) / 1000 + (2475 x 79) / 1000

= Dimmed Consumption 184.36 + Full Power Consumption 195.525

= 380kWh per annum (to the nearest kWh)

For a full list of Charge Codes that support dimming please see the Operational Information Charge Code spreadsheet).

7.3 Multi-Level Dimming Switch Regimes

A Customer (or the dimmer / ballast manufacturer) can apply for a Multi-Level Switch Regime from BSCCo. The application can have up to 8 different power levels, including the 100% level, in a 24 hour period. The application will state all the lamp ballast combinations that the Multi-Level device will be used in conjunction with, together with evidence from either the dimming device manufacturer or the lamp ballast manufacturer that the device will work with the proposed lamp/ballast combination and will dim accurately.

The applicant will also provide a letter of undertaking from the Multi-Level dimming device manufacturer that it will label the dimming devices with the Switch Regime information at the factory prior to delivery, and will ensure that the product cannot be re-programmed by the Customer.

Where a dimming device can be configured remotely or locally the Manufacturer (or its representative) will provide an undertaking to BSCCo that the Customer will not be provided with the ability to change the operation of the device. Furthermore, any changes undertaken on behalf of the Customer will be reported to both BSCCo and the host UMSO. The Customer must provide a new inventory immediately declaring the new Switch Regimes for a Valid Dimming Combination as defined in the Valid Dimming Combination Spreadsheet on the BSC website: Valid Dimming Combination Spreadsheet

If the combination of lamps and dimming devices is already a 'Valid Dimming Combination' as defined in the table on the BSC Website then the customer does not need to provide the test evidence from the Manufacturer. However, the letter of undertaking will still be required.

7.4 Motorway Operating Hours

Annual motorway operating hours will be calculated by the Highways Agencies based on actual operational information. These are updated periodically and issued to UMSOs.

8 Standard File Format for Detailed Inventories

8.1 General Comments

The inventory shall be submitted either as a fixed format text file or as a comma separated file with a line for each item of inventory.

The file format below is that which shall be supplied by the Customer or as otherwise agreed with the UMSO. The file format shall contain, as a minimum, the following information:

a) a list of items of Unmetered Equipment providing a unique identification and geographical location of each item;

b) the number of items of each category of Unmetered Equipment, classified by Charge Code and Switch Regime. Items not able to be so classified shall be identified and quantified separately;

c) the nominal rating for each Charge Code shall be indicated; and

d) the Switch Regime for each UMS equipment. Items not able to be so classified shall be identified separately.

For the purposes of this Unmetered Supplies Operational Information document, reference to the summary inventory means only the summarised information identified in (b), (c) and (d) above.

8.2 Standard File Format

Field No.	Name	Details Required	Type	Length	Start Position	Finish Position
1	Road Reference	e.g. Ordinance Survey Number	Text	8	1	8
2	Town, Parish, District		Text	30	9	38
3	Road Name		Text	30	39	68
4	Location		Text	20	69	88
5	Unit Type	Identifies the record as a lamp or a sign, etc. B = bollard; F = school crossing flashers; L = street light; M = miscellaneous; P = pillar; R = Refuge Beacon; S = sign light; T = traffic signal equip; Z = Belisha Beacon (Zebra)	Text	1	89	89
6	Unit Identity	Identity shown on unit (if any)	Text	12	90	101
7	CMS Unit Reference	Unique alphanumeric identifier of the CMS Unit (if applicable)	Text	12	102	113
8	Charge Code	Appropriate BSCP520 code	Numeric	13	114	126
9	No. of Items	Number of items of this charge code at this location	Numeric	3	127	129
10	Switch Regime	Appropriate BSCP520 code	Numeric	3	130	132
11	No. of Controls	Number of PECs or time switches on the item	Numeric	1	133	133
12	Control Charge Code	Appropriate BSCP520 code for the control device	Numeric	13	134	146
13	Ordinance Survey Grid ref 'East' or Latitude	This can be either in Latitude or Eastings	Text	11	147	157
14	Ordinance Survey Grid	This can be either in	Text	11	158	168

Field No.	Name	Details Required	Type	Length	Start Position	Finish Position
	ref 'North' or Longitude	Longitude or Northings				
15	Exit Point (Optional)	Y if Yes, N if No, U if Unknown	Text	1	169	169

The data, with the originator clearly identified, shall be either on a CD or attached to an e-mail. It may be a compressed .ZIP file but NOT a 'self extracting .EXE' archive.

8.3 Notes on Standard Inventory Format

This format has been developed to provide the information required for the operation of BSCP520 and the auditing requirements of Distribution Businesses in a standard way. It is expected to be of particular benefit to customers with unmetered equipment in more than one Distribution Licence area and to suppliers of inventory software who wish to provide a standard extract package for their customers.

It is NOT intended to supersede existing arrangements where both the customer and the Distribution Business agree to continue with a different format. With respect to the longer, 13 digit charge code, the Distribution Business will continue to support the 'old' seven digit Charge Code format for a period of time to be agreed with the UMS customer.

Field 1 Road Reference

National Street Gazetteer Unique Street Reference Number is the preferred format because it provides a better location than the combination of road name and town. It is also a very useful sort field when checking for duplicate records.

NSGIR codes are not available for motorways so the motorway reference shall be used e.g. M42, A1(M)

Field 3 Road Name

In the case of Motorways this will be the Motorway reference number e.g. M42, A1(M)

Field 5 Unit Type

B = bollard	F = school crossing flasher	L = street light
M= miscellaneous	P = pillar	R = refuge beacon
S = sign light	T = traffic signal equip	Z = zebra crossing

Field 7 CMS Unit Reference

Where this field is populated, the Switch Regime code in Field 10 shall be reported as either 998 or 999.

Field 11 No. of Controls

In the case of isolation pillars which only contain a time control device and no other load consuming device then the number of time control devices shall be entered here and the appropriate charge code in field 11. Zeros shall be entered in fields 8 & 9.

Fields 13, 14 Grid References or Latitude and Longitude

Data is to be inserted in these fields when available. The increasing use of GPS equipment provides very accurate location data which may supplement or be in addition to the location in Field 4.

Field 15 A 'Y' identifies if the equipment is connected directly to the Distribution network, a 'N' indicates fed via some private distribution network, i.e. a sign light looped from a lighting column, or column fed from private distribution cables.

8.4 Notes for Customers on declaring Charge Codes and Switch Regimes for Multi-level Static Dimming Devices

These notes are provided for the accurate declaration of Charge Codes and Switch Regimes for Multi-Level Static Dimming devices:

Dimming devices integral to the ballast:

- The Charge Code for the dimming-equipped lamp/ballast must be declared in Field 8;
- A valid alpha-numeric Switch Regime that corresponds to the operation of the device will be declared in Field 10; and
- A Control Charge Code in the 99 series that accounts for any stand by power used by the ballast will be declared in Field 12. It also includes the power of a standard photocell so please note the 99… charge code will be used instead of a standard photocell charge code.

Dimming devices that are stand alone or integral PECU:

- The standard Charge Code for the lamp/ballast(s) must be declared in Field 8;
- A valid alpha-numeric Switch Regime that corresponds to the operation of the device will be declared in Field 10; and
- The Charge Code for the dimming device in the 99 series will be declared as the Control Charge Code in Field 12. Please note a separate charge code for the photocell is not required as its consumption is included in the 99… control charge code.

Note: Valid Combinations for declaration can be found in the Valid Dimming Combination Spreadsheet on the BSC Website: Valid Dimming Combination Spreadsheet

8.5 Standard File Format for Valid Dimming Combinations for UMSOs and MAs

On each new publish of the Valid Dimming Combination Spreadsheet a flat file will be provided to the UMSOs and published on the BSC website in the following . CSV format.

Field No.	Name	Details Required	Mandatory	Type	Length	Start Position	Finish Position
1	Switch Regime Code	A Code defining the Switch Regime for the Valid Dimming Combination	M	Alphanumeric	3	1	3
2	On Event Time or PECU	A time in the format '00:00', 'PECUS' if the on event is PECU controlled or SS+NN if an algorithm or other calculation is used where NN is the offset minutes to be used	M	TEXT	5	5	9
3	On Energy Level	A level from 001 to 100 indicating the Dimming Level	M	Alphanumeric	3	11	13
4	Dim Level 2 Time	A Time in the Format '00:00'	M	TEXT	5	15	19
5	Dim Energy Level 2	A level from 001 to 100 indicating the dimming level.	M	Alphanumeric	3	21	23
6	Dim Level 3 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	25	29
7	Dim Energy Level 3	A level from 001 to 100 indicating the dimming level or 'UUU' if unused	M	Alphanumeric	3	31	33
8	Dim Level 4 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	35	39
9	Dim Energy Level 4	A level from 001 to 100 indicating the dimming level or 'UUU' if unused	M	Alphanumeric	3	41	43

Field No.	Name	Details Required	Mandatory	Type	Length	Start Position	Finish Position
10	Dim Level 5 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	45	49
11	Dim Energy Level 5	A level from 001 to 100 indicating the dimming level or 'UUU' if unused	M	Alphanumeric	3	51	53
12	Dim Level 6 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	55	59
13	Dim Energy Level 6	A level from 001 to 100 indicating the dimming level or 'UUU' if unused	M	Alphanumeric	3	61	63
14	Dim Level 7 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	65	69
15	Dim Energy Level 7	A level from 001 to 100 indicating the dimming level or 'UUU' if unused	M	Alphanumeric	3	71	73
16	Dim Level 8 Time	A time in the format '00:00' or 'NULLS' if no further events.	M	TEXT	5	75	79
17	Dim Energy Level 8	A level from 001 to 100 indicating the dimming level or 'UUU' if unused.	M	Alphanumeric	3	81	83
18	Off Event Time or PECU	A time in the format '00:00', 'PECUS' if the on event is PECU controlled or SR+NN if an algorithm or other calculation is used where NN is the offset minutes to be used	M	TEXT	5	85	89
19	Dimmer Charge Code with PECU 'uplift' or PECU with Standby power 'uplift'	13 digit charge code for standalone dimmers or a 99 Series Code with uplift for stand-by power of controls integral to the ballast.	M	Numeric	13	91	103
20	Lamp/ Ballast Charge	13 digit charge code for		Numeric	13	105	117

Field No.	Name	Details Required	Mandatory	Type	Length	Start Position	Finish Position
	Code	Dimmable Lamp/ Ballast or Dimmable Lamp/ Ballast with built-in control	M				

Note: Other Valid Lamp/ Ballast Combinations will be provided on separate lines of the file.