# Communications Hub Supporting Information

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|---|---|
| **Version:** | **V1.~~7~~6** |
| **Date:** | **~~25~~ ~~April~~10 Decmeber 2019** |
| **Author:** | **DCC** |
| **Classification:** | **DCC Public** |

# 1. Document History

## 1.1 Version Control

1.1.1 In accordance with clause 1.5 of CH Handover Support Materials, DCC shall only make material modifications to this CH Supporting Information where it has:

a) undertaken reasonable consultation with stakeholders regarding the proposed modification;

b) given due consideration to, and taken into account, any consultation responses received; and

c) published a statement of its reasons for the modification together with copies of any consultation responses received that are not marked as confidential.

1.1.2 DCC further commits to publish an up-to-date copy of the CH Supporting Information on its website as soon as reasonably practicable following any such modification.

1.1.3 The CH Supporting Information will be published on the DCC web site and now includes the Advanced Shipment Notification (ASN) File Specification that was previously defined in "Guidance Note - Advanced Shipment Notification v2.1".

## 1.2 Document Revisions

| Version | Comments | Date Issued |
|---|---|---|
| 1.0 | Post consultation version | 30 June 2015 |
| 1.1 | Changes to the technical specification of Communications Hubs, the inclusion of information on aerial types and wait timings. | March 2016 |

| Version | Comments | Date Issued |
|---|---|---|
| 1.2 | Post-consultation changes following review comments. | June 2016 |
| 1.3 | Updated to align with changes identified in testing.<br>Included the ASN File specification that was previously defined in “Guidance Note - Advanced Shipment Notification v2.1”.<br>Barcode format updated to align with latest technical specification of Communications Hubs<br>LED state information updated to align with latest technical specification of Communications Hubs<br>Included the aligned view of Order and Consignment Status values defined in CHHSM and the exact terms used in OMS systems for CSP-N and CSP-C&S regions.<br>Removed old references to CHSM | July 2017 |

| Version | Comments | Date Issued |
|---|---|---|
| 1.4 | Updated to align with the naming convention for CH, WAN and HAN Variants.<br>Dual band CH Variant labels added and 'Variant 450' CH Variant label removed.<br>Updated 'CHF ID' field format, removed comma from 'Manufacturer country and date of manufacture' field and added data samples in Table 1 - ASN Field Specifications.<br>New DCC document template used for the cover page, headers and footers.<br>Updated to provide information on Mesh Aerial Types for South and Central Regions.<br>Updated and expanded Central and South LED state indicators – Table 4 split into LED functional groupings for ease of reference | February 2018 |
| 1.5 | Updated to include instructions on the installation of Aerial Types with an Intimate Communication Hub Interface Specifications (ICHIS) Host emitting greater than 3.5dB noise interference in the 900MHz frequency band. | December 2018 |
| 1.6 | Updated to specify changes to the SM WAN LED behaviour for North Region Communications Hubs. | April 2019 |
| 1.7 | Updated to specify consequences of not following Communications Hub wait timings for the South and Central region in Appendix C | December 2019 |

## Contents

# 2. Introduction

## 2.1 Document Purpose

2.1.1 This document provides additional information for SEC Parties in relation to the packaging, labelling, Advanced Shipment Notification file formats, CH Status Information of Communications Hubs and outline descriptions for aerial types. Such information will provide Parties with additional technical detail and guidance to that set out in Appendices [H and I] of the SEC (these being the CH Handover Support Materials and the CH Installation & Maintenance Support Materials respectively).

2.1.2 The supporting information provided in this document includes:

a) information regarding Communications Hub labelling;

b) Advanced Shipment Notification file formats;

c) additional graphical information supporting the definition of Significant Metallic Obstruction;

d) a description of the way in which LED indicators depict the operational status of a Communications Hub;

e) a description of the aerial types DCC make available within the South and Central Regions; and

f) a definition of the wait times necessary to initiate reboot functionality and to completely power down the Communications Hub.

# 3. Labelling and ASN format

3.1.1 Annex E of CH Installation and Maintenance Support Materials describes the equipment which the DCC will supply, by region, in relation to its fulfilment of Communications Hub Orders.

## 3.2 Communications Hub Labels

3.2.1 The DCC will meet its obligation in clause 5.4 of the CH Handover Support Materials for it to permanently mark the identification information onto the front face of each Communications Hub, by permanently marking the Communications Hub labelling information specified in Annex A of the CH Handover Support Materials onto the front face of each Communications Hub. As detailed in the aforementioned clause 5.4, the front face of the Communications Hub is the face which contains the M4 retaining screw.

3.2.2 The Communication Hub labelling shall be formatted and positioned as follows:

a) the CHF Identifier shall be located on the front face in Code 128 barcode format with human-readable plain text below that barcode;

b) the CH Variant shall be located above the CHF Identifier;

c) both the CHF Identifier and CH Variant information shall be visible directly through a cut-out in the Communications Hub packaging;

d) the GPF Identifier shall be in Code 128 barcode format with human-readable plain text below this barcode;

e) the GPF Identifier shall be located to assist suppliers in avoiding mis-scanning; wherever practicable this will be below the bottom of the CHF Identifier label and offset to the right of the centre of the CHF Identifier label; and

f) the Zigbee MAC address as specified by GBCS shall be presented in human-readable form and located on the front face of the Communications Hub. This code is the same as the GPF Identifier and therefore does not appear as a separate item.

3.2.3 The CH Variant labels shall be as follows:

a) South Region and Central Region

- SKU1 Cellular
- SKU2 Cellular + Mesh
- SKU3 SIMCH
- Cellular DB
- Cellular + Mesh DB
- SIMCH DB

b) North Region

- Standard 420
- Standard 420 DB
- Variant 450 DB

## 3.3 ASN File Format

3.3.1 The DCC shall provide the ASN file for Communications Hub and Aerial deliveries in CSV file format.

3.3.2 The field formats for the data items in the ASN file are further described in Appendix A of this document.

# 4. Metallic Obstructions

## 4.1 Significant Metallic Obstructions

4.1.1 Effective operation of the wireless SM WAN communications technology of the Communications Hub requires that it is not installed in a location where:

a) the Communications Hub is located within an earthed, metallic enclosure (i.e. a Faraday cage); or

b) the Communications Hub is installed in a location with a Significant Metallic Obstruction on 3 or more sides, relevant to the top, front, left and right faces of the Communications Hub (with the front face being the face that holds the M4 retaining screw).

4.1.2 With the measurements as illustrated in Figure 1, Significant Metallic Obstruction means:

a) for the North Region, any metallic object where any dimension 'X' parallel to the relevant face of the Communications Hub is 32cm or greater and any second dimension 'Y' parallel to the relevant face of the Communications Hub is 18cm or greater, and where the object is situated within distance 'D' of 18cm or less of that face when installed; or

b) for the Central Region and South Region, any metallic object where any dimension 'X' parallel to the relevant face of the Communications Hub is 16cm or greater and any second dimension 'Y' parallel to the relevant face of the Communications Hub is 8cm or greater, and where the object is situated within distance 'D' of 8cm or less of that face when installed.

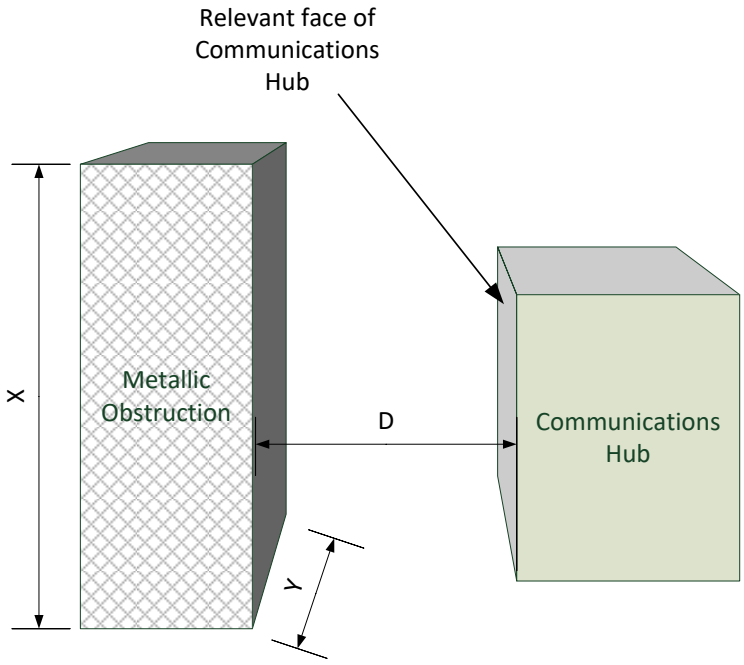


**Figure 1: Metallic Obstruction**

# 5. CH Status Information

5.1.1 The operational status of the Communications Hub shall be indicated by the LEDs as set out in Appendix B of this document.

5.1.2 The wait timings required to initiate reboot functionality and completely power down the Communications Hub are set out in Appendix C of this document.

## 5.2 CH Status Information for the North Region

5.2.1 For the North Region, Communications Hubs will indicate their current operational status via two LED indicators clearly visible on the front face of the Communications Hub (all CH Variants), which will provide information regarding;

a) Power and SM WAN connection state (WAN); and

b) Home Area Network connection state (HAN).

## 5.3 CH Status Information for the Central Region and South Region

5.3.1 For the Central Region and South Region, Communications Hubs will indicate their current operational status via five LED indicators clearly visible on the front face of the Communications Hub (all CH Variants) which will appear in this order and provide information regarding the following:

a) Device power/operating state (SW);

b) SM WAN connection state (WAN);

c) Wireless mesh connection state for a cellular + mesh or SIMCH Device Model (MESH);

d) HAN connection state (HAN); and

e) Gas Proxy Function (GAS).

5.3.2 Communications Hubs provided by the DCC in the Central Region and South Region will also have a ‘signal checker’ operational status, used to indicate SM WAN signal strength using the LED indicators. This state will be enabled automatically for a period of 1 minute following the connection of a cellular aerial, to support SEC parties in optimisation of aerial positioning, as described in Section A.2 of CHIMSM (Installation of Communications Hub aerials - Central Region and South Region).

5.3.3 In ‘signal checker’ mode, the number of LEDs lit on a Communications Hub indicates the relative signal strength to that Communications Hub. The greater the number of LEDs lit, the greater the signal strength. A minimum of one LED lit is required to indicate that the Communications Hub is able to connect to the SM WAN.

# 6. Auxiliary Equipment

## 6.1 Aerial Types – South and Central Region

6.1.1 The DCC shall provide aerial types in the South and Central Regions as described below. More than one aerial model may be provided within these type specifications and full details are provided through the manufacturer data sheets which will be published to Parties by DCC as part of an aerial information pack.

6.1.2 Data sheets are published using the following path on the DCC web site www.smartdcc.co.uk:

> Implementation > Design and Assurance > Communications Hubs > Communications Hubs Product Information

6.1.3 An introductory overview of the aerial types is as follows:

a) T1 Aerial Type. This cellular aerial type is low gain. It is estimated that 6% of all installations (approximately 57-60% of Mesh Communications Hub installations) will require this aerial type. There are two aerial models of this type and both are supplied with an aerial lead. The length of lead and dimensions of the aerial models are supplied in the manufacturer data sheets.

b) T2 Aerial Type. This cellular aerial type is high gain. It is estimated that 4% of all installations (approximately 37-40% of Mesh Communications Hub installations) will require this aerial type. There are two aerial models of this type and both are supplied with an aerial lead. The length of lead and dimensions of the aerial models are supplied in the manufacturer data sheets.

c) T3 Aerial Type. This cellular aerial type is high gain. It is estimated that less than 0.5% of all installations (approximately 3-5% of Mesh Communications Hub installations) will require this aerial type. The aerial may be externally mounted. The size of the T3 models varies and will in all cases conform to planning guidance. There are two aerial models of this type and both are supplied with an aerial lead. The length of lead and dimensions of the aerial models are supplied in the manufacturer data sheets.

d) M1 Aerial Type. This mesh aerial type is low gain. It is estimated that less than 0.25% of all installations will require this aerial type. There is one model of this type and it is supplied with an aerial lead. The length of lead and dimensions of the aerial models are supplied in the manufacturer data sheets. The M1 will only be utilised with SIMCH devices.

e) M2 Aerial Type. This mesh aerial type is high gain. It is estimated that less than 0.25% of all installations will require this aerial type. There is one model of this type and it is supplied with an aerial lead that allows it to be externally mounted. The length of lead and dimensions of the aerial model are supplied in the manufacturer data sheets. The M2 model will in all cases conform to planning guidance. The M2 will only be utilised with SIMCH devices. The M2 Aerial Type will always be installed externally. In a very small number of cases it could be installed internally but only where the building layout and fabric has been assessed beforehand by appropriately trained radio engineers to determine its suitability.

## 6.2 Installation of Aerial Types with an ICHIS Host emitting greater than 3.5dB (but less or equal to 6.5dB) noise interference in the 900MHz frequency band.

6.2.1 For the period up to 30 September 2019, an ICHIS Host that emits a level of Radio Frequency (RF) noise interference greater than 3.5dB within the 900MHz frequency band shall not be installed where the SM WAN Coverage Database recommends that a SKU2 Communications Hub and Aerial be used.

6.2.2 For the period up to 30 September 2019, an ICHIS Host that emits a level of RF noise interference greater than 3.5dB in the 900MHz frequency band that is to be installed deep indoors (more than one wall between the host and outside) shall be installed using a SKU2 Communications Hub and T2 Aerial Type.

# Appendix A. ASN Specification

## A.1. General Information

A.1.1. As defined in the CHHSM, the ASN files will be a compliant CSV file.

A.1.2. As the aerials can only be ordered for Central and South regions, the DCC will only supply the Aerial ASN files for Central and South regions and hence the aerial specification is only applicable for Central and South regions.

A.1.3. The ASN record for aerials can contains both T1 (low gain aerial) and T2 (high gain aerial) types of aerials. These aerials are not part of the Comms Hub and hence are ordered separately as part of CH Auxiliary Equipment ordering process. Please refer to CHHSM for further information on these aerial types.

A.1.4. There will be exactly one ASN file for each consignment. This implies that there will be a separate ASN file for Comms Hubs and Aerials.

## A.2. ASN Fields

A.2.1. Table 1 defines the ASN field name, format and other data requirements using following columns:

a) **Field Name:** Defines the field name as appeared in the header record.

b) **Field Format:** Defines the field type and length

c) **Data Requirement:** Provides additional data requirements including

- Additional data rules and constraints such as enumerated values
- Whether applicable to Communication Hub devices or Aerials or both
- Whether applicable to North Region or Central and South Regions or both
- Whether enclosed within double quotes or not

- Any reference to CHSM or other SEC documents
- Any other information, as applicable

d) **Communication Hub Sample Data:** Provides a sample data for the relevant field in ASN file for Communications Hub. Where relevant, regional examples are provided. These samples are supplied to illustrate to DCC Users what the data will look like. They are not exhaustive and are subject to change as long as compliant with required format.

e) **Aerial Sample Data:** Provides a sample data for the relevant field in ASN file for Aerial. These samples are supplied to illustrate to DCC Users what the data will look like. They are not exhaustive and are subject to change as long as compliant with required format.

**Table 1: ASN Field Specifications**

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| 1 | CHF ID | Text (max 16) | **Only used for Communications Hub**<br>An IEEE EUI-64 compliant media access control address comprising eight groups of two hexadecimal digits.<br>Hyphens are not used to delimit the hexadecimal digits to ensure alignment with scanned device barcode artwork.<br>Enclosed in “”. | For all regions:<br>“10ABAC12122324C5”, “8873840100009772” | Not applicable for North region<br>For Central and South regions:<br>“” |
| 2 | Communications Hub WAN Variant | Text (max 50 chars) | The current valid values for Communications Hub are:<br>North region:<br>“Standard 420”<br>“Standard 420 DB” | For North region:<br>“Standard 420”<br>For Central and South regions:<br>“SKU1 Cellular” | Not applicable for North region<br>For Central and South Regions:<br>“Type 1 Cellular antenna (T1)” |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| | | | "Variant 450 DB"<br>Central and South regions:<br>"SKU1 Cellular"<br>"SKU2 Cellular + Mesh"<br>"SKU3 SIMCH"<br>"Cellular DB"<br>"Cellular + Mesh DB"<br>"SIMCH DB"<br>The current valid values for Aerial are:<br>North region:<br>""<br>Central and South regions:<br>"Type 1 Cellular antenna (T1)"<br>"Type 2 Cellular antenna (T2)"<br>Please note that the above values can change in future to match values specified in section 3.2.3 of this document<br>Enclosed in "". | | |
| 3 | GPF ID | Text (max 23) | **Only used for Communications Hub**<br>An IEEE EUI-64 compliant media access control address comprising eight groups of two hexadecimal digits.<br>Hyphens are not used to delimit the hexadecimal digits to ensure alignment with | For all regions:<br>"10ABAC12122324C5" | Not applicable for North region<br>For Central and South regions:<br>"" |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| | | | scanned device barcode artwork.<br>Enclosed in "". | | |
| 4 | ZigBee MAC Address | Text (max 23) | **Only used for Communications Hub**<br>An IEEE EUI-64 compliant media access control address comprising eight groups of two hexadecimal digits.<br>Hyphens are not used to delimit the hexadecimal digits to ensure alignment with device artwork.<br>Enclosed in "". | For all regions:<br>"10ABAC12122324C5" | Not applicable for North region<br>For Central and South regions:<br>"" |
| 5 | SM WAN Identifier | Text (max 50 chars) | **Only used for Communications Hub for North region**<br>Unique identifier also referred to as FlexNet ID or REPID by North region CSP<br>Will be blank for Central and South region-issued ASN files<br>Enclosed in "" (for text and blank entries). | For North region:<br>"110342210"<br>For Central and South regions:<br>"" | Not applicable for North region<br>For Central and South regions:<br>"" |
| 6 | DCC order reference | Text (max 50 chars) | **Only used for Communications Hub**<br>OMS generates this for an order so that DCC has an order reference<br>Enclosed in "". | For North region:<br>"DCC011"<br>For Central and South regions:<br>"a00250000020zhoAAA" | Not applicable for North region<br>For Central and South regions:<br>"" |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| 7 | Party order reference | Text (max 50 chars) | Alpha or numeric text<br>The Party Reference Order Number in the ASN file will be populated by the order reference number for the corresponding order. As both the CSP solutions manage the order reference number differently, the value of this field is interpreted differently for each CSP. For orders placed for Central and South CSP Regions, the value of this field is taken from the OMS generated reference number whereas for order placed for North CSP Region the value of this field is same as the order reference number provided by the Users.<br>Enclosed in "". | For North region:<br>"COP0012000"<br>For Central and South regions:<br>"5108" | Not applicable for North region<br>For Central and South regions:<br>"5108" |
| 8 | Party consignment reference | Text (max 50 chars) | Enclosed in "". | For North region:<br>"98762664"<br>For Central and South regions:<br>"ORDER00005108-CONS1" | Not applicable for North region<br>For Central and South regions:<br>"ORDER00005108-CONS1" |
| 9 | Delivery Location | Text (max 200 chars) | A free formatted address consisting of one of more address fields (e.g. house number, house name, company name, SEC party signifier, street name, town, postcode etc.), each of them separated by a space (and not a comma)<br>Enclosed in "". | For North region:<br>"PAC001 CV11FX"<br>For Central and South regions:<br>"12 Smithford Way Coventry CV11FX" | Not applicable for North region<br>For Central and South regions:<br>"12 Smithford Way Coventry CV11FX" |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| 10 | Scheduled Delivery Date and time | DD/MM/YYYY HH:MM | Not enclosed in “”. | For all regions:<br>31/03/2016 10:00 | Not applicable for North region:<br>For Central and South regions:<br>31/03/2016 10:00 |
| 11 | Firmware version number | Text (max 50 chars) | **Only used for Communications Hub**<br>As per CPL: “This string is a hexadecimal representation of the OTA Header 'File Version' field which is an unsigned 32 bit integer (so representable as 4 octets).”<br>Hexadecimal alpha or numeric text<br>Colons are not used to delimit the hexadecimal digits.<br>Hexadecimal values are to be expected in this field.<br>Enclosed in “”. | For all regions:<br>"12345678"<br>or<br>"AAAAAAAA" | Not applicable for North region<br>For Central and South regions:<br>“” |
| 12 | Hardware version number | Text (max 50 chars) | **Only used for Communications Hub**<br>As per CPL: “This string is a concatenation of three fields; Model_Identifier, Hardware_Version.Version, HardwareVersion.Revision,<br>where<br>• Model_Identifier is an unsigned 16 bit number, so representable as 2 octets i.e. as XXXX, where X is 0 to 9 or A to F;<br>• Hardware_Version.Version is an unsigned 8 bit number, so representable | For all regions:<br>“00A122FF” | Not applicable for North region<br>For Central and South regions:<br>“” |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| | | | as 1 octet i.e. as XX, where X is 0 to 9 or A to F; and<br>• HardwareVersion.Revision is an unsigned 8 bit number, so representable as 1 octet i.e. as XX, where X is 0 to 9 or A to F.<br>Note-1: Hexadecimal values are to be expected in this field.<br>Note-2: Colons are not used to delimit the hexadecimal digits<br>Note-3: All octets must be completed. In other words, where there is no version or revision this should be identified as 00, for example:<br>• AF2C0000 = no version or revision<br>• AF2C0900 = no revision<br>• AF2C0004 = no version<br>Enclosed in "". | | |
| 13 | Device configuration identifier | Text (max 50 chars) | **Only used for Communications Hub for North region**<br>Will be blank for Central and South region-issued ASN files<br>Enclosed in "" (for text and blank entries). | For North region:<br>"DCI001"<br>For Central and South regions:<br>"" | Not applicable for North region<br>For Central and South regions:<br>"" |
| 14 | Manufacturer country and date of manufacture | Text (max 200 chars) | **Only used for Communications Hub**<br>A text string in the format "<Item1> <Item2>"<br>Where:<br>• Item1 is the manufacture and country pair separated | For North region:<br>"106C Romania 04/04/2016"<br>For Central and South regions: | Not applicable for North region<br>For Central and South regions:<br>"" |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| | | | by space. The current valid values are:<br>○ North Region<br>▪ 106C Romania<br>○ Central and South Regions<br>▪ Toshiba CN<br>▪ Wistron TW<br>• Item2 is the date of device manufacture in DD/MM/YYYY format<br>Space (and not comma) is used as a separator between Item1 and Item2<br>Enclosed in "". | "Toshiba CN 21/09/2015" | |
| 15 | Batch number | Text (max 50 chars) | **Only used for Communications Hub**<br>Enclosed in "" as per section 5.1 and subsection vi of this document | For North region:<br>"40416"<br>For Central and South regions (Toshiba):<br>"ICM1240365"<br>For Central and South regions (Wistron):<br>"PA701240001100027" | Not applicable for North region<br>For Central and South regions:<br>"" |
| 16 | Reconditioned status | Text (max 3) | Valid values for Communications Hub are:<br>"Yes"<br>"No"<br>Valid values for Aerials are:<br>"No"<br>Enclosed in "". | For all regions:<br>"Yes"<br>Or<br>"No" | Not applicable for North region<br>For Central and South regions:<br>"No" |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| 17 | Pallet identifier | Text (max 50 chars) | Enclosed in "". | For North region:<br>"PAL01545"<br>For Central and South regions (Toshiba):<br>"169701385600237297"<br>For Central and South regions (Wistron):<br>"PA51021002" | Not applicable for North region<br>For Central and South regions (Wistron):<br>"PA51021002" |
| 18 | Quantity of cartons on the pallet | Number (max 2 digits) | Up to the values specified in Table 2; Communications Hub delivery packaging Annex B. Communications Hub Pallet and Carton Quantities, Appendix H – CH Handover Support Materials<br>Not Enclosed in "". | For North region:<br>32<br>For Central and South regions:<br>64 | Not applicable for North region<br>For Central and South regions:<br>2 |
| 19 | Carton Identifier | Text (max 50 chars) | Enclosed in "". | For North region:<br>"PACK245824"<br>For Central and South regions (Toshiba):<br>"106970138560000014"<br>For Central and South regions (Wistron):<br>"CSM142081000AA" | Not applicable for North region<br>For Central and South regions (Wistron):<br>"CSM142081000AA"<br>For Central and South regions (Panorama):<br>"60688/1/56" |
| 20 | Quantity of Communications | Number (max 3 digits) | Up to the values specified in Table 2; Communications Hub delivery packaging Annex B. Communications | For North region:<br>28 | Not applicable for North region |

| No | Field Name | Field Format | Data Requirement | Communications Hub Sample Data | Aerial Sample Data |
|---|---|---|---|---|---|
| | Hubs in carton | | Hub Pallet and Carton Quantities, Appendix H – CH Handover Support Materials<br>Addendum for Central and South regions: up to 14 for Cellular WAN Variant' up to 10 for Mesh WAN Variant<br>Note: No leading zeros are allowed in this field; e.g. the 32, 64 and not 032, 064 are the valid values.<br>Not enclosed in "". | For Central and South regions:<br>14 or 10 | For Central and South regions:<br>100 |
| 21 | Quantity of pallets in consignment | Number (max 2 digits) | Up to the values specified in Table 2; Communications Hub delivery packaging Annex B. Communications Hub Pallet and Carton Quantities, Appendix H – CH Handover Support Materials<br>Not enclosed in "". | For North region:<br>52<br>For Central and South regions:<br>40 | Not applicable for North region<br>For Central and South regions:<br>2 |

## A.3. Compliant ASN File Examples

### A.3.1. Communications Hubs

#### A.3.1.1. North Region

A.3.1.1.1. The following is an example of a Communications Hub ASN CSV file issued by North region CSP.

```
"CHF ID","Communications Hub WAN Variant","GPF ID","Zigbee MAC
Address","SM WAN Identifier","DCC order reference","Party order
reference","Party consignment reference","Delivery Location","Scheduled
Delivery Date and time","Firmware version number","Hardware version
number","Device configuration identifier","Manufacturer country and date
of manufacture","Batch number","Reconditioned status","Pallet
identifier","Quantity of cartons on the pallet","Carton
Identifier","Quantity of Communications Hubs in carton","Quantity of
pallets in consignment"

"E4FED90022E92C1F","Standard
420","E4FED90100116482","E4FED90100116482","110342210","DCC011","COP0012
000","98762664","Chester",18/04/2015
```

17:00,"AAAAAAAA","XXXXXXXX","DCI001","106C Romania
04/04/2016","40416","No","PAL01545",32,"PACK245824",28,52

"E4FED90022E92C20","Standard
420","E4FED90100116483","E4FED90100116483","AI-CHB-
C01","DCC011","COP0012000","98762664","Chester",18/04/2015
17:00,"AAAAAAAA","XXXXXXXX","DCI001","106C Romania
04/04/2016","40416","No","PAL01545",32,"PACK245824",28,52

### A.3.1.2. Central and South Regions

#### A.3.1.2.1. The following is an example of a Communications Hub ASN CSV files issued by the Central and South region CSP.

"CHF ID","Communications Hub WAN Variant","GPF ID","Zigbee MAC
Address","SM WAN Identifier","DCC order reference","Party order
reference","Party consignment reference","Delivery Location","Scheduled
Delivery Date and time","Firmware version number","Hardware version
number","Device configuration identifier","Manufacturer country and date
of manufacture","Batch number","Reconditioned status","Pallet
identifier","Quantity of cartons on the pallet","Carton
Identifier","Quantity of Communications Hubs in carton","Quantity of
pallets in consignment"

"000B6B01A6223B88","SKU1
Cellular","000B6BAAA6223C01","000B6BAAA6223C01","","a00250000020zhoAAA",
"5108","ORDER00005108-CONS1","15 Bath Road Slough SL1 1ED",31/10/2015
15:00,"AAAAAAAA","XXXXXXXX","","Toshiba CN
21/09/2015","ICM1240365","No","169701385600237297",64,"06970138560000001
",10,40

"000B6B01A6223B86","SKU1
Cellular","000B6BAAA6223C02","000B6BAAA6223C02","","a00250000020zhoAAA",
"5108","ORDER00005108-CONS1","15 Bath Road Slough SL1 1ED",31/10/2015
15:00,"AAAAAAAA","XXXXXXXX","","Toshiba CN
21/09/2015","ICM1240365","No","PA51021002",64,"CSM142081000AA",10,40

## A.3.2. Aerials

### A.3.2.1. T1 Aerial Type

#### A.3.2.1.1. The following is an example of a T1 Aerial Type ASN CSV file issued by Central and South region CSP.

"CHF ID","Communications Hub WAN Variant","GPF ID","Zigbee MAC
Address","SM WAN Identifier","DCC order reference","Party order
reference","Party consignment reference","Delivery Location","Scheduled
Delivery Date and time","Firmware version number","Hardware version
number","Device configuration identifier","Manufacturer country and date
of manufacture","Batch number","Reconditioned status","Pallet
identifier","Quantity of cartons on the pallet","Carton
Identifier","Quantity of Communications Hubs in carton","Quantity of
pallets in consignment"

```
"","Type 1 Cellular antenna (T1)","","","","","00009999","ORDER00009999-
CONS9","Address County Post Code",02/06/2016
13:00,"","","","","","No","4560000003424567890",2,"Carton1",100,2
```

### A.3.2.2. T2 Aerial Type

#### A.3.2.2.1. The following is an example of a T2 Aerial Type ASN CSV file issued by Central and South region CSP.

```
"CHF ID","Communications Hub WAN Variant","GPF ID","Zigbee MAC
Address","SM WAN Identifier","DCC order reference","Party order
reference","Party consignment reference","Delivery Location","Scheduled
Delivery Date and time","Firmware version number","Hardware version
number","Device configuration identifier","Manufacturer country and date
of manufacture","Batch number","Reconditioned status","Pallet
identifier","Quantity of cartons on the pallet","Carton
Identifier","Quantity of Communications Hubs in carton","Quantity of
pallets in consignment"

"","Type 2 Cellular antenna (T2)","","","","","00009999","ORDER00009999-
CONS9","Address County Post Code",02/06/2016
13:00,"","","","","","No","4560000003424567890",2,"Carton2",100,2
```

# Appendix B. LED State Indicators

## B.1. Operating State

B.1.1. Table 2 details the LED State Indicators 'on and off' times for each of the three operating states – "normal", "transitional" and "error". The corresponding flashing frequency is described as being low, medium or high frequency flashing.

**Table 2: Communications Hub LED state indicators - frequency (all LEDs)**

| Description | LED ON Time | LED OFF Time | Indication |
|---|---|---|---|
| HIGH FREQUENCY FLASH (HFF) | 100ms | 500ms | Indicates error operating state |
| MEDIUM FREQUENCY FLASH (MFF) | 100ms | 2000ms | Indicates transitional operating state |
| LOW FREQUENCY FLASH (LFF) | 100ms | 5000ms | Indicates normal operating state |

## B.2. North Region - Communications Hub LED Descriptions

B.2.1. In the North Region, Communications Hubs will have the LED functionality as described in this sub section.

B.2.2. As specified, a Communication Hub will have, on the front face of the enclosure, two LED indicators, with the following labels:

a) WAN: status of connection to the SM WAN network

b) HAN: status of connection to the HAN

B.2.3. Of the two LEDs on the front of the Communications Hub, the LED on the left (nearest the securing screw) shall indicate the Communications Hub power and SM WAN connection statuses and the LED on the right shall

indicate the status of the Communications Hub HAN connection. The SM WAN LED and the HAN LED shall be bi-colour (green and red).

B.2.4. Table 3 shows the operational status table for Region North Communications Hubs.

**Table 3: Region North Communications Hub operational status table for all states**

| *Operational status* | | Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| Power State | *Power off* | No light | N/A | Check power to the Comms Hub and if power is on, replace Comms Hub. Repeat failure indicates ICHIS host issue. |
| | *Power on, device initialising (normal operating state)* | SM WAN / Power LED SOLID GREEN | Maximum 30 seconds | Perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Hub on repeat failure |
| | *Power on, device in error state (error state)* | SM WAN / Power LED HIGH FREQUENCY GREEN | Maximum 5 seconds (before automatic reboot) | Perform reset of Comms Hub (see Appendix C) if state does not change. Replace Hub on repeat failure |
| SM WAN State | *SM WAN initialising (normal operating state)* | N/A (See Power on, device initiating) | N/A (See Power on, device initiating) | See Power on, device initiating |
| | *Attempting to connect to the SM WAN (normal operating state)* | SM WAN / Power LED MEDIUM FREQUENCY GREEN | Maximum 5 minutes | Party may utilise a separated ICHIS-compliant host (cradle) or undertake the CH *No SM WAN Coverage Installation Procedure* where duration is exceeded. |
| | *SM WAN connected (normal operating state)* | SM WAN / Power LED LOW FREQUENCY GREEN | N/A - final normal operating state | N/A |

| *Operational status* | | Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *SM WAN dis-connected / attempting to re-connect* | SM WAN / Power LED MEDIUM FREQUENCY GREEN | Continuous until re-connected | Update the DCC Incident Record to indicate any recovery steps taken and the continued dis-connection to the SMWAN |
| | *SM WAN error (normal operating state)* | SM WAN / Power LED HIGH FREQUENCY GREEN | Maximum 5 seconds (before automatic reboot) | Perform reset of Comms Hub (see Appendix C) if state does not change. Replace Hub on repeat failure |
| HAN State | *Power off, HAN not functioning* | No light | N/A | Check power to the Comms Hub and if power is on, replace Comms Hub. Repeat failure indicates ICHIS host issue. |
| | *HAN initialising (normal operating state)* | HAN LED MEDIUM FREQUENCY RED | Maximum 60 seconds | Perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Hub on repeat failure |
| | *HAN initialised, no HAN devices in CHF Device Log (normal operating state)* | HAN LED SOLID GREEN | N/A - pending Device Log update | Take necessary steps to add HAN Devices to CHF Device Log as set out in GBCS |
| | *HAN in 'permit join' mode (normal operating state)* | HAN LED MEDIUM FREQUENCY GREEN | Up to 60 mins from Device Log update | Take necessary steps to add HAN Devices to HAN (initiate pairing according to HAN device specification) |
| | *HAN initialised, one or more HAN devices in CHF Device Log (normal operating state)* | HAN LED LOW FREQUENCY GREEN | N/A - final normal operating state | N/A |

| Operational status | | Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *HAN in error state (error state)* | HAN LED HIGH FREQUENCY GREEN | Maximum 5 seconds (before automatic reboot) | Perform reset of Comms Hub (see Appendix C) if state does not change. Replace Hub on repeat failure |
| | *HAN Device join success* | HAN LED SOLID RED | Displayed for 5 seconds following successful Zigbee HAN join | N/A |
| | *HAN Device join failure* | HAN LED HIGH FREQUENCY RED | Displayed for 5 seconds following unsuccessful Zigbee HAN join | Re-try adding Device to CHF Device log and attempt re-join |

## B.3. Central and South Regions - Communications Hub LED Descriptions

B.3.1. In the Central and South Regions, Communications Hubs will have the LED functionality as described in this sub section.

B.3.2. As specified, a Communication Hub will have, on the front face of the enclosure, five LED indicators, with the following labels:

a) SW: indication of software state on the Communications Hub

b) WAN: status of connection to the SM WAN network

c) MESH: status of connection to the Mesh network (for Cellular + Mesh and SIMCH WAN variants only – not used for this purpose on Cellular WAN Variants)

d) HAN: status of connection to the HAN

e) GAS: status of the Gas Proxy Function

B.3.3. Table 4 to 10 show the operational statuses for Regions Central and South Communications Hubs.

**Table 4: Regions Central and South Communications Hub operational status table for Power State**

Power-on: power-on commences when Communications Hub is seated on an ICHIS compliant device or host and power is applied.

| Power State | Operational Status | All LEDs Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *Power off* | OFF | Continuous | Wait 60 seconds then Perform reset of Comms Hub (see Appendix C). If failure reoccurs, replace Comms Hub. |
| | *Boot-up sequence* | OFF | After power applied:<br>- WNC: max. 26 seconds<br>- Toshiba: max. 1 minute | After relevant duration has elapsed, check power to the Comms Hub and if power is on, replace Comms Hub. Repeat failure indicative of ICHIS host power issue. |
| | *Power on, device initialising* | Transition from SOLID to LOW FREQUENCY to OFF.<br><br>- 5 LEDs SOLID, max. 10 seconds then switch to<br>- 5 LEDs LOW FREQ, max. 10 seconds then switch to<br>- 5 LEDs OFF, max. 20 seconds | Total max. 40 seconds | Perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |

**Table 5: Regions Central and South Communications Hub operational status table for CH Software State**

Individual LEDs after power-on: after successful power-on, the following features may be checked according to state

| CH Software state | Operational Status | SW LEDs Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *CH functioning* | LOW FREQUENCY | Continuous | N/A |
| | *Error state* | CH reboots or LED high frequency | LED continuous if error not resolved by reboot | Comms Hub will automatically reboot.<br>If failure reoccurs, Comms Hub will reboot again or LED will flash with high frequency.<br>In both cases, replace Comms Hub on repeat failure |

**Table 6: Regions Central and South Communications Hub operational status table for SM WAN State**

| SM WAN State | Operational Status | WAN LED Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *SM WAN initialising* | SOLID | Max. 10 seconds following power on | Perform reset Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |
| | *Attempting connect to SM WAN* | MEDIUM FREQUENCY | Normal WAN connectivity: up to 25 seconds WAN connectivity may take max. 2 minutes | If maximum duration is exceeded, Supplier Party should refer to the CH Fitting and removal procedures |
| | *SM WAN connected (normal operating state)* | LOW FREQUENCY | N/A - final normal operating state | N/A |
| | *SM WAN doesn't connect* | OFF | Continuous until next WAN reconnection attempt | Supplier party should refer to the CH Fitting and removal procedures with reference to attempting a Cellular + Mesh Comms Hub and the use of aerial auxiliary equipment<br><br>Note, check the state of MESH LED to ascertain status of MESH connection |

| | | | | |
|---|---|---|---|---|
| | *SM WAN error* | HIGH FREQUENCY | Continuous until WAN error resolved | Where Mesh LED indicates Mesh connected, no action is required. Where Mesh LED does not indicate a connected state, wait 60 seconds then perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |

**Table 7: Regions Central and South Communications Hub operational status table for HAN State**

| HAN State | Operational Status | HAN LED Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *Power on but HAN not functioning* | OFF | Continuous | Where Comms Hub indicates no power (all LEDs off), check power to the Comms Hub and if power is on replace Comms Hub. Repeat failure indicates ICHIS host issue |
| | *HAN initialising* | SOLID | Up to 10 seconds following power on | Perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |
| | *HAN initialised, no HAN devices in device log or All previous HAN devices removed.* | OFF | N/A | Take necessary steps to add HAN Devices to CHF Device Log as set out in GBCS |
| | *HAN in 'permit join' mode* | MEDIUM FREQUENCY | Defined by 'CCS01 Add Device to CHF device log' commands. Range 1 second to 3600s seconds | Take necessary steps to add HAN Devices to HAN (initiate pairing according to device specification) |
| | *HAN initialised, one or more HAN devices in CHF Device Log* | LOW FREQUENCY | Continuous Note: This state is activated by HAN device successfully added to CH Device log, however HAN pairing must be verified separately | N/A |

| | | | | |
|---|---|---|---|---|
| | *HAN in error state* | HIGH FREQUENCY | Continuous | Wait 60 seconds, perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |

| Table 8: Regions Central and South Communications Hub operational status table for Mesh Connection StateMesh Connection State | Operational Status | Mesh LED Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *Power on but no mesh network* | OFF | Continuous | Note, only for Mesh + Cellular & SIMCH: Where Comms Hub indicates no power (all LEDs off), Check power to the Comms Hub, perform reset of Comms Hub (see Appendix C) if state does not change. Replace Comms Hub on repeat failure.<br><br>Where WAN LED indicates connected (normal operating state), no action is required. Comms Hub is connected to SM WAN.<br><br>Where WAN LED does not indicate a connected state, perform reset of Comms Hub (see Appendix C) if state does not change. Replace Comms Hub on repeat failure. |

| | | | | |
|---|---|---|---|---|
| | *Power on, mesh initialising* | SOLID | Max. 10 seconds<br><br>Note: After this the CH will attempt to connect to the cellular network (see next row) | Note, only for Mesh + Cellular & SIMCH: Where WAN LED indicates no Connectivity Perform reset Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |
| | *Preliminary attempt to connect mesh or Whenever CH waits for connection retry* | OFF | Max. 80 seconds Includes preliminary attempt to connect to cellular before switching to mesh (after power on and mesh initialising) | Note, only for Mesh + Cellular & SIMCH - following 'Power on, mesh initialising' state: Where WAN LED indicates no Connectivity Perform reset of Comms Hub (see Appendix C) if maximum time exceeded. Replace Comms Hub on repeat failure |
| | *Attempting to connect to mesh* | MEDIUM FREQUENCY | ~ Max. 30 seconds (when successful)<br>~ Continuous until connection retry (when not successful) | After 60 seconds has elapsed Party may undertake the CH No SM WAN Installation Procedure where state does not change |
| | *Mesh Connected* | LOW FREQUENCY | Continuous (while Mesh connected) | N/A |

| | | | | |
|---|---|---|---|---|
| | *Mesh error state* | HIGH FREQUENCY | Continuous while error conditions prevail (Note: external network issues) | If this state is present in conjunction with the WAN LED indicating no connection to the SM WAN, the Party may undertake the CH No SM WAN Installation Procedure |

**Table 9: Regions Central and South Communications Hub operational status table for Gas State**

| Gas state | Operational Status | GPF LED Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *Power on but no device added to GPF Device Log* | OFF | Continuous | Add Device to GPF Device Log and complete Device Join process as set out in GBCS |
| | *Device successfully added to CHF Device Log* | LOW FREQUENCY | Continuous<br><br>Note: This state is activated when a HAN device enters the GPF device log, however HAN pairing success must be verified separately. | N/A |
| | *GPF Device removed* | OFF | Continuous | If required: add Device to GPF Device Log and complete Device Join process as set out in GBCS |
| | *GPF in error state* | HIGH FREQUENCY | Continuous until reboot and HAN or HAN device problem(s) resolved. | Retry adding Device to GPF Device Log.<br>Wait 60 seconds then perform reset of Comms Hub (see Appendix C) and replace Comms Hub on repeat failure |

**Table 10: Regions Central and South Communications Hub operational status table for Signal Checker Mode**

| Signal Checker Mode | Operational Status | All LEDs Indication | Duration | Supplier Party Action |
|---|---|---|---|---|
| | *Commences when aerial connected to powered SKU2/3 Comms Hub* | Number of LEDs relative to signal strength.<br>Greater number of lit LEDs indicates stronger signal.<br>6 rapid blinks on all 5 LEDs signifies end of Signal Checker mode | Signal Checker Mode enabled for 60 seconds following connection of external cellular aerial to powered hub or following normal power on states if aerial already connected. | Optimise aerial position (within permitted installation location) to maximise SMWAN signal strength<br><br>Note, signal checker mode can be restarted by re-attaching an aerial |

# Appendix C. Reset (Reboot and Power Down) Timings and Processes

C.1.1. Table  details the procedures and timings for undertaking a reset of a Communication Hub, for each CH Variant in each Region.

C.1.2. Where a Party wishes to reset a Communications Hub in order to resolve an issue, then the soft reset (reboot) should be tried first followed by a hard reset (power down) where the soft reset does not resolve the issue.

**Table 11: Communications Hub wait timings**

| Region | CH Variant | Soft reset (Reboot) | Hard reset (Power down) |
|---|---|---|---|
| North | All CH Variants | The Communications Hub can be unseated from a powered ICHIS host for at least 10 seconds and then re-seated, triggering a reboot. | The Communications Hub can either:<br>• be unseated from a powered ICHIS host for at least 15 minutes and then re-seated; or<br>• remain seated on the ICHIS host and power removed from the ICHIS host for at least 15 minutes.<br>Note that 15 minutes allows for temporary power storage in the CH to discharge. |
| South and Central | All CH Variants | The Communications Hub can either:<br>• be unseated from a powered ICHIS host for at least 3 minutes and then re-seated; or<br>• remain seated on the ICHIS host and power removed from the ICHIS host for at least 3 minutes | |

C.1.3. The consequences of not following the Communications Hub wait timings for the South and Central region are:

- the Communications Hub will observe a power surge which could potentially damage circuitry and the Communications Hub;
- due to the power surge the Communications Hub detect PIN 12 (of ICHIS interface) as HIGH and reboots in to the Test bench mode which will result in the wrong Birth Event date; and
- the wrong Birth Event will trigger an Incident, Billing and reporting issues.

# Appendix D. Order and Consignment Status

## D.1. Order Status

D.1.1. The terms used to define various values of order status in CHHSM and OMS systems have slight variances. Table  lists all the order statuses DEFINED IN CHHSM and the corresponding one or more terms used in OMS systems for CSP-N and CSP-C&S.

**Table 12: Order Status Values**

| CHHSM Status | CHHSM Definition | CSP-N OMS Term(s) | CSP-C&S OMS Term(s) |
|---|---|---|---|
| Submitted | Order submitted to the DCC | Order Created | Created |
| | | | Voided |
| | | Awaiting DCC Approval | Submitted |
| Accepted | Order (where appropriate, as amended) accepted by the DCC | DCC Approved | Approved by DCC |
| | | Arqiva Approved | Approved by CSP |
| Rejected | Full order rejected by DCC | DCC Rejected | Rejected by DCC |
| | | | Rejected by CSP |
| Partially Delivered | Partial order delivered and accepted by the Party | Delivered | In Progress |
| | | Delivery Accepted | |
| Delivered | All Consignments for the order accepted by the Party | Delivered | Closed |
| | | Delivery Accepted | |

## D.2. Consignment Status

D.2.1. The terms used to define various values of consignment status in CHHSM and OMS systems have slight variances. Table  lists all the consignment

statuses defined in CHHSM and the corresponding one or more terms used in OMS systems for CSP-N and CSP-C&S.

**Table 13: Consignment Status Values**

| CHHSM Status | CHHSM Definition | CSP-N OMS Term(s) | CSP-C&S OMS Term(s) |
|---|---|---|---|
| In Progress | Consignment scheduled for delivery within 30 days or less | In Process | Created |
| | | | Submitted |
| | | | Approved by DCC |
| | | | Approved by CSP |
| | | | Rejected by DCC |
| | | | Rejected by CSP |
| | | | In Progress |
| Shipped | Advance Shipment Notification (ASN) issued and Consignment in transit | Shipped | Shipped |
| Partially Delivered | Partial Consignment acceptance by the Party | Delivery Partially Rejected | Partially Accepted |
| | | Delivery Partially Accepted | |
| Delivered | Consignment delivered to Delivery Location | Delivered | Delivered |
| | | Delivery Accepted | Accepted |
| Rejected | The Party has rejected all of the Consignment | Delivery Rejected | Delivery Rejected |
| Accepted | The Party has accepted delivery of all Communications Hubs in the Consignment | Delivery Accepted | Accepted |

| CHHSM Status | CHHSM Definition | CSP-N OMS Term(s) | CSP-C&S OMS Term(s) |
|---|---|---|---|
| Cancelled | The Party has cancelled delivery of the Consignment | <Not Available>[1] | <Not Available>[2] |

[1] At present, OMS CSP-N does not support cancellation process and therefore there are no corresponding terms available for OMS CSP-N.
[2] At present, OMS CSP-C&S does not support cancellation process and therefore there are no corresponding terms available for OMS CSP-C&S