



# **Spectrum Switch**

## **Subscription Guideline**

**CSIR Secondary Geo-location Spectrum Database**

**(South African Edition)**

## DOCUMENT INFORMATION

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**NOTE:** *Please note that the latest version of this document supersedes any previous version and its contents.*

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## ABBREVIATIONS/ACRONYMS

The following abbreviations and acronyms apply for this document:

AGL	Above Ground Level
CSIR	The Council for Scientific and Industrial Research
ECN	Electronic Communication Network license
ECS	Electronic Communication Services license
GLSD	Geo-location Spectrum Database
ICASA	The Independent Communication Authority of South Africa (the term 'Authority' and ICASA are used interchangeably in this document)
IETF	Internet Engineering Task Force
JSON	JavaScript Object Notation
OEM	Original Equipment Manufacturer
OPs	Operational Parameters
PAWS	Protocol to Access White-Space Databases RFC 7545
RFC	Request for Comments
R-GLSD	Reference Geo-location Spectrum Database
S-GLSD	Secondary Geo-location Spectrum Database
TVWS	Television White Spaces
URL	Uniform Resource Locator
WAPA	Wireless Access Providers Association
WSD	White Space Device

# 1 DEAR USER



**Objective:** At the end of this section, a new user is expected to gain key details contained in this on-boarding literature.

This guideline presents various feature rich functions of the CSIR Secondary Geo-location Spectrum Database (S-GLSD) platform, a.k.a the "Spectrum Switch". The manual intends to equip you with a quick start; and walk-through guidelines on how to effectively interact with the Spectrum Switch for the purpose of managing network equipment, planning and provisioning of network services to the end users.

## 1.1 Preface

No prior experience on S-GLSD platforms is required to start using this on-board literature. However, you are expected to have general knowledge about TVWS technology and its applications. Please note that figures/images depicted in this manual are for illustration purposes only, and subjected to change anytime whenever the Spectrum Switch is upgraded.

## 1.2 CSIR Legal and Compliance Framework

You are required to familiarise yourself with the CSIR's Legal and Compliance Framework on the [CSIR main website](#). The framework covers aspects such as Legal notice and disclaimer, privacy notice, code of conduct, ethics statement and copyright.

The CSIR shall all it can to protect your personal data and any form of data collected via Spectrum Switch. However, the CSIR shall not be held liable for any breach of privacy or loss of property as a result of using this on-board manual or the Spectrum Switch.

## 1.3 Spectrum Switch Access

Spectrum Switch is designed as a web-based, dynamic spectrum management platform that is publicly accessible online using a web browser ([Preferably, Chrome or Firefox](#)). It can be reached through the following uniform resource locator (URL): <https://whitespaces.csir.co.za>.

## 1.4 Suggestions

Do you have any questions, suggestions, or ideas about your TVWS network deployment or the on-board literature?

Please write to us: [tvws@csir.co.za](mailto:tvws@csir.co.za)

## 2 SUBSCRIBING ON SPECTRUM SWITCH



**Objective:** At the end of this section, you will have an understanding how to subscribe to the Spectrum Switch

The CSIR Spectrum Switch is a subscription based platform allowing aspiring TVWS network operators to use it for radio equipment management, network planning, deployment and service provision to end users. This section describe the subscription process.

There are three(3) subscriptions that a user may choose from:

- Original Equipment Manufacturer (OEM)/Distributor Subscription;
- TVWS Network Operator Subscription;
- Network Sharing Subscription;

At this stage, there is no requirement to be logged in the system. The subscription form is directly accessible by going to the Spectrum Switch menu and clicking on the subscription type that one intends to submit.

### 2.1 Original Equipment Manufacturer (OEM)/Distributor Subscription

Original Equipment Manufacturer (OEM)/Distributor subscription is mean for entities that are either manufacturers of TV whitespace equipment or distributors thereof.

#### 2.1.1 Online Subscription Form

The following is the URL to access the subscription form for OEM)/Distributor subscription which is publicly accessible from the system top menu as illustrated in Figure 1,

<https://whitespaces.csir.co.za/public/oem-distributor/subscription/form>.



Figure 1: System menu to access OEM/Distributor subscription form

Below is functional walk-through for submitting the OEM/Distributor subscription request:

- The information icon at the top of the subscription form provides some guidelines on the page that the user has opened.
- **Required sign** - All the fields indicated with a (\*) at the beginning are mandatory, If the user violate any of the required information the system

will present the users with appropriate error messages as shown in Figure 2. It is the user's responsibility to provide correct and required information for the application to start processing.

- **General Details** - A subscriber shall specify their capacity, i.e. account type, whether OEM/Distributor. Furthermore, description of TV whitespace devices shall also be provided
- **Website URL** - The website for the applicant. This field is optional. Note the input format, e.g. <https://whitespaces.csir.co.za>.
- **Required document** - The required documents to be uploaded by the applicant differ according to the applicant status. However, it could atle one of the following:
  - ✓ **Proof of Identify:** A copy of a business registration certificate in a case where a subscription is submitted by the OEM; **OR**
  - ✓ **Proof of Identify:** distribution agreement in a case where a subscription is submitted by a distributor; **AND**
  - ✓ A copy of a laboratory test report confirmation that the TV whitespace devices to be assessed by the CSIR is compliant with ETSI EN 301 598 specifications. If such compliance tests have not be done, a declaration that such will be done should be submitted.
- **Submit button** - Take note that after selecting a status the submit button will appear.

Figure 2: Error when submitting without completing all required fields

Figure 3: Click on the add button to open an input field for uploading a file. A delete button can be used to discard documents that have not been saved.

**NOTE:** Please note that the documents to be uploaded are limited to 5MB, and the supported file formats are [.pdf, .png, .jpeg, .jpg].

### 2.1.2 Subscription Confirmation

Upon successful submission of a subscription, a confirmation such as the one shown in Figure 4 will be displayed.

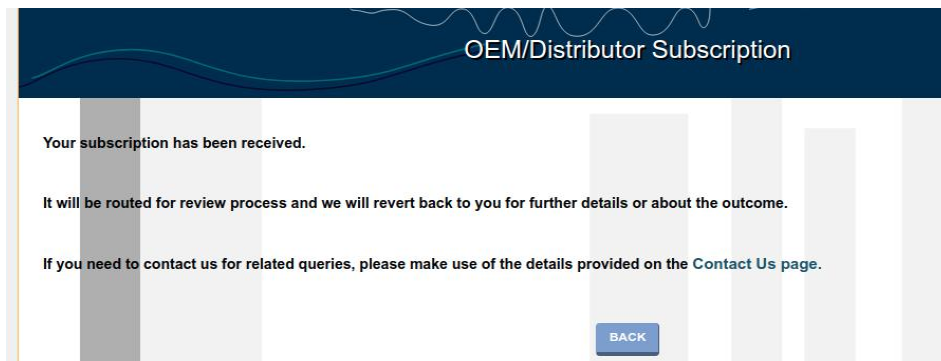


Figure 4: Subscription Confirmation Screen

In addition, a confirmation email will be sent to the email address provided in the contact details that were provided provided when filling the subscription-form.

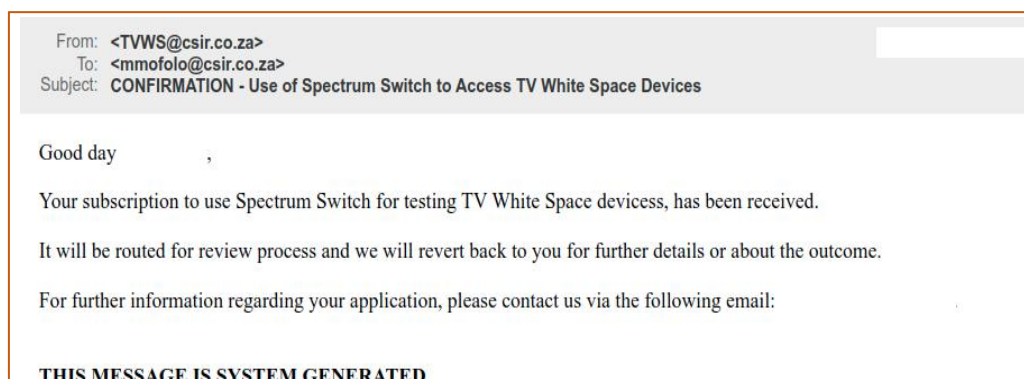


Figure 5: Subscription Email Confirmation Notification

### 2.1.3 Subscription Condition

A subscriber shall make use the CSIR Spectrum Switch for the period stipulated in the agreement contract, signed with the CSIR.

## 2.2 TVWS Network Operators Subscription

TVWS Network Operators Subscription is mean for entities that are licensed by ICASA to operate wireless networks in South Africa. Such entities should have valid ECN and ECS licenses when subscribing to the CSIR Spectrum Switch.

### 2.2.1 Online Subscription Form

The following is the URL to access the subscription form for Network Operators Subscription which is publicly accessible from the system top menu as illustrated in Figure 6,

<https://whitespaces.csir.co.za/public/network/operator/subscription/form>.



Figure 6: System menu to access network operator subscription form



Below is functional walk-through for submitting a network operator subscription request:

- At the top of the subscription form, the note is the important information to be read by the users before completing the form.
- **Status** - The legal status of an applicant. There are three applicant legal status options that an applicant can choose from; *Partnership* or *Juristic applicant*.
- **Required sign** - All the fields indicated with a (\*) at the beginning are mandatory, If the user violate any of the required information the system will present the users with appropriate error messages as shown in Figure 7. It is the user's responsibility to provide correct and required information for the application to start processing.
- **Website URL** - The website for the applicant. This field is optional. Note the input format, e.g. <https://whitespaces.csir.co.za>.
- **Required document** - The required documents to be uploaded by the applicant differ according to the applicant legal status selected from the drop-down option. The available options and the accompanying documents are as follows:
  - ✓ Proof of business registration, e.g copy of a certificate;
  - ✓ Proof of license exemption from ICASA, If licensed, attach certified copies of the ECN, ECS license.
- **Submit button** - Take note that after selecting a status the submit button will appear.

Figure 7: Error when submitting without completing all required fields

### 2.2.2 Subscription Confirmation

Upon successful submission of a subscription, a confirmation such as the one shown in Figure 8 will be displayed.

Figure 8: Subscription Confirmation Screen

In addition, a confirmation email will be sent to the email address provided in the contact details that were provided when filling the subscription-form.

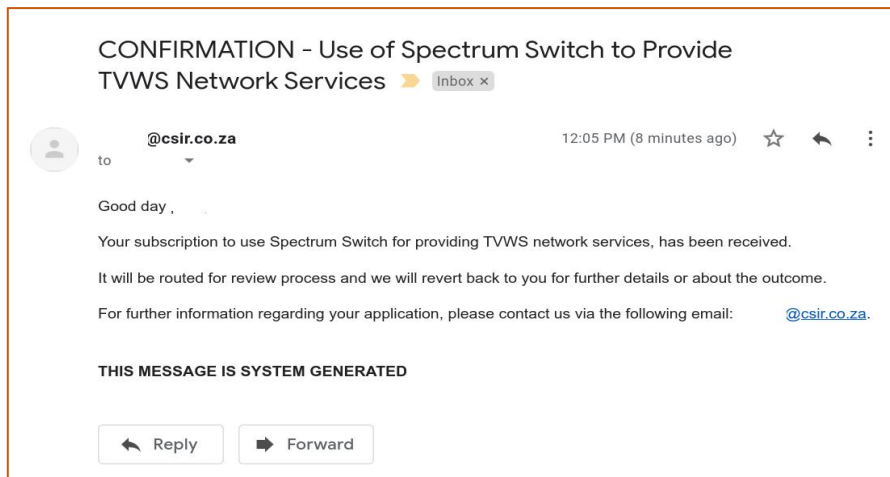


Figure 9: Subscription Email Confirmation Notification

### 2.2.3 Subscription Condition

By becoming a Spectrum Switch subscriber, you are expected to incur usage fees based on the tariffs to be determined in a separate agreement with the CSIR.

## 2.3 Network Sharing Subscription

The CSIR Spectrum Switch offers a unique feature that takes advantage of the device ownership details that could belong to two different entities. This NetSharing feature is well orchestrated by the Spectrum Switch as it allows a combination of sharing a network. For examples let us consider the following scenarios:

- **Device Owner:** An entity that owns or have a desire to own TV whitespace device(s) but don't have a license or don't want to operate a TV whitespace network.
- **Virtual Operator:** An entity that wishes to operate TV whitespace network but don't have infrastructure.

The CSIR Spectrum Switch offers a NetSharing feature that allows different entities/individuals to cooperatively be part of a network while only owning devices or having license rights and oversee network deployments. Spectrum Switch enables and facilitates that **Device Owners** or **Virtual Operators** can subscribe to be part of the existing network at the area of their choice. However, the following restrictions might apply:

- There is already an existing network at an area, or the network operator is willing to extend their footprint to such an area.
- Network operator may prefer/recommend/allow only specific brands on TV whitespace devices, i.e. devices from certain manufacturer(s).

### 2.3.1 Online Subscription Form

If someone is ready to be part of the revolutionary wireless network that is based on TV white space technology, s/he Just need to select preferred network operator to virtually share their network, fill in the subscription form with their details, then the system will notify them about such intent.

The subscription form is directly accessible by going to the Spectrum Switch menu and clicking on the following is the URL as illustrated in Figure 10, <https://whitespaces.csir.co.za/public/network/sharing/subscription/form>.



Figure 10: System menu to access network operator subscription form

### 2.3.2 Feature Overview

A subscribed user will have access to features such as the following:

- **subscription list** - A collection of all netSharing subscriptions that were submitted under your network.
- **Map Overlays** - A map interface that enables filtering, fetching and displaying of all WSDs which are shared.
- **Dashboard View** - A graphical representation of statistics relating to network sharing.
- **Ownership Sharing** - An interface that allows sharing device ownership, thus grant device access to another person to enable them to perform approvals, view device details as well as PAWS transaction log for such a device.

## 2.4 Review of Subscription Request

Submitted information will be reviewed for completeness by the CSIR, inline with TVWS Regulations. During the review process, the applicant/subscriber might be contacted using the contact details that were provided when filling the subscription-form. This forms part of the verification process that will inform the subscription outcome, thus to approve or decline based on the approval framework. In both cases, an email notification will be sent regarding the outcome.

### 2.4.1 Approved Subscription

In the case where a subscription has been approved, a user account/profile will be automatically created. An email notification shall be sent which includes some instructions to complete the profile registration process on the Spectrum Switch, as described in the [next section 3.2](#).

### 2.4.2 Declined Subscription

In the case where a subscription has been declined, there is no further action that will be required from the subscriber as no account registration will be started on the Spectrum Switch. Thus such the applicant/subscriber can't use Spectrum Switch for testing of TV whitespace devices or deploying of TVWS networks, depending on the subscription type.

### 3 SYSTEM ACCESS CONTROL



**Objective:** At the end of this section, you will understand how to access the Spectrum Switch.

Some limited features of the Spectrum Switch are publicly accessible by anonymous users without the need to login to the system. However, all key features can only be accessed by authenticated and authorised users from based on their respective account profiles.

#### 3.1 User Profile Registration

The CSIR Spectrum Switch does not support public user registration. This is for security purposes. There are two cases of registering a user profile:

- User profile registration during the approval of the subscription to use the CSIR Spectrum Switch. Information provided under the contact details shall be used.
- Additional two (2) nominated users to be registered under as alternative contacts for the entity/company which has subscribed.

#### 3.2 User Profile Activation

Once the profile registration has been initiated, a new user will receive email notification to complete the registration process, with the following details:

- **Username** - The email address that a user submitted during the subscription process or have requested the CSIR to add to Spectrum Switch.
- **Temporary password reset link** - As a new subscriber, you will be given a short period of time to open the link in order to change the temporary password before the link expiration. This is for security, control and privacy reasons.

#### 3.3 User Login

Spectrum Switch subscribers can gain access to their respective profiles through the login form, from the main menu using their respective credentials as shown in Figure 11.

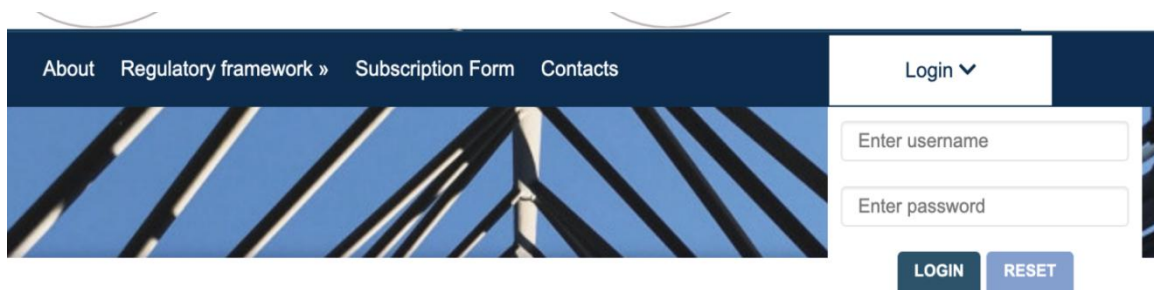


Figure 11: The profile log in form with password reset option

Functional walk-through for profile login:

- **Username** - A system recognized email address;

- **Password** - A valid and strong password;
- **Login** - Submit button used to gain access to the Spectrum Switch;
- Upon successful authentication, you will be redirected to the respective account profile. If the provided credentials (username and password) are incorrect an appropriate error message is propagated back to you.

### 3.4 Password Reset

Password reset is an action undertaken when the user needs to change their password. This functionality is available to all users with active profiles, and the old password will be replaced by a new password if reset process is successful.

To reset a password, a user clicks on a RESET button (on the login form), and the system redirects the user to the password reset page similar to the one shown in Figure 12.

#### 3.4.1 Password Reset Request

A user must provide an email address that is used to login and such email address must match the already known by the system.

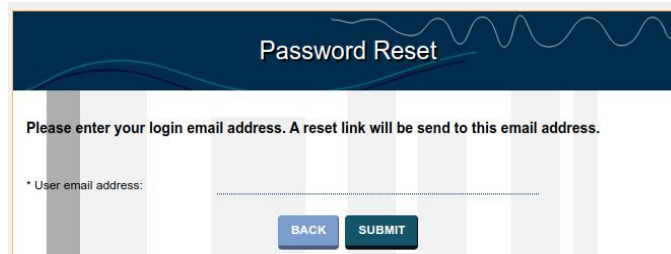


Figure 12: Password reset request page for the user to provide a valid email address

Functional walk-through for requesting password reset:

- Step 1: Input a valid email address that is used to login;
- Step 2: Click "submit" button to invalidate the current password for the associated account to the provided email address, and send a link to the user's email address;
- Optionally : Click on cancel button, should you wish to not proceed;

#### 3.4.2 Password Reset Confirmation

If the provided email address matches one of system's active profiles, a password reset notification is generated and send to the provided email address with the password reset link. A confirmation message is shown to the user that "a reset link has been sent to the provided email address" as shown below in Figure 13.

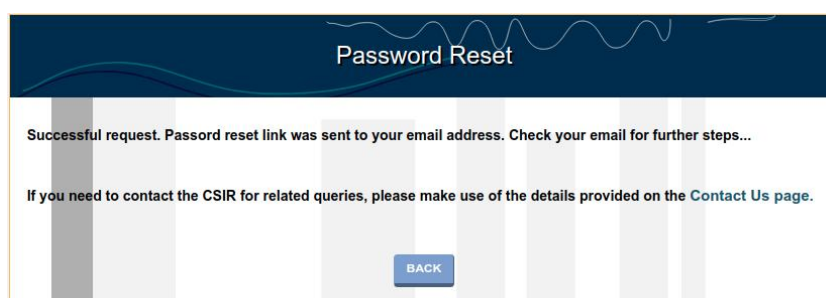


Figure 13: Confirmation of password reset.

The user will receive an email message similar to the one shown in Figure 14 below. The email received will consist of a link that will redirect the user to an edit window whereby the user can change the password or their name and surname.

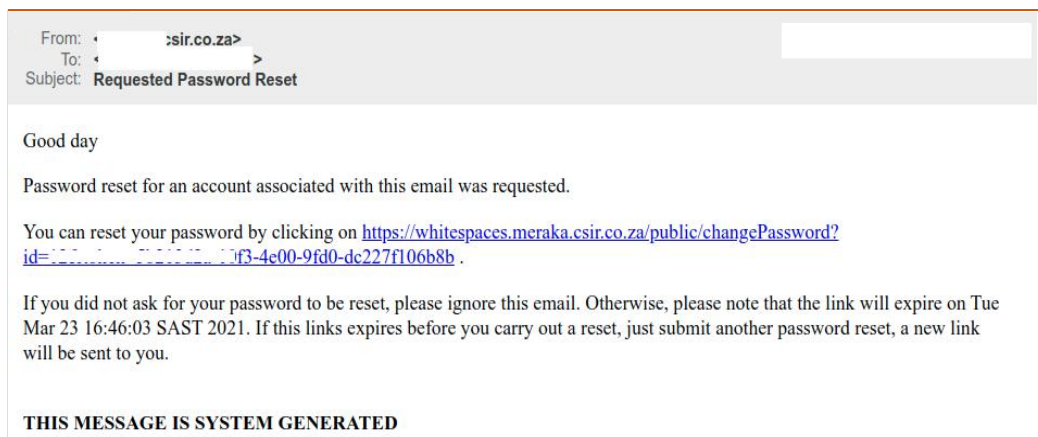


Figure 14: Email message generated by the system for password reset link.

Upon clicking on the password reset link from the received email, it redirects the user to a window similar to the one shown in Figure 15. The user has to abide by some principles for password reset explained in tool-tip on the same screen.



Figure 15: Password Update Screen

If a user has successfully updated his/her password, the system will present a confirmation screen such as the one shown in Figure 16 as well as email alert.

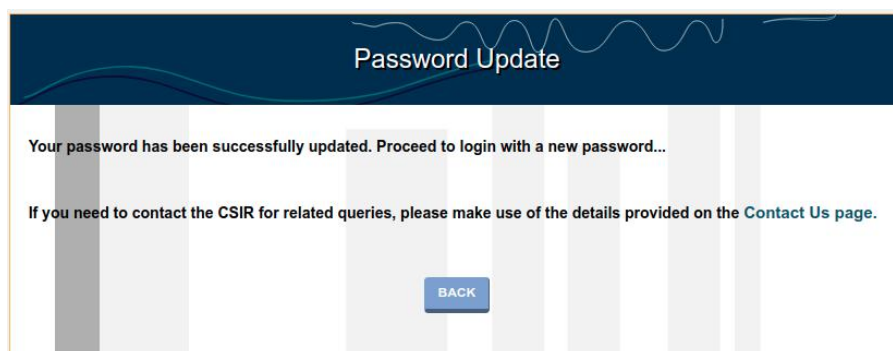


Figure 16: Confirmation of Password Update

## APPENDIX-5: TOOLTIPS

The following are some of the common features found on several pages while navigating the system.

### List Pages

The system provides some additional features, to limit the list of the records in the display table, a selection of which table columns to show and hide, the ability to export records to a file and the ability to filter records through searching for specific data keywords. These features are presented as illustrated in Figure 17.

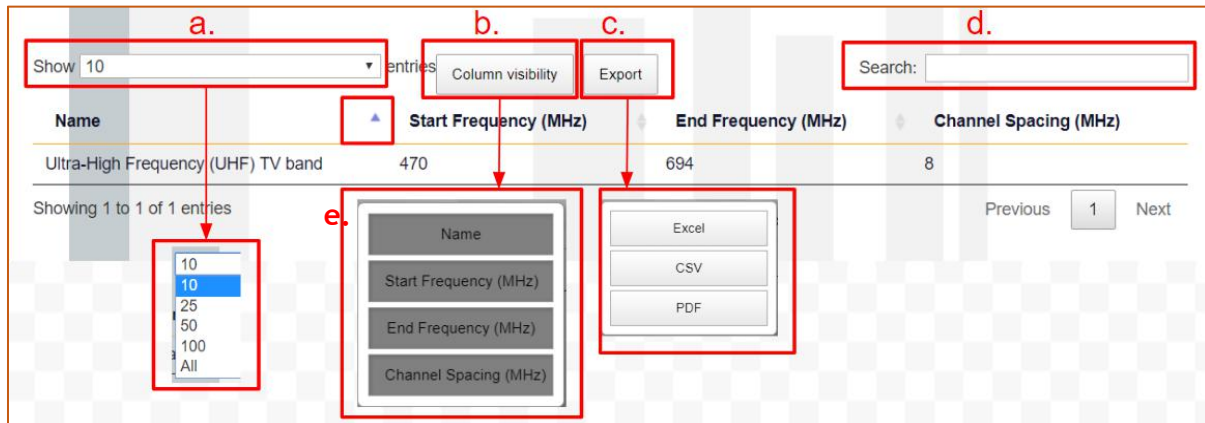


Figure 17: Tool tips for list pages

Functional walk-through for features on the list pages:

- Number of entries - This function allows the user to select how many entries to show per page on the table, see label 'a' in Figure 17;
- Column visibility - This function allows the user to choose which columns to be visible on the table, see label 'b' in Figure 17;
- Export - This function allows the user to export the data displayed on the table to either, Excel file, CSV file, and PDF file, see label 'c' in Figure 17;
- Search Input - A user can type in the search input to search the records displayed in the page, see label 'd' in Figure 17;
- Sorting - A user can click on any of the preferred column name for sorting the row contents, either ascending or descending.

### Page Help/Tips

Different pages may require some specific guidelines. So, the system has an embedded guidelines for some particular pages. Such guide lines can be viewed by clicking the information icon similar to the one that is shown in Figure 18 below.



Figure 18: Information icon for user help and tips on a particular page