

# Proposed Changes to CPC-2-1-23 Annex B

## Summary List of Proposed Changes to CPC-2-1-23 Section 5.11 Technical Information & Annex B – Site Data Elements

ISED proposes to make a series of modifications to the list of mandatory site data elements listed in Annex B of CPC-2-1-23 - [Licensing Procedure for Spectrum Licences for Terrestrial Services](#). These changes are intended to ensure that the data we collect remains relevant, and reflects both current and emerging trends in radiocommunication installation site technologies. This document outlines ISED's proposed changes and corresponding rationales.

### 1. Proposed New Data Elements:

- 1.1 Site Type
- 1.2 Site Structure Type
- 1.3 Cell ID
- 1.4 Radio Technology
- 1.5 Radio Certification Number
- 1.6 Antenna Type
- 1.7 Number of Tx Antenna
- 1.8 Number of RX Antenna
- 1.9 Tx Antenna Vertical Beam
- 1.10 Tx Antenna Horizontal Beam
- 1.11 Downlink Resource Allocation
- 1.12 Site Owner
- 1.13 Site ID
- 1.14 Site Sharing Indicator

### 2. Proposed Data Element Modifications

- 2.1 Make **Upload Reference Number** optional.
- 2.2 Limit the use of **Structure Height** to outdoor structure types.
- 2.3 Rename **Tx Channel Frequency or Tx Lower Frequency Limit** as Tx Channel Frequency and request only the Tx centre frequency of the channel.
- 2.4 Rename **Rx Channel Frequency or Rx Lower Frequency Limit** as Rx Channel Frequency and request only the Rx centre frequency of the channel.
- 2.5 Rename **Tx Radio Model Number** as Tx Radio HVIN to reinforce a standard syntax for radio model information.
- 2.6 Rename **Rx Radio Model Number** as Rx Radio HVIN to reinforce a standard syntax for radio model information.
- 2.7 Replace existing code system for **Tx Radio Manufacturer Code**.
- 2.8 Replace existing code system for **Rx Radio Manufacturer Code**.
- 2.9 Rename **Transmitter Output Power** as **Transmitter TCP-TRP** and request different data based on the Antenna type. Change unit of measurement from Watts to dBm.

- 2.10 Replace existing code system for **Tx Antenna Manufacturer Code**.
- 2.11 Replace existing code system for **Rx Antenna Manufacturer Code**.
- 2.12 Expand **Tx Antenna Height** to accept negative values in order to record underground sites.
- 2.13 Expand **Rx Antenna Height** to accept negative values in order to record underground sites.
- 2.14 In **Tx Antenna Gain**, require that the gain of the antenna elements be provided for massive-MIMO systems.
- 2.15 In **Rx Antenna Gain**, require that the gain of the antenna elements be provided for massive-MIMO systems.
- 2.16 Site Data file uploads will be accepted exclusively in a **CSV file** format.

### 3. Proposed Data Element Removals:

- 3.1 Administrative District Office of the Account Number
- 3.2 Site Elevation
- 3.3 Zone Enhancer Indicator
- 3.4 Tx Upper Frequency Limit
- 3.5 Rx Upper Frequency Limit

## I. Facilitating Site Identification and Validation During Field Operations

In order to facilitate the visual identification of sites during field operations, and differentiate between individual installations in dense areas, ISED proposes the introduction of the site data elements **Cell ID**, **Site Type Code** and **Site Structure Code**. These data elements would support field operations, as well as activities related to ISED's role in interference management.

The introduction of the **Cell ID** data element is meant to facilitate processes involving sites which provide mobile services. Licensees would input the 3GPP Cell Identifier, a unique series of numbers meant to identify a specific cell within a Public Land Mobile Network (PLMN). As ISED is modernizing its field equipment, this data element will facilitate interference investigations, making it easier for spectrum management officers to link with site data, and better distinguish among multiple installations at a site. The **Cell ID** will facilitate the detection of discrepancies between uploaded data and field sensor reports, and allow ISED to better regulate heavily used commercial mobile bands.

In **Site Type Code**, licensees would indicate the broad category of site associated with the radiocommunication installation using the following code to indicate the type of site: "U"=underground (e.g., mine, subway), "O"=outdoor (e.g., purpose build tower), "I"= indoor (e.g., stadium, corporate building).

**Site Structure Type Code** would further specify the type of structure in use at the site. ISED proposes that licensees indicate the site structure type using the following codes: "T"=purpose-built Tower, "R"= building Roof-Top, "P"=light, electrical or utility Pole, "S"=water or farm Silo, "M"=transportable, "O"=Other.

In support of ISED's radio frequency propagation modeling, minor modifications are also proposed to the data entry range for **Tx & Rx Antenna Height**. In order to better capture data related to underground site types, ISED proposes that the entry of negative values be permitted in **Tx & Rx Antenna Height** in order to account for the depth below ground level in underground sites.

## II. Facilitating Identification and Compliance of On-Site Radio Technology

Evolving radio technology has led to radio models which are capable of supporting a number of different technologies in the field. As a result, the **Radio Model Number** is no longer sufficient on its own for ISED to reliably derive the specific mode of operation of the technology being used at a site (3G, 4G, 5G-NSA, Broadband, Satellite, etc.).

For this reason, ISED proposes the introduction of a **Radio Technology** data element. This is intended to facilitate assessment of how a site is operated in the field, as well as site compliance with ISED's Certified Radio Equipment List (REL) database and field measurements. ISED proposes that licensees input one of the following options to indicate the mode of operation (provisioning) at the site: "GSM" (2G/GPRS/EDGE service), "CDMA/AMRC" (2G CDMA), "HSPA" (3G CDMA), "LTE" (4G), "5GNR", "5GDSS" (4G-5G Dynamic Spectrum Sharing sites), "WiMax", and "Other/Autre".

ISED also proposes that licensees be required to provide their **Radio Certification Number**, as issued and listed in ISED's Radio Equipment List (REL). This will facilitate the linking of site data to the REL database to facilitate regulatory actions and internal analysis work.

In order to either simplify or clarify ISED's data entry expectations towards licensees, some minor changes are also proposed for **Tx & Rx Radio Model Number**, **Tx & Rx Radio Manufacturer Codes** and **Antenna Manufacturing Codes**.

ISED proposes to rename the **Tx & Rx Radio Model Number** data elements as **Tx & Rx Radio HVIN** to reinforce a standard syntax for radio model information. Licensees would be expected to indicate the hardware version identification number (HVIN) of radio transmitters certified by ISED unless operating a radio without an HVIN from ISED, in which case the manufacturer's radio model number should be provided.

ISED also proposes to replace the current system of manufacturer codes used in the **Tx & Rx Radio Manufacturer Code** data elements and the **Tx & Rx Antenna Manufacturing Code** data elements, by alternative codified systems. The purpose of this change is to develop a system will better match the pace of change in the radio vendor ecosystem, and ensure that all authorized equipment manufacturers can be captured by the relevant site data elements. One example of an alternative coding system for the **Tx & Rx Radio Manufacturer Code** data elements could be the use of the Certification & Engineering Bureau (CEB) company number, which can easily be found at the beginning of the certification number on the label of any existing equipment, or by looking up a licensee's equipment in the [Radio Equipment Search](#) tool provided on the Spectrum Management System (SMS) website. For **Tx & Rx Antenna Manufacturing Code**, a new data extract option could be added to the [SMS Authorization Data Extract](#) present on the SMS website containing Antenna manufacturer information. Licensees would be expected to use the codes provided in this data extract.

### III. Adapting Site Data Collection Requirements to the Deployment of 5G Networks and Massive-MIMO

Given the increase in deployments of Active Antenna Systems (AAS) with beam-forming and beam-steering capabilities for 5G networks, a number of changes and additions to data elements have become necessary in order for ISED to conduct interference analyses and determine compliance with conditions of licence as defined in section 5.13 of CPC-2-1-23.

In this context, ISED proposes the introduction of **Antenna Type Code** and **Number of Tx & Rx Antenna**, as well as modifications to **Transmitter Output Power** and **Tx & Rx Antenna Gain**. ISED also proposes to introduce **Tx Antenna Vertical Beam** and **Tx Antenna Horizontal Beam** as complimentary to the data provided by **Tx Antenna Elevation Angle** and **Tx Antenna Azimuth** for the purposes of interference analysis. Finally, ISED proposes that licensees report on **Downlink Resource Allocation** in support of anticipated changes to the Radio Frequency Compliance Measurement Procedures defined in GL-01– [Guidelines for the Measurement of Radio Frequency Fields at Frequencies From 3 kHz to 300 GHz](#).

In order to accommodate a range of different technologies, certain fields will require the input of slightly different data depending on the type of system being reported (AAS vs non-AAS). Information requirements are summarized in Table 1, and a full description of each data element follows below.

<b>Table 1 – Information requirement differences for Non-AAS and AAS</b>		
<b>Proposed Field Name</b>	<b>User Input</b>	
	<b>Non-AAS</b>	<b>AAS</b>
Number of Tx Antenna	SISO: 1 MIMO: Number of antennas	Number of antenna elements
Transmitter TCP-TRP	Total conducted power in dBm	Total radiated power in dBm
Tx Antenna Gain	Gain of the transmitter antenna in dBi	Gain of the individual antenna element in dBi
Tx Antenna Vertical Beam	Half-power (3 dB) beam width in the vertical plane of the main lobe for the transmitter antenna in degrees	Vertical beam steering angle range (difference between the maximum and minimum values) in degrees
Tx Antenna Horizontal Beam	Half-power (3 dB) beam width in the horizontal plane of the main lobe for the transmitter antenna in degrees	Horizontal beam steering angle range (difference between the maximum and minimum values) in degrees

**Antenna Type Code** would require licensees to specify the type of antenna associated with a radio installation. Licensees would select from three options: Active Antenna systems (AAS), Non-AAS correlated (NAC), and Non-AAS uncorrelated (NAU). Correlated and uncorrelated refers to the way the signals are phase-aligned or independent as specified in [SRSP-518](#) and [SRSP-520](#).

Licensees would also be required to specify the **Number of Tx Antenna** and **Number of Rx Antenna**. In a single-input and single-output (SISO) system the value should be set to "1"; and to "2" or more in traditional antenna diversity and multi-user (MU) -MIMO systems. In massive-MIMO systems or AAS, licensees should specify the number of antenna elements in the antenna panel.

In support of massive-MIMO AAS deployments, ISED also proposes to rename and modify the **Transmitter Output Power** data element to **Transmitter TCP-TRP**. This change is intended to clarify the power value to be entered for AAS and non-AAS respectively. For AAS equipment, the total radiated power (TRP), as defined in [SRSP-518](#) and [SRSP-520](#), should be provided. For non-AAS equipment, the total conducted power (TCP) should be provided, representing the signal conducted across all antennas. ISED is also considering modifying the unit of measurement in which the data is provided, from Watts to dBm.

ISED is also proposing a small modification to **Tx & Rx Antenna Gain**. This data element would remain the same for omni and directional antennas, but in massive-MIMO AAS, the gain of the antenna elements should be provided.

As a complement to the existing **Tx Antenna Elevation Angle** data element, ISED proposes to have licensees record the **Tx Antenna Vertical Beam**. In non-AAS, this field would indicate the half-power (3 dB) beamwidth, in degrees, in the vertical plane of the main lobe for the transmitter antenna. In case of AAS beam steering systems, it would represent the beam elevation angle range (maximum - minimum), in degrees, around the mean value specified by **Tx Antenna Elevation Angle**.

As a complement to **Tx Antenna Azimuth**, ISED also proposes that licensees record the **Tx Antenna Horizontal Beam**. In non-AAS, this field would indicate the half-power (3 dB) beam width in the horizontal plane of the main lobe for the transmitter antenna. In case of AAS beam steering systems, it would represent the horizontal beam steering angle range (maximum - minimum) around the mean value specified by **Tx Antenna Azimuth**.

Finally, ISED proposes to collect the **Downlink Resource Allocation** of systems in support of recently consulted upon changes to GL-01 – *Guidelines for the Measurement of Radio Frequency Fields at Frequencies From 3 kHz to 300 GHz*. In the consultation on the forthcoming Issue 4 of GL-01, updates are proposed to the process of predicting RF levels prior to collecting on-site measurements to account for time division duplex (TDD) systems, which are expected to become increasingly common in 5G New Radio (5G NR) deployments. When generating predictions about TDD systems, the maximum transmitted power (or EIRP) may be reduced by the duty cycle factor to account for the lower downlink resource allocation and better align with measurements. For Frequency Division Duplex (FDD) systems, 100% of the maximum transmitted power shall be used. Licensees would be expected to report this data as a percentage, to match the proposed language of GL-01.

## V. Facilitating Identification and Coordination on Matters Related to Mandatory Antenna Tower and Site Sharing

ISED is proposing to introduce three new data elements, titled **Site ID**, **Site Owner**, and **Site Sharing Indicator** to facilitate antenna and site sharing processes covered under CPC-2-0-17 [Conditions of Licence for Mandatory Roaming and Antenna Tower and Site Sharing and to Prohibit Exclusive Site Arrangements](#).

ISED proposes to introduce the use of a **Site ID** data element. A **Site ID** is a unique identifier generated by licensees meant to identify each location where radios are installed. A licensee may be operating multiple services (e.g. 4G PCS, 5G AWS, etc.) at a given **Site ID**, each with their own site data records describing associated equipment and technical parameters. For example, one **Site ID** might represent a location where a broadband internet station in the FWA band is in operation. In which case the **Site ID** is associated to a single radio station installation. Another **Site ID** may represent a location where a three-sector cellular station in an AWS band is in operation. In which case that singular **Site ID** is associated with three separate radio station installations.

**Site ID** will be especially useful with the growth of 5G networks and the proliferation of small cell installations, particularly in dense areas (e.g. stadiums, airports, shopping malls, etc.) where it may not be possible to use distinct GPS coordinates to identify the different site locations within that area. It is intended to facilitate tracking new site uploads or modifications, and will also be used for tracking site sharing information as required under CPC-2-0-17. In order for **Site ID** to function as intended, each identifier would need to be unique. As such, ISED proposes that a common naming convention be developed and adopted by licensees to avoid the duplication of **Site IDs** at a given GPS location.

The **Site Owner** data element would indicate the licensee responsible for antenna tower and site sharing at the location indicated by the **Site ID**, pursuant to CPC-2-0-17. The **Site Owner** would be the licensee uploading the site data unless it relates to an installation that is presently operating on a third-party site; in which case the third-party should be identified as the **Site Owner**. Licensees uploading site data related to an installation operating on a third-party site would be expected to coordinate with the site owner to ensure entry consistency.

The **Site Sharing Indicator** would specify whether the site in question is currently being shared with other licensees. ISED proposes that the licensee would select from one of three options:

- **Not shared:** the licensee uploading the data record is the **Site Owner** and has no active sharing agreement in place for the site indicated by the **Site ID**.
- **Sharing own site:** the licensee uploading the data record is the **Site Owner** and has an active sharing agreement in place with one or more licensees.
- **Operating on a third-party site:** the licensee uploading the data record operates a station that is installed at a site identified by **Site ID**, owned by another licensee that is in turn identified by the **Site Owner** data element.

By introducing these two data elements into the site data uploading requirements, ISED's intent is to automate some aspects of the semi-annual reporting required under CPC-2-0-17 related to antenna tower and site sharing. This, in turn, could make the coordination between licensees simpler, and reduce reporting requirements for licensees.

Furthermore, with the addition of the **Site Type Code** data element (see section I) ISED proposes to limit the entry of **Structure Height** to outdoor sites only. **Structure height** being primarily recorded to facilitate the exchange of information between licensees for purposes of site and tower sharing.

## VI. Phasing out Reporting Requirements

ISED seeks to phase out data elements from Annex B, either because ISED has developed alternate means of inferring this data from other internal sources, or because the collection of this data has become outdated as ISED's operational procedures evolve.

- **Administrative District Office of the Account Number**
- **Site Elevation**
- **Zone Enhancer Indicator**

In addition, ISED proposes to make the **Upload Reference Number** data element optional. This data element is not required for ISED's own processes, but may still be a useful tool for some licensees as a means of linking uploaded data to their internal database.

ISED also proposes to reduce the information reporting requirements related to channel frequency. As technology standards have evolved, data on bandwidth and center frequencies is now sufficient for ISED's purposes. ISED proposes that **Tx Channel Frequency or Lower Frequency Limit** and **Rx Channel Frequency or Lower Frequency Limit** be renamed as **Tx Channel Frequency and Rx Channel Frequency**. Licensees would no longer be required to provide a lower frequency limit, instead only providing the centre frequency of the channel, along with Bandwidth information to indicate the occupied bandwidth of the emission. Furthermore, **Tx Upper Frequency Limit and Rx Upper Frequency Limit** would be removed entirely, as they are no longer essential to ISED's operations.

## VII. Changes to the File Format for Site Data Uploads

Currently, section 5.11 of CPC-2-1-23 requires licensees to submit their site data in XML or ASCII-delimited formats. ISED proposes to standardize the use of Comma Separated Values (CSV) as the exclusive file format supported for the submission of technical information. ISED expects that this shift to standardize the use of CSV will make the site upload process faster and more efficient for licensees. Furthermore, ISED proposes to remove all language in section 5.11 of the CPC which dictates specific file formats for the submission of site data, in order to make the language of the CPC more technologically neutral. File formatting requirements of site data submissions for licensees will instead be listed on the SMS website.

## VIII. Questions for RABC

### **1. With regard to the proposed new data elements:**

- a) Is it technically and operationally feasible for licensees to provide the additional data elements proposed above? If not, which ones and why ?**
- b) Are additional site data elements needed, for example to facilitate inter-operator domestic or international coordination, or tower and site sharing?**
- c) Do RABC members have comments or recommendations on a standard naming convention for the new Site ID field ?**
- d) Are the proposed identification codes to be used for site type, site structure type, and antenna type appropriate? If ISED should consider different codes, what would they be?**

### **2. With regard to existing data elements:**

- a) Are there technical or operational reasons for ISED to maintain the following elements: Administrative District Office of the Account Number, Site Elevation, Zone Enhancer Indicator, Tx Upper Frequency Limit, and Rx Upper Frequency Limit?**
- b) Should other revisions to existing data elements be considered? If so, what revisions should be considered and why?**

### **3. Do RABC members have any comments on the proposed standardization of site data submissions to exclusively accept the use of CSV file format ?**

### **4. With regard to the transition toward implementation of the revised Annex B site data elements:**

- a) How should licensees and ISED manage legacy data that has already been entered into the site database?**
- b) What would RABC members consider an appropriate timeframe to transition to/adapt these new data collection and reporting requirements?**