通訊事務管理局辦公室
OFFICE OF THE COMMUNICATIONS AUTHORITY

Your Ref 來函檔號:

Our Ref 本函檔號: OFCA/R/R/395 C

28 April 2020

By email and web-posting

Circular letter to:

- **All Unified Carrier Licensees authorised to provide mobile services**
- **All Services-Based Operator Licensees authorised to provide mobile virtual network operator services**
- **All Services-Based Operator Licensees authorised to provide public radio communications relay services**
- **All Localised Wireless Broadband Service Licensees**
- **All Wireless Internet of Things Licensees**

Dear Sir/Madam,

Reporting of the Number of
Customer Connections, Mobile Stations and Base Stations

Having regard to the latest developments in the mobile telecommunications market and the evolution of radio access network ("RAN") technology, we consider that there is a need to set out clearly the proper interpretations of the following terms:

(a) "customer connections" in respect of mobile/wireless services provided under Unified Carrier Licence ("UCL") (or "mobile stations" under Services-Based Operator ("SBO") Licence); and

(b) "base stations" under UCL, SBO Licence, Localised Wireless Broadband Service ("LWBS") Licence and Wireless Internet of Things ("WIoT") Licence,

to facilitate licensees' reporting of the numbers to the Office of the Communications Authority ("OFCA") in a consistent and effective manner.

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Customer Connections/Mobile Stations

In recent years, a variety of prepaid SIM cards have emerged in the market. Whilst some prepaid SIM cards have a stored monetary value, with the value deducted based on the usage and the unit charge for access to voice, data and/or SMS services after card activation, other prepaid SIM cards come with specified usage quota on voice, data and/or SMS, but without any stored monetary value or with the stored monetary value dropping to less than $1 right after card activation. These prepaid SIM cards, despite their different arrangements, are capable of providing telecommunications services to end users. As such, to ensure consistent treatment, the methods for counting the number of customer connections/mobile stations relating to prepaid mobile services are set out in **Appendix I**.

Base Stations

The emergence of new types of RAN technology and equipment has brought about changes to the system design of base stations, particularly for 5G networks, as explained in a number of examples given in **Appendix II**. Guidance for interpretation of "base station" is needed in particular where:

(a) The installation of BTS cabinets (including the active radio units and BBU) (each as defined in **Appendix II**) in the conventional RAN design may differ from the BBU configuration in the new RAN design, in which the active radio units are more commonly located near or even combined with antennas in the form of RRUs and AAUs (each as defined in **Appendix II**) respectively, but not co-located with the BBU in the same cabinet; and

(b) There is a need to ensure consistency of reporting the number of base stations among various types of licensees including holders of UCLs, SBO (Radio Relay) Licensees, LWBS Licensees and WIoT Licensees which might also deploy RRUs and AAUs.

The methods for counting the number of base stations and the application of the methods to various examples for illustration purpose are given in **Appendix II**.

Timeline

The methods for counting the number of customer connections/mobile stations and base stations as set out in Appendices I and II will take effect from **1 August 2020** and apply to all UCLs as well as SBO, LWBS and WIoT Licences (as applicable). All licensees concerned shall follow these counting methods when submitting the provisional and audited figures of customer connections/mobile stations and base stations to OFCA for the purpose of licence fee calculation.

Should you have any enquiries about the aforementioned methods for counting the number of customer connections/mobile stations and base stations, please contact Mr. Kenneth Leung at 2961 6784 for UCLs, LWBS and WIoT Licences and Mr. SK Ng at 2961 6635 for SBO Licences.

Yours sincerely,

(Linda Yu)
for Director-General of Communications

Encl.

Appendix I

Counting of Customer Connections/Mobile Stations Relating to Prepaid Mobile Services

1. A prepaid SIM card shall be counted as a "customer connection" under the UCL and a "mobile station" under the SBO Licence if -

(a) the prepaid SIM card has been activated or at least used once by the customer but not yet expired; and

(b) the activated prepaid SIM card falls into either one of the following two categories:

(i) with stored monetary value and a residual balance of $1 or above; or

(ii) with stored usage quota in the form of voice, data and/or SMS usage volume[1] which can be used for access to mobile service.

[1] Prepaid SIM cards which support only free-of-charge services such as emergency calls, voice calls/SMS to the licensee's service centre, incoming SMS and call forwarding/waiting are not included.

Appendix II

Counting of Base Stations

1. For UCLs, LWBS Licences, WIoT Licences and SBO (Radio Relay) Licences, a "base station" means one or more transmitters or receivers or a combination of transmitters and receivers with active radio units, including the accessory equipment, necessary at one fixed location for carrying a radiocommunications service, where -

(a) "transmitters or receivers or a combination of transmitters and receivers with active radio units" ("active transceivers") include but are not limited to base transceiver stations ("BTSs"), remote radio units ("RRUs") and active antenna units ("AAUs"), amplifiers and repeaters. For the avoidance of doubt, baseband units ("BBUs") and the conventional antennas without active radio units are not considered as active transceivers;

(b) a set of active transceivers, such as BTS, RRUs, AAUs, amplifiers and/or repeaters, including the accessory equipment necessary at one fixed location operated by a licensee of UCL, LWBS or WIoT Licence is counted as one base station, irrespective of its operating frequency bands and/or mobile technologies adopted. The above principle will apply to different configurations, including as follows -

<u>Conventional BTS configuration</u>

(i) where amplifiers and/or repeaters are connected to a BTS, irrespective of whether such amplifiers and/or repeaters are within the same building[2] or not, the whole set of equipment

[2] Whenever the word "building" appears in this Appendix II, "building" refers to a single building, and includes (but is not limited to), any domestic or public building, sheltered bus stop, payphone kiosk, post, arch, bridge, train station, passenger terminal, tunnel, dock, pier, cavern or underground space adapted or constructed for occupation. For example, if a property development involves a number of towers or blocks, each tower or block would be regarded as an individual "building" at one fixed location. Likewise, if a property development involves integration or interfacing of one building with a different building (e.g. a tower with a transportation hub), each building would be regarded as an individual building.

so connected is regarded as necessary at one fixed location where the building housing the BTS is situated and counted as one base station; and where the BTS is co-located with another or more BTSs in the same equipment room or floor number (where applicable), and each BTS is connected to its own set of amplifiers and/or repeaters, the several sets of BTSs co-located together are also regarded as necessary at one fixed location where the building housing the BTSs is situated and are collectively counted as one base station;

New BBU, RRU and AAU configuration

(ii) where one or more RRU(s) and/or AAU(s) in a building are connected to a BBU within the same building, the whole set of equipment so connected is regarded as necessary at one fixed location where the building is situated and counted as one base station; and where the BBU is co-located with another or more BBUs in the same equipment room or floor number (where applicable), and each BBU so co-located is connected to RRU(s) and/or AAU(s) installed in the same building, the RRU(s) and/or AAU(s) together with the multiple BBUs co-located are also regarded as necessary at one fixed location where the building is situated and are collectively counted as one base station;

(iii) where RRUs and/or AAUs at one or more buildings are connected to the same BBU at another building situated at a remote location, each of the buildings housing the RRUs and/or AAUs is to be counted as a separate fixed location and each set of RRUs and/or AAUs within the same building is counted as one base station; and

(iv) where RRUs and/or AAUs in the same building are connected with more than one BBU which are co-located in the same equipment room or floor number (where applicable) at another

building situated at a remote location, the building housing the RRUs and/or AAUs is to be counted as one fixed location and the set of RRUs and/or AAUs installed therein counted as one base station; and if the BBUs are not co-located in the same equipment room or floor number (where applicable) of the remote building or they are scattered at different remote buildings, each set of RRUs and/or AAUs connected with one BBU is counted as one base station.

(c) a set of active transceivers, such as amplifiers, repeaters, RRUs and/or AAUs, including the accessory equipment necessary at one fixed location is operated by an SBO (Radio Relay) Licensee and connected to the BTS and/or BBU operated by another licensee, irrespective of the operating frequency bands and/or mobile technologies adopted, a similar approach of counting the number of base stations set out in the whole paragraph 1(b) above will apply to the SBO (Radio Relay) Licence by treating the BTS and/or BBU (connected with the active transceivers) of another licensee as if it were operated by the SBO (Radio Relay) Licensee itself.

Applications of the aforementioned methods for counting the number of "base station" under various examples are illustrated in paragraphs 2 to 5 below.

Example 1: BTS, amplifiers and/or repeaters located in the same building (for illustration of the principle in paragraph 1(b)(i))

2. As illustrated in Figure 1 below, one or more BTS cabinet(s) are installed inside the same equipment room of a building. The BTS cabinet(s) is/are connected to the antennas located at different locations to provide mobile coverage to different floors and areas. Where applicable, amplifier(s) and/or repeater(s) may also be installed to boost the signal strength along the feeder cables. Applying the principle as stated in paragraph 1(b)(i), the **BTS at the equipment room is regarded as necessary at one fixed location with the antennas, amplifier(s) and/or repeater(s) connected to the BTS as its accessory equipment**. The whole set of equipment is **counted as one base station**.

BTS = BBU + Active Radio Units in the same cabinet

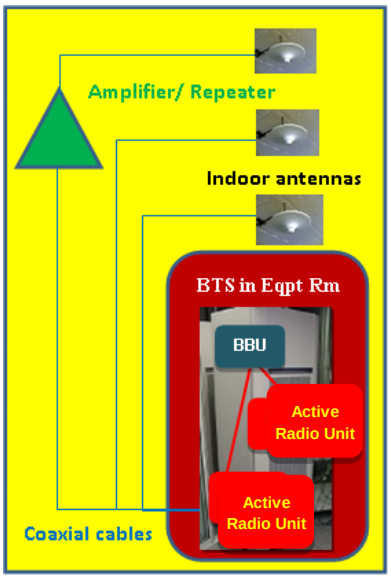

Figure 1 - Conventional BTS Configuration in a Building

Example 2: RRUs, AAUs and BBUs located in the same building (for illustration of the principle in paragraph 1(b)(ii))

3. Under the new radio access network ("RAN") design, multiple RRUs and AAUs may be installed remotely at the vicinity of the antennas instead of being co-located near the BBU, as illustrated in the case of a high-rise building in Figure 2 below.

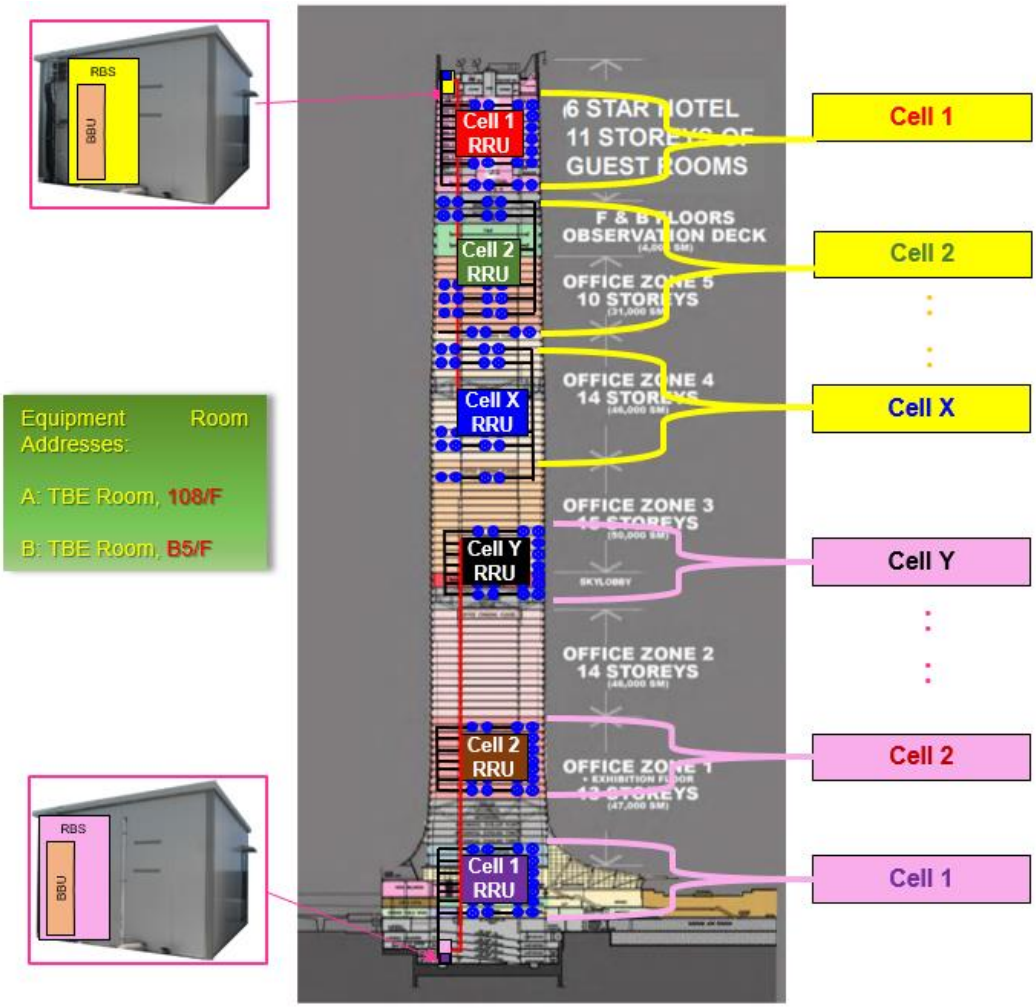

Figure 2 – High Rise Building with Multiple (X+Y) RRUs on Different Floors Connected with Two BBUs in Two Equipment Rooms

Applying the principle as stated in paragraph 1(b)(ii), the X number of RRUs in yellow connected to the BBU at 108/F of the building would be counted as one base station, and the Y number of RRUs in pink connected to the BBU at B5/F would be counted as another base station, i.e. a total of **two base stations would be counted for two sets of RRUs connected to two separate BBUs at**

different floors. However, if the two BBUs were to be co-located at the same equipment room, the whole set of equipment including all RRUs and/or AAUs connected to their respective BBUs would be counted as one base station at one fixed location.

Example 3: RRUs and/or AAUs located in a building separated from BBUs (for illustration of the principles in paragraphs 1(b)(iii) and 1(b)(iv))

4. Under the new RAN design, RRUs and/or AAUs could also be deployed under a Cloud-RAN (or BBU hotel) configuration, whereby several BBUs are co-located at the switching centre of the mobile network operator ("MNO") and are connected to multiple RRUs or AAUs located at different buildings remotely (e.g. across streets), as illustrated in Figure 3 below.

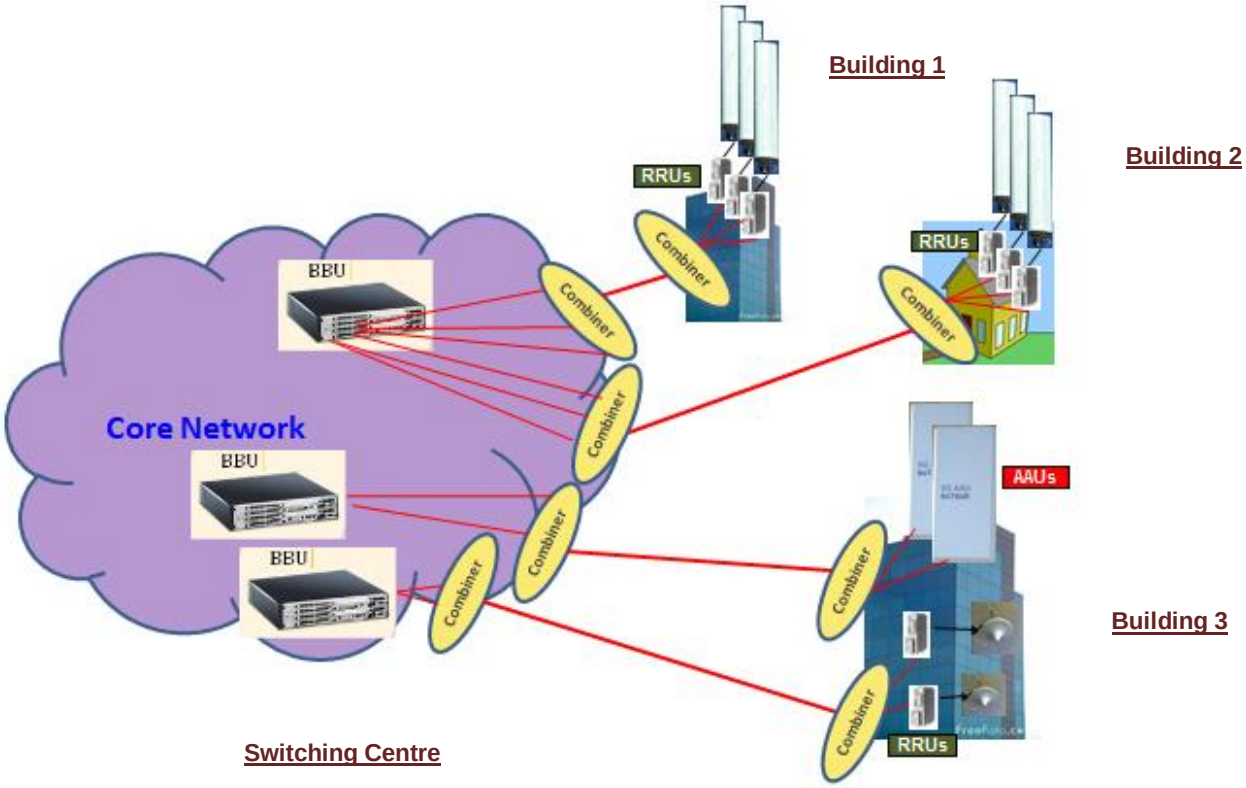

Figure 3 – Cloud RAN (or BBU Hotel) Configuration

Applying the principle as stated in paragraph 1(b)(iii), **a set of RRUs and/or AAUs installed at one building which are connected to one BBU would be counted as one base station** (see Building 1 in Figure 3), and **RRUs and/or AAUs installed at two different buildings, despite being connected to the same BBU, would be counted as two base stations (**see Buildings 1 and 2). Applying the principle as stated in paragraph 1(b)(iv), **when RRUs and/or AAUs at one building are connected to two BBUs which are not co-located in the same equipment room or floor number (where applicable)** (e.g. in different equipment rooms or at different floors of a building) (see Building 3), **two base stations would be counted**.

Example 4: Amplifiers and Repeaters of SBO (Radio Relay) Licensees (for illustration of the principle in paragraph 1(c))

5. Applying the principle as stated in paragraph 1(c), a similar approach of counting base stations for MNOs applies to a relay network operated by SBO (Radio Relay) Licensees, which usually comprises amplifiers and repeaters to boost the radio signal from the preceding BTS equipment operated by MNOs. **Amplifiers and repeaters operated by an SBO (Radio Relay) Licensee and connected to a preceding BTS (operated by another licensee) is regarded as necessary at one fixed location and counted as one base station under the SBO (Radio Relay) Licence**, as if the BTS were operated by the SBO licensee itself.