RADIO ADVISORY BOARD OF CANADA
CONSEIL CONSULTATIF CANADIEN DE LA RADIO

July 14, 2022

Mr. Luc Delorme
Senior Director, Spectrum Management Operations
Engineering, Planning and Standards Branch
Innovation, Science and Economic Development Canada
235 Queen Street, 6th Floor
Ottawa, ON, K1A 0H5
(Submitted by email)

Subject: **Draft CPC-2-0-20, Issue 2, *Radio Frequency Exposure – Site Compliance and Access Control***

Dear Mr. Delorme,

In June 2022, the Department requested the RABC provide an initial review of draft Issue 2 of CPC-2-0-20, Issue 2, *Radio Frequency Exposure – Site Compliance and Access Control.* The Board assigned the review of the document to its Safety Code 6 Subcommittee.

The Subcommittee held two calls to review the document. Approximately 20 members participated. The attachment to this letter includes comments and suggestions that were received directly from members. The comments have not been consolidated into a consensus submission. We understand the Department will proceed with a public consultation on the proposed document; RABC intends to participate and will provide its consensus advice at that time.

We appreciate having had the opportunity to provide an initial review of the updated document

Sincerely,

J. D. Farnes

J. David Farnes
General Manager

Attachment

c.c. Heath Lariviere, Director – Spectrum Operations, Heath.Lariviere@ised-isde.gc.ca
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CPC-2-0-20 Issue 2 June 2022 (Draft)
Radio Frequency Exposure — Site Compliance and Access Control

Compilation of comments and request for clarification from RABC members

General comments

CBC/Radio-Canada

This draft CPC-2-0-20 Issue 2 provides a lot more information on access control than the previous version. A lot of the information found in the document formalizes common knowledge / good practices established by operators/ISED over the recent years. It's very good to have this information officially included in the document to avoid potential disputes or misunderstandings for the different parties involved.

RCMP

I think each site should have its own RF radiation map as an integral part of "signage"; a so-called red zone clearly identified at the entrance way of a radio site where one should avoid extended exposure. The comment about a scan code to the site's current SC6 status was a very "progressive" statement.

CAB

The CAB suggests the addition of a new section, "Definitions".

SHAW

This draft provides much more detail than the previous issue but is primarily focused on towers and rooftop antenna installations. The document needs to be expanded to cover other increasingly common types of antenna installations such as indoor small cells and distributed antenna systems, outdoor small/micro cells mounted on street furniture, buildings, aerial strand, etc.

1. Introduction

(No comments)

1.1. Mandate

(No comments)

1.2. Application

CBC/Radio-Canada

The definition of “Work-related activities” is good. The document introduces a more "hands-on" description of who can be present in a controlled environment. People working in a controlled environment should also meet the Health Canada SC6 definition.

Eric Poppleton (Member of CABC)

The definition of Controlled Environment here differs greatly from the definition in Safety Code 6. In SC6 there is a 3-part test to determine if an area is a CE or not. Here the definition is more like "Restricted Access"

STAC

Require clarification of this: does this change the definition of an RF worker? Whose responsibility is it to provide education to “non-RF workers”?

CAB

1st paragraph refers to the controlled environment (CE). The Department should either adopt the Health Canada definition or propose a different term if a different area is intended.

The CAB supports the clarification of “work related activities” in the Note highlighted in 1.2.

2. Responsibility

CBC/Radio-Canada

The contact and induced currents statement is in bold letters... Is it to put emphasis on its importance? Because there was no reference to it in the previous version of the document before?

Eric Poppleton (member of CABC)

"entire site" - what does this mean? There was some discussion on the calls about that. For an AM site, is it just the area around the towers, or the entire property? For a hilltop/mountain site with numerous towers stretched overs 10s or 100s of meters, what is the "site"?

2nd paragraph speaks to each proponent and operator openly sharing installation parameters and working cooperatively. In my experience, this is a practical nightmare for a loaded facility. I suppose it will get better in terms of the availability of contact information proposed in Annex B. Also it is my experience that it can be difficult to get system information from cellular operators.

it's great to have contact information available for proponents/operators, but what kind of response time can reasonably be expected? Non-working hours, vacation, staffing changes all are hurdles here.

François Gauthier (Member of CABC)

“entire site”: could the department defines what Entire Site means? Does one license owner is responsible for the guy wires on a tower located at 600m from your own tower. Where does “entire site” ends.

“PROPONENT”: What is the definition? Proponent, landlord or operator should all be merged and changed to “Licensees”

“In some circumstances…arrangement with owner”: to my knowledge, a person entering a CE for the purpose of its work falls within their Provincial Labor Law (CNESST, WSIB, etc.). This paragraph should be removed from the CPC or just say that this should be taken care of by the Provincial Labor Laws.

STAC

1st paragraph: While certainly the goal of an operator, the Legal community may need wording more like "must make reasonable efforts to ensure compliance at all times".

3rd paragraph: Based on information requested in annexes, this is an additional burden that does not provide any benefit; all information is already in the databases
-General agreement that this is not feasible for large operators
-Operators already work with each other to ensure compliance on a site-by-site basis with the last operator making a change responsible for doing so
-Rogers notes that they have a policy to post the NOC phone number at sites

Last paragraph: Need clarification with regards to multi-tenant rooftops, for example: would they be required to have individual arrangements with the landlord, or can it be consolidated with the last tenant making adjustments taking responsibility to lead?

What is the intention and what is the metric they will use to measure whether it's ascertained?

CAB

The term “proponents and operators” is vague and used throughout the document. This could be clarified under Definitions. Also, reference to licensees should be used, especially in sections referring to enforcement by the Department.

“Entire site” requires definition. Every antenna installation has many factors which contribute to the area that a licensee may be responsible for, such as property boundaries or a portion of a roof top. This is especially complex for shared sites or antenna installations in close proximity.

The 2nd paragraph of section 2; Responsibility is especially difficult for licensees to comply with if other “proponents or operators” at or near their site are not cooperating in a timely manner. Possibly there should be an obligation on licensees to share system installation parameters and work cooperatively within a specified time period.

Section 2, 3rd paragraph, 2nd sentence, “See the Annexes…” should be deleted. The CAB recommends that up to date contact information should be available by electronic means for all authorized personnel, including the Department. How to access the list of contacts could be posted within the transmitter building or equipment room as appropriate (i.e., a secure area that is only accessed by authorized personnel). The CAB does not believe that this information should be posted in controlled environments (CE’s) visible to the general public, such as fenced tower bases and guy anchors. Names of individuals or personal phone numbers should not be included. Rather, contacts can be described by role or position. Hence, Annex B can be deleted.

Also, provision must be made to respect confidentiality of licensees, operators, or owners where necessary.

Similarly, Annex A refers to information that must be posted at all access points, which would be visible to the general public. Posting the name of the licensee or operator can draw undue attention from disgruntled citizens, political activists or terrorists. A contact telephone number is all that should be required. The contact telephone number should voicemail, which can be responded to during normal business hours. Alternatively, the FCC in the US maintains a database of antenna structure registration; https://www.fcc.gov/wireless/systems-utilities/antenna-structure-registration#determine. The Department could have a similar mechanism for Canada.

The last paragraph of section 2 should be deleted. This point has already been addressed in section 1, and the scope of this CPC is to protect the general public in uncontrolled environments (UE).

SHAW

Is there a reason "entire site" is underscored? Since there are many types of antenna installations (e.g., towers, rooftops, indoor, etc.), the terms "entire site" and "site" should be clearly defined.

“*at each antenna installation site, a list of all proponents and operators on the site and*
their up-to-date contact information be readily available” It may not be feasible for this information to be available at some antenna installations (e.g., antennas mounted on lamp posts).

3. Compliance and Enforcement Measures

Eric Poppleton (Member of CABC)

Paragraph 3, Item 2) - change in physical environment - I had a broadcast client authorized to operate on a cell tower. A condo development started less than 100 meters away, with building height and balconies of concern for a broadcast installation. They ended up moving to a different tower, but had they built there, they would have had to reduce power to be compliant. Not sure what the solution is here, other than better landlord/tenant communication (the cell operator would probably have been notified/aware of the proposed construction, but the other tower tenants would not).

François Gauthier (Member of CABC)

"or in close proximity to": please define close proximity, does a fence must be included to protect the close proximity of another fence where the UE limits exceed?

STAC

1st paragraph: Would be better stated as "the area must be restricted with appropriate barriers and signage to prevent public access"

Need clarification on the definition of "in close proximity to"

Suggestion that this should reference restricting access to a reasonable person; cannot completely ensure you restrict access to someone who is dead-set on getting somewhere

2nd paragraph: To maintain awareness of the radio environment, operators would need to check if other operators have changed their conditions as well. This should be a step added to the site inspection regime.

CAB

"Close proximity" is used throughout the document and requires definition to ensure uniform interpretation across the country.

It should be clarified that the licensee causing an area to exceed UE limits should be the one that is immediately required to take corrective measures. A nearby

licensee that is in compliance should not be forced to reduce power or shut down because of non-compliance by others.

Section 3, last paragraph; Proponents and operators should be changed to licensees. The Department may not have authority to take enforcement action over other parties.

4. Access Control Requirements

CBC/Radio-Canada

Re: "*Guy-wires and associated anchor points… As neither numerical analysis methods, nor current computer simulations, are able to accurately assess the RF energy,*" General comment for the group: This is an issue for broadcasters since they operate at high power systems at frequencies below 110MHz. CBC is starting to look into computer simulations to better assess the level of RF energy at guy wire anchor points.

"*Construction of new access controls may be required even though anti-climbing devices are already installed*." Clarification requested: We assume this would only apply if the site presented levels above the UE limits?

Summary, during the 7-year transition:

- Existing or modification to existing access controls = meet requirements of 4.2
- New or replacement of access controls =meet requirements of 4.3

"*A site which has been assessed, and deemed compliant by ISED between the release of CPC-2-0-20, Issue 1 (March 2013) and the date of publication of this document, will continue to be considered compliant*" This point is extremely important for operators. We can't afford our transmission sites to become non-compliant overnight when the new version of this document is published. We understand that if a site was deemed compliant, operators will have 7 years to meet the new more stringent requirements (section 4.3). In the meantime, it should be status quo. We now understand it might not be the case since some sites may have been considered compliant by ISED in the past and may not necessarily meet all the requirements of section 4.2. This is a problem for us.

Eric Poppleton (Member of CABC)

- Paragraph 3 - guy wires - The importance of measuring guy wires has been better defined in the past few years, but measurements are increasingly complex/impractical given the new requirements in GL-01 (measurement guidelines) for any sites that have cellular operations. In GL-01, two approaches are suggested, either 1) operate the base station in a special test mode where all channels push maximum power or 2) simulate maximum power using cell-enabled laptop or cell phones doing intensive network operations. For a non-cellular proponent, these measurement challenges are burdensome. In asking ISED about the GL-01 changes, their advice was to do calculations for all cell sites, avoiding the cumbersome measurements. Great, but what about sites with guy anchors that we need to measure? It's a chicken and egg situation.
- final paragraph - I appreciate greatly that the draft has included "site-specific guidance" as available from ISED. There needs to be flexibility in interpreting what's needed at a given site for reasonable access control

François Gauthier (Member of CABC)

Note on Vegetation: does the usage of cliffs, highway side, is acceptable?

STAC

Planned events exceeding limits should be accompanied by risk mitigation plans, etc.

CAB

Access Control Requirements, paragraph 5; There may be existing sites (possibly AM sites or remote installations) where the Department has agreed that the site is in compliance under the current CPC. Some of these sites may not meet the new requirements of 4.2 Existing Access Controls. It will not be reasonable or practical for these sites to immediately be in compliance with the new rules on the date that the new CPC takes effect. Upgrades of existing control measures will incur significant financial cost and require engineering resources. This is unreasonable considering the Department has deemed these sites to be acceptable. The CAB recommends that these sites could be given a reasonable period of two years to upgrade to the new requirements. This period would take into account the extended length of time it takes to complete construction projects such as availability of resources, the season, weather conditions and/or remote locations.

Throughout the document the Department refers to "as well as any additional requirements set out by ISED". As the new requirements are much more stringent and prescriptive than the current CPC, it would be helpful to have examples of what those additional requirements could be. Also, it is important to have uniform and consistent application and enforcement by the Department across all regions.

Section 4, 2nd last paragraph; The CAB recommends that the first sentence be modified to delete "…and meet the Existing Access Controls requirements as outlined below in section 4.2." That is, existing sites deemed compliant by ISED under CPC-2-0-20, Issue 1 (March 2013) remain compliant until the publication date of this document. Further, the CAB recommends that licensees be given a period of 2 years after the publication date of this document to upgrade their sites to meet the Existing Access Controls requirements as outlined below in section 4.2. The CAB acknowledges that the Department strongly urges licensees making changes to upgrade to the requirements of 4.3 Construction of New Access Controls as they will be required after 7 years anyway.

4.1. Physical Barriers

4.2. Existing Access Controls

CBC/Radio-Canada

A locked access point for workers inside a controlled environment can become a safety issue in case of an emergency. This exemption was confirmed in a previous subcommittee meeting, thank you for including it in the document!

Eric Poppleton (Member of CABC)

Others have commented that not all doors/gates can be locked while workers are present on site as it could create an egress issue in case of an emergency

RCMP

This is a very real concern for RCMP technicians in the rare case they are working at a remote site as a single worker. Self-locking doors. This is a serious RCMP radio technician safety issue.

CAB

The CAB emphasizes that access points must be unlocked when personnel are on site for their safety and so that emergency responders can access the location.

Guidance should be provided on the Department's expectations regarding snow accumulation and fencing. An accumulation of 4 m. or more is not unheard of at some remote locations.

4.2, 2nd bullet; What criteria will be used for Existing Access Controls to demonstrate that openings and clearances are small enough to preclude access by children?

SHAW

7th Bullet - "*on a tower*" Another common example would be an antenna mounted on a lamp pole or aerial strand.

"*the antenna supporting structures must be equipped with anti-climbing devices*" This requirement is too general. For example, it wouldn't be practical or necessary to install an anti-climb device on a lamp post that supported an antenna.

4.2.1 Modifications to Existing Access Controls

CBC/Radio-Canada

"*Dans le cas où une clôture ou une barrière répond aux exigences de la section 4.2, mais dont la hauteur n'est pas suffisante pour empêcher une personne de la franchir***".** Clarification requested in the French version, the statement, as it reads, is contradictory.

"*Comply with any additional requirements set out by ISED*" Could ISED provide examples of additional requirements? This appears a bit vague.

Eric Poppleton (Member of CABC)

Barbed wire spacing, 105 mm from adjacent strands. I think that there needs to be some flexibility here. In rural settings, with towers in farming fields, barbed wire is a common deterrent for animals and also two-legged species. Is it possible to allow for the use of barbed wire in some locations? I realize then we have to define what's rural, what's remote, etc.

STAC

Some concerns about concept of local ISED officials applying criteria outside official regulations

CAB

The CAB suggests that "proponents and operators" could be changed to licensees or authorized representative.

SHAW

1st sentence - There should be an adequate transition period (e.g., 90 days) for proponents and operators to make modifications to existing access controls that do not meet the new requirements in Section 4.2.

4.3. Construction of New Access Controls

CBC/Radio-Canada

"*Maximum separation between the ground and bottom of the access controls (in all locations) must not exceed 55 mm.*" The 55 mm requirement is too stringent and almost impossible to implement due to uneven terrain at transmission sites. The requirement should be relaxed. Suggestion: 15-20 cm

"*...a gate must be of at least the same height as, and have a ground clearance no greater than, the surrounding fence/barrier.*" Please explain the rationale behind this. As long as the gate respects the 1.8m height minimum, it should be considered high enough to prevent access, even if it's shorter than the surrounding fence/barrier. Why should the requirement be more stringent in this case?

"*Preferably, access controls should be constructed of non-conductive material; this is especially important at AM broadcasting sites.*" Comment to group: Chain-link fence is the most broadly used solution. Non-conductive alternatives are usually a lot more expensive. Does anyone have any recommendations regarding potential affordable non-conductive fences?

"*It is recommended that gates and doors be self-closing and self-latching where possible.*" In the French version the wording means: "Self-locking" instead of "self-latching" which is not desirable.

"Chain-link Requirements: Link openings must not allow a spherical object of greater than 55 mm to pass through." Clarification request: is the 55 mm requirement come from standard chain-link fences dimension? We should allow for slightly wider openings. Maybe 65 mm?

Eric Poppleton (Member of CABC)

Max separation between access controls is 55 mm. That's very difficult to achieve. Why is this space smaller than the maximum spacing between gates and posts given as 105 mm?

François Gauthier (Member of CABC)

Constructions of new barrier: A clear definition of the minimal barrier configuration should be provided (so just keep the General Requirements). All other specific fencing requirements should be moved into an annex "example of new fencing constructions", since this is only informative, and the General Requirements are the part that should be kept in force in the circular. NOTE: there is no mention of environmental conditions that can count as acceptable (cliffs, non-accessible areas).

STAC

Would like to see reference to "seasonal snow accumulation" as is referenced elsewhere in this document

Self-latching is acceptable but self-locking could pose a safety hazard

Self-latching gates and doors should be able to be opened to leave the CE at all times. (e.g. in the unlikely event someone gets in there, they should be able to get out and not be locked into an unsafe area.)

"*Choice of species and treatment of wood (both for posts and fencing/barrier material) must be such that it does well in wet environments;*" Should be suitable to the climate in which it is intended. Dry climates or extended freezing can also present issues.

CAB

The CAB agrees with the comments of CBC Radio-Canada in section 4.3.

Section 4.3, 6th bullet; As noted for section 4.2, guidance should be provided on the Department's expectations regarding snow accumulation and fencing.

The CAB supports the proposal that there should be one set of guidelines for ground clearances, barrier heights, and spacing between posts and gates so that there is uniform application across the country. However, site conditions and terrain can make it impossible to meet the proposed clearances in some situations. Site specific exceptions should be permitted. The Department is requested to provide the references or standards which form the basis of the proposed clearances.

4.3, 9th bullet; The height and ground clearances for gates can be especially problematic to ensure reliable and safe operation in all seasons and weather conditions.

4.3, 11th bullet; As noted in 4.2, the CAB emphasizes that access points must be unlocked when personnel are on site for their safety and so that emergency responders can access the location.

4.3, 14th bullet; The CAB recommends against self-closing and self-latching gates and doors. These can compromise the safety of personnel when on site and impede first responders. Further, self-closing and/or self-latching gates are not practical or reliable in Canadian weather conditions.

Chain link and wood fence requirements:

a. As noted above, the Department is requested to provide the references or standards which form the basis of the proposed clearances.
b. It may be acceptable to have a greater interval spacing between support posts depending on the size, strength and design of the fence supporting members.

SHAW

"*in these scenarios, the antenna supporting structures must be equipped with anti-climbing devices*" Again, this requirement is too general and wouldn't be practical in some situations.

"*Wood Fence (Vertical Boards) / Wood Barrier*" - Suggest replacing "Wood" with "Solid" since wood is not the only building material that could be used (e.g., PVC, concrete, stone, brick), as noted in Section 4.1, Physical Barriers.

4.4. Non-tower Structures

CAB

1st bullet: The CAB emphasizes that access points must be unlocked when personnel are on site for their safety and so that emergency responders can access the location.

SHAW

"*Rooftops"* There are other examples of antenna installations that should be considered here, including: indoor small cells or distributed antenna systems mounted on interior ceilings or walls; outdoor small/micro cells mounted on building walls, lamp posts, aerial strand, etc.

4.5. Alternate Access Controls

CBC/Radio-Canada

Could ISED please provide an example of an accepted alternate access control for the benefit of the group? Thanks!

Eric Poppleton (Member of CABC)

When ISED is consulted about plans for compliance is there any guidance on reasonable time windows for responses? If a proponent needs to reduce power or turn a service off to be compliant, naturally they will want to get the situation resolved as soon as possible. We run in the same non-working hours, vacation, etc. as above.

5. Signage

CBC/Radio-Canada

"*It shall not display any images or symbols related to the Government of Canada signature, including the "Canada" wordmark, logo or any other symbol or image of the Government of Canada corporate identity*" Could ISED please confirm this is strictly a reference to the wordmark Canada and not the word "Canada'' itself. Otherwise, names like "CBC/Radio-Canada'' would not work. Same for RCMP = Royal Canadian Mounted Police. GRC = Gendarmerie Royale du Canada. (Yes, already confirmed by ISED)

They should be recommended signs like there was in the previous version of this document. It would be very useful for the operators and the general public. If the RF signs are identical or at least very similar everywhere in the country (and in the world), they become more easily recognizable for the public.

Eric Poppleton (Member of CABC)

- there should be sample graphics of approved signs

François Gauthier (Member of CABC)

A real example of the representation of a RF sign panel should be provided in the CPC that meets the TC requirements (no example exists anymore).

CAB

It was noted that Health Canada no longer provides examples of acceptable signage. The CAB recommends that images of either the tower or satellite dish currently in use should be deemed acceptable and appended to the CPC document.

SHAW

It may not be practical to install signage in all circumstances. For example, it wouldn't be practical to install demarcation signs for an antenna mounted on an aerial strand.

6. Corrective Measures

6.1. Temporary Measures

CBC/Radio-Canada

"*A period of 90 days would typically be considered sufficient time to implement permanent corrective measures.*" The 90 days requirement will be a challenge, especially for implementing corrective measures in remote locations. Suggestion for 120 days.

Eric Poppleton (Member of CABC)

Does "attended" include on-site security personnel that restrict access to rooftops? Security personnel are listed as a temporary corrective measure further down. It also says security personnel need to be made aware of the potential exposure to RF energy and be able to give guidance on where the general public cannot enter. This could be very difficult to do. One idea I have is for signage to include a QR code that would link to a document or drawing that could inform what areas of a site/rooftop should be avoided.

There is a 90-day period to implement permanent measures. In Canadian winters, especially at higher elevations, this timeline is problematic, but I assume that ISED would be flexible.

STAC

Proposed 90-day implementation of permanent corrective measures is very tight and may not always be feasible; should be increased to at least 120 days

CAB

The CAB notes that where corrective measures are required, temporary measures must be put in place until permanent measures are approved by ISED and implemented. The proposed one-week timeframe to present a plan to ISED may be reasonable to present desired solutions to ISED. However, additional time will be required to produce engineering drawings, obtain permits, evaluate vendor quotes and confirm a viable solution. Similarly, 90 days may be sufficient time in some instances to implement permanent corrective measures. But many factors such as availability of contractors, site location, the time of year and weather conditions can create significant delays. The CAB agrees that licensees should be in regular contact with ISED to communicate any delays.

E-comm911

Suggested wording: "*Where the RF energy levels at, or in close proximity to, an antenna installation site are found to exceed the UE limits in any area which is accessible to the general public, ISED requires that corrective measures be implemented without delay. Operators shall not leave a site* ***unsecured*** *until the site is brought into compliance, unless extenuating circumstances arise; these circumstances and the proposed corrective measures must be discussed with ISED prior to the site being left* ***unsecured***."

6.2. Notification

(No comments)

7. References

SHAW

(7) - The correct title of this reference is "Technical Guide for Safety Code 6: Health Canada's Radiofrequency Exposure Guidelines"

8. Annexes

Eric Poppleton (Member of CABC)

- potential privacy concerns for posting employee names/phone numbers

- in general, I think building managers will freak out about signage that describes any kind of potential safety hazard. The solution is education, but it will be a slow, bumpy process.

Rogers

Our biggest concern is the requirement to post a list of operator contacts at the site as outlined in Annex A and B. Our site technicians frequently change; we would prefer to keep it to a more general contact to avoid having to update this information at each site on a constant basis.

François Gauthier (Member of CABC)

Annex A and B should be removed: way too difficult to implement for smaller operators.

Annex A: Template - Contact information – all access points

CBC/Radio-Canada

Although there could be some value to posting such information at transmission sites, we have concerns:

This could have the potential of triggering false alarms and various "unwanted" requests from the general public.

We are questioning the additional value of having this information easily visible from all access points. Typically, someone looking for this information would go to the main entrance/building of the site.

Annex B: Template - Contact information – posted inside the controlled environment

CBC/Radio-Canada

For whom is this information intended? Who would benefit? ISED? Contractors? Other? The proposed requirements from Annex B appears to be an unwanted burden for operators:

- The site technicians will often change, and the information will be hard to keep up to date. A general site contact information should be more than sufficient ex. Number to reach a national operations/surveillance center. (NOC)

- The contact information for all the active operators should already be available and up to date in ISED databases. It should be easy to look up online.

- Suggestion: create an automatic downloadable site contact information from ISED's databases. It would always be up to date.

- Typically, would this information be posted inside a transmission building? If so, how would this work for a multi-building transmission site?

- Will operators with undisclosed services/frequencies will be exempted from this requirement?

SHAW

Also, how would this information be posted at antenna installations where there is no central communication shelter or room and/or where the antennas may be distributed around the site. Examples include indoor small cells or distributed antenna systems mounted on the ceiling or walls; and outdoor small cells mounted on the side of the building or on street furniture such as lamp posts)?