POLICY LETTER	C&E Mobility Policy (Standard)		at&t
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C&E Mobility Program Office	**ATT-CEM-13002**	**4**	**01/11/2016**
Title:		Next Review Date By:	Approved By:
FIF Installation & Grounding of 3G/4G RF and DC Equipment		**01/11/2017**	Dan De Leo

Subject: Guidelines for grounding distributed UMTS/LTE RF and DC equipment in FIF racks

Date: 01/06/2016

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Exceptions to Policy:

Due to the large number of sites affected and the associated costs involved, effective upon issuance of this policy, upgrading of **existing** FIF frames to meet the requirement to isolate communications equipment found in ATT-TP-76416 is no longer required unless either of the following occurs:

1. Markets have budgeted to upgrade existing FIF racks to comply with grounding standards and those upgrades will not delay scheduled launch dates for the applicable project
2. Sites with service affecting problems related to improper grounding, including a lack of isolated grounding, must update the grounding to comply with AT&T standards, including those related to isolation of communication equipment, as soon as possible

All other sites may remain as they are currently configured provided equipment is grounded

Approved FIF racks must be used on all new installations (new or existing sites). Those racks are identified in ATT-CEM-14002 and listed below. **New racks must meet all grounding standards when installed, including isolation of communications equipment, both for existing technologies (3G/4G) and any future technologies**.

ITEM NUMBER	MANUFACTURE PART #	ITEM DESCRIPTION	MANUFACTURER
NEQ.17861	PTS3702-1515	Communications Bay with 15/15 fuse panel	PTS
NEQ.17862	PTS3701-1515	Hybrid Bay with 15/15 fuse panel and 72 Fiber Tray	PTS
NEQ.18217	017-4011-0123-0168	Communications Bay with 15/15 fuse panel	Telect
NEQ.18218	017-4011-0123-0169	Hybrid Bay with 15/15 fuse panel and 72 Fiber Tray	Telect

NOTE: **NEQ. 18217 was formerly NEQ. 17869; NEQ. 18218 was formerly NEQ. 17870**

Revision History:

REV 4 updates:

- "*Exceptions to Policy*" added

REV 3 updates:

- Corrected part # for Burndy 2-hole lug (#10-14 AWG wire)
- Clarified 2-hole lugs in Option #1 for sizes other than 1" OC
- Clarified ground wire size between rack and CRGB

REV 2 updates:

- Added Olympus equipment (Cisco 2911 and DPS NG480) to Table-A
- Revised C-tap part numbers in Table-A

Summary:

Per AT&T grounding policy, ATT-TP-76416, "communications equipment" such as the UMTS or LTE BBU (baseband unit) must be isolated.

The objective of this Policy Letter is to provide guidance on two methods of installing and grounding UMTS and LTE distributed equipment which meet the requirements of ATT-TP-76416

Audience:

- AT&T Equipment Engineers and Implementation Project Managers
- Turf vendors and contractors performing installation work

Guidance on Implementing:

Two options are recommended for proper grounding isolation of the RF equipment associated with distributed RF hardware used in UMTS and LTE. RF equipment includes the BBU and alarm panel (ALU eAM or Ericsson SAU for example). Also included is the method to properly ground the DC equipment (such as Raycap devices), ancillary equipment such as fiber management trays and DC trunk cables.

Options are explained in the following pages.

NOTE: These guidelines are directed at new installations. There are currently no plans or requirements to retrofit previously installed commercial sites.

OPTION #1: Combined RF & DC equipment in a single rack

DC Equipment:

1. The FIF rack itself is NOT isolated (no isolation pad is installed between the rack and floor)
2. DC equipment, including the DC bus bar, are mounted directly to the FIF rack
3. DC devices, such as the Raycap rack mount DCx-48-60-RM, are mounted directly to the FIF rack and bonded to the DC bus bar utilizing a #6 AWG wire with a 2-hole compression lug
4. The DC bus bar will be bonded to the "P" section of the Cell Reference Ground Bar (CRGB) utilizing a minimum #6 AWG wire and 2-hole compression lug per ATT-TP-76416, Section 7, 7.7.1.1
5. Mount the DC bus bar near the top of the FIF so that the distance to the CRGB is minimized
6. Mount the initial Raycap below the DC bus bar. Additional Raycaps will grow downwards towards the RF equipment
7. DC trunk cables will have the ground wire, along with the drain wire in shielded cables, connected to the DC bus bar or the Raycap ground connections utilizing 2-hole compression lugs. For shielded cables the actual shield is not grounded (the drain wire performs this function)
    a. When bonding to the DC bus bar it is acceptable to bond to both sides of the bar to conserve termination points if necessary provided the required hardware is properly installed
    b. In situations where the number of 2-hole lug termination points are limited, it is acceptable to C-tap the #12 AWG drain wire to the #10 AWG ground wire. The #10 AWG ground wire is then bonded to the DC bus bar or Raycap utilizing a 2-hole compression lug
    c. 2-hole compression lugs must have 1" OC hole spacing to fit the older style Raycap ground adapter or the ground bus bar specified in Table-A. For connections other than 1" OC (5/8" or 3/4" OC as examples) use the appropriate 2-hole compression lug

RF Equipment:

1. RF equipment, including the BBU and alarm module, must be isolated from the FIF frame. Figure 1 below shows the use of insulation pads to be mounted between the FIF rail and 19" to 23" extension bracket. The bracket will be secured using insulator bushings. See Table-A for Telect part #'s for mounting kits which include 19"-23" extension brackets, insulation pads and insulation bushings
    a. Telect extension brackets should be used to accommodate the insulation bushings
2. A separate RF bus bar will be mounted on insulation pads or isolation standoffs towards the bottom of the FIF and bonded to the "I" section of the CRGB utilizing a minimum #6 AWG wire and 2-hole compression lugs

Miscellaneous Equipment:

1. Fiber management trays may be grounded using one of the following methods:
    a. Bonding to the RF bus bar if mounted on insulation pads
    b. Bonding directly to the FIF frame provided external toothed lock washers are used on all painted surfaces including the extension brackets and FIF frame rails

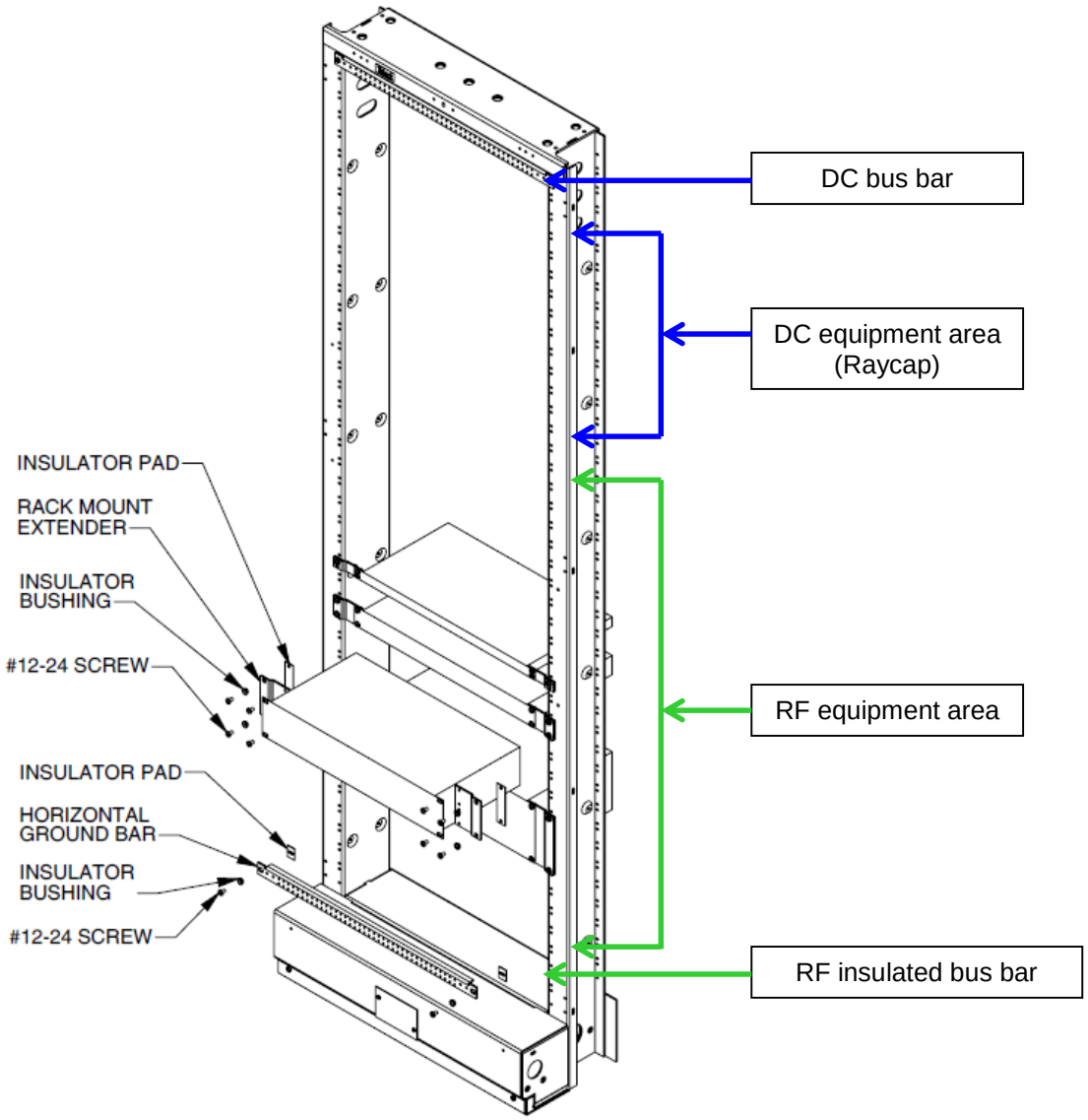

Figure-1
Single Rack Option

Table-A below lists the isolated 19" to 23" extension brackets, ground bus bars and hardware required when installing DC and RF equipment in a single rack, as described in Option #1 and shown in Figure-1.

Select the required quantity of each size adapter kit based on the RU height of RF equipment being installed in the FIF. Hardware is included with each item (mounting screws and insulated bushings). For equipment that does not have an exact RU match to the items listed use the next larger size.

One each of the isolated and non-isolated ground bus bars are required. Also included are part numbers for common items such as 2-hole compression lugs and C-taps to be used when grounding the DC trunk power cable ground wire (and drain wire if applicable).

NOTE: 2-hole connections other than 1" OC are not listed. Use the appropriate lug as required.

Item #	Item Description	Unit Cost	Mfr. Part #	Applicable Equipment
NEQ.16004	Isolated PNL adapter w/HDWR & ISO Pad; **½ RU**, 23-19 EIA (Telect)	20.00	02117-005I	ALU eAM Ericsson SAU
NEQ.16005	Isolated PNL adapter w/HDWR & ISO Pad; **1 RU**, 23-19 EIA (Telect)	22.50	02117-01I	Fiber management tray(s) DPS NG480
NEQ.16006	Isolated PNL adapter w/HDWR & ISO Pad; **2 RU**, 23-19 EIA (Telect)	25.00	02117-02I	ALU BBU, Ericsson BBU, Cisco 2911
NEQ.16007	Isolated PNL adapter w/HDWR & ISO Pad; **3 RU**, 23-19 EIA (Telect)	27.50	02117-03I	(as needed)
NEQ.16009	Ground bar, 23" dual hole (Telect)	85.00	02114-A23	DC equip (Raycap)
NEQ.16010	Ground bar, isolated, 23" dual hole (Telect)	90.00	02114-A23I	RF equip (BBU, alarm mod)
n/a	Burndy #6 AWG, 2-hole lug w/IW, 1" OC, ¼" bolt size	n/a	YAZ6C2TC14E1	Ground lug for bus bar or Raycap ground adapter
n/a	Burndy #14-10 AWG, 2-hole lug w/IW, 1" OC, ¼" bolt size	n/a	YAZV102TC14E1	Ground lug for bus bar or Raycap ground adapter
n/a	Panduit #6 AWG, 2-hole lug w/IW, 1" OC, ¼" bolt size	n/a	LCD6-14D-L	Ground lug for bus bar or Raycap ground adapter
n/a	Panduit #14-10 AWG, 2-hole lug w/IW, 1" OC, ¼" bolt size	n/a	LCD10-14D-L	Ground lug for bus bar or Raycap ground adapter
n/a	Burndy #10 to #12 AWG C-tap	n/a	YC10C10	Ground & drain wire C-tap
n/a	Panduit #10/14 to #12/16 AWG C-tap	n/a	CTAPF10-16-C	Ground & drain wire C-tap

Table-A

OPTION #2: Separate racks for RF and DC equipment

As an alternative to combining RF and DC equipment, separate FIF racks may be used as pictured in APEX documents ATT-002-290-370 and ATT-002-290-531 (UMTS and LTE Operations Guidelines respectively).

DC Equipment FIF:

1. The FIF rack itself is NOT isolated
2. DC equipment, including a bus bar, are mounted directly to the DC FIF rack shown in Figure 2
3. DC devices, such as the Raycap rack mount DCx-48-60-RM, are mounted directly to the DC FIF rack and bonded to the DC bus bar utilizing a #6 AWG wire with a 2-hole compression lug
4. The DC bus bar will be bonded to the "P" section of the Cell Reference Ground Bar (CRGB) utilizing a minimum #6 AWG wire and 2-hole compression lug per ATT-TP-76416, Section 7, 7.7.1.1
5. Mount the DC bus bar near the top of the FIF so that the distance to the CRGB is minimized
6. DC trunk cables will have the ground wire, along with the drain wire in shielded cables only, connected to the DC bus bar or the Raycap ground connections utilizing 2-hole compression lugs. For shielded cables the actual shield is not grounded (the drain wire performs this function)
    a. When bonding to the DC bus bar it is acceptable to bond to both sides of the bar to conserve termination points provided the required hardware is properly installed
    b. In situations where the number of 2-hole lug termination points are limited, it is acceptable to C-tap the #12 AWG drain wire to the #10 AWG ground wire. The #10 AWG ground wire is then bonded to the DC bus bar or Raycap utilizing a 2-hole compression lug
    c. 2-hole compression lugs must have 1" OC hole spacing to fit the older style Raycap ground adapter or the ground bus bar specified in Table-A
    d. C-taps applicable to bonding the drain to the ground wire are shown in Table-A

RF Equipment:

1. RF equipment, including the BBU and alarm module, are mounted directly to the RF FIF as shown in Figure 2 below.
2. Per ATT-TP-76416, the RF FIF is considered communications equipment and as such, must be isolated.
    a. Isolation should be accomplished using Telect part # 01464-02, **NEQ 13297**. The kit includes the isolation pad and hardware for isolating the floor anchors
3. The RF FIF bus bar will be mounted towards the top of the FIF and bonded to the "I" section of the CRGB utilizing a minimum #6 AWG wire and 2-hole compression lugs per ATT-TP-76416, Section 7, 7.7.1.1

Miscellaneous Equipment:

2. Fiber management trays may be grounded using one of the following methods:
    a. Bonding to the RF bus bar
    b. Bonding directly to the FIF frame provided external toothed lock washers are used on all painted surfaces included the extension brackets and FIF frame rails

NOTE: Allow a minimum 1" physical space between the RF and DC racks for isolation

Note: Figure 2 is not drawn to scale. With the exceptions of locating the ground bus bars at the top of the FIF rack and starting equipment placement directly below the bus bar (and growing downward), equipment location is at the discretion of the local market based on current and future requirements.

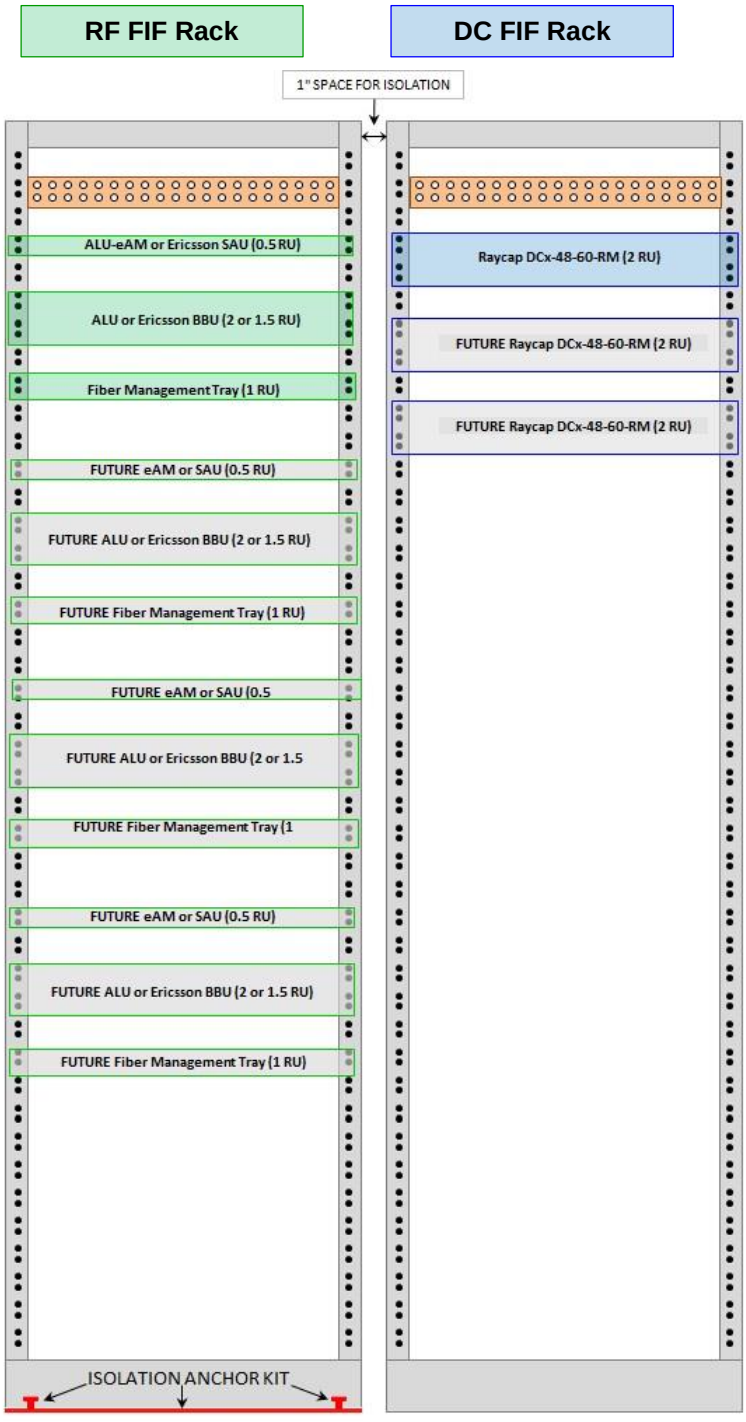

Figure-2
Two Rack Option