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January 12, 2026

Marlene Dortch
Secretary
Federal Communications Commission
45 L Street, NE
Washington, D.C. 20554

Re: Notice of *Ex Parte*, WP Docket No. 07-100, RM-12002

On January 8, 2026, the undersigned, along with Mel Maier, CEO and Executive Director, and Stephen Devine, Chief Technology Officer, from APCO International, met with the representatives from the Public Safety and Homeland Security Bureau and the Wireless Telecommunications Bureau identified below. We discussed APCO's Petition for Rulemaking concerning the 4.9 GHz band and provided an update on the 4.9 GHz standards process within 3GPP, as detailed in the attached presentation.[1] As we discussed, APCO's proposed technical changes would enable public safety agencies, including incumbent 4.9 GHz Band licensees that currently operate in the band, to leverage innovative 5G technologies in the band. We therefore urge the Commission to proceed expeditiously with initiating a rulemaking proceeding to enable the deployment of advanced technologies for public safety use that will provide life-saving benefits across the country.

Respectfully submitted,

APCO INTERNATIONAL

By:

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Attachment

CC (via email):

David Furth; Susan Mort; Kenneth Carlberg; Renee Roland; John Evanoff; Rasoul Safavian; Brian Marenco; Baron Chan; Cameron Duncan; Roberto Mussenden

[1] Petition for Rulemaking of APCO International, WP Docket No. 07-100, RM-12002 (filed Feb. 4, 2025).

APCO International

Leaders in Public Safety Communications®

4.9 GHz Band Status and 3GPP Challenges

Mel Maier, Executive Director and Chief Executive Officer

Stephen Devine, Chief Technology Officer

Alison Venable, Senior Counsel

January 8, 2025

4.9 GHz Progress in Support of Public Safety

1. 3GPP stages and Release 20 timelines
2. 3GPP process is experiencing challenges with developing rules for 4.9 GHz based on Part 90:
   - User Equipment (uplink) challenges
   - Base Station (downlink) challenges
3. APCO's pending petition provides a better path for 4.9 GHz use and 5G deployment:
   - Current rules are out of phase with traditional 5G deployment
   - Industry-based 5G standardization would allow for TDD 5G synchronization in the implementation of the band (e.g., FirstNet, MTA, BART, etc.)
   - Mirroring Part 27 rules would facilitate industry-based 5G deployments

3GPP Stages in 4.9 GHz Standardization Process

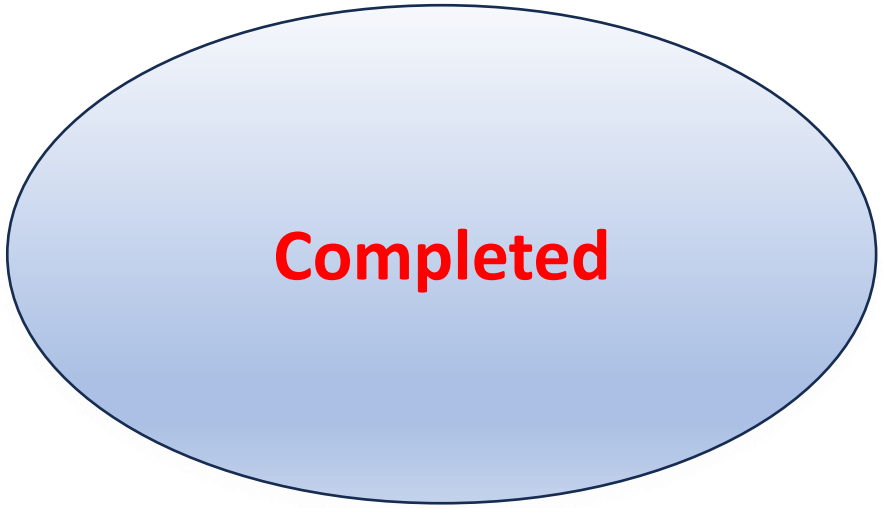
- Stage 1: This stage provides an overall service description from the user point of view. *It outlines what the service should achieve and requirements from the end user perspective*.

- Stage 2: This stage shifts the focus to the overall description of network functions. *It maps the service requirements identified in Stage 1 into specific network capabilities.*

- Stage 3: This stage defines the switching and signaling capabilities and radio frequency (RF) requirements needed to support the services and capabilities outlined in Stage 1. *It includes the technical specifications that detail how the network functions will be implemented,* including protocols and procedures necessary for communication between network elements.

Status of U.S. 4.9 GHz within 3GPP

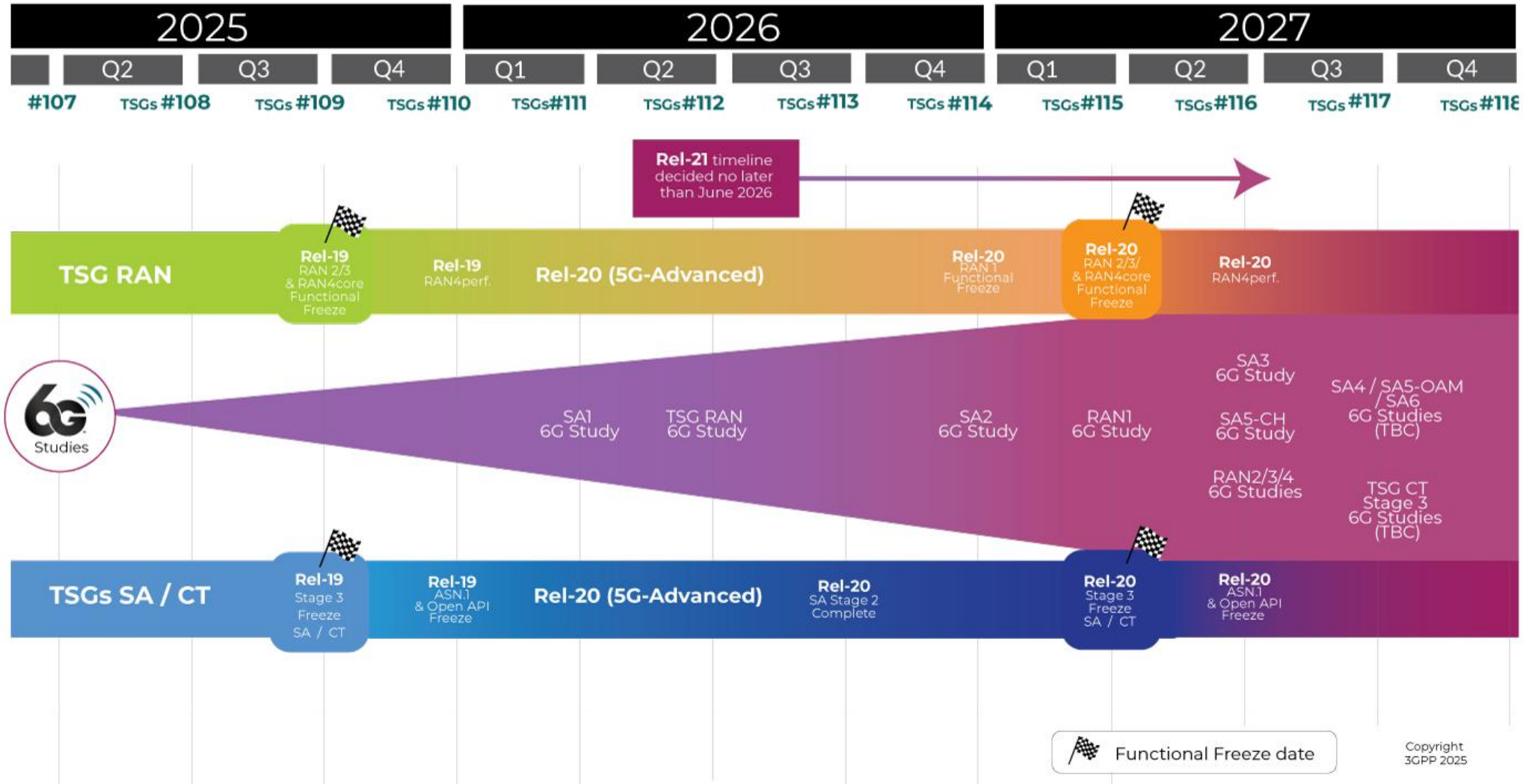
- 3GPP has done good work on defining band number **(n 114)**, frequency band, channel bandwidth chart, channel and sync raster.
  - This work is generic, non-controversial and independent of BS and UE RF work
  - **Stage 1 Work completed, June 2025**



Status of U.S. 4.9 GHz within 3GPP, cont.

- The U.S. 4.9 GHz band is being developed in RAN4 (3GPP Stage 2):
- 3GPP Release 20, the release in which 4.9 GHz is being developed in, is scheduled to be completed by March 2027.
- This date should serve as a freeze of 4.9 GHz RAN requirements and ASN.1 message syntax.
  - RAN, System Architecture (SA) and CORE (CT) work, however, can vary in how they approach the freeze.
  - Note that RAN doesn't always follow Stage 1, Stage 2, Stage 3 dates in the same manner SA and CORE do.

Release 20 Timeline



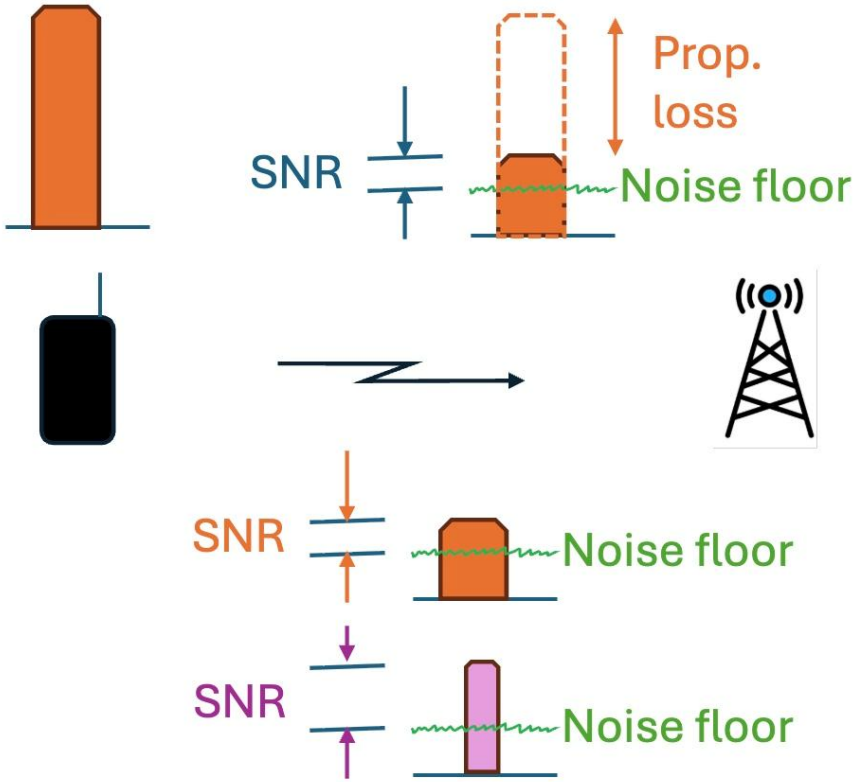
Challenges within 3GPP for U.S. 4.9 GHz

- Downlink issues: Section 90.1215 base station power limits are problematic for 5G implementation
- Uplink issues: UE uplink requirements are complicated due to difficulties applying current Part 90 rules to 3GPP/industry accepted concepts and methods.
  - Continuing with current assumptions will create significant rework. And absent this rework, deliverable that won't meet public safety expectations.
  - To resolve these issues, FCC could provide clarity on how 5G implementations could be implemented within the existing rule (90.1215) **or** adopt new rules for the band, consistent with APCO's petition seeking to permit 5G macrocell deployments in 4.9 GHz public safety spectrum.
  - If NPRM were issued, 3GPP could pause its current work in anticipation of new rules that more natively support 5G implementation.
  - As a TDD band, increased UL power levels are crucial with ~5 GHz propagation characteristics. HPUE PC1, PC1.5, PC2 are all anticipated to be used in the band, in addition to PC3.

Uplink Coverage Challenges

- User terminals have a maximum Uplink (UL) transmit power capability dictated by design choices (for example, power amplifier size)
- UL coverage determined by signal-to-noise ratio at base station
  - To improve SNR, base station schedules UL transmission over a narrower band of frequencies, which "concentrates the power"
- Section 90.210 outlines the 0 dB reference level for mask M but it's not clear how it applies to narrow transmissions. Conservatively, 3GPP leans towards the following specification:
  - No allocation may exceed the 0 dB reference level
  - Terminal power must be scaled down if frequency band of transmission is reduced
- Takeaway:
  - The ability to increase PSD of UL by reducing frequency width of transmission is a crucial, important strategy to ensure UL coverage and is a staple of today's 5G networks
  - Reducing frequency width of transmission overcomes excessive propagation loss experienced by cell-edge terminals
  - Public safety will benefit from this flexibility as it strives to improves connectivity and the user experience
  - Lower power channels require a much denser network topology than the use cases outlined by public safety

Mechanism to Concentrate Power via Narrower Transmissions is Disabled



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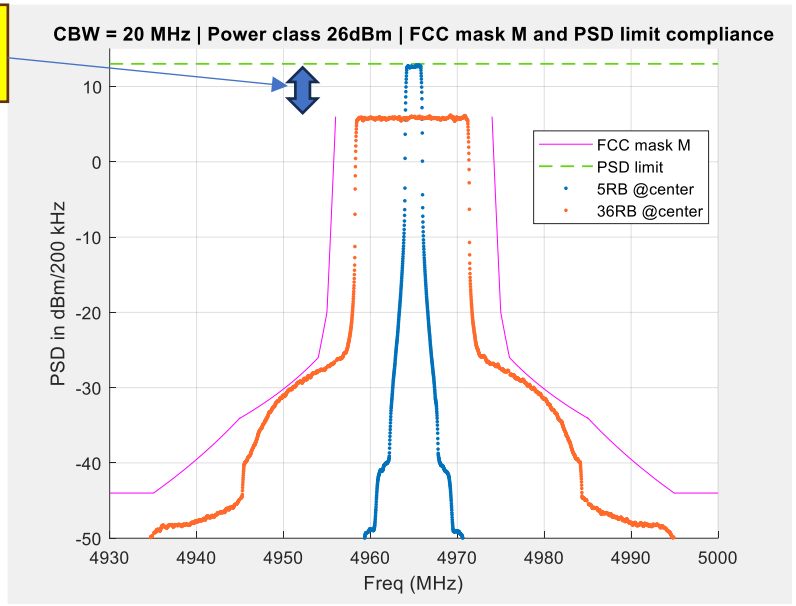


UL Challenges

Observation: The UE's "highest average power of the fundamental emission measured across the designated channel bandwidth" must equal the "power class max. output power" for at least some allocation and modulation type. This is required to reconcile regulation and the RAN4 agreement on FCC mask M reference level.

Observation: The FCC's Part 90 PSD limit precludes certain combinations of power classes and configured channel bandwidths because the PSD, even at full allocation and at "power class max. output power," exceeds the FCC limit.

UE Emissions Requirements

- 3GPP has agreed to adopt FCC Part 90 rules for the band. The emissions regulation (Section 90.210 (m)), however, uses some undefined terms, and it is unclear how the regulations apply to uplink (UL) waveforms *that occupy a narrower band of frequency compared to the terminal's capability ("partial allocations").*
- *These ambiguities are likely to result in a system that is severely handicapped in UL performance*. An impact of the Part 90 emission mask is that the system must trade spectrum for UL range. If the system "gives up" some spectrum near the channel edges, it can transmit with higher power, due to mask definition. If the system chooses to retain most of the available spectrum for UL, the UE must be backed off significantly relative to other bands where less restrictive rules apply, for example, in Part 27 of the FCC's rules.
- Moreover, *the system may lose an important second mechanism in 5G to ensure good range, which is to trade UL RB allocation size for UL range.* This degradation manifests because of uncertainties on whether it is consistent with regulation intent to exploit the mask for narrow allocations.

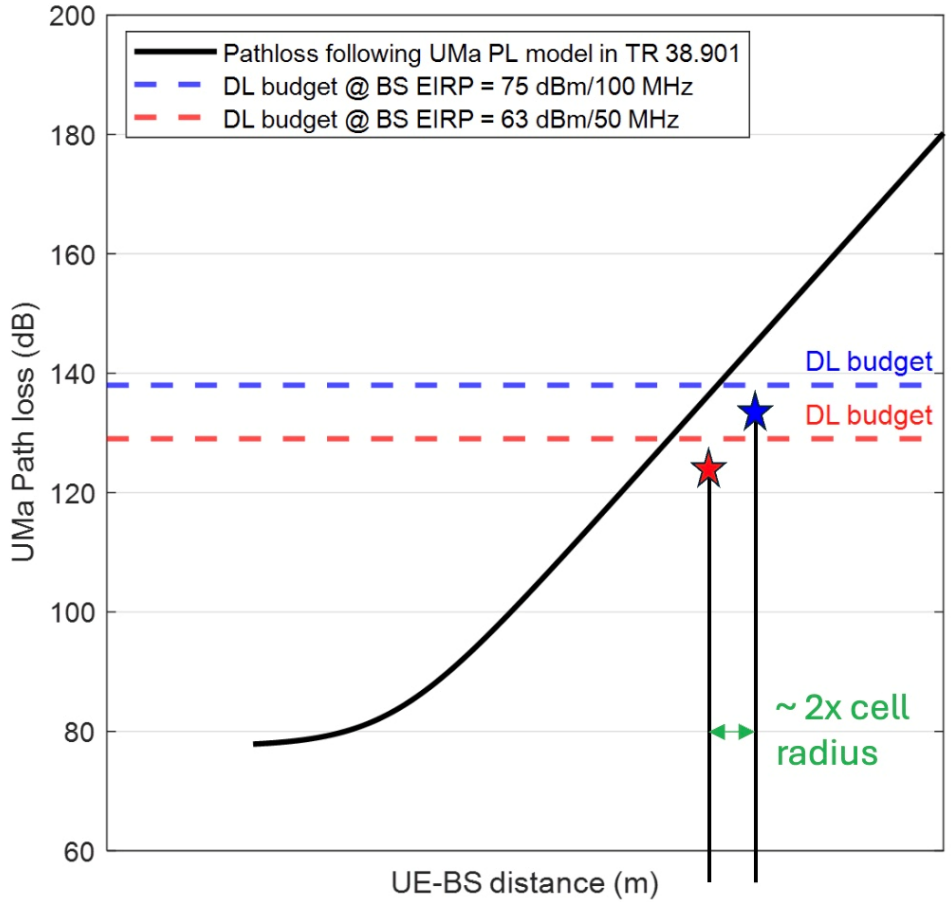
Power Class vs Channel Bandwidth (UL)

3GPP power → class	PC3	PC2	PC1.5	PC1
UE CBW (MHz) ↓				
10	valid	no full power waveforms	mask 0 dB ref > FCC PSD limit	
15	valid	valid	no full power waveforms	mask 0 dB ref > FCC PSD limit
20	valid	valid		no full power waveforms
25	valid	valid	valid	
30	valid	valid	valid	
40	valid	valid	valid	valid
50	valid	valid	valid	valid

Per Section 90.1215, high power devices are limited to a peak power spectral density of 21 dBm per MHz. 3GPP originally specified a dedicated UE type (PC1) for this public safety band and this Power Class cannot even be implemented with the narrow channels based on existing Part 90 rules.

Downlink Coverage Problem

- DL coverage determined by SNR at user terminal
  - To improve SNR, base station must rely solely on EIRP of base station
- Section 90.1215 (a)-(e) suggests base station EIRP is limited to:
  - 63 dBm for 50 MHz channels
  - 56 dBm for 10 MHz channels
- 5G order-of-magnitude analysis at 3.3 GHz:
  - A base station with 75 dBm EIRP and a 100 MHz wide channel has about 1 km cell radius for indoor terminals and about 2.2 km for outdoor terminals
  - ***Cell radius is reduced by a factor of 2 for base stations that comply with Section 90.1215***
  - Plot shows the maximum cell radius assuming UMa pathloss model in TR 38.901 at 3.3 GHz with 25m BS height and 1.5m UE height and assuming UE noise figure = 9 dB
- Takeaway:
  - DL cell radius is severely compromised by Part 90 EIRP rules



Base Station Output Power

Pursuant to Section 90.1215 of the FCC's rules, the maximum output power of a base station is 37dBm. ***The current 3GPP specifications defines three base station classes in 3GPP TS38.104, Wide Area Base Stations (MACRO), Medium Range Base Stations (MICRO) and Local Area Base Stations (PICO).***

Macro base stations, which are what we think of as a regular cell site, have an output power level greater than 38dBm. This implies the current Part 90 power output can only be supported in local area and medium area base station equipment.

As currently defined and based on the current 3GPP interpretation the 4.9 GHz band cannot be deployed using regular macro base station equipment, so wide area deployment will require more base stations and higher deployment cost and OpEx cost.

FCC Part 90 Power Limit – 47 CFR § 90.1215

TABLE 1 TO PARAGRAPH (a)(1)

Channel bandwidth (MHz)	Low power maximum conducted output power (dBm)	High power maximum conducted output power (dBm)
1	7	20
5	14	27
10	17	30
15	18.8	31.8
20	20	33
30	21.8	34.8
40	23	36
50	24	37

3GPP Base Station defined output power defined in TS38.104 section 6.2

Table 6.2.1-1: *BS type 1-C* rated output power limits for BS classes

BS class	$P_{rated,c,AC}$
Wide Area BS	(Note)
Medium Range BS	⩽ 38 dBm
Local Area BS	⩽ 24 dBm
NOTE: There is no upper limit for the $P_{rated,c,AC}$ rated output power of the Wide Area Base Station.	

Swift FCC Action Prevents Costly 3GPP Rework

- If 3GPP continues its current course (specifying nothing more than medium-range BS and power limited UEs), subsequent changes to the FCC's rules to rectify these specifications will necessitate substantial 3GPP rework.
- Scoping this work is very difficult, not only because of technical uncertainties but also because of challenges achieving alignment with the overall 3GPP schedule and conflicting time demands.
  - 3GPP is currently pursuing both the final phase of 5G development as well as study activities towards defining 6G. The amount of time and resources in 3GPP to pursue new work is severely constrained by the existing workload.

Other Part 90 Terminology that Presents Challenges for 5G Use

- 47 CFR 90.210 (m)(7) defines the mask based on "designated channel BW"
  - This quantity is not defined in regulation
  - 5G user terminals are configured with a channel bandwidth
    - Typically, this value is the bandwidth licensed to the operator
- 47 CFR 90.210 (m)(7) mask M zero dB reference wording becomes ambiguous in context of transmissions over narrow frequency allocations:
  - Is the 0 dBr fixed by *some nominal transmission condition* (full allocation and max power?) **OR**
  - Is the 0 dBr evaluated *for each transmission condition*? (allocation size, power level) **OR**
  - Other…?
    - An established 0 dB reference condition for 5G use may better protect incumbent use of the band

Possible Regulatory Concerns

- 4940-4990 MHz is covered by Part 90. The equipment currently deployed in the band (802.11/802.16) was designed with the expectation that other users of the band would be compliant with the same Part 90 rules.
  - As previously noted, the limitations imposed by adoption of Part 90 rules for 3GPP requirements excessively constrain the performance and capabilities of a 3GPP-type 5G system
  - Such a constrained system may not effectively support first responder applications and thus fails the FCC goal of "*facilitat[ing] the integration of the latest commercially available technologies, including 5G, for the benefit of public safety users.*" (*Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, Eighth Report and Order, 39 FCC Rcd 12032 at 12033 (2024))

Status of 4.9 GHz licensees

- 5850 4.9 GHz license total as of December 22, 2025
- 401 unique licensees in PB/PF Radio Service Code
  - Top 10 licensees with most call signs consist of half of the total licenses
  - PF: Granted 5618; Pending 120
  - PB: Granted 232; Pending 42

APCO's Petition for Rulemaking To Enable 5G Technologies in the 4.9 GHz Band

- APCO's pending petitions proposes solutions:
  - Aligns closer to Part 27 while allowing existing rules to apply to incumbents
  - Provides a closer harmonization with existing 5G mobile broadband systems
  - Provides more concise language to align with 3GPP understanding
  - Standardized 5G use of the band will create a stable environment in support of incumbent protection and coordination

APCO's Petition for Rulemaking To Enable 5G Technologies in the 4.9 GHz Band

- APCO's Petition will benefit public safety in its implementation of 4.9 GHz
- APCO's proposed rules do not inhibit incumbent use of the band
- APCO's Petition proposes 5G supported power levels, OOBE emissions and PFD limits at the service boundary consistent with Part 27 rules
- No entity in 3GPP opposes 4940-4990 MHz public safety spectrum from becoming a 5G band.
- Given the timeframe of Release 20, initiating a rulemaking proceeding in the near term would allow for 3GPP to pivot, acknowledge anticipated rule changes and still complete work within the March 2027 Rel 20 freeze time frame