

# Radio Altimeters and 5G C-Band Deployment ICAO Spectrum Review Working Group



Federal Aviation  
Administration



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Flimsy 1 of ICAO APAC SRWG/6

# Discussion Topics

- Synopsis
- Intra-Agency and Industry Coordination & 5G Deployment
- Airworthiness Directives (AD)
- Alternative Methods of Compliance (AMOC)
- Notices to Air Missions (NOTAM)
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# Radio Altimeter and 5G C-Band Synopsis

- The FCC Report and Order dated February 28, 2020, established a new operating environment for aircraft operating in areas where 5G (3.7-3.98 C-Band) emissions will be present.
- RTCA/SC-239 published a report that assessed 5G telecommunications interference impact on low range radio altimeter operations in the United States.
  - Concluded that telecommunications can cause harmful interference
  - Emissions can degrade radio altimeter to the point that loss of data and/or erroneous data can occur
  - Threat is from base station emissions and on-board user equipment



# Radio Altimeter and 5G C-Band Synopsis (continued)

- RTCA report, public comments to the RTCA report, and analyses from radio altimeter manufacturers and aircraft manufacturers were used in support of the safety risk determination and development of the FAA ADs.

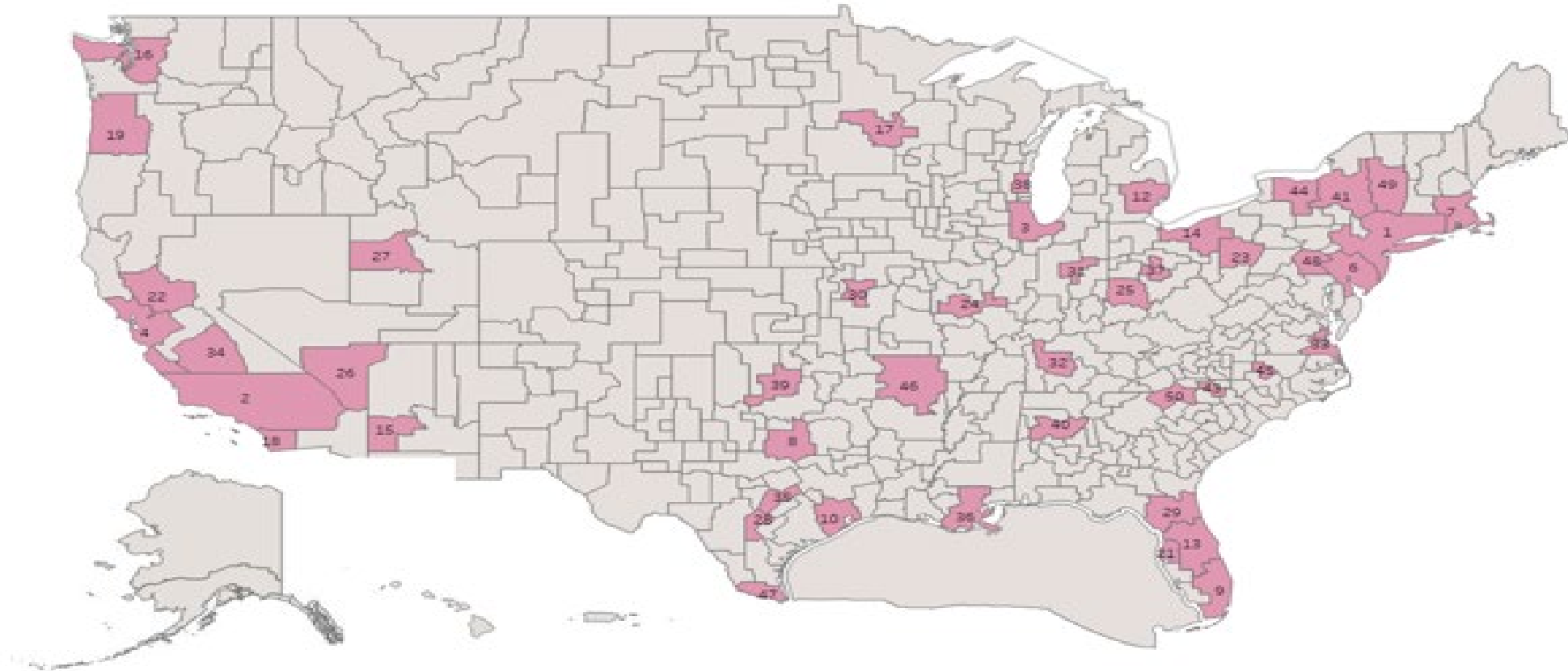


# Intra-Agency and Industry Coordination

- The Federal Aviation Administration (FAA) believes the expansion of 5G C-band and aviation will safely co-exist.
- The FAA continues to work closely with the Federal Communications Commission (FCC) and wireless companies, and we are making progress toward safely implementing the 5G C-band expansion.
- We are confident with ongoing collaboration we will reach this shared goal.



# 5G C-Band Wireless Broadband Deployment



Wireless broadband deployment will occur in phases in 46 markets beginning January 5, 2022. The FCC defines these areas as Partial Economic Areas (PEAs) 1-4, 6-10, 12-19, 21-41, and 43-50.



# Airworthiness Directives (AD)

- On December 9, 2021, FAA issued two ADs (transport category airplanes and helicopters) prohibiting certain operations in the presence of 5G (3.7-3.98 GHz C-Band) emissions.
  - Notices to Air Missions (NOTAMs) were issued to limit the impact of the AD to areas and airports where 5G C-Band will be deployed.
- Five aircraft-specific ADs have been issued to date:
  - Boeing 787 (AD 2022-02-16) published on January 19, 2022.
  - Boeing 747/Boeing 777 (AD 2022-03-05) published on January 27, 2022.
  - Boeing 737 MAX (AD 2022-03-20) published on January 31, 2022.
  - Boeing 757/Boeing 767 (AD 2022-04-05) published on February 14, 2022.
  - Boeing 737 Classic and 737 NG (AD 2022-05-04) published on February 18, 2022.
  - Manufacturers continue to assess the impact of 5G C-Band wireless interference to all systems integrated with the radio altimeter.



# Alternative Method of Compliance (AMOC) Process

- FAA regulations and advisory guidance allows anyone to propose to the FAA an alternative method of compliance or a change in the compliance time, if the proposal provides an acceptable level of safety (see Advisor Circular (AC) 39-10).
- An AD contains the required method for resolving an unsafe condition in an aircraft, aircraft engine, propeller, or appliance. An AMOC provides an acceptable level of safety for a different way, other than the one specified in the AD, to address the unsafe condition.
- To apply for an AMOC a requestor submits a request to the FAA via letter, email or similar documentation, along with supporting information showing an acceptable level of safety.
- The FAA provides an approval letter if the application is deemed to be acceptable.
- AMOC can apply to one or many aircraft.



# Alternative Methods of Compliance (AMOC)

- To date, the FAA issued 21 5G C-band-related AMOCs for airplanes in commercial service.
  - AMOCs are aircraft make/model and radio altimeter specific, and they are the property of the requestor.
  - Specific information about the AMOCs belongs to the requestor.
  - Manufacturers distributed the information to operators of their aircraft.
  - The AMOCs open up specific runways at many of the airports most directly affected by 5G C-band interference.
- The FAA is evaluating new data that could impact current AMOCs.
- The FAA will review new AMOC applications as they come in.



# Notices to Air Missions (NOTAM)

NOTAMs will be maintained to identify locations with 5G C-band base station deployments.

- An airspace NOTAM will delineate a three-dimensional area where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference. Operations identified by AD 2021-23-13 are prohibited in this airspace, unless the operator has an FAA-approved AMOC.

HHR 01/044 (KZLA A0063/22) ZLA AIRSPACE RDO ALTIMETER UNREL WI AN AREA DEFINED AS 365346N1143031W (MMM289013.5) TO 371320N1135504W (MMM016032.2) TO 364611N1133036W (MMM074036.9) TO 362441N1140431W (MMM140023.6) TO POINT OF ORIGIN SFC-5000FT AGL. HEL OPS REQUIRING RDO ALTIMETER DATA TO INCLUDE OFFSHORE INSTRUMENT OPS, HOVER AUTOPILOT MODES, SAR AUTOPILOT MODES, AND CAT A/B/PERFORMANCE CLASS TKOF AND LDG NOT AUTHORIZED EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVE 2021-23-13 2201190501-2401190501

- An aerodrome NOTAM will identify any public airport or heliport (with an instrument approach procedure) where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference, and the operations at that airport or heliport that are prohibited by the ADs, unless the operator has an FAA-approved AMOC.

BDL AD AP RDO ALTIMETER UNREL. AUTOLAND, HUD TO TOUCHDOWN, ENHANCED FLT VISION SYSTEMS TO TOUCHDOWN, HEL OPS REQUIRING RDO ALTIMETER DATA TO INCLUDE HOVER AUTOPILOT MODES AND CAT A/B/PERFORMANCE CLASS TKOF AND LDG NOT AUTHORIZED EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVES 2021-23-12, 2021-23-13 2201190501-2401190501



# Notices to Air Missions (continued)

- An IAP NOTAM will identify the public and special IAPs affected by 5G C-Band interference, and prohibited by the ADs unless the operator has an FAA-approved AMOC.

BDL IAP BRADLEY INTL, WINDSOR LOCKS, CT. ILS RWY 06 (SA CAT I), AMDT 38A ... ILS RWY 24 (SA CAT I - II), AMDT 13A ... ILS RWY 06 (CAT II - III), AMDT 38A ... PROCEDURE NA EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVES 2021-23-12, 2021-23-13 2201190500-2401190506EST

A special IAP NOTAM will identify an IAP (except SA CAT I / II, CAT II, III, or RNP AR), at a private landing location, affected by 5G C-Band wireless broadband interference, and the operations prohibited by the ADs unless the operator has an FAA-approved AMOC.

45LA SPECIAL BRISTOW US LLC, VENICE, LA. COPTER GPS 146, ORIG... COPTER GPS 326, ORIG... RDO ALTIMETER UNREL EXC FOR ACFT USING APPROVED ALTERNATIVE METHODS OF COMPLIANCE DUE TO 5G C-BAND INTERFERENCE PLUS SEE AIRWORTHINESS DIRECTIVES 2021-23-13. 2201190500-2401190506EST



# Notices to Air Missions (continued)

- Current NOTAM totals (*Effective March 1, 2022*)
  - Airspace: 53 areas
  - Aerodrome: 1,416 (includes 5 heliports and 17 VFR airports)
  - Instrument Approach Procedures (IAP):
    - 88 Public IAP NOTAMs
    - 56 Special IAP NOTAMs



# FAA Website

- FAA Statements on 5G: <https://www.faa.gov/5g>
- Map of Airports with Low-Visibility Landings in 5G Deployment
- DOT and FAA Letters
- Airworthiness Directives (AD)
- Special Airworthiness Information Bulletin (SAIB) AIR-21-18R1
- Safety Alert for Operators (SAFO) 21007
- FCC Partial Economic Areas (PEA)
- Questions and Answers



# Questions

