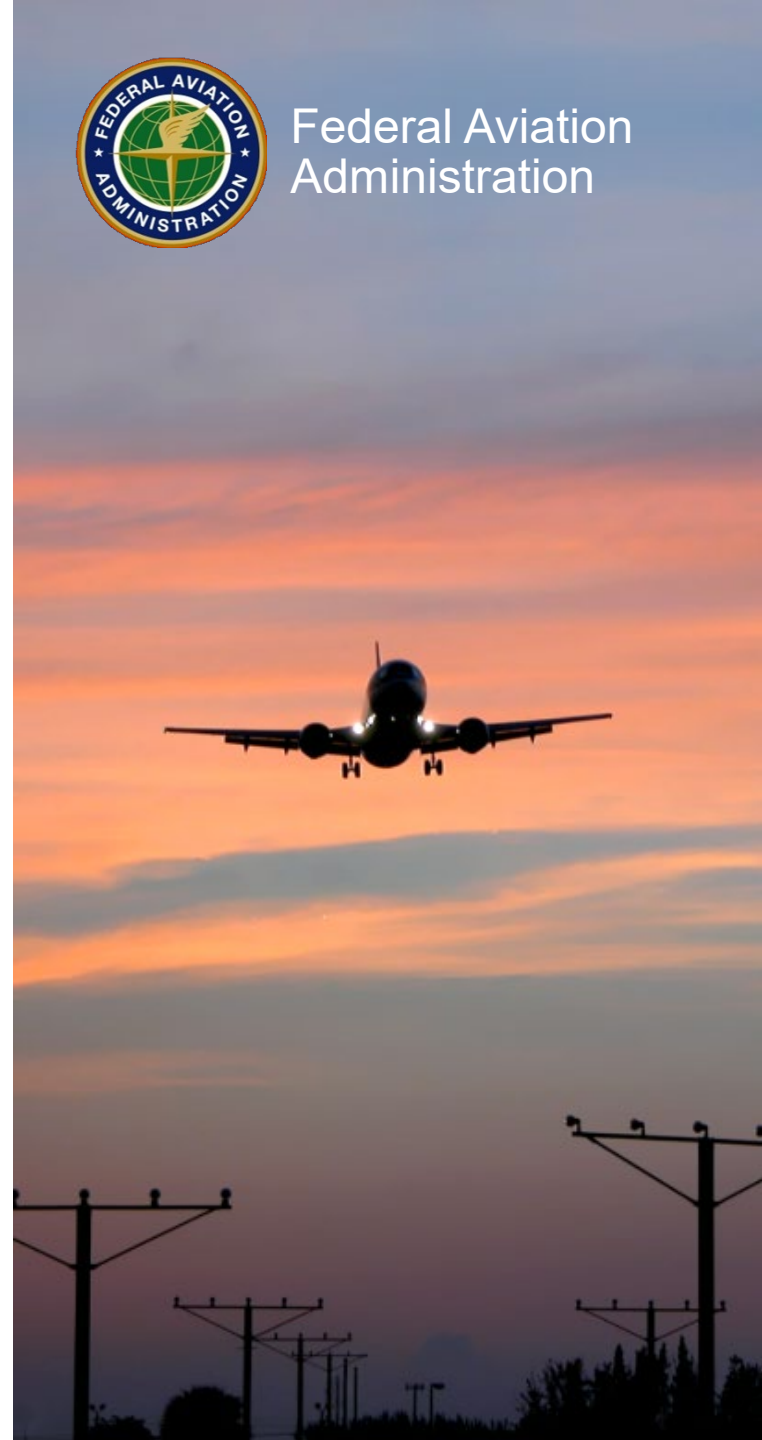


United States Helicopter Safety Team – Infrastructure Working Group

Radio Altimeters and 5G C-Band Deployment



Federal Aviation
Administration



Discussion Topics

- Synopsis
- Intra-Agency and Industry Coordination & 5G Deployment
- Airworthiness Directives (AD)
- Notices to Air Missions (NOTAM)
- Alternative Methods of Compliance (AMOC)
- Exemptions
- FAA Website

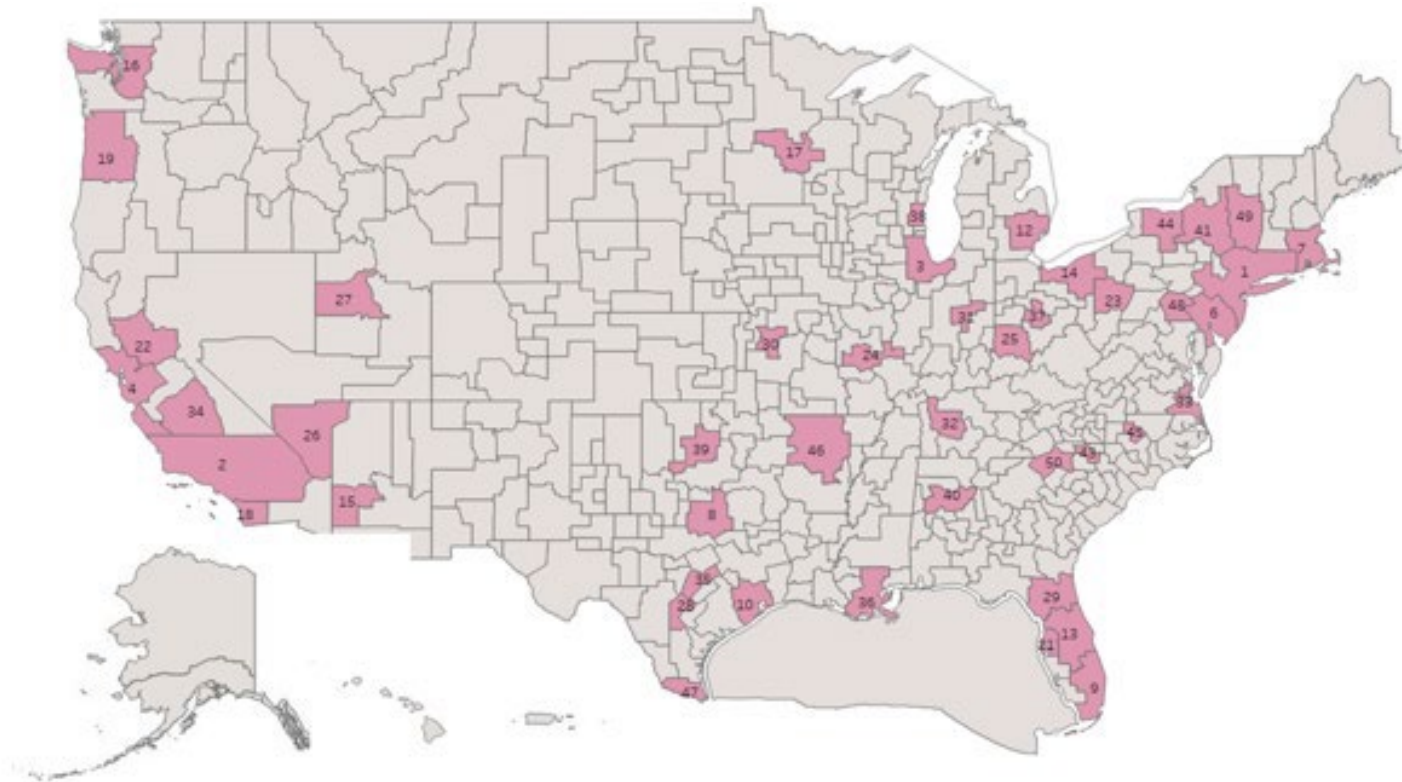


Radio Altimeter and 5G C-Band Synopsis

- 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
- 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.



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.



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.



Airworthiness Directives (AD)

- In December 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.
- Six aircraft-specific ADs have been issued to date:
 - Boeing 787 (AD 2022-02-16) published on Jan 19, 2022.
 - Boeing 747/Boeing 777 (AD 2022-03-05) published on Jan 27, 2022.
 - Boeing 737 MAX (AD 2022-03-20) published on Jan 31, 2022.
 - Boeing 757/Boeing 767 (AD 2022-04-05) published on Feb 14, 2022.
 - Boeing 737 Classic and 737 NG (AD 2022-05-04) published on Feb 18, 2022.
 - Boeing 747 (AD 2022-06-16) published on Mar 16, 2022.



Rotorcraft AD

- **AD 2021-23-13 has the following helicopter restrictions when operating in U.S. airspace in the presence of 5G C-Band interference as identified by NOTAMs:**
 - Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Baro mins must be used for these operations instead
 - Engaging hover autopilot modes that require radio altimeter data
 - Engaging Search and Rescue (SAR) autopilot modes that require radio altimeter data
 - Performance takeoffs and landings IAW any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data

The AD restrictions don't impact the majority of the helicopter industry.



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)

- **As of April 1, NOTAM totals (*subject to change*)**
 - Airspace: 53 areas
 - Aerodrome: 1,439 (includes 5 heliports and 21 VFR airports)
 - Instrument Approach Procedures (IAP):
 - 88 Public IAP NOTAMs
 - 55 Special IAP NOTAMs

The FAA is continuing to work the 5G interference issues through the NOTAM, AMOC, and Exemption processes.



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.



AMOC Update

- As of March 28, 2022 the FAA has not been officially presented a helicopter AMOC in regards to the 5G AD.
- The FAA is conducting weekly meetings with OEMs to discuss any potential AMOC solutions



NVG Ops in 5G NOTAM Areas

- 14 CFR 91.205(h)(7) requires a normally functioning radar (radio) altimeter for operations utilizing NVGs.
- There is no proven, viable method at this time for a pilot to make a determination if the RA is functioning in a normal manner in 5G NOTAM areas
 - The possibility of a pilot incorrectly determining the radio altimeter to be providing accurate altitude information increases the risk level of this operation.
- Operators who would like to conduct NVG operations in areas designated by NOTAM for 5G interference should request an exemption from §91.205(h)(7) that contains appropriate conditions and limitations to ensure an equivalent level of safety.



FAA Request

- Become familiar with the FAA Statements on 5G:
<https://www.faa.gov/5g>
- DOT and FAA Letters
- Airworthiness Directives (AD)
- Special Airworthiness Information Bulletin (SAIB) AIR-21-18R1
- Safety Alert for Operators (SAFO) 21007
- AMOC process – if required
- Exemption process – if required
- FCC Partial Economic Areas (PEA)
- If 5G interference is encountered – report it
- Reliable data helps drive positive decisions
- Questions and Answers

