



RSPG WORKSHOP

“The future of the 470 – 694 MHz band within the EU”

Military applications

Mr. Adam Kugler, Principal Engineer, Spectrum Policy Head, IMS/NDS

NATO JOINT CIVIL/MILITARY FREQUENCY AGREEMENT (NJFA)

450 - 790 MHz - NATO band Class F - The range 450 - 790 MHz is a future military requirement for broadband mobile utilisation in parts of the range, if the evolution of the regulation in this frequency range facilitates it.

Class F: A frequency band where a NATO requirement is identified for a possible future harmonised military use. Some may be dependent on regulatory modifications

Current and future military applications in the 470 - 694 MHz band*



Current use :

- military land mobile radio systems in white spaces
- bandwidth ranges from **5 – 16 MHz**

Future use :

- military mobile radio systems
- bandwidth ranges from **5 – 40 MHz**



* Based on information from NATO Nations

Why the 470 – 694 MHz band

- RF Spectrum access is indispensable for military operations and exercises
- Operations and exercises typically involve land, sea, air and space based assets
- Command, control and coordination requires extensive (mobile) communications infrastructure
- Many of our MIL radios for land mobile, maritime mobile and aeronautical mobile is capable to tune up to 512 MHz which we would like to use in order to relieve the congestion of 225-400 MHz

Challenges

- The lack of sufficient wideband possibilities in that part of the spectrum that has the ideal propagation characteristics for mobile services.
- Current RR spectrum allocation in the band limits potential military usages to mobile, except aeronautical mobile, service on a secondary basis. Therefore, possible usages will have to coexist with broadcasting and PMSE which will remain the primary usages of the band for an undefined period of time
- IMT identification in the parts of the 470-694 MHz band could negatively affect the future defence use

NATIONAL APPROACH

German military spectrum requirement in 470 – 694 MHz

LTC Ralf Unkelbach

on behalf of German MoD

Brussels, 11 April 2025

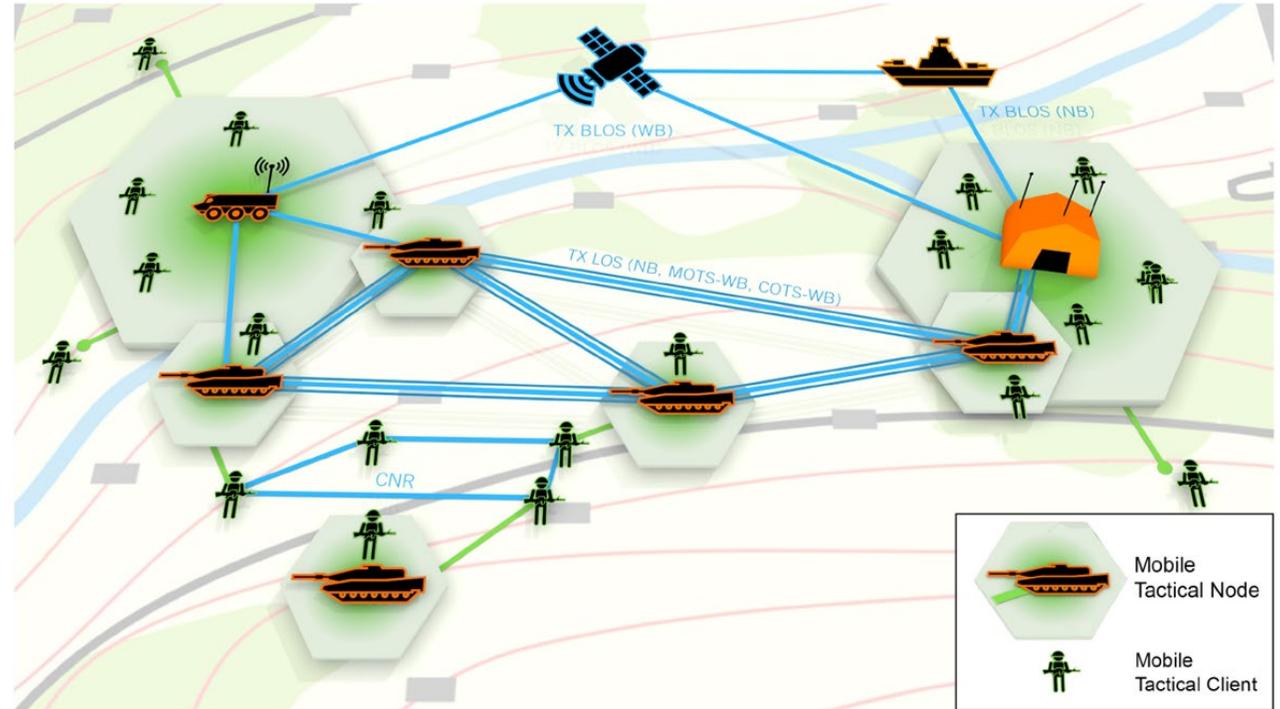
- **Military objectives**
- support digitization of land based operations
- robust broadband radio connectivity to enable network based military operations
- in non-cooperative harsh environment

Ensure and improve Host Nation Support

- reform equipment from 225 – 399.9 MHz to 470 – 694 MHz
- increase capacity for other equipment and Allies in 225 – 399,9 MHz

Enable **Multi Domain Operations (MDO)**

incl. training and exercise in peacetime



Goal: meshed network for battlefield connectivity

Use of „white spaces“ in 470 – 694 MHz

- usage in white spaces of Broadcasting Service according to GE-06
- **2 x 8 MHz regional channels in 470 – 512 MHz**
- In selected training areas
- measurements confirmed available channels
- low probability of interference
- planned extension for a **third channel (8 MHz in 512 – 600 MHz)**
- demand to support coordinated convoy operations on-route (under further consideration)
- coordinated approach involving Defence, Broadcasters, PMSE and NRA (BNetzA)

Regulatory framework

- usage already possible due to a national footnote in DE spectrum ordinance



Deployment

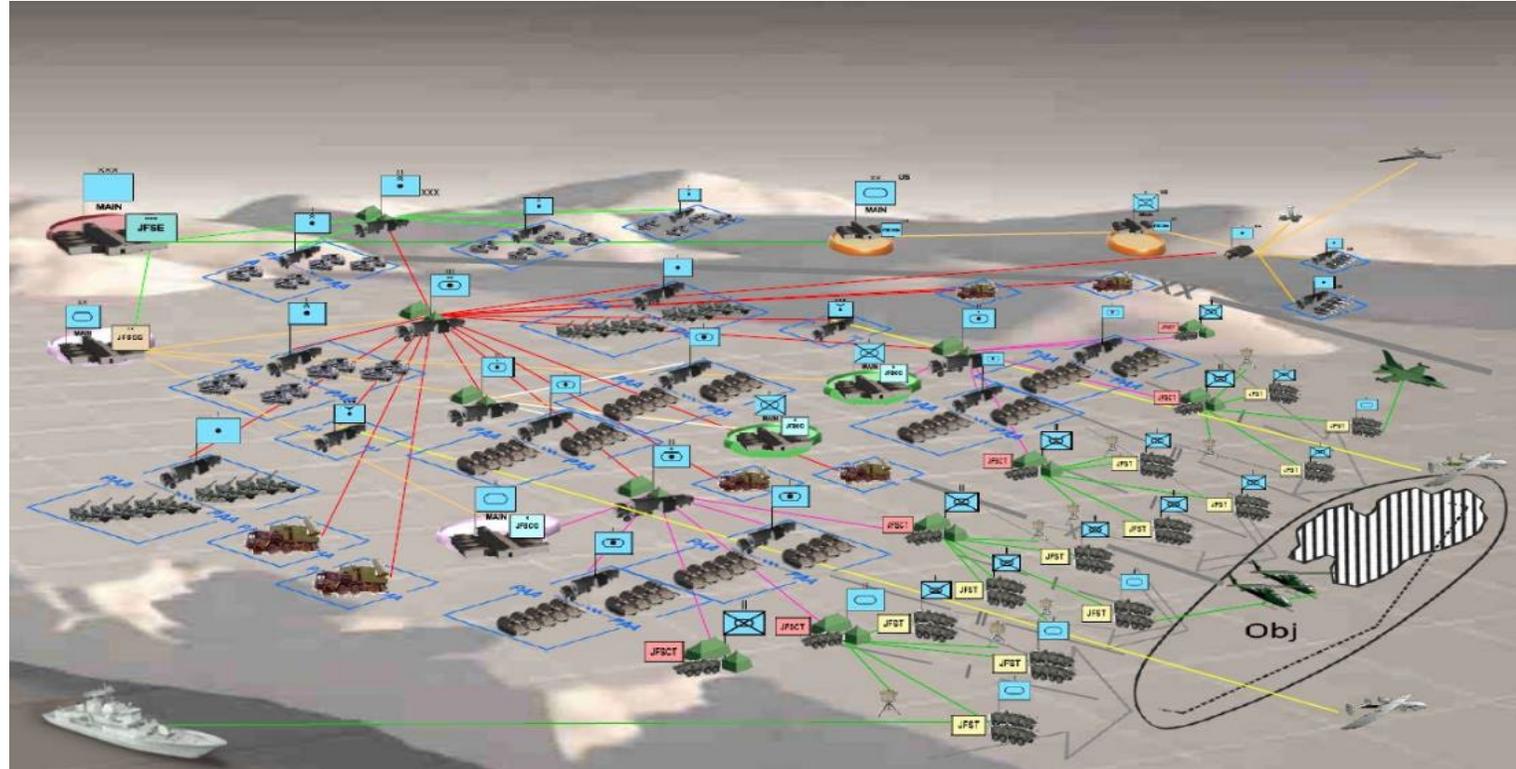
- Broadband **Ad-hoc networks**
- **3GPP based military networks**
- including backbones

Spectrum requirements

- **60 MHz** in 470 – 694 MHz
- demand applies for peacetime scenario
- higher demand for crisis and wartime

Sharing opportunities & challenges

- respecting GE-06 sharing of channels remains possible
- peacetime usage primarily on military sites and coordinated convoy routes
- interoperability with PPDR



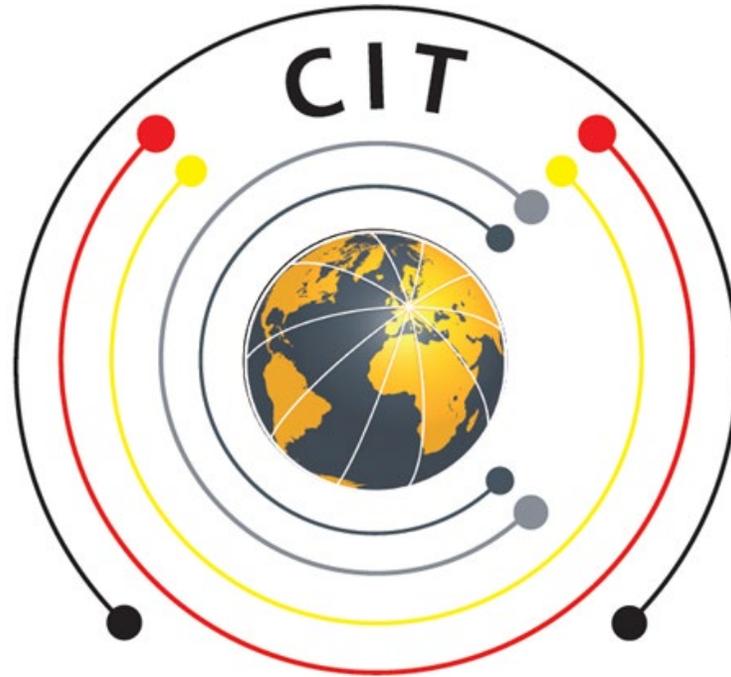
Peacetime

- exercises and training on military training areas
- troop movement (convoys) along pre-coordinated routes
- realistic example: large scale exercise from WILDFLECKEN to HAMMELBURG by road convoys using highway A7 (see map)
- local use can be coordinated with other users of the spectrum

Wartime

- intensity of military operations will differ regionally
- radio communications required on short notice at any time or location
- necessity to switch between systems, e. g. when some networks jammed or otherwise unavailable
- limited possibility for coordination with other users





Thank you!



NATO DIGITAL STAFF

Questions ?

kugler.adam@hq.nato.int

+32 2 707 5618