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Proposal for a Technical standard for an automatic link establishment and wideband set-up

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Presentation Outline

Context and object of the presentation

4G ALE key features

4G ALE solution

- > (optional) Cognitive engine
- > Link set-up
- > Traffic set-up

Interoperability rules for Link management

Conclusions

Context and object of the presentation

Purpose

- New wideband HF modems have been proposed aiming at providing end-users with more reliable, more efficient services (incl. Voice, data, IP services)
- Both approaches (contiguous or non-contiguous) are more complex to manipulate than legacy 3kHz narrow-band ones
- ➔ A corresponding Link Establishment and Link Management needs to be specified and standardized to ensure interoperability

Definitions

- ST4539-H proposal : non-contiguous modem waveform
- MIL STD 188-110C-D (WBHF) : contiguous modem waveform
- « XL radio » : radio with wideband RF front-end (>1MHz in reception) and capable to use both contiguous and non-contiguous modem waveforms

4G ALE/ALM desired key features

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2G/3G features

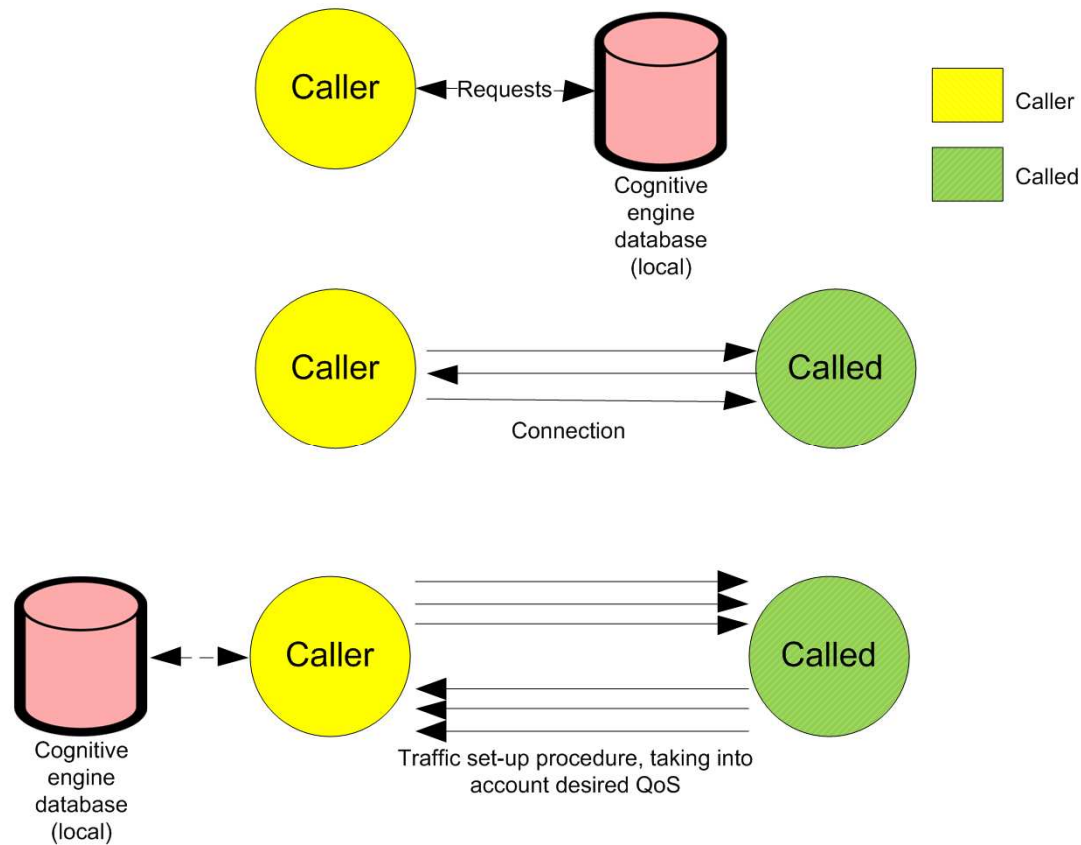
- Automatic channel selection (ACS) among frequency allocations, using any relevant available information
- Quick and reliable link set-up & termination protocols
- Allows voice & data transmission with adaptive protocols to ensure error-free data at an optimum rate

Additional 4G features

- Unified linking protocol for different wideband capacity providing backward compatibility with narrowband radios
- Exchange through ALE protocol of information regarding traffic & radio capacities, to make a relevant choice of the transmission parameters
- Decision from the calling station regarding the traffic channel and waveform types, taking into account prediction & local information

4G ALE solution : principle

A three steps procedure

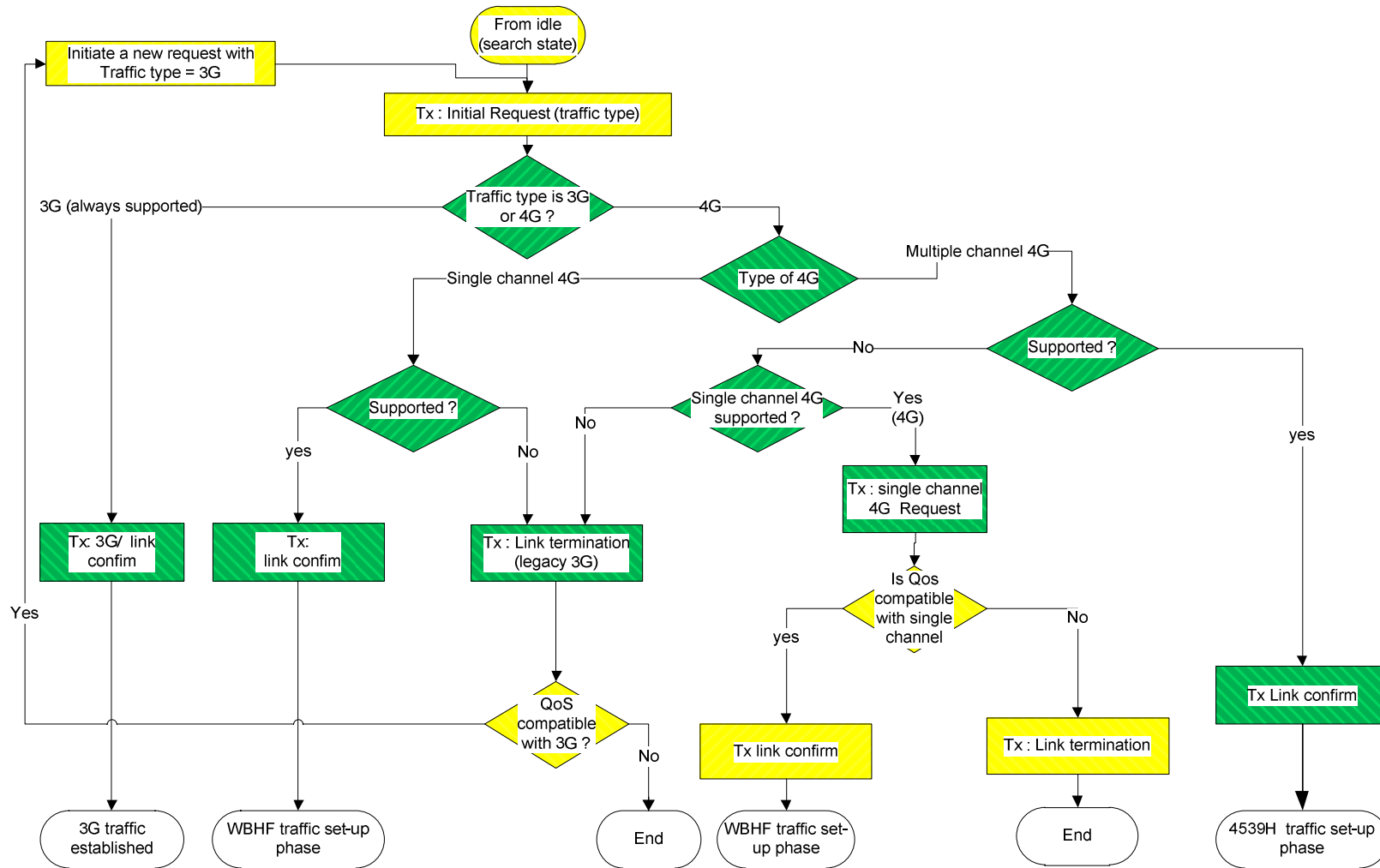


Backward compatible in link set-up phase with legacy 3G systems

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4G ALE solution (1/4)

ALE flowchart integrating the backward 3G FLSU compatibility

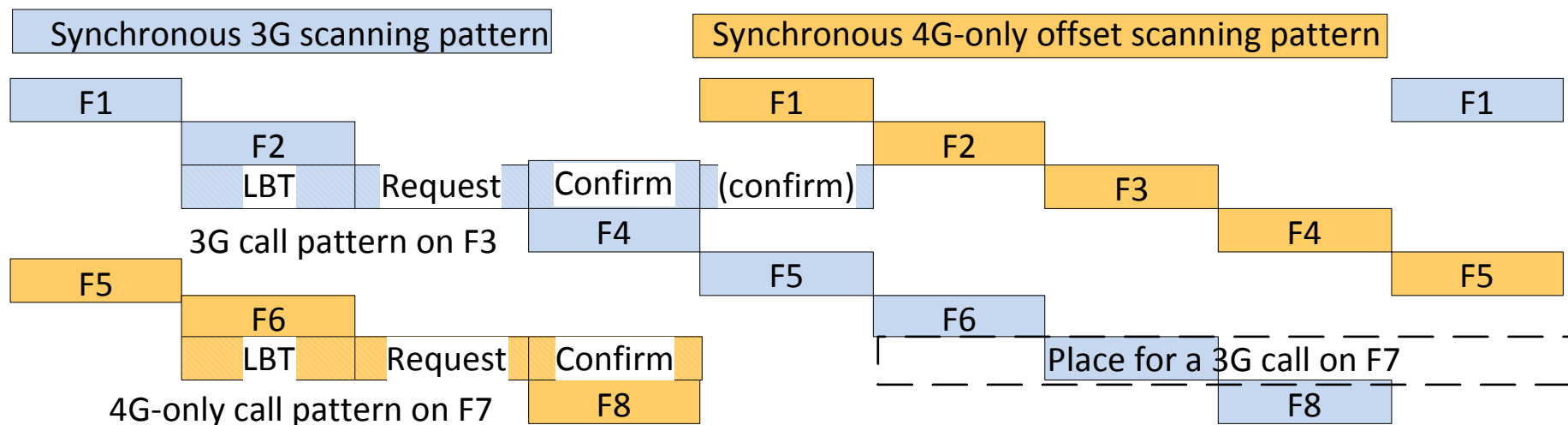


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4G ALE solution (2/4)

Specific feature proposed for XL capable radios (link set-up phase)

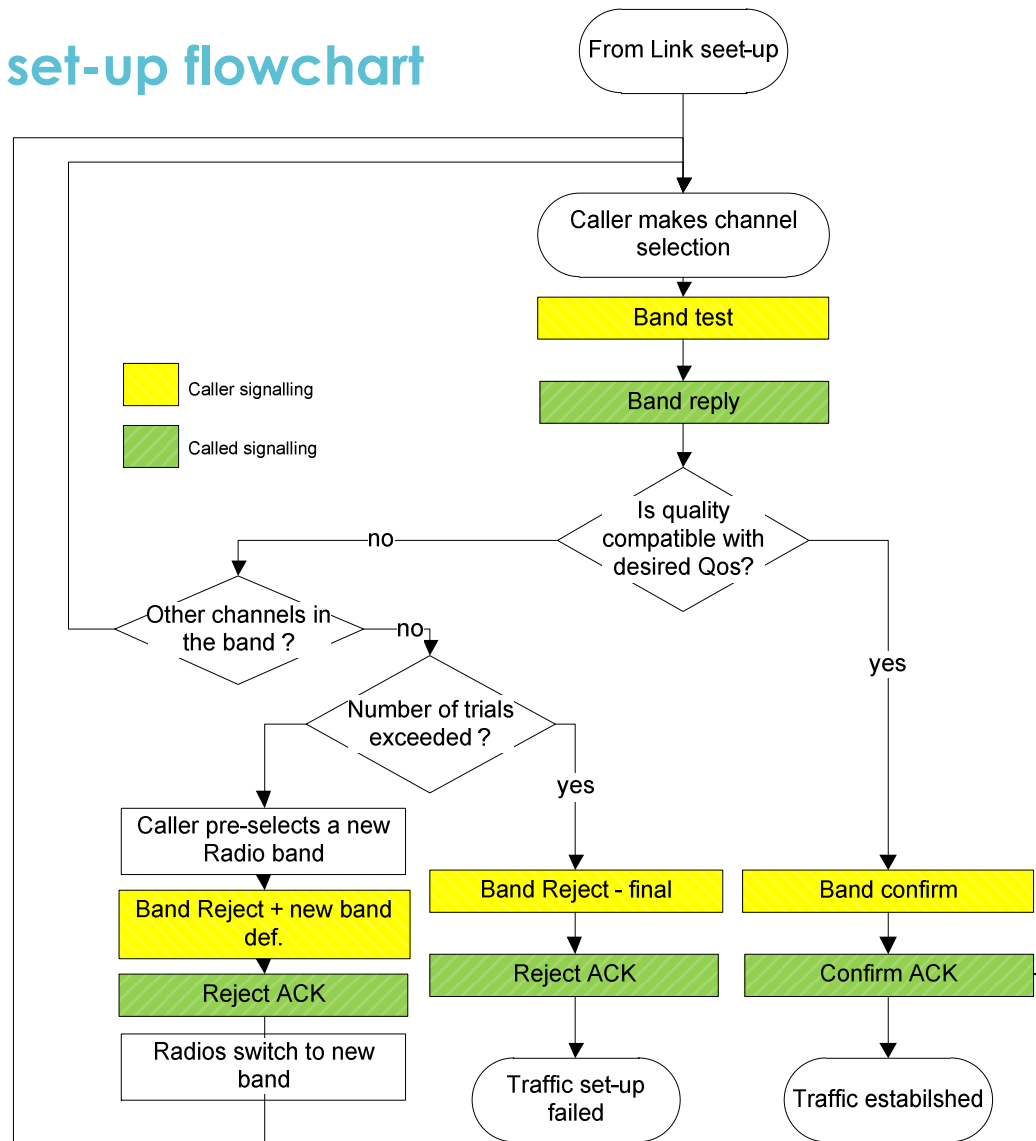
- Introduction of a specific 4G-only search pattern to allow XL radios to connect quicker and without perturbing legacy users on the same network (sharing of the set of calling frequencies)



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4G ALE solution (3/4)

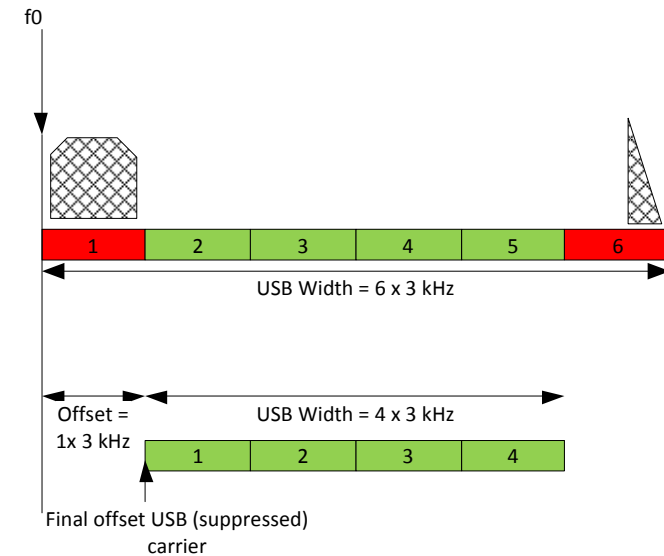
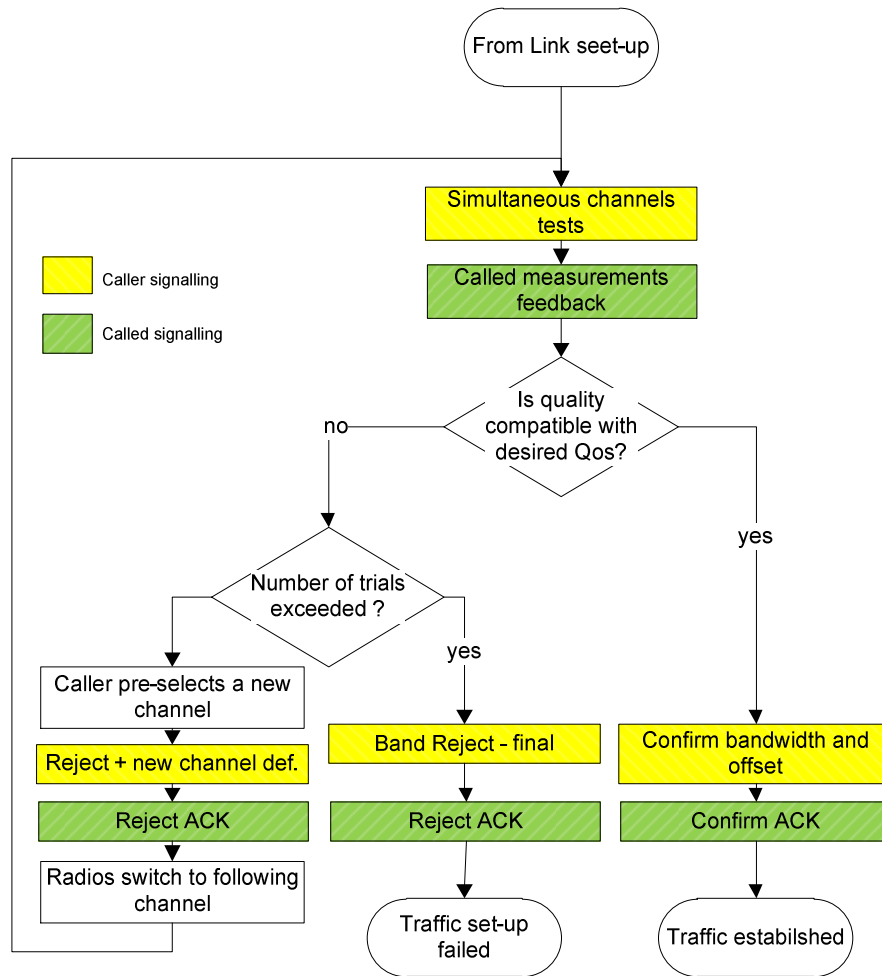
ST4539-H traffic set-up flowchart



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4G ALE solution (4/4)

WBHF traffic set-up flowchart



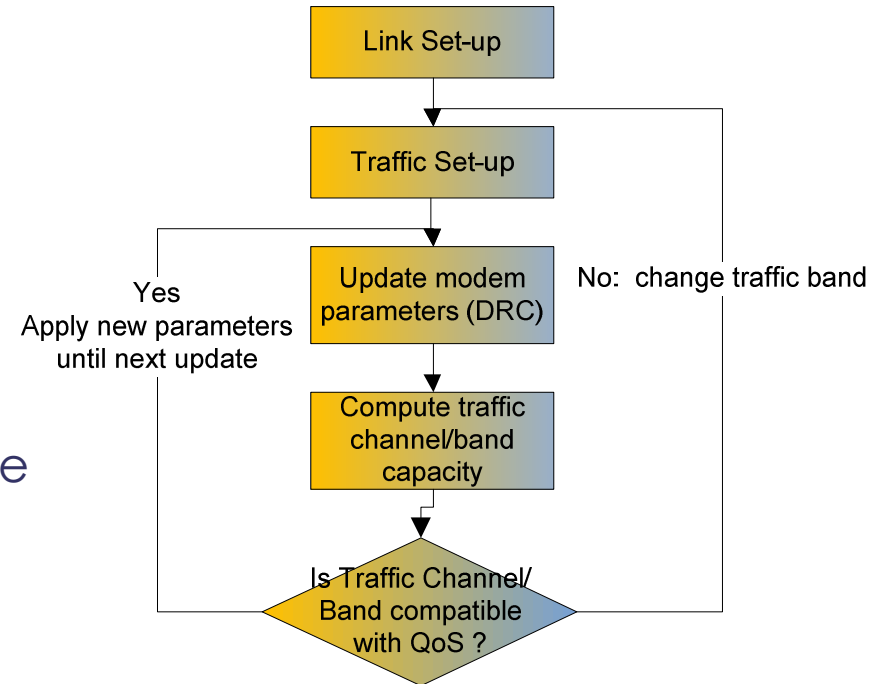
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Interoperability rules for Link management

Specific rules proposed for XL capable radios

➤ Link maintenance flowchart

➔ Take advantage of the waveform resilience to jamming and channel rapid degradation to propose a new band as per suggestion of the cognitive engine. Only traffic set-up phase then needs to be performed.



➤ Network service channel feature

- Priority call slot with ST4539-H TDD modem
- Detection of dedicated narrow band channels of request break-in thanks to wideband reception

Conclusions

A strategy for link establishment, taking into account both contiguous and non-contiguous approaches for wideband HF communications is being proposed

This proposal

- Is backward compatible with 3G FLSU approach, allowing for interoperability with legacy users
- Takes into account, when possible, suggested evolutions made possible with wideband approaches

A draft document has been uploaded to BLOS group website for initiating a discussion by the experts of the group to define the 4G ALE procedure, to become ultimately a NATO STANAG. THALES welcomes in name of French MOD comments or suggestions.

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SALAMANDRE



If you have any questions

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