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Proposal for a new Study Group

Dynamic Spectrum Access in Vehicular Environments

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June 20, 2011

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Document Title: Proposal for a new Study Group
Document Date: June 20, 2011
Document No: sc-11-0001-00-VeAd

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Proposal for a new Study Group

Proposal to the DySPAN-SC Plenary:

Consider establishing a new study group on
Dynamic Spectrum Access in Vehicular Environments (DSA-VE)

Main purpose:

Evaluate the need for DSA standardization in this area and provide all information needed to prepare a decision on the creation of a new working group.

Should be created as a pre-PAR activity.

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Background – The need for a Study Group (I/III)

ITS frequency bands have been allocated for both road safety and TTI in the 5.9 GHz bands.

- Still open interference and congestion issues in safety-relevant situations due to limited spectrum availability (few and narrow bands of 5 and 10 MHz, use of neighboring IMS bands needed).

TV white space use has been demonstrated in Car-to-Car communications.

- Potentially creates lots of new regulatory issues.
- Coexistence issues with users relying on geolocation DBs.
- Hard timing constraints on sensing and device reconfiguration.

ITS intelligent transportation system
TTI tourist and travel information

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Background – The need for a Study Group (II/III)

Useful applications of vehicle-to-infrastructure communication have been demonstrated based on UMTS, WiMAX and LTE.

- Lack of approaches to handle timing constraints along with increased user density in cellular systems.
- No grounds for DSA if utilized for example in LTE-advanced

Operators consider dynamic cell-size adjustment based on communication purpose to enhance energy-conservation and minimize interference (e.g. optimizing cell-coverage along wayside/roadside).

- Open issues on spectrum planning and management, interference mitigation in dynamics and spectrum efficiency.

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Background – The need for a Study Group (III/III)

Car manufacturers evaluate the benefits and cost factors if utilizing SDR and CR in their vehicles.

- One transmitter / multiple receivers and multi-channel MAC operation will become the regular case.
- Transceiver and antenna technical characteristics have to follow the car's body design principles.
- Multi-standard operation will be mandatory (e.g. LTE, 802.11abgnp, Bluetooth).

It appears that the area may benefit from an application of DSA principles and from related standardization.

MAC media access control

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Expected Scope of the new Study Group

Consider use of DSA systems and principles for

1. In-vehicle wireless communication
   - Human user as well as M2M.
   - Machinery compartments, cabin, consist, …
2. Vehicle-to-vehicle communication
   - Safety as well as non-safety ITS communication.
3. Vehicle-to-wayside/roadside communication
   - DSRC as well as vehicle control
4. Vehicle-to-infrastructure communication
   - Cellular for ITS as well as generic applications

M2M machine-to-machine
DSRC dedicated short range communication

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Expected Activities of the new Study Group

- Evaluate on
  - The need for DSA in vehicular communications;
  - State of the art and the need for standardization in scope.
- Identify
  - relevant complementing standardization activities in the area;
  - stakeholders to address.
- Prepare
  - Initial evaluation of relevance and feasibility;
  - Information needed to draft one or more PARs

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Expected cooperation with other DySPAN-SC WGs

The new study group can complement ongoing work, for example

- Requirements and policies for spectrum sensing in mobile environments (1900.6)
- Utilization of vehicles as spectrum sensors (1900.4, 1900.6)
- Policies and coexistence issues for mobile users (1900.5, 1900.6)
- Feasibility and constraints of white space access for mobile users (1900.6, 1900.7)
- Requirements for multi-standard / multi-channel operation (1900.7)
- Requirements for mobile networks in DSA / non-DSA configurations (1900.4, 1900.5)

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Conclusions

The need, scope and purpose for a new study group on DSA in vehicular environments has been given.

Potential technical areas of relevance to address have been given.

It has been shown how this group and its potential outcomes will fit into the DySPAN-SC framework of activities.

The DySPAN-SC is now is asked if this proposed activity is considered within scope and if the creation of a new study group will be supported.