



# SAPHYRE

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Business models, pricing mechanism and advises for spectrum policy  
and regulation for scenario I

## D5.3a

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### Abstract

This document focuses on spectrum sharing scenario SC2abc identified and selected in D5.1b. It analysis influence of the novel technology on the service delivery chain (needs, processes, roles), discovers new business opportunities, discuss the influence of the novel technology on the strategy of the current key market players and makes proposal of trends of regulatory policy evolution required to profit from the advantages of the new technology.

### Keywords

Spectrum sharing, process analysis, spectrum assignment policy, asset management.



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## Abbreviations

CAPEX	Capital Expenditures
CPC	Cognitive Pilot Channel
CRS	Cognitive Radio System
CSP	Communication Service Provider
D#	Deliverable (number)
EU	European Union
eTOM	enhanced Telecom Operations Map
FCC	Federal Communications Commission
GPS	Global Positioning System
HSPA	High Speed Packet Access
ICT	Information and Communication Technology
IMT	International Mobile Telecommunications
ITU	International Telecommunication Union
ITU-D	ITU development sector
ITU-R	ITU radio communication sector
LTE	Long Term Evolution
MNO	Mobile Network Operator
MVNO	Mobile Virtual Network Operator
NBP	National Broadband Plan
NRA	National Regulatory Authority
OPEX	Operating Expenditures
RAN	Radio Access Network
RSPG	Radio Spectrum Policy Group
SDR	Software Defined Radio
SWOT	Strengths, Weaknesses, Opportunities and Threats
UE	User Equipment
UMTS	Universal Mobile Telecommunication Service
WiMax	Worldwide Interoperability for Microwave Access
WP#	Work Package (number)
WRC	World Radio Conference

## 1 Executive summary

Using the methodology developed in D5.2 ([5]) this document presents a business analysis of spectrum sharing scenario SC2abc identified and selected in D5.1b ([4]).

Knowing the answer to classical questions related to current market segmentation answered in D5.2:

- What does the customer need?
- What are the processes required to address customer needs?
- What are the roles on the market related to the processes?
- How the roles are assigned to the key market players on the current market?

participants of WP5 evaluate the spectrum sharing scenarios discussing whether the developed novel technology could as result:

- Create a new or address non supported needs on customer side;
- Influence the processes related to service delivery, changing their complexity level or influencing their cost efficiency;
- Influence assignment of roles on the market to the market players, enabling new business models or changing existing ones,

The subject of the analysis is also the regulatory policy. The document makes proposal of new trends in policy evolution required to positively influence the market development, implementing the sharing technology.

## 2 Business scenarios – general overview

Spectrum sharing scenario SC2abc identified and selected in D5.1b has been presented on the Figure 1.

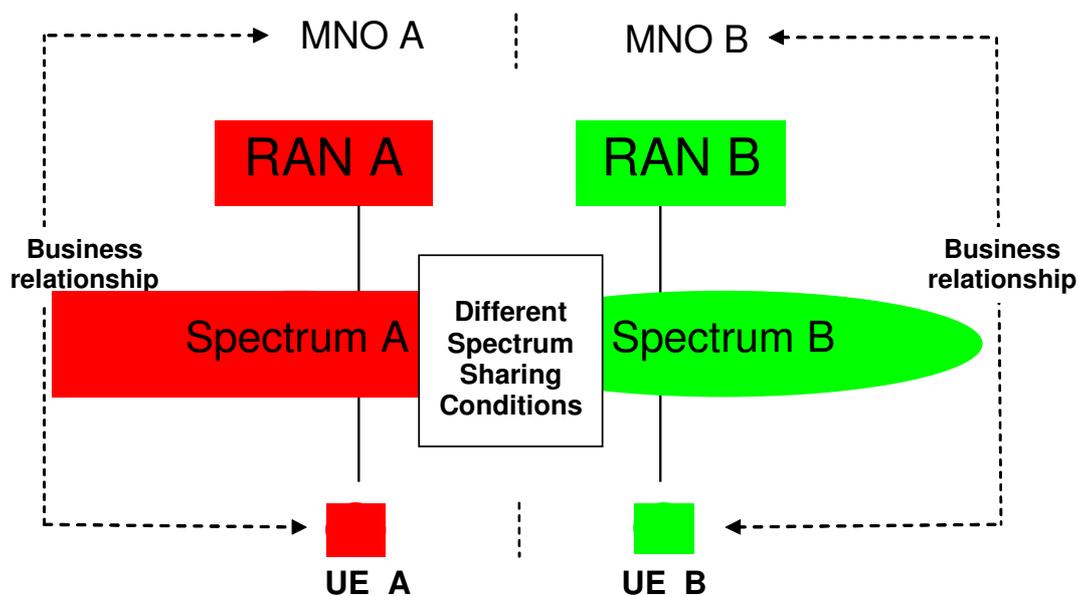


Figure 1: Spectrum sharing scenario SC2abc<sup>1</sup>

To analyse its business implication the scenario should be decomposed into four business scenarios presented on Figure 2, i.e.:

- Collaborative spectrum sharing in existing spectrum band, where Operator A and Operator B decide to share spectrum block which belongs to Operator B (on Figure 2 marked as ①),
- Collaborative spectrum sharing in additional spectrum band, where Operator A and Operator B decide to buy a dedicated spectrum block which will be a subject of sharing (on Figure 2 marked as ②),
- Inter-operator spectrum sharing with spectrum broker, where Operator A and Operator B access the same part of the spectrum resources they have usage rights for. The spectrum is owned by a wholesaler, who sells the access rights real-time (on Figure 2 marked as ③),

<sup>1</sup> [4], page 20.

- Spectrum spot market, where Regulatory Body changes the spectrum policy and sells the spectrum quanta on the spot market, making de facto pay per use policy possible (on Figure 2 marked as ④).

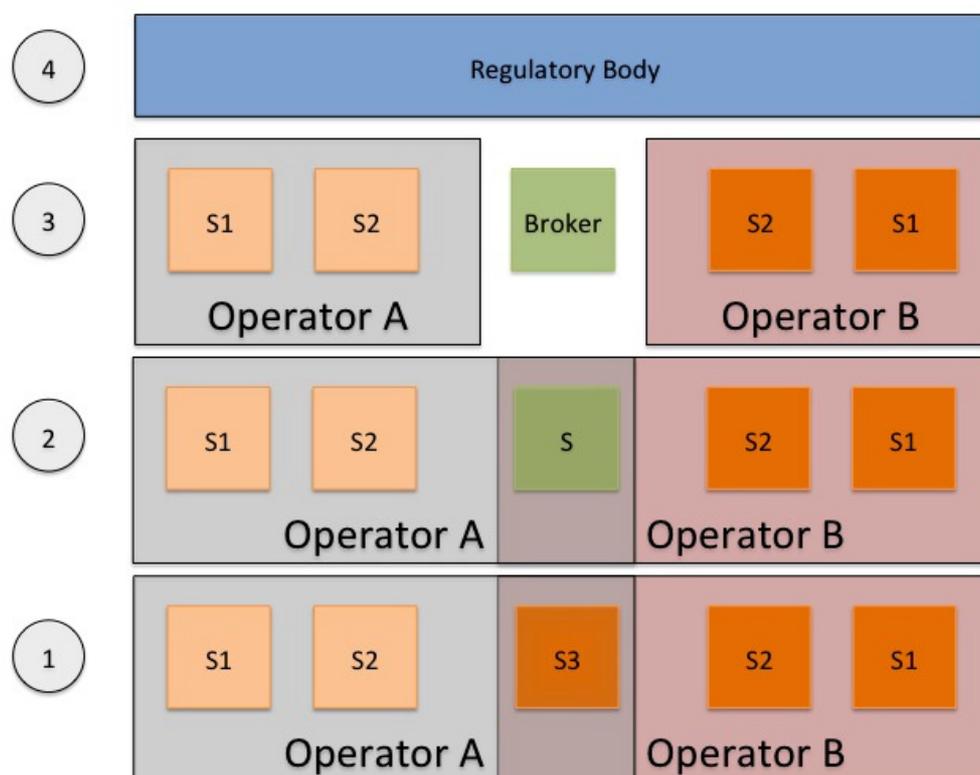


Figure 2: SC2abc based business scenarios

The main business criterion differentiating the scenarios is a different approach to risk management, related to investment in spectral resources:

- In case of scenario 1 Operator B de facto offers not fully utilised resources, to get additional revenue from the asset,
- In case of scenario 2 Operator A and Operator B decide to invest jointly, buying additional spectrum band as non of them is able to utilise the spectrum block individually as efficient as in the coalition,
- In case of scenario 3 Wholesaler takes the investments risk related to investment in spectral resources,
- In case of scenario 4 Regulatory Body eliminates the investment risk related to spectral resources from the market.

It shows one more dimension of SAPHYRE gain – new, more efficient market structure.

Implementation of scenario 2, 3 or 4 requires addressing the same challenge, related to the need of bilateral settlements, defined by following questions:

- How to define unit of spectrum (both dimensions: time/information unit and frequency range)?
- How to measure consumption of spectrum units?
- How to define a price of spectrum unit?
- How to decide about resources assignment in case of resources bottlenecks?

To answer these questions technical solutions developed in SAPHYRE project will be analysed to synchronise the technical approach to resource allocation and business perspective of pricing mechanisms.

### **3 Collaborative spectrum sharing in existing spectrum band**

#### **3.1 Introduction**

#### **3.2 Benefits for the market**

#### **3.3 Definition of the modified map of the market**

#### **3.4 Required changes in regulatory policy**

## **4 Collaborative spectrum sharing in additional spectrum band**

### **4.1 Introduction**

### **4.2 Benefits for the market**

### **4.3 Definition of the modified map of the market**

### **4.4 Required changes in regulatory policy**

## **5 Inter-operator spectrum sharing with spectrum broker**

### **5.1 Introduction**

### **5.2 Benefits for the market**

### **5.3 Definition of the modified map of the market**

### **5.4 Required changes in regulatory policy**

## **6 Spectrum spot market**

### **6.1 Introduction**

### **6.2 Benefits for the market**

### **6.3 Definition of the modified map of the market**

### **6.4 Required changes in regulatory policy**

## **7 Conclusions**



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