



Nokia Siemens Networks

Answers to ARCEP Public Consultation on the bands 57-66 GHz, 71-76 GHz and 81-86 GHz

Purpose of the document

This document provides Nokia Siemens Networks answers to the ARCEP Public Consultation issued on January 2010 about the usage of the bands 57–60 GHz, 71-76 GHz and 81-86 GHz.

Nokia Siemens Networks offers a complete Microwave Portfolio of brand new full packet and hybrid Microwave radio solutions designed to meet the requirements of evolved transport network. Nokia Siemens Networks Microwave solutions achieve the target of minimizing the operator Total Cost of Ownership thanks to the benefits of advanced scalable fully outdoor radio design together with Carrier grade Ethernet nodal solution. The result is to enable Communication Service Providers to deploy a cost-effective microwave infrastructure for 2G/3G, WiMAX and LTE backhaul, High speed Wireless Internet networks, fixed broadband access backhaul, private wireless networks.

Nokia Siemens Networks is a leading global enabler of telecommunications services. With its focus on innovation and sustainability, the company provides a complete portfolio of mobile, fixed and converged network technology, as well as professional services including consultancy and systems integration, deployment, maintenance and managed services. It is one of the largest telecommunications hardware, software and professional services companies in the world. Operating in 150 countries, its headquarters are in Espoo, Finland.

www.nokiasiemensnetworks.com.

Answers

Although the consultation was issued only in French, We understood ARCEP offers also the possibility to answer in English. Below we will report Nokia Siemens Networks' answer, in English, for each ARCEP's correspondent question in French.

Q1. Donner un caractère obligatoire à ces recommandations européennes vous paraît-il contraignant ou au contraire utile au développement des applications sur ces bandes de fréquences ?

Nokia Siemens Networks is strongly in favour of the full adoption of the European recommendations, e.g. ECC REC (05)07 and ETSI EN 302 217-3, or even further requirements, expecting an extensive use of these frequency bands for LTE and WiMAX backhaul application in dense urban areas.

Q2. Votre société a-t-elle des projets concernant la fourniture ou l'utilisation de matériel point-à-point du service fixe dans des bandes supérieures à 39,5 GHz, et plus particulièrement dans des sous-bandes de la présente consultation ?

Yes. Nokia Siemens Networks Microwave Portfolio includes also a solution for point-to-point fixed services in 71-76 and 81-86 GHz.

Nokia Siemens Networks believes that split-band FDD design offers the most appropriate duplex scheme, by using 71-76 GHz band to transmit in one direction and 81-86 GHz band for the opposite direction.

Q2bis. Si oui, précisez votre projet :

- la ou les sous-bandes ciblées

Nokia Siemens Networks supplies radio systems in 71-76 and 81-86 GHz bands.

- le besoin en fréquences (quantité, largeur de bande,...)

Nokia Siemens Networks E-Band radio solution operates both with BPSK and QPSK modulation schemes with Adaptive Code Modulation mechanism allowing to switch between them. The occupied bandwidths in both cases are:

Modulation/Bandwidth/Data Rate: BPSK; 1GHz; 600 Mbps.

Modulation/Bandwidth/Data Rate: QPSK; 1GHz; 1200 Mbps.

- le marché visé (cible commerciale, privée, expérimentations en laboratoire,...)

Mobile and Fixed Operators for LTE, WiMAX and DSL backhaul.

- la longueur du bond et la disponibilité associée

At 80 GHz with 60cm antenna in the geographical area of France,

- up to 3 km @99.99%
- up to 2,4 km @99.995%
- up to 1,5 km @99.999%

- la zone géographique (rurale, grandes villes, zones industrielles,...)

Mostly for high density urban area, business and industrial park, campus

- le calendrier dans lequel s'inscrit votre projet

Now commercially available.

Q3. La largeur minimale d'un canal proposée dans le plan CEPT est de 250 MHz. Quelle quantité spectrale minimale recommanderiez-vous d'attribuer à chaque utilisateur ?

We believe that 80GHz application will presumably take place where fiber is not available and radio offers the only realistic alternative when customer needs are in the range of Gb/s capacities.

This leads to the general assumption that at least 1GHz of band, or four 250MHz channels, should be assigned to each service provider who, eventually, might share the spectrum among several customers.

Q4. Quels sont vos besoins à long terme dans l'utilisation de ces bandes ?

This question seems to be more relevant for Communication Service Providers than microwave suppliers like Nokia Siemens Networks. As a matter of fact the worldwide requirement for Gbit wireless solution in the 80GHz band is growing very fast as also reported by major Market Analysts.

Q5. Précisez pour chaque bande :

- les applications possibles

Nokia Siemens Networks believes that typical applications will include:

- LTE, or collocated 2G/3G/LTE, cell site backhaul
- Fiber alternative in Aggregation for Mobile Backhaul
- WiMAX site backhaul
- DSL backhaul
- Fiber extension for Enterprise

- les types d'équipements et antennes et leurs principales caractéristiques techniques (gain, puissance à l'antenne, débit, type de modulation,...) envisagés

Data Rate	Bandwidth	Modulation	Tx Power	Rx Sens 1E-12
120 Mbps	250 MHz	BPSK	+18 dBm	-73 dBm
240 Mbps	250 MHz	QPSK	+18 dBm	-70 dBm
600 Mbps	1000 MHz	BPSK	+18 dBm	-66 dBm
1200 Mbps	1000 MHz	QPSK	+18 dBm	-63 dBm

Antenna Size	Gain	XPD	Beamwidth	F/B Ratio
30 cm	44 dBi	30 dB	0.9°	64 dB
60 cm	51 dBi	30 dB	0.4°	66 dB

- les fournisseurs

Nokia Siemens Networks hopes to be considered as preferred supplier for any ongoing project.

Q6. Que pensez-vous de la maturité des équipements dans ces bandes de fréquences ?

Gb/s wireless equipment in the 80GHz band have been supplied by several vendors since 2007 with the result of many thousands of systems already deployed in the field and extensive MTBF data recorded: consequently both technology and equipment can be considered to have already reached a good maturity level.

Q7. Quel mode de duplexage vous paraît-il le plus approprié (par exemple le mode FDD en duplex 70 / 80 GHz) ?

Nokia Siemens Networks believes that **split-band FDD** design offers the most appropriate duplex scheme, by using 71-76 GHz band to transmit in one direction and 81-86 GHz band for the opposite direction.

Main advantages of this choice vs others (e.g. single-band FDD systems) are:

- Single hardware design covering the entire 70/80 GHz spectrum vs. different HW versions
- More efficient use (guard-band) of unused spectrum between 76GHz and 81GHz
- Twice the maximum data capacity provided by single-band FDD design
- No need to move to high order modulation (32 or 64 QAM) to reach ten Gb/s link capacity when required in the next future (single-band FDD design would be forced to do that).

Q8. Ces modalités d'attribution vous paraissent-elles adaptées aux besoins du marché ?

Nokia Siemens Networks is in general favourable to a "light licensed" approach as also envisaged by ETSI/CEPT as intended usage of this band. Of course some specific geographical zones, for instance around military locations or radio telescopes, might be excluded by such a simplified coordination to avoid potential interference.

As a consequence the licence fee should not be comparable with the traditional 7-42 GHz bands where spectrum is relatively scarce and complex modulation scheme are required thus reducing link distances.

In the 80 GHz band where there is 10 GHz of spectrum available that is largely empty at present, a 2/4 level modulation allows link distances as the ones required, for example, by LTE cell site backhaul applications, providing that, at least, a cost parity with the 7-42GHz bands might be reached in terms of cost vs. throughput.