

OS-Gemini 5.4 GHz Deployment Technical Note



OS Gemini 5.4

Deploying OS-Gemini 5.4 GHz in European Union (EU) Countries

Introduction

This Technical Note provides guidelines for deploying OS-Gemini 5.4 GHz wireless Ethernet bridges in EU countries. This note explains regulatory conditions in the EU and shows typical throughputs which can be achieved when deploying OS-Gemini in the 5.4 band.

Regulatory Situation in the EU

Deployment of broadband wireless in the 5470 MHz to 5725 MHz band in the EU is subject to the Candidate Harmonized European Standard EN 301 893 produced by ETSI Project Broadband Radio Access Networks (BRAN). EN 301 893 v1.2.3, which is in force today, will be replaced by v1.3.1 in 2006. This version has more stringent controls on Dynamic Frequency Selection (to meet radar avoidance requirements of all EU member states) and on EIRP. OS-Gemini complies with both versions of EN 301 893.

Deploying OS-Gemini 5.4GHz in European Union (EU) Countries

EIRP

Under EN 301 893 the following EIRP limits for the 5470 to 5725 MHz band apply to OS-Gemini 5.4:

- Mean EIRP density $\leq 17\text{dBm/MHz}$
- Mean EIRP $\leq 30\text{dBm}$

With a channel size of $<12\text{ MHz}$, OS-Gemini is a highly, spectrally efficient radio, and may be deployed with **EIRP = 27dBm**

Region Keys

The OS-Gemini 5.4 GHz wireless Ethernet bridge is shipped with a **default Region 9** key which ensures that an OS-Gemini 5.4 Integrated is fully compliant to EN 301 893 and may be deployed in the EU. With the default Region 9 key:

Maximum Power = 4 dBm, EIRP=27 dBm, DFS=ON

In regions outside of the EU, other EIRP limits are permitted. Therefore on the OS-Gemini Quick Start Guide, a second alternative license key is provided which “unlocks” the transmit power of the radio whilst maintaining DFS=ON (Figure1).

Link Configuration Data

These two units have been pre-configured as a link:

Units:

ODU serial number	ODU serial number
E242200029F3	E242200029E2
Ethernet MAC address	Ethernet MAC address
00:04:56:00:29:F3	00:04:56:00:29:E2
Software version	Software version
5445-07-00	5445-07-00

Configured as:

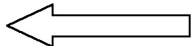
Master	Slave
Target MAC address	Target MAC address
00:04:56:00:29:E2	00:04:56:00:29:F3
IP address	IP address
10.10.10.11	10.10.10.10
Licence key	Licence key
1F2E-3DF4-5225-36D1	8F17-4F4B-6145-2334

Region 9 key: Complies to EN 301 893 with 23dBm integrated antenna

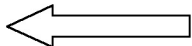
Alternate licence keys:

A034-3203-314B-4B33	6EA6-CDA1-CF20-3971
---------------------	---------------------

WARNING: Region 7 keys. Transmit power up to 25dBm
User must ensure product is configured to conform to local regulatory requirements. Refer to User Manual.



Default Region 9 Key



Alternate License Key

Figure 1: The location of the License Keys on the Quick Start Guide which is shipped with your link.

Deploying OS-Gemini 5.4GHz in European Union (EU) Countries

In the case where OS-Gemini 5.4 is to be deployed with an external higher gain antenna, the maximum transmitter power will need to be reduced to comply with the 27 dBm EIRP limit. The power setting can be calculated from:

$$\text{Maximum Power (dBm)} = 27 - \text{New Antenna Gain (dBi)} + \text{Feeder Loss (dB)}$$

OS-Gemini 5.4 Reach Capability

Even with the stringent EIRP limits in the EU, OS-Gemini 5.4 can be deployed in many applications.

In general terms, for Line-of-Sight hops <30 km and short range Non-Line-of-Sight (NLoS), **OS-Gemini Integrated**, with its compact integrated antenna, is a cost effective solution. Deploying this solution you can achieve the throughput shown in Figure 2.

OS-Gemini Integrated can also be successfully deployed on NLoS links <5 km. Used Line-of-Sight data rates in excess of 10 Mbps can be achieved over links of 25 km.

For more challenging deployments, we recommend using the **OS-Gemini Connectorised**. With a 0.9-metre (3-foot) parabolic antenna, the extra system gain can significantly improve throughput (Figure 3).

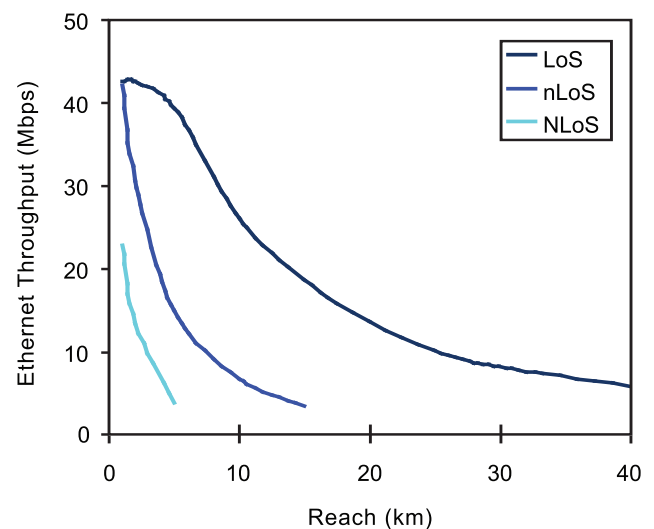


Figure 2: Typical reach and throughput rates with OS-Gemini Integrated

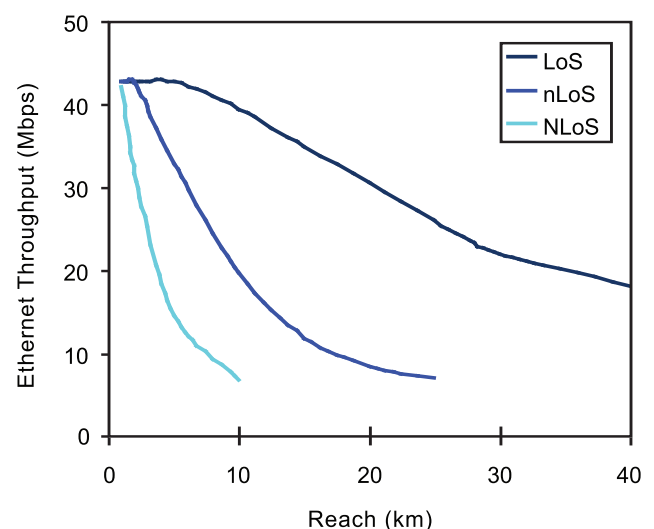


Figure 3: Typical reach and throughput rates with OS-Gemini Connectorised

Deploying OS-Gemini 5.4GHz in European Union (EU) Countries

Throughput rates in excess of 10 Mbps become possible on 5 km NLoS hops. Line of Sight data rates greater than 10 Mbps can be achieved on links of 50+ km.

Note: The examples shown in Figures 2 and 3 provide indicative throughputs only and are not guaranteed.

Orthogon Systems recommends that the **OS-Link Estimator** – available from the Partners page at www.orthogonsystems.com – is used to plan every path before you deploy your link. Doing a path calculation using the Link Estimator ensures that local terrain, mast height, and atmospheric and other conditions specific to your link are all taken into account. This way you will know before you deploy what the throughput and availability of your link will be, ensuring that your deployment goes according to plan.

HEADQUARTERS

Orthogon Systems
Unit A1, Linhay Business Park
Eastern Road, Ashburton
Devon, TQ13 7UP, UK

Outside of North America:
Sales: +44 1364 655500
Tech Support: +44 1364 655656

USA OFFICE

Orthogon Systems LLC
890 Winter Street, Suite 320
Waltham, MA 02451

Sales and Tech Support in
North America:
+1 877 515-0400

www.orthogonsystems.com

©Copyright 2006 Orthogon Systems. All rights reserved. All trademarks are the property of their respective owners. All statements of fact contained herein are provided for informational purposes only and are subject to change without notice. No warranty of accuracy is expressed or implied, and the user of this information assumes all liability.