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# GS-Kit S-Band

Alén Space Ground Station kit

# Datasheet

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GS-Kit S-Band Datasheet

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1. Changelog	4
2. Overview	4
3. Architecture	5
3.1 Outdoor equipment	6
3.2 Indoor equipment	6
4. Electrical characteristics	7
4.1 Outdoor equipment	7
4.2 Power rack	7
4.3 SDR Rack	8
5. Antennae characteristics	10
6. Physical characteristics	11
6.1 Installation area	12



# 1. Changelog

Table 1 - Changelog			
Date	Revision	Author	Description
06/02/2023	1.0	BFA	Initial release

## 2. Overview

The GS-Kit S-Band from Alén Space S.L. is a ground station complete solution used to communicate and track LEO satellites in S-Band. It is composed of different subsystems: external structure and an antenna with azimuth and elevation rotators, SDR rack, power rack and server.

With the external structure and both rotators (azimuth and elevation rotator), the antenna can point in any direction, and follow the spacecraft in each and every contact.

The SDR rack is able to transmit and receive data from the satellite in Full-Duplex and Half-Duplex communications, providing this data to the server through USB 3.0.



3. Architecture



Figure 1 - GS-Kit diagram



### 3.1 Outdoor equipment

The outdoor equipment is composed of a structure with four base bars to provide stability. Over the four bars, is the main pyramid tower with the azimuth rotator. Over the pyramid is the elevation rotation with the antenna.

The antenna is connected to an external box that integrates a diplexer and an LNA. This diplexer allows full-duplex communications.

### 3.2 Indoor equipment

The indoor equipment is composed by:

- A rotator controller that controls both rotators.
- SDR rack provides the signal transmission and reception in S-Band.
- Power rack provides power supply to the SDR rack.
- Server rack is connected to the rotator controller rack and SDR rack. The server controls the rotator controller, and sends and receives data from the SDR rack.



# 4. Electrical characteristics

### 4.1 Outdoor equipment

#### Table 1 - Outdoor electrical characteristics

Description	Тур	Unit
S-Band RF Box in Transmission: - Insertion Loss - Frequency range	0.75 2.025 - 2.11	dB GHz
S-Band RF Box in Reception: - Gain - Noise Figure - Frequency range - Current consumption	31 3 2.2 - 2.3 95	dB dB GHz mA
S-Band RF Box - RX-TX isolation (range: 2.025 - 2.11 GHz)	91	dB

### 4.2 Power rack

Table 2 - Power rack electrical characteristics

Description	Тур	Unit
Input voltage	90 - 264	VAC
Input frequency range	47 - 63	Hz
Efficiency	89	%
Maximum power consumption	1000	w
Output voltage	48	V
Output max current	21	A



#### GS-Kit S-Band Datasheet

### 4.3 SDR Rack

Table 3 - SDR rack electrical characteristics

Description	Тур	Unit
Input power supply (VCC)	48	V
Current supply typical	0.5	А
Current supply in Transmission	4	А
Current supply maximum (fused)	10	А
Biuas-T output voltage	13.5	V
Bias-T output max current	500	mA



#### GS-Kit S-Band Datasheet

Table 4 - SDR rack RF characteristics

Description	Тур	Unit	Comments
Transmission frequency range	2.025 - 2.11	GHz	
Maximum transmission bandwidth	1.7 - 2.2	GHz	
Máximum output power	44	dBm	
Reception frequency range:	1.5 - 3.6	GHz	
Reception maximum bandwidth	61.44	MHz	
Máximum input power	+7	dBm	



# 5. Antennae characteristics

#### Table 5 - Antennae characteristics

Antenna	Description	Тур	Unit
Dish 1.9 m	Туре	Dish	N/A
	Diameter	1.9	m
	Frequency band	2.025 - 2.29	GHz
	Gain	31.3	dBi
	Beamwidth	5.1	ō
Dish 2.4 m	Туре	Yagi	N/A
	Diameter	2.4	m
	Frequency band	2.025 - 2.29	GHz
	Gain	33.2	dBi
	Beamwidth	4	ō
Dish 3 m	Туре	Yagi	N/A
	Diameter	3	m
	Frequency band	2.025 - 2.29	GHz
	Gain	37.5	dBi
	Beamwidth	3.2	ō



# 6. Physical characteristics

Table 6 - Physical characteristics

Description	Тур	Unit	Comments
Mass	200	kg	
Shipping weight	310	kg	
Size structure: Base Height (from ground to cross boom)	4.5 x 4.5 2.3	m² m	
Azimuth angles	0 - 360	ō	
Elevation angles	0 - 180	ō	



6.1 Installation area



Figure X - Alen GS-Kit structure installation area



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