Orbital Ka-ISO

Ext Ref Ka LNB with integrated isolator

Orbital Research Ltd
#10-3871 North Fraser Way
Burnaby, BC V5J5G6

Part number generator

Frequencies (GHz):

LO	Input	Output	Bandwidth
18.40F	19.35 to 20.4	.95 to 2.0	1.050
19.20F	20.2 to 21.2	1.0 to 2.0	1.000
19.25F	20.2 to 21.2	.95 to 1.95	1.000
18.25F	19.2 to 20.2	.95 to 1.95	1.000

Bandwidth in MHz

'X' Signifies External Reference

LNB1920F-1000XA-WIN60

Anchor Holes
#4-40 x 12 holes

Input Connector
Ka LNB is WR-42

Integrated input Isolator
I - integrated isolator

Output Connector
F - F, 75 ohm
N - N, 50 ohm
S - SMA, 50 ohm
T - TNC, 50 ohm

Gain
55 - 55 dB
60 - 60 dB
65 - 65 dB

Ka-ISO Features:

- Integrated input isolator ensures good match and is hermetically sealed
- The DC and 10 MHz are multiplexed onto the output L-Band signal.
- With internal, input isolator, the input VSWR is only 1.4:1 max, nominal 1.25:1 - and the noise figure is 1.4 dB max, nominal 1.3 dB.
- Anchor holes on back of LNB for mounting support
- Other frequencies available. Check with Orbital.
- Meets Mil Standard 188-164B specifications.
- Just slightly longer than our 694XA series LNB.

Sales contact:

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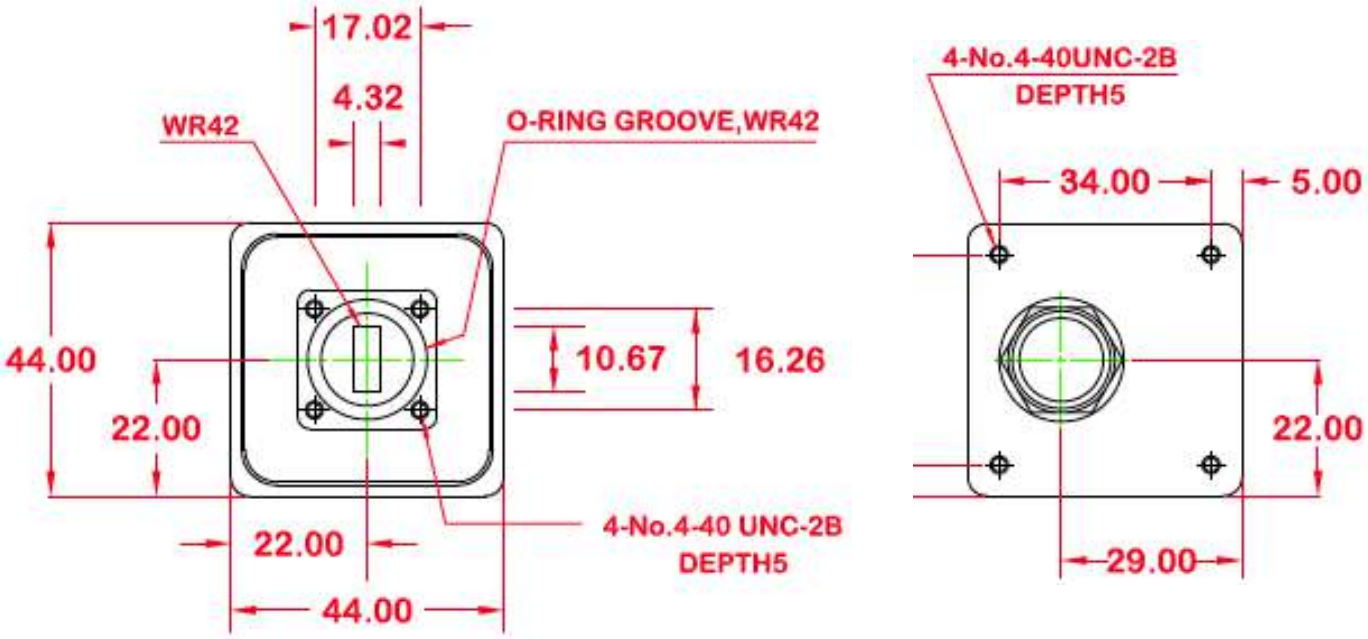
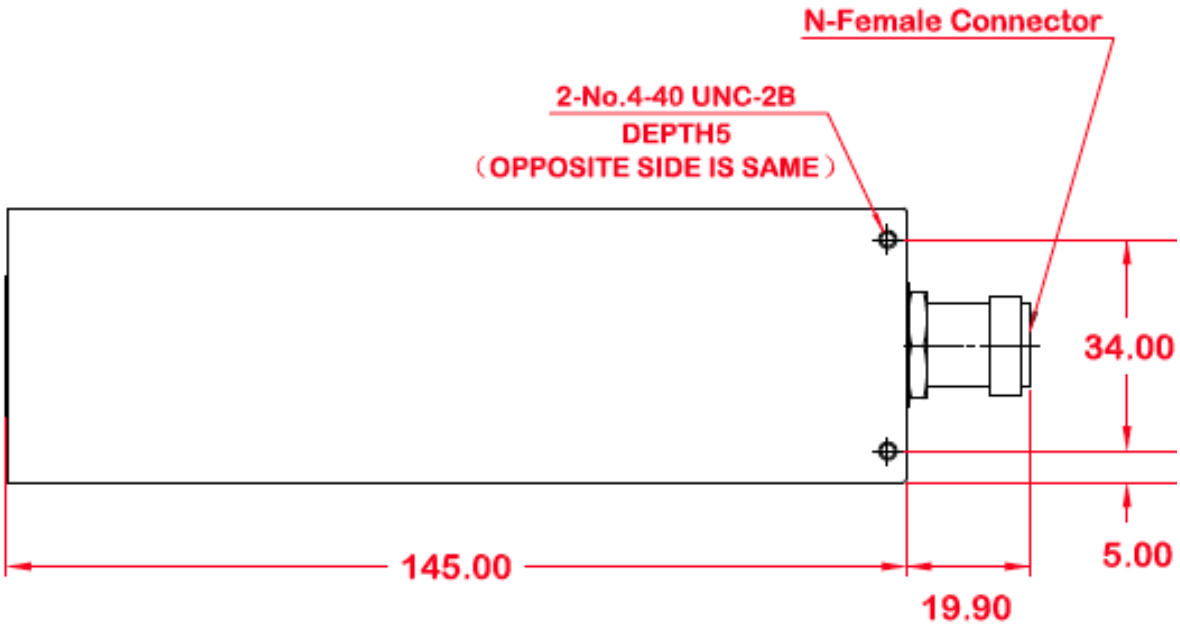
Mechanical Diagram





Sample Test Data Sheets for one LNB

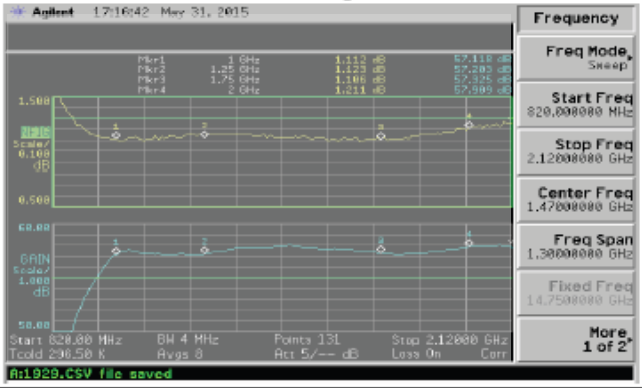
Client	Sample	Part No	LNB1920M-1000X-WS55-T90		SCD	Ka Single WGS	Rev	H
PO	0	Serial	6000-070	Tested By	MS	Product	Ka LNB HiVibe, HiTemp	
Date	30-May-15	Band	1929	Checked By	LT	Orb ID	0	

SCD	Compliance Parameters	Specification	Unit	Status
3.1.1	RF Input Frequency	20.20-21.20	GHz	confirmed
3.2.1	IF Output Frequency	1000-2000	MHz	confirmed
3.3.1	10 Mhz -5 to +7 dBm	Tested to +8	dB	confirmed
3.4.1	Local Osc Frequency	19.2	GHz	confirmed
3.6.1	DC Input 18 ± 1 VDC	18	VDC	confirmed
4.0	Length x Width x Height	4.4 x 2.0 x 1.75	in	confirmed
4.2	Input Connector	WR-42	std	confirmed
4.3	Output Connector	Type S (f)	std	confirmed
4.4	Weight, 500 gms	495	gms	confirmed
4.5	MIL-A-8625	Type 2 CL2	gld	confirmed

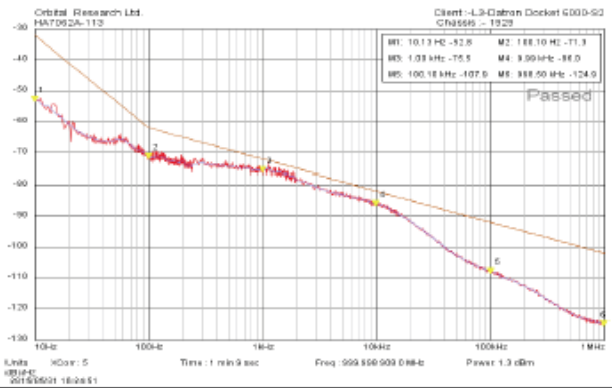
SCD	Measured Parameters	Spec	Data	Unit
3.1.5	Noise Figure	< 1.3	1.13	dB
3.5.1	Gain (+4,-0)	55	57.42	dB
3.5.3	Max Ripple 10 MHz	± 0.25	0.10	dB
3.5.4	In Band Spurs signal	> 45	>90	dBc
3.5.5	Image Rejection	> 40	-53	dBc
3.4.3	LO Leakage Output	-45	-68	dBm
3.2.3	1dB Comp @ 1ghz	+7	12	dBm
0	Third Order Intercept	+17	22	dBm
3.8.1	DC Current@24 vdc	200	199	mA
3.1.4	Input / Output VSWR	1.5:1	1.4	

SCD	Measured Phase Noise, as per plot				
3.4.4	10 Hz	-90	-32	-52.8	dBc/Hz
3.4.4	100 Hz	-131	-62	-71.3	dBc/Hz
3.4.4	1 KHz	-155	-72	-75.5	dBc/Hz
3.4.4	10 KHz	-158	-82	-86.0	dBc/Hz
3.4.4	100 KHz	-158	-92	-108	dBc/Hz
3.4.4	1 MHz	-160	-102	-125	dBc/Hz
	Offset	Ref	Spec	Data	Unit

Gain and Noise Figure at 23C



Phase Noise at 23C



Note 1 - Gain and Noise figure plots taken with N8973A Agilent Analyzer every 10 MHz, 131 sample points over 1300 MHz bandwidth.
Note 2 - Phase Noise measured with Holzworth 7062A phase noise analyzer and Agilent E8257D 40 GHz source with ultra low phase noise option
Note 3 - Noise and Gain Data plus ripple computations in columns AC through AH, client can create custom formulas for specific data analysis
Note 4 - For 1 dB compression point, the reference output level is +0 dBm

Included are references to customer's order info such as PO & SCD (if

Gain & NF data is average over output frequency range.

Measured performance of all relevant parameters against specifications or SCD.

Phase noise plotted using Orbital's POP OCXO Oscillator as reference.

Test Data panel of compliance parameters.

POP phase noise also provided.

Phase Noise plot provided.

Raw Data (not shown) of Gain & NF is also supplied.

Included is a list of test equipment used.

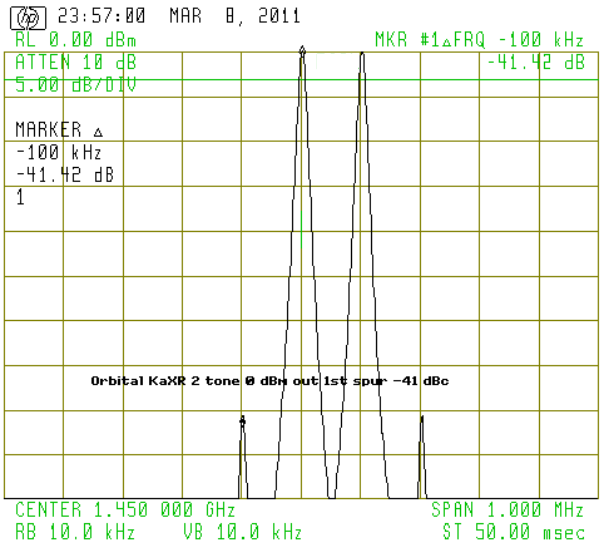
The above 2 test data examples are for WGS and Global Xpress frequencies.

Individual plots of Gain & NF are provided.

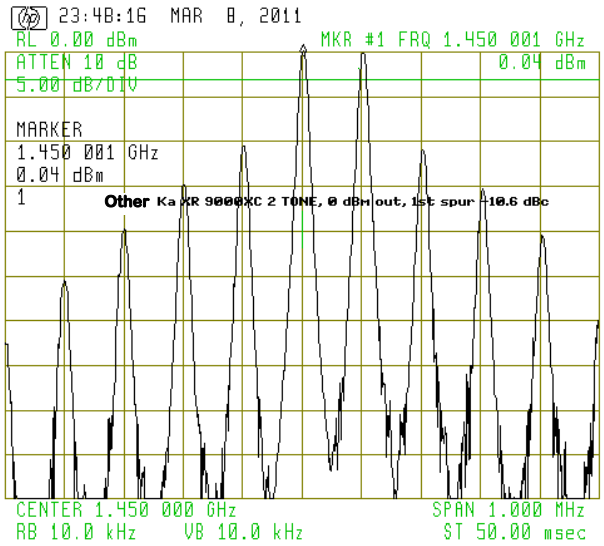
One sheet per is supplied with each LNB shipped.

Two Tone Test

What it means - The two plots below compare gain linearity for the new Orbital design with competitor designs. Two tones at 20.200000 GHz and 20.200100 GHz are injected into the LNBs to provide 0 dBm out. The first spur in the Orbital design is over -40 dBc down compared to the multiple spurs on the competitive LNB starting at only -10 dB down. Intermodulation (IM) distortion for a given output is reduced in the Orbital LNB while providing higher overall gain (60 dB minimum for the Orbital LNB, versus 55 dB for the competitor LNB).



Orbital LNB



Competitor LNB

How it works - The LNB has to amplify the multiple signals from the satellite by a factor of a million (60 dB) without adding significant noise (noise figure), but also to perform this conversion without adding distortion. The above graphs represent the comparative levels of distortion between the Orbital design and competitive designs. Basically, if you put two signals into the LNB, you should get two signals, and only two signals, out. You can imagine the mess using a poor quality LNB when you amplify and convert the dozens or even hundreds of signals from the satellite.

What it shows - While an LNB would never be operated at 0 dBm output level, the test and design represent the linear conversion quality of each LNB and the P1 dB compression point. The Two Tone tests are proxies for the quality of conversion that is absolutely necessary for low bit error rate satellite transmissions. LNB non-linearity starts at much lower levels than 0 dBm output, and the 2 tone test is the best method of comparing the quality of design and manufacture of LNBs. The ultimate benefit to the end user is lower noise figure, higher conversion gain, and most importantly, lower bit error rate for their digital transmissions.

Orbital Ka Isolator

Until recently, Orbital has been adding an input isolator to the LNB when required by the customer. Because of recent proprietary improvements in isolator design, Orbital has been able to reduce the width of the isolator so that it can fit inside the case of a standard LNB (without the load sticking out sideways). This gives the added benefit of sealing the isolator into the case with the LNB.

Specifications

Frequency Range:

Input RF Frequency:	See first page
Output IF Frequency:	950 to 1950 MHz, or 1000 to 2000 MHz
Local Frequency:	See first page
LO Stability:	Phase locked to external 10 MHz reference

Gain:

Gain:	60 dB ±4dB max. over temp & freq
Flatness:	±1.5 dB max over freq
Ripple:	±0.15 dB per 10 MHz
Stability:	±0.25dB max over 24hr @ +25˚C

VSWR:

Input:	1.4:1 max (integrated input isolator) 1.25:1 nominal
Output:	1.8:1 max

Amplitude Response:

10 MHz Band:	±0.3dB max
120 MHz Band:	±1.0dB max
Receive Band:	±1.5dB max

Interfaces:

Input:	WR-42 waveguide flange with O-ring groove & threaded screw holes (#4-40 UNC x .38 deep thread)
Output:	N, 50Ω female coax connector. Optional: SMA (50Ω) & F (75Ω)

Environmental:

Operating Temp:	-40˚C to +60˚C
Operating Altitude:	10,000 ft ASL
Operating Rel Humidity:	100% condensing
Non-operating Temp:	-50˚C to +70˚C
F Shock:	10g, 11ms, half sine
MTBF:	>125,000 hours
Standards Compliant to:	RoHS & REACH

10 MHz Reference:

Insertion:	Multiplexed onto the IF coaxial connector
Input Level:	-5 to +5 dBm
Phase Noise:	-135dBc/Hz max. @ 100 Hz -148dBc/Hz max. @ 1 kHz -152dBc/Hz max. @ 10 kHz -155 dBc/Hz max. @ 100 kHz

Mechanical:

Dimensions:	44 x 44 x 128 mm
Color:	White or blue (standard)
Weight:	485 grams TBC
Anchor holes:	#4 threaded (4-40) x 12

Noise Figure:
1.4 dB max. @ +23˚C
(1.3 dB nominal)

LNB 10 MHz Phase Noise:
-62 dBc/Hz max. @ 100 Hz
-72 dBc/Hz max. @ 1 kHz
-82 dBc/Hz max. @ 10 kHz
-92 dBc/Hz max. @ 100 kHz
-102 dBc/Hz max. @ 1 MHz

Power:

DC in:	+12 to +24 VDC, 300mA
Interface:	DC power is multiplexed with the IF & 10 MHz reference signals on the output connector

Other Specs:

LO Leakage:	Output: -45 dBm min Input: -45 dBm max at waveguide flange
Image Rejection:	-45 dB min
P1 dB comp pt:	+10 dBm min
3rd order ICP:	+20 dBm min
Overdrive:	-20 dBm, non-damaging
Spurious:	Input Spurious level of -85 dBm equates to <-140 dBm
Desense level:	-50dBm transmit signal level results in no more than 0.1dB of NF degradation

Orbital Research Ltd. designs and builds products for satellite communications applications. Orbital website: www.orbitalresearch.net.

Specifications subject to change without notice.