Norsat International Inc.

Innovative Communication Solutions

35 YEARS OF EXCELLENCE

Norsat SigmaLink™

The new Norsat SigmaLink™ is the latest in a series of transportable satellite terminals. The SigmaLink™ is ideally suited to provide broadband connectivity for base camps or other prolonged missions where assignments are temporary but deployment is protracted. With simple setup and alignment procedures, personnel with minimal training can have the Norsat SigmaLink™ up and transmitting in minutes.

Flexible. Intelligent. Rugged.

The Norsat SigmaLink™ was designed from the ground up to deliver broadband data connectivity in a transportable, rugged and easy-to-use package. The terminal can be easily configured to meet varying needs; it includes a 1.8m or 2.4m antenna, interchangeable Ku/X/C band capability, various power amplifiers options, positioner, controller, pointing tools, and different system configurations (pointing box and/or baseband configuration). Norsat is also the first in the industry to incorporate an easy-to-use graphical interface for antenna alignment, satellite acquisition, peaking and transmitter control, as well as access to the built-in spectrum analyzer, beacon detector, and DVB receiver.

The Norsat Advantage

Only the Norsat SigmaLink™ provides a quick assembly platform that can be set up in less than 15 minutes without tools. It comes complete with pointing tools (compass, inclinometer, and GPS) to aid in satellite alignment. The sophisticated LinkControl™ software together with an easy-to-use pointing box, or Satellite Acquisition Assistant (SAA), makes alignment and acquisition easy for even novice operators. To further simplify operation in the field, a full range of settings can be pre-configured in user selectable profiles before the Norsat SigmaLink™ is sent out on assignment.

Flexible

- Ku/X/C band capable
- 1.8 M or 2.4 M antenna for greater throughput
- Available with pointing box (SAA) and/or baseband configuration
- Configurable to operate on any commercial satellite at any time

Intelligent

- Quick and simple assembly
- Assisted-acquire via easy-to-use SAA
- Intuitive graphical software interface
- Built-in spectrum analyzer, beacon detector, DVB receiver
- Software control of transmitter

Rugged

- Packaged in ruggedized industrial cases
- Built tough and weatherized for harsh environments
- Shock protected assemblies
- Compliant with military environmental standards

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1.8M SigmaLink™ Baseband Variant

System	C-Band		X-Band		Ku-Band	
	Rx	**Tx**	**Rx**	**Tx**	**Rx**	**Tx**
EIRP	N/A	53.3 dBW	N/A	>61 dBW	N/A	58.3 dBW
G/T	15.3 dB/K	N/A	>19 dB/K	N/A	23.7 dB/K	N/A

Antenna

Frequency	3.4 - 4.2 GHz	5.85 - 6.425 GHz	7.25 - 7.75 GHz	7.9 - 8.4 GHz	10.95 - 12.75 GHz	13.75 - 14.5 GHz
Midband Gain	35.4 dBi	39.3 dBi	41 dBi	41.7 dBi	45.1 dBi	46.8 dBi
X-pol	30 dB on axis, 23 dB within 1 dB contour	30 dB on axis, 23 dB within 1 dB contour	N/A	N/A	35dB on axis, 23 dB within 1db contour	35dB on axis, 23 dB within 1db contour
Axial Ratio	N/A	N/A	1.5 dB	1.5 dB	N/A	N/A
Sidelobe	ITU 580 / IESS 207		Meets DSCS		Meets IESS 208	
Isolation						
Tx - Rx	-60 dB	N/A	-110 dB	N/A	-85 dB	N/A
Rx - Tx	N/A	-50 dB	N/A	-110 dB	N/A	-30 dB
Reflector Size	1.8m, 4 piece segmented reflector, offset feed		1.8m, 4 piece segmented reflector, offset feed		1.8m, 4 piece segmented reflector, offset feed	
Antenna Travel						
Az	+/- 35 degrees fine adjust		+/- 35 degrees fine adjust		+/- 35 degrees fine adjust	
El	0 - 90 degrees		0 - 90 degrees		0 - 90 degrees	
Pol	+/- 90 degrees		+/- 90 degrees		+/- 90 degrees	
Feed	2-port linear		2-port circular		2-port linear	

Transmit

	C-Band	**X-Band**	**Ku-Band**
Output Frequency	5.85 - 6.425 GHz	7.9 - 8.4 GHz	13.75 - 14.5 GHz
Reference	10 MHz	10 MHz	10 MHz
Reference Level	0 +/- 5 dBm	0 +/- 5 dBm	0 +/- 5 dBm
Output Power @ P1dB	40 W	175 W	25 W
Gain (typical)	77 dB	84 dB	50 dB
Spectral Regrowth	-26 dBc @ 44.7 dBm	-26 dBc @ 45.5 dBm	-26 dBc @44 dBm

Receive

LNB NF	0.5	0.8	0.8
Reference	10 MHz	10 MHz	10 MHz
Reference Level	-5 +/- 5 dBm	+2 +/- 5 dBm	+2 +/- 5 dBm
Phase Noise	-73 dBc/Hz at 1 kHz -83 dBc/Hz at 10 kHz -93 dBc/Hz at 100 kHz	-75 dBc/Hz at 1 kHz -85 dBc/Hz at 10 kHz -95 dBc/Hz at 100 kHz	-65 dBc/Hz at 1 kHz -75 dBc/Hz at 10 kHz -85 dBc/Hz at 100 kHz
Input VSWR	2.2 : 1	2.0 : 1	2.2 : 1
Output VSWR	2.2 : 1	1.5 : 1	2.2 : 1
Conversion Gain Typical	65 dBm	55 dBm	65 dBm
Output P1 dB	9 dBm	5 dBm	7 dBm
Power Req	15 - 24 V on IF cable	15 - 24 V on IF cable	15 - 24 V on IF cable
Current Drain	550 mA	300 mA	200 mA

Shock Protected Baseband

8 Rack Unit

1st shelf (2RU):	Baseband distributes Tx IF from two modems to the SSPA and distributes Rx
(RF Distribution Assembly)	IF from LNB to modems and SAA
2nd shelf (1RU): (CDM 625 modem)	SCPC modem (options and features per customer spec)
3rd shelf (1RU): (CDM 625 modem)	SCPC modem (options and features per customer spec) (future use)
4th shelf (2RU): (Cisco 2911 router)	Router (options and features per customer spec)
5th shelf (1RU): (SAA/PS)	SAA Module Contains an integrated spectrum analyzer, received signal strength meter, and DVB receiver PS supplies up to 100W @ 24V (for IDU), up to 400W @ 48V (for SSPA power supply)
6th shelf (1RU): (AC-Distribution)	Distributes AC throughout rack

Shock Protected UPS

6 Rack Unit

1st shelf (3RU):	Electronics
2nd shelf (3RU):	Batteries
Capacity	3000 VA/ 2100W
Universal Input	90 - 264 Volts 47 - 63 Hz
Output Voltage	120 V
Reserve	5 minutes @ full capacity
Temperature	0 - 40° C

Ruggedized System Controller

Operating System	Microsoft(R) XP Tablet Edition		
Screen	264mm Touchscreen XGA LCD, TFT sunlight readable		
Keyboard	87 Key Compact, Sealed		
CPU	Intel® CoreTM Duo Processor L2400 (1.06 GHz) Low power, shock mounted, fully sealed		
Physical	Ruggedized MIL-Spec Laptop 1RU 254mm deep rack enclosure 482 x 44 x 254mm (WxHxD)		
MIL-STD 810F	514.5	I	(vibration)
	516.5	IV	(freefall)
	501.4	I & II	(stabilized temp.)
	503.4	I	(sudden changes)
	506.4	III	(falling or sprayed liquids)

Indoor Power Supply

Prime Power	115 / 230 VAC 50 / 60 Hz
Output Voltage	48V / 24V
Consumption	< 500 VAAC

Interfacility Link Cable

Length	10m (Standard) 30m (Optional) longer lengths available on request

Environmental

Operating Temp	-30 to +50 °C (Antenna/RF) 0 to +50 °C (Indoor Equipment)
Rainfall	50mm/h Operational 100mm/h Survival
Wind Speed	72km/h Operational 108km/h Survival
Humidity	100% condensing (Antenna / RF) 5 - 95% non-condensing (Indoor Equipment)

Packaging

10 cases total

Case 1	Pedestal Case	43cm x 73cm x 84cm 29.5kg
Case 2	Boom/Legs Case	26cm x 46cm x 1.27cm 29.5kg
Case 3	Reflector Case 1	36cm x 99cm x 1.04cm 40.9kg
Case 4	Reflector Case 2	36cm x 99cm x 1.04cm 40.9kg
Case 5	Baseband Case	68.6cm x61.6cm x 88. 6cm 66.8kg (est.)
Case 6	UPS Case	68.6cm x 47.3cm x 88.6cm 71.3kg (est.)
Case 7	X-Band 125W SSPA	51.8cm x 39.3cm x 79.5cm 35kg (est.)
Case 8	X-Band Feed, LNB, cables	51.8cm x 31.0cm x 79.5cm 24.5kg (est.)
Case 9	Misc. Equipment	51.8cm x 31.0cm x 79.5cm 24.5kg (est.)
Case 10	Misc. Equipment	51.8cm x 31.0cm x 79.5cm 24.5kg (est.)

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1.8M SigmaLink™ SAA Variant

System	C-Band		X-Band		Ku-Band	
	Rx	**Tx**	**Rx**	**Tx**	**Rx**	**Tx**
EIRP	N/A	53.3 dBW	N/A	55.2 dBW	N/A	58.3 dBW
G/T	15.3 dB/K	N/A	19.6 dB/K	N/A	23.7 dB/K	N/A

Antenna

Frequency	3.4 - 4.2 GHz	5.85 - 6.425 GHz	7.25 - 7.75 GHz	7.9 - 8.4 GHz	10.95 - 12.75 GHz	13.75 - 14.5 GHz
Midband Gain	35.4 dBi	39.3 dBi	41 dBi	41.7 dBi	45.1 dBi	46.8 dBi
X-pol	30 dB on axis, 23 dB within 1 dB contour	30 dB on axis, 23 dB within 1 dB contour	N/A	N/A	35dB on axis, 23 dB within 1db contour	35dB on axis, 23 dB within 1db contour
Axial Ratio	N/A	N/A	1.5 dB	1.5 dB	N/A	N/A
Sidelobe	ITU 58/ IESS 207		Meets DSCS		Meets IESS 208	
Isolation						
Tx - Rx	-60 dB	N/A	-110 dB	N/A	-85 dB	N/A
Rx - Tx	N/A	-50 dB	N/A	-110 dB	N/A	-30 dB
Reflector Size	1.8m, 4 piece segmented reflector, offset feed		1.8m, 4 piece segmented reflector, offset feed		1.8m, 4 piece segmented reflector, offset feed	
Antenna Travel						
Az	+/- 35 degrees fine adjust		+/- 35 degrees fine adjust		+/- 35 degrees fine adjust	
El	0 - 90 degrees		0 - 90 degrees		0 - 90 degrees	
Pol	+/- 90 degrees		+/- 90 degrees		+/- 90 degrees	
Feed	2-port linear		2-port circular		2-port linear	

Transmit

	C-Band	**X-Band**	**Ku-Band**
Output Frequency	5.85 - 6.425 GHz	7.9 - 8.4 GHz	13.75 - 14.5 GHz
Reference	10 MHz	10 MHz	10 MHz
Reference Level	0 +/- 5 dBm	0 +/- 5 dBm	0 +/- 5 dBm
Output Power @ P1dB	40 W	35 W	25 W
Gain (typical)	50 dB	65 dB	65 dB
Spectral Regrowth	-26 dBc @ 46 dBm	-26 dBc @ 45.5 dBm	-26 dBc @44 dBm

Receive

LNB NF	0.5	0.8	0.8
Reference	10 MHz	10 MHz	10 MHz
Reference Level	-2 +/- 5 dBm	+2 +/- 5 dBm	+2 +/- 5 dBm
Phase Noise	-73 dBc/Hz at 1 kHz -83 dBc/Hz at 10 kHz -93 dBc/Hz at 100 kHz	-75 dBc/Hz at 1 kHz -85 dBc/Hz at 10 kHz -95 dBc/Hz at 100 kHz	-73 dBc/Hz at 1 kHz -85 dBc/Hz at 10 kHz -95 dBc/Hz at 100 kHz
Input VSWR	2.2 : 1	2.0 : 1	2.2 : 1
Output VSWR	2.2 : 1	1.5 : 1	2.2 : 1
Conversion Gain Typical	65 dBm	55 dBm	65 dBm
Output P1 dB	9 dBm	5 dBm	7 dBm
Power Req	15 - 24 V on IF cable	15 - 24 V on IF cable	15 - 24 V on IF cable
Current Drain	550 mA	300 mA	200 mA

Satellite Acquisition Assistant

Includes Inclinometer, Compass, GPS, SA / RSSI, DVB Receiver, Interface with laptop

Outdoor Power Supply

Prime Power	115 / 230 VAC 50 / 60 Hz
Output Voltage	24 V DC
Consumption	< 500 VA AC

Interfacility Link Cable

Length	10m (Standard) 30m (Optional) longer lengths available on request

Environmental

Operating Temp	-30 to +50 °C (Antenna/RF) 0 to +50 °C (Indoor Equipment)
Rainfall	50mm/h Operational 100mm/h Survival
Wind Speed	72km/h Operational 108km/h Survival
Humidity	100% condensing (Antenna / RF) 5 - 95% non-condensing (Indoor Equipment)

Built-in Military Grade System Controller

Modem	User supplied

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2.4M SigmaLink™ Baseband Variant

System	C-Band		X-Band		Ku-Band	
	Rx	**Tx**	**Rx**	**Tx**	**Rx**	**Tx**
EIRP	N/A	56.6 dBW	N/A	58.7 dBW	N/A	61.6 dBW
G/T	18.5 dB/K	N/A	23.5 dB/K	N/A	27.2 dB/K	N/A

Antenna

Frequency	3.625 - 4.2 GHz	5.85 - 6.425 GHz	7.25 - 7.75 GHz	7.9 - 8.4 GHz	10.95 - 12.75 GHz	13.75 - 14.5 GHz
Midband Gain	38 dBi	42.2 dBi	43.7 dBi	44.3 dBi	47.6 dBi	49.2 dBi
X-pol	N/A	N/A	N/A	N/A	-30dB on axis	-30dB on axis
Axial Ratio	3.0	2.3	1.5 dB	1.5 dB	N/A	N/A
Sidelobe	ITU 580 / IESS 207		Meets DSCS		Meets IESS 208	
Isolation						
Tx - Rx	-60 dB	0 dBm input	-110 dB	0 dBm input	-110 dB	0 dBm input
Rx - Tx	0 dBm input	-60 dB	0 dBm input	-110 dB	0 dBm input	-35 dB
Reflector Size	2.4m, 4 piece segmented reflector, offset feed		2.4m, 4 piece segmented reflector, offset feed		2.4m, 4 piece segmented reflector, offset feed	
Antenna Travel						
Az	± 35° fine adjust (360° coarse)		± 35° fine adjust (360° coarse)		± 35° fine adjust (360° coarse)	
El	5 - 90°		5 - 90°		5 - 90°	
Pol	± 90°		± 90°		± 90°	
Feed	2-port circular		2-port circular		2-port linear	

Transmit

	C-Band	**X-Band**	**Ku-Band**
Output Frequency	5.85 - 6.425 GHz	7.9 - 8.4 GHz	13.75 - 14.5 GHz
Reference	10 MHz	10 MHz	10 MHz
Reference Level	0 +/- 5 dBm	0 +/- 5 dBm	0 +/- 5 dBm
Output Power @ P1dB	40 W	40 W	25 W
Gain (typical)	70 dB	70 dB	70 dB
Spectral Regrowth	-26 dBc @ P1dB	-26 dBc @ P1dB	-26 dBc @ P1dB

Receive

LNB NF	0.5	0.8	0.8
Reference	10 MHz	10 MHz	10 MHz
Reference Level	-5 +/- 5 dBm	+2 +/- 5 dBm	+2 +/- 5 dBm
Phase Noise	-73 dBc/Hz at 1 kHz	-75 dBc/Hz at 1 kHz	-65 dBc/Hz at 1 kHz
	-83 dBc/Hz at 10 kHz	-85 dBc/Hz at 10 kHz	-75 dBc/Hz at 10 kHz
	-93 dBc/Hz at 100 kHz	-95 dBc/Hz at 100 kHz	-85 dBc/Hz at 100 kHz
Input VSWR	1.5 : 1	1.3 : 1	1.5 : 1
Output VSWR	1.3 : 1	1.3 : 1	1.3 : 1
Conversion Gain Typical	65 dBm	55 dBm	65 dBm
Output P1 dB	9 dBm	5 dBm	7 dBm
Power Req	15 - 24 V on IF cable	15 - 24 V on IF cable	15 - 24 V on IF cable
Current Drain	550 mA	300 mA	200 mA

Shock Protected Baseband

Top Rack Unit: System Controller,
Power Supply

Middle Rack Unit: Pointing Tools
(Spectrum Analyzer, DVB Receiver)
SSPA Control and Management
Ethernet Switch

Bottom Rack Unit: Modem (user supplied)

Ruggedized System Controller

Operating System	Microsoft(R) XP Tablet Edition		
Screen	264mm Touchscreen XGA LCD, TFT sunlight readable		
Keyboard	87 Key Compact, Sealed		
CPU	Intel® CoreTM Duo Processor L2400 (1.06 GHz)		
	Low power, shock mounted, fully sealed		
Physical	Ruggedized MIL-Spec Laptop		
	1RU 254mm deep rack enclosure		
	482 x 44 x 254mm (WxHxD)		
MIL-STD 810F	514.5	I	(vibration)
	516.5	IV	(freefall)
	501.4	I & II	(stabilized temp.)
	503.4	I	(sudden changes)
	506.4	III	(falling or sprayed liquids)

Indoor Power Supply

Prime Power	115 / 230 VAC
	50 / 60 Hz
Output Voltage	48V / 24V
Consumption	< 500 VAAC

Interfacility Link Cable

Length	10m (Standard)
	30m (Optional)
	longer lengths available on request

Environmental

Operating Temp	-40 to +60°C Operational (ODU)
	-50 to +70°C Survival (ODU)
	0 - 50°C (IDU)
Rainfall	50.8mm/h Operational
	101.6mm/h Survival
Wind Speed	Up to 45 km/h Operational (no ballast or anchors)
	30 Gusting to 45 km/h Operational (ballast or anchors)
	96km/h Survival
Humidity	0 - 100% condensing (Antenna / RF)
	5 - 95% non-condensing (Indoor Equipment)

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2.4M SigmaLink™ SAA Variant

System	C-Band		X-Band		Ku-Band	
	Rx	**Tx**	**Rx**	**Tx**	**Rx**	**Tx**
EIRP	N/A	56.6 dBW	N/A	58.7 dBW	N/A	61.6 dBW
G/T	18.5 dB/K	N/A	23.5 dB/K	N/A	27.2 dB/K	N/A

Antenna

Frequency	3.625 - 4.2 GHz	5.85 - 6.425 GHz	7.25 - 7.75 GHz	7.9 - 8.4 GHz	10.95 - 12.75 GHz	13.75 - 14.5 GHz
Midband Gain	38 dBi	42.2 dBi	43.7 dBi	44.3 dBi	47.6 dBi	49.2 dBi
X-pol	N/A	N/A	N/A	N/A	-30dB on axis	-30dB on axis
Axial Ratio	3.0	2.3	1.5 dB	1.5 dB	N/A	N/A
Sidelobe	ITU 580 / IESS 207		Meets DSCS		Meets IESS 208	
Isolation						
Tx - Rx	-60 dB	0 dBm input	-110 dB	0 dBm input	-110 dB	0 dBm input
Rx - Tx	0 dBm input	-60 dB	0 dBm input	-110 dB	0 dBm input	-35 dB
Reflector Size	2.4m, 4 piece segmented reflector, offset feed		2.4m, 4 piece segmented reflector, offset feed		2.4m, 4 piece segmented reflector, offset feed	
Antenna Travel						
Az	± 35° fine adjust (360° coarse)		± 35° fine adjust (360° coarse)		± 35° fine adjust (360° coarse)	
El	5 - 90°		5 - 90°		5 - 90°	
Pol	± 90°		± 90°		± 90°	
Feed	2-port circular		2-port circular		2-port linear	

Transmit

	C-Band	**X-Band**	**Ku-Band**
Output Frequency	5.85 - 6.425 GHz	7.9 - 8.4 GHz	13.75 - 14.5 GHz
Reference	10 MHz	10 MHz	10 MHz
Reference Level	0 +/- 5 dBm	0 +/- 5 dBm	0 +/- 5 dBm
Output Power @ P1dB	40 W	40 W	25 W
Gain (typical)	70 dB	70 dB	70 dB
Spectral Regrowth	-26 dBc @ P1dB	-26 dBc @ P1dB	-26 dBc @ P1dB

Receive

LNB NF	0.5	0.8	0.8
Reference	10 MHz	10 MHz	10 MHz
Reference Level	-5 +/- 5 dBm	+2 +/- 5 dBm	+2 +/- 5 dBm
Phase Noise	-73 dBc/Hz at 1 kHz -83 dBc/Hz at 10 kHz -93 dBc/Hz at 100 kHz	-75 dBc/Hz at 1 kHz -85 dBc/Hz at 10 kHz -95 dBc/Hz at 100 kHz	-73 dBc/Hz at 1 kHz -85 dBc/Hz at 10 kHz -95 dBc/Hz at 100 kHz
Input VSWR	1.5 : 1	1.3 : 1	1.5 : 1
Output VSWR	1.3 : 1	1.3 : 1	1.3 : 1
Conversion Gain Typical	65 dBm	55 dBm	65 dBm
Output P1 dB	9 dBm	5 dBm	7 dBm
Power Req	15 - 24 V on IF cable	15 - 24 V on IF cable	15 - 24 V on IF cable
Current Drain	550 mA	300 mA	200 mA

Satellite Acquisition Assistant

Includes Inclinometer, Compass, GPS, SA / RSSI, DVB Receiver, Interface with laptop

Outdoor Power Supply

Prime Power	115 / 230 VAC 50 / 60 Hz
Output Voltage	24 V DC
Consumption	< 500 VA AC

Interfacility Link Cable

Length	10m (Standard) 30m (Optional) longer lengths available on request

Environmental

Operating Temp	-40 to +60°C Operational (ODU) -50 to +70°C Survival (ODU) 0 - 50°C (IDU)
Rainfall	50.8mm/h Operational 101.6mm/h Survival
Wind Speed	Up to 45 km/h Operational (no ballast or anchors) 30 Gusting to 45 km/h Operational (ballast or anchors) 96km/h Survival
Humidity	0 - 100% condensing (Antenna / RF) 5 - 95% non-condensing (Indoor Equipment)

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