



## SeeGull® EX Family | Scanning Receivers



LTE FDD / TD-LTE /  
UMTS [WCDMA/HSPA(+)] /  
GSM / CDMA / EV-DO /  
WiMAX

### Field-Proven Scanner Performance for Today's Evolving Mobile Networks

Mobile networks are evolving to meet accelerating user demand for data services. In the age of limited wireless spectrum, operators need to optimize their networks for new and existing technologies in order to deliver superior service with limited resources. Since its introduction, the EX family has continued to evolve along with emerging network technologies to provide the RF data optimization engineers need while maintaining PCTEL's commitment to performance and accuracy. With two-band, four-band, and six-band models in a variety of multi-technology configurations, the SeeGull EX helps operators characterize the Radio Access Network [RAN], lower their operational expenditures, and deliver a better experience to their users.

#### FEATURES

- Single and Multi-Technology Configurations
- Top N, Spectrum Analysis and RSSI Measurements
- High Dynamic Range for Expanded Signal Detection
- LTE Resource Block and Subband Measurements
- Exclusive PCTEL LTE MIMO Parameters
- Clarify® Interference Management Solution for WCDMA/GSM
- GPS Time Stamp and CDMA/EV-DO GPS Holdover Capability
- Low Power Consumption for Indoor Applications

#### APPLICATIONS

- Plan, Baseline and Optimize the Network
- Maximize Data Capacity and Throughput
- Verify and Troubleshoot Coverage
- Conduct Site Surveys and Tune Models with CW Testing
- Identify Antenna Connection Problems with Path Measurements
- Benchmark Networks from Multiple Operators
- Walk Test In-building and Campus Venues with Portable Indoor Kit

# SeeGull® EX Family | Scanning Receivers

## Full Suite of Broadband Wireless Technology Measurements



### LTE Measurements

- Carrier RSSI
- Top N Primary/Secondary Synchronization Channel
- Top N Reference Signals
- Top N Resource Blocks (Including Subbands)
- Received Power, Received Quality, CINR, Cyclic Prefix, Time Offset, and Delay Spread
- Transmit Antenna Path
- TD-LTE Uplink/Downlink Configuration and Special Sub-frame Configurations
- TD-LTE Power Analysis of Resource Blocks, Slots, Frames, and Sub-frames

### LTE MIMO Measurements (FDD Only)

- Condition Number
- Estimated CQI and Estimated Throughput (Calculated from RF Measurements)
- Transmit and Receive Antenna Paths

### UMTS [WCDMA/HSPA(+)] Measurements

- Top N Pilot
- $I_o$ ,  $E_c/I_o$ , Aggregate  $E_c/I_o$ , SIR, Rake Finger Count, Time Offset, Multi-path Delay Spread
- Blind Scan for Easy Channel Detection
- Layer 3 Reporting
- Clarify® Pilot

### GSM Measurements

- BSIC Decoding
- C/I
- RSSI
- Layer 3 Reporting
- Clarify® BCCH

### WiMAX Measurements

- Top N Preamble
- CINR,  $I_o$ , Neighbor Cell Delay, Delay Spread

### Power Measurements

- RSSI: Total Channel Power
- Spectrum Analysis: High Sweep Rate Frequency/Amplitude
- Enhanced Power Scan (EPS™): Time-Stamped Power Measurements Selectable by Time and Frequency

### CDMA/EV-DO Measurements

- Top N PN
- $E_c$ ,  $I_o$ ,  $E_c/I_o$ , Aggregate  $E_c/I_o$ , Pilot Delay, Delay Spread



SeeGull® EX Mini | 2 bands



SeeGull® EX | 4 bands



SeeGull® EX+ | 6 bands

# SeeGull EX | Specifications

LTE FDD and TD-LTE	Measurement Modes	Top N Synchronization Channel (P-SCH/S-SCH), Reference Signal, and Resource Block (Wideband, Subband)
	Data Modes	RP, RQ, CINR, Cyclic Prefix, Time Offsets, Delay Spread, Averaging (FDD Only); LTE MIMO (FDD Only): CN, ECQI, Est. Throughput
	Channel Bandwidths	1.4 / 3 / 5 / 10 / 15 / 20 MHz (up to 10 MHz for TD-LTE and LTE MIMO)
	Antenna Techniques	SISO, MISO, MIMO (2x2)
	Measurement Rates @ 5 MHz: Top N Sync Channel RS	50/sec; 25/sec for 2x2 MIMO
	Dynamic Range (CINR) @ 20 MHz: P-SCH/S-SCH RS	-10 to +18 dB* -20 to +40 dB*
	Min. Detection Level: RS RP	-140 dBm (RSRP@ 10 MHz)
	Relative Accuracy (CINR): RS	± 2 dB (Typical)
UMTS [WCDMA/HSPA(+)]	Measurement Modes	Top N Pilot
	Data Modes	Io, Ec/Io, Aggregate Ec/Io, SIR, Rake Finger Count, Time Offset, Delay Spread
	Channel Bandwidths	200 kHz / 3.84 MHz
	Measurement Rate	100/sec (High Speed Mode); 50/sec (High Dynamic Range Mode); 50/sec Pilots with Clarify® Option
	Top N CPICH Dynamic Range (Ec/Io)	-21.5 dB (High Speed Mode); -26 dB (High Dynamic Range Mode)*; -33 dB (High Dynamic Range) with Clarify® Option (via Post Processing)
	Min. Detection Level	-120 dBm (High Dynamic Range Mode)
	Relative Accuracy	± 1 dB
GSM	Measurement Modes	Color Code
	Data Modes	BSIC, C/I, RSSI
	Channel Bandwidths	30 kHz / 200 kHz
	Measurement Rate	Up to 20 BSIC Decodes/sec; 15 Decodes/sec BCCH with Clarify® Option
	Dynamic Range	+2 dB C/I @ 90% BSIC Detection with <0.1% False Detection Rate -18 dB C/I with Clarify® Option (via Post Processing)
	Min. BSIC Detection Level	-110 dBm
	Relative Accuracy	± 1 dB
CDMA	Measurement Modes	Top N PN
	Data Modes	Ec, Io, Ec/Io, Aggregate Ec/Io, Pilot Delay, Delay Spread
	Channel Bandwidths	30 kHz / 1.25 MHz
	Measurement Rate	25/sec
	Top N PN Dynamic Range, Ec/Io	-28 dB*
	Min. PN Detection Level	-130 dBm
	Relative Accuracy	± 1 dB
EV-DO	Measurement Modes	Top N PN
	Data Modes	Ec, Io, Ec/Io, Aggregate Ec/Io, Pilot Delay, Delay Spread
	Channel Bandwidths	30 kHz / 1.25 MHz
	Measurement Rate	18/sec
	Top N PN Dynamic Range, Ec/Io	-18.5 dB*
	Min. PN Detection Level	-120 dBm
	Relative Accuracy	± 1 dB
WiMAX	Measurement Modes	Top N Preamble
	Data Modes	CINR, Io, Neighbor Cell Delay, Delay Spread
	Channel Bandwidths	250 kHz / 5 MHz / 10 MHz
	Measurement Rate	200/sec
	Top N PN Dynamic Range, Ec/Io	-18.5 dB*
	Min. Detection Level	-105 dBm
Relative Accuracy	± 1 dB	

\* @ 90% Signal Detection with <0.1% False Detection Rate

# SeeGull EX | Specifications [continued]

Power Measurements	<b>RSSI MEASUREMENTS</b>	
	Measurement Rate (Maximum)	LTE 13,000 ch/sec UMTS [WCDMA/HSPA(+)] 450 ch/sec GSM 500 ch/sec CDMA 10,000 ch/sec EV-DO 10,000 ch/sec WiMAX 500 ch/sec
	Dynamic Range	- 120 to - 20 dBm @ 30 kHz
	Absolute Accuracy	± 1 dB (across Basic RF Input Power Range)
	<b>ENHANCED POWER SCAN (EPS™) MEASUREMENTS (Available for LTE-FDD, TD-LTE, CDMA, &amp; EV-DO Only)</b>	
	Channel Bandwidths	5 kHz to 20 MHz in 2.5 kHz Increments
	Measurement Rate	1,000 MHz/sec @ 5 MHz (Typical)
	Absolute Accuracy	± 1 dB (across Basic RF Input Power Range)
	<b>SPECTRUM ANALYSIS MEASUREMENTS</b>	
	Measurement Range	>90 dB
	Measurement Rate (Single Sweep)	>270 MHz/sec
	Accuracy	± 1 dB (across Basic RF Input Power Range)
	<b>LTE POWER ANALYSIS MEASUREMENTS (Available for TD-LTE Only)</b>	
	Channel Bandwidths	1.4 / 3 / 5 / 10 / 15 / 20 MHz
	Measurement Rate	50/sec @ 5 MHz
	Accuracy	± 1 dB (across Basic RF Input Power Range)
	RF Characteristics	Internally Generated Spurious Response
Protection Against Spurious Response Interference		88 dB (Typical)
Conducted Local Oscillator		- 75 dBm Max.
RF Operating Range:		In-Band - 15 dBm Max.
Desensitization:		Adjacent Channel >50 dB (CDMA/EV-DO) Adjacent Channel >55 dB (All Other Technologies) Alternate Channel >65 dB
Safe RF Input Range		≤ 10 dBm
Frequency Accuracy		± 0.05 ppm (GPS Locked); ± 0.1 ppm (GPS Unlocked)
GPS		Type
	Position Accuracy	± 2.5 meter
	Acquisition Time	Cold Start: <30 sec; Hot Start: <2 sec
	Sensitivity (Tracking)	> -150 dBm
Physical	Maximum Power (+8 to +16 VDC)	EX Mini: 12W; EX: 18W; EX+: 30W (Max.)
	Size	EX Mini 8.7" D x 3.7" W x 1.9" H (221 mm D x 94 mm W x 48.3 mm H) EX 8.7" D x 3.7" W x 2.7" H (221 mm D x 94 mm W x 68.5 mm H) EX+ 10" D x 3.8" W x 4.9" H (254 mm D x 97 mm W x 124 mm H)
	Weight	EX Mini: 1.0 lb (0.45 kg); EX: 1.8 lb (0.82 kg); EX+: 4.6 lb (2 kg)
	Temperature Range	Operating: 0°C to +50°C; Storage: -40°C to +85°C
	Host Data Communications Interface	USB 2.0
	RF Input	RF: SMA Female (50Ω); GPS: Male (50Ω) SMB
	Safety (CE)	EN 60950-1
	EMC	EN 301 489-1
	Shock and Vibration	MIL-STD-810G, SAE J1455
	RoHS	Compliant (6/6)

The SeeGull EX Family supports LTE FDD, TD-LTE, UMTS [WCDMA/HSPA(+)], GSM, CDMA, EV-DO and WiMAX operating bands currently deployed around the world.

Please contact your sales representative or email [RFS.Sales@pctel.com](mailto:RFS.Sales@pctel.com) for more details.



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Specifications subject to change without notice.

PCTEL RF Solutions products are protected under the following U.S. patents:

7,272,126; 7,236,746; 7,050,755; 7,013,113; 6,950,665; 6,931,235; 6,917,609; 6,816,709; 6,609,001; 5,819,177; 6,091,715; 7,639,985; 7,019,691; 7,301,920.  
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