PCTEL®
Performance Critical

2TEST

PCTEL, INC. 5 YEAR WARRANTY

SeeGull® MX*flex*® | Scanning Receiver

PCTEL's Flagship Scanning Receiver

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

Concurrent, Flexible Network Testing

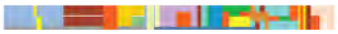
CHALLENGE:

Today's wireless networks utilize a wide range of physical infrastructure, technology protocols, and frequency bands. Network configurations vary by region and carrier. Even an individual carrier's network in a single geographic location can be exceedingly complex. A given network may include multiple technologies and bands deployed in a heterogeneous network of small cells, Distributed Antenna Systems (DAS), and macro cells. Cutting-edge technologies such as LTE Advanced carrier aggregation and Multiple Input Multiple Output (MIMO) add further complexity that can frequently lead to inefficient data collection. To collect accurate data, engineers must use multiple scanning receivers in parallel, or repeat each walk or drive test with differently configured equipment. Either method can utilize CAPEX and OPEX resources that could otherwise be spent on improvements to the network.

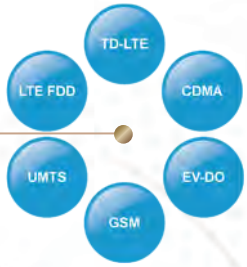
SOLUTION: The SeeGull MX*flex*

The SeeGull MX*flex* empowers engineers to collect complete data with one scanner in a single test. PCTEL's most advanced scanning receiver, the MX*flex* has the power and flexibility to accurately test today's complex wireless networks, including enhanced measurements like evolved Multimedia Broadcast Multicast Services (eMBMS). It combines the concurrent data collection of the SeeGull MX with the flexible configuration of PCTEL's innovative *flex* line. The scanner features software definable, field-upgradeable support of frequency bands from 130 MZ to 6 GHz. The MX*flex*'s design includes a modular front end and parallel high performance signal processing engines. This enables it to acquire, process, and report data from all 3GPP defined RF bands across all major technologies at the same time. Multiple technology and band concurrency allows it to maintain full speed and accuracy while measuring complex networks, for high resolution data density when compared to other scanning receivers. No extra test runs or additional scanning receivers are required.

SeeGull MX*flex* | Features

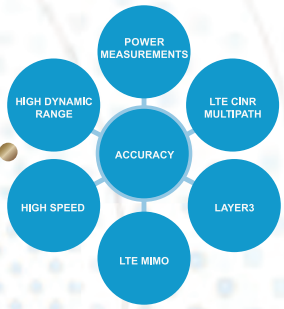


Software definable, field-upgradeable support of frequency bands from 130 MHz to 6 GHz.

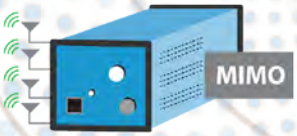


Supports simultaneous data collection, with up to **six technologies and no band limitations,** including uplink and downlink.

Increase data density by testing **multiple concurrent measurements** while collecting up to six technologies in the same test.



Collect accurate data with deep dynamic range for **in-depth characterization** of a heterogeneous network's multiple technologies.



Dual LTE scanning with 4x4 MIMO interface ports.

Apply to multiple applications **throughout the network lifecycle.**

Designed for **full performance** during in-building walk tests and outdoor drive testing.

Benefits

- Reduce project expenses by collecting all the necessary data in less time
- Visualize network performance easily with a high-density view of the network
- Maximize LTE throughput with 2x2 MIMO and 4x4 MIMO†
- Simplify setup by discovering all active channels using Blind Scan
- Increase ROI with multiple applications, including benchmarking, baseline and CW testing, spectrum analysis, interference hunting, and network optimization
- Integrate eMBMS with existing network coverage
- Covered by PCTEL's industry-leading 5 year limited warranty

† *Channel Matrix optional feature available for detailed analysis of 4x4 MIMO performance.*

SeeGull MX*flex* | Specifications*

LTE FDD and TD-LTE	Measurement Modes	Top N Synchronization Channel Reference Signal (P-SCH/S-SCH) and Resource Block (Wideband, Subband); Blind Scan; Top N eMBMS** Multicast Reference Signal; Unicast Synchronization Channel Reference Signal and P-SCH/S-SCH
	Data Modes	RP, RQ, CINR, Cyclic Prefix, Time Offsets, Delay Spread, Averaging; Layer 3; LTE MIMO: CN, ECQI, Est. Throughput; eMBMS: Area ID, Cluster ID, Frame Configuration
	Channel Bandwidths	1.4 / 3 / 5 / 10 / 15 / 20 MHz
	Max. Number of Channels	18
	Antenna Techniques	SISO, MISO, MIMO (2x2 and 4x4)
	Measurement Rates: Top N Sync Channel RS Multicast RS	LTE FDD: 48/sec; 2x2 MIMO: 24/sec; 4x4: 3/sec PRELIMINARY; TD-LTE: 19/sec; eMBMS: 2/sec
	Dynamic Range (CINR): @ 20 MHz: RS P-SCH/S-SCH Multicast RS	LTE FDD / TD-LTE: -26*** to +40 dB**** LTE FDD: -10 to +22 dB****; TD-LTE: -8 to +22 dB**** -9 to +30 dB****
	Min. Detection Level: RSRP	-140 dBm @ 15 kHz
	Relative Accuracy (CINR): P-SCH/S-SCH & RS	±2 dB (Typical)
UMTS [WCDMA/HSPA(+)]	Measurement Modes	Top N Pilot, Blind Scan
	Data Modes	Io, Ec/Io, Aggregate Ec/Io, SIR, Rake Finger Count, Time Offset, Delay Spread, Layer 3
	Channel Bandwidths	200 kHz / 3.84 MHz
	Max. Number of Channels	24
	Measurement Rate	47/sec
	Top N CPICH Dynamic Range (Ec/Io)	-28 dB****
	Min. Detection Level	-127 dBm @ 90% Detection
	Relative Accuracy	±1 dB
GSM	Measurement Modes	Color Code, Blind Scan
	Data Modes	BSIC, C/I, RSSI, Layer 3
	Channel Bandwidths	30 kHz / 200 kHz
	Measurement Rate	Up to 196 BSIC Decodes/sec
	Dynamic Range, C/I	+2 dB****
	Min. BSIC Decode Detection Level	-110 dBm
	Relative Accuracy	±1 dB
CDMA	Measurement Modes	Top N PN, Blind Scan
	Data Modes	Ec, Io, Ec/Io, Aggregate Ec/Io, Pilot Delay, Delay Spread, Layer 3
	Channel Bandwidths	30 kHz / 1.25 MHz
	Max. Number of Channels	24
	Measurement Rate	25/sec
	Top N PN Dynamic Range, Ec/Io	-28 dB****
	PN Detection Level	-130 dBm @ 90% Detection
	Relative Accuracy	±1 dB
EV-DO	Measurement Modes	Top N PN, Blind Scan
	Data Modes	Ec, Io, Ec/Io, Aggregate Ec/Io, Pilot Delay, Delay Spread, Layer 3
	Channel Bandwidths	30 kHz / 1.25 MHz
	Max. Number of Channels	24
	Measurement Rate	25/sec
	Top N PN Dynamic Range, Ec/Io	-18.5 dB****
	Min. PN Detection Level	-120 dBm @ 90% Detection
	Relative Accuracy	±1 dB
Multi-Technology	Concurrent Measurement Capacity	Up to 3 Technologies (Protocol Decoding) and 1 Aggregate Power Measurement (RSSI, EPS, or Spectrum Analysis)
	Measurements Rate Degradation When Measuring LTE, WCDMA, and GSM Concurrently	None
	Measurements Rate Degradation When Measuring LTE, CDMA, and EV-DO Concurrently	None
	Typical Aggregate Measurement Rate	Up to 400/sec Across 3 Concurrent Technologies

Specifications are for single-technology scanning. **eMBMS for LTE FDD only. * -20 dB for ≤ 5 MHz Channel Bandwidth for LTE FDD and for ≤ 15 MHz Channel Bandwidth for TD-LTE. **** @ 90% Signal Detection with < 0.1% False Detection Rate.*

SeeGull MX*flex* | Specifications* [continued]

Power Measurements	**RSSI MEASUREMENTS**	
	Measurement Rate (Typical) LTE UMTS [WCDMA/HSPA(+)] GSM CDMA EV-DO	5,200 ch/sec 2,600 ch/sec 2,600 ch/sec 4,000 ch/sec 4,000 ch/sec
	Absolute Accuracy	±1 dB (across Basic RF Input Power Range)
	ENHANCED POWER SCAN (EPS™) MEASUREMENTS	
	Channel Bandwidths	5 kHz to 20 MHz in 2.5 kHz Increments
	Measurement Rate	400 MHz/sec @ 5 MHz (Typical)
	Absolute Accuracy	±1 dB (across Basic RF Input Power Range)
	SPECTRUM ANALYSIS MEASUREMENTS	
	Measurement Range	>90 dB
	Measurement Rate (Single Sweep)	>110 MHz/sec
	Sensitivity	–110 dBm ± 1 dB @ 80 kHz; –120 dBm Min. Discernable Signal
	Accuracy	±1 dB (across Basic RF Input Power Range)
	LTE POWER ANALYSIS MEASUREMENTS (Available for TD-LTE Only)	
	Channel Bandwidths	1.4 / 3 / 5 / 10 / 15 / 20 MHz
	Measurement Rate	20/sec @ 20 MHz
	Accuracy	±1 dB (across Basic RF Input Power Range)
RF Characteristics	Channel Range	130 MHz to 6 GHz
	Internally Generated Spurious Response	–100 dBm Max.
	Conducted Local Oscillator	–100 dBm Max.
	RF Input Power Range	–10 dBm Max. In-Band; +5 dBm Max. Out-of-Band
	Desensitization	Adjacent Channel > 50 dB; Alternatve Channel > 60 dB
	Safe RF Input Range	≤10 dBm
	Frequency Accuracy (Ambient)	± 0.05 ppm (GPS Locked); ± 0.1 ppm (GPS Unlocked)
	Intermodulation-free Dynamic Range, 2 tone (level 2)	–40 dBm, 3.8 GHz, –55 dBc (Typical), –12.5 dBm TOI –25 dBm, 3.8 GHz, –60 dBc (Typical), 5 dBm TOI
GPS	Type	50 Channel Internal Receiver
	Position Accuracy	± 2.5 meter
	Acquisition Time	Cold Start: <30 sec; Hot Start: <2 sec
	Sensitivity (Tracking)	> –150 dBm
Physical	Input Power	+10 to +16 VDC (80W Nominal, 90W Max.)
	Size	9.5" D x 5.9" W x 4.3" H (241 mm D x 150 mm W x 110 mm H)
	Weight	4.9 lbs. (2.2 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)

** Specifications are for single-technology scanning.*