IB*flex*®

In-Building and Outdoor Network Testing

Scanning Receiver | 10 MHz – 6 GHz

The PCTEL® IB*flex* scanning receiver combines portability and accuracy with the power to test multiple technologies and bands simultaneously. It can be used to deploy 5G New Radio networks in sub-6 GHz spectrum, verify public safety coverage, optimize dense small cell deployments, and improve the reliability of IoT systems. Low power consumption and a hot-swap battery system make the IB*flex* scanner a convenient tool for a long day of walk testing or interference hunting.

Bands

- 5G: 3GPP FR1
- All existing 2G, 3G, and 4G
- CBRS
- Public safety
- WiFi (2.4 and 5 GHz)
- Other bands currently deployed around the world

Technologies

- 5G NR
- LTE FDD
- TD-LTE
- NB-IoT
- UMTS
- GSM
- CDMA
- EV-DO
- WiFi
- LAA
- P25
- DMR
- TETRA
- Analog FM

Custom Channel Power Measurements for additional technologies

Features

- 4G/5G Dynamic Spectrum Sharing (DSS)
- Dual polarization beamforming measurements
- 2x2 and 4x2 LTE MIMO measurements
- Hot-swap battery system
- Windows® laptop and Android™ tablet support
- Connect with Bluetooth® or USB
- Blind Scan for automatic channel detection
- LMR active channel scan

MADE IN THE USA
of U.S. and imported parts

PCTEL
an **Amphenol** company

IB*flex*® Specifications

5G New Radio (NR)

Measurement modes		NR TopN Signal: Synchronization channels (PSS/SSS) & PBCH; Layer 3 Reporting: MIB, SIBs 1-9; Dual polarization beamforming measurements; Blind Scan; Mobile Blind Scan
Data modes		PCI, PSS-RP [dBm], SSS-RP [dBm], PSS-RQ [dB], SSS-RQ [dB], SS-CINR [dB], SSS-CINR [dB], RSPBCH-RP [dBm], RSPBCH-RQ [dB], RSPBCH-CINR [dB], SSB-RP [dBm], SSB-RQ [dB], SSB-CINR [dB], SSB-idx, SSB-RSSI, SSS-Delay Spread, Time Offset
Sub carrier spacing		15/30 kHz
Max. number of channels		24
Max. number of PCIs		8
Max. number of beams/PCI		8
Measurement rate (typical)		30/sec
Dynamic range (CINR)	PSS/SSS CINR PBCH DMRS CINR	-10 to +33 dB -8 to + 40 dB
Min. detection level	RP	SCS @15 kHz: -135 dBm, SCS @30 kHz: -132 dBm
Accuracy (CINR)	PSS/SSS, PBCH DMRS	±2 dB

LTE FDD and TD-LTE

Measurement modes		Top N Synchronization Channel Reference Signal (P-SCH/S-SCH) and Resource Block (Wideband, Subband), Dynamic Spectrum Sharing (DSS), Layer 3 Reporting, Blind Scan, Mobile Blind Scan
Data modes		RP, RQ, CINR, Cyclic Prefix, Time Offsets, Delay Spread; RF Path Measurements (4x1, 4x2); MIMO: Condition Number, ECQI, EPUT
Channel bandwidths		1.4 / 3 / 5 / 10 / 15 / 20 MHz
Max. number of channels		24
Receive modes		SISO; MIMO (2x2, 4x2)
Transmit antenna configurations		1, 2, 4 (with path measurement)
Measurement rates	Sync Channel RS	LTE FDD: 50/sec; TD-LTE: 25/sec
Dynamic range (CINR) @ 10/15/20 MHz	RS P-SCH/S-SCH	-26 to + 40 dB -10 to +18 dB
Min. detection level	P-SCH/S-SCH & RS	-140 dBm (RSRP @ 15 kHz)
Accuracy (CINR)	P-SCH/S-SCH & RS	±1 dB
Max. number of PCIs		16

NB-IoT

Measurement modes		Top N NRS (Narrowband Reference Signal), NPSS (Narrowband Primary Synchronization Signal), and NSSS (Narrowband Secondary Synchronization Signal), Layer 3 Reporting, Blind Scan
Data modes		NRS: RP, RQ, RSSI, CINR, Time Offset; NPSS: RP, RQ, RSSI, CINR; NSSS: RP, RQ, RSSI, CINR, Time Offset
Operation mode		In-Band, Guard Band, Stand-alone (eTopN mode only)
Channel bandwidths		180 kHz
Measurement rates		5/sec
Dynamic range (CINR)	NRS	-10 to + 40 dB
Min. detection level	NRS RP	-138 dBm
Accuracy (CINR)	NRS	±2 dB
Max. number of PCIs		16

UMTS [WCDMA/HSPA(+)]

Measurement modes	Top N Pilot, Layer 3 Reporting, Blind Scan, Mobile Blind Scan
Data modes	Io, Ec/Io, Aggregate Ec/Io, SIR, Rake Finger Count, Time Offset, Delay Spread
Channel bandwidths	200 kHz / 3.84 MHz
Max. number of channels	24
Measurement rate	100/sec (high speed mode); 50/sec (high dynamic range mode)
Top N CPICH dynamic range (Ec/Io)	-26 dB
Min. detection level	-120 dBm (high dynamic range mode)
Accuracy	±1 dB
Max. number of Pilots	32

GSM

Measurement modes	Color Code, Layer 3 Reporting, Blind Scan, Mobile Blind Scan
Data modes	BSIC, C/I, RSSI
Channel bandwidths	30 kHz / 200 kHz
Measurement rates	Up to 200 BSIC Decodes/sec
Dynamic range	+2 dB C/I
Min. BSIC detection level	-110 dBm
Accuracy	±1 dB

CDMA and EV-DO

Measurement modes		Top N PN, CDMA Layer 3 Reporting, Blind Scan, Mobile Blind Scan
Data modes		Ec, Io, Ec/Io, Aggregate Ec/Io, Pilot Delay, Delay Spread
Channel bandwidths		30 kHz / 1.25 MHz
Max. number of channels		24
Measurement rates		CDMA: 25/sec; EV-DO: 18/sec
Top N PN dynamic range, Ec/Io		CDMA: -28 dB; EV-DO: -18.5 dB
Min. PN detection level		CDMA: -130 dBm; EV-DO: -120 dBm
Accuracy (CINR)		±1 dB
Max. number of Pilots		32

WiFi

Wireless adapter		D-Link Wi-Fi Adapter AC1200 Mini (Only D1 version is supported)
Radio configuration		802.11a/g/n/ac
Data modes		Signal Strength, Noise Level, Channel Number, Channel Bandwidth, BSSID, Device Name, SSID, Security Protocol, 802.11 Media, Beacon Interval, Channel Utilization
Frequency range		2.4 - 2.483 GHz; 5.15 - 5.85 GHz (subject to country regulations)
Measurement rates		5/sec (typical)

LAA

Measurement modes		QTopN
Data modes		RSRP, RSRQ, RS-CINR, PSS-RQ, PSS- RP, PSS-CINR, SSS-RP, SSS-RQ, SSS-CINR
Channel bandwidth		20 MHz
Max. number of channels		24
Measurement rate (20 MHz, 1 Sig)		6.25/sec
Dynamic range (CINR)		-12 dB
Minimum detection level	RSRP	-130 dBm
Accuracy (CINR)	RS-CINR	±1 dB (Input CINR 0 dB to +15 dB)

P25 (Phase 1 and Phase 2)

Measurement modes		DL, UL*, RSSI, DL Active Channel Scan
Data modes	DL UL	SINR, RSSI, OOS-BER, Frame BER, Network ID, Auto Classification of Phase and Modulation Type SINR, RSSI, Frame BER, Network ID, Mobile ID, Auto Classification of Phase and Modulation Type, Frequency Offset
Channel bandwidths	DL & UL	12.5 kHz
Measurement rate	DL UL	5.4 Decodes/sec (maximum); 2.7 Decodes/sec (typical); 100 RSSI/sec 2.4 Decodes/sec (typical), 100 RSSI/sec
Dynamic range (SINR)	DL & UL	+1 dB minimum detection
RSSI Accuracy	DL (Phase 1 C4FM & Phase 2 HDQPSK) UL	±1 dB over -105 to -10 dBm ±1 dB over -105 to -10 dBm
SINR Accuracy	DL (Phase 1 C4FM & Phase 2 HDQPSK) UL	±1 dB over +10 to +25 dB; ±2 dB over +7 to +10 dB, 25 to 30dB ±1 dB over +10 to +25 dB; ±2 dB over +7 to +10 dB, 25 to 30dB
Adjacent channel rejection	DL & UL	49 dB
UL frequency offset	Detection range Granularity Accuracy	-780 to +780 Hz +/- 10 Hz +/- 10 Hz over RSSI >-105dBm, SINR > 20 dB
UL radio ID detection rate	Control Channel Traffic Channel	95% detection RSSI> -110 dBm and SNR > 18 dB 95% detection for RSSI> -95 dBm and SNR > 30 dB
Rejection of strong wideband (10 MHz LTE) signal 1 MHz from P25 channel		High rejection when the RSSI of the Wideband signal < -60 dBm

DMR

Measurement modes		Decode, RSSI, DL Active Channel Scan
Data modes		SINR, RSSI, Frame BER, cSysCode, CSBKO
Channel bandwidths		12.5 kHz
Measurement rate		5.4 Decodes/sec (maximum); 2.7 Decodes/sec (typical); 100 RSSI/sec
Dynamic range (SINR)		-1 dB minimum detection
Accuracy	SINR RSSI	±1 dB over 6 to 40 dB; ±2 dB over 3 to 6 dB ±1 dB over -118 to -10 dBm
Adjacent channel rejection		49 dB
Rejection of strong wideband (10 MHz LTE) signal 1 MHz from DMR channel		High rejection when the RSSI of the Wideband signal < -60 dBm

TETRA

Measurement modes		Decode, RSSI, DL Active Channel Scan
Data modes		SINR, RSSI, Frame BER, Color Code, MCC, MNC
Channel bandwidths		25 kHz
Measurement rate		6.5 Decodes/sec (maximum); 3.5 Decodes/sec (typical); 100 RSSI/sec
Dynamic range (SINR)		+2 dB minimum detection
Accuracy	SINR RSSI	±2 dB over +8 to +20 dB; ±3 dB over +4 to +8 dB ±1 dB over -118 to -10 dBm
Adjacent channel rejection		20 dB
Rejection of strong wideband (10 MHz LTE) signal 1 MHz from TETRA channel		High rejection when the RSSI of the Wideband signal < -60 dBm

**UL measured on one out-of-service traffic channel*

Analog FM

Measurement modes		Decode, RSSI
Data modes		SINR, RSSI
Channel bandwidths		12.5 KHz; 25 KHz
Measurement rate		2.7 Decodes/sec (4 frequencies)
Dynamic range (SINR)		1.5 dB minimum detection for PL (> 90% detection) 2 dB minimum detection for DPL (> 90% detection)
Accuracy	SINR RSSI	±1 dB over +5 to +40 dB; ±2 dB over +1 to +5 dB and +41 to +45db; ±3 dB over -3 to 0 db and +45 to +50 db ±1 dB over -118 to -35 dBm

GPS/GNSS

Supported navigation systems	Galileo, GPS, GLONASS, SBAS, QZSS
Type	56 channel internal receiver
Position accuracy	2.5 meters
Acquisition time	Cold start: <30 sec; Hot start: <2 sec
Sensitivity (tracking)	>-150 dBm

Power Measurements

Accuracy		±1 dB (across basic RF input power range)
Dynamic range		-120 to -20 dBm @ 30 kHz
RSSI	5G NR, LTE NB-IoT, UMTS, GSM CDMA, EV-DO	11,050 ch/sec (maximum, continguous channels) 4,250 ch/sec (maximum, continguous channels) 8,500 ch/sec (maximum, continguous channels)
Custom channel power (examples)	12.5 kHz (P25, DMR, EDACS, Analog LMR) 25 kHz (TETRA, EDACS, Analog LMR) 125 kHz (LoRa) 250 kHz (LoRa) 500 kHz (LoRa)	25,500 ch/sec (maximum, continguous channels) 14,025 ch/sec (maximum, continguous channels) 10,710 ch/sec (maximum, continguous channels) 8,925 ch/sec (maximum, continguous channels) 6,885 ch/sec (maximum, continguous channels)
Enhanced Power Scan (EPS)	5 kHz to 20 MHz in 2.5 kHz increments	1,000 MHz/sec @ 5 MHz (typical)
Spectrum analysis	Range: >90 dB	>270 MHz/sec (single sweep)
LTE power analysis	1.3 / 3/ 5 / 10 / 15 / 20 MHz TD-LTE only	20 msec @ 5 MHz

RF Characteristics

Frequency range		10 MHz - 6 GHz
Internally generated spurious response		-110 dBm (typical)
Conducted local oscillator		- 75 dBm max.
RF operating range	In-Band	- 15 dBm max.
Desensitization	Adjacent channel Alternate channel	>50 dB >55 dB
Safe RF input range		10 dBm
Frequency accuracy		±0.05 ppm (GPS Locked); ±0.1 ppm (GPS unlocked)
Intermodulation-free dynamic range		2 tone (level 2) @ -40 dBm, 6 GHz, -68 dBc (typical), -12.6 dBm TOI; @ -25 dBm, 6 GHz, -70 dBc (typical), 10 dBm TOI

Physical

Power switch		Normal and Power Save
Maximum power (+9 to +17 VDC)		18W; Power Save: 10W
Size	Without battery pack With battery pack	7.6" D x 4.4" W x 1.55" H (192 mm D x 111.8 mm W x 39.4 mm H) 10.1" D x 4.4" W x 2.1" H (257.6 mm D x 111.8 mm W x 53.1 mm H)
Weight	Without battery pack With battery pack	2.4 lb (1.1 kg) 3.8 lb (1.7 kg)
Temperature range		Operating: 0°C to +50°C; Storage: - 40°C to +85°C
Humidity		5% to 95% relative humidity, non-condensing
Host data communications interface		USB 2.0, Ethernet, Bluetooth®
Data storage		SD (32 GB)
Antenna ports		RF: SMA Female (50Ω); GPS: Male (50Ω); Bluetooth: SMA Female (50Ω)
Safety		EN 62368-1
EMC		EN 301 489-1
Shock and vibration		MIL-STD-810G, SAE J1455
RoHS		Directive 2011/65/EU and amendment 2015/863 (RoHS 3)

Supported bands, technologies, data modes, software features, and frequency ranges vary by scanning receiver configuration. Upgrades may be available for previously purchased scanning receivers. Please contact a sales representative for more information.

PCTEL
an **Amphenol** company

PCTEL, Inc.

T: +1 301 515 0036 | pctel.com