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
- Wi-Fi (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
- Wi-Fi
- LAA
- P25
- DMR
- TETRA

Custom Channel Power Measurements for additional technologies

Features

- 4G/5G Dynamic Spectrum Sharing (DSS)
- 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

PCTEL

IB*flex*® Specifications

5G New Radio (NR)

Measurement modes		NR TopN Signal: Synchronization channels (PSS/SSS) & PBCH, 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		12
Max. number of beams/channel		8
Measurement rate (typical)		30/sec
Dynamic range (CINR)		PSS/SSS CINR: -10 to +33 dB PBCH DMRS CINR: -8 to + 40 dB
Min. detection level	RP	-132 dBm (SCS @15 kHz)
Accuracy (CINR)	PSS/SSS, PBCH DMRS	±2 dB
Max. number of PCIs		16

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 MHz)
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
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. basic detection level	-110 dBm
Accuracy	±1 dB

IB*flex*® Specifications

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 dBm
Min. PN detection level		CDMA: -130 dBm; EV-DO: -120 dBm
Accuracy (CINR)		±1 dB
Max. number of Pilots		32

Wi-Fi

Wireless adapter		ORiNOCO® USB-9100 (US), Asus USB-AC56 (world) or equivalent
Radio configuration		802.11a/b/g/n/ac
Data modes		Signal Strength, Noise Level, SNR, Channel Number, Channel Bandwidth, BSSID, Device Name, SSID, Security Protocol, 802.11 Media, Beacon Interval, Channel Utilization, Throughput
Frequency range		2.4 - 2.483 GHz; 5.15 - 5.85 GHz (subject to country regulations)
Measurement rates		9/sec (typical); 5/sec (typical) for 802.11ac

LAA

Measurement mode		QTopN
Data mode		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 (20MHz, 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		Decode, RSSI
Data modes		SINR, RSSI, OOS-BER, Frame BER, Network ID, Auto Classification of Phase and Modulation Type
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 **(Phase 1 C4FM and Phase 2 HDQPSK)**	SINR RSSI	±1 dB over 8 to 25 dB; ±2 dB over 3 to 8 dB, 25 to 30 dB ±1 dB over -118 to -10 dBm
Adjacent channel rejection		49 dB

DMR

Measurement modes		Decode, RSSI
Data modes		SINR, RSSI, Frame BER
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

TETRA

Measurement modes		Decode, RSSI
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

GPS

Type		56 channel internal receiver
Position accuracy		2.5 meters
Acquisition time		Cold start: <30 sec; Hot start: <2 sec
Sensitivity (tracking)		>-150 dBm

IB*flex*® Specifications

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.

Solving Complex RF Challenges

PCTEL is a leading global provider of wireless technology, including purpose-built Industrial IoT devices, antenna systems, and test and measurement solutions. Trusted by our customers for over 25 years, we solve complex wireless challenges to help organizations stay connected, transform, and grow.

For more information about the IB*flex* scanning receiver, contact your sales representative or visit
> pctel.com/scanning-receivers

PCTEL

PCTEL, Inc.

T: +1 301 515 0036 | pctel.com | NASDAQ: PCTI

25 YEARS
of Innovation and Excellence