

# IBflex®

## In-Building and Outdoor Network Testing

Scanning Receiver | 10 MHz – 6 GHz



The PCTEL® IBflex scanning receiver combine 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 IBflex 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
- eMBMS
- UMTS
- GSM
- CDMA
- EV-DO
- TD-SCDMA
- WI-FI
- LAA
- P25

Custom Channel Power Measurements for additional technologies (TETRA, etc.)

### Features

- 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

# IBflex Specifications

5G New Radio (NR)		
Measurement Modes		NR TopN Signal: Synchronization channels (P-SS/S-SS) & 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)
Relative Accuracy (CINR)	PSS/SSS CINR	±2 dB
LTE FDD and TD-LTE		
Measurement Modes		Top N Synchronization Channel Reference Signal, (P-SCH/S-SCH), and Resource Block (Wideband, Subband); Layer 3 Reporting; 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; MIMO: Condition Number, ECQI, EPUT eMBMS: Area TD, Cluster ID, Frame Configuration
Channel Bandwidths		1.4 / 3 / 5 / 10 / 15 / 20 MHz
Max. Number of Channels		24 (16 for eMBMS)
Receive Modes		SISO; MIMO (2x2, 4x2)
Transmit Antenna Configurations		1, 2, 4 (with path measurement)
Measurement Rates:	Sync Channel RS Multicast RS	LTE FDD: 50/sec; TD-LTE: 25/sec eMBMS: 2/sec
Dynamic Range (CINR): @ 10 / 15 / 20 MHz	RS P-SCH/S-SCH Multicast RS	-26 to +40 dB -10 to +18 dB -9 to +30 dB
Min. Detection Level:	RSRP	-140 dBm (RSRP @ 15 MHz)
Relative Accuracy (CINR):	P-SCH/S-SCH & RS	±1 dB
NB-IoT		
Measurement Modes		Top N NRS (Narrowband Reference Signal), NPSS (Narrowband Primary Synchronization Signal), and NSSS (Narrowband Secondary Synchronization Signal)
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		190 ms
Dynamic Range (CINR):	NRS	-10 to +40 dB
Min. Detection Level:	NRS RP	-138 dBm
Relative Accuracy (CINR):	NRS	±2 dB
Max. Number of PCIs		16
UMTS [WCDMA/HSPA(+)]		
Measurement Modes		Top N Pilot, Layer 3 Reporting
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)
Relative Accuracy		±1 dB
GSM		
Measurement Modes		Color Code, Layer 3 Reporting
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
Relative Accuracy		±1 dB

# Specifications (continued)

CDMA and 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
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
Relative Accuracy (CINR)	±1 dB
TD-SCDMA	
Measurement Modes	Top N Pilot, Layer 3 Reporting
Data Modes	Sync_DL: Ec/Io, Io, Time Offset, SIR Midamble: Ec/Io, Io, Time Offset, SIR, Midamble Code
Channel Bandwidths	200 kHz / 1.28 MHz
Max. Number of Channels	24
Measurement Rates	50/sec
Top N Dynamic Range, Ec/Io	-20 dB
Min. Detection Level	-110 dBm
Relative Accuracy	±1 dB
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):	RS-CINR -12 dB
Minimum Detection Level	RSRP -130 dBm
Relative 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, BER, Frame BER, Network ID, Auto Classification of Phase and Modulation Type
Channel Bandwidths	12.5 kHz
Measurement Rate	14 Decodes/sec (Maximum) 7 Decodes/sec (Typical) 100 RSSI/sec
Dynamic Range (SINR)	-1 dB minimum detection
Relative Accuracy Phase 1 C4FM and Phase 2 HDQPSK	SINR ±1 dB over 8 to 25 dB ±2 dB over 3 to 8 dB, 25 to 30 dB
	RSSI ±1 dB over -118 to -10 dBm
Adjacent Channel Rejection	49 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

\* ORINOCO is a registered trademark of Proxim Wireless Corporation.

# Specifications (continued)

Power Measurements		
<b>RSSI MEASUREMENTS</b>		
Measurement Rate (Maximum, Contiguous Channels)	5G NR LTE NB- IoT UMTS [WCDMA/HSPA(+)] GSM CDMA and EV-DO TD-SCDMA	11,050 ch/sec 11,050 ch/sec 4,250 ch/sec 4,250 ch/sec 4,250 ch/sec 8,500 ch/sec 4,250 ch/sec
Custom Channel Power Measurements (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, Contiguous Channels) 14,025 ch/sec (Maximum, Contiguous Channels) 10,710 ch/sec (Maximum, Contiguous Channels) 8,925 ch/sec (Maximum, Contiguous Channels) 6,885 ch/sec (Maximum, Contiguous Channels)
Dynamic Range		-120 to -20 dBm @ 30 kHz
Absolute Accuracy		±1 dB (across Basic RF Input Power Range)
<b>ENHANCED POWER SCAN (EPS™) MEASUREMENTS</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		20 msec @ 5 MHz
Accuracy		±1 dB (across Basic RF Input Power Range)
<b>RF CHARACTERISTICS</b>		
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	>50 dB (CDMA/EV-DO)
	Adjacent Channel	>55 dB (All Other Technologies)
	Adjacent Channel	>65 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
<b>PHYSICAL</b>		
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
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 (CE)		EN 60950 -1
EMC		EN 301 489-1
Shock and Vibration		MIL-STD-810G, SAE J1455
RoHS		Compliant (6/6)

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, Inc.

p +1 301 515 0036 | f +1 301 515 0037 | [www.pctel.com](http://www.pctel.com) | Nasdaq: PCTI

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