



# 5G NEW RADIO TEST & MEASUREMENT SOLUTIONS

**HBflex™ scanning receiver | sub-6 GHz and mmWave**

**IBflex® scanning receiver | sub-6 GHz**

**MXflex® scanning receiver | sub-6 GHz**



# Be Ready for 5G



The promise of 5G is that it will usher in a new age of intelligent networking, encompassing both human communications and the Internet of Things.

## CHALLENGES OF 5G DEPLOYMENTS

Accurate RF testing can help operators solve both pre-deployment and post-deployment 5G challenges.

### Pre-deployment

- Introduction of new high frequency mmWave and mid-band spectrum
- Spectrum clearing on existing and new bands
- Accurate network baseline
- Precise planning and design of 5G networks

### Post-deployment

- Integrating 5G New Radio (NR) technology
- Co-managing 5G NR with existing 2G, 3G, 4G, 4.5G networks
- Implementing 4G/5G Dynamic Spectrum Sharing (DSS)
- Optimizing dense small cell deployments

## SOLUTION: 5G NEW RADIO (NR) SCANNING RECEIVERS

PCTEL® scanning receivers provide accurate, high speed measurements that make it easy to deploy and optimize 5G New Radio (NR) Networks. Simultaneous 2G/3G/4G/5G testing on mmWave and sub-6 GHz bands with support for 4G/5G Dynamic Spectrum Sharing (DSS) enables a smooth transition to 5G.

### Multi-Band

Supported Bands	Scanning Receivers
mmWave 3GPP FR 2 bands (24 GHz – 40 GHz)	HBflex™
sub-6 GHz 3GPP FR 1 bands	HBflex, IBflex®, MXflex®
All existing 2G, 3G and 4G bands	HBflex, IBflex, MXflex

### Multi-Technology

- 5G NR
- LTE FDD
- TD-LTE
- NB-IoT
- eMBMS\*
- UMTS
- GSM
- CDMA
- EV-DO
- Wi-Fi\*
- LAA\*
- P25\*
- DMR\*
- TETRA\*

### Multi-Application

- Spectrum clearing
- Interference management
- Baseline testing
- Integration testing
- Optimization testing
- Operational troubleshooting

\*LAA, Wi-Fi, P25, DMR, and TETRA technology decode available only on HBflex and IBflex scanning receivers. eMBMS measurements available only on MXflex scanning receivers. Power measurements for these and other technologies available on IBflex, HBflex, and MXflex scanners via RSSI, Enhanced Power Scan (EPS) and Spectrum Analysis (SA) features.

## WHY PCTEL?



### Efficient Execution

Thorough and accurate RF data for better planning and more optimized rollout, with or without data from user equipment (UE).



### ROI

Cost savings by collecting complete data set from all technologies and bands with one scanner in a single test.



### Peace of Mind

Industry-leading reliable platform with high dynamic range, accuracy, and performance.



### Productivity

Single-box solution for multi-technology, multi-band measurement support.



### Flexibility

Support from multiple test vendors and on multiple operating systems for easy data collection and analysis.



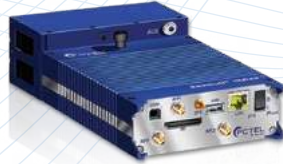
### Agile

Versatile tools designed for use in both indoor and outdoor environments.

# 5G NR SOLUTIONS & FEATURES



▲ HBflex



▲ IBflex



▲ MXflex

Feature	HBflex	IBflex	MXflex
Sub-6 GHz 5G NR measurements	●	●	●
mmWave 5G NR measurements	●		
Simultaneous mmWave/sub 6 GHz measurements	●		
Simultaneous 2G/3G/4G/5G testing	●	●	●
4G/5G Dynamic Spectrum Sharing (DSS)	●	●	
Fast mmWave measurements for drive testing	●		
4x2 LTE MIMO testing	●	●	●
4x4 LTE MIMO testing			●
Ultra-fast concurrent 5G/LTE/UMTS measurements			●

## 5G NR 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], PSS-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	15/30/120/240 kHz
Max. number of channels	12 (sub-6 GHz), 8 (mmWave)
Max. number of beams/channel	8 (sub-6 GHz), 64 (mmWave)
Measurement rate (typical)	30/sec (sub-6 GHz), 10/sec (mmWave, 2 RF ports), 5/sec (mmWave, 1 RF port)
Dynamic range (CINR)	PSS/SSS CINR: -10 to +33 dB (sub-6 GHz), -10 to +23 dB (mmWave) PBCH DMRS CINR: -8 to +40 dB
Min. detection level	RP -132 dBm (SCS @15 kHz)
Accuracy (CINR)	PSS/SSS, PBCH DMRS ±2 dB

### RSSI Measurements

Measurement rate (maximum)	5G NR	11,050 ch/sec (HBflex, IBflex), 5,200 ch/sec (MXflex)
Dynamic range		-120 to -20 dBm @ 30 kHz
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	1000 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)	>270 MHz/sec (HBflex, IBflex), >110 MHz/sec (MXflex)
Accuracy	±1 dB (across basic RF input power range)

## HBflex Specifications

### Physical

Maximum power (+9 to +17 VDC)	25W max.
Size	10.10" D x 6.50" W x 4.40" H (255.3 mm D x 165.1 mm W x 111.5 mm H)
Weight	7.26 lbs (3.3kg)
Temperature range	Operating: 0°C to +50°C; Storage: - 30°C to +80°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 (sub 6 GHz, Bluetooth): SMA Female (50 Ω); GPS: Male (50 Ω) SMB, RF (mmWave): 2.92 mm Female
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)

### RF Characteristics

Frequency range	Sub 6 GHz: 10 MHz – 6 GHz mmWave: N257 (26.5-29.5 GHz), N258 (24.25-27.5 GHz), N260 (37-40 GHz), N261 (27.5-28.35 GHz)
Internally generated spurious response	-105 dBm (typical)
RF operating range	In-Band - 20 dBm max.
Desensitization	Adjacent channel >50 dB (20MHz RBW)
Safe RF input range	≤ +0 dBm
Frequency accuracy	±0.05 ppm (GPS Locked); ± 0.1 ppm (GPS unlocked)
Conducted local oscillator	-55 dBm (typical)

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.

Refer to IBflex brochure for HBflex specifications related to additional technologies. IBflex and MXflex specifications can be found on their respective brochures.

## Upgrade Your Scanners to 5G

It's easy to upgrade your existing PCTEL scanning receivers to support 5G. Current IBflex scanning receivers can be upgraded into a 5G-capable HBflex. Existing MXflex and IBflex scanning receivers can also be upgraded to support sub-6 GHz 5G measurements.

## Solving Complex RF Challenges

PCTEL is a leading global provider of wireless technology, including purpose-built antenna systems, Industrial IoT devices, 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 5G testing solutions, contact your sales representative or visit

[pctel.com/scanning-receivers](https://pctel.com/scanning-receivers)



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