



# SPEC SHEET

*CellScanner<sup>TM</sup> | CellDigitizer<sup>TM</sup>*





# CellScanner™

9 kHz to 8 GHz / 18 GHz / 27 GHz

**CellScanner** is a specialized and detailed Technology Analyzer for the main wireless technologies in the industry today. Our development team strives to keep the tool updated as new technologies become available in the market; the software can be easily upgraded and there's no need to make changes to the hardware. The tool collects and parses digitized samples for use in optimization and network performance analysis.

**CellScanner** works with a Software-Defined Radio Receiver, **CellDigitizer**.

The receiver samples and digitizes up to 100 MHz of spectrum at a time (real time collection and recording capabilities) with a sampling rate of up to 125 MSamples/s and 14-bit digitization - all samples can be geotagged.

**CellDigitizer** has a wide dynamic range and automatic input level regulation to avoid saturation when close to transmitters. With a small form factor, it is light weight with low power consumption.



The three models of **CellDigitizer** cover the following frequency ranges: CD08 (8 GHz), CD18 (18 GHz), CD27 (27 GHz).

**CellScanner** processes 3GPP technologies (GSM, UMTS, LTE, and 5G) on frequencies and channel bandwidths compatible with **CellDigitizer**.

**CellScanner** collection features include:

- Geotagged samples (with and without interpolation)
- Capture of multiple bands per scan
- Collection of samples in sequence from multiple bands (round-robin) in a single drive test
- Simultaneous detection and analysis of 2G, 3G, 4G and 5G signals
- Samples snapped to drive route (for GPS positioning error compensation)
- Multi-measurement concatenation and multi-data visualization



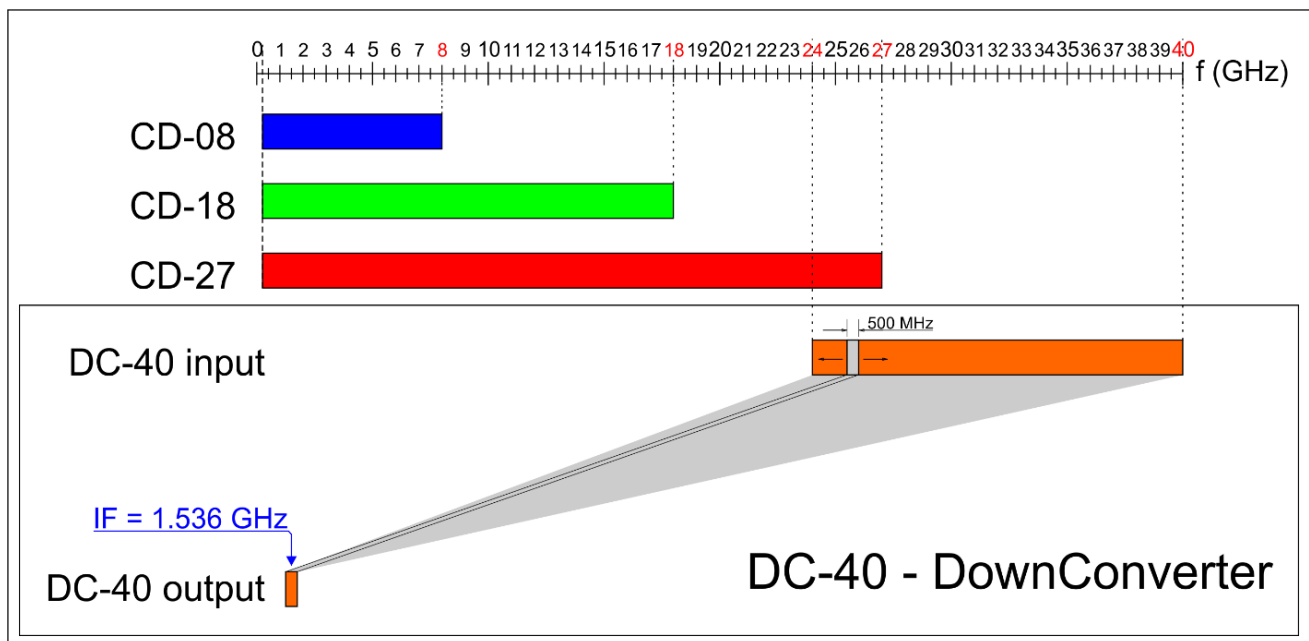
# CellScanner™

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*CellDigitizer* main characteristics include:

- Simultaneous operation in multi-band, multi-channels and multi-technology modes
- Operation on licensed, unlicensed or user-defined bands and channels
- High Dynamic Range
- High sensitivity with a front-end amplifier<sup>1</sup> allowing measurement of signals close to the noise floor.
- Automatic front end gain control for protection against receiver saturation
- Cost-effective, small form factor and light weight with low power consumption (fanless)
- Capable of spectrum recording: ideal for off-line and forensic analysis
- Capable of recording I/Q data

Additionally, DC40 (Downconverter) can translate frequencies from 24 to 40 GHz to a 1.536 GHz center frequency band.



<sup>1</sup> CD18 and CD27 only



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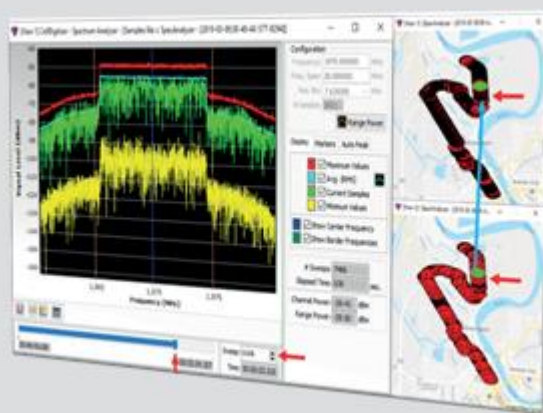
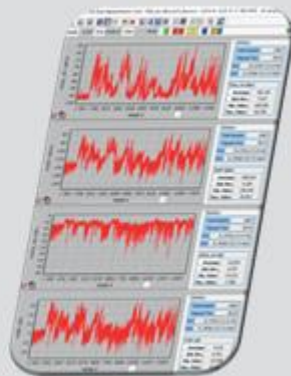
*CellScanner* will control both devices to allow synchronized operation to sweep all bands using the LAN port.



# CellScanner™ Applications

CellScanner main applications include:

- Network Planning, Optimization, and Performance Analysis of multi-technology networks
- Deployment evaluation: cross feeders, coverage footprint, cluster behavior, frequency plan checking
- Collection of network statistical information for report generation



Spectrum analyzer capabilities can be added to the system by a simple software upgrade (*CellSpectrum*), allowing users to also perform propagation model tuning, spectrum field measurements, long term spectrum monitoring, spectrum clearance and interferer location.

*CellScanner* is supplied in a certified-waterproof, crushproof, dustproof maximum-size airline carry on suitcase.

Backpack available for walk-test and indoor collection.



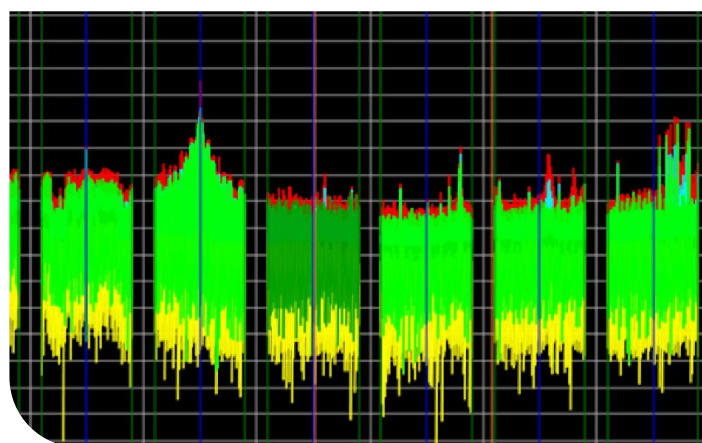
# CellScanner™ Applications



## Wide Frequency Range

The frequency bands and channel bandwidths used in commercial wireless systems have been increasing steadily to accommodate the growing demand for larger data rates.

*CellScanner* can process and extract information from 3GPP technologies and is prepared to incorporate future technologies, enabling testing of modern systems from narrowband to wideband channels.



## Wide Signal Dynamic Range and Saturation avoidance

*CellDigitizer* allows users to adjust gain of the input signal to create an effective dynamic range for measurements by avoiding saturation of samples collect close to the transmitter and by increasing sensitivity to weaker signal.



## Real-Time Acquisition and Spectrum Recording

3GPP technologies employ packet-based signaling techniques. *CellScanner* allows real-time acquisition and recording of spectrum for report generation and/or further analysis. Playback mode is very convenient for post-processing tasks and allows users to add new markers and change the configured Resolution Bandwidth (RBW).



### High Measurement Rates

The measurement rate reflects how many channels can be analyzed per second.

*CellScanner* collects information related to each technology and channels configured by the user.

Location can be scanned in advance to search for channels maximizing the measurement rate.

Fast setup times and sophisticated capture control allow the tool to work with high measurement rates even when collecting multiple technologies.



### Channel Bandwidth flexibility

The wide application of wireless technologies requires scanners to cover from narrow channels in IoT applications up to wide LTE-Advanced channels; the configuration flexibility of *CellScanner* allows the tool to easily tackle this challenge.



### Portable and flexible

Besides providing the means for capturing and processing digitized samples, *CellScanner* also offers a wide variety of information manipulation and visualization options that, along with *CellDigitizer's* small form factor, makes the combo very portable and flexible.



# Easy 'Drive Test Setup'

Outdoor Measurement Collection



*CellScanner* is quickly & easily installed for a drive test campaign. All items are packaged in an airline carry on suitcase.

Magnetic mounts for the wide band antenna and GPS module are easily installed in the vehicle roof.



Due to the low power consumption an external DC converter is needed.

Extensive support, training and documentation is provided to allow fast and painless drive test campaigns.

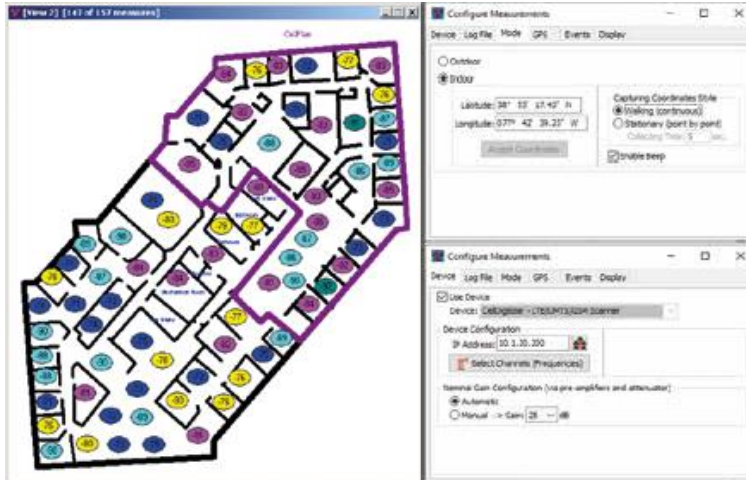






# Easy 'Click and Go'

## Indoor Measurement Collection

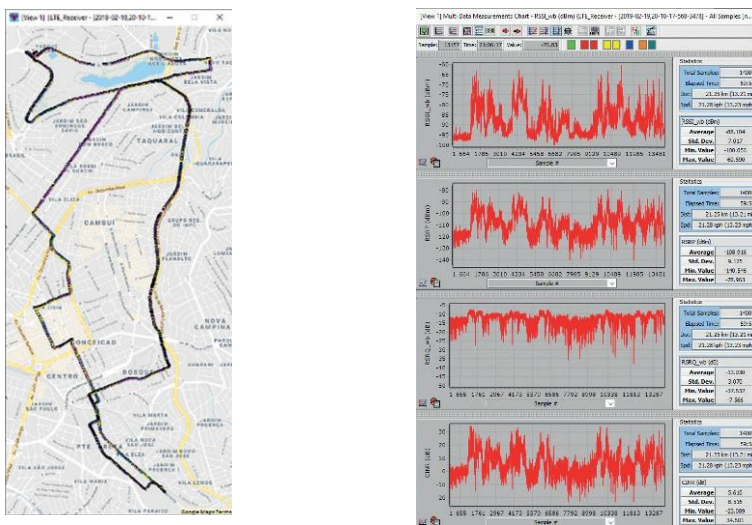


Just click on a point in the visualization window and samples are collected, even when no GPS is available.

Floor plan can be imported, geo-tagged and made available for a walk test. **CellScanner** options includes stationery and walking (continuous) measurement.

# Easy 'See and Conclude'

## Analysis capability



Select what you want to see from the information available. Charts, maps, and detailed collection data are displayed to help with your analysis.

Rec #	Date	Time	Latitude	Longitude	Tech	Band	Duplex Mode	Channel Number	Frequency (MHz)	PCI	RSRP (dBm)	RSRQ_crs (dB)	RSRQ_wb (dB)	RSRQ_mb (dB)	CINR (dB)	Avg.NoisePw (dBm)	Noise Power (dBm)	RSSI_crs (dBm)	RSSI_wb (dBm)	RSSI_mb (dBm)	Frame Load (%)
1	04/22/2019	13:09:35.787	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.21	-10.79	-11.86	-11.14	39.71	-119.92	-119.92	-69.42	-60.57	-61.29	100
2	04/22/2019	13:09:35.830	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.2	-10.79	-11.87	-11.15	39.65	-119.89	-119.85	-69.41	-60.56	-61.27	100
3	04/22/2019	13:09:35.871	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.25	-10.79	-11.87	-11.16	37.7	-119.14	-117.95	-69.46	-60.59	-61.31	100
4	04/22/2019	13:09:36.006	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.27	-10.79	-11.89	-11.18	39.83	-119.36	-120.1	-69.48	-60.6	-61.31	100
5	04/22/2019	13:09:36.039	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.23	-10.79	-11.86	-11.14	38.3	-119.18	-118.53	-69.44	-60.58	-61.3	100
6	04/22/2019	13:09:36.082	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.2	-10.79	-11.86	-11.15	38.45	-119.09	-118.66	-69.41	-60.56	-61.28	100
7	04/22/2019	13:09:36.124	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.26	-10.79	-11.89	-11.18	41.86	-119.41	-122.12	-69.47	-60.59	-61.31	100
8	04/22/2019	13:09:36.191	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.23	-10.79	-11.86	-11.15	37.63	-119.19	-117.86	-69.44	-60.59	-61.3	100
9	04/22/2019	13:09:36.222	32.512004	-93.743673	LTE	36	TDD	36960	1931	375	-80.22	-10.79	-11.88	-11.16	39.65	-119.26	-119.88	-69.43	-60.56	-61.28	100
10	04/22/2019	13:09:36.265	32.512538	-93.744262	LTE	36	TDD	36960	1931	375	-80.22	-10.79	-11.86	-11.15	43.57	-123.79	-123.79	-69.43	-60.58	-61.29	100



# Technology Specifications

## LTE / 5G Characteristics

Frequency bands supported	All Licensed and Unlicensed FDD/TDD Bands plus User defined frequencies	
Channel Bandwidth	1.4 MHz	
Maximum number of channels	256	
Measurement Elements	Synchronization (PSCH and SSCH) / Resource Elements (RE)	
Measurement information	Per channel: PCI, SSB Index, RSSI, RSRP, RSRQ, SINR, Cyclic Prefix, RSRP, RSRQ, Noise Power, Average Noise (LTE), CNIR (LTE)	
Information Set Measurement Rate	Up to 40 channels/s	
CINR Dynamic Range	- 10 to + 20 dB	
Automatic Gain Control	- 30 to + 25 dB gain - 30 to 0 dB gain	CD18, CD27 CD08
RSRP Sensitivity	- 135 to - 20 dBm	
CINR / RSRP Accuracy	± 2 dB / ± 2 dBm	

## GSM Characteristics

Frequency bands supported	All 3GPP Bands plus User defined frequencies	
Maximum number of channels	256	
Measurement information	BSIC, RSSI, C/I, BER	
Measurement speed	Up to 30 channels/s	
C/I range	5 to 20	
Automatic Gain Control	- 30 to + 25 dB gain	
BSIC Detection Level @ 5% BER maximum	- 102 to - 20 dBm	
C/I / RSSI Accuracy	± 2 dB / ± 2 dBm	

## UMTS Characteristics

Frequency bands supported	All 3GPP Bands plus User defined frequencies	
Maximum number of channels	256	
Measurement information	RSSI / RSCP / $E_{c/I_0}$ / Delay Spread	
Measurement speed	Up to 30 channels/s	
RSCP Sensitivity / $E_{c/I_0}$ range	- 110 dBm / - 20 dB	
C/I / RSSI Accuracy	± 2 dB / ± 2 dBm	

## RF and Digitalization Specifications

Frequency Range	9 kHz to 8, 18, 27 GHz, possible extent to 40GHz using DC-40 (downconverter)	
Max. Instantaneous Bandwidth	100 MHz (extended using SW features to <i>CellDigitizer</i> frequency range)	
Max. Dynamic Range / Noise Figure	100 dB / < 15 dB	
Real Time Bandwidth (RTBW)	0.1 / 10 / 40 / 100 MHz	
Maximum Safe RF Input Level	+ 10 dBm, DC 10 V	
Programable Attenuation and Gain	CD08: - 30, - 20, - 15, - 10, - 5, 0 dB CD18, CD27: - 30, - 20, - 15, - 10, - 5, 0, 5, 15, 25 dB	
Spurious Free Dynamic Range (SFDR)	60 dBc (typical) 70 dBc (typical) 100 dBc (typical)	100 MHz RTBW 10 / 40 MHz RTBW 0.1 MHz RTBW
Amplitude Accuracy (25 °C ± 5 °C)	± 2.0 dB (typical)	
A/D Converter Sampling Rate and Resolution	125 MSa/s, 14 bits for each I and Q 300 kSa/s, 24 bits	10 / 40 / 100 MHz RTBW 0.1MHz RTBW



# Specifications

## Frequency

Frequency Range	9 kHz to 8, 18, 27 or 40 GHz	
Frequency Reference	± 1.0 ppm	Accuracy at room temperature
	± 1.0 ppm 0 °C to 55 °C	Stability over temperature
	± 1.0 ppm per year	Aging
Probability of Intercept (POI)	≥ 25.552 μs signal duration	For 100% POI
	≤ 17.360 μs signal duration	For 0% POI

## Amplitude

Amplitude Accuracy 25 °C ± 5 °C	± 2.00 dB typical	for frequencies between 50 MHz to 27 GHz
Measurement Range	DANL to levels in table below	
Maximum Safe RF Input Level	+ 10 dBm, Max DC: 10 V	

## Displayed Average Noise Level (DANL)

At 25 °C ± 5 °C, typical

Frequency (GHz)	CD08	CD18	CD27
0.1	-157-dBm/Hz	-161-dBm/Hz	-160-dBm/Hz
0.5	-155-dBm/Hz	-160-dBm/Hz	-159-dBm/Hz
1.0	-156-dBm/Hz	-160-dBm/Hz	-159-dBm/Hz
2.0	-154-dBm/Hz	-154-dBm/Hz	-153-dBm/Hz
3.0	-152-dBm/Hz	-158-dBm/Hz	-157-dBm/Hz
4.0	-151-dBm/Hz	-162-dBm/Hz	-162-dBm/Hz
5.0	-150-dBm/Hz	-158-dBm/Hz	-158-dBm/Hz
6.0	-149-dBm/Hz	-157-dBm/Hz	-157-dBm/Hz
7.0	-150-dBm/Hz	-153-dBm/Hz	-155-dBm/Hz
8.0	-144-dBm/Hz	-160-dBm/Hz	-161-dBm/Hz
9.0		-158-dBm/Hz	-161-dBm/Hz
10.0		-160-dBm/Hz	-161-dBm/Hz
11.0		-156-dBm/Hz	-160-dBm/Hz
12.0		-158-dBm/Hz	-157-dBm/Hz
13.0		-151-dBm/Hz	-157-dBm/Hz
14.0		-154-dBm/Hz	-154-dBm/Hz
15.0		-160-dBm/Hz	-157-dBm/Hz
16.0		-157-dBm/Hz	-157-dBm/Hz
17.0		-150-dBm/Hz	-156-dBm/Hz
18.0		-144-dBm/Hz	-156-dBm/Hz
19.0			-149 dBm/Hz
20.0			-154 dBm/Hz
21.0			-153 dBm/Hz
22.0			-152 dBm/Hz
23.0			-153 dBm/Hz
24.0			-155 dBm/Hz
25.0			-153 dBm/Hz
26.0			-150 dBm/Hz
27.0			-148 dBm/Hz



# Specifications

## Spectral Purity

SSB Phase noise	Offset	
25 °C ± 5 °C At, 1 GHz, measured with external oscillator not present	100 Hz	-90 dBc/Hz
	1 kHz	-93 dBc/Hz
	10 kHz	-98 dBc/Hz
	100 kHz	-106 dBc/Hz
	1 MHz	-120 dBc/Hz

## Power and Physical

Power Supply / Consumption	12 V <sub>DC</sub> / 17 W – CD08	Use AC Wall Power adaptor provided At room temperature	Input AC 100 – 240 V
	12 V <sub>DC</sub> / 23 W – CD18		
	12 V <sub>DC</sub> / 23 W – CD27		
Operating Temperature Range	0 °C to 50 °C		
Enclosure Dimensions / Weight	257.3 (L) x 193.7 (W) x 66.0 (H) mm / 2.7 kg		
	10.13 (L) x 7.63 (W) x 2.61 (H) inches / 6 lbs		
Warm up time	30 minutes		

## Connectors

RF in	SMA female, 50 Ω
10 MHz Reference In and Out	SMA female, 50 Ω
Analog I and Q Out	SMA female, 50 Ω
HIF Out	SMA female, 50 Ω
10 / 100 / 1000 Ethernet	RJ45
USB Console	Type B - mini
GPIO	25-pin male D-Subminiature
Power	Coaxial Type A: 5.5 mm, OD 2.5 mm ID

## Regulatory Compliance

FCC / RoHS Compliance / Mark (CE)		
EMC Directive 2014/30/EU	EN 61326-1:2013	Electromagnetic Compatibility
Low Voltage Directive 2006/95/EC	EN 61010-1-2010 Class 1	Safety
Humidity & Temperature	MIL-STD-PRF-28800 Class 2	
Shock & Vibration	MIL-STD-PRF-28800 Class 2	
	MIL-STD-PRF-28800 Class 3	

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