

Melcome to Deviser Melcome to Deviser

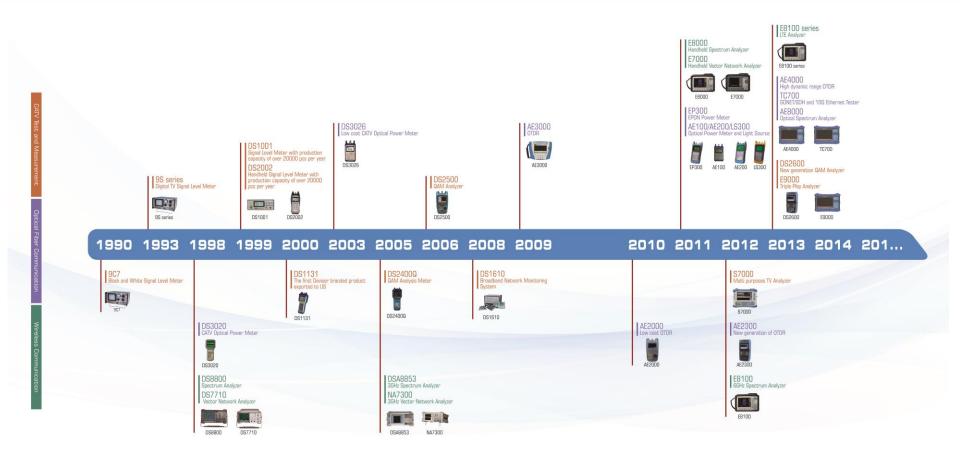


Welcome to Deviser





Product Roadmap





E8000A 9kHz \sim 3.0GHz Released E8100A 9kHz \sim 6.0GHz 2014-Q1



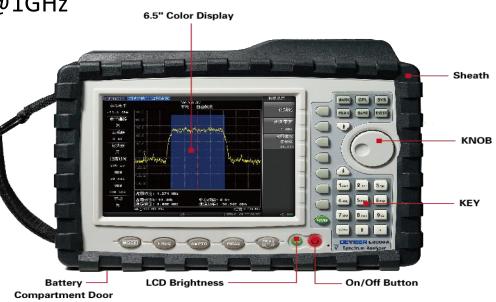


> Introduction

- ➢ Features
- PC Software
- Accessories and Options
- Competitive Analysis
- Specification



- 6.5inch TFT LCD, visible under strong light
- 9kHz \sim 3/6GHz frequency span
- Lower DNAL -145dBm@RBW=100Hz@1GHz
- Fast sweep 1ms \sim 250S@span>1kHz
- Large DR \geq 90dB@RBW=100Hz
- IP3≥15dBm @ATT=0
- Phase Noise< -95dBc/Hz@10kHz





- One button test , CHP, ACP, OBW
- LAN/USB data port with SCPI
- 3/6GHz TG OPTION
- GPS option
- LTE Analysis Option
- Interference Analysis Option
- \bullet >3.5 hours battery working time





> Introduction

➢ Features

- PC Software
- Accessories and Options
- Competitive Analysis
- Specification



Features

Key Features:

- 3/6GHz Spectrum Analysis (SA)
- Interference Analysis (IA)
- 3GPP 2G/3G/4G Base Station Analysis LTE Analysis will be released in



Spectrum Analysis

Interference Analysis

LTE Analysis

Dynamic Range

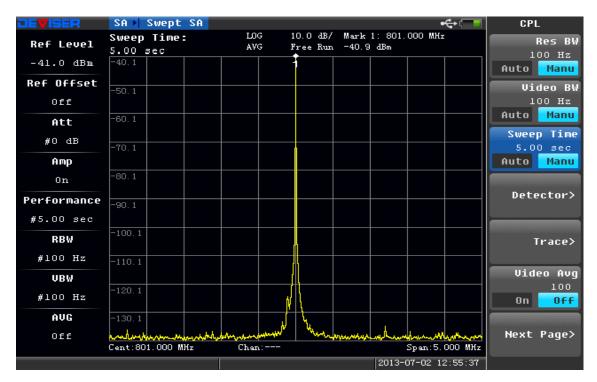
Dynamic Range

What is Dynamic Range? Max Input level – DANL

- Input related Spurious
- Spurious

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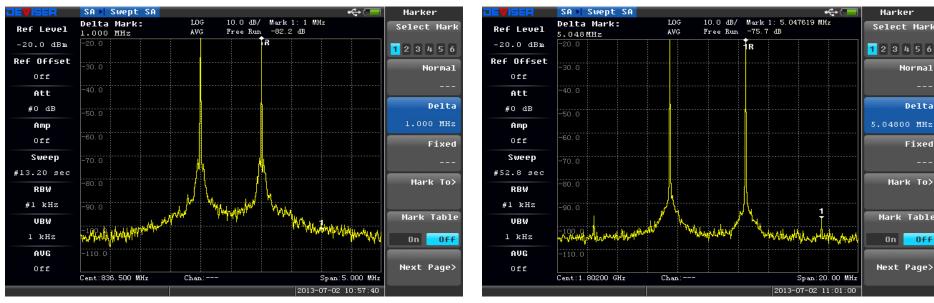
- TOI
- DANL
- Phase Noise



Large Dynamic Range > 90 dB @ 100Hz RBW



High TOI - IP3 > +15dBm @ ATT=0, -20dBm two tone input



836&837MHz , -20dBm

ATT=0dB

IM3 >80dB

1800&1805MHz , -20dBm ATT=0dB

IM3 >75dB



Dynamic Range

Low DANL

DEVISER	SA≯ Swept SA				÷	Marker
Ref Level	Marker: 865.25000 MHz	LOG AVG	10.0 dB/ Free Run	Mark 1: 865 -130.2 dBm	.25000 MHz	Select Mark
-60.0 dBm	-60.0					123456
Ref Offset	-70.0					Normal
Off						
Att	-80.0					865.250 MHz
#0 dB	-90.0					Delta
Amp						
0n	-100.0					Fixed
Sweep	-110.0					
#2.00 sec						
RBW	-120.0					Mark To>
#1 kHz	myselver prove the second	Willing Winnel	heilige the states	en hand manual and	the	
VBW						Mark Table
l kHz	-140.0					On Off
AVG	-150.0					
9						Next Page>
	Cent:865.25000 MHz	Chan:			Span:50.00 kHz	
				2013-	-07-02 11:04:17	

800MHz, amplifier=on, ATT = 0dB DANL -135dBm@1kHz RBW DANL -165dBm@1Hz RBW

JE V ISER	SA ► 3	Swept	SA							• < +	Frequency
Ref Level	Center 2.4500			LO AV		0.0 dB/ ree Run		1: 2.45 6 dBm	5 GHz		Center Freq
-60.0 dBm	-60.0										2.45000 GHz
Ref Offset	-70.0										Spar
Off	10.0										
Att	-80.0										50.000 kHz
#0 dB	-90.0										Start Free
Amp	50.0										2.45000 GHz
On	-100.0										Stop Fred
Sweep	-110.0										2.45000 GHz
#2.00 sec											2.43000 0112
RBW	-120.0										Full Spar
#1 kHz	-130.0	apayan and a second	YHYNMUYM	drymyy	httan an a	ᠺ᠈ᡎᠬᡰᡟᠮᠰᡰᡰᢩ୰	yper having	And the second	www.	Mymmer	
VBW											
l kHz	-140.0										Zero Spar
AVG	-150.0										
23											Next Page>
	Cent:2.4	45000000	IO GHz	Char	.:					000 kHz	

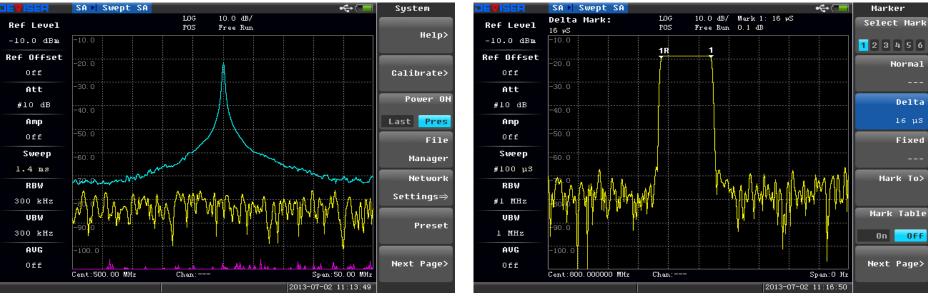
2400MHz, amplifier=on, ATT = 0dB DANL -131dBm@1kHz RBW DANL -161dBm@1Hz RBW



Spectrum Analysis - Fast sweep and helpful for catch impulse signal

Full span: Span > 1kHz: Zero span: 60mS 1mS – 250S 20μS – 250S

SPAN=0 20µS -250S



SPAN≠0 1mS-250S



Spectrum Analysis

Spectrum Analysis - Lower phase noise

<-85dBc/Hz@1kHz <-95dBc/Hz@10kHz <-105dBc/Hz@100kHz

DE <mark>W</mark> ISER	SA ⊨ Swept SA			• • • 🗔	Marker
Ref Level	Delta Mark: 35.00 kHz		0 dB/ Mark 2:3 e Run 0.8 dB	5.00 kHz	Select Mark
-20.0 dBm	-20.0	IR			123456
Ref Offset	-30.0				Normal
Off					normal
Att	-40.0				
#0 dB	-50.0				Delta
Amp					35.000 kHz
Off	-60.0				Fixed
Performance	-70.0				
#200 ms					Mark To>
RBW	-80.0		2	man man	Mark TO2
#100 Hz	2B	mmmm	manprover		
VBW					Mark Table
100 Hz	-100.0				On Off
AVG	-110.0				
Off	Cent:1.80000000 GHz	 Chan:		Span:50.00 kHz	Next Page>
	GAZ			3-07-03 08:20:24	

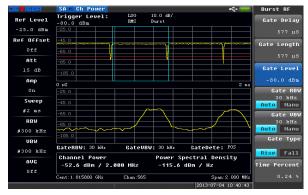
Spectrum Analysis

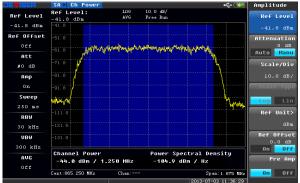
Spectrum Analysis - One Button Testing

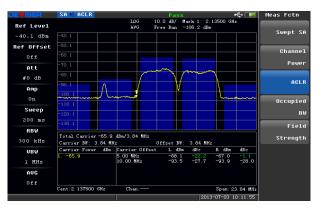
- CHANNEL POWER
- ACP

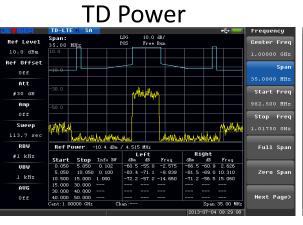
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- OBW
- SEM

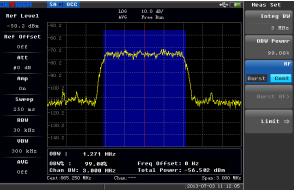








Channel Power



OBW

ACLR

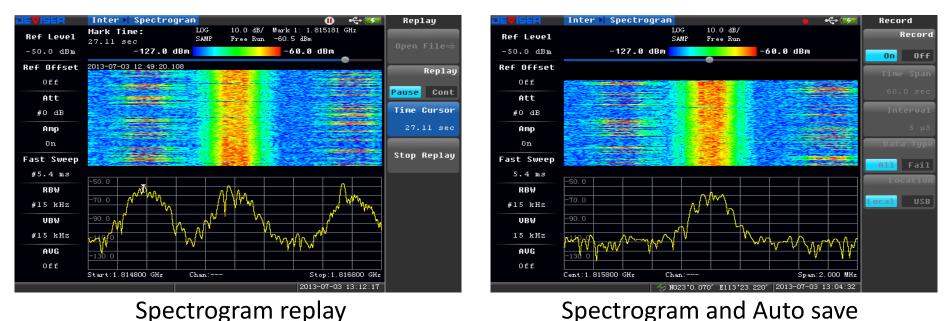
SEM



Interference Analysis

Interference Analysis — Spectrogram

- Monitoring Spectrum over time
- Save/recall a history of data up to 3 days
- Save/recall a history of warning data up to 3 days

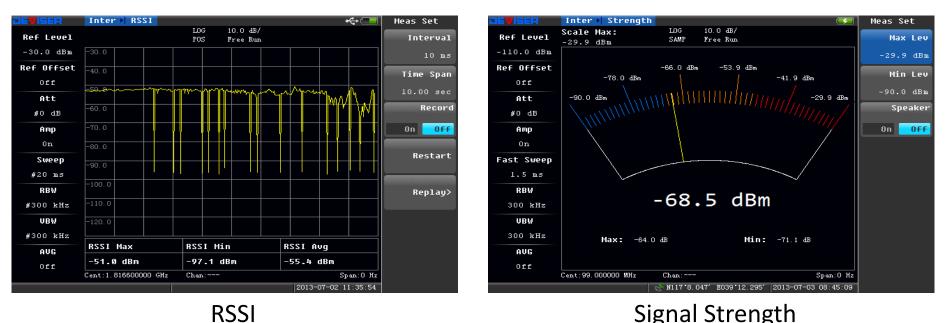




Interference Analysis

Interference Analysis — Signal Strength

- Monitoring Signal Strength
- An Audible beep proportional to the Signal Strength
- RSSI monitor/save Signal Strength data up to 10 days





Interference Analysis — Interference mapping

- With GPS and compass to triangulate interfering signal
- GPS indentifies the location on the map
- Compass indentifies direction of the antenna
- The additional map can be imported from USB disk
- GPS and Compass are designed inside of the directional antenna



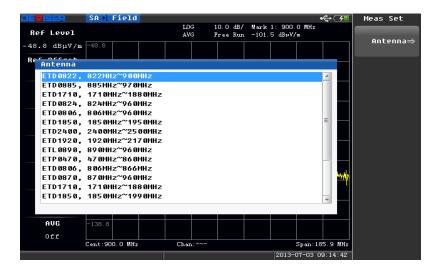


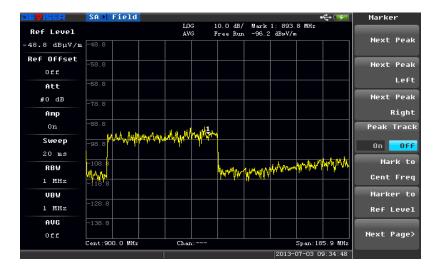


Interference Analysis

Interference Analysis — Field Strength

• The Antenna factor can be imported from USB disk



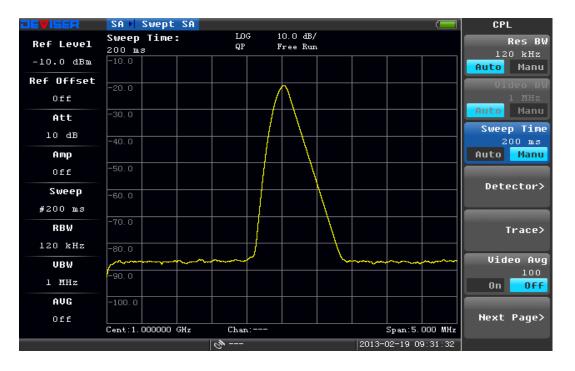




Interference Analysis

Interference Analysis – EMI Test

- 6dB RBW 200Hz/9kHz/120kHz
- Detector mode Quasi-peak
 Peak
 Avg.





Interference Analysis — AM/FM/SSB demodulation and monitoring

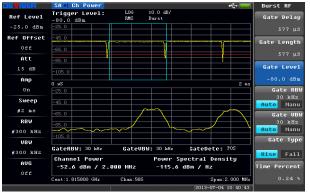
- Demodulate AM/FM/SSB signal
- Listen the signal and figure out what it is



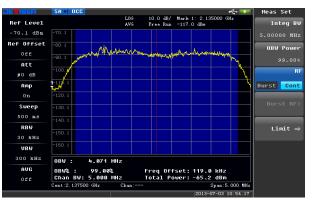
Base Station Analsis

Base Station Analysis – RF measurements

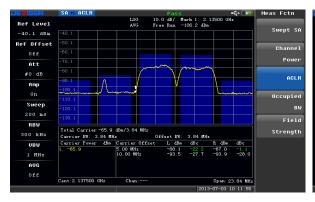
- CHANNEL POWER
- ACLR
- OBW
- SEM

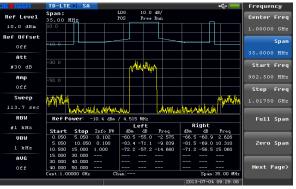


Power vs. Time



Channel Power





SEM



OBW&Channel Power

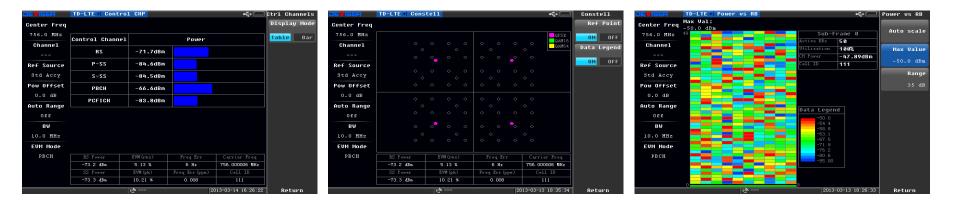
ACLR



Base Station Analysis

Base Station Analysis – Demodulation Measurements

- Power vs. Resource Block (RB)
- Constellation (EVM/frequency error)
- Control Channel (CCH) Power



CCH Power

Constellation/EVM

Power vs. RB



Base Station Analysis – OTA Measurements

- SS-P
- RSRP/RSRQ/SINR

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- Cell/Sector/Group ID
- Auto save with GPS
- Tagging information

JE <mark>N</mark> ISER	TD-LTE > OT	A Scanner			€□	OTA Scanner
Center Freq						Sort
756.0 MHz	Cell (Grp, Sec)	S-SS Power	RSRP	RSRQ	SINR	Cel.
Channe1	82	-33.7 dBm	-8.3 dBm	-5.4 dB	-6.9 dB	Mod Resul
	100	-23.9 dBm	-24.5 dBm	-82.2 dB	-85.7 dB	nou Kesul
	37	-98.3 dBm	-12.4 dBm	-79.2 dB	-80.5 dB	
Ref Source	40	-65.9 dBm	-67.7 dBm	-95.8 dB	-59.2 dB	
Std Accy	96	-93.3 dBm	-88.7 dBm	-96.2 dB	-29.0 dB	Bar:
Pow Offset	13 Dominance	-48.1 dBm	-33.4 dBm	-30.0 dB	-26.0 dB	SS Power
0.0dB Loss	0.0					Auto sav
Auto Range	-24.0					
关	-48.0					
BW	-72.0					
10.0 MHz	-96.0					
EVM Mode			RSPR			
PBCH						
		4- 1 000	9*8.553′ E117		3-04-16 13:38:23	Return

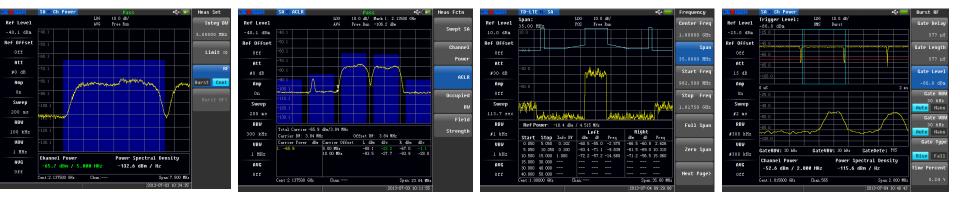


E8000A series spectrum analyzer includes LTE-TDD/FDD signal analysis option for downlink signal quality measurement to ensure the quality of signal coverage of base station and identify the possible interference. There are three portions of test: RF testing, signal modulation quality testing and over-the-air testing.





RF test includes Channel Power, Occupied Bandwidth (OBW), Adjacent Channel Leakage Ratio (ACLR), Spectrum Emission Mask (SEM) and Power vs. Time (PVT) measurement. All test results can be exported and printed. PVT measurement applies to LTE-TDD specifically.



Channel Power and OBW

ACLR

SEM

PVT



Signal modulation quality test is used to measure Error Vector Magnitude (EVM), Channel Power and Resource Block (RB) power of control channels, EVM analysis on sub-carrier, co-channel interference (CCI) ...etc. All measurement results can be formatted in a report to export.

RB power measurement provides RB quantity, RB utilization, channel power, Cell ID ... etc. metrics.

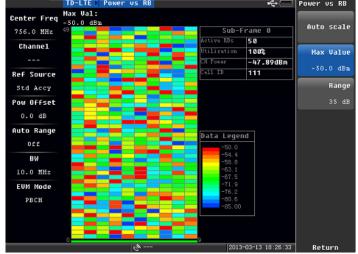




Table of Control Channel Power

Control channel power of Reference Signal (RS), Synchronization Signals (PSS and SSS), Physical Broadcast Channel (PBCH), Physical Control Format Indicator Channel (PCFICH), Physical Hybrid ARQ Indicator Channel (PHICH) and Physical Control Channel (PDCCH) are displayed in table and bar graph formats.

	TD-LTE Contr	ol CHP		÷-	Ctrl Cha	nnels
Center Freq					Display	Mode
756.0 MHz	Control Channe	1	Power		Table	Bar
Channel			- Ouer			
	RS	-71.7dBm				
Ref Source	P-SS	-84.6dBm				
Std Accy	2-22	-84.5dBm				
Pow Offset	PBCH	-66.6dBm				
0.0 dB	PCFICH	-83.8dBm				
Auto Range	PGFIGH	-83.8080				
Off						
BW						
10.0 MHz						
EVM Mode						
PBCH	RS Power	EVM (rms)	Freq Err	Carrier Freq		
	-73.2 dBm	5.13 %	6 Hz	756.000006 MHz		
	SS Power	EVM (pk)	Freq Err(ppm)	Cell ID		
	-73.3 dBm	10.21 %	0.008	111		
		ch	2	013-03-14 16:26:22	Retu	rn

RS/SS/PBCH/PCFICH/PHICH/PDCCH Power Measurement



Constellation analysis is used to test LTE-TDD/FDD signal quality to ensure the signal coverage can be received by network terminals and any potential problems. Test measurement metrics are:

- Reference Signal Channel Power / Synchronization Signal Channel Power
- EVM Peak & Root Mean Square (RMS)
- Sub-Carrier EVM for in-band interference
- Frequency Deviation / Cell ID

	TD-LTE Cons	stell							Const	tell
Center Freq									Ref	Poin
756.0 MHz								QPSK	ON	OF
Channel								QAII16 QAII64		Leger
Ref Source		•				•			ON	OF
Std Accy	• •									
Pow Offset										
0.0 dB				0						
Auto Range							0			
Off										
BW		° 0				•				
10.0 MHz										
EVM Mode										
PBCH	RS Power	EVM (rms)	Fr	eq Eri		Carri	er Freq		
	-73.2 dBm	5.1	3 %		6 Hz		756.000	1006 MHz		
	SS Power	EVII	(pk)	Freq	Err (p	pm)	Cel	1 ID		
	-73.3 dBm	10.2	21 %	C	. 008		1	11		

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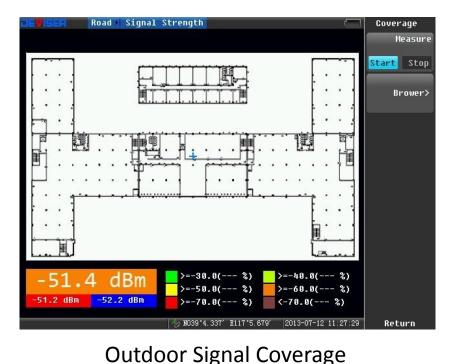
Over-the-Air test measures the quality of covered signal with signal sweep, GPS, electronic compass, output signal coverage and outdoor geographical mapping.

 Signal sweep provides fast measurement of SS power, Reference Signal Receive Power (RSRP), Reference Signal Receive Quality (RSRQ), Signal to Interference plus Noise Ratio (SINR) and Cell ID. GPS information can be recorded and exported to the geographical mapping tool.

	TD-LTE → OT	A Scanner			*	OTA Scanner
Center Freq						排序>
756.0 MHz	Cell (Grp, Sec)	S-SS Power	RSRP	RSRQ	SINR	Sector
Channel	82	-33.7 dBn	-8.3 dBn	-5.4 dB	-6.9 dB	调制结果
	100	-23.9 dBm	-24.5 dBn	-82.2 dB	-85.7 dB	阴水运术
	37	-98.3 dBm	-12.4 dBn	-79.2 dB	-80.5 dB	开 关
Ref Source	40	-65.9 dBm	-67.7 dBn	-95.8 dB	-59.2 dB	
Std Accy	96	-93.3 dBm	-88.7 dBn	-96.2 dB	-29.0 dB	柱状图>
Pow Offset	13	-48.1 dBm	-33.4 dBn	-30.0 dB	-26.0 dB	RSPR
	Dominance					6-1/0+
0.0dB Loss	0.0					自动保存
Auto Range	-24.0				_	开 关
关	-48.0					
BV	-72.0					
10.0 MHz	-96.0					
EVM Mode			RSPR			
PBCH						
			8'8.553' E117	11.2017 2013	-04-16 13:38:23	Return



• Signal Coverage Map reflects the signal coverage of the area. Coverage measurement indicators can be CW signal strength or LTE mobile signal quality (synchronization channel power, reference signal power, Cell ID) etc.





Indoor Signal Coverage



Tracking Generator

Tracking Generator Option

- Frequency Range
- Level Range

- 10MHz 3000/25M 6000MHz -50dBm – 0dBm
- Level Resolution
- Level Accuracy
- Output Port



1dB

N-F

 $\pm 2 dB$



Interface

Interface

• 10M/100M LAN port

SCPI program command

• 2 USB port

USB1.1 and USB2.0

for import and export file

support USB printer





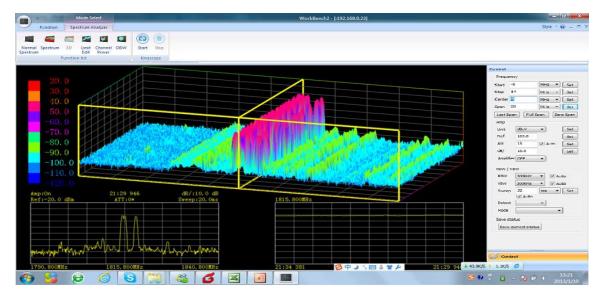
- > Introduction
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PC Software

PC software

- It supports Max. 64 E8000A series or E8001M module connection
- Remote control via LAN port
- File import and export
- SCPI compatible programming interface



Monitoring multi-SA



- > Introduction
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Accessories and Options

Accessories

- Analyzer
- AC adaptor
- Car Cigarette Lighter 12 VDC Adapter
- Soft Carrying Case
- Li-on Battery
- User Manual
- CD with PC tool software
- Options
 - Tracking Generator
 - Power Meter
 - LTE Analysis
 - Interference Analysis







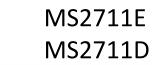


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VS



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E8000A N9340B





To see the complete competitive analysis spreadsheet please review the excel file: <u>E8000 Deviser vs Anritsu vs Agilent Competative Analysis.xls</u>



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Specifications

- Frequency Specifications
- Frequency Range
- Frequency Reference

100 kHz to 3000 MHz

- Aging \pm 1 ppm per yearStability \pm 1 ppmTemperature Stability \pm 2 ppm (0 to +50°C)
- Marker Count Accuracy (S/N 25 dB, RBW/span 0.01)

Accuracy	\pm 2 ppm, \pm 1 count
Counter Resolution	1 Hz
Frequency Span	0 Hz (zero span), 1kHz to 3000 MHz



Specification

- Sweep
- Trigger Type
- Resolution Bandwidths

1mSec to 250 sec (span > 200 Hz) 20μSec to 250 sec (span = 0 Hz) free run, single, video, TV

Range10Hz to 3 MHz in 1-3-10 sequenceBandwidth Accuracy $< \pm 10\%$ Selectivity (60 dB/3 dB Bandwidth Ratio)< 5:1

- Video Bandwidths
- Phase Noise

- 3 Hz to 1 MHz in 1-3-10 sequence
- < -105dBc/Hz @ 100 kHz offset from CW signal
- < -95 dBc/Hz @ 10 kHz offset from CW signal
- < -85 dBc/Hz @ 1 kHz offset from CW signal



Specifications

- Amplitude Specifications
- Measurement Range
- Input Attenuator Range Step
- Internal Preamplifier Frequency Range Gain
- Max Safe Input

displayed average noise level to maximum safe input level

0 dB to 50 dB 5dB

1 MHz to 3000 MHz 15 dB +30dBm (peak power/input attenuation >15 dB), 100 VDC





Specifications

DANL (Input Terminated, 0 dB Attenuator, RBW=10Hz, VBW=3Hz, Sample Detector)

Pre-amplifier OFF (typical)

< -142 dBm 1MHz ~ 1GHzPre-amplifier ON (typical)

< -155 dBm 1MHz ~ 1GHz

Spurious Responses
 Second Harmonic

< -138 dBm 1GHz ~ 3GHz

< -151 dBm 1GHz ~ 3GHz

Second Harr

< -68dBc for -20 dBm signal at input mixer

• TOI

>+15dBm (two -20 dBm signals at input mixer with > 1 MHz separation and att=0)

• Residual Responses (Input Terminated and 0 dB Attenuator)

< -85 dBm 1 MHz to 3000 MHz



Specifications Display Range

- Log Scale
- Linear Scale
- Scale Units
- Marker Readout Resolution

0.1 to 1 dB/div in 0.1 dB step 1 to 40 dB/div in 1 dB step
10 divisions
dBm, dBmV, dBμV, mV
0.03 dB for log scale
0.03% of ref level for linear scale



Specifications

- Traces
- Trace Detector
- Marker Functions
- Marker Display
- Reference Level
- Level Accuracy

3 traces

sample, posi-peak, neg-peak, normal, average peak, next peak, marker to center, marker to ref, etc.

normal, delta, fix marker & frequency counter -130 dBm to +30 dBm

< \pm 1 dB @ +25°C (typical)



Specification

Specifications

- Inputs/Outputs
- **RF INPUT**
 - Input Input Impedance
- USB PORT
- LAN port
- CHARGER
- Power Specifications Battery Type Charge Time Operating Time

AC Adapter

N-F 50Ω USB 2.0 port and USB 1.1 port 10M/100M RJ45 Battery charger connection

11.1V @ 5.2Ah Lithium-Ion < 5 hours > 3.5 hours > 2.5 hours with TG 19 VDC @ 3.42A



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Specifications

TG (tracking generator) OUT Output Frequency Range Phase Noise Level Range Level Accuracy Harmonic Distortion Non-Harmonic Distortion Output Impedance

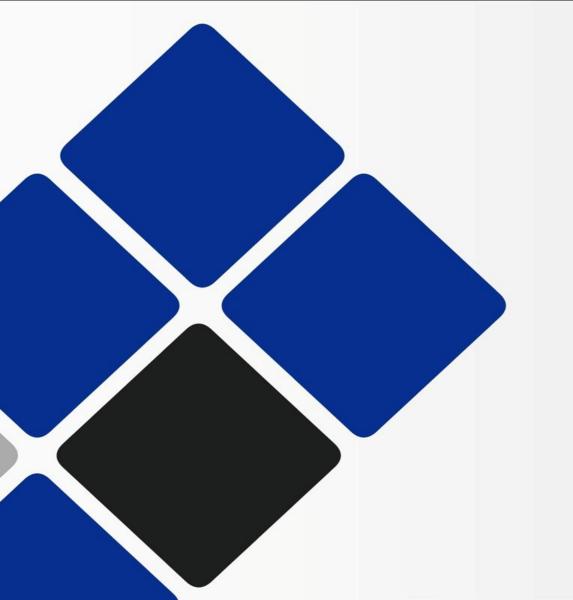
N-F 10 MHz to 3000 MHz < -70 dBc/Hz @ 10 kHz -40 to 0 dBm ± 2 dB < -20 dBc < -30 dBc 50Ω



Other Specifications

- Temperature, Operating
- Temperature, Storage
- Dimensions (W x H x D)
- Weight (With Battery)
- Display Type
- Display Resolution
- Language

-10°C to +55°C -30°C to +80°C 258 mm x 173 mm x 74 mm <2.2 kg 6.5 inch TFT color LCD 640 X 480 pixels Chinese, English





Thank you