PowerSuite Measurement PathWave Vector Signal Analysis (89600 VSA)

Option 89601PSMC

Key Features

- Supports FFT-based PowerSuite measurements
- Perform Spectrum Emission Mask (SEM) and Adjacent Channel Power (ACP) measurements on 5G NR, 802.11be plus other cellular, WLAN and user defined signals
- Supports single or multiple carrier scenarios with cumulative ACLR (CACLR) for non-contiguous carrier aggregation
- Support multiple sequential acquisition which doesn't require wideband hardware to make SEM or ACP measurements
- Perform EVM and PowerSuite measurements at once, with combined display, using the VSA multi-measurement feature
- Provides standard compliant "Quick Setup" and demo for IEEE WLAN 802.11be (Wi-Fi 7) SEM measurement and 3GPP 5G NR ACP measurement
- Use data from over 45 measurement platforms, or simulation tools, to meet your design and test goals
- Record and playback measurements for thorough analysis

PowerSuite Measurement

PowerSuite measurement can help you configure the PathWave Vector Signal Analysis (89600 VSA) software to perform fast spectrum related measurements like Spectrum Emission Mask (SEM) and Adjacent Channel Power (ACP) measurements. These measurements are similar to the ones found in the Keysight X-Series Measurement Applications software. This technology is based on the advances in analog-to-digital converters and digital signal processors combined with FFT technology, which can offer the similar results as a swept-tuned spectrum analyzer with additional capabilities. You will discover that PowerSuite measurement now allows you select span, resolution bandwidth, and detectors that have previously only been available in swept-tuned spectrum analyzer. As PowerSuite measurement using the FFT mode, you can connect to hardware signal analyzer or scopes. This new capability also extends the 89600 VSA software beyond demodulation analysis, and you can sequence a multi-measurement as demodulation analysis and PowerSuite measurement together. Furthermore, PowerSuite measurement can also support both live measurement and recalling the recording files.

The picture below is an example measuring WLAN 802.11be signals using 89600 VSA software with sequenced multi-measurements. It includes two measurements: Wireless Connectivity measurement and PowerSuite SEM measurement. That means now you can make the modulation analysis and PowerSuite together inside the 89600 VSA software.

Figure 1. WLAN 802.11be sequenced multi-measurements with SEM and Modulation Analysis together

Try Before You Buy!

Download the PathWave Vector Signal Analysis (VSA) software and use it free for

30 days to make measurements with your analysis hardware or use our recorded demo signals by selecting File > Recall > Recall Demo > Pulse > on the software toolbar. Request your free trial license today: www.keysight.com/find/89600_trial

Spectrum Emission Mask (SEM) Measurement

When working on wireless signal such as 5G NR or WLAN, you can characterize the transmitters by measuring the power of in-band and out-of-band emissions in a chosen frequency band at specified offsets. PowerSuite SEM measurement is an easy way to perform this task. It measures the levels of spurious signals in specified offset frequencies and relates them to the carrier power as reference. You can simply select the pre-defined radio standard which is compliant to the IEEE WLAN or 3GPP 5G NR specification definition, then it will list the SEM measurement results in some summary tables together with result trace. It also provides a pass/fail indication of whether or not the transmitter meets the limit test defined by the standard or your manual settings.

PowerSuite SEM measurement can provide you the following key features:

- It supports both single carrier and multiple carries
- Support the flexible power reference selection such as maximum power, left and right carriers, carrier index, manual setting or max power carrier in sub-block
- You can make SEM measurement either by single spectrum region with single acquisition, which is limited to the maximum bandwidth of hardware. Or you can use the advanced multiple spectrum region with multiple acquisitions so SEM measurement doesn't require the hardware with wideband IQ bandwidth, and you can specify different settings for each acquisition (such as input range, RBW, and detector type)
- It provides the "Quick Setup" for 802.11be SEM measurement 40 MHz (shared), 160 MHz and 320 MHz and "Quick Demo" for 802.11be 160 MHz
- It can define the SEM limit mask for each offset and define the fail mask as absolute, relative, absolute or relative, absolute and relative
- It allows you to add interfering signals
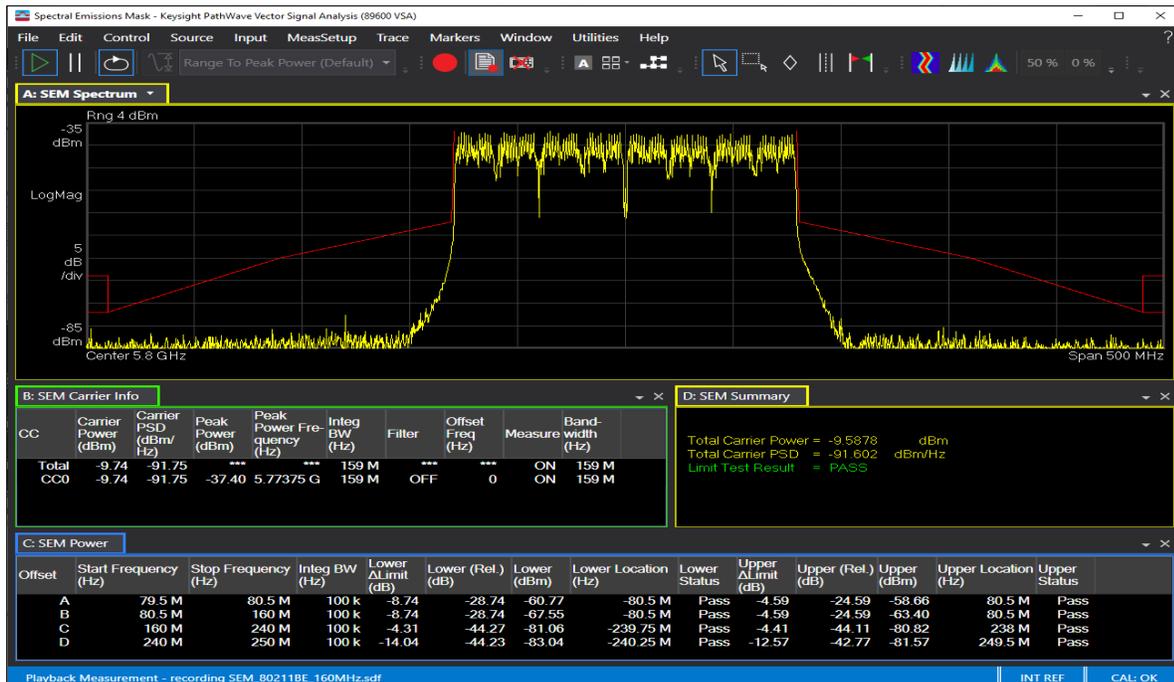
Figure 2. WLAN 802.11be 160 MHz Signal with PowerSuite SEM Measurement

Spectrum Emission Mask (SEM) Measurement Properties
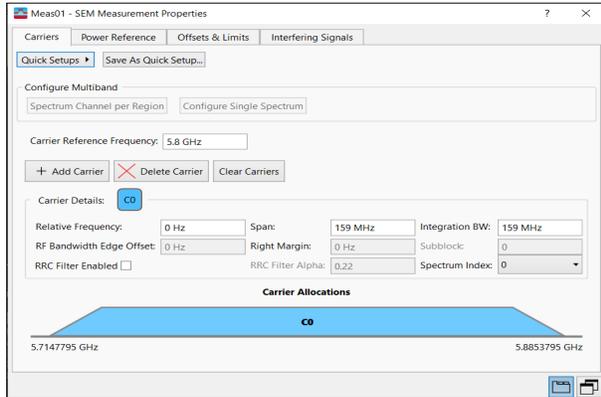
Carrier – this setup menu allows you to recall Quick Setup from pre-defined or user-defined setup; You can manually configure the acquisition method as single or multiple. Each carrier frequency, span, integration BW, RRC filter etc. can be specified separately.
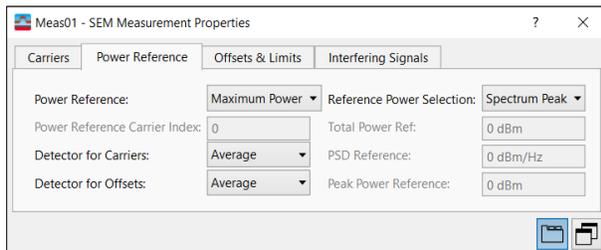
Power Reference - sets the overall type of power reference. Sets the overall type of power reference as Left and Right Carrier, Maximum Power, Index, Manual, or Max Power Carrier in Subblock. Set the detector of carrier and offsets.
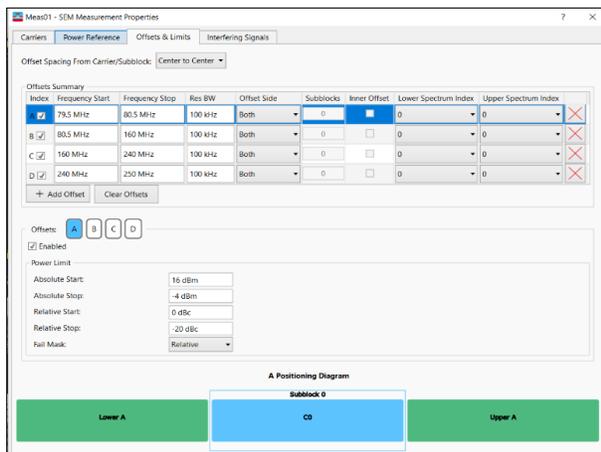
Offset & Limits - Defines the points between which a frequency offset is measured with frequency start, frequency stop. RBW and offside specified for each offset. Moreover, the limit mask can be defined here for each offset with fail mask type as absolute, relative, absolute and relative, absolute or relative.
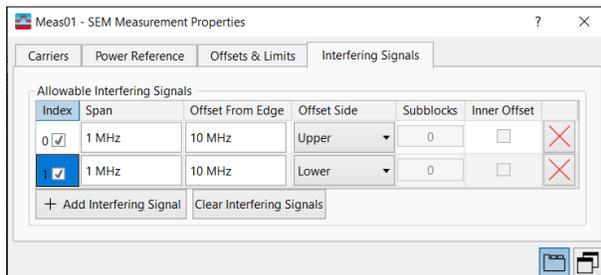
Interfering Signals – it allows you to add some interfering signals to the SEM measurement with user-defined span, offset from edge, upper/lower offset side,

Adjacent Channel Power (ACP) Measurement

ACP measurement measures the amount of interference, or power, in an adjacent frequency channel. This is a typical measurement for wireless communications because it helps you ensure that signals are effectively transmitted within their allocated spectral bandwidth and are not leaking into an adjacent channel where it may interfere with other signals.

PowerSuite ACP measurement can support multi-carrier and multi-offset ACP measurements. The span is set according to the defined carriers and offsets with their associated integration bandwidths, defined by you or the selected radio standard. The ACP results are displayed as a bar graph based on spectrum data, with measurement data at specified offsets (Figure 3). Furthermore, ACP Carrier Info, ACP Results and ACP Summary are also provided in table format, which will show you the configured settings, and measurement results for each offset and pass/fail etc. more details results information.

PowerSuite ACP measurement can provide you the following key feature:

- Supports single or multiple carrier scenarios with cumulative ACLR (CACLR) for non-contiguous carrier aggregation
- Support sequential acquisition for a measurement span beyond the maximum IF bandwidth of hardware
- Support the flexible power reference selection as maximum power, left and right carriers, carrier index, manual setting or max power carrier in sub-block
- It provides a demo for 5G NR standard compliant FR1 100 MHz ACP measurement and can be leveraged for configuring other wireless standards
- It can define the ACP limit mask for each offset and define the fail mask as absolute, relative, absolute or relative, absolute and relative
- It allows you to add interfering signals
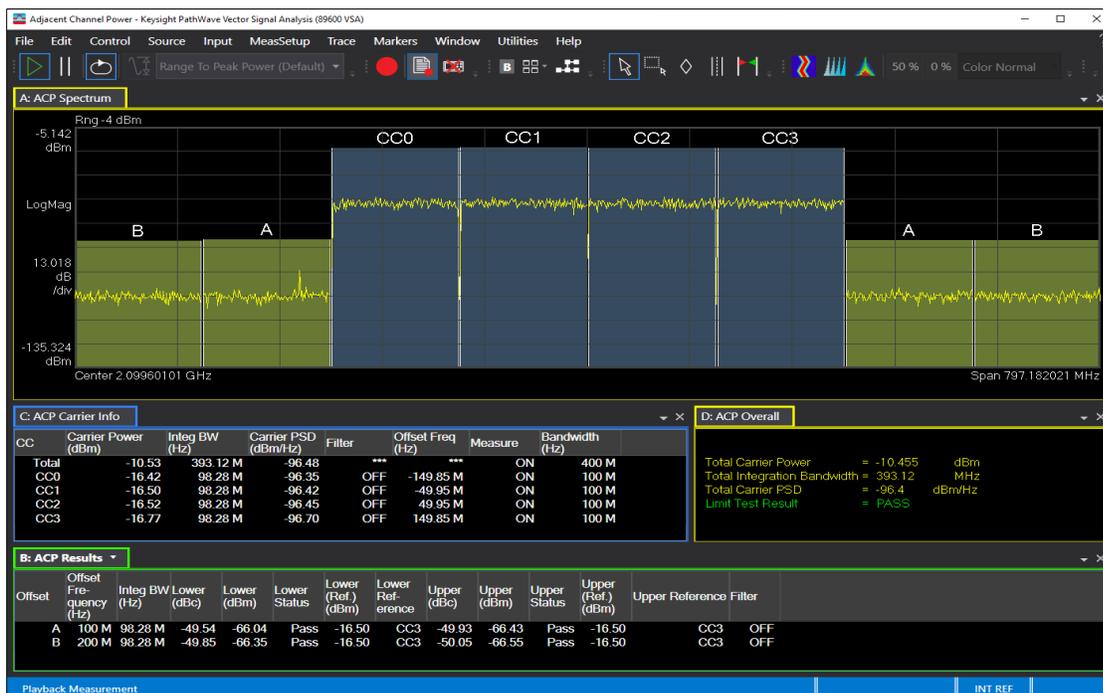
Figure 3. 5G NR multi-carrier ACP measurement with four contiguous component carriers

PowerSuite Measurement Software Features

Note: The following features are independent of hardware platform used, unless otherwise noted.

Table 1. SEM (Spectrum Emission Mask) Measurement Properties

SEM (Spectrum Emission Mask) Measurement Properties

Carriers	Setup the SEM carrier related parameters
Quick Setups	Selects an available factory-provided or user-defined Spectral Emission Mask configuration, now it can support IEEE 802.11be 160 MHz, and IEEE 802.11be 320 MHz
Save As Quick Setup	Saves the current Spectral Emission Mask configuration to the list of available Quick Setups
Carrier Reference Frequency	Sets the reference frequency (in Hz). All other frequency settings are either directly or indirectly relative to this value
Add Carrier	Adds a carrier to the end of the collection of carriers. When more than one carrier exists, a Carrier Summary table appears with Index, Relative Frequency, Span, Integration BW and Subblock information for each carrier
Carrier Index	Indicates the automatically assigned carrier number, starting with C0
Relative Frequency	Sets the carrier center frequency (in Hz) as an offset from the Carrier Reference Frequency
Span	Sets the span (in Hz) used to determine offset spacing.
Integration BW	Sets the equivalent noise bandwidth (in Hz) used when calculating carrier power.
RF Bandwidth Edge Offset	Sets RF Bandwidth Edge Offset value (in Hz) of this carrier
Right Margin	Sets the value (in Hz) for compensating the frequency range of subblock
Sub-block	Sets the ID of the Subblock which this carrier belongs to
RRC Filter Enabled	When enabled, carrier power calculations are weighted with a root-raised-cosine filter.
RRC Filter Alpha	Sets the roll off factor of the RRC filter used when RRC Filter Enabled is selected
Carrier Allocation	Displays an illustration of the SEM measurement's configured carriers.
Power Reference	**Sets the overall type of power reference**
Power Reference	Sets the overall type of power reference as Left and Right Carrier, Maximum Power, Index, Manual, or Max Power Carrier in Subblock
Reference Power Selection	Sets the overall type of power calculation used. The selection specifies the format of the power reference and related results as Integrated Power, PSD or Spectrum Peak
Power Reference Carrier Index	Sets the index of the carrier used for the power reference
Total Power Ref	Sets the total integrated power (in dBm) used for the power reference
Detector for Carriers	Sets the spectrum detector to use for carriers power measurement as Average or Peak (Max)
Detector for Offsets	Sets the spectrum detector to use for offsets power measurement as Average or Peak (Max) (default 0.0 dBm/Hz)
PSD Reference	Sets the PSD power (in dBm/Hz) used for the power reference
Peak Power Reference	Sets the peak envelope power (in dBm) used for the power reference (default 0.0 dBm)
Offsets & Limits	**Defines the points between which a frequency offset is measured.**
Offset Spacing from Carrier/Subblock	Defines the points between which a frequency offset is measured
	Offset Summary
Index	Indicates the automatically assigned offset identifier, starting with "A". When an offset's checkbox is selected, it is included in the measurement. The checkbox includes or excludes the offset
Frequency Start	Sets the start frequency (in Hz) as an offset from the point defined by the Offset Spacing from Carrier/Subblock parameter
Frequency Stop	Sets the stop frequency (in Hz) as an offset from the point defined by the Offset Spacing from Carrier/Subblock parameter
Res BW	Sets the resolution bandwidth used for this offset calculation. Units are Hz
Offset Side	Sets which side of offsets are enabled: upper, lower or both
Sub-blocks	Sets the ID(s) of the subblock(s) the selected offset is referencing (Subblock1, or both Subblock 1 and Subblock2).
Inner Offset	Sets a value indicating whether this offset is an inner offset or not

SEM (Spectrum Emission Mask) Measurement Properties

Offsets Settings for Each Index	
Enabled	Includes (enabled) or excludes (disabled) the selected offset
Power Limit – Absolute Start	Sets the absolute power level limit (in dBm) at the start frequency of the offset
Power Limit – Absolute Stop	Sets the absolute power level limit (in dBm) at the stop frequency of the offset
Power Limit - Relative Start	Sets the relative power level limit (in dBc) at the start frequency of the offset
Power Limit - Relative Stop	Sets the relative power level limit (in dBc) at the stop frequency of the offset
Power Limit - Fail Mask	Sets what types of failures are reported: absolute, relative, absolute or relative, absolute and relative
Cumulate Masks	Cumulate Mask parameters are visible when more than one carrier is configured
Index	Indicates the automatically assigned cumulate mask number, starting with Mask0. When a mask's checkbox is selected, it is included in the measurement
Stop Frequency	Sets the stop frequency (in Hz) of the mask as an offset from the edge of the outer most carrier of Subblock1 and Subblock2 as specified by the Subblocks parameter
Subblocks	Sets the ID(s) of the subblock(s) the selected cumulate mask is referencing (Subblock1, or both Subblock1 and Subblock2)
Interfering Signals	**Allowable Interfering Signals**
Index	Indicates the automatically assigned interfering signal number, starting with 0. When a interfering signal's checkbox is selected, it is included in the measurement
Span	Sets the span of the interfering signal. Units are Hz
Offset from Edge	Sets the offset frequency from the edge of sub block. Units are Hz
Offset Side	Sets which side of interfering signal is present: lower or upper
Subblocks	Sets the ID(s) of the subblock(s) the selected interfering signal is referencing (Subblock1, or both Subblock 1 and Subblock2).
Inner Offset	Sets a value indicating whether this interfering signal is at an inner offset area or not
Add Interfering	Adds an interfering signal to the end of the collection
Clear Interfering	Deletes the entire collection of interfering signals

Table 2. SEM (Spectrum Emission Mask) Measurement Results

SEM (Spectrum Emission Mask) Measurement Results

SEM Carrier Info (table)	
SEM Carrier Info	This table shows power measurement information about Carriers configured for the Spectral Emissions Mask measurement.
CC	This identifies the carrier for the row
Carrier Power	This is the average power of the carrier
Carrier PSD (dBm/Hz)	This is the average power spectral density of the carrier.
Peak Power	This is the peak spectrum power of the carrier
Peak Power Frequency (Hz)	This is the frequency location of measured Peak Power
Integ BW	This is the bandwidth used for the average power measurements
Filter	This indicates what filter factor is applied to the carrier power measurement
Offset Freq (Hz)	This is the frequency location of the center of the carrier relative to the Carrier Reference Frequency
Measure	This indicates if the carrier power is measured ('ON') or not ('OFF')
Bandwidth (Hz)	This indicates the expected carrier bandwidth (corresponds to the Span property of the carrier definition)
SEM Results (table)	
SEM Power	SEM Power is a type of Matrix Table that provides sortable rows by column, selectable column visibility, and copy/paste and export functionality to share rows of content or complete tables to applications like email, text editing or spreadsheet programs.
Offset	This identifies the offset for the row (corresponds to offsets configured in the Offsets & Limits parameter tab).
Start Frequency	This indicates the beginning of the frequency region used for evaluating the offset power.
Stop Frequency	This indicates the end of the frequency region used for evaluating the offset power
Integ BW (Hz)	The -3 dB resolution bandwidth used for the offset power measurements, as defined by Offset parameters.
Lower ΔLimit	The power difference between the measured spectrum at the Lower Location and the enabled power limit mask defined for the Lower offset.

SEM (Spectrum Emission Mask) Measurement Results

SEM Results (table)	
Lower (dB)	The power measured at the Lower Location relative to the defined Power Reference
Lower (dBm/Hz)	The power measured at the Lower Location. Units are dBm/Hz when Reference Power Selection is PSD.
Lower Location (Hz)	The spectrum location within the defined Offset (Lower) where the measured power is largest, relative to any enabled power limit mask
Lower Status	This indicates the Lower Offset limit test result (Pass, Fail, or Not Tested).
Lower (Ref.) (dBm)	The Lower Location's reference power such that Lower (Ref.) + Lower (Rel.) = Lower. Units are dBm/Hz when Reference Power Selection is PSD.
Lower Reference Carrier	This indicates which carrier is used for the power reference calculation. This result is useful when multiple carriers are enabled.
Upper ΔLimit (dB)	The power measured at the Upper Location relative to the defined Power Reference
Upper (dB)	The power measured at the Upper Location relative to the defined Power Reference.
Upper (dBm)	The power measured at the Upper Location. Units are dBm/Hz when Reference Power Selection is PSD.
Upper Location (Hz)	The spectrum location within the defined Offset (Upper) where the measured power is largest, relative to any enabled power limit mask.
Upper Status	This indicates the Upper Offset limit test result (Pass, Fail, or Not Tested).
Upper (Ref.) (dBm)	The Upper Location's reference power such that Upper (Ref.) + Upper (Rel.) = Upper. Units are dBm/Hz when Reference Power Selection is PSD.
Upper Reference Carrier	This indicates which carrier is used for the power reference calculation. This result is useful when multiple carriers are enabled.
SEM Spectrum (trace)	
SEM Spectrum	This trace is a composite trace showing the detected spectrum data used for computing the carrier power and the offset power values as configured by the Carrier and Offset parameters. Any power limit mask defined to be active for offsets is presented on the trace to allow direct viewing of the pass/fail criteria as configured for the measurement. Failing regions of the trace have data drawn to indicate the failure, and marker table displays power limit mask information
SEM Summary (table)	
SEM Summary	This table lists the available summary data for the SEM measurement.
Total Carrier Power	The total measured power of all enabled carriers (see SEM Carrier Info)
Total Carrier PSD	The total measured power spectral density of all enabled carriers
Limit Test Result	The aggregate Pass/Fail status of power limit masks for all enabled offsets

Table 3. ACP (Adjacent Channel Power) Measurement Properties

ACP (Adjacent Channel Power) Measurement Properties

Carriers	Setup the SEM carrier related parameters
Quick Setups	Selects an available factory-provided or user-defined Spectral Emission Mask configuration, now it can support 5G NR FR1 100 MHz
Save As Quick Setup	Saves the current Spectral Emission Mask configuration to the list of available Quick Setups
Carrier Reference Frequency	Sets the reference frequency (in Hz). All other frequency settings are either directly or indirectly relative to this value
Add Carrier	Adds a carrier to the end of the collection of carriers. When more than one carrier exists, a Carrier Summary table appears with Index, Relative Frequency, Span, Integration BW and Subblock information for each carrier
Carrier Index	Indicates the automatically assigned carrier number, starting with C0
Relative Frequency	Sets the carrier center frequency (in Hz) as an offset from the Carrier Reference Frequency
Span	Sets the span (in Hz) used to determine offset spacing.
Integration BW	Sets the equivalent noise bandwidth (in Hz) used when calculating carrier power.
RF Bandwidth Edge Offset	Sets RF Bandwidth Edge Offset value (in Hz) of this carrier
Right Margin	Sets the value (in Hz) for compensating the frequency range of subblock
Sub-block	Sets the ID of the Subblock which this carrier belongs to
RRC Filter Enabled	When enabled, carrier power calculations are weighted with a root-raised-cosine filter.
RRC Filter Alpha	Sets the roll off factor of the RRC filter used when RRC Filter Enabled is selected
Carrier Allocation	Displays an illustration of the ACP measurement's configured carriers.

ACP (Adjacent Channel Power) Measurement Properties

Power Reference	Sets the overall type of power reference
Power Reference	Sets the overall type of power reference as Left and Right Carrier, Maximum Power, Index, Manual, or Max Power Carrier in Subblock
Reference Power Selection	Sets the overall type of power calculation used. The selection specifies the format of the power reference and related results as Integrated Power, PSD or Spectrum Peak
Detector for Carriers	Sets the spectrum detector to use for carriers power measurement as Average or Peak (Max)
Detector for Offsets	Sets the spectrum detector to use for offsets power measurement as Average or Peak (Max) (default 0.0 dBm/Hz)
Integrated Power	Sets the Integrated power (in dBm) used for the power reference
PSD	Sets the PSD power (in dBm/Hz) used for the power reference
Offsets & Limits	**Defines the points between which a frequency offset is measured.**
Offset Spacing from Carrier/Subblock	Defines the points between which a frequency offset is measured
Offset Summary	
Index	Indicates the automatically assigned offset identifier, starting with "A". When an offset's checkbox is selected, it is included in the measurement. The checkbox includes or excludes the offset
Relative Frequency	Sets the carrier center frequency (in Hz) as an offset from the Carrier Reference Frequency
Integration Bandwidth	Sets the equivalent noise bandwidth (in Hz) used when calculating carrier power.
Offset Side	Sets which side of offsets are enabled: upper, lower or both
Sub-blocks	Sets the ID(s) of the subblock(s) the selected offset is referencing (Subblock1, or both Subblock 1 and Subblock2).
Inner Offset	Sets a value indicating whether this offset is an inner offset or not
Offsets Settings for Each Index	
Enabled	Includes (enabled) or excludes (disabled) the selected offset
Power Limit – Absolute Integrated Power	Sets the absolute power level limit (in dBm) at the start frequency of the offset
Power Limit – Absolute PSD	Sets the absolute power level limit (in dBm) at the stop frequency of the offset
Power Limit - Relative Integrated Power	Sets the relative power level limit (in dBc) at the start frequency of the offset
Power Limit - Relative PSD	Sets the relative power level limit (in dBc) at the stop frequency of the offset
Power Limit - Fail Mask	Sets what types of failures are reported: absolute, relative, absolute or relative, absolute and relative
Interfering Signals	**Allowable Interfering Signals**
Index	Indicates the automatically assigned interfering signal number, starting with 0. When an interfering signal's checkbox is selected, it is included in the measurement
Span	Sets the span of the interfering signal. Units are Hz
Offset from Edge	Sets the offset frequency from the edge of sub block. Units are Hz
Offset Side	Sets which side of interfering signal is present: lower or upper
Subblocks	Sets the ID(s) of the subblock(s) the selected interfering signal is referencing (Subblock1, or both Subblock 1 and Subblock2).
Inner Offset	Sets a value indicating whether this interfering signal is at an inner offset area or not
Add Interfering	Adds an interfering signal to the end of the collection
Clear Interfering	Deletes the entire collection of interfering signals

Table 4. ACP (Adjacent Channel Power) Measurement Results

ACP (Adjacent Channel Power) Measurement Results

ACP Carrier Info (table)	
ACP Carrier Info	This table shows power measurement information about Carriers configured for the Adjacent Channel Power measurement.
CC	This identifies the carrier for the row
Integ BW	This is the bandwidth used for the average power measurements
Carrier PSD (dBm/Hz)	This is the average power spectral density of the carrier.
Filter	This indicates what filter factor is applied to the carrier power measurement
Offset Freq (Hz)	This is the frequency location of the center of the carrier relative to the Carrier Reference Frequency
Measure	This indicates if the carrier power is measured ('ON') or not ('OFF')
Bandwidth (Hz)	This indicates the expected carrier bandwidth (corresponds to the Span property of the carrier definition)
ACP Results (table)	
ACP Power	ACP Power is a type of Matrix Table that provides sortable rows by column, selectable column visibility, and copy/paste and export functionality to share rows of content or complete tables to applications like email, text editing or spreadsheet programs.
Offset	This identifies the offset for the row (corresponds to offsets configured in the Offsets & Limits parameter tab).
Integ BW (Hz)	The -3 dB resolution bandwidth used for the offset power measurements, as defined by Offset parameters.
Lower (dB)	The power measured at the Lower Location relative to the defined Power Reference
Lower (dBm/Hz)	The power measured at the Lower Location. Units are dBm/Hz when Reference Power Selection is PSD.
Lower Status	This indicates the Lower Offset limit test result (Pass, Fail, or Not Tested).
Lower (Ref.) (dBm)	The Lower Location's reference power such that Lower (Ref.) + Lower (Rel.) = Lower. Units are dBm/Hz when Reference Power Selection is PSD.
Lower Reference Carrier	This indicates which carrier is used for the power reference calculation. This result is useful when multiple carriers are enabled.
Upper (dB)	The power measured at the Upper Location relative to the defined Power Reference.
Upper (dBm/Hz)	The power measured at the Upper Location. Units are dBm/Hz when Reference Power Selection is PSD.
Upper Location (Hz)	The spectrum location within the defined Offset (Upper) where the measured power is largest, relative to any enabled power limit mask.
Upper Status	This indicates the Upper Offset limit test result (Pass, Fail, or Not Tested).
Upper (Ref.) (dBm)	The Upper Location's reference power such that Upper (Ref.) + Upper (Rel.) = Upper. Units are dBm/Hz when Reference Power Selection is PSD.
Upper Reference Carrier	This indicates which carrier is used for the power reference calculation. This result is useful when multiple carriers are enabled.
Filter	This indicated the filter status On/Off
ACP Spectrum (trace)	
ACP Spectrum	This trace is a composite trace showing the detected spectrum data used for computing the carrier power and the offset power values as configured by the Carrier and Offset parameters. Any offset defined to be active s presented on the trace to allow direct viewing of the pass/fail criteria as configured for the measurement. Failing regions of the trace have data drawn to indicate the failure, and marker table displays ACP information
ACP Summary (table)	
ACP Summary	This table lists the available summary data for the ACP measurement.
Total Carrier Power	The total measured power of all enabled carriers (see SEM Carrier Info)
Total Carrier PSD	The total measured power spectral density of all enabled carriers
Limit Test Result	The aggregate Pass/Fail status of power limit masks for all enabled offsets

Ordering Information

Software licensing and configuration

Flexible licensing and configuration

- **Perpetual**: License can be used in perpetuity.
- **Subscription**: License is time limited to a defined period, such as 12-months.
- **Node-locked**: Allows you to use the license on one specified instrument/computer.
- **Transportable**: Allows you to use the license on one instrument/computer at a time. This license may be transferred to another instrument/computer using Keysight's online tool.
- **Floating**: Allows you to access the license on networked instruments/computers from a server, one at a time. For concurrent access, multiple licenses may be purchased.
- **USB portable**: Allows you to move the license from one instrument/computer to another by end-user only with certified USB dongle, purchased separately.
- **Software support subscription**: Allows the license holder access to Keysight technical support and all software upgrades

Basic vector signal analysis and hardware connectivity (89601200C) (required)

Power Suite Measurement (89601PSMC)

Software license type	Software license	KeysightCare support subscription
Node-locked perpetual	R-Y5A-001-A	R-Y6A-001-z[2]
Node-locked time-based	R-Y4A-001-y[1]	Included
Transportable perpetual	R-Y5A-004-D	R-Y6A-004- z[2]
Transportable time-based	R-Y4A-004-y[1]	Included
Floating perpetual (single site)	R-Y5A-002-B	R-Y6A-002-z[2]
Floating time-based (single site)	R-Y4A-002-y[1]	Included
Floating perpetual (worldwide)	R-Y5A-010-J	R-Y6A-010-z[2]
Floating time-based (worldwide)	R-Y4A-010-y[1]	Included
USB portable perpetual	R-Y5A-005-E	R-Y6A-005- z[2]
USB portable time-based	R-Y4A-005-y[1]	Included

1. "y" denotes different time-based license durations. F for six months, L for 12 months, X for 24 months, and Y for 36 months. All time-based licenses include the support subscription for the entire time-base duration.
2. "z" denotes different support subscription durations for perpetual licenses. L for 12 months (as default), X for 24 months, Y for 36 months, and Z for 60 months. Support subscriptions must be purchased for all perpetual licenses with 12-months as the default. All software upgrades and KeysightCare support are provided for software licenses with valid support subscription.

Additional Information

Literature

- 89600 VSA Software Brochure, literature number 5990-6553EN
- 89600 VSA Software Configuration Guide, literature number 5990-6386EN
- 89601B200C Basic VSA and Hardware Connectivity Technical Overview, literature number 5992-4232EN
- 89601BHNC 5G NR Modulation Analysis Technical Overview 5992-0319EN
- 89601BHXC WLAN Modulation Analysis Technical Overview 5992-4202EN

Web

- www.keysight.com/find/89600
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- https://www.keysight.com/us/en/product/89601PSMC/powersuite-measurement-application.html