S9106A
5G Multi-Band Vector Transceiver

380 MHz to 6 GHz, and 7-15 GHz

KEYSIGHT

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System Performance

Conditions

Information and data contained in this data sheet is subject to change without notice.

In addition to the following conditions, the S9106A system performance, documented in this data sheet, is valid for an ambient temperature of 22 to 28 °C unless otherwise noted.

- The system is within its calibration cycle.
- The system has been stored at an ambient temperature within the allowed operating range for at least two hours before being powered on.
- The system has been powered on continuously for at least 45 minutes warm-up time, with the IQ Analyzer or X-Series application (e.g. 5G NR) running. If the system met these warm-up requirements and there is a brief power shutdown, such as a system reboot, allow 20 minutes of warm-up time after the system is powered back on.
- The alignments have been run in order of “Align Now All” for the first use, after the warm-up period.
- The “Align Now All” alignments have been run within the previous 7 days, after the warm-up period.
- A “Fast Alignment” has been run:
  - within the previous 8 hours
  - if the temperature has changed more than 5 °C from when the previous “Fast Alignment” was performed

Characteristics

The RF performance of the S9106A systems is based on the performance of the M9410A VXT transceivers, subject to additional nominal insertion loss of 1 to 1.5 dB due to the switches and internal cabling and connectors between the M9410A modules and the system’s front panel.

The performance characteristics of the M9410A VXT modules are described in the product data sheet which can be found here: https://www.keysight.com/us/en/assets/7018-06329/data-sheets/5992-3331.pdf

Performance characteristics for the E7770A CIU are provided in the product data sheet which can be found here: https://www.keysight.com/us/en/assets/7018-06640/data-sheets/5992-4003.pdf

Definitions

Specification	Warranted performance. Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions. All specifications and characteristics apply over an ambient temperature range of 22 to 28 °C (unless otherwise stated).
Typical (typ)	Describes additional product performance information that is not covered by the product warranty. It is performance beyond specifications that 95% of the units exhibit with a 95% confidence level at room temperature (approximately 25 °C). Typical performance does not include measurement uncertainty. Typical performance is not warranted.
Nominal (nom)	Describes the expected mean or average performance, or an attribute whose performance is by design, such as the 50 Ω connector. This data is measured at room temperature (approximately 25 °C). Nominal performance is not warranted.
Measured (meas)	Describes an attribute measured during the design phase for purposes of communicating expected performance, such as amplitude drift vs. time. This data is measured at room temperature (approximately 25 °C). Measured performance is not warranted.

Recommended best practices

- Set chassis fan to high at environmental temperatures above 45 °C.

S9106A Configurations

This data sheet contains system performance for the S9106A base systems that are available in three configurations.

Three standard configurations are available:

Configuration 1: S9106A-2IF

5G FR1 Multi-Band Vector Transceiver contains:

- Two Transceiver channels, 380 MHz to 6 GHz, with MIMO subsystem
- 7-15 GHz High IF on both channels

Configuration 2: S9106A-4UP

5G FR1 Multi-Band Vector Transceiver contains:

- Four Transceiver channels, 380 MHz to 6 GHz, with MIMO subsystem

Configuration 3: S9106A-42D

5G FR1 Multi-Band Vector Transceiver contains:

- Four Transceiver channels, 380 MHz to 6 GHz, with MIMO subsystem
- 7-15 GHz High IF on two channels

S9106A Overview

System capabilities

The S9106A systems includes a PXI chassis subsystem containing two or four M9410A VXT PXIe RF Vector Transceivers to provide two or four channels of vector signal generation and signal analysis. Each M9410A transceiver module is configured with a frequency range of 380 MHz to 6 GHz, 1.2 GHz IF bandwidth, option 1EA for high output power up to +20 dBm CW, and option HDX to provide a half-duplex port.

Each M9410A also includes option MMO to support timing synchronization for MIMO measurements. The four M9410A transceiver channels can be used independently, or they can be configured for 2x2 or 4x4 MIMO, 4x4 MIMO only supported in S9106A-4UP and S9106A-42D, measurements with timing synchronization between the channels. Phase coherency between the channels is not supported.

Additional common components in the base subsystem include an M9019A 18-slot PXIe chassis (Gen 3), an M9038A embedded controller, and an M9300A PXIe Frequency Reference module, as well as a custom front panel with rugged type-N test ports that is used for connecting to the device under test. Two M9155C Dual SPDT switch modules are integrated in S9106A-2IF and S9106A-42D only.

The S9106A-2IF and S9106A-42D systems also includes an E7770A Common Interface Unit (CIU) which provides up conversion and down conversion to enable measurements of the device under test (DUT) over the range of center frequencies from 7.7 to 14.3 GHz, with 1.2 GHz IF bandwidth. This is referred to as the DUT IF test capability. One LO module, one LO distribution module, and two channel cards are included to provide two DUT IF measurement channels, and the channels can be used independently or configured for 2x2 MIMO measurements with timing synchronization between the channels, but no phase coherency.

RF cables needed for connections between the PXI subsystem and the E7770A CIU are included in the solution. Additional cables, adapters, attenuators, or other components required for connecting the device under test (DUT) to the system are not included and must be supplied by the Customer.

The following connectors will be available on the system front panel for each of the sub-6 GHz transceiver channels:

- RF In: Signal analyzer input, +27 dBm/30 VDC maximum input level, nominal (type-N female)
- RF Out: Signal generator output, +20 dBm maximum output level, nominal (type-N female)
- HD Port: Half-duplex port, +27 dBm/30 VDC maximum input level, +5 dBm CW maximum output level, nominal (type-N female)
- Trig 1 and Trig 2: trigger ports (BNC female)

The following connectors will be available on the system front panel for each of the two DUT IF 7-15 GHz transceiver channels:

- RF In: Signal analyzer input, +18 dBm CW maximum input level, nominal (type-N female)
- RF Out: Signal generator output, +5 dBm CW (-10 dBm modulated) maximum output level, nominal (type-N female)

The following connectors will be available on the system front panel, with the signals shared by the entire system:

- 10 MHz Reference Input
- 10 MHz Reference Output
- PXI Backplane Triggers: Trig 1 and Trig 2

Vector Signal Analyzer Performance

Performance			
Capture depth	512 MSa		
Frequency			
	Frequency range		
S9106A-4UP	380 to 6000 MHz		
S9106A-2IF and S9106A-42D	380 to 6000 MHz		
	7.7 to 14.3 GHz		
	Frequency reference		
Accuracy, aging rate, stability	Refer to Frequency Reference information in General Performance section.		
Signal analysis bandwidth			
	Center frequency	**Maximum bandwidth**	
S9106A-4UP, S9106A-2IF and S9106A-42D	380 to 550 MHz	100 MHz	
	550 to 1310 MHz	200 MHz	
	1310 to 1900 MHz	600 MHz	
	1900 to 6000 MHz	1200 MHz	
S9106A-2IF and S9106A-42D	7.7 to 14.3 GHz	1200 MHz	
Amplitude range			
	Frequency range	**Settable input level ranges**	
S9106A-4UP	380 to 6000 MHz	-150 dBm to +27 dBm	
S9106A-2IF and S9106A-42D	380 to 6000 MHz	-150 dBm to +27 dBm	
	7.7 to 14.3 GHz	-70 dBm to +10 dBm	
Half Duplex Ports	380 to 6000 MHz	-150 dBm to +27 dBm	
Absolute amplitude accuracy (CW mode) *() = typical*			
	Frequency range	**Level**	**Accuracy**
S9106A-4UP, S9106A-2IF and S9106A-42D	380 to 1310 MHz	- 50 dBm to +10 dBm	≤ ± 0.80 dB *(≤ ± 0.45 dB)*
	1310 to 2000 MHz	- 50 dBm to +10 dBm	≤ ± 0.75 dB *(≤ ± 0.40 dB)*
	2000 to 4500 MHz	- 50 dBm to +10 dBm	≤ ± 0.85 dB *(≤ ± 0.40 dB)*
	4500 to 5400 MHz	- 50 dBm to -40 dBm	≤ ± 0.85 dB *(≤ ± 0.50 dB)*
		- 40 dBm to +10 dBm	≤ ± 0.85 dB *(≤ ± 0.45 dB)*
	5400 to 6000 MHz	- 50 dBm to -40 dBm	≤ ± 1.00 dB *(≤ ± 0.60 dB)*
		- 40 dBm to +10 dBm	≤ ± 0.90 dB *(≤ ± 0.50 dB)*
S9106A-2IF and S9106A-42D	7.0 to 7.7 GHz	- 50 dBm to +10 dBm	≤ ± 2.30 dB *(≤ ± 1.70 dB)*
	7.7 to 14.3 GHz	- 50 dBm to +10 dBm	≤ ± 2.10 dB *(≤ ± 1.40 dB)*
	14.3 to 15 GHz	- 50 dBm to +10 dBm	≤ ± 1.80 dB *(≤ ± 1.20 dB)*
Half Duplex Ports	380 to 6000 MHz	- 50 dBm to +10 dBm	≤ ± 0.95 dB *(≤ ± 0.55 dB)*

IF Flatness				
	Frequency range	**Bandwidth**	**Flatness (typical)**	
S9106A-4UP, S9106A-2IF and S9106A-42D RF and Half Duplex Ports	380 to 6000 MHz	100 MHz	± 0.67 dB	
		200 MHz	± 0.36 dB	
		300 MHz	± 0.38 dB	
		600 MHz	± 0.61 dB	
		1200 MHz	± 0.66 dB	
S9106A-2IF and S9106A-42D	7.7 to 14.3 GHz	1200 MHz	± 1.50 dB	

Error vector magnitude (EVM)			
	Test signal for FR1: 5G NR, 30 kHz subcarrier spacing, 256QAM		
All S9106A Configurations	**Signal Bandwidth**	**Frequency**	**EVM (typical)**
	100 MHz	480 MHz	≤ –46 dB, –20 to -15 dBm input power
			≤ –48 dB, –15 to 0 dBm input power
		1100 MHz	≤ –46 dB, –20 to -15 dBm input power
			≤ –50 dB, –15 to 0 dBm input power
		1500 MHz	≤ –49 dB, –20 to -15 dBm input power
			≤ –52 dB, –15 to 0 dBm input power
		2000 MHz	≤ –48 dB, –20 to -15 dBm input power
			≤ –52 dB, –15 to 0 dBm input power
		3000 MHz	≤ –51 dB, –20 to 0 dBm input power
		4000 MHz	≤ –50 dB, –20 to 0 dBm input power
		5000 MHz	≤ –48 dB, –20 to -10 dBm input power
			≤ –49 dB, –10 to 0 dBm input power
	400 MHz	2000, 3000, 4000 MHz	≤ –44 dB, –20 to -15 dBm input power
			≤ –46 dB, –15 to 0 dBm input power
		5000 MHz	≤ –45 dB, –20 to 0 dBm input power
		5600 MHz	≤ –43 dB, –20 to -15 dBm input power
			≤ –45 dB, –15 to 0 dBm input power
S9106A-2IF and S9106A-42D	100 MHz	7.7 to 14.3 GHz	≤ –35 dB, –40 to -30 dBm input power
			≤ –39 dB, –30 to 0 dBm input power
	400 MHz		≤ –30 dB, –40 to -32 dBm input power
			≤ –35 dB, –32 to -22 dBm input power
			≤ –38 dB, –22 to 0 dBm input power
All S9106A Standard Configurations HD PortsOLD	**Signal Bandwidth**	**Frequency**	**EVM (typical)**
	100 MHz	380 – 1500 MHz	≤ –46 dB, –20 to -10 dBm input power
			≤ –48 dB, –10 to 0 dBm input power
		1500 – 2000 MHz	≤ –50 dB, –20 to -15 dBm input power
			≤ –52 dB, –15 to 0 dBm input power
		2000 – 3000 MHz	≤ –48 dB, –20 to -10 dBm input power
			≤ –52 dB, –10 to -5 dBm input power
		3000 – 5000 MHz	≤ –50 dB, – 20 to 0 dBm input power
		5000 – 6000 MHz	≤ –49 dB, – 20 to -15 dBm input power
			≤ –49 dB, – 15 to 0 dBm input power
	400 MHz	2000 – 4000 MHz	≤ –44 dB, – 20 to 0 dBm input power
		4000 – 5600 MHz	≤ –39 dB, – 20 to -15 dBm input power
			≤ –45 dB, – 15 to 0 dBm input power
		5600 – 6000 MHz	≤ –35 dB, – 20 to -15 dBm input power
			≤ –43 dB, – 15 to 0 dBm input power

Adjacent channel leakage ration (ACLR)			
Test signal for FR1: 5G NR, 30 kHz subcarrier spacing, 256 QAM			
	Signal Bandwidth	**Frequency range**	**ACLR (typical)**
All S9106A Configurations	100 MHz	380 - 4000 MHz	-53 dBc, -20 to 0 dBm input power
		4000 - 6000 MHz	-52 dBc, -20 to 0 dBm input power
	400 MHz	2000 - 5000 MHz	-48 dBc, -20 to 0 dBm input power
		5000 - 6000 MHz	-46 dBc, -20 to 0 dBm input power
S9106A-2IF and S9106A-42D	100 MHz	7.7 to 14.3 GHz	-36 dBc, -40 to -35 dBm input power
			-42 dBc, -35 to -30 dBm input power
			-45 dBc, -30 to 0 dBm input power
	400 MHz	7.7 to 14.3 GHz	-30 dBc, -40 to -35 dBm input power
			-35 dBc, -35 to -30 dBm input power
			-39 dBc, -30 to -26 dBm input power
			-42 dBc, -26 to 0 dBm input power
All S9106A Configurations HD ports	100 MHz	380 – 5000 MHz	-53 dBc, -20 to 0 dBm input power
		5000 – 6000 MHz	-52 dBc, -20 to 0 dBm input power
	400 MHz	2000 – 5000 MHz	-48 dBc, -20 to -10 dBm input power
		5000 – 5600 MHz	-46 dBc, -20 to 0 dBm input power
		5600 – 6000 MHz	-48 dBc, -20 to 0 dBm input power

Vector Signal Generator Performance

Performance		
ARB depth	512 MSa	
Frequency		
	Frequency range	
S9106A-4UP	380 to 6000 MHz	
S9106A-2IF and S9106A-42D	380 to 6000 MHz	
	7.7 to 14.3 GHz	
	Frequency reference	
Accuracy, aging rate, stability	Refer to Frequency Reference information in General Performance section.	
Signal generation bandwidth		
	Center frequency	**Maximum bandwidth (typical)**
S9106A-4UP, S9106A-2IF and S9106A-42D	380 to 550 MHz	100 MHz
	550 to 1310 MHz	200 MHz
	1310 to 1900 MHz	600 MHz
	1900 to 6000 MHz	1200 MHz
S9106A-2IF and S9106A-42D	7.7 to 14.3 GHz	1200 MHz
Amplitude range		
	Frequency range	**Settable Output Level Range**
S9106A-4UP	380 to 6000 MHz	CW: -120 dBm to +20 dBm Modulated: Depends on Crest Factor
S9106A-2IF and S9106A-42D	380 to 6000 MHz	CW: -120 dBm to +20 dBm Modulated: Depends on Crest Factor
	7.7 to 14.3 GHz	CW: -50 dBm to +10 dBm Modulated: Depends on Crest Factor
S9106A Half Duplex Ports	380 to 6000 MHz	CW: -120 dBm to +5 dBm

Absolute amplitude accuracy (CW mode) *() = typical*			
	Frequency range	**Level**	**Accuracy**
S9106A-4UP, S9106A-2IF and S9106A-42D	380 to 550 MHz	-50 dBm to 0 dBm	≤ ± 0.70 dB *(≤ ± 0.30 dB)*
	550 to 2000 MHz	-50 dBm to 0 dBm	≤ ± 0.70 dB *(≤ ± 0.35 dB)*
	2000 to 3900 MHz	-50 dBm to 0 dBm	≤ ± 0.80 dB *(≤ ± 0.40 dB)*
	3900 to 5100 MHz	-50 dBm to 0 dBm	≤ ± 1.10 dB *(≤ ± 0.65 dB)*
	5100 to 5600 MHz	-50 dBm to 0 dBm	≤ ± 1.55 dB *(≤ ± 1.00 dB)*
	5600 to 5700 MHz	-50 dBm to 0 dBm	≤ ± 1.10 dB *(≤ ± 0.60 dB)*
	5700 to 6000 MHz	-50 dBm to 0 dBm	≤ ± 1.10 dB *(≤ ± 0.65 dB)*
S9106A-2IF and S9106A-42D	7.0 to 7.7 GHz	- 50 dBm to +5 dBm	≤ ± 2.70 dB *(≤ ± 1.95 dB)*
	7.7 to 14.3 GHz	- 50 dBm to +5 dBm	≤ ± 2.00 dB *(≤ ± 1.40 dB)*
	14.3 to 15 GHz	- 50 dBm to +5 dBm	≤ ± 2.10 dB *(≤ ± 1.50 dB)*
Half Duplex Ports	**Frequency range**	**Level**	**Accuracy**
	380 to 3000 MHz	-50 dBm to 0 dBm	≤ ± 0.80 dB *(≤ ± 0.45 dB)*
	3000 to 6000 MHz	-50 dBm to 0 dBm	≤ ± 1.15 dB *(≤ ± 0.75 dB)*

IF Flatness			
	Frequency range	**Bandwidth**	**Flatness (typical)**
S9106A-4UP, S9106A-2IF and S9106A-42D	380 to 6000 MHz	100 MHz	± 0.6 dB
		200 MHz	± 0.8 dB
		300 MHz	± 1.0 dB
		600 MHz	± 1.0 dB
		1200 MHz	± 1.5 dB
S9106A-2IF and S9106A-42D	7.7 to 14.3 GHz	1200 MHz	± 1.5 dB
Half Duplex Ports	380 to 6000 MHz	100 MHz	± 0.8 dB
		200 MHz	± 1.0 dB
		300 MHz	± 1.0 dB
		600 MHz	± 1.0 dB
		1200 MHz	± 1.0 dB

Error vector magnitude (EVM)			
	Test signal for FR1: 5G NR, 30 kHz subcarrier spacing, 256 QAM		
S9106A-4UP, S9106A-2IF and S9106A-42D	**Signal Bandwidth**	**Frequency range**	**EVM (typical)**
	100 MHz	480 - 1100 MHz	≤ –48 dB, –20 to –10 dBm output power
			≤ –50 dB, –10 to 0 dBm output power
		1500, 2000, 3000 MHz	≤ –49 dB, –20 to –10 dBm output power
			≤ –52 dB, –10 to 0 dBm output power
		4000 MHz	≤ –50 dB, –20 to –10 dBm output power
			≤ –51 dB, –10 to 0 dBm output power
		5000, 5600 MHz	≤ –48 dB, –20 to 0 dBm output power
	400 MHz	2000 MHz	≤ –45 dB, –20 to -12 dBm output power
			≤ –47 dB, –12 to -8 dBm output power
			≤ –48 dB, –8 to 0 dBm output power
		3000 MHz	≤ –47 dB, –20 to -5 dBm output power
			≤ –49 dB, –5 to 0 dBm output power
		4000 MHz	≤ –47 dB, –20 to 0 dBm output power
		5000 MHz	≤ –44 dB, –20 to -5 dBm output power
			≤ –45 dB, –5 to 0 dBm output power
		5600	≤ –45 dB, –20 to -15 dBm output power
			≤ –46 dB, –15 to 0 dBm output power
	8 x 100 MHz	3000 MHz	≤ –43 dB, –20 to -5 dBm output power
			≤ –45 dB, –5 to 0 dBm output power
		4000 MHz	≤ –40 dB, –20 to -15 dBm output power
			≤ –42 dB, –15 to -10 dBm output power
			≤ –44 dB, –10 to 0 dBm output power
		5000 MHz	≤ –42 dB, –20 to -5 dBm output power
			≤ –43 dB, –5 to 0 dBm output power
		5600 MHz	≤ –42 dB, –20 to -15 dBm output power
			≤ –43 dB, –15 to -8 dBm output power
			≤ –42 dB, –8 to 0 dBm output power

Error vector magnitude (EVM)			
S9106A-2IF and S9106A-42D	100 MHz	7.7 to 14.3 GHz	≤ –42 dB, –20 to -15 dBm output power
			≤ –44 dB, –15 to -10 dBm output power
			≤ –42 dB, –10 to -5 dBm output power
			≤ –35 dB, –5 to 0 dBm output power
	400 MHz	7.7 to 14.3 GHz	≤ –37 dB, –20 to -15 dBm output power
			≤ –40 dB, –15 to -10 dBm output power
			≤ –39 dB, –10 to -5 dBm output power
			≤ –33 dB, –5 to 0 dBm output power
	8 x 100 MHz	7.7 to 14.3 GHz	≤ –34 dB, –20 to -3 dBm output power
			≤ –32 dB, –3 to 0 dBm output power
Half Duplex Ports	100 MHz	380 – 1500 MHz	≤ –47 dB, –20 to -10 dBm output power
			≤ –51 dB, –10 to 0 dBm output power
			≤ –51 dB, –10 to 0 dBm output power
		1500 – 4000 MHz	≤ –49 dB, –20 to -10 dBm output power
			≤ –51 dB, –10 to 0 dBm output power
		4000 – 5000 MHz	≤ –49 dB, –20 to -10 dBm output power
			≤ –52 dB, –10 to -5 dBm output power
			≤ –48 dB, – 5 to 0 dBm output power
		5000 – 6000 MHz	≤ –49 dB, – 20 to 0 dBm output power
	400 MHz	380 – 1500 MHz	≤ –45 dB, –20 to -10 dBm output power
			≤ –48 dB, –10 to 0 dBm output power
		2000 – 3000 MHz	≤ –47 dB, –20 to -10 dBm output power
			≤ –48 dB, –10 to 0 dBm output power
		3000 – 4000 MHz	≤ –47 dB, –20 to -10 dBm output power
			≤ –48 dB, –10 to 0 dBm output power
		4000 – 5000 MHz	≤ –46 dB, – 20 to -10 dBm output power
			≤ –47 dB, – 10 to 0 dBm output power
		5000 – 6000 MHz	≤ –44 dB, – 20 to 0 dBm output power

Adjacent channel leakage ration (ACLR)			
	Test signal for FR1: 5G NR, 30 kHz subcarrier spacing, 256 QAM		
S9106A-4UP	**Signal Bandwidth**	**Frequency range**	**ACLR (typical)**
	100 MHz	380 – 1000 MHz	≤ –52 dBc, –20 to -10 dBm output power
			≤ –53 dBc, –10 to 0 dBm output power
		1000 – 4500 MHz	≤ –56 dBc, –20 to 0 dBm output power
		4500 – 5200 MHz	≤ –53 dBc, –20 to 0 dBm output power
		5200 – 6000 MHz	≤ –49 dBc, –20 to 0 dBm output power
	400 MHz	2000 MHz	≤ –50 dBc, –20 to 0 dBm output power
		3000 MHz	≤ –48 dBc, –20 to 0 dBm output power
		4000 MHz	≤ –46 dBc, –20 to 0 dBm output power
		5000 MHz	≤ –47 dBc, –20 to 0 dBm output power
		5600 MHz	≤ –44 dBc, –20 to 0 dBm output power
	8CC x 100 MHz	3000 MHz	≤ –45 dBc, –20 to 0 dBm output power
		4000 MHz	≤ –43 dBc, –20 to 0 dBm output power
		5000 MHz	≤ –44 dBc, –20 to 0 dBm output power
		5600 MHz	≤ –41 dBc, –20 to 0 dBm output power
S9106A-2IF and S9106A-42D	100 MHz	380 – 1000 MHz	≤ –52 dBc, –20 to -10 dBm output power
			≤ –53 dBc, –10 to 0 dBm output power
		1000 – 4500 MHz	≤ –57 dBc, –20 to 0 dBm output power
		4500 – 5200 MHz	≤ –53 dBc, –20 to 0 dBm output power
		5200 – 6000 MHz	≤ –49 dBc, –20 to 0 dBm output power
		7.7 to 14.3 GHz	≤ –49 dBc, –20 to -15 dBm output power
			≤ –51 dBc, –15 to -10 dBm output power
			≤ –49 dBc, –10 to -5 dBm output power
			≤ –40 dBc, –5 to 0 dBm output power
	400 MHz	2000 MHz	≤ –50 dBc, –20 to 0 dBm output power
		3000 MHz	≤ –48 dBc, –20 to 0 dBm output power
		4000 MHz	≤ –46 dBc, –20 to 0 dBm output power
		5000 MHz	≤ –47 dBc, –20 to 0 dBm output power
		5600 MHz	≤ –44 dBc, –20 to 0 dBm output power
		7.7 to 14.3 GHz	≤ –43 dBc, –20 to -15 dBm output power
			≤ –46 dBc, –15 to -10 dBm output power
			≤ –47 dBc, –10 to -5 dBm output power
			≤ –40 dBc, –5 to 0 dBm output power
	8CC x 100 MHz	3000 MHz	≤ –45 dBc, –20 to 0 dBm output power
		4000 MHz	≤ –43 dBc, –20 to 0 dBm output power
		5000 MHz	≤ –44 dBc, –20 to 0 dBm output power
		5600 MHz	≤ –41 dBc, –20 to 0 dBm output power
Half Duplex Ports	**Signal Bandwidth**	**Frequency range**	**ACLR (typical)**
	100 MHz	380 MHz – 1.1 GHz	≤ –51 dBc, –20 to -10 dBm output power
			≤ –53 dBc, –10 to 0 dBm output power
		1.1 GHz – 4.0 GHz	≤ –55 dBc, –20 to 0 dBm output power
		4.0 GHz – 6 GHz	≤ –52 dBc, –20 to 0 dBm output power
	400 MHz	2.0 GHz – 3.0 GHz	≤ –50 dBc, –20 to 0 dBm output power
		3.0 GHz – 4.0 GHz	≤ –48 dBc, –20 to 0 dBm output power
		4.0 GHz – 5.6 GHz	≤ –46 dBc, –20 to 0 dBm output power
		5.6 GHz – 6 GHz	≤ –44 dBc, –20 to 0 dBm output power

General Performance

Environmental characteristics		
S9106A 5G Multi-Port Vector Transceiver	For indoor use only	
	Altitude up to 6,561.68 ft (2,000 m)	
	Operating temperature 10 to 40° C maximum relative humidity (non-condensing): 85% RH	
Power requirements		
	Voltage and frequency	**Power consumption**
S9106A Base System (PXIe chassis with modules, rugged panel, and cables)	100/120 V, 50/60 Hz 220/240 V, 50/60 Hz	1200 W Max (lower range) 1300 W Max (upper range)
E7770A	100/120 V, 50/60 Hz 220/240 V, 50/60 Hz	480W maximum
Size and weights		
Dimensions		
S9106A	Height: 197.8 mm (7.79 in); with feet installed	
	Width: 449.5 mm (17.70 in); with rugged panel	
	Depth: 568.9 mm (22.40 in); with rugged panel (from back bumper to front BNC)	
S9106A Rack Space	2 X 2U x 1 rack width	
E7770A	Height: 145.6 mm (5.7 in); with feet installed	
	Width: 449 mm (17.7 in); across handles	
	Depth: 424 mm (16.7 in); across front connectors and rear feet	
Weight		
S9106A-4UP	20.4 kg (45.0 lbs)	
S9106A-2IF (Base System)	22.6 kg (49.8 lbs)	
S9106A-42D (Base System)	24.0 kg (53.0 lbs)	
E7770A	19.0 kg (40 lbs)	
Remote programming		
Interface	LAN RJ-45	
Warranty		
Standard 1-year warranty		
Calibration cycle		
The recommended calibration cycle is one year; calibration services are available through Keysight service centers.		

LAN, Display Port, and USB Connectors, M9038A PXIe Embedded Controller

Note: M9038A Embedded controllers are in all S9106A units

LAN 1 and LAN2 (TCP/IP interface)	
Connectors (Ethernet)	One 10/100/1000BASE-T (RJ45), One 100/1000/10GBASE-T (RJ45)
Video/Dual Display Ports	
Connectors (Video)	One DisplayPort++, Two Thunderbolt-3 (TB1 & TB2)
USB 2.0 and 3.0	
Connectors (USB)	Four, USB 2.0(Type A)
Connectors (USB)	Two, USB 3.0 (Type A)
Thunderbolt	
Connector (Thunderbolt)	Two Thunderbolt 3.0 ports (USB-C with PD 3.0) TB1 Port: Max. 37.5W, supports USB PD 5V @ 3A, 9V @ 3A, 12V @ 3A, 15V @ 2.5A, and daisy-chain capability TB2 Port: Max. 15W, supports USB PD 5V @ 3A and daisy-chain capability TB2 Port: Max. 15W, supports USB PD 5V @ 3A and daisy-chain capability
GPIB	
Connector	GPIB (Micro-D 25-pin)

S9106A Base System Front Panel

Frequency reference, 100 MHz Ref Out and 10 MHz Ref In/Out connectors above the rugged front panel

100 MHz Ref Out, frequency reference (if available)	
Accuracy	± 16 Hz, typical, within 1 year since last calibration, from 20 to 30°C. Refer to the Keysight M9300A PXIe Frequency Reference Data Sheet for details on accuracy, aging rate, and stability.
Recommended Calibration Cycle	1 year
Connector	BNC (f)
Amplitude	9.5 dBm (nominal)
10 MHz Ref Out, Frequency Reference	
Accuracy	± 1.6 Hz, typical, within 1 year since last calibration, from 20 to 30°C. Refer to the Keysight M9300A PXIe Frequency Reference Data Sheet for details on accuracy, aging rate, and stability.
Recommended Calibration Cycle	1 year
Connector	BNC (f)
Amplitude	9.5 dBm (nominal)
10 MHz Ref In	
Connects behind rugged panel to M9300A PXIe Reference Ref In and locks to another reference with a value from 1 to 110 MHz.	
Connector	BNC (f)
Frequency	1 MHz to 110 MHz, sine wave
Lock range	± 1 ppm (nominal)
Input amplitude	0 to 10 dBm (nominal)
Impedance	50 Ω (nominal)

Trig 1 and Trig 2 Connectors above the rugged front panel

Trig 1 and Trig 2	
Connects behind rugged panel to M9019A PXIe Chassis Trig 1 and Trig 2. These two front panel trigger connectors (Trig 1 and Trig 2) above the rugged front panel connect to the PXI [0:7] backplane trigger bus in the M9019A chassis and can be configured as Input or Output. To learn more about these connectors, see the Keysight PXIe Chassis Family, User Guide (M9019-90003).	
Connector	BNC (f)
Direction control	Input or output (configurable)
Output level	3.3 V CMOS (TTL compatible, 5 V tolerant)
Output impedance	50 Ω (typical)
Output trigger source	PXI_Trig0 - PXI_Trig7 (Segment 2 or 3)
Input level	3.3 V CMOS (TTL compatible, 5 V tolerant)
Input impedance	3 kΩ (typical)
Input trigger destination	PXI_Trig0 - PXI_Trig7 (Segment 2 or 3)
Input threshold	1.65 V (typical)
Minimum swing	250 mV (typical)
Minimum pulse width	100 ns (typical)

Transceiver Connectors, RF 380 MHz to 6 GHz on the rugged front panel

RF In	
Connector	Type-N (f), 50 Ω (nominal)
Frequency range	380 MHz to 6 GHz
Amplitude	30 VDC, +27 dBm maximum safe input power
RF Out	
Connector	Type-N (f), 50 Ω (nominal)
Frequency range	380 MHz to 6 GHz
Amplitude	30 VDC, +27 dBm maximum applied reverse input power
Half Duplex, Option HD1, HD2	
Connector	Type-N (f), 50 Ω (nominal)
Frequency range	380 MHz to 6 GHz
Amplitude	30 VDC, +27 dBm maximum safe input power
Trig 1 and Trig 2	
Connector	BNC (f)
Direction control	Input or Output
Input impedance	1 kΩ or 50 Ω nominal
Input level	Range: 0 to +3.3v
Output impedance	50 Ω nominal
Output Level	+3.3V LVTTL, LVDS

E7770A Common Interface Unit (CIU) Front Panel and Rear Panel

(S9106A-2IF and S9106A-42D configurations Only)

Local oscillator card (LO card), connectors	
10 MHz In	BNC (f), 50 Ω, nominal
LO Aux Out	SMA (f), 50 Ω, nominal
Ref Out and CLK In LO Ou	50 Ω, nominal (Intended for future use.)
LO Out	SMA (f), 50 Ω, nominal
LO distribution card, connectors	
LO In, LO In 2,	BNC (f), 50 Ω, nominal
LO Out 1,2,3,4	BNC (f), 50 Ω, nominal
LO AUX 1,2,3,4	BNC (f), 50 Ω, nominal
Channel Cards (QTY 2)	
Front Panel Connections	
LO In	SMA (f), 50 Ω, nominal
IF Out A	N Type (f), 50 Ω, nominal
IF Out B	N Type (f), 50 Ω, nominal
IF In A	N Type (f), 50 Ω, nominal
IF IN B	N Type (f), 50 Ω, nominal
Rear Panel Connections	
Channel A, DUT IF In	N Type (f), 50 Ω, nominal
Channel B, DUT IF Out	N Type (f), 50 Ω, nominal
LO/CTRL/PWR	TNC (f), 50 Ω, nominal, +36 VDC, 1A

Related Literature

For more detailed product and specification information refer to the following literature and web pages:

- Keysight S9106A Start Up Guide
- Keysight M9019A PXIe 18 slot Chassis, Data Sheet (literature no. 5992-1481EN)
- Keysight M9038A PXIe High Performance Embedded Controller, Data Sheet (literature no. 3122-1717.EN)
- Keysight M9410A and M9411A PXIe VXT Vector Transceivers, Data Sheet (literature no. 5992-3331EN)
- Keysight X-Series Measurement Applications, Brochure (literature no. 5989-8019EN)
- Keysight Signal Studio Software, Brochure (literature no. 5989-6448EN)