AR8700C Automotive Radar OTA Test Solution

Compact antenna test range chamber for E-band

Introduction

This data sheet provides key features and specifications for the AR8700C Solution

KEYSIGHT

Overview

The Keysight AR8700C Advanced CATR Chamber solution for automotive radar provides a measurement environment for characterizing functionality, performance, and antenna radiation patterns of radar sensors at E-band millimeter-wave (mmWave) frequencies. Use the AR8701C chamber with Keysight test and measurement equipment in a range of applications including device R&D, design validation, functional verification, and ETSI & FCC conformance test.

Key features

- Compact antenna test range (CATR)
    - Shielded anechoic chamber with a rolled edge reflector
    - Roll-over-azimuth positioner
- Controller for feed and device under test (DUT) positioners with triggered data acquisition capability
- Probe feed options for in-band and spurious test frequency ranges
- Optional calibration kits for chamber validation and calibration
- LED lighting and camera
- Lasers for DUT alignment
- Support for hand and head phantoms
- E-Band 60-90 GHz antenna options
- Chamber control software
- 2D/3D plotting software option
- OTA chamber Test Automation Platform TAP plugins for the following Keysight equipment:
    - N9040/1/2B UXA, N9030/2B PXA, N9020/1B MXA signal analyzers
    - N5244/5/7B PNA-X microwave network analyzer with N5292A Millimeter Test Set
    - E8719A RTS radar target simulator
    - M8195A AWG Arbitrary Waveform Generator
    - MXR-Series Real-Time Oscilloscopes

Applications

- Antenna radiation pattern measurements
- RF performance characterization
    - RF design verification test
    - RF conformance test, in-band, and out-of-band spurious
    - RF demodulation
- Functional test

Figure 1. Outside view of the CATR Chamber used in AR8700C Automotive Radar OTA Test Solution

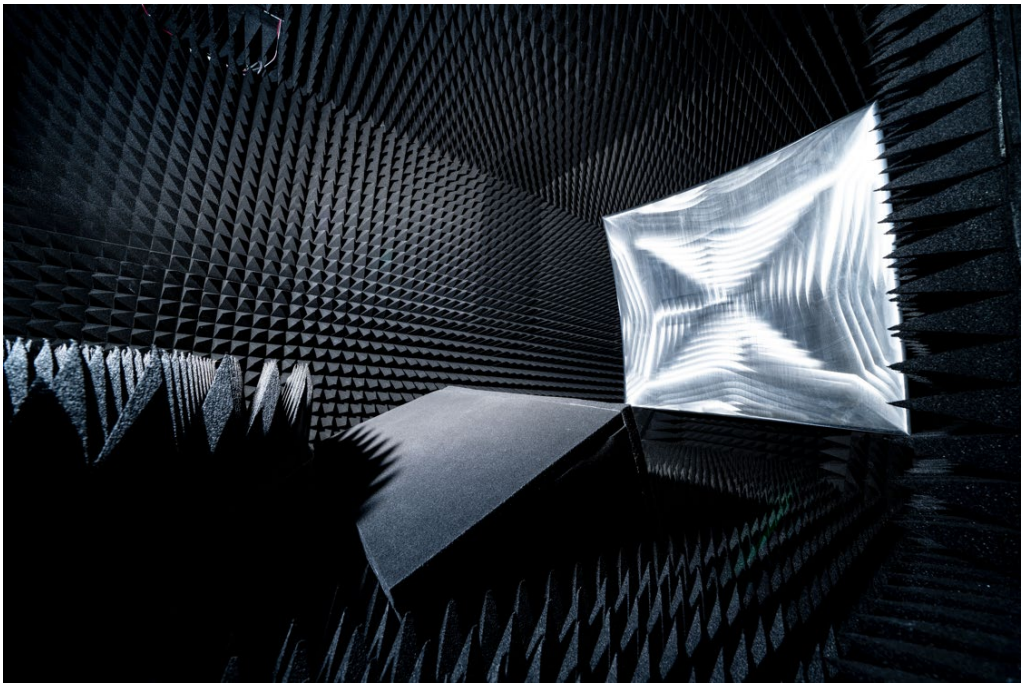

Figure 2. View inside the CATR chamber, showing the reflector and the absorbing material

AR8701C System Specifications

Chamber anechoic enclosure

Description	Specification (nominal)	Supplemental information
Construction	Not applicable	Aluminum frame and panels
Size (length x width x height)	2.8 m x 1.6 m x 2.0 m	
Weight	585 kg (1290 lbs)	
Anechoic treatment	120-mm pyramidal anechoic foam	
Supported frequency range	6-110 GHz	
Isolation	>70 dB (typical) >75dB (nominal)	

Reflector

Description	Specification (nominal)
Frequency range	6-110 GHz
Focal length	1.02 m
Edge treatment	Rolled edge

45 cm quiet zone for E-band

Description	Specification (nominal)	Supplemental information
Quiet zone (QZ) dimensions	45 cm diameter	At 76.5 GHz
Cross polarization	-30 dB	
Amplitude taper	< 1 dB	Average
Amplitude ripple	± 0.5 dB	Average
Phase variation	< 22.5° @ 79GHz	< 13° @ 79 GHz for 30cm QZ
Path loss	60 dB ± 2 dB	Free space path loss

Antenna feed

Option	Description
Feedhorn assembly	Expandable frequency band with multi-feedhorn assembly (6~110GHz)
Multi-band switching box	Multi-feedhorn assembly and multi-band switching box: Multiple reference antennas & auto-routing for calibration and measurement paths. Available band Options: 24~50GHz, 50~75GHz, 60~90GHz

DUT positioner

Description	Specification (nominal)	Supplemental information
Roll over azimuth	Roll range: ± 180° Azimuth range: ± 165°	
Resolution Accuracy Speed	Roll/azimuth: 0.01° Roll/azimuth: 0.1° Roll: 40 deg/sec Azimuth: 20 deg/sec	
Max DUT weight	4.5 kg (10 lbs) 2.0 Nm max torque	On roll axis Torque = mass x (distance from roll axis to center of DUT mass) *For higher torque options contact your Keysight representative*
Communications	USB 3.0	
Power requirements	110 V/220 V AC	320 W input power

Options

AR8721C signal switching unit

Includes	Description
Chassis	PXIe chassis that can contain up to 4 modules.
E-Band Module	Multi-feedhorn assembly and multi-band switching box: Multiple reference antennas & auto-routing for calibration and measurement paths. Available band Options: 24~50GHz, 50~75GHz, 60~90GHz

Input module specification				
Parameter	**Minimum**	**Typical**	**Maximum**	**Units**
AC input voltage	85		264	VRMS
AC input frequency	47	50/60	63	Hz
Input power rating			600	Watt
RF parameter specification				
Frequency range	60		90	GHz
VSWR		1.22:1	1.26:1	dB
Insertion loss			1.8	dB
RF connector type		WR12		
Environmental specification				
Operating Temperature	-5		65	°C
Humidity	20		90	%
Mechanical specification				
LxWxH	576 mm x 445.6 mm x 219.45 mm			
Weight	16 Kg			

KS83SB0A

Soft front panel for the AR8721C Signal Switching Unit.

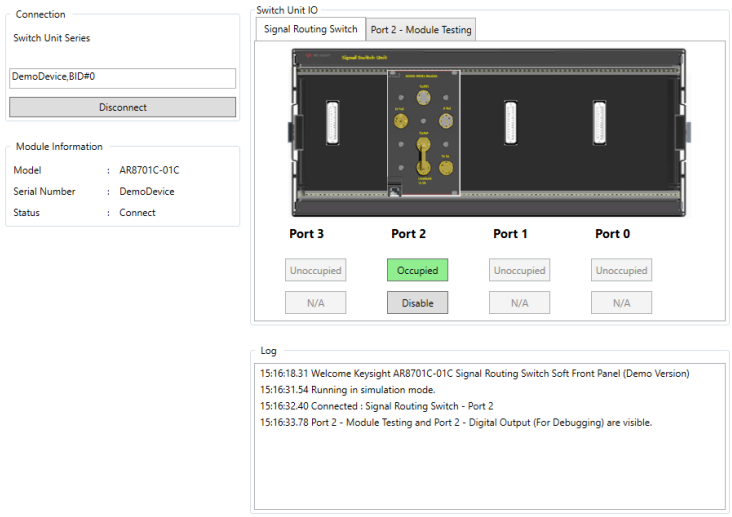

Figure 3. Screenshot of KS83SB0A soft front panel for AR8721C signal switching unit, showing the signal routing switch view.

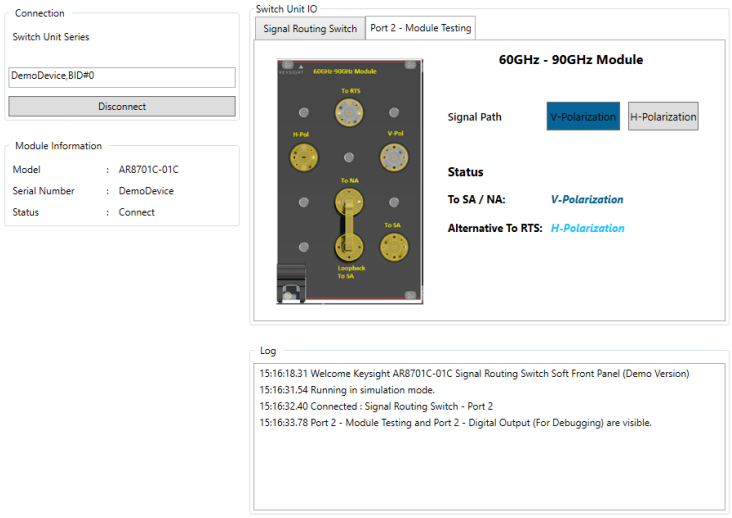

Figure 4. Screenshot of KS83SB0A soft front panel for AR8721C signal switching unit, showing the port 2 - module testing view.

KS83CC0A

Software plugin that enables OTA chamber calibration using a PNA

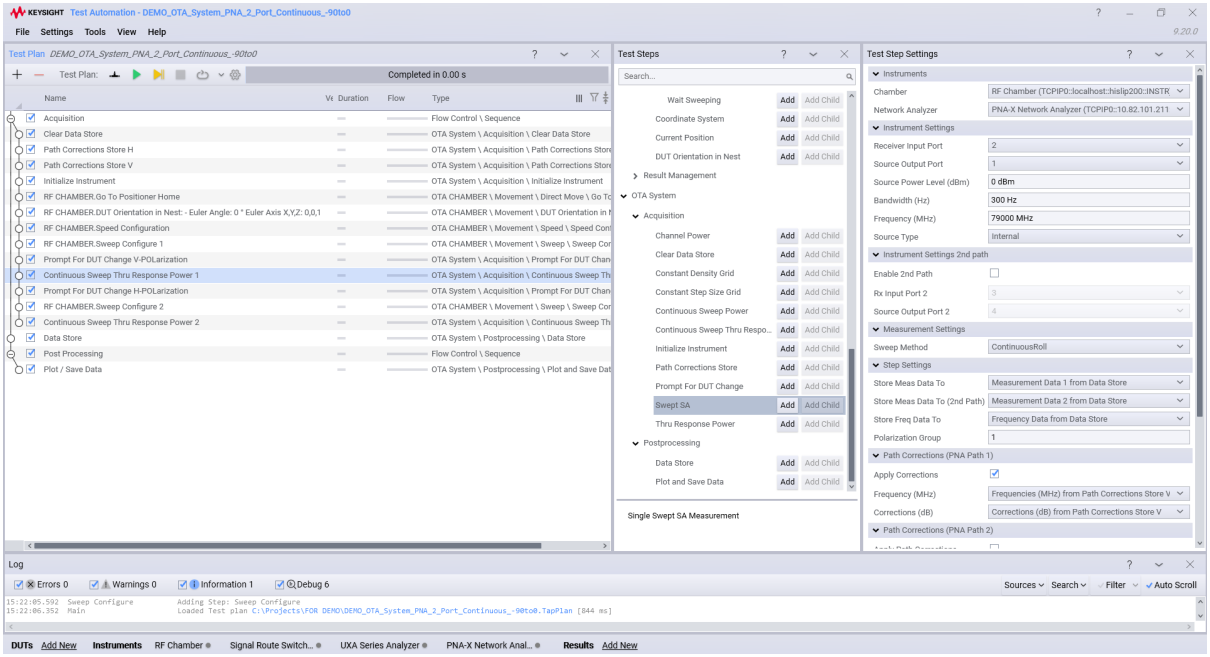

Figure 5. Screenshot of KS83CC0A PNA chamber calibration plugin showing the main window

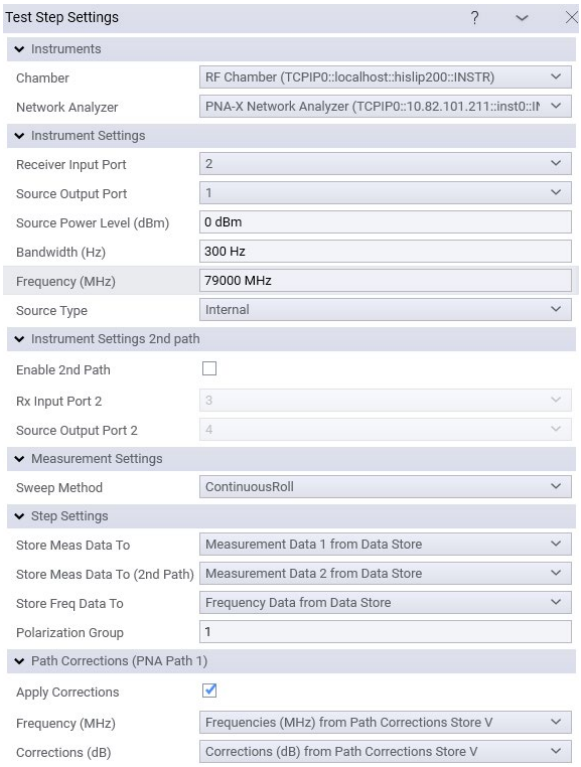

Figure 6. Screenshot of KS83CC0A PNA chamber calibration plugin zooming in on the test step settings window

KS83CC1A

Software plugin that enables OTA chamber calibration using U9361M RCal Receiver Calibrator

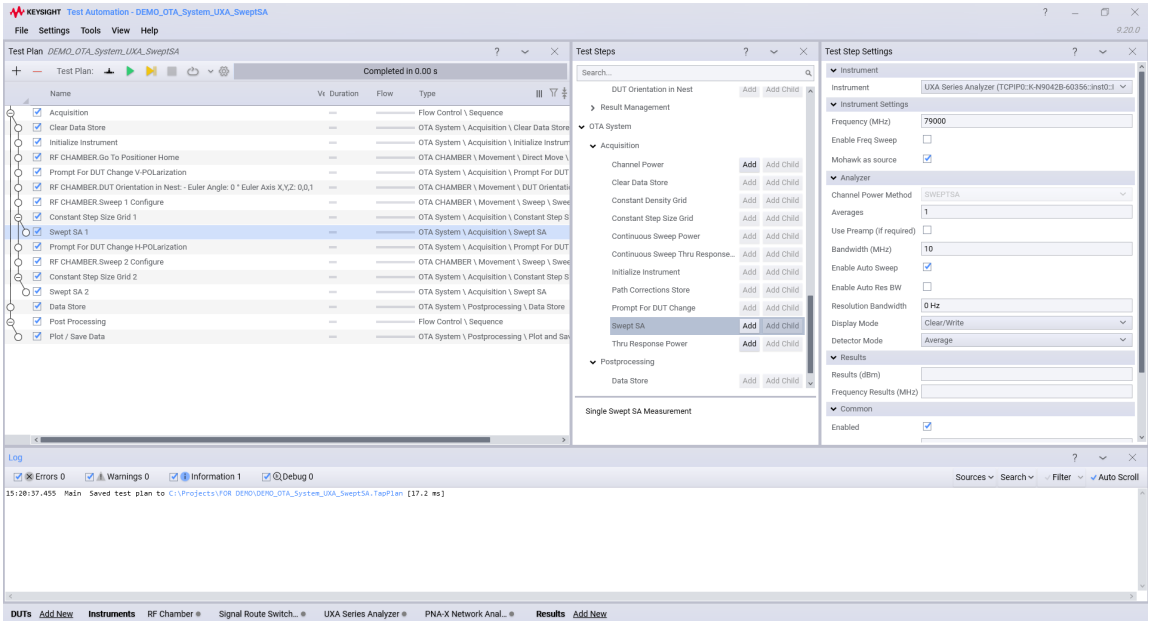

Figure 7. Screenshot of KS83CC1A chamber calibration plugin using U9361M RCal receiver calibrator showing the main window

Figure 8. Screenshot of KS83CC1A chamber calibration plugin using U9361M RCal zooming in on the test step settings window

Ordering information

Option	Description	Supplemental information
AR8700C	Advanced Automotive Radar CATR chamber	Includes a bundle of hardware and software: • Mandatory hardware: AR8701C • Optional hardware: AR8721C, U9361M, N9042B, N9041B, N9040B, N9032B, N9030B, N9021B, N9020B, V3050A, N5242B, N52192A, N5293AX51 • Mandatory software: F9629001A • Optional software: KS8400B, KS83CC0A, KS83CC1A
AR8702C	Antenna radiation pattern measurements	Includes a bundle of software: • Mandatory: KS83CA0A, F9629020A, • Optional: KS8400B
AR8703C	RF and conformance-test	Includes a bundle of software: • Mandatory: KS83200A, KS83ST0A, KS83RX0A • Optional: KS8400B
AR8704C	Functional test	Includes a bundle of software: • Mandatory: KS83200A, KS83ST0A, KS83RX0A • Optional: KS8400B

Accessories

Option	Description
Software	
F9629001A	OTA Chamber control software
F9629020A	OTA 3D Viewer software
F9629030A	OTA VNA control software (requires KS8400B TAP)
F9629031A	OTA signal analyzer control (requires KS8400B TAP)