



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ANRITSU AASC SERVICE WEST
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CALIBRATION

Valid To: June 30, 2023

Certificate Number: 2160.05

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,4}:

I. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
Scattering Parameters ³ – Measure Transmission & Phase S ₂₁ , S ₁₂ (0 to 80) dB	70 kHz to 18 GHz 70 kHz to 40 GHz 70 kHz to 26 GHz (26 to 32) GHz (32 to 67) GHz	0.08 dB / 0.5° 0.08 dB / (0.5 to 1.1)° 0.04 dB / 0.8° 0.05 dB / 2° 0.06 dB / 2°	VNA & Type N cal kit VNA & Type K cal kit VNA & Type V cal kit
Scattering Parameters ³ – Measure Reflection S ₁₁ , S ₂₂ (0.0001 to 1.0) lin (0.0001 to 0.01) lin (0.01 to 0.1) lin (0.1 to 1) lin	70 kHz to 18 GHz (18 to 40) GHz (40 to 67) GHz 70 kHz to 40 GHz	0.02 lin 0.03 lin 0.02 lin (90 to 18)° (2.6 to 1.8)° (0.65 to 0.95)°	VNA & Type N, K, V cal kit

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
Return Loss (Directivity & TPM) ³ – Measure	70 kHz to 20 GHz (20 to 35) GHz (30 to 70) GHz	0.4 dB 0.7 dB 1.2 dB	Airline, MAE
Power Level ³ – Measure			
Absolute & Relative			
(-35 to 20) dBm	DC to 100 MHz (0.1 to 2) GHz (2 to 12) GHz (12 to 18) GHz	0.024 dB 0.03 dB 0.045 dB 0.055 dB	N power sensor NRP18T
(-70 to 20) dBm	(0.01 to 2) GHz (2 to 9) GHz (9 to 13) GHz (13 to 18) GHz	0.057 dB 0.063 dB 0.071 dB 0.088 dB	N power sensor MA2472D
(-35 to 20) dBm	(0.01 to 1) GHz (1 to 12) GHz (12 to 30) GHz (30 to 40) GHz	0.035 dB 0.05 dB 0.055 dB 0.065 dB	K power sensor NRP40T
(-70 to 20) dBm	(0.01 to 3) GHz (3 to 8) GHz (8 to 12) GHz (12 to 27) GHz (27 to 40) GHz	0.057 dB 0.063 dB 0.071 dB 0.088 dB 0.097 dB	K power sensor MA24X4A
(-35 to 20) dBm	DC to 100 MHz (0.1 to 2) GHz (2 to 8) GHz (8 to 12) GHz (12 to 40) GHz (40 to 50) GHz (51 to 67) GHz	0.027 dB 0.038 dB 0.044 dB 0.06 dB 0.072 dB 0.1 dB 0.15 dB	V power sensor NRP67T
(-35 to 20) dBm	70 kHz to 100 MHz (0.1 to 2) GHz (2 to 8) GHz (8 to 12) GHz (12 to 18) GHz (18 to 26) GHz (26 to 40) GHz (40 to 50) GHz (50 to 67) GHz (67 to 70) GHz	0.04 dB 0.05 dB 0.07 dB 0.08 dB 0.11 dB 0.14 dB 0.24 dB 0.46 dB 0.54 dB 1.2 dB	V power sensor SC7770

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
Relative Power ³ – Measure Return Loss 85 dB 102 dB 115 dB 122 dB 115 dB 115 dB 110 dB 107 dB	(70 to 300) kHz (0.3 to 2) MHz (2 to 10) MHz (0.01 to 2.5) GHz (2.5 to 40) GHz (40 to 50) GHz (50 to 65) GHz (65 to 70) GHz	2 dB 2 dB 2 dB 2 dB 2 dB 3.6 dB 3.6 dB 4 dB	VNA
Frequency Modulation – Generate 10 MHz to 40 GHz	10 kHz to 10 MHz	1.5 %	Reference synthesizer with mixer
Amplitude Modulation – Generate & Measure (1 to 40) GHz	(45 to 55) %	1.2 %	Function generator measuring receiver
Pulse Modulation – Generate Pulse Power Accuracy Pulse Rise & Fall	(0.01 to 50) GHz (0.5 to 41) GHz	0.12 dB 0.023 nSec	Wide band oscilloscope function generator
Phase Noise ³ – Measure CW Frequency (1 to 3) GHz (1 to 10) GHz (1 to 10) GHz	Offset: 100 Hz to 10 MHz 1 kHz to 40 MHz (40 to 100) MHz	0.4 dB 2.4 dB 3.4 dB	Signal analyzer, down converter, generator

II. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
Frequency ³ – Measuring Equipment	10 MHz	9×10^{-11} Hz/Hz	GPS receiver
	1 Hz to 70 GHz	1.4×10^{-9} Hz/Hz	Synthesizer w/ GPS disciplined oscillator

¹ This laboratory offers commercial calibration services.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the Calibration and Measurement Capability Uncertainty (CMC) found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC

⁴ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁵ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

⁶ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

ANRITSU AASC SERVICE WEST

Morgan Hill, CA

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 19th day of May 2021.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2160.05
Valid to June 30, 2023

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.