

Calibration Laboratory of Microwave Measuring Equipment
of MWMLab



Calibration certificate

ISO 17025
ACCREDITED LABORATORY



Accreditation certificate No. № BY/112 5.0065 of 09.01.2015

Certificate number 28-21 Date when calibrated 11.02.2021 Page 1 of 2

Item calibrated Spectrum Analyzer Extension Module № SAX 721 (N9029AV03)

Customer Bureau Veritas Consumer Products Services (Hong Kong) Limited,
Taoyuan Branch

Method of calibration GOST 20271.1, MK KL 8.2-16

All measurements are traceable to the SI units which are realized by national measurement standards of NMI and state standards of RF. Conversion loss measurements above 178 GHz are to confirm operation functionality and traceable only to MWMLab standards and OML. This certificate shall not be reproduced, except in full. Any publication extracts from the calibration certificate requires written permission of the issuing calibration laboratory of microwave measuring equipment.

Authorising
signature



/ Technical manager Date of issue 11.02.2021

Calibration Certificate

Certificate number **28-21**

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Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M 514	Reference power meter	165	24 March 2022	1/111-176-20	RF Power
RG4-14	Signal generator	22	12 October 2021	22-20	RF Power
02	Frequency multiplier	02	11 January 2023	05-21	RF Power
03	Frequency multiplier	03	11 January 2023	06-21	RF Power
V7-34	Universal voltmeter	0067787	23 September 2021	2742-42	DC Voltage
RCH3-72	Frequency meter	931200	18 September 2021	2822-43	Frequency
MG3694C	Signal generator	133805	11 September 2021	2726-43	RF Power Frequency
E4407B	Spectrum analyzer	MY45110807	14 September 2021	2734-43	RF Power Frequency

Calibration conditions

Temperature: 22.2 °C.

Humidity: 37.0 %.

Pressure: 100.2 kPa.

Calibration results are given in the measurement report # 28-21

#	Parameter	Specifications required	Specifications tested and measured
1	RF Frequency Band	220 – 330 GHz	Corresponds
2	Multiplication Factor (Low / High)	48 / 12	Corresponds
3	Low Freq. LO Input Power (Typical / Damage)	10 dBm ± 3dB / 20 dBm	Corresponds
4	High Freq. LO Input Power (Typical / Damage)	0 dBm ± 3dB / 6 dBm	Corresponds
5	RF Power Limits: Compression / Damage	-10 / 0 dBm	Corresponds
6	Conversion loss RF to IF output (configuration "B")	-1.0 – 4.0* dB	Corresponds (Table 1)
7	IF Output Standard Frequency Range	16 kHz – 2.5 GHz	Corresponds

* – Expanded uncertainty of measurements 2.5 dB (IF Frequency 400 MHz).

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of k=2 for a normal distribution.

Signature of the person who has performed calibration



/ Engineer

**Calibration Laboratory of
Microwave Measuring Equipment**
Accreditation certificate
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MEASUREMENT REPORT # 28-21
February 11, 2021

Customer:	Bureau Veritas Consumer Products Services (Hong Kong) Limited, Taoyuan Branch
Item calibrated:	Spectrum Analyzer Extension Module № SAX 721 (N9029AV03)
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	14.01.2021
Date of calibration:	From 14.01.2021 to 11.02.2021

MEASUREMENT CONDITIONS

Temperature: 22.2 °C	Humidity: 37 %	Pressure: 100.2 kPa
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MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
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MEASUREMENT RESULTS

SSB conversion loss RF to IF port for an LO input power of 10 dBm in Standard LO Frequency operation. IF power measured from "IF Output" port with IF frequency fixed at 400 MHz.

Table 1

RF frequency, GHz	220	275	330
RF input power, dBm	-15.0	-15.0	-15.0
LO frequency, MHz	4.575	5.721	6.867
LO input power, dBm	10.0	10.0	10.0
IF frequency, MHz	400.0		
IF measured level, dBm	-18.0	-14.3	-15.8
Conversion loss, dB	3.0	-0.7	0.8
Expanded uncertainty, dB	2.0	2.2	2.5

The uncertainty evaluation has been performed in accordance with ISO/IEC Guide 98-3:2008 (GUM). The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %. This probability corresponds to a coverage factor of $k=2$ for a normal distribution.

Engineer



This measurement report issued in duplicate and sent to:

1. Bureau Veritas Consumer Products Services (Hong Kong) Limited, Taoyuan Branch
2. Calibration Laboratory of Microwave Measuring Equipment

Duplication of Measurement report (complete or partial) must be authorized by the laboratory.