

工服 NO. 19-07-BAC-728-01L

財團法人台灣電子檢驗中心



收件日期: Jul.29,2019

# 校正報告

## CALIBRATION REPORT

Receipt Date

發行日期: Aug.02,2019

ELECTRONICS TESTING CENTER, TAIWAN

Report Issue Date

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顧客名稱 香港商立德國際商品試驗有限公司桃園分公司

Customer

顧客地址 桃園市龜山區文化里華亞二路19號

Address

### 供校儀器 ITEM CALIBRATED

儀器名稱: PXA Signal Analyzer

Nomenclature

製造商: KEYSIGHT

Manufacturer

型別: N9030A

Model No.

識別號碼: MY54490561

ID. No.

上述儀器經本實驗室校正，結果如內文。未經本實驗室書面許可，不得部份複製本報告，完整複製則不在此限。

The above instruments were calibrated by the laboratory and please refer to the content for the calibration results. This report may not be reproduced in part without the written permission of the laboratory, except for full reproduction.

校正資料:  僅量測  調整

Calibration Information Calibration Only Adjusted

實際環境: 溫度: 23 °C 相對濕度: 47 %

Actual Environments Temperature Relative Humidity

環境管制條件: 溫度: (23 ± 2) °C ; 相對濕度: (50 ± 10) %

Environmental Conditions

校正日期: Jul.31,2019

Calibration Date

建議再校日期: Jul.30,2020

註: 建議再校日期為應客戶要求列入。

Recommended Recalibration Date

Note: The recommended recalibration date is agreed by the customer.

校正地點: 財團法人台灣電子檢驗中心校正實驗室

Laboratory Location

實驗室名稱地址:  1. 校正實驗室 33383 桃園市龜山區文明路29巷8號 TEL:+886-3-3280026

Laboratory Name and Address 2. 新竹校正實驗室 30075 新竹市科學園區園區二路47號205室 TEL:+886-3-5798806

3. 台中校正實驗室 40766 台中市西屯區福中二街8號2樓之2 TEL:+886-4-23584899

4. 台南校正實驗室 70248 台南市南區新和二路5號 TEL:+886-6-2925787#50,51

財團法人台灣電子檢驗中心特此證明報告內記載之受校儀器已與下方標準做過比較校正，用以校正之標準器可追溯至中華民國國家度量衡標準實驗室，美國標準及技術研究院，或其它國家之度量衡國家標準。本中心的校正服務均符合ISO/IEC 17025 之規定。

ETC hereby certifies that the equipment noted herein has been compared with the below listed standards. The Standards used to perform this calibration are traceable to NML/ROC,NIST/USA or other countries. The calibration services from ETC are capable of performing services in compliance with the requirements of ISO/IEC 17025.

財團法人台灣電子檢驗中心

實驗室主管

報告簽署人

ELECTRONICS TESTING CENTER,  
TAIWAN

Laboratory Head

Signature



使用校正依據 CALIBRATION PROCEDURE USED
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1. 「頻譜(信號)分析儀校正程序書」, B00-CD-142, 5th Edition。
2. 「測試接收機/信號(頻譜)分析儀校正程序書」, B00-CD-376, 5th Edition。

使用標準器及附配件 STANDARD AND ACCESSORIES
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儀器名稱【廠牌/型號】 Nomenclature【Mfg./Model No.】	【識別號碼】 【ID. No.】	校正單位(認可編號) Cal. Source(ACRED Code)	報告號碼 Cal. Report No.	校正日期 Date Cal.	有效日期 Due Date
RF Step Attenuator 【R/S RSG】 【13050122-001】		R&S(DAKKS D-K-15195-01-01)	D-K-15195-01-01 2018-03	2018/03/08	2021/09/07
EPM Series Power Meter 【HP E4419B】 【13050609-001】		NML(TAF N0688)	U180018A	2018/03/21	2019/09/20
Power Sensor 【AGILENT 8482A】 【13053506-001】		KEYSIGHT(ANAB AC-1498)	1-9328170856-1	2017/10/16	2020/04/15
Power Sensor 【AGILENT 8487A】 【13053508-003】		KEYSIGHT(ANAB AC-1498)	1-9230656623-1	2017/09/14	2020/03/13
Universal Counter 【HP 53132A】 【13060804-001】		ETC(TAF 0025)	19-06-BAC-512-04L	2019/07/05	2020/01/04

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Test Description	Actual Value	Expanded Uncertainty
1. Freq. Readout Accuracy and Freq. Count Marker Accuracy:		
(a) Freq. Readout Accuracy		
(a.1) 1.5 GHz Center Freq.		
1 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	1.500000 GHz	$1.2 \times 10^{-3}$
(a.2) 4.0 GHz Center Freq.		
1 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	3.999000 GHz	$1.2 \times 10^{-3}$
(a.3) 9.0 GHz Center Freq.		
1 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
10 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-4}$
100 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-3}$
1 GHz SPAN	8.999000 GHz	$1.2 \times 10^{-6}$
(a.4) 16.0 GHz Center Freq.		
1 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-5}$
10 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-4}$
50 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-3}$
100 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-6}$
1 GHz SPAN	15.999000 GHz	$1.2 \times 10^{-5}$

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Test Description	Actual Value	Expanded Uncertainty
1. Freq. Readout Accuracy and Freq. Count Marker Accuracy: (@ Continued):		
(a) Freq. Readout Accuracy		
(a.5) 21.0 GHz Center Freq.		
1 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	20.999 GHz	$1.2 \times 10^{-3}$
(a.6) 29.0 GHz Center Freq.		
1 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
10 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-4}$
100 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-3}$
1 GHz SPAN	28.999 GHz	$1.2 \times 10^{-6}$
(a.7) 35.0 GHz Center Freq.		
1 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-5}$
10 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-4}$
50 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-3}$
100 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-6}$
1 GHz SPAN	35.000 GHz	$1.2 \times 10^{-5}$
(b) Freq. Count Marker Accuracy:		
1.5 GHz Center Freq.	1.50000000 GHz	$5.0 \times 10^{-8}$
4.0 GHz Center Freq.	4.00000000 GHz	$5.0 \times 10^{-8}$
9.0 GHz Center Freq.	9.00000000 GHz	$5.0 \times 10^{-8}$
16.0 GHz Center Freq.	16.00000000 GHz	$5.0 \times 10^{-8}$
21.0 GHz Center Freq.	21.00000000 GHz	$5.0 \times 10^{-8}$
29.0 GHz Center Freq.	29.00000000 GHz	$5.0 \times 10^{-8}$
35.0 GHz Center Freq.	35.00000000 GHz	$5.0 \times 10^{-8}$

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Test Description	Actual Value	Expanded Uncertainty
2. Freq. Span Accuracy:		
1 kHz Span	0.00 %	0.15 %
2 kHz Span	0.00 %	0.15 %
5 kHz Span	0.00 %	0.15 %
10 kHz Span	0.00 %	0.15 %
20 kHz Span	0.00 %	0.15 %
50 kHz Span	0.00 %	0.15 %
100 kHz Span	0.00 %	0.15 %
200 kHz Span	0.00 %	0.15 %
500 kHz Span	0.00 %	0.15 %
1 MHz Span	0.00 %	0.15 %
2 MHz Span	0.00 %	0.15 %
5 MHz Span	0.00 %	0.15 %
10 MHz Span	0.00 %	0.15 %
20 MHz Span	0.00 %	0.15 %
50 MHz Span	0.00 %	0.15 %
100 MHz Span	0.00 %	0.15 %
200 MHz Span	0.00 %	0.15 %
500 MHz Span	0.00 %	0.15 %
1 GHz Span	0.00 %	0.15 %
2 GHz Span	0.00 %	0.15 %

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Test Description	Actual Value	Expanded Uncertainty
3. Image, Multiple, and Out-of-Band Response:		
(a)2 GHz Center Freq.		
2021.4 MHz	-98.22 dBc	1.7 dB
2621.4 MHz	-98.46 dBc	0.86 dB
2321.4 MHz	-98.39 dBc	1.0 dB
2600.0 MHz	-98.67 dBc	0.94 dB
7910.7 MHz	-98.48 dBc	1.0 dB
9821.4 MHz	-98.63 dBc	1.0 dB
(b)4 GHz Center Freq.		
4021.4 MHz	-94.89 dBc	0.9 dB
4621.4 MHz	-95.38 dBc	1.1 dB
4321.4 MHz	-95.46 dBc	1.1 dB
4600.0 MHz	-95.50 dBc	1.1 dB
8310.7 MHz	-95.56 dBc	1.1 dB
8932.1 MHz	-95.57 dBc	1.1 dB
(c)9 GHz Center Freq.		
9021.4 MHz	-95.57 dBc	1.1 dB
9621.4 MHz	-94.60 dBc	1.2 dB
9321.4 MHz	-94.31 dBc	1.2 dB
9600.0 MHz	-94.06 dBc	0.84 dB
18310.7 MHz	-94.56 dBc	1.1 dB
18932.1 MHz	-93.73 dBc	0.91 dB
(d)15 GHz Center Freq.		
15021.400 MHz	-94.12 dBc	1.1 dB
15621.400 MHz	-94.53 dBc	1.2 dB
22655.350 MHz	-94.62 dBc	1.1 dB
23276.750 MHz	-94.31 dBc	1.1 dB
7344.650 MHz	-94.53 dBc	1.1 dB
7966.050 MHz	-94.63 dBc	1.0 dB
(e)20 GHz Center Freq.		
20021.400 MHz	-92.31 dBc	0.94 dB
20621.400 MHz	-93.69 dBc	1.0 dB
15543.725 MHz	-93.47 dBc	1.1 dB
25699.075 MHz	-93.67 dBc	1.0 dB
9844.650 MHz	-93.52 dBc	1.1 dB
10466.050 MHz	-92.50 dBc	1.1 dB

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3. Image, Multiple, and Out-of-Band Response: (@Continued):		
(f)29 GHz Center Freq.		
28378.600 MHz	-90.48 dBc	1.5 dB
28978.600 MHz	-90.43 dBc	1.3 dB
24450.925 MHz	-90.54 dBc	1.4 dB
28700.000 MHz	-90.66 dBc	1.3 dB
16455.350 MHz	-90.41 dBc	1.4 dB
35272.325 MHz	-90.44 dBc	1.4 dB
(g)35 GHz Center Freq.		
35021.400 MHz	-86.97 dBc	1.4 dB
35621.400 MHz	-87.24 dBc	1.3 dB
33093.725 MHz	-86.39 dBc	1.3 dB
35321.400 MHz	-86.45 dBc	1.3 dB
8744.538 MHz	-86.60 dBc	1.3 dB
15544.650 MHz	-86.20 dBc	1.2 dB
4. Frequency accuracy:	10.0000003 MHz	$3.5 \times 10^{-8}$
5. IF bandwidth level accuracy Check:		
100 Hz	-0.02 dB	0.32 dB
300 Hz	-0.01 dB	0.32 dB
1 kHz	0.00 dB	0.32 dB
3 kHz	0.00 dB	0.32 dB
10 kHz	0.00 dB(Ref.)	----
30 kHz	0.00 dB	0.32 dB
100 kHz	0.00 dB	0.32 dB
300 kHz	0.00 dB	0.32 dB
1 MHz	0.00 dB	0.32 dB
3 MHz	0.01 dB	0.32 dB

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Test Description	Actual Value	Expanded Uncertainty
6. IF bandwidth (3 dB) Check:		
Bandwidth		
100 Hz	100.1 Hz	4.4 %
300 Hz	300.0 Hz	4.4 %
1 kHz	1.000 kHz	4.4 %
3 kHz	3.001 kHz	4.4 %
10 kHz	10.00 kHz	4.4 %
30 kHz	30.00 kHz	4.4 %
100 kHz	100.1 kHz	4.4 %
300 kHz	300.8 kHz	4.4 %
1 MHz	1.000 MHz	4.4 %
3 MHz	3.009 MHz	4.4 %
7. IF Bandwidths (3 dB)		
Shape factor Check:		
100 Hz	3.82	6.1 %
300 Hz	3.82	6.1 %
1 kHz	3.88	6.1 %
3 kHz	3.82	6.1 %
10 kHz	3.80	6.1 %
30 kHz	3.93	6.1 %
100 kHz	3.82	6.1 %
300 kHz	3.81	6.1 %
1 MHz	3.82	6.1 %
3 MHz	3.81	6.1 %



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Test Description	Actual Value	Expanded Uncertainty
8. Noise Display Check :		
9 kHz	-146.6 dBm	0.76 dB
100 kHz	-146.1 dBm	0.76 dB
999 kHz	-146.3 dBm	0.76 dB
10.99 MHz	-148.2 dBm	0.76 dB
19.99 MHz	-149.6 dBm	0.76 dB
49.99 MHz	-152.8 dBm	0.76 dB
99.99 MHz	-153.1 dBm	0.76 dB
199.9 MHz	-153.4 dBm	0.76 dB
499.9 MHz	-154.8 dBm	0.76 dB
999.9 MHz	-155.4 dBm	0.76 dB
1499 MHz	-153.9 dBm	0.88 dB
1999 MHz	-152.1 dBm	0.88 dB
2499 MHz	-151.3 dBm	0.88 dB
2999 MHz	-152.2 dBm	0.88 dB
3099 MHz	-151.8 dBm	0.88 dB
3499 MHz	-151.3 dBm	0.88 dB
3999 MHz	-152.4 dBm	0.88 dB
4499 MHz	-152.3 dBm	0.88 dB
4999 MHz	-151.9 dBm	0.88 dB
5499 MHz	-151.6 dBm	0.88 dB
5999 MHz	-152.6 dBm	0.88 dB
6499 MHz	-151.9 dBm	0.88 dB
6999 MHz	-152.3 dBm	0.88 dB
7999 MHz	-151.7 dBm	0.88 dB
8999 MHz	-152.3 dBm	0.88 dB
9999 MHz	-151.8 dBm	0.88 dB
10999 MHz	-152.0 dBm	0.88 dB
11999 MHz	-152.5 dBm	0.88 dB
12999 MHz	-152.3 dBm	0.88 dB
13999 MHz	-151.9 dBm	0.88 dB
14999 MHz	-152.1 dBm	0.88 dB
15999 MHz	-152.7 dBm	0.88 dB
16999 MHz	-152.3 dBm	0.88 dB

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Test Description	Actual Value	Expanded Uncertainty
8. Noise Display Check (@ Continued):		
17999 MHz	-150.7 dBm	0.88 dB
18999 MHz	-150.3 dBm	0.88 dB
19999 MHz	-149.6 dBm	0.88 dB
20999 MHz	-149.0 dBm	0.88 dB
21999 MHz	-148.8 dBm	0.88 dB
22999 MHz	-149.3 dBm	0.88 dB
23999 MHz	-148.9 dBm	0.88 dB
24999 MHz	-149.1 dBm	0.88 dB
25999 MHz	-148.7 dBm	0.88 dB
26999 MHz	-148.9 dBm	0.88 dB
27999 MHz	-148.6 dBm	0.88 dB
28999 MHz	-147.9 dBm	0.88 dB
29999 MHz	-145.3 dBm	0.88 dB
30999 MHz	-144.3 dBm	0.88 dB
31999 MHz	-143.2 dBm	0.88 dB
32999 MHz	-144.8 dBm	0.88 dB
33999 MHz	-145.1 dBm	0.88 dB
34999 MHz	-147.4 dBm	0.88 dB
35999 MHz	-146.6 dBm	0.86 dB
36999 MHz	-145.2 dBm	0.86 dB
37999 MHz	-143.4 dBm	0.86 dB
38999 MHz	-141.6 dBm	0.86 dB
39999 MHz	-140.5 dBm	0.86 dB

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Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check:		
RF Attenuation 10 dB		
1 MHz	0.06 dB	0.64 dB
10 MHz	0.03 dB	0.64 dB
50 MHz	0.01 dB	0.64 dB
100 MHz	0.03 dB	0.64 dB
200 MHz	0.04 dB	0.64 dB
300 MHz	0.04 dB	0.64 dB
400 MHz	0.05 dB	0.64 dB
500 MHz	0.07 dB	0.64 dB
600 MHz	0.06 dB	0.64 dB
700 MHz	0.04 dB	0.64 dB
800 MHz	0.03 dB	0.64 dB
900 MHz	0.02 dB	0.64 dB
1000 MHz	0.03 dB	0.64 dB
1500 MHz	0.04 dB	0.64 dB
2000 MHz	0.05 dB	0.64 dB
2500 MHz	0.11 dB	0.64 dB
2990 MHz	0.16 dB	0.64 dB
3010 MHz	-0.19 dB	0.70 dB
3500 MHz	-0.17 dB	0.70 dB
4000 MHz	-0.18 dB	0.70 dB
4500 MHz	-0.17 dB	0.70 dB
5000 MHz	-0.15 dB	0.70 dB
5500 MHz	-0.14 dB	0.70 dB
6000 MHz	-0.16 dB	0.70 dB
6500 MHz	-0.17 dB	0.70 dB
6990 MHz	-0.18 dB	0.70 dB
7100 MHz	-0.17 dB	0.70 dB
8000 MHz	-0.13 dB	0.70 dB
9000 MHz	-0.16 dB	0.70 dB
10000 MHz	0.06 dB	0.70 dB
11000 MHz	0.05 dB	0.70 dB

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Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check (@ Continued):		
RF Attenuation 10 dB		
12000 MHz	0.02 dB	0.70 dB
13000 MHz	0.03 dB	0.70 dB
13500 MHz	0.03 dB	0.70 dB
14000 MHz	0.04 dB	0.70 dB
15000 MHz	0.02 dB	0.70 dB
16000 MHz	0.06 dB	0.70 dB
17000 MHz	0.11 dB	0.70 dB
18000 MHz	0.18 dB	0.70 dB
19000 MHz	0.10 dB	0.98 dB
20000 MHz	-0.09 dB	0.98 dB
21000 MHz	-0.02 dB	0.98 dB
22000 MHz	0.24 dB	0.98 dB
23000 MHz	0.14 dB	0.98 dB
24000 MHz	0.09 dB	0.98 dB
25000 MHz	0.05 dB	0.98 dB
26000 MHz	0.35 dB	0.98 dB
27000 MHz	-0.19 dB	1.3 dB
28000 MHz	-0.11 dB	1.3 dB
29000 MHz	-0.09 dB	1.3 dB
29900 MHz	0.04 dB	1.3 dB
31000 MHz	0.05 dB	1.3 dB
32000 MHz	0.03 dB	1.3 dB
33000 MHz	0.02 dB	1.3 dB
34000 MHz	0.05 dB	1.3 dB
35000 MHz	0.07 dB	1.3 dB
36000 MHz	0.09 dB	1.3 dB
37000 MHz	0.12 dB	1.3 dB
38000 MHz	-0.39 dB	1.3 dB
39000 MHz	-0.03 dB	1.3 dB
39999 MHz	-0.08 dB	1.3 dB
40000 MHz	-0.11 dB	1.3 dB
41000 MHz	-0.18 dB	1.3 dB
42000 MHz	-0.29 dB	1.3 dB
43000 MHz	-0.35 dB	1.3 dB

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Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check (@ Continued):		
RF Attenuation 20 dB		
1 MHz	0.07 dB	0.64 dB
10 MHz	0.05 dB	0.64 dB
50 MHz	0.03 dB	0.64 dB
100 MHz	0.04 dB	0.64 dB
200 MHz	0.06 dB	0.64 dB
300 MHz	0.05 dB	0.64 dB
400 MHz	0.06 dB	0.64 dB
500 MHz	0.07 dB	0.64 dB
600 MHz	0.08 dB	0.64 dB
700 MHz	0.07 dB	0.64 dB
800 MHz	0.06 dB	0.64 dB
900 MHz	0.04 dB	0.64 dB
1000 MHz	0.02 dB	0.64 dB
1500 MHz	0.09 dB	0.64 dB
2000 MHz	0.11 dB	0.64 dB
2500 MHz	0.17 dB	0.64 dB
2990 MHz	0.20 dB	0.64 dB
Frequency response Check (@ Continued):		
RF Attenuation 40 dB		
1 MHz	0.09 dB	0.62 dB
10 MHz	0.07 dB	0.62 dB
50 MHz	0.06 dB	0.62 dB
100 MHz	0.07 dB	0.62 dB
200 MHz	0.06 dB	0.62 dB
300 MHz	0.05 dB	0.62 dB
400 MHz	0.04 dB	0.62 dB
500 MHz	0.15 dB	0.62 dB
600 MHz	0.11 dB	0.62 dB
700 MHz	0.07 dB	0.62 dB
800 MHz	0.08 dB	0.62 dB
900 MHz	0.08 dB	0.62 dB
1000 MHz	0.07 dB	0.62 dB
1500 MHz	0.09 dB	0.62 dB
2000 MHz	0.12 dB	0.62 dB
2500 MHz	0.18 dB	0.62 dB
2990 MHz	0.29 dB	0.62 dB

# 校正報告

財團法人台灣電子檢驗中心

工 服NO. 19-07-BAC-728-01L

## CALIBRATION REPORT

ELECTRONICS TESTING  
CENTER, TAIWAN

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Test Description	Actual Value	Expanded Uncertainty
10. Display linearity Check:		
RBW 300 Hz		
10 dB	9.99 dB	0.64 dB
12 dB	7.98 dB	0.64 dB
14 dB	5.97 dB	0.64 dB
16 dB	3.97 dB	0.64 dB
18 dB	1.97 dB	0.64 dB
20 dB	0.00 dB(Ref.)	-----
22 dB	-2.00 dB	0.64 dB
24 dB	-4.00 dB	0.64 dB
26 dB	-6.01 dB	0.64 dB
28 dB	-8.02 dB	0.64 dB
30 dB	-10.00 dB	0.64 dB
32 dB	-12.00 dB	0.64 dB
34 dB	-14.01 dB	0.64 dB
36 dB	-16.02 dB	0.64 dB
38 dB	-18.03 dB	0.64 dB
40 dB	-20.01 dB	0.64 dB
42 dB	-22.00 dB	0.64 dB
44 dB	-23.99 dB	0.64 dB
46 dB	-25.99 dB	0.64 dB
48 dB	-27.99 dB	0.64 dB
50 dB	-29.99 dB	0.64 dB
52 dB	-31.98 dB	0.64 dB
54 dB	-33.98 dB	0.64 dB
56 dB	-35.99 dB	0.64 dB
58 dB	-38.00 dB	0.64 dB
60 dB	-39.96 dB	0.64 dB
65 dB	-45.00 dB	0.64 dB
70 dB	-49.97 dB	0.64 dB
75 dB	-55.00 dB	0.64 dB
80 dB	-59.99 dB	0.64 dB
85 dB	-64.98 dB	0.64 dB
90 dB	-69.97 dB	0.64 dB
95 dB	-74.96 dB	0.64 dB
100 dB	-79.95 dB	0.64 dB

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Test Description	Actual Value	Expanded Uncertainty
10. Display linearity Check		
RBW 300 kHz:		
10 dB	9.99 dB	0.64 dB
12 dB	7.99 dB	0.64 dB
14 dB	5.99 dB	0.64 dB
16 dB	3.98 dB	0.64 dB
18 dB	1.97 dB	0.64 dB
20 dB	0.00 dB(Ref.)	-----
22 dB	-2.00 dB	0.64 dB
24 dB	-4.01 dB	0.64 dB
26 dB	-6.02 dB	0.64 dB
28 dB	-8.03 dB	0.64 dB
30 dB	-10.00 dB	0.64 dB
32 dB	-12.00 dB	0.64 dB
34 dB	-14.00 dB	0.64 dB
36 dB	-16.01 dB	0.64 dB
38 dB	-18.01 dB	0.64 dB
40 dB	-20.00 dB	0.64 dB
42 dB	-21.99 dB	0.64 dB
44 dB	-23.98 dB	0.64 dB
46 dB	-25.98 dB	0.64 dB
48 dB	-27.99 dB	0.64 dB
50 dB	-30.00 dB	0.64 dB
52 dB	-32.00 dB	0.64 dB
54 dB	-33.99 dB	0.64 dB
56 dB	-35.99 dB	0.64 dB
58 dB	-38.01 dB	0.64 dB
60 dB	-39.99 dB	0.64 dB
65 dB	-45.00 dB	0.64 dB
70 dB	-49.99 dB	0.64 dB
75 dB	-54.98 dB	0.64 dB
80 dB	-59.97 dB	0.64 dB

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Test Description	Actual Value	Expanded Uncertainty
11. Attenuator accuracy Check:		
0 dB	-9.98 dB	0.38 dB
10 dB	0.00 dB(Ref.)	-----
20 dB	10.00 dB	0.38 dB
30 dB	20.00 dB	0.38 dB
40 dB	30.01 dB	0.38 dB
50 dB	40.00 dB	0.38 dB
60 dB	50.03 dB	0.38 dB
70 dB	60.06 dB	0.38 dB
12. Reference level		
switching accuracy		
Reference level Check:		
0 dBm	10.00 dB	0.36 dB
-10 dBm	0.00 dB(Ref.)	-----
-20 dBm	-10.00 dB	0.36 dB
-30 dBm	-20.00 dB	0.36 dB
-40 dBm	-30.00 dB	0.36 dB
-50 dBm	-40.01 dB	0.36 dB
-11 dBm	-1.00 dB	0.36 dB
-12 dBm	-2.00 dB	0.36 dB
-13 dBm	-3.00 dB	0.36 dB
-14 dBm	-4.00 dB	0.36 dB
-15 dBm	-5.00 dB	0.36 dB
-16 dBm	-6.00 dB	0.36 dB
-17 dBm	-7.00 dB	0.36 dB
-18 dBm	-8.00 dB	0.36 dB
-19 dBm	-9.00 dB	0.36 dB

說明:

- 1.本校正報告內的項次2、6、7相對擴充不確定度評估與評估表示係依據「ISO Guide 98-3 量測不確定度表示方式指引」，相對擴充不確定度 $U = ku_c$  其中 $u_c$ 為相對組合標準不確定度， $k=2.0$ ，為信賴水準 95 %之涵蓋因子。  
本校正報告內的項次1、3、4、5、8、9、10、11、12擴充不確定度與評估表示係依據「ISO Guide 98-3 量測不確定度表示方式指引」，擴充不確定度  $U = ku_c$  其中 $u_c$ 為相對組合標準不確定度， $k = 2.0$ ，為信賴水準 95 %之涵蓋因子。
- 2.參考ANSI C63.2及CISPR 16-1-1相關規範。



工服 NO. 20-07-BAC-440-08L

財團法人台灣商品檢測驗證中心



收件日期: Jul.16,2020

# 校正報告

Receipt Date

## CALIBRATION REPORT

發行日期: Jul.24,2020

TAIWAN TESTING AND CERTIFICATION CENTER

Report Issue Date

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顧客名稱 香港商立德國際商品試驗有限公司桃園分公司

Customer

顧客地址 新北市林口區嘉寶里14鄰47-2號

Address

### 供校儀器 ITEM CALIBRATED

儀器名稱: PXA Signal Analyzer

Nomenclature

製造商: KEYSIGHT

Manufacturer

型別: N9030A

Model No.

識別號碼: MY54490260(E2-010476)

ID. No.

上述儀器經本實驗室校正,結果如內文。未經本實驗室書面許可,不得部份複製本報告,完整複製則不在此限。

The above instruments were calibrated by the laboratory and please refer to the content for the calibration results. This report may not be reproduced in part without the written permission of the laboratory, except for full reproduction.

校正資料:  僅量測  調整

Calibration Information Calibration Only Adjusted

環境狀態: 環境溫度: (23 ± 2) °C, 相對濕度: (50 ± 10) %

Environmental Conditions

校正日期: Jul.22,2020

Calibration Date

建議再校日期: Jul.21,2021

註: 建議再校日期為應顧客要求列入。

Recommended Recalibration Date

Note: The recommended recalibration date is agreed by the customer.

校正地點: 財團法人台灣商品檢測驗證中心校正實驗室

Laboratory Location

實驗室名稱地址:  1. 校正實驗室 33383 桃園市龜山區文明路29巷8號 TEL:+886-3-3280026

Laboratory Name and Address 2. 新竹校正實驗室 30075 新竹市科學園區園區二路47號205室 TEL:+886-3-5798806

3. 台中校正實驗室 40766 台中市西屯區福中二街8號2樓之2 TEL:+886-4-23584899

4. 台南校正實驗室 70248 台南市南區新和二路5號 TEL:+886-6-2925787#50,51

財團法人台灣商品檢測驗證中心特此證明報告內記載之受校儀器已與下方標準做過比較校正,用以校正之標準器可追溯至中華民國國家度量衡標準實驗室,美國標準及技術研究院,或其它國家之度量衡國家標準。本中心的校正服務均符合ISO/IEC 17025之規定。

Taiwan Testing and Certification Center hereby certifies that the equipment noted herein has been compared with the below listed standards. The Standards used to perform this calibration are traceable to NML/ROC,NIST/USA or other countries. The calibration services from Taiwan Testing and Certification Center are capable of performing services in compliance with the requirements of ISO/IEC 17025.

財團法人台灣商品檢測驗證中心

實驗室主管

報告簽署人

Taiwan Testing and Certification Center

Laboratory Head

Signature



## 使用校正依據 CALIBRATION PROCEDURE USED

1. 「頻譜(信號)分析儀校正程序書」, B00-CD-142, 5th Edition。
2. 「測試接收機/信號(頻譜)分析儀校正程序書」, B00-CD-376, 5th Edition。

## 使用標準器及附配件 STANDARD AND ACCESSORIES USED

儀器名稱【廠牌/型號】 Nomenclature【Mfg./Model No.】	【識別號碼】 【ID. No.】	校正單位(認可編號) Cal. Source(ACRED Code)	報告號碼 Cal. Report No.	校正日期 Date Cal.	有效日期 Due Date
RF Step Attenuator 【R/S RSG】 【13050122-001】		R&S(DAKK S D-K-15195-01-01)	D-K-15195-01-01 2018-03	2018/03/08	2021/09/07
EPM Series Power Meter 【HP E4419B】 【13050609-001】		NML(TAF N0688)	U190100A	2019/07/24	2021/01/23
Swept Signal Generator 【AGILENT 83650B】 【13051703-001】		ETC(TAF 0025)	20-06-BAC-570-16L	2020/07/10	2021/07/09
Signal Generator 【R&S/SMB100A】 【13051715-001】		R&S(DAKK S D-K-15195-01-01)	532388	2019/11/26	2023/05/25
Power Sensor 【AGILENT 8482A】 【13053506-001】		KEYSIGHT(ANAB AC-1498)	1-11911589522-1	2019/11/14	2022/05/13
Power Sensor 【AGILENT 8487A】 【13053508-003】		KEYSIGHT(ANAB AC-1498)	1-12179698623-1	2020/01/15	2022/07/14
Universal Counter 【HP 53132A】 【13060804-001】		ETC(TAF 0025)	20-06-BAC-570-04L	2020/07/01	2020/12/31

# 校正報告

財團法人台灣商品檢驗證中心

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TAIWAN TESTING AND  
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Test Description	Actual Value	Expanded Uncertainty
1. Freq. Readout Accuracy and Freq. Count Marker Accuracy:		
(a) Freq. Readout Accuracy		
(a.1) 1.5 GHz Center Freq.		
1 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	1.500000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	1.499 GHz	$1.2 \times 10^{-3}$
(a.2) 4.0 GHz Center Freq.		
1 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	4.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	3.999 GHz	$1.2 \times 10^{-3}$
(a.3) 9.0 GHz Center Freq.		
1 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	9.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	8.999 GHz	$1.2 \times 10^{-3}$
(a.4) 16.0 GHz Center Freq.		
1 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	16.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	15.999 GHz	$1.2 \times 10^{-3}$

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TAIWAN TESTING AND  
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Test Description	Actual Value	Expanded Uncertainty
1. Freq. Readout Accuracy and Freq. Count Marker Accuracy: (@ Continued):		
(a) Freq. Readout Accuracy		
(a.5) 21.0 GHz Center Freq.		
1 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	21.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	20.999 GHz	$1.2 \times 10^{-3}$
(a.6) 29.0 GHz Center Freq.		
1 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	29.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	28.999 GHz	$1.2 \times 10^{-3}$
(a.7) 35.0 GHz Center Freq.		
1 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-6}$
10 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-5}$
20 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-5}$
50 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-5}$
100 MHz SPAN	35.000000 GHz	$1.2 \times 10^{-4}$
1 GHz SPAN	35.000 GHz	$1.2 \times 10^{-3}$
(b) Freq. Count Marker Accuracy:		
1.5 GHz Center Freq.	1.50000000 GHz	$5.0 \times 10^{-8}$
4.0 GHz Center Freq.	4.00000000 GHz	$5.0 \times 10^{-8}$
9.0 GHz Center Freq.	9.00000000 GHz	$5.0 \times 10^{-8}$
16.0 GHz Center Freq.	16.00000000 GHz	$5.0 \times 10^{-8}$
21.0 GHz Center Freq.	21.00000000 GHz	$5.0 \times 10^{-8}$
29.0 GHz Center Freq.	29.00000000 GHz	$5.0 \times 10^{-8}$
35.0 GHz Center Freq.	35.00000000 GHz	$5.0 \times 10^{-8}$

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Test Description	Actual Value	Expanded Uncertainty
2. Freq. Span Accuracy:		
1 kHz Span	0.00 %	0.15 %
2 kHz Span	0.00 %	0.15 %
5 kHz Span	0.00 %	0.15 %
10 kHz Span	0.00 %	0.15 %
20 kHz Span	0.00 %	0.15 %
50 kHz Span	0.00 %	0.15 %
100 kHz Span	0.00 %	0.15 %
200 kHz Span	0.00 %	0.15 %
500 kHz Span	0.00 %	0.15 %
1 MHz Span	0.00 %	0.15 %
2 MHz Span	0.00 %	0.15 %
5 MHz Span	0.00 %	0.15 %
10 MHz Span	0.00 %	0.15 %
20 MHz Span	0.00 %	0.15 %
50 MHz Span	0.00 %	0.15 %
100 MHz Span	0.00 %	0.15 %
200 MHz Span	0.00 %	0.15 %
500 MHz Span	0.00 %	0.15 %
1 GHz Span	0.00 %	0.15 %
2 GHz Span	0.00 %	0.15 %

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Test Description	Actual Value	Expanded Uncertainty
3. Image, Multiple, and Out-of-Band Response:		
(a)2 GHz Center Freq.		
2021.4 MHz	-101.48 dBc	0.89 dB
2621.4 MHz	-101.41 dBc	0.97 dB
2321.4 MHz	-101.46 dBc	0.90 dB
2600.0 MHz	-101.61 dBc	0.92 dB
7910.7 MHz	-101.26 dBc	0.83 dB
9821.4 MHz	-101.33 dBc	0.86 dB
(b)4 GHz Center Freq.		
4021.4 MHz	-100.25 dBc	0.88 dB
4621.4 MHz	-100.49 dBc	0.89 dB
4321.4 MHz	-100.47 dBc	0.88 dB
4600.0 MHz	-100.51 dBc	0.91 dB
8310.7 MHz	-100.60 dBc	0.88 dB
8932.1 MHz	-100.53 dBc	0.93 dB
(c)9 GHz Center Freq.		
9021.4 MHz	-100.45 dBc	0.88 dB
9621.4 MHz	-100.68 dBc	0.88 dB
9321.4 MHz	-100.51 dBc	0.93 dB
9600.0 MHz	-100.51 dBc	0.91 dB
18310.7 MHz	-100.34 dBc	0.86 dB
18932.1 MHz	-100.54 dBc	0.93 dB
(d)15 GHz Center Freq.		
15021.400 MHz	-99.55 dBc	0.93 dB
15621.400 MHz	-99.31 dBc	0.94 dB
22655.350 MHz	-99.64 dBc	0.93 dB
23276.750 MHz	-99.45 dBc	1.01 dB
7344.650 MHz	-99.44 dBc	0.90 dB
7966.050 MHz	-99.58 dBc	0.95 dB
(e)20 GHz Center Freq.		
20021.400 MHz	-98.33 dBc	0.98 dB
20621.400 MHz	-98.59 dBc	0.96 dB
15543.725 MHz	-98.27 dBc	0.94 dB
25699.075 MHz	-99.69 dBc	0.96 dB
9844.650 MHz	-99.50 dBc	0.98 dB
10466.050 MHz	-99.19 dBc	0.89 dB

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Test Description	Actual Value	Expanded Uncertainty
3. Image, Multiple, and Out-of-Band Response: (@Continued):		
(f)29 GHz Center Freq.		
28378.600 MHz	-98.47 dBc	1.3 dB
28978.600 MHz	-98.69 dBc	1.2 dB
24450.925 MHz	-98.51 dBc	1.3 dB
28700.000 MHz	-98.67 dBc	1.2 dB
16455.350 MHz	-98.33 dBc	1.3 dB
35272.325 MHz	-98.54 dBc	1.3 dB
(g)35 GHz Center Freq.		
35021.400 MHz	-95.60 dBc	1.2 dB
35621.400 MHz	-96.47 dBc	1.3 dB
33093.725 MHz	-96.41 dBc	1.3 dB
35321.400 MHz	-96.32 dBc	1.2 dB
8744.538 MHz	-95.76 dBc	1.2 dB
15544.650 MHz	-95.68 dBc	1.2 dB
4. Frequency accuracy:	10.0000006 MHz	$3.5 \times 10^{-8}$
5. IF bandwidth level accuracy Check:		
100 Hz	0.00 dB	0.32 dB
300 Hz	0.00 dB	0.32 dB
1 kHz	0.00 dB	0.32 dB
3 kHz	0.00 dB	0.32 dB
10 kHz	0.00 dB(Ref.)	----
30 kHz	0.00 dB	0.32 dB
100 kHz	0.00 dB	0.32 dB
300 kHz	0.00 dB	0.32 dB
1 MHz	0.00 dB	0.32 dB
3 MHz	0.01 dB	0.32 dB

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Test Description	Actual Value	Expanded Uncertainty
6. IF bandwidth (3 dB) Check:		
Bandwidth		
100 Hz	100.1 Hz	4.4 %
300 Hz	300.1 Hz	4.4 %
1 kHz	1.000 kHz	4.4 %
3 kHz	3.000 kHz	4.4 %
10 kHz	10.00 kHz	4.4 %
30 kHz	30.00 kHz	4.4 %
100 kHz	100.1 kHz	4.4 %
300 kHz	300.2 kHz	4.4 %
1 MHz	1.000 MHz	4.4 %
3 MHz	2.997 MHz	4.4 %
7. IF Bandwidths (3 dB)		
Shape factor Check:		
100 Hz	3.86	6.1 %
300 Hz	3.88	6.1 %
1 kHz	3.91	6.1 %
3 kHz	3.89	6.1 %
10 kHz	3.97	6.1 %
30 kHz	4.01	6.1 %
100 kHz	4.03	6.1 %
300 kHz	3.98	6.1 %
1 MHz	3.89	6.1 %
3 MHz	3.86	6.1 %



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Test Description	Actual Value	Expanded Uncertainty
8. Noise Display Check :		
9 kHz	-140.1 dBm	0.76 dB
100 kHz	-141.0 dBm	0.76 dB
999 kHz	-143.2 dBm	0.76 dB
10.99 MHz	-144.6 dBm	0.76 dB
19.99 MHz	-145.9 dBm	0.76 dB
49.99 MHz	-147.4 dBm	0.76 dB
99.99 MHz	-149.7 dBm	0.76 dB
199.9 MHz	-149.9 dBm	0.76 dB
499.9 MHz	-150.0 dBm	0.76 dB
999.9 MHz	-150.4 dBm	0.76 dB
1499 MHz	-149.3 dBm	0.88 dB
1999 MHz	-149.7 dBm	0.88 dB
2499 MHz	-148.5 dBm	0.88 dB
2999 MHz	-146.7 dBm	0.88 dB
3099 MHz	-144.9 dBm	0.88 dB
3499 MHz	-148.2 dBm	0.88 dB
3999 MHz	-147.9 dBm	0.88 dB
4499 MHz	-148.2 dBm	0.88 dB
4999 MHz	-148.1 dBm	0.88 dB
5499 MHz	-147.5 dBm	0.88 dB
5999 MHz	-147.1 dBm	0.88 dB
6499 MHz	-147.2 dBm	0.88 dB
6999 MHz	-147.1 dBm	0.88 dB
7999 MHz	-147.2 dBm	0.88 dB
8999 MHz	-149.1 dBm	0.88 dB
9999 MHz	-148.8 dBm	0.88 dB
10999 MHz	-146.9 dBm	0.88 dB
11999 MHz	-146.2 dBm	0.88 dB
12999 MHz	-146.3 dBm	0.88 dB
13999 MHz	-146.2 dBm	0.88 dB
14999 MHz	-146.7 dBm	0.88 dB
15999 MHz	-145.8 dBm	0.88 dB
16999 MHz	-144.9 dBm	0.88 dB

# 校正報告

財團法人台灣商品檢驗驗證中心

工服NO. 20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

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Test Description	Actual Value	Expanded Uncertainty
8. Noise Display Check (@ Continued):		
17999 MHz	-144.1 dBm	0.88 dB
18999 MHz	-143.9 dBm	0.88 dB
19999 MHz	-141.9 dBm	0.88 dB
20999 MHz	-140.7 dBm	0.88 dB
21999 MHz	-143.7 dBm	0.88 dB
22999 MHz	-144.2 dBm	0.88 dB
23999 MHz	-143.9 dBm	0.88 dB
24999 MHz	-143.3 dBm	0.88 dB
25999 MHz	-143.9 dBm	0.88 dB
26999 MHz	-142.5 dBm	0.88 dB
27999 MHz	-141.7 dBm	0.88 dB
28999 MHz	-141.3 dBm	0.88 dB
29999 MHz	-140.2 dBm	0.88 dB
30999 MHz	-140.1 dBm	0.88 dB
31999 MHz	-139.6 dBm	0.88 dB
32999 MHz	-139.8 dBm	0.88 dB
33999 MHz	-140.0 dBm	0.88 dB
34999 MHz	-139.9 dBm	0.88 dB
35999 MHz	-139.3 dBm	0.86 dB
36999 MHz	-139.1 dBm	0.86 dB
37999 MHz	-140.1 dBm	0.86 dB
38999 MHz	-139.9 dBm	0.86 dB
39999 MHz	-138.3 dBm	0.86 dB

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財團法人台灣商品檢測驗證中心

工服NO. 20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

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Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check:		
RF Attenuation 10 dB		
100 kHz	-0.15 dB	0.66 dB
1 MHz	-0.12 dB	0.66 dB
10 MHz	-0.11 dB	0.66 dB
50 MHz	-0.17 dB	0.66 dB
100 MHz	-0.23 dB	0.66 dB
200 MHz	-0.19 dB	0.66 dB
300 MHz	-0.17 dB	0.66 dB
400 MHz	-0.12 dB	0.66 dB
500 MHz	-0.15 dB	0.66 dB
600 MHz	-0.17 dB	0.66 dB
700 MHz	-0.13 dB	0.66 dB
800 MHz	-0.19 dB	0.66 dB
900 MHz	-0.25 dB	0.66 dB
1000 MHz	-0.19 dB	0.66 dB
1500 MHz	-0.22 dB	0.66 dB
2000 MHz	-0.27 dB	0.66 dB
2500 MHz	-0.27 dB	0.66 dB
2990 MHz	-0.29 dB	0.66 dB
3010 MHz	-0.32 dB	0.70 dB
3500 MHz	-0.27 dB	0.70 dB
4000 MHz	0.92 dB	0.70 dB
4500 MHz	0.88 dB	0.70 dB
5000 MHz	0.82 dB	0.70 dB
5500 MHz	0.78 dB	0.70 dB
6000 MHz	0.71 dB	0.70 dB
6500 MHz	0.69 dB	0.70 dB
6990 MHz	0.04 dB	0.70 dB
7100 MHz	0.23 dB	0.70 dB
8000 MHz	-0.41 dB	0.70 dB
9000 MHz	-0.76 dB	0.70 dB
10000 MHz	-1.38 dB	0.70 dB
11000 MHz	-1.12 dB	0.70 dB
12000 MHz	-1.09 dB	0.70 dB
13000 MHz	-1.11 dB	0.70 dB
13500 MHz	-1.12 dB	0.70 dB
14000 MHz	-1.12 dB	0.70 dB

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財團法人台灣商品檢驗驗證中心

工 服NO. 20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

Page 12 of 16

Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check		
RF Attenuation 10 dB: (@Continued)		
15000 MHz	-0.97 dB	0.70 dB
16000 MHz	-1.05 dB	0.70 dB
17000 MHz	-1.17 dB	0.70 dB
18000 MHz	-1.16 dB	0.70 dB
19000 MHz	-1.12 dB	0.98 dB
20000 MHz	-1.43 dB	0.98 dB
21000 MHz	-1.19 dB	0.98 dB
22000 MHz	-1.15 dB	0.98 dB
23000 MHz	-1.22 dB	0.98 dB
24000 MHz	-1.41 dB	0.98 dB
25000 MHz	-1.64 dB	0.98 dB
26000 MHz	-1.13 dB	0.98 dB
27000 MHz	-1.71 dB	1.3 dB
28000 MHz	-1.19 dB	1.3 dB
29000 MHz	-1.37 dB	1.3 dB
29900 MHz	-1.47 dB	1.3 dB
31000 MHz	-1.76 dB	1.3 dB
32000 MHz	-1.98 dB	1.3 dB
33000 MHz	-2.14 dB	1.3 dB
34000 MHz	-2.16 dB	1.3 dB
35000 MHz	-2.13 dB	1.3 dB
36000 MHz	-2.11 dB	1.3 dB
37000 MHz	-2.08 dB	1.3 dB
38000 MHz	-2.09 dB	1.3 dB
39000 MHz	-2.17 dB	1.3 dB
39999 MHz	-2.12 dB	1.3 dB
43999 MHz	-2.17 dB	1.3 dB

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財團法人台灣商品檢測驗證中心

工服NO. 20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

Page 13 of 16

Test Description	Actual Value	Expanded Uncertainty
9. Frequency response Check (@ Continued):		
RF Attenuation 20 dB		
100 kHz	-0.12 dB	0.64 dB
1 MHz	-0.13 dB	0.64 dB
10 MHz	-0.11 dB	0.64 dB
50 MHz	-0.09 dB	0.64 dB
100 MHz	-0.07 dB	0.64 dB
200 MHz	-0.06 dB	0.64 dB
300 MHz	-0.07 dB	0.64 dB
400 MHz	-0.09 dB	0.64 dB
500 MHz	-0.11 dB	0.64 dB
600 MHz	-0.13 dB	0.64 dB
700 MHz	-0.14 dB	0.64 dB
800 MHz	-0.11 dB	0.64 dB
900 MHz	-0.09 dB	0.64 dB
1000 MHz	-0.08 dB	0.64 dB
1500 MHz	-0.09 dB	0.64 dB
2000 MHz	-0.09 dB	0.64 dB
2500 MHz	-0.11 dB	0.64 dB
2990 MHz	-0.18 dB	0.64 dB
RF Attenuation 40 dB		
100 kHz	-0.12 dB	0.62 dB
1 MHz	-0.13 dB	0.62 dB
10 MHz	-0.11 dB	0.62 dB
50 MHz	-0.09 dB	0.62 dB
100 MHz	-0.07 dB	0.62 dB
200 MHz	-0.06 dB	0.62 dB
300 MHz	-0.07 dB	0.62 dB
400 MHz	-0.09 dB	0.62 dB
500 MHz	-0.08 dB	0.62 dB
600 MHz	-0.09 dB	0.62 dB
700 MHz	-0.11 dB	0.62 dB
800 MHz	-0.09 dB	0.62 dB
900 MHz	-0.08 dB	0.62 dB
1000 MHz	-0.08 dB	0.62 dB
1500 MHz	-0.09 dB	0.62 dB
2000 MHz	-0.11 dB	0.62 dB
2500 MHz	-0.12 dB	0.62 dB
2990 MHz	-0.15 dB	0.62 dB

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工 服NO.20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

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Test Description	Actual Value	Expanded Uncertainty
10. Display linearity Check:		
RBW 300 Hz		
10 dB	9.99 dB	0.64 dB
12 dB	7.98 dB	0.64 dB
14 dB	5.98 dB	0.64 dB
16 dB	3.97 dB	0.64 dB
18 dB	1.97 dB	0.64 dB
20 dB	0.00 dB(Ref.)	-----
22 dB	-2.00 dB	0.64 dB
24 dB	-4.01 dB	0.64 dB
26 dB	-6.02 dB	0.64 dB
28 dB	-8.03 dB	0.64 dB
30 dB	-10.01 dB	0.64 dB
32 dB	-12.00 dB	0.64 dB
34 dB	-14.01 dB	0.64 dB
36 dB	-16.02 dB	0.64 dB
38 dB	-18.03 dB	0.64 dB
40 dB	-19.99 dB	0.64 dB
42 dB	-22.00 dB	0.64 dB
44 dB	-23.99 dB	0.64 dB
46 dB	-26.00 dB	0.64 dB
48 dB	-28.00 dB	0.64 dB
50 dB	-29.99 dB	0.64 dB
52 dB	-31.98 dB	0.64 dB
54 dB	-33.99 dB	0.64 dB
56 dB	-36.00 dB	0.64 dB
58 dB	-38.00 dB	0.64 dB
60 dB	-39.98 dB	0.64 dB
65 dB	-44.98 dB	0.64 dB
70 dB	-49.97 dB	0.64 dB
75 dB	-54.98 dB	0.64 dB
80 dB	-59.99 dB	0.64 dB
85 dB	-64.98 dB	0.64 dB
90 dB	-69.97 dB	0.64 dB
95 dB	-74.96 dB	0.64 dB
100 dB	-79.94 dB	0.64 dB

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財團法人台灣商品檢驗驗證中心

工 服NO.20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

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Test Description	Actual Value	Expanded Uncertainty
10. Display linearity Check		
RBW 300 kHz:		
10 dB	9.99 dB	0.64 dB
12 dB	7.98 dB	0.64 dB
14 dB	5.98 dB	0.64 dB
16 dB	3.97 dB	0.64 dB
18 dB	1.97 dB	0.64 dB
20 dB	0.00 dB(Ref.)	-----
22 dB	-2.00 dB	0.64 dB
24 dB	-4.01 dB	0.64 dB
26 dB	-6.02 dB	0.64 dB
28 dB	-8.02 dB	0.64 dB
30 dB	-10.00 dB	0.64 dB
32 dB	-12.00 dB	0.64 dB
34 dB	-14.01 dB	0.64 dB
36 dB	-16.02 dB	0.64 dB
38 dB	-18.03 dB	0.64 dB
40 dB	-20.00 dB	0.64 dB
42 dB	-22.00 dB	0.64 dB
44 dB	-23.99 dB	0.64 dB
46 dB	-25.98 dB	0.64 dB
48 dB	-27.98 dB	0.64 dB
50 dB	-29.99 dB	0.64 dB
52 dB	-31.98 dB	0.64 dB
54 dB	-33.99 dB	0.64 dB
56 dB	-36.00 dB	0.64 dB
58 dB	-38.01 dB	0.64 dB
60 dB	-39.98 dB	0.64 dB
65 dB	-44.98 dB	0.64 dB
70 dB	-49.98 dB	0.64 dB
75 dB	-54.97 dB	0.64 dB
80 dB	-59.96 dB	0.64 dB

# 校正報告

財團法人台灣商品檢測驗證中心

工 服NO.20-07-BAC-440-08L

## CALIBRATION REPORT

TAIWAN TESTING AND  
CERTIFICATION CENTER

Page 16 of 16

Test Description	Actual Value	Expanded Uncertainty
11. Attenuator accuracy Check:		
0 dB	-9.99 dB	0.38 dB
10 dB	0.00 dB(Ref.)	-----
20 dB	10.00 dB	0.38 dB
30 dB	20.01 dB	0.38 dB
40 dB	30.00 dB	0.38 dB
50 dB	40.01 dB	0.38 dB
60 dB	50.02 dB	0.38 dB
70 dB	60.02 dB	0.38 dB
12. Reference level		
switching accuracy		
Reference level Check:		
0 dBm	10.00 dB	0.36 dB
-10 dBm	0.00 dB(Ref.)	-----
-20 dBm	-10.00 dB	0.36 dB
-30 dBm	-20.00 dB	0.36 dB
-40 dBm	-30.01 dB	0.36 dB
-50 dBm	-40.01 dB	0.36 dB
-11 dBm	-1.00 dB	0.36 dB
-12 dBm	-2.00 dB	0.36 dB
-13 dBm	-3.00 dB	0.36 dB
-14 dBm	-4.00 dB	0.36 dB
-15 dBm	-5.00 dB	0.36 dB
-16 dBm	-6.00 dB	0.36 dB
-17 dBm	-7.00 dB	0.36 dB
-18 dBm	-8.00 dB	0.36 dB
-19 dBm	-9.00 dB	0.36 dB

### 說明:

1.本校正報告內的項次1、2、6、7相對擴充不確定度評估與評估表示係依據「ISO Guide 98-3 量測不確定度表示方式指引」，相對擴充不確定度 $U = ku_c$  其中 $u_c$ 為相對組合標準不確定度， $k = 2.0$ ，為信賴水準 95%之涵蓋因子。

本校正報告內的項次3、4、5、8、9、10、11、12擴充不確定度與評估表示係依據「ISO Guide 98-3 量測不確定度表示方式指引」，擴充不確定度  $U = ku_c$  其中 $u_c$ 為相對組合標準不確定度， $k = 2.0$ ，為信賴水準 95%之涵蓋因子。

2.參考ANSI C63.2及CISPR 16-1-1相關規範。



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 04-20 Date when calibrated 20.01.20 Page 1 of 2

Item calibrated Conical Horn Antenna QWH-UCRR00 # 924200002

Customer Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300,  
Taiwan, R.O.C.

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  
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/ Technical manager Date of issue 20.01.20

# Calibration Certificate

Certificate number **04-20**

Page **2** of **2**

## Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	19 November 2020	2978-43	RF Power
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
MG3694C	Signal generator	133805	21 August 2020	2066-43	RF Power Frequency
G4-161	Signal generator	3	10 July 2020	22-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-11B	Measuring horn antenna	08051	23 September 2021	2370-43	Gain
P6-133	Measuring horn antenna	15005	23 September 2021	2374-43	Gain

## Calibration conditions

Temperature: 21.8 °C.  
Humidity: 37.0 %.  
Pressure: 100.0 kPa.


## Calibration results are given in the measurement report # 04-20

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	33 – 55 GHz	Corresponds
2	Antenna Gain	21* dBi	Corresponds (Table 1)
3	Antenna Factor	43 dB/m	Corresponds (Table 1)

\* – Expanded uncertainty of measurements 2.5 dB.

*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

No. BY/112 5.0065

Address: 6, P. Brovki str., Minsk  
220013, Belarus

Phone/Fax: +375 17 2938496



Technical Manager

January 20, 2020

**MEASUREMENT REPORT # 04-20**

January 20, 2020

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Conical Horn Antenna QWH-UCRR00 # 924200002
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	29.11.2019
Date of calibration:	From 09.12.2019 to 20.01.2020

## MEASUREMENT CONDITIONS

Temperature: 21.8 °C	Humidity: 37 %	Pressure: 100.0 kPa
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## MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
E4418B/ N8486AR	Power meter	US39251390/ MY52270003	19 November 2020	2978-43	RF Power
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
MG3694C	Signal generator	133805	21 August 2020	2066-43	RF Power Frequency
G4-161	Signal generator	3	10 July 2020	22-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-11B	Measuring horn antenna	08051	23 September 2021	2370-43	Gain
P6-133	Measuring horn antenna	15005	23 September 2021	2374-43	Gain

## MEASUREMENT RESULTS

Distance between tested and generating antenna 2 m.

Table 1

Frequency, GHz	33	44	55
Power density of electromagnetic field, W/m <sup>2</sup>	0.022	0.057	0.049
Maximum level of measured power, dBm	-20.0	-16.4	-17.2
Gain, dBi	18.4	20.3	21.3
Expanded uncertainty, dB	2.5	2.5	2.5
Antenna Factor, dB/m	42.2	42.8	42.9

*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

Quality Manager


This Measurement report issued in duplicate and sent to:

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Certificate number 01-20 Date when calibrated 20.01.20 Page 1 of 2

Item calibrated Conical Horn Antenna WR15CH\_001

Customer Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300,  
Taiwan, R.O.C.

Method of calibration GOST 20271.1, MK KL 8.2-16

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/ Technical manager Date of issue 20.01.20

# Calibration Certificate

Certificate number **01-20**

Page 2 of 2

## Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
G4-186	Signal generator	5	10 July 2020	23-19	RF Power Frequency
G4-161	Signal generator	3	10 July 2020	22-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-134	Measuring horn antenna	14002	23 September 2021	2372-43	Gain

## Calibration conditions

Temperature: 21.8 °C.  
Humidity: 37.0 %.  
Pressure: 100.0 kPa.

## Calibration results are given in the measurement report # 01-20

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	50 – 75 GHz	Corresponds
2	Antenna Gain	21* dBi	Corresponds (Table 1)
3	Antenna Factor	46 dB/m	Corresponds (Table 1)

\* – Expanded uncertainty of measurements 2.8 dB.

*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  
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Accreditation certificate  
No. BY/112 5.0065  
Address: 6, P. Brovki str., Minsk  
220013, Belarus  
Phone/Fax: +375 17 2938496



**MEASUREMENT REPORT # 01-20**  
January 20, 2020

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Conical Horn Antenna WR15CH_001
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	29.11.2019
Date of calibration:	From 09.12.2019 to 20.01.2020

## MEASUREMENT CONDITIONS

Temperature: 21.8 °C	Humidity: 37 %	Pressure: 100.0 kPa
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## MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
G4-186	Signal generator	5	10 July 2020	23-19	RF Power Frequency
G4-161	Signal generator	3	10 July 2020	22-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-134	Measuring horn antenna	14002	23 September 2021	2372-43	Gain

## MEASUREMENT RESULTS

Distance between tested and generating antenna 1 m.

Table 1

Frequency, GHz	50	55	65	75
Power density of electromagnetic field, W/m <sup>2</sup>	0.15	0.18	0.23	0.26
Maximum level of measured power, dBm	-15.0	-14.7	-14.2	-14.2
Gain, dBi	18.7	19.0	20.0	20.5
Expanded uncertainty, dB	2.8	2.8	2.8	2.8
Antenna Factor, dB/m	45.6	46.1	46.5	47.2

*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

Quality Manager


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Certificate number 02-20 Date when calibrated 20.01.20 Page 1 of 2

Item calibrated Conical Horn Antenna WR10CH\_001

Customer Bureau Veritas Group Consumer Products Services Division, Taiwan  
Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300,  
Taiwan, R.O.C.

Method of calibration GOST 20271.1, MK KL 8.2-16

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/ Technical manager Date of issue 20.01.20

# Calibration Certificate

Certificate number **02-20**

Page 2 of 2

## Calibration is performed by using

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
G4-186	Signal generator	5	10 July 2020	23-19	RF Power Frequency
RG4-14	Signal generator	22	10 July 2020	24-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-31A	Measuring horn antenna	35864	23 September 2021	2368-43	Gain

## Calibration conditions

Temperature: 21.8 °C.

Humidity: 37.0 %.

Pressure: 100.0 kPa.

## Calibration results are given in the measurement report # 02-20

#	Parameter	Specifications required	Specifications tested and measured
1	Frequency range	75 – 110 GHz	Corresponds
2	Antenna Gain	21* dBi	Corresponds (Table 1)
3	Antenna Factor	49 dB/m	Corresponds (Table 1)

\* – Expanded uncertainty of measurements 2.8 dB.

*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

No. BY/112 5.0065

Address: 6, P. Brovki str., Minsk  
220013, Belarus

Phone/Fax: +375 17 2938496



**MEASUREMENT REPORT # 02-20**

January 20, 2020

Customer:	Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
Item calibrated:	Conical Horn Antenna WR10CH_001
Method of calibration:	GOST 20271.1, MK KL 8.2-16
Number of samples:	One
Delivery date of the sample:	29.11.2019
Date of calibration:	From 09.12.2019 to 20.01.2020

## MEASUREMENT CONDITIONS

Temperature: 21.8 °C	Humidity: 37 %	Pressure: 100.0 kPa
----------------------	----------------	---------------------

## MEASUREMENT EQUIPMENT

Model	Model Description	Equipment ID	Cal Due Date	Certificate Number	Trace Value
M3-75	Power meter	002189	12 March 2021	06-19	RF Power
G4-186	Signal generator	5	10 July 2020	23-19	RF Power Frequency
RG4-14	Signal generator	22	10 July 2020	24-19	RF Power Frequency
RCH3-72	Frequency meter	931200	13 September 2020	2261-43	Frequency
P6-31A	Measuring horn antenna	35864	23 September 2021	2368-43	Gain

## MEASUREMENT RESULTS

Distance between tested and generating antenna 0.8 m.

Table 1

Frequency, GHz	75	92.5	110
Power density of electromagnetic field, W/m <sup>2</sup>	0.20	0.29	0.37
Maximum level of measured power, dBm	-16.2	-15.5	-15.1
Gain, dBi	19.9	20.6	21.5
Expanded uncertainty, dB	2.8	2.8	2.8
Antenna Factor, dB/m	47.9	49.0	49.6

*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

Quality Manager

A  
A. Roay

This Measurement report issued in duplicate and sent to:

1. Bureau Veritas Group Consumer Products Services Division, Taiwan Branch E-2, No.1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan, R.O.C.
  2. Calibration Laboratory of Microwave Measuring Equipment
- Duplication of Measurement report (complete or partial) must be authorized by the laboratory.



**Virginia Diodes, Inc**  
979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902  
Phone: 434-297-3257  
Fax: 434-297-3258

**Certificate of Conformance**

To: Keysight Technologies, Inc.  
SPECIAL HANDLING - Dock 2LS  
1400 FOUNTAINGROVE PARKWAY  
SANTA ROSA, CA 95403

From: Virginia Diodes, Inc  
979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902

Packing List No: 191700  
Shipping Date: 06/04/19

Today's Date: 06/05/19  
PO Number: 9000855821

Attn: Ryan England  
Phone: 1-707-577-5741  
SO#: 3922450  
FedEx: 4296 8006 3330 / 4296 8006 3340

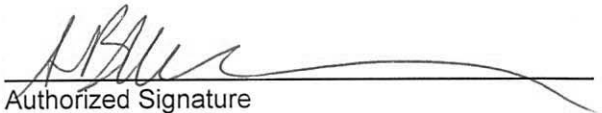
<u>Quantity Shipped</u>	<u>Unit</u>	<u>Description</u>	<u>Order-Job Number</u>
1	EA	VDIWR15.0SAX N9029-80057 Rev - 001; SN: SAX 381.	19194-01
1	EA	VDI15.0ATTE2-36 N9029-80059 Rev - 001; SN: 4-12.	19194-02
1	EA	VDI15.0BPFE57.2-59.4 N9029-80071 Rev - 001; SN: 7-21.	19194-03
1	EA	VDI15.0BPFE59.4-61.6 N9029-80072 Rev - 001; SN: 3-08.	19194-04
1	EA	VDI15.0BPFE61.5-63.8 N9029-80073 Rev - 001; SN: 4-14.	19194-05
1	EA	VDI15.0BPFE63.7-65.9 N9029-80074 Rev - 001; SN: 4-15.	19194-06
1	EA	WR12BPF64-71R1 N9029-80128 Rev - 001; SN: 2-11.	19194-07

Quantity

Shipped    Unit    Description

Order-Job  
Number

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

  
Authorized Signature  
Virginia Diodes, Inc



**Virginia Diodes, Inc**

979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902  
Phone: 434-297-3257  
Fax: 434-297-3258

**Certificate of Conformance**

To: Keysight Technologies, Inc.  
SPECIAL HANDLING - Dock 2LS  
1400 FOUNTAINGROVE PARKWAY  
SANTA ROSA, CA 95403  
United States

From: Virginia Diodes, Inc  
979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902

Packing List No: 191741  
Shipping Date: 06/10/19

Today's Date: 06/10/19  
PO Number: 9000855824

Attn: Ryan England  
Phone: 1-707-577-5741  
SO#: 3922450

<u>Quantity Shipped</u>	<u>Unit</u>	<u>Description</u>	<u>Order-Job Number</u>
1	EA	VDIWR10.0SAX N9029-80052 Rev - 001; SN: SAX 378.	19195D-01
1	EA	VDI10.0ATTE2-34 N9029-80027 Rev - 001; SN: 3-04.	19195D-02

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature  
Virginia Diodes, Inc



**Virginia Diodes, Inc**

979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902  
Phone: 434-297-3257  
Fax: 434-297-3258

**Certificate of Conformance**

To: Keysight Technologies, Inc.  
1400 FOUNTAINGROVE PARKWAY  
DOCK 2LS  
Santa Rosa, CA 95403-1799  
United States

From: Virginia Diodes, Inc  
979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902

Packing List No: 151109                      Today's Date: 05/26/15  
Shipping Date: 05/26/15                      PO Number: 9000708309

Attn: Mike Skaggs  
Phone: 1-707-577-5741  
S.O.#: 3479320.SGS-541

<u>Quantity Shipped</u>	<u>Unit</u>	<u>Description</u>	<u>Order-Job Number</u>
1	EA	VDIWR15.0SGX E8251-80083 Rev - 001; SN: VDI SGX 050.	15115A-01
1	EA	VA15R E8257-80032 Rev - 001; SN: 4L08.	15115A-02

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

  
Authorized Signature  
Virginia Diodes, Inc





**Virginia Diodes, Inc**

979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902  
Phone: 434-297-3257  
Fax: 434-297-3258

**Certificate of Conformance**

To: Keysight Technologies, Inc.  
1400 FOUNTAINGROVE PARKWAY  
DOCK 2LS  
Santa Rosa, CA 95403-1799  
United States


From: Virginia Diodes, Inc  
979 2nd St. SE  
Suite 309  
Charlottesville, VA 22902

Packing List No: 152530	Today's Date: 10/27/15
Shipping Date: 10/26/15	PO Number: 9000722360

Attn: Mike Skaggs  
Phone: 1-707-577-3492  
S.O.#: 3526488.SGS-541

Quantity	Unit	Description	Order-Job Number
1	EA	VDIWR10.0SGX E8251-80080 Rev - 001; SN: VDI SGX 069.	15304D-01

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

  
\_\_\_\_\_  
Authorized Signature  
Virginia Diodes, Inc

工服 NO. 20-06-BCC-176-02L

財團法人台灣電子檢驗中心



收件日期: Jun.11,2020

# 校正報告

## CALIBRATION REPORT

Receipt Date

發行日期: Jun.20,2020

ELECTRONICS TESTING CENTER, TAIWAN

Report Issue Date

Page 1 of 6

顧客名稱 香港商立德國際商品試驗有限公司桃園分公司

Customer

顧客地址 新竹市科學園區力行一路1號E-2

Address

### 供校儀器 ITEM CALIBRATED

儀器名稱: PSG Analog Signal Generator

Nomenclature

製造商: KEYSIGHT

Manufacturer

型別: E8257D

Model No.

識別號碼: MY53401987

ID. No.

上述儀器經本實驗室校正，結果如內文。未經本實驗室書面許可，不得部份複製本報告，完整複製則不在此限。

The above instruments were calibrated by the laboratory and please refer to the content for the calibration results. This report may not be reproduced in part without the written permission of the laboratory, except for full reproduction.

校正資料:  僅量測  調整

Calibration Information Calibration Only Adjusted

環境狀態: 環境溫度: (23 ± 2) °C, 相對濕度: (50 ± 10) %

Environmental Conditions

校正日期: Jun.17,2020

Calibration Date

建議再校日期: Jun.16,2021 註: 建議再校日期為應顧客要求列入。

Recommended Recalibration Date Note: The recommended recalibration date is agreed by the customer.

校正地點: 財團法人台灣電子檢驗中心校正實驗室

Laboratory Location

實驗室名稱地址:  1. 校正實驗室 33383 桃園市龜山區文明路29巷8號 TEL:+886-3-3280026

Laboratory Name and 2. 新竹校正實驗室 30075 新竹市科學園區區區二路47號205室 TEL:+886-3-5798806

Address 3. 台中校正實驗室 40766 台中市西屯區福中二街8號2樓之2 TEL:+886-4-23584899

4. 台南校正實驗室 70248 台南市南區新和二路5號 TEL:+886-6-2925787#50,51

財團法人台灣電子檢驗中心特此證明報告內記載之受校儀器已與下方標準做過比較校正，用以校正之標準器可追溯至中華民國國家度量衡標準實驗室，美國標準及技術研究院，或其它國家之度量衡國家標準。本中心的校正服務均符合ISO/IEC 17025 之規定。

ETC hereby certifies that the equipment noted herein has been compared with the below listed standards. The Standards used to perform this calibration are traceable to NML/ROC,NIST/USA or other countries. The calibration services from ETC are capable of performing services in compliance with the requirements of ISO/IEC 17025.

財團法人台灣電子檢驗中心  
ELECTRONICS TESTING CENTER,  
TAIWAN



實驗室主管  
Laboratory Head



報告簽署人  
Signature



## 使用校正依據 CALIBRATION PROCEDURE USED

- 「信號產生器校正程序書」，B00-CD-369，4th Edition。

## 使用標準器及附配件 STANDARD AND ACCESSORIES USED

儀器名稱【廠牌/型號】 Nomenclature【Mfg./Model No.】	【識別號碼】 【ID. No.】	校正單位(認可編號) Cal. Source(ACRED Code)	報告號碼 Cal. Report No.	校正日期 Date Cal.	有效日期 Due Date
EPM Series Power Meter 【HP E4419B】 【13050609-001】		NML(TAF N0688)	U190100A	2019/07/24	2021/01/23
Avg Power Sensor 【AGILENT E9304A】 【13053522-001】		KEYSIGHT(ANAB AC-1498)	1-11911589470-1	2019/11/15	2022/05/14
Power Sensor 【R&S/NRP-Z56】 【13053525-001】		R&S(DAKKS D-K-15195-01-00)	0260/D-K-15195-01-00	2017/09/11	2021/03/10
Measuring Receiver 【R&S FSMR】 【13054413-001】		R&S(DAKKS D-K-15195-01-00)	438369/D-K-15195-01-01	2017/11/16	2021/05/15
Universal Counter 【HP 53132A】 【13060804-001】		ETC(TAF 0025)	19-12-BAC-630-02L	2020/01/03	2020/07/02
Frequency Counter 【AGILENT 53152A】 【13060808-001】		KEYSIGHT(ANAB AC-1498)	1-11246338304-1	2019/05/09	2022/11/08

# 校正報告

財團法人台灣電子檢驗中心

工 服NO.20-06-BCC-176-02L

## CALIBRATION REPORT

ELECTRONICS TESTING  
CENTER, TAIWAN

Page 3 of 6

### 1. Frequency Accuracy Check:

Reading	Standard	Expanded Uncertainty
250.0000 kHz	249.99998990 kHz	$1.0 \times 10^{-9}$
1.000000 MHz	99.999996117 kHz	$8.8 \times 10^{-10}$
10.000000 MHz	9.9999995995 MHz	$8.2 \times 10^{-10}$
100.000000 MHz	99.999995977 MHz	$8.1 \times 10^{-10}$
200.000000 MHz	199.99999195 MHz	$8.1 \times 10^{-10}$
500.000000 MHz	499.99997987 MHz	$8.1 \times 10^{-10}$
1.000000000 GHz	999.99995975 MHz	$8.1 \times 10^{-10}$
2.000000000 GHz	1.9999999195 GHz	$8.1 \times 10^{-10}$
5.000000000 GHz	4.999999799 GHz	$8.2 \times 10^{-10}$
10.000000000 GHz	9.999999598 GHz	$8.1 \times 10^{-10}$
20.000000000 GHz	19.999999195 GHz	$8.1 \times 10^{-10}$
30.000000000 GHz	29.999998794 GHz	$8.1 \times 10^{-10}$
40.000000000 GHz	39.999998397 GHz	$8.1 \times 10^{-10}$
46.000000000 GHz	45.999998196 GHz	$8.1 \times 10^{-10}$

### 2. Output Level And Frequency Response Accuracy Check:

Test Freq.	Setting(dBm)	Measured(dBm)	Expanded Uncertainty(dB)
250.0000 kHz	0.00	0.06	0.10
1.000000 MHz	0.00	-0.03	0.10
10.000000 MHz	0.00	-0.05	0.10
100.000000 MHz	0.00	-0.05	0.10
200.000000 MHz	0.00	-0.04	0.09
500.000000 MHz	0.00	-0.02	0.11
1.000000000 GHz	0.00	-0.05	0.09
2.000000000 GHz	0.00	0.01	0.15
3.000000000 GHz	0.00	-0.03	0.21
4.000000000 GHz	0.00	-0.00	0.27
5.000000000 GHz	0.00	-0.01	0.15
6.000000000 GHz	0.00	-0.02	0.11
7.000000000 GHz	0.00	-0.02	0.12
8.000000000 GHz	0.00	-0.04	0.11
9.000000000 GHz	0.00	-0.03	0.11
10.000000000 GHz	0.00	-0.04	0.11
11.000000000 GHz	0.00	-0.04	0.16
12.000000000 GHz	0.00	-0.06	0.16
13.000000000 GHz	0.00	0.01	0.16
14.000000000 GHz	0.00	-0.11	0.16
15.000000000 GHz	0.00	-0.07	0.16
16.000000000 GHz	0.00	-0.04	0.16
17.000000000 GHz	0.00	-0.07	0.16
18.000000000 GHz	0.00	-0.23	0.16

# 校正報告

財團法人台灣電子檢驗中心

工 服NO. 20-06-BCC-176-02L

## CALIBRATION REPORT

ELECTRONICS TESTING  
CENTER, TAIWAN

Page 4 of 6

### 2. Output Level And Frequency Response Accuracy Check: (Continued)

Test Freq.	Setting(dBm)	Measured(dBm)	Expanded Uncertainty(dB)
19.000000000 GHz	0.00	-0.37	0.16
20.000000000 GHz	0.00	-0.61	0.16
21.000000000 GHz	0.00	-0.24	0.18
22.000000000 GHz	0.00	-0.10	0.18
23.000000000 GHz	0.00	-0.06	0.18
24.000000000 GHz	0.00	-0.08	0.18
25.000000000 GHz	0.00	-0.10	0.18
26.000000000 GHz	0.00	-0.06	0.18
27.000000000 GHz	0.00	-0.10	0.18
28.000000000 GHz	0.00	-0.08	0.18
29.000000000 GHz	0.00	-0.11	0.18
30.000000000 GHz	0.00	-0.25	0.18
31.000000000 GHz	0.00	-0.06	0.21
32.000000000 GHz	0.00	-0.02	0.21
33.000000000 GHz	0.00	-0.15	0.21
34.000000000 GHz	0.00	0.03	0.21
35.000000000 GHz	0.00	0.02	0.21
36.000000000 GHz	0.00	-0.06	0.21
37.000000000 GHz	0.00	0.02	0.22
38.000000000 GHz	0.00	0.01	0.22
39.000000000 GHz	0.00	-0.10	0.21
40.000000000 GHz	0.00	0.08	0.21
41.000000000 GHz	0.00	0.07	0.38
42.000000000 GHz	0.00	-0.19	0.38
43.000000000 GHz	0.00	-0.31	0.38
44.000000000 GHz	0.00	-0.14	0.38
45.000000000 GHz	0.00	-0.15	0.38
46.000000000 GHz	0.00	-0.35	0.38
47.000000000 GHz	0.00	-0.34	0.38
48.000000000 GHz	0.00	-0.24	0.38
49.000000000 GHz	0.00	-0.40	0.38
50.000000000 GHz	0.00	-0.36	0.38
100.000000 MHz	10.00	9.98	0.62
100.000000 MHz	-10.00	-10.05	0.62
100.000000 MHz	-20.00	-20.07	0.62
100.000000 MHz	-30.00	-30.12	0.62
100.000000 MHz	-40.00	-40.12	0.62
100.000000 MHz	-50.00	-50.09	0.62
100.000000 MHz	-60.00	-60.09	0.62
100.000000 MHz	-70.00	-70.10	0.62
100.000000 MHz	-80.00	-80.10	0.62
100.000000 MHz	-90.00	-90.11	0.62

# 校正報告

財團法人台灣電子檢驗中心

工 服NO. 20-06-BCC-176-02L

## CALIBRATION REPORT

ELECTRONICS TESTING  
CENTER, TAIWAN

Page 5 of 6

### 2. Output Level And Frequency Response Accuracy Check: (Continued)

Test Freq.	Setting(dBm)	Measured(dBm)	Expanded Uncertainty(dB)
100.000000 MHz	-100.00	-100.11	0.62
1.000000000 GHz	10.00	10.01	0.62
1.000000000 GHz	-10.00	-10.10	0.62
1.000000000 GHz	-20.00	-20.12	0.62
1.000000000 GHz	-30.00	-30.16	0.62
1.000000000 GHz	-40.00	-40.16	0.62
1.000000000 GHz	-50.00	-50.13	0.62
1.000000000 GHz	-60.00	-60.12	0.62
1.000000000 GHz	-70.00	-70.13	0.62
1.000000000 GHz	-80.00	-80.10	0.62
1.000000000 GHz	-90.00	-90.11	0.62
1.000000000 GHz	-100.00	-100.11	0.62
10.000000000 GHz	10.00	9.98	0.65
10.000000000 GHz	-10.00	-10.01	0.65
10.000000000 GHz	-20.00	-20.03	0.65
10.000000000 GHz	-30.00	-30.04	0.65
10.000000000 GHz	-40.00	-40.04	0.65
10.000000000 GHz	-50.00	-50.13	0.65
10.000000000 GHz	-60.00	-60.13	0.65
10.000000000 GHz	-70.00	-70.11	0.65
10.000000000 GHz	-80.00	-80.13	0.65
10.000000000 GHz	-90.00	-90.17	0.65
10.000000000 GHz	-100.00	-100.24	0.65
20.000000000 GHz	10.00	9.37	0.68
20.000000000 GHz	-10.00	-10.61	0.68
20.000000000 GHz	-20.00	-20.59	0.68
20.000000000 GHz	-30.00	-30.72	0.68
20.000000000 GHz	-40.00	-40.71	0.68
20.000000000 GHz	-50.00	-50.99	0.68
20.000000000 GHz	-60.00	-60.99	0.68
20.000000000 GHz	-70.00	-71.00	0.68
20.000000000 GHz	-80.00	-81.01	0.68
20.000000000 GHz	-90.00	-91.00	0.68
20.000000000 GHz	-100.00	-101.04	0.68

# 校正報告

財團法人台灣電子檢驗中心

工 服NO. 20-06-BCC-176-02L

## CALIBRATION REPORT

ELECTRONICS TESTING  
CENTER, TAIWAN

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### 3. Harmonic Distortion Measurement Check:

Test Freq.	Harmonic(dBc)	Expanded Uncertainty(dB)
250.0000 kHz	-31.2	0.69
1.00000 MHz	-34.4	0.69
10.0000 MHz	-39.7	0.69
100.0000 MHz	-66.7	0.69
500.0000 MHz	-37.2	0.69
1.000000000 GHz	-39.0	0.69
5.000000000 GHz	-54.5	1.3
10.000000000 GHz	-67.6	1.9
20.000000000 GHz	-65.5	1.9

### 4. 10 MHz Ref. Out. Frequency Accuracy Check:

Reading(MHz)	Standard(MHz)	Expanded Uncertainty
10	9.9999995953	$8.7 \times 10^{-10}$

說明:

- 1.項次1、4校正報告內的相對擴充不確定度評估與表示是依據「ISO Guide 98-3量測不確定度表示方式指引」，相對擴充不確定度 $U = ku_c$ ，其中 $u_c$ 為相對組合標準不確定度， $k = 2.0$ ，為信賴水準約95%之涵蓋因子。
- 2.項次2、3校正報告內的擴充不確定度評估與表示是依據「ISO Guide 98-3量測不確定度表示方式指引」，擴充不確定度 $U = ku_c$ ，其中 $u_c$ 為組合標準不確定度， $k = 2.0$ ，為信賴水準約95%之涵蓋因子。