

**CERTIFICATE OF
 CALIBRATION**



Certificate No. ACT-1272

<p>CERTIFICATION NUMBER CP134-00034-840</p> <p>FOR Sample Manufacturing 3121 Medalist Drive Oshkosh, WI 54902</p> <p>TEST INSTRUMENT EMI Test Receiver</p> <p>MAKE Rohde & Schwarz MODEL ESR 3 RANGE 10 Hz to 3.6 GHz</p> <p>CUSTOMER LOCATION Location1 Location2</p> <p>CONDITION RECEIVED In Tolerance CONDITION RETURNED In Tolerance CALIBRATED BY Benjamin Kees REVIEWED/ISSUED D.P. 07/29/2025 CALIBRATION LOCATION FVM ENVIRONMENT 69.0°F, 31.0%RH, 28.92inHg CALIBRATION DATE 05/14/2025 RECALIBRATION DUE 05/14/2026</p>	<p>IDENTIFICATION EL-026B</p> <p>SERIAL NUMBER 34</p> <p>PURCHASE ORDER #</p> <p>PROCEDURES FOLLOWED EL-026B rev. 0</p> <p>STANDARDS USED</p> <table border="1"> <thead> <tr> <th>INSTRUMENT</th> <th>SERIAL NUMBER</th> <th>TRACE NUMBER</th> <th>NEXT CAL</th> </tr> </thead> <tbody> <tr> <td>FRF-012</td> <td>MY50006339</td> <td>C0313-44729-823</td> <td>11/30/2025</td> </tr> <tr> <td>FRF-021</td> <td>323</td> <td>CN276-31714-693</td> <td>07/31/2025</td> </tr> <tr> <td>FRF-025A</td> <td>122096</td> <td>C0277-38071-693</td> <td>09/30/2025</td> </tr> <tr> <td>FRF-025E</td> <td>102901</td> <td>C0253-34222-762</td> <td>08/31/2025</td> </tr> <tr> <td>FVS-275E</td> <td>16783134</td> <td>C0134-20963-690</td> <td>05/31/2025</td> </tr> </tbody> </table>	INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL	FRF-012	MY50006339	C0313-44729-823	11/30/2025	FRF-021	323	CN276-31714-693	07/31/2025	FRF-025A	122096	C0277-38071-693	09/30/2025	FRF-025E	102901	C0253-34222-762	08/31/2025	FVS-275E	16783134	C0134-20963-690	05/31/2025
INSTRUMENT	SERIAL NUMBER	TRACE NUMBER	NEXT CAL																						
FRF-012	MY50006339	C0313-44729-823	11/30/2025																						
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FVS-275E	16783134	C0134-20963-690	05/31/2025																						



CALIBRATION RESULTS

* DENOTES "OUT OF TOLERANCE"

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
REFERENCE FREQUENCY UNCERTAINTY	(MHz) 1000	(MHz) 1000	(MHz) 1000	(MHz) 1000	(MHz) 1000	(MHz) 6.0E-1
2nd IF IMAGE FREQUENCY REJECTION	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
101 MHz	>80	>80	>80	Pass	Pass	
1799 MHz	>80	>80	>80	Pass	Pass	
3599 MHz	>80	>80	>80	Pass	Pass	
3rd IF IMAGE FREQUENCY REJECTION	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
101 MHz	>80	>80	>80	Pass	Pass	
3599 MHz	>80	>80	>80	Pass	Pass	
2nd IF REJECTION	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
101 MHz	>80	>80	>80	Pass	Pass	
3599 MHz	>80	>80	>80	Pass	Pass	

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3rd IF REJECTION	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1001 MHz	>80	>80	>80	>80	>80	
BANDWIDTH SWITCHING LEVEL						
Sweep Mode, Normal (3 dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
RBW:						
40 MHz	0	0	0	0	0	6.0E-1
28 MHz	0	0	0	0	0	6.0E-1
20 MHz	0	0	0	0	0	6.0E-1
10 MHz	0	0	0	0	0	6.0E-1
5 MHz	0	0	0	0	0	6.0E-1
3 MHz	0	0	0	0	0	6.0E-1
2 MHz	0	0	0	0	0	6.0E-1
1 MHz	0	0	0	0	0	6.0E-1
500 kHz	0	0	0	0	0	6.0E-1
300 kHz	0	0	0	0	0	6.0E-1
200 kHz	0	0	0	0	0	6.0E-1
100 kHz	0	0	0	0	0	6.0E-1
10 kHz	Ref	Ref	Ref	Ref	Ref	
1 kHz	0	0	0	0	0	6.0E-1
100 Hz	0	0	0	0	0	6.0E-1
FFT Mode, Normal (3 dB)						
RBW:						
300 kHz	0	0	0	0	0	6.0E-1
200 kHz	0	0	0	0	0	6.0E-1
100 kHz	0	0	0	0	0	6.0E-1
10 kHz	0	0	0	0	0	6.0E-1
1 kHz	0	0	0	0	0	6.0E-1
100 Hz	0	0	0	0	0	6.0E-1
Sweep Mode, EMI (6 dB)						
RBW:						
1 MHz	0	0	0	0	0	6.0E-1
120 kHz	0	0	0	0	0	6.0E-1
9 kHz	0	0	0	0	0	6.0E-1
200 Hz	0	0	0	0	0	6.0E-1
FFT Mode, EMI (6 dB)						
RBW:						
1 MHz	0	0	0	0	0	6.0E-1
120 kHz	0	0	0	0	0	6.0E-1
9 kHz	0	0	0	0	0	6.0E-1
200 Hz	0	0	0	0	0	6.0E-1
BANDWIDTH Normal (3dB)	(%)	(%)	(%)	(%)	(%)	(%)
RBW:						

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
10 MHz	0	-3	3	0	0	6.0E-1
5 MHz	0	-3	3	0	0	6.0E-1
3 MHz	0	-3	3	0	0	6.0E-1
2 MHz	0	-3	3	0	0	6.0E-1
1 MHz	0	-3	3	0	0	6.0E-1
500 kHz	0	-3	3	0	0	6.0E-1
300 kHz	0	-3	3	0	0	6.0E-1
200 kHz	0	-3	3	0	0	6.0E-1
100 kHz	0	-3	3	0	0	6.0E-1
10 kHz	0	-3	3	0	0	6.0E-1
1 kHz	0	-3	3	0	0	6.0E-1
100 Hz	0	-3	3	0	0	6.0E-1
EMI (6 dB)						
RBW:						
1 MHz	0	-3	3	0	0	6.0E-1
120 kHz	0	-3	3	0	0	6.0E-1
9 kHz	0	-3	3	0	0	6.0E-1
200 Hz	0	-3	3	0	0	6.0E-1
SHAPE FACTOR						
Normal (3dB)						
RBW:						
10 MHz	<5	<5	<5	<5	<5	
5 MHz	<5	<5	<5	<5	<5	
3 MHz	<5	<5	<5	<5	<5	
2 MHz	<5	<5	<5	<5	<5	
1 MHz	<5	<5	<5	<5	<5	
500 kHz	<5	<5	<5	<5	<5	
300 kHz	<5	<5	<5	<5	<5	
200 kHz	<5	<5	<5	<5	<5	
100 kHz	<5	<5	<5	<5	<5	
10 kHz	<5	<5	<5	<5	<5	
1 kHz	<5	<5	<5	<5	<5	
100 Hz	<5	<5	<5	<5	<5	
EMI (6 dB)						
RBW:						
1 MHz	<4	<4	<4	<4	<4	
120 kHz	<4	<4	<4	<4	<4	
9 kHz	<4	<4	<4	<4	<4	
200 Hz	<4	<4	<4	<4	<4	
SPURIOUS RESPONSE						
	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
16 MHz	<-103	<-103	<-103	<-103	<-103	
32 MHz	<-103	<-103	<-103	<-103	<-103	
64 MHz	<-103	<-103	<-103	<-103	<-103	
128 MHz	<-103	<-103	<-103	<-103	<-103	
256 MHz	<-103	<-103	<-103	<-103	<-103	
384 MHz	<-103	<-103	<-103	<-103	<-103	

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
NOISE DISPLAY						
Preselector	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
off, Preamp off						
9 kHz	<-130	<-130	<-130	<-130	<-130	
99 kHz	<-130	<-130	<-130	<-130	<-130	
999 kHz	<-145	<-145	<-145	<-145	<-145	
10.1 MHz	<-152	<-152	<-152	<-152	<-152	
19.99 MHz	<-152	<-152	<-152	<-152	<-152	
49.99 MHz	<-152	<-152	<-152	<-152	<-152	
99.99 MHz	<-152	<-152	<-152	<-152	<-152	
199.9 MHz	<-152	<-152	<-152	<-152	<-152	
499.9 MHz	<-152	<-152	<-152	<-152	<-152	
599.9 MHz	<-152	<-152	<-152	<-152	<-152	
699.9 MHz	<-152	<-152	<-152	<-152	<-152	
799.9 MHz	<-152	<-152	<-152	<-152	<-152	
899.9 MHz	<-152	<-152	<-152	<-152	<-152	
999.9 MHz	<-152	<-152	<-152	<-152	<-152	
1199.9 MHz	<-150	<-150	<-150	<-150	<-150	
1399.9 MHz	<-150	<-150	<-150	<-150	<-150	
1599.9 MHz	<-150	<-150	<-150	<-150	<-150	
1799.9 MHz	<-150	<-150	<-150	<-150	<-150	
1999.9 MHz	<-150	<-150	<-150	<-150	<-150	
2199.9 MHz	<-150	<-150	<-150	<-150	<-150	
2399.9 MHz	<-150	<-150	<-150	<-150	<-150	
2599.9 MHz	<-150	<-150	<-150	<-150	<-150	
2799.9 MHz	<-150	<-150	<-150	<-150	<-150	
2999.9 MHz	<-150	<-150	<-150	<-150	<-150	
3199.9 MHz	<-150	<-150	<-150	<-150	<-150	
3399.9 MHz	<-150	<-150	<-150	<-150	<-150	
3599.9 MHz	<-150	<-150	<-150	<-150	<-150	
Preselector on,						
Preamp off						
9 kHz	<-130	<-130	<-130	<-130	<-130	
99 kHz	<-130	<-130	<-130	<-130	<-130	
999 kHz	<-145	<-145	<-145	<-145	<-145	
10.1 MHz	<-152	<-152	<-152	<-152	<-152	
19.99 MHz	<-152	<-152	<-152	<-152	<-152	
49.99 MHz	<-152	<-152	<-152	<-152	<-152	
99.99 MHz	<-152	<-152	<-152	<-152	<-152	
199.9 MHz	<-152	<-152	<-152	<-152	<-152	
499.9 MHz	<-152	<-152	<-152	<-152	<-152	
599.9 MHz	<-152	<-152	<-152	<-152	<-152	
699.9 MHz	<-152	<-152	<-152	<-152	<-152	
799.9 MHz	<-152	<-152	<-152	<-152	<-152	
899.9 MHz	<-152	<-152	<-152	<-152	<-152	
999.9 MHz	<-152	<-152	<-152	<-152	<-152	
1199.9 MHz	<-150	<-150	<-150	<-150	<-150	
1399.9 MHz	<-150	<-150	<-150	<-150	<-150	
1599.9 MHz	<-150	<-150	<-150	<-150	<-150	
1799.9 MHz	<-150	<-150	<-150	<-150	<-150	
1999.9 MHz	<-150	<-150	<-150	<-150	<-150	
2199.9 MHz	<-150	<-150	<-150	<-150	<-150	

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
2399.9 MHz	<-150	<-150	<-150	<-150	<-150	
2599.9 MHz	<-150	<-150	<-150	<-150	<-150	
2799.9 MHz	<-150	<-150	<-150	<-150	<-150	
2999.9 MHz	<-150	<-150	<-150	<-150	<-150	
3199.9 MHz	<-150	<-150	<-150	<-150	<-150	
3399.9 MHz	<-150	<-150	<-150	<-150	<-150	
3599.9 MHz	<-150	<-150	<-150	<-150	<-150	
Preselector on,						
Preamp on						
9 kHz	<-150	<-150	<-150	<-150	<-150	
99 kHz	<-150	<-150	<-150	<-150	<-150	
999 kHz	<-155	<-155	<-155	<-155	<-155	
10.1 MHz	<-155	<-155	<-155	<-155	<-155	
19.99 MHz	<-165	<-165	<-165	<-165	<-165	
49.99 MHz	<-165	<-165	<-165	<-165	<-165	
99.99 MHz	<-165	<-165	<-165	<-165	<-165	
199.9 MHz	<-165	<-165	<-165	<-165	<-165	
499.9 MHz	<-165	<-165	<-165	<-165	<-165	
599.9 MHz	<-165	<-165	<-165	<-165	<-165	
699.9 MHz	<-165	<-165	<-165	<-165	<-165	
799.9 MHz	<-165	<-165	<-165	<-165	<-165	
899.9 MHz	<-165	<-165	<-165	<-165	<-165	
999.9 MHz	<-165	<-165	<-165	<-165	<-165	
1199.9 MHz	<-162	<-162	<-162	<-162	<-162	
1399.9 MHz	<-162	<-162	<-162	<-162	<-162	
1599.9 MHz	<-162	<-162	<-162	<-162	<-162	
1799.9 MHz	<-162	<-162	<-162	<-162	<-162	
1999.9 MHz	<-162	<-162	<-162	<-162	<-162	
2199.9 MHz	<-162	<-162	<-162	<-162	<-162	
2399.9 MHz	<-162	<-162	<-162	<-162	<-162	
2599.9 MHz	<-162	<-162	<-162	<-162	<-162	
2799.9 MHz	<-162	<-162	<-162	<-162	<-162	
2999.9 MHz	<-162	<-162	<-162	<-162	<-162	
3199.9 MHz	<-162	<-162	<-162	<-162	<-162	
3399.9 MHz	<-162	<-162	<-162	<-162	<-162	
3599.9 MHz	<-162	<-162	<-162	<-162	<-162	
ABSOLUTE LEVEL						
64 MHz	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
Input 1,	0	0	0	0	0	6.0E-1
preselector						
off, preamp off						
Input 1,	0	0	0	0	0	6.0E-1
preselector on,						
preamp off						
Input 1,	0	0	0	0	0	6.0E-1
preselector on,						
preamp on						
Input 2,	0	0	0	0	0	6.0E-1
preselector						
off, preamp off						

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Input 2, preselector on, preamp off	0	0	0	0	0	6.0E-1
Input 2, preselector on, preamp on	0	0	0	0	0	6.0E-1
FREQUENCY RESPONSE						
Input 1	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
RF Atten 5 dB						
9 kHz to 3599 MHz	0	-1	1	0	0	6.0E-1
RF Atten 10 dB						
9 kHz to 51 MHz	0	-1	1	0	0	6.0E-1
101 to 3599 MHz	0	0	0	0	0	6.0E-1
RF Atten 20 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1
10.15 to 3599 MHz	0	0	0	0	0	6.0E-1
RF Atten 30 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1
10.15 to 3599 MHz	0	0	0	0	0	6.0E-1
RF Atten 40 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1
10.15 to 3599 MHz	0	0	0	0	0	6.0E-1
Input 2						
RF Atten 5 dB						
9 kHz to 999 MHz	0	-1	1	0	0	6.0E-1
RF Atten 10 dB						
9 kHz to 51 MHz	0	-1	1	0	0	6.0E-1
101 to 999 MHz	0	0	0	0	0	6.0E-1
RF Atten 20 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1
10.15 to 999 MHz	0	0	0	0	0	6.0E-1
RF Atten 30 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1
10.15 to 999 MHz	0	0	0	0	0	6.0E-1
RF Atten 40 dB						
9 kHz to 1.005 MHz	0	-1	1	0	0	6.0E-1

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
10.15 to 999 MHz	0	0	0	0	0	6.0E-1
DISPLAY						
NONLINEARITY						
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
10 dB	10	10	10	10	10	6.0E-1
12 dB	8	8	8	8	8	6.0E-1
14 dB	6	6	6	6	6	6.0E-1
16 dB	4	4	4	4	4	6.0E-1
18 dB	2	2	2	2	2	6.0E-1
20 dB	Ref	Ref	Ref	Ref	Ref	
22 dB	-2	-2	-2	-2	-2	6.0E-1
24 dB	-4	-4	-4	-4	-4	6.0E-1
26 dB	-6	-6	-6	-6	-6	6.0E-1
28 dB	-8	-8	-8	-8	-8	6.0E-1
30 dB	-10	-10	-10	-10	-10	6.0E-1
32 dB	-12	-12	-12	-12	-12	6.0E-1
34 dB	-14	-14	-14	-14	-14	6.0E-1
36 dB	-16	-16	-16	-16	-16	6.0E-1
38 dB	-18	-18	-18	-18	-18	6.0E-1
40 dB	-20	-20	-20	-20	-20	6.0E-1
42 dB	-22	-22	-22	-22	-22	6.0E-1
44 dB	-24	-24	-24	-24	-24	6.0E-1
46 dB	-26	-26	-26	-26	-26	6.0E-1
48 dB	-28	-28	-28	-28	-28	6.0E-1
50 dB	-30	-30	-30	-30	-30	6.0E-1
52 dB	-32	-32	-32	-32	-32	6.0E-1
54 dB	-34	-34	-34	-34	-34	6.0E-1
56 dB	-36	-36	-36	-36	-36	6.0E-1
58 dB	-38	-38	-38	-38	-38	6.0E-1
60 dB	-40	-40	-40	-40	-40	6.0E-1
65 dB	-45	-45	-45	-45	-45	6.0E-1
70 dB	-50	-50	-50	-50	-50	6.0E-1
75 dB	-55	-55	-55	-55	-55	6.0E-1
80 dB	-60	-60	-60	-60	-60	6.0E-1
RF ATTENUATOR						
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
0 dB	10	10	10	10	10	6.0E-1
5 dB	5	5	5	5	5	6.0E-1
10 dB	Ref	Ref	Ref	Ref	Ref	
15 dB	-5	-5	-5	-5	-5	6.0E-1
20 dB	-10	-10	-10	-10	-10	6.0E-1
25 dB	-15	-15	-15	-15	-15	6.0E-1
30 dB	-20	-20	-20	-20	-20	6.0E-1
40 dB	-25	-25	-25	-25	-25	6.0E-1
50 dB	-30	-30	-30	-30	-30	6.0E-1
60 dB	-35	-35	-35	-35	-35	6.0E-1
70 dB	-40	-40	-40	-40	-40	6.0E-1

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
PHASE NOISE						
OFFSET						
	(dBc/Hz)	(dBc/Hz)	(dBc/Hz)	(dBc/Hz)	(dBc/Hz)	(dBc/Hz)
100 Hz	<-84	<-84	<-84	<-84	<-84	
1 kHz	<-101	<-101	<-101	<-101	<-101	
10 kHz	<-106	<-106	<-106	<-106	<-106	
96 kHz	<-115	<-115	<-115	<-115	<-115	
1 MHz	<-134	<-134	<-134	<-134	<-134	
Sine Wave Accuracy						
Band A						
10 kHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
70 kHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
149 kHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
Band B						
151 kHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
15 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
29 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
Band C						
31 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
165 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
299 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
Band D						
301 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
650 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1
990 MHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	52	50	50	6.0E-1
AVG Measured	50	48	52	50	50	6.0E-1
RMS Measured	50	48	52	50	50	6.0E-1

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Band E						
1.01 GHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	53	50	50	6.0E-1
AVG Measured	50	48	53	50	50	6.0E-1
RMS Measured	50	48	53	50	50	6.0E-1
1.8 GHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	53	50	50	6.0E-1
AVG Measured	50	48	53	50	50	6.0E-1
RMS Measured	50	48	53	50	50	6.0E-1
3.59 GHz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak Measured	50	48	52	50	50	6.0E-1
Peak Measured	50	48	53	50	50	6.0E-1
AVG Measured	50	48	53	50	50	6.0E-1
RMS Measured	50	48	53	50	50	6.0E-1
Absolute Amplitude						
Measured @ reference pulse rate	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
70 kHz	0	-2	2	0	0	6.0E-1
15 MHz	0	-2	2	0	0	6.0E-1
165 MHz	0	-2	2	0	0	6.0E-1
650 MHz	0	-2	2	0	0	6.0E-1
Quasi Peak Detector Responses to Pulses						
Band A @ RBW 200 Hz						
10 kHz Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-4	-5	-3	-4	-4	6.0E-1
60	-3	-4	-2	-3	-3	6.0E-1
10	4	3	5	4	4	6.0E-1
5	7	5	9	7	7	6.0E-1
2	13	11	15	13	13	6.0E-1
1	17	15	19	17	17	6.0E-1

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
Sinlge pulse	19	17	21	19	19	6.0E-1
70 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-4	-5	-3	-4	-4	6.0E-1
60	-3	-4	-2	-3	-3	6.0E-1
10	4	3	5	4	4	6.0E-1
5	7	5	9	7	7	6.0E-1
2	13	11	15	13	13	6.0E-1
1	17	15	19	17	17	6.0E-1
Sinlge pulse	19	17	21	19	19	6.0E-1
149 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-4	-5	-3	-4	-4	6.0E-1
60	-3	-4	-2	-3	-3	6.0E-1
10	4	3	5	4	4	6.0E-1
5	7	5	9	7	7	6.0E-1
2	13	11	15	13	13	6.0E-1
1	17	15	19	17	17	6.0E-1
Sinlge pulse	19	17	21	19	19	6.0E-1
Band B @ RBW 9 kHz						
151 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-4.5	-5.5	-3.5	-4.5	-4.5	6.0E-2
20	6.5	5.5	7.5	6.5	6.5	6.0E-2
10	10	9	12	10	10	6.0E-1
2	20.5	18.5	22.5	20.5	20.5	6.0E-2
1	22.5	20.5	24.5	22.5	22.5	6.0E-2
Single Pulse	23.5	21.5	25.5	23.5	23.5	6.0E-2
15 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-4.5	-5.5	-3.5	-4.5	-4.5	6.0E-2
20	6.5	5.5	7.5	6.5	6.5	6.0E-2
10	10	9	12	10	10	6.0E-1
2	20.5	18.5	22.5	20.5	20.5	6.0E-2
1	22.5	20.5	24.5	22.5	22.5	6.0E-2
Single Pulse	23.5	21.5	25.5	23.5	23.5	6.0E-2
29 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-4.5	-5.5	-3.5	-4.5	-4.5	6.0E-2

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
20	6.5	5.5	7.5	6.5	6.5	6.0E-2
10	10	9	12	10	10	6.0E-1
2	20.5	18.5	22.5	20.5	20.5	6.0E-2
1	22.5	20.5	24.5	22.5	22.5	6.0E-2
Single Pulse	23.5	21.5	25.5	23.5	23.5	6.0E-2
Band C @ RBW						
120 kHz						
31 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
2	26	24	28	26	26	6.0E-1
1	28.5	26.5	30.5	28.5	28.5	6.0E-2
Single Pulse	31.5	29.5	33.5	31.5	31.5	6.0E-2
165 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
2	26	24	28	26	26	6.0E-1
1	28.5	26.5	30.5	28.5	28.5	6.0E-2
Single Pulse	31.5	29.5	33.5	31.5	31.5	6.0E-2
299 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
2	26	24	28	26	26	6.0E-1
1	28.5	26.5	30.5	28.5	28.5	6.0E-2
Single Pulse	31.5	29.5	33.5	31.5	31.5	6.0E-2
Band D @ RBW						
120 kHz						
301 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
650 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	

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1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
990 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
100	Reference	Reference	Reference	Reference	Reference	
1000	-8	-9	-7	-8	-8	6.0E-1
20	9	8	10	9	9	6.0E-1
10	14	13	16	14	14	6.0E-1
RMS Detector Responses to Pulses						
Band A @ RBW 200 Hz						
10 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-6	-7	-5	-6	-6	6.0E-1
10	4	4	4	4	4	6.0E-1
5	9	8	10	9	9	6.0E-1
70 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-6	-7	-5	-6	-6	6.0E-1
10	4	4	4	4	4	6.0E-1
5	9	8	10	9	9	6.0E-1
149 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
25	Reference	Reference	Reference	Reference	Reference	
100	-6	-7	-5	-6	-6	6.0E-1
10	4	4	4	4	4	6.0E-1
5	9	8	10	9	9	6.0E-1
Band B @ RBW 9 kHz						
151 kHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	15	14	17	15	15	6.0E-1
25	16	14	18	16	16	6.0E-1
10	20	18	22	20	20	6.0E-1
5	25	23	27	25	25	6.0E-1

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FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
15 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	15	14	17	15	15	6.0E-1
25	16	14	18	16	16	6.0E-1
10	20	18	22	20	20	6.0E-1
5	25	23	27	25	25	6.0E-1
29 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	15	14	17	15	15	6.0E-1
25	16	14	18	16	16	6.0E-1
10	20	18	22	20	20	6.0E-1
5	25	23	27	25	25	6.0E-1
Band C @ RBW 120 kHz						
31 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
165 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
299 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
Band D @ RBW 120 kHz						
301 MHz						

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Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
650 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
990 MHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
316	5	5	6	5	5	6.0E-1
100	10	9	11	10	10	6.0E-1
31.6	20	18	22	20	20	6.0E-1
Band E @ RBW 1 MHz						
1.01 GHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
100000	-20	-22	-18	-20	-20	6.0E-1
316	10	9	11	10	10	6.0E-1
1.8 GHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
100000	-20	-22	-18	-20	-20	6.0E-1
316	10	9	11	10	10	6.0E-1
3.59 GHz						
Pulse rate (Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1000	Reference	Reference	Reference	Reference	Reference	
10000	-10	-11	-9	-10	-10	6.0E-1
100000	-20	-22	-18	-20	-20	6.0E-1
316	10	9	11	10	10	6.0E-1
Relative Pulse Response						

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Band A @ 100 kHz						
Pulse rate 25 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
AVG	12.4	10.9	13.9	12.4	12.4	6.0E-2
Peak	6.1	4.6	7.6	6.1	6.1	6.0E-2
RMS	4.2	2.7	5.7	4.2	4.2	6.0E-2
Band B @ 5 MHz						
Pulse rate 100 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
Peak	6.6	5.1	8.1	6.6	6.6	6.0E-2
RMS	14.3	12.8	15.8	14.3	14.3	6.0E-2
Pulse rate 500 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
AVG	22.9	21.4	24.4	22.9	22.9	6.0E-2
Band C @ 50 MHz						
Pulse rate 100 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
Peak	12	11	14	12	12	6.0E-1
RMS	20.1	18.6	21.6	20.1	20.1	6.0E-2
Pulse rate 500 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
AVG	26.3	24.8	27.8	26.3	26.3	6.0E-2
Band D @ 500 MHz						
Pulse rate 100 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)
Quasi Peak	Reference (dB)	(dB)				
Peak	12	11	14	12	12	6.0E-1
RMS	20.1	18.6	21.6	20.1	20.1	6.0E-2
Pulse rate 500 Hz	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)	(dBμV)

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Quasi Peak	Reference	Reference	Reference	Reference	Reference	
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
AVG	26.3	24.8	27.8	26.3	26.3	6.0E-2
1 MHz Impulse	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Bandwidth @ 1.5 GHz						
Peak Detector	1	1	1	1	1	6.0E-1
Selectivity						
Band A @ 70 kHz						
RBW 200 Hz						
n dB Down	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
1.5	155	90	220	155	155	6.0E-1
6	200	180	220	200	200	6.0E-1
20	310	180	440	310	310	6.0E-1
Band B @ 15 MHz						
RBW 9 kHz						
n dB Down	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
1.5	7	4	10	7	7	6.0E-1
6	9	8	10	9	9	6.0E-1
20	14	8	20	14	14	6.0E-1
Band C @ 165 MHz						
RBW 120 kHz						
dB Down	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
1.5	90	40	140	90	90	6.0E-1
6	120	100	140	120	120	6.0E-1
20	190	100	280	190	190	6.0E-1
Band D @ 650 MHz						
RBW 120 kHz						
n dB Down	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
1.5	90	40	140	90	90	6.0E-1
6	120	100	140	120	120	6.0E-1
20	190	100	280	190	190	6.0E-1
Band E @ 1.5 GHz						
RBW 1 MHz						
n dB Down	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)

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 CALIBRATION**



Certificate No. ACT-1272

FEATURE	NOMINAL	LOWER LIMIT	UPPER LIMIT	AS FOUND	AS LEFT	UNCERTAINTY
3	0.8	0.5	1.1	0.8	0.8	6.0E-2
6	0.925	0.750	1.100	0.925	0.925	6.0E-4
9	1.45	0.90	2.00	1.45	1.45	6.0E-3
20	1.8	0.9	2.7	1.8	1.8	6.0E-2

COMMENTS

Example certificate, actual results and uncertainties will be reported at the time of calibration.
 Nominal and limits may vary based on actual make/model.

■ This certificate shall not be altered in any form or reproduced, except in full, without prior written approval from originating lab. These results relate only to the item(s) calibrated. Form Revision 10: 06/04/2024

■ Total expanded measurement uncertainties expressed are based on a confidence level of 95%; coverage factor of (k=2). The statement of compliance in this certificate was issued without taking the uncertainty of measurement into consideration. The customer shall assess the results and uncertainty when determining if the results meet their needs. (This is considered "shared responsibility.") Uncertainties expressed in nominal units.

■ The calibrations within the certificate/report are traceable through NIST or another National Metrology Institute to the International System of Units (SI). Calibration was completed in accordance with ISO/IEC 17025:2017, ANSI/NCSL Z540-1-1994 and ANSI/NCSL Z540.3-2006. Other standards listed upon request.