



天线性能测试报告			
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项目名称	M4021	结构工程师	黄振明
天线频段	2G/3G/4G		
报告版本	时间	内容概括	
V1.0	2024-7-23	天线性能测试报告(更换新电池)	

测试报告目录

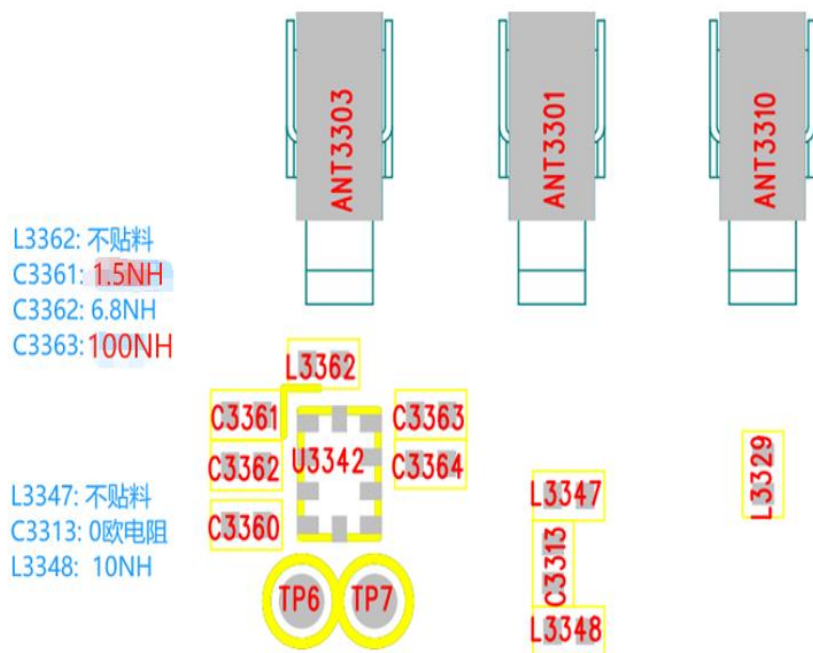
- 1. 整机效果图
- 2. 主天线匹配电路
- 3. 主天线开关逻辑
- 4. 天线测试数据
- 5. 分集天线匹配电路
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1 整机效果图

整机正反面，如图：



2 主天线匹配电路

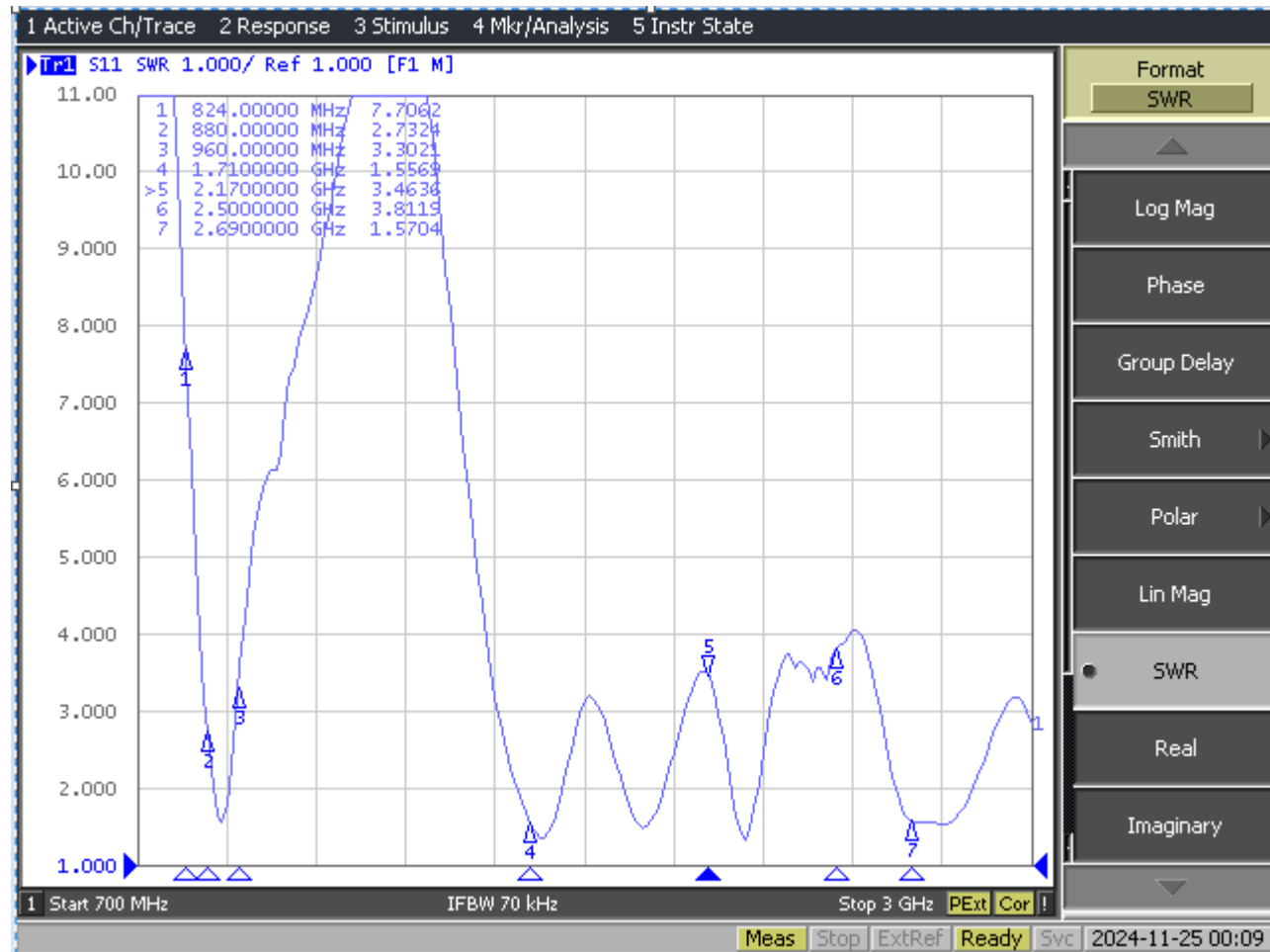


主板型号 : CSM91-01
20231220

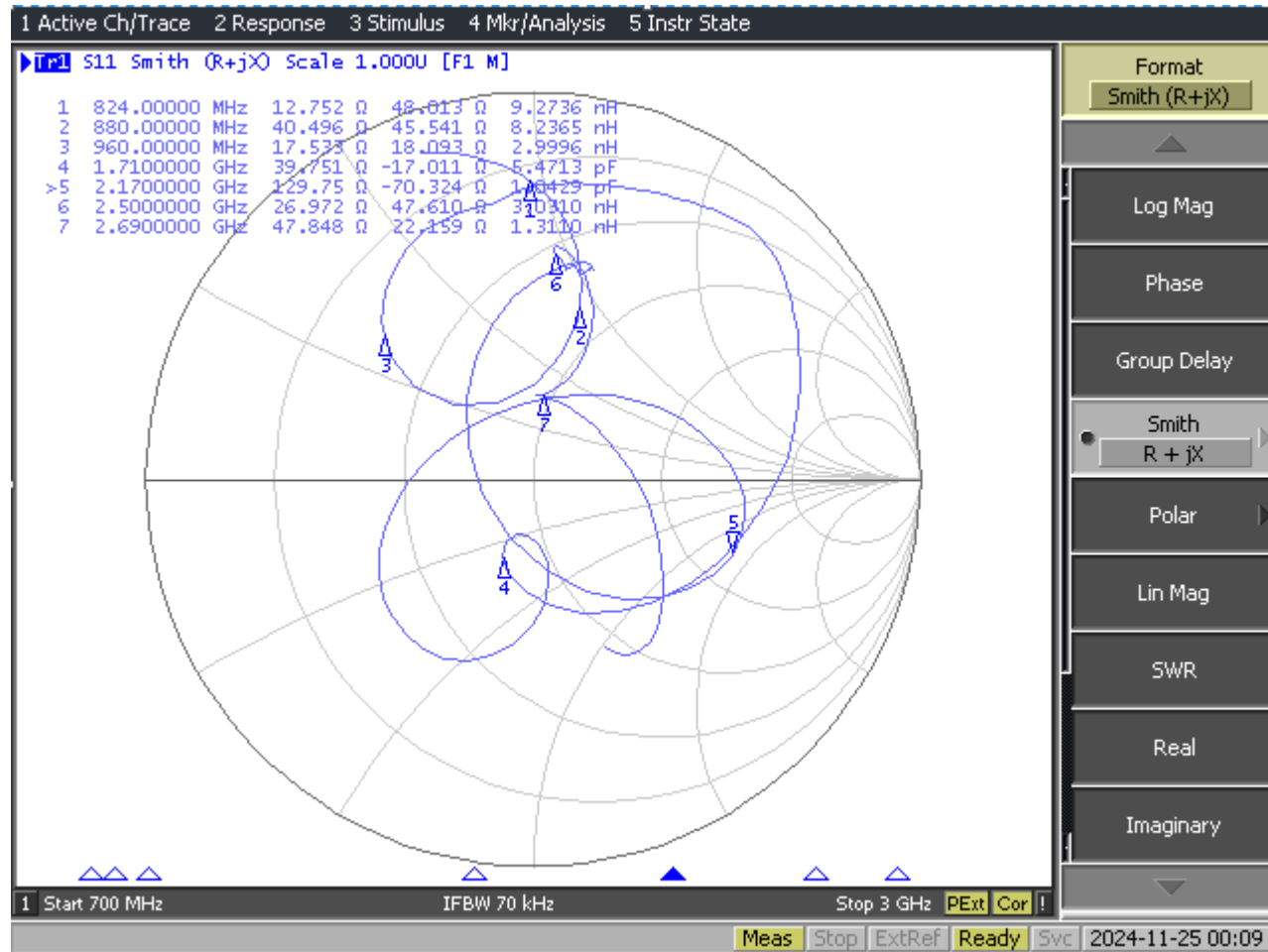
3 开关逻辑

RF1控制：1.5nH	GSM900/1900+WCDMA2100/1900/1700/900/850+LTE-B1/B2/B4/B8/B66
RF2控制：6.8nH	WCDMA850+LTE-B5
RF3控制：100nH	LTE-B12/B17/B28

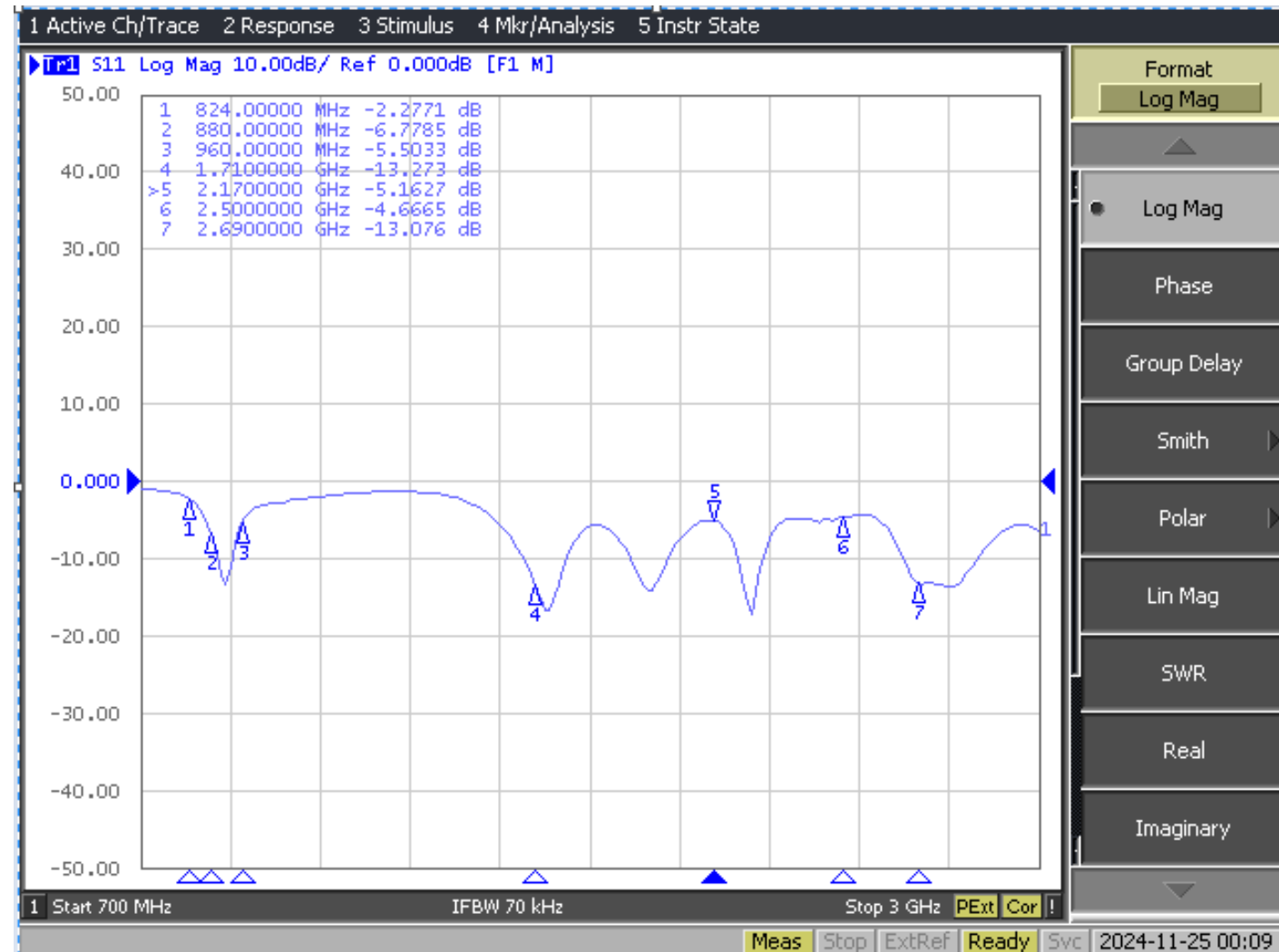
4 MAIN-1 RF1



5 MAIN-1 RF1



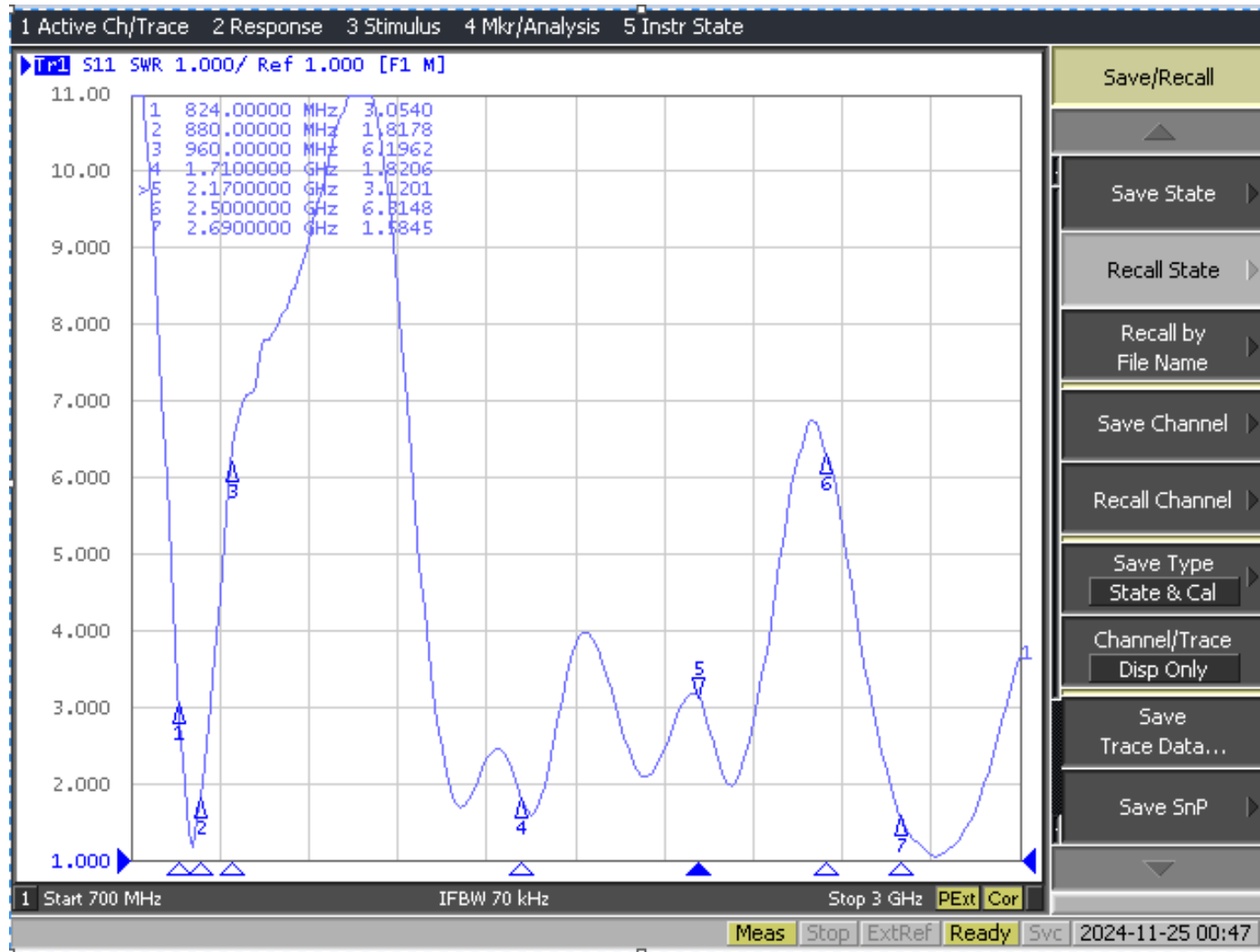
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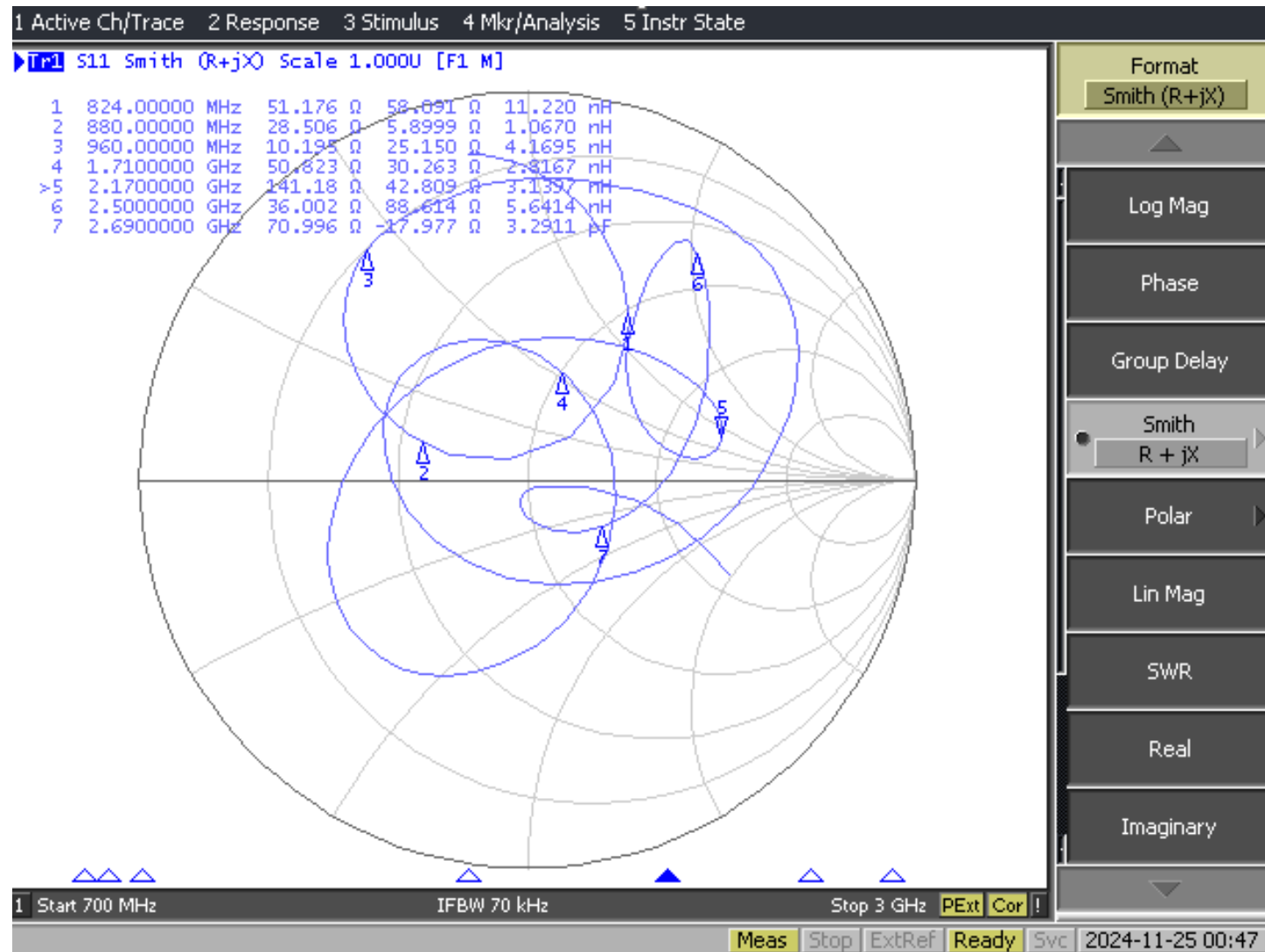
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1	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)
3	880	23.1	-2.74	1700	36.05	-0.28	1970	61.65	1.6	2240	35.97	-0.31	2510	36.55	0.14
4	890	25.48	-2.46	1710	32.56	-0.98	1980	63.29	1.79	2250	33.81	-0.43	2520	36.13	-0.07
5	900	35.55	-1.19	1720	30.31	-1.42	1990	63.27	1.79	2260	30.37	-0.76	2530	35.81	-0.14
6	910	51.57	0.04	1730	30.33	-1.5	2000	63.55	1.78	2270	29.29	-0.85	2540	34.3	-0.31
7	920	57.08	0.13	1740	27.49	-1.99	2010	61.88	1.69	2280	27.73	-0.91	2550	33.89	-0.36
8	930	56.43	-0.04	1750	27.96	-1.97	2020	61.35	1.65	2290	24.6	-1.3	2560	34.07	-0.26
9	940	54.01	-0.41	1760	30.9	-1.84	2030	59.83	1.51	2300	23.13	-1.58	2570	30.4	-0.62
10	950	42.51	-1.59	1770	31.42	-1.66	2040	54.48	1.07	2310	20.84	-1.94	2580	29.32	-0.63
11	960	30.17	-3.08	1780	31.14	-1.6	2050	51.57	0.8	2320	18.68	-2.08	2590	33.46	0.18
12	970	27.81	-3.59	1790	30.2	-1.8	2060	49.01	0.66	2330	17.26	-2.2	2600	33.54	0.66
13	980	23.3	-4.25	1800	34.43	-1.2	2070	44.12	0.3	2340	16.09	-2.34	2610	31.83	0.75
14				1810	37.46	-0.88	2080	44.94	0.44	2350	15.54	-2.45	2620	33.95	1.44
15				1820	36.67	-0.85	2090	45.36	0.48	2360	15.89	-2.33	2630	36.53	2.12
16				1830	41.43	-0.29	2100	44.56	0.4	2370	13.89	-2.76	2640	37.35	2.53
17				1840	43.15	-0.09	2110	36.83	-0.32	2380	14.15	-2.56	2650	38.79	2.89
18				1850	44.14	-0.19	2120	35.9	-0.26	2390	15.65	-1.78	2660	43.85	3.55
19				1860	49.24	0.36	2130	34.29	-0.23	2400	19.61	-1.55	2670	45.26	3.79
20				1870	51.96	0.58	2140	31.31	-0.53	2410	20.67	-1.35	2680	43.13	3.69
21				1880	56.09	0.91	2150	31.8	-0.4	2420	21.6	-1.14	2690	43.61	3.8
22				1890	52.81	0.49	2160	33.47	-0.17	2430	23.72	-0.74	2700	43.05	3.69
23				1900	51.35	0.67	2170	32.24	-0.47	2440	25.95	-0.72			
24				1910	54.56	1.07	2180	31.67	-0.88	2450	28.86	-0.55			
25				1920	55.28	1.14	2190	32.64	-0.99	2460	32.55	-0.08			
26				1930	55.38	1.1	2200	35.27	-0.79	2470	29.56	-0.42			
27				1940	57.42	1.25	2210	34.4	-0.8	2480	33.03	-0.01			
28				1950	62.48	1.57	2220	33.88	-0.79	2490	35.75	0.32			
29				1960	61.19	1.49	2230	35.19	-0.53	2500	35.4	0.21			

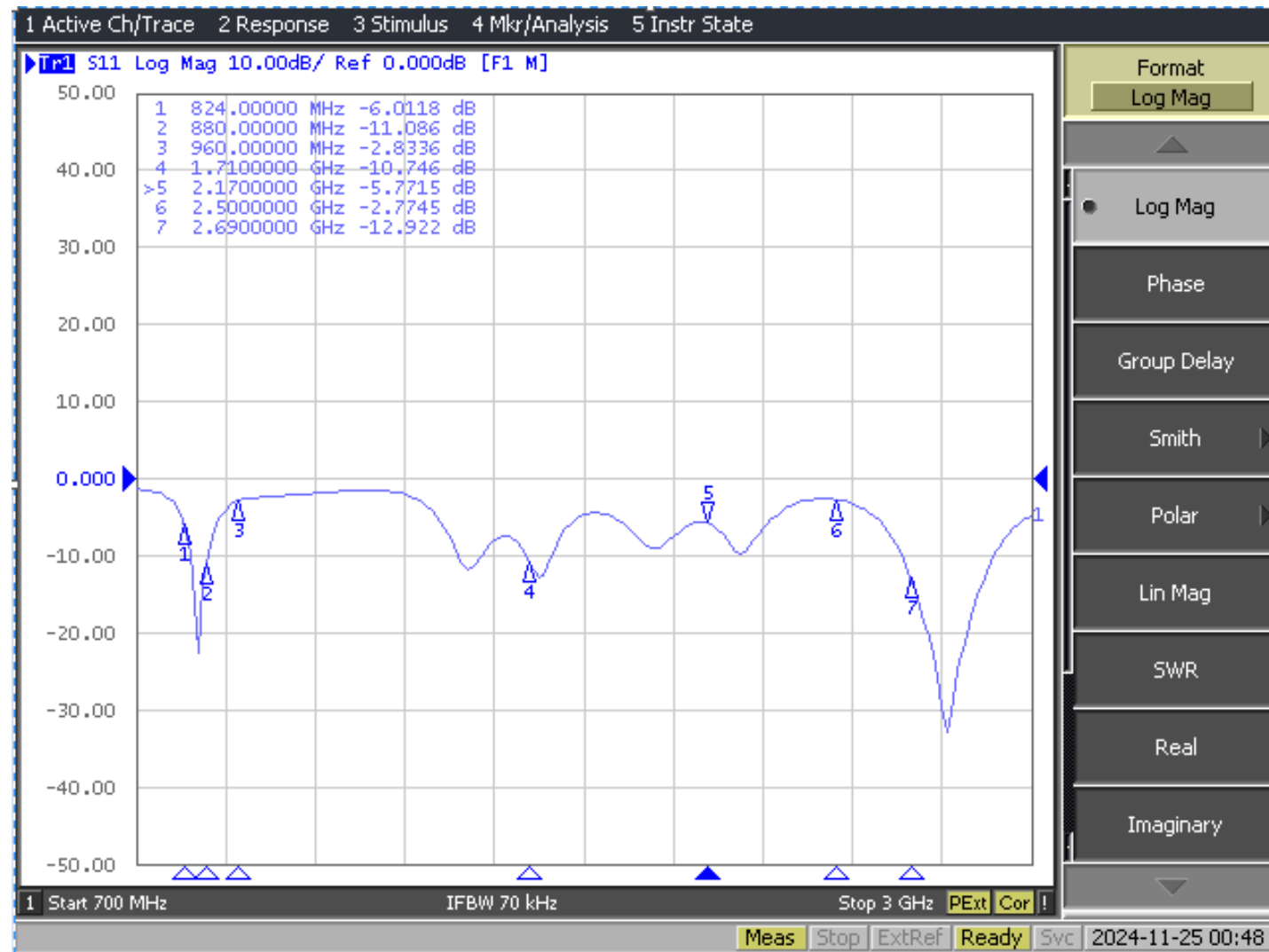
8 MAIN-1 RF2



9MAIN-1 RF2



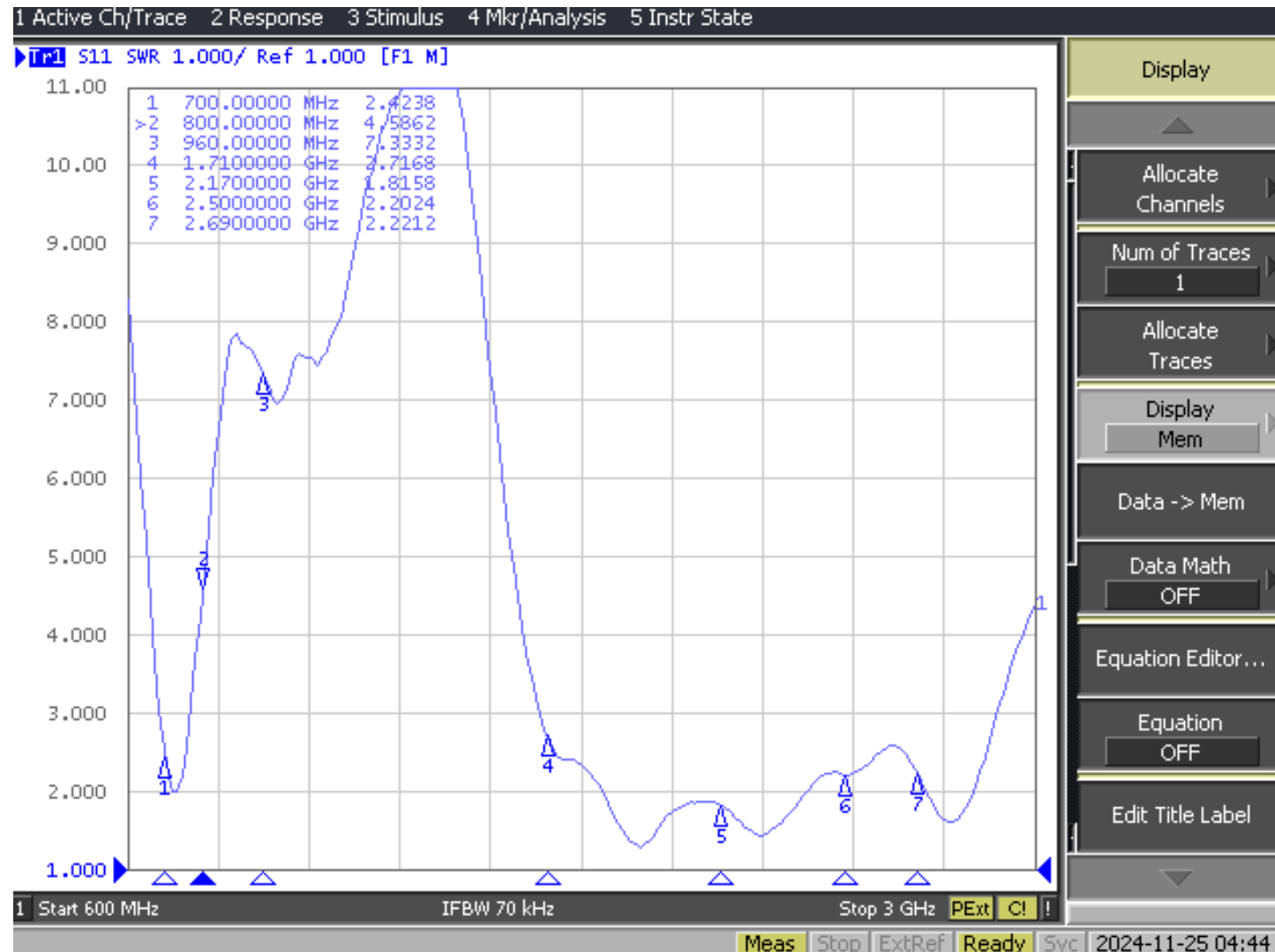
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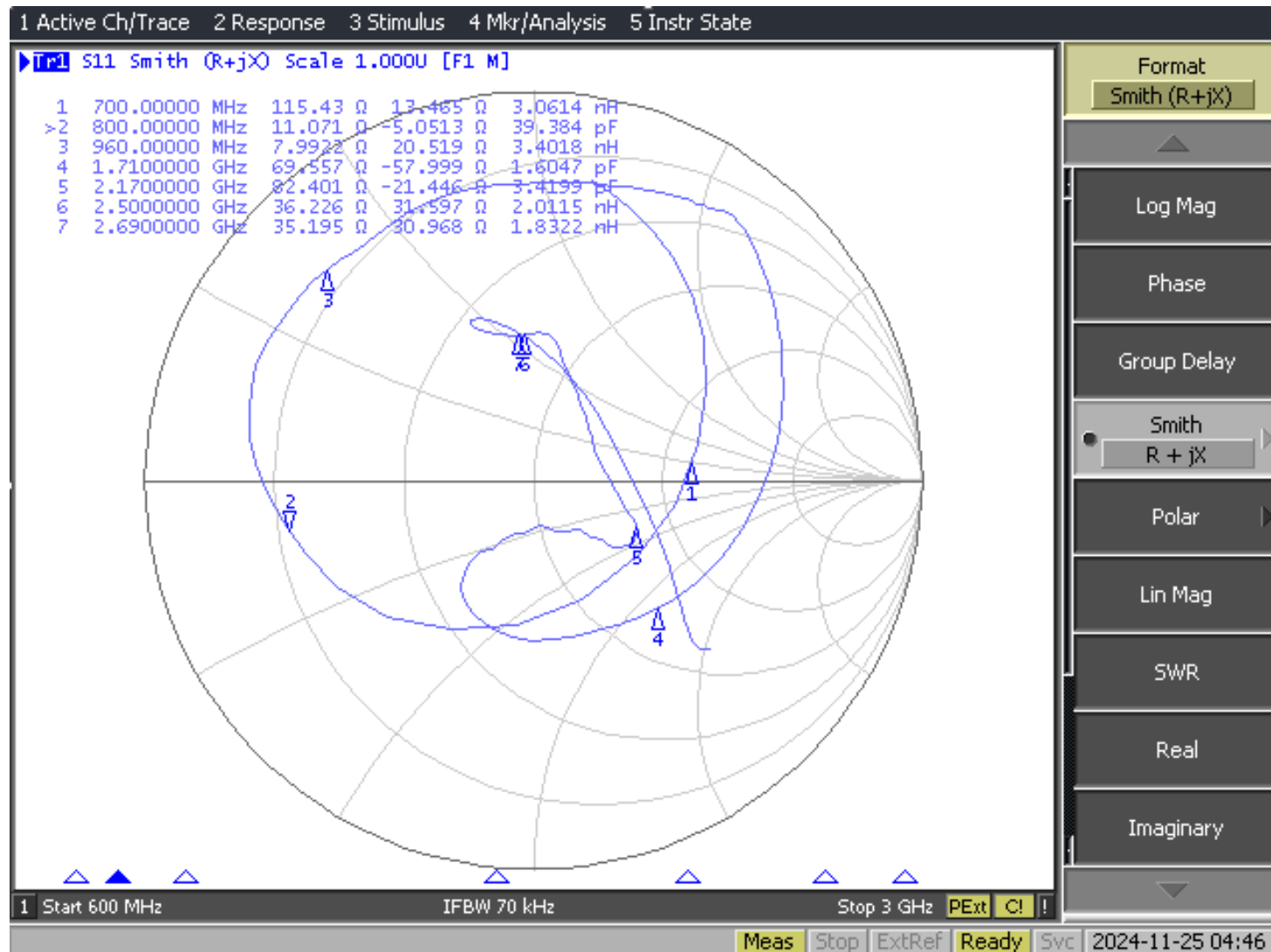
11 MAIN-1 RF2

	A	B	C
1	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)
3	820	18.99	-4.65
4	830	29.32	-2.69
5	840	38.57	-1.18
6	850	43.48	-0.65
7	860	43.07	-0.67
8	870	39.03	-1.36
9	880	35.08	-1.76
10	890	27.51	-2.95
11	900	21.24	-4.26

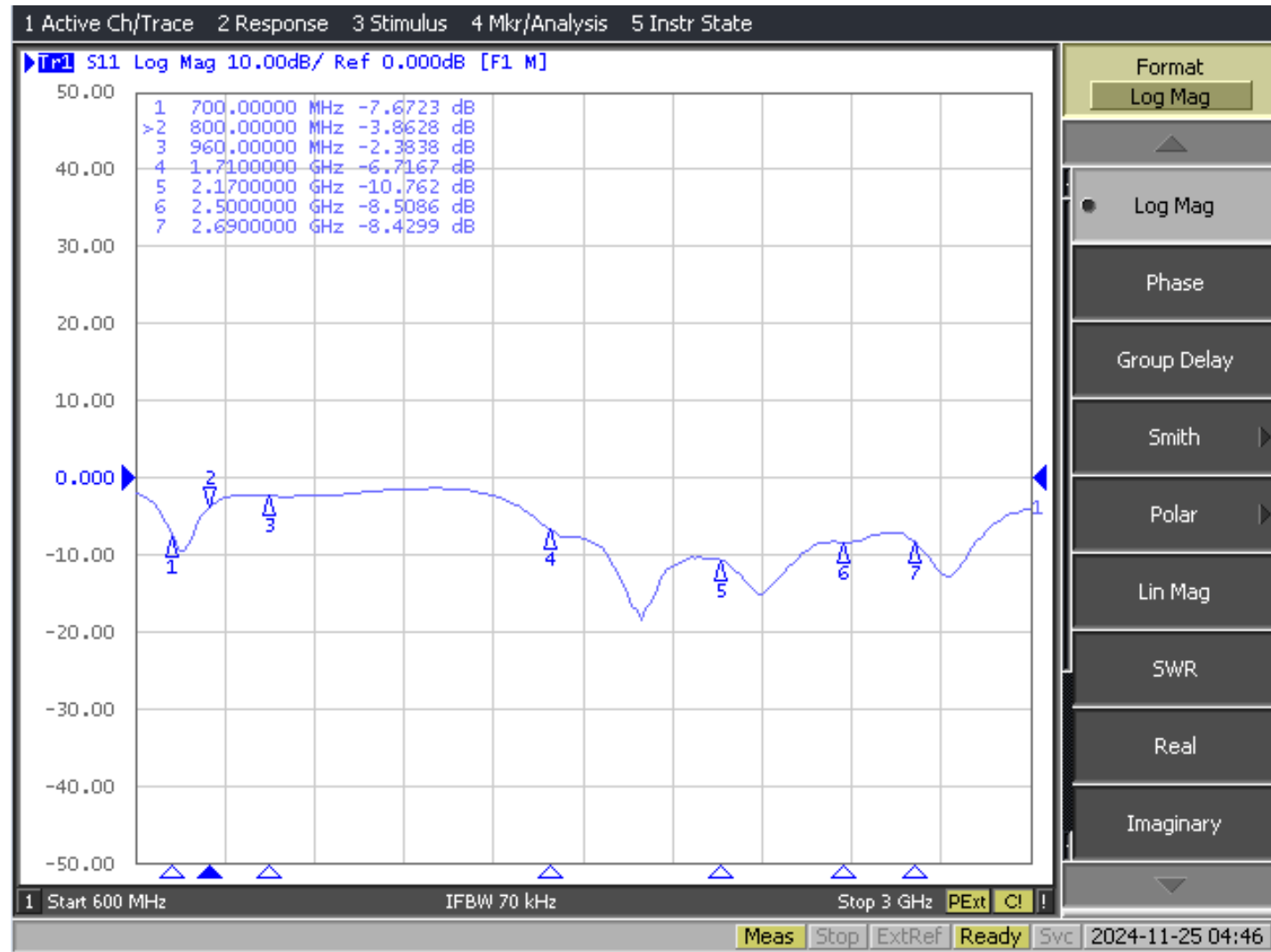
12 MAIN-1 RF3



13MAIN-1 RF3



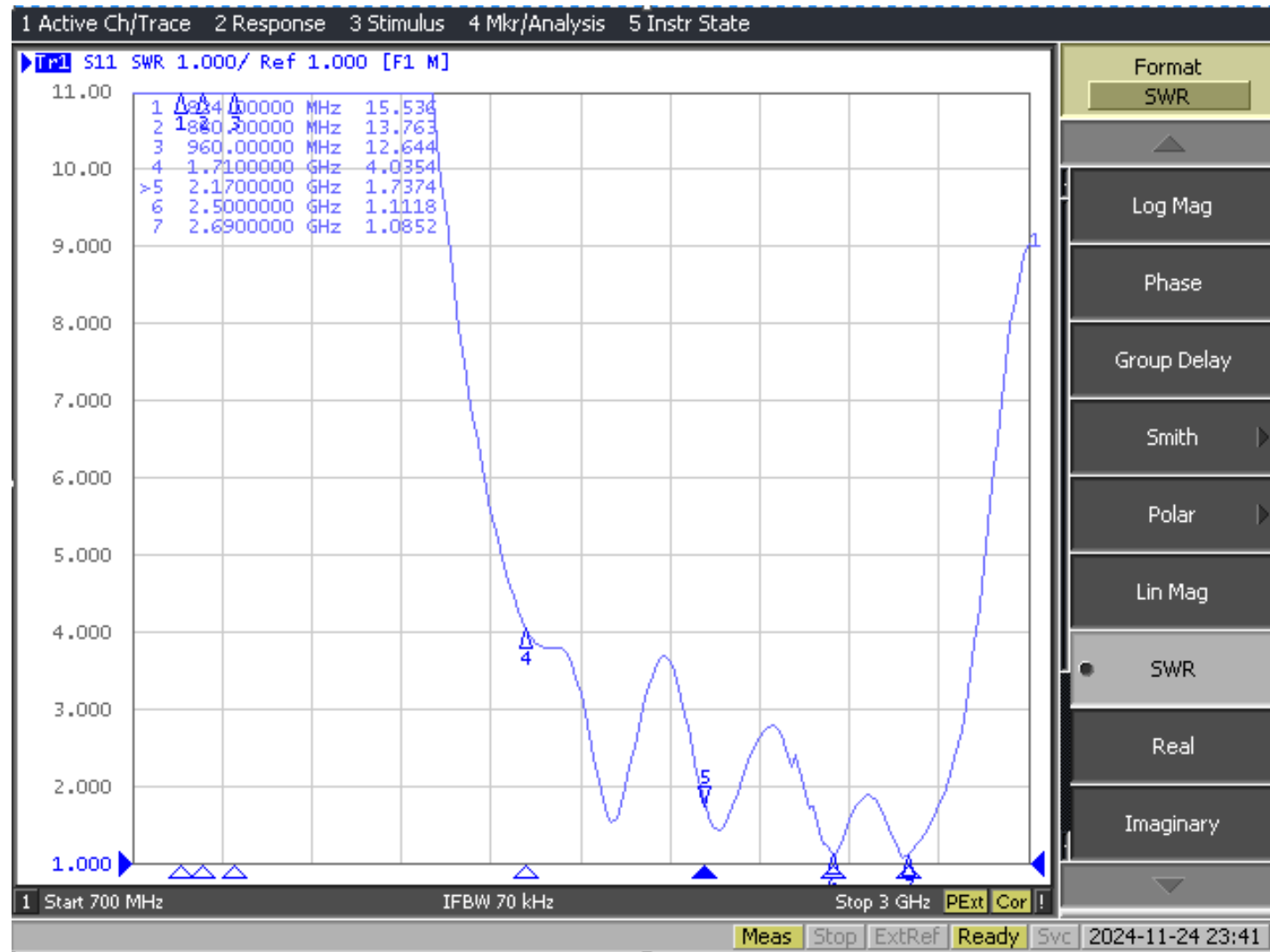
14 MAIN-1 RF3



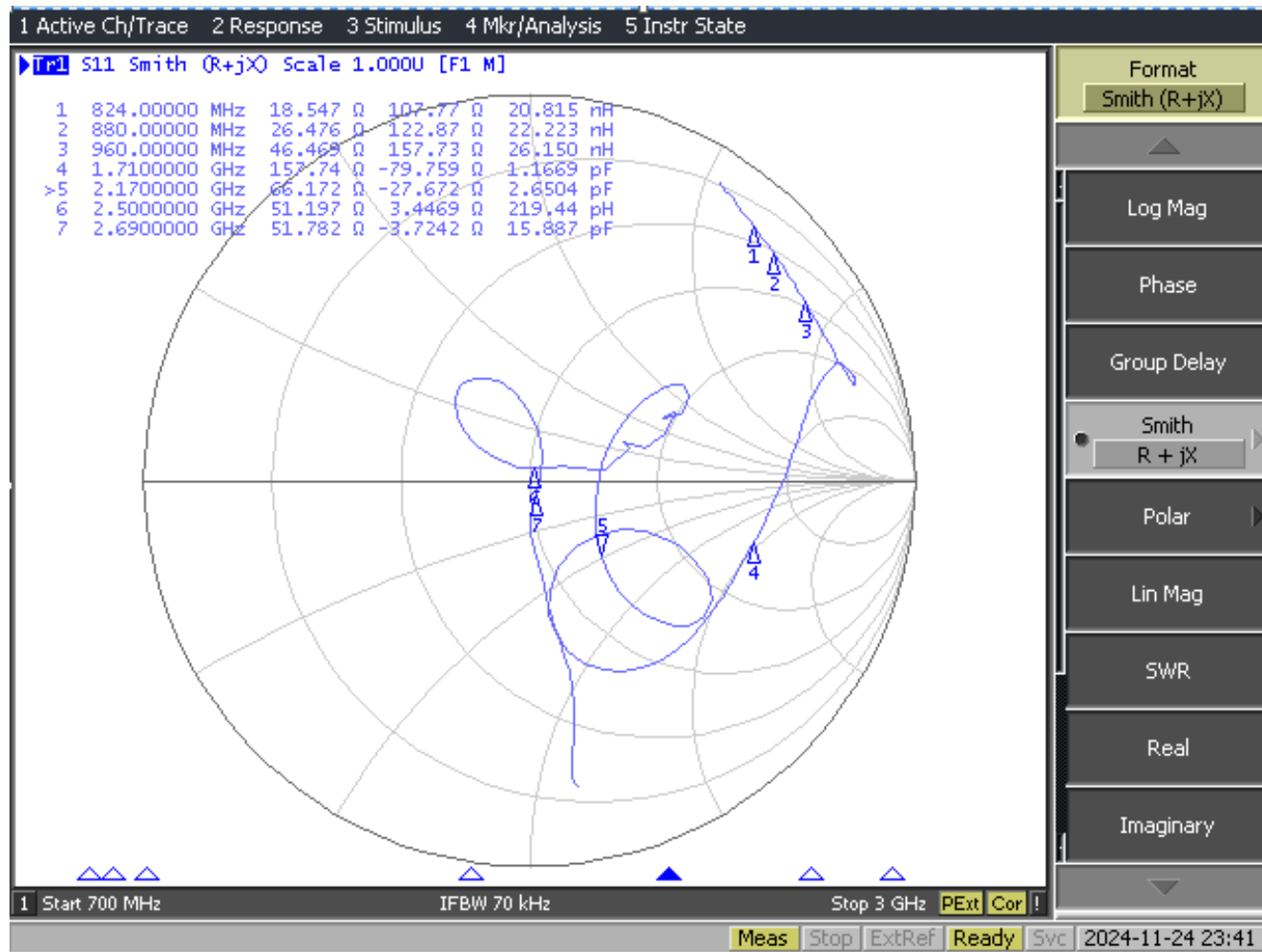
15 MAIN-1 RF3

	A	B	C
1	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)
3	690	5.12	-10.61
4	700	6.6	-9.53
5	710	8.85	-7.88
6	720	9.22	-7.29
7	730	9.33	-6.71
8	740	11.78	-5.46
9	750	13.74	-4.88
10	760	14.09	-4.97
11	770	12.95	-5.6
12	780	13.67	-5.6
13	790	15.77	-4.89
14	800	17.64	-4.58

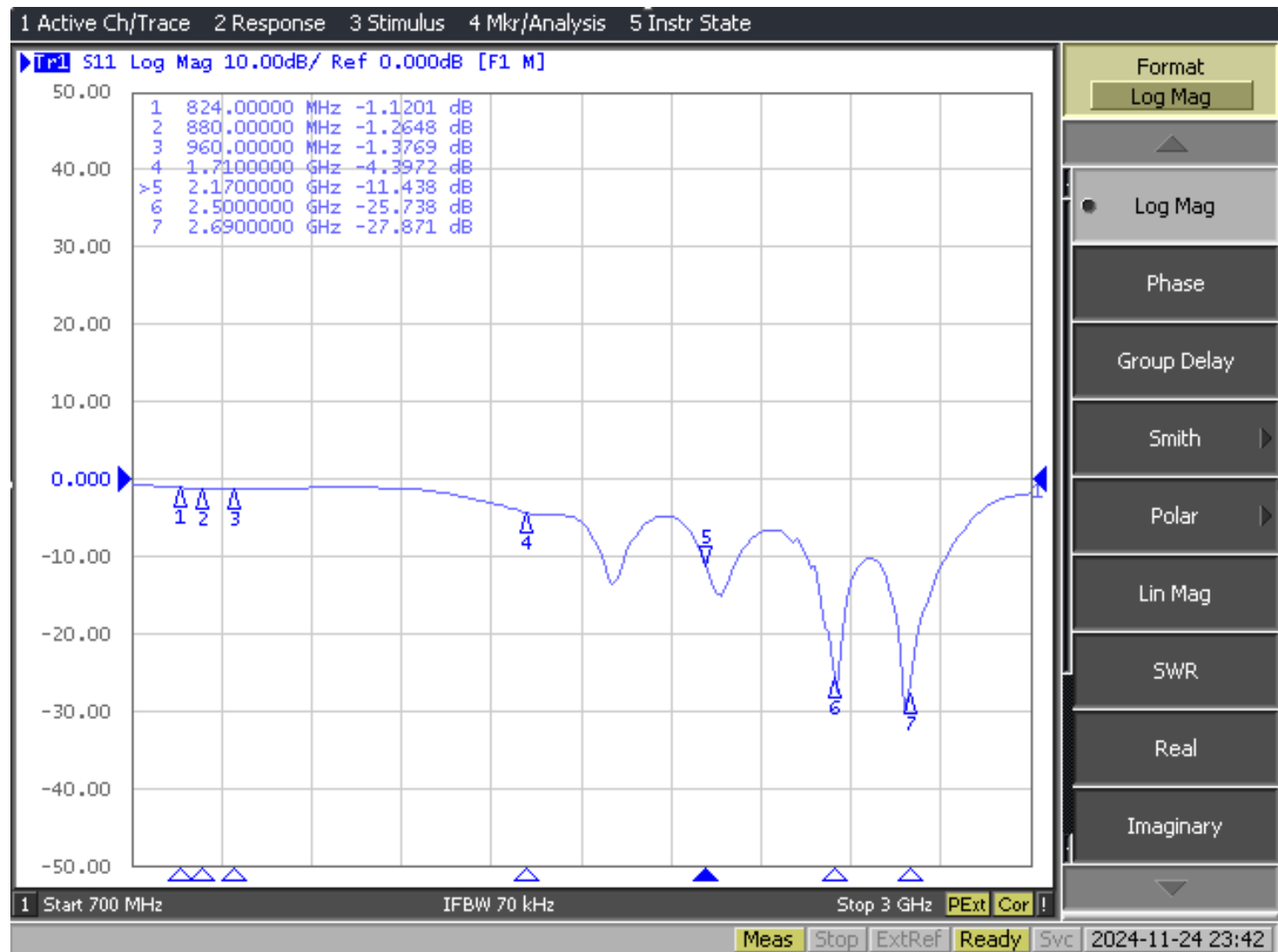
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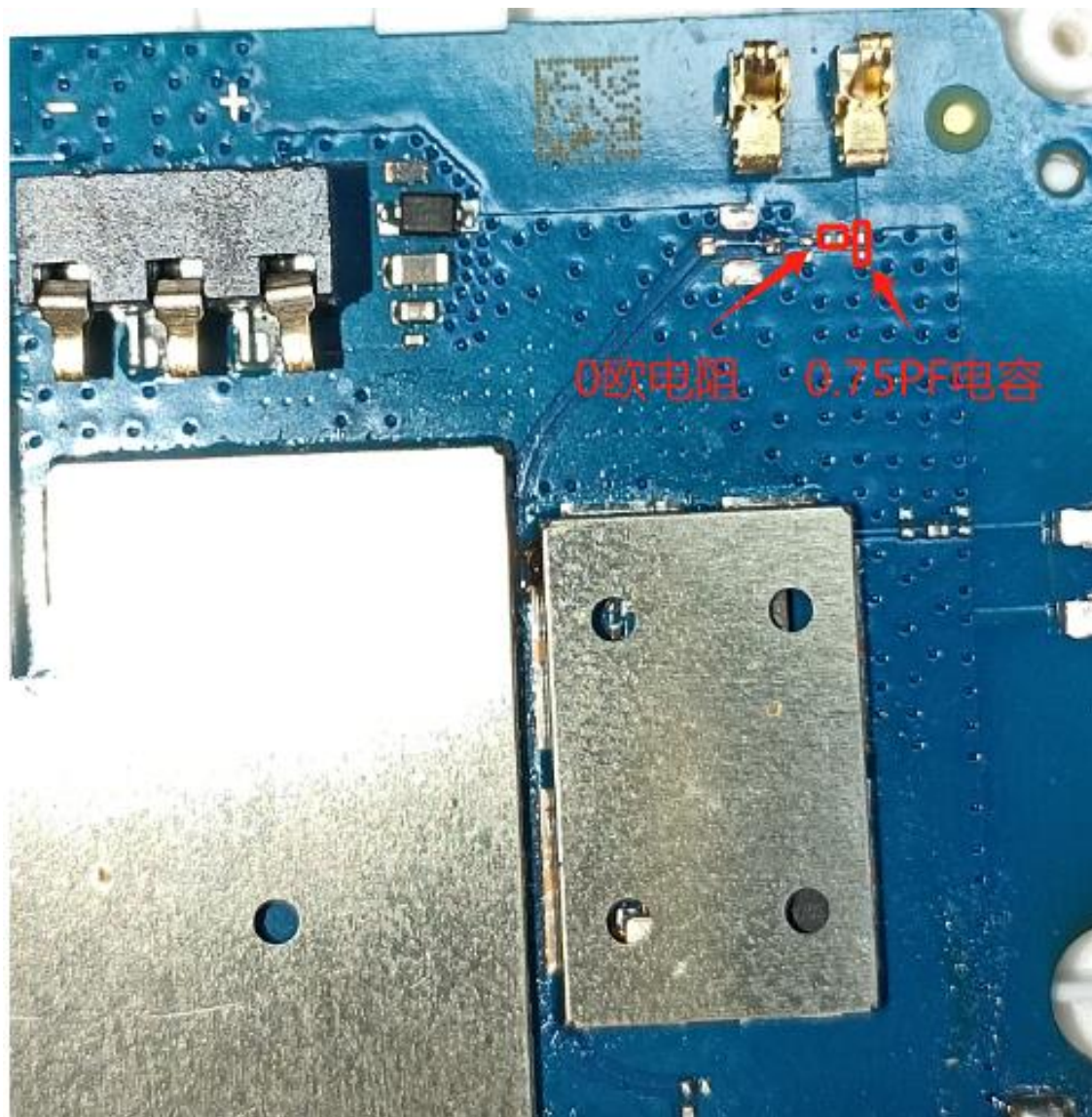
17 MAIN-2



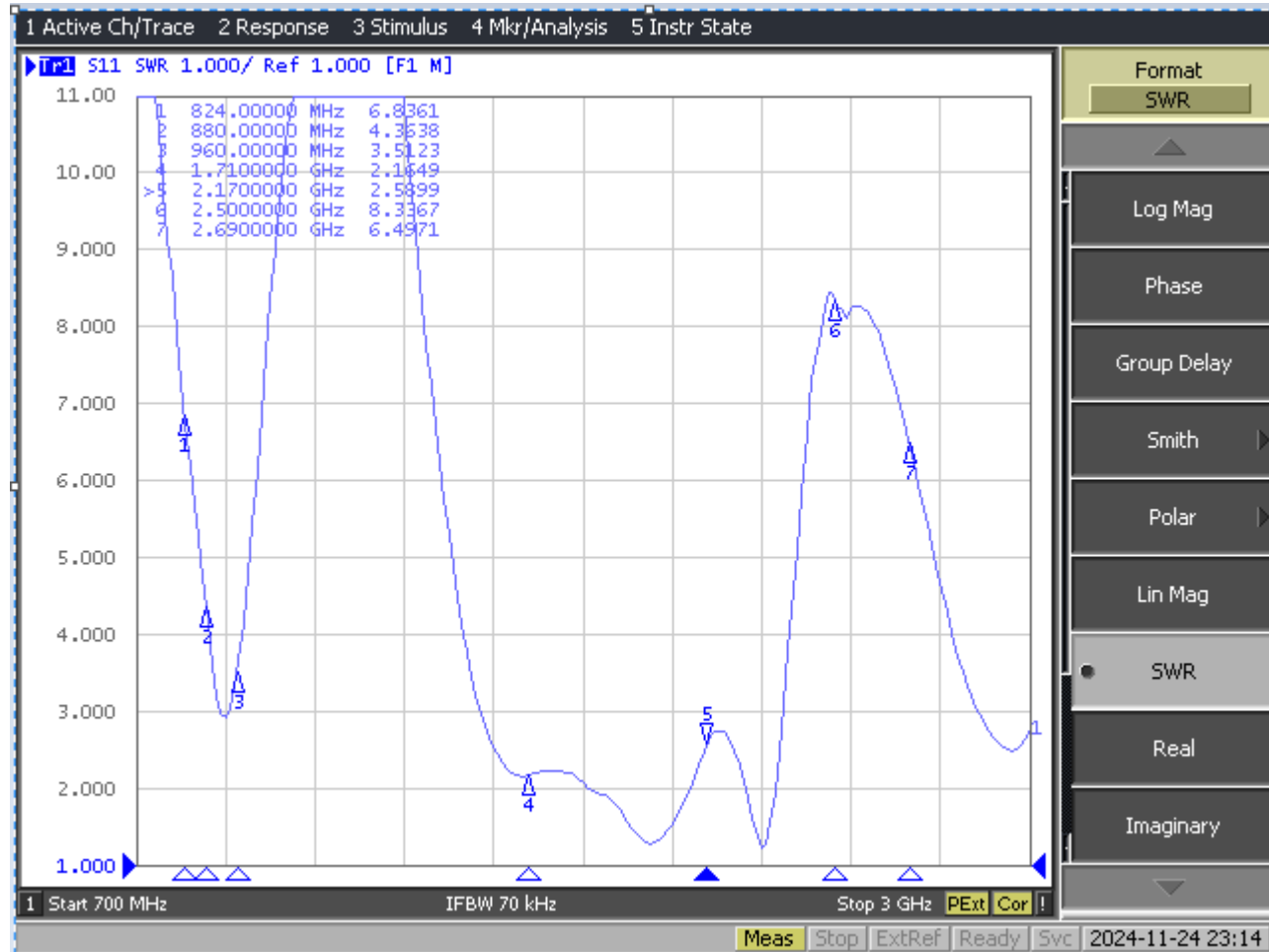
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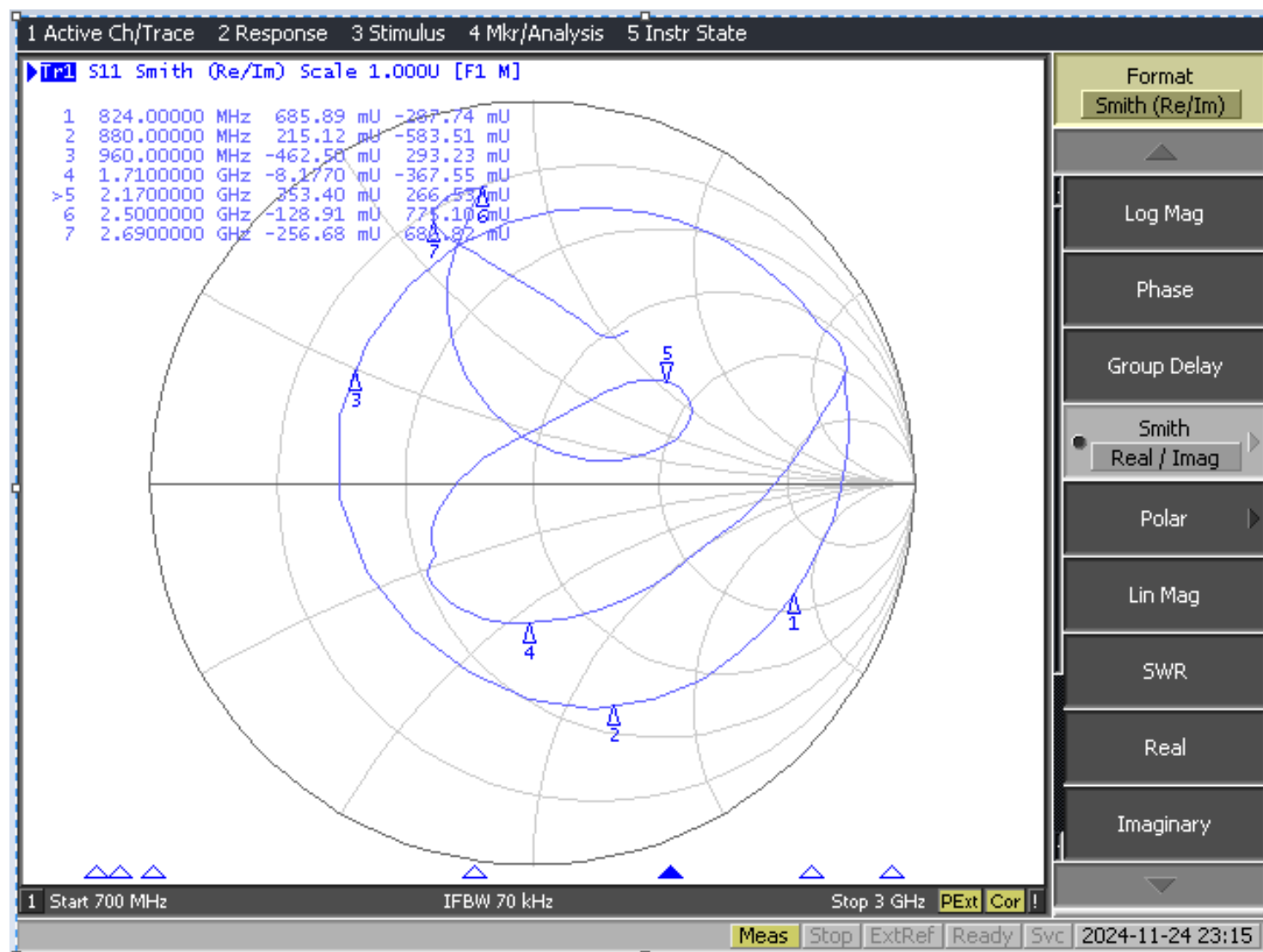
20 分集天线匹配电路



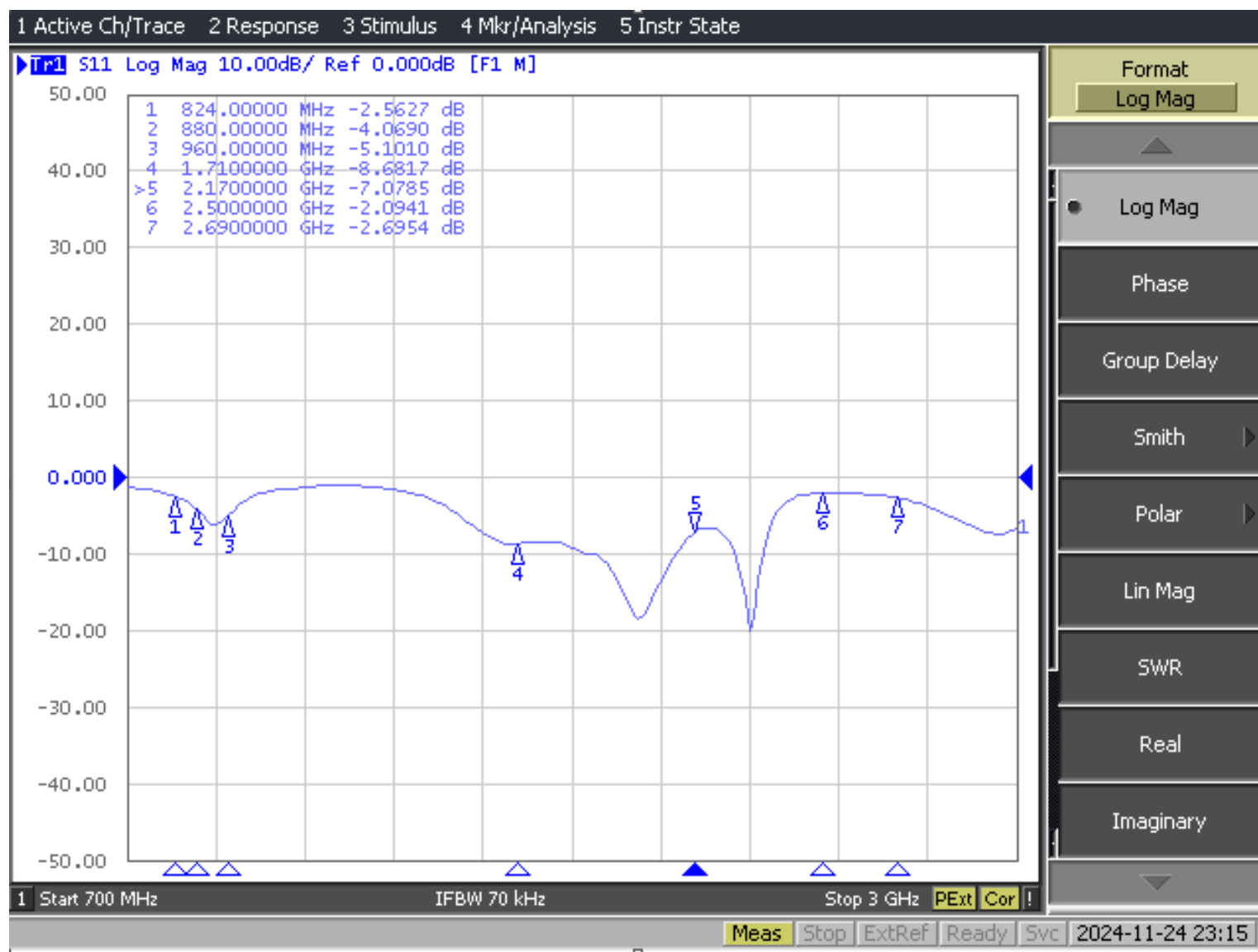
21 DIV 天线



22 DIV 天线



23DIV 天线



24 DIV 天线

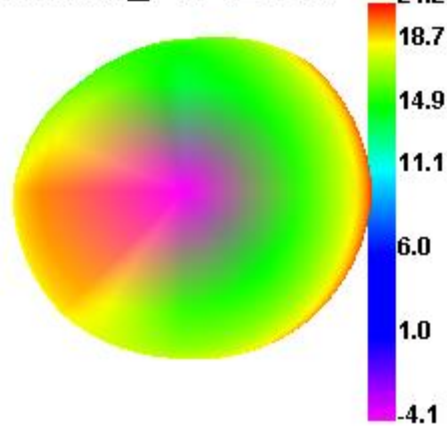
	A	B	C	D	E	F	G	H	I	J	K	L
1	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)
3	820	6.2	-8.58	1700	40.44	1.92	2060	63.05	2.89	2400	14.27	-3.43
4	830	5.85	-9.14	1710	38.34	1.69	2070	58.11	2.71	2410	11.57	-5.11
5	840	7.8	-7.93	1720	35.93	1.59	2080	59.8	2.92	2420	10.32	-6.11
6	850	13.16	-5.92	1730	37.81	1.9	2090	59.63	3	2430	8.91	-6.36
7	860	17.09	-4.85	1740	37.03	1.72	2100	58.37	2.98	2440	7.8	-6.4
8	870	18.54	-4.42	1750	39.62	1.64	2110	50.01	2.44	2450	10.37	-5.46
9	880	20.71	-3.59	1760	45.5	2.06	2120	47.71	2.38	2460	12	-5.54
10	890	21.79	-3.5	1770	46.94	2.23	2130	40.04	1.76	2470	9.9	-6.11
11	900	26.14	-3.24	1780	48.35	2.34	2140	36	1.33	2480	9.66	-6.11
12	910	31.01	-2.66	1790	48.77	2.15	2150	38.02	1.53	2490	10.04	-5.93
13	920	33.64	-2.32	1800	55.38	2.52	2160	35.2	1.07	2500	14.23	-4.74
14	930	38.33	-1.97	1810	61.31	2.88	2170	32.05	0.5	2510	15.96	-4.26
15	940	42.44	-1.62	1820	59.22	2.81	2180	33.64	0.45	2520	16.53	-3.58
16	950	39.36	-1.76	1830	63.45	3.15	2190	33.95	0.18	2530	17.41	-3.17
17	960	31.88	-2.6	1840	64.64	3.24	2200	34.93	0.12	2540	17.65	-3.01
18	970	30.21	-2.96	1850	65.52	3.2	2210	35.65	-0.08	2550	18.77	-2.72
19	980	24.27	-3.69	1860	69.97	3.2	2220	41.54	0.28	2560	18.99	-2.43
20				1870	68.67	2.91	2230	46.81	0.83	2570	16.29	-2.89
21				1880	70.5	2.73	2240	45.34	0.68	2580	17.24	-2.44
22				1890	65.27	2.15	2250	47.47	0.77	2590	19.66	-1.84
23				1900	62.56	1.51	2260	51.56	0.95	2600	17.21	-2.31
24				1910	64.53	1.48	2270	52.91	1.04	2610	17.2	-2.19
25				1920	63.52	1.62	2280	53.84	1.12	2620	19.06	-1.62
26				1930	62.71	1.87	2290	54.05	1.07	2630	17.87	-1.83
27				1940	62.81	2.14	2300	55.04	1.31	2640	16.36	-2.34
28				1950	64.91	2.43	2310	53.45	1.43	2650	17.28	-2.12
29				1960	61.54	2.23	2320	50.82	1.44	2660	20.63	-1.5
30				1970	62.19	2.34	2330	47.34	1.42	2670	18.55	-2.09
31				1980	64.78	2.62	2340	41.2	1.03	2680	17.2	-2.66
32				1990	65.11	2.78	2350	35.81	0.57	2690	19.76	-2.11
33				2000	66.44	2.85	2360	28.26	-0.42			
34				2010	69.16	2.96	2370	20.39	-1.89			
35				2020	71.07	2.99	2380	16.84	-2.76			
36				2030	69.6	2.82	2390	13.83	-3.23			
37				2040	68.74	2.88						
38				2050	67.58	3.01						

25 天线测试数据

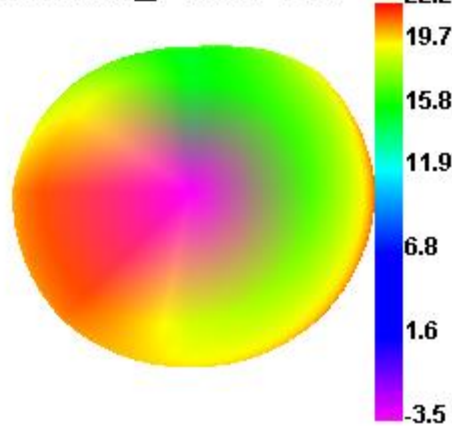
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GSM900	TRP	27.26	26.75	26.54	LTE-B8	TRP	18.25	17.84	17.57
	TIS			-102.42		TIS			-91.24
PCS1800	TRP	25.43	25.22	24.93	LTE-B20	TRP	17.86	18.15	18.23
	TIS			-103.35		TIS			-90.88
WCDMA850	TRP	17.80	18.19	18.63	LTE-B28	TRP	15.04	15.18	15.22
	TIS			-104.25		TIS			-90.59
WCDMA900	TRP	18.27	18.12	17.69	LTE-B38	TRP	18.13	18.28	18.53
	TIS			-104.38		TIS			-90.46
WCDMA2100	TRP	18.72	18.84	19.27	LTE-B40	TRP	18.39	18.48	18.59
	TIS			-105.50		TIS			-90.17
LTE-B1	TRP	18.59	18.78	19.26	LTE-B41	TRP	18.08	18.21	18.75
	TIS			-92.75		TIS			-89.14
LTE-B3	TRP	19.68	19.35	18.79					
	TIS			-92.45					
LTE-B5	TRP	17.66	18.18	18.38					
	TIS			-91.31					
LTE-B7	TRP	18.03	18.26	18.38					
	TIS			-90.86					

26 天线测试数据

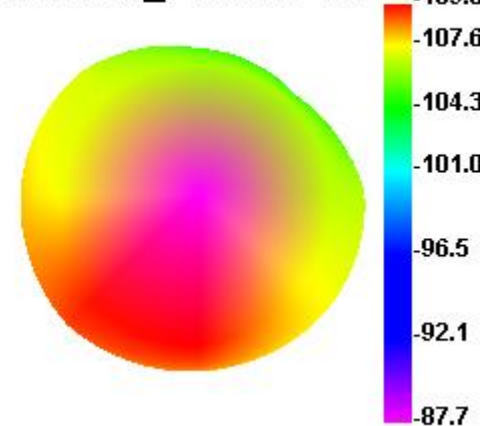
WCDMA_I 9612 TRP



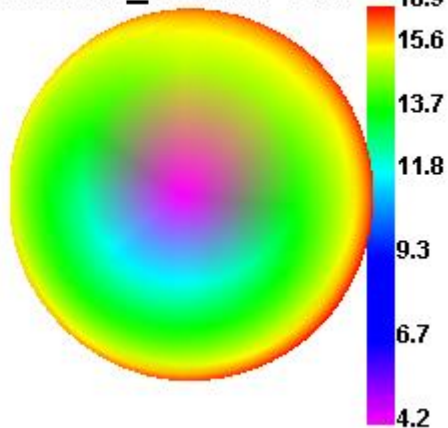
WCDMA_I 9888 TRP



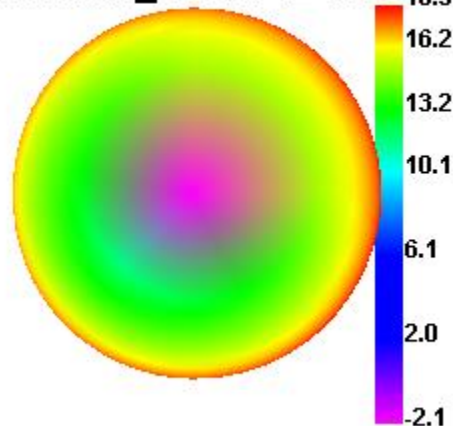
WCDMA_I 10838 TIS



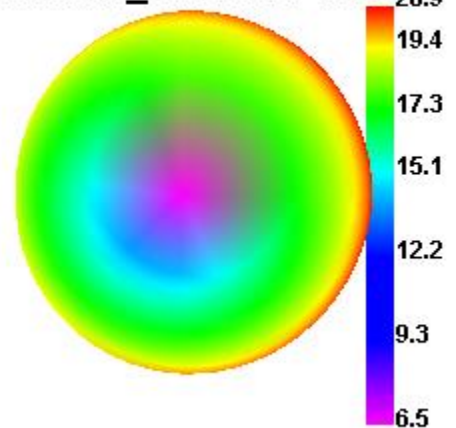
WCDMA_V 4233 TRP



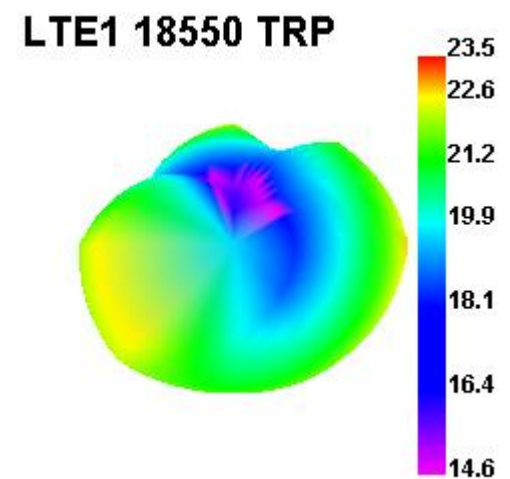
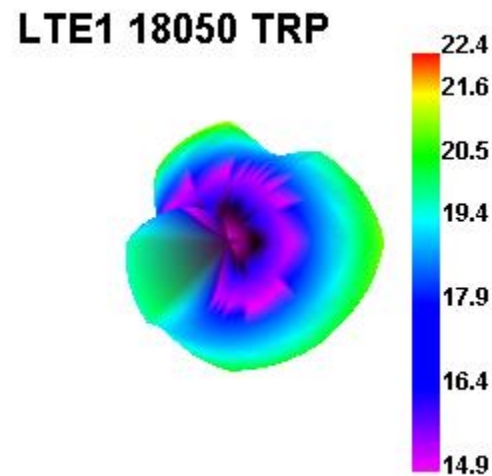
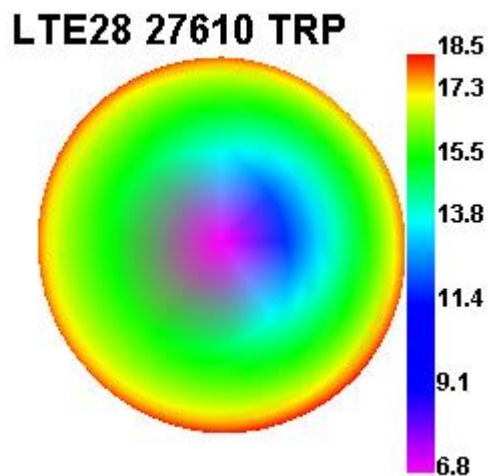
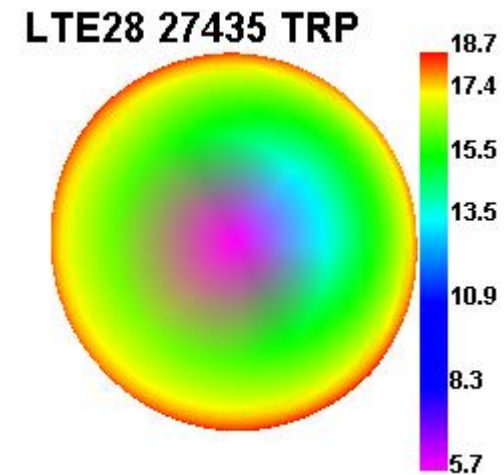
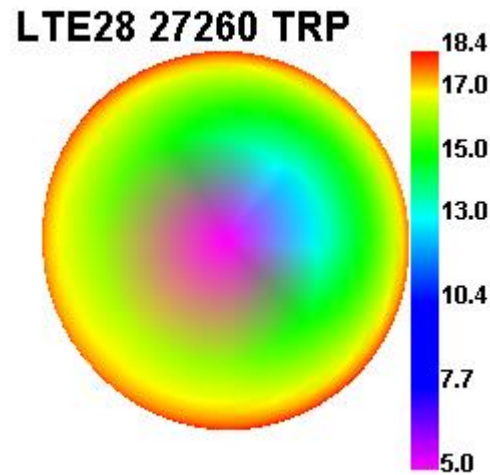
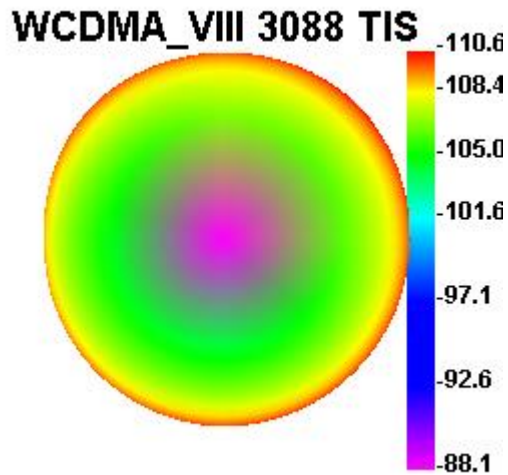
WCDMA_VIII 2712 TRP



WCDMA_VIII 2863 TRP

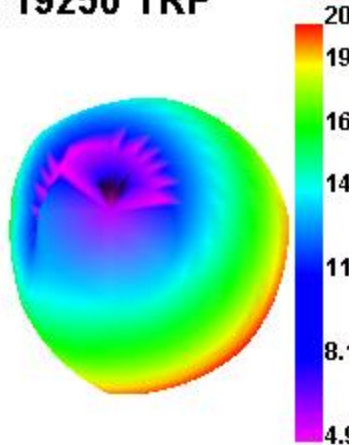


27 天线测试数据

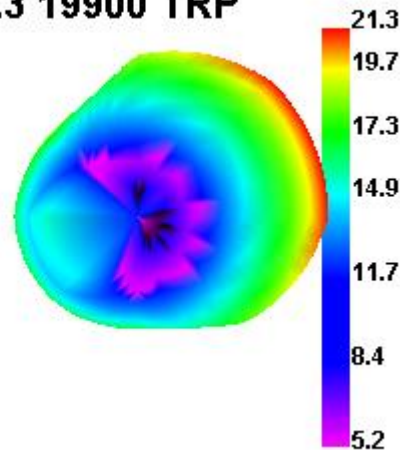


28 天线测试数据

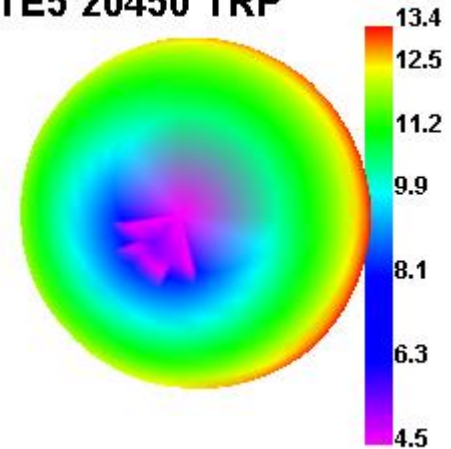
LTE3 19250 TRP



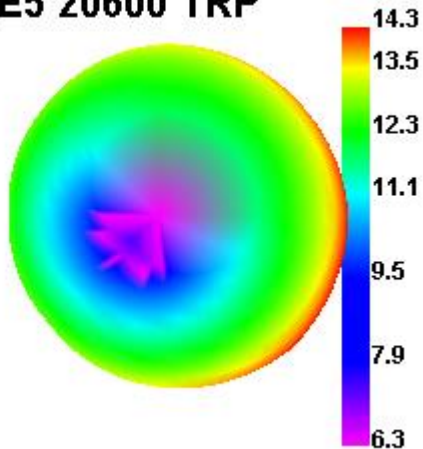
LTE3 19900 TRP



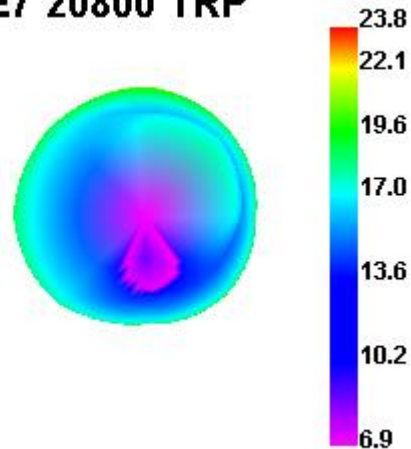
LTE5 20450 TRP



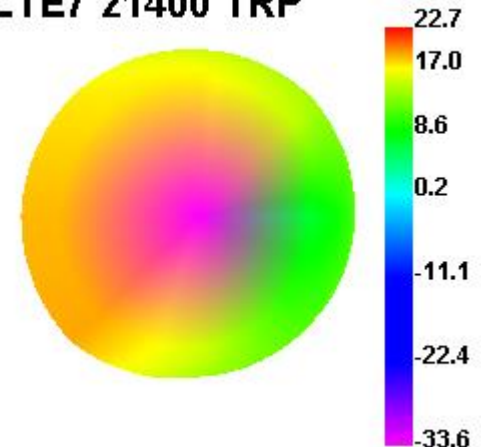
LTE5 20600 TRP



LTE7 20800 TRP

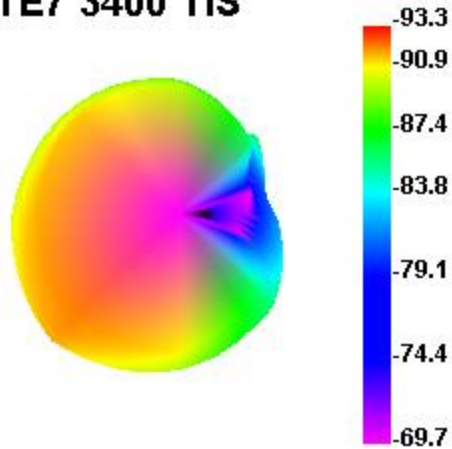


LTE7 21400 TRP

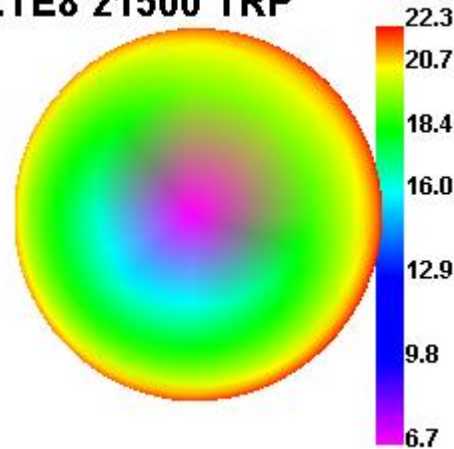


29 天线测试数据

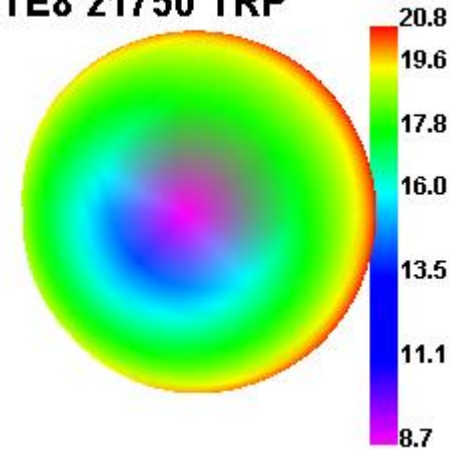
LTE7 3400 TIS



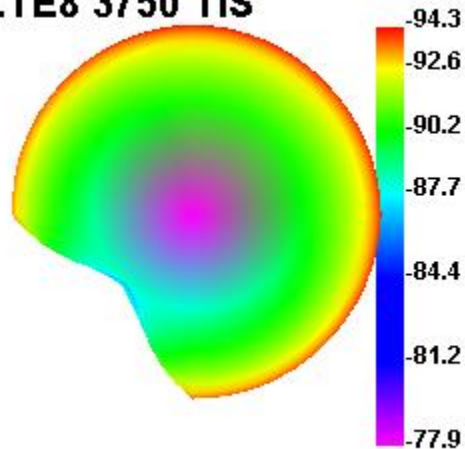
LTE8 21500 TRP



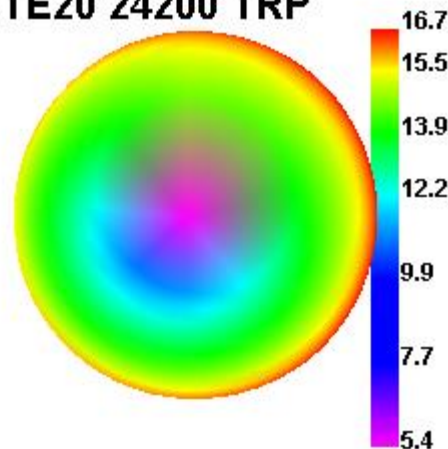
LTE8 21750 TRP



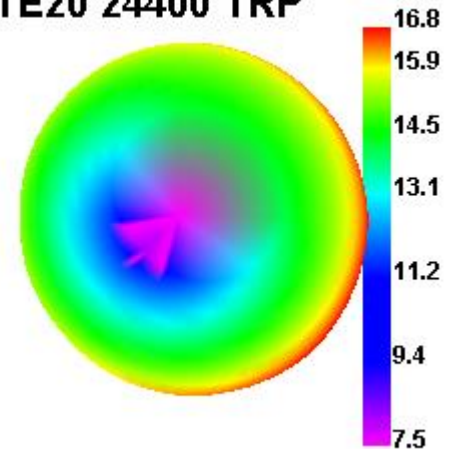
LTE8 3750 TIS



LTE20 24200 TRP

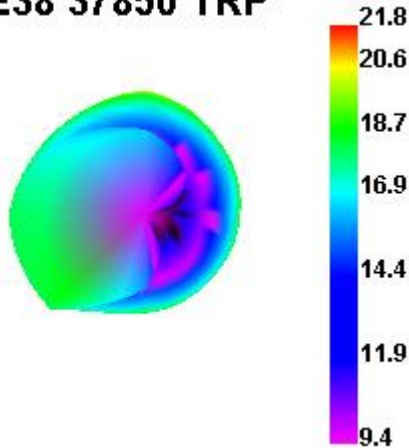


LTE20 24400 TRP

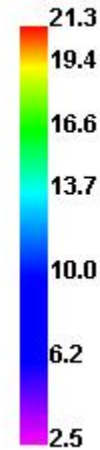


30 天线测试数据

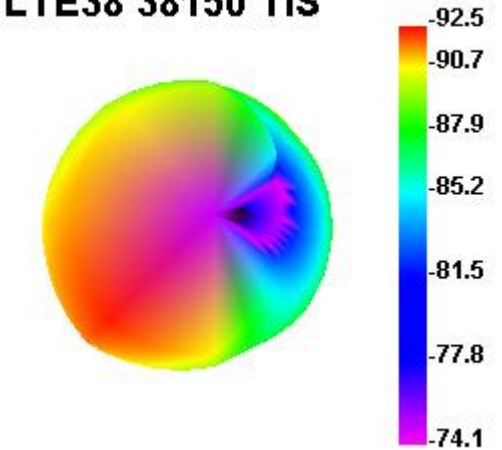
LTE38 37850 TRP



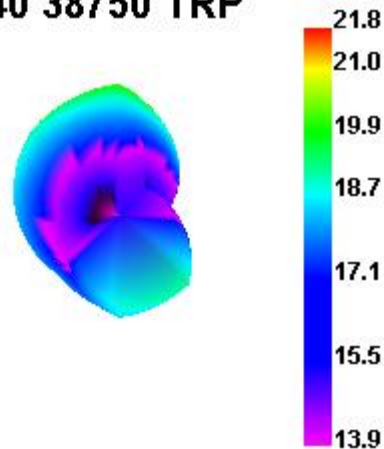
LTE38 38150 TRP



LTE38 38150 TIS



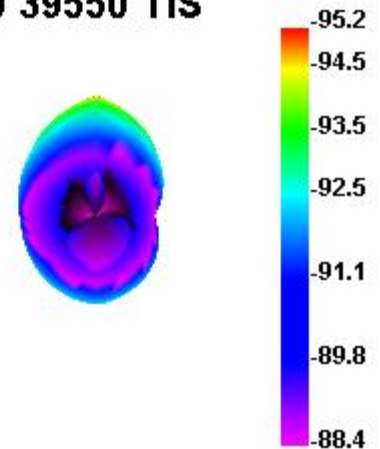
LTE40 38750 TRP



LTE40 39550 TRP

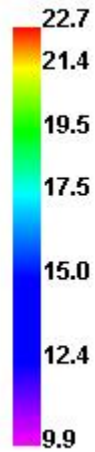
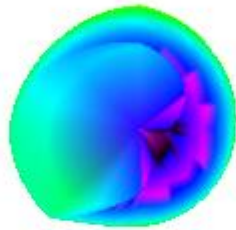


LTE40 39550 TIS

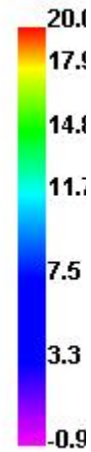
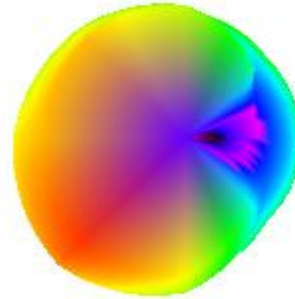


31 天线测试数据

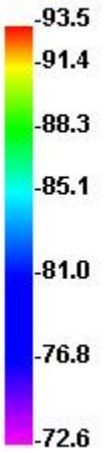
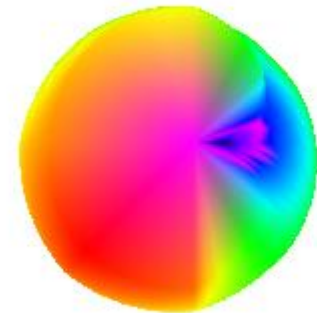
LTE41 40340 TRP



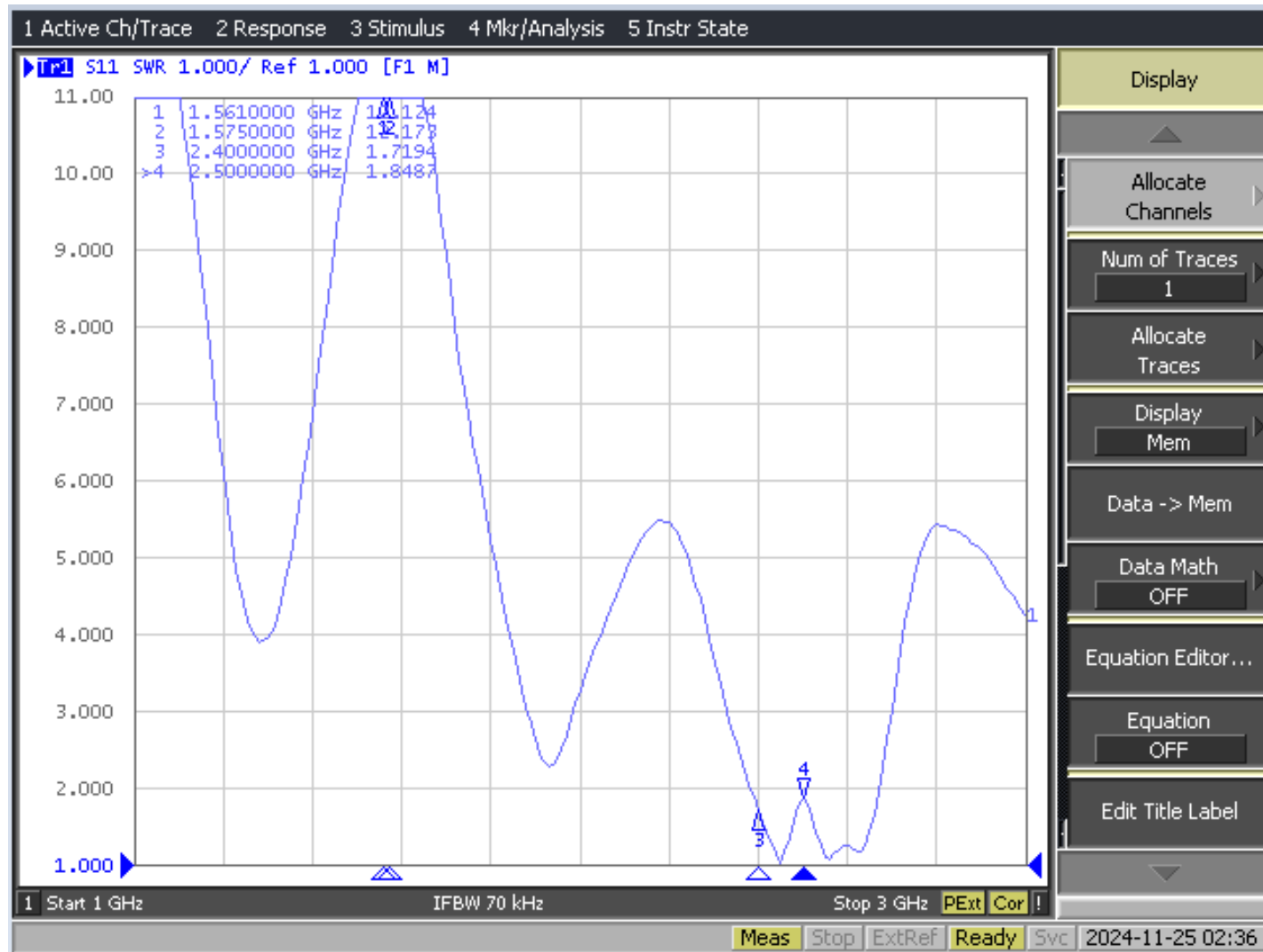
LTE41 41140 TRP



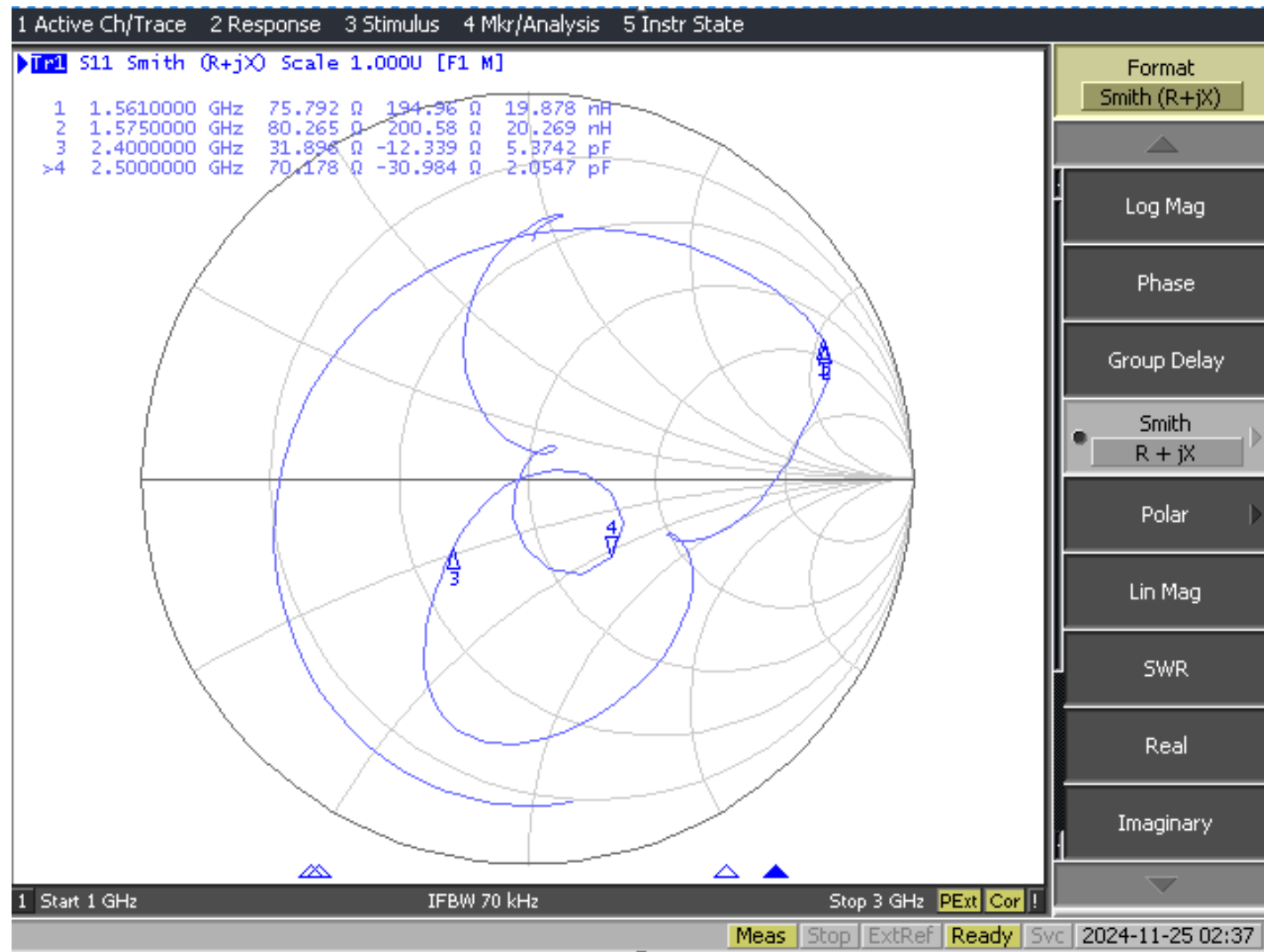
LTE41 41140 TIS



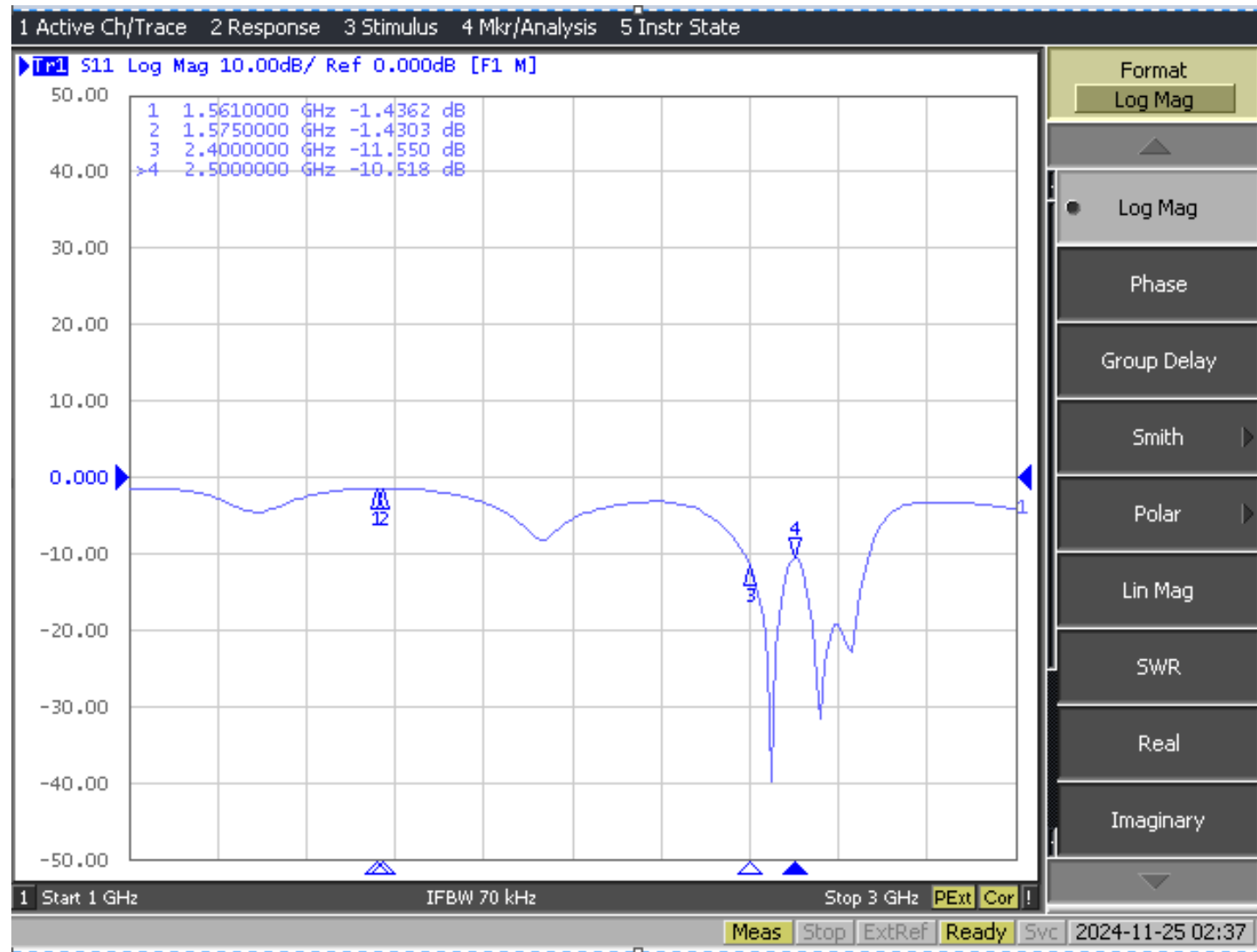
32 WIFI -1 天线



33 WIFI -1 天线



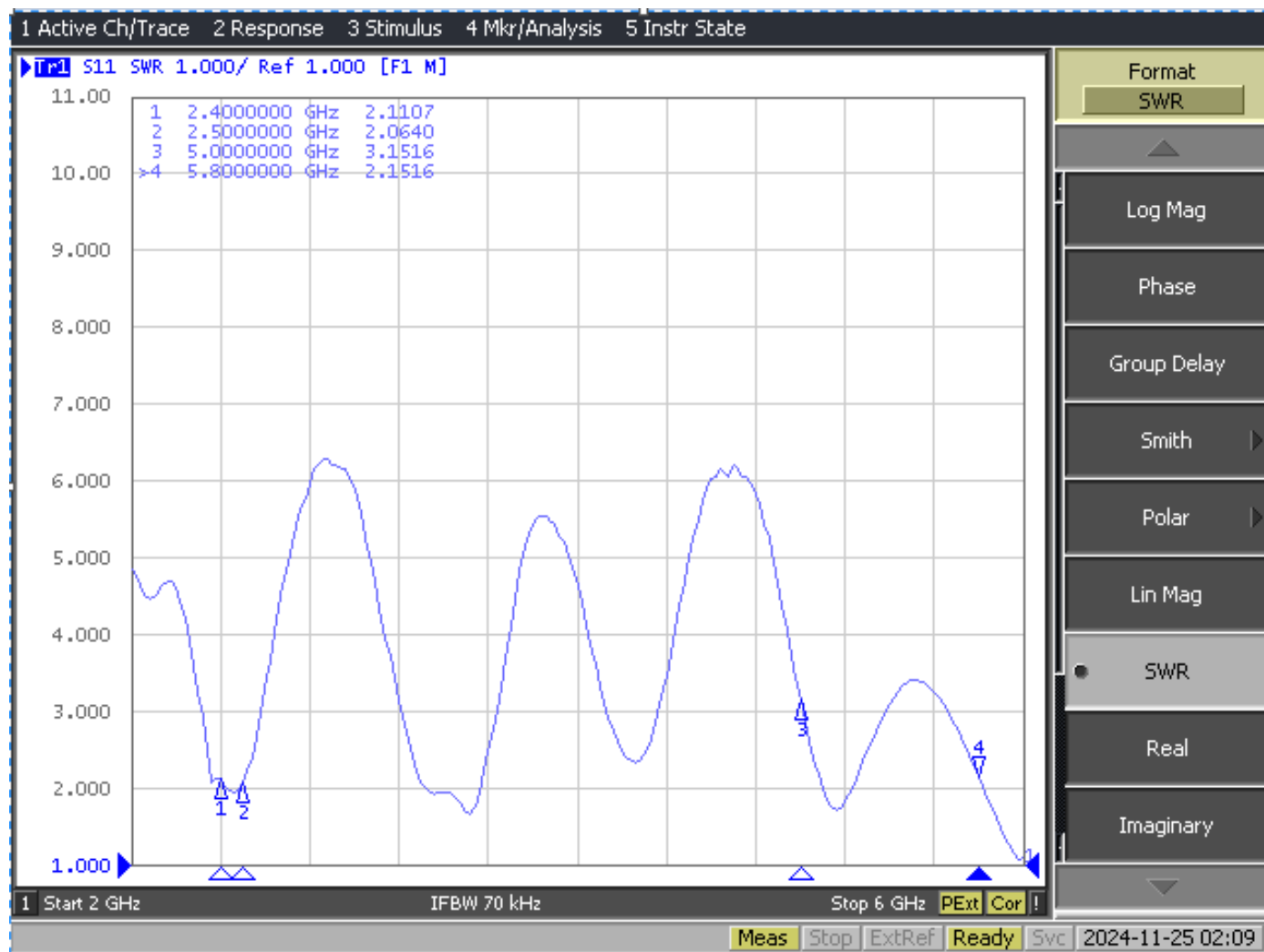
34WIFI -1 天线



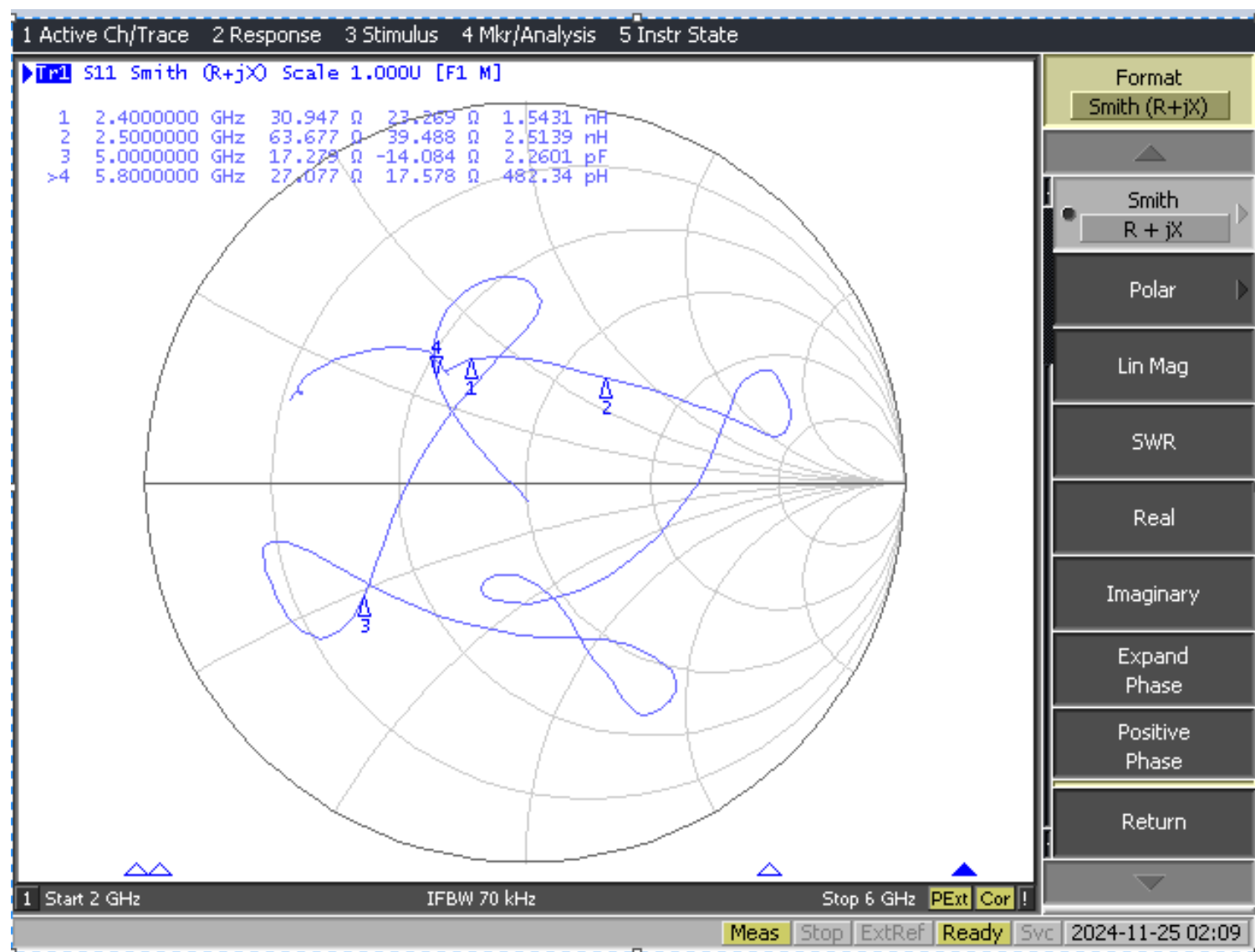
35 WIFI -1 天线

▲	A	B	C
1	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)
3	2400	34.48	0.59
4	2410	32.62	0.26
5	2420	35.62	0.56
6	2430	35.23	0.49
7	2440	31.65	0.1
8	2450	32.59	0.22
9	2460	33.7	0.28
10	2470	29.27	-0.45
11	2480	31.38	0.36
12	2490	29.45	-0.66
13	2500	29.33	-0.71

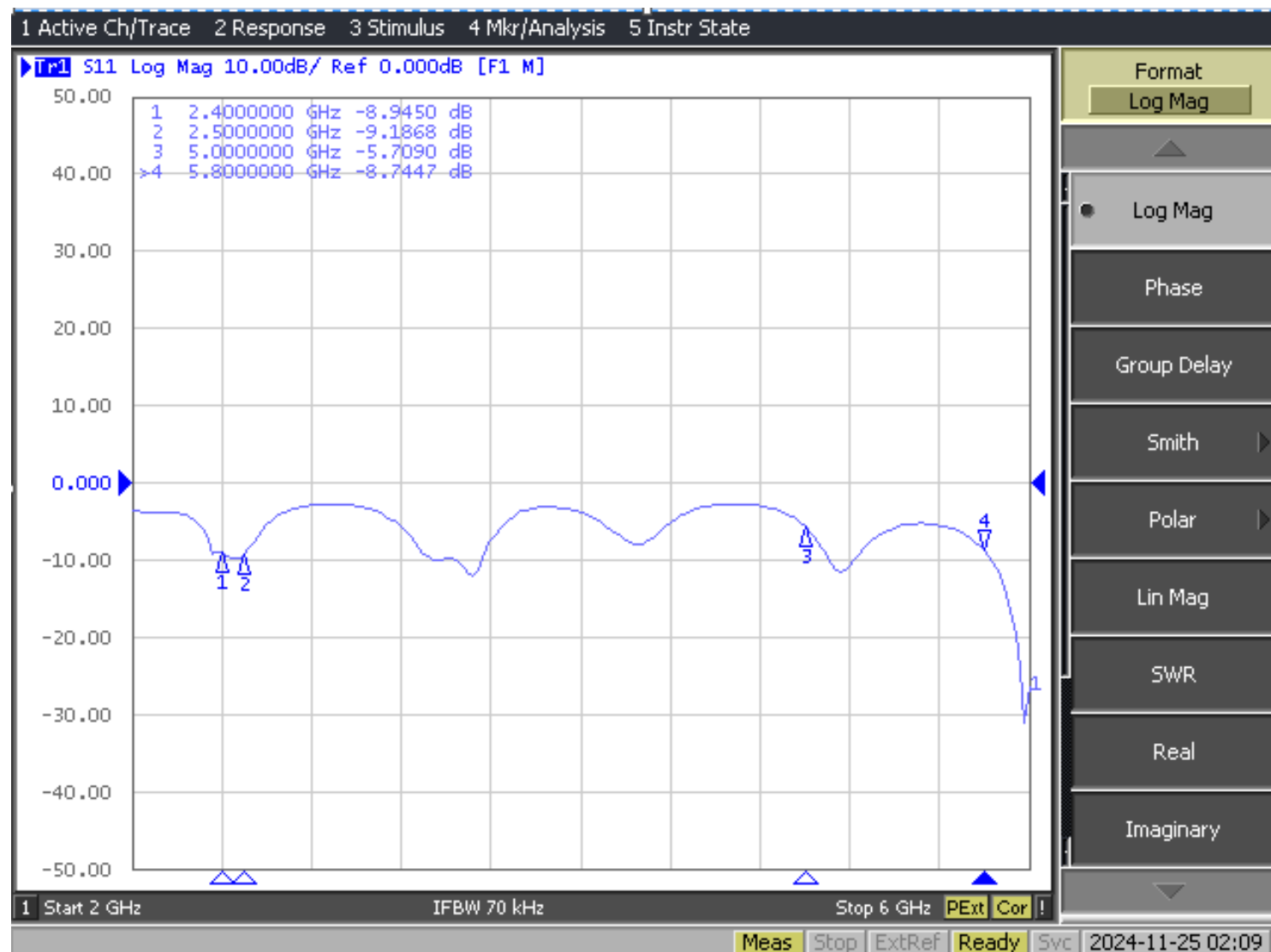
36 WIFI -2 天线



37 WIFI -2 天线



38 WIFI -2 天线



39 WIFI -2 天线

	A	B	C	D	E	F	G	H	I	J	K	L
1	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain	Freq	Effi	Gain
2	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)	(MHz)	(%)	(dBi)
3	2400	40.93	2.74	4900	34.48	0.59	5230	40.02	0.97	5560	57.34	1.61
4	2410	39.69	2.97	4910	32.62	0.26	5240	33.96	0.23	5570	58.77	1.86
5	2420	38.82	3.04	4920	35.62	0.56	5250	37.02	0.57	5580	62.03	1.99
6	2430	39.93	3.36	4930	35.23	0.49	5260	34.99	0.42	5590	63.26	2.09
7	2440	43.13	3.57	4940	31.65	0.1	5270	31.88	0.05	5600	66.12	2.27
8	2450	42.25	3.53	4950	32.59	0.22	5280	32.91	0.26	5610	65.53	2.21
9	2460	38.99	3.32	4960	33.7	0.28	5290	34.51	0.51	5620	66.74	2.3
10	2470	40.18	3.42	4970	29.27	-0.45	5300	33.78	0.4	5630	67.16	2.45
11	2480	41.47	3.23	4980	27.93	-0.76	5310	31.84	0.21	5640	67.83	2.48
12	2490	41.93	3.13	4990	29.45	-0.66	5320	35.91	0.85	5650	68.14	2.37
13	2500	42.55	3.15	5000	29.33	-0.71	5330	34.02	0.67	5660	65.08	2.13
14				5010	28.41	-0.81	5340	31.38	0.36	5670	60.13	1.8
15				5020	30.33	-0.44	5350	30.27	-0.65	5680	62.13	1.93
16				5030	30.62	-0.22	5360	29.01	-1.01	5690	60.85	1.92
17				5040	29.98	-0.02	5370	32.29	-0.55	5700	59.6	1.67
18				5050	33.39	0.86	5380	30.37	-1.03	5710	57.3	1.46
19				5060	38.97	2.64	5390	35	-0.48	5720	57.84	1.2
20				5070	40	2.58	5400	44.39	0.5	5730	56.08	1.1
21				5080	39.88	2.37	5410	44.02	0.16	5740	56.61	1.07
22				5090	39.76	2.06	5420	40.99	-0.06	5750	57.64	1.18
23				5100	38.99	1.75	5430	41.61	-0.19	5760	54.33	0.85
24				5110	42.87	1.94	5440	47.74	0.3	5770	45.82	0
25				5120	43.33	1.78	5450	45.17	0.1	5780	46.8	0.21
26				5130	37.05	0.93	5460	46.62	-0.05	5790	51.78	0.54
27				5140	40.54	1.16	5470	51.73	0.5	5800	51.12	0.3
28				5150	46.41	1.69	5480	51.51	0.46	5810	52.16	0.49
29				5160	42.16	1.23	5490	53.62	0.65	5820	50.84	0.24
30				5170	40.04	1.01	5500	57.1	1.06	5830	48.77	0.17
31				5180	45.12	1.45	5510	55.64	0.94	5840	48.68	0.1
32				5190	46.65	1.62	5520	52.56	0.99	5850	52.19	0.43
33				5200	39.92	0.83	5530	50.7	0.8	5860	51.65	0.52
34				5210	39.37	0.77	5540	55.43	1.41	5870	44.78	-0.07
35				5220	46.98	1.58	5550	55.21	1.33	5880	40.57	-0.13
36										5890	41.64	0.03
37										5900	38.24	-0.14

40 备注