

ASSP Mobile Communication Systems

Piezoelectric SAW BPF (700 MHz to 1000 MHz)

F5CH Series (L2 type)

■ DESCRIPTION

The F5CH series of SAW bandpass filters apply to the frequency range 700 MHz to 1000 MHz.

The SAW filters are fabricated on a lithium tantalate (LiTaO_3) substrate, producing filters with a wide frequency bandwidth, low insertion loss in passband and superior stability due to the high electromechanical coupling coefficient of the material.

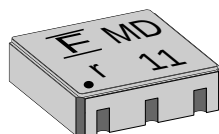
The F5CH series filters are housed in a small surface mount package. Moreover, the impedance in the passband is 50 ohms, and so applications require no external matching circuits.

The F5CH series SAW filters are suitable for interstage RF filter in mobile communications systems in the frequency range 700 MHz to 1000 MHz. Standard devices are available for AMPS, ETACS, GSM, EGSM, PDC and so on.

■ FEATURES

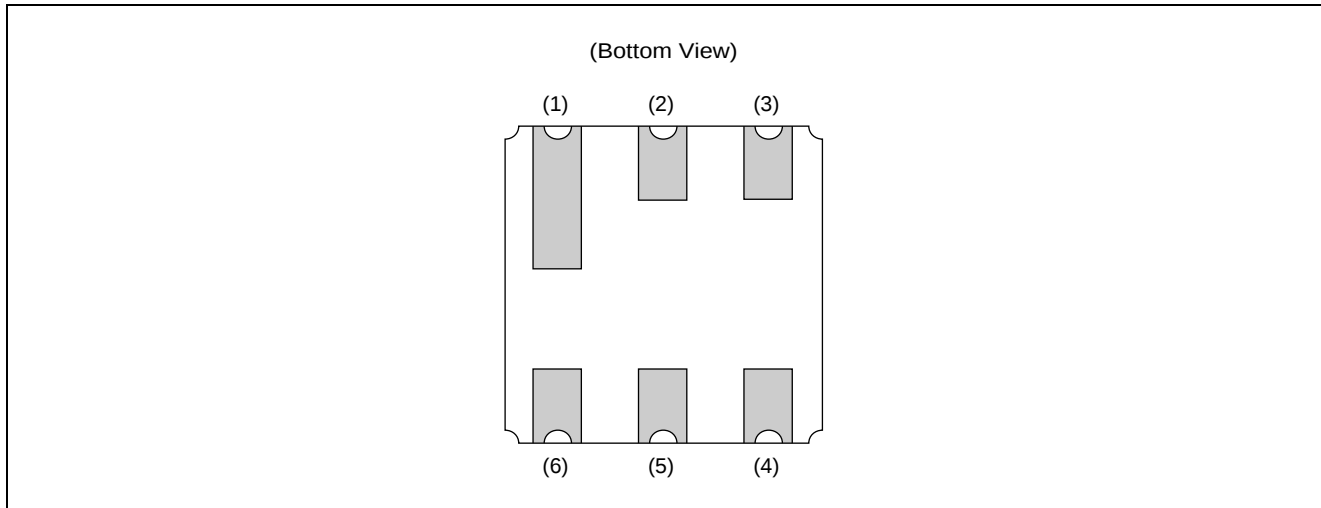
- Low insertion loss and high attenuation
- High handling power (0.2 W)
- Ultra compact and light package (3.8 mm)
- External matching circuits are not required.
- Surface mount package (SMT)
- Wide variety of standard devices for worldwide mobile communication systems (AMPS, GSM, EGSM, ETACS, PDC800, NTACS, 2 WAY PAGER etc.)

■ PACKAGE



F5CH Series (L2 type)

PIN ASSIGNMENT



PIN DESCRIPTION

Pin No.	Pin name	Description
1	GND	Ground Pin
2	IN	Input Pin
3	GND	Ground Pin
4	GND	Ground Pin
5	OUT	Output Pin
6	GND	Ground Pin

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating		Unit
		Min	Max	
Operating temperature	Ta	−30	+85	°C
Storage temperature	Tstg	−40	+100	°C
Maximum input power	P _{IN}	—	200	mW
Frequency range	—	700	+1000	MHz

WARNING: Piezoelectric devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

F5CH Series (L2 type)

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value		Unit
		Min	Max	
Operating temperature	Ta	−30	+85	°C

WARNING: The recommended operating conditions are required in order to ensure the normal operation of the piezoelectric device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.

Always use piezoelectric devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their FUJITSU representatives beforehand.

■ STANDARD FREQUENCIES

System		Center freq. (MHz)	BW (MHz)	Part Symbol	Part number	Remarks
AMPS/ADC	Tx	836.5	25	AL	FAR-F5CH-836M50-L2AL	
				AW	FAR-F5CH-836M50-L2AW	High Att. type
	Rx	881.5	25	AM	FAR-F5CH-881M50-L2AM	
				AV	FAR-F5CH-881M50-L2AV	High Att. type
ETACS	Tx	888.5	33	CL	FAR-F5CH-888M50-L2CL	
	Rx	933.5	33	CM	FAR-F5CH-933M50-L2CM	
NTACS	Rx	856.5	27	DM	FAR-F5CH-856M50-L2DM	
GSM/NMT	Tx	902.5	25	EW	FAR-F5CH-902M50-L2EW	High Att. type
	Rx	947.5	25	EM	FAR-F5CH-947M50-L2EM	
				EV	FAR-F5CH-947M50-L2EV	High Att. type
EGSM	Tx	897.5	35	KL	FAR-F5CH-897M50-L2KL	
	Rx	942.5	35	KM	FAR-F5CH-942M50-L2KM	
				KV	FAR-F5CH-942M50-L2KV	High Att. type
PDC800	Tx	950.0	20	FW	FAR-F5CH-950M00-L2FW	High Att. type
	Rx	820.0	20	FM	FAR-F5CH-820M00-L2FM	
				FV	FAR-F5CH-820M00-L2FV	High Att. type
ISM900	—	915.0	26	JW	FAR-F5CH-915M00-L2JW	High Att. type

F5CH Series (L2 type)

■ ELECTRIC CHARACTERISTICS

1. AMPS/ADC (Tx)

Part number: FAR-F5CH-836M50-L2AL

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	824 MHz to 849 MHz	—	1.6	2.5	dB	
Inband ripple	—	824 MHz to 849 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	869 MHz to 894 MHz	20	25	—	dB	
Inband VSWR	—	824 MHz to 849 MHz	—	1.8	2.0	—	

2. AMPS/ADC (Tx) High Attenuation Type

Part number: FAR-F5CH-836M50-L2AW

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	824 MHz to 849 MHz	—	2.6	3.5	dB	
Inband ripple	—	824 MHz to 849 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 800 MHz	28	31	—	dB	
	—	869 MHz to 1049 MHz	30	38	—	dB	
	—	1049 MHz to 2000 MHz	25	30	—	dB	
Inband VSWR	—	824 MHz to 849 MHz	—	1.8	2.5	—	

3. AMPS/ADC (Rx)

Part number: FAR-F5CH-881M50-L2AM

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	869 MHz to 894 MHz	—	2.5	3.5	dB	
Inband ripple	—	869 MHz to 894 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 849 MHz	20	24	—	dB	
	—	914 MHz to 939 MHz	20	30	—	dB	
	—	939 MHz to 1049 MHz	25	30	—	dB	
	—	1049 MHz to 2000 MHz	20	23	—	dB	
Inband VSWR	—	869 MHz to 894 MHz	—	1.8	2.0	—	

F5CH Series (L2 type)

4. AMPS/ADC (Rx) High Attenuation Type Part number: FAR-F5CH-881M50-L2AV

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	869 MHz to 894 MHz	—	3.0	3.5	dB	
Inband ripple	—	869 MHz to 894 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 779 MHz	25	33	—	dB	
	—	779 MHz to 849 MHz	35	40	—	dB	
	—	914 MHz to 939 MHz	20	30	—	dB	
	—	939 MHz to 1049 MHz	40	42	—	dB	
	—	1049 MHz to 2000 MHz	25	30	—	dB	
Inband VSWR	—	869 MHz to 894 MHz	—	1.7	2.0	—	

5. ETACS (Tx) Part number: FAR-F5CH-888M50-L2CL

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	872 MHz to 905 MHz	—	3.0	5.0	dB	
Inband ripple	—	872 MHz to 905 MHz	—	1.5	—	dB	
Absolute attenuation	—	917 MHz to 950 MHz	10	15	—	dB	
Inband VSWR	—	872 MHz to 905 MHz	—	2.0	2.5	—	

6. ETACS (Rx) Part number: FAR-F5CH-933M50-L2CM

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	917 MHz to 950 MHz	—	3.8	5.5	dB	
Inband ripple	—	917 MHz to 950 MHz	—	2.0	—	dB	
Absolute attenuation	—	DC to 900 MHz	30	34	—	dB	
	—	900 MHz to 905 MHz	10	15	—	dB	
	—	1007 MHz to 1040 MHz	35	40	—	dB	
	—	1040 MHz to 2000 MHz	25	30	—	dB	
Inband VSWR	—	917 MHz to 950 MHz	—	2.0	2.5	—	

F5CH Series (L2 type)

7. NTACS (Rx)

Part number: FAR-F5CH-856M50-L2DM

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	843 MHz to 870 MHz	—	2.5	3.0	dB	
Inband ripple	—	843 MHz to 870 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 733 MHz	23	25	—	dB	
	—	733 MHz to 760 MHz	35	37	—	dB	
	—	760 MHz to 815 MHz	25	33	—	dB	
	—	898 MHz to 953 MHz	30	35	—	dB	
	—	953 MHz to 980 MHz	35	40	—	dB	
	—	980 MHz to 1100 MHz	25	35	—	dB	
	—	1100 MHz to 2000 MHz	20	24	—	dB	
Inband VSWR	—	843 MHz to 870 MHz	—	1.8	2.5	—	

8. GSM/NMT (Tx) High Attenuation Type

Part number: FAR-F5CH-902M50-L2EW

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	890 MHz to 915 MHz	—	2.9	3.5	dB	
Inband ripple	—	890 MHz to 915 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 845 MHz	32	34	—	dB	
	—	845 MHz to 870 MHz	20	35	—	dB	
	—	935 MHz to 980 MHz	20	35	—	dB	
	—	980 MHz to 1200 MHz	35	40	—	dB	
	—	1200 MHz to 2000 MHz	25	30	—	dB	
Inband VSWR	—	890 MHz to 915 MHz	—	1.6	2.0	—	

F5CH Series (L2 type)

9. GSM/NMT (Rx)

Part number: FAR-F5CH-947M50-L2EM

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	935 MHz to 960 MHz	—	2.5	3.5	dB	
Inband ripple	—	935 MHz to 960 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 800 MHz	20	25	—	dB	
	—	890 MHz to 915 MHz	20	35	—	dB	
	—	980 MHz to 1025 MHz	15	28	—	dB	
	—	1025 MHz to 1105 MHz	35	38	—	dB	
	—	1105 MHz to 1600 MHz	25	29	—	dB	
	—	1600 MHz to 2000 MHz	20	26	—	dB	
Inband VSWR	—	935 MHz to 960 MHz	—	1.7	2.5	—	

10. GSM/NMT (Rx) HIGH ATTENUATION TYPE

Part number: FAR-F5CH-947M50-L2EV

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	935 MHz to 960 MHz	—	2.8	3.5	dB	
Inband ripple	—	935 MHz to 960 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 770 MHz	32	34	—	dB	
	—	770 MHz to 855 MHz	35	38	—	dB	
	—	855 MHz to 871 MHz	40	43	—	dB	
	—	890 MHz to 915 MHz	20	30	—	dB	
	—	980 MHz to 1025 MHz	15	25	—	dB	
	—	1025 MHz to 1077 MHz	40	46	—	dB	
	—	1077 MHz to 1105 MHz	43.5	47	—	dB	
	—	1105 MHz to 2000 MHz	25	30	—	dB	
	—	2000 MHz to 3000 MHz	10	12	—	dB	
Inband VSWR	—	935 MHz to 960 MHz	—	1.6	2.0	—	

F5CH Series (L2 type)

11. EGSM (Tx)

Part number: FAR-F5CH-897M50-L2KL

(Ta = -20°C to +80°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	880 MHz to 915 MHz	—	2.4	4.0	dB	
Inband ripple	—	880 MHz to 915 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 845 MHz	20	21	—	dB	
	—	925 MHz to 935 MHz	5	—	—	dB	-20 to +25°C
			8	10	—	dB	+25 to +80°C
	—	935 MHz to 980 MHz	20	25	—	dB	
Inband VSWR	—	880 MHz to 915 MHz	—	1.9	2.5	—	

12. EGSM (Rx)

Part number: FAR-F5CH-942M50-L2KM

(Ta = -20°C to +80°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	925 MHz to 960 MHz	—	3.2	4.0	dB	
Inband ripple	—	925 MHz to 960 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 619 MHz	25	26	—	dB	
	—	619 MHz to 905 MHz	26	27	—	dB	
	—	905 MHz to 915 MHz	10	20	—	dB	-20 to +25°C
			7	—	—	dB	+25 to +80°C
	—	980 MHz to 1200 MHz	20	30	—	dB	
	—	1200 MHz to 2000 MHz	25	27	—	dB	
Inband VSWR	—	925 MHz to 960 MHz	—	2.0	2.5	—	

F5CH Series (L2 type)

13. EGSM (Rx) High Attenuation Type

Part number: FAR-F5CH-942M50-L2KV

(Ta = -20°C to +80°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	925 MHz to 960 MHz	—	3.0	5.0	dB	
Inband ripple	—	925 MHz to 960 MHz	—	1.5	2.5	dB	
Absolute attenuation	—	DC to 619 MHz	30	34	—	dB	
	—	619 MHz to 905 MHz	30	35	—	dB	
	—	905 MHz to 915 MHz	8	10	—	dB	-20 to +25°C
			6	—	—	dB	+25 to +80°C
	—	980 MHz to 1200 MHz	20	30	—	dB	
	—	1200 MHz to 2000 MHz	30	31	—	dB	
Inband VSWR	—	925 MHz to 960 MHz	—	2.4	2.7	—	

14. PDC800 (Tx) High Attenuation Type

Part number: FAR-F5CH-950M00-L2FW

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	940 MHz to 960 MHz	—	2.8	3.5	dB	
Inband ripple	—	940 MHz to 960 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 680 MHz	30	34	—	dB	
	—	680 MHz to 696 MHz	33	36	—	dB	
	—	810 MHz to 830 MHz	40	44	—	dB	
	—	1015 MHz to 1106 MHz	40	45	—	dB	
	—	1106 MHz to 2000 MHz	30	34	—	dB	
Inband VSWR	—	940 MHz to 960 MHz	—	1.6	2.0	—	

F5CH Series (L2 type)

15. PDC800 (Rx)

Part number: FAR-F5CH-820M00-L2FM

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	810 MHz to 830 MHz	—	1.8	2.5	dB	
Inband ripple	—	810 MHz to 830 MHz	—	1.0	1.5	dB	
Absolute attenuation	—	DC to 680 MHz	20	24	—	dB	
	—	680 MHz to 700 MHz	25	29	—	dB	
	—	875 MHz to 940 MHz	25	30	—	dB	
	—	940 MHz to 1070 MHz	30	32	—	dB	
	—	1070 MHz to 1090 MHz	35	37	—	dB	
	—	1090 MHz to 2000 MHz	20	24	—	dB	
Inband VSWR	—	810 MHz to 830 MHz	—	1.8	2.0	—	

16. PDC800 (Rx) High Attenuation Type

Part number: FAR-F5CH-820M00-L2FV

(Ta = -30°C to +85°C)

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	810MHz to 830 MHz	—	3.0	3.5	dB	
Inband ripple	—	810 MHz to 830 MHz	—	1.5	2.0	dB	
Absolute attenuation	—	DC to 130 MHz	35	40	—	dB	
	—	130 MHz to 760 MHz	30	33	—	dB	
	—	855 MHz to 875 MHz	25	35	—	dB	
	—	875 MHz to 920 MHz	40	42	—	dB	
	—	920 MHz to 1090 MHz	35	40	—	dB	
	—	1090 MHz to 2000 MHz	25	30	—	dB	
Inband VSWR	—	810 MHz to 830 MHz	—	2.0	2.5	—	

F5CH Series (L2 type)

17. ISM900 High Attenuation Type

Part number: FAR-F5CH-915M00-L2JW

(Ta = -30°C to +85°C)

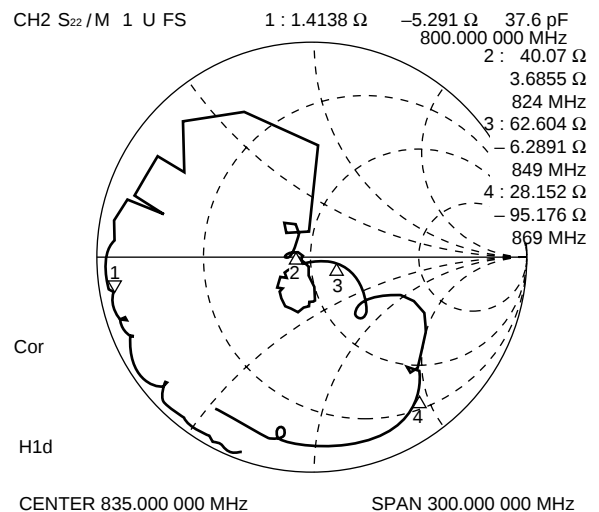
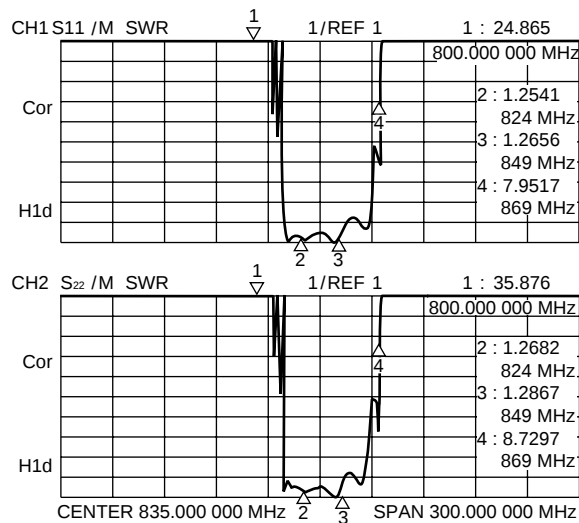
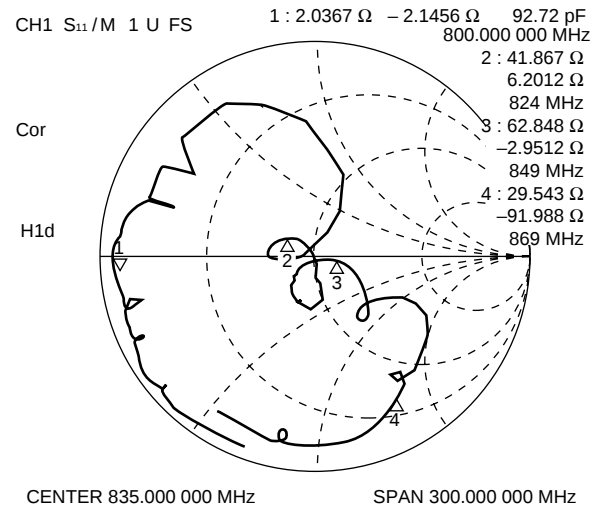
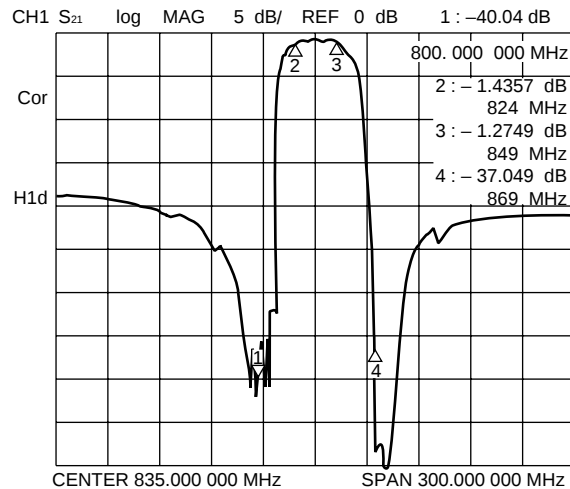
Parameter	Symbol	Condition	Value			Unit	Remarks
			Min	Typ	Max		
Insertion loss	IL	902 MHz to 928 MHz	—	3.0	3.5	dB	
Inband ripple	—	902 MHz to 928 MHz	—	1.5	2.0	dB	
Absolute attenuation	—	DC to 800 MHz	25	27	—	dB	
	—	800 MHz to 880 MHz	20	30	—	dB	
	—	950 MHz to 1080 MHz	30	40	—	dB	
	—	1080 MHz to 2000 MHz	20	24	—	dB	
Inband VSWR	—	902 MHz to 928 MHz	—	2.0	2.5	—	

F5CH Series (L2 type)

■ TYPICAL CHARACTERISTICS (STANDARD VERSION)

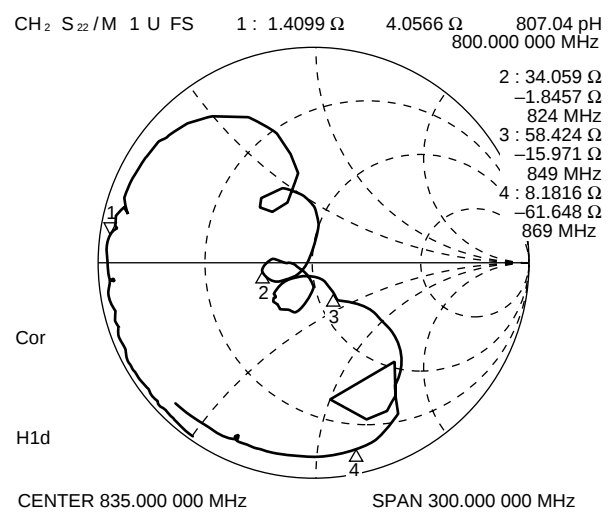
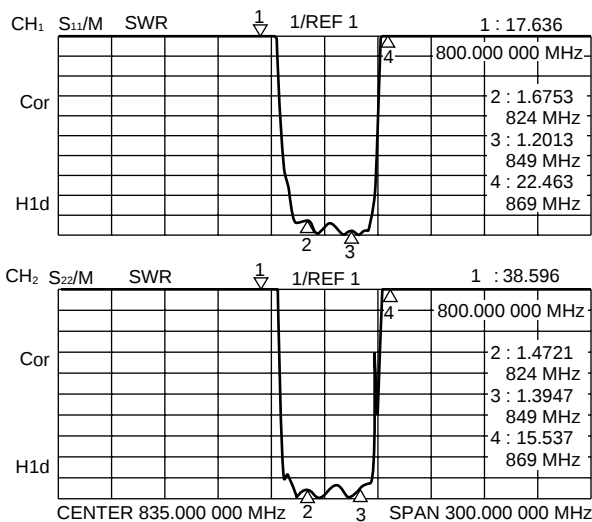
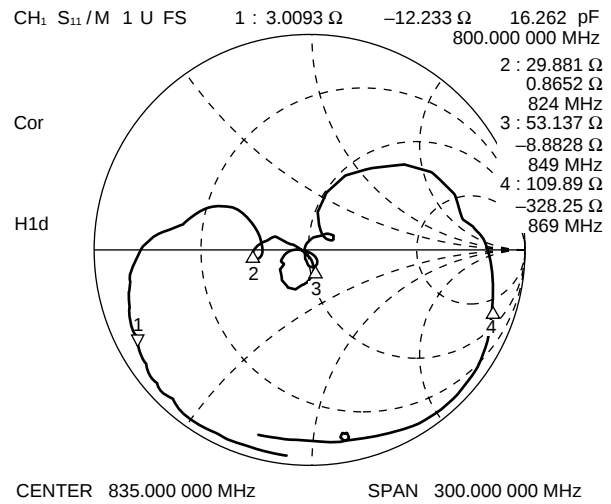
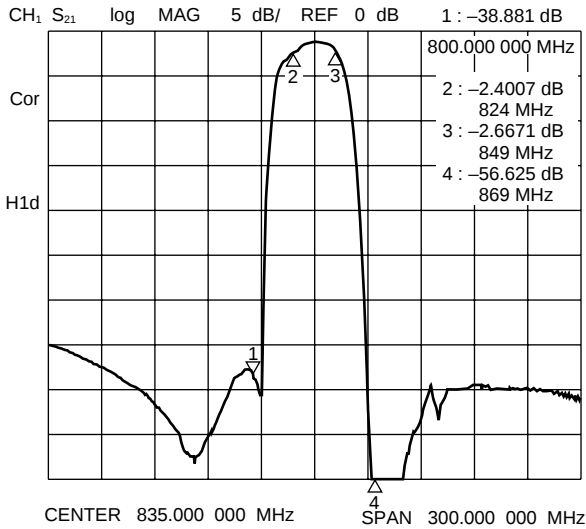
1. AMPS/ADC System (Tx)

Part number: FAR-F5CH-836M50-L2AL



F5CH Series (L2 type)

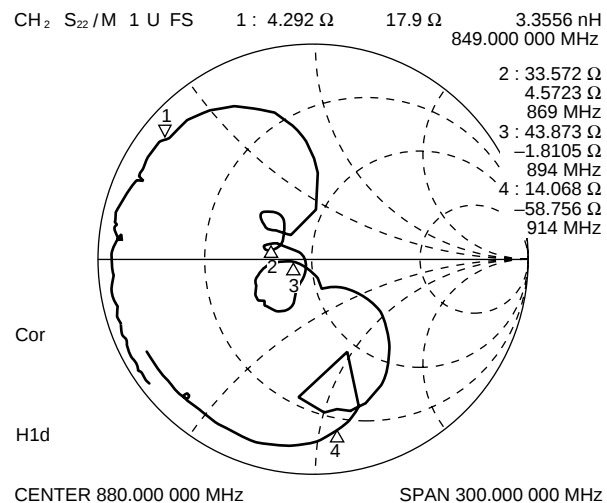
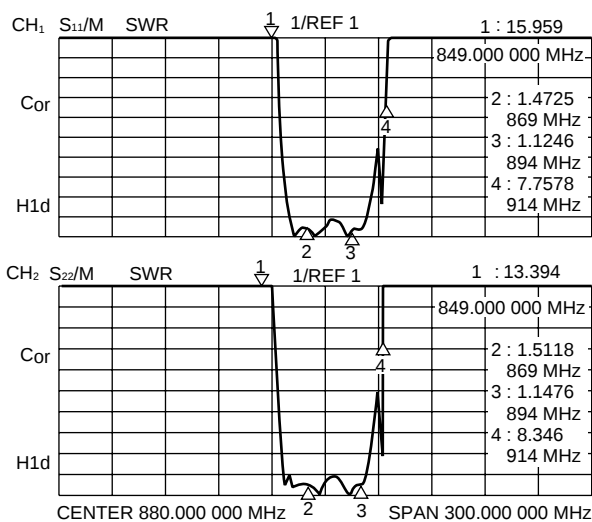
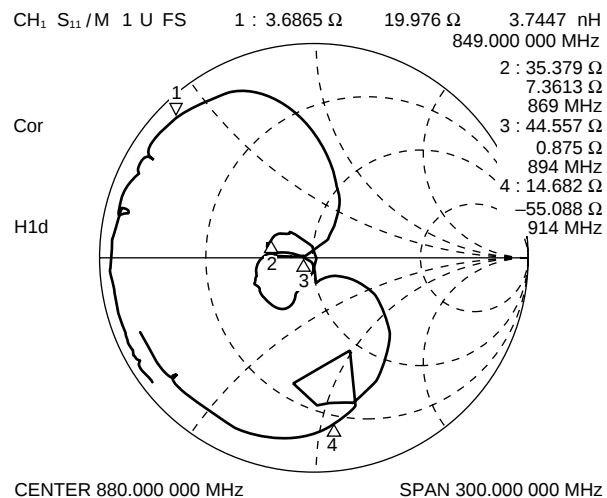
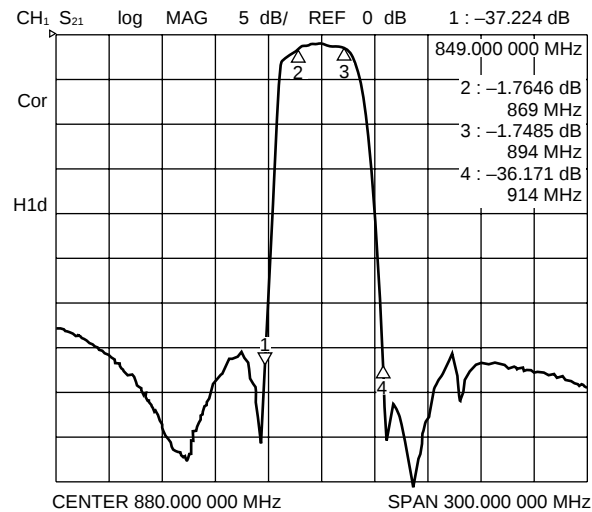
2. AMPS/ADC System (Tx) High Attenuation type Part number: FAR-F5CH-836M50-L2AW



F5CH Series (L2 type)

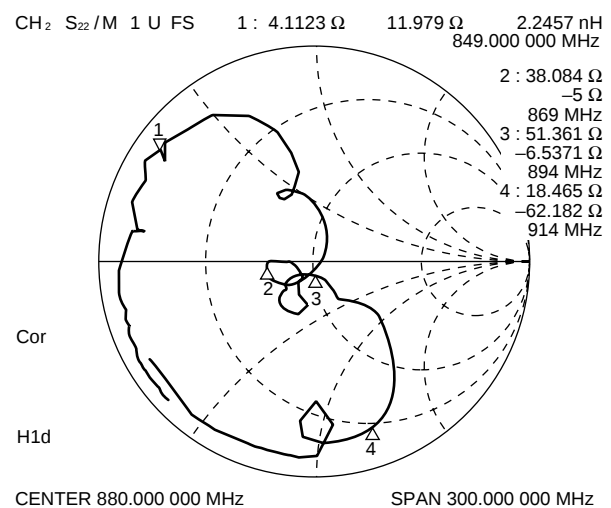
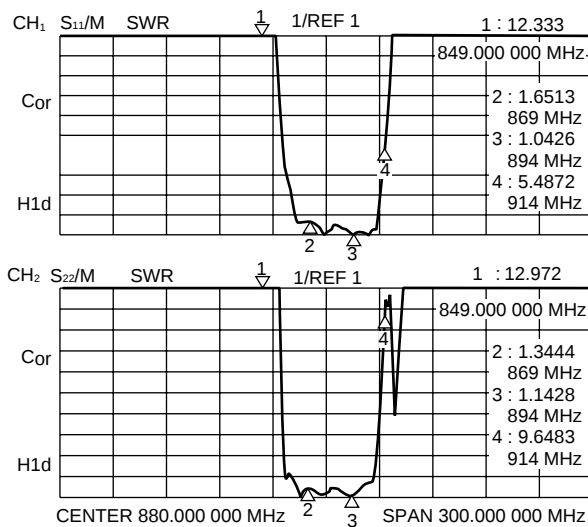
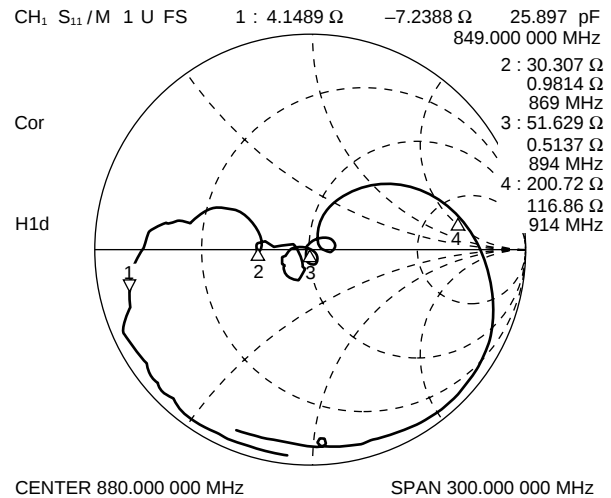
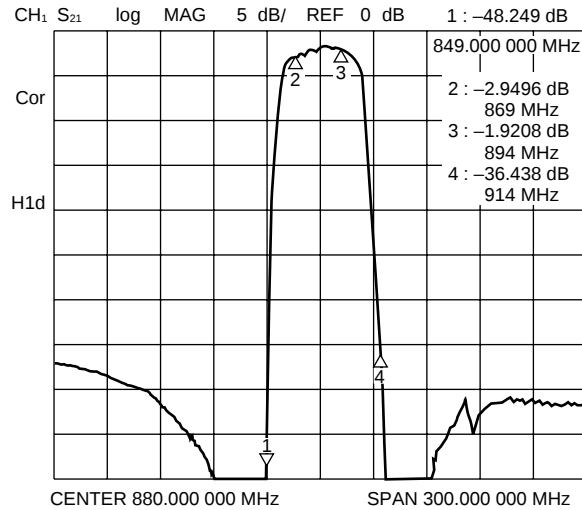
3. AMPS/ADC System (Rx)

Part number: FAR-F5CH-881M50-L2AM



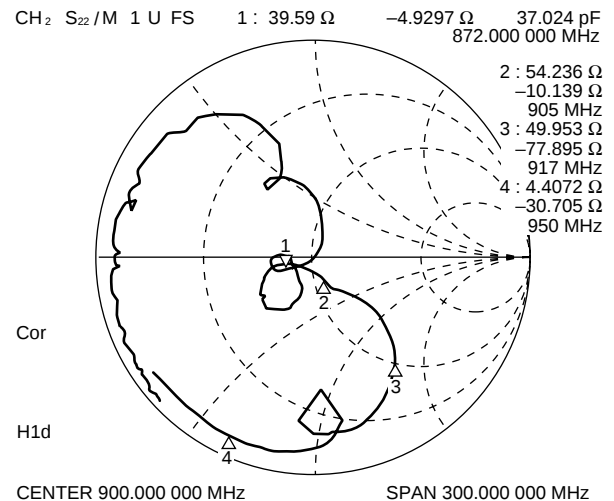
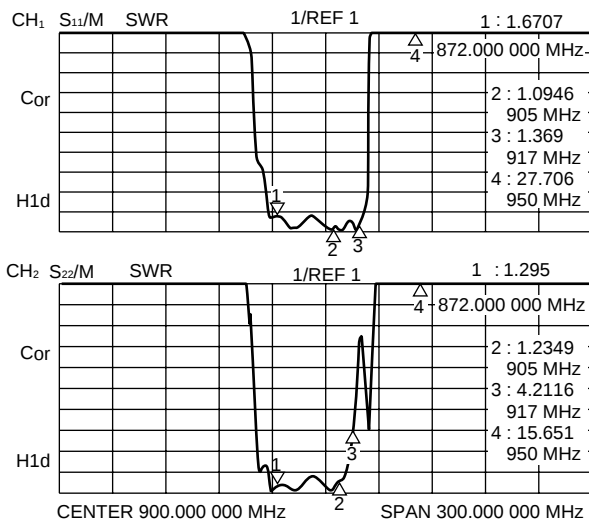
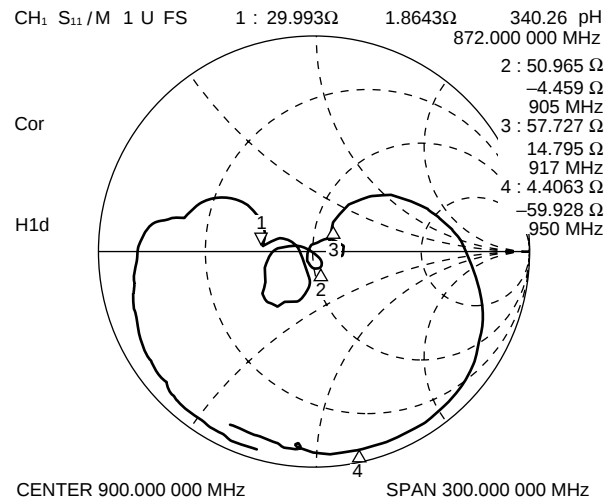
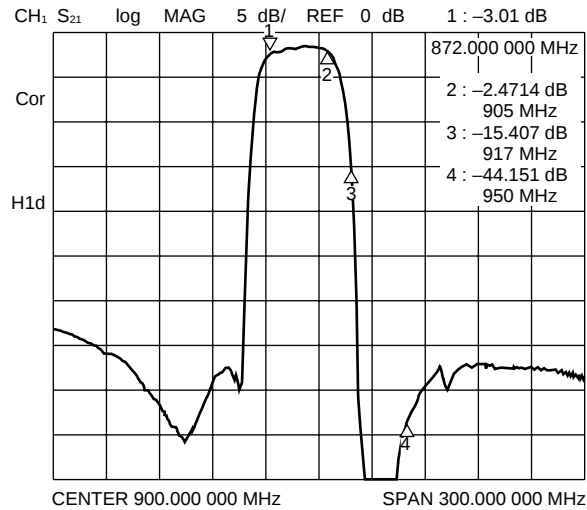
F5CH Series (L2 type)

4. AMPS/ADC System (Rx) High Attenuation type Part number: FAR-F5CH-881M50-L2AV



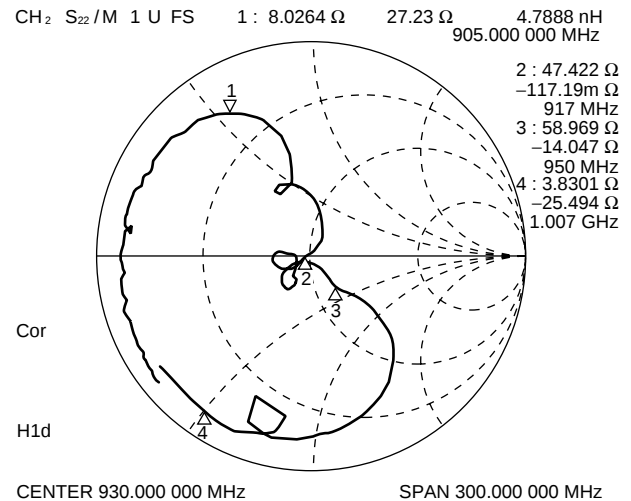
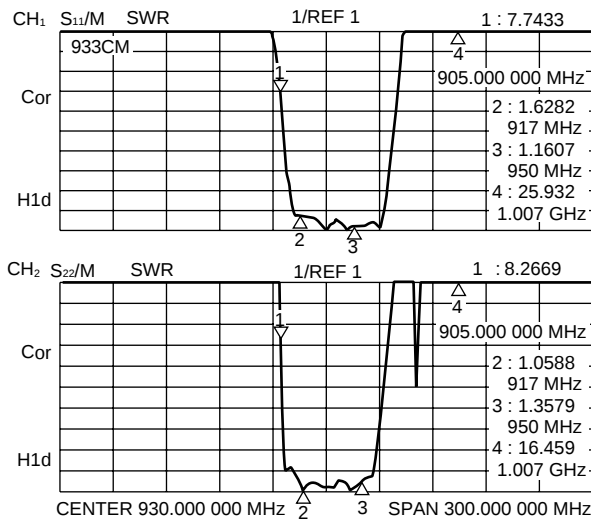
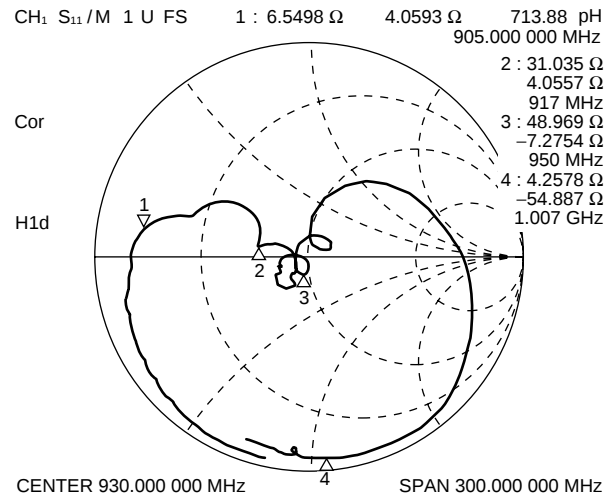
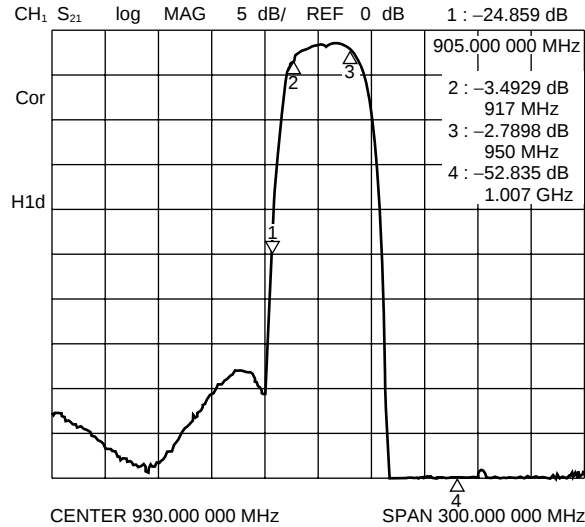
F5CH Series (L2 type)

5. ETACS System (Tx) Part number: FAR-F5CH-888M50-L2CL



F5CH Series (L2 type)

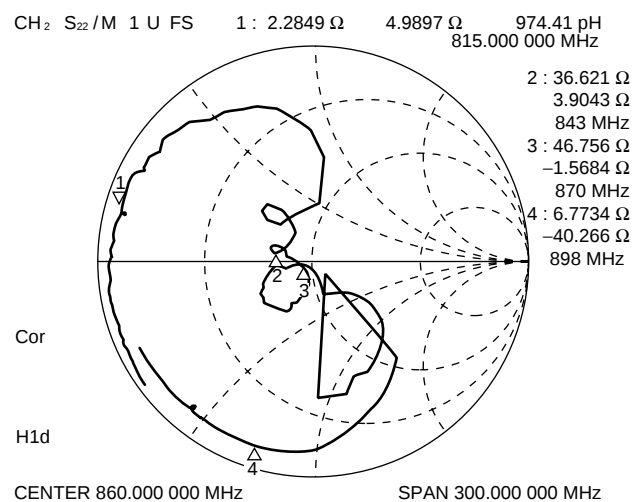
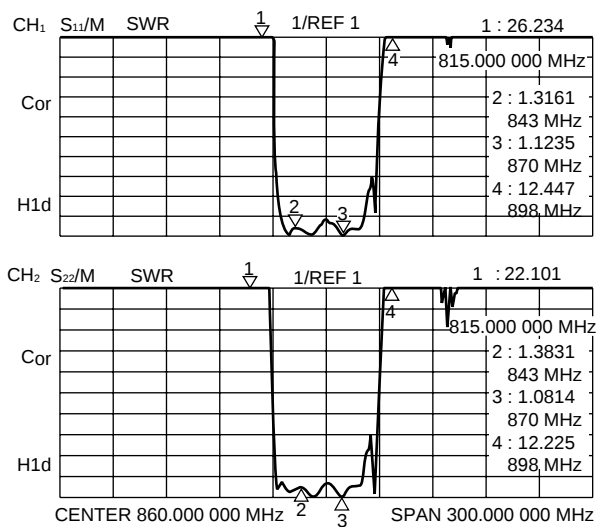
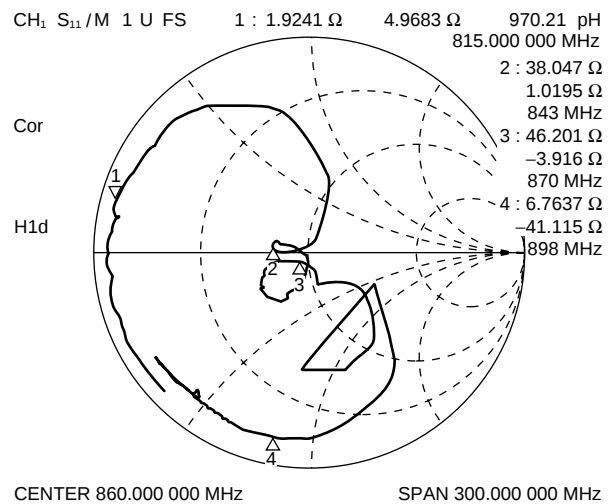
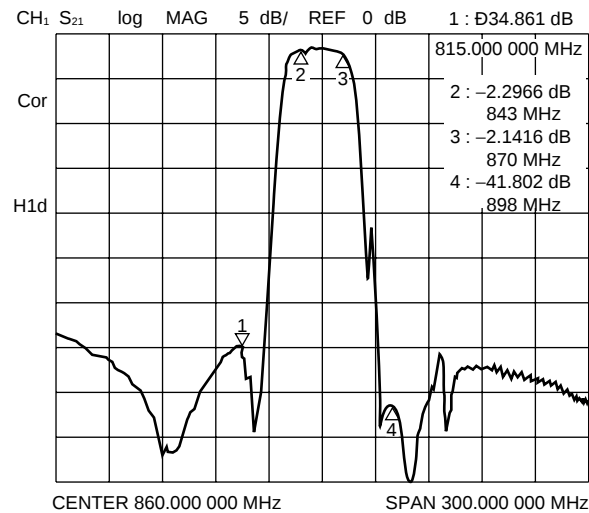
6. ETACS System (Rx) Part number: FAR-F5CH-933M50-L2CM



F5CH Series (L2 type)

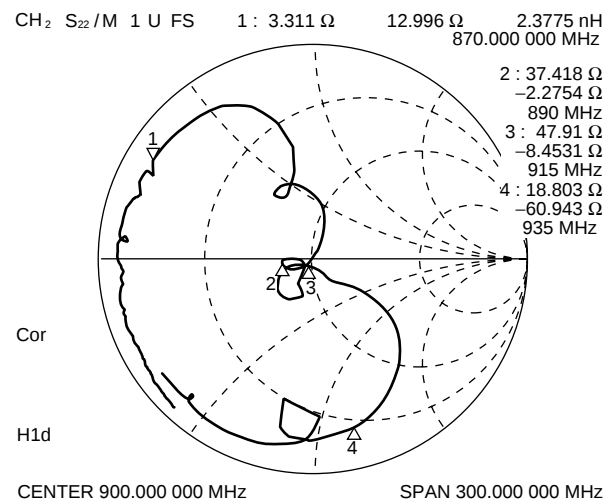
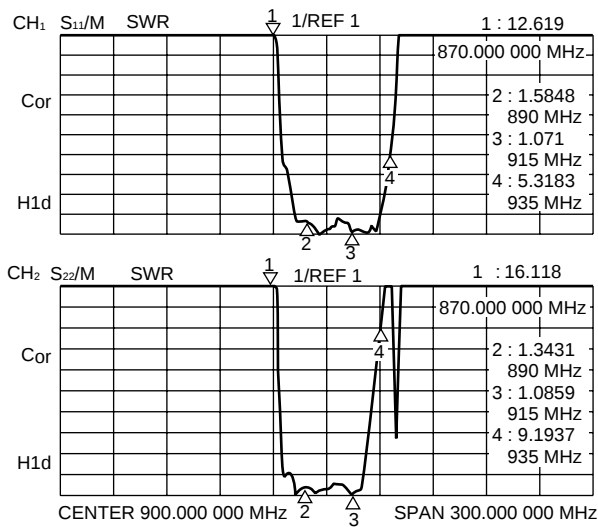
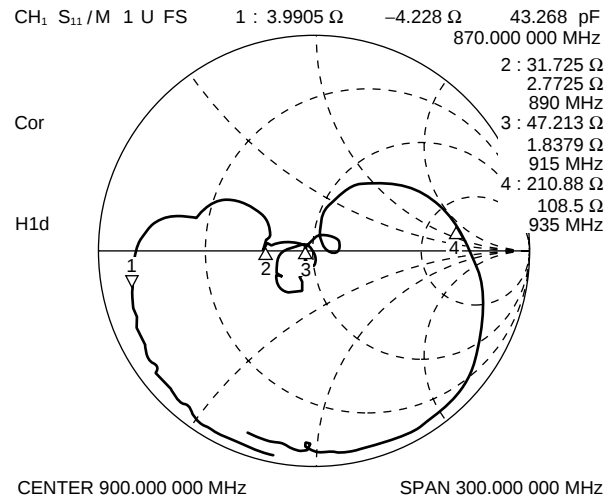
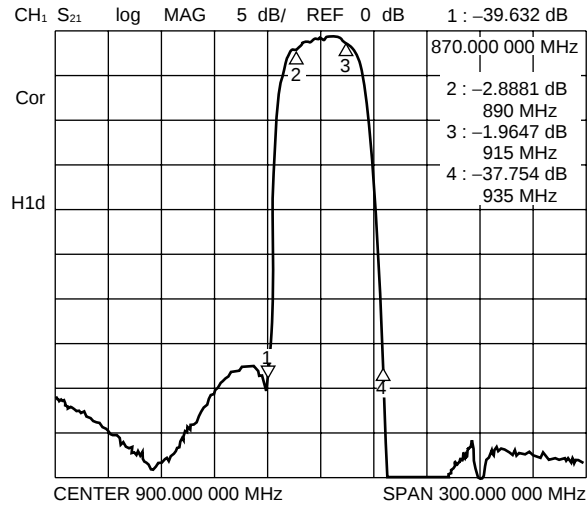
7. NTACS System (Rx)

Part number: FAR-F5CH-856M50-L2DM



F5CH Series (L2 type)

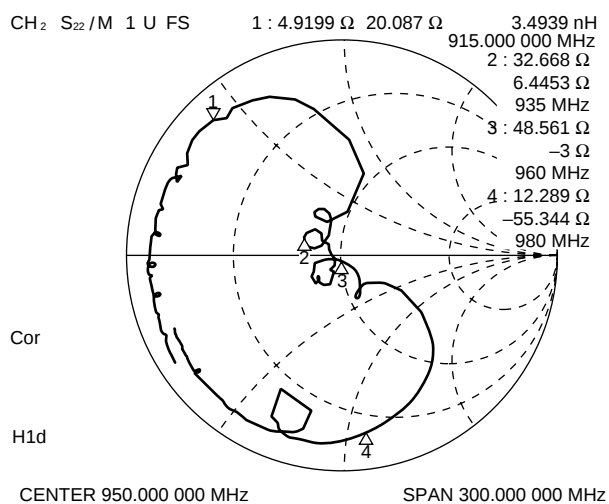
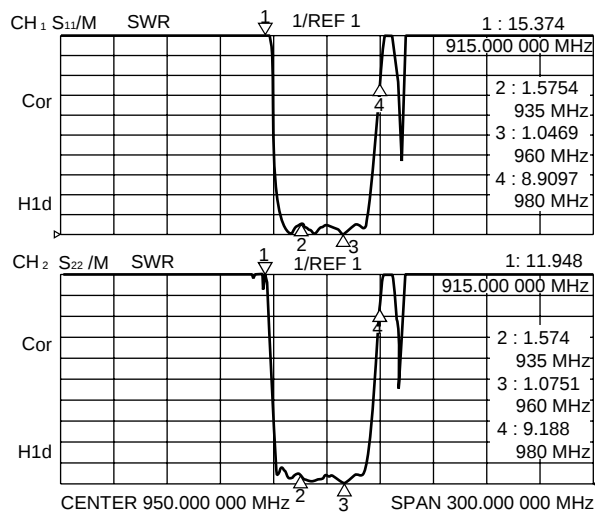
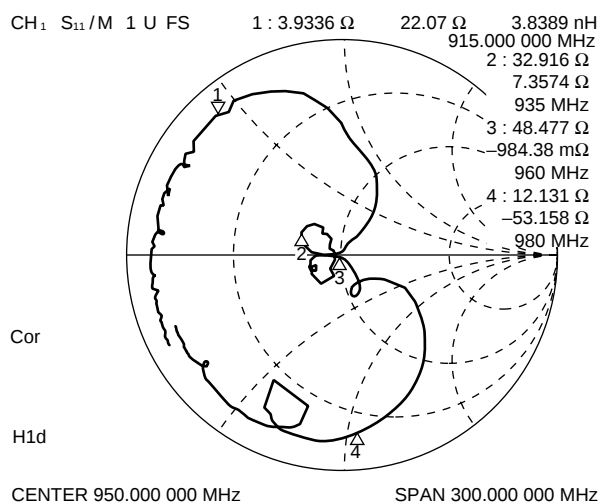
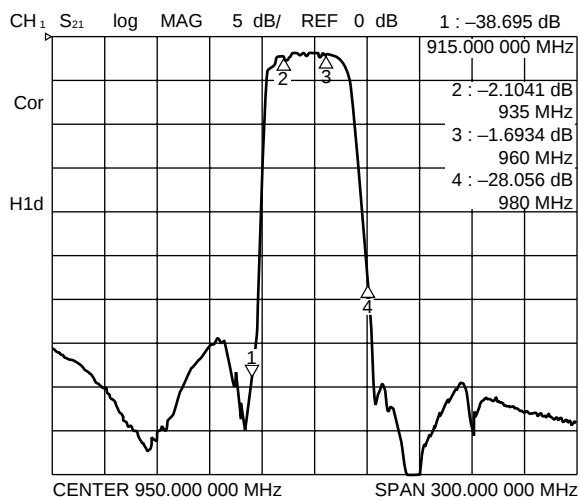
8. NMT/GSM System (Tx) High Attenuation type Part number: FAR-F5CH-902M50-L2EW



F5CH Series (L2 type)

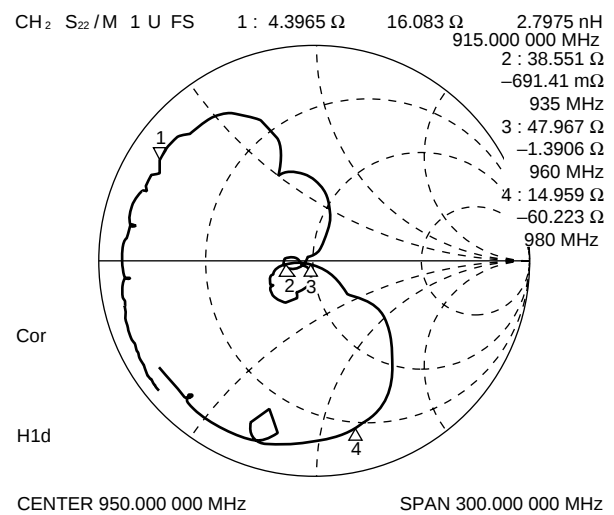
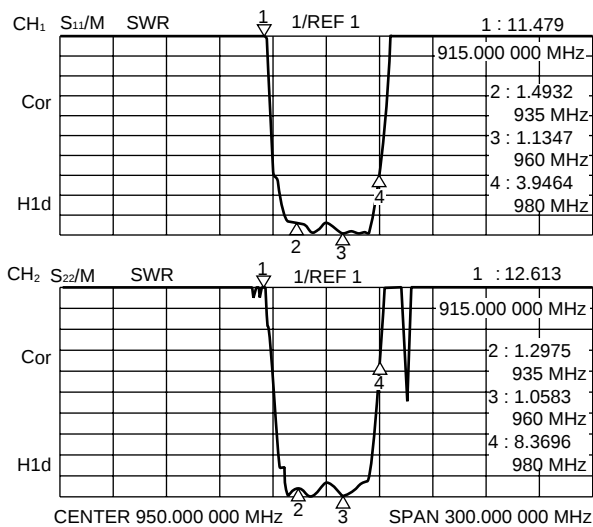
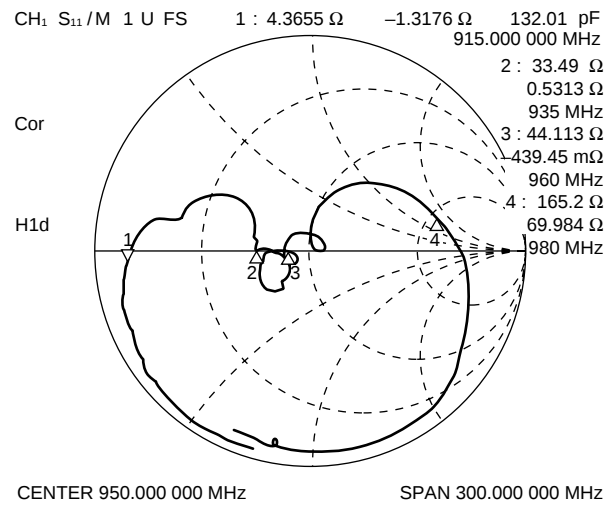
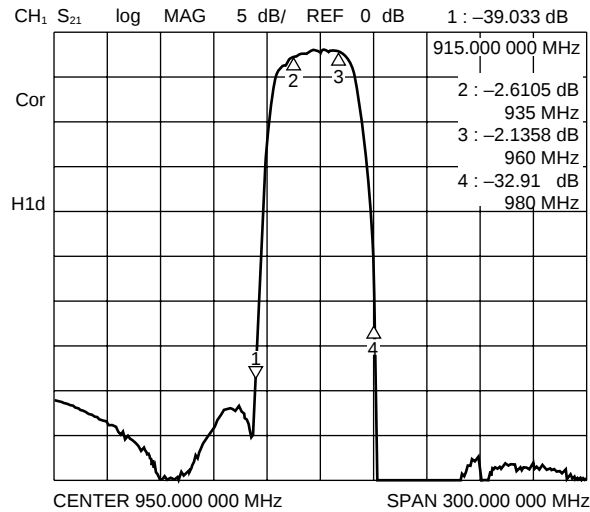
9. HMT/GSM System (Rx)

Part number: FAR-F5CH-947M50-L2EM



F5CH Series (L2 type)

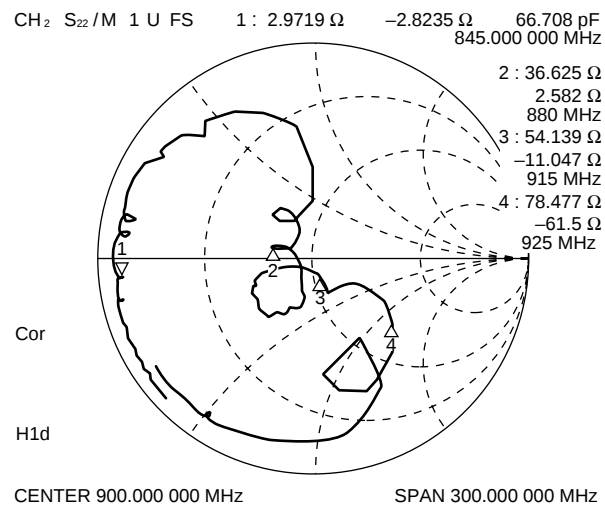
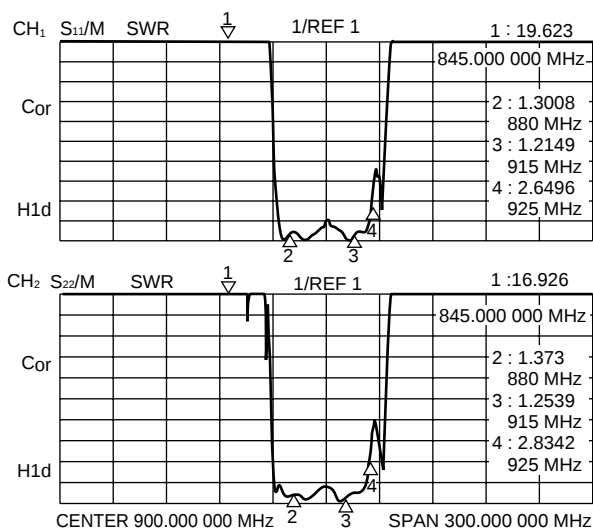
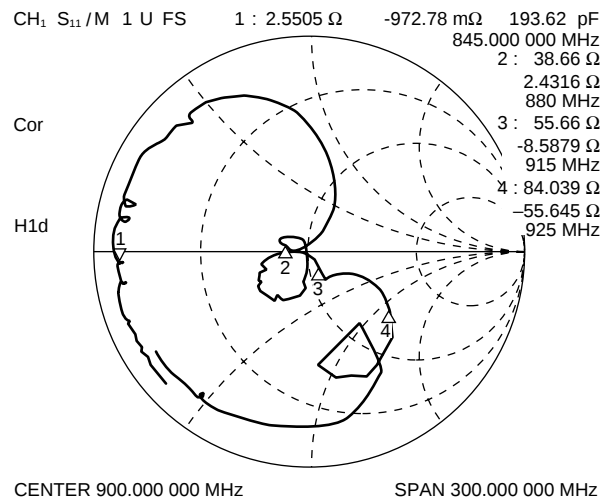
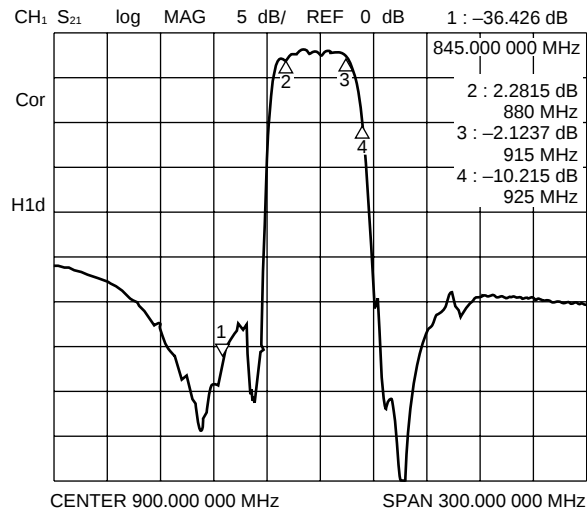
10. NMT/GSM System (Rx) High Attenuation type Part number: FAR-F5CH-947M50-L2EV



F5CH Series (L2 type)

11. EGSM System (Tx)

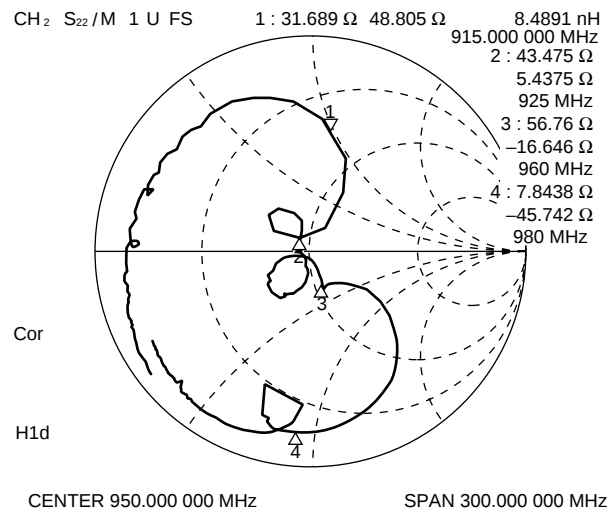
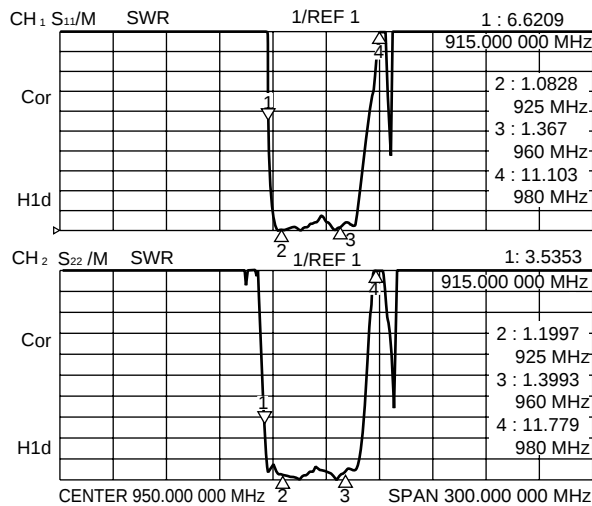
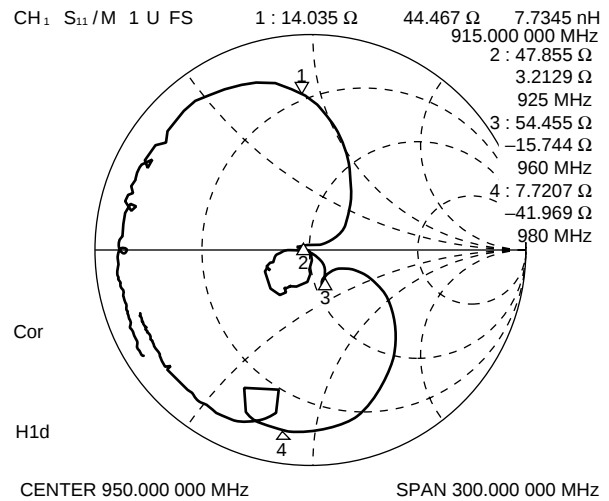
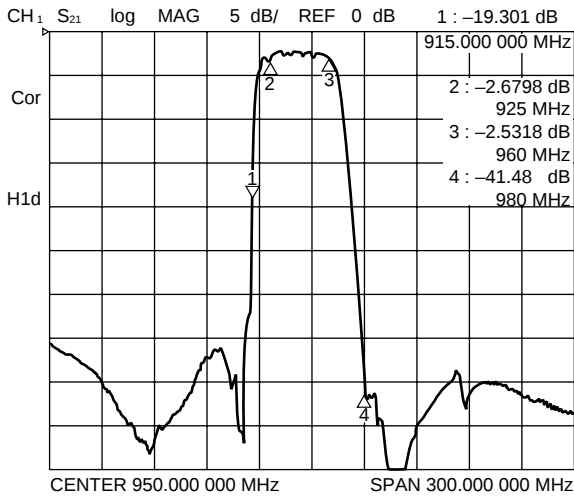
Part number: FAR-F5CH-897M50-L2KL



F5CH Series (L2 type)

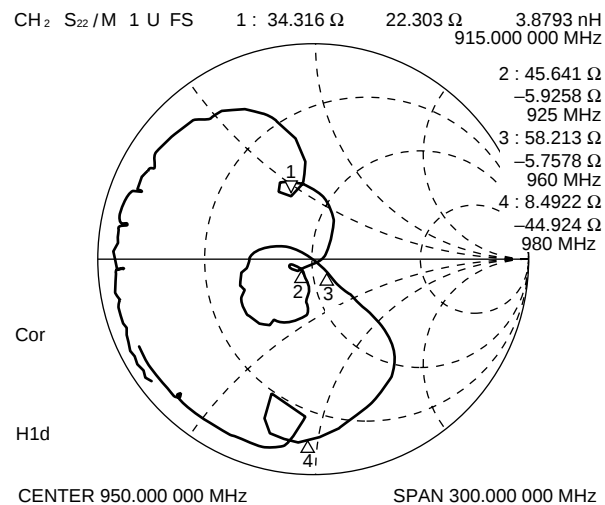
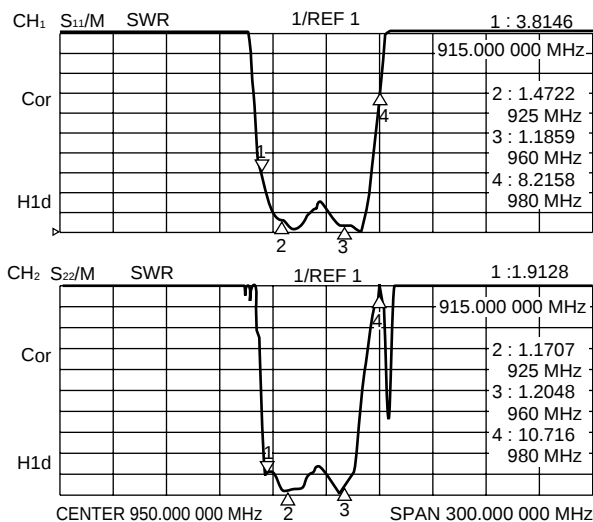
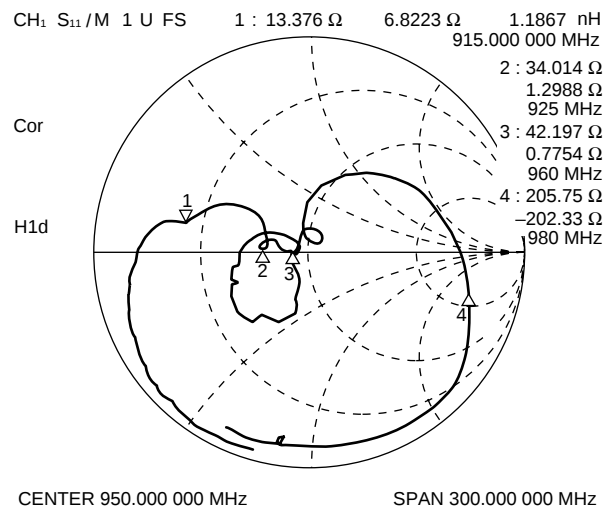
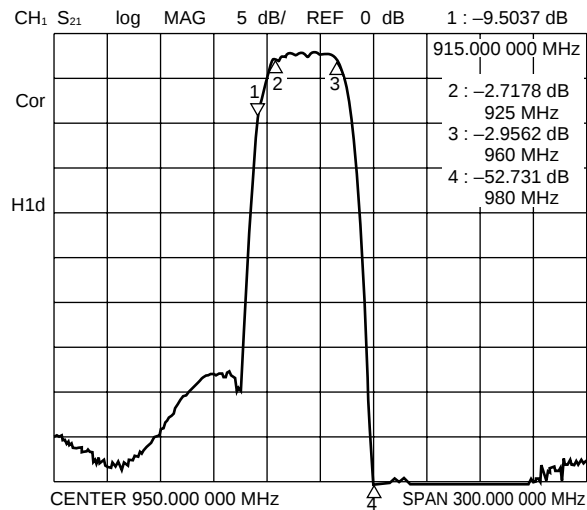
12. EGSM System (Rx)

Part number: FAR-F5CH-942M50-L2KM

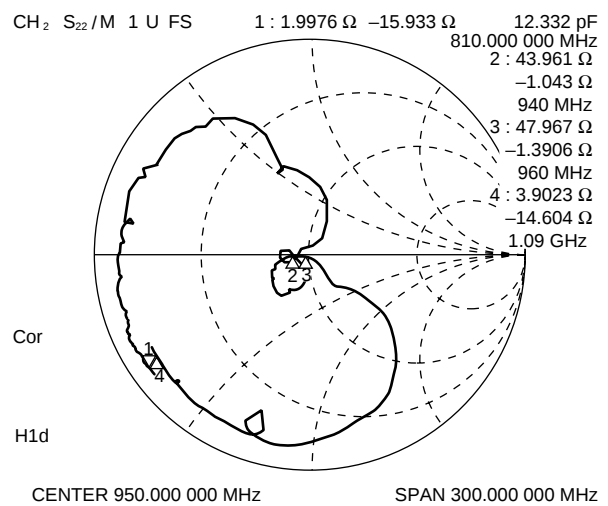
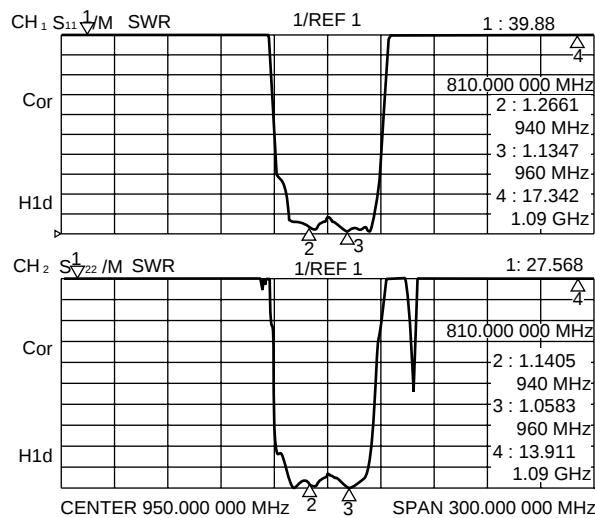
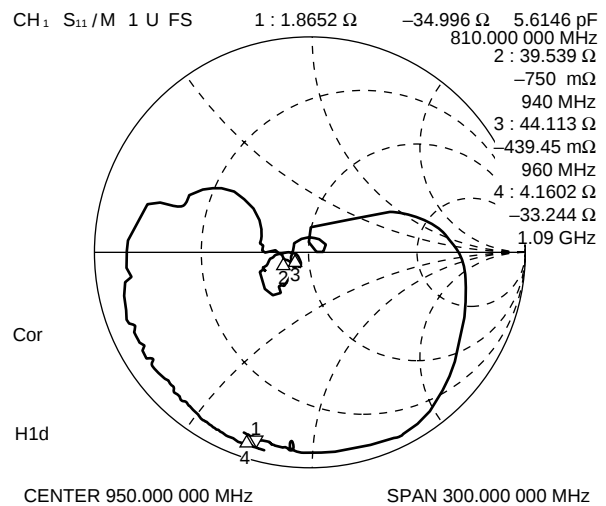
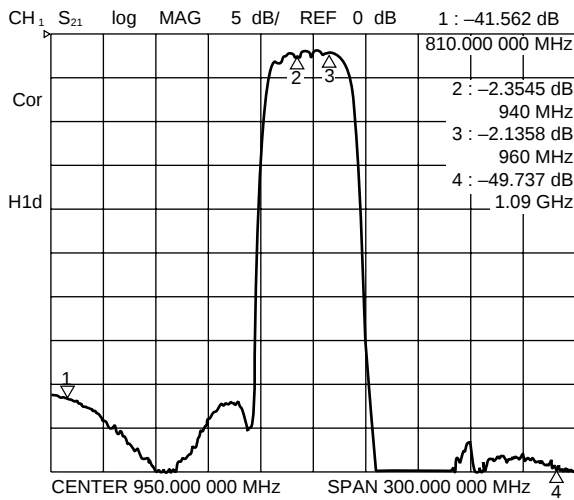


F5CH Series (L2 type)

13. EGSM System (Rx) High Attenuation type Part number: FAR-F5CH-942M50-L2KV



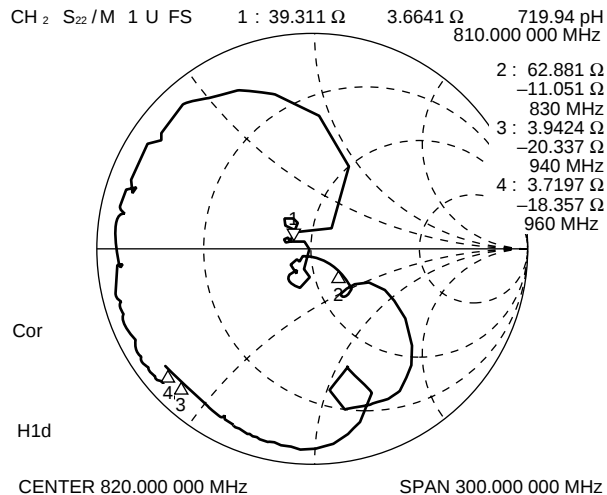
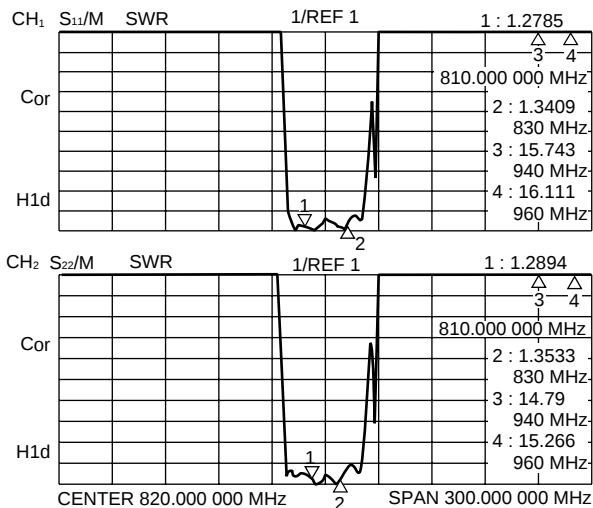
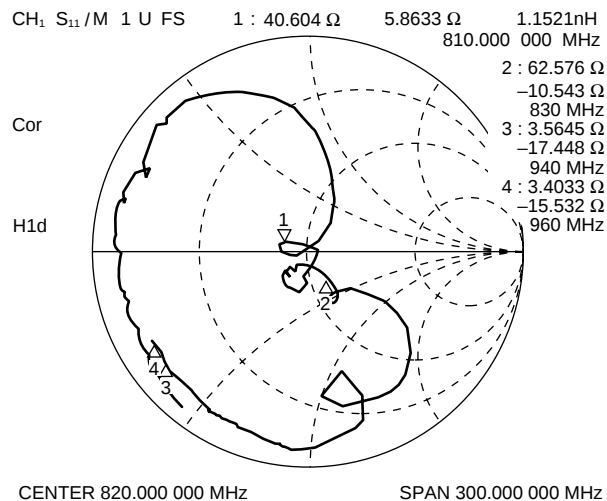
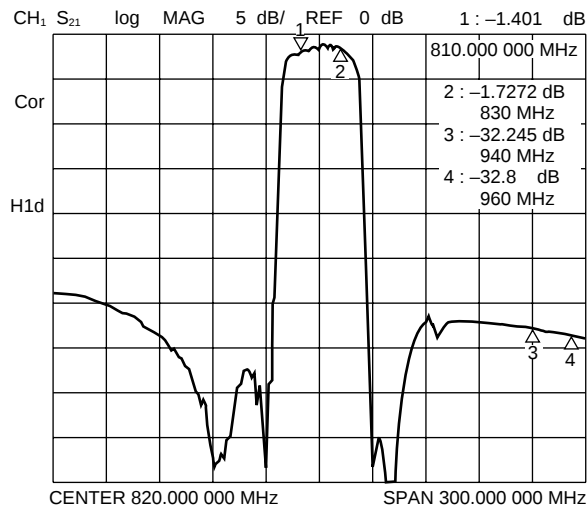
14. PDC800 System (Tx) High Attenuation Type Part number: FAR-F5CH-950M00-L2FW



F5CH Series (L2 type)

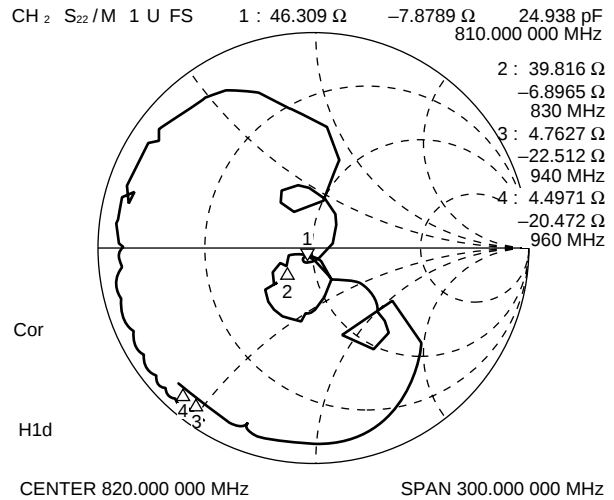
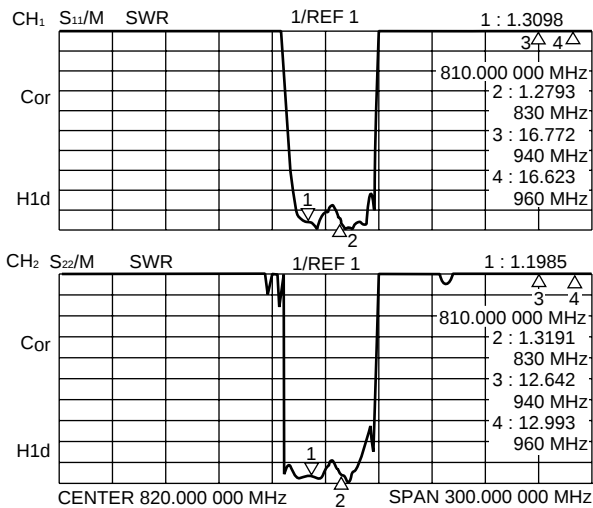
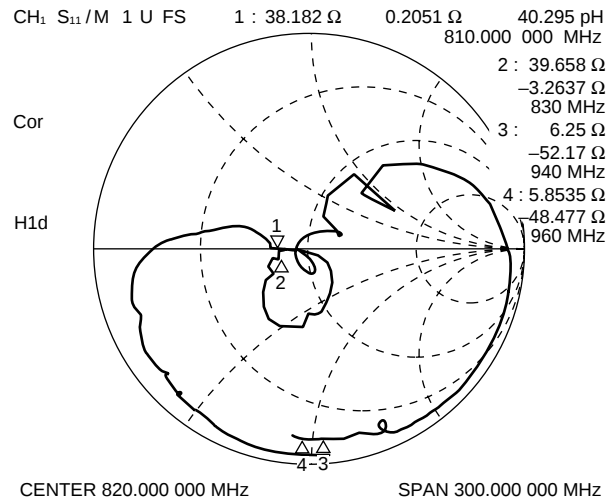
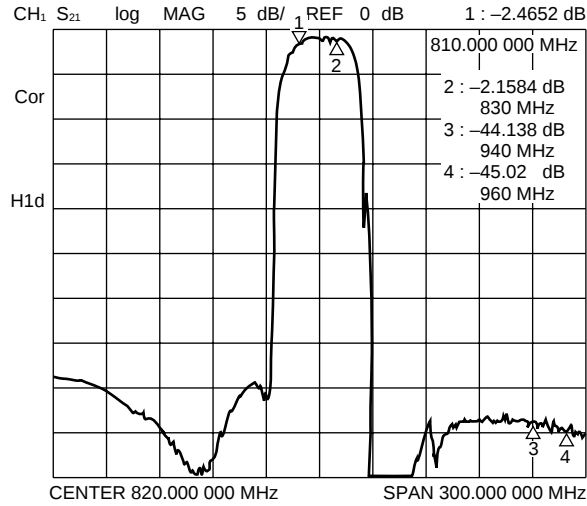
15. PDC800 System (Rx)

Part number: FAR-F5CH-820M00-L2FM



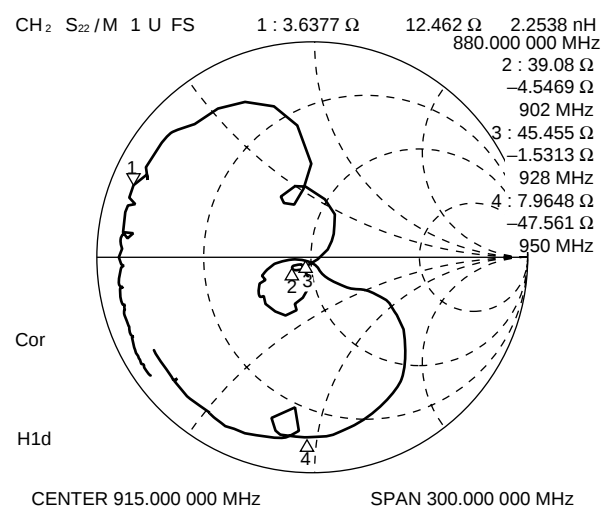
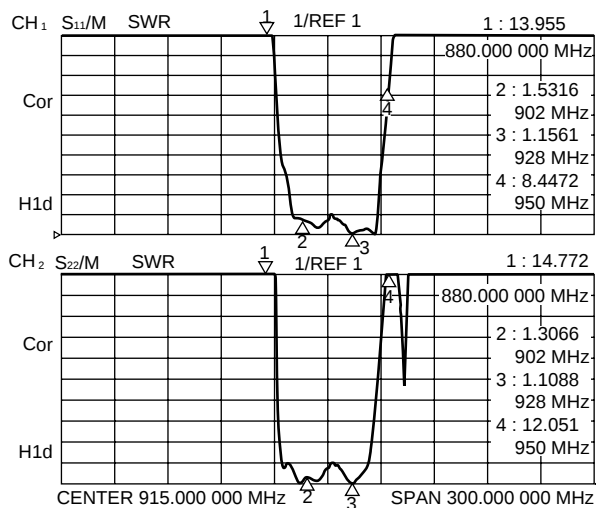
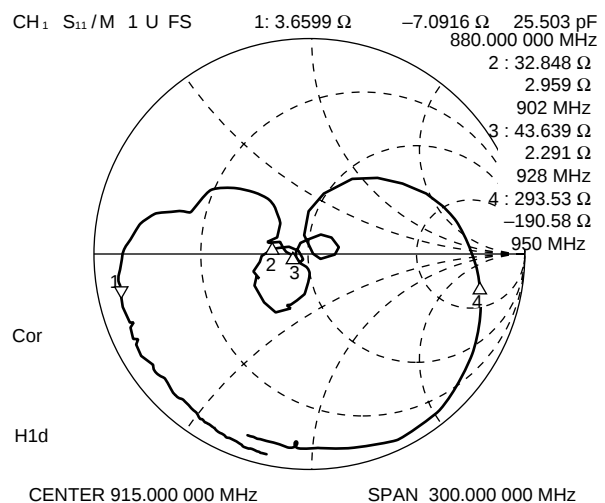
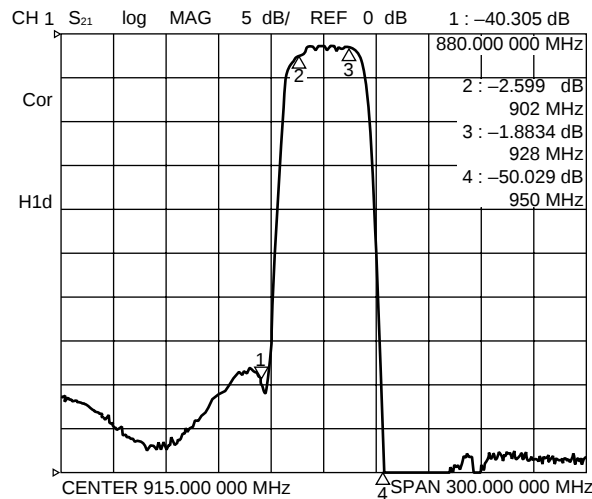
F5CH Series (L2 type)

16. PDC800 System (Rx) High Attenuation Type Part number: FAR-F5CH-820M00-L2FV



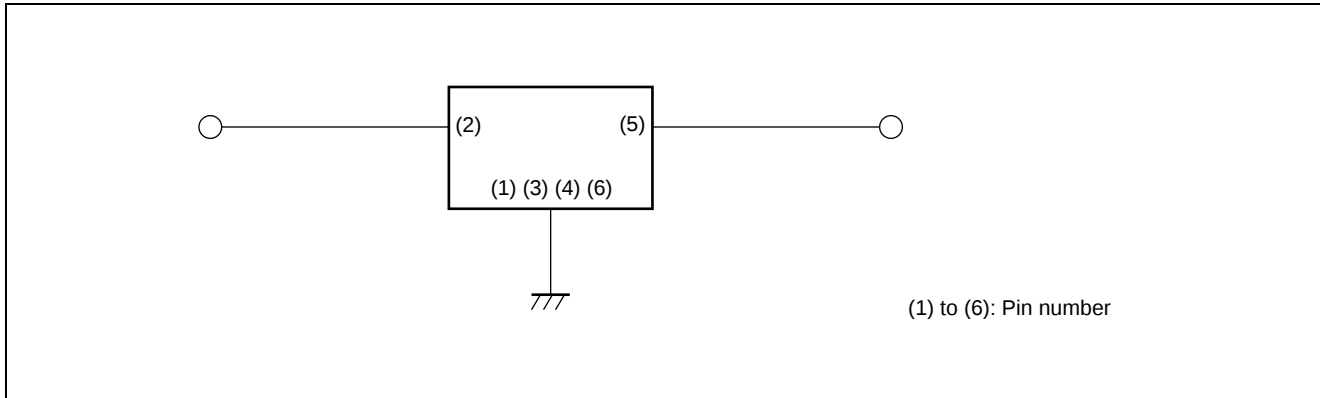
F5CH Series (L2 type)

17. ISM900 High Attenuation Type Part number: FAR-F5CH-915M00-L2JW



F5CH Series (L2 type)

■ MEASURING CIRCUIT



■ PART NUMBER DESIGNATION

[Designation example]

FAR-F5CH- -L2 -
(1) (2) (3)

(1)Frequency designation:Specify the nominal frequency in six alphanumeric characters.
Enter M (for MHz) at the decimal point.
Refer to standard frequencies.

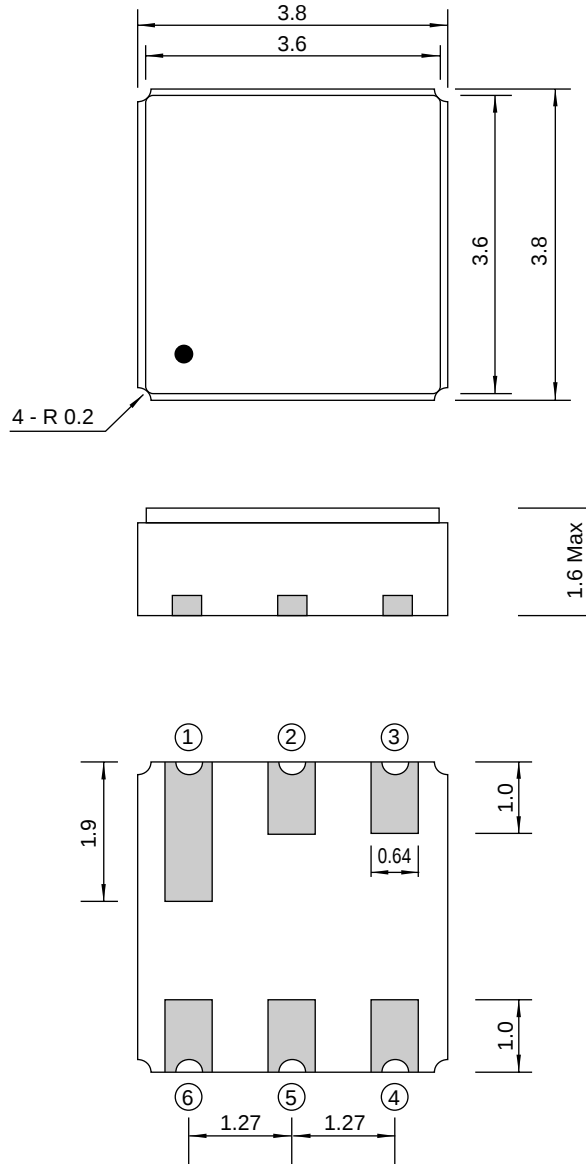
[Example]836.5 MHz ⇒ 836M50

(2)Serial number:Specify a characters from AA to KZ.
Refer to standard frequencies.

(3)Packing (Reeled tape):T: 1k pcs/reel
R: 3k pcs/reel

F5CH Series (L2 type)

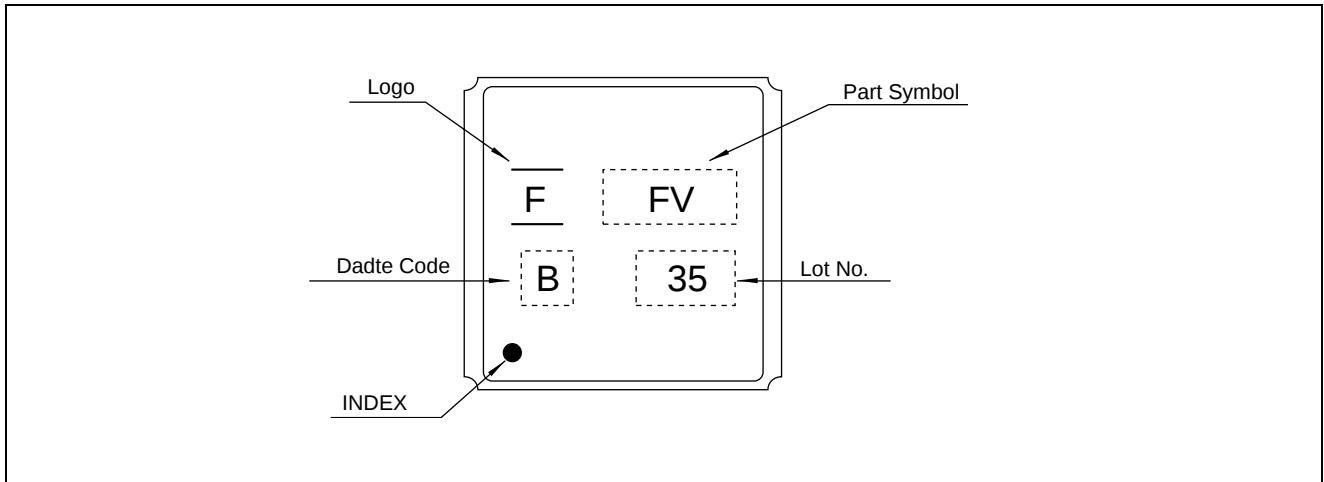
■ PACKAGE DIMENSION



Dimensions in mm.

F5CH Series (L2 type)

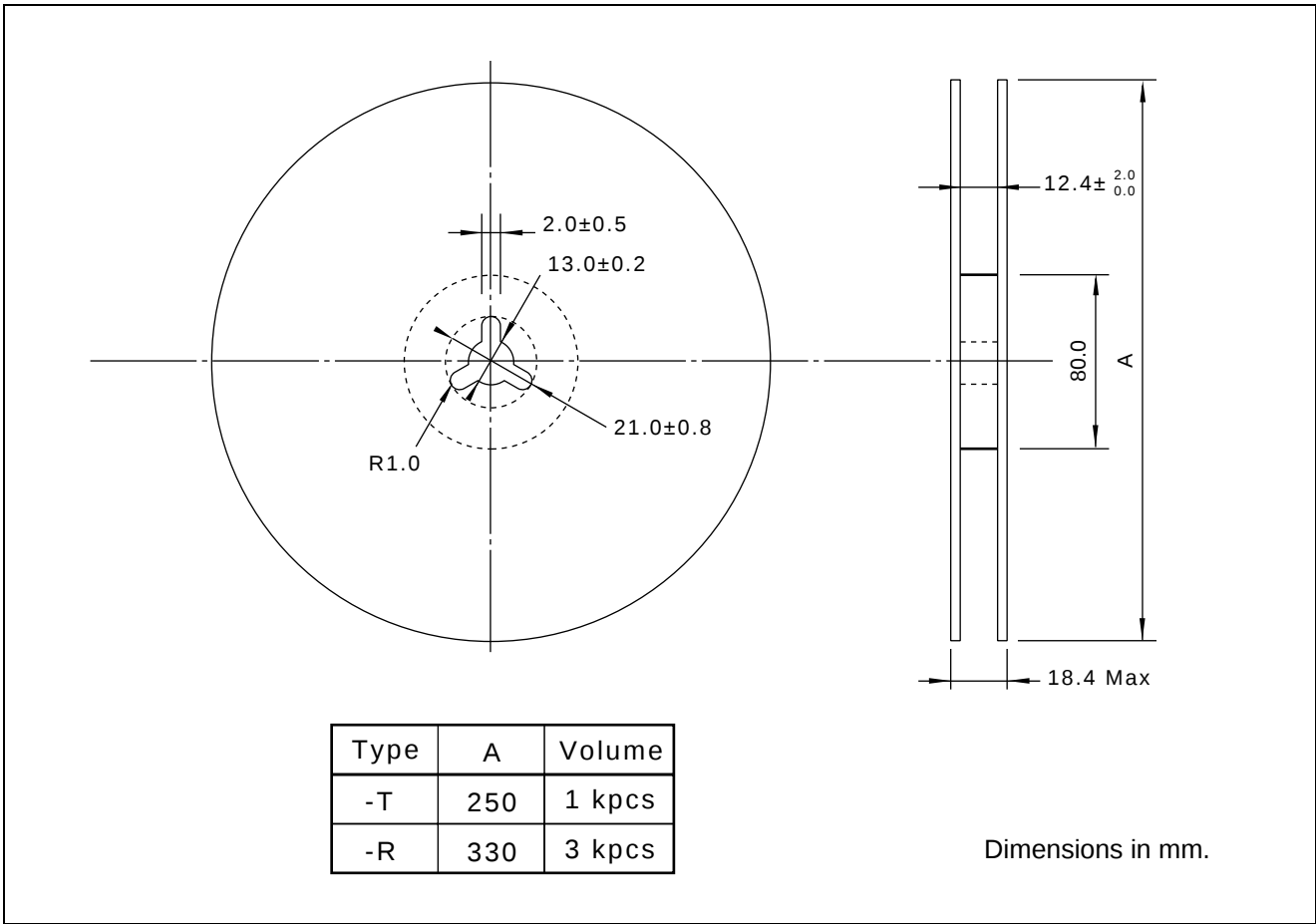
■ MARKING



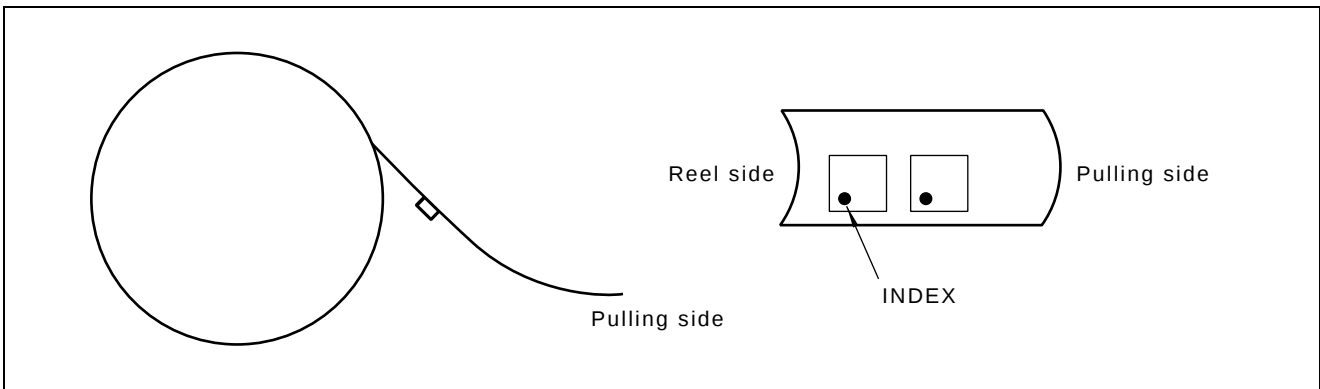
F5CH Series (L2 type)

■ PACKING: Reel type

1. Reel Dimensions

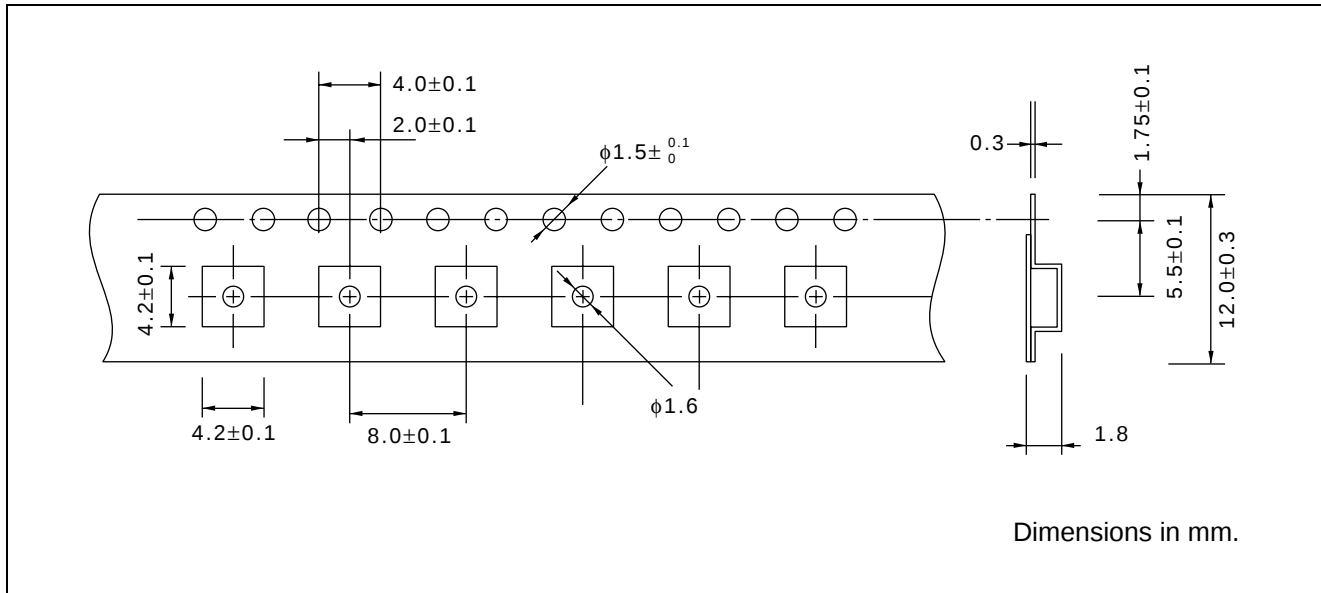


2. Packing Style



F5CH Series (L2 type)

3. Tape Dimensions



F5CH Series (L2 type)

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