FUJITSU MEDIA DEVICE
DATA SHEET

DS04-23117-6E

ASSP Mobile Communication Systems

Piezoelectric SAW BPF (700 MHz to 1700 MHz)

F5/F6 Series (K2 type)

■ DESCRIPTION

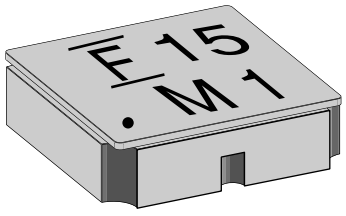
The F5/F6-K2 series of SAW band pass filters is available in the 700 MHz-1700 MHz frequency range and exhibit high stability by using single crystal Lithium Tantalate ($LiTaO_3$) with a large electro-mechanical coefficient. The F5/F6-K2 series provides low insertion loss and wide pass-band width by taking advantage of FUJITSU MEDIA DEVICE'S unique "Ladder-type" design.

Typical applications for the F5/F6-K2 series include RF interstage filter in mobile communications systems. Standard devices are available for AMPS/TDMA/CDMA,GSM, EGSM,PDC800,J-CDMA,PDC1.5G and so on. If higher attenuation is preferred, our F5-D2 series is also recommended.

■ FEATURES

- Low insertion loss and good skirt performance
- Compact and light package (3.0 mm sq.)
- External matching circuits are not required. (50 Ω I/O)
- Surface mount package (SMT)
- Standard devices are available for mobile communication standards.

■ PACKAGE



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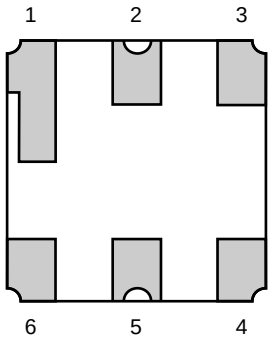
■ PIN ASSIGNMENT

(BOTTOM VIEW)



■ 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
Input level	P_{IN}	—	+23	dBm
Input DC voltage	—	–5	+5	V

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.

■ 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 this range.

Always use piezoelectric devices within their recommended operating conditionranges. 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 DEVICES

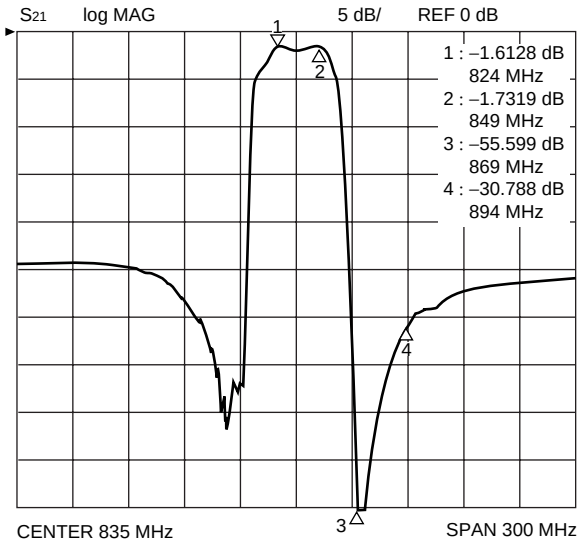
System		Center frequency (MHz)	Band width (MHz)	Part symbol	Part number	Remarks
AMPS/TDMA/CDMA	Tx	836.5	25	25	FAR-F5CE-836M50-K225	Low loss type
		836.5	25	30	FAR-F5CE-836M50-K230	High Att. type
EGSM	Tx	897.5	35	26	FAR-F5CE-897M50-K226	
		897.5	35	31	FAR-F5CE-897M50-K231	Low loss type
	Rx	942.5	35	88	FAR-F5CE-942M50-K288	Low loss type
PDC800 (20 MHz pass-band width standard)	Rx	820.0	20	04	FAR-F5CE-820M00-K204	High Att. type
J-CDMA	Tx	906.0	38	19	FAR-F5CE-906M00-K219	
		906.0	38	15	FAR-F5CE-906M00-K215	High Att. type
		906.0	38	38	FAR-F5CE-906M00-K238	
	Rx	851.0	38	12	FAR-F5CE-851M00-K212	
PDC1.5 G	Tx	1441.0	24	20	FAR-F6CE1G4410-K220	
	Rx	1489.0	24	21	FAR-F6CE1G4890-K221	
	Lo	1619.0	24	22	FAR-F6CE1G6190-K222	

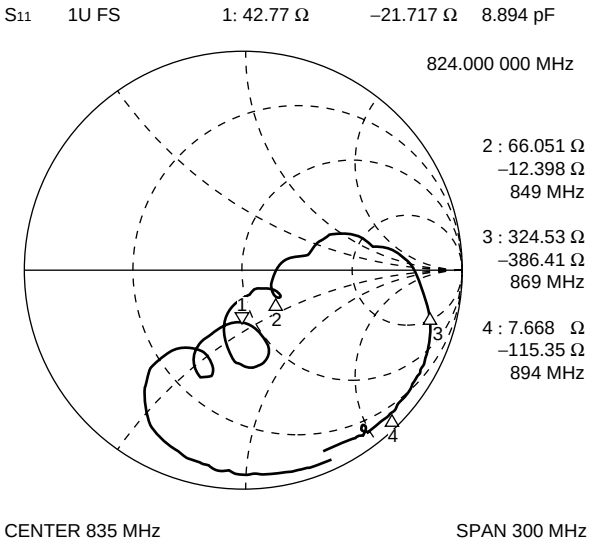
■ ELECTRICAL CHARACTERISTICS AND TYPICAL FREQUENCY RESPONSE

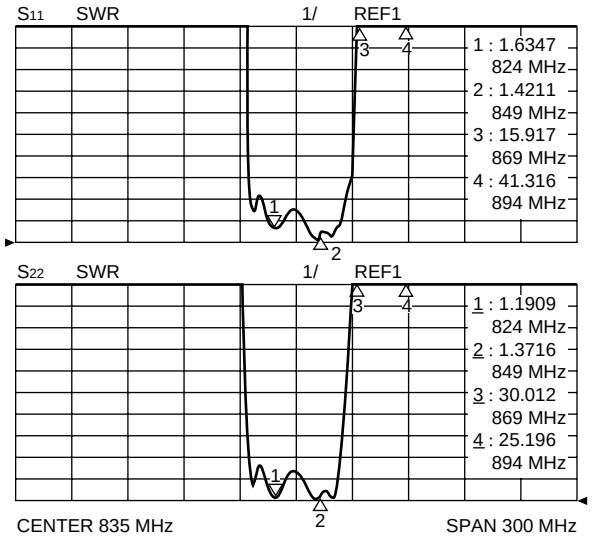
1. AMPS/TDMA/CDMA (Tx) Low Loss type
Part number : FAR-F5CE-836M50-K225

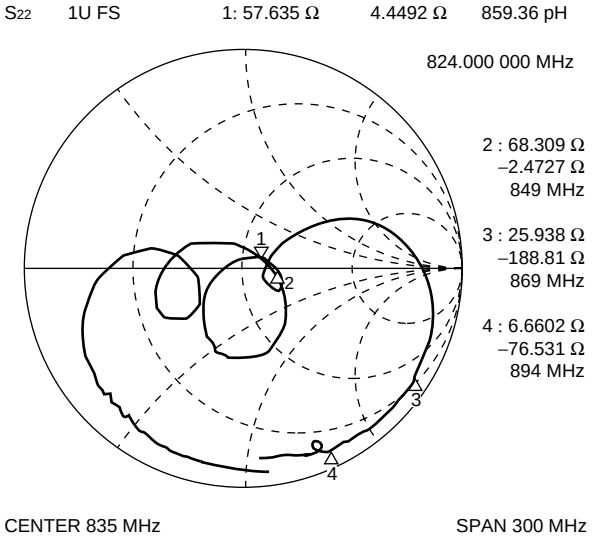
(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	824 MHz to 849 MHz	—	2.0	2.5	dB	
Pass-band ripple	824 MHz to 849 MHz	—	0.9	1.5	dB	
Absolute stop-band attenuation	DC to 800 MHz	20	23	—	dB	
	869 MHz to 894 MHz	28	30	—	dB	
	894 MHz to 2000 MHz	22	25	—	dB	
Pass-band VSWR (Return loss)	824 MHz to 849 MHz	— (6.2)	2.6 (7.0)	2.9 (—)	— (dB)	





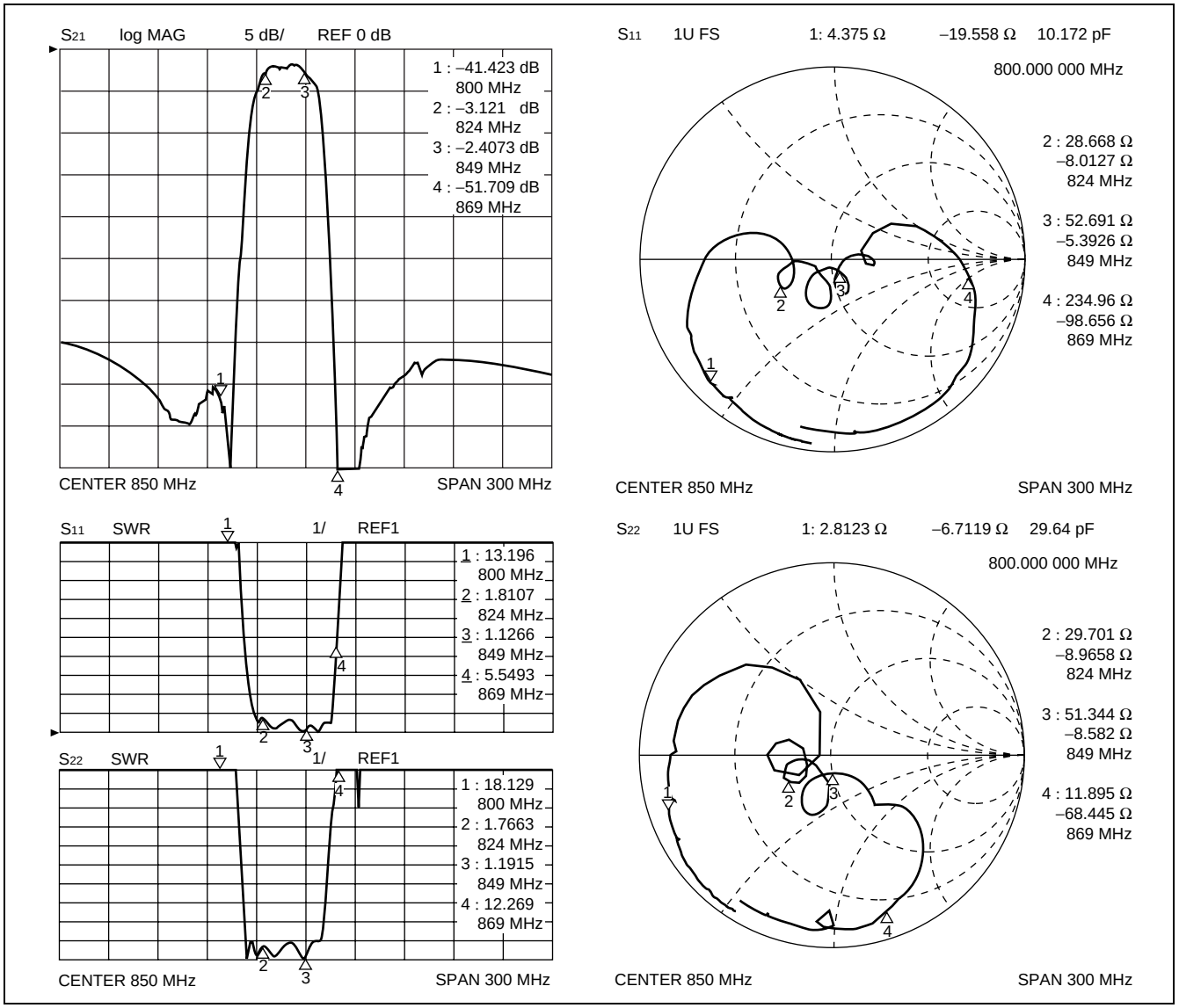




2. AMPS/TDMA/CDMA (Tx) High Attenuation type
Part number : FAR-F5CE-836M50-K230

(Ta = –30 °C to +85 °C)

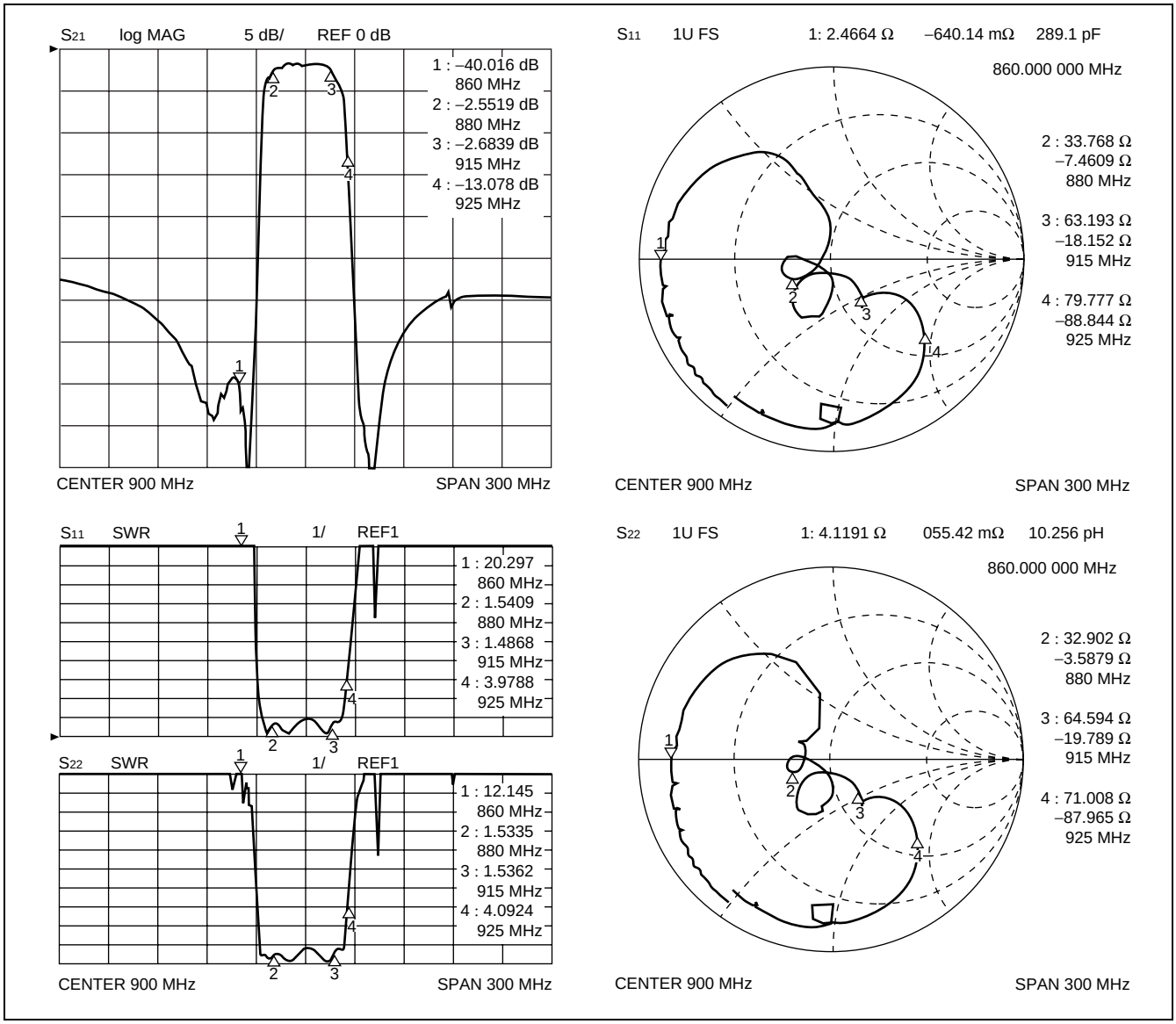
Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	824 MHz to 849 MHz	—	2.7	3.5	dB	
Pass-band ripple	824 MHz to 849 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 800 MHz	28	30	—	dB	
	869 MHz to 894 MHz	30	43	—	dB	
	894 MHz to 1200 MHz	35	37	—	dB	
	1200 MHz to 2000 MHz	20	25	—	dB	
Pass-band VSWR (Return loss)	824 MHz to 849 MHz	— (8.5)	1.7 (11.7)	2.2 (—)	— (dB)	



3. EGSM (Tx)
Part number : FAR-F5CE-897M50-K226

(Ta = –30 °C to +85 °C)

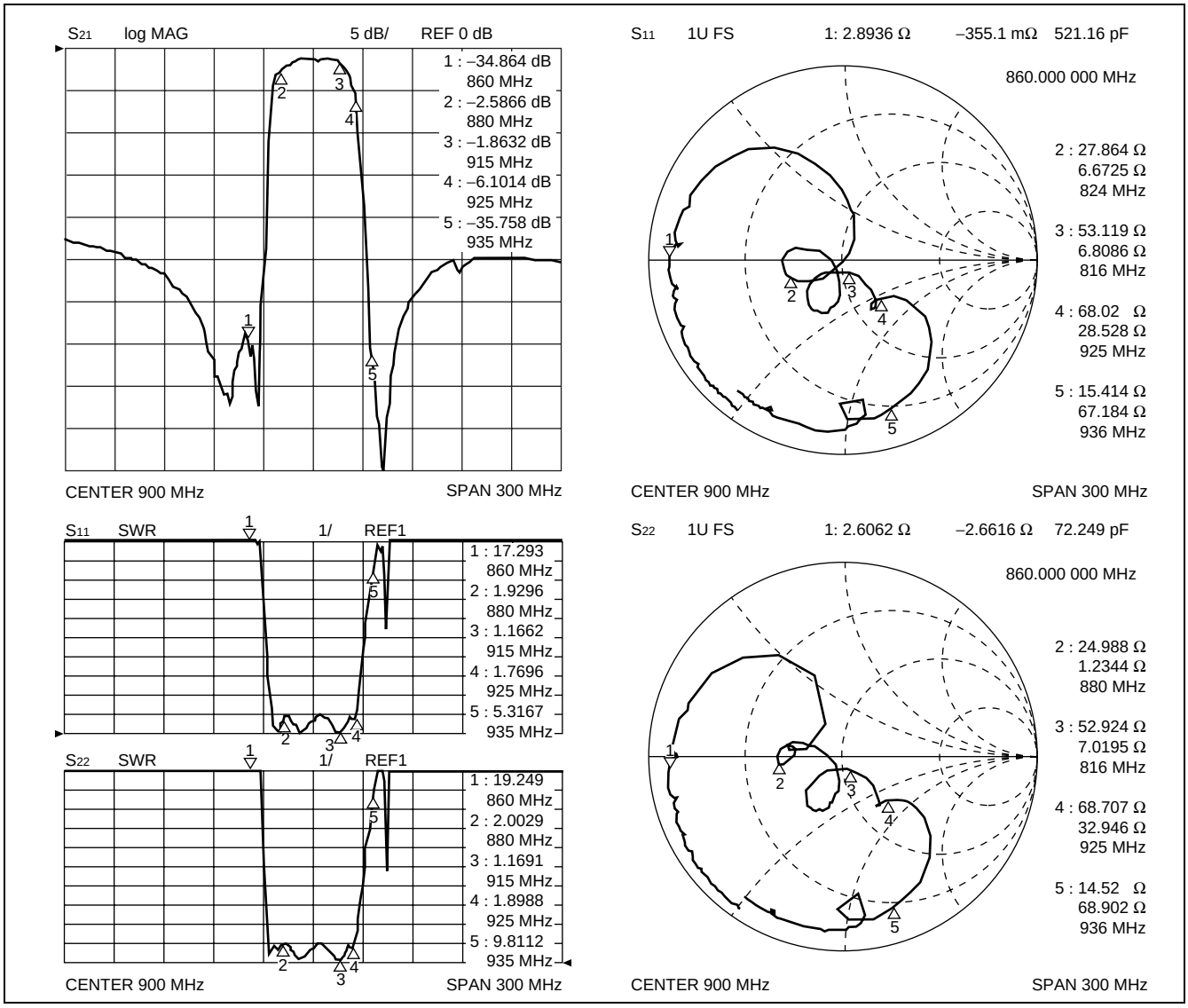
Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	880 MHz to 915 MHz	—	2.5	3.5	dB	
Pass-band ripple	880 MHz to 915 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 845 MHz	20	23	—	dB	
	925 MHz to 935 MHz	4.5	8	—	dB	Ta = –30 °C to +25 °C
		7			dB	Ta = +25 °C to +85 °C
	935 MHz to 2000 MHz	25	30	—	dB	
Pass-band VSWR (Return loss)	880 MHz to 915 MHz	— (6.8)	2.2 (8.5)	2.7 (—)	— (dB)	



4. EGSM (Tx) Low Loss type
Part number : FAR-F5CE-897M50-K231

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	880 MHz to 915 MHz	—	2.3	3.0	dB	
Pass-band ripple	880 MHz to 915 MHz	—	1.0	1.5	dB	
Absolute stop-band attenuation	DC to 800 MHz	17	19	—	dB	
	800 MHz to 860 MHz	15	25	—	dB	
	925 MHz to 935 MHz	4	—	—	dB	
	935 MHz to 960 MHz	20	25	—	dB	
	960 MHz to 1850 MHz	20	25	—	dB	
	1850 MHz to 3000 MHz	7	12	—	dB	
Pass-band VSWR (Return loss)	880 MHz to 915 MHz	— (8.5)	2.0 (9.5)	2.2 (—)	— (dB)	



5. EGSM (Rx) Low Loss type
Part number : FAR-F5CE-942M50-K288

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	925 MHz to 960 MHz	—	2.0	2.5	dB	Ta = +25 °C ± 2 °C
				2.7	dB	Ta = –10 °C to +60 °C
				3.0	dB	Ta = –30 °C to +85 °C
Pass-band ripple	925 MHz to 960 MHz	—	0.5	1.5	dB	
Absolute stop-band attenuation	DC to 905 MHz	17	18	—	dB	
	905 MHz to 915 MHz	13	16	—	dB	Ta = +25 °C ± 2 °C
		8			dB	Ta = –10 °C to +60 °C
		5			dB	Ta = –30 °C to +85 °C
	980 MHz to 1000 MHz	13	20	—	dB	
	1000 MHz to 2000 MHz	20	22	—	dB	
Pass-band VSWR (Return loss)	925 MHz to 960 MHz	— (6.8)	2.2 (8.5)	2.7 (—)	— (dB)	

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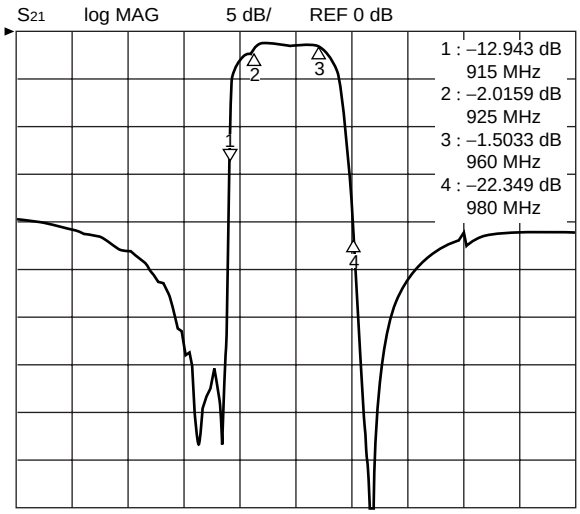
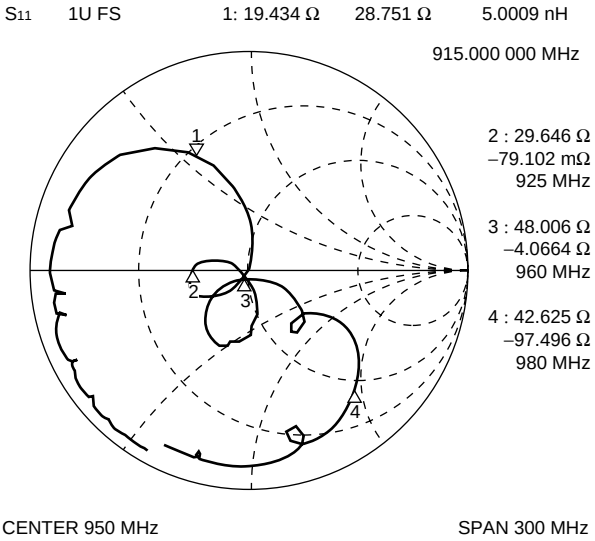
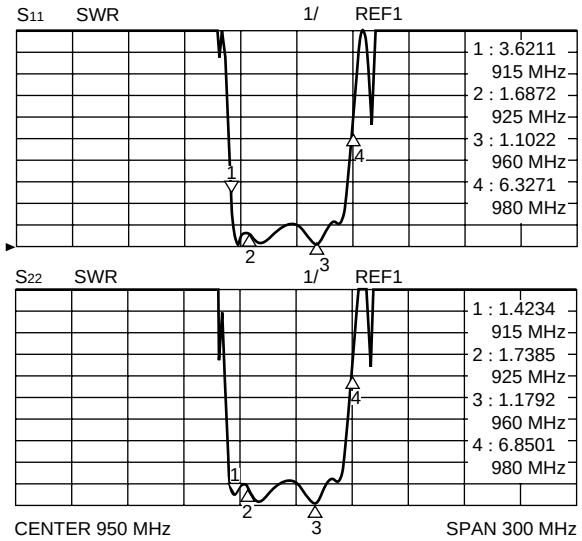
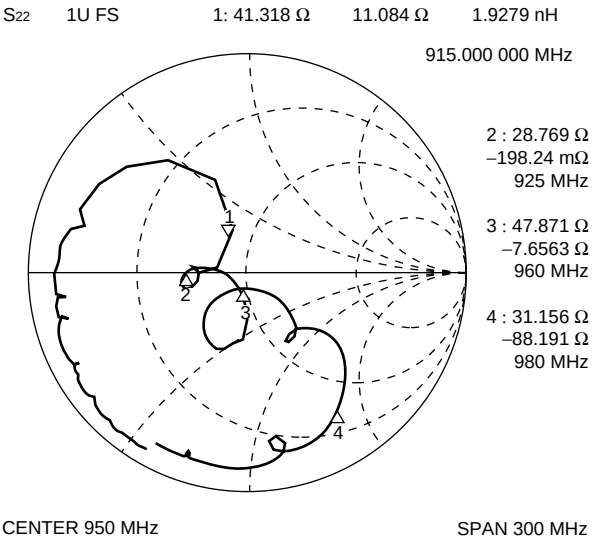
Part number : FAR-F5CE-942M50-K288





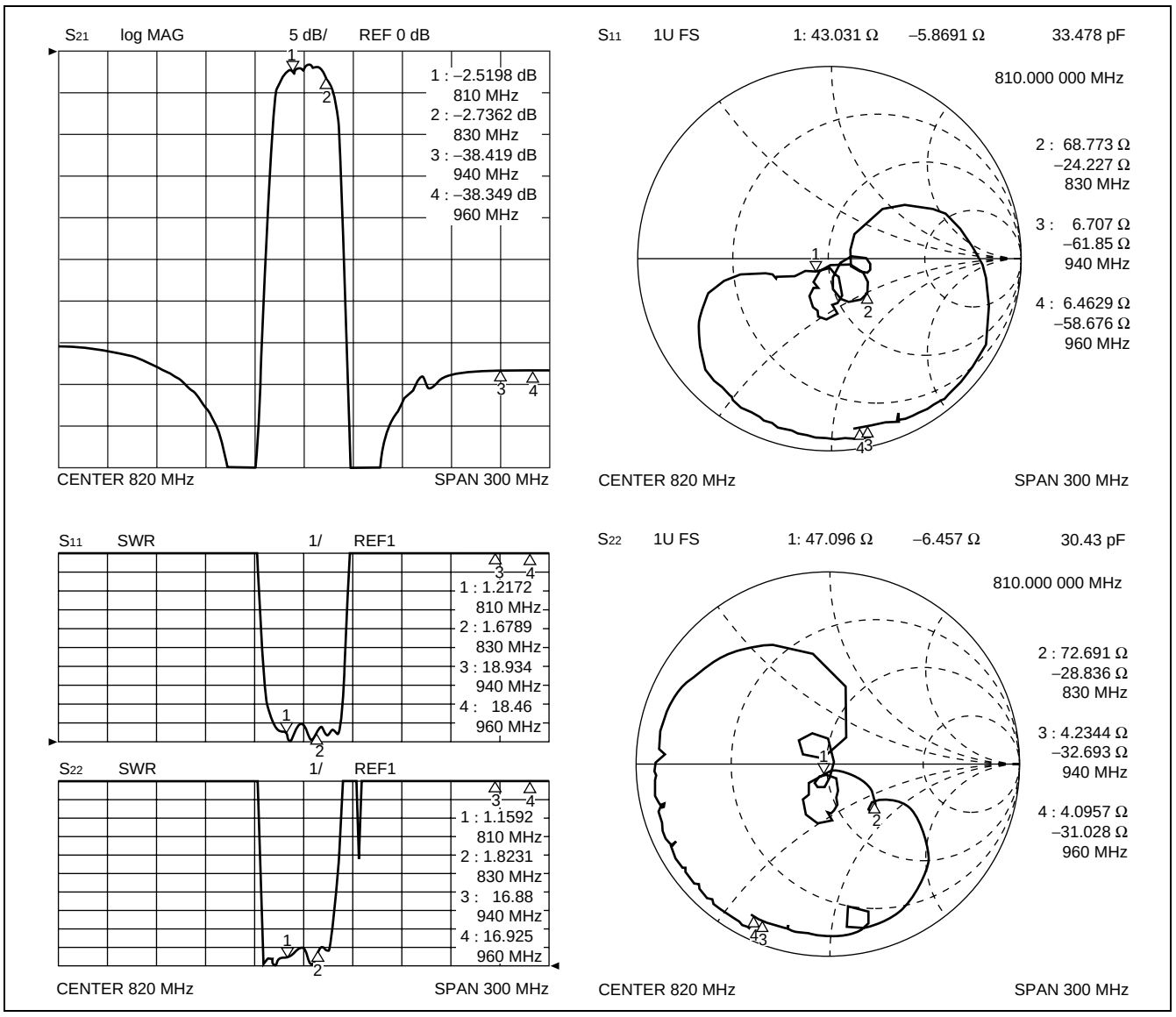




6. PDC800 (Rx) High Attenuation type
Part number : FAR-F5CE-820M00-K204

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	810 MHz to 830 MHz	—	3.0	3.5	dB	
Pass-band ripple	810 MHz to 830 MHz	—	1.5	2.0	dB	
Absolute stop-band attenuation	DC to 130 MHz	35	41	—	dB	
	130 MHz to 760 MHz	30	34	—	dB	
	855 MHz to 875 MHz	35	38	—	dB	
	875 MHz to 1090 MHz	33	38	—	dB	
	1090 MHz to 2000 MHz	30	38	—	dB	
Pass-band VSWR (Return loss)	810 MHz to 830 MHz	— (7.4)	2.0 (9.5)	2.5 (—)	— (dB)	



7. J-CDMA (Tx)
Part number : FAR-F5CE-906M00-K219

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	887 MHz to 925 MHz	—	2.7	3.7	dB	
Pass-band ripple	887 MHz to 925 MHz	—	1.0	2.2	dB	
Absolute stop-band attenuation	DC to 720 MHz	20	22	—	dB	
	720 MHz to 800 MHz	20	23	—	dB	
	832 MHz to 870 MHz	32	33	—	dB	
	940 MHz to 942 MHz	15	25	—	dB	
	942 MHz to 950 MHz	20	30	—	dB	
	950 MHz to 2000 MHz	20	23	—	dB	
	2000 MHz to 3000 MHz	15	17	—	dB	
Pass-band VSWR (Return loss)	887 MHz to 925 MHz	— (6.8)	2.2 (8.5)	2.7 (—)	— (dB)	

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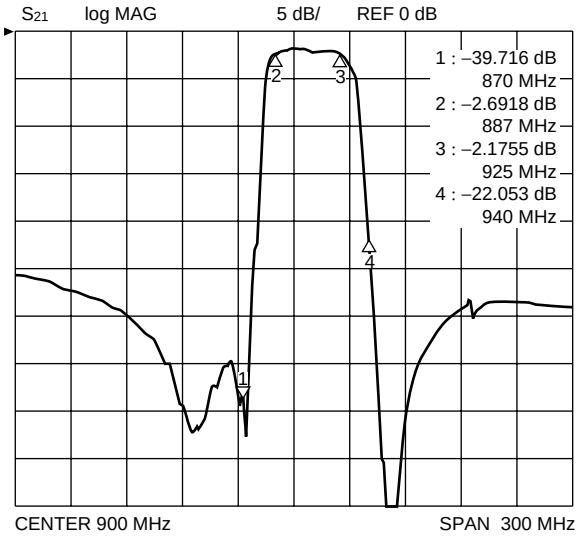
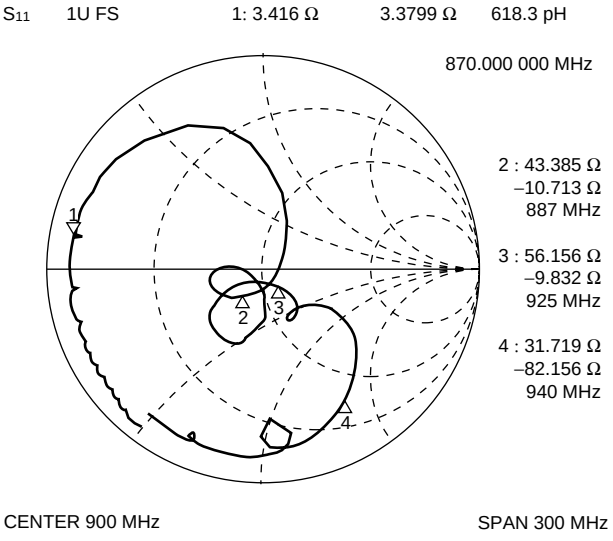
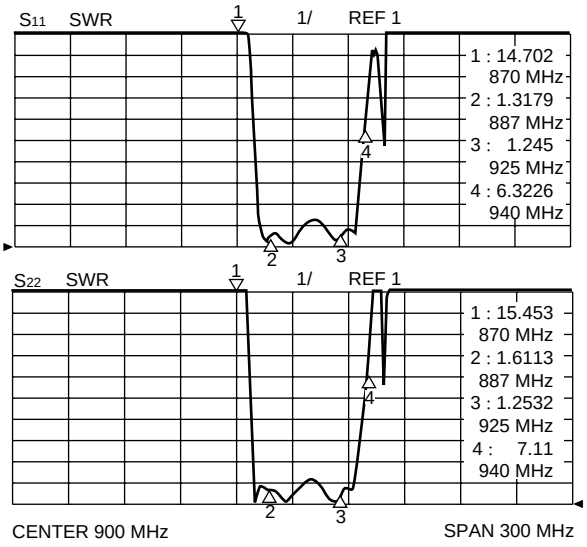
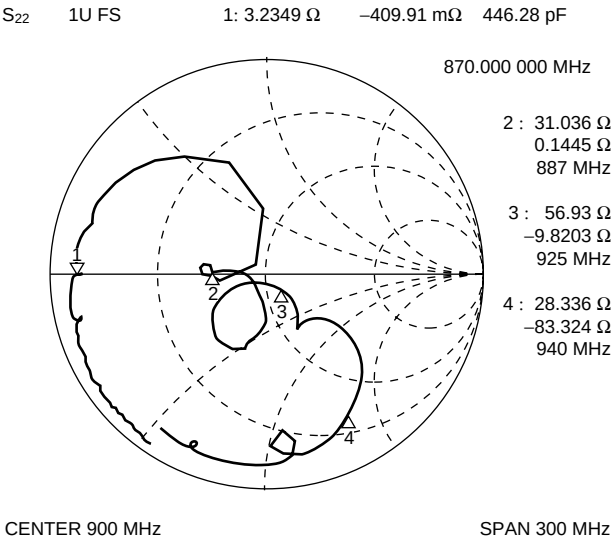
Part number : FAR-F5CE-906M00-K219









8. J-CDMA (Tx) High Attenuation type
Part number : FAR-F5CE-906M00-K215

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	887 MHz to 925 MHz	—	3.0	4.5	dB	
Pass-band ripple	887 MHz to 925 MHz	—	1.5	3.0	dB	
Absolute stop-band attenuation	DC to 720 MHz	25	26	—	dB	
	720 MHz to 800 MHz	25	30	—	dB	
	832 MHz to 870 MHz	30	35	—	dB	
	940 MHz to 942 MHz	20	25	—	dB	
	942 MHz to 950 MHz	25	30	—	dB	
	950 MHz to 2000 MHz	20	25	—	dB	
	2000 MHz to 3000 MHz	15	20	—	dB	
Pass-band VSWR (Return loss)	887 MHz to 925 MHz	— (5.1)	3.0 (6.0)	3.5 (—)	— (dB)	

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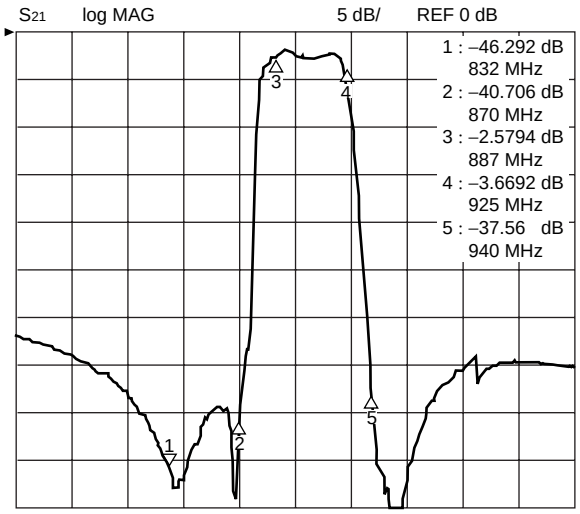
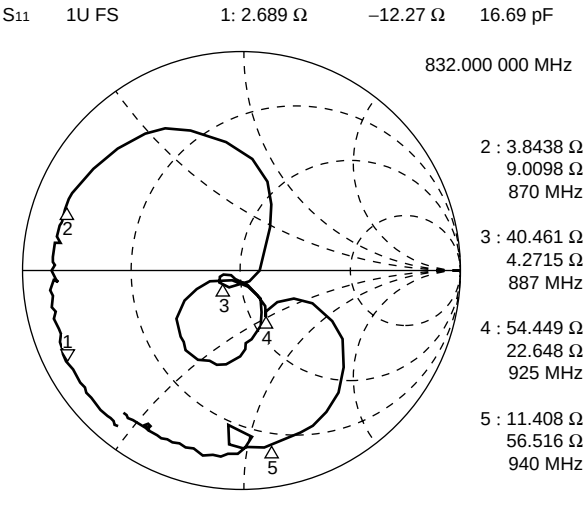
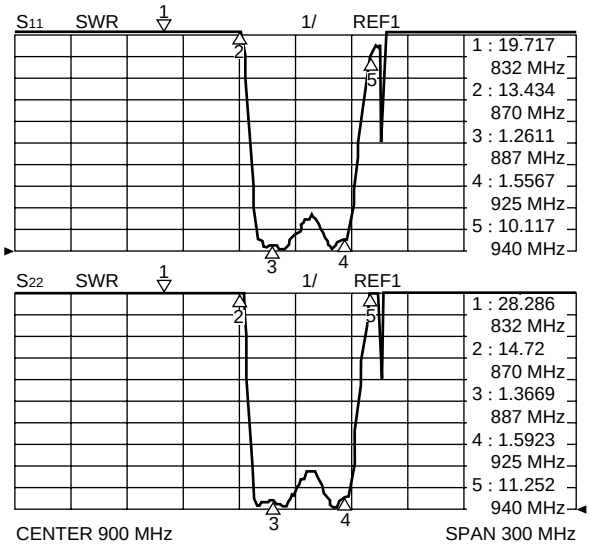
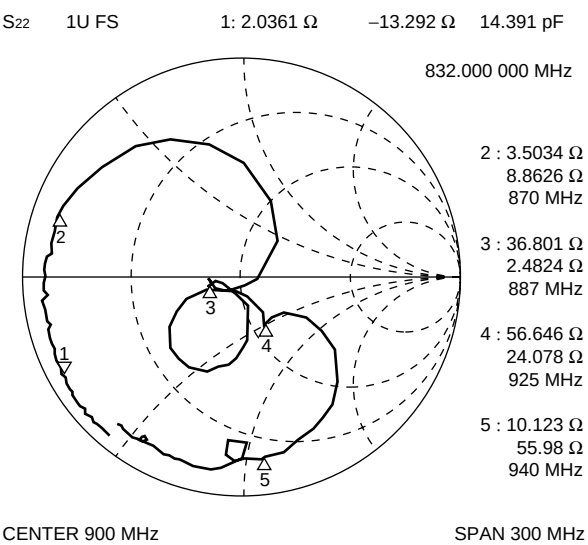
Part number : FAR-F5CE-906M00-K215









9. J-CDMA (Tx)
Part number : FAR-F5CE-906M00-K238

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	887 MHz to 925 MHz	—	2.7	4.0	dB	
Pass-band ripple	887 MHz to 925 MHz	—	1.0	2.3	dB	
Absolute stop-band attenuation	DC to 720 MHz	23	25	—	dB	
	720 MHz to 800 MHz	25	27	—	dB	
	832 MHz to 870 MHz	37	40	—	dB	
	940 MHz to 942 MHz	15	23	—	dB	
	942 MHz to 950 MHz	20	28	—	dB	
	950 MHz to 2000 MHz	25	30	—	dB	
	2000 MHz to 3000 MHz	20	25	—	dB	
Pass-band VSWR (Return loss)	887 MHz to 925 MHz	— (5.6)	2.2 (8.5)	3.2 (—)	— (dB)	

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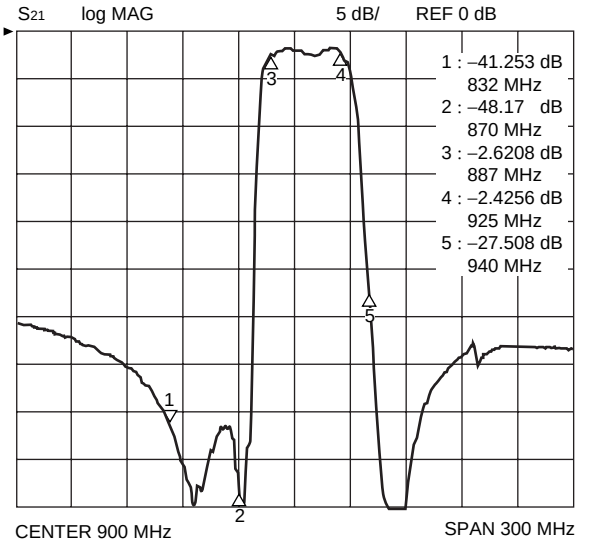
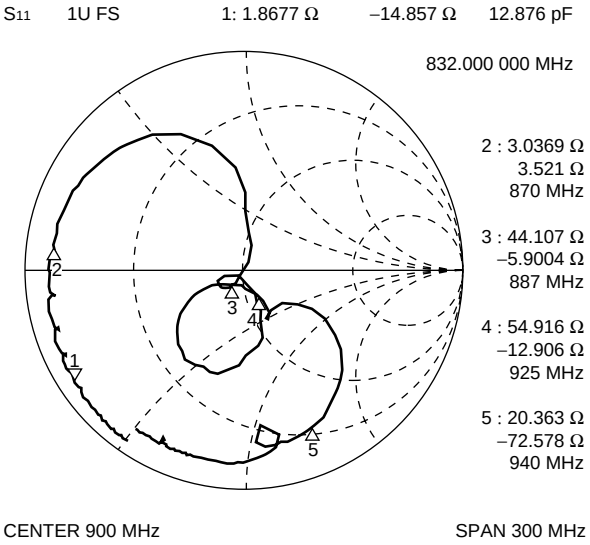
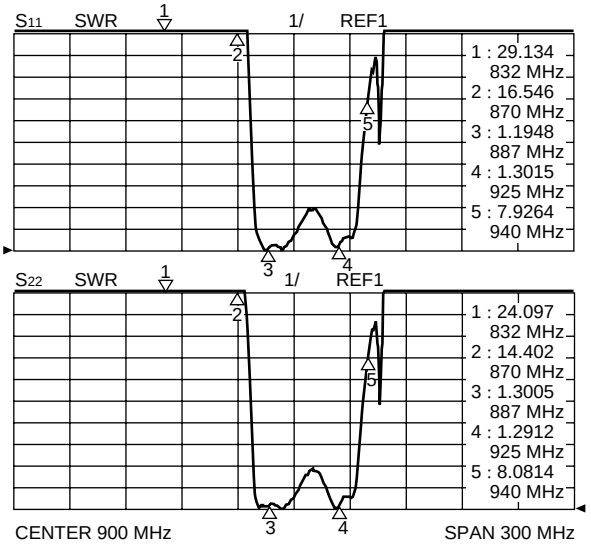
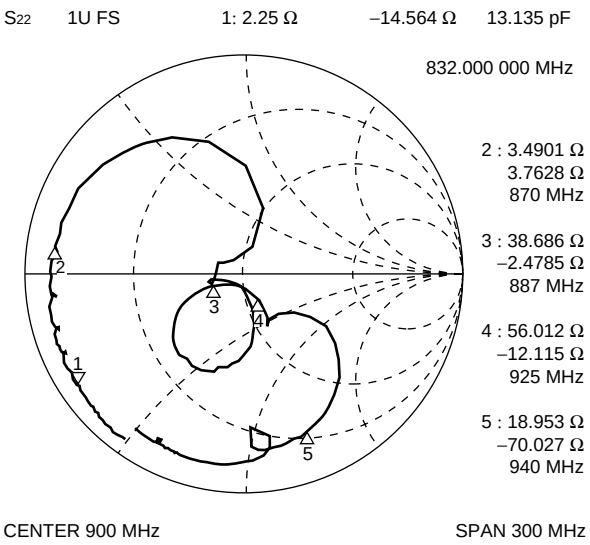
Part number : FAR-F5CE-906M00-K238









10. J-CDMA (Rx)
Part number : FAR-F5CE-851M00-K212

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	832 MHz to 870 MHz	—	2.5	3.5	dB	
Pass-band ripple	832 MHz to 870 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 170 MHz	20	24	—	dB	
	170 MHz to 720 MHz	18	20	—	dB	
	720 MHz to 770 MHz	20	22	—	dB	
	770 MHz to 815 MHz	25	27	—	dB	
	818 MHz	15	40	—	dB	
	887 MHz to 897 MHz	20	30	—	dB	
	897 MHz to 925 MHz	23	25	—	dB	
	925 MHz to 1100 MHz	22	24	—	dB	
	1100 MHz to 2000 MHz	20	24	—	dB	
Pass-band VSWR (Return loss)	832 MHz to 870 MHz	— (6.0)	2.7 (6.8)	3.0 (—)	— (dB)	

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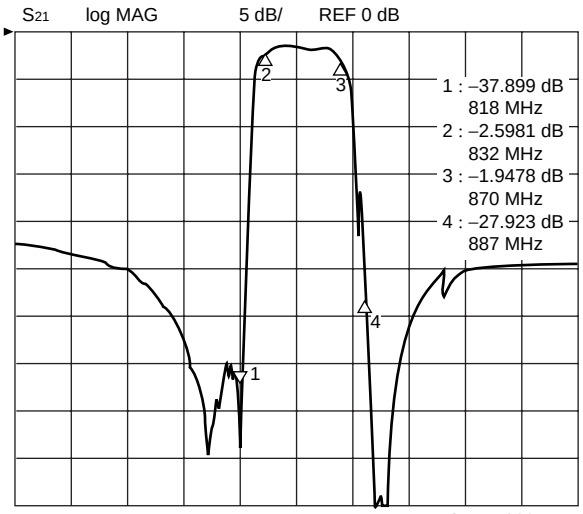
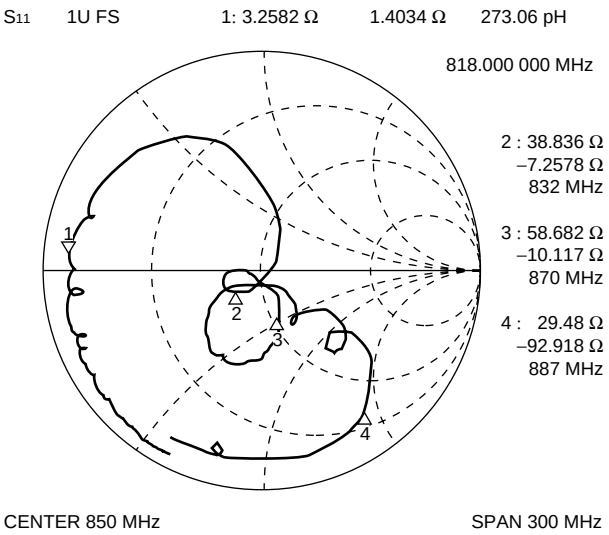
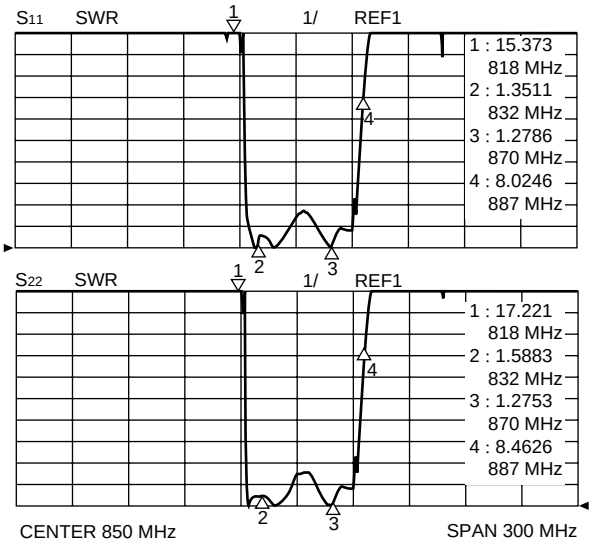
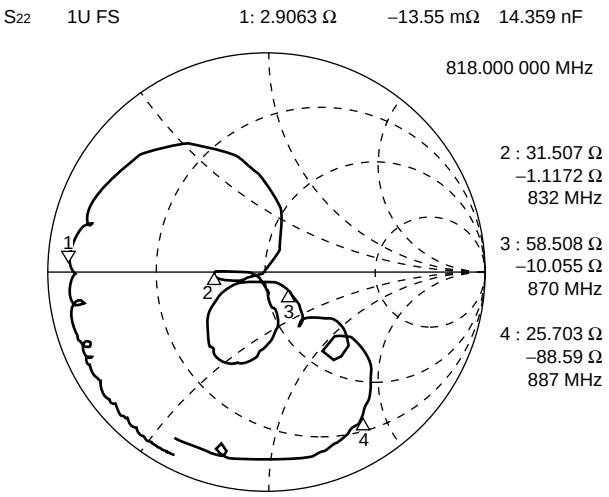
Part number : FAR-F5CE-851M00-K212





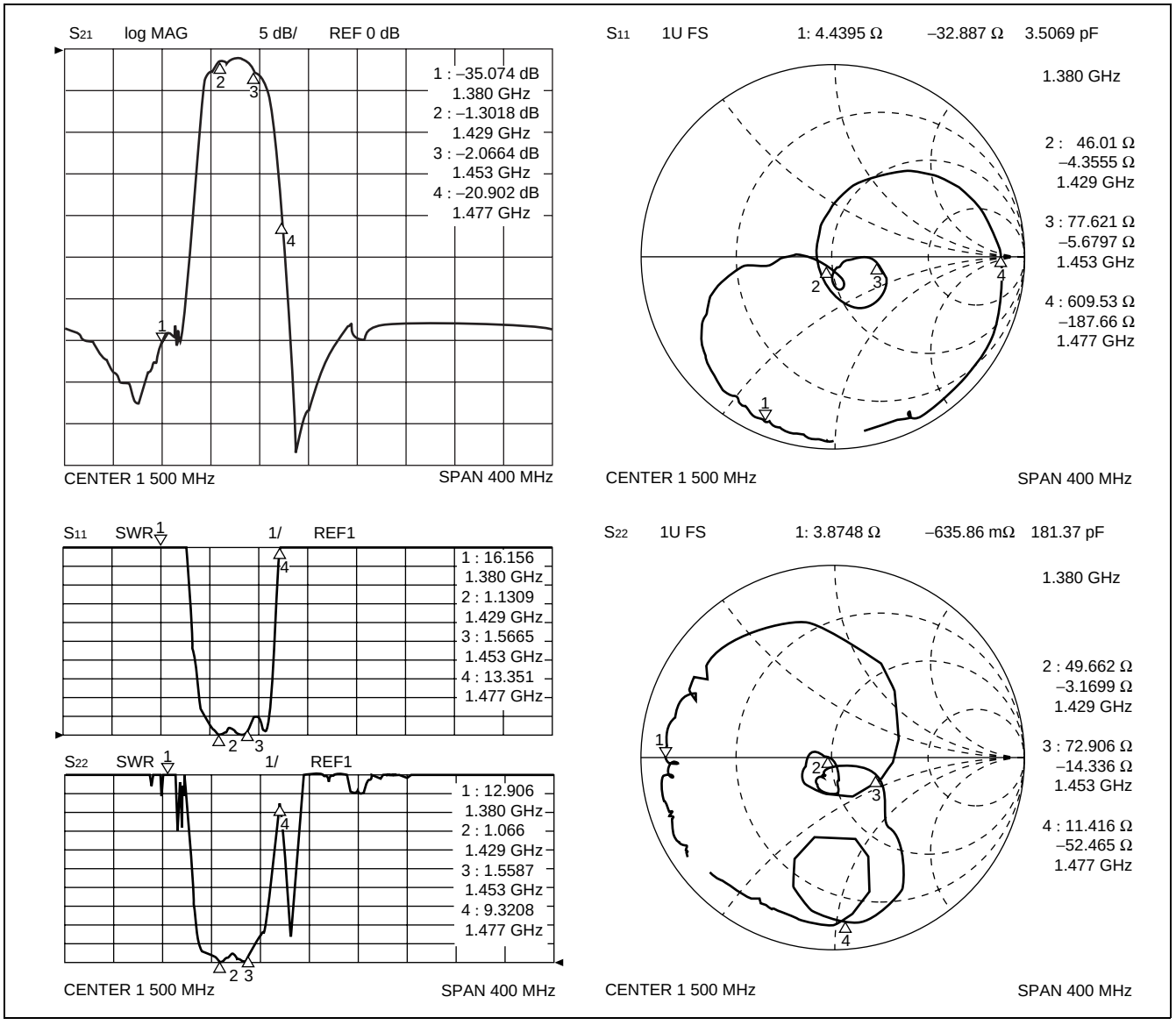




11. PDC1.5 G (Tx) High Attenuation type
Part number : FAR-F6CE-1G4410-K220

(Ta = –30 °C to +85 °C)

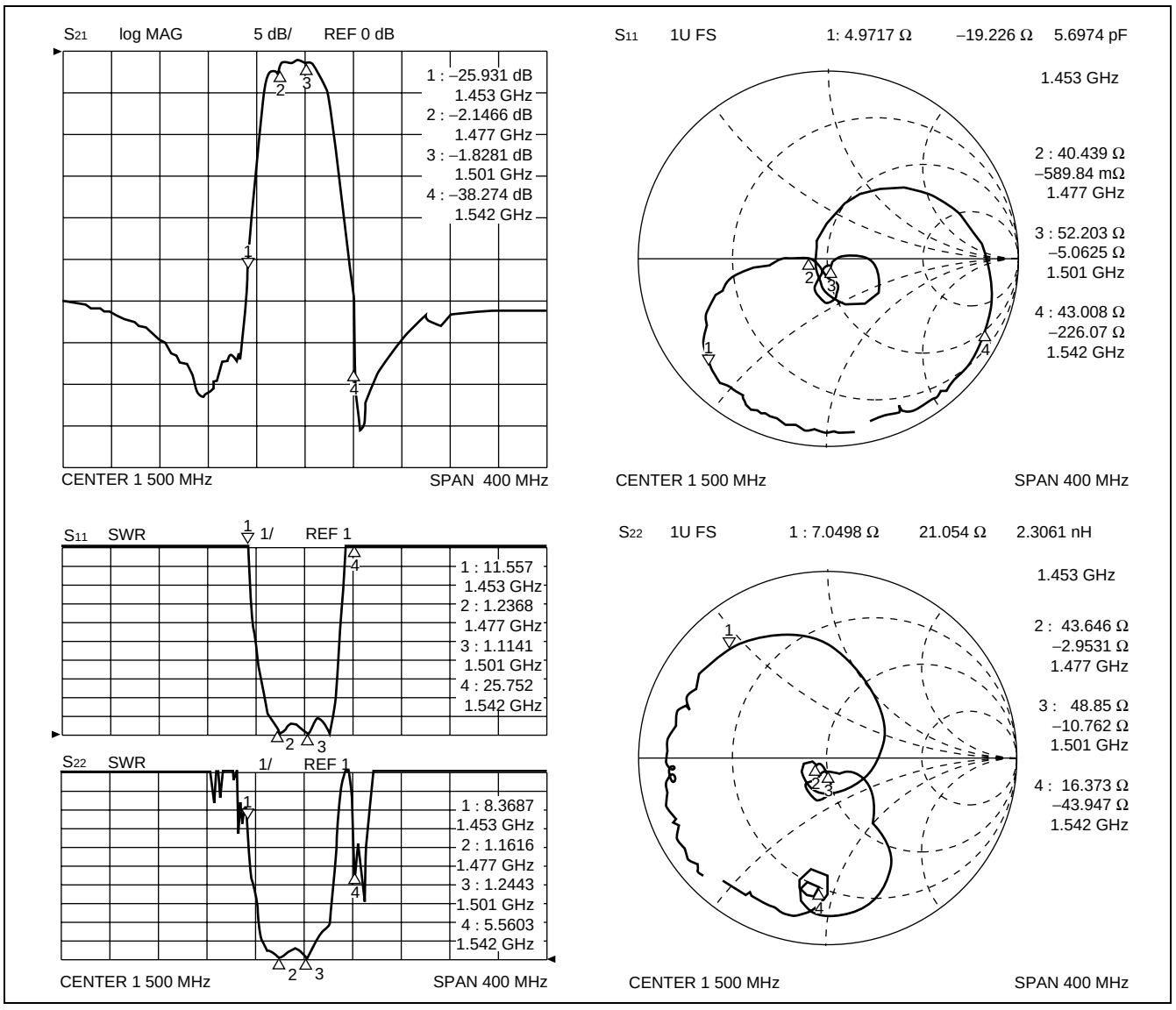
Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	1429 MHz to 1453 MHz	—	2.2	3.0	dB	
Pass-band ripple	1429 MHz to 1453 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 1380 MHz	25	27	—	dB	
	1477 MHz to 1501 MHz	10	18	—	dB	
	1501 MHz to 1900 MHz	30	32	—	dB	
	1900 MHz to 2906 MHz	18	28	—	dB	
Pass-band VSWR (Return loss)	1429 MHz to 1453 MHz	— (7.4)	2.1 (9.0)	2.5 (—)	— (dB)	



12. PDC1.5 G (Rx) High Attenuation type
Part number : FAR-F6CE-1G4890-K221

(Ta = –30 °C to +85 °C)

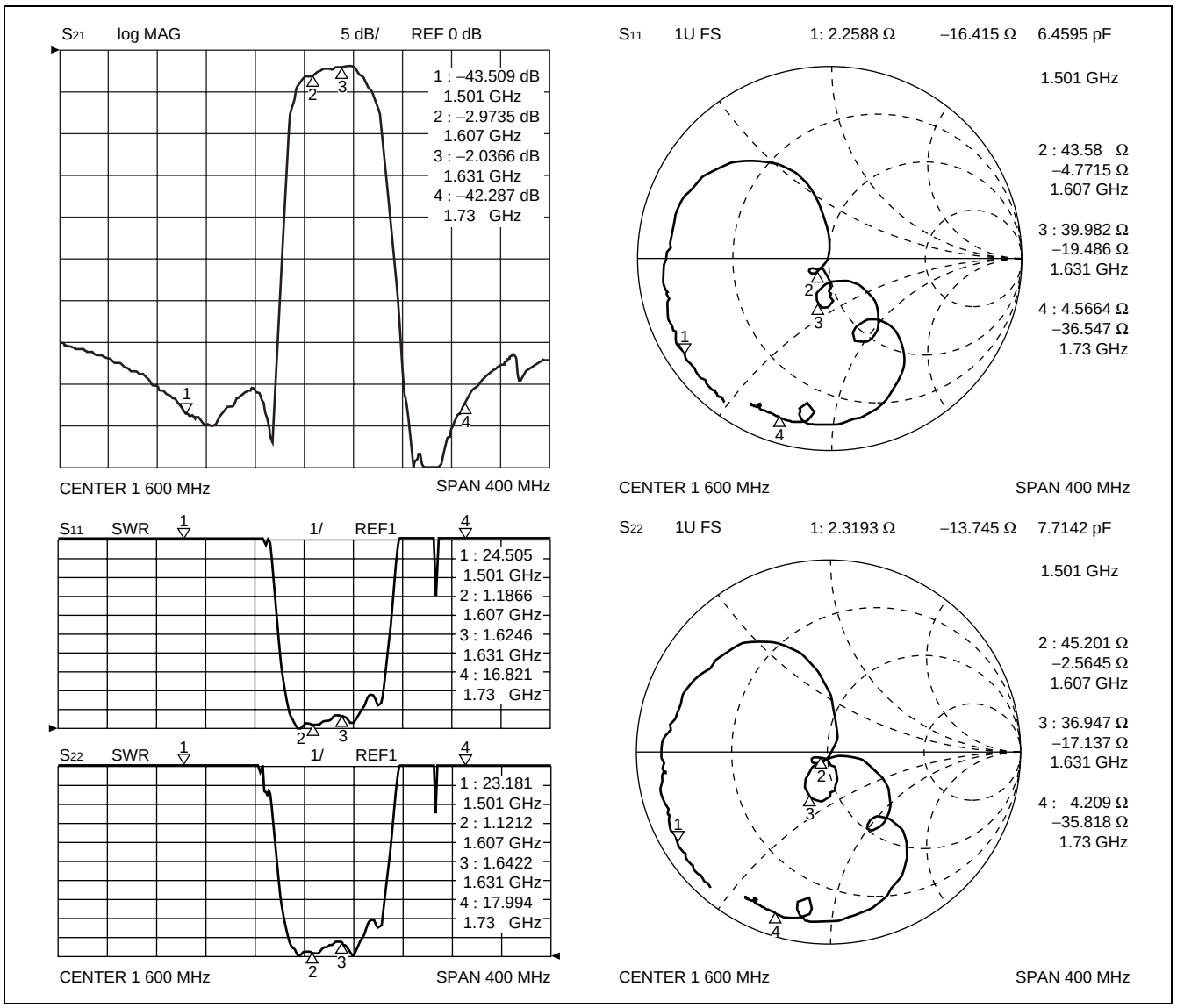
Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	1477 MHz to 1501 MHz	—	2.5	3.0	dB	
Pass-band ripple	1477 MHz to 1501 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 1429 MHz	25	28	—	dB	
	1429 MHz to 1453 MHz	10	25	—	dB	
	1542 MHz to 1566 MHz	20	28	—	dB	
	1566 MHz to 1900 MHz	30	33	—	dB	
	1900 MHz to 3000 MHz	20	29	—	dB	
Pass-band VSWR (Return loss)	1477 MHz to 1501 MHz	— (6.8)	2.4 (7.7)	2.7 (—)	— (dB)	



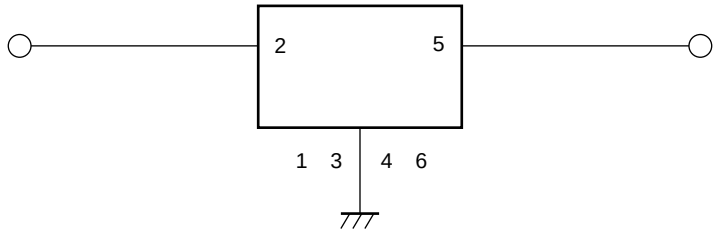
13. PDC1.5 G (Lo)
Part number : FAR-F6CE-1G6190-K222

(Ta = –30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min	Typ	Max		
Insertion loss	1607 MHz to 1631 MHz	—	2.4	3.3	dB	
Pass-band ripple	1607 MHz to 1631 MHz	—	1.0	2.0	dB	
Absolute stop-band attenuation	DC to 130 MHz	30	38	—	dB	
	130 MHz to 1501 MHz	25	28	—	dB	
	1737 MHz to 1809 MHz	30	35	—	dB	
	1809 MHz to 2500 MHz	25	35	—	dB	
	3214 MHz	20	30	—	dB	
Pass-band VSWR (Return loss)	1607 MHz to 1631 MHz	— (9.5)	1.8 (10.9)	2.0 (—)	— (dB)	



■ MEASURMENT CIRCUIT



1 to 6: Pin number

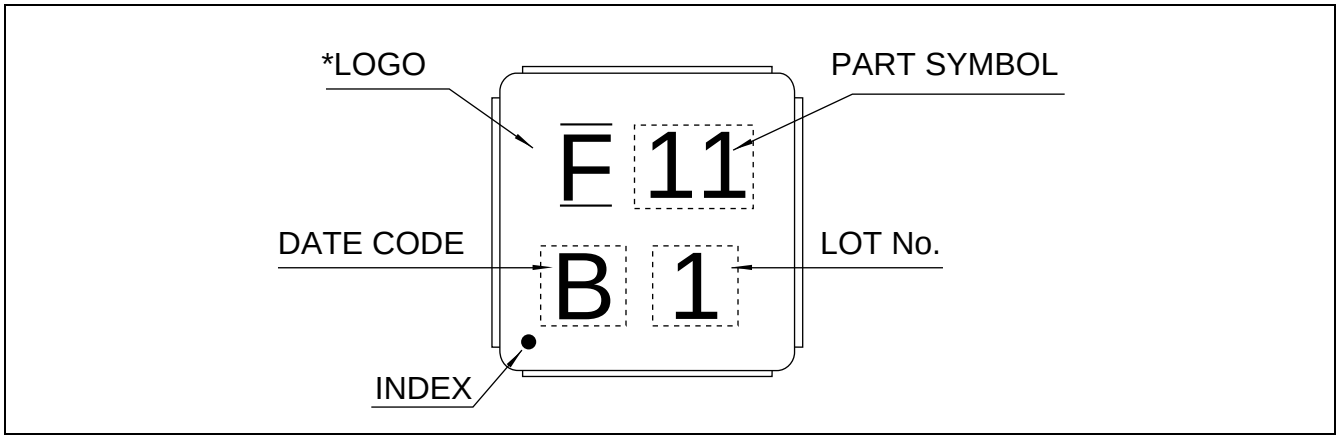
■ PART NUMBER DESIGNATION

[Designation example]

FAR-F□ CE-□□□□□□-K2 □□-□
(1) (2) (3) (4) (5)

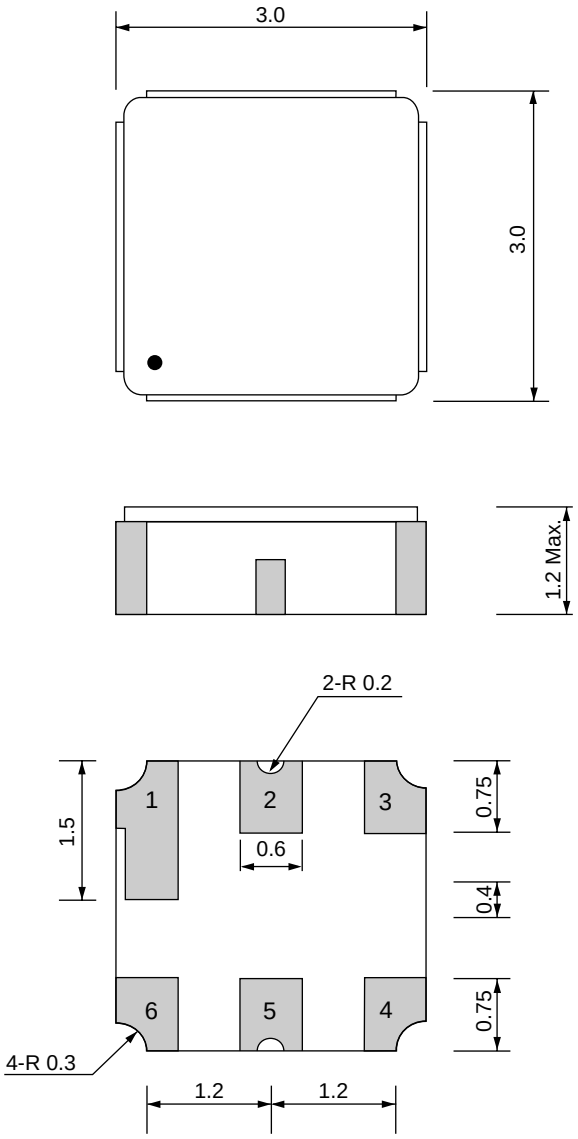
(1) Frequency range	:	5 : 700 MHz to 1000 MHz 6 : 1000 MHz to 1700 MHz
(2) Package size	:	E : 3.0 mm × 3.0 mm × 1.2 mm
(3) Frequency	:	This specifies the nominal center frequency using six alphanumeric. M (for MHz) or G (for GHz) indicates the decimal point. [Example] 906.0 MHz ⇒ 906M00 1.441GHz ⇒ 1G4410
(4) Part symbol	:	Numbers specified by FUJITSU MEDIA DEVICE Refer to "■STANDARD DEVICES".
(5) Packing (Reeled tape)	:	Y : 1 k pcs/reel X : 5 k pcs/reel

■ MARKING



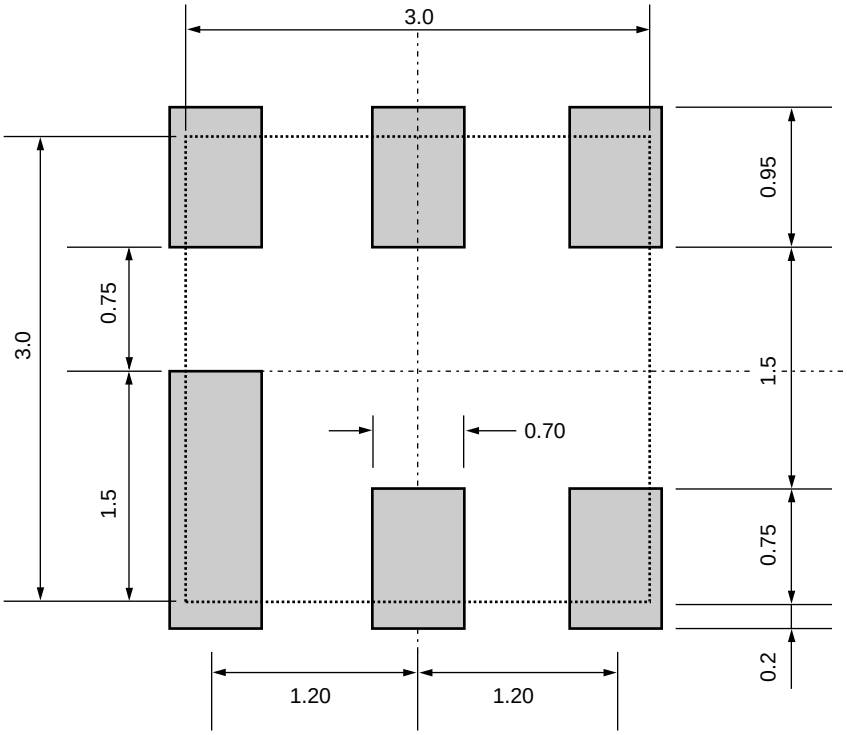
*: For the following parts, “K” is marked in place of “F”.
FAR-F5CE-836M50-K230
FAR-F5CE-897M50-K231
FAR-F5CE-906M50-K238

■ PACKAGE DIMENSION



Dimensions in mm.

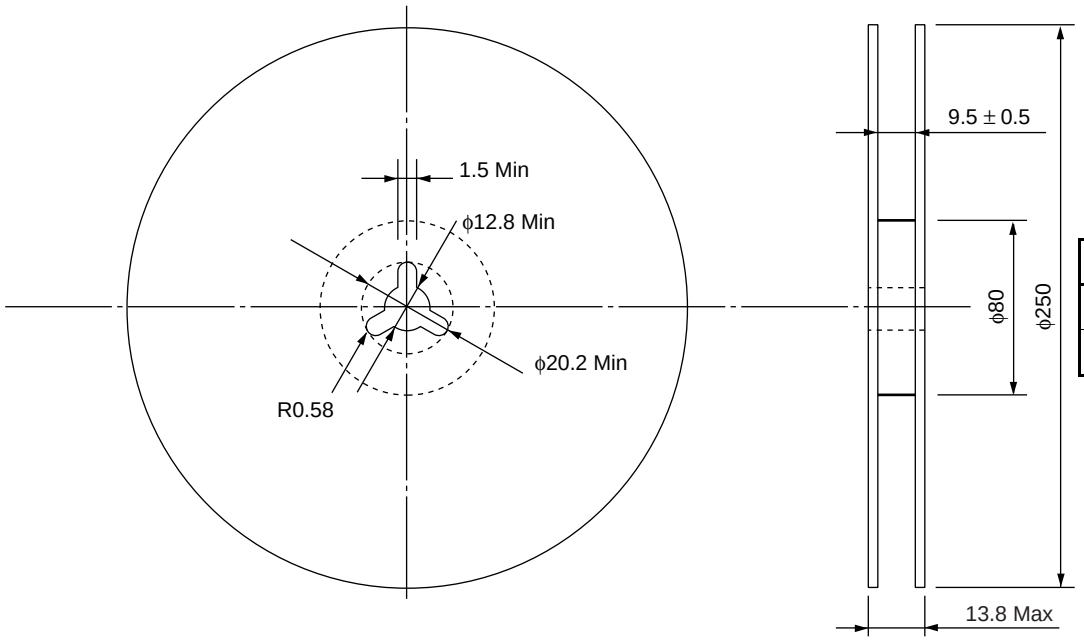
■ RECOMMENDED LAND PATTERN



Dimensions in mm.

■ PACKING

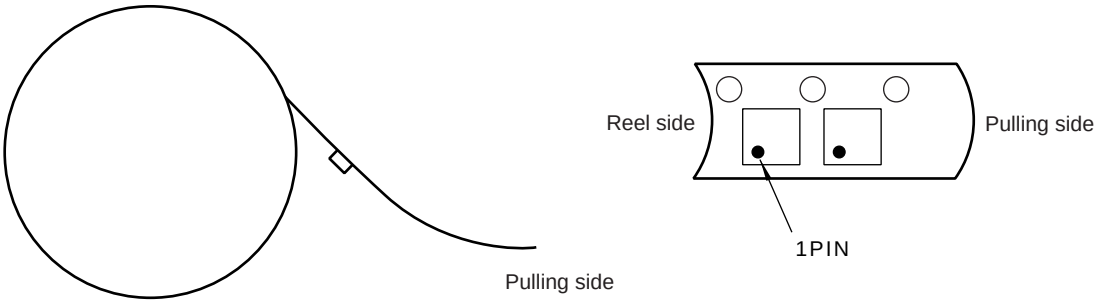
1. Reel Dimensions



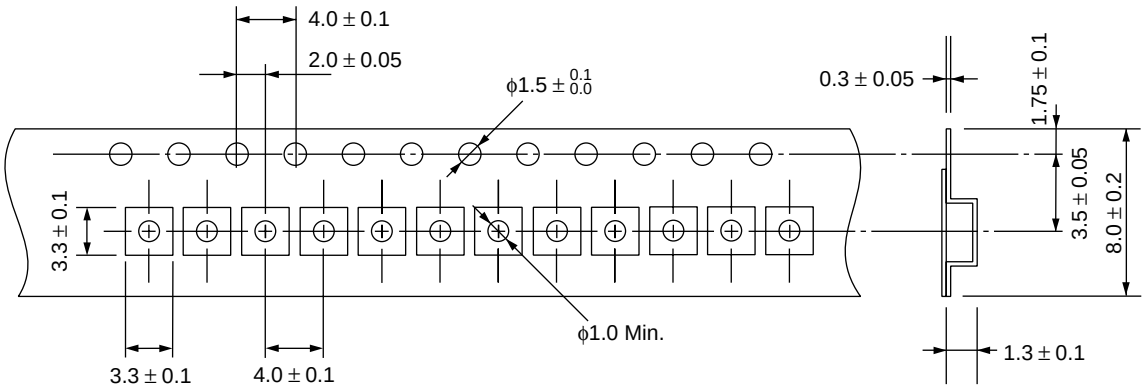
Type	Volume
Y	1 k pcs
X	5 k pcs

Dimensions in mm.

2. Packing Style



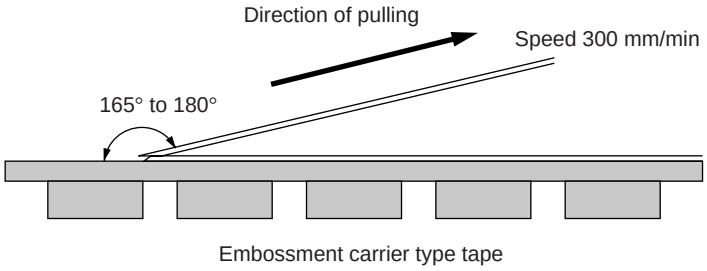
3. Tape Dimensions



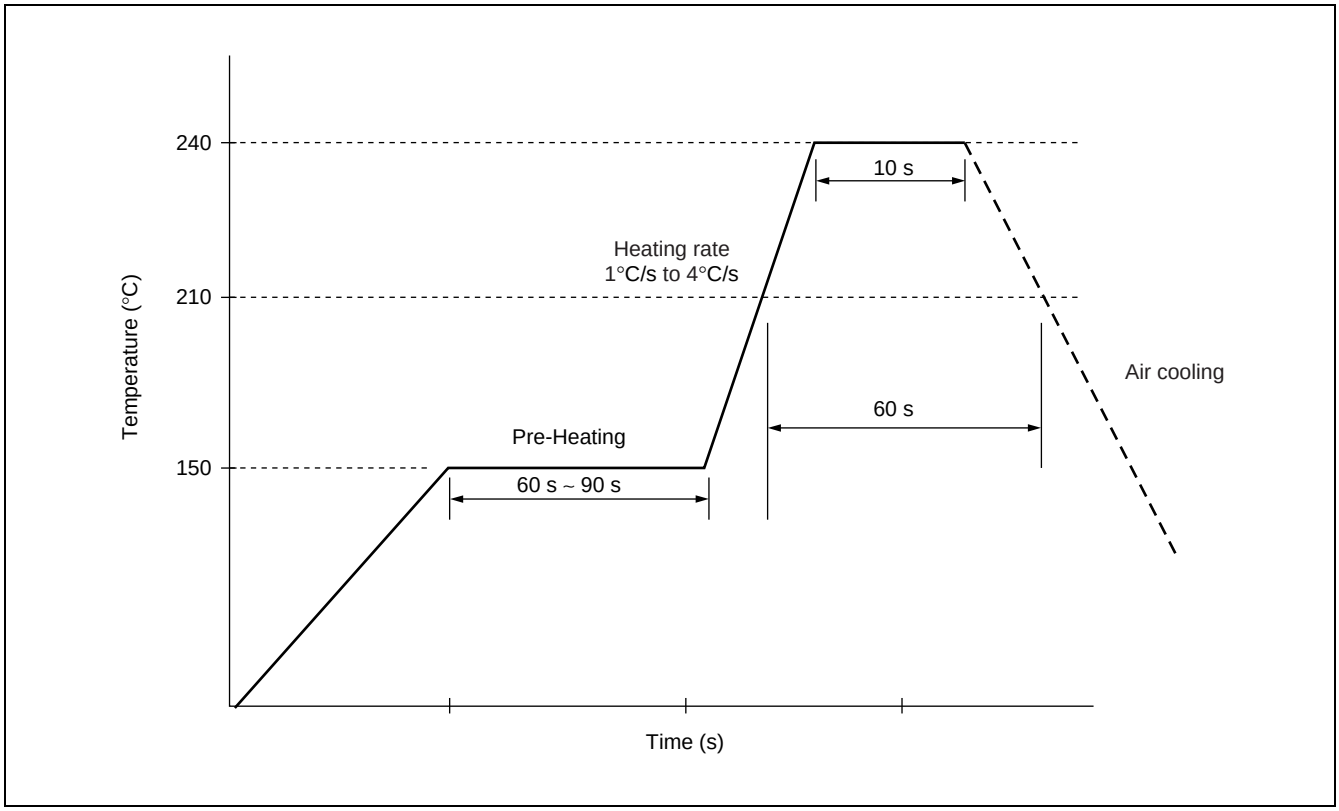
Dimensions in mm.

4. Peel strength of top cover tape

Peel off by the force of 0.1 N to 1.0 N under the condition at the right.
(Conforms to EIA)



■ RECOMMENDED REFLOW PROFILE



■ NOTE

A mass-produced product order is accepted by a unit of 1000.

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