



## **SAW Components**

### **SAW Tx 2in1 Filter**

WCDMA band V / WCDMA band II

<b>Series/type:</b>	<b>B9312</b>
<b>Ordering code:</b>	<b>B39192B9312N410</b>
<b>Date:</b>	<b>May 31, 2006</b>
<b>Version:</b>	<b>2.0</b>



## SAW Components

B9312

### SAW Tx 2in1 Filter

836.5 / 1880.0 MHz

#### Data Sheet



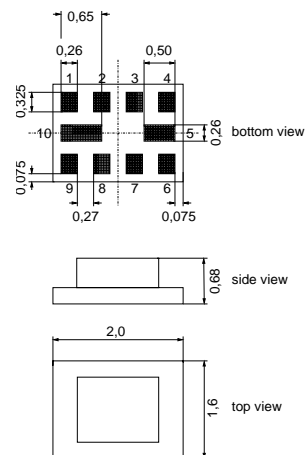
#### Application

- Low-loss RF filter for mobile telephone WCDMA band V / band II systems, transmit path (Tx)
- Usable passband:
  - Filter 1 (band V): 25 MHz
  - Filter 2 (band II): 60 MHz
- Impedance transformation from:
  - Filter 1 (band V): 100  $\Omega$  to 50  $\Omega$
  - Filter 2 (band II): 100  $\Omega$  to 50  $\Omega$
- Balanced to unbalanced operation



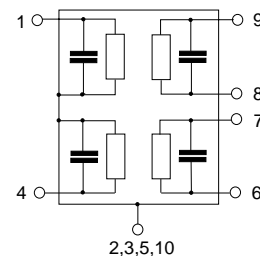
#### Features

- Package size 2.0 x 1.6 x 0.68 mm<sup>3</sup>
- Package code QCS10I
- RoHS compatible
- Approximate weight 0.008 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**



#### Pin configuration

- 1 Output [ Filter 1: band V ]
- 4 Output [ Filter 2: band II ]
- 6,7 Input balanced [ Filter 2: band II ]
- 8,9 Input balanced [ Filter 1: band V ]
- 2,3,5,10 Case ground





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#### Characteristics filter 1 (WCDMA band V)

Temperature range for specification:  $T = -15\text{ °C to }+80\text{ °C}$   
 Terminating source impedance:  $Z_S = 100\ \Omega$  (balanced)  
 Terminating load impedance:  $Z_L = 50\ \Omega$  (unbalanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	836.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	1.6	2.2	dB
824.0 ... 849.0 MHz		—	1.6	2.2	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.7	1.5	dB
824.0 ... 849.0 MHz		—	0.7	1.5	dB
<b>Input VSWR</b>		—	1.7	2.0	
824.0 ... 849.0 MHz		—	1.7	2.0	
<b>Output VSWR</b>		—	1.7	2.0	
824.0 ... 849.0 MHz		—	1.7	2.0	
<b>Input amplitude balance (<math> S_{31}/S_{21} </math>)</b>		−1.0	−0.6/0.7	1.0	dB
824.0 ... 849.0 MHz		−1.0	−0.6/0.7	1.0	dB
<b>Input phase balance (<math>\phi(S_{31}) - \phi(S_{21}) + 180^\circ</math>)</b>		−10.0	−2/+1	10.0	°
824.0 ... 849.0 MHz		−10.0	−2/+1	10.0	°
<b>Common mode suppression</b>	$S_{cs21}$	23.0	28.0	—	dB
824.0 ... 849.0 MHz		23.0	28.0	—	dB
<b>Attenuation</b>	$\alpha$	35.0	42.0	—	dB
0.0 ... 779.0 MHz		35.0	42.0	—	dB
779.0 ... 804.0 MHz		25.0	31.0	—	dB
869.0 ... 1570.0 MHz		33.0	36.0	—	dB
1570.0 ... 1580.0 MHz		43.0	48.0	—	dB
1580.0 ... 2547.0 MHz		35.0	43.0	—	dB
2547.0 ... 6000.0 MHz		25.0	34.0	—	dB



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### Maximum ratings

Operable temperature range	T	−30/+85	°C	
Storage temperature range	T <sub>stg</sub>	−40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>1)</sup>	V	machine model, 10 pulses
Input power at				
WCDMA band V	P <sub>IN</sub>	10	dBm	continuous wave @ +55°C ambient
Tx band				

<sup>1)</sup> acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



SAW Components

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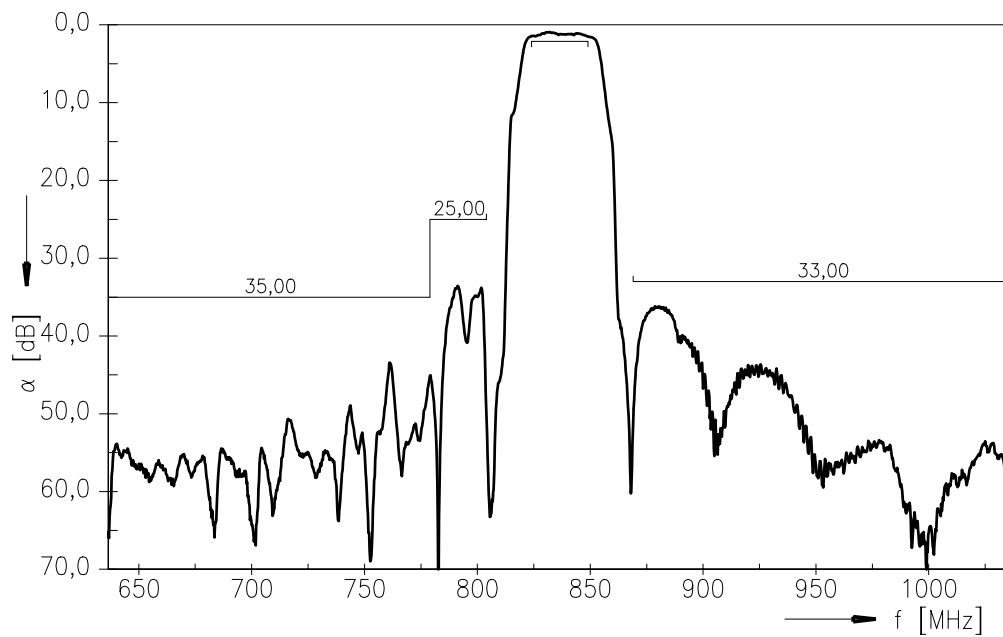
SAW Tx 2in1 Filter

836.5 / 1880.0 MHz

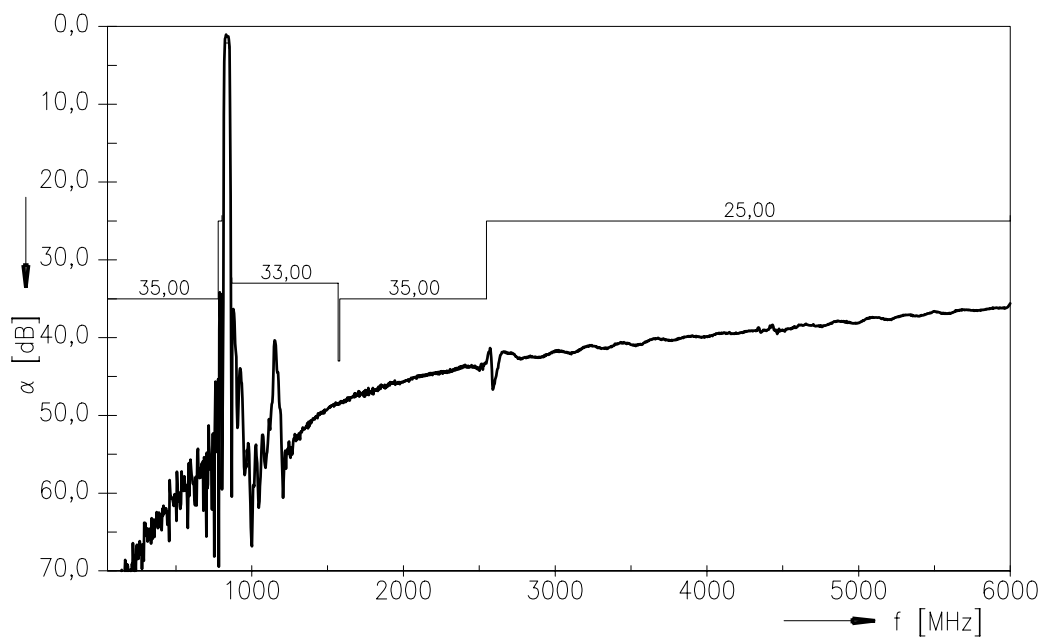
Data Sheet



Transfer function filter 1 (WCDMA band V)



Transfer function filter 1 (WCDMA band V) - wideband



Please read *cautions and warnings* and *important notes* at the end of this document.



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### SAW Tx 2in1 Filter

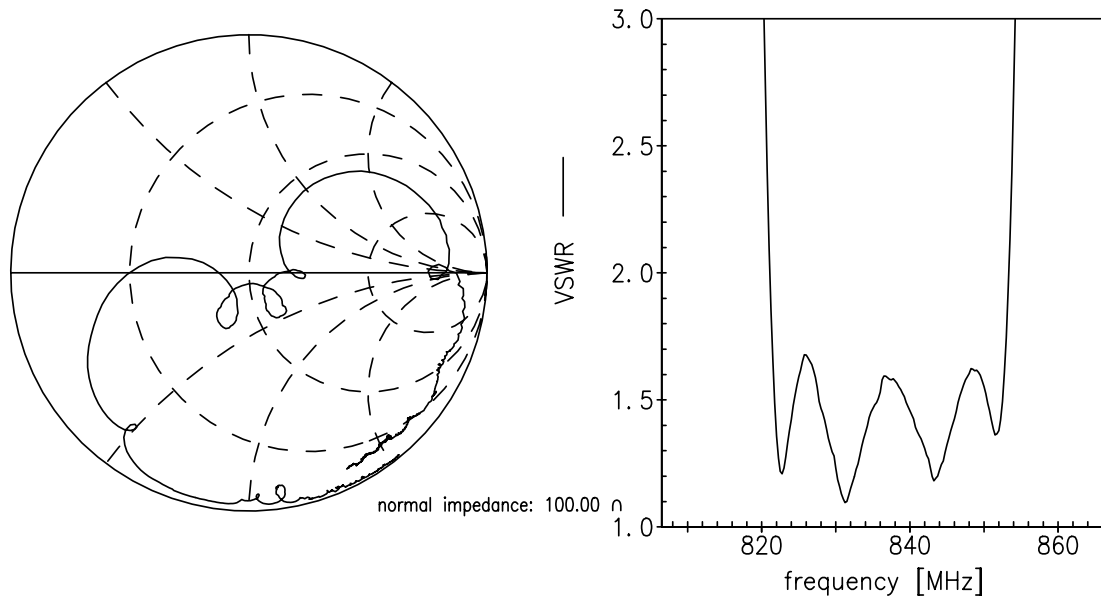
836.5 / 1880.0 MHz

#### Data Sheet

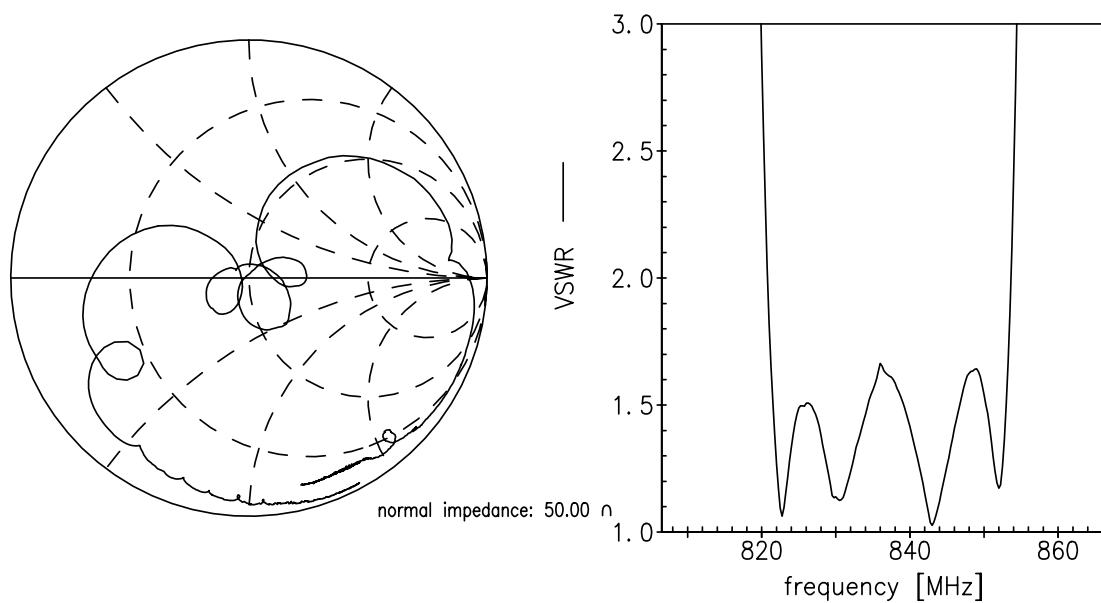


#### Smith charts filter 1 (WCDMA band V)

##### $S_{11}$ function



##### $S_{22}$ function





## SAW Components

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### SAW Tx 2in1 Filter

836.5 / 1880.0 MHz

#### Data Sheet



#### Characteristics filter 2 (WCDMA band II)

Temperature range for specification:  $T = -15\text{ °C to }+80\text{ °C}$   
 Terminating source impedance:  $Z_S = 100\ \Omega$  (balanced) || 18nH  
 Terminating load impedance:  $Z_L = 50\ \Omega$  (unbalanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	1880.0	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	2.4	3.8	dB
1850.0 ... 1910.0 MHz		—	2.4	3.8	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	1.0	2.4	dB
1850.0 ... 1910.0 MHz		—	1.0	2.4	dB
<b>Input VSWR</b>		—	1.8	2.3	
1850.6 ... 1909.4 MHz		—	1.8	2.3	
<b>Output VSWR</b>		—	1.8	2.3	
1850.6 ... 1909.4 MHz		—	1.8	2.3	
<b>Input amplitude balance (<math> S_{31}/S_{21} </math>)</b>		−1.1	−0.7/0.7	1.1	dB
1850.0 ... 1910.0 MHz		−1.1	−0.7/0.7	1.1	dB
<b>Input phase balance (<math>\phi(S_{31}) - \phi(S_{21}) + 180^\circ</math>)</b>		−10.0	−3/+3	10.0	°
1850.0 ... 1910.0 MHz		−10.0	−3/+3	10.0	°
<b>Common mode suppression</b>	$S_{cs21}$	23.0	29.0	—	dB
1850.0 ... 1910.0 MHz		23.0	29.0	—	dB
<b>Attenuation</b>	$\alpha$	45.0	54.0	—	dB
0.0 ... 1580.0 MHz		45.0	54.0	—	dB
1580.0 ... 1770.0 MHz		30.0	42.0	—	dB
1770.0 ... 1830.0 MHz		18.0	36.0	—	dB
1930.6 ... 1990.0 MHz		33.0 <sup>1)</sup>	35.7	—	dB
1990.0 ... 2500.0 MHz		30.0	35.5	—	dB
2500.0 ... 6000.0 MHz		30.0	40.0	—	dB

1) Attenuation of WCDMA signal determined by

$$\int_{-\infty}^{\infty} |S_{ds21}(f) H_{RRC}(f - f_C)|^2 df$$

with  $f_C$  ranging from 1932.4 MHz (lowest Rx channel) to 1987.6 MHz (highest Rx channel).  
 $H_{RRC}(f)$  is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



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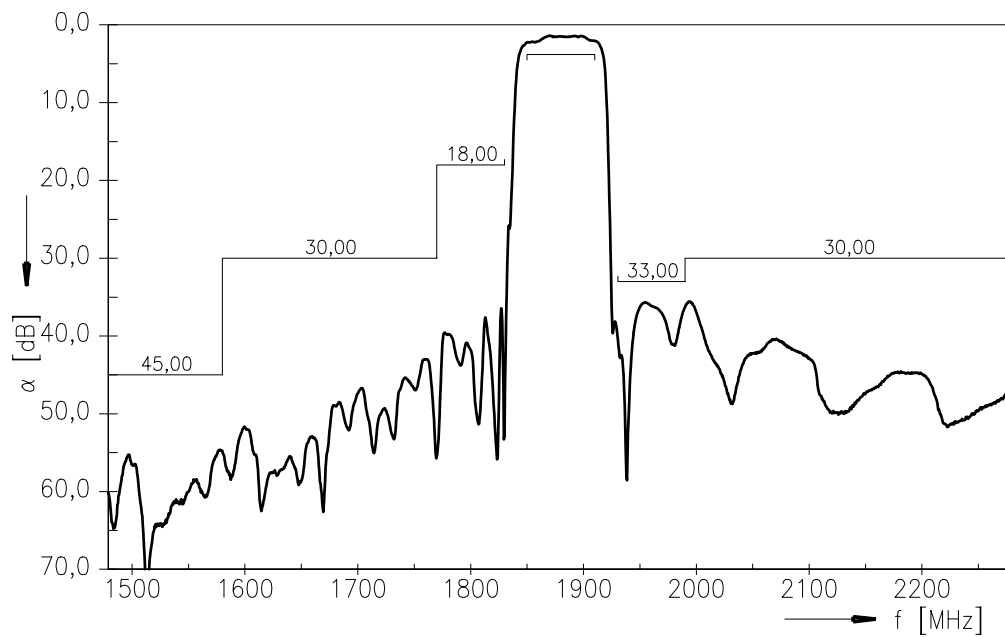
SAW Tx 2in1 Filter

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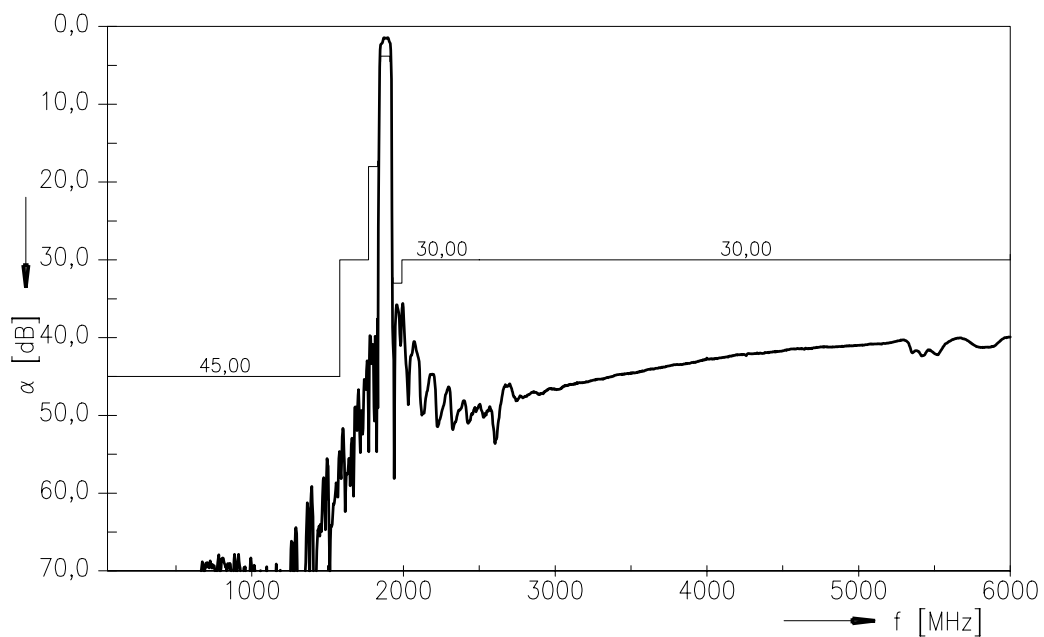
Data Sheet



Transfer function filter 2 (WCDMA band II)



Transfer function filter 2 (WCDMA band II) - wideband



Please read *cautions and warnings* and *important notes* at the end of this document.



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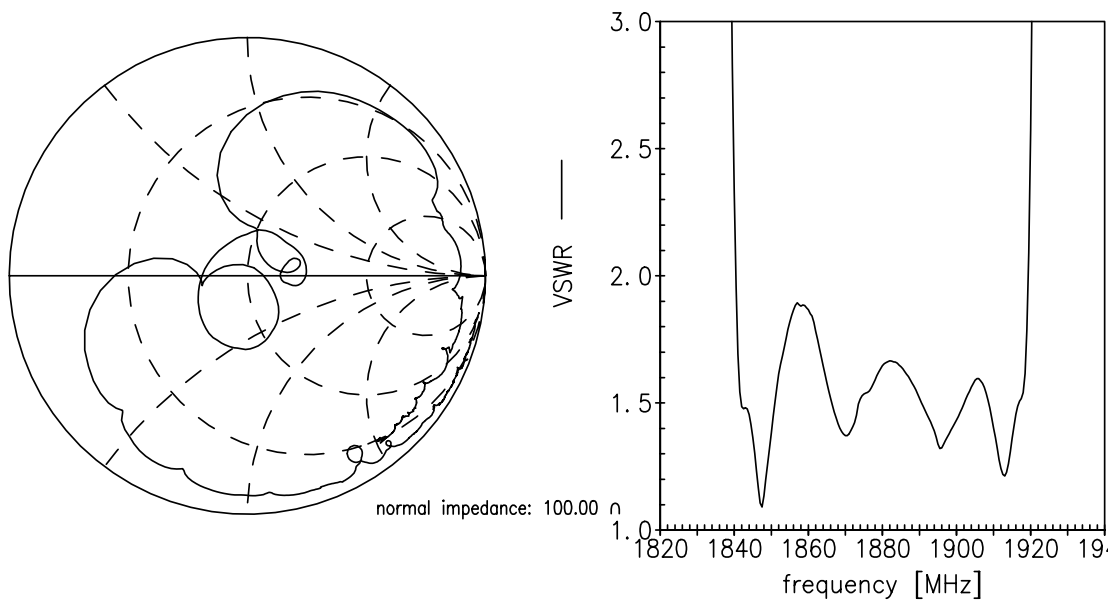
836.5 / 1880.0 MHz

#### Data Sheet

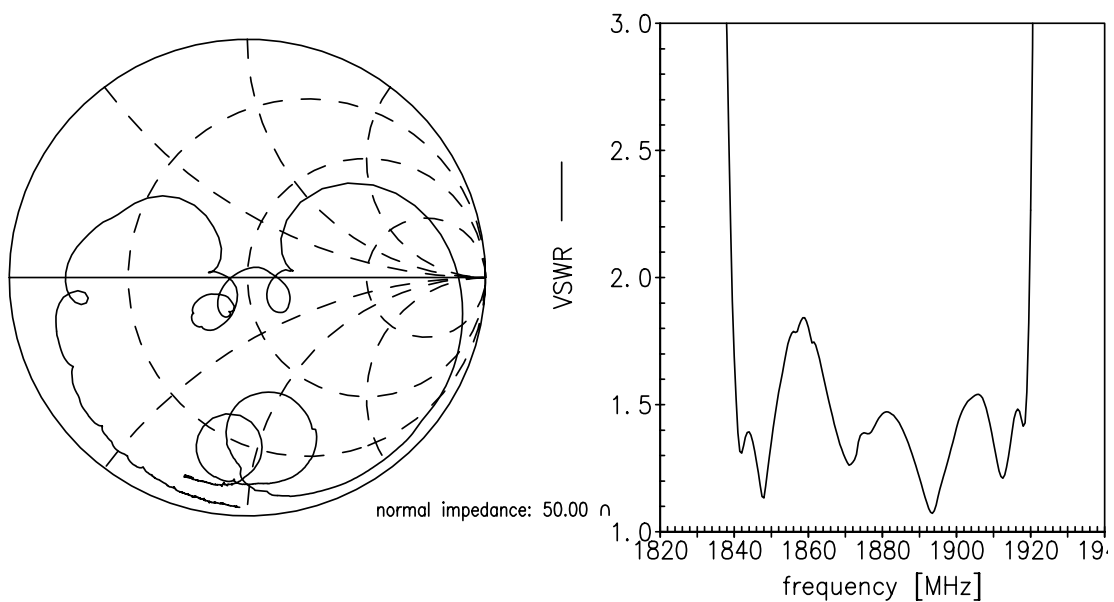


#### Smith charts filter 2 (WCDMA band II)

##### $S_{11}$ function



##### $S_{22}$ function



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<b>Type</b>	B9312
<b>Ordering code</b>	B39192B9312N410
<b>Marking and package</b>	C61157-A7-A146
<b>Packaging</b>	F61074-V8152-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	LN55D_band5_NB.s3p, LN55D_band5_WB.s3p LN55D_band2_NB.s3p, LN55D_band2_WB.s3p
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maxi- mum concentration values for certain hazardous substances in electrical and electronic equipment."
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