SAW Components

SAW duplexer

WCDMA band VIII

Series/type:	**B8514**
Ordering code:	**B39941B8514P810**
Date:	April 9, 2013
Version:	2.0

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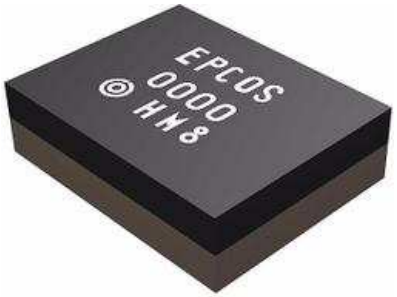
SAW duplexer 897.5 / 942.5 MHz

Preliminary Data SMD

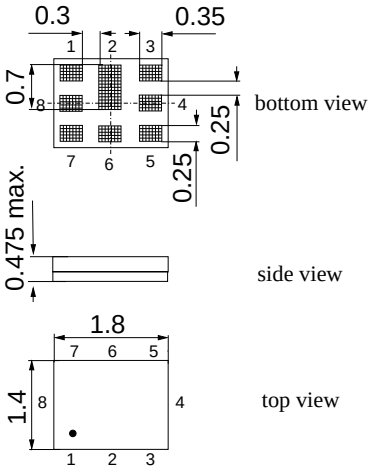
Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- 50 Ω single-ended in both in Antenna-Rx and Tx-Antenna paths



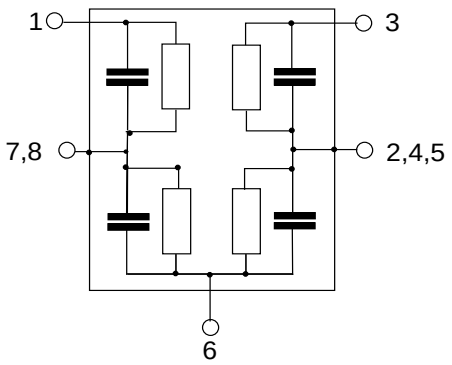
Features

- Package size 1.8 x 1.4 x 0.475 mm³.
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, Au-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

1	RX output (single-ended)
3	TX input (single-ended)
6	Antenna
2,4,5,7,8	Ground



Preliminary Data SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50Ω
RX terminating impedance: Z_{RX} = 50Ω

Characteristics Tx - Ant				min.	typ. @25 ˚C	max.	
Center frequency		f_C		—	897.5	—	MHz
Maximum insertion attenuation							
@$f_{Carrier}$ 882.4 ... 912.6 MHz		α_{WCDMA} 1)		—	2.0	2.7	dB
880.0 ... 915.0 MHz				—	2.2	3.9	dB
880.0 ... 915.0 MHz				—	2.2	2.8 3)	dB
Amplitude ripple (p-p)							
@$f_{Carrier}$ 882.4 ... 912.6 MHz		$\Delta\alpha_{WCDMA}$ 1)		—	1.0	2.1	dB
880.0 ... 915.0 MHz				—	1.2	3.1	dB
Error Vector Magnitude							
@$f_{Carrier}$ 882.4 ... 912.6 MHz		EVM 2)		—	2.3	6.0	%
VSWR							
TX port 880.0 ... 915.0 MHz				—	1.7	2.0	
ANT port 880.0 ... 915.0 MHz				—	1.7	2.2	
Attenuation		α					
10.0 ... 716.0 MHz				30	35	—	dB
716.0 ... 728.0 MHz				30	35	—	dB
728.0 ... 793.0 MHz				30	35	—	dB
@$f_{Carrier}$ 927.4 ... 957.6 MHz		α_{WCDMA} 1)		42	51	—	dB
@$f_{Carrier}$ 927.4 ... 957.6 MHz		α_{WCDMA} 1)		44 3)	51	—	dB
1559.0 ... 1563.0 MHz				42	45	—	dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141
3) T= +25˚C

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50Ω
RX terminating impedance: Z_{RX} = 50Ω

Characteristics Tx - Ant		min.	typ. @25 ˚C	max.	
Attenuation	α				
1565.42 ... 1573.374 MHz		42	45	—	dB
1573.374 ... 1577.466 MHz		40	45	—	dB
1577.466 ... 1585.42 MHz		40	45	—	dB
1597.5515 ... 1605.886 MHz		40	44	—	dB
1760.0 ... 1830.0 MHz		35	38	—	dB
1830.0 ... 1880.0 MHz		27	36	—	dB
2110.0 ... 2170.0 MHz		27	33	—	dB
2400.0 ... 2500.0 MHz		26	30	—	dB
2620.0 ... 2745.0 MHz		22	27	—	dB
3520.0 ... 3660.0 MHz		20	26	—	dB
4400.0 ... 4575.0 MHz		20	25	—	dB
5150.0 ... 5490.0 MHz		10	19	—	dB
5725.0 ... 5850.0 MHz		10	14	—	dB

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50Ω
RX terminating impedance: Z_{RX} = 50 Ω

Charcteristics Rx - Ant						min.	typ. @25 ˚C	max.	
Center frequency					f_C	—	942.5	—	MHz
Maximum insertion attenuation									
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} 1)	—	1.9	2.6	dB
	925.0	...	960.0	MHz		—	2.4	4.3	dB
	925.0	...	960.0	MHz		—	2.4	2.8 3)	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	0.6	1.2	dB
	925.0	...	960.0	MHz		—	2.7	3.1	dB
Error Vector Magnitude									
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM 2)	—	3.4	8.0	%
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM 4)	—	3.4	5.0 3)	%
VSWR									
RX port	925.0	...	960.0	MHz		—	1.7	2.2	
ANT port	925.0	...	960.0	MHz		—	1.9	2.2	
Attenuation					α				
	10.0	...	880.0	MHz		40	58	—	dB
	902.5	...	910.0	MHz		30	55	—	dB
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} 1)	45	55	—	dB
	980.0	...	1045.0	MHz		20	29	—	dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141
3) T= +25˚C

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50Ω
RX terminating impedance: Z_{RX} = 50Ω

Charcteristics Rx - Ant			min.	typ. @25 ˚C	max.	
Attenuation						
1045.0 ... 1805.0	MHz		35	52	—	dB
1805.0 ... 1920.0	MHz		40	51	—	dB
1920.0 ... 2400.0	MHz		35	48	—	dB
2400.0 ... 2500.0	MHz		40	47	—	dB
2685.0 ... 2880.0	MHz		40	46	—	dB
2880.0 ... 3700.0	MHz		35	42	—	dB
3700.0 ... 3840.0	MHz		35	42	—	dB
4625.0 ... 4800.0	MHz		35	41	—	dB
5550.0 ... 5725.0	MHz		30	38	—	dB
5725.0 ... 5875.0	MHz		30	37	—	dB

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50Ω
RX terminating impedance: Z_{RX} = 50Ω

Charcteristics Tx - Rx						min.	typ. @25 ˚C	max.	
Isolation									
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} [1]	53	56	—	dB
	880.0	...	915.0	MHz		52	55	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} [1]	48	59	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} [1]	55 [2]	59	—	dB

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
[2] T= +15˚C to +85˚C

Maximum ratings

Storage temperature range	T_{stg}	–40/+85[1)]	°C	
DC voltage	V_{DC}	5[2)]	V	
ESD voltage	V_{ESD}	100[3)]	V	machine model, 1 pulse
Input power at	P_{IN}			
880.0 ... 915.0 MHz		29	dBm	} continuous wave 50 °C, 5000 h
elsewhere		10	dBm	

1) extended upperlimit: 96h@125°C acc. to IEC 60062-2-2 Bb
2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy
3) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Annotation for characteristics section

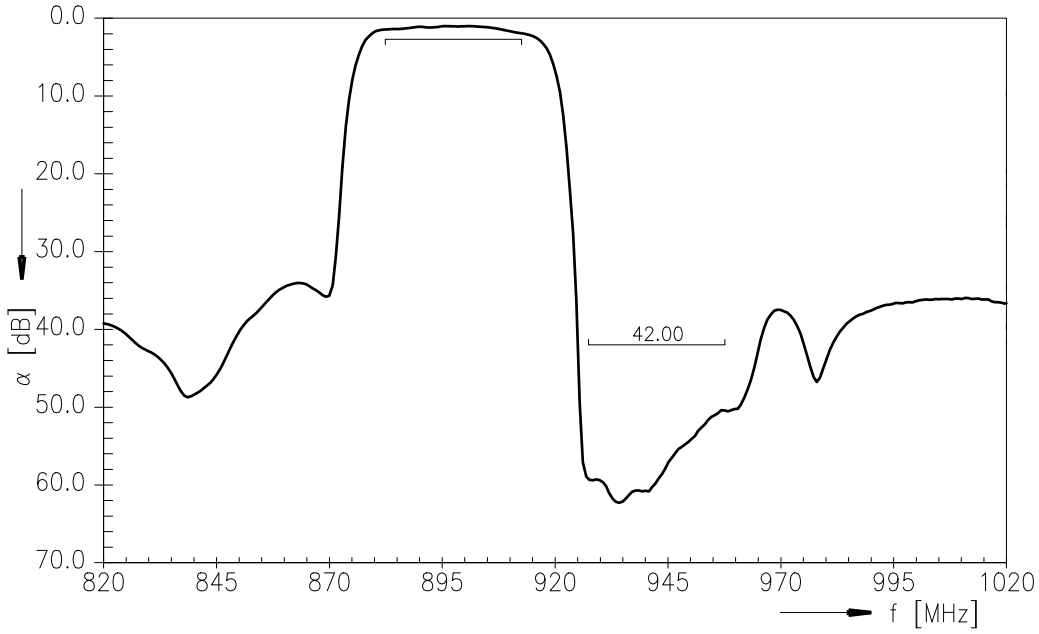
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

$$\int_{\infty}^{\infty} \left| S_{ds21}(f) H_{RRC}(f - f_{Carrier}) \right|^2 df$$

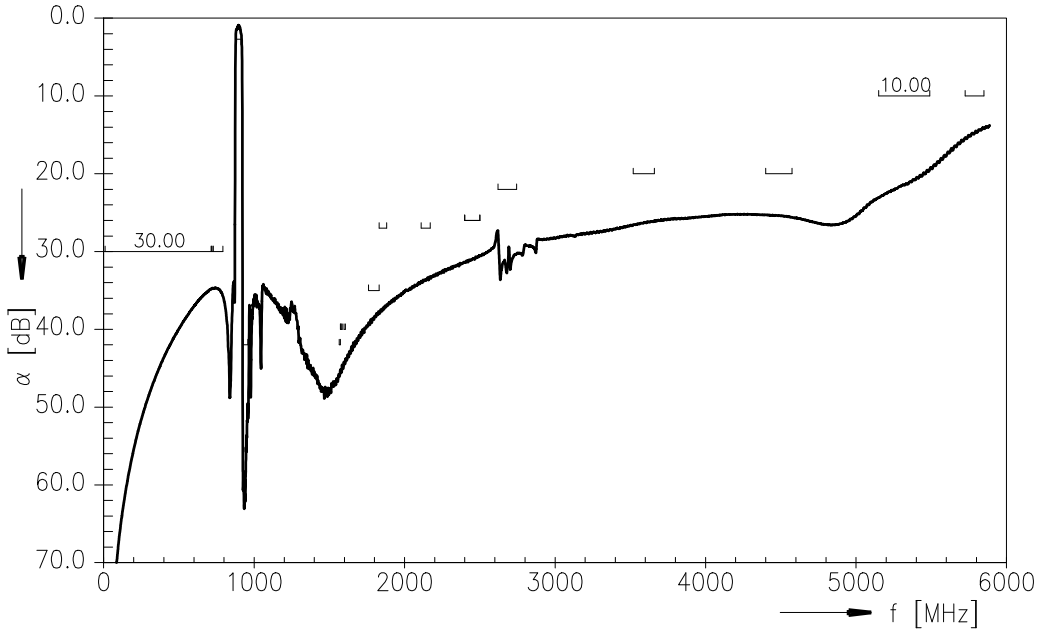
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

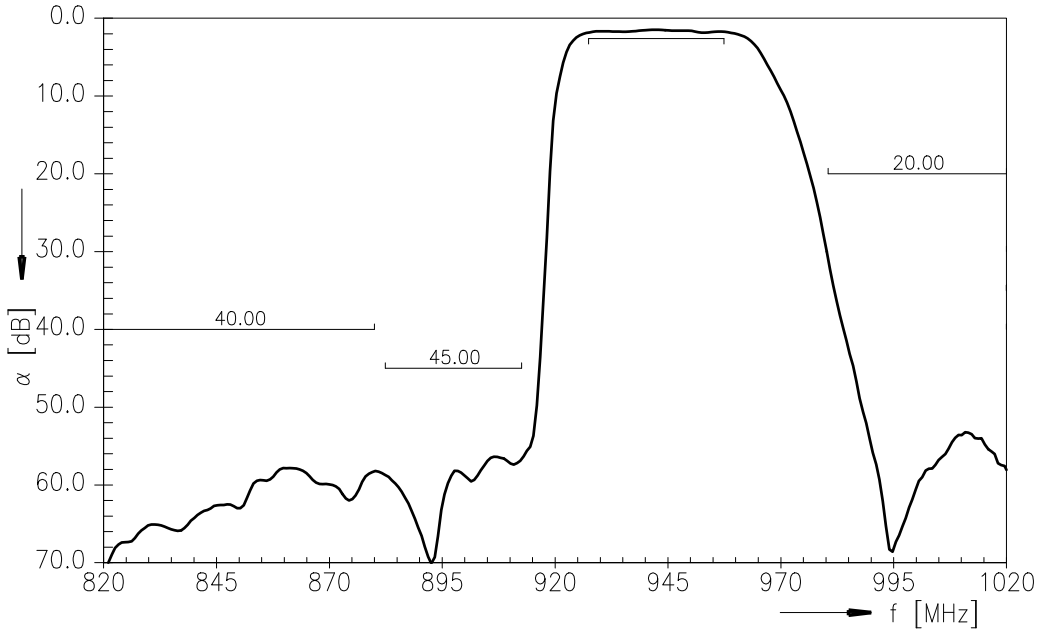
Frequency response Tx-Antenna (Power transfer function)



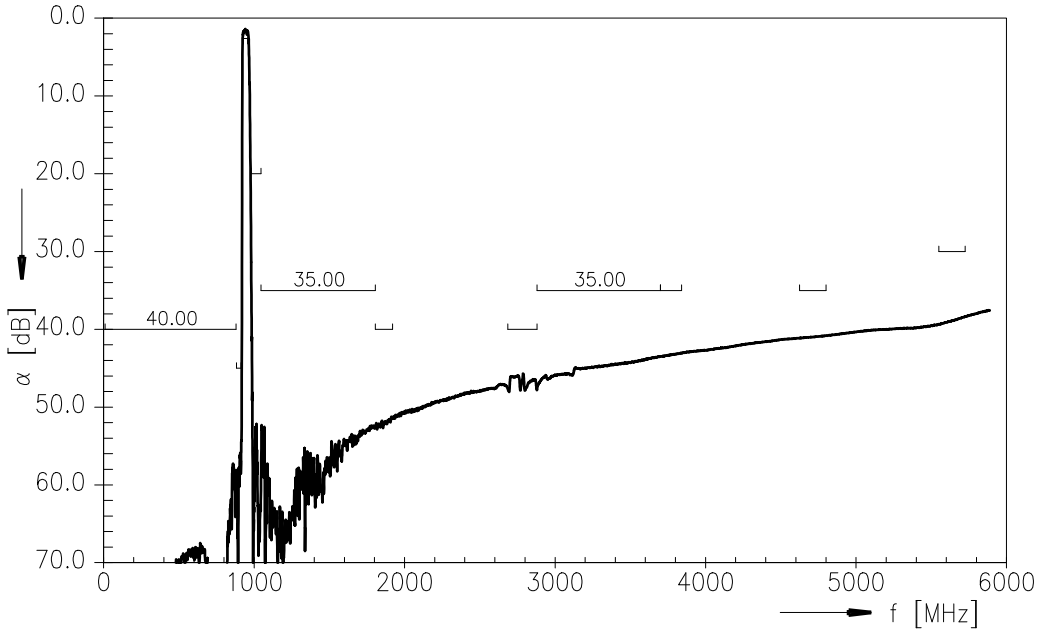
Frequency response Tx-Antenna (wideband)



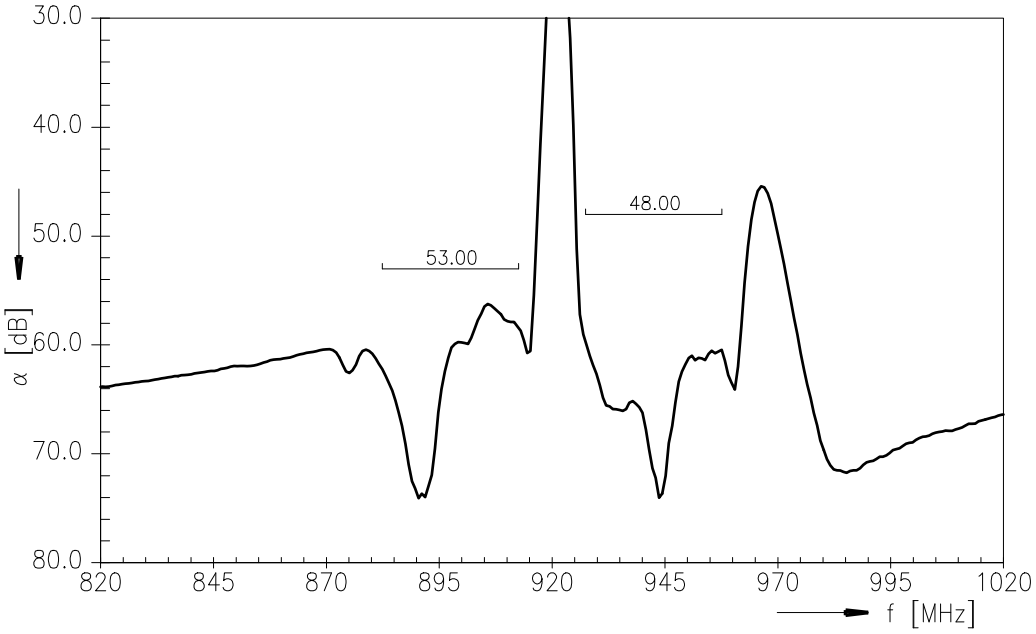
Frequency response Antenna-Rx (Power transfer function)



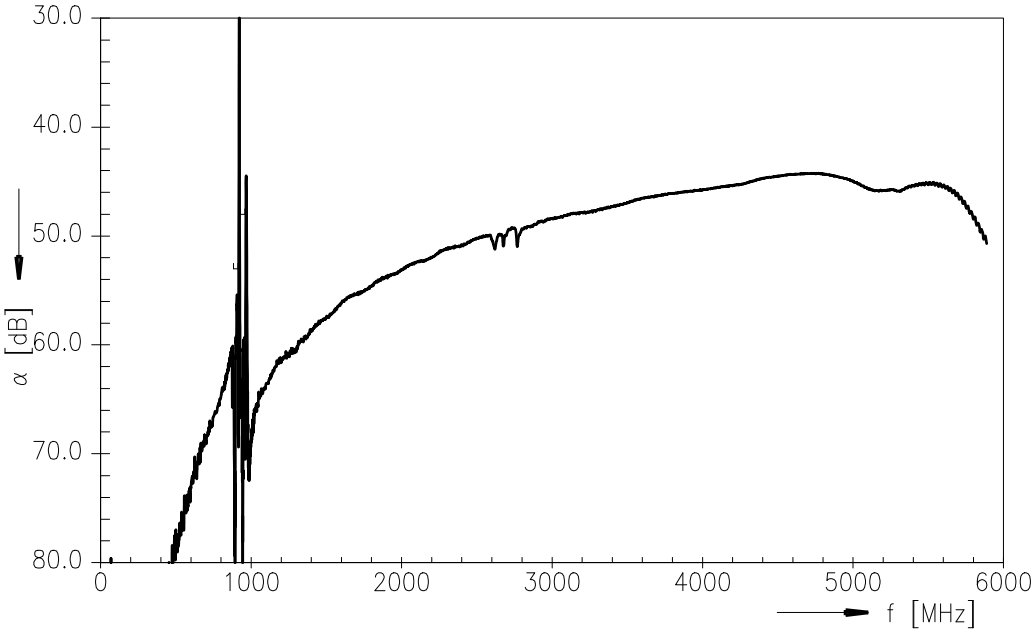
Frequency response Antenna-Rx (wideband)



Frequency response Tx-Rx (Power transfer function)

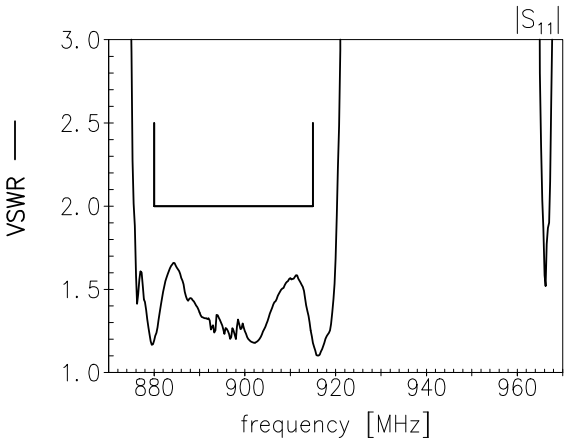


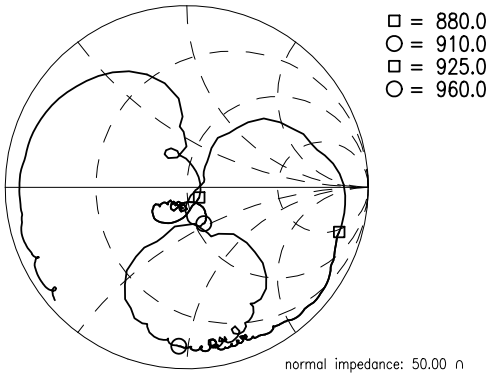
Frequency response Tx-Rx (wideband)

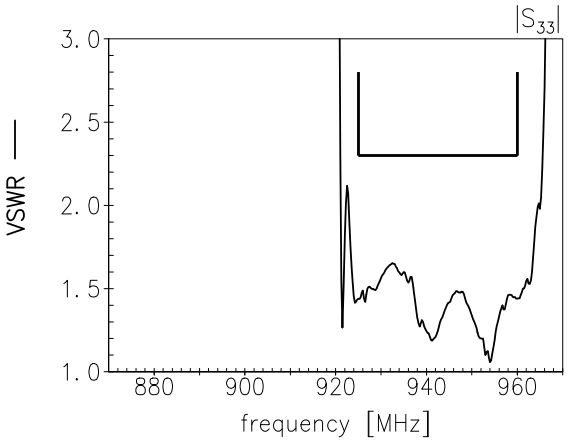


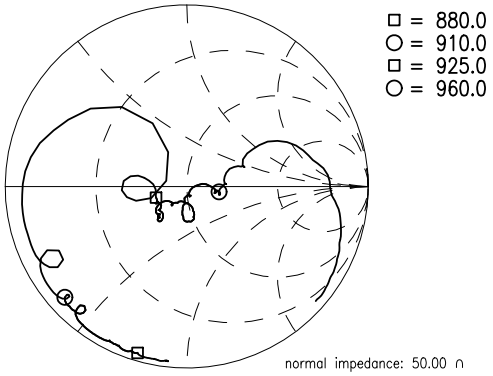
Preliminary Data

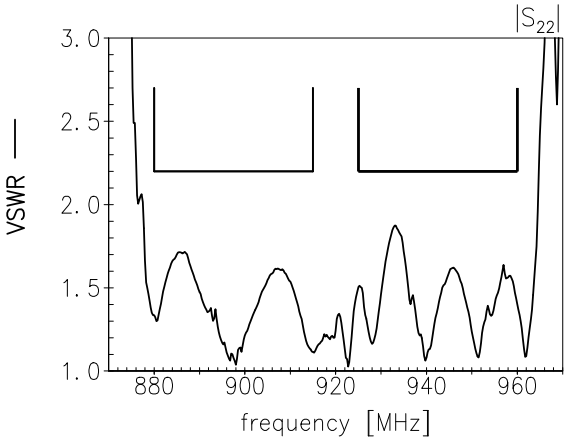
Return loss **S_{11} Tx-port** **S_{22} Antenna-port** **S_{33} Rx-portReferences**

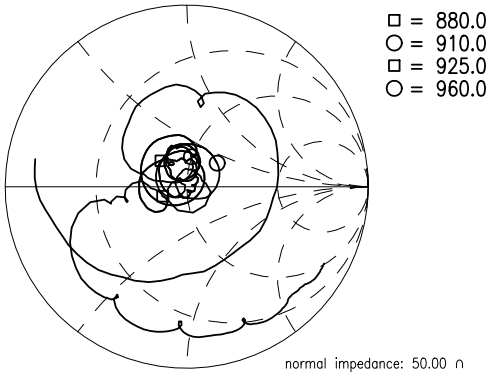












References

Type	B8514
Ordering code	B39941B8514P810
Marking and package	C61157-A8-A38
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8514_NB_UN.s3p, B8514_WB_UN.s3p See file header for pin/port assignment.
Soldering profile	S_6001
RoHS compatible	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm

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