SAW Components

SAW duplexer

WCDMA band VIII

Series/type:	**B8605**
Ordering code:	**B39941B8605P810**
Date:	July 02, 2013
Version:	2.1

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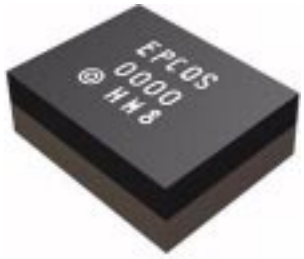
Data sheet SMD

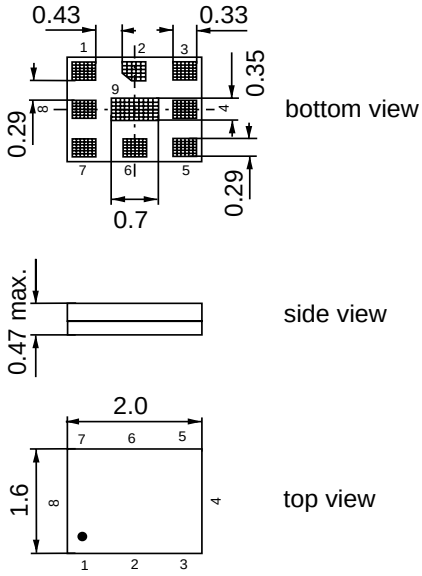
Application

- 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



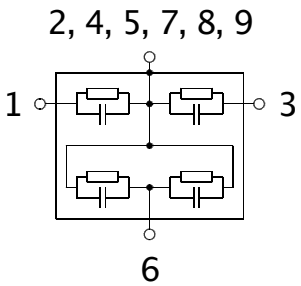
Features

- Package size 2.0 x 1.6mm²
- Max. package height 0.47mm
- RoHS compatible
- Approx. weight 0.006g
- 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
2,4,5,7,8,9	Ground



Data sheet SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
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	2.6	dB
880.4	...	914.6	MHz		—	2.3	3.8	dB
880.0	...	915.0	MHz		—	2.4	4.0	dB
Amplitude ripple (p-p)								
@$f_{Carrier}$ 882.4	...	912.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	1.1	1.8	dB
880.4	...	914.6	MHz		—	1.4	3.0	dB
880.0	...	915.0	MHz		—	1.5	3.2	dB
Amplitude ripple over any 5MHz channel								
@$f_{Carrier}$ 882.4	...	912.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	0.7	1.1	dB
880.0	...	915.0	MHz		—	0.8	2.1	dB
Error Vector Magnitude								
@$f_{Carrier}$ 882.4	...	912.6	MHz	EVM 2)	—	2.6	7.0	%
@$f_{Carrier}$ 882.4	...	912.6	MHz	EVM 2)	—	2.6	4.5 3)	%
VSWR								
Tx port 880.0	...	915.0	MHz		—	1.7	2.1	
Ant port 880.0	...	915.0	MHz		—	1.8	2.1	
Attenuation				α				
10.0	...	716.0	MHz		30	34	—	dB
716.0	...	728.0	MHz		30	34	—	dB
728.0	...	793.0	MHz		30	34	—	dB
@$f_{Carrier}$ 927.4	...	957.6	MHz	α_{WCDMA} 1)	44	50	—	dB
1559.0	...	1563.0	MHz		45	51	—	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

Data sheet SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
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	45	51	—	dB
1573.374	... 1577.466	MHz	45	51	—	dB
1577.466	... 1585.42	MHz	45	52	—	dB
1597.5515	... 1605.886	MHz	45	51	—	dB
1760.0	... 1830.0	MHz	38	43	—	dB
1830.0	... 1880.0	MHz	27	42	—	dB
2110.0	... 2170.0	MHz	27	36	—	dB
2400.0	... 2500.0	MHz	27	33	—	dB
2620.0	... 2745.0	MHz	20	32	—	dB
3520.0	... 3660.0	MHz	20	29	—	dB
4400.0	... 4575.0	MHz	20	27	—	dB
5150.0	... 5490.0	MHz	10	25	—	dB
5725.0	... 5850.0	MHz	10	21	—	dB

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
Tx terminating impedance: Z_{Tx} = 50Ω
Rx terminating impedance: Z_{Rx} = 50 Ω

Characteristics 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)	—	1.7	2.5	dB
	925.4	...	959.6	MHz		—	1.9	3.5	dB
	925.0	...	960.0	MHz		—	1.9	4.0	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	0.5	1.3	dB
	925.4	...	959.6	MHz		—	0.7	2.3	dB
	925.0	...	960.0	MHz		—	0.7	2.8	dB
Amplitude ripple over any 5MHz channel									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	0.3	1.0	dB
	925.0	...	960.0	MHz		—	0.5	1.8	dB
Error Vector Magnitude									
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM 2)	—	2.8	8.0	%
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM 2)	—	2.8	5.0 3)	%
VSWR									
Rx port	925.0	...	960.0	MHz		—	1.7	2.3	
Ant port	925.0	...	960.0	MHz		—	1.7	2.1	
Attenuation					α				
	10.0	...	880.0	MHz		40	60	—	dB
	902.5	...	910.0	MHz		30	55	—	dB
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} 1)	45	58	—	dB
	980.0	...	1045.0	MHz		22	28	—	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

Data sheet SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
Tx terminating impedance: Z_{Tx} = 50Ω
Rx terminating impedance: Z_{Rx} = 50Ω

Characteristics Rx - Ant				min.	typ. @25 ˚C	max.	
Attenuation							
1045.0	...	1805.0	MHz	35	56	—	dB
1805.0	...	1920.0	MHz	40	66	—	dB
1920.0	...	2400.0	MHz	40	65	—	dB
2400.0	...	2500.0	MHz	40	65	—	dB
2685.0	...	2880.0	MHz	40	55	—	dB
2880.0	...	3700.0	MHz	40	59	—	dB
3700.0	...	3840.0	MHz	40	55	—	dB
4625.0	...	4800.0	MHz	35	43	—	dB
5550.0	...	5725.0	MHz	30	35	—	dB
5725.0	...	5875.0	MHz	30	38	—	dB
IMD Product Level Limit[1)]							
at f_{Tx}=897.5 MHz, f_{Rx}=942.5 MHz							
Blocker 1		45.0	MHz	—	-126	-117	dBm
Blocker 2		852.5	MHz	—	-109	-100	dBm
Blocker 3		1840.0	MHz	—	-111	-100	dBm
Blocker 4		2737.5	MHz	—	-111	-103	dBm

1) IMD product level limits for power levels P_{Tx}=21dBm (antenna port output power) and $P_{Blocker}$= -15dBm (antenna port input power)

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Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
Tx terminating impedance: Z_{Tx} = 50Ω
Rx terminating impedance: Z_{Rx} = 50Ω

Characteristics Tx - Rx						min.	typ. @25 ˚C	max.	
Isolation									
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} [1]	55	61	—	dB
	880.0	...	915.0	MHz		50	60	—	dB
	880.0	...	915.0	MHz		55 [2]	60	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} [1]	50	54	—	dB

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
[2] T= +25˚C

Maximum ratings

Storage temperature range	T_{stg}	–40/+85[1)]	˚C	
DC voltage	V_{DC}	5[2)]	V	
DC impedance to ground		>100	MΩ	
ESD voltage	V_{ESD}	100[3)]	V	Machine Model
Input power at	P_{IN}			
880.0 ... 915.0 MHz		29	dBm	} continuous wave 50 ˚C, 5000 h
elsewhere		10	dBm	

1) extended upperlimit: 168h@125˚C acc. to IEC 60068-2-2 Bb
2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy
3) acc. to JESD22-A115B (MM - Machine Model), 10 negative and 10 positive pulses.

Annotation for characteristics section

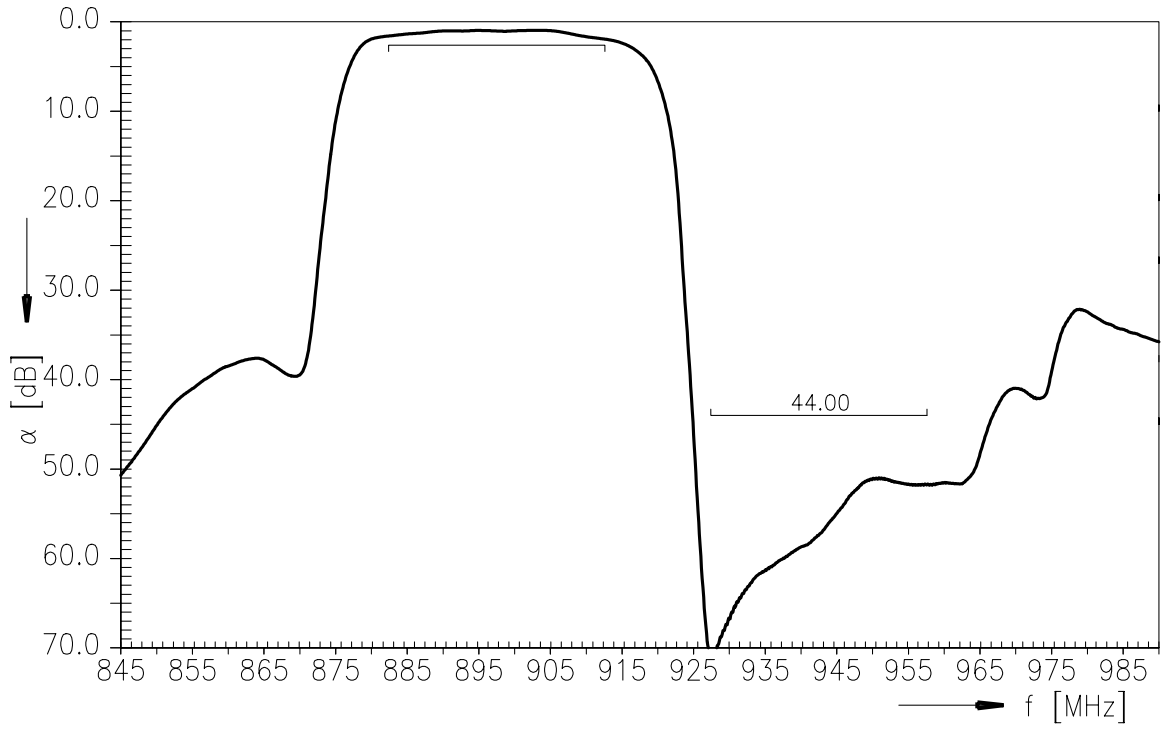
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

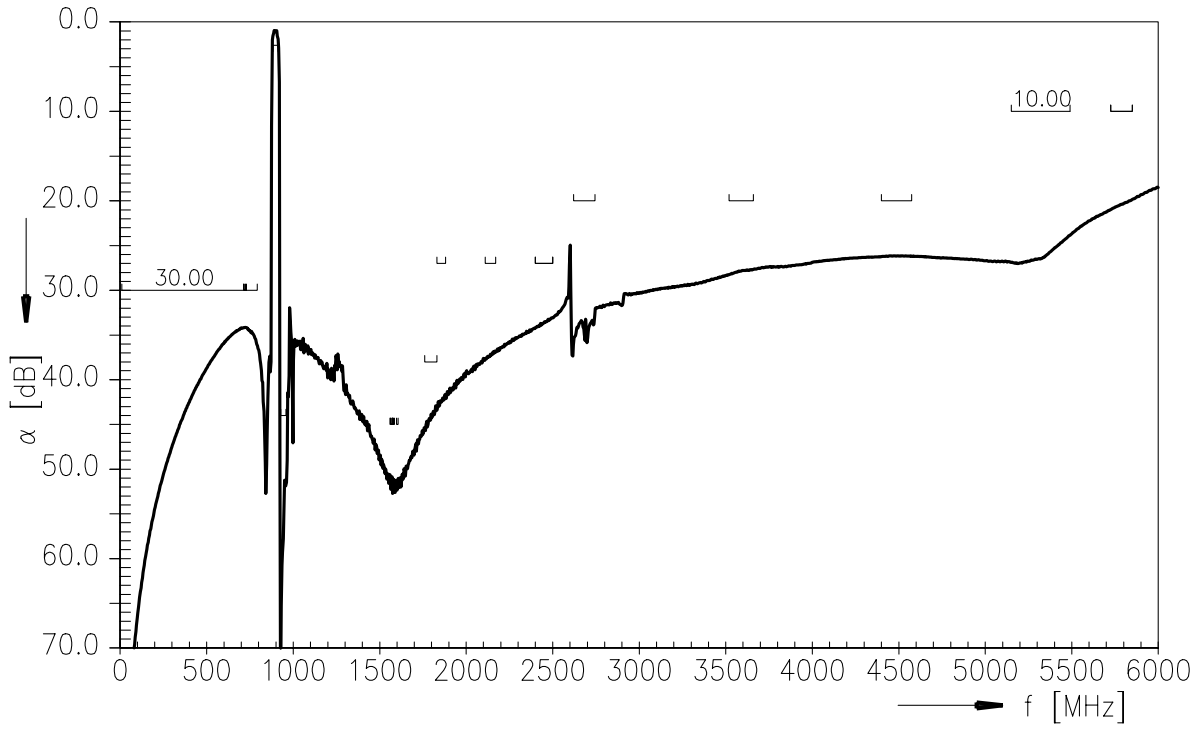
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for band VIII Rx Passband, $f_{Carrier}$ ranges from 927.4 MHz (lowest Rx channel) to 957.6 MHz (highest Rx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

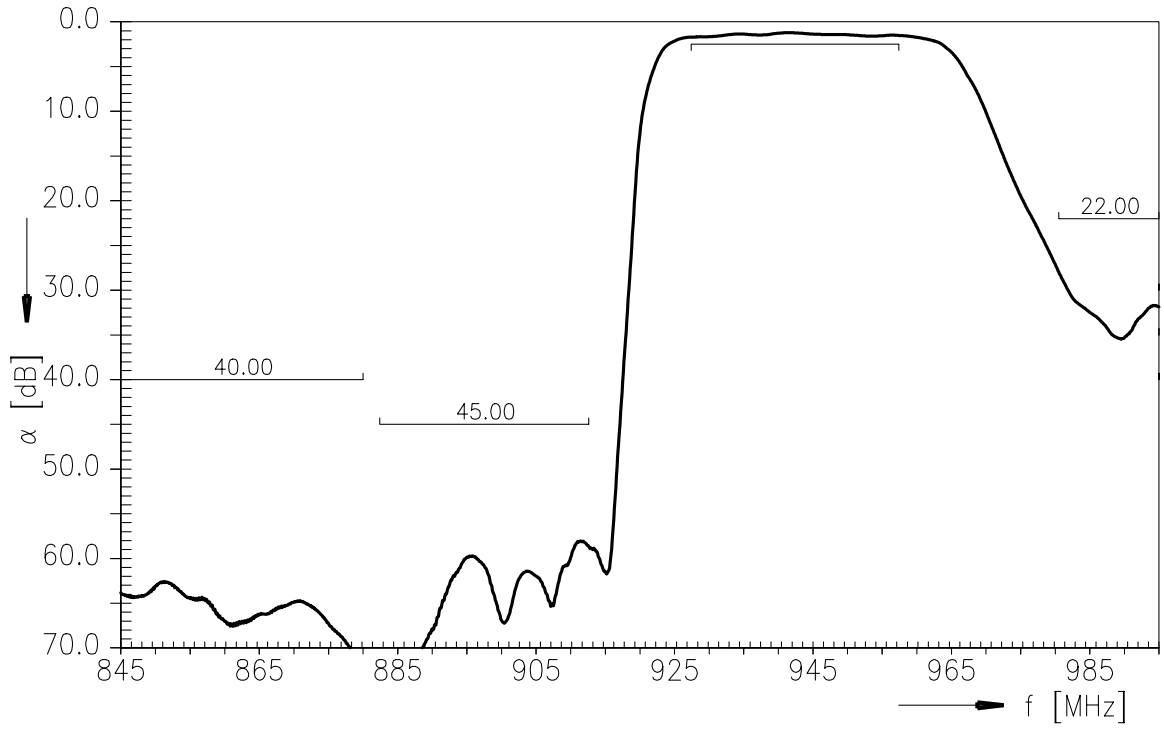
Frequency response Tx-Antenna (Power transfer function)



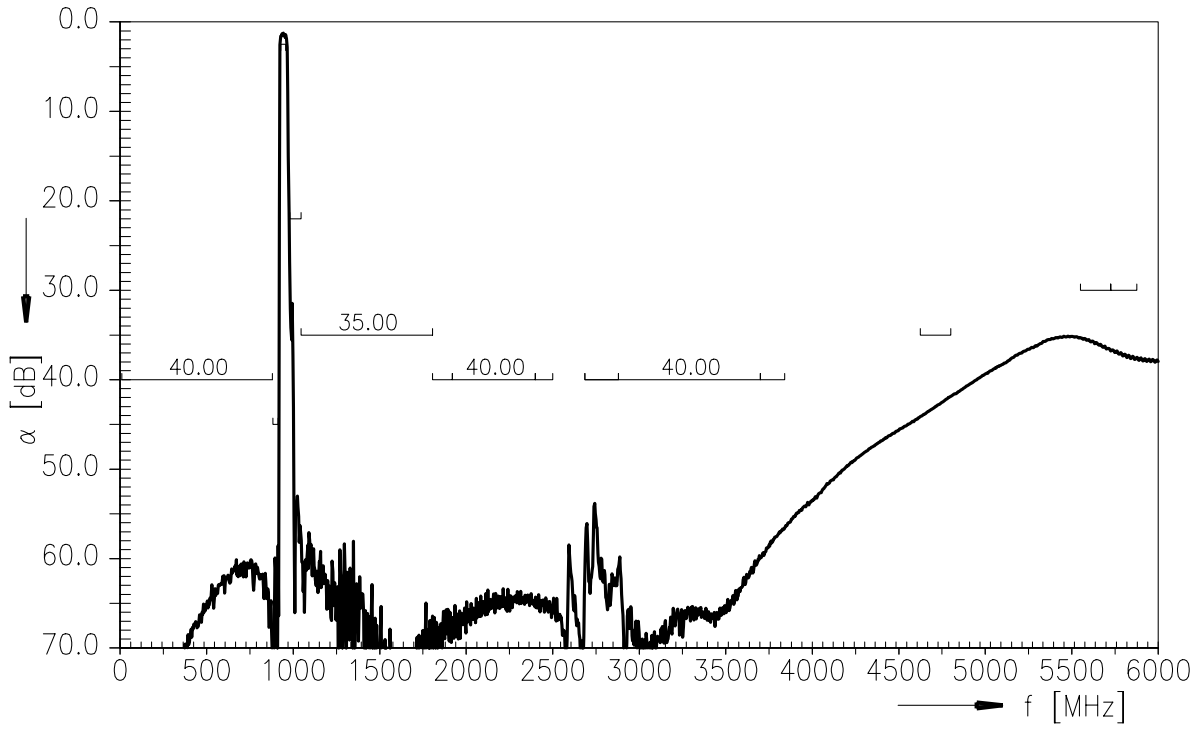
Frequency response Tx-Antenna (wideband)



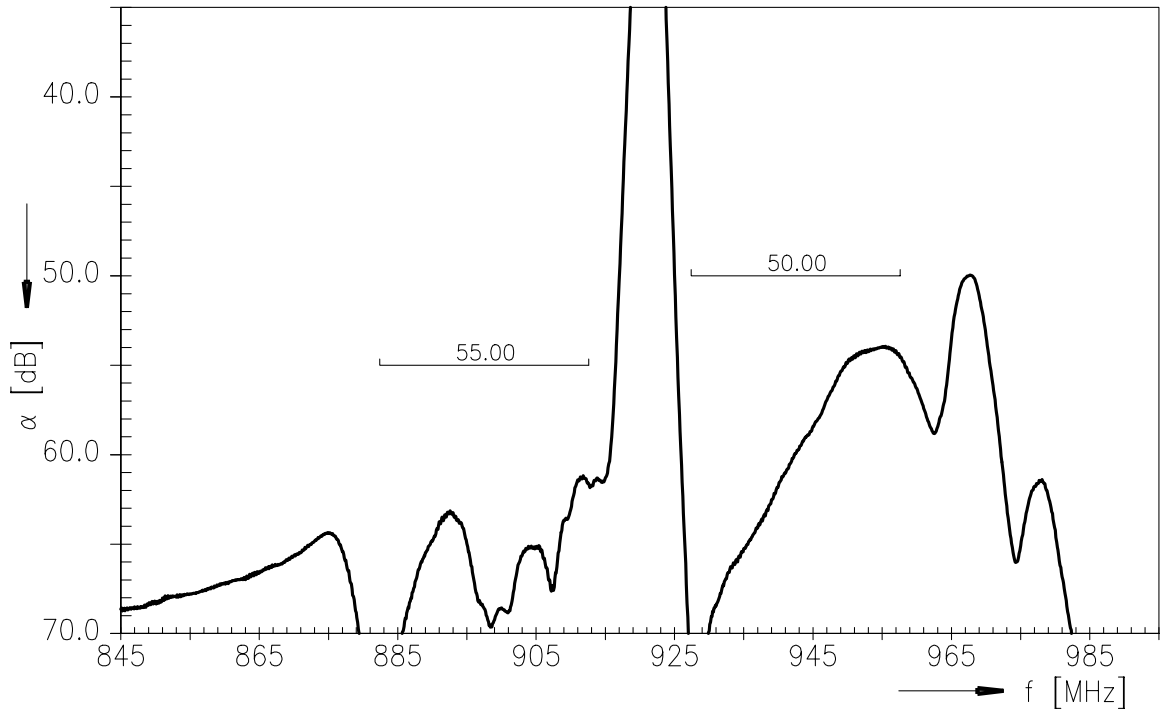
Frequency response Antenna-Rx (Power transfer function)



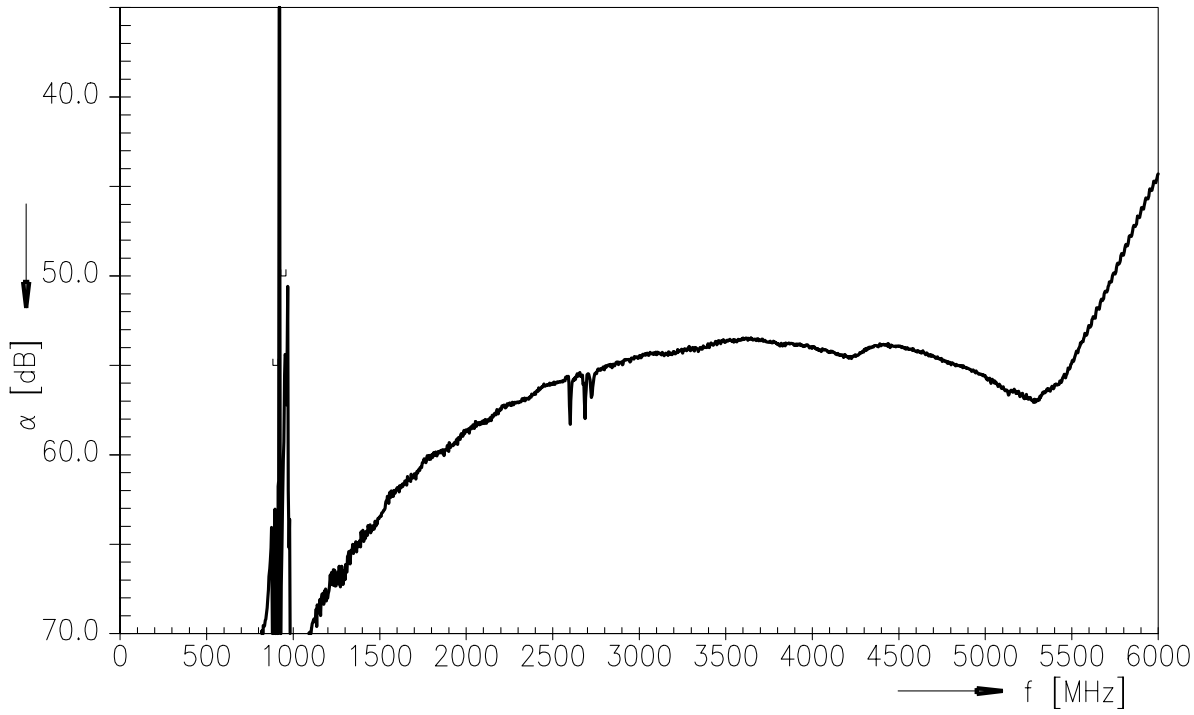
Frequency response Antenna-Rx (wideband)



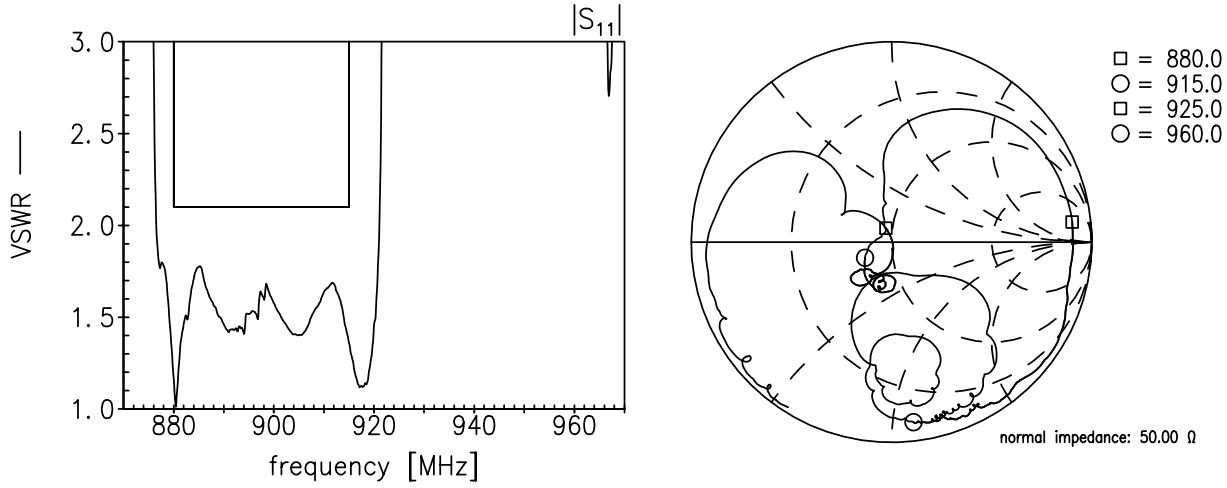
Frequency response Tx-Rx (Power transfer function)

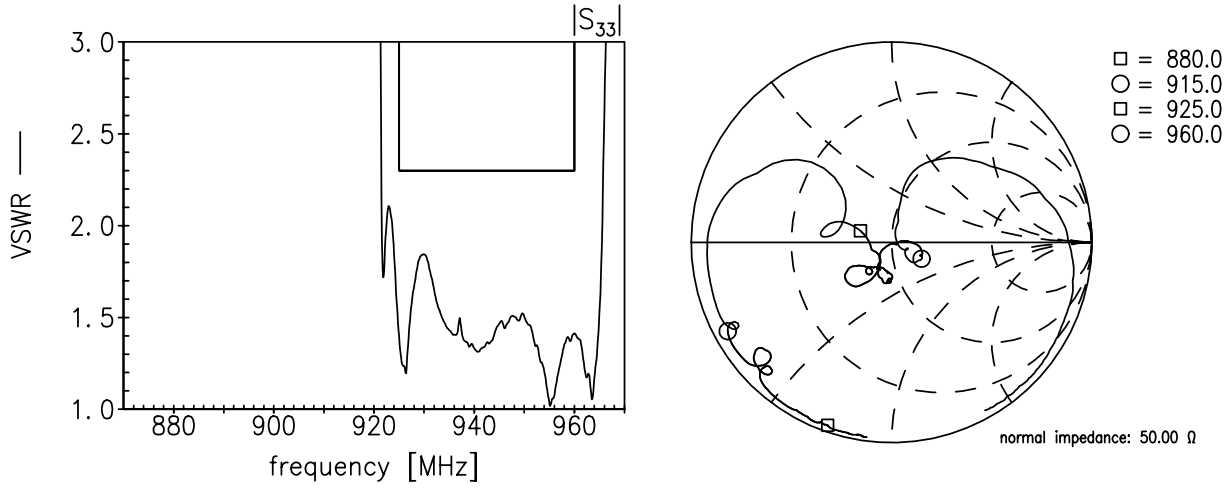


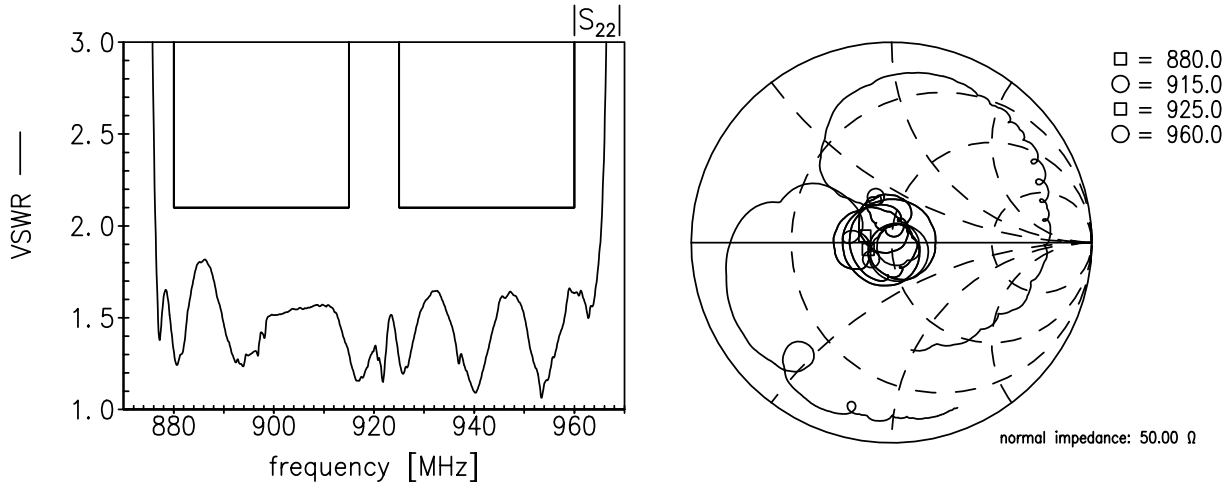
Frequency response Tx-Rx (wideband)



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







References

Type	B8605
Ordering code	B39941B8605P810
Marking and package	C61157-A8-A38
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8605_NB_UN.s3p, B8605_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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