SAW Components

SAW Duplexer

WCDMA Band 8

Series/type:	**B8605**
Ordering code:	**B39941B8605P810**
Date:	May 31, 2016
Version:	2.3

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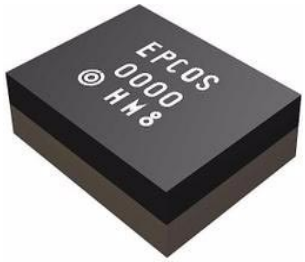
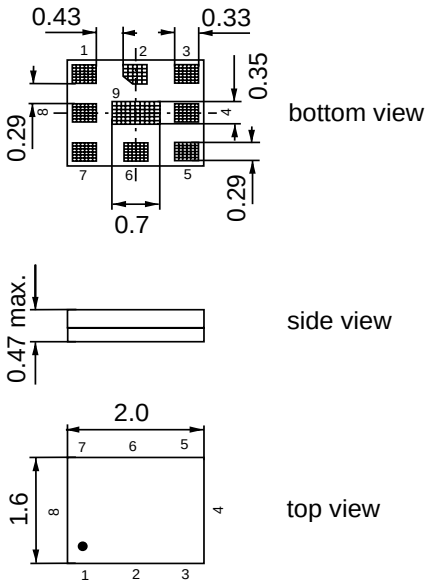
Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band 8 systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- 50 Ω single-ended in both in Antenna-Rx and Tx-Antenna paths



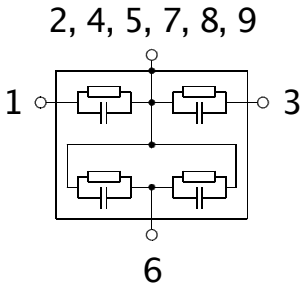
Features

- 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



Characteristics

Temperature range for specification: T = –30 ˚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 - Antenna					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

Characteristics

Temperature range for specification: T = –30 ˚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 - Antenna		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 = –30 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
Tx terminating impedance: Z_{Tx} = 50 Ω
Rx terminating impedance: Z_{Rx} = 50 Ω

Characteristics Antenna - Rx						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

Characteristics

Temperature range for specification: T = –30 ˚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 Antenna - Rx				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)

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Ant terminating impedance: Z_{Ant} = 50 Ω || 7.5 nH
Tx terminating impedance: Z_{Tx} = 50 Ω
Rx terminating impedance: Z_{Rx} = 50 Ω

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	˚C	
DC voltage	V_{DC}	5[1)]	V	
DC impedance to ground		>100	MΩ	
ESD voltage	V_{ESD}	100[2)]	V	Machine Model
		250[3)]	V	Human Body Model
		600[4)]	V	Charged Device Model
Input power at	P_{IN}			
880.0 ... 915.0 MHz		29	dBm	} continuous wave 50 ˚C, 5000 h
elsewhere		10	dBm	

1) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy
2) acc. to JESD22-A115B (MM - Machine Model), 10 negative and 10 positive pulses.
3) acc. to JESD22-A114F (HBM - Human Body Model) , 1 negative & 1 positive pulses.
4) acc. to JESD22-C101C (CDM - Field Induced Charged Device Model) , 3 negative & 3 positive pulses.

Annotation for characteristics section

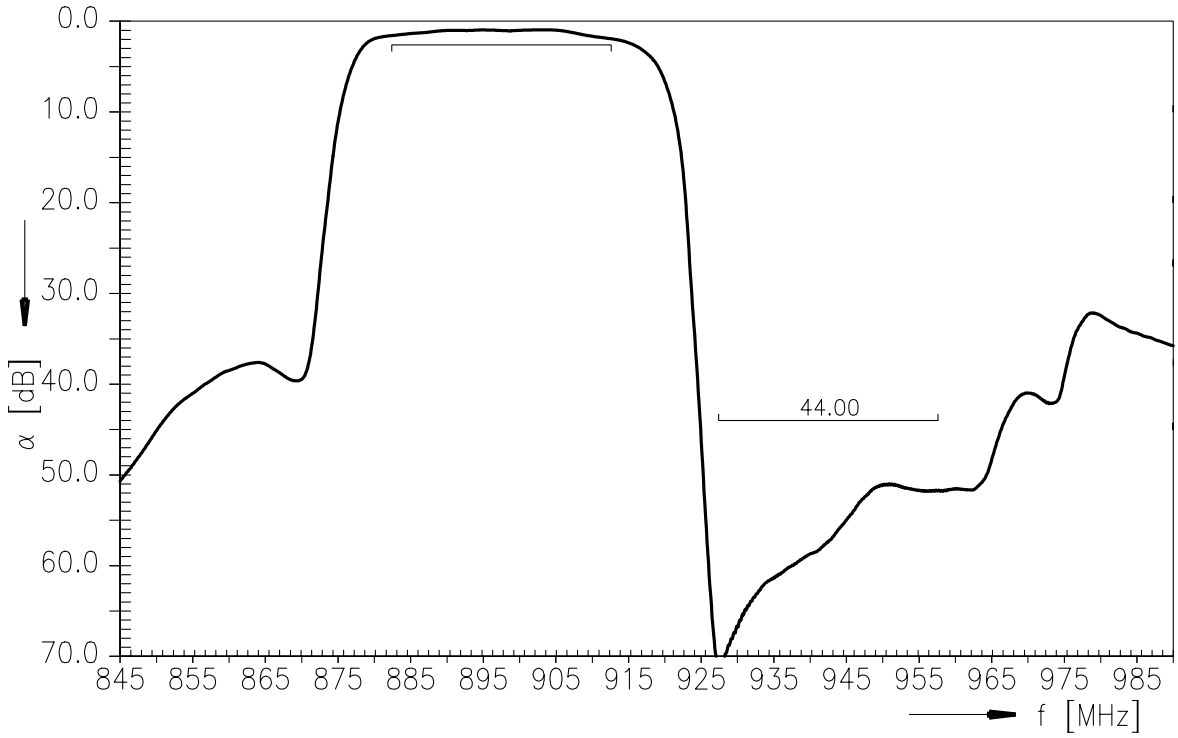
Attenuation of WCDMA signal (“Powertransferfunction”, α_{WCDMA}) is determined by

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

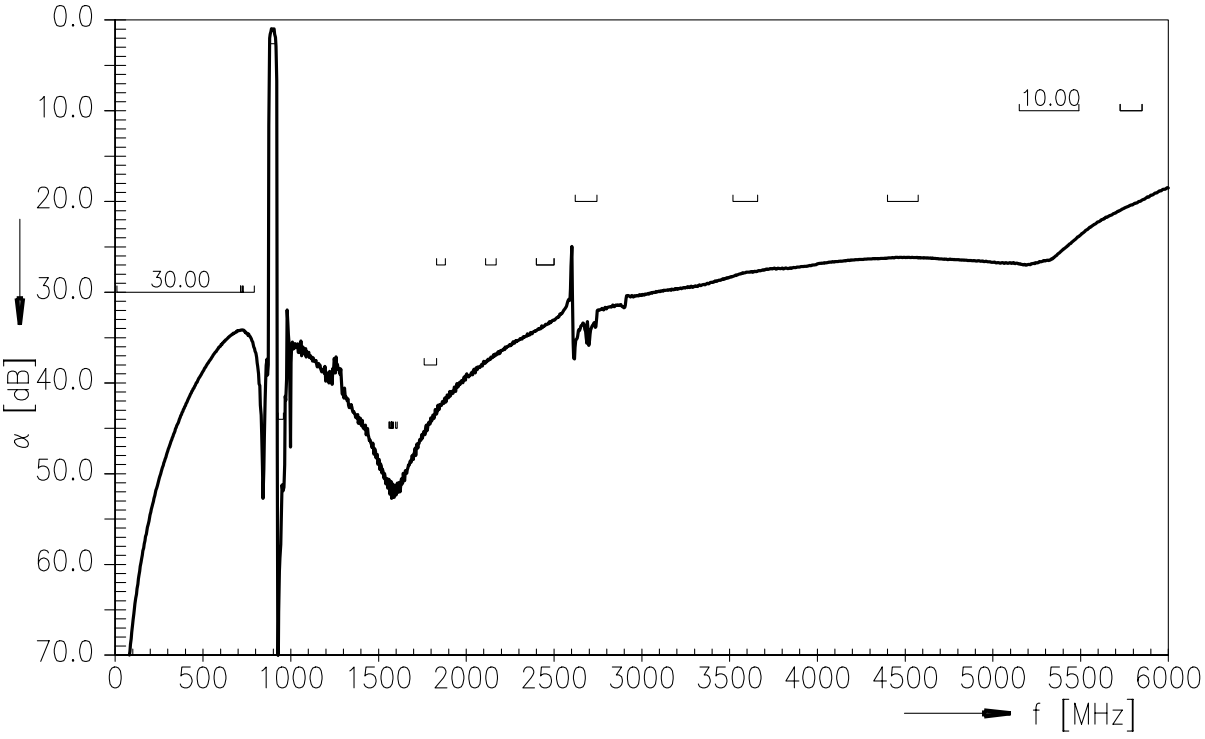
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for band 8 Rx Passband, $f_{Carrier}$ ranges from 927.4 MHz (lowest Rx channel) to 957.6 MHz (highest Rx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

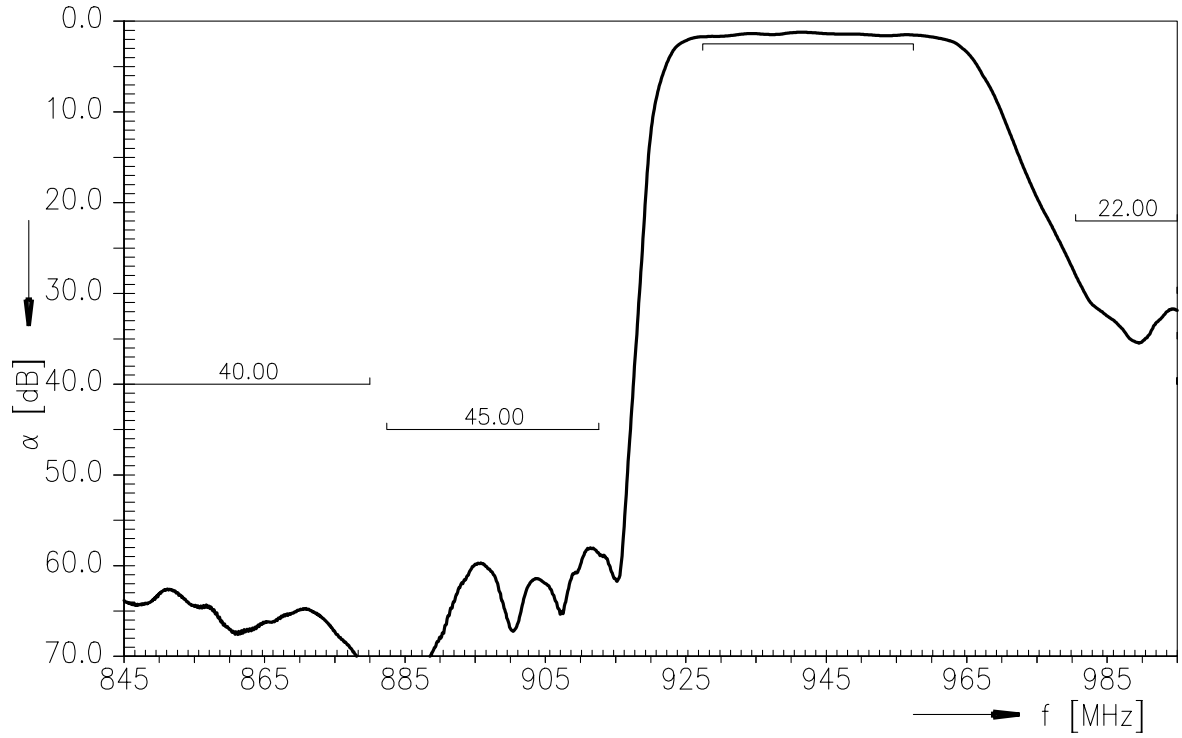
Frequency response Tx-Antenna (power transfer function)



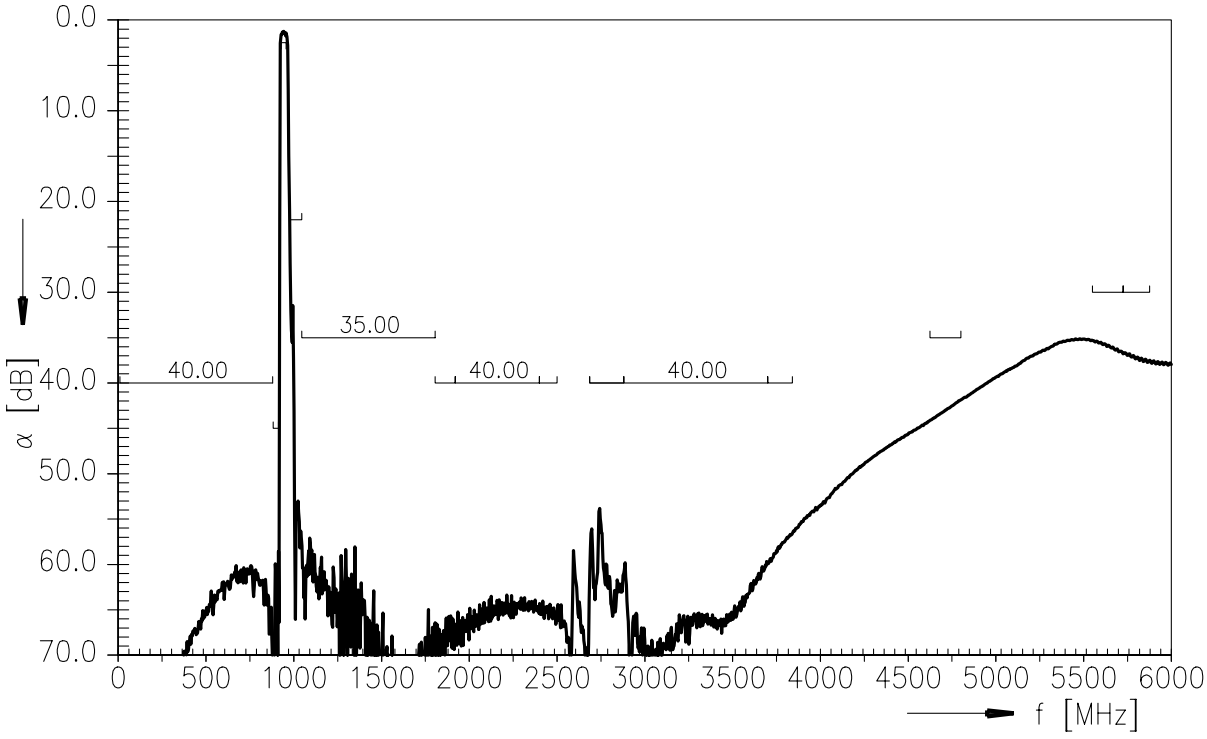
Frequency response Tx-Antenna (wideband)



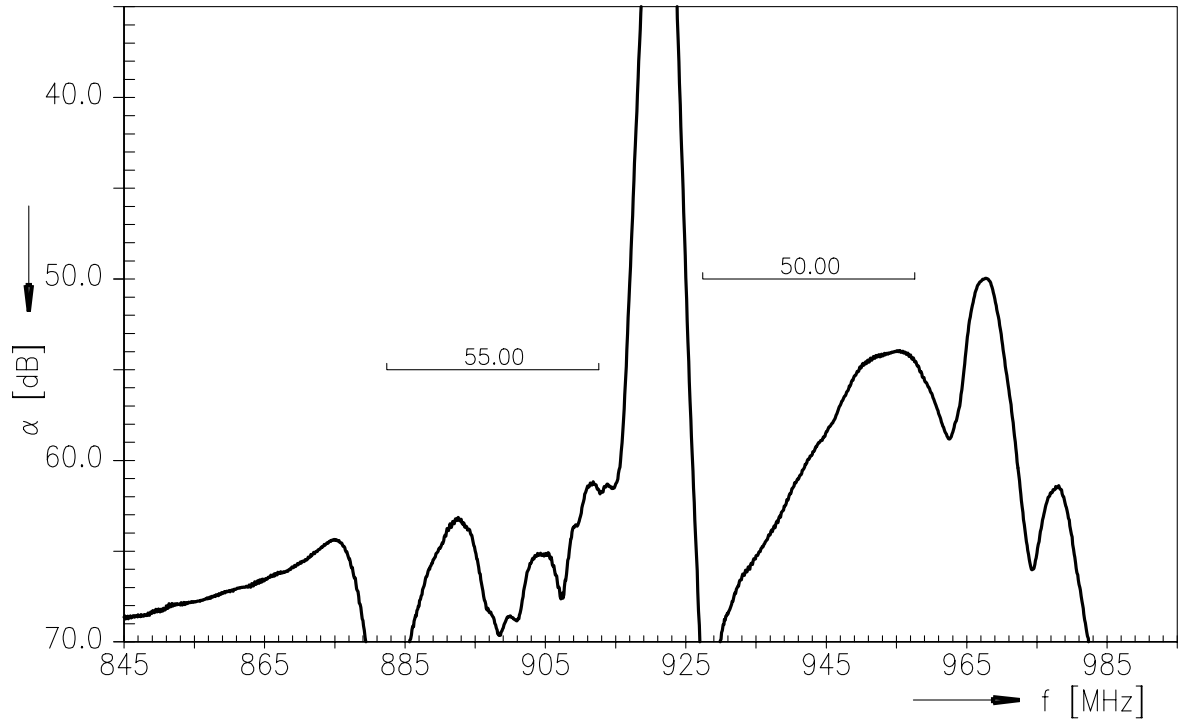
Frequency response Antenna-Rx (power transfer function)



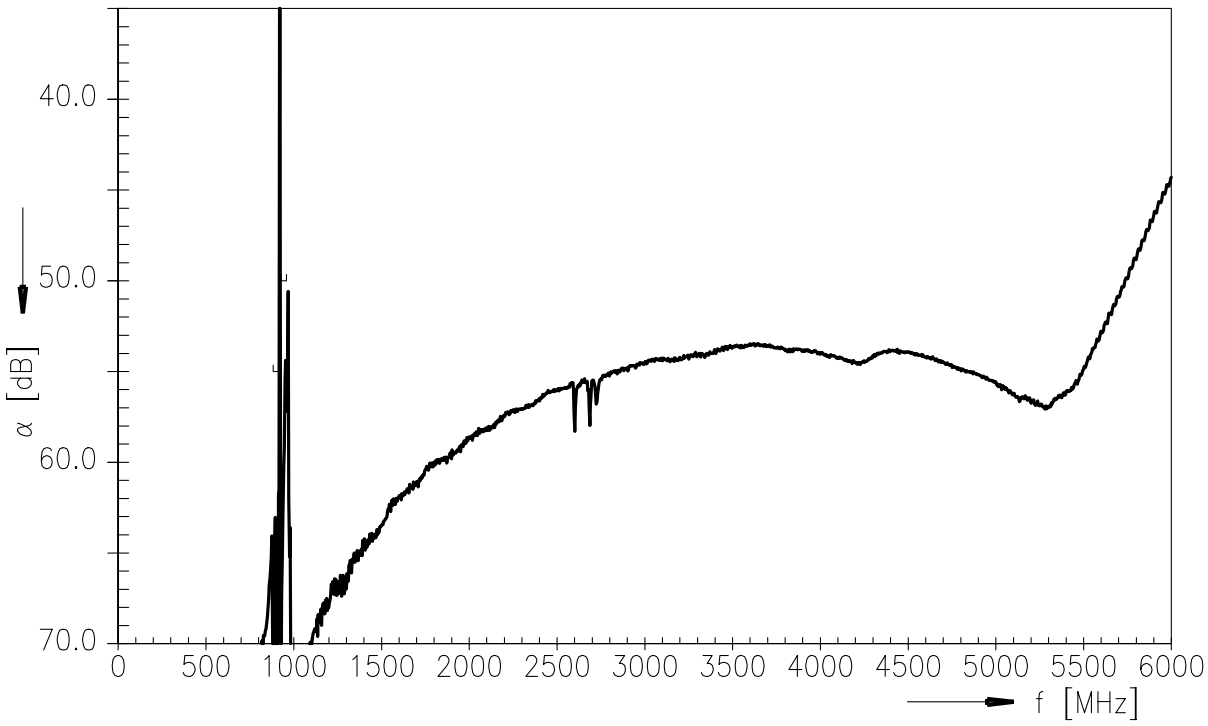
Frequency response Antenna-Rx (wideband)



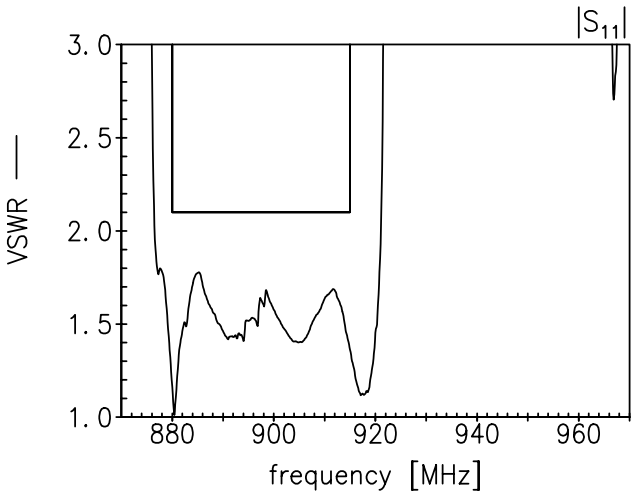
Frequency response Tx-Rx (power transfer function)

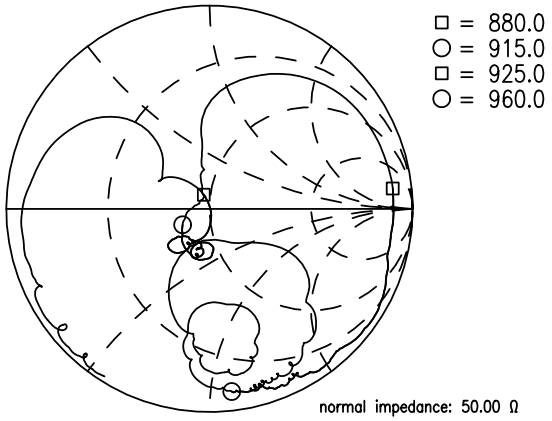


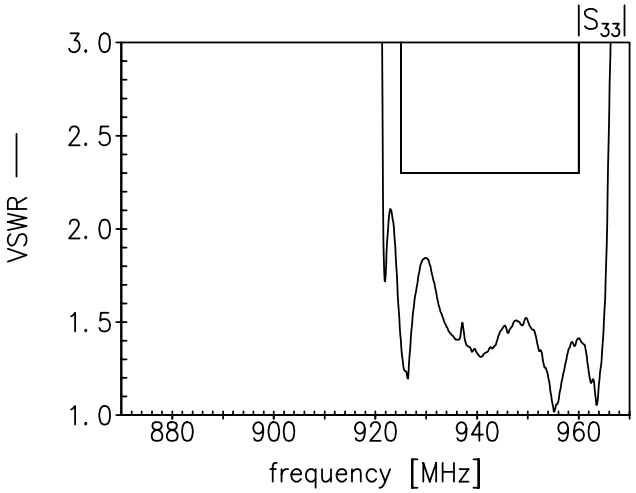
Frequency response Tx-Rx (wideband)

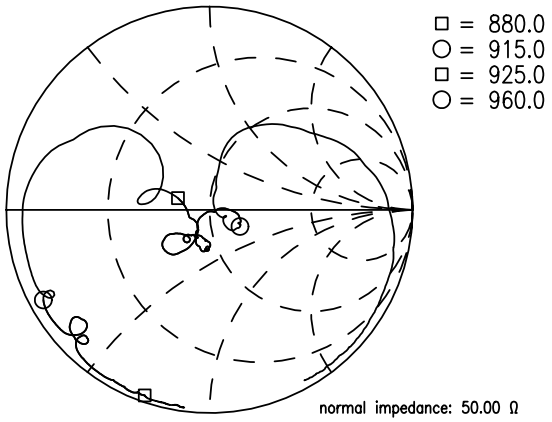


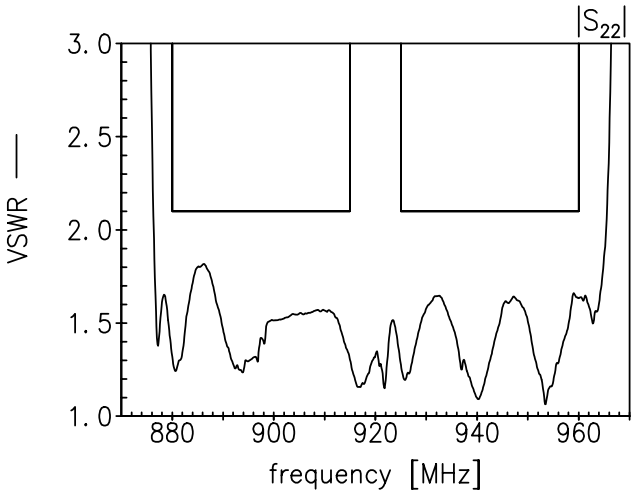
VSWR **S_{11} Tx-port** **S_{22} Antenna-port** **S_{33} Rx-portReferences**

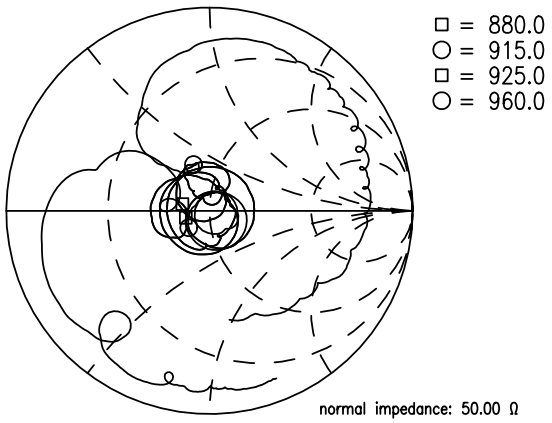












References

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

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com .

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