SAW Components

SAW duplexer

WCDMA band VIII

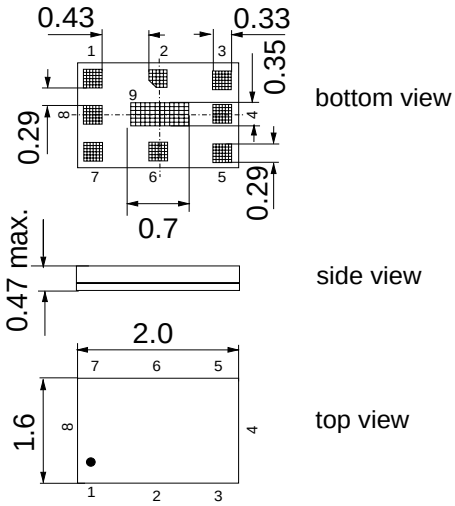
Series/type:	**B8515**
Ordering code:	**B39941B8515P810**
Date:	July 8, 2013
Version:	2.4

Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path
- high Tx - Rx isolation

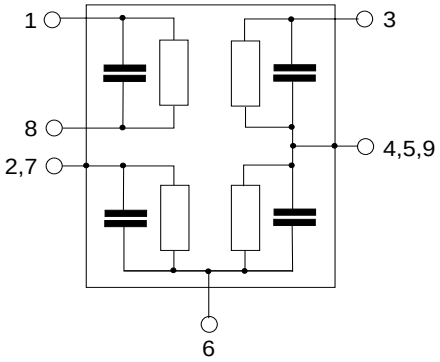
Features

- Package size 2.0 x 1.6 mm^2
- Maximum package height 0.47 mm max.
- Approximate weight 0.0051 g
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

1,8	RX output, balanced
3	TX input, single ended
6	Antenna
2,4,5,7,9	To be Grounded



Data sheet 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} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced)[1)]

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}[2)]	—	2.1	2.6	dB
	880.0	...	915.0	MHz		—	2.8	3.9	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	882.4	...	912.6	MHz	$\Delta\alpha_{WCDMA}$[2)]	—	1.2	1.8	dB
	880.0	...	915.0	MHz		—	1.2	2.9	dB
Error Vector Magnitude									
@$f_{Carrier}$	882.4	...	912.6	MHz	EVM[3)]	—	2.3	6.0	%
@$f_{Carrier}$	882.4	...	912.6	MHz	EVM[3)]	—	2.3	4.0[4)]	%
VSWR									
TX port	880.0	...	915.0	MHz		—	1.6	2.0	
ANT port	880.0	...	915.0	MHz		—	1.5	2.0	
Attenuation					α				
	0.3	...	716.0	MHz		30	37	—	dB
	716.0	...	728.0	MHz		32	36	—	dB
	728.0	...	865.0	MHz		30	35	—	dB
	865.0	...	870.0	MHz		10	37	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA}[2)]	42	50	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA}[2)]	48[4)]	50	—	dB
	1452.0	...	1477.0	MHz		20	47	—	dB
	1565.42	...	1573.374	MHz		40	47	—	dB
	1573.374	...	1577.466	MHz		40	46	—	dB
	1577.466	...	1585.42	MHz		40	46	—	dB
	1597.55	...	1605.89	MHz		40	45	—	dB
	1670.0	...	1675.0	MHz		25	45	—	dB
	1760.0	...	1830.0	MHz		35	43	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (9) for recommendation.
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).
3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
4) T=5˚C to +85˚C

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} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced)[1)]

Characteristics Tx - Ant			min.	typ. @ 25 ˚C	max.	
Attenuation		α				
1830.0	... 1880.0	MHz	27	38	—	dB
2110.0	... 2170.0	MHz	27	36	—	dB
2400.0	... 2500.0	MHz	28	32	—	dB
2620.0	... 2640.0	MHz	22	28	—	dB
2640.0	... 2745.0	MHz	25	32	—	dB
3520.0	... 3660.0	MHz	20	26	—	dB
4400.0	... 4575.0	MHz	20	26	—	dB
5100.0	... 5490.0	MHz	15	22	—	dB
5490.0	... 5850.0	MHz	10	16	—	dB

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ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced)[1)]

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} [2)]	—	2.0	2.5	dB
	925.0	...	960.0	MHz		—	2.5	3.7	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ [2)]	—	0.6	1.2	dB
	925.0	...	960.0	MHz		—	1.0	2.3	dB
Error Vector Magnitude									
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM [3)]	—	2.7	8.0	%
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM [3)]	—	2.7	4.0 [4)]	%
VSWR									
RX port	925.0	...	960.0	MHz		—	1.6	2.1	
ANT port	925.0	...	960.0	MHz		—	1.6	2.0	
Attenuation					α				
	0.3	...	462.0	MHz		35	62	—	dB
	462.0	...	480.0	MHz		45	62	—	dB
	480.0	...	835.0	MHz		38	62	—	dB
	835.0	...	870.0	MHz		50	62	—	dB
	870.0	...	880.0	MHz		38	62	—	dB
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} [2)]	50	58	—	dB
	980.0	...	1045.0	MHz		16	36	—	dB
	1045.0	...	2400.0	MHz		35	58	—	dB
	2400.0	...	2500.0	MHz		45	58	—	dB
	2500.0	...	4810.0	MHz		35	55	—	dB
	5100.0	...	5825.0	MHz		35	54	—	dB
Common Mode Rejection Ratio					α				
	925.0	...	960.0	MHz		23	28	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (9) for recommendation.
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).
3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
4) T=5˚C to +85˚C

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} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced)[1)]

Charcteristics Rx - Ant			min.	typ. @ 25 ˚C	max.	
IMD product level limits[2)]						
at f_{TX} = 897.5MHz, f_{RX} = 942.5MHz						
Blocker 1	45.0	MHz	—	-126	-110	dBm
Blocker 2	852.5	MHz	—	-110	-100	dBm
Blocker 3	1840.0	MHz	—	-110	-100	dBm
Blocker 4	2737.5	MHz	—	-110	-100	dBm

1) Appropriate matching network has to be applied towards PA and LNA. See page (9) for recommendation.
2) Power levels: 21.5 dBm Tx signal, -15dBm blocker at antenna port.

Charcteristics Tx - Rx					min.	typ. @ 25 ˚C	max.	
Differential Mode Isolation								
@$f_{Carrier}$	882.4 ...	912.6	MHz	α_{WCDMA}[2)]	56	63	—	dB
@$f_{Carrier}$	927.4 ...	957.6	MHz	α_{WCDMA}[2)]	50	58	—	dB
Common Mode Isolation								
@$f_{Carrier}$	882.4 ...	912.6	MHz	α_{WCDMA}[2)]	55	63	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (9) for recommendation.
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).

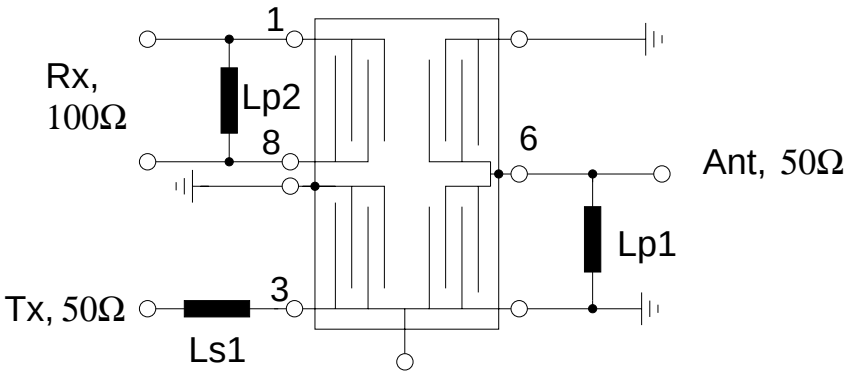
Maximum ratings

Storage temperature range	T_{stg}	–40/+85[1)]	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[2)]	V	machine model, 10 pulses
ESD voltage	V_{ESD}	300[3)]	V	HBM,+/- 1 pulses
ESD voltage	V_{ESD}	600[4)]	V	CDM,+/- 3 pulses
Input power at	P_{IN}			
880.0 ... 915.0 MHz		29	dBm	} WCDMA signal 55 °C, 10000 h
elsewhere		10	dBm	

1) Extended upperlimit: 168@125°C acc. to IEC 60068-2-2 Bb.
2) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.
3) acc. to JESD22-A114F (human body model), 1 negative & 1 positive pulses.
4) acc. to JESD22-A101C (charge device model), 3 negative & 3 positive pulse

Matching circuit to terminating impedances

(element values depend upon pcb layout)

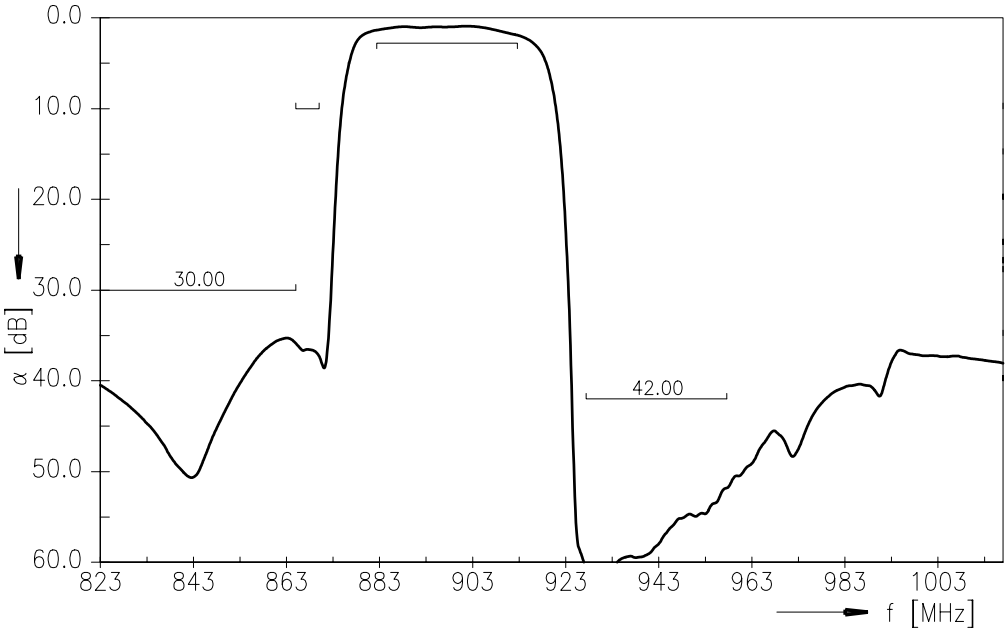


Lp1 = 5.6nH

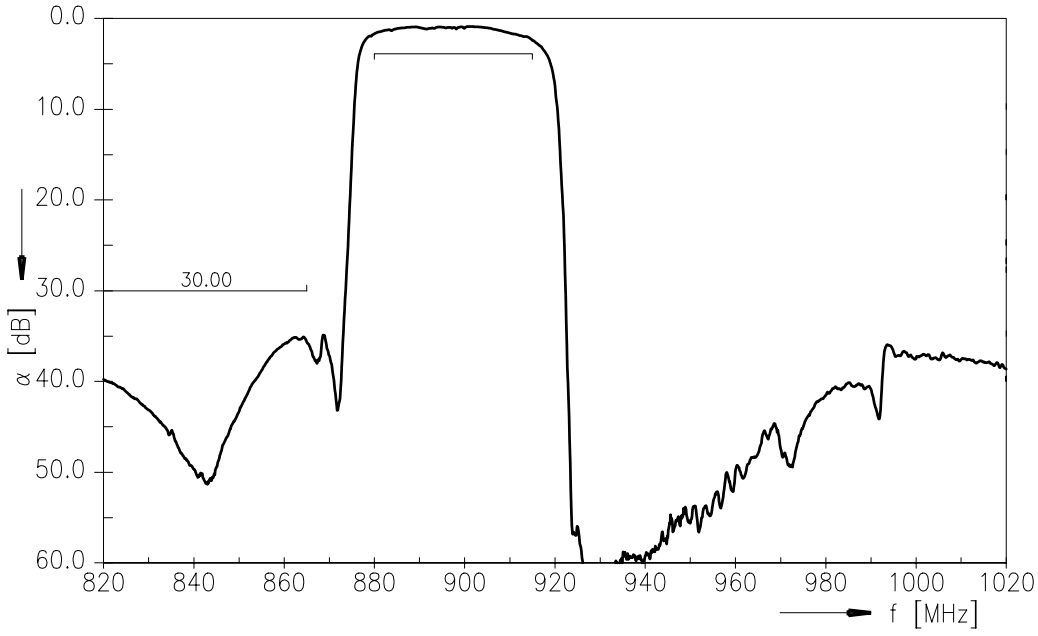
Lp2 = 82.0nH

Ls1 = 1.0nH

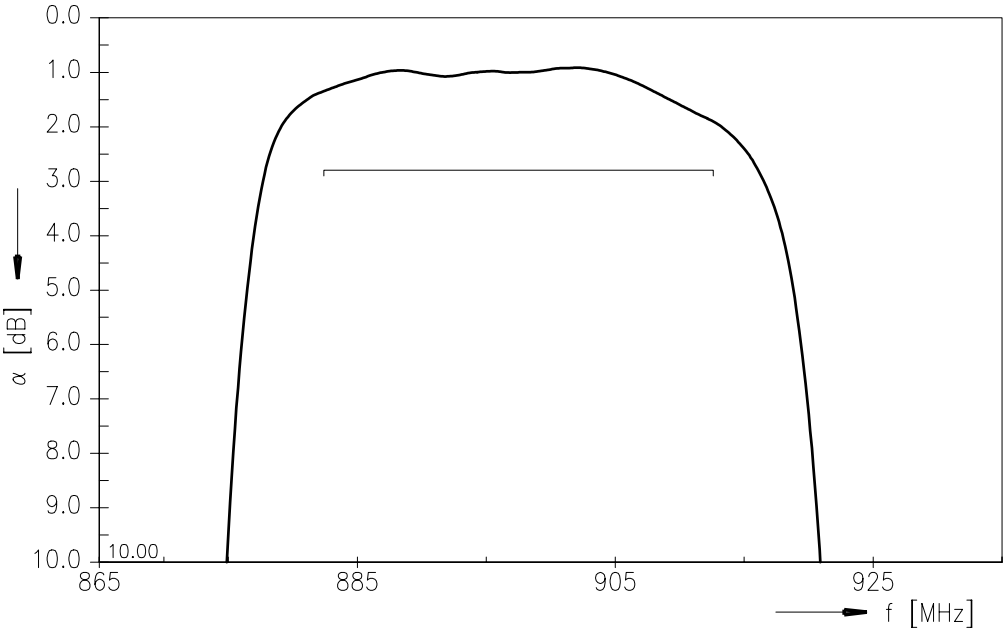
Frequency Response TX-ANT (Power transfer function)



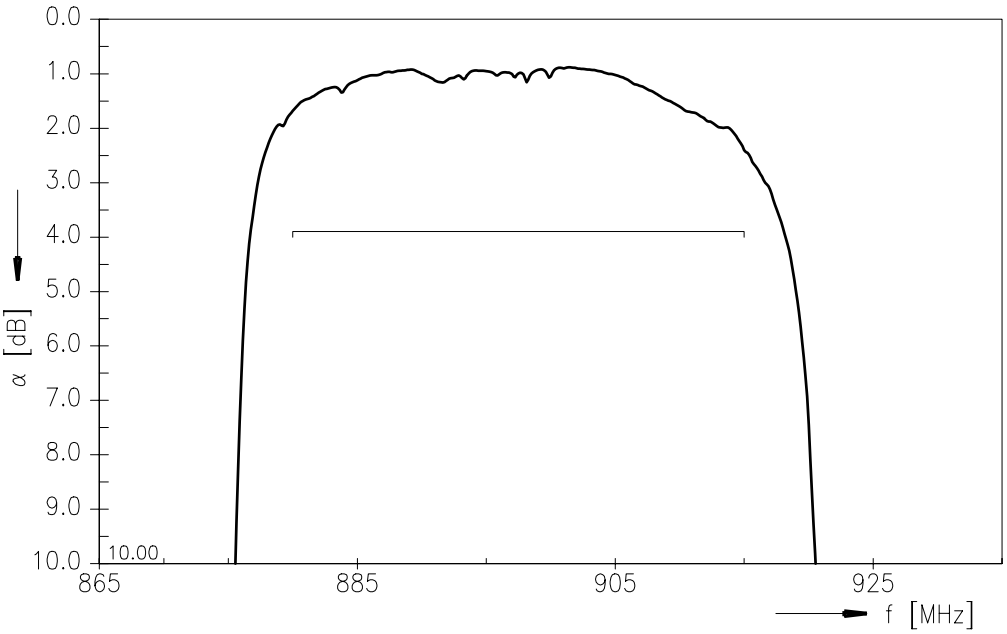
Frequency Response TX-ANT (CW test signal)



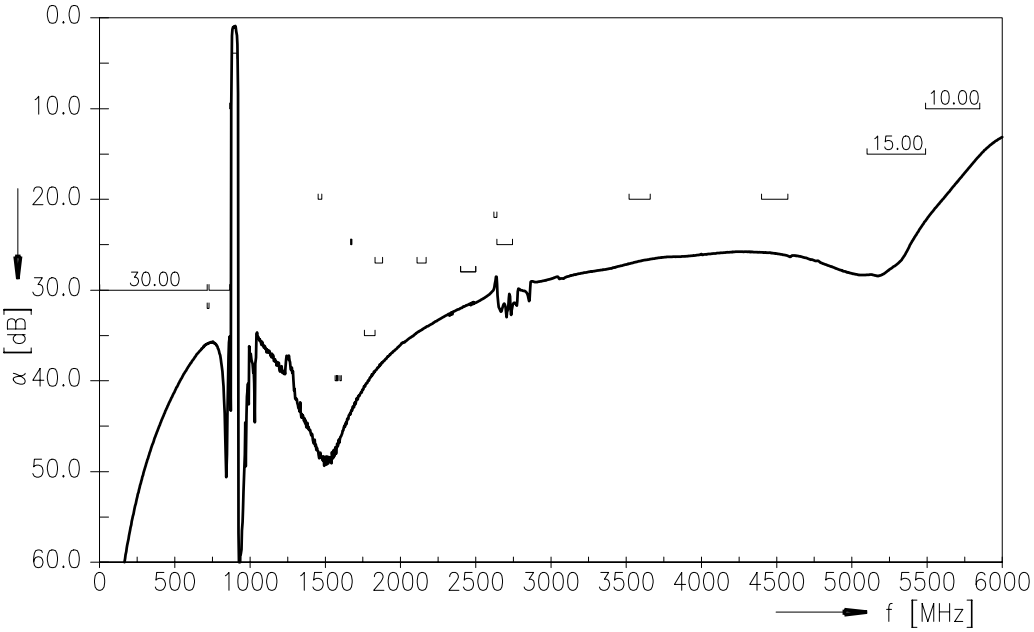
Frequency Response TX-ANT (Passband, power transfer function)



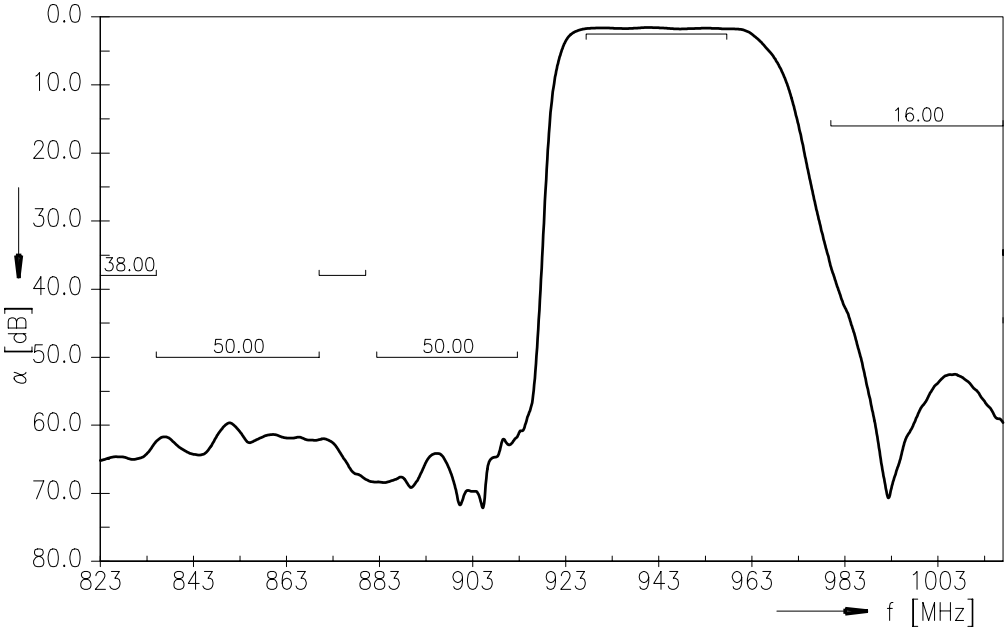
Frequency Response TX-ANT (Passband, CW test signal)



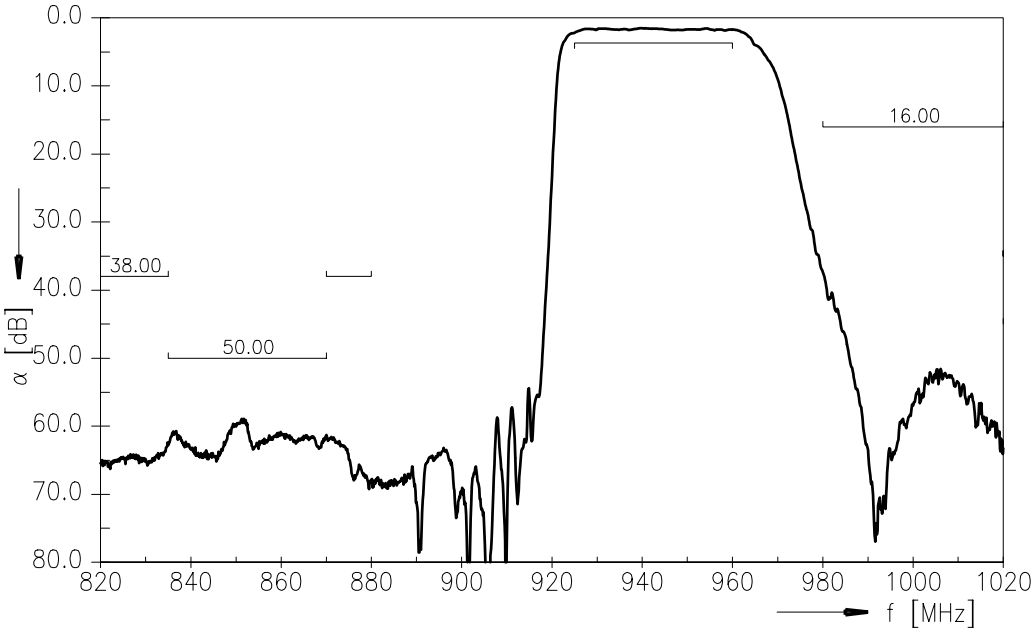
Frequency Response TX-ANT (wideband)



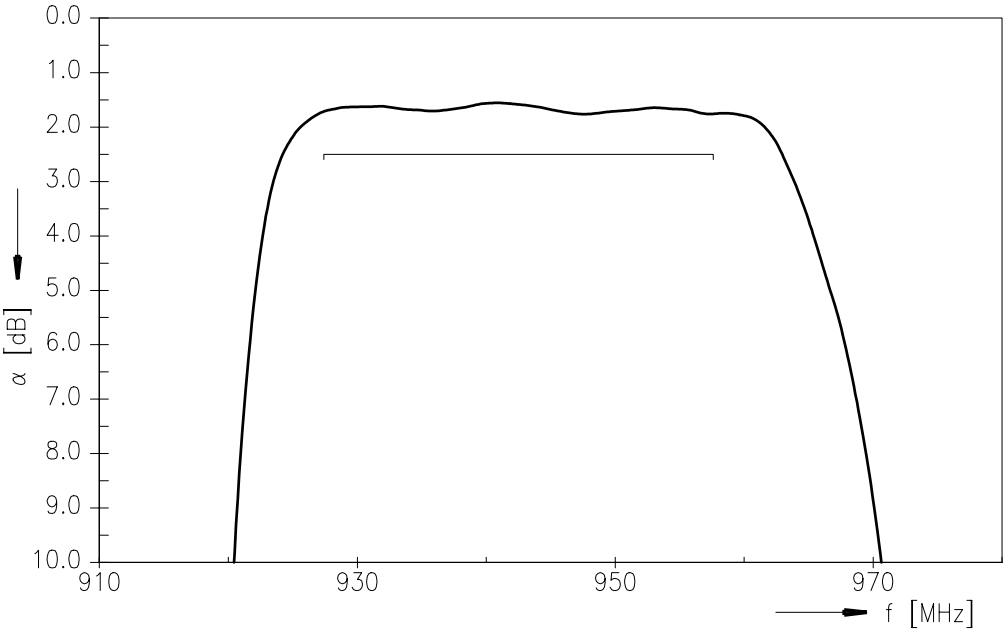
Frequency Response ANT- RX (Power transfer function)



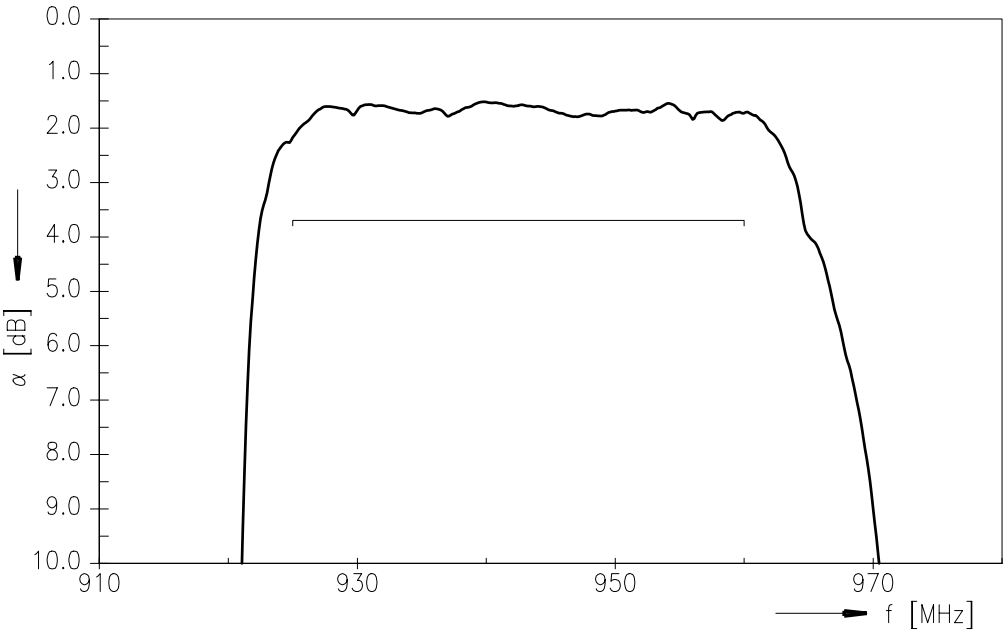
Frequency Response ANT- RX (CW test signal)



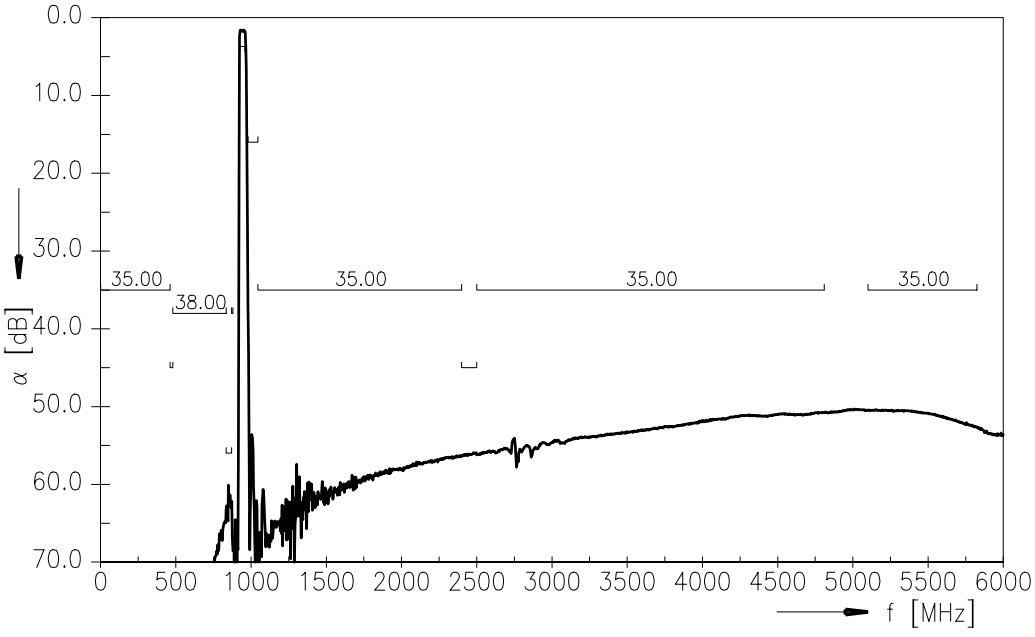
Frequency Response ANT- RX (Passband, power transfer function)



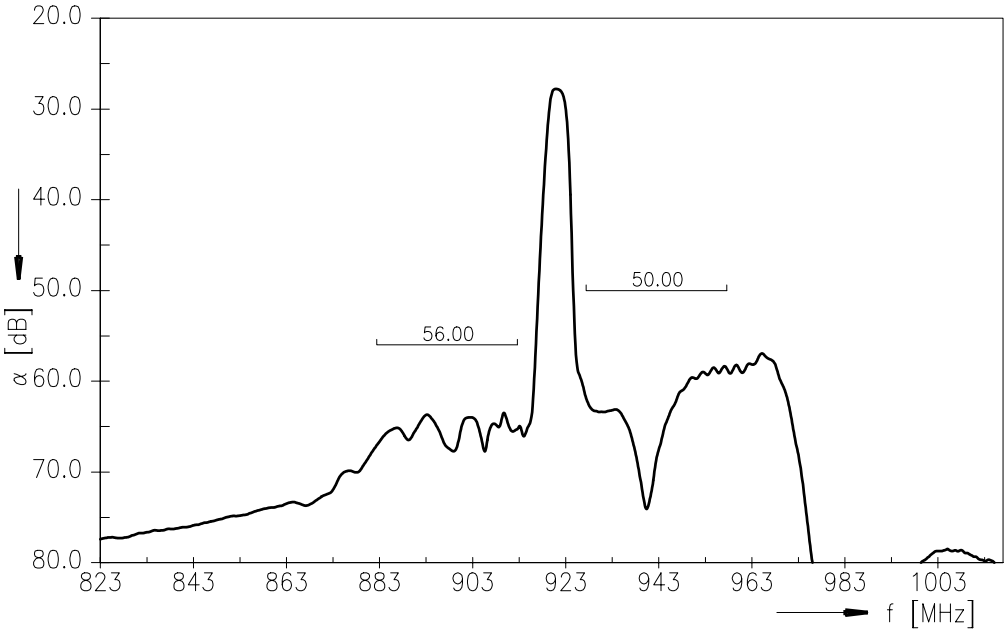
Frequency Response ANT- RX (Passband, CW test signal)



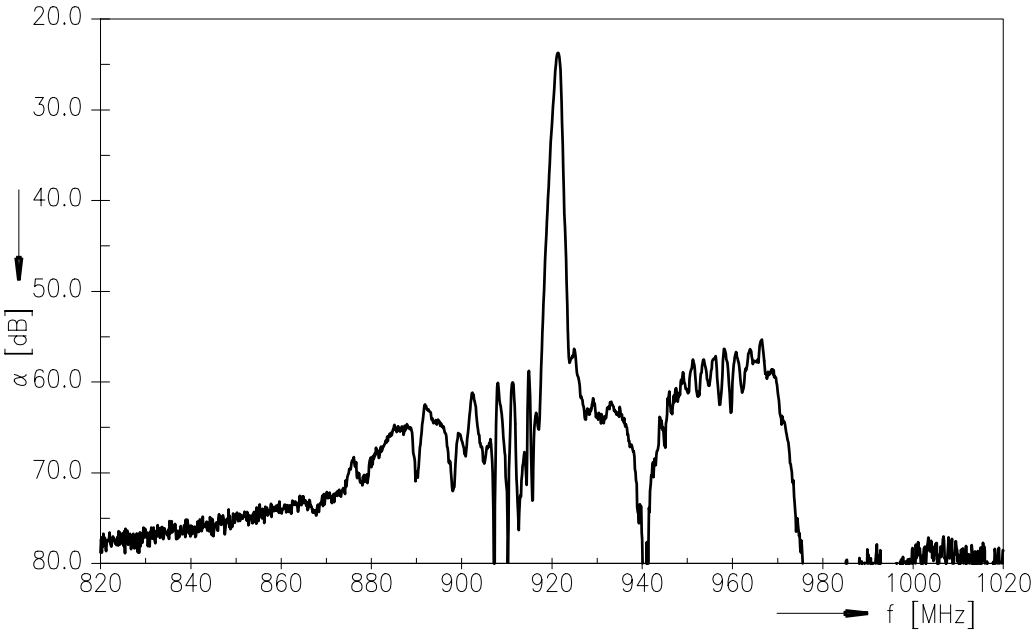
Frequency Response ANT - RX (wideband)



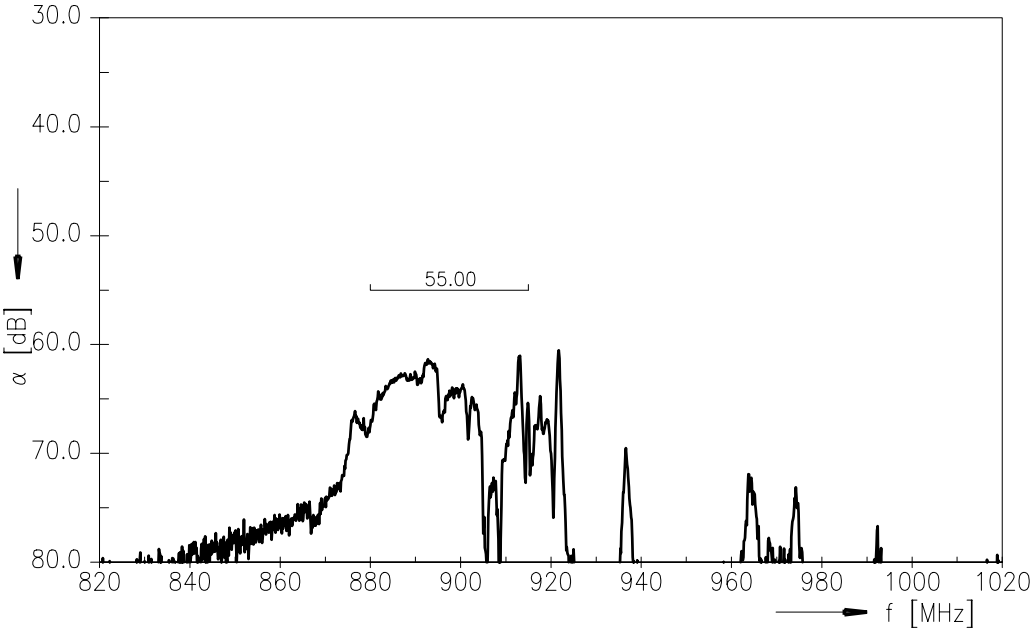
Frequency Response TX - RX (Power transfer function, differential mode)



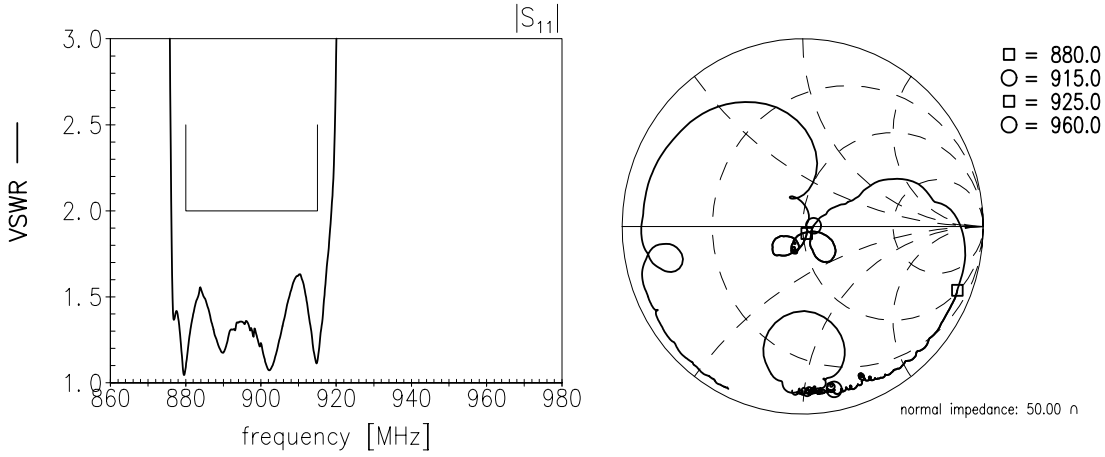
Frequency Responce TX-RX (differential, CW signal)

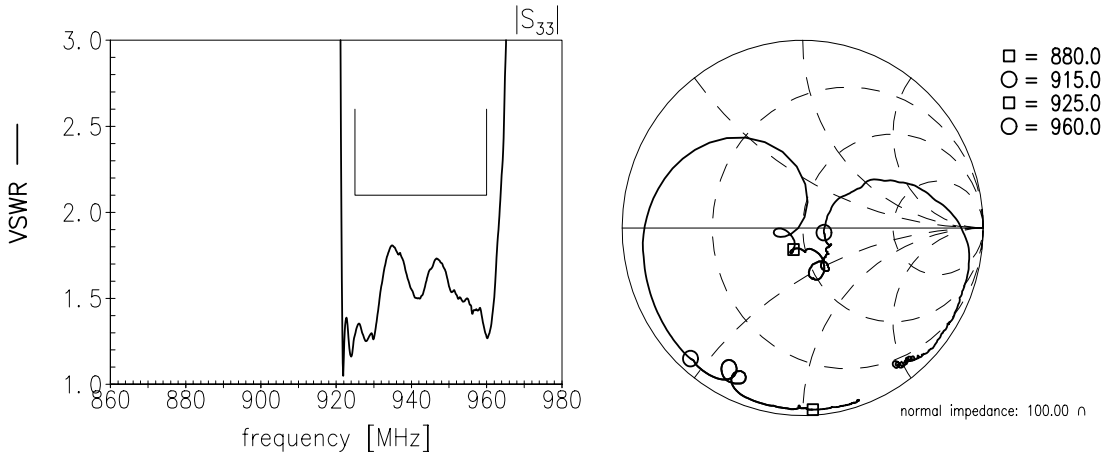


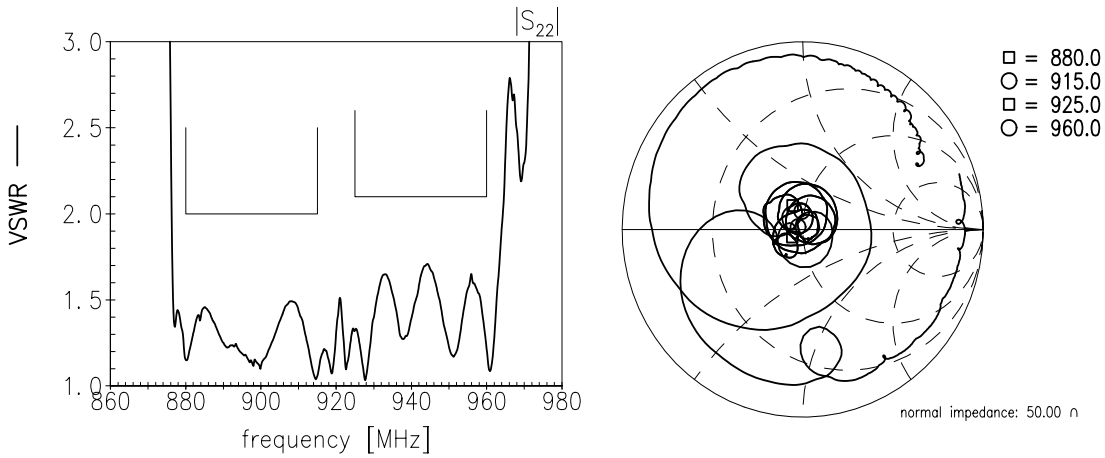
Frequency Response TX - RX (common mode, CW signal)



Matching (TX, RX, ANT)







References

Type	B8515
Ordering code	B39941B8515P810
Marking and package	C61157-A8-A38
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8515_NB_UN.s4p, B8515_WB_UN.s4p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	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 maximum concentration values for certain hazardous substances in electrical and electronic equipment."
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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