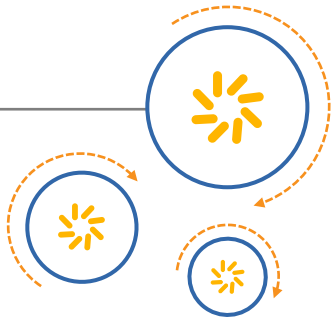
RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW Components

SAW duplexer

WCDMA band VIII

Series/type:	B8521
Ordering code:	B39941B8521P810
Date:	November 26, 2014
Version:	2.0

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SAW Components

SAW duplexer

WCDMA band VIII

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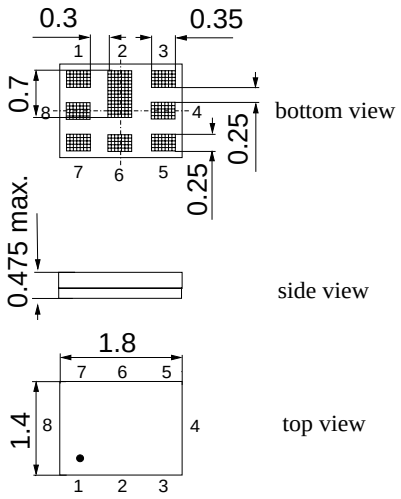
Application

- 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

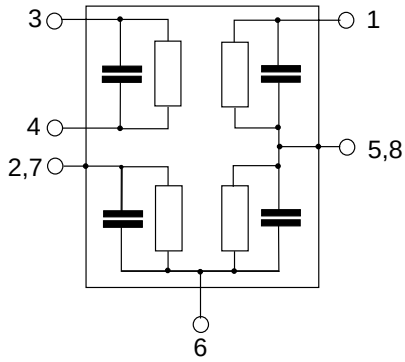
Features

- Package size 1.8 x 1.4 mm², max package height 0.475 mm.
- RoHS compatible
- approx. weight 0.0042g
- 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	TX input, single ended
■	3,4	RX output, balanced
■	6	Antenna
■	2,5,7,8	To be Grounded



Characteristics

Temperature range for specification: T = –20 ˚C to +90 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)

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)	—	2.1	2.8	dB
	880.0	... 915.0	MHz		—	2.8	3.9	dB
	880.24	... 914.76	MHz		—	2.7	3.8	dB
Amplitude ripple (p-p)								
@$f_{Carrier}$	882.4	... 912.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	1.2	1.8	dB
Error Vector Magnitude								
@$f_{Carrier}$	882.4	... 912.6	MHz	EVM 2)	—	2.1	6.0	%
VSWR								
TX port	880.0	... 915.0	MHz		—	1.7	2.1	
ANT port	880.0	... 915.0	MHz		—	1.7	2.1	
Attenuation				α				
	0.3	... 716.0	MHz		30	37	—	dB
	716.0	... 728.0	MHz		32	37	—	dB
	728.0	... 821.0	MHz		30	35	—	dB
@$f_{Carrier}$	927.4	... 957.6	MHz	α_{WCDMA} 1)	42	48	—	dB
	925.0	... 960.0	MHz		38 3)	48	—	dB
	925.24	... 959.76	MHz		41 3)	48	—	dB
	1565.42	... 1573.374	MHz		37	45	—	dB
	1573.374	... 1577.466	MHz		37	45	—	dB
	1577.466	... 1585.42	MHz		37	44	—	dB
	1597.55	... 1605.89	MHz		37	43	—	dB
	1760.0	... 1830.0	MHz		32	38	—	dB
	1830.0	... 1880.0	MHz		27	33	—	dB
	2110.0	... 2170.0	MHz		27	32	—	dB
	2400.0	... 2500.0	MHz		28	33	—	dB
	2620.0	... 2745.0	MHz		22	27	—	dB
	3520.0	... 3660.0	MHz		20	26	—	dB
	4400.0	... 4575.0	MHz		20	30	—	dB
	5150.0	... 5490.0	MHz		15	18	—	dB
	5725.0	... 5850.0	MHz		10	16	—	dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
3) T=0˚C to +90˚C

Characteristics

Temperature range for specification: T = –20 ˚C to +90 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)

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)	—	2.0	2.5	dB
	925.0	...	960.0	MHz		—	2.5	3.7	dB
	925.24	...	959.76	MHz		—	2.5	3.5	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ 1)	—	0.6	1.2	dB
Error Vector Magnitude									
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM 2)	—	2.7	6.0	%
VSWR									
RX port	925.0	...	960.0	MHz		—	1.8	2.1	
ANT port	925.0	...	960.0	MHz		—	1.8	2.1	
Attenuation					α				
	0.3	...	880.0	MHz		35	62	—	dB
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} 1)	50	58	—	dB
	880.0	...	915.0	MHz		46	56	—	dB
	1045.0	...	4810.0	MHz		35	58	—	dB
	1850.0	...	1920.0	MHz		40	58	—	dB
	2400.0	...	2484.0	MHz		45	58	—	dB
	2775.0	...	2880.0	MHz		45	60	—	dB
Common Mode Rejection Ratio					α				
	925.0	...	960.0	MHz		25	33	—	dB
IMD product level limits 3)									
at f_{TX} = 897.5MHz, f_{RX} = 942.5MHz									
Blocker 1			45.0	MHz		—	-127	-115	dBm
Blocker 2			852.5	MHz		—	-111	-100	dBm
Blocker 3			1840.0	MHz		—	-110	-100	dBm
Blocker 4			2737.5	MHz		—	-110	-100	dBm

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
3) Power levels: 21dBm Tx signal, -15dBm blocker at antenna port

Data Sheet SMD

Characteristics

Temperature range for specification: T = –20 ˚C to +90 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 5.6nH
TX terminating impedance: Z_{TX} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)

Charcteristics Tx - Rx					min.	typ. @ 25 ˚C	max.	
Differential Mode Isolation								
	880.0 ...	915.0	MHz		52	58	—	dB
@$f_{Carrier}$	882.4 ...	912.6	MHz	α_{WCDMA} 1)	55	60	—	dB
	925.0 ...	960.0	MHz		40 2)	56	—	dB
	925.24 ...	959.76	MHz		43 2)	56	—	dB
@$f_{Carrier}$	927.4 ...	957.6	MHz	α_{WCDMA} 1)	48	58	—	dB
Common Mode Isolation								
@$f_{Carrier}$	882.4 ...	912.6	MHz	α_{WCDMA} 1)	55	63	—	dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).
2) T=0˚C to +90˚C

Maximum ratings

Storage temperature range	T_{stg}	–40/+90[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	} continuous wave 50 °C, 5000 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

Annotation for characteristics section

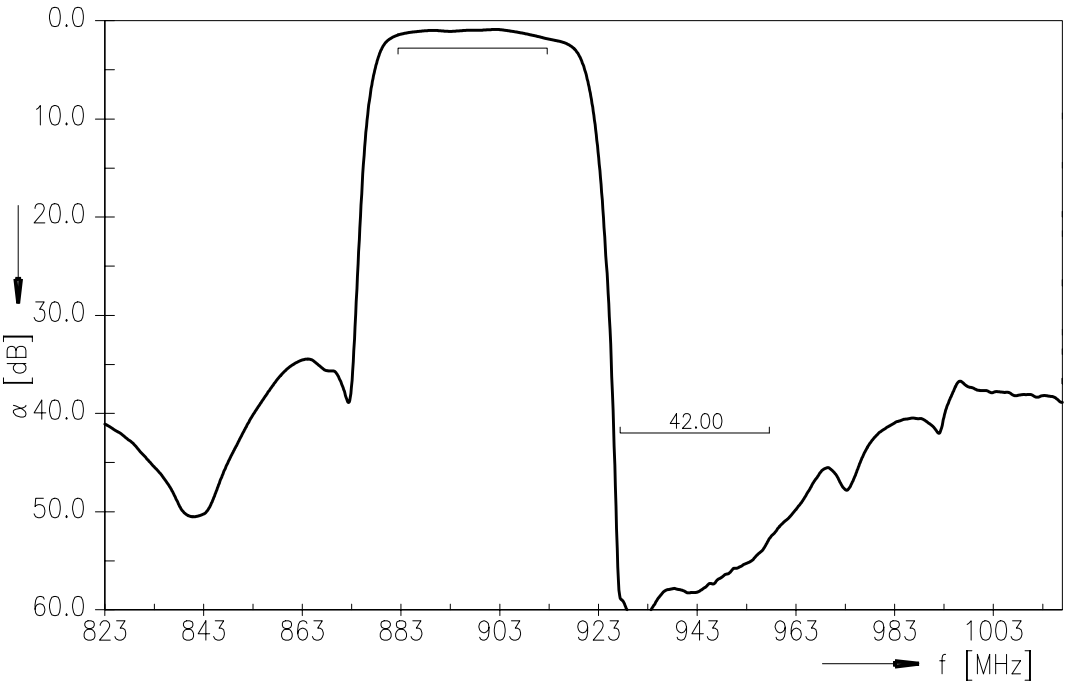
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

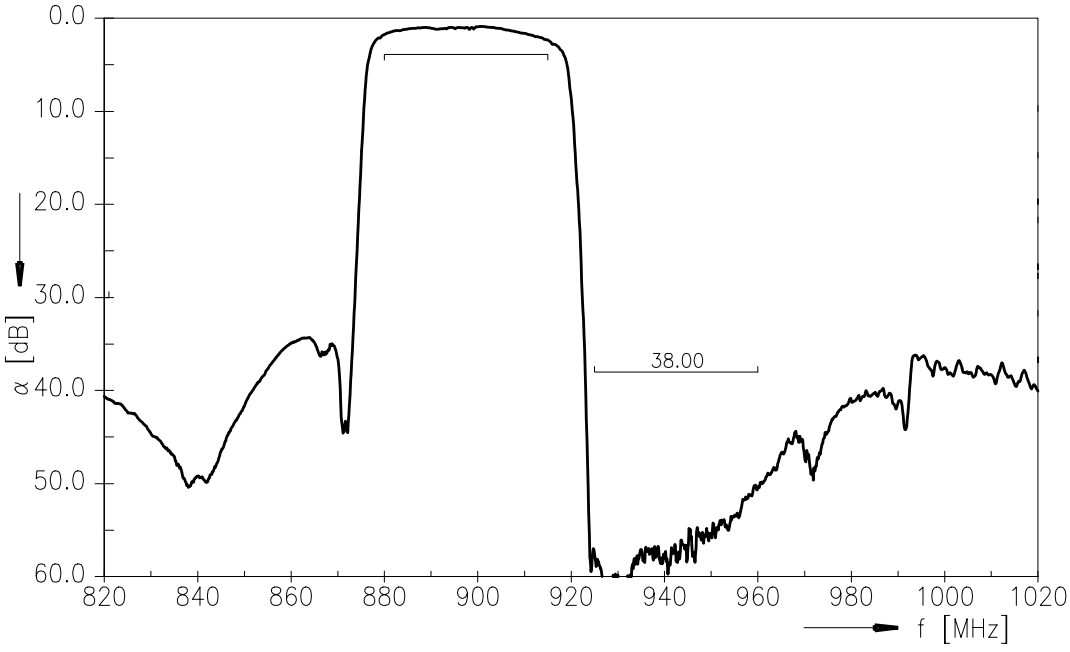
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following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

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

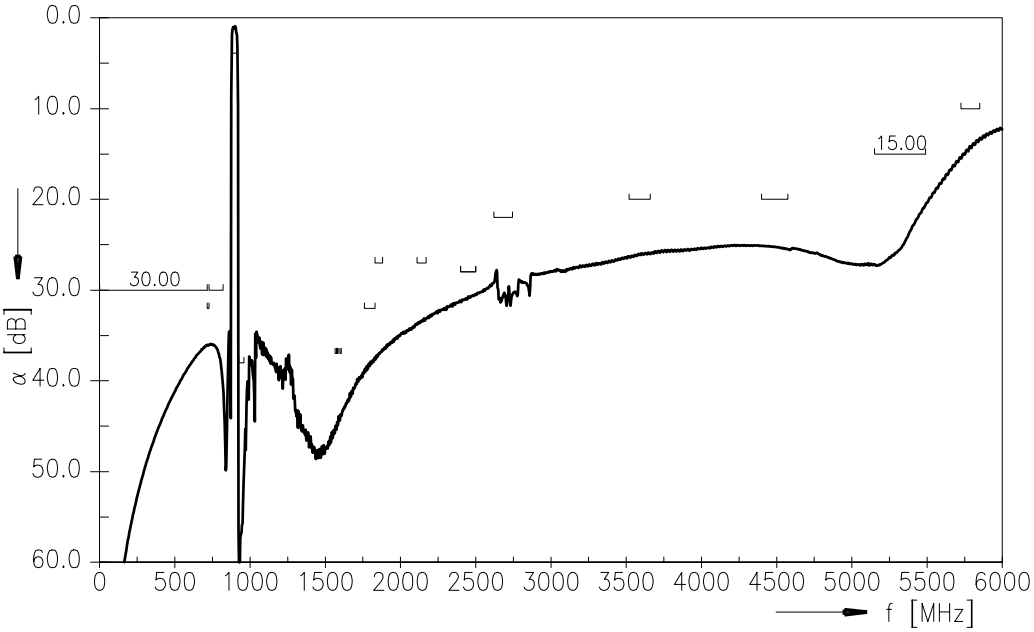
Frequency Response TX-ANT (Power transfer function)



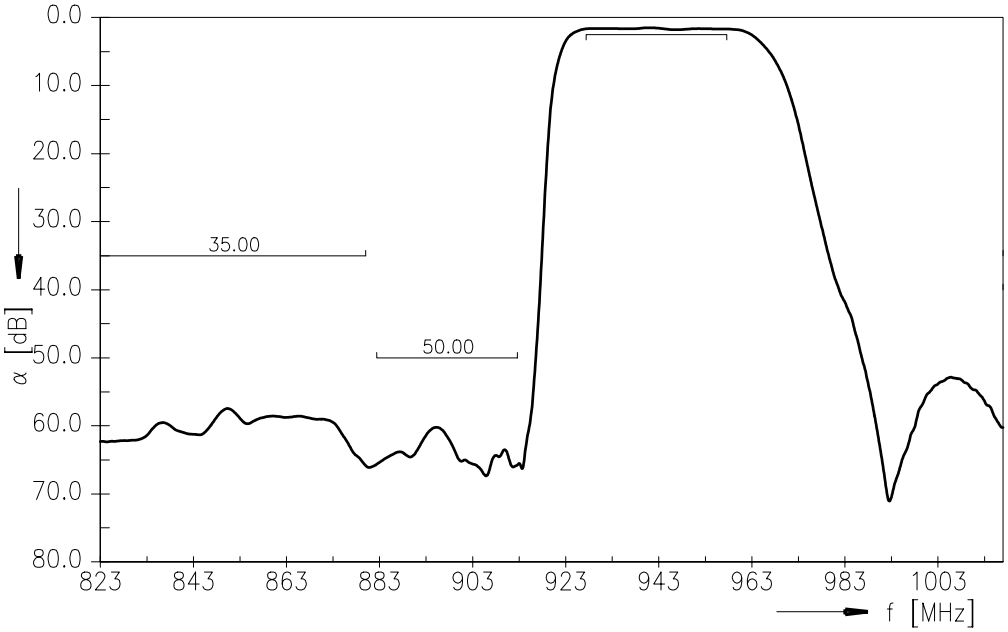
Frequency Response TX-Ant (CW test signal, specification temperature range T=0 ˚C to +90 ˚C)



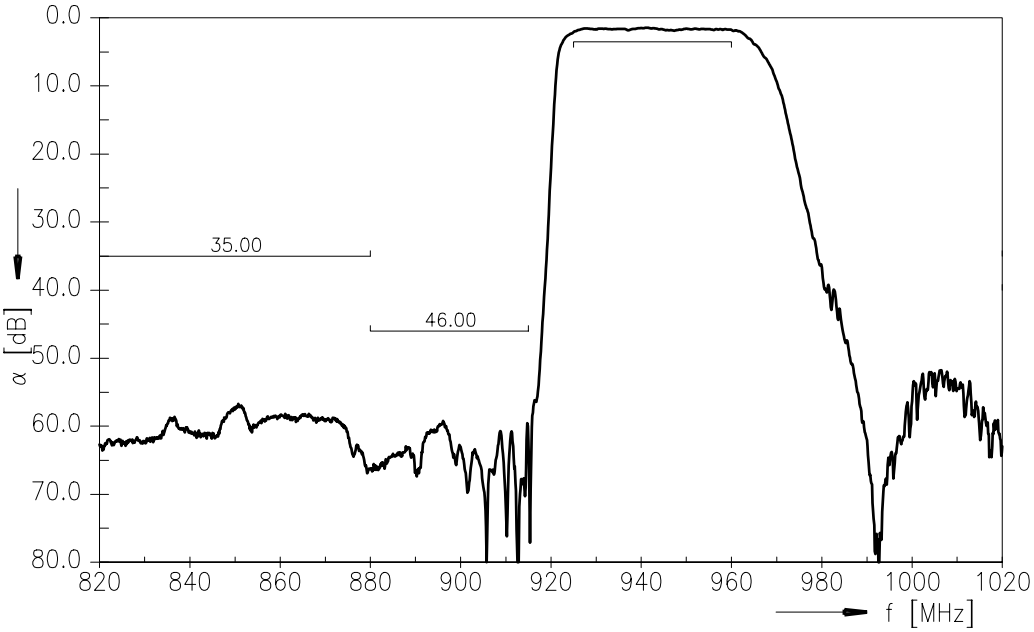
Frequency Response TX-ANT (wideband)



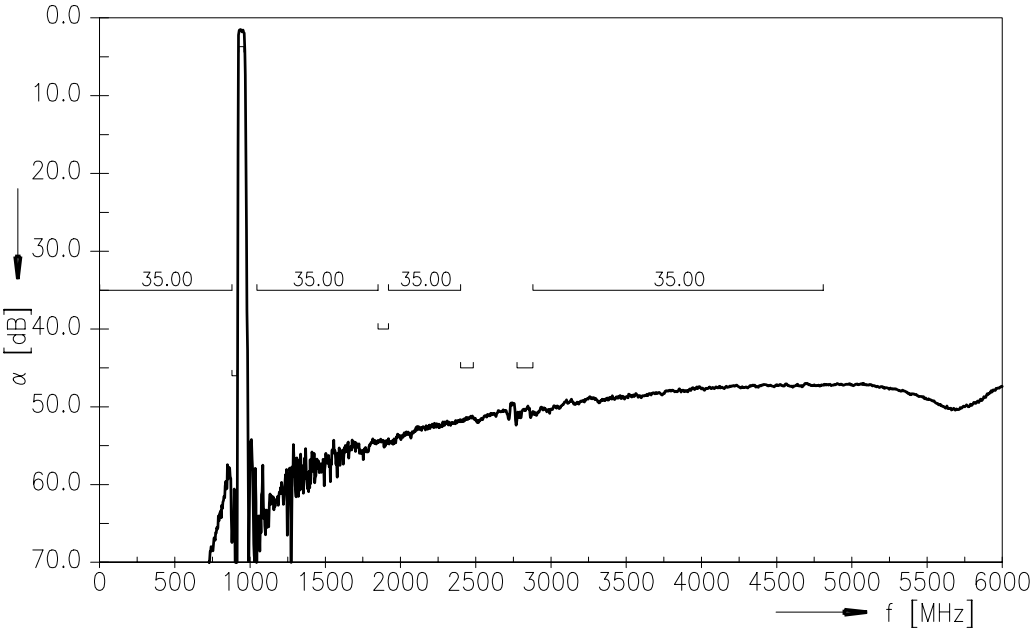
Frequency Response ANT - RX (Power transfer function)



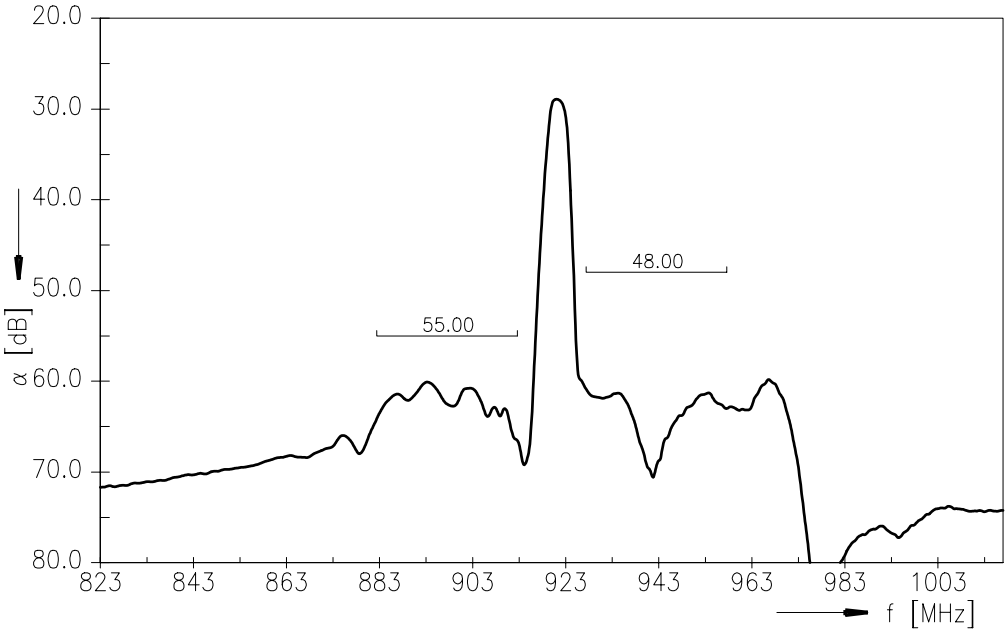
Frequency Responce (CW test signal)



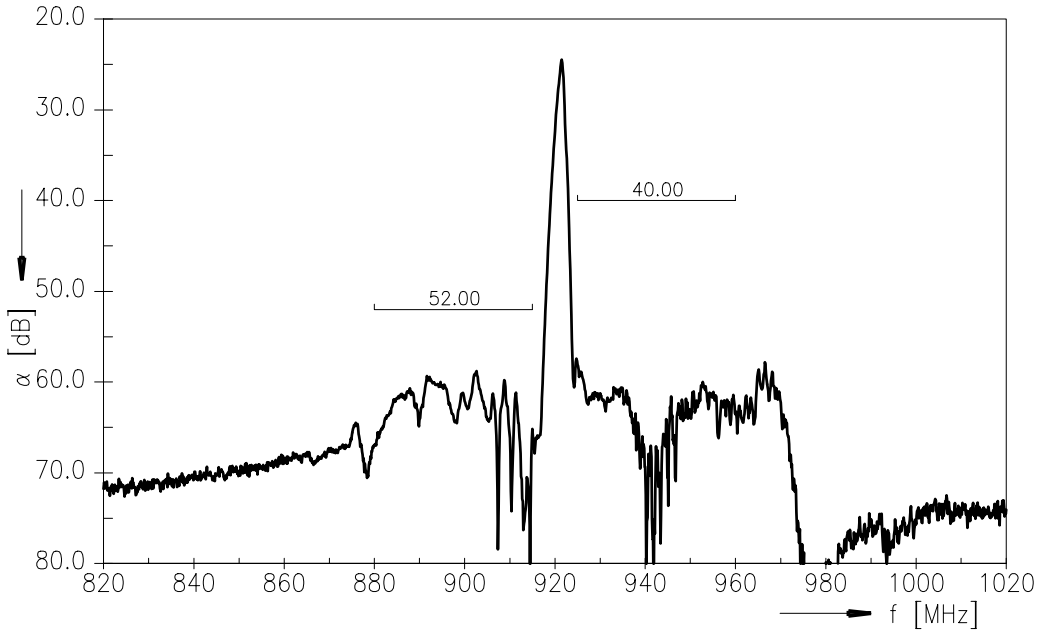
Frequency Response ANT - RX (wideband)



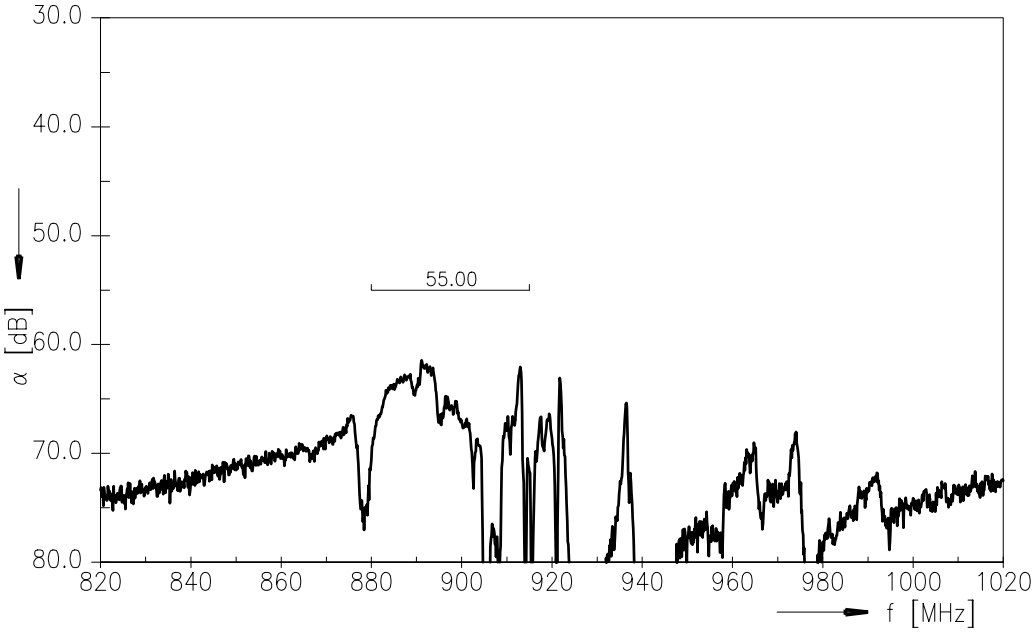
Frequency Response TX - RX (Power transfer function, differential mode)



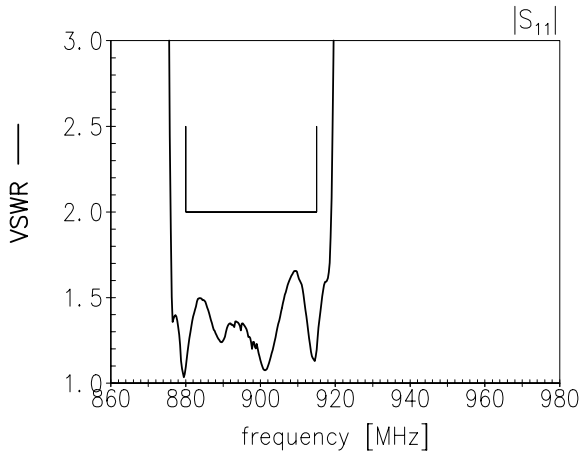
Frequency Responce TX-RX (differential, CW signal , spec temperature range T=0˚C to +90˚C)

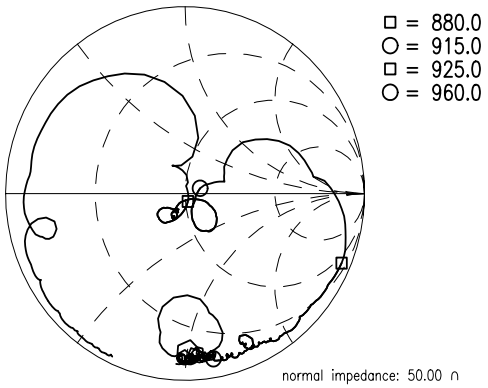


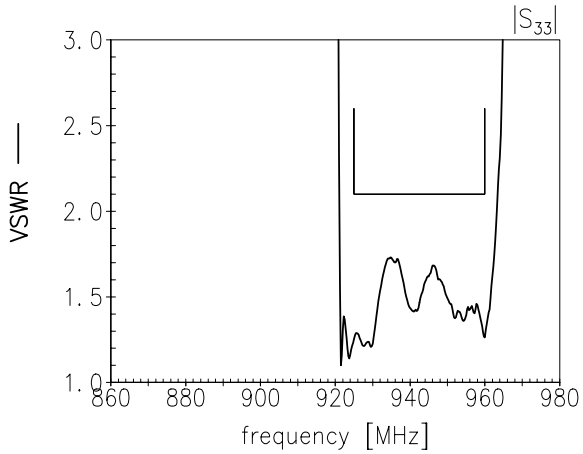
Frequency Response TX - RX (common mode, CW signal)

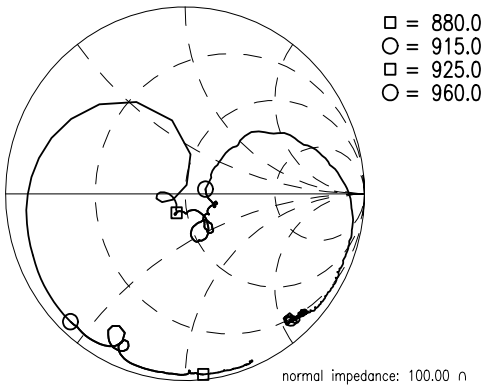


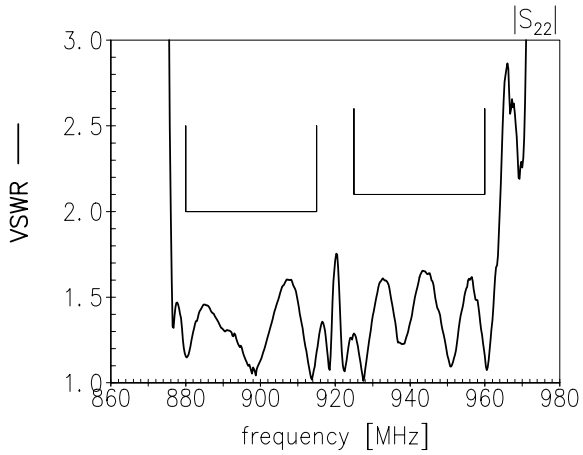
Return Loss: S_{11} Tx port S_{22} Antenna port S_{33} Rx port

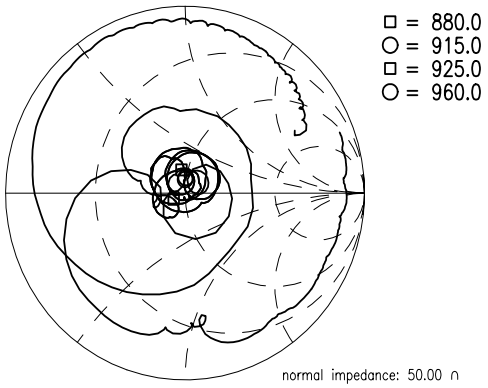












References

Type	B8521
Ordering code	B39941B8521P810
Marking and package	C61157-A8-A79
Packaging	F61047-V8247-Z000
Date codes	L_1126
S-parameters	B8521_NB_UN.s4p, B8521_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

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