SAW Components

SAW Duplexer

WCDMA Band 4/ CDMA 1x AWS Band

Series/type:	**B8517**
Ordering code:	**B39212B8517P810**
Date:	June 4, 2013
Version:	2.0

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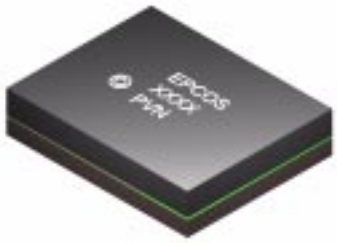
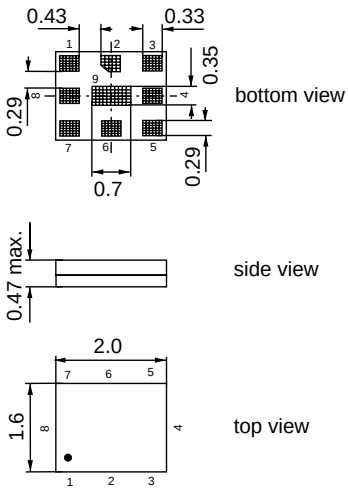
Application

- Low-loss SAW duplexer for mobile telephone W-CDMA Band 4 (UMTS) systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- High isolation between Tx and Rx



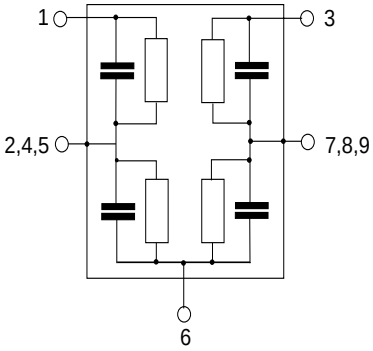
Features

- Package size 2.0 * 1.6 mm²
- max. Package height 0.47 mm
- RoHS compatible
- Approximate weight 0.005 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni terminals, Au-plated
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- Fully matched by integrated matching network
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

■	3	Tx input
■	6	Antenna
■	1	Rx output
■	2, 4, 5, 7, 8, 9	To be grounded



Characteristics for CDMA 1x AWS Band

Temperature range for specification: T = –30 ˚C to +90 ˚C
TX terminating impedance: Z_{Tx} = 50 Ω
ANT terminating impedance: Z_{Ant} = 50 Ω ll 2.4 nH
RX teminating impedance: Z_{Rx} = 50 Ω ll 5.6 nH

		B8517			
Characteristics Tx-Antenna		**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency	f_c		1732.5		MHz
Maximum insertion attenuation					
1710.0 ... 1755.0MHz			1.5	2.0	dB
@$f_{Carrier}$ 1712.4 ... 1752.6MHz	$\alpha_{W\text{-}CDMA}$ [1)]		1.4	1.9	dB
Amplitude ripple (p-p)					
1710.0 ... 1755.0MHz			0.4	1.0	dB
@$f_{Carrier}$ 1712.4 ... 1752.6MHz	$\Delta\alpha_{W\text{-}CDMA}$ [1)]		0.4	0.9	dB
Error Vector Magnitude	EVM [2)]				
@$f_{Carrier}$ 1712.4 ... 1752.6MHz			0.5	2.0	%
Input VSWR (Tx port)					
1710.0 ... 1755.0MHz			1.8	2.2	
Output VSWR (Ant Port)					
1710.0 ... 1755.0MHz			1.7	2.2	
Attenuation	α				
10.0 ... 1559.0MHz		30	47		dB
728.0 ... 764.0MHz		42	46		dB
851.0 ... 894.0MHz		39	44		dB
1559.0 ... 1563.0MHz		40	47		dB
1565.0 ... 1573.0MHz		41	48		dB
1573.0 ... 1577.0MHz		45	51		dB
1577.0 ... 1585.0MHz		42	51		dB
1598.0 ... 1606.0MHz		38	45		dB
1805.0 ... 1880.0MHz		20	47		dB
1930.0 ... 1990.0MHz		42	48		dB
2110.0 ... 2155.0MHz		42	46		dB
@$f_{Carrier}$ 2112.4 ... 2152.6MHz	$\alpha_{W\text{-}CDMA}$ [1)]	42	47		dB
2400.0 ... 2500.0MHz		32	38		dB
3420.0 ... 3510.0MHz		20	27		dB
4900.0 ... 5265.0MHz		18	28		dB
5265.0 ... 5850.0MHz		14	25		dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 6.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141

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		B8517			
Characteristics Antenna-Rx		**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency	f_c		2132.5		MHz
Maximum insertion attenuation					
2110.0 ... 2155.0MHz			1.9	2.3	
@$f_{Carrier}$ 2112.4 ... 2152.6MHz	$\alpha_{W\text{-}CDMA}$ [1)]		1.8	2.2	dB
Amplitude ripple (p-p)					
2110.0 ... 2155.0MHz			0.4	0.9	
@$f_{Carrier}$ 2112.4 ... 2152.6MHz	$\Delta\alpha_{W\text{-}CDMA}$ [1)]		0.4	0.8	dB
Error Vector Magnitude	EVM [2)]				
@$f_{Carrier}$ 2112.4 ... 2152.6MHz			0.5	2.0	%
Input VSWR					
2110.0 ... 2155.0MHz			1.4	1.8	
Output VSWR					
2110.0 ... 2155.0MHz			1.4	1.8	
Attenuation	α				
1.0 ... 1710.0MHz		40	51		dB
400.0 ... 400.0MHz		50	70		dB
1710.0 ... 1755.0MHz		45	51		dB
@$f_{Carrier}$ 1712.4 ... 1752.6MHz	$\alpha_{W\text{-}CDMA}$ [1)]	45	51		dB
1755.0 ... 2025.0MHz		15	40		dB
1910.0 ... 1955.0MHz		35	45		dB
2255.0 ... 6000.0MHz		30	39		dB
2400.0 ... 2500.0MHz		40	50		dB
2500.0 ... 3820.0MHz		35	42		dB
3820.0 ... 3910.0MHz		35	42		dB
4220.0 ... 4310.0MHz		34	41		dB
5530.0 ... 5665.0MHz		32	40		dB
5725.0 ... 5875.0MHz		32	40		dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 6.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141

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					B8517			
Characteristics Tx-Rx					**min.**	**typ. @ 25 ˚C**	**max.**	
Isolation				α				
	1574.0	...	1577.0	MHz		40	63		dB
	1710.0	...	1755.0	MHz		52	56		dB
	1712.4	...	1752.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	52	56		dB
	2110.0	...	2155.0	MHz		50	61		dB
	2112.4	...	2152.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	50	62		dB
	3410.0	...	3520.0	MHz		20	52		dB
	5120.0	...	5275.0	MHz		20	48		dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 6.

Annotation for characteristics section

Attenuation of W-CDMA signal (Power Transfer Function, $\alpha_{W\text{-}CDMA}$) is determined by

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

with $f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS pass band, $f_{Carrier}$ ranges from 1712.4 MHz (lowest Tx channel) to 1752.6 MHz (highest Tx channel)). Here, $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

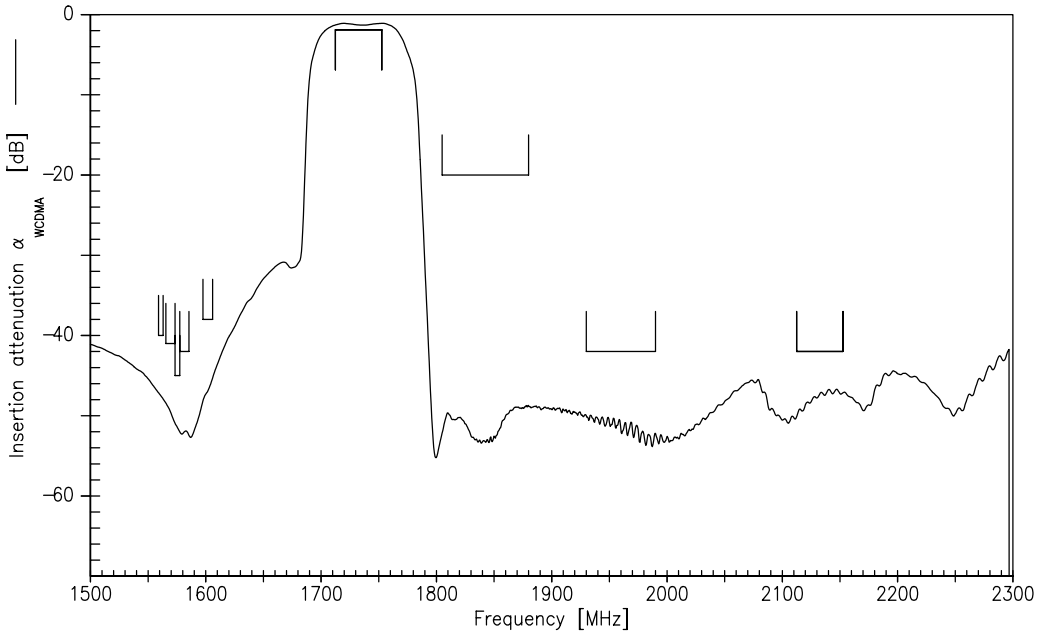
$$\int_{-\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum Ratings

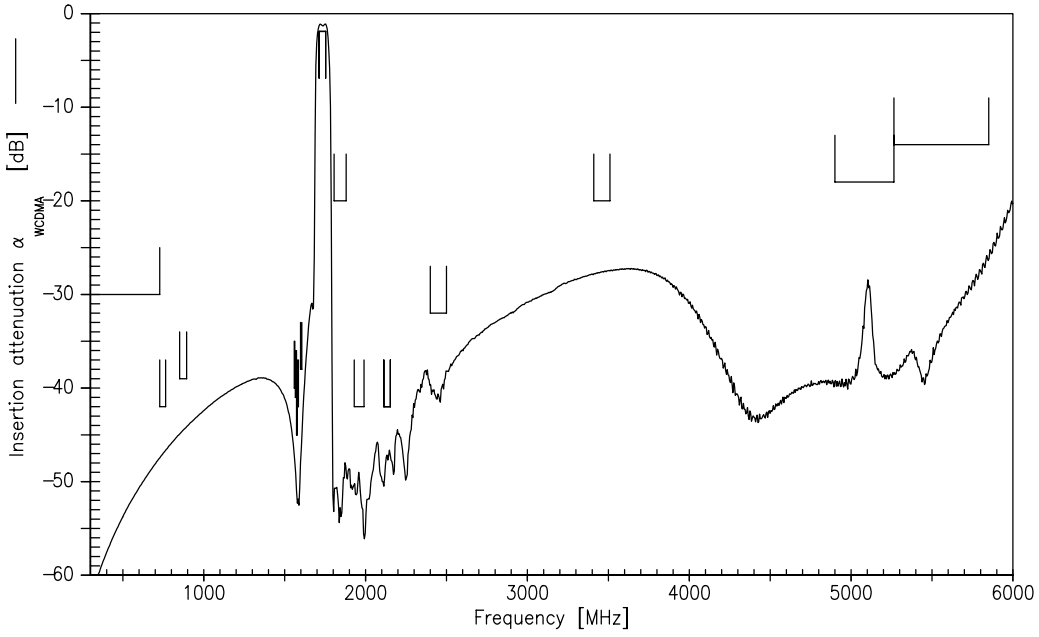
Storage temperature range	T_{stg}	–40/+90	˚C	
DC voltage	V_{DC}	5[1)]	V	
DC impedance to ground		> 100	MΩ	
ESD voltage	V_{ESD}	50[2)]	V	machine model, 10 pulses
Input power at				
1710.0 ... 1755.0 MHz	P_{in}	29	dBm	} continuous wave
elsewhere	P_{in}	10	dBm	} 50 ˚C, 5000h

1) min. 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy.
2) According to JESD22-A115A (machine model), 10 negative and 10 positive pulses.

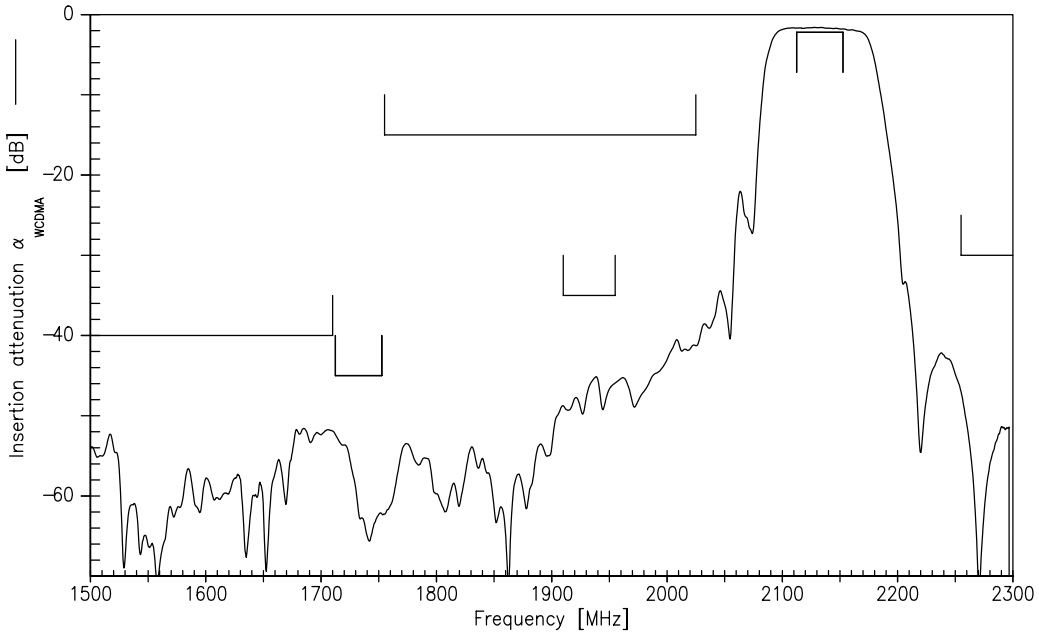
Power Transfer Function Tx-Ant:



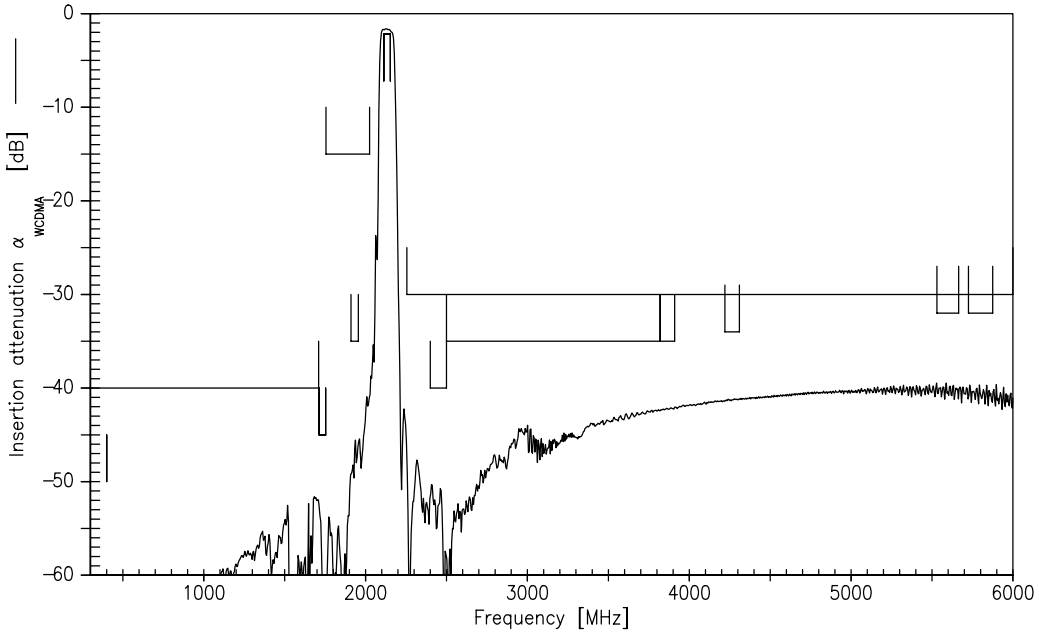
Power Transfer Function Tx-Ant (wideband):



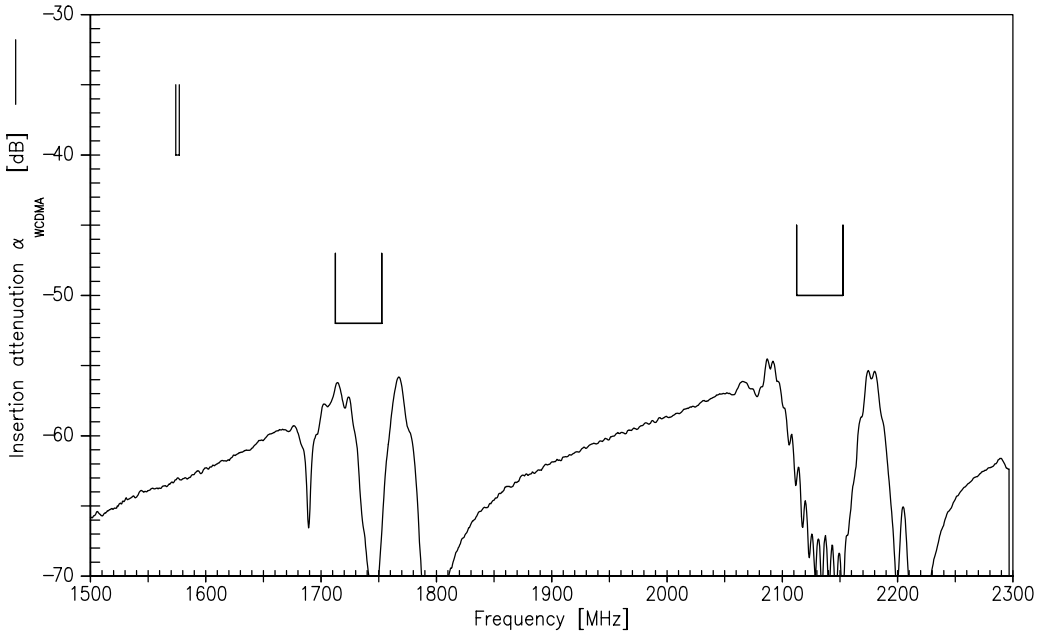
Power Transfer Function Ant-Rx:



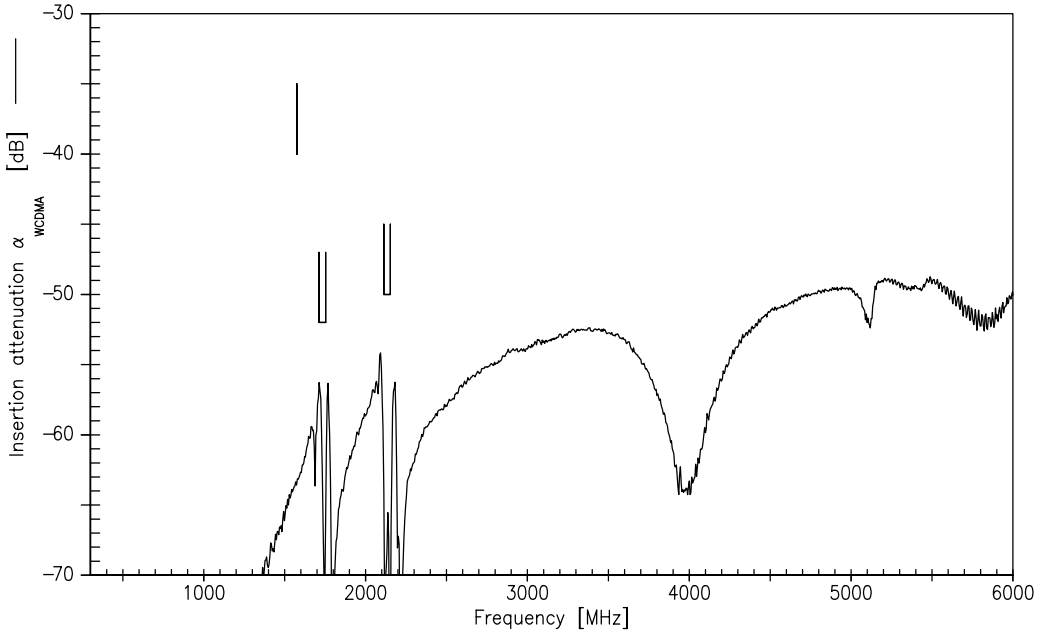
Power Transfer Function Ant-Rx (wideband):



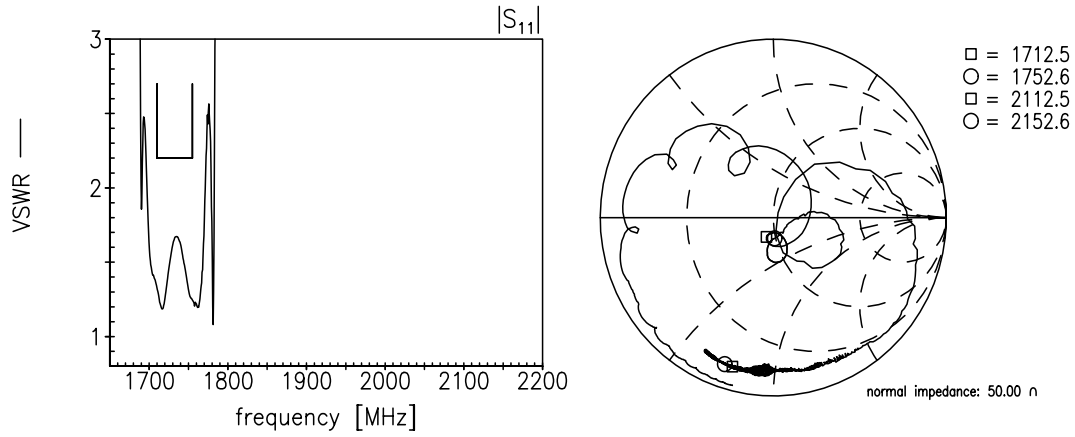
Power Transfer Function Tx-Rx isolation:

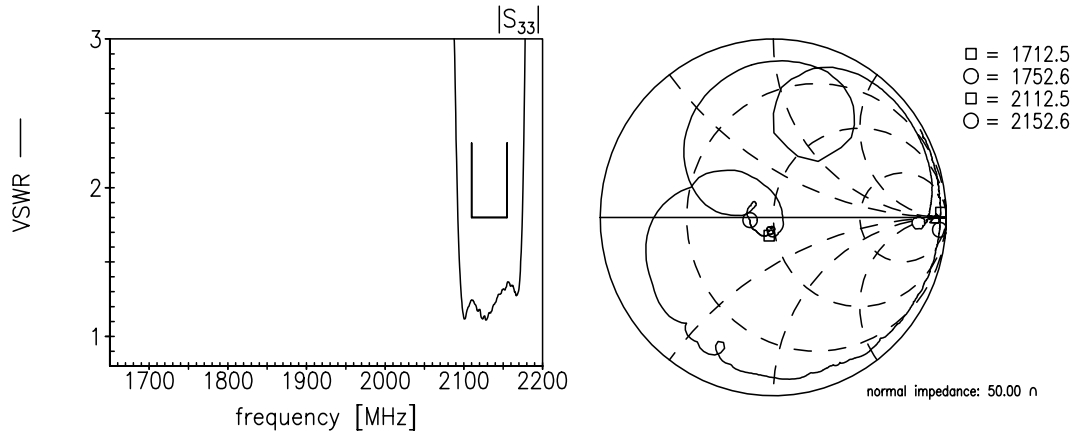


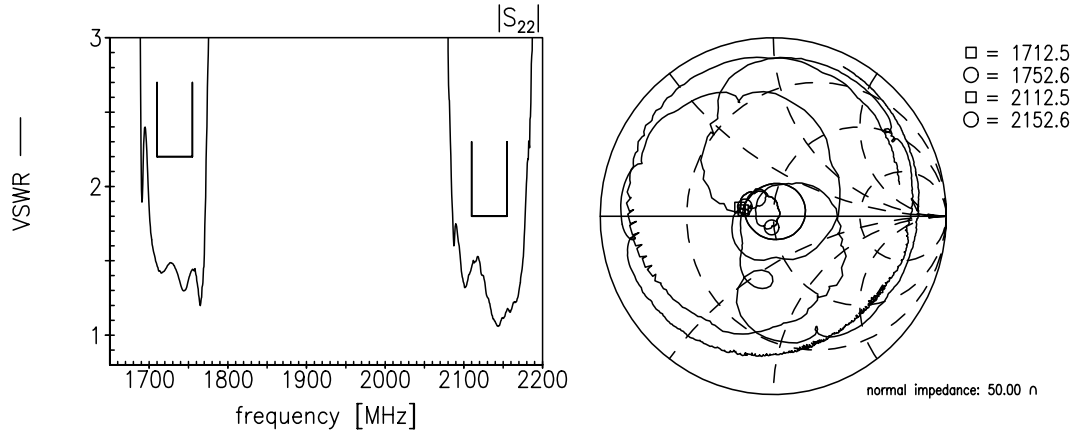
Power Transfer Function Tx-Rx isolation (wideband):



VSWRs at Tx, Rx and Ant:







References

Type	B8517
Ordering code	B39212B8517P810
Marking and package	C61157-A8-A76
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8517_NB_UN.s3p, B8517_WB_UN.s3p See file header for pin/port assignments
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."
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 a large variety of matching coils.

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