



SAW Components

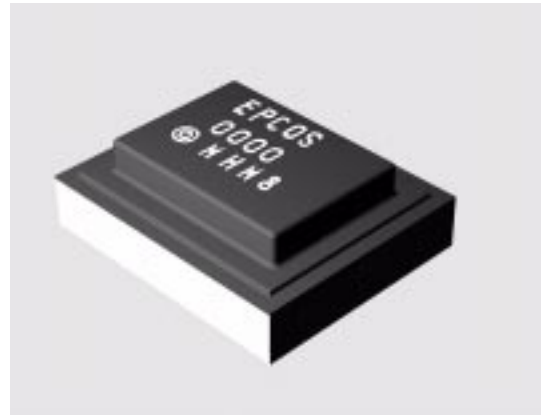
SAW Duplexer

Cellular / WCDMA Band V

Series/type:	B7683
Ordering code:	B39881B7683L310
Date:	February 05, 2008
Version:	2.0

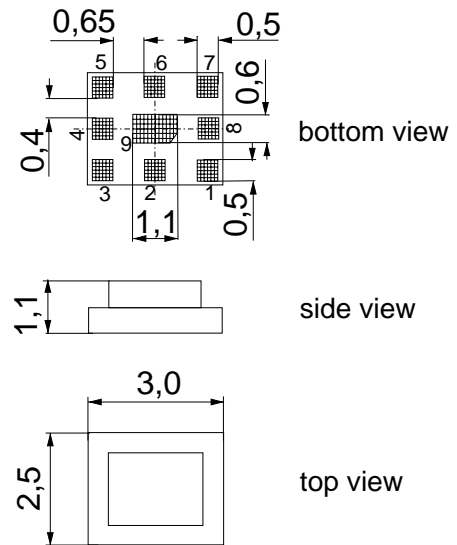
Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path



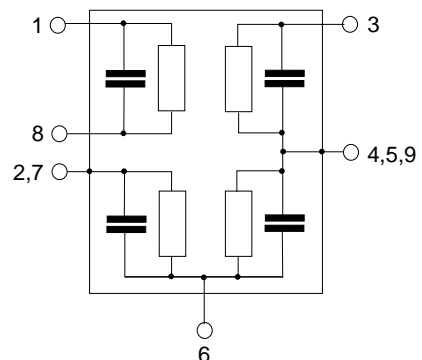
Features

- Package size 3.0 x 2.5 x 1.1 mm³
- RoHS compatible
- Approx. weight 0.035 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- Fully matched by integrated matching network
- **Electrostatic Sensitive Device (ESD)**



Pin configuration

- 3 TX Input
- 1, 8 RX Output (balanced)
- 6 Antenna
- 2, 4, 5, 7, 9 To be grounded



Data Sheet

Characteristics

Temperature range for specification:	T = -15 °C to +80 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs TX - ANT		min.	typ. @ 25 °C	max.	
Center frequency	f _C		836.5		MHz
Maximum insertion attenuation					
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾		1.4	1.8	dB
Amplitude ripple (p-p)					
@f _{Carrier} 826.4 ... 846.6 MHz	Δα _{WCDMA}		0.2	1.0	dB
Error Vector Magnitude					
@f _{Carrier} 826.4 ... 846.6 MHz	EVM ²⁾		1.1	2.5	%
Input VSWR (TX port)					
824.0 ... 849.0 MHz			1.5	1.9	
Output VSWR (ANT port)					
824.0 ... 849.0 MHz			1.5	1.8	

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Data Sheet

Characteristics

Temperature range for specification:	T = -15 °C to +80 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs TX - ANT				min.	typ. @ 25 °C	max.	
Attenuation			α				
	0.3 ... 779.0	MHz		30	35		dB
	779.0 ... 804.0	MHz		30	40		dB
@f _{Carrier}	871.4 ... 891.6	MHz	$\alpha_{\text{WCDMA}}^{1)}$	45	48		dB
	1550.0 ... 1600.0	MHz		35	48		dB
	1648.0 ... 1698.0	MHz		30	54		dB
	2400.0 ... 2547.0	MHz		25	33		dB
	2547.0 ... 4120.0	MHz		10	18		dB
	4120.0 ... 4245.0	MHz		15	25		dB
	4245.0 ... 5150.0	MHz		10	13		dB
	5150.0 ... 5825.0	MHz		8	11		dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).



Data Sheet



Characteristics

Temperature range for specification: $T = -15\text{ °C to }+80\text{ °C}$
 Antenna terminating impedance: $Z_{ANT} = 50\ \Omega$
 RX terminating impedance: $Z_{RX} = 100\ \Omega$ (balanced)
 TX terminating impedance: $Z_{TX} = 50\ \Omega$

Characterisitcs ANT - RX	min.	typ. @ 25 °C	max.	
Center frequency f_C		881.5		MHz
Maximum insertion attenuation				
869.0 ... 894.0 MHz α_{max}		1.9	2.7 ¹⁾	dB
@ $f_{Carrier}$ 871.4 ... 891.6 MHz $\alpha_{WCDMA}^{2)}$		1.8	2.5	dB
Amplitude ripple (p-p)				
869.0 ... 894.0 MHz $\Delta\alpha$		0.6	1.3	dB
@ $f_{Carrier}$ 871.4 ... 891.6 MHz $\Delta\alpha_{WCDMA}$		0.5	1.0	dB
Common mode rejection ratio CMRR				
869.0 ... 894.0 MHz	23	28		dB
Error Vector Magnitude				
@ $f_{Carrier}$ 871.4 ... 891.6 MHz $EVM^3)$		1.7	2.5	%
Input VSWR (ANT port)				
869.0 ... 894.0 MHz		1.5	1.8	
Output VSWR (RX port)				
869.0 ... 894.0 MHz		1.8	2.0	

1) 3.0 dB for $T = -25 \dots -15\text{ °C}$ and $T = +80 \dots +85\text{ °C}$.
 2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Data Sheet

Characteristics

Temperature range for specification:	T = -15 °C to +80 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs ANT - RX					min.	typ. @ 25 °C	max.		
IMD product level limits¹⁾									
at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz									
Blocker 1		45.0	MHz		-105	-101		dBm	
Blocker 2		791.5	MHz		-121	-110		dBm	
Blocker 3		1718.0	MHz		-120	-110		dBm	
Attenuation									
				α					
	0.3	...	779.0	MHz	40	56		dB	
			779.0	...	824.0	MHz	40	58	dB
@f _{Carrier}	826.4	...	846.6	MHz	α _{WCDMA} ²⁾	47	53	dB	
	849.0	...	854.0	MHz		23	50	dB	
	914.0	...	1693.0	MHz		23	37	dB	
	1693.0	...	1788.0	MHz		45	63	dB	
	1788.0	...	2400.0	MHz		40	55	dB	
	2400.0	...	2500.0	MHz		40	49	dB	
	2500.0	...	2682.0	MHz		40	45	dB	
	2682.0	...	5000.0	MHz		30	45	dB	
	5150.0	...	5825.0	MHz		30	47	dB	
	5825.0	...	6000.0	MHz		30	50	dB	

1) Power levels: 21dBm Tx signal, -15dBm blocker at antenna port.

2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

Characterisitcs TX - RX					min.	typ. @ 25 °C	max.	
Isolation								
				α				
@f _{Carrier}	826.4	...	846.6	MHz	α _{WCDMA} ¹⁾	50	57	dB
@f _{Carrier}	871.4	...	891.6	MHz	α _{WCDMA}	45	49	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

Maximum ratings

Temperature range for specification ¹⁾	T	-15/+80	°C	
Operable temperature range ²⁾	T	-25/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	100 ³⁾	V	machine model, 10 pulses
Input power at	P _{IN}			source and load impedance 50 Ω
824.0 ... 849.0 MHz		30	dBm	} continuous wave T = 55°C, 50.000 h
elsewhere		10	dBm	

1) Defines the temperature range in which the specification values are guaranteed.

2) Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.

3) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Annotation for characteristics section

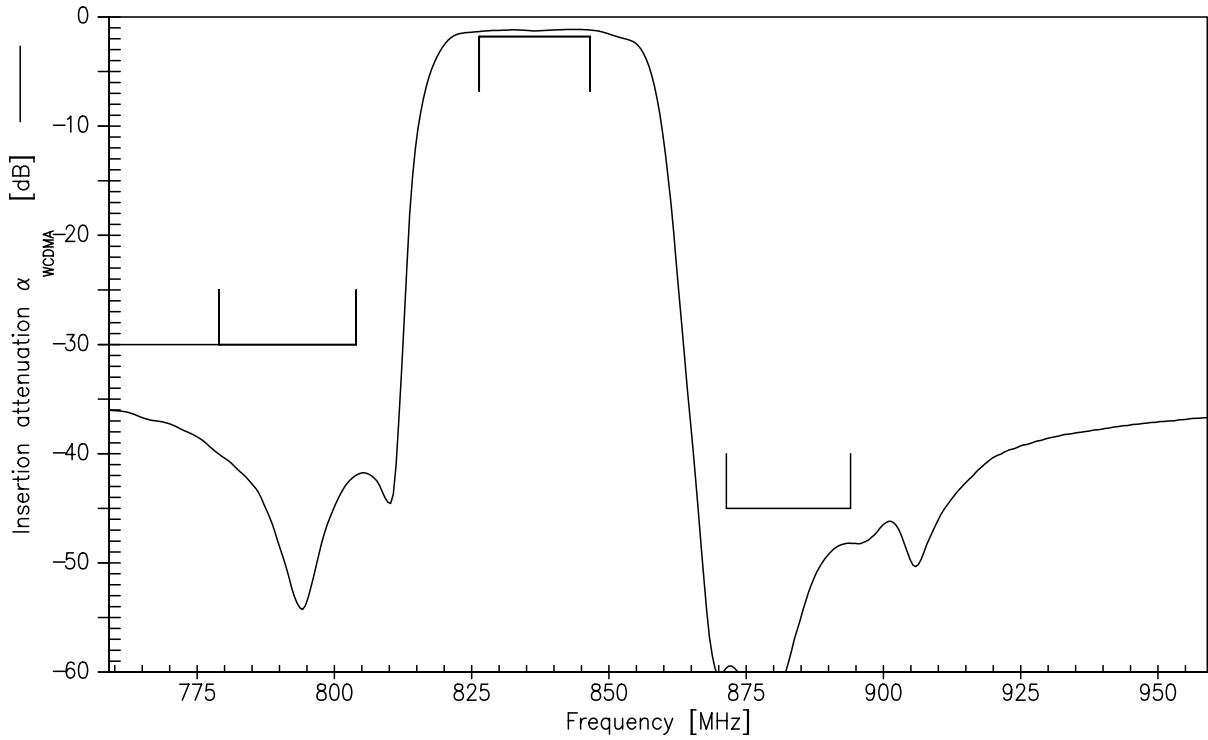
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

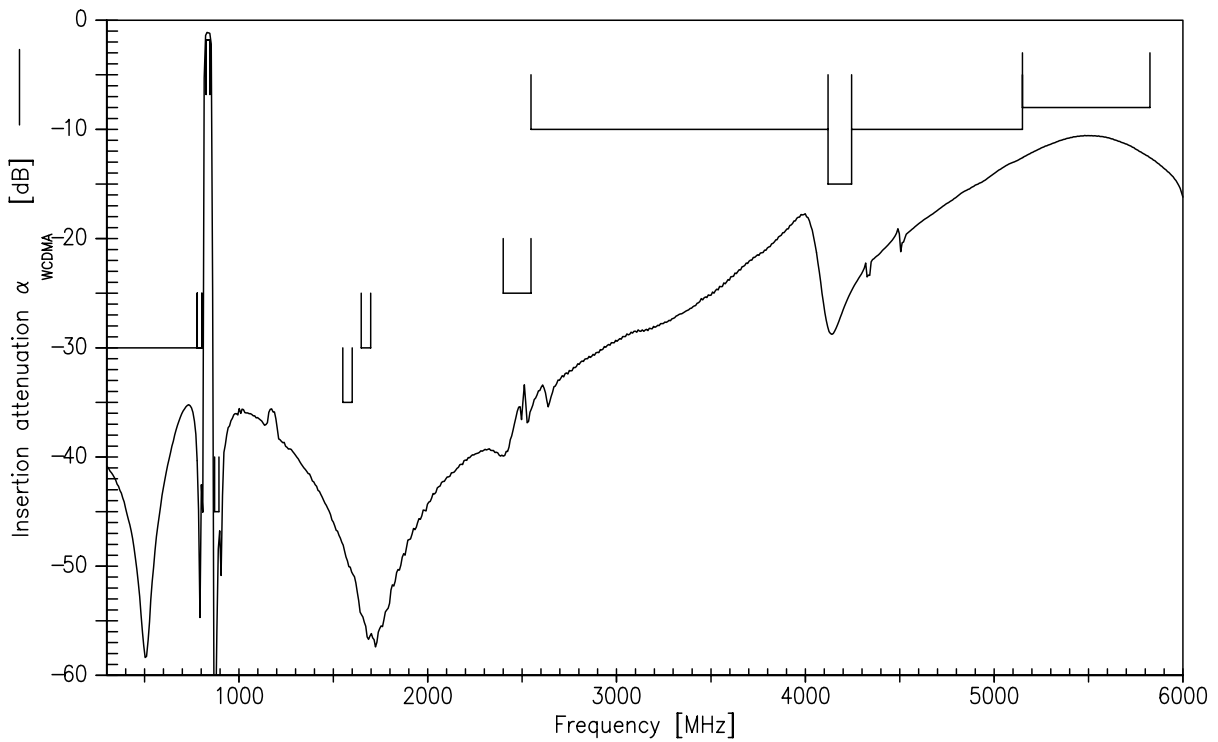
f_{Carrier} according to 3GPP TS 25.101 (e.g. for WCDMA Band 5-Passband, f_{Carrier} ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

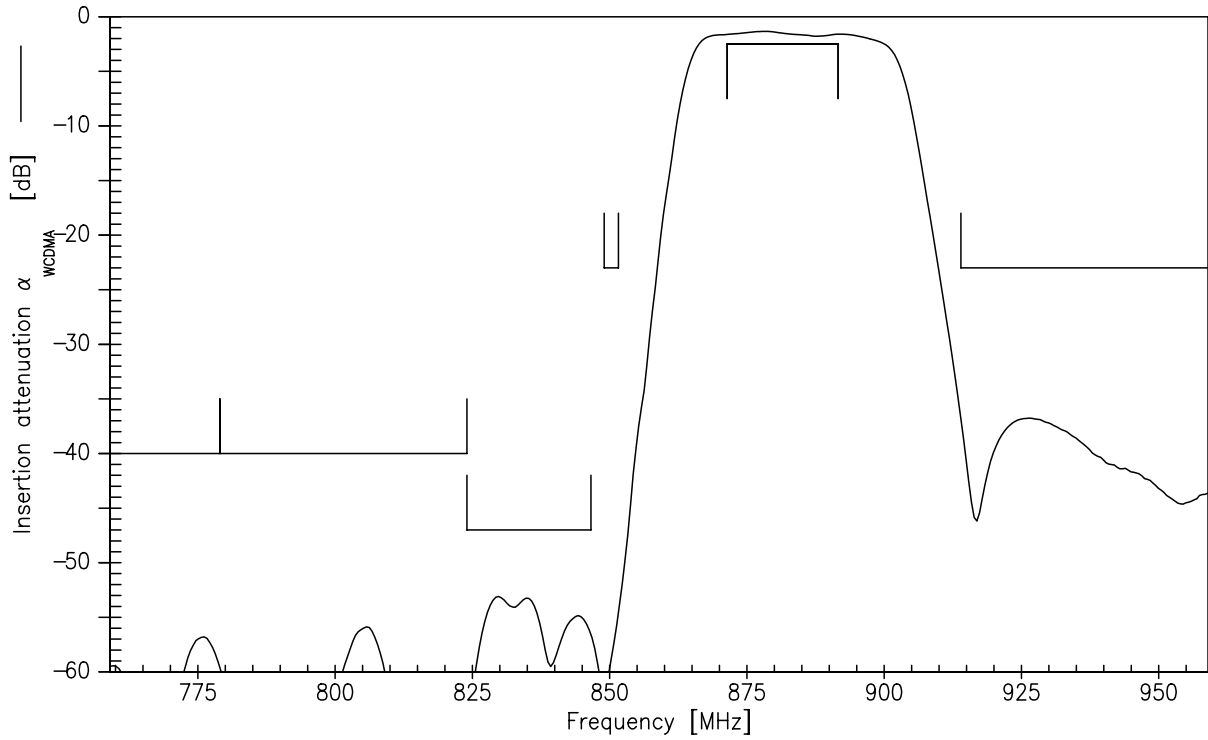
Frequency Response TX-ANT



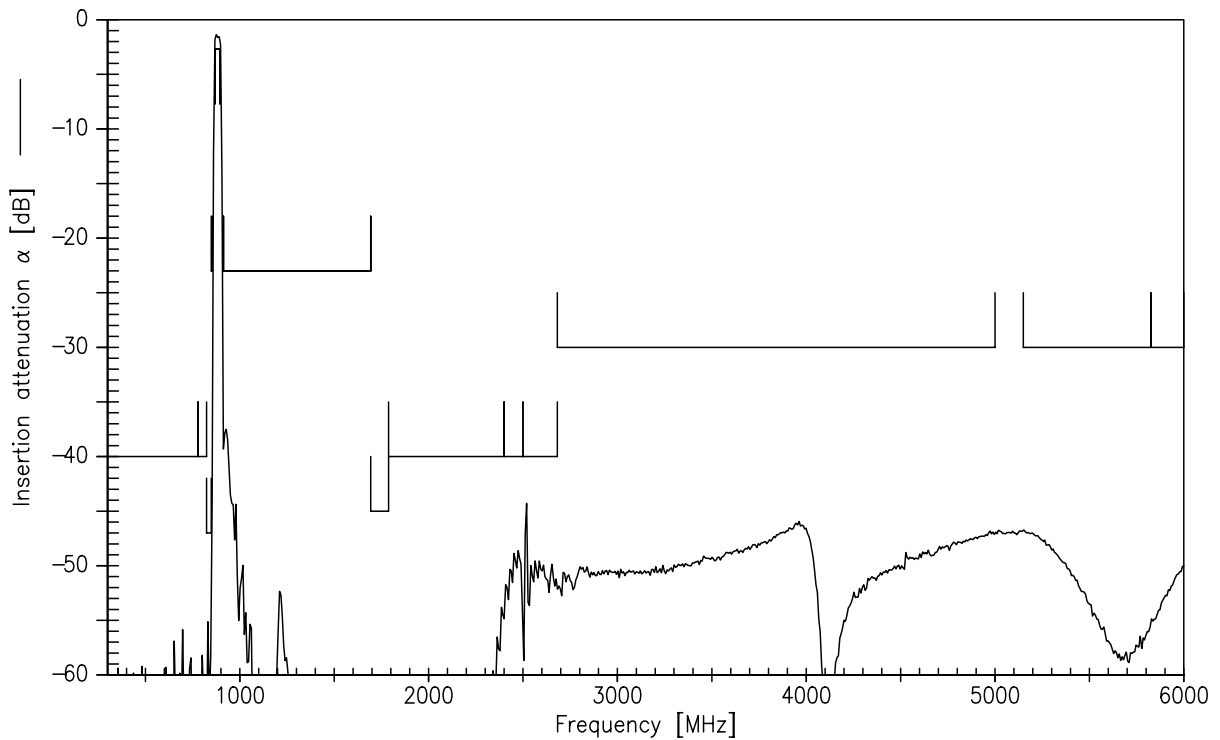
Frequency Response TX-ANT (wideband)



Frequency Response RX-ANT

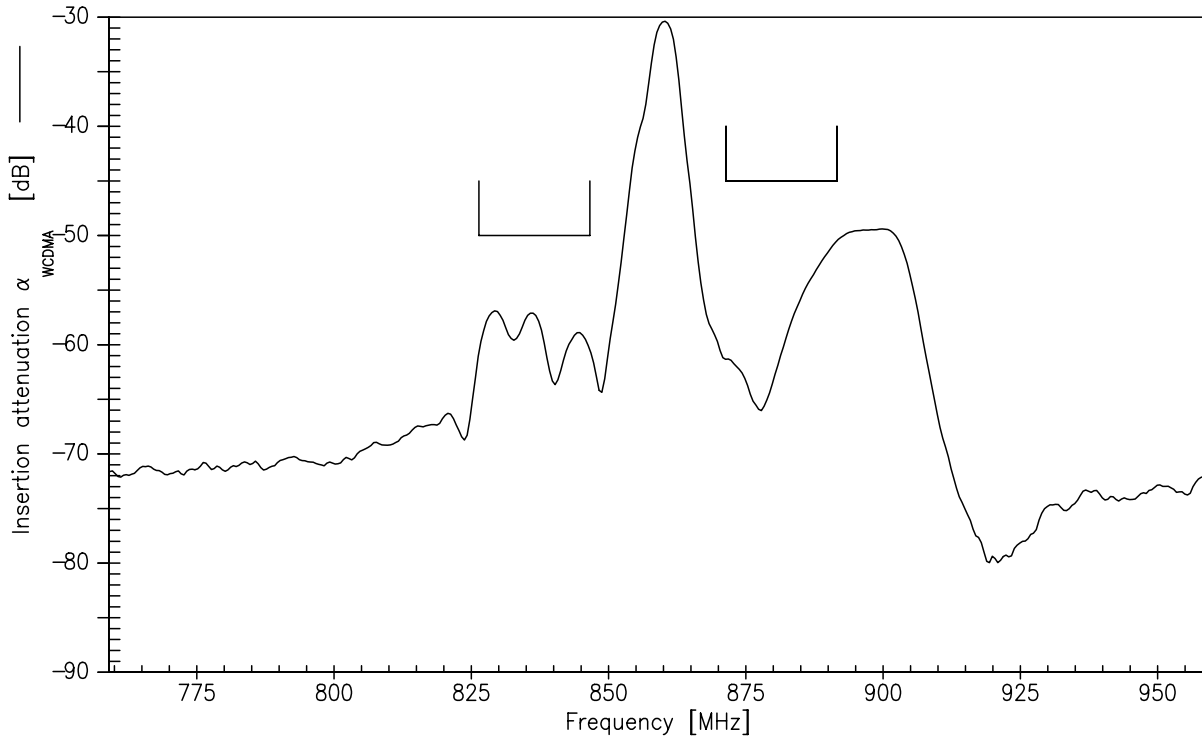


Frequency Response RX-ANT (wideband)

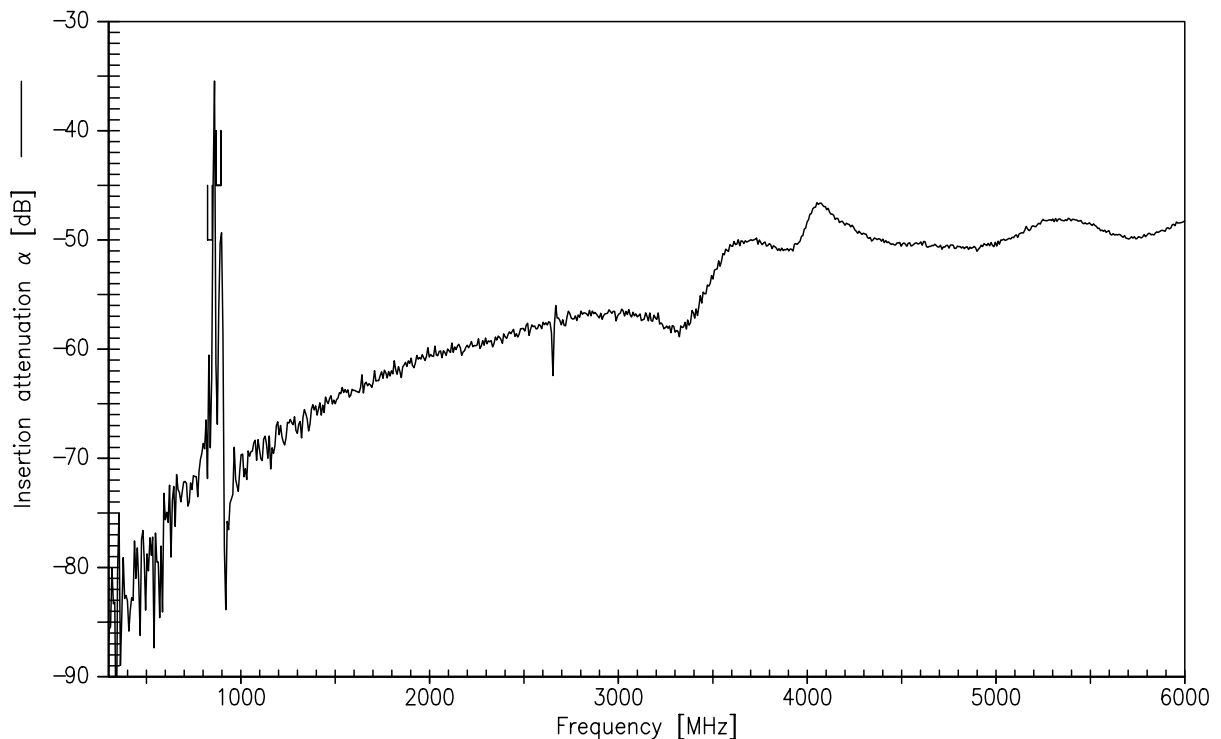




Frequency Response TX-RX



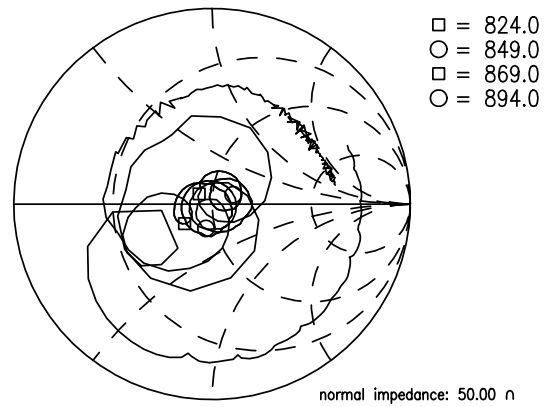
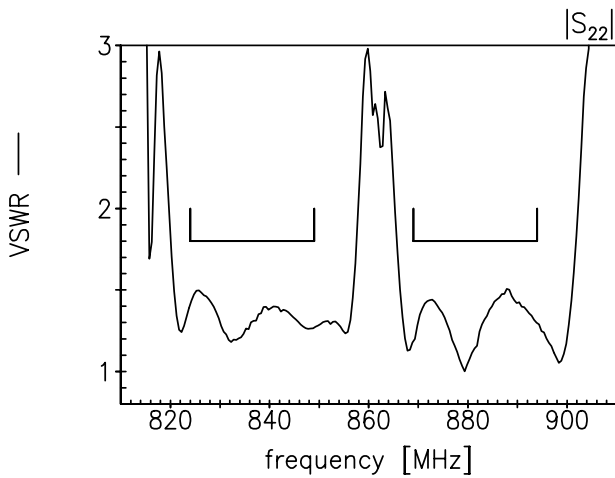
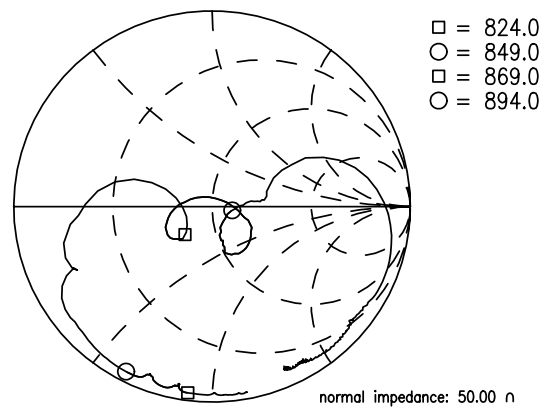
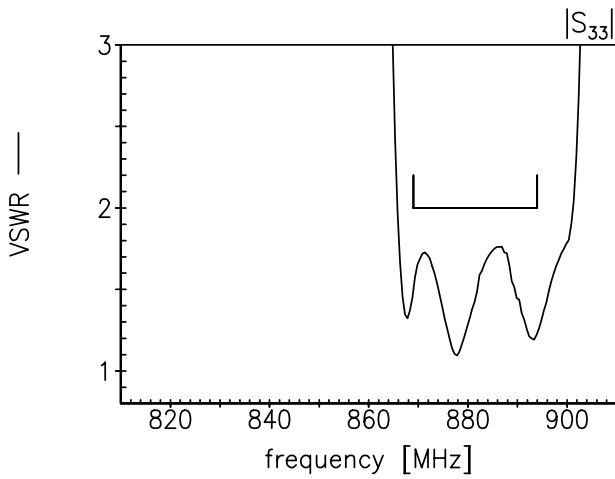
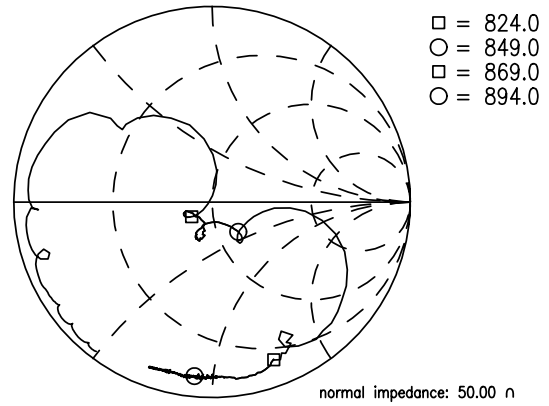
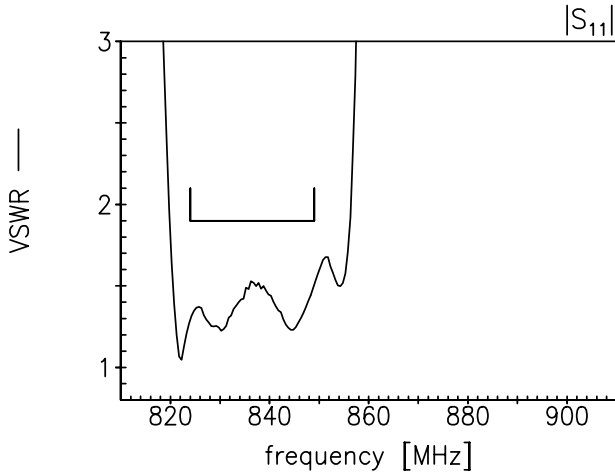
Frequency Response TX-RX (wideband)



Data Sheet



Return Loss S_{11} TX- port S_{22} ANT-port S_{33} RX-port



References

Type	B7683
Ordering code	B39881B7683L310
Marking and package	C61157-A3-A37
Packaging	F61074-V8211-Z000
Date codes	L_1126
S-parameters	B7683_NB.s4p B7683_WB.s4p
Soldering profile	S_6001
RoHS compatible	<p>defined as compatible with the following documents:</p> <p>"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."</p>

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