



SAW Components

SAW Duplexer

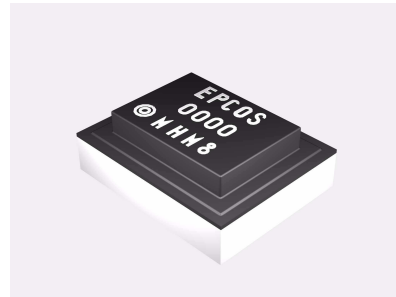
W-CDMA Band 1

Series/type:	B7696
Ordering code:	B39212B7696M810
Date:	March 04, 2009
Version:	2.0



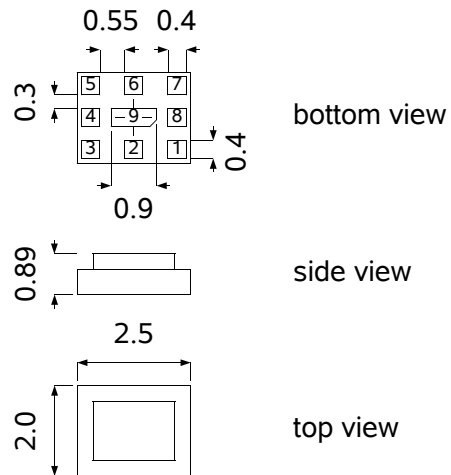
Application

- Low-loss SAW duplexer for mobile telephone W-CDMA Band 1 (UMTS) systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path
- High isolation between Tx and Rx



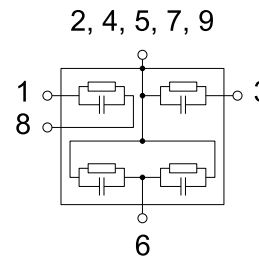
Features

- Package size 2.5 * 2.0 * 0.89 mm³
- RoHS compatible
- Approximate weight 0.035 g
- Package for **Surface Mount Technology (SMT)**
- Ni terminals, Au-plated
- **Electrostatic Sensitive Device (ESD)**
- Fully matched by integrated matching network



Pin configuration

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





Data Sheet



Characteristics

Temperature range for specification: T = -20 °C to +85 °C
 TX terminating impedance: Z_{Tx} = 50 Ω
 ANT terminating impedance: Z_{Ant} = 50 Ω
 RX terminating impedance: Z_{Rx} = 100 Ω (balanced) || 10 nH

Characteristics Tx-Antenna				min.	typ. @ 25 °C	max.	
Center frequency	f _c						MHz
Maximum insertion attenuation	α _{W-CDMA} ¹⁾						
1922.4 ... 1977.6 MHz				1.6	1.9		dB
Amplitude ripple (p-p)	α _{W-CDMA}						
1922.4 ... 1977.6 MHz				0.4	1.0		dB
Error Vector Magnitude	EVM ²⁾						
1922.4 ... 1977.6 MHz				1.0	2.0		%
TX port VSWR							
1920.0 ... 1980.0 MHz				1.5	1.8		
ANT port VSWR							
1980.0 ... 1980.0 MHz				1.5	1.8		
Attenuation	α						
10.0 ... 1574.0 MHz				28	31		dB
1574.0 ... 1577.0 MHz				30	32		dB
1577.0 ... 1805.0 MHz				25	32		dB
1805.0 ... 1880.0 MHz				10	31		dB
2112.4 ... 2167.6 MHz	α _{W-CDMA}			42	45		dB
2400.0 ... 2500.0 MHz				22	25		dB
2620.0 ... 2690.0 MHz				18	22		dB
3840.0 ... 3960.0 MHz				20	28		dB
5150.0 ... 5940.0 MHz				14	17		dB

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

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



Data Sheet



Characteristics

Temperature range for specification: T = -20 °C to +85 °C
 TX terminating impedance: Z_{Tx} = 50 Ω
 ANT terminating impedance: Z_{Ant} = 50 Ω
 RX terminating impedance: Z_{Rx} = 100 Ω (balanced) || 10 nH

Characteristics Antenna-Rx				min.	typ. @ 25 °C	max.	
Center frequency	f _c						MHz
Maximum insertion attenuation	α _{W-CDMA} ¹⁾						
2112.4 ... 2167.6 MHz				2.3	2.6		dB
Amplitude ripple (p-p)	α _{W-CDMA}						
2112.4 ... 2167.6 MHz				0.7	1.0		dB
Error Vector Magnitude	EVM ²⁾						
2112.4 ... 2167.6 MHz				1.0	2.0		%
ANT port VSWR							
2110.0 ... 2170.0 MHz				1.6	2.0		
RX port VSWR							
2110.0 ... 2170.0 MHz				1.8	2.2		
Attenuation	α						
10.0 ... 1920.0 MHz				35	53		dB
1922.4 ... 1977.6 MHz	α _{W-CDMA}			45	58		dB
1980.0 ... 2025.0 MHz				15	45		dB
2255.0 ... 2400.0 MHz				15	46		dB
2400.0 ... 2484.0 MHz				30	49		dB
2484.0 ... 6000.0 MHz				35	46		dB

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

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



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SAW Duplexer	1950.0 / 2140.0 MHz

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Characteristics

Temperature range for specification: T = -20 °C to +85 °C
 TX terminating impedance: Z_{Tx} = 50 Ω
 ANT terminating impedance: Z_{Ant} = 50 Ω
 RX terminating impedance: Z_{Rx} = 100 Ω (balanced) || 10 nH

Characteristics Tx-Rx				min.	typ. @ 25 °C	max.	
Differential Mode Isolation							
		α					
1922.4	...	1977.6	MHz α _{W-CDMA} ¹⁾	55	59		dB
2112.4	...	2167.6	MHz α _{W-CDMA}	46	49		dB
Common Mode Isolation							
		α					
1922.4	...	1977.6	MHz α _{W-CDMA}	50	57		dB

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



SAW Components

B7696

SAW Duplexer

1950.0 / 2140.0 MHz

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SMD

Annotation for characteristics section

Attenuation of W-CDMA signal (Power Transfer Function, α_{W-CDMA}) is determined by

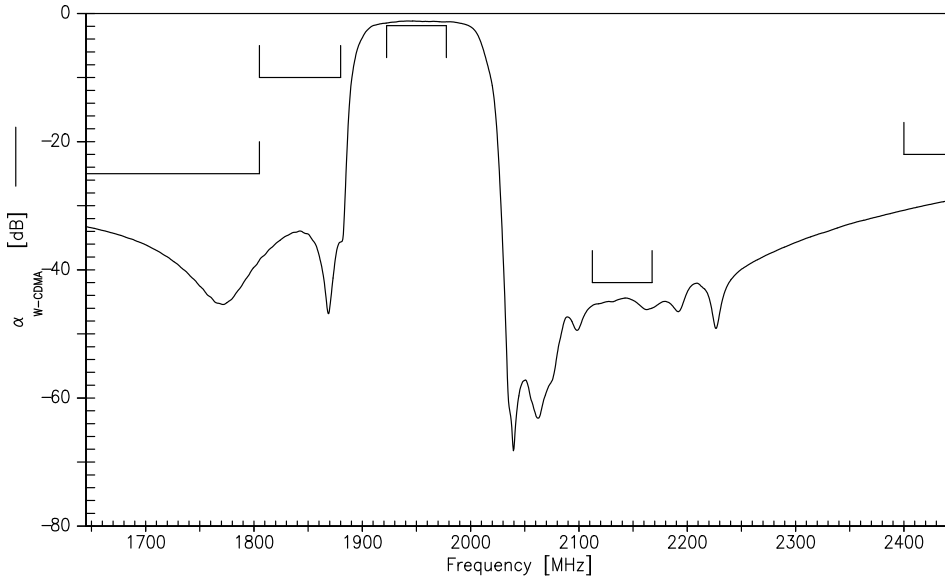
$$\int_{-\infty}^{\infty} |S_{ds21}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

with $f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS pass band, $f_{Carrier}$ ranges from 1922.4 MHz (lowest Tx channel) to 1977.6 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:

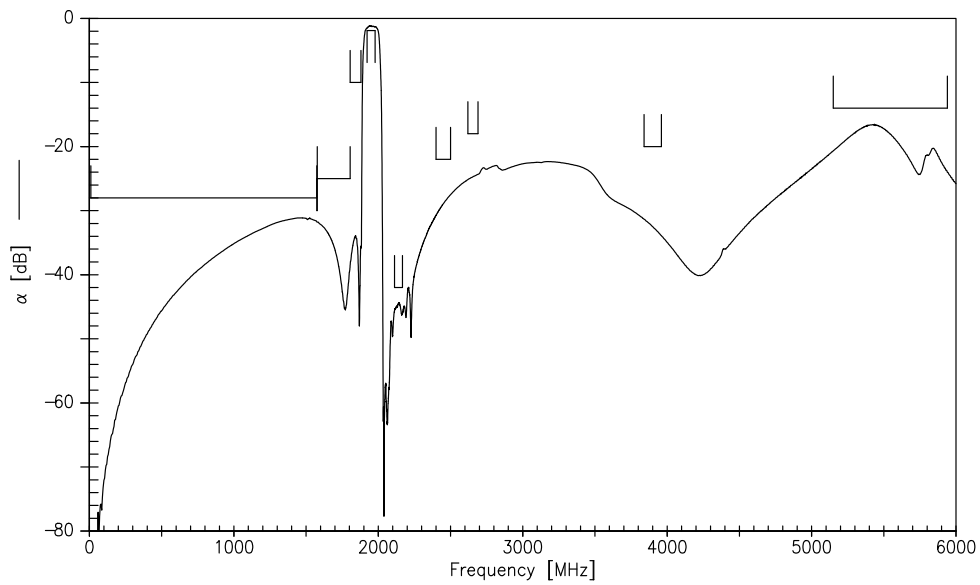
$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



Frequency Response TX-ANT

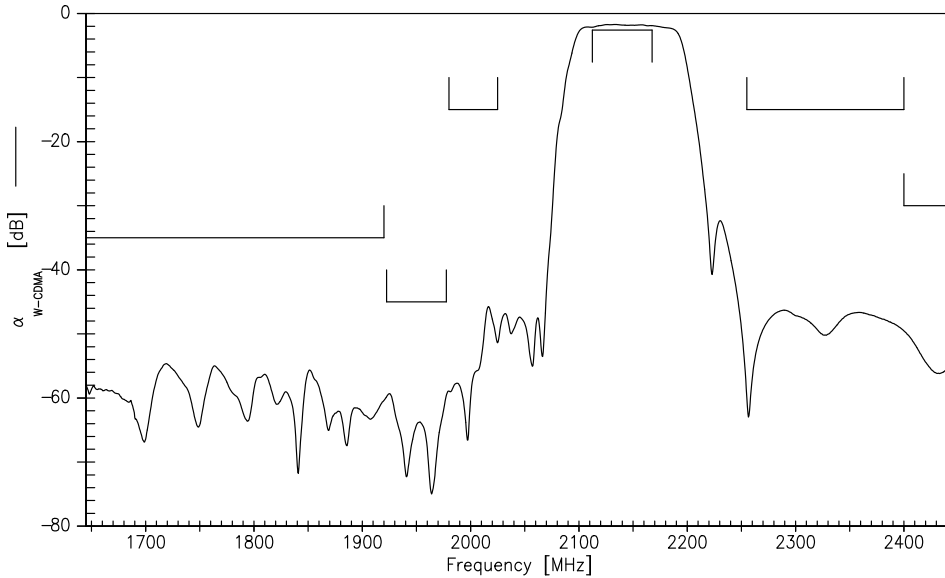


Frequency Response TX-ANT

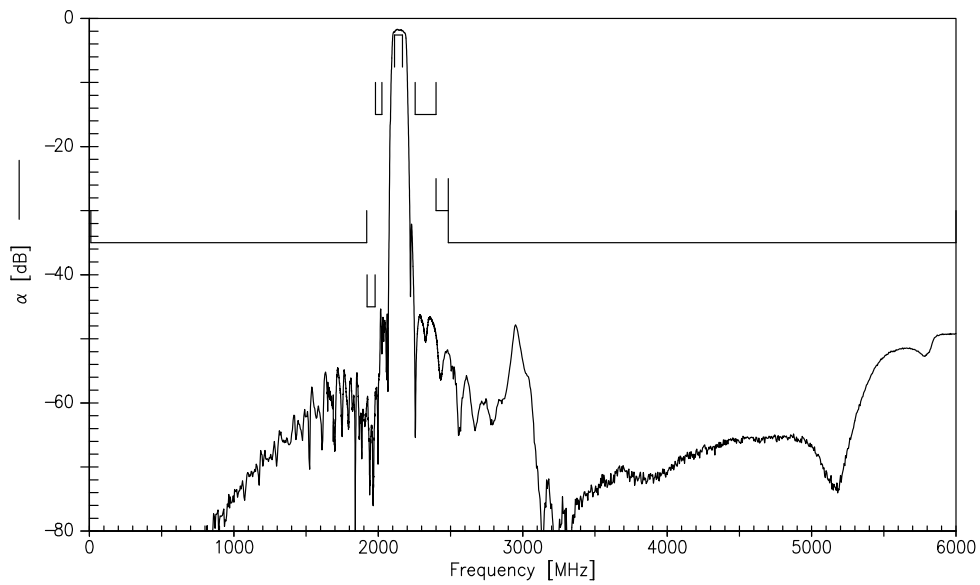




Frequency Response ANT-RX

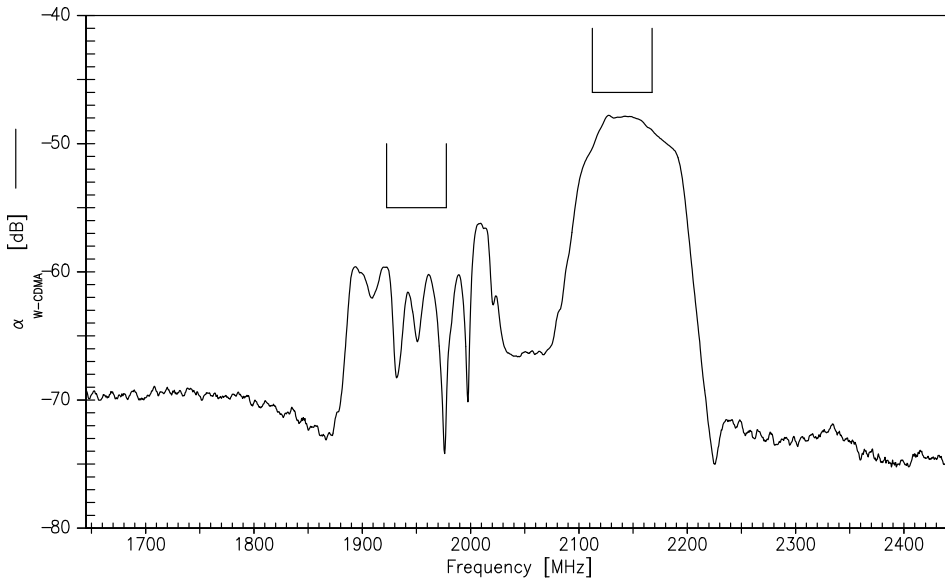


Frequency Response ANT-RX

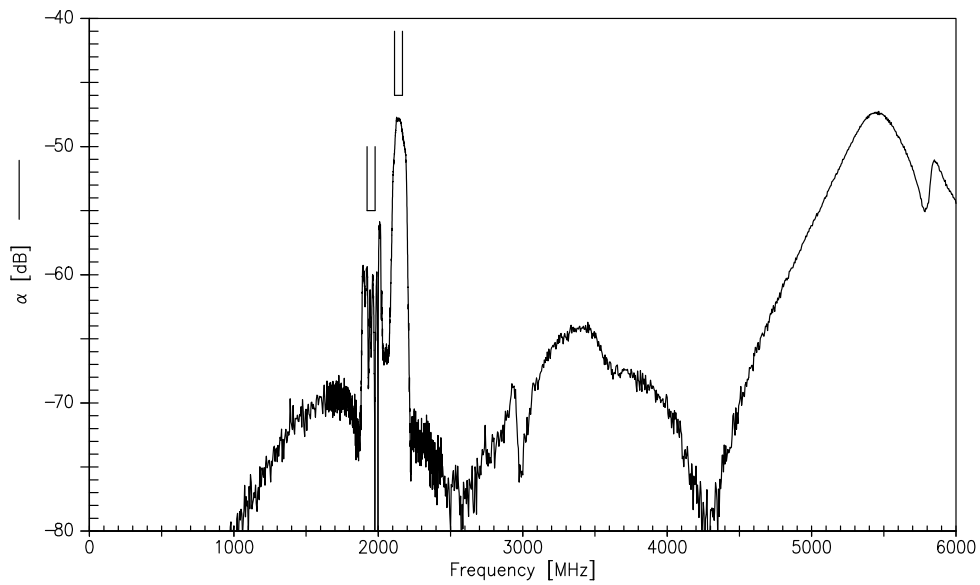




Frequency Response TX-RX



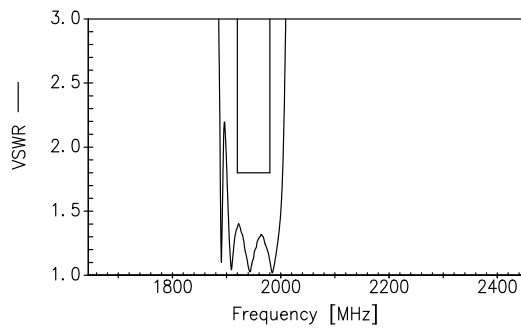
Frequency Response TX-RX



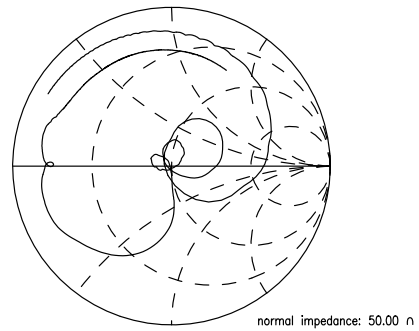


Matching

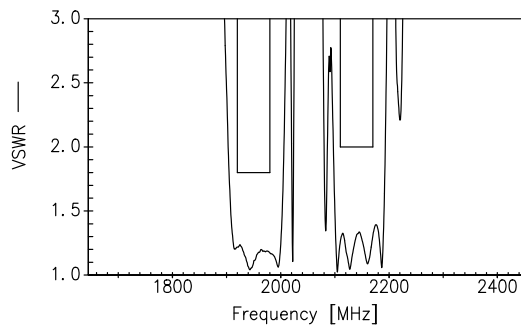
S₁₁ (TX) VSWR



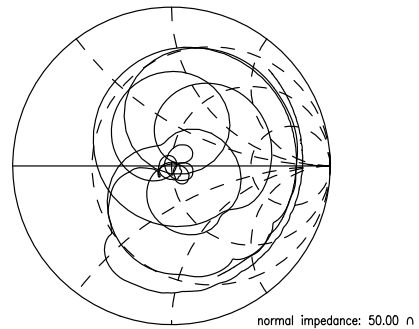
S₁₁ (TX)



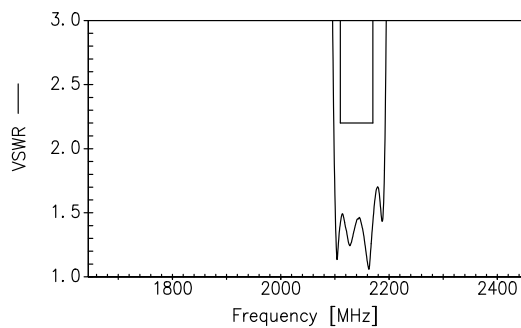
S₂₂ (ANT) VSWR



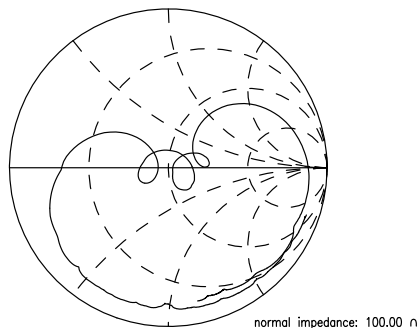
S₂₂ (ANT)



S₃₃ (RX) VSWR



S₃₃ (RX)





SAW Components **B7696**

SAW Duplexer **1950.0 / 2140.0 MHz**

Data Sheet **SMD**

Maximum Ratings

Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	machine model, 10 pulses
Input power at				
1920.0 ... 1980.0 MHz	P _{in}	29	dBm	} continuous wave 50 °C, 5000h
elsewhere	P _{in}	10	dBm	

¹⁾ According to JESD22-A115A (machine model), 10 negative and 10 positive pulses.

**SAW Components****B7696****SAW Duplexer****1950.0 / 2140.0 MHz**

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References

Type	B7696
Ordering code	B39212B7696M810
Marking and package	C61157-A3-A44
Packaging	F61074-V8153-Z000
Date codes	L_1126
S-parameters	B7696_NB.s4p B7696_WB.s4p B7696_UN_NB.s4p B7696_UN_WB.s4p See file header for pin/port assignment.
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."

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