



SAW Components

SAW Duplexer

Cellular / WCDMA Band V

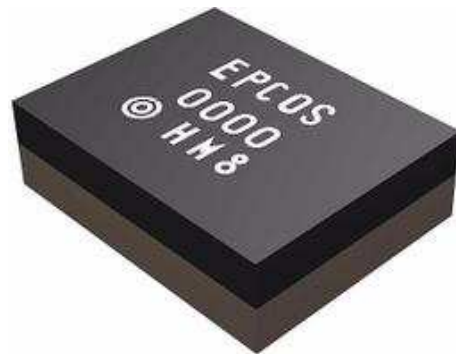
Series/type:	B8556
Ordering code:	B39881B8556P810
Date:	August 29, 2011
Version:	2.1

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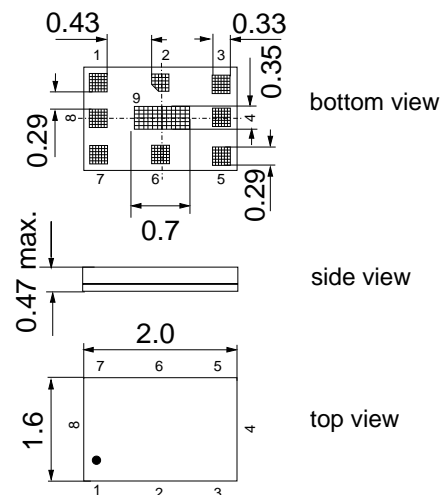
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Application

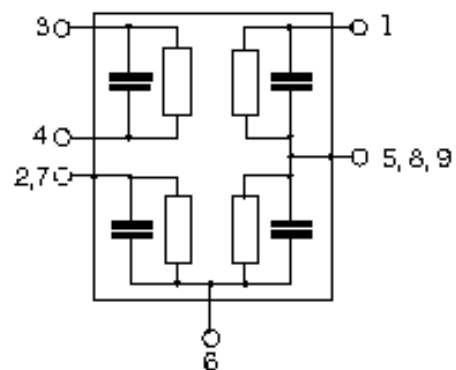
- Multimode SAW duplexer for mobile telephone Cellular/WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- High Tx band isolation
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path


Features

- Component size 2.0 x 1.6 mm²
- Component height 0.47 mm max.
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level (MSL) 3**


Pin configuration

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



Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 14 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics TX - ANT		min.	typ. @ 25 °C	max.	
Center frequency	f _C		836.5		MHz
Maximum insertion attenuation	α _{max}				
824.0 ... 849.0 MHz			1.8	2.3	dB
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾		1.5	2.0 ²⁾	dB
Amplitude ripple	Δα				
824.0 ... 849.0 MHz			0.9	1.5	dB
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾		0.5	1.2 ²⁾	dB
Error Vector Magnitude					
@f _{Carrier} 826.4 ... 846.6 MHz	EVM ³⁾		2.0	3.0 ²⁾	%
Input VSWR (TX port)					
824.0 ... 849.0 MHz			1.9	2.2	
Output VSWR (ANT port)					
824.0 ... 849.0 MHz			1.7	2.1	

1) Attenuation of WCDMA signal ("Power transfer function"). Please refer to annotation on page (8).

2) Temperature range for this parameter is -20°C to +85°C.

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

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 14 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics TX - ANT				min.	typ. @ 25 °C	max.	
Absolute attenuation							
		α					
1.0	...	10.0	MHz	20	70		dB
10.0	...	420.0	MHz	30	42		dB
420.0	...	494.0	MHz	35	39		dB
494.0	...	701.0	MHz	30	38		dB
701.0	...	728.0	MHz	35	39		dB
728.0	...	764.0	MHz	35	40		dB
764.0	...	804.0	MHz	30	34		dB
860.0	...	869.0	MHz	3	24		dB
869.0	...	894.0	MHz	44	50		dB
1565.42	...	1573.374	MHz	35	40		dB
1573.374	...	1577.466	MHz	35	40		dB
1577.466	...	1585.42	MHz	35	40		dB
1597.5515	...	1605.886	MHz	35	39		dB
1605.886	...	1607.0	MHz	35	39		dB
1638.0	...	1648.0	MHz	20	38		dB
1648.0	...	1698.0	MHz	30	37		dB
1698.0	...	1708.0	MHz	20	37		dB
1844.9	...	1879.9	MHz	30	34		dB
1884.5	...	1919.6	MHz	29	34		dB
1930.0	...	1990.0	MHz	27	33		dB
2110.0	...	2170.0	MHz	23	31		dB
2400.0	...	2557.0	MHz	23	27		dB
3286.0	...	3406.0	MHz	19	24		dB
4110.0	...	4255.0	MHz	16	19		dB
4934.0	...	5350.0	MHz	11	17		dB
5350.0	...	5725.0	MHz	10	17		dB
5725.0	...	5953.0	MHz	9	16		dB

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 14 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics ANT - RX		min.	typ. @ 25 °C	max.	
Center frequency	f _C		881.5		MHz
Maximum insertion attenuation	α _{max}				
869.0 ... 894.0 MHz			2.0	2.5	dB
@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ¹⁾		1.9	2.2 ²⁾	dB
Amplitude ripple (p-p)	Δα				
869.0 ... 894.0 MHz			0.7	1.3	dB
@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ¹⁾		0.6	1.0 ²⁾	dB
Error Vector Magnitude					
@f _{Carrier} 871.4 ... 891.6 MHz	EVM ³⁾		1.9	3.2 ²⁾	%
Input VSWR (ANT port)					
869.0 ... 894.0 MHz			1.8	2.1	
Output VSWR (RX port)					
869.0 ... 894.0 MHz			2.0	2.3	
Common mode rejection ratio					
869.0 ... 894.0 MHz	CMRR	23 ⁴⁾	37 ⁴⁾		dB

1) Attenuation of WCDMA signal ("Power transfer function"). Please refer to annotation on page (8).

2) Temperature range for this parameter is -20°C to +85°C.

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

4) A combination of 10° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 14 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics 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			-137	-106	dBm
Blocker 2	791.5	MHz			-114	-109	dBm
Blocker 3	1718.0	MHz			-92	-88	dBm
Blocker 4	2554.5	MHz			-120	-109	dBm
Attenuation							
			α				
10.0	...	447.0	MHz	45	80		dB
447.0	...	779.0	MHz	30	71		dB
779.0	...	824.0	MHz	38	65		dB
824.0	...	849.0	MHz	55	60		dB
849.0	...	854.0	MHz	10	60		dB
909.0	...	1000.0	MHz	13	24		dB
1000.0	...	1693.0	MHz	28	62		dB
1693.0	...	1743.0	MHz	30	62		dB
1743.0	...	1850.0	MHz	28	61		dB
1850.0	...	1920.0	MHz	40	60		dB
1920.0	...	2400.0	MHz	35	57		dB
2400.0	...	2500.0	MHz	45	56		dB
2500.0	...	5100.0	MHz	35	48		dB
5100.0	...	6000.0	MHz	41	47		dB

¹⁾ Power levels: 21.5 dBm Tx signal, -15dBm blocker at antenna port.

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 14 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics TX - RX					min.	typ. @ 25 °C	max.	
Isolation								
	824.0	...	849.0	MHz	60	67		dB
@f _{Carrier}	826.4	...	846.6	MHz	60 ²⁾	68		dB
	869.0	...	894.0	MHz	50	54		dB
@f _{Carrier}	871.4	...	891.6	MHz	50 ²⁾	53		dB
	1574.0	...	1577.0	MHz	40	70		dB
	1638.0	...	1708.0	MHz	20	71		dB
	2462.0	...	2557.0	MHz	20	63		dB
Common Mode Isolation								
	824.0	...	849.0	MHz	55	60		dB
@f _{Carrier}	826.4	...	846.6	MHz	55 ²⁾	60		dB

¹⁾ Attenuation of WCDMA signal ("Power transfer function"). Please refer to annotation on page (8).

²⁾ Temperature range for this parameter is -20°C to +85°C.

Maximum ratings

Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	250 ¹⁾	V	human body model, 1 pulse charged device model, 3 pulses machine model, 10 pulses source and load impedance 50 Ω
		300 ²⁾	V	
		100 ³⁾	V	
Input power at 824.0 ... 849.0 MHz elsewhere	P _{IN}	29	dBm	} WCDMA UP wave T = 55° C, 1000 h
		10	dBm	

1) acc. to JESD22-A114F (human body model), 1 negative & 1 positive pulse.

2) acc. to JESD22-C101E (charged device model), 3 negative & 3 positive pulses.

3) acc. to JESD22-A115C (machine model), 10 negative & 10 positive pulses.

Annotation for characteristics section

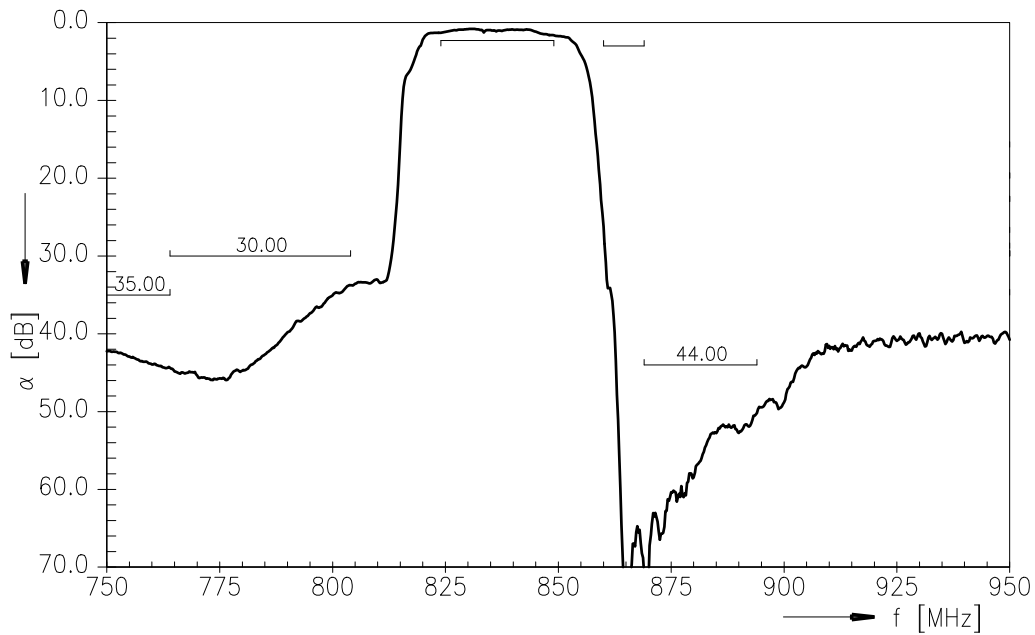
Attenuation of WCDMA signal ("Power transfer function", α_{WCDMA}) is determined by

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

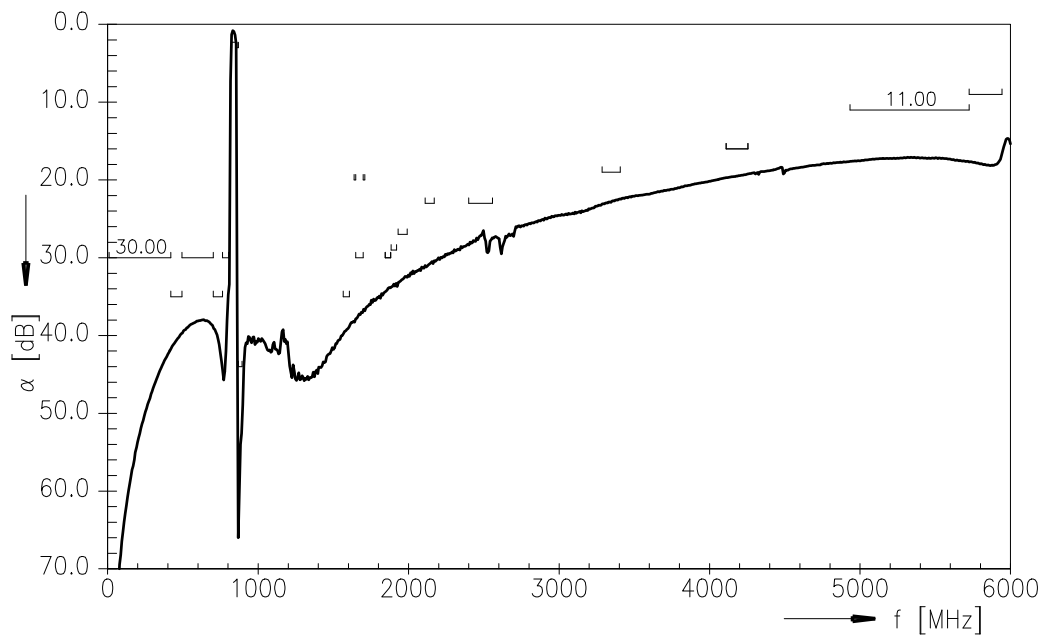
f_{Carrier} according to 3GPP TS 25.101 (e.g. for WCDMA Band 5-Passband, f_{Carrier} ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the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

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

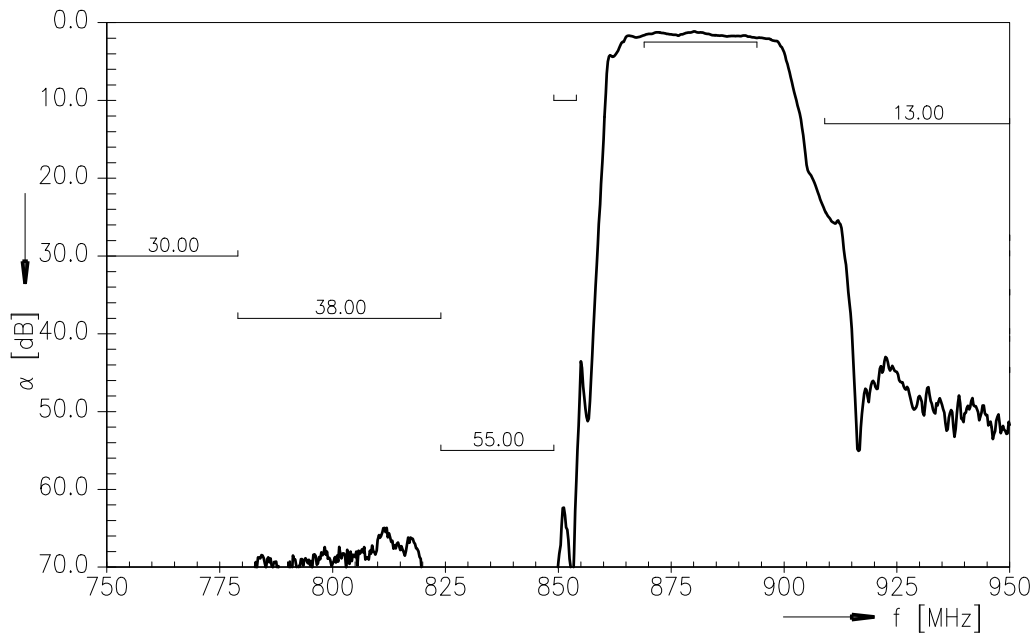
Frequency Response TX-ANT (Passband)



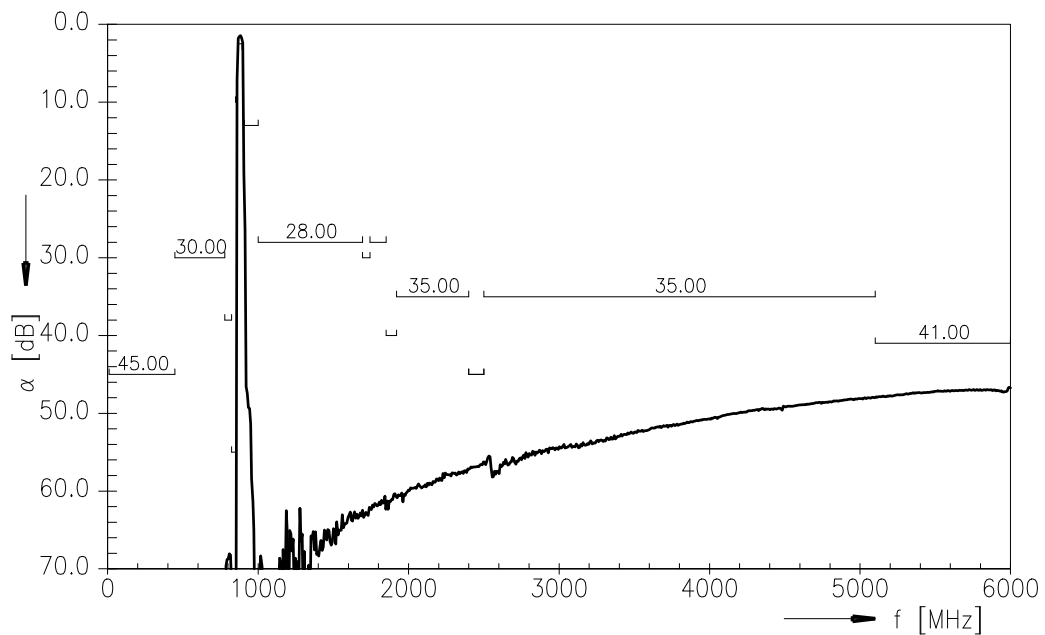
Frequency Response TX-ANT (Wideband)



Frequency Response RX-ANT (Passband)

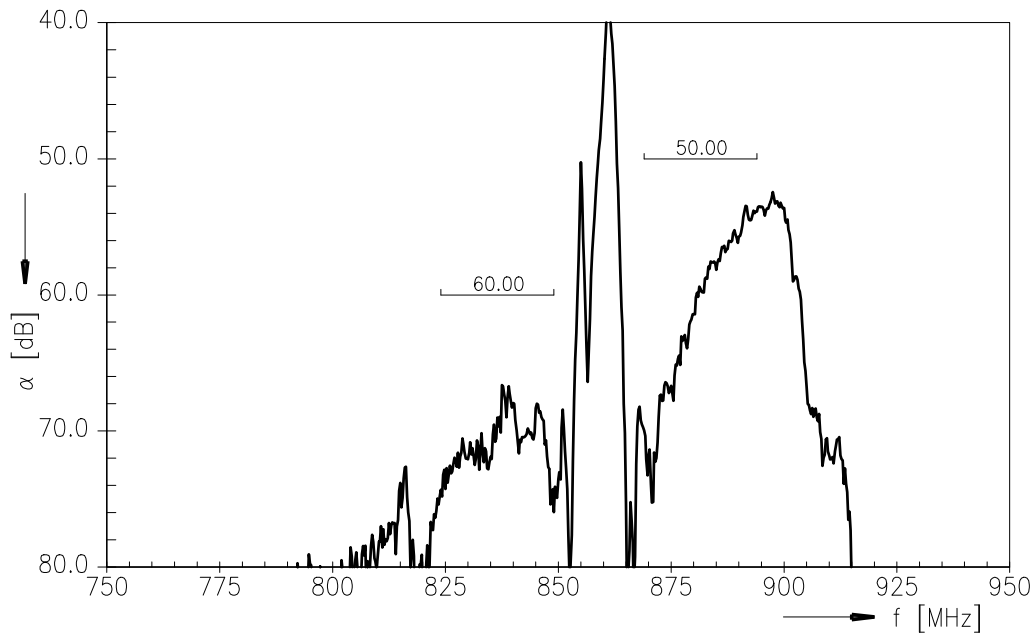


Frequency Response RX-ANT (Wideband)

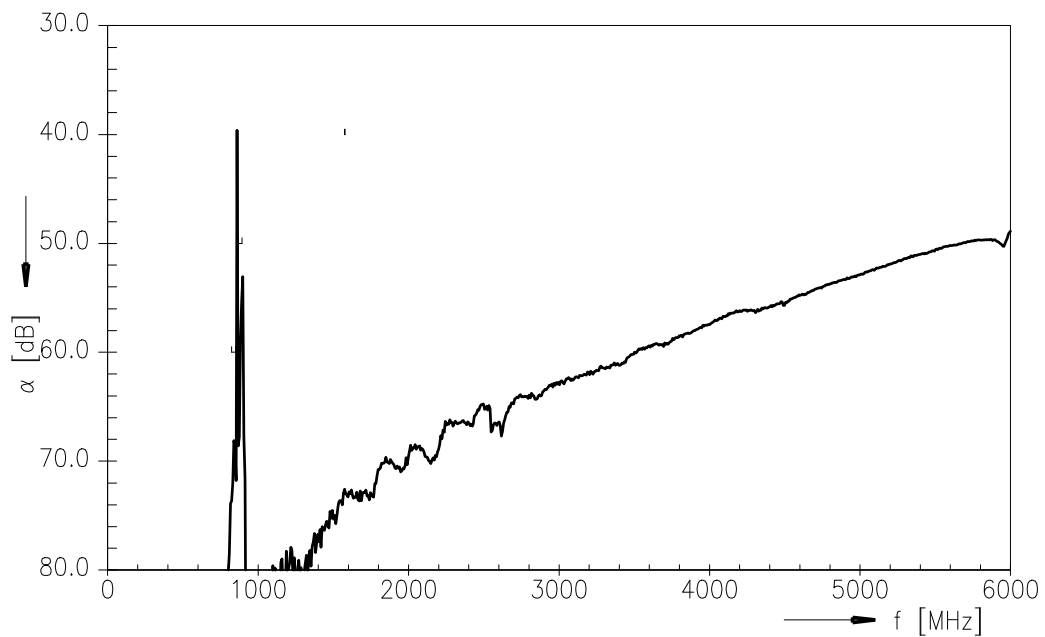


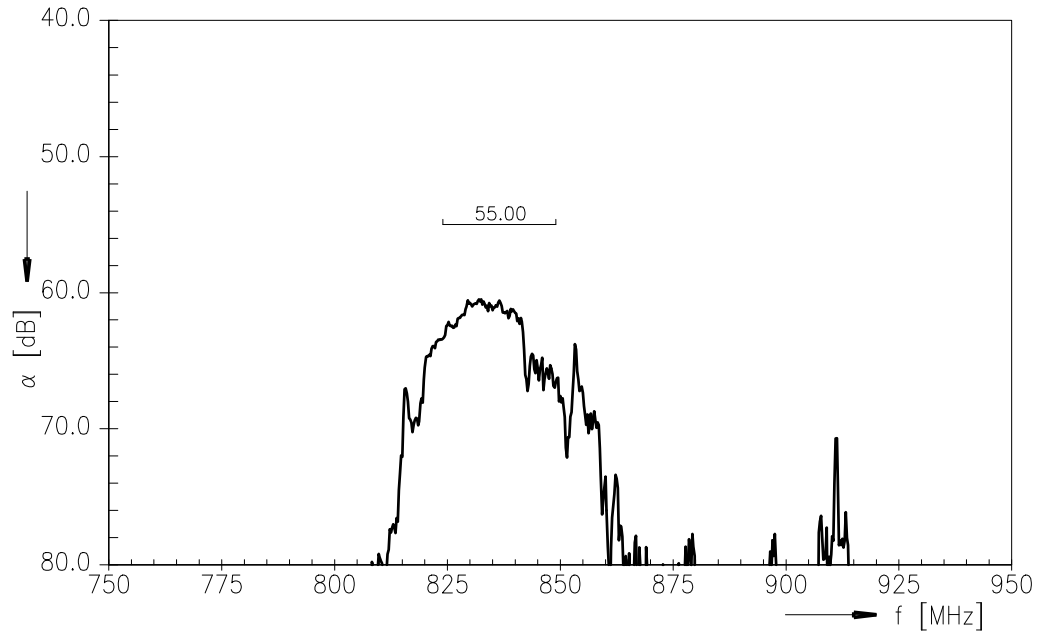
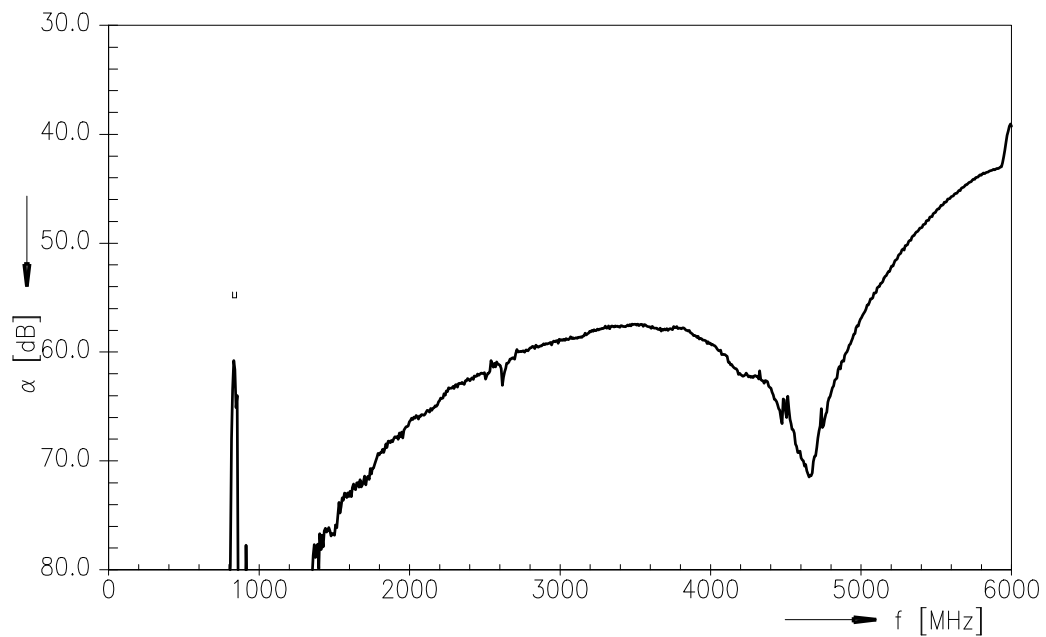
Please read *cautions and warnings* and *important notes* at the end of this document.

Frequency Response TX-RX (Passband Differential Mode Isolation)

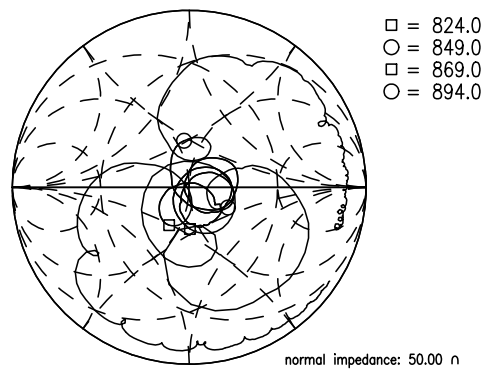
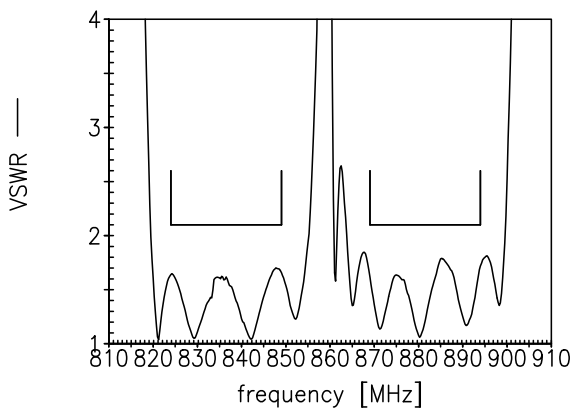
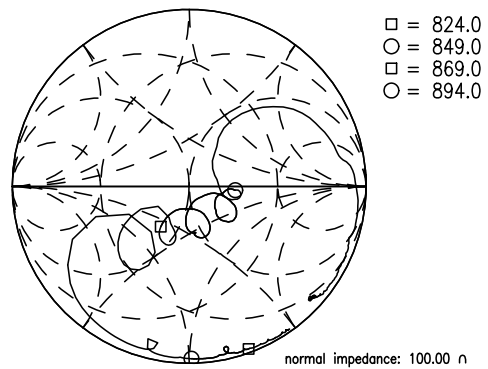
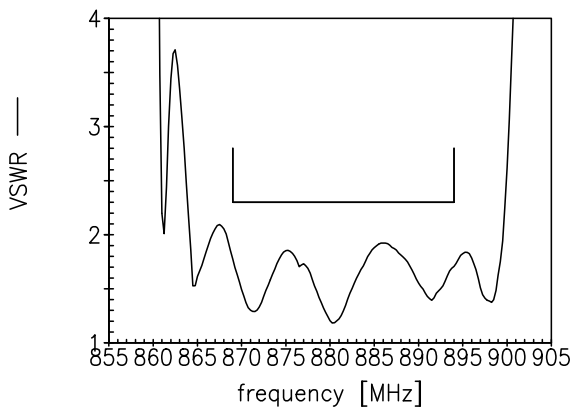
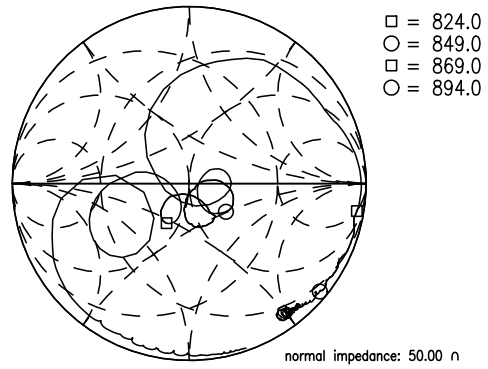
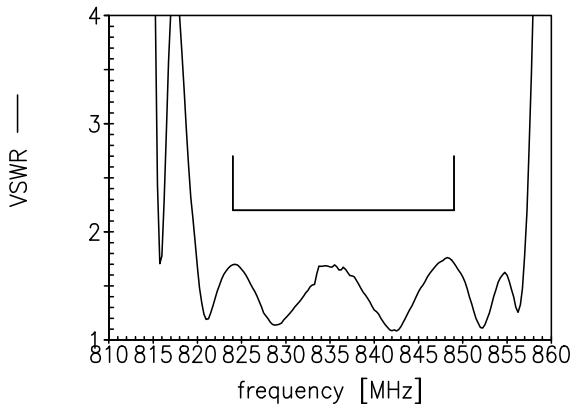


Frequency Response TX-RX (Wideband Differential Mode Isolation)



Frequency Response TX-RX (Passband Common Mode Isolation)

Frequency Response TX-RX (Wideband Common Mode Isolation)


Matching (TX, RX, ANT)



SAW Components	B8556
SAW Duplexer	836.50 / 881.50 MHz
Data Sheet	

References

Type	B8556
Ordering code	B39881B8556P810
Marking and package	C61157-A8-A40
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8556_UN_NB.s4p, B8556_UN_WB.s4p; 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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