



SAW Components

SAW Duplexer

W-CDMA Band 5 / CDMA 800

Series/type:	B7654
Ordering code:	B39881B7654P810
Date:	December 28, 2011
Version:	2.0



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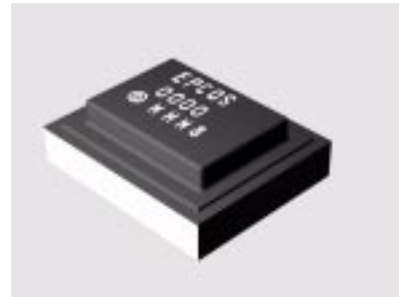
836.5 / 881.5 MHz

Data sheet



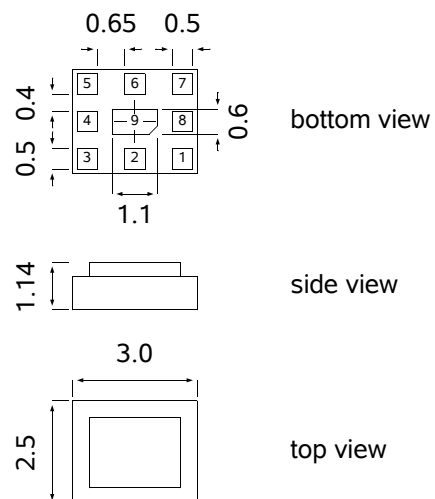
Application

- Low-loss SAW duplexer for mobile telephone W-CDMA Band 5 / CDMA 800 systems
- Low insertion attenuation
- Low amplitude ripple
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path



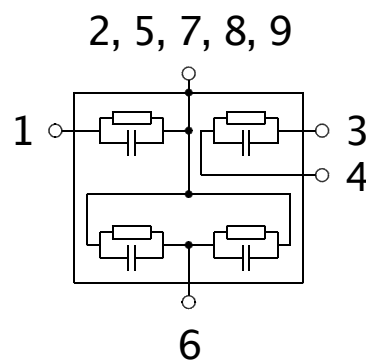
Features

- Package size 3.0 x 2.5 x 1.14 mm³
- RoHS compatible
- Approximate weight 0.032 g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- Balanced Rx port, unbalanced Tx port
- **Electrostatic Sensitive Device (ESD)**
- Fully matched by integrated matching network
- **Moisture Sensitive Level 3**



Pin configuration

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





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Characteristics

Temperature range for specification: $T = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
 Tx terminating impedance: $Z_{\text{Tx}} = 50 \Omega$
 Antenna terminating impedance: $Z_{\text{Ant}} = 50 \Omega$
 Rx terminating impedance: $Z_{\text{Rx}} = 100 \Omega$ (balanced)

Characteristics Tx-Antenna				min.	typ. @ 25 °C	max.	
Center frequency f_c				—	836.5	—	MHz
Maximum insertion attenuation α 824.0 ... 849.0 MHz				—	1.7	2.2	dB
Amplitude ripple (p-p) $\Delta\alpha$ 824.0 ... 849.0 MHz				—	0.8	1.3	dB
Tx port VSWR 824.0 ... 849.0 MHz				—	1.8	2.1	
Antenna port VSWR 824.0 ... 849.0 MHz				—	1.8	2.1	
Attenuation α							
10.0	...	420.0	MHz	30	45	—	dB
420.0	...	494.0	MHz	38	55	—	dB
494.0	...	701.0	MHz	30	42	—	dB
701.0	...	728.0	MHz	35	42	—	dB
728.0	...	764.0	MHz	36	42	—	dB
764.0	...	804.0	MHz	30	42	—	dB
860.0	...	869.0	MHz	5	11	—	dB
869.0	...	894.0	MHz	44	55	—	dB
1565.42	...	1573.374	MHz	35	45	—	dB
1573.374	...	1577.466	MHz	40	45	—	dB
1577.466	...	1585.42	MHz	35	45	—	dB
1597.5515	...	1605.88	MHz	40	44	—	dB
1648.0	...	1698.0	MHz	30	42	—	dB
1884.0	...	1919.0	MHz	30	39	—	dB
1930.0	...	1990.0	MHz	34	38	—	dB
2110.0	...	2170.0	MHz	33	37	—	dB
2400.0	...	2500.0	MHz	25	35	—	dB
2500.0	...	2547.0	MHz	20	33	—	dB
3286.0	...	3406.0	MHz	15	24	—	dB
4255.0	...	4600.0	MHz	15	26	—	dB
4934.0	...	5350.0	MHz	8	17	—	dB
5725.0	...	6000.0	MHz	6	14	—	dB



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Characteristics

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Antenna terminating impedance:	Z _{Ant} = 50 Ω
Rx terminating impedance:	Z _{Rx} = 100 Ω (balanced)

Characteristics Antenna-Rx	min.	typ. @ 25 °C	max.	
Center frequency f_c	—	881.5	—	MHz
Maximum insertion attenuation α 869.0 ... 894.0 MHz	—	2.2	2.7	dB
Amplitude ripple (p-p) $\Delta\alpha$ 869.0 ... 894.0 MHz	—	0.9	1.4	dB
Antenna port VSWR 869.0 ... 894.0 MHz	—	1.7	2.0	
Rx port VSWR 869.0 ... 894.0 MHz	—	2.0	2.3	
CMRR ($ S_{32}-S_{42} / S_{32}+S_{42} $) 869.0 ... 894.0 MHz	21 ¹⁾	26	—	dB
Attenuation α				
10.0 ... 447.0MHz	45	55	—	dB
447.0 ... 824.0MHz	40	55	—	dB
824.0 ... 849.0MHz	45	55	—	dB
849.0 ... 854.0MHz	23	31	—	dB
909.0 ... 970.0MHz	13	17	—	dB
970.0 ... 1320.0 MHz	40	46	—	dB
1360.0 ... 2180.0MHz	45	60	—	dB
2180.0 ... 4500.0MHz	35	41	—	dB
4500.0 ... 6000.0MHz	30	37	—	dB

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

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Antenna terminating impedance: $Z_{Ant} = 50\ \Omega$
Rx terminating impedance: $Z_{Rx} = 100\ \Omega$ (balanced)

Characteristics Tx-Rx	min.	typ. @ 25 °C	max.	
Differential mode isolation α				
824.0 ... 849.0 MHz	52	56	—	dB
869.0 ... 894.0 MHz	50	57	—	dB
Common mode isolation α				
824.0 ... 849.0 MHz	45	49	—	dB



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Characteristics

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Tx terminating impedance:	Z _{Tx} = 50 Ω
Antenna terminating impedance:	Z _{Ant} = 50 Ω
Rx terminating impedance:	Z _{Rx} = 100 Ω (balanced)

Intermodulation Characteristics SV-LTE coexistence CDMA Cell - LTE Band 13 ¹⁾	min.	typ. @ 25 °C	max.	
Case 1 - IM3 in CDMA Cell Rx band²⁾ $f_{TX5} = 824.0 \dots 832.0 \text{ MHz}$ $P_{TX5}^{3)} = 24 \text{ dBm}$ $f_{jam} = 779.0 \dots 787.0 \text{ MHz}$ $P_{jam} = 9 \text{ dBm}$ $f_{RX5} = 869.0 \dots 877.0 \text{ MHz}$ P_{RX5}	—	-103	—	dBm
Case 2 - IM3 in B13 Rx band²⁾ $f_{TX5} = 824.0 \dots 828.0 \text{ MHz}$ $P_{TX5}^{3)} = 24 \text{ dBm}$ $f_{jam} = 785.0 \dots 787.0 \text{ MHz}$ $P_{jam} = 9 \text{ dBm}$ $f_{RX13} = 746.0 \dots 750.0 \text{ MHz}$ P_{RX13}	—	-112	—	dBm

¹⁾ In combination with TDK-EPC LTE Band13 duplexer B7928

²⁾ See picture 1 on page 7.

³⁾ Power level at Ant of picture 1 on page 7.



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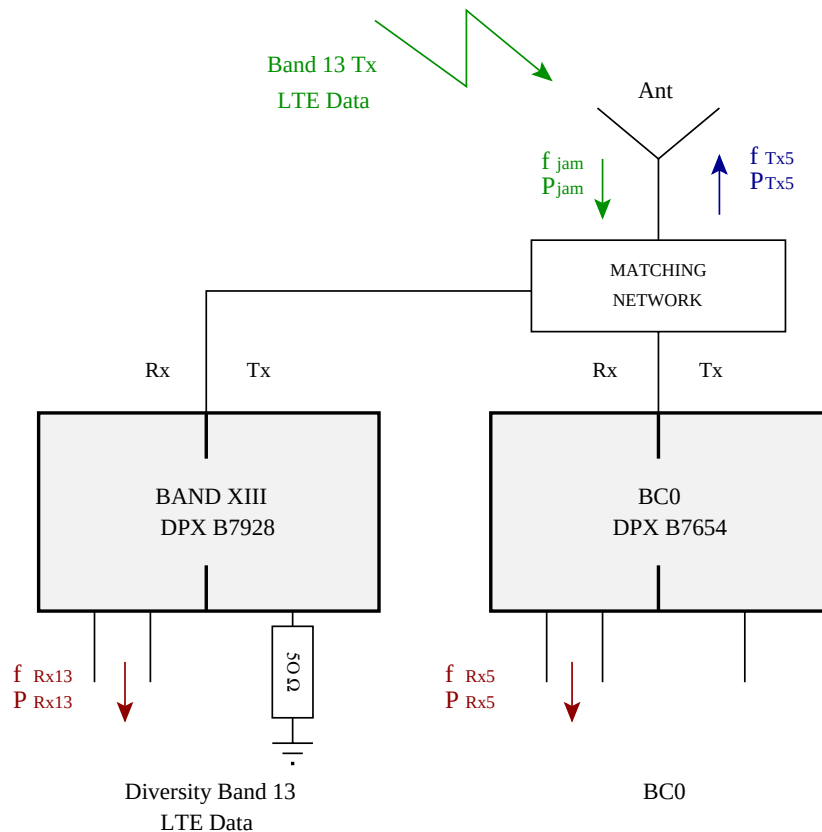
Data sheet



Maximum ratings

Storage temperature range	T_{stg}	-40/+85	°C	machine model, 1 pulse source and load impedance 50 Ω } continuous wave 55 °C, 5000h
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100 ¹⁾	V	
Input power at				
824.0 ... 849.0 MHz	P_{in}	29	dBm	
elsewhere	P_{in}	10	dBm	

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



Picture 1: Signal definition for SV-LTE coexistence intermodulation specification using TDK-EPC CDMA cell duplexer B7654 in combination with LTE Band 13 duplexer B7928.



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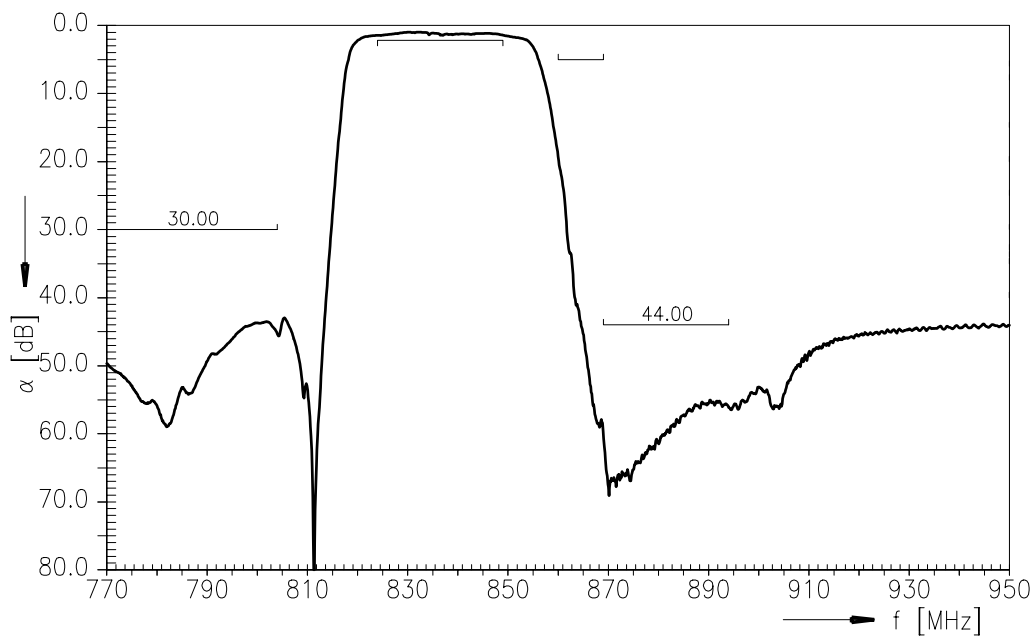
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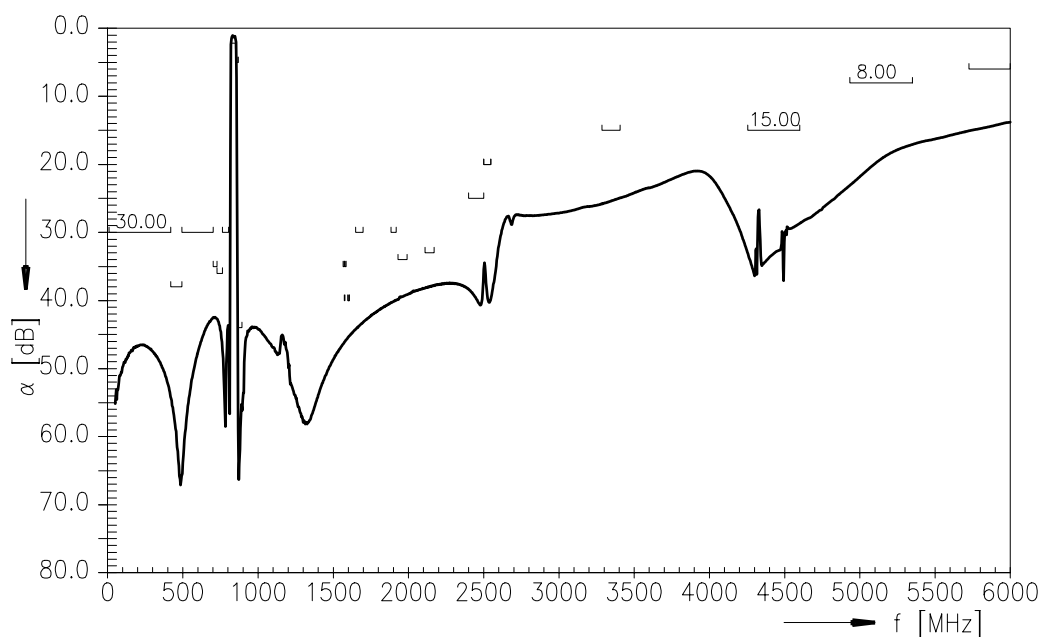
Data sheet



Frequency response Tx-Antenna



Frequency response Tx-Antenna (wideband)



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



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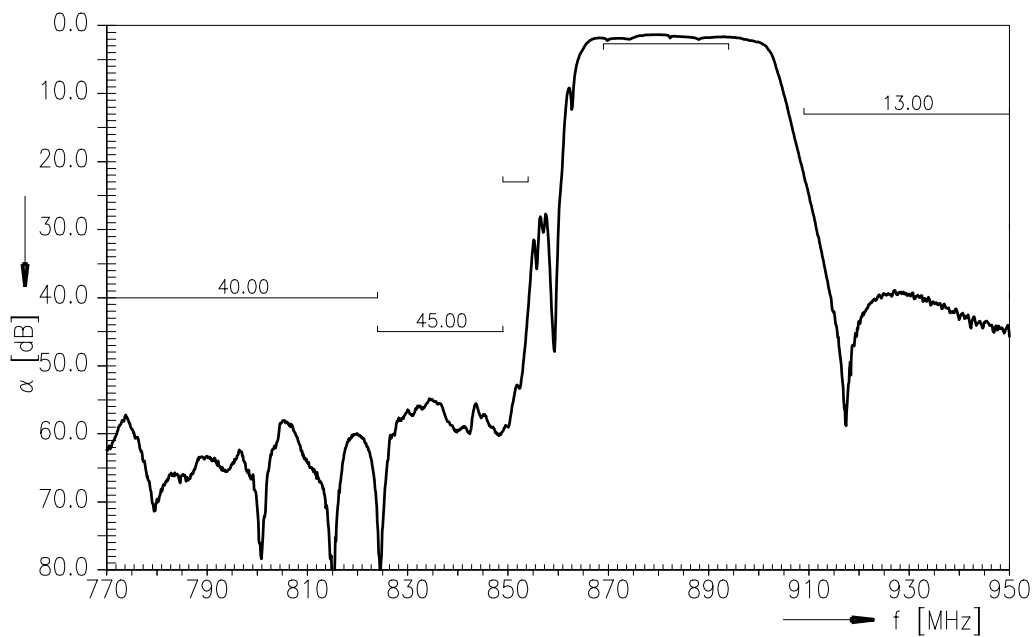
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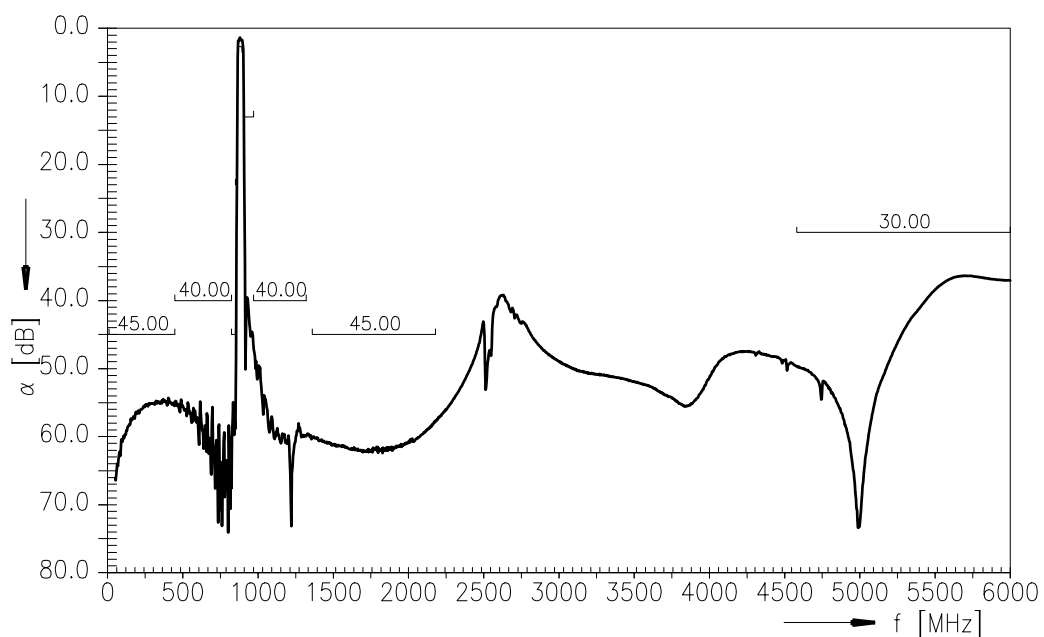
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Frequency response Antenna-Rx



Frequency response Antenna-Rx (wideband)



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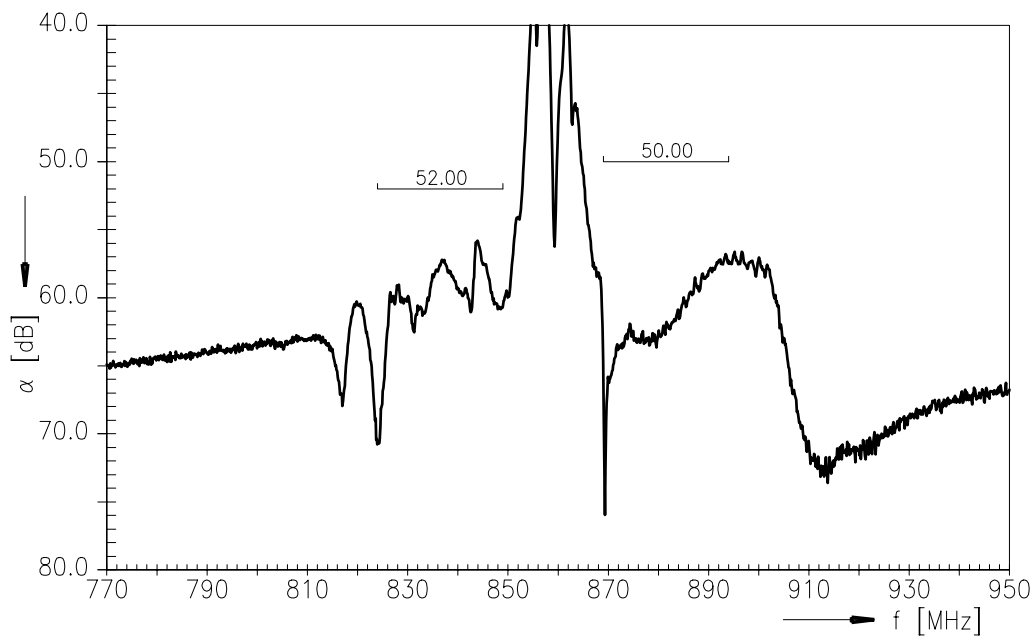
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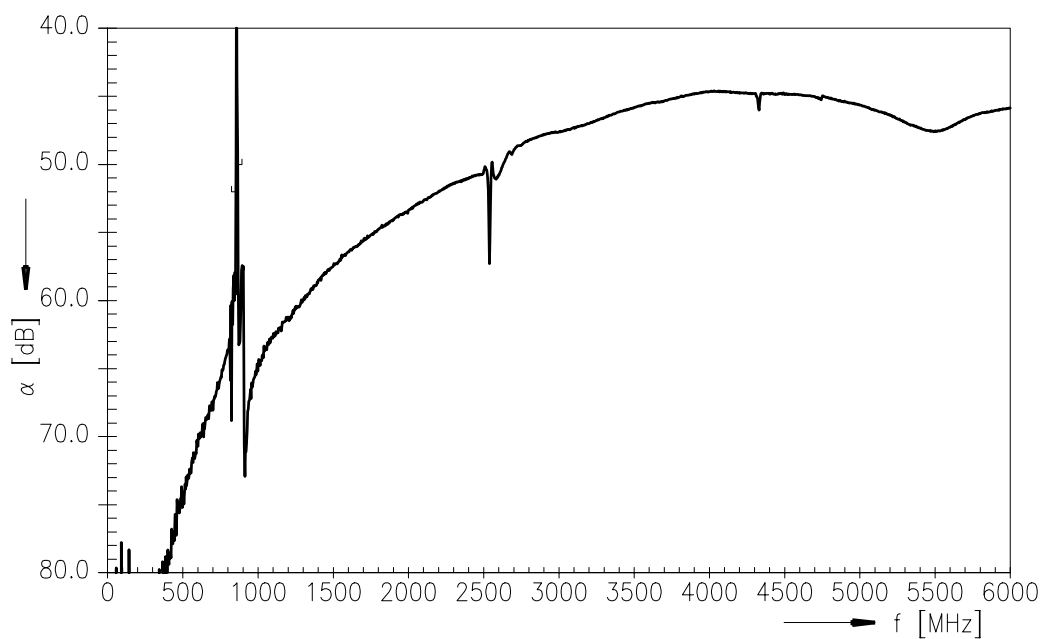
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Frequency response Tx-Rx



Frequency response Tx-Rx (wideband)



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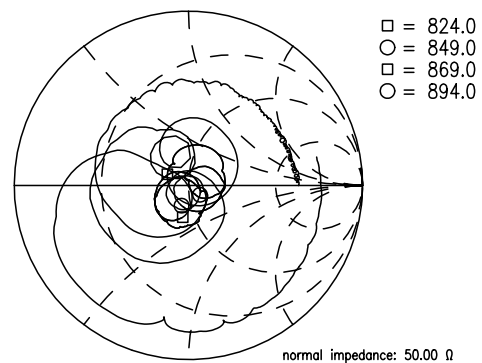
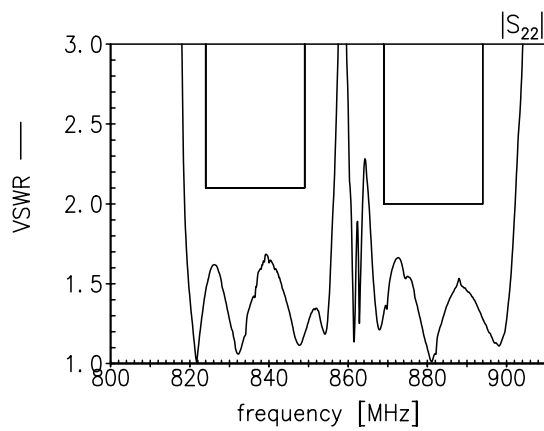
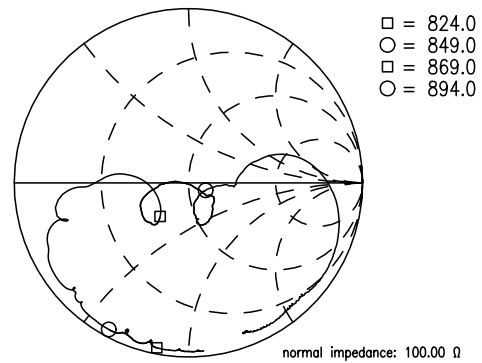
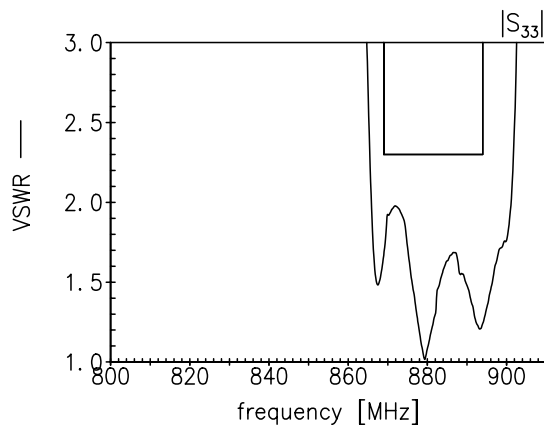
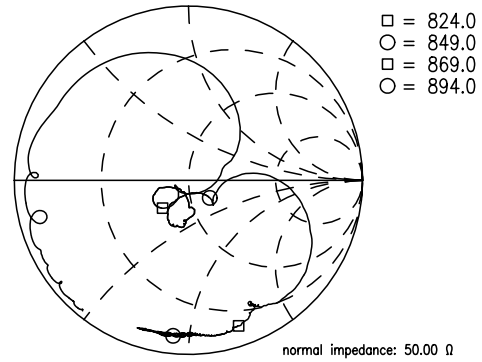
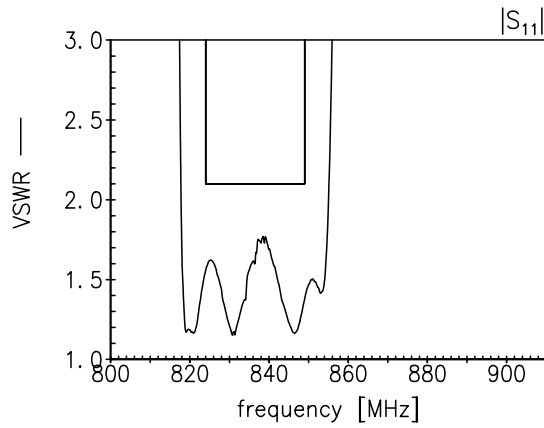


Return loss

S_{11} Tx-port

S_{22} Antenna-port

S_{33} Rx-portReferences



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Type	B7654
Ordering code	B39881B7654P810
Marking and package	C61157-A3-A87
Packaging	F61074-V8211-Z000
Date codes	L_1126
S-parameters	B7654_NB.s4p, B7654_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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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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