SAW Components

SAW Duplexer

WCDMA Band IV (AWS)

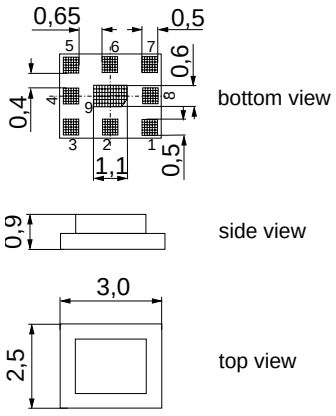
Series/type:	**B7680**
Ordering code:	**B39212B7680A710**
Date:	June 06, 2008
Version:	2.0

Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band IV (AWS) systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path

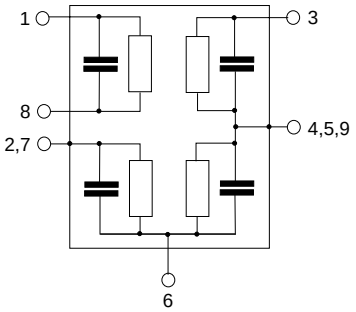
Features

- Package size 3.0 x 2.5 x 0.9 mm^3
- RoHS compatible
- Approx. weight 0.035 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- Fully matched by integrated matching network
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

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



Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT				**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency		f_C			1732.5		MHz
Maximum insertion attenuation							
@$f_{carrier}$1712.4 ... 1752.6 MHz		α_{WCDMA} [1]			1.7	2.0	dB
Amplitude ripple (p-p)							
@$f_{carrier}$1712.4 ... 1752.6 MHz		$\Delta\alpha_{WCDMA}$ [1]			0.4	1.0	dB
Amplitude ripple (p-p) **per 5 MHz-channel**							
1710.0 ... 1755.0 MHz		$\Delta\alpha_{ch}$			0.2	0.5	dB
Error Vector Magnitude							
@$f_{carrier}$1712.4 ... 1752.6 MHz		EVM [2]			0.9	2.0	%
Input VSWR (TX port)							
1710.0 ... 1755.0 MHz					1.8	2.1	
Output VSWR (ANT port)							
1710.0 ... 1755.0 MHz					1.6	2.0	
Attenuation		α					
10.0 ... 1574.0 MHz				30	35		dB
1574.0 ... 1577.0 MHz				40	44		dB
1805.0 ... 1880.0 MHz				20	43		dB
1930.0 ... 1990.0 MHz				27	40		dB
@$f_{carrier}$2112.4 ... 2152.6 MHz		α_{WCDMA} [1]		42	51		dB
2400.0 ... 2500.0 MHz				29	36		dB
3420.0 ... 3510.0 MHz				20	29		dB
5130.0 ... 5350.0 MHz				18	23		dB
5725.0 ... 5850.0 MHz				15	19		dB
6840.0 ... 7020.0 MHz					10		dB
8550.0 ... 8775.0 MHz					23		dB
10260.0 ... 10530.0 MHz					34		dB
11970.0 ... 12285.0 MHz					31		dB

[1] Attenuation of WCDMA signal (“Powertransferfunction“). Please refer to annotation on page (6).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C		2132.5		MHz
Maximum insertion attenuation					
@$f_{carrier}$2112.4 ... 2152.6 MHz	α_{WCDMA} [1]		2.1	2.5	dB
Amplitude ripple (p-p)					
@$f_{carrier}$2112.4 ... 2152.6 MHz	$\Delta\alpha_{WCDMA}$ [1]		0.3	1.0	dB
Amplitude ripple (p-p) **per 5 MHz-channel**					
2110.0 ... 2155.0 MHz	$\Delta\alpha_{ch}$		0.2	0.5	dB
Error Vector Magnitude					
@$f_{carrier}$2112.4 ... 2152.6 MHz	EVM [2]		0.5	2.0	%
Input VSWR (ANT port)					
2110.0 ... 2155.0 MHz			1.6	2.0	
Output VSWR (RX port)					
2110.0 ... 2155.0 MHz			1.8	2.0	
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)					
2110.0 ... 2155.0 MHz		-10	-7	10	degree
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
2110.0 ... 2155.0 MHz		-1.0	0.5	1.0	dB
IMD Product Level Limits					
at f_{TX} = 1732.5 MHz f_{RX} = 2132.5 MHz [3]					
Blocker 1 400 MHz			-123	-106	dBm
Blocker 2 2 f_{TX} +400 MHz			-112	-106	dBm
Blocker 3 f_{TX} -400 MHz			-114	-109	dBm
Blocker 4 3 f_{TX} + 400 MHz			-125	-109	dBm

1) Attenuation of WCDMA signal (“Powertransferfunction“). Please refer to annotation on page (6).
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
3) Power levels: 21 dBm Tx signal, -15dBm blocker at antenna port.

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX				min.	typ. @ 25 ˚C	max.	
Attenuation			α				
10.0	... 1710.0	MHz		35	49		dB
@$f_{carrier}$1712.4	... 1752.6	MHz	α_{WCDMA}[1)]	45	54		dB
1755.0	... 2025.0	MHz		15	33		dB
2240.0	... 2400.0	MHz		15	33		dB
2400.0	... 2484.0	MHz		30	42		dB
2484.0	... 6000.0	MHz		35	40		dB
6000.0	... 6475.0	MHz		-	53		dB
10540.0	...10785.0	MHz		-	28		dB

1) Attenuation of WCDMA signal (“Powertransferfunction“). Please refer to annotation on page (6).

Characterisitcs TX - RX				min.	typ. @ 25 ˚C	max.	
Isolation			α_{WCDMA}[1)]				
@$f_{carrier}$1712.4	... 1752.6	MHz		53	56		dB
@$f_{carrier}$2112.4	... 2152.6	MHz		43	47		dB

1) Attenuation of WCDMA signal (“Powertransferfunction“). Please read annotation on page (6).

Maximum ratings

Temperature range for specification [1]	T	-20/+85		
Operable temperature range[2]	T	–30/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[3]	V	machine model, 10 pulses
Input power at	P_{IN}			source and load impedance 50 Ω
1710.0 ... 1755.0 MHz		29	dBm	} continuous wave
elsewhere		10	dBm	*T* = 50˚C, 5.000 h

[1] Defines the temperature range in which the specification values are warranted.

[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

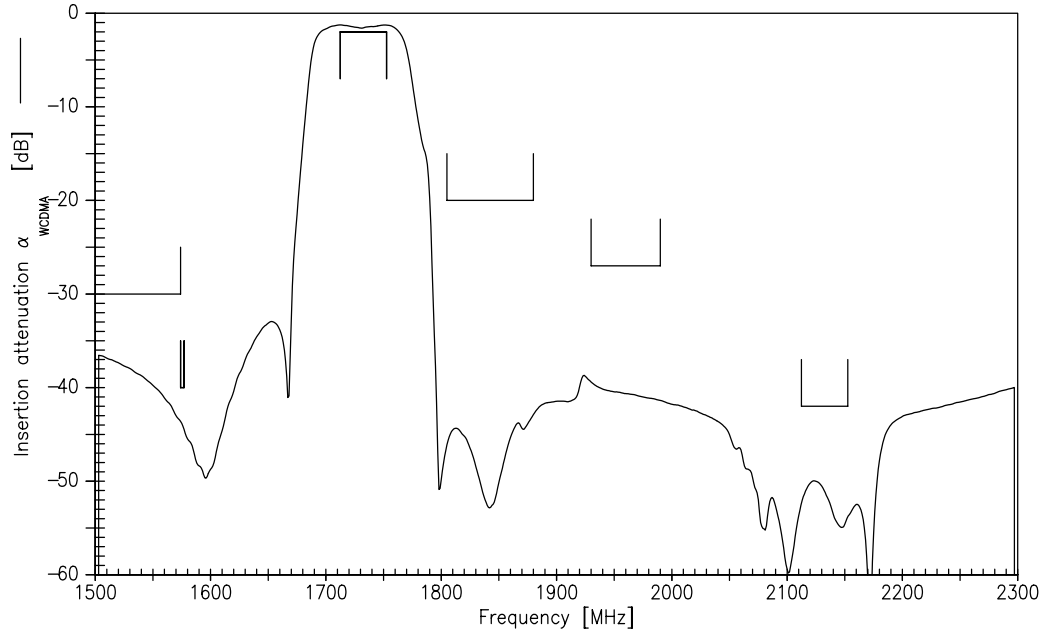
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

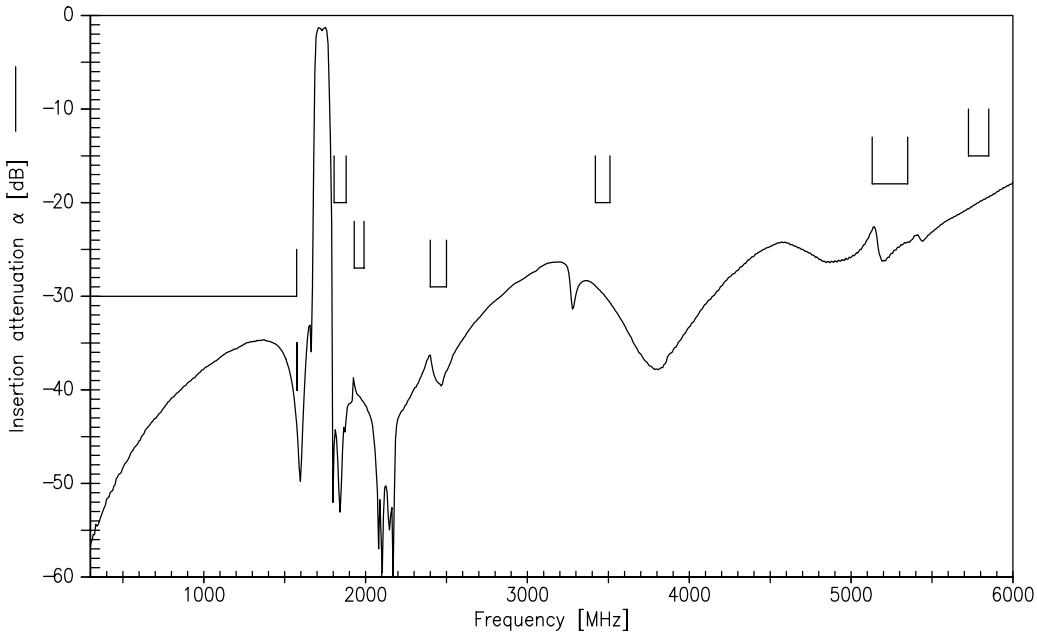
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for WCDMA Band 5-Passband, $f_{Carrier}$ ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following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

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

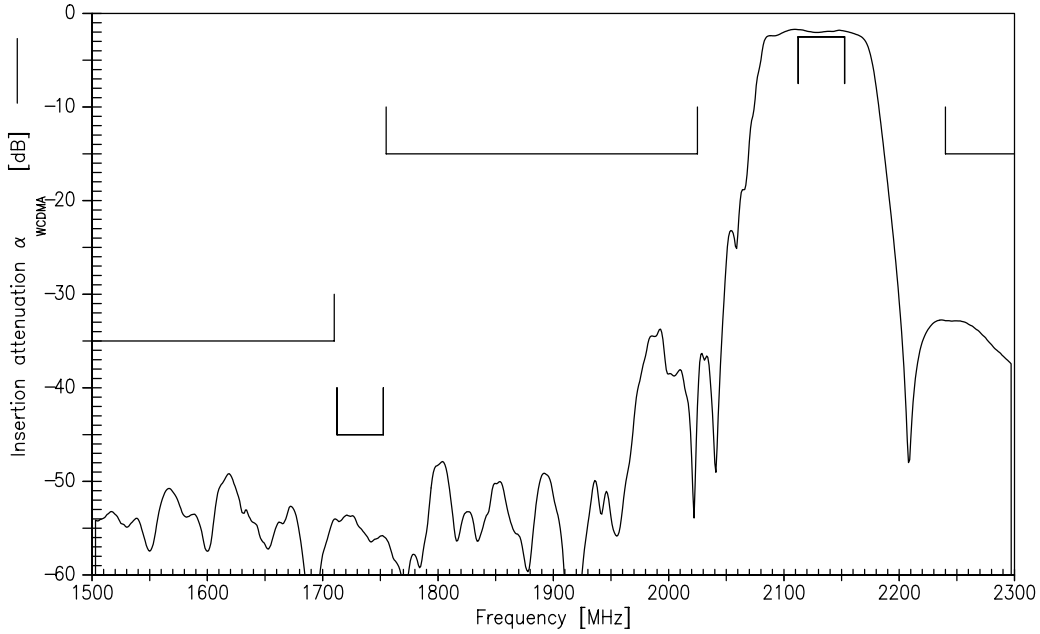
Frequency response TX-ANT



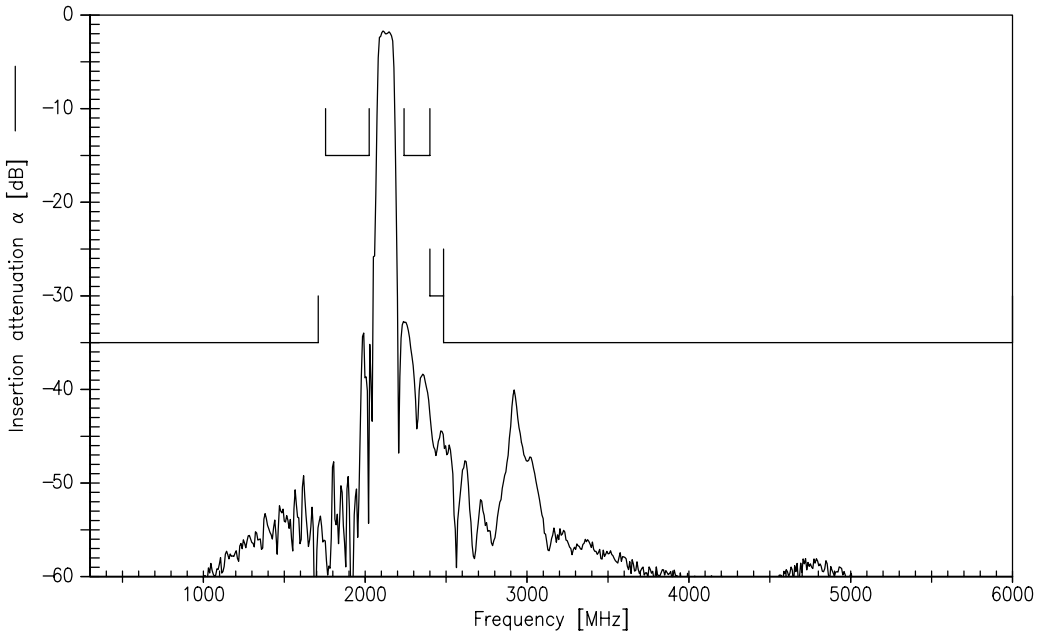
Frequency response TX-ANT (wideband)



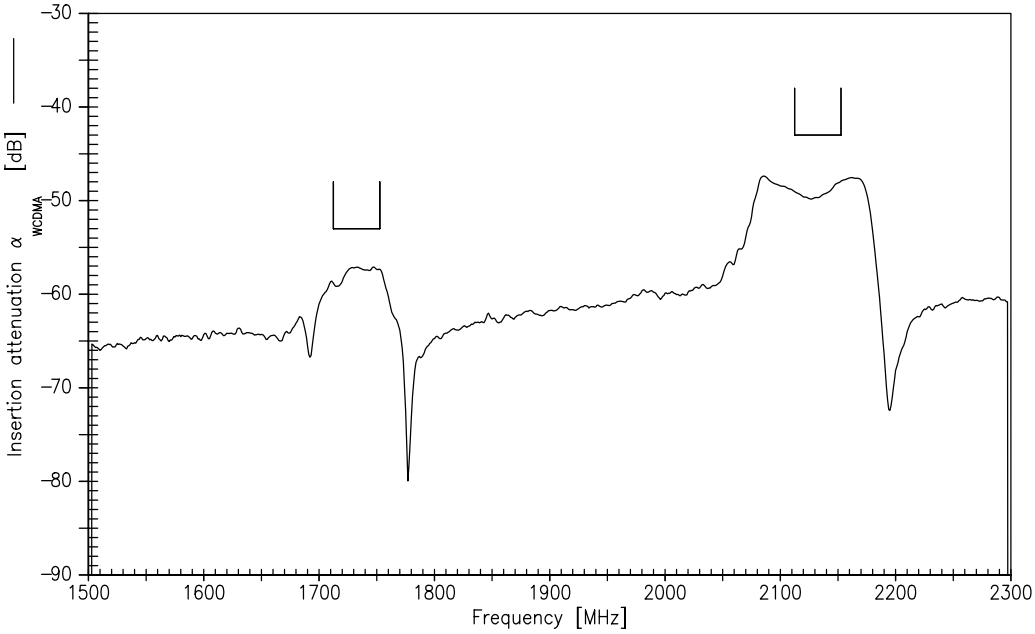
Frequency response RX-ANT



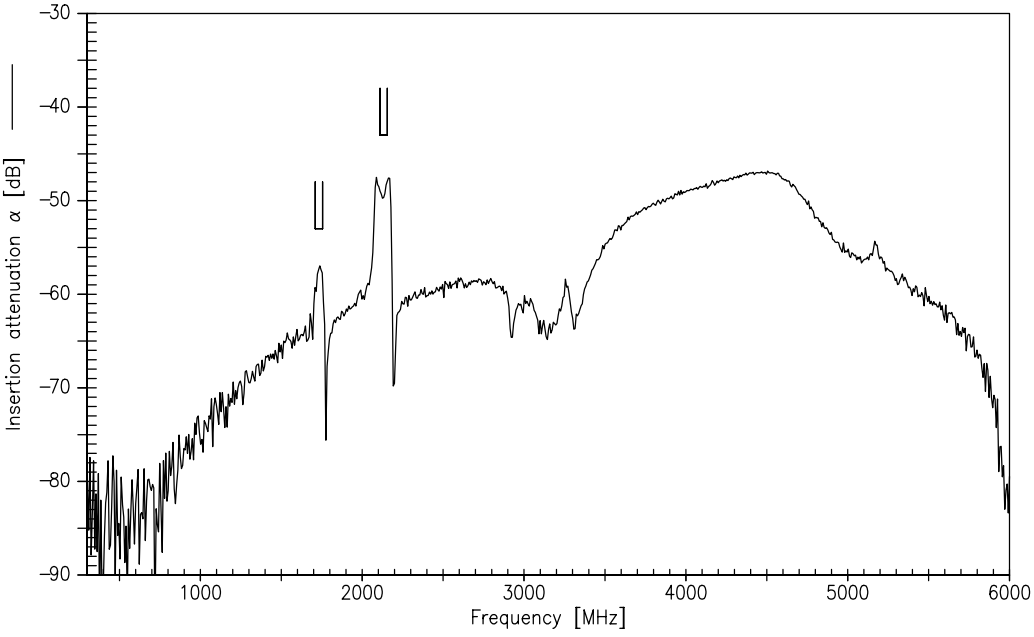
Frequency response RX-ANT (wideband)



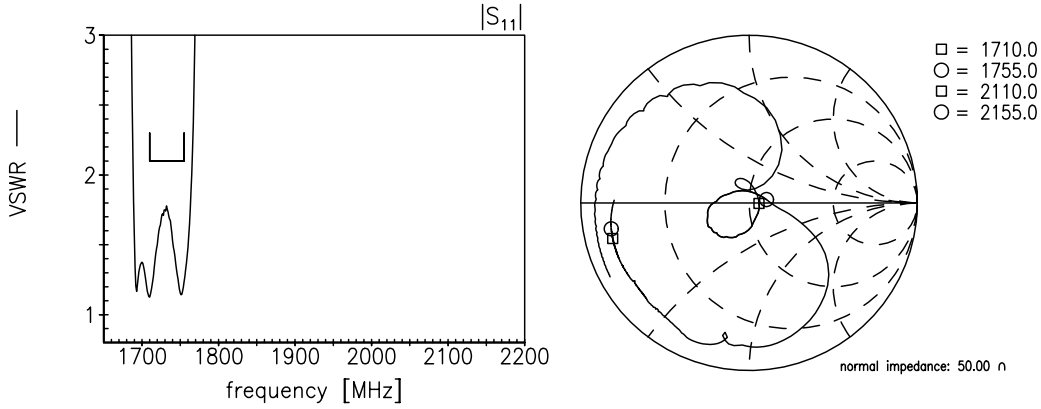
Frequency response TX-RX

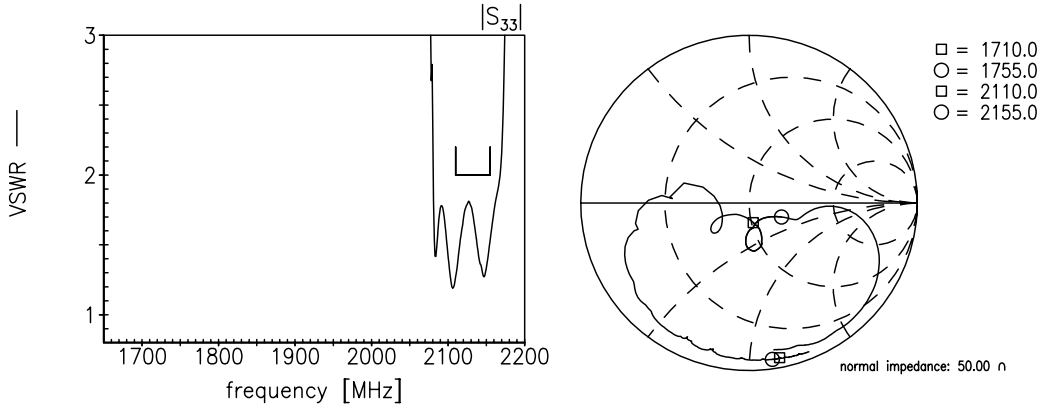


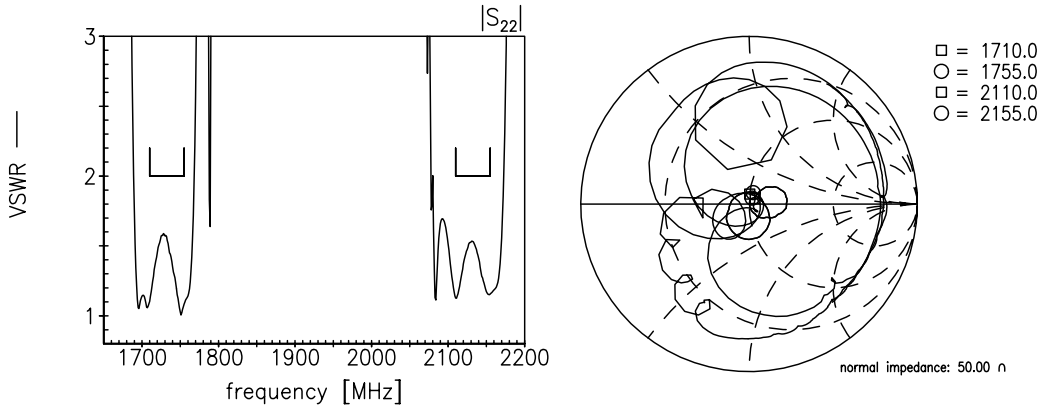
Frequency response TX-RX (wideband)



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







References

Type	B7680
Ordering code	B39212B7680A710
Marking and package	C61157-A3-A41
Packaging	F61074-V8211-Z000
Date codes	L_1126
S-parameters	B7680_NB.s4p B7680_WB.s4p See file header for pin / port assignements.
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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