# SAW Components

## SAW Duplexer

Band IV DPX for femtocell

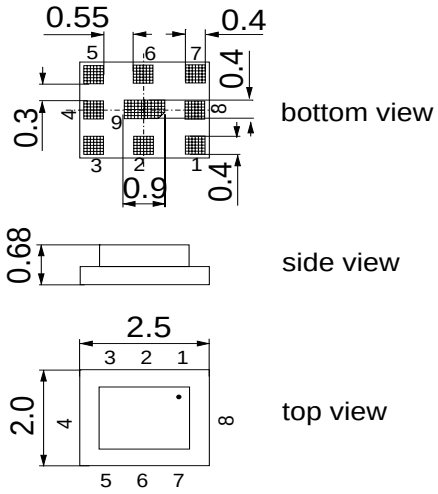
| | |
|---|---|
| **Series/type:** | **B7936** |
| **Ordering code:** | **B39212B7936P810** |
| Date: | September 19, 2012 |
| Version: | 2.0 |

## Application

- Low-loss SAW duplexer for WCDMA femtocell systems (Band IV)
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- High power durability

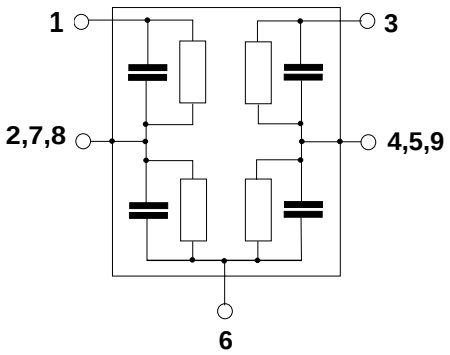

## Features

- Package size 2.5 * 2.0 * 0.68 mm³
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, Au-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- Moisture Sentivity Level 3




## Pin configuration

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



## Characteristics

Temperature range for specification: T = –10 ˚C to +85 ˚C
RX terminating impedance: $Z_{RX}$ = 50 Ω
Antenna terminating impedance: $Z_{ANT}$= 50 Ω ‖ 3.3nH
TX terminating impedance: $Z_{TX}$ = 50 Ω

| Characterisitcs ANT - RX | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_C$ | - | 1732.5 | - | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 1710.0 ... 1755.0 MHz | | - | 2.1 | 2.5 | dB |
| **Amplitude ripple** (p-p) | $\Delta\alpha$ | | | | |
| 1710.0 ... 1755.0 MHz | | - | 0.5 | 1.0 | dB |
| **Error Vector Magnitude** | EVM[1)] | | | | |
| @$f_{carrier}$ 1712.4 ... 1752.6 MHz | | - | 1.5 | 2.0 | % |
| **Input VSWR (RX port)** | | | | | |
| 1710.0 ... 1755.0 MHz | | - | 1.7 | 2.1 | |
| **Output VSWR (ANT port)** | | | | | |
| 1710.0 ... 1755.0 MHz | | - | 1.8 | 2.0 | |
| **Attenuation** | $\alpha$ | | | | |
| 10.0 ... 1500.0 MHz | | 40.0 | 57.0 | - | dB |
| 1805.0 ... 1910.0 MHz | | 20.0 | 25.0 | - | dB |
| 1920.0 ... 1980.0 MHz | | 40.0 | 46.0 | - | dB |
| 2110.0 ... 2155.0 MHz | | 50.0 | 61.0 | - | dB |
| 2400.0 ... 2500.0 MHz | | 38.0 | 41.0 | - | dB |
| 3420.0 ... 3510.0 MHz | | 40.0 | 45.0 | - | dB |
| 4220.0 ... 4310.0 MHz | | 35.0 | 45.0 | - | dB |
| 5130.0 ... 5265.0 MHz | | 35.0 | 43.0 | - | dB |

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

## Characteristics

Temperature range for specification: T = –10 ˚C to +85 ˚C
RX terminating impedance: $Z_{RX}$ = 50 Ω
Antenna terminating impedance: $Z_{ANT}$= 50 Ω ‖ 3.3nH
TX terminating impedance: $Z_{TX}$ = 50 Ω

| Characterisitcs TX - ANT | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_C$ | - | 2132.5 | - | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 2110.0 ... 2155.0 MHz | | - | 1.7 | 2.4 | dB |
| **Amplitude ripple** (p-p) | $\Delta\alpha$ | | | | |
| 2110.0 ... 2155.0 MHz | | - | 0.5 | 1.0 | dB |
| **Error Vector Magnitude** | EVM[1)] | | | | |
| @$f_{carrier}$ 2112.4 ... 2152.6 MHz | | - | 0.9 | 2.0 | % |
| **Input VSWR (ANT port)** | | | | | |
| 2110.0 ... 2155.0 MHz | | - | 1.4 | 1.8 | |
| **Output VSWR (TX port)** | | | | | |
| 2110.0 ... 2155.0 MHz | | - | 1.4 | 1.8 | |
| **Attenuation** | $\alpha$ | | | | |
| 10.0 ... 1574.0 MHz | | 30.0 | 39.0 | - | dB |
| 1574.0 ... 1606.0 MHz | | 35.0 | 41.0 | - | dB |
| 1606.0 ... 1710.0 MHz | | 35.0 | 40.0 | - | dB |
| 1710.0 ... 1755.0 MHz | | 38.0 | 42.0 | - | dB |
| 1850.0 ... 1910.0 MHz | | 20.0 | 29.0 | - | dB |
| 1920.0 ... 2025.0 MHz | | 15.0 | 20.0 | - | dB |
| 2240.0 ... 2400.0 MHz | | 30.0 | 35.0 | - | dB |
| 2400.0 ... 2500.0 MHz | | 30.0 | 33.0 | - | dB |
| 2500.0 ... 3000.0 MHz | | 20.0 | 26.0 | - | dB |
| 4220.0 ... 4310.0 MHz | | 10.0 | 18.0 | - | dB |

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

## Characteristics

Temperature range for specification: T = –10 ˚C to +85 ˚C
RX terminating impedance: $Z_{RX}$ = 50 Ω
Antenna terminating impedance: $Z_{ANT}$ = 50 Ω ‖ 3.3nH
TX terminating impedance: $Z_{TX}$ = 50Ω

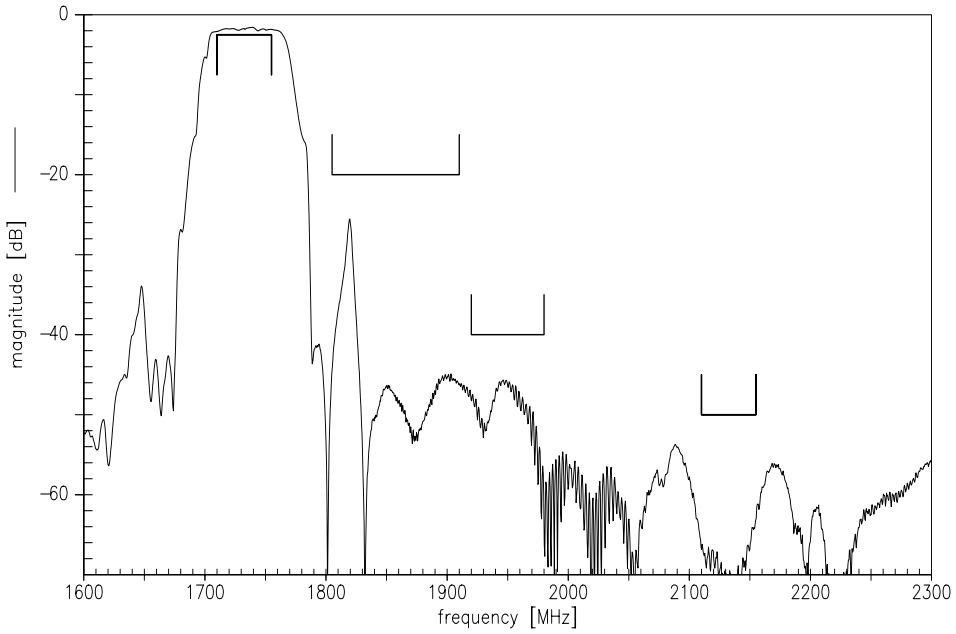
| Characteristics TX-RX | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|
| **Attenuation** | α | | | | |
| 1710.0 ... 1755.0 MHz | | 40.0 | 46.0 | - | dB |
| 2110.0 ... 2155.0 MHz | | 50.0 | 57.0 | - | dB |

## Maximum Ratings

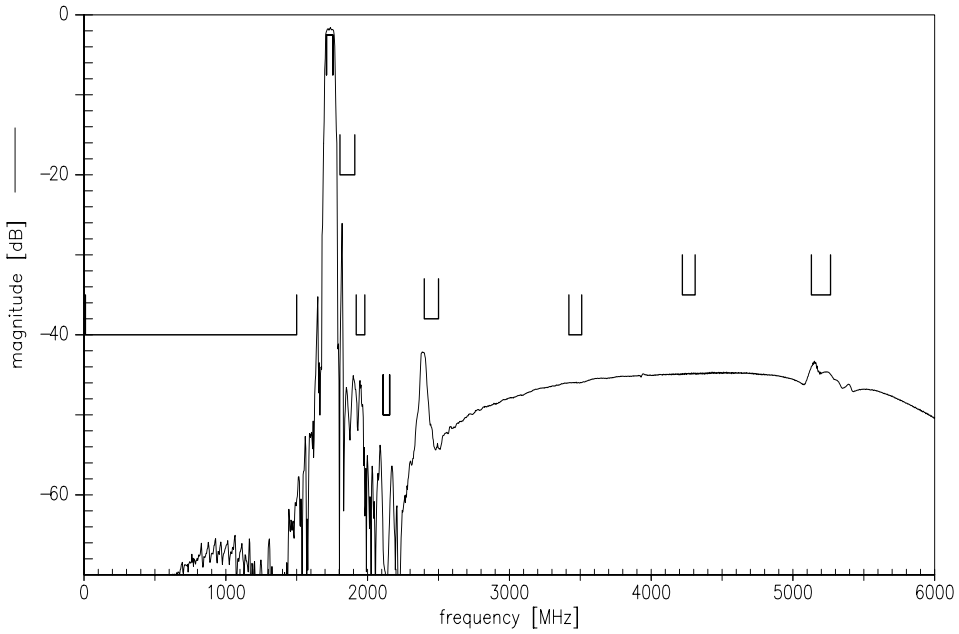
| | | | | |
|---|---|---|---|---|
| Storage temperature range | $T_{stg}$ | –40/+85 | ˚C | |
| DC voltage | $V_{DC}$ | 0 | V | |
| ESD voltage | $V_{ESD}$ | 50[1)] | V | machine model, 10 pulses |
| Input power at pin 1 | | | | source and load impedance 50 Ω |
| 2110.0 ...2155.0 MHz | $P_{in}$ | 27 | dBm | } LTE 5 MHz downlink average power T = 55˚C, 50.000 h |
| elsewhere | $P_{in}$ | 10 | dBm | |

1) According to JESD-A115B (machine model), +/- 10 pulses.

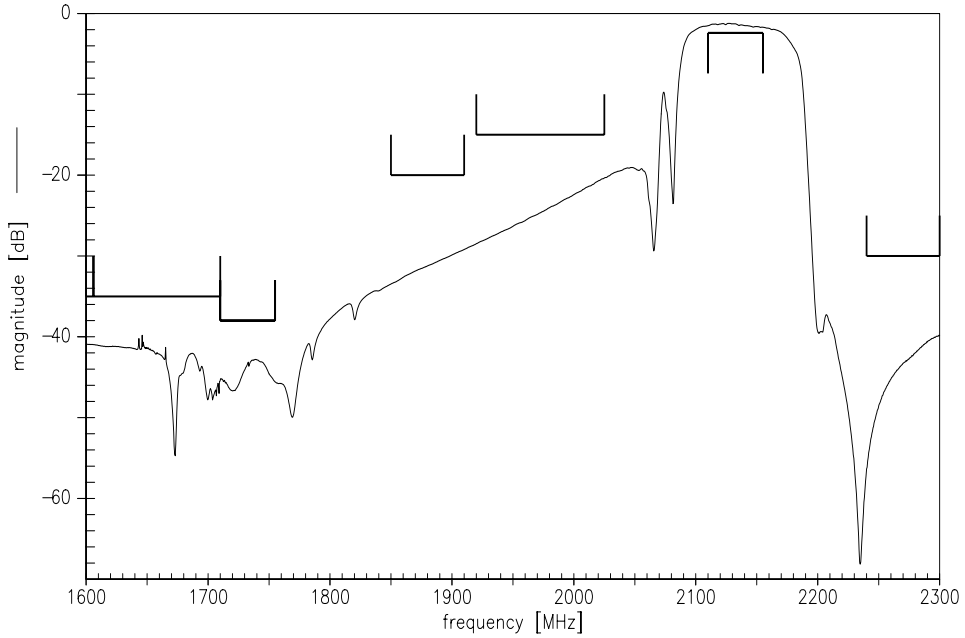
**Frequency Response ANT-RX**



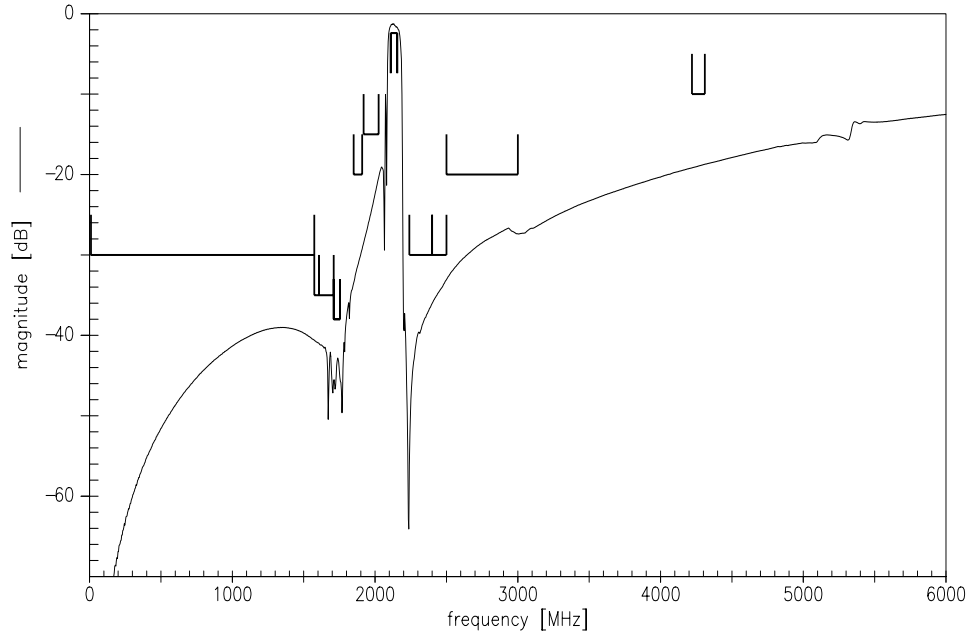

**Frequency Response ANT-RX**



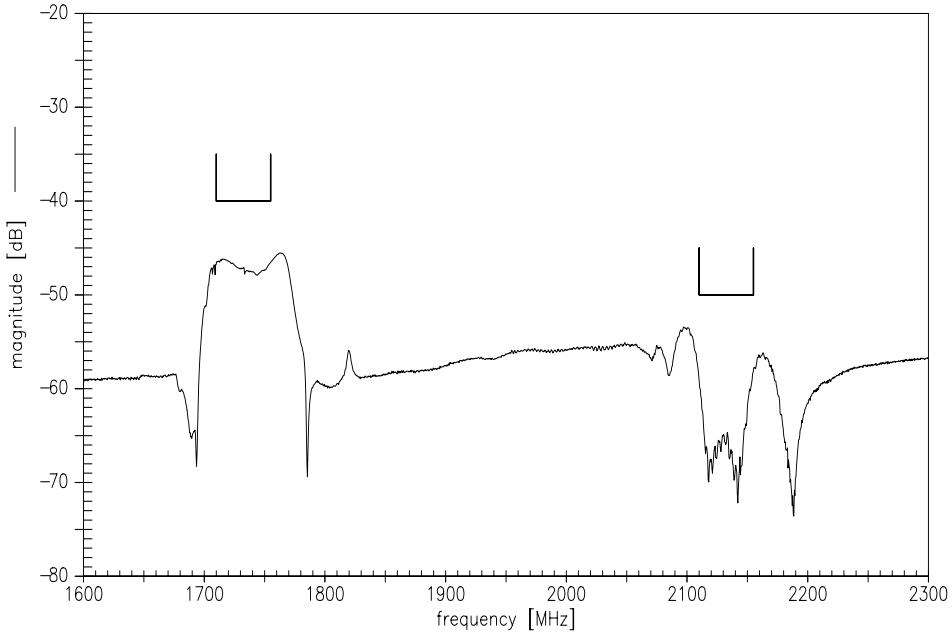
**Frequency Response TX-ANT**



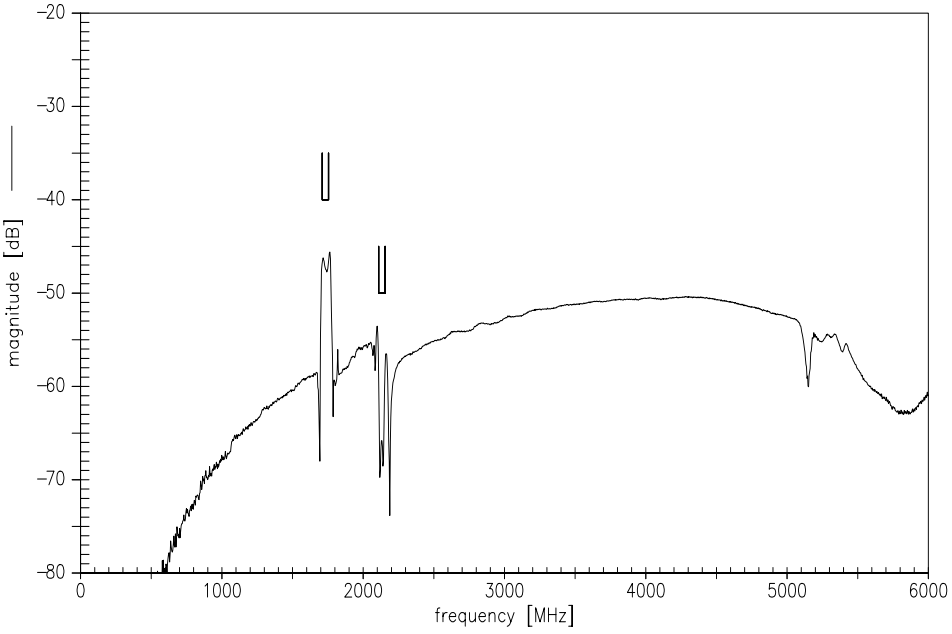

**Frequency Response TX-ANT**



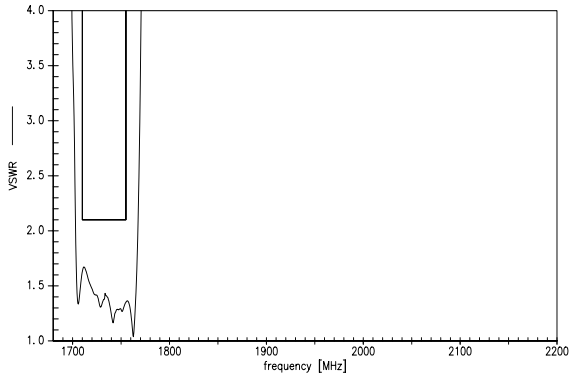
**Frequency Response TX-RX**

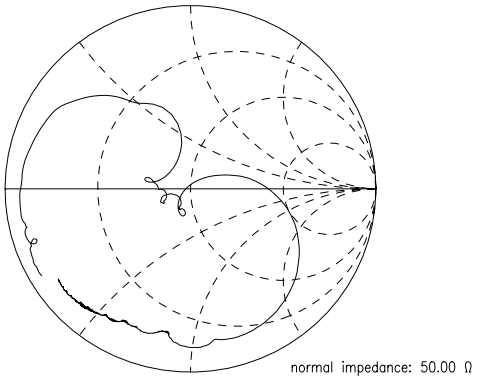



**Frequency Response TX-RX**

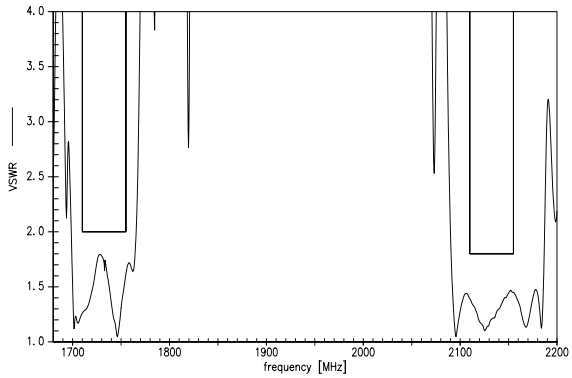


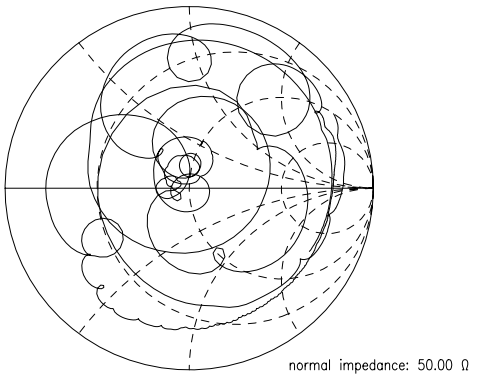
### S11 VSWR (RX)



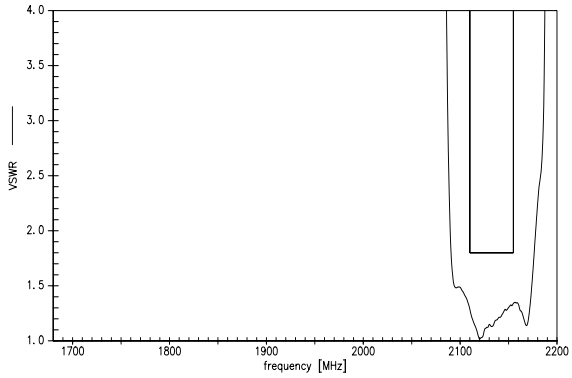



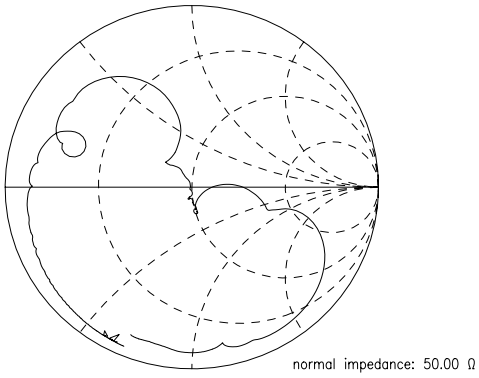

### S22 VSWR (ANT)



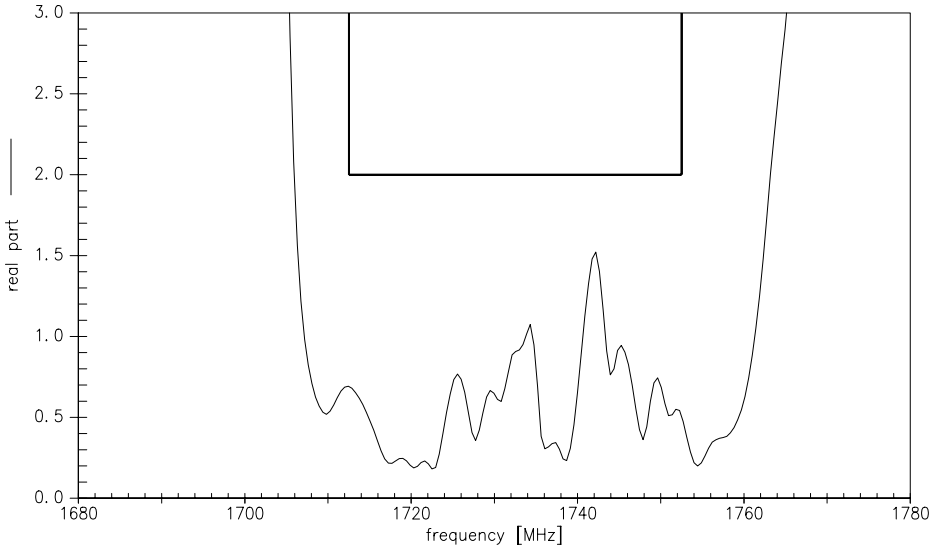




### S33 VSWR (TX)

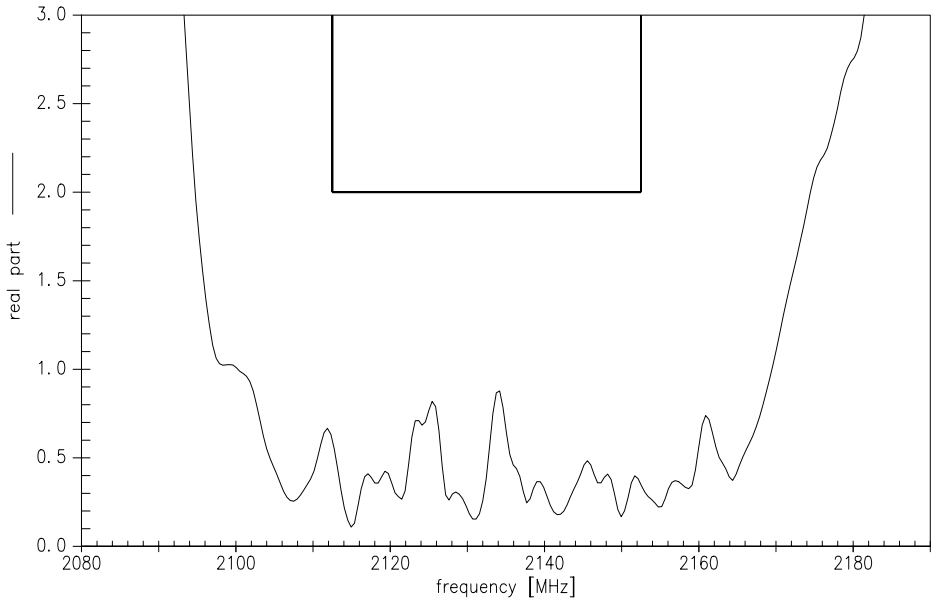


**EVM RX**


3.0
2.5
2.0
1.5
1.0
0.5
0.0
real part
1680
1700
1720
1740
1760
1780
frequency [MHz]

**EVM TX**


3.0
2.5
2.0
1.5
1.0
0.5
0.0
real part
2080
2100
2120
2140
2160
2180
frequency [MHz]

**References**

| | |
|---|---|
| **Type** | B7936 |
| **Ordering code** | B39212B7936P810 |
| **Marking and package** | C61157-A7-A173 |
| **Packaging** | F61074-V8153-Z000 |
| **Date codes** | L_1126 |
| **S-parameters** | B7936_NB.s3p<br>B7936_WB.s3p<br>see file header for port/pin assignment table |
| **Soldering profile** | S_6001 |
| **RoHS compatible** | Defined as compatible with the following documents:<br>"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." |
| **Moldability** | Before using in overmolding environment, please contact your EPCOS sales office. |
| **Matching coils** | See Inductor pdf-catalog<br>http://www.tdk.co.jp/tefe02/coil.htm#aname1<br>and Data Library for circuit simulation<br>http://www.tdk.co.jp/etvcl/index.htm |

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