# SAW Components

## SAW duplexer

WCDMA band VIII

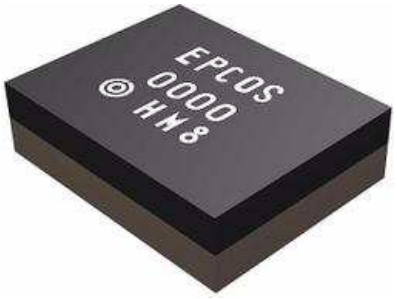
| | |
|---|---|
| **Series/type:** | **B8514** |
| **Ordering code:** | **B39941B8514P810** |
| Date: | April 9, 2013 |
| Version: | 2.0 |

## SAW duplexer 897.5 / 942.5 MHz

**Preliminary Data** SMD

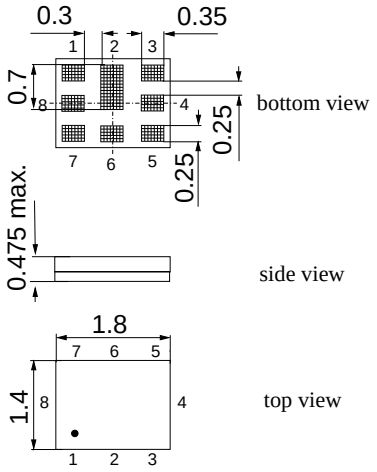
### Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- 50 Ω single-ended in both in Antenna-Rx and Tx-Antenna paths



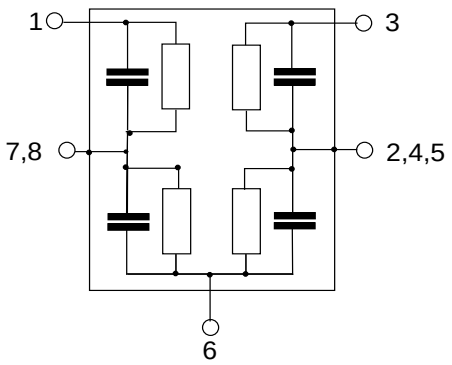

### Features

- Package size 1.8 x 1.4 x 0.475 mm³.
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, Au-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3




### Pin configuration

| | | |
|---|---|---|
| ■ | 1 | RX output (single-ended) |
| ■ | 3 | TX input (single-ended) |
| ■ | 6 | Antenna |
| ■ | 2,4,5,7,8 | Ground |



**Preliminary Data** SMD

## Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: $Z_{ANT}$= 50 Ω || 5.6nH
TX terminating impedance: $Z_{TX}$ = 50Ω
RX terminating impedance: $Z_{RX}$ = 50Ω

| Characteristics Tx - Ant | | | | | min. | typ. @25 ˚C | max. | |
|---|---|---|---|---|---|---|---|---|
| **Center frequency** | | | | $f_C$ | — | 897.5 | — | MHz |
| **Maximum insertion attenuation** | | | | | | | | |
| @$f_{Carrier}$ | 882.4 ... 912.6 | MHz | | $\alpha_{WCDMA}$ 1) | — | 2.0 | 2.7 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 2.2 | 3.9 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 2.2 | 2.8 3) | dB |
| **Amplitude ripple** (p-p) | | | | | | | | |
| @$f_{Carrier}$ | 882.4 ... 912.6 | MHz | | $\Delta\alpha_{WCDMA}$ 1) | — | 1.0 | 2.1 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 1.2 | 3.1 | dB |
| **Error Vector Magnitude** | | | | | | | | |
| @$f_{Carrier}$ | 882.4 ... 912.6 | MHz | | EVM 2) | — | 2.3 | 6.0 | % |
| **VSWR** | | | | | | | | |
| TX port | 880.0 ... 915.0 | MHz | | | — | 1.7 | 2.0 | |
| ANT port | 880.0 ... 915.0 | MHz | | | — | 1.7 | 2.2 | |
| **Attenuation** | | | | α | | | | |
| | 10.0 ... 716.0 | MHz | | | 30 | 35 | — | dB |
| | 716.0 ... 728.0 | MHz | | | 30 | 35 | — | dB |
| | 728.0 ... 793.0 | MHz | | | 30 | 35 | — | dB |
| @$f_{Carrier}$ | 927.4 ... 957.6 | MHz | | $\alpha_{WCDMA}$ 1) | 42 | 51 | — | dB |
| @$f_{Carrier}$ | 927.4 ... 957.6 | MHz | | $\alpha_{WCDMA}$ 1) | 44 3) | 51 | — | dB |
| | 1559.0 ... 1563.0 | MHz | | | 42 | 45 | — | dB |

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141
3) T= +25˚C

**Preliminary Data** SMD

## Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: $Z_{ANT}$= 50Ω || 5.6nH
TX terminating impedance: $Z_{TX}$ = 50Ω
RX terminating impedance: $Z_{RX}$ = 50Ω

| Characteristics Tx - Ant | | min. | typ. @25 ˚C | max. | |
|---|---|---|---|---|---|
| **Attenuation** | α | | | | |
| 1565.42 ... 1573.374 MHz | | 42 | 45 | — | dB |
| 1573.374 ... 1577.466 MHz | | 40 | 45 | — | dB |
| 1577.466 ... 1585.42 MHz | | 40 | 45 | — | dB |
| 1597.5515 ... 1605.886 MHz | | 40 | 44 | — | dB |
| 1760.0 ... 1830.0 MHz | | 35 | 38 | — | dB |
| 1830.0 ... 1880.0 MHz | | 27 | 36 | — | dB |
| 2110.0 ... 2170.0 MHz | | 27 | 33 | — | dB |
| 2400.0 ... 2500.0 MHz | | 26 | 30 | — | dB |
| 2620.0 ... 2745.0 MHz | | 22 | 27 | — | dB |
| 3520.0 ... 3660.0 MHz | | 20 | 26 | — | dB |
| 4400.0 ... 4575.0 MHz | | 20 | 25 | — | dB |
| 5150.0 ... 5490.0 MHz | | 10 | 19 | — | dB |
| 5725.0 ... 5850.0 MHz | | 10 | 14 | — | dB |

Preliminary Data SMD

## Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: $Z_{ANT}$= 50 Ω || 5.6nH
TX terminating impedance: $Z_{TX}$ = 50Ω
RX terminating impedance: $Z_{RX}$ = 50 Ω

| Charcteristics Rx - Ant | | | | | | min. | typ. @25 ˚C | max. | |
|---|---|---|---|---|---|---|---|---|---|
| **Center frequency** | | | | | $f_C$ | — | 942.5 | — | MHz |
| **Maximum insertion attenuation** | | | | | | | | | |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | $\alpha_{WCDMA}$ 1) | — | 1.9 | 2.6 | dB |
| | 925.0 | ... | 960.0 | MHz | | — | 2.4 | 4.3 | dB |
| | 925.0 | ... | 960.0 | MHz | | — | 2.4 | 2.8 3) | dB |
| **Amplitude ripple** (p-p) | | | | | | | | | |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | $\Delta\alpha_{WCDMA}$ 1) | — | 0.6 | 1.2 | dB |
| | 925.0 | ... | 960.0 | MHz | | — | 2.7 | 3.1 | dB |
| **Error Vector Magnitude** | | | | | | | | | |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | EVM 2) | — | 3.4 | 8.0 | % |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | EVM 4) | — | 3.4 | 5.0 3) | % |
| **VSWR** | | | | | | | | | |
| RX port | 925.0 | ... | 960.0 | MHz | | — | 1.7 | 2.2 | |
| ANT port | 925.0 | ... | 960.0 | MHz | | — | 1.9 | 2.2 | |
| **Attenuation** | | | | | $\alpha$ | | | | |
| | 10.0 | ... | 880.0 | MHz | | 40 | 58 | — | dB |
| | 902.5 | ... | 910.0 | MHz | | 30 | 55 | — | dB |
| @$f_{Carrier}$ | 882.4 | ... | 912.6 | MHz | $\alpha_{WCDMA}$ 1) | 45 | 55 | — | dB |
| | 980.0 | ... | 1045.0 | MHz | | 20 | 29 | — | dB |

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141
3) T= +25˚C

Preliminary Data

SMD

## Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: $Z_{ANT}$= 50 Ω || 5.6nH
TX terminating impedance: $Z_{TX}$ = 50Ω
RX terminating impedance: $Z_{RX}$ = 50Ω

| Charcteristics Rx - Ant | | | min. | typ. @25 ˚C | max. | |
|---|---|---|---|---|---|---|
| **Attenuation** | | | | | | |
| 1045.0 ... 1805.0 | MHz | | 35 | 52 | — | dB |
| 1805.0 ... 1920.0 | MHz | | 40 | 51 | — | dB |
| 1920.0 ... 2400.0 | MHz | | 35 | 48 | — | dB |
| 2400.0 ... 2500.0 | MHz | | 40 | 47 | — | dB |
| 2685.0 ... 2880.0 | MHz | | 40 | 46 | — | dB |
| 2880.0 ... 3700.0 | MHz | | 35 | 42 | — | dB |
| 3700.0 ... 3840.0 | MHz | | 35 | 42 | — | dB |
| 4625.0 ... 4800.0 | MHz | | 35 | 41 | — | dB |
| 5550.0 ... 5725.0 | MHz | | 30 | 38 | — | dB |
| 5725.0 ... 5875.0 | MHz | | 30 | 37 | — | dB |

Preliminary Data SMD

## Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: $Z_{ANT}$= 50 Ω || 5.6nH
TX terminating impedance: $Z_{TX}$ = 50Ω
RX terminating impedance: $Z_{RX}$ = 50Ω

| Charcteristics Tx - Rx | | | | | | min. | typ. @25 ˚C | max. | |
|---|---|---|---|---|---|---|---|---|---|
| **Isolation** | | | | | | | | | |
| @$f_{Carrier}$ | 882.4 | ... | 912.6 | MHz | $\alpha_{WCDMA}$ [1] | 53 | 56 | — | dB |
| | 880.0 | ... | 915.0 | MHz | | 52 | 55 | — | dB |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | $\alpha_{WCDMA}$ [1] | 48 | 59 | — | dB |
| @$f_{Carrier}$ | 927.4 | ... | 957.6 | MHz | $\alpha_{WCDMA}$ [1] | 55 [2] | 59 | — | dB |

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page 8.
[2] T= +15˚C to +85˚C

**Maximum ratings**

| | | | | |
|---|---|---|---|---|
| Storage temperature range | $T_{stg}$ | –40/+85[1)] | °C | |
| DC voltage | $V_{DC}$ | 5[2)] | V | |
| ESD voltage | $V_{ESD}$ | 100[3)] | V | machine model, 1 pulse |
| Input power at | $P_{IN}$ | | | |
| 880.0 ... 915.0 MHz | | 29 | dBm | } continuous wave 50 °C, 5000 h |
| elsewhere | | 10 | dBm | |

1) extended upperlimit: 96h@125°C acc. to IEC 60062-2-2 Bb
2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy
3) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

**Annotation for characteristics section**

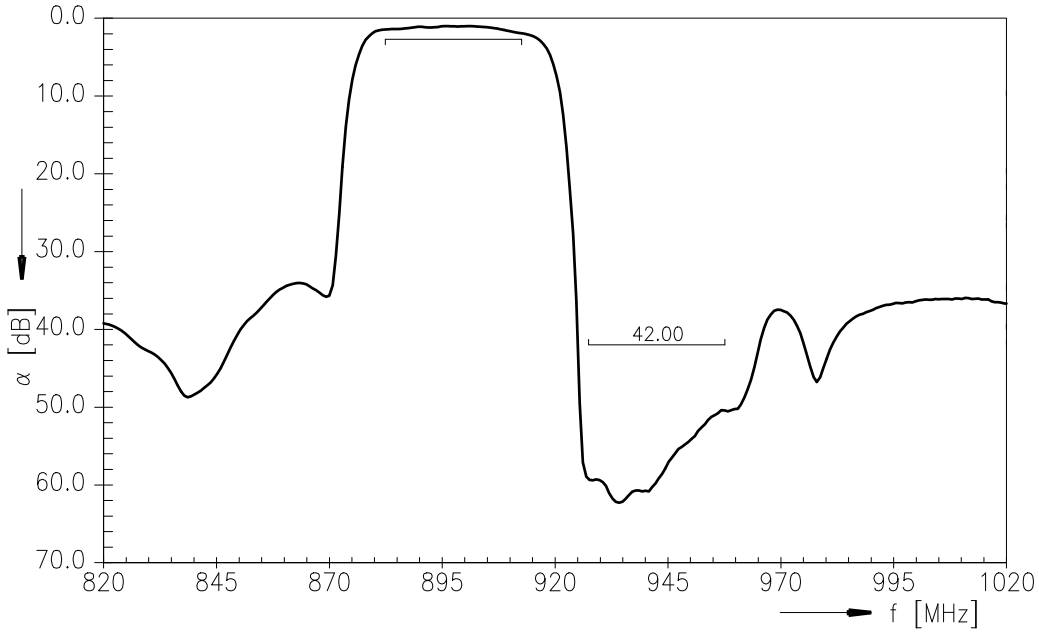
Attenuation of WCDMA signal ("Powertransferfunction", $\alpha_{WCDMA}$) is determined by

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

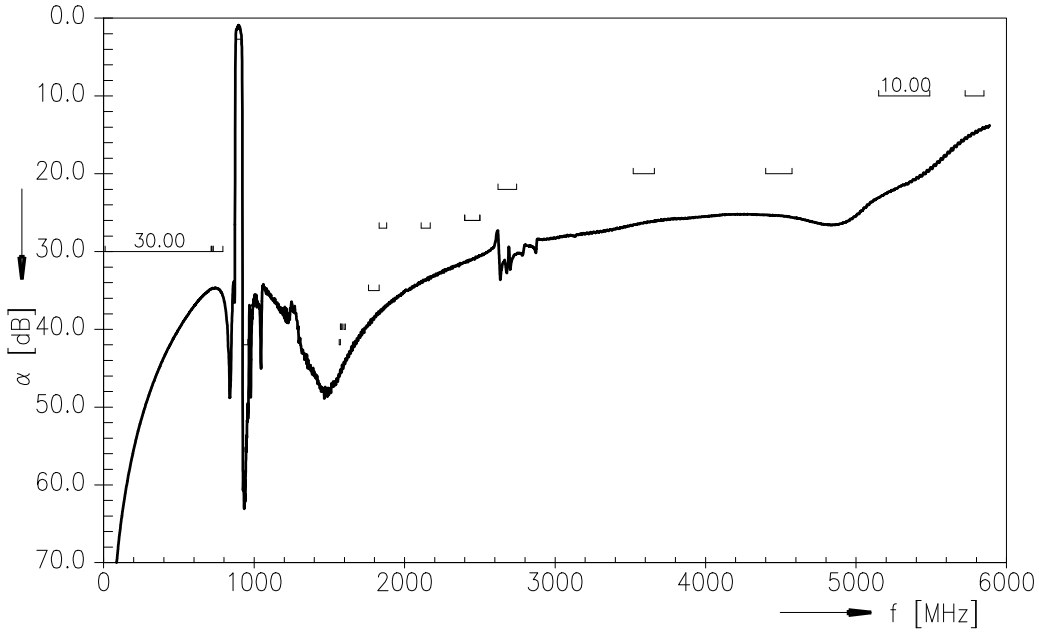
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

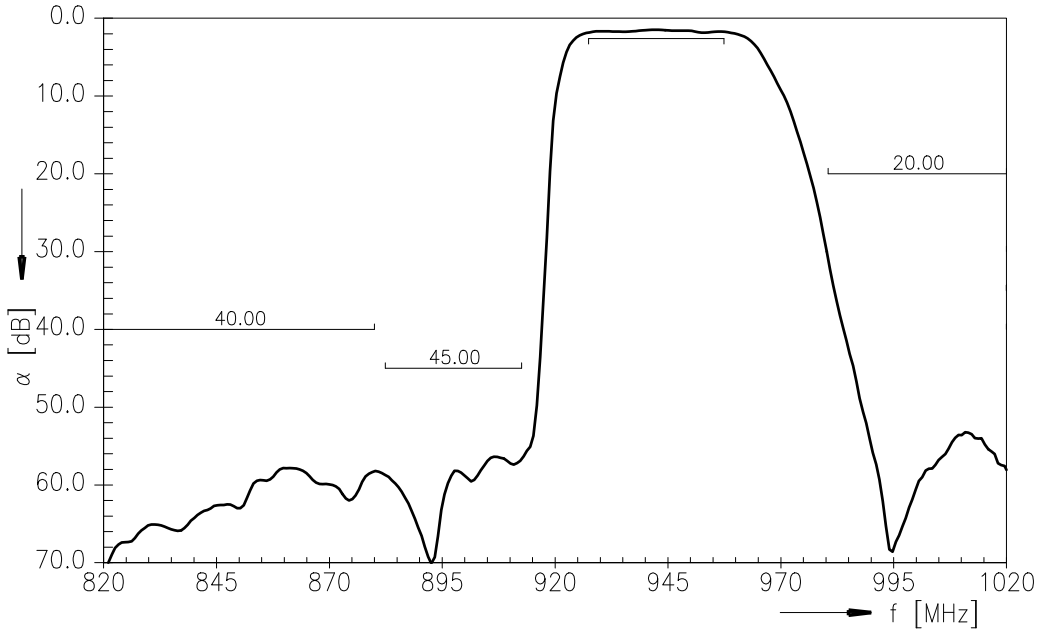
**Frequency response Tx-Antenna (Power transfer function)**



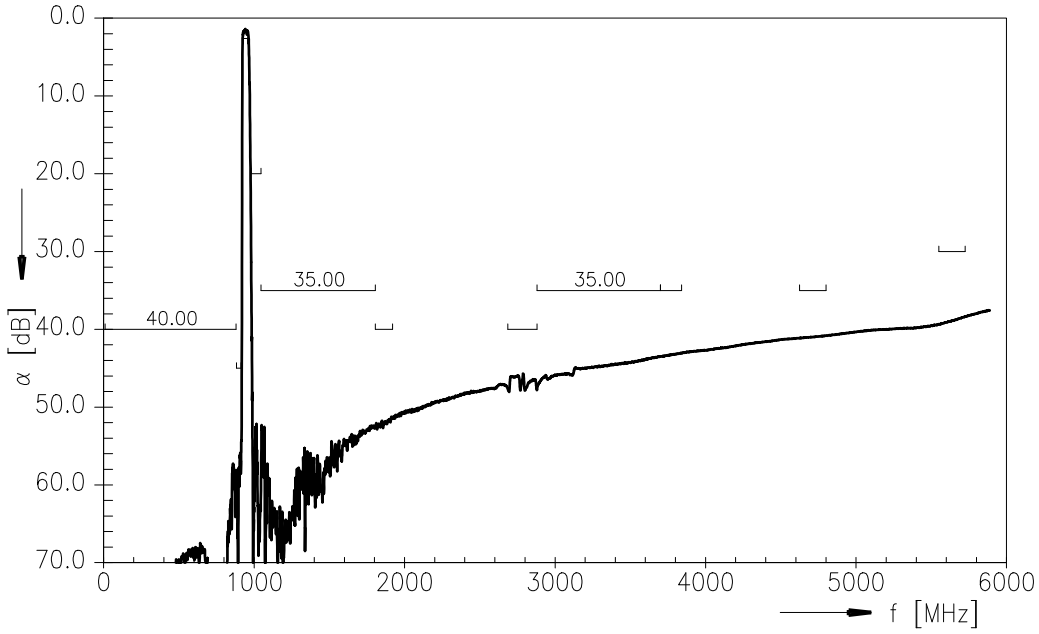

**Frequency response Tx-Antenna (wideband)**



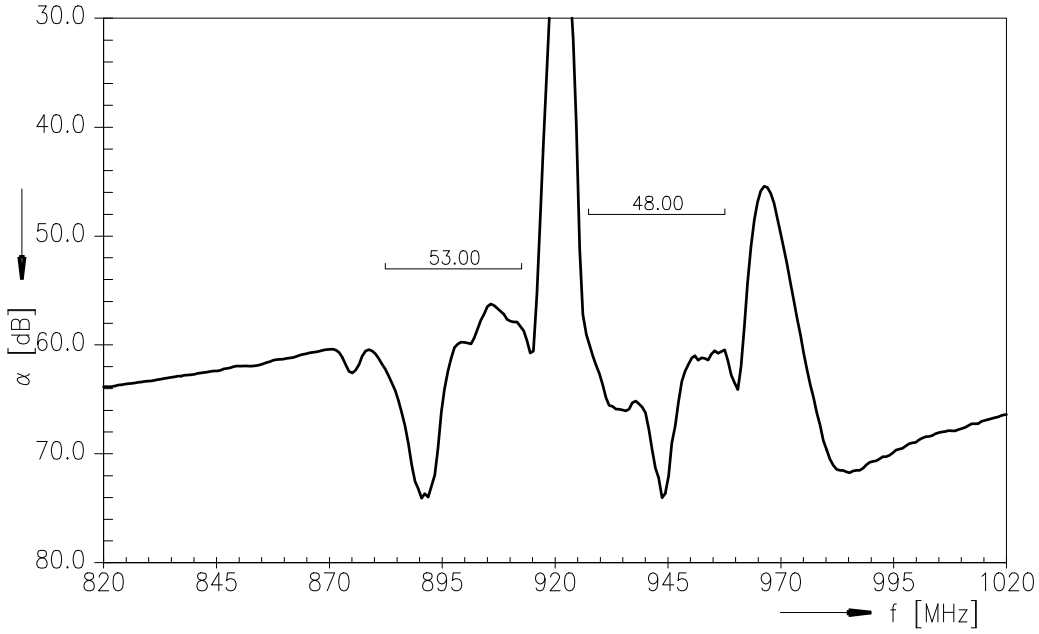
**Frequency response Antenna-Rx (Power transfer function)**



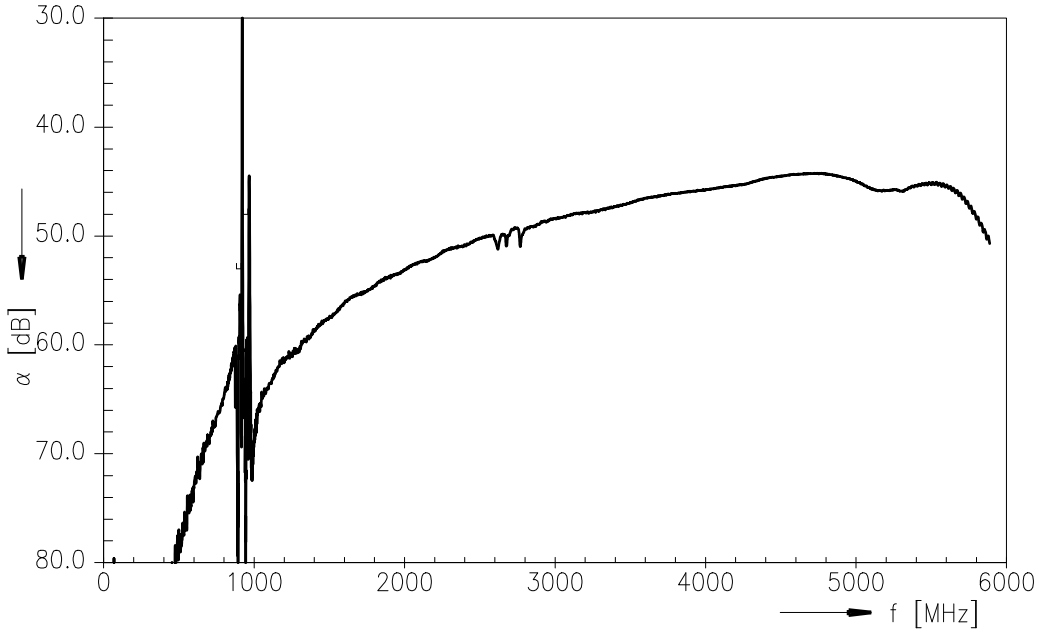

**Frequency response Antenna-Rx (wideband)**



**Frequency response Tx-Rx (Power transfer function)**

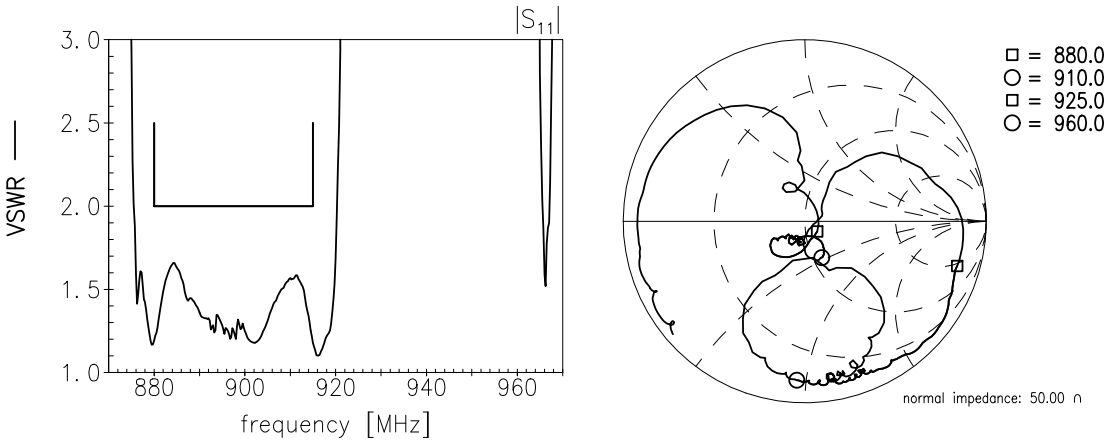


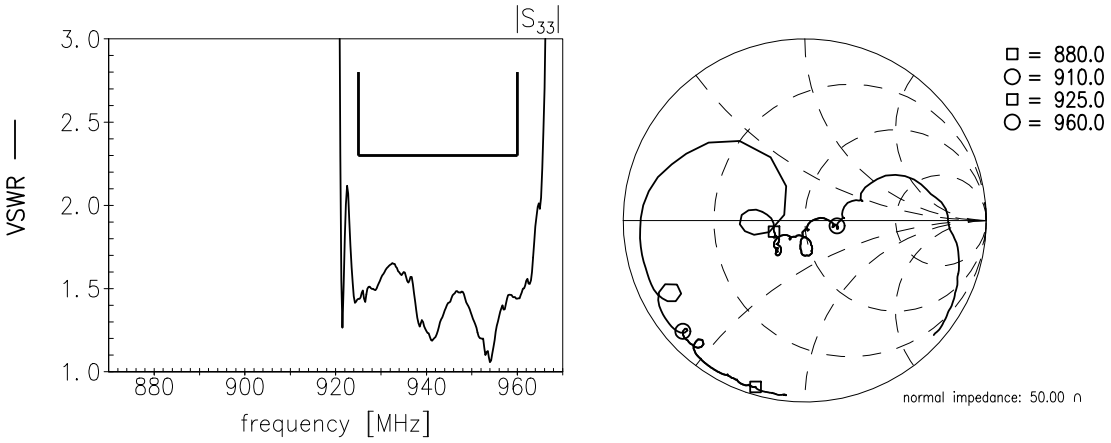

**Frequency response Tx-Rx (wideband)**

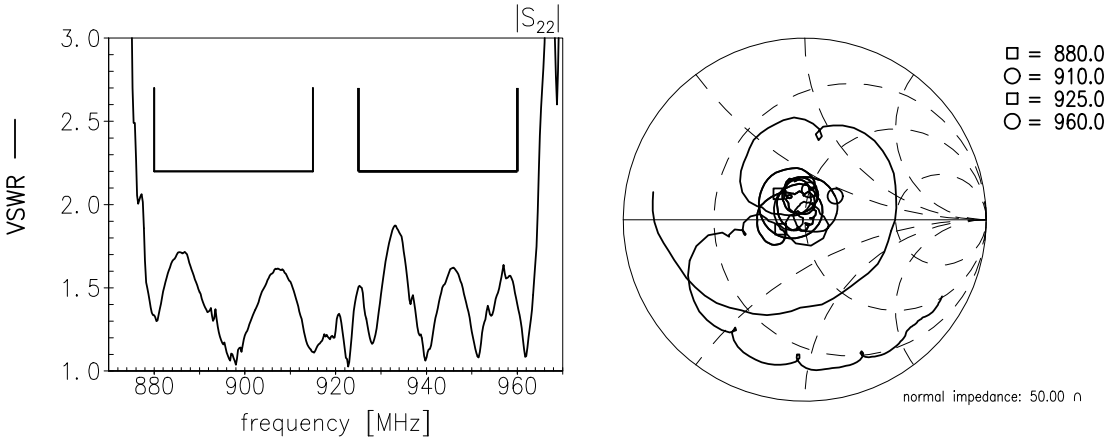


Preliminary Data

**Return loss** **$S_{11}$ Tx-port** **$S_{22}$ Antenna-port** **$S_{33}$ Rx-portReferences**



## References

| | |
|---|---|
| **Type** | B8514 |
| **Ordering code** | B39941B8514P810 |
| **Marking and package** | C61157-A8-A38 |
| **Packaging** | F61074-V8247-Z000 |
| **Date codes** | L_1126 |
| **S-parameters** | B8514_NB_UN.s3p, B8514_WB_UN.s3p<br>See file header for pin/port assignment. |
| **Soldering profile** | S_6001 |
| **RoHS compatible** | RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases. |
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