

Applications

- Mobile (LTE) devices operating on GSM bands (GSM850, EGSM900, PCN1800, PCS1900), WCDMA 2100, LTE700 and LTE2.6G

Features

- Compact size: Maximum dimensions 50.2 x 18.0 x 6.9 mm³, includes volume for speakers etc.
- All operating bands combined to a single feed point for multiband RF engines
- Antenna requires SMT contact clips' mounting on device PCB
- ROHS compliant



Electrical specifications @ +25 °C

Specified antenna parameters are measured in +25°C. Platform size has been 102.2 x 50 mm which includes 9.2 x 50 mm area under antenna in which ground plane is removed. * (E)-UTRA bands 12, 13, 14 and 17 ** (E)-UTRA band 7

Typical performance (Test board size 102.2 x 50 mm)

Operating band	Frequency Range [MHz]	Efficiency min. [%] / [dB]	Efficiency max [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
LTE700*	698-798	35/-4.5	49/-3.1	-6	50	-40 to +85
GSM850	824-894	40/-4.0	56/-2.5			
GSM900	880-960	48/-3.2	63/-2.0			
PCN1800	1710-1880	45/-3.5	58/-2.4			
PCS1900	1850-1990	48/-3.2	58/-2.4			
WCDMA2100	1920-2170	43/-3.7	56/-2.5			
LTE2600**	2500-2690	54/-2.7	71/-1.5			

Terminal Configuration

Antenna has three contact pads for contact to device. Terminal configuration is defined in Figure 1. Recommended contact method is to use SMT c-clips mounted on the device PCB. Recommended transmission line

between antenna feed contact and the transceiver port is a 50 Ohm strip line. Supply voltage and two control voltages are required for adjusting circuit. Dimensions of recommended c-clip are defined in Figure 2.

Figure 1. Required contacts on device PCB.

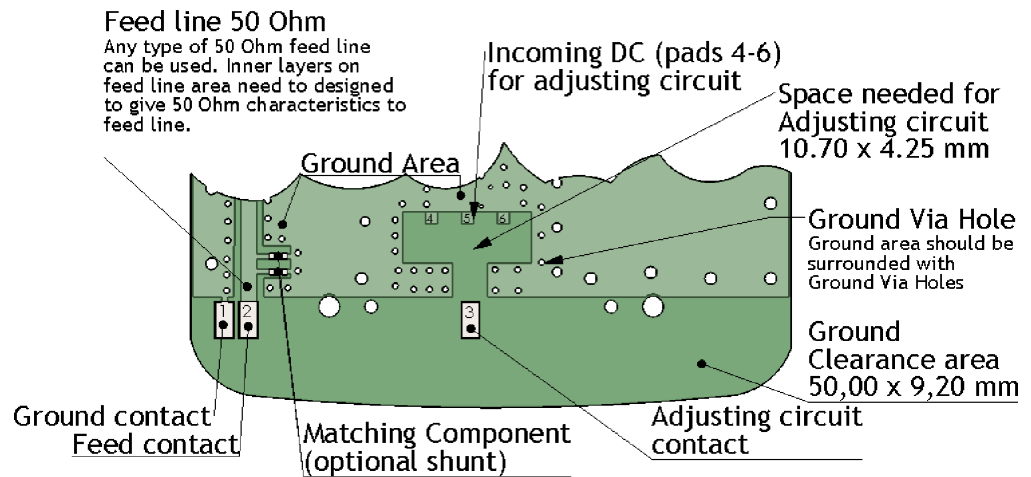
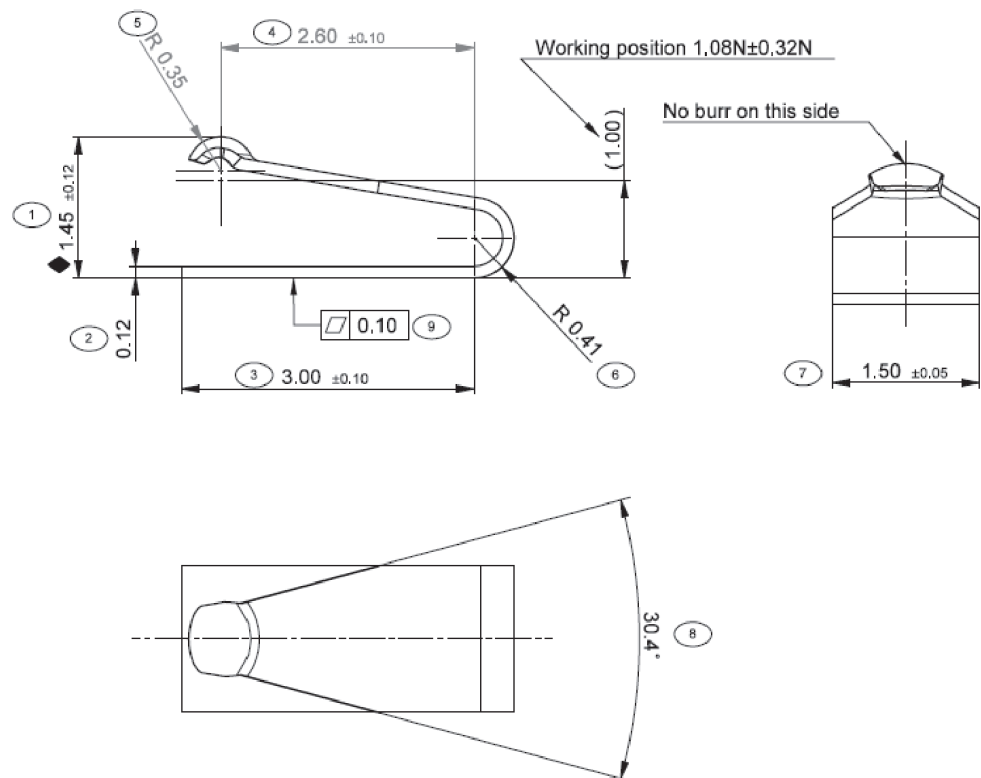


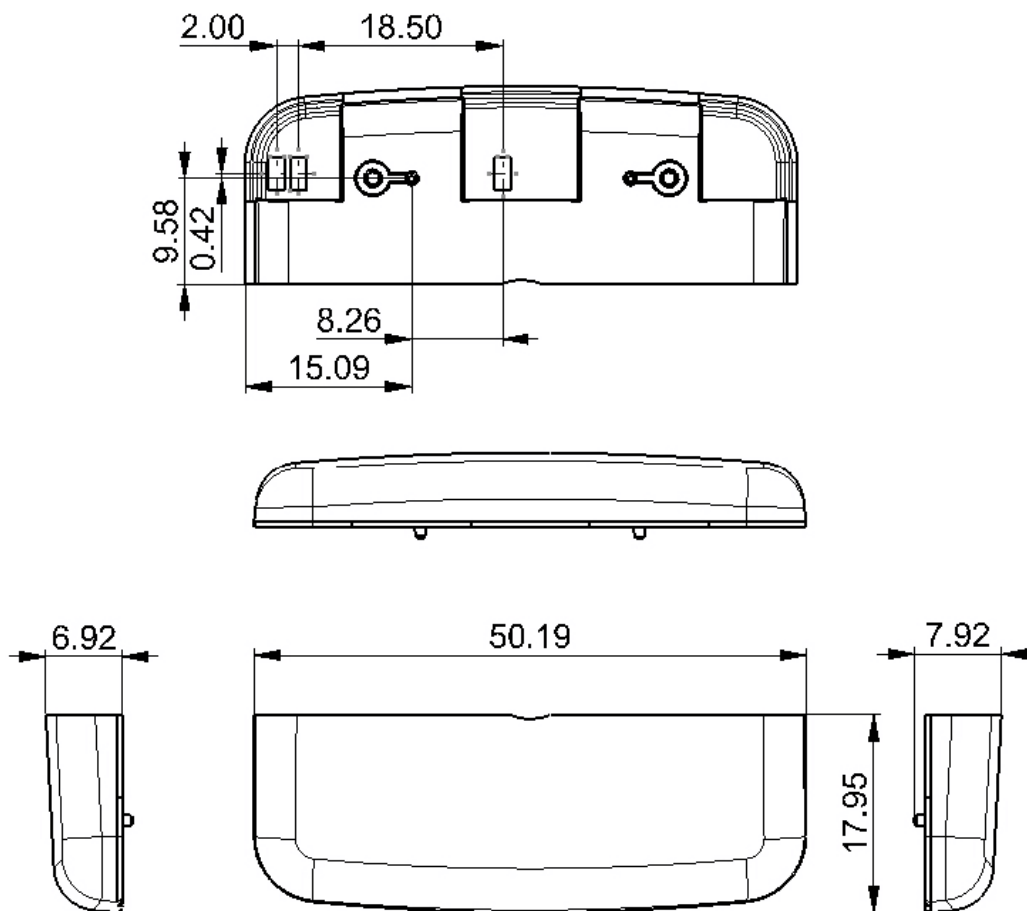
Figure 2. Example of antenna SMT contact clip design used in the electrical test setup. Adjustable LTE antenna



Antenna module dimensions

Antenna module dimensions are described in Figure 3. Volume inside the module can be used partially for component placement. For instance the integration of speakers inside the antenna module is possible.

Figure 3. Antenna module main dimensions.



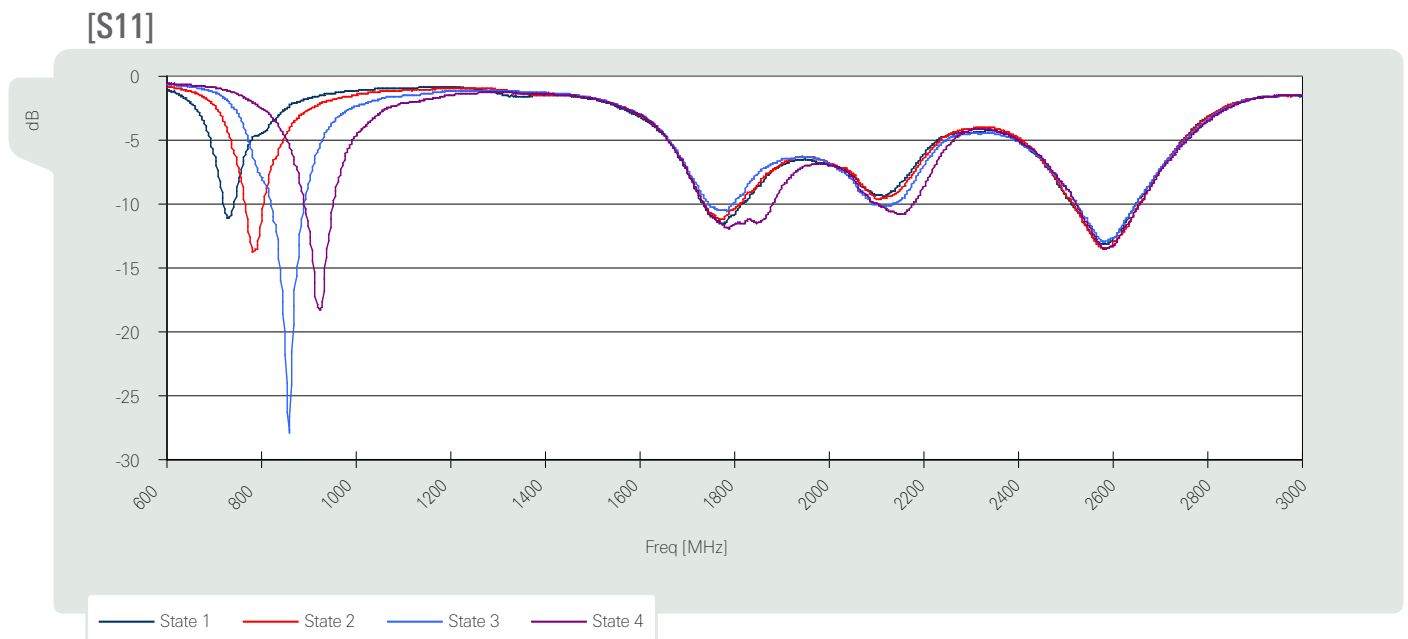
Typical electrical characteristics in free space (T=25°C)

Antenna has been measured on a 102.2 x 50 mm platform including 9.2 x 50 mm ground clear area under antenna. Antenna has four operating states which are chosen with two control voltages as shown in the table below.

Figure 4. Control voltages and corresponding antenna states.

Operating state	Control voltage 1 [V]	Control voltage 2 [V]	Efficiency max [%] / [dB]	Active operating bands [MHz] marked with x in each operating state				
				698-746	746-798	824-894	880-960	1710-2170, 2500-2690
1	0	0	49/-3.1	x				x
2	3	0	56/-2.5		x			x
3	3	3	56/-2.5			x		x
4	0	3	71/-1.5				x	x

Figure 5. Measured |S11| in four states of antenna.



Typical MIMO electrical characteristics in free space (T=25°C)

Adjustable antenna performance in MIMO antenna applications has been evaluated using two antennas on a platform sized 111.4 x 50 mm (including 9.2 x 50 mm ground clear area under two antennas) on top and bottom locations of the device.

Figure 6. MIMO antenna performance. While other antenna has been under measurement, the other one has been terminated to 50 Ohm. Correlation has been defined as the envelope correlation coefficient between antennas of MIMO configuration in an isotropic environment.

Operating band	Frequency Range [MHz]	Efficiency min. [%] / [dB]	Efficiency max [%] / [dB]	Return loss min. [dB]	Isolation min. [dB]	Correlation coefficient max
LTE700 (12,13,14)	698-798	32/-5.0	43/-3.7	-6	10	0.30
GSM850	824-894	38/-4.2	51/-2.9		12	0.25
GSM900	880-960	40/-4.0	47/-3.3		11	0.20
PCN1800	1710-1880	40/-4.0	51/-2.9		17	0.10
PCS1900	1850-1990	45/-3.5	50/-3.0		17	0.10
WCDMA2100	1920-2170	43/-3.7	52/-2.8		17	0.08
LTE2.6 (7)	2500-2690	50/-3.0	68/-1.7		19	0.04

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