

*Application note*

## High Efficiency Wideband LTE Dipole Antenna

*Covered frequency range:  
698MHz – 960MHz  
and 1710MHz – 2690MHz*

*Pulse Part Number: W3554*

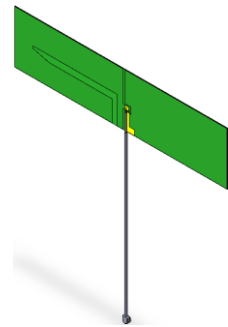
### Status

|                    |      |                |            |
|--------------------|------|----------------|------------|
| <b>Author</b>      | TLa  | <b>Version</b> | 1.0.1      |
| <b>Checked by</b>  | KiKo | <b>Date</b>    | 2012.03.23 |
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# High Efficiency Wideband LTE Dipole Antenna



## Features

- Coaxial Feed
- Single Feed Point
- Size W x L x H (30mm x 120mm x 0.2mm)
- Low Weight (1.5g)
- Lead Free Materials
- Lead Free Soldering Compatible
- RoHS Compliant
- Coaxial Cable Connector:
  - Hirose Connector U.FL- Series (I.PEX Connector MHF- Series Compatible)

## Applications

LTE devices operating on GSM bands (GSM850, EGSM900, PCN1800, PCS1900), WCDMA band 1, LTE700 and LTE2.6GHz.

## Electrical specifications @ +25 °C

Note: Antenna’s electrical characteristics depend on test board ground plane (GP) size, antenna positioning in relative to GP, antenna distance to test board and antenna surrounding mechanics.

### W3554: Typical electrical characteristics of High Efficiency Wideband LTE Dipole Antenna.

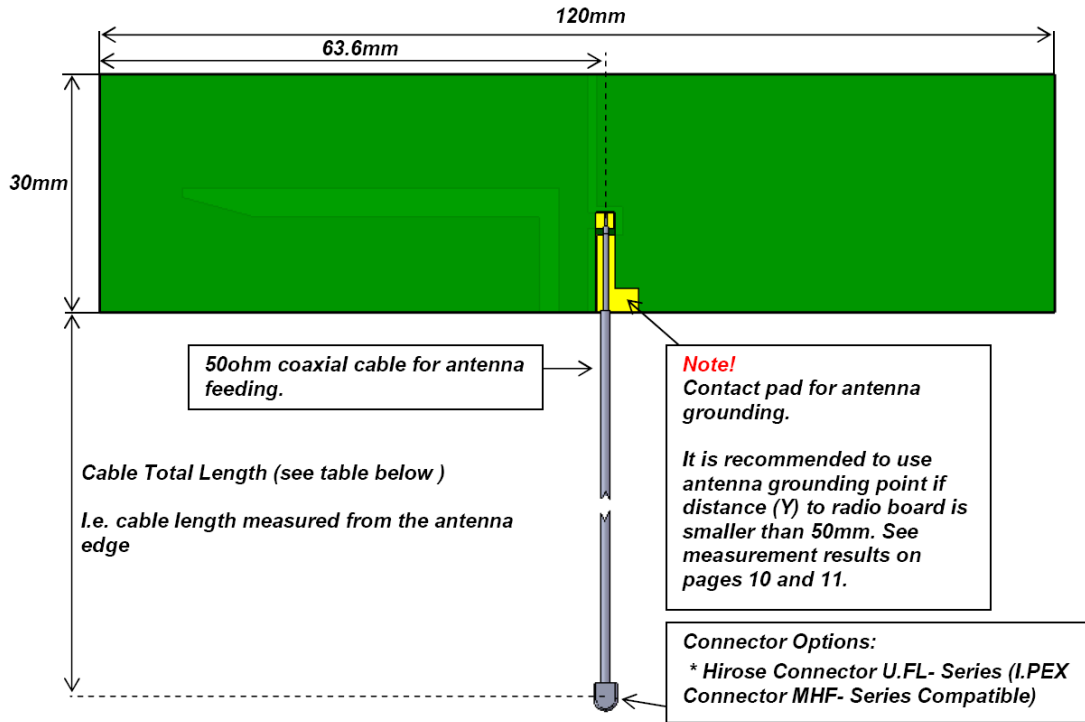
Antenna measured in Free Space Environment (FS) without test board presence (see slide 6).

| Operating Band | Frequency Range [MHz] | 3D Efficiency [%] / [dB]                               | Return loss at band edges [dB] | Impedance [ $\Omega$ ] | Operating Temperature [°C] |
|----------------|-----------------------|--|--------------------------------|------------------------|----------------------------|
| LTE700*        | 698 – 798             | 61 / -2.2 ; 80 / -0.9 (band edges)<br>80 / -0.9 (peak) | -5.4 / -12.2                   | 50                     | -40 to +85                 |
| GSM850         | 824 - 894             | 86 / -0.6 ; 68 / -1.7 (band edges)<br>86 / -0.6 (peak) | -15.5 / -8.6                   |                        |                            |
| EGSM900        | 880 – 960             | 64 / -1.9 ; 49 / -3.0 (band edges)<br>68 / -1.7 (peak) | -10 / -4.7                     |                        |                            |
| PCN1800        | 1710 - 1880           | 61 / -2.2 ; 63 / -2.0 (band edges)<br>63 / -2.0 (peak) | -6.6 / -8.2                    |                        |                            |
| PCS1900        | 1850 - 1990           | 63 / -2.0 ; 65 / -1.9 (band edges)<br>65 / -1.9 (peak) | -7.6 / -10.2                   |                        |                            |
| WCDMA band 1   | 1920 - 2170           | 64 / -1.9 ; 76 / -1.2 (band edges)<br>76 / -1.2 (peak) | -8.5 / -15                     |                        |                            |
| LTE2.6GHz**    | 2500 - 2690           | 86 / -0.7 ; 80 / -1 (band edges)<br>87 / -0.6 (peak)   | -20.5 / -10.7                  |                        |                            |
| LTE2.4GHz***   | 2300 – 2400           | 85 / -0.7 (band edges)<br>85 / -0.7 (peak)             | -20 / -27.1                    |                        |                            |

\* (E)-UTRA/FDD bands 12, 13, 14, 15. \*\* (E)-UTRA/FDD band 7. \*\*\* (E)-UTRA/TDD band 40.

# High Efficiency Wideband LTE Dipole Antenna

## Antenna Dimensions and Coaxial Feed Cable

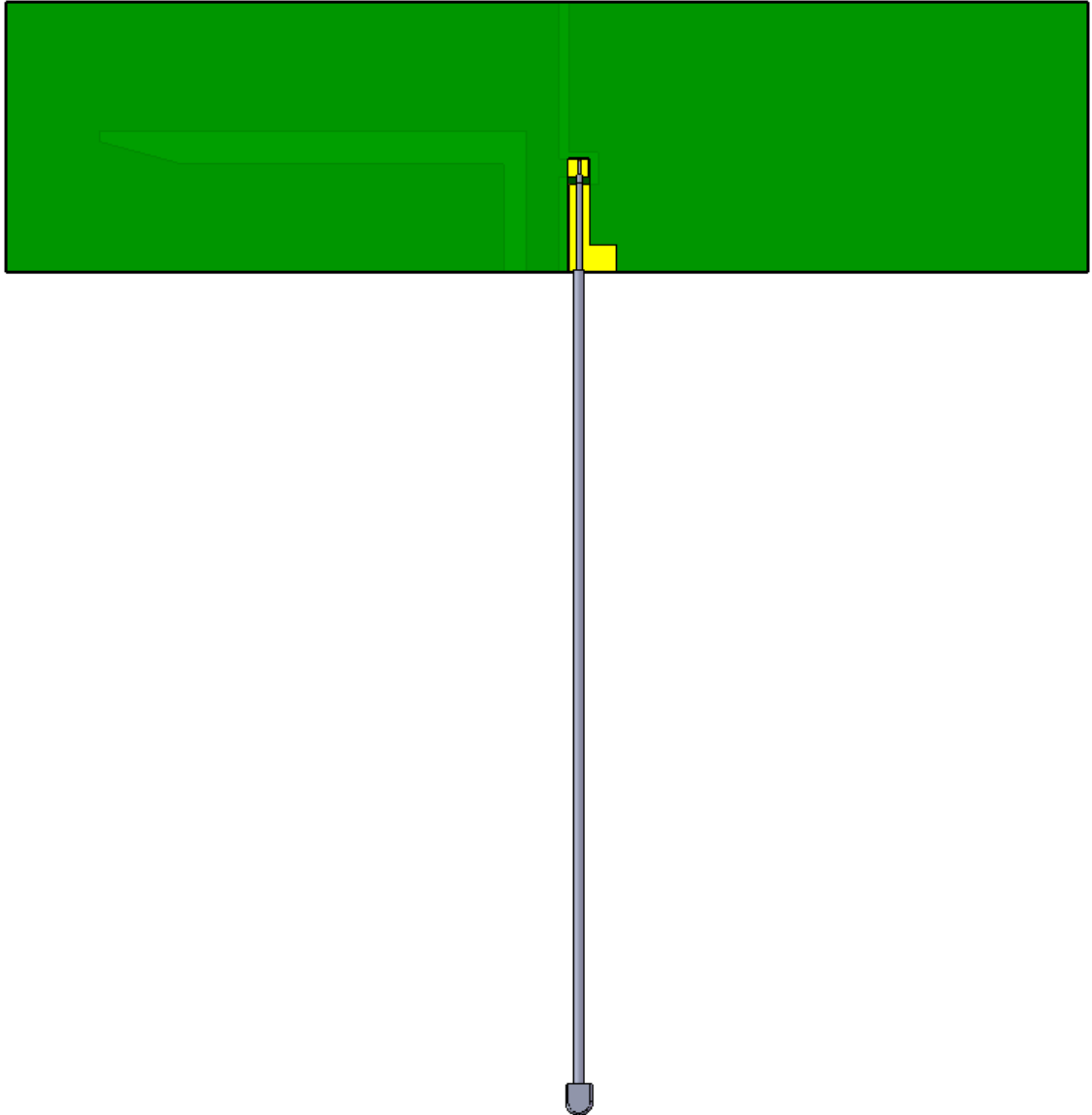


| Part No.   | Cable length | Connector type        |
|------------|--------------|-----------------------|
| W3554B0140 | 140mm        | MHF-Series Compatible |

## *High Efficiency Wideband LTE Dipole Antenna*

### *Test Setup*

*Antenna was measured in Free Space Environment (FS) without test board presence.*

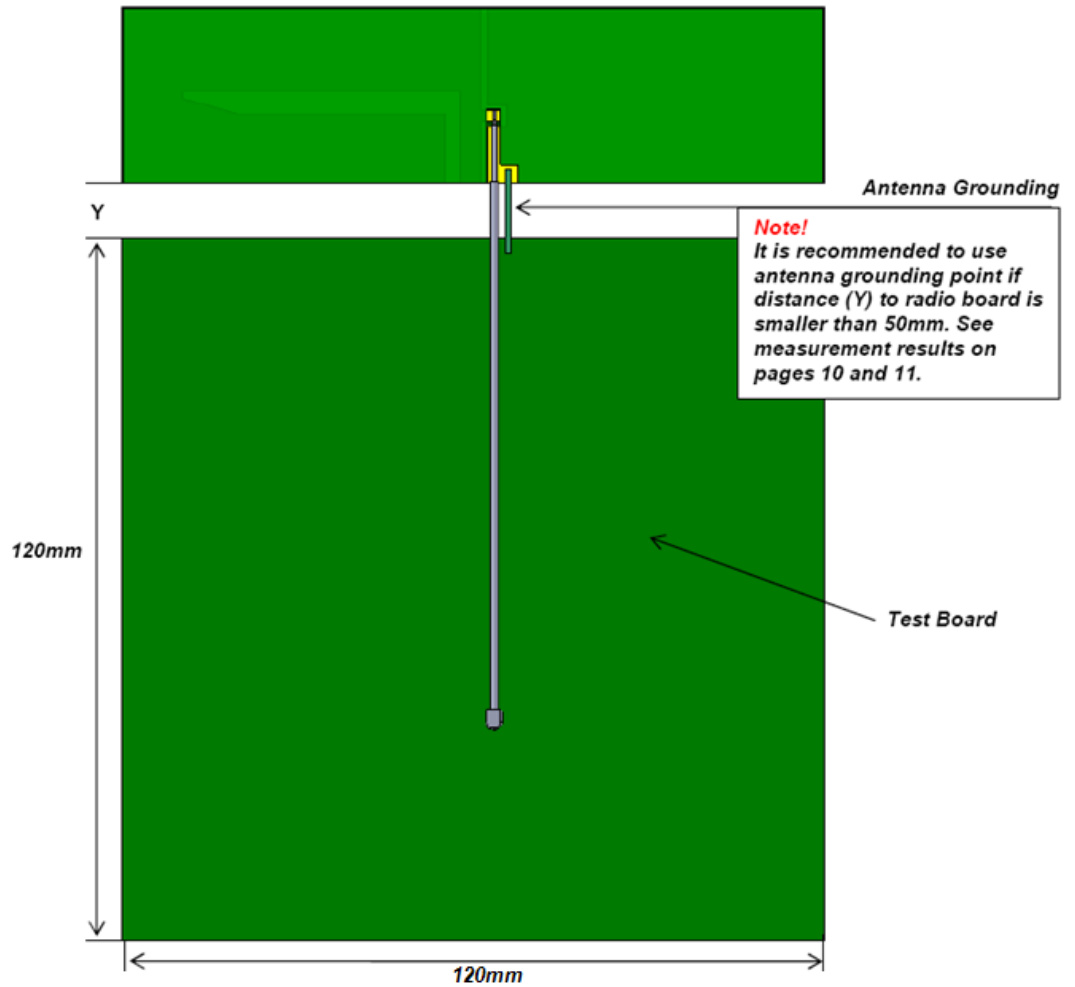


### Test Setup Matrix for Electrical Measurements

Antenna was tested totally with 6 different measurement setups as presented in table below. Antenna distance (Y) to test board GP was changed. Also antenna grounding effect to antenna's electrical characteristics was investigated.

**W3554 Test Setup Matrix for Electrical Measurements**

| Test No. | NOTE                        | Y [mm] | Antenna grounding in use |
|----------|-----------------------------|--------|--------------------------|
| 1        | Without test board presence | -      | -                        |
| 2        |                             | 50     | No                       |
| 3        |                             | 50     | Yes                      |
| 4        |                             | 30     | Yes                      |
| 5        |                             | 30     | Yes                      |
| 6        |                             | 10     | Yes                      |

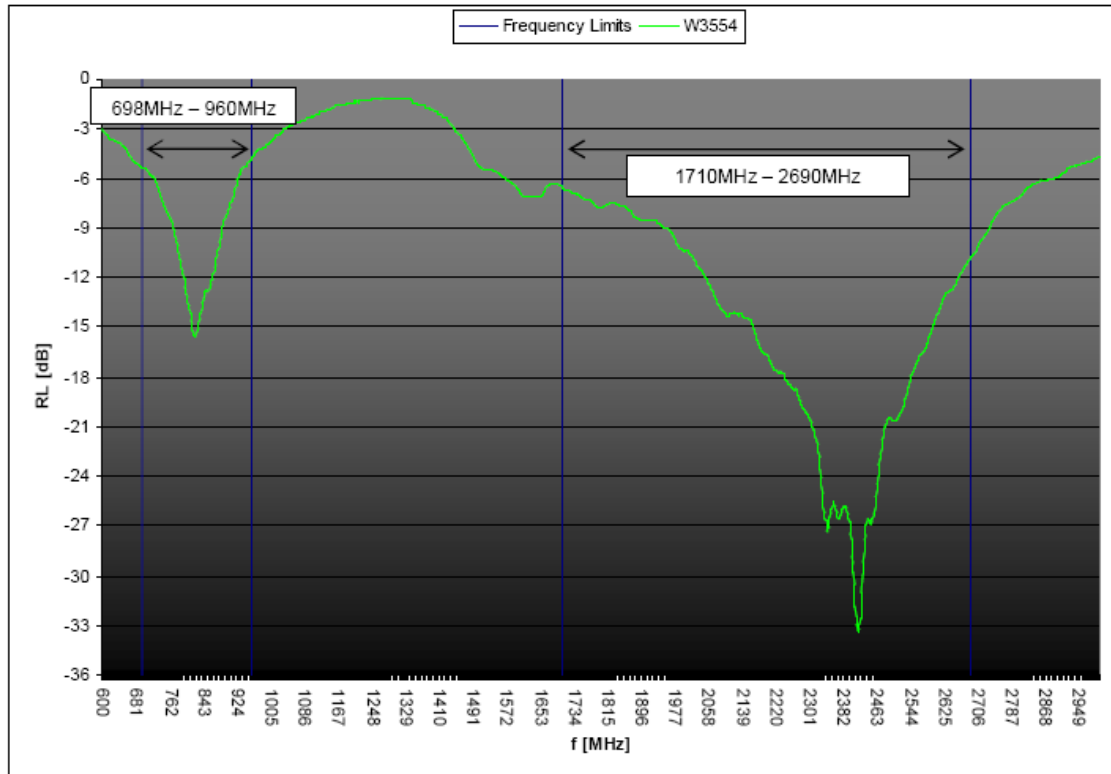


# High Efficiency Wideband LTE Dipole Antenna

## Typical Electrical Characteristics (T=25 °C)

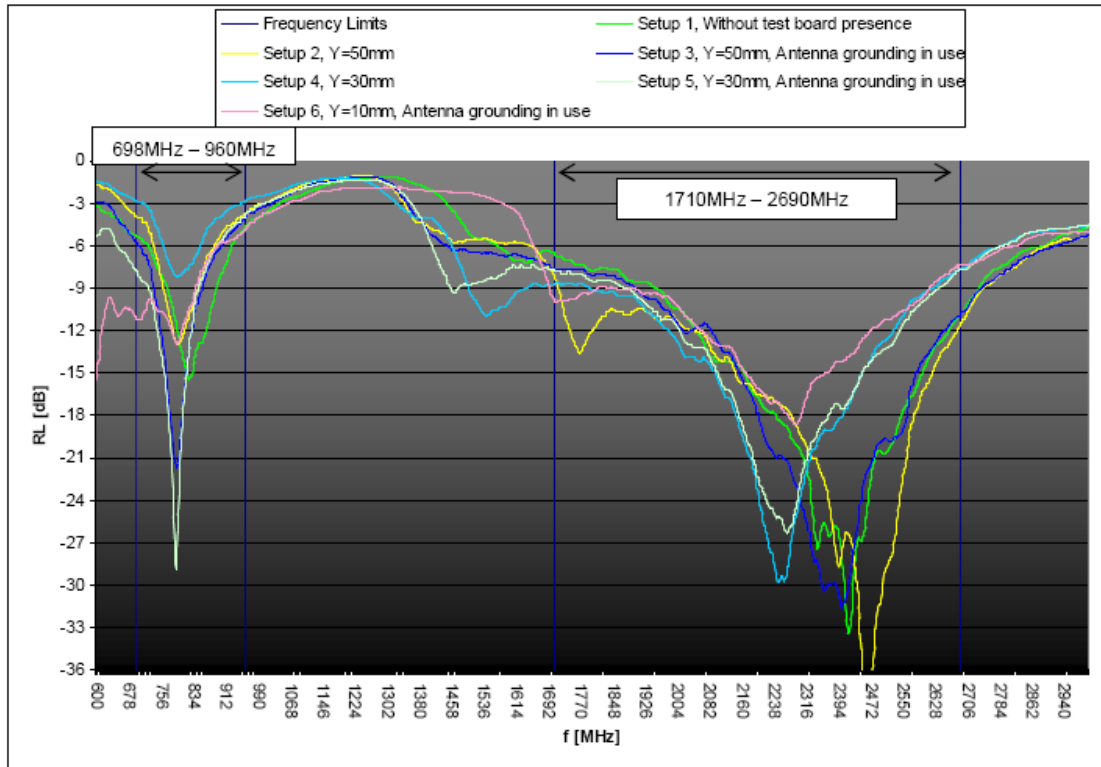
Antenna was measured in Free Space Environment (FS) without test board presence (see page 6).

### W3554 Typical Return Loss in dB



Antenna was tested totally with 6 different measurement setups as presented in table on page 7. Antenna distance (Y) to test board GP was changed. Also antenna grounding effect to antenna's electrical characteristics was investigated.

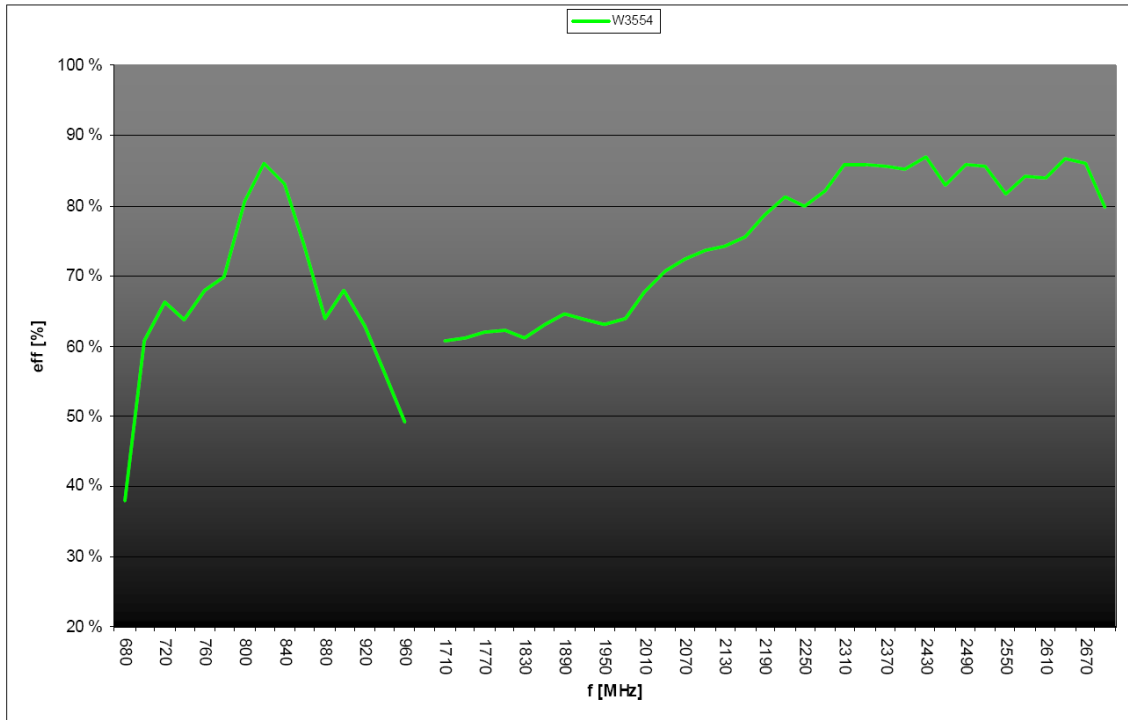
**W3554 Typical Return Loss in dB**





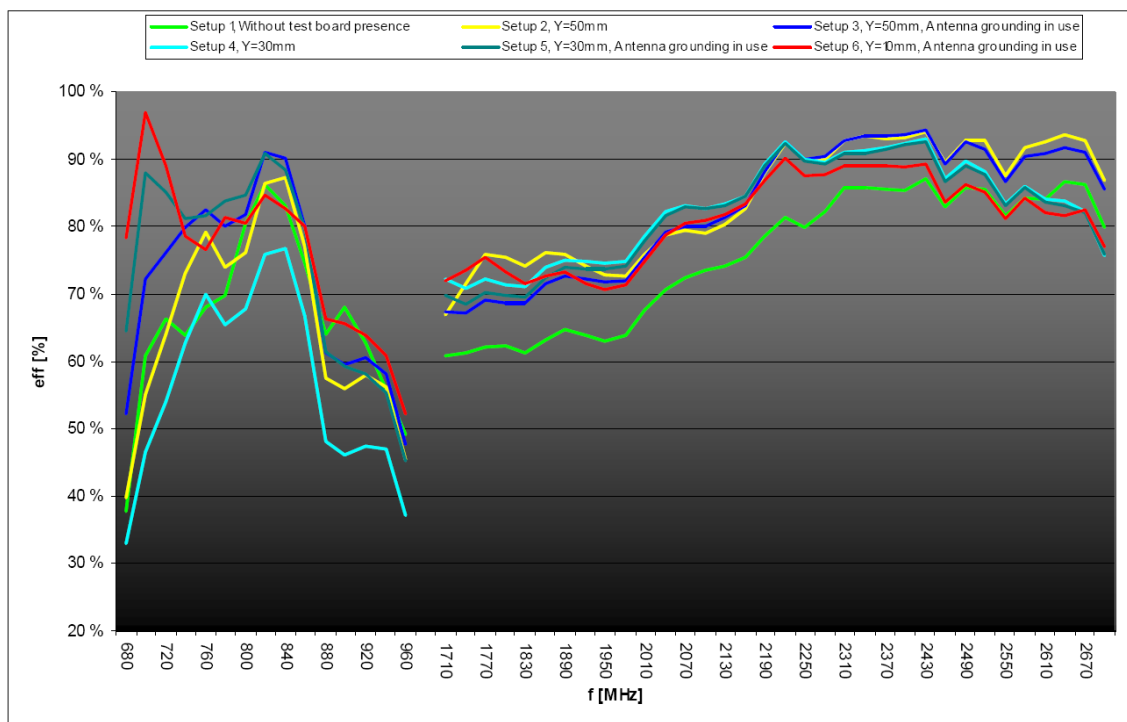
Antenna was measured in Free Space Environment (FS) without test board presence (see page 6).

**W3554 Typical Total Efficiencies in %**



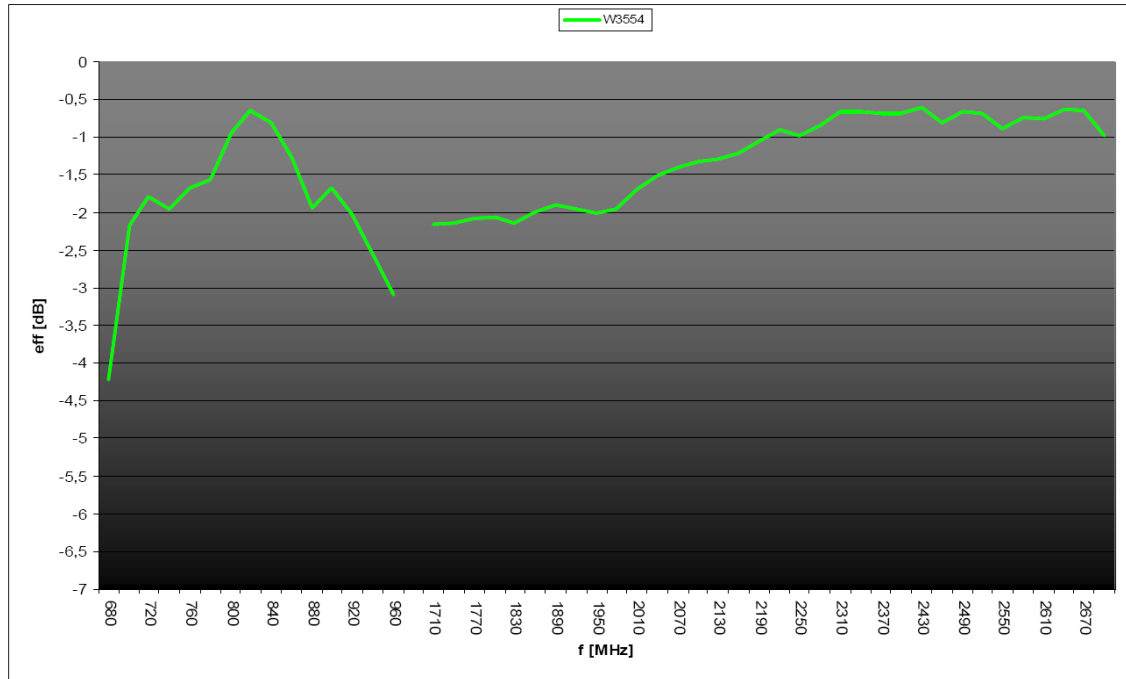
Antenna was tested totally with 6 different measurement setups as presented in table on page. Antenna distance (Y) to test board GP was changed. Also antenna grounding effect to antenna's electrical characteristics was investigated (see page 7).

**W3554 Typical Total Efficiencies in %**



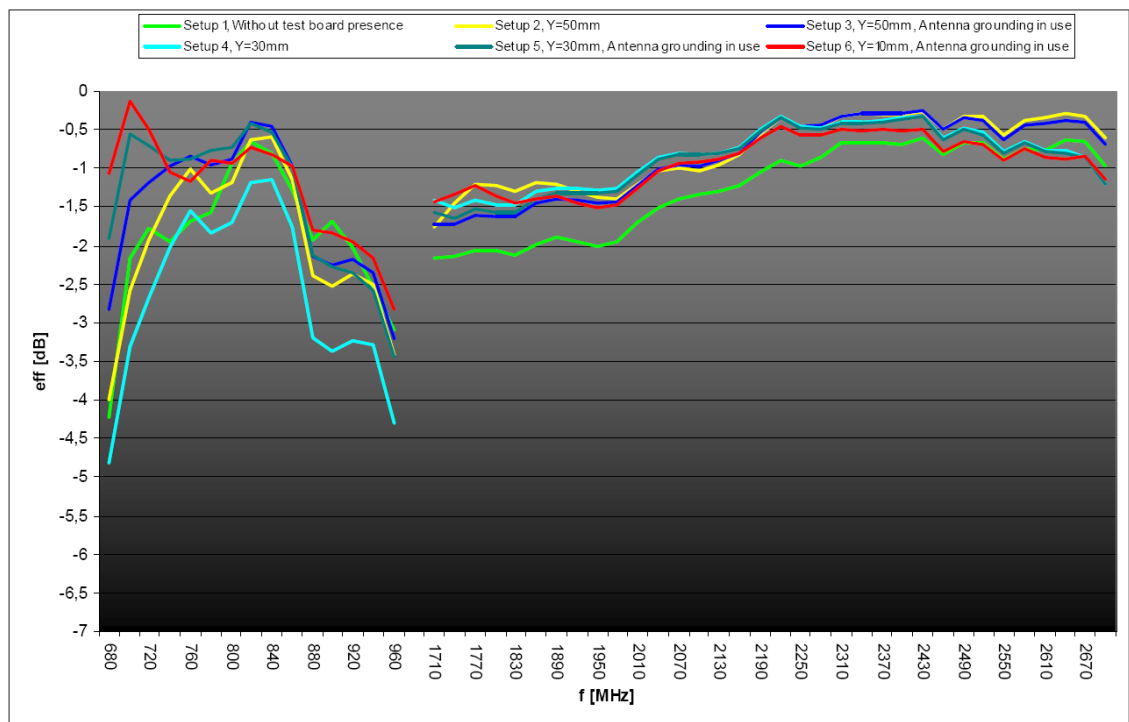
Antenna was measured in Free Space Environment (FS) without test board presence (see page 6).

**W3554 Typical Total Efficiencies in dB**



Antenna was tested totally with 6 different measurement setups as presented in table on page. Antenna distance (Y) to test board GP was changed. Also antenna grounding effect to antenna's electrical characteristics was investigated (see page 7).

**W3554 Typical Total Efficiencies in dB**



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