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LAMPIRAN



Pengambilan data dengan metode *invasive*



Pengambilan data dengan metode *non-invasive*



Dokumentasi pengukuran secara *non-invasive*



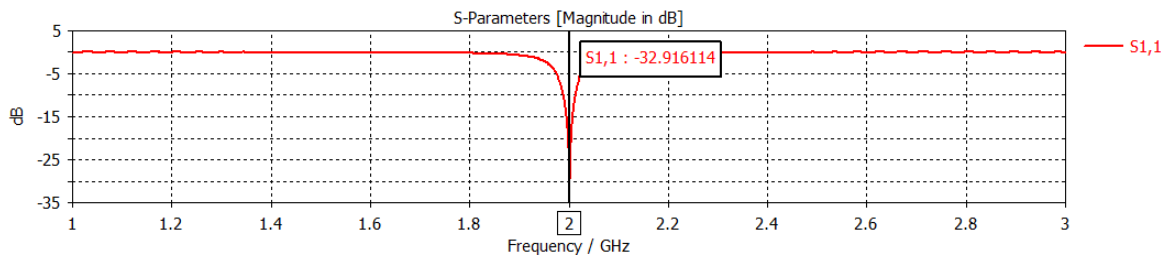
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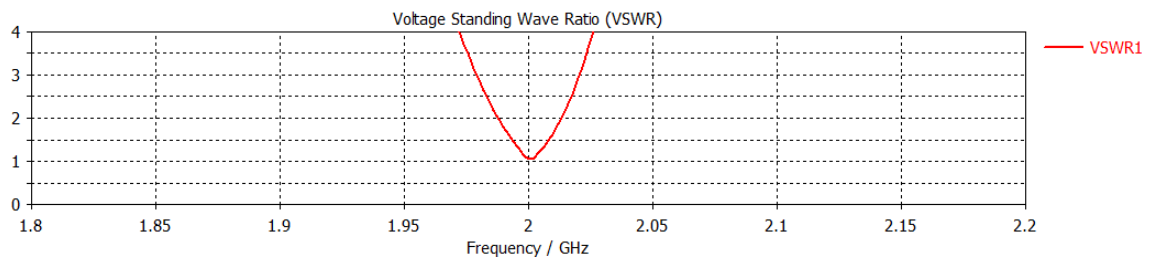
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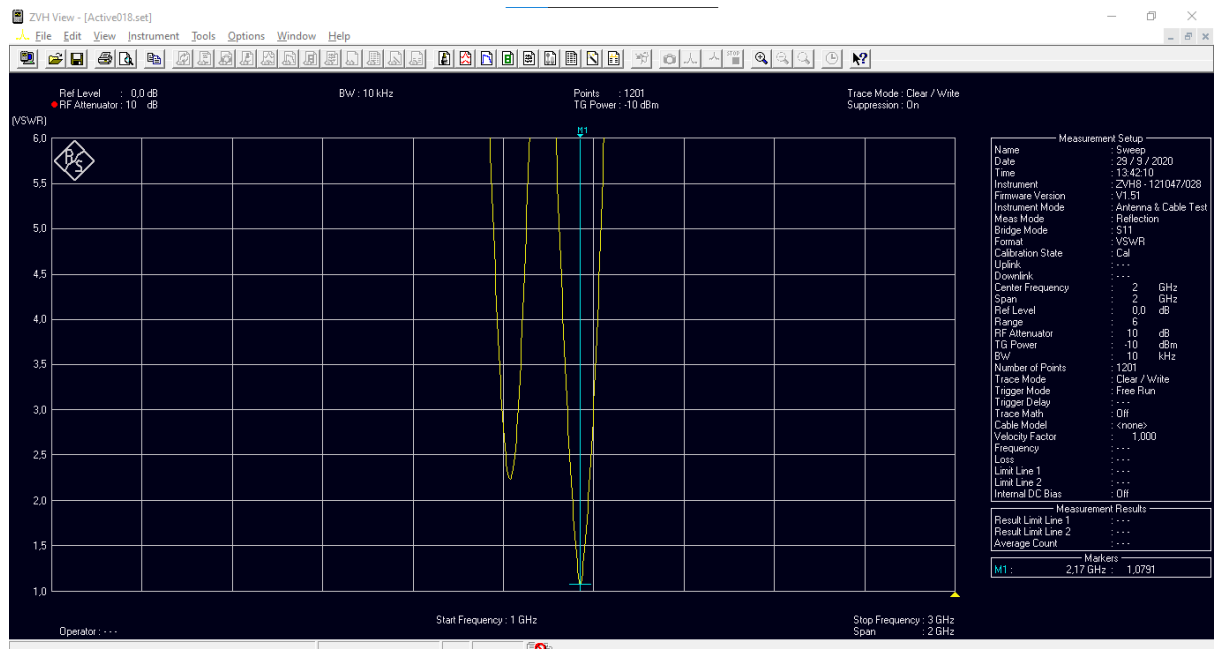
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Simulasi S11 antenna mikrostrip material *substrate* FR4 pada CST

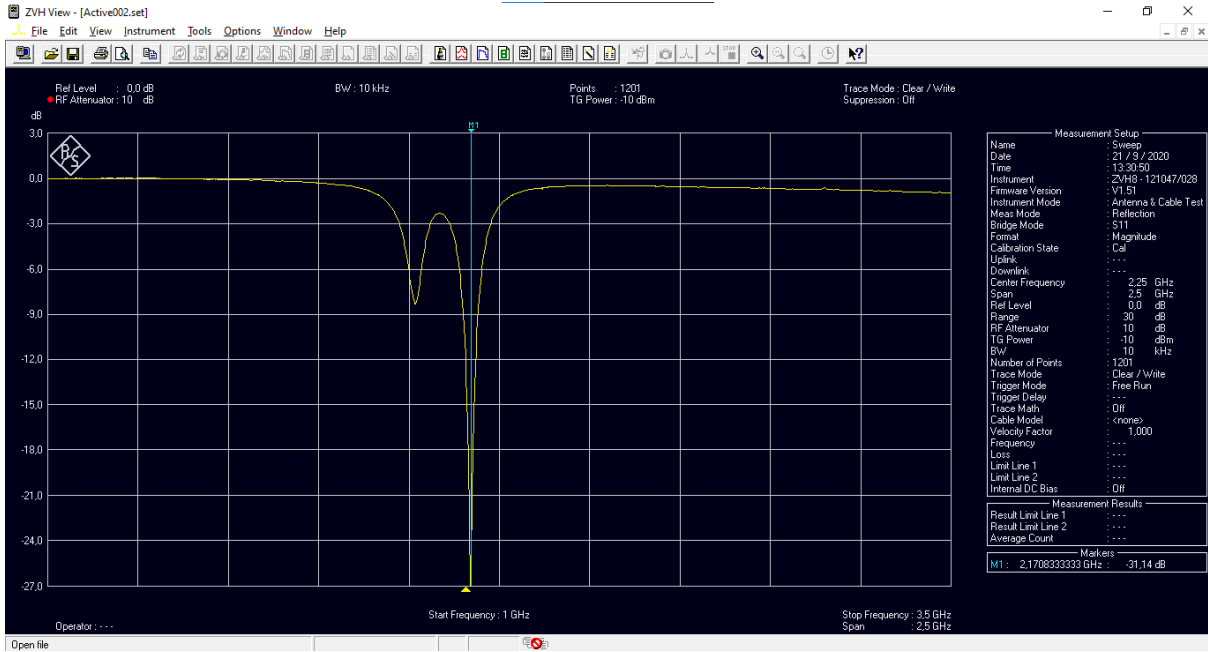


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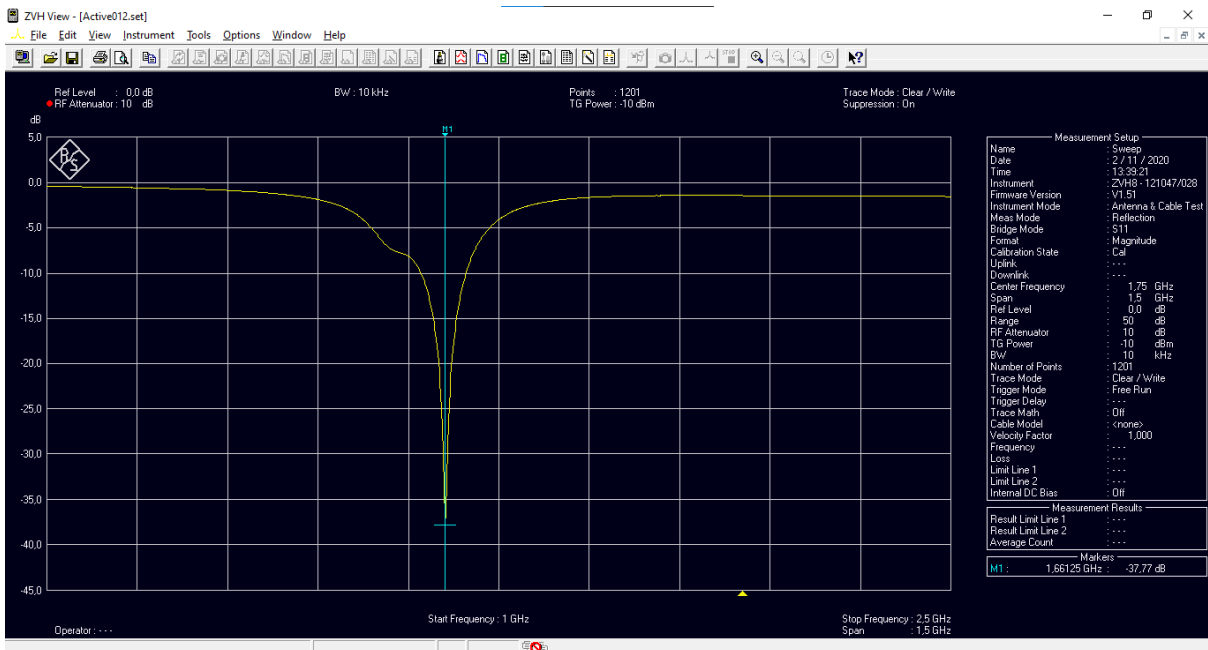


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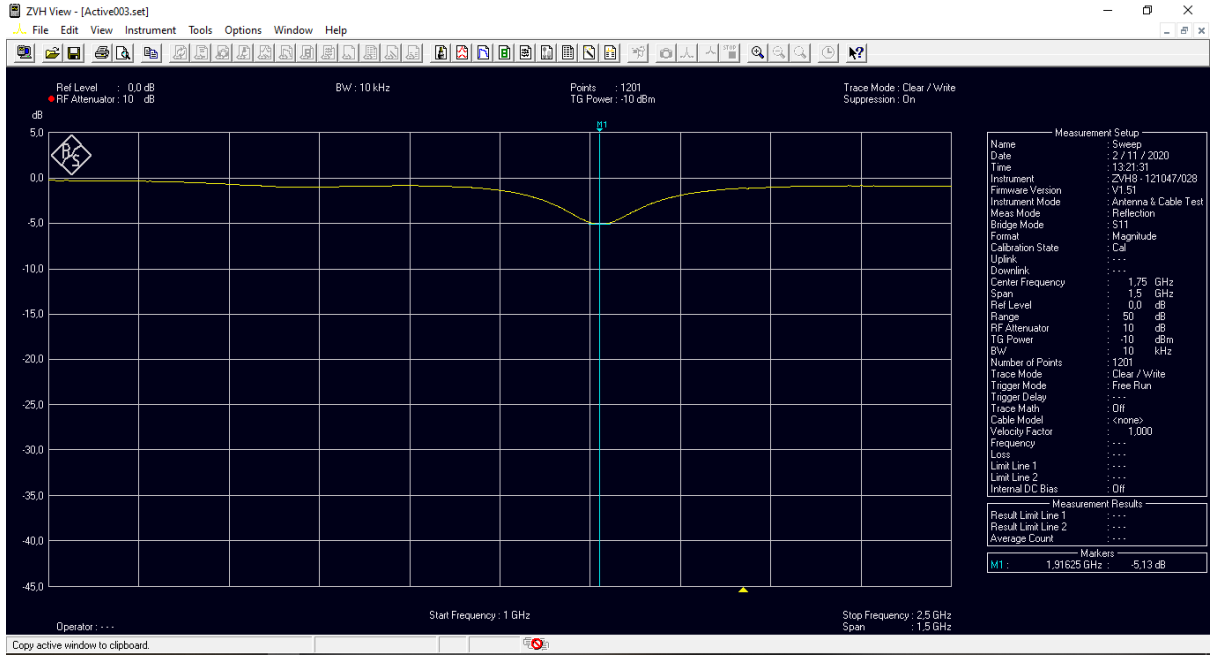
VNA



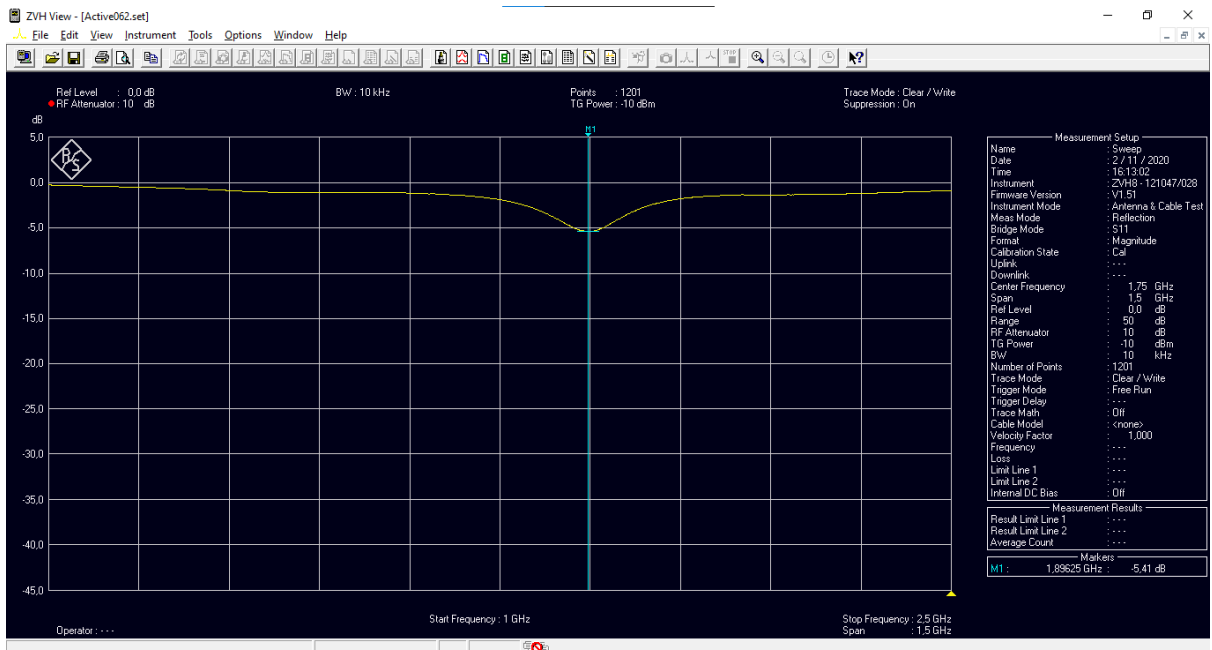
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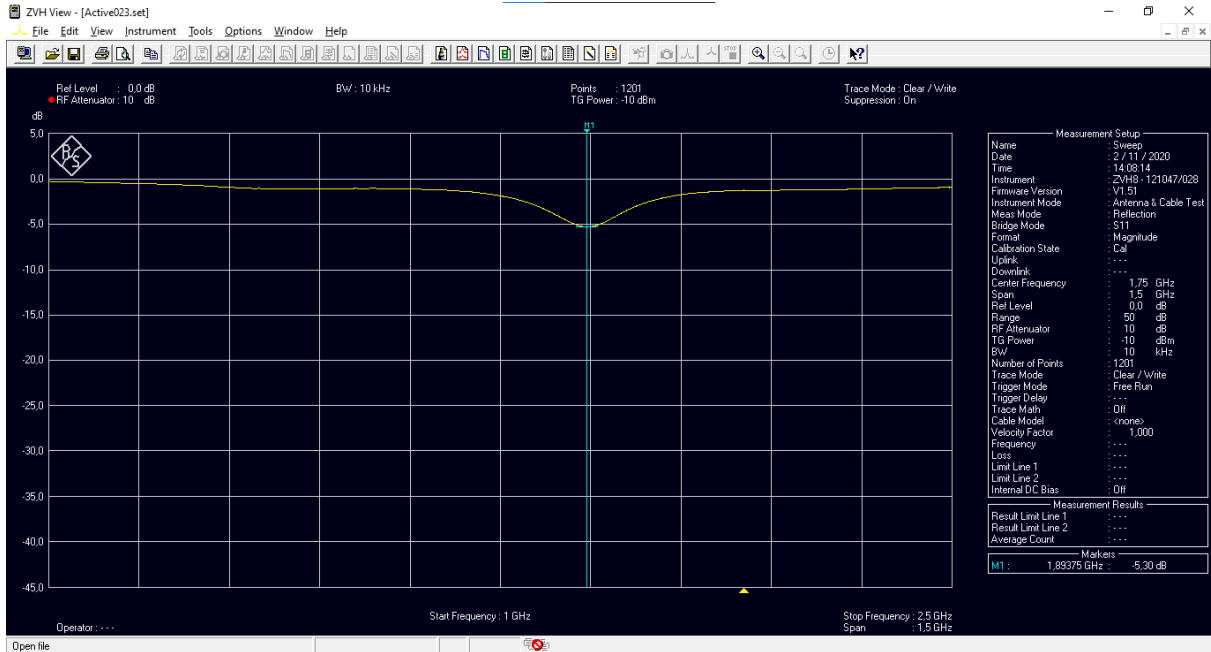
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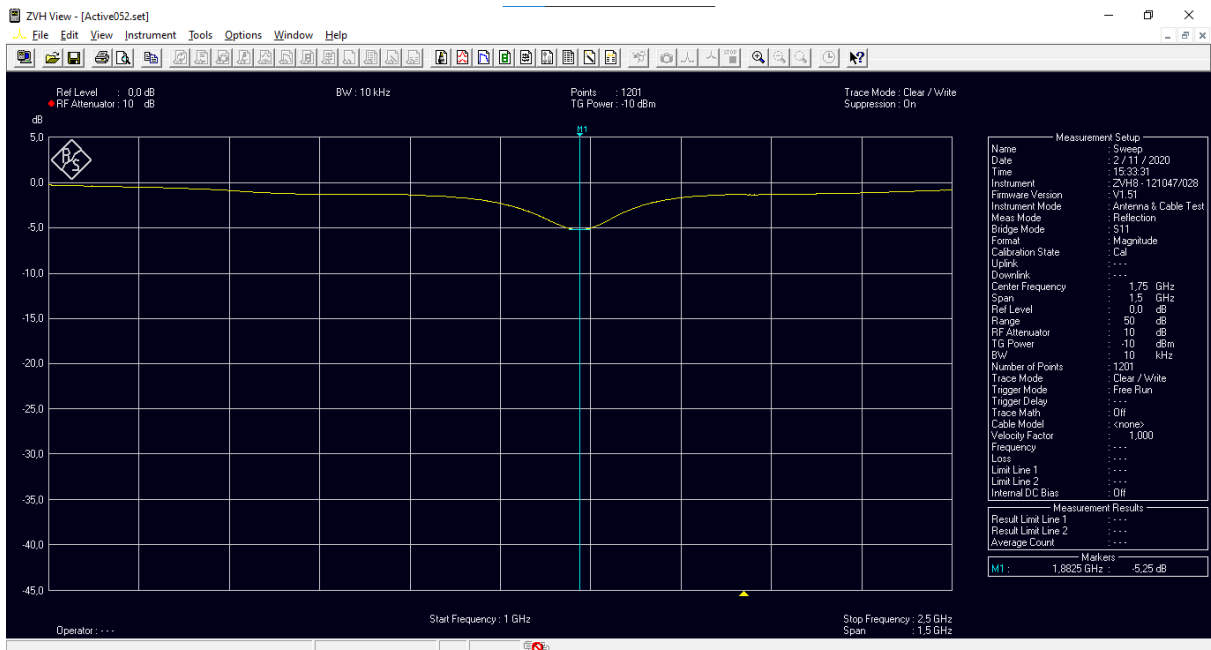
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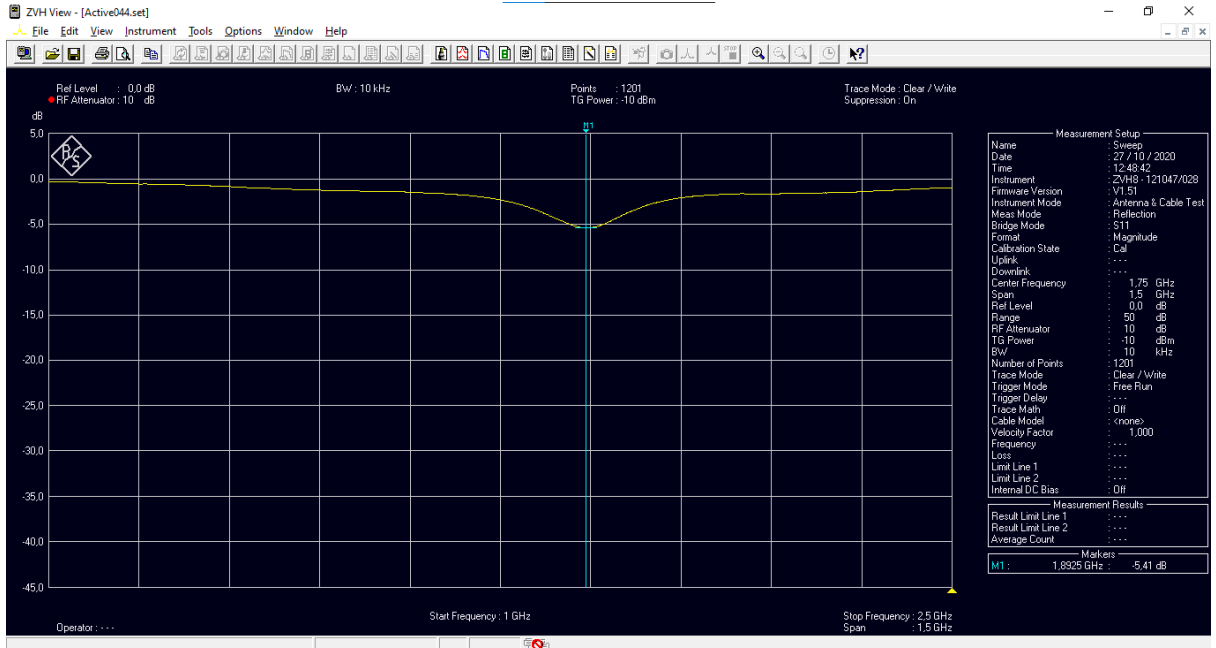
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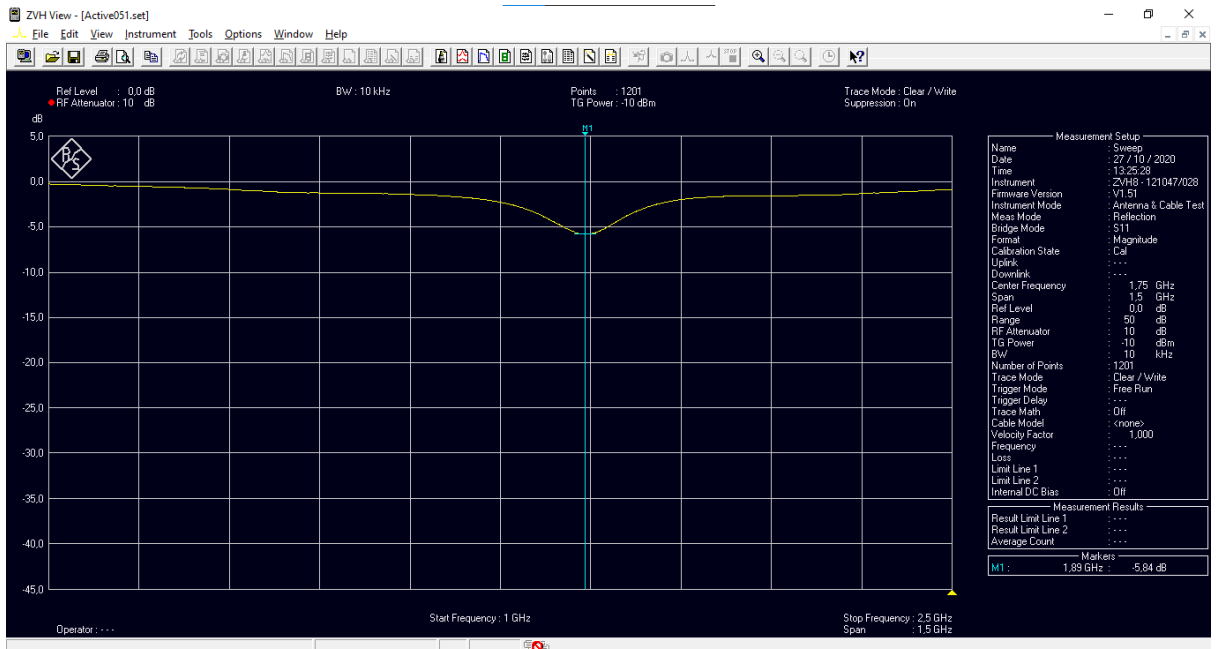
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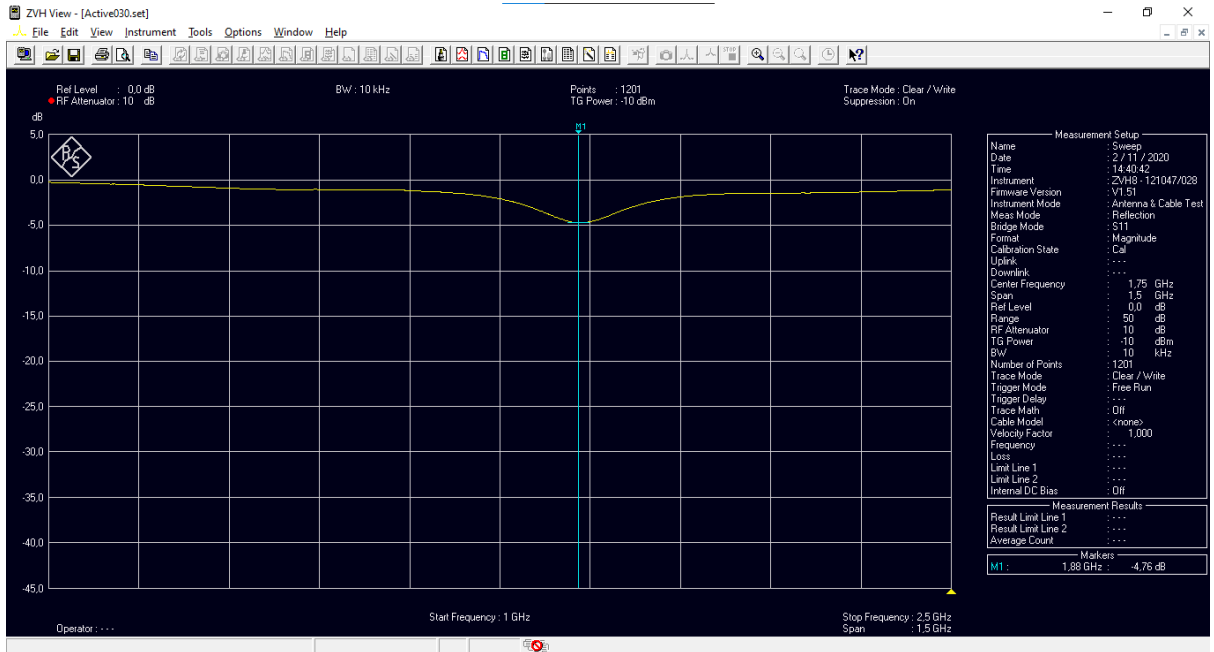
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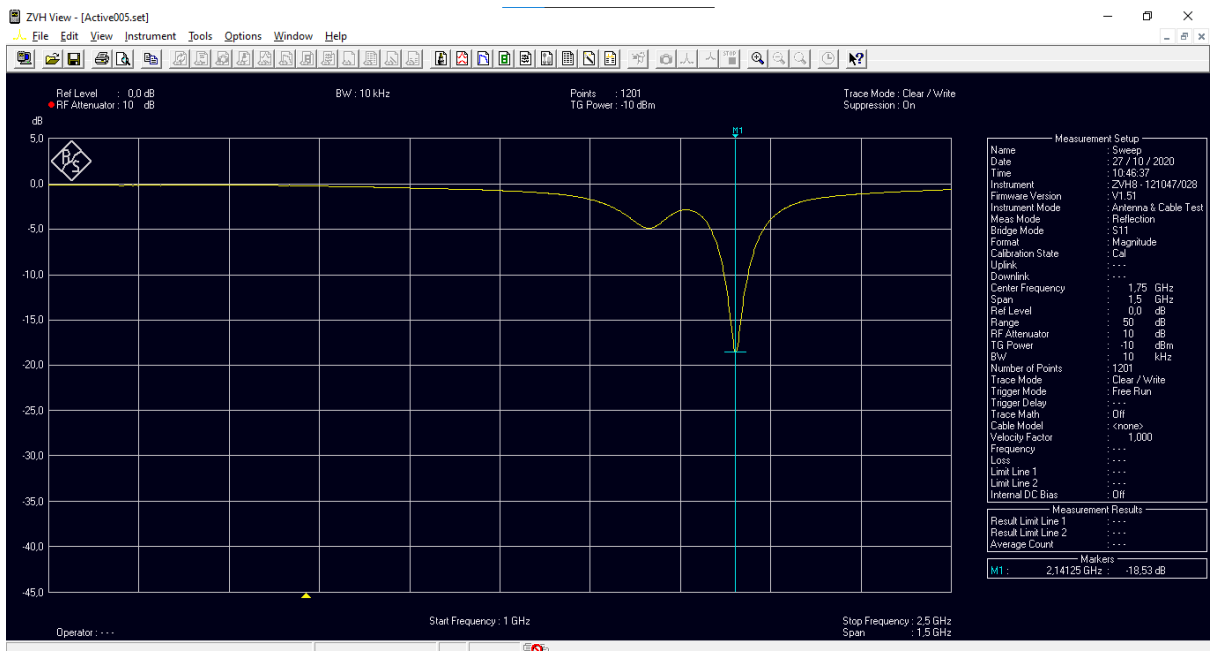
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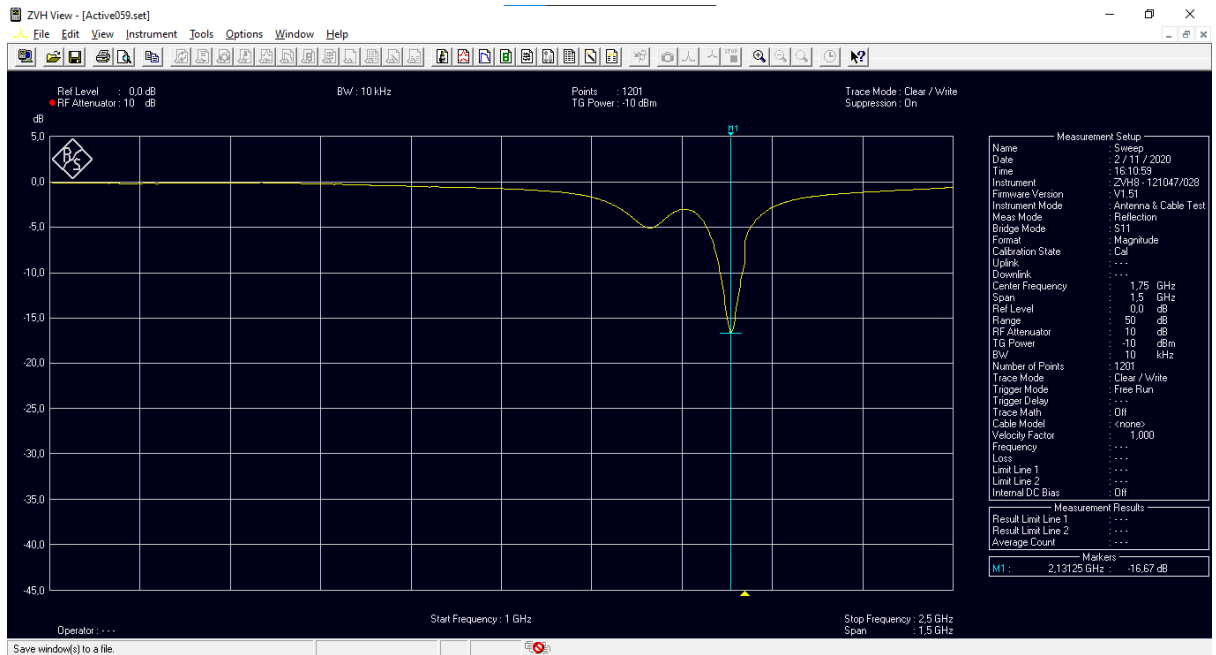
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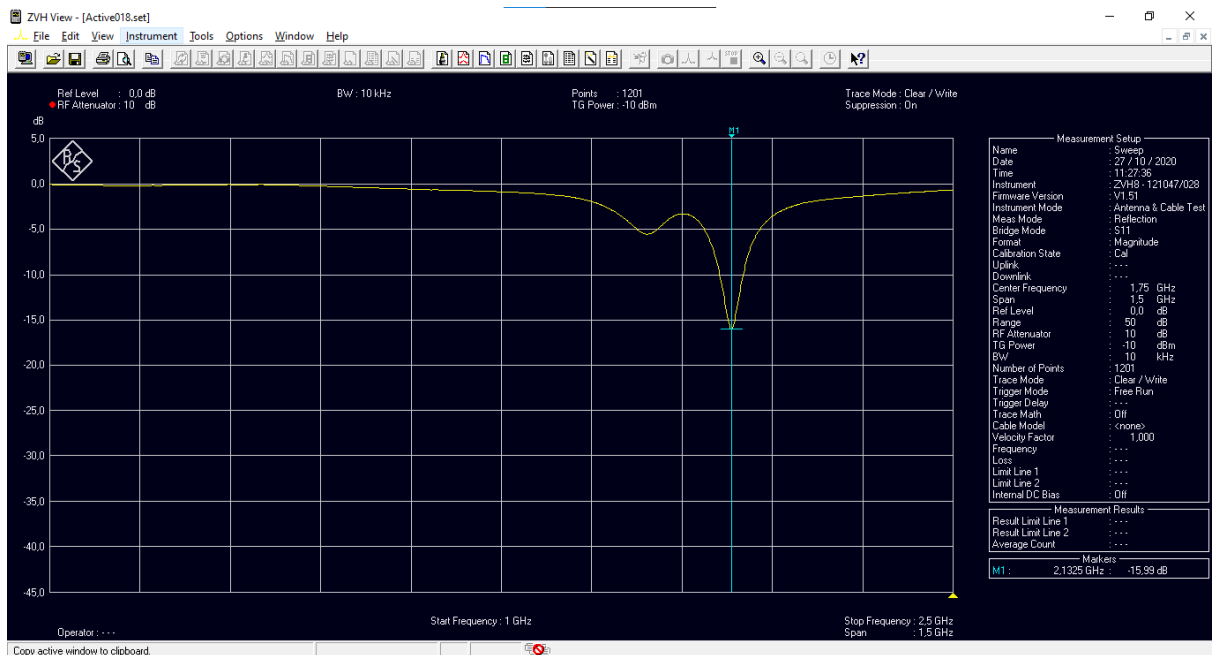
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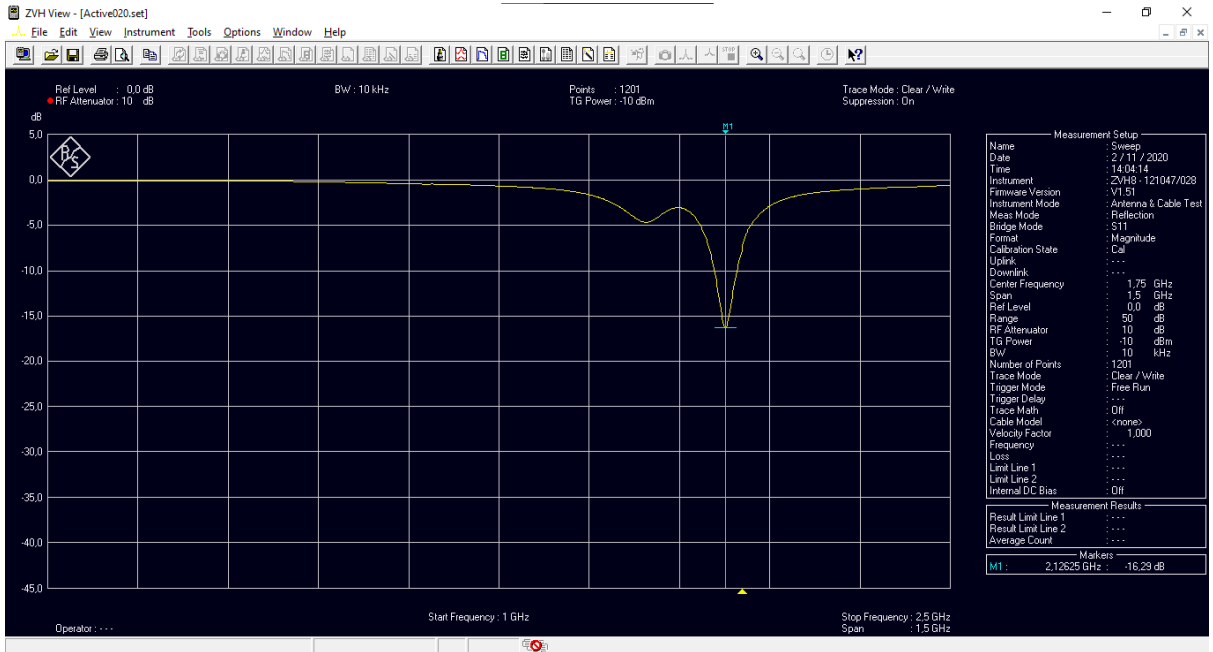
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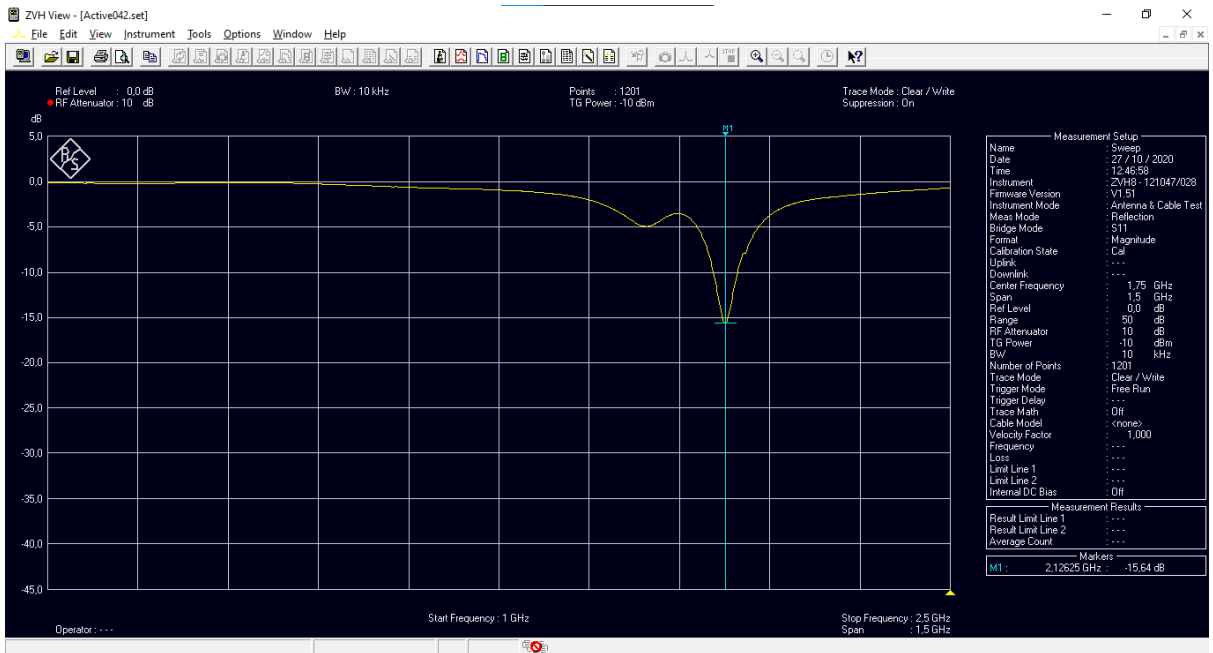
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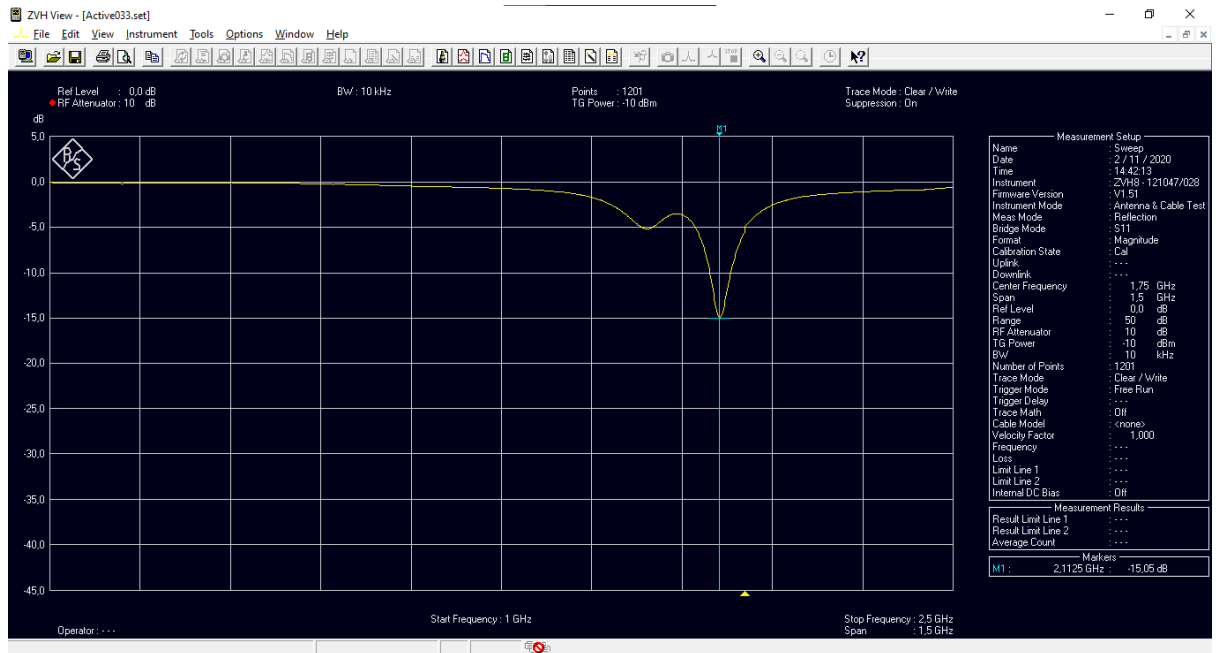
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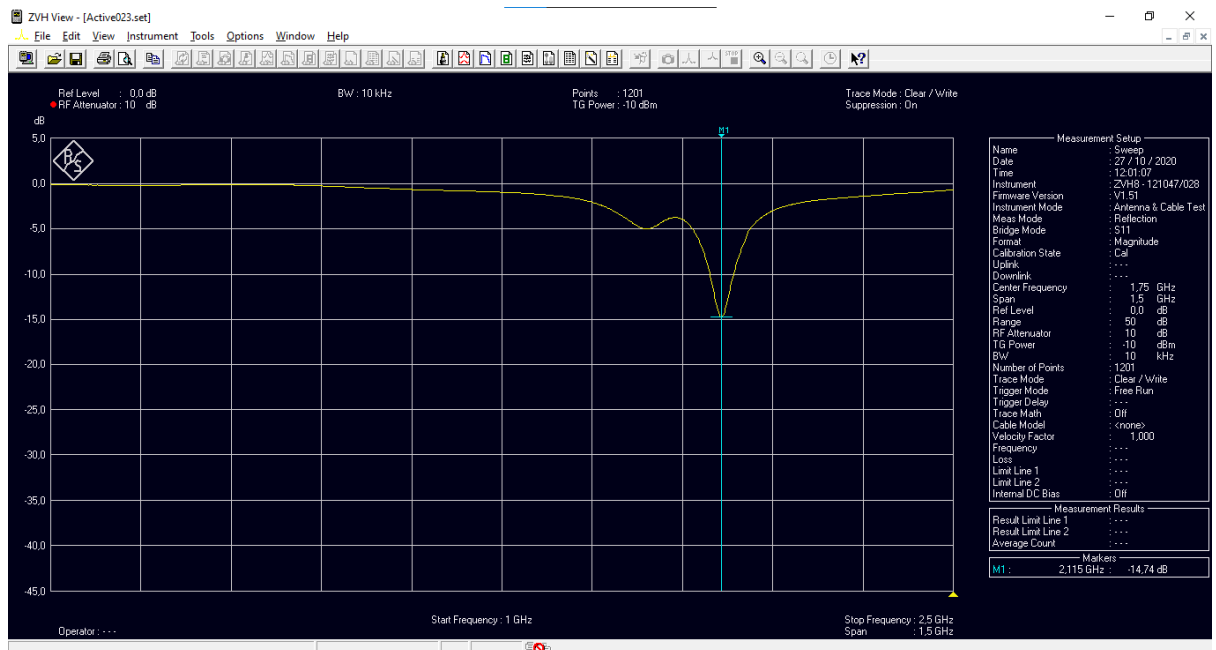
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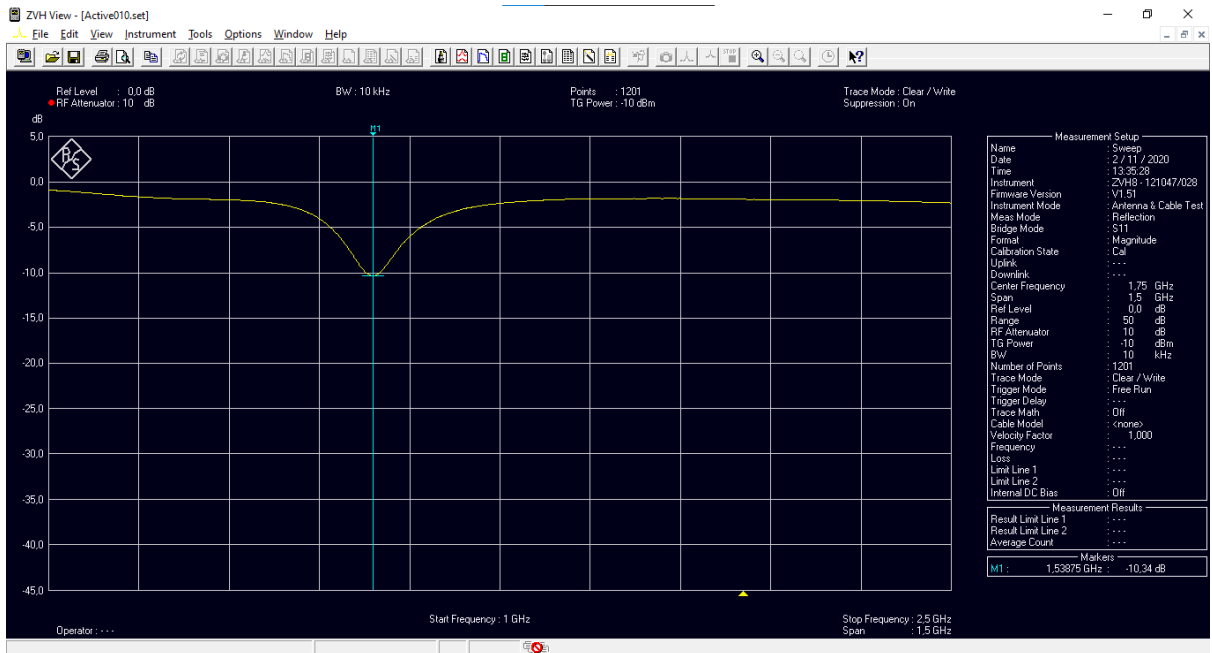
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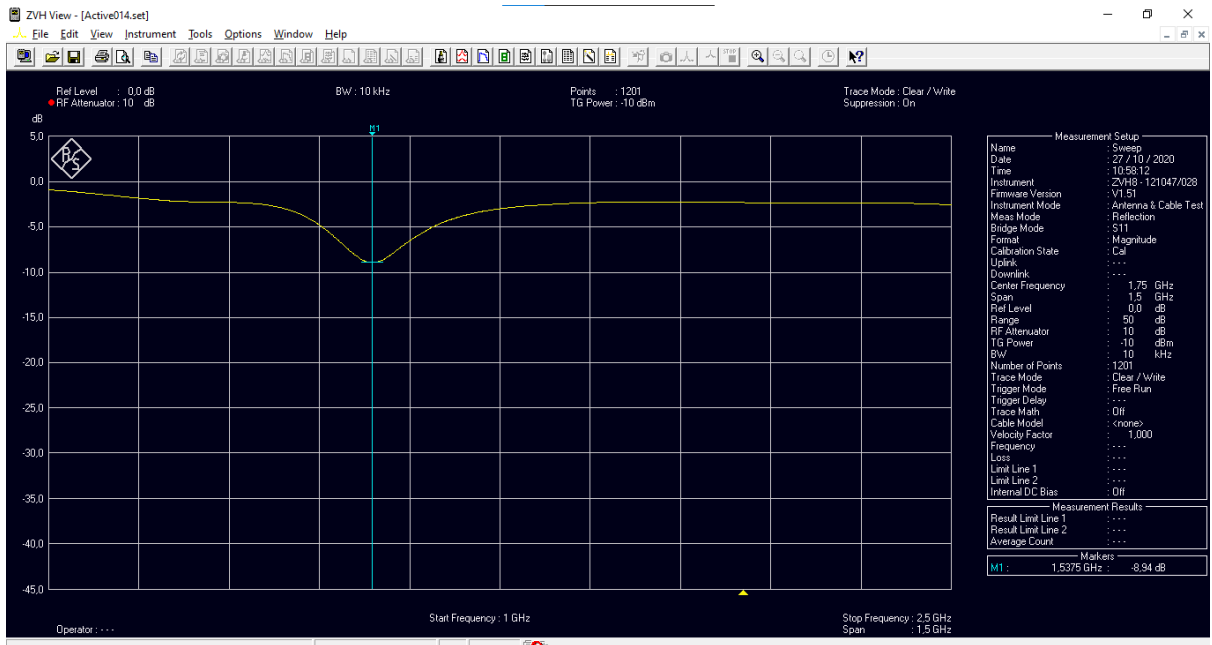
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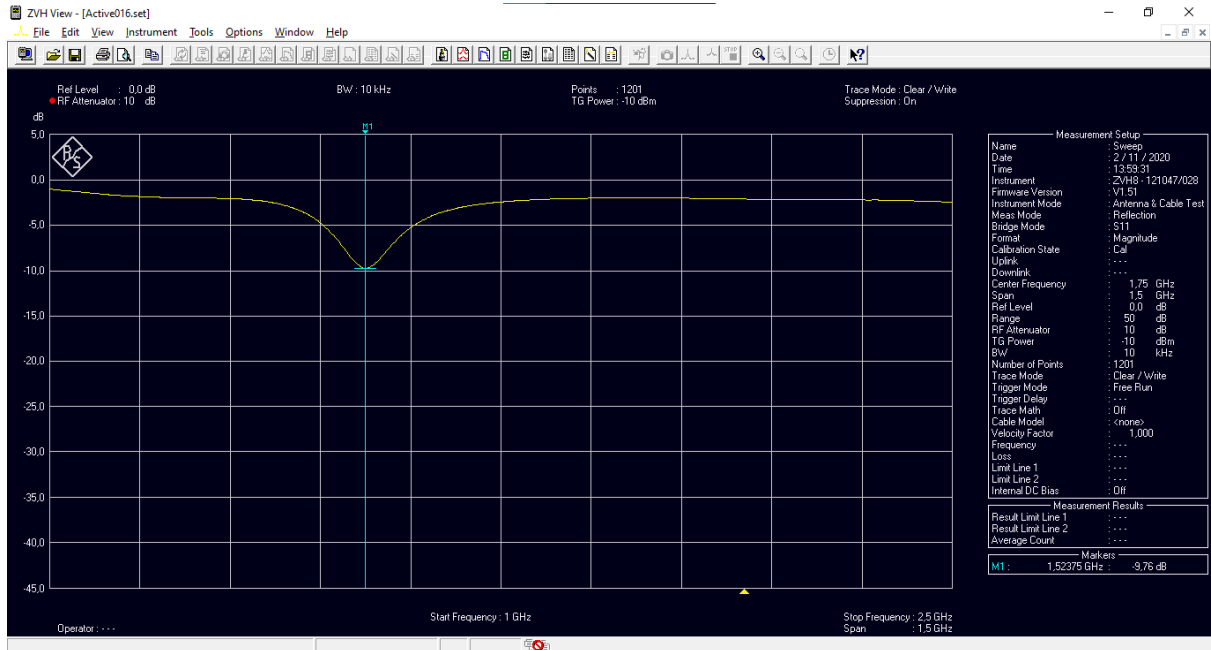
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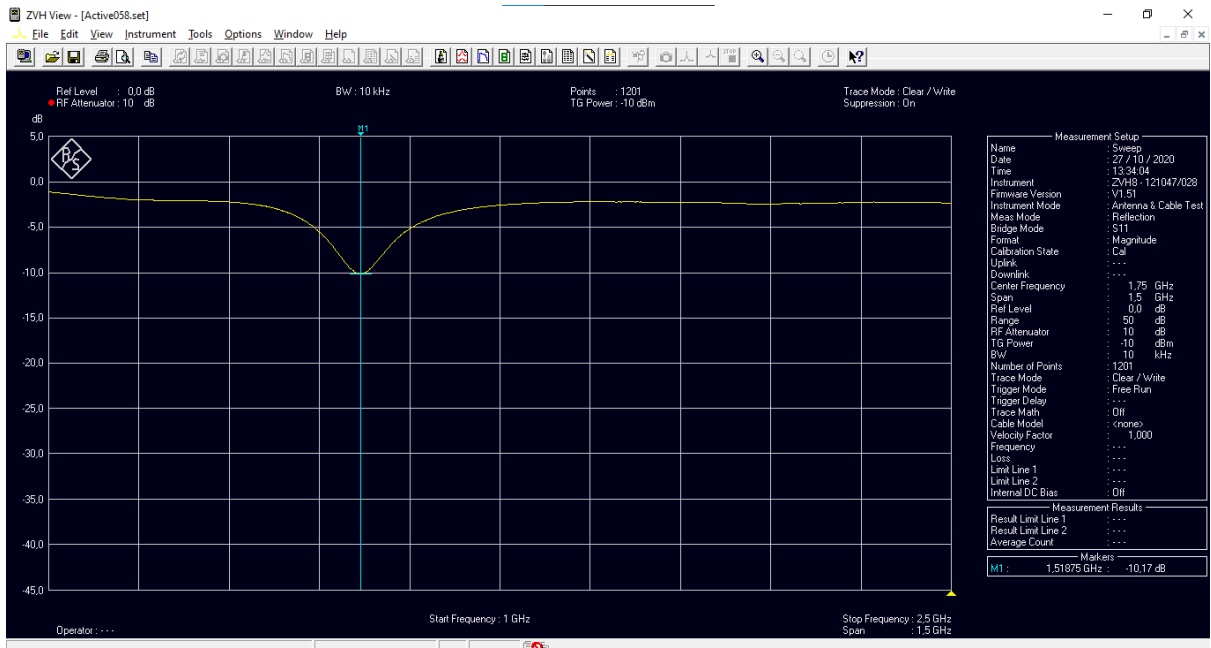
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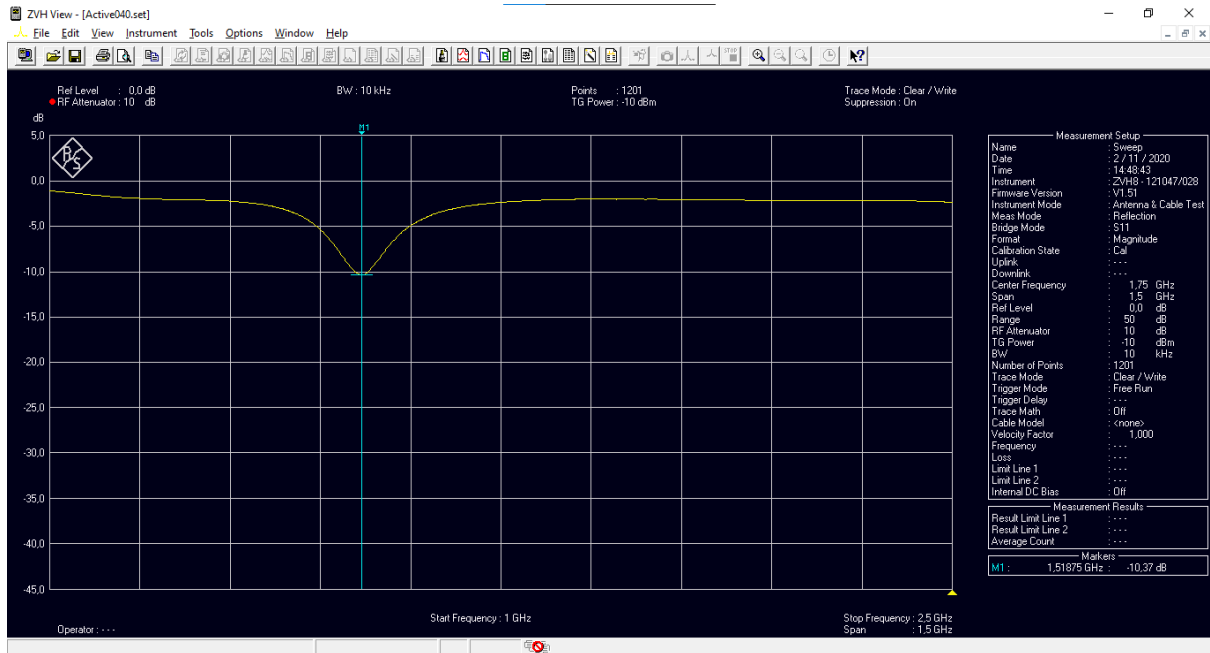
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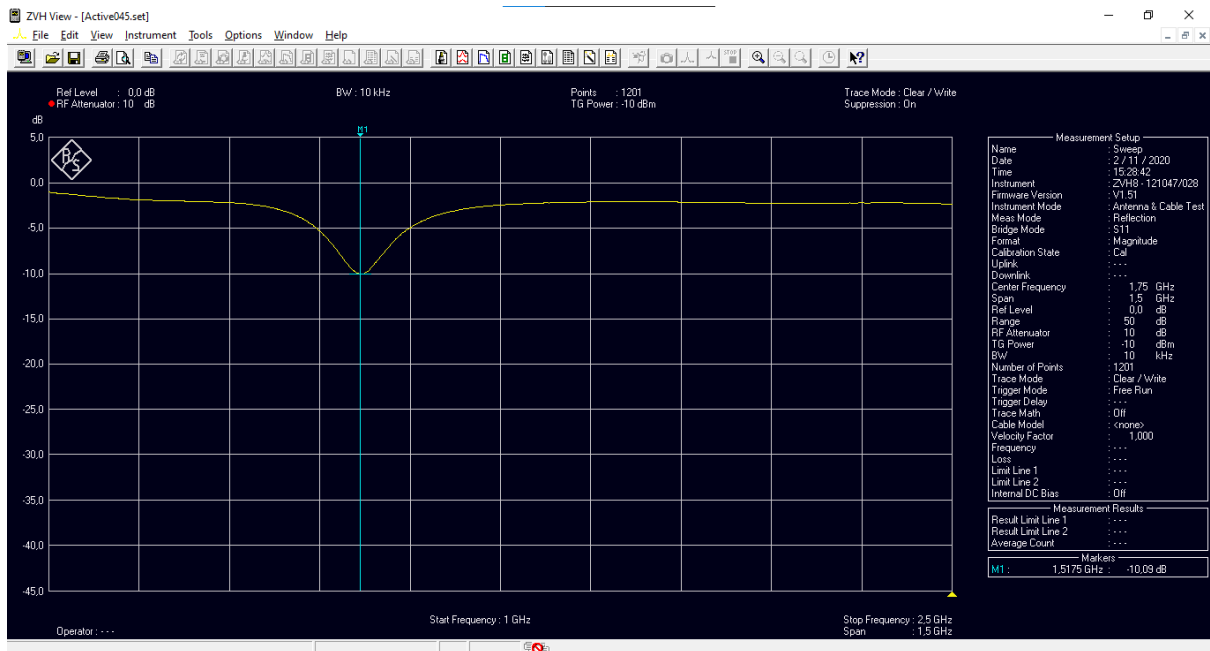
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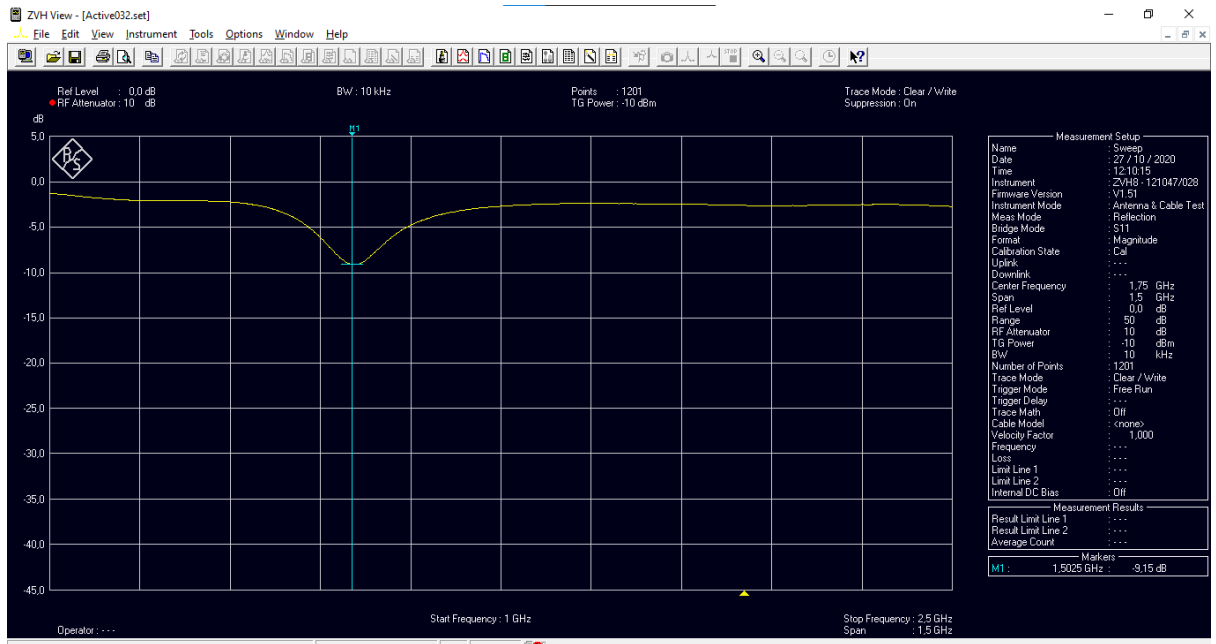
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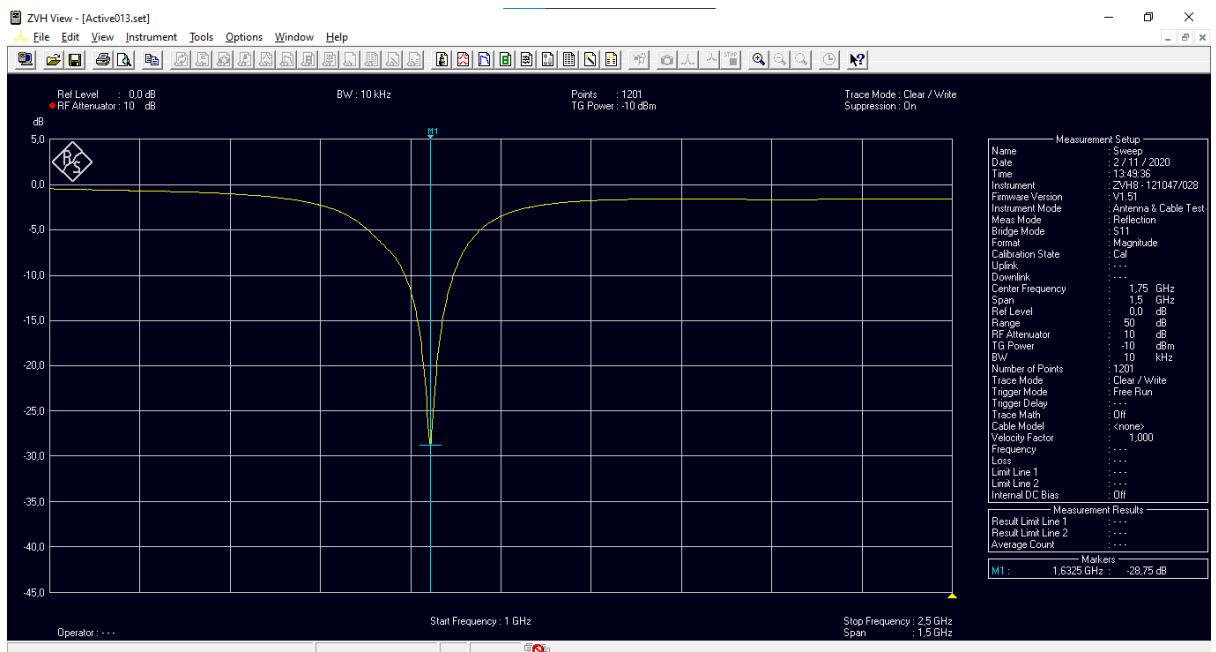
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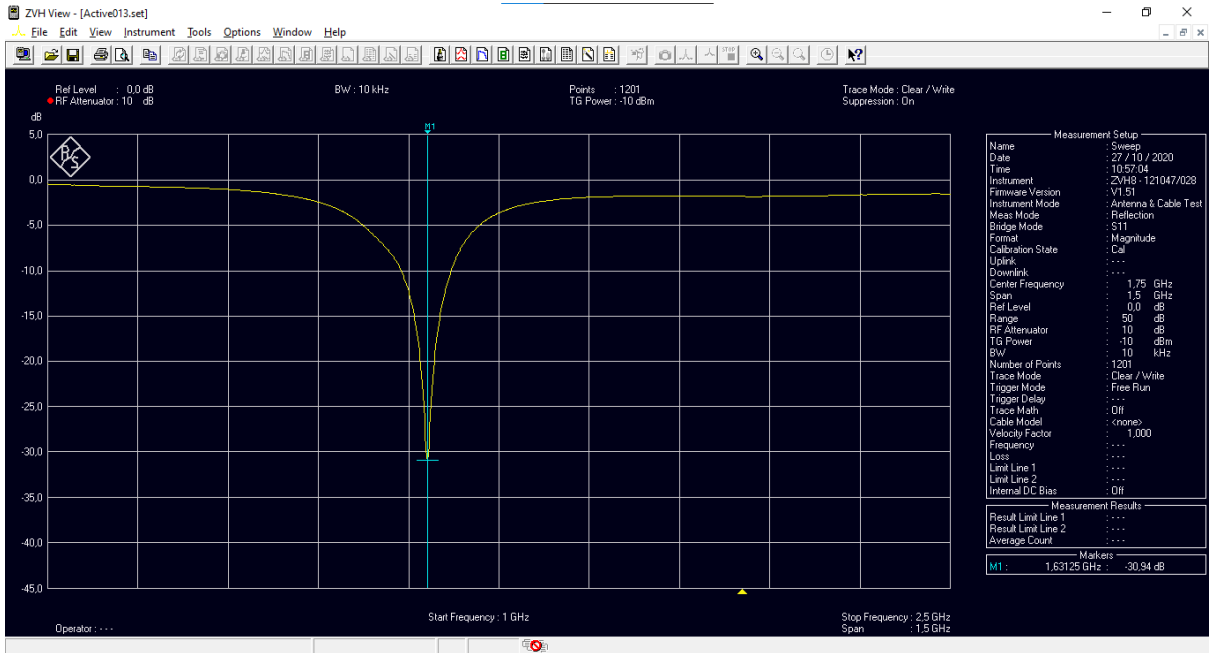
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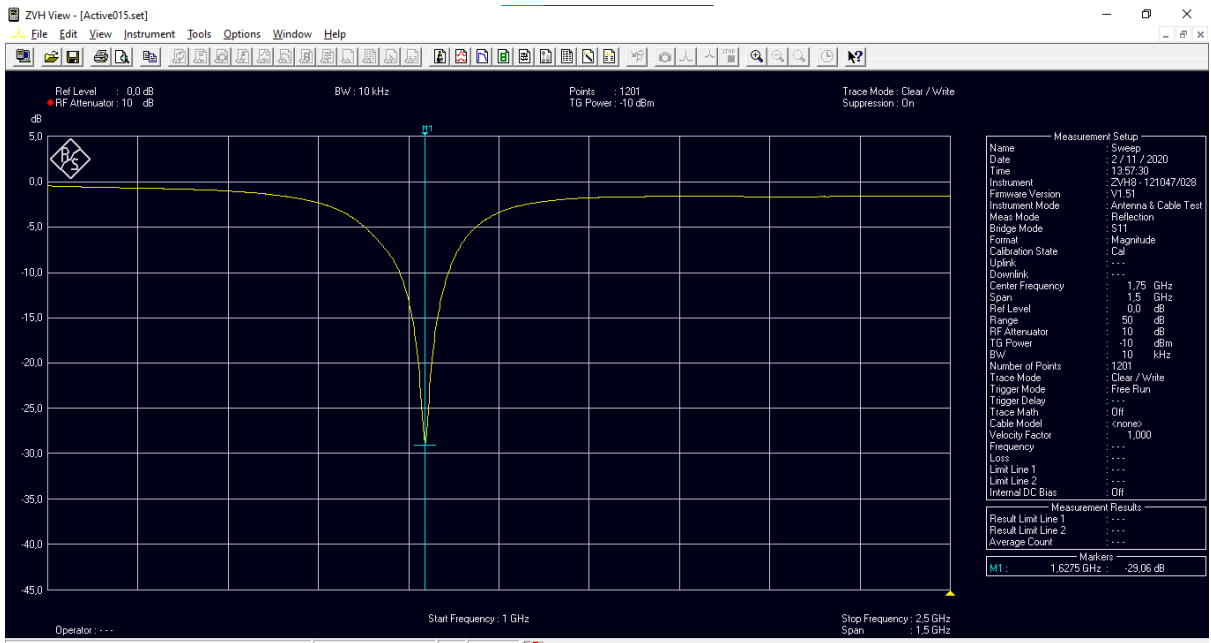
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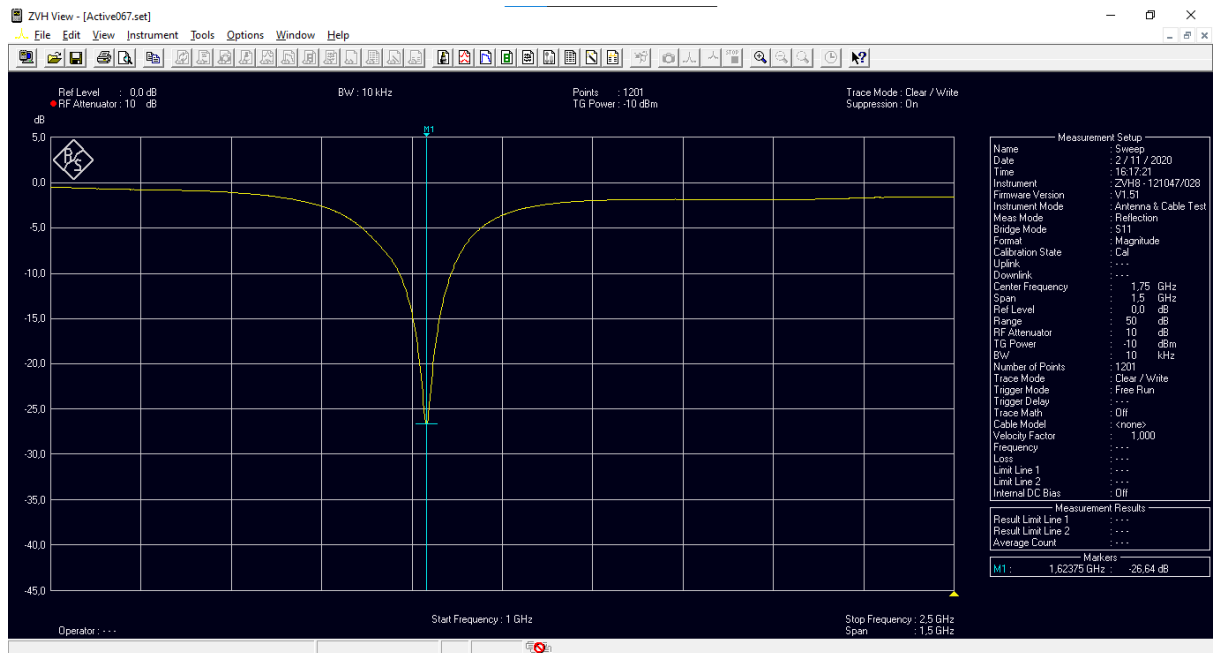
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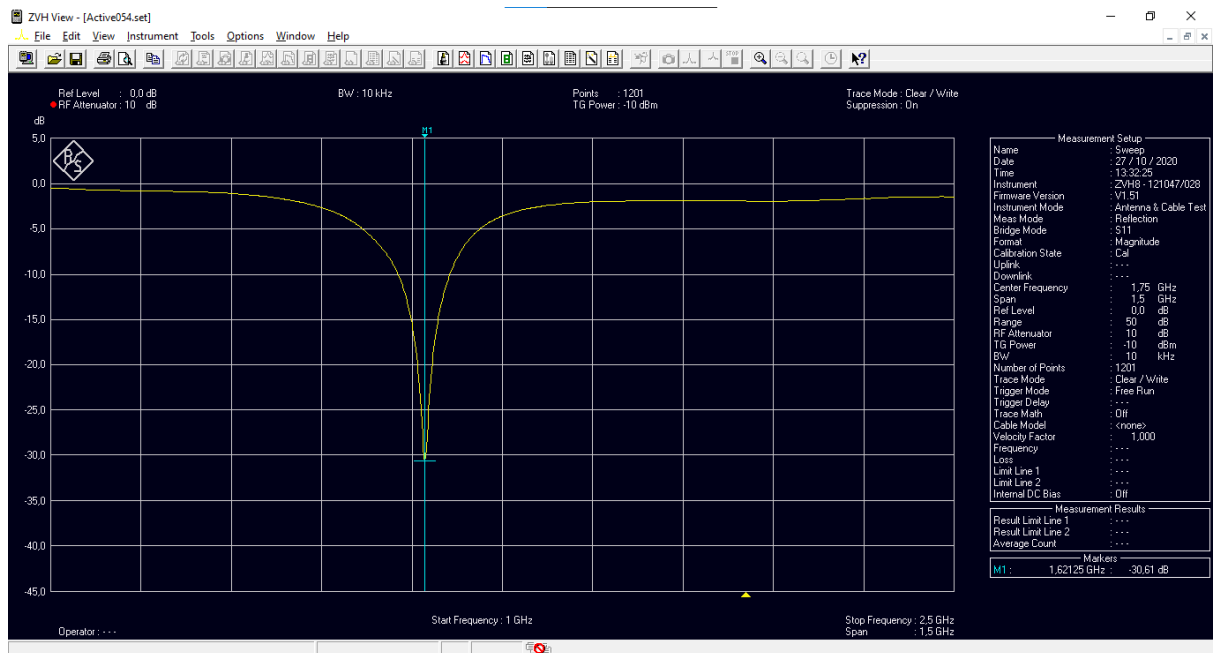
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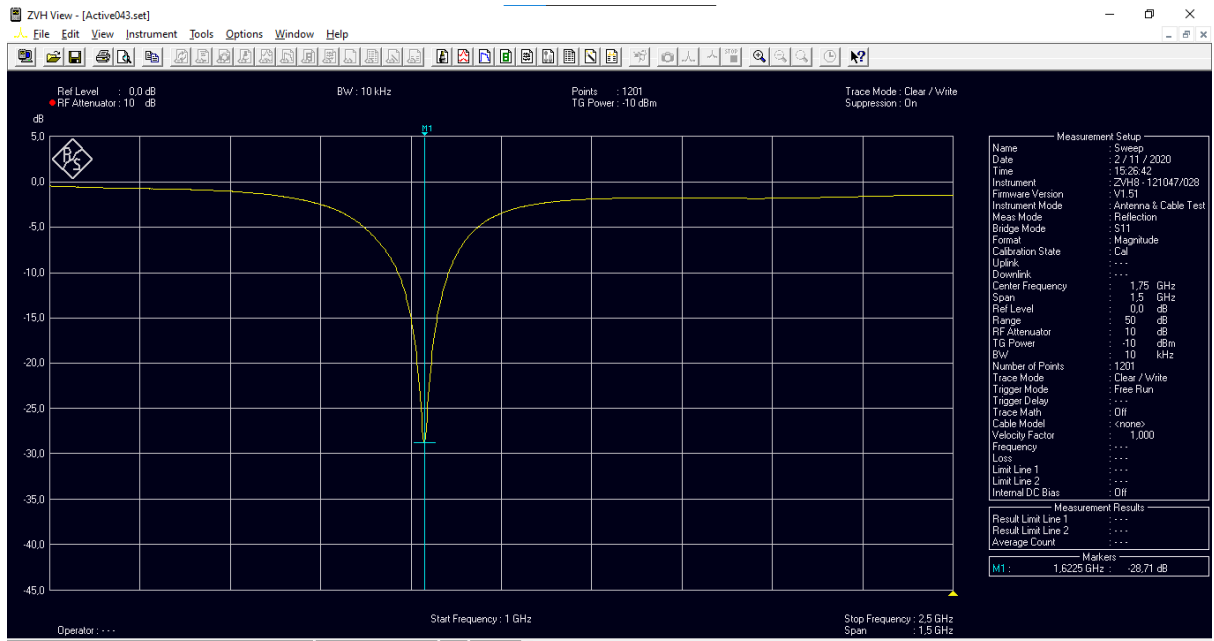
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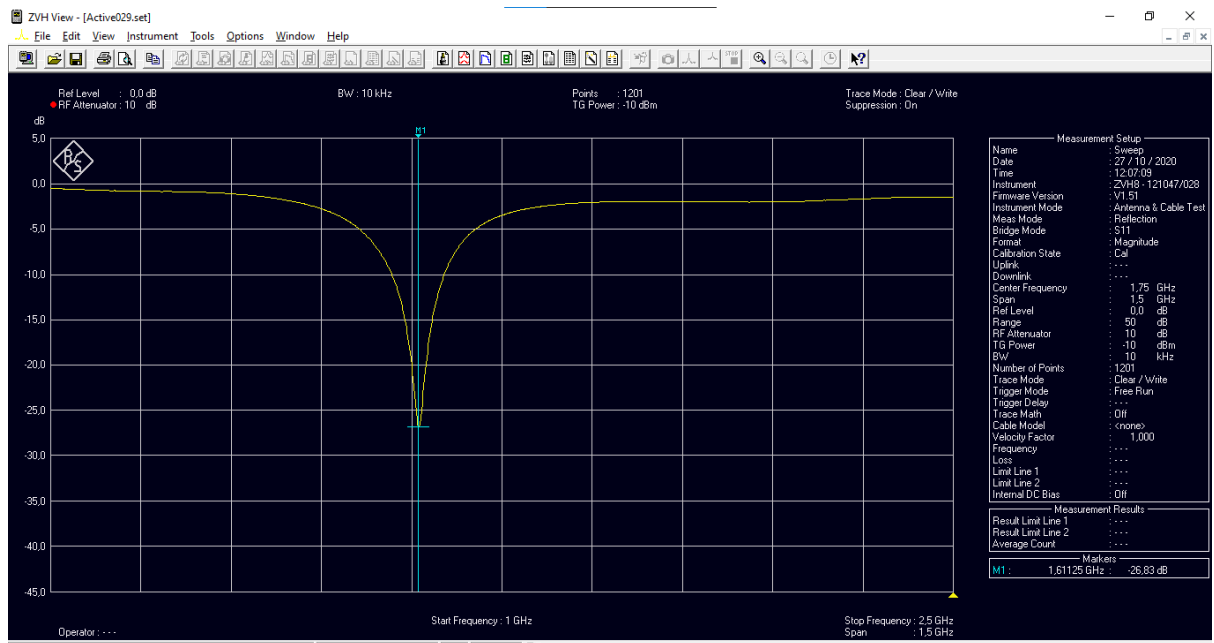
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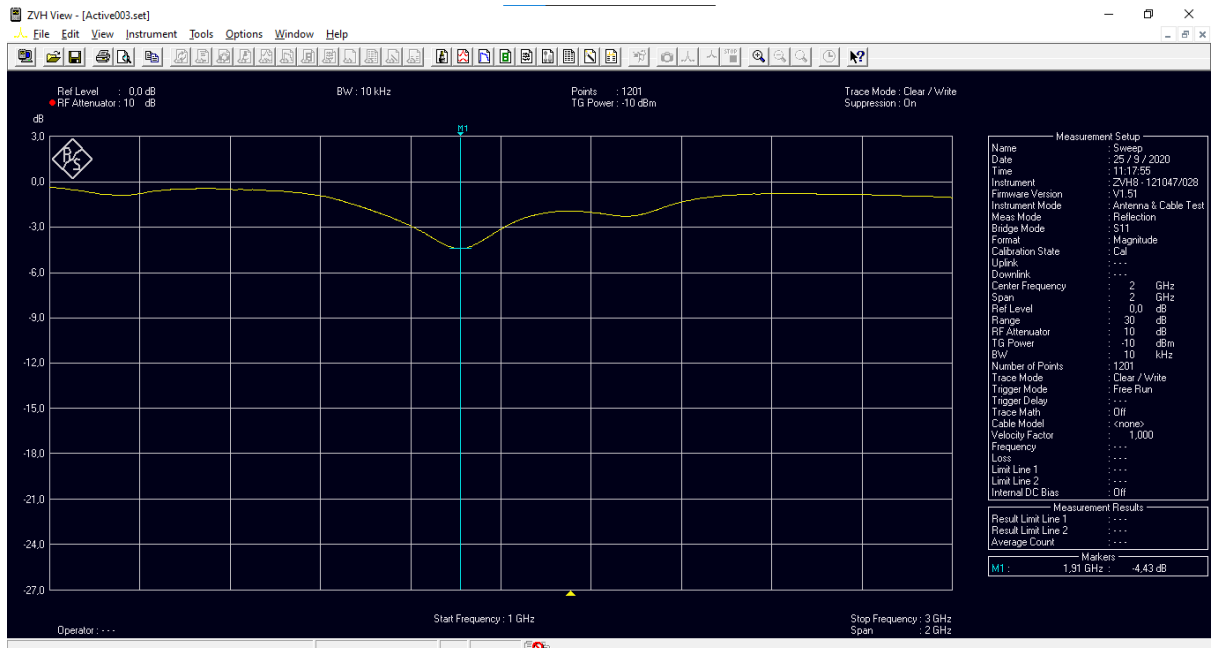
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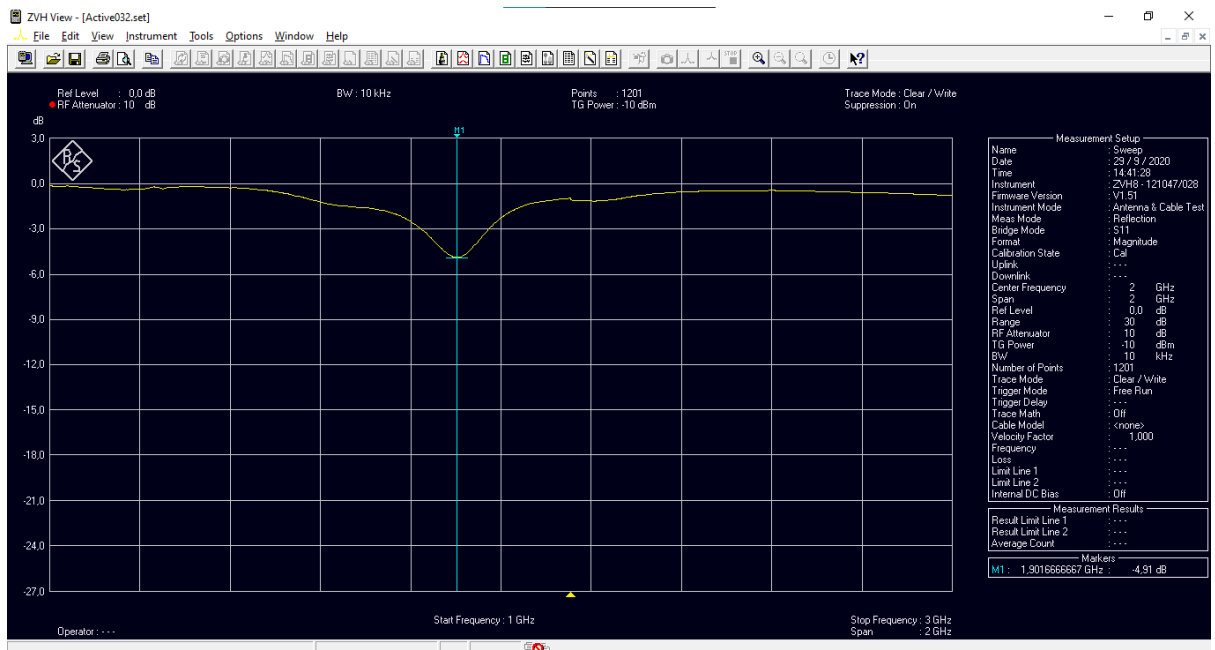
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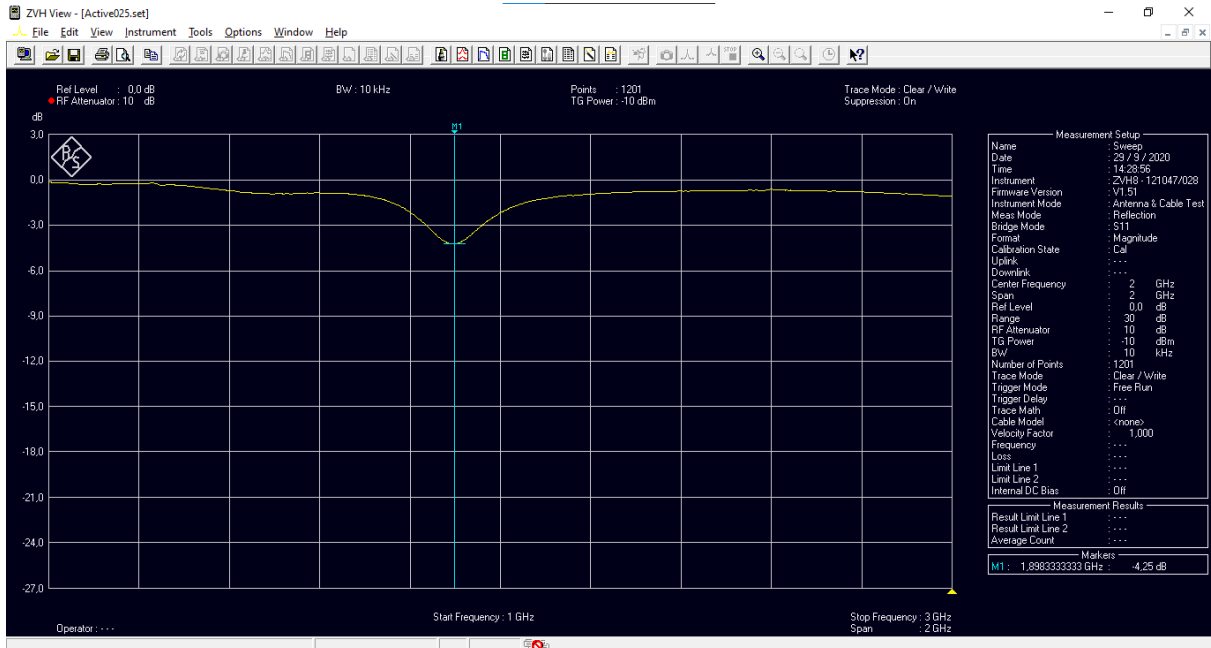
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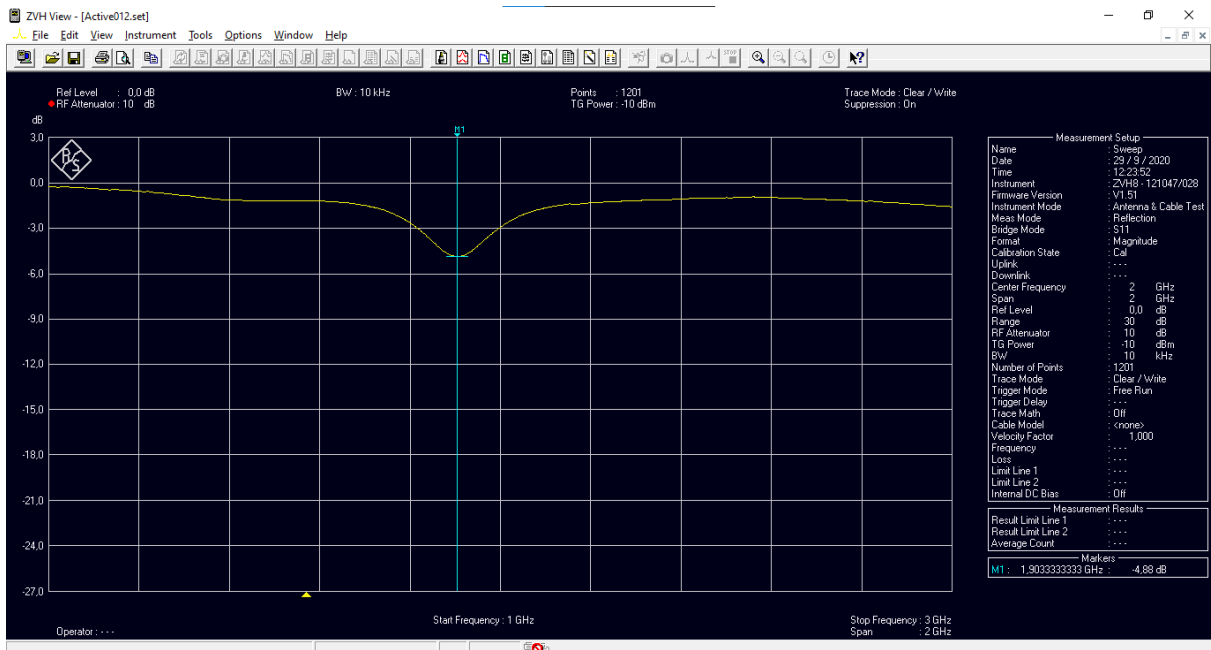
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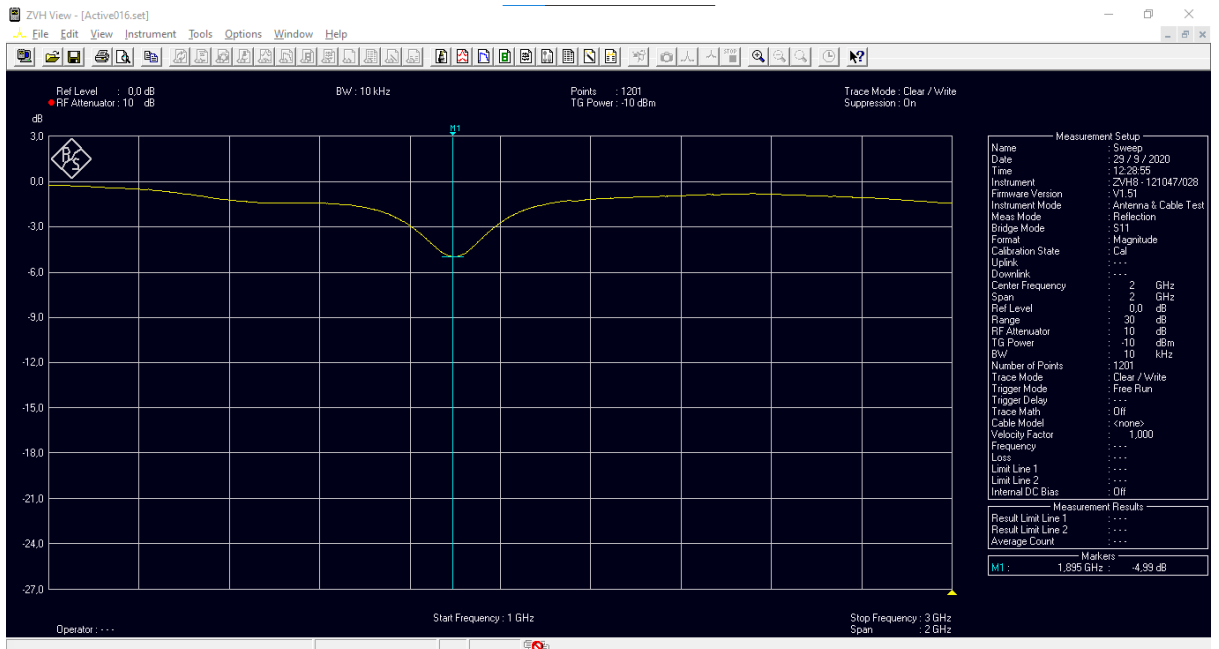
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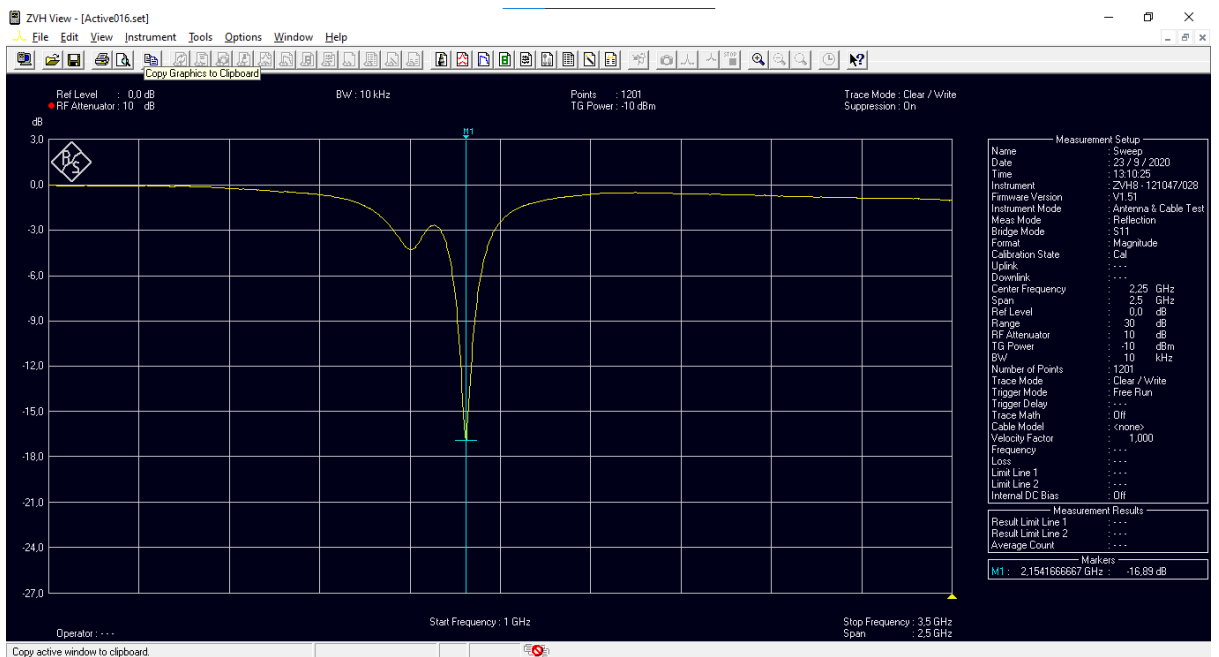
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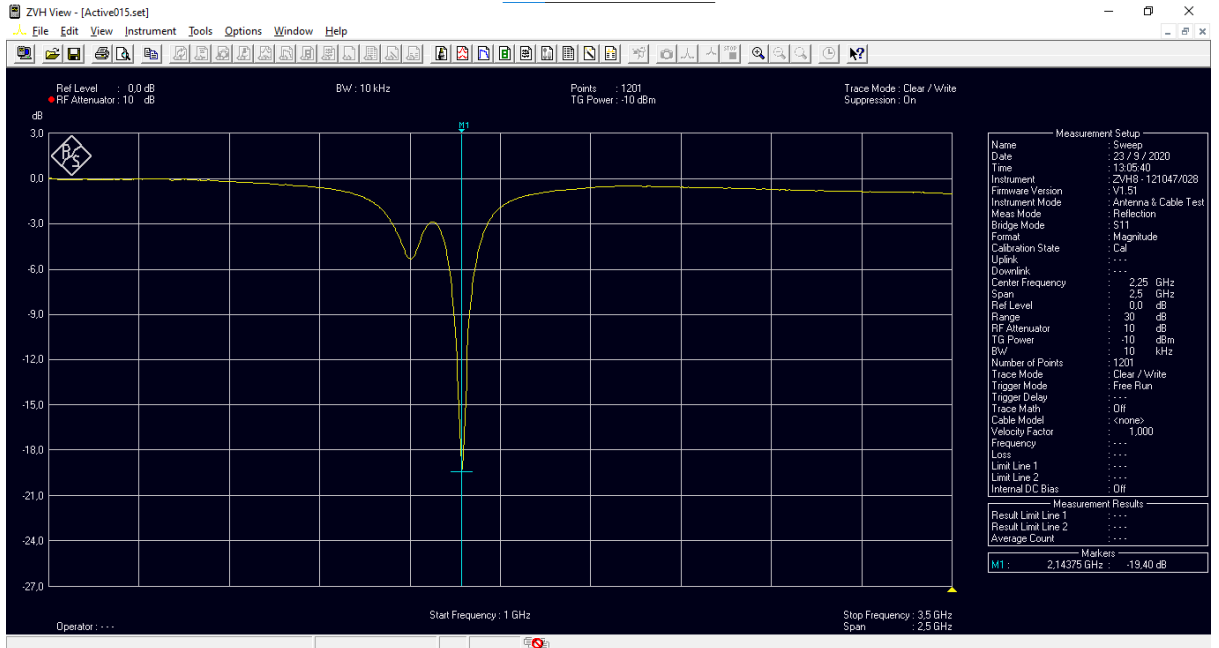
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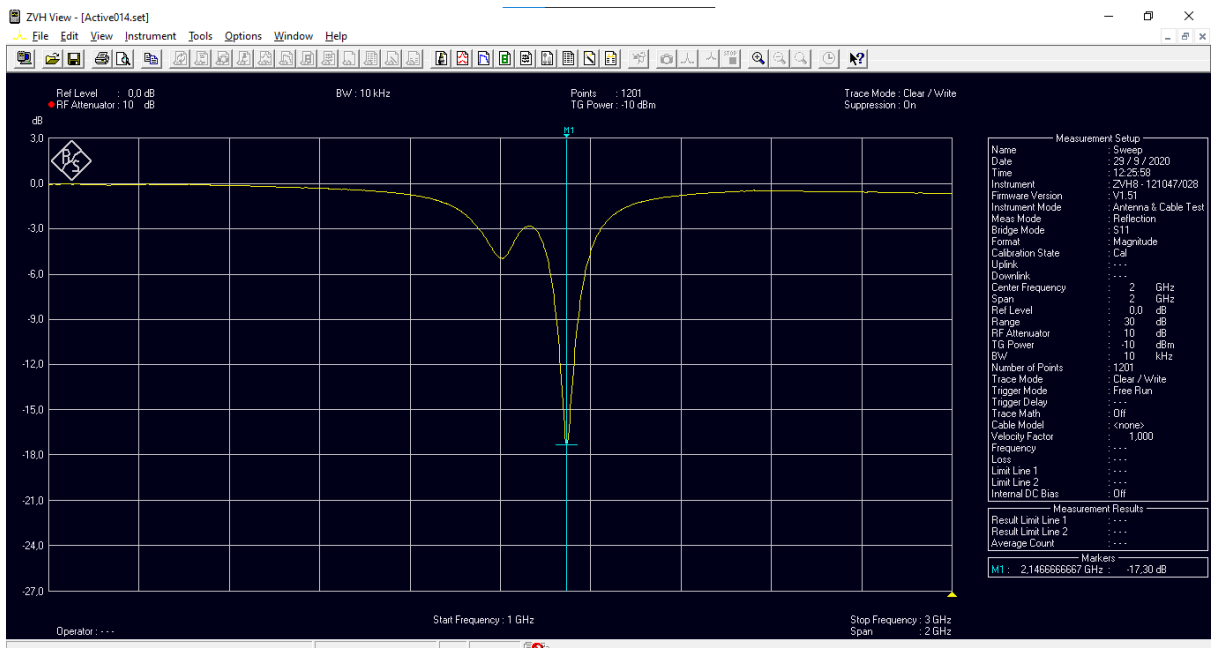
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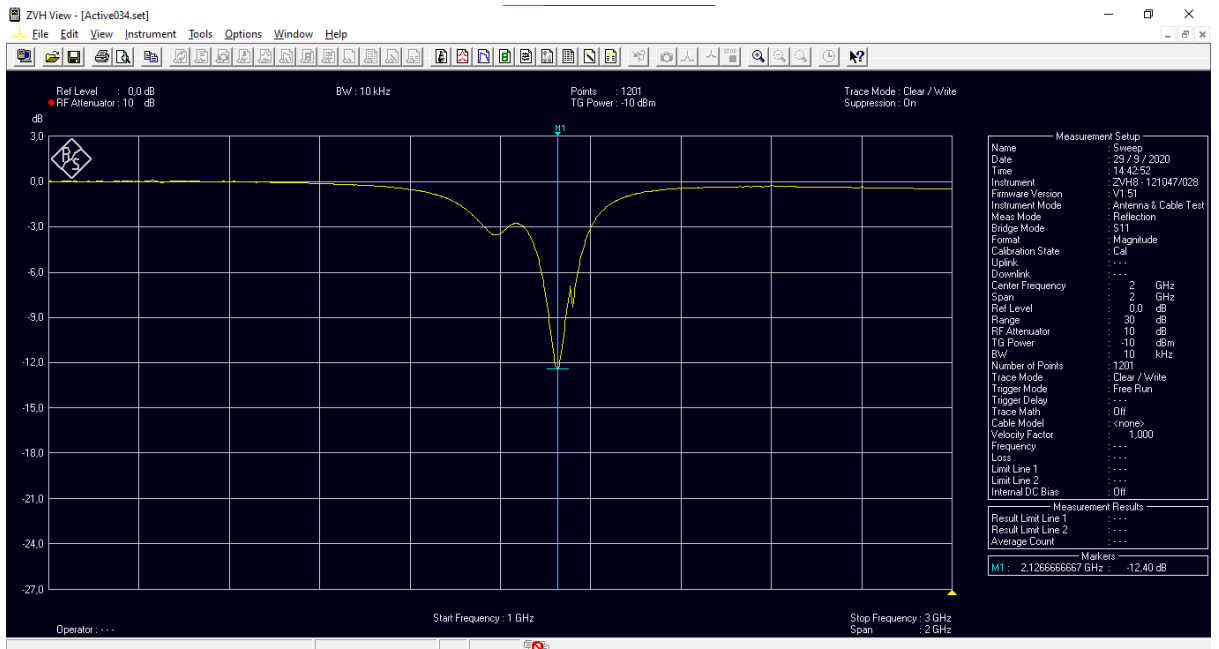
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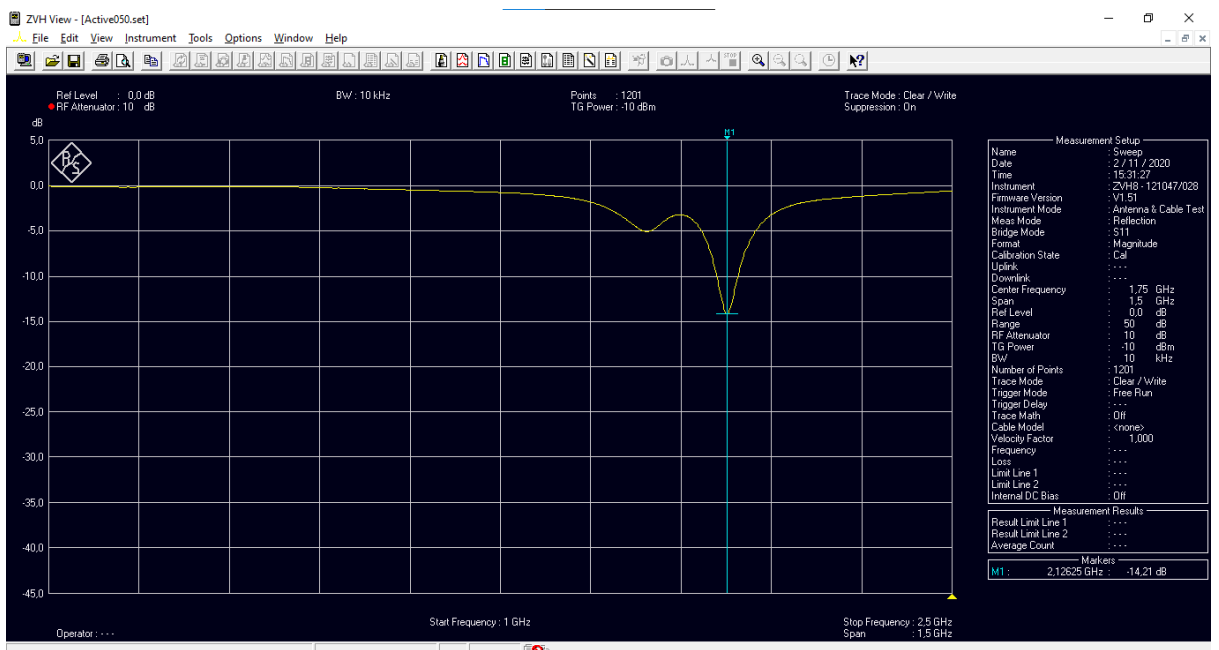
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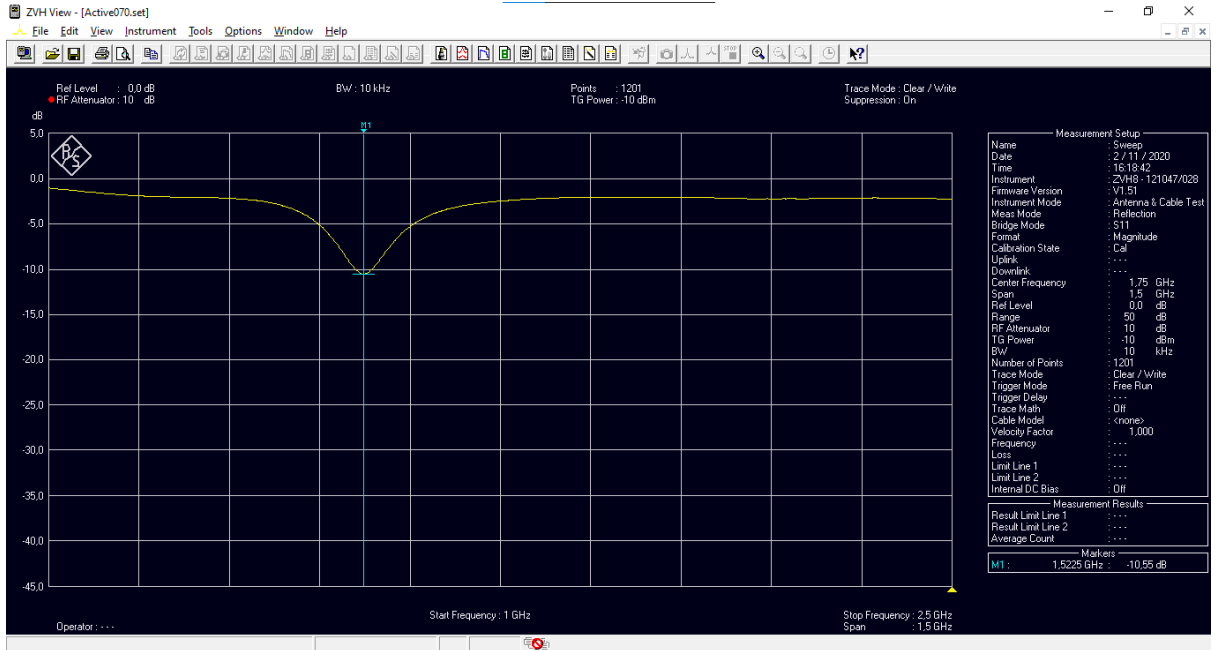
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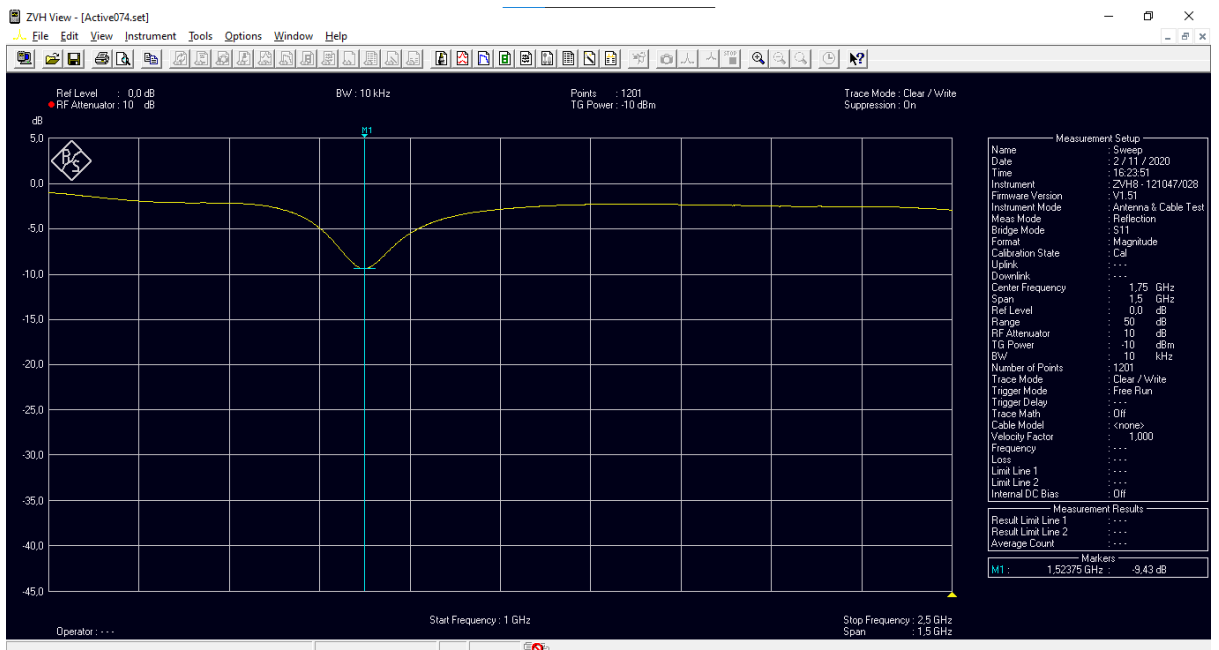
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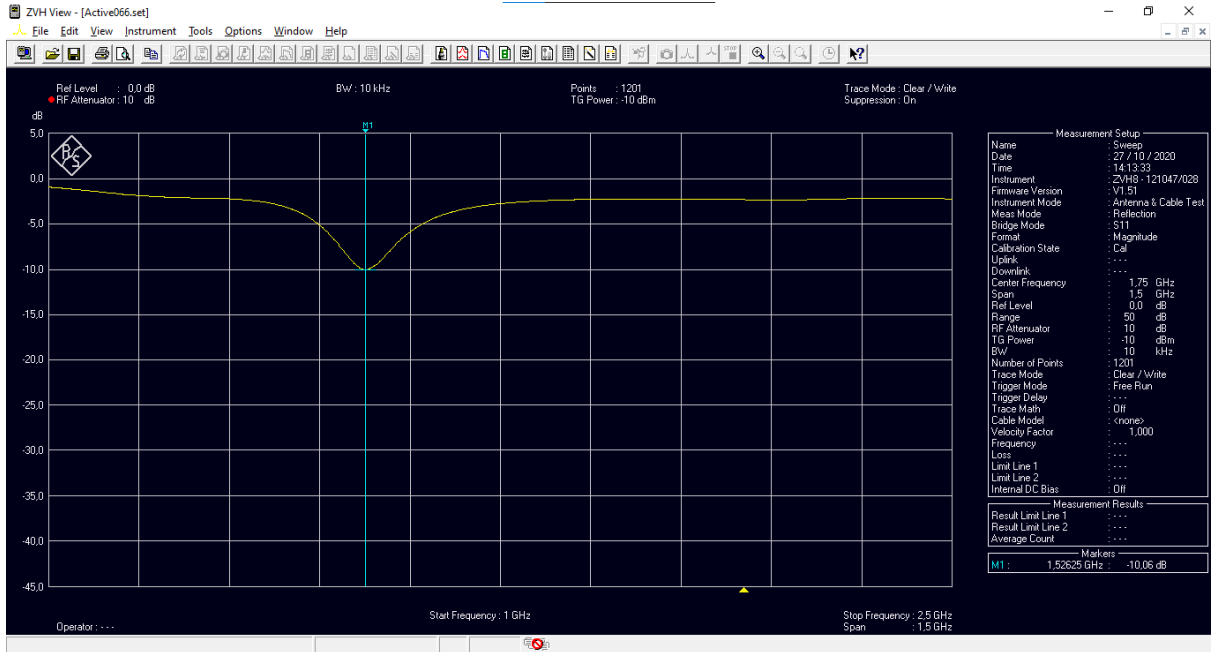
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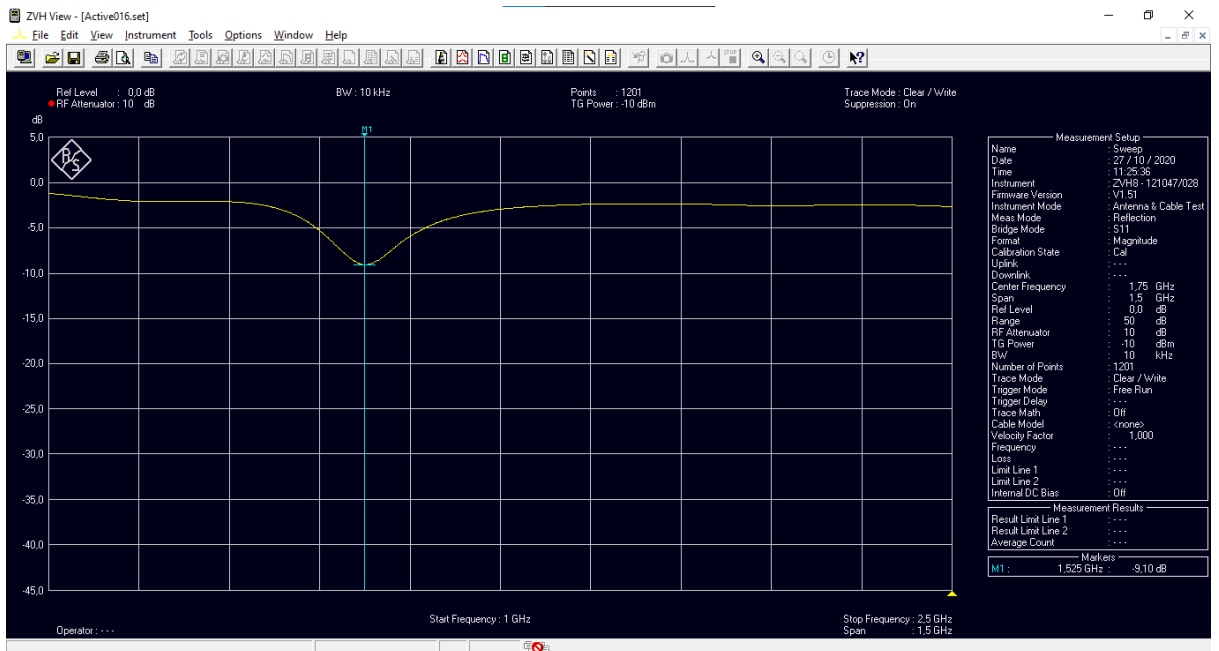
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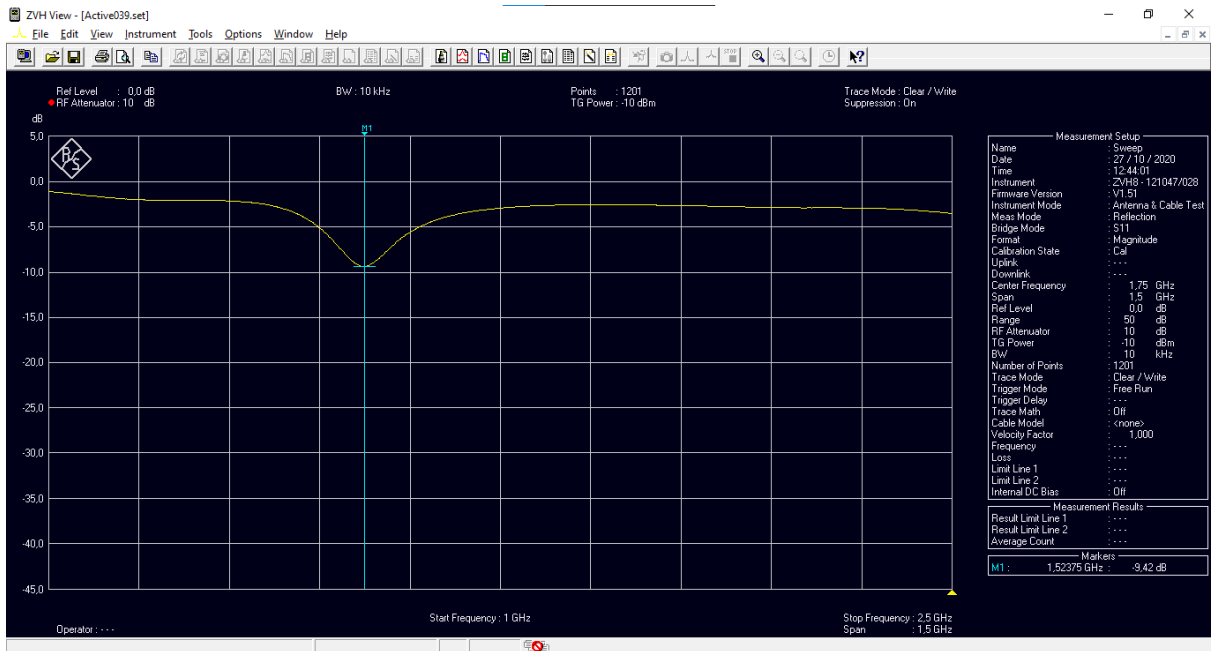
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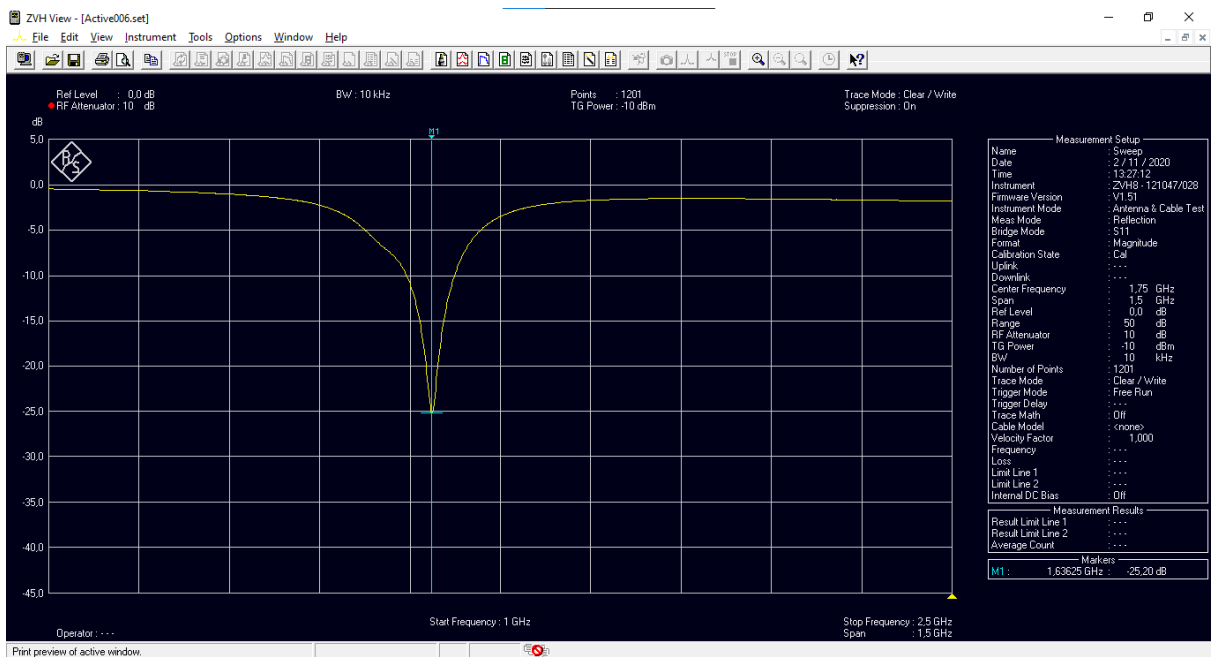
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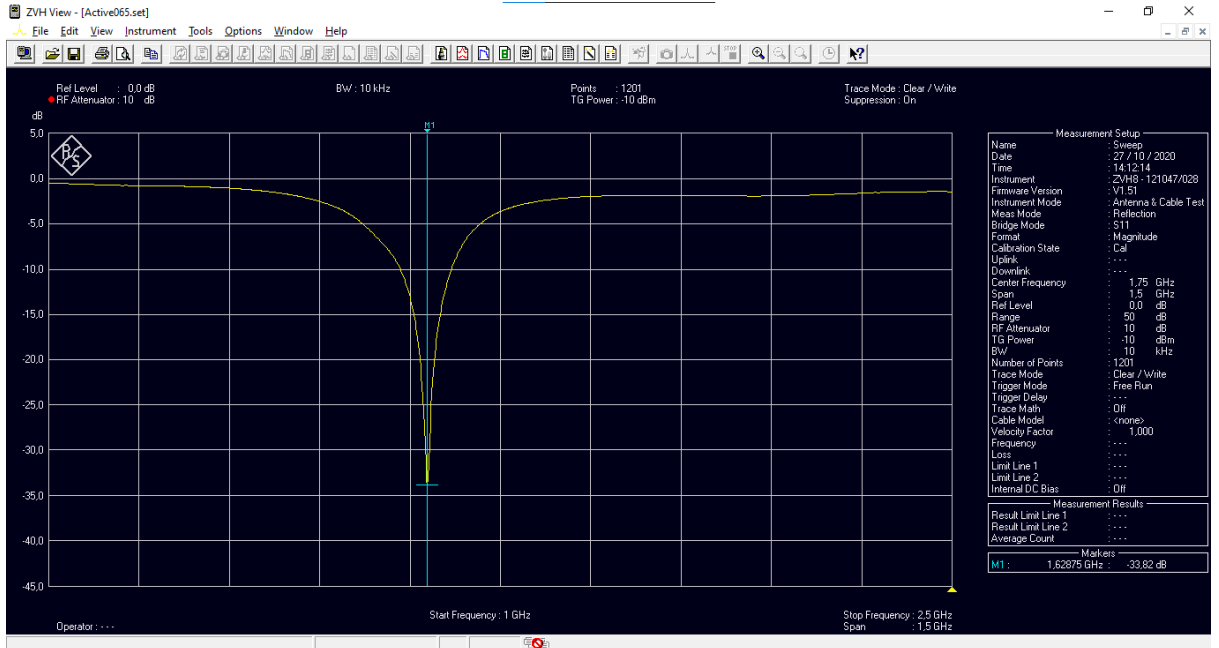
**Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC
H220 keadaan tangan sentuh glukosa 118 mg/dL pada VNA**



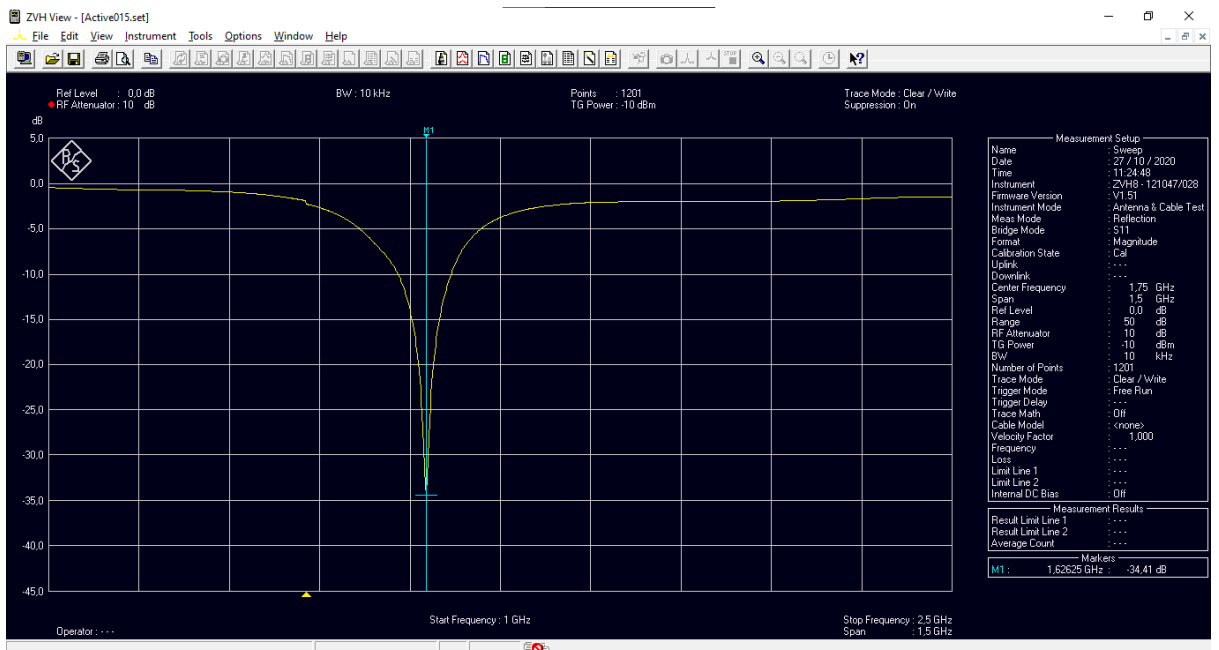
**Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC
H220 keadaan tangan sentuh glukosa 135 mg/dL pada VNA**



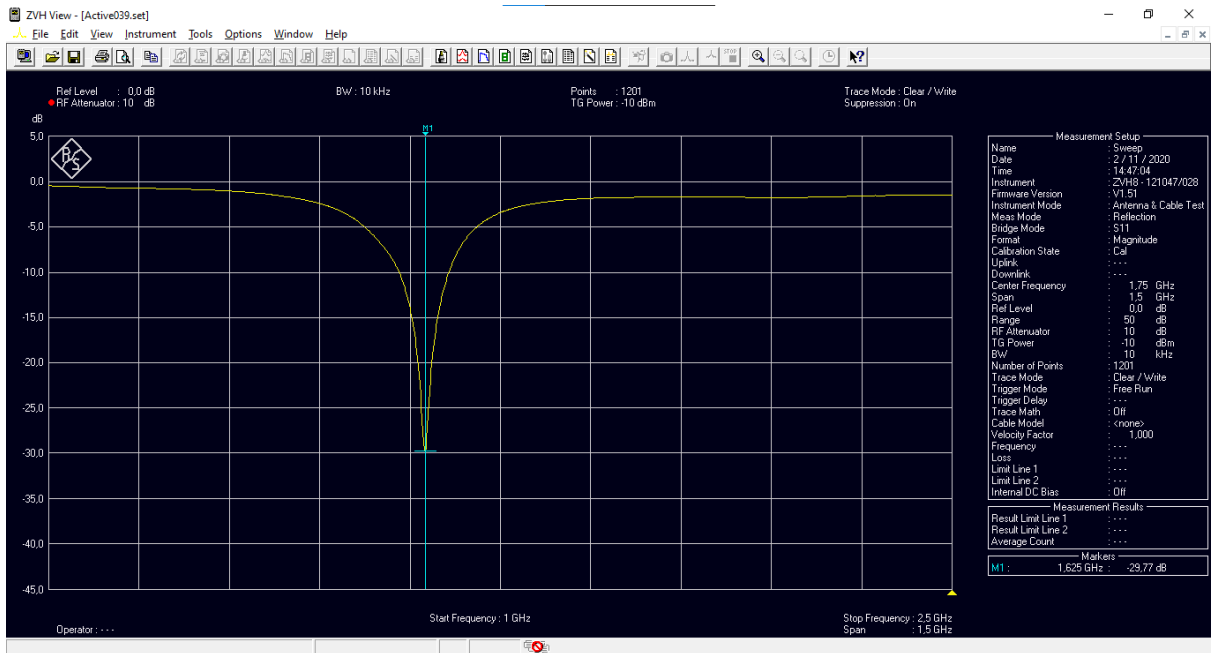
**Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC
H220 keadaan tangan tidak sentuh glukosa 89 mg/dL pada VNA**



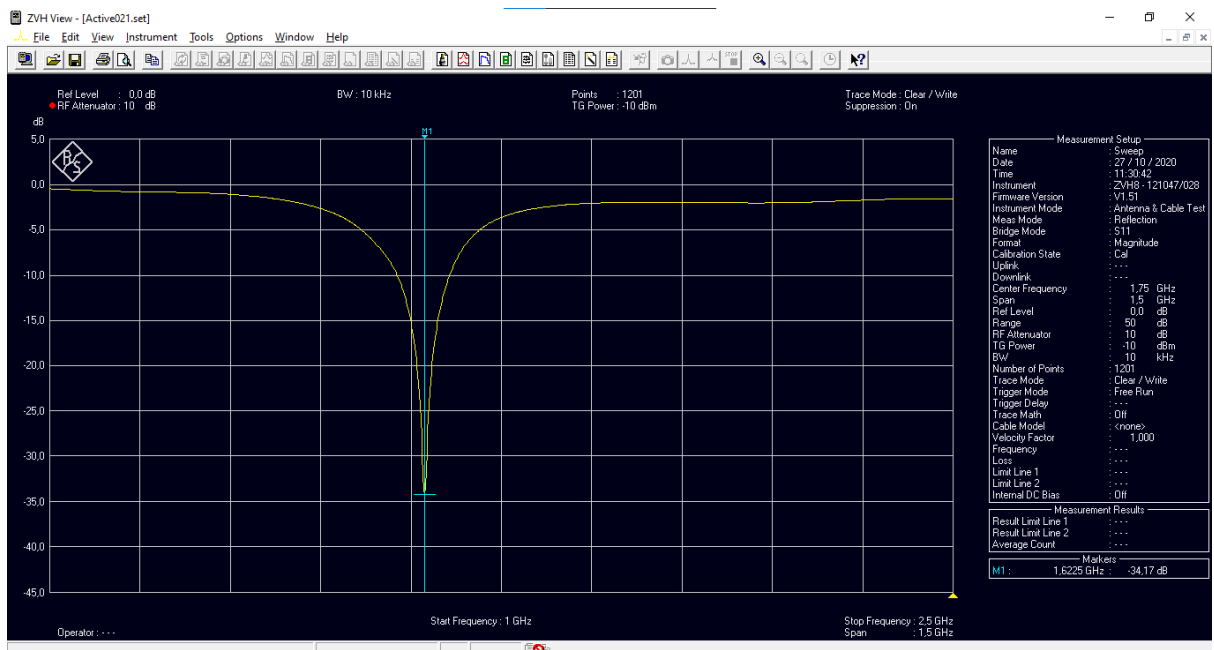
Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC H220 keadaan tangan tidak sentuh glukosa 105 mg/dL pada VNA



Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC H220 keadaan tangan tidak sentuh glukosa 113 mg/dL pada VNA



Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC H220 keadaan tangan tidak sentuh glukosa 139 mg/dL pada VNA



Pengukuran data validasi sensor antenna mikrostrip material *substrate* NPC H220 keadaan tangan tidak sentuh glukosa 150 mg/dL pada VNA

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fr4\sentuh\fr4_sentuh.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\2nov\fr4\sentuh\fr4_sentuh_2nov.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\s11fr4.mat')

figure(1);

plot(x003_2,y003_2,x062_2,y062_2,x023_2,y023_2,...
      x052_2,y052_2,x044,y044,x051,y051,...
      x030_2,y030_2,x_s11fr4,y_s11fr4),xlabel('Frekuensi (GHz)'),ylabel('S11 (dB)');

legend('86','116','126',...
       '134','135','137',...
       '153','S11 Awal');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk plot data hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan sentuh

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fr4\tidak
_sentuh\fr4_tidaksentuh.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\2nov\fr4\
tidak_sentuh\fr4_tidaksentuh_2nov.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\s11fr4.ma
t')

figure(1);

plot(x005,y005, x059_2,y059_2,x018,y018,...
     x020_2,y020_2, x042,y042,...
     x033_2, y033_2,...
     x023,y023,x_s11fr4,y_s11fr4),xlabel('Frekuensi
(GHz)'),ylabel('S11 (dB)');

legend('96','119','122',...
      '130','132',...
      '155',...
      '160','S11 Awal');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk plot data hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan tidak sentuh

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\nipponpilar\sentuh\nippon_sentuh.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\2nov\nipponpilar\sentuh\nippon_sentuh_2nov.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\s11nippon.mat')

figure(1);

plot(x010_2,y010_2,x014,y014,x016_2,y016_2,...

     x058,y058,...

     x040_2,y040_2,x045_2,y045_2,...

     x032,y032,x_s11nippon,y_s11nippon),xlabel('Frekuensi (GHz)'),ylabel('S11 (dB)');

legend('85','92','108',...

      '127',...

      '130','132',...

      '163','S11 Awal');

set(gca, 'fontsize', 24);

```

***Coding* program matlab untuk plot data hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan sentuh**

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\nipponpilar\tidak_sentuh\nippon_tidaksentuh.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\2nov\nipponpilar\tidak_sentuh\nippon_tidaksentuh_2nov.mat')

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\s11nippon.mat')

figure(1);

plot(x013_2,y013_2,x013,y013,...

     x015_2,y015_2,x067_2,y067_2,...

     x054,y054,...

     x043_2,y043_2,x029,y029,x_s11nippon,y_s11nippon),xlabel('Frekuensi (GHz)'),ylabel('S11 (dB)');

legend('89','92',...

      '110','117',...

      '127',...

      '142','160','S11 Awal');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk plot data hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan tidak sentuh


```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fix\fr4\sentuh\table_fr4sentuh.mat')

figure(2);

scatter(frekuensi,glukosa,100, 'b', 'filled');

xlabel('Frekuensi (GHz)');

ylabel('Glukosa (mg/dL)');

set(gca, 'fontsize', 24);set(gca, 'fontsize', 24);

```

Coding program matlab untuk scatter plot hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan sentuh

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fix\fr4\tidak_sentuh\table_fr4tidaksentuh.mat')

figure(2);

scatter(frekuensi,glukosa,100, 'b', 'filled');

xlabel('Frekuensi (GHz)');

ylabel('Glukosa (mg/dL)');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk scatter plot hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan tidak sentuh

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fix\nippo
npilar\sentuh\table_nipponsentuh.mat')

figure(2);

scatter(frekuensi,glukosa,100, 'b', 'filled');

xlabel('Frekuensi (GHz)');

ylabel('Glukosa (mg/dL)');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk scatter plot hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan sentuh

```

clear

load('D:\OneDrive\unhas\Research\punya_ima\data\revisi\fix\nippo
npilar\tidak_sentuh\table_nippontidaksentuh_rev.mat')

figure(2);

scatter(frekuensi,glukosa,100, 'b', 'filled');

xlabel('Frekuensi (GHz)');

ylabel('Glukosa (mg/dL)');

set(gca, 'fontsize', 24);

```

Coding program matlab untuk scatter plot hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan tidak sentuh

```
yCalcl = -1.70818278427208e-06*frekuensi+3360.36530286933;  
Rsqr2 = 1 - sum((glukosa - yCalcl).^2)/sum((glukosa - mean(glukosa)).^2)
```

Coding program matlab untuk hitung R^2 hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan sentuh

```
yCalcl = -2.14564254062038e-06*frekuensi+4693.12703101920;  
Rsqr2 = 1 - sum((glukosa - yCalcl).^2)/sum((glukosa - mean(glukosa)).^2)
```

Coding program matlab untuk hitung R^2 hasil pengukuran sensor antena mikrostrip material *substrate* FR4 keadaan tidak sentuh

```
yCalcl = -2.10596026490063e-06*frekuensi+3325.89593188264;  
Rsqr2 = 1 - sum((glukosa - yCalcl).^2)/sum((glukosa - mean(glukosa)).^2)
```

Coding program matlab untuk hitung R^2 hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan sentuh

```
yCalcl = -3.43815028901736e-06*frekuensi+5704.10982658963;  
Rsqr2 = 1 - sum((glukosa - yCalcl).^2)/sum((glukosa - mean(glukosa)).^2)
```

Coding program matlab untuk hitung R^2 hasil pengukuran sensor antena mikrostrip material *substrate* NPC H220 keadaan tidak sentuh

```
figure(1);  
plot(freq,vswr),xlabel('Frekuensi'),ylabel('VSWR'),ylim([0  
5]),xlim([1.8000000000000000e+09 2.5e+09]);  
title('Voltage Standing Wave Ratio (VSWR)');  
legend('VSWR');  
set(gca, 'fontsize', 24);
```

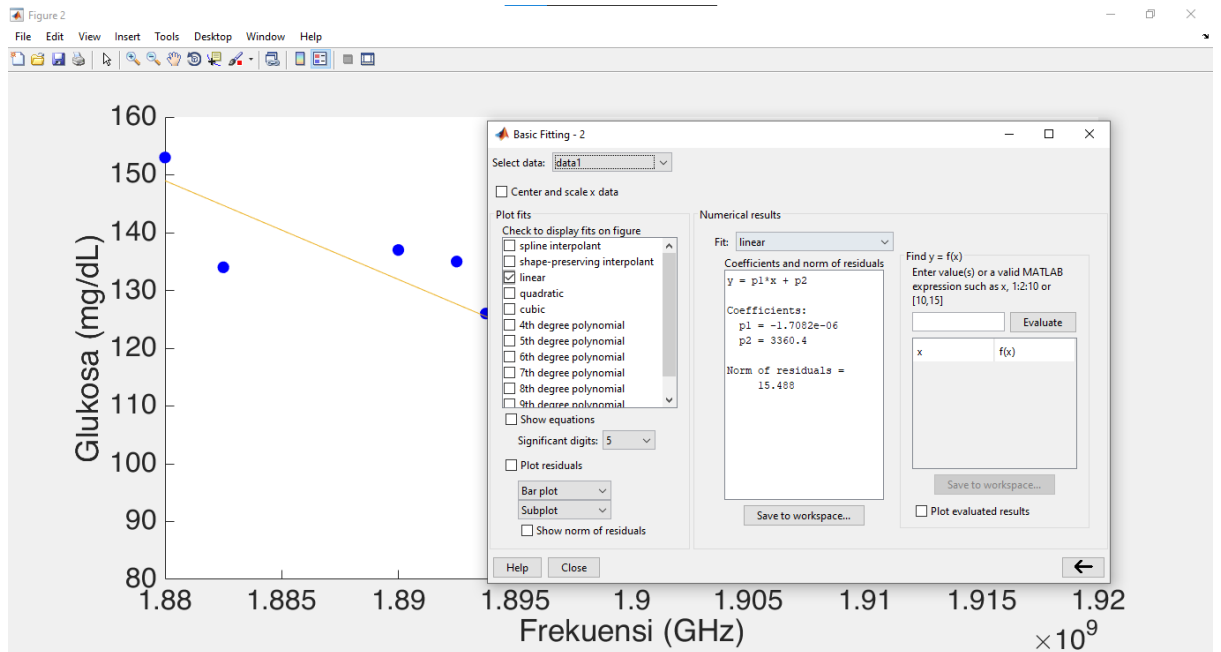
Coding program matlab untuk plot VSWR hasil pengukuran sensor antena mikrostrip material *substrate* FR4

```

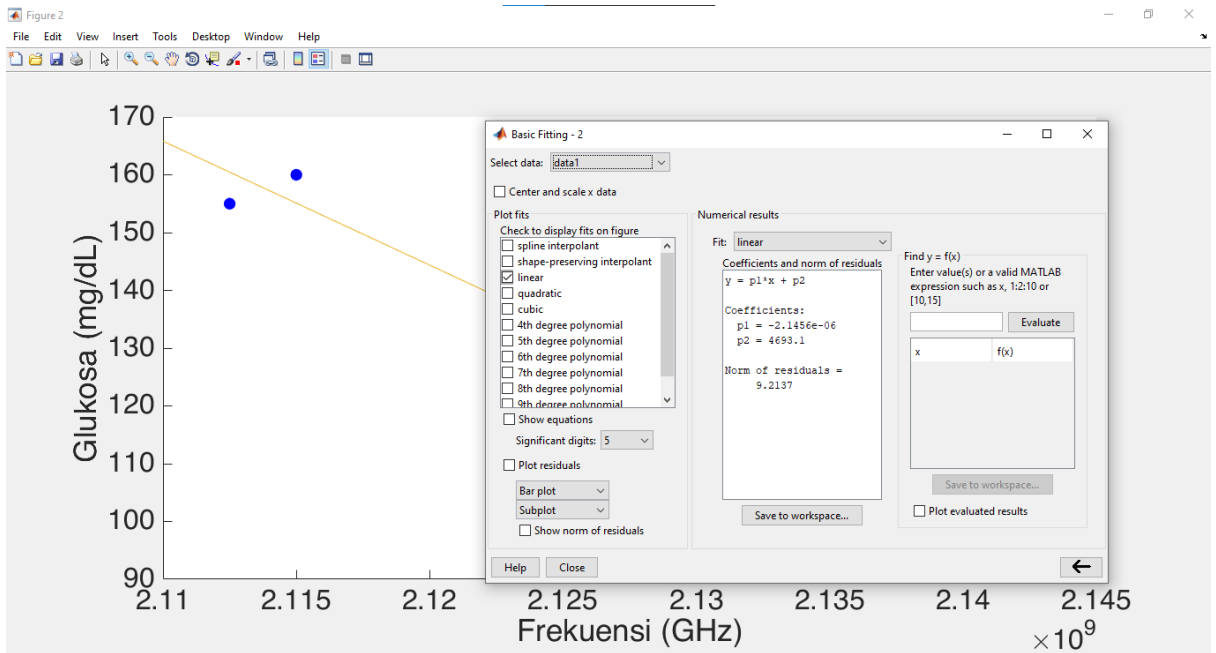
figure(1);
plot(x002,y002,Xsim,Ysim),xlabel('Frekuensi (GHz)'),ylabel('S11 (dB)');
legend('S11 Pengukuran','S11 Simulasi');
set(gca, 'fontsize', 24);

```

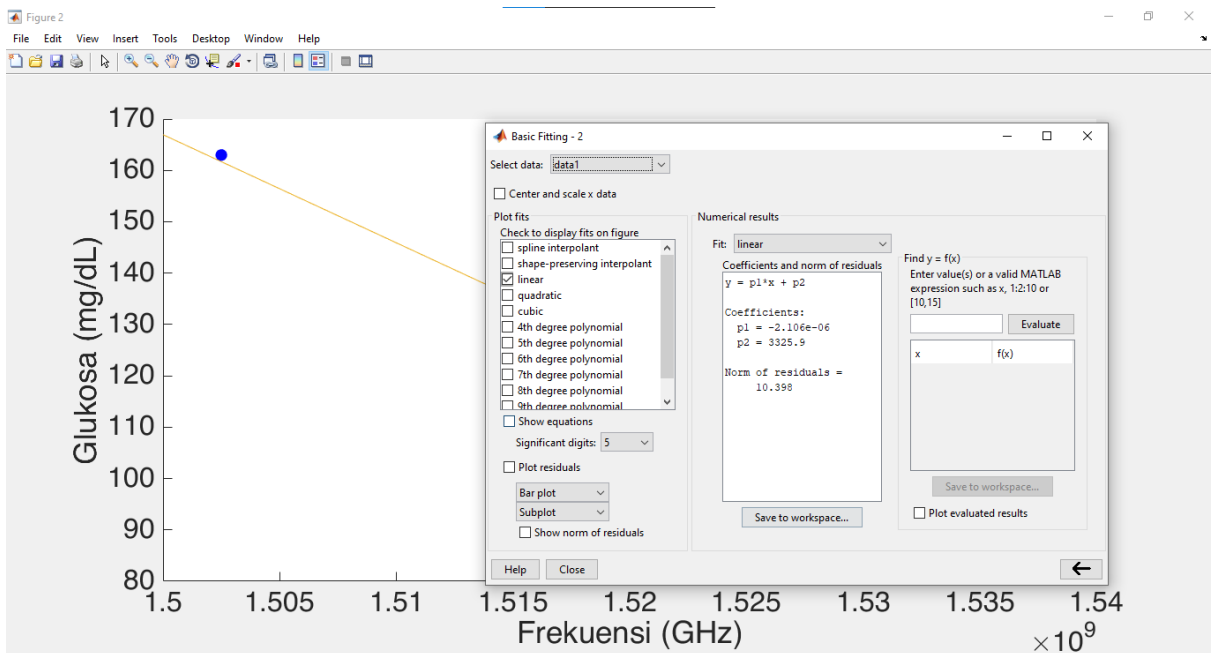
**Coding program matlab untuk plot S11 hasil pengukuran dan simulasi
sensor antenna mikrostrip material *substrate* FR4**



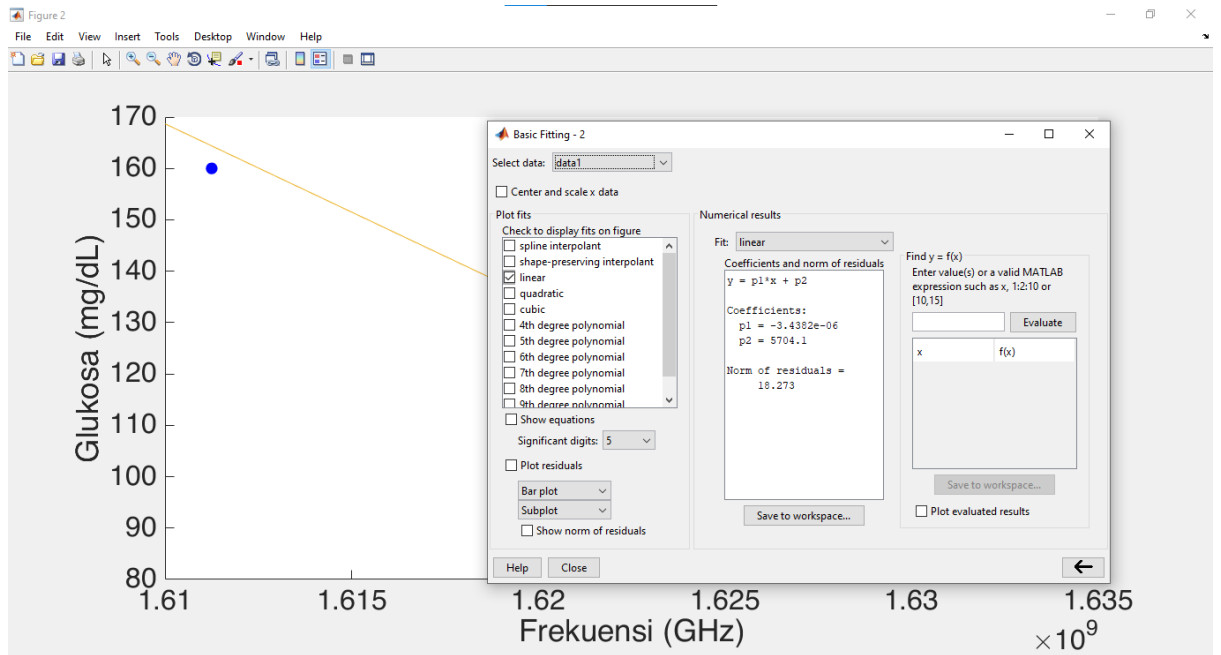
**Regresi linear sensor antenna mikrostrip material *substrate* FR4 keadaan
tangan sentuh**



Regresi linear sensor antenna mikrostrip material *substrate* FR4 keadaan tangan tidak sentuh



Regresi linear sensor antenna mikrostrip material *substrate* NPC H220 keadaan tangan sentuh



**Regresi linear sensor antenna mikrostrip material *substrate* NPC H220
keadaan tangan tidak sentuh**