Annexure A

MATLAB Program for Thickness Dependent Reflection Loss (R.L.) Characteristics at MW Frequencies

A.1 MATLAB Program for MW Reflection Loss Calculations

```
% ***Load input data for complex relative permittivity, permeability and frequency***
%[F,e,meu] = textread('C:\Users\HP-PC\Desktop\tt.txt','%f %f %f')
load('C:\Users\HP-PC\Desktop\arr.mat')
F=arr(:,1);
e=arr(:,2);
meu=arr(:,3);
c = 3*10^8;
lem = c./(F.*10^9);
Z = 1;
d1 = input('Enter the first thickness value (mm) ')
d2 = input('Enter the second thickness value (mm) ')
d3 = input('Enter the third thickness value (mm) ')
d4 = input('Enter the fourth thickness value (mm) ')
d5 = input('Enter the fifth thickness value (mm) ')

d1 = d1/10^3;
d2 = d2/10^3;
d3 = d3/10^3;
d4 = d4/10^3;
d5 = d5/10^3;

if true (d1 && d2 && d3 && d4 && d5)

y = 0+i*((2*pi*sqrt(meu.*e))./lem);
part = sqrt((meu./e)).*(tanh(y*d1));
part1 = part - Z;
part2 = part + Z;
A=(part1/part2);
B=abs(A);
R = 20*log10(B)
plot(F,R,'c')
hold on
grid on

y = 0+i*((2*pi*sqrt(meu.*e))./lem);
part = sqrt((meu./e)).*(tanh(y*d2));
part1 = part - Z;
part2 = part + Z;
A=(part1/part2);
B=abs(A);
```

```
R = 20*log10(B)
plot(F,R,'b')
hold on
grid on

y = 0+i*((2*pi*sqrt(meu.*e))./lem);
part = sqrt((meu./e)).*(tanh(y*d3));
part1 = part - Z;
part2 = part + Z;
A=(part1/part2);
B=abs(A);
R = 20*log10(B)
plot(F,R,'g')
hold on
grid on

y = 0+i*((2*pi*sqrt(meu.*e))./lem);
part = sqrt((meu./e)).*(tanh(y*d4));
part1 = part - Z;
part2 = part + Z;
A=(part1/part2);
B=abs(A);
R = 20*log10(B)
plot(F,R,'k')
hold on
grid on

y = 0+i*((2*pi*sqrt(meu.*e))./lem);
part = sqrt((meu./e)).*(tanh(y*d5));
part1 = part - Z;
part2 = part + Z;
A=(part1/part2);
B=abs(A);
R = 20*log10(B)
plot(F,R,'r')
hold on
grid on
end
% d1=d1*10^3;
% if true (d1 && d2 && d3 && d4 && d5)
% legend(['thickness1 =',d1 , 'mm','thickness2 =',d2, 'mm','thickness3 =',d3, 'mm','thickness4 =',d4,
'mm','thickness5 =',d5, 'mm']);
% end
% if true (d1 && d2 && d3 && d4)
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d1))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'c')
% hold on
% grid on
%
```

```
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d2))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'b')
% hold on
% grid on
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d3))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'k')
% hold on
% grid on
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d4))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'r')
% hold on
% grid on
%
% end
%
% if true (d1 && d2 && d3)
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d1))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'c')
% hold on
% grid on
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d2))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'b')
% hold on
% grid on
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d3))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
```

```
% plot(F,R,'k')
% hold on
% grid on
%
% end
% %
% if true (d1 && d2 )
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d1))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'c')
% hold on
% grid on
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d2))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'b')
% hold on
% grid on
%
% end
%
% if true (d1 )
%
% y = (2*pi*sqrt(meu.*e))./lem
% part = sqrt((meu./e).*tanh(y*d1))
% part1 = part - Z
% part2 = part + Z
% R = 20*log(part1./part2)
% plot(F,R,'c')
% hold on
% grid on
%
% save ('RL value','F','R'
% end
```

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