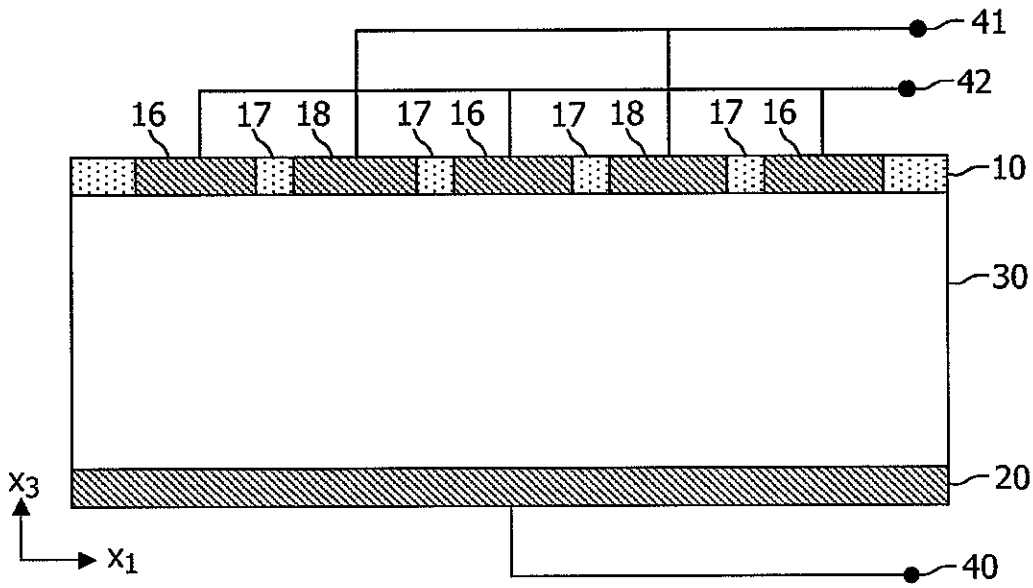

41
42
16
17
18
17
16
17
18
17
16
10
30
20
40
x3
x1

FIG. 1

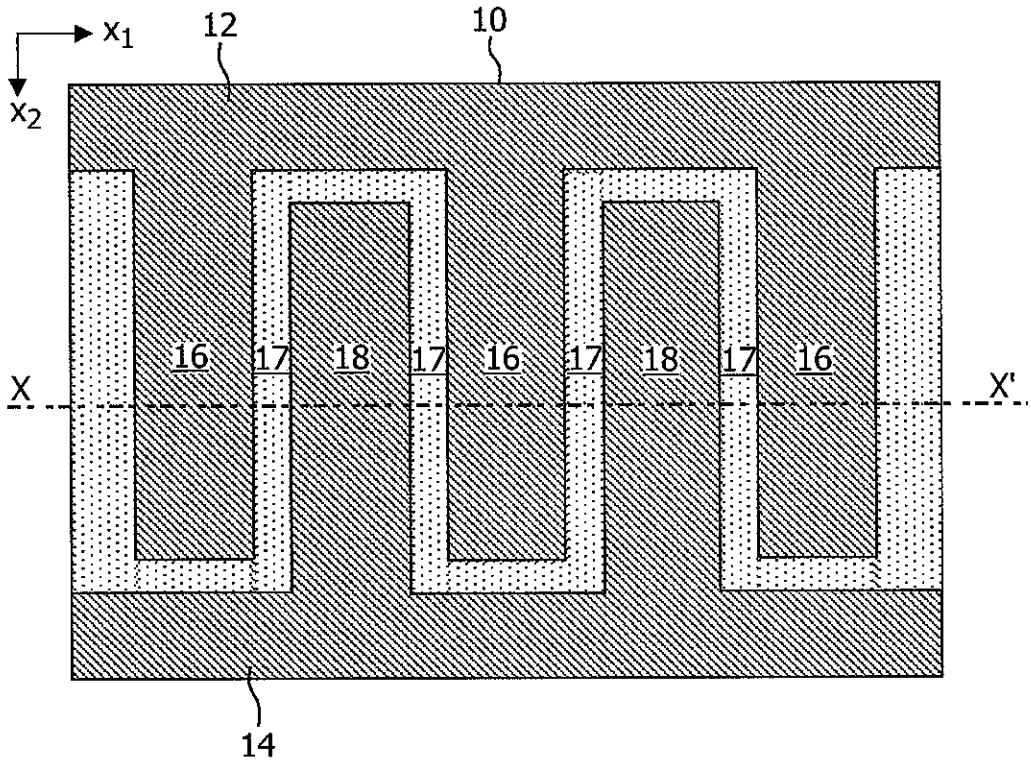

x1
x2
12
10
16
17
18
17
16
17
18
17
16
X
X'
14

FIG. 2

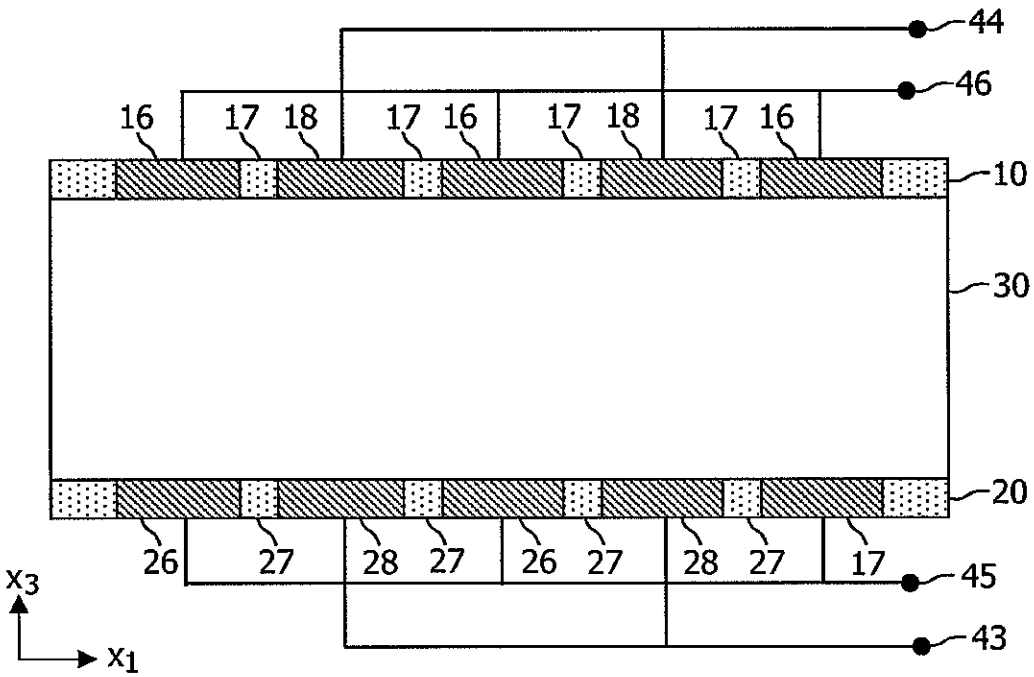

44
46
16
17
18
17
16
17
18
17
16
10
30
20
26
27
28
27
26
27
28
27
17
45
43
x3
x1

FIG. 3

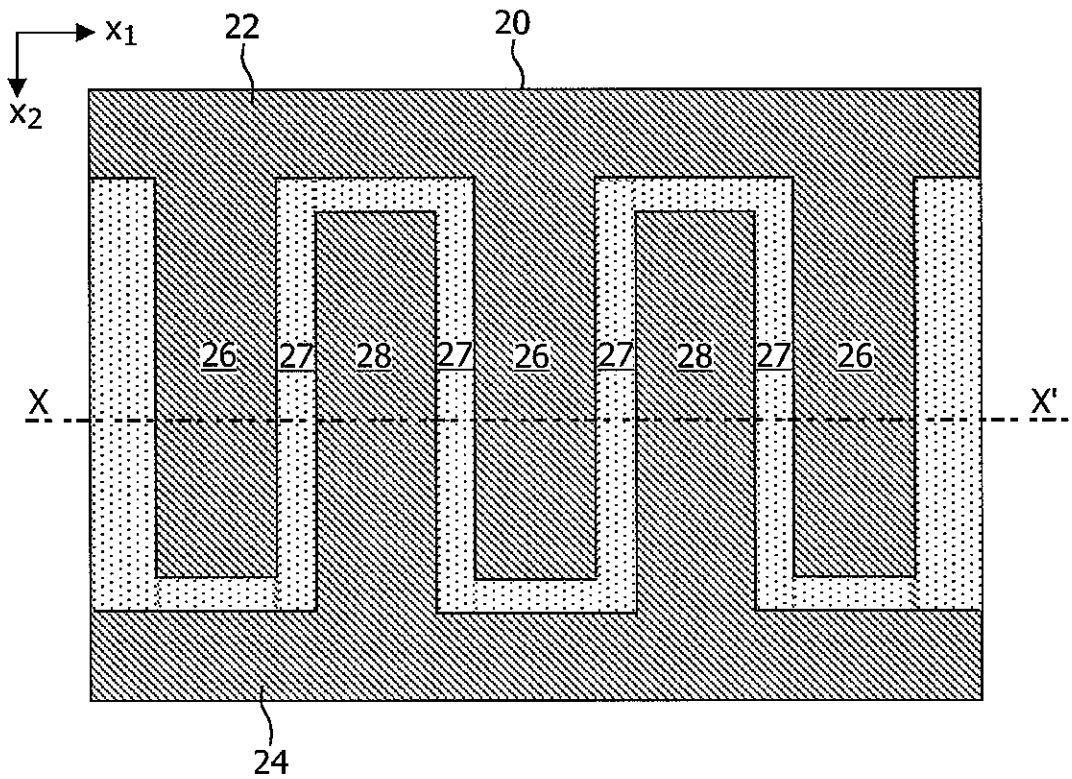

x1
x2
22
20
26
27
28
27
26
27
28
27
26
X
X'
24

FIG. 4

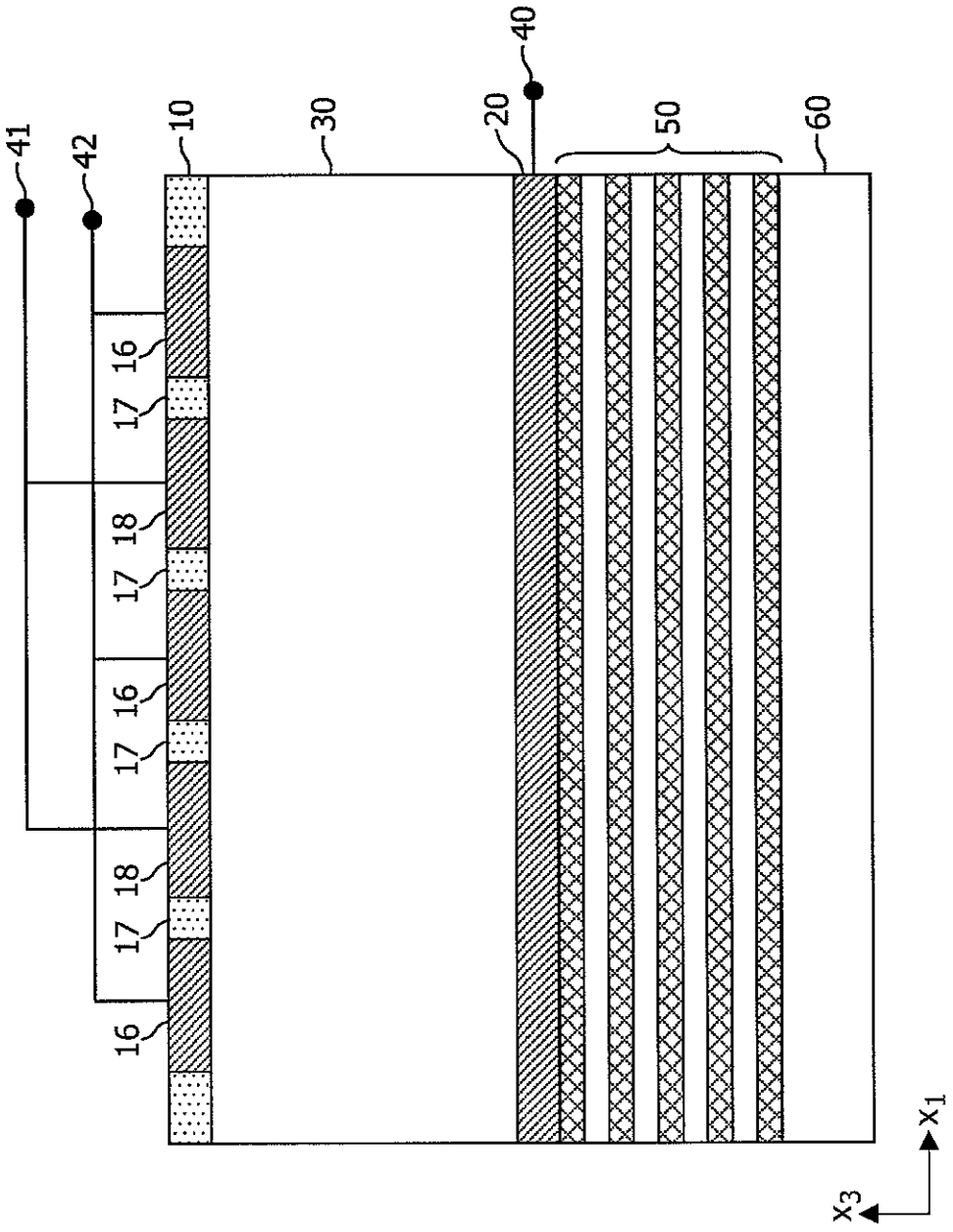


FIG. 5

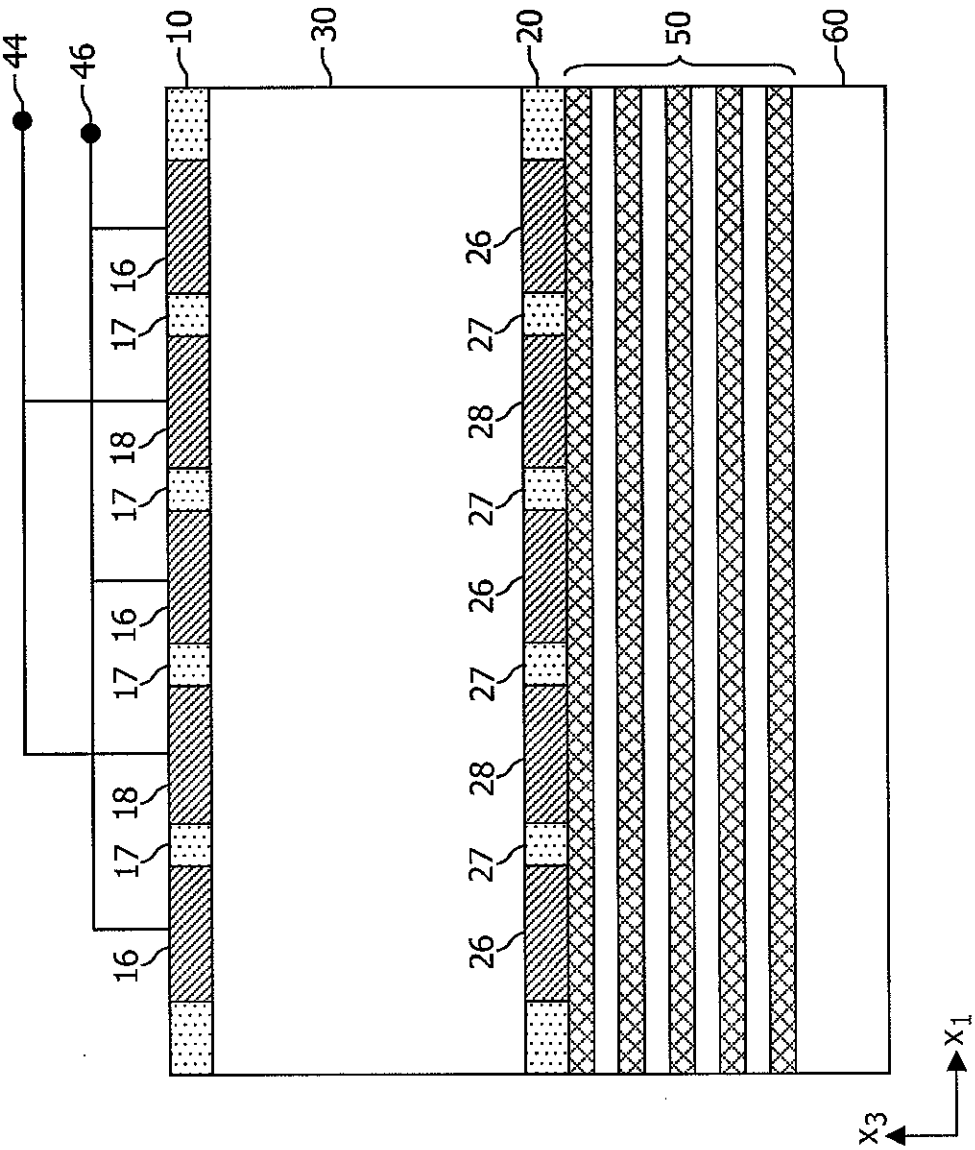


FIG. 6

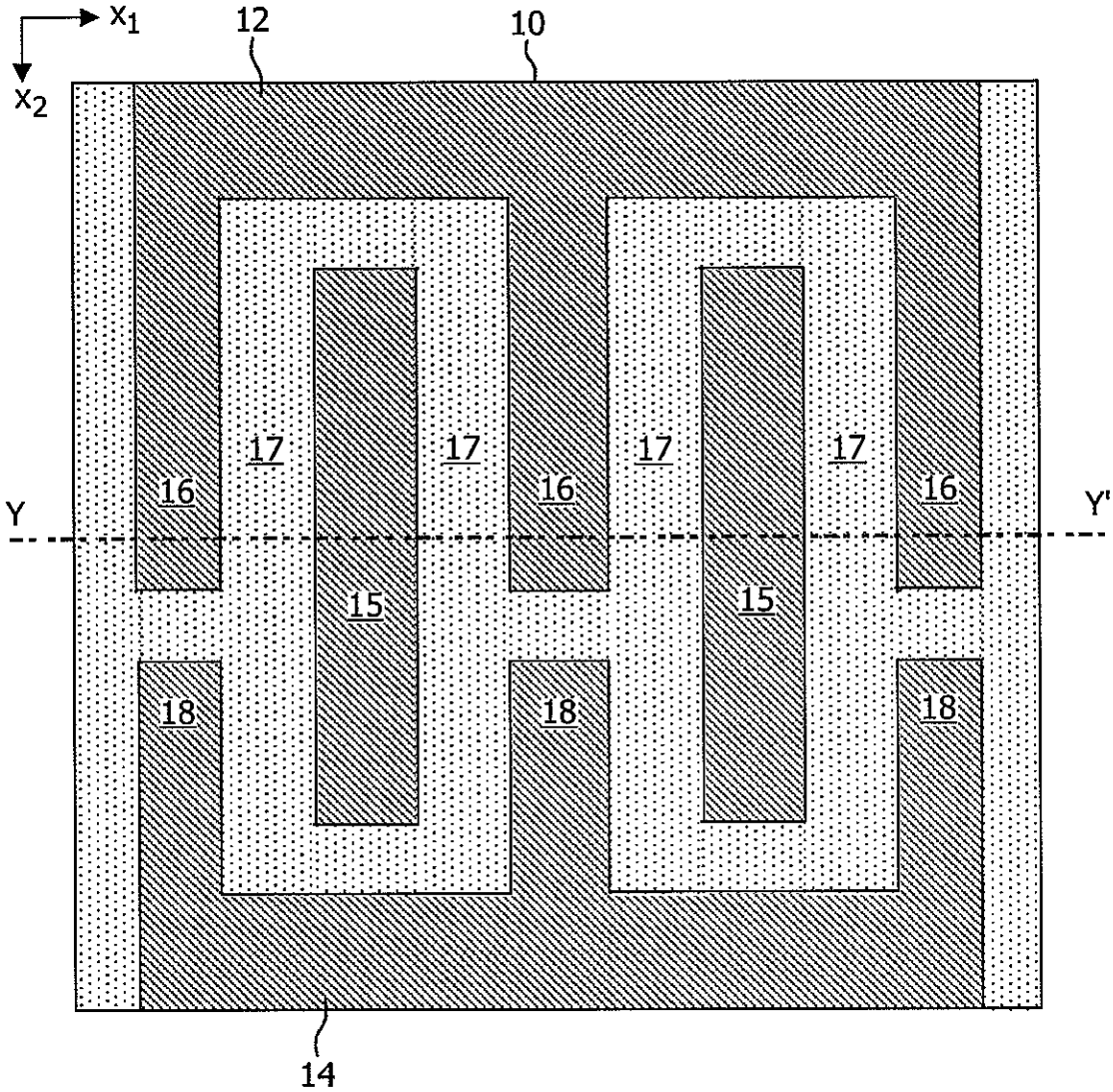


FIG. 7

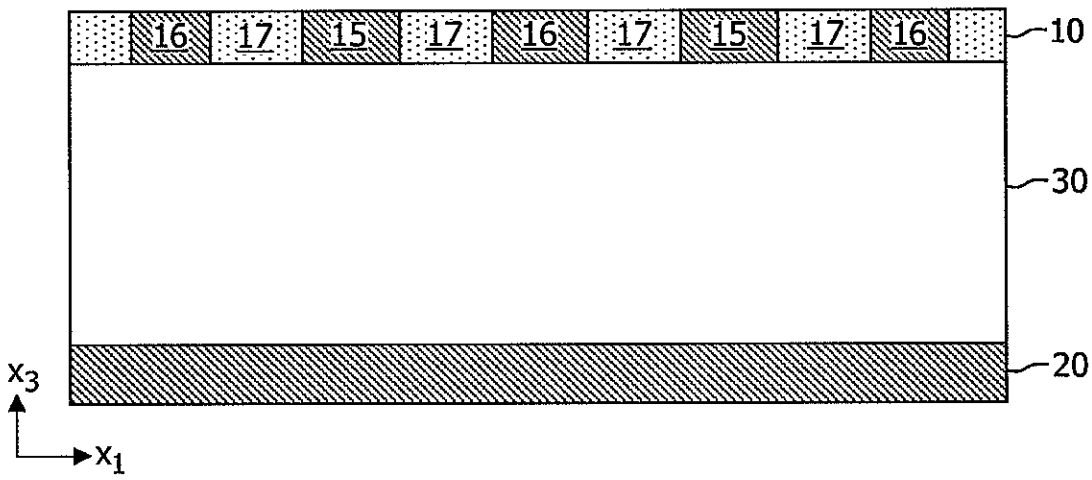

16
17
15
17
16
17
15
17
16
10
30
20
x3
x1

FIG. 8

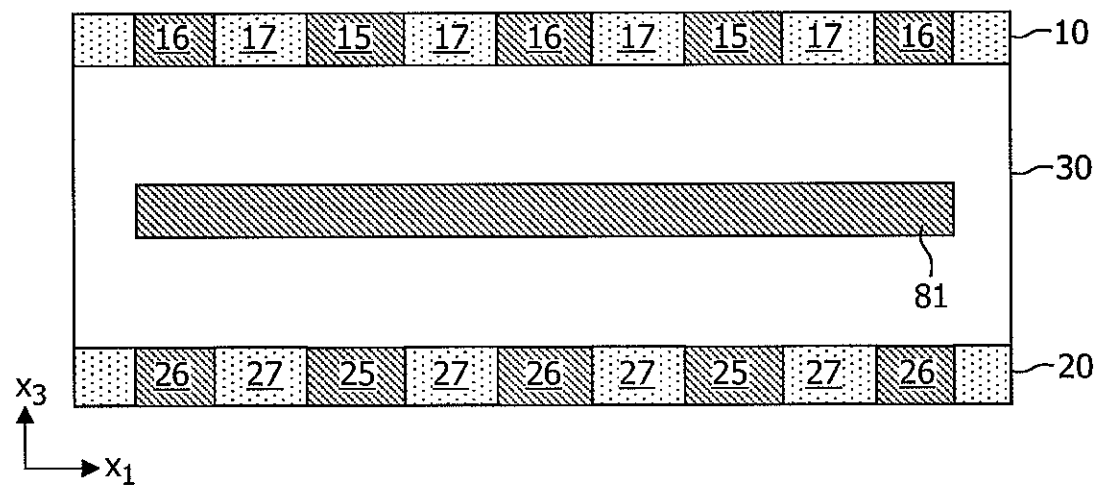

16
17
15
17
16
17
15
17
16
10
30
81
26
27
25
27
26
27
25
27
26
20
x3
x1

FIG. 9

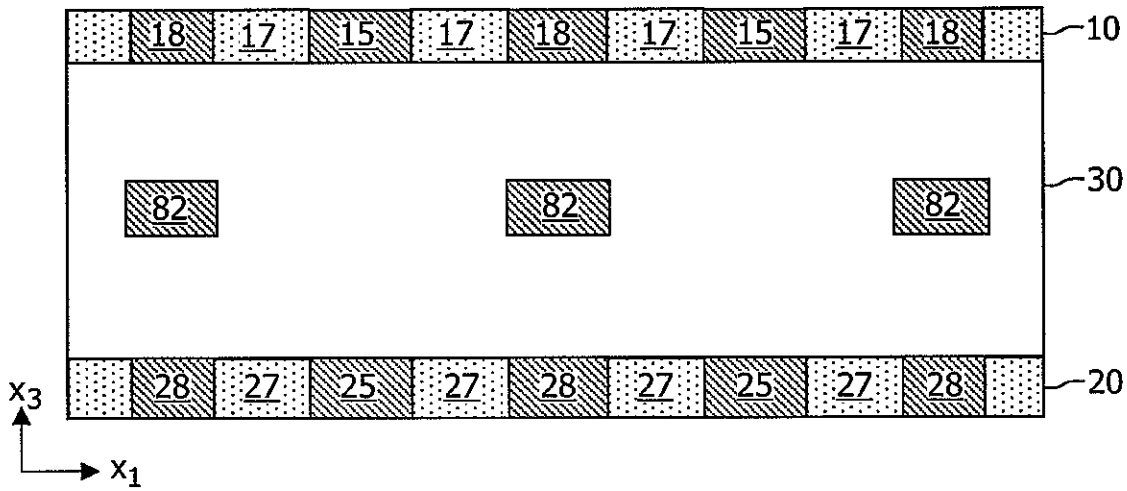

18
17
15
17
18
17
15
17
18
10
82
82
82
30
28
27
25
27
28
27
25
27
28
20
x3
x1

FIG. 10

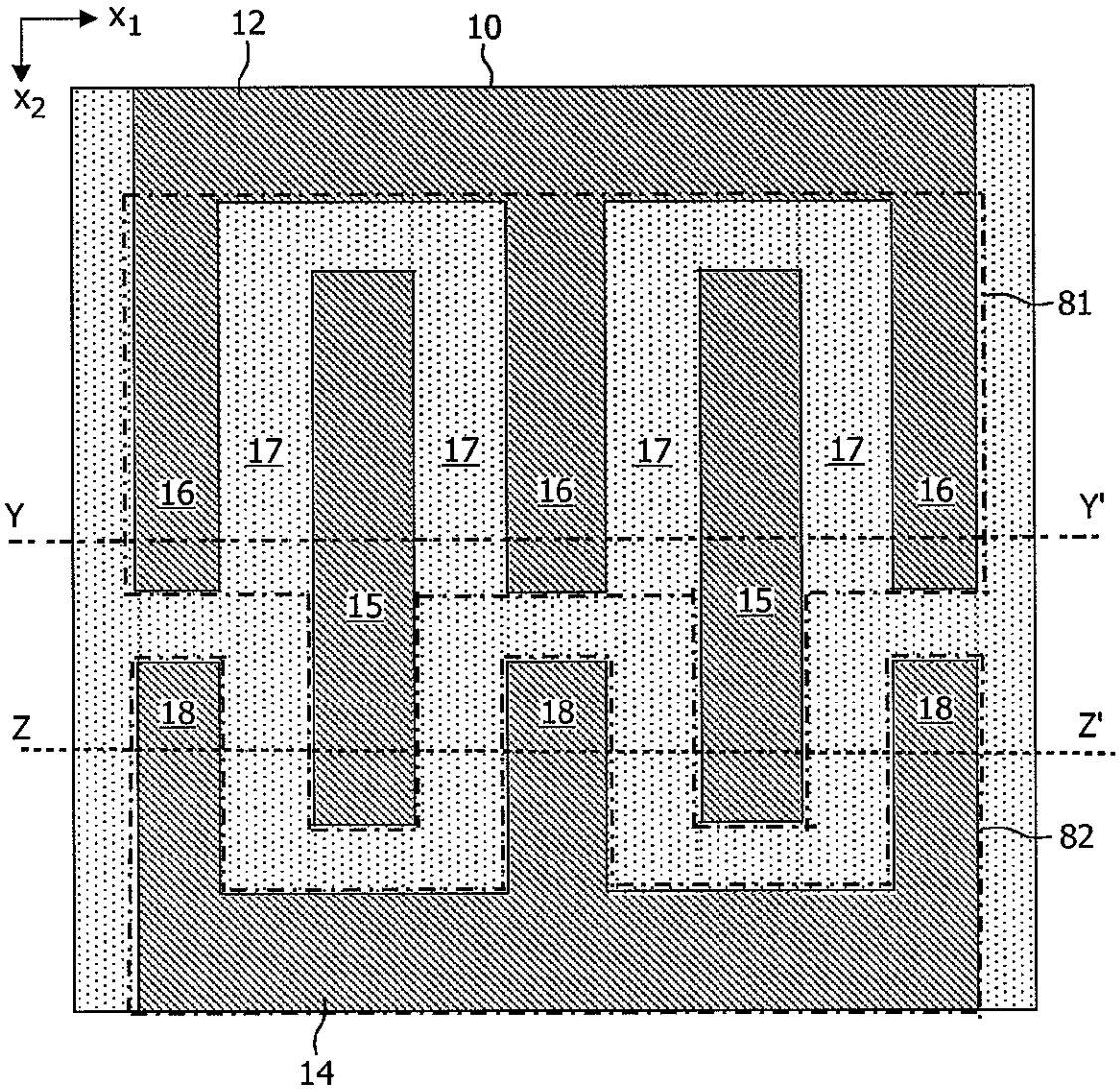


FIG. 11

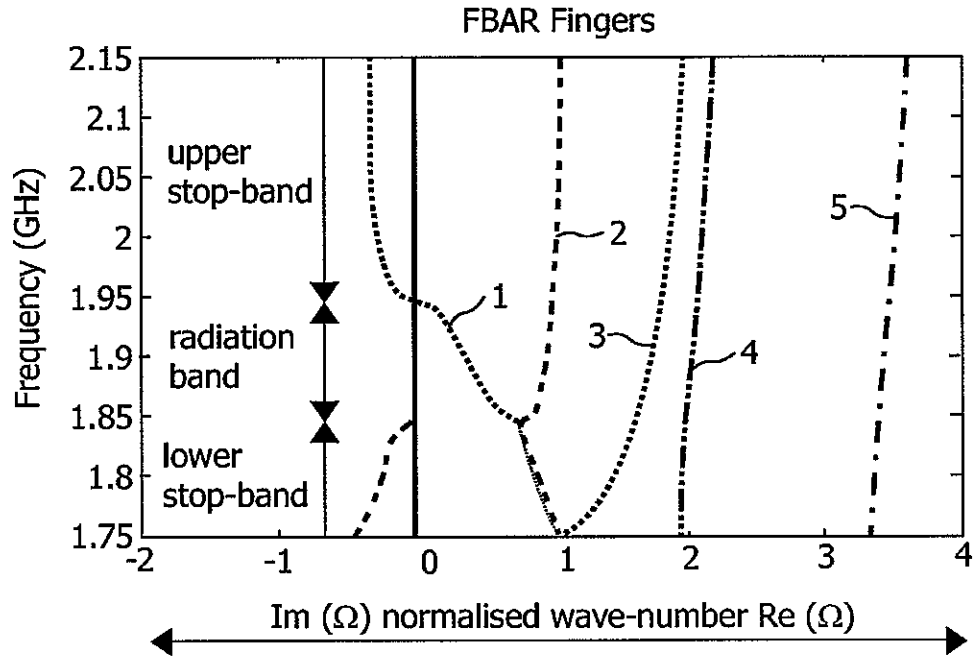

FBAR Fingers
Frequency (GHz)
2.15
2.1
2.05
2
1.95
1.9
1.85
1.8
1.75
upper stop-band
radiation band
lower stop-band
1
2
3
4
5
-2
-1
0
1
2
3
4
Im (Ω) normalised wave-number Re (Ω)

FIG. 12

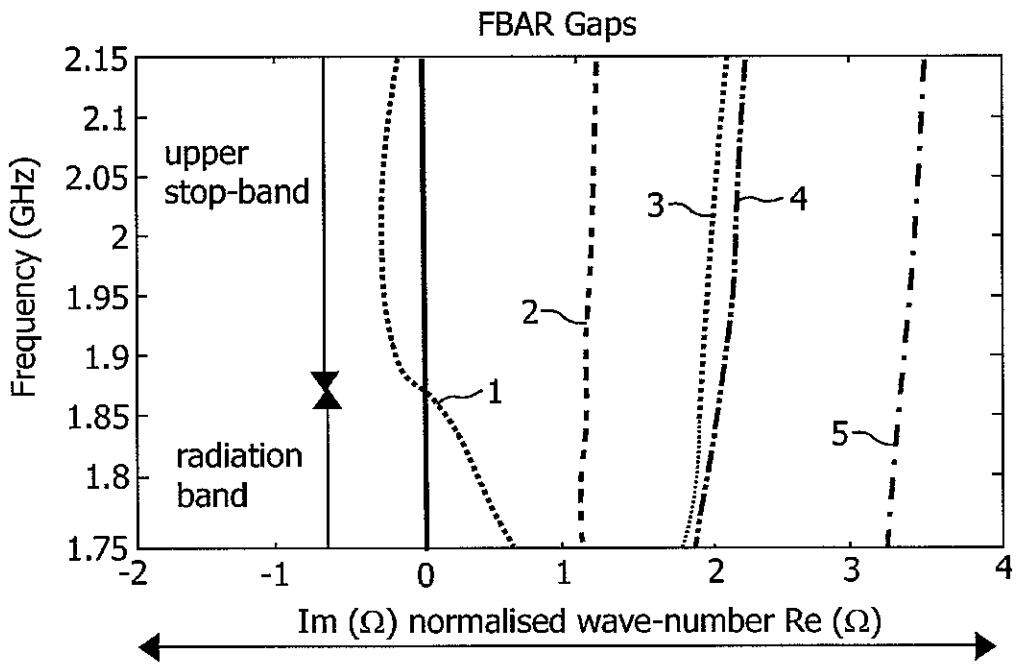

FBAR Gaps
Frequency (GHz)
2.15
2.1
2.05
2
1.95
1.9
1.85
1.8
1.75
upper stop-band
radiation band
1
2
3
4
5
-2
-1
0
1
2
3
4
Im (Ω) normalised wave-number Re (Ω)

FIG. 13

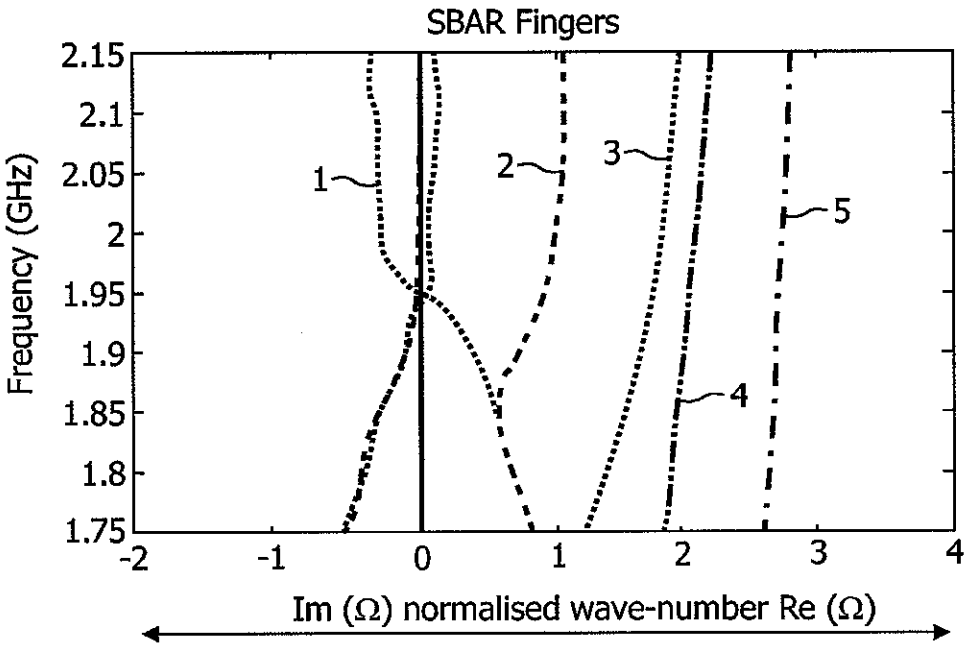

SBAR Fingers
Frequency (GHz)
2.15
2.1
2.05
2
1.95
1.9
1.85
1.8
1.75
-2
-1
0
1
2
3
4
1
2
3
4
5
Im (Ω) normalised wave-number Re (Ω)

FIG. 14

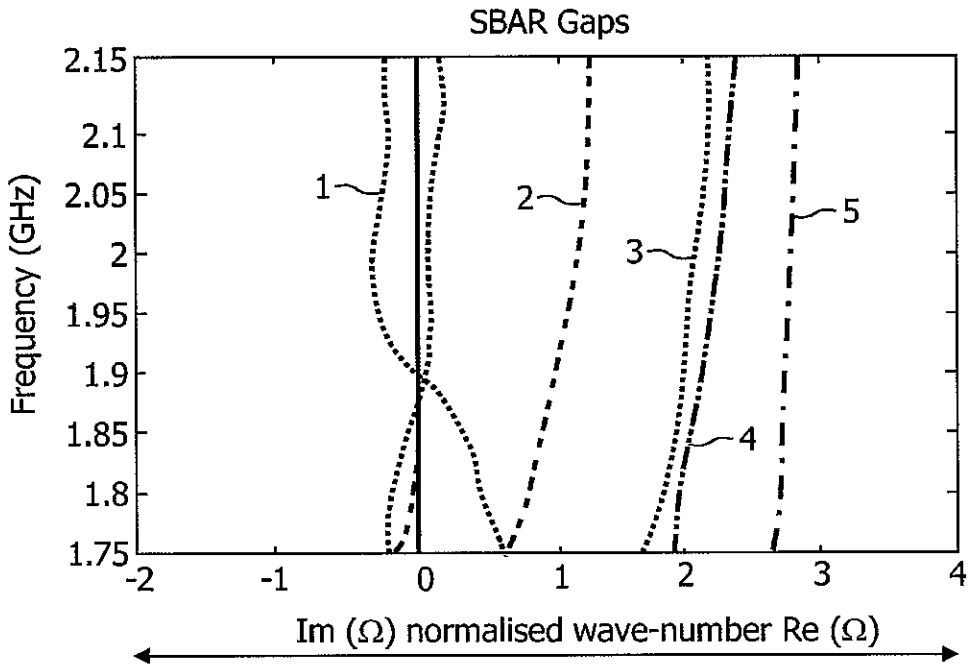

SBAR Gaps
Frequency (GHz)
2.15
2.1
2.05
2
1.95
1.9
1.85
1.8
1.75
-2
-1
0
1
2
3
4
1
2
3
4
5
Im (Ω) normalised wave-number Re (Ω)

FIG. 15

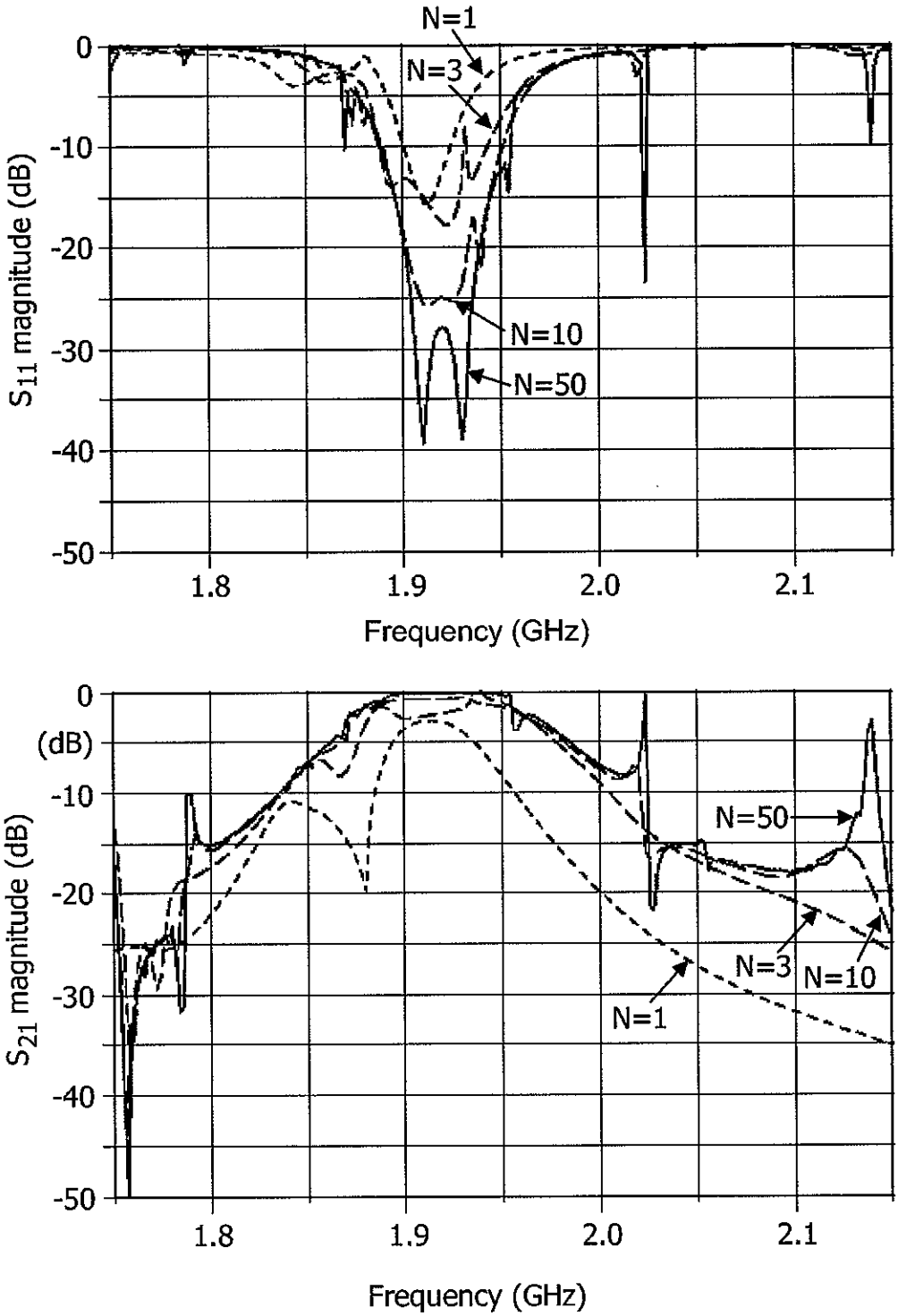
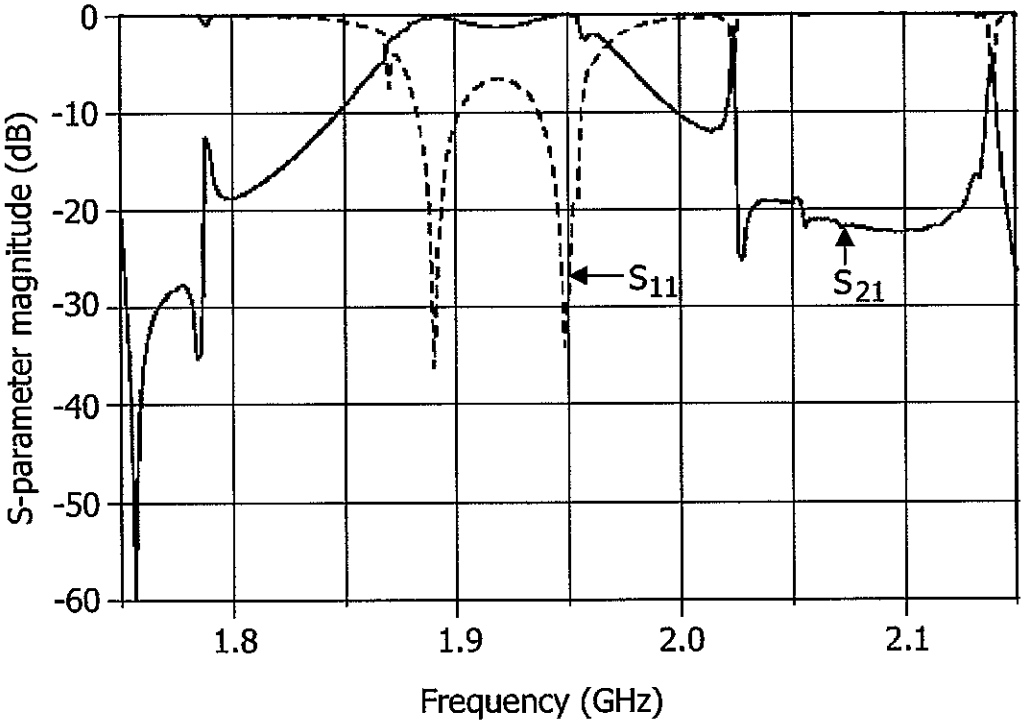

N=1
N=3
N=10
N=50
0
-10
-20
-30
-40
-50
S_{11} magnitude (dB)
1.8
1.9
2.0
2.1
Frequency (GHz)
0
(dB)
-10
-20
-30
-40
-50
S_{21} magnitude (dB)
N=50
N=3
N=10
N=1
1.8
1.9
2.0
2.1
Frequency (GHz)

FIG. 16


0
-10
-20
-30
-40
-50
-60
S-parameter magnitude (dB)
S11
S21
1.8
1.9
2.0
2.1
Frequency (GHz)

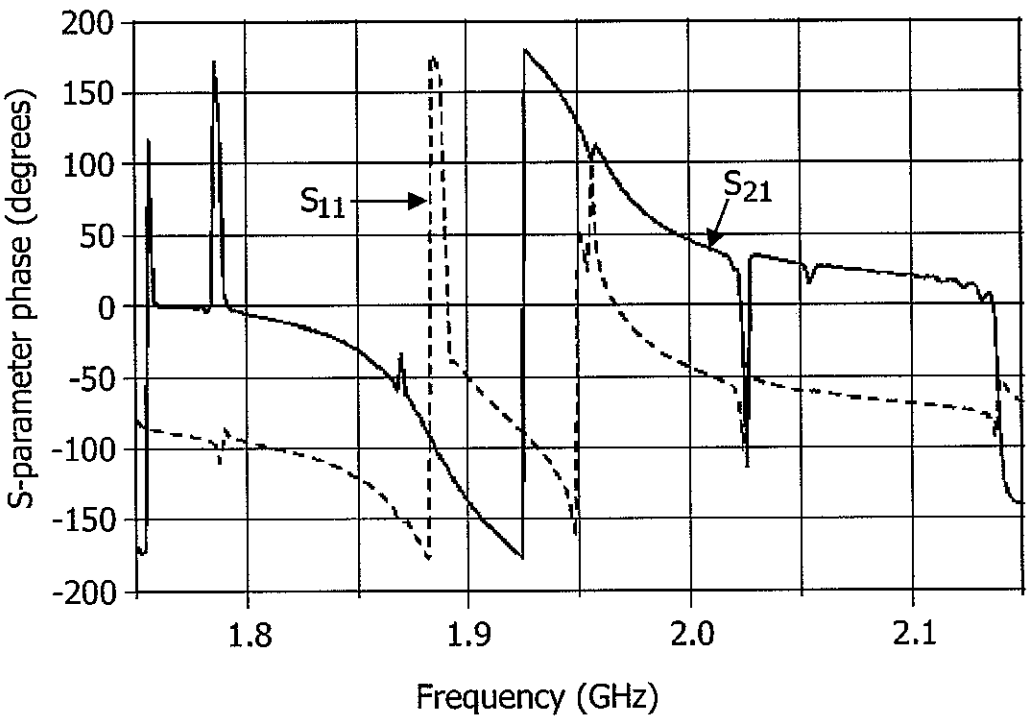

200
150
100
50
0
-50
-100
-150
-200
S-parameter phase (degrees)
S11
S21
1.8
1.9
2.0
2.1
Frequency (GHz)

FIG. 17

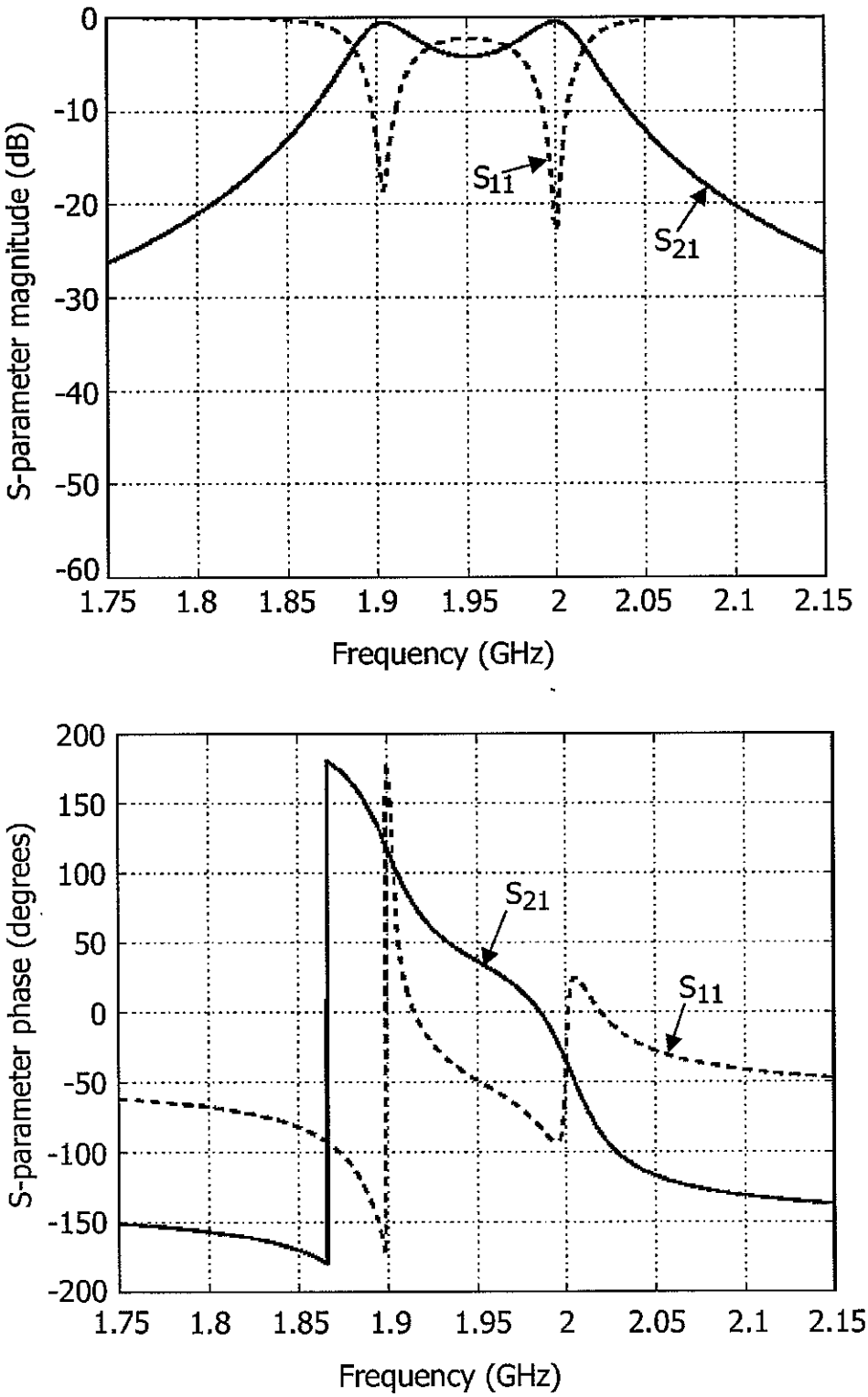

0
-10
-20
-30
-40
-50
-60
S-parameter magnitude (dB)
S11
S21
1.75
1.8
1.85
1.9
1.95
2
2.05
2.1
2.15
Frequency (GHz)
200
150
100
50
0
-50
-100
-150
-200
S-parameter phase (degrees)
S21
S11
1.75
1.8
1.85
1.9
1.95
2
2.05
2.1
2.15
Frequency (GHz)

FIG. 18

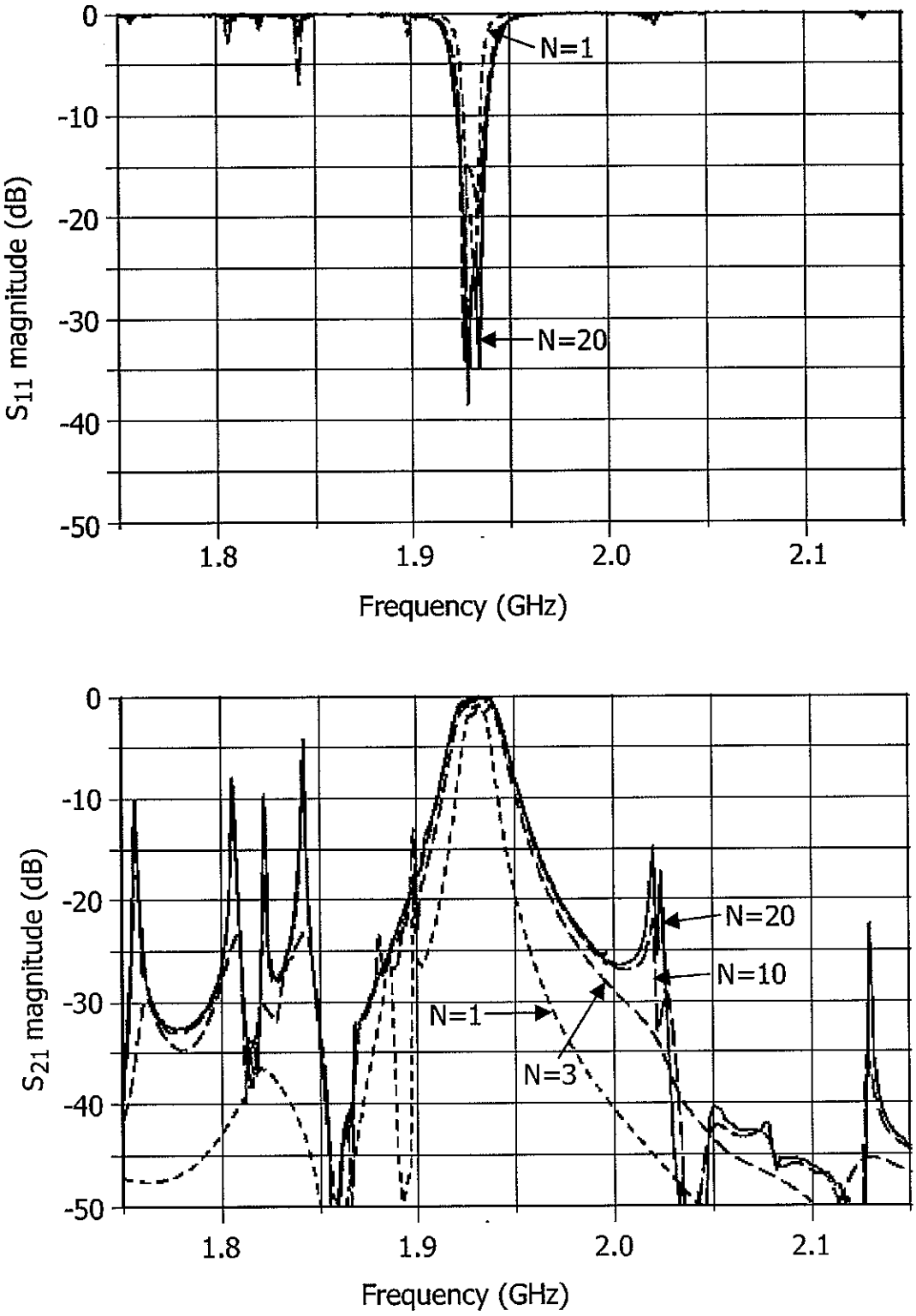

0
-10
-20
-30
-40
-50
S_{11} magnitude (dB)
N=1
N=20
1.8
1.9
2.0
2.1
Frequency (GHz)
0
-10
-20
-30
-40
-50
S_{21} magnitude (dB)
N=20
N=10
N=1
N=3
1.8
1.9
2.0
2.1
Frequency (GHz)

FIG. 19

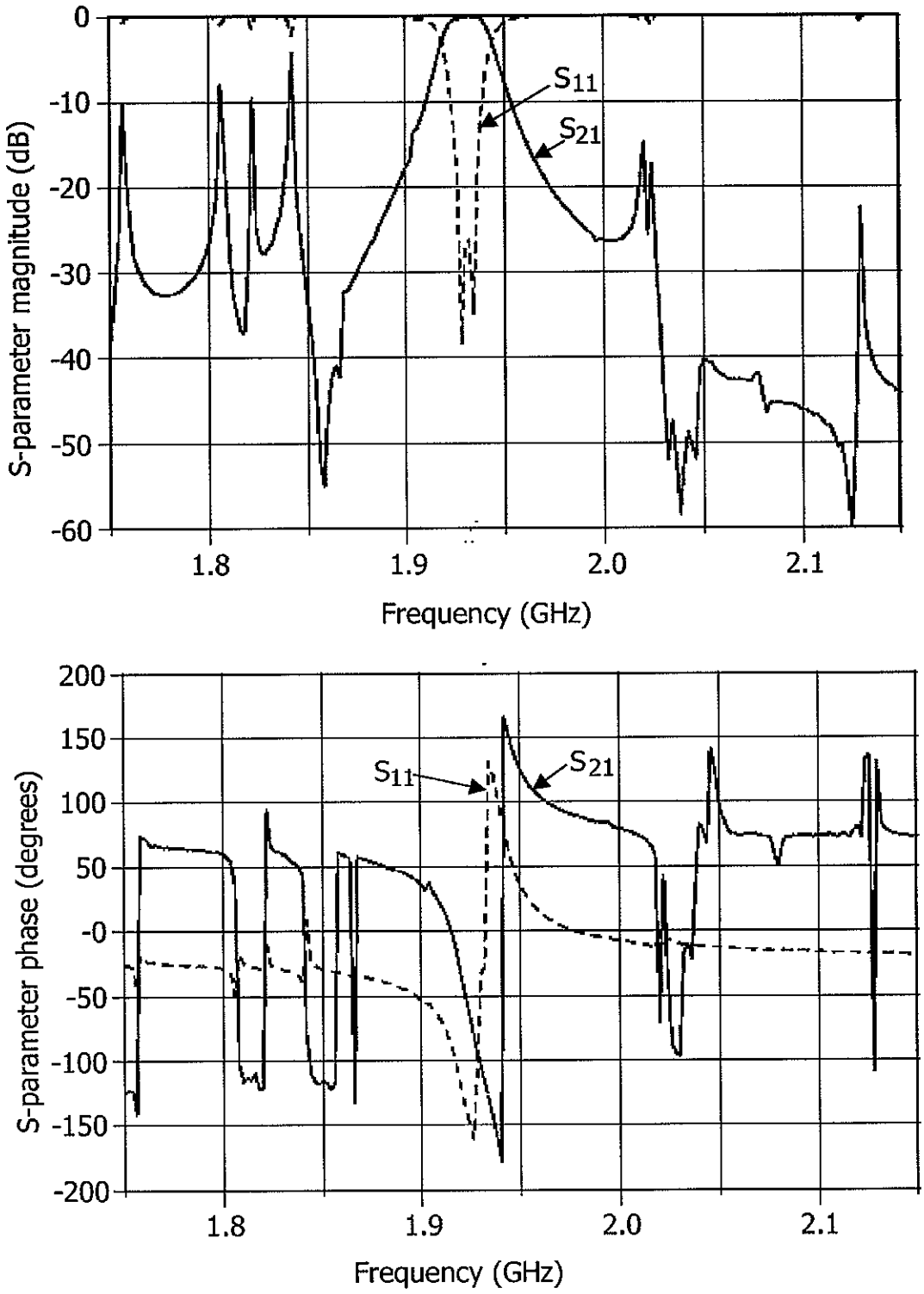

0
-10
-20
-30
-40
-50
-60
S-parameter magnitude (dB)
S11
S21
1.8
1.9
2.0
2.1
Frequency (GHz)
200
150
100
50
-0
-50
-100
-150
-200
S-parameter phase (degrees)
S11
S21
1.8
1.9
2.0
2.1
Frequency (GHz)

FIG. 20

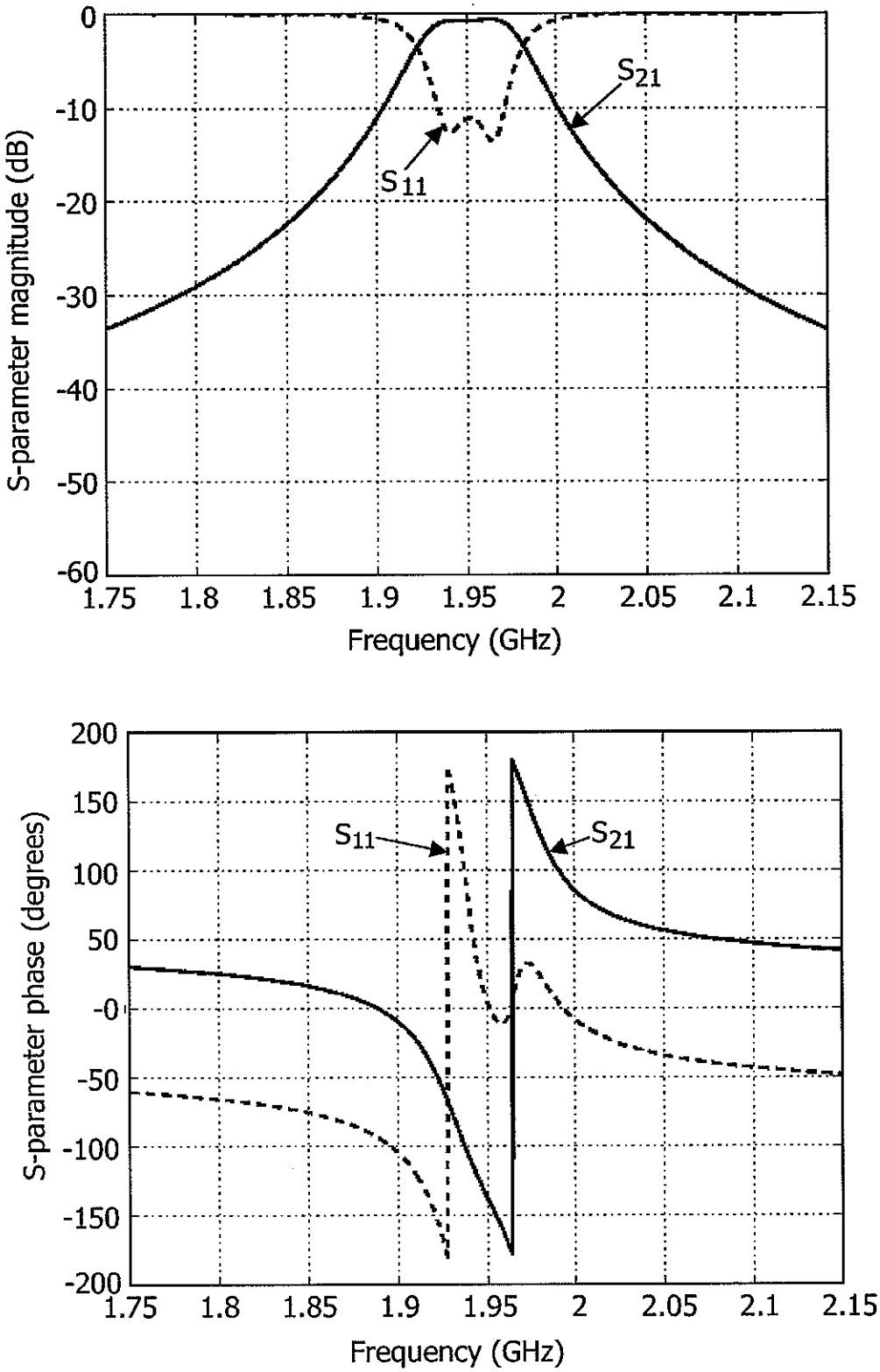

0
-10
-20
-30
-40
-50
-60
S-parameter magnitude (dB)
S11
S21
1.75
1.8
1.85
1.9
1.95
2
2.05
2.1
2.15
Frequency (GHz)
200
150
100
50
-0
-50
-100
-150
-200
S-parameter phase (degrees)
S11
S21
1.75
1.8
1.85
1.9
1.95
2
2.05
2.1
2.15
Frequency (GHz)

FIG. 21