The problem with 100GHz and 200GHz bands

Signal power is calculated from 100GHz to 1THz with 100GHz steps for different distances between the transmitter and the receiver. Then the diagram of power versus distance in centimeter is plotted in the logarithmic scale as below.

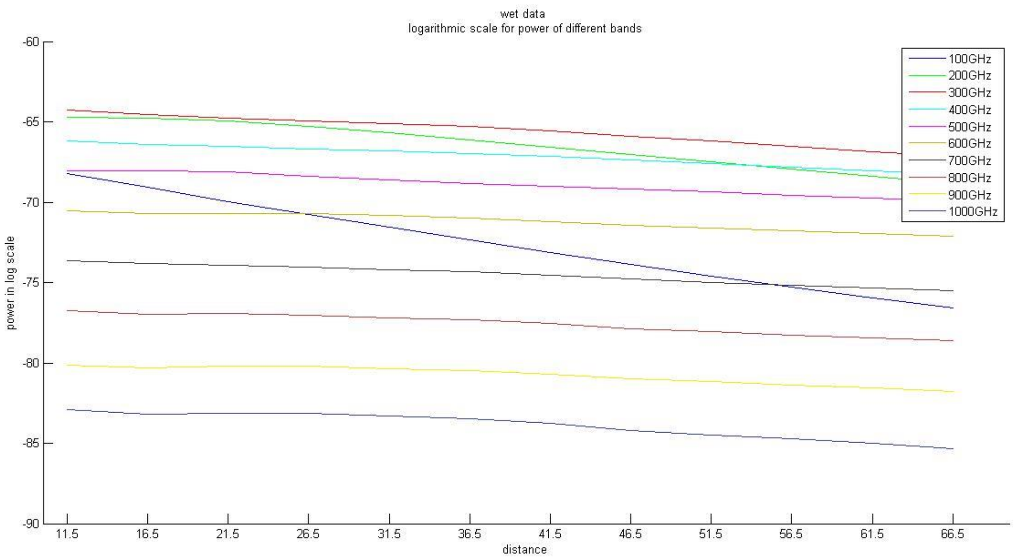

Figure (1)

As it is shown in figure (1) except for 100 and 200GHz bands, the curves are almost parallel and have the same slope. Therefore, it can be concluded that there may be some problems with the lenses for the lower frequencies. For testing the hypothesis, the lenses were removed from the transmitter and the receiver and again for different distances the received signal power for each GHz band is calculated.

Because no lenses are used the transmitted beams are not collimated; therefore, the detected THz energy is distributed even below 1THz.

Figure (2) shows the signal's frequency spectrum for the 20 cm distance between transmitter and receiver when no lenses are used.

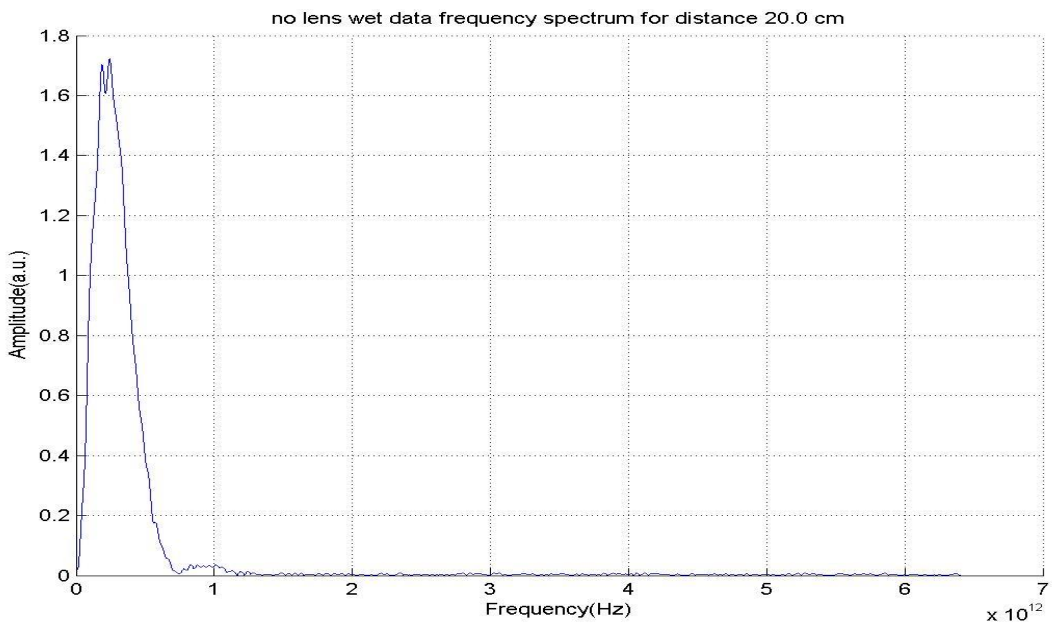

Figure (2)

Again, signal power is calculated from 100GHz to 1THz with 100GHz steps for different distances between the transmitter and the receiver and the power diagram for different distances is plotted. Figure (3) shows the logarithmic scale for signal power versus distance in centimeter between transmitter and the receiver when no lens is used.

From 700GHz bands the signal power is not strong enough and mostly noises are captured by the receiver, but for bands 100GHz to 600GHz the curves are almost parallel. Hence, it can be concluded that the earlier hypothesis was true and the lenses are not work properly for the frequencies lower than 200GHz.

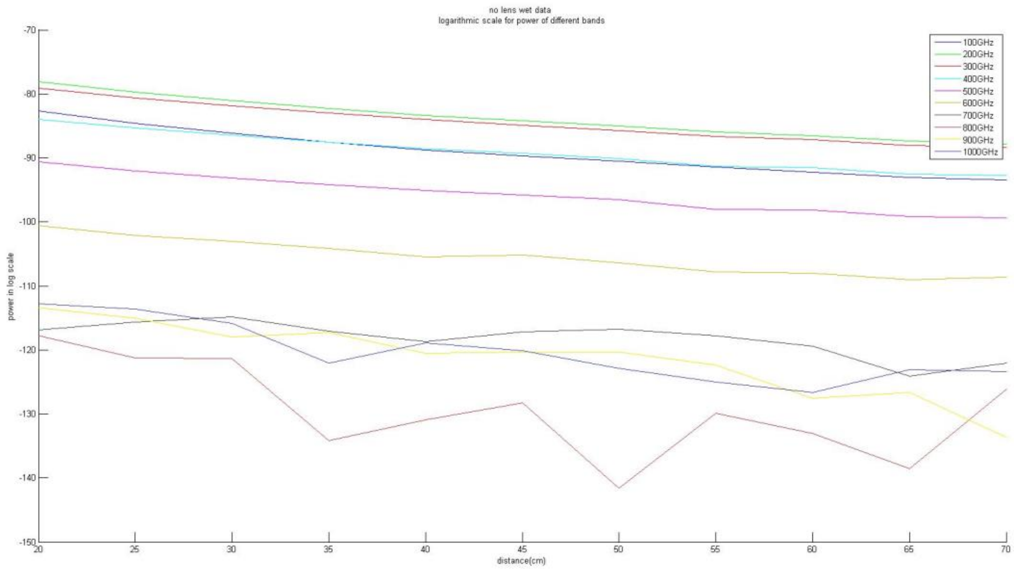
no lens wet data
logarithmic scale for power of different bands
-70
-80
-90
-100
-110
-120
-130
-140
-150
power in log scale
20
25
30
35
40
45
50
55
60
65
70
distance(cm)
100GHz
200GHz
300GHz
400GHz
500GHz
600GHz
700GHz
800GHz
900GHz
1000GHz

Figure (3)