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TRL01203900102	11/07/2024	ML	Added explicit peak gains

1 Acronyms, Glossary, Conventions

Table 1-1 introduces the acronyms used inside the document:

Acronym	Meaning

Table 1-1

Table 1-2 introduces the Glossary of terms used inside the document:

Term	Meaning

Table 1-2

Table 1-3 introduces the conventions list adopted by the document:

Convention	Meaning

Table 1-3

2 Bibliography and Reference Documents

Table 2-1 shows the list of books, articles and documents cited within the document and the correlation with the code used for their citation:

Citation Data	Code

Table 2-1

3 Document Subject

The document reports the radiation lobes of BFT remote control named Mitto Cool C4 FCC.

4 Measure Set Up

The measure is realized using EMScan RFXpert.
The original nominal RF conducted power is -7dBm.
To better measure the radiation lobes according to RFXpert characteristics, a sample provided with a firmware characterized by RF 0dBm conducted output power has been adopted.

5 RF Conducted Measures

A sample with the set up for FCC radiated measures (not the specific one used during the FCC approval process but one sample from the same batch with the same firmware) has been used to realize the RF power output conducted measures.
The set up is shown in Figure 5-1:

Figure 5-1

The results are shown in Figure 5-2:

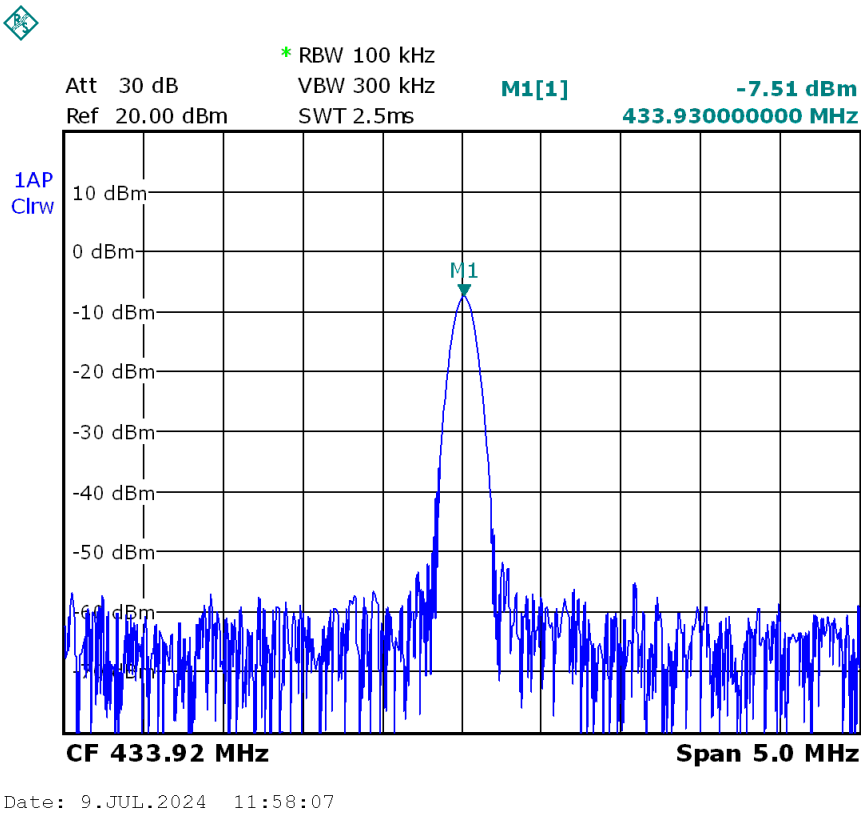

Figure 5-2

To execute the measure the last series capacitor has been removed isolating the antenna from the rest of the circuit and a micro-caxial cable (nearly 6cm long) has been soldered in that position.
The same measure has been realized on the sample with nominal 0dBm RF conducted output power.
The results are reported below:

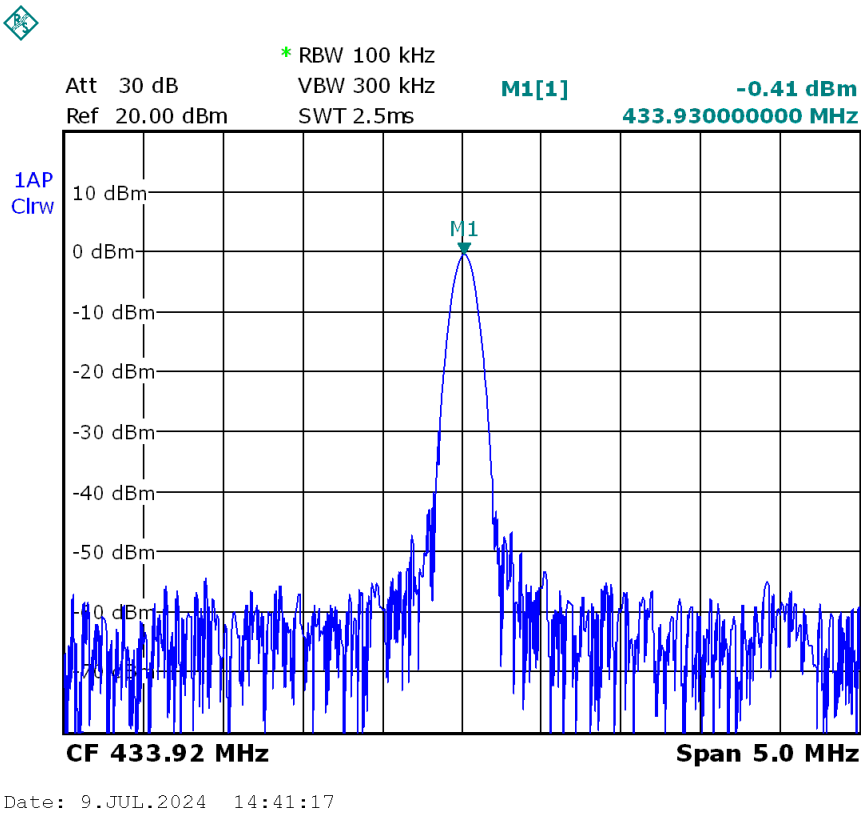

Figure 5-3

In terms of RF conducted output power the difference between the two sample is 7dBm.

6 Preliminary Measures

The preliminary measures are focused on identifying the DUT configuration that produce the radiation peak.
All the preliminary measures are realized without any compensation or calibration related to the chamber adopter for FCC compliance checks.

The first configuration is shown in Figure 6-1:

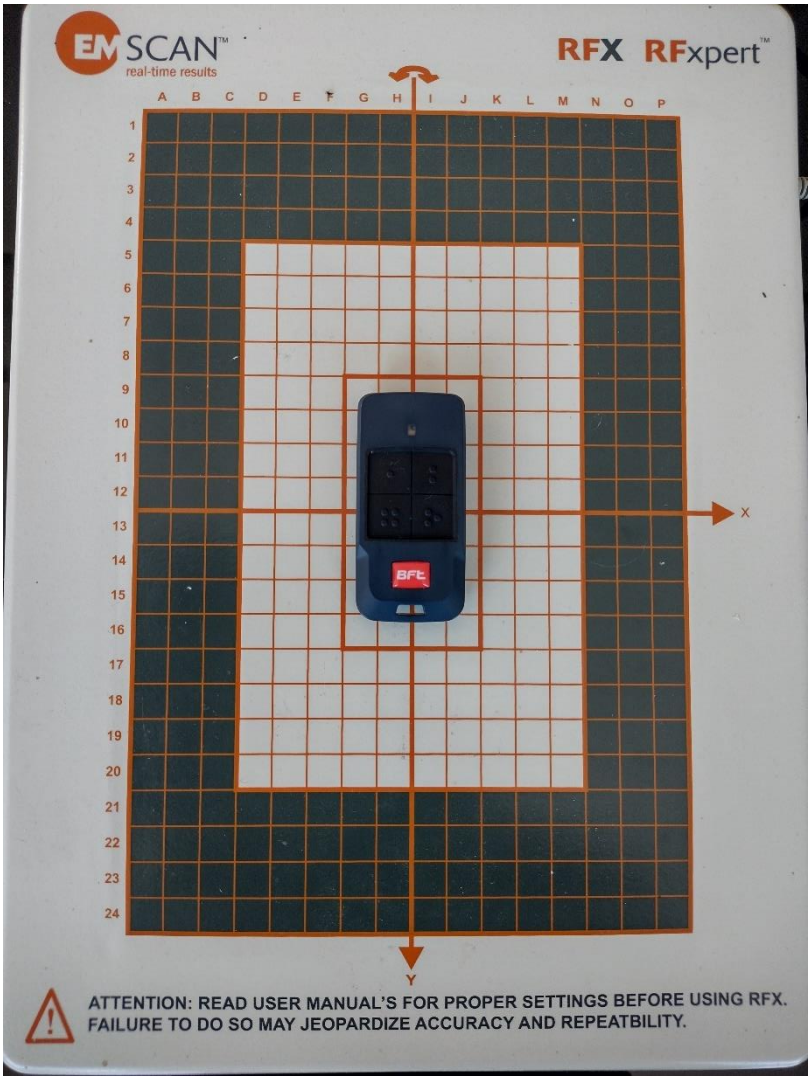

Figure 6-1

In this configuration the radiation lobes are reported below:

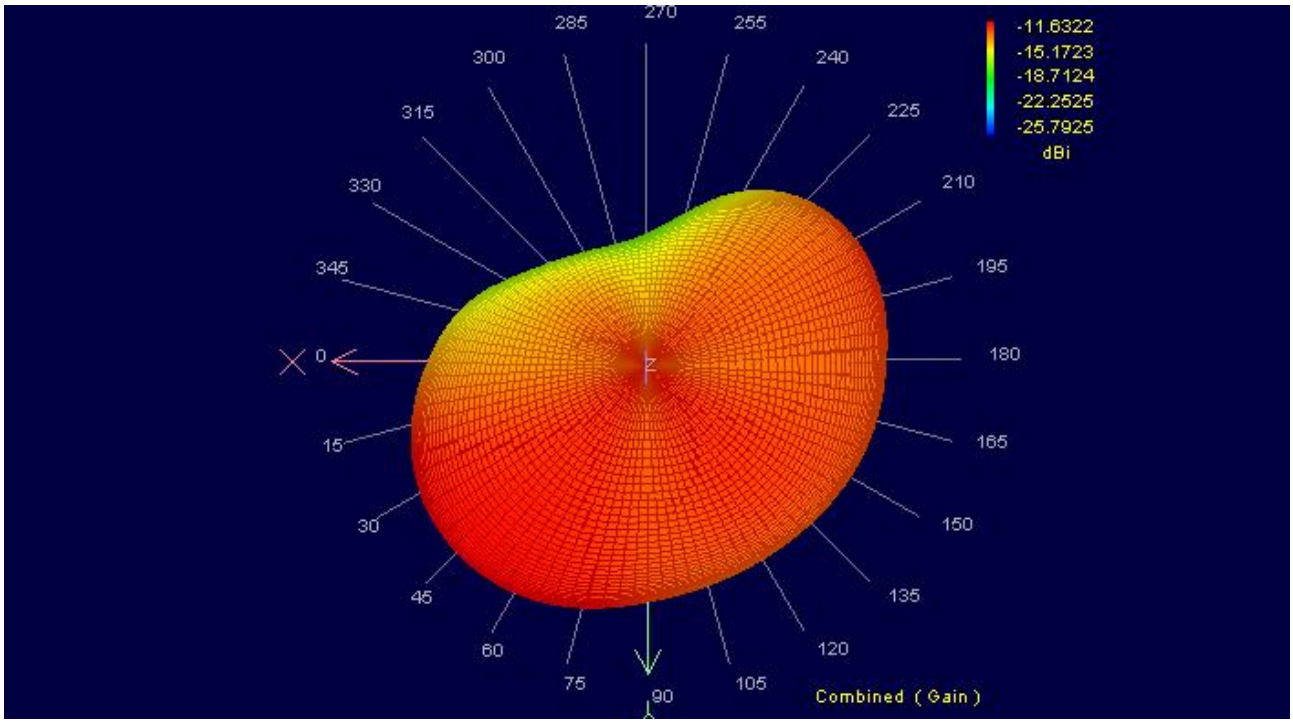

Figure 6-2

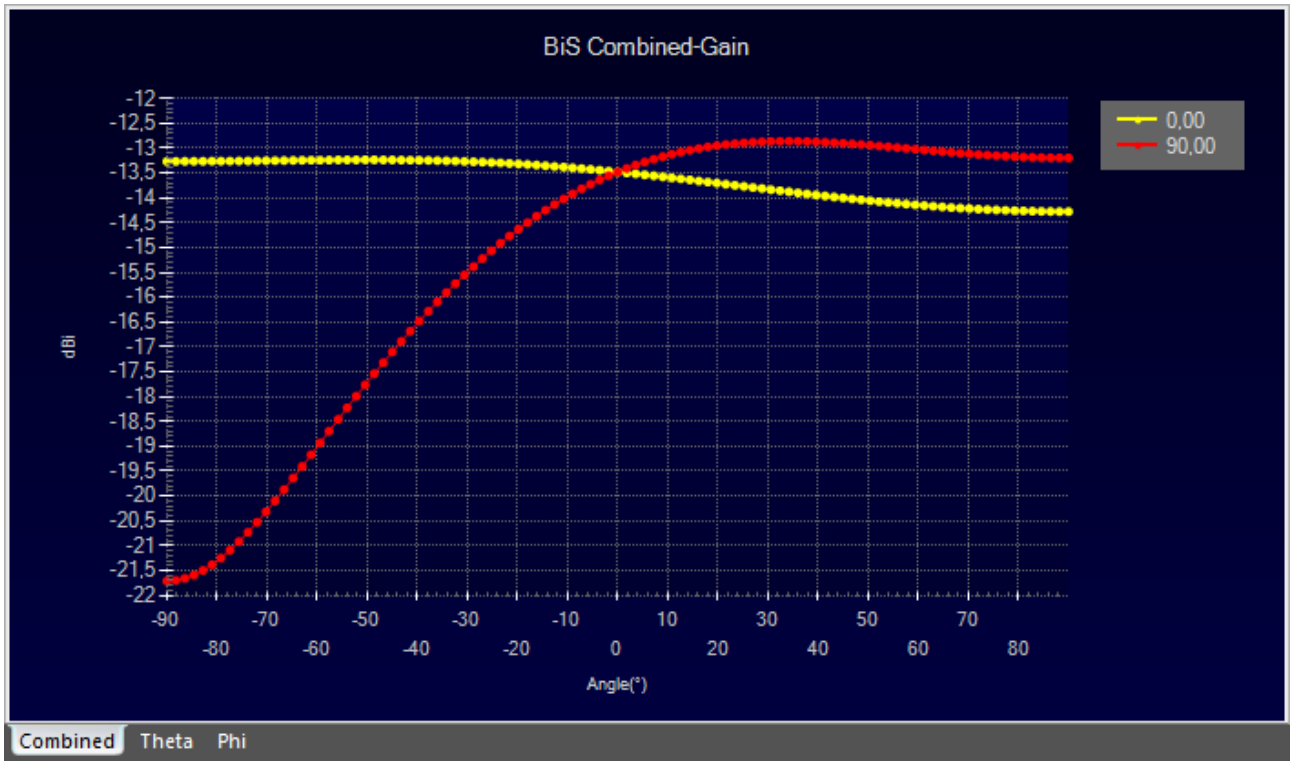

Figure 6-3

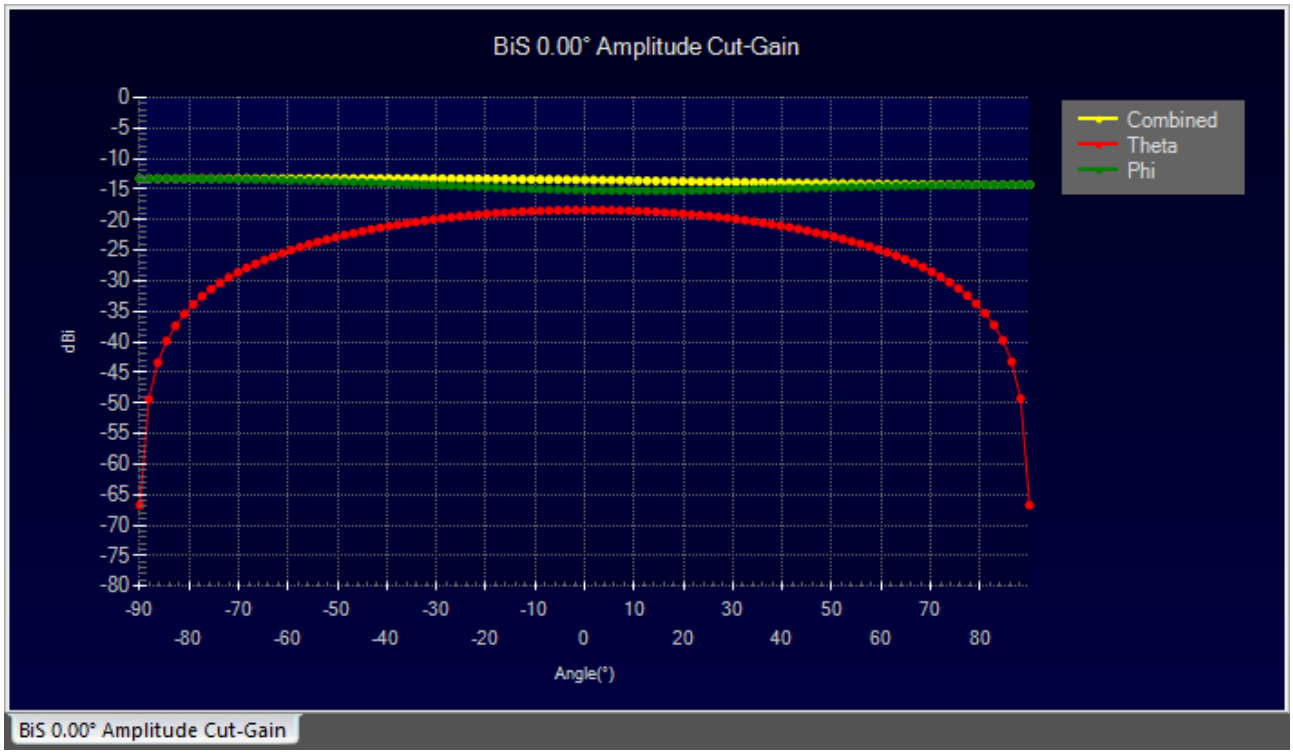

Figure 6-4

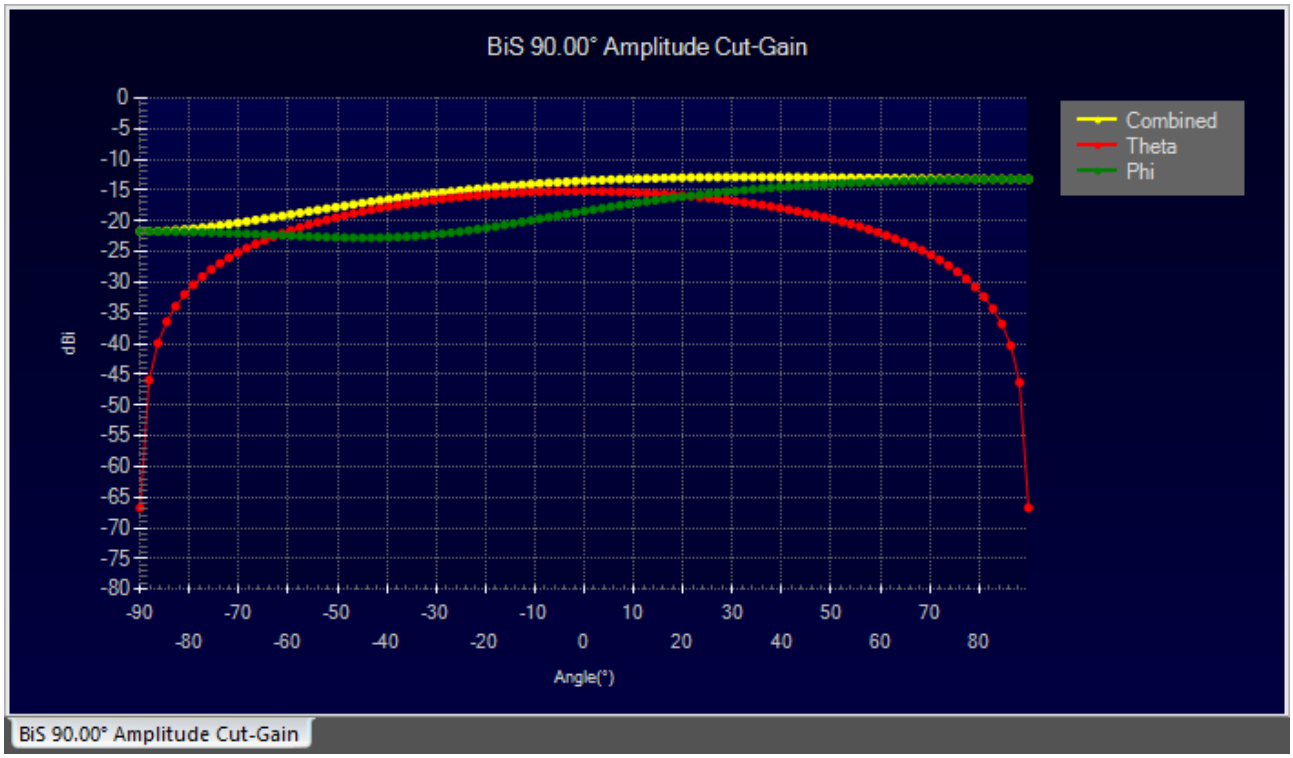

Figure 6-5

Peak EIRP: -11.88dBm.

The second configuration is shown in Figure 6-6:

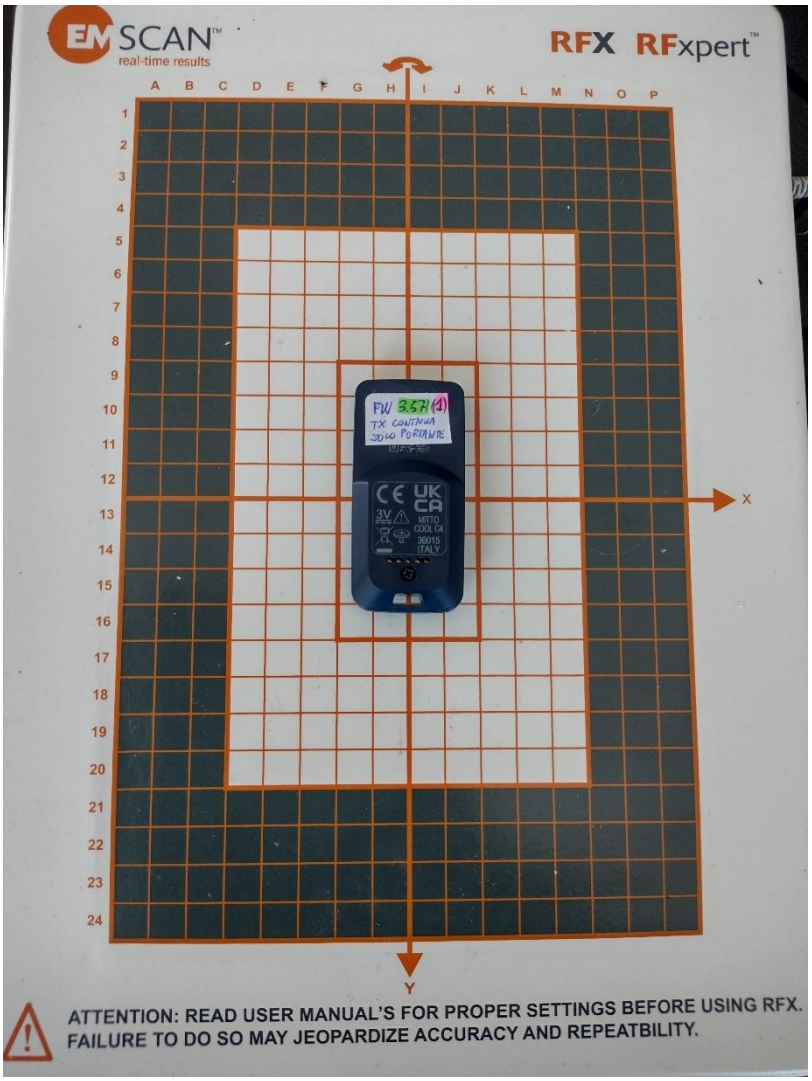

Figure 6-6

In this configuration the radiation lobes are reported below:

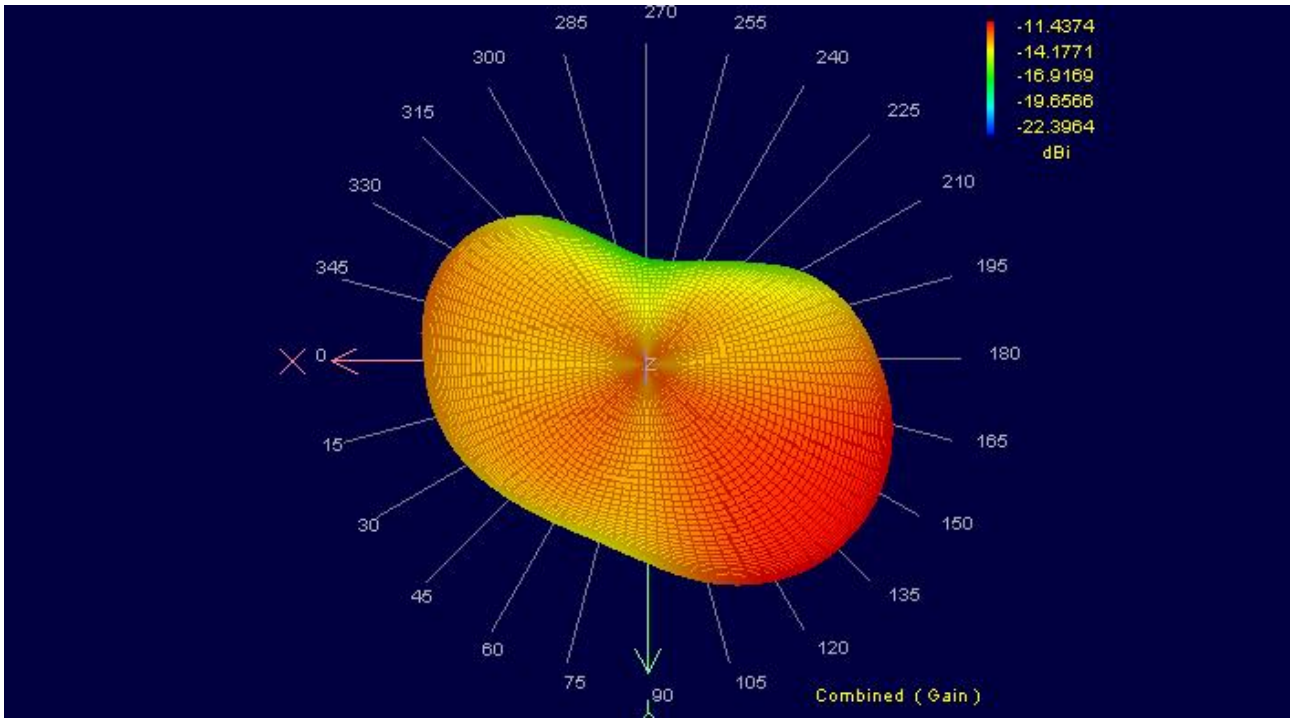

Figure 6-7

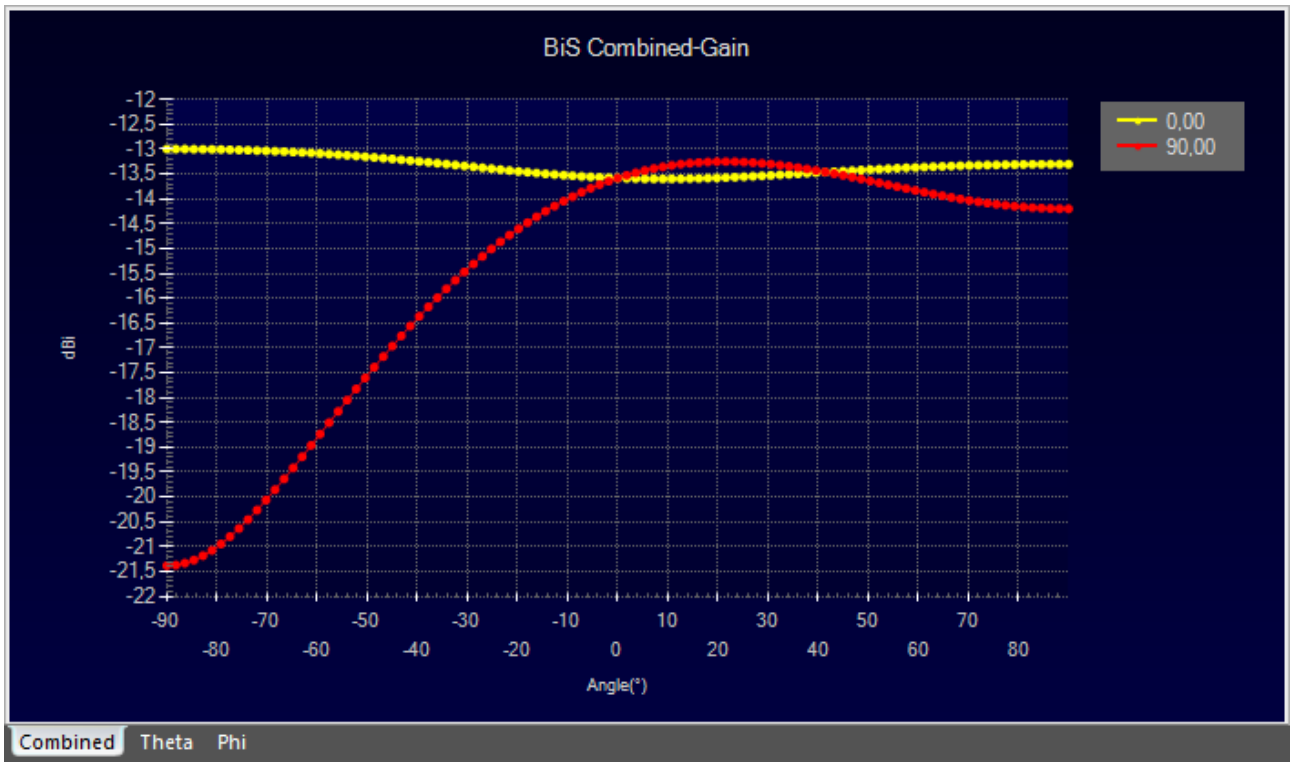

Figure 6-8

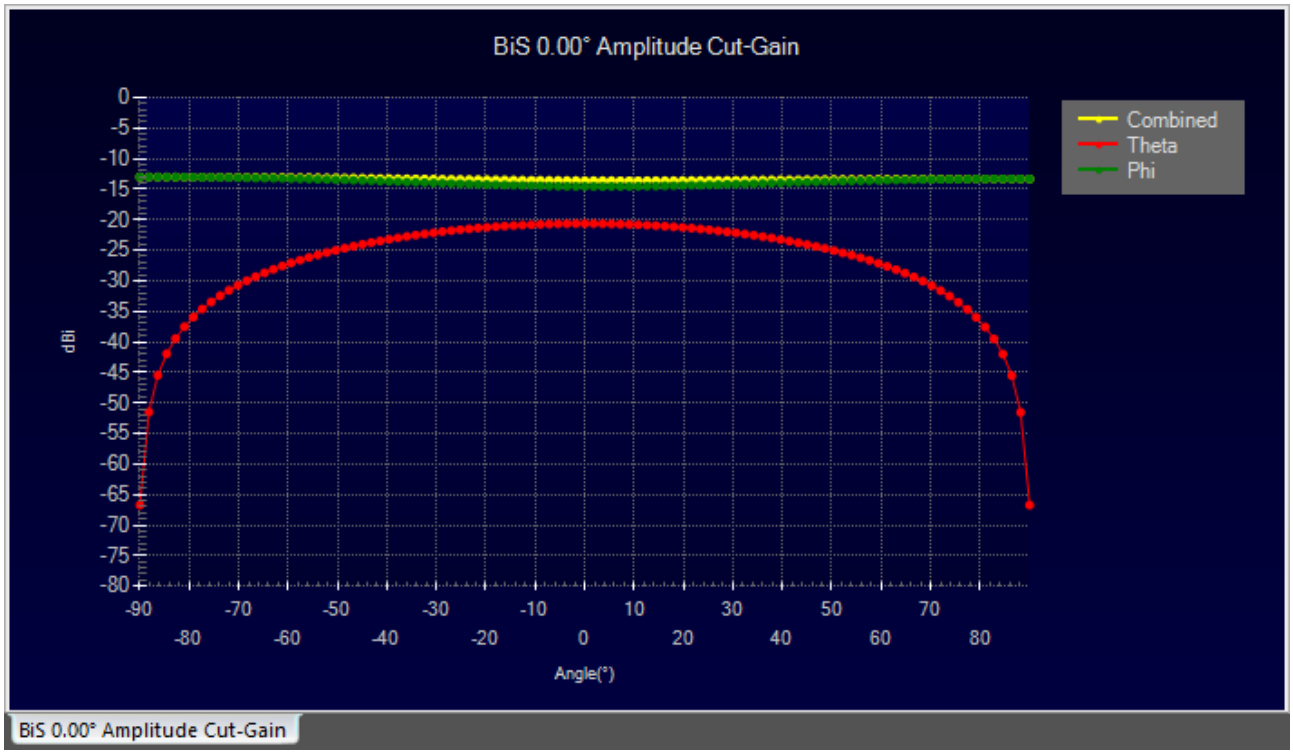

Figure 6-9

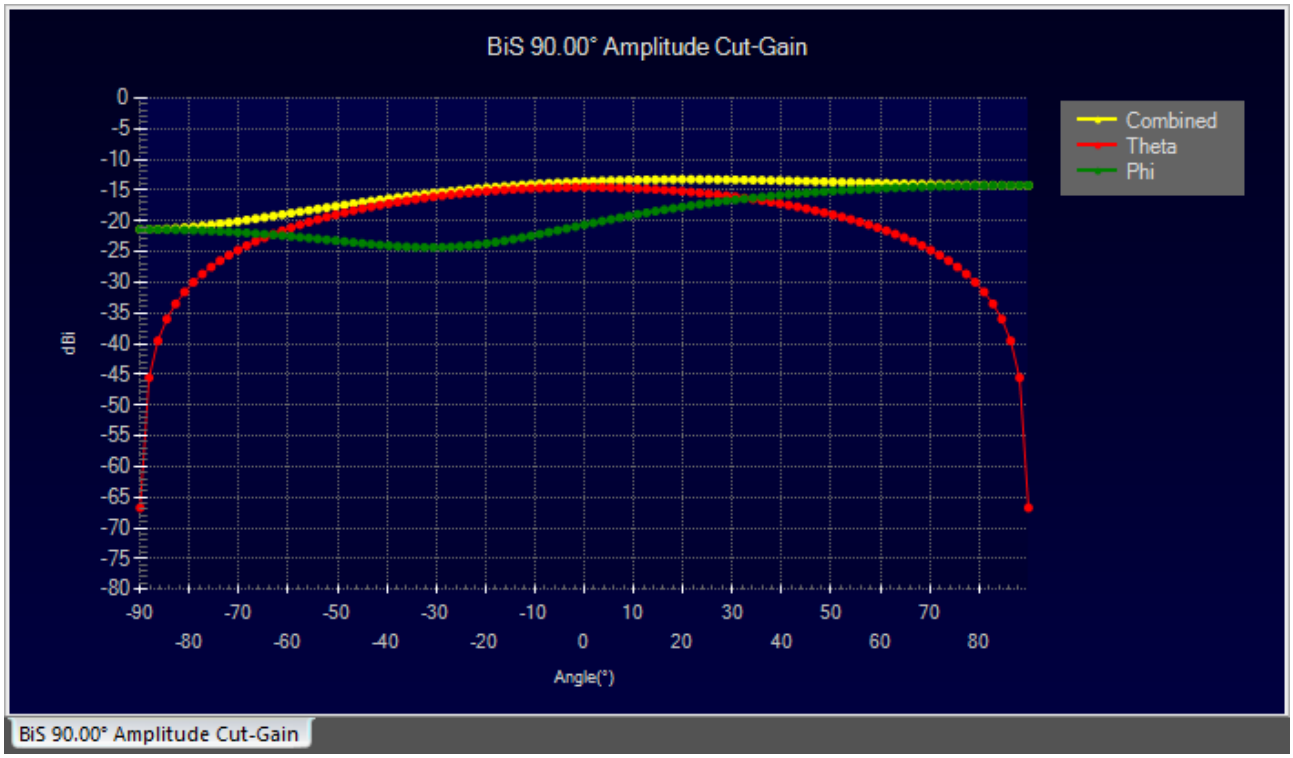

Figure 6-10

Peak EIRP: -11.68dBm.

The third configuration is shown in Figure 6-11:

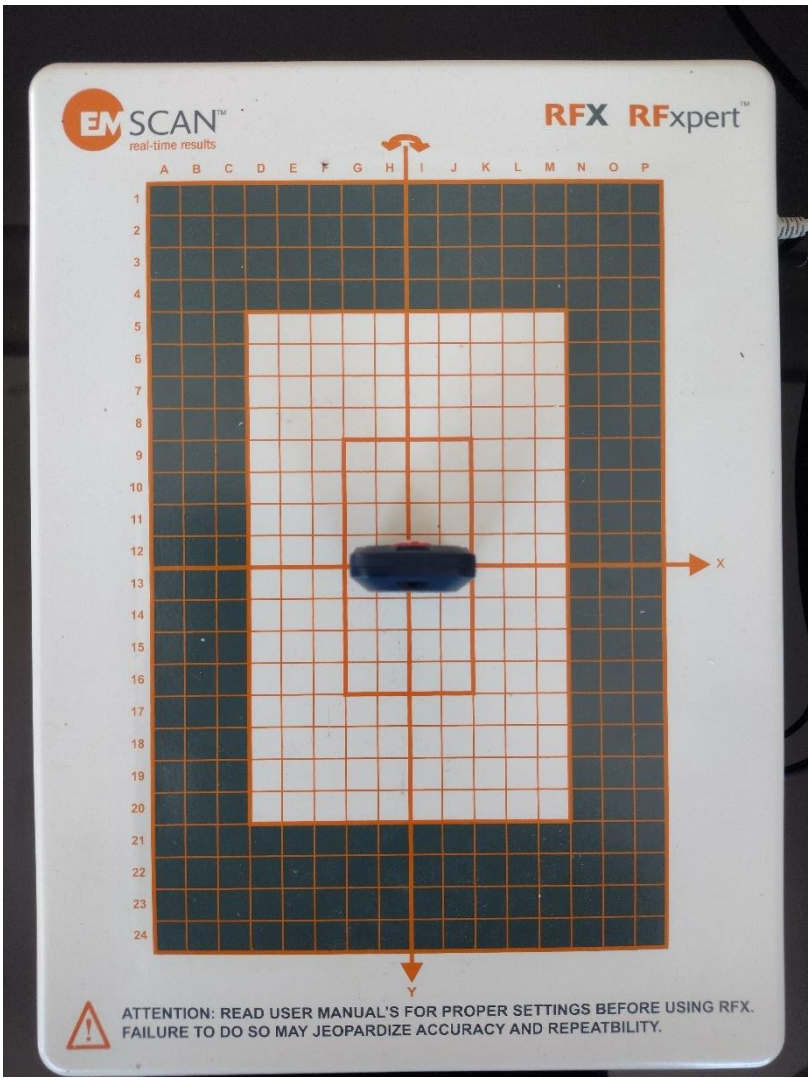

Figure 6-11

In this configuration the radiation lobes are reported below:

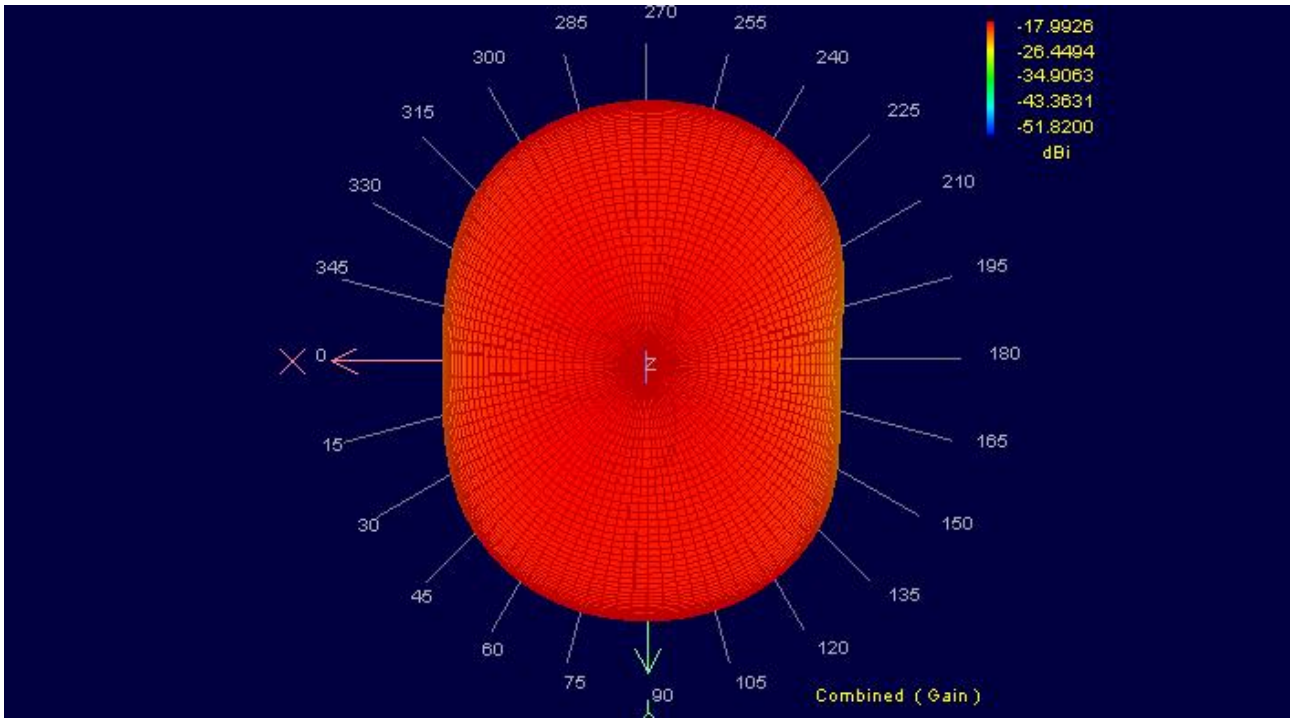

Figure 6-12

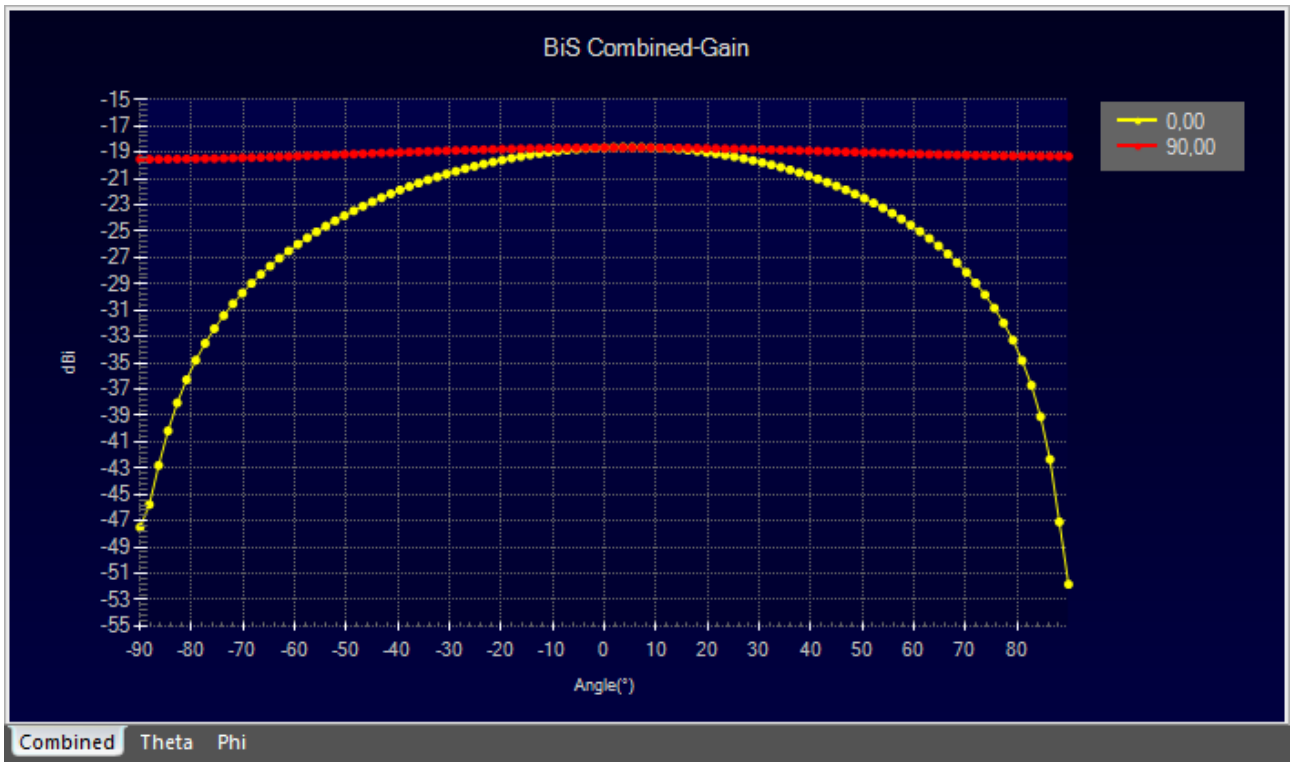

Figure 6-13

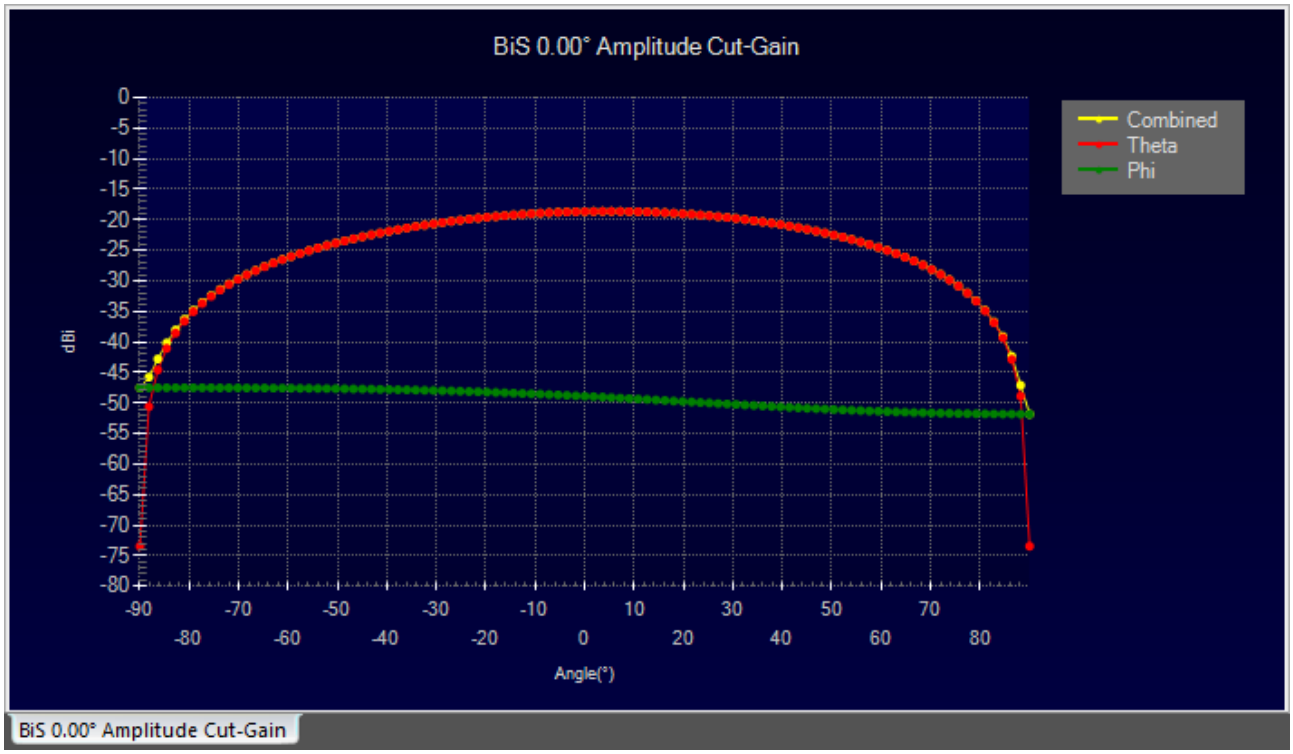

Figure 6-14

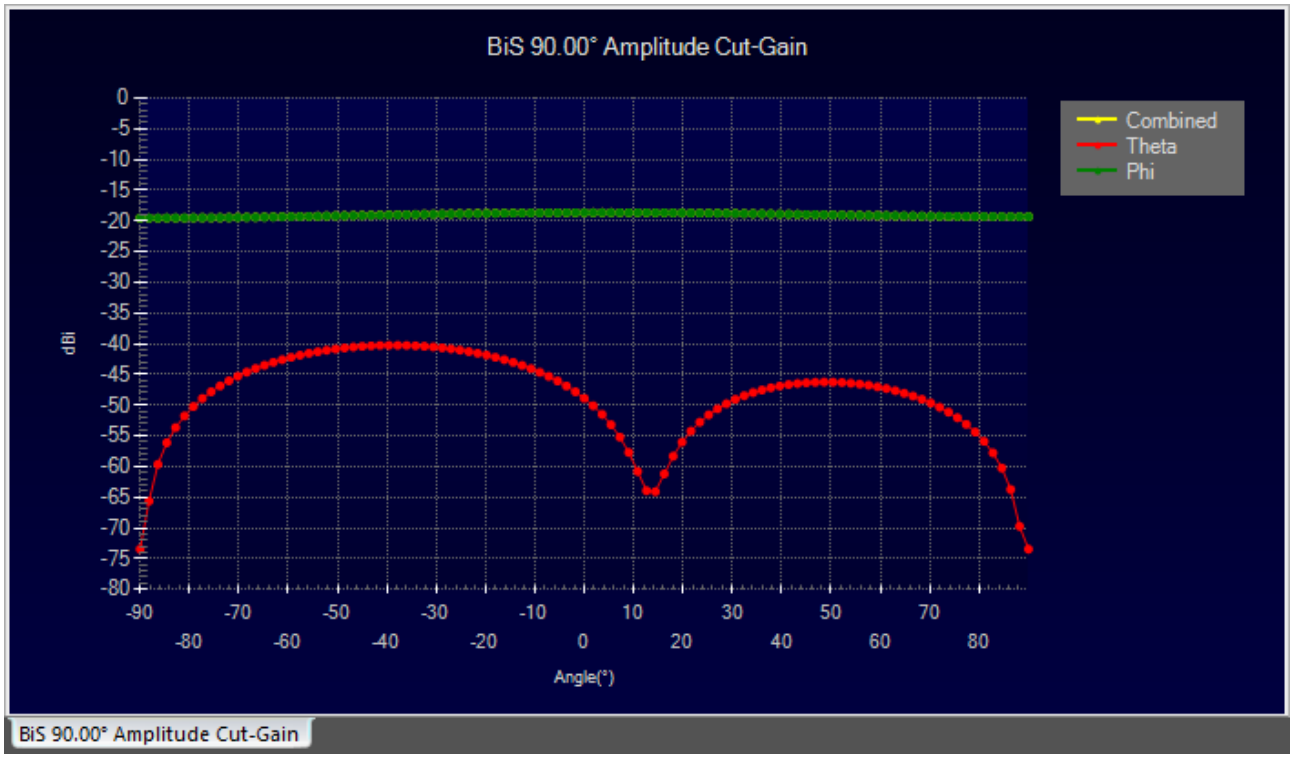

Figure 6-15

Peak EIRP: -18.24dBm.

The fourth configuration is shown in Figure 6-16:

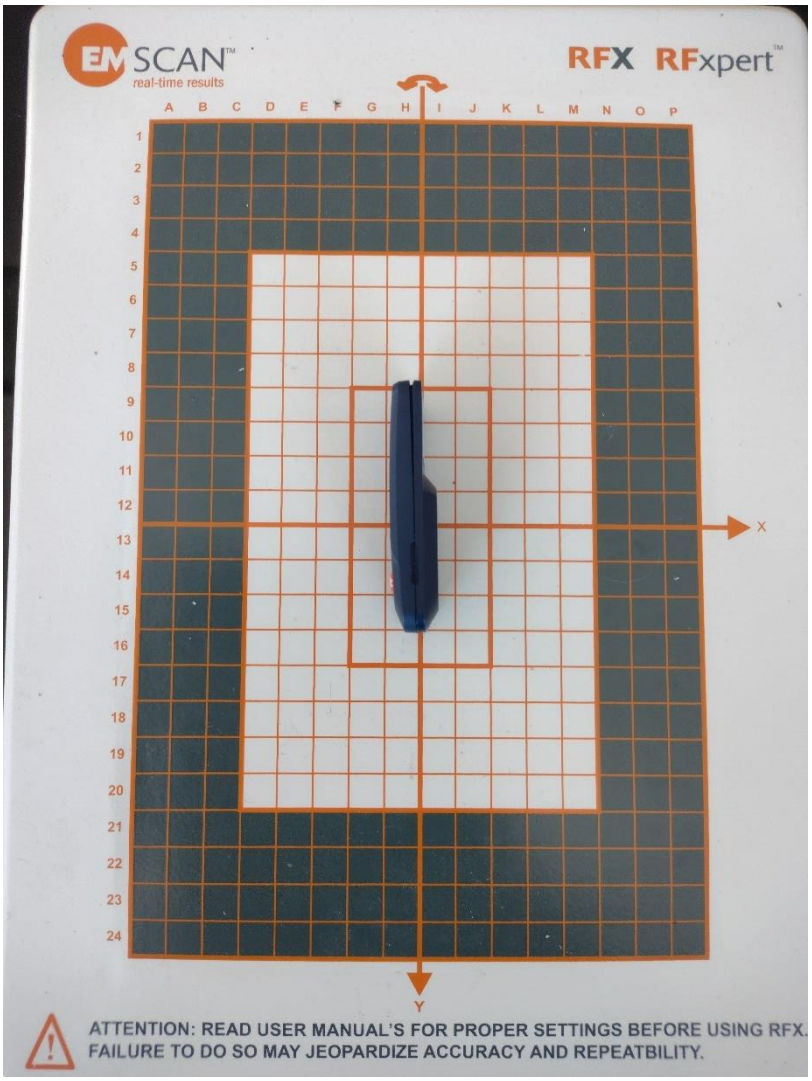

Figure 6-16

In this configuration the radiation lobes are reported below:

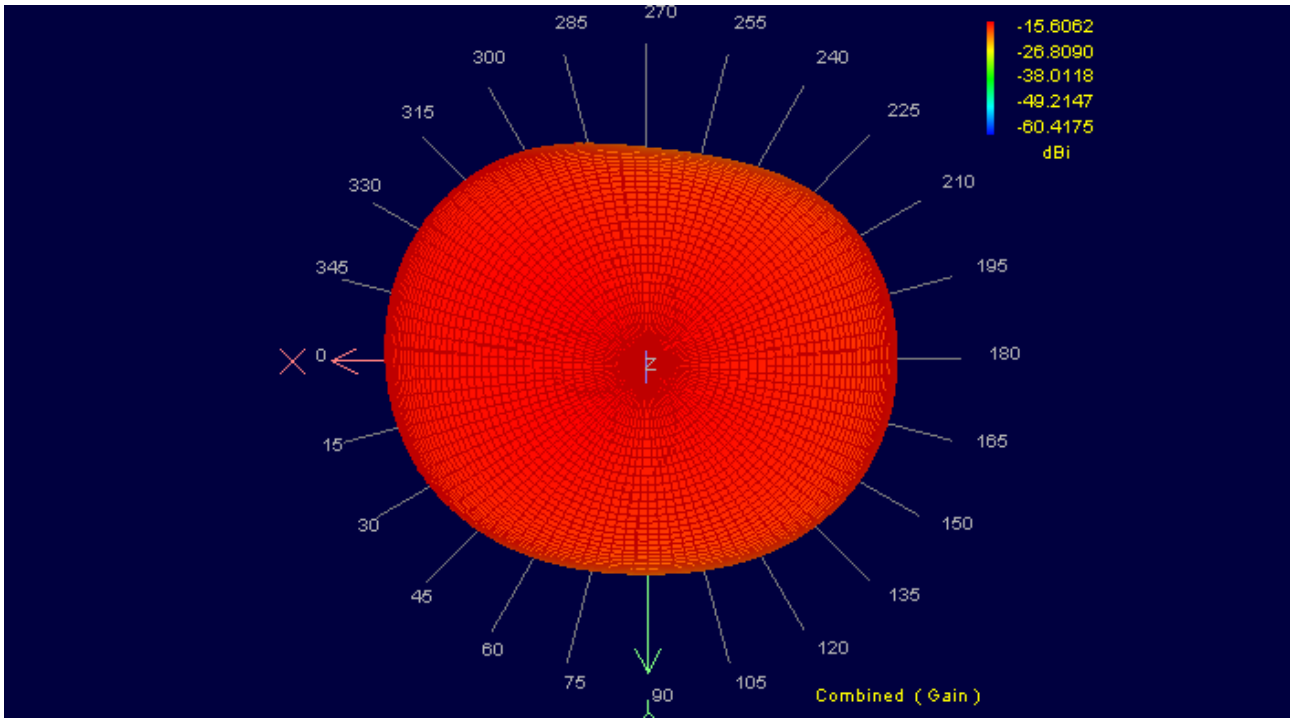

Figure 6-17

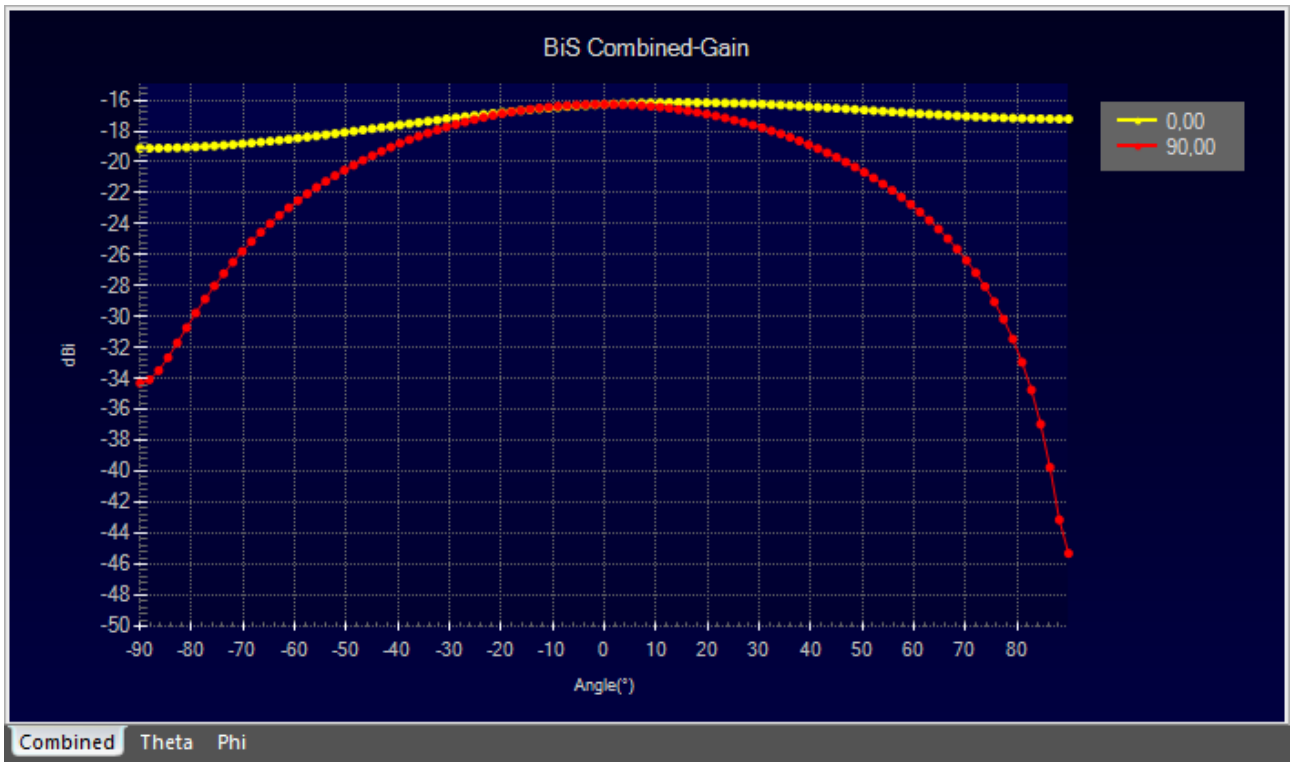

Figure 6-18

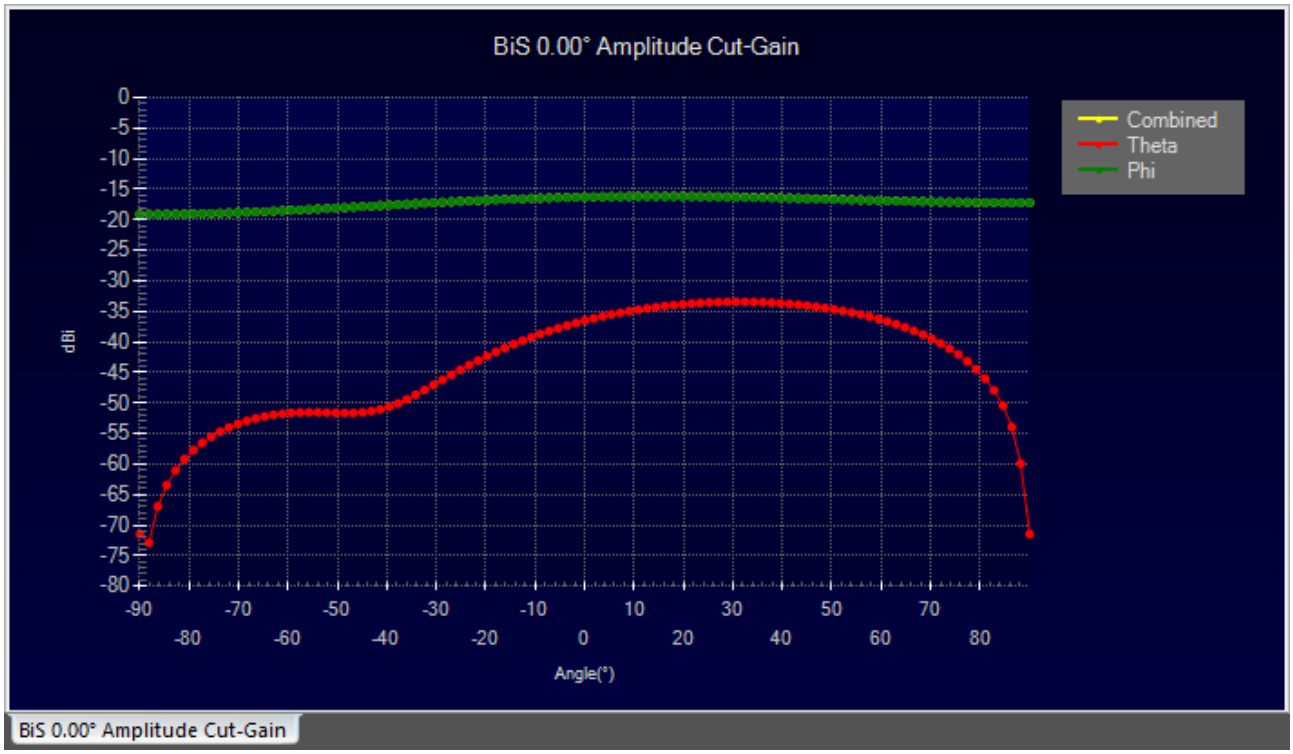

Figure 6-19

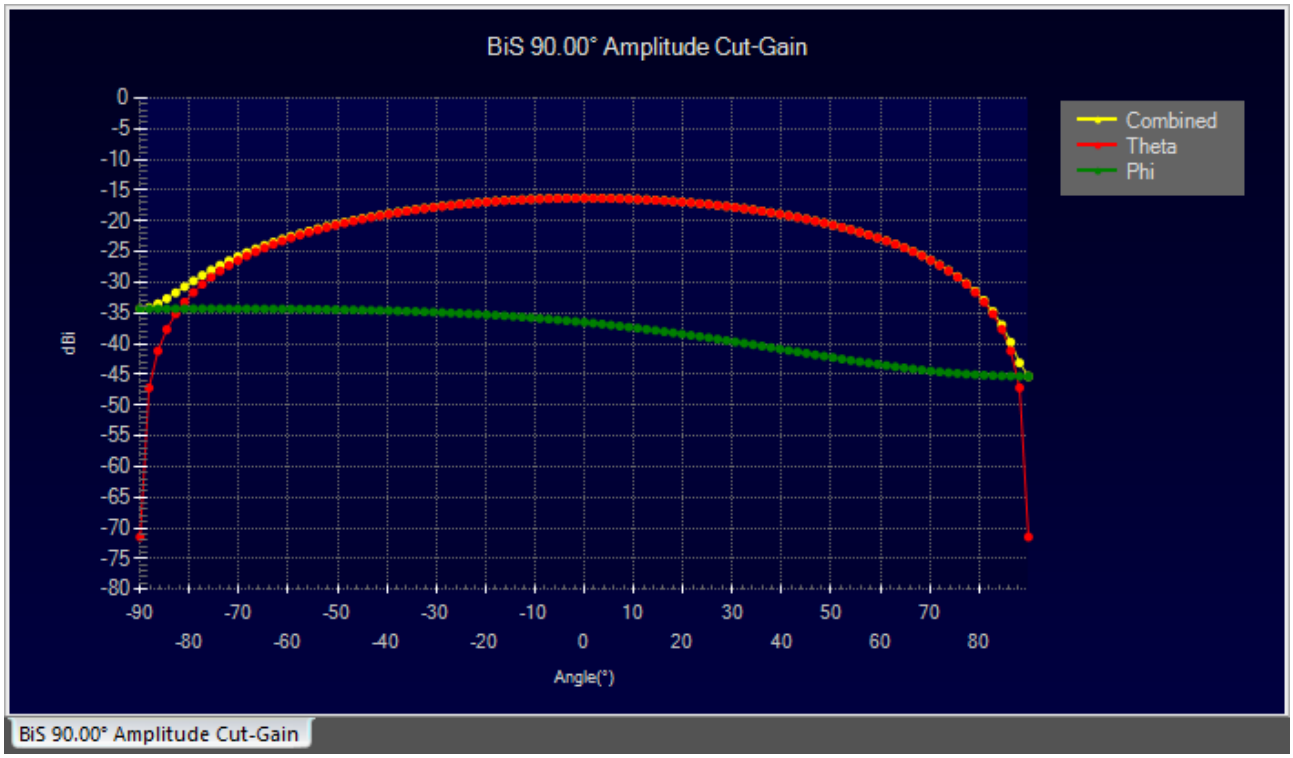

Figure 6-20

Peak EIRP: -15.85dBm.

The fifth configuration is shown in Figure 6-21:

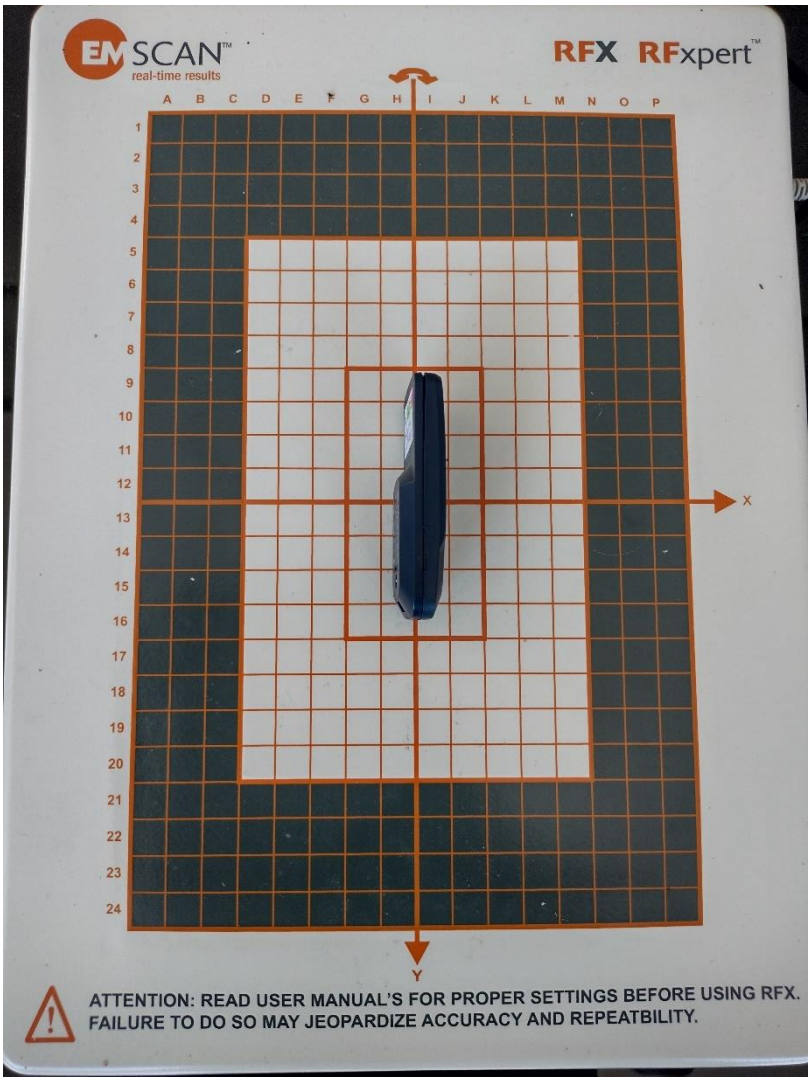

Figure 6-21

In this configuration the radiation lobes are reported below:

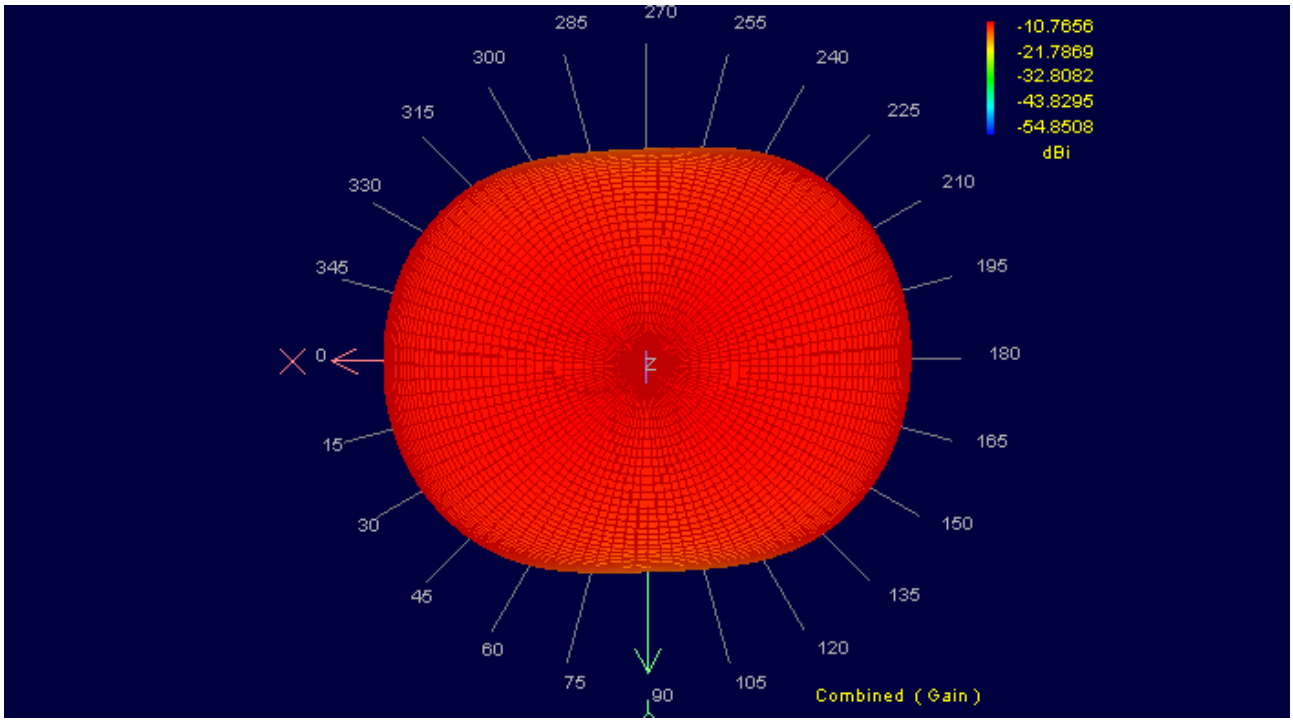

Figure 6-22

Figure 6-23

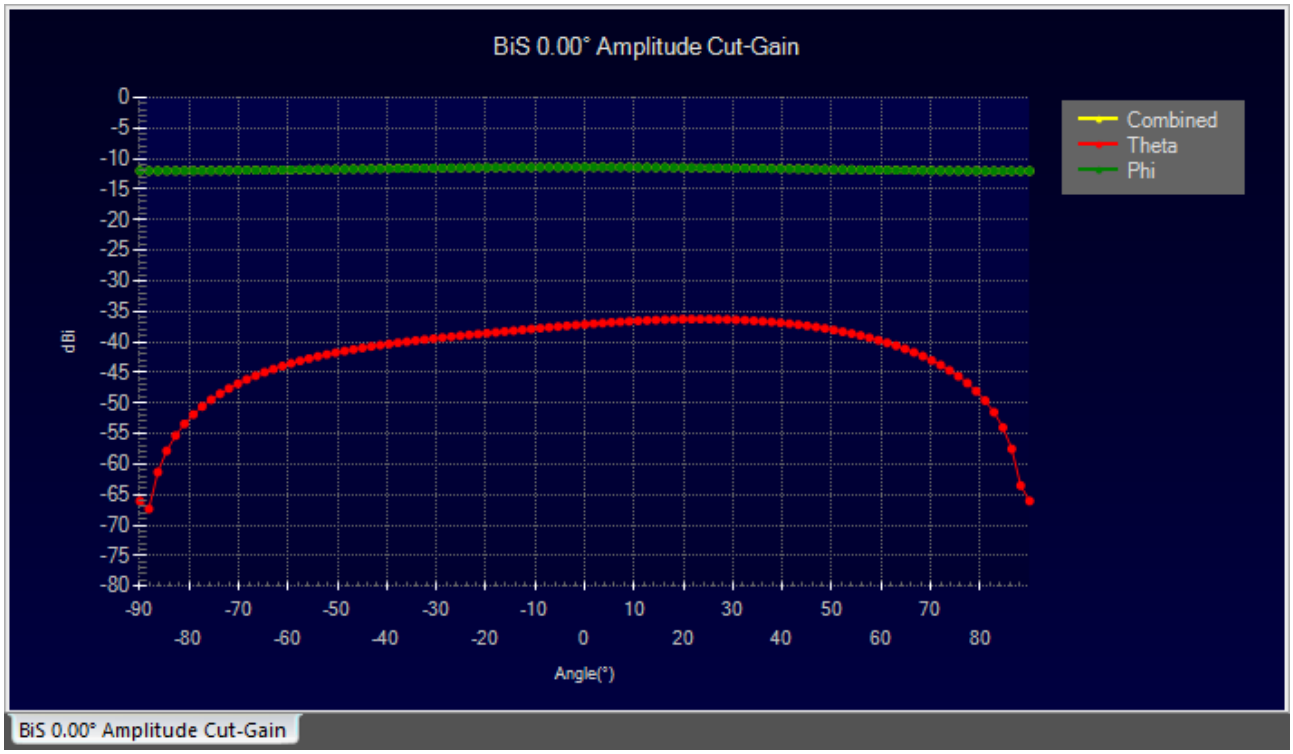

Figure 6-24

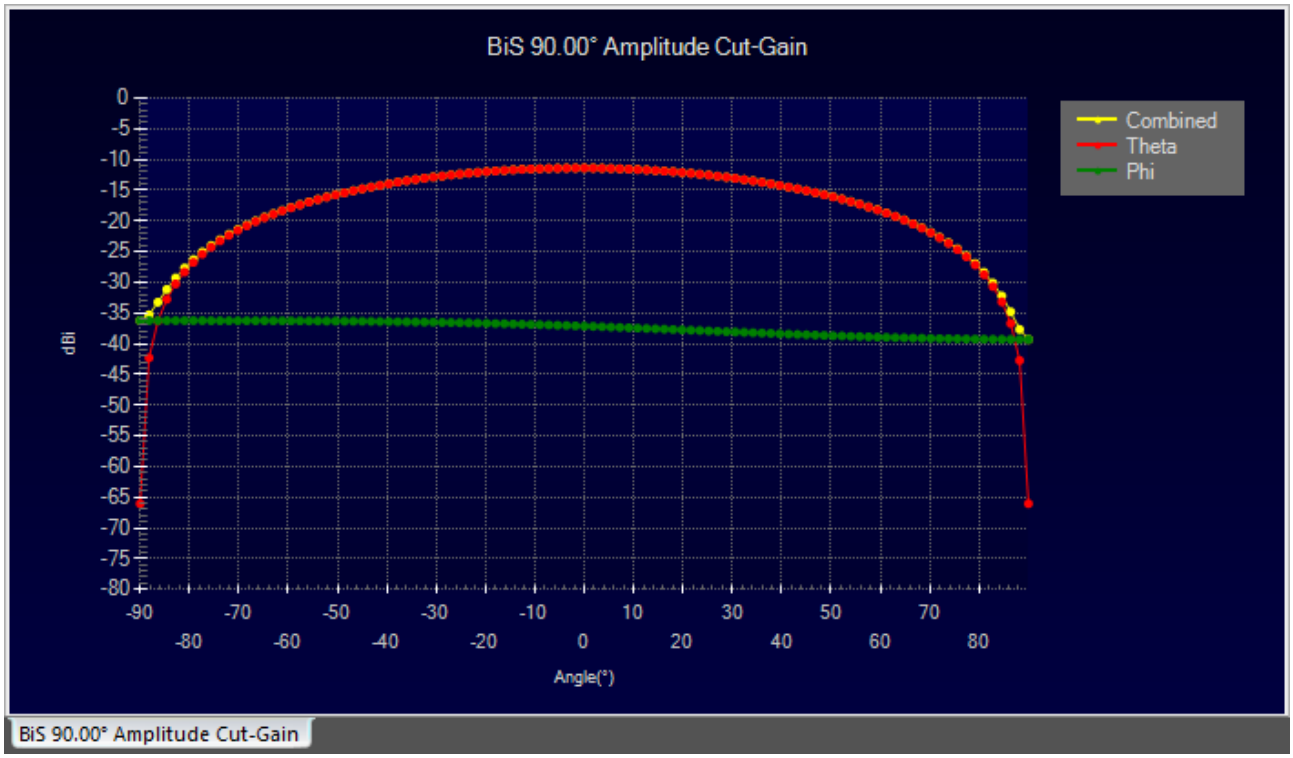

Figure 6-25

Peak EIRP: -11.01dBm.

EIRP peak has been measured with the fifth configuration.
The original sample has 7dB less than the sample used for the preliminary measures. In Dekra chamber the measured radiation peak was 78,84dBµV/m at 3m.

Converted in dBm EIRP:

78,84dBµV/m at 3m = -16,39dBm EIRP.

To find a correction factor (although original Dekra measures were realized in semi-anechoic environment while RFXpert can be compared to a measure in an anechoic enviroment) the EIRP peak measured with RFXpert must include the offset equal to the difference of the conducted RF output power that is:

$$P_{EIRP\_MAX} = (-11.1 - 7)dBm = -18.1dBm$$

The correction factor is:

$$P_{FCC} - P_{EIRP_{MAX}} = (-16{,}39 + 18{,}1)dB = 1{,}71dB$$

7 Relevant Radiation Lobes for FCC

The radiation lobes of Mitto Cool C4 toward the back of the remote command are reported below (Note for the customer: the measurement configuration is that one represented in Figure 5-1):

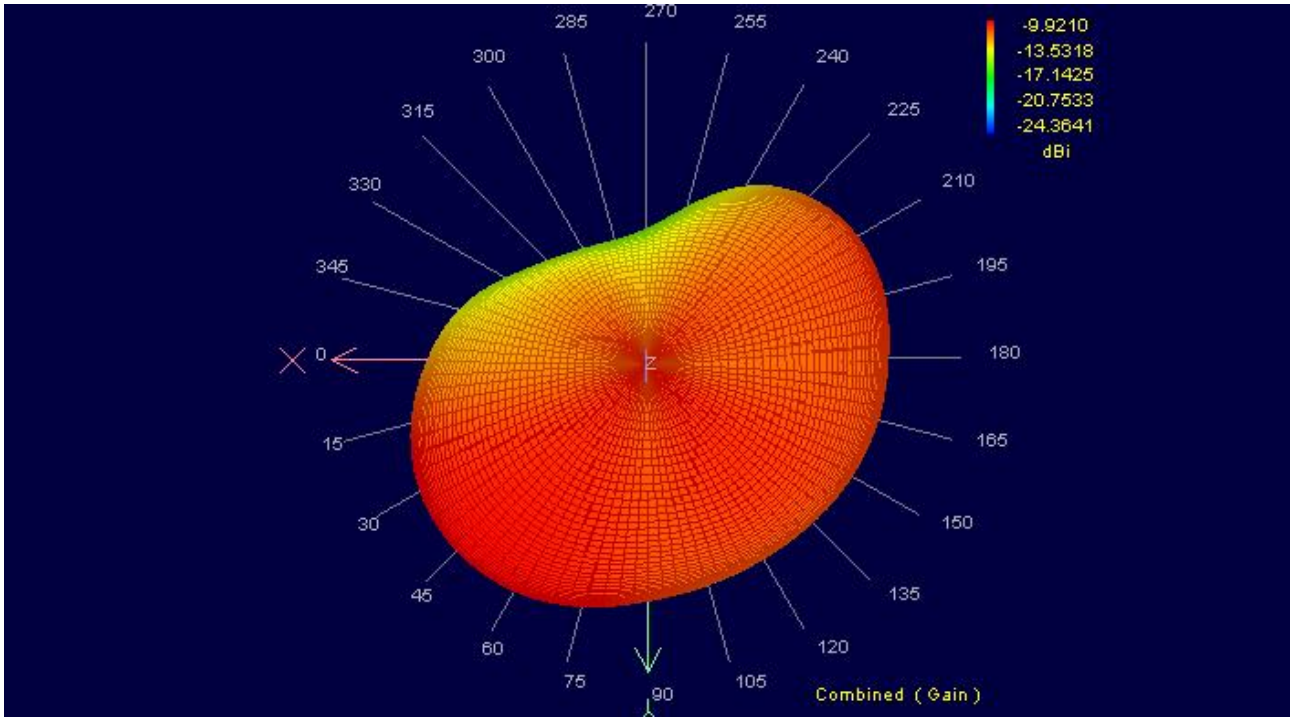

Figure 7-1

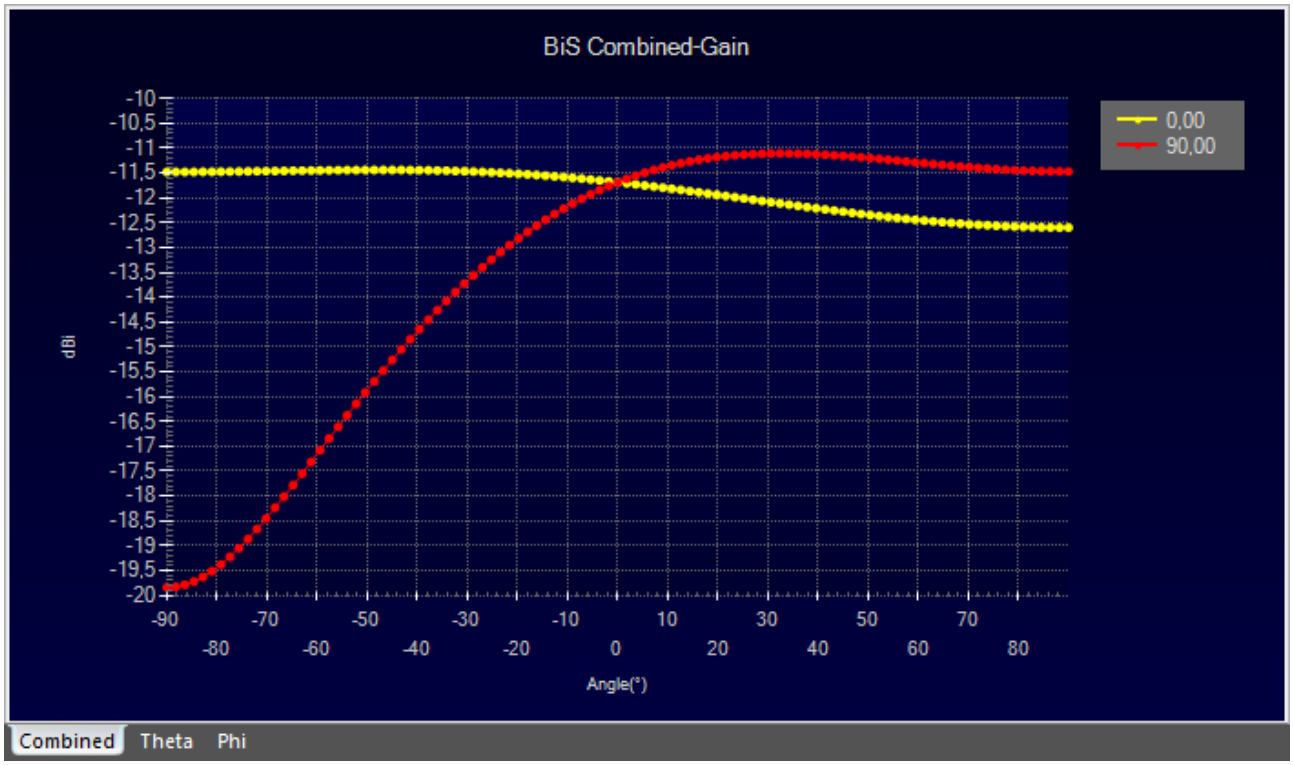

Figure 7-2

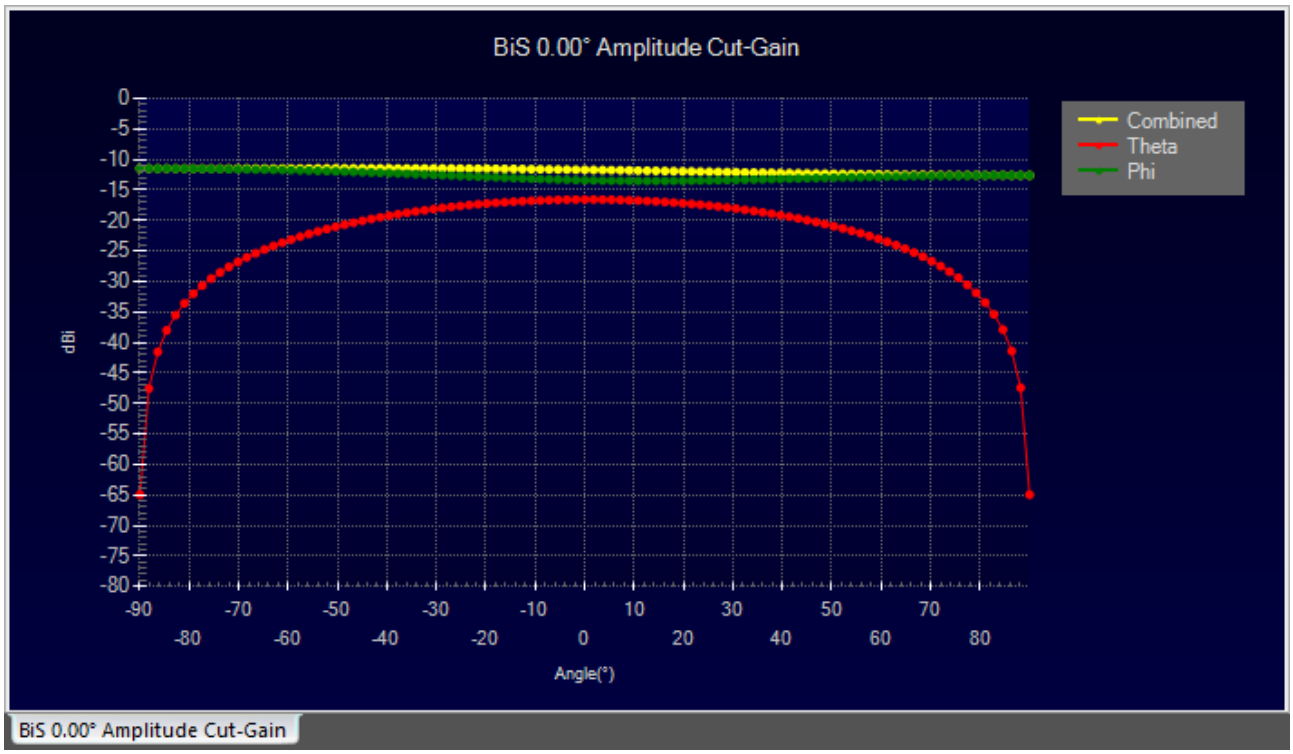

Figure 7-3

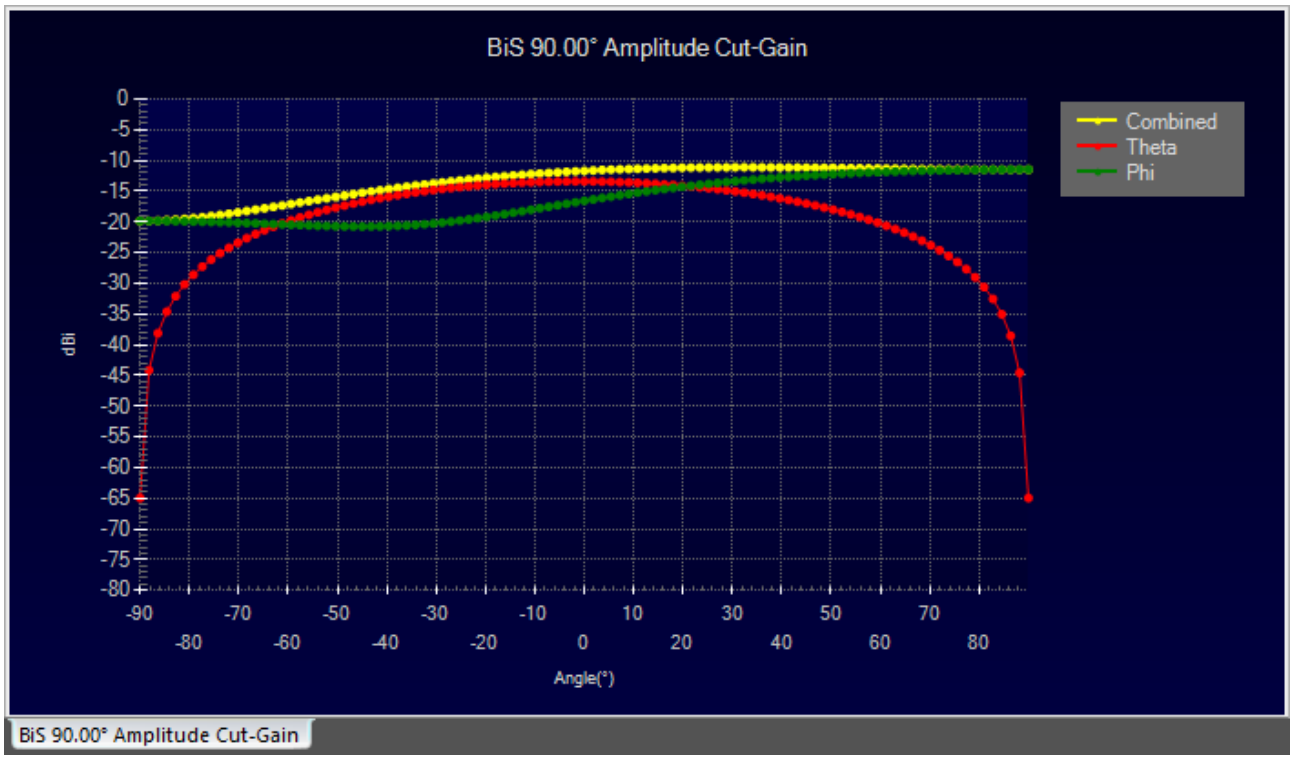

Figure 7-4

Peak Total Gain: -9.9dBi

The radiation lobes of Mitto Cool C4 toward the front of the remote command are reported below (Note for the customer: the measurement configuration is that one represented in Figure 6-6):

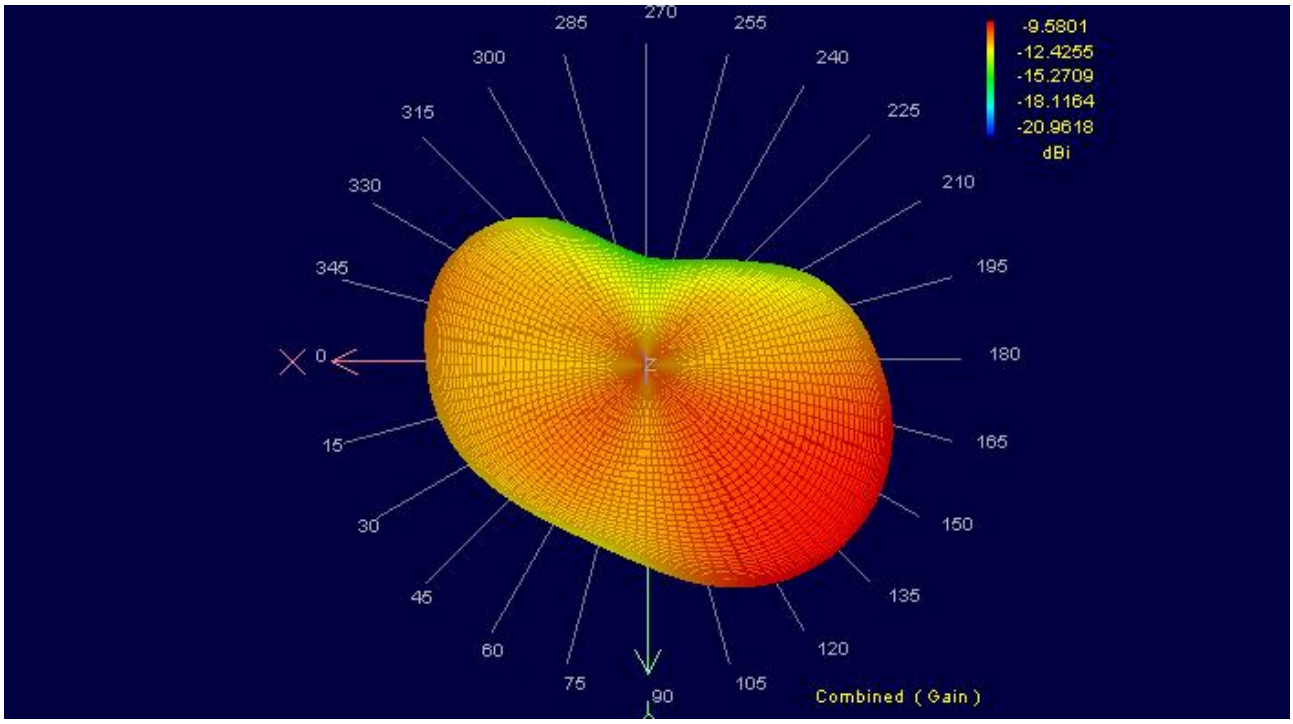

Figure 7-5

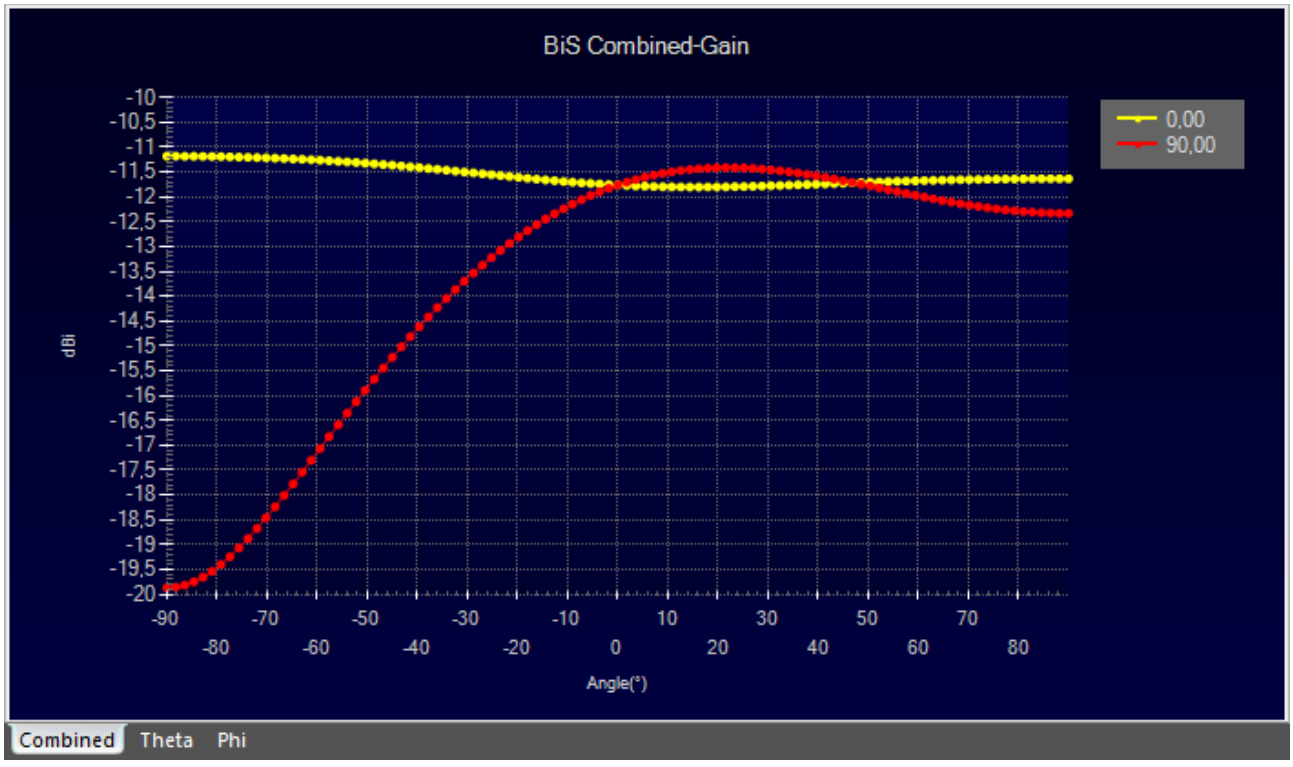

Figure 7-6

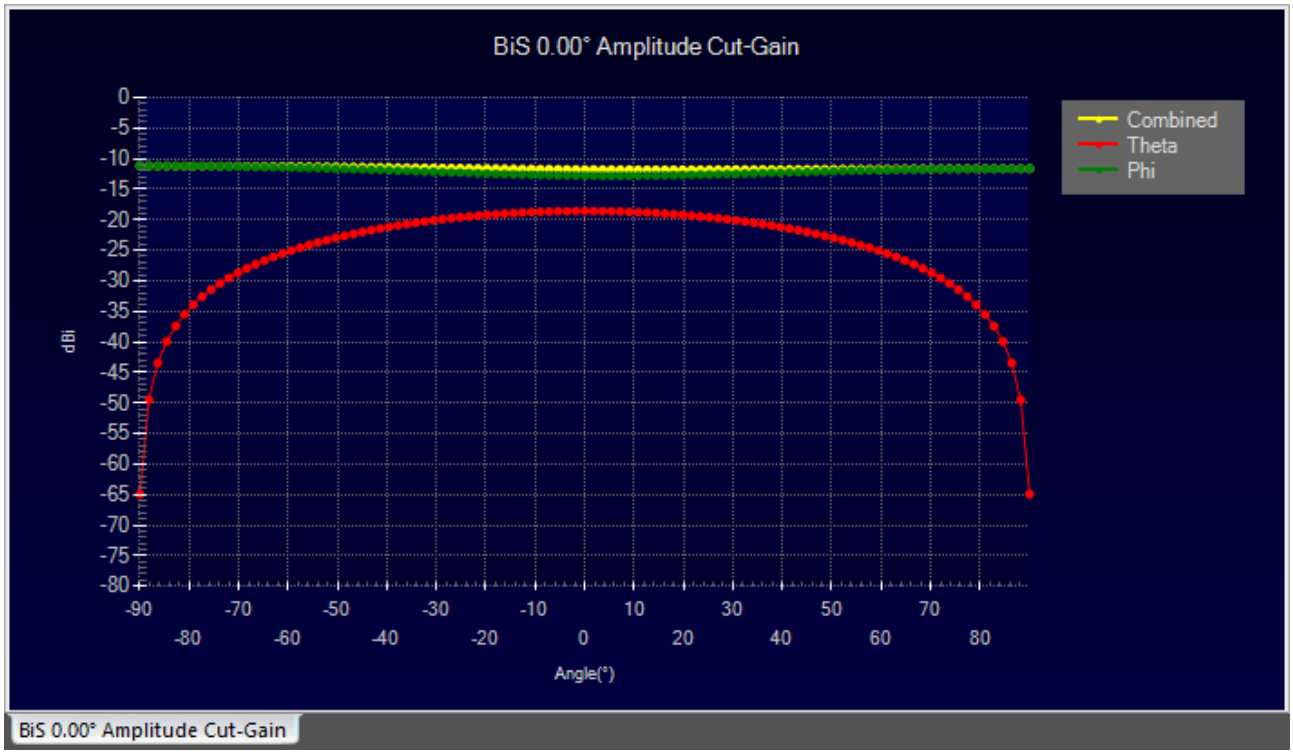

Figure 7-7

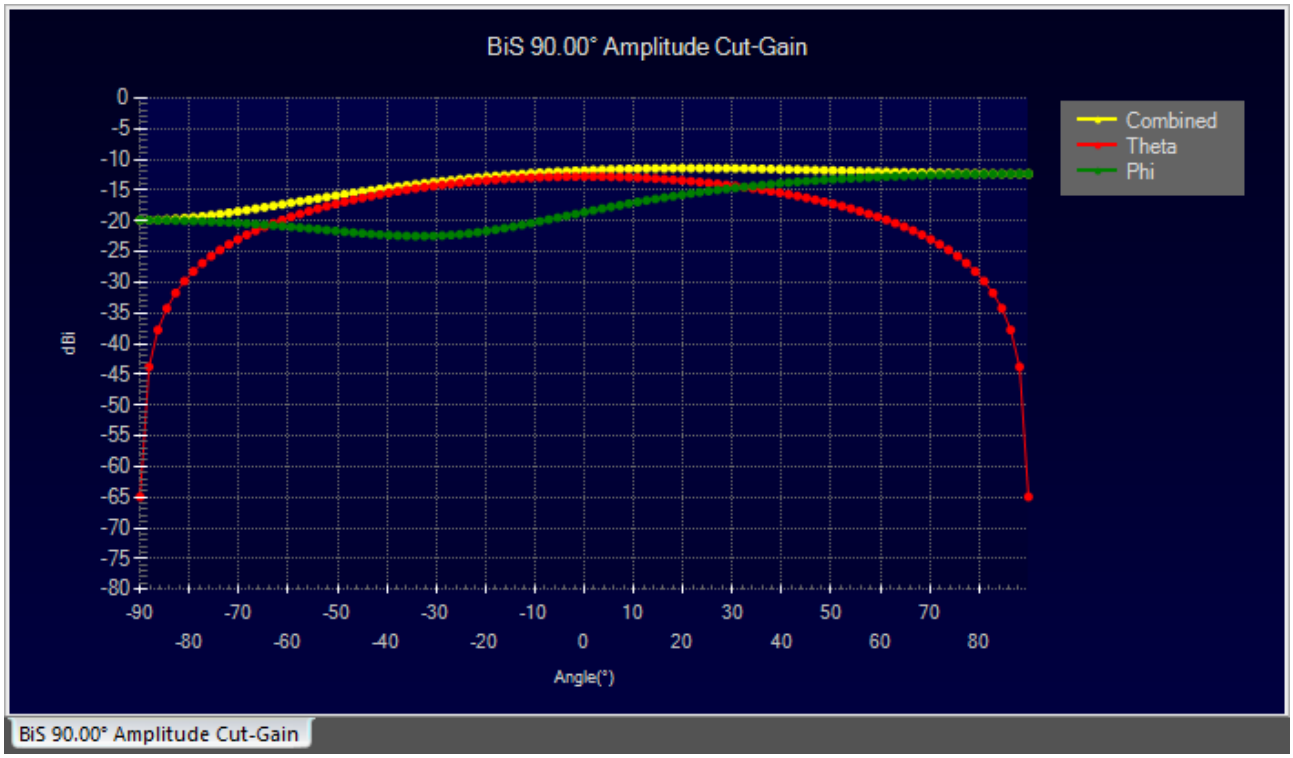

Figure 7-8

Peak Total Gain: -9.6dBi