

Antenna Gain Calculation

FCC ID: CCKPC0237 IC:525A-PC0237

Unit 1106, Antenna Gain Calculation

DMP 1106 Unit

Antenna gain is derived as follows. The Effective Isotropic Radiated Power (EIRP) is the product of the transmitter power and the transmitter antenna gain. The EIRP is reported in dBm. EIRP is measured at a distance of 3m from the EUT. The conducted power is measured directly at the output port from the transmitter module. The conducted power is a direct measurement of the transmitter power. The antenna gain is the difference, in dB, between the EIRP and the conducted power.

Figures 1 through 3 show the uncorrected measurement of the EIRP. The correction adds 107dB to convert from dBm to field strength; adds the loss of the transducer; adds the loss of the cable. The intermediate result converts dBm to field strength at the receive antenna. Next, 95.23dB is subtracted to convert from field strength at the receive antenna to EIRP at the EUT transmitter. Table 1 lists the corrected EIRP values and frequencies.

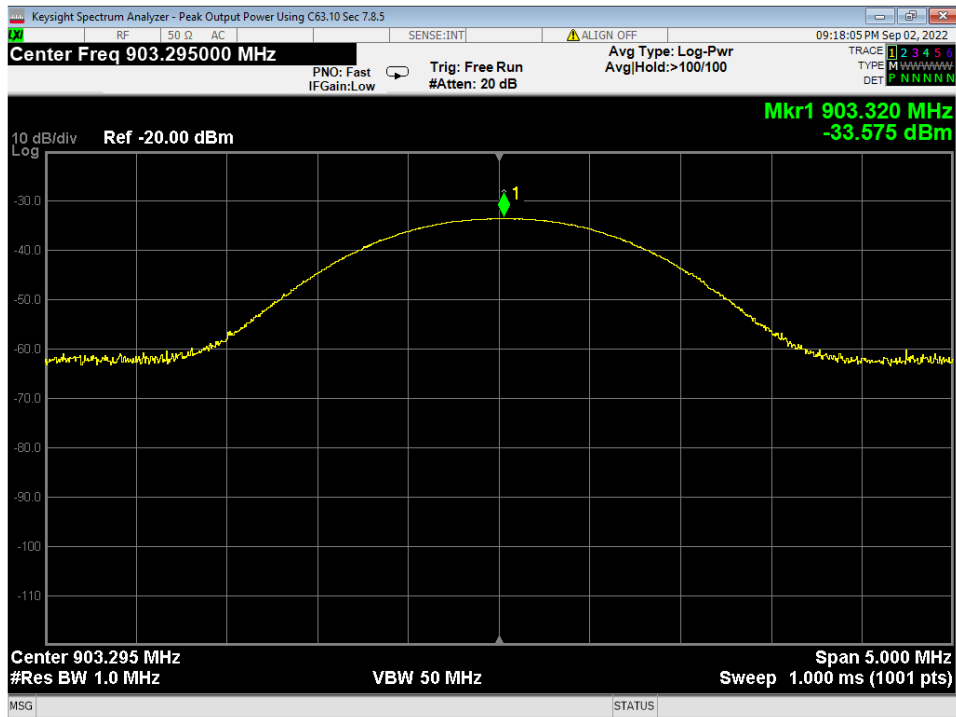


Figure 1. Uncorrected EIRP Measurement, Low Frequency

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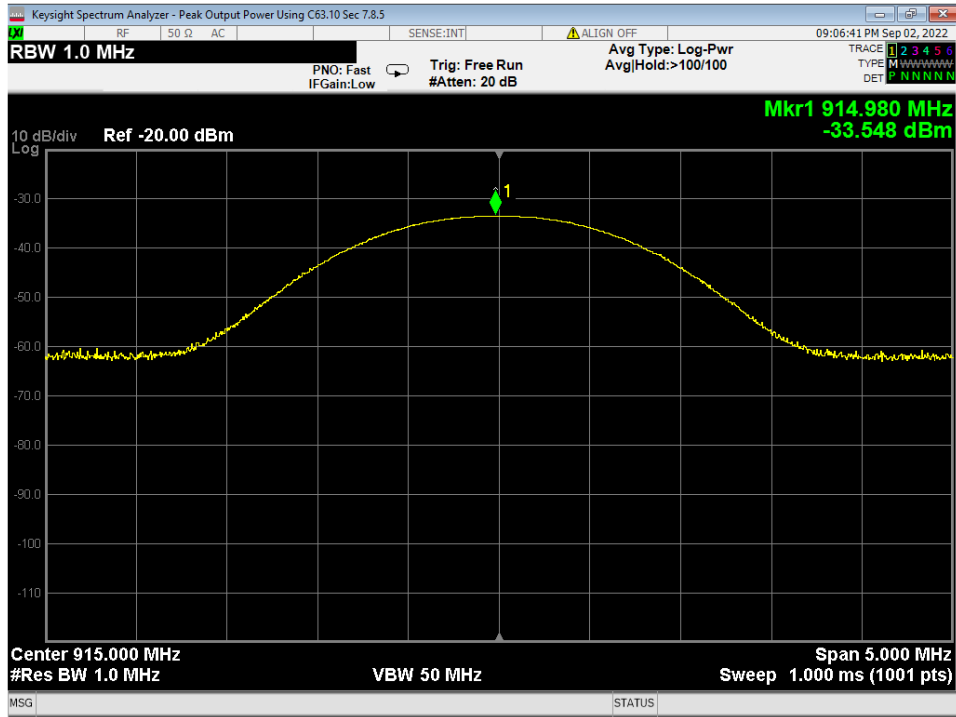


Figure 2. Uncorrected EIRP Measurement, Mid Frequency

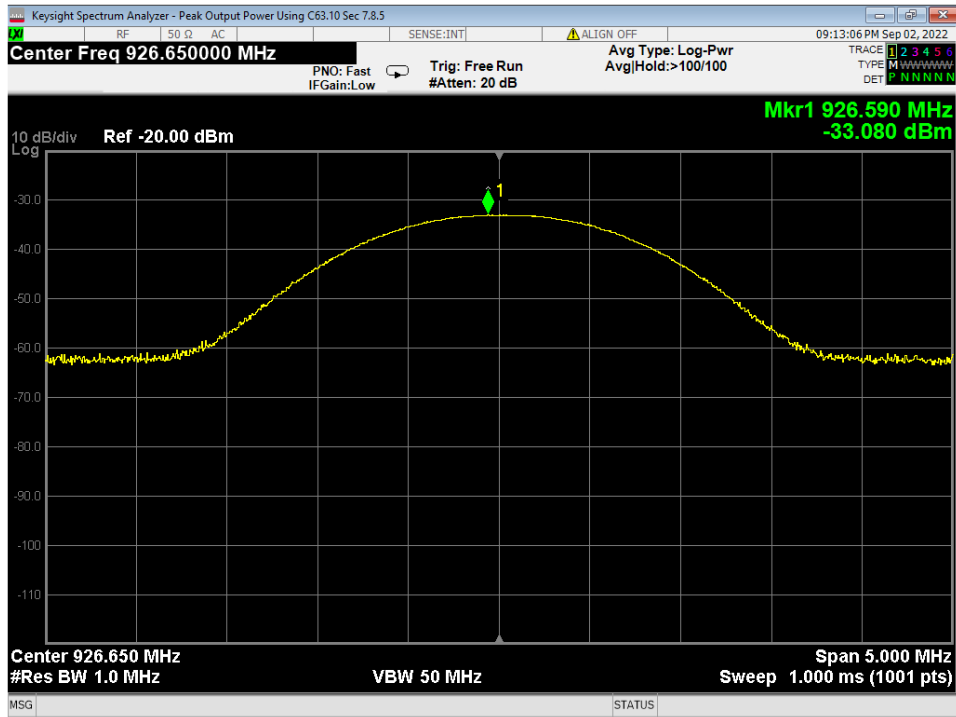


Figure 3. Uncorrected EIRP Measurement, High Frequency

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Table 1: Corrected EIRP

| Frequency (MHz) | Transducer Loss (TL dB) | Cable Loss (CL dB) | Uncorrected EIRP (UEIRP dBm) | Corrected EIRP (CEIRP dBm)* |
|-----------------|-------------------------|--------------------|------------------------------|-----------------------------|
| 903.3 | 26.6 | 5.3 | -33.58 | 10.09 |
| 915.0 | 26.5 | 5.37 | -33.55 | 10.09 |
| 926.6 | 26.6 | 5.43 | -33.08 | 10.72 |

*CEIRP = UEIRP + 107 + TL + CL - 95.23

Figure 4 shows the modified EUT that allows conducted power measurements.

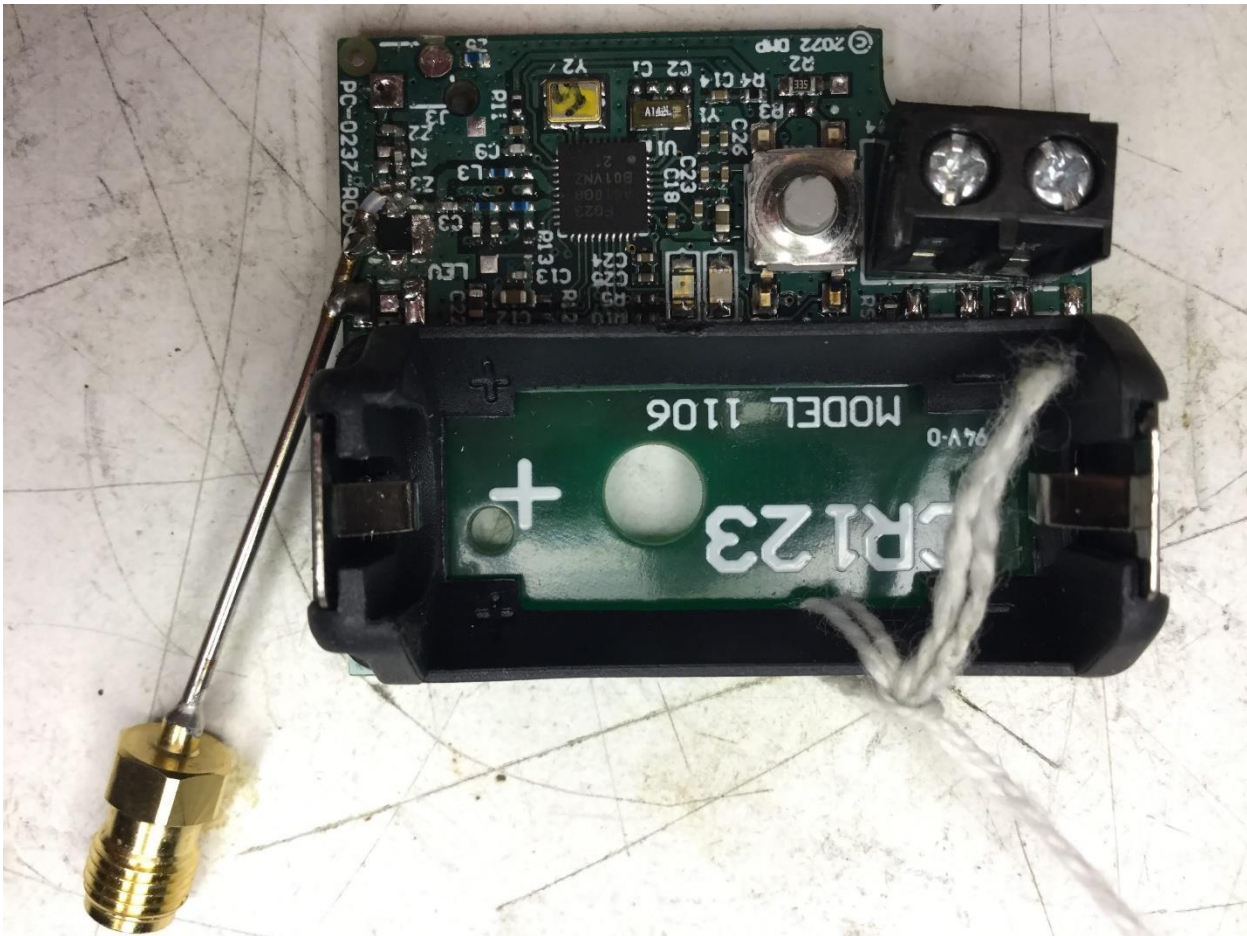


Figure 4. EUT modified for conducted power measurements

Figures 5 through 7 show the results of the conducted power measurements.

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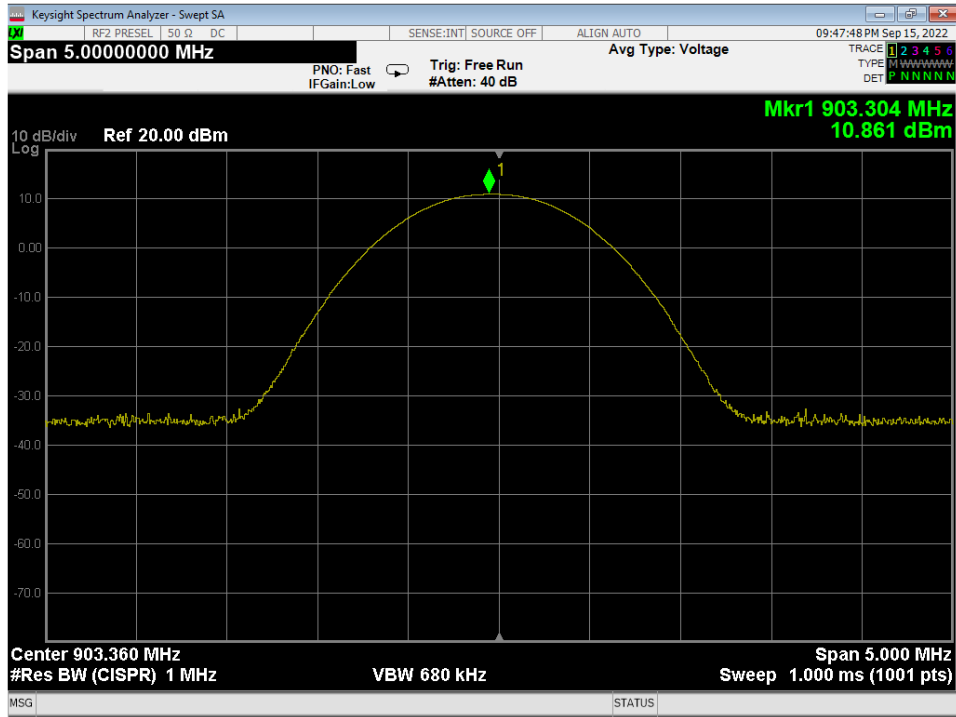


Figure 5. Conducted power, Low Frequency

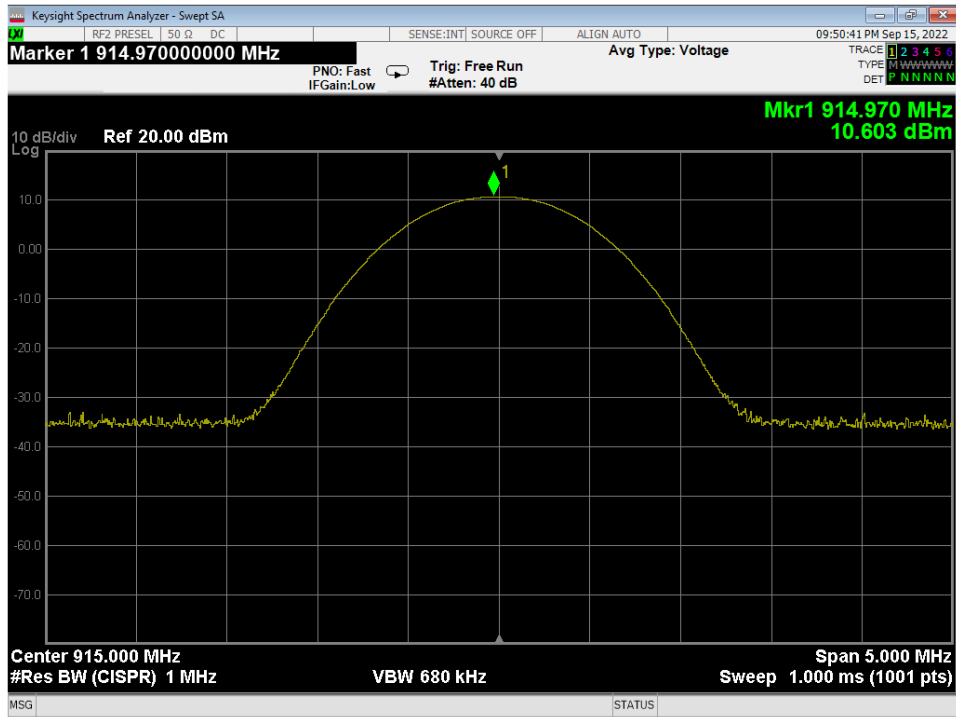


Figure 6. Conducted power, Mid Frequency

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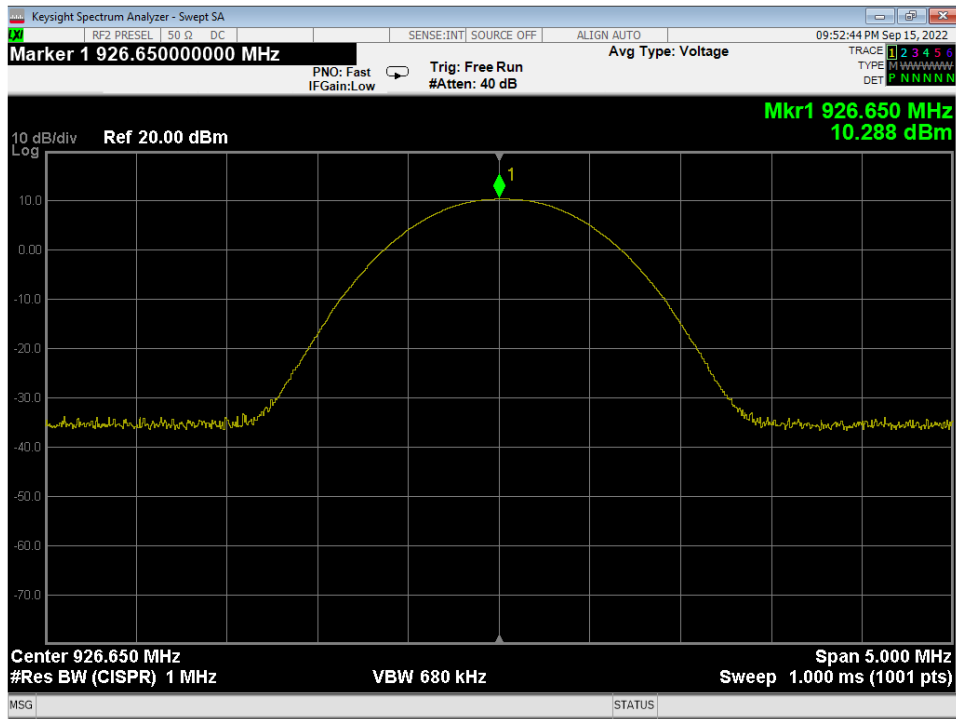


Figure 7. Conducted power, High Frequency

Table 2 shows the calculated antenna gain and frequencies

Table 2. Antenna Gain

| Frequency (MHz) | EIRP (dBm) | Conducted Power (dBm) | Peak Gain (dBi) |
|-----------------|------------|-----------------------|-----------------|
| 903.3 | 10.09 | 10.86 | -0.77 |
| 915.0 | 10.09 | 10.60 | -0.51 |
| 926.6 | 10.72 | 10.29 | 0.43 |