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**From:** Les Payne [mailto:[les@dnbenginc.com](mailto:les@dnbenginc.com)]  
**Sent:** Tuesday, March 23, 2004 2:06 PM  
**To:** dward ATCB  
**Cc:** Leon Kass  
**Subject:** RE: Revised Coiler TG-806 files

Greetings Dennis,

To answer the two items below.

There was an error in the addition in the substitution formula. However, the difference in the readings would not be enough to cause the EUT to be out of spec. We will correct imbedded formulas for future reference.

On item two, the occupied bandwidth plots are to show relative input and output signal characteristics and should not be used for indicating amplitude parameters. The input plots were taken with the signal in the bottom graticules of the spectrum analyzer (HP 8568) and are no longer accurate for amplitude measurements according to HP manuals. The true gain of the amplifier was measured at or near the reference level of the spectrum analyzer and then verified with a power meter for correlation. There is no internal limiting on this device.

This should clear things up.

Les

-----Original Message-----

**From:** dward ATCB [mailto:[dward@americanatcb.com](mailto:dward@americanatcb.com)]  
**Sent:** Wednesday, March 17, 2004 4:19 PM  
**To:** 'Leon Paul Kass'  
**Subject:** RE: Revised Coiler TG-806 files

Hi Leon

One final note. Since the numbers for radiated spurious emissions are 20dB below the limit, I am not going to make an issue of the test method. However, please note that I cannot determine from the explanation given in the report if the antenna substitution method was actually used even though it references TIA603. From the formula given and from the data shown, it appears to me that only a radiated field strength type measurement was made. Another item is that the antenna gain was subtracted to the reading when I believe it should be added. Antenna substitution is measuring the power at 3 meters from the EUT then replacing the EUT with a signal generator and a substitution antenna. The signal generator is then set to a power level delivered to the substitution antenna that coincides with that measured from the EUT. This level from the signal generator is then measured and the substitution antenna gain is added to this number. This then is the ERP of the radiated spurious emissions. Perhaps I am reading it wrong, but this does not appear to be what was done in the report.

**From:** dward ATCB [mailto:[dward@american tcb.com](mailto:dward@american tcb.com)]  
**Sent:** Friday, March 19, 2004 11:57 AM  
**To:** 'les@dnbenginc.com'  
**Cc:** William Graff  
**Subject:** RE: Revised Coiler TG-806 files

Hi Les

Please look at page 65 of the report. Please also note double ridge guide horns typically have positive gains. I have never heard of a horn that has a negative dB gain. As these items generally have small beam widths and concentrate energy through this small beam width, their gains would be positive as all of the energy is focused in the beam. This increases the power delivered to the antenna terminal, not decrease it. This means that the 8.7dBi in the table should be added. This also means that the -51.61dBm reading in the table for ERP would be -51.61+ 8.7 or = -42.91 (the limit then is -29.91 not -47 as reported. The horn would increase the power not decrease as shown in the table. Please explain how the horn has a negative gain. This is unlikely.

Also, there is nothing in the report that shows the signs of the antenna gain that would allow you to change the arithmetic function. In the report it appears that you have positive gain and that you subtracted this positive gain. Please correct the tables to show exactly what is going on. Please also be aware of the positive gain nature of a horn antenna.

As mentioned, the device appears compliant, but the tables need to reflect what is going on. Please explain.

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**From:** Les Payne [mailto:[les@dnbenginc.com](mailto:les@dnbenginc.com)]  
**Sent:** Friday, March 19, 2004 10:54 AM  
**To:** dward ATCB  
**Subject:** RE: Revised Coiler TG-806 files

Sorry for the confusion our antenna gain factor are a negative number we will correct correct in the future documentation to indicate that we are added a negative as opposed to subtracting a positive. In the end the numbers come out the same.

$50+(-10) = 40$   
 $50-10=40$

Sorry for the confusion, Les

-----Original Message-----

**From:** dward ATCB [mailto:[dward@american tcb.com](mailto:dward@american tcb.com)]  
**Sent:** Thursday, March 18, 2004 8:33 AM  
**To:** les@dnbenginc.com; 'Leon Paul Kass'  
**Subject:** RE: Revised Coiler TG-806 files

Hi Les

Please note that because the + gain of the antenna increases the effective power, the antenna is always added to the signal generator reading, not subtracted. The power being measured is the ERP (effective radiated Power). This is the power that includes the antenna gain. By subtracting the gain you are incorrectly reducing the power estimated power and this is not correct. Please use the formula provided in TIA 603 for ERP

measurements. Please note that this formula is  $P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss}$  (dB) + *antenna gain* (dB).

Please note that the sign of the sign of the antenna gain itself will determine if the power is more or less than measured at the generator output. If for example the antenna gain is -1dB, then the formula would plus a minus number. This will account for the loss in power. But in ALL cases, the substitution gain is always ADDED.

This means that in some of your radiated data the actual calculated ERP is up to 16dB greater than reported.

Please follow the antenna substitution formula and test methods described in TIA 603 section 2.2.12.2.

Thanks  
Dennis

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**From:** Les Payne [mailto:[les@dnbenginc.com](mailto:les@dnbenginc.com)]  
**Sent:** Thursday, March 18, 2004 7:40 AM  
**To:** dward ATCB; 'Leon Paul Kass'  
**Subject:** RE: Revised Coiler TG-806 files

Greetings Dennis,

Just to confirm that the substitution method was performed here is the step by step procedure that we use at DNB.

- 1, Set up EUT on a 3 meter OATS.
- 2, Rotate table 360 degrees to determine maxima
- 3, Raise and lower antenna 1-4 meters to obtain maxima
- 4, Once maximum emission has been identified and recorded the unit is replaced with either a dipole (30-1000MHz) or a double ridge guide (above 1GHz) antenna
- 5, A signal generator is used to input a signal into the substituted antenna until the maximum level in step 3 is achieved.
- 6, Once achieved the signal level going into the antenna is measured at the antenna with a power meter. (This allows us to remove any error due to cable loss.
- 7, Since a drg antenna has a numeric **gain** when transmitting the gain factor is **subtracted** from the maximum reading.
- 8, This is the reading that has been reported.
- 9, If the antenna had a loss then it would have been added to the reading.

Hope this helps.

Les

-----Original Message-----

**From:** dward ATCB [mailto:[dward@american tcb.com](mailto:dward@american tcb.com)]  
**Sent:** Wednesday, March 17, 2004 4:19 PM

**To:** 'Leon Paul Kass'  
**Subject:** RE: Revised Coiler TG-806 files

Hi Leon

One final note. Since the numbers for radiated spurious emissions are 20dB below the limit, I am not going to make an issue of the test method. However, please note that I cannot determine from the explanation given in the report if the antenna substitution method was actually used even though it references TIA603. From the formula given and from the data shown, it appears to me that only a radiated field strength type measurement was made. Another item is that the antenna gain was subtracted to the reading when I believe it should be added. Antenna substitution is measuring the power at 3 meters from the EUT then replacing the EUT with a signal generator and a substitution antenna. The signal generator is then set to a power level delivered to the substitution antenna that coincides with that measured from the EUT. This level from the signal generator is then measured and the substitution antenna gain is added to this number. This then is the ERP of the radiated spurious emissions. Perhaps I am reading it wrong, but this does not appear to be what was done in the report.

At any rate, the device appears to be compliant, so once the question about the gain limiting of the amplifier and the inclusion of this into the theory of operation (or at least a short operational description rather than the one line definition of the device) is done, I can issue the grant.

Thanks  
Dennis

At any rate, the device appears to be compliant, so once the question about the gain limiting of the amplifier and the inclusion of this into the theory of operation (or at least a short operational description rather than the one line definition of the device) is done, I can issue the grant.

Thanks  
Dennis