

Hi Jay
Thanks for the email clarification.

Item 1 of the comments sent to you on 2-16 has an error in my comment. It says "...the EMC report appear to show that a horn antenna was used and not a dipole as stated in the procedure..." This should say that the setup photos "show a horn antenna was used and not a log periodic as stated in the procedure". This relates to the setup diagram notes on page 10 of the report not being consistent with the test setup photos on page 14. Your explanation of actual ERP/EIRP measurement procedures provided in the email clears up this issue. In future reports, consistency between setup photos and setup diagrams should be considered.

Sorry for the confusion about Item 1 in the comments.

As to item 2 – the ATCB staff is fully aware of the relationship between ERP and EIRP. However, this assumes that an actual reference dipole was used. As there are a number of antenna sets in the industry that, while dipoles, the manufacturer has included certain correctional circuitries in them to correct for the inherent impedance problems with their dipoles. It was not know by the reviewer if the Aprel manufactured dipoles had any inherent limitations or other factors that might make their gains more or less than true reference dipoles. This is why it is always best to include the actual antenna factors of the substitution antennae used during ERP/EIRP measurements. Your explanation in the email response concerning the Aprel dipole antennae clears up this issue – thanks. A suggestion would be that for future reference a clear indication of actual factors be provided so ambiguity is lessened.

I will accept the email as answering the comments and continue processing the application..

Dennis Ward
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From: Jay Sarkar [mailto:j.sarkar@aprel.com]
Sent: Thursday, February 17, 2005 11:40 AM
To: dward@americantcb.com
Cc: Jay Sarkar; Arthur Brennan
Subject: RE: SHFWDP318_ATCB002154

Hi Dennis,

It was a pleasure talking to you. Here is the responses to your comments as discussed over the telephone.

Answers to the questions related to report with Project No.: WDIB-WDP318 GSM Cell Phone (EMC)-5089

- 1) Horn antenna shown on the setup photo for ERP measurement on page 14 of the report was used only as a receiving antenna and not a substitution antenna. As substitution antennas for ERP measurement APREL used *reference half-wave resonant dipoles* with 0 dBd gain. These dipoles were made with $\lambda/4$ coaxial stub balun according to IEEE/ANSI C63.5 Standard, Annex C, and then calibrated for gain and return loss to assure they would perform adequately when used as reference antenna. On the setup photo only receiving horn-antenna and the DUI are presented showing the first step in the ERP measurement. After this step is finished the DUI is replaced (substituted) by reference dipole antenna for a given frequency (not shown on the photo). The power measured with the powermeter is the power delivered directly to the feed-point of the substitution dipole, so there is no need to correct it for cable loss or antenna gain (because it is exactly 0 dBd). In the given frequency range (835 MHz and 1900 MHz) ERP measurement is always performed only with reference dipoles being used as substitution antenna.
- 2) The EIRP levels presented in the tables on page 19 of the report were derived directly from ERP that was measured by using a relation well known from antenna and propagation theory:

$$\text{EIRP}_{(\text{dBm})} = \text{ERP}_{(\text{dBm})} + 2.17 \text{ dB}$$

There was no need to apply any additional correction to measured ERP levels as they were obtained by using reference half-wave dipoles as explained in the above answer and under Effective Radiated Power Measurement Procedure on page 9 of the report.

- 3) The ERP values given in the tables on pages 80, 81, 84 and 85 of the report were all obtained by substitution method as described in the test procedure on page 77 of the report. Up to third harmonic the ERP was measured by using reference dipoles with 0 dBd gain and following test procedure that is identical to the one described on page 9 of the report. No additional corrections were required. The 4th harmonic and above had to be measured by using a calibrated horn antenna with known gain as a substitution source of radiation. The power levels measured at the feed point of the substitution horn antenna had to be corrected by adding the gain of the previously calibrated horn antenna to obtain the actual ERP levels for given frequencies. This was done at the site during the actual testing and the actual ERP levels were recorded and entered into the tables.
- 4) In the tables on pages 82, 83, 86 and 87 measured ERP levels were presented instead of EIRP as required in FCC Part 24. This was done by mistake and has to be corrected by adding 2.17 dB to all ERP levels presented in the tables. However, the margins to the limit are so high that this will not affect the final result of the measurement and the DUI will still pass the spurious radiation test.

Thanking in advance for your help and cooperation.

Thanks,

Jay Sarkar

Sincerely,
--//---

Jay Sarkar
Technical Director, Standards and Certification
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From: Arthur Brennan
Sent: Thursday, February 17, 2005 1:12 PM
To: Jay Sarkar
Subject: FW: SHFWDP318_ATCB002154

Sincerely,
--//---
Art Brennan
APREL Laboratories,
51 Spectrum Way,
Ottawa, Ontario,
Canada, K2R 1E6
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Fax: (613) 820-4161

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

From: dward ATCB [mailto:dward@americantcb.com]
Sent: February 16, 2005 9:56 PM
To: Arthur Brennan
Subject: RE: SHFWDP318_ATCB002154

Hi Art

Thanks for providing the EMC and SAR reports.
Please see attached comments on these reports.
Nothing serious, maybe just wording and incomplete data. These should be able to be addressed quickly.
I should be able to complete the filing and issue the grant as soon as I get acceptable responses.

Thanks

Dennis Ward

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From: dward ATCB [mailto:dward@americantcb.com]

Sent: Tuesday, February 15, 2005 1:37 PM

To: 'Arthur Brennan'

Subject: RE: SHFWDP318_ATCB002154

Hi Art

Please try again – our IT guy reset everything. So it should be ok now.

Dennis Ward

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From: Arthur Brennan [mailto:artb@aprel.com]

Sent: Tuesday, February 15, 2005 1:04 PM

To: dward@americantcb.com; Jay Sarkar

Subject: RE: SHFWDP318_ATCB002154

Hello Dennis;

I've been trying to upload EMC and SAR reports this afternoon, and I timed out on first attempt and now can not log in.

About comments and especially Frequency Tolerance

"Please note that the frequency tolerance listed on the 731 is confusing. Is the tolerance 2 ppm or is it actually 2.2×10^{-5} ppm. This later would appear to be .000022ppm. Please clarify."

Our reply, we inadvertently supplied our reference standard, = 0.000022 ppm. I've amended the form 731 and will upload it with the reports.

Sincerely,

--//---

Art Brennan

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

From: dward ATCB [mailto:dward@americantcb.com]

Sent: February 15, 2005 1:31 PM

To: Jay Sarkar

Cc: Arthur Brennan

Subject: SHFWDP318_ATCB002154

Hi Jay

Please see comments attached for the above application.

Dennis Ward

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