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ATCB
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Subject
Comments&Answers

Date
February 16, 2010.

Our reference
17_ATCB008706_comments-and-answers

Your reference
ATCB008706

Page
1 of 1

Dear Mr. Fabina,

Related to your comments based on our request for certification for the following product,

FCC ID : QM9-SPEVOFIT
Brand : Ansr Audio
Model : Evo

we would like to provide you with the following information:

Question 1:
Please provide a description of the test procedure used, instrument readings and sample calculations, to show how the ERP was determined for this transmitter in Section 3.1.1 of the submitted test report. According to the test report, the test set up used was in ANSI C63.4 but the FCC-specified test procedure for this licensed band transmitter is in TIA 603C. Simple radiated emission measurements from ANSI 63.4 are not acceptable for measuring the ERP of a licensed transmitter. Page 94 of TIA 603C shows the ERP being calculated with the loss between the signal generator and analyzer being added to the reading on the signal generator. This loss should include the cable loss and the receive antenna correction from a dipole antenna gain (Page 78 of TIA 603A-2001 has a better description for determining these losses). I see no such calculation or description on how the tabular data for ERP for this transmitter was obtained.

Answer 1:
On the test site (full anechoic room), the equipment is placed at a height of 1.5 meters on a non-conductive support, and in the position closest to normal use as declared by the provider (Antenna vertically).
The test antenna is oriented for vertical polarization and is suitable for the frequency of the transmitter (Biconilog antenna 25-2000 MHz).
The output of the test antenna is connected to the spectrum analyser.
The transmitter is switched on without modulation and the spectrum analyser is tuned to the frequency of the transmitter under test.
The test antenna is at the same height as the transmitter.
The transmitter is rotated through 360° in the horizontal plane, until the maximum signal level is detected by the spectrum analyser.
The maximum signal level detected by the spectrum analyser is noted.
The transmitter is replaced by a reference dipole antenna.
The reference dipole antenna is orientated for vertical polarization and the length of the reference dipole antenna is adjusted to correspond to the frequency of the transmitter.

The reference dipole antenna is connected to a calibrated signal generator.
The input signal to the reference dipole antenna is adjusted to the level that produces a level detected by the spectrum analyser, that is equal to the level noted while the transmitter radiated power was measured.
The generator level (input level to coax cable to the reference dipole antenna) is recorded as power level, corrected with a substraction of 1 dB for cable and balun losses.
The measurement is repeated with the test antenna and the reference dipole antenna orientated for horizontal polarization and also for the transmitter orientation in horizontal position.
The measure of the effective radiated power is the larger of the two levels recorded at the input to the reference dipole antenna.

Note 1:
this procedure is performed once a year for the whole frequency range. During the actual measurements, corrections are made by computer software to avoid human errors. Daily check of the correction factors is performed by verification with a comb generator.

Note 2:
Also the conducted power values can be found in the test report. These are measured while the antenna was replaced by a temporary antenna connector.

Question 2:
Please also provide a description of the test procedure, instrument readings and calculations used for spurious radiated emissions testing in Section 3.4 of the submitted test report. Although ANSI C53.4 test set ups may be used, TIA 603 C test procedures must be used for measuring these emissions from this licensed band transmitter per the FCC.

Answer 2:
This is the same procedure as given above, except that above 1 GHz, a guide horn is used instead of a reference dipole antenna and that the corrections are for EIRP instead of ERP. The value in dBc is obtained by substracting the transmit power in dBm and the level of spurious emissions in dBm.

Question 3:
Please provide the peak frequency deviation (D) determined from the test report. See Carson's rule in Section 2.202 of the FCC Rules.

Answer3:
The maximum peak deviation can be found in clause 3.2.3 of the test report and D=48.9 kHz.

Question 4:
Please provide the maximum modulation frequency (M) determined from the test report. See Carson's rule in Section 2.202 of the FCC Rules. Modulation vs. input plots should be submitted and be capable of at least showing the input up to 16 dB above that which is necessary to produce 50% modulation. Ideally 100% modulation (flattening of the curve should also be shown) in plots (not just tabular data).
See next page

Answer 4:
The modulation characteristics and modulation limiting can be found in clause 3.2.1 of the test report. The microphone input circuit is replaced by an audio generator for this test. Measurements are made over the whole frequency range at 0 dB level (500 mV), +10 dB level (1583 mV) and +20 dB level (5000 mV). It can be seen that there is hardly any difference between the +10 dB level and +20 dB level, except a strange behavior for a modulation frequency of 200 Hz. However, increasing the input level more than 5000 mV would certainly damage the audio input of the transmitter. The value of 5000 mV is well above the battery level and will never occur in practice.

For the maximum modulation frequency, the frequency deviation level at a modulation frequency of 30 kHz is the same as the frequency deviation of the pilot tone. So an input signal of 30 kHz does not affect the deviation. Therefore, the maximum modulation frequency M can be considered as being 30 kHz.

Question 5:
Please provide a calculation showing the necessary bandwidth for this transmitter using Carson's rule. Use the values of M and D (above) from the submitted test report in this calculation.

Answer 5:
D = 48.9 kHz
M = 30 kHz

Then the necessary bandwidth is 2 x (48.9 + 30) = 157.8 kHz

Question 6:
Please provide information regarding both DC voltages AND currents applied into the elements of the final radio frequency amplifying device for normal operation over the power range (Section 2.1033(c)(8) of the FCC Rules).

Answer 6:
The applicant is asked to provide this information, this info will be submitted as soon as it is made available.

Question 7:
Emission mask testing was provided for 2.5 kHz modulated mode. However this device appears to be a high fidelity (TV band wireless microphone) device where the maximum deviation may occur at, or close to, 15 kHz. Please either provide an emission mask using 15 kHz modulating frequency or provide justification for not providing an emission mask with this modulating frequency.

Answer 7:
As modulating frequency, 2.5 kHz was taken in accordance with 2.1049(c)(1) as this device is not a broadcast transmitter in accordance with 2.1049(e). It is a transmitter with a microphone for speech (reporter use), not for high fidelity music. An extra justification is also that the frequency deviation of the transmitter at 2.5 kHz is much higher than at 15 kHz.

Question 8:
Please address the RF safety of this device. Specifically, please provide documentation on why SAR tests are not required on this portable device that is used within 2.5 cm of the human head during normal operation.
See next page

Answer 8:
See uploaded document: “16_RF-Exposure_QM9-SPEVOFIT”.

Question 9:
The address shown in the FCC Grantee code database for Grantee Code QM9 (See attachment entitled “__FCC Grantee Search Result.pdf”) does not agree with the address on the FCC application form (3800 Highway 271 N, Powderly, TX 75473). Please either amend the FCC application form or have the FCC Grantee Code database corrected to show the current address for Ansr Audio. The FCC grant of equipment authorization is automatically filled out with information from their Grantee Code database. Therefore, I cannot issue a grant with the address shown on the FCC application form. Since it appears that the company address has changed, the FCC must be notified. For help changing the address on the FCC Grantee Code database, you may contact Ms. Marianne Bosley by email at Marianne@atcb.com.

Answer 9:
The applicant is informed and they will take care of the change. Meanwhile the application form is modified and now shows the data equal to that by the FCC database.

Question 10:
Please provide an amended FCC application form with the following information:

(a) The maximum output power for this transmitter in Section III, item 6(b) (either provide the maximum ERP or the maximum conducted output power and the antenna gain),
(b) The frequency tolerance for this transmitter in Section III, item 6(c), and
(c) The emission designator for this transmitter in Section III, item 6(d) (See Section 2.202 of the FCC Rules).

Answer 10:
See uploaded revised application form 731:
“04_Rev01_Form-731_QM9-SPEVOFIT.pdf”.

Best regards,
TÜV Rheinland EPS B.V.

R. van der Meer
Test Engineer