Mr. Dichoso:

This is to follow up on the discussion with you on June 6 regarding the radiated test data for the SAT 551 car kit amplifier system from Telit. As you know, the radiated emissions testing was done as part of the European testing of the unit according to TBR 41 requirements. You indicated this was acceptable for measuring the levels of the radiated emissions, however, you asked for specific clarification of the equipment setup and for calculations of the radiated spurious levels of harmonics that would allow comparison of the levels with the Part 25 requirements.

The radiated data covers the emissions outside the band of operation (1610 to 1626 MHz) over the range from 30 MHz to 12.75 GHz. During our conversation, the issue of radiated in band emission and the acceptance of the conducted data previously submitted for showing compliance was discussed. It was agreed that based on the conducted data, compliance with radiated in band requirements was shown. It was noted that in band emissions during normal operation would be connected to the supplied antenna and that the antenna gain would be applicable to emissions within the band of operation. Since compliance ratios between the fundamental emission and the modulation sidebands would be the same irrespective of whether the measurements were made on a conducted or radiated basis, actual radiated emissions in the band would not be required in this instance. The conducted ratios shown in the test report confirm compliance with in band emissions attenuation requirements.

I have downloaded those pages out of the TBR41 test report (approximately 15 of the 233 pages) that pertain to the radiated emissions test to show compliance with the emissions requirements of Section 25.202(f) outside the 1.610 to 1.626 GHz band. According to Section 25.202(f)(3), the attenuation requirement for emissions in a 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth is given by the formula 43 + 10log(power of the transmitter in watts). Transmit power for this system is 2 watts. 43 + 10 log(2) is equal to 46 dB. Thus the attenuation required is 46 dB below the power of the amplifier.

The test setup is shown in Section 2 of the report. Configurations 2.1 and 2.2 show the basic set up in an anechoic chamber. Antennas were the EMCO series of biconnical, log periodic, and Model 3115 horn with an attached cable connecting to the spectrum analyzer. From the scan data as shown in Annex 3 charts 63 - 70, the only emissions of concern were the 2^{nd} and 3^{rd} harmonics. Based on your recommendation, I have computed the field strengths of these harmonics using the appropriate antenna factor, cable loss, and measured level of the signal based on the spectrum scan levels shown in the charts. The field strength was then used to compute the EIRP of the signal and serves as a basis for comparison with the fundamental EIRP power level.

The data was scanned with a measurement separation distance of 0.5 meter to insure any low level emissions were captured. This allowed using a resolution bandwidth of 1 MHz while maintaining a sufficient signal to noise ratio. Since the levels were measured in a 1 MHz bandwidth, and the compliance requirement specifies an attenuation requirement

for a 4 kHz bandwidth, the measured levels must be adjusted based on the ratios of the resolutions bandwidths according to 10log(4kHz/1MHz). This correction is applied to the measured levels and equals -24 dB. For the 2nd harmonic, using the corrected reading as would be measured at 0.5 meter, the antenna factor and cable loss, the field strength is calculated according to -41 + 107 + 31 = 97 dBuV/m or 0.071 V/m at 0.5 meter. Using the formula E = Square root (30 x P)/R the calculated EIRP is 0.000042 watts equivalent to -44dBW or -14 dBm. For the 3rd harmonic, using the same procedure as for the 2nd harmonic, we calculate an EIRP level of 0.000017 watts equivalent -48 dBW or -18 dBm.

As indicated in your correspondence dated May 23, 2002, the comparison for compliance is based on a radiated comparison with the antenna connected. With the antenna connected, the effective isotropic radiated power of the RF amplifier is +7.5 dBW or +37.5 dBm. From the above, 46 dB below +37.5 dBm is equivalent to: -46 + 37.5 = -8.5 dBm. Thus the power in any 4 kHz bandwidth cannot exceed -8.5 dBm.

The tabulated levels follow:

Frequency, MHz	Scan Level, @ 0.5 meter, 1MHz BW	Corrected reading for 4 kHz BW	Ant. Factor + cable loss, dB	EIRP, dBm	Limit, dBm	Delta, dB
3236	-17 dBm	-41 dBm	31 dB	-14	-8.5	5.5
4859	-25 dBm	-49 dBm	35 dB	-18	-8.5	12.5

The above shows the RF amplifier meets the emissions levels as specified in Part 25 of the FCC rules on radiated basis by a margin of compliance of approximately 6 dB. Compliance on a conducted basis was shown in the previously submitted test report.

A SAT 550 mobile satellite phone was used to provide the input signal to the RF amplifier. In previous correspondence it was indicated that use of the SAT 550 was acceptable for testing but the FCC would need to place a note on the grant limiting use of the RF amplifier to the SAT 550 satellite phone. Telit accepts that the grant will have a note restricting the RF amplifier car kit to use with the SAT 550 phone only. As a point of clarification, the SAT 550 phone has been previously certified under FCC ID: OQKSAT550.

Regards,
Phil Inglis, Cetecom bvba