

Test Lab Inquiry on 10/01/2012 :

We are testing a series of repeaters which operate in multiple bands and support a variety of technologies, including (CDMA/WCDMA, GSM & LTE)

Can you please confirm if it is acceptable to use a CW signal in place of a modulated signal, when performing radiated spurious emissions, conducted spurious and intermodulation tests.

The alternative would be to load the units with the range of applicable signals e.g. QPSK, GMSK, 64QAM for each of the technologies above. However this would significantly extend the test time, and we believe that the CW signal would provide worst case results for these tests.

Testing would still be performed on each band, with the CW signal/s set to the maximum input for the EUT.

I have attached an example data sheet for the products in question.

FCC response on 10/11/2012

For reference, FCC guidance has included the following (from 2009 Licensed Devices General Technical Requirements powerpoint/notes):

Intermodulation

INTERMOD TEST

– Transmitters and amplifiers designed to handle multiple channels must be tested with multiple carriers for each emission type to show intermodulation products.

For multi channel devices show a single channel comparison of input and output signal and also perform the three tone intermodulation test.

This is a conducted measurement. In most cases the equipment is modulated during the test. In some cases, such as FM, the signal is unmodulated.

For units where a power reduction is required at the band edges, the test only needs to be done at the first channels at each edge of the band with maximum power.

Intermodulation (continued)

– Intermodulation products are spurious emissions which must meet the emissions mask in each Radio Service rule part

– Test Procedure - Should be tested at highest rated output level

• Three Signal Test – requires only one test

– two near to each other at one edge of passband

– other signal alone at other edge of passband

• Two Signal Test - requires the test be done twice

– Once with two signals at upper edge of passband

– Once with two signals at lower edge of passband

Three signals of equal magnitude at their highest rated output level should be tested for each type of modulation.

The two channels near each other should be separated by at least one operating channel width.

The two tone test is also accepted but must be performed twice, one time at each end of the operating band.

As we understand it, general industry procedures include:

i) Measured using a 1 MHz Measurement Bandwidth, for UTRA signals with the first interfering signal at 3.5 MHz offset from the center of the first UTRA channel in the passband and the second carrier adjusted in frequency such that the intermodulation product falls at the frequency of the first UTRA channel in the passband.

ii) Measured using a 1 MHz Measurement Bandwidth, for CDMA signals with the first interfering signal at 1.25 MHz offset from the center of the first CDMA channel in the passband and the second carrier

adjusted in frequency such that the intermodulation product falls at the frequency of the first CDMA channel in the passband.

iii) Measured using a 1 MHz Measurement Bandwidth, for E-UTRA signals with the first interfering signal at 1.0 MHz offset from the edge of the first and last E-UTRA channel in the passband and the second carrier adjusted in frequency such that the intermodulation product falls at the frequency of the first and last E-UTRA channel in the passband.

iv) Measured using a 3 kHz Measurement Bandwidth, for GSM signals with two continuous wave (CW) input signals spaced 600 kHz apart and centered in the pass band of the booster.

Attachment Details:

[3GPP](#)