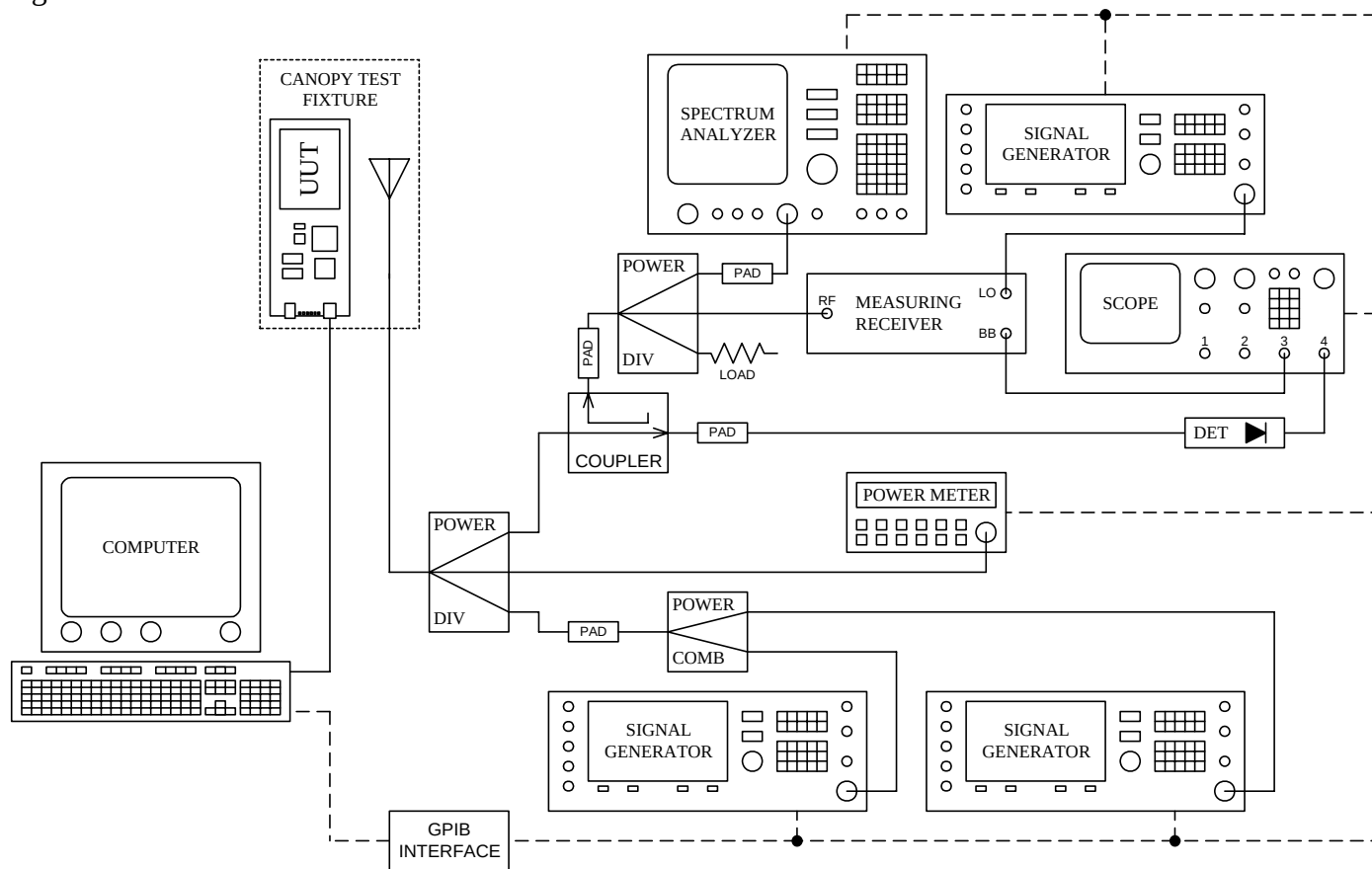


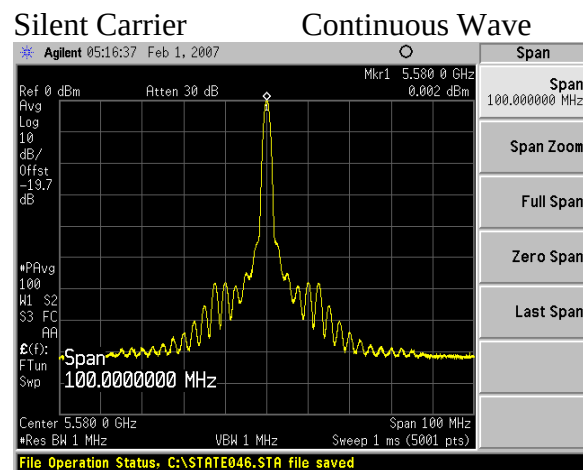
Technical Brief CANOPY Model 5400 SAL Conducted Test

Compliance testing with FCC rules part 15.407 and RSS-210 Issue 5 Amendment of Industry Canada was performed in conducted fashion. The integral patch antenna was replaced with a 3.5mm connector, since production CANOPY units have no RF connector. This test setup was used to make power spectral density, and occupied bandwidth measurements. A reference antenna which has 7 dBi gain was used to correlate radiated and conducted measurements in the setup. Measurements were made on CANOPY 5400SAL unit serial #0A003E51550E. The testing was done using a Agilent spectrum analyzer, model E4440A PSA (serial # MY46185583), and a laptop to control the UUT and data taken from the spectrum analyzer. The test setup diagram is as follows:

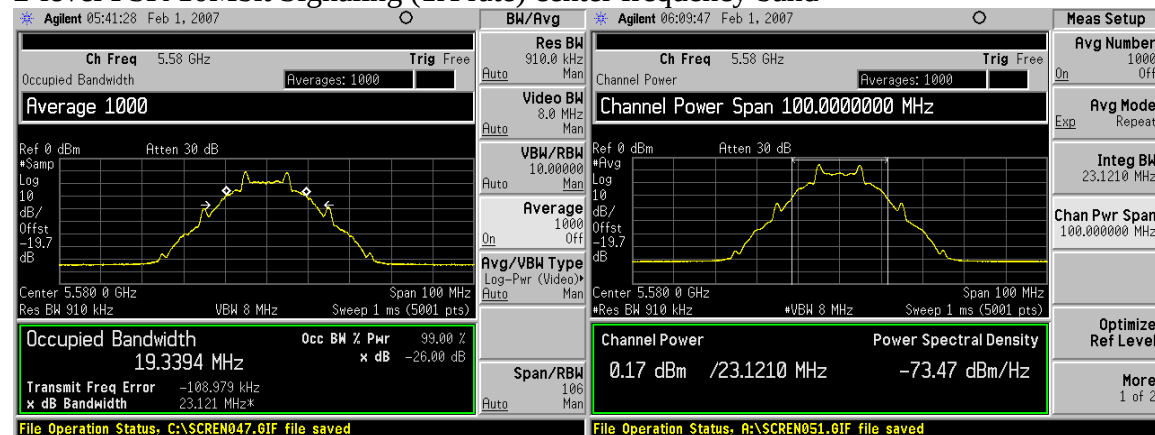


Spectrum Analyzer Reference Level Calibration

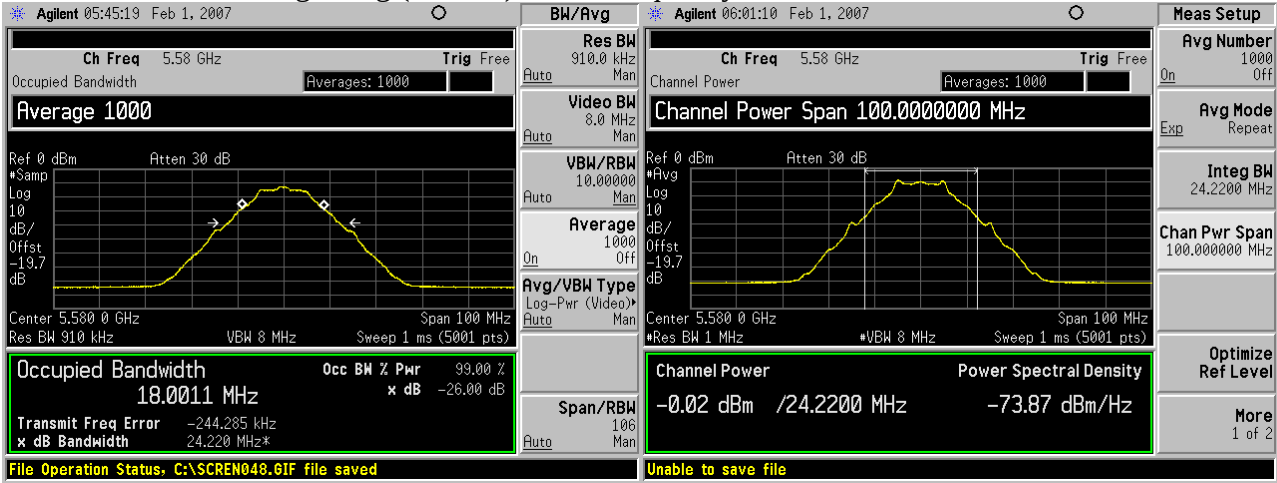
The silent carrier power at all test frequencies was normalized (via the RF attenuator pads in the test station) to 0dBm in the analyzer plots. The dBm units in the plots can be translated to dBc. TX bit error test pattern was initiated at maximum transmit duty cycle and data throughput for the radio under test. This will result in 97.7% duty cycle or an average power versus maximum power ratio of -0.101dB.



2-level FSK 10Mbit Signaling (1X rate) center frequency band



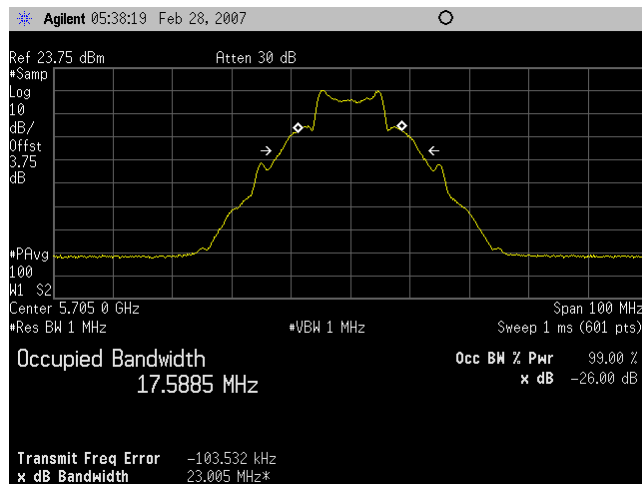
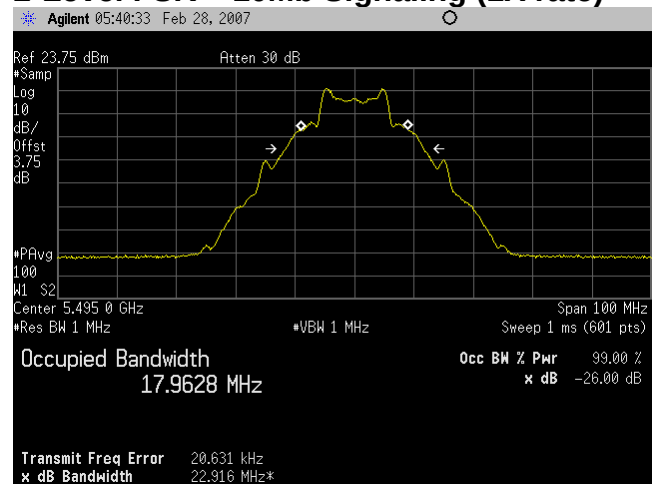
4-level FSK 20Mbit Signaling (2X rate) center frequency band



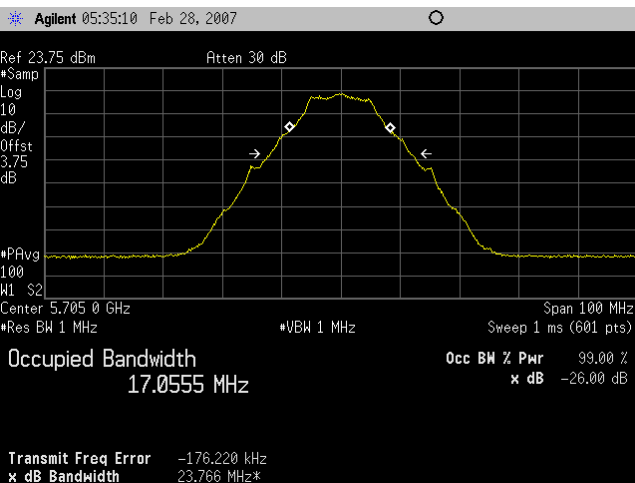
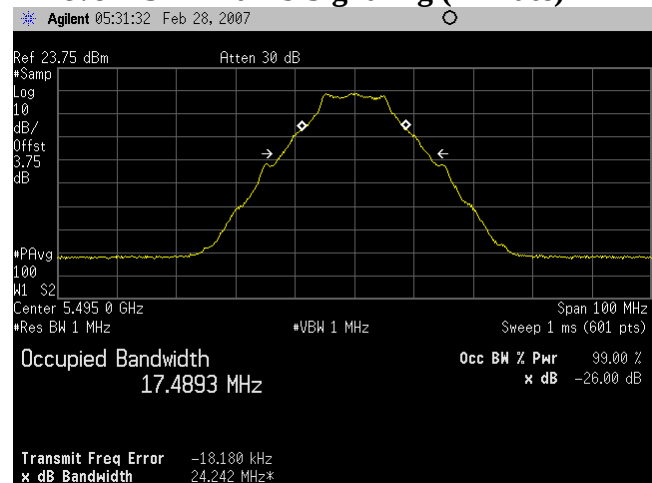
15.407 and RSS-210 Issue 5 Band Edge Measurements

The following plot shows that the CANOPY 5400 radio produces an acceptable out-of-band spectral output when operated at the channel limits of 5495MHz at the lowest product channel frequency, and 5705MHz at the highest product channel frequency.

2-Level FSK – 10Mb Signaling (1X rate)



4-Level FSK – 20Mb Signaling (2X rate)

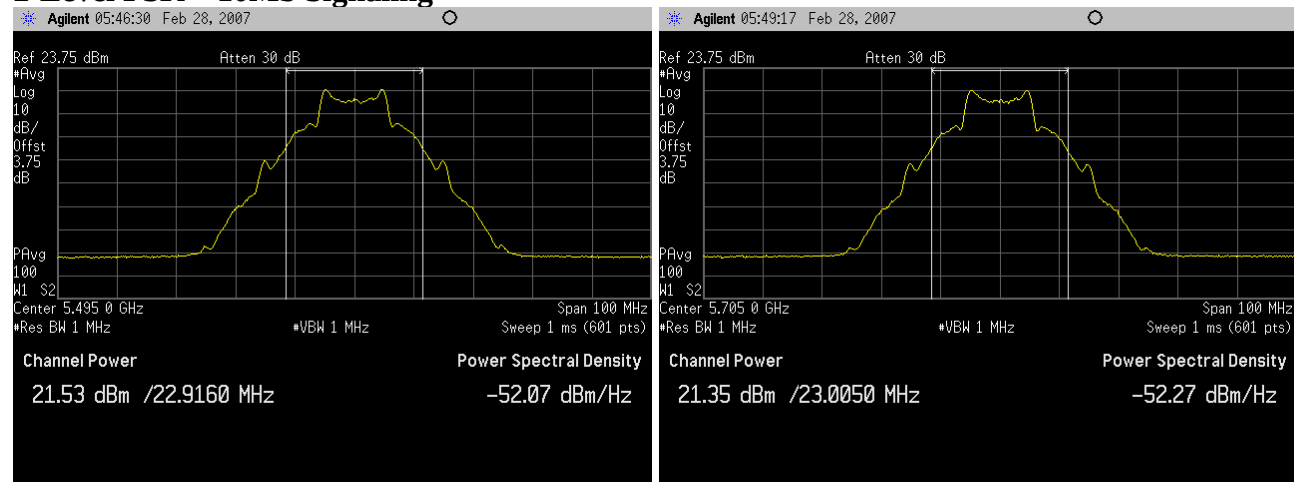


The test results indicated that the band-edge spectral emissions were more than 60dBc below the in-band power for both 2FSK and 4FSK modulation modes compared against the silent carrier calibration. The carrier frequencies tested were 5495MHz and 5705MHz. The 26dB bandwidth was used to calculate power spectral density limits for each frequency. $PSD = 10 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. Note 1dB limit reduction due to gain of integral patch antenna measured to be 7dBi.

15.407 and RSS-210 Issue 5 Conducted Peak Power Spectral Density

The plots shown below display the power spectral density results for the radio operation in the frequency band 5495-5705MHz. The channel power (measured with a conducted measurement) at the antenna port was 21.53dBm maximum at 5495MHz. At 5705MHz the carrier power was 21.35dBm/23.0050MHz. The specification limit for this measurement was 23.6dBm/22.916MHz in this unit under test at 5.495GHz. The specification limit for this measurement was 23.62dBm/23.005MHz in this unit under test at 5.705GHz.

2-Level FSK – 10Mb Signaling

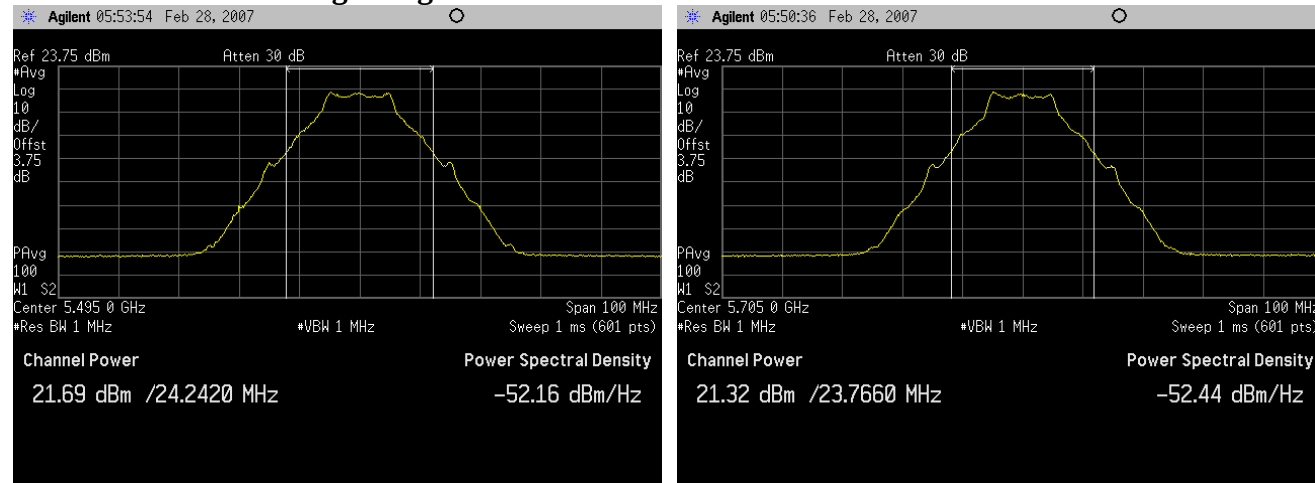


2FSK Modulation Results: The maximum peak power spectral density when measured in a 1MHz resolution bandwidth was (21.35dBm/23.005MHz) at the uppermost operating frequency of 5705MHz. At the lowest operating frequency, 5495MHz the maximum peak power spectral density was measured to be (21.53dBm/22.916MHz).

The test results show we have 2.07dB margin worst case.

The plots shown below display the power spectral density results for the radio operation (with a 2X rate) in the frequency band 5495-5705MHz. The carrier power (measured with a conducted measurement) at the antenna port was 21.69dBm maximum at 5495MHz. At 5705MHz the channel power was 21.32 dBm. The specification limit for this measurement was 23.85dBm/24.766MHz in this unit under test at 5.705GHz. The specification limit for this measurement was 23.76dBm/23.242MHz in this unit under test at 5.495GHz.

4-Level FSK – 20Mb Signaling



4FSK Modulation Results: The maximum peak power spectral density when measured in a 1MHz resolution bandwidth was (21.32dBm/23.766MHz) at the uppermost operating frequency of 5705MHz. At the lowest operating frequency, 5495MHz the maximum peak power spectral density was measured to be (21.69dBm/24.242MHz). The test results show we have 2.16dB margin worst case.

