

EXHIBIT 13**Conducted Emissions Measurements
of Allocation Band Edges****Exhibit Summary:**

Exhibit 9 contains measurement data pertaining to conducted spurious emissions. As indicated on the chart, some spur levels were reported using Motorola's proposed "Brickwall Filter" technique. This technique is outlined in the included letter that was sent to Julius Knapp of the FCC. This measurement method is intended to overcome limitations caused by non-ideal filter roll-off within the measurement equipment (Rohde & Schwarz Spectrum Analyzer). For each spur level reported using this technique, the associated level measured using the FCC method per Part 24.238 is reported in the included table. In addition, at spurs located 1 MHz away from the band edge, the level recorded using the 1 % resolution bandwidth or greater requirement is also listed.

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Measurement Procedure:

The following steps outline the procedure used to measure the conducted emissions from the mobile station.

1. Determine frequency range for measurements: From CFR 2.1057, the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 25 MHz to 20 GHz.
2. Determine the mobile station transmit frequencies: Table 13.1 below outlines the band edge frequencies and the mid-band frequency pertinent to conducted emissions testing.

USPCS Channel	Transmitter Frequency
25	1851.25 MHz
600	1880 MHz
1175	1908.75 MHz

Table 13.1: Transmit frequencies for conducted emissions testing.

The carrier frequencies for each of the 1.25 MHz wide channels of the USPCS transmit band (1850 to 1910 MHz) begins with the first channel 1.25 MHz higher than the lower band edge, at 1851.25 MHz for channel number 25, and ends with the last channel 1.25 MHz lower than the upper band edge, at 1908.75 MHz for channel number 1175.

3. Measure attenuator and cable losses:
 - a) Connect a Band Rejection Filter and nominal 20 dB attenuator together, and place cables at input of the filter and output of the attenuator.
 - b) The rejection response of the filter was measured using a signal generator and the spectrum analyzer. This attenuation was used to offset the analyzer and verify the band edge readings were not affected by the carrier.
4. Power up Mobile Station:
 - a) Tune to desired frequency.
 - b) Set the desired output power.
 - c) Modulated the carrier with the mobile station’s internal pseudo random data sequence.
 - d) Set the appropriate spectrum analyzer offset level to account for external attenuation.
5. Measure the spectrum:
 - a) In the 1st 1 MHz band outside the band edge nearest the channel of interest use a 10 kHz resolution bandwidth.
 - b) In the 2nd and 3rd 1 MHz bands outside the band edge nearest the channel of interest use the “Brickwall filter” technique with a 10 kHz resolution bandwidth and integrate the power in the two 1 MHz bands. This was included in the level offset, “LVLOFF”, of the appropriate graphs and annotated as such. The 3 MHz cut-off was determined from the spectrum analyzer filter plot shown in Figure 13.13 and the roll-off of the carrier. At 3 MHz from the carrier, the attenuation is sufficient enough to guarantee against non-compliance readings.
 - c) From 3 MHz outside the band edge nearest the channel of interest to the min./max. frequency limits, a 1 MHz resolution bandwidth was used.
6. Repeat steps 4 & 5 for the other extreme carrier frequency listed in Table 13.1.

Measurement Limit:

Section 24.238 Emission Limits.

- (a) On any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Measurement Results:

Conducted Emission Measurements were made not only at the extreme upper and lower carrier frequencies of the USPCS band, but also at mid-band. It was decided that measurements at the block edge frequencies, along with the mid-band frequency of 1880 MHz (Channel 600), would be sufficient to demonstrate compliance with emission limits. The equipment must still, however, meet emission requirements at all frequencies over which the equipment is designed to operate and it is the manufacturer’s responsibility to verify this.

Measurement results are listed below in Tables 13.2 through 13.4. These results correlate to the conducted emission graph of EXHIBIT 9C. The band edge emissions are shown in Figures 13.1 through 13.6. In each of the following charts the emission level reported is the level of the spurious emission of largest magnitude found within the specified frequency window.

Carrier 1851.25 MHz (Channel 25)

Frequency	Emission Level	Method Used
10 MHz - 1847 MHz	-48.42 dBm @ 1696 MHz	FCC
1847 MHz - 1848 MHz	-21 dBm @ 1847.95 MHz	Brickwall Filter
1848 MHz - 1849 MHz	-14 dBm @ 1848.38 MHz	Brickwall Filter
1849 MHz - 1850 MHz	-20 dBm @ 1849.8 MHz	FCC
1910 MHz - 19.1 GHz	-28.44 dBm @ 5.551 GHz	FCC

Table 13.2: Conducted Emissions results for a 1851.25 MHz carrier.

Carrier 1880 MHz (Channel 600)

Frequency	Emission Level	Method Used
10 MHz - 1850 MHz	-37.32 dBm @ 1724.6 MHz	FCC
1910 MHz - 19.1 GHz	-38.5 dBm @ 5.631 GHz	FCC

Table 13.3: Conducted Emissions results for a 1880 MHz carrier.

Carrier 1908.75 MHz (Channel 1175)

Frequency	Emission Level	Method Used
10 MHz - 1850 MHz	-26.1 dBm @ 1750.4 MHz	FCC
1910 MHz - 1911 MHz	-19 dBm @ 1910.1 MHz	FCC
1911 MHz - 1912 MHz	-16 dBm @ 1911 MHz	Brickwall Filter
1912 MHz - 1913 MHz	-26 dBm @ 1912 MHz	Brickwall Filter
1913 MHz - 20 GHz	-41 dBm @ 5.721 GHz	FCC

Table 13.4: Conducted Emissions results for a 1908.75 MHz carrier.

Figure 13.1: Carrier 1851.25 MHz, Spectrum 1847 MHz to 1848 MHz

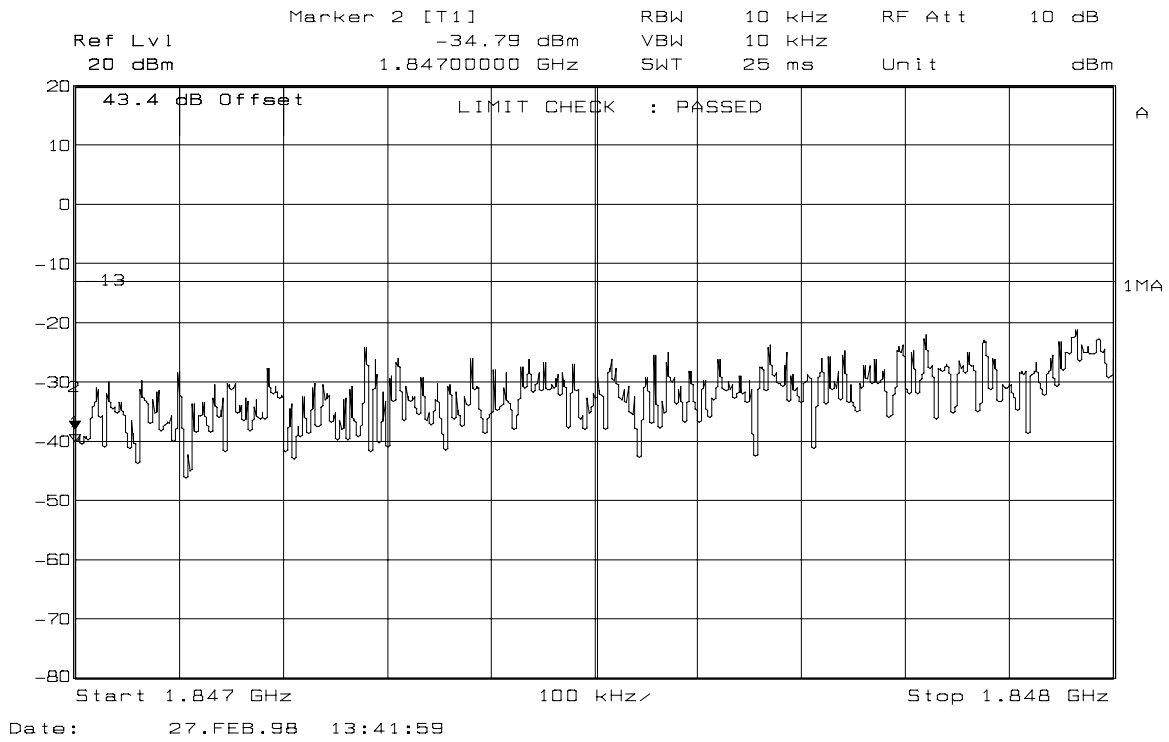


Figure 13.2: Carrier 1851.25 MHz, Spectrum 1848 MHz to 1849 MHz

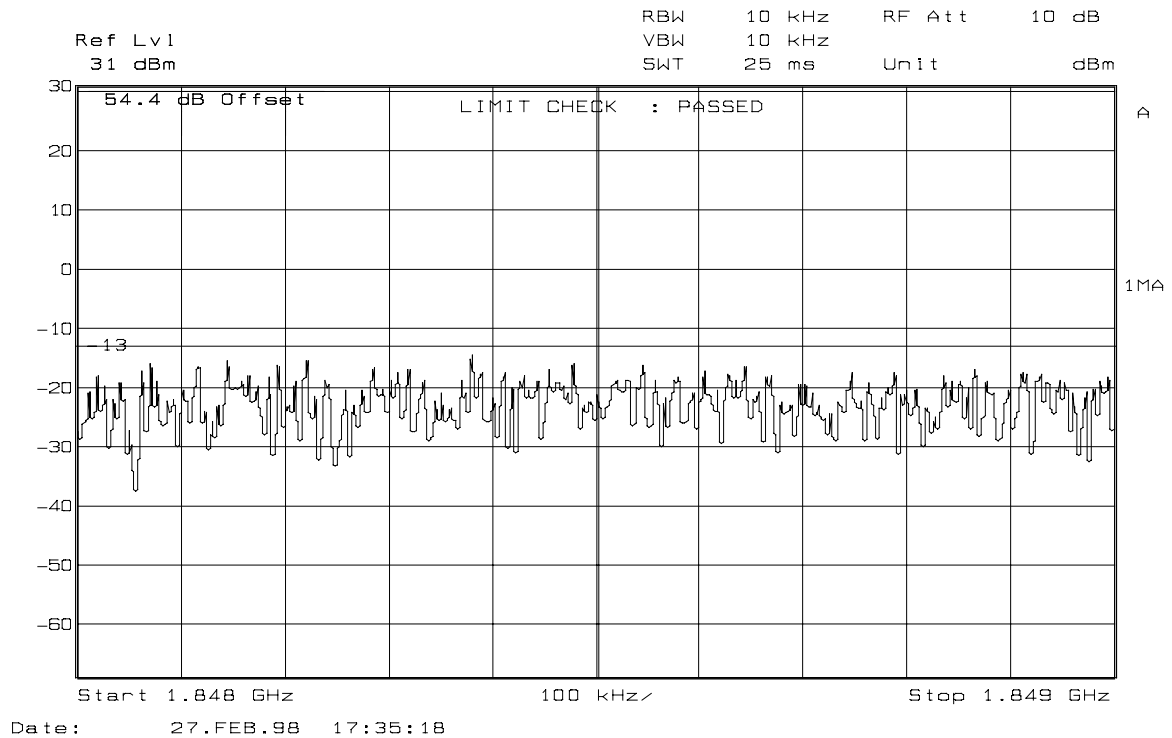


Figure 13.3: Carrier 1851.25 MHz, Spectrum 1849 MHz to 1850 MHz

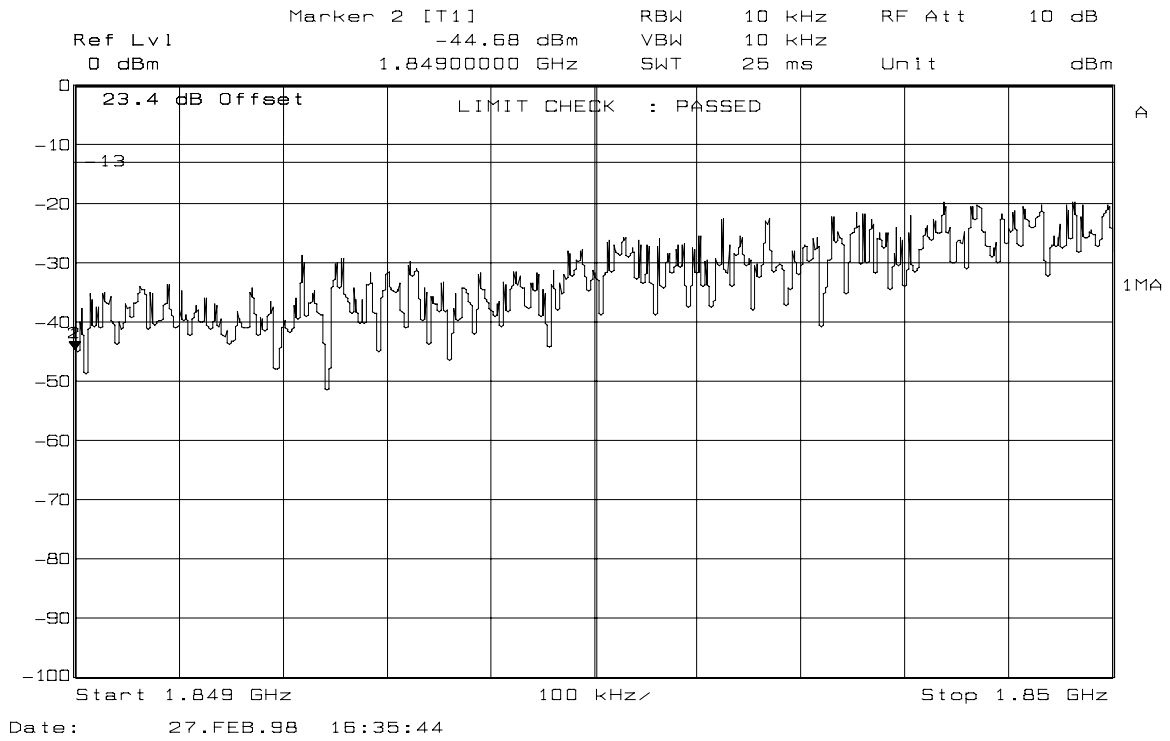


Figure 13.4: Carrier 1908.75 MHz, Spectrum 1910 MHz to 1911 MHz

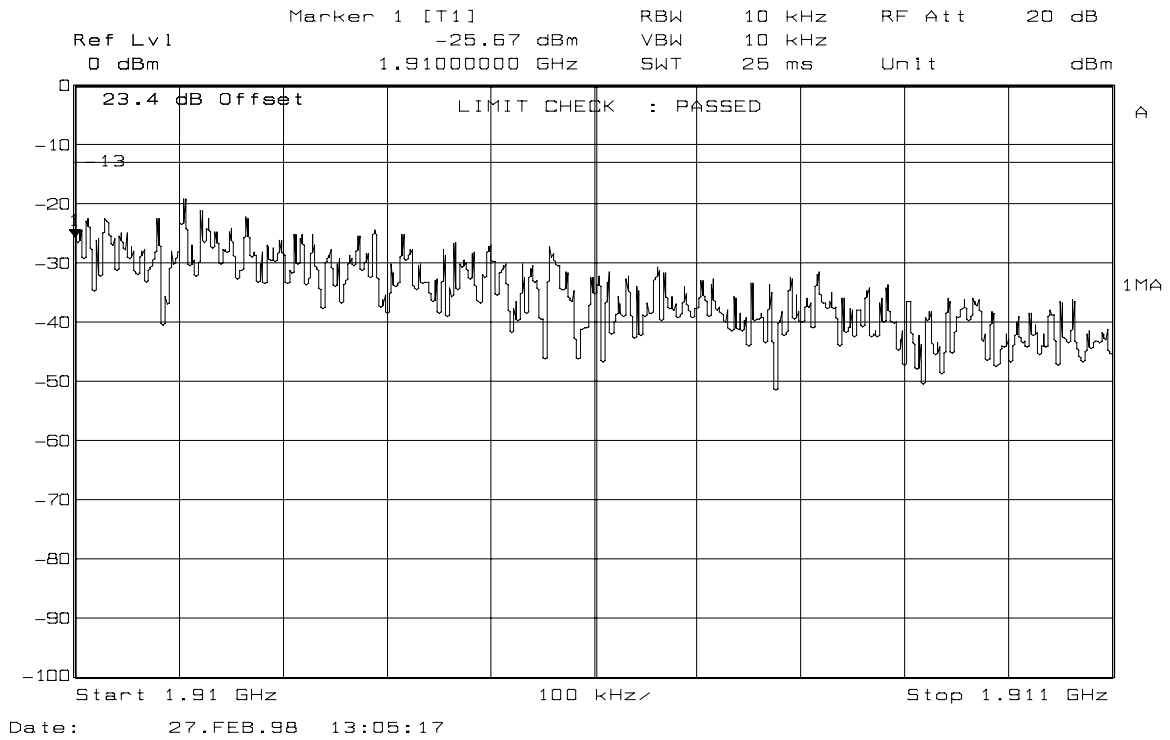


Figure 13.5: Carrier 1908.75 MHz, Spectrum 1911 MHz to 1912 MHz

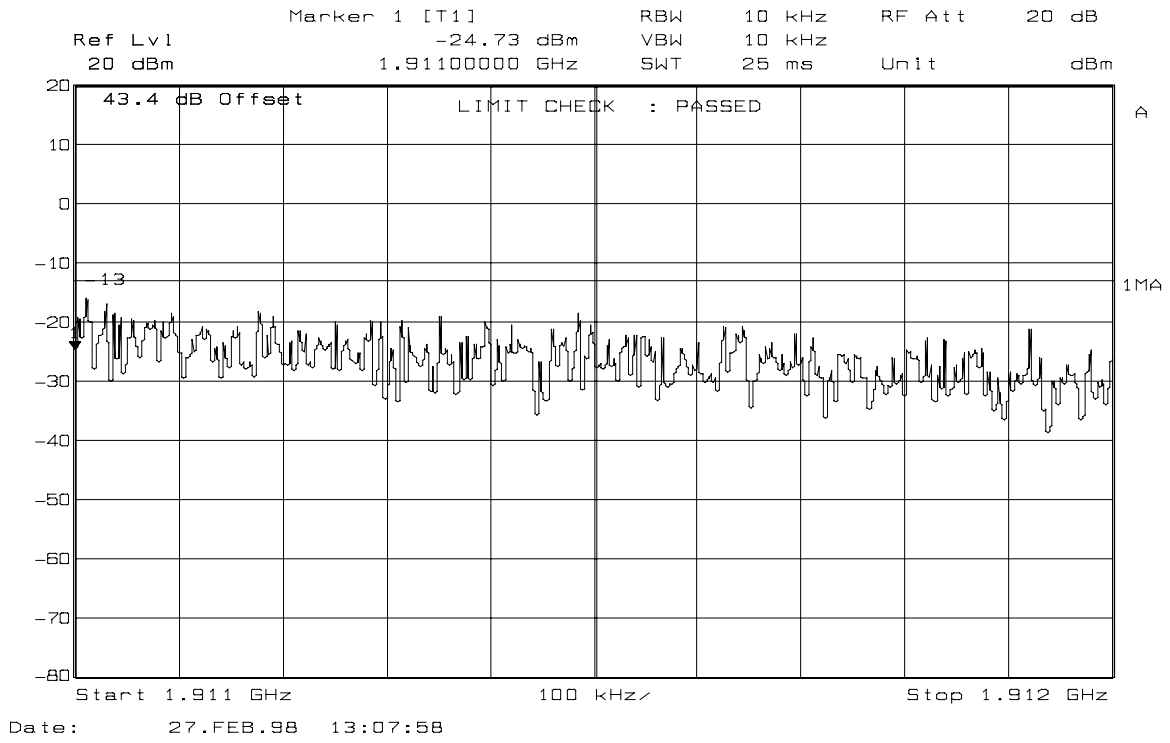


Figure 13.6: Carrier 1908.75 MHz, Spectrum 1912 MHz to 1913 MHz

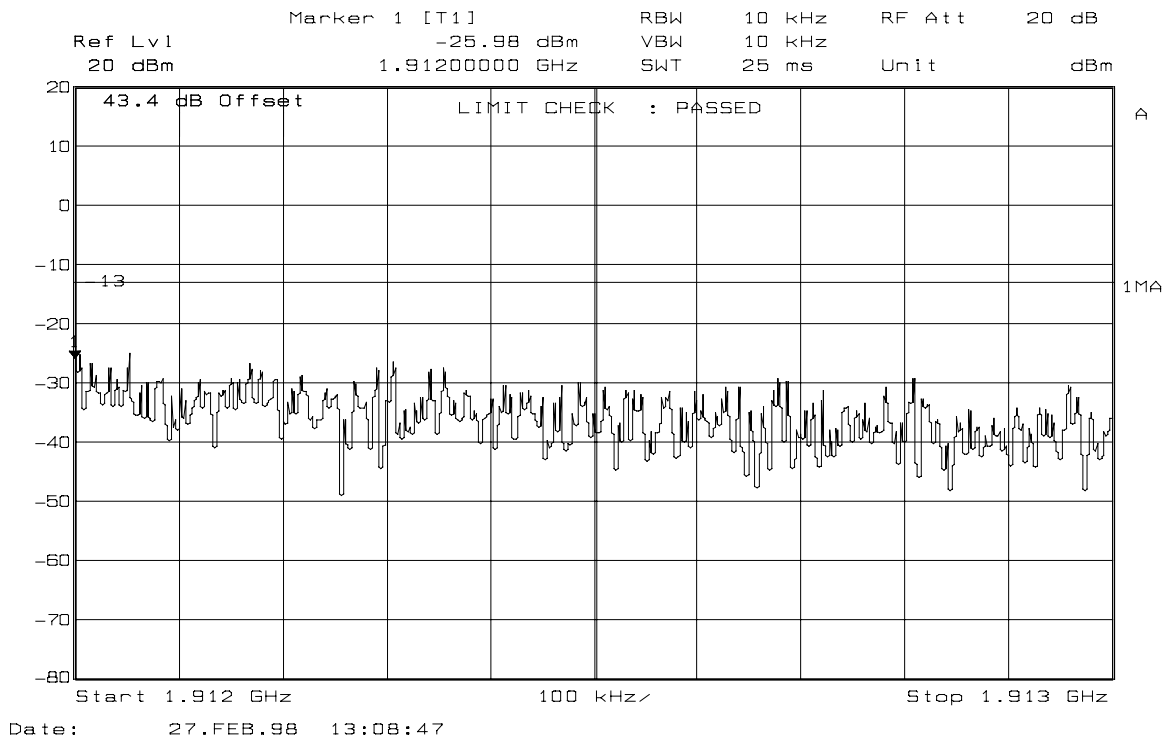


Figure 13.7: Spectrum Analyzer 1 MHz Resolution Bandwidth Filter Response

