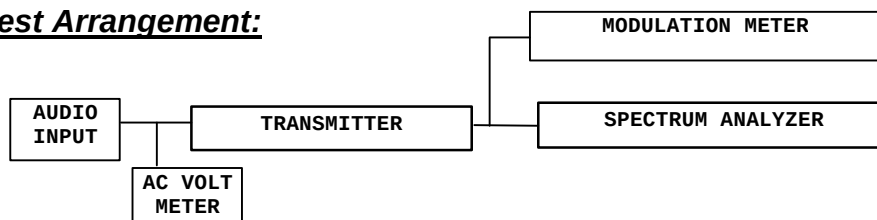


2.1047 Modulation Characteristics

Measurements Required:

A curve or equivalent data, which shows that the equipment will meet the modulation requirements of the rules, under which the equipment is to be licensed, shall be submitted.

Test Arrangement:



The radio frequency output was coupled to a HP Spectrum Analyzer and a modulation meter. The spectrum analyzer was used to observe the radio frequency spectrum with the transmitter operating in its various modes. The modulation meter was used to measure the percent modulation or frequency deviation.

Results:

Figure 1 displays the graph made showing the audio frequency response of the modulator. The frequency generator was set to 1 kHz and injected into the audio input port of the EUT. The input voltage amplitude was adjusted to obtain 50% modulation at 1000 Hz. This level was then taken as the 0-dB reference. The frequency of the generator was then varied and the voltage input level recorded while holding the output modulation level constant.

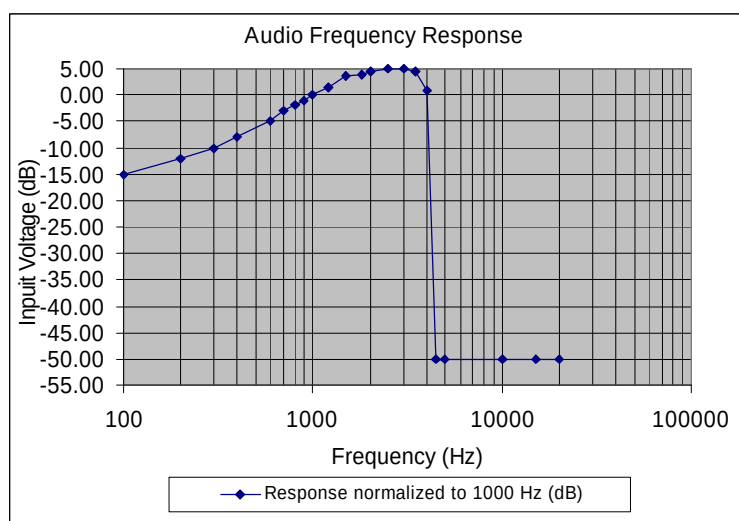


Figure 1 Audio Frequency Response Characteristics.

Figure 2 shows the deviation response for FRS operation each of four frequencies while the input voltage was varied. Figure 3 shows the deviation response for GMRS channels. The frequency is held constant and the frequency deviation is read from the deviation meter.

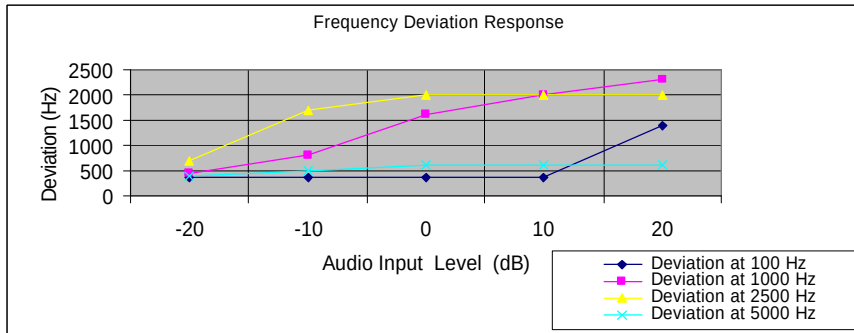


Figure 2 Frequency Deviation Characteristics (FRS).

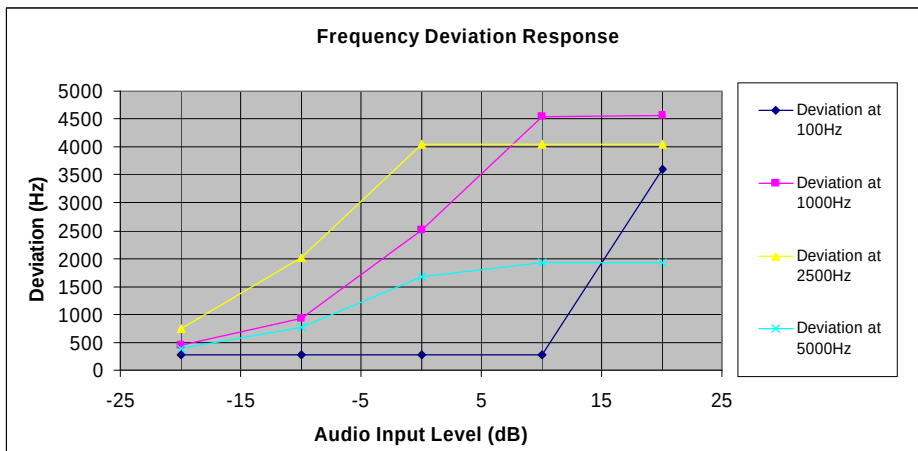


Figure 3 Frequency Deviation Characteristics (GMRS).

Figure 4 shows the frequency response of the audio low pass filter.

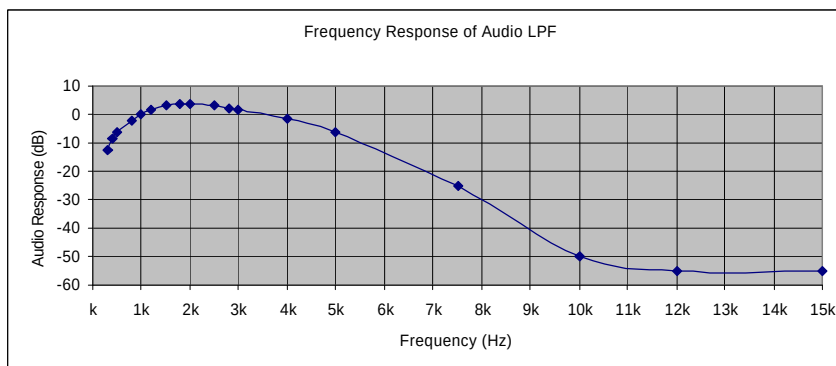


Figure 4 Frequency Response of Audio low Pass Filter.

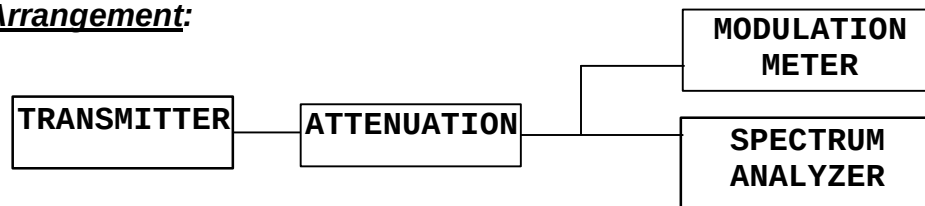
The specifications of Paragraph 2.1047 and applicable parts of 95 are met.

2.1049 Occupied Bandwidth

Measurements Required:

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are equal to 0.5 percent of the total mean power radiated by a given emission. Plots were taken with the unit operating in audio and digital data modes.

Test Arrangement:



Results:

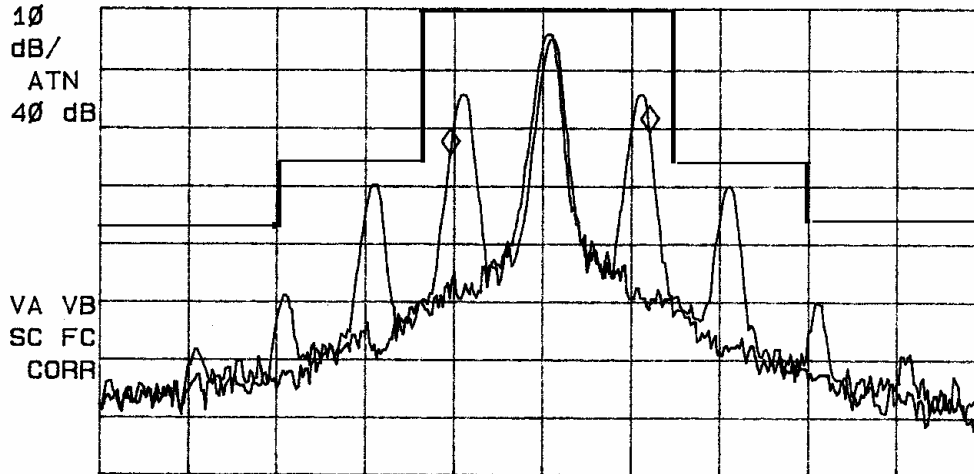
Channel	f_c (MHz)	O.B. (kHz)
10 (FRS Audio)	467.6125	5.75
10 (with CTCSS)	467.6125	6.00
10 (FRS digital 1111)	467.5625	7.06
10 (FRS digital 1010)	467.5625	7.50
18 (GMRS Audio)	462.6250	10.6

A spectrum analyzer was used to observe the radio frequency spectrum with the transmitter operating in a normal modes, modulated by a frequency of 2500 Hz at a level 16 dB above 50% modulation for voice and either a 1010 or 1111 digital code for transmitting GPS data. The power ratio in dB representing 99.5% of the total mean power was recorded from the spectrum analyzer. Refer to figures 5 through 10 for plots showing the occupied bandwidth of 99.5% power and emission mask.

CENTER
467.61250 MHz
STEP 183.95000 MHz

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 5.75 kHz
3.98 dB

REF OFFST 3.0 dB
LOG REF 30.0 dBm



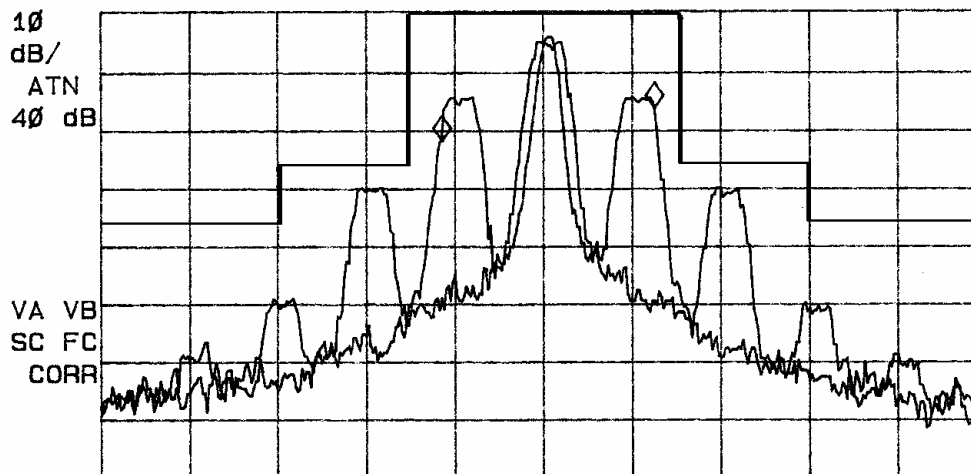
CENTER 467.61250 MHz SPAN 25.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Figure 5 Occupied Band Width (voice FRS).

MARKER Δ
6.00 kHz
5.62 dB

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 6.00 kHz
5.62 dB

REF OFFST 3.0 dB
LOG REF 30.0 dBm



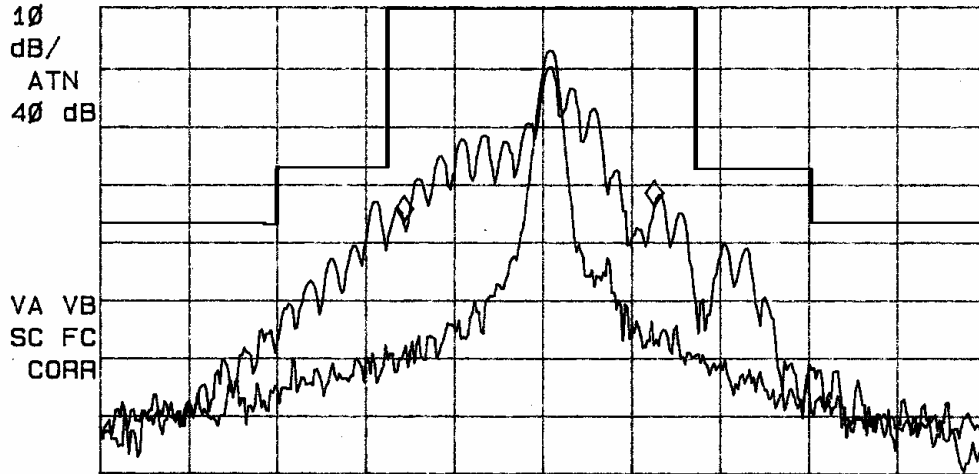
CENTER 467.61250 MHz SPAN 25.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Figure 6 Occupied Band Width (voice with CTCSS).

MARKER Δ
7.06 kHz
2.73 dB

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 7.06 kHz
2.73 dB

LOG REF 30.0 dBm



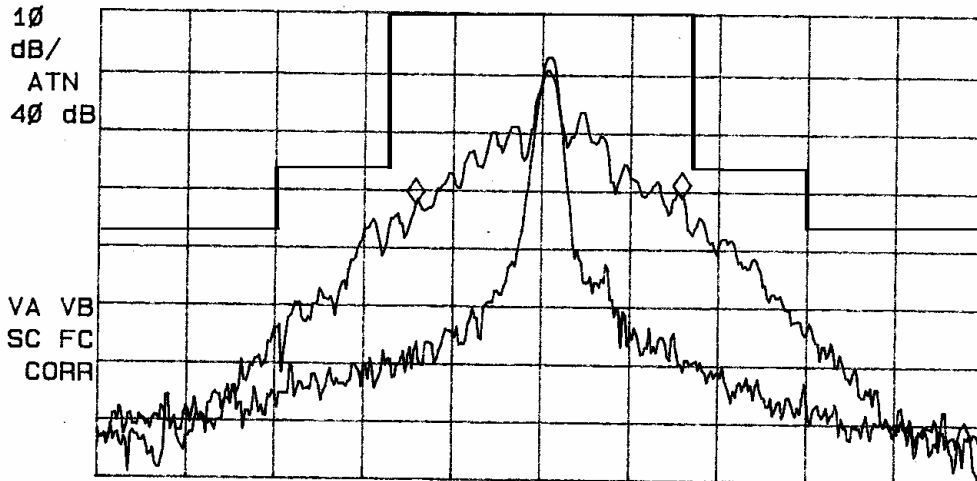
CENTER 467.61250 MHz SPAN 25.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Figure 7 Occupied Band Width (Data 1111).

MARKER Δ
7.50 kHz
1.38 dB

ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 7.50 kHz
1.38 dB

LOG REF 30.0 dBm



CENTER 467.61250 MHz SPAN 25.00 kHz
#IF BW 300 Hz AVG BW 300 Hz SWP 1.00 sec

Figure 8 Occupied Band Width (Data 1010).

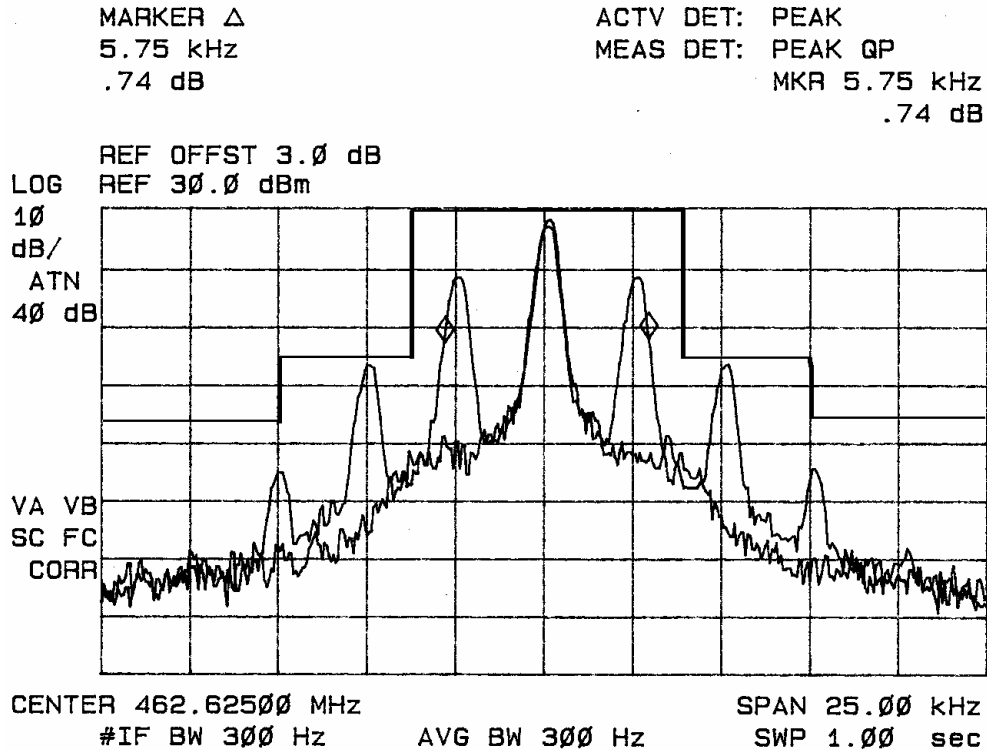


Figure 9 Occupied Band Width (voice GMRs).

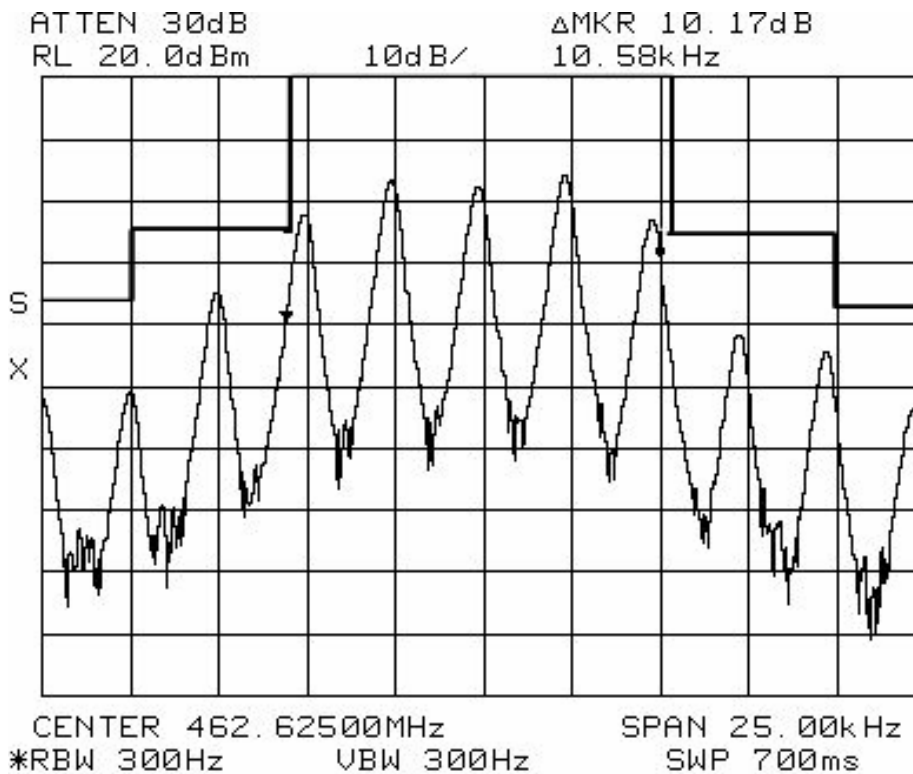


Figure 10 Occupied Band Width (voice).