

GENERAL INFORMATION REQUIREMENTS

Paragraph 2.983(a)

Name of Applicant: Samson Technologies
Address of Applicant: 575 Underhill Blvd.
Syosset, NY 11791
Name of Manufacturer: Samson Technologies

Paragraph 2.983(b)

Equipment
Identification: **FCC ID: CCRAG1M**

Paragraph 2.02(c)(1)

Necessary Bandwidth Determination:

The necessary bandwidth was calculated utilizing the following formula:

$$B_n = 2M + 2D \quad \begin{array}{l} M = 15 \text{ kHz} \\ D = 32.8 \text{ kHz} \end{array}$$

$$B_n = 2(15) + 2(32.8) = 95.6 \text{ kHz}$$

Paragraph 2.1046

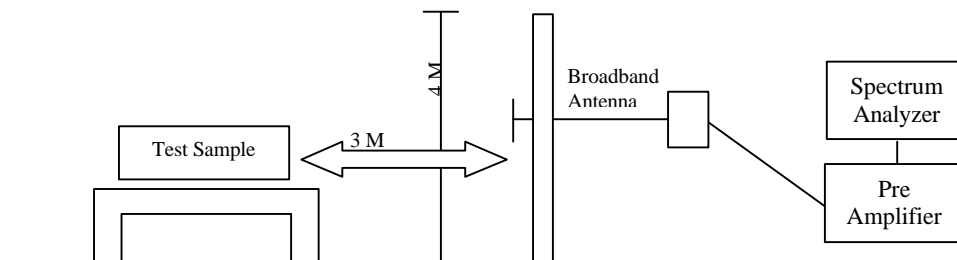
Power Output, Effective Radiated Power

POWER OUTPUT, EFFECTIVE RADIATED POWER (Para. 2.1046)

A. Measurement Procedure:

The transmitter under test was placed on an 80 cm. high non metallic table on the Open Air Test Site with its antenna polarized vertically. A receive dipole antenna was placed three meters away from the transmitter. The turntable was rotated 360 degrees and the receive antenna was raised and lowered from 1 to 4 meters until a maximum reading was obtained. This reading was recorded. The transmitter under test was replaced with a dipole and signal generator. The signal generator was set to the frequency of the transmitter under test. The level of the signal generator was increased until the level was equal to that previously measured. The required input level from the signal generator in dBm was recorded and converted into milliwatts. This was the Effective Radiated Power of the transmitter.

Setup of the test is shown below:



B. Test Results:

The results for the above test are submitted as a separate attachment named ERP.pdf.

Paragraph 2.1047

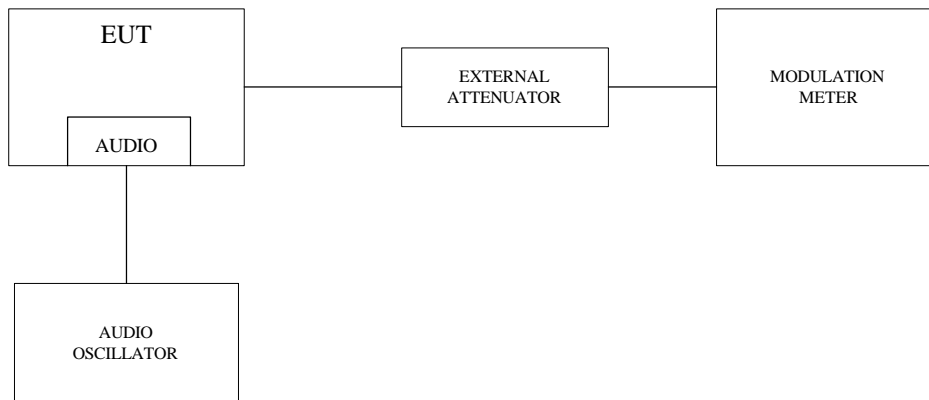
Modulation Characteristics

MODULATION CHARACTERISTICS (2.1047)

A. Measurement Procedure:

An Audio Oscillator was directly coupled to the audio input of the transmitter under test. The RF Output at the antenna terminals was loosely coupled to a modulation meter as shown below. The audio level applied to the input was adjusted from -50dBm to $+10\text{dBm}$ at each frequency listed herein. At each test frequency and level, the FM modulation was recorded.

Setup of the above test is shown below:



B. Test Results:

The test data for this method are being submitted as a separate attachment, named modchar.pdf.

Paragraph 2.1049

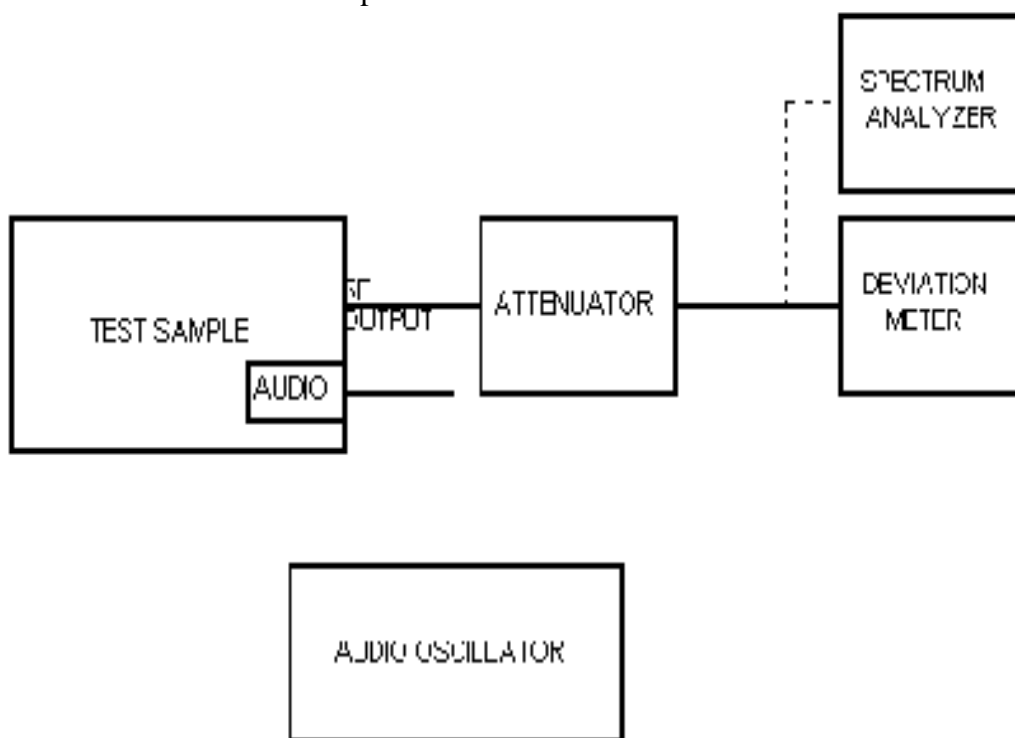
Occupied Bandwidth

OCCUPIED BANDWIDTH (PARA.2.1049)

A. Measurement Procedure:

An audio signal was directly coupled to the audio input of the test sample. The RF output was monitored using a deviation meter. The audio input level was increased to produce a 50% deviation +16dB. The RF output was then loosely coupled through external attenuators to a spectrum analyzer. The occupied bandwidth of the RF carrier, modulated at 50% deviation +16dB, was then measured. The above procedure was performed with the audio input frequencies of 1000, 2500, and 15000 Hz. The modulated signal must be within the template as specified by the applicable paragraph in Part 74. The above procedure was then repeated with the Audio Input acoustically coupled to the microphone at a level of 100dBspl.

Setup of the test is shown below:



B. Test Results:

The results for the above test are submitted as a separate attachment named occbw.pdf.

Para. 2.1053

Field Strength of Spurious Radiation

FIELD STRENGTH OF SPURIOUS RADIATION (PARA 2.1053)

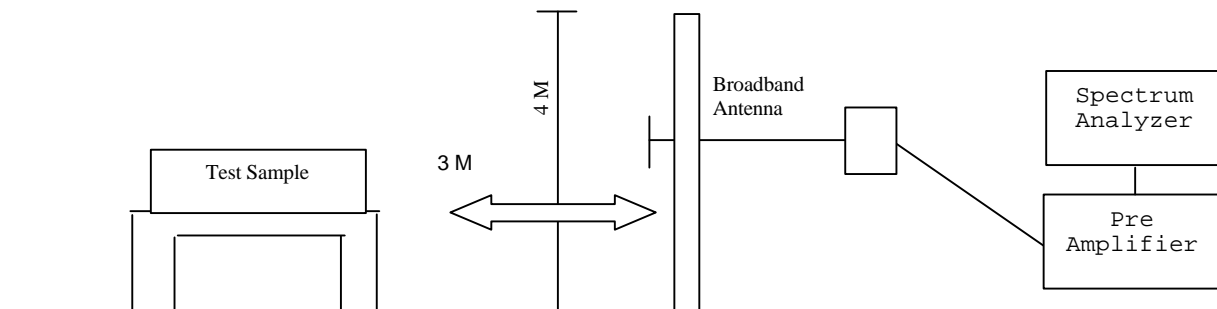
A. Measurement Procedure:

The test sample was then placed on an 80cm high wooden test stand, which was located three meters from the test antenna on an FCC listed test site. The frequency range scanned was from the lowest frequency generated by the test sample to its tenth harmonic. In order to maximize the level of each emission observed from the test sample, the broadband antenna was tuned to the frequency of each emission and the test sample was rotated 360 degrees. To further maximize the each emission observed, the test antenna was both horizontally and vertically polarized, and then was raised and lowered from one to four meters from the ground plane. The limits for all of the spurious emissions was calculated utilizing the measured output power and the following equation:

$$\text{Limit } \langle \text{dB}\mu\text{V/M} \rangle = 20 \log [\{ (49.2 \times P_T)^{1/3} \} \times 10^6] - (43 + 10 \log P_T)$$

The above procedure was performed at the lower, middle and upper frequencies of the device's range.

Setup of the test is shown below:



B. Test Results:

The results for the above test are submitted as a separate attachment named spurious case.doc.

Paragraph 2.1055

Frequency Stability

FREQUENCY STABILITY MEASUREMENTS

A. Measurement Procedure (Frequency vs. Voltage):

The RF output of the test sample was coupled to a frequency counter through external attenuation. Using a Variable power supply and voltmeter, the input voltage was varied. Measurements were taken with the device being supplied with 85, 100, and 115 percent of its rated input voltage and set to transmit the unmodulated carrier frequency.

Setup of the test is shown below:



B. Test Results:

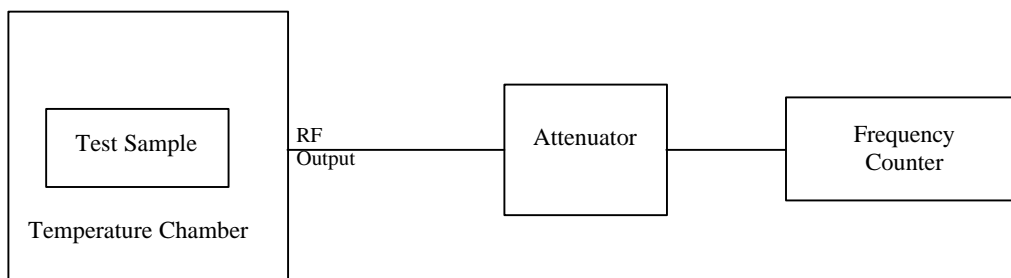
The results for the above test are submitted as a separate attachment named freq voltage.pdf.

FREQUENCY STABILITY MEASUREMENTS (PARA 2.995)

A. Measurement Procedure (Frequency vs. Temperature)

The RF output of the test sample was coupled to a frequency counter through external attenuators. With the counter connected, the test sample was activated and placed into a temperature chamber. The temperature was then programmed to start at -30 degrees Celsius and reach +50 degrees Celsius in 10 degree increments. Each increment was held for 30 minutes in order to let the test sample stabilize at that temperature.

Setup of the test is shown below:



B. Test Results:

The results for the above test are submitted as a separate attachment named freq temp.pdf.

EQUIPMENT LISTS
Effective Radiated Power

| EN | Type | Manufacturer | Description | Model No. | Cal Date | Due Date |
|------|----------------------|-------------------|-----------------|-----------|------------|------------|
| 067 | Open Area Test Site | Retlif | 3 Meter | RNY | 10/15/2000 | 10/15/2003 |
| 141 | Spectrum Analyzer | Hewlett Packard | 100 Hz - 40 GHz | 8566B | 08/03/2000 | 02/03/2001 |
| 141B | Quasi-Peak Adaptor | Hewlett Packard | 100 Hz - 1 GHz | 85650A | 08/02/2000 | 02/02/2001 |
| 451C | Tuned Dipole Antenna | Empire Devices | 400 - 1000 MHz | DM-105-T3 | 08/08/2000 | 08/08/2001 |
| 523 | Biconilog | Electro-Mechanics | 26 - 2000 MHz | 3142B | 06/08/2000 | 06/08/2001 |
| 574 | Signal Generator | Marconi Instru. | 9 kHz - 2.4 GHz | 2024 | 05/01/2000 | 05/01/2001 |

FCC 74.861(e)(3) Frequency Response and Modulation Characteristics

| EN | Type | Manufacturer | Description. | Model No. | Cal Date | Due Date |
|-----|--------------------|---------------------|----------------|-----------|------------|------------|
| 091 | Shielded Enclosure | Retlif | 10 kHz - 1 GHz | Room 6 | 07/14/1999 | 07/14/2000 |
| 159 | Frequency Counter | Leader | 10 Hz - 1 GHz | LDC-825 | 09/15/1999 | 09/15/2000 |
| 419 | Modulation Meter | Boonton Electronics | .01 - 1.2 GHz | 82AD | 05/03/2000 | 05/03/2001 |
| 488 | HP Test Oscillator | Hewlett Packard | 10 Hz - 10 MHz | 654A | 05/02/2000 | 05/02/2001 |

Frequency Stability versus Input Voltage (85% to 115%)

| EN | Type | Manufacturer | Description. | Model No. | Cal Date | Due Date |
|------|--------------------|--------------|----------------|-----------|------------|------------|
| 091 | Shielded Enclosure | Retlif | 10 kHz - 1 GHz | Room 6 | 07/14/1999 | 07/14/2000 |
| 159 | Frequency Counter | Leader | 10 Hz - 1 GHz | LDC-825 | 09/15/1999 | 09/15/2000 |
| 520F | Digital Multimeter | Wavetek | N/A | DM25XT | 01/06/2000 | 07/06/2000 |
| 696 | DC Power Supply | BK Precision | 30V/3A | 1730 | 08/20/1999 | 08/20/2000 |

Frequency Stability versus Temperature (-30 degrees C. to 50 degrees C.)

| EN | Type | Manufacturer | Description. | Model No. | Cal Date | Due Date |
|------|---------------------|------------------|---------------|-----------|------------|------------|
| 159 | Frequency Counter | Leader | 10 Hz - 1 GHz | LDC-825 | 09/15/1999 | 09/15/2000 |
| 520F | Digital Multimeter | Wavetek | N/A | DM25XT | 01/06/2000 | 07/06/2000 |
| 612 | Temperature Chamber | Thermotron Corp. | N/A | SE-1000L | 01/18/2000 | 01/18/2001 |
| 696 | DC Power Supply | BK Precision | 30V/3A | 1730 | 08/20/1999 | 08/20/2000 |

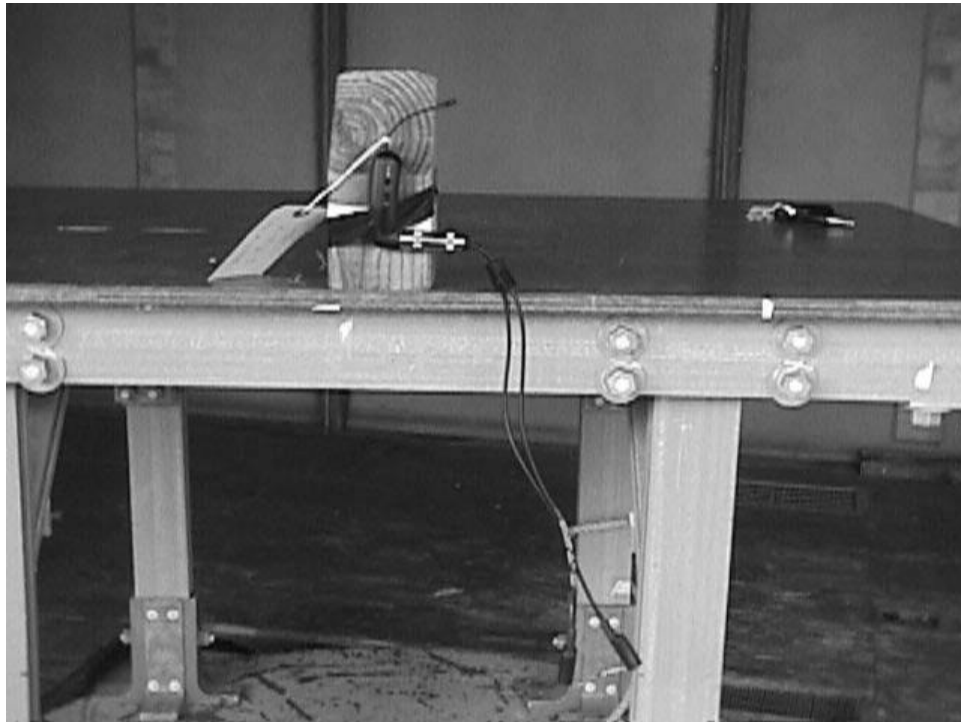
FCC 74.861(e)(5) Occupied Bandwidth

| EN | Type | Manufacturer | Description. | Model No. | Cal Date | Due Date |
|------|--------------------|-----------------|-------------------|-----------|------------|------------|
| 091 | Shielded Enclosure | Retlif | 10 kHz - 1 GHz | Room 6 | 07/14/1999 | 07/14/2000 |
| 141A | Graphics Plotter | Hewlett Packard | N/A | 7470A | 03/08/2000 | 03/08/2001 |
| 488 | HP Test Oscillator | Hewlett Packard | 10 Hz - 10 MHz | 654A | 05/02/2000 | 05/02/2001 |
| 544 | EMC Analyzer | Hewlett Packard | 9.0 kHz - 1.8 GHz | 8591EM | 08/25/1999 | 08/25/2000 |

FCC2.1053 Spurious Radiated Emissions, 30MHz-9GHz

| EN | Type | Manufacturer | Description | Model No. | Cal Date | Due Date |
|------|-------------------------|-------------------|----------------------|--------------|------------|------------|
| 067 | Open Area Test Site | Retlif | 3 Meter | RNY | 10/15/2000 | 10/15/2003 |
| 128C | Double Ridge Guide | Eaton Corporation | 1 GHz - 18 GHz | 96001 | 09/18/2000 | 09/18/2001 |
| 133 | Broadband Pre-Amplifier | Electro-Metrics | 10 kHz - 1 GHz, 26dB | BPA-1000 | 06/13/2000 | 06/13/2001 |
| 141 | Spectrum Analyzer | Hewlett Packard | 100 Hz - 40 GHz | 8566B | 08/03/2000 | 02/03/2001 |
| 141A | Graphics Plotter | Hewlett Packard | N/A | 7470A | 03/08/2000 | 03/08/2001 |
| 141B | Quasi-Peak Adaptor | Hewlett Packard | 100 Hz - 1 GHz | 85650A | 08/02/2000 | 02/02/2001 |
| 206B | 6.0 dB Attenuator | Texscan | 0 - 1.0 GHz | FP-50 - 6 dB | 06/13/2000 | 06/13/2001 |
| 523 | Biconilog | Electro-Mechanics | 26 - 2000 MHz | 3142B | 06/08/2000 | 06/08/2001 |
| 543 | Preamplifier | Hewlett Packard | 1.0 GHz - 26.5 GHz | 8449B | 06/16/1999 | 06/16/2001 |
| 617 | Interference Analyzer | Electro-Metrics | 10 kHz - 1 GHz | EMC-30 | 01/17/2000 | 01/17/2001 |

TEST SETUP PHOTOGRAPHS



AF1 / AG1 PCB ADJUSTMENT

| ITEMS | | DETAILS | ADJUSTMENT POINTS/EQUIPMENT TO CONFIRM | SETTING / REGULATION | NOTES |
|-------|----------------------------------|--|--|--|-------------------------|
| 1 | Initial Setting | SET PCB, INITIAL SETTINGS | | PCB POWER SW = ON ATT = 0dB AF INPUT SIGNAL = 1kHz Sinewave, Level = 0 | |
| 2 | Powered ON | Supply power at battery terminal. | | 1.5V | |
| 3 | Check Consumption Current | at 1.5V | | Less than 70mA | |
| 4 | Check Internal Voltage | Output voltage of DC-DC converter | | 3.0V | |
| 5 | Check Initial Frequency | at initial setting | | | |
| 6 | Frequency Adjustment | Adjust each channel to designated frequency | VR2, Spectrum Analyzer | Desonated Frequency (fo+10kHz within +/-5kHz) | |
| 7 | Check RF Output Level | Check with Spectrum Analyzer | | +3dBm - +10dBm | |
| 8 | Check Spurious Level | Check with Spectrum Analyzer | | Less than 1uW | |
| 9 | Deviation Adjustment 1 | Adjust with receiver audio output. | VR1, Audio Analyzer | Receiver Output THD3.5% +/-0.5% | Audio Generator -8 dBv |
| 10 | Deviation Adjustment 2 | Adjust with receiver audio output. | VR3, Audio Analyzer | Receiver Output 10dBv +/-1dB | Audio Generator -8 dBv |
| 11 | Check Input THD | Check THD at FET Source. | Audio Analyzer | Less than 1% | Audio Generator -2 dBv |
| 12 | Check Deviation - 1 | Check at receiver audio output. | Audio Analyzer | Receiver Output -2dBv +/-3dB | Audio Generator -20 dBv |
| 13 | Check Distortion - 1 | Check at receiver audio output. | Audio Analyzer | Either one is less than 2%. | Audio Generator -20 dBv |
| 14 | Check Distortion - 2 | Check at receiver audio output. | Audio Analyzer | | Audio Generator -30 dBv |
| 15 | Check Frequency Response | Check at receiver audio output. | Audio Analyzer | Within +/-3.5dB to the level at 1kHz (50Hz-15kHz) | Audio Generator -50 dBv |
| 16 | Check Deviation - 2 | Check at receiver audio output. | Att-20dBv/Audio Analyzer | Within +/-2dB to the receiver output level at "ITEM 2". | Audio Generator 0 dBv |
| 17 | Power SW Operation Check - 1 | Measure consumption current at power switch OFF. | | 0mA | |
| 18 | Power SW Operation Check - 2 | Check LED1 flash at power switch ON. | Check with Jig. | | |
| 19 | Check Low Battery Indication - 1 | Check LED1 lighting OFF. | Check with Jig. | Power Supply Voltage 1.15V | |
| 20 | Check Low Battery Indication - 2 | Check LED1 lighting ON. | Check with Jig. | Power Supply Voltage 1.05V | |
| 21 | Check Low Battery Operation | Check output voltage at DC-DC converter. | | Power Supply Voltage 0.9V | within 3.0V +/-0.1V |

AF1/AG1 Explanation of Spurious Limitation

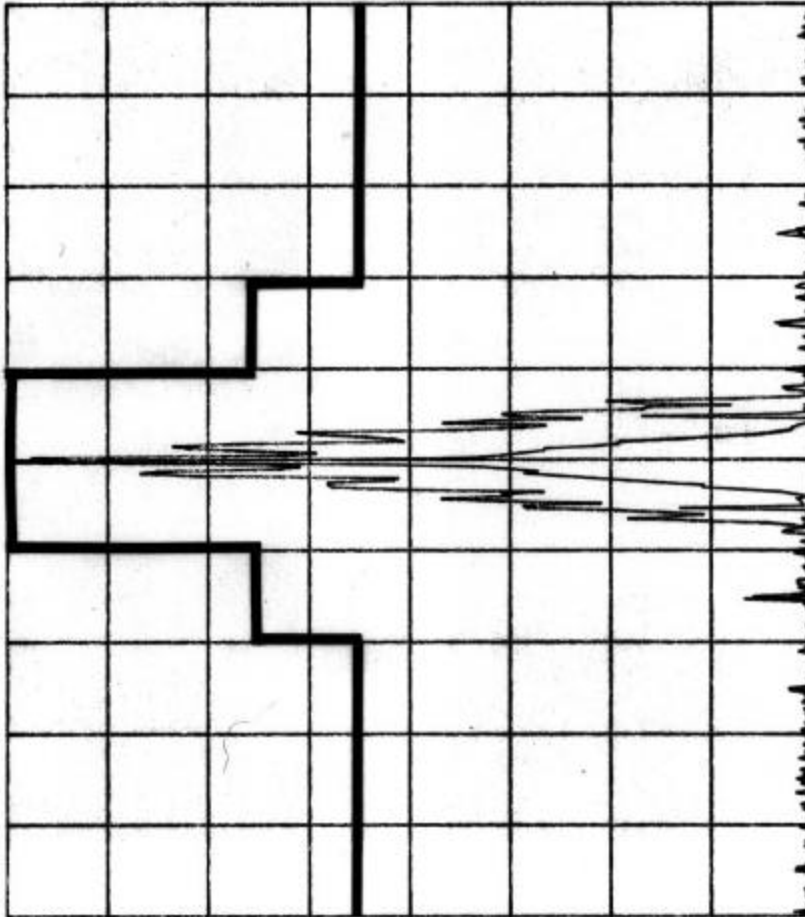
- 1 Not use lower frequency than the transmission frequency 800MHz - Direct Oscillation.
- 2 Emitter coupling which has less spurious is used for between oscillation stage and buffer.
- 3 Output side of the final stage is tuning type which has proper matching. It limits higher harmonic factor.
- 4 Low pass filter located at the final stage eliminates higher harmonic factor.

Utilizing SAW Resonator
VCO etc. process.

Paired type 2 stages.

ator.

15:37:41 NOV 21, 2000
 R-8512-6 Samson AG1 Occupied Bandwidth TS AF=1KHz
 REF -10.7 dBm AT 10 dB



PEAK
 LOG
 10
 dB/

VA VB
 SC FC
 CORR

CENTER 803.763 MHz
 #RES BW 300 Hz
 SPAN 1.000 MHz
 SWP 33.3 sec
 VBW 300 Hz

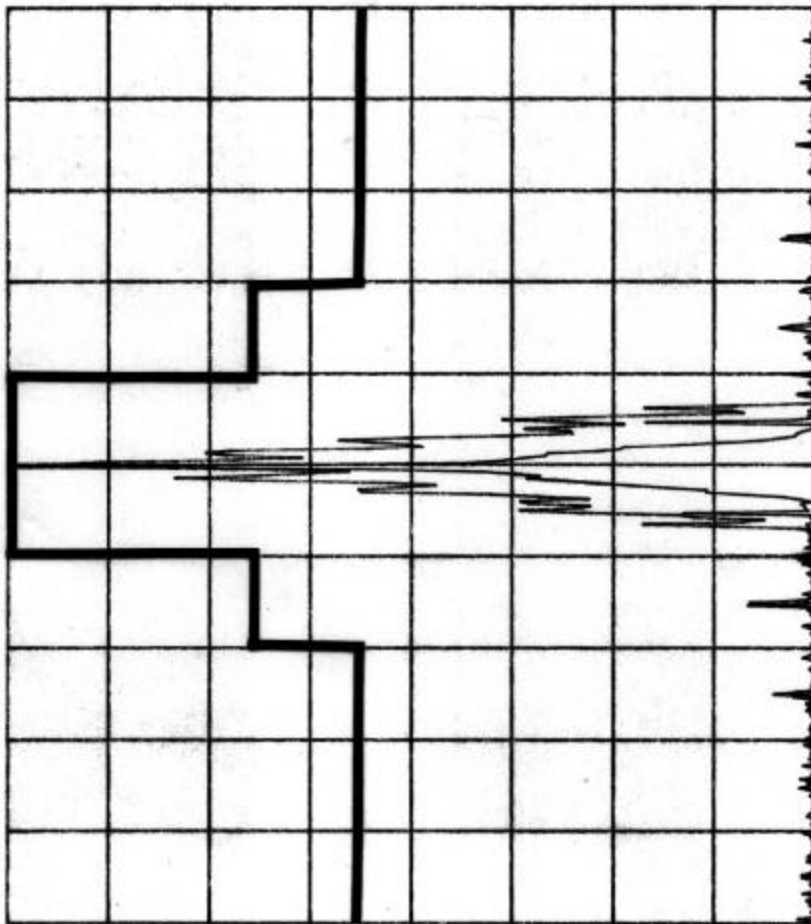
| | |
|--------------|---|
| Customer: | Samson Technologies |
| Test Sample: | 800 MHz FM Transmitter |
| Model No.: | AG1 POC ID: CCRAG1 |
| Test Method: | Occupied Bandwidth |
| Notes: | Audio Input level set to 50% modulation + 16 dB (-29 dBm) Audio Input Frequency= 1 kHz |
| Date: | November 21, 2000 |
| Technician: | T. Schneider |
| Sheet: | 1 of 3 |



Retlif Testing Laboratories

Report No. R-8512-6

15: 32: 57 NOV 21, 2000
 R-8512-6 Samson AG1 Occupied Bandwidth TS AF=2.5kHz
 REF -10.7 dBm AT 10 dB



PEAK
 LOG
 10
 dB/

VA VB
 SC FC
 CORR

CENTER 803.763 MHz
 #RES BW 300 HZ
 SPAN 1.000 MHz
 SWP 33.3 sec
 VBW 300 HZ

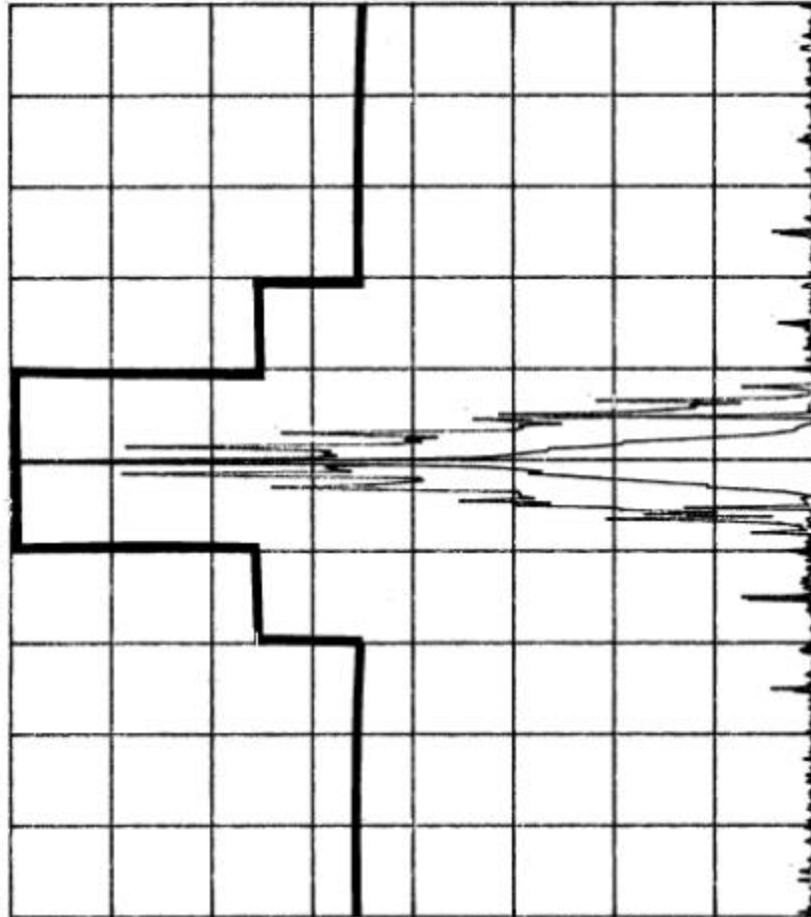
Customer: Samson Technologies
 Test Sample: 800 MHz FM Transmitter
 Model No.: AG1 FCC ID: CCRAG1
 Test Method: Occupied Bandwidth
 Notes: Audio Input level set to 50% modulation + 16 dB (-34 dBm)
 Audio Input Frequency= 2.5 kHz
 Date: November 21, 2000 Tech: T. Schneider Sheet 2 of 3



Retlif Testing Laboratories

Report No. R-8512-6

15:28:18 NOV 21, 2000
 R-8512-6 Samson AG1 Occupied Bandwidth TS AF=15kHz
 REF -10.7 dBm AT 10 dB



PEAK
 LOG
 10
 dB/

VA VB
 SC FC
 CORR

CENTER 803.763 MHz
 #RES BW 300 Hz
 SPAN 1.000 MHz
 SWP 33.3 sec
 VBW 300 Hz

| | |
|--------------|---|
| Customer: | Samson Technologies |
| Test Sample: | 800 MHz FM Transmitter |
| Model No.: | AG1 FCC ID: CCRAG1 |
| Test Method: | Occupied Bandwidth |
| Notes: | Audio input level set to 50% modulation = 16 dB (-61 dBm) Audio Input Frequency = 15 kHz |
| Date: | November 21, 2000 |
| Tech: | T. Schneider |
| Sheet: | 3 of 3 |



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Report No. R-8512-6

