HEWLETT
PACKARD

# OPERATING AND SERVICE MANUAL

# MODIFICATION

# M O D E L  8 9 0 2 A

# O P T I O N  H 1 5

# M E A S U R I N G  R E C E I V E R

## How To Use This Insert

This Manual Modification Insert should be used in conjunction with the 8902A Operating and Calibration Manual, HP Part Number 08902-90029 (printed December 1985) and 8902A Service Manual, HP Part Number 08902-90031 (printed April 1986). Make the changes described in this Insert to the indicated Sections of the Operating and Calibration Manual.

## Applicable Serial Numbers

This Manual Modification Insert applies to instruments with serial number prefixes greater than or equal to 2621A.

## Updates to this Manual Insert

Periodically, changes are made to this Manual Insert to correct errors in the original printing and to include Option improvements. Corrections are indicated by a mark at the right-hand edge of the modified text. The mark used is keyed to the date the corrections are added (found on this cover page below the issue date).

Manual Modification Insert
HP Part Number 08902-92009

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## SECTION I. GENERAL INFORMATION

Option H15 for the HP Model 8902A Measuring Receiver provides better than standard specifications for Frequency Modulation, Amplitude Modulation, Phase Modulation, and Tuned RF Level measurements.

The HP 8902A Option H15 is an integral part of the HP 8902MS Microwave Measurement System. This System consists of an HP 8902A Option H15 Measuring Receiver, an HP 11792A Option H15 Sensor Module, an HP 11792A Option H16 Sensor Module, an HP 11793A Option H15 Microwave Converter, two HP 8673D Option H15 Synthesized Signal Generators, miscellaneous accessories, and two System Cabinets with power and signal cabling.

On page 1-20, in Table 1-1, Specifications (1 of 7), under FREQUENCY MODULATION, make the following changes and additions:

ACCURACY

| FM Accuracy (+-1 digit) | Frequency Range | Rates | Peak Deviation |
|---|---|---|---|
| +-1.75% of reading | 250 kHz to 10 MHz | 50 Hz to 10 kHz | <= 40 kHz |
| +-2% of reading | 250 kHz to 10 MHz | 20 Hz to 10 kHz | <= 40 kHz |
| +-0.75% of reading | 10 MHz to 1300 MHz | 50 Hz to 100 kHz | <= 400 kHz |
| +-5% of reading | 10 MHz to 1300 MHz | 20 Hz to 200 kHz | <= 400 kHz |

DEMODULATED OUTPUT DISTORTION

| THD | Frequency Range | Rates | Deviations |
|---|---|---|---|
| <0.25% | 400 kHz to 10 MHz | 50 Hz to 10 kHz | <= 40 kHz |
| <0.1% | 400 kHz to 10 MHz | 20 Hz to 10 kHz | <= 10 kHz |
| <0.25% | 10 MHz to 1300 MHz | 50 Hz to 100 kHz | <= 400 kHz |
| <.01% | 10 MHz to 1300 MHz | 20 Hz to 100 kHz | <= 100 kHz |

Also on page 1-20, under AMPLITUDE MODULATION, make the following additions:

ACCURACY: RF Carrier Power Level >= -10 dBm

| AM Accuracy ( +-1 digit ) | Frequency Range | Rates | Depths |
|---|---|---|---|
| +-1.75% of reading | 150 kHz to 10 MHz | 50 Hz to 10 kHz | 5% to 99% |
| +-0.75% of reading | 10 MHz - 1300 MHz | 50 Hz to 50 kHz | 5% to 99% |
| +-0.4% of reading | 108 MHz - 112 MHz | 90 Hz | 5% to 40% |
| +-0.4% of reading | 108 MHz - 112 MHz | 150 Hz | 5% to 40% |
| +-0.4% of reading | 332 MHz - 335 MHz | 90 Hz | 5% to 40% |
| +-0.4% of reading | 332 MHz - 335 MHz | 150 Hz | 5% to 40% |
| +-0.45% of reading | 332 MHz - 335 MHz | 90 Hz | 41% to 80% |
| +-0.45% of reading | 332 MHz - 335 MHz | 150 Hz | 41% to 80% |

On page 1-21, in Table 1-1, Specifications (2 of 7), under PHASE MODULATION, make the following changes:

PHASE MODULATION

| PM Accuracy ( +-1 digit ) | Frequency Range | Peak Deviations (to 1 kHz rates) |
|---|---|---|
| +-3.5% of reading | 150 kHz - 10 MHz | <=40 radians |
| +-2.75% of reading | 10 MHz - 1300 MHz | <=400 radians |

DEMODULATED OUTPUT DISTORTION: <0.25% THD.

On page 1-22, in Table 1-1, Specifications (3 of 7), under TUNED RF LEVEL, make the following changes:

POWER RANGE: -100 dBm to +5 dBm, using IF synchronous detector (200 Hz BW)

FREQUENCY RANGE: 10 MHz to 1300 MHz

On page 1-23, in Table 1-1, Specifications (4 of 7), under TUNED RF LEVEL, continued, make the following changes:

DETECTOR LINEARITY:
For IF Synchronous Detector:
+-0.02 dB +-(accuracy for appropriate dynamic range as noted below) +-1 digit, (add +- 0.18 dB for power levels > -10 dBm).

| Dynamic Range | Frequency Range | Accuracy |
|---|---|---|
| 0 - 80 dB | 10 MHz - 1300 MHz | +-0.01 dB / 10 dB Step |
| 80.01 - 105 dB | 10 MHz - 1300 MHz | +-0.02 dB / 10 dB Step |

On page 1-24, in Table 1-1, Specifications (5 of 7), under CARRIER NOISE (OPTIONS 030-037), make the following changes:

RELATIVE MEASUREMENT ACCURACY: +-0.5 dB; levels >=-95 dBc; 12.5 kHz , 25 kHz and 30 kHz filters. +-0.5 dB; levels >=-129 dBc/Hz, and +-2 dB; levels >=-140 dBc/Hz; carrier noise filter.

NOISE FLOOR: -150 dBc/Hz, excluding LO contribution

On page 1-26, in Table 1-1, Specifications (7 of 7), under GENERAL SPECIFICATIONS, make the following change:

TEMPERATURE: Operating: 15 to 30 degrees C (59 to 85 degrees F)

## SECTION IV. PERFORMANCE TESTS

On page 4-2, Performance Test 1 - AM, incorporate the following into the specification table:

| Characteristic | Performance Limit | Conditions |
|---|---|---|
| Accuracy | | Option H15 Only |
| | +-1.75% of reading +-1 digit | 150 kHz to 10 MHz; 50 Hz to 10 kHz rates; 5% to 99% depth |
| | +-0.75% of reading +-1 digit | 10 MHz - 1300 MHz; 50 Hz to 50 kHz rates; 5% to 99% depth |
| | +-0.4% of reading +-1 digit | 108 MHz to 112 MHz and 332 MHz to 335 MHz; 90 Hz and 150 Hz rates; 5% to 40% depth |
| | +-0.45% of reading | 332 MHz to 335 MHz; 90 and 150 Hz rates; 41% to 80% depth |

On page 4-6, under AM Accuracy, step 18, change the Lower and Upper AM Limits for 50 kHz and 50 Hz to 99.2 and 100.9, respectively.

On page 4-8, Performance Test 2 - FM, incorporate the following into the specification table:

| Characteristic | Performance Limit | Conditions |
|---|---|---|
| Accuracy | | Option H15 Only |
| | +-1.75% of reading +-1 digit | 250 kHz to 10 MHz; 50 Hz to 10 kHz rates; <=40 kHz peak deviation |
| | +-0.75% of reading +-1 digit | 10 MHz to 1300 MHz; 50 Hz to 100 kHz rates; <=400 kHz peak deviation |
| Demodulated Output Distortion | <0.25% THD | 400 kHz to 10 MHz carrier; 50 Hz to 10 kHz rates; <=40 kHz peak dev. |
| | <0.25% THD | 10 MHz to 1300 MHz carrier; 50 Hz to 100 kHz rates; <=400 kHz peak dev. |

On page 4-12, under FM Distortion, Accuracy, and Rejection - 1.5 MHz IF, change the Lower and Upper FM Limits for 50 kHz and 50 Hz to 99.2 and 100.9, respectively.

On page 4-13, under FM Distortion, Accuracy, and Rejection - 455 kHz IF, change the Lower and Upper FM Limits for 10 kHz to 9.82 and 10.19, respectively.

On page 4-14, Performance Test 3 - ØM, incorporate the following into the specification table:

| Characteristic | Performance Limits | Conditions |
|---|---|---|
| Accuracy | | Option H15 Only |
| | +-3.5% of reading +-1 digit | 150 kHz to 10 MHz; <=40 radians (up to 1 kHz rates) |
| | +-2.75% of reading +-1 digit | 10 MHz to 1300 MHz; <=400 radians (up to 1 kHz rates) |

On page 4-16, under ØM Accuracy, in Step 6, change the Lower and Upper ØM Limits for 200 Hz and 1 kHz, to 243.0 and 257.0, respectively. Change the Limits for 20 kHz, 250 kHz deviation, to 12.1 and 12.9, respectively. Also, change the Lower Limit for 20 kHz, 4 kHz deviation, to 0.194.

Also on page 4-16, in Step 7, change the Lower and ØM Limits for 10 kHz, 25 kHz deviation, to 2.40 and 2.60, respectively. Change the Limits for 10 kHz, 2.5 kHz deviation, to 0.240 and 0.260, respectively.