HW-19A ELECTRONIC START-STOP TELETYPE SIGNAL MIXER 1956-1958

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H19-0309-2

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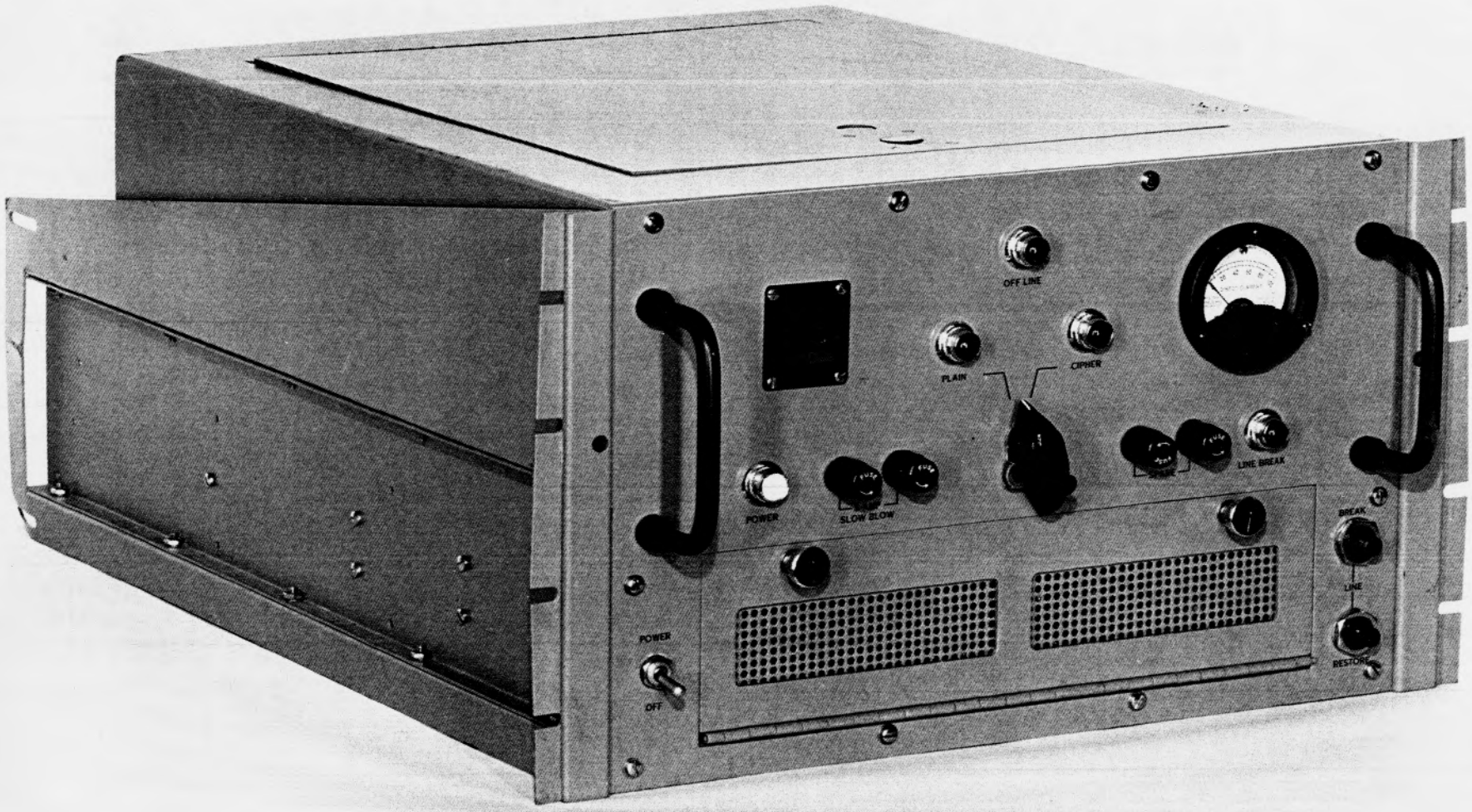
NATIONAL
SECURITY AGENCY
TSEC/HW-19A
NO. 267
OFF LINE
PLAIN
CIPHER
DIRECT CURRENT
POWER
5 AMP
SLOW BLOW
SPARE
LINE BREAK
CUR ADJ
LOCAL KEYER
REC LINE
REPERF CUR
ENCIPHER
RECEIVE
AUTO
DECIPHER
SEND
SUP CUR BAL
20 MA
ADJ
BREAK
POWER
OFF
REC LINE CUR ADJ
REC LINE
NEUT 60 MA
NEUT 20 MA
J31
J33
J17
J18
J19
J20
J24
J28
AUTO BREAK DELAY
SPACE TEST
+150V ADJ
LOCAL KEYER
LINE
RESTORE


OFF LINE
PLAIN
CIPHER
LINE BREAK
POWER
SLOW BLOW
BREAK
LINE
RESTORE
POWER
OFF


NATIONAL SECURITY AGENCY

22 December 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Magnavox Corporation

b. Address

Urbana, Illinois

c. Dates of Conferences

1 through 11 December 1958

2. EQUIPMENT NOMENCLATURE:

TSEC/SM-194, Electronic Start-Stop Teletypewriter Signal Mixer

3. REPRESENTATIVES:

a. NSA

Mr. Norman A. Stead, Contracting Officers Representative (COR), M83-3

b. Signal Corps

Mr. Edward Quelter, Resident Government Inspector (RGI)

c. Magnavox Corporation

Mr. Gene Nelson, Project Engineer
Mr. Harold Nuppel, Quality Control Manager

4. PURPOSES OF THE TRIP:

The purposes of the trip were to:

a. Observe and evaluate Magnavox's quality control related to inspection and operational testing during the initial production of TSEC/SM-194, Electronic Start-Stop Teletypewriter Signal Mixer.

b. Assist the Resident Government Inspector (RGI) in visual and operational testing of the TSEC/KW-19A equipment.

5. CONFERENCE BRIEFS:

a. On arriving at Magnavox, a conference was held with the Resident Government Inspector (RGI) to discuss the status of the initial KW-19A Production Model equipment. Three of the initial KW-19A's were to be delivered to NSA, 1 December 1958, for environmental testing. Mr. Qualter, RGI, informed the undersigned that one of the three KW-19A Production Model equipment had been accepted. Two discrepancies were found on each of the two remaining KW-19A's while performing Operational and Radiation Tests. These discrepancies weress follows:

(1) B-minus voltage at test point J-32 had high AC ripple.

(2) Excessive radiation, caused by tube V-6, which controls the output relay.

These equipment were rejected by Signal Corps and returned to Magnavox.

b. Upon rejection of the two KW-19A's, Magnavox immediately conducted re-tests to locate causes of discrepancies. Magnavox found that the KW-19A would pass or fail Radiation Tests when tube selection was used. Magnavox observed that by adding a capacitor in the relay output circuit, tube selection was eliminated. Mr. Rozanski, EMC-121 Project Engineer was notified by the EMI-3 COR, and Mr. Nelson, Magnavox, by telephone, 2 December 1958, of the discrepancies. In the telephone conversation, Mr. Nelson also requested that the specification for ripple voltage in System Test Specification No. 13 be changed to 20 ma, and that the addition of a capacitor be added to the relay output circuit. Mr. Rozanski stated that he would investigate this problem immediately.

c. On 5 December 1958, Mr. Sizemore, EMC-312, made a telephone call to Magnavox, and informed the undersigned that Col. F. McCarthy, EMC-1, Messrs. R. Rozanski, EMI-121, and D. Trump, EMC-113, would visit Magnavox in order to resolve the ripple voltage and radiation problems. Mr. Sizemore instructed the undersigned to return to NSA if the ripple voltage and radiation problems were not resolved. The COR was also instructed to complete visual, mechanical and operational evaluation of equipment available, pending action by NSA on radiation and voltage ripple problems.

d. During the period 8 through 10 December 1958, at which time the Project Engineer was present at Magnavox, no solution was resolved between NSA and Magnavox, with reference to ripple voltage and radiation problems. Mr. Rozanski requested that Magnavox submit a waiver to the Contracting Officer requesting that these defects be waived on the first three AN-19A Production Model equipment; in order that NSA could begin environmental tests. Magnavox was advised, that upon notification of approval of waivers from the NSA Contracting Officer, Signal Corps will release equipment for shipment.

e. During the period 1 through 10 December 1958, twelve AN-19A Production Model equipments were visually and mechanically evaluated by Signal Corps and the ENG-3 CGH. The twelve AN-19A equipments were rejected for major and minor defects and returned to Magnavox for rework. Upon completion of rework, the twelve AN-19A's were resubmitted to Signal Corps for inspection. No discrepancies were found on second evaluation and AN-19A's were accepted for visual and mechanical inspection only.

f. A meeting was held with the ENG-3 CGH, Signal Corps and Mr. Ruppel, Magnavox Quality Control Manager, to discuss Magnavox's request for elimination of a rubber bushing on cable W-301, contained in AN-19A TD modification Kit. Mr. Ruppel stated that due to the inner diameter of the bushing being smaller than the cable, too much time was consumed in fitting the bushing on the cable. Mr. Ruppel also stated that bushings are not specified in NSA drawings; however, the bushings will continue to be fitted to the cable. Upon investigation of prints it was found by the ENG-3 CGH and Signal Corps NCI, that the bushing was listed on the "Bill of Material" for the AN-19A. This bushing acts as a moisture and dust-proof seal protecting interconnections. The ENG-3 CGH stated that this bushing would be required on all W-301 TD modification cables. Mr. Rozanski concurred in this decision.

g. While observing Signal Corps and Magnavox personnel perform the "Line Break" check of System Test Specification No. 13, it was noticed that AC fuses were accidently being blown. This was due to the test probe shorting against pin 7 of K-3 relay when checking "Break Circuit" with the oscilloscope.

At the present time, System Test Specification No. 13 calls for checking this circuit at bottom of chassis. The EMC-3 CCR found that by inserting a test socket adapter in the socket of tube V-7, the "Line Break" circuit can be checked from top of chassis. This prevents excessive handling of unit, ease of testing and improbability of shorting fuses. This test procedure will be coordinated with the EMC-121 Project Engineer.

b. On 8 December 1958, an additional inspector was assigned to Mr. Qualter, by the Chicago Regional Office. Mr. Qualter requested that the undersigned train and familiarize the new personnel with the test equipment and test procedures used in acceptance of the EM-19A. The NSA representative trained the new inspector satisfactorily on operational test of the EM-19A. The training as received by the new inspector, though of a short duration, did achieve the purpose of assuring NSA that EM-19A equipment would be satisfactorily operationally tested by the Signal Corps personnel.

6. CONCLUSIONS:

a. Signal Corps NGI will not accept or release any EM-19A equipment until ripple voltage and radiation problems have been resolved by NSA.

b. Mr. Kozuski requested that Magnavox submit a waiver request to the Contracting Officer requesting that the radiation and ripple voltage problems for the first three EM-19A equipment be waived so that NSA may begin environmental tests.

c. Twelve equipment were inspected for visual and mechanical defects, and accepted.

d. The EMC-3 CCR rejected Magnavox's request for removal of rubber bushing on cable W-301.

e. NSA drawings do not specify the use of a rubber bushing on cable W-301, modification kit cable.

f. Line "Break Circuit" test procedure will be coordinated with the EMC-1 Project Engineer.

22 December 1958

7. RECOMMENDATIONS:

It is recommended that:

a. Signal Corps NII be notified immediately of NSA's decision on ripple voltage and radiation problems. This is an NMI and a CNEC-65 action.

b. NSA drawings be revised to reflect bushing on cable W-301, TD modification cable for KW-19A equipment. This is an NMI action.

c. NMI-1 Project Engineer review "Line Break" circuit test, and coordinate results with NMI-3 COR for incorporation in NSA Standard of Acceptance No. 104. This is an NMI action.

d. An NMI-3 COR schedule a trip in January 1959 to complete coordination of Standard of Acceptance No. 104, to insure that KW-19A equipment meets the criteria of operational performance and good workmanship. This is an NMI action.

8. ACTIONS TAKEN ON RECOMMENDATIONS:

a. NMI-1 Project Engineer will take the necessary action to grant a waiver on recommendation, paragraph 7.a. of this report, on or about 5th December 1958.

b. The NMI-3 COR has taken the necessary action to notify NMI-1 concerning revision to NSA drawings for cable W-301, TD modification kit for the KW-19A equipment. This action was coordinated with NMI-1, on 17 December 1958.

c. NMI-3 COR has coordinated with NMI-1 the test for the "Line Break" circuit. This action was coordinated with NMI-1, on 17 December 1958.

d. NMI-3 COR has taken the necessary action to schedule a trip to Magnavox for January 1959.

Norman A. Stead

NORMAN A. STEAD
Contracting Officers Representative, NMI-3

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17 December 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

   a. Name of Organization

      U. S. Testing Laboratories, Inc.

   b. Address

      1415 Park Avenue
      Hoboken, New Jersey

   c. Dates of Trip

      10 through 12 December 1958

2. EQUIPMENT:

   TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

3. REPRESENTATIVES:

   a. NSA

      Mr. James A. Keels, Test Engineer, R3E-111

   b. U. S. Testing Laboratories, Inc.

      Mr. T. Hooks, Project Engineer
      Mr. Joseph Salerno, Test Technician

4. PURPOSE OF TRIP:

   The purpose of this trip was to make necessary equipment installations and arrangements for the environmental testing of the TSEC/KW-19A. Also, to discuss the types of tests to be performed and the programming of the testing so future visits may be scheduled to observe portions of the testing.

5. CONFERENCE NOTES:

   a. Background

      On 13 November 1958, NSA received two Pilot Production TSEC/KW-19A equipments from the Magnavox Company. One of these equipments is currently undergoing suitability testing in R3E-111. The other

equipment was transferred to the U. S. Testing Laboratories on 5 December 1958 for environmental testing. These tests will be conducted in accordance with MIL-E-16400B and MIL-E-5272A.

b. Installation of Equipment

The TSEC/MM-19A was connected in a circuit suitable for conducting environmental tests. Preliminary adjustments were made on the equipment and the lock nuts on all potentiometers secured. The equipment was operationally tested prior to the beginning of the environmental tests. During the installation and operational testing of the equipment, two U. S. Testing technicians were instructed on the operation of the MM-19A.

c. Test Schedule

A tentative test schedule was established by Mr. Boche of U. S. Testing and the undersigned. At the present time tests are scheduled to be conducted during the period of 11 December 1958 to approximately 3 April 1959. The test schedule is included as an inclosure to this trip report.

6. CONCLUSIONS:

a. The Pilot Production MM-19A was installed with its associated equipment and operationally tested, prior to undergoing environmental testing. The operational tests established that the MM-19A, to undergo environmental testing, is in good operating condition. Two U. S. Testing technicians were instructed on the operation of the MM-19A during the installation and testing of the equipment.

b. Under the present testing schedule it will require approximately three months to complete environmental testing of the MM-19A. It is the opinion of the undersigned that if two additional equipments were sent to U. S. Testing, this time could be reduced by approximately one-half. The additional equipments would allow for various phases of the testing to be conducted concurrently.

7. RECOMMENDATIONS:

The sending of two more Pilot Production MM-19A's to the U. S. Testing Laboratories has been concurred in by the EMI Project Engineer. These equipments will become available approximately 5 January 1959. Therefore, it is recommended that EMI take the necessary actions to revise the MM-19A environmental testing schedule.

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8. ACTION TAKEN ON RECOMMENDATIONS:

A memorandum to the operating element (EMG-1) directing action on the recommendation contained in paragraph 7. has been prepared for the signature of Chief, EMG.

James A. Keels
JAMES A. KEELS
EMG-111

Incl:
Test Schedule, TSEC/SW-19A

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TEST SCHEDULE TSEC/RU-19A

Description of Test	Time Required (Days)	*Estimated Completion Date
EXAMINATION OF PRODUCT	1/4	11 Dec 1958
ROOM TEMPERATURE	1	12 Dec 1958
HIGH TEMPERATURE		
Storage Phase	3	17 Dec 1958
Operational Phase	3	22 Dec 1958
LOW TEMPERATURE		
Storage Phase	3	29 Dec 1958
Low Temp. Operation	3	2 Jan 1959
THERMAL SHOCK	4	8 Jan 1959
ACCELERATED LIFE TEST		
Conditioning		
Normal Operation	1/4	9 Jan 1959
High Temp. Operation	1/2	12 Jan 1959
Test Cycling	30	12 Feb 1959
VIBRATION		
Resonant Search	1/2	13 Feb 1959
Vibration	1	16 Feb 1959
Vibration	1	17 Feb 1959
Vibration	1	18 Feb 1959
SHOCK	2	20 Feb 1959
HUMIDITY	7	3 Mar 1959
FUNGUS RESISTANCE TEST	30	3 Apr 1959

* Estimated completion date does not include lost time due to possible malfunctioning of equipment under test.

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Hw-19A

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17 December 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Magnavox Corporation

b. Address

Urbana, Illinois

c. Dates of Trip

8 Dec 58 through 12 Dec 58

2. EQUIPMENT:

TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer (TEMPEST Aspect).

3. REPRESENTATIVES:

a. NSA

Lt. Col. Fred E. McCarthy
Mr. Raymond A. Rzeszuski
Mr. David M. Trump

b. Magnavox Corporation

Mr. G. Nelson, Project Engineer
Mr. C. Shapiro, Consulting Engineer
Mr. J. Allen, Technician

4. PURPOSE OF TRIP:

The purpose of this trip was to investigate, to collect technical data and to determine why the Contractor's Production Model TSEC/KW-19A equipments failed to meet a TEMPEST test requirement after two of their Preproduction Model equipments had met the requirement.

5. CONFERENCE BRIEFS:

a. The TEMPEST aspect was discussed by the representatives mentioned in paragraph 3. above to determine if the Contractor had made any changes in his test procedures and if the defect noted by the Contractor was actually above the limits as specified in Test Specification NSA-54.

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b. One unit of the TSEC/SW-19A, production unit #005 which exhibited the worst condition was used as the testing sample and was set-up within the Shielded Enclosure, as outlined in Test Specification NSA-54, paragraph 3.2.5.2.2, with reference to paragraph 3.2.5.2.2.3 step 4 and to paragraph 3.2.5.2.2.6.1. The unit was switched to and operated in the defective mode of operation which was Auto-Cipher-Receive. The signal line was monitored, while the unit was receiving a cipher signal and it was observed by Mr. Trump that text intelligence was emanating from the TSEC/SW-19A and appearing on the signal line but was low in magnitude.

c. Mr. Nelson, having previously investigated the defect, informed the NSA representatives that the defect could or could not exist by hand picking tube V6 and that commercial equivalent tubes accentuated the defect.

d. The Contractor proposed, to the NSA representatives, adding a capacitor to the circuitry to correct the defect. The value of the capacitor would be 0.01 mfd. The capacitor would be connected between the plate and control grid of tube V6B (1/2 of 5814A the Mark Driver Tube). The capacitor would create a degenerative circuit for the tube. The capacitor would be added to two unused terminals on terminal board 10 and connected to the existing circuit by short pieces of insulated wire.

e. A 0.01 mfd capacitor was temporarily added to the unit #005 being tested in the Shielded Enclosure to determine the actual affect upon the defect and also the circuit operation in the other modes. Mr. Trump observed on the oscilloscope, used in the test set-up, that the capacitor corrected the defect by no more than 90 percent and that it did affect the signal waveform when operated in the other modes.

f. It was brought to the attention of the Contractor's personnel by Lt. Col. McCarthy that the source of the defect should be located and the defect corrected at the source.

g. Good engineering practices were used to locate the source of the defect.

(1) The wiring associated with send relay K1, tube V5, tube V6B, tube V7 was tested by temporarily disconnecting the leads individually to determine whether or not the defect was caused by cable coupling within the cable harness. It was proved to the satisfaction of all personnel concerned that the defect was not created by cable coupling within the cable harness.

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(2) With the aid of the oscilloscope the circuitry was probed and the defect was traced to and found to have originated in tube V7. It was then coupled to tube V6B, amplified by tube V6B, and subsequently coupled from the send relay K1 to the signal line.

(3) Inspecting the circuit, we find that tube V7 is a gating tube and under the condition of Auto-Cipher-Receive this tube should not be conducting. To determine whether or not this tube was in a non-conducting condition a micro-ampere current meter was temporarily inserted in the plate circuit. In this condition the plate current measured 1.5 micro-amperes. This is a positive indication that this gating tube is not in the required non-conducting state.

(4) The oscilloscope was used to observe the waveshape and to record the amplitude of the detecting signal.

(a) It was observed that the amplitude of the test signal coupling over to the plate circuit of tube V7 was 0.7 volt negative spike on the space to mark transition and 0.2 volt positive spike on the mark to space transition. Also the actual baud transitions were present on the plate of the tube having a 0.2 volt swing.

(b) It was observed that the amplitude of the test signal amplified by tube V6B was 2.0 volts positive spike on the space to mark transition and 0.5 volt negative spike on the mark to space transition.

(5) Assuming that the gating voltage of 10 volts negative on the gating (suppressor grid) grid wasn't negative enough, or just on the border line, to prevent tube V7 from conducting, this voltage was temporarily disconnected and replaced with 67.5 volts negative from an external battery. It was observed on the oscilloscope that the test intelligence was still being conducted through the tube. The 67.5 volts negative was replaced with 150 volts negative and it was observed on the oscilloscope that the test signal was eliminated from conducting through the tube.

(6) It is evident that the cathode (pin 2), control grid (pin 1), screen grid (pin 6) are acting as a three element tube.

Since the text signal is being applied to the control grid the tube is normally conducting through the screen grid circuit. The geometry of the tube is of such a nature that the conducting signal was coupled over to the plate (pin 5) circuit of the tube even though the suppressor grid (pin 7) had a negative gating voltage applied to it.

(7) It was found that by capacity by-passing and filtering the swinging section of the screen grid of tube V7, the text signal coupling over to the plate circuit was slightly increased.

(8) It was found that ~~by~~ decreasing the positive voltage (within operating limit) applied to the screen grid of tube V7 had no effect on the text signal coupling over to the plate circuit of the tube.

(9) It is a design feature of this particular circuit that the text signal applied to the signal grid of tube V7 be present in this mode of operation. Since there are no relays or switches being actuated when switching from the Auto-Cipher-Send mode to the Auto-Cipher-Receive mode the text signal applied to the signal grid cannot be disconnected.

(10) Mr. Shapiro, in investigating the tube data of computer and gating tubes, recommended tube 5915A (General Electric's Dual Control Heptode) be used to replace the existing tube V7 which is a 5725. The 5915A has identical base connections as the 5725. The typical operating characteristics of the 5915A are practically identical to those of the 5725. Tube V7, the 5725, was replaced by the 5915A tube and without any other circuit modifications it was observed on the oscilloscope that the text intelligence appearing on the signal line was reduced by approximately 90 percent. This is an indication that the geometry and the internal shielding of the 5915A is superior to the 5725.

(11) Mr. Shapiro had a breadboard circuit fabricated using the 5915A tube to determine its correct operating point and characteristics. In the process of operating the 5915A breadboard circuit Mr. Shapiro found that the gating action was greatly improved by reversing the control

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grid (pin 1) text signal voltage with the suppressor grid (pin 7) gating voltage. It was a unanimous decision that this circuit modification be applied to the TSEC/KW-19A existing circuitry without delay. The modification was made and it was observed on the oscilloscope that no trace of the text intelligence could be detected on the signal line.

(12) Mr. Trump checked through the complete frequency range of the Wide Band RC Amplifier as specified in Test Specification MEA-8A, paragraph 3.2.3.2.2.3 and could find no trace of text intelligence on the signal line.

(13) Using the modified circuit, as per paragraph 5.(11) above, the AC input power was increased until the B plus voltage increased to 130 volts without adversely affecting the operation of the TSEC/KW-19A and no trace of text intelligence was detected on the signal line. The AC input power was then decreased until the B plus voltage decreased to 110 volts without adversely affecting the operation of the TSEC/KW-19A and no trace of text intelligence was detected on the signal line.

(14) Using the modified circuit, as per paragraph 5.(11) above, the filament leads were temporarily removed from the tube socket XV7 and replaced from an external source. The filament voltage was decreased to 3.8 volts before it failed to operate the remote pageprinter. At 4.0 volts the remote pageprinter was restored to normal operation. This is an indication that normal aging will have no affect on the operation reliability using this circuit modification.

(15) Using the modified circuit, as per paragraph 5.(11) above, tube V7 was replaced with 30 different 5725 tubes and each time the TSEC/KW-19A was checked to determine its reliability and if text intelligence could be detected on the signal line. It was observed on the oscilloscope that no trace of text intelligence could be detected on the signal line.

(16) This modified unit was then checked operationally as per System Test Specification MEA-13. It was observed and determined that this circuit modification did not adversely affect the TSEC/KW-19A in any respect.

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(17) The signal voltages applied to tube V7 using the modified circuit were measured to determine whether or not the tube was being operated according to the manufacturer's specification. The gating voltage now being applied to the control grid (pin 1) measured 10 volts negative. The test signal now being applied to the suppressor grid (pin 7) measured 20 volts positive, 20 volts negative (40 volt swing). These voltages are in excess of those required to prevent conduction.

(18) Mr. Nelson asked Mr. Trump if he was satisfied with the circuit modification and if he would give his consent to use this modification on the remaining units. Mr. Trump gave his verbal consent to Mr. Nelson that this modification was satisfactory and that it could be applied to the remaining units so that TEMPEST tests could be resumed.

(19) A telephone call was placed to Mr. Rosenski by Mr. Trump. Mr. Rosenski was informed of the circuit modification. Mr. Rosenski gave his verbal consent to Mr. Nelson that the modification could be applied to the 3 units that failed to meet the TEMPEST test requirement. Mr. Rosenski informed Mr. Nelson that he would follow up with the necessary written approval and action so that TEMPEST tests could be resumed.

(20) To further satisfy Mr. Trump that this modification would not adversely affect the TSEC/KW-19A, two units incorporating the circuit modification were checked operationally as per System Test Specification MSA-13. It was observed and determined that the circuit modification did not adversely affect the TSEC/KW-19A in any respect.

(21) To further satisfy Mr. Trump that this modification would not adversely affect the TSEC/KW-19A TEMPEST wise, 3 units incorporating the circuit modification were tested in the Shielded Enclosure through the complete frequency range of the Wide Band RF Amplifier as specified in Test Specification MSA-8A, paragraph 3.8.3.2.2.3. It was observed and determined that no trace of test intelligence was detected on the signal line or on the AC power line.

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6. CONCLUSIONS:

a. The Contractor in [redacted] testing the TSEC/KW-19A was experiencing a discrepancy in the production of their units that prevented the units from passing the [redacted] tests.

b. It is the opinion of the undersigned that the discrepancy is not due to the present Contractor but instead seems to have been inherent in the unit before the present Contractor became involved.

c. The defect was eliminated by a minor circuit modification.

d. The circuit modification consisted of reversing the two input signals on tube V7.

e. The circuit modification was made directly at the tube socket XV7.

f. The circuit modification did not involve any additional components or wires.

7. RECOMMENDATIONS:

a. It is recommended that the project engineer of the TSEC/KW-19A take action to have the Contractor change the existing circuitry to incorporate this modification as per paragraph 5.(11) above, in all remaining units to be manufactured.

b. It is further recommended that the project engineer of the TSEC/KW-19A investigate the possibility of incorporating the 5915A (General Electric's Dual Control Heptode) tube as the Space Driver Tube V7 instead of using the existing 5725 tube.

(1) The 5915A tube was designed especially for computer operation.

(2) The internal construction of the 5915A offers greater shielding and isolation. This added shielding will prevent adverse effects of coupling between the plate and the signal grid (signal grid not gating grid) within the tube.

(3) The 5915A has the same socket connections as the 5725.

(4) The typical operating characteristics of the 5915A are practically identical to those of the 5725.

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8. ACTION TAKEN ON RECOMMENDATIONS:

a. ENG has initiated action relative to the recommendation contained in paragraph 7.a. above.

b. ENG will initiate action relative to the recommendation contained in paragraph 7.b. above.

DAVID M. TRUMP
ENG-113

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17 December 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

The Magnavox Company

b. Address

1505 South Main Street, Urbana, Illinois

c. Dates of Conferences

8, 9, 10 December 1958

2. EQUIPMENT:

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

3. REPRESENTATIVES:

a. NSA

Lt. Colonel Fred M. McCarthy, Chief, EMG-12
Mr. Raymond R. A. Rozanski, TSEC/HW-19A Project Engineer, EMG-121
Mr. David M. Trump, Equipment Specialist, EMG-113

b. U. S. Signal Corps

Mr. Edward Qualter Resident Government Inspector in Charge

c. The Magnavox Company

Mr. J. E. Heath, Factory Manager
Mr. G. Nelson, TSEC/HW-19A Project Engineer
Mr. D. Ormiston, Personnel and Security Manager
Mr. H. E. Rupple, Quality Control
Mr. R. H. Severance, Urbana Division, Chief Engineer
Mr. W. C. Teagno, Sales Manager

4. PURPOSE OF TRIP:

This trip was made in an effort to avoid a possible discontinuation of production (and consequently delays in scheduled delivery of equipments) by endeavoring to determine why Magnavox Production Model TSEC/HW-19A equipments were failing to meet a requirement contained in paragraph 3.2.5.2.2.5 of Test Specification NSA No. 8A after two Preproduction Model equipments met the requirement.

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5. CONFERENCE BRIEFS:

a. Mr. Rozanski requested that the Contracting Officer be formally notified if Magnavox discontinued production of TSEC/HW-19A equipments for any reason. This request was made because Messrs. Nelson and Heath both stated that no additional production would be initiated until a circuit-design deficiency in TSEC/HW-19A equipments was corrected.

b. The Magnavox representatives stated that in their opinion the circuit design deficiency was responsible for Magnavox-produced equipments not meeting one requirement contained in paragraph 3.2.5.2.2.5 of Test Specification NSA No. 8A. By trial and error, Magnavox found that the addition of a capacitor would allow the equipments to meet the requirement. However, they had not determined the cause of the deficiency. Mr. Rozanski stated that adding a capacitor was not acceptable to NSA since the specific cause of the deficiency was not known. Later investigation by the NSA representatives indicated that the "gate" tube V-7, was not completely cutting off signals when it should; this was the cause for equipments failing to meet the one requirement contained in paragraph 3.2.5.2.2.5. After this, Mr. Rozanski told Mr. Nelson that it was NSA's intention to have the tube cut off completely when it was supposed to be.

c. Mr. Rozanski stated that the first three Production Model equipments should have been delivered to NSA per contractual agreements so that NSA could conduct various phases of environmental tests simultaneously. This would permit a speed-up in the acceptance or rejection of the two Preproduction Model equipments. Mr. Qualter pointed out that waivers for three requirements would be necessary in order to do this since the equipments did not meet them. Mr. Rozanski pointed out that previously Magnavox informally requested these waivers and that Mr. Rozanski suggested that Magnavox request the waivers in a formal manner. Further that the waiver request would probably receive favorable consideration for the reasons noted above. Mr. Nelson stated that he would initiate action to obtain waivers for the paint requirement of relay #CE 165351, the "B" minus ripple voltage requirement, and one requirement contained in paragraph 3.2.5.2.2.5 of Test Specification NSA No. 8A. If NSA grants these waivers, Magnavox will submit the three equipments to the Resident Government Inspector for acceptance.

d. The NSA representatives commented that the number of people on the access list for the screened room appeared to be excessive. Lt. Colonel McCarthy stated that a security clearance did not automatically endow an individual with the "need to know" which should govern the placement of people on the list. Mr. Severance instructed Mr. Nelson to obtain a copy of the list after the conference in order to review it.

e. The instructions on how to prepare changes and corrections for KAM-40/TSEC Repair and Maintenance Instructions for TSEC/HW-19A, were reviewed. Mr. Nelson stated that these changes and corrections, which are overdue by a matter of months, would be mailed to NSA by 15 December 1958.

f. Mr. Nelson stated that Magnavox had received a telegram from NSA on Friday, 5 December 1958 directing Magnavox to fabricate two sets of rack mount channels and liners (according to Magnavox's suggested redesign), and to purchase drawer slides for them. He stated that these items would be shipped from Magnavox to NSA by 26 December 1958.

6. CONCLUSIONS:

a. After two Preproduction Model equipments had been accepted, two out of the next three Production Model TSEC/HW-19A equipments failed to meet one requirement of Test Specification NSA No. 8A. Magnavox had not determined the cause of failure, but during this trip, the NSA representatives did. Magnavox was told of the general approach NSA intended to use in solving the problem. Further technical details of this problem will be covered in the trip report of Mr. Trump, ENG-113.

b. Magnavox had not submitted three Production Model equipments for delivery to NSA per schedule since the equipments did not meet three requirements. Consequently, NSA will probably lose most of the time it had planned to save by conducting simultaneous environmental tests with these three equipments.

c. According to a Magnavox promise, the first monthly report containing changes and corrections to KAM-40/TSEC will be mailed to NSA by 15 December 1958. The contractor has never submitted a monthly report containing these changes as he is required to do under paragraph 3.1.7.1 of Purchase Description NSA No. 10. The changes to KAM-40/TSEC have to be expedited in order to have the manuals shipped with the equipments to the Services. This expediting will not guarantee that the manuals will be prepared in time for the first shipment of equipments.

d. Redesigned rack mount channels and liners, plus drawer slides to fit, will be shipped to NSA by 26 December 1958. This will allow the remainder of the environmental tests on the two Preproduction Model equipments to be initiated.

e. Lt. Colonel Fred M. McCarthy will write a separate trip report which covers his activities for this trip.

7. RECOMMENDATIONS:

It is recommended that:

a. ENG determine if any circuit redesign is necessary to cause TSEC/HW-19A equipments to pass all requirements of paragraph 3.2.5.2.2.5 of Test Specification NSA No. 8A. Further, if redesign is necessary, to initiate action to notify the contractor of these changes.

b. CSEC-05 initiate action to give the contractor waivers as follows:

(1) Change the semi-gloss paint requirement to a lustreless paint requirement for the paint used on the dust cover of relay #CE 165551; this is to be allowable for equipments with serial numbers 362 to 377 inclusive.

(2) In paragraphs 2.9.2, 4.4.2.5, and 6.10 of System Test Specification NSA No. 13, the maximum 10 millivolt ripple voltage limit is changed to a maximum of 20 millivolt ripple voltage for equipments with serial numbers 362 to 374 inclusive.

(3) Interchange the wires which are connected to pins 1 and 7 of the socket for tube V-7 in all TSEC/HW-19A equipments beginning with the equipment that has serial #362.

It is recommended that a copy of these waivers be transmitted to the Resident Government Inspector in Charge at the Magnavox Plant in Urbana, Illinois. It is further recommended that the delivery of the three TSEC/HW-19A equipments which were scheduled for delivery to NSA by 1 December 1958 be expedited.

c. CSEC-05 initiate action to have changes and corrections to KAM-40/TSEC, Repair and Instruction Manual for TSEC/HW-19A, forwarded to ENG prior to 22 December 1958. Further, that CSEC-05 initiate action to remind the contractor that the contractor has not in the past and is not now meeting the terms of the contract (paragraph 3.1.7.1 of Purchase Description NSA No. 10) by failing to submit monthly reports on changes and corrections to KAM-40/TSEC, Repair and Maintenance Manual for TSEC/HW-19A.

8. ACTIONS TAKEN ON RECOMMENDATIONS:

a. Regarding the recommendation contained in paragraph 7.a above, circuit redesign will probably not be necessary. On 12 December 1958, while at Magnavox, Mr. Trump reported back to NSA that transposing the wires connected to pins 1 and 7 (control grid and shield grid, respectively) of tube V-7 eliminated the deficiency which made this trip necessary. Mr. Trump reversed the two wires in two GFE equipments which NSA furnished to Magnavox and the three Production Model equipments which Magnavox assembled. In all cases the deficiency was not detectable. Mr. Trump ascertained that tube V-7 was operating within recommended voltages and currents. ENG will initiate action to have these two wires transposed on all equipments which have been or will be produced.

b. The recommendations contained in paragraphs 7.b and 7.c have been informally coordinated with CSEC-05.

Raymond R. A. Rozanski

RAYMOND R. A. ROZANSKI
ENG-121

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~~SECRET~~

19 November 1958

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

The Magnavox Company

b. Address

1905 South Main Street, Urbana, Illinois

c. Dates of Conferences

27 October 1958 through 7 November 1958 Inclusive

d. Equipment Nomenclature

TSEC/SW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

e. Contract

DA49-170-sc-2869

2. Representatives:

a. NSA

Mr. Raymond R. A. Rezmoski, Project Engineer, ENG-121
Mr. Norman A. Steed, Quality Assurance Representative, ENG-312
Mr. David Tremp, Equipment Specialist, ENG-113

b. Resident Government Inspector in Charge

Mr. Edward Coulter, U. S. Signal Corps

c. Magnavox

Mr. James Smith, Production Manager
Mr. Gene Nelson, Project Engineer
Mr. Harold Ripple, Quality Control
Mr. Steven Thomas, Products Manager
Mr. J. C. Dimond, Chief Engineer

~~SECRET~~

[redacted]

3. Purpose of the Trip:

The purpose of the trip was to:

a. Observe Hayward personnel perform visual-mechanical inspection on the first two TOW/M-151 Preproduction Model equipments which Hayward assembled at their Wilmington, Illinois plant.

b. Assist the Resident Government Inspector in performing those same inspections and tests in order to accept the two equipments.

c. Determine that Depot Test equipment was calibrated, was functioning properly, and had a log for the calibration.

d. Observe Hayward production personnel perform Operational and Support Tests on the two Preproduction Model equipments in accordance with System Test Specification SSA No. 13 and Test Specification SSA No. 8A respectively.

e. Indoctrinate the Resident Government Inspector with Depot Test equipments and procedures.

4. Conference Briefs:

a. Visual-Mechanical Inspection

(1) Mr. Quiter, S.C.D.I. assigned one of his personnel to the SSA Quality Assurance Representative to review Signal Corps procedures on inspecting incoming material for the TOW/M-151. Upon inspecting Signal Corps records it was noted that no major component for the TOW/M-151 had been submitted to Signal Corps for inspection. It was found that these items were in the process of being inspected by Hayward inspection personnel.

(2) Mr. Stout and Mr. Quiter performed an informal visual-mechanical inspection on the two TOW/M-151 Preproduction Model equipments in order to initiate the type of workmanship that would not be acceptable. Hayward personnel were given a list of defects contained in the first equipment. Among other things, the defects included poor wiring (i.e., cables were insufficiently tied and leads were excessively long, looping, or too tight, all of which resulted in an untidy appearance), worn anodized joints, burned capacitors on component board C-9, eight components not identified with either CS or military identification numbers, and two relays incorrectly marked with the prefix K instead of K.

(3) After Magnavox personnel had reworked the first Preproduction Model equipment, and after it was submitted to the Resident Government Inspector for visual-mechanical inspection, the NGI rejected it. This equipment still contained five major defects, three minor defects and three cosmetic defects. The major defects consisted of an unsoldered connection, a grounded terminal, a wire rubbing against the arm of potentiometer R-163, a tack wire, and excessively long wire leads that still appeared untidy. The next time the equipment was submitted, it was accepted as passing visual-mechanical inspection. It was accepted with some untidy wiring and the 8 components that were not stenciled.

(4) The second Preproduction Model equipment was accepted as passing visual-mechanical inspection with the same conditions as noted for the first equipment. Mr. Heath stated that the untidy appearance of wiring would be completely eliminated before the tenth equipment was produced. Mr. Thomas stated that production would have to be stopped in order to stencil the 8 components. The components consisted of radio filter FL-1, relays K-2 and K-4, buzzer alarm BS-6, spectal tube shields V-14, V-15, and V-16, and the blower motor. Mr. Rozanski pointed out that Magnavox had failed to comply with paragraph 3.4.1 of ESA Purchase Description No. 10 which in part requires the following: "all components likely to be replaced in service use, and for which no specific markings and identification requirements are given, shall be referred to the Contracting Officer for identification." Mr. Rozanski agreed that Magnavox could rubber stamp the unmarked components already in the assembly line but that the remainder of the components, especially spare parts, had to be stenciled properly. For the purpose of ESA giving Magnavox a waiver for marking requirements, Mr. Nelson stated that he would determine how many parts would be rubber stamped before the parts with correct stenciling would be available. Mr. Nelson provided Mr. Rozanski this information approximately 14 November 1958. Mr. Rozanski agreed to accept the two Preproduction Model equipments without stenciling on the 8 components. He stated that this was done in order not to delay the environmental testing of these equipments.

(5) On 5 November 1958 Magnavox installed the first new wiring harness boards on the assembly line. Mr. Heath stated that other boards would also be installed. These boards are intended to eliminate the untidy appearance of wiring.

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b. Operational Tests

(1) Mr. Zawacki and Mr. Stead observed a Magnavox production employee perform approximately one quarter of the operational test on the first Preproduction Model equipment before Mr. Zawacki requested that a Magnavox technician complete the test. This request was made in order to save time since the production employee was very slow at performing the tests. Also, the production employee could not, in some cases, read the character values and had to have assistance on occasion. Mr. Nelson stated that eventually there would be a total of five non-technicians trained to perform the operational tests. Also, a technician would remain at the operational test position to assist them. Mr. Quintero was requested to perform close surveillance on operational tests until such time as the 5 production employees were proved satisfactorily competent at operational testing techniques.

(2) The two Preproduction Model equipments passed operational tests. However, the voltages at test points J-29 and J-36 did not fall within the limits specified in NSA Test Specification No. 13. The voltage at J-29 was + 39 volts minimum. This was a result of the higher gain of the tubes which Magnavox was using. (The tubes were of the proper type but were made by a different tube manufacturer.) The voltage at J-36 was slightly less than one volt too low (a minimum of 22.1 volts was specified). In both cases the voltages in question were not critical to operating characteristics. In fact, in the case of J-29, the lower voltage provides a more positive cut-off of the next tube. It was agreed that after a trend has been established, NSA System Test Specification may be revised to reflect the different voltages.

c. Tempest Tests

(1) Mr. Trump witnessed a Magnavox technician perform Tempest Tests on the two TSEC/KW-13A Preproduction Model equipments. The equipments passed Tempest Tests. The technician was reasonably competent at conducting the tests. Mr. Trump found that the Tempest Test Instruments were calibrated according to the manuals and that Magnavox had started a maintenance log on these instruments.

(2) As a result of observing the Tempest Tests, Mr. Trump suggested ten changes to Test Specification NSA No. 4A which were accepted by Messrs. Nelson and Zawacki. The first, a change to paragraph 3.2.3.1.2.3.1, requires tuned antennas down to 30 megacycles instead of 90 megacycles. This creates a more sensitive test and is feasible because Magnavox's screened room is large enough to

accomodate the 90 megacycle antenna. The second change permits the use of the Du Mont type 322 oscilloscope, instead of the Tektronix type 535 or 545 oscilloscope for the test conducted under paragraph 3.2.5.2.1.1. The Du Mont oscilloscope has a smaller band pass, but is sufficient to detect the output signals of the receivers. Use of the Du Mont oscilloscope, in conjunction with a Beaver Generator, permits easier and more accurate scanning for this portion of the test. This results in a time saving of approximately two hours for each test.

(3) The ± 3% tolerance given in paragraph 3.2.5.1.2.2 of Test Specification NSA No. 61 did not agree with the ± 10% tolerance for test item J 28 set forth in NSA System Test Specification No. 13. It was agreed that Specification 61 would be changed to agree with System Test Specification No. 13. The specific paragraph changes to be made to System Test Specification NSA No. 61 are indicated in Inclosure #1.

(4) During the tests Mr. Trump indicated various cables which were inadequately terminated or shielded. The cables are used to interconnect various Tempest Test instruments. In each case the undesirable condition was corrected immediately.

(5) During the course of the Tempest Tests, Mr. Trump instructed the Resident Government Inspector sufficiently so that the inspector can determine that the tests are being conducted properly and that the proper data is being collected.

d. As a result of Magnavox having to rework the Preproduction Model equipments, NSA representatives worked overtime to observe or conduct tests before the end of their scheduled trip. Mr. Kosaski spent one evening while Messrs. Stead and Trump each spent 3 evenings at their respective tasks.

e. On approximately 4 November 1958, NSA representatives noted a possible security violation. The Tempest Test screened room was left unlocked and no one was in the room for at least eleven minutes. Classified documents were left in the room. In this manner, the classified documents were available to personnel who had inadequate or no security clearance. Mr. Kosaski reported this to Mr. Nelson.

f. A temporary part of an assembly line, consisting of a table, was placed in front of the screened room door. In such a position the table had to be moved occasionally so that personnel could enter or leave the room. When the door was opened, personnel at the table were practically forced to look into the room. This condition was reported to Messrs. Nelson and Thomas. Mr. Thomas stated that NSA physical security had inspected the area and approved it. However, the inspection had been made before any assembly lines were in it.

or personnel were in the area. This condition was eventually corrected by Mr. Dimond after one of the assembly line personnel was struck by the door when someone opened it in order to emerge from the screened room.

g. Magnavox Failure to Meet Purchase Description Requirement

(1) Besides the Magnavox failure to meet its obligations under paragraph 3.4.1 of Purchase Description NSA No. 10 (refer to paragraph 4.a.(4) above), Magnavox has also failed to meet its obligation under paragraphs 3.1.7.1, 3.1.7.2, 2.1.2 and 2.1.3 of Purchase Description NSA No. 10. Paragraph 3.1.7.1 requires that Magnavox submit monthly reports during the course of the contract concerning changes to KAM-40/TSEC, Repair and Maintenance Manual for the TSEC/KW-19A. To date Magnavox has not complied. Mr. Rosanski requested that they begin. Paragraph 3.1.7.2 requires that Magnavox review KAM-40/TSEC and bring it up to date for NSA prior to production. Magnavox has not done this, but Mr. Nelson has promised that this would be mailed to NSA by 15 December 1958.

(2) Magnavox has substituted components that Magnavox considers as components equivalent to those specified on drawings, such as Cemar relays instead of Potter-Brumfield relays. These relays were not specified for purchase according to Mil Specs. However, according to Purchase Description NSA No. 10, paragraphs 2.1.2 and 2.1.3, an attempt must then be made by the contractor to purchase the parts according to a nongovernment standard of some type such as the American Society for Testing Materials. Further, the substitution of the nongovernment standard is subject to the approval of the Contracting Officer. So far as is known, Magnavox has not sought such approval from the Contracting Officer.

h. Ordering Parts From Vendors

(1) Magnavox did not have all applicable Military Specifications to check components which they have purchased from vendors. Likewise they had no applicable Qualified Products List to determine whether or not vendors are selling approved parts.

(2) Mr. Qualter stated that Magnavox was giving vendors insufficient information and instructions when ordering components from vendors. In some cases applicable Military Specifications were not cited in purchase orders to vendors, or only portions of the specification were cited. Magnavox claimed that their purchase order plus the manufacturing drawing was sufficient to satisfy the requirements of paragraph 3.1.5 of NSA Purchase Description No. 10. Mr. Quathers pointed out how it was easily possible

for misunderstandings to occur at the vendor so that a component would be improperly Government Source Inspected or not inspected at all.

(3) A letter concerning this ordering was sent to Hagenuk by Mr. Quelter prior to this visit. A copy of this letter is included as Inclosure No. 2. Hagenuk did not properly answer it. Mr. Rosaldi made separate requests of Mr. Ingle and Mr. Heath for an answer to the inspector's letter. An answer was provided before the end of this trip but was never received by the inspector or the ESA representatives involved.

i. Spare Parts

Hagenuk has not received the approved WRE/DF-19A spare parts list. Mr. Nelson stated that as a consequence, shipping boxes would not be ready by 15 December 1958.

j. Rack Mounts and Liners

Hagenuk has not received approved manufacturing drawings for the redesigned rack mount liners and chassis. Mr. Nelson stated that rack mounts for the Preproduction Model equipments would be available three weeks after receipt of approved drawings. The production rack mounts and liners would be available 6 weeks after receipt of the drawings.

3. Conclusions:

a. The two WRE/DF-19A Preproduction Model equipments passed Operational and Tempest Tests, but did not have required CE or military identification numbers stenciled on eight different components. There was also a limited amount of untidy wiring. Subject to the Resident Government Inspector's acceptance, Hagenuk will mark the eight components on all Production Model equipments and in the spare parts, and has taken steps to completely eliminate any untidy wiring.

b. Hagenuk has not fulfilled its obligations under paragraphs 3.4.1, 3.1.7.1, 3.1.7.2, 3.1.2 and 3.1.3 of Purchase Description NSA No. 10. This resulted in the eight unmarked components noted in paragraph 3.a. above, no monthly reports nor preproduction report to ESA on changes necessary to fulfill MIL-E-5400, and no Contracting Officer's approval of subcontract standards by which the contractor was to buy parts. (There are parts which the contractor substituted as being equivalent to those specified on manufacturing drawings.)

c. The five Magnavox production personnel who will conduct operational tests, will not be technicians. However, one technician will oversee these five people. The first one had not indicated a reasonable degree of proficiency at conducting the test nor the ability to read an obscure indication. The Resident Government Inspector has been requested to keep close surveillance over operational tests. However, this may be impossible due to his many other duties.

d. Magnavox personnel satisfactorily performed Tempest Tests on the two Preproduction Model Equipments. The Tempest Test instruments were found to be calibrated properly.

e. Changes to Test Specification NSA No. 8A as listed in Inclosure No. 1, were agreed to in order to make Tempest Tests more sensitive and efficient.

f. A possible security violation was noted by NSA representatives. NSA physical security has not visited Magnavox's Urbana plant since the production facilities have been installed and started.

g. It is the opinion of the Resident Government Inspector and the Contracting Officer's Technical Representative that in some cases Magnavox has not informed vendors in a manner that is reasonably clear and explicit, that components are to meet applicable military specifications and are subject to Resident Government Inspection. Consequently, substandard components could result. Inclosed, as Inclosure No. 2 is the Inspector's formal request along these lines. On two occasions an answer to the inspector's correspondence was promised before the Technical Representative left. No such answer was given.

h. Since Magnavox has not received the spare parts requirements, shipping boxes will not be ready by 15 December 1958. This is the scheduled date for shipping the first 10 Preproduction Model equipments.

i. Magnavox has not received approved manufacturing drawings for the R4C/ AN-19A rack mounts and channels. Consequently, part of the environmental testing of the preproduction equipments may be delayed by a month or more. Also, the rack mounts and channels may not be ready for the 15 December 1958 shipment.

6. Recommendations:

It is recommended that:

a. C3EC-65 initiate any action deemed necessary or appropriate, to have the contractor fulfill his obligations according to Purchase Description NSA No. 10, especially with regard to paragraphs 3.4.1, 3.1.7.1, 3.1.7.2, 3.1.2, and 3.1.3. In the future, it is requested that it be ensured that the

contractor fulfill his obligations under paragraphs 3.1.4.5, 3.1.6, 3.1.7, and 3.1.8 which are a final report, a list of authorized factory changes, maintenance and repair manual information, and a list of special tools or equipment used for production, respectively.

b. NMD-3 send a representative to Magnavox at Urbana, Illinois from 1 December 1958 to 23 December 1958 in order to determine the proficiency of production personnel in conducting accurate operational tests. This to be accomplished by having the representative assist the Resident Government Inspector conduct 100% operational tests.

c. NSA initiate action to have Test Specification NSA 8A changed as indicated in Inclosure No. 1 to this report.

d. An NSA physical security representative visit the Magnavox plant at Urbana, Illinois to inspect the newly installed assembly line areas. Beforehand, this representative should informally coordinate his visit with Mr. Robert Klause, secure telephone extension 2140 at NSA.

e. CESC-05 read Inclosure No. 2, the Resident Government Inspector's correspondence to Magnavox. Further, should any or all of the Inspector's requests be proper, that CESC-05 initiate action to have the contractor comply with them.

f. CESC-05 initiate action to have the spare parts requirement for the TSEC/KW-19A sent to Magnavox at Urbana, Illinois.

g. This report may be downgraded to [illegible] when [illegible]

Raymond R. A. Rozanski
RAYMOND R. A. ROZANSKI
NMD-121

Norman A. Stead
NORMAN A. STEAD
NMD-312

David M. Trump
DAVID M. TRUMP
NMD-113

2 Incls:
1. Addenda to NSA Spec. No. 8A
2. Ltr fm E. Qualter, CAMIE, Subj: Purchase Orders, dtd 14 Oct 58

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AMENDMENT NO. 2 TO SPECIFICATION NAVAER 16-

1. In the last two sentences of paragraph 3.2.3.1.2.3.3 change the three numbers 90's to 30's so that the last two sentences read, "The antenna of the AI-21 shall be tuned to the frequency being checked except at 30 mc and below. At the frequencies below 30 mc the antenna shall be tuned to 30 mc."
2. Delete the last three sentences of paragraph 3.2.3.2.1.1 and add the following: "The Hewlett Type 329 dual beam oscilloscope shall be used in conjunction with the Pulser Generator for the tests to be conducted under paragraph 3.2.3.2.2.4. The Tektronix Type 535 or 545 oscilloscope shall be used for the tests to be conducted under paragraph 3.2.3.2.2.3. An oscilloscope with a vertical band pass of 1.7 mc or greater may be substituted for the Type 535 or 545."
3. At the end of paragraph 3.2.3.2.1.1.1 add, "(b) Pulser Generator."
4. At the end of the second line of paragraph 3.2.3.2.2.4 replace the colon with a comma and add, "Pulser Generator and Hewlett Type 329 dual-beam oscilloscope."
5. At the end of the third line in paragraph 3.2.3.2.2.3 replace the colon with a comma and add, "and Tektronix Type 535 or 545 oscilloscope."
6. In the last two lines of paragraph 3.2.3.1.2.2, change the ±5% to ±10% tolerance.
7. In the box at the bottom of the first test data sheet change the voltage limits for J 25 from "1.68 to 1.78" to "1.63 to 1.81".

15 October 1958 E. Walter, 6810

Purchase Orders

1. A review of Purchase Orders placed for material for use on government contracts indicates a need for clarification of requirements.

2. It is requested that necessary action be taken to assure that all future Purchase Orders contain the following information.

A. A clear description of the material ordered including the applicable specification and details of any applicable modification.

B. A statement indicating whether Qualification Approval or Preproduction Approval is required.

C. A statement indicating "per blue print attached" when applicable.

D. The approval statement when Government source inspection is required.

E. Name and address of the plant where Government Source Inspection will be performed if different from vendors address.

F. The applicable government contract number.

3. It is also requested that "source inspection" be deleted from the following parts:

A. All tube sockets and tube shields.
B. All fuses
C. All open type relays
D. CS-165977, Capacitor
E. CS-165911, Fan
F. CS-165907, Filter

4. A periodic review of source inspection requirements, will be made by the Government QA Representative to determine any additions or deletions to the established list, that may be required.

Edward F. Walter, 6810

EW/jm

Encl. #2

6 November 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Magnavox Corporation

b. Address

5512 Cazenlina Avenue
Los Angeles, California

c. Dates of Conferences

20 through 23 October 1958

d. Equipment Nomenclature

TSEC/KW-19, Electronic Start-Stop Teletypewriter Signal Mixer and Associated Teletype Equipment

e. Contract Number

None

2. REPRESENTATIVES:

National Security Agency

Mr. Carroll T. Robinson, S/D
Mr. Thomas Cosgrove, S/D
Mr. George M. Cohn, S/D
Mr. Forrest Riffle, COMC

Magnavox Corporation

Mr. Robert Halberson, Project Engineer

Pacific Telephone Company (PT&T)

Mr. Donald Wente

6 November 1958

3. PURPOSE OF TRIP:

The purposes of the trip were to:

a. Replace Telephone Company (TELCO) 131-B2 terminal equipment with KSA, TSEC/KW-19 terminal equipment on the Magnavox end of a TWX link between Magnavox Corporation, Los Angeles, California and R/D, Fort Meade, Maryland.

b. Provide training to Mr. Congrove, KSA R/D Resident Engineer at Magnavox in the maintenance of TSEC/KW-19 terminal equipment.

4. CONFERENCE BRIEFS:

a. Equipment for the subject terminal in California, had been shipped to Magnavox Corporation by KSA previous to the arrival of the undersigned on 21 October 1958. The Teletype equipment was shipped from TCSM, Fort Meade, Maryland, and the crypto and mixer equipment from NSA, KSA. Mr. Gayson of TCSM had made the necessary arrangements through U. S. Signal Corps, so the TWX terminal equipment at Magnavox would be changed from TELCO 131-B2 equipment to the Agency's KW-19 equipment on 24 October 1958.

b. Upon arrival of the undersigned at Magnavox, it was found that the Teletype equipment furnished by TCSM was fully modified and ready for installation, but the TSEC/KW-19 equipment furnished by NSA had not been modified to accept the KYK-1 shunt device. The kit of parts necessary for local modification had not been shipped with the equipment. Mr. Stephens, NSC, was informed of this deficiency by wire note. Mr. Stephens advised that the equipment was not to be used on line until the shunt device was installed and operative. He further stated that the parts for modification would not be available from the Agency for approximately ninety days, and that parts for modification should be procured at Magnavox Corporation. Mr. Congrove, the KSA R/D Engineer, through various sources at Magnavox Corporation, finally assembled all necessary parts. The modification was completed and checked 23 October 1958.

c. The Pacific Telephone Company representative, Mr. Donald Veste, arrived 24 October 1958, to disconnect the TELCO equipment from the TWX line. At this time, Mr. Veste informed the undersigned that all TELCO TWX lines were operated on 20 ma line current and that 60 ma current would not be provided for operation of KSA terminal equipment since this would involve non-standard operation through the TELCO repeater systems. Further inquiry of the TELCO

Test Board at Beverly Hills, California, confirmed this information. This difficulty was solved by modifying the KW-19 to operate on the 20 ma line current furnished by WUAO. This was accomplished by changing the value of the shunt resistor from 330 ohms, 2 watts to an 8K ohm, ½ 10%, 2 watts across the receive relay in the KW-19 equipment. Upon completion and local testing of this modification on 26 October 1953, the equipment was connected to the TWX line. However, on-line tests could not be completed because, due to the four-hour time difference of the two locations, the personnel at the Fort Meade terminal had gone off duty.

4. On 27 October 1953, the KW-19 terminal equipment at Hagaruva, California, was brought up on-line to the Fort Meade terminal for testing. Clear text reception from Fort Meade to the Hagaruva terminal was satisfactory. Reception at Fort Meade from the Hagaruva terminal was readable but not satisfactory. The Hagaruva terminal was taken off-line for local testing and the trouble was found to be a poor ground connection to the equipment. A proper ground was installed and the equipment was put back on line. No further tests could be conducted because it was off duty hours at the Fort Meade terminal.

5. On 28 October 1953, the Hagaruva terminal was connected to the TWX link and through to the Fort Meade terminal for further testing. All tests were satisfactory in the test condition, but satisfactory contact could not be established in cipher condition. Since the difficulty appeared to be in the Fort Meade terminal cipher device, Mr. R. Johnson, WCAN Maintenance, was called to the Fort Meade terminal. He discovered a malfunctioning crypto device. Mr. Johnson corrected this trouble and cipher contact was established. The circuit and equipment was then fully checked out by Mr. Johnson and the undersigned. Test messages were transmitted by both key-board and transmitter-distributor from both terminals. Contact was deliberately broken and re-established several times during this test. The terminals and line checked satisfactory in all respects. The equipment was then released to Mr. Cohn, WCA S/D at the Hagaruva terminal and Mr. Robinson at the Fort Meade terminal for use. The undersigned observed approximately 45 minutes of traffic between Mr. Cohn at Hagaruva and Mr. Robinson at Fort Meade in cipher condition. No malfunctioning of equipment occurred during this time.

6. Mr. Congrove, WCA R/D Resident Engineer at Hagaruva aided in modifying, wiring, testing and installing the KW-19 terminal equipment at Hagaruva. During this time Mr. Congrove was given

on-the-job training in theory and circuits of the TSEC/KW-19. Mr. Congrove was also briefed in the theory of Teletype as used with the KW-19, and readily grasped all instructions. Mr. Congrove stated he was satisfied with the training received from the undersigned. Manuals necessary for maintenance of the KW-19, Teletype and associated equipment were available to Mr. Congrove at Magnavox.

5. CONCLUSIONS:

a. The Teletype equipment furnished by TSEC was fully modified and ready for installation.

b. The TSEC/KW-19 was not modified for use with the KXK-1 shunt device and parts were not furnished for this modification. Parts were procured locally from Magnavox supply to perform this modification.

c. TELCO furnished only 20 ma line current, necessitating modification of KW-19 to operate on 20 ma circuit.

d. Mr. Congrove, NSA R/D Resident Engineer at Magnavox was satisfactorily trained in maintenance of the terminal equipment.

e. Terminal equipment was fully installed and operating satisfactorily, 23 October 1958.

f. All command personnel of both R/D and Magnavox Corporation were very cooperative and helpful in making the installation.

6. RECOMMENDATIONS:

It is recommended that:

In the future when an installation of this type is to be made outside the Agency, the crypto and mixer equipment be fully modified in accordance with Agency requirements before being shipped to the place of installation, and that all parts necessary for installation of this equipment be included in the initial shipment. This is a NET action.

Forest Ripple
Forest Ripple

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~~[illegible]~~ 17 October 1958

TRIP REPORT

1. Identification of Trip:

   a. <u>Name of Organization</u>

   Magnavox Company

   b. <u>Address</u>

   Urbana, Illinois

   c. <u>Date of Conference</u>

   6 through 10 October 1958

   d. <u>Equipment Nomenclature</u>

   TSEC/[illegible], Electronic Start-Stop Teletypewriter Signal Mixer

   e. <u>Contract</u>

   [illegible]

2. Representatives:

   NSA

   Mr. [illegible], Quality Assurance Representative ([illegible])
   Mr. [illegible], Chief, Standards Branch ([illegible])
   Mr. [illegible], Project Engineer ([illegible])

   <u>Signal Corps Inspection Agency</u>

   Mr. [illegible], Resident Government Inspector, Signal Corps
   Mr. [illegible], Government Inspection Specialist, Signal Corps

   <u>Magnavox Company</u>

   Mr. [illegible], Products Manager
   Mr. [illegible], Project Engineer
   Mr. [illegible], Quality Control Manager

3. Purpose of the Trip:

   The purposes of the trip were to:

   a. Indoctrinate the Resident Government Inspector on NSA Standard of Acceptance No. [illegible].

Declassified by D. Janosek,
Deputy Associate Director for Policy and Records
on 2/4/11 and by BFB

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b. Discuss any comments or questions which the Resident Government Inspector or Magnavox representatives might have as a result of their review of the Standard since the Magnavox production of TSEC/SH-19A equipments is scheduled to begin 15 October 1958.

c. Confer with Magnavox Quality Control and Management personnel to emphasize the quality objective related to NSA's requirements of the subject equipment.

d. Discuss technical matters, especially with regard to a design change in the Back Mount Channels and Liners.

4. Conference Briefs:

a. Conference of 2 October 1958

A conference with NSA, Signal Corps and Magnavox Inspection personnel was held to discuss all comments or questions which the Signal Corps or Magnavox representatives might have pertaining to NSA Standard of Acceptance No. 108. During the conference, the following items were discussed and resolved between participants:

(1) The Resident Government Inspector suggested that two, instead of six, government visual and mechanical inspection stations, as proposed by NSA, would provide the necessary quality of inspection on the TSEC/SH-19A equipments. One of the two stations would be used for inspection of TSEC/SH-19A chassis-harness, prior to wiring, and the other station would be used for inspection of the completed unit. NSA representatives agreed to this suggestion. Mr. Shoal prepared a new Acceptable Quality Level for these stations with an AQL of 1.5% major and 4% minor for the first station, and 4% major and 10% minor for the second station.

(2) The Resident Government Inspector requested the following items:

(a) A copy of Purchase Description NSA No. 108.

(b) Copies of all current approved Revision Directives NSA Form 270.

(c) The names of NSA personnel assigned to Contract NSA-170-ac-0165.

NSA representatives told the Resident Government Inspector that action would be initiated to have these items supplied to him.

(3) Magnavox suggested changes to NSA System Test Specification No. 13. These changes pertain to the operation of a new test panel, which provides for faster readings via pre-loaded test jacks and a manual switching procedure. Evaluation of the test panel and test procedure indicates that accurate results can be obtained at a much faster rate than could be obtained under the present procedure. The use of the test panel was approved.

(4) A draft of the Magnavox production and inspection flow chart plans was reviewed by Messrs. Bulkeley and Stead. It was determined by NSA representatives that the flow chart and the actual procedure do not agree. Magnavox stated that this will be corrected, and, upon completion, a copy will be submitted to NSA for review.

b. Conference of 10 October 1958

(1) Magnavox representatives were of the opinion that NSA Standard of Acceptance No. 10 required too much lacing on the wiring harness of the TSEC/SP-19A. Messrs. Bulkeley and Stead indicated that the Standard was being misinterpreted. For instance, in the case where two adjoining breakouts containing 6 or more wires are located within 1/2" of each other, only three wraps of lacing are required and not six as interpreted by Magnavox. According to NSA Standard of Acceptance No. 10 Magnavox had deficiencies in three main cable harnesses which they have already produced. Magnavox will overcome the deficiencies by adding ties, wherever necessary, as specified in the Standard. All subsequent cable harnesses will also be fabricated in accordance with NSA Standard of Acceptance No. 10.

(2) Mr. Nelson stated that Magnavox did not have specific instructions for packing and shipping TSEC/SP-19A equipment. That is, how many equipments were to be packed for Army requirements each month, and how many equipments were to be packed for Navy requirements each month. Mr. Nowacki stated that these instructions should be obtained from the Contracting Officer.

(3) Along this line Mr. Qualter gave Mr. Nelson six copies of Form SC-CP4, Technical Action Request. This form will be used by Magnavox to apply for deviation to packaging and spare parts requirements for the first two Preproduction Model equipments plus the next three equipments that come off the production line. The deviation will be necessary because Magnavox does not officially have the spare parts requirements; therefore, they cannot design and prepare boxes in time to ship spares and the five equipments. Magnavox will ship the five equipments to Assistant Director, National Security Agency, 3801 Nebraska Avenue, N.W., Washington 25, D. C., Attention: [redacted]/ANG-322, in containers made according to best commercial practices. Magnavox will transmit the equipment in a Magnavox station wagon and be responsible for any shipping damage. At NSA, the NSA Acceptance Section (ANG-312) will inspect the equipments for any possible damage caused in transit. Messrs. Thomas and Nelson agreed that spare parts and the proper shipping containers for these five equipments will be sent to NSA no later than 15 December 1958. These five equipments will undergo tests by NSA; consequently, the proper packing boxes will not be required before 15 December 1958.

(4) Magnavox representatives, the Resident Government Inspector and the NSA representatives all agreed that it would be better to age the equipments first and then to perform the tests and checks of NSA System Test Specification No. 13. This is the reverse order to that now indicated. By aging the equipment first, Magnavox technicians and the Resident Government Inspector will test and obtain data from equipments that are in very nearly the same condition. Magnavox and NSA representatives will further study this proposal. Changes relating only to the order of testing will be provided for in the Test Specification by addition of the following statement: "The test procedure as outlined below does not necessarily depict the order of testing. The order of testing will be agreed upon by the NSA Technical Representative and the Contractor."

(5) Magnavox is not clear on the interpretation of paragraph 3.3.10 of the Purchase Description No. 10 in regard to moisture-fungus proofing. Mr. Rozanski suggested Magnavox send NSA a formal request for clarification. At Mr. Stout's suggestion, Magnavox agreed to place electrical insulating sleeves on all capacitor mounting bolts in the CSEC/RT-19A. This sleeving is in only four of the five sets of capacitor mounting bolts in the model equipment furnished to Magnavox by NSA.

(6) Mr. Nelson stated that drawings for Magnavox's suggested redesign for Rack Mount Channels and Liners had not yet been approved. Mr. Rozanski told Mr. Nelson that an official answer was in the offing. Mr. Nelson stated that it would be necessary to fabricate these parts in Magnavox's model shop, at an added cost of $500 in order to have the parts ready for the two Preproduction Model CSEC/RT-19A equipments. Further, in order to save time, Magnavox will offer to subject the Channels and Liners to vibration tests if the Urbana plant facilities can handle it. The cost for the vibration tests was estimated by Magnavox representatives to be $1500. Mr. Rozanski stated that the entire matter should be submitted to the Contracting Officer, since costs were involved.

(7) Mr. Rozanski informed Mr. Nelson that power transformer T-1 has to be stenciled according to MIL-S-27A. Mr. Nelson called the vendor and arranged to have ten transformers returned to the plant for stenciling. This will be accomplished by 20 October 1958. All transformers will be stenciled. Mr. Rozanski also stated that any transformers not providing the specified minimum 10,000 hours service would be returned to Magnavox for replacement or Magnavox would be asked to make suitable restitution.

(8) Magnavox is replacing the 5.6 ohm 1 watt resistor in the power supply with 10 and 13 ohm 1 watt resistors in parallel, to give an approximate rating of 2 watts. Two resistors in parallel must be used since 5.6 ohm 2 watt resistors are not available. Tests have indicated that the original 1 watt rating was a borderline design. Mr. Nelson stated that no extra contract cost or schedule change will be involved.

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5. Conclusions:

a. The Signal Corps Inspector's suggestion to use two, rather than six, government inspection stations for visual and mechanical inspection is valid and will be adopted.

b. NSA should furnish to the Signal Corps Inspector copies of Decision Directives, Purchase Description and the names of personnel assigned to Contract No. [illegible].

c. According to Magnavox representatives, the deficiencies which NSA representatives noted in the first three main cable harnesses produced by Magnavox, will be corrected by adding ties wherever a deficiency exists with respect to the requirements of NSA Standard No. 16. The remaining harnesses will be laced in accordance with the Standard of Acceptance No. 16.

d. Magnavox representatives stated that they did not have instructions on how many equipments were to be packed for Army requirements and how many equipments were to be packed for Navy requirements each month.

e. Magnavox representatives stated that they will submit a formal request for clarification of moisture-fungus proofing as required in Purchase Description No. 12.

f. Magnavox representatives stated that they will insulate all five sets of capacitor mounting bolts instead of the four sets as indicated on the model [illegible] equipment which was furnished to Magnavox by NSA as a sample of their production.

g. The redesigned Rack Front Channel and Liners for the first two Preproduction Model equipments will have to be fabricated in Magnavox's model shop in order to meet schedules. Magnavox may elect to vibrationally test them at Urbana, Illinois in order to save time.

h. The power transformers will all be stenciled according to specification MIL-T-27A.

i. The 5.6 ohm 1 watt resistor in the power supply will be replaced by 10 and 13 ohm 1 watt resistors in parallel in order to give an equivalent 2 watt rating.

6. Recommendations:

It is recommended that:

a. [illegible] and [illegible] take the necessary action to supply the Signal Corps Inspector at the Magnavox plant in Urbana, Illinois with the following items:

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(1) A copy of Purchase Description No. 10. (Since this date, a letter request from the Signal Corps Inspector was received, and the P.D. was forwarded by [illegible].)

(2) Revision Directives on all approved changes to [illegible] manufacturing drawings.

(3) The names of RCA personnel assigned to Contract [illegible].

b. [illegible] take necessary action relative to scheduling shipping instructions for the [illegible] and to inform Engineers as soon as possible.

Raymond R. Rozanski
[illegible]
[illegible]

Francis J. McNeeley
FRANCIS J. McNEELEY
ENG-31

for Francis J. McNeeley
NORMAN A. STEAD
ENG-312

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25 September 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory (AIL)

b. Address

1101 Stewart Avenue
Mineola, New York

c. Dates of Conference

18 through 19 September 1958

d. Equipment Nomenclature

TSEC/SM-194, Electronic Start-Stop Teletypewriter Signal Mixer

e. Contract

NObsr-170-ac-2500

2. REPRESENTATIVES:

National Security Agency

Mr. Norman A. Stead, Contracting Officers Representative, ERI-3

Airborne Instruments Laboratory

Mr. John Murray, Project Engineer

3. PURPOSE OF TRIP:

The purpose of this trip was to perform acceptance on one set of TSEC/SM-194 bulk spare parts.

4. CONFERENCE NOTES:

a. The final shipment on Contract NObsr-170-ac-2500 of one set of bulk spare parts was evaluated 18 through 19 September 1958.

25 September 1958

During this evaluation the following defects were noted:

(1) Line Item No. 11 on bill of material, 65 resistors, variable - two missing.

(2) Line Item No. 30 on bill of material, cap and chain plugs - two missing.

(3) Line Item No. 37 on bill of material, switch, rotary - hardware missing.

AIL Corrected these defects and shipment was accepted.

b. Evaluation of Line Item No. 46 on bill of material, meters, should be accomplished at EMA. The subcontractor cannot supply AIL these meters until late October 1958.

5. CONCLUSIONS:

a. One set of bulk spare parts, less meters, was inspected and accepted by the Contracting Officers Representative.

b. The shipment of 25 meters, CR 145981, on Contract DA49-170-sc-2000, will be ready for shipment the latter part of October 1958.

6. RECOMMENDATIONS:

It is recommended that:

CSEC-05 take the necessary action to notify AIL to ship meters to EMA for final acceptance by Quality Assurance Section, EMD-312. This is a CSEC-05 action.

William M. Stalfort
for [illegible] A. [illegible]
Contracting Officers Representative, EMD-3

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12 August 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

   a. Name of Organization

      Airborne Instruments Laboratory (AIL)

   b. Address

      Mineola, New York

   c. Date of Conference

      24 July 1958

   d. Equipment Nomenclature

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

   e. Contract

      DA49-170-sc-2000

2. REPRESENTATIVES:

   National Security Agency

   Mr. Russell O. Simmons, ENG-3

   Airborne Instruments Laboratory

   Mr. John Murray, Assistant Project Engineer

3. PURPOSE OF TRIP:

   The purpose of this trip was to perform evaluation on one set of TSEC/KW-19A bulk spares, which was ready for shipment to the Army.

4. CONFERENCE NOTES:

   a. On 24 July 1958, one set of bulk spare parts was evaluated and accepted. Packaging was performed under surveillance

of the NSA Representative. Form DD-250, Material Inspection and Receiving Report, was signed for one set of bulk spares and six transformers. The six transformers were a shortage from a previous shipment.

b. ASL will have final shipment of bulk spare parts ready on schedule with exception of meter CE 165501, which the supplier cannot provide until 15 October 1958. It will be necessary for NSA to make a decision as to whether to accept a partial shipment in September 1958 or wait for a complete shipment with meters in October 1958.

5. CONCLUSIONS:

a. One set of bulk spare parts was inspected and accepted by the NSA Representative.

b. The final shipment of one set of bulk spare parts on Contract DA49-170-sc-2400 will be ready for shipment in September 1958 with the exception of meter CE 165501 or complete shipment with meters in October 1958.

6. RECOMMENDATION:

It is recommended that:

ASL be furnished information as to whether final shipment of one set of bulk spare parts should be shipped with or without meters. This is an ENG action.

Russell O. Sizemore
RUSSELL O. SIZEMORE
ENG-3

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17 July 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

   a. Name of Organization

      Magnavox Company

   b. Address

      Urbana, Illinois

   c. Dates of Conferences

      7 through 11 July 1958

   d. Equipment Nomenclature

      TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

   e. Contract

      DA49-170-sc-2465

2. REPRESENTATIVES:

   National Security Agency

   Mr. Norman A. Stead, Quality Assurance Representative, ENG-3

   Signal Corps Inspection Agency

   Mr. E. Qualter, Inspector

   Magnavox Company

   Mr. H. E. Rupple, Quality Control Manager
   Mr. G. Nelson, Project Engineer

3. PURPOSE OF TRIP:

   The purposes of the trip were to:

   a. Advise and train the Signal Corps Inspector in the use of Standard of Acceptance #10A and System Test #13, which are used for acceptance of the HW-19A.

b. Resolve any problem that might arise pertaining to NSA Standard of Acceptance #10A, and its intended use.

c. Investigate Magnavox's manufacturing process inspection procedure on incoming material, parts, sub-assemblies and final assembly of the HW-19A.

d. Coordinate ~~a tentative~~ Standard of Acceptance #10A with Magnavox.

4. CONFERENCE BRIEFS:

a. A conference was held with Magnavox, Signal Corps and NSA personnel to coordinate NSA Standard of Acceptance #10A, which will be used as acceptance criteria in production of the HW-19A. Magnavox's personnel were under the impression that inspection would be done strictly on a surveillance basis by the Government inspector. Mr. Rupple, Magnavox Company, referenced Purchase Description #10, paragraph 4, which, in his interpretation, states, inspection will be under the surveillance of the Resident Government Inspector. Inspection procedures outlined in this paragraph were clarified by the Quality Assurance Representative. Mr. Qualter, Signal Corps Inspector, asked that a Government inspection station be established on the production line. Mr. Qualter also requested a set of HW-19A drawings be furnished him prior to production. This request will be coordinated with CSEC-05, to assure that Magnavox has ample Government Furnished Equipment for the Government test station, as well as the Magnavox stations. Comments from Magnavox and the Signal Corps on the Standard of Acceptance were withheld pending further study. Two copies of the Standard were left with Magnavox and one copy with the Signal Corps Inspector.

b. At the time of this visit, Magnavox was starting their physical set up for producing the HW-19A. At present the Urbana plant's main function is research and development, and their quality control procedures are limited to R/D functions. Therefore, fabrication of chassis and sub-assemblies have not been started. Parts and materials for use in production of the HW-19A have not been received from the vendors.

Incoming and in-process inspection stations are being set up, but no production quality control procedures have been established for these stations. However, electronic test equipment, gauges, and quality control procedures now being used on R/D functions indicate Magnavox is capable of producing an acceptable end product.

c. A temporary test station was set up by the Contractor for the purpose of training the Resident Government Inspector, in conducting inspection and operational tests for acceptance of the HW-19A. This temporary test station was not a thorough means of following the test procedure, but it did familiarize the Resident Government Inspector with the general procedure which will be used.

d. Magnavox's Project Engineer requested an NSA representative be at the plant during preliminary TEMPEST testing of Preproduction Model equipment, so Magnavox can familiarize their personnel with the exact requirements of NSA. It was decided by the Signal Corps and the NSA representative that surveillance of the TEMPEST test procedures was necessary.

5. CONCLUSIONS:

a. The ~~draft of the~~ Standard of Acceptance has been coordinated with Signal Corps and Magnavox representatives. Comments will be reviewed with these representatives during the next scheduled visit.

b. Inspection stations for incoming and in-process inspection are now being set up. Quality control procedures will be reviewed by the Signal Corps and NSA on the next visit.

c. The Signal Corps Inspector responsible for the final acceptance of the HW-19A has been indoctrinated in the acceptance procedures set forth in NSA Standard of Acceptance #10A.

d. Signal Corps and NSA representatives will maintain surveillance on TEMPEST testing of Preproduction Model equipment.

6. RECOMMENDATIONS:

It is recommended that:

a. An NSA representative schedule a trip to Magnavox in October to:

(1) Review with the Resident Government Inspector the NSA requirements relative to Radiation Test Specification #8A.

(2) Perform surveillance of TEMPEST testing of Preproduction Model of the HW-19A.

This is an ENG action.

17 July 1958

b. The Quality Assurance Representative schedule a trip to Magnavox in October 1958, to review the manufacturer's inspection procedures and establish Acceptable Quality Levels with the Signal Corps for final acceptance of HW-19A parts, sub-assemblies and completed equipment. This is an ENG action.

Russell O. Sizemore
for NORMAN A. STEAD
Quality Assurance Representative, ENG-3

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~~CONFIDENTIAL~~ 1 July 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

16 through 25 June 1958

d. Equipment Nomenclature

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

e. Contract

DA49-170-sc-2000

2. REPRESENTATIVES:

National Security Agency

Mr. Norman A. Stead, Quality Assurance Representative, ENG-31

Airborne Instruments Laboratory

Mr. V. Middlebrook, Project Engineer
Mr. R. Kowell, Quality Control Supervisor

3. PURPOSE OF TRIP:

The purposes of the trip were to:

a. Perform final acceptance tests on TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer equipment.

b. Inspect spare parts, modification kits, and packaging of equipment for overseas shipment.

4. CONFERENCE BRIEFS:

a. An informal meeting was held with AIL representatives to discuss submission of the final twenty-five equipments on Contract 2000, and to resolve all inspection problems encountered since the last visit. All inspection procedures on the HW-19A have been tightened. AIL assured the NSA Quality Assurance Representative that all requirements in Standard of Acceptance #10 have been met.

b. During the period 16 through 25 June 1958, the NSA Quality Assurance Representative received twenty-five equipments for visual and mechanical inspection, and operational testing in accordance with NSA specifications. During these evaluations the following Major defect was noted on equipment No. 346:

Resistors R-91 and R-98 shorted together resulting in a low voltage reading of 16 VDC at test jack J39 instead of the required 105 VDC. This caused an operational failure. AIL corrected this defect, and upon re-evaluation unit No. 346 was accepted.

c. Twenty-five units, numbers 323, 330, 331, 335 and 339 through 359, were accepted. Four of these units were shipped to NSA for radiation testing. Material Inspection and Receiving Report, Form DD-250, was signed for twenty-five equipments, which completed the equipment portion of Contract 2000 for 109 units. However, an amendment to the contract for additional spare parts will extend completion of contract to September 1958.

d. Twelve equipments were inspected and accepted for requirements of spare parts, modification kits and packaging. Surveillance was performed on the remaining thirteen equipments.

5. CONCLUSIONS:

a. Final acceptance was made on twenty-five equipments with spare parts and modification kits. This completes the total of 109 equipments on Contract 2000., However, an amendment to the contract for additional spare parts will extend completion to September 1958.

b. Material Inspection and Receiving Report, DD-250, was signed for twenty-five equipments.

c. AIL will notify NSA when a shipment of spare parts is ready for NSA inspection.

6. RECOMMENDATION:

It is recommended that upon receipt of notification from AIL that a shipment of spare parts is ready for inspection, the Quality Assurance Representative make a trip to AIL to perform acceptance inspection. This is an ENG action.

Norman A. Stead

NORMAN A. STEAD
Quality Assurance Representative, ENG-31

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CSEC-05
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12 June 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

   a. Name of Organization

      Airborne Instruments Laboratory (AIL)

   b. Address

      Steward Avenue
      Mineola, New York

   c. Dates of Conferences

      11 through 29 May 1958

   d. Equipment Nomenclature

      TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. REPRESENTATIVES:

   National Security Agency

   Mr. F. J. McNeeley, Chief, Standards Branch, ENG-31
   Mr. Norman A. Stead, Quality Assurance Representative, ENG-31
   Mr. John C. Orr, Quality Assurance Representative, ENG-31

   Airborne Instruments Laboratory

   Mr. Dunning, Vice President, Production
   Mr. John Murray, Assistant Project Engineer
   Mr. Simms, Quality Control Manager

3. PURPOSES OF TRIP:

   The purposes of the trip were to:

   a. Review AIL's manufacturing processes.

   b. Make a survey of inspection and Quality Control Stations.

c. Ascertain why the Quality Control Department of AIL was passing defective equipment to NSA's Quality Assurance Representative for acceptance.

d. Perform final acceptance tests on the MW-19A, inspect spare parts, modification kits, and packaging of equipment for overseas shipment.

This is a joint trip report of Messrs. McNeeley, Stead and Orr, ENG-3.

4. CONFERENCE BRIEFS:

a. Upon arrival at AIL, the NSA Quality Assurance Representative was informed that twenty-five equipments were ready for NSA inspection and acceptance. These equipments were 100% visually and operationally tested in accordance with NSA Standard of Acceptance #10 and Systems Test Specification #13. All twenty-five units were rejected due to the following major and minor defects:

Major

(1) Unit numbers 310, 312, 317, 322 and 338 failed operational test (Test Specification #13).

(2) Unit numbers 311, 317, 318, 320 and 338, terminal connections with no solder applied where intended.

(3) Unit numbers 308, 311, 312, 318, 320 and 321, terminal connections with insufficient solder.

(4) Unit numbers 310, 318, 319, 324, 326 and 332 had component parts missing, defective or improperly assembled, so as to cause equipment to become inoperative.

Minor

(1) Unit numbers 308, 310, 311, 318, 320, 322, 326 and 334 had loose hardware.

(2) Unit numbers 305, 308, 310, 311, 312, 316, 317, 324, 325, 334 and 337 had component parts missing, inoperative, improperly assembled, defective or wrong part, which could reduce efficiency of equipment in service.

b. The units were returned to AIL for correction and upon correction by AIL, resubmitted to the NSA Quality Assurance Representatives for re-evaluation. These equipments were re-evaluated and found free of defects and accepted. Four of these units, serial numbers 310, 320, 327, and 334, were selected and shipped for radiation testing.

c. Additional inspection time was necessary so that completion dates would be met. It was necessary to send Mr. Orr to AIL, 26 May 1958, to assist Mr. Stead.

d. Packaging of equipment was performed under surveillance of the NSA Quality Assurance Representative. Packaging process complied with contractual requirements.

e. Conferences were held with Messrs. Dunning and Simms of AIL, and Messrs. Stead and McNeeley to review and discuss the defects found on HW-19A equipment. It was emphasized by the NSA Representatives that the quality control procedures established for this contract were not the type that would be considered satisfactory for a full scale production contract. AIL Representative stated that tightened controls would be established on the remaining units under Contract DA-49-170-sc-2000. Also, additional AIL inspection personnel would be assigned.

5. CONCLUSIONS:

a. Twenty-five equipments, serial numbers 305,308,310, 311, 312, 315, 316, 317, 318, 319, 320, 321, 322, 324, 325, 326, 327, 328, 329, 332, 333, 334, 336, 337 and 338, with spare parts and modification kits have been accepted and packaged for overseas shipment.

b. Material Inspection and Receiving Report, DD-250, was signed for twenty-five equipments.

c. Due to the nature of this contract (quantity extension under an R/D contract) AIL had not established quality control check points on the equipment as assembled.

d. The assignment of additional AIL inspection personnel should provide against poor quality equipment being submitted to the NSA Quality Assurance Representative.

12 June 1958

6. RECOMMENDATION:

It is recommended that:

Upon receipt of notification from AIL that the final twenty-five equipments on Contract DA-49-170-sc-2000 have been completed, a Quality Assurance Representative make a trip to AIL for inspection, operational testing and final acceptance. This is an ENG action.

FRANCIS J. MCNEELEY
Chief, Standards Branch, ENG-31

NORMAN A. STEAD
Quality Assurance Representative, ENG-31

JOHN C. ORR
Quality Assurance Representative, ENG-31

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~~Security~~

TRIP REPORT

9 June 1958

1. Identification of Trip:

a. Name of Organization

Magnavox Corporation

b. Address

Urbana, Illinois

c. Date of Trip

2-6 June 1958

d. Equipment

TSEC/SM-19A, Electronic Short-Stop Teletypewriter Signal Mixer

2. Representatives:

a. NSA

William Reeves, ESS-121 (2-3 June 1958)
Raymond Rozanski, ESS-121 (2-6 June 1958)
Raymond Welsh, ESS-113 (4-6 June 1958)

b. Magnavox Corporation

James Diamond, Chief Engineer
Gene Nelson, Project Engineer
Stephen Thomas, Products Manager
Clarence Shapiro, Consulting Engineer

3. Purpose of Trip:

The purposes of the trip were to:

a. Establish minimum performance levels for operational aspects of TSEC/SM-19A Production Model equipments by witnessing Magnavox personnel perform tests in accordance with Test Specification, NSA #13, for TSEC/SM-19A and recording data during these tests.

b. Introduce Mr. Rozanski as the Project Engineer succeeding Mr. Reeves on the TSEC/SM-19A.

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c. Establish minimum performance levels for TEMPEST aspects of TSEC/KW-13A Production Model equipments by witnessing Magnavox personnel perform tests in accordance with Specification, NSA 68. Mr. Welsh has written a separate trip report covering these TEMPEST Tests.

4. Test Results:

a. Teletypewriter Equipment Maintenance by Magnavox. Improper teletypewriter equipment maintenance by Magnavox caused several hours delay in the operational tests of the TSEC/KW-13A. According to Mr. Nelson, Magnavox will probably hire their own full-time teletypewriter technicians when sufficient additional teletypewriter equipments are located in the Urbana Plant of Magnavox.

b. Nonconformances to NSA System Test Specification #13. Magnavox personnel obtained data, using the equipment with serial #2/2, which did not conform to paragraphs 2.3.2, 2.6.3, 2.8.3, and 2.12.16 of System Test Specification #13. The nonconformances were noted and initialed on two Test Data Sheets (one copy for Magnavox and one copy for NSA) by Mr. Nelson and Mr. Rozanski. The nonconformances consisted of deviations in two potentiometer settings and two pictorial presentations of voltage wave forms.

c. Changes Made to the Test Data Sheet. Details were sketched on the voltage wave forms shown in paragraphs 2.12.7, 2.12.9, 2.12.10, 2.12.11, 2.12.17 and 2.12.20 of the Test Data Sheet. As changed, four of the wave forms now agree with the correct wave forms shown in KAM-40/TSEC photographs. The other two wave forms are now correct but are not shown in KAM-40/TSEC.

d. Operational Test to be Completed. The equipment was not checked in accordance with paragraphs No. 6, Aging and Recheck, and No. 7, Recheck After TEMPEST Tests. Aging the equipment would have caused the TEMPEST Test schedule to slip. Recheck after TEMPEST Tests could not be performed until after TEMPEST Tests. Mr. Nelson stated that the equipment would be aged during the period of 9-10 June 1958 and that the equipment would be rechecked on 10 June 1958. A copy of the results will be forwarded to NSA. Mr. Nelson stated that the delay in rechecking will not affect Magnavox Corporation's schedule for transmitting their Specification Review to NSA.

5. Conference Briefs:

a. Incinerator Facilities. Mr. Rozanski was told by Magnavox representatives that Magnavox Corporation has no incinerator for burning classified trash at the Urbana Plant. Mr. Dimond stated that the plant is new and that the planned incinerator has not been built yet. Mr. Dimond was not familiar with the current status of the planned incinerator.

Secret

b. Spare Parts. In order not to delay production, Mr. Thomas stated that Magnavox must place parts orders soon, and plan to package spare parts. Mr. Thomas stated that spare parts will be ordered according to contract if NSA does not change its requirement. (At the present time, NSA has until 15 Aug 58 to change spare parts requirements.) If this order is placed and NSA wishes to change its spare parts requirements at a later date, Magnavox will attempt to readjust their contracts with parts vendors. Failing this, Magnavox will attempt to absorb excess standard parts into its inventory. Mr. Reeves referred Mr. Thomas to Mr. Chew of NSA (CSSO-05) regarding this matter.

c. Additional Preproduction Model Equipments. In order for Magnavox to plan its parts ordering, Mr. Thomas stated that NSA should order any additional Preproduction Model equipments immediately. Mr. Reeves instructed Mr. Thomas to contact Mr. Chew of CSSO-05 regarding this matter.

d. Specification Review. Magnavox representatives raised several questions concerning test specifications and manufacturing drawings. Mr. Hennekel told the representatives that Magnavox's Specification Review should include written requests for changes, deviations, or clarifications of Test Specifications.

6. Conclusions:

a. If Magnavox is careless with teletypewriter maintenance they could experience production delays.

b. The equipment, with serial #2?2, supplied to Magnavox as a production standard did not meet four requirements of the System Test Specification. An initial examination of the four requirements indicates that the requirements should possibly be made less stringent.

c. The Urbana Plant of Magnavox does not have incinerator facilities for burning classified trash which may accumulate from the CSSO/AN-19A program.

7. Recommendations:

It is recommended that:

a. CSSO-05 investigate Magnavox Corporations plans for maintenance of teletypewriter equipment at the Urbana, Illinois Plant and obtain an assurance from the contractor that production of equipments will not be delayed due to a lack of adequate maintenance.

SECRET

b. ENG review paragraphs 2.3.2, 2.6.3, 2.8.3, and 2.12.14 of the Test Data Sheet to determine if the requirements in these paragraphs may be relaxed. (The review will be an ENG-121 action.)

c. SIGPO, Physical Security, review the physical security measures taken at the Urbana, Illinois Plant of Magnavox.

WILLIAM L. REEVES
ENG-121

RAYMOND R. ROZANSKI
ENG-121

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Trip Report of Mr. Raymond Rosenski and Mr. William Reeves

CSEC-05 ENG 27 JUN 1958

Rosenski/ENG-121/60256/mlm

1. Inclosed is a joint report of a trip to Magnavox Corporation, Urbana, Illinois, by Mr. Raymond Rosenski, CSEC Equipment Engineering Division (ENG-1), during the period 2 through 6 June 1958, and Mr. William Reeves, CSEC Equipment Engineering Division (ENG-1), during the period 2 through 3 June 1958.

2. It is requested that CSEC-05 take action on the recommendation contained in paragraph 7.a. of the subject trip report. This request has been informally coordinated with Mr. Shaw of CSEC-05.

3. This correspondence may be declassified upon removal of the inclosure.

HOWARD AYERS
Chief, Office of
Communications Security Engineering

Incl:
Trip Report

cc: CSEC Mailroom (less incl.)
CSEC Daily (less incl.)
ENG-01 (less incl.)
ENG-02 (less incl.)
ENG-1 (less incl.)
ENG-12 (less incl.)
ENG-121 (less incl.)

~~SECRET~~ ENG-02

[illegible]

Trip Report of Mr. Raymond Rosanski and
Mr. William Reeves

SIDPO
~~THRU: CSEC-05~~

[illegible] ENG

27 JUN 1958

[illegible]/ENG-121/[illegible]/els

1. Inclosed is a joint report of a trip to Magnavox Corporation, Urbana, Illinois, by Mr. Raymond Rosanski, COMSEC Equipment Engineering Division (ENG-1), during the period 2 through 6 June 1958, and Mr. William Reeves, COMSEC Equipment Engineering Division (ENG-1), during the period 2 through 3 June 1958.

2. It is requested that SIDPO take action on the recommendation contained in paragraph 7.e. of the subject trip report. The recommendation is based on paragraph 5.a. of the report. This request has been informally coordinated with Mr. Paul Miller of SIDPO.

3. This correspondence may be declassified upon removal of the inclosure.

HOWARD AYERS
Chief, Office of
Communications Security Engineering

Incl:
Trip Report

cc: CSEC Mailroom (less incl.)
CSEC Daily (less incl.)
CSEC-05 (less incl.)
ENG-01 (less incl.)
ENG-02 (less incl.)
ENG-1 (less incl.)
ENG-12 (less incl.)
ENG-121 (less incl.)

Declassified by D. Janosek,
Deputy Associate Director for Policy and Records
on 2/4/2011 and by [illegible]

~~SECRET~~ 9 June 1958

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

Magnavox Corporation

b. Address

Urbana, Illinois

c. Dates of Trip

3 June 58 - 6 June 58

d. Contract No. DA49-170-sc-2465

2. Representatives:

NSA

Mr. Raymond E. Walsh

Magnavox Corporation

Mr. J. Dimond - Chief Engineer
Mr. G. Nelson - Project Engineer
Mr. C. Shapiro - Consulting Engineer

3. Purpose of Trip:

a. The purposes of this trip were:

(1) To review with the Contractor various engineering aspects of the radiation evaluation of the TSEC/SM-19A, Electronic Start-Stop Teletypewriter Signal Mixer with respect to measurement techniques and instrumentation.

(2) To approve or reject the procedures proposed by the Contractor for evaluating the radiation characteristics of the TSEC/SM-19A in relation to the Specification NSA-8A.

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4. Discussion and Observations:

a. The engineering aspects of the applicable specification were discussed in detail with the Contractor Engineering Personnel and minor clarifications were given to the technician, Mr. Jim Allen, currently assigned by the Contractor to this phase of the work. The clarifications given centered, for the most part, on the techniques of correct instrument operation. The technician was attentive, alert, and cooperative. The technician demonstrated a step-by-step procedure as prescribed in the specification. In the conduct of this demonstration the following non-conformities with the specification as detailed below were noted:

(1) Paragraph 3.2.4 states: "All material not required as an item in the test set-up shall be removed from the screened enclosure."

(a) It was noted that a four drawer, combination dial lock secure file is located within the screened enclosure, and further that, during the course of testing, numerous interruptions occurred due to personnel not directly associated with this test entering and leaving the enclosure for access to the file. The Contractor explained that Agency Security Personnel had approved the placing of this file within this screened enclosure.

1. It was pointed out to the Contractor that placing a large metal object within the screened enclosure creates a source of reflection and distortion of radio frequency energy and, in addition, invalidates the characterization of the enclosure which were determined prior to test.

(2) Paragraph 3.2.3.2.1.1 requires that the Remote Line of the TEMC/MI-19A be energized during radiation tests.

(a) The remote line was not energized.

1. This condition was brought to the attention of the Contractor, and was corrected immediately. No further action is required.

[redacted]

(3) Paragraph 3.2.5.1.2.2 directs that voltage readings be taken between terminal J28 and ground, and between terminal J2-B and ground, prior to conduct of the test.

(a) These voltage readings were not being taken.

1. This non-compliance was corrected immediately upon being brought to the attention of the Contractor. Therefore, no further action is required.

(4) Paragraph 3.2.4.2 directs that all motor driven teletypewriter equipment operated within the screened enclosure shall have motor shafts maintained at ground potential by means of grounding brushes.

(a) No grounding brush was evident on the motor shaft of the local printer operating within the screened enclosure. A resistance check made established that the motor shaft was not grounded.

1. The Contractor agreed to initiate action to correct this non-compliance feature prior to further testing.

(5) Paragraphs 3.2.4.1.1, 3.2.4.1.1.1 and 3.2.4.1.1.13 require that field intensity measuring equipment shall be calibrated prior to commencement of tests, that subsequent calibrations shall be performed at least each successive sixty-days after the initial calibration, and that calibration procedures shall be those established by the manufacturer of the specific equipment.

(a) Examination of the individual calibration charts which accompany each RI-FI equipment indicated that none of the equipment had been calibrated since leaving the manufacturer's laboratory. Notes on these charts indicated that the last calibration had been performed approximately one year ago. The Contractor stated that at present he had one only set of RI-FI measuring equipments, and, expressed a desire to obtain relief from the calibration requirements due to a potential delay to continuity of radiation testing during the time required for calibration. It was pointed out to

SECRET

the Contractor that unless calibrated instruments were used in the content of the radiation tests, there could be no assurance that readings taken were within a reasonable degree of accuracy, and therefore it could not be determined whether the results of the tests were actually within the limits prescribed in the specification since these limits were arrived at through the use of instruments calibrated according to their manufacturer's specifications. It was further pointed out to the Contractor that programming and scheduling of instrument calibration is the responsibility of the Contractor. The Contractor was advised that this matter would be subject to review and discussion at the Agency, that such review and discussion would be accomplished during the week of 16 Jun 58, and further that if any revisions were in order that the Contractor would be so advised by the Contracting Officer.

5. Conclusions:

a. The test set-up, with respect to the facilities and required instrumentation, evidenced a sincere attempt on the part of the Contractor to accomplish the test in a thorough and efficient manner. The physical construction of the screened enclosure evidenced good workmanship in accordance with established engineering practice with respect to input and output connection facilities, RF bonds and grounding. The question raised by the Contractor personnel during the various discussions indicated an overall interest in obtaining clarifications of the specification requirements and the elimination of possible ambiguities which might affect the quality of the evaluation.

b. It should be noted that the Contractor had not received a copy of the applicable Specification MIL-S4 prior to this visit. This was established by telephone information received from Mr. Burton, CEEC-05, on Monday afternoon, 2 Jun 58. It was therefore necessary that this material be hand carried to the Contractor by the writer. While it is true that the revised version of the specification clarifies certain possible ambiguities which may have appeared in the original specification, this presented no real problem to the Contractor inasmuch as some of the requirements relative to the non-compliances which appear in this report were revised.

c. The procedures proposed by the Contractor for evaluating the radiation characteristics of the RM-19A were approved with the exception of the instrument calibration problem discussed in paragraph 4.(5) which is yet to be resolved. Also, it will be required that the secure file located in the screened enclosure at Contractor's Plant be removed in order to prevent undesirable reflections and distortions of radio frequency energy caused by this object.

6. Recommendations:

a. It is recommended that CREC-05 request the Contracting Officer to advise the Contractor to remove the secure file from within the screened enclosure. This action has been coordinated with Mr. Shaw of CREC-05.

b. It is recommended that the radiation testing aspects of the RM-19A production contract again be observed by an EMC representative at the time testing is commenced on actual production equipments.

RAYMOND E. WELSH
EMC-113

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TRIP REPORT

21 May 1958

1. Identification of Trips

a. Name of Organization

Airborne Instruments Laboratories Incorporated (AIL)

b. Address

Mineola, New York

c. Date of Trip

15 May 1958

d. Equipment

TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives

NSA

Mr. William L. Reeves, NSO-1 (NSA project engineer)
Mr. H. Stead, NSO-3 (NSA quality assurance representative)

AIL

Mr. John Murray, Project Engineer

3. Purpose of Trip

The purpose of the trip was to monitor and observe the production of TSEC/KW-19A equipments by the Airborne Instrument Laboratories Incorporated. On this visit the NSA representatives particularly observed the quality control procedures being used by the contractor in the fabrication and testing of TSEC/KW-19A equipments.

4. Conference Briefs and Observations

a. Background - The Airborne Instruments Laboratories Inc., under NSA contract Number NSA3-170-sc-2000, are manufacturing 109 TSEC/KW-19A equipments. To date 59 equipments have been accepted by the government. Because of the small quantity of equipments being manufactured, the final inspection and government acceptance of the TSEC/KW-19A equipments have been assigned as a direct responsibility of NSO. Mr. H. Stead of NSO-3 is the Contracting Officer's representative assigned to perform final inspection and government acceptance on the TSEC/KW-19A equipments. There are no other government inspecting agencies involved in this program. Mr. Stead previously reported that the last two "lots" of TSEC/KW-19A equipments he inspected indicated a steady decline in workmanship quality. Mr. Stead further reported that continuance of this inferior workmanship would slow the equipment production rate and possibly cause non-delivery on the dates promised.

b. Upon my arrival at the Airborne Instruments Laboratories I went directly to the fabrication and inspection area and joined Mr. Stead of NSA-3, who was already performing the government acceptance tests on equipments scheduled for delivery during May 1951. Together, we observed the fabrication and inspection of TSEC/MS-19A equipments by AIL personnel. Our observance included reviews of inspection cards which accompany the equipments through the assembly line. These cards are used to record discrepancies found in the equipment by AIL quality control personnel. Mr. Stead said that each equipment presented to him is accompanied by two or three of these inspection cards completely filled on both sides with workmanship discrepancies. Mr. Stead further stated that in the performance of inspection on each equipment, he has noted a large number of additional discrepancies, which have been overlooked by the AIL quality control personnel. To substantiate this, Mr. Stead showed me his records on the equipment he had inspected. These records reflected the fact that Mr. Stead was required to reject many of the same equipments more than once.

c. I discussed the problem of poor workmanship with Mr. Murray, the AIL project engineer. He said that Mr. Stead had brought the problem to him on previous occasions and that he (Mr. Murray) had taken action to try to improve the workmanship being applied to the TSEC/MS-19A production equipments. He admitted, however, that his action to achieve this had not resulted in much improvement. At this point I told Mr. Murray that in my opinion the poor workmanship was being caused by fabrication personnel who were not properly trained or were not adequately supervised. Also, I advised Mr. Murray that, by virtue of the fact that AIL quality control personnel were finding large numbers of discrepancies and yet were overlooking many discrepancies in the equipment, detailed inspections on reworked equipments were not being accomplished.

d. In conclusion to this conference with Mr. Murray I demanded that AIL take positive action immediately to improve the workmanship being put into the fabricated equipments. Continuation of this high rejection rate by the NSA inspector would result in AIL's failure to maintain delivery schedules for the equipments.

5. Conclusions:

a. AIL personnel fabricating TSEC/MS-19A equipments are not exhibiting proficiency in their work. The numerous discrepancies found on each equipment by both the AIL quality control personnel and the NSA inspector are definite indications that the workmanship of the AIL fabrication personnel is of very poor quality.

b. The inspection of the fabricated equipments by AIL quality control personnel would normally be considered adequate; however, because of the numerous discrepancies they are finding, many smaller discrepancies are being overlooked. These discrepancies are then being found by the NSA inspector, who has to reject the equipment.

c. The rejection rate by the NSA government inspector is steadily increasing, thus extending the manufacturing time for each equipment. The end result is a slow-down in production, with the possibility of not maintaining the current delivery schedule.

4. Recommendations:

It is recommended that CSEC-05 initiate action notifying the management personnel of the Airborne Instruments Laboratories Incorporated to take immediate action to improve their workmanship without disturbing the current delivery rate and schedules.

Jack E. Casey
for
WILLIAM L. REEVES
ENG-111

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2 May 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory, Incorporated (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

10 through 24 April 1958

d. Equipment Nomenclature

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. REPRESENTATIVES:

National Security Agency

Mr. Norman A. Stead, Quality Assurance Representative, ENG-312

Airborne Instruments Laboratory

Mr. V. Middlebrook, Project Engineer
Mr. R. Kowell, Quality Control Supervisor

3. PURPOSES OF TRIP:

The purposes of Mr. Stead's trip were to:

a. Perform final acceptance tests on TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer equipment.

b. Inspect spare parts, modification kits, bulk spares and packaging of equipment for overseas shipment.

4. CONFERENCE BRIEFS:

a. Upon arrival at AIL, the NSA representative was notified by Mr. R. Kowell, Quality Control supervisor, that 20 equipments were ready for inspection and final testing. Four of

these equipments, Serial Nos. 284, 292, 298 and 303, were selected for radiation testing. The four equipments were randomly selected, evaluated, accepted and shipped to NSS. The remaining 16 units, Serial Nos. 277, 288, 290, 293, 294, 295, 299, 300, 301, 302, 304, 306, 307, 309, 313 and 314, were 100% operationally tested and visually inspected. Two equipments were rejected by the NSA Quality Assurance representative on the first submission for the following defects.

(1) Equipment No. 277

(a) Operational Inspection:

Break circuit operating improperly. Cause: Wire broken on terminal board "E3", resistor R66.

(b) Visual Inspection:

1. Loose screws on front panel.

2. V-26, pin 8, broken insulation; possible short to pin 7.

3. On terminal board E8, black lead has broken insulation to resistor R130.

4. V-17, pin 4, damaged insulation with bare wire exposed.

5. Button capacitor not properly insulated.

6. Loose hardware throughout chassis.

7. Rubber insulation under relay plate cover peeling.

(2) Equipment No. 294

(a) Operational Inspection:

No B plus voltage. B plus shorted to ground.

b. Upon rejection of equipment, AIL corrected defects and resubmitted equipment number 277 and number 294 for re-evaluation. Equipment number 294 passed operational test and was accepted. Equipment number 277 was reinspected visually and found free of defects. An additional operational test on equipment number 277 revealed the following operational defect. Send circuit was

inoperative due to grounded shield lead shorted to resistor R29.

c. Equipment number 277 was returned to AIL for correction. After correction by AIL, equipment number 277 was resubmitted for evaluation and accepted by the NSA representative.

d. On 21 April 1958, information was received from NSA, ENG-312, requesting that immediate action by the NSA representative be taken to tighten final visual and mechanical inspection of the TSEC/HW-19A. In addition, instructions were received to direct the manufacturer to tighten controls at in-process inspection stations. Furthermore, it was advised that all finished equipment remaining at the plant be reinspected. Tightening of inspection resulted from loose hardware found on one equipment while undergoing radiation tests.

e. An inspection of AIL's fabricated sub-assemblies revealed that 25% of the sub-assemblies contained loose hardware. AIL was requested to initiate immediate action to tighten control points and processes during fabrication of the TSEC/HW-19A.

f. The following recurring defects have been noted and brought to the attention of the Project Engineer, ENG-1, who has initiated the necessary action to correct these conditions on the future contract with Magnovox.

(1) Rubber gaskets under relay plate covers peeling due to constant heat temperature on 24 hours aging test. NSA's Quality Assurance representative requested AIL to remove relay plate covers until aging test is completed.

(2) Side rack mount panels were deformed by handling of unit while testing. At the request of the NSA representative, the side rack panels are attached to the equipment after final operational acceptance.

(3) Blower door not seated properly due to reinforcing strips in rear of door striking dust cover shelf.

The Project Engineer, ENG-1, granted AIL waivers on the above defects, covering a total of 109 units on Contract DA49-170-sc-2000. This action was necessary due to the urgent requirement for early delivery to the Army, and the fact that AIL had already fabricated the sub-assemblies. The above noted discrepancies will not effect assembly or operation of the HW-19A.

g. Packaging of equipment was under the surveillance of the NSA Quality Assurance representative. Packaging process complied with contractual requirements.

2 May 1958

5. CONCLUSIONS:

a. Twenty equipments, Serial Nos. 277, 284, 288, 290, 292, 293, 294, 295, 298, 299, 300, 301, 302, 303, 304, 306, 307, 309, 313 and 314, with spare parts and modification kits have been accepted and packaged for overseas shipment.

b. Material Inspection and Receiving Report, DD 250, was signed for 20 equipment.

c. Corrective action has been taken by AIL to tighten their final inspection.

d. Project engineer has taken corrective action for defects listed in paragraph 4.f.

6. RECOMMENDATION:

It is recommended that:

Upon receipt of notification from AIL that a lot of TSEC/HW-19A equipment has been completed, a Quality Assurance representative make a trip to AIL for inspection, operational testing and final acceptance. This is an ENG action.

Norman A. Stead

NORMAN A. STEAD
Quality Assurance Representative, ENG-312

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CREF-322
CSEC-05
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ENG-01
ENG-02 ←
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ENG-111
ENG-3
ENG-31
ENG-311
ENG-312

2 April 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

17 through 27 March 1958

d. Equipment Nomenclature

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. REPRESENTATIVES:

National Security Agency

Mr. Norman A. Stead, Quality Assurance Representative, ENG-3

Airborne Instruments Laboratory

Mr. V. Middlebrook, Project Engineer

3. PURPOSES OF TRIP:

The purposes of Mr. Stead's trip were to:

a. Perform final acceptance tests on TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer equipment.

b. Inspect spare parts, modification kits, bulk spares and packaging of equipment for overseas shipment.

4. CONFERENCE BRIEFS:

a. During the period 17 through 27 March 1958, fifteen equipment were inspected and operationally tested by the NSA Quality Assurance Representative in accordance with NSA's Standard of Acceptance #10 and Systems Test Specification #13.

b. While performing Quality Assurance evaluation it was noted that AIL has achieved a higher quality product. The following is a list of Quality Assurance improvements on the TSEC/HW-19A:

(1) Hardware adjacent to cabling was insulated to prevent any abrasive action.

(2) The ends of lacing on cables have been coated with glyptal to prevent unraveling.

(3) All hardware used to secure components were coated with glyptal as an extra locking precaution.

c. The fifteen equipment have met the requirements set forth in NSA's Standard of Acceptance #10 and Systems Test Specification #13 and have been accepted by the NSA Quality Assurance Representative. After acceptance by NSA, equipment including spare parts kit and modification kit was packaged for overseas shipment.

d. One shipment of bulk spares was submitted for inspection by AIL to the NSA Representative. Inspection revealed no defects.

e. Form DD-250, Material Inspection and Receiving Report was signed by the Quality Assurance Representative for equipment numbers 275, 276, 278 through 283, 285 through 287, 289, 291, 296 and 297.

5. CONCLUSIONS:

a. The fifteen equipment, numbers 275, 276, 278 through 283, 285 through 287, 289, 291, 296 and 297 with spare parts and modification kits have been accepted and packaged for overseas shipment.

b. One lot of bulk spares was accepted upon completion of inspection.

6. RECOMMENDATION:

It is recommended that:

Upon receipt of notification from AIL that a lot of TSEC/HW-19A equipment have been completed, a Quality Assurance Representative make a trip for inspection, operational testing and final acceptance. This is an ENG action.

Lenayne A Schroeder
for NORMAN A. STEAD
Quality Assurance Representative
ENG-3

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TRIP REPORT

11 March 1958

1. Identification of Trip:

   a. Name of Organization

      Magnavox Corporation

   b. Address

      Urbana, Illinois

   c. Dates of Trip

      3 - 6 March 1958

   d. Equipment

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

   NSA

   Mr. L. L. Ziegler - GEEC-05
   Mr. W. L. Reeves - KEG-1

   Magnavox Corporation

   Mr. S. Thomas
   Mr. C. Nelson
   Mr. J. Diamond
   Mr. J. Bennit

3. Purpose of Trip:

   The purpose of the trip was to demonstrate to personnel of the Magnavox Corporation the operation and functions of the TSEC/KW-19A equipment. This demonstration is in agreement with the engineering phase of the KW-19A production contract.

4. Conference Brief:

   a. Background:

      In June 1957 the Magnavox Corporation was awarded NSA Contract [redacted] for the production of TSEC/KW-19A equipments. On the request

of NSA the Magnavox Corporation has postponed any action on the production program. This request by NSA was because the service test manufacturing phase of the KW-19A program, under contract with Airborne Instruments Laboratories, Inc., was not completed in July 1957 as planned. The service test manufacturing phase was completed in February 1958.

On 3 March 1958 two KW-19A service test equipments and associated teletypewriter equipments were delivered to the Magnavox Corporation. These KW-19A equipments are to be used as prototype equipments and for conducting a specification review by the contractor.

b. On arrival at the Magnavox Facility I was introduced to the engineering personnel to be associated with the KW-19A production program. Together we conducted a visual inspection of the KW-19A service test equipments and discussed various characteristics of the equipments. This was the contractor's first opportunity to view the KW-19A equipment.

c. Magnavox engineers and I modified the KW-19A associated teletypewriter equipments and set up a test circuit for the operation of the KW-19A equipment. The test circuit was strictly a make-shift arrangement as the contractor had not had time to set up a laboratory line, since the teletypewriter equipments were delivered to Magnavox only one day before we arrived.

d. I familiarized and instructed Magnavox personnel in the operation of the equipments and demonstrated its various modes of operation. I was unable to adequately demonstrate the KW-19A in the "off-line" mode because we had no superformer available for demonstration. I reviewed the schematic diagram with the Magnavox engineers and pointed out various changes that would be incorporated in the equipments for production: i.e. replacing of K3 relay, replacing of the present resistor, stiffening of the relay rack mounts, and changing of R-130 resistor for a higher wattage rating.

e. The equipment was next demonstrated for its compliance to the NSA #13 System Test for the KW-19A. This demonstration was only 85 per cent completed because a trouble developed in the KW-19A which required considerable time to determine its cause and remedy. This trouble occurred during the making of the TD Limiter adjustment, in two-wire operations. An undesirable feed back pulse was tripping off the local printer causing it to receive intermittent character hits. It was concluded that this feed back pulse was being caused by the action of the KW-19A break circuit. (Later, at NSA, I found

that this feed back pulse was an inherent characteristic of the AN-19A. R/D had known about this characteristic, but had not passed the information to NMC. The feed back pulse does not affect the operation of the AN-19A and can only be discovered under certain conditions when making the TD limiter adjustment. I am taking action to change the adjustment procedures for the TD limiter to eliminate the effects of the feed back pulse during the making of the adjustment.)

f. It was agreed that, because time did not allow for the completion of the systems test, it would be conducted on a later visit to Magnavox. In the interim the contractor will become more familiar with the operation and construction of the AN-19A equipment.

5. Conclusions:

a. The visit to the Magnavox Corporation was successful in instructing Magnavox personnel in the operation and construction of the AN-19A equipment.

b. Demonstration of the AN-19A for compliance to the system test specification was unsuccessful because of an undesirable feed back problem encountered in the AN-19A equipment. It was later found that this undesirable feed back was an inherent characteristic of the AN-19A. This inherent characteristic was known to R/D designers of the equipment, but they had not forwarded this information to NMC. Discovery of this condition can only be made under certain operating conditions when adjusting the TD limiter circuit in the equipment. Action is being taken to change the adjustment procedures for the TD limiter to eliminate the effects of the feed back pulse during the making of the adjustment. This feed back pulse does not affect the normal operation of the AN-19A.

6. Recommendations:

It is recommended that:

a. CNMC-05 furnish the Magnavox Corporation with a reperforator for use with the AN-19A.

b. Upon the setting up of a laboratory test circuit in accordance with the NSA 413 System Test for the AN-19A, that the undersigned return to the Magnavox Corp. to complete the conduct of the system test.

WILLIAM L. REEVES
CNMC Equipment Engineering Division

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[illegible]

24 February 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory, Incorporated (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

10 through 13 February 1958

d. Equipment Nomenclature

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. REPRESENTATIVES:

National Security Agency

Mr. John C. Orr, Quality Assurance Representative, ENG-3
Mr. Norman A. Stead, Quality Assurance Representative, ENG-3

Airborne Instruments Laboratory

Mr. V. Middlebrook, Project Engineer

3. PURPOSE OF TRIP:

To perform final acceptance tests on TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer equipment produced by AIL, Contract DA49-170-sc-2000. This is a joint trip report of Messrs. John C. Orr and Norman A. Stead.

4. CONFERENCE BRIEFS:

a. During the period 10 through 13 February 1958, four units were tested by ENG's Quality Assurance Representatives in accordance with NSA's Standard of Acceptance #10 and Systems Test #13. The results of these tests are as follows:

(1) Units 273 and 274 were accepted.

(2) Units 270 and 272 were rejected due to the following operational failures:

(a) Equipment #270 - Jumper wire connecting terminals 2 and 4 power transformer terminal strip broken, causing an open in the AC power line.

(b) Equipment #272 - K-5 relay not operating properly, causing unit to stay in break condition.

b. Upon rejection of equipment, AIL corrected defects and resubmitted equipment for evaluation. Equipment #270 and #272 were found to be free of defects upon re-evaluation and were accepted.

c. Inspection on spare parts kits and bulk spares revealed the following defects:

(1) Spare parts kits - Packing list did not list all component parts.

(2) Bulk spares - Packing list called for ten power transformers. One was missing.

Upon rejection of spare parts kits and bulk spares, AIL corrected the defects and resubmitted the lots. The spare parts kits and bulk spares were accepted.

d. On the previous trip, 18 TSEC/HW-19A's were accepted provisionally pending an ENG modification. This modification has been accepted by ENG and coordinated with AIL. The 24 service test models will be modified at NSA, and the remaining 85 models will be modified by AIL prior to ENG acceptance.

d. Form DD-250, Materiel Inspection and Receiving Report was signed by the Quality Assurance Representative for equipment numbers 251 through 274, 24 each, which completed the contract for service test models.

5. CONCLUSIONS:

AIL has completed 24 service test models, and ENG's Quality Assurance Representatives have accepted these models

6. RECOMMENDATION:

It is recommended that:

Upon receipt of notification from AIL that a sufficient quantity of TSEC/HW-19A equipment has been completed, ENG's Quality Assurance Representatives make a trip for final acceptance. This is an ENG action.

24 February 1958

Norman A. Stead

NORMAN A. STEAD
Quality Assurance Representative
ENG-3

John C. Orr

JOHN C. ORR
Quality Assurance Representative
ENG-3

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11 February 1958

TRIP REPORT

1. IDENTIFICATION OF TRIP:

a. Name of Organization

Airborne Instruments Laboratory, Inc. (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

6 through 23 January 1958

d. Equipment Nomenclature

TSEC/HW-19A, Electro - Start-Stop Teletypewriter Signal Mixer

2. REPRESENTATIVES:

National Security Agency

Mr. Norman A. Stead, Quality Assurance Representative, ENG-3
Mr. William L. Reeves, Project Engineer

Airborne Instruments Laboratory, Inc.

Mr. V. Middlebrook

3. PURPOSE OF TRIP:

To perform final acceptance tests on TSEC/HW-19A equipment produced by AIL under NSA Contract DA49-170-sc-2000.

4. CONFERENCE BRIEFS:

a. From the period 6 through 23 January 1958, 18 equipments were visually and mechanically inspected and operationally tested in accordance with NSA Standard of Acceptance #10 and Systems Test Specification #13.

b. While performing Quality Assurance evaluation, equipment numbers 253, 259, and 261 were unacceptable due to the following major defects found on the equipment:

(1) Equipment No. 253 - Major

Operational failure of the Relay Line Break Circuit (K-3).

(2) Equipment No. 259 - Major

Restore Line Break Switch, wired wrong.

(3) Equipment No. 261 - Major

(a) Leadwire to tap on the primary winding of power transformer TB-1 not connected.

(b) Contacts on reperforator phone jack out of adjustment, causing reperforator to run open.

c. Upon rejection of equipment, AIL corrected defects and resubmitted equipment for evaluation. This equipment was found to be free of defects upon re-evaluation and was accepted.

d. Equipments (18) were provisionally accepted pending a decision by the NSA project engineer on the marginal limitation of the "Relay Line Break Circuit."

e. During the process of performing visual and mechanical inspection it was discovered that the relay plate covers and the lockscrews on the blower door were coming loose. A check of the prints revealed that no provisions were made for lockwashers and retaining rings at these points. NSA and AIL project engineers agreed that locking devices were needed at these points and will be included on all models to be produced on this contract. The NSA project engineer approved revision of prints to reflect these changes.

5. CONCLUSIONS:

a. The 18 equipments evaluated meet the requirements outlined in the Standard of Acceptance #10 and the Systems Test Specification #13.

b. Locking devices were put on equipment as agreed and prints were revised by AIL to reflect these changes.

6. RECOMMENDATION:

It is recommended that:

Upon receipt of notification from AIL that a lot of HW-19A equipment have been completed, a Quality Assurance Representative make a trip for final acceptance. This is an ENG action.

NORMAN A. STEAD
Quality Assurance Representative
ENG-3

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TRIP REPORT

23 May 1957

1. Identification of Trip:

   a. Name of Organization

      Airborne Instruments Laboratories Incorporated (AIL)

   b. Address

      Mineola, Long Island, New York

   c. Dates of Trip

      20 - 22 May 1957

   d. Equipment

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

   NSA

   Mr. John Orleman, S32D
   Mr. Bruce Schmidt, S32D
   Mr. Don R. Moore, E43

   AIL

   Mr. S. Kats
   Mr. D. Duffy
   Mr. E. Denison

3. Purpose of Trip:

   The purpose of this trip was to coordinate NSA requirements with plans formulated by the contractor for the manufacturer and testing of the TSEC/KW-19A. Also, to assist Mr. Orleman of S32D in the conducting of acceptance tests on the KW-19A equipment.

4. Conference Brief:

   a. Background. - The TSEC/KW-19A will be the production model of the existing TSEC/KW-19 equipment. Airborne Instruments Laboratories Incorporated, under S32D contract No. DA49-170-sc-2000, is to

SECRET

manufacture 109 equipments, 24 of the Service Test model and 85 of the production model. The 85 production equipments are being manufactured under a modification to the SFTD contract at the request of LOG in order to fulfill a requirement submitted by the Army. Through a mutual agreement between SFTD, LOG and NSA, the manufacturing program has been divided into two parts. Technical authority and contract control will be the responsibility of SFTD. The performance of acceptance test, spare parts provisioning, preparation of the maintenance manual and manufacturing drawing format will be the responsibility of NSA.

b. SFTD Modification Kits. - Eighty-five SFTD modification kits which were scheduled for delivery to NSA by 22 April 1957 have not been shipped by AIL to date. AIL's Shipping Department processes its equipment for shipment on a priority system and has a low priority assigned to the SFTD modification kits. NSA representatives were informed by personnel of AIL's Shipping Department that shipment would not be made before the first week of June 57.

On the last visit to AIL, NSA representatives requested the contractor to make certain revisions and corrections to the drawings and bill of material for the SFTD modification kits. Two sets of these amended drawings and bills of material have since been obtained from AIL and will be reviewed by NSA for accuracy and final approval.

c. Acceptance Test. - After testing at AIL the first two Service Test equipments of the Models of the TSEC/KW-19A were accepted by Mr. Coleman of SFTD. This was an interim acceptance test, and these two equipments are scheduled to be delivered to R/D on 27 May 57 for further operational testing and radiation testing. Upon completion of final testing, approximately 28 June 1957, R/D will notify AIL of the disposition of future equipments. During the interim tests it was noted that AIL did not have qualified maintenance personnel to repair the teletypewriter equipment failures. It was necessary for NSA representatives to repair this equipment in order to complete testing of the TSEC/KW-19A.

d. Radiation Testing. - All-Tronics Incorporated made a firm bid of $25.00 per hour for radiation testing of the TSEC/KW-19A; however, they have not stated the number of hours required to test the 45 equipments.

31 January 1958

TRIP REPORT

1. Identification of Trip:

   a. Name of Organization

      Airborne Instruments Laboratories, Inc. (AIL)

   b. Address

      Mineola, Long Island, New York

   c. Date of Trip

      6-9 January 1958

   d. Equipment

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

   NSA

   Mr. V. L. Reeves, NSC-121
   Mr. H. A. Steed, NSD

   AIL

   Mr. V. Middlebrook, Project Engineer
   Mr. F. Smith, Project Manager

3. Purpose of Trip:

The purpose of this trip was to perform Government inspection and acceptance tests on the TSEC/KW-19A service test equipments and to coordinate NSA requirements with plans formulated by the contractor (AIL) for production of 24 service test equipments and 65 operational equipments of the TSEC/KW-19A.

4. Conference Brief:

a. Background - On 9-12 Dec 57 NSA representatives visited AIL for the purpose of performing Government inspection and acceptance tests on the KW-19A service test equipment. Because of manufacturing difficulties, AIL was unable to prepare an equipment for testing at that time. Although no testing was done, a visual and mechanical inspection was performed on the equipments and plans for conducting the acceptance tests were

coordinated with the contractor (AIL). AIL notified NSA on 31 Dec 57 that a quantity of equipments would be ready for testing on 6 Jan 58.

b. Break Circuit

(1) Prior to starting acceptance tests on 6 Jan 58, AIL informed me that a discrepancy had been found in the equipments during system testing by AIL personnel. The equipments break circuit had been designed to operate on a current margin too narrow to assure circuit reliability. The break circuit basically consists of a 5814 (12AU7) tube which conducts to pull in a relay which places the equipment in a break condition. The relay was designed to operate on a pull-in current of 8 MA. or less. The break tube (5814), as used in the present circuit, has a plate current of approximately 7.5 MA. Therefore in order for the break circuit to operate the break relay had to be selected for operation below 7.5 MA. The pull-in current of a sample lot of 82 relays was measured. 91% of the relays tested pulled in at 7.5 MA. or less. It was definitely decided that selection of the break relays was not a satisfactory solution to the problem, because the design of the circuit was still too critical to assure positive operation under adverse operating conditions, such as weak tubes, increased coil resistance, low filament voltage, and low B+ voltage.

(2) Various possible solutions were discussed and two were considered to be most promising:

(a) Replacing the break relay with a relay having a pull in current of 6 MA. or less.

(b) Replacing the break tube (5814) with a type 5867 tube to increase the current output.

(3) The Potter and Brumfield Relay Company was contacted to determine if they could manufacture a relay which would require 6 MA. or less pull in current. They said they could manufacture the relay but it would not meet shock and vibration requirements. The Price Relay Company was contacted and they said they could build the desired relay to meet all specifications.

(4) Investigation of the second possible solution (replacing the break tube) is currently being conducted by AIL.

c. Inspection and Acceptance Testing - Inspection and acceptance testing was performed on the equipments even though the break circuit problem, until corrected, would make the equipments unacceptable for operational use. Two equipments were randomly selected and the complete

system test was performed on them by Mr. Stead and myself. The two equipments satisfactorily conformed to the inspection and testing requirements. Ten other equipments were inspected visually and mechanically by Mr. Stead and found to be satisfactory. Mr. Stead is remaining at the AIL facility to complete the inspection and testing of the RM-19A service test equipments.

4. Manufacturing Drawings - The original manufacturing drawings for the RM-19A will be delivered to NSA on 17 January 1958. AIL is retaining "brown line" copies of the drawings and will use them to complete the contract. AIL will keep NSA informed of any changes required to the drawings in the future.

5. Conclusions:

a. Government inspection and acceptance testing of the RM-19A service test equipments is currently being conducted although a design discrepancy has been found in the break circuit of the equipment. After correction of the break circuit discrepancy additional acceptance tests as required will be performed on all equipments. No equipments will be delivered to NSA until the break circuit problem is corrected and proved satisfactory.

b. The performing of the Government inspection and acceptance test on the 65 operational RM-19A equipments will require the services of at least two persons in order to keep up with the production of the equipments. The rate of production planned by AIL for the 65 equipments will be 25 equipments in March, 30 equipments in April and 30 equipments in May.

6. Recommendations:

a. NSA conduct an immediate investigation to determine the most practical solution to the equipments break circuit problem and forward findings to AIL for action. Every effort should be expended so as not to delay the RM-19A program.

b. NSA assign at least one more person to the RM-19A program to assist in the performance of the inspection and acceptance tests on the RM-19A equipments. This is required so that acceptance testing can keep up with the production of the equipment. This person should be obtained from the Quality Assurance Branch of NSA.

William L. Reeves

WILLIAM L. REEVES
R3G-121

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24 December 1957

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

Airborne Instruments Laboratory, Incorporated (AIL)

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences:

9 through 12 December 1957

d. Equipment Nomenclature

TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

National Security Agency

Mr. William M. Reeves, Project Engineer, ENG-1
Mr. Norman A. Stead, Quality Assurance Representative, ENG-3

Airborne Instruments Laboratory, Inc.

Mr. Prati, Quality Control Engineer
Mr. Savage, Quality Control Supervisor
Mr. Duffy, Project Manager

3. Purpose of Trip:

To present the final Standard of Acceptance to the Manufacturer; to perform acceptance tests on the second two models of the TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer service test equipment and to make surveillance of the Manufacturer's process and sampling procedures.

4. Conference Brief:

a. Upon arrival at AIL, a meeting was held with their personnel for implementation of Standard of Acceptance #10, as acceptance criteria on HW-19A equipment. During this meeting all problems were resolved and this Standard is now acceptable for use and will be used by AIL and CSEC's Quality Assurance Representative.

b. A tour was made of AIL's plants where the HW-19A is being fabricated and tested. The tour of these plants revealed acceptable process control and sample inspection procedures. A sampling inspection is performed after each process and a final visual inspection, which will maintain the quality of product to an Acceptable Quality Level.

c. Although the Quality Assurance Representative inspected AIL's incoming material records on the last trip, records of AIL's incoming inspection of parts (relays, meters, etc.) was surveyed to establish quality of material as received. All material coming to AIL for the HW-19A receives incoming inspection.

d. An inspection of AIL's Fabrication Section showed that every subassembly is inspected 100% visually and mechanically. Visual and mechanical inspection at this point eliminates trouble on the final assembly. Two units of equipment were being made ready for shipment to the Steward Avenue Plant for operational tests. An evaluation of these two HW-19A's by the ENG Quality Assurance Representative found them to be visually and mechanically acceptable.

e. At the Steward Avenue Plant three test stations for testing the HW-19A will be available for AIL and CSEC's Quality Assurance Representative. AIL will use two stations to test equipment coming off the production line. At present the third station for NSA's use has not been completed.

f. During the inspection of these test stations, two units were in the process of being operationally tested by AIL. Due to operational failures of the HW-19A, it was impossible for AIL to complete necessary tests. In view of these failures, AIL has rescheduled production, promising a minimum of four units of HW-19A's to be ready on or about 6 January 1958, for final acceptance.

g. Signal Corps' Resident Government Inspector contacted the ENG representatives in reference to the present R/D contract for HW-19A's, stating that they could assist ENG in Quality Assurance during manufacture. Although this is a R/D contract and the ENG Quality Assurance Representative will accept the final equipment, a request was made by the Signal Corps Inspector to allow their personnel to work on the HW-19A project.

5. Conclusions:

a. Standard of Acceptance #10 has been accepted and signed by Airborne Instruments Laboratory.

b. Process control, sampling inspection procedures and inspection records are acceptable for the HW-19A program.

c. The Quality Assurance program which incorporates Standard of Acceptance #10 has been coordinated with the Manufacturer, R/D and elements of ENG.

d. Signal Corps Resident Inspector has offered NSA assistance on the HW-19A contract.

6. Recommendations:

It is recommended that:

a. An investigation be made as to the desirability of requesting inspection by a cognizant Government agency during service test contracts of equipment for CSEC. ENG will take this action and coordinate with R/D.

b. A trip be made on or about 6 January 1958, for final acceptance of four HW-19A's. This is an ENG action.

for Russell O. Sizemore
NORMAN A. STEAD
Quality Assurance Representative
ENG-31

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16 December 1957

TRIP REPORT

1. Identification of Trip:

   a. Name of Organization

      Airborne Instruments Laboratories, Incorporated (AIL)

   b. Address

      Mineola, New York

   c. Date of Trip

      9 through 12 December 1957

   d. Equipment

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer.

2. Representatives:

   AIL

   Mr. V. Middlebrook, Project Engineer
   Mr. D. Duffy, Project Manager
   Mr. L. Prahl, Quality Control Engineer
   Mr. E. Savage, Quality Control (Mechanical)

   NSA

   Mr. W. L. Reeves, NSA Project Engineer
   Mr. H. Stead, NSA, Quality Assurance

3. Purpose of Trip:

   To perform Government inspection and acceptance tests on the TSEC/KW-19A service test equipments. To coordinate the NSA Standard of Acceptance (No. 10) for the KW-19A equipment with AIL Quality Control personnel. Also, to inspect the facilities and procedures being used for the fabricating and testing of the KW-19A equipments. To discuss and coordinate pertinent matters concerning the KW-19A program.

4. Conference Briefs:

   a. Background - The TSEC/KW-19A will be the production model of the existing TSEC/KW-19 equipment. Airborne Instruments Laboratories, Inc., under R/D contract No. DA49-170-sc-2300, are to manufacture 109 equipments,

24 service test equipments, and 65 operational equipments. The 65 operational equipments are being manufactured under a modification to the R/D contract at the request of CSEO-05 to fulfill a requirement submitted by the Army. To date R/D has conducted acceptance tests on two RM-19A equipments (prototypes). The results of these tests were satisfactory with only minor design changes having to be made to meet the test requirements. One of these changes was the addition of two reinforcement brackets on the power transformer to "stiffen" the equipments chassis against vibrations. Airborne Instruments Laboratories Inc., notified NSA that two equipments would be available, at their facility during the week of 9 December 1957 for Government inspection and acceptance testing.

b. Government Inspection and Acceptance Testing: - No Government acceptance testing was performed on this visit because the equipments to be tested would not function properly. AIL stated that due to manufacturing difficulties they were not able to completely "de-bug" the equipments before the arrival of the NSA representatives. Attempts to "de-bug" the equipments during the duration of this visit were unsuccessful. Although no acceptance testing could be conducted the equipments were inspected for conformance to workmanship standards. Discrepancies noted were the mal-positioning of the capacitors used in the filter network for the send and receive lines and the omission of symbol identification for various components. The overall workmanship quality of the equipment was considered satisfactory. The week of 6 January 1958 has now been scheduled for the conducting of the acceptance tests on the equipments.

c. NSA Standard of Acceptance No. 10: - A copy of the NSA Standards of Acceptance No. 10 (Visual and Mechanical) was given to Mr. Pruti of AIL Quality Control Division. The Standard was reviewed by and concurred in by Mr. Pruti. Mr. Pruti arranged for a tour of the AIL facility for Mr. Stead and I to inspect the quality control procedures being used in the manufacturing of the RM-19A equipments. The tour was very informative and indicated that the quality procedures were satisfactory by NSA standards.

d. TTEC/RM-19A Modification Kits and Spare Parts Kits: - It was mutually agreed that inspection and acceptance of the Transmitter Distributor and Teletypewriter Printer Modification Kits would be made after the kits had been packaged. Mr. Stead will make the inspection and acceptance by random sampling of the completed kits. The same procedure will be used for the spare parts kits.

e. Packaging of the RM-19A Equipments for Delivery: - It was mutually agreed that no equipment accepted by the Government would be sealed in the shipping container prior to inspection of the packaging by the NSA inspector. AIL representatives were informed that a selected few of the equipments would be delivered to NSA unsealed. This pertained to the 65 operational equipments which are to be packaged for export shipment. It is necessary that these selected equipments not be permanently sealed because they will be unpackaged at NSA to conduct additional tests.

f. Manufacturing Drawings: - The disposition of the manufacturing drawings for the RM-19A and the Special Transmitter Distributor (TSEC/RM-19) Modification Kit were discussed. Discrepancies found in the military specifications called out on various RM-19A manufacturing drawings were reviewed. AIL agreed to make the necessary corrections to the specifications on the drawings. Mr. Duffy (AIL) was told that the RM-19A manufacturing drawings would be acceptable to NSA if all revision markings were removed from the drawings. Also, the Special Transmitter Distributor Modification Kit drawings would be acceptable to NSA if AIL would check the drawings for errors and make the necessary corrections. Mr. Duffy agreed to make the necessary corrections to the RM-19A drawings and Special Transmitter Distributor Modification Kit drawing and to forward both sets of drawings to NSA as soon as possible.

g. System Test Data Sheets: - I reviewed the data sheets formulated by AIL for use in the performing of the system test on the RM-19A equipments. The data sheets appeared to be adequate; however, because AIL was unable to get an equipment operating it was not possible to evaluate the accuracy of the data sheets. Copies of these data sheets were obtained and will be evaluated at NSA. It was agreed that no further changes would be made to the data sheets without NSA concurrence.

h. RM-19A Wiring Diagram and Schematic: - AIL representatives furnished a copy of the latest wiring and schematic for the RM-19A equipment. The diagram and schematic was presented as the final and correct version for the RM-19A equipments.

3. Conclusions:

a. Due to manufacturing difficulties, an RM-19A equipment was not available for the NSA representatives to perform the Government acceptance tests. AIL had two equipments completely fabricated but were unable to "de-bug" the equipments for testing. The equipments were inspected for workmanship qualities and except for minor discrepancies were considered satisfactory. Plans are now for the acceptance testing to be conducted during the week of 6 January 1958.

b. The quality control procedures being used by AIL in the production of RM-19A equipments appeared satisfactory to the NSA representatives.

c. AIL representatives concurred with plans formulated by NSA for inspection and acceptance of the RM-19A modification kits, spare parts kits and packaging requirements.

d. AIL will review and make the necessary corrections to the TSEC/RM-19A and Special Transmitter Distributor manufacturing drawings. They will forward the drawings to NSA for acceptance.

e. AIL agreed to make no changes to the RM-19A System Test data sheets without the concurrence of NSA.

18 December 1957

6. Recommendations:

a. [redacted] make the necessary plans to have Mr. Reeves and Mr. Shaul visit AIL during the week of 6 January 1958 for the purpose of conducting Government acceptance tests on the RM-19A service test equipment.

b. [redacted] evaluate the data sheets for the RM-19A system tests to determine their accuracy and validity.

c. [redacted] review the final wiring diagram and schematic for the RM-19A to determine their technical accuracy.

for B. N. Morcalo
WILLIAM L. REEVES
[redacted]

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~~CONFIDENTIAL~~ HW-19A

TRIP REPORT 27 August 1957

1. Identification of Trip:

   a. Name of Organization

      Airborne Instruments Laboratories Incorporated (AIL)

   b. Address

      Mineola, Long Island, New York

   c. Dates of Trip

      13 August - 16 August 1957

   d. Equipment

      TSEC/HM-19A, On/Off-Line Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

   NSA

   Mr. Don R. Moore

   AIL

   Mr. Sid Katz

3. Purpose of Trip:

   To install and operationally test government-furnished teletypewriter equipment which is to be used in conducting government acceptance tests on the TSEC/HM-19A equipment manufactured by AIL. This equipment was furnished under Contract No. DA49-170-sc-2000.

4. Conference Briefs:

   This teletypewriter equipment was cleaned, lubricated, adjusted and tested by the undersigned at the manufacturer's facility during this trip. AIL personnel were also briefed on the preventative maintenance procedures for teletypewriter equipment as well as on the proper use of teletypewriter technical manuals. This instruction was necessary because the teletypewriter equipment associated with the HM-19A is being maintained by inexperienced AIL personnel.

5. Conclusions:

   Upon my departure from AIL the teletypewriter equipment to be used in conducting acceptance tests on the HM-19A equipment was in excellent operating condition. However, the ability of AIL personnel to adequately maintain the

   equipment is doubtful.

27 August 1957

6. Recommendation:

It is recommended that AIL be directed to obtain the services of a qualified teletypewriter repairman in order to adequately maintain the FM-19A associated teletypewriter equipment.

Don R. Moore
DON R. MOORE
ENG-132

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LITERAL AND TELETYPE SECTION

9 July 1957

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

Airborne Instruments Laboratory, Incorporated

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conferences

19 through 21 June 1957

d. Equipment Nomenclature

TSEC/KM-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

National Security Agency

Mr. Russell C. Simmons, Quality Assurance Representative
Mr. Norman A. Stead, Quality Assurance Representative

Airborne Instruments Laboratory

Mr. Katz, Project Engineer
Mr. Simms, Quality Control Manager
Mr. Prati, Quality Control Engineer

3. Purpose of Trip:

To establish technical liaison with the manufacturer, to coordinate the final draft of the Standard of Acceptance, and to make a survey of the manufacturing processes, the inspection procedures, and the quality assurance program for the TSEC/KM-19A. This is a joint trip report of Messrs. Russell C. Simmons and Norman A. Stead.

4. Conference Brief:

a. Upon arriving at Airborne Instruments Laboratory (AIL) a conference was held to coordinate the final draft of the Standard of Acceptance

with the manufacturer. This Standard of Acceptance is considered acceptable for use and will be used by AIL and NSA inspection personnel. Inasmuch as the quantity of teletype equipment currently available at the contractor's factory is adequate for two inspection stations only, the contractor was under the impression that NSA Quality Assurance would be conducted on a surveillance basis. The contractor considered these two inspection stations to be essential for his use in completing the contract without undue delay in production. On 20 June 1957, Mr. Reeves, [redacted], was contacted to reaffirm the fact that NSA Quality Assurance Representatives will use the facilities of one of AIL's test stations. It has been subsequently established that sufficient teletype equipment will be available for three test stations and that one of these stations will be utilized by NSA Quality Assurance Representatives.

b. A tour through AIL disclosed acceptable process control and sampling inspection procedures. AIL's Chief of the Quality Control Section showed samples of inspection records kept on the TSEC/[redacted]-19A for incoming parts and materials. These materials have a certification of compliance from the sub-contractor. All parts are source inspected and are resampled by AIL. During the tour through the plant, the metal chassis of the TSEC/[redacted]-19A, which were sub-contracted to another manufacturer were visually examined with respect to workmanship and were found to be acceptable.

c. Eleven units of equipment of the TSEC/[redacted]-19A are to be ready for final acceptance at the factory on or about 15 August 1957. A firm schedule of quality assurance visits cannot be planned at this time due to the lack of definite production data.

5. Conclusions:

a. The final draft of the Standard of Acceptance has been coordinated with AIL.

b. Process control, sampling inspection, procedures and recording of inspection records are acceptable for the TSEC/[redacted]-19A program.

c. That necessary teletype equipment will be available for use in final acceptance by NSA's Quality Assurance Representative in order to perform operational inspection on the TSEC/[redacted]-19A.

d. Quality Assurance of the TSEC/[redacted]-19A will be performed on a lot basis by NSA.

9 July 1957

6. Recommendation:

It is recommended that:

Liaison be maintained with AIL so that planned quality assurance visits may be scheduled as definite production data becomes available. ENG should assume this action.

Norman A. Stead

NORMAN A. STEAD
Quality Assurance Representative
ENG

Lorraine A Schraeder
for
[redacted] C. SIZEMORE
Quality Assurance Representative
ENG

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International Electronics Engineering Incorporated (IEEI) of Annapolis, Maryland, made a firm bid of $11,250 for radiation testing of the 45 HW-19A equipments. This is $250.00 per equipment which includes $11.33 per unit for shipping of equipment back to AIL. This is a sizable increase over their informal bid of $8,200.00

AIL is still contemplating conducting radiation tests at their plant. It was pointed out to AIL that they had a very short time to procure equipment, set up facilities and train personnel. They do not have an experienced engineer in radiation testing.

5. Conclusions:

a. Due to AIL's failure to ship the SFTD modification kits as originally promised the plans and fabrication of the TSEC/HW-10 equipment by MAP has been hampered. AIL was informed that NSA desired the SFTD modification kits as soon as possible in order to convert KD 224 (Receiving Transmitter Distributor) to TSEC/HW-10's.

b. AIL does not have qualified personnel to repair the ancillary teletypewriter equipment used in testing the HW-19A. This situation can result in delays and unsatisfactory acceptance testing.

6. Recommendation:

a. It is recommended that ENG continue to closely monitor this project to assure that no slippage occurs which will interfere with the Service Test plans.

b. It is recommended that R/D inform AIL, through the SIRFQ contracting officer, that NSA considers the maintenance of government loaned teletypewriter equipment by AIL to be inadequate and inconsistent with contractual requirements.

Don R. Moore
DON R. MOORE
SYSTEMS ENGINEERING DIVISION
ENG-13

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4/37.18

TRIP REPORT

10 May 1957

1. Identification of Trip:

   a. Name of Organization

      Airborne Instruments Laboratory

   b. Address

      1600 Old Country Road, Mineola, N. Y.

   c. Dates of Trip

      24 - 25 April 1957

   d. Equipment

      TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

   NSA

   Mr. Edgar L. Gollop - ENG-141
   Mr. Joe H. Rosier - ENG-141

   Airborne Instruments Laboratory

   Mr. Sid Katz - Project Engineer
   Mr. Phillip Smith - Supervisor, Technical Publications

3. Purpose of Trip:

   To review the progress which has been made by AIL on illustrations and technical data being prepared for KAM-40/TSEC, "Repair and Maintenance Instructions for TSEC/KW-19A."

4. Background Information:

   a. The original date for the completion of KAM-40/TSEC was 1 June 1957. This date was based on plans for the first two equipments to be completed and ready for testing by NSA in

February 1957. The schedule has since been revised and the initial two equipments are not now scheduled for testing until May 1957. The service test and first production models have also been rescheduled to reflect this slippage.

b. A preliminary draft of KAM-40/TSEC was initiated last September using engineering information that was then available. Work on this draft ceased in December 1957 pending receipt of information on equipment changes being developed by AIL. To obtain this information, arrangements were made in January 1957 to have AIL prepare those items that would be necessary to complete and finalize the manuscript. These items include schematics, waveforms, voltage and resistance measurements, part lists, etc. Official authorization in the form of a PD amendment was given AIL on 4 March 1957.

5. Conference Brief:

a. The latest schematic diagram of the TSEC/TM-19A was reviewed in detail. Mr. Kats of AIL pointed out many changes in the circuitry, each of which requires an appropriate change in the manuscript. A detailed list of these changes is on file in EMG-141.

b. The status of material AIL is to furnish was reviewed and it was found that practically no progress had been made toward its completion. AIL pointed out that work on the manual project had been delayed because the engineers who are responsible for compiling it are currently concentrating on completing the initial two equipments in accordance with the current delivery schedule. Further, AIL pointed out, these equipments, once completed, are to be shipped to NSA before compilation of manual data can be completed. The importance of the manual phase of the program was emphasized and (as subsequently developed from this trip) AIL decided to build for their own purposes and at their risk an additional equipment that can also be used for manual purposes. (Details concerning this equipment were handled by Mr. John Grieman, STED contract representative.) Based on the completion of this third equipment, a schedule was established for each of the manual items for which AIL is responsible. The final date for completion of all these items is 30 June 1957. Details of this schedule are on file in EMG-141.

6. Conclusions:

a. At the time of the visit, the status of the material AIL is to furnish had not progressed satisfactorily. The schedule as now established with AIL is based on a realistic appraisal of the overall program. This schedule commits AIL to furnish manual material in sufficient time for publication of KAM-40/TSEC.

b. Even if manual material is received from AIL as scheduled, however, the amount of rewriting necessary to revise the existing text in accordance with equipment changes, has necessitated rescheduling KAM-40 in ENG-141 as a priority project to meet service test requirements. Since it will not be possible to complete the manual in time for training purposes, arrangements are being made to furnish manuscript copies of the manual for use during the training course.

6. Recommendations: - None.

Edgar L Goliof

EDGAR L. GOLIOF
Equipment Specialist
Systems Engineering Division

Edgar L Goliof

for JOE H. ROZIER
Equipment Specialist
Systems Engineering Division

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24 April 1957

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

Airborne Instruments Laboratory, Incorporated

b. Address

Steward Avenue
Mineola, New York

c. Dates of Conference

16 through 17 April 1957

d. Equipment Nomenclature

TSEC/KW-19A, Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

National Security Agency

Mr. William Reeves, Project Engineer, ENG-13
Mr. Russell C. Sizemore, Quality Assurance Representative, ENG-12
Mr. Norman A. Stead, Quality Assurance Representative, ENG-12

Airborne Instruments Laboratory

Mr. Kuhn, Project Engineer
Mr. Simms, Quality Control Manager
Mr. Prati, Quality Control Engineer

3. Purpose of Trip:

To establish technical liaison with the manufacturer, make surveillance of the manufacturing processes, the inspection procedures and the quality assurance program. Also to coordinate Standard of Acceptance, attribute sampling plan and test requirements for final equipment, and to plan NSA's inspection and acceptance trips so that they coincide with the manufacturer's production schedule of final equipment.

This is a joint trip report of Messrs. Russell Sizemore and Norman Stead.

4. Conference Brief:

a. Standard of Acceptance draft was coordinated with the manufacturer. During the discussions Mr. Sinns explained that Airborne Instruments Laboratory has never experienced the use of Standard of Acceptance, however, they will produce equipment to meet this Standard. Mr. Sinns submitted written comments and suggested additions to the Standard, with a request that they be added as amendments. Mr. Sinns was notified that these comments will be considered and Airborne Instruments Laboratory will be advised of the findings.

b. A tour through Airborne Instruments Laboratory disclosed acceptable process control and sampling inspection procedures. A sampling inspection is performed after each process and at final inspection. Provisions of MIL-STD-105A are maintained at final acceptance for visual and mechanical defects. A one hundred per cent operational test inspection will be performed on all completed equipment. During a tour through the plant two incomplete TSEC/KW-19A's were evaluated for general conformance with visual requirements. Workmanship was found to be acceptable.

c. Airborne Instruments Laboratory requested that NSA provide a full-time quality assurance representative at the plant, since there will be no Government cognizant inspector on the contract. The NSA representative stated that full-time representation was not practical at this time, but that a representative would be available when lots are ready for final acceptance.

d. Eighty-five modification kits for the TSEC/KW-10, associated equipment for the TSEC/KW-19A will be ready for final acceptance on or about 22 April 1957. Due to the time element it was decided by the NSA representatives that acceptance be made at destination (NSA, Washington, D. C.).

5. Conclusions:

a. The draft of the Standard of Acceptance has been coordinated with AIL and their recommended changes will be considered by NSC.

b. Inspection facilities at AIL are adequate for the TSEC/KW-19A program.

c. Evaluation of the two incomplete TSEC/KW-19A's indicate that AIL will produce acceptable equipment.

d. A firm schedule of quality assurance visits cannot be planned at this time due to lack of definite production data. A trip is planned for 15 May 57, to resolve the final Standard of Acceptance.

e. Modification kits for associated TSEC/KW-10's will be given final acceptance at destination (NSA, Washington, D. C.).

6. Recommendation:

It is recommended that:

Standards Branch review Airborne Instruments Laboratory's suggested changes in the draft of the Standard of Acceptance and a trip be scheduled for 15 May 1957 for final coordination.

Norman A. Stead

NORMAN A. STEAD
Quality Assurance Representative
ENG-12

George A. Smith for

RUSSELL O. BIVENS
Quality Assurance Representative
ENG-12

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MEMORANDUM FOR RECORD

SUBJECT: Trip Report - Airborne Instruments Labs., Mineola, L.I., N.Y.

DATE: 17-18 April 1957

REPRESENTATIVES:

Airborne	NSA
K. Dashem	J. Orleman
D. Duffy	C. McKean (Observer)
S. Katz	A. Miller
P. Smith	L. Ziegler
R. Schaller	

PURPOSE: To review the progress of the TSEC/KW-19A and TSEC/KW-22 equipments.

TSEC/KW-19A:

The first two TSEC/KW-19A preproduction models are about 90% completed and will be entirely completed and ready for debugging and testing by Airborne on 22 April 1957. These equipments will be ready for NSA final acceptance testing by 6 May 1957. Mr. Orleman, STED-12, and Mr. Reeves, CSEC/EMI, will conduct the acceptance tests for NSA. Certain items contained in the test procedure specification originally prepared by the contractor were discussed and clarified. The test acceptance specification should now be complete and ready for NSA use on 6 May. The possibility of having the contractor conduct a training program on the TSEC/KW-19A equipments was also discussed. The contractor has indicated an interest in conducting the training course but the final decision would be dependent upon the time selected and availability of the necessary instructors at that time.

NSA representatives requested and received three sets of the available drawings (manufacturing) on the TSEC/KW-19A equipments. These drawings will be used to secure competitive bids for the planned production of these equipments.

TSEC/KW-22:

Each of the fourteen different types of chassis strips containing the electronic circuitry was reviewed for its completeness and possible release for purchase of parts. A total of six were found to be entirely completed and ready for fabrication. These were:

(a) Binag Strip, Type A
(b) Binag Strip, Type B

(c) Combining Strip
(d) Comparison Alarm Strip
(e) MA Binary
(f) MA Sampling Strip.

The contractor was cautioned to observe all NSA specifications regarding wiring, length of pigtails, soldering techniques, etc. The remaining strips will be released as soon as the 100-word speed of operation is approved.

Samples of the reworked slides mounted on a drawer assembly were inspected by NSA representatives. The contractor was informed that some improvement had been noted but that certain parts would have to be held to close tolerances in order to eliminate the excess movement which still exists. Also, the slide locks needed tightening to eliminate interference of free-movement, and stops should be reworked to eliminate automatic ejection or possibility of having the drawer fall out of the slide after the lock is released. The drawer cables were binding at two points, which indicated the necessity for a different type of clamping and the drawer tilt-lock was too short and should be lengthened to assure firm locking. The contractor agreed to incorporate these further improvements in the slides.

The possibility of conducting a training course on the TSEC/KW-22 equipment was also proposed to the contractor and again the decision is dependent upon the availability of qualified instructors. This will be discussed further at a later date.

L. L. ZIEGLER
LOG-21

4-3/1.19

ENG-02

file

15 March 1957

TRIP REPORT

1. Identification:

   a. Name of Company

      Airborne Instrument Corporation

   b. Address

      Mineola, New York

   c. Date of Conference

      27 - 28 February 1957

   d. Equipment

      TSEC/HW-19A, Electronic Start-Stop Teletypewriter Signal Mixer.

2. Representatives:

   a. NSA

      Paul A. Duchene - ENG-142

   b. Airborne Instrument Corporation

      Joe Schweizer - Chief Draftsman
      Stuart Thomas - Designer

3. Purpose of Trip:

   To review and discuss drawing format, specifications, numbering methods and other items in connection with the completion of the manufacturing drawings.

4. Conference Brief:

   a. Several items were discussed with Airborne Instrument concerning drawing format. Airborne stated that the CSEC drafting specification 04.014 contradicts itself when it allows the use of JAN or MIL numbers but not AN numbers. The only difference at the present time between JAN numbers and AN numbers is that JAN numbers reflect electrical parts and components, whereas AN numbers represent the common hardware. All three types of numbers indicate Government inspected parts. It is more expensive to procure parts by the use of these numbers due to the additional handling of the items as they pass thru Government inspection and stocking. Some benefits which arise thru this type of procurement are as follows:

(1) Parts of a superior quality.

(2) Less drawings required to produce parts.

(3) Standardized parts procurement.

b. It was found that Airborne was assigning CE numbers to material spec's, finish spec's, and plating spec's. Mr. Duchene stated that this was unnecessary as these items were part of each individual drawing and did not require a separate CE number.

c. In the process of making a drawing obsolete and superseding it by another drawing, Airborne only prepared one revision directive. Two directives are required, one for each drawing. The proper procedure was outlined by Mr. Duchene.

d. A small quantity of CE numbers ~~were~~ WAS assigned to parts for which there were no drawings. Airborne stated that they would ask for a renegotiation of the contract if they were expected to prepare these drawings. It was decided that these drawings would be prepared by Consultants and Designers when the originals are received from Airborne.

5. Conclusions:

a. Airborne had a valid criticism when they criticized the drafting specifications use of JAN and MIL numbers and not AN numbers. Consequently, AN numbers have been approved for use by Airborne where FIIN numbers do not exist.

b. Airborne stated they would comply with the requirement outlined in paragraphs 4b and 4c of this trip report.

c. The drawings referred to in paragraph 4d will be prepared under the contract now existing with Consultants and Designers.

6. Recommendations:

None.

Paul A. Duchene

PAUL A. DUCHENE
Acting Chief, Engineering Drafting Section
ENG-142

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TRIP REPORT

8 March 1957

1. Identification of Trip:

a. Name of Organizations

Airborne Instruments Laboratories Inc. (AIL)
All-Tronics Incorporated

b. Addresses

Mineola, Long Island, New York
Westbury, Long Island, New York

c. Date of Trip

27 - 28 February 1957

d. Equipment

TSEC/KW-19A, On/Off-Line Electronic Start-Stop Teletypewriter Signal Mixer

2. Representatives:

NSA	AIL	All-Tronics
Mr. J. A. Kersey, ENG	Mr. S. Katz	Mr. Samuel Markell
Mr. W. E. Reeves, ENG	Mr. D. Duffy	Mr. Harold Westman
Mr. J. O. Coleman, STED	Mr. E. Bastman	
Mr. J. R. Valentine, STED	Mr. Simms	

3. Purpose of Trip:

The purpose of this trip was to coordinate NSA requirements with plans formulated by the contractor for the manufacture of 109 models of the TSEC/KW-19A. The issues to be discussed on this visit were, the status of equipment production, the acceptance test program and spare parts provisioning. On this trip Mr. Kersey and Mr. Reeves of NSA and Mr. Duffy of AIL visited All-Tronics Inc., to inspect their testing facilities. All-Tronics is being considered as a possible radiation testing facility for AIL in the manufacturing of KW-19A equipments. This is a joint trip report of Mr. Reeves and Mr. Kersey.

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4. Conference Brief:

a. Status of Equipment Production

(1) AIL is in the process of fabricating the first two service test models of the TSEC/KW-19A. These equipments will be ready for testing by NSA (S7E6) in early April 1957. Upon completion of testing any discrepancies found in the equipments will be remedied by AIL and production of the remaining equipments will commence.

(2) Due to the proximity of the "jacks" located on the rear of the KW-19A chassis, AIL requested that the identifying information for each "jack" be condensed. A manufacturing drawing of the rear of the chassis was inspected by NSA representatives and AIL's request was considered valid. Through mutual agreement between NSA representatives, AIL was directed to condense the identifying information.

b. Acceptance Testing

(1) AIL is in the process of preparing the acceptance test specifications for the KW-19A. The acceptance test is to be divided into four parts; inspection of incoming materials; inspection of manufactured parts and assemblies; final visual and mechanical inspection; and systems test.

(2) In January 1957, AIL was requested to furnish NSA a draft copy of the acceptance test specifications by 1 March 1957, for review by NSA personnel. At the time of this visit AIL had completed the first three parts of the specifications and informed NSA representatives that the fourth part would not be completed before 15 Mar 57. Mr. Reeves reviewed the completed parts of the test specification and found them to be inadequate and requested AIL to make the specifications more detailed.

(3) At Mr. Reeves' request, personnel from AIL's Quality Control Division outlined the procedures used by AIL in performing quality control functions. At the conclusion of this briefing, Mr. Reeves informed AIL representatives that he would brief KMG's Quality Assurance personnel on his findings, and forward to AIL any comments or questions.

c. Spare Parts:

No action has been taken by AIL for the procurement of spare parts for the MW-19A equipments. NSA representatives were informed that AIL at that time had not received the authority from NSA to procure the spare parts. AIL representatives were informed that the required authority was being processed within NSA and would be forwarded to AIL as soon as possible.

d. Repair/Maintenance Manual:

NSA representatives queried AIL as to the status of the requested material for the Repair/Maintenance manual for the MW-19A. AIL informed NSA representatives that no work had been done in formulating the material because no contractual authority had been received from NSA. Mr. Valentino stated that he was unaware of this situation as he had forwarded a contract amendment to cover this work. He further stated that he would check on this and expedite the amendment.

e. General:

AIL had been previously requested to furnish NSA by 1 March 1957, a material specification list and the drawing number of the Master Manufacturing Drawing List for the TSEC/MW-19A. Mr. Reeves queried AIL representatives as to the status of the request and was informed that the information would not be available to NSA until about 8 Mar 57.

f. Visit to All-Tronics Incorporated:

Mr. Kersey, Mr. Reeves of NSA and Mr. Duffy of AIL visited the All-Tronics Company and toured their facility. At the end of the tour it was concluded by both AIL and NSA representatives that All-Tronics appeared adequately equipped to perform the required testing.

5. Conclusions:

a. AIL will have the first two MW-19A service test equipments completed by 1 April 57. Conducting of acceptance tests by NSA (STED) on the first two equipments will commence in early April as scheduled.

b. The first draft of the acceptance test specifications for the MW-19A should be delivered by AIL to NSA for review by 15 Mar 57. The first three parts of the test will have to be rewritten by ENG's Quality

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ENG-02

TRIP REPORT

Jan 5-7

CONFIDENTIAL

1. Identification of Trip

a. Name of Organization

Airborne Instruments Laboratories, Inc. (AIL)

b. Address

160 Old Country Road
Mineola, Long Island, New York

c. Date of Trip

9 January 1957

d. Equipment

TSEC/KW-19A, On-Line Electronic Start-Stop, Single Channel Teletypewriter Signal Mixer

2. Representatives

NSA

Mr. John Orleman, STED
Mr. William Gooch, STED
Mr. William L. Reeves, ENG

Airborne Instruments Laboratories, Inc.

Mr. D. Duffy
Mr. S. Katz
Mr. E. Baskom
Mr. S. Thomas

3. Purpose of Trip:

To coordinate NSA requirements with plans formulated by the contractor (AIL) in the production of 24 service test models and 85 production models of the KW-19A. Also to view the prototype model of the KW-19A equipment constructed by AIL.

4. Conference Brief:

a. Background. - The TSEC/KW-19A will be the production model of the existing TSEC/KW-19 equipment. Airborne Instruments Laboratories, Inc., under STED Contract No. DA 49-170-sc-2000, is to manufacture 109 equipments.

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24 service test equipments and 85 production models. The 85 production models are being manufactured under a modification to the STED contract at the request of LOG in order to fulfill a requirement submitted by the Army. Through a mutual agreement between STED, LOG and ENG, the manufacturing program has been divided into two parts. Technical authority and contract control will be the responsibility of STED. The performance of acceptance test, spare parts provisioning, preparation of the maintenance manual and manufacturing drawing format will be the responsibility of ENG.

b. Modification Kits. - NSA representatives informed AIL representatives that they had received the prototype of the modification kits for the Special Transmitter Distributor, Transmitter Distributor and Printer-Keyboard. Further, that the SPTD kits had not been evaluated for installation and operational suitability. The SPTD modification kit had been given a visual inspection, and certain discrepancies were noted. The discrepancies; method of grounding cable shields, unsuitable resistor clamp, inadequate screw sizes used, and the deletion of one terminal post on the fabricated terminal board were each discussed, and AIL will take required corrective actions. Upon completion of NSA evaluation of the SPTD modification kit, AIL will be informed of the results and will make any required changes and commence the production of 24 kits. The 24 kits are required to convert 24 XD 224 RU/GU equipments to HW-10 equipments for the conduct of service test of HW-19A. Next AIL was questioned as to the possibility of their fabricating the 85 SPTD kits that are required for the 85 production models of the HW-19 equipments at the same time they are fabricating the 24 service test modification kits. This would mean that the total of 109 SPTD kits to be fabricated under the STED contract could be delivered to NSA in bulk. This would expedite the HW-10 conversion being done within NSA. AIL stated that it would be possible for them to fabricate the complete 109 SPTD kits at one time, providing they were given written authority to do so from the contracting officer.

c. Manufacturing Drawings. - The manufacturing drawings for the TD, SPTD and Printer-Keyboard modification kits were reviewed, and various discrepancies in drawing format were pointed out to AIL Representatives. In regard to discrepancies in the method of indicating revisions to the drawings, Mr. Reeves informed AIL Representatives of the proper method required by NSA for making revisions to drawings. AIL requested that they be furnished with NSA revision forms at the earliest possible date. Mr. Reeves gave AIL a list of the discrepancies that had been noted on the drawings; however, AIL Representatives still were confused on some points of the drawing format required by NSA. AIL indicated that they had just completed all drawings for the HW-19A equipment and would like to have them reviewed by NSA representatives for proper format. Also, AIL requested that they be furnished with NSA forms for Bill of Material listings.

d. Spare Parts. - The list of recommended spare parts for the 24 service test models of the HW-19A was discussed as to cost of some items on the list. Mr. Katz, AIL Representative, briefly explained the method used by AIL in arriving at the price of each item on the parts list. It was determined that

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NSA would further review the spare parts list prior to NSA approval. Mr. Reeves requested that AIL furnish NSA with a complete list of all replaceable parts in the MW-19A as soon as possible. AIL stated that they will fulfill Mr. Reeves' request.

e. Acceptance Test. - AIL representatives were queried as to the status of the system test procedure that AIL is to prepare for acceptance testing of the MW-19A equipments. To date AIL has done no work in the preparation of the system test. However, they stated that they would start preparation of the test immediately.

f. General. - AIL informed NSA representatives that they are having difficulty in maintaining the teletype equipment furnished by NSA for conduction of MW-19A equipment test. AIL requested that NSA send a teletype maintenance man to their facility to put the teletype equipment in good shape. NSA representatives said they would investigate the possibility of fulfilling AIL's request.

5. Conclusions:

a. Upon approval of the SFTD modification kit for production, AIL will commence fabrication of 24 service test kits. If NSA requests in writing the fabrication of the 85 production SFTD kits, AIL will take action to expedite the kits' fabrication.

b. AIL requires further instructions from NSA representatives in the use of NSA format in the preparation of manufacturing drawings.

c. The recommended spare parts list for the MW-19A prepared by AIL will require detailed review by ENG and STED.

d. AIL will take immediate action to prepare the system test specification for acceptance testing of the MW-19A.

e. The Teletype equipment being used by AIL for testing the MW-19A equipment is in the need of maintenance repairs.

6. Recommendations:

It is recommended that ENG take required action on the following:

a. The prototype modification kits for the associated teletype equipment used with the MW-19A be evaluated as soon as possible.

b. A representative from ENG Drafting Section visit AIL to review the manufacturing drawings for correct format.

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c. As soon as possible, send AIL fifty copies each of NSA Bill of Material forms and Drawing Revision forms.

d. Allow AIL to fabricate the complete SFTD modification in one production run.

e. The recommended spare parts list for the HM-19A be reviewed as soon as possible and in complete detail as to adequacy and item cost.

f. Investigate the possibility of sending teletype maintenance personnel to the AIL facility to repair the teletype equipments being used for test purposes.

William L. Reeves
WILLIAM L. REEVES
ENG-1

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File ENG-12 COMSEC 4-3/1.19-D

17 October 1956

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

Airborne Instruments Laboratories, Inc.

b. Address

Mineola, Long Island, New York

c. Date of Trip

10 October 1956

d. Equipment

TSEC/KW-19A (On/Off Line Electronic Start-Stop, Single Channel Teletypewriter Signal Mixer)

2. Representatives:

NSA

Mr. J. O. Erleman, STED
Mr. W. Gooch, MTED
Mr. W. L. Reeves, ENG

Airborne Instruments Laboratories, Inc.

Mr. D. Duffy
Mr. J. Cole
Mr. E. Basham
Mr. S. Katz
Mr. S. Thomas
Mr. J. Schorlezer

3. Purpose of Trip:

To coordinate NSA requirements with plans formulated by the Contractor (AIL) in the production of 24 service test and 85 production models of the TSEC/KW-19A. For Mr. Reeves, ENG-1, who is being appointed contract representative, to become acquainted with Airborne Instruments Laboratories, Inc. personnel and manufacturing procedures.

CONFIDENTIAL 17 October 1956

4. Conference Brief:

a. Background. The TSEC/ARW-13A will be the "Janized" model of the existing TSEC/ARW-13 equipment. The Airborne Instrument Laboratories, Inc., under SFED contract no. DA36-170-ac-2000, is to manufacture 109 equipments, 24 service test and 85 production models. The 85 production models are being manufactured under a modification to SFED contract at the request of LOG in order to fulfill a requirement submitted by the Army. Through a mutual agreement between SFED, LOG, and EMD, the manufacturing program has been divided into two parts. Technical authority and contract control will be the responsibility of SFED. The performance of acceptance tests, spare parts provisioning, preparation of the maintenance manual, and manufacturing drawing format will be the responsibility of EMD.

b. Manufacturing Drawings. Airborne representatives were questioned as to when the schematic and practical wiring diagrams of the equipment would be available to NSA so they could be used in preparation of the maintenance manual. They stated that a preliminary schematic diagram would be available to NSA by 1 December 1956 and the final diagram by 1 May 1957; also that a preliminary practical diagram would be available by 1 February 1957 and the final by 1 May 1957. Mr. Reeves requested that the drawings be made in accordance with EMC drawing specifications by being a channelized type and that they be suitable for being reduced in size for incorporation into the maintenance manual without the need for horizontal folding (a requirement of EMC-14). Airborne representatives stated that the contract requirements for manufacturing drawings did not require their preparation for use in the maintenance manual. They stated that to prepare the schematic and practical wiring diagrams in order to meet such a requirement (no horizontal folds) would require the use of special drawing techniques and materials. They agreed to make the drawings in channelized drawing form and that the drawings would be reproducible for use in the manual. However, they would require horizontal folding. Next, they were queried as to the availability of manufacturing drawings for the SFED, TD, and Printer Modification kits. They stated that these drawings would be delivered to NSA in early November 1956. The SFED modification kit drawing was discussed as to the assignment of FSCM numbers to parts now having CS numbers and in the assignment of reference symbols to the parts.

c. Parts List. Airborne was queried as to the availability of a list indicating all replaceable parts in the ARW-13A equipment. This list is required for incorporation into the maintenance manual. Airborne Instrument Laboratories stated that such a list was not a contractual requirement but that one would be available to NSA early in November 1956.

5. Conclusions:

a. Airborne will prepare channelized schematics and practical wiring diagrams, but not in a format that can be reproduced for the manual so as to require no horizontal folds. Preliminary schematic and practical wiring diagrams will be delivered to NSA by 1 December 1956 and 1 February 1957 respectively.

b. Manufacturing drawings for modification kits will be delivered to NSA by early November 1956.

c. A complete list of replaceable spare parts for the KW-19A will be available to NSA in early November 1956.

6. Recommendations:

a. It is recommended that ENG take action to:

(1) Waive their requirement for no horizontal folding of the schematic or practical wiring diagrams in the maintenance manual.

(2) Assure that in the future when the maintenance manual for an equipment is to be written within NSA, consideration be given to pertinent items that will be required from the contractor in order to prepare the manual. These items should be stated in the equipment purchase description and funds established for the cost to obtain this information from the contractor.

(3) Assure that in the future, prior to the formulating of an equipment purchase description, representatives of ENG to be involved in the program meet and discuss their responsibilities. Each representative should review pertinent requirements of his obligation in regard to the purchase description. Each representative should establish if additional funds will be required for the program in order to fulfill its program responsibilities. Each representative should attempt to tie-in requirements of his element with the requirements of other related elements whenever possible.

W. L. Reeves
W. L. REEVES
ENG-1

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TRIP REPORT

18 September 1956

1. Identification of Trip:

   a. Name of Organization

      Airborne Instrument Corporation

   b. Address

      160 Old Country Road, Mineola, New York

   c. Date of Conference

      11 September 1956

   d. Equipment

      TSEC/KW-19, Electronic Start-Stop Teletype Signal Mixer

2. Representatives:

   NSA

      Mr. Paul A. Duchene - ENG
      Mr. John Griesman - R/D

   Airborne Instrument Corp.

      Mr. Sydney Kats - Project Engineer
      Mr. John Cole - Electrical Engineer
      Mr. Stewart Thomas - Chief Draftsman
      Mr. Edward Gascomb - Engineer
      Mr. John Duffy - Engineer
      Mr. Joseph Schwietzer - Engineer

3. Purpose of Trip:

   To discuss drafting specifications and present Airborne Instrument Corporation with a stock material catalog and several sections of the NSA stock catalog to assure that proper numbers will be utilized in the progress of this contract.

4. Conference Brief:

a. In a conference attended by Messrs. Katz, Cole, Thomas, Gascomb, Duffy and Schwietzer of Airborne Instrument Corp. and Duchene of NSA, a discussion was held in which Mr. Duchene explained the use of the SM-1500 Stock Material Catalog and the NSA Stock Catalog.

b. Airborne Instrument Corp. expressed a desire to use oversize sheets for certain drawings. A limited use of oversize sheets was authorized where congestion or reduction in scale would otherwise obscure detail.

c. There were no requirements for Bills of Material in the contract; consequently, Airborne Instrument Corp. was not obligated to prepare them. However, they did agree to prepare Bills of Material for this equipment without additional charge to NSA. Airborne advanced a problem stating that when revisions are made resulting in the addition of an item to an assembly, a whole sheet has to be retyped to maintain sequence of items on the Bill of Material.

d. It was indicated that there would be occasions when larger numbers of callouts on drawings would tend to congest the image area to the extent of its being unreadable at times. Airborne expressed a desire to use a cross-reference block to alleviate this situation. Mr. Duchene stated that this was permissable, provided it be indicated in the note column on the drawing, clarifying the procedure. He also stated that this should be held to an extreme minimum and exercised only when it is absolutely necessary.

e. A cross-reference list was provided to replace dash numbers with individual CE numbers when revising existing drawings on the maintenance kits for MW-19 equipment. The drawings with dash numbers were previously prepared by International Electronics. Airborne had intended to redraw these drawings, but were told that the drawings would be required on 1 October 1956, or as soon thereafter as possible, and that the relatively few changes necessary could be accomplished by revision rather than redrawing.

f. Airborne was advised to use the "Used on" and "Next Assembly" blocks at the top of the sheet. This was motivated by a D/F from MAT requesting EMC to utilize these blocks on all future drawings.

5. Conclusions:

EMC will send the original drawing paper with the printed format, including the Bill of Material format. Airborne stated that they would call Mr. Duchene direct concerning drafting problems and requirements for drawing paper and CE numbers to expedite handling of these matters, rather than go through the Project Engineer. Mr. Orleman (Project Engineer) approved of this, indicating it would save him time and effort.

18 September 1956

6. Recommendation:

It is recommended that ENG furnish portions of the NSA Supply Catalog to outside contractors when applicable, to avoid assigning CE numbers to items already assigned FIIN numbers. If this is not done, these CE numbers would have to be changed to FIIN numbers on the drawings and lists at a future time.

Paul A. Duchene

PAUL A. DUCHENE
Acting Chief, Engineering Drafting Section

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File 7.12 (T.R.)

4202

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3 February 1956

TRIP REPORT

1. Identification of Trip:

a. Name of Organization

RADC (Rome Air Development Center)

b. Address

Griffiss Air Force Base, Rome, New York

c. Date of Trip

26 January 1956

d. Equipment

TSEC/HW-19 Mixer
TSEC/HW-10 Special T-D

2. Representatives:

NSA

Mr. J. Collins, NSA 31
2/Lt J. T. Holland, NSA 42

USAFSS

Mr. W. Cory, SED

ARDC

M/Sgt Kohuk

RADC

J. Berliner, Chief, Interference Analysis and Control Section
R. Powers, Assistant, Interference Analysis and Control Section
E. Safary, Assistant, Interference Analysis and Control Section

3. Purpose of Trip:

To investigate report that RADC was picking up compromising information by space radiation detection means at distances greater than 35 feet from the TSEC/HW-19.

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4. Brief of Findings:

a. The Interference Analysis and Control Section of RADC performed tests on the TSEC/HW-19 in two phases as follows:

1. In Baltimore the test consisted of putting a constant input to the TSEC/HW-10 (Special T-D used to read the key tape) and allowing the ordinary T-D to operate under normal message conditions. At best this mode of operation allows only mono-alphabetic substitution, and in the special case of having all letters combinations on the TSEC/HW-10, allows the output of the ordinary T-D (plain text) to be sent out on the transmit line. It was under this latter condition that RADC found plain text radiation, and on the basis of these results the TSEC/HW-19 was taken to Rome, New York, for further tests.

Note: This test was invalid in that the equipment was not being operated under normal conditions, and the mode of operation was such as to produce inconclusive results. Although RADC did pick up plain-text radiation from the TSEC/HW-19, it was not determined which of the following was the emanating source:

(a) The input T-D.
(b) The internal circuitry of the TSEC/HW-19.
(c) The output relay and transmit line of the TSEC/HW-19.

Mr. Collins through a quick test demonstrated that the output relay was producing the compromising emanations. The test Mr. Collins conducted will be explained later in this report. It may be well to point out here that emanations from the output relay or from the send line are of no importance since the signal leaving the TSEC/HW-19 is normally enciphered.

2. (a) Based on the incorrect conclusions drawn from the tests in Baltimore, RADC did further testing of the TSEC/HW-19 at their facility in Rome, New York. Those tests were more correctly a study of the r.f. interference produced by a TSEC/HW-19 installation (motor noise, etc.) than a study of the possibility of compromise from the TSEC/HW-19.

(b) As a result of the tests conducted in Rome, New York, RADC designed shielding for the TSEC/HW-10 and the ordinary T-D and has compiled a fairly complete set of data on the r. f. interference produced by the TSEC/HW-19 installation. (A copy of their findings will be sent to the Director, NSA, upon completion of their work.)

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b. Mr. Collins (NSA 31) noted the fallacy of the test conducted in Baltimore and in order to demonstrate the error conducted the following test. Using the TSEC/HW-19 installation that RADC had in their screen room, an R-Y tape was placed in the TSEC/HW-10 and a Y-R tape placed in the transmitting T-D. A PRM-1 RI/FI meter was tuned to receive the emanations that RADC was concerned about and the output of the PRM-1 was displayed on an oscilloscope. With the specified inputs to the TSEC/HW-19 the output would be a blank combination (six space bauds and a stop baud). Under this output condition, normally there will be two spikes on an otherwise straight trace displayed on the oscilloscope. During the test only those two spikes appeared on the oscilloscope. If the TSEC/HW-19 circuitry, the TSEC/HW-10, or the ordinary T-D had been giving rise to emanations there would have been spikes displayed on the oscilloscope that could be traced by a process of elimination to the emanating element. Such was not the case. Therefore, on the basis of past experience, it may be concluded that the emanations were arising from the output relay. This test is by no means conclusive in that it was conducted at a single frequency; however it does point out the fallacy in RADC's statement that they were picking up compromising information.

5. Conclusions and Recommendations:

a. The results of this trip indicate that RADC was in error in stating they were picking up compromising information from the TSEC/HW-19.

b. During the discussion that preceeded the demonstration Mr. Berliner mentioned some cable changes that RADC has made and proposes to make to the TSEC/HW-19 and TSEC/HW-10. These cable modifications are not necessary from the standpoint of security of the equipment. However, should RADC decide to make such modifications in an attempt to reduce r.f. interference, it will be necessary that the modifications be checked by NSA to determine whether or not they affect the security of the equipment. This can be accomplished by RADC submitting a request for modification to NSA. After evaluation NSA will then take action on all modifications. A ~~letter~~ memo to this effect will be sent to RADC by COMSEC. ~~with concurrence with NSA 42~~.

John T. Holland

JOHN T. HOLLAND
Lt. USAF
NSA 42133

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CSEC 4-3/119

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HW 19
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TEST SPECIFICATION
NO. NSA-8
RADIATION TESTING

NOTICE: This purchase description contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S. Code, Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

DATE 20 February 1957

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20 February 1957

TEST SPECIFICATION
NO. NSA-8

1. SCOPE

1.1 This Test Specification sets forth requirements governing the testing of communications equipment of the Armed Forces according to specified compromising radiation test procedures.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards of the issue in effect on date of invitation to bid form a part of this Specification. As a general requirement, work shall be conducted in accordance with Military and Federal specifications and standards applicable to communications equipment of the Armed Forces:

STANDARDS:

MILITARY

MIL-STD-188 - Military Communication System Technical Standards

DOD DOCUMENTS

Industrial Security Manual for Safeguarding Classified Information

NSA DOCUMENTS

Industrial Security Handbook for Safeguarding Cryptographic Information

(Copies of specifications, standards, and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the Contracting Officer)

3. GENERAL REQUIREMENTS

3.1 Control and Approval of Work - All work conducted under the requirements of this specification shall be subject to the direction and approval of the Contracting Officer or his duly authorized representative.

3.1.1 Information With Bids - If the bidder proposes to deviate from the requirements of this Specification, he shall submit with his bid a complete description of the proposed changes, including such drawings and sketches as are necessary to describe fully without further reference to the bidder, the nature of the proposed changes.

3.2 Detailed Requirements

3.2.1 Test Objective - The ultimate objectives of the compromising emanation tests, conducted under this Specification, on TSEC/HW-19A equipments, shall be to determine:

(a) The extent and magnitude of compromising emanation

(b) Whether such emanation is above or below specification limits.

(c) The source of such emanation that is above specification limits.

(d) Modifications that may be recommended to the equipment manufacturer that will reduce such emanation to specification limits.

3.2.2 Phases of Work

3.2.2.1 Phase I, Engineering Study - A government furnished TSEC/HW-19A and associated teletypewriter equipment, together with a Repair and Maintenance Manual and Operational Test Criteria, will be furnished the contractor for engineering study and familiarization. Prior to quantity testing of the equipments the contractor shall:

(a) Become acquainted with all aspects of construction and operation of the TSEC/HW-19A.

(b) Become proficient in the concepts of compromising radiation detection techniques, and in the analysis and interpretation of recorded data, as pertains to the TSEC/HW-19A and its associated equipments.

3.2.2.2 Phase II, Compromising Emanation Testing - Testing of the TSEC/HW-19A shall consist of measuring emanations from the equipment using the procedures and instrumentation set forth in the testing schedule outlined under para. 3.2.5.

3.2.2.3 Phase III, Assigning the Cause and Extent of Unacceptable Compromising Emanations - Assignable causes for unacceptable compromising emanations shall be determined. Recommendations will be made as to the type of modifications required to bring unacceptable compromising emanations within specification limits.

3.2.3 Performance of Phases I, II, and III - Phase I shall be completed prior to the start of Phase II. To the extent practicable, Phase II and Phase III shall be performed simultaneously.

3.2.4 Conditions for Tests - With the exception of the Power Line Modulation Test, para. 3.2.5.3, all tests shall be conducted within a screened inclosure specifically designed and constructed to afford the necessary attenuation to reduce the internal ambient noise levels of the inclosure to the limits expressed in Figures 1 and 2. During tests, all material not required as an item in the test set-up shall be removed from the screened inclosure. Suitable power line filtering shall be provided to reduce the ambient noise level on the power line within the shielded enclosure to below the peak internal noise of the RI-FI instruments specified in para. 3.2.5.2.1.1.

3.2.4.1 Instrumentation Calibration

3.2.4.1.1 All Radio Interference - Field Intensity measuring equipment and the Power Line Demodulator shall be calibrated prior to commencement of tests.

3.2.4.1.1.1 Subsequent calibrations of RI-FI equipments shall be performed at least each successive 60 days after the initial calibration.

3.2.4.1.1.2 The Power Line Demodulator shall be calibrated immediately prior to use.

3.2.4.1.1.3 Calibration procedures shall be those established by the manufacturer of the specific equipment. During calibration of the Line Demodulator the special calibration box and oscilloscope shall be connected as shown in figure 9.

3.2.4.2 Motors - All motor driven teletypewriter equipment operated within the screened inclosure shall be equipped with synchronous motors to minimize the noise level during tests. Motor shafts shall be maintained at ground potential by means of grounding brushes.

3.2.4.3 Data Sheets - Results of all tests will be recorded on data sheets. Separate data sheets will be prepared and submitted to the Contracting Officer or his duly authorized representative for each equipment. The format for the data sheets will be supplied by the government.

3.2.5 Test Schedule - Tests will be conducted in accordance with the procedures outlined herein. Inasmuch as there is not a preferred order of testing, the decisions as to whether tests will be conducted concurrently, or in a logical order, will be left to the contractor.

3.2.5.1 Compromising Space Radiation Tests

3.2.5.1.1 Required Test Equipment

3.2.5.1.1.1 RI-FI Measuring

14KC to 250KC, Stoddart Model NM-10A, (AN/URM-6B)
150KC to 25MC, Stoddart Model NM-20B, (AN/PRM-1A)
*20MC to 400MC, Stoddart Model NM-30A, (AN/URM-47)
375MC to 1000MC, Stoddart Model NM-50A, (AN/URM-17)

*Stoddart Model NM-5A (TS587/U) may be used if Stoddart Model NM-30A is not available.

3.2.5.1.1.2 Miscellaneous

Vacuum Tube Voltmeter, Hewlett Packard 410B or equal.
Oscilloscope, Tektronix, Type 535 or 545.

SECRET

20 February 1957

TEST SPECIFICATION
NO. NSA-8

Power Supply, D.C., for Remote Signal Line.
Line Stabilizer for Power Line.

3.2.5.1.2 Procedure - All tests will be conducted with the TSEC/HW-19A connected for on-line operation to the local transmitter-distributor (TD), the local special TD and the local teletypewriter. The associated local equipment will be modified in accordance with the modification kit and wiring instructions furnished with the equipment.

3.2.5.1.2.1 The compromising radiation tests will be conducted with the equipments positioned as shown in Figure 3. For convenience, the local teletypewriter keyboard may be mounted on a separate table. The remote line of the TSEC/HW-19A will be connected with shielded cable to a selector magnet mounted external to the screen room. The receiver section of the local teletypewriter printer will be replaced by a selector magnet mounted outside the screen room and connected to the TSEC/HW-19A with shielded cable.

3.2.5.1.2.2 Place the TSEC/HW-19A in "Mark" Condition. The voltage measured between TP-1 and ground shall be minus 1.7 volts, plus or minus 5%. The voltage measured between J9-6 and ground shall be plus 3.95 volts, plus or minus 5%.

3.2.5.1.2.3 Remove the TSEC/HW-19A from its cabinet. Remove also the shield enclosing the local keyer tube, V15, together with the dust covers from the TD and special TD. Place the TSEC/HW-19A and all its ancillary equipment in operating position. Assure that the TSEC/HW-19A can be operated in either the Automatic Cipher or Send Cipher condition and will "send" to the selector magnets on the remote line. Proceed with compromising space radiation tests at the following dial indicated frequencies:

(1)	14KC	(15)	150KC	(29)	7MC	(43)	150MC
(2)	20KC	(16)	200KC	(30)	8MC	(44)	200MC
(3)	30KC	(17)	250KC	(31)	10MC	(45)	250MC
(4)	40KC	(18)	300KC	(32)	12MC	(46)	300MC
(5)	50KC	(19)	500KC	(33)	15MC	(47)	350MC
(6)	60KC	(20)	700KC	(34)	20MC	(48)	400MC
(7)	70KC	(21)	1MC	(35)	25MC	(49)	550MC
(8)	80KC	(22)	1.6MC	(36)	30MC	(50)	600MC
(9)	90KC	(23)	2MC	(37)	40MC	(51)	750MC
(10)	100KC	(24)	2.5MC	(38)	50MC	(52)	800MC
(11)	110KC	(25)	3MC	(39)	60MC	(53)	900MC
(12)	120KC	(26)	4MC	(40)	70MC	(54)	950MC
(13)	130KC	(27)	5MC	(41)	90MC		
(14)	140KC	(28)	6MC	(42)	100MC		

3.2.5.1.2.3.1 All other frequencies within the range of the instrumentation used, not specified in paragraph 3.2.5.1.2.3 above, shall be explored while monitoring with an oscilloscope. If compromising peaks occur while exploring, measurements shall be made at each frequency at which such a peak occurs. The results shall be included with those presented for the specified frequencies.

3.2.5.1.2.4 Compromising Space Radiation Limits

3.2.5.1.2.4.1 In the frequency range from 14KC to 2.5MC detectable compromising space radiation shall not exceed the limits expressed in Figure 4.

3.2.5.1.2.4.2 In the frequency range from 2.5MC to 400MC - with the antenna of the RI-FI meter adjusted for the frequency being checked, placed horizontally parallel to and centered above and at a distance of three (3) feet from the TSEC/HW-19A - there shall be no detectable compromising space radiation.

3.2.5.1.2.4.3 In the frequency range from 375MC to 1000MC - with the antenna of the RI-FI meter adjusted for the frequency being checked and placed a distance of one inch from any component of the TSEC/HW-19A, the distributor of the TD, the special TD, or the Keyboard Contacts of the local teletypewriter - there shall be no detectable compromising space radiation.

3.2.5.2 Compromising Line Conduction Tests

3.2.5.2.1 Required Test Equipment

3.2.5.2.1.1 The RI-FI measuring and miscellaneous test equipments specified in paragraphs 3.2.5.1.1 and 3.2.5.1.2 are required, with the exception of Stoddart Model NM-10A (AN/URM-6B).

3.2.5.2.1.1.1 In addition, the following miscellaneous equipments are required:

(a) Standard Signal Generator having a minimum frequency range of 100KC to 1000KC; General Radio 100lA, Measurements Corporation Model 80, or equal.

(b) Isolating Network for remote line (See Figure 5).

(c) Line Conduction Test Set. (Wide Band RC Amplifier)

(d) Rejection filters, 60CPS and 120CPS, Kay-Lab Models 503A and 503B respectively, one each.

(e) Electronic Variable filters, Spencer Kennedy Laboratories, Inc., Type 300 or equivalent, two each.

(f) Magnetic or electronic type preferably - or a constant voltage transformer type - voltage regulator.

3.2.5.2.2 Procedure - All line conduction tests will be conducted with the equipment connected as shown in Figure 5. The points on the power line and remote signal line to be tested for compromising conducted information are indicated in Figure 5. A regulated AC power supply will be used during the tests.

3.2.5.2.2.1 The equipment will be tested while operating in the following modes: On-Line, (Cipher), (Send and Receive); Automatic (Send and Receive); Off-Line (Text); Off-Line (Cipher), Encipher, and Decipher.

3.2.5.2.2.2 The power line and remote signal line will be tested at the following frequencies with RI-FI meters:

(1)	5 MC	(4)	50 MC	(7)	550 MC
(2)	10 MC	(5)	150 MC	(8)	750 MC
(3)	25 MC	(6)	400 MC	(9)	950 MC

3.2.5.2.2.3 The power line and remote signal line will be tested at the following frequencies with the variable electronic filters, the 60 CPS and 120 CPS rejection filters, and the Wide Band RC amplifier test set:

(1)	2.5KC-5KC	(4)	20 KC-30KC
(2)	5KC-10KC	(5)	30KC-1.6MC
(3)	10KC-20KC		

3.2.5.2.2.4 When testing for remote signal line conduction with the TSEC/HW-19A in the on-line cipher mode of operation, assurance will be had that the following conditions prevail: In Send, and when sending in Automatic, the "Y" character shall be received from the local TD and mixed with the "M" character from the special TD; In Receive, and when receiving in Automatic, the "Letters" character shall be received from the remote TD and mixed with the "Y" character from the special TD.

3.2.5.2.2.5 When testing with the TSEC/HW-19A in the off-line mode, the remote signal line will remain physically connected to the line terminals of the equipment.

3.2.5.2.2.6 Compromising Line Conduction Limits

3.2.5.2.2.6.1 When tested in accordance with the foregoing paragraphs 3.2.5.2.2 through 3.2.5.2.2.5, the TSEC/HW-19A shall have no detectable compromising radiation on the power line or on the remote signal line.

3.2.5.3 Power Line Modulation Tests

3.2.5.3.1 Required Test Equipment

(a) Voltage regulator as detailed in paragraph 3.2.5.2.1.1.1(d).

(b) Oscilloscope, Tektronix Type 315D, or Dumont Type 322 or their equal.

(c) Variac, General Radio type V5 or equal.

(d) Demodulator, power line Model 2.

(e) Calibrator for demodulator as per Figure 8.

(f) Power supply, D.C. general purpose.

3.2.5.3.2 Procedure - All line modulation tests shall be conducted with the equipment connected as shown in Figure 7. The TSEC/HW-19A will be the only equipment receiving its AC power from the AC power output of the Line Demodulator, which in turn is connected to a regulated AC power source. All other equipments will receive AC power from a source external to the Line Demodulator.

3.2.5.3.2.1 The TSEC/HW-19A power supply balancing potentiometer, R142, will be adjusted in accordance with the Repair and Maintenance Manual prior to conduction of the power line modulation tests. The local teletypewriter keyer current will be balanced for equal plate currents on Mark and Space impulses. The oscilloscope will have its vertical amplifier calibrated prior to performing the line modulation tests.

3.2.5.3.2.2 The Equipment will be tested while operating in the following modes: Automatic, Cipher (Send and Receive), Text (Send and Receive); Off-Line, Decipher, Encipher, and Text. Line voltages of the TSEC/HW-19A, during each of the modes of operation, shall be set at 98, 115, and 132 volts respectively.

3.2.5.3.2.3 Power Line Modulation Limits

3.2.5.3.2.3.1 When operating under all the conditions specified in the foregoing paragraphs 3.2.5.3.2 through 3.2.5.3.2.2, the power line modulation of the TSEC/HW-19A shall not exceed 0.1% of the AC power input as measured by a properly calibrated Power Line Demodulator Unit. Power Line modulation resulting from the special TD trip magnet shall be ignored.

3.2.6 Government Furnished Equipment - The following equipments, together with schematic drawings, alignment procedures, operating instructions, and the TSEC/HW-19A Repair and Maintenance Manual, will be furnished by the Government. The contractor will be responsible for the safekeeping of the equipments and materials while in his care, and shall return them in like condition as originally received, reasonable wear and tear excepted:

TSEC/HW-19A	1 each
Stabilizer, Power Line	1 each
Amplifier, AC, Wide Band, Line Conduction Test Set	1 each
Demodulator, Power Line	1 each
Calibration Box, Special, for Line-Demodulator	1 each

TEST SPECIFICATION
NO. NSA-8

Associated Teletypewriter Equipment required for operation and testing of the TSEC/HW-19A	1 set

4. QUALITY ASSURANCE PROVISIONS

4.1 Tests - Thorough and comprehensive tests shall be conducted by the contractor on all phases of the work to prove conclusively the results achieved. The contractor shall furnish all facilities for such tests, unless otherwise specified by the government. The contractor shall conduct such other tests within the scope of this Specification, as specified by the Contracting Officer or his duly authorized representative. At the option of the Government, all tests may be observed by authorized representatives.

5. PREPARATION FOR DELIVERY - Not Applicable.

6. NOTES

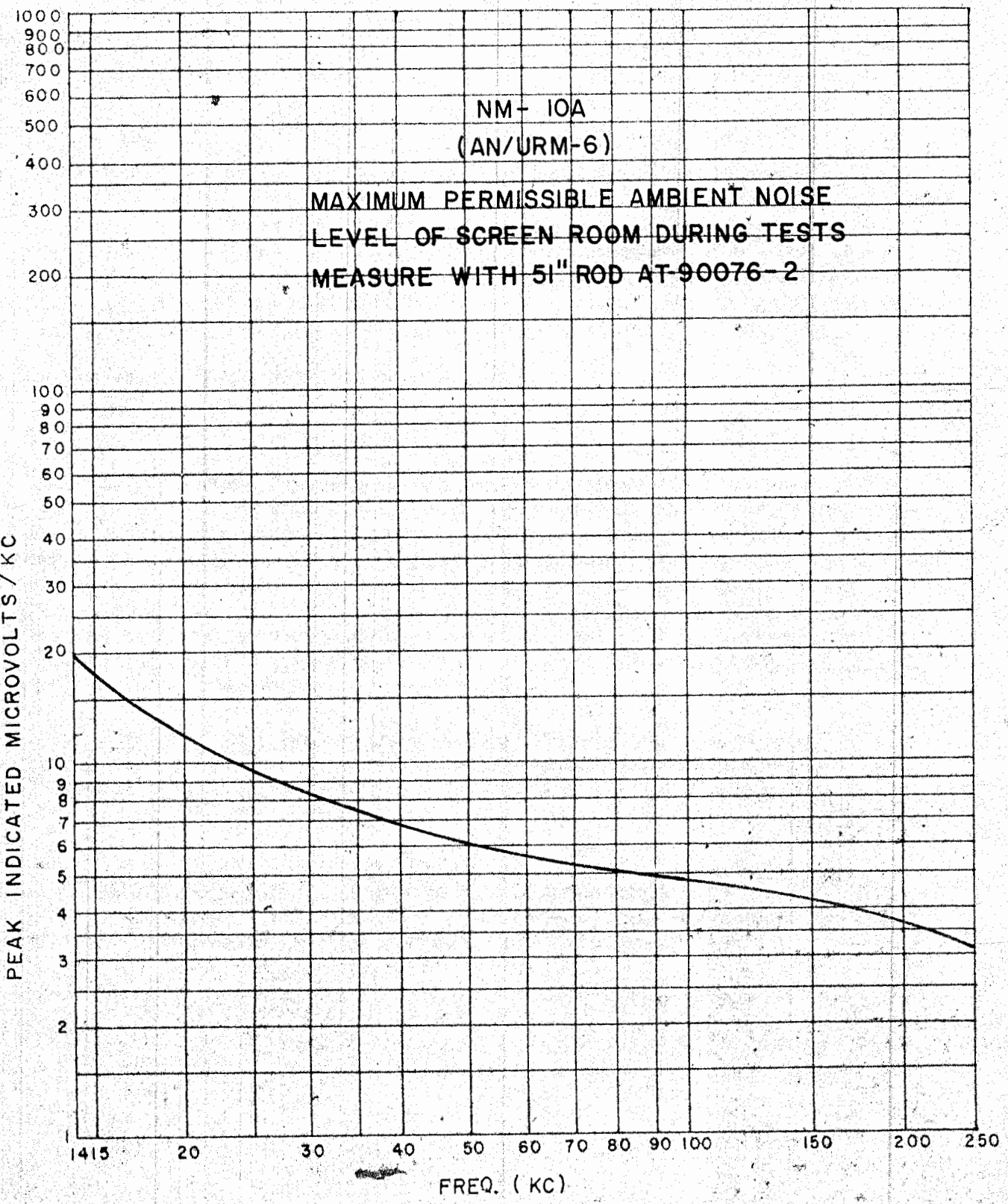
6.1 Notice - When Government drawings, specifications, P.D.'s or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility or any obligation whatsoever; and the fact the Government may have formulated, furnished, or in any way supplied the drawings, specifications, P.D., or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation or conveying or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

6.2 Disclosure of Information - The contractor shall not divulge any information concerning any aspect of the work performed under the contract to any person not directly engaged in the work under the contract, or not specifically authorized by the Contracting Officer to receive such information.

6.3 Copies of Test Specification - Copies of this specification may be obtained only upon application through the Contracting Officer, SIGPQ, Washington 25, D.C., Attn: ENG-12. When requesting copies, state title and number of the specification and the purpose for which required.

6.4 Warning - This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S. Code, Sections 793, 794 and 798. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

SECRET



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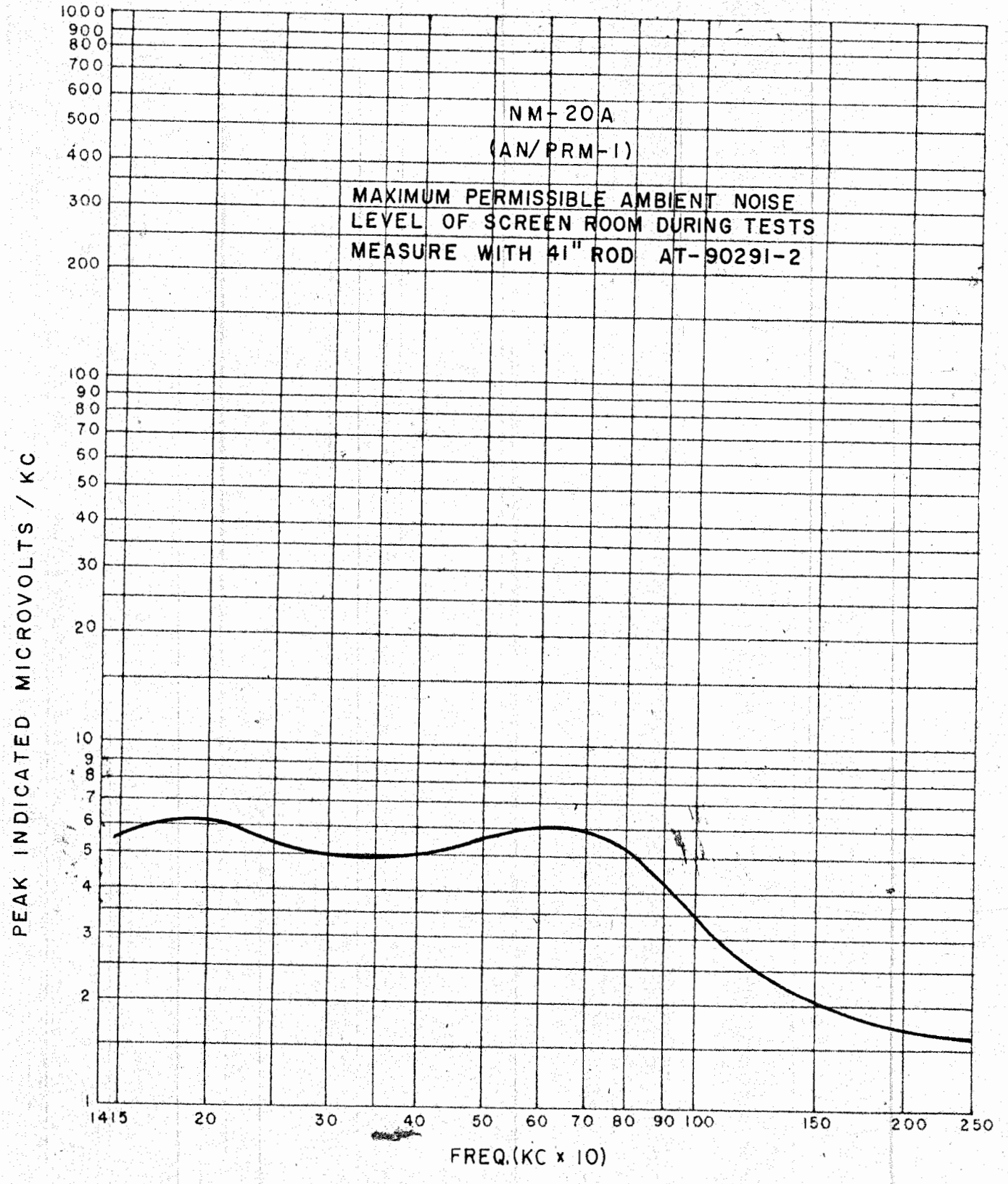
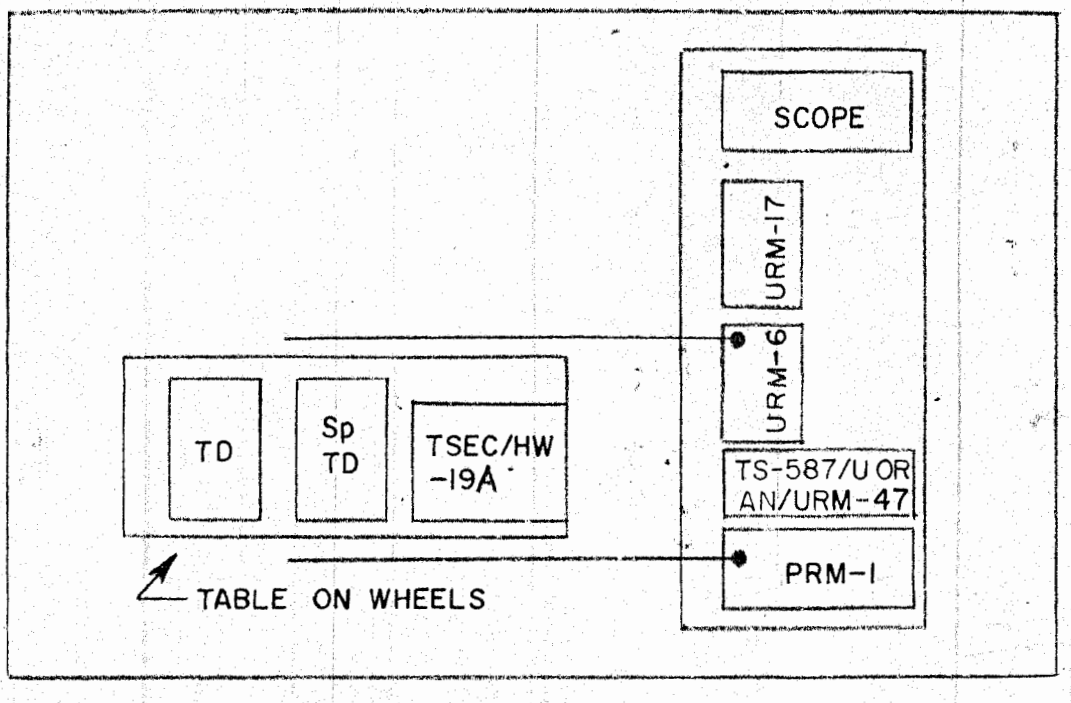
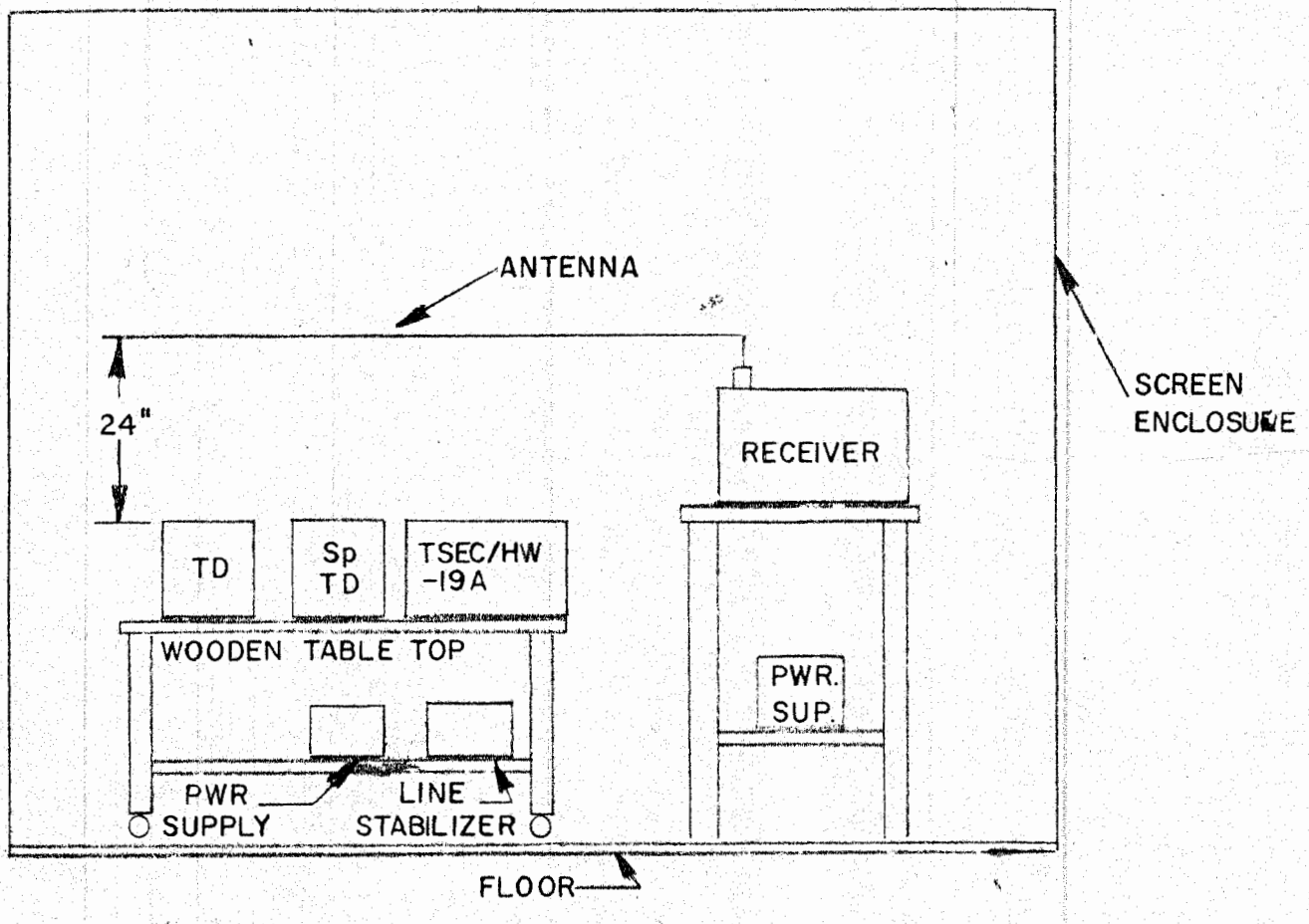

NM-20A
(AN/PRM-1)
MAXIMUM PERMISSIBLE AMBIENT NOISE
LEVEL OF SCREEN ROOM DURING TESTS
MEASURE WITH 41" ROD AT-90291-2
PEAK INDICATED MICROVOLTS / KC
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
14 15 20 30 40 50 60 70 80 90 100 150 200 250
FREQ.(KC x 10)

~~SECRET~~



URM-6 ANTENNA LENGTH = 51"

PRM-1 " " = 41"



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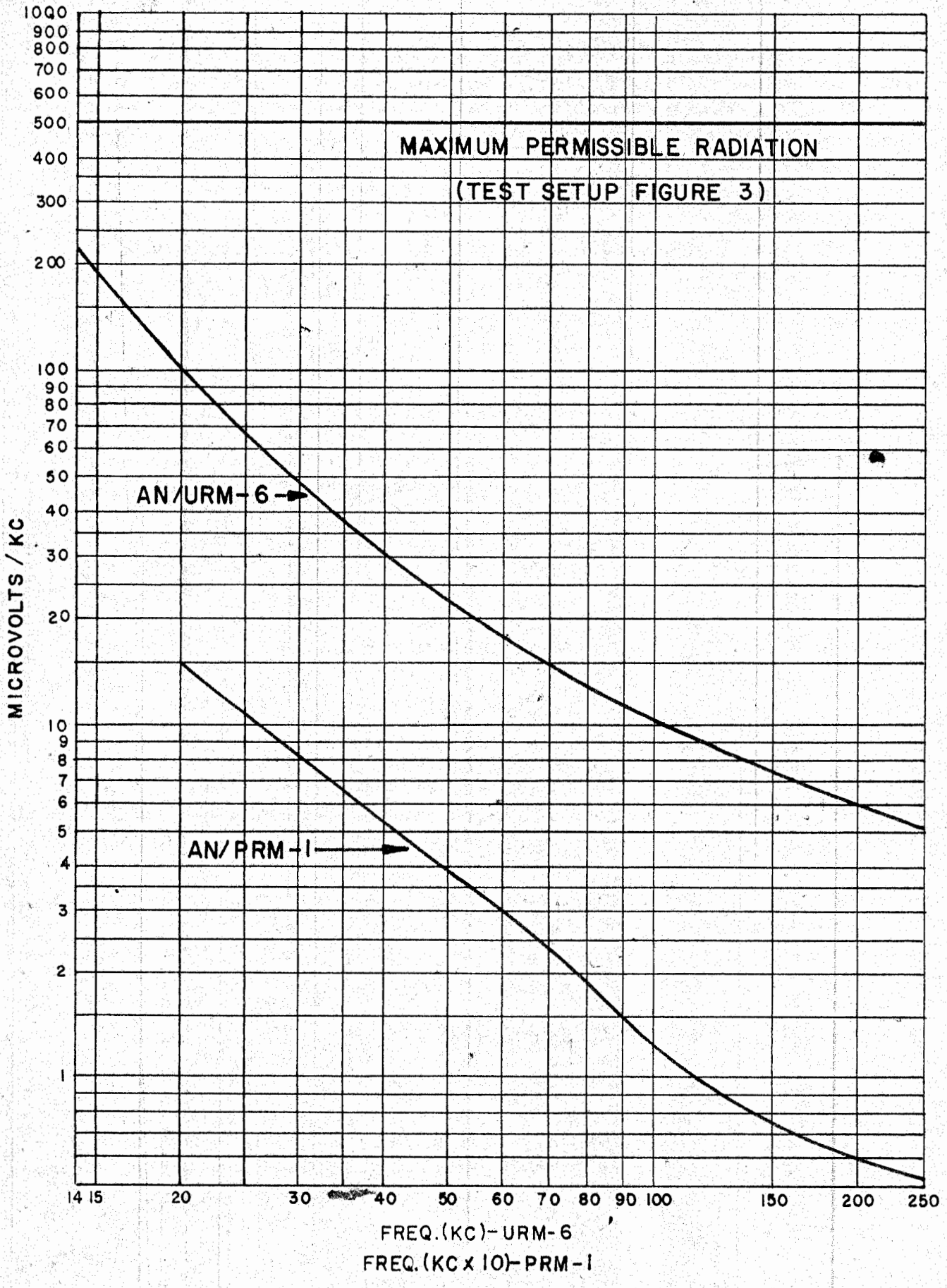

MAXIMUM PERMISSIBLE RADIATION
(TEST SETUP FIGURE 3)
MICROVOLTS / KC
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
AN/URM-6
AN/PRM-1
14 15 20 30 40 50 60 70 80 90 100 150 200 250
FREQ.(KC)-URM-6
FREQ.(KC x 10)-PRM-1

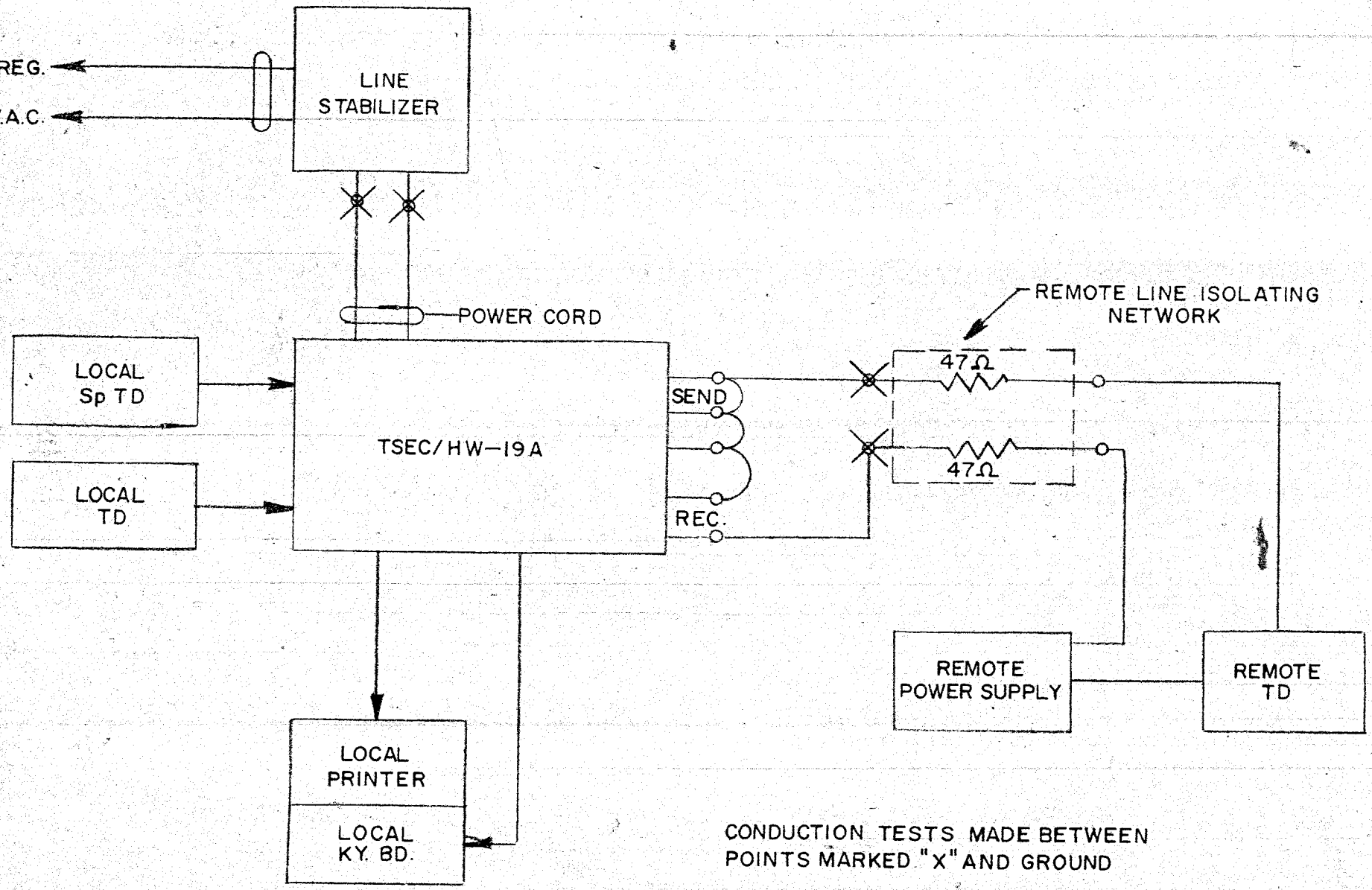
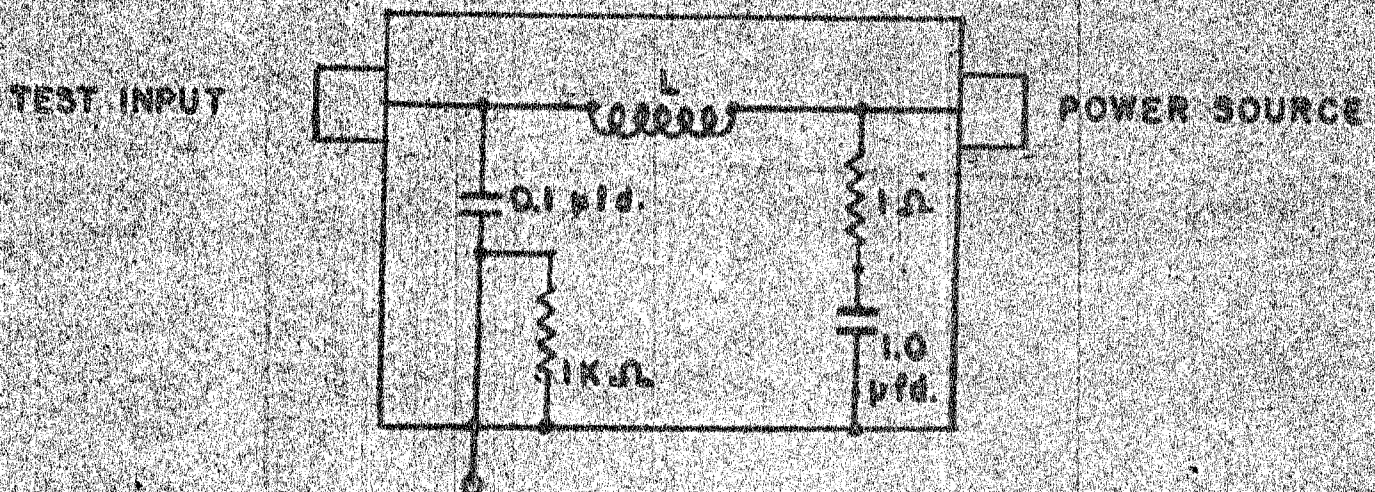


FIGURE 5

CONDUCTION TESTS MADE BETWEEN POINTS MARKED "X" AND GROUND

SECRET



NOTE: TWO REQUIRED, ONE FOR EACH SIDE OF POWER LINE.

TERMINATE UNUSED OUTPUT "A" IN 80 Ω NON-INDUCTIVE RESISTOR.

L-600 μh, TESTS 1-4, PAR. 3.2.5.2.2.3

L-100 μh, TESTS 5-8, PAR. 3.2.5.2.2.3

FIGURE 8

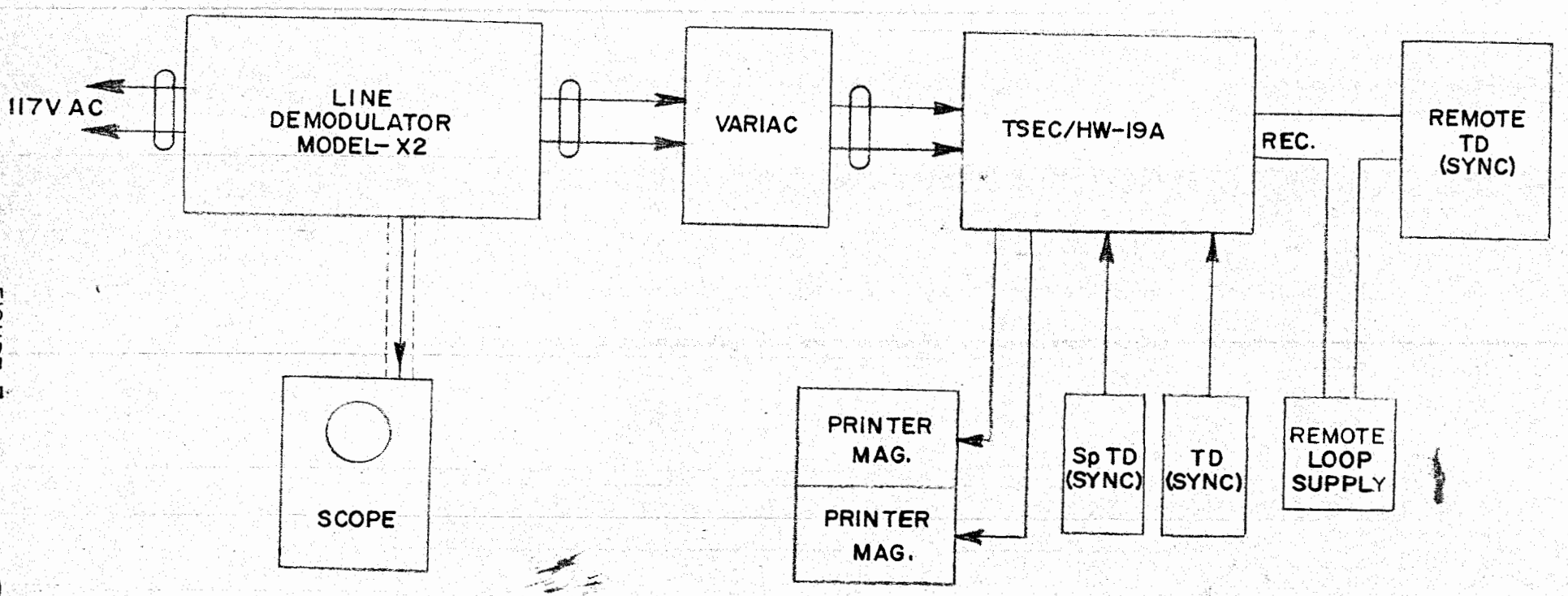


FIGURE 7

TEST SETUP FOR DETECTING LINE MODULATION

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CONNECT "T.D." TO TAPS FOR PERCENT OF MODULATION DESIRED. SHORT ALL OTHER TAPS WITH JUMPERS

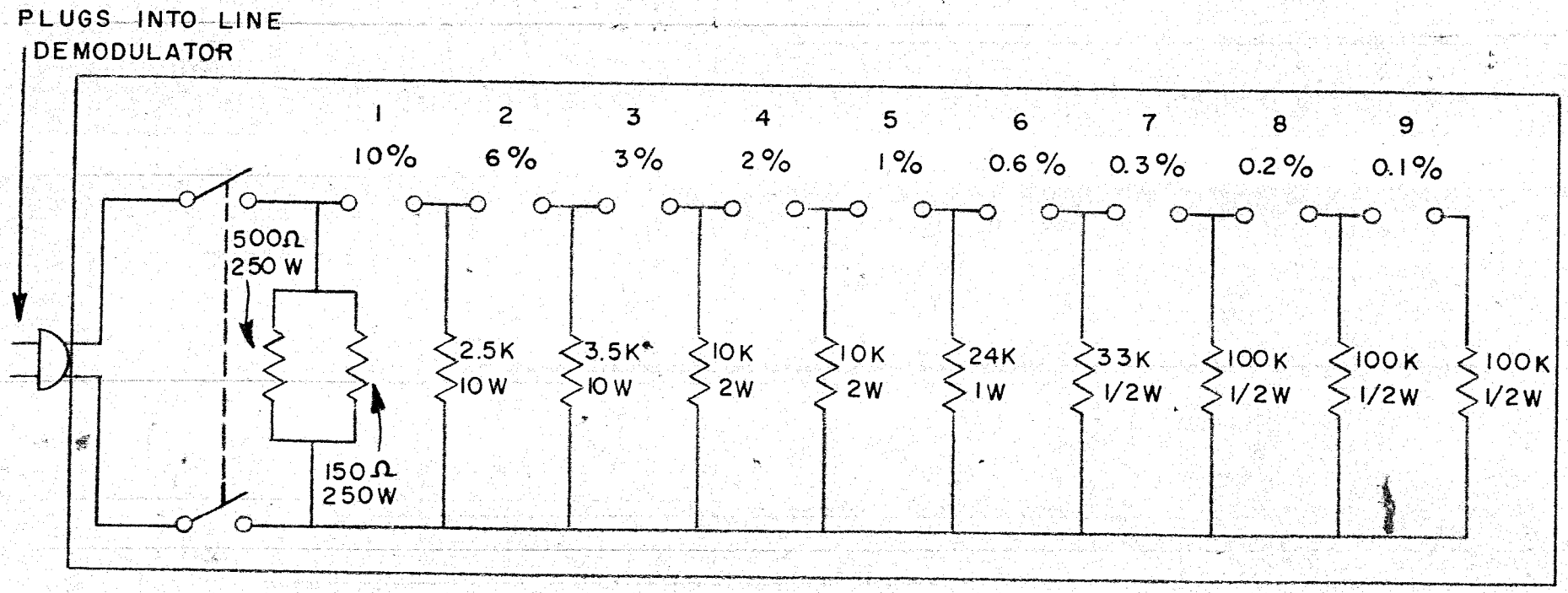

FIGURE 8

RESISTOR BOX WITH "TAP-OFF" POINTS SO THAT VARIOUS AMOUNTS OF CURRENT CAN BE BROKEN BY THE "T.D." TO SIMULATE LINE MODULATION. USED TO CHECK CALIBRATION OF LINE DEMODULATOR.

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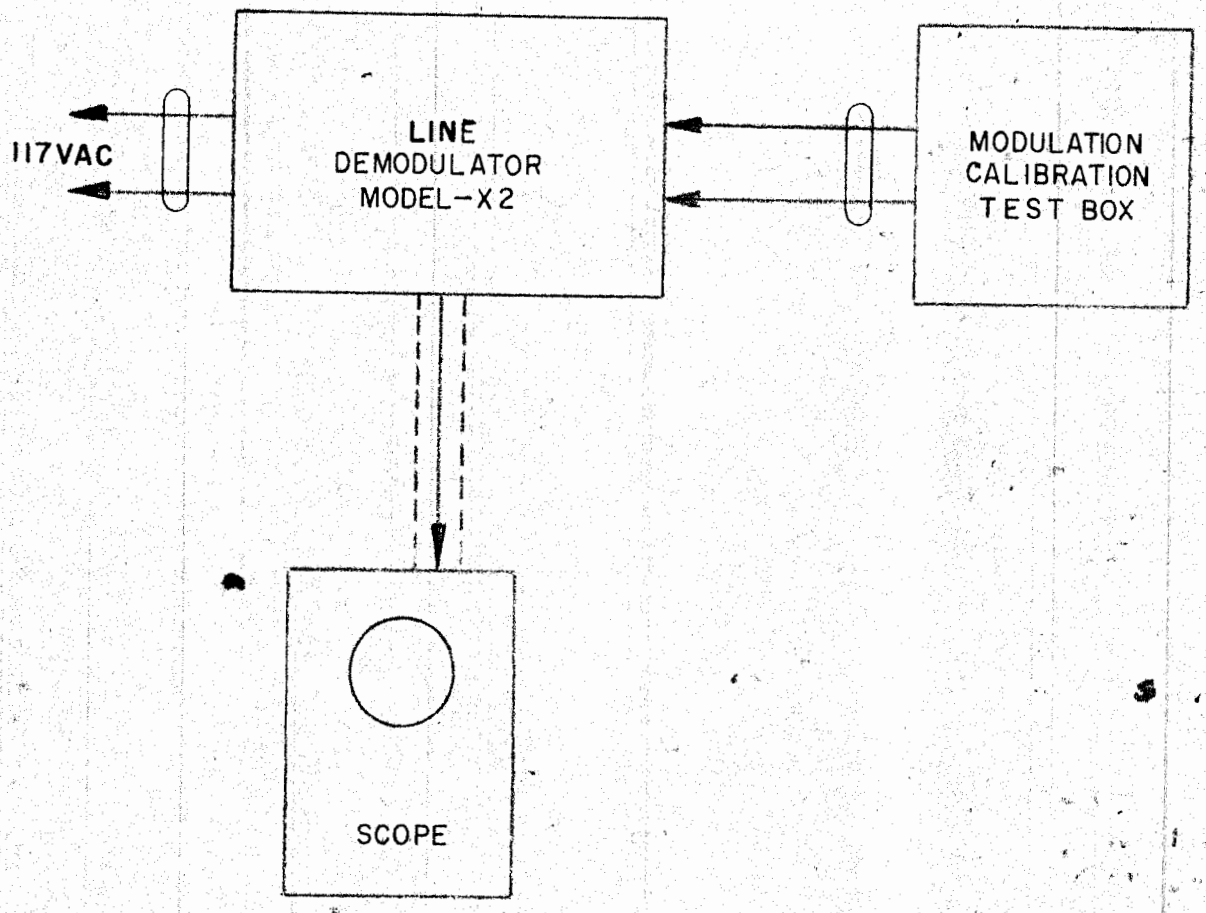

SETUP FOR CHECKING CALIBRATION OF DEMODULATOR