SHEET 1 OF 10		TMC SPECIFICATION NO. S 705	F
N.P. COMPILED	N.P. CHECKED	TITLE:	
APPROVED BP			

SBS-1 TEST PROCEDURE

SBS-9 TEST PROCEDURE

DATE 7/26/62 SHEET 2 OF 10	TMC SPECIFICATION NO. S 705	F
N.P. COMPILED / N.P. CHECKED	TITLE: SBS-1 TEST PROCEDURE	
APPROVED	SBS-9 TEST PROCEDURE	

I TEST EQUIPMENT REQUIRED

A. 1-AC VTVM Balentine Model 314. (or equivalent)
B. 1-RF VTVM Hewlett Packard Model 410B. (or equivalent)
C. 1-RF generator Measurements Corporation Model 82. (or equivalent)
D. 1-Audio generator Hewlett Packard Model 200AB. (or equivalent)
E. 1-Counter Hewlett Packard Model 523C. (or equivalent)
F. 1-Audio analyzor Panoramic Model LP-1A. (or equivalent)
G. 1-TTG (two tone generator) (or equivalent)
H. 1-Oscilloscope Tektronix Model 515A. (or equivalent)
I. 1-50 ohm 1 watt resistor.
J. 2-600 ohm 1 watt resistors.

ADDITIONAL INFORMATION

Supporting test specifications, S-628 power supply and S-626, 250KC plug-in IF strip.

II PRELIMINARY

A. Inspect the unit for mechanical imperfections such as loose screws, terminal boards, etc.
B. Inspect for obvious wiring errors.
C. Check for B+ shorts with an ohmmeter.
D. Turn Power Switch to STAND-BY position, then plug unit into AC outlet. The filament of the power supply tubes, V-7001 and V-7002, should be on. STAND-BY lights should go on immediately
E. Turn power switch from STAND-BY to ON. 60 seconds ± 20 sec. after applying AC to the unit the fan and B+ should be on. POWER ON light should go on immediately and STAND-BY light should go off.
F. Check B+ on L-6803 of A-2232 terminal board, it should be +200 volts. Check B- on L-6805 of the same board, it should be -105 volts.

III 250KC OSCILLATOR

A. Turn AFC switch to the OFF position. This in effect engages the, 250KC crystal oscillator.
B. Turn the CHANNEL A DETECTION switch to the SSB position, and the CHANNEL B DETECTION switch to the AM position.
C. Connect VTVM to Pin 2 of V-6203, and adjust R-6249 for a reading of -1 volt.
D. Connect a counter to the output side (B1) of T-6204 (center conductor of coaxial cable is also on this point), and adjust C-6231 for 250,000 ± 1 cycle.
E. Check back to Pin 2 of V-6203 as in C. and re-adjust R-6249 if necessary. The final setting should be of C-6231 for the proper frequency reading on the counter.
F. Connect AC VTVM to th utput of T-6204, it should be 1 volt ± 10%.

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G. With AC VTVM still connected as in F. turn the CHANNEL A DETECTION switch from SSB to AM. The output should drop to 0 volts. Leave in the AM position.
H. Turn the CHANNEL B DETECTION switch to the CW, then the SSB position. In both cases the AC VTVM should read 1 volt ± 10%.

IV 705KC OSCILLATOR

A. With the AFC switch in the OFF position. The 705KC crystal oscillator is activated.
B. Connect VTVM to Pin 2 of V-6202, and adjust R-6215 for a reading of -1 volt.
C. Connect a counter to the output side (B1) of T-6203 (center conductor of coaxial cable is also on this point), and adjust C-6214 for 705,000 ± 1 cycle.
D. Check back to Pin 2 of V-6202 as in B. and re-adjust R-6215 if necessary. The final setting should be of C-6214 for the proper frequency.
E. Connect AC VTVM to the output of T-6213, it should be 1 volt ± 10%.

V AGC COMPARATOR

A. Turn the AGC SELECTOR switch to the CH-A-B position.
B. Turn CHANNEL A & B AGC RESPONCE switches to the FAST position.
C. Connect the VTVM to Pin 2 then Pin 7 of V-6206, a reading of 0 volts should exist in both cases.
D. Rotate both pots R-6234 and R-6237 to the full clockwis position and place the VTVM on the slider arm of R-6234. Rotation of R-6234 should vary the DC voltage from a positive to negative voltage from CW to CCW position. Repeat the same operation with R-6237.
E. Adjust R-6234 to 0 DC volts with the VTVM on the slider arm of this pot and lock.
F. Place VTVM on the R-6237 slider arm, adjust to 0 DC volts and lock.

VI AGC MANUAL CONTROL

A. Turn the AGC SELECTOR switch to the MANUAL position.
B. Connect the VTVM ON the post at the junction of CR-6202 and CR-6203 and rotate the AGC MANUAL control to the full clockwise position. The VTVM should read 0 volts.
C. Rotation of the AGC control to the full CCW position will bring the voltage to -20 V min. Record th reading obtained on the test data sh t.

VII CONVERTER AND 250KC AMPLIFIER

* A. Set the RF generator for 250KC and 10MV output. Connect to J-6800, the low Z input, and the AC VTVM on Pin 6 of V-6200. Rotate R-6800 to full CW position, AFC switch to ON and AGC MANUAL control to maximum.

B. Connect a temporary clip lead jumper from Pin 1 of V-6201 to ground. This is to prevent interaction of the secondary to the primary of T-6200.

C. Tune the top slug on T-6200 for maximum indication.

D. Remove jumper line connected in B and adjust bottom slug for minimum indication on meter. Remove AC VTVM and adjust RF generator output for 1MV.

* E. Connect AC VTVM to J-6804. Adjust slug on T-6201 for maximum indication on VTVM. Meter should read 7 millivolts or better. Record on test data sheet.

* F. Connect VTVM to J-6801 HI Z input. With 1MV on J-6800, there should be 2 to 3 millivolts on J-6801. Rotation of R-6800 in the CCW direction should reduce the reading to zero volts. Rotate R-6800 back to full clockwise position. Record voltage on test data sheet.

G. Converter and 250KC Response.

a. Set the RF generator for 455KC and 1MV output, AFC switch to OFF position.

b. Connect AC VTVM as in VII E. Turn CHANNEL A DETECTION switch to SSB and CHANNEL B DETECTION switch to AM.

c. Vary the frequency of the signal generator above and below 455KC. Record the 3db drop off points. Subtracting the two frequencies will give the overall bandpass of 20KC, ± 1KC.

VIII IF AMPLIFIER OUTPUT (See note after step VIII. I)

A. The bandpass of the crystal filters may vary with the different customer orders. The 3.5KC and 7.5KC filters are more widely used and are illustrated in this procedure. The position of the filters in relation to USB and LSB may also vary with customer orders. In this procedure the USB and LSB IF strips are plugged in as follows: 7.5KC USB IF strip to J-6000. 3.5KC LSB IF strip to J-6002, 3.5KC USB IF strip to J-6001, 7.5KC LSB IF strip to J-6003.

B. Turn the AGC SELECTOR switch to the CH-A-B position.

C. Turn CHANNEL A and B IF BANDWIDTH switches to the 7.5KC LSB position and connect AC VTVM to J-102 of the 7.5KC USB IF strip.

D. Vary the RF generator approximately 1KC below 455KC and adjust for 10MV output.

* For SBS-9, Step E should read 25mv or better; and step F should read 6-9mv. All R f r nce to R-6800, us R-6813.

E. The VTVM should show a peak of 1 volt. If this does not occur, set R-116 for 1 volt and remove VTVM.

F. Turn CHANNEL A and B IF BANDWIDTH switches to the 3.5KC LSB position. Connect AC VTVM to J-102 of the 3.5KC USB IF strip and proceed as in step D and E.

G. Turn CHANNEL A and B IF BANDWIDTH switches to the 3.5KC USB position and connect AC VTVM to J-102 of the 3.5KC LSB strip.

H. Vary the RF generator approximately 1KC above 455KC and proceed as in step E.

I. Turn CHANNEL A and B IF BANDWIDTH switches to the 7.5KC USB position. Connect AC VTVM to J-102 of the 7.5KC LSB IF strip and proceed as in step E and H.

NOTE: Since the SBS-9 channel selection is different, follow front panel designation for USB and LSB selection.

IX CHANNEL A AND B AMPLIFIERS (SBS-1 only)

A. Connect 50 ohm load on J-6806 CH-A output.

B. Readjust RF generator for 1MV output.

C. Connect AC VTVM across 50 ohm load and tune T-6205 for maximum indication on VTVM. The reading should be 1 volt ± 10%, and recorded on test data sheet.

D. Connect 50 ohm load on J-6805 CH-B output.

E. Connect AC VTVM across 50 ohm load and tune T-6206 for maximum indication on VTVM. The reading should be 1 volt ± 10%, and recorded on test data sheet.

X AUDIO CHANNELS, A & B

A. Connect one 600 ohm 1 watt resistor between terminals 7 and 9 and one between terminals 17 and 19 of E-6800. Turn CHANNEL A and B DETECTION switches to SSB. Adjust CHANNEL A and B LEVEL controls for 0VU or 100% on the meters.

B. Connect AC VTVM between terminals 2 and 4 of E-6800 (CHANNEL A). IT should read between 22 & 24 volts. Record on test data sheet.

C. Connect AC VTVM between terminals 12 and 14 of E-6800 (CHANNEL B). IT should read between 22 & 24 volts. Record on test data sheet.

D. Remove RF generator from J-6800. Set IF Bandwidth switches (A&B) to OFF position.(Offis midway between any two bandwidth positions). Switch AC VTVM to a low range and adjust R-6073 (CHANNEL B hum balance control) for minimum reading. It should read 230MV or less. Record on test data sheet. Turn CHANNEL B DETECTION switch to AM. The VTVM should read approximately 23MV.Record on test data sheet. Turn CHANNEL B DETECTION switch to SSB position.

E. Connect AC VTVM between terminals 2 and 4 of E-6800 and adjust R-6036 (CHANNEL A hum balance control) for minimum reading. It should read 230MV or less. Record on test data sheet. Turn CHANNEL A DETECTION switch to AM. The VTVM should read approximately 23MV. Record on test data sheet. Turn CHANNEL A DETECTION switch to SSB position.

F. Connect Audio generator on the post of R-6005, (15K resistor to 5814 grid) and set frequency at 1KC and 2.5 MV output. Adjust CHANNEL A and B LEVEL controls for 0VU or 100% on the meters. Connect scope between terminals 2 and 4 of E-6800. **Set AFC switch to ON position.**

G. Vary the Audio generator above and below 1KC. The 3db points should be 200 cycles or lower and 10 KC or higher. A clean sine wave should appear on the scope. Record on test data sheet.

H. Connect AC VTVM and scope between terminals 12 and 14 of E-6800 (CHANNEL B) and repeat step G.

I. Replace Audio generator with TTG. Set controls as follows:
   1. POWER switch to ON.
   2. TWO TONE SELECTOR to OFF.
   3. AUDIO TONE SELECTOR to TWO TONE.
   4. AUDIO OUTPUT control for 2.5MV output.

J. Adjust CHANNEL A and B LEVEL controls for 0VU or 100% on the meters.

K. Connect Audio analyzor between terminals 2 and 4 of E-6800 (CHANNEL A). Set controls as follows:
   1. POWER switch ON.
   2. VERT. CALIB. SELECTOR to DB.
   3. SWEEP RANGE SELECTOR to 20KC LOG.
   4. SCALE SELECTOR to 0.5.
   5. INPUT MULT. to X1K.
   6. INPUT POT., Set the control so that the top of the two tones is on the + 20DB line of the screen. The total distortion products should be 40db down. Record on test data sheet.

L. Connect Audio analyzor between terminals 12 and 14 of E-6800 (CHANNEL B) and repeat step K-6. Remove TTG and Audio analyzor. **Set AFC switch to OFF position.**

XI PHONE MONITOR

A. Connect RF generator to J-6800. Connect earphones to MONITOR jack. Adjust CHANNEL A and B LEVEL controls for 0VU or 100% on the meters.

B. A 1KC tone should be heard on the phones, in the full CW and full CCW position of the MONITOR control.
C. Turn CHANNEL A IF BANDWIDTH switch to 7.5KC LSB and rotate MONITOR control to full CW position. The 1KC tone should be heard on the phones.
D. Connect AC VTVM to J-6202 MONITOR jack. It should read 2 volts ± 20%. Record on test data sheet (CHANNEL A). Rotating control to full CCW position should yield no signal.
E. Turn CHANNEL A IF BANDWIDTH switch to 7.5KC USB position and the CHANNEL B IF BANDWIDTH switch to 7.5KC LSB position. The VTVM should read 2 volts ± 20%. Record on test data sheet (CHANNEL B). Rotating control to the full CW position should yield no signal. Remove RF generator from J-6800.

XII PRODUCT DETECTORS

A. Connect AC VTVM to the post of R-6005. There should be 1 volt ± 10% at 250KC on this post. Record on test data sheet.
B. Connect RF generator to the post of R-6074. Set generator for 249KC and .33 volts output.
C. Adjust LINE LEVEL control on CHANNEL A for 0VU or 100% on meter. Connect AC VTVM and scope to terminals 2 and 4 of E-6800. The VTVM should read between 22 & 24 volts and there should be a clean sine wave on the scope. Record on test data sheet.
D. Connect RF generator to the post of R-6075.
E. Adjust LINE LEVEL control on CHANNEL B for 0VU or 100% on meter. Connect AC VTVM and scope to terminals 12 and 14 of E-6800. The VTVM should read between 22 & 24 volts and there should be a clean sine wave on the scope. Record on test data sheet.

XIII AM DETECTORS

A. Turn CHANNEL A and B DETECTION switches to AM.
B. Adjust RF generator for 250KC with a 1KC 50% modulation and .33 volts output.
C. Connect RF generator to pin 3 of T-6002 on detector board A-2193. Adjust CHANNEL B LINE LEVEL control for 0VU or 100% on meters. The VTVM should read between 22 & 24 volts and there should be a clean sine wave on the scope. Record on test data sheet.

D. Connect AC VTVM and scope to terminals 2 and 4 of E-6800.
E. Connect RF generator to pin 3 of T-6000 on detector board A-2193. Adjust CHANNEL A LINE LEVEL control for 0VU 100% on meter. The VTVM should read between 22 and 24 volts and there should be a clean sine wave on the scope. Record on test data sheet.

XIV AGC RESPONSE

A. Connect RF generator to J6800 at 455KC and 1 MV out.
B. set CHANNEL A to 7.5KC LSB & CHANNEL B to 7.5KC USB.
C. Vary generator 1 KC below 455KC. Set CHANNEL A line level for 0 VU.
D. Set AGC selector MANUAL.
E. Turn AGC MANUAL control to full CCW position, the output drops to 0.
F. Turn control to full CW position, the output should rise immediately.
G. Set AGC RESPONSE to MED position.
H. Turn AGC MANUAL control full CCW then back to CW, the output should hesitate before rising.
I. Set AGC RESPONSE to SLOW position.
J. Turn AGC MANUAL control full CCW then back to CW, the output should rise very slowly.
K. Vary RF generator 1 KC above 455KC. Set CHANNEL B line level for 0 VU.
L. Repeat steps E to J for CHANNEL B.

XV BANDWIDTH CHECK

A. Connect RF generator to J6800 at 455KC and 1MV out.
B. Connect 600 ohm load to terminals 7 and 9 of E6800.
C. Connect VTVM and Frequency Counter to terminals 2 and 4 of E6800.
D. Set CH-A &B to 7.5KC LSB. Detection to SSB, AFC "OFF", and AGC to CH -A/B.
E. Ground AGC to IF strip at R119 on strip terminal board.
F. Tune generator around 455KC for output indication on VTVM.
G. Set CH-A line level for reference DB around 22v output (0VU on SBS meter).
H. Sweep generator through IF bandwidth, checking 3DB points.
I. Minimum bandwidth of IF should be as indicated on strip (i.e. 7.5KC LSB/BW = 7500 cps min.)
J. Repeat steps E to I for each IF strip. Record results.

XVI Repeat step III. Record oscillator volts and frequency on test data sheet.
Repeat step IV. Record oscillator volts and frequency on test data sheet.

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y.

SBS-1 TEST DATA SHEET #1

SERIAL NO._____
MFG. NO._____

AGC COMPARATOR

BALANCE POTENIOMETER_____OK

AGC MANUAL CONTROL

AGC_____VOLTS.
AGC POTENTIOMETER_____OK

250KC CONVERTER AND AMPLIFIER

250KC AMPLIFIER OUTPUT_____VOLTS.
LOZ INPUT AND INPUT POTENTIOMETER_____OK
HIZ INPUT_____VOLTS.
RESPONSE: 3DB POINTS_____KC AND_____KC
BANDPASS_____KC.

CHANNEL A AND B IF AMPLIFIERS

CHANNEL A IF AMPLIFIER_____VOLTS.
CHANNEL B IF AMPLIFIER_____VOLTS.

} Omit on SBS-9 Test Data.

BANDWIDTH CHECK

7.5LSB_____TO_____
3.5LSB_____TO_____
3.5USB_____TO_____
7.5USB_____TO_____

AUDIO OUTPUT

CHANNEL A_____VOLTS
CHANNEL B_____VOLTS

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DATE 12/19/63 SHEET 10 OF 10	TMC SPECIFICATION NO. S-705	F
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SBS-1 TEST DATA SHEET #2

HUM BALANCE

	SSB	AM
CHANNEL A	_____ MV	_____ MV
CHANNEL B	_____ MV	_____ MV

AUDIO FREQUENCY RESPONSE (3DB POINTS)

CHANNEL A _____ CYCLES AND _____ KC
CHANNEL A WAVESHAPE _____ OK.
CHANNEL B _____ CYCLES AND _____ KC
CHANNEL B WAVESHAPE _____ OK.

AUDIO DISTORTION

CHANNEL A _____ DB.
CHANNEL B _____ DB.

PHONE MONITOR OUTPUT

CHANNEL A _____ VOLTS
CHANNEL B _____ VOLTS

PRODUCT DETECTORS

250KC PRODUCT DETECTION INJECTION _____ VOLTS.

CHANNEL A _____ OK
CHANNEL B _____ OK

AM DETECTORS

CHANNEL A _____ OK
CHANNEL B _____ OK

AGC RESPONSE

CHANNEL A _____ OK
CHANNEL B _____ OK

250KC OSCILLATOR

OSCILLATOR _____ VOLTS.
OSCILLATOR FREQUENCY _____ CYCLES.

705KC OSCILLATOR

OSCILLATOR _____ VOLTS.

OSCILLATOR FREQUENCY _____ CYCLES

DATE _____
TESTER _____

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REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S-705
LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
7-2-63	A		9471	Sheets 4,5. Chgd per EMN	
12/19/63	B	-----	10605	Revised Sheets 3,4,5,6,7,8,9,10 Per EMN	
6/2/64	C	6	11474	Revised page 6 per EMN	
1/6/65	D	5,9	13198	Revised shts. 5,9 per EMN	
12/31/65	E	5,8,9	15500	Revised per EMN	
12-23-68	F		19164	Revised per EMN	

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