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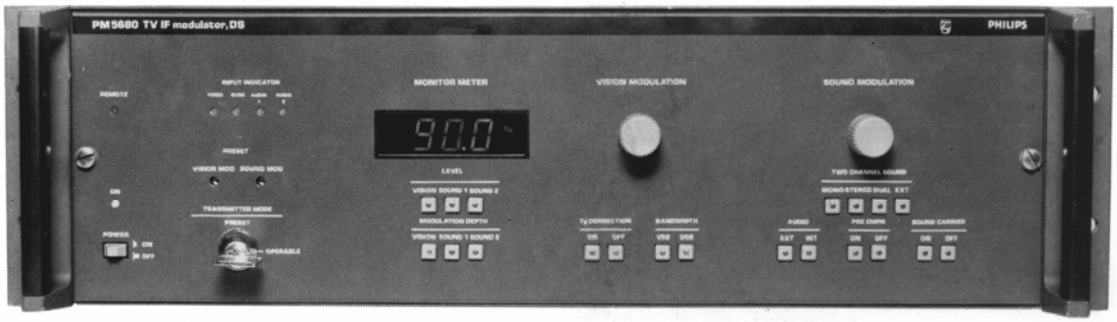
sense and simplicity

PM 5680 | TV IF modulator



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2. Introduction and applications

PM 5680 is a Vision and Sound IF modulator.
The instrument is produced in a number of different versions to fulfill the requirements of most TV standards. All versions can be delivered with VSB filter in traditional LC technology and most of them are also available in SAW technology. It's output can be configured to either combined or separate vision and sound. You can control parameters like "Sound Modulation", "Vision Modulation", "Receiver Precorrection On/Off" e.t.c. via knobs and buttons on the front plate. The 3 digit monitor meter provides, together with a group of push buttons, the facility for read-out of IF level and modulation degree for both vision and sound. The presence of vision-, sync- and sound inputs are indicated by separate LED's facilitating trouble-shooting in major system set-up.

The "KEY-LOCK" on the front plate may adapt your PM 5680 for operation in different environments. When the key is in the OPERABLE position all functions on the front plate are available to the user. This makes the instrument suitable as a general purpose IF modulator in a laboratory.
When the key, however, is in position PRESET only the monitoring controls are operable. All the other controls will be in a fixed preprogrammed state. In this mode your instrument is suited for operation at a factory testline, in a TV/CATV transmitter or in any application where unintended change of parameters in not desirable.

The PM 5680 is prepared for remote control via the "AUXILLARY" connector at the rear plate. You can as standard select between Mono-, Stereo- and Dual sound via the connector when the "Dual Sound" option is installed.

Your PM 5680 is/can furthermore be equipped with the following options:

1. White Clipper/Sync Stretcher - PM 8533
This option eliminates "buzz" from overmodulation in sound and counteracts sync compression due to non-linear power stage characteristics.
NOTE: In system L the function of the unit is limitation of peak power.

2. Dual Sound - PM 8536
An option providing Mono-, Stereo- and Dual sound in accordance with the German A2 standard.

3. Non-linearity Corrector - PM 8537
This option predistorts the IF signal to counteract up to 15% non-linear distortion in a succeeding power stage.

3. Technical data

3.1 Safety characteristics

This apparatus has been designed and tested in accordance with Safety Class I requirements of IEC Publication 348 (Safety Requirements for Electronics Measuring Apparatus), and has been supplied in a safe condition. This manual contains information and warnings which must be followed to ensure safe operation and to retain the apparatus in a safe condition.

3.2 Performance characteristics

Properties expressed in numerical values with stated tolerances are guaranteed by the Philips organization in your country. Specified non-tolerance numerical values indicate those that could be nominally expected as a mean of a range of identical instruments.

3.3 Systems covered

	Vision carrier	Sound carrier	LC VSB	SAW VSB
B/G	fv: 38.9 MHz	fs: 33.4MHz	X	X
M	fv: 38.9 MHz	fs: 34.4 MHz	X	
M	fv: 45.75MHz	fs:41.25MHz	X	X
L	fv: 32.7 MHz	fs: 39.2 MHz	X	
L	fv: 38.9 MHz	fs: 32.4 MHz	X	X
D/K	fv: 38.9 MHz	fs: 32.4 MHz	X	X
D/K	fv: 38.0 MHz	fs: 31.5 MHz	X	
I	fv: 38.9 MHz	fs: 32.9 MHz	X	X
I	fv: 39.5 MHz	fs: 33.5 MHz	X	

3.3.1 Receiver pre-correction availability:

German:
ARD 5/2.1
(Danish):
*

Norwegian:
K 1665
Swedish:
(new Sw. 1983 - is eq. to the Norwegian)
Hungarian:
TK-III-830
(Russian:
GOST 20532-75)*
American:
FCC EIA1977
Australian:
ABCB 1986
(French:
SN 823)*

*: Not directly included in the design - but the circuit lay-out takes these versions into account (only on request).

3.4 Vision

3.4.1 Input

Connector type:
BNC
Input range:
1V NOM. +3dB/-6dB
Input impedance:
High Z loop-through
Return loss:
>34dB up to 7MHz
Hum suppression:
>50dB (with backporch clamp)

3.4.2 Video processing:

DC-restore (Clamp):
Blackporch clamp. Black level stability better than 0.5% ref. BL/WH (measured by means of transmitter bump signal).
DC-restore (Peak neg.):
Activated automatic (no sync) or by switch.
Sync Stretcher (optional):
Adjustable -2/+6dB.
White Clipper (optional):
Adjustable from white level equal to 5% restcarrier down to 20%.

3.4.3 Video monitoring

Meter:
3 digit LED display
Modulation read-out:
Modulation depth between -10 +50% restcarrier. Accuracy +/-1%, resolution 0.1% (White level indication possible by internal modification).

3.4.4 Receiver group-delay

Nominal curve +/-10ns up to color subcarrier (own response +/-70ns at max. video freq.).

DEMODULATED RESPONSE DSB MODE:
Australian standard:
See fig. 3-11
European standard:
See fig. 3-12
FCC M standard:
See fig. 3-13
Norwegian-Swedish standard:
See fig. 3-14
TK III-830 standard:
See fig. 3-15

3.4.5 Frequency response:

NOTE: Frequency of reference in the nominal profiles are 1.5MHz for system B/G and D/K, 2MHz for system I, 3.58MHz for FCC system M, 2.5MHz for system L.

DSB MODE:
+/-0.3dB; +/-10ns (-4MHz to +6MHz).

VSB MODE:
Attenuation of unwanted video frequencies:
>20dB (measured 0.5MHz lower and higher than required minimum edges of BP-curve).
Attenuation of image color frequency:
>50dB.

VSB RESPONSE PROFILES:

System B/G	- LC	: See fig. 3-1
	- SAW	: See fig. 3-2
System D/K	- LC	: See fig. 3-3
	- SAW	: See fig. 3-4
System I	- LC	: See fig. 3-5
	- SAW	: See fig. 3-6
System L	- LC 38.9	: See fig. 3-7
	- LC 32.7	: See fig. 3-8
System M	- LC	: See fig. 3-9
	- SAW	: See fig. 3-10

3.4.6 Harmonics spurious:

Residual carrier suppression:
>56dB (max. remp. range)
>60dB (15°C - 35°C)
Harmonics of vision carrier:
<-40dB (DSB mode)
<-60dB (VSB mode)
Spurious signal components out of band:
<-63dB

3.4.7 Demodulated response via PM 5560 or similar demodulator

Differential gain:
<1%
Differential phase:
<1°
Stat non linearity:
<1%
2T K-factor:
<1%
Pulse/bar*:
<2%
20T gain ineq.:
<0.3dB
20T delay ineq.:
<10ns
Square wave tilt:
<0.5% (except line + field)
S/N level:
>64dB$_{RMS}$ (10kHz to max. video freq.)
>60dB peak (below 1kHz)
>66dB peak (periodical 1kHz to max. video freq.)
*: For system I pulse bar %, due to system defined VSB filter shape.

3.4.8 Outputs in separate mode:

MAIN OUTPUT:
Connector type:
N-connector
Output level:
1V$_{RMS}$/120dBuV (sync reference)

Output level (L-system):
1V_{RMS}/120dBuV (white reference)
Level adj. range:
+/-3dB
Automatic level control:
Keyed system. Backporch is reference. Accuracy +/-2%
Impedance:
50ohm
Return loss:
>26dB within band

MONITOR OUTPUT:
Connector type:
BNC
Output level:
10% +/-2% of main output.
Impedance:
50ohm

3.5 Sound

3.5.1 Input

Connector type:
XLR
Input range (nom. modul):
0dBm +/-6dB
Input impedance (normal):
600ohm +/-2%
Input impedance (high ohm):
>10kohm (possible by internal modification)

3.5.2 Intern sound

Sound IF may be modulated from internal 1kHz sound source (configurable by user to 400Hz).

3.5.3 Modulation:

System B/G, M, D/K, I:
FM
System L:
AM

3.5.4 Frequency response:

WITHOUT PRE-EMPHASIS:
System B/G, D/K, I:
20Hz - 20kHz +/-0.3dB
System M:
30Hz - 50Hz +/-0.3dB
50Hz - 53kHz +/-0.1dB
53kHz - 105kHz +0.2dB/-1dB
System L:
20Hz - 15kHz +/-0.3dB

WITH PRE-EMPHASIS:
System B/G, M, D/K, I:
20Hz - 50Hz +/-1.0dB
50Hz - 15kHz +/-0.5dB

PRE-EMPHASIS CURVE:
System B/G, I, D/K:
50us
System M:
75us

3.5.5 Demodulated response

DISTORTION:
System B/G, D/K, I, L, M:
<0.25% (30Hz - 15kHz)
System B/G, D/K, I:
<0.4% (75kHz dev./15kHz - 75kHz)
System M:
<0.5% (50kHz dev./75kHz - 100kHz)
System L:
<1% (80% AM, 110dBuV out combined)

S/N LEVEL:
Sound part alone:
>76dB_{RMS}
30% AM, system L:
>63dB_{RMS}
Intercarrier:
S/N level weighted CCIR 468-2 quasipeak measured during full modulation of the vision part
>60dB (f_{video} 0 - 5MHz)

3.5.6 Sound output in separate mode:

MAIN OUTPUT:
Connector type:
N-connector
Level nominal:
316mV (110dBuV)
Range of adjustment:
+3dB/-15dB
Impedance:
50ohm
Return loss:
>26dB
Harmonics:
<-60dB below unmodulated sound carrier

MONITOR OUTPUT:
Connector type:
BNC
Level:
10% +/-2% of main output
Impedance:
50ohm

3.6 Combined output:

3.6.1 Vision level*:

120dBuV +/-0.5dB ($1V_{RMS}$)

3.6.2 Sound level:

Single sound*:
110dBuV +/-0.5dB
Dual Sound "Sound 1"*:
106.5dBuV +/-0.5dB
Dual Sound "Sound 2"*:
100dBuV +/-0.5dB
Return loss:
>26dB in the band vision + sound
*: Referred to standard setting of instrument (vision level 1V).

3.7 Frequency stability

Absolute stability better than:
$2x10^{-6}$
Aging lower than:
$1x10^{-6}$/year

3.8 Auxillary

3.8.1 Input for external standard:

Connector type:
BNC
Frequency:
5MHz or 10MHz by internal configuration
Input level:
100mV - 1V
Input impedance:
75ohm

3.8.2 Input for ext. sync (scrambled system)

Connector type:
BNC
Input level:
4V +/-6dB
Input impedance:
75ohm

3.8.3 Auxillary

The instrument is prepared for remote operation via rear plate connector "AUXILLARY".
Connector type:
Amphenol 24pin
Switch control:
Active by "GROUND"
Modulation:
DC-controlled

3.9 Non-Linearity Corrector

Capacity:
>15% diff. gain can be corrected.
Unwanted diff. phase at 15% correction:
$<2^{o}$
Nominal input level:
1V peak sync
Input return loss:
>20dB
Nominal output level:
1V peak sync
Output return loss:
>26dB

3.10 Stereo/Dual Sound

System:
German (A2)
System cross talk:
40Hz - 15kHz : -55dB
100Hz - 15kHz : -55dB
DS channel isolation:
30Hz - 20kHz : 80dB

For general performance refer to paragraph 3.5 Sound.

3.11 Response graphs

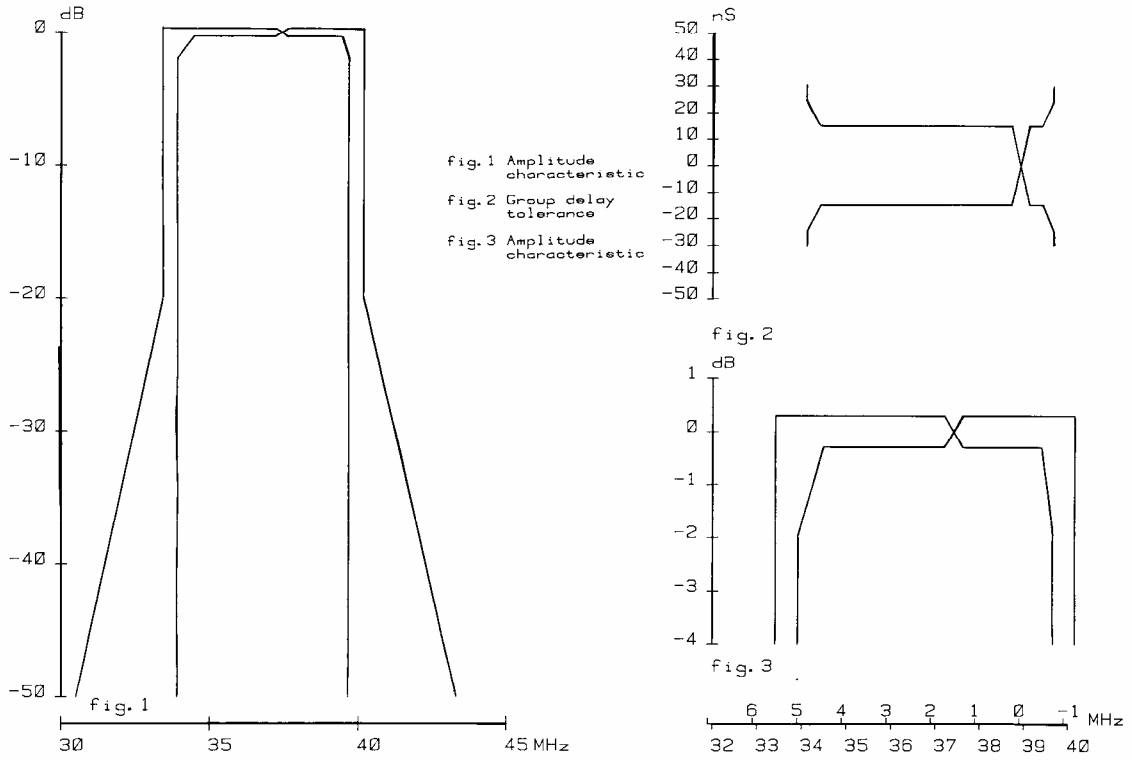

Fig. 3-1 VSB response - system B/G - LC

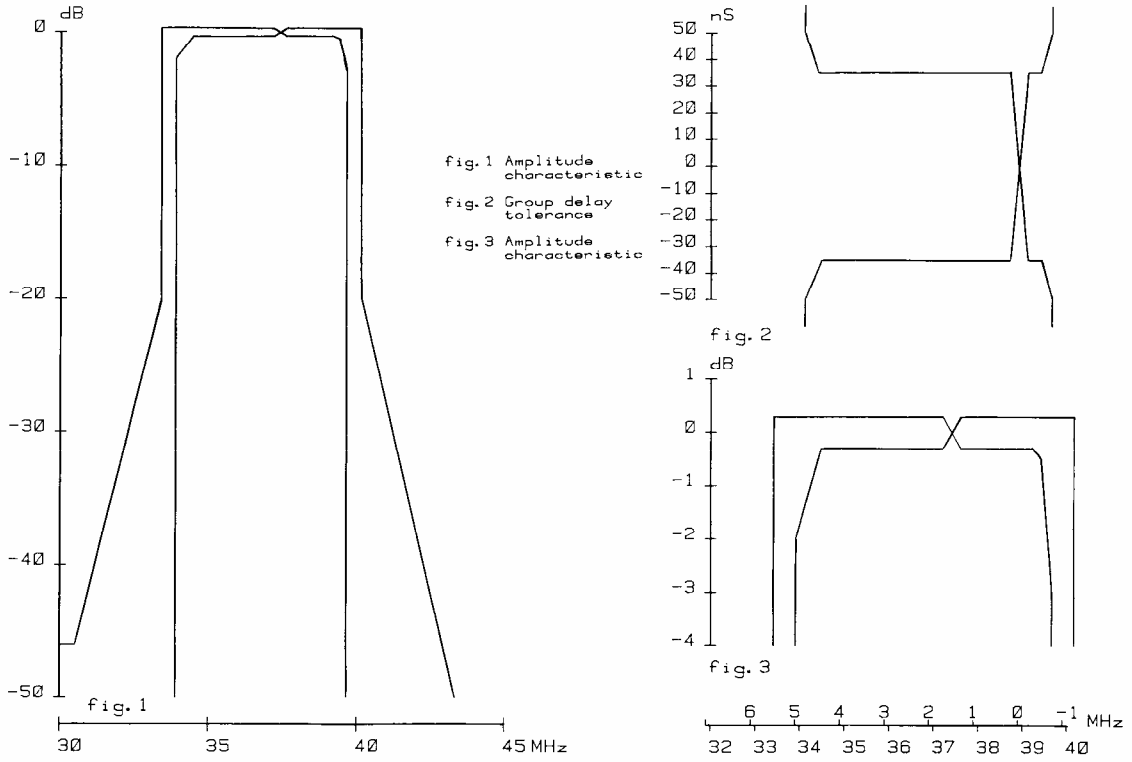

Fig. 3-2 VSB response - system B/G - SAW

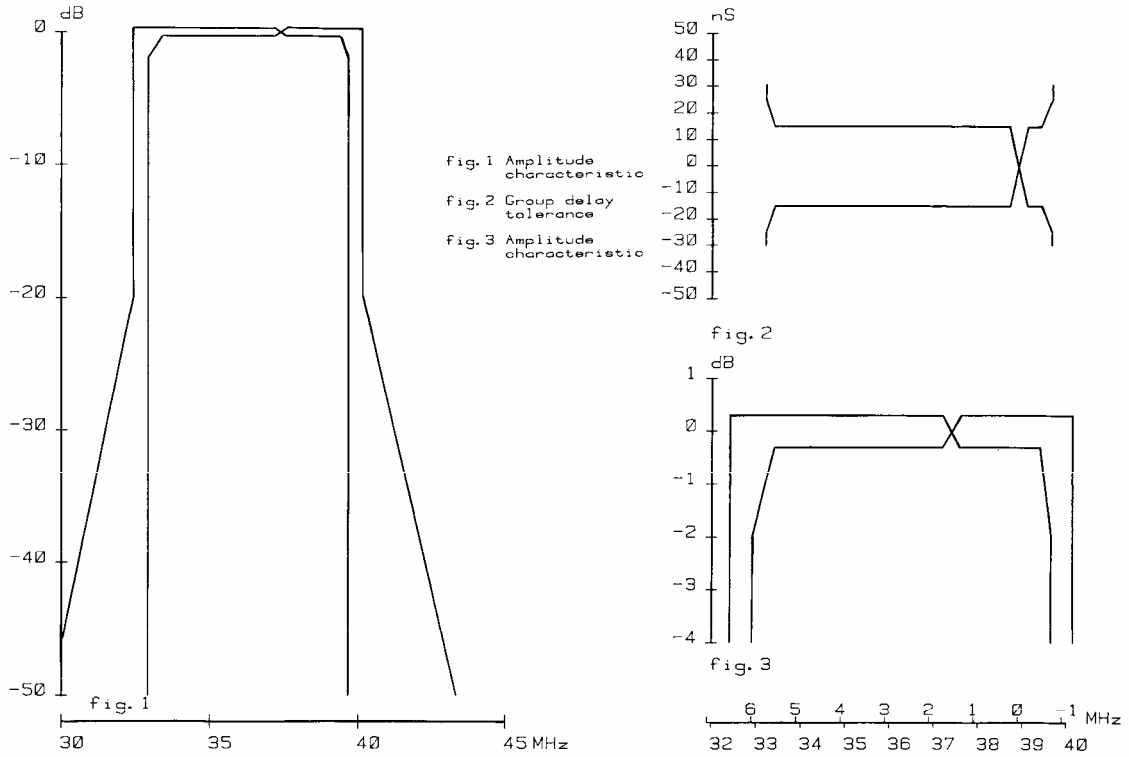

Fig. 3-3 VSB response - system D/K - LC (covers 38.0MHz as well).

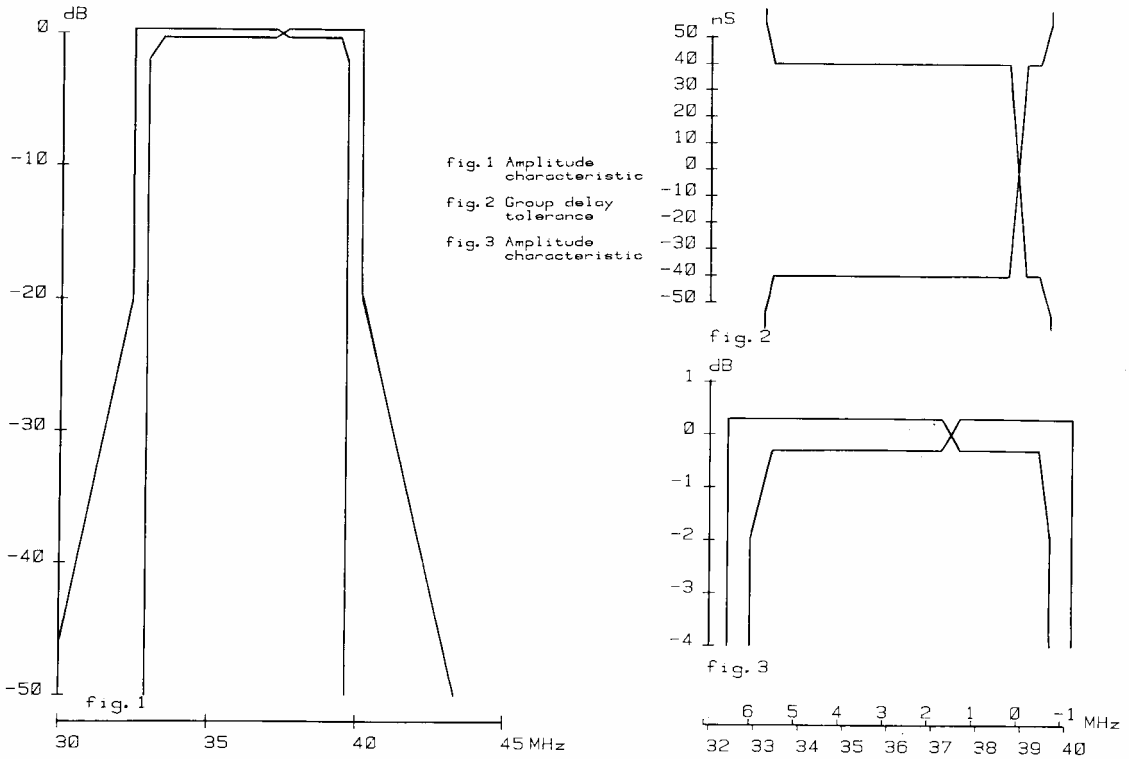

Fig. 3-4 VSB response - system D/K - SAW

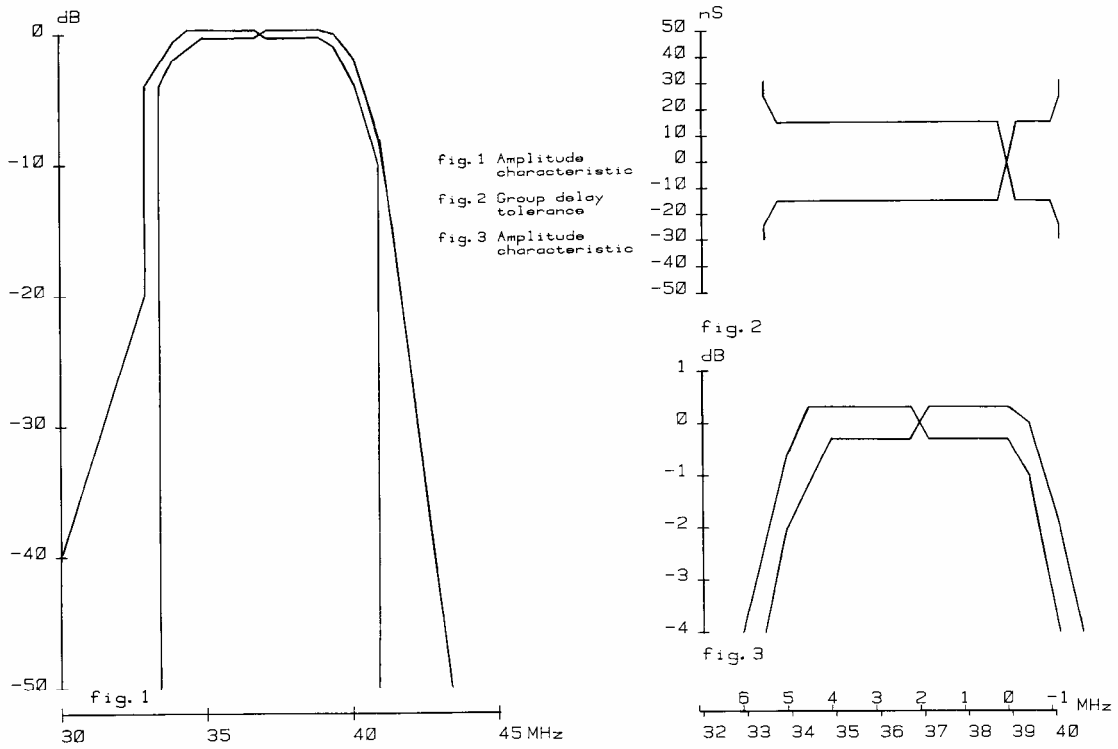

Fig. 3-5 VSB response - system I - LC (covers 39.5MHz as well)

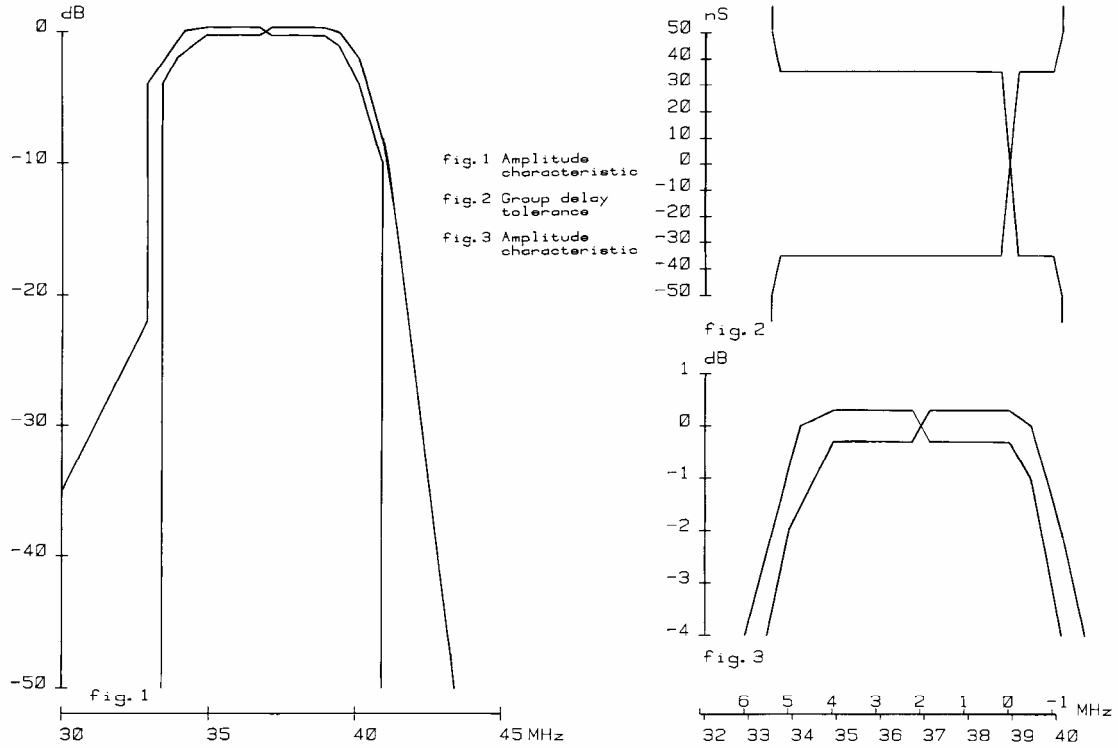

Fig. 3-6 VSB response - system I - SAW

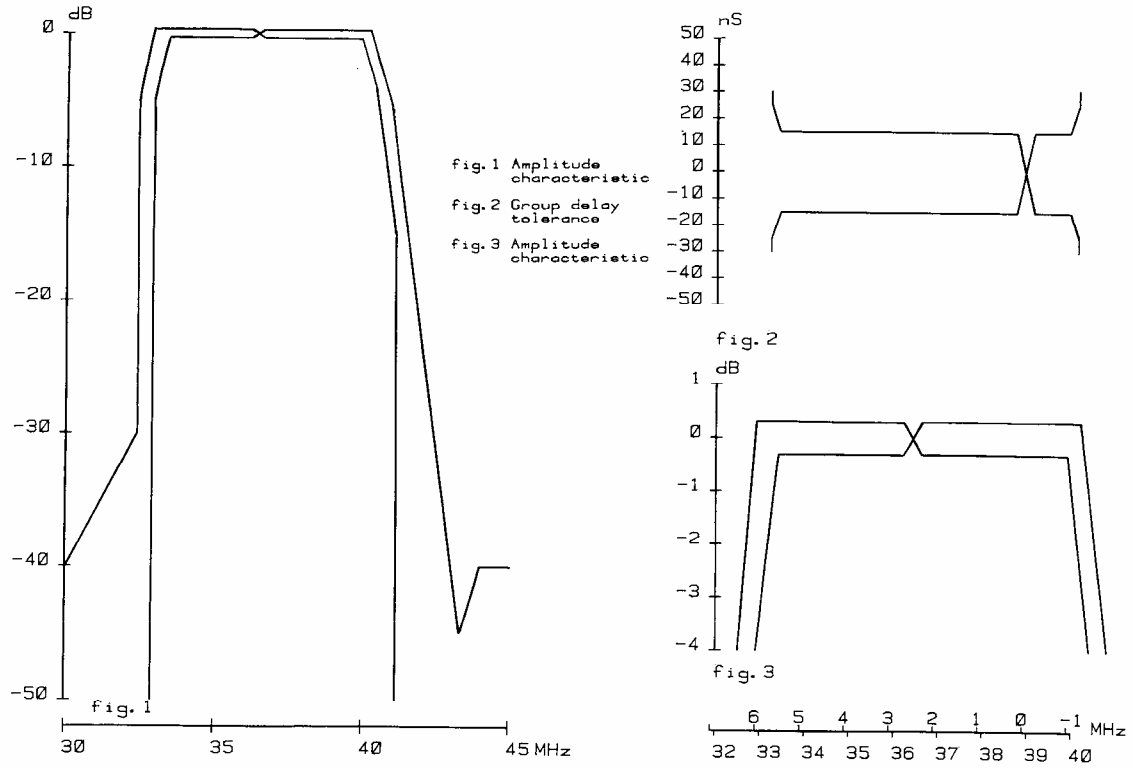

Fig. 3-7 VSB response - system L - LC 38.9MHz

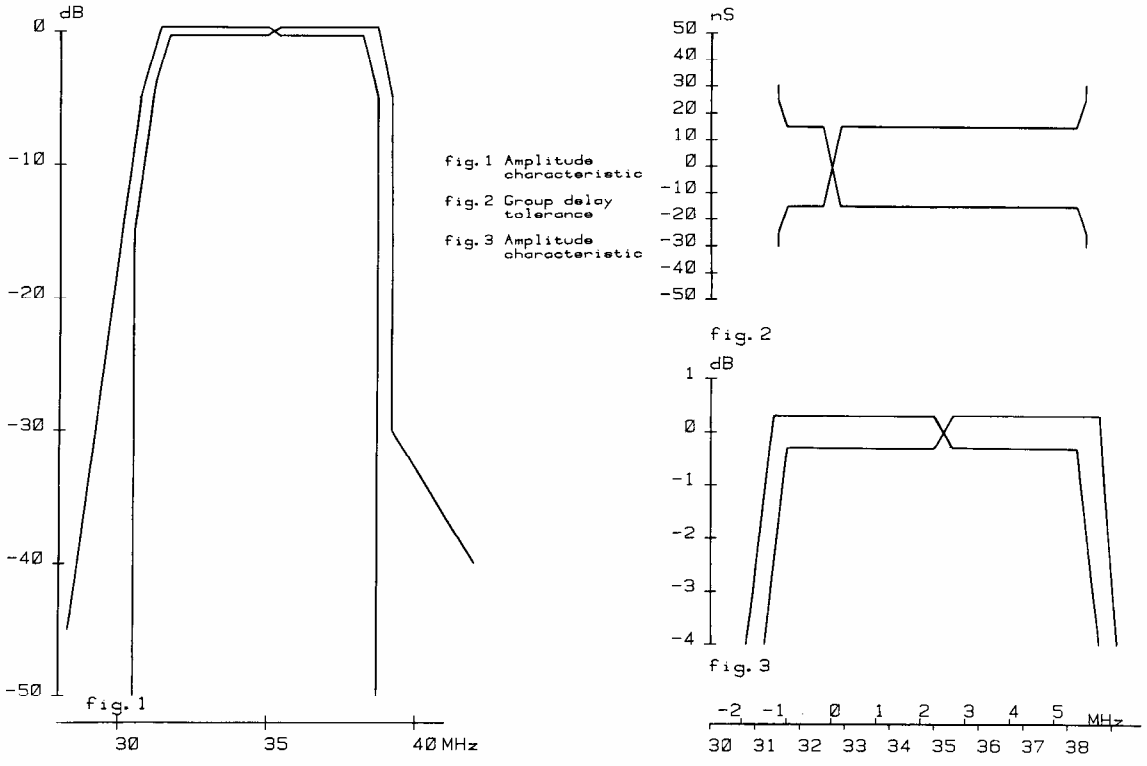

Fig. 3-8 VSB response - system L - LC 32.7MHz

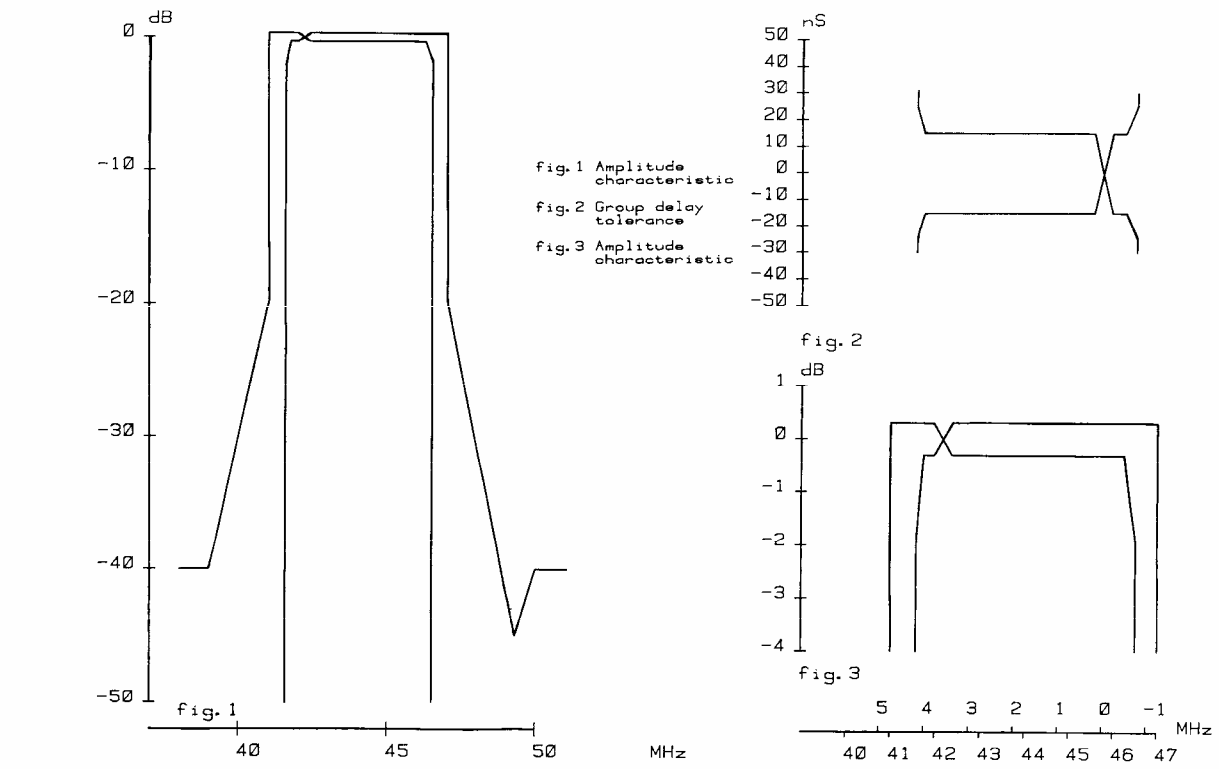

Fig. 3-9 VSB response - system M - LC (covers 38.9MHz as well)

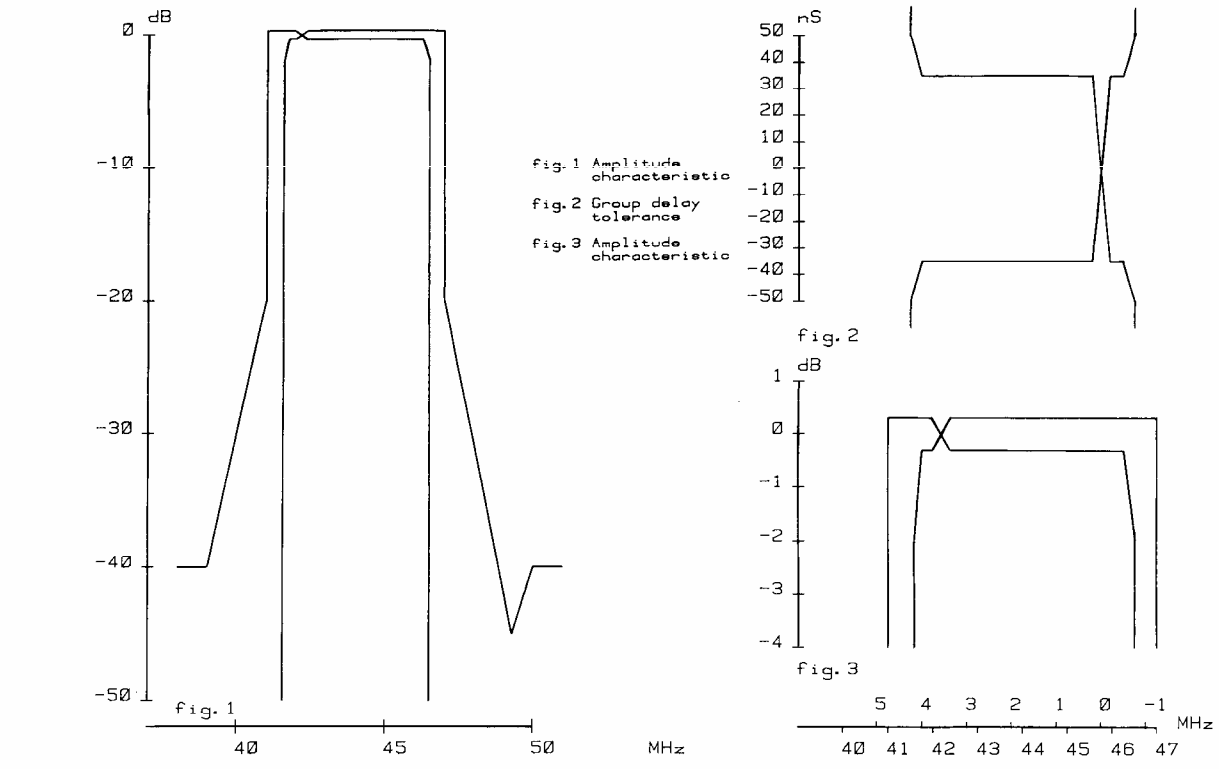

Fig. 3-10 VSB response - system M - SAW

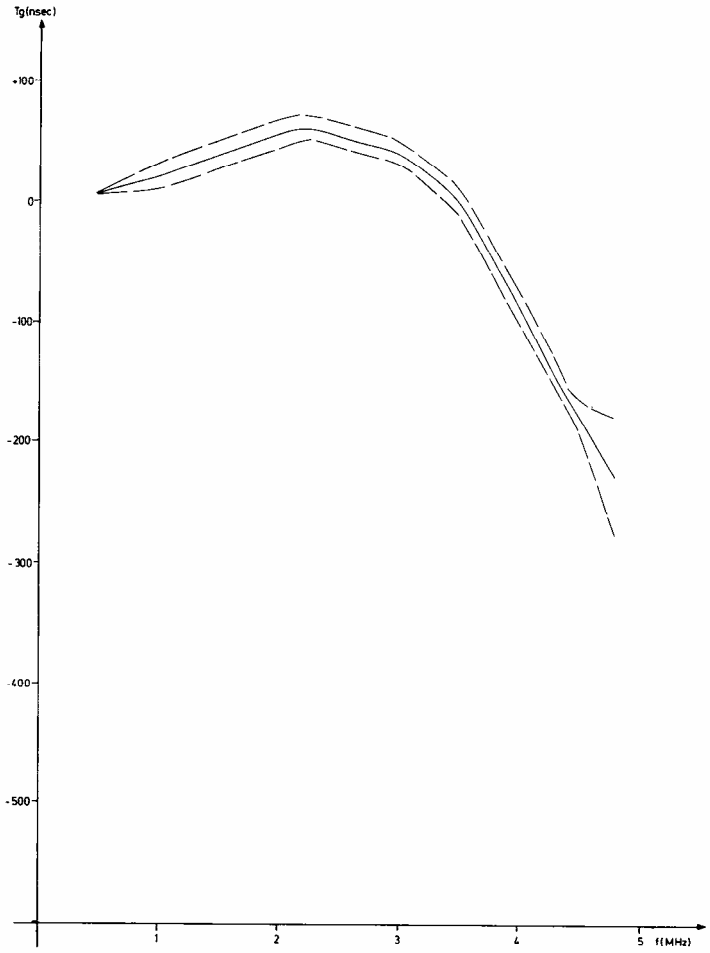

Fig. 3-11 Demodulated response DSB mode - Australian standard

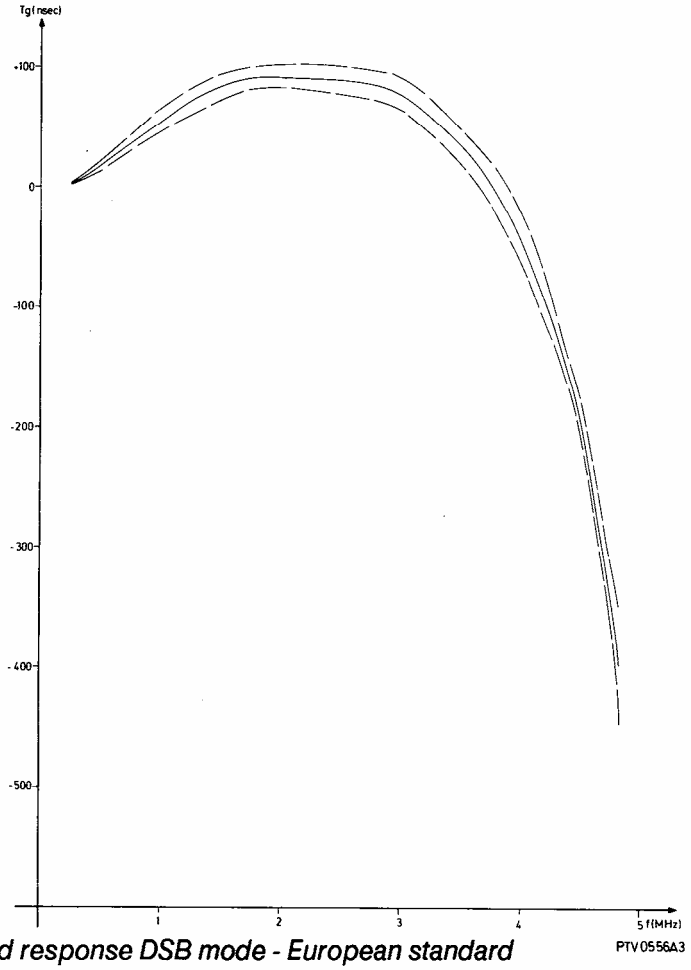

Fig. 3-12 Demodulated response DSB mode - European standard

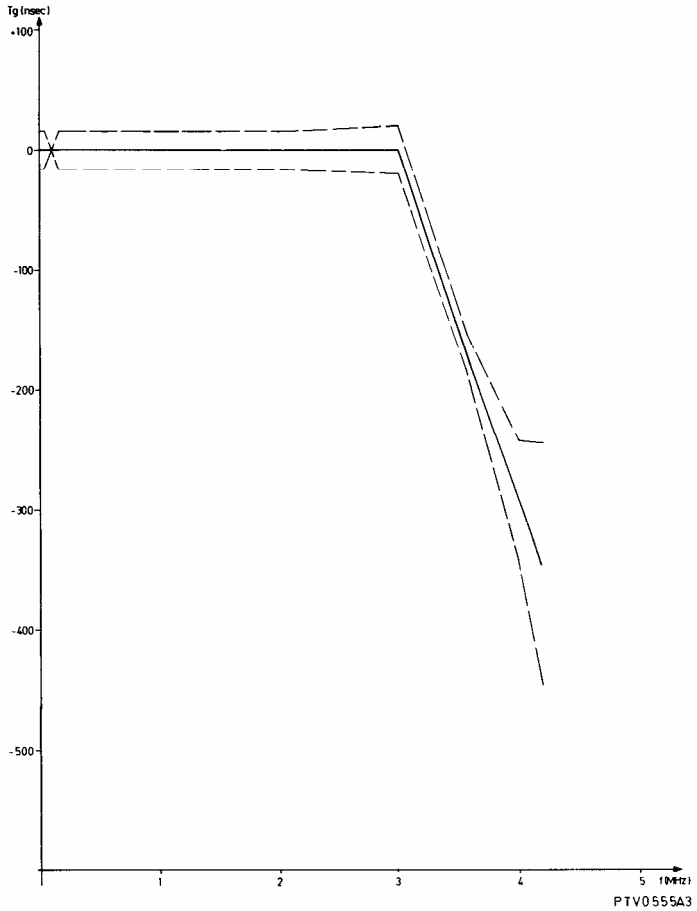

Fig. 3-13 Demodulated response DSB mode - FCC M standard

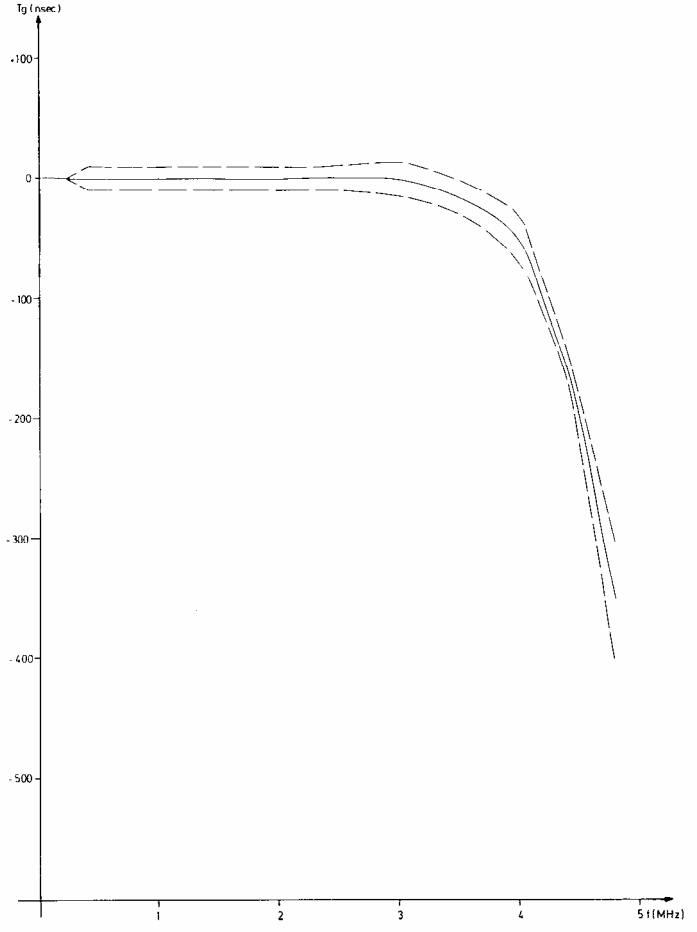

Fig. 3-14 Demodulated response DSB mode - Norwegian-Swedish standard

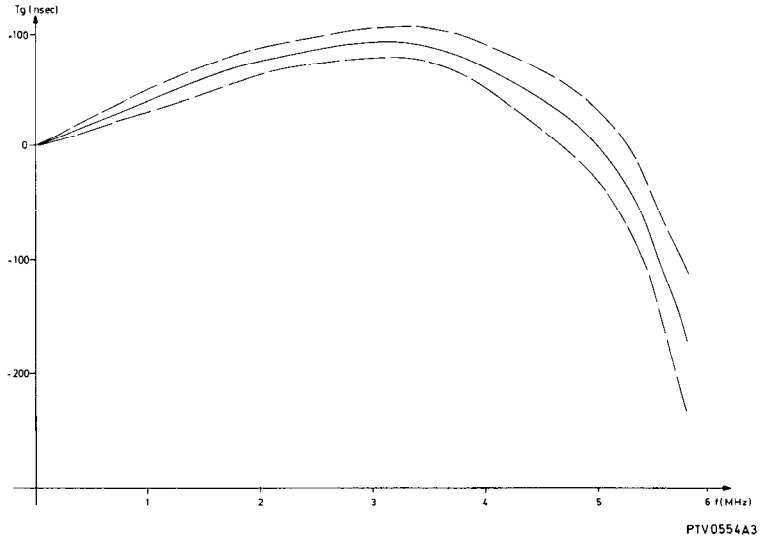

Fig. 3-15 Demodulated response DSB mode - TK III-830 standard

3.12 Mechanical dimensions

Height	:	132mm (5.19")
Width	:	482mm (19.0")
Depth	:	410mm (16.1")
Weight	:	16.5kg (36.0lbs)

3.13 Environmental conditions

The environmental data mentioned in this instruction manual is based on the results of the manufacturer's procedures.
Details of these procedures and failure criteria are supplied on request by the PHILIPS organization in your country, or by PHILIPS, INDUSTRIAL & ELECTRO-ACOUSTIC DIVISION, EINDHOVEN, THE NETHERLANDS.

3.13.1 Climatic conditions

Ambient temperature:
+5°C to +45°C (+41°F to +113°F)
Limit range for storage and transport:
-30°C to +70°C (-22°F to +158°F)

3.13.2 Mechanical requirements

VIBRATION
Limit range for storage and transport:
30min. in each of three directions, 10 to 150Hz;
0.7mm P-P and 50m/s^2 max acceleration.
According to IEC-Publ. 68, test Fc.
NOTE: Unit mounted on vibration table without shock absorbing material.

BUMP
Limit range for storage and transport:
1000 bumps of 100m/s^2 sine, 6ms duration in each of 3 directions.
According to IEC-Publ. 68, test Eb.

PACKAGING
According to UN-D-1400
The test methods mentioned in the N.V. Philips Standard UN-D-1400 are in accordance with those of relevant ISO-Standards.

3.14 Mains supply conditions

Mains supply voltage:
100,120,220 or 240V AC, +10%, -15%
Mains supply frequency:
48 - 60Hz
Power consumption:
60W at 240V AC (85W with all options installed).

4. Accessories & options

4.1 Accessories

Item	Quantity	Ordering number
Mains cable - EU	1*	5322 312 20697
Mains cable - US	1*	5322 321 10123
Termination for 50ohm N-con.	1	5322 263 60026
Termination for 75ohm BNC-con.	1	5322 263 60037
Extension board	1	5322 212 70176
Short support for extension board	1	5322 462 10307
Long support for extension board	1	5322 462 10306
Manual	1	9499 493 05411

***NOTE:**

Mains cable only delivered for the country specified by your order.

4.2 Options

Item	Ordering number
PM 8533G White Clipper/Sync Stretcher	9449 085 33003
PM 8533L White Clipper/Sync Stretcher	9449 085 33007
PM 8533M White Clipper/Sync Stretcher	9449 085 33008
PM 8536G Stereo/Dual Sound (German Standard-A2)	9449 085 36003
PM 8537 Non Linearity Corrector	9499 085 37013
PM 8537 Non Linearity Corrector (for f_{IF} 45.75MHz)	9449 085 37018