

2-GHz Radiocommunication Tester CMT55

**Broadband modulator/demodulator, for all transmitter and receiver measurements up to 2 GHz**

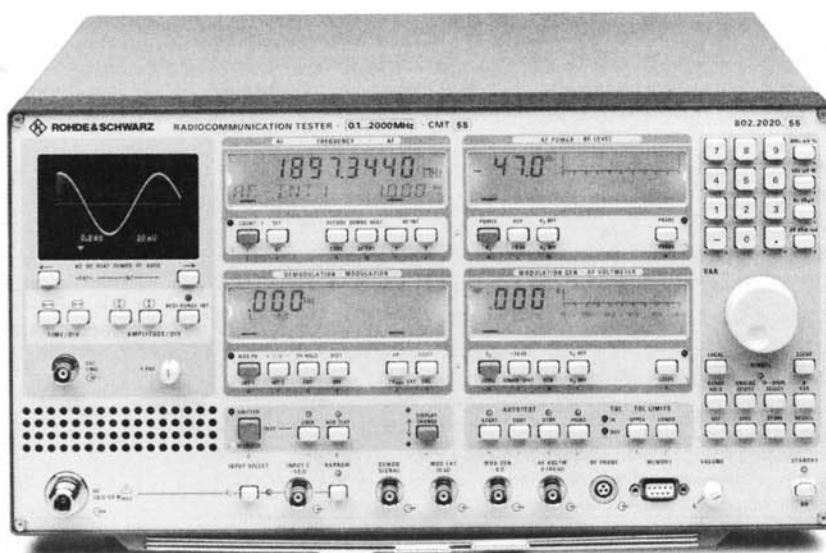


Photo 40547

**Brief description**

The extension of frequency bands up to 2 GHz in mobile radio places new requirements on radio test equipment. The 2-GHz Radiocommunication Tester CMT55 is a suitable measuring instrument in this field as well as for directional-radio applications.

**Main features**

- Favourably priced radio tester with all the necessary measurement

- facilities for AM, FM and  $\phi$ M transceivers
- Full measurement capabilities from 100 kHz to 2 GHz
- Highly sensitive off-air measurements
- High measurement accuracy and wide dynamic range at a high measurement rate
- Integrated oscilloscope
- Integrated broadband modulator and demodulator for broadband radiocommunication measurements
- Wide choice of options for special applications

- Light and compact unit powered from battery or AC supply for mobile and stationary use
- Fully automatic test run including hardcopy test report thanks to integrated memory for comprehensive transceiver tests
- Automatic operation with external process controller via IEC/IEEE bus
- Ergonomic manual operation with measurement data shown on digital and analog displays and on integrated oscilloscope

**Overview of equipment and options**

Measuring and control facilities contained in CMT55		Receiver test	Transmitter test	Option/add-on
<b>Generator section</b>				
<b>RF generator with broadband FM</b>	0.1 to 2000 MHz, -137 to +13 dBm	•		
Modulation generator 1	20 dB electronic level fine variation 20 Hz to 30 kHz with 6 additional fixed frequencies	•	•	
Modulation generator 2	20 Hz to 30 kHz	•	•	CMT-B7
Two-tone modulation generator	two-tone generation to DTMF, two-tone modulation with separate setting	•	•	CMT-B7
Selective-call encoder	to standard or programmable	•		
<b>Measurement section</b>				
RF counter	0.4 to 2000 MHz		•	

Measuring and control facilities contained in CMT55		Receiver test	Transmitter test	Option/add-on
RF power meter	5 mW to 50 W		•	
Modulation meter (AM, FM, φM)	MAX PK, -PK, +PK, ±PK/2, PK HOLD, RMS, automatic tuning, presettable		•	
Broadband FM demodulator	40 to 2000 MHz		•	
Spurious modulation meter	true rms weighting, automatic tuning, presettable		•	
AF voltmeter	0.1 mV to 30 V, true rms weighting, switchable time constants	•		
Distortion meter	0.1 to 50%	•	•	
SINAD meter	1 to 46 dB	•		
S/N meter	1 to 99 dB	•	•	
AF counter	20 Hz to 500 kHz	•	•	
Frequency offset meter	20 Hz to 20 kHz		•	
Oscilloscope	ext.: AC, DC; int.: AF voltage, demod. signal; beat signal, distortion	•	•	
Selective-call decoder	to standard or programmable		•	
Adjacent-channel power meter	20 to 80 dB		•	CMT-B6
RF millivoltmeter	10 kHz to 2 GHz, 1 mV to 100 V	•	•	CM-B8
Selective RF millivoltmeter			•	CMT-B6
Dual-tone decoder	to DTMF standard		•	CM-B11
Duplex modulation meter	same as main modulation meter		•	CMT-B9
Off-air measurements	sensitivity approx. 5 μV with selectable narrowband filter		•	
Audible monitoring	demodulated signal, AF voltmeter input signal, beat signal	•	•	
CCITT filter		•	•	
300-Hz highpass filter			•	
DC ammeter	0 to ±10 A	•	•	CMT-Z6
DC voltmeter	0 to ±30 V	•	•	CMT-Z6
<b>Control section</b>				
IEC/IEEE-bus control interface	to IEC625-1 (IEEE 488) standard, 8 relays	•	•	CM-B4
Autorun control/printer interface	20 complex or 100 simple test programs, 3 relays, Centronics parallel interface	•	•	CM-B5

## Measurement capabilities

The RF synthesizer, which can be modulated for the receiver test, provides output signals of up to 2 GHz at a maximum level of +13 dBm. A higher maximum frequency deviation (1600 kHz) and a wider modulation frequency range (130 kHz) are available for broadband modulation at high frequencies. The intermodulation dis-

tortion of the FM modulator is low regarding the multitone and subcarrier method used in this frequency range. The AM modulation capabilities even apply to the frequency range 1 to 2 GHz, for instance for fading simulation at the receiver input.

Two standard FM demodulators are provided:

The first FM demodulator, with modu-

lation frequency and maximum deviation corresponding to that of the 1-GHz models, features low residual FM in the 2-GHz range as well. It is mainly used for testing single-channel radio-communications (rural links).

The second FM demodulator fitted as standard is a broadband FM demodulator and can also be used for frequencies below 1 GHz (≥40 MHz). It



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demodulates signals with modulation frequencies of up to 130 kHz and 520-kHz deviation and weights them accordingly to +PK, -PK, ±PK/2, MAX PK and PK Hold or RMS. It is therefore suitable for measurements on multi-channel transceivers and radio links and provides sufficient margin regard-

ing deviation and modulation frequency. Even overmodulated 24-channel low-capacity FDM signals (FDM = frequency division multiplex) can thus be weighted.

Especially the RF options Adjacent-Channel Power Meter CMT-B6,

Duplex Modulation Meter CM-B9 and RF Millivoltmeter CM-B8 complete the measurement capabilities up to 2 GHz.

Specifications in brief

Reference Standard	crystal reference oscillator
Aging	<1 x 10 <sup>-6</sup> /month
Temperature effect	<1 x 10 <sup>-6</sup> /°C
Option CMT-B1	OCXO reference oscillator
Aging	<2 x 10 <sup>-9</sup> /day
Temperature effect	<2 x 10 <sup>-9</sup> /°C

Receiver measurements

<b>Signal generator</b>	
Frequency range	100 kHz to 2000 MHz
Resolution	<200 Hz
Level CW, FM, φM	-137 to +13 dBm
AM	-137 to +7 dBm
Resolution	0.1 dB
Accuracy	2 dB
Spectral purity (up to 1 GHz)	
Harmonics	<-30 dBc (level <10 dBm)
Residual AM (rms) at 0.03 to 20 kHz	<0.02%
Nonharmonics	<-54 dBc
Residual FM (to CCITT)	<24 Hz
Spectral purity (>1 GHz)	
Harmonics and 1/2 f, 3/2 f, etc	typ. -20 dBc

<b>Modulation modes</b>	
Internal/external, AC or DC	AM, FM, φM
Multiple modulation	AM int. with FM/φM ext. FM/φM int. with AM ext.

<b>Amplitude modulation</b>	0 to 95%
Modulation frequency	DC to 30 kHz

<b>Frequency modulation (up to 1 GHz)</b>							
Frequency range	0.1 to 31.25	31.25 to 62.5	62.5 to 125	125 to 250	250 to 500	500 to 1000	MHz
Max. deviation	100	50	100	200	400	800	kHz

<b>Modulation frequency range</b>	
FM AC	10 Hz to 100 kHz (internal)
FM DC	DC to 100 kHz
Low Rate FM option (SCM-U1, factory-fitted)	2 Hz to 100 kHz

<b>Frequency modulation (&gt;1 GHz)</b>	
Frequency deviation	up to 1600 kHz
Modulation frequency range	up to 130 kHz (external)

<b>Phase modulation</b>	
up to 1 GHz	0 to 80 rad
>1 GHz	up to 160 rad
Modulation frequency	300 Hz to 6 kHz

<b>AF voltmeter, S/N meter</b>	0 to 35 V
Weighting	rms, +peak, -peak
Frequency range	50 Hz to 20 kHz

<b>AF counter</b>	20 Hz to 500 kHz
Input voltage	3 mV to 30 V
<30 kHz	30 mV to 30 V
≥30 kHz	

Transmitter measurements

<b>Power measurement</b>	
Frequency range	1.5 to 2000 MHz
Measurement range	5 mW to 50 W (usable up to 75 W)
Resolution	0.1 dBm
Accuracy (0% AM)	
P>20 dBm	0.4 dB + resolution (f <1 GHz)
P≥20 dBm	1 dBm (f >1 GHz)
7 dBm<P<20 dBm	typ. 1 dB (f >1 GHz)
VSWR	<1.3 for f≤1 GHz, <1.5 for f>1 GHz

<b>RF frequency measurement</b>	1 MHz to 2 GHz (usable up to 400 kHz)
Frequency range	
Input level range	
up to 1 GHz	5 mW to 50 W
second input	5 to 500 mV
>1 GHz	20 mW to 50 W (10 to 500 mV)
Resolution	10 Hz/1 Hz selectable
Error	timebase error + 100 Hz

<b>Frequency deviation measurement</b>	
Operating modes	+PK, -PK, ±PK/2, PK Hold, MAX PK or RMS
Frequency range	4 to 1000 MHz
Deviation measurement range	1 Hz to 100 kHz
Peak weighting, rms weighting or automatic switchover at 100 Hz deviation	
Demodulation frequency	20 Hz to 20 kHz
Residual FM (to CCITT)	<24 Hz

<b>FM broadband demodulator</b>	
Frequency range	40 to 2000 MHz
Modulation frequency range	up to 130 kHz
Deviation (presettable range limits)	130/260/520 kHz
Residual FM (measured at demodulator output, rms weighting, 130 kHz bandwidth, range limit 130 kHz)	
RF<1000 MHz	<120 Hz
RF>1000 MHz	<200 Hz
Accuracy (of reading with peak weighting)	
AF<20 kHz	3% + residual FM + resolution
AF<100 kHz	5% + residual FM + resolution
AF<130 kHz	7% + residual FM + resolution

<b>Phase deviation meter</b>	
Operating modes	+PK, -PK, ±PK/2, PK Hold, MAX PK or RMS