



Data Sheet

4202R

Mobile Service Tester

for GSM-R applications



Boosting wireless efficiency

4202R ensures railway communications systems work

The Willtek 4202R Mobile Service Tester is dedicated to new features and frequency bands introduced by GSM-R, the railway communication system, based on GSM.

The 4202R allows the simulation of group calls (VGCS) at various priority levels. This includes emergency calls based on group calls to verify not only the performance of cab radios but also of peripherals, such as optical and acoustical alarms. These tests ensure proper performance of the overall radio system and help to verify safety function in an emergency case.

The 4202R is based on the popular 4200S Series Mobile Service Tester and therefore provides all the necessary features for mid-level service activities, for example, performing board swaps, module exchanges and subsequent RF alignment. It performs fast and accurate RF measurements and offers a full range of features, including voice, data and the SMS testing functions for dual-band and triple-band mobile handsets.

The Mobile Service Testers 4202R is designed to meet the requirements of installation teams, service centres and manufacturers of GSM-R terminals who want to perform fault analysis and diagnoses.

The 4202R goes the extra mile, by offering high generator and measurement accuracy, along with one of the highest sensitivity levels in its class and a large dynamic range for I/Q alignment allowing optimal tuning of phones.



Highlights

- Mobile Service Tester for GSM-R applications
- Supports voice group call service (VGCS)
- Ability to define Group ID and priority level for VGCS
- Reads out the SW version number from the terminal (IMEISV)
- Covers GSM-R frequency range in addition to GSM 900/1800/1900
- Optional DC power supply option (7 to 32 V) and optional battery pack (2 or 4 hours operating time)
- Features remote control and built-in AUTOTEST

VOICE GROUP CALL SERVICE		
BCCH channel		0060
TCH channel		0060
BS Power Level (dBm)		-80.0
Group ID		000000299
Priority level		0
MS Power Level	25dBm	09
Pre-attenuation (dB) RX		001.5
Pre-attenuation (dB) TX		001.5

MS CALL LOC UPD PARAMETER BS CALL

The test set allows the setting for the group ID and the priority level, which will be used when performing a voice group call (VGCS). Depending on the priority level and the group ID this will either be a standard call or an emergency call.

The Willtek 4202R is designed for the test and alignment of mobile phones in service centers and for final testing by manufacturers: for the test of GSM-R cab radios during installation and maintenance.

The paperless workbench is becoming a reality: The Result Upload Option offers transferring test results to virtually any location in the corporate network with a push of a button on the 4202R Series.

The built-in autotests allows the execution of automatic test routines, a pass/fail verdict at the end of the autotest tells the user whether the phone is good or bad, making it easy for even not so skilled technicians to test mobile phones.

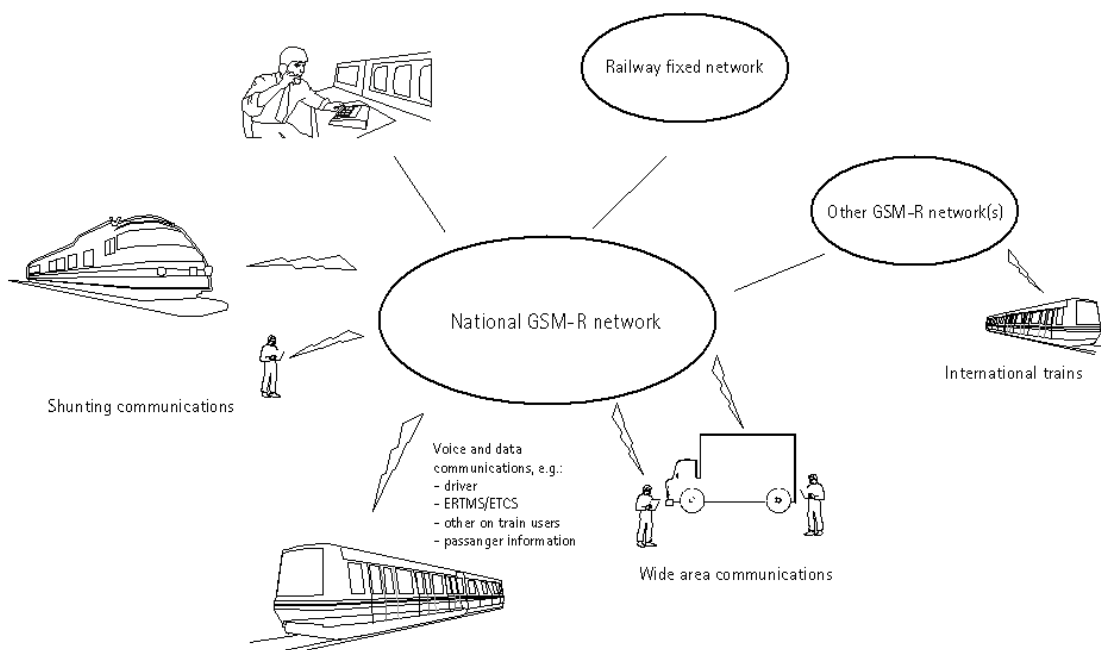
The manual or "Fault Find" Mode distinguishes two different operating modes, the first is the synchronous mode, which allows the standard signalling, i.e. location update, call set-up procedures, in order to get a phone onto a traffic channel and perform RF testing. The other mode is asynchronous, which is dedicated to the service mode, where the phones are actually controlled by a manufacturer's service software. This mode is used to align mobile phones.

To take testing even further the 4202R offers testing of short message service. The focus here is on retrieving all the necessary parameters used by the phone for transferring messages, which will help the technician to analyse faulty behavior.

The data mode is intended to test data modems, which do not support standard traffic channels but only data channels for RF testing.

VGCS MS Call active	
TCH channel	0060
BS Power Level (dBm)	-80.0
MS Power Level	25dBm 09
Group ID:	000000200
Priority level:	2
MS Pwr:	24.3 dBm
Phase RMS:	2.41°
Phase Peak:	4.73°
Freq.Err:	-14 Hz
Rx Level / Rx Qual.:	30 / 0
Power/Time Template:	Pass
Burst Length:	552
<input type="button" value="U2U INFO"/> <input type="button" value="BS CLR"/>	

The test set allows voice group calls from the mobile. For this call the tester decodes the group ID and priority level, while performing measurements.



GSM-R network, making of different types of mobile phones, which can be tested with the 4202R

Specifications

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.3
RF input/output	N-type, female
Internal reference frequency	13 MHz
Aging	10 ⁻⁶ /year
External ref. input	BNC-type, female 5/10/13 MHz

RF generator

Frequency ranges	GSM 900 (channels 1 – 124) E-GSM (channels 0, 975 – 1023) GSM-R (channels 955 – 974) GSM 1800 (channels 512 – 885) GSM 1900 (channels 512 – 810) GSM 850 (optional) (channels 128 – 251)
Reference frequency accuracy (without external reference oscillator)	< 10 ⁻⁶
Output level accuracy For levels –110 to +38 dBm	< 0.9 dB
Operating temperature range	+20°C to +30°C
Output level range	
GSM 850/900	–38 to –117 dBm
GSM 1800/1900	–44 to –117 dBm
Resolution	0.1 dB

RF analyzer

Frequency ranges	GSM 900 (channels 1 – 124) E-GSM (channels 0, 975 – 1023) GSM-R (channels 955 – 974) GSM 1800 (channels 512 – 885) GSM 1900 (channels 512 – 810) GSM 850 (optional) (channels 128 – 251)
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Frequency error measurement

Measurement range	±10 kHz off carrier
Usable range	±45 kHz
Measurement accuracy	
GSM 850/900	< 15 Hz
GSM 1800/1900	< 25 Hz

Power level measurement

Measurement range	
Burst mode	–20 to +39 dBm
CW mode	–20 to +33 dBm
Async burst mode	–40 to +39 dBm

Measurement accuracy	< 0.9 dB
Dynamic range	
Power/time template	> 40 dB
I/Q alignment mask	> 60 dB

Phase error measurement

Measurement range	1.5° to 20° rms
Measurement accuracy	
GSM 850/900	< 0.8° rms
GSM 1800/1900	< 1.4° rms
Timing advance accuracy	¼ bit

Measurements

RX level/RX qual
MS power/sensitivity
BER/FER
Phase (RMS + peak)
Frequency error
Burst shape/length
I/Q modulation
Timing advance accuracy
Spectrum

Signalling

Location update
MS call/MS clear
BS call/BS clear
Channel change (handover)
Band handover
Broadcast message (index 0)
SMS point-to-point (MS/BS originated)
Data channel 9.6 transparent
Voice group call service (VGCS) – MS/BS originated (incl. call priority/emergency call)
VGCS BS clear
Asynchronous mode

Ordering information

General data

Serial interface	D-Sub 9, female 4800, 9600, 19,200, 38,400 Bd
Printer interface	D-Sub 25, female
Mains voltage range (AC)	100 to 250 V
Mains voltage frequency	50 to 60 Hz
Power consumption	17 W
Storage temperature	-30°C to +50°C
Operating temperature	+15°C to +35°C
Size	310 x 170 x 165 mm
Weight	2.4 kg

Standard delivery

4202R Mobile Service Tester
Manual pack 4200
Test SIM
RF connecting cable
Power cable
RS-232 cable

Ordering details

Willtek 4202R	M 101 308
Willtek 4202R with DC option	M 101 309
4200 Soft Bag	M 241 014
4274 DC Power Supply Upgrade (for 4200)	M 248 410
4281 External battery kit (7.2 Ah)	M 205 014
Battery (7.2 Ah)	M 205 012
4272 Result Upload Option	M 897 136
4260 GSM 850 Option	M 248 418



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