



Data Sheet

**4208**  
***Off-Air Mobile Tester***



***Boosting wireless efficiency***

## Willtek 4208 Off-Air Mobile Tester

The 4208 is used for functional tests on GSM mobile phones over a distance of several metres, without an RF cable. A typical example is the overall check of the vehicle-mount phone installation including the antenna and hands-free cabling. Car manufacturers can easily integrate the 4208 in an automated test environment to ensure proper operation of the mobile phone car kit.

By connecting the mobile phone with the tester over the air interface, the entire radio signal path of the phone installation is tested, from the external aerial to the phone's antenna connector. The audio paths, including microphone and loudspeakers, can be checked as well.

The 4208 tests GSM mobile phones of all sorts, not only conventional handsets but also phones with hands-free set and phones integrated into modern car radios.

Tests like audio loop, power measurements, power/time template, frequency error and receiver measurements are readily available in the 4208.

The user can restrict the mobile phones' access to the 4208 by defining number ranges for acceptable IMSIs (International Mobile Subscriber Identity). Mobiles with other IMSIs are rejected by the 4208; this ensures that the instrument only tests the intended phones. This feature helps to prevent jamming or interruption of local mobile communication.

In local mode, the user can select if the 4208 shall restrict access to phones with a test SIM (Subscriber Identity Module). In remote mode, any IMSI can be set to be acceptable or not.



### Highlights

- High sensitivity and high output level for off-air tests
- Possibility of using external amplifier thanks to separate receive and transmit connectors
- Support for operation over the air
- Small GSM tester with low power consumption

### Important note

It is the user's responsibility to take precautions against interfering with public cellular networks. Appropriate shielding arrangements can help to attenuate the signal outside the building so that the signal level does not violate regulations set by local authorities.

With its accuracy and ease of use, the 4208 Off-Air Mobile Tester is the ideal instrument for applications in the automotive and other industries where comparable measurements and easy and quick fault detection are essential. In the car manufacturing example, antennas or radiating cables are positioned beneath or above the assembly line for a good connection, independent of the car's position on the assembly line.

A range of options and accessories supports various applications and use in different environments. The 4275 Remote Power Option, for example, supports integration of the 4208 into a system. This option eliminates the need to manually turn the 4208 on and off: A single mains switch for the whole system is sufficient to power up the 4208. And after a power outage, the 4208 is started automatically!

Additional features for bad signal conditions:

- Power level measurement during a location update for fast power level checks without an established call.
- The fault-tolerant Location Update procedure may be completed even under worst signal conditions.

## Specification highlights

### RF

Max. output level: -24 dBm

Sensitivity: -54 dBm

Separate RX and TX connectors

### Software

User-definable number ranges for accepted IMSIs (e.g. only mobiles with dedicated test SIM will be accepted by the 4208)

Delay for Location Update (useful under difficult RF signal conditions)

Power level measurement during a Location Update

BS Call active			
TCH channel			<b>0075</b>
BS Power Level (dBm)		-24.0	
MS Power Level	33dBm		05
Dialed:			
MS Pwr:		*-58.0 dBm	
Phase RMS:		3.08°	
Phase Peak:		8.01°	
Freq.Err:		-5 Hz	
Rx Level:		4	
Rx Qual.:		4	
Power/Time Template:		Pass	
Burst Length:		553	
<div style="display: flex; justify-content: space-between; border-top: 1px solid black; padding-top: 5px;"> <span>SPECTRUM</span> <span>BURST</span> <span>MORE</span> <span>PHASE</span> <span>SPEECH</span> </div>			

Figure 1: The high receiver sensitivity supports connections to mobile phones over a wider distance. The menu displayed above shows the results from a measurement in a 20 metres distance (indoor) between the 4208 and the mobile phone.

PARAMETER	
Mobile Country Code (MCC)	<b>001</b>
Mobile Network Code (MNC)	01
BS-PA-MFRMS	2
Accept test SIM cards only	On ✓Off
<div style="display: flex; justify-content: space-between;"> <span></span> <span></span> <span></span> <span>LIMIT</span> <span>DEFAULT</span> </div>	

Figure 2: The 4208 Off-Air Phone Tester can be set to reject phones with a normal subscription, thus assuring that only phones to be tested lock onto the 4208 signal.

## Specifications

Specifications valid after 30 minutes warm-up time at ambient temperature, specified environmental conditions and typical measurement range, within a period of one year after calibration.

### Basic RF data

Input/output impedance	50 $\Omega$
VSWR	< 1.9
RF input	N-type, female
RF output	N-type, female
Internal reference frequency	13 MHz
Aging	10 <sup>-6</sup> /year
External ref. input	BNC-type, female 5/10/13 MHz

### RF generator

#### Frequency range

GSM 900, E-GSM	935 to 960 MHz (channels 1 to 124) 925 to 935 MHz (channels 975 to 1023, 0)
GSM 1800	1805 to 1880 MHz (channels 512 to 885)
GSM 1900	1930 to 1990 MHz (channels 512 to 810)
GSM 850 (optional)	869 to 894 MHz (channels 128 to 251)
Reference frequency accuracy (without external reference oscillator)	< 10 <sup>-6</sup>

#### Output level accuracy

For levels from -96 to -24 dBm	< 1.0 dB
Operating temperature range	+20°C to +30°C

#### Output level range

GSM 850/900	-24 to -103 dBm
GSM 1800/1900	-30 to -103 dBm
Resolution	0.1 dB

### RF analyzer

#### Frequency range

GSM 900, E-GSM	890 to 915 MHz (channels 1 to 124) 880 to 890 MHz (channels 975 to 1023, 0)
GSM 1800	1710 to 1785 MHz (channels 512 to 885)

GSM 1900	1850 to 1910 MHz (channels 512 to 810)
GSM 850 (option)	824 to 849 MHz (channels 128 to 251)

### Frequency error measurement

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

### Power level measurement

Measurement range	
Burst mode	-54 to +25 dBm
CW mode	-54 to +19 dBm
Measurement accuracy	
-17 to + 25 dBm	< 1.1 dB
-54 to -17 dBm	< 1.5 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

## 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

4208 Off-Air Mobile Tester  
Manual pack  
Test SIM  
Power cable  
RS-232 cable

### Ordering details

Willtek 4208 Off-Air Mobile Tester	M 101 311
Willtek 4208 Off-Air Mobile Tester incl. DC Option	M 101 312
4260 GSM 850 Option	M 248 418
4261 GPRS Go/NoGo Option	M 897 185
4262 GPRS Measurement Option	M 897 186
4263 SMS Option	M 248 974
4272 Result Upload Option	M 897 136
4273 Detuning Option	M 248 505
4275 Remote Power Option	M 248 748
4281 External Battery Kit	M 205 014

### Accessories

Centronics cable	M 860 378
RF connecting cable	M 382 826



Figure 3: The back of the 4208 shows separate connectors for radio frequency input and output. Isolation between receive and transmit paths can be improved by arranging the two antennas in a 90° angle.



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