



PRODUCT INTRODUCTION

MU860x20A

Demodulation Unit

MX860x20A

W-CDMA BER/BLER Measurement Software

ANRITSU CORPORATION

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MS860xA Transmitter Tester

MU860x20A Demodulation Unit

MX860x20A W-CDMA BER/BLER Measurement Software

Product Introduction (Ver.2.0)



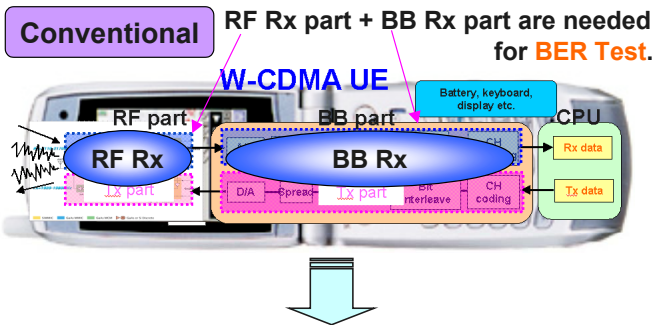
Product Marketing Dept.
Wireless Measurement Div.
Anritsu Corporation

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Slide 1



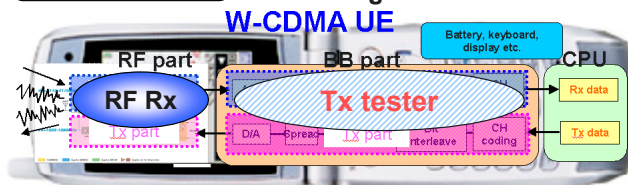
Product concept



BER test item

TS	Terminal Conformance Specification	Measurement Method
34.121	Terminal Conformance Specification	
V3.0.1		
6	Receiver Test	
6.2	Reference Sensitivity Level	BER
6.3	Maximum Input Level	BER
6.4	Adjacent Channel Selectivity (ACS)	BER
6.5	Blocking Characteristics	BER
6.6	Spurious Response	BER
6.7	Intermodulation Characteristics	BER
6.8	Spurious Emissions	Spectrum
7	Performance Requirement	
7.2	Demodulation in Static Propagation Conditions	BLER

New proposal BER Test can be performed only in RF Rx part by substituting BB function of Tx tester.



Merits

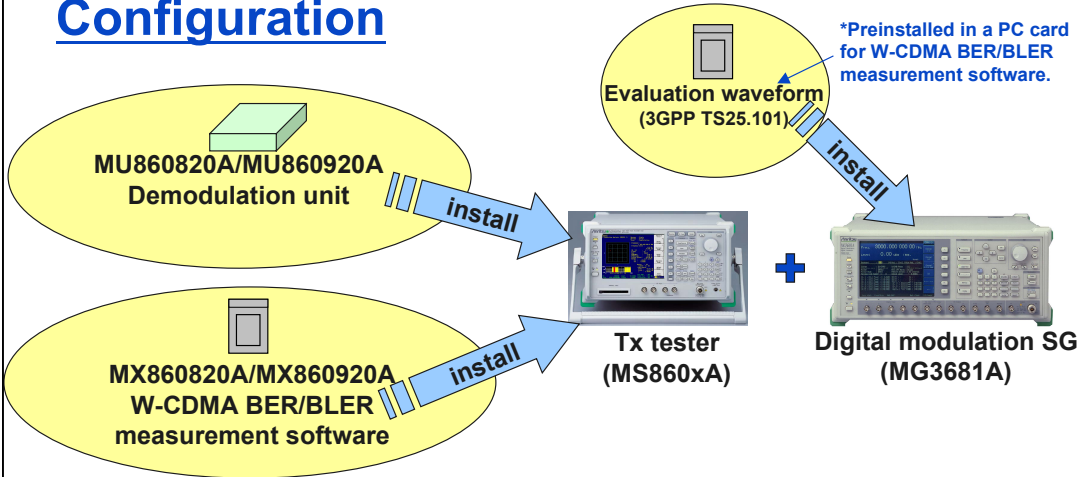
- Able to continue the development of RF part even if the BB part is not available for some reasons.
- Able to use it as a reference receiver of BB Rx part.
- Able to perform fault isolation in RF Rx part and BB Rx portion.

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Configuration



Features

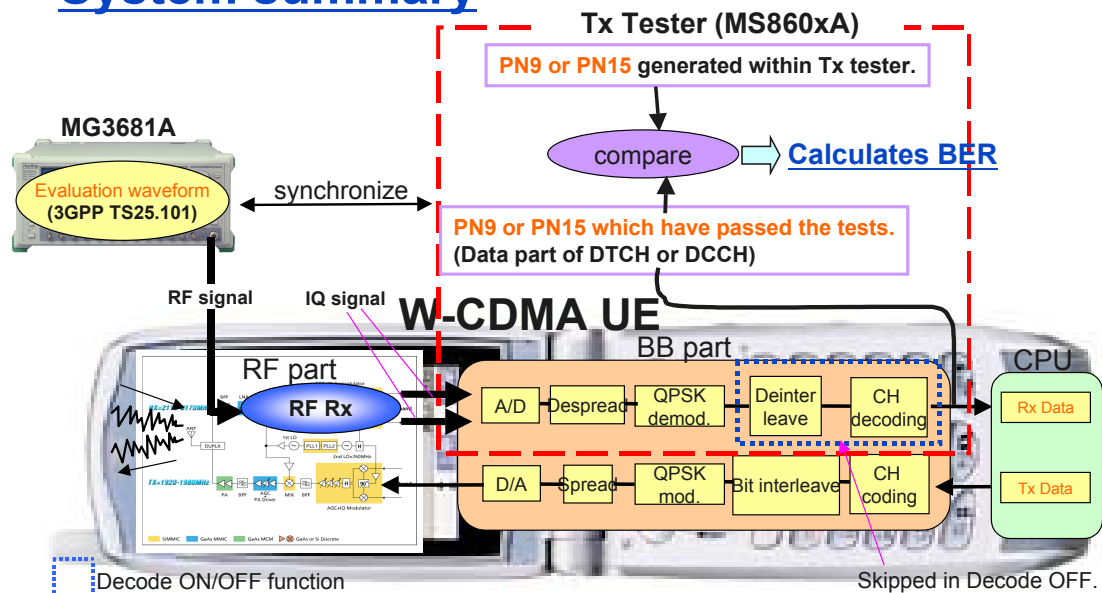
- ◆ RF Rx part of W-CDMA UE can be evaluated by BER/BLER.
- ◆ BER can be measured with/without Error correcting function.
- ◆ Demodulation data(Data,Clock,Enable,Error) is outputted from the rear of MS860xA. (The development of data logging and analyzing application is being considered.)

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System summary



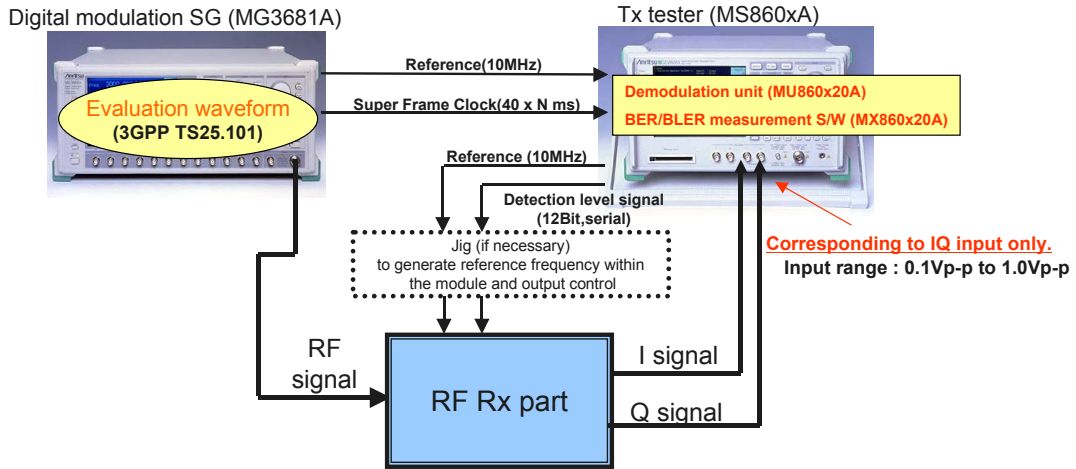
Decode ON/OFF function
 Minute error status can be observed by eliminating error correcting function in Decode OFF. (Error correcting function is capable of correcting errors of max. $1.0 \times E^{-3}$ (approx.). If error correcting function is ON, it is unable to identify the generation of error less than $1.0 \times E^{-3}$.)

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Connections



Reference frequency generation : required when the reference crystal accuracy inside Rx module is low. (Normally the crystal accuracy within Rx module is low because reference frequency is provided by BB part.)

Jig

Output control : required when module output is out of Tx tester's input range, 0.1Vp-p to 1.0Vp-p.

•Evaluation waveform (for MG3681A)

File name	Contents
P12v1 P12Nv1	3GPP TS25.101 A.3.1 DL reference measurement channel(12.2 kbps)
P64v1 P64Nv1	3GPP TS25.101 A.3.2 DL reference measurement channel(64 kbps)
P144v1 P144Nv1	3GPP TS25.101 A.3.3 DL reference measurement channel(144 kbps)
P384v1 P384Nv1	3GPP TS25.101 A.3.4 DL reference measurement channel(384 kbps)
RSv1 RSNv1	For testing 6.2 Reception sensitivity
MAXv1 MAXNv1	For testing 6.3 Max. input level

← (Transmitter Tester measures by setting to 12.2kbps)

•Evaluation waveforms with N are without decoding.

•Terminal test item(Rx)

TS 34.121 V3.0.1	Terminal Conformance Specification	Meas. function	Realtime BER supporting item
6	Receiver Test		
6.2	Reference Sensitivity Level	BER	✓
6.3	Maximum Input Level	BER	✓
6.4	Adjacent Channel Selectivity (ACS)	BER	✓
6.5	Blocking Characteristics	BER	✓
6.6	Spurious Response	BER	✓
6.7	Intermodulation Characteristics	BER	✓
6.8	Spurious Emissions	Spectrum	Unnecessary for module
7	Performance Requirement		
7.2	Demodulation in Static Propagation Conditions	BLER	✓
7.3	Demodulation of DCH in Multi-path Fading Propagation Conditions	BLER	x
7.4	Demodulation of DCH in Moving Propagation Conditions	BLER	x
7.5	Demodulation of DCH in Birth-death Propagation Conditions	BLER	x
7.6	Demodulation in of DCH in Base Station Transmit Diversity Mode		
7.6.1	Demodulation of DCH in Open-loop Transmit Diversity Mode	BLER	x
7.6.2	Demodulation of DCH in Closed Loop Transmit Diversity Mode	BLER	x
7.6.3	Demodulation of DCH in Site Selection Diversity Transmission Mode	BLER	x
7.7	Demodulation in Handover Conditions		
7.7.1	Inter-Cell Soft Handover Performance	BLER	x
7.8	Inner Loop Power Control in Downlink	BLER	x
7.9	Outer Loop Power Control in Downlink		x
7.10	Downlink Compressed Mode		x

Performance tests (7.2~7.10) are not supported because they are performed under multi-path fading environment and BB performance affects the test result.

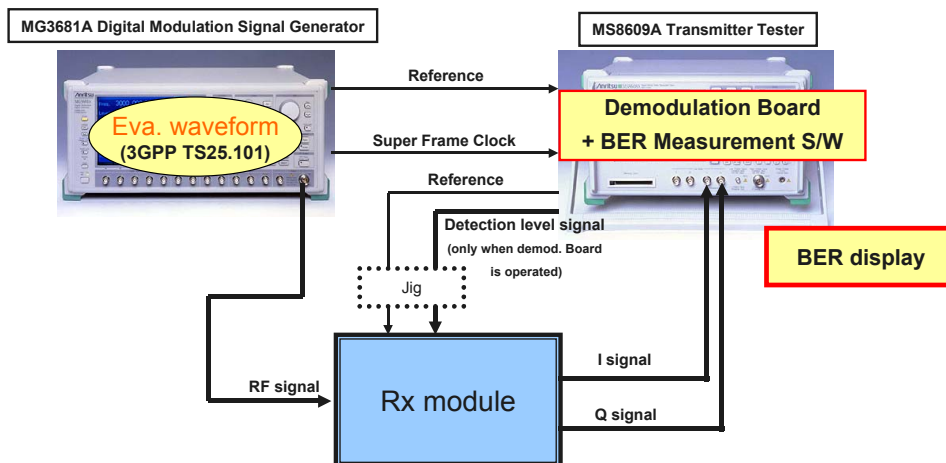
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•Down link

6.2 Reception sensitivity
6.3 Max. input level



Tests are performable at SG output level set to module's reception sensitivity level or max. input level !!

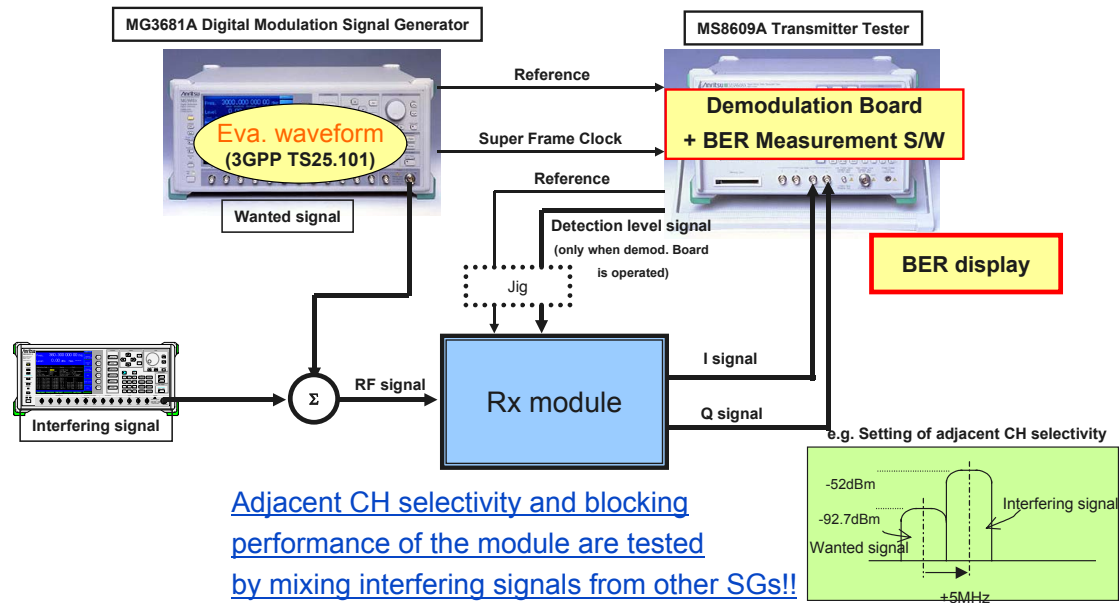
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- 6.4 Adjacent CH selectivity
- 6.5 Blocking characteristic
- 6.6 Spurious response



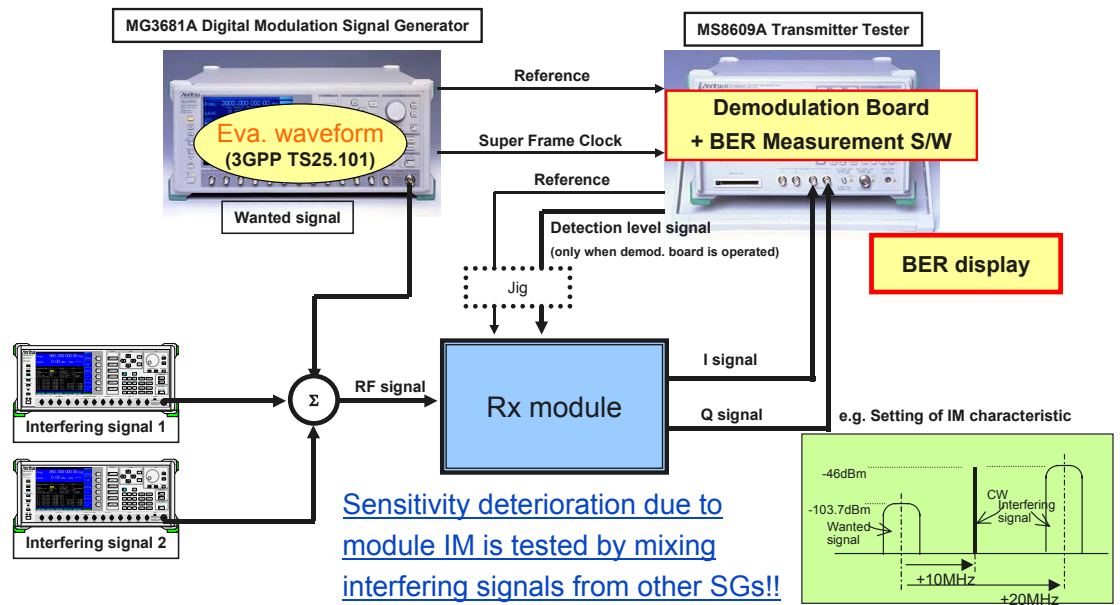
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- 6.7 Inter-modulation characteristic



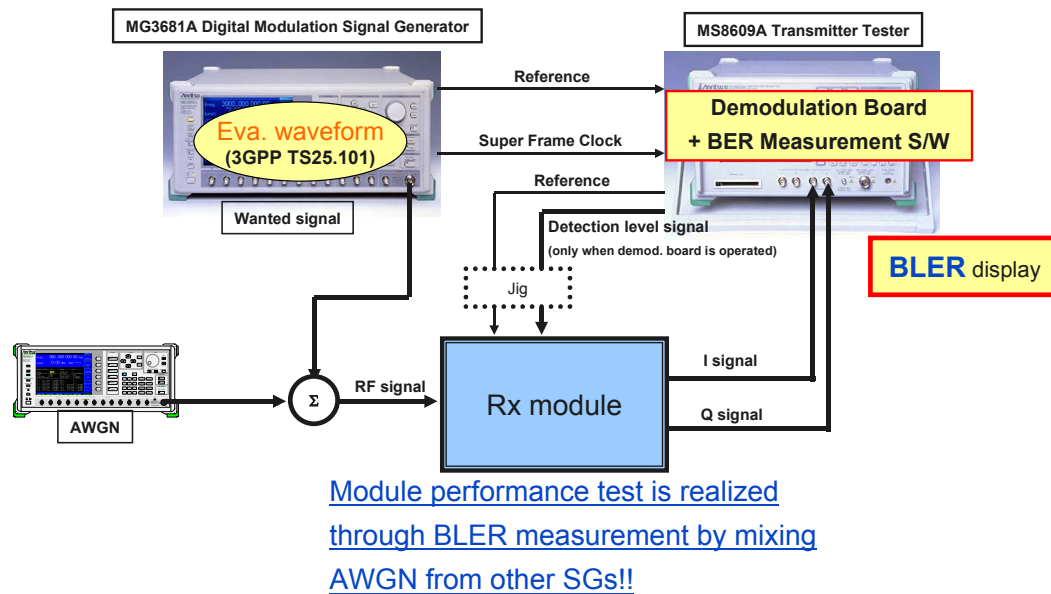
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CW : Continuous Wave

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•Down link 7.2 Performance test



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•Terminal test items (Tx)

Measured by **MX860x01B W-CDMA Measurement Software**.

*Both W-CDMA BER/BLER software and demodulation unit are **not necessary**.

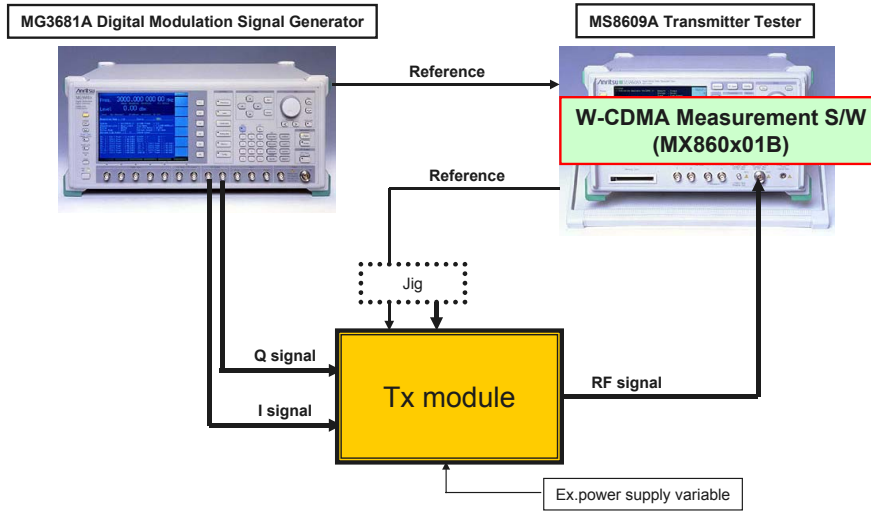
TS 34.121 V3.0.1	Terminal Conformance Specification	Meas. function	MX860x01B supporting items
5	Transmitter Test		
5.2	Maximum Output Power	Power Level	✓
5.3	Frequency Stability	Frequency	✓
5.4	Output Power Dynamics in the Uplink		
5.4.1	Open Loop Power Control in the Uplink	Power Level	Unnecessary for module
5.4.2	Inner Loop Power Control in the Uplink	Power Level	Unnecessary for module
5.4.3	Minimum Output Power	Power Level	✓
5.5	Transmit ON/OFF Power		
5.5.1	Transmit OFF Power	Power Level	Unnecessary for module
5.5.2	Transmit ON/OFF Time Mask	Power Level	Unnecessary for module
5.6	Change of TFC	Power Level	Unnecessary for module
5.7	Power Setting in Uplink Compressd Mode	Power Level	Unnecessary for module
5.8	Occupied Bandwidth	Spectrum	✓
5.9	Spectrum Emission Mask	Spectrum	✓
5.10	Adjacent Channel Leakage Power Ratio (ACLR)	Spectrum	✓
5.11	Spurious Emissions	Spectrum	✓
5.12	Transmit Intermodulation	Spectrum	Unnecessary for module
5.13	Transmit Modulation		
5.13.1	Modulation Accuracy	EVM	✓
5.13.2	Peak Code Domain Error	PCDE	✓

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•Up link

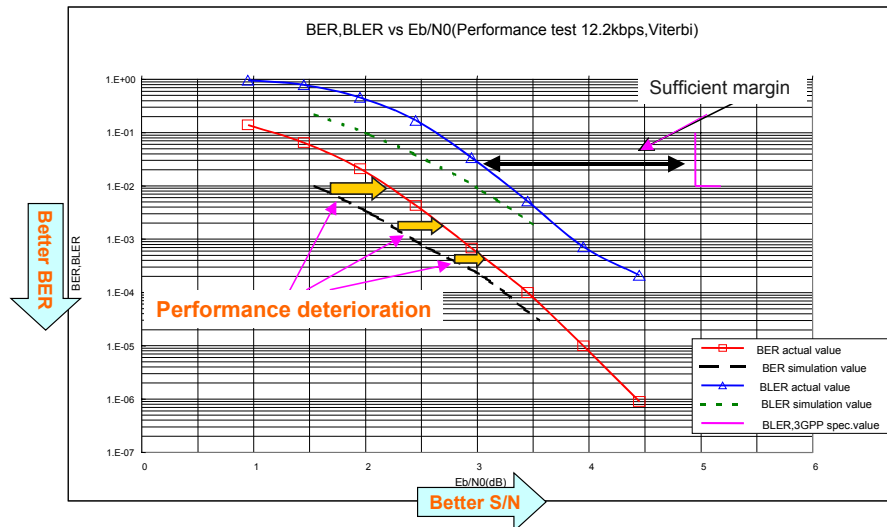


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Example of measurement result (12.2kbps)



*BER performance deteriorates 0.3dB(12.2kbps) to 1dB(384kbps) in comparison with simulation value.

Normally, however, BB part of mobile equipment has deterioration of approx. 1dB in its BER performance. Therefore, **satisfactory performance is maintained.**

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•Parameter setup screen

Input
Terminal & Impedance : [IQ-AC] [1] [1MΩ]

Signal
Measuring Object : (Down Link)
Filter : [Normal]

Synchronization
Scrambling Code Number : [100080]

Demodulation
Decoding : [On]
Target Transport Channel : [1]
Parameter Package : [for 12.2kbps]

Setup Parameter
Parameter Package List ← Go to P18
BER/BLER ← Go to P16
No Filter
Normal
ACP
Used together with the Scrambling Code Number of evaluation signals.
Error correction function ON/OFF
1 : DTCH
2 : DCCH
Ext. Signal Interface ← Go to P19
for 12.2kbps
for 64.0kbps
for 144.0kbps
for 384 kbps

•BER/BLER measurement screen (1)

MS8608A 2002/12/06 19:42:31
<< BER/BLER (W-CDMA BER/BLER) >> Measure : Single

Synchronous Status : Synchronized
Frequency Error : -0.5 Hz

Power
Total Power : 44.46 mV(rms)
Code Power(CPICH) : -9.73 dB, 14.50 mV(rms)
Code Power(DPCH) : -5.21 dB, 24.40 mV(rms)
I p-p : 361.22 mVp-p
Q p-p : 349.29 mVp-p

BER/BLER
BER (3114240 / 10000000)
Status : Error Pattern Loss
Error Rate : 3.00E-03 0.3000 %
BLER (802 / 100000)
Status : Error
Error Rate : 4.99E-03 0.4987 %

BER/BLER
Resync ← Resynchronized
Refresh Interval
Every Once ← Every:Refreshed at every timing (100ms) of entire screen's refresh. Once:Refreshed when count reaches the preset value.
Back Screen
1 2

•BER/BLER measurement screen (2)

MS8608A 2002/12/06 19:42:31
 << BER/BLER (W-CDMA BER/BLER) >> Measure : Single

Synchronous Status : Synchronized
 Frequency Error : -0.5 Hz

Power
 Total Power : 44.46 mV(rms)
 Code Power(CPICH) : -9.73 dB, 14.50 mV(rms)
 Code Power(DPCH) : -5.21 dB, 24.40 mV(rms)
 I p-p : 361.22 mVp-p
 Q p-p : 349.29 mVp-p

BER/BLER
 BER (3114240 / 100000000)
 Status : ■Error ■Pattern Loss
 Error Rate : 3.00E-03 0.3000 %
 BLER (802 / 100000)
 Status : ■Error
 Error Rate : 4.99E-03 0.4987 %

PN9
 PN15
 PN9Invert
 PN15Invert

BER/BLER
 BER Measuring Bits
 BER Result Disp Rate Count
 BER PN Type
 BLER Measuring Blocks
 BLER Result Disp Rate Count
 Back Screen
 1 2

(1) Upper count setting
 Display switching of Error Rate/Error Count
 PN pattern setting
 (2) Upper count setting
 Display switching of Error Rate/Error Count

•Parameter package list screen

MS8609A 2003/09/17 18:24:53
 << Parameter Package List (W-CDMA BER/BLER) >>

Parameter Package : [for 12.2kbps]
 Spreading Factor : (128)
 Slot Format : (11)
 Transport Channel Number : (2)
 Channelization Code Number : (96)
 Frame Offset : (74)

DTCH DCCH
 TTI : (20ms) (40ms)
 Max TrBK Size : (244) (100)
 TrBK Size : (244) (100)
 TrBK set No. : (1) (1)
 CRC : (16bit) (12bit)
 Coder : (CC1/3) (CC1/3)
 RM attribute : (256) (256)

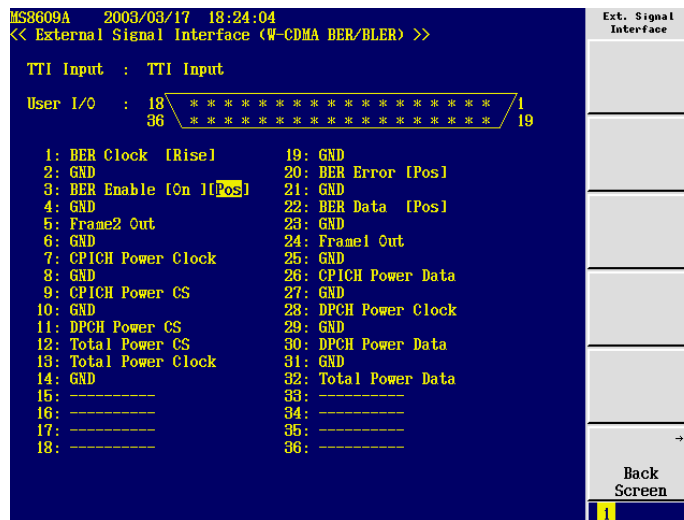
Parameter Package List
 Back Screen
 1 2

for 12.2kbps
 for 64.0kbps
 for 144.0kbps
 for 384 kbps

•Detail parameters for each of above 4 types are displayed.

• Confirmation screen of rear connector's pin assignment

• Pin assignment for signals outputted from the rear can be confirmed.



Merits of Real-time BER

• Estimation of BER by NF and EVM, etc. → Real-time BER

Merit Accuracy in meas. result allows for deteriorating the performance to the threshold of required level. As a result, cheaper components can be adopted. → Cost reduced

• Measurement of BER

◆ Measured by the BB Rx part of conventional model. → Real-time BER

Merit Error correct OFF function enables to observe minute errors less than 1.0 x E-3, thus, more reliable quality assurance is achieved. → More reliable quality assurance

◆ Measured by the BB Rx part of newly-developed model. → Real-time BER

Merit Not affected by the development status of BB Rx part. → Developed at its own pace

Merit Able to identify in which bugs are caused, RF Rx part or BB Rx part. → Easy to perform fault isolation

◆ Measured by simulation with a PC. → Real-time BER

Merit BER measurement is performed in real time, which has ever taken extremely long time due to simulation. → Dev. efficiency is improved.



Specifications are subject to change without notice.

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