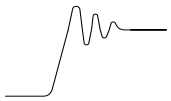
MICRONIX

Air interface simulation for wireless communication

The radio wave radiated from a wireless communication equipment changes variously while passing the air. Therefore, it should be confirmed enough that the wireless communication equipment operates correctly or how it works.
The high-speed programmable attenuator MAT800/810 is the best equipment for simulating the change of the radio wave in the air, and it might be able to be called the air simulator. The explanation is done below through the difference between MAT800/810 and the traditional attenuator, and two applications.

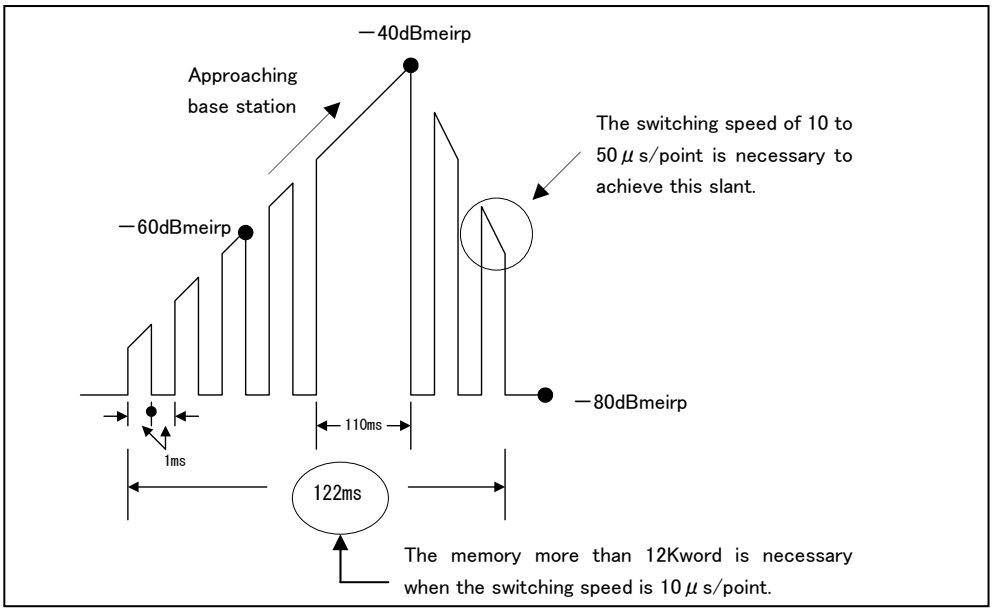
1 Difference between MAT800/810 and traditional attenuator

Item	Traditional attenuator	MAT800/810	Remarks
Switching method	Mechanical	Electronic	
Switching speed	10 to 20 ms/point	2 μs/point	Great improvement of time resolution
Attenuation step	About 1dB	0.05dB	Great improvement of amplitude resolution
Spike at switching	 Large spike	No spike	The spike causes the communication error
Program memory	Nothing	128Kword built-in program memory	The air state is stored.
Memory readout	Not available	・FREE、BURST、GATE ・Trigger for readout ・Internal/external readout clock ・Pause period of readout cycle	Various memory readout function
Software for making attenuation program	Nothing	Making attenuation program can be done as easily as making arbitrary waveform.	Standard accessory of MAT800/810

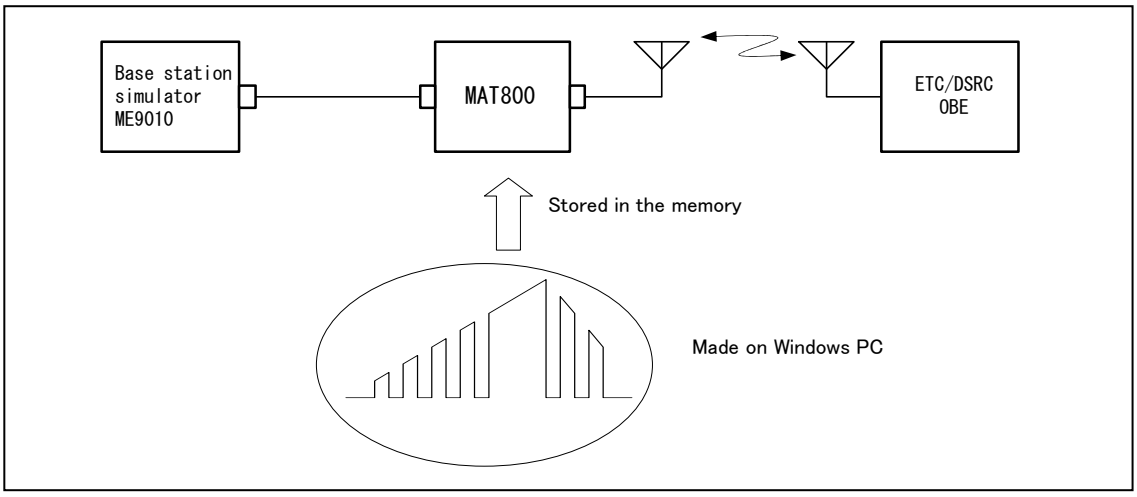
2 Application

2-1 Dynamic communication test of ETC/DSRC

The ARIB (Association of Radio Industries and Business) standard provides that the dynamic communication test must be done in ETC (Electric Toll Collection system) and DSRC (Dedicated Short Range Communication). This test simulates the actual operation between the road side unit (base station) located at the toll gate and the OBE.
The typical power profile "High-speed run ・ actual pattern A" is shown in the figure of the next page. The power profile represents the state of the radio wave in the air.

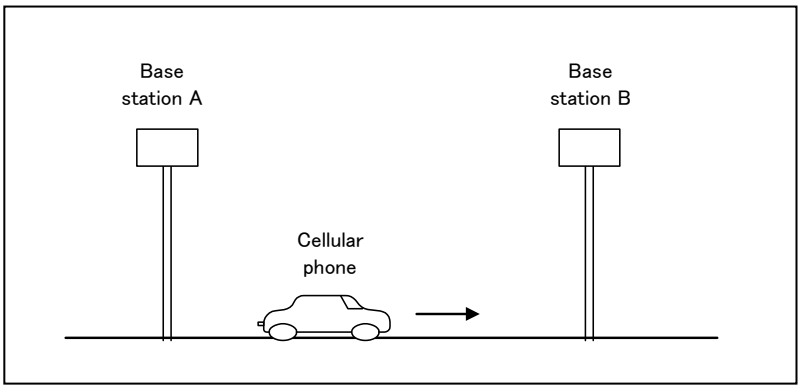


The block diagram for the test using MAT800/810 is shown below.

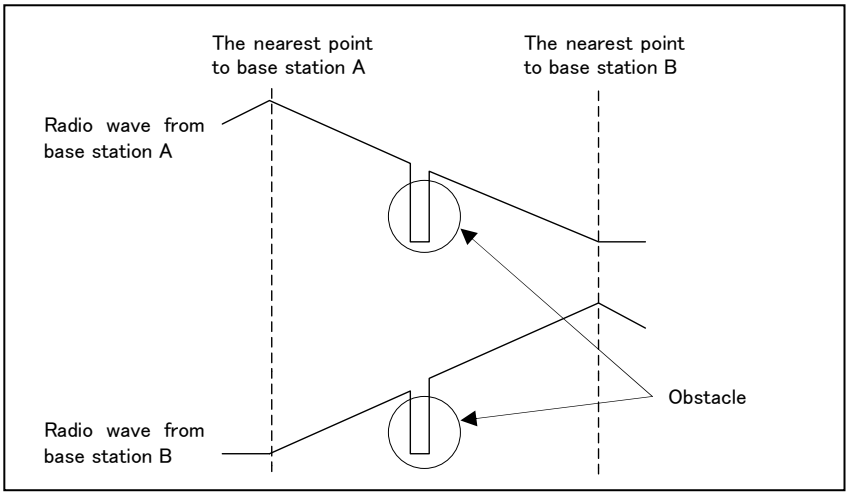


2-2 Handover test of mobile communication

In the mobile wireless system such as cellular phone, it is necessary that the communication doesn't become interrupted when the transmission line is switched (handover) from a base station to the next base station.
This handover test can be simulated by using two MAT800/810.



The receiving power of the base station A and the cellular phone becomes low gradually because of going away from each other, and oppositely that of the base station B and the cellular phone becomes strong gradually. The figure below shows this state.



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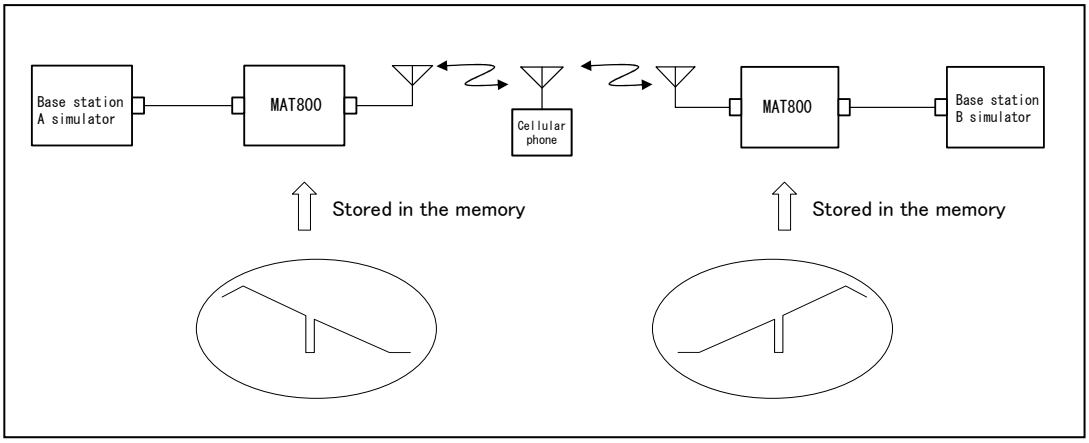

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