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DFS (ETSI) Waveform Pattern
MX370075A

Vector Signal Generator
MG3710A/MG3710E

MX370075A DFS (ETSI) Waveform Pattern

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Installing the DFS (ETSI) Waveform Pattern MX370075A option in the Vector Signal Generator MG3710A*/MG3710E or MG3700A* support output of ETSI EN 301 893 (V2.1.1) DFS test signals.
Output of complex combinations of pulse and chirp signals required to support DFS tests is made easy just by selecting combination files supplied with the MX370075A.

* MG3700A has been discontinued.

DFS(ETSI) Waveform Pattern

Install

MG3710A/MG3710E

The main frame requires a license.

- ***The MX370075A supports ETSI EN 301 893 DFS test signals.***
- ***One unit supports pulse and chirp signals.***
- ***PC not required. Simply selecting prepared waveform pattern outputs various signals.***

DFS (ETSI) Waveform Patterns List

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DFS (ETSI) Waveform Patterns List

Specification No.		Package	Combination File Name	Note	File Size [MB]
Reference Signal		ReferenceDFSSignal	ReferenceDFSsignal	Fixed Pulse Radar Signals. 1 pattern.	600 (Include all patterns)
Radar Test Signal	1	TestSignal-1_Single	TestSignal-1_S_00 to TestSignal-1_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-1B_S_00 to TestSignal-1B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 to 5650 MHz	
		TestSignal-1_Multi	TestSignal-1_M_00 to TestSignal-1_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-1B_M_00 to TestSignal-1B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 to 5650 MHz	
	2	TestSignal-2_Single	TestSignal-2_S_00 to TestSignal-2_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-2B_S_00 to TestSignal-2B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 to 5650 MHz	
		TestSignal-2_Multi	TestSignal-2_M_00 to TestSignal-2_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-2B_M_00 to TestSignal-2B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 to 5650 MHz	

DFS (ETSI) Waveform Patterns List

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DFS(ETSI) Waveform Patterns List

Specification No.		Package	Combination File Name	Note	File Size [MB]
Radar Test Signal	3	TestSignal-3_Single	TestSignal-3_S_00 to TestSignal-3_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	600 (Include all patterns)
		TestSignal-3_Multi	TestSignal-3_M_00 to TestSignal-3_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
	4	TestSignal-4_Single	TestSignal-4_S_00 to TestSignal-4_S_19	Variable Chirp Radar Signals for multi-burst Twenty patterns	
		TestSignal-4_Multi	TestSignal-4_M_00 to TestSignal-4_M_19	Variable Chirp Radar Signals for multi-burst Twenty patterns	
	5	TestSignal-5_Single	TestSignal-5_S_00 to TestSignal-5_S_19	Variable Pulse Radar Signals for single burst Twenty patterns	
			TestSignal-5B_S_00 to TestSignal-5B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 to 5650 MHz	
		TestSignal-5_Multi	TestSignal-5_M_00 to TestSignal-5_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-5B_M_00 to TestSignal-5B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 to 5650 MHz	

DFS (ETSI) Waveform Patterns List

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DFS(ETSI) Waveform Patterns List

Specification No.		Package	Combination File Name	Note	File Size [MB]
Radar Test Signal	6	TestSignal-6_Single	TestSignal-6_S_00 to TestSignal-6_S_19	Variable Pulse Radar Signals for single burst Twenty patterns.	600 (Include all patterns)
			TestSignal-6B_S_00 to TestSignal-6B_S_19	Variable Pulse Radar Signals for single burst Twenty patterns Used from 5600 to 5650 MHz	
		TestSignal-6_Multi	TestSignal-6_M_00 to TestSignal-6_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns	
			TestSignal-6B_M_00 to TestSignal-6B_M_19	Variable Pulse Radar Signals for multi-burst Twenty patterns Used from 5600 to 5650 MHz	

TestSignal-x_Single waveform pattern is for single burst (x is an integer of 1 to 6)
TestSignal-x_Multi waveform pattern is for multi-burst x is an integer of 1 to 6)
Patterns with B appended after TestSignal-x (x is an integer of 1 to 6), such as TestSignal-1B_S_00, are used in the 5600 to 5650 MHz band.

- ***Simple output just by selecting combination file.***
- ***Supports 20 types of variable signals for each radar test signal. Selecting in order supports tests with random conditions.***

What is a Combination file?

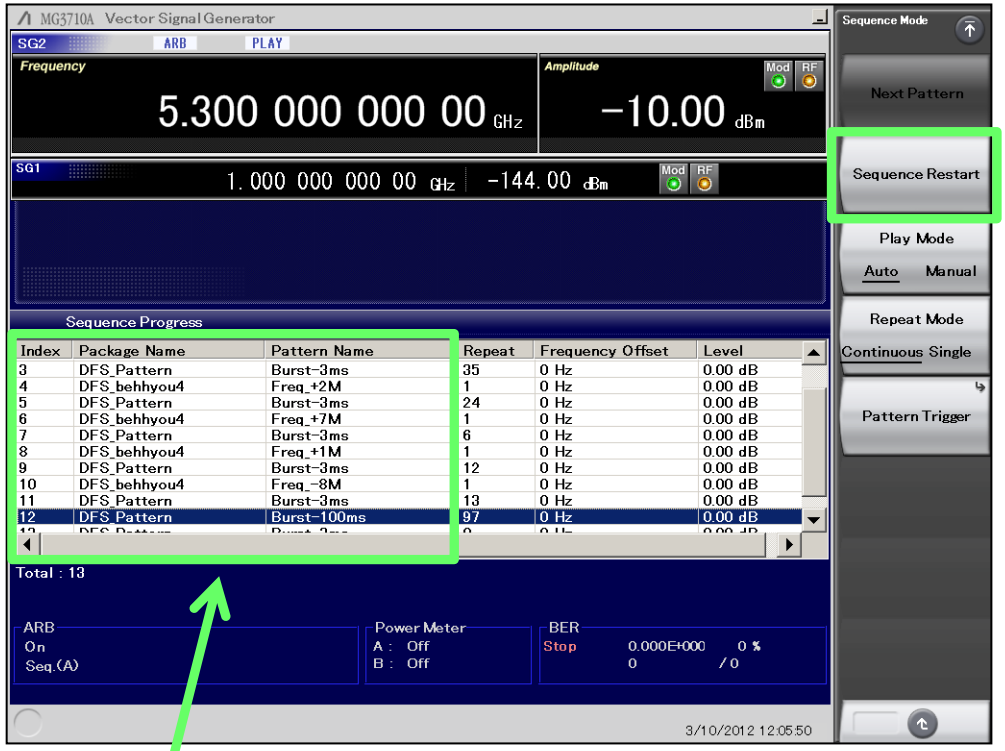
Sequence Function:

This standard function switches and outputs multiple waveform patterns continuously.
Standards-compliant test signals can be created by combining complex patterns of pulse, chirp, and null signal waveforms.
Clicking “Sequence Restart” on the right starts output of the DFS test signal according to the standards.

Combination File:

Users can output pulse and chirp signals for DFS tests easily just by selecting a combination file with this sequence information.

Sequence function:
[Mode] > (Page2) [F7: Sequence Mode]

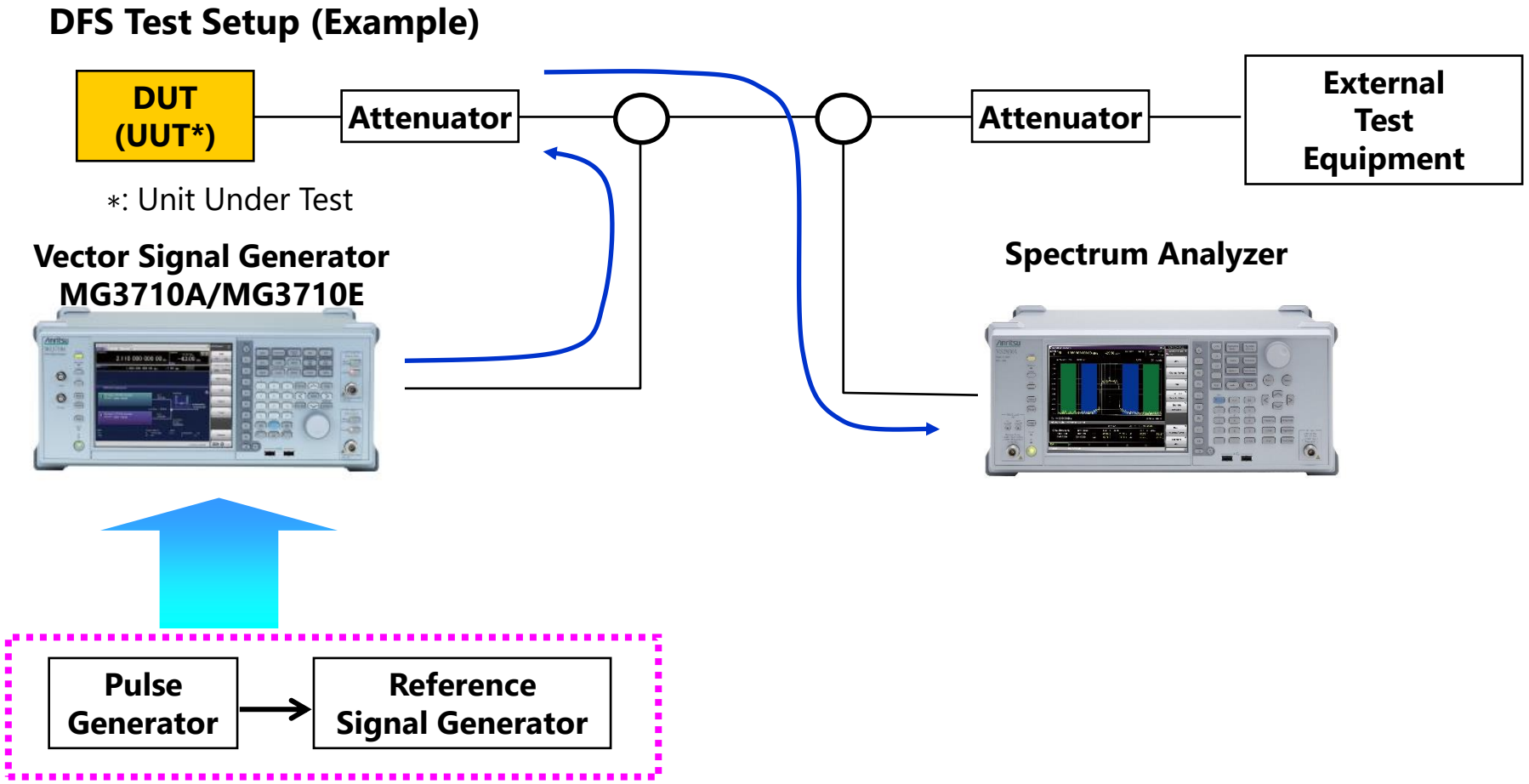


Sequence Function Screen

Switches and outputs multiple waveform patterns continuously.

DFS Test Setup (Example)

- One unit supports pulse, chirp and hopping signals.
- PC not required.



Parameters of DFS Test Signals for ETSI (1/6)

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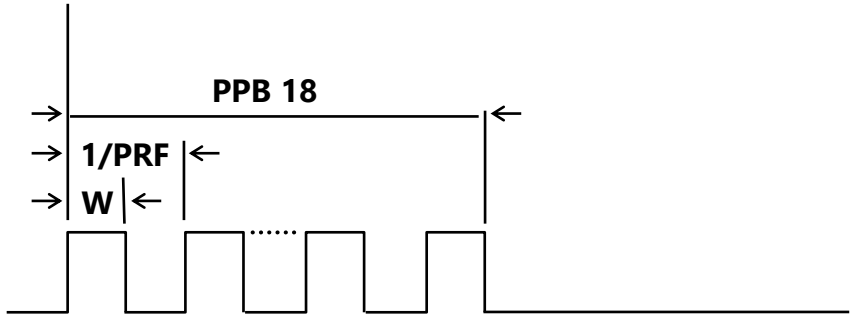
Reference DFS test signal

Test Signal	Pulse Width W [μs]	Number of Different PRFs	Pulse Per Burst for each PRF (PPB)
Reference DFS test signal	1	700	18



Parameters of DFS Test Signals for ETSI (2/6)

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Radar test signals

Radar Test Signal	Pulse Width W [μs]		Pulse Repetition Frequency PRF		Number of Different PRFs	Pulse Per Burst for each PRF (PPB)
	Min	Max	Min	Max		
1	0.8	5	200	1000	1	10*2
2	0.8	15	200	1600	1	15*2
3	0.8	15	2300	4000	1	25
4*1	20	30	2000	4000	1	20
5	0.8	2	300	400	2/3	10*2
6	0.8	2	400	1200	2/3	15*2

*1: The waveform for Radar test signal 4 is chirp-modulated in the range ±2.5 MHz.
*2: The Pulse Per Burst (PPB) is 18 when testing CAC and Off-Channel CAC at 5600 to 5650 MHz.
*3: Uses randomly selected value at 1-μs steps between max. and min.
*4: Uses randomly selected value at 1-PPS steps between max. and min.
*5: PRF (Pulse Repetition Frequency)
*6: PPS (Pulse Per Second)
*7: PPB (Pulse Per Burst)

Parameters of DFS Test Signals for ETSI (3/6)

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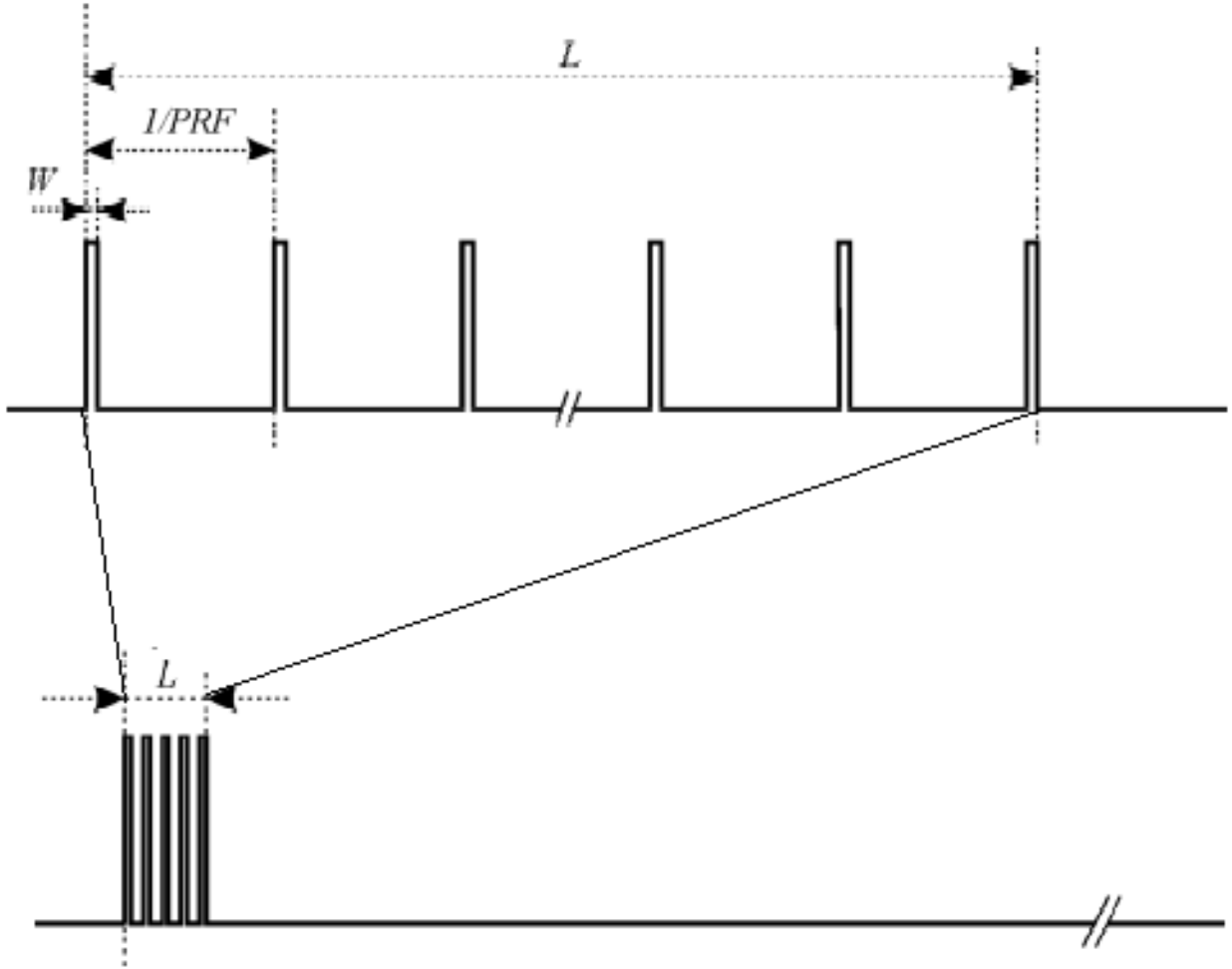
General structure of Radar test signal 1 to 4



Single burst/Constant PRF

Parameters of DFS Test Signals for ETSI (4/6)

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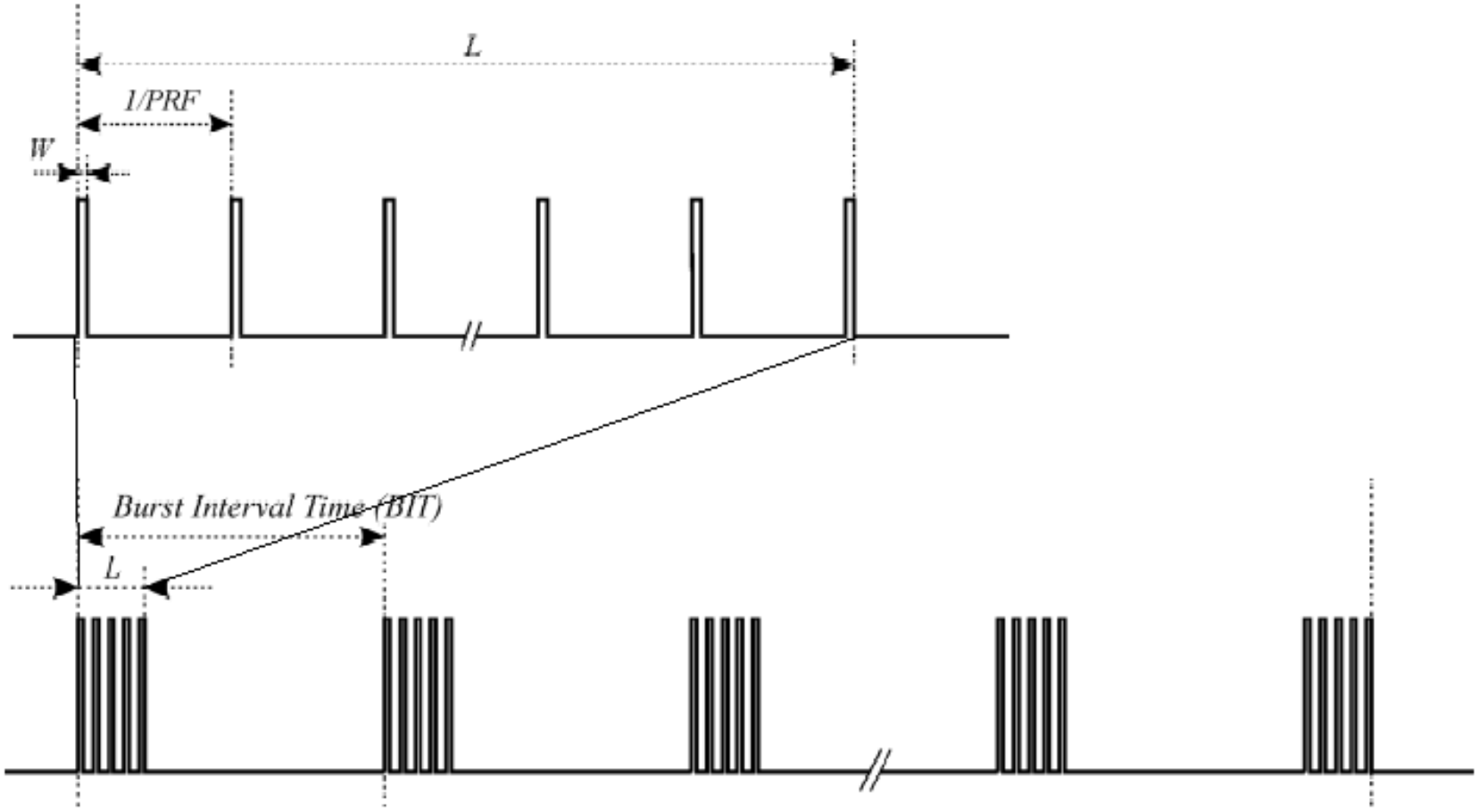
General structure of Radar test signal 1 to 4



Multiple burst/Constant PRF

Parameters of DFS Test Signals for ETSI (5/6)

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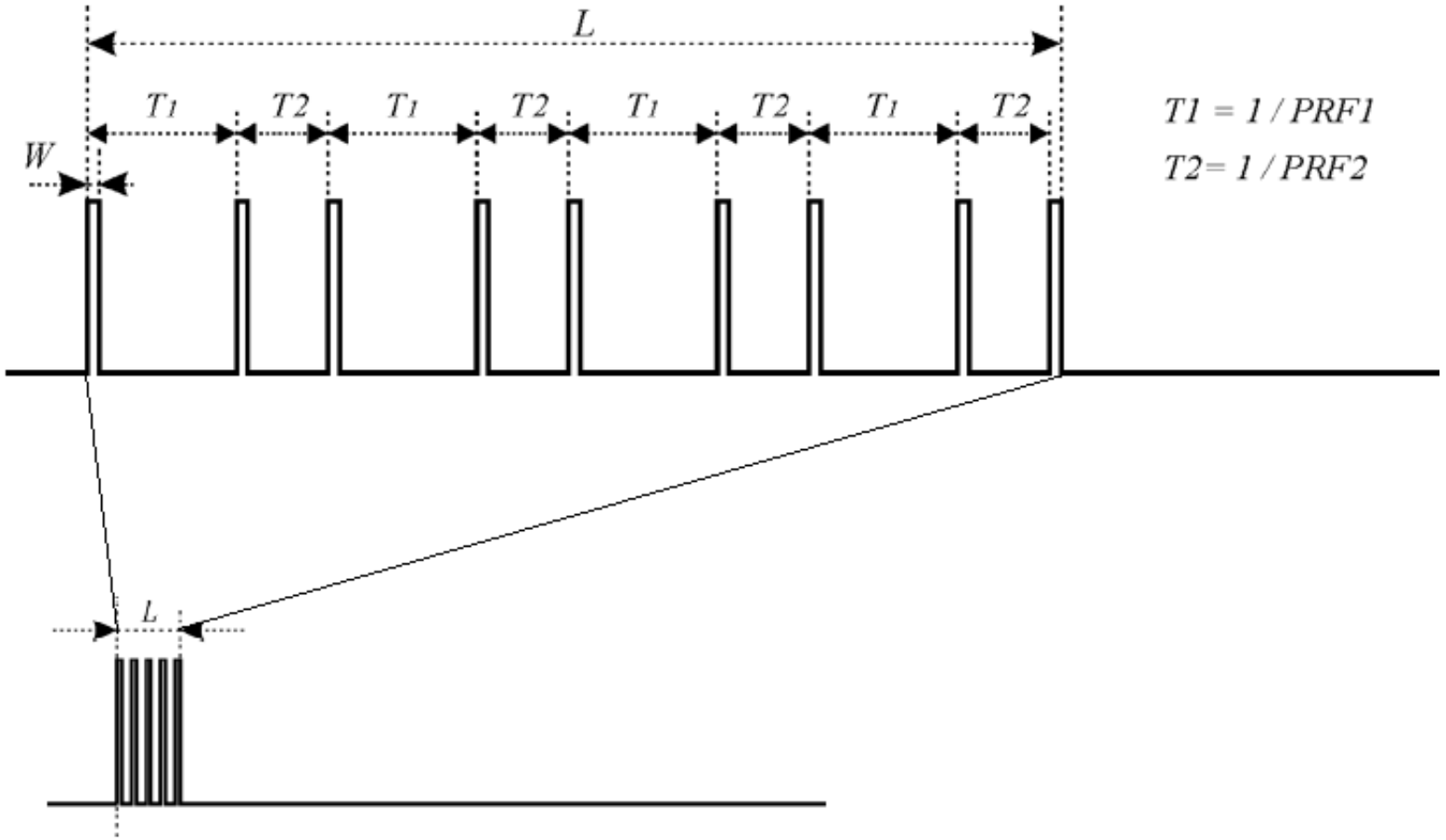
General structure of Radar test signal 5 6



Single burst/Staggered PRF

Parameters of DFS Test Signals for ETSI (6/6)

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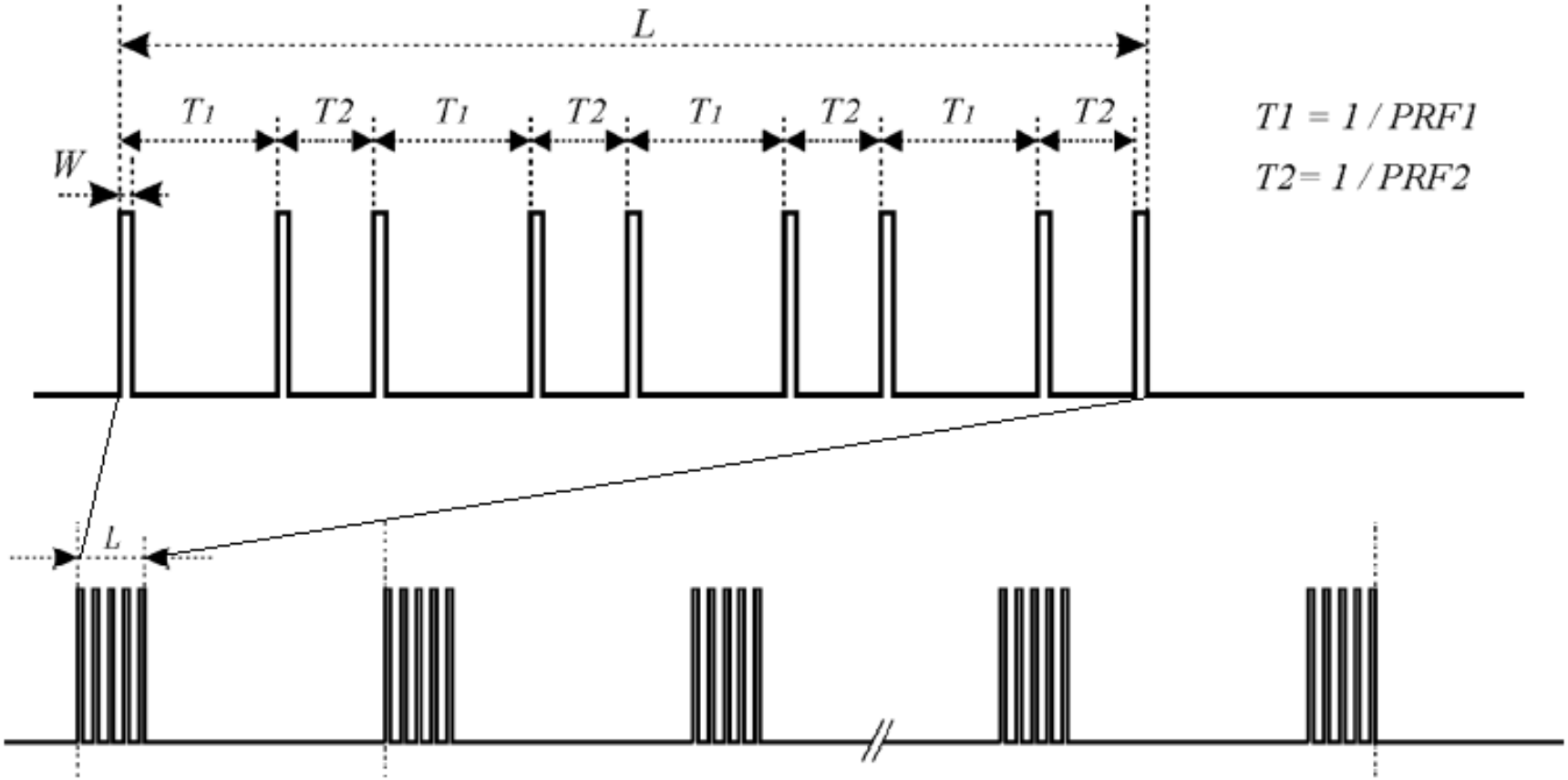
General structure of Radar test signal 5 and 6



Multiple burst/Staggered PRF

Ordering Information

The minimum required options are as follows:

Hardware

Model (MG3710A*)	Model (MG3710E)	Name
MG3710A	MG3710E	Vector Signal Generator
MG3710A-036	MG3710E-036	1stRF 100 kHz to 6 GHz
MG3710A-045	MG3710E-045	ARB Memory Upgrade 256 Msample for 1stRF

Software

MX370075A	DFS (ETSI) Waveform Pattern

*: Although production of the MG3710A main frame has been discontinued, the MX370073B can be installed in existing MG3710A units. In addition, the MG3710A-045 option can also be retrofitted.

[Supplement] What is DFS: Dynamic Frequency Selection?

ETSI EN 301 893 specifies use of frequency bands from 5.25 to 5.35 GHz and from 5.47 to 5.725 GHz, for the WLAN 5-GHz band. Since these are the same frequency bands as used by meteorological radar[Note] and marine radar, these pulse signals are obliged to use Dynamic Frequency Selection (DFS) technology.

The 5.15 to 5.25-GHz band does not require DFS tests.

Note: Weather radar locates precipitation by transmitting pulse bursts every second. Interference from wireless LAN can be mistaken for precipitation. Therefore, use DFS to confirm the absence of weather radar before starting operation.

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公知 2022-3 MJM No. MX370075A-E-L-1-(3.01)