

TFS21-22 - Frequency synthesizer

The TFS21-22 is a compact, high-performance frequency synthesizer designed for applications requiring ultra-low phase noise and rapid frequency agility.



Operating across a broad frequency range of 50 MHz to 22.6 GHz, it features a miniature form factor (50×50×13 mm) and SPI control for seamless integration into advanced systems.

Applications Include:

Wireless Communication Systems:

Local oscillators for 5G/6G transceivers, satellite modems, and microwave links.

Defense & Aerospace:

Radar systems, electronic warfare (EW), and frequency-hopping applications.

Consumer Electronics:

High-frequency modules for drones, automotive radar, and smart home devices.

Test & Measurement Equipment:

Signal sources for spectrum analyzers, vector network analyzers, and RF test benches.

Embedded RF Solutions:

Integration into IoT devices, wireless sensors, and compact digital acquisition systems.

Research & Prototyping:

Precision frequency synthesis in RF circuit design and academic experiments

General Specifications

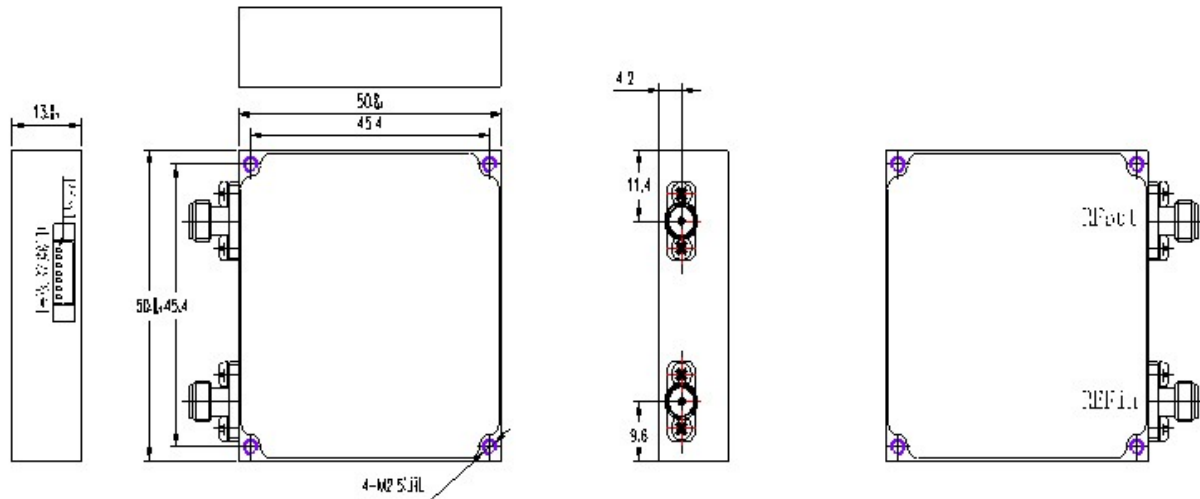
- Output frequency: 50MHz~22.6GHz
- Small size: 50*50*13mm
- Phase Noise: -107dBc/Hz@1kHz(10GHz)
- Control mode: SPI control

kTB Frequency synthesizer

With phase noise as low as -107 dBc/Hz @1 kHz (10 GHz) and configurable frequency hopping times (25 μ s to 400 μ s), the TFS21-22 delivers precision and flexibility for demanding RF and microwave environments.

Product Features:	Specification name		Indicator parameters			Remark	
External references	Enter the frequency		100MHz				
	Input power		7±3dBm				
	Frequency stability		Synchronized with external references				
	Frequency accuracy		Synchronized with external references				
	Phase noise		≤-155dBc/Hz@1kHz				
	Input impedance		50 Ω				
Frequency output	Output frequency		50~22600MHz				
	Frequency stepping		0.1mHz (Option 2)				
	Frequency hopping time		≤400us ≤ 200us (option 1). ≤25us (Option 2)				
	Phase noise	Standard	1GHz	5GHz	10GHz	22.6GHz	
		dBc/Hz@ 100Hz	-105	-91	-85	-79	
		dBc/Hz@ 1kHz	-127	-113	-107	-101	
		10kHz	-135	-122	-116	-110	
		100kHz	-135	-122	-116	-110	
		1MHz	-135	-122	-116	-110	
		Option 2	1GHz	5GHz	10GHz	22.6GHz	
		dBc/Hz@ 100Hz	-110	-98	-92	-85	
		dBc/Hz@ 1kHz	-130	-117	-110	-104	
		10kHz	-136	-125	-119	-112	
		100kHz	-136	-125	-119	-112	
		1MHz	-136	-125	-119	-112	
	Spurious		-70dBc (TYP)/ -65dBc (MAX) ≤-20dBc (11.3G~22.6GHz 1/2&3/2 harmonics)				
	harmonic wave		≤-5dBc				
	Output power		4±5dBm				
	Power supply requirements	Operating voltage		+12±0.5V			
		Maximum voltage		+15V			
Operating current		650mA max. 700mA max (Option 2)					
Temperature and environmental characteristics	Operating temperature		-40℃~+70℃				
	Storage temperature		-55℃~+85℃				
Exterior volume	volume		50×50×13mm				
	weight		≤80g				
① Note: 200us frequency hopping time, TFS21 -22 takes 30 seconds to start each time it is powered on; 25us frequency hopping time, TFS21 -22 takes 5 seconds to start up each time it is powered on							

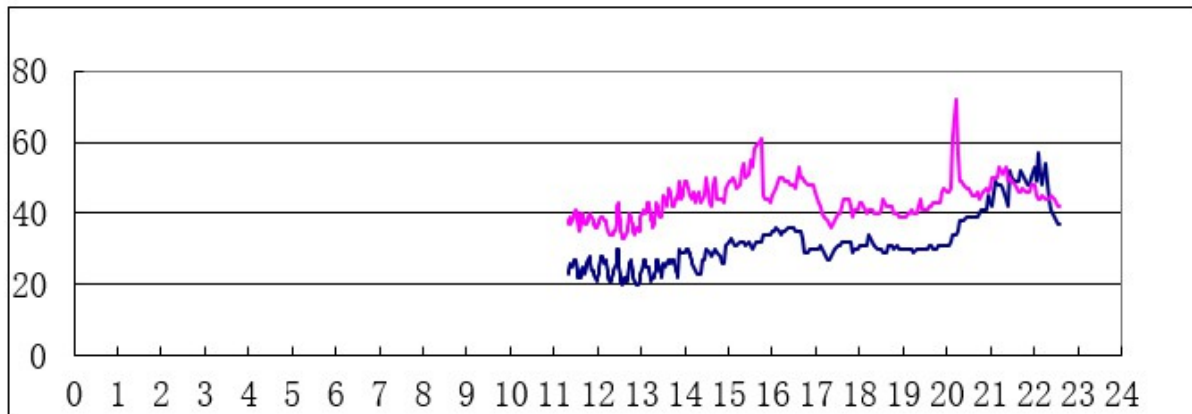
Dimensions:



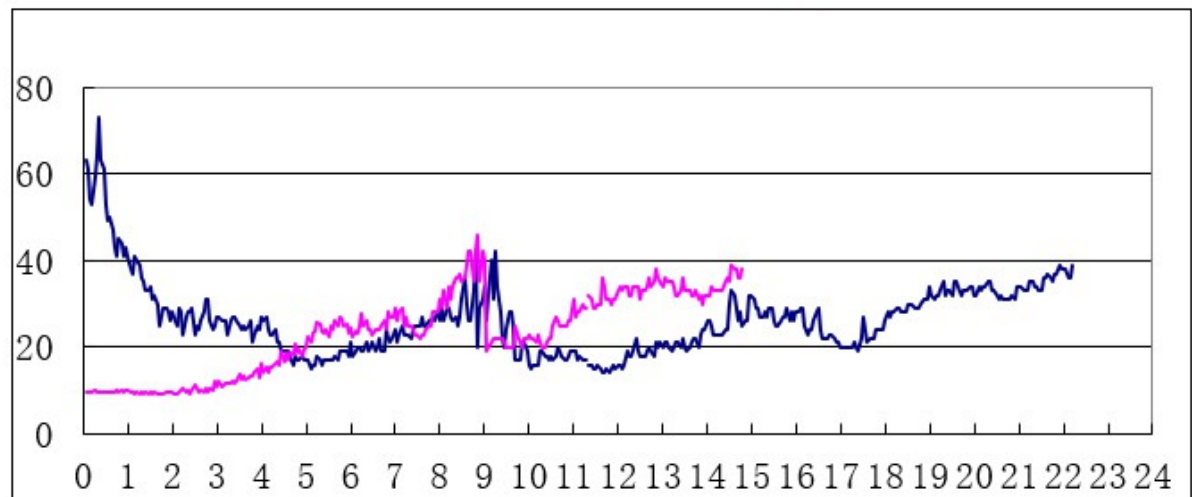
Connector definition	
REF in	SMA-K (Detachable)
RF out	2.92 (Type K Female) (Detachable)
Power and	53261-0671-7P (1.25 pitch; Single-row 7-pin horizontal row seat).

control					
Power control interface definition					
1	+12V (Power)	4	LE (SPI Communication Interface).	7	LD (Lock Indicator: High Level Lock)
2	GND (Ground)	5	MISO (SPI Communication Interface)		
3	MOSI (SPI Communication Interface).	6	SCK (SPI Communication Interface).		

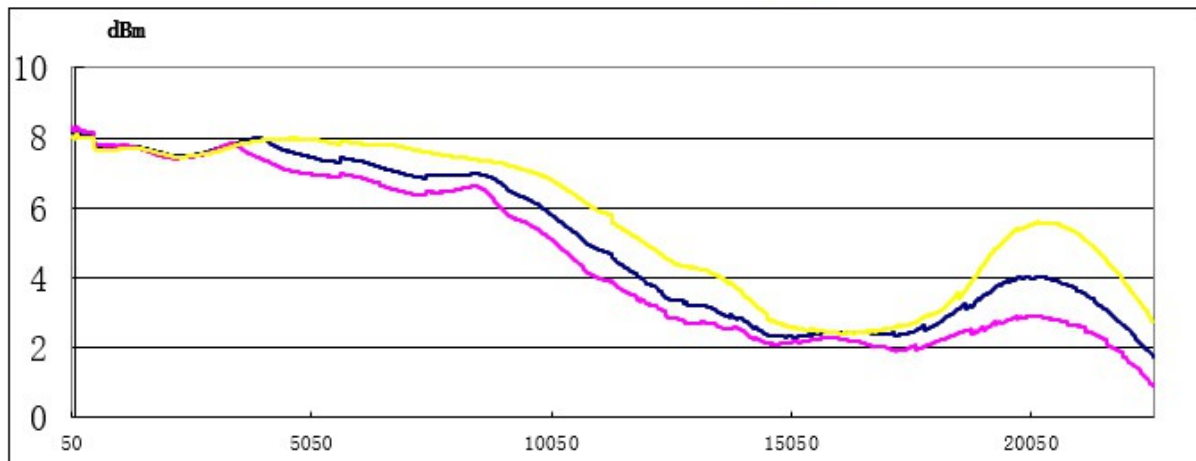
Typical Test Curves:



TFS21-22 1/2&3/2 Harmonics (dBc)

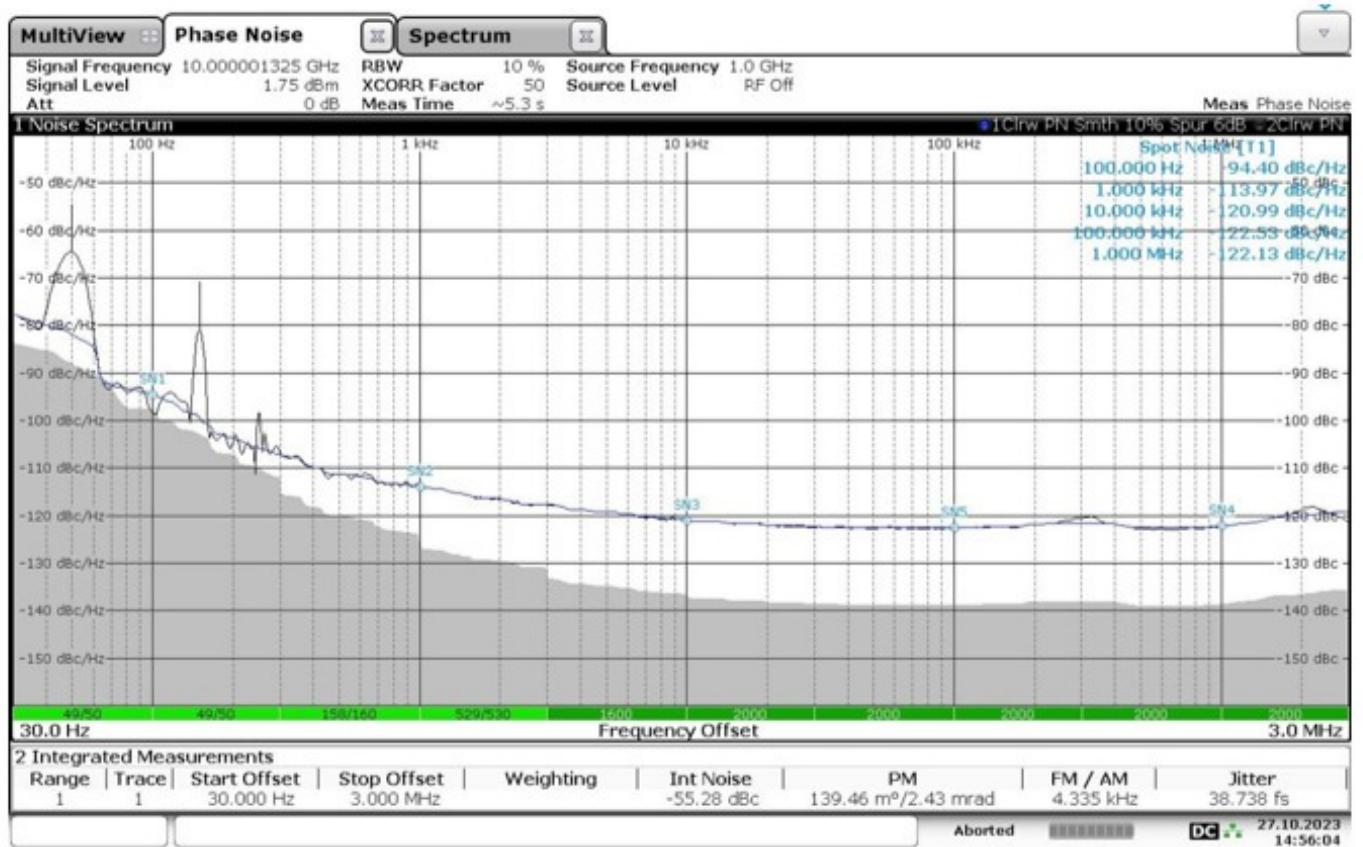


TFS21-22 2&3rd Harmonic (dBc)



TFS21-22 Output Power(dBm)

10GHz phase noise test graph:



10GHz phase noise test graph

List of options:

When the product is delivered, the documents specified in the following table will be provided:

The product order number		
standard	TFS21- 22- 400	Frequency hopping time: 400us
Option 1	TFS21- 22- 200	Frequency hopping time: 200us
Option 2	TFS21- 22- 25	Frequency hopping time: 25us

Deliverables:

No.	Attachments	Quantity	Remark
1	Factory inspection report	1	
2	Product Certificate	1	
3	Instruction manual for the product	1	Paper/electronic version