

Supplementary Information for “Terahertz Spoof Surface Plasmon Polariton Waveguides: A Comprehensive Model with Experimental Verification”

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Table S1 The dimensions of CPW and transition sections.	
CPW length	253 μm
CPW gap	15 μm
CPW pitch	55 μm
Period length in transition	5 μm
Aperture length in transition	2.5 μm
Maximum corrugation depth in transition	50 μm
Minimum corrugation depth in transition	2 μm
Transition section length	125 μm
Major radius in transition	100 μm
Major to minor Radius rate in transition	1.2

Table S2 The dimensions and physical properties of the sSPP WG simulation sets.								
Set #	Delay Section Length (μm)	a (μm)	d (μm)	h (μm)	t_{sub} (μm)	$*t_{met}$ (nm)	ϵ_r	Step Size
1	402.5	2.5	5	2.5 to 75	650	100 nm	11.9	2.5 μm
2	407.5	5	25	5 to 75	650	100 nm	11.9	5 μm
3	407.5	5 to 20	25	30	650	100 nm	11.9	5 μm
4	407.5	5 to 30	40	30	650	100 nm	11.9	5 μm
5	407.5	5 to 45	50	20	650	100 nm	11.9	5 μm
6	407.5	5 to 45	50	30	650	100 nm	11.9	5 μm
7	402.5	2.5	5	2.5	450	100 nm	11.9	-
8	402.5	2.5	5	2.5	650	100 nm	2.38 to 16.66	2.38
9	402.5	2.5	5	35	650	200 nm to 800 nm	11.9	300 nm

*Set 1-to-Set 8 metals are of PEC type and gold (Au) is used in Set 9.

Table S3 The mapping frequencies for the simulations (f_{ms}) and measurements (f_{mm}).								
Set #	Adjusted Parameter	Range (μm)	$f = 0.25 \text{ THz}$		$f = 0.275 \text{ THz}$		$f = 0.3 \text{ THz}$	
			f_{ms} (THz)	f_{mm}/f_{ms}	f_{ms} (THz)	f_{mm}/f_{ms}	f_{ms} (THz)	f_{mm}/f_{ms}
1	h	[2.5, 10]	$900/f_{GHz}$	-	$1000/f_{GHz}$	-	$1180/f_{GHz}$	-
1	h	[10, 62.5]	$925/f_{GHz}$	1.0270	$1050/f_{GHz}$	1.0048	$1180/f_{GHz}$	0.9746
1	h	[62.5, 75]	$900/f_{GHz}$	1.0389	$1062.5/f_{GHz}$	0.9906	$1205/f_{GHz}$	0.9751
2	h	[2.5, 65]	$700/f_{GHz}$	1.0000	$800/f_{GHz}$	1.0000	$900/f_{GHz}$	1.0000
2	h	[65, 75]	$775/f_{GHz}$	1.0258	$850/f_{GHz}$	1.0294	$975/f_{GHz}$	1.0000
3	a	Entire set	$700/f_{GHz}$	1.0714	$750/f_{GHz}$	1.1333	$750/f_{GHz}$	1.2667
4	a	Entire set	$600/f_{GHz}$	1.0667	$670/f_{GHz}$	1.0746	$650/f_{GHz}$	1.2154
5	a	Entire set	$150/f_{GHz}$	0.8000	$200/f_{GHz}$	0.7000	$225/f_{GHz}$	1.6000
6	a	Entire set	$550/f_{GHz}$	0.8636	$610/f_{GHz}$	1.0000	$600/f_{GHz}$	1.1667

f_{GHz} is defined as the operation frequency in GHz.

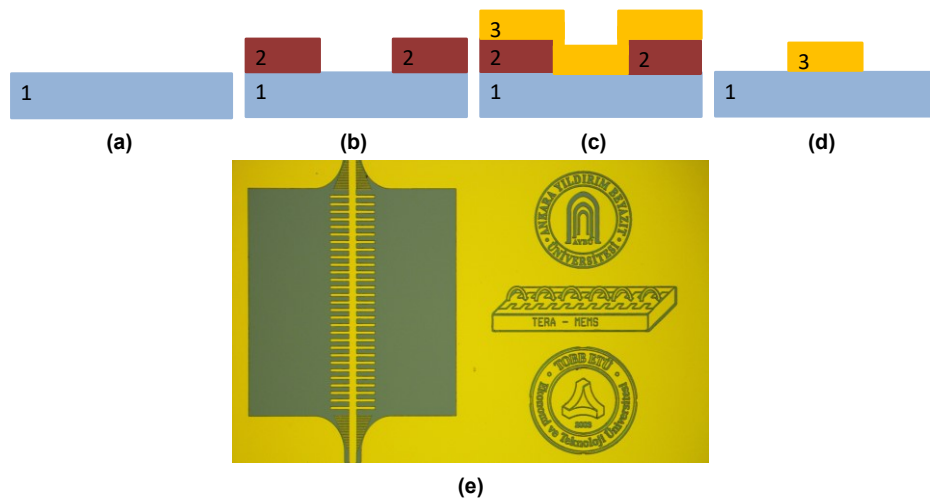


Figure S1| Fabrication steps: High-resistivity silicon wafer (a), lithography using SPR220-3 photoresist (b), Cr (20 nm)/Au (540 nm) sputtering (c), lift-off (d) and microscope image of a fabricated waveguide (e).