



惠州硕贝德无线科技股份有限公司

Huizhou Speed wireless technology Co.,Ltd

ANTENNA SPECIFICATION

Customer/ Project	R0101		Frequency Band	76GHz~81GHz	
SCT P/N	F-PL-08-0001-001-S0		Version	V1.0	
Date	2024.04.26				
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Date					
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Remark					

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Revision record

Date	Revision version	Change Description	Author
2024.4.26	V1.0	Initial release	Kai Zhang

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1 Overview

This document provides specifications for the R0101 waveguide antenna working in the 76-81GHz frequency band.

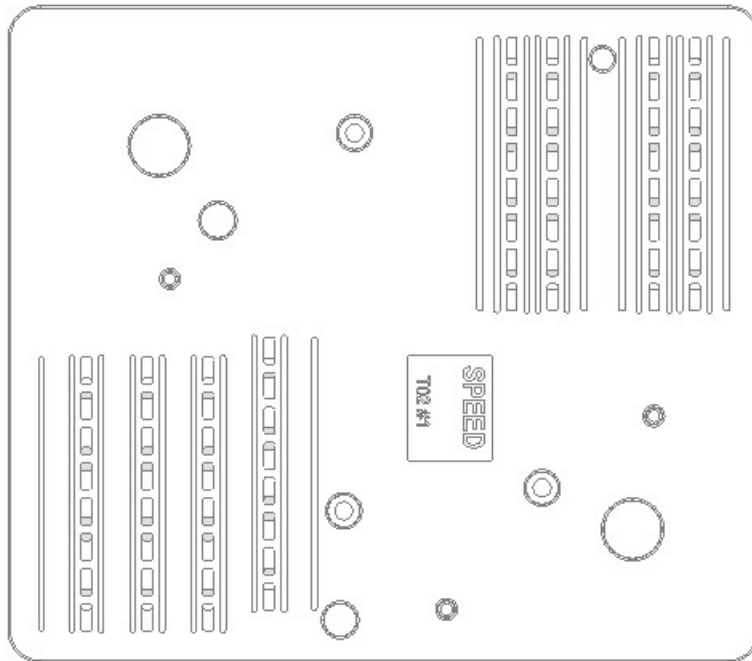


Figure1 R0101 overview

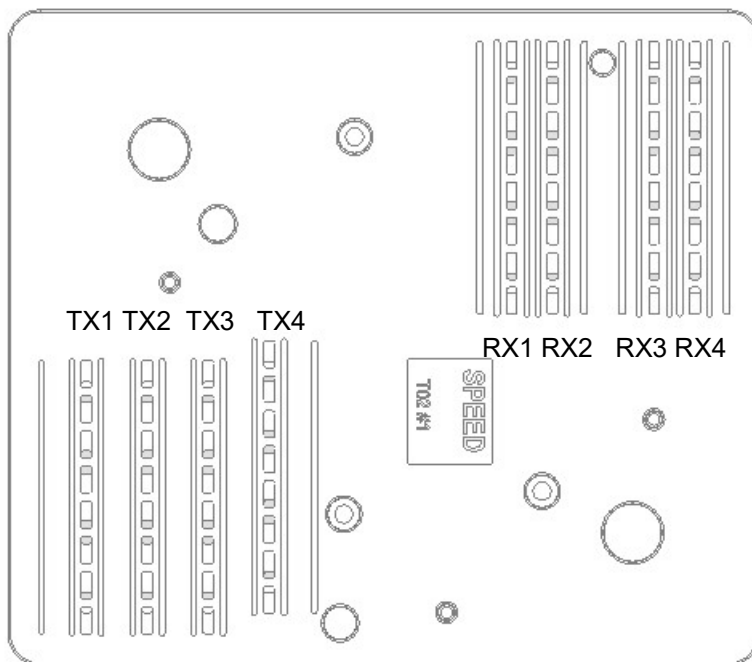


Figure2 antenna definition layout

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2 antenna specification

Antenna type	Injection molding plastic waveguide ANT.
Working Frequency	76GHz~81GHz
Gain	≥15dBi
Return Loss	S11<-15dB@76-81GHz for all ports
Isolation	Rx-Rx, Tx-Tx isolation > 25dB Tx-Rx isolation > 35dB
Ports type	8 ports (4TX+4RX)
polarization	Horizontal
3dB beamwidth	Azimuth >57deg Elevation >9deg
6dB beamwidth	Azimuth >93deg Elevation >13deg
Side lobe level(dB)	<-20dB
Feeding type	Waveguide ports ,Lauch on Package
size(L*W*H)	70.7*61.7*13.4mm
weight	45g
Working temperature	-20 °C to +85 °C
Storage temperature	+20 °C to +25 °C

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3 passive performance

3.1 Return Loss

$S_{11} < -15\text{dB}$ @ 76-81GHz (feeding from FR4 PCB)

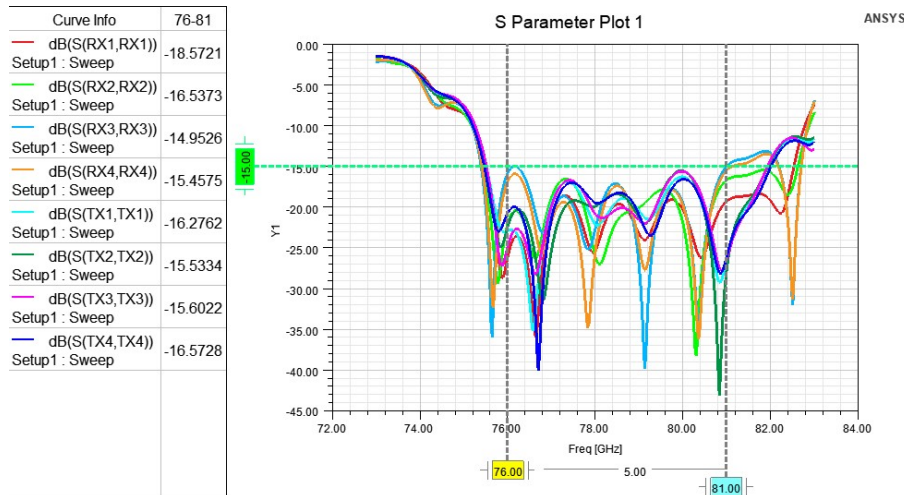


Figure3 Return loss

3.2 Isolation

$TX-TX, RX-RX > 26.3\text{dB}$

$TX-RX > 46.3\text{dB}$

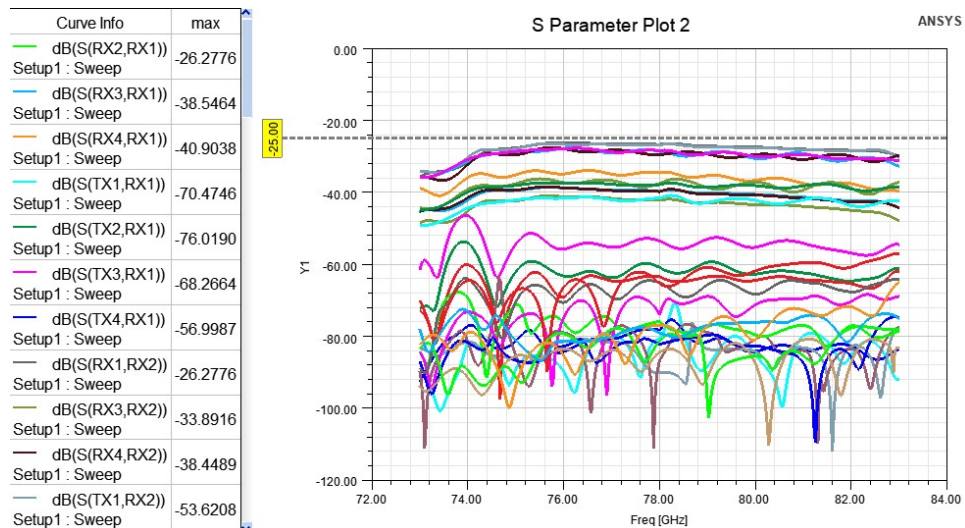


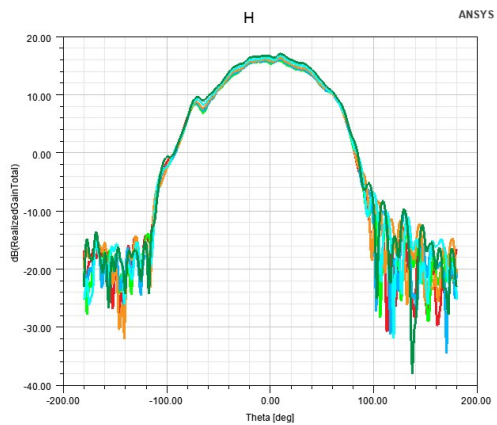
Figure4 Isolation

3.3 Radiation Pattern

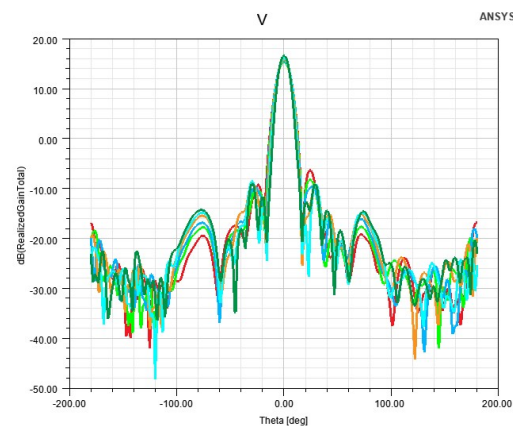
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RX1 antenna

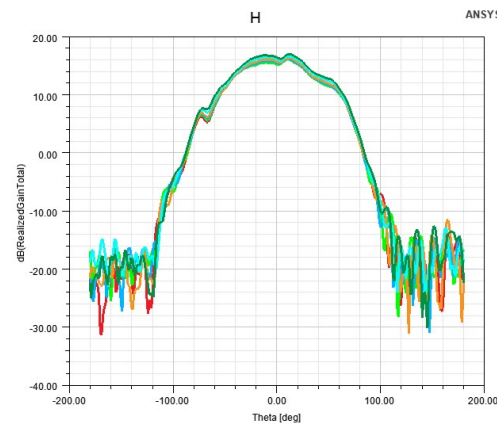


Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='90deg'	16.0128	8.2426	4.4007	13.9004	14.3407
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='90deg'	15.8440	7.9656	4.4455	13.8707	14.2460
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='90deg'	16.0535	8.0992	4.2247	14.0088	14.3995
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='90deg'	16.3116	8.1636	4.6789	14.2776	14.5539
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='90deg'	16.6920	8.4377	4.9708	14.7505	14.9726
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='90deg'	17.0196	8.7163	4.8492	15.2066	15.4281

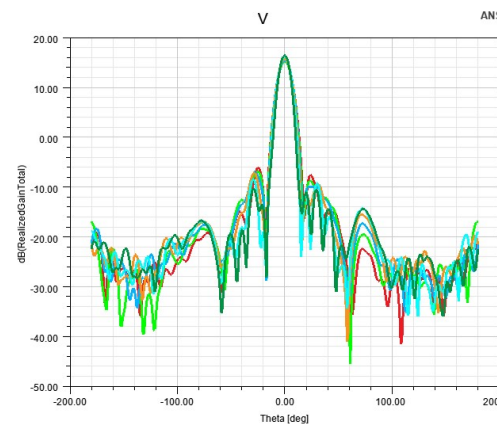


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='0deg'	15.4350	7.2443	7.0018	13.4341	13.3964
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='0deg'	15.2967	7.0823	6.9371	13.3893	13.3360
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='0deg'	15.5420	6.7491	6.7834	13.4890	13.5153
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='0deg'	15.8007	5.8422	6.2030	13.4025	13.5152
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='0deg'	16.1992	4.4690	5.0445	13.3890	13.5431
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='0deg'	16.5953	1.8255	2.8713	13.2513	13.4239

RX2 antenna



Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='90deg'	16.1910	6.0123	4.8671	14.7515	13.5181
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='90deg'	16.0854	6.2313	4.2928	14.6137	13.5333
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='90deg'	16.2063	6.4246	4.4053	14.6882	13.6884
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='90deg'	16.2838	6.4833	4.6020	14.8451	13.9017
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='90deg'	16.5994	6.8474	4.8563	15.1281	14.2573
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='90deg'	16.9795	7.0619	5.2141	15.4785	14.6692

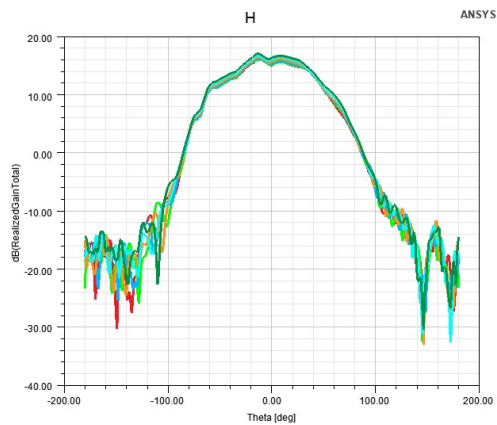


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='0deg'	15.1556	6.5757	6.8927	13.0896	13.1118
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='0deg'	15.1503	6.6336	6.7243	13.1103	13.1459
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='0deg'	15.4148	6.5687	6.3034	13.2933	13.2590
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='0deg'	15.6440	5.8981	5.3364	13.3409	13.2125
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='0deg'	16.0834	4.7870	3.6715	13.4062	13.1969
dB(RelizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='0deg'	16.4228	2.6140	0.6759	13.2733	12.8638

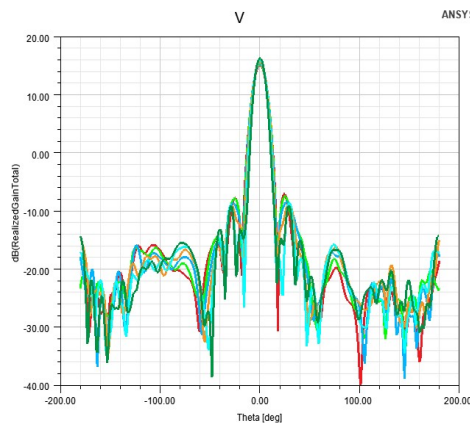
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RX3 antenna

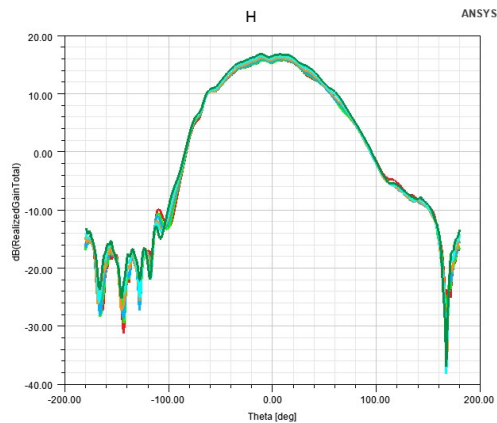


Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=76GHz' Phi='90deg'	16.0958	5.5128	4.3782	13.5949	14.6445
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=77GHz' Phi='90deg'	16.0566	5.3340	4.5963	13.6119	14.6178
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=78GHz' Phi='90deg'	16.1899	5.4201	4.6681	13.7093	14.7202
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=79GHz' Phi='90deg'	16.3982	5.6415	4.8965	14.0063	14.9063
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=80GHz' Phi='90deg'	16.6924	5.8691	5.0677	14.3390	15.1268
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=81GHz' Phi='90deg'	17.0904	6.1790	5.2403	14.7375	15.4208

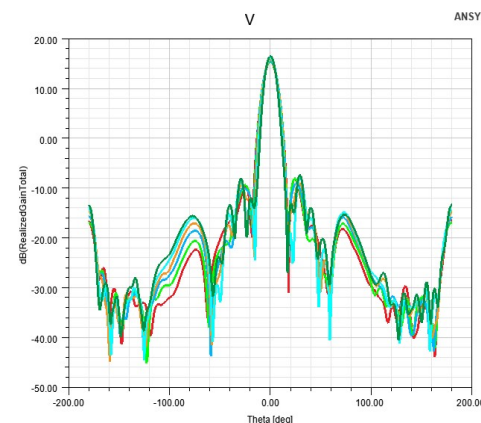


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=76GHz' Phi='0deg'	15.0435	6.6391	6.6330	12.9970	12.9990
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=77GHz' Phi='0deg'	15.1746	6.7193	6.8400	13.2021	13.2179
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=78GHz' Phi='0deg'	15.3110	6.3201	6.5821	13.2441	13.2778
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=79GHz' Phi='0deg'	15.6342	5.5587	6.0920	13.2772	13.3950
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=80GHz' Phi='0deg'	15.9635	3.8731	4.9364	13.1038	13.3870
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=81GHz' Phi='0deg'	16.2914	0.8848	2.8680	12.8250	13.1903

RX4 antenna



Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=76GHz' Phi='90deg'	15.8774	4.7483	5.7105	14.3942	13.6167
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=77GHz' Phi='90deg'	15.8275	5.0732	5.6164	14.4802	13.7631
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=78GHz' Phi='90deg'	15.9615	5.2780	5.8078	14.5404	13.8537
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=79GHz' Phi='90deg'	16.1832	5.3867	5.9308	14.7542	14.1392
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=80GHz' Phi='90deg'	16.5198	5.5457	6.1307	15.0788	14.5501
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=81GHz' Phi='90deg'	16.8314	5.7331	6.3515	15.4262	14.9554

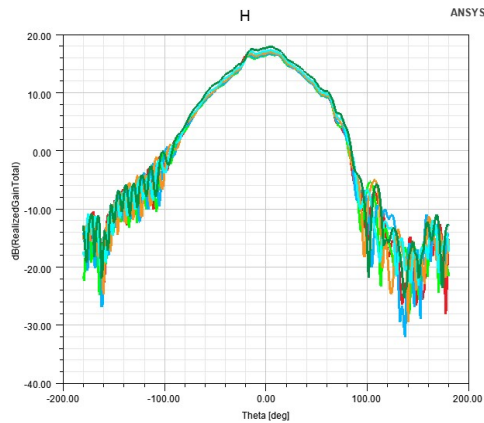


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=76GHz' Phi='0deg'	15.3233	6.9202	6.8319	13.2625	13.2328
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=77GHz' Phi='0deg'	15.3667	6.9173	7.1053	13.3478	13.3998
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=78GHz' Phi='0deg'	15.5250	6.4884	6.9404	13.3971	13.4925
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=79GHz' Phi='0deg'	15.7924	5.6313	6.3831	13.4013	13.5529
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=80GHz' Phi='0deg'	16.1212	3.9825	5.2805	13.2681	13.5385
dB(RelizedGainTotal) Setup1 : Sweep1 Freq=81GHz' Phi='0deg'	16.4901	1.1051	3.2729	12.9933	13.3801

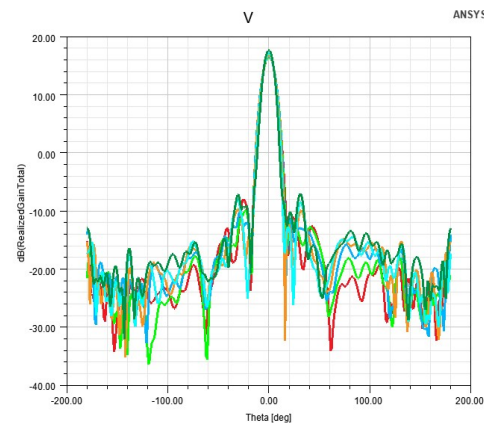
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TX1 antenna

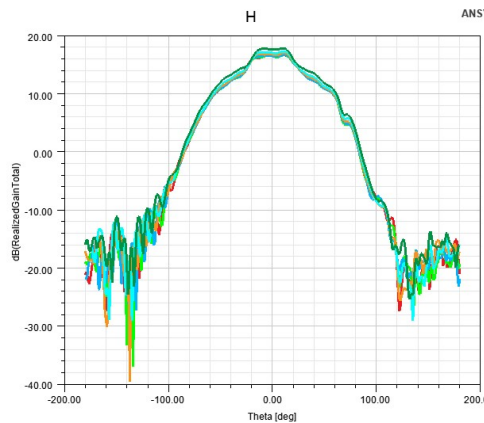


Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='90deg'	16.6783	5.3944	3.5835	13.2548	14.0052
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='90deg'	16.6454	4.8960	4.1591	13.2445	13.7890
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='90deg'	16.7070	4.8209	4.4385	13.4452	13.8199
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='90deg'	16.9255	5.3030	4.4670	13.6594	14.0388
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='90deg'	17.2901	5.7829	5.3721	13.9635	14.2396
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='90deg'	17.8772	6.0584	5.6792	14.4633	14.7100

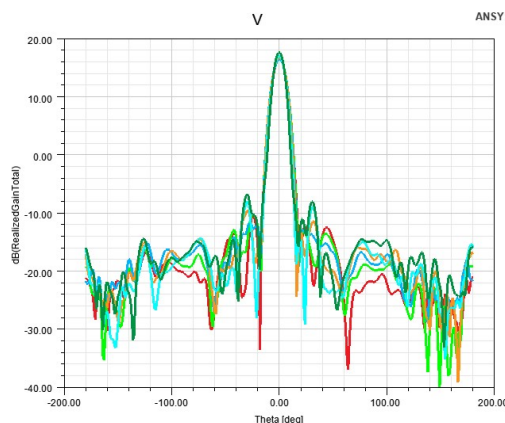


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='0deg'	16.5085	7.5293	7.7145	14.3211	14.3752
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='0deg'	16.4110	7.9385	7.9506	14.4047	14.4059
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='0deg'	16.5209	7.8445	7.7140	14.4942	14.4542
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='0deg'	16.7378	7.1610	6.9014	14.5219	14.4408
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='0deg'	17.0871	5.9879	5.3075	14.5200	14.3469
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='0deg'	17.6650	3.9939	2.4820	14.5989	14.2730

TX2 antenna



Curve Info	Gain	1(-75deg)	2(75deg)	3(-30deg)	4(30deg)
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='90deg'	16.7083	4.2521	4.6003	13.1050	13.4893
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='90deg'	16.6601	3.8718	4.4779	13.0175	13.3270
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='90deg'	16.7087	3.8880	4.5557	13.0378	13.3108
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='90deg'	17.0091	4.1583	4.9226	13.4127	13.4779
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='90deg'	17.2644	4.6349	5.3440	13.7415	13.7546
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='90deg'	17.7997	5.0131	5.8690	14.3451	14.3049

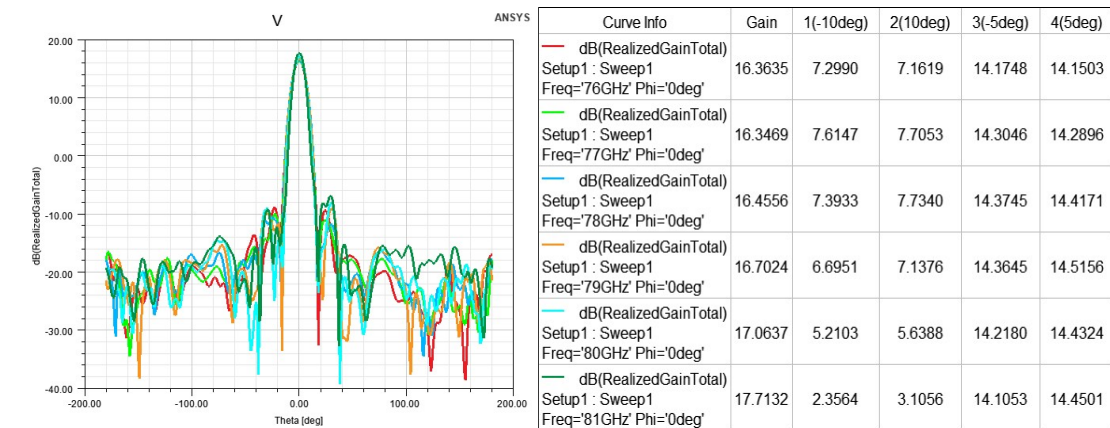
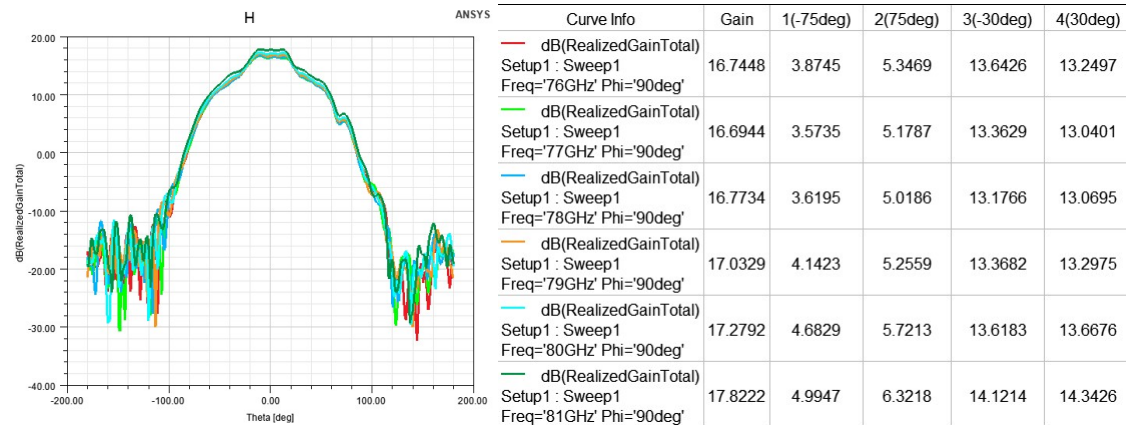


Curve Info	Gain	1(-10deg)	2(10deg)	3(-5deg)	4(5deg)
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='76GHz' Phi='0deg'	16.5352	6.9538	7.1964	14.1832	14.2955
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='77GHz' Phi='0deg'	16.5276	7.5493	7.7379	14.3348	14.4193
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='78GHz' Phi='0deg'	16.4738	7.5431	7.5218	14.3817	14.3499
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='79GHz' Phi='0deg'	16.7426	7.2625	6.7687	14.5622	14.3786
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='80GHz' Phi='0deg'	17.0144	5.9068	4.9857	14.4296	14.1268
dB(RealizedGainTotal) Setup1 : Sweep1 Freq='81GHz' Phi='0deg'	17.6404	3.7336	2.1278	14.4125	14.0581

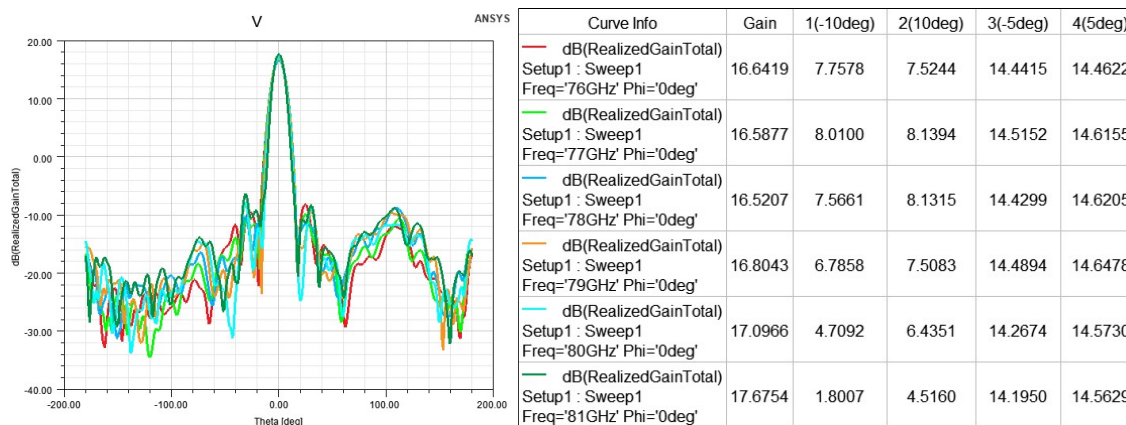
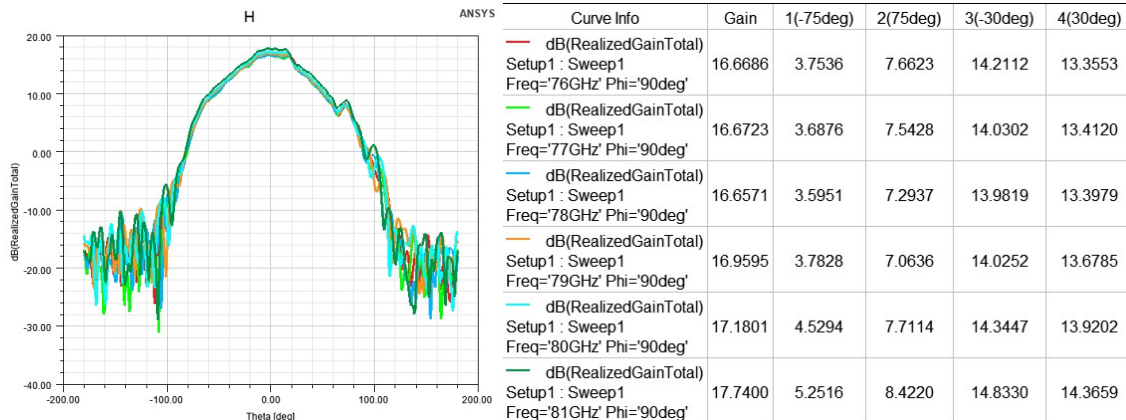
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TX3 antenna



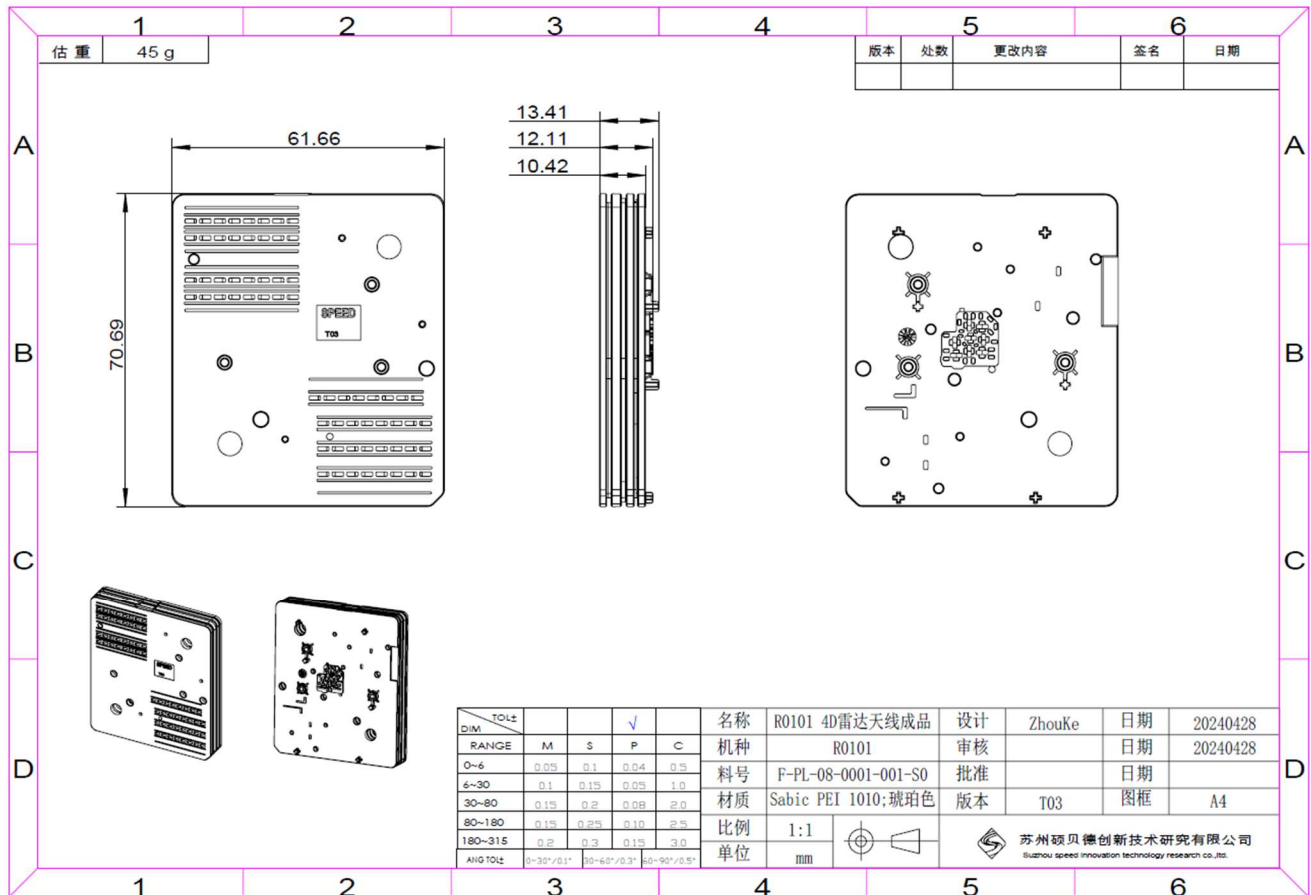
TX4 antenna



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4 antenna structure



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